Nemko Korea Co., Ltd.

155 & 159, Osan-Ro, Mohyeon-Myeon, Cheoin-Gu, Yongin-Si, Gyeonggi-Do, 449-852 KOREA, REPUBLIC OF
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FCC and IC EVALUATION REPORT FOR CERTIFICATION

Applicant :

Samsung Electronics Co., Ltd.
129, Samsung-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, Korea
(Post code : 443-742)
Attn. : Mr. Jaywoo. Lee

Dates of Issue : October 23, 2012
Test Report No. : NK-12-R-171
Test Site : Nemko Korea Co., Ltd.

FCC ID **IC**	**A3LWLM100A** **649E-WLM100A**
Brand Name	**SAMSUNG**
Contact Person	**Samsung Electronics Co., Ltd.** **129, Samsung-ro, Yeongtong-gu,** **Suwon-si, Gyeonggi-do, Korea 443-742** **Mr. Jaywoo. Lee** **Telephone No. : +82-31-277-2569**

Applied Standard:	FCC 47 CFR Part 15C and IC RSS-210
Classification:	FCC part 15 Spread Spectrum Transmitter
EUT Type:	Wireless LAN module

The device bearing the brand name and model specified above has been shown to comply with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.4-2003, ANSI C63.10. The client should not use it to claim product endorsement by TAF or any government agencies. The test results in the report only apply to the tested sample.

I attest to the accuracy of data and all measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

Oct. 23. 2012
Tested By : Jin-ha, Ko
Engineer

Oct. 23. 2012
Reviewed By : Deokha, Ryu
Manager & Chief Engineer

TABLE OF CONTENTS

1. SCOPE

Measurement and determination of electromagnetic emissions (EME) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission under FCC part 15 and IC RSS-210.

Responsible Party :	Samsung Electronics Co., Ltd.
Contact Person :	Mr. Jaywoo. Lee
Manufacturer :	Samsung Electronics Co., Ltd. 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, Korea 443-742

- FCC ID: A3LWLM100A
- Model: WLM100A
- Brand Name: SAMSUNG
- EUT Type: Wireless LAN module
- Classification: FCC part 15 Spread Spectrum Transmitter
- Applied Standard: FCC 47 CFR Part 15 subpart C and IC RSS-210
- Test Procedure(s): ANSI C63.4-2003, ANSI C63.10 and FCC guidance of 558074 D01 DTS Meas. Guidance v02 dated October 4, 2012 entitled "Guidance for Performing Compliance Measurements on Digital Transmission System (DTS) Operating Under §15.247"
- Dates of Test: October 5, 2012 ~ October 23, 2012
- Place of Tests: Nemko Korea Co., Ltd.

2. INTRODUCTION

2.1 Test facility

The measurement procedure described in American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz (ANSI C63.4-2003), the American National Standard for Testing Unlicensed Wireless Devices (ANSI C63.10-2009) was used in determining radiated and conducted emissions emanating from **Samsung Electronics Co., Ltd. FCC ID : A3LWLM100A** and **IC : 649E-WLM100A**

These measurement tests were conducted at ***Nemko Korea Co., Ltd. EMC Laboratory***.
The site address is 155 & 159, Osan-Ro, Mohyeon-Myeon, Cheoin-Gu, Yongin-Si, Gyeonggi-Do, 449-852 KOREA, REPUBLIC OF.

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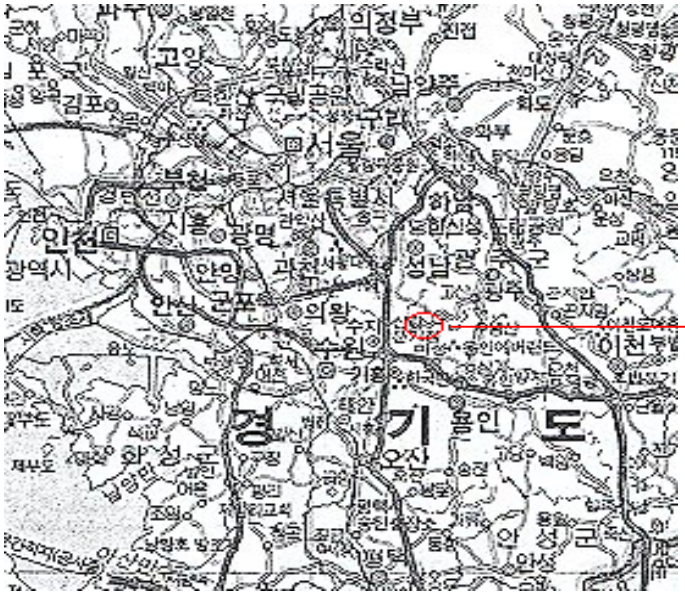
The area of Nemko Korea Corporation Ltd. EMC Test Site is located in a mountain area at 80 kilo-meters (48 miles) southeast and Incheon International Airport (Incheon Airport), 30 kilometers (18 miles) south-southeast from central Seoul.
It is located in the valley surrounded by mountains in all directions where ambient radio signal conditions are quiet and a favorable area to measure the radio frequency interference on open field test site for the computing and ISM devices manufactures.
The detailed description of the measurement facility was found to be in compliance with the requirements of § 2.948 according to ANSI C63.4 2003.



Nemko Korea Co., Ltd.
EMC Lab.
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Fig. 1. The map above shows the Seoul in Korea vicinity area.
The map also shows Nemko Korea Corporation Ltd. EMC Lab. and Incheon Airport.

2.2 Accreditation and listing

Accreditation type		Accreditation number
FC	FCC part 15/18 Filing site	Registration No. 97992
	CAB Accreditation for DOC	Designation No. KR0026
KOLAS	KOLAS Accredited Lab. (Korea Laboratory Accreditation Scheme)	Registration No. 155
Industry Canada	Canada IC Registered site	Site No. 2040E
VCCI	VCCI registration site(RE/CE/Telecom CE)	Member No. 2118
IECEE CB SCHEME	EMC CBTL	-
방송통신위원회	KCC(RRL)Designated Lab.	Registration No. KR0026
	SASO registered Lab and Certification Body	Registration No. 2008-15

3. TEST CONDITIONS & EUT INFORMATION

3.1 Operation During Test

The EUT is the transceiver which is the module supporting the 802.11b/g/n mode.
It supports two antennas. The main antenna can be used as transmitting and receiving.
The aux antenna can be used as receiving only.
During the test, the EUT was incorporated into a Bluray disc player.
The EUT was connected to laptop PC and then a test program was executed to operate EUT continuously. The EUT was tested at the lowest channel, middle channel and the highest channel with the maximum output power in accordance with the manufacturer's specifications. The worst data were recorded in the report.

The EUT is programmed with the following setting during the testing:

Test frequency		2412 MHz	2437 MHz	2462 MHz
802.11b	Average power	12.59	16.13	13.84
	Data rate (Mbps)	11	11	11
802.11g	Average power	15.56	16.14	15.68
	Data rate (Mbps)	6	6	6
802.11n	Average power	15.75	16.14	15.51
	Data rate (Mbps)	MCS0	MCS0	MCS0

Test frequency		2422 MHz	2437 MHz	2452 MHz
802.11n(HT40)	Average power	13.19	15.66	13.05
	Data rate (Mbps)	MCS0	MCS0	MCS0

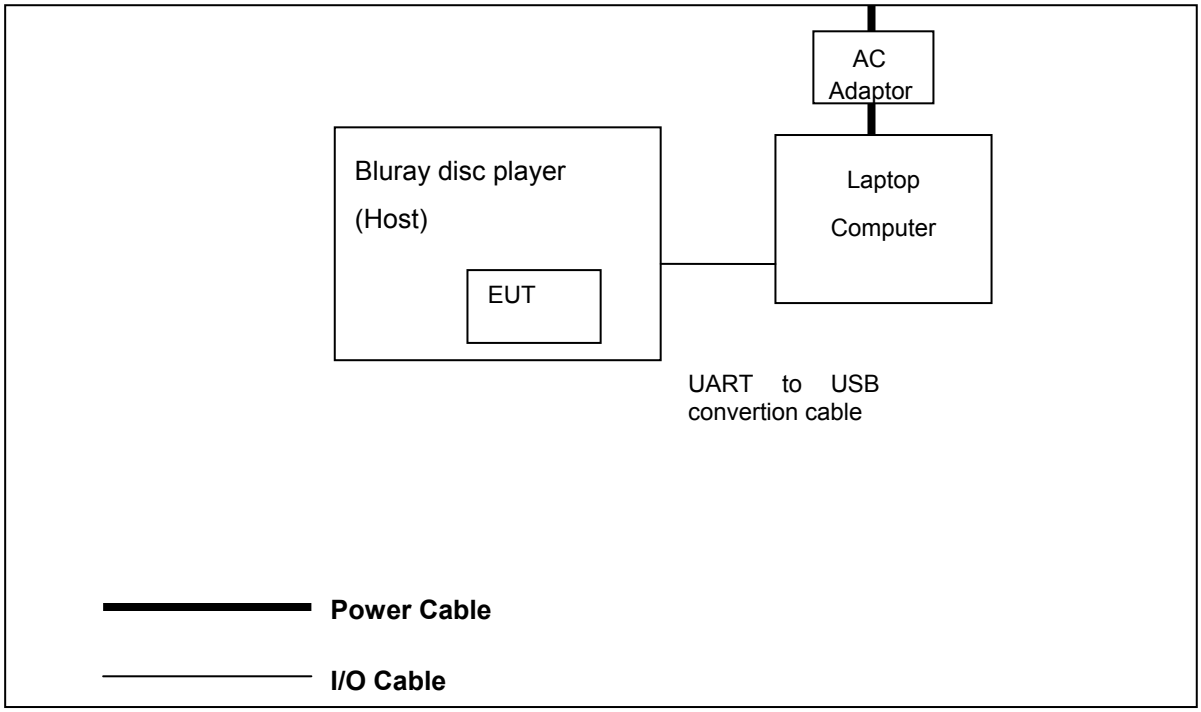
Table of test modes:

Test Items	Mode	Data rate (Mbps)
Conducted Emissions	802.11n(HT20)	MCS0
Radiated Emissions	802.11n(HT20)	MCS0
6 dB Bandwidth	802.11b	11
	802.11g	6
	802.11n(HT20)	MCS0
	802.11n(HT40)	MCS0
Peak Output Power	802.11b	11
	802.11g	6
	802.11n(HT20)	MCS0
	802.11n(HT40)	MCS0
Peak Power Spectral Density	802.11b	11
	802.11g	6
	802.11n(HT20)	MCS0
	802.11n(HT40)	MCS0
Conducted Spurious Emission, Radiated Spurious Emission, Band edge Emission	802.11b	11
	802.11g	6
	802.11n(HT20)	MCS0
	802.11n(HT40)	MCS0

3.2 Support Equipment

Wireless LAN Module (EUT)	Samsung Electronics Co., Ltd. FCC ID : A3LWLM100A	S/N: N/A
Bluray disc player	Samsung Electronics Co., Ltd. Model : BD-E5400	S/N: ZX2X1T4C929731ZF
Laptop PC	Samsung Electronics Co., Ltd. Model : NT-R520 0.15 m UART to USB shielded convertion cable	FCC DOC S/N: ZK6V93FS800012Y
a.c.-d.c. Adaptor	Chicony Power Technology Co., Ltd. Model : AD-6019R 1.5 m unshielded power cable	FCC DOC S/N: CNBA440024ADON897I2602

3.3 Setup Drawing



3.4 EUT Information

The EUT is the **Samsung Wireless LAN module FCC ID: A3LWLM100A, IC: 649E-WLM100A.**

Specifications:

EUT Type	Wireless LAN module
Model Name	WLM100A
Brand Name	SAMSUNG
Frequency of Operation	2412 MHz to 2462 MHz
Peak Power Output (Conducted)	802.11b : 22.70 dBm, 802.11g : 24.86 dBm 802.11n(HT20) : 24.64 dBm 802.11n(HT40) : 24.96 dBm
Channels	802.11b,g,n(HT20) : 11 CH, 802.11n(HT40) : 7ch
TX Antenna Gain	2.60 dBi
Spreading	DSSS, OFDM
Modulations	BPSK, QPSK, 16QAM, 64QAM
Temperature Range	-20 ℃ ~ +55 ℃
Voltage	3.3 Vdc
Dimension(W x H x D)	23.0 mm x 33.7 mm x 4.2 mm
Weight	3 g
Remarks	-

4. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specification:

Name of Test	FCC Paragraph No.	IC Paragraph No.	Result	Remark
Conducted Emission	15.207	RSS-GEN 7.2.4	Complies	
Radiated Emission	15.205 15.209	RSS-GEN 7.2.2	Complies	
6 dB Bandwidth	15.247(a)(2)	RSS-210 A8.2	Complies	
Peak Power Output	15.247(b)(3)	RSS-210 A8.4	Complies	
Peak Power Spectral Density	15.247(e)	RSS-210 A8.2	Complies	
Conducted Spurious Emission	15.247(d)	RSS-210 A8.5	Complies	
Radiated Spurious Emission	15.247(d)	RSS-210 A8.5	Complies	
Maximum Permissible Exposure	1.1307(b)	RSS-102	Complies	

5. RECOMMENDATION/CONCLUSION

The data collected shows that the **Samsung Wireless LAN module FCC ID: A3LWLM100A, IC: 649E-WLM100A** is in compliance with Part 15 Subpart C 15.247 of the FCC Rules.

6. ANTENNA REQUIREMENTS

§15.203 of the FCC Rules part 15 Subpart C

: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

The antenna of the **Samsung Wireless LAN module FCC ID: A3LWLM100A, IC: 649E-WLM100A** is **Permanently attached** and there are no provisions for connection to an external antenna. It complies with the requirement of §15.203.

7. DESCRIPTION OF TESTS

7.1 Conducted Emissions

The Line conducted emission test facility is located inside a 4 x 7 x 2.5 meter shielded enclosure.
It is manufactured by EM engineering. The shielding effectiveness of the shielded room is in accordance with MIL-STD-285 or NSA 65-6.
A 1 m x 1.5 m wooden table 0.8 m height is placed 0.4 m away from the vertical wall and 1.5 m away from the side of wall of the shielded room Rohde & Schwarz (ESH3-Z5) and Rohde & Schwarz (ESH2-Z5) of the 50 ohm/50 μH Line Impedance Stabilization Network(LISN) are bonded to the shielded room.
The EUT is powered from the Rohde & Schwarz LISN (ESH3-Z5) and the support equipment is powered from the Rohde & Schwarz LISN (ESH2-Z5).
Power to the LISNs are filtered by high-current high insertion loss Power line filters. The purpose of filter is to attenuate ambient signal interference and this filter is also bonded to shielded enclosure. All electrical cables are shielded by tinned copper zipper tubing with inner diameter of 1 / 2 ”.
If DC power device, power will be derived from the source power supply it normally will be powered from and this supply lines will be connected to the LISNs, All interconnecting cables more than 1 meter were shortened by non inductive bundling (serpentine fashion) to a 1 meter length.
Sufficient time for EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the spectrum analyzer to determine the frequency producing the maximum EME from the EUT.
The spectrum was scanned from 150 kHz to 30 MHz with 200 ms sweep time.
The frequency producing the maximum level was re-examined using the EMI test receiver. (Rohde & Schwarz ESCS30).
The detector functions were set to CISPR quasi-peak mode & average mode.
The bandwidth of receiver was set to 9 kHz. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each EME emission.
Each emission was maximized by; switching power lines; varying the mode of operation or resolution; clock or data exchange speed; scrolling H pattern to the EUT and of support equipment, and powering the monitor from the floor mounted outlet box and computer aux AC outlet, if applicable; whichever determined the worst case emission.
Each EME reported was calibrated using the R&S signal generator.

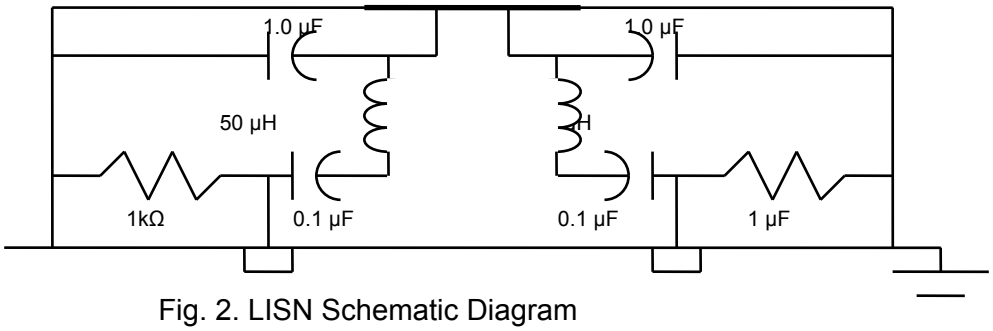


Fig. 2. LISN Schematic Diagram

7.2 Radiated Emissions

Preliminary measurements were made indoors at 3 meter using broad band antennas, broadband amplifier, and spectrum analyzer to determine the frequency producing the maximum EME. Appropriate precaution was taken to ensure that all EME from the EUT were maximized and investigated. The Technology configuration, clock speed, mode of operation or video resolution, turntable azimuth with respect to the antenna was note for each frequency found. The spectrum was scanned from 9 kHz to 30 MHz using Loop Antenne(Rohde&Schwarz, HFH2-Z2) and 30 to 1000 MHz using Bi-conical log Antenna(ARA, LPB-2520/A). Above 1 GHz, Horn antenna (Scwarzbeck BBHA 9120D: up to 18 GHz, Q-par Angus QSH20S20 : 18 to 26.5 GHz, QSH22K20: up to 40 GHz) was used. Final Measurements were made outdoors at 3 or 10 m test range using Loop Antenne(Rohde&Schwarz, HFH2-Z2) and Logbicon Super Antenna (Schwarzbeck, VULB9168) or Horn antenna.(Scwarzbeck BBHA 9120D: up to 18 GHz , Q-par Angus QSH20S20 : 18 to 26.5 GHz, QSH22K20: up to 40 GHz).
The test equipment was placed on a wooden table. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition.
Each frequency found during pre-scan measurements was reexamined and investigated using EMI test receiver (ESCS30) & (FSP40). The detector function was set to CISPR peak mode or quasi-peak mode or average mode and the band-width of the receiver was set to 120 kHz or 1 MHz depending on the frequency or type of signal. The half wave dipole antenna was tuned to the frequency found during preliminary radiated measurements. The EUT support equipment and interconnecting cables were re configured to the setup producing the maximum emission for the frequency and were placed on top of a 0.8 m high non- metallic 1.0 x 1.5 meter table. The EUT, support equipment and interconnecting cables were re-arranged and manipulated to maximize each EME emission. The turn table containing the Technology was rotated; the antenna height was varied 1 to 4meter and stopped at the azimuth or height producing the maximum emission Each emission was maximized by : switching power lines; varying the mode of operation or resolution; clock or data exchange speed; scrolling H pattern to the EUT and of support equipment, and powering the monitor from the floor mounted outlet box and computer aux AC outlet, if applicable; whichever determined the worst case emission.
Each EME reported was calibrated using the R/S signal generator.

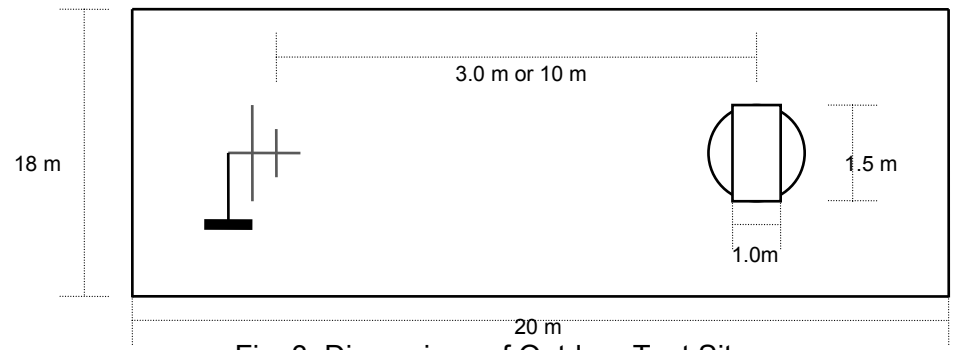
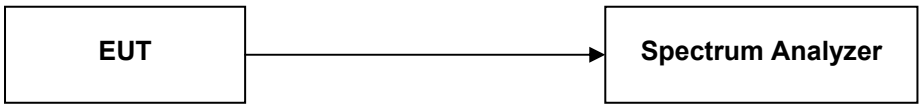


Fig. 3. Dimensions of Outdoor Test Site

7.3 6 dB Bandwidth

Test Setup

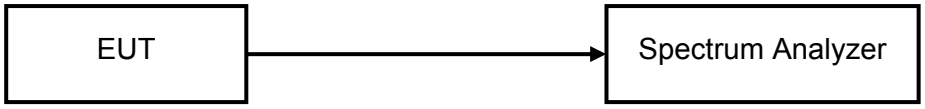


Test Procedure

EUTs 6 dB bandwidth is measured at low, middle, high channels with a spectrum analyzer connected to the antenna terminal while the EUTs operating at its maximum power control level. The spectrum analyzer setting is as follows.
RBW = approximately 1-5 % of the emission bandwidth
VBW ≥ 3 x RBW
Detector = Peak
Trace mode = max hold
Sweep = auto couple
Allow the trace to stabilize.
The bandwidth measurement function on the spectrum analyzer is used to measure the 6 dB bandwidth.

7.4 Maximum Peak Output Power

Test Setup

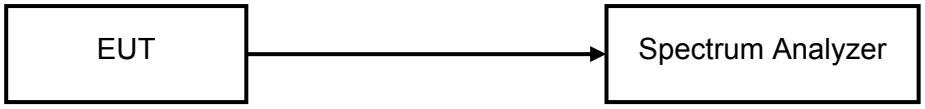


Test Procedure

EUTs Maximum Peak Conducted Output Power is measured at low, middle, high channels with a spectrum analyzer connected to the antenna terminal while the EUTs operating at its maximum power control level.
The spectrum analyzer setting is as follows.
RBW = 1 MHz
VBW = 3 MHz
Span = fully encompass the DTS bandwidth
Detector = peak
Sweep time = auto couple
Allow the trace to stabilize.
The band power measurement function on the spectrum analyzer is used to measure the Maximum peak conducted output power.

7.5 Peak Power Spectral Density

Test Setup



Test Procedure

EUTs Peak Power Spectral Density is measured at low, middle, high channels with a spectrum analyzer connected to the antenna terminal while the EUTs operating at its maximum power control level.

The spectrum analyzer setting is as follows.

Center frequency = DTS channel center frequency

Span = 1.5 times the DTS channel bandwidth

RBW ≥ 3 kHz

VBW ≥ 3 x RBW

Detector = peak

Sweep time = auto couple

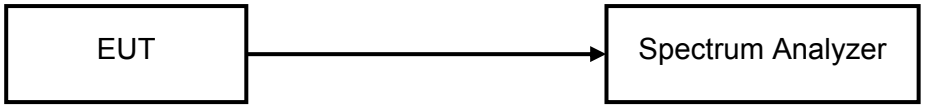
Trace mode = max hold

Allow the trace to stabilize.

The peak search function on the spectrum analyzer is used to determine the maximum amplitude level in any 3 kHz band segment within the fundamental DTS bandwidth.

7.6 Conducted Spurious Emissions

Test Setup



Test Procedure

EUTs Conducted spurious emissions are measured at low, middle, high channels with a spectrum analyzer connected to the antenna terminal while the EUTs operating at its maximum power control level.
The spectrum analyzer setting is as follows.

1) Reference Level
RBW = 100 kHz
VBW ≥ 300 kHz
Span = 1.5 times the DTS channel bandwidth
Detector = peak
Sweep time = auto couple
Trace mode = max hold
Allow the trace to stabilize.
The peak search function on the spectrum analyzer is used to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

2) Unwanted Emissions
RBW = 100 kHz
VBW ≥ 300 kHz
Span = encompass the spectrum to be examined
Detector = peak
Sweep time = auto couple
Allow the trace to stabilize.
The amplitude of all unwanted emissions outside of the authorized frequency band is confirmed that it is attenuated by at least the minimum requirements specified.

8. TEST DATA

8.1 Conducted Emissions

FCC §15.207, RSS-Gen 7.2.4

Frequency	Level(dBµV)		*)Factor	**) Line	Limit(dBµV)		Margin(dB)	
(MHz)	Q-Peak	Average	(dB)		Q-Peak	Average	Q-Peak	Average
0.19	45.5	34.3	0.2	N	64.0	54.0	18.5	19.7
0.25	40.6	30.6	0.2	N	61.8	51.8	21.2	21.2
0.51	43.8	43.2	0.2	N	56.0	46.0	12.2	2.8
0.79	39.6	26.2	0.1	L	56.0	46.0	16.4	19.8
1.55	36.6	35.5	0.2	L	56.0	46.0	19.4	10.5
23.20	37.8	21.2	1.7	L	60.0	50.0	22.2	28.8

Line Conducted Emissions Tabulated Data

NOTES:
1. Measurements using CISPR quasi-peak mode & average mode.
2. All modes of operation were investigated and the worst -case emission were reported. See attached Plots.
3. *) Factor = LISN + Cable Loss
4. **) LINE : L = Line , N = Neutral
5. The limit is on the FCC Part section 15.207(a).

PLOTS OF EMISSIONS

- ***Conducted Emission at the Mains port (Line)***

NEMKO KOREA (NK-12-R-171 12 Oct 2012 14:30

Conducted Emissions

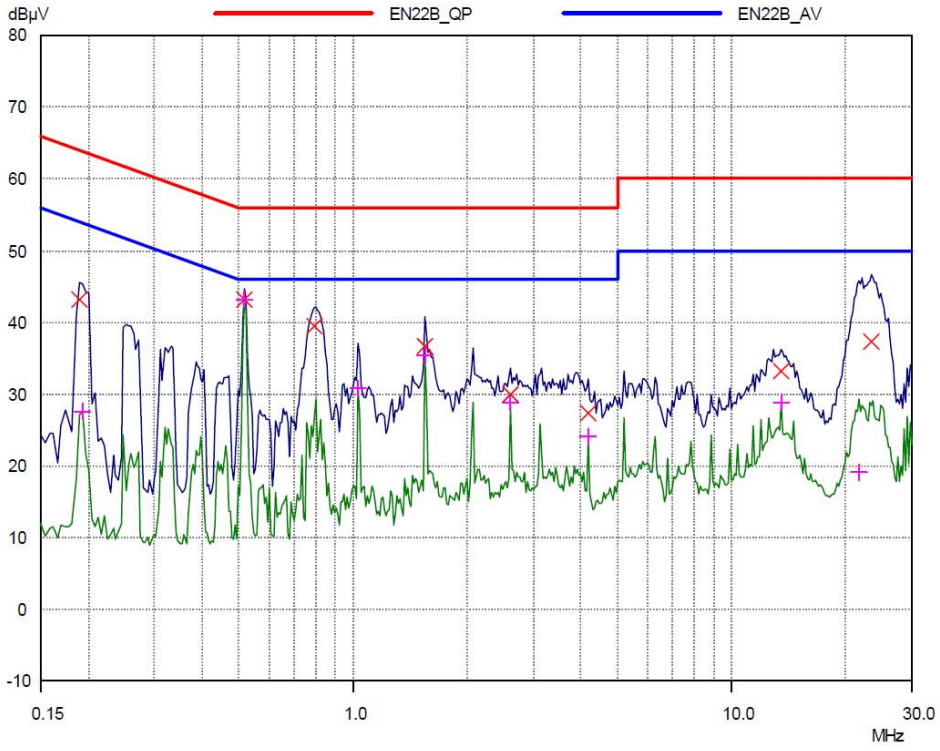
EUT:	Wireless lan module
Manuf:	Samsung Electronics
Op Cond:	a.c. 120 V, 60 Hz (802.11n20 TX mode)
Operator:	Jinha. KO
Test Spec:	FCC Part 15.207
Comment:	MODEL : WLM100A
	LINE : L1

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	3.9063kHz	9kHz	PK+AV	20msec	20 dB	OFF	60dB

Transducer	No.	Start	Stop	Name
	1	150kHz	30MHz	ESH3_Z5_Line

Final Measurement:		
	Detectors:	X QP / + AV
	Meas Time:	1sec
	Subranges:	8
	Acc Margin:	30 dB



PLOTS OF EMISSIONS

- ***Conducted Emission at the Mains port (Neutral)***

NEMKO KOREA (NK-12-R-171 12 Oct 2012 14:20

Conducted Emissions

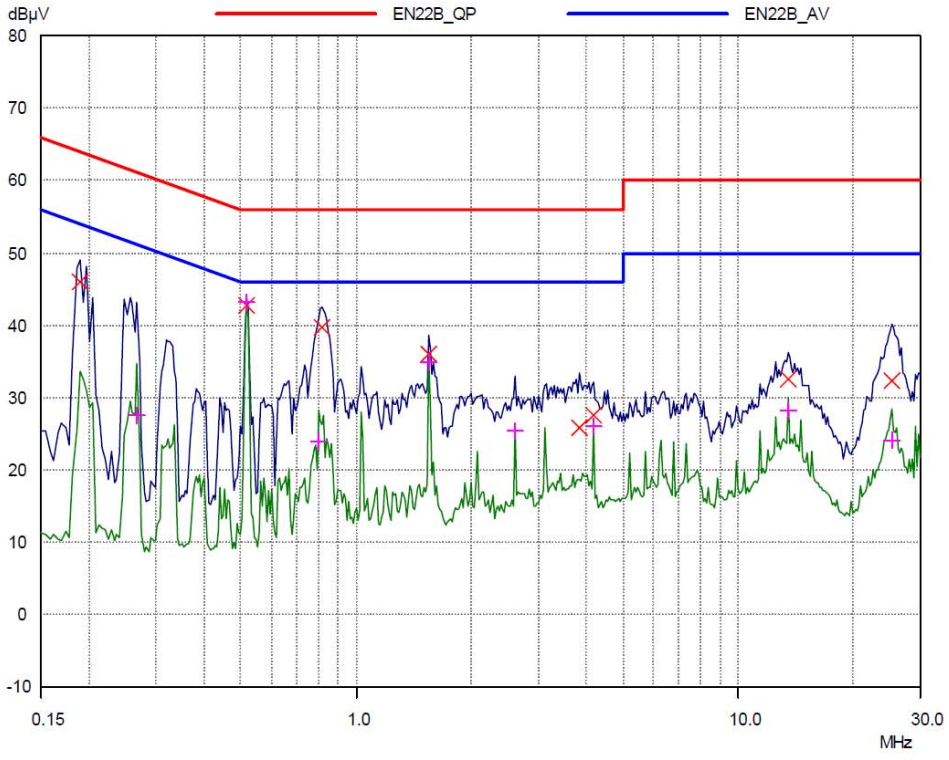
EUT:	Wireless lan module
Manuf:	Samsung Electronics
Op Cond:	a.c. 120 V, 60 Hz (802.11n20 TX mode)
Operator:	Jinha. KO
Test Spec:	FCC Part 15.207
Comment:	MODEL : WLM100A
	LINE : Neutral

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	3.9063kHz	9kHz	PK+AV	20msec	20 dB	OFF	60dB

Transducer	No.	Start	Stop	Name
	1	150kHz	30MHz	ESH3_Z5_Neutral

Final Measurement:		
	Detectors:	X QP / + AV
	Meas Time:	1sec
	Subranges:	8
	Acc Margin:	30 dB



TEST DATA

8.2 Radiated Emissions

FCC §15.209, RSS-210 A8.5

Frequency (MHz)	Reading (dBµV/m)	Pol* (H/V)	Antenna Heights (cm)	Turntable Angles (°)	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
120.01	53.1	V	114	354	-25.7	27.4	43.5	16.1
240.00	57.6	H	131	287	-23.9	33.7	46.0	12.3
360.00	57.2	H	133	253	-19.6	37.6	46.0	8.4
600.00	51.2	H	183	333	-11.1	40.1	46.0	5.9
840.00	48.5	H	147	255	-8.7	39.8	46.0	6.2
960.00	48.9	H	198	230	-7.8	41.1	46.0	4.9

Radiated Measurements at 3 meters

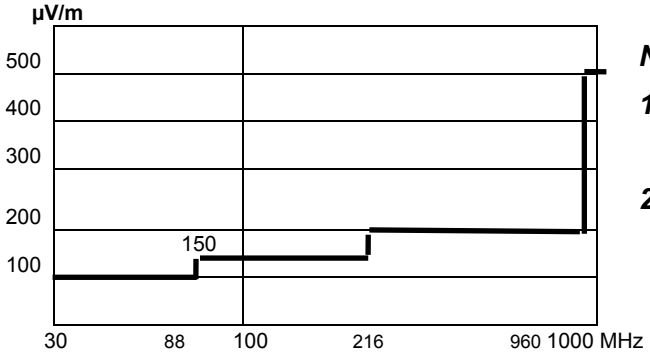


Fig. 4. Limits at 3 meters

NOTES:

1. All modes were measured and the worst-case emission was reported.

2 The radiated limits are shown on Figure 4.

Above 1 GHz the limit is 500 µV/m.

NOTES:

1. *Pol. H = Horizontal V = Vertical

2. **AF + CL + Amp. = Antenna Factor + Cable Loss + Amplifier.

3. Measurements using CISPR quasi-peak mode below 1 GHz.

4. The radiated emissions testing were made by rotating EUT through three orthogonal axes and rotating the receive antenna with horizontal, Vertical polarization. The worst date was recorded.

5. The limit is on the FCC Part section 15.209(a).

8.3 6 dB Modulated Bandwidth

FCC §15.247(a)(2), RSS-210 A8.2

Test Mode : Set to Lowest channel, Middle channel and Highest channel

Result:

802.11b mode

Channel	Frequency(MHz)	Result(MHz)	Limit(MHz)
Low	2412	12.30	0.5
Middle	2437	12.27	0.5
High	2462	12.28	0.5

802.11g mode

Channel	Frequency(MHz)	Result(MHz)	Limit(MHz)
Low	2412	16.44	0.5
Middle	2437	16.45	0.5
High	2462	16.44	0.5

802.11n(HT20) mode

Channel	Frequency(MHz)	Result(MHz)	Limit(MHz)
Low	2412	17.56	0.5
Middle	2437	17.54	0.5
High	2462	17.59	0.5

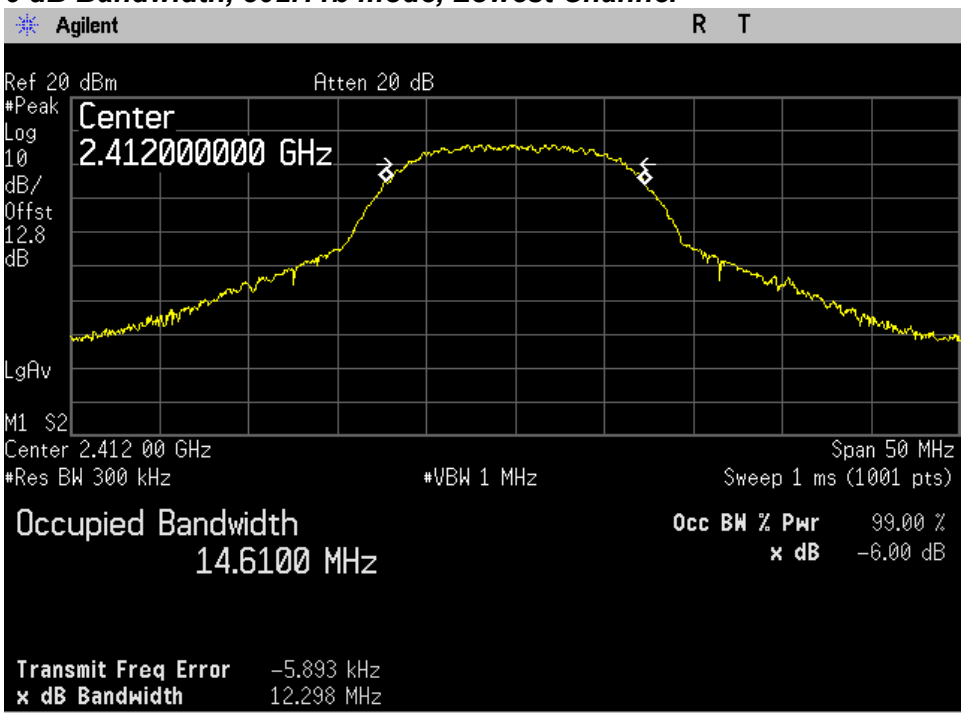
802.11n(HT40) mode

Channel	Frequency(MHz)	Result(MHz)	Limit(MHz)
Low	2422	36.19	0.5
Middle	2437	35.82	0.5
High	2452	35.89	0.5

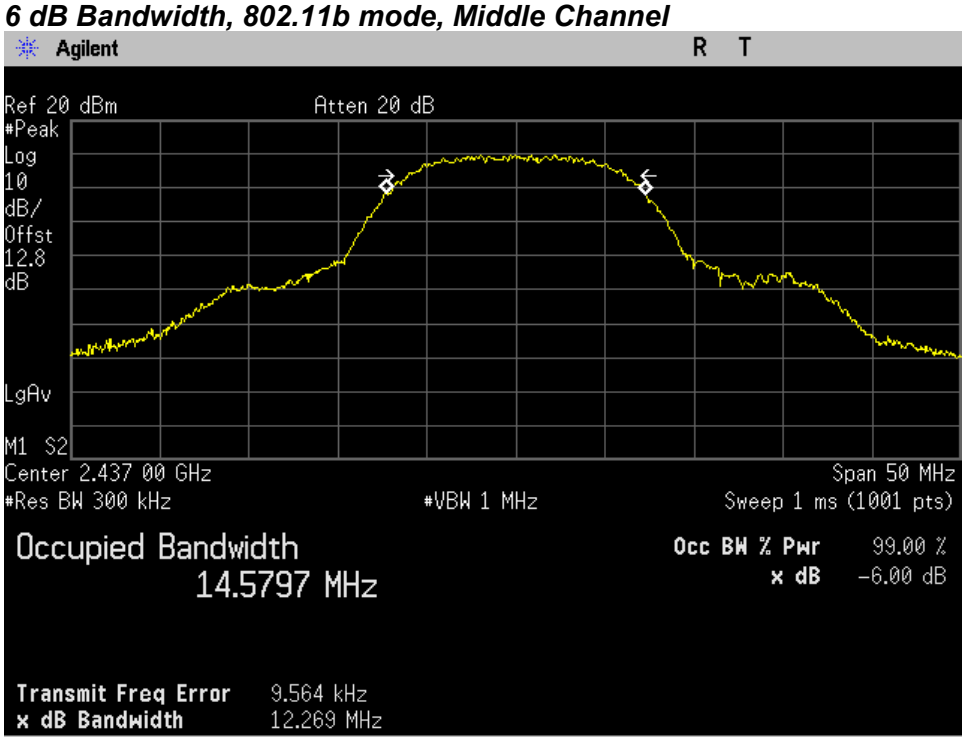
PLOTS OF EMISSIONS

802.11b mode

6 dB Bandwidth, 802.11b mode, Lowest Channel

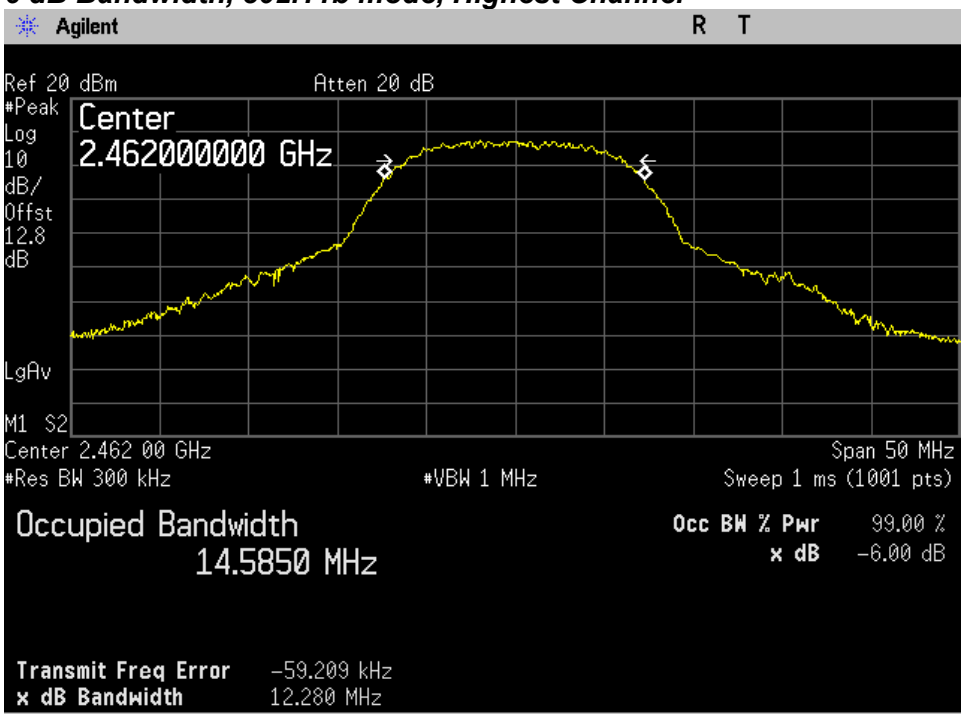


6 dB Bandwidth, 802.11b mode, Middle Channel



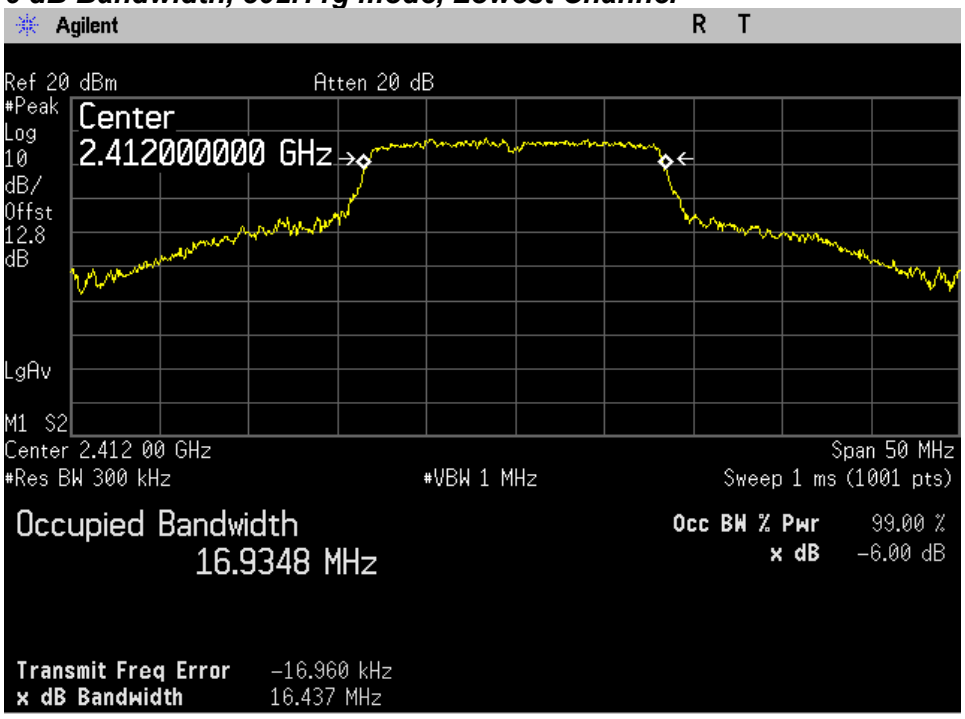
PLOTS OF EMISSIONS

6 dB Bandwidth, 802.11b mode, Highest Channel



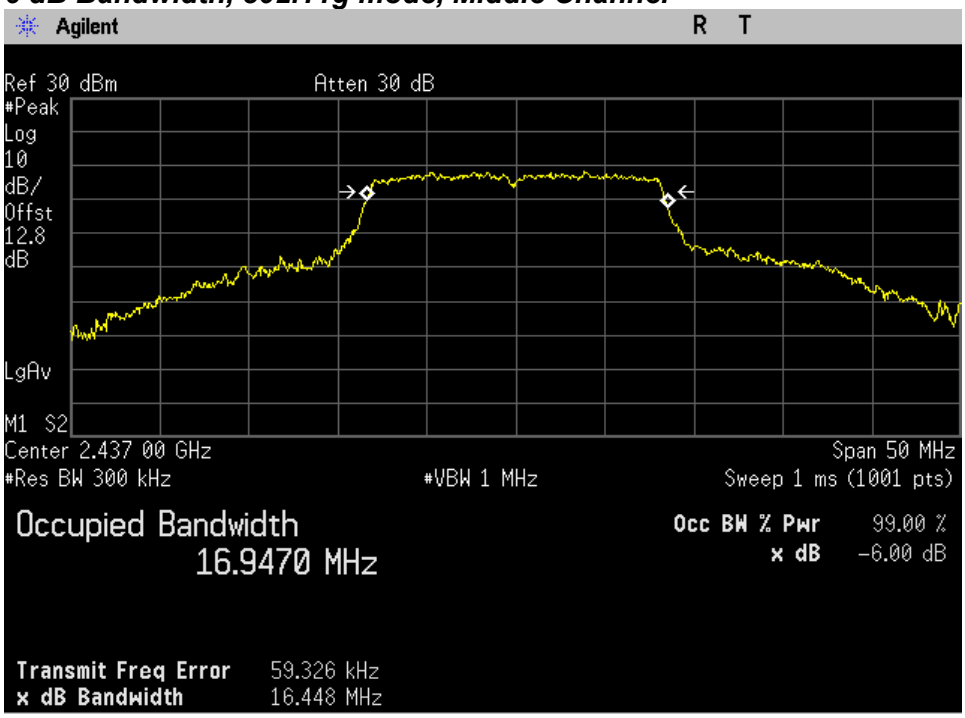
802.11g mode

6 dB Bandwidth, 802.11g mode, Lowest Channel

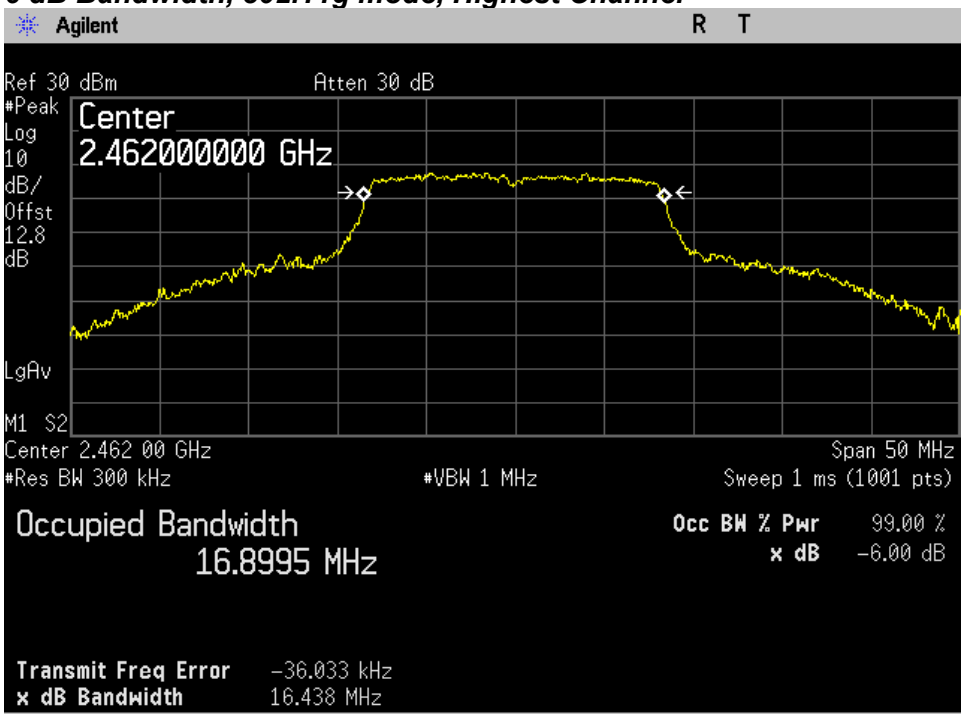


PLOTS OF EMISSIONS

6 dB Bandwidth, 802.11g mode, Middle Channel



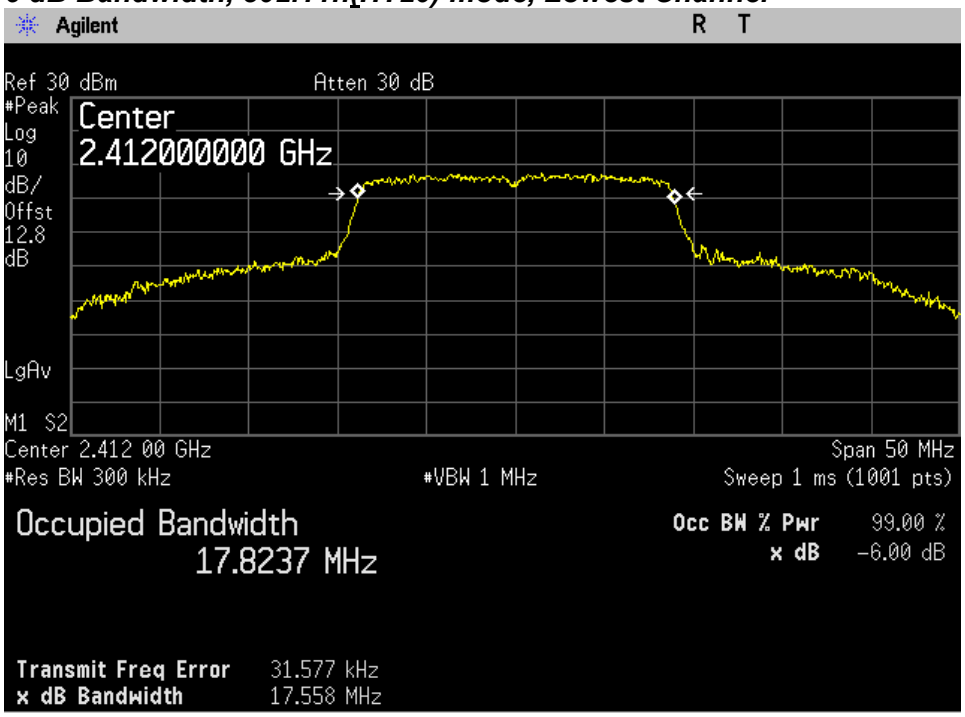
6 dB Bandwidth, 802.11g mode, Highest Channel



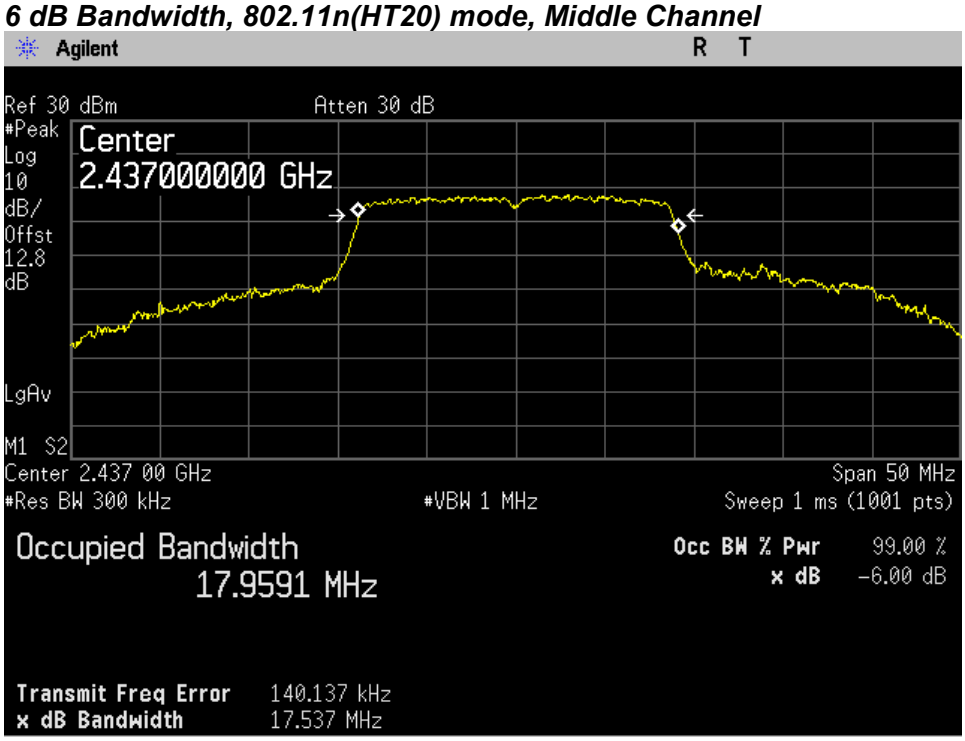
PLOTS OF EMISSIONS

802.11n(HT20) mode

6 dB Bandwidth, 802.11n(HT20) mode, Lowest Channel

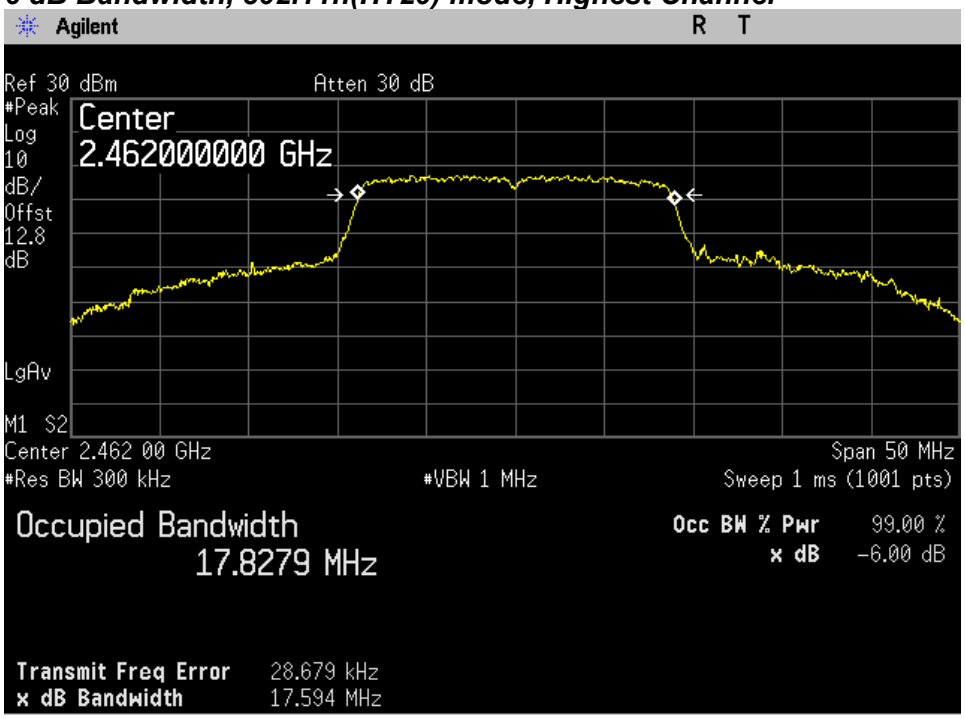


6 dB Bandwidth, 802.11n(HT20) mode, Middle Channel



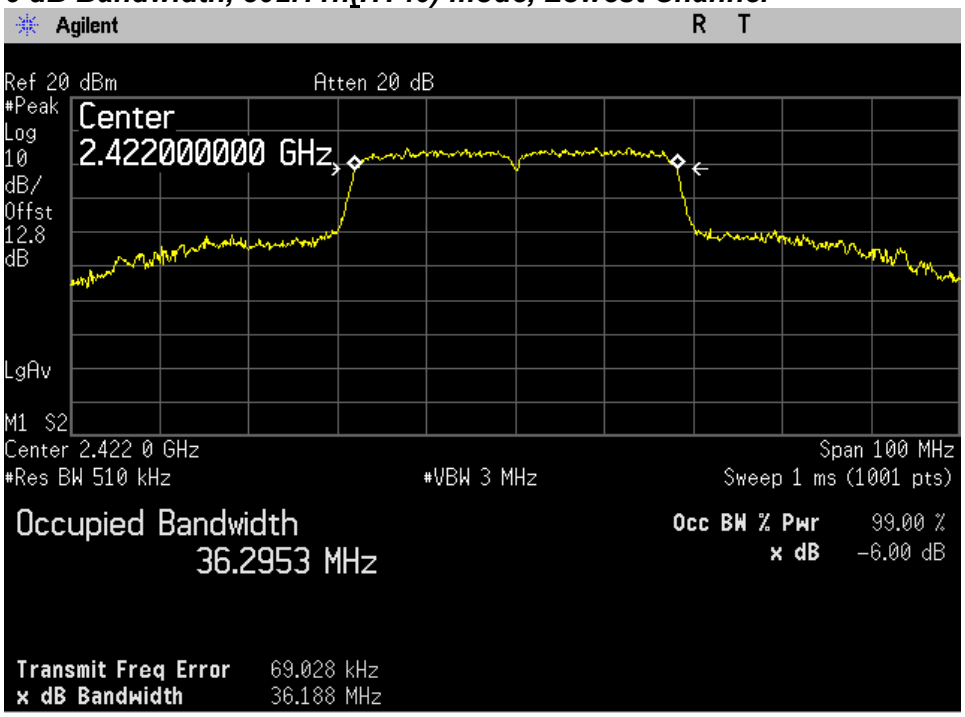
PLOTS OF EMISSIONS

6 dB Bandwidth, 802.11n(HT20) mode, Highest Channel



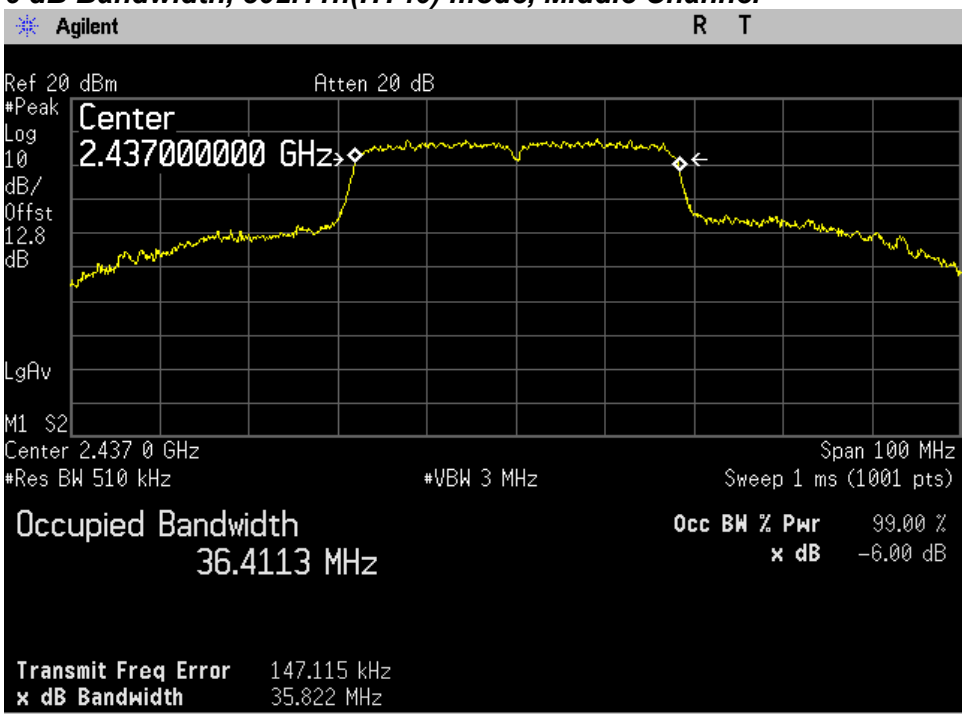
802.11n(HT40) mode

6 dB Bandwidth, 802.11n(HT40) mode, Lowest Channel

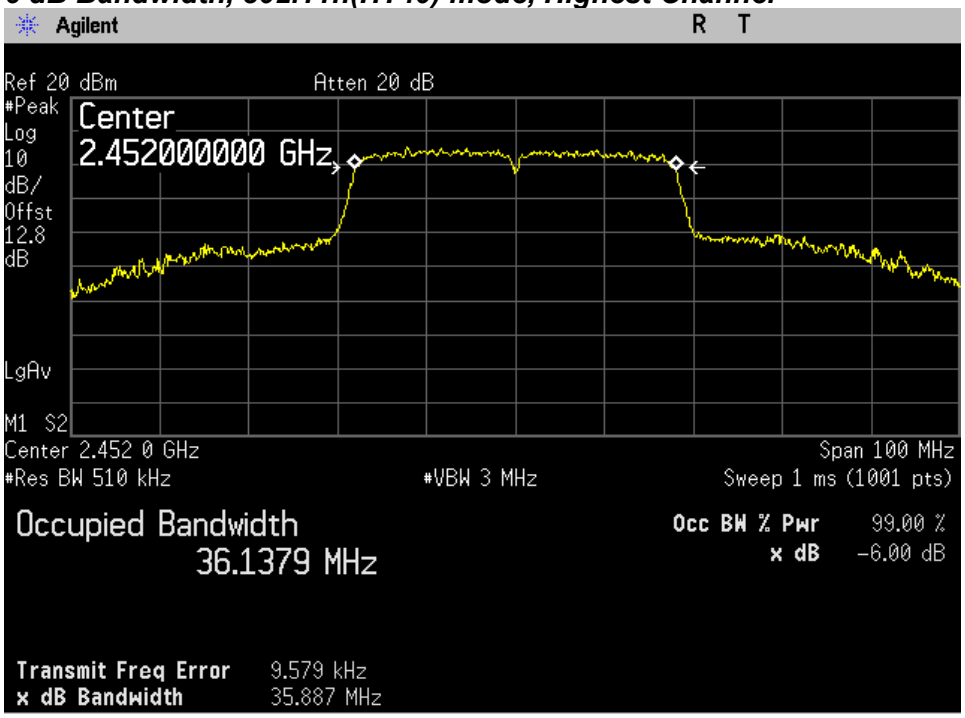


PLOTS OF EMISSIONS

6 dB Bandwidth, 802.11n(HT40) mode, Middle Channel



6 dB Bandwidth, 802.11n(HT40) mode, Highest Channel



8.4 Peak Power Output

FCC §15.247(b)(3), RSS-210 A8.4

Test Mode : Set to Lowest channel, Middle channel and Highest channel

Result:

802.11b mode

Channel	Frequency(MHz)	Peak Power(dBm)	Limit(dBm)
Low	2412	19.04	30
Middle	2437	22.70	30
High	2462	20.35	30

802.11g mode

Channel	Frequency(MHz)	Peak Power(dBm)	Limit(dBm)
Low	2412	24.29	30
Middle	2437	24.86	30
High	2462	24.31	30

802.11n(HT20) mode

Channel	Frequency(MHz)	Peak Power(dBm)	Limit(dBm)
Low	2412	24.13	30
Middle	2437	24.64	30
High	2462	24.06	30

802.11n(HT40) mode

Channel	Frequency(MHz)	Peak Power(dBm)	Limit(dBm)
Low	2422	22.31	30
Middle	2437	24.96	30
High	2452	22.32	30

Note:

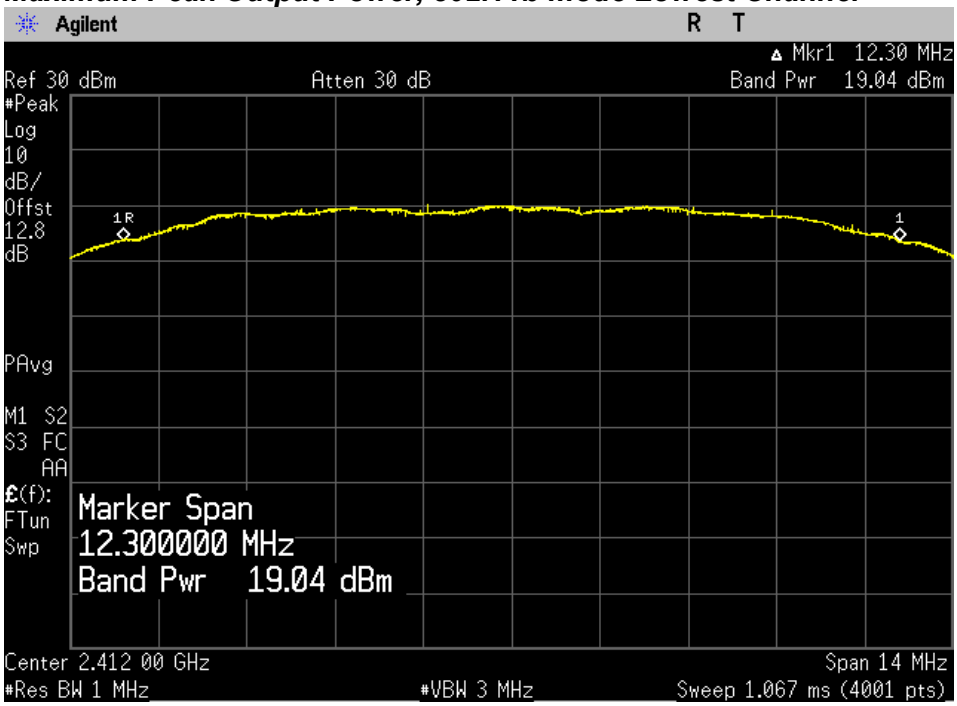
The following equation was used for spectrum offset:

Spectrum offset (dB) = Attenuator (dB) + Cable Loss (dB) + SMA Type Connector Loss (dB)

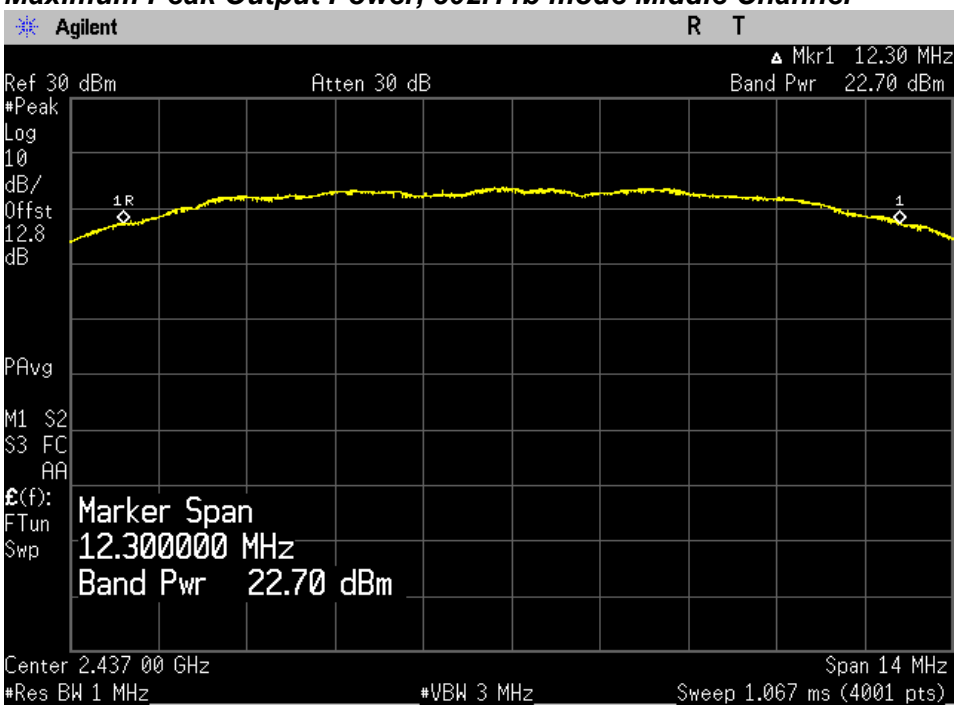
PLOT OF TEST DATA

802.11b mode

Maximum Peak Output Power, 802.11b mode Lowest Channel

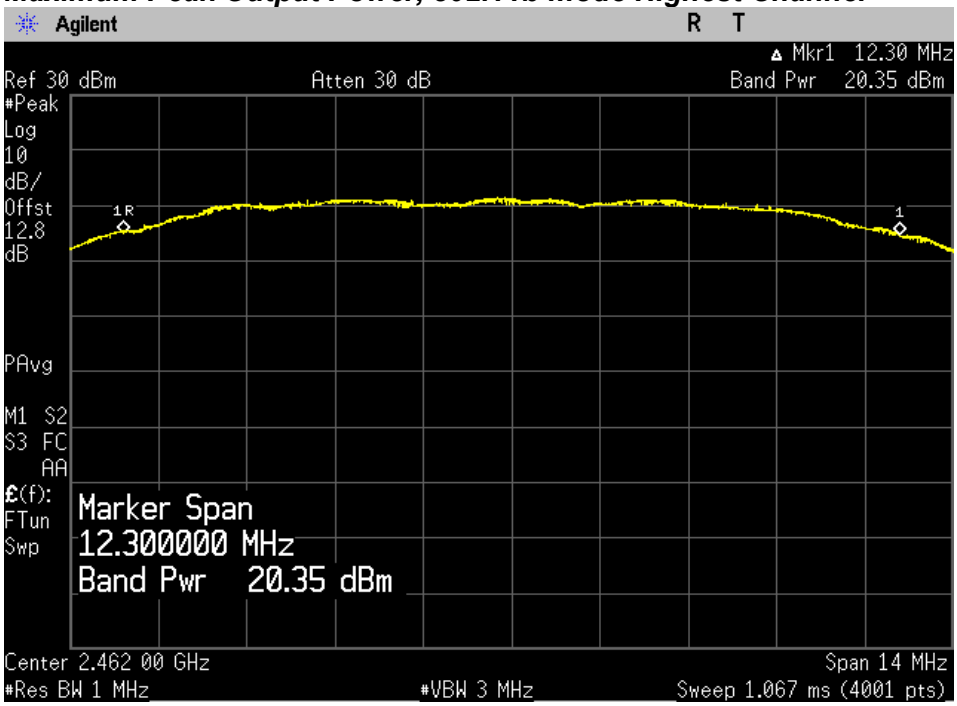


Maximum Peak Output Power, 802.11b mode Middle Channel



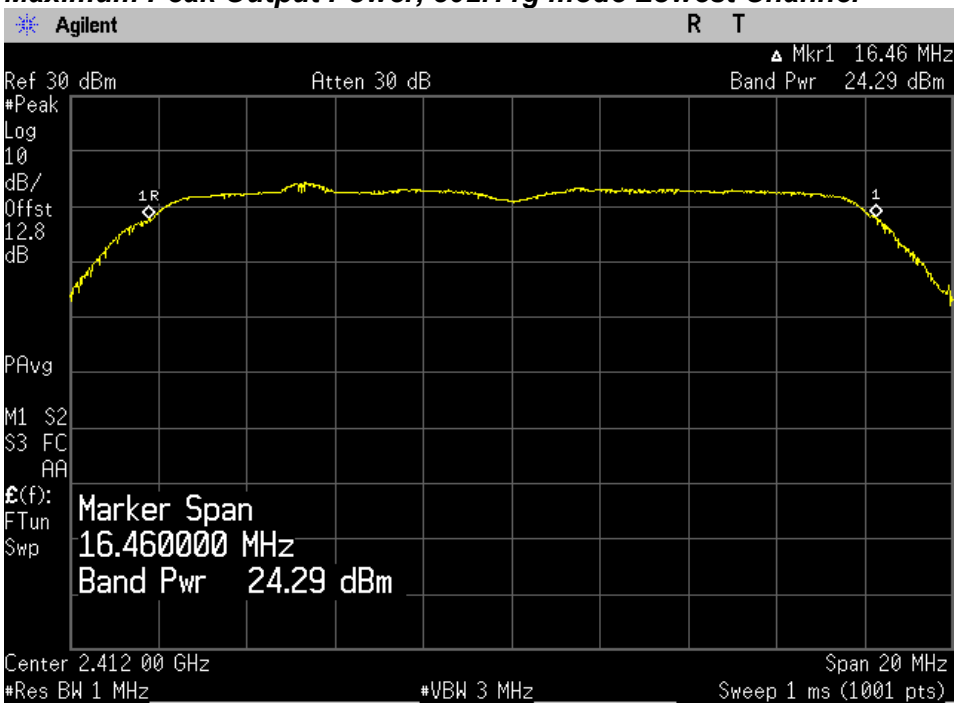
PLOT OF TEST DATA

Maximum Peak Output Power, 802.11b mode Highest Channel



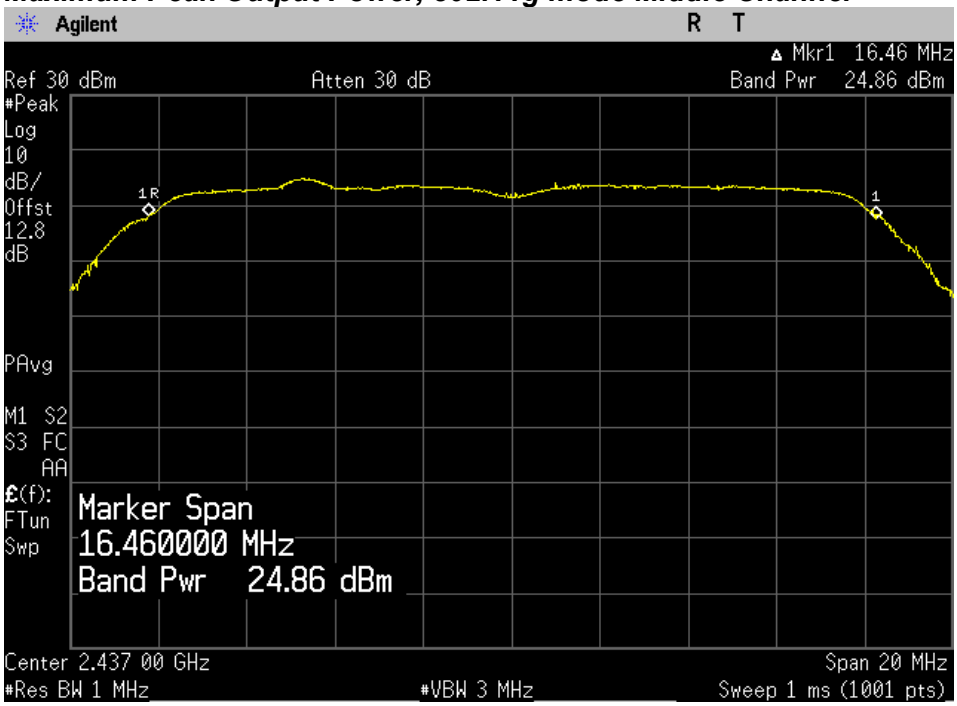
802.11g mode

Maximum Peak Output Power, 802.11g mode Lowest Channel

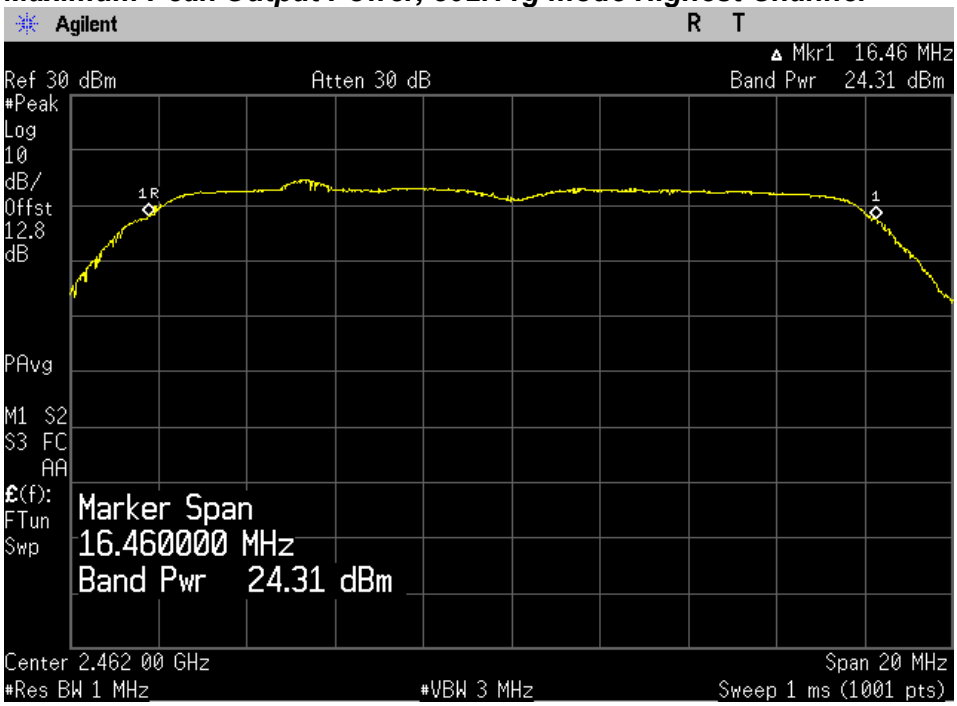


PLOT OF TEST DATA

Maximum Peak Output Power, 802.11g mode Middle Channel



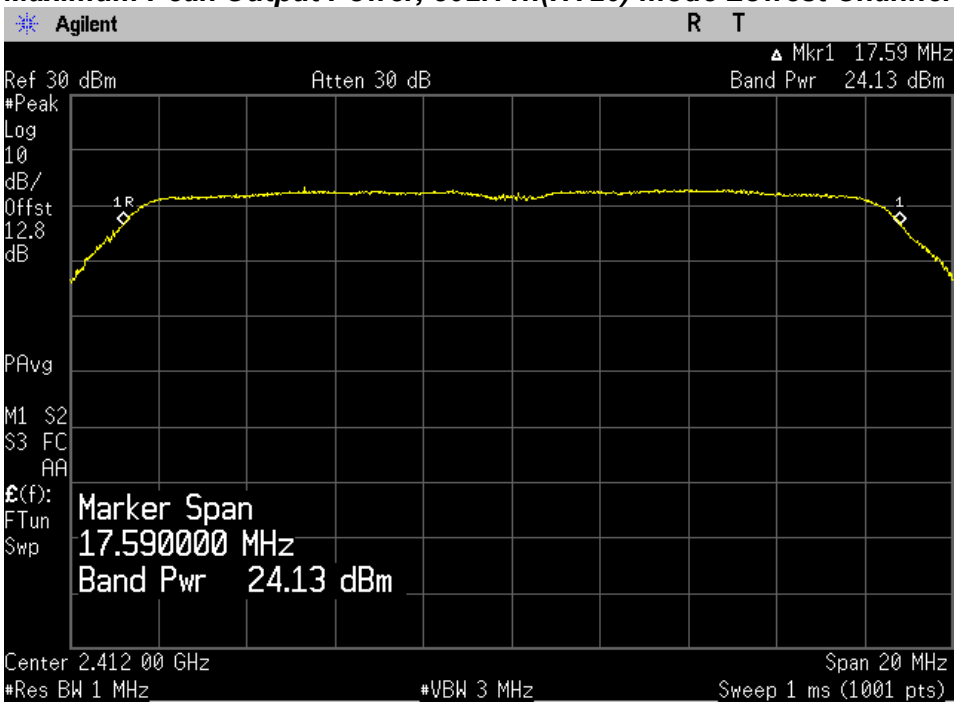
Maximum Peak Output Power, 802.11g mode Highest Channel



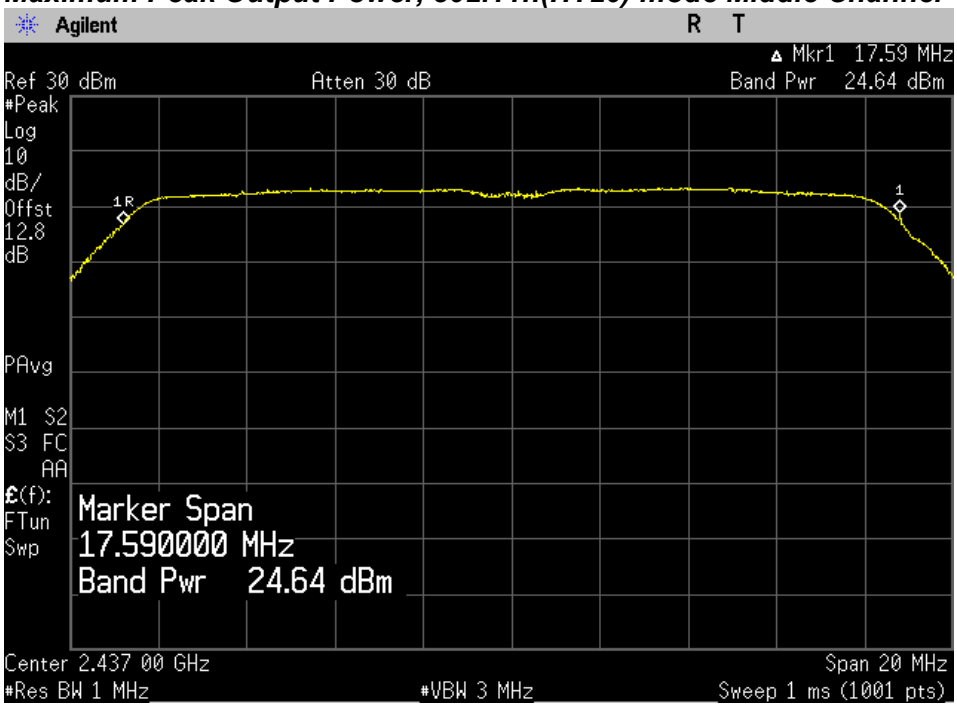
PLOT OF TEST DATA

802.11n(HT20) mode

Maximum Peak Output Power, 802.11n(HT20) mode Lowest Channel

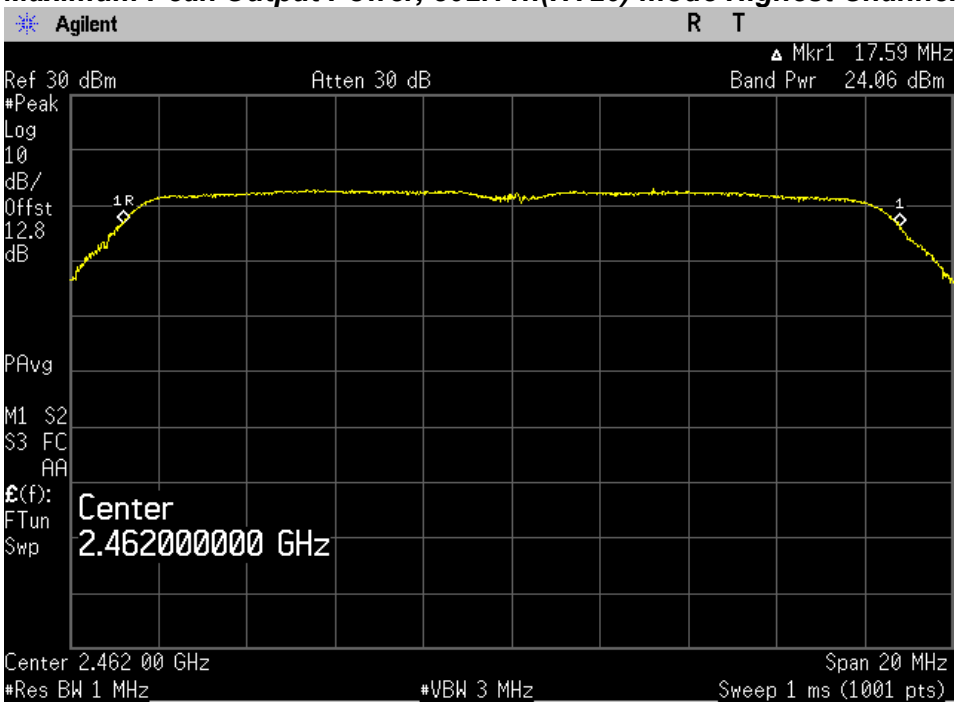


Maximum Peak Output Power, 802.11n(HT20) mode Middle Channel



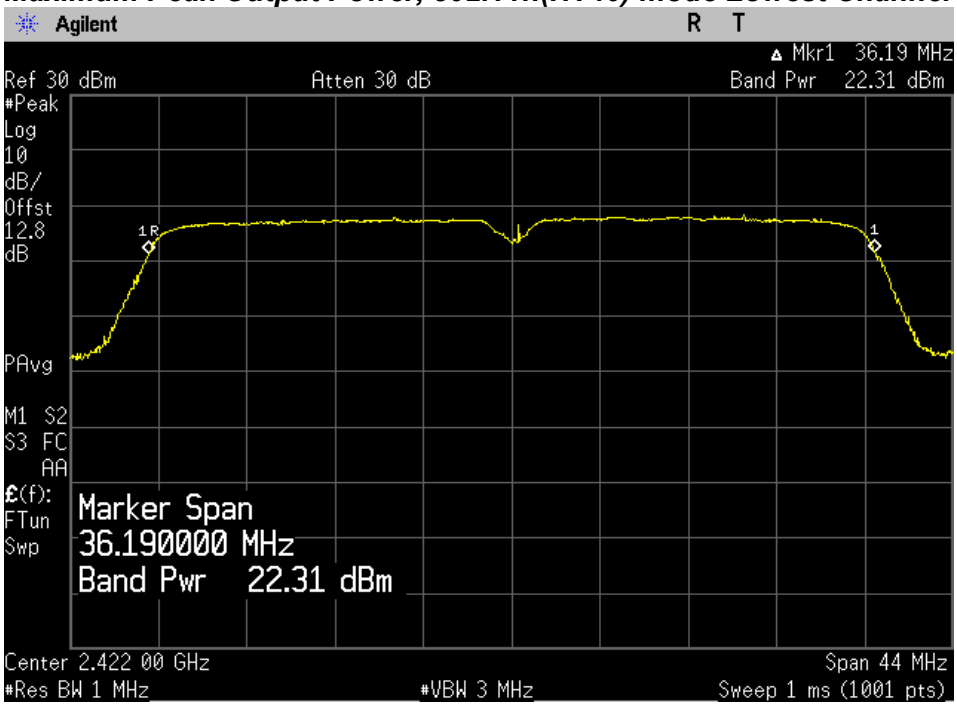
PLOT OF TEST DATA

Maximum Peak Output Power, 802.11n(HT20) mode Highest Channel



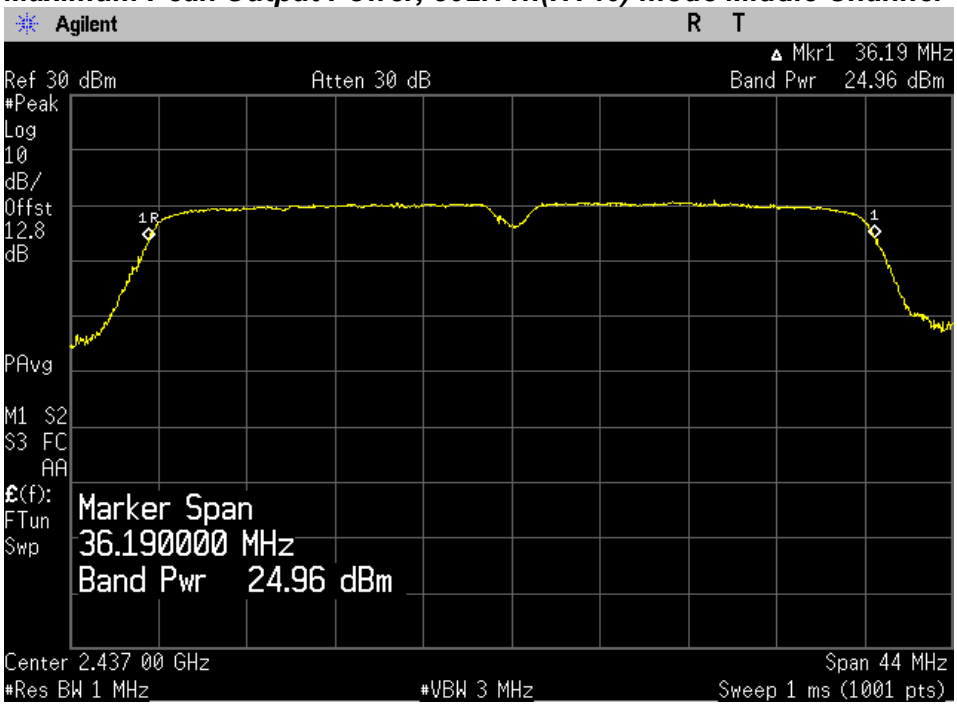
802.11n(HT40) mode

Maximum Peak Output Power, 802.11n(HT40) mode Lowest Channel

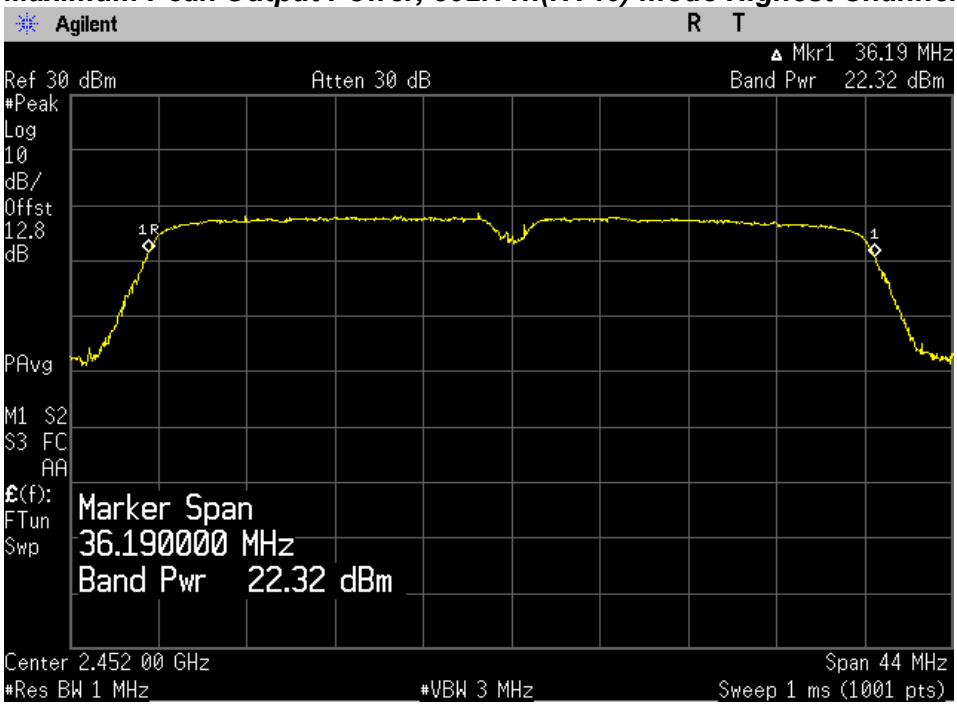


PLOT OF TEST DATA

Maximum Peak Output Power, 802.11n(HT40) mode Middle Channel



Maximum Peak Output Power, 802.11n(HT40) mode Highest Channel



8.5 Peak Power Spectral Density

FCC §15.247(e), RSS-210 A8.2

Test Mode : Set to Lowest channel, Middle channel and Highest channel

Result:

802.11b mode

Channel	Frequency (MHz)	Measured Power Spectral Density (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-11.22	8	19.22
Middle	2437	-8.41	8	16.41
High	2462	-9.57	8	17.57

802.11g mode

Channel	Frequency (MHz)	Measured Power Spectral Density (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-9.21	8	17.21
Middle	2437	-9.99	8	17.99
High	2462	-10.26	8	18.26

802.11n(HT20) mode

Channel	Frequency (MHz)	Measured Power Spectral Density (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-9.11	8	17.11
Middle	2437	-8.96	8	16.96
High	2462	-10.61	8	18.61

802.11n(HT40) mode

Channel	Frequency (MHz)	Measured Power Spectral Density (dBm)	Limit (dBm)	Margin (dB)
Low	2422	-14.25	8	22.25
Middle	2437	-12.07	8	20.07
High	2452	-15.34	8	23.34

Note:

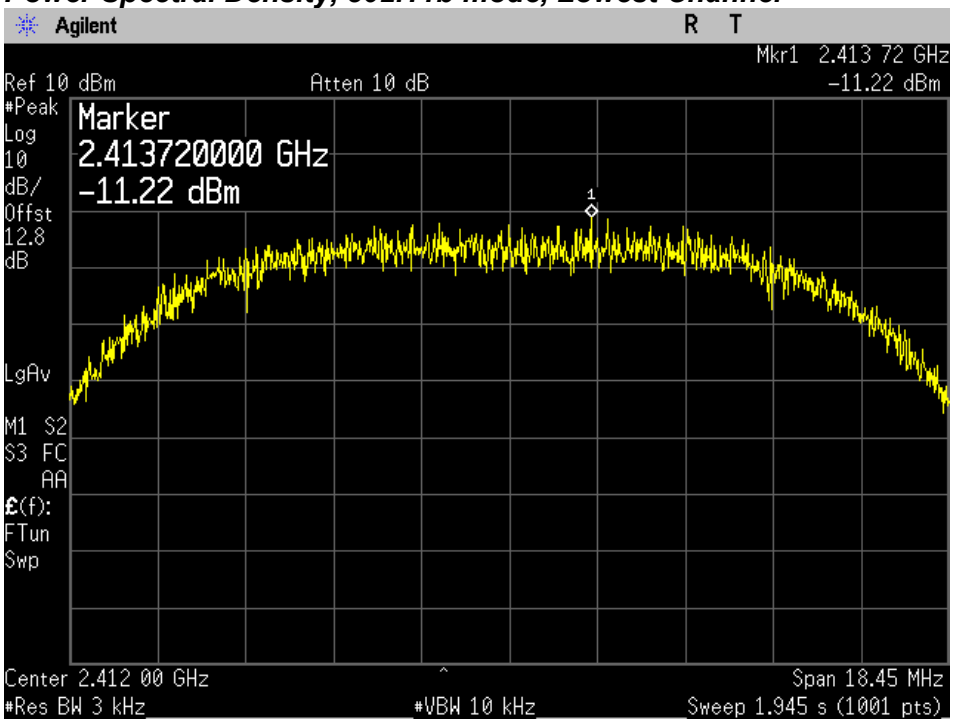
The following equation was used for spectrum offset for Power Spectral Density:

Spectrum offset (dB) = Attenuator (dB) + Cable Loss (dB) + SMA Type Connector Loss (dB)

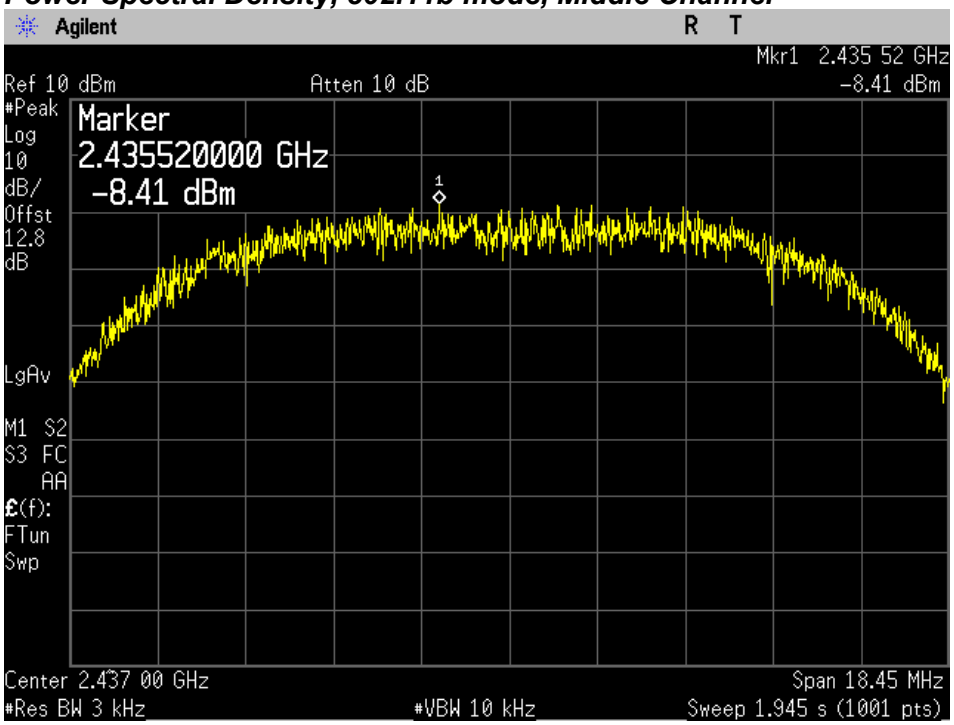
PLOTS OF EMISSIONS

802.11b mode

Power Spectral Density, 802.11b mode, Lowest Channel

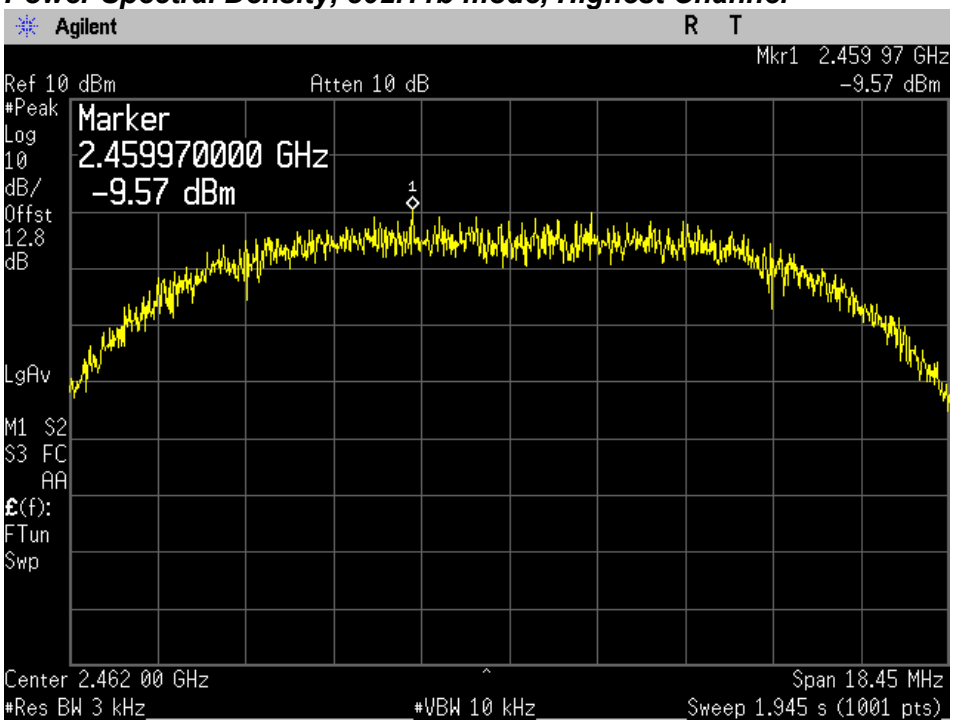


Power Spectral Density, 802.11b mode, Middle Channel



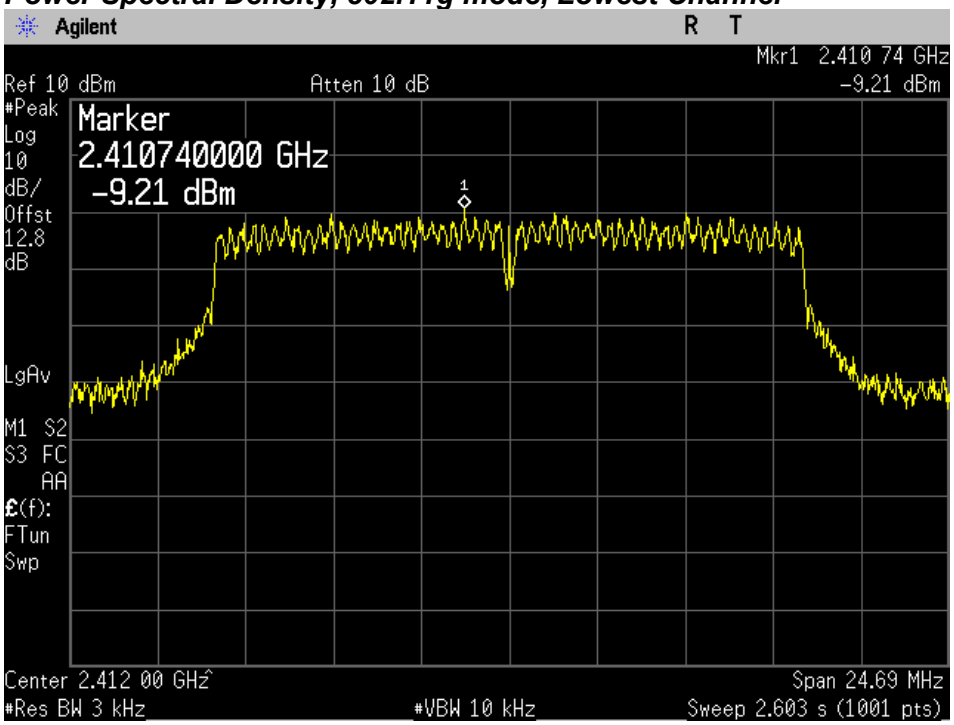
PLOTS OF EMISSIONS

Power Spectral Density, 802.11b mode, Highest Channel



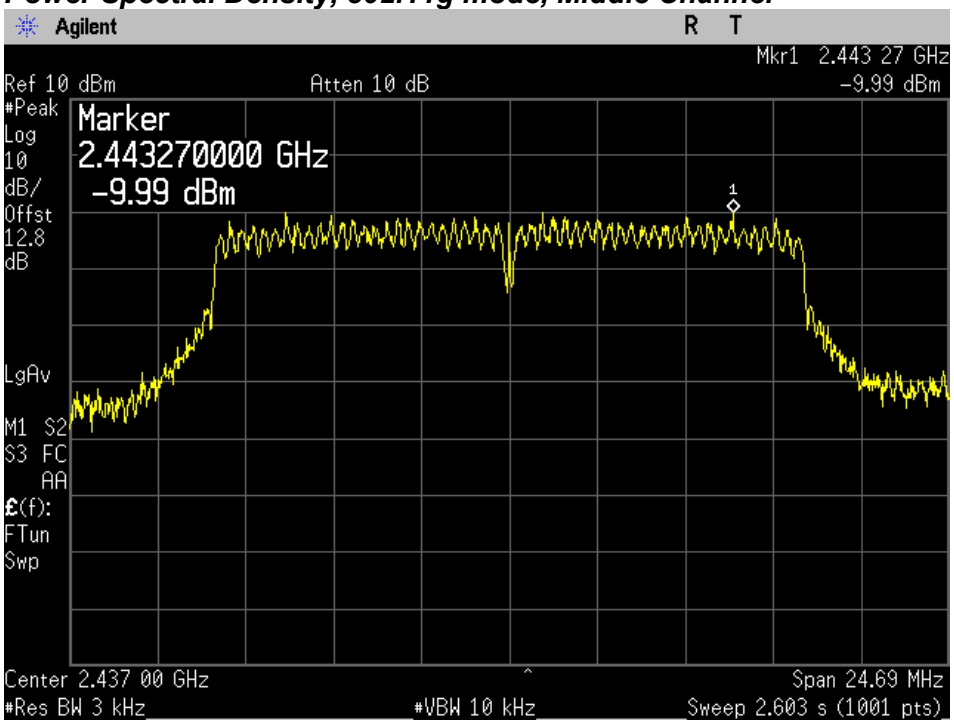
802.11g mode

Power Spectral Density, 802.11g mode, Lowest Channel

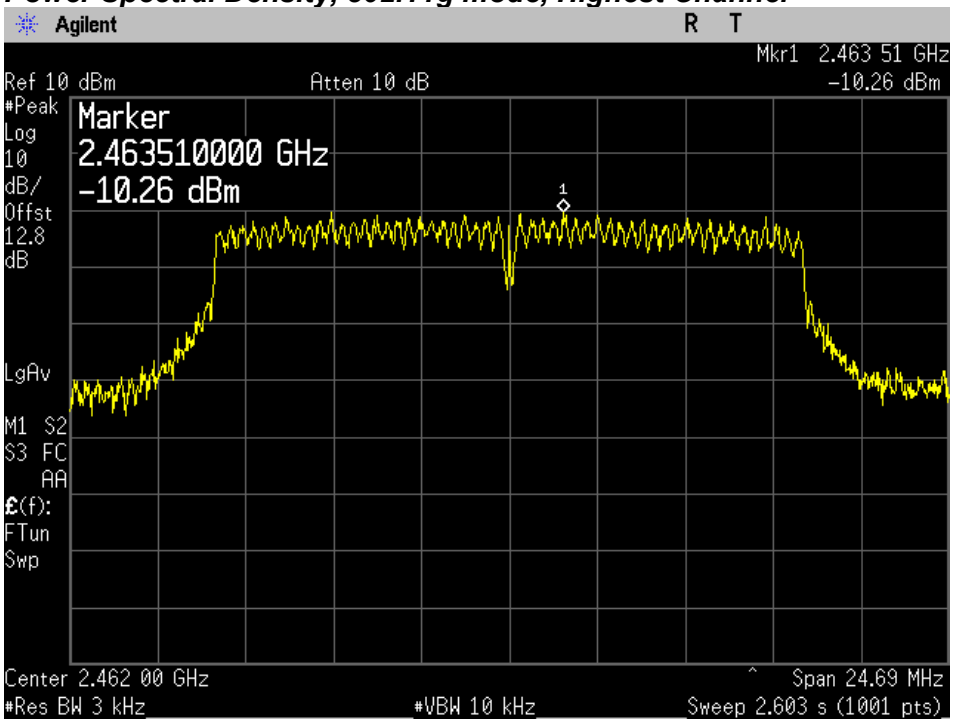


PLOTS OF EMISSIONS

Power Spectral Density, 802.11g mode, Middle Channel



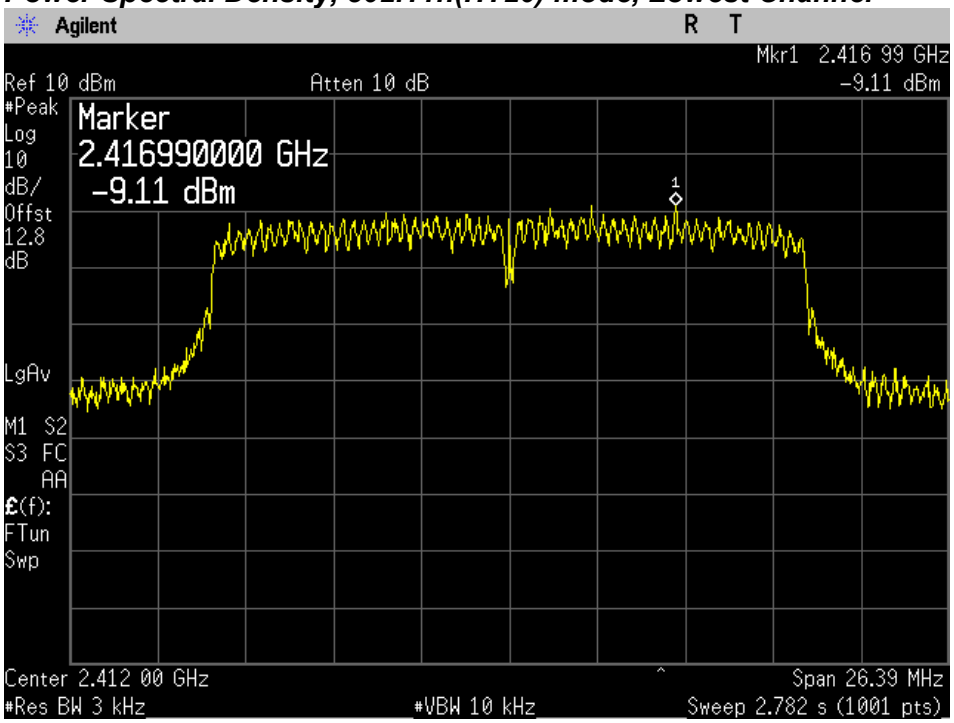
Power Spectral Density, 802.11g mode, Highest Channel



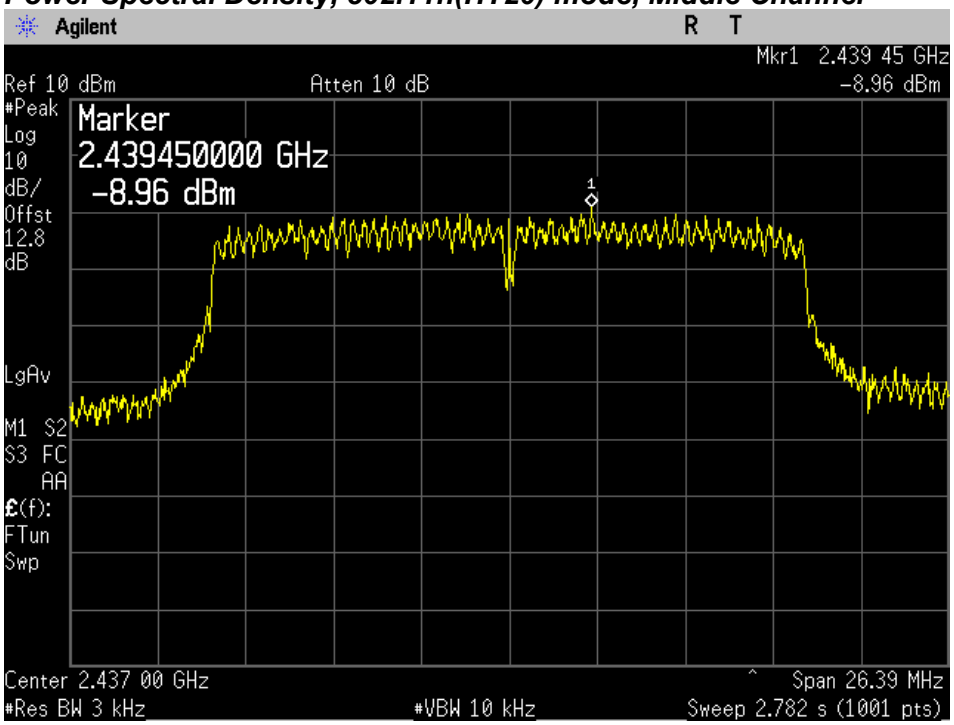
PLOTS OF EMISSIONS

802.11n(HT20) mode

Power Spectral Density, 802.11n(HT20) mode, Lowest Channel

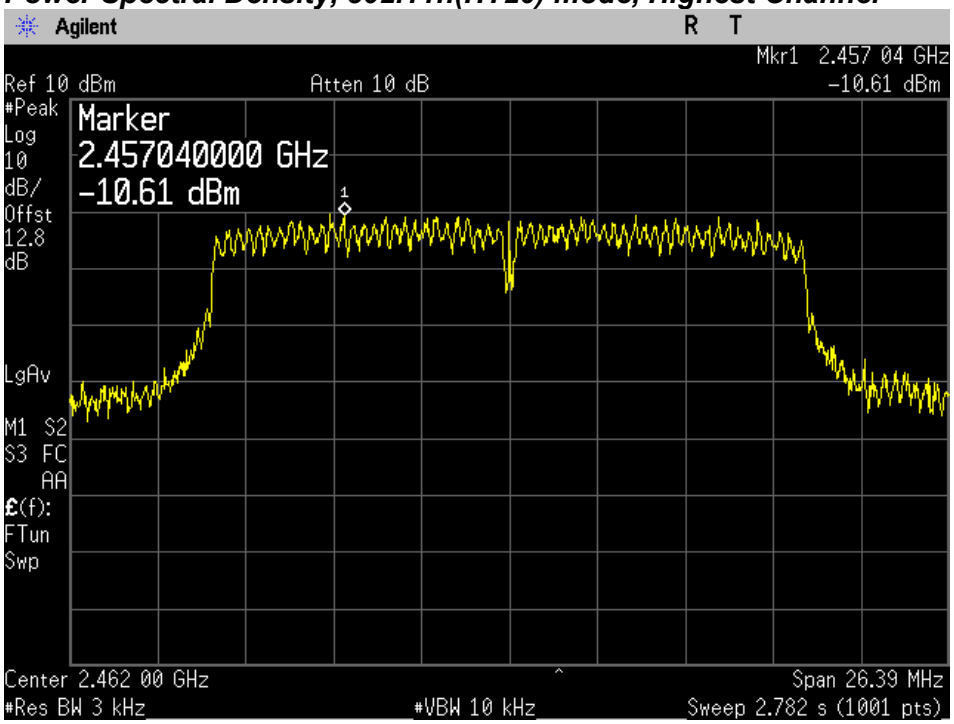


Power Spectral Density, 802.11n(HT20) mode, Middle Channel



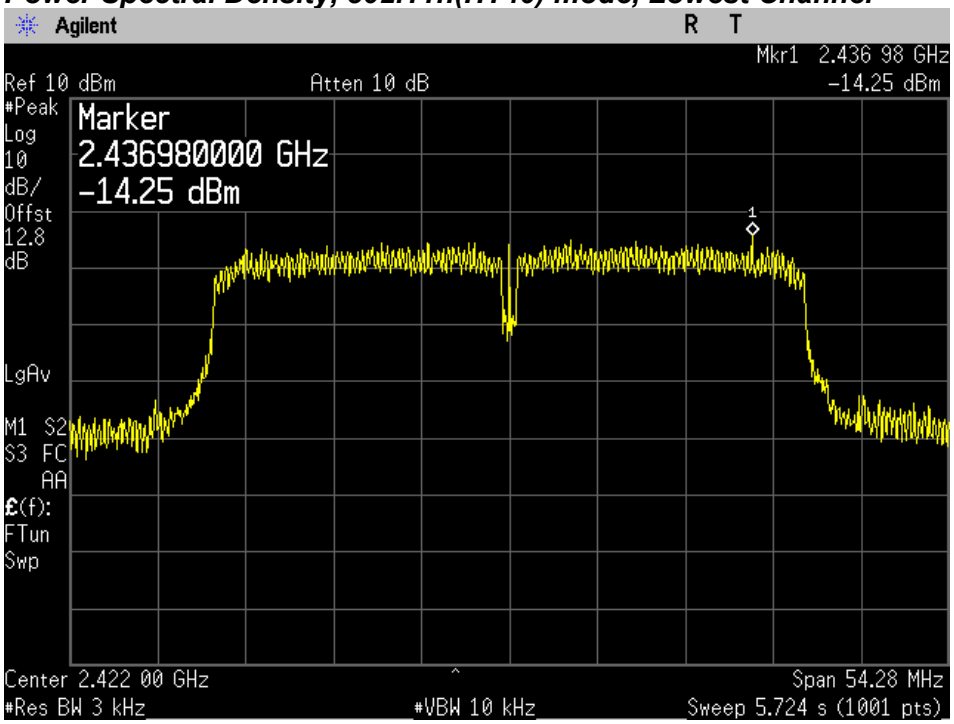
PLOTS OF EMISSIONS

Power Spectral Density, 802.11n(HT20) mode, Highest Channel



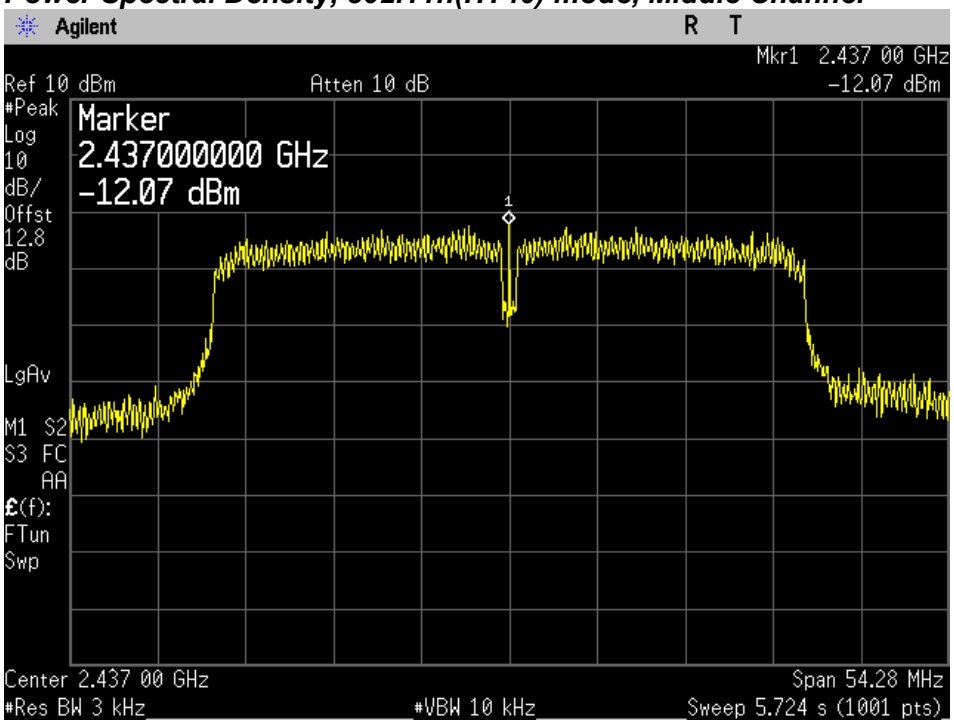
802.11n(HT40) mode

Power Spectral Density, 802.11n(HT40) mode, Lowest Channel

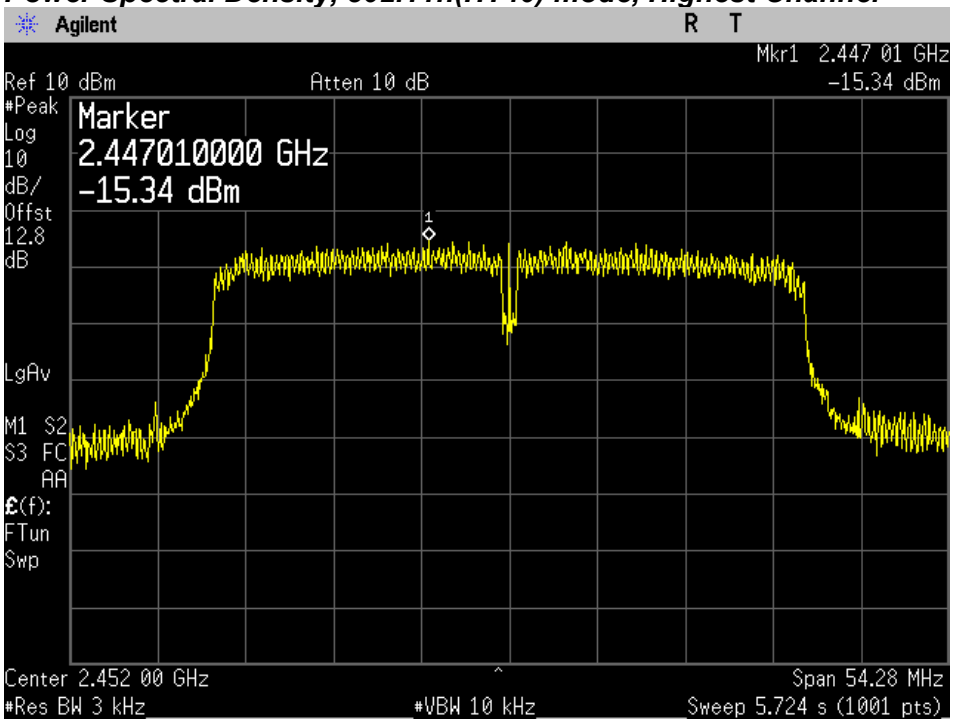


PLOTS OF EMISSIONS

Power Spectral Density, 802.11n(HT40) mode, Middle Channel



Power Spectral Density, 802.11n(HT40) mode, Highest Channel



8.6 Conducted Spurious Emissions

FCC §15.247(d), RSS-210 A8.5

Test Mode : Set to Lowest channel, Middle channel and Highest channel

Result:

802.11b/g/n(HT20) mode

Channel	Frequency(MHz)	Result(dBc)	Limit(dBc)
Low	2412	More than 30 dBc	20
Middle	2437	More than 30 dBc	20
High	2462	More than 30 dBc	20

802.11n(HT40) mode

Channel	Frequency(MHz)	Result(dBc)	Limit(dBc)
Low	2422	More than 30 dBc	20
Middle	2437	More than 30 dBc	20
High	2452	More than 30 dBc	20

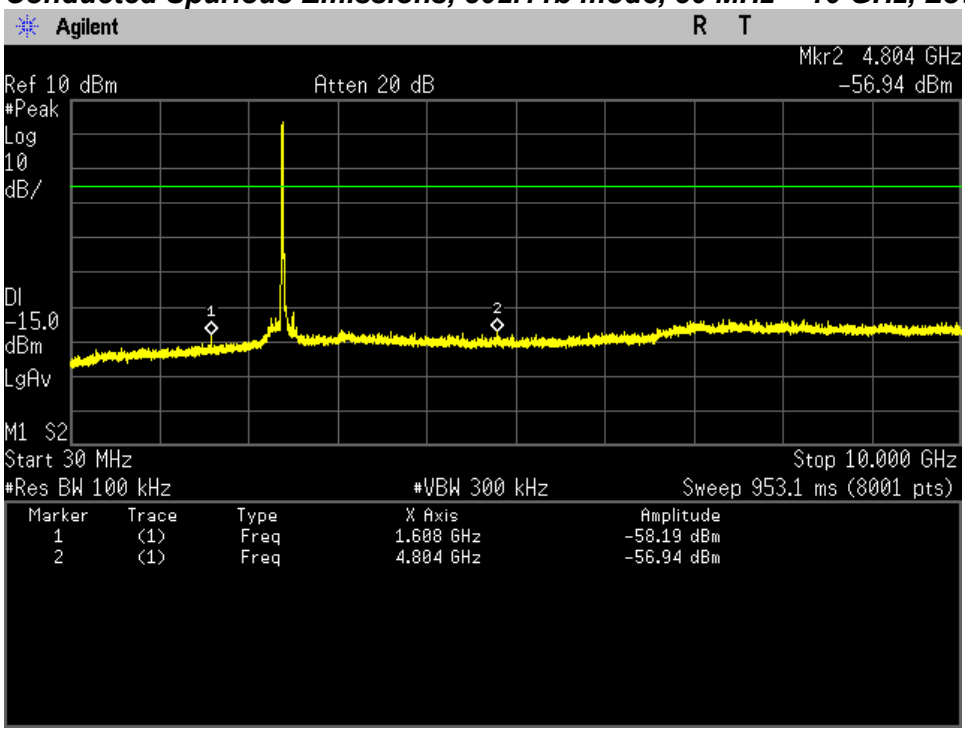
Note:

The cable and attenuator loss from 30 MHz to 25 GHz was reflected in spectrum analyzer with correction factor for the spurious emissions test.

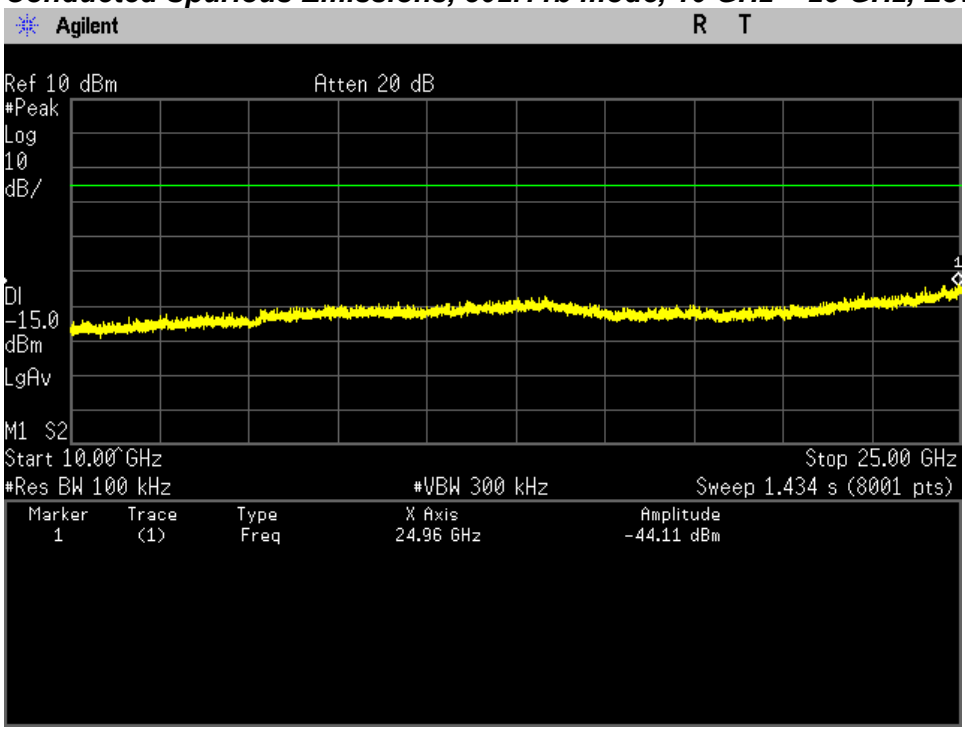
PLOT OF TEST DATA

802.11b mode

Conducted Spurious Emissions, 802.11b mode, 30 MHz ~ 10 GHz, Lowest Channel

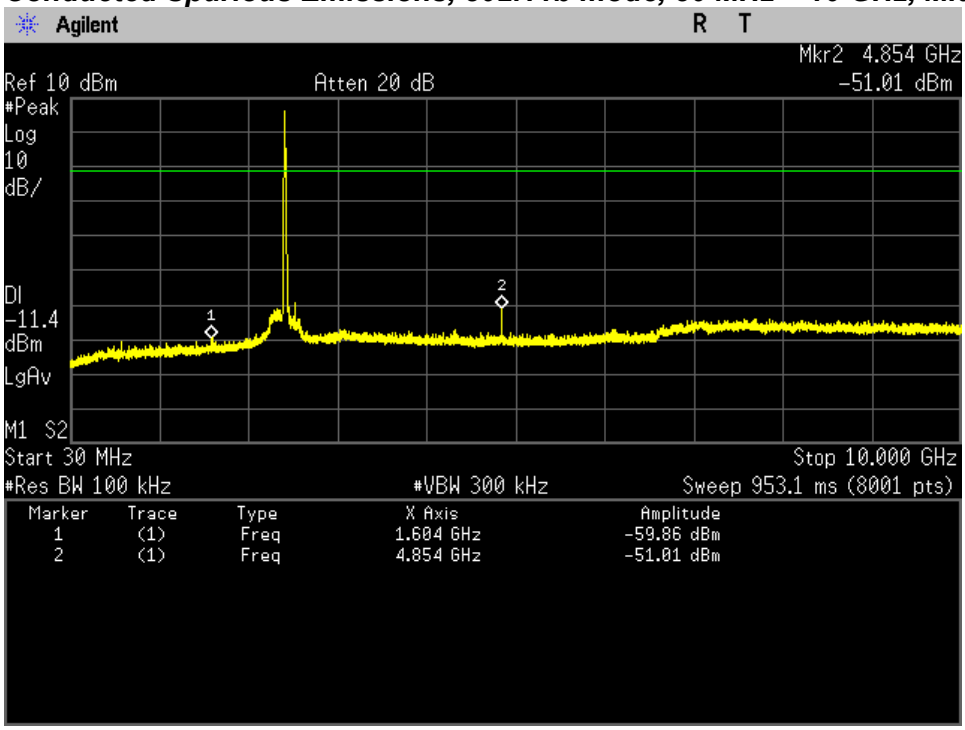


Conducted Spurious Emissions, 802.11b mode, 10 GHz ~ 25 GHz, Lowest Channel

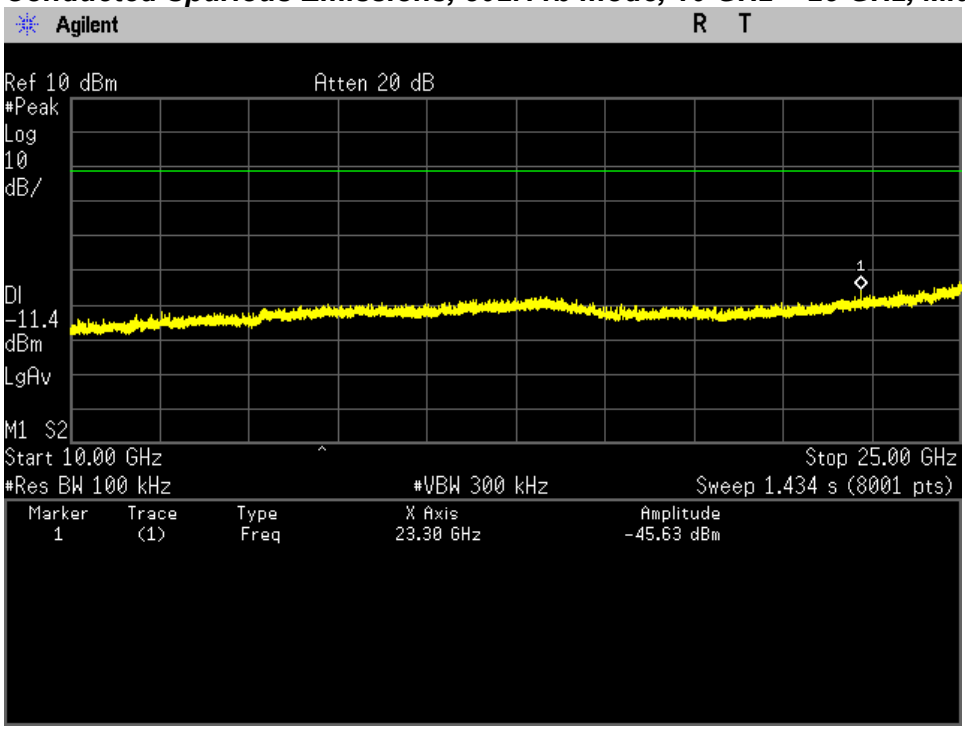


PLOT OF TEST DATA

Conducted Spurious Emissions, 802.11b mode, 30 MHz ~ 10 GHz, Middle Channel

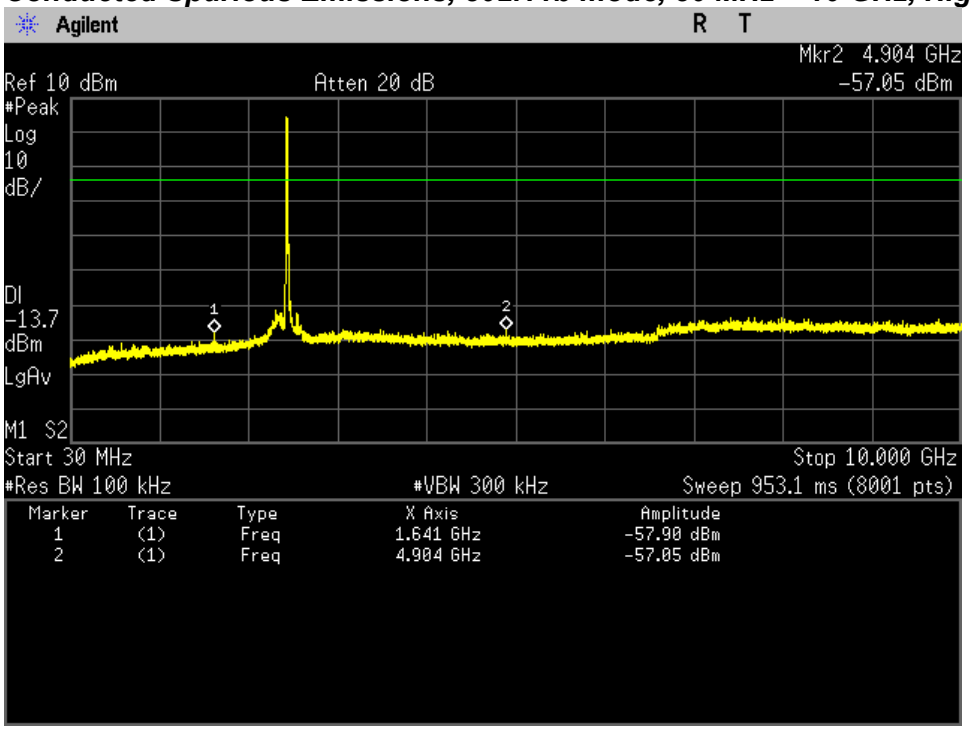


Conducted Spurious Emissions, 802.11b mode, 10 GHz ~ 25 GHz, Middle Channel

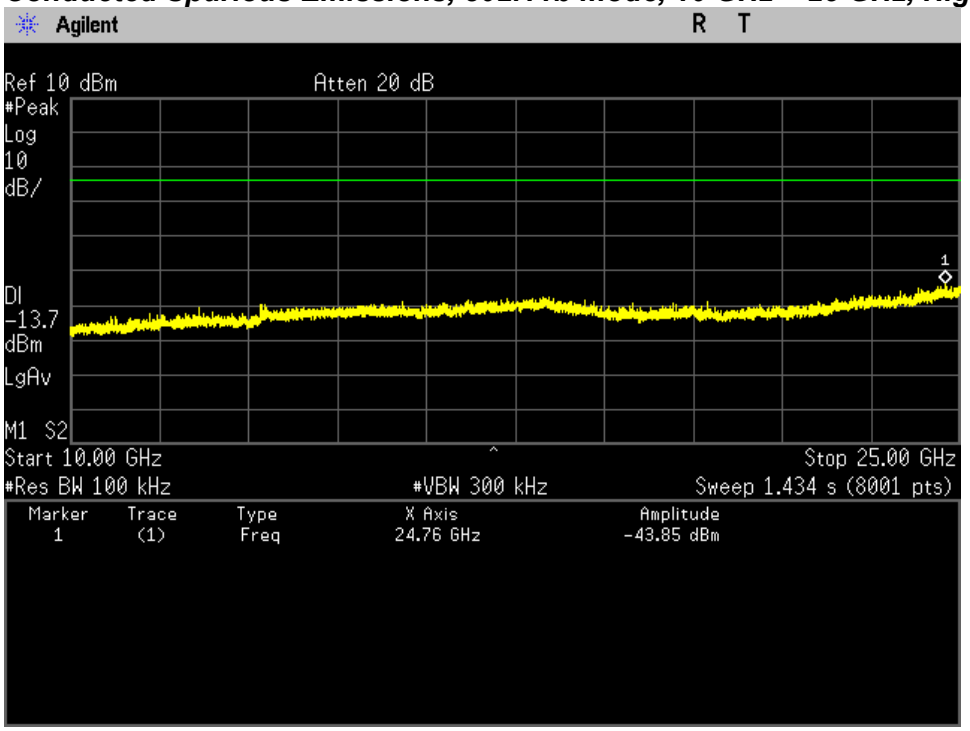


PLOT OF TEST DATA

Conducted Spurious Emissions, 802.11b mode, 30 MHz ~ 10 GHz, Highest Channel



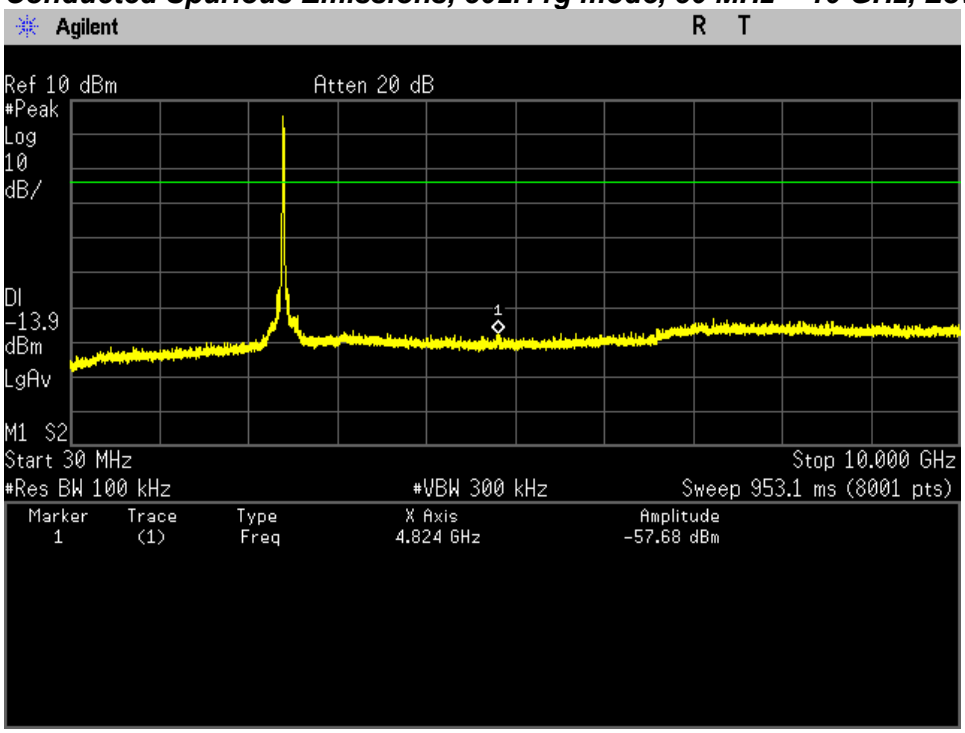
Conducted Spurious Emissions, 802.11b mode, 10 GHz ~ 25 GHz, Highest Channel



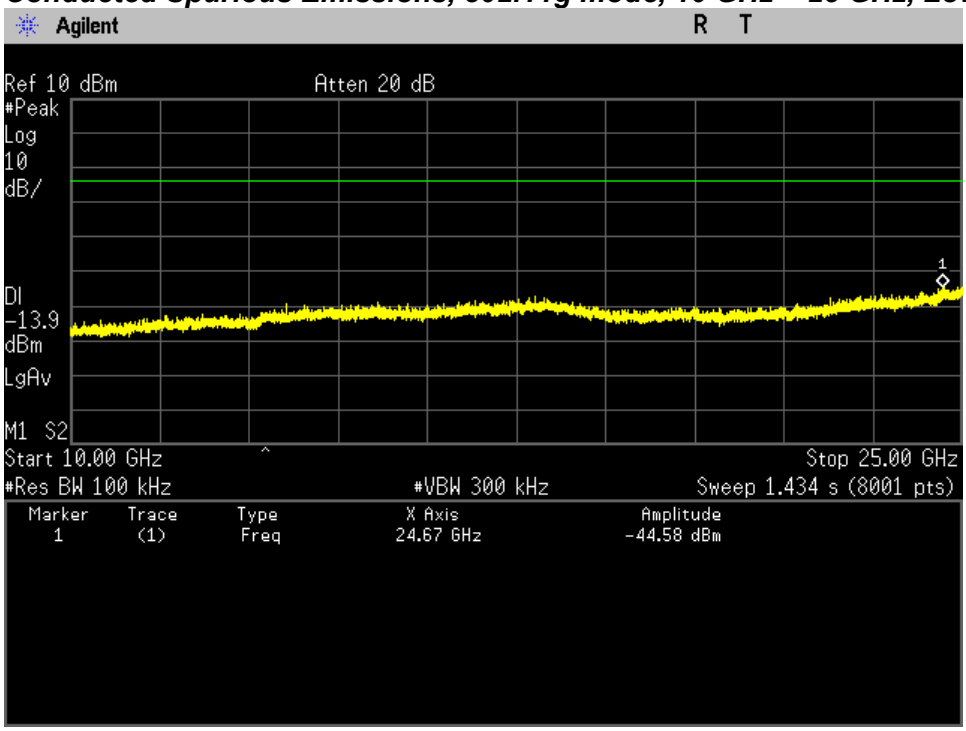
PLOT OF TEST DATA

802.11g mode

Conducted Spurious Emissions, 802.11g mode, 30 MHz ~ 10 GHz, Lowest Channel

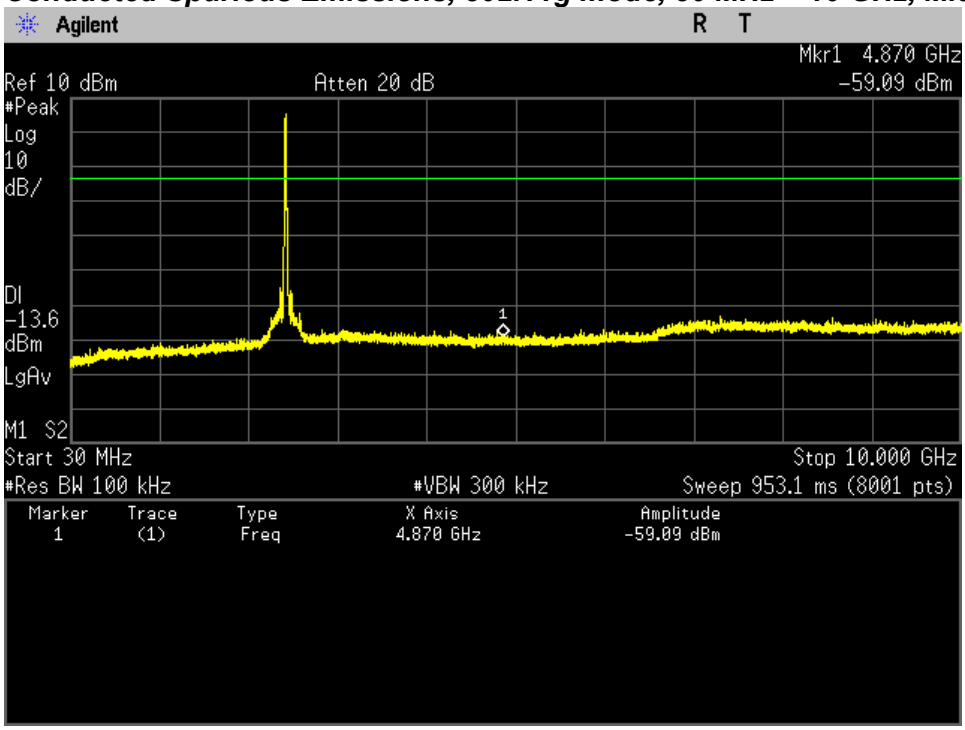


Conducted Spurious Emissions, 802.11g mode, 10 GHz ~ 25 GHz, Lowest Channel

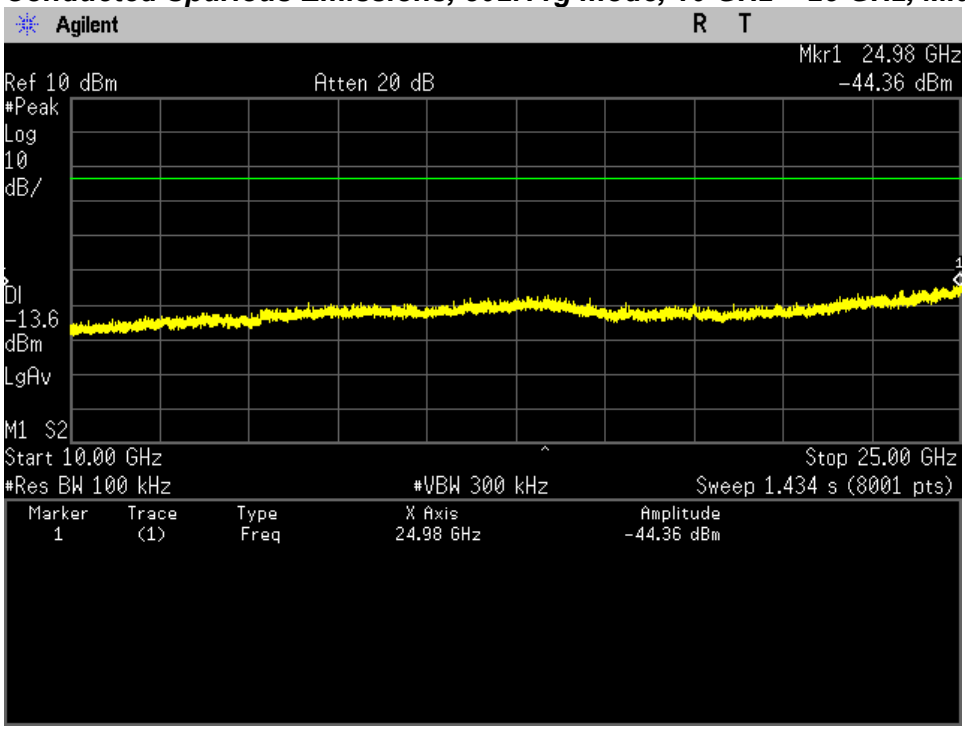


PLOT OF TEST DATA

Conducted Spurious Emissions, 802.11g mode, 30 MHz ~ 10 GHz, Middle Channel

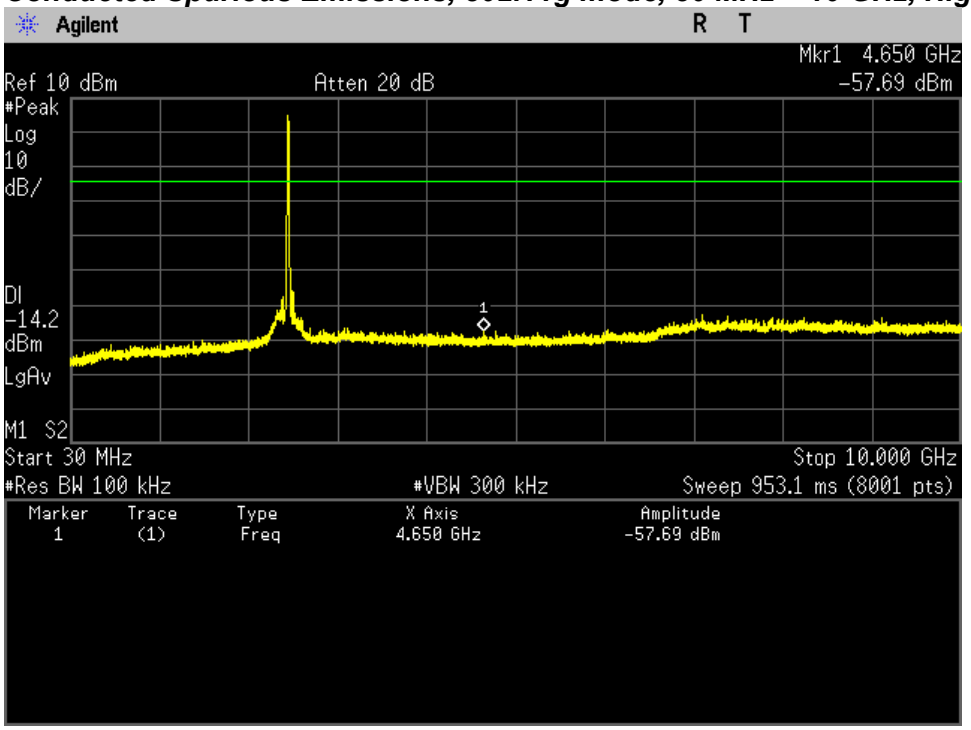


Conducted Spurious Emissions, 802.11g mode, 10 GHz ~ 25 GHz, Middle Channel

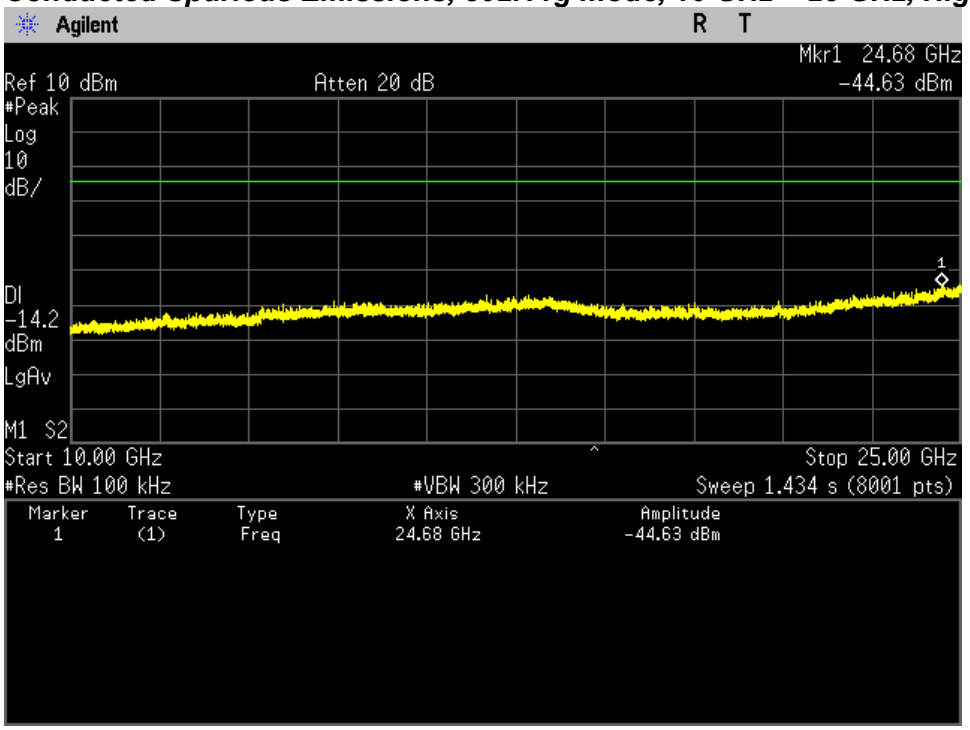


PLOT OF TEST DATA

Conducted Spurious Emissions, 802.11g mode, 30 MHz ~ 10 GHz, Highest Channel



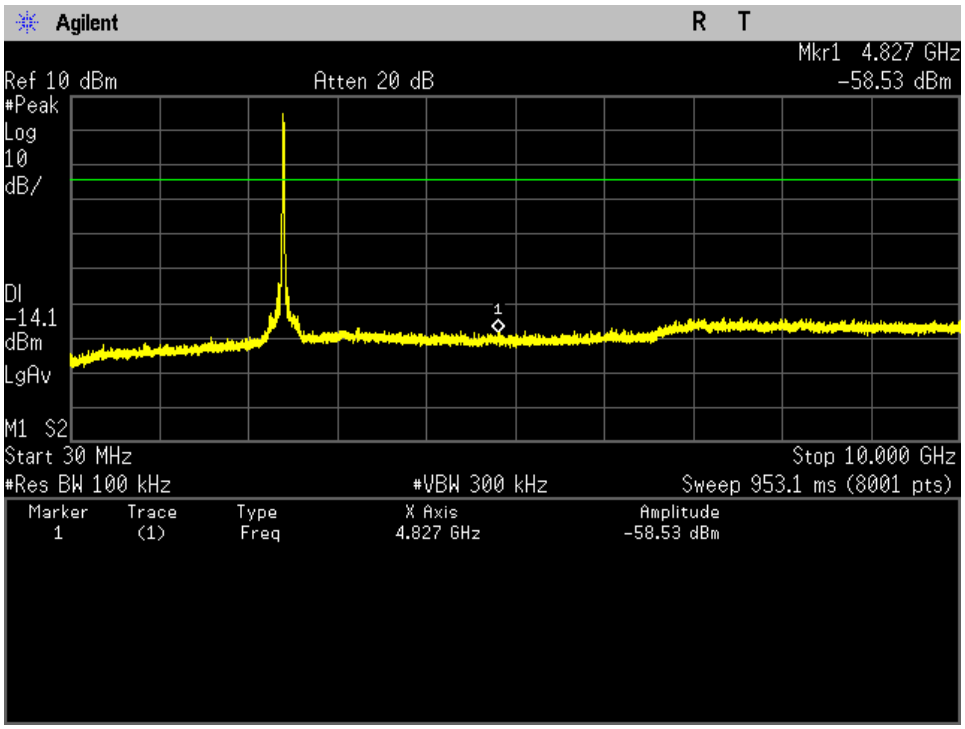
Conducted Spurious Emissions, 802.11g mode, 10 GHz ~ 25 GHz, Highest Channel



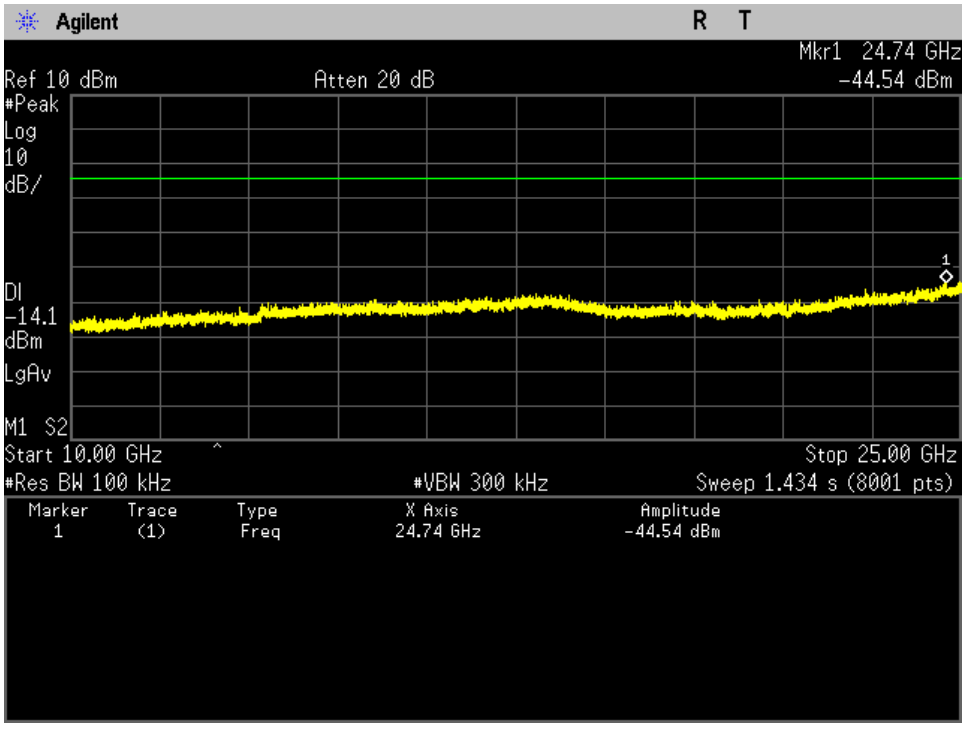
PLOT OF TEST DATA

802.11n(HT20) mode

Conducted Spurious Emissions, 802.11n(HT20) mode, 30 MHz ~ 10 GHz, Lowest Channel

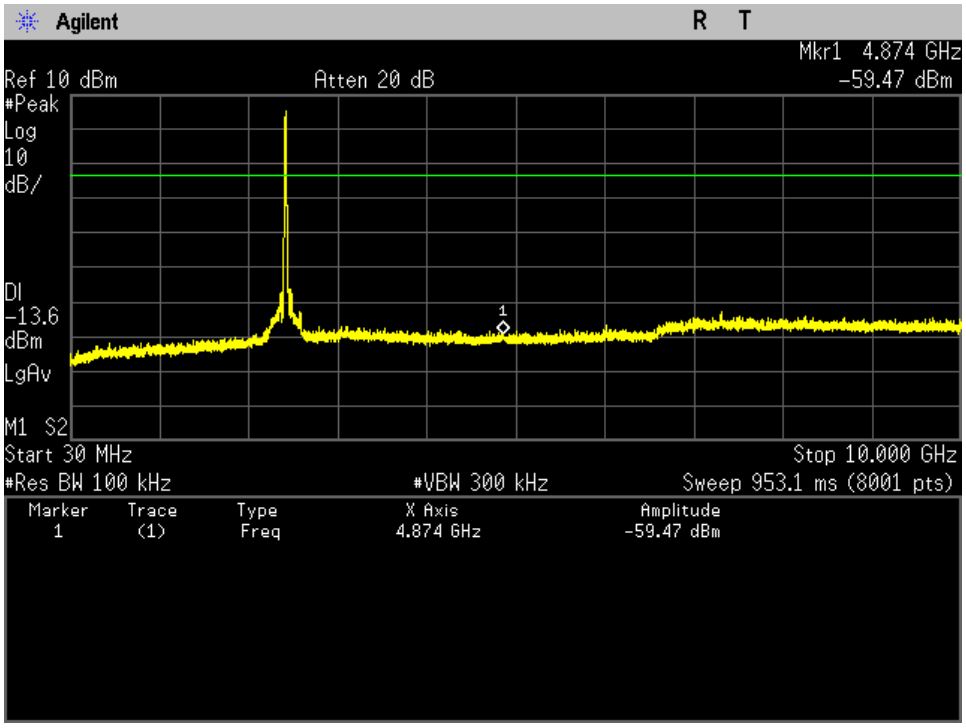


Conducted Spurious Emissions, 802.11n(HT20) mode, 10 GHz ~ 25 GHz, Lowest Channel

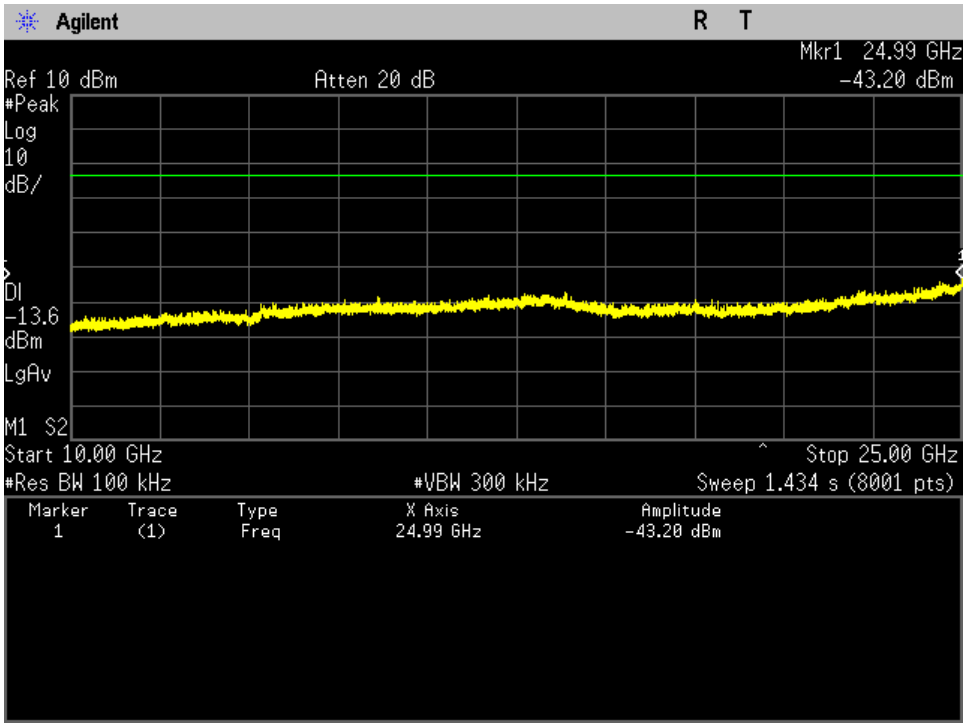


PLOT OF TEST DATA

Conducted Spurious Emissions, 802.11n(HT20) mode, 30 MHz ~ 10 GHz, Middle Channel

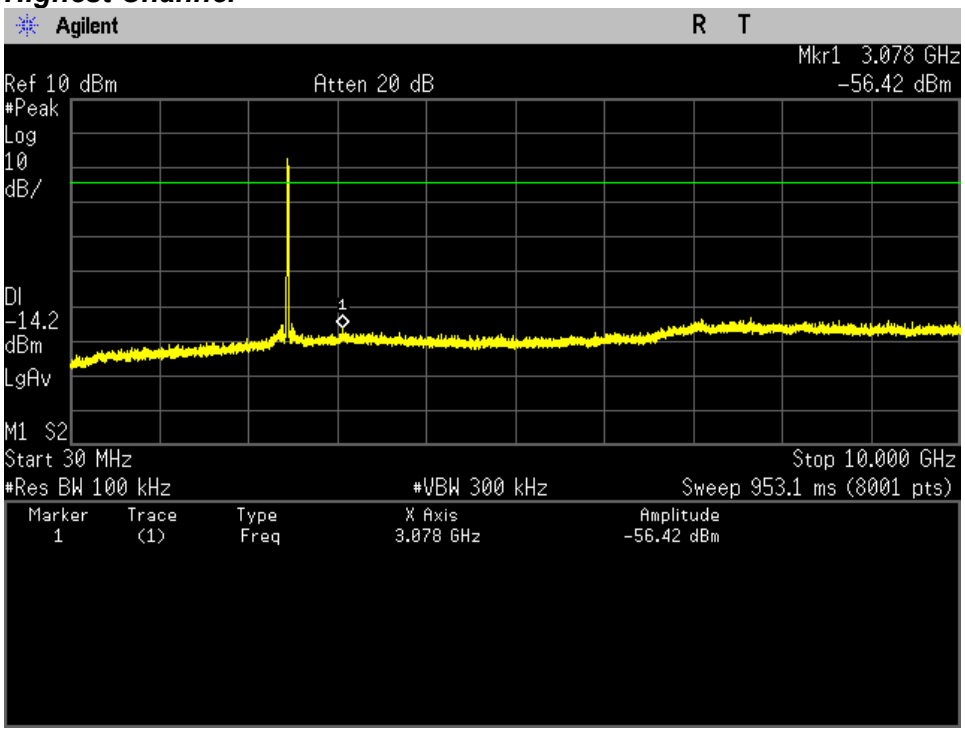


Conducted Spurious Emissions, 802.11n(HT20) mode, 10 GHz ~ 25 GHz, Middle Channel

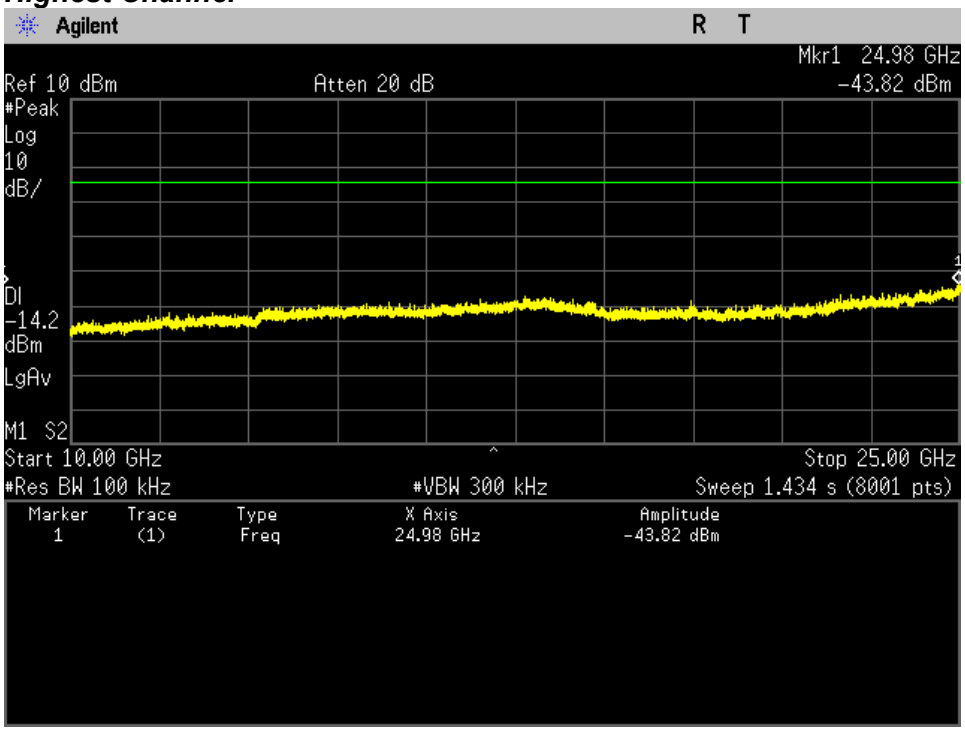


PLOT OF TEST DATA

Conducted Spurious Emissions, 802.11n(HT20) mode, 30 MHz ~ 10 GHz, Highest Channel



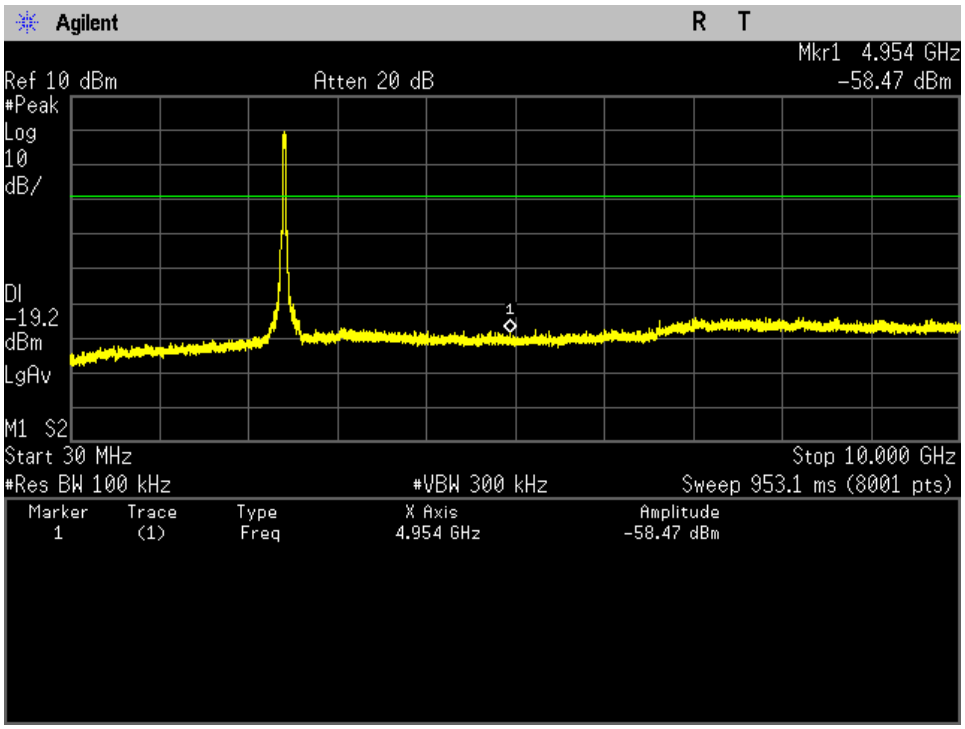
Conducted Spurious Emissions, 802.11n(HT20) mode, 10 GHz ~ 25 GHz, Highest Channel



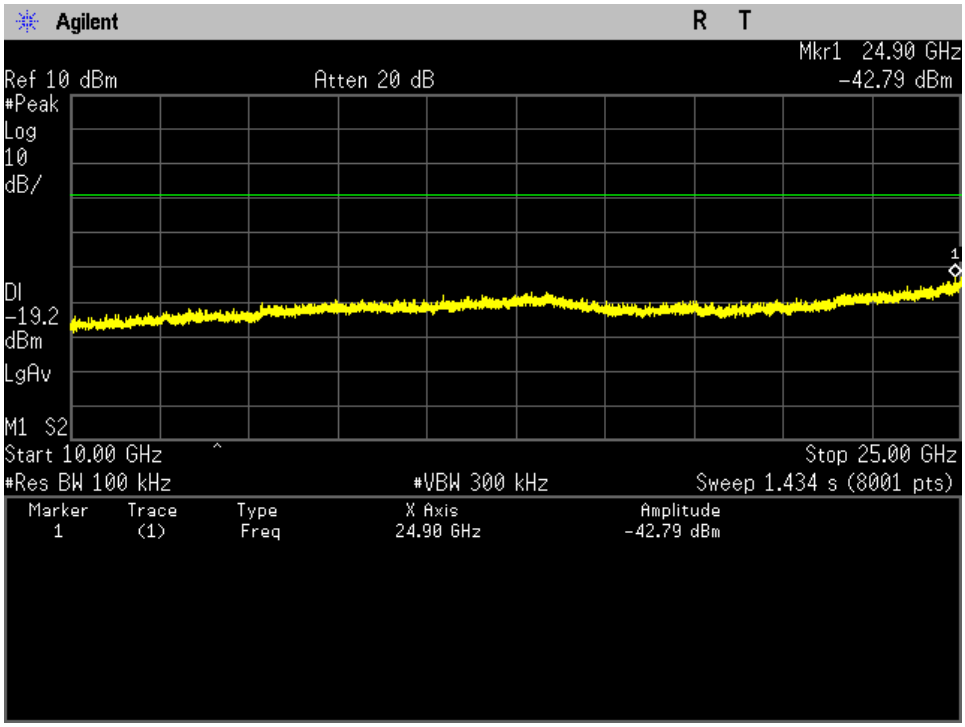
PLOT OF TEST DATA

802.11n(HT40) mode

Conducted Spurious Emissions, 802.11n(HT40) mode, 30 MHz ~ 10 GHz, Lowest Channel

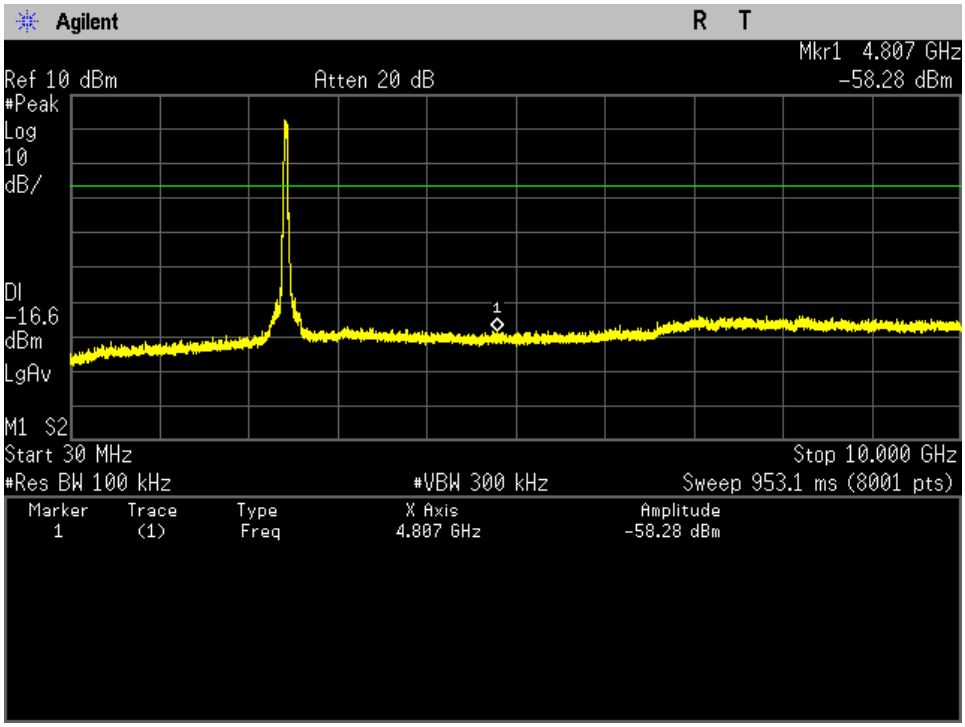


Conducted Spurious Emissions, 802.11n(HT40) mode, 10 GHz ~ 25 GHz, Lowest Channel

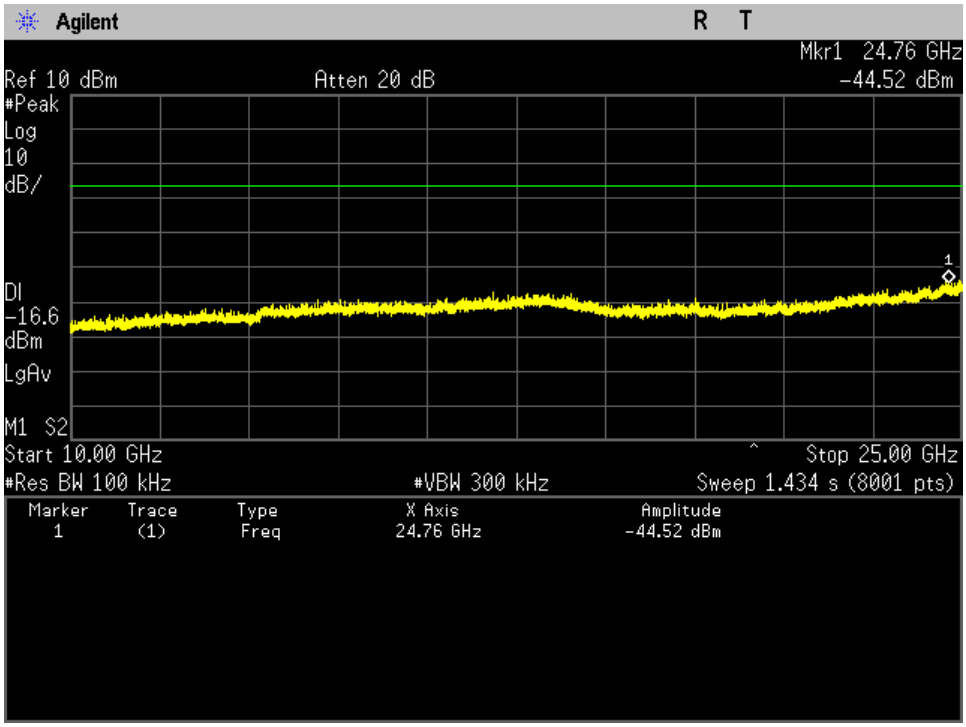


PLOT OF TEST DATA

Conducted Spurious Emissions, 802.11n(HT40) mode, 30 MHz ~ 10 GHz, Middle Channel

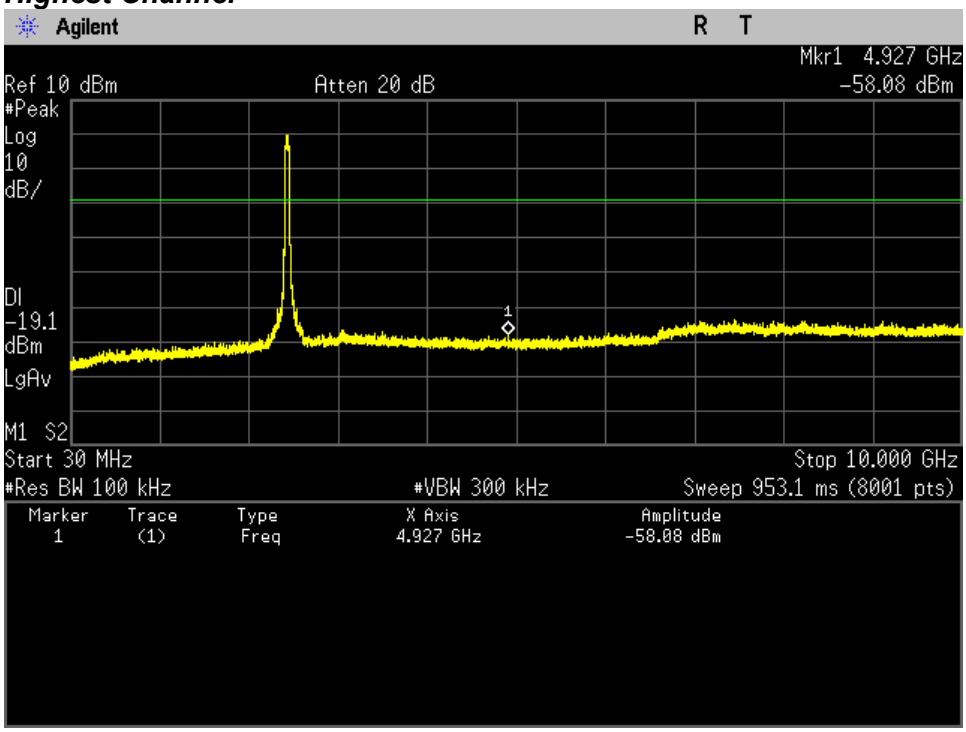


Conducted Spurious Emissions, 802.11n(HT40) mode, 10 GHz ~ 25 GHz, Middle Channel

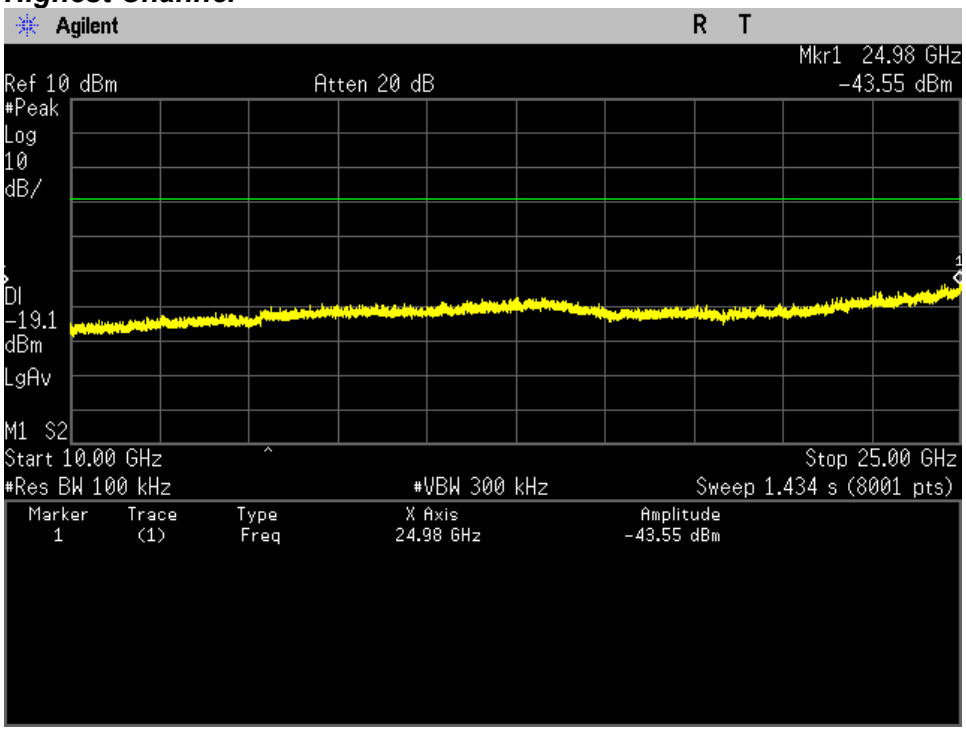


PLOT OF TEST DATA

Conducted Spurious Emissions, 802.11n(HT40) mode, 30 MHz ~ 10 GHz, Highest Channel



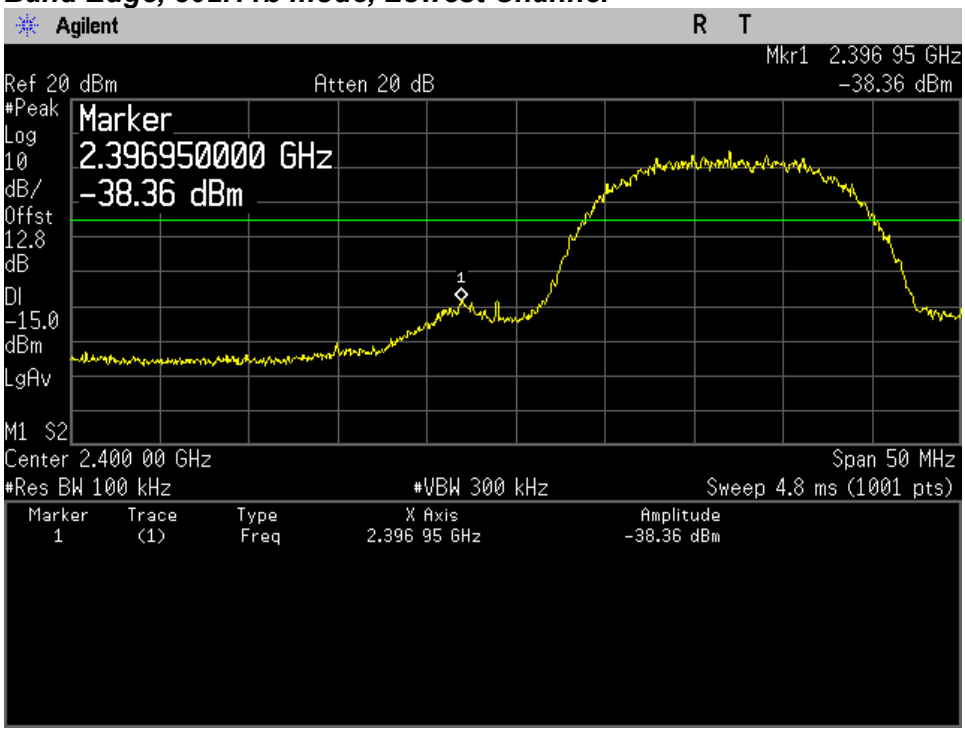
Conducted Spurious Emissions, 802.11n(HT40) mode, 10 GHz ~ 25 GHz, Highest Channel



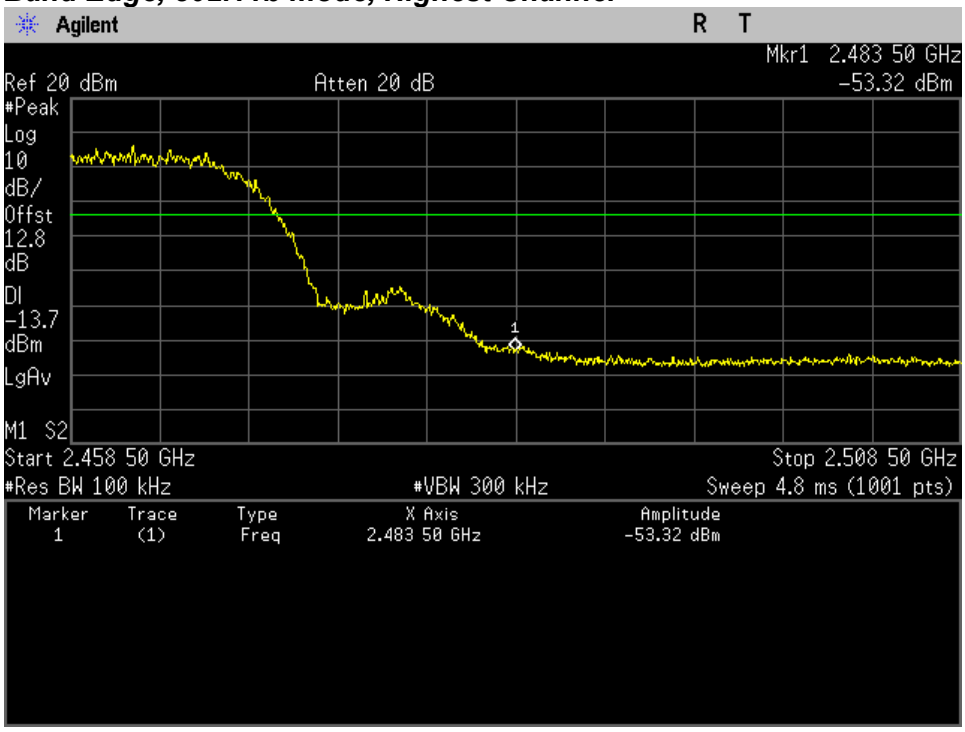
PLOT OF TEST DATA

802.11b mode

Band Edge, 802.11b mode, Lowest Channel



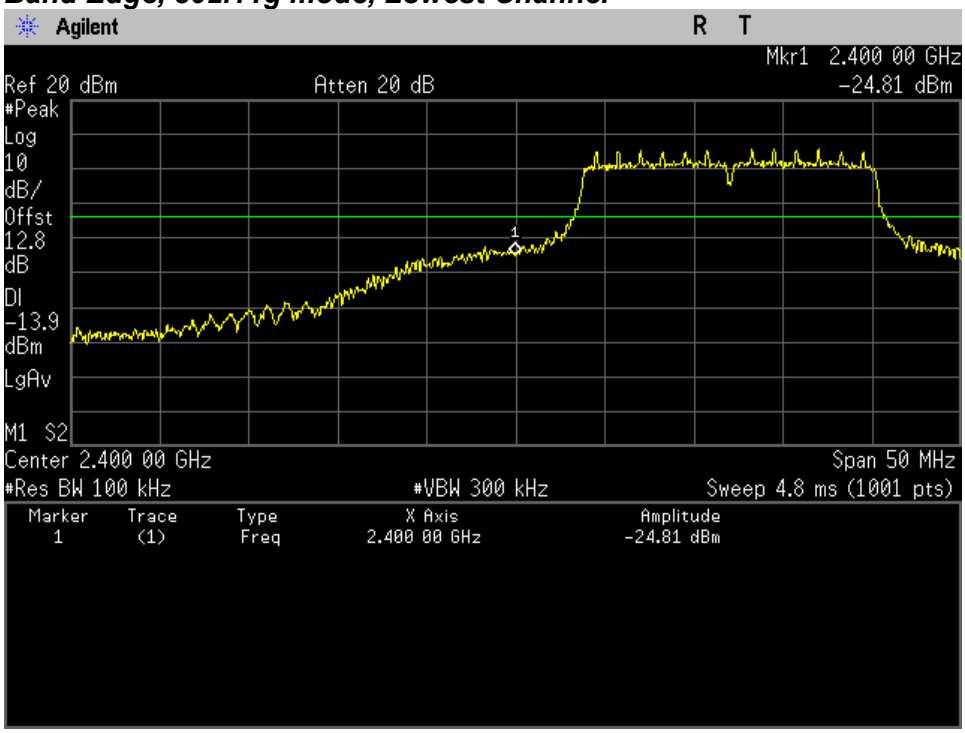
Band Edge, 802.11b mode, Highest Channel



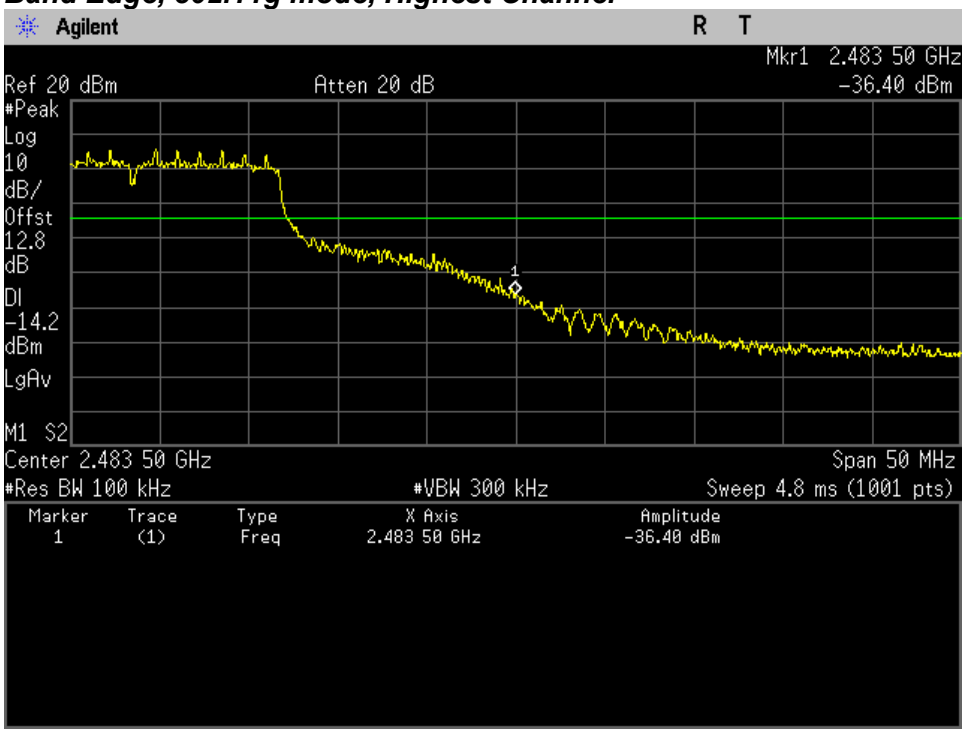
PLOT OF TEST DATA

802.11g mode

Band Edge, 802.11g mode, Lowest Channel



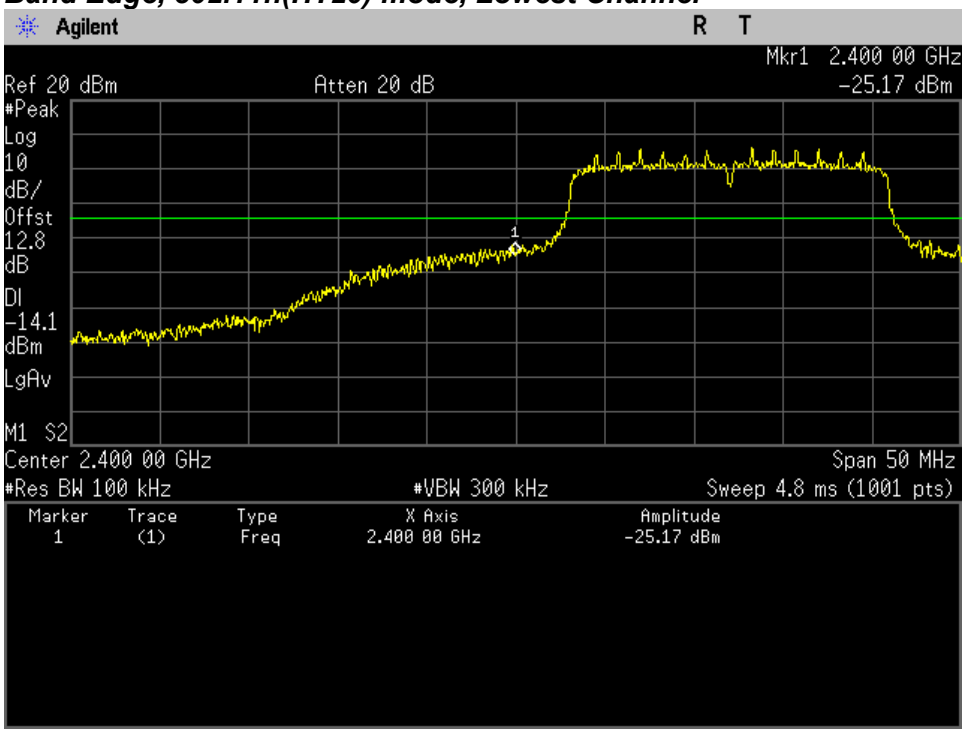
Band Edge, 802.11g mode, Highest Channel



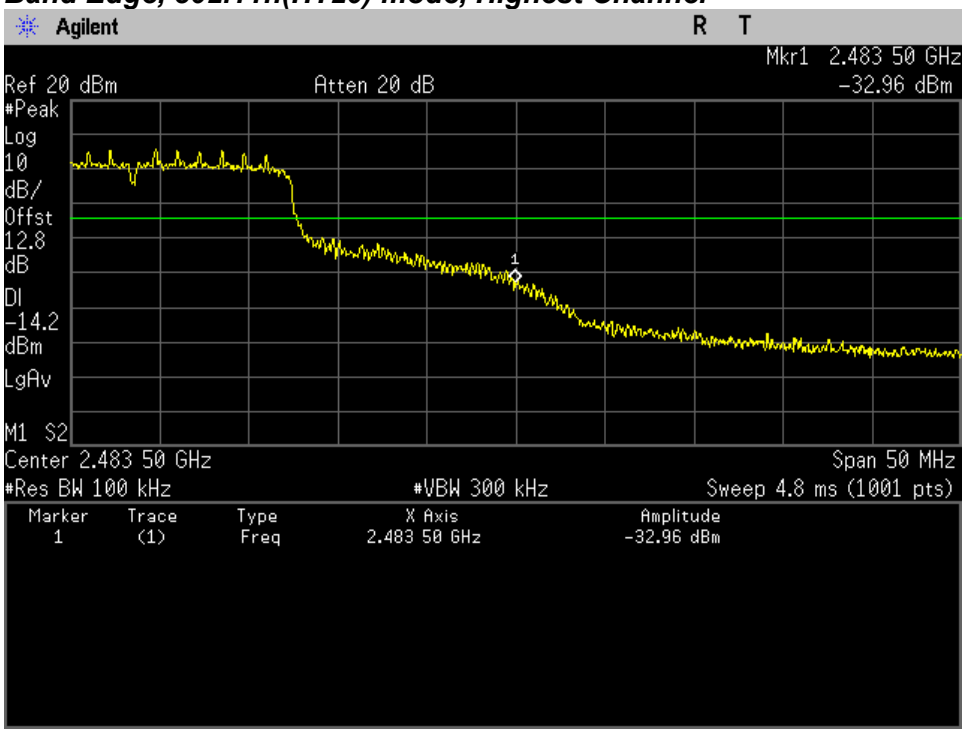
PLOT OF TEST DATA

802.11n(HT20) mode

Band Edge, 802.11n(HT20) mode, Lowest Channel



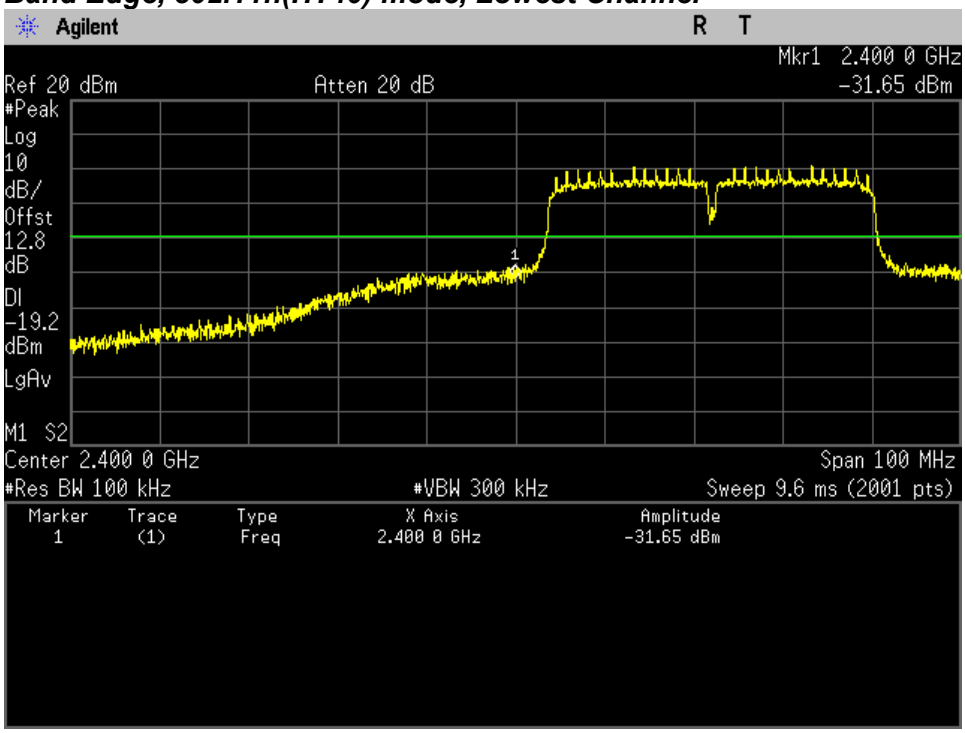
Band Edge, 802.11n(HT20) mode, Highest Channel



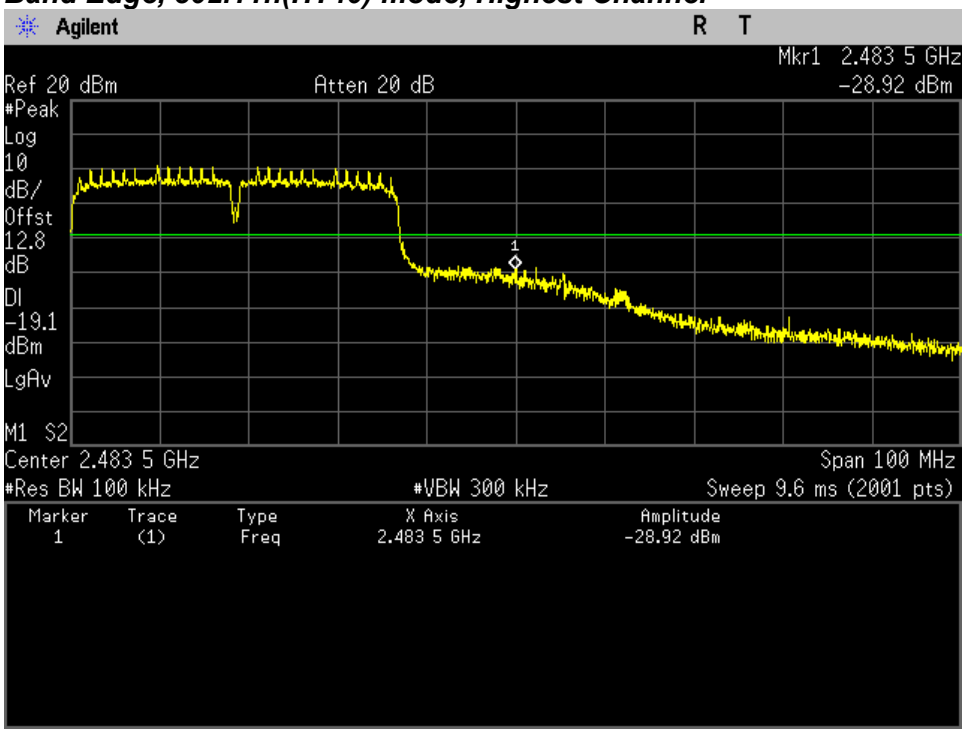
PLOT OF TEST DATA

802.11n(HT40) mode

Band Edge, 802.11n(HT40) mode, Lowest Channel



Band Edge, 802.11n(HT40) mode, Highest Channel



8.7 Radiated Spurious Emissions

FCC §15.247(d), RSS-210 A8.5

Test Mode : Set to Lowest channel, Middle channel and Highest channel

Result:

802.11b mode

Lowest Channel

Frequency (MHz)	Reading (dBµV/m)	Pol* (H/V)	Detector	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1083.00	51.10	V	peak	-4.60	46.50	74.0	27.50
1083.00	38.80	V	average	-4.60	34.20	54.0	19.80
1090.75	53.60	H	peak	-4.60	49.00	74.0	25.00
1090.75	38.60	H	average	-4.60	34.00	54.0	20.00
1199.50	49.20	H	peak	-4.40	44.80	74.0	29.20
1199.50	37.90	H	average	-4.40	33.50	54.0	20.50
1497.75	48.10	V	peak	-3.50	44.60	74.0	29.40
1497.75	39.20	V	average	-3.50	35.70	54.0	18.30
1662.75	47.80	V	peak	-2.90	44.90	74.0	29.10
1662.75	38.00	V	average	-2.90	35.10	54.0	18.90
2246.75	48.30	V	peak	-1.30	47.00	74.0	27.00
2246.75	39.30	V	average	-1.30	38.00	54.0	16.00
4824.00	44.40	H	peak	9.00	53.40	74.0	20.60
4824.00	41.10	H	average	9.00	50.10	54.0	3.90

TEST DATA

Middle Channel

Frequency (MHz)	Reading (dBµV/m)	Pol* (H/V)	Detector	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1080.00	51.00	V	peak	-4.60	46.40	74.0	27.60
1080.00	39.70	V	average	-4.60	35.10	54.0	18.90
1091.75	52.50	V	peak	-4.60	47.90	74.0	26.10
1091.75	38.50	V	average	-4.60	33.90	54.0	20.10
1304.00	47.20	H	peak	-3.90	43.30	74.0	30.70
1304.00	37.90	H	average	-3.90	34.00	54.0	20.00
1333.50	47.50	H	peak	-3.80	43.70	74.0	30.30
1333.50	39.40	H	average	-3.80	35.60	54.0	18.40
1351.50	46.80	H	peak	-3.80	43.00	74.0	31.00
1351.50	37.90	H	average	-3.80	34.10	54.0	19.90
4874.00	46.90	V	peak	9.20	56.10	74.0	17.90
4874.00	41.80	V	average	9.20	51.00	54.0	3.00

Highest Channel

Frequency (MHz)	Reading (dBµV/m)	Pol* (H/V)	Detector	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1086.00	55.20	V	peak	-4.60	50.60	74.0	23.40
1086.00	38.80	V	average	-4.60	34.20	54.0	19.80
1326.75	46.30	H	peak	-3.80	42.50	74.0	31.50
1326.75	38.50	H	average	-3.80	34.70	54.0	19.30
1497.75	48.50	H	peak	-3.50	45.00	74.0	29.00
1497.75	38.80	H	average	-3.50	35.30	54.0	18.70
1676.25	46.40	V	peak	-2.90	43.50	74.0	30.50
1676.25	38.30	V	average	-2.90	35.40	54.0	18.60
2247.50	48.90	V	peak	-1.30	47.60	74.0	26.40
2247.50	39.20	V	average	-1.30	37.90	54.0	16.10
2299.50	48.60	H	peak	-1.10	47.50	74.0	26.50
2299.50	40.40	H	average	-1.10	39.30	54.0	14.70
4924.00	44.20	V	peak	9.30	53.50	74.0	20.50
4924.00	41.10	V	average	9.30	50.40	54.0	3.60

TEST DATA

802.11g mode

Lowest Channel

Frequency (MHz)	Reading (dBµV/m)	Pol* (H/V)	Detector	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1080.00	50.90	H	peak	-4.60	46.30	74.0	27.70
1080.00	39.90	H	average	-4.60	35.30	54.0	18.70
1320.00	46.90	H	peak	-3.80	43.10	74.0	30.90
1320.00	38.40	H	average	-3.80	34.60	54.0	19.40
1498.25	47.80	V	peak	-3.50	44.30	74.0	29.70
1498.25	39.50	V	average	-3.50	36.00	54.0	18.00
1660.50	47.30	V	peak	-2.90	44.40	74.0	29.60
1660.50	37.80	V	average	-2.90	34.90	54.0	19.10
1693.00	46.70	V	peak	-2.90	43.80	74.0	30.20
1693.00	38.90	V	average	-2.90	36.00	54.0	18.00
1703.00	47.40	H	peak	-2.90	44.50	74.0	29.50
1703.00	37.70	H	average	-2.90	34.80	54.0	19.20
4824.00	50.90	H	peak	9.00	59.90	74.0	14.10
4824.00	41.90	H	average	9.00	50.90	54.0	3.10

Middle Channel

Frequency (MHz)	Reading (dBµV/m)	Pol* (H/V)	Detector	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1079.75	52.30	V	peak	-4.60	47.70	74.0	26.30
1079.75	38.50	V	average	-4.60	33.90	54.0	20.10
1129.25	46.90	H	peak	-4.50	42.40	74.0	31.60
1129.25	38.10	H	average	-4.50	33.60	54.0	20.40
1497.25	47.80	V	peak	-3.50	44.30	74.0	29.70
1497.25	39.10	V	average	-3.50	35.60	54.0	18.40
1662.25	47.70	V	peak	-2.90	44.80	74.0	29.20
1662.25	38.80	V	average	-2.90	35.90	54.0	18.10
4874.00	51.20	V	peak	9.20	60.40	74.0	13.60
4874.00	41.80	V	average	9.20	51.00	54.0	3.00

TEST DATA

Highest Channel

Frequency (MHz)	Reading (dBµV/m)	Pol* (H/V)	Detector	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1080.00	53.30	V	peak	-4.60	48.70	74.0	25.30
1080.00	40.60	V	average	-4.60	36.00	54.0	18.00
1319.75	46.80	H	peak	-3.80	43.00	74.0	31.00
1319.75	38.50	H	average	-3.80	34.70	54.0	19.30
1498.50	47.50	V	peak	-3.50	44.00	74.0	30.00
1498.50	39.10	V	average	-3.50	35.60	54.0	18.40
1615.00	45.90	H	peak	-3.10	42.80	74.0	31.20
1615.00	37.90	H	average	-3.10	34.80	54.0	19.20
1664.00	46.80	V	peak	-2.90	43.90	74.0	30.10
1664.00	38.30	V	average	-2.90	35.40	54.0	18.60
2247.50	48.90	V	peak	-1.30	47.60	74.0	26.40
2247.50	38.80	V	average	-1.30	37.50	54.0	16.50
4924.00	47.90	H	peak	9.30	57.20	74.0	16.80
4924.00	36.50	H	average	9.30	45.80	54.0	8.20

802.11n(HT20) mode

Lowest Channel

Frequency (MHz)	Reading (dBµV/m)	Pol* (H/V)	Detector	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1079.95	50.80	V	peak	-4.60	46.20	74.0	27.80
1079.95	39.50	V	average	-4.60	34.90	54.0	19.10
1320.00	46.50	H	peak	-3.80	42.70	74.0	31.30
1320.00	38.50	H	average	-3.80	34.70	54.0	19.30
1496.50	47.80	V	peak	-3.50	44.30	74.0	29.70
1496.50	39.00	V	average	-3.50	35.50	54.0	18.50
1662.00	48.10	V	peak	-2.90	45.20	74.0	28.80
1662.00	37.80	V	average	-2.90	34.90	54.0	19.10
2255.00	48.60	H	peak	-1.30	47.30	74.0	26.70
2255.00	39.60	H	average	-1.30	38.30	54.0	15.70
4824.00	50.90	H	peak	9.00	59.90	74.0	14.10
4824.00	41.20	H	average	9.00	50.20	54.0	3.80

TEST DATA

Middle Channel

Frequency (MHz)	Reading (dBµV/m)	Pol* (H/V)	Detector	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1080.00	49.10	H	peak	-4.60	44.50	74.0	29.50
1080.00	42.50	H	average	-4.60	37.90	54.0	16.10
1333.25	47.10	H	peak	-3.80	43.30	74.0	30.70
1333.25	39.20	H	average	-3.80	35.40	54.0	18.60
1497.25	48.00	V	peak	-3.50	44.50	74.0	29.50
1497.25	39.20	V	average	-3.50	35.70	54.0	18.30
1663.75	48.20	V	peak	-2.90	45.30	74.0	28.70
1663.75	37.80	V	average	-2.90	34.90	54.0	19.10
4873.12	51.00	H	peak	9.20	60.20	74.0	13.80
4873.12	41.50	H	average	9.20	50.70	54.0	3.30

Highest Channel

Frequency (MHz)	Reading (dBµV/m)	Pol* (H/V)	Detector	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1082.25	54.30	H	peak	-4.60	49.70	74.0	24.30
1082.25	39.60	H	average	-4.60	35.00	54.0	19.00
1333.50	46.80	H	peak	-3.80	43.00	74.0	31.00
1333.50	39.40	H	average	-3.80	35.60	54.0	18.40
1417.25	47.50	H	peak	-3.70	43.80	74.0	30.20
1417.25	38.70	H	average	-3.70	35.00	54.0	19.00
1497.00	48.20	V	peak	-3.50	44.70	74.0	29.30
1497.00	39.10	V	average	-3.50	35.60	54.0	18.40
1661.25	48.20	V	peak	-2.90	45.30	74.0	28.70
1661.25	39.90	V	average	-2.90	37.00	54.0	17.00
2242.50	48.30	V	peak	-1.30	47.00	74.0	27.00
2242.50	39.10	V	average	-1.30	37.80	54.0	16.20
4924.00	47.50	H	peak	9.30	56.80	74.0	17.20
4924.00	36.40	H	average	9.30	45.70	54.0	8.30

TEST DATA

802.11n(HT40) mode

Lowest Channel

Frequency (MHz)	Reading (dBµV/m)	Pol* (H/V)	Detector	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1080.00	52.60	V	peak	-4.60	48.00	74.0	26.00
1080.00	41.30	V	average	-4.60	36.70	54.0	17.30
1166.50	47.10	V	peak	-4.40	42.70	74.0	31.30
1166.50	41.20	V	average	-4.40	36.80	54.0	17.20
1320.00	46.50	H	peak	-3.80	42.70	74.0	31.30
1320.00	39.30	H	average	-3.80	35.50	54.0	18.50
1497.25	49.30	V	peak	-3.50	45.80	74.0	28.20
1497.25	39.60	V	average	-3.50	36.10	54.0	17.90
1661.25	47.90	V	peak	-2.90	45.00	74.0	29.00
1661.25	38.60	V	average	-2.90	35.70	54.0	18.30
1688.00	49.40	V	peak	-2.90	46.50	74.0	27.50
1688.00	39.70	V	average	-2.90	36.80	54.0	17.20
4844.00	49.70	H	peak	9.00	58.70	74.0	15.30
4844.00	40.60	H	average	9.00	49.60	54.0	4.40

Middle Channel

Frequency (MHz)	Reading (dBµV/m)	Pol* (H/V)	Detector	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1080.25	48.50	H	peak	-4.60	43.90	74.0	30.10
1080.25	41.50	H	average	-4.60	36.90	54.0	17.10
1333.50	48.90	H	peak	-3.80	45.10	74.0	28.90
1333.50	38.40	H	average	-3.80	34.60	54.0	19.40
1498.00	48.00	V	peak	-3.50	44.50	74.0	29.50
1498.00	38.90	V	average	-3.50	35.40	54.0	18.60
1597.75	46.30	V	peak	-3.20	43.10	74.0	30.90
1597.75	37.50	V	average	-3.20	34.30	54.0	19.70
1662.75	49.50	V	peak	-2.90	46.60	74.0	27.40
1662.75	38.20	V	average	-2.90	35.30	54.0	18.70
4874.00	49.60	H	peak	9.20	58.80	74.0	15.20
4874.00	40.60	H	average	9.20	49.80	54.0	4.20

TEST DATA

Highest Channel

Frequency (MHz)	Reading (dBµV/m)	Pol* (H/V)	Detector	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1080.00	50.90	V	peak	-4.60	46.30	74.0	27.70
1080.00	39.90	V	average	-4.60	35.30	54.0	18.70
1329.50	46.40	H	peak	-3.80	42.60	74.0	31.40
1329.50	38.20	H	average	-3.80	34.40	54.0	19.60
1440.50	46.40	H	peak	-3.70	42.70	74.0	31.30
1440.50	38.00	H	average	-3.70	34.30	54.0	19.70
1495.25	47.60	V	peak	-3.50	44.10	74.0	29.90
1495.25	38.70	V	average	-3.50	35.20	54.0	18.80
1664.50	47.30	V	peak	-2.90	44.40	74.0	29.60
1664.50	38.70	V	average	-2.90	35.80	54.0	18.20
2248.75	47.90	V	peak	-1.30	46.60	74.0	27.40
2248.75	39.90	V	average	-1.30	38.60	54.0	15.40
4904.00	44.90	V	peak	9.30	54.20	74.0	19.80
4904.00	36.20	V	average	9.30	45.50	54.0	8.50

Note:

1. *Pol. H = Horizontal V = Vertical

2. **AF + CL + Amp. = Antenna Factor + Cable Loss + Amplifier.

3. Other spurious are 20 dB below than Fundamental.

4. The radiated emissions testing were made by rotating EUT through three orthogonal axes and rotating the receive antenna with horizontal, Vertical polarization.
The worst date was recorded.

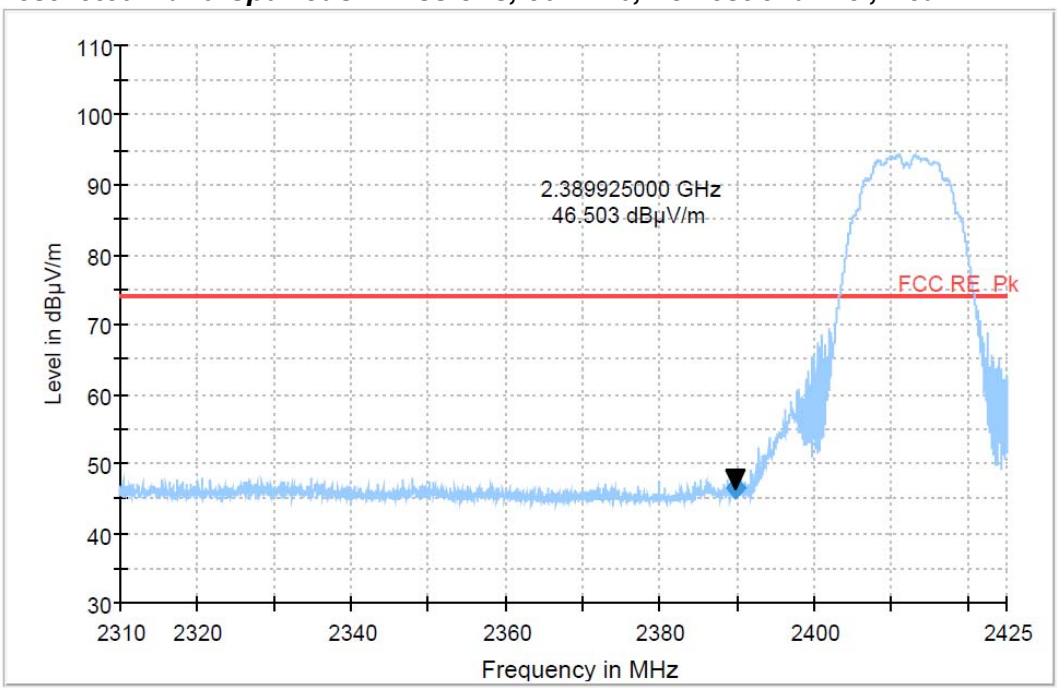
5. For measurements the resolution bandwidth is set to 1 MHz, and then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

6. The spectrum is measured from 9 kHz to 10th harmonic and the worst-case emissions are reported. No significant emissions were found beyond the fifth harmonic for this device.

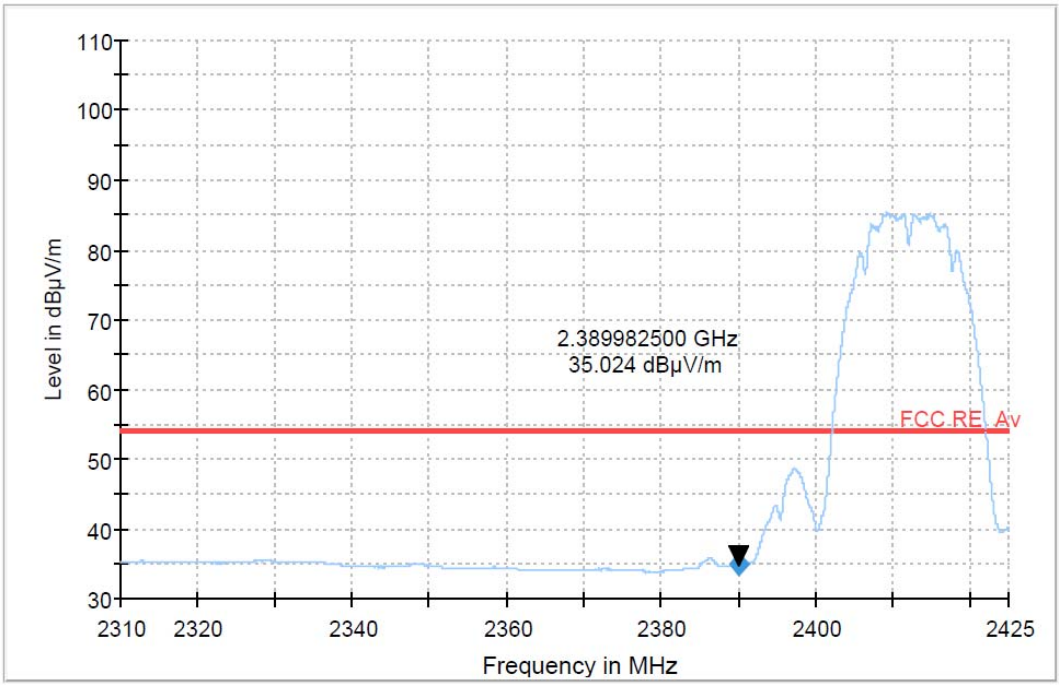
PLOT OF TEST DATA

802.11b mode

Restricted Band Spurious Emissions, 802.11b, Lowest channel, Peak

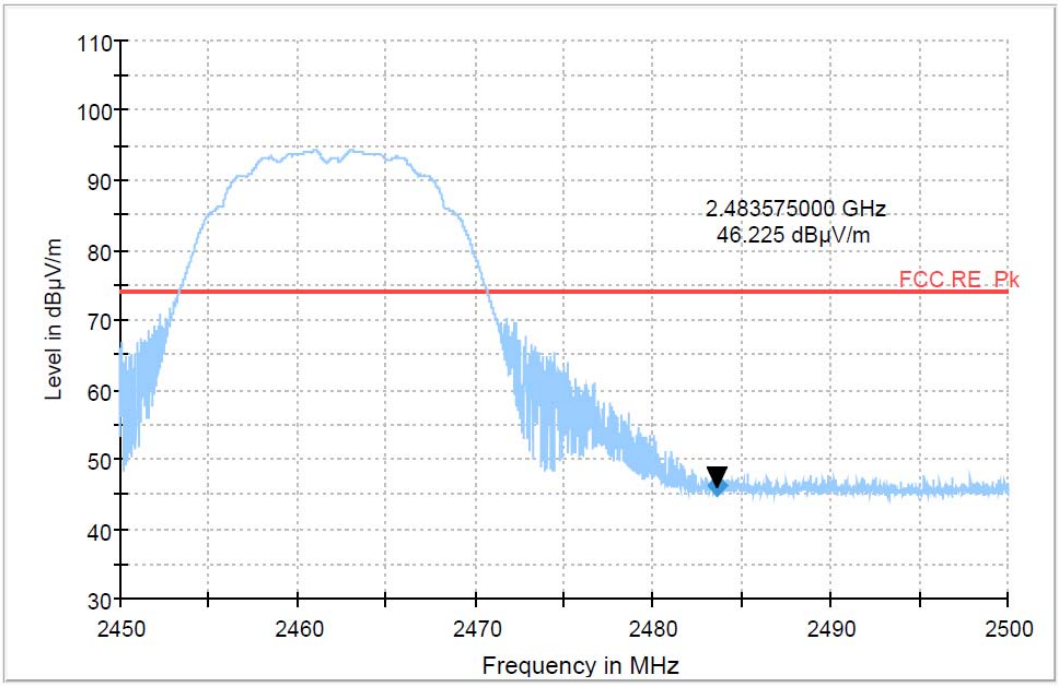


Restricted Band Spurious Emissions, 802.11b, Lowest channel, Average

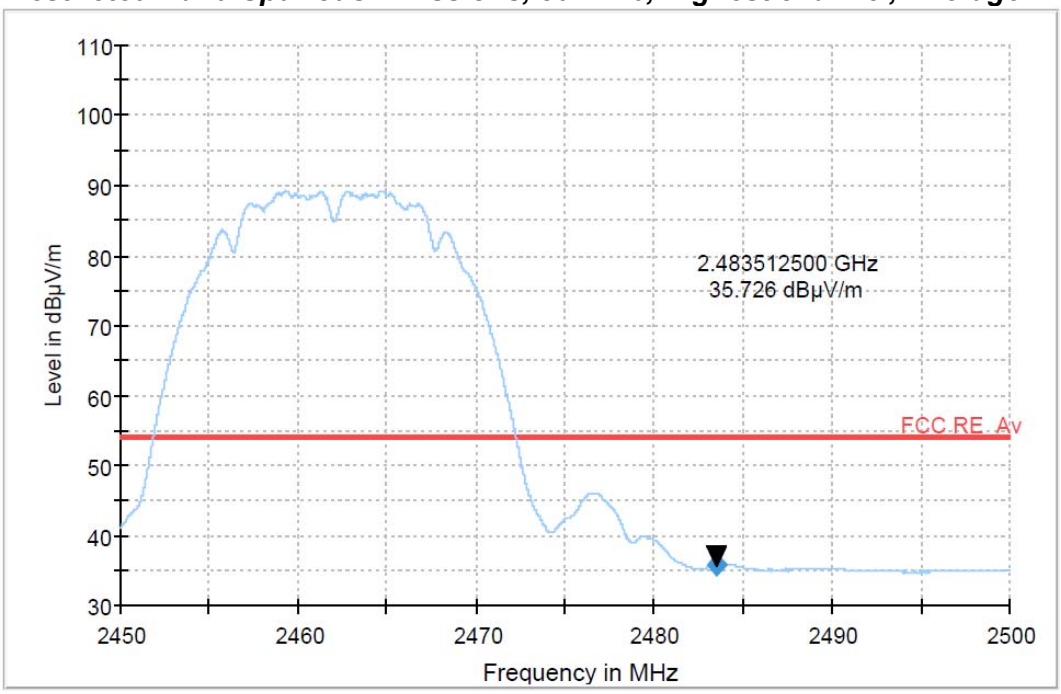


PLOT OF TEST DATA

Restricted Band Spurious Emissions, 802.11b, Highest channel, Peak



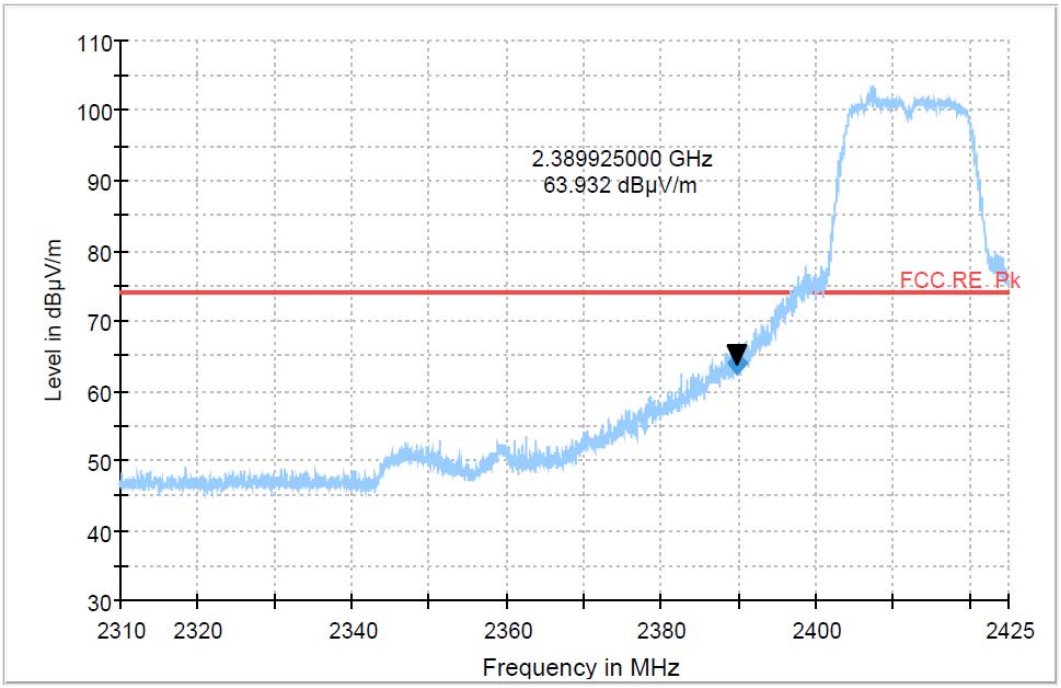
Restricted Band Spurious Emissions, 802.11b, Highest channel, Average



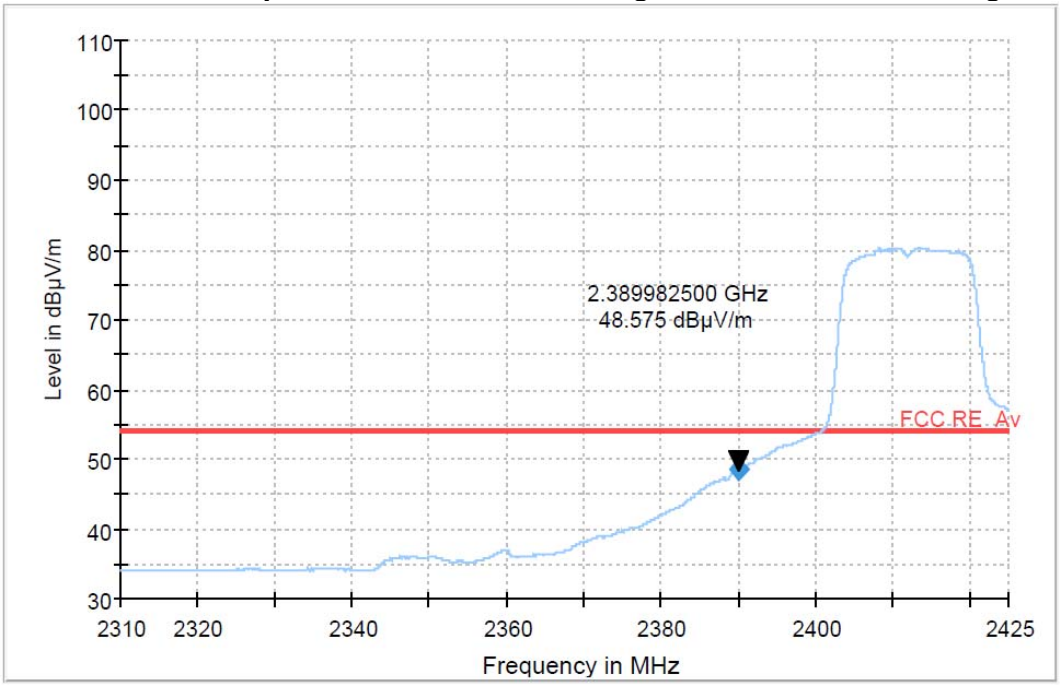
PLOT OF TEST DATA

802.11g mode

Restricted Band Spurious Emissions, 802.11g, Lowest channel, Peak

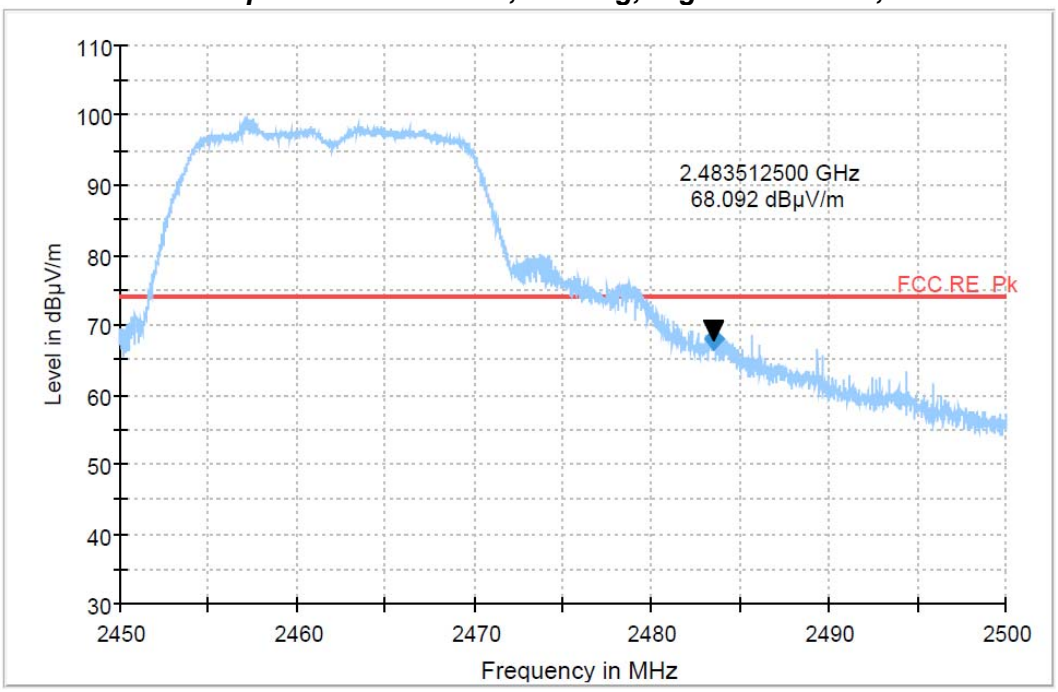


Restricted Band Spurious Emissions, 802.11g, Lowest channel, Average

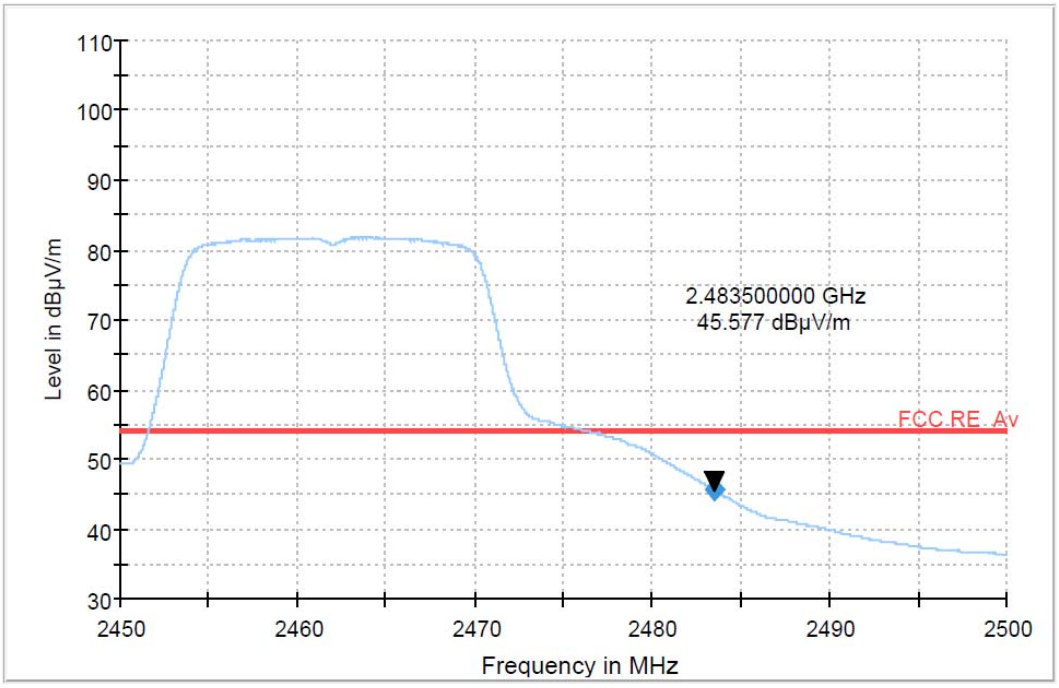


PLOT OF TEST DATA

Restricted Band Spurious Emissions, 802.11g, Highest channel, Peak



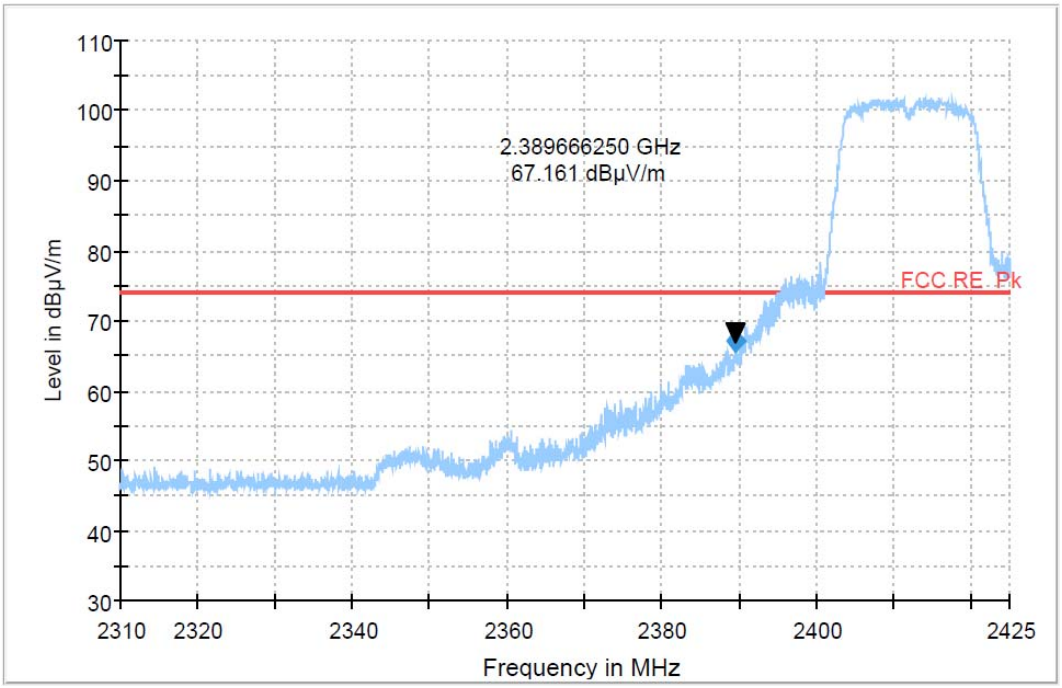
Restricted Band Spurious Emissions, 802.11g, Highest channel, Average



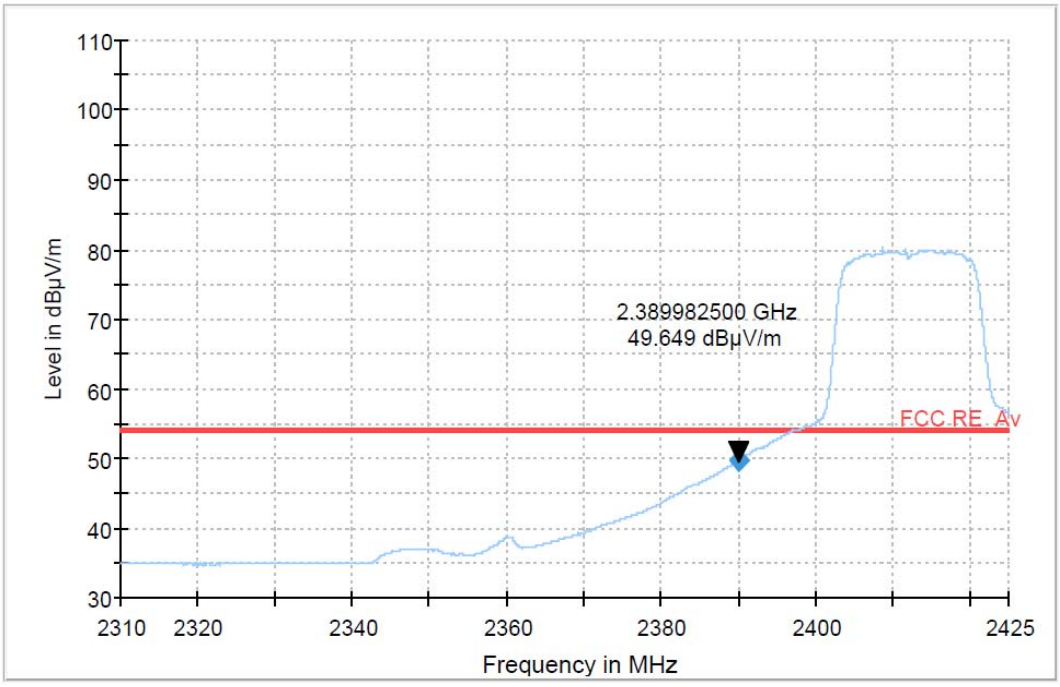
PLOT OF TEST DATA

802.11n(HT20) mode

Restricted Band Spurious Emissions, 802.11n(HT20), Lowest channel, Peak

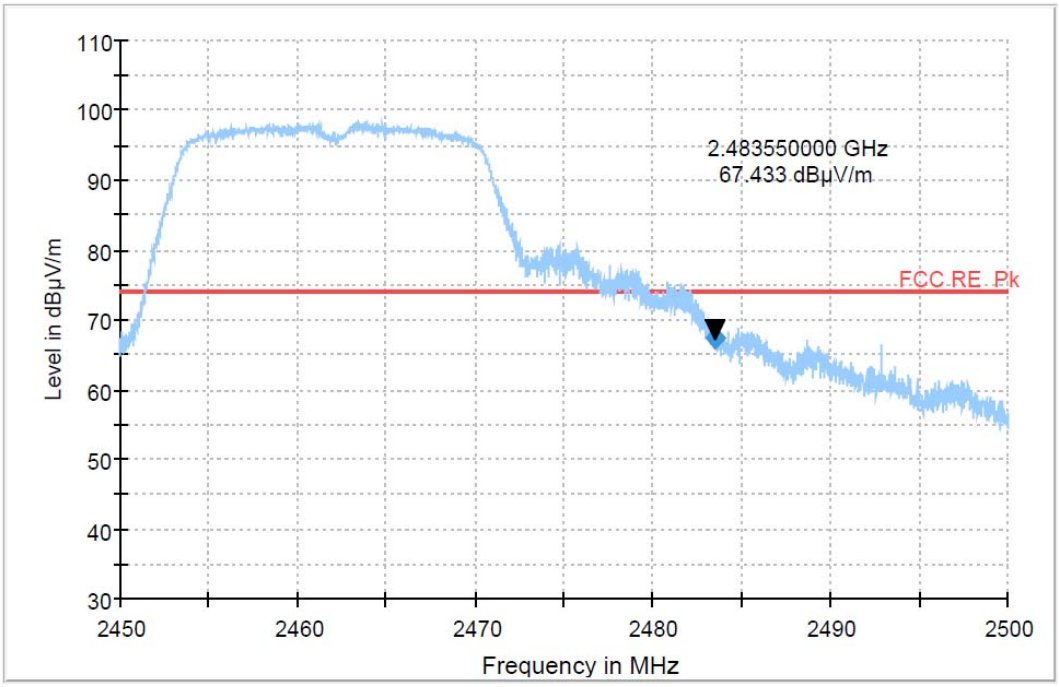


Restricted Band Spurious Emissions, 802.11n(HT20), Lowest channel, Average

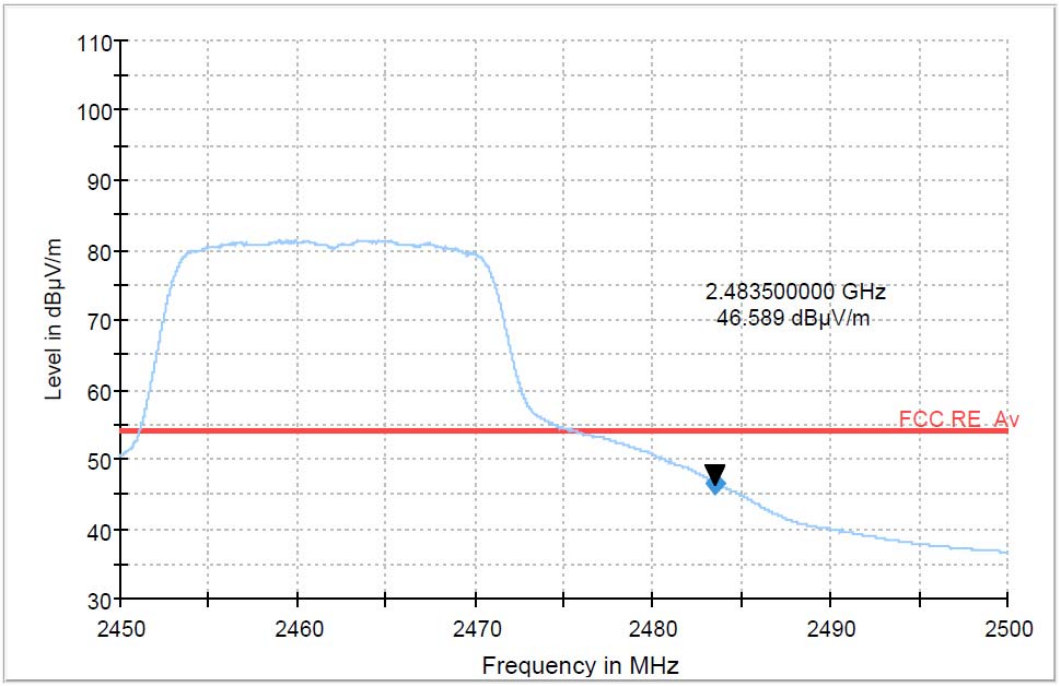


PLOT OF TEST DATA

Restricted Band Spurious Emissions, 802.11n(HT20), Highest channel, Peak



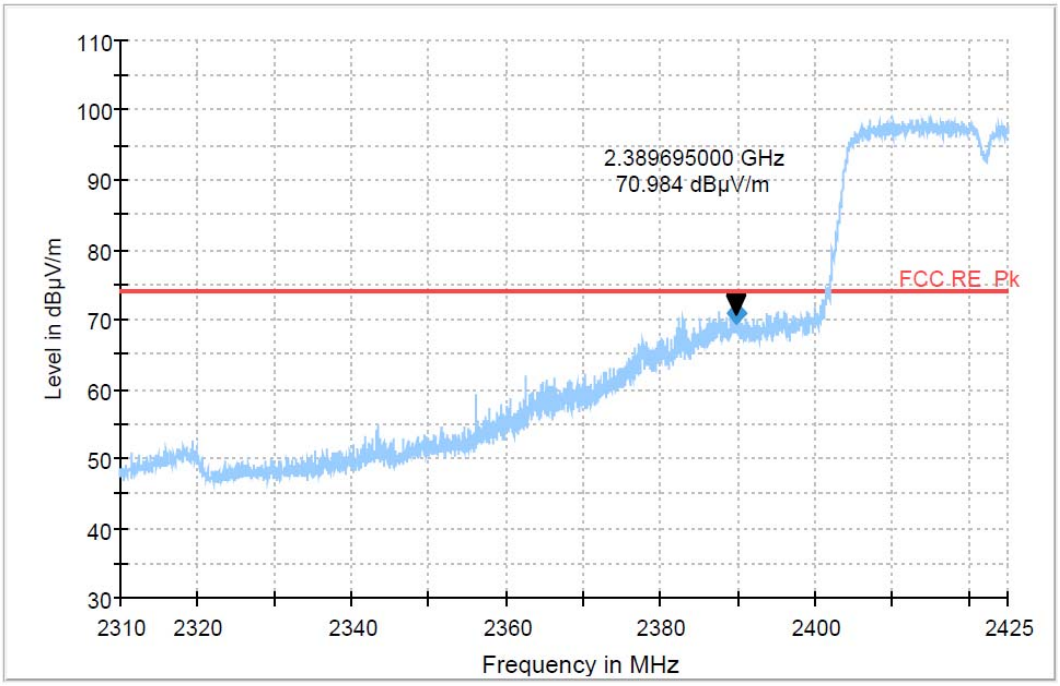
Restricted Band Spurious Emissions, 802.11n(HT20), Highest channel, Average



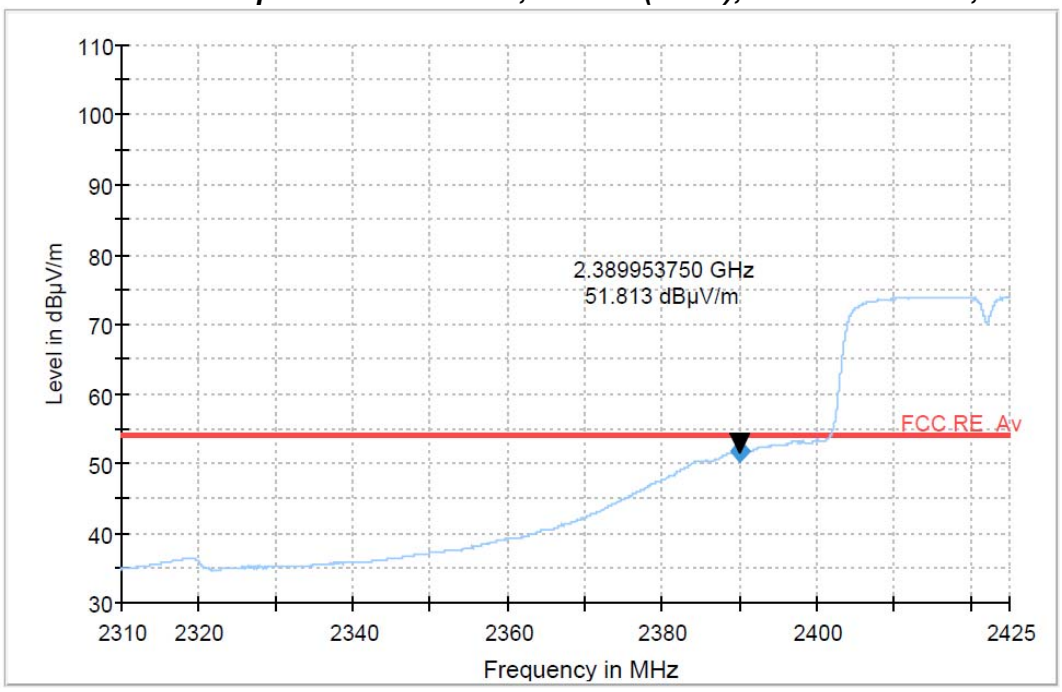
PLOT OF TEST DATA

802.11n(HT40) mode

Restricted Band Spurious Emissions, 802.11n(HT40), Lowest channel, Peak

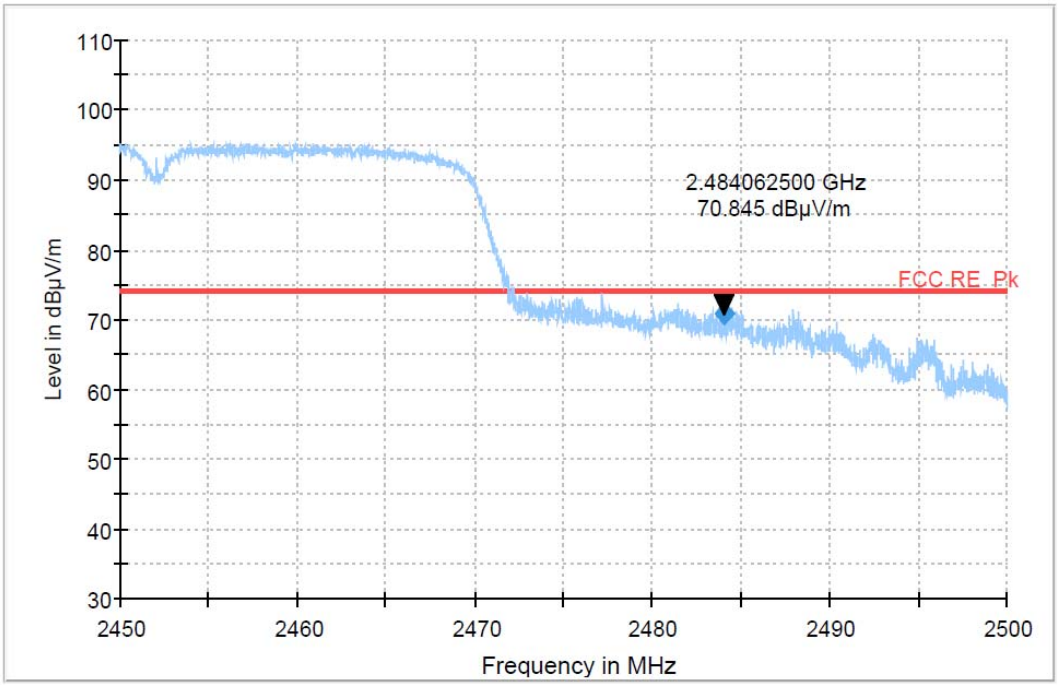


Restricted Band Spurious Emissions, 802.11n(HT40), Lowest channel, Average

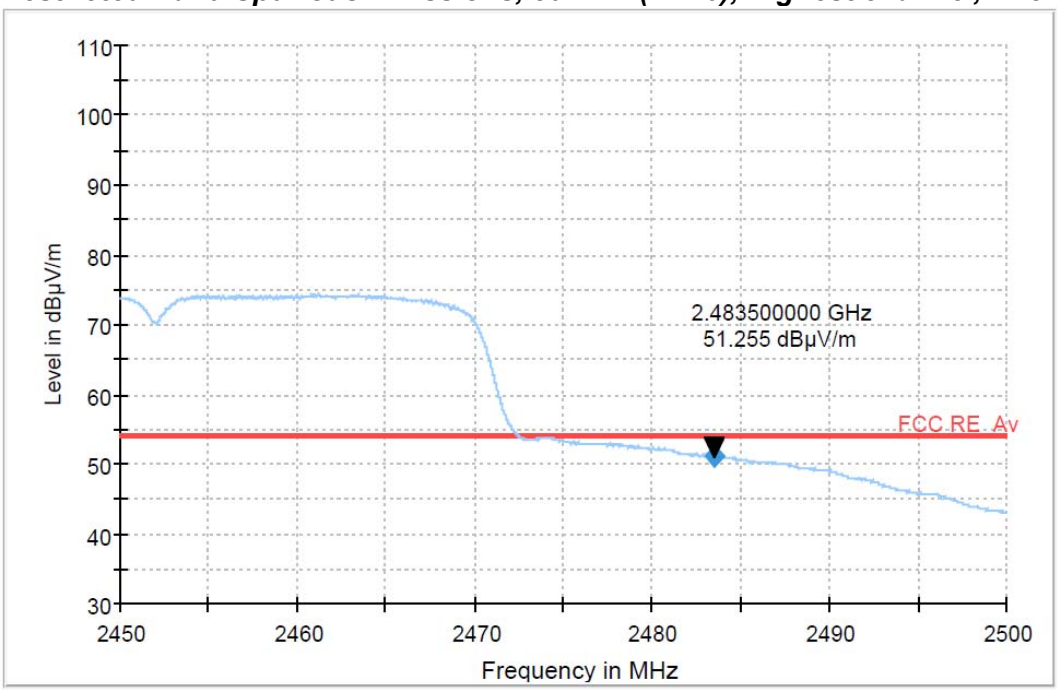


PLOT OF TEST DATA

Restricted Band Spurious Emissions, 802.11n(HT40), Highest channel, Peak



Restricted Band Spurious Emissions, 802.11n(HT40), Highest channel, Average



Note: For the radiated emission field strength measurements at the bandedges, the resolution bandwidth was set to 1 MHz then the video bandwidth was set to 1 MHz for peak measurements and 10 Hz for average measurements. Peak detector was used.

9. ACCURACY OF MEASUREMENT

The Measurement Uncertainties stated were calculated in accordance with the requirements of measurement uncertainty contained in CISPR 16-4-2 with the confidence level of 95%

1. Conducted Uncertainty Calculation

Source of Uncertainty	Xi	Uncertainty of Xi		Coverage factor k	u(Xi) (dB)	Ci	Ci u(Xi) (dB)
		Value (dB)	Probability Distribution				
Receiver reading	RI	± 0.1	normal 1	1.000	0.1	1	0.1
Attenuation AMN-Receiver	LC	± 0.08	normal 2	2.000	0.04	1	0.04
AMN Voltage division factor	LAMN	± 0.8	normal 2	2.000	0.4	1	0.4
Sine wave voltage	dVSW	± 2.00	normal 2	2.000	1.00	1	1.00
Pulse amplitude response	dVPA	± 1.50	rectangular	1.732	0.87	1	0.87
Pulse repetition rate response	dVPR	± 1.50	rectangular	1.732	0.87	1	0.87
Noise floor proximity	dVNF	± 0.00	-	-	0.00	1	0.00
AMN Impedance	dZ	± 1.80	triangular	2.449	0.73	1	0.73
ⓐ Mismatch	M	+ 0.70	U-Shaped	1.414	0.49	1	0.49
ⓑ Mismatch	M	- 0.80	U-Shaped	1.414	- 0.56	1	- 0.56
Measurement System Repeatability	RS	0.05	normal 1	1.000	0.05	1	0.05
Remark	ⓐ: AMN-Receiver Mismatch : + ⓑ: AMN-Receiver Mismatch : -						
Combined Standard Uncertainty	Normal			± 1.88			
Expended Uncertainty U	Normal (k = 2)			± 3.76			

2. Radiation Uncertainty Calculation

Source of Uncertainty	*Xi*	Uncertainty of *Xi*		Coverage factor *k*	*u(Xi)* (dB)	*Ci*	*Ci u(Xi)* (dB)
		Value (dB)	Probability Distribution				
Receiver reading	***RI***	± 0.10	normal 1	1.000	0.10	1	0.10
Sine wave voltage	***dVsw***	± 2.00	normal 2	2.000	1.00	1	1.00
Pulse amplitude response	***dVpa***	± 1.50	rectangular	1.732	0.87	1	0.87
Pulse repetition rate response	***dVpr***	± 1.50	rectangular	1.732	0.87	1	0.87
Noise floor proximity	***dVnf***	± 0.50	normal 2	2.000	0.25	1	0.25
Antenna Factor Calibration	***AF***	± 1.50	normal 2	2.000	0.75	1	0.75
Attenuation Antenna-receiver	***CL***	± 0.52	normal 2	2.000	0.26	1	0.26
Antenna Directivity	***AD***	± 1.00	rectangular	1.732	0.58	1	0.58
Antenna Factor Height Dependence	***AH***	± 0.50	rectangular	1.732	0.29	1	0.29
Antenna Phase Centre Variation	***AP***	± 0.30	rectangular	1.732	0.17	1	0.17
Antenna Factor Frequency Interpolation	***AI***	± 0.30	rectangular	1.732	0.17	1	0.17
Site Imperfections	***SI***	± 4.00	triangular	2.449	1.63	1	1.63
Measurement Distance Variation	***DV***	± 0.10	rectangular	1.732	0.06	1	0.06
Antenna Balance	***Dbal***	± 0.90	rectangular	1.732	0.52	1	0.52
Cross Polarisation	***DCross***	± 0.90	rectangular	1.732	0.52	1	0.52
ⓐ Mismatch	***M***	+ 0.25	U-Shaped	1.414	0.18	1	0.18
ⓑ Mismatch	***M***	- 0.26	U-Shaped	1.414	- 0.18	1	- 0.18
ⓒ Mismatch	***M***	+ 0.98	U-Shaped	1.414	0.69	1	0.69
ⓓ Mismatch	***M***	- 1.11	U-Shaped	1.414	- 0.79	1	- 0.79
Measurement System Repeatability	***RS***	0.09	normal 1	1.000	0.09	1	0.09
Remark	ⓐ: Biconical Antenna-receiver Mismatch : + (< 200 MHz) ⓑ: Biconical Antenna-receiver Mismatch : - (< 200 MHz) ⓒ: Log Periodic Antenna-receiver Mismatch : + (≧ 200 MHz) ⓓ: Log Periodic Antenna-receiver Mismatch : - (≧ 200 MHz)						
Combined Standard Uncertainty	Normal			± 2.63 (< 200 MHz) ± 2.74 (≧200 MHz)			
Expended Uncertainty U	Normal (*k* = 2)			± 5.26 (< 200 MHz) ± 5.48 (≧200 MHz)			

10. TEST EQUIPMENT

No.	Instrument	Manufacturer	Model	Serial No.	Calibration Date	Calibration Interval
1	*Test Receiver	R & S	ESCS 30	833364/020	Jan. 12 2012	1 year
2	*Test Receiver	R & S	ESCS 30	100302	Oct. 08 2012	1 year
3	*Amplifier	Sonoma Instrument	310N	291916	Jul. 17 2012	1 year
4	*Amplifier	R & S	SCU18	10065	Apr. 05 2012	1 year
5	*Amplifier	R & S	SCU26	10011	Jun. 01 2012	1 year
6	Amplifier	R & S	SCU40	10008	Jun. 01 2012	1 year
7	*Pre Amplifier	HP	8449B	3008A00107	Jan. 13 2012	1 year
8	*Pre Amplifier	HP	8447F	2805A03351	Jul. 17 2012	1 year
9	*Spectrum Analyzer	Agilent	E4440A	MY44303257	Jul. 17 2012	1 year
10	*Spectrum Analyzer	Agilent	E4440A	MY44022567	Apr. 05 2012	1 year
11	*Spectrum Analyzer	R & S	FSP40	100361	Jul. 17 2012	1 year
12	*Loop Antenna	R & S	HFH2-Z2	100279	Feb. 21 2011	2 year
13	*Wideband Power Sensor	R & S	NRP-Z81	100634	Apr. 05 2012	1 year
14	*Biconical Log Antenna	ARA	LPB-2520/A	1209	Dec. 21 2010	2 year
15	*Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-508	Dec. 24 2010	2 year
16	*Horn Antenna	Q-par Angus	QSH20S20	8179	Mar. 28 2011	2 year
17	*Horn Antenna	Q-par Angus	QSH22K20	8180	Mar. 28 2011	2 year
18	*Trilog-Broadband Antenna	SCHWARZBECK	VULB 9168	9168-257	Apr. 26 2012	2 year
19	*LISN	R & S	ESH3-Z5	833874/006	Oct. 08 2012	1 year
20	*LISN	R & S	ESH2-Z5	100227	Apr. 04 2012	1 year
21	*Position Controller	DAEIL EMC	N/A	N/A	N/A	N/A
22	*Turn Table	DAEIL EMC	N/A	N/A	N/A	N/A
23	*Antenna Mast	DAEIL EMC	N/A	N/A	N/A	N/A
24	*Anechoic Chamber	EM Eng.	N/A	N/A	N/A	N/A
25	*Shielded Room	EM Eng.	N/A	N/A	N/A	N/A
26	*Position Controller	Seo-Young EMC	N/A	N/A	N/A	N/A
27	*Turn Table	Seo-Young EMC	N/A	N/A	N/A	N/A
28	*Antenna Mast	Seo-Young EMC	N/A	N/A	N/A	N/A
29	*Anechoic Chamber	Seo-Young EMC	N/A	N/A	N/A	N/A
30	*Shielded Room	Seo-Young EMC	N/A	N/A	N/A	N/A

***) Test equipment used during the test**