FCC 47 CFR PART 15 SUBPART C

TEST REPORT

For

Wifi Module

Model: SMC-90M、A9750

Trade Name: SG Home

Issued to

SALIX TECHNOLOGY CO., LTD.
18F, No.116,Sec.1, Xintai5 Road, XiZhi Dist.,
New Taipei City 221, Taiwan R.O.C

ELECTRONICS TESTING CENTER, TAIWAN

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1309

Revision History

Rev.		Issue Date		Revisions	Effect Page	Revised By
00		March 09, 2017		Initial Issue	All	Iren Wang

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1 TEST RESULT CERTIFICATION

Applicant:	**SALIX TECHNOLOGY CO., LTD.** 18F, No.116,Sec.1, Xintai5 Road, XiZhi Dist., New Taipei City 221, Taiwan R.O.C
Manufacturer:	**SALIX TECHNOLOGY CO., LTD.** 18F, No.116,Sec.1, Xintai5 Road, XiZhi Dist., New Taipei City 221, Taiwan R.O.C
Equipment Under Test:	Wifi Module
Trade Name:	SG Home
Model:	SMC-90M、A9750
Date of Test:	Jan 17 ~ Mar 09, 2017

APPLICABLE STANDARDS	
STANDARD	**TEST RESULT**
FCC 47 CFR Part 15 Subpart C	No non-compliance noted

Approved by:

Brian Huang

Brian Huang
Section Manager

Reviewed by:

S.S.Liou

S.S.Liou
Section Manager

2 EUT DESCRIPTION

Product	Wifi Module		
Trade Name	SG Home		
Model Number	SMC-90M、A9750		
Model Discrepancy	N/A		
EUT Power Rating	5VDC		
Received Date	Mar 09, 2017		
RF Module Manufacturer	Ampak	**Model**	AP6212
Frequency Range	IEEE 802.11b/g IEEE 802.11n HT20 mode: 2412~2462MHz		
Transmit Power	IEEE 802.11b mode: 21.93 dBm (0.1560W) IEEE 802.11g mode: 22.74 dBm (0.1879W) IEEE 802.11n HT20 mode: 23.59 dBm (0.2286W)		
Modulation Technique & Transmit Data Rate	IEEE 802.11b mode: DSSS (11, 5.5, 2, 1 Mbps) IEEE 802.11g mode: OFDM (54, 48, 36, 24, 18, 12, 11, 9, 6 Mbps) IEEE 802.11n HT20 mode: OFDM (6.5, 13, 19.5, 26, 39, 52, 58.5, 65, 78, 104, 117, 130 Mbps)		
Number of Channels	IEEE 802.11b/g mode: 11 Channels IEEE 802.11n HT20 mode: 11 Channels		
Antenna Specification	Chip Antenna / Gain: -5.2 dBi		

Remark:

1. *The sample selected for test was production product and was provided by manufacturer.*
2. *This submittal(s) (test report) is intended for FCC ID: **2ABDZSMC90** filing to comply with Section 15.207, 15.209 and 15.247 of the FCC Part 15, Subpart C Rules.*

3 TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4: 2014, C63.10:2013 and FCC CFR 47 Part 15.207, 15.209, 15.247 and DA00-705.

3.1 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

3.2 EUT EXERCISE

The EUT was operated in the engineering mode to fix the TX frequency that was for the purpose of the measurements.

According to its specifications, the EUT must comply with the requirements of the Section 15.207, 15.209 and 15.247 under the FCC Rules Part 15 Subpart C.

3.3 GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4:2014 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.1.4.1 of ANSI C63.4.

3.4 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 -	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.52525	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	156.7 - 156.9	3260 - 3267	23.6 - 24.0
12.29 - 12.293	162.0125 - 167.17	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	167.72 - 173.2	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	240 - 285	3600 - 4400	([2])
13.36 - 13.41	322 - 335.4		

[1] Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

[2] Above 38.6

(b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

3.5 DESCRIPTION OF TEST MODES

The EUT is a 1Tx1R transmitter.

The EUT (model: SMC-90M、A9750) had been tested under operating condition.

Software used to control the EUT for staying in continuous transmitting and receiving mode was programmed.

The worst case data rate is determined as the data rate with highest output power. After verification, all tests were carried out with the worst case test modes as shown below except radiated spurious emission below 1GHz and power line conducted emissions below 30MHz, which worst case was in normal link mode.

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

IEEE 802.11b mode:
Channel Low (2412MHz), Channel Mid (2437MHz) and Channel High (2462MHz) with 1Mbps data rate were chosen for full testing.

IEEE 802.11g mode:
Channel Low (2412MHz), Channel Mid (2437MHz) and Channel High (2462MHz) with 6Mbps data rate were chosen for full testing.

IEEE 802.11n HT20 mode:
Channel Low (2412MHz), Channel Mid (2437MHz) and Channel High (2462MHz) with 6.5Mbps data rate were chosen for full testing.

4 INSTRUMENT CALIBRATION

4.1 MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

4.2 MEASUREMENT EQUIPMENT USED

Equipment Used for Emissions Measurement

Conducted Emissions Test Site				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
Spectrum Analyzer	Agilent	E4446A	MY48250064	01/01/2018
Spectrum Analyzer	Agilent	N9010A	MY52220817	03/20/2017
Spectrum Analyzer	R&S	FSL	100837	11/11/2017
Power meter	Anritsu	ML2495A	1033009	09/29/2017
Power Sensor	Anritsu	MA2411B	0917221	09/29/2017

3M Semi Anechoic Chamber				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
Spectrum Analyzer	Agilent	E4446A	MY48250064	01/01/2017
Spectrum Analyzer	R&S	FSL	100837	11/11/2017
Pre-Amplifier	HP	8447D	2944A06530	05/02/2017
Pre-Amplifier	EMEC	EM01M26G	060570	07/28/2017
Pre-Amplifier	MITEQ	AMF-6F-260400-40-8P	985646	06/12/2017
Pre-Amplifier	Agilent	8449B	3008A01738	08/11/2017
EMI Test Receiver	SCHAFFNER	SCR 3501	430	03/30/2017
Loop Antenna	EMCO	6502	8905-2356	08/20/2017
Bilog Antenna	TESEQ	CBL 6112D	35378	09/11/2017
Horn Antenna	EMCO	3115	00022250	08/05/2017
Horn Antenna	EMCO	3116	00026370	12/29/2017
Antenna Tower	EMCO	CC-A-1F	N/A	N.C.R
Turn Table	EMCO	CC-T-1F	N/A	N.C.R
Test S/W	EZ-EMC			

NOTE: *1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.*
2. N.C.R = No Calibration Request.

Powerline Conducted Emissions Test Site #3				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
EMI Test Receiver	R&S	ESCI	101300	09/06/2017
LISN	R&S	ENV216	100069	06/09/2017
LISN	FCC	FCC-LISN-50/250-16-2-07	06013	11/20/2017
ISN	TESEQ	ISN-T8	30842	07/30/2017
Current Probe	FCC	F-35	506	07/13/2017
ISN	FCC	FCC-TLISN-T2-02	20587	07/28/2017
Test S/W	EZ-EMC			

NOTE: *1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.*
2. N.C.R = No Calibration Request.

4.3 MEASUREMENT UNCERTAINTY

Parameter	Uncertainty
Powerline Conducted Emission # 3	±2.1876
3M Semi Anechoic Chamber / 30MHz ~ 200MHz	±3.5921
3M Semi Anechoic Chamber / 200MHz ~ 1GHz	±3.5657
3M Semi Anechoic Chamber / 1 ~ 8GHz	±2.5873
3M Semi Anechoic Chamber / 8 ~ 18GHz	±2.6646
3M Semi Anechoic Chamber / 18 ~ 26GHz	±2.9617
3M Semi Anechoic Chamber / 26 ~ 40GHz	±3.4250

Remark*: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.*

5 FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at

NO. 34. LIN 5. DINGFU VIL., LINKOU DIST., NEW TAIPEI CITY, TAIWAN, 24442, R.O.C.

FCC lab Reg. No. 963325

5.2 LABORATORY ACCREDITATIONS AND LISTING

The test facilities used to perform radiated and conducted emissions tests are accredited by American Association for Laboratory Accreditation Program for the specific scope accreditation under Lab Code: 0824-01 to perform Electromagnetic Interference tests according to FCC Part 15 and CISPR 22 requirements. In addition, the test facilities are listed with Industry Canada, Certification and Engineering Bureau, IC 2324G-1 for 3M Semi Anechoic Chamber A, IC 2324G-2 for 3M Semi Anechoic Chamber B.

6 SETUP OF EQUIPMENT UNDER TEST

6.1 SETUP CONFIGURATION OF EUT

See test photographs attached in Appendix II for the actual connections between EUT and support equipment.

6.2 SUPPORT EQUIPMENT

For Radiated Emissions(Below 1GHz) & Conducted Emission							
No.	**Device Type**	**Model**	**Series No.**	**FCC ID**	**Brand**	**Data Cable**	**Power Cord**
1	LCD	2408WFB	CN-0NN792-74261-849-15GS	FCC DOC	DELL	HDMI Cable: Shielded, 1.8m	Unshielded, 1.8m
2	Notebook PC	ThinkPad T430u	PB-VZLGG 12/09	FCC DOC	LENOVO	USB Cable: Shielded, 1.8m	AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.8m with a core
3	USB Mouse	M100	N/A	N/A	Logitech	Shielded, 1.8m	N/A

For Radiated Emissions(Above 1GHz) & Powerline Conducted Emission							
No.	**Device Type**	**Model**	**Series No.**	**FCC ID**	**Brand**	**Data Cable**	**Power Cord**
1	Notebook PC	ThinkPad T430u	PB-VZLGG 12/09	FCC DOC	LENOVO	USB Cable: Shielded, 1.8m	AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.8m with a core

Remark: *Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.*

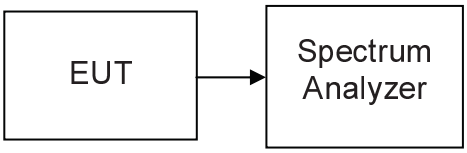
7 FCC PART 15 REQUIREMENTS

7.1 6DB BANDWIDTH

LIMIT

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

Test Configuration



TEST PROCEDURE

1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW = 100kHz, VBW = 300kHz, Sweep = auto, Span = 30MHz (IEEE 802.11b, IEEE 802.11g, IEEE 802.11n HT20) or Span = 50MHz
4. Mark the peak frequency and –6dB (upper and lower) frequency.
5. Repeat until all the rest channels are investigated.

TEST RESULTS

No non-compliance noted

Test Data

Test mode: IEEE 802.11b mode

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	2412	10.10	>500	PASS
Mid	2437	10.10		PASS
High	2462	10.10		PASS

Test mode: IEEE 802.11g mode

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	2412	16.60	>500	PASS
Mid	2437	16.60		PASS
High	2462	16.60		PASS

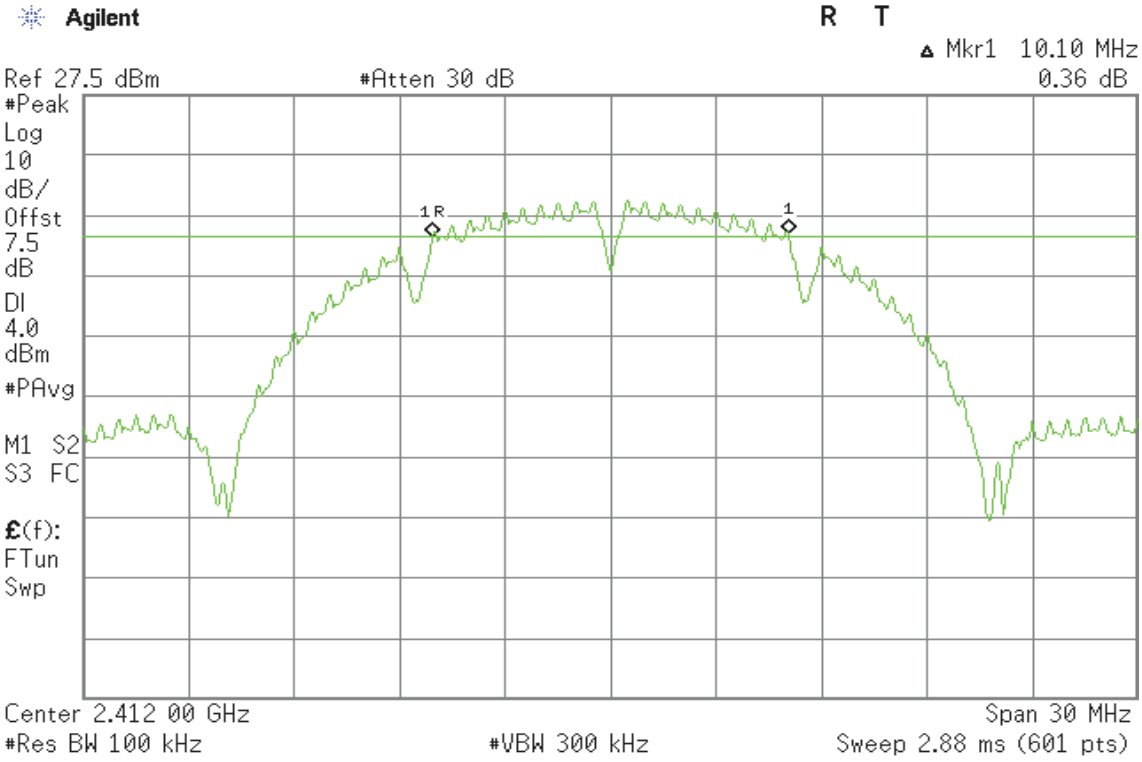
Test mode: IEEE 802.11n HT20 mode

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	2412	17.85	>500	PASS
Mid	2437	17.85		PASS
High	2462	17.85		PASS

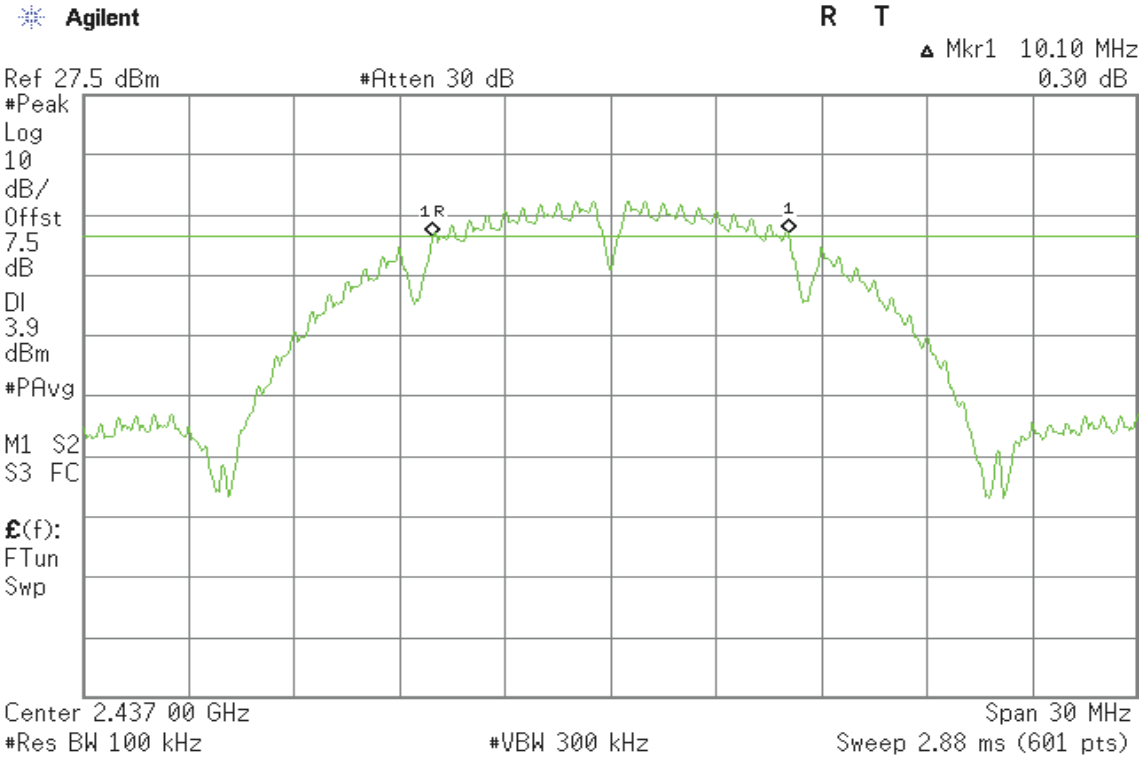
Test Plot

IEEE 802.11b mode

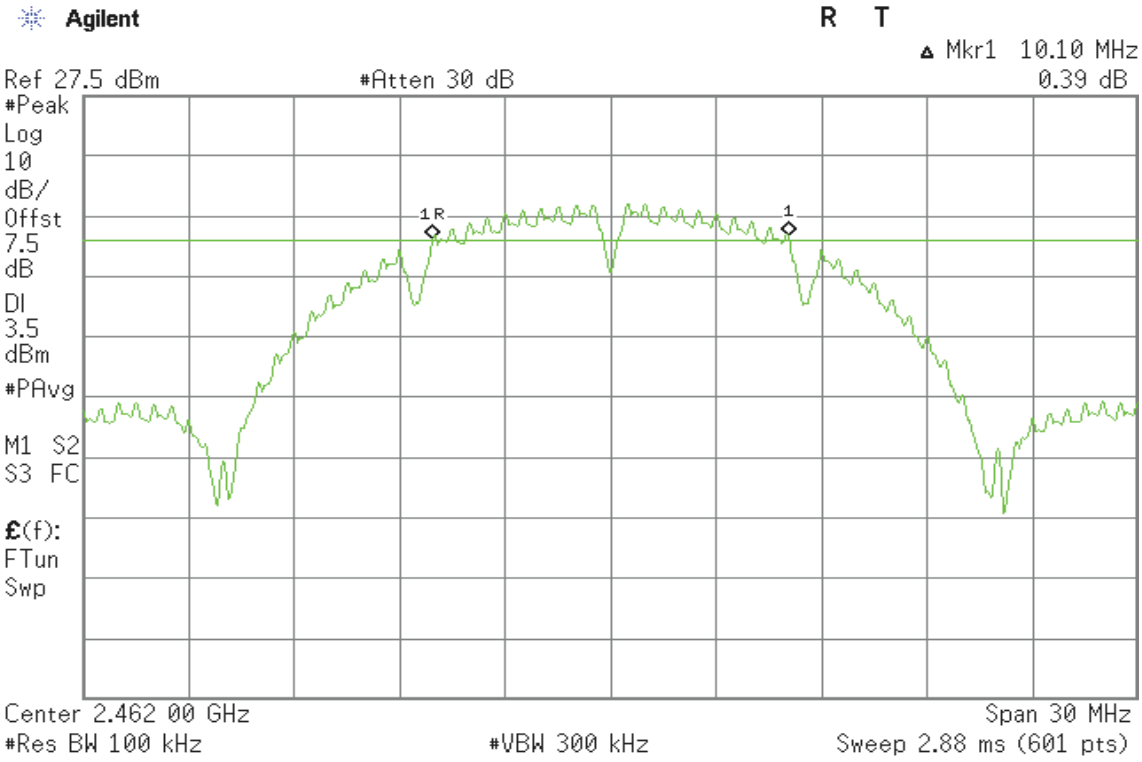
6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)

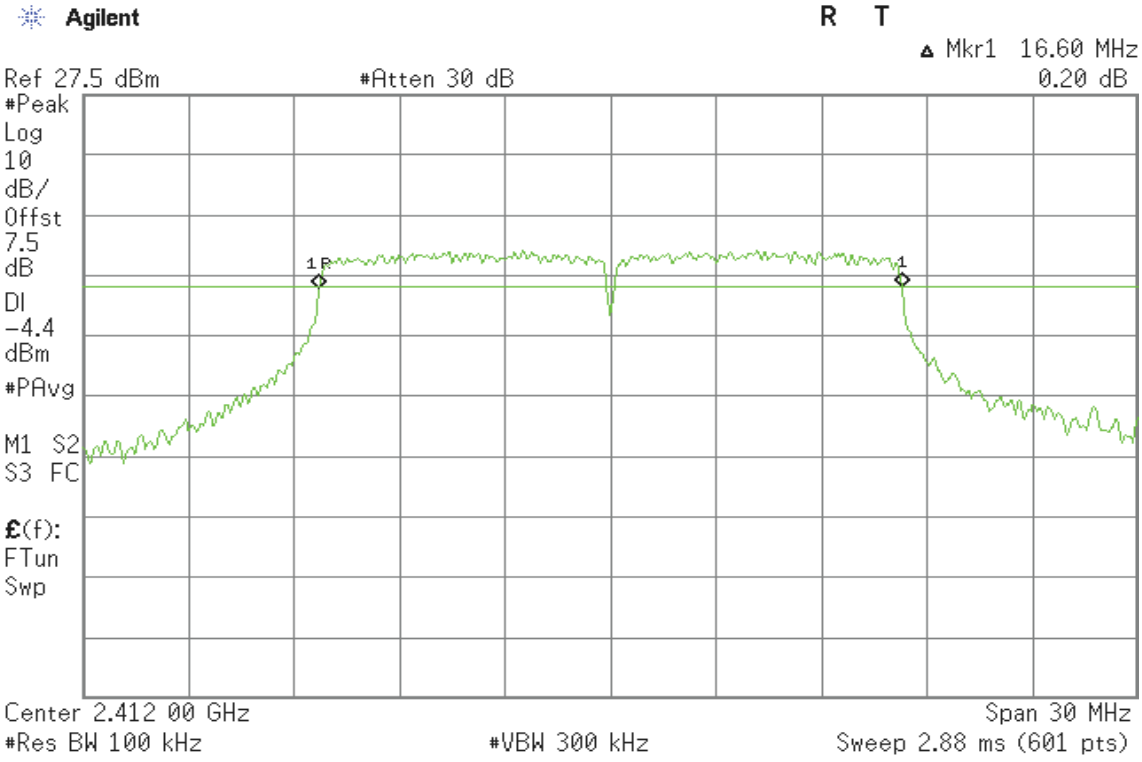


6dB Bandwidth (CH High)

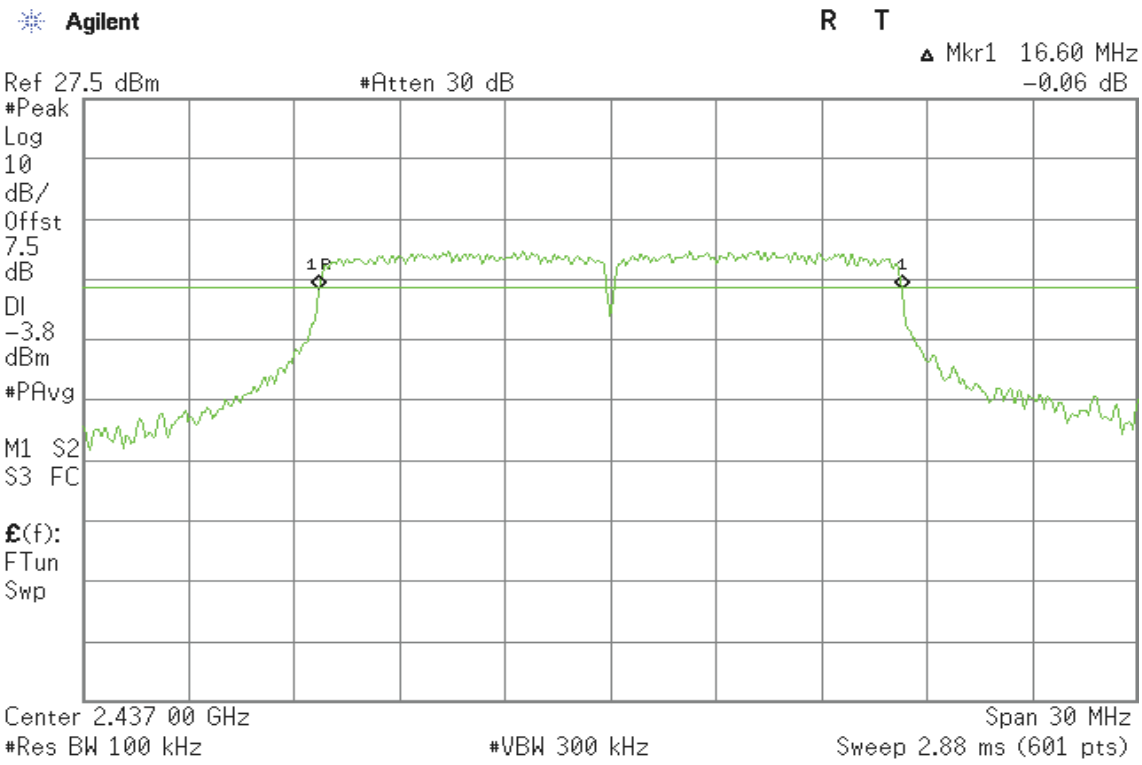


IEEE 802.11g mode

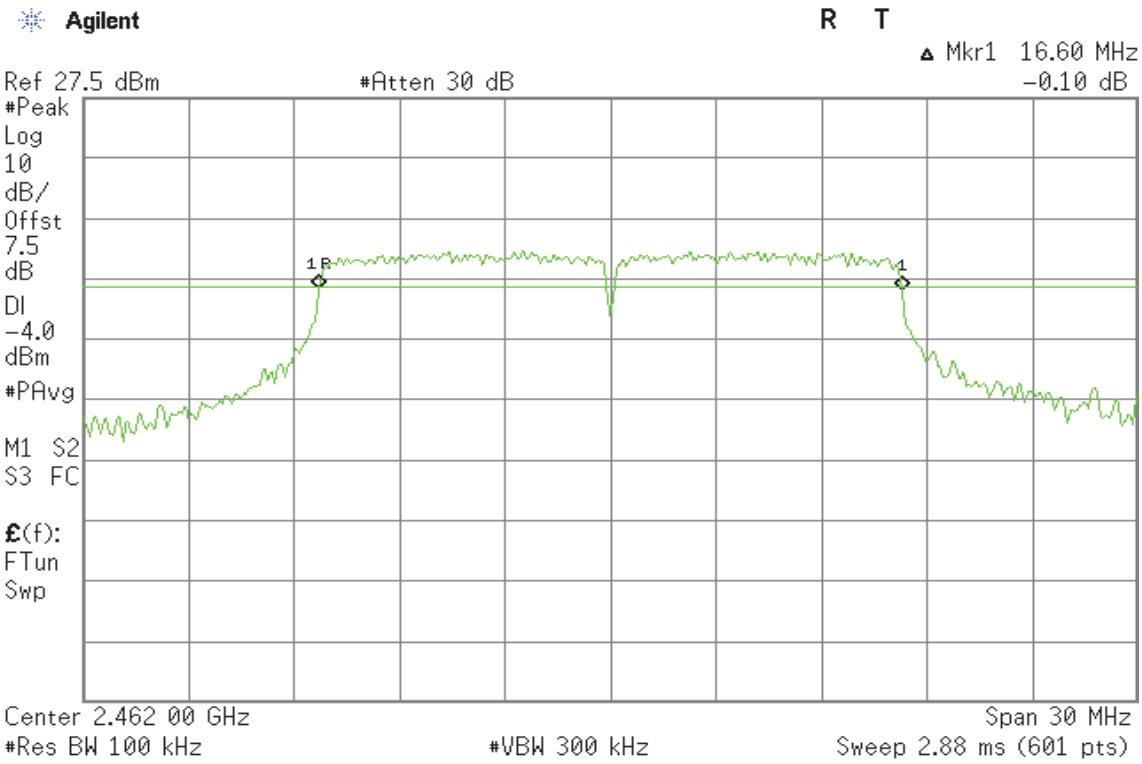
6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)

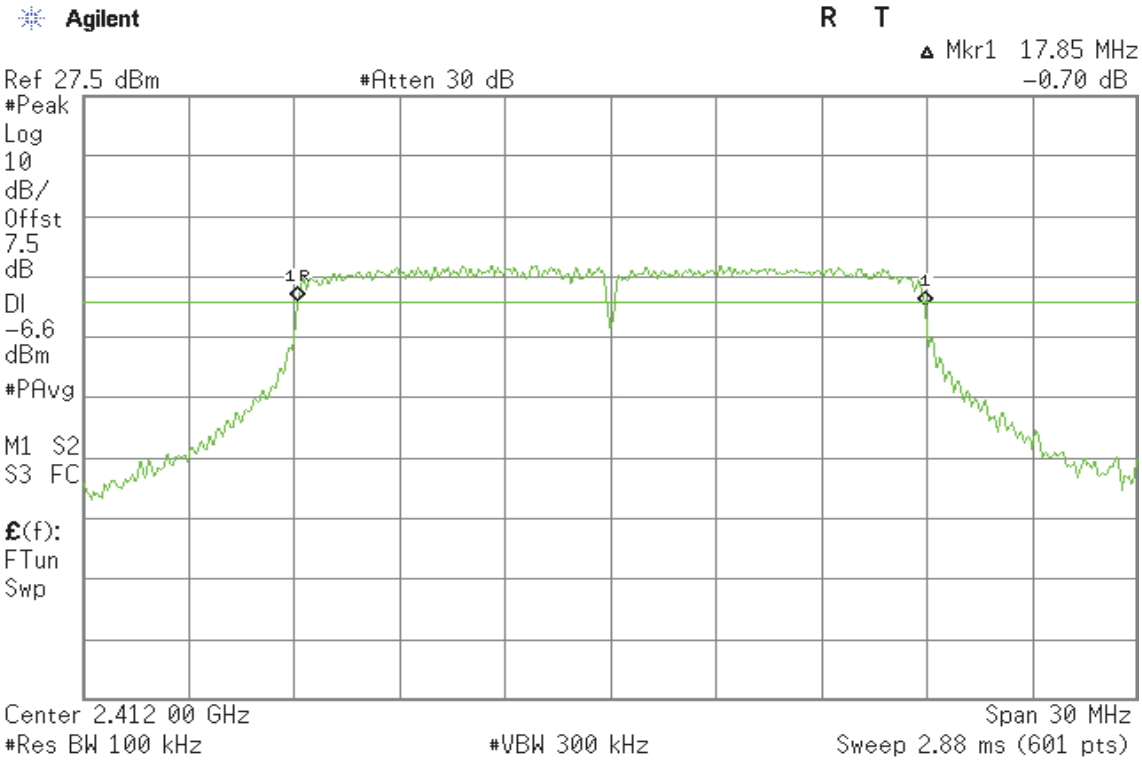


6dB 6dB Bandwidth (CH High)

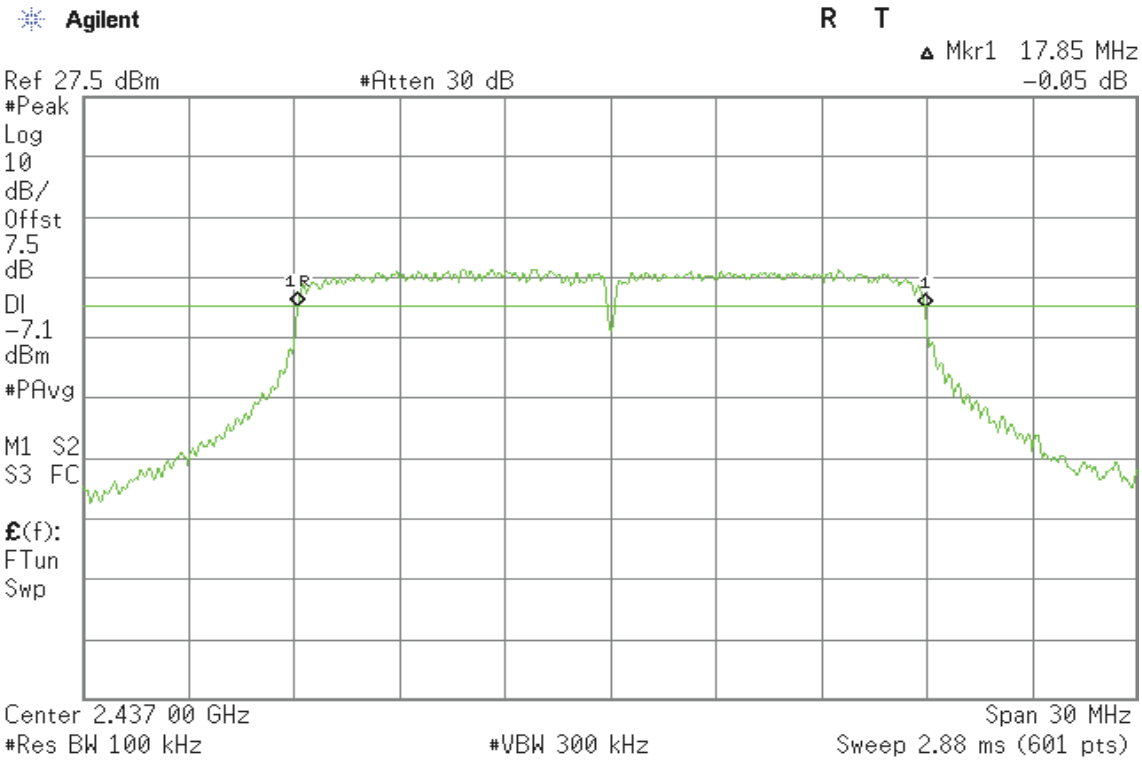


IEEE 802.11n HT20 mode

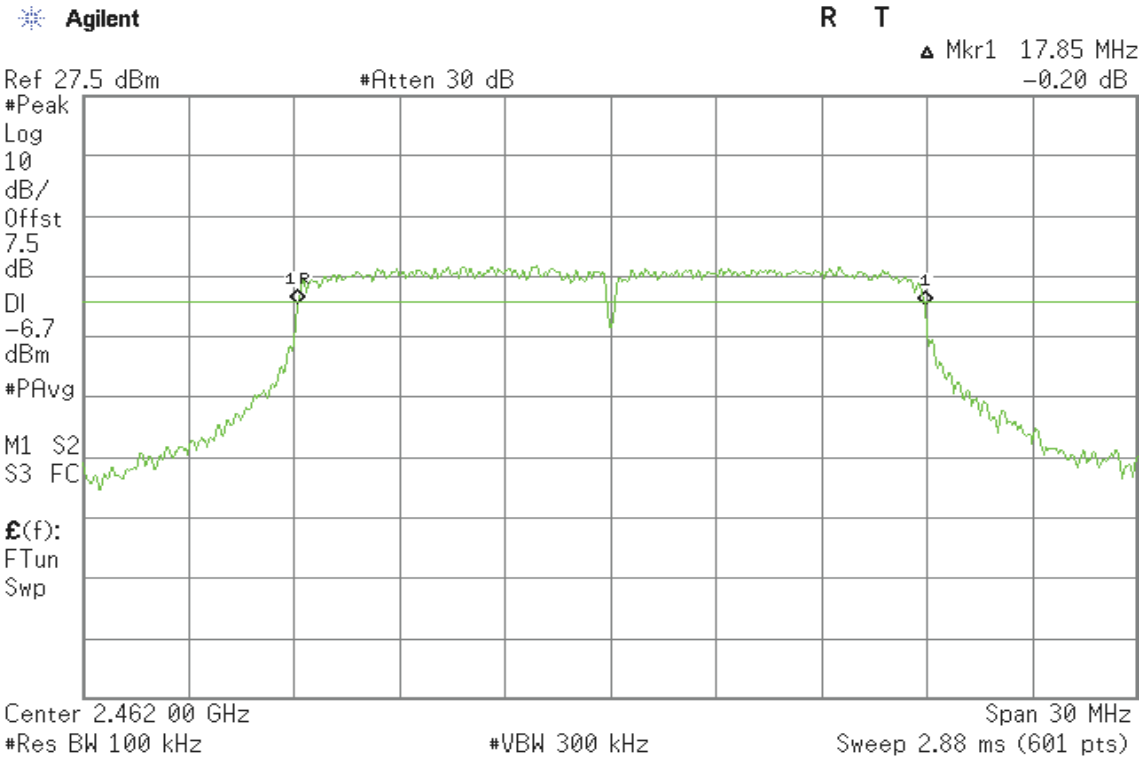
6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)

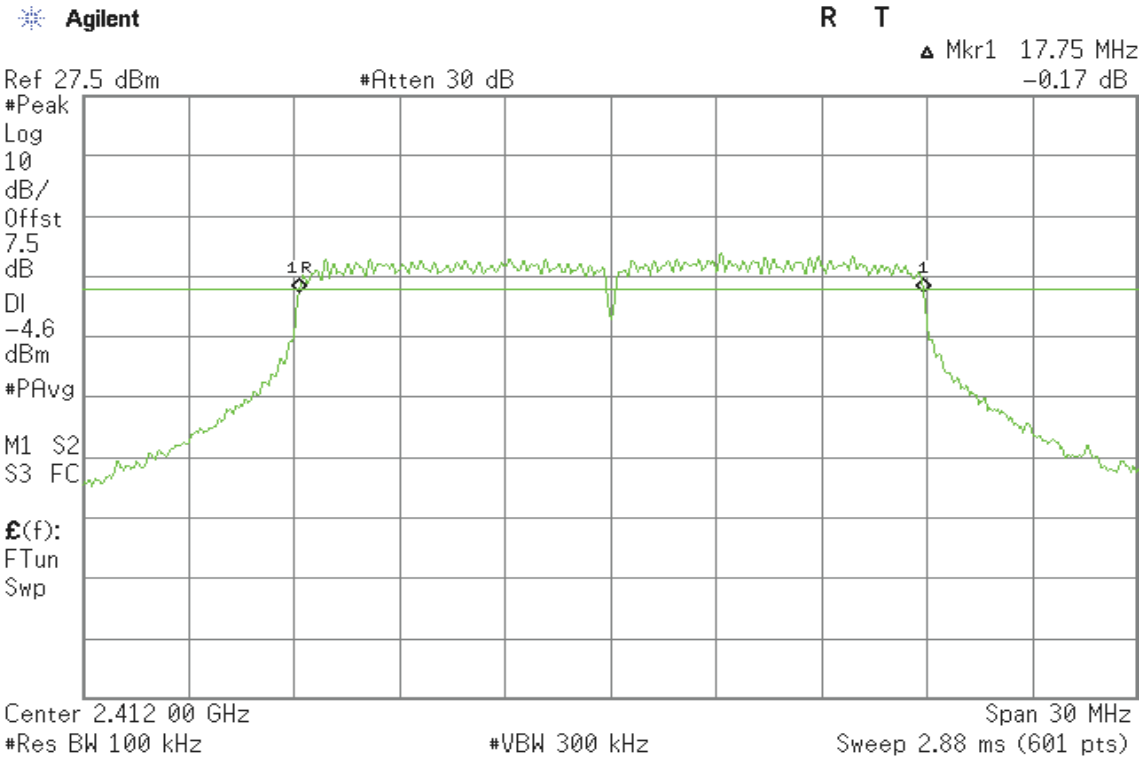


6dB Bandwidth (CH High)

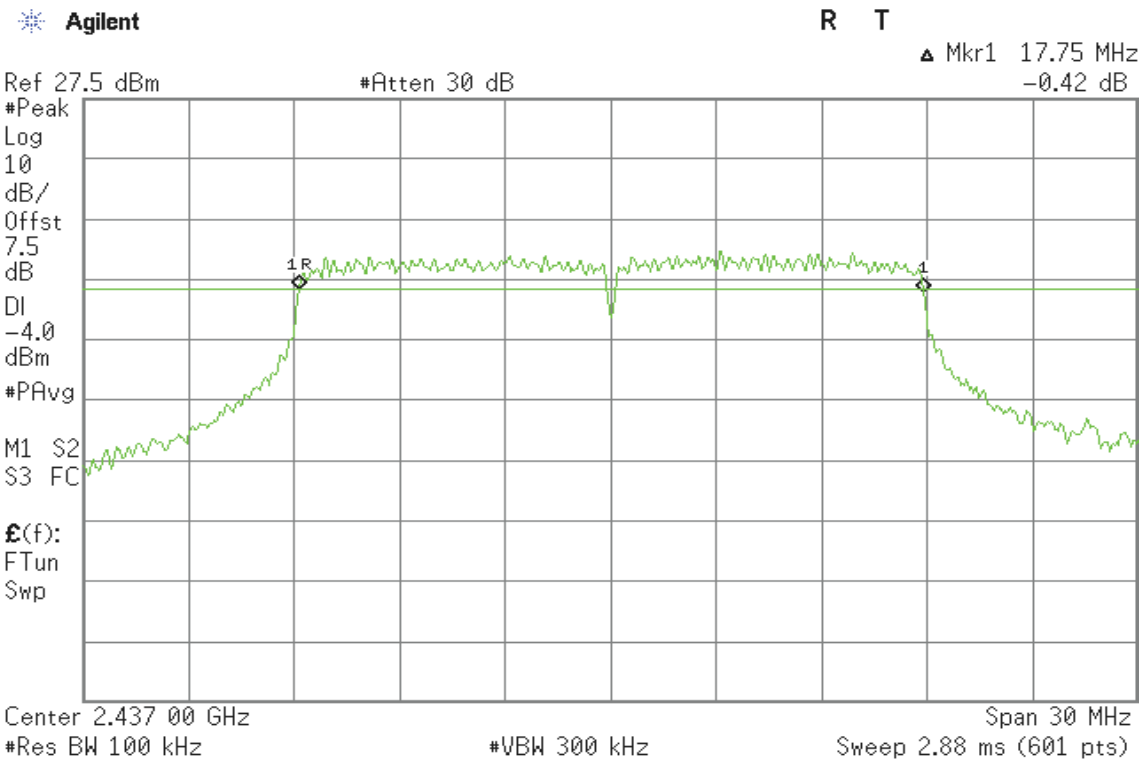


IEEE 802.11n HT20 mode

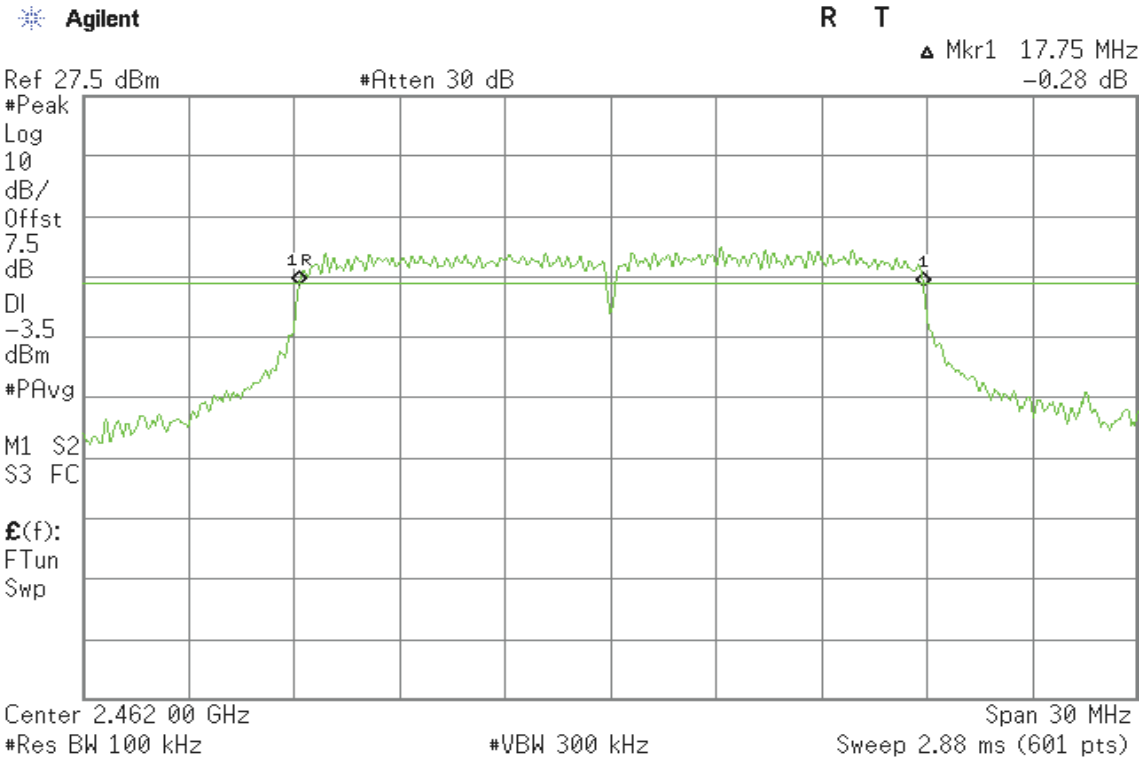
6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)



6dB Bandwidth (CH High)



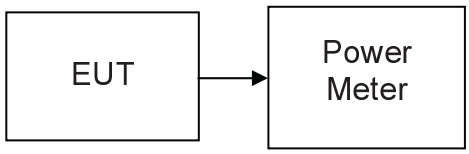
7.2 PEAK POWER

LIMIT

The maximum peak output power of the intentional radiator shall not exceed the following:

1. According to §15.247(b)(3), for systems using digital modulation in the bands of 2400-2483.5 MHz: 1 Watt.
2. According to §15.247(b)(4), the conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Test Configuration



TEST PROCEDURE

Per KDB 558074 v03r02

The transmitter output is connected to the Power Meter. The Power Meter is set to the peak power detection.

TEST RESULTS

No non-compliance noted

Test Data

Test mode: IEEE 802.11b mode

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2412	21.68	0.1472	1.00	PASS
Mid	2437	21.93	0.1560		PASS
High	2462	21.6	0.1445		PASS

Test mode: IEEE 802.11g mode

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2412	22.38	0.1730	1.00	PASS
Mid	2437	22.74	0.1879		PASS
High	2462	22.54	0.1795		PASS

Test mode: IEEE 802.11n HT20 mode

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2412	19.21	0.0834	1.00	PASS
Mid	2437	19.45	0.0881		PASS
High	2462	19.29	0.0849		PASS

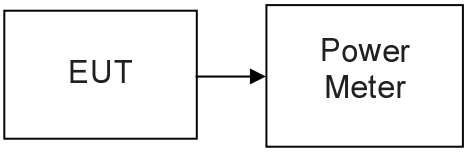
Remark:
1. Total Output Power (w) = Chain (10^(Output Power /10)/1000)

7.3 AVERAGE POWER

LIMIT

None; for reporting purposes only.

Test Configuration



TEST PROCEDURE

Per KDB 558074 v03r02

The transmitter output is connected to the Power Meter. The Power Meter is set to the AVG power detection.

TEST RESULTS

No non-compliance noted

Test Data

Test mode: IEEE 802.11b mode

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)
Low	2412	18.88	0.0773
Mid	2437	18.9	0.0776
High	2462	18.52	0.0711

Test mode: IEEE 802.11g mode

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)
Low	2412	15.28	0.0337
Mid	2437	15.59	0.0362
High	2462	15.43	0.0349

Test mode: IEEE 802.11n HT20 mode

Channel	Frequency (MHz)	Chain 0 Output Power (dBm)	Chain 0 Output Power (W)
Low	2412	11.85	0.0153
Mid	2437	12.14	0.0164
High	2462	12.01	0.0159

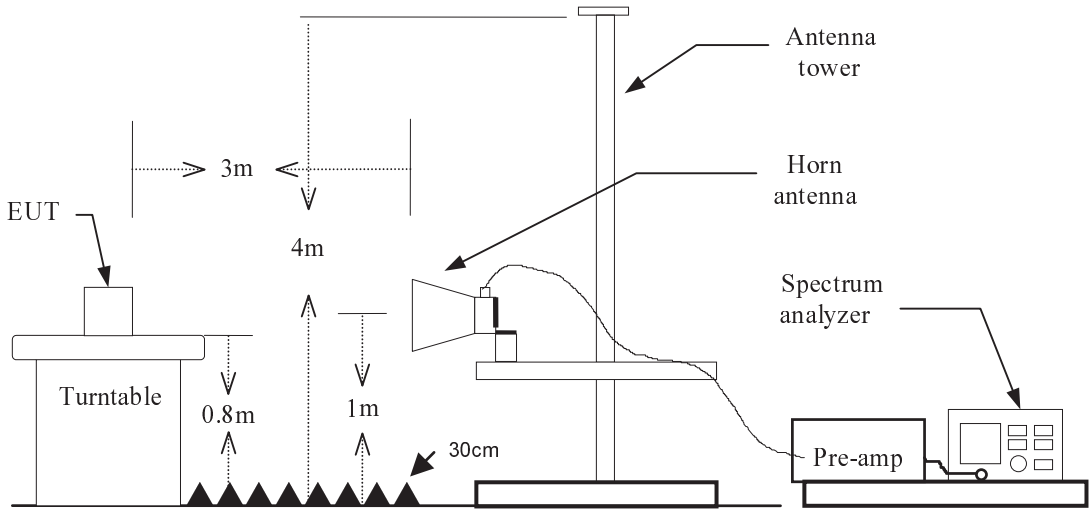
7.4 BAND EDGES MEASUREMENT

LIMIT

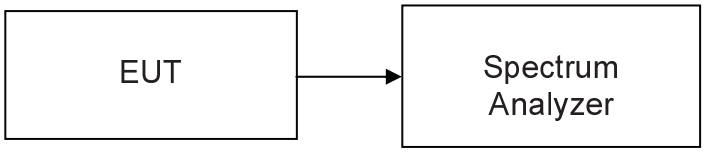
According to §15.247(d), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in 15.209(a) (see Section 15.205(c)).

Test Configuration

For Radiated



For Conducted



TEST PROCEDURE

For Radiated

1. The EUT is placed on a turntable, which is 0.8m above the ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
4. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:
   (a) PEAK: RBW=1MHz / VBW=3MHz / Sweep=AUTO
   (b) AVERAGE: RBW=1MHz / VBW=300Hz / Sweep=AUTO
5. Repeat the procedures until all the PEAK and AVERAGE versus POLARIZATION are measured.

For Conducted

Conducted RF measurements of the transmitter output were made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 100 kHz.

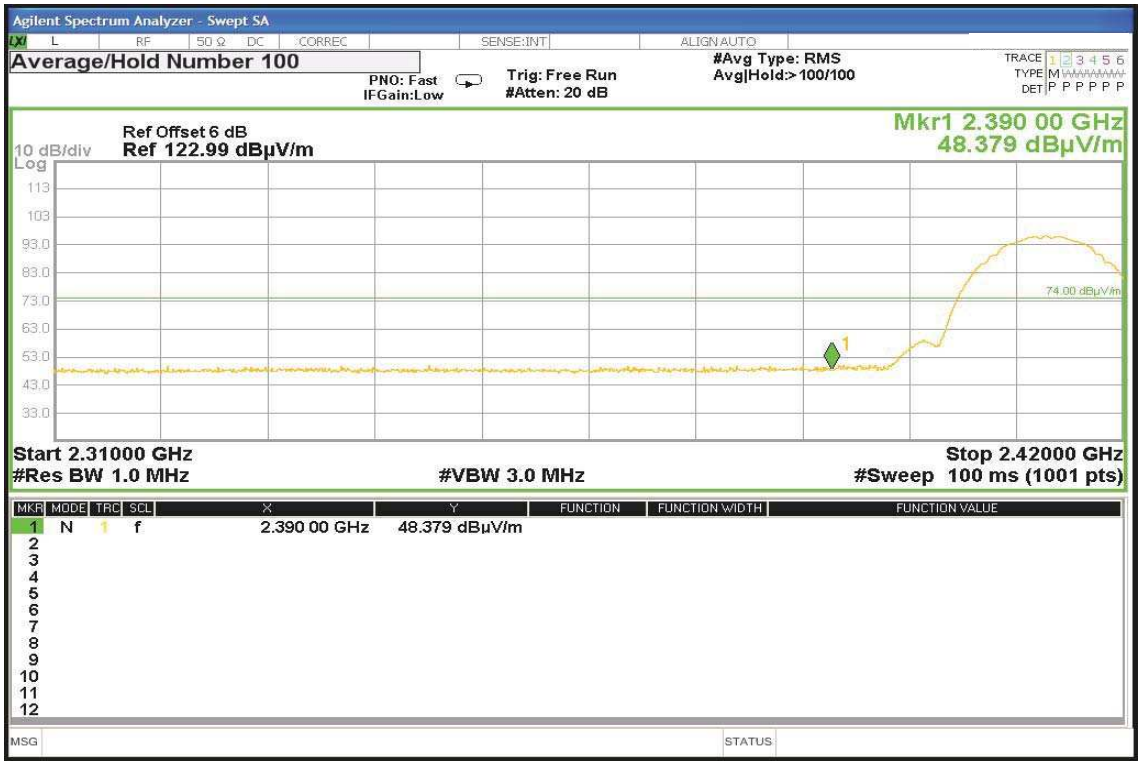
TEST RESULTS

Refer to attach spectrum analyzer data chart.

Test Plot

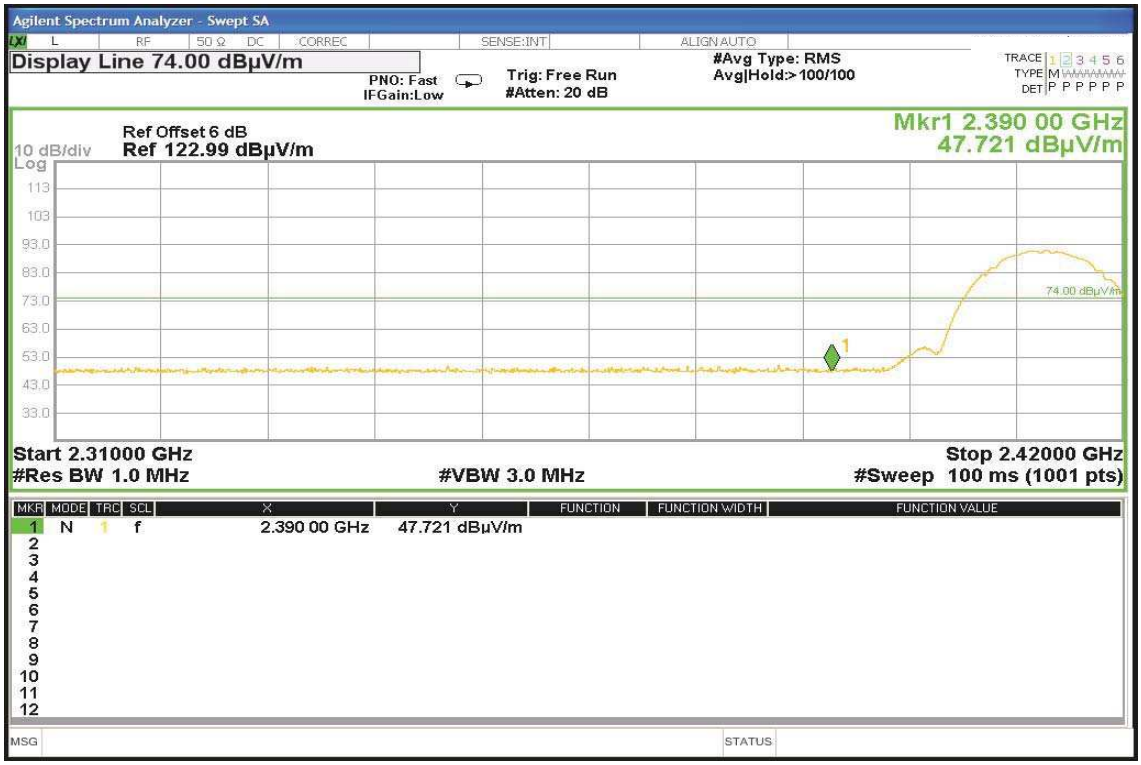
Band Edges (IEEE 802.11b mode / CH Low)

Detector mode: Peak Polarity: Vertical

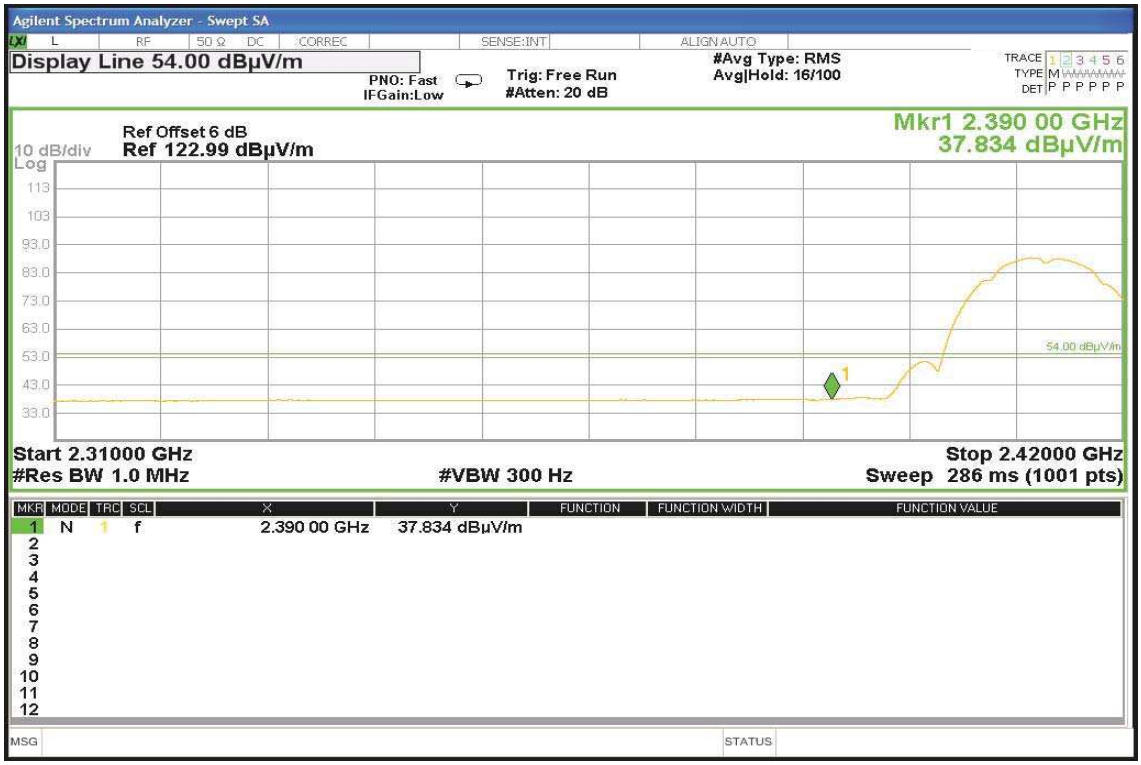


Detector mode: Average Polarity: Vertical

Detector mode: Peak Polarity: Horizontal



Detector mode: Average Polarity: Horizontal



Band Edges (IEEE 802.11b mode / CH High)

Detector mode: Peak Polarity: Vertical

Detector mode: Average Polarity: Vertical

Detector mode: Peak Polarity: Horizontal

Detector mode: Average Polarity: Horizontal

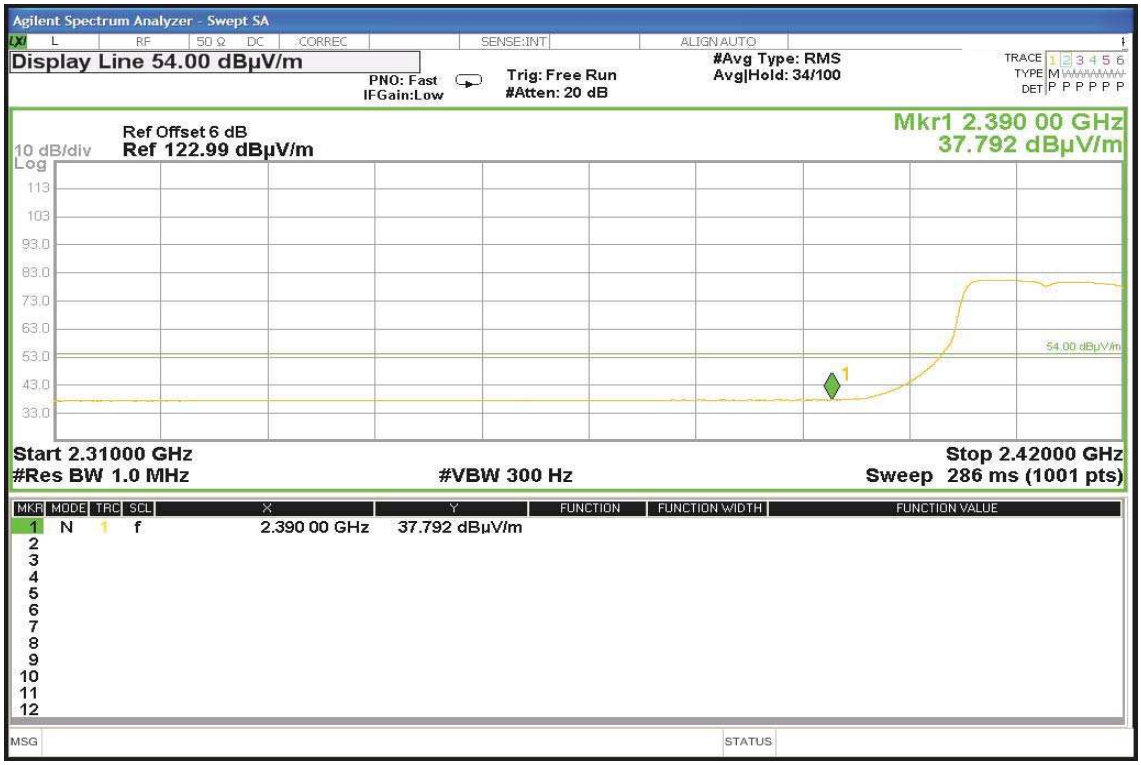
Band Edges (IEEE 802.11g mode / CH Low)

Detector mode: Peak Polarity: Vertical

Detector mode: Average Polarity: Vertical

Detector mode: Peak Polarity: Horizontal

Detector mode: Average Polarity: Horizontal



Band Edges (IEEE 802.11g mode / CH High)

Detector mode: Peak Polarity: Vertical

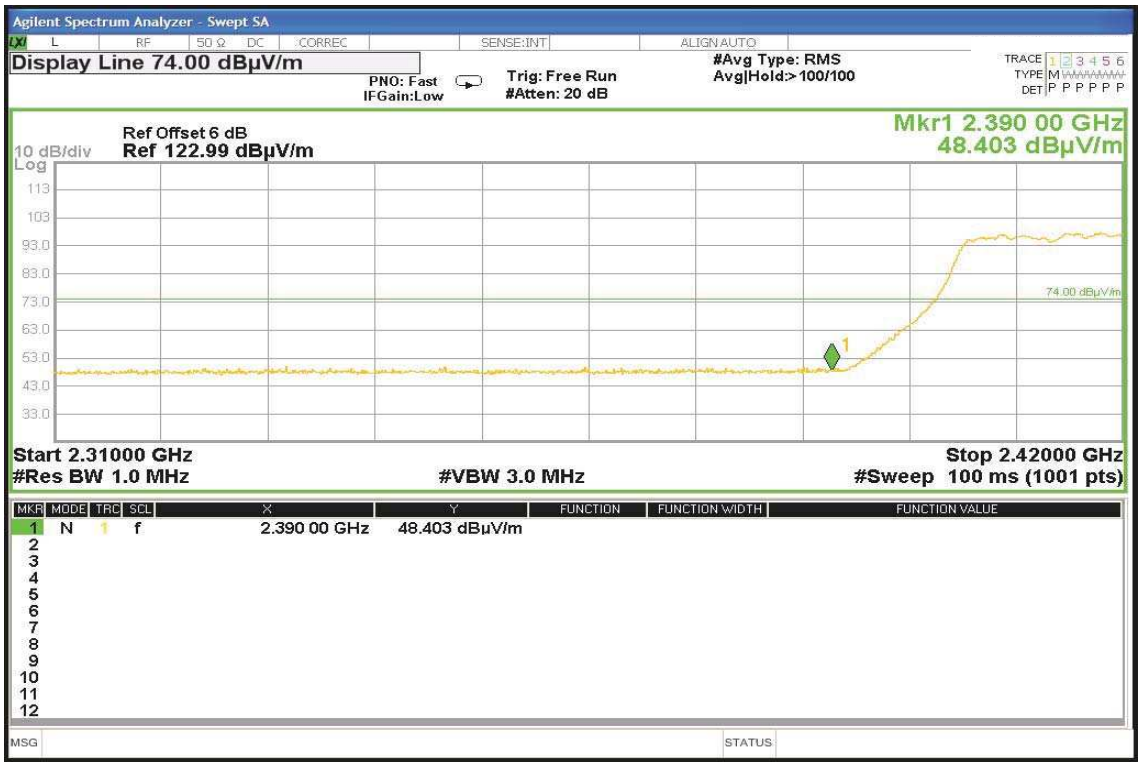
Detector mode: Average Polarity: Vertical

Detector mode: Peak Polarity: Horizontal

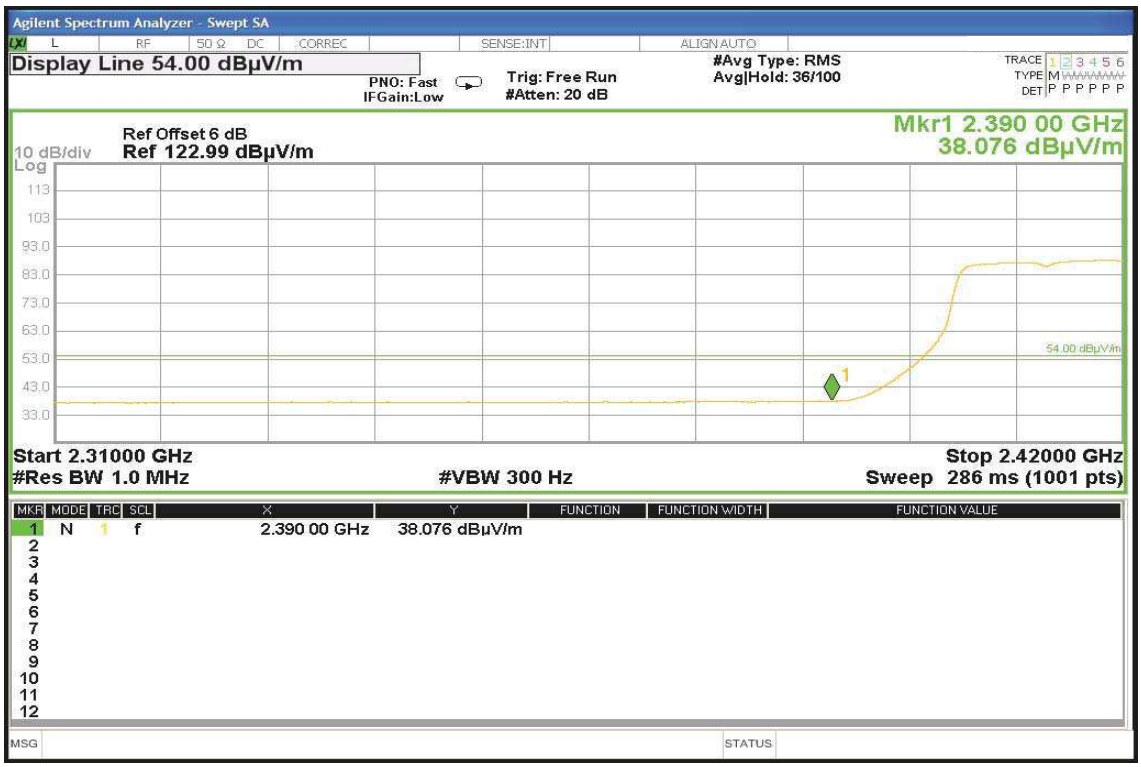
Detector mode: Average Polarity: Horizontal

Band Edges (IEEE 802.11n HT20 mode / CH Low)

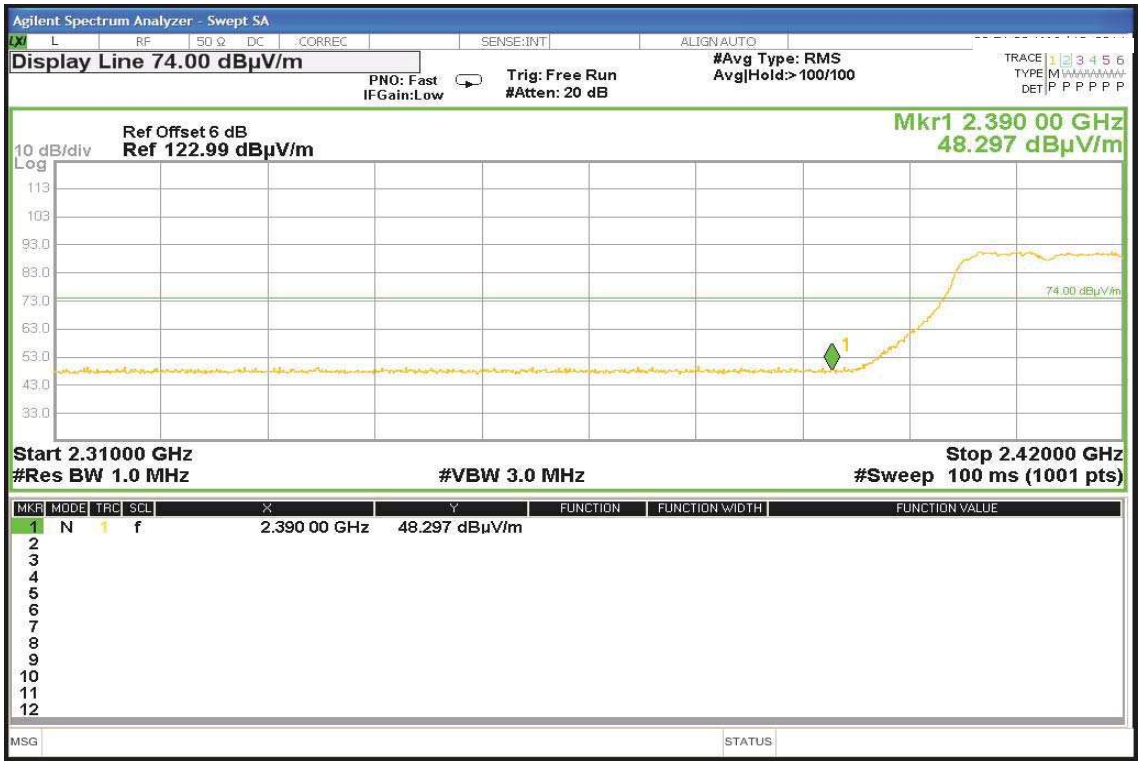
Detector mode: Peak Polarity: Vertical



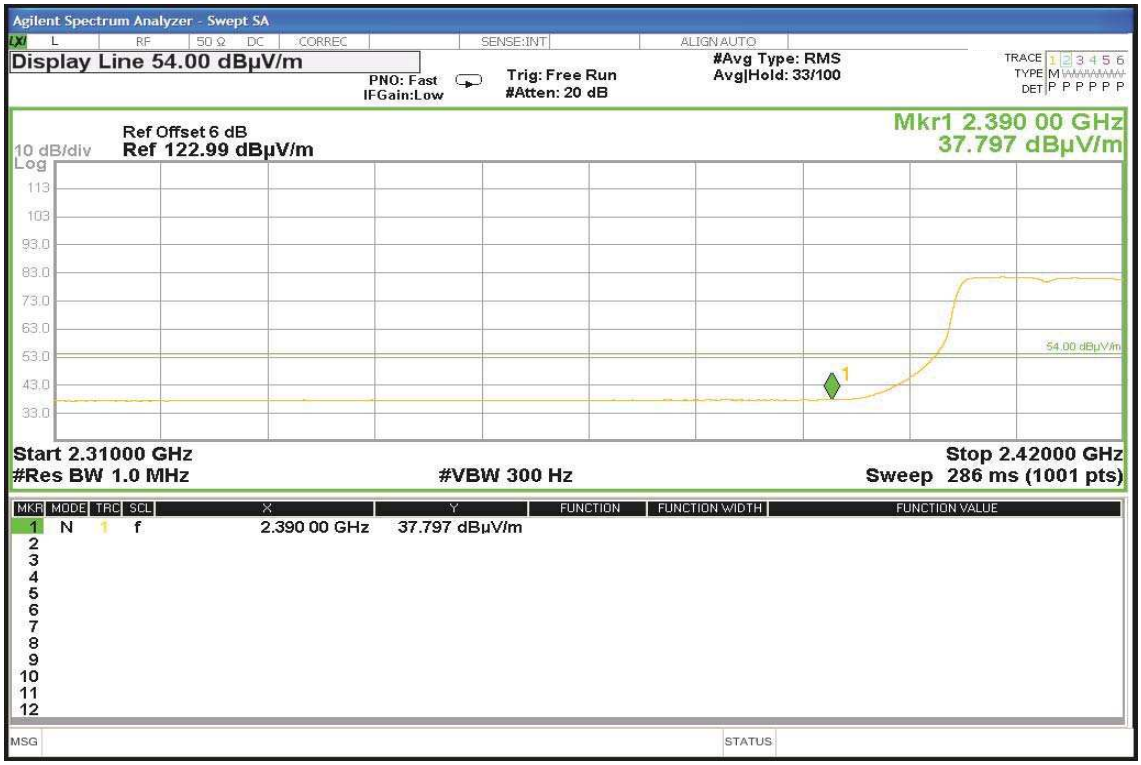
Detector mode: Average Polarity: Vertical



Detector mode: Peak Polarity: Horizontal



Detector mode: Average Polarity: Horizontal



Band Edges (IEEE 802.11n HT20 mode / CH High)

Detector mode: Peak Polarity: Vertical

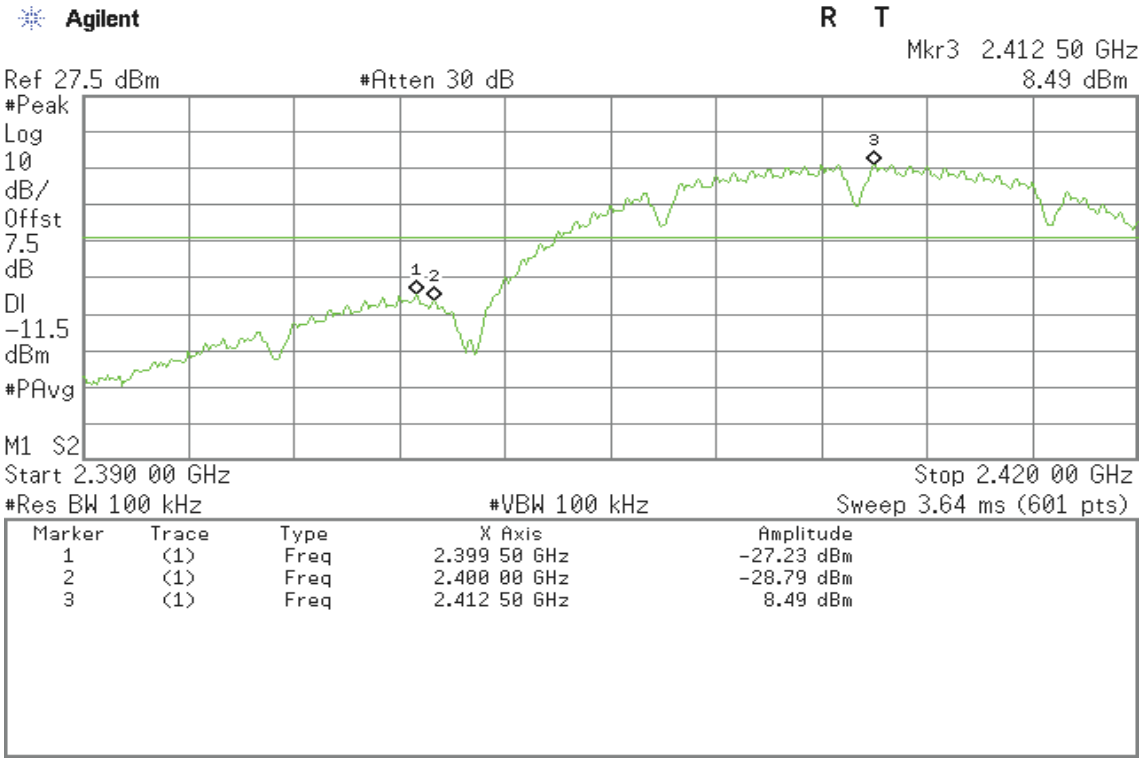
Detector mode: Average Polarity: Vertical

Detector mode: Peak Polarity: Horizontal

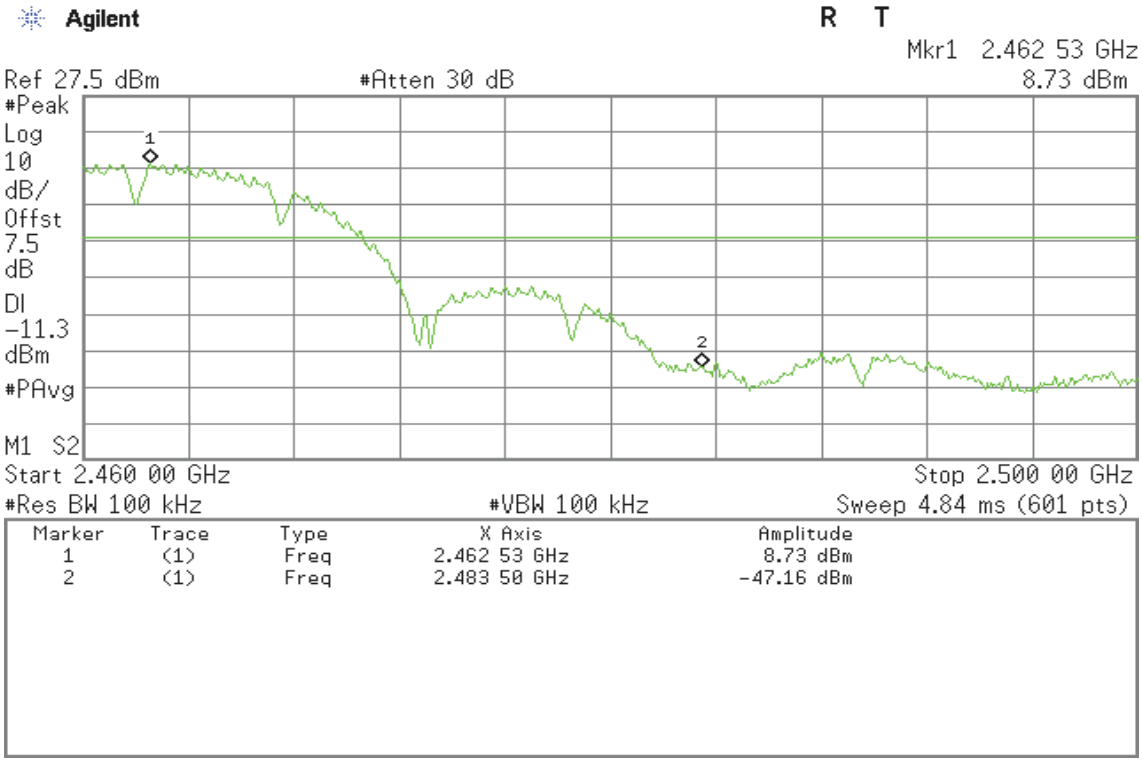
Detector mode: Average Polarity: Horizontal

Test Plot

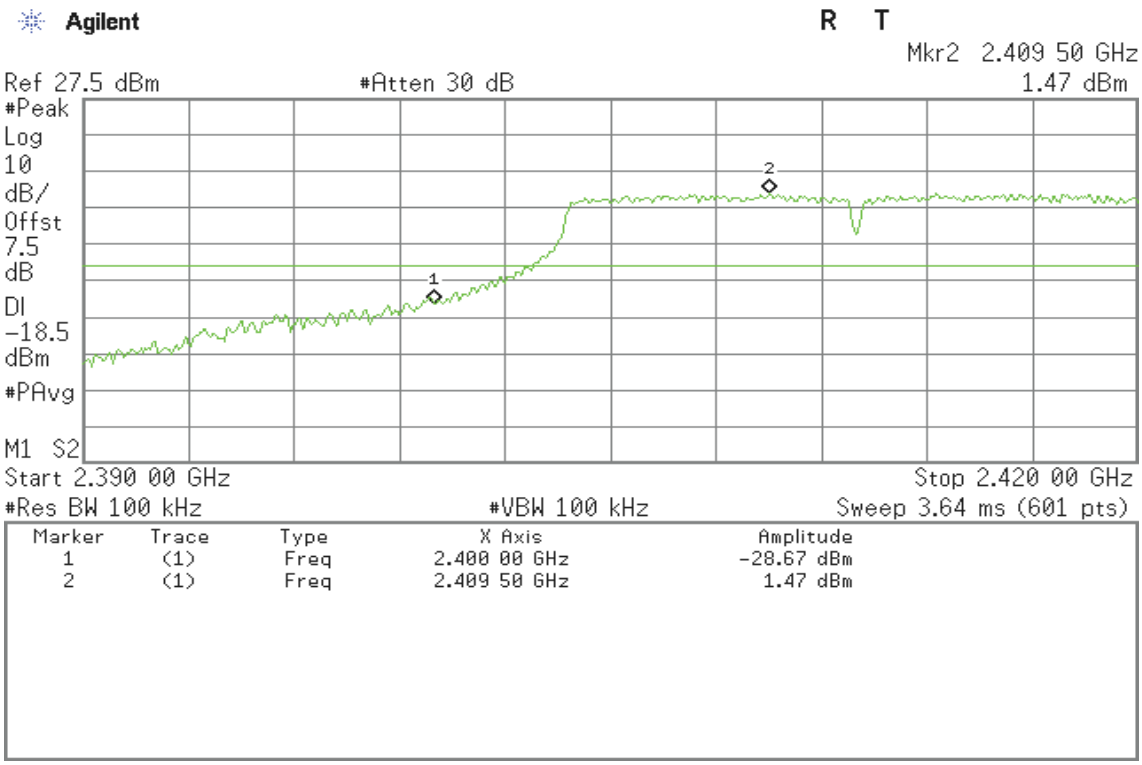
Conducted Band Edges (IEEE 802.11b mode / CH Low)



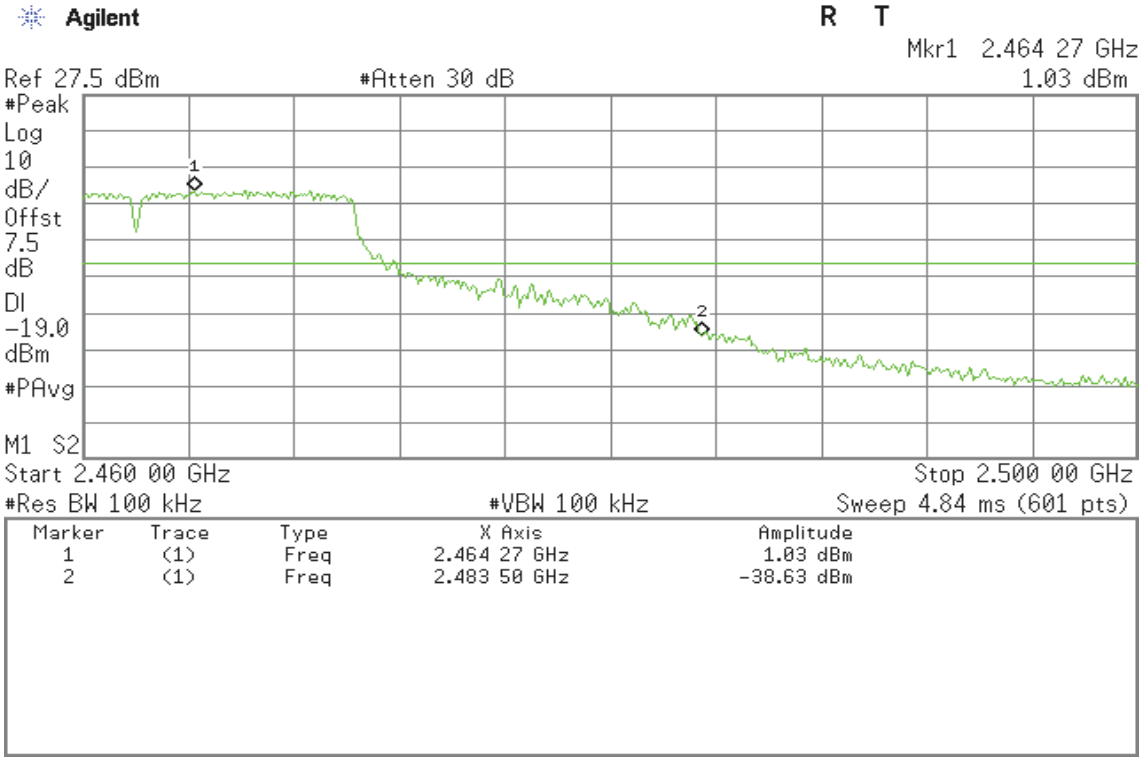
Conducted Band Edges (IEEE 802.11b mode / CH High)



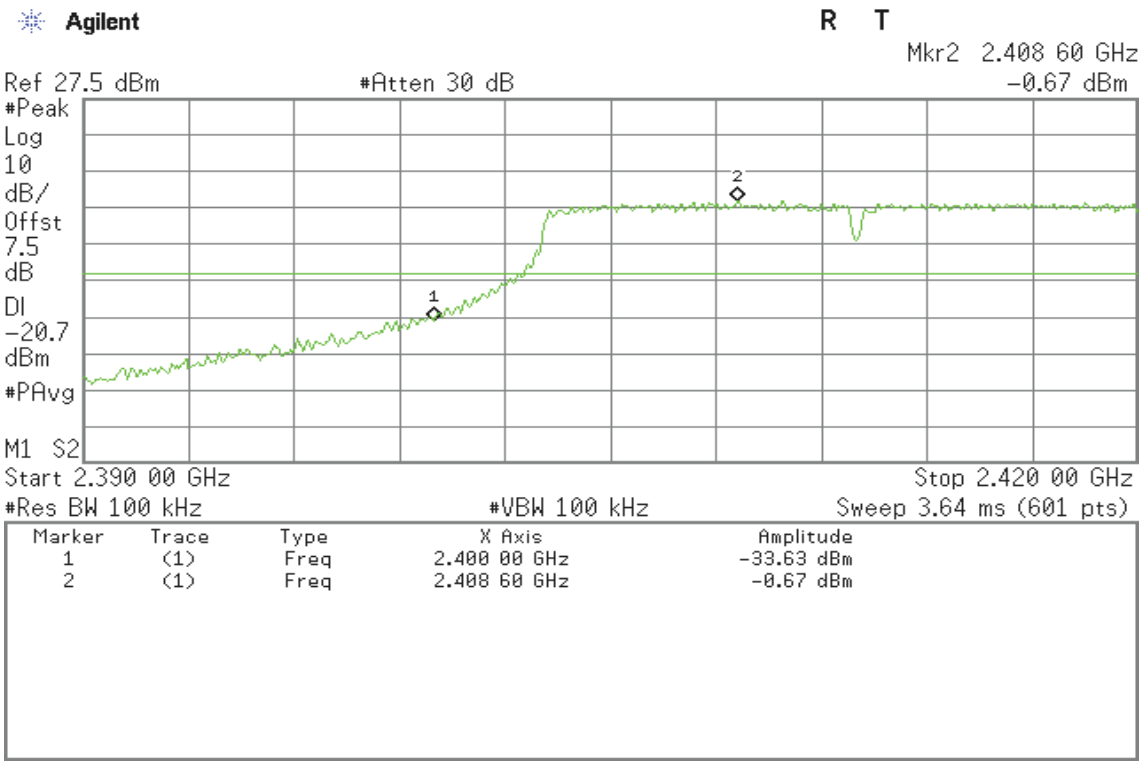
Conducted Band Edges (IEEE 802.11g mode / CH Low)



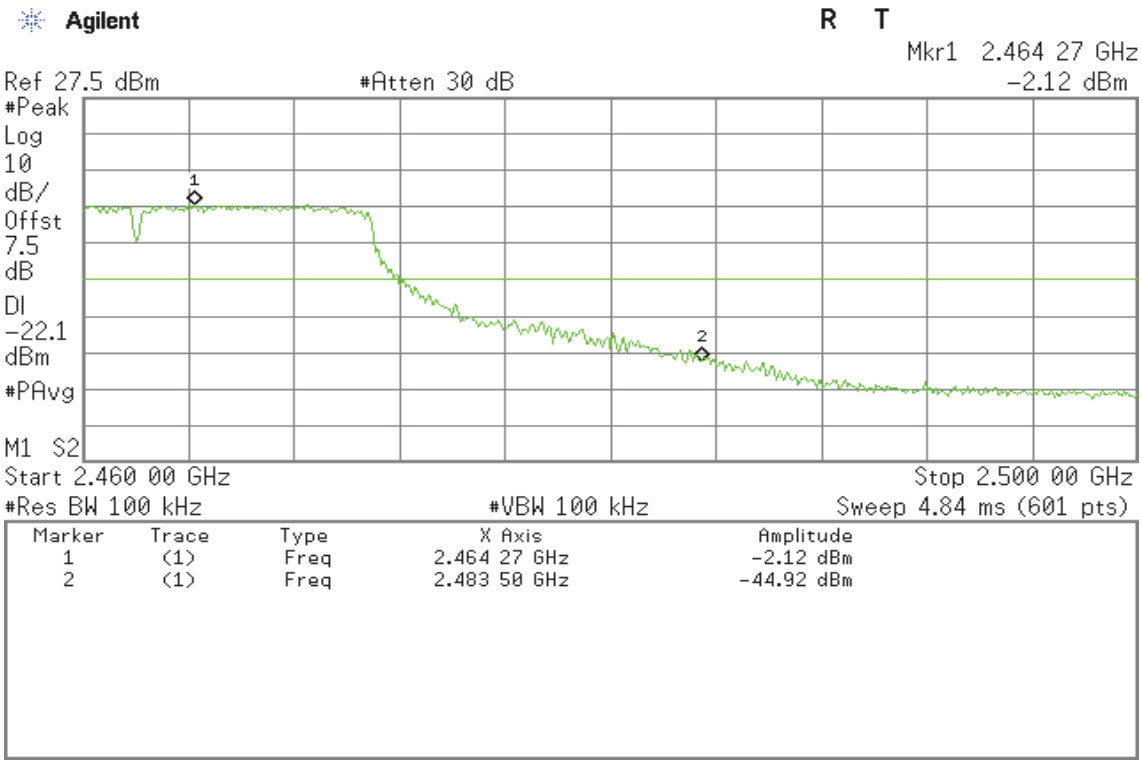
Conducted Band Edges (IEEE 802.11g mode / CH High)



Conducted Band Edges (IEEE 802.11n HT20 mode / Chain 0 / CH Low)



Conducted Band Edges (IEEE 802.11n HT20 mode / CH High)

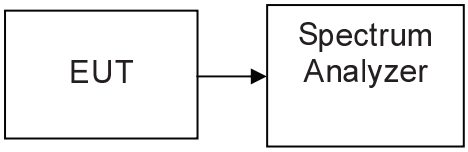


7.5 PEAK POWER SPECTRAL DENSITY

LIMIT

1. According to §15.247(e), for digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.
2. According to §15.247(f), the digital modulation operation of the hybrid system, with the frequency hopping turned off, shall comply with the power density requirements of paragraph (d) of this section.

Test Configuration



TEST PROCEDURE

Per KDB 558074 v03r02

This procedure must be used if maximum peak conducted output power was used to demonstrate compliance to the fundamental output power limit, and is optional if the maximum (average) conducted output power was used to demonstrate compliance.

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS channel bandwidth.
3. Set the RBW ≥ 3 kHz.
4. Set the VBW ≥ 3 x RBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.

Use the peak marker function to determine the maximum amplitude level.
If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat

TEST RESULTS

No non-compliance noted

Test Data

Test mode: IEEE 802.11b mode

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Result
Low	2412	-10.92	8.00	PASS
Mid	2437	-10.17		PASS
High	2462	-10.25		PASS

Test mode: IEEE 802.11g mode

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Result
Low	2412	-12.81	8.00	PASS
Mid	2437	-12.16		PASS
High	2462	-12.14		PASS

Test mode: IEEE 802.11n HT20 mode

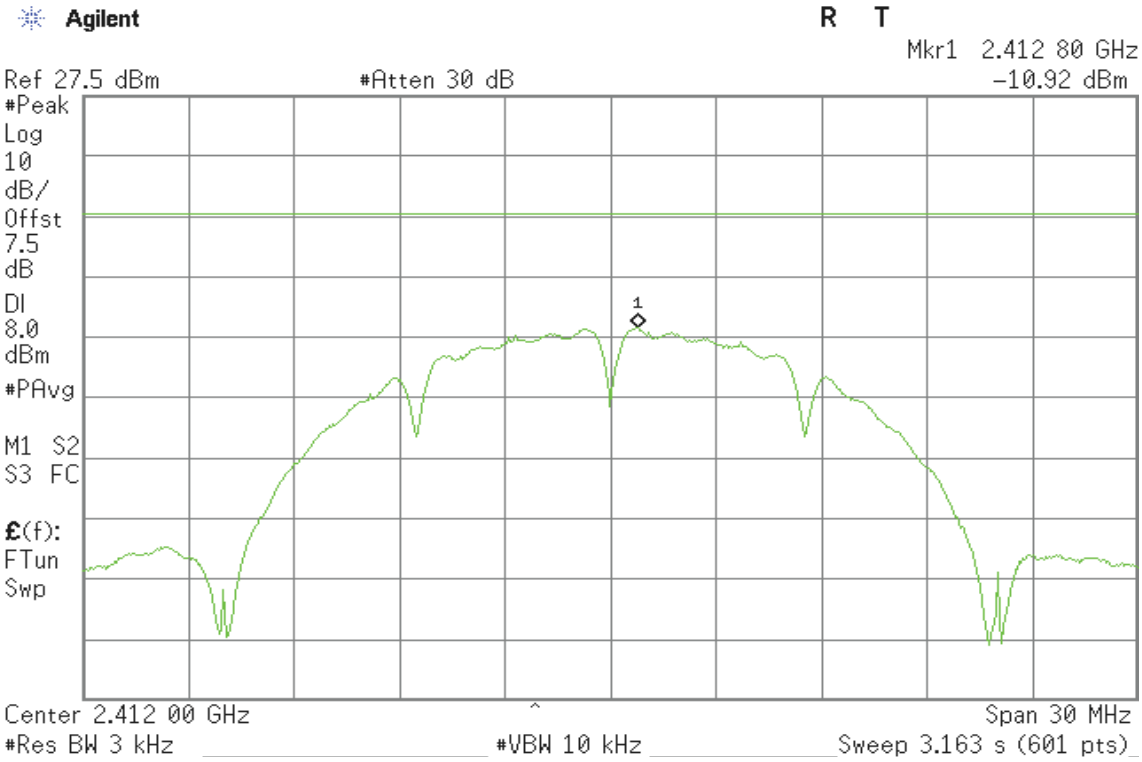
Channel	Frequency (MHz)	PPSD(dBm)	Limit (dBm)	Result
Low	2412	-13.19	8.00	PASS
Mid	2437	-14.67		PASS
High	2462	-13.76		PASS

Remark:

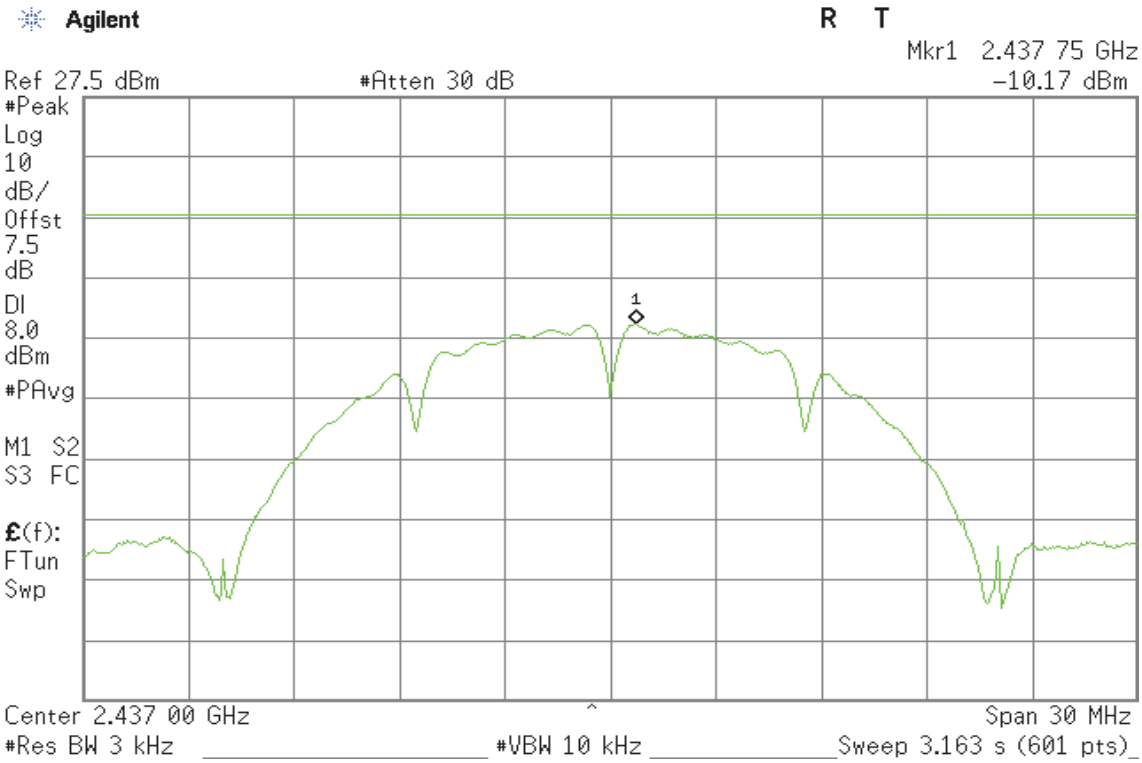
*1.Total PPSD (dBm) = 10*LOG(10^(Chain 0 PPSD / 10)+10^(Chain 1 PPSD /10))*

Test Plot

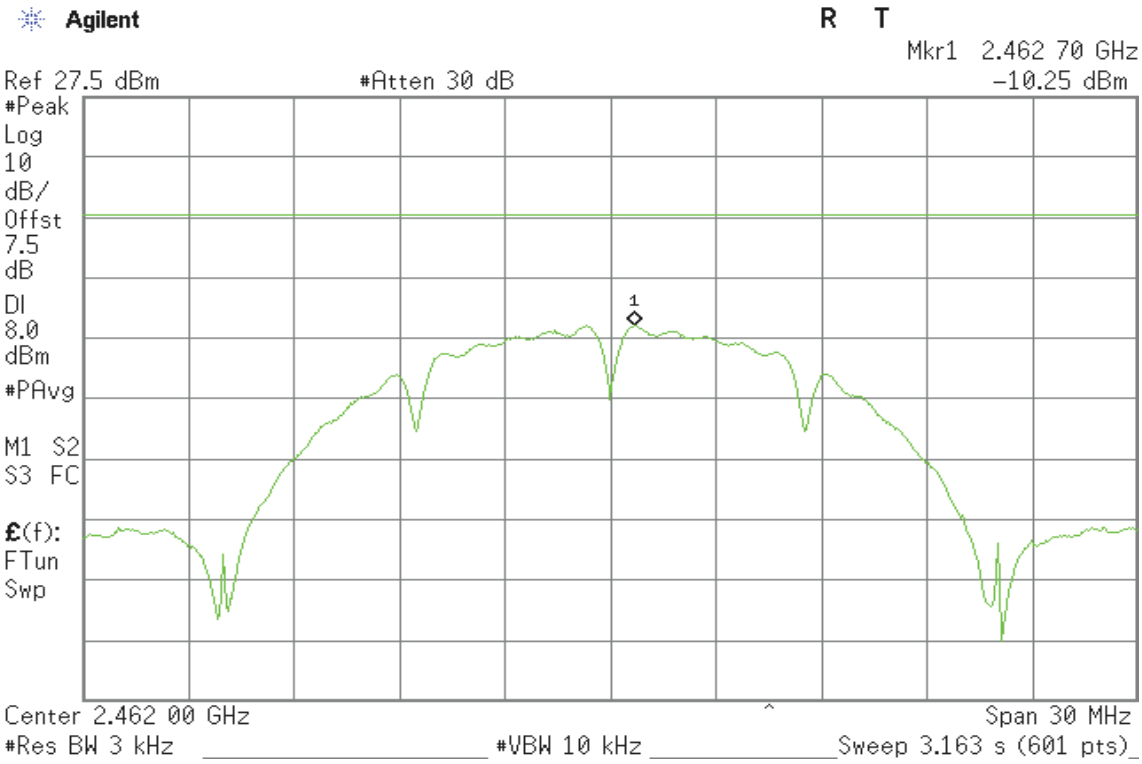
IEEE 802.11b mode
PPSD (CH Low)



PPSD (CH Mid)

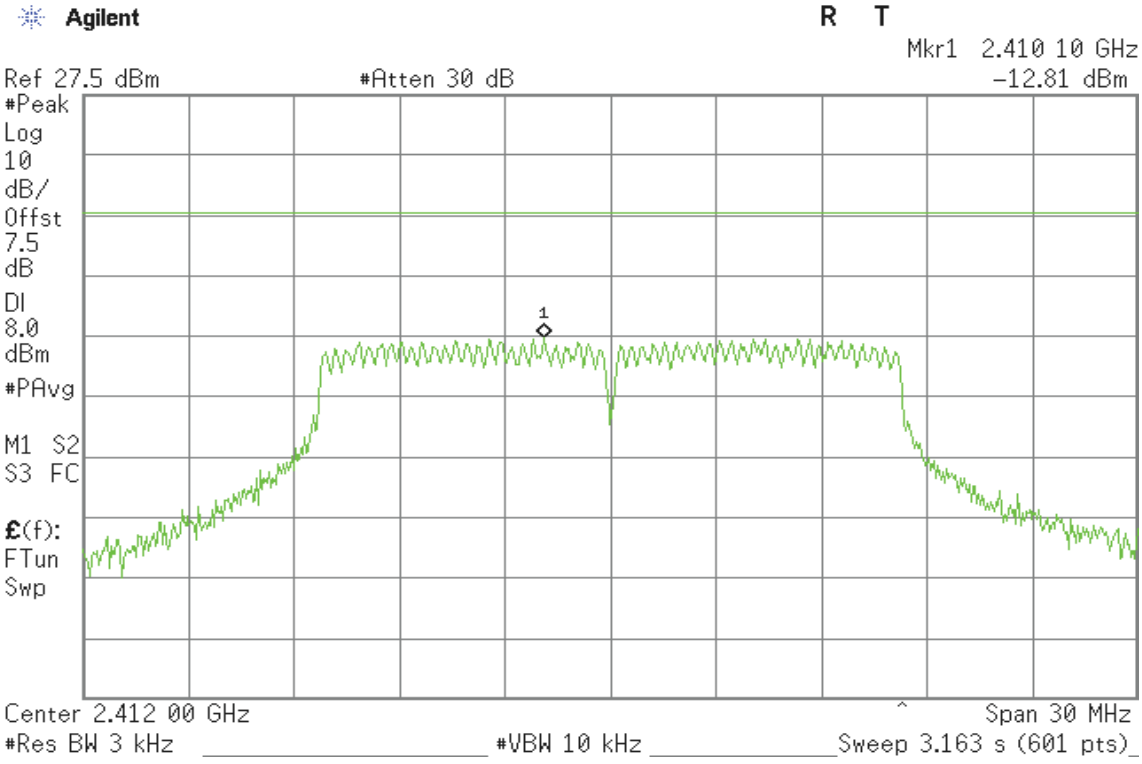


PPSD (CH High)

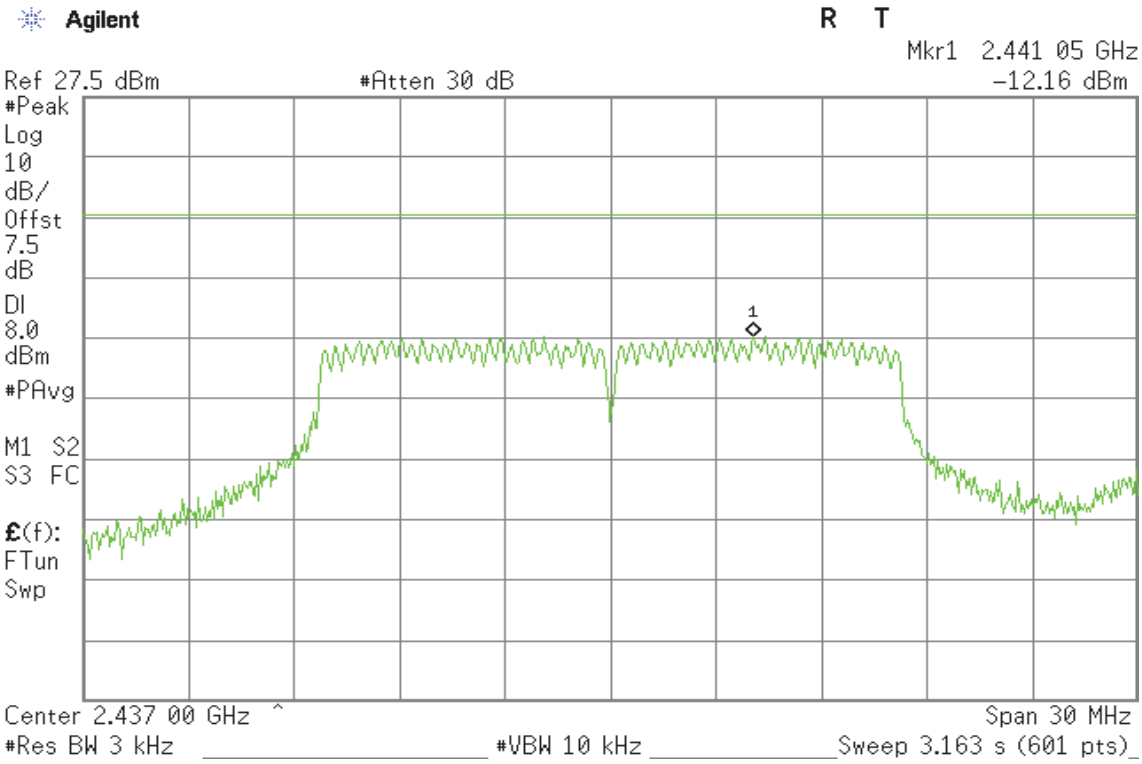


IEEE 802.11g mode

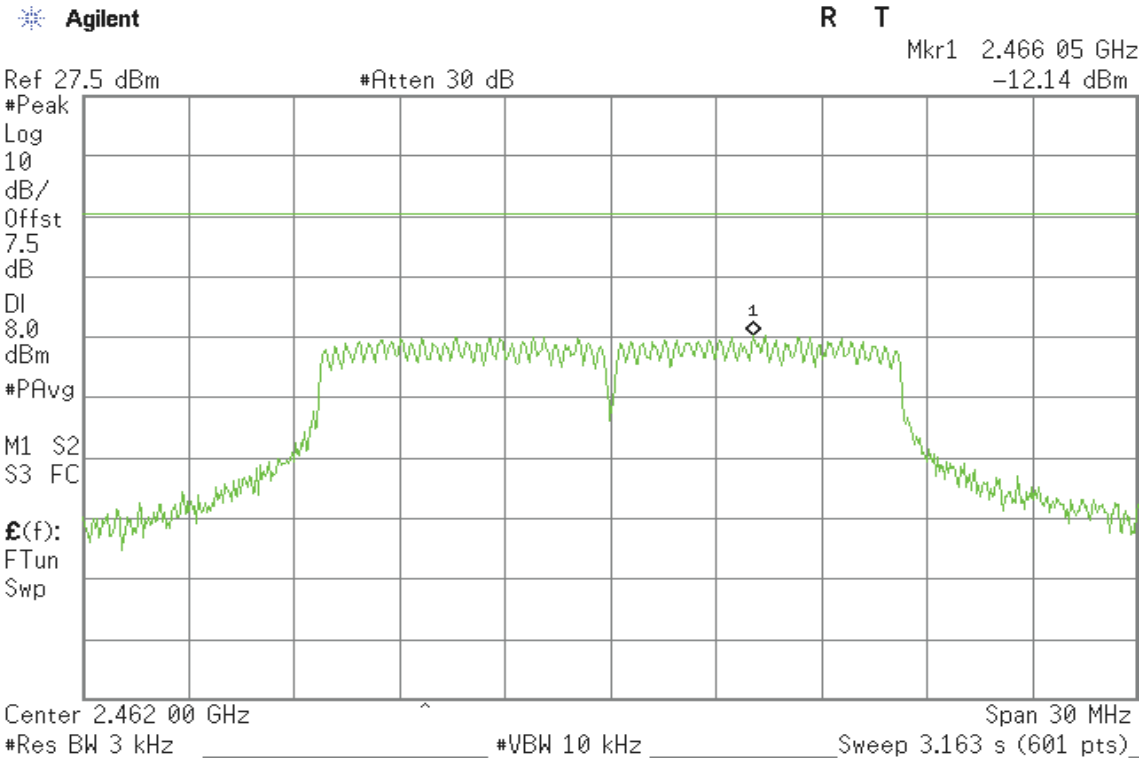
PPSD (CH Low)



PPSD (CH Mid)

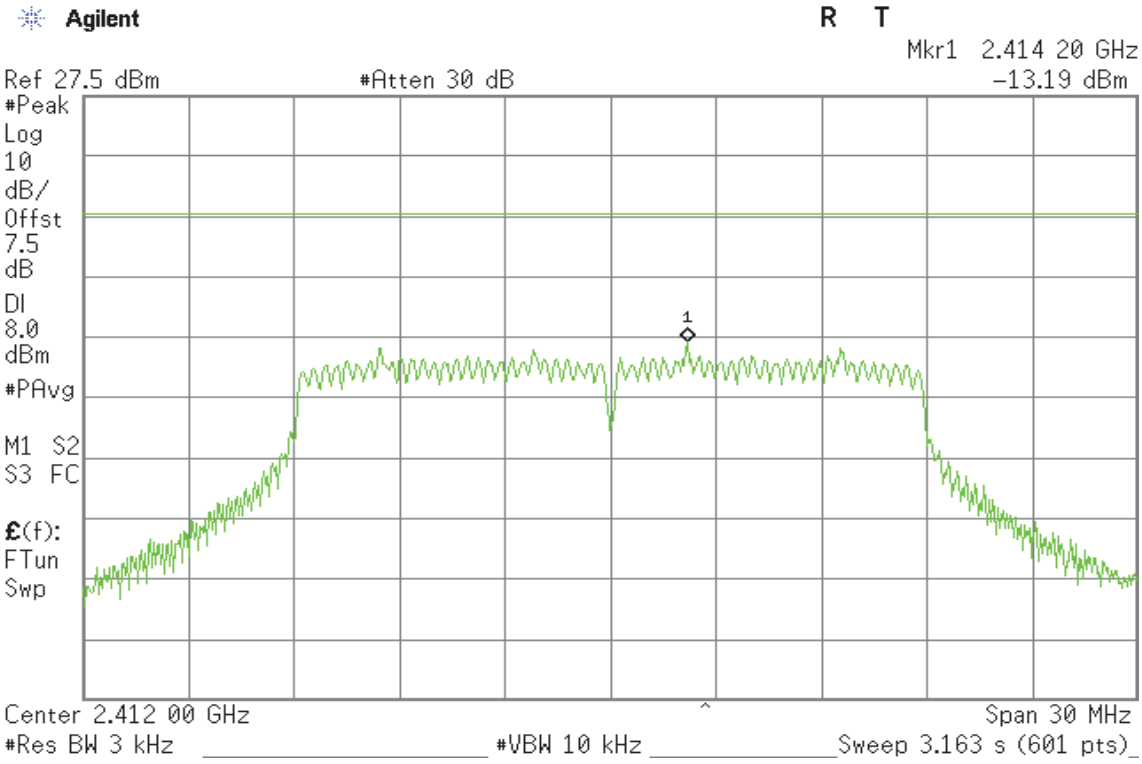


PPSD (CH High)

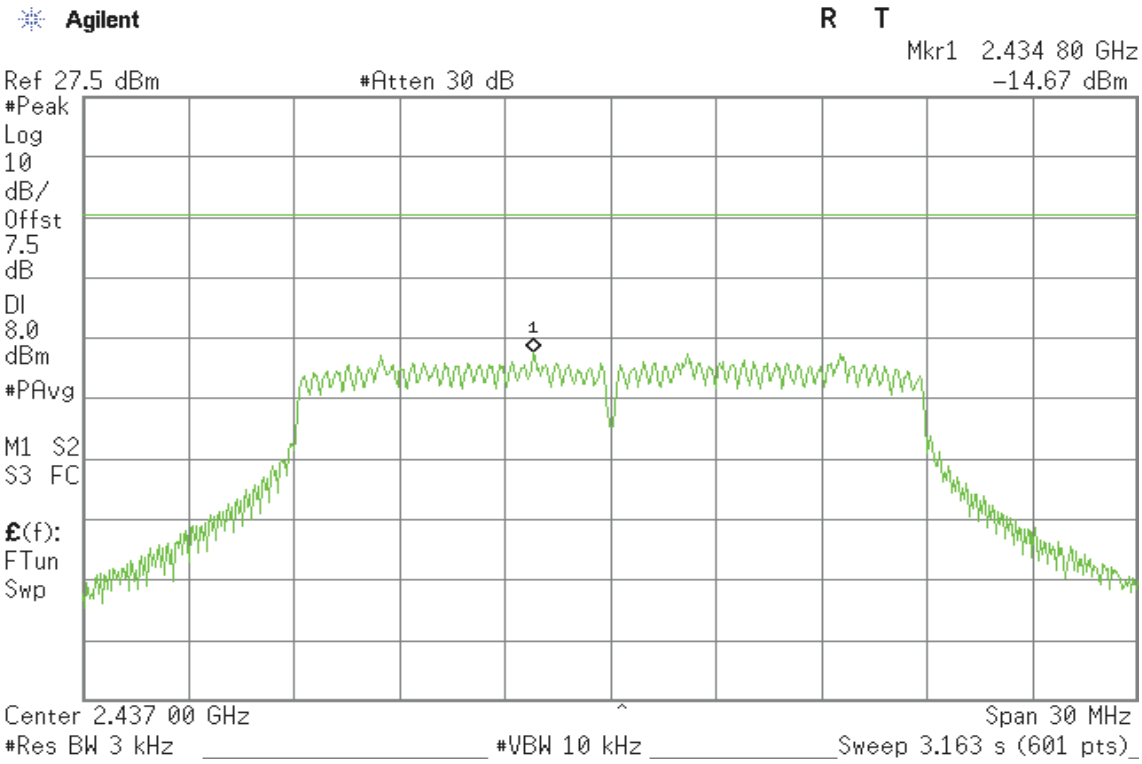


IEEE 802.11n HT20 mode

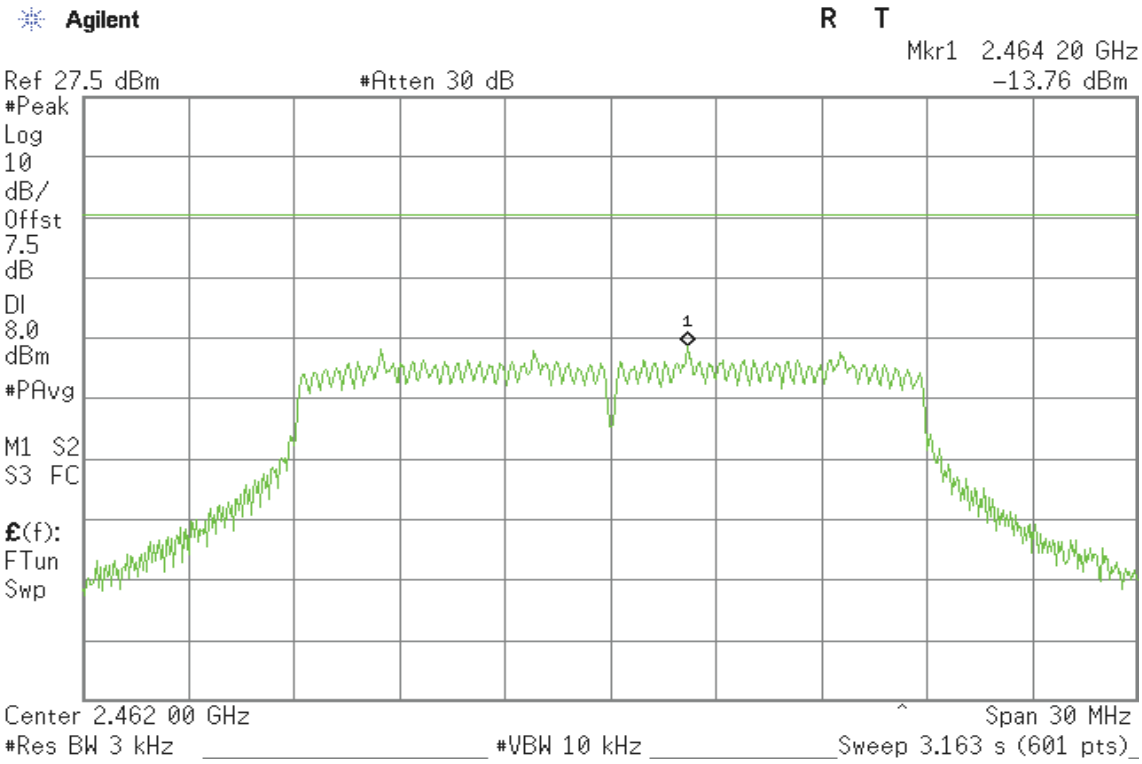
PPSD (CH Low)



PPSD (CH Mid)



PPSD (CH High)


Agilent
R T
Mkr1 2.464 20 GHz
Ref 27.5 dBm
#Atten 30 dB
-13.76 dBm
#Peak
Log
10
dB/
Offst
7.5
dB
Dl
8.0
dBm
#PAvg
M1 S2
S3 FC
£(f):
FTun
Swp
1
Center 2.462 00 GHz
Span 30 MHz
#Res BW 3 kHz
#VBW 10 kHz
Sweep 3.163 s (601 pts)

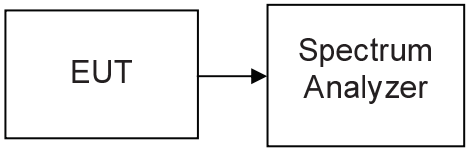
7.6 SPURIOUS EMISSIONS

7.6.1 Conducted Measurement

LIMIT

According to §15.247(d), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in 15.209(a) (see Section 15.205(c)).

Test Configuration



TEST PROCEDURE

Conducted RF measurements of the transmitter output were made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 100 kHz.

Measurements are made over the 30MHz to 26GHz range for IEEE 802.11b/g, 30MHz to 40GHz range for IEEE 802.11a with the transmitter set to the lowest, middle, and highest channels.

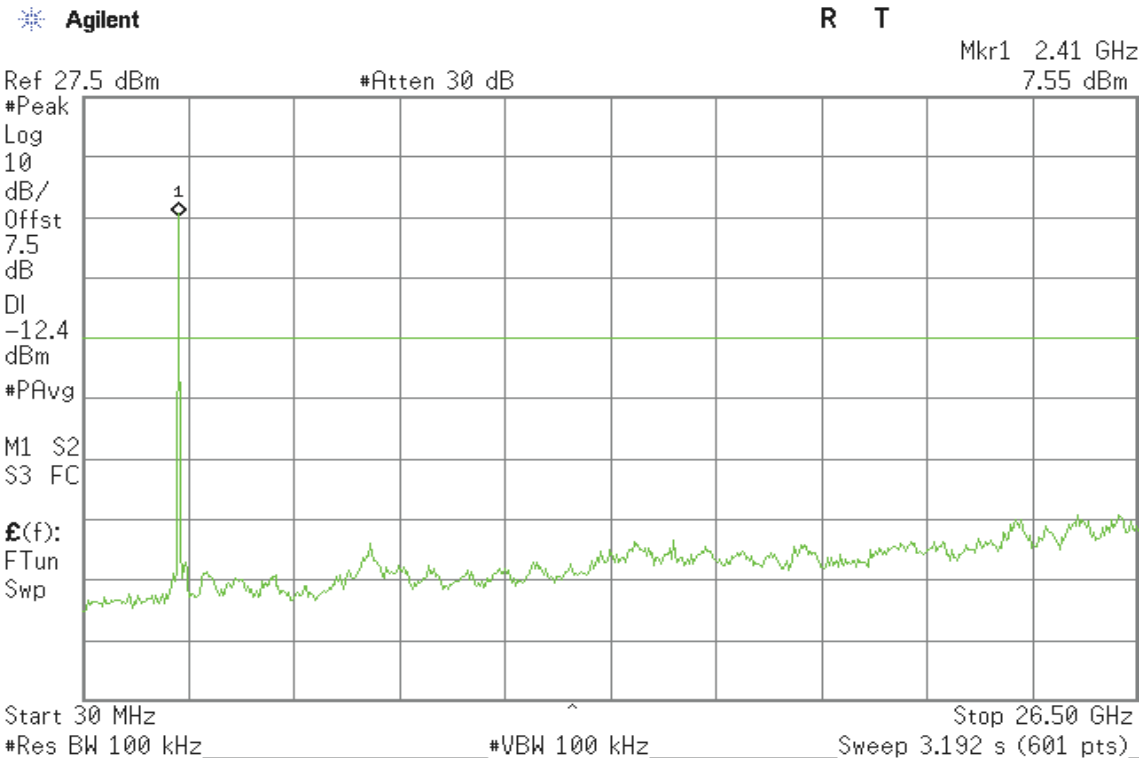
TEST RESULTS

No non-compliance noted

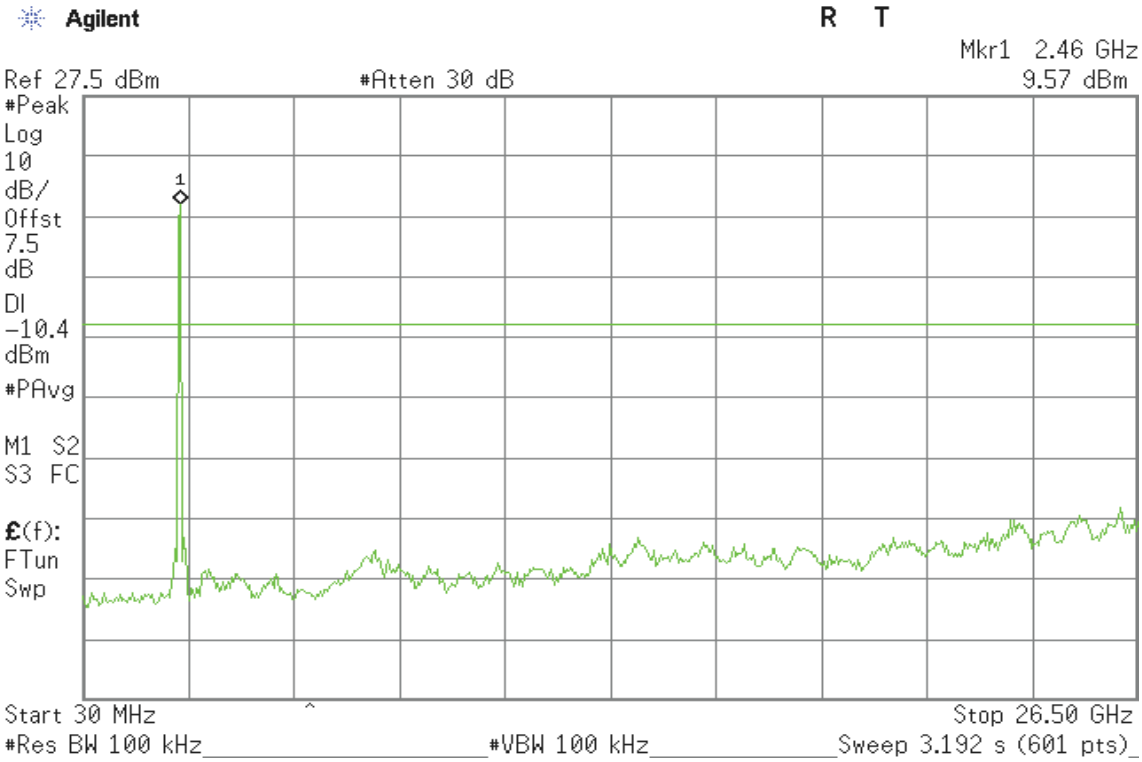
Test Plot

IEEE 802.11b mode

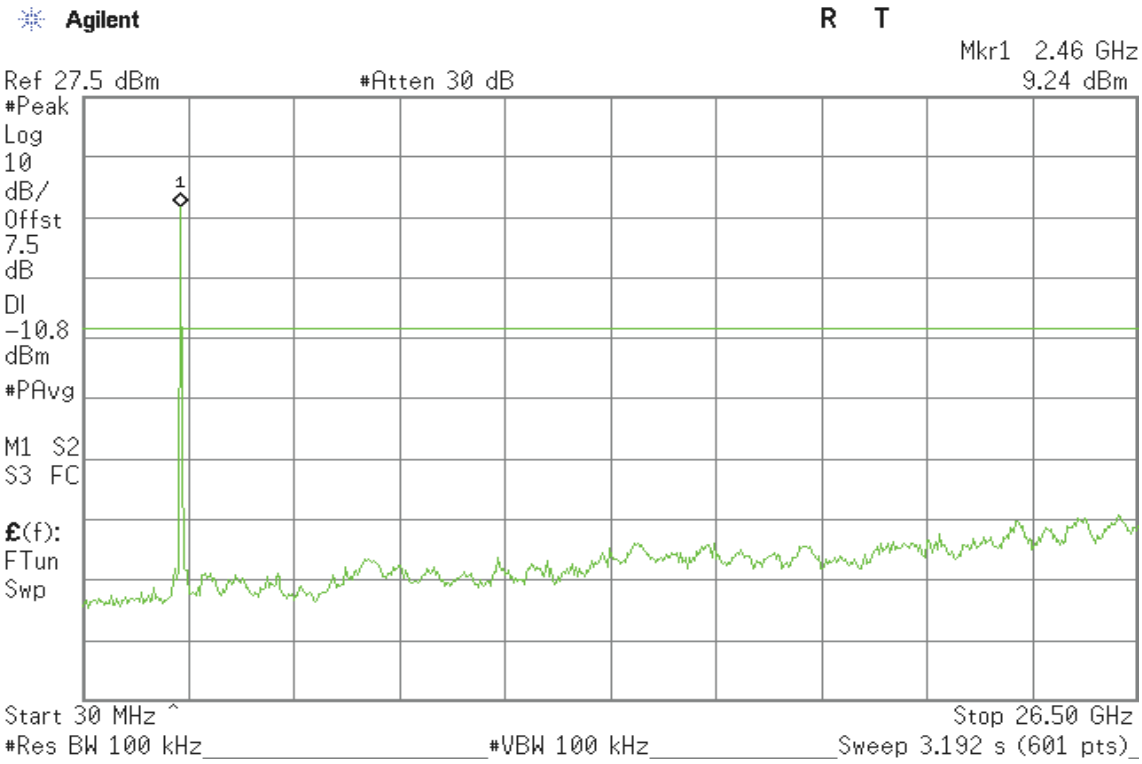
CH Low



CH Mid

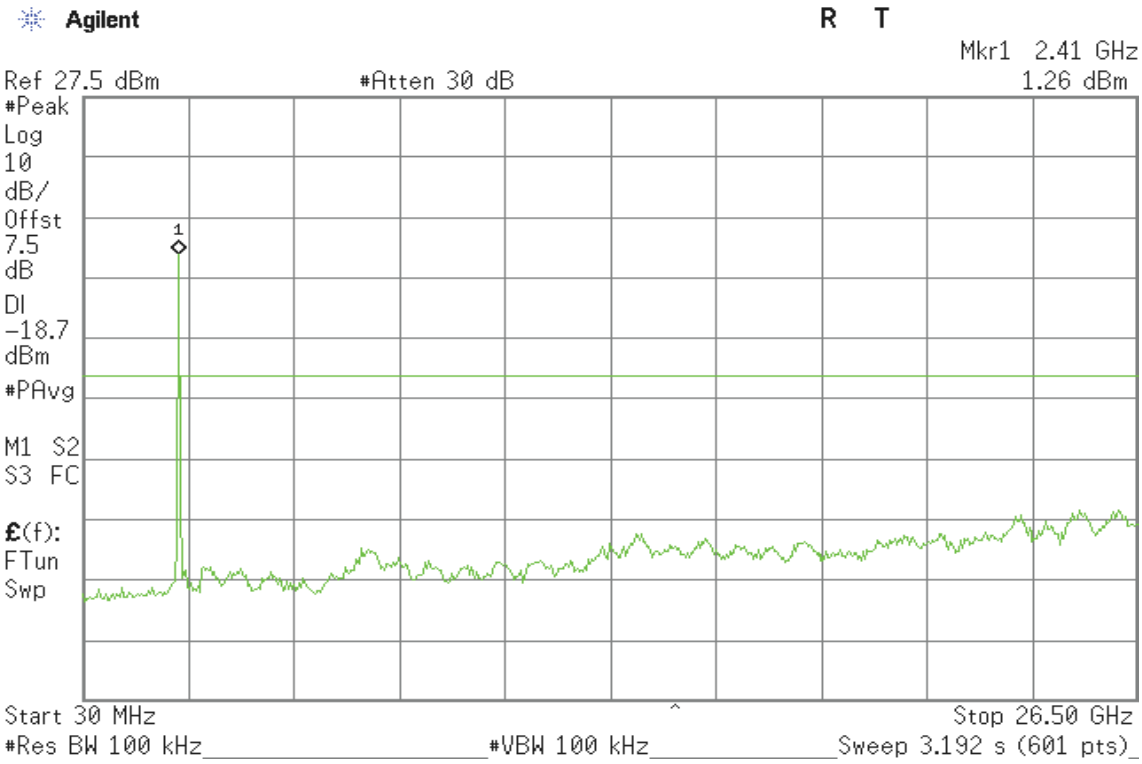


CH High

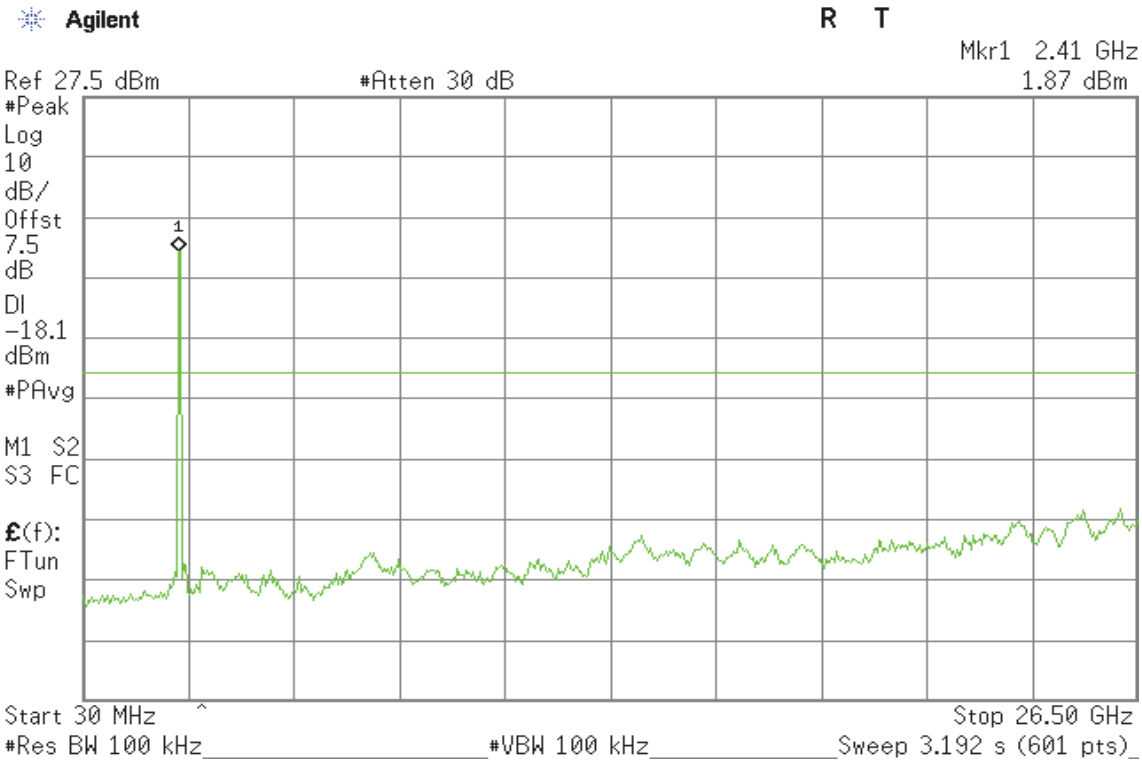


IEEE 802.11g mode

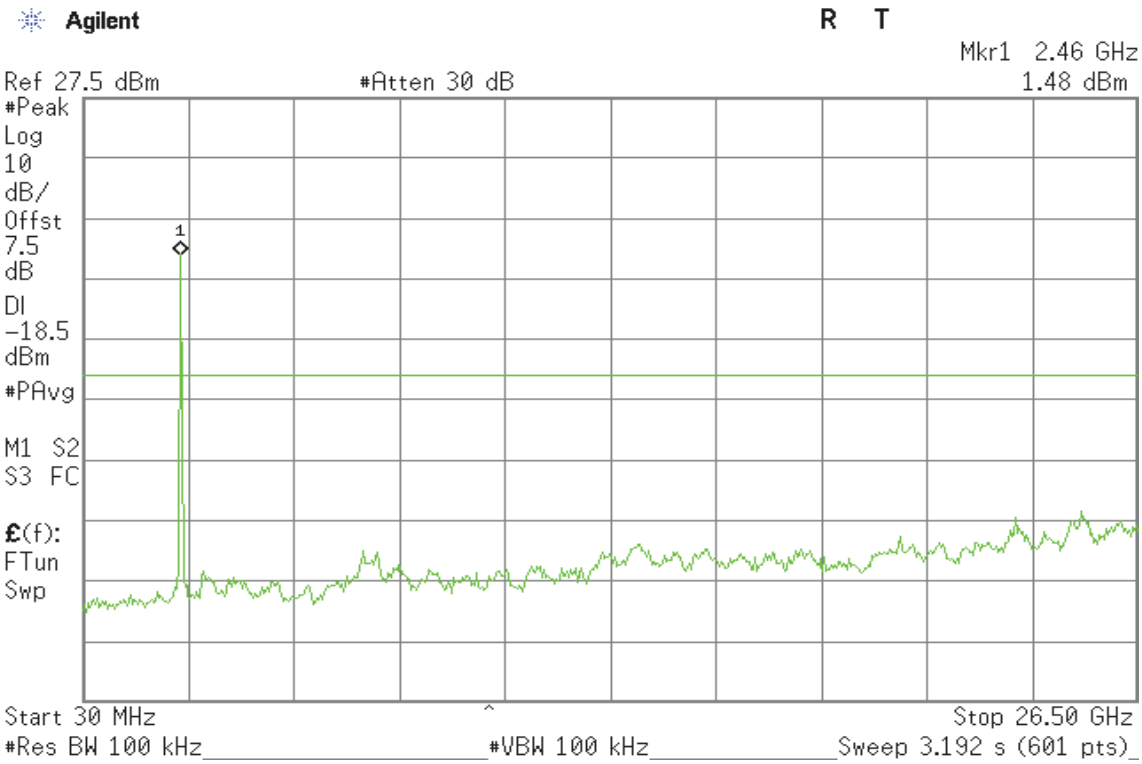
CH Low



CH Mid

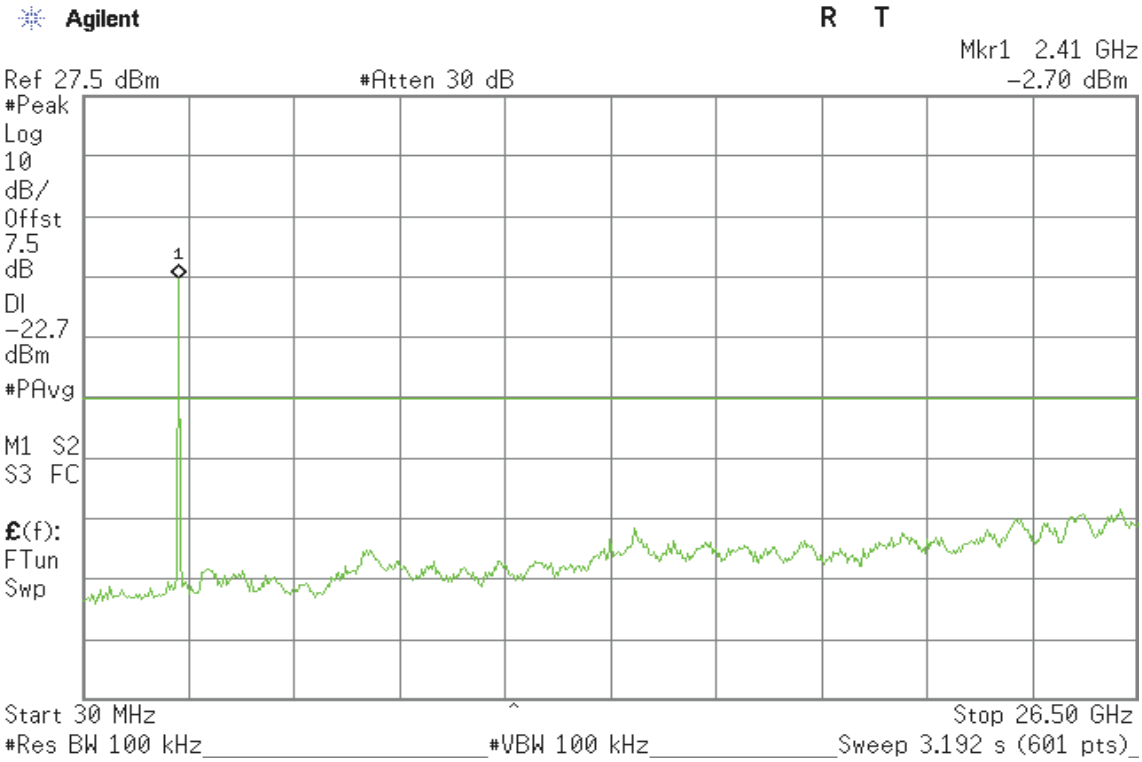


CH High

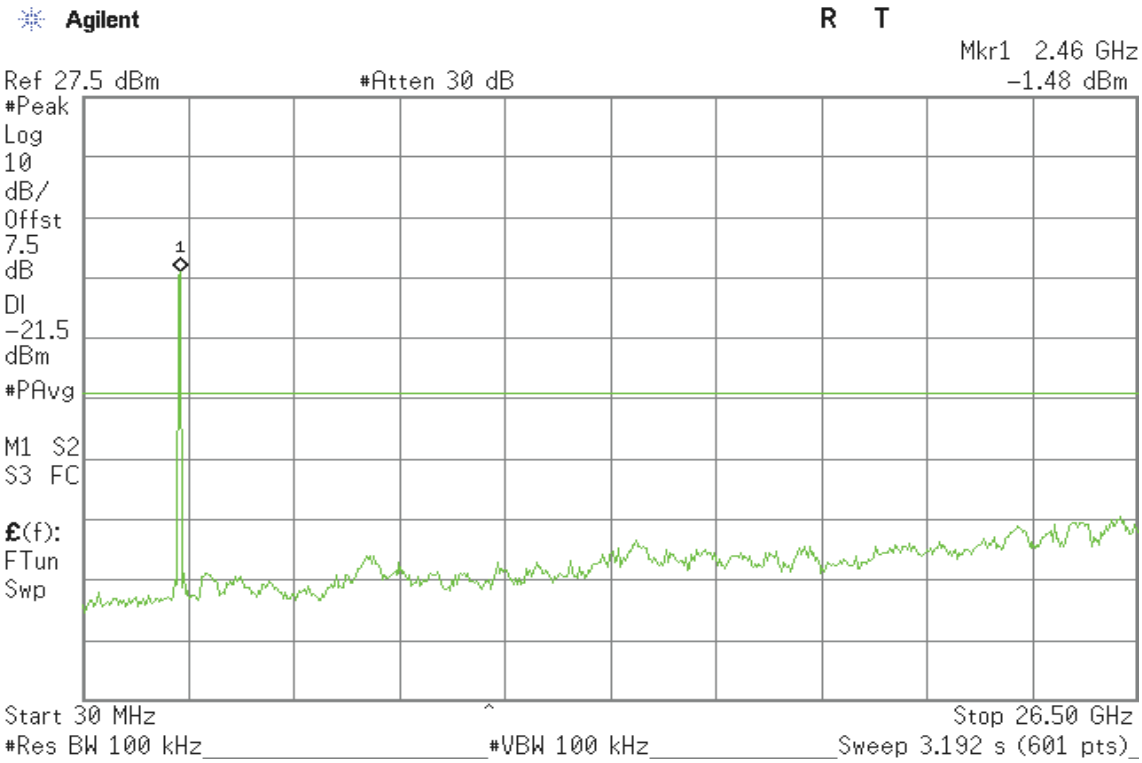


IEEE 802.11n HT20 mode

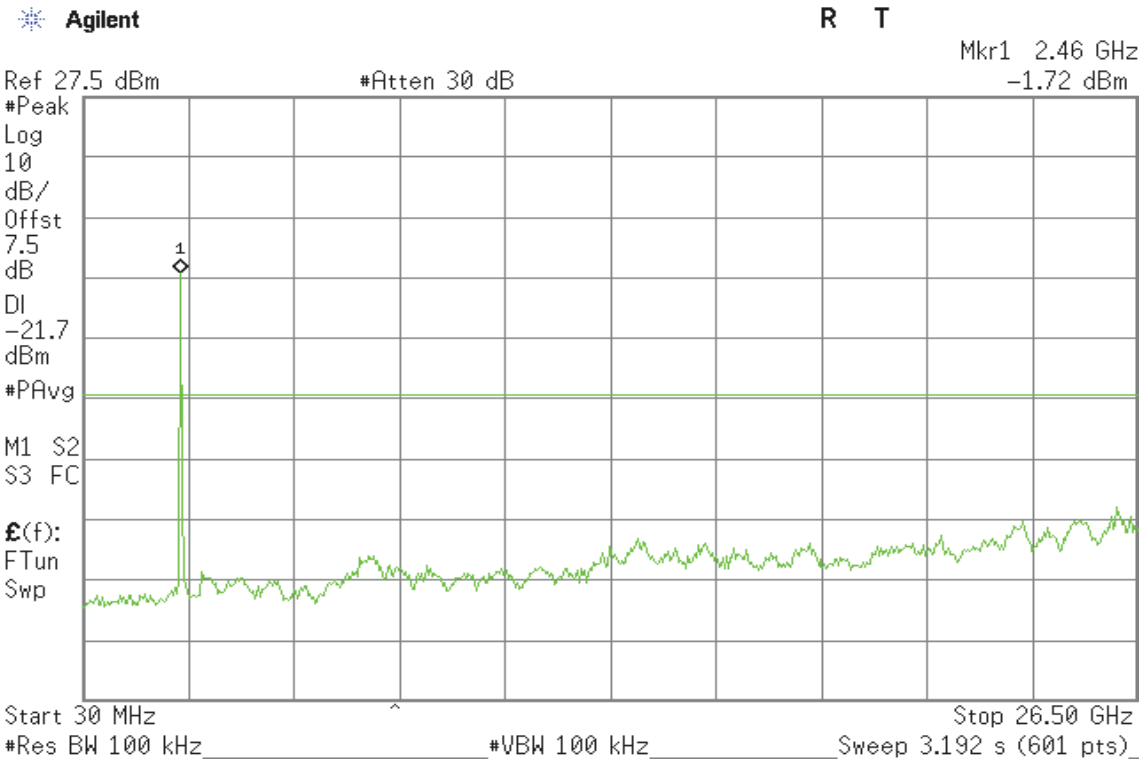
CH Low



CH Mid



CH High


Agilent
R T
Mkr1 2.46 GHz
Ref 27.5 dBm
#Atten 30 dB
-1.72 dBm
#Peak
Log
10
dB/
Offst
7.5
dB
Dl
-21.7
dBm
#PAvg
M1 S2
S3 FC
£(f):
FTun
Swp
Start 30 MHz
Stop 26.50 GHz
#Res BW 100 kHz
#VBW 100 kHz
Sweep 3.192 s (601 pts)

7.6.2 Radiated Emissions

LIMIT

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

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

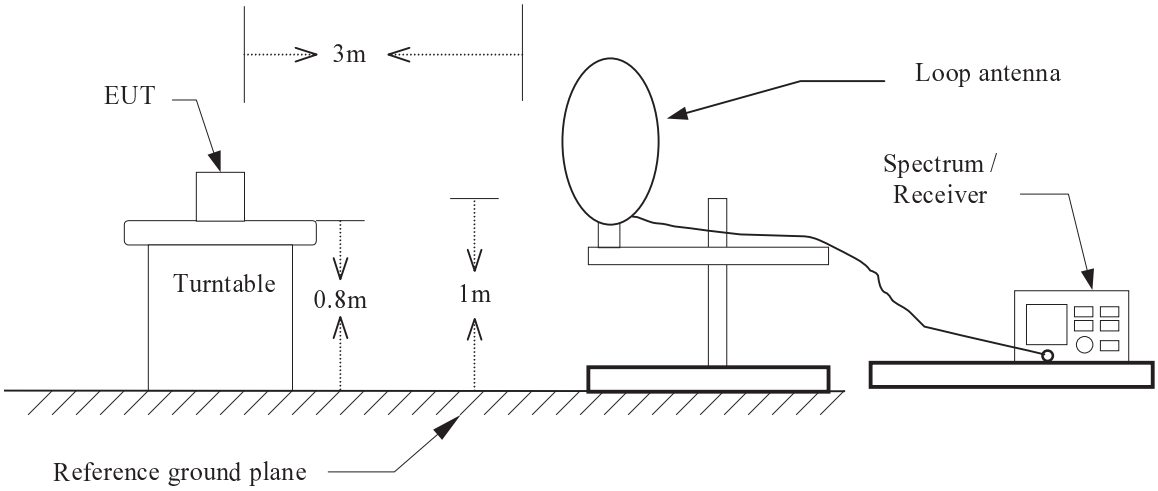
Remark: *Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of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

2. In the above emission table, the tighter limit applies at the band edges.

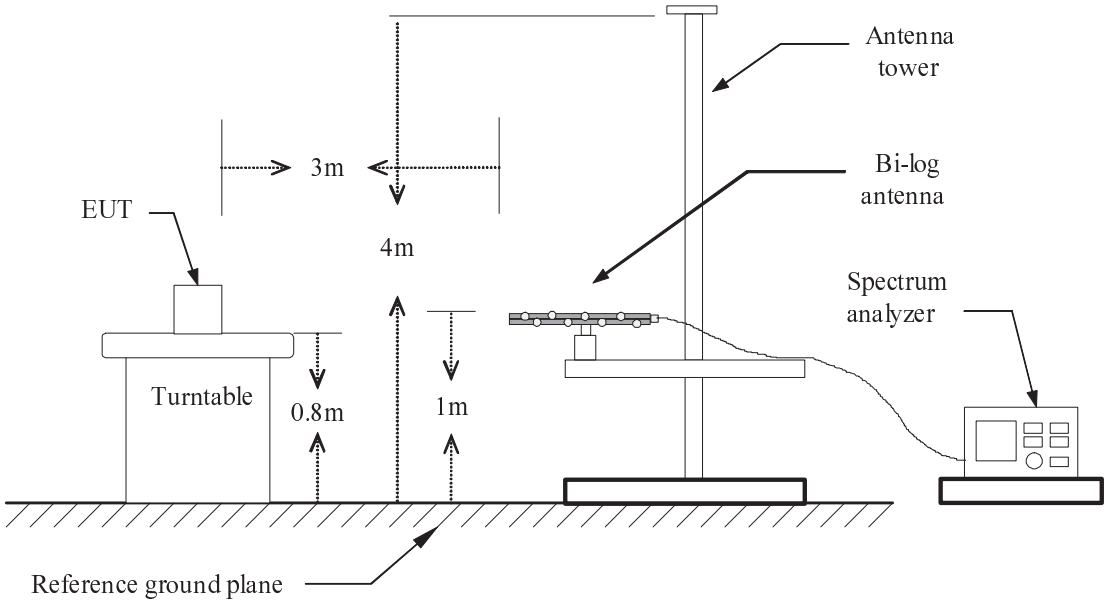
Frequency (MHz)	Field Strength (μV/m at 3-meter)	Field Strength (dBμV/m at 3-meter)
0.009 - 0.490	2400/F(kHz) x10000	20LOG((2400/F(kHz))+80)
0.490 - 1.705	24000/F(kHz) x100	20LOG((24000/F(kHz))+40)
1.705 – 30.0	30	69.54
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

Test Configuration

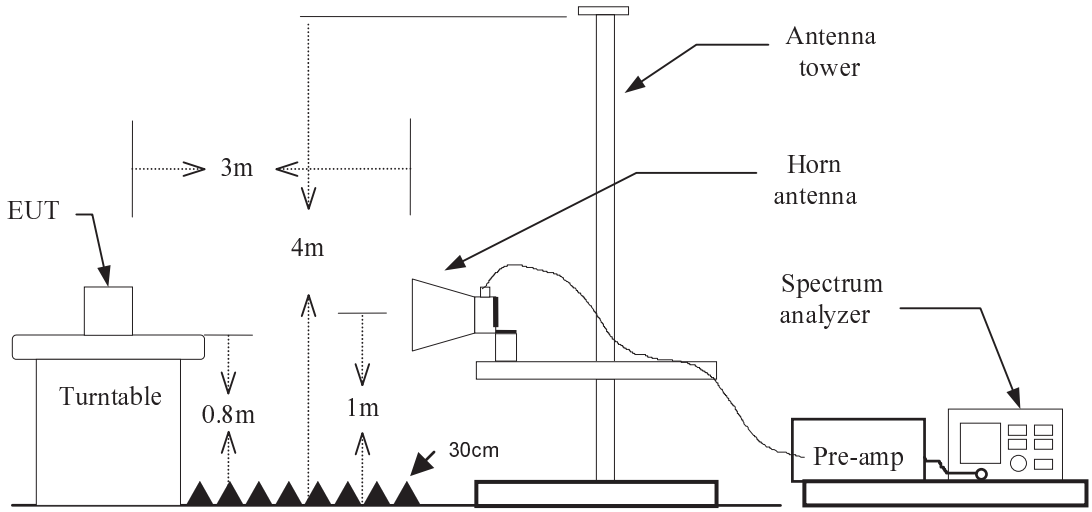
9kHz ~ 30MHz



30MHz ~ 1GHz



Above 1 GHz



TEST PROCEDURE

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Set the spectrum analyzer in the following setting as:

   Below 30MHz

   RBW=10kHz / VBW=30kHz / Sweep=AUTO

   30 ~ 1000MHz:

   RBW=100kHz / VBW=300KHz / Sweep=AUTO

   Above 1GHz:

   a) PEAK: RBW=1MHz / VBW=3MHz / Sweep=AUTO

   b) AVERAGE: RBW=1MHz / VBW=300Hz / Sweep=AUTO
7. Repeat above procedures until the measurements for all frequencies are complete.

DATA SAMPLE

Below 1 GHz

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol. (H/V)	Remark
x.xx	43.20	-20.71	22.49	40.00	-17.51	V	QP

Frequency (MHz) = Emission frequency in MHz
Reading (dBuV) = Uncorrected Analyzer / Receiver reading
Correction Factor (dB/m) = Antenna factor – Amplifier gain + Cable loss
Result (dBuV/m) = Reading (dBuV) + Corr. Factor (dB/m)
Limit (dBuV/m) = Limit stated in standard
Margin (dB) = Result (dBuV/m) – Limit (dBuV/m)
Q.P. = Quasi-Peak

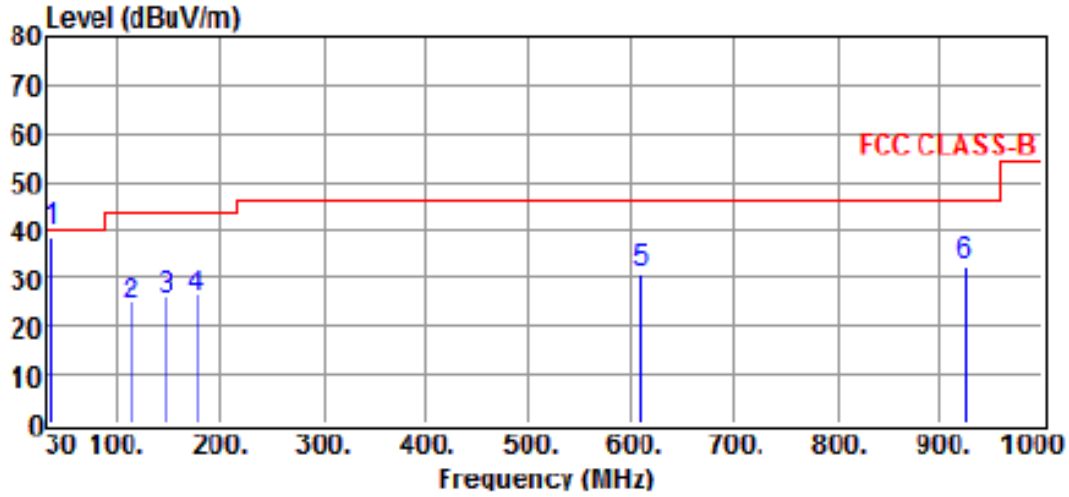
Above 1 GHz

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
x.xx	45.25	6.91	52.16	74.00	-21.84	H	peak
x.xx	32.33	6.91	39.24	54.00	-14.76	H	AVG

Frequency (MHz) = Emission frequency in MHz
Reading (dBuV) = Uncorrected Analyzer / Receiver reading
Correction Factor (dB/m) = Antenna factor + Cable loss – Amplifier gain
Result (dBuV/m) = Reading (dBuV) + Corr. Factor (dB/m)
Limit (dBuV/m) = Limit stated in standard
Margin (dB) = Result (dBuV/m) – Limit (dBuV/m)

Below 1 GHz

Operation Mode:	Data Link	**Test Date:**	2017/2/22
Temperature:	26°C	**Tested by:**	Francis Lee
Humidity:	56% RH	**Polarity:**	Ver. / Hor.



Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol. (H/V)	Remark
35.8200	50.00	-12.13	37.87	40.00	-2.13	V	QP
112.4500	43.94	-15.68	28.26	43.50	-15.24	V	QP
154.1599	42.85	-16.39	26.46	43.50	-17.04	V	QP
179.3799	42.54	-17.26	25.28	43.50	-18.22	V	QP
617.8200	37.11	-7.76	29.35	46.00	-16.65	V	QP
927.2500	34.65	-3.58	31.07	46.00	-14.93	V	QP
35.8200	40.55	-12.13	28.42	40.00	-11.58	H	QP
309.3599	38.00	-12.11	25.89	46.00	-20.11	H	QP
341.3700	39.72	-11.36	28.36	46.00	-17.64	H	QP
617.8200	40.35	-7.76	32.59	46.00	-13.41	H	QP
772.0500	38.13	-5.91	32.22	46.00	-13.78	H	QP
927.2500	38.37	-3.58	34.79	46.00	-11.21	H	QP

Remark:

1. *No emission found between lowest internal used/generated frequency to 30MHz (9kHz~30MHz).*
2. *Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using peak/quasi-peak detector mode.*
3. *Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit or as required by the applicant.*
4. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
5. *Margin (dB) = Remark result (dBuV/m) – Quasi-peak limit (dBuV/m).*

Above 1 GHz

Operation Mode: TX / IEEE 802.11b mode / CH Low **Test Date:** 2017/2/17

Temperature: 26℃ **Tested by:** Francis Lee

Humidity: 56%RH **Polarity:** Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
1330.000	53.68	-8.02	45.66	74.00	-28.34	V	peak
1598.000	50.74	-4.80	45.94	74.00	-28.06	V	peak
1994.000	50.13	-1.39	48.74	74.00	-25.26	V	peak
2492.000	43.65	-0.99	42.66	74.00	-31.34	V	peak
3995.000	40.38	3.39	43.77	74.00	-30.23	V	peak
5730.000	39.20	5.70	44.90	74.00	-29.10	V	peak
7420.000	38.70	11.35	50.05	74.00	-23.95	V	peak
1382.000	51.64	-7.36	44.28	74.00	-29.72	H	peak
2104.000	50.09	-3.77	46.32	74.00	-27.68	H	peak
2882.000	48.99	-1.86	47.13	74.00	-26.87	H	peak
4300.000	40.81	7.66	48.47	74.00	-25.53	H	peak
5555.000	38.88	9.05	47.93	74.00	-26.07	H	peak
7280.000	39.04	11.55	50.59	74.00	-23.41	H	peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m) or Peak limit (dBuV/m).*

Operation Mode: TX / IEEE 802.11b mode / CH Mid **Test Date:** 2017/2/17

Temperature: 26℃ **Tested by:** Francis Lee

Humidity: 56%RH **Polarity:** Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
1326.000	54.40	-8.10	46.30	74.00	-27.70	V	peak
1998.000	50.89	-1.33	49.56	74.00	-24.44	V	peak
2880.000	50.03	-0.95	49.08	74.00	-24.92	V	peak
3805.000	40.95	3.58	44.53	74.00	-29.47	V	peak
4875.000	46.30	3.81	50.11	74.00	-23.89	V	peak
7435.000	39.80	11.38	51.18	74.00	-22.82	V	peak
1400.000	51.48	-6.90	44.58	74.00	-29.42	H	peak
2106.000	50.17	-3.77	46.40	74.00	-27.60	H	peak
2840.000	49.04	-2.18	46.86	74.00	-27.14	H	peak
4250.000	40.67	6.82	47.49	74.00	-26.51	H	peak
4875.000	41.51	6.73	48.24	74.00	-25.76	H	peak
7320.000	39.52	11.72	51.24	74.00	-22.76	H	peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m) or Peak limit (dBuV/m).*

Operation Mode: TX / IEEE 802.11b mode / CH High **Test Date:** 2017/2/17

Temperature: 26℃ **Tested by:** Francis Lee

Humidity: 56%RH **Polarity:** Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
1596.000	52.05	-4.81	47.24	74.00	-26.76	V	peak
1984.000	51.52	-1.55	49.97	74.00	-24.03	V	peak
2922.000	49.37	-0.80	48.57	74.00	-25.43	V	peak
3735.000	42.20	2.90	45.10	74.00	-28.90	V	peak
4925.000	49.41	4.61	54.02	74.00	-19.98	V	peak
4925.000	47.95	4.61	52.56	54.00	-1.44	V	AVG
7390.000	41.31	11.22	52.53	74.00	-21.47	V	peak
7390.000	36.83	11.22	48.05	54.00	-5.95	V	AVG
1430.000	51.28	-7.53	43.75	74.00	-30.25	H	peak
2134.000	50.06	-3.71	46.35	74.00	-27.65	H	peak
2904.000	49.44	-1.69	47.75	74.00	-26.25	H	peak
4025.000	41.76	4.99	46.75	74.00	-27.25	H	peak
4925.000	43.78	7.26	51.04	74.00	-22.96	H	peak
6565.000	41.34	8.10	49.44	74.00	-24.56	H	peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m) or Peak limit (dBuV/m).*

Operation Mode: TX / IEEE 802.11g mode / CH Low **Test Date:** 2017/2/17

Temperature: 26℃ **Tested by:** Francis Lee

Humidity: 56%RH **Polarity:** Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
1328.000	53.91	-8.06	45.85	74.00	-28.15	V	peak
1998.000	52.30	-1.33	50.97	74.00	-23.03	V	peak
2742.000	50.11	-1.73	48.38	74.00	-25.62	V	peak
3995.000	40.57	3.39	43.96	74.00	-30.04	V	peak
5535.000	38.64	6.12	44.76	74.00	-29.24	V	peak
7505.000	39.30	11.56	50.86	74.00	-23.14	V	peak
1402.000	51.52	-6.94	44.58	74.00	-29.42	H	peak
2212.000	50.32	-3.89	46.43	74.00	-27.57	H	peak
2900.000	49.81	-1.73	48.08	74.00	-25.92	H	peak
4325.000	40.15	7.47	47.62	74.00	-26.38	H	peak
6430.000	41.45	7.80	49.25	74.00	-24.75	H	peak
7290.000	39.19	11.69	50.88	74.00	-23.12	H	peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m) or Peak limit (dBuV/m).*

Operation Mode: TX / IEEE 802.11g mode / CH Mid **Test Date:** 2017/2/17

Temperature: 26℃ **Tested by:** Francis Lee

Humidity: 56%RH **Polarity:** Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
1326.000	53.16	-8.10	45.06	74.00	-28.94	V	peak
1992.000	51.78	-1.43	50.35	74.00	-23.65	V	peak
2684.000	49.41	-1.58	47.83	74.00	-26.17	V	peak
3765.000	41.09	3.26	44.35	74.00	-29.65	V	peak
4995.000	38.98	5.27	44.25	74.00	-29.75	V	peak
7555.000	40.23	11.74	51.97	74.00	-22.03	V	peak
1384.000	51.24	-7.31	43.93	74.00	-30.07	H	peak
2162.000	50.08	-3.64	46.44	74.00	-27.56	H	peak
2946.000	49.27	-1.24	48.03	74.00	-25.97	H	peak
4310.000	40.08	7.59	47.67	74.00	-26.33	H	peak
5940.000	39.74	9.06	48.80	74.00	-25.20	H	peak
7245.000	39.65	11.09	50.74	74.00	-23.26	H	peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m) or Peak limit (dBuV/m).*

Operation Mode: TX / IEEE 802.11g mode / CH High **Test Date:** 2017/2/17

Temperature: 26℃ **Tested by:** Francis Lee

Humidity: 56%RH **Polarity:** Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
1594.000	54.31	-4.82	49.49	74.00	-24.51	V	peak
1996.000	50.91	-1.36	49.55	74.00	-24.45	V	peak
2904.000	48.83	-0.69	48.14	74.00	-25.86	V	peak
3795.000	40.16	3.63	43.79	74.00	-30.21	V	peak
4925.000	43.69	4.61	48.30	74.00	-25.70	V	peak
7390.000	39.57	11.22	50.79	74.00	-23.21	V	peak
1420.000	51.09	-7.32	43.77	74.00	-30.23	H	peak
2160.000	49.95	-3.65	46.30	74.00	-27.70	H	peak
2854.000	49.34	-2.07	47.27	74.00	-26.73	H	peak
3810.000	40.93	5.11	46.04	74.00	-27.96	H	peak
4915.000	40.89	7.22	48.11	74.00	-25.89	H	peak
7400.000	39.75	11.31	51.06	74.00	-22.94	H	peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m) or Peak limit (dBuV/m).*

Operation Mode: TX / IEEE 802.11n HT20 mode / CH Low
Test Date: 2017/2/17
Temperature: 26℃
Tested by: Francis Lee
Humidity: 56%RH
Polarity: Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
1594.000	52.65	-4.82	47.83	74.00	-26.17	V	peak
1998.000	51.54	-1.33	50.21	74.00	-23.79	V	peak
2854.000	49.16	-1.32	47.84	74.00	-26.16	V	peak
4015.000	40.57	3.43	44.00	74.00	-30.00	V	peak
5665.000	39.52	5.93	45.45	74.00	-28.55	V	peak
7615.000	38.93	11.74	50.67	74.00	-23.33	V	peak
1720.000	54.32	-7.45	46.87	74.00	-27.13	H	peak
2122.000	51.01	-3.73	47.28	74.00	-26.72	H	peak
2664.000	49.69	-3.37	46.32	74.00	-27.68	H	peak
4335.000	39.95	7.40	47.35	74.00	-26.65	H	peak
5645.000	38.96	8.70	47.66	74.00	-26.34	H	peak
7300.000	38.89	11.82	50.71	74.00	-23.29	H	peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m) or Peak limit (dBuV/m).*

Operation Mode:	TX / IEEE 802.11n HT20 mode / CH Mid	**Test Date:**	2017/2/17
Temperature:	26℃	**Tested by:**	Francis Lee
Humidity:	56%RH	**Polarity:**	Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
1580.000	52.17	-4.88	47.29	74.00	-26.71	V	peak
1994.000	51.62	-1.39	50.23	74.00	-23.77	V	peak
2828.000	49.43	-1.70	47.73	74.00	-26.27	V	peak
4000.000	41.19	3.49	44.68	74.00	-29.32	V	peak
5880.000	39.73	6.03	45.76	74.00	-28.24	V	peak
7665.000	40.10	11.16	51.26	74.00	-22.74	V	peak
1408.000	51.05	-7.07	43.98	74.00	-30.02	H	peak
2164.000	50.26	-3.64	46.62	74.00	-27.38	H	peak
2830.000	49.69	-2.25	47.44	74.00	-26.56	H	peak
4310.000	40.14	7.59	47.73	74.00	-26.27	H	peak
5910.000	40.04	9.18	49.22	74.00	-24.78	H	peak
7315.000	39.79	11.74	51.53	74.00	-22.47	H	peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m) or Peak limit (dBuV/m).*

Operation Mode: TX / IEEE 802.11n HT20 mode / CH High
Test Date: 2017/2/17
Temperature: 26℃
Tested by: Francis Lee
Humidity: 56%RH
Polarity: Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
1598.000	52.63	-4.80	47.83	74.00	-26.17	V	peak
1994.000	50.97	-1.39	49.58	74.00	-24.42	V	peak
2914.000	49.30	-0.75	48.55	74.00	-25.45	V	peak
3770.000	40.76	3.32	44.08	74.00	-29.92	V	peak
5010.000	38.86	5.23	44.09	74.00	-29.91	V	peak
7505.000	39.30	11.56	50.86	74.00	-23.14	V	peak
1396.000	50.87	-7.00	43.87	74.00	-30.13	H	peak
2182.000	49.65	-3.60	46.05	74.00	-27.95	H	peak
2836.000	49.62	-2.21	47.41	74.00	-26.59	H	peak
4275.000	39.61	7.24	46.85	74.00	-27.15	H	peak
5985.000	39.63	8.89	48.52	74.00	-25.48	H	peak
7330.000	39.19	11.67	50.86	74.00	-23.14	H	peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m) or Peak limit (dBuV/m).*

7.7 POWERLINE CONDUCTED EMISSIONS

LIMIT

According to §15.207(a), except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency Range (MHz)	Limits (dBμV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56*	56 to 46*
0.50 to 5	56	46
5 to 30	60	50

** Decreases with the logarithm of the frequency.*

Test Configuration

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

TEST PROCEDURE

1. The EUT was placed on a table, which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

TEST RESULTS

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

Test Data

Operation Mode:	**normal link**	**Test Date:**	2017/2/27
Temperature:	25℃	**Tested by:**	Francis Lee
Humidity:	57% RH		

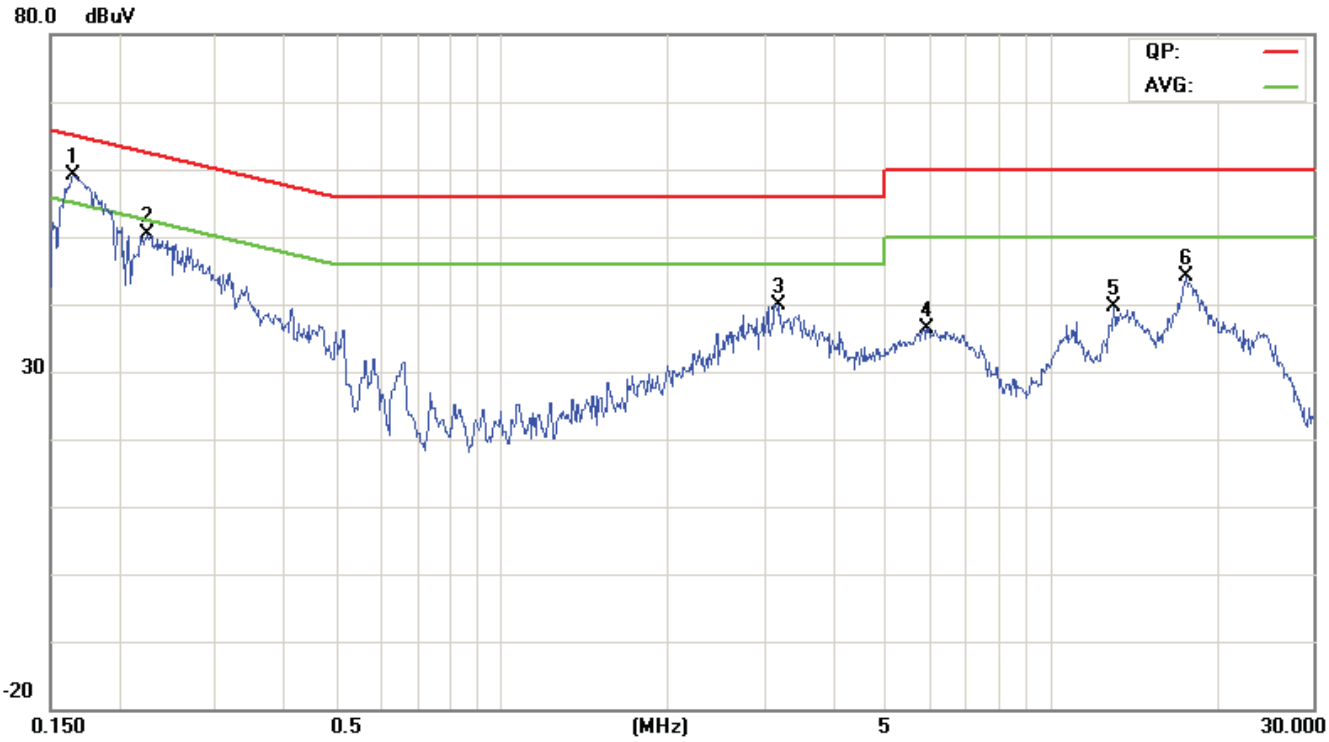
Freq. (MHz)	QP Reading	AV Reading	Corr. factor	QP Result	AV Result	QP Limit	AV Limit	QP Margin	AV Margin	Note
0.1640	45.34	26.88	9.78	55.12	36.66	65.25	55.26	-10.13	-18.60	L1
0.2245	35.99	21.69	9.73	45.72	31.42	62.65	52.65	-16.93	-21.23	L1
3.1966	24.39	18.48	9.83	34.22	28.31	56.00	46.00	-21.78	-17.69	L1
5.9343	20.95	15.55	9.91	30.86	25.46	60.00	50.00	-29.14	-24.54	L1
12.9590	23.06	17.68	10.01	33.07	27.69	60.00	50.00	-26.93	-22.31	L1
17.5611	29.06	23.73	10.06	39.12	33.79	60.00	50.00	-20.88	-16.21	L1
0.1570	43.05	26.12	9.76	52.81	35.88	65.62	55.62	-12.81	-19.74	L2
0.2065	29.05	8.34	9.72	38.77	18.06	63.34	53.34	-24.57	-35.28	L2
3.4520	21.08	15.59	9.82	30.90	25.41	56.00	46.00	-25.10	-20.59	L2
7.0884	19.93	14.42	9.94	29.87	24.36	60.00	50.00	-30.13	-25.64	L2
13.9558	19.97	14.70	10.05	30.02	24.75	60.00	50.00	-29.98	-25.25	L2
21.5275	21.18	15.89	10.17	31.35	26.06	60.00	50.00	-28.65	-23.94	L2

Remark:

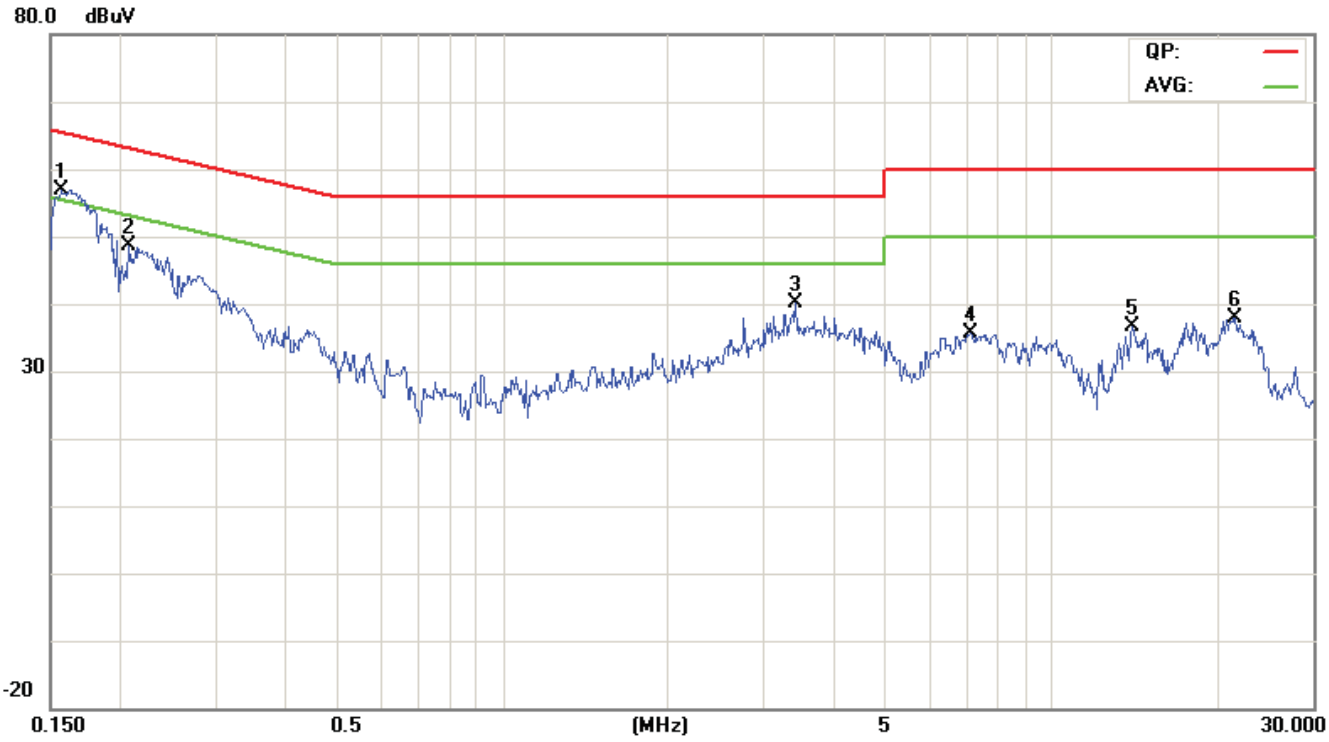
1. *Measuring frequencies from 0.15 MHz to 30MHz.*
2. *The emissions measured in frequency range from 0.15 MHz to 30MHz were made with an instrument using Quasi-peak detector and average detector.*
3. *The IF bandwidth of SPA between 0.15MHz to 30MHz was 10kHz; the IF bandwidth of Test Receiver between 0.15MHz to 30MHz was 9kHz;*
4. *L1 = Line One (Live Line) / L2 = Line Two (Neutral Line)*

Test Plots

Conducted emissions (Line 1)



Conducted emissions (Line 2)



8 APPENDIX I
PHOTOGRAPHS OF TEST SETUP

Radiated Emissions Setup Photos
Below 1GHz

Above 1GHz

Conducted Emissions Setup Photo

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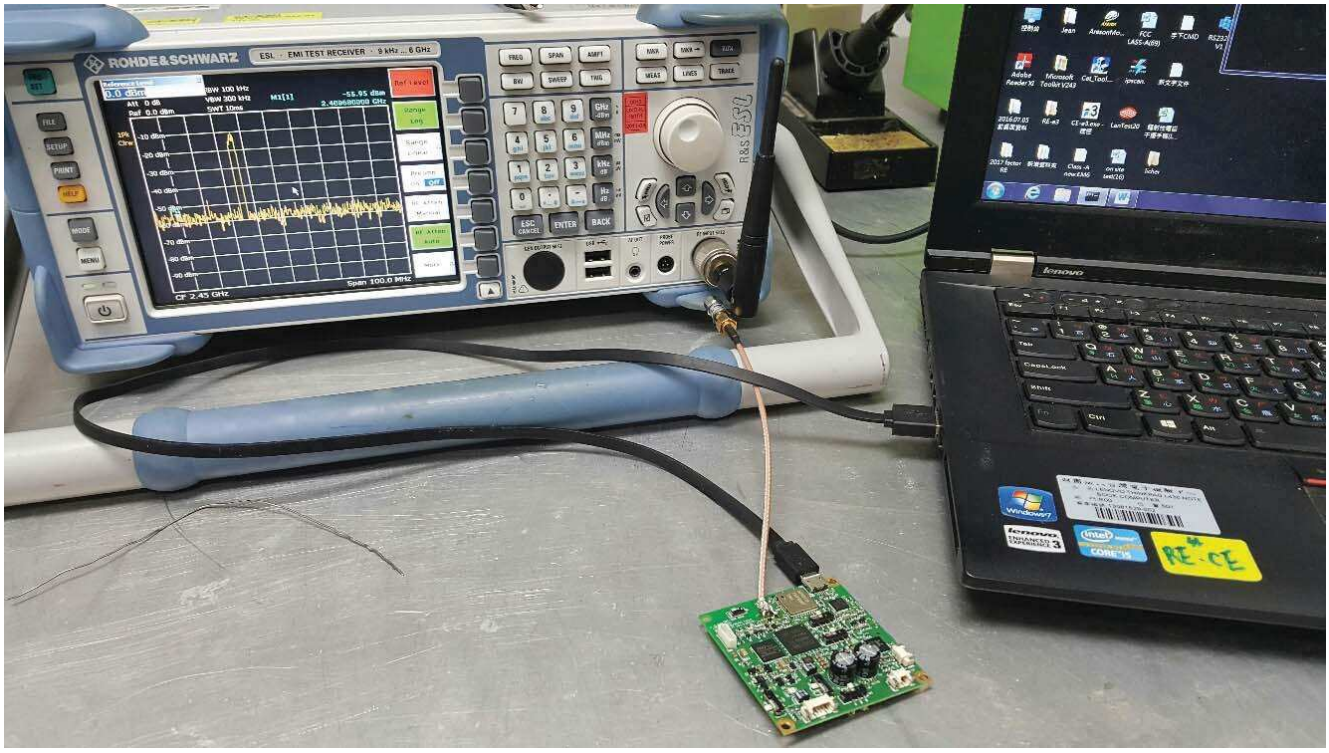
9 APPENDIX II: PHOTOGRAPHS OF EUT Refer to 16-10-RBF-044-07 External Photographs.



9 APPENDIX II: PHOTOGRAPHS OF EUT Refer to 16-10-RBF-044-07 External Photographs.