

TEST REPORT For FCC

Test Report No. : 2011120079
Date of Issue : December 28, 2011
FCC ID : QJCH432B
Model/Type No. : H432B
Kind of Product : Braille Sense U2
Applicant : HIMS International Corporation
Applicant Address : KT Daejeon Satellite Center, 139-9, Gajung-dong, Yuseong-gu, Daejeon, KOREA, 305-350
Manufacturer : HIMS International Corporation
Manufacturer Address : KT Daejeon Satellite Center, 139-9, Gajung-dong, Yuseong-gu, Daejeon, KOREA, 305-350
Contact Person : Kim Sung Man / Associate Researcher
Telephone : +82-42-864-4460
Received Date : November 16, 2011
Test period : Start : November 22, 2011 End : December 12, 2011
Test Results : ☒ In Compliance ☐ Not in Compliance

The test results presented in this report relate only to the object tested.

Tested by

Y. T. Lee

Young-taek, Lee
Test Engineer
Date: December 28, 2011

Reviewed by

Y. J. Park

Young-Joon, Park
Technical Manager
Date: December 28, 2011

REPORT REVISION HISTORY

Date	Revision	Page No
December 28, 2011	Issued (2011120079)	All

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TABLE OF CONTENTS

REPORT REVISION HISTORY	2
1.0 General Product Description	4
1.1 Tested Frequency	4
1.2 Device Modifications	5
1.3 Peripheral Devices	7
1.4 Calibration Details of Equipment Used for Measurement	7
1.5 Test Facility.....	7
1.6 Laboratory Accreditations and Listings	8
2 Summary of tests.....	9
2.1 Technical Characteristic Test	10
2.1.1 6dB Bandwidth	10
2.1.2 Maximum peak Conducted Output Power.....	24
2.1.3 Power Spectral Density	26
2.1.4 Band - edge	40
2.1.5 Field Strength of Emissions	59
Test Data.....	60
2.1.6 AC Conducted Emissions.....	66
APPENDIX A – Test Equipment Used For Tests	69

1.0 General Product Description

Equipment model name	H432B
Serial number	Prototype
EUT condition	Pre-production, not damaged
Frequency Range	802.11b/g/n(20 MHz) : 2412 MHz - 2462 MHz 802.11n(40 MHz) : 2422 MHz - 2452 MHz
RF output power	802.11b : 11.13 dBm 802.11g : 12.44 dBm 802.11n(20 MHz) : 12.27 dBm 802.11n(40 MHz) : 11.86 dBm
Number of channels	802.11b/g/n(20 MHz) : 11 802.11n(40 MHz) : 7
Channel Spacing	5 MHz
Transfer Rate	802.11b : 11 / 5.5 / 2 / 1 Mbps 802.11g : 54 / 48 / 36 / 24 / 18 / 12 / 9 / 6 Mbps 802.11n : up to 300 Mbps
Type of Modulation	802.11b : DSSS 802.11g/n : OFDM
Duty cycle TX power	1.0
Power Source	DC 3.7 V (Lithium Ion Rechargeable Battery)
Antenna Type	Chip antenna
Antenna Gain	Ant0 - ALA931C5 : -1 dBi Ant1 - ALA931C5 : -1 dBi

1.1 Tested Frequency

802.11b, 802.11g, 802.11n (20MHz, Ant0 and Ant1)

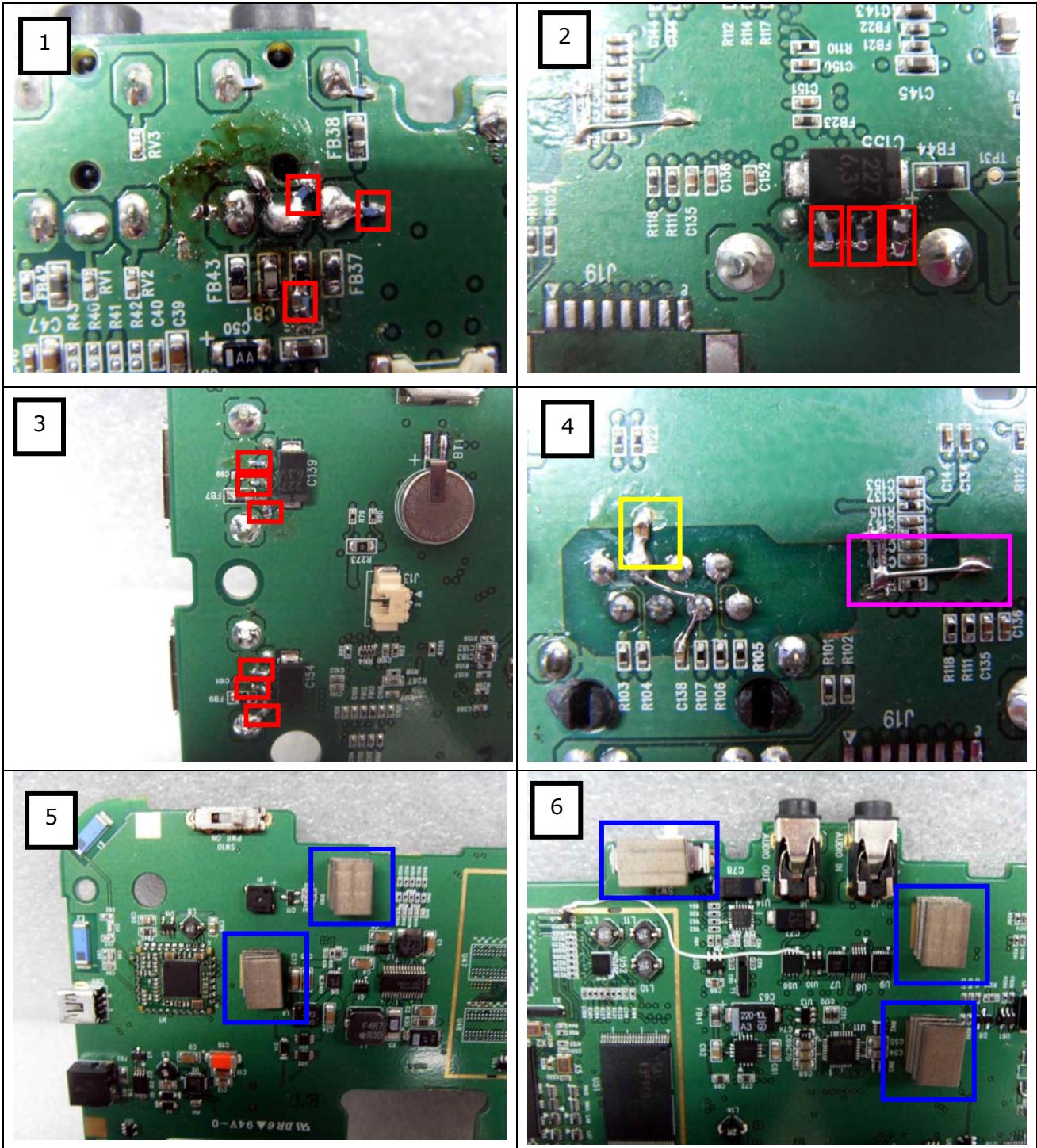
	LOW	MID	HIGH
Frequency (MHz)	2412	2437	2462

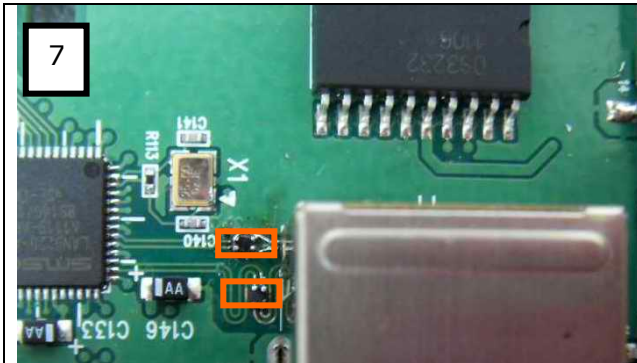
802.11n (40MHz, Ant0 and Ant1)

	LOW	MID	HIGH
Frequency (MHz)	2422	2437	2452

1.2 Device Modifications

The following modifications were necessary for compliance and was applied by applicant.





Varistor [Part No. : ULCE0505C015FR]

1) Location No. : RV4, RV26, RV27

2) Location No. : RV36, RV37, RV38

3) Location No. : RV30, RV31, RV32, RV33, RV34, RV35

4) Capacitor [Part No. : X7R/22nF/25V]

Location No. : C24

4) Ground reinforcement

5) Gasket

6) Gasket

7) Common mode Filter [Part No. : MCZ1210AH900TAOG]

Location No. : T2, T3

1.3 Peripheral Devices

Device	Manufacturer	Model No.	Serial No.
Switching Adapter (for EUT)	Dee Van Electronics(Longchuan)Co., Ltd.	DSA-12CA-05 050200	-
LCD Monitor 1	Innocom Technology(Shenzhen) Co., Ltd.	SE198WFPf	CN-ORR716-72872-81T-OWG
Keyboard (USB type)	-	GP-K5000	82019943
Mouse (USB type) 1	INTECH ELECTRONICS CORPORATION	3D-510	-
SD Card	-	-	-
USB Drive	BMK	MemoRive	-
Headset	-	-	-
Personal Computer	SAMSUNG	DB-A75	Z9KM96BS300055E
LCD Monitor 2	Lite-On Technology Corp.	VS17	CNN5130QMC
Keyboard (PS/2 type)	-	SEM-DT35US	31001616
Mouse (USB type) 2	MICROSOFT CORPORATION	Optical Mouse USB/PS2 Compatible	69657-492-4974533-40420

1.4 Calibration Details of Equipment Used for Measurement

Test equipment and test accessories are calibrated on regular basis. The maximum time between calibrations is one year or what is recommended by the manufacturer, whichever is less. All test equipment calibrations are traceable to the Korea Research Institute of Standards and Science (KRISS), therefore, all test data recorded in this report is traceable to KRISS.

1.5 Test Facility

The measurement facility is located at 386-1, Ho-dong, Cheoin-gu, Yongin-si, Gyeonggi-do, 449-100, Korea. The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

1.6 Laboratory Accreditations and Listings

Country	Agency	Scope of Accreditation	Logo
USA	FCC	3 m & 10 m OATS, 3 m & 10 m SAC and Conducted Test Site to perform FCC Part 15/18 measurements	 805871
JAPAN	VCCI	10 meter Open Area Test Site and one conducted site.	 R-948, C-986, T-1843
KOREA	KCC	EMI (10 meter Open Area Test Site and two conducted sites) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	 No. 51, KR0025
International	KOLAS	EMC	

2 Summary of tests

FCC Part Section(s)	Parameter	Limit	Test Condition	Status (note 1)
15.247(a)	6 dB Bandwidth	> 500 kHz	Conducted	C
15.247(b)	Maximum Output Power	< 1 Watt		C
15.247(d)	Conducted Spurious emission	> 20 dBc		C
15.247(d)	Band Edge	> 20 dBc		C
15.247(e)	Transmitter Power Spectral Density	< 8 dBm @ 3 kHz		C
				C
15.209	Field Strength of Harmonics	15.209(a)	Radiated	C
15.207	AC Conducted Emissions	15.207(a)	Line Conducted	NA

Note 1: C=Complies NC=Not Complies NT=Not Tested NA=Not Applicable

Note 2: The data in this test report are traceable to the national or international standards.

The sample was tested according to the following specification:
- FCC Part 15.247, ANSI C63.4-2003

2.1 Technical Characteristic Test

2.1.1 6dB Bandwidth

Procedure:

The bandwidth at 6dB below the highest in-band spectral density was measured with a spectrum analyzer connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate frequencies.

After the trace being stable, Use the marker-to-peak function to set the marker to the peak of the emission. Use the marker-delta function to measure 6dB down one side of the emission. Reset the marker-delta function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is the 6 dB bandwidth of the emission.

The spectrum analyzer is set to:

Center frequency = the highest, middle and the lowest channels

RBW = 100 kHz

Span = 40 MHz

VBW = 100 kHz (VBW ≥ RBW)

Sweep = auto

Trace = max hold

Detector function = peak

Measurement Data:

Test mode : 802.11b

Mode	Frequency (MHz)	Channel No.	Test Results	
			Measured Bandwidth (MHz)	Result
802.11b	2412	1	10.07	Complies
	2437	6	10.06	Complies
	2462	11	10.06	Complies

Test mode : 802.11g

Mode	Frequency (MHz)	Channel No.	Test Results	
			Measured Bandwidth (MHz)	Result
802.11g	2412	1	16.50	Complies
	2437	6	16.51	Complies
	2462	11	16.51	Complies

Test mode : 802.11n (20 MHz, Ant0)

Mode	Frequency (MHz)	Channel No.	Test Results	
			Measured Bandwidth (MHz)	Result
802.11n (20 MHz, Ant0)	2412	1	17.74	Complies
	2437	6	17.77	Complies
	2462	11	17.77	Complies

Test mode : 802.11n (40 MHz, Ant0)

Mode	Frequency (MHz)	Channel No.	Test Results	
			Measured Bandwidth (MHz)	Result
802.11n (40 MHz, Ant0)	2422	3	36.37	Complies
	2437	6	36.36	Complies
	2452	9	36.36	Complies

Test mode : 802.11n (20 MHz, Ant1)

Mode	Frequency (MHz)	Channel No.	Test Results	
			Measured Bandwidth (MHz)	Result
802.11n (20 MHz, Ant1)	2412	1	17.76	Complies
	2437	6	17.41	Complies
	2462	11	17.73	Complies

Test mode : 802.11n (40 MHz, Ant1)

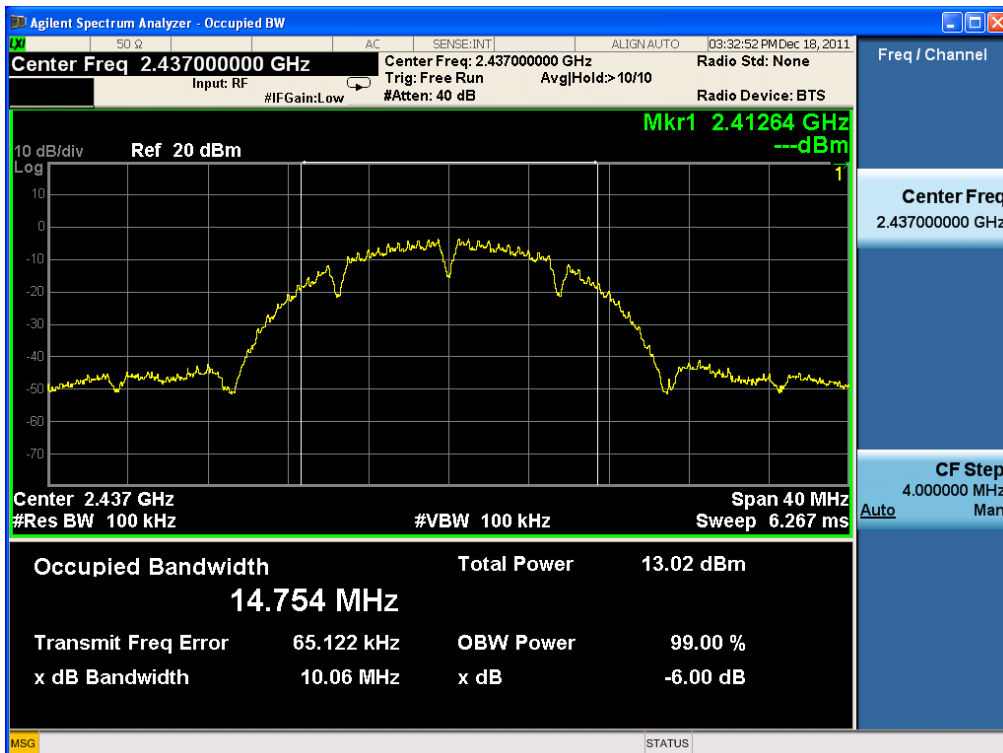
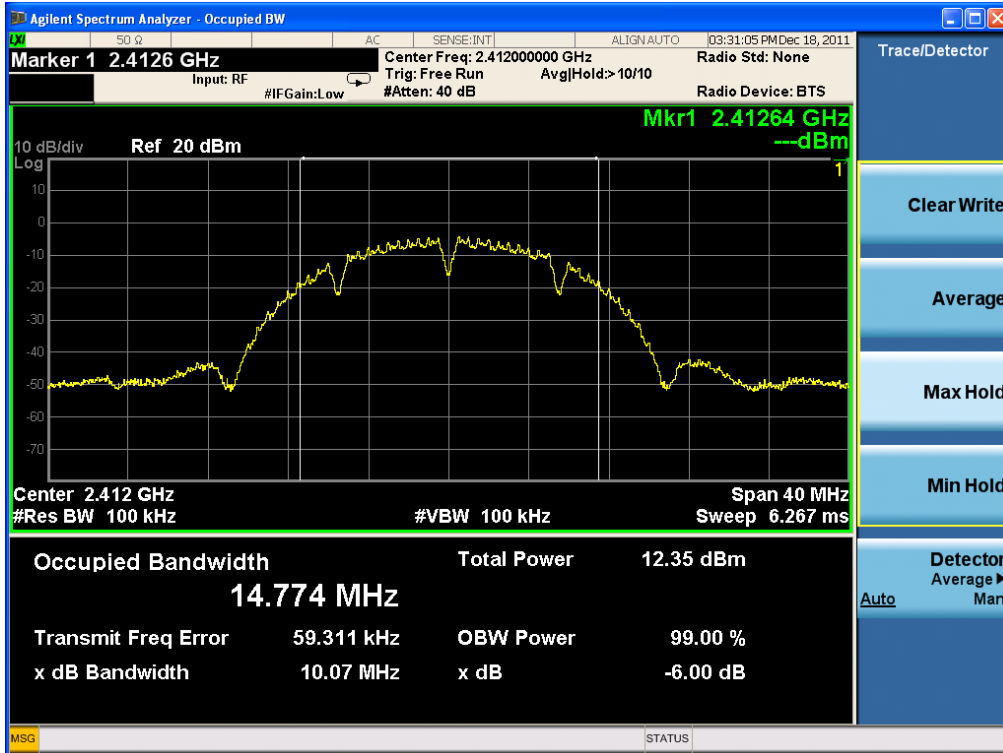
Mode	Frequency (MHz)	Channel No.	Test Results	
			Measured Bandwidth (MHz)	Result
802.11n (40 MHz, Ant1)	2422	3	36.42	Complies
	2437	6	35.12	Complies
	2452	9	35.12	Complies

Minimum Standard:

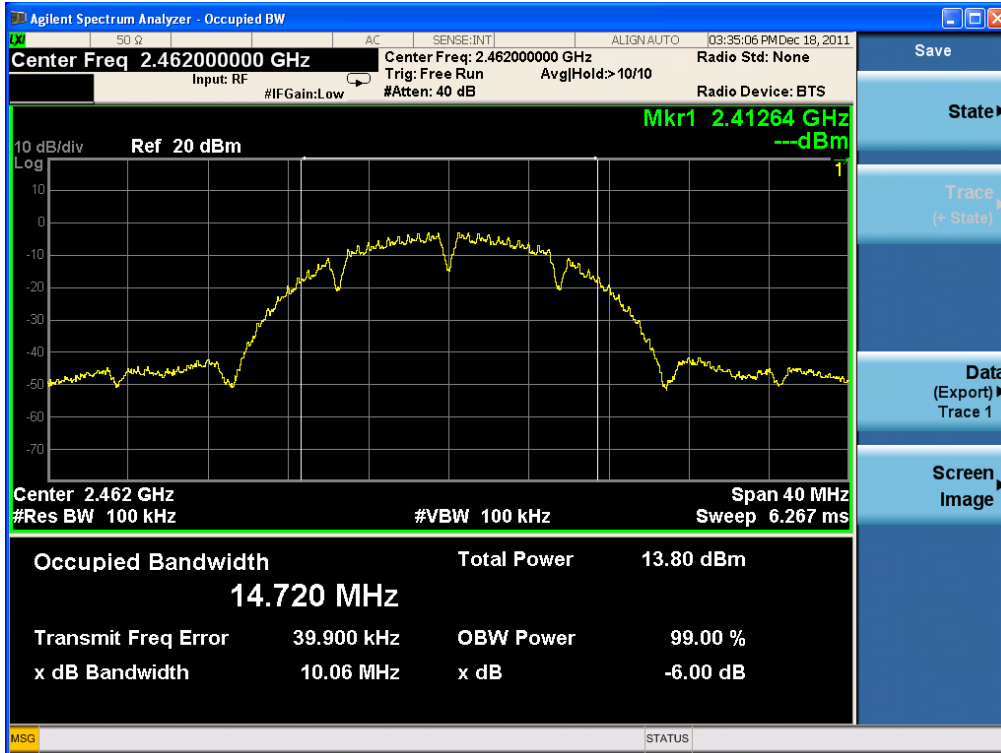
6 dB Bandwidth > 500kHz

See next pages for actual measured spectrum plots.

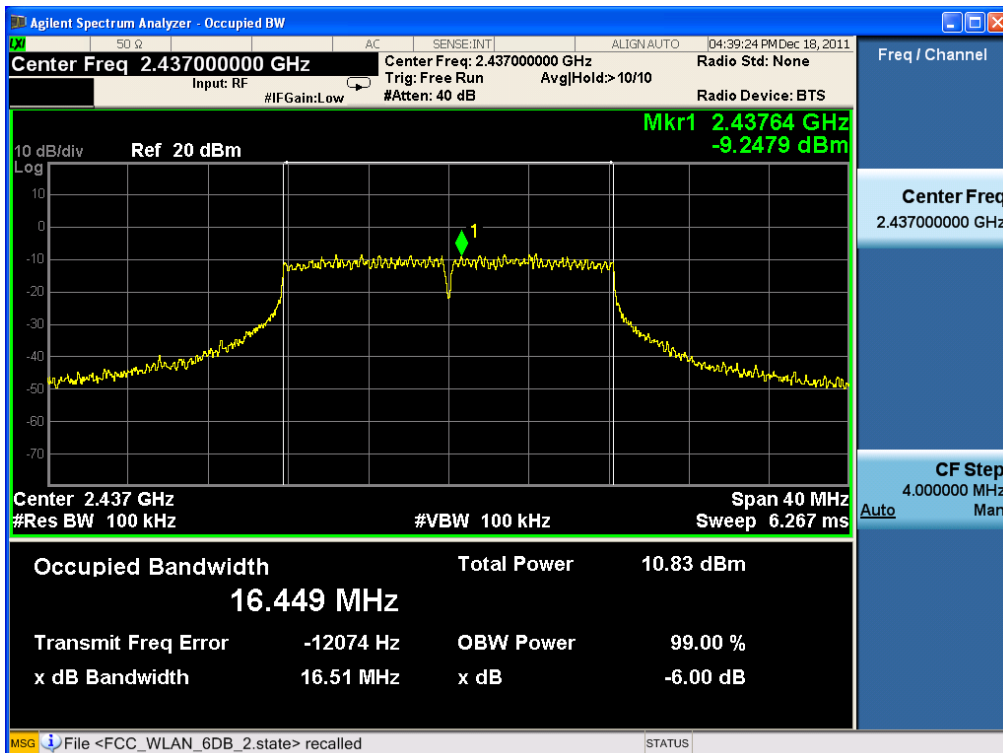
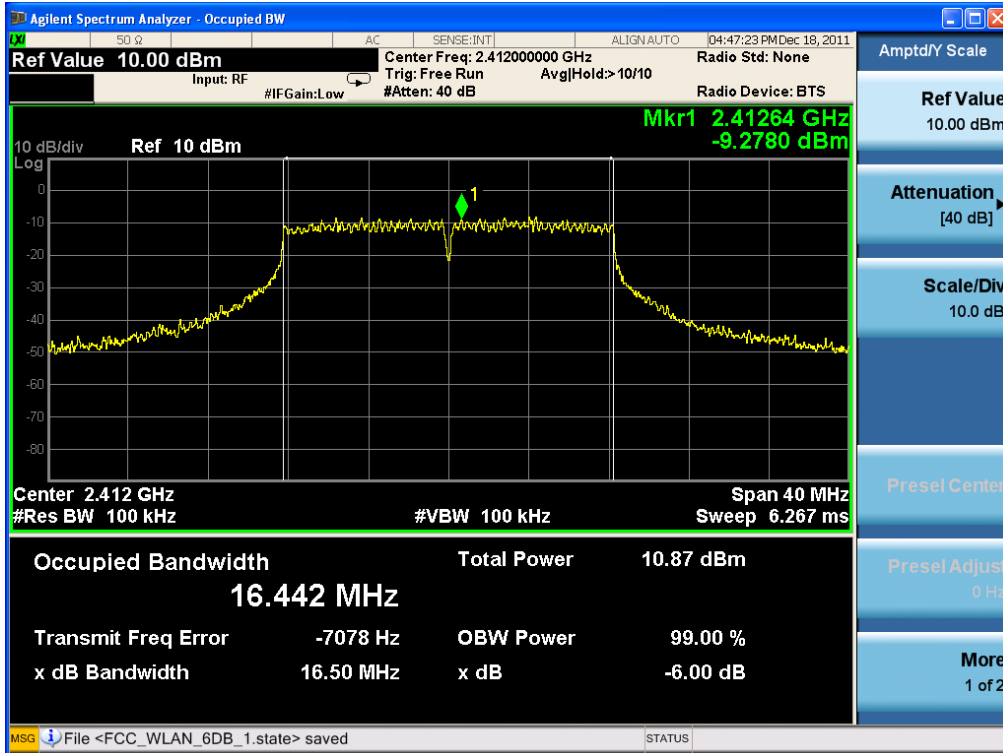
802.11b



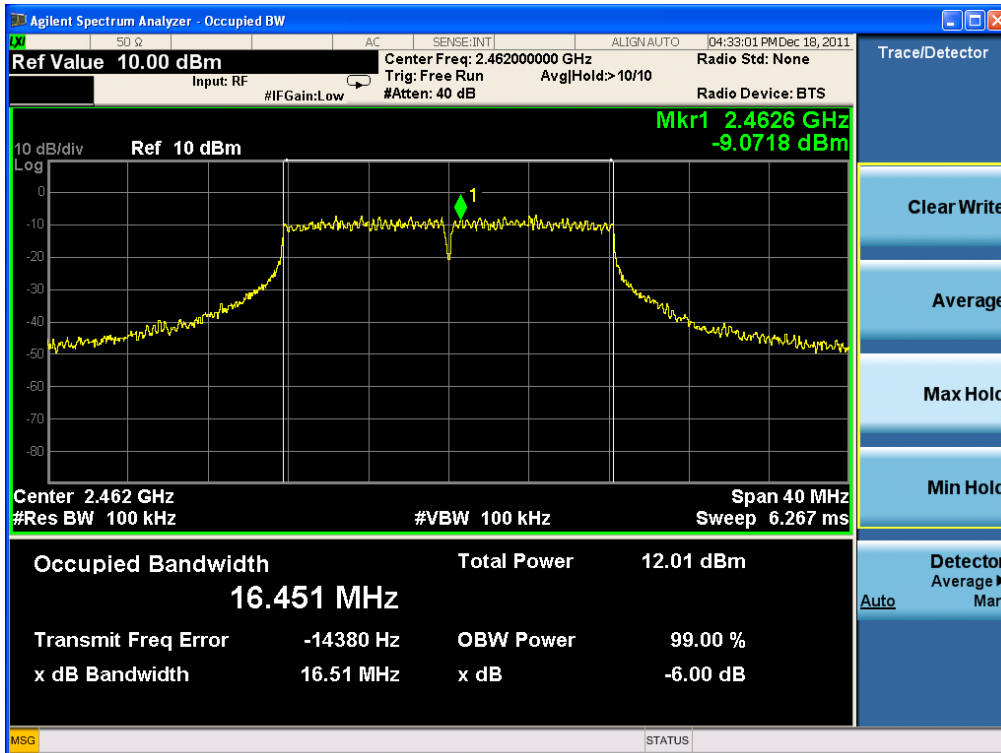
802.11b



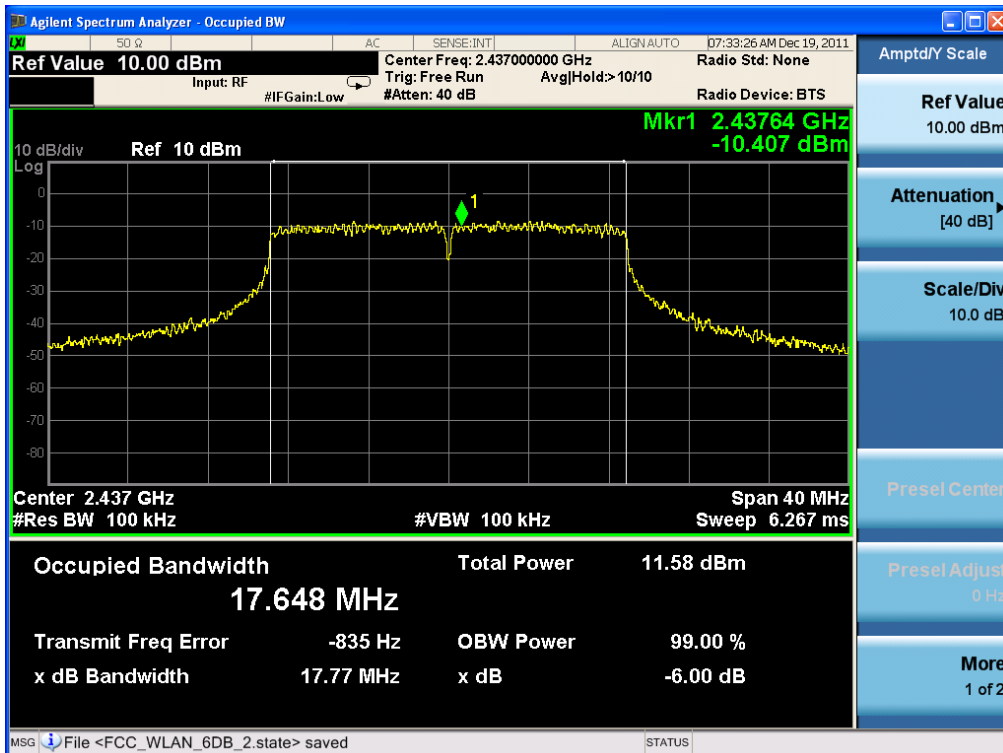
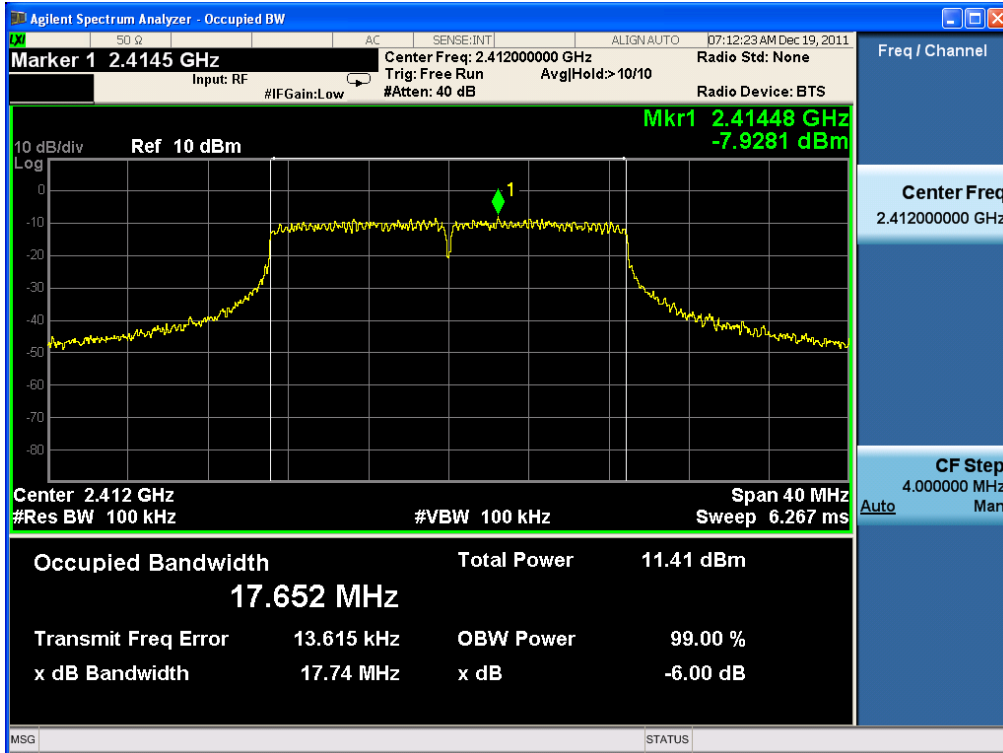
802.11g



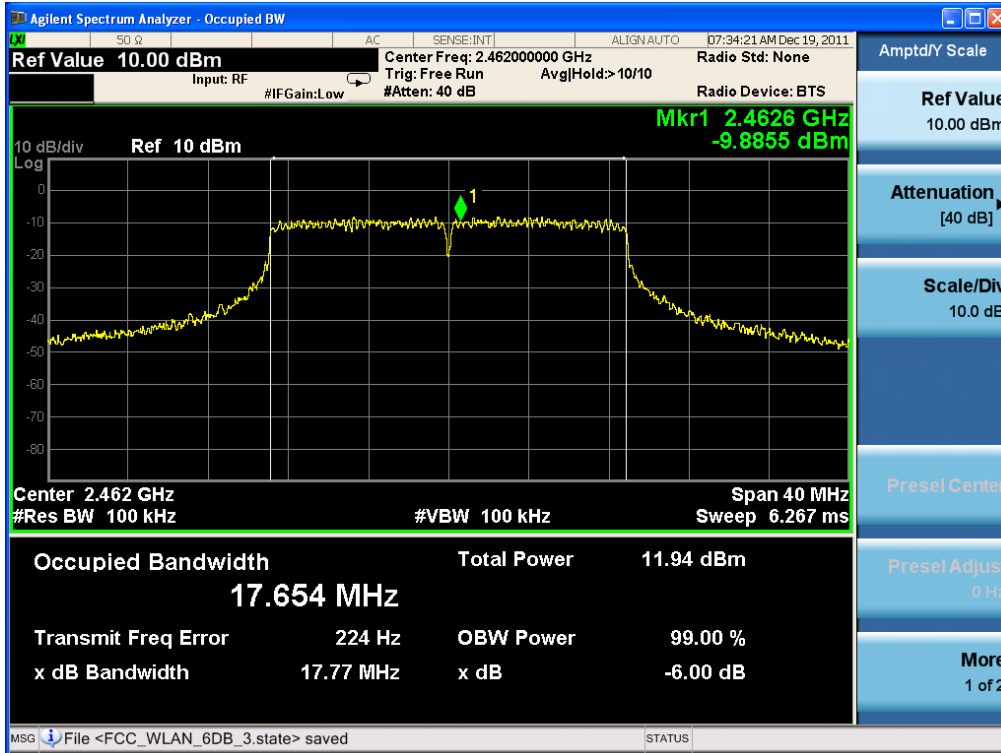
802.11g



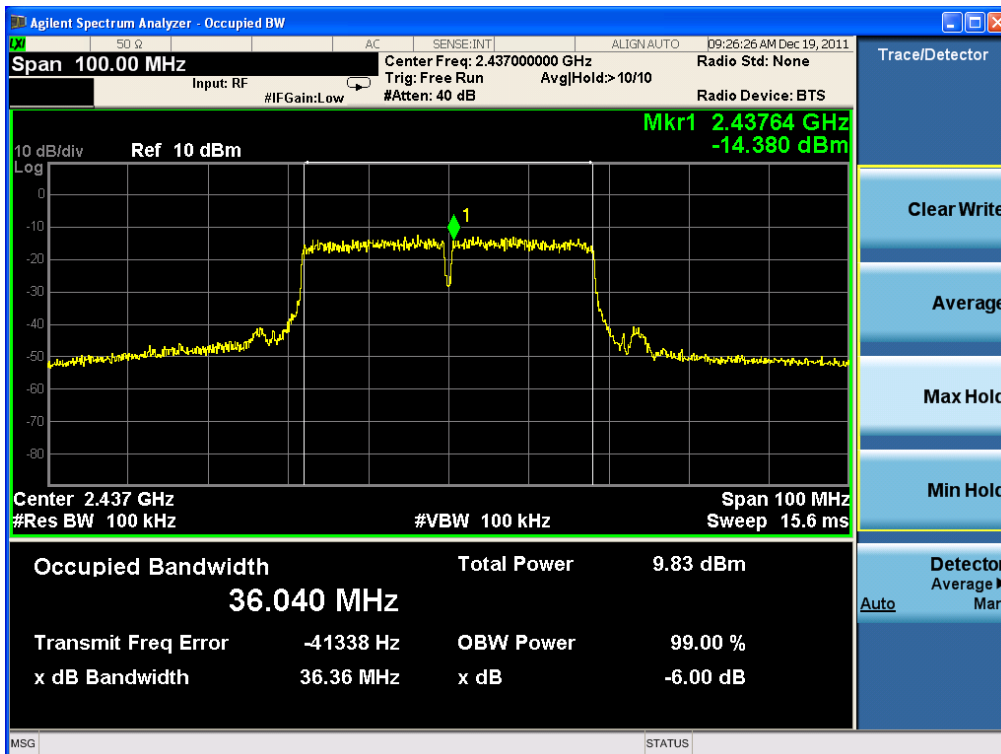
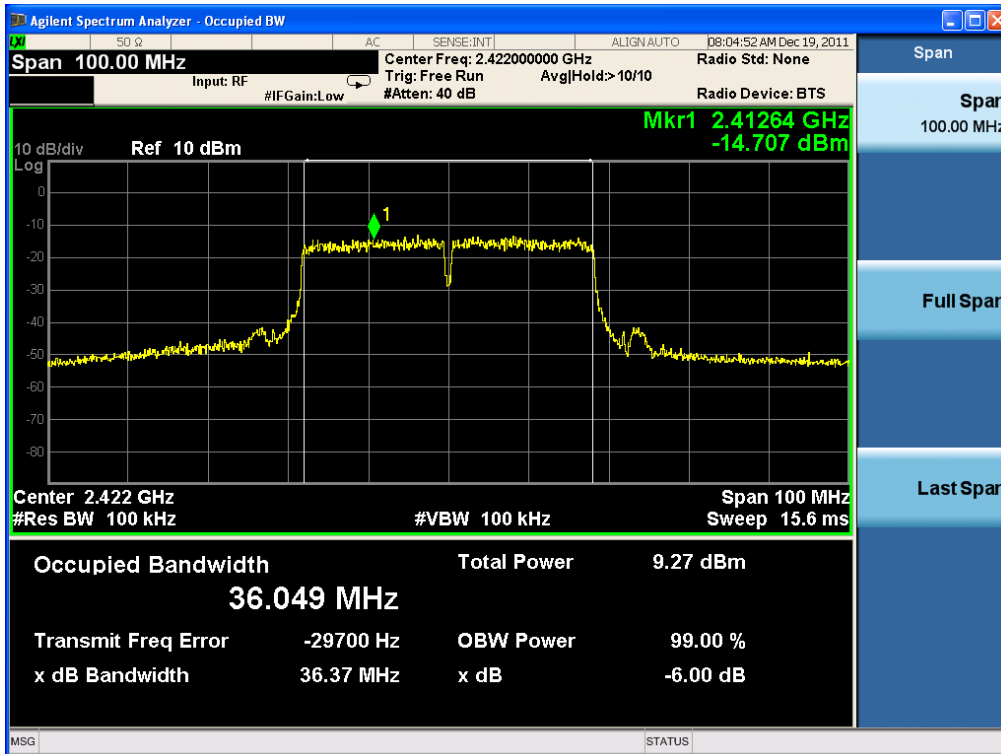
802.11n (20 MHz, Ant0)



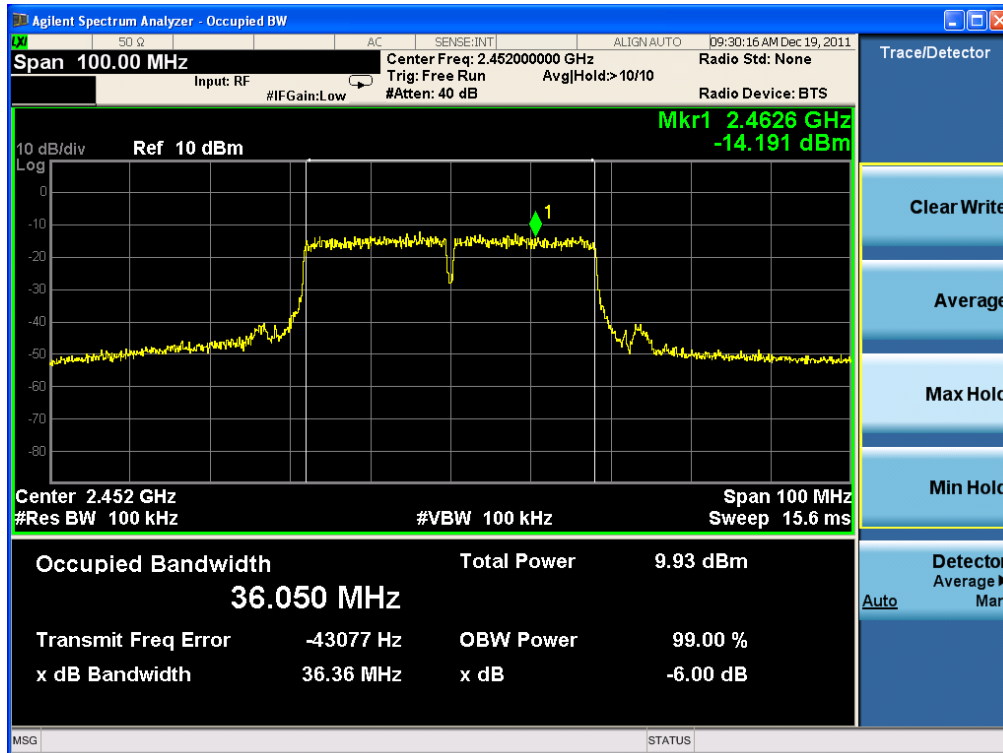
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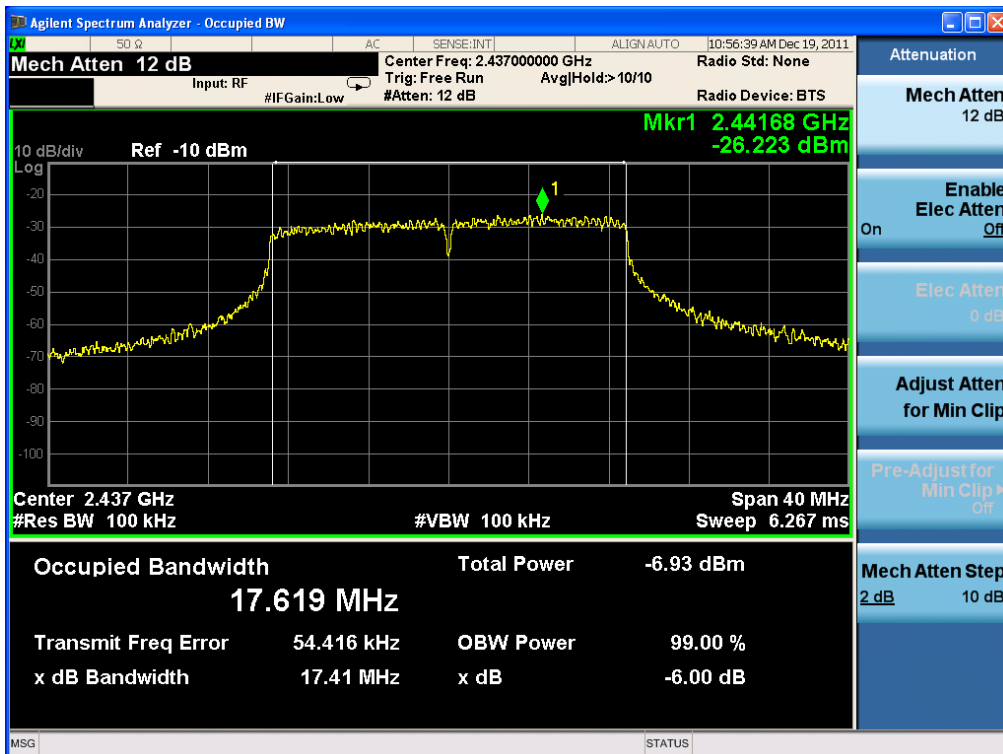
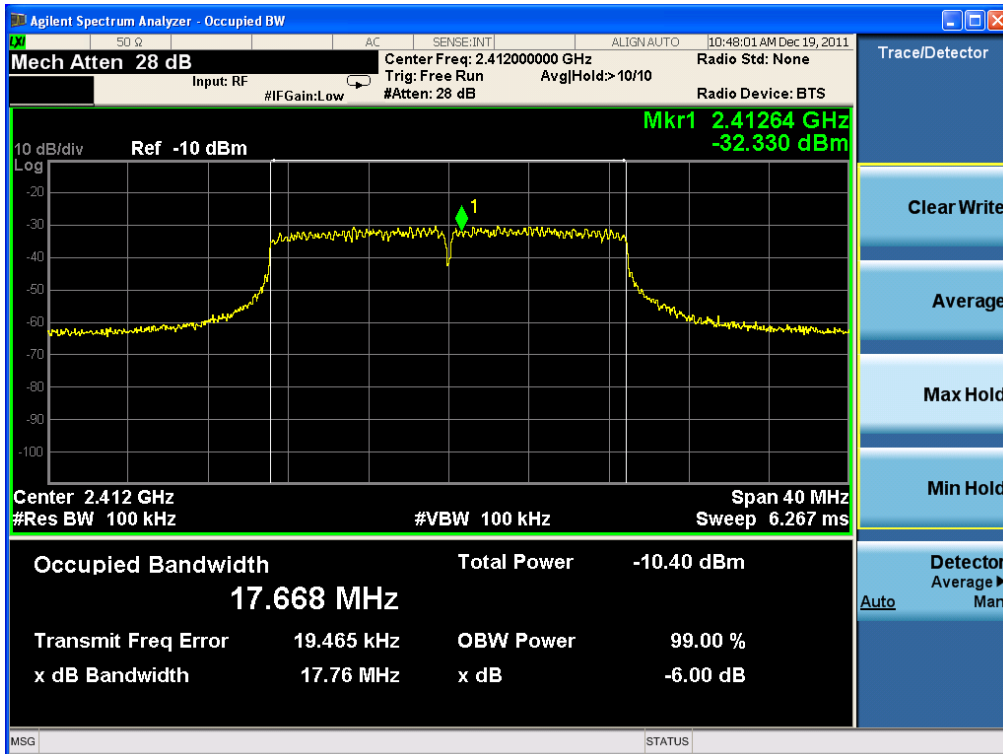
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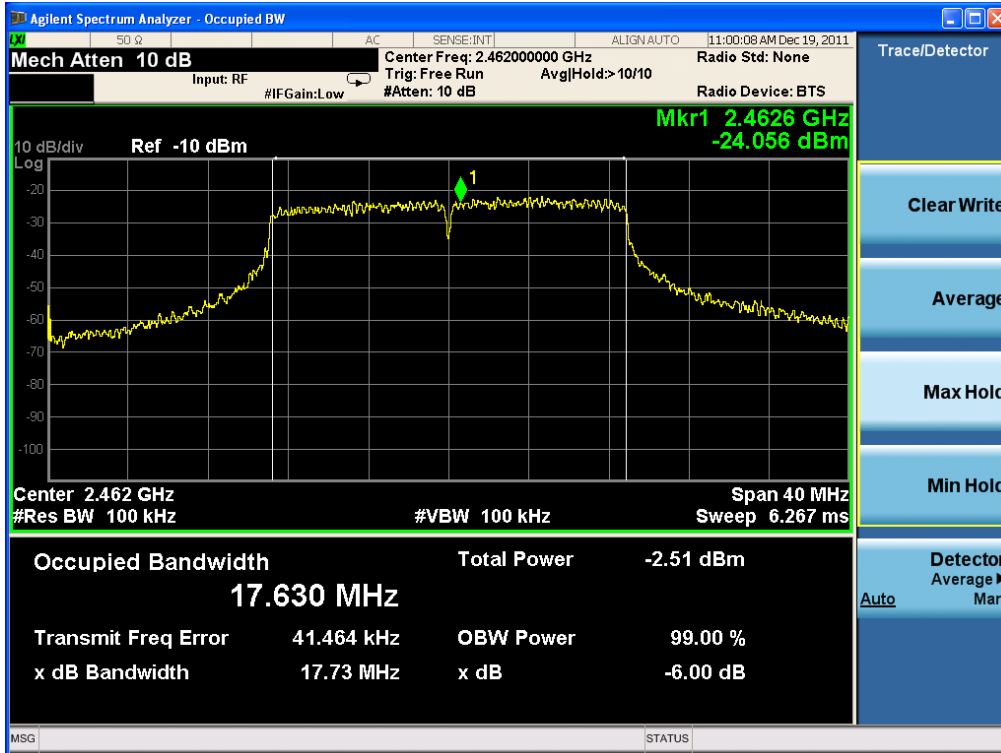
802.11n (40 MHz, Ant0)



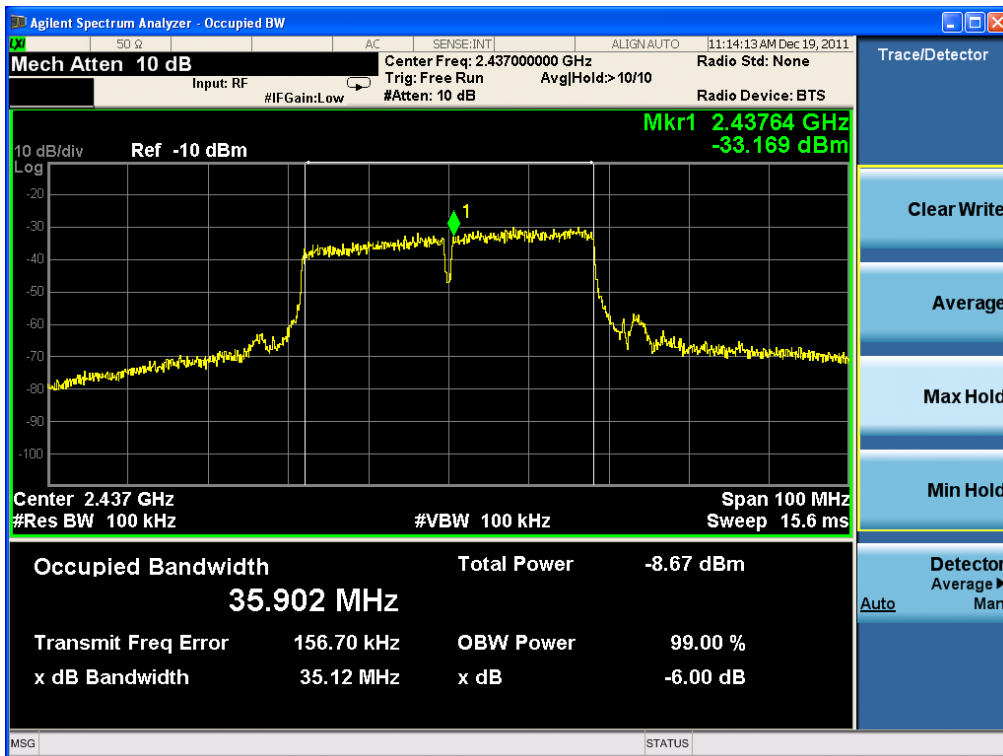
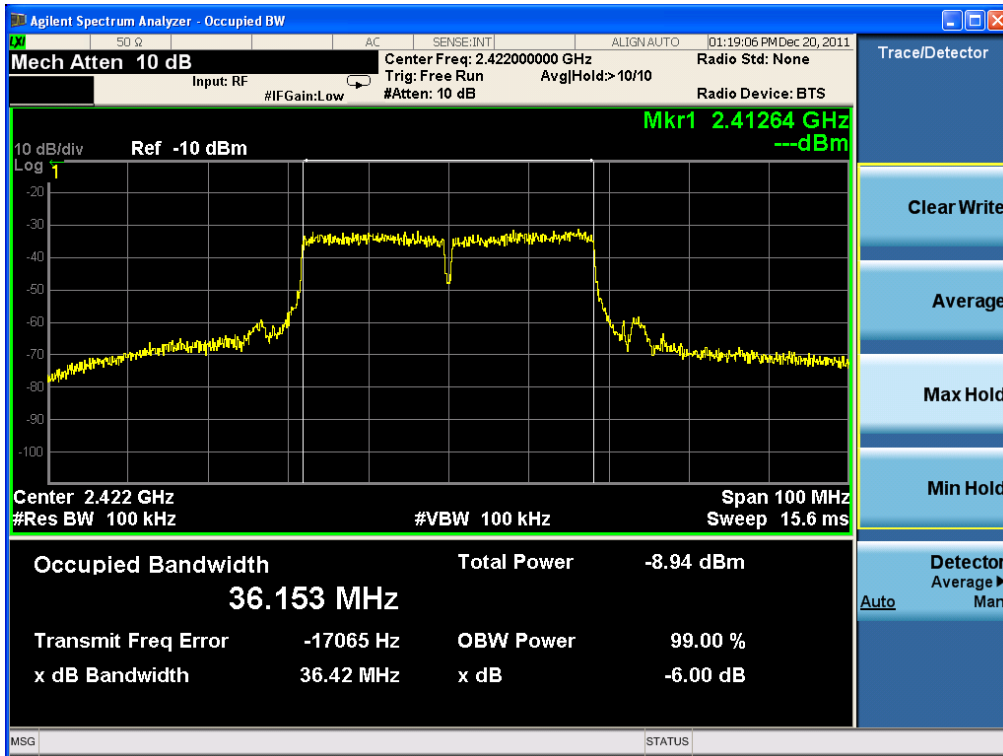
802.11n (20 MHz, Ant1)



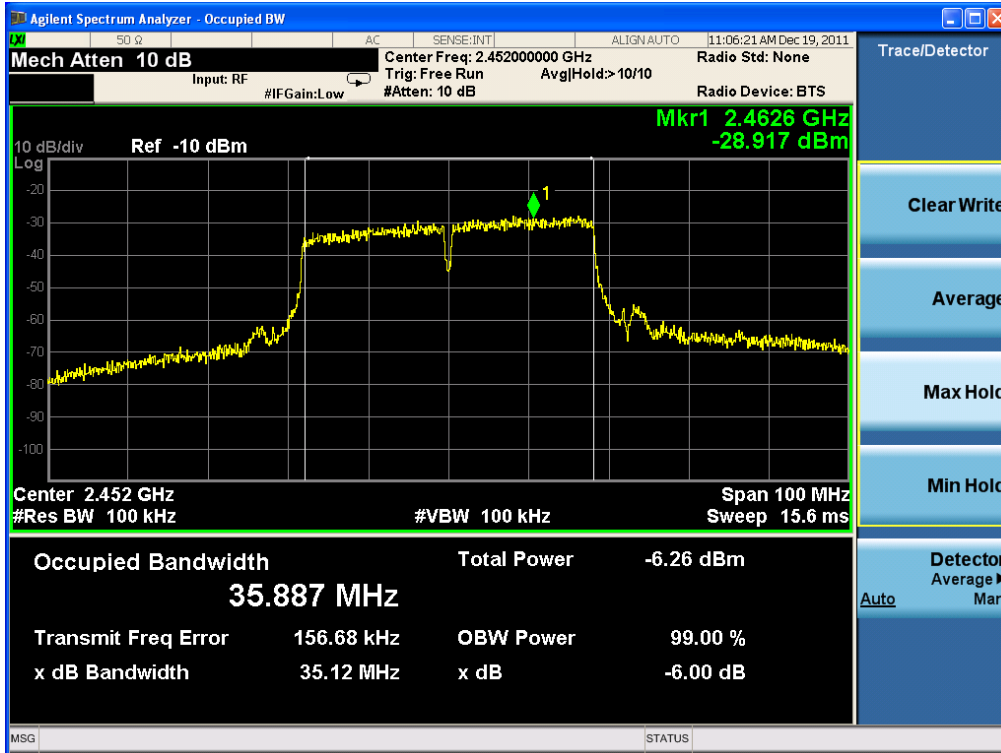
802.11n (20 MHz, Ant1)



802.11n (40 MHz, Ant1)



802.11n (40 MHz, Ant1)



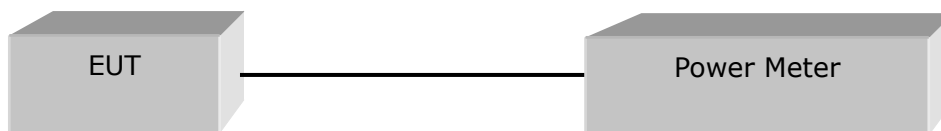
2.1.2 Maximum peak Conducted Output Power

Test Location

RF Test Room

Test Procedures

The transmitter output is connected to a spectrum analyzer and the analyzer's internal channel power integration function is used to integrate the power over a bandwidth greater than or equal to the 99% bandwidth.



Limit

< 1 W

Test Results

Test mode : 802.11b - 11 Mbps

Frequency (MHz)	Channel No.	Peak output power(dBm)	Limit	Result
2412	Low	10.46	30dBm	Complies
2437	Middle	11.11	30dBm	Complies
2462	High	11.13	30dBm	Complies

Remark.

The 802.11b data rate were set in 11 Mbps, due to the highest RF output power.

Test mode : 802.11g - 18 Mbps

Frequency (MHz)	Channel No.	Peak output power(dBm)	Limit	Result
2412	Low	11.41	30dBm	Complies
2437	Middle	12.41	30dBm	Complies
2462	High	12.44	30dBm	Complies

Remark.

The 802.11g data rate were set in 18 Mbps, due to the highest RF output power.

Test mode : 802.11n (20 MHz, Ant0) – MCS2

Frequency (MHz)	Channel No.	Peak output power(dBm)	Limit	Result
2412	Low	11.64	30dBm	Complies
2437	Middle	12.27	30dBm	Complies
2462	High	12.00	30dBm	Complies

Remark.

The 802.11n(20 MHz, Ant0) data rate were set in MCS2, due to the highest RF output power.

Test mode : 802.11n (40 MHz, Ant0) – MCS1

Frequency (MHz)	Channel No.	Peak output power(dBm)	Limit	Result
2422	Low	11.20	30dBm	Complies
2437	Middle	11.86	30dBm	Complies
2452	High	11.60	30dBm	Complies

Remark.

The 802.11n(40 MHz, Ant0) data rate were set in MCS1, due to the highest RF output power.

Test mode : 802.11n (20 MHz, Ant1) – MCS2

Frequency (MHz)	Channel No.	Peak output power(dBm)	Limit	Result
2412	Low	-9.32	30dBm	Complies
2437	Middle	-6.63	30dBm	Complies
2462	High	-3.40	30dBm	Complies

Remark.

The 802.11n(40 MHz, Ant1) data rate were set in MCS2, due to the highest RF output power.

Test mode : 802.11n (40 MHz, Ant1) – MCS1

Frequency (MHz)	Channel No.	Peak output power(dBm)	Limit	Result
2422	Low	-8.79	30dBm	Complies
2437	Middle	-6.78	30dBm	Complies
2452	High	-5.32	30dBm	Complies

Remark.

The 802.11n(40 MHz, Ant1) data rate were set in MCS1, due to the highest RF output power.

2.1.3 Power Spectral Density

Procedure:

The peak power density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating in transmission mode at the appropriate frequencies.

The spectrum analyzer is set to:

RBW = 3 kHz

VBW = (VBW ≥ RBW)

Sweep = 100 s (Span/3 kHz)

Span = 300 kHz

Detector function = peak

Trace = max hold

Test Results

Test mode : 802.11b

Mode	Frequency (MHz)	Ch.	Test Results	
			dBm	Result
802.11b	2412	1	-31.486	Complies
	2437	6	-30.766	Complies
	2462	11	-30.769	Complies

Test mode : 802.11g

Mode	Frequency (MHz)	Ch.	Test Results	
			dBm	Result
802.11b	2412	1	-27.228	Complies
	2437	6	-27.864	Complies
	2462	11	-27.417	Complies

Test mode : 802.11n(20 MHz, Ant0)

Mode	Frequency (MHz)	Ch.	Test Results	
			dBm	Result
802.11n (20 MHz, Ant0)	2412	1	-28.672	Complies
	2437	6	-27.834	Complies
	2462	11	-27.857	Complies

Test mode : 802.11n(40 MHz, Ant0)

Mode	Frequency (MHz)	Ch.	Test Results	
			dBm	Result
802.11n (40 MHz, Ant0)	2422	3	-36.465	Complies
	2437	6	-35.976	Complies
	2452	9	-35.765	Complies

Test mode : 802.11n(20 MHz, Ant1)

Mode	Frequency (MHz)	Ch.	Test Results	
			dBm	Result
802.11n (20 MHz, Ant1)	2412	1	-50.016	Complies
	2437	6	-46.552	Complies
	2462	11	-42.318	Complies

Test mode : 802.11n(40 MHz, Ant1)

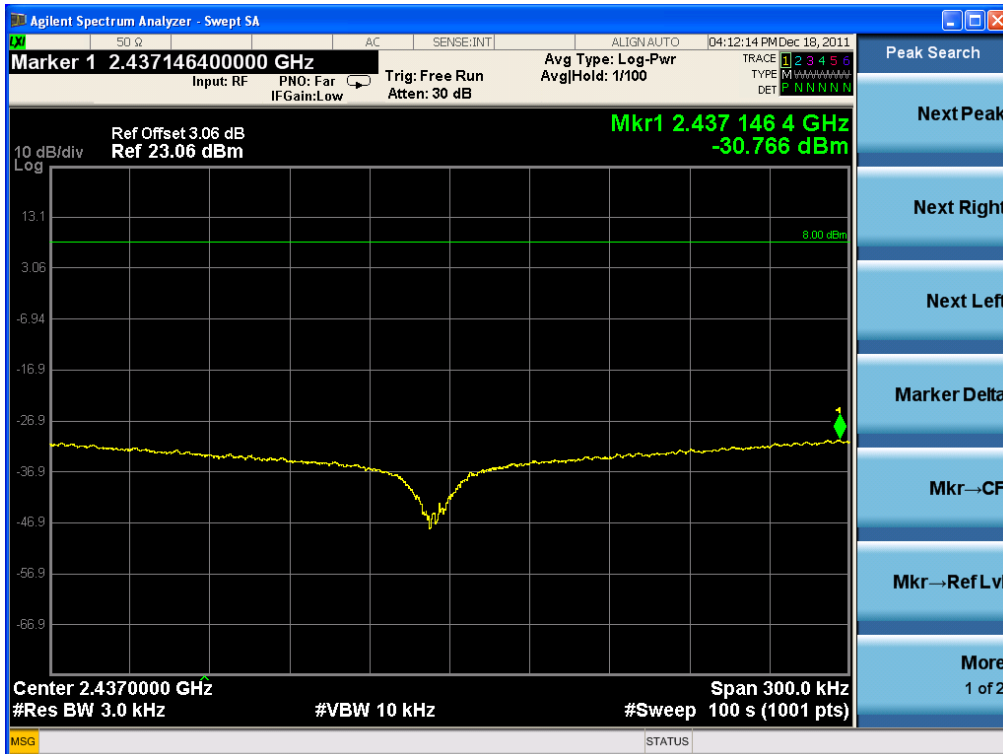
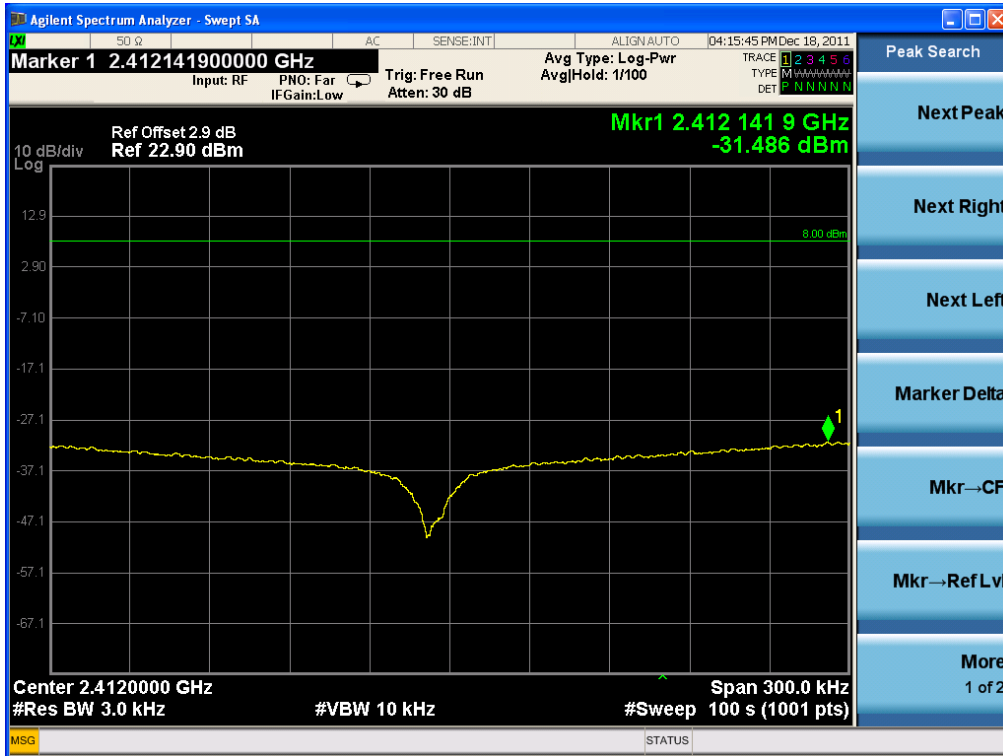
Mode	Frequency (MHz)	Ch.	Test Results	
			dBm	Result
802.11n (40 MHz, Ant1)	2422	3	-56.030	Complies
	2437	6	-54.563	Complies
	2452	9	-52.078	Complies

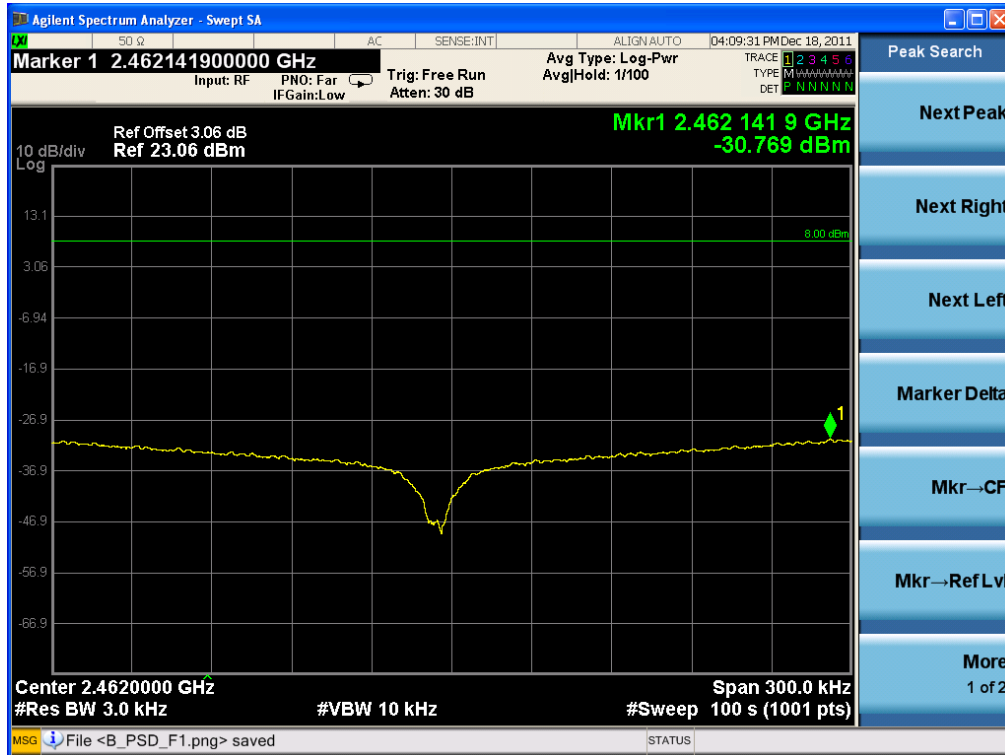
Minimum Standard:

Power Spectral Density < 8dBm @ 3 kHz BW

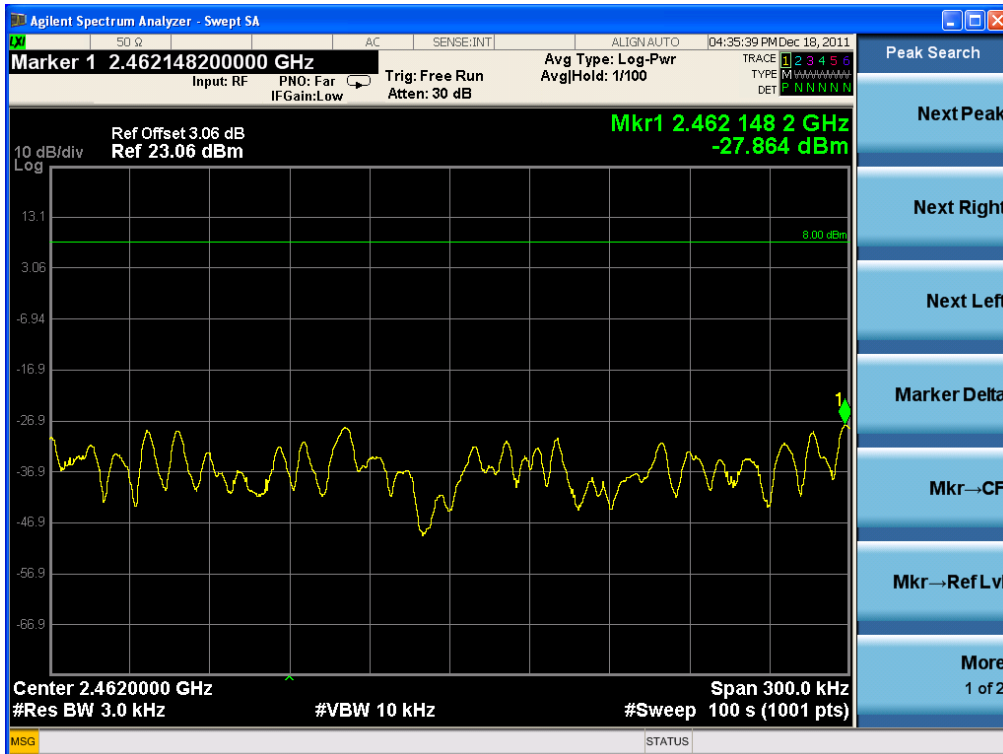
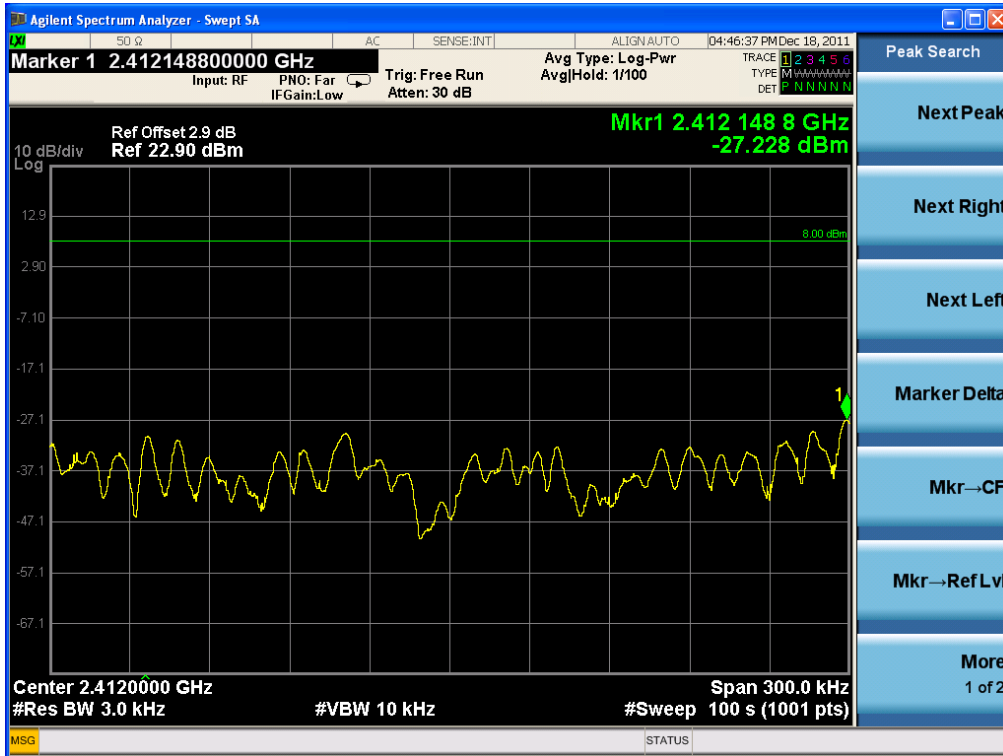
See next pages for actual measured spectrum plots.

802.11b Power Density Measurement





802.11g Power Density Measurement

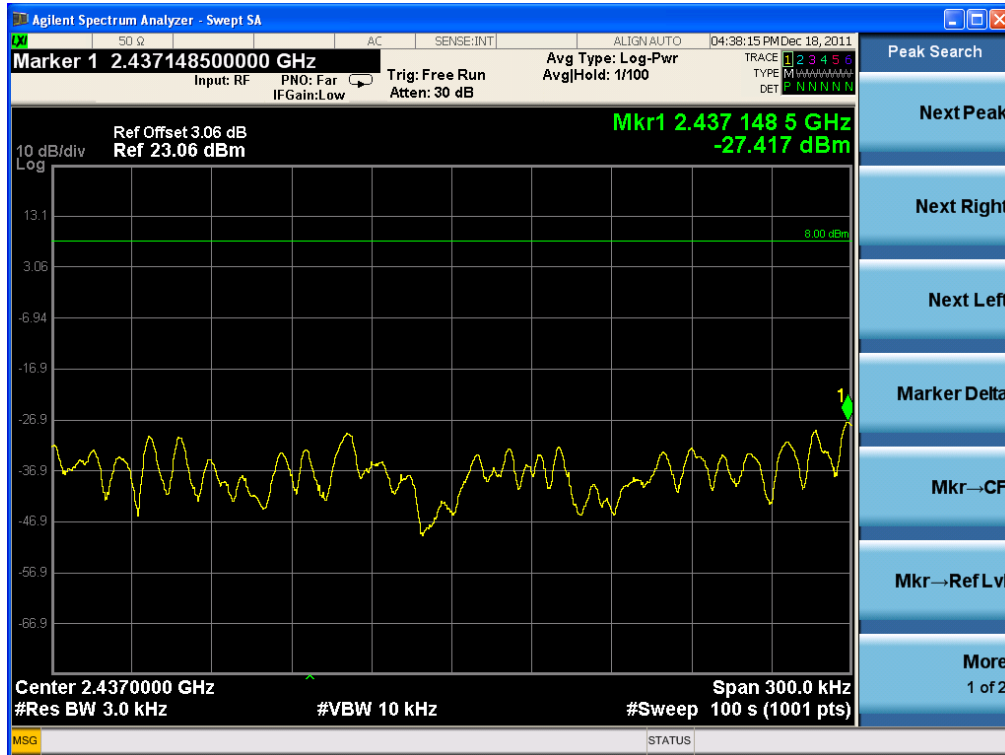




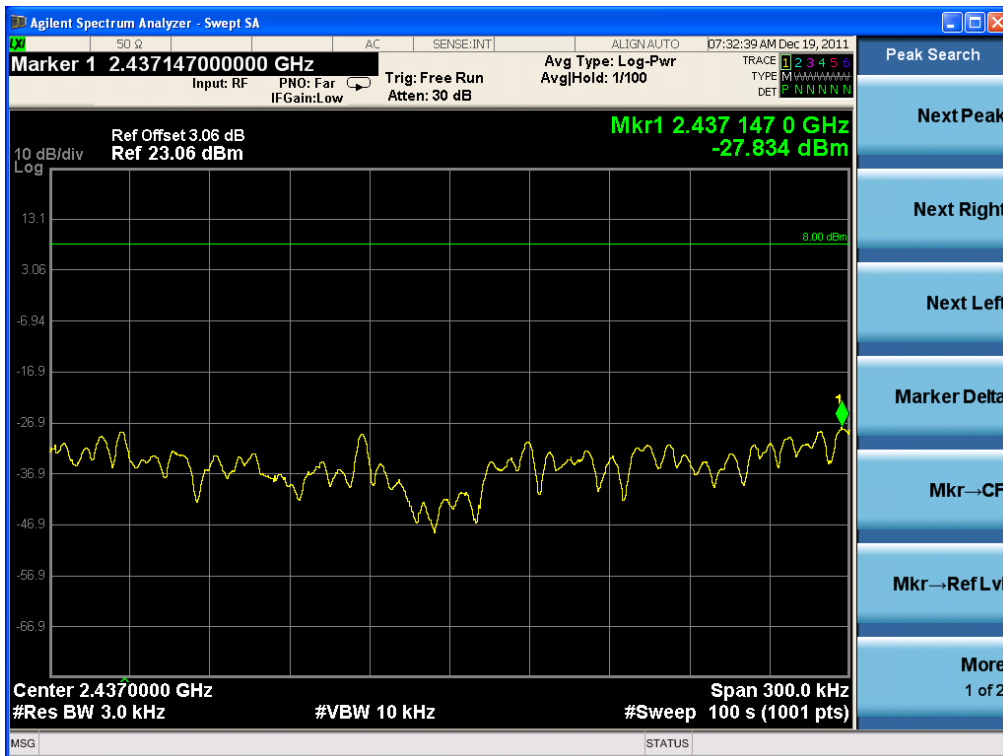
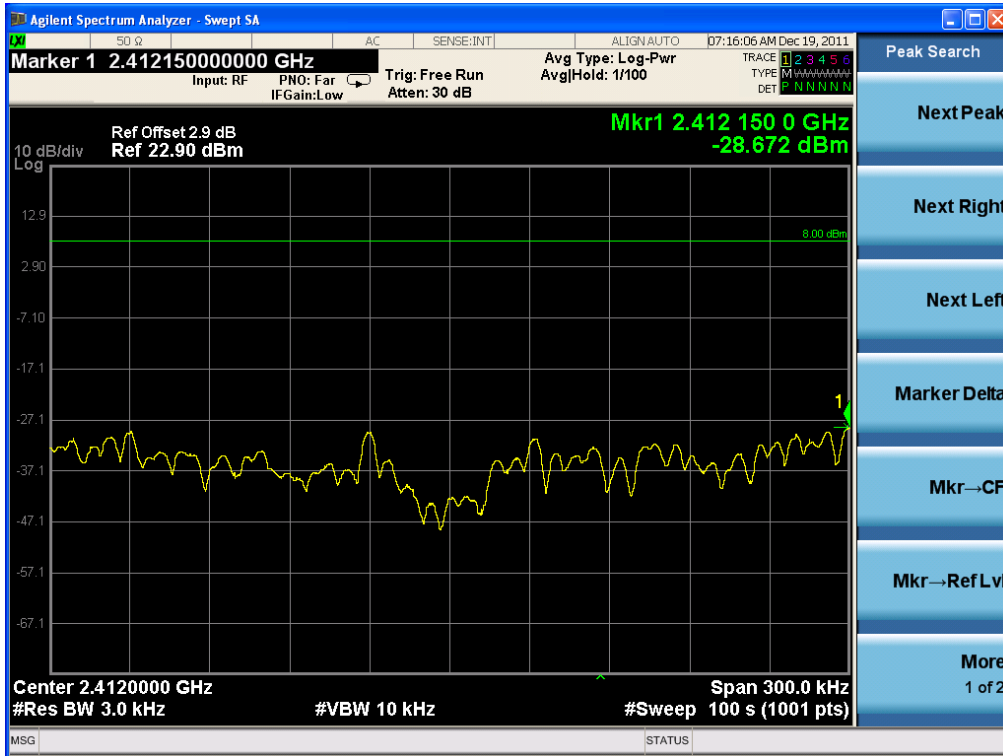
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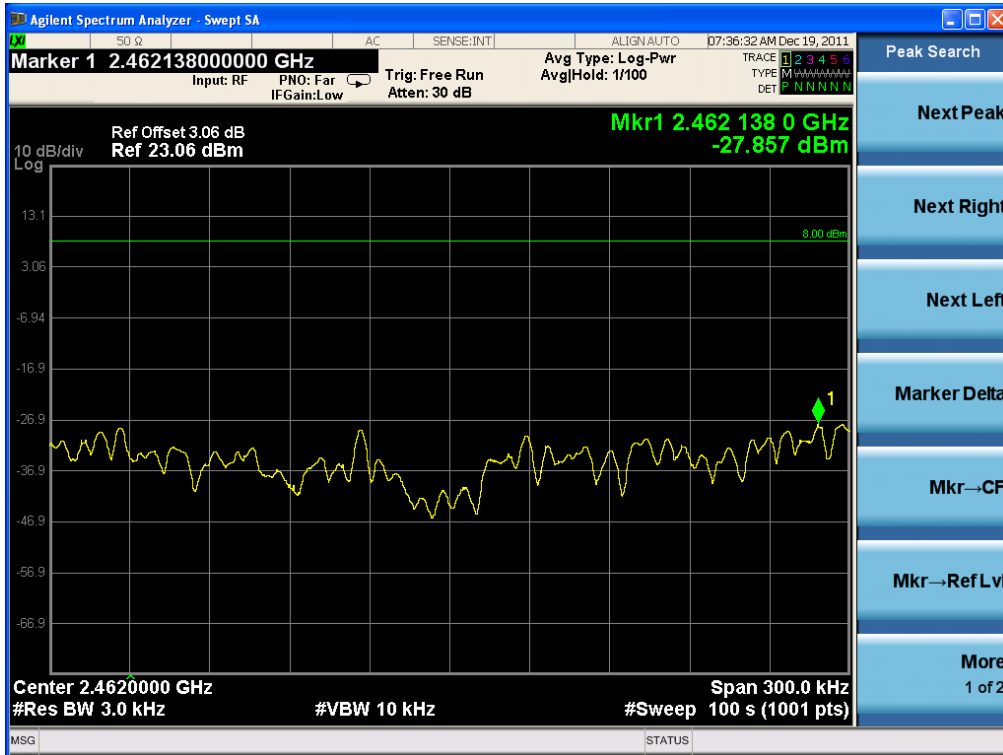
CTK Co., Ltd.

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Tel: +82-31-339-9970 Fax: +82-31-339-9855
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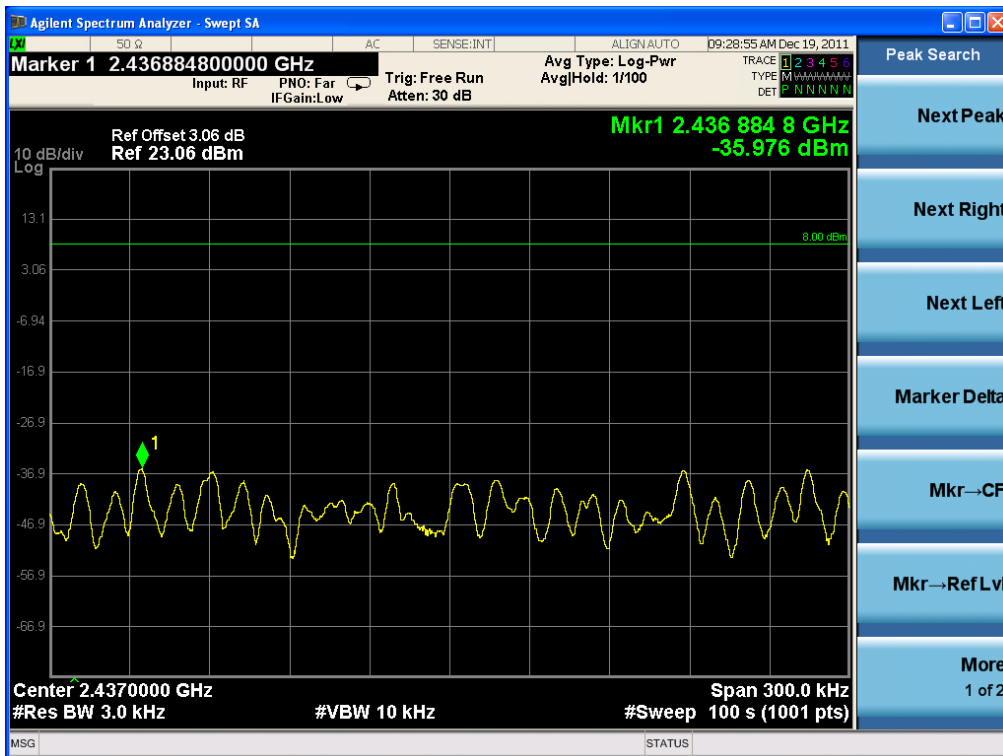
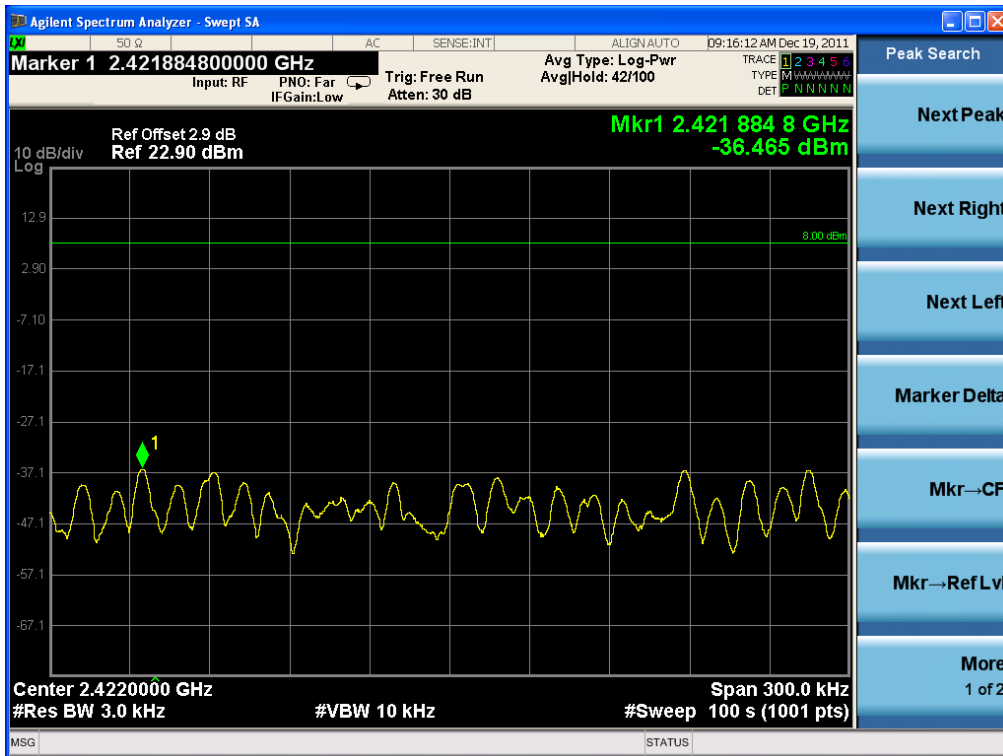


802.11n(20 MHz, Ant0) Power Density Measurement





802.11n(40MHz, Ant0) Power Density Measurement

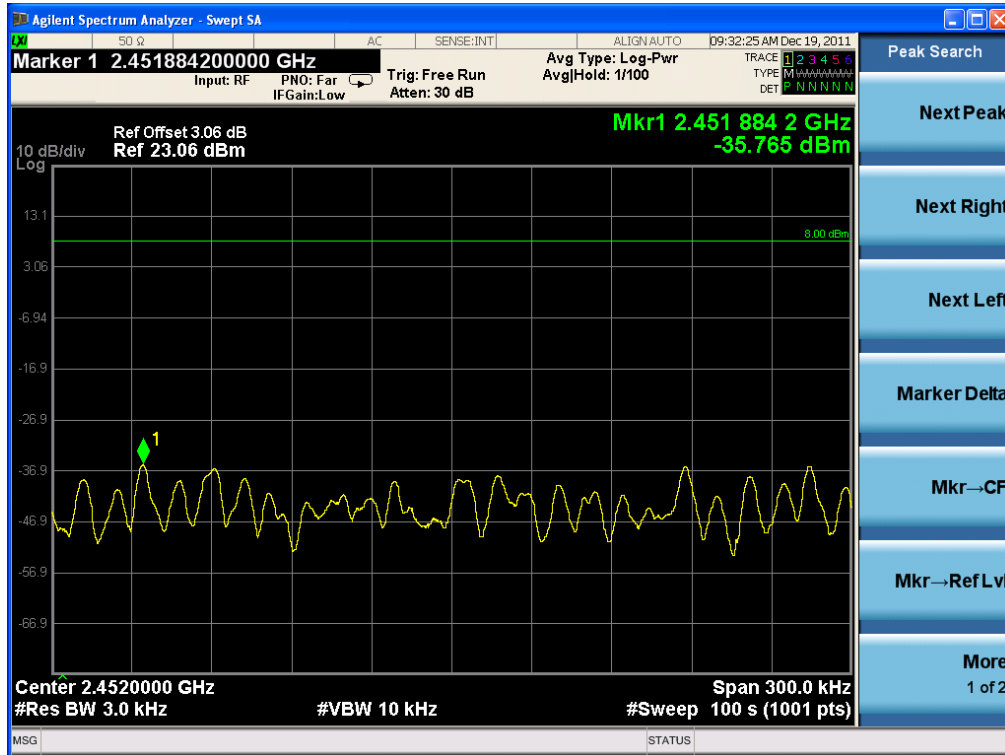




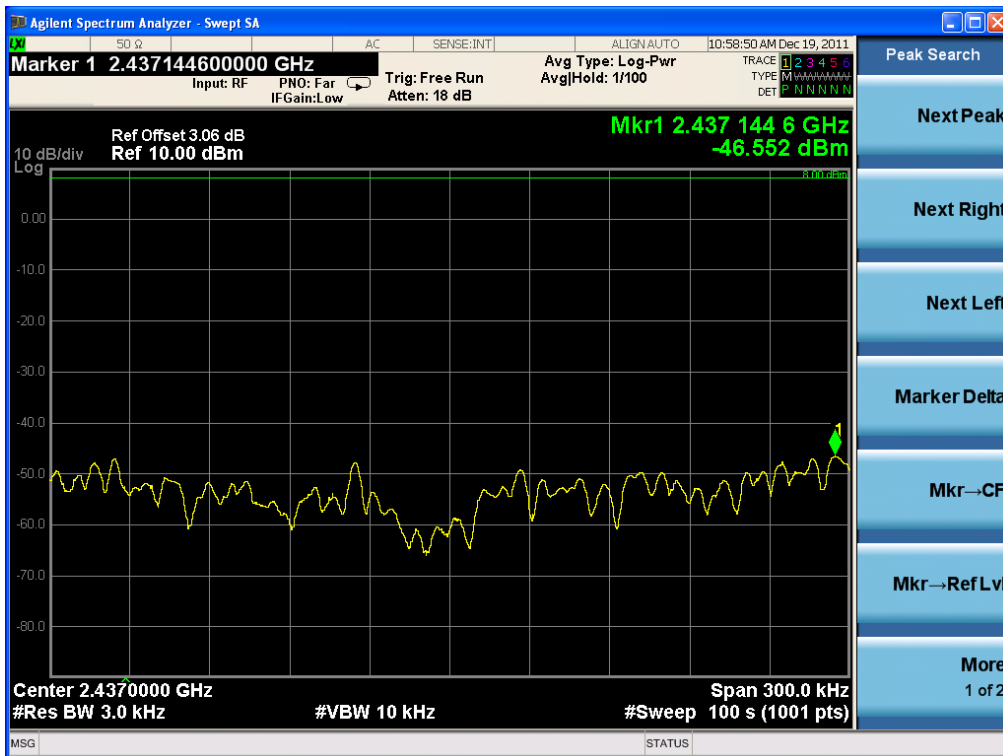
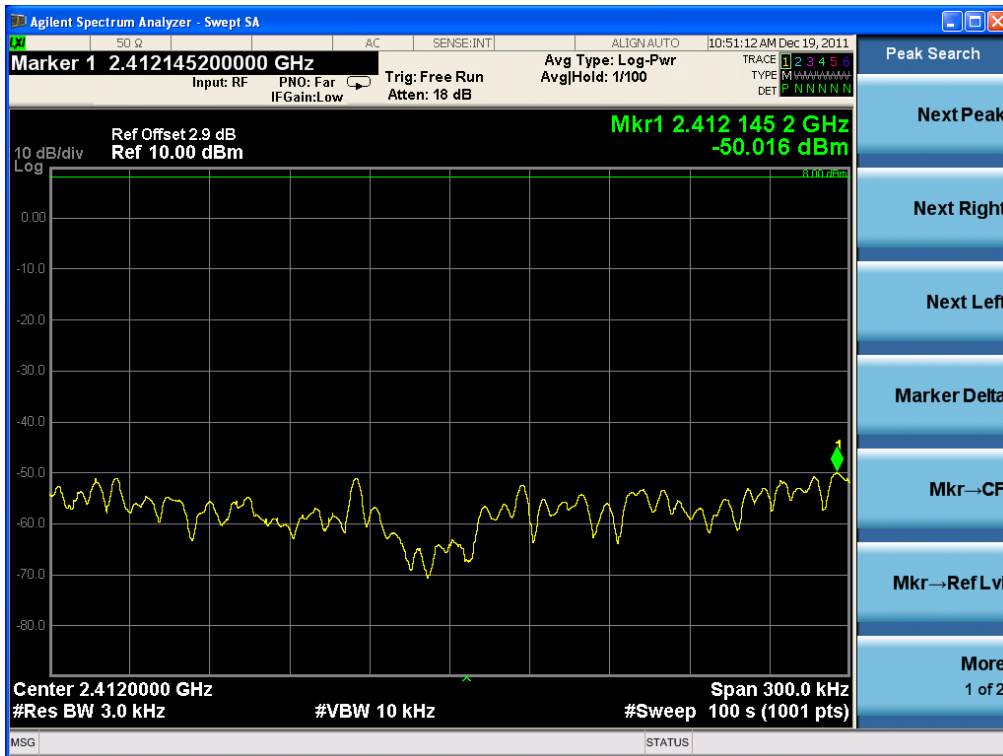
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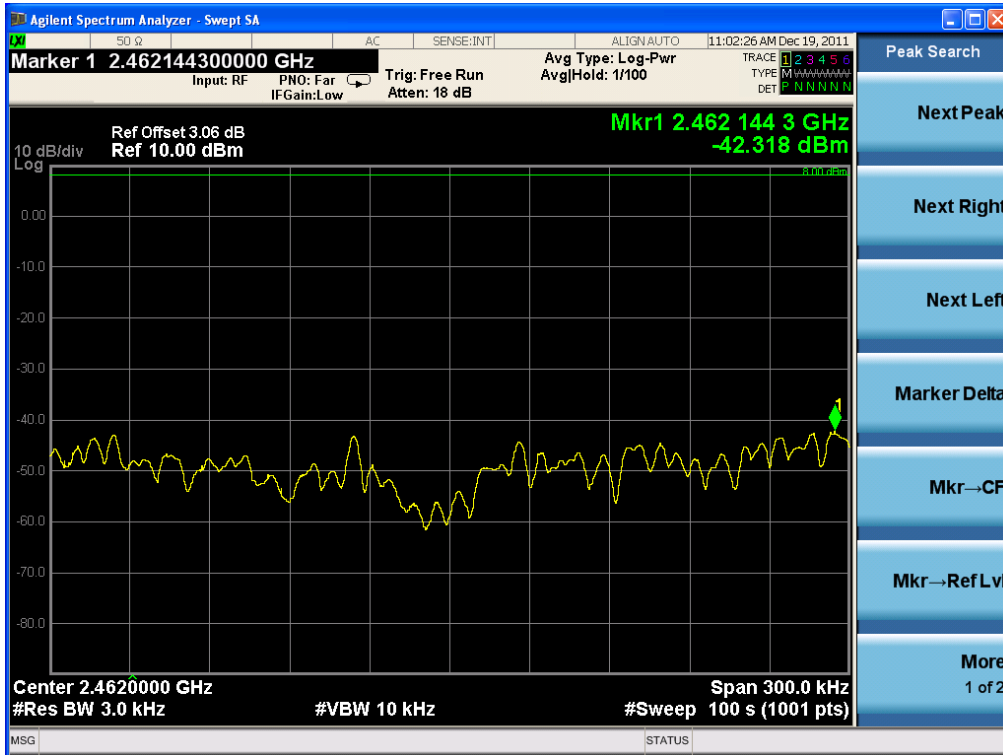
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Tel: +82-31-339-9970 Fax: +82-31-339-9855
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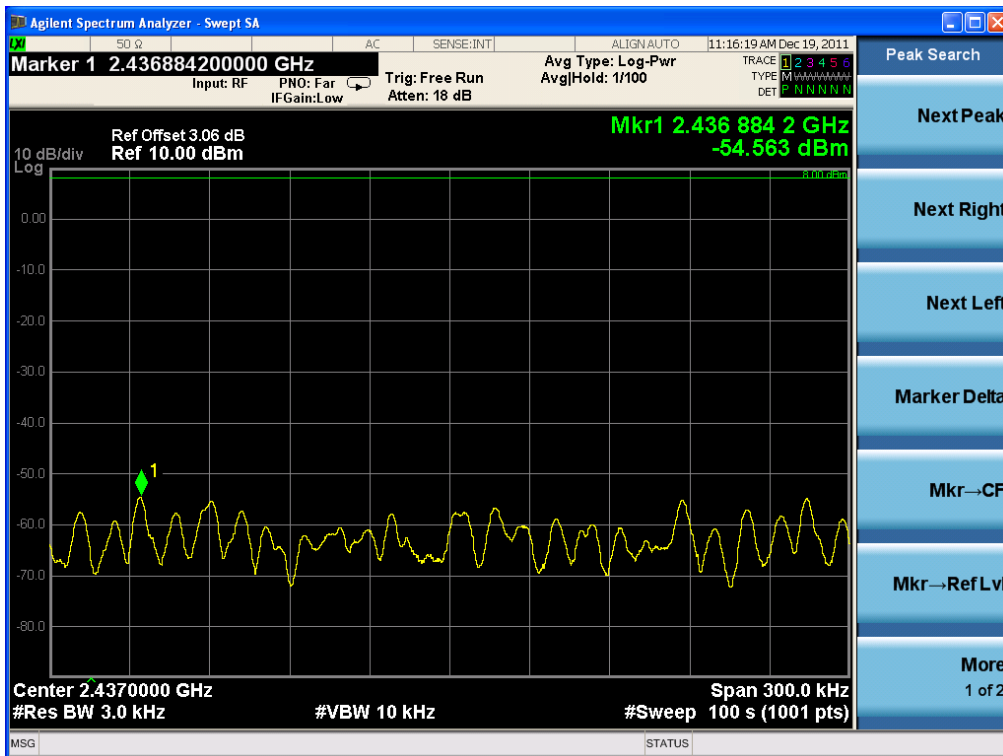
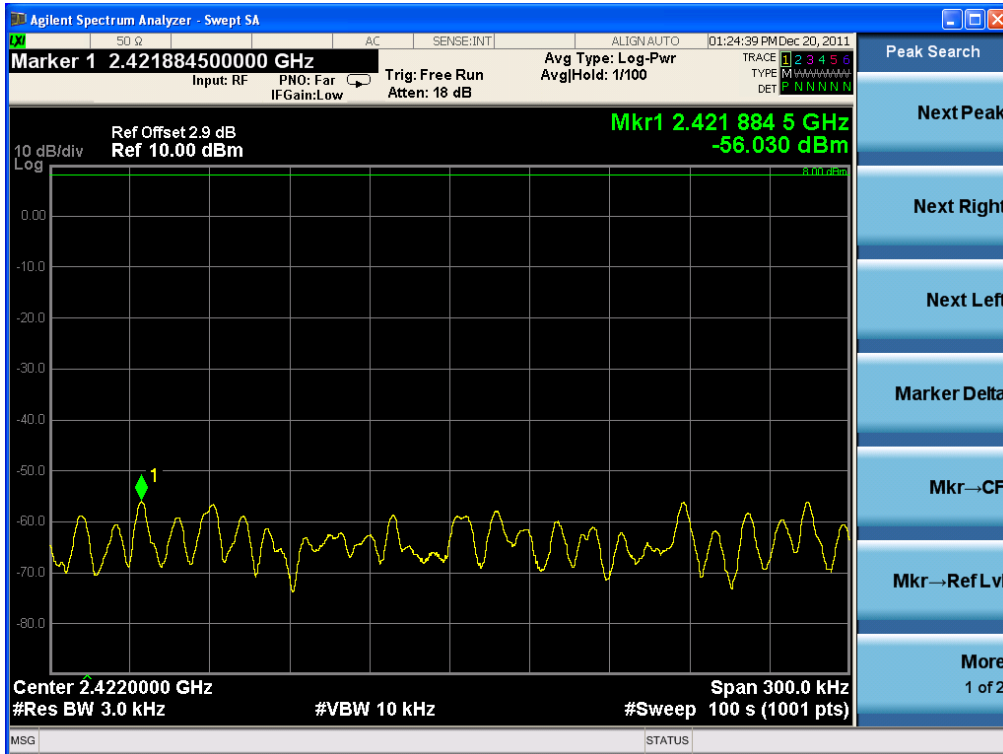


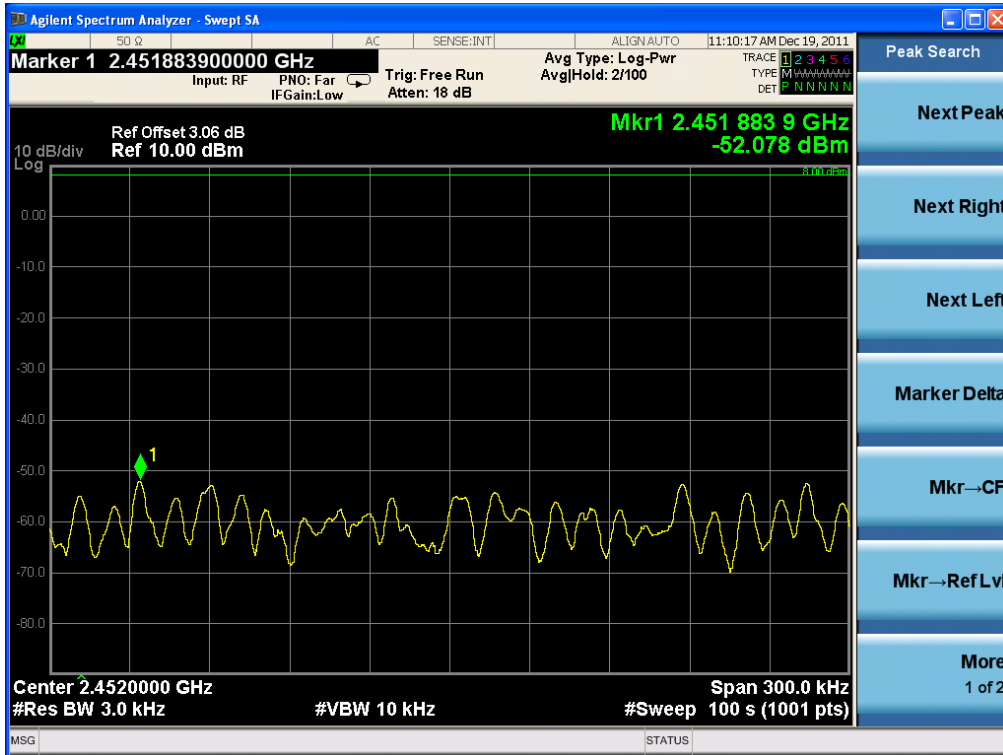
802.11n(20 MHz, Ant1) Power Density Measurement





802.11n(40MHz, Ant1) Power Density Measurement





2.1.4 Band - edge

Procedure:

The bandwidth at 20dB down from the highest inband spectral density is measured with a spectrum analyzer connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate frequencies.

After the trace being stable, Use the marker-to-peak function to measure 20 dB down both sides of the intentional emission.

The spectrum analyzer is set to:

Center frequency = the highest, middle and the lowest channels

RBW = 100 kHz

VBW = 100 kHz

Span = 50 MHz

Detector function = peak

Trace = max hold

Sweep = auto

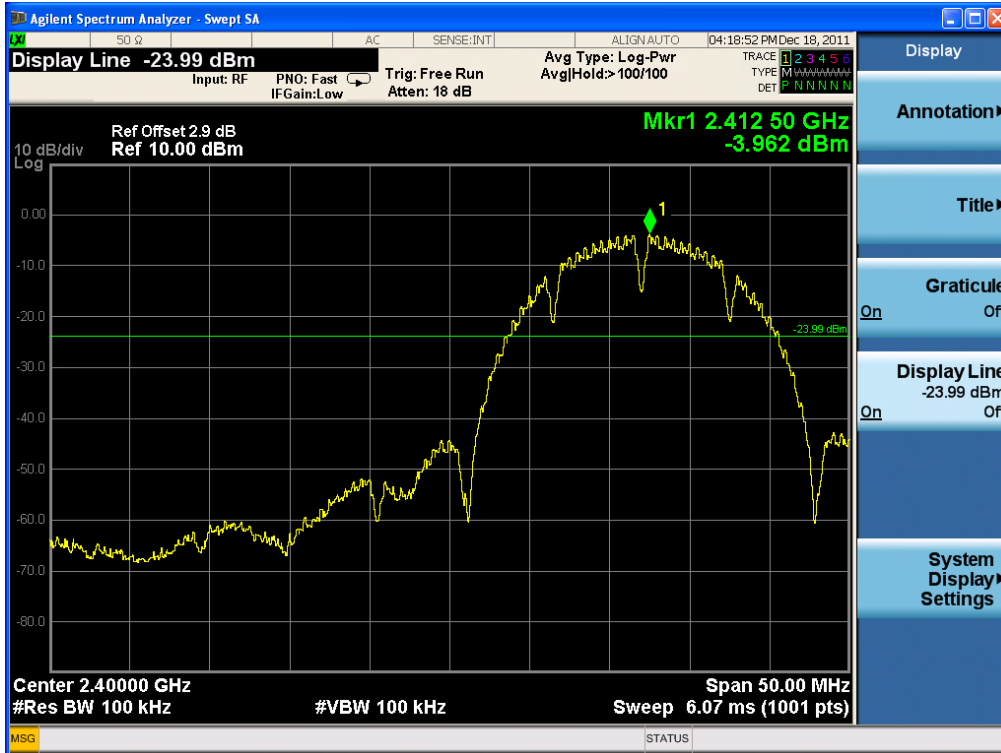
Measurement Data: Complies

- All conducted emission in any 100kHz bandwidth outside of the spread spectrum band was at least 20dB lower than the highest inband spectral density. Therefore the applying equipment meets the requirement.

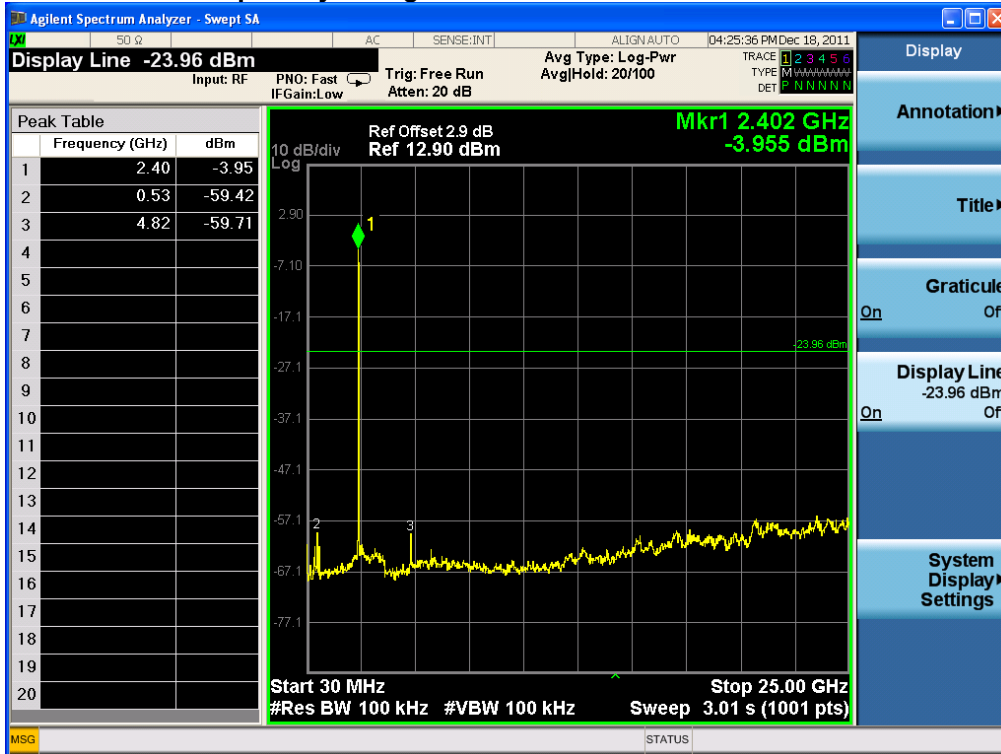
Minimum Standard:	> 20 dBc
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See next pages for actual measured spectrum plots.

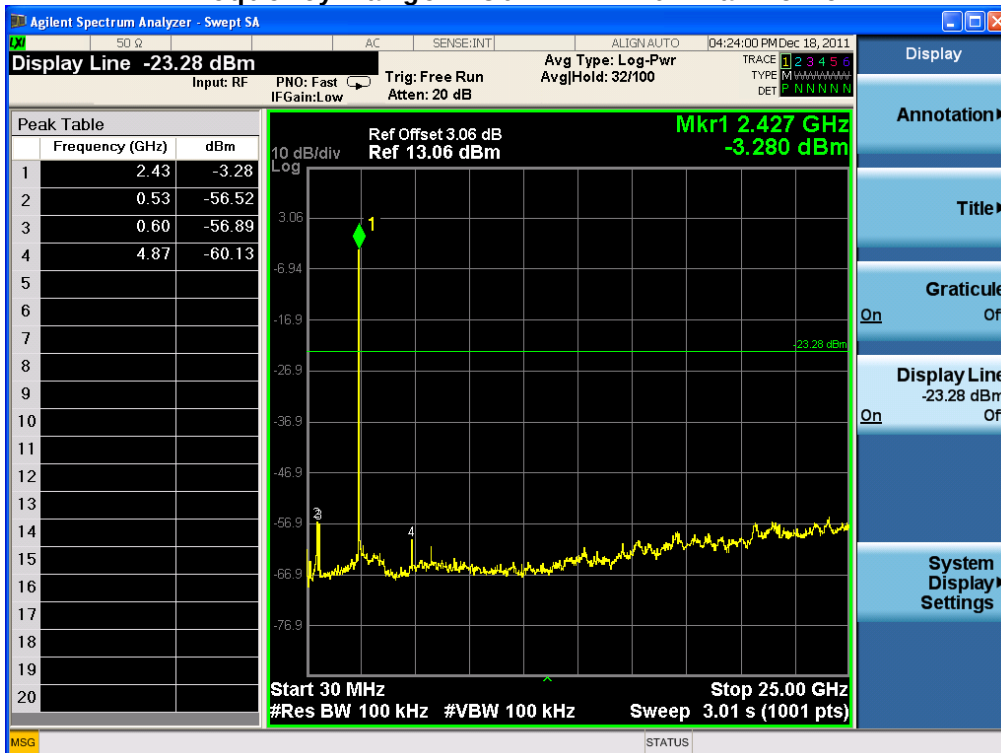
802.11b Band-edge Measurements



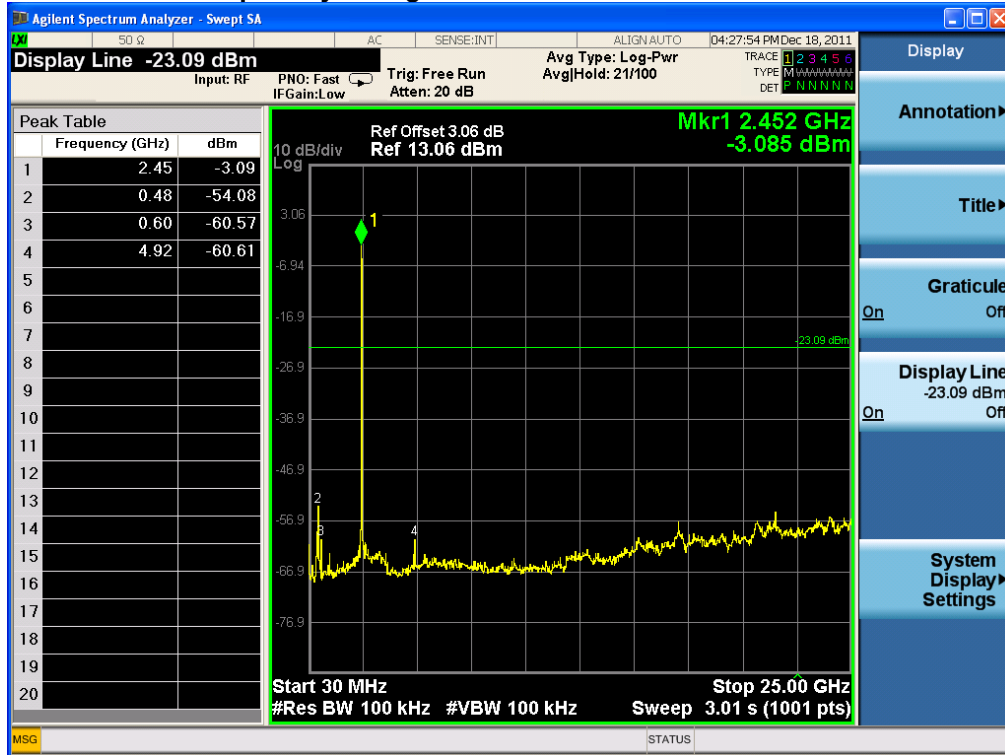
Band – edge (at 20 dB blow) – Low channel(802.11b)
Frequency Range = 30 MHz ~ 10th harmonic



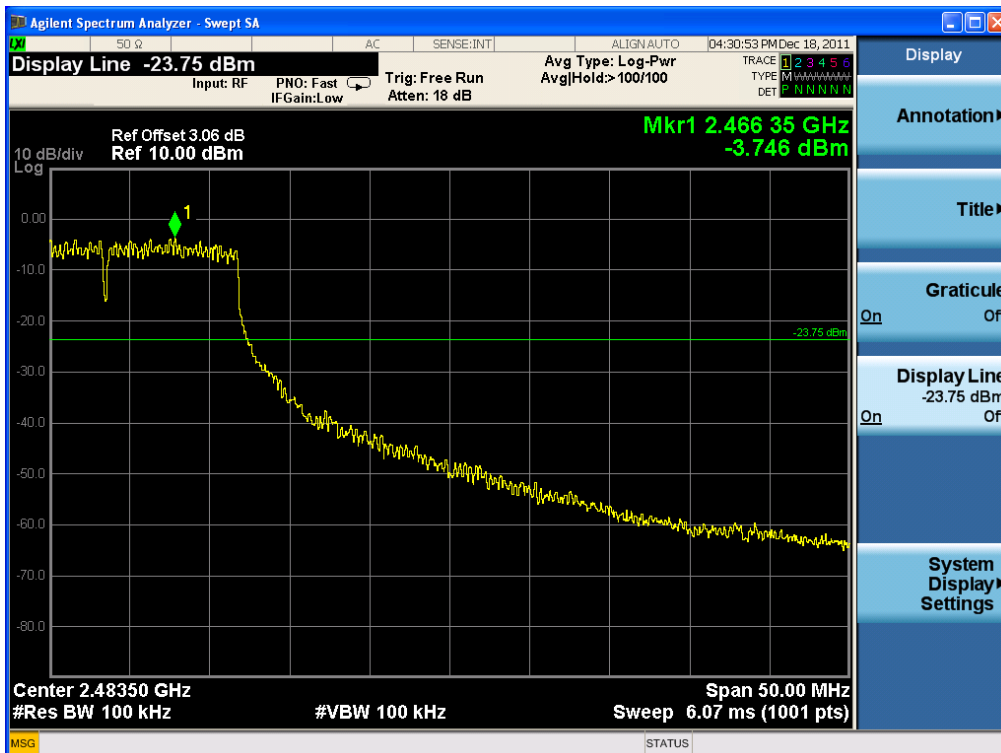
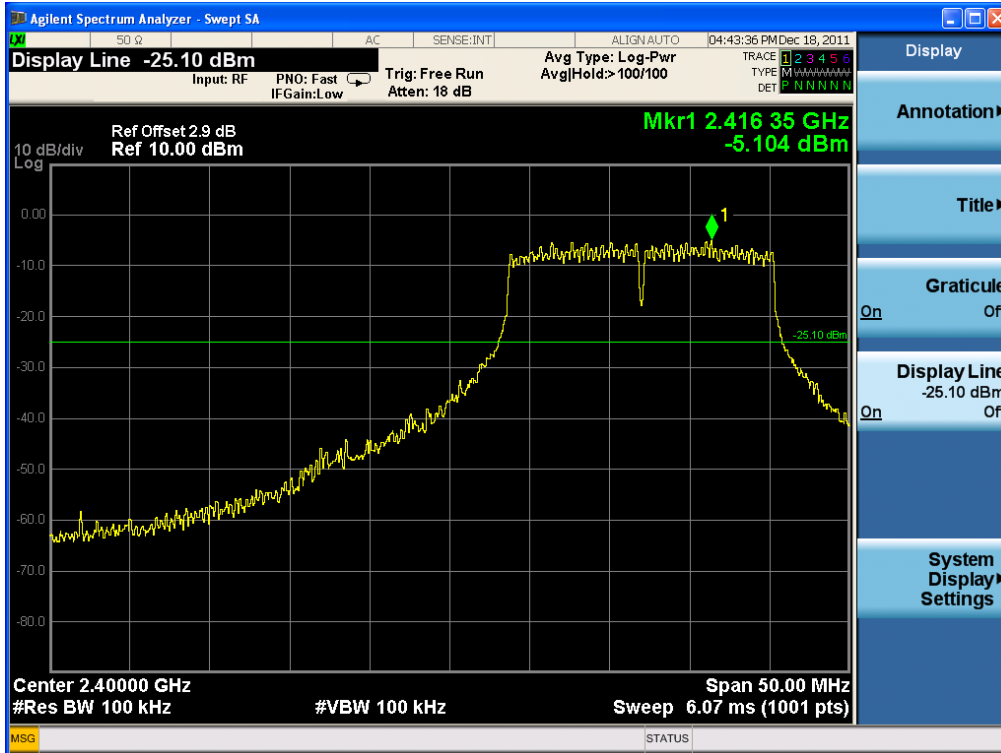
Band – edge (at 20 dB blow) – Mid channel(802.11b)
Frequency Range = 30 MHz ~ 10th harmonic



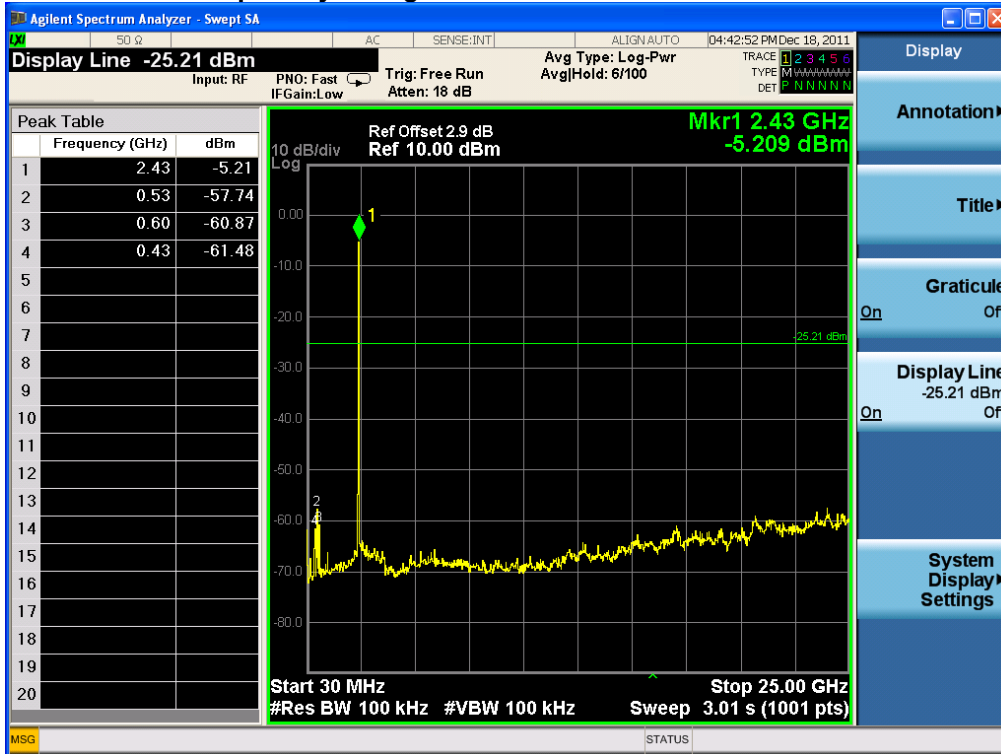
Band – edge (at 20 dB blow) – High channel(802.11b)
Frequency Range = 30 MHz ~ 10th harmonic



802.11g Band-edge Measurements



Band – edge (at 20 dB blow) – Low channel(802.11g)
Frequency Range = 30 MHz ~ 10th harmonic



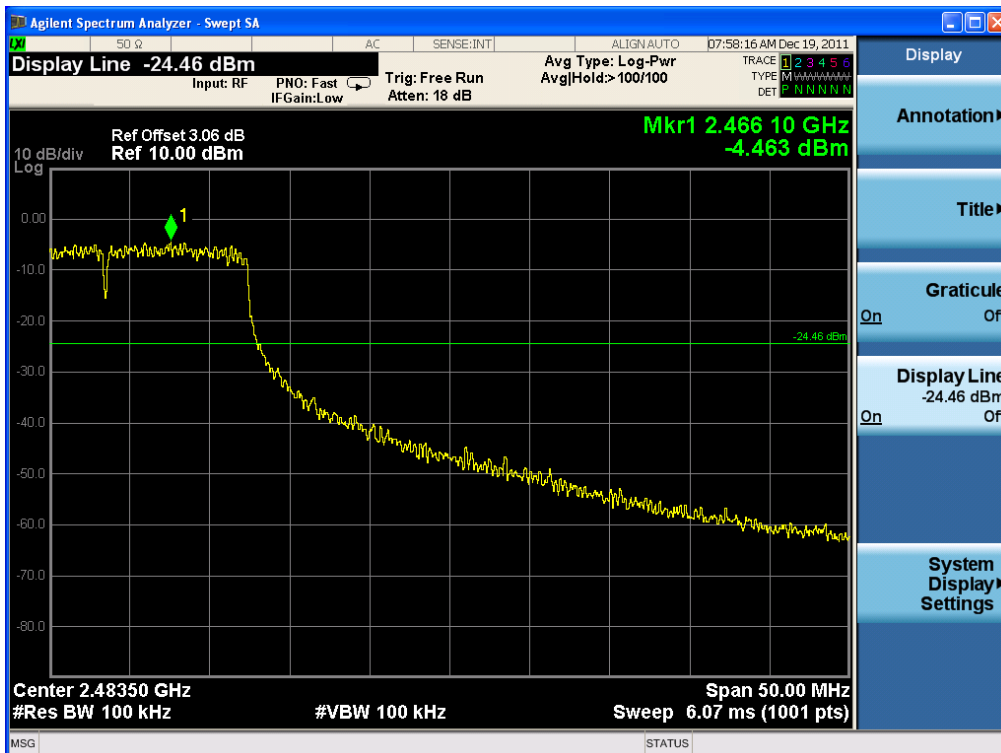
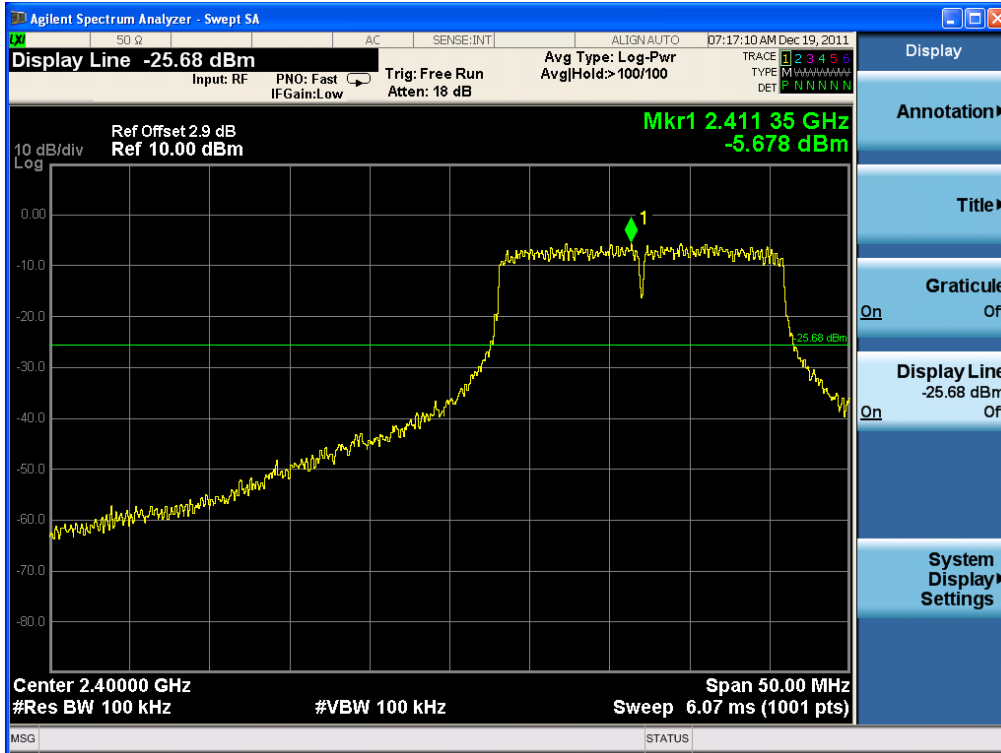
Band – edge (at 20 dB blow) – Mid channel(802.11g)
Frequency Range = 30 MHz ~ 10th harmonic



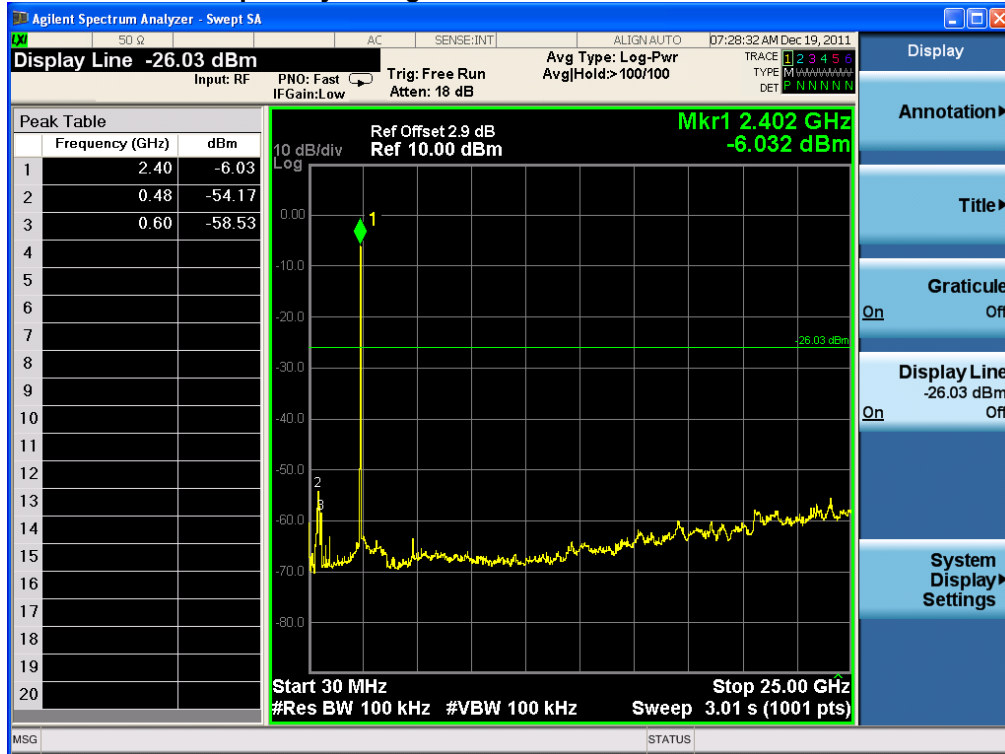
Band – edge (at 20 dB blow) – High channel(802.11g)
Frequency Range = 30 MHz ~ 10th harmonic



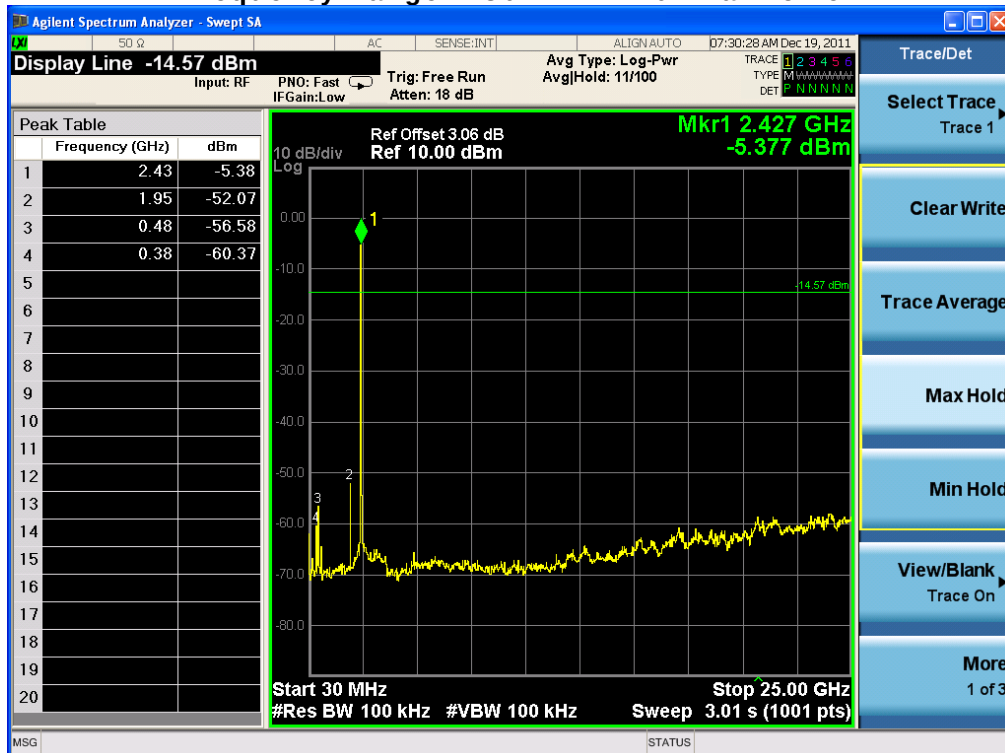
802.11n(20MHz, Ant0) Band-edge Measurements



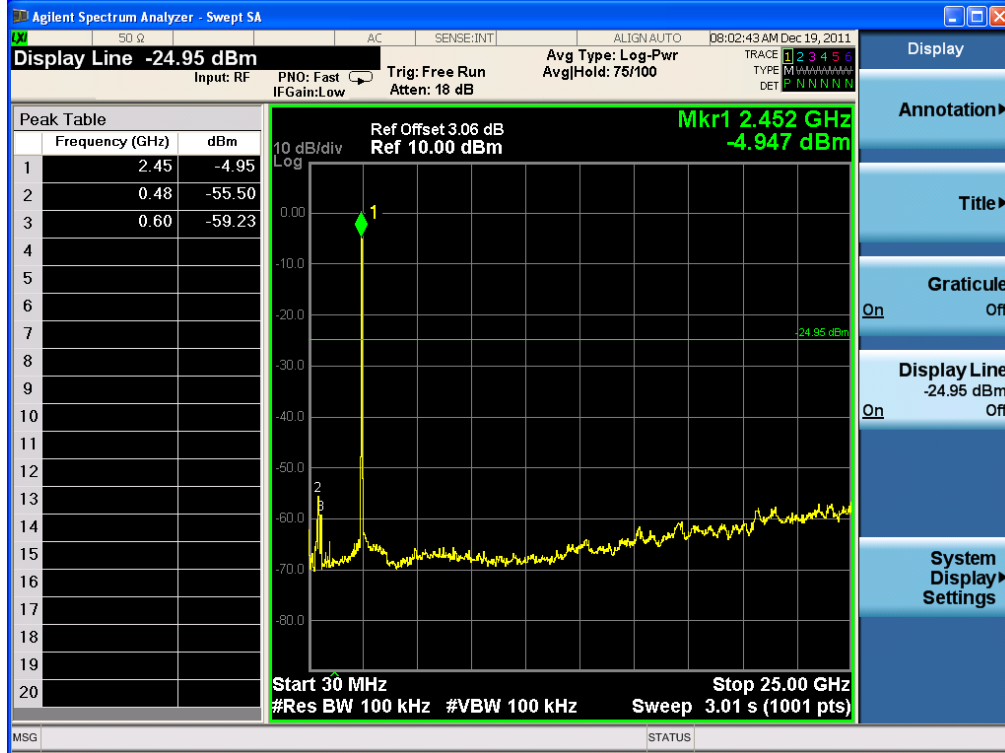
Band – edge (at 20 dB blow) – Low channel(802.11n(20MHz, Ant0))
Frequency Range = 30 MHz ~ 10th harmonic



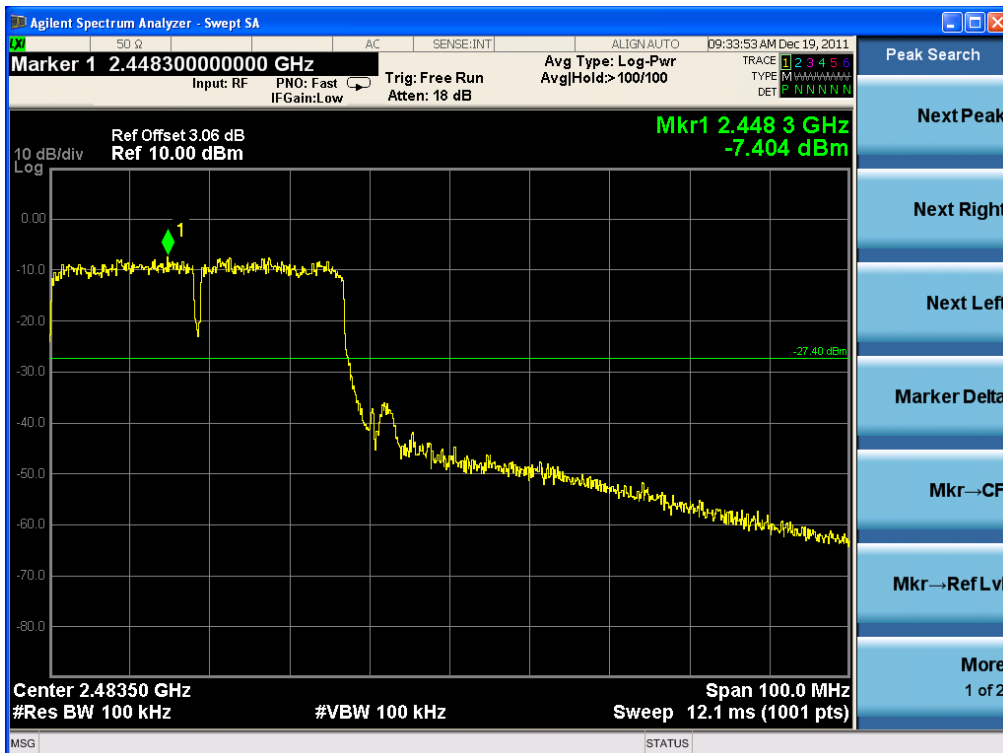
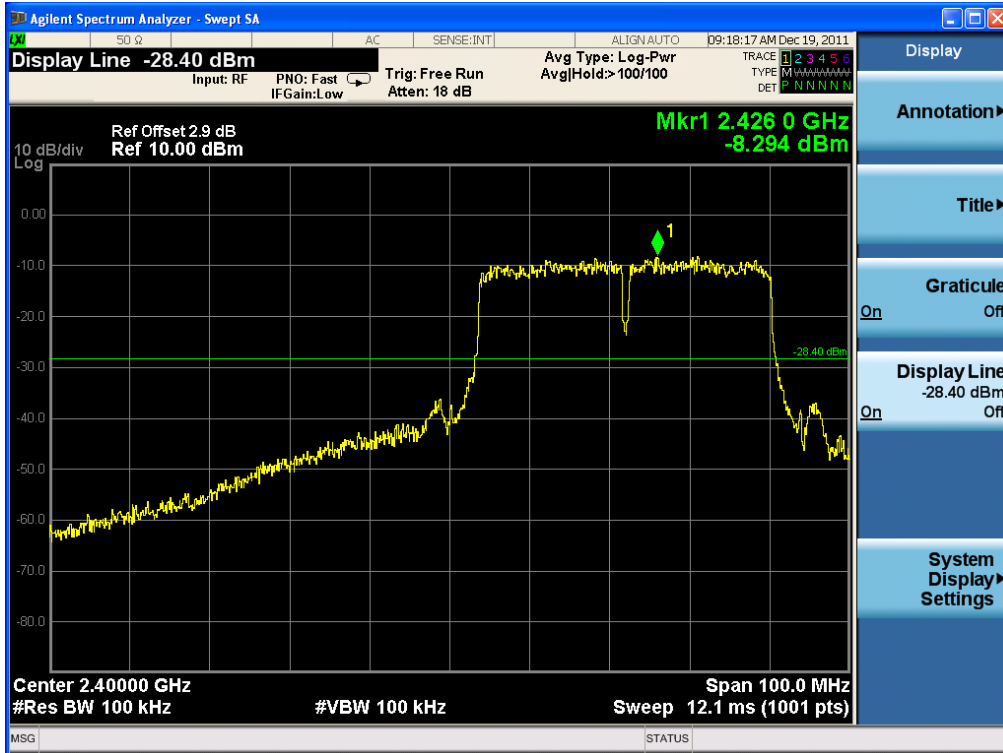
Band – edge (at 20 dB blow) – Mid channel(802.11n(20MHz, Ant0))
Frequency Range = 30 MHz ~ 10th harmonic



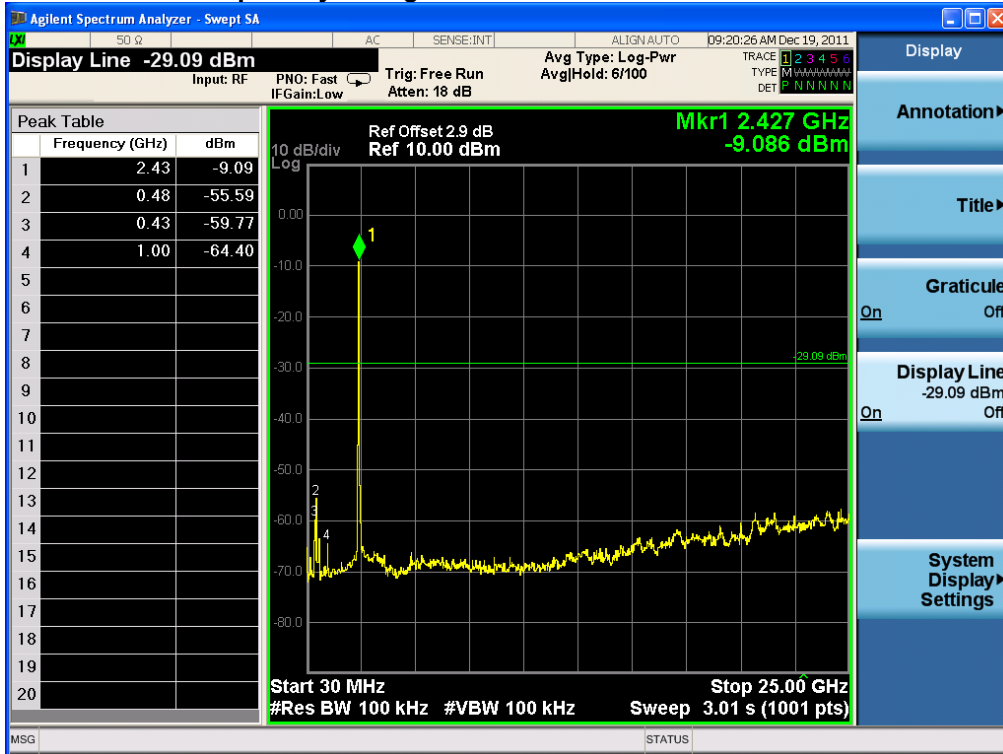
Band – edge (at 20 dB blow) – High channel(802.11n(20MHz, Ant0))
Frequency Range = 30 MHz ~ 10th harmonic



802.11n(40MHz, Ant0) Band-edge Measurements



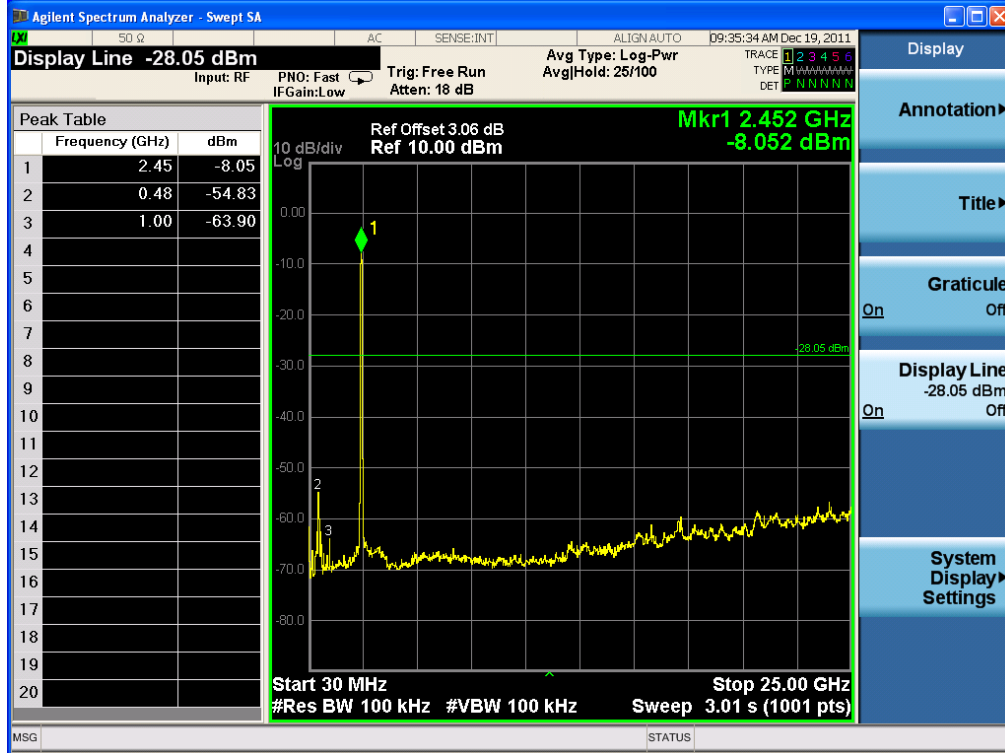
Band – edge (at 20 dB blow) – Low channel(802.11n(40MHz, Ant0))
Frequency Range = 30 MHz ~ 10th harmonic



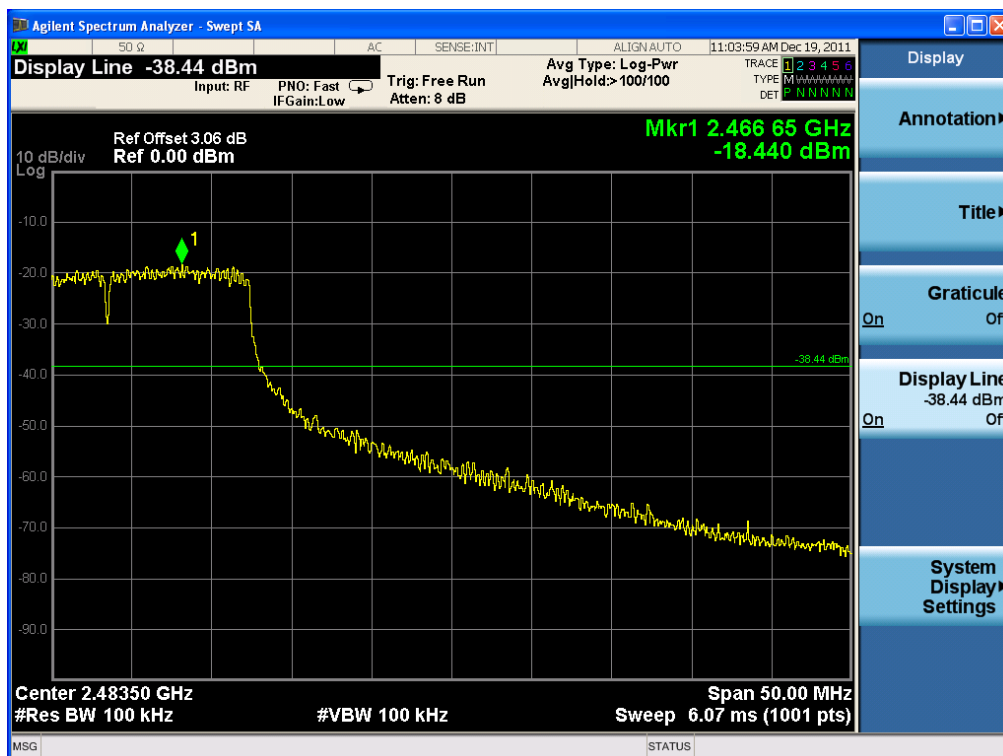
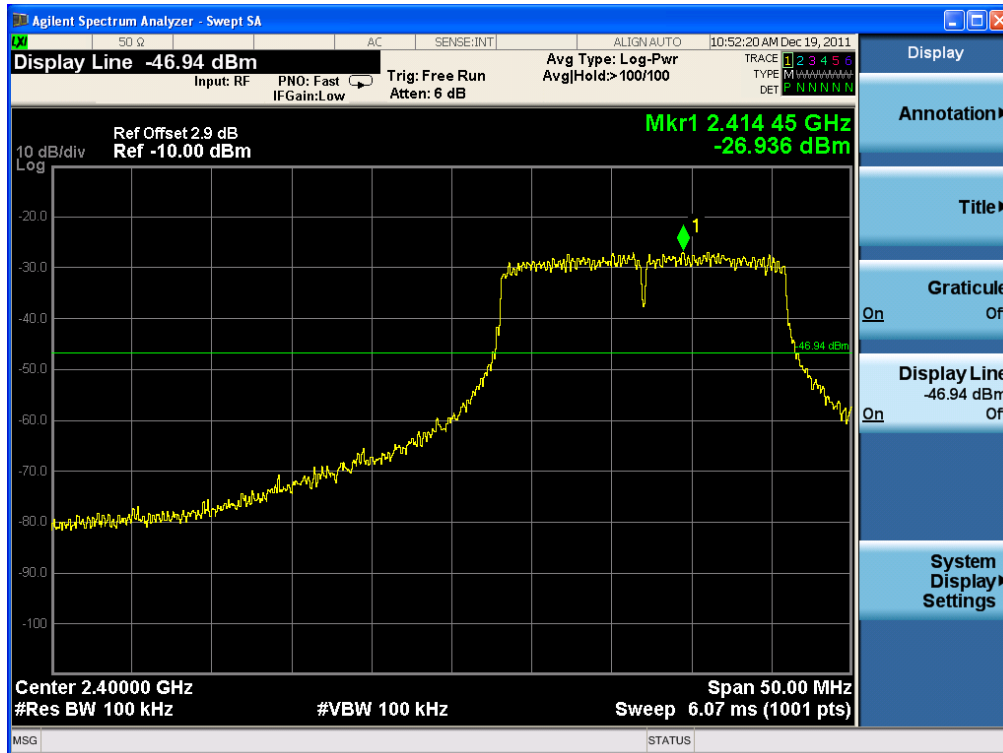
Band – edge (at 20 dB blow) – Mid channel(802.11n(40MHz, Ant0))
Frequency Range = 30 MHz ~ 10th harmonic



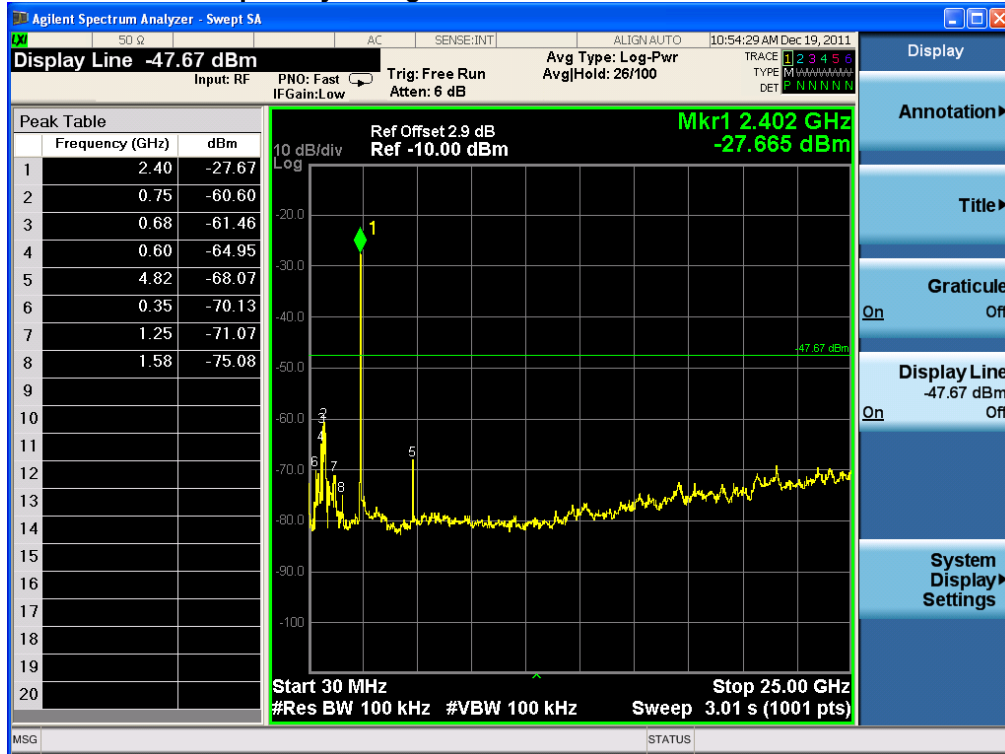
Band – edge (at 20 dB blow) – High channel(802.11n(40MHz, Ant0))
Frequency Range = 30 MHz ~ 10th harmonic



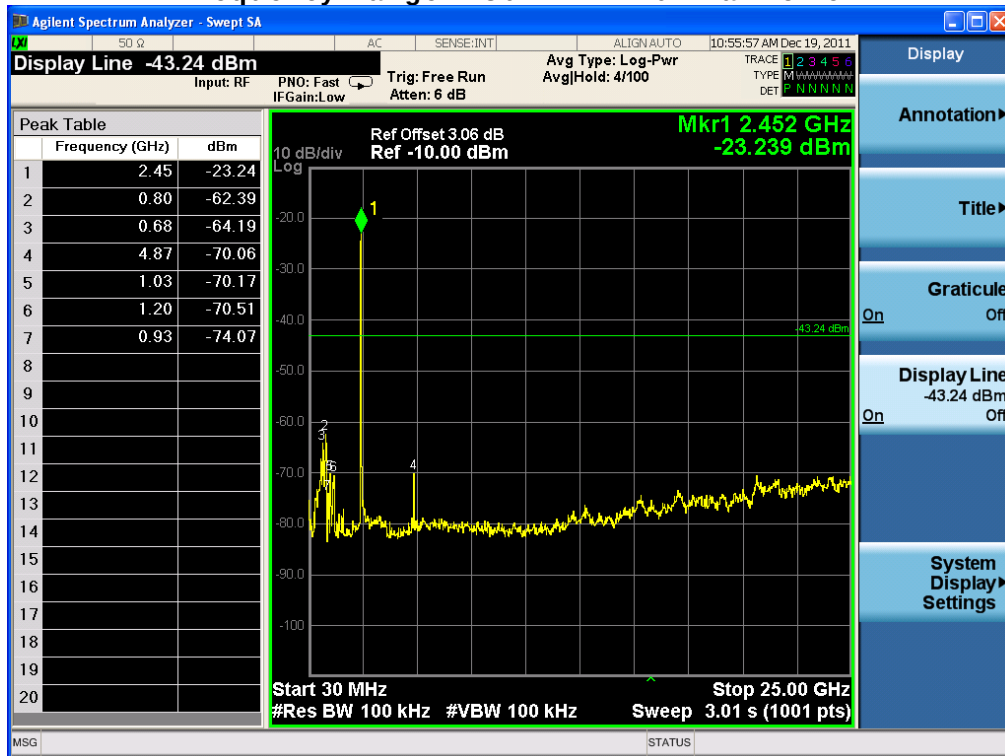
802.11n(20MHz, Ant1) Band-edge Measurements



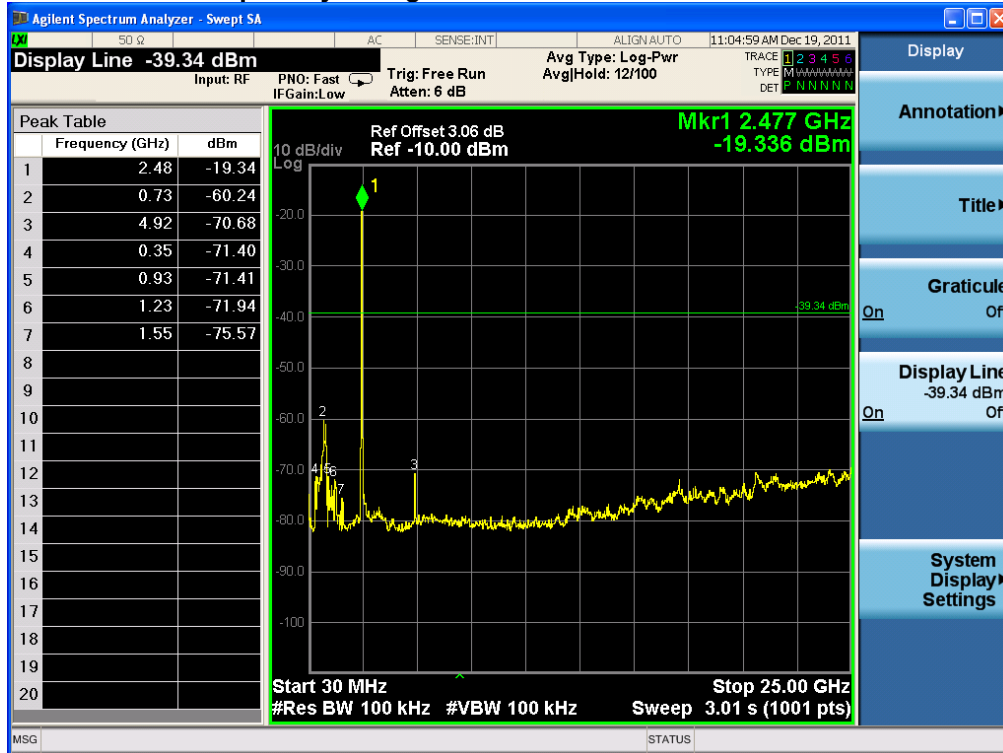
Band - edge (at 20 dB blow) - Low channel(802.11n(20MHz, Ant1))
Frequency Range = 30 MHz ~ 10th harmonic



Band - edge (at 20 dB blow) - Mid channel(802.11n(20MHz, Ant1))
Frequency Range = 30 MHz ~ 10th harmonic



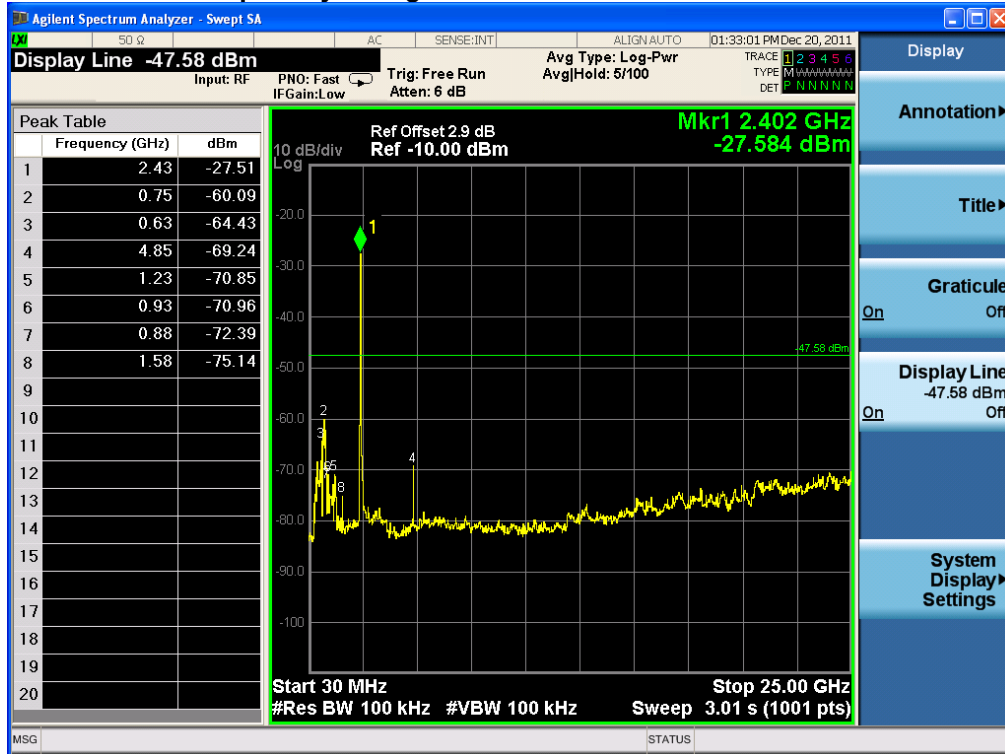
Band – edge (at 20 dB blow) – High channel(802.11n(20MHz, Ant1))
Frequency Range = 30 MHz ~ 10th harmonic



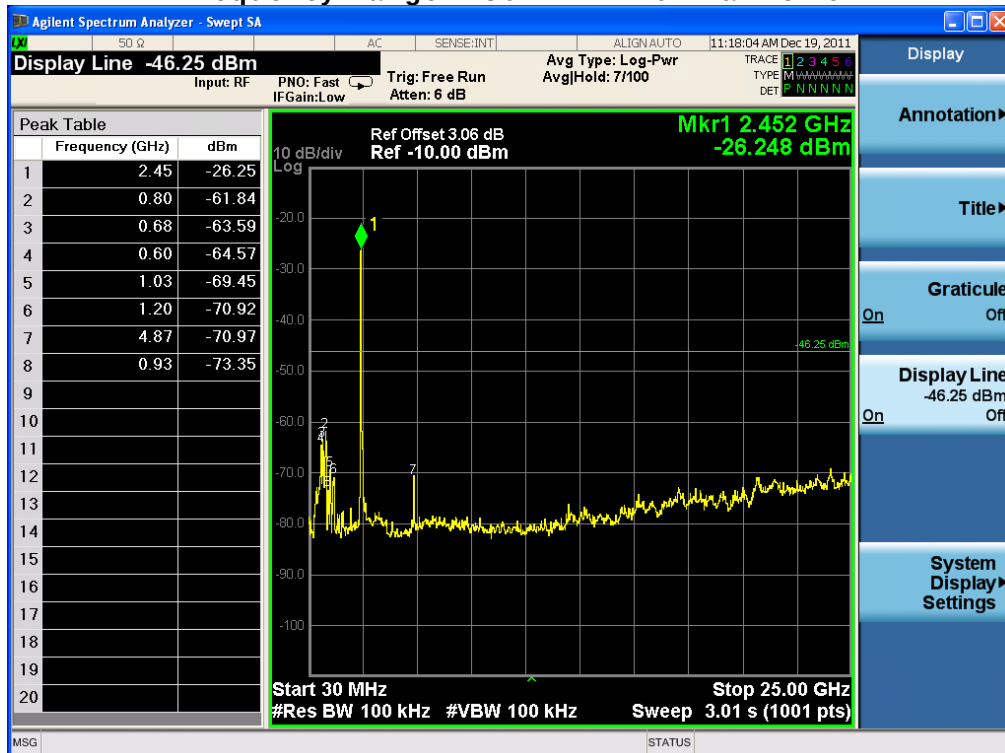
802.11n(40MHz, Ant1) Band-edge Measurements



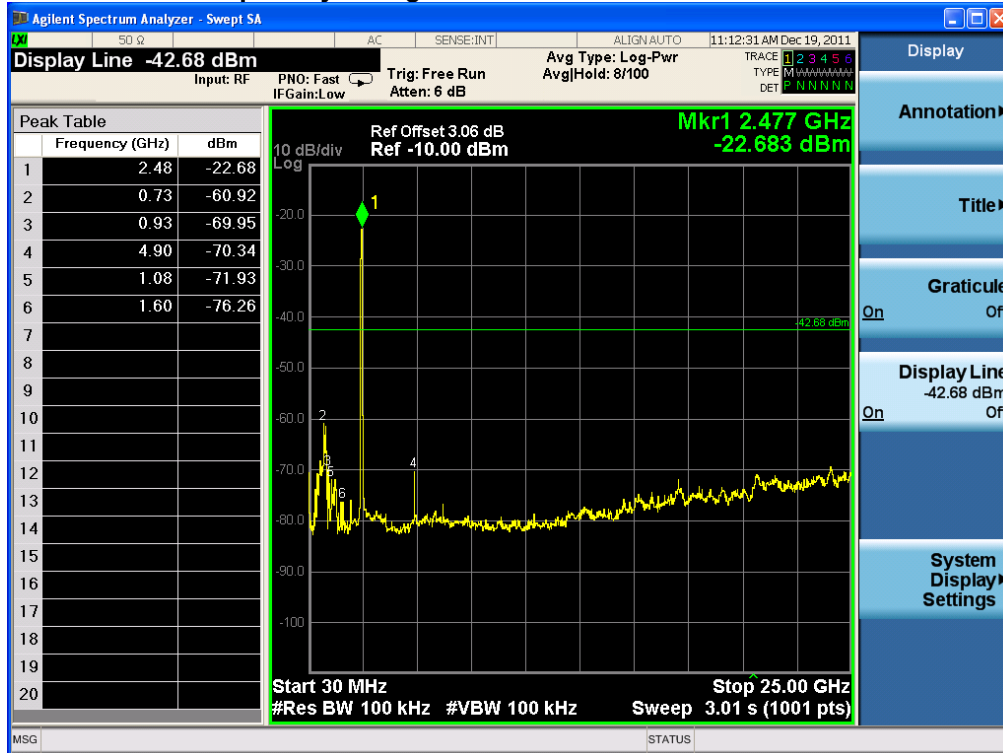
Band – edge (at 20 dB blow) – Low channel(802.11n(40MHz, Ant1))
Frequency Range = 30 MHz ~ 10th harmonic



Band – edge (at 20 dB blow) – Mid channel(802.11n(40MHz, Ant1))
Frequency Range = 30 MHz ~ 10th harmonic



Band – edge (at 20 dB blow) – High channel(802.11n(40MHz, Ant1))
Frequency Range = 30 MHz ~ 10th harmonic



2.1.5 Field Strength of Emissions

Test Location

☒ Testing was performed at a test distance of 3 meter SAC

Test Procedures

The height of the measuring antenna was varied between 1 to 4 m and the table was rotated a full revolution in order to obtain maximum values of the electric field intensity. The measurement was made in both the vertical and horizontal polarization, and the maximum value is presented in the report.

The spectrum analyzer is set to:

Center frequency = the worst channel

Frequency Range = 30 MHz ~ 10th harmonic

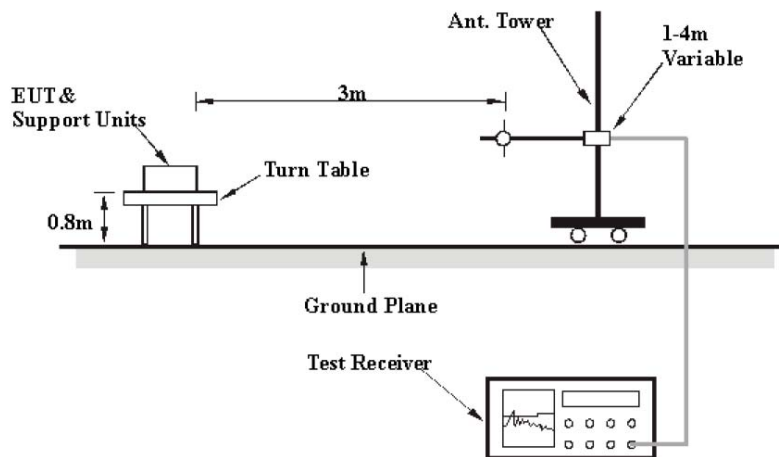
RBW = 120 kHz (30 MHz ~ 1 GHz) VBW ≥ RBW

= 1 MHz (1 GHz ~ 10th harmonic)

Span = 100 MHz

Detector function = Quasi-peak

Trace = max hold



Limit

- 15.209(a)

Frequency(MHz)	Field Strength uV/m@3m	Field Strength dBuV/m@3m
30-88	100**	40
88-216	150**	43.5
216-960	200**	46
Above 960	500	54

** Except as provided in 15.209(g).fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72MHz, 76-88MHz, 174-216MHz, 470-806MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g.15.231 and 15.241.

Test Results

Test mode : 802.11b

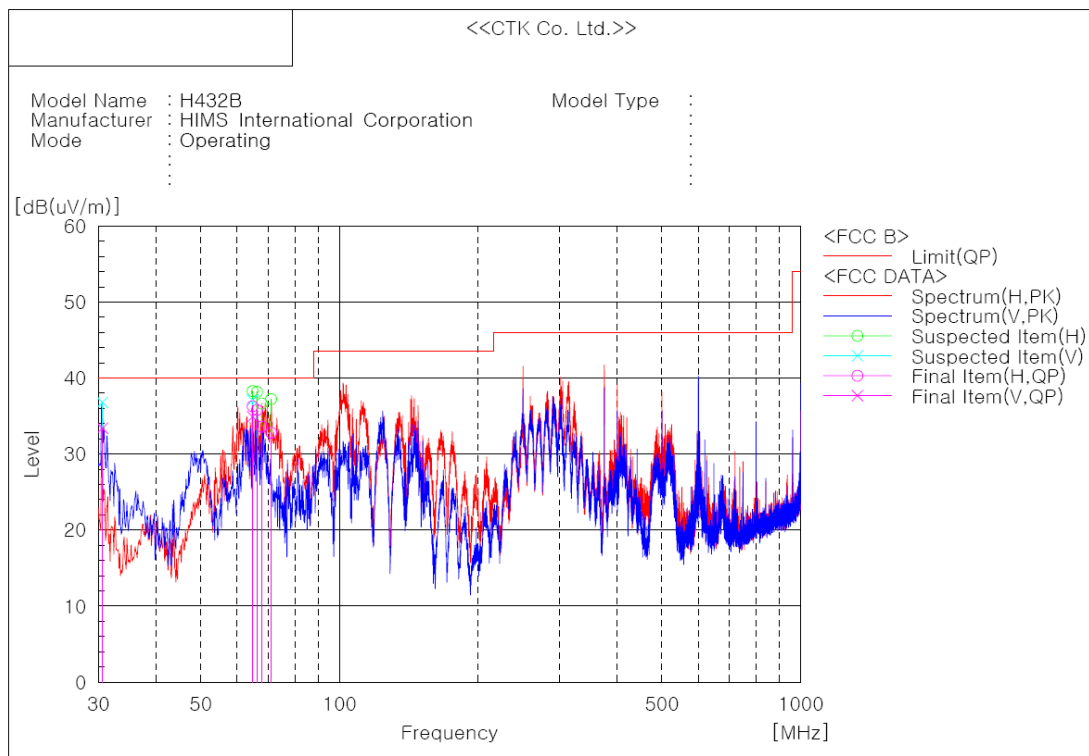
EUT	Braille Sense U2	Measurement Detail	
Model	H432B	Frequency Range	Below 1000MHz
Mode	802.11b(Worst Case)	Detector function	Quasi-Peak

The requirements are:

☒ Complies

Frequency (MHz)	Measured Data (dBuV/m)	Margin (dB)	Remark
64.799	36.3	3.7	Quasi-peak

Test Data



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]
1	30.606	V	44.6	-11.2	33.4	40.0	6.6	295.0	104.0
2	64.799	H	60.6	-24.3	36.3	40.0	3.7	309.0	129.0
3	64.799	V	59.2	-24.3	34.9	40.0	5.1	295.0	104.0
4	66.254	H	59.7	-23.9	35.8	40.0	4.2	400.0	66.0
5	67.830	H	57.0	-23.4	33.6	40.0	6.4	309.0	129.0
6	71.104	H	55.2	-22.4	32.8	40.0	7.2	400.0	66.0

Remark :

1. The field strength of spurious emission was measured in the following position: EUT stand-up position(Z axis), lie-down position(X,Y axis). The worst emission was found in stand-up position(X axis) and the worst case was recorded.

Test Results

EUT	Braille Sense U2	Measurement Detail	
Model	H432B	Frequency Range	1-25GHz
Channel	Low Channel	Detector function	Peak

Remarks

We have tested three mode (X, Y, Z). The worst mode (X axis) for final test.

The requirements are:

☒ Complies

Frequency (MHz)	Measured Data (dBuV/m)	Margin (dB)	Remark
2390	47.2	6.8	Average

Test Data – 802.11b

Frequency [MHz]	Reading [dBuV/m] AV / Peak	Pol.	Height [m]	Correction Factor			Limits [dBuV/m] AV / Peak		Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
				Antenna	Amp. Gain	Cable						
4824.00	35.8 42.7	V	1.1	32.7	34.9	11.4	54.0	74.0	45.0	51.9	9.0	22.1

Test Data – 802.11g

Frequency [MHz]	Reading [dBuV/m] AV / Peak	Pol.	Height [m]	Correction Factor			Limits [dBuV/m] AV / Peak		Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
				Antenna	Amp. Gain	Cable						
4824.00	32.9 42.8	V	1.1	32.7	34.9	11.4	54.0	74.0	42.1	52.0	11.9	22.0

Test Data – 802.11n(20 MHz, Ant0 and Ant1)

Frequency [MHz]	Reading [dBuV/m] AV / Peak	Pol.	Height [m]	Correction Factor			Limits [dBuV/m] AV / Peak		Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
				Antenna	Amp. Gain	Cable						
4824.00	33.1 42.5	V	1.1	32.7	34.9	11.4	54.0	74.0	42.3	51.7	11.7	22.3

Test Data – 802.11n(40 MHz, Ant0 and Ant1)

Frequency [MHz]	Reading [dBuV/m] AV / Peak	Pol.	Height [m]	Correction Factor			Limits [dBuV/m] AV / Peak		Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
				Antenna	Amp. Gain	Cable						
4844.00	31.7 41.0	V	1.1	32.7	34.9	11.4	54.0	74.0	40.9	50.2	13.1	23.8

Restricted band edge test data

Measured frequency range : 2310-2390 MHz, 2483.5-2500 MHz

Test data - 802.11b

Frequency [MHz]	Reading [dBuV/m] AV / Peak	Pol.	Height [m]	Correction Factor			Limits [dBuV/m] AV / Peak	Result [dBuV/m] AV / Peak	Margin [dB] AV / Peak
				Antenna	Amp. Gain	Cable			
2390.00	35.4 45.3	V	1.1	28.2	35.3	7.4	54.0 74.0	35.7 45.6	18.3 28.4

Test Data - 802.11g

Frequency [MHz]	Reading [dBuV/m] AV / Peak	Pol.	Height [m]	Correction Factor			Limits [dBuV/m] AV / Peak	Result [dBuV/m] AV / Peak	Margin [dB] AV / Peak
				Antenna	Amp. Gain	Cable			
2390.00	44.9 59.4	V	1.1	28.2	35.3	7.4	54.0 74.0	45.2 59.7	8.8 14.3

Test Data - 802.11n(20 MHz, Ant0 and Ant1)

Frequency [MHz]	Reading [dBuV/m] AV / Peak	Pol.	Height [m]	Correction Factor			Limits [dBuV/m] AV / Peak	Result [dBuV/m] AV / Peak	Margin [dB] AV / Peak
				Antenna	Amp. Gain	Cable			
2390.00	38.1 51.6	V	1.1	28.2	35.3	7.4	54.0 74.0	38.4 51.9	15.6 22.1

Test Data - 802.11n(40 MHz, Ant0 and Ant1)

Frequency [MHz]	Reading [dBuV/m] AV / Peak	Pol.	Height [m]	Correction Factor			Limits [dBuV/m] AV / Peak	Result [dBuV/m] AV / Peak	Margin [dB] AV / Peak
				Antenna	Amp. Gain	Cable			
2390.00	46.9 61.1	V	1.1	28.2	35.3	7.4	54.0 74.0	47.2 61.4	6.8 12.6

Test Results

EUT	Braille Sense U2	Measurement Detail	
Model	H432B	Frequency Range	1-25GHz
Channel	Mid Channel	Detector function	Peak

Remarks

We have tested three mode (X, Y, Z). The worst mode (X axis) for final test.

The requirements are:

☒ Complies

Frequency (MHz)	Measured Data (dBuV/m)	Margin (dB)	Remark
4874	43.9	10.1	Average

Test Data – 802.11b

Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Height [m]	Correction Factor			Limits [dBuV/m] AV / Peak		Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
					Antenna	Amp. Gain	Cable						
4874.00	34.7	41.8	V	1.1	32.7	34.9	11.4	54.0	74.0	43.9	51.0	10.1	23.0

Test Data – 802.11g

Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Height [m]	Correction Factor			Limits [dBuV/m] AV / Peak		Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
					Antenna	Amp. Gain	Cable						
4874.00	33.2	43.5	V	1.1	32.7	34.9	11.4	54.0	74.0	42.4	52.7	11.6	21.3

Test Data – 802.11n(20 MHz, Ant0 and Ant1)

Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Height [m]	Correction Factor			Limits [dBuV/m] AV / Peak		Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
					Antenna	Amp. Gain	Cable						
4874.00	33.4	44.1	V	1.1	32.7	34.9	11.4	54.0	74.0	42.6	53.3	11.4	20.7

Test Data – 802.11n(40 MHz, Ant0 and Ant1)

Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Height [m]	Correction Factor			Limits [dBuV/m] AV / Peak		Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
					Antenna	Amp. Gain	Cable						
4874.00	31.9	42.0	V	1.1	32.7	34.9	11.4	54.0	74.0	41.1	51.2	12.9	22.8

Test Results

EUT	Braille Sense U2	Measurement Detail	
Model	H432B	Frequency Range	1-25GHz
Channel	High Channel	Detector function	Peak

Remarks

We have tested three mode (X, Y, Z). The worst mode (X axis) for final test.

The requirements are:

☒ Complies

Frequency (MHz)	Measured Data (dBuV/m)	Margin (dB)	Remark
2483.5	51.7	2.3	Average

Test Data – 802.11b

Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Height [m]	Correction Factor			Limits [dBuV/m] AV / Peak		Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
					Antenna	Amp. Gain	Cable						
4924.00	34.8	42.1	V	1.1	32.7	34.9	11.4	54.0	74.0	44.0	51.3	10.0	22.7

Test Data – 802.11g

Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Height [m]	Correction Factor			Limits [dBuV/m] AV / Peak		Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
					Antenna	Amp. Gain	Cable						
4924.00	33.3	44.3	V	1.1	32.7	34.9	11.4	54.0	74.0	42.5	53.5	11.5	20.6

Test Data – 802.11n(20 MHz, Ant0 and Ant1)

Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Height [m]	Correction Factor			Limits [dBuV/m] AV / Peak		Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
					Antenna	Amp. Gain	Cable						
4924.00	33.2	43.3	V	1.1	32.7	34.9	11.4	54.0	74.0	42.4	52.5	11.6	21.5

Test Data – 802.11n(40 MHz, Ant0 and Ant1)

Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Height [m]	Correction Factor			Limits [dBuV/m] AV / Peak		Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
					Antenna	Amp. Gain	Cable						
4904.00	31.7	41.9	V	1.1	32.7	34.9	11.4	54.0	74.0	40.9	51.1	13.1	22.9

Restricted band edge test data

Measured frequency range : 2310-2390 MHz, 2483.5-2500 MHz

Test data - 802.11b

Frequency [MHz]	Reading [dBuV/m]		Pol.	Height [m]	Correction Factor			Limits [dBuV/m]		Result [dBuV/m]		Margin [dB]	
	AV / Peak				Antenna	Amp. Gain	Cable	AV / Peak		AV / Peak		AV / Peak	
2483.50	35.5	45.1	V	1.1	28.2	35.3	7.4	54.0	74.0	35.8	45.4	18.2	28.6

Test Data - 802.11g

Frequency [MHz]	Reading [dBuV/m]		Pol.	Height [m]	Correction Factor			Limits [dBuV/m]		Result [dBuV/m]		Margin [dB]	
	AV / Peak				Antenna	Amp. Gain	Cable	AV / Peak		AV / Peak		AV / Peak	
2483.50	47.6	62.1	V	1.1	28.2	35.3	7.4	54.0	74.0	47.9	62.4	6.1	11.6

Test Data - 802.11n(20 MHz, Ant0 and Ant1)

Frequency [MHz]	Reading [dBuV / m] AV / Peak		Pol.	Height [m]	Correction Factor			Limits [dBuV / m] AV / Peak		Result [dBuV / m] AV / Peak		Margin [dB] AV / Peak	
					Antenna	Amp. Gain	Cable						
2483.50	49.8	63.8	V	1.1	28.2	35.3	7.4	54.0	74.0	50.1	64.1	3.9	9.9

Test Data - 802.11n(40 MHz, Ant0 and Ant1)

Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Height [m]	Correction Factor			Limits [dBuV/m] AV / Peak		Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
					Antenna	Amp. Gain	Cable						
2483.50	51.4	64.5	V	1.1	28.2	35.3	7.4	54.0	74.0	51.7	64.8	2.3	9.2

2.1.6 AC Conducted Emissions

Test Location

Shielded Room

Frequency Range of Measurement

150 kHz to 30 MHz

Instrument Settings

IF Band Width: 9 kHz

Test Procedures

The EUT was placed on a non-metallic table 0.8m above the metallic, grounded floor and 0.4m from the reference ground plane wall. The distance to other metallic surfaces was at least 0.8m.

Amplitude measurements were performed with a quasi-peak detector and an average detector.

Limit

- 15.207(a)

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 ~ 0.5	66 to 56*	56 to 46*
0.5 ~ 5	56	46
5 ~ 30	60	50

* Decreases with the logarithm of the frequency.

Test Results

The requirements are:

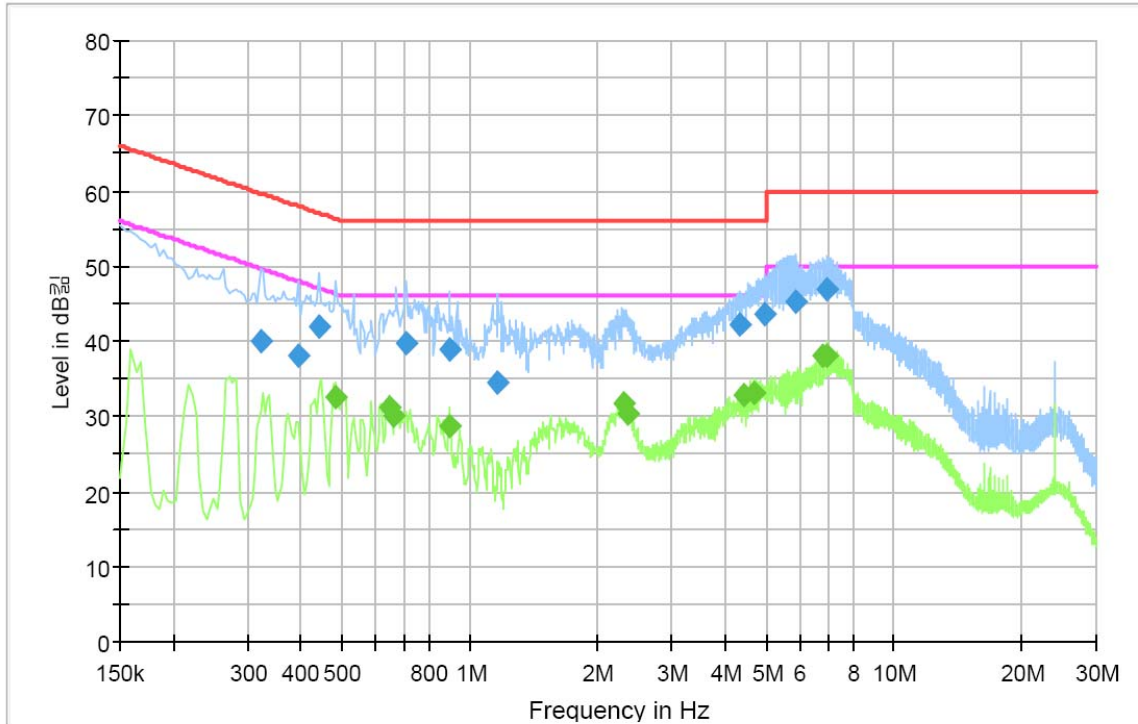
☒ Complies

Test mode : 802.11b

Frequency (MHz)	Measured Data (dBuV/m)	Margin (dB)	Remark
6.972	38.1	11.9	Average

Test Data

[HOT]



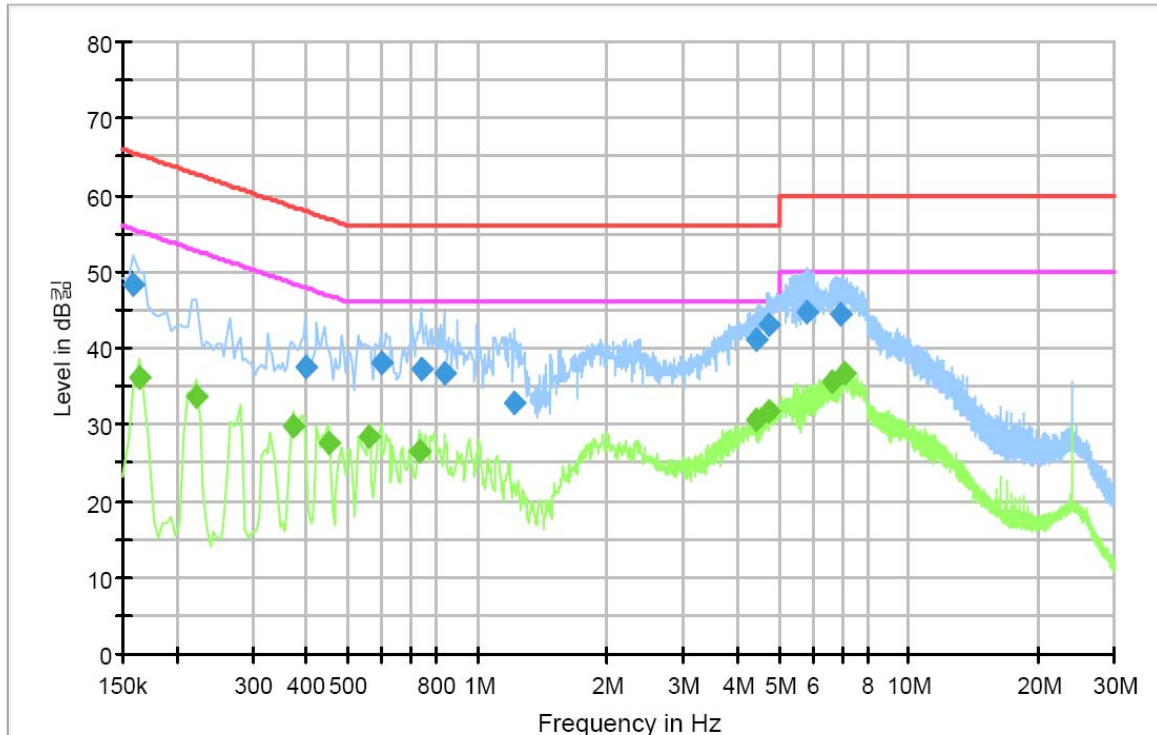
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.321000	39.9	1000.0	9.000	On	L1	10.0	19.8	59.7
0.393000	38.1	1000.0	9.000	On	L1	10.0	19.9	58.0
0.442500	41.9	1000.0	9.000	On	L1	10.0	15.2	57.0
0.708000	39.6	1000.0	9.000	On	L1	10.1	16.4	56.0
0.897000	38.9	1000.0	9.000	On	L1	10.0	17.1	56.0
1.167000	34.5	1000.0	9.000	On	L1	10.0	21.5	56.0
4.339500	42.3	1000.0	9.000	On	L1	9.8	13.7	56.0
4.974000	43.6	1000.0	9.000	On	L1	9.8	12.4	56.0
5.901000	45.3	1000.0	9.000	On	L1	9.8	14.7	60.0
6.972000	46.9	1000.0	9.000	On	L1	9.7	13.1	60.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.483000	32.6	1000.0	9.000	On	L1	10.0	13.7	46.3
0.645000	31.0	1000.0	9.000	On	L1	10.1	15.0	46.0
0.663000	30.0	1000.0	9.000	On	L1	10.1	16.0	46.0
0.897000	28.8	1000.0	9.000	On	L1	10.0	17.2	46.0
2.319000	31.6	1000.0	9.000	On	L1	9.9	14.4	46.0
2.373000	30.4	1000.0	9.000	On	L1	9.9	15.6	46.0
4.425000	32.9	1000.0	9.000	On	L1	9.8	13.1	46.0
4.663500	33.2	1000.0	9.000	On	L1	9.8	12.8	46.0
6.801000	38.1	1000.0	9.000	On	L1	9.7	11.9	50.0
6.972000	38.1	1000.0	9.000	On	L1	9.7	11.9	50.0

[NEUTRAL]



Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.159000	48.3	1000.0	9.000	On	N	10.1	17.2	65.5
0.397500	37.6	1000.0	9.000	On	N	10.0	20.3	57.9
0.595500	38.1	1000.0	9.000	On	N	10.0	17.9	56.0
0.739500	37.3	1000.0	9.000	On	N	10.1	18.7	56.0
0.834000	36.6	1000.0	9.000	On	N	10.1	19.4	56.0
1.216500	32.7	1000.0	9.000	On	N	10.0	23.3	56.0
4.447500	41.2	1000.0	9.000	On	N	9.8	14.8	56.0
4.717500	43.0	1000.0	9.000	On	N	9.8	13.0	56.0
5.824500	44.7	1000.0	9.000	On	N	9.8	15.3	60.0
6.945000	44.5	1000.0	9.000	On	N	9.7	15.5	60.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.163500	36.3	1000.0	9.000	On	N	10.0	19.0	55.3
0.222000	33.6	1000.0	9.000	On	N	10.2	19.2	52.7
0.375000	29.7	1000.0	9.000	On	N	10.0	18.7	48.4
0.451500	27.6	1000.0	9.000	On	N	9.9	19.3	46.8
0.559500	28.3	1000.0	9.000	On	N	10.0	17.7	46.0
0.730500	26.4	1000.0	9.000	On	N	10.1	19.6	46.0
4.420500	30.6	1000.0	9.000	On	N	9.8	15.4	46.0
4.717500	31.6	1000.0	9.000	On	N	9.8	14.4	46.0
6.634500	35.5	1000.0	9.000	On	N	9.7	14.5	50.0
7.134000	36.7	1000.0	9.000	On	N	9.7	13.3	50.0



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APPENDIX A – Test Equipment Used For Tests

Name of Equipment	Manufacturer	Model No.	Serial No.	Due Date
Signal Analyzer	Agilent	N9020A	MY48011598	2012-11-10
Spectrum Analyzer	Rohde & Schwarz	FSP-30	100994	2012-11-10
EMI Test Receiver	Rohde & Schwarz	ESVS30	826638/008	2012-07-07
ULTRA Broadband Antenna	Rohde & Schwarz	HL562	100203	2013-07-05
LOOP ANTENNA	EMCO	6502	9107-2652	2012-10-29
Attenuator	HP	8494A	3308A33351	2012-11-14
EPM Series Power Meter	HP	E4418A	GB38272734	2012-11-10
Power Sensor	HP	8487A	3318A03524	2012-07-07
Audio Analyzer	HP	8903B	2747A03432	2012-11-10
ESG-D Series Signal Generator	Agilent	E4432B	US40054094	2012-11-21
SYNTHESIZED SWEEPER	HP	8341B	2819A01563	2012-11-10
Modulation Analyzer	HP	8901B	3438A05228	2012-11-18
Attenuator	BIRD	1000-WA-MFN-30	236	2012-11-14
Temp&Humi Chamber	Kunpoong	JT-TH-556-1	9QE5-002	2012-01-14
DC POWER SUPPLY	Agilent	E3632A	MY40011638	2012-11-10
EMC Analyzer	Agilent	E7405A	MY45110859	2012-02-11
Horn Antenna	ETS-Lindgren	3115	00078894	2013-03-22
Horn Antenna	ETS-Lindgren	3115	00078895	2013-03-22
Antenna(Biconical)	EMCO	3110	9202-1510	2012-06-10
Antenna(Log Periodic)	EMCO	3146	9607-4567	2012-06-10
OPT H64 AMPLIFIER	HP	8447F	3113A06814	2012-03-31
PREAMPLIFIER	Agilent	8449B	3008A02307	2012-11-17
EMI Test Receiver	Rohde & Schwarz	ESHS30	828144/022	2012-02-09
LISN	Rohde & Schwarz	ENV216	101150	2012-02-10
EMI Test Receiver	Rohde & Schwarz	ESCI3	100032	2012-02-09
AC Power Source	California Instruments	2001RP	08770	2012-02-09