



Compliance Certification Services (Kunshan) Inc.

Report No.: KSCR220100014201

Page: 1 of 84

TEST REPORT

Application No.: KSCR2201000142AT
FCC ID: 2ADTD-7608L1W
IC: 20199-7608L1W
Applicant: Hangzhou Hikvision Digital Technology Co., Ltd.
Address of Applicant: No.555 Qianmo Road, Binjiang District, Hangzhou 310052, China
Manufacturer: Hangzhou Hikvision Digital Technology Co., Ltd.
Address of Manufacturer: No.555 Qianmo Road, Binjiang District, Hangzhou 310052, China
Factory: 1. Hangzhou Hikvision Technology Co., Ltd.
 2. Hangzhou Hikvision Electronics Co., Ltd.
 3. Hangzhou Hikvision Digital Technology Co., Ltd.
 4. Chongqing Hikvision technology Co., LTD
Address of Factory: 1. No.700, Dongliu Road, Binjiang District, Hangzhou City, Zhejiang, 310052, China;
 2. No.299, Qiushi Road, Tonglu Economic Development Zone, Tonglu County, Hangzhou, Zhejiang, 310052, China
 3. No.555 Qianmo Road, Binjiang District, Hangzhou 310052, China
 4. NO.118, Haikang Road, Area C, Jianqiao Industrial Park, Dadukou District, Chongqing, 401325, China.
Equipment Under Test (EUT):
EUT Name: Network Video Recorder
Model No.: DS-7604NI-L1/W, DS-7604NI-L1/WUHK, DS-7604NI-L1/WCKV, DS-7604NI-L1/WUVS, DS-7604NI-L1/WKVO, DS-7604NI-L1/WHUN, DS-7608NI-L1/W, DS-7608NI-L1/WUHK, DS-7608NI-L1/WCKV, DS-7608NI-L1/WUVS, DS-7608NI-L1/WKVO, DS-7608NI-L1/WHUN
 * Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.
Standard(s) : 47 CFR Part 15, Subpart C 15.247
 RSS-247 Issue 2, February 2017
 RSS-Gen Issue 5 Amendment 2 (February 2021)
Date of Receipt: 2022-02-15
Date of Test: 2022-02-17 to 2022-02-21
Date of Issue: 2022-02-23

Test Result:	Pass*
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* In the configuration tested, the EUT complied with the standards specified above.

Eric Lin
EMC Laboratory Manager



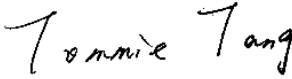
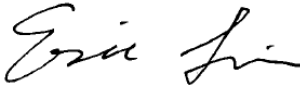
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Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2022-02-23		Original

Authorized for issue by:			
			
		<u>Tommie_Tang/Project Engineer</u>	
			
		<u>Eric Lin/Reviewer</u>	



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For IC Model No.: DS-7604NI-L1/W, DS-7608NI-L1/W



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2 Test Summary

Radio Spectrum Technical Requirement				
Item	FCC Requirement	IC Requirement	Method	Result
Antenna Requirement	47 CFR Part 15, Subpart C 15.203 & 15.247(c)	RSS-Gen Clause 6.8	N/A	Customer Declaration

N/A: Not applicable

Radio Spectrum Matter Part				
Item	FCC Requirement	IC Requirement	Method	Result
Conducted Emissions at AC Power Line (150kHz-30MHz)	47 CFR Part 15, Subpart C 15.207	RSS-Gen Clause 8.8	ANSI C63.10 (2013) Section 6.2	Pass
Minimum 6dB Bandwidth	47 CFR Part 15, Subpart C 15.247a(2)	RSS-247 Clause 5.2(a)	ANSI C63.10 (2013) Section 11.8.1	Pass
Conducted Average Output Power	47 CFR Part 15, Subpart C 15.247(b)(3)	RSS-247 Clause 5.4(d)	ANSI C63.10 (2013) Section 11.9.2	Pass
Power Spectrum Density	47 CFR Part 15, Subpart C 15.247(e)	RSS-247 Clause 5.2(b)	ANSI C63.10 (2013) Section 11.10.2	Pass
Conducted Band Edges Measurement	47 CFR Part 15, Subpart C 15.247(d)	RSS-247 Clause 5.5	ANSI C63.10 (2013) Section 11.13.3.2	Pass
Conducted Spurious Emissions	47 CFR Part 15, Subpart C 15.247(d)	RSS-247 Clause 5.5	ANSI C63.10 (2013) Section 11.11	Pass
Radiated Emissions which fall in the restricted bands	47 CFR Part 15, Subpart C 15.209 & 15.247(d)	RSS-247 Section 3.3 & RSS-Gen Section 8.9	ANSI C63.10 (2013) Section 6.10.5	Pass
Radiated Spurious Emissions	47 CFR Part 15, Subpart C 15.209 & 15.247(d)	RSS-247 Section 3.3 & RSS-Gen Section 8.9	ANSI C63.10 (2013) Section 6.4,6.5,6.6	Pass
99% Bandwidth	-	RSS-Gen Section 6.7	ANSI C63.10 Section 6.9.3	Pass

Note: There are series models mentioned in this report, and they are the similar in electrical and electronic characters. Only the model DS-7608NI-L1/W was tested since their differences were the model number and appearance.



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4 General Information

4.1 Details of E.U.T.

Power supply:	DC 12V by adapter
Cable(s):	Ethernet cable *1 Wired mouse *1
Operation Frequency:	802.11b/g/n(HT20): 2412MHz to 2462MHz;802.11n(HT40): 2422MHz to 2452MHz
Modulation Type:	802.11b: DSSS (CCK, DQPSK, DBPSK);802.11g/n: OFDM (64QAM, 16QAM, QPSK, BPSK)
Number of Channels:	802.11b/g/n(HT20):11;802.11n(HT40):7
Channel Spacing:	5MHz
Antenna Type:	Antenna 1:Dipole Antenna Antenna 2:Dipole Antenna
Antenna Gain:	Antenna 1:4.96dBi (Provided by manufacturer) Antenna 2:4.96dBi (Provided by manufacturer) Directional gain:7.97dBi
Serial Number:	DS-7608NI-L1/W0820211207CCRRJ12873588WVU
Firmware Version:	V4.32.110build 211228

4.2 Power level setting using in test:

Channel	802.11b		802.11g		802.11n(HT20)	
	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2
1	30	30	32	32	22	22
6	30	30	32	32	22	22
11	30	30	32	32	22	22
Channel	802.11n(HT40)					
	Ant 1	Ant 2				
3	22	22				
6	22	22				
9	22	22				

4.3 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
Laptop	Lenovo	ThinkPad X100e	/
SecureCRT	VanDyke	V 6.2.0	/
Serial port adapter plate	/	Test Plate 3	/



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Adapter	SHENZHEN HONOR ELECTRONIC CO., LTD.	ADS-12AM-12 12012EPCU	/
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4.4 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	8.4×10^{-8}
2	Timeout	2s
3	Duty Cycle	0.37%
4	Occupied Bandwidth	3%
5	RF Conducted Power	0.6dB
6	RF Power Density	2.9dB
7	Conducted Spurious Emissions	0.75dB
8	RF Radiated Power	5.2dB (Below 1GHz)
		5.9dB (Above 1GHz)
9	Radiated Spurious Emission Test	4.2dB (Below 30MHz)
		4.5dB (30MHz-1GHz)
		5.1dB (1GHz-18GHz)
		5.4dB (Above 18GHz)
10	Temperature Test	1°C
11	Humidity Test	3%
12	Supply Voltages	1.5%
13	Time	3%

Note: The measurement uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.



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4.5 Test Location

All tests were performed at:

Compliance Certification Services (Kunshan) Inc.

No.10 Weiye Rd, Innovation park, Eco&Tec, Development Zone, Kunshan City, Jiangsu, China.

Tel: +86 512 5735 5888 Fax: +86 512 5737 0818

No tests were sub-contracted.

4.6 Test Facility

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

- **CNAS (No. CNAS L4354)**

CNAS has accredited Compliance Certification Services (Kunshan) Inc. to ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- **A2LA (Certificate No. 2541.01)**

Compliance Certification Services (Kunshan) Inc. is accredited by the American Association for Laboratory Accreditation (A2LA). Certificate No. 2541.01.

- **FCC (Designation Number: CN1172)**

Compliance Certification Services (Kunshan) Inc. has been recognized as an accredited testing laboratory.

Designation Number: CN1172.

- **ISED (CAB identifier: CN0072)**

Compliance Certification Services (Kunshan) Inc. has been recognized by Innovation, Science and Economic Development Canada (ISED) as an accredited testing laboratory.

Company Number: 2324E

- **VCCI (Member No.: 1938)**

The 3m and 10m Semi-anechoic chamber and Shielded Room of Compliance Certification Services (Kunshan) Inc. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-20134, R-11600, C-11707, T-11499, G-10216 respectively.

4.7 Deviation from Standards

None

4.8 Abnormalities from Standard Conditions

None



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5 Equipment List

Item	Equipment	Manufacturer	Model	Serial Number	Cal Date	Cal. Due Date
Conducted Emission at Mains Terminals (150kHz-30MHz)						
1	EMI Test Receive	R&S	ESCI	100781	01/22/2022	01/21/2023
2	LISN	R&S	ENV216	101604	10/12/2021	10/11/2022
3	LISN	Schwarzbeck	NNLK 8129	8129-143	10/12/2021	10/11/2022
4	Pulse Limiter	R&S	ESH3-Z2	100609	01/22/2022	01/21/2023
5	CE test Cable	Thermax	/	14	10/16/2021	10/15/2022
6	Test Software	Faratronic	EZ-EMC	CCS-03A1	N.C.R	N.C.R
RF Conducted Test						
1	Spectrum Analyzer	Agilent	E4446A	MY44020154	04/16/2021	04/15/2022
2	Spectrum Analyzer	Keysight	N9020A	MY55370209	10/11/2021	10/10/2022
4	Signal Generator	Agilent	N5182A	MY50142015	08/27/2021	08/26/2022
5	Spectrum Analyzer	Keysight	N9030B	MY61330164	01/22/2022	01/21/2023
6	Vector Signal Generator	R&S	SMW200A	110074	10/12/2021	10/11/2022
7	Radio Communication Test Station	Anritsu	MT8000A	6262012849	09/23/2021	09/22/2022
8	Radio Communication Analyzer	Anritsu	MT8821C	6201692222	09/23/2021	09/22/2022
9	Universal Radio Communication Tester	R&S	CMW500	159275	10/12/2021	10/11/2022
10	Universal Radio Communication Tester	R&S	CMW500	167239	04/16/2021	04/15/2022
11	Power Meter	Anritsu	ML2495A	1445010	04/15/2021	04/14/2022
12	Switcher	CCSRF	FY562	KUS2001M001-3	10/12/2021	10/11/2022
13	AC Power Source	EXTECH	6605	1570106	N.C.R	N.C.R
14	DC Power Supply	Aglient	E3632A	MY50340053	N.C.R	N.C.R
15	6dB Attenuator	Mini-Circuits	NAT-6-2W	15542-1	N.C.R	N.C.R
16	Power Divider	AISI	IOWOPE2068	PE2068	N.C.R	N.C.R
17	Filter	MICRO-TRONICS	BRM50701	5	N.C.R	N.C.R
18	Conducted Test Cable	/	RF01-RF04	/	04/15/2021	04/14/2022
19	Software	BST	TST-PASS	N/A	N/A	N/A
20	Temp. / Humidity Chamber	TERCHY	MHK-120AK	X30109	04/15/2021	04/14/2022
21	Thermometer	Anymetre	TH603	CCS007	10/14/2021	10/13/2022
RF Radiated Test						
1	Spectrum Analyzer	R&S	FSV40	101493	10/11/2021	10/10/2022
2	Signal Generator	Agilent	E8257C	MY43321570	10/18/2021	10/17/2022
3	Loop Antenna	Schwarzbeck	HXYZ9170	9170-108	02/22/2021	02/21/2022
4	Bilog Antenna	TESEQ	CBL 6112D	35403	06/21/2021	06/20/2023
5	Bilog Antenna	SCHWARZBECK	VULB9160	9160-3342	04/13/2021	04/12/2023
6	Horn-antenna(1-18GHz)	Schwarzbeck	BBHA9120D	267	10/26/2020	10/25/2022
7	Horn-antenna(1-18GHz)	ETS-LINDGREN	3117	00143290	02/22/2021	02/21/2023
8	Horn Antenna(18-40GHz)	Schwarzbeck	BBHA9170	BBHA9170171	02/22/2021	02/21/2022
9	Pre-Amplifier(30MHz~18GHz)	LNA	/	/	04/15/2021	04/14/2022
10	Amplifier(18~40GHz)	COM-POWER	PAM-840A	461332	10/18/2021	10/17/2022
11	Low Pass Filter	MICRO-TRONICS	VLFX-950	RV142900829	N.C.R	N.C.R
12	High Pass Filter	Mini-Circuits	VHF-1200	15542	N.C.R	N.C.R
13	Filter (5450MHz~5770 MHz)	MICRO-TRONICS	BRC50704-01	2	N.C.R	N.C.R



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14	Filter (5690 MHz~5930 MHz)	MICRO-TRONICS	BRC50705-01	4	N.C.R	N.C.R
15	Filter (5150 MHz~5350 MHz)	MICRO-TRONICS	BRC50703-01	2	N.C.R	N.C.R
16	Filter (885 MHz~915 MHz)	MICRO-TRONICS	BRM14698	1	N.C.R	N.C.R
17	Filter (815 MHz~860 MHz)	MICRO-TRONICS	BRM14697	1	N.C.R	N.C.R
18	Filter (1745 MHz~1910 MHz)	MICRO-TRONICS	BRM14700	1	N.C.R	N.C.R
19	Filter (1922 MHz~1977 MHz)	MICRO-TRONICS	BRM50715	1	N.C.R	N.C.R
20	Filter (2550 MHz)	MICRO-TRONICS	HPM13362	5	N.C.R	N.C.R
21	Filter (1532 MHz~1845 MHz)	MICRO-TRONICS	BRM50713	1	N.C.R	N.C.R
22	Filter (2.4GHz)	MICRO-TRONICS	BRM50701	5	N.C.R	N.C.R
23	RE test cable	/	RE01-RE04	/	04/15/2021	04/14/2022
24	Software	Faratronic	EZ_EMG	N/A	N/A	N/A



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6 Radio Spectrum Technical Requirement

6.1 Antenna Requirement

6.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.203 & 15.247(b)(4)

6.1.2 Conclusion

Standard Requirement:

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, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

15.247(b) (4) requirement:

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.

EUT Antenna:

The antenna 1 and antenna 2 are Dipole antennas, and no consideration of replacement. The best case gain of the antenna 1 is 4.96dBi and antenna 2 is 4.96dBi.

Antenna location: Refer to internal photo.



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7 Radio Spectrum Matter Test Results

7.1 Conducted Average Output Power

Test Requirement 47 CFR Part 15, Subpart C 15.247(b)(3)

Test Method: ANSI C63.10 (2013) Section 11.9.2

Limit:

Frequency range(MHz)	Output power of the intentional radiator(watt)
902-928	1 for ≥ 50 hopping channels
	0.25 for $25 \leq$ hopping channels < 50
	1 for digital modulation
2400-2483.5	1 for ≥ 75 non-overlapping hopping channels
	0.125 for all other frequency hopping systems
	1 for digital modulation
5725-5850	1 for frequency hopping systems and digital modulation
Remark:	The EUT 802.11n mode supports 2 * 2 MIMO transmission. The Gain of each antenna is 4.96dBi and 4.96dBi, and the directional antenna gain is 7.97dBi. Therefore, the power limit should be reduced from the part exceeding 6, 2400-2483.5: 28.03dBm

7.1.1 E.U.T. Operation

Operating Environment:

Temperature: 19.7 °C Humidity: 26.4 % RH Atmospheric Pressure: 1010 mbar

7.1.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40). Only the data of worst case is recorded in the report.

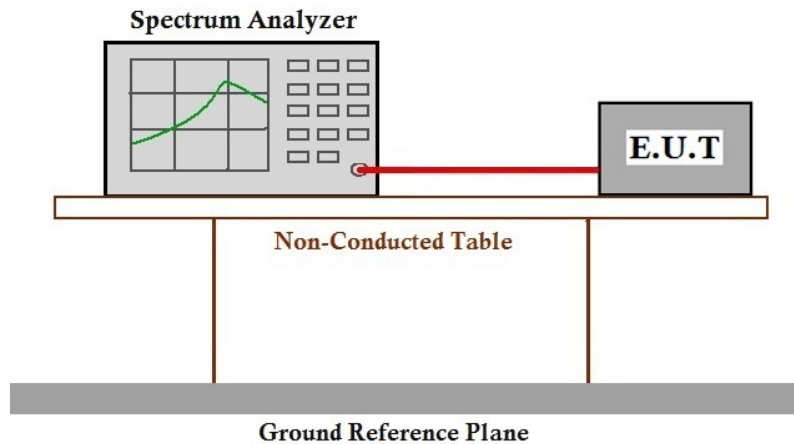


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7.1.3 Test Setup Diagram



7.1.4 Measurement Procedure and Data

Please Refer to Appendix A for KSCR220100014201



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7.2 Minimum 6dB Bandwidth

Test Requirement 47 CFR Part 15, Subpart C 15.247a(2)

Test Method: ANSI C63.10 (2013) Section 11.8.1

Limit:

≥500 kHz

7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 19.7 °C

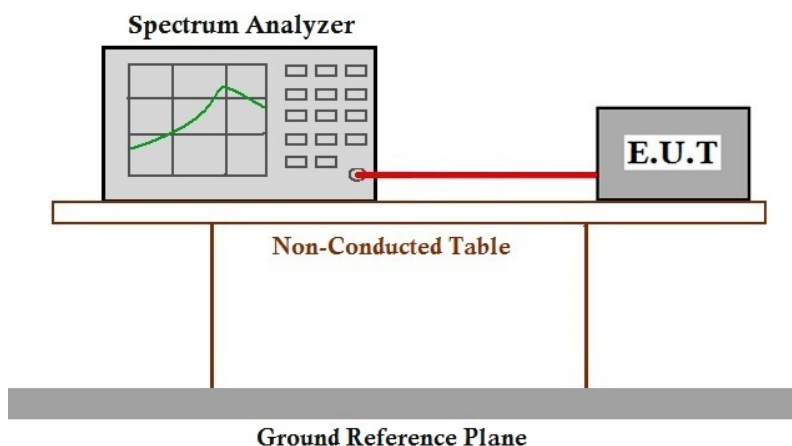
Humidity: 26.4 % RH

Atmospheric Pressure: 1010 mbar

7.2.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40). Only the data of worst case is recorded in the report.

7.2.3 Test Setup Diagram



7.2.4 Measurement Procedure and Data

Please Refer to Appendix A for KSCR220100014201



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7.3 Power Spectrum Density

Test Requirement 47 CFR Part 15, Subpart C 15.247(e)

Test Method: ANSI C63.10 (2013) Section 11.10.2

Limit:

≤8dBm in any 3 kHz band during any time interval of continuous transmission

Remark: The EUT 802.11n mode supports 2 * 2 MIMO transmission. The Gain of each antenna is 4.96dBi and 4.96dBi, and the directional antenna gain is 7.97dBi. Therefore, the power limit should be reduced from the part exceeding 6, 2400-2483.5: 6.03dBm/3kHz

7.3.1 E.U.T. Operation

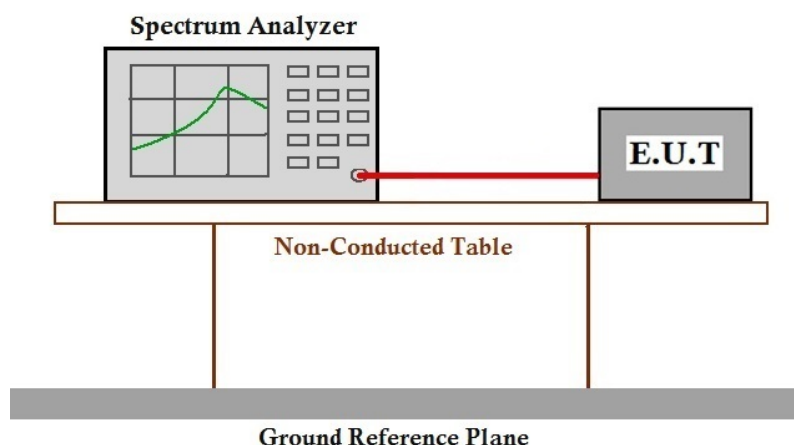
Operating Environment:

Temperature: 18.8 °C Humidity: 29.5 % RH Atmospheric Pressure: 1010 mbar

7.3.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40). Only the data of worst case is recorded in the report.

7.3.3 Test Setup Diagram



7.3.4 Measurement Procedure and Data

Please Refer to Appendix A for KSCR220100014201



7.4 Conducted Band Edges Measurement

Test Requirement 47 CFR Part 15, Subpart C 15.247(d)
 Test Method: ANSI C63.10 (2013) Section 11.13.3.2

Limit:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. 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 §15.205(c)).

7.4.1 E.U.T. Operation

Operating Environment:

Temperature: 19.7 °C Humidity: 26.4 % RH Atmospheric Pressure: 1010 mbar

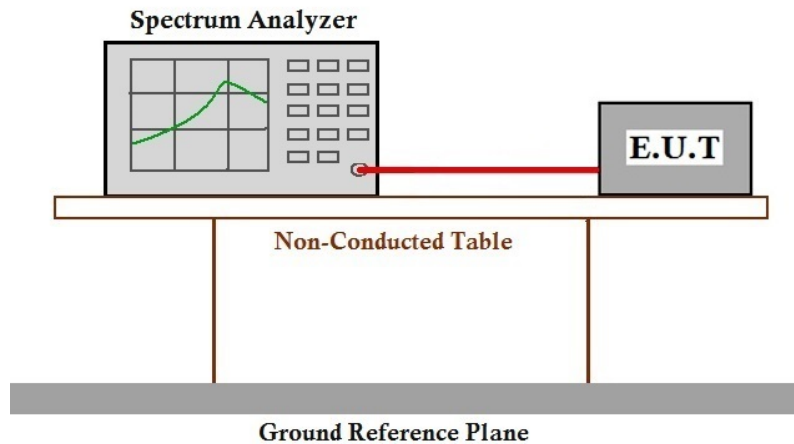
7.4.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40). Only the data of worst case is recorded in the report.



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7.4.3 Test Setup Diagram



7.4.4 Measurement Procedure and Data

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7.5 Conducted Spurious Emissions

Test Requirement 47 CFR Part 15, Subpart C 15.247(d)

Test Method: ANSI C63.10 (2013) Section 11.11

Limit:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. 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 §15.205(c)).

7.5.1 E.U.T. Operation

Operating Environment:

Temperature: 19.7 °C Humidity: 26.4 % RH Atmospheric Pressure: 1010 mbar

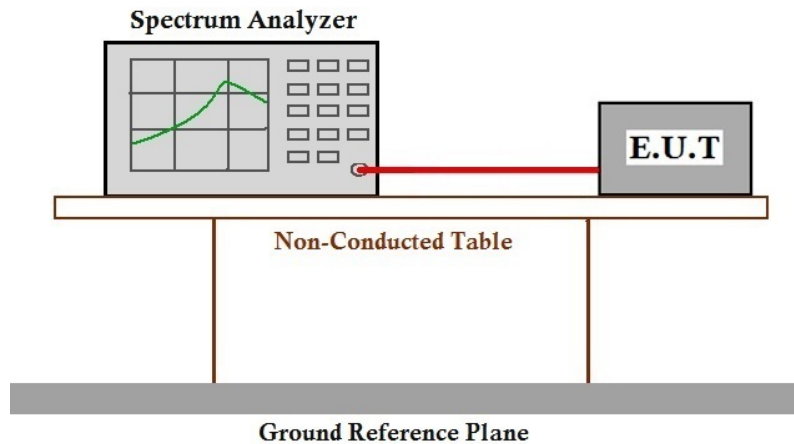
7.5.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40). Only the data of worst case is recorded in the report.



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7.5.3 Test Setup Diagram



7.5.4 Measurement Procedure and Data

Please Refer to Appendix A for KSCR220100014201



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7.6 Radiated Emissions which fall in the restricted bands

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209

Test Method: ANSI C63.10 (2013) Section 6.10.5

Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

7.6.1 E.U.T. Operation

Operating Environment:

Temperature: 16.2 °C

Humidity: 35.7 % RH

Atmospheric Pressure: 1010 mbar

7.6.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40). Only the data of worst case is recorded in the report.



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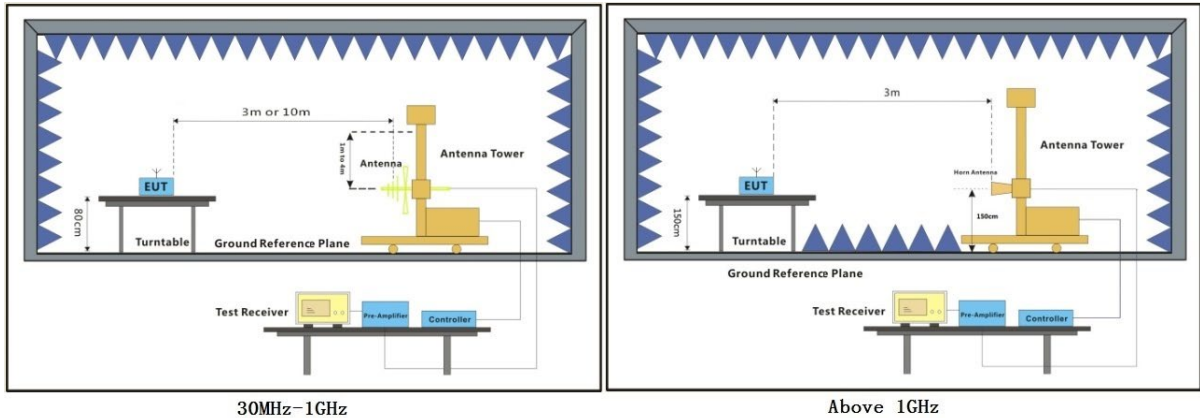
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7.6.3 Test Setup Diagram



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7.6.4 Measurement Procedure and Data

- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
- h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- j. Repeat above procedures until all frequencies measured was complete.

Remark 1: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

Remark 2: For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.

Remark 3: This test item was investigated while operating in SISO and MIMO mode, however, it was determined that SISO antenna 1 operation for b/g modulation and MIMO antenna operation for n modulation produced the worst emissions. So the emissions produced from other operation are not recorded in report.

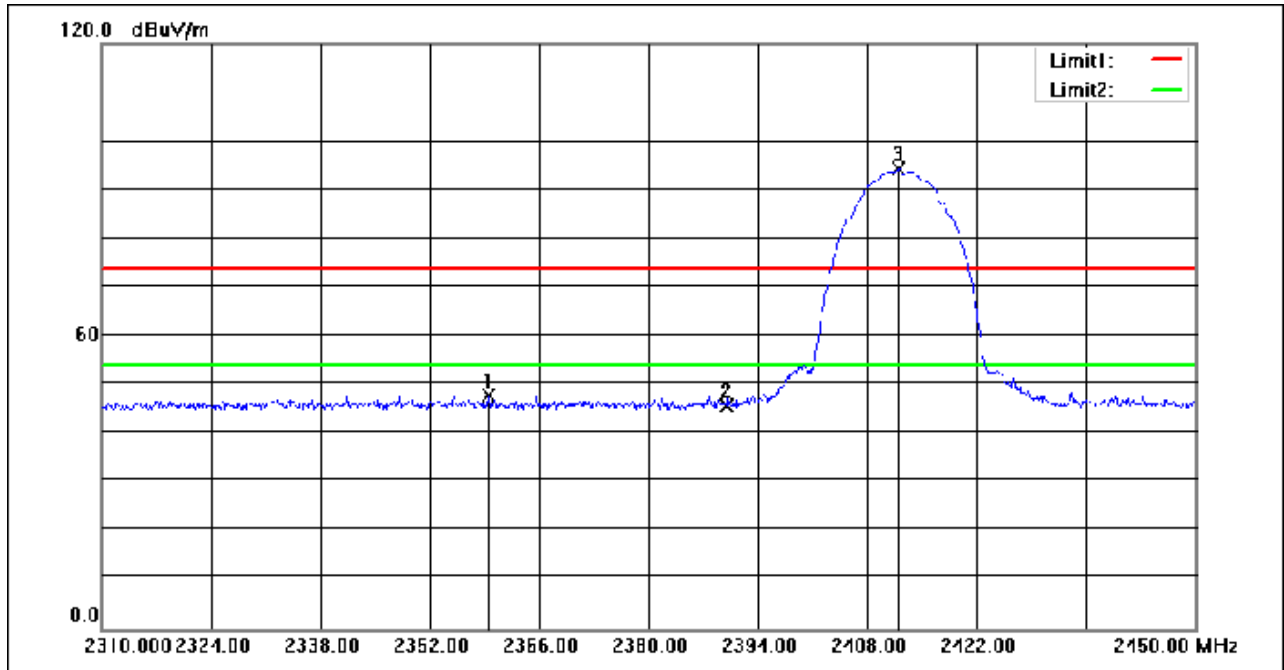


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No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2359.560	62.03	-14.10	47.93	74.00	-26.07	peak
2	2390.000	59.67	-14.01	45.66	74.00	-28.34	peak
3	2412.060	108.33	-13.94	94.39	74.00	20.39	peak



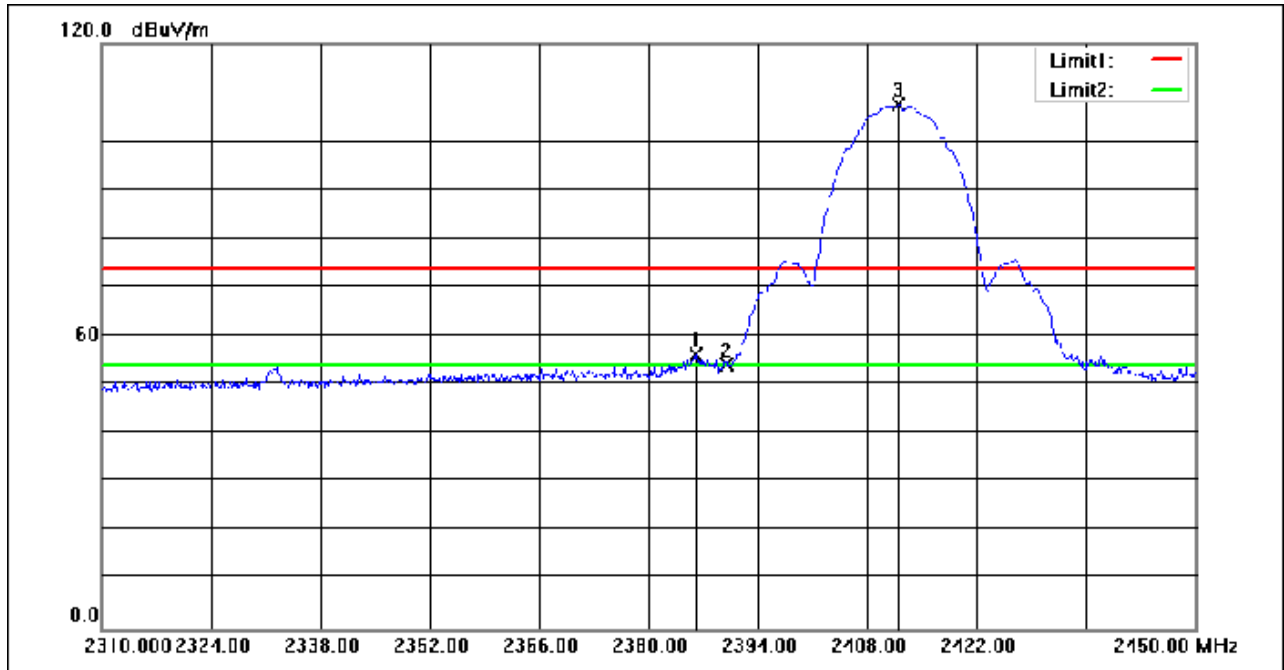
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No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2386.020	70.25	-14.02	56.23	74.00	-17.77	peak
2	2390.000	68.03	-14.01	54.02	74.00	-19.98	peak
3	2412.060	121.46	-13.94	107.52	74.00	33.52	peak



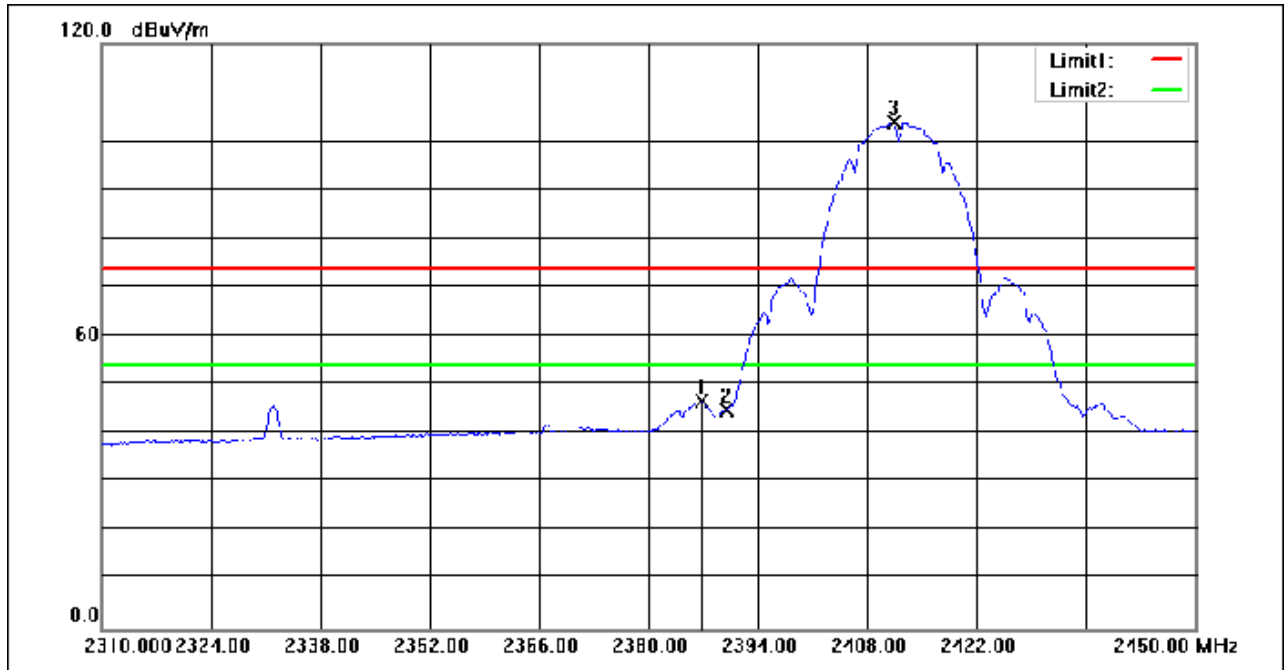
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No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2386.720	60.53	-14.02	46.51	54.00	-7.49	AVG
2	2390.000	59.00	-14.01	44.99	54.00	-9.01	AVG
3	2411.360	117.94	-13.94	104.00	54.00	50.00	AVG



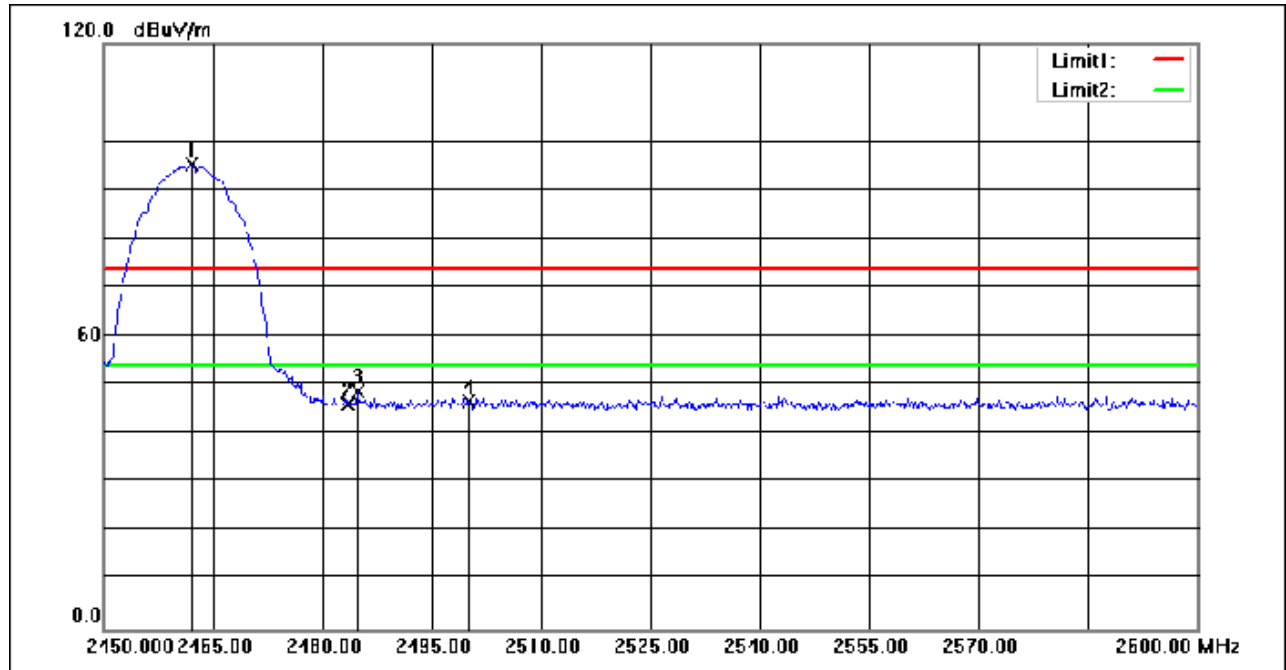
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Test Mode: 00; Polarity: Horizontal; Modulation: 802.11b; Bandwidth: 20MHz; Channel: High



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2462.000	109.03	-13.78	95.25	74.00	21.25	peak
2	2483.500	59.89	-13.71	46.18	74.00	-27.82	peak
3	2484.800	62.33	-13.70	48.63	74.00	-25.37	peak
4	2500.000	60.16	-13.64	46.52	74.00	-27.48	peak



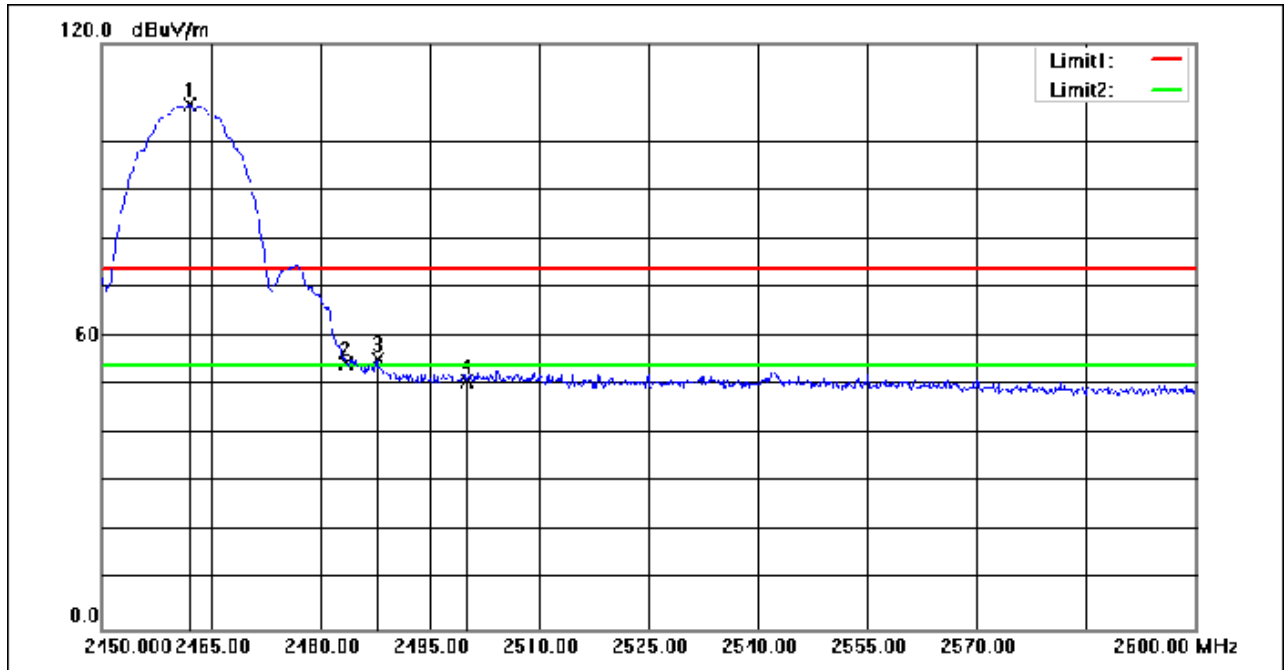
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Test Mode: 00; Polarity: Vertical; Modulation: 802.11b; Bandwidth: 20MHz; Channel: High



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2462.000	121.29	-13.78	107.51	74.00	33.51	peak
2	2483.500	68.19	-13.71	54.48	74.00	-19.52	peak
3	2487.800	68.92	-13.69	55.23	74.00	-18.77	peak
4	2500.000	64.64	-13.64	51.00	74.00	-23.00	peak



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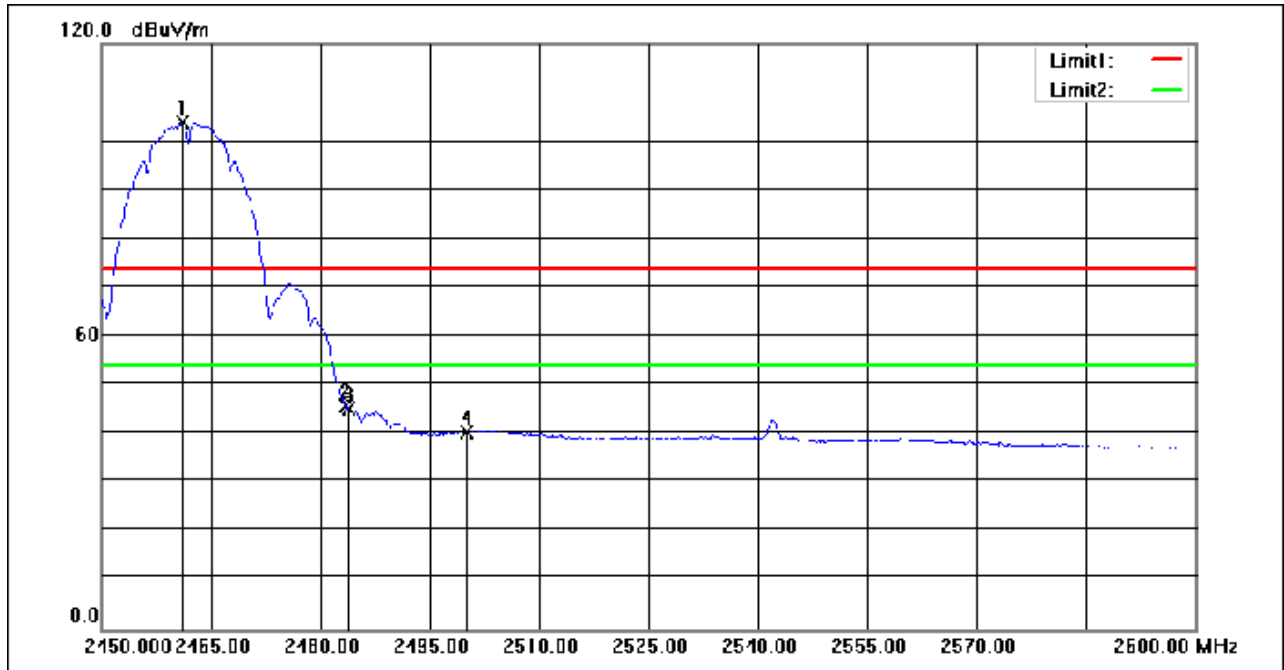
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No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2461.100	117.72	-13.78	103.94	54.00	49.94	AVG
2	2483.500	59.41	-13.71	45.70	54.00	-8.30	AVG
3	2483.900	58.97	-13.70	45.27	54.00	-8.73	AVG
4	2500.000	53.95	-13.64	40.31	54.00	-13.69	AVG



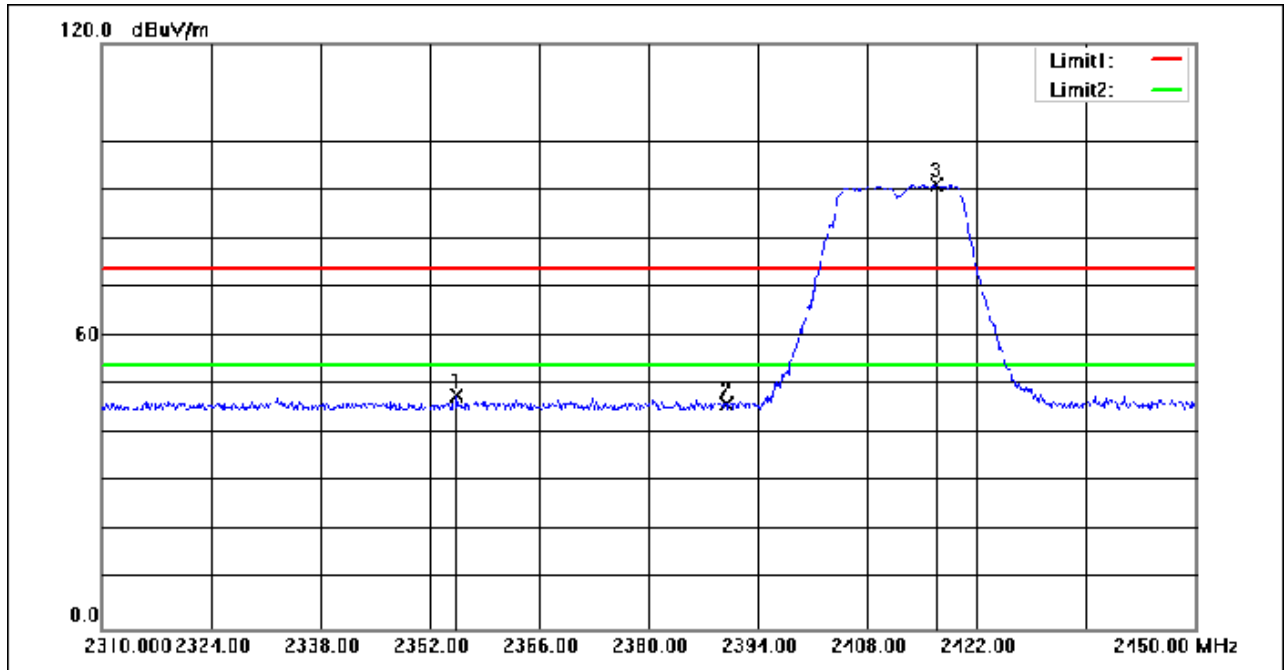
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Test Mode: 00; Polarity: Horizontal; Modulation: 802.11g; Bandwidth: 20MHz; Channel: Low



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2355.500	61.83	-14.12	47.71	74.00	-26.29	peak
2	2390.000	60.07	-14.01	46.06	74.00	-27.94	peak
3	2416.820	105.04	-13.93	91.11	74.00	17.11	peak



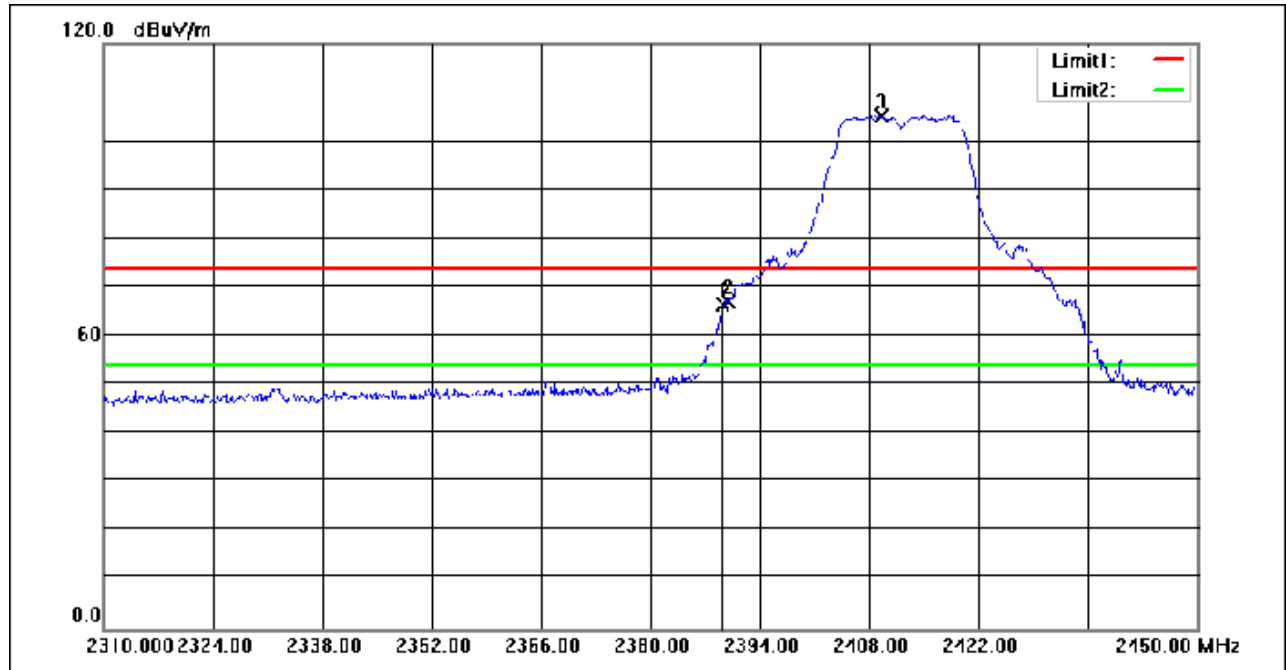
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Test Mode: 00; Polarity: Vertical; Modulation:802.11g; Bandwidth:20MHz; Channel:Low



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2389.240	80.58	-14.01	66.57	74.00	-7.43	peak
2	2390.000	81.09	-14.01	67.08	74.00	-6.92	peak
3	2409.540	119.21	-13.95	105.26	74.00	31.26	peak



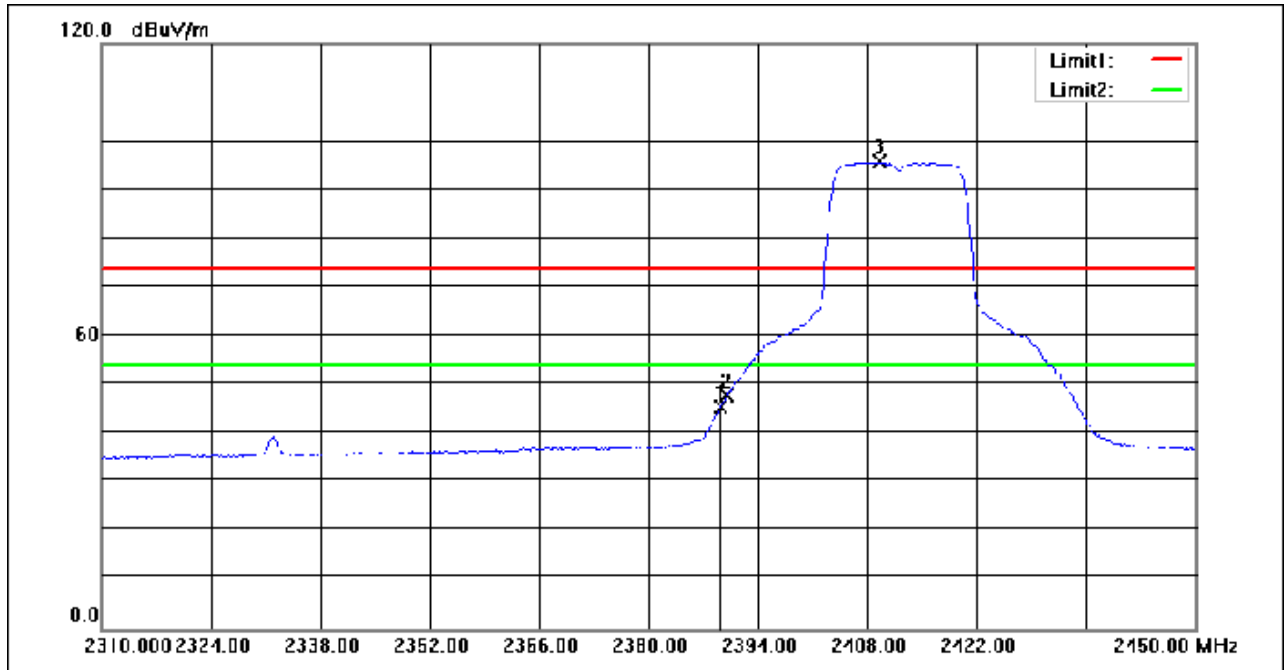
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Test Mode: 00; Polarity: Vertical; Modulation: 802.11g; Bandwidth: 20MHz; Channel: Low



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2389.240	59.60	-14.01	45.59	54.00	-8.41	AVG
2	2390.000	61.90	-14.01	47.89	54.00	-6.11	AVG
3	2409.540	109.66	-13.95	95.71	54.00	41.71	AVG



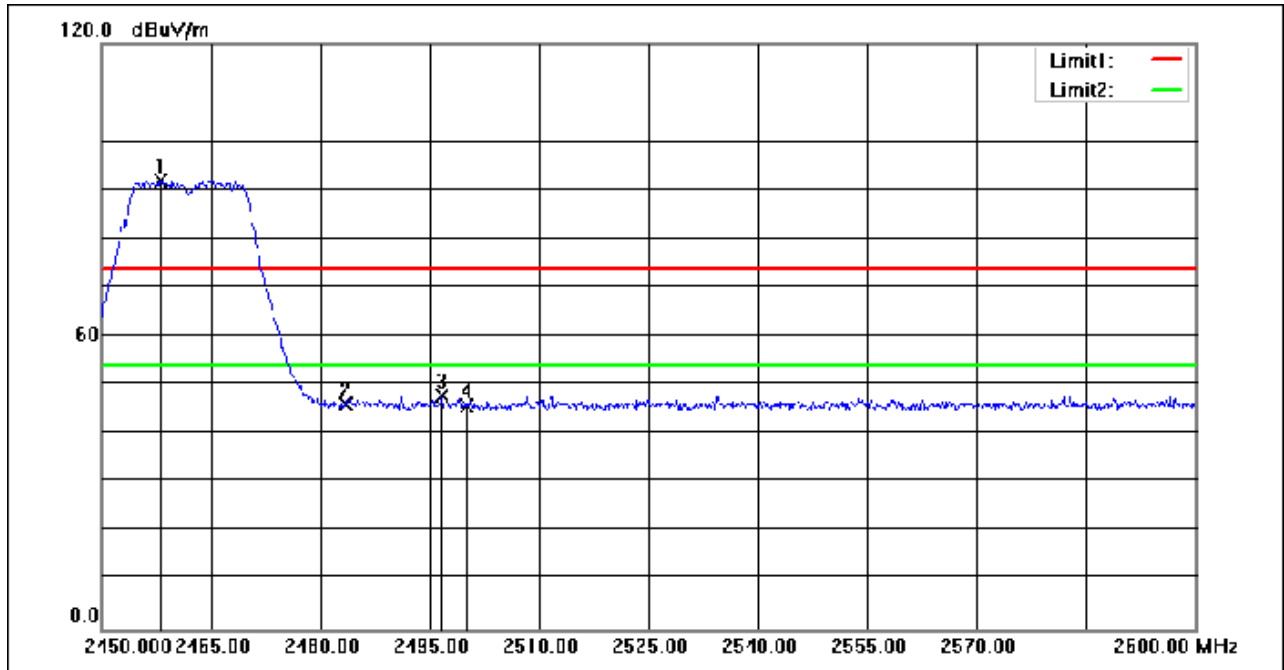
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Test Mode: 00; Polarity: Horizontal; Modulation: 802.11g; Bandwidth: 20MHz; Channel: High



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2458.100	105.73	-13.79	91.94	74.00	17.94	peak
2	2483.500	59.62	-13.71	45.91	74.00	-28.09	peak
3	2496.650	61.46	-13.66	47.80	74.00	-26.20	peak
4	2500.000	59.53	-13.64	45.89	74.00	-28.11	peak



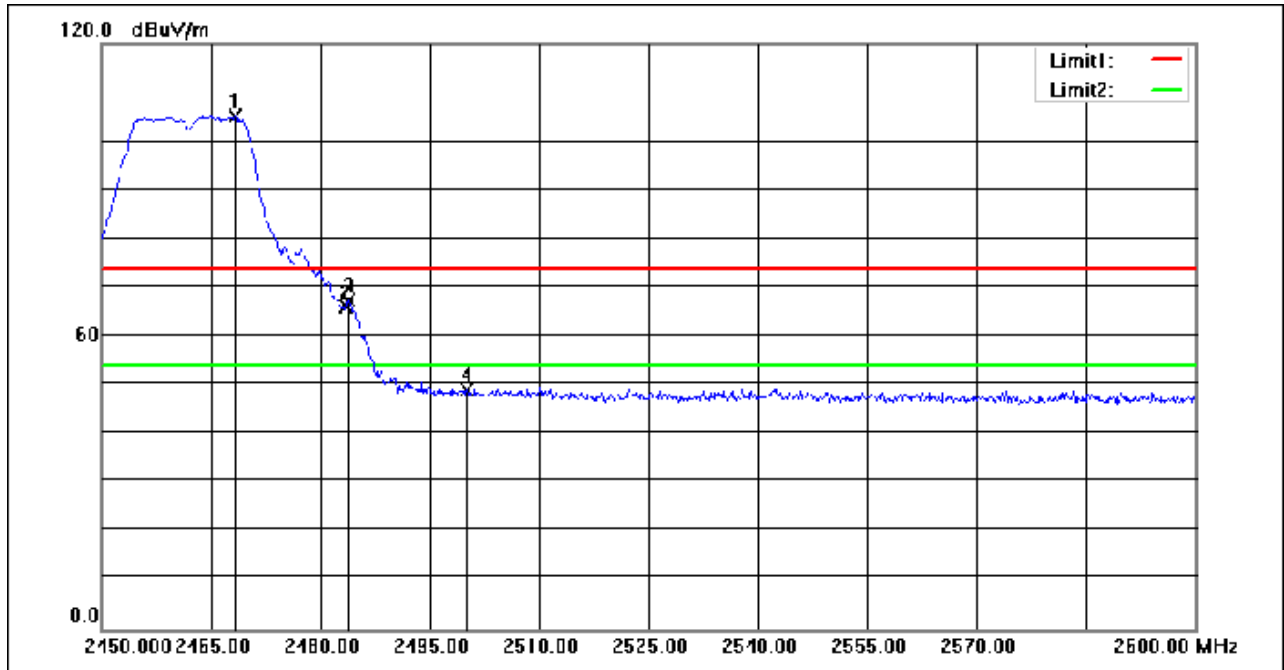
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Test Mode: 00; Polarity: Vertical; Modulation: 802.11g; Bandwidth: 20MHz; Channel: High



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2468.300	118.97	-13.75	105.22	74.00	31.22	peak
2	2483.500	79.99	-13.71	66.28	74.00	-7.72	peak
3	2483.900	80.90	-13.70	67.20	74.00	-6.80	peak
4	2500.000	62.62	-13.64	48.98	74.00	-25.02	peak



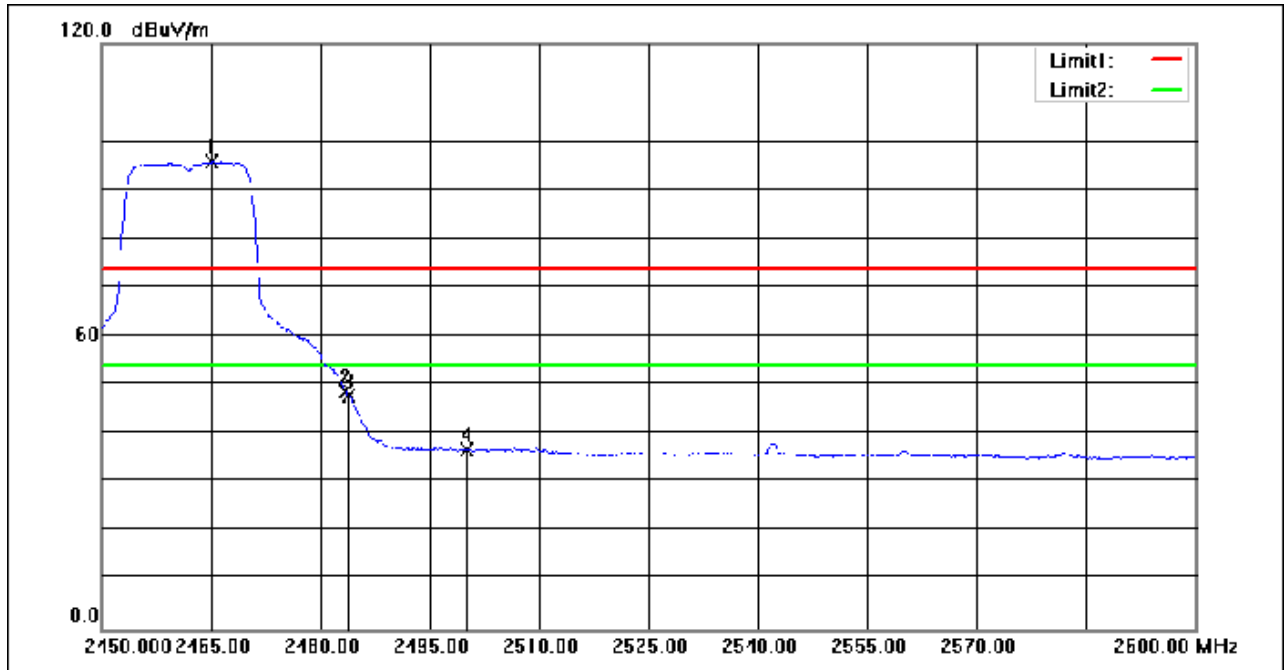
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Test Mode: 00; Polarity: Vertical; Modulation: 802.11g; Bandwidth: 20MHz; Channel: High



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2465.150	109.51	-13.76	95.75	54.00	41.75	AVG
2	2483.500	62.46	-13.71	48.75	54.00	-5.25	AVG
3	2483.900	61.66	-13.70	47.96	54.00	-6.04	AVG
4	2500.000	50.28	-13.64	36.64	54.00	-17.36	AVG



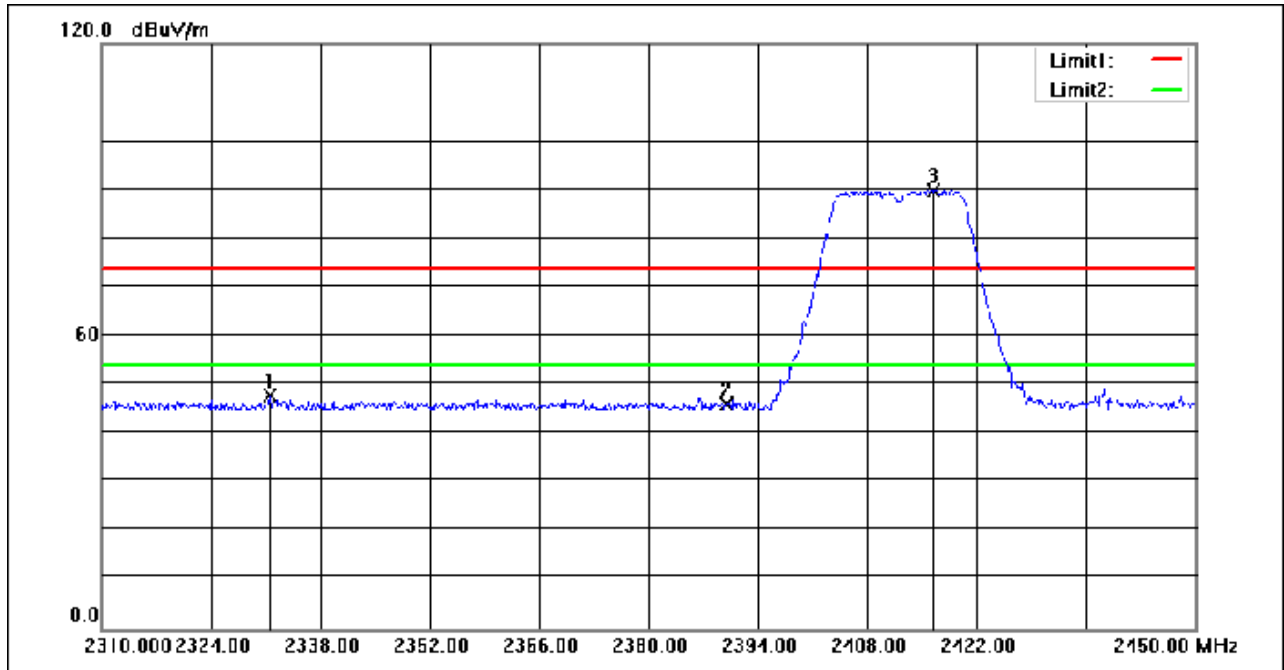
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Test Mode: 00; Polarity: Horizontal; Modulation: 802.11n; Bandwidth: 20MHz; Channel: Low



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2331.560	62.01	-14.19	47.82	74.00	-26.18	peak
2	2390.000	59.92	-14.01	45.91	74.00	-28.09	peak
3	2416.540	103.82	-13.93	89.89	74.00	15.89	peak



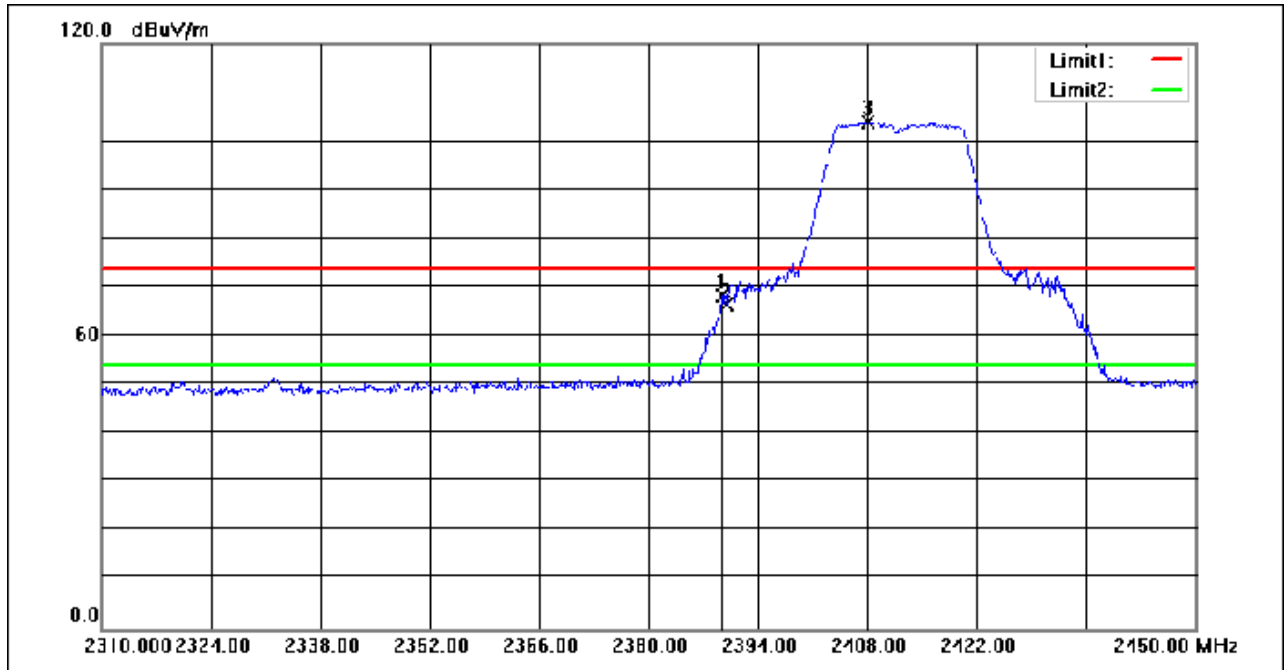
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Test Mode: 00; Polarity: Vertical; Modulation: 802.11n; Bandwidth: 20MHz; Channel: Low



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2389.380	82.33	-14.01	68.32	74.00	-5.68	peak
2	2390.000	80.43	-14.01	66.42	74.00	-7.58	peak
3	2408.000	117.89	-13.95	103.94	74.00	29.94	peak



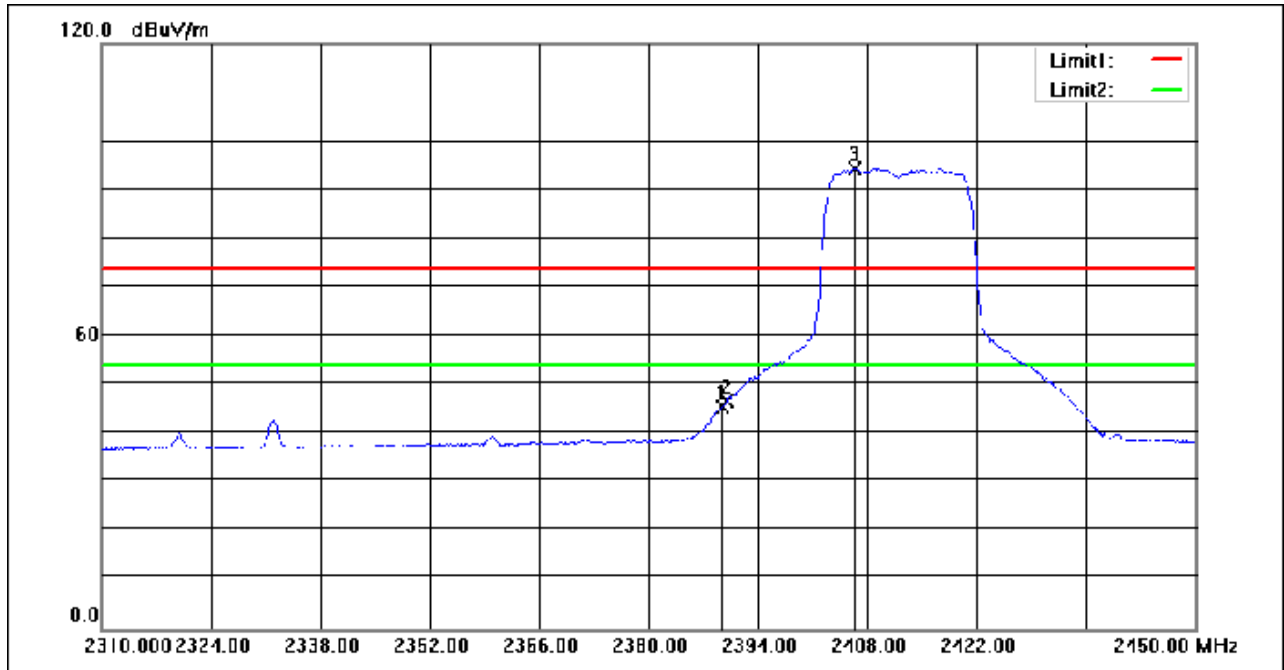
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Test Mode: 00; Polarity: Vertical; Modulation: 802.11n; Bandwidth: 20MHz; Channel: Low



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2389.380	59.41	-14.01	45.40	54.00	-8.60	AVG
2	2390.000	60.55	-14.01	46.54	54.00	-7.46	AVG
3	2406.320	108.34	-13.95	94.39	54.00	40.39	AVG



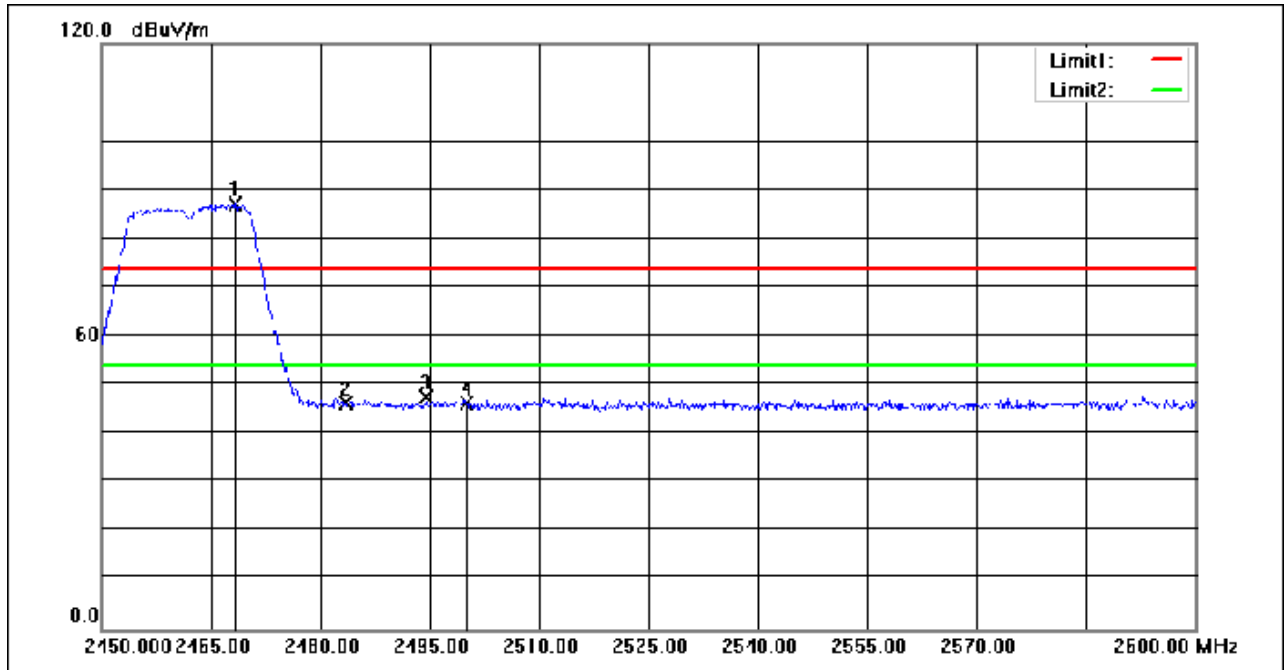
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Test Mode: 00; Polarity: Horizontal; Modulation: 802.11n; Bandwidth: 20MHz; Channel: High



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2468.300	100.77	-13.75	87.02	74.00	13.02	peak
2	2483.500	59.96	-13.71	46.25	74.00	-27.75	peak
3	2494.550	61.22	-13.67	47.55	74.00	-26.45	peak
4	2500.000	60.03	-13.64	46.39	74.00	-27.61	peak



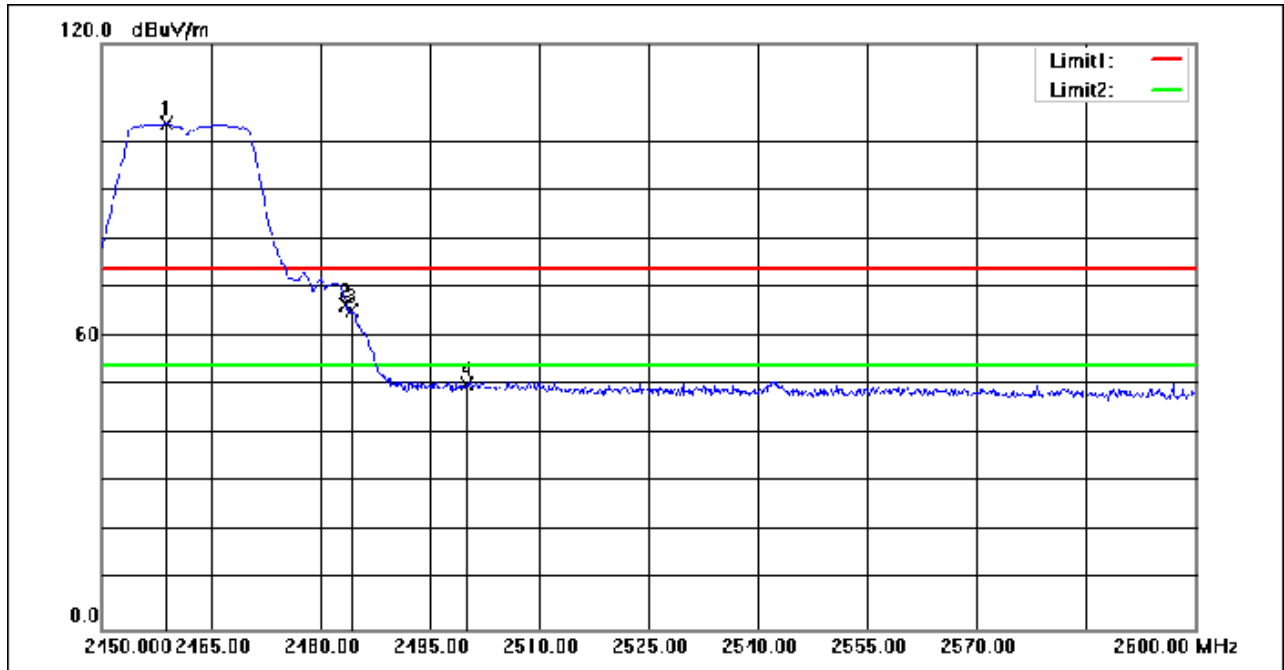
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Test Mode: 00; Polarity: Vertical; Modulation: 802.11n; Bandwidth: 20MHz; Channel: High



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2458.850	117.53	-13.79	103.74	74.00	29.74	peak
2	2483.500	80.24	-13.71	66.53	74.00	-7.47	peak
3	2484.200	79.03	-13.70	65.33	74.00	-8.67	peak
4	2500.000	63.77	-13.64	50.13	74.00	-23.87	peak



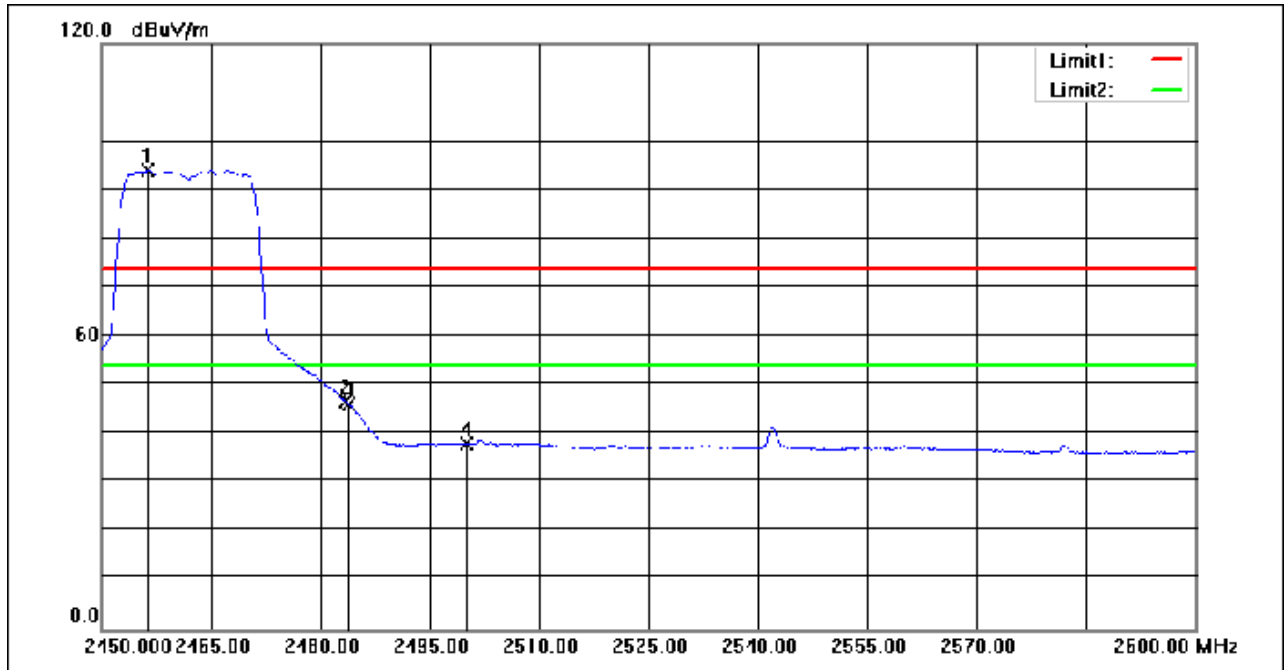
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No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2456.300	107.88	-13.79	94.09	54.00	40.09	AVG
2	2483.500	60.24	-13.71	46.53	54.00	-7.47	AVG
3	2483.900	59.87	-13.70	46.17	54.00	-7.83	AVG
4	2500.000	51.66	-13.64	38.02	54.00	-15.98	AVG



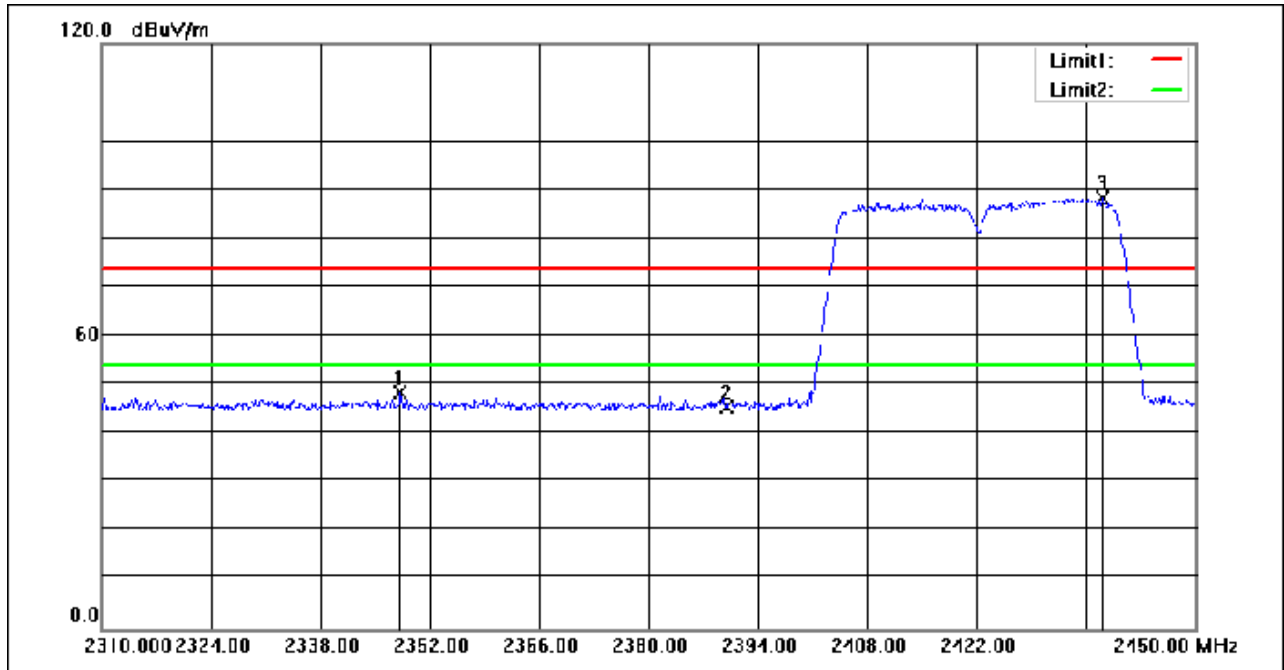
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Test Mode: 00; Polarity: Horizontal; Modulation: 802.11n; Bandwidth: 40MHz; Channel: Low



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2348.220	62.59	-14.13	48.46	74.00	-25.54	peak
2	2390.000	59.38	-14.01	45.37	74.00	-28.63	peak
3	2438.100	102.34	-13.86	88.48	74.00	14.48	peak



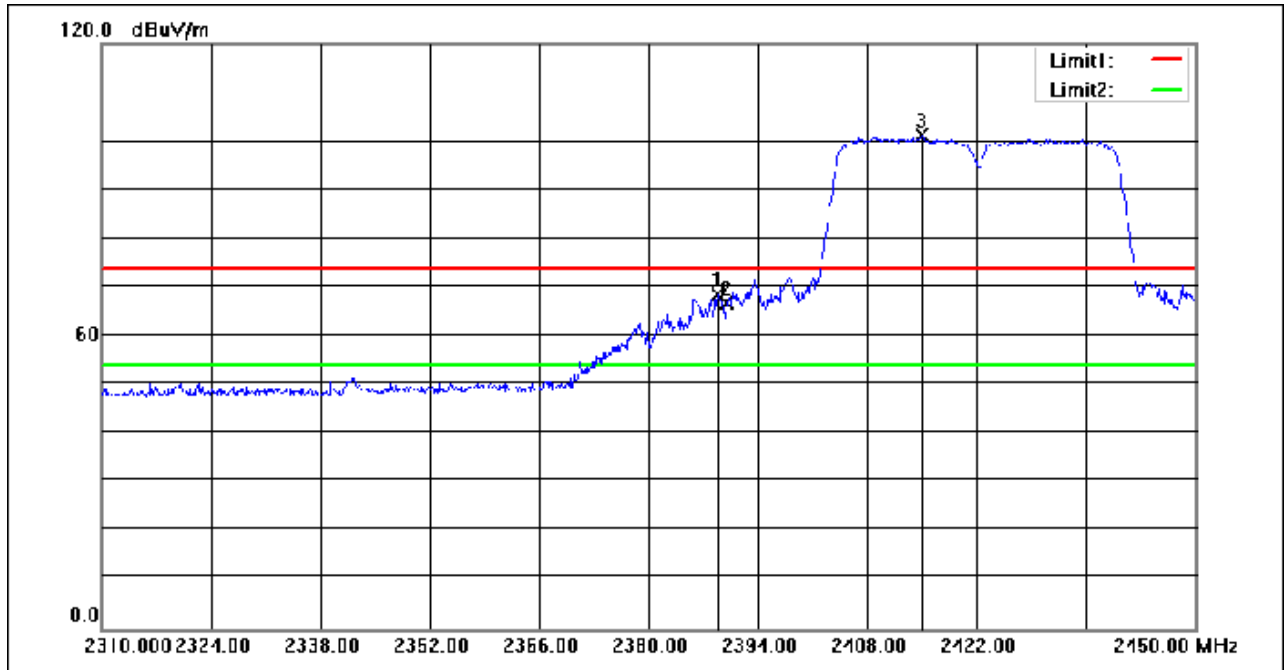
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Test Mode: 00; Polarity: Vertical; Modulation: 802.11n; Bandwidth: 40MHz; Channel: Low



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2388.820	82.54	-14.01	68.53	74.00	-5.47	peak
2	2390.000	80.72	-14.01	66.71	74.00	-7.29	peak
3	2415.000	115.22	-13.93	101.29	74.00	27.29	peak



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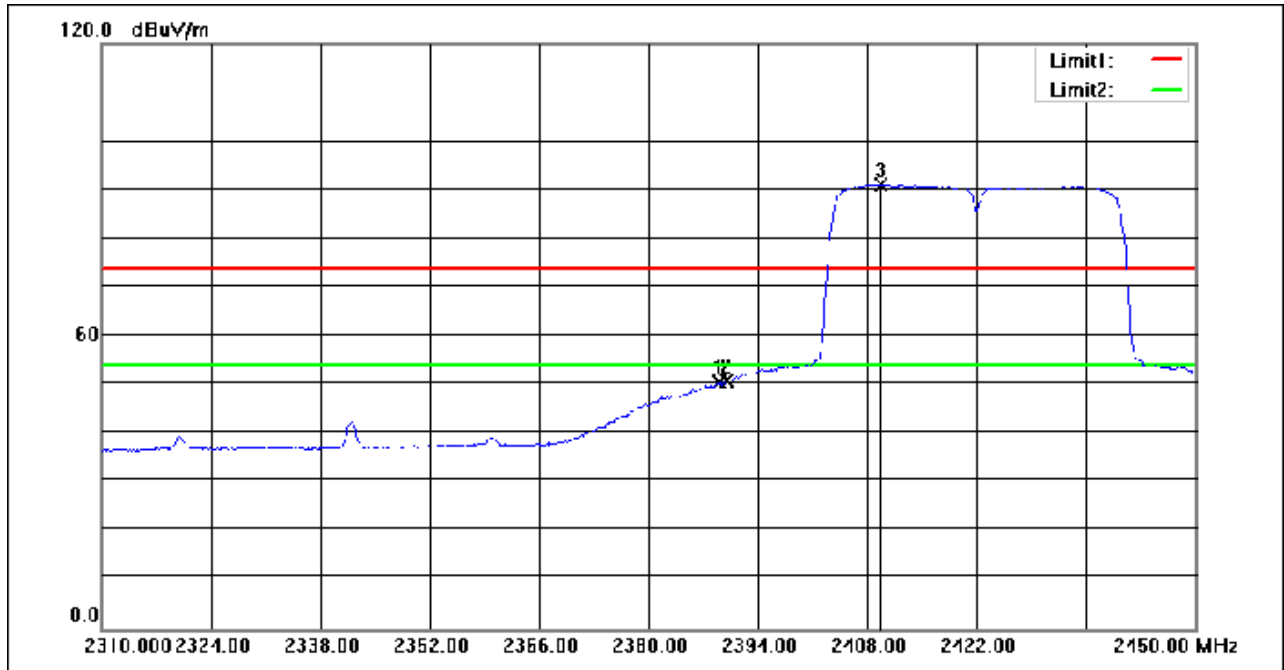
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Test Mode: 00; Polarity: Vertical; Modulation: 802.11n; Bandwidth: 40MHz; Channel: Low



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2389.100	64.47	-14.01	50.46	54.00	-3.54	AVG
2	2390.000	64.83	-14.01	50.82	54.00	-3.18	AVG
3	2409.820	105.08	-13.95	91.13	54.00	37.13	AVG



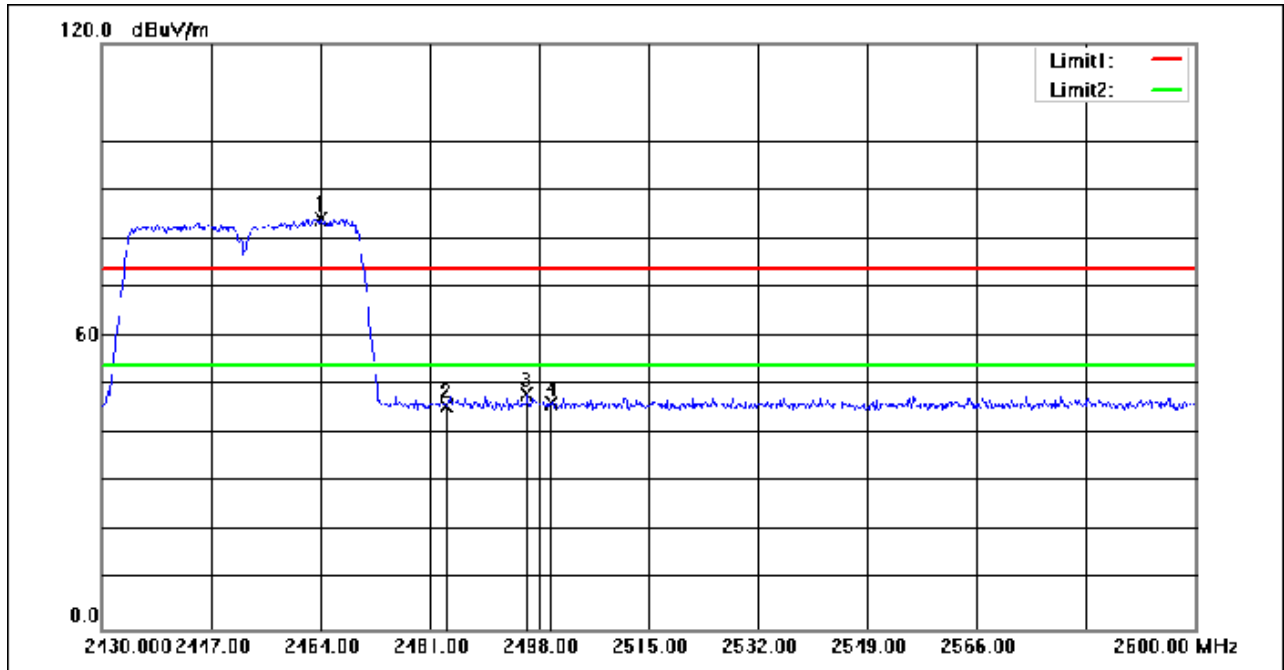
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Test Mode: 00; Polarity: Horizontal; Modulation: 802.11n; Bandwidth: 40MHz; Channel: High



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2464.000	98.04	-13.77	84.27	74.00	10.27	peak
2	2483.500	59.37	-13.71	45.66	74.00	-28.34	peak
3	2496.130	61.70	-13.66	48.04	74.00	-25.96	peak
4	2500.000	59.95	-13.64	46.31	74.00	-27.69	peak



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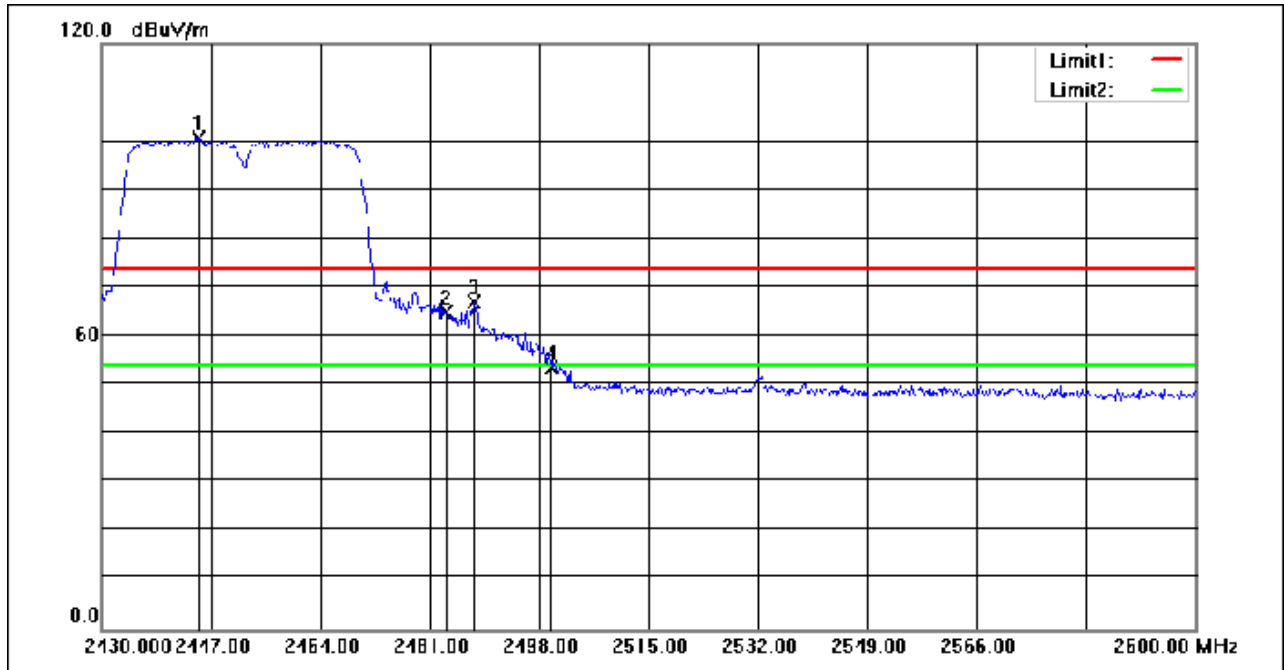
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Test Mode: 00; Polarity: Vertical; Modulation: 802.11n; Bandwidth: 40MHz; Channel: High



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2445.130	114.51	-13.83	100.68	74.00	26.68	peak
2	2483.500	78.52	-13.71	64.81	74.00	-9.19	peak
3	2487.970	80.88	-13.69	67.19	74.00	-6.81	peak
4	2500.000	67.12	-13.64	53.48	74.00	-20.52	peak



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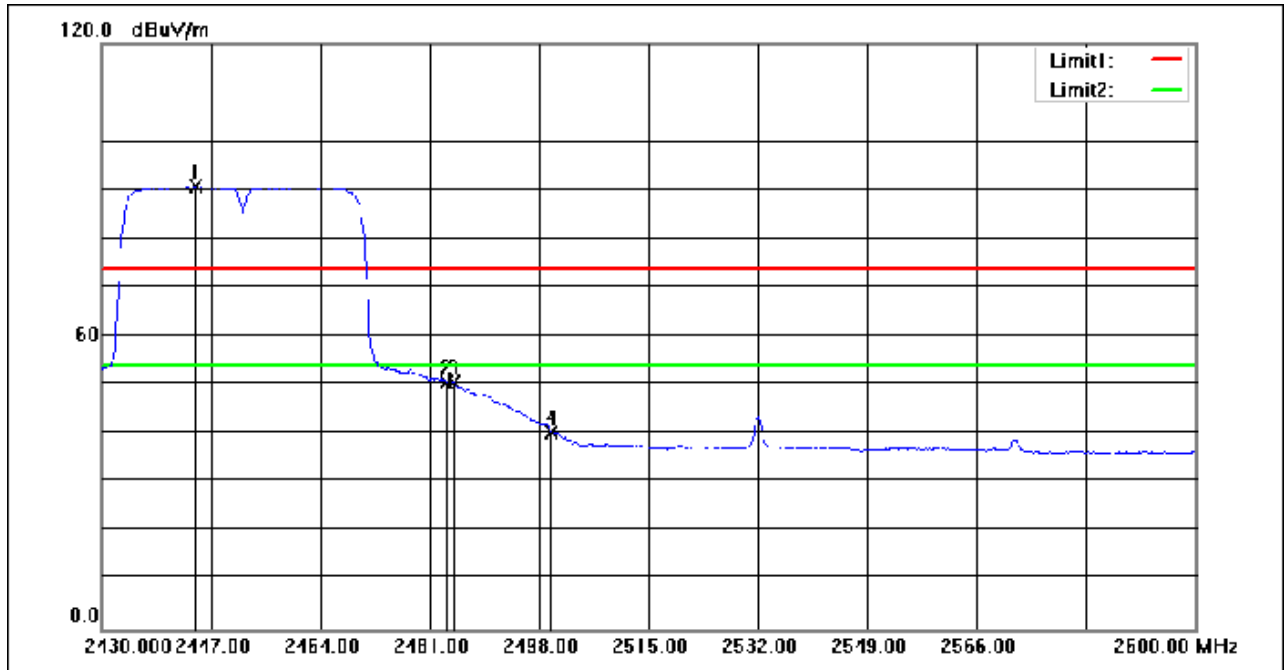
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No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2444.620	104.57	-13.83	90.74	54.00	36.74	AVG
2	2483.500	64.35	-13.71	50.64	54.00	-3.36	AVG
3	2484.740	64.29	-13.70	50.59	54.00	-3.41	AVG
4	2500.000	54.13	-13.64	40.49	54.00	-13.51	AVG



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7.7 Radiated Spurious Emissions Below 1GHz

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209

Test Method: ANSI C63.10 (2013) Section 6.4,6.5

Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
960-1000	500	3

7.7.1 E.U.T. Operation

Operating Environment:

Temperature: 16.2 °C

Humidity: 35.5 % RH

Atmospheric Pressure: 1010 mbar

7.7.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40). Only the data of worst case is recorded in the report.



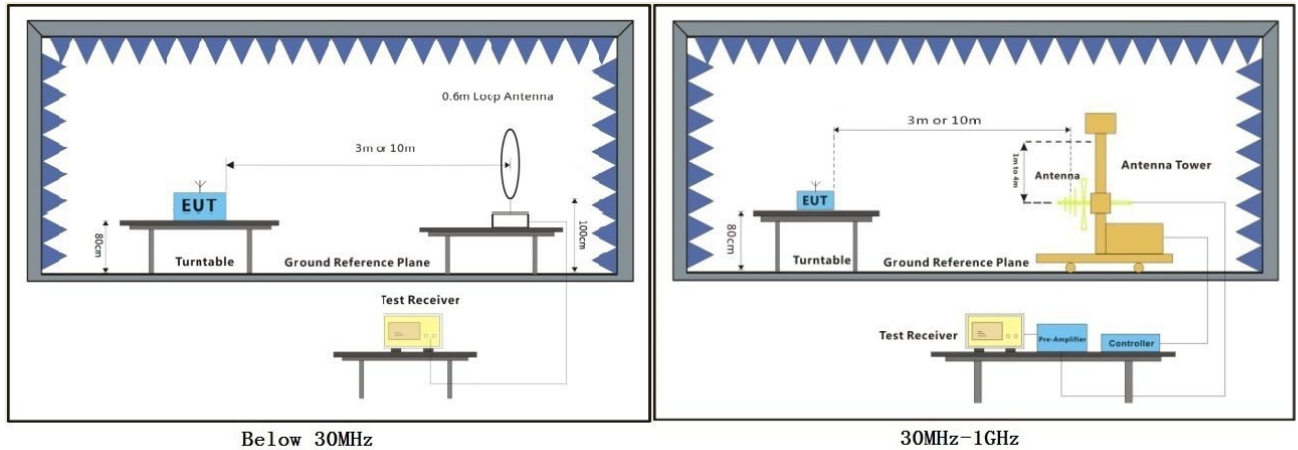
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7.7.3 Test Setup Diagram



Below 30MHz

30MHz-1GHz



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7.7.4 Measurement Procedure and Data

- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using quasi-peak method as specified and then reported in a data sheet.
- g. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- i. Repeat above procedures until all frequencies measured was complete.

Remark:

1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor
2. Scan from 9kHz to 30MHz, the disturbance below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.
3. The disturbance below 1GHz was very low and the harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.
4. For emission below 1GHz, through pre-scan found the worst case is the lowest channel. Only the worst case is recorded in the report.

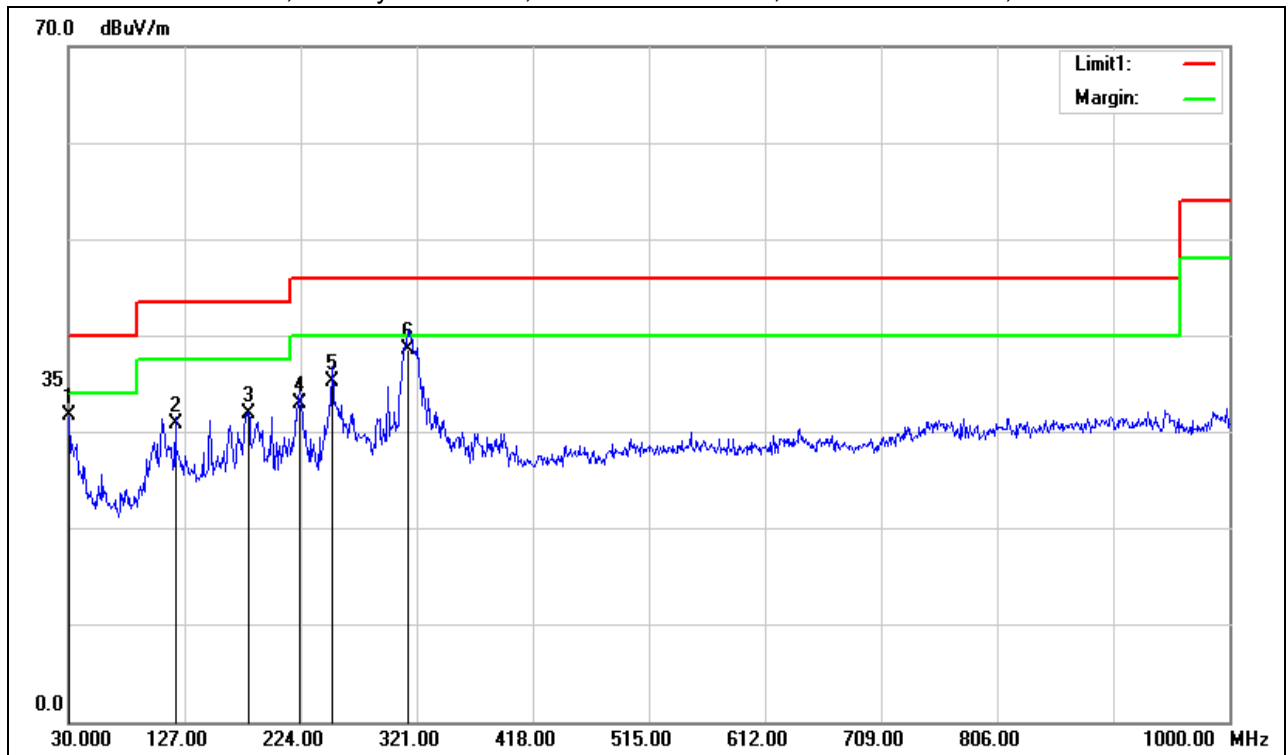


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Test Mode: 00; Polarity: Horizontal; Modulation: 802.11b; Bandwidth: 20MHz; Channel: Low



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	30.9700	6.34	25.38	31.72	40.00	-8.28	200	0	QP
2	119.2400	11.74	19.14	30.88	43.50	-12.62	100	22	QP
3	180.3500	14.18	17.78	31.96	43.50	-11.54	100	98	QP
4	223.0300	15.40	17.66	33.06	46.00	-12.94	100	332	QP
5	250.1900	15.93	19.32	35.25	46.00	-10.75	100	281	QP
6	314.2100	17.50	21.12	38.62	46.00	-7.38	100	360	QP

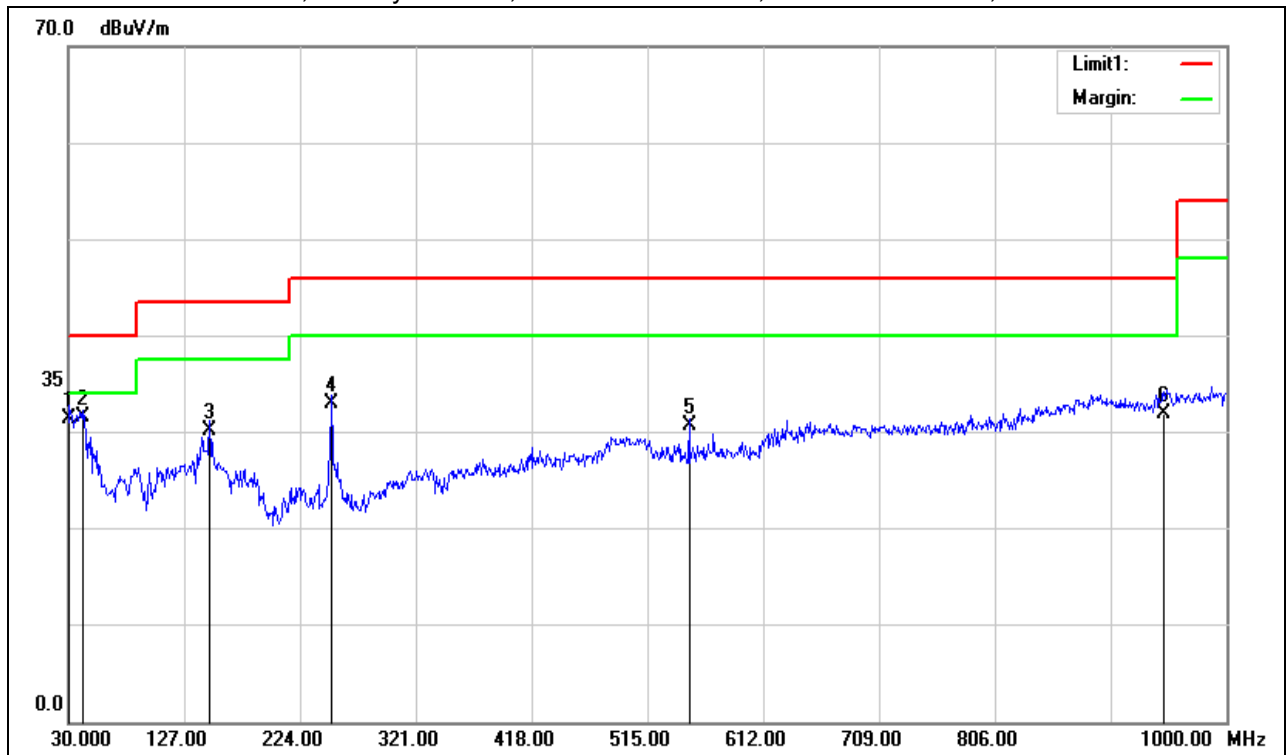


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No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	30.9700	6.12	25.38	31.50	40.00	-8.50	200	330	QP
2	41.6400	12.29	19.32	31.61	40.00	-8.39	200	71	QP
3	148.3400	10.11	20.09	30.20	43.50	-13.30	200	177	QP
4	250.1900	13.63	19.32	32.95	46.00	-13.05	200	0	QP
5	549.9200	4.94	25.83	30.77	46.00	-15.23	100	182	QP
6	947.6200	2.62	29.27	31.89	46.00	-14.11	100	0	QP



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7.8 Radiated Spurious Emissions Above 1GHz

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209

Test Method: ANSI C63.10 (2013) Section 6.6

Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
Above 1000	500	3

7.8.1 E.U.T. Operation

Operating Environment:

Temperature: 16.2 °C

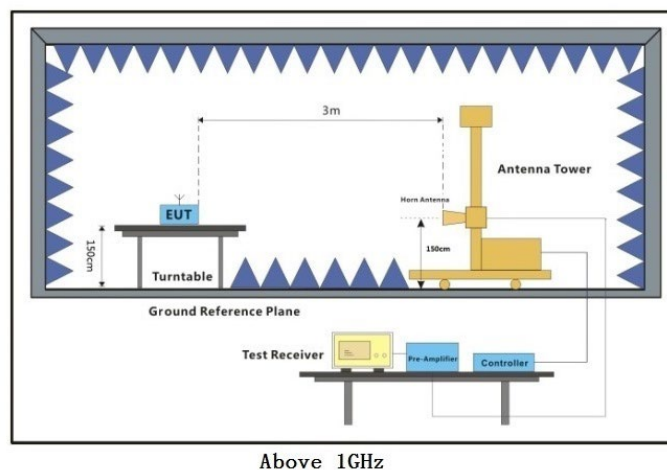
Humidity: 35.5 % RH

Atmospheric Pressure: 1010 mbar

7.8.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40). Only the data of worst case is recorded in the report.

7.8.3 Test Setup Diagram



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7.8.4 Measurement Procedure and Data

- a. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak or average method as specified and then reported in a data sheet.
- g. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- i. Repeat above procedures until all frequencies measured was complete.

Remark:

1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor
2. Scan from 1GHz to 25GHz, the disturbance above 18GHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.
3. As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.
4. This test item was investigated while operating in SISO and MIMO mode, however, it was determined that SISO antenna 1 operation for b/g modulation and MIMO antenna operation for n modulation produced the worst emissions. So the emissions produced from other operation are not recorded in report.

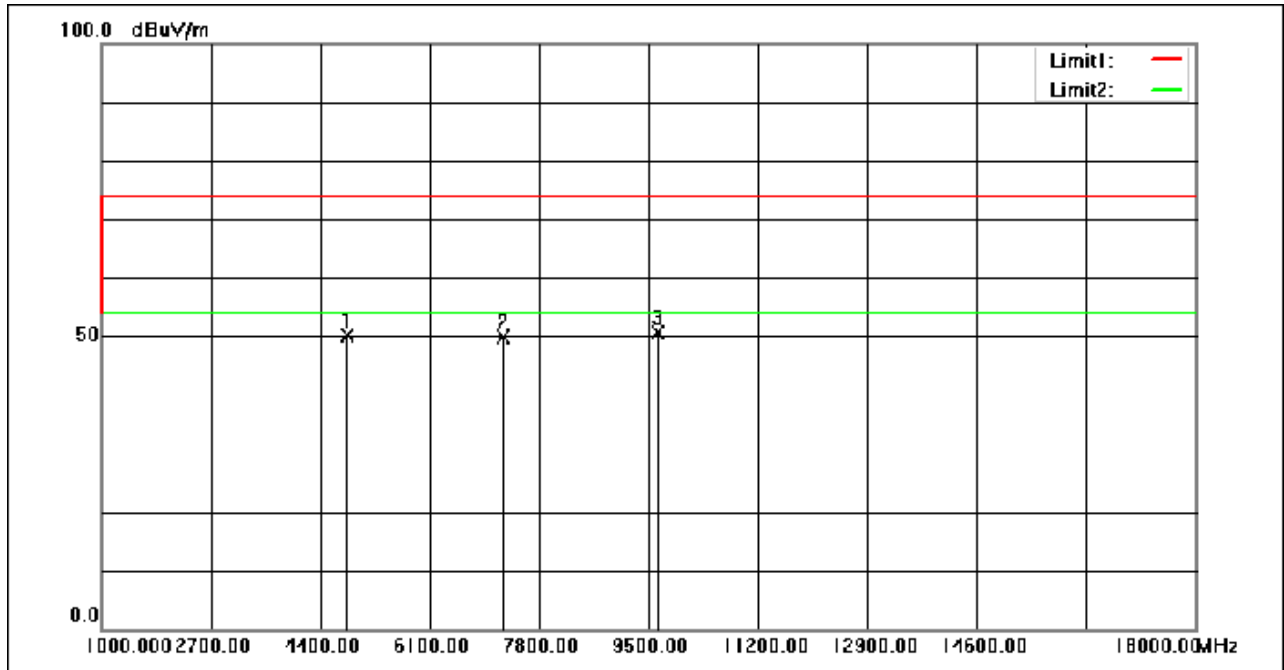


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No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4824.000	58.95	-8.78	50.17	74.00	-23.83	peak
2	7236.000	55.84	-5.86	49.98	74.00	-24.02	peak
3	9648.000	51.96	-1.31	50.65	74.00	-23.35	peak



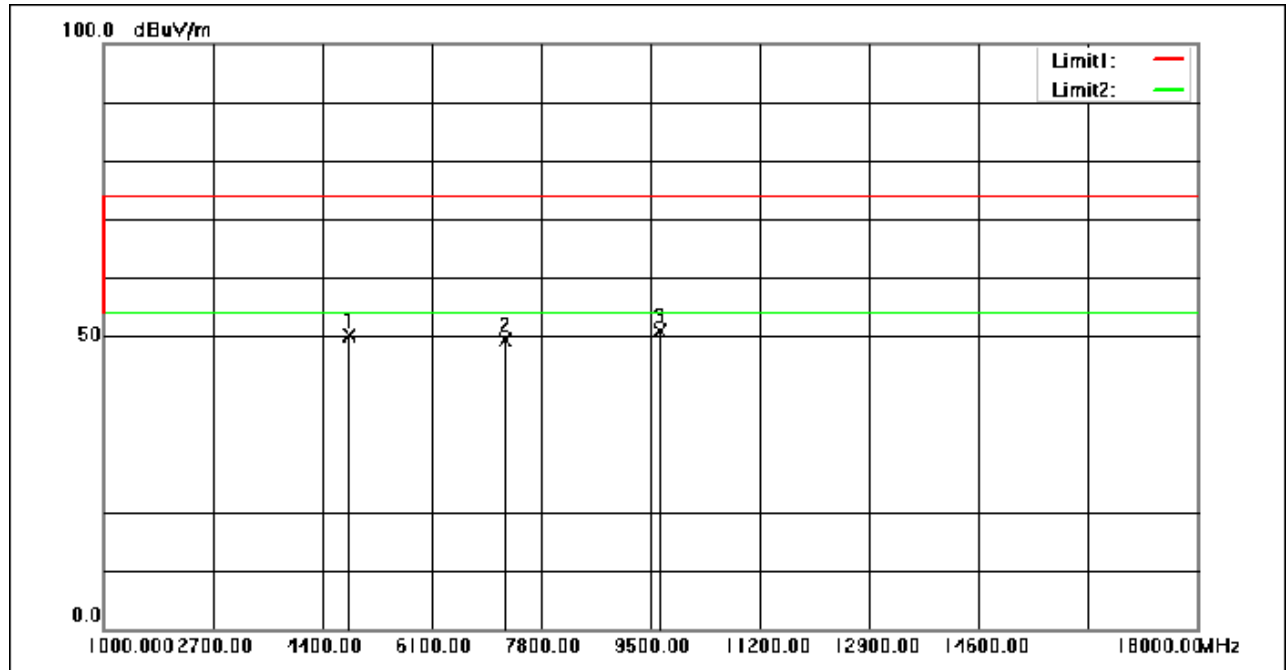
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No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4824.000	58.94	-8.78	50.16	74.00	-23.84	peak
2	7236.000	55.30	-5.86	49.44	74.00	-24.56	peak
3	9648.000	52.25	-1.31	50.94	74.00	-23.06	peak



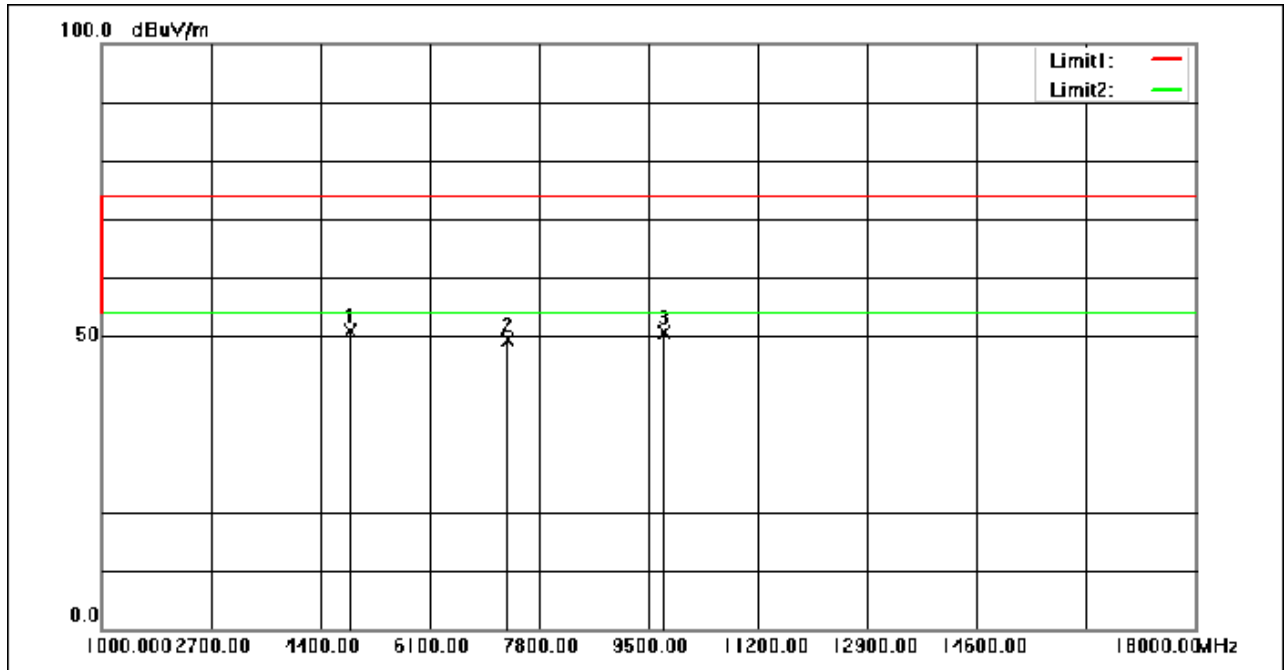
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Test Mode: 00; Polarity: Horizontal; Modulation: 802.11b; Bandwidth: 20MHz; Channel: middle



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4874.000	59.37	-8.61	50.76	74.00	-23.24	peak
2	7311.000	55.13	-5.78	49.35	74.00	-24.65	peak
3	9748.000	52.02	-1.43	50.59	74.00	-23.41	peak



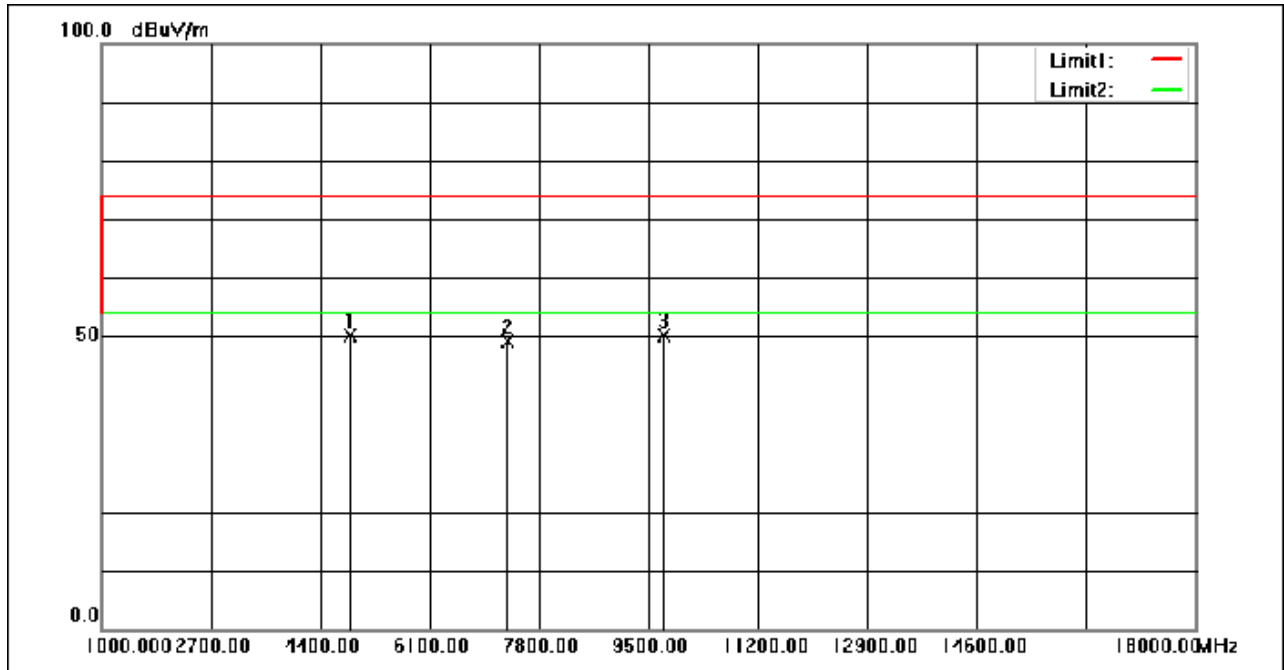
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No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4874.000	58.67	-8.61	50.06	74.00	-23.94	peak
2	7311.000	54.96	-5.78	49.18	74.00	-24.82	peak
3	9748.000	51.67	-1.43	50.24	74.00	-23.76	peak



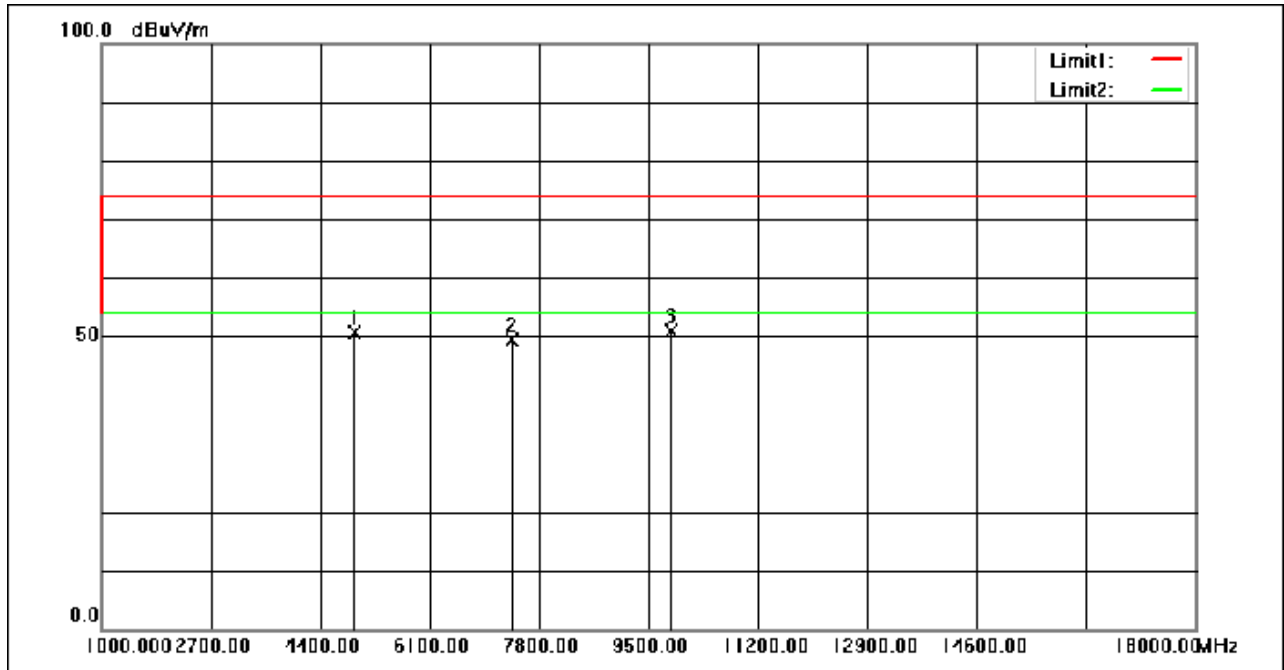
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Test Mode: 00; Polarity: Horizontal; Modulation: 802.11b; Bandwidth: 20MHz; Channel: High



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4924.000	59.05	-8.44	50.61	74.00	-23.39	peak
2	7386.000	55.09	-5.69	49.40	74.00	-24.60	peak
3	9848.000	52.14	-1.27	50.87	74.00	-23.13	peak



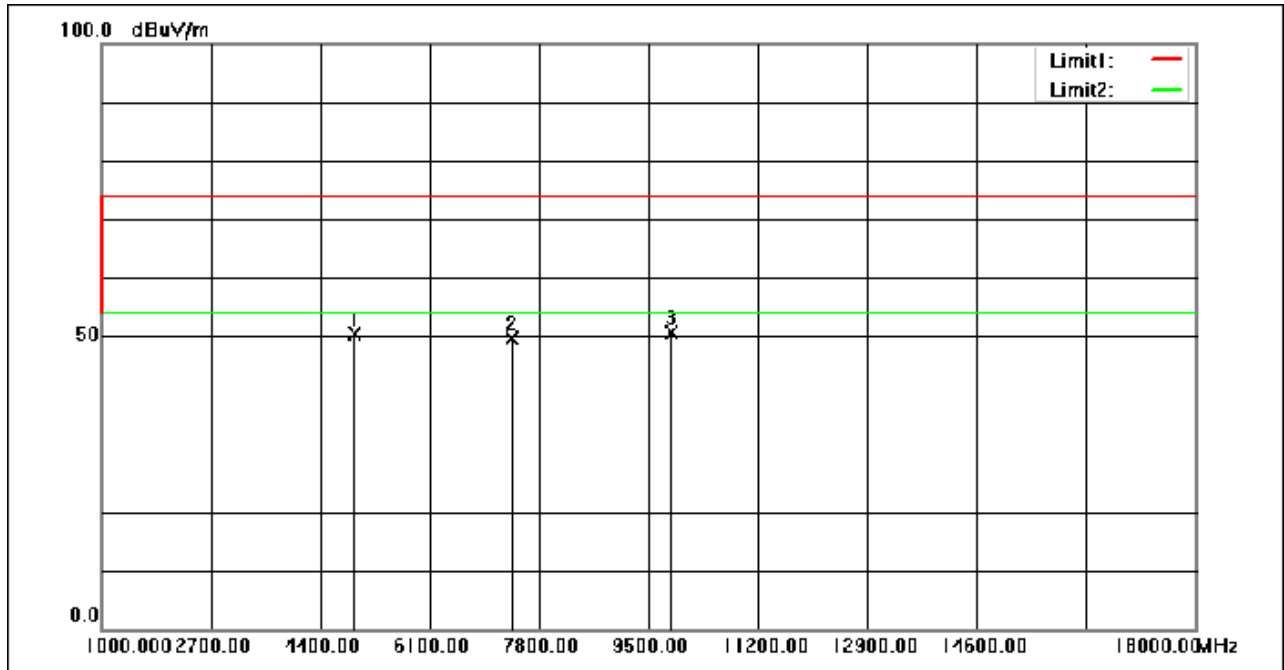
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No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4924.000	58.83	-8.44	50.39	74.00	-23.61	peak
2	7386.000	55.40	-5.69	49.71	74.00	-24.29	peak
3	9848.000	51.78	-1.27	50.51	74.00	-23.49	peak



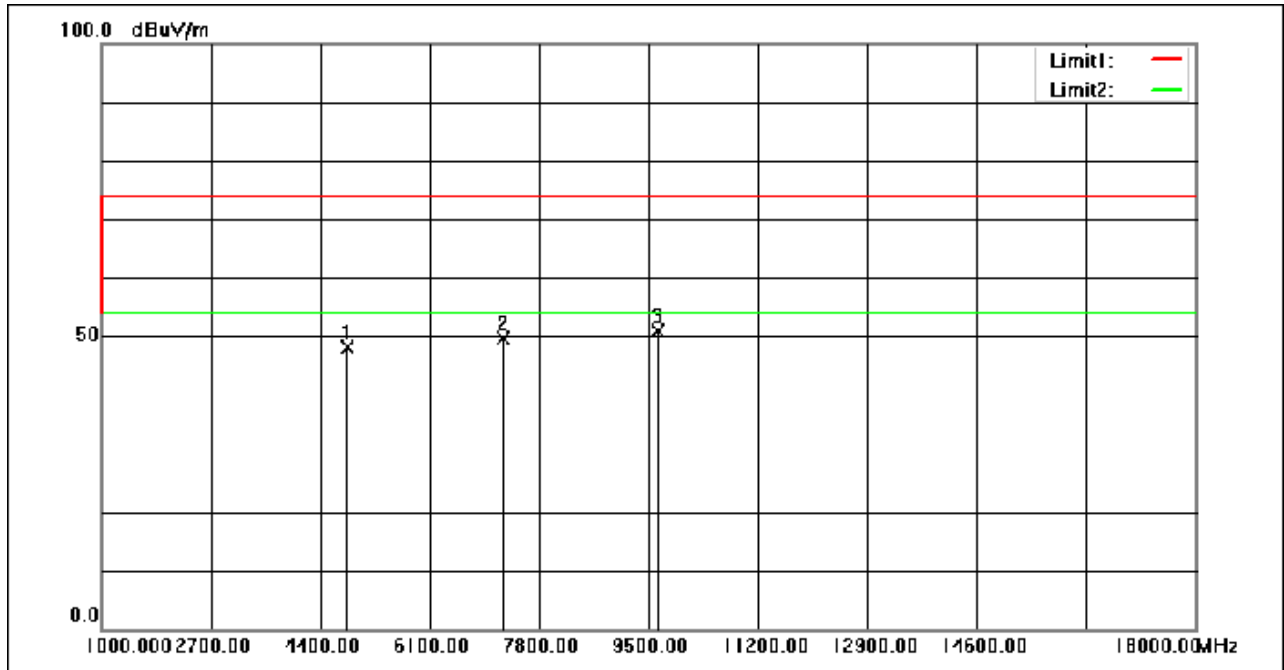
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Test Mode: 00; Polarity: Horizontal; Modulation: 802.11g; Bandwidth: 20MHz; Channel: Low



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4824.000	56.99	-8.78	48.21	74.00	-25.79	peak
2	7236.000	55.39	-5.86	49.53	74.00	-24.47	peak
3	9648.000	52.17	-1.31	50.86	74.00	-23.14	peak



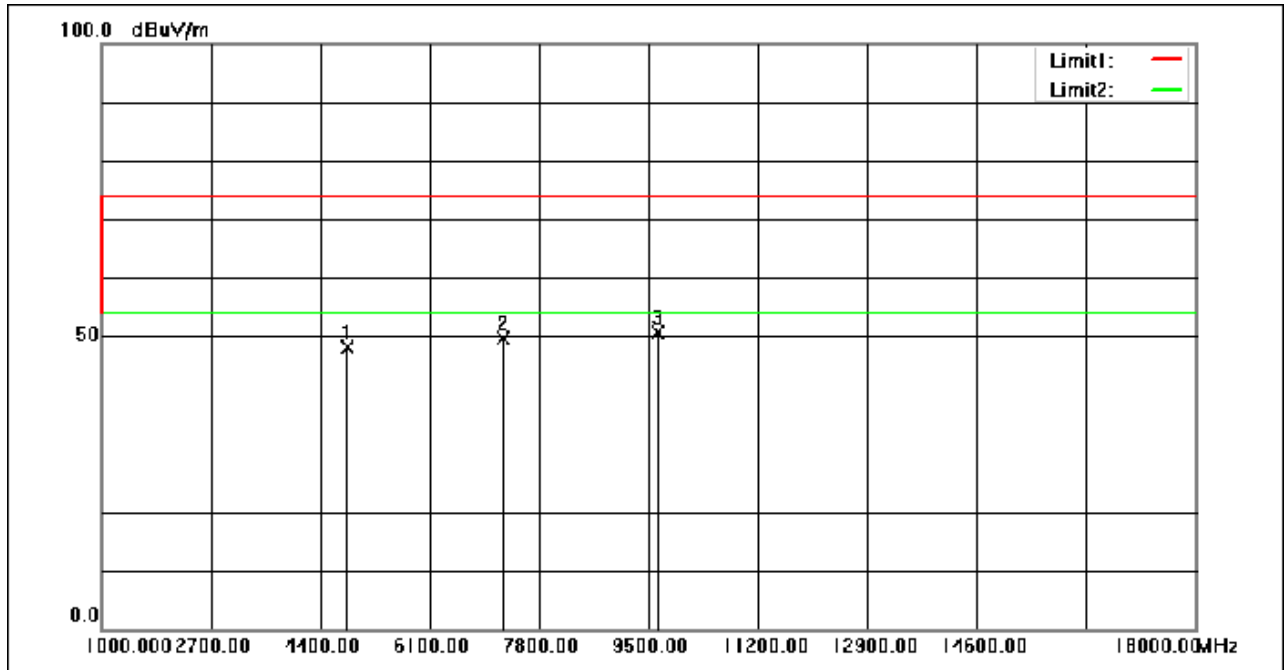
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Test Mode: 00; Polarity: Vertical; Modulation: 802.11g; Bandwidth: 20MHz; Channel: Low



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4824.000	56.92	-8.78	48.14	74.00	-25.86	peak
2	7236.000	55.55	-5.86	49.69	74.00	-24.31	peak
3	9648.000	51.89	-1.31	50.58	74.00	-23.42	peak



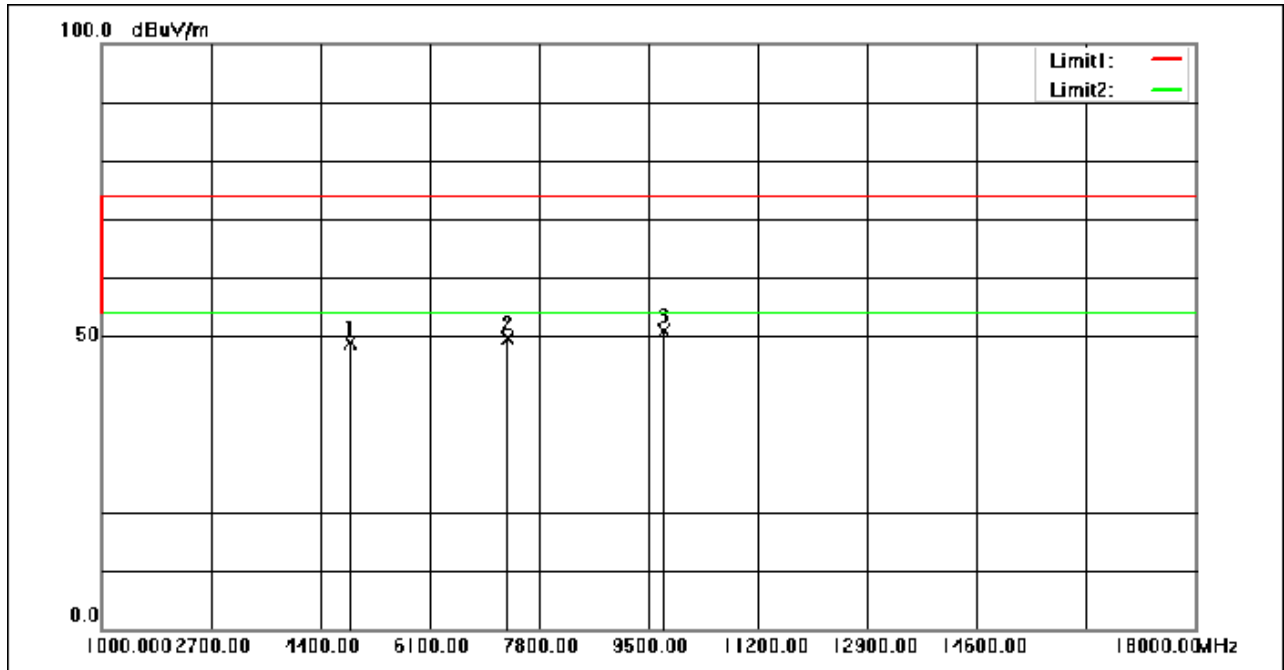
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Test Mode: 00; Polarity: Horizontal; Modulation: 802.11g; Bandwidth: 20MHz; Channel: middle



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4874.000	57.49	-8.61	48.88	74.00	-25.12	peak
2	7311.000	55.43	-5.78	49.65	74.00	-24.35	peak
3	9748.000	52.38	-1.43	50.95	74.00	-23.05	peak



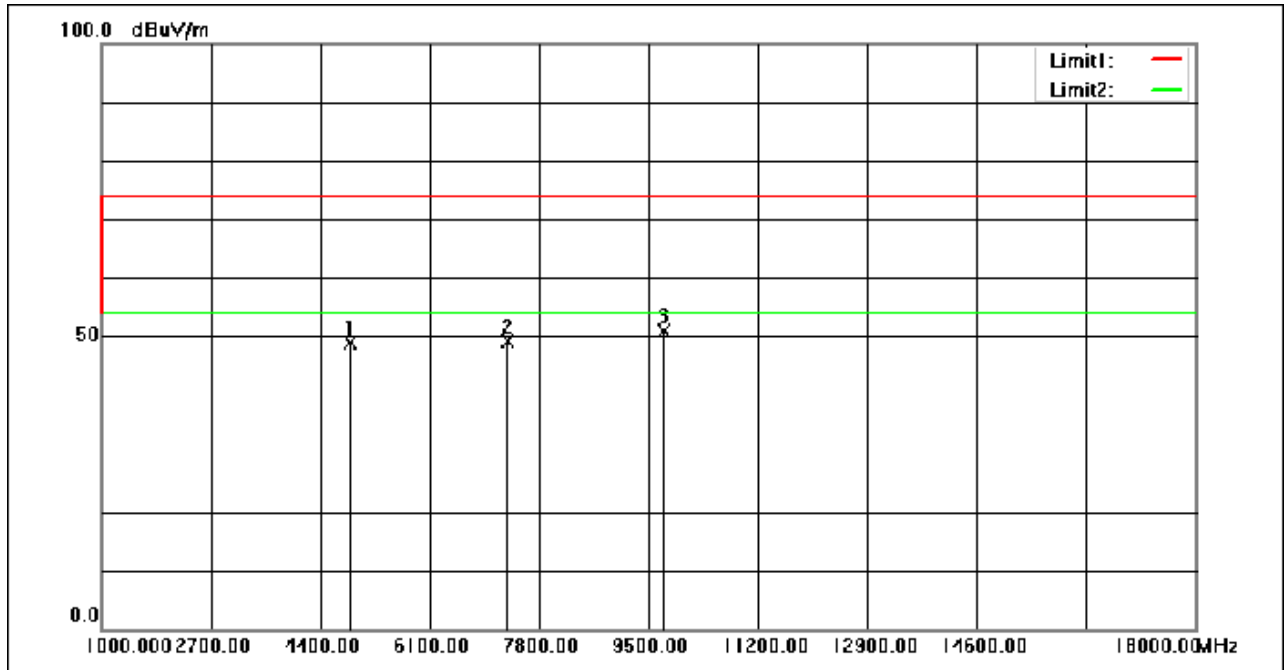
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Test Mode: 00; Polarity: Vertical; Modulation: 802.11g; Bandwidth: 20MHz; Channel: middle



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4874.000	57.53	-8.61	48.92	74.00	-25.08	peak
2	7311.000	54.93	-5.78	49.15	74.00	-24.85	peak
3	9748.000	52.29	-1.43	50.86	74.00	-23.14	peak



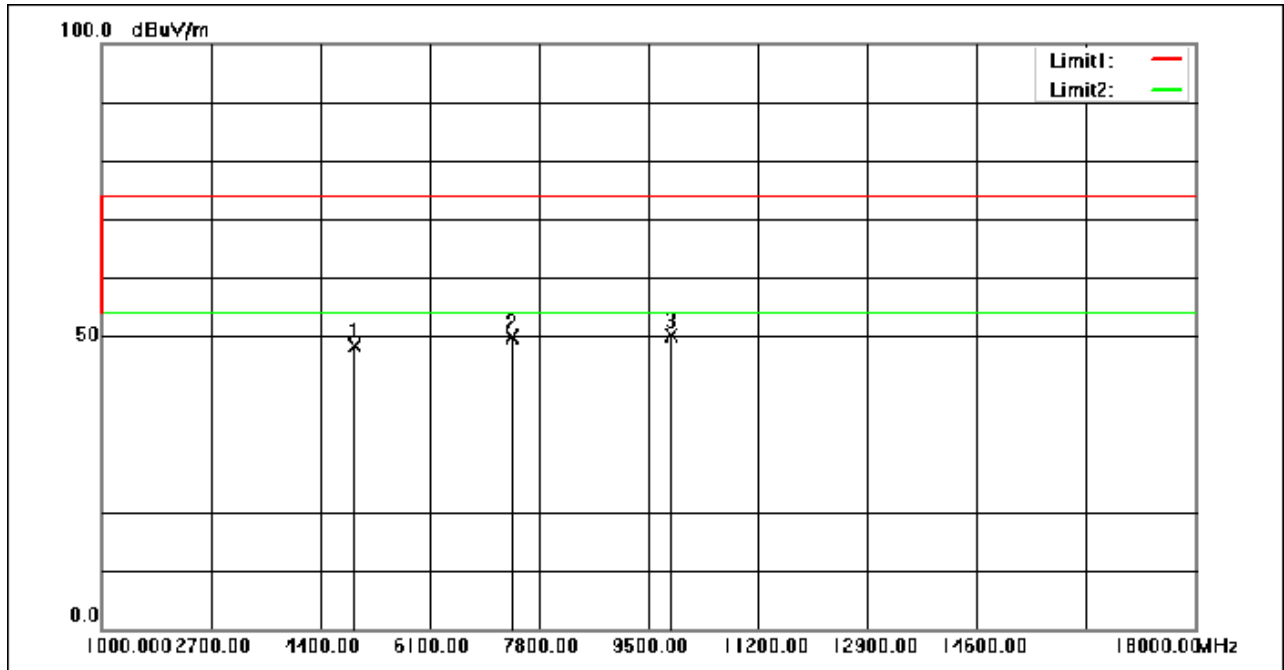
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Test Mode: 00; Polarity: Horizontal; Modulation: 802.11g; Bandwidth: 20MHz; Channel: High



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4924.000	56.70	-8.44	48.26	74.00	-25.74	peak
2	7386.000	55.60	-5.69	49.91	74.00	-24.09	peak
3	9848.000	51.42	-1.27	50.15	74.00	-23.85	peak



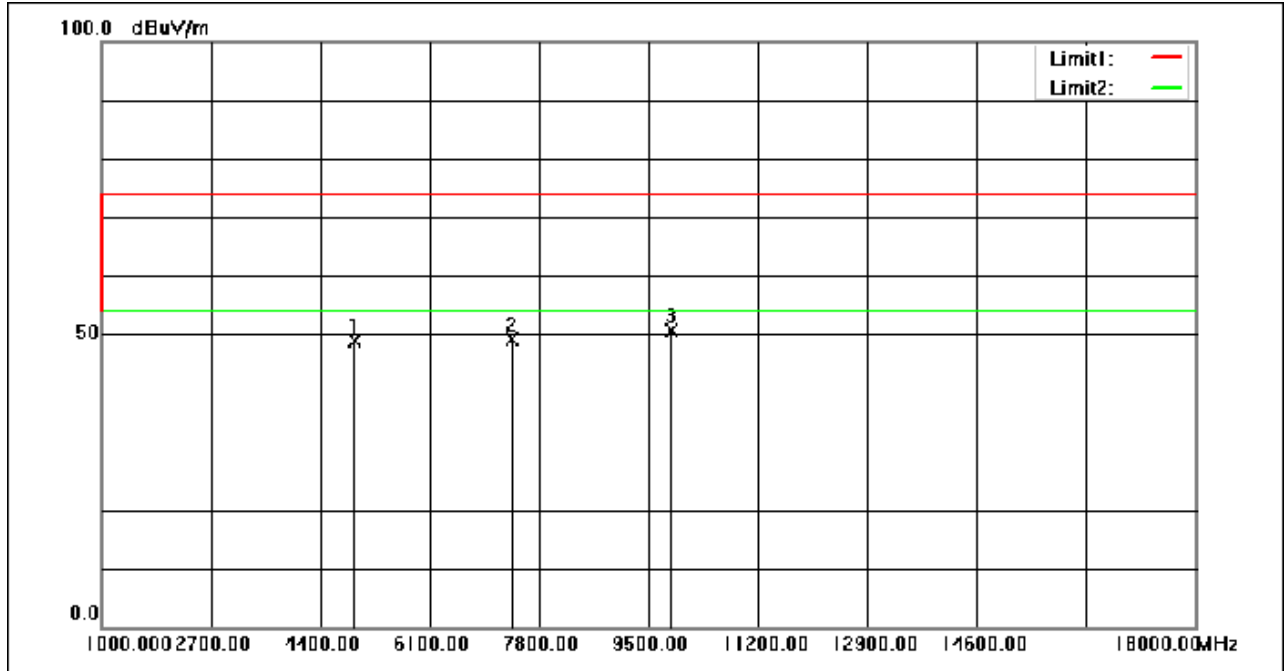
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Test Mode: 00; Polarity: Vertical; Modulation: 802.11g; Bandwidth: 20MHz; Channel: High



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4924.000	57.29	-8.44	48.85	74.00	-25.15	peak
2	7386.000	54.88	-5.69	49.19	74.00	-24.81	peak
3	9848.000	51.92	-1.27	50.65	74.00	-23.35	peak



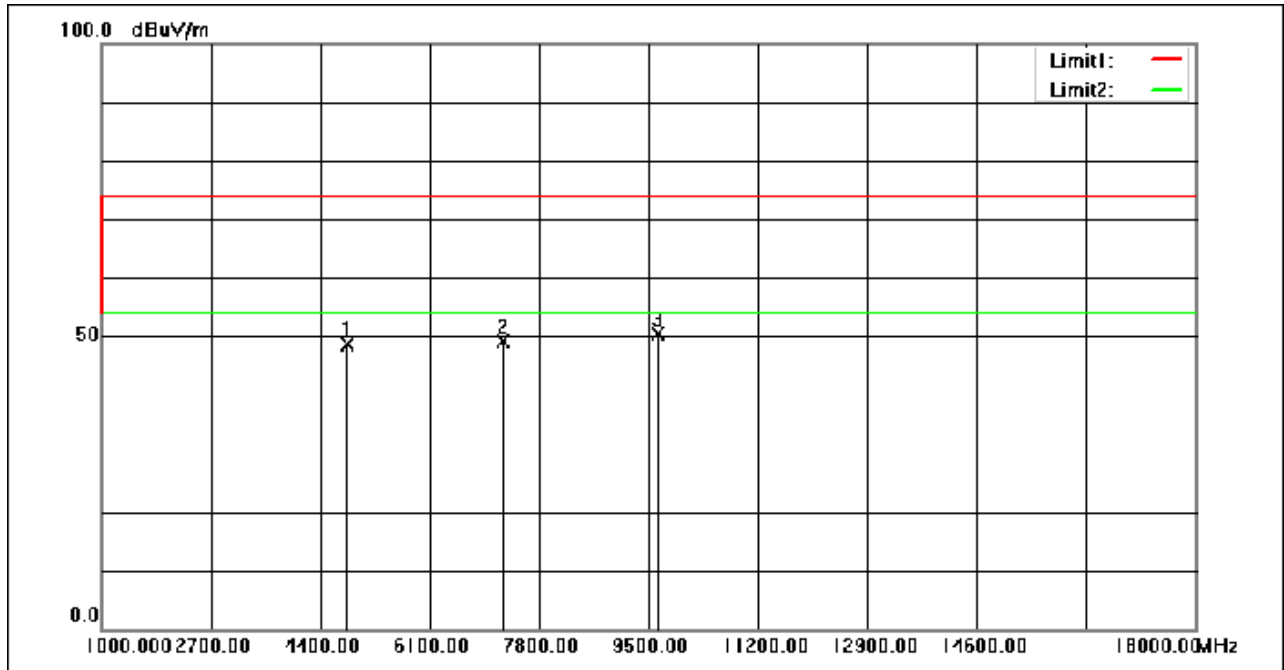
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Test Mode: 00; Polarity: Horizontal; Modulation: 802.11n; Bandwidth: 20MHz; Channel: Low



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4824.000	57.35	-8.78	48.57	74.00	-25.43	peak
2	7236.000	54.92	-5.86	49.06	74.00	-24.94	peak
3	9648.000	51.72	-1.31	50.41	74.00	-23.59	peak

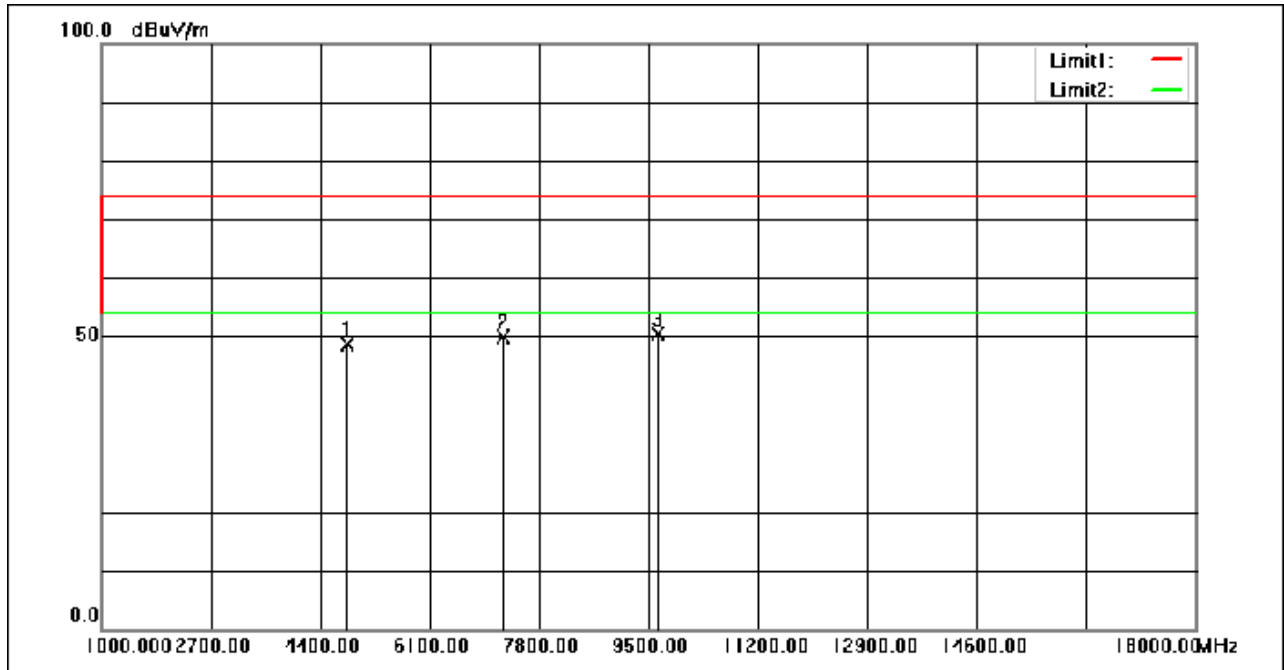


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Test Mode: 00; Polarity: Vertical; Modulation: 802.11n; Bandwidth: 20MHz; Channel: Low



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4824.000	57.42	-8.78	48.64	74.00	-25.36	peak
2	7236.000	55.66	-5.86	49.80	74.00	-24.20	peak
3	9648.000	51.65	-1.31	50.34	74.00	-23.66	peak



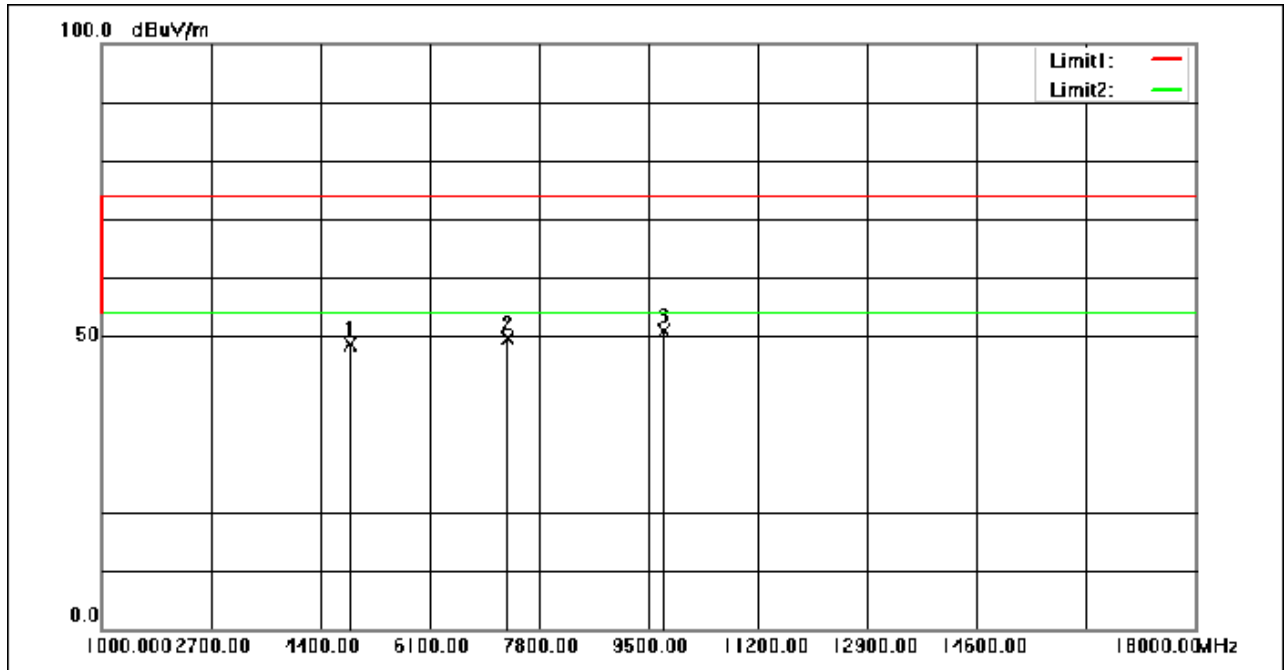
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Test Mode: 00; Polarity: Horizontal; Modulation: 802.11n; Bandwidth: 20MHz; Channel: middle



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4874.000	57.32	-8.61	48.71	74.00	-25.29	peak
2	7311.000	55.34	-5.78	49.56	74.00	-24.44	peak
3	9748.000	52.34	-1.43	50.91	74.00	-23.09	peak



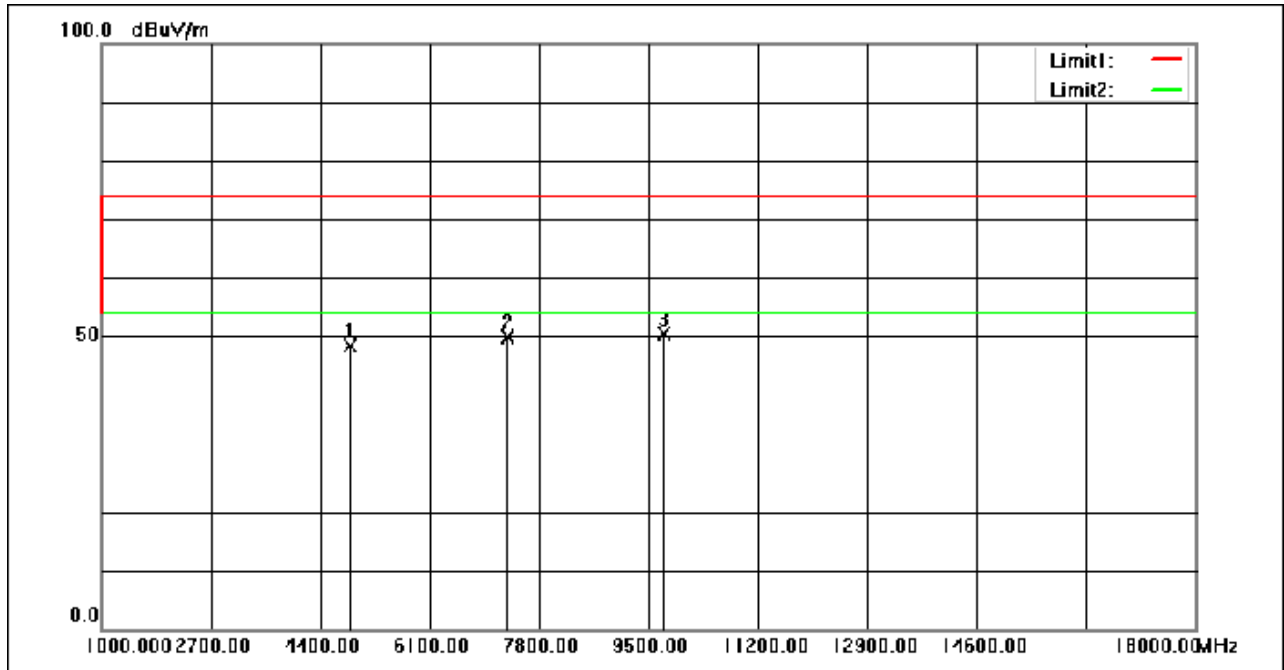
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Test Mode: 00; Polarity: Vertical; Modulation: 802.11n; Bandwidth: 20MHz; Channel: middle



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4874.000	56.87	-8.61	48.26	74.00	-25.74	peak
2	7311.000	55.65	-5.78	49.87	74.00	-24.13	peak
3	9748.000	51.78	-1.43	50.35	74.00	-23.65	peak



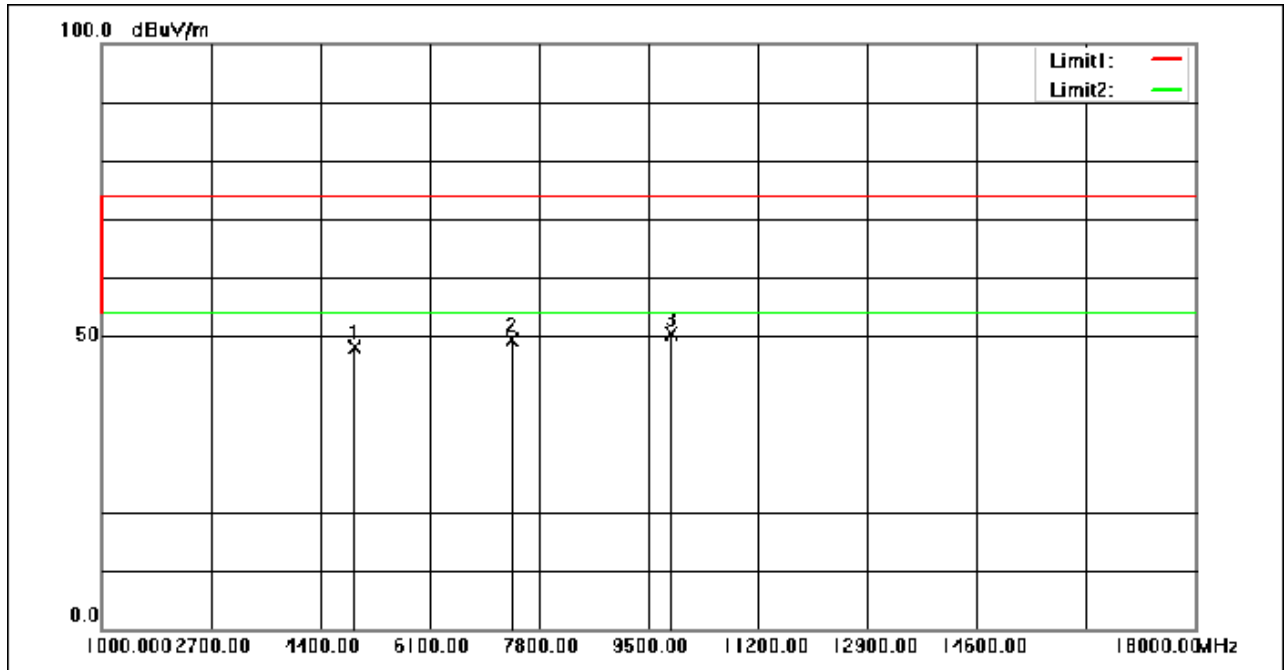
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Test Mode: 00; Polarity: Horizontal; Modulation: 802.11n; Bandwidth: 20MHz; Channel: High



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4924.000	56.55	-8.44	48.11	74.00	-25.89	peak
2	7386.000	55.15	-5.69	49.46	74.00	-24.54	peak
3	9848.000	51.55	-1.27	50.28	74.00	-23.72	peak



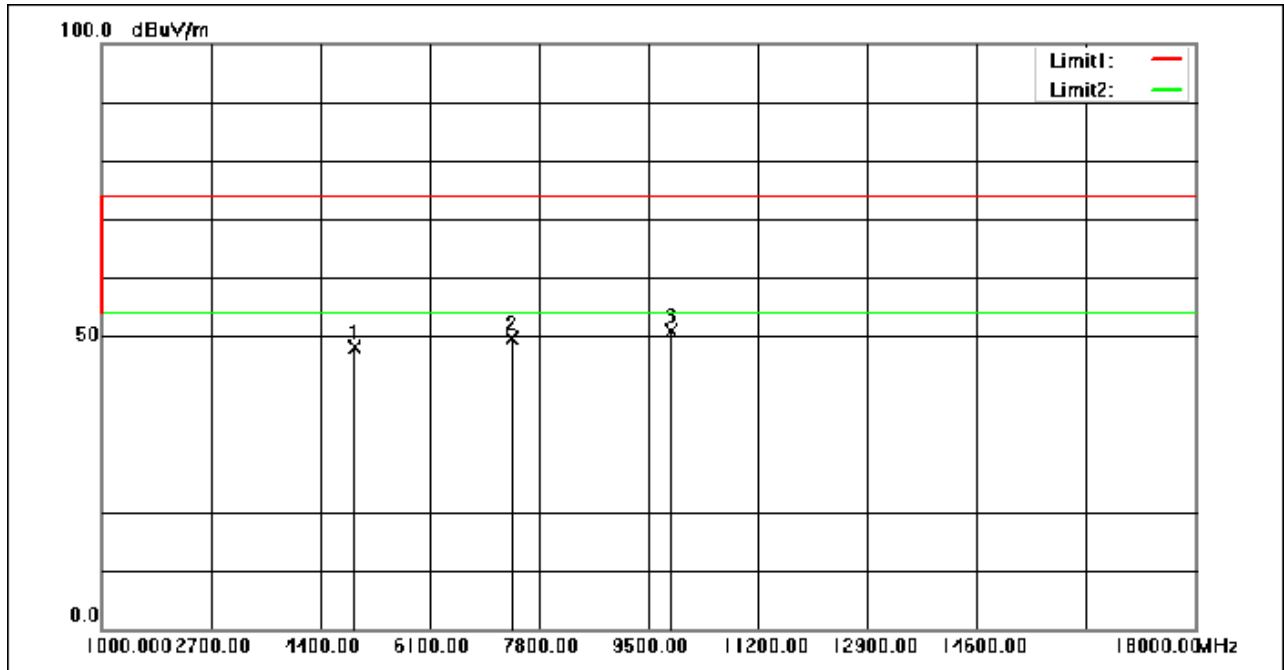
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Test Mode: 00; Polarity: Vertical; Modulation: 802.11n; Bandwidth: 20MHz; Channel: High



No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4924.000	56.66	-8.44	48.22	74.00	-25.78	peak
2	7386.000	55.35	-5.69	49.66	74.00	-24.34	peak
3	9848.000	52.25	-1.27	50.98	74.00	-23.02	peak



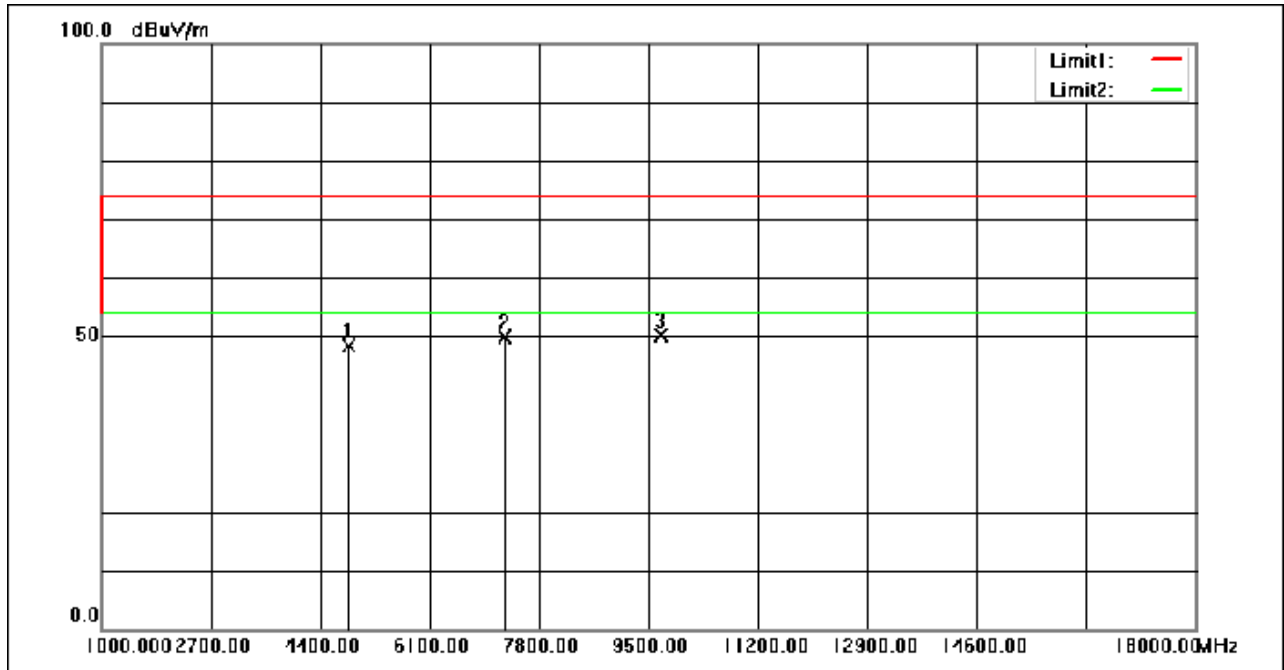
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Test Mode: 00; Polarity: Horizontal; Modulation: 802.11n; Bandwidth: 40MHz; Channel: Low



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4844.000	57.16	-8.71	48.45	74.00	-25.55	peak
2	7266.000	55.64	-5.83	49.81	74.00	-24.19	peak
3	9688.000	51.46	-1.36	50.10	74.00	-23.90	peak



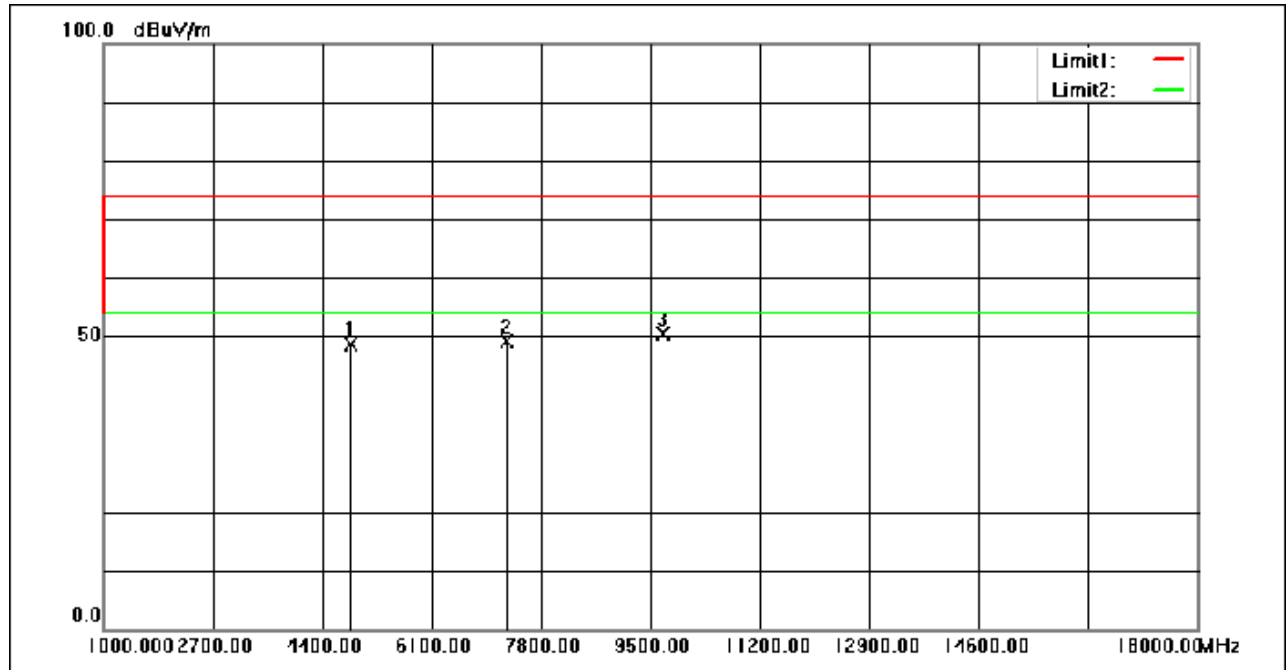
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Test Mode: 00; Polarity: Vertical; Modulation: 802.11n; Bandwidth: 40MHz; Channel: Low



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4844.000	57.28	-8.71	48.57	74.00	-25.43	peak
2	7266.000	54.99	-5.83	49.16	74.00	-24.84	peak
3	9688.000	51.78	-1.36	50.42	74.00	-23.58	peak



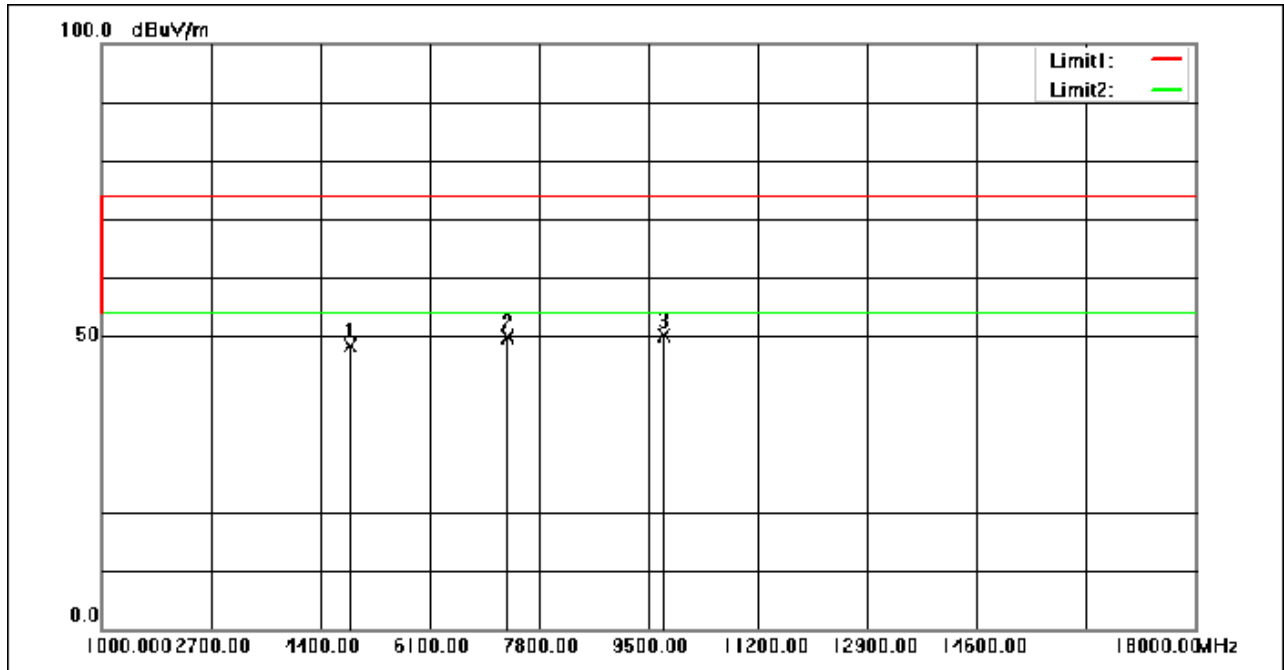
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Test Mode: 00; Polarity: Horizontal; Modulation: 802.11n; Bandwidth: 40MHz; Channel: middle



No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4874.000	56.97	-8.61	48.36	74.00	-25.64	peak
2	7311.000	55.65	-5.78	49.87	74.00	-24.13	peak
3	9748.000	51.68	-1.43	50.25	74.00	-23.75	peak



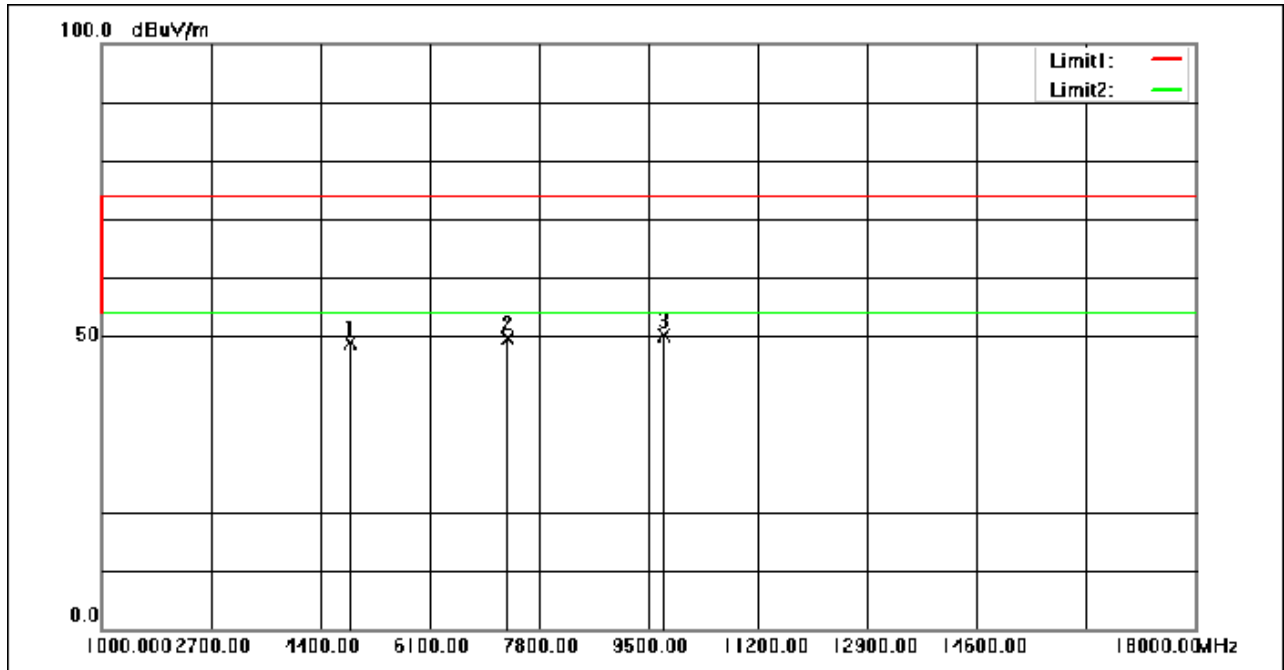
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Test Mode: 00; Polarity: Vertical; Modulation: 802.11n; Bandwidth: 40MHz; Channel: middle



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4874.000	57.52	-8.61	48.91	74.00	-25.09	peak
2	7311.000	55.39	-5.78	49.61	74.00	-24.39	peak
3	9748.000	51.60	-1.43	50.17	74.00	-23.83	peak



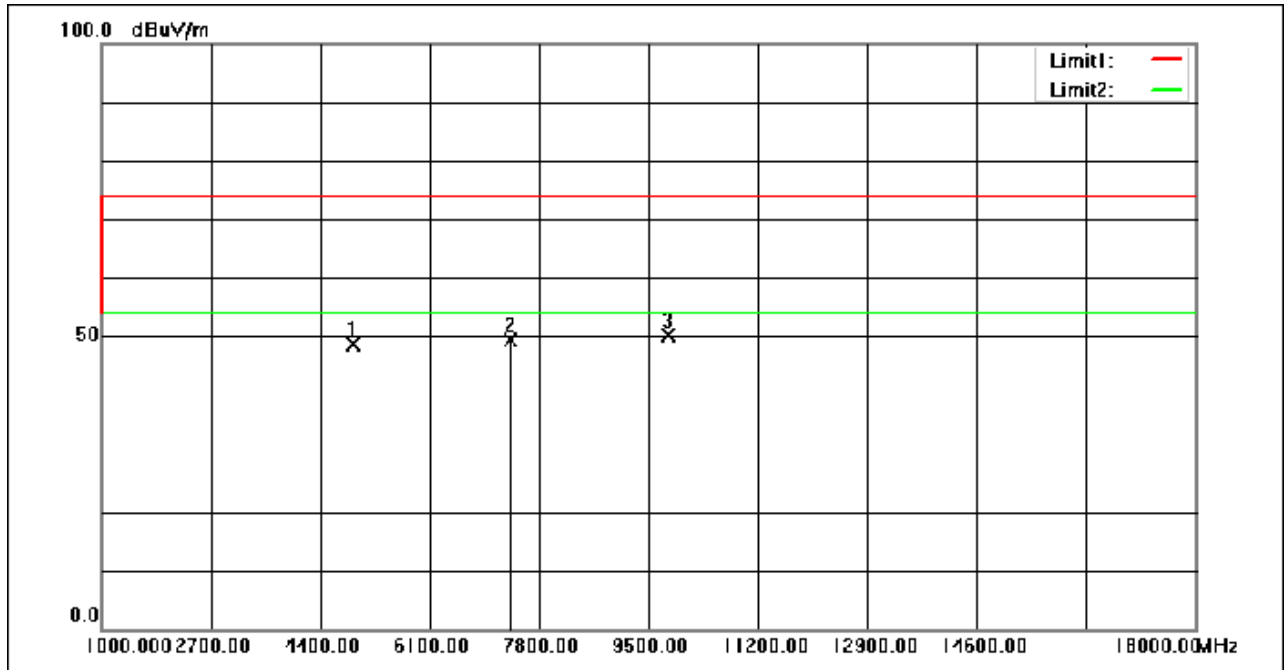
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Test Mode: 00; Polarity: Horizontal; Modulation: 802.11n; Bandwidth: 40MHz; Channel: High



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4904.000	57.11	-8.51	48.60	74.00	-25.40	peak
2	7356.000	55.10	-5.73	49.37	74.00	-24.63	peak
3	9808.000	51.61	-1.47	50.14	74.00	-23.86	peak



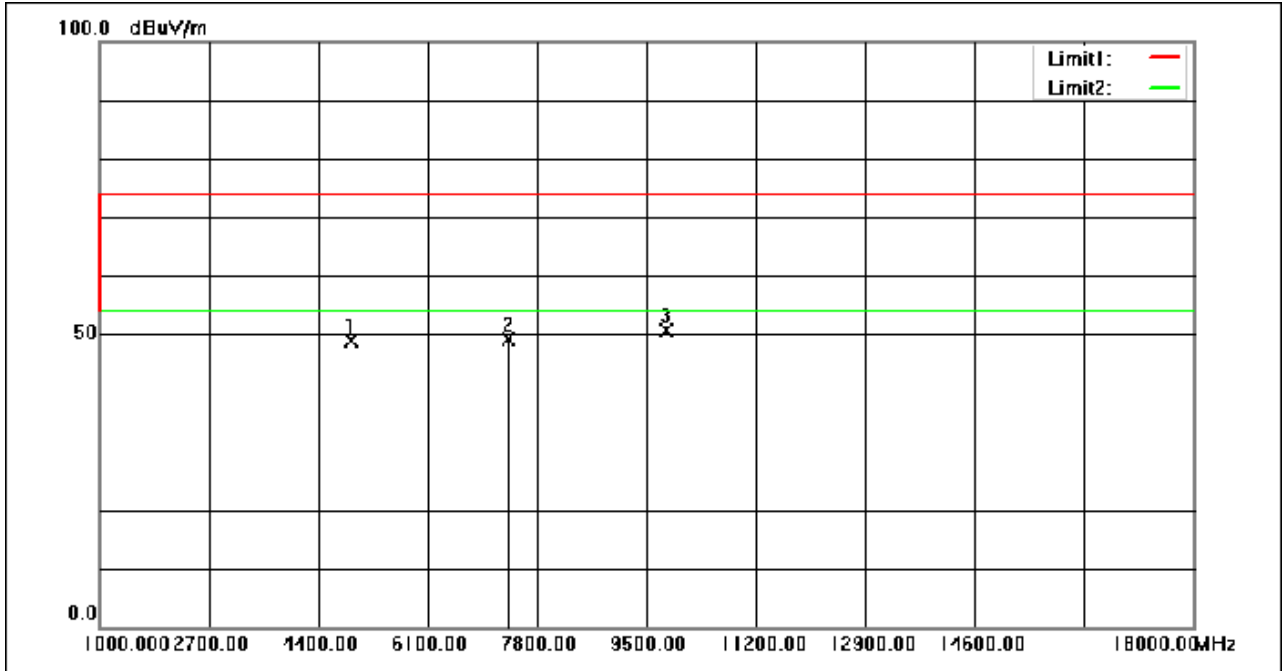
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Test Mode: 00; Polarity: Vertical; Modulation: 802.11n; Bandwidth: 40MHz; Channel: High



No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4904.000	57.30	-8.51	48.79	74.00	-25.21	peak
2	7356.000	54.86	-5.73	49.13	74.00	-24.87	peak
3	9808.000	51.99	-1.47	50.52	74.00	-23.48	peak



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7.9 99% Bandwidth

Test Requirement RSS-Gen Section 6.7
Test Method: ANSI C63.10 Section 6.9.3

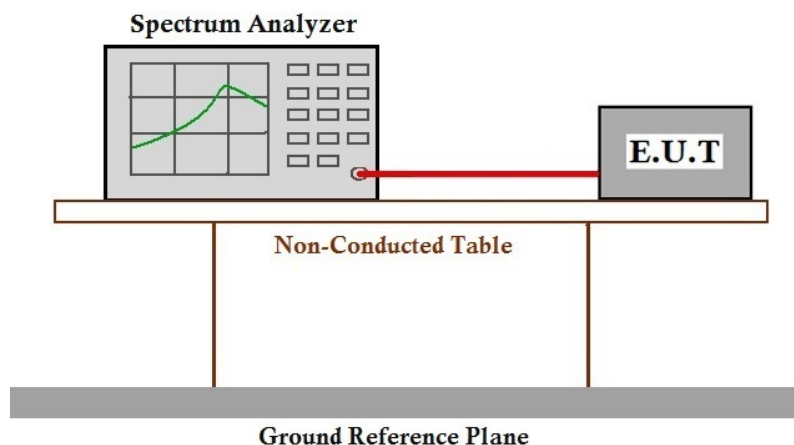
7.9.1 E.U.T. Operation

Operating Environment:
Temperature: 18.9 °C Humidity: 29.4 % RH Atmospheric Pressure: 1010 mbar

7.9.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40). Only the data of worst case is recorded in the report.

7.9.3 Test Setup Diagram



7.9.4 Measurement Procedure and Data

Please Refer to Appendix A for KSCR220100014201



8 Emission Test Results

8.1 Conducted Emissions at AC Power Line (150kHz-30MHz)

Test Requirement: 47 CFR Part 15, Subpart C 15.247
RSS-Gen Issue 5 April 2018 Amendment 2

Test Method: ANSI C63.10 (2013) Section 6.2

Limit:

Frequency of emission(MHz)	Conducted limit(dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50
*Decreases with the logarithm of the frequency.		
Detector: Peak for pre-scan (9kHz resolution bandwidth) 0.15M to 30MHz		

8.1.1 E.U.T. Operation

Operating Environment:
Temperature: 22.6 °C Humidity: 18.7 % RH Atmospheric Pressure: 1010 mbar

8.1.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40). Only the data of worst case is recorded in the report.



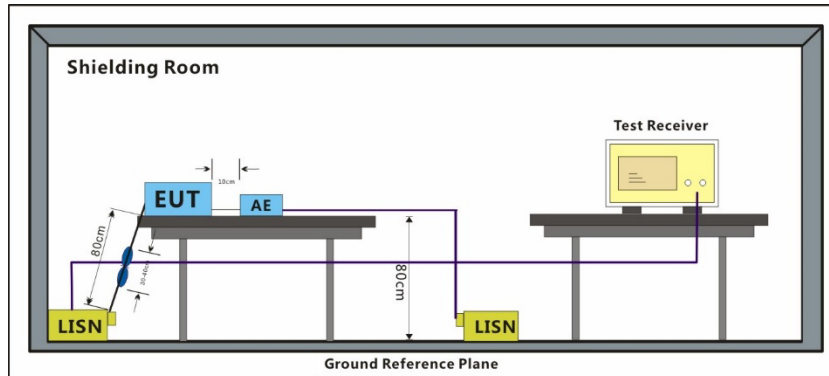
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8.1.3 Test Setup Diagram



8.1.4 Measurement Procedure and Data

- 1) The mains terminal disturbance voltage test was conducted in a shielded room.
- 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50ohm/50μH + 5ohm linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.
- 3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane.
- 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.
- 5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.

Remark: LISN=Read Level+ Cable Loss+ LISN Factor



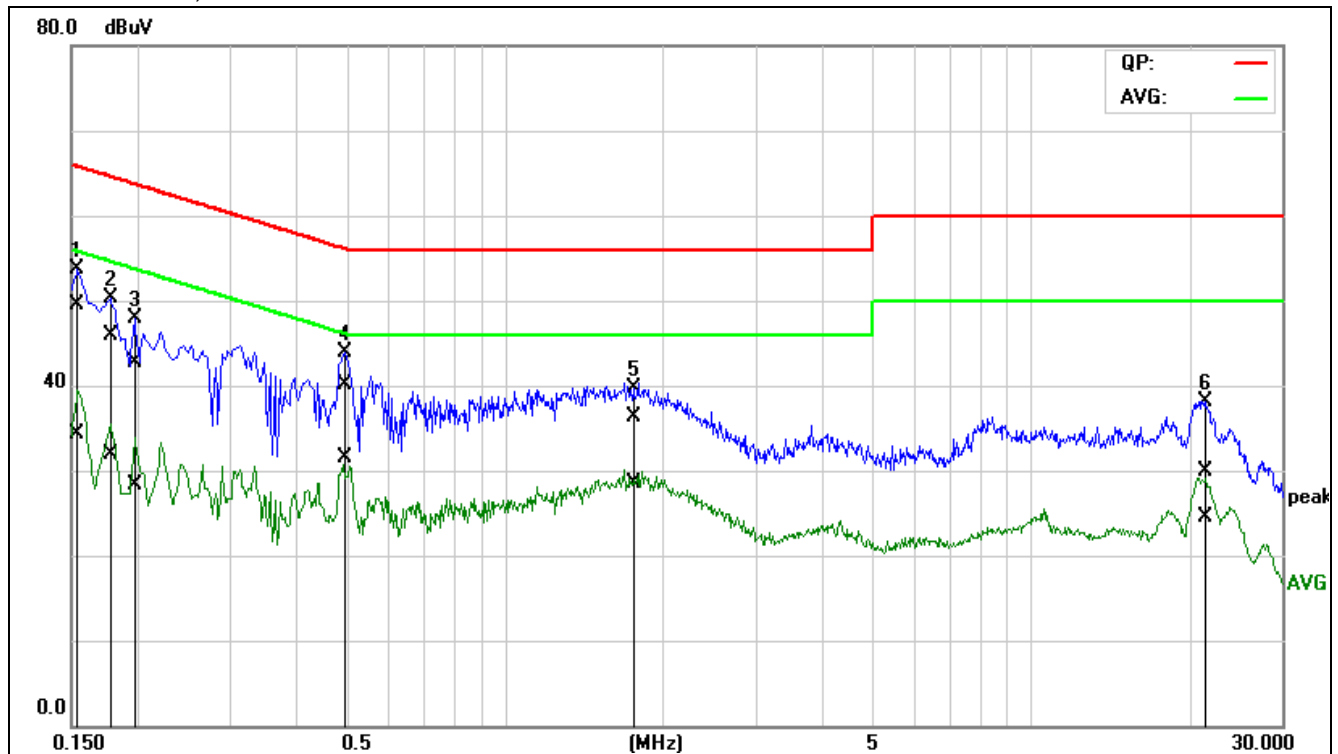
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Test Mode: 00; Line: Live line



No.	Frequency (MHz)	QuasiPeak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	QuasiPeak result (dBuV)	Average result (dBuV)	QuasiPeak limit (dBuV)	Average limit (dBuV)	QuasiPeak margin (dB)	Average margin (dB)	Remark
1	0.1522	29.93	14.88	19.50	49.43	34.38	65.87	55.88	-16.44	-21.50	Pass
2	0.1754	26.35	12.38	19.50	45.85	31.88	64.70	54.70	-18.85	-22.82	Pass
3	0.1975	23.18	8.90	19.50	42.68	28.40	63.71	53.72	-21.03	-25.32	Pass
4*	0.4970	20.57	11.86	19.56	40.13	31.42	56.05	46.05	-15.92	-14.63	Pass
5	1.7256	16.58	8.95	19.63	36.21	28.58	56.00	46.00	-19.79	-17.42	Pass
6	21.4523	9.58	4.23	20.36	29.94	24.59	60.00	50.00	-30.06	-25.41	Pass



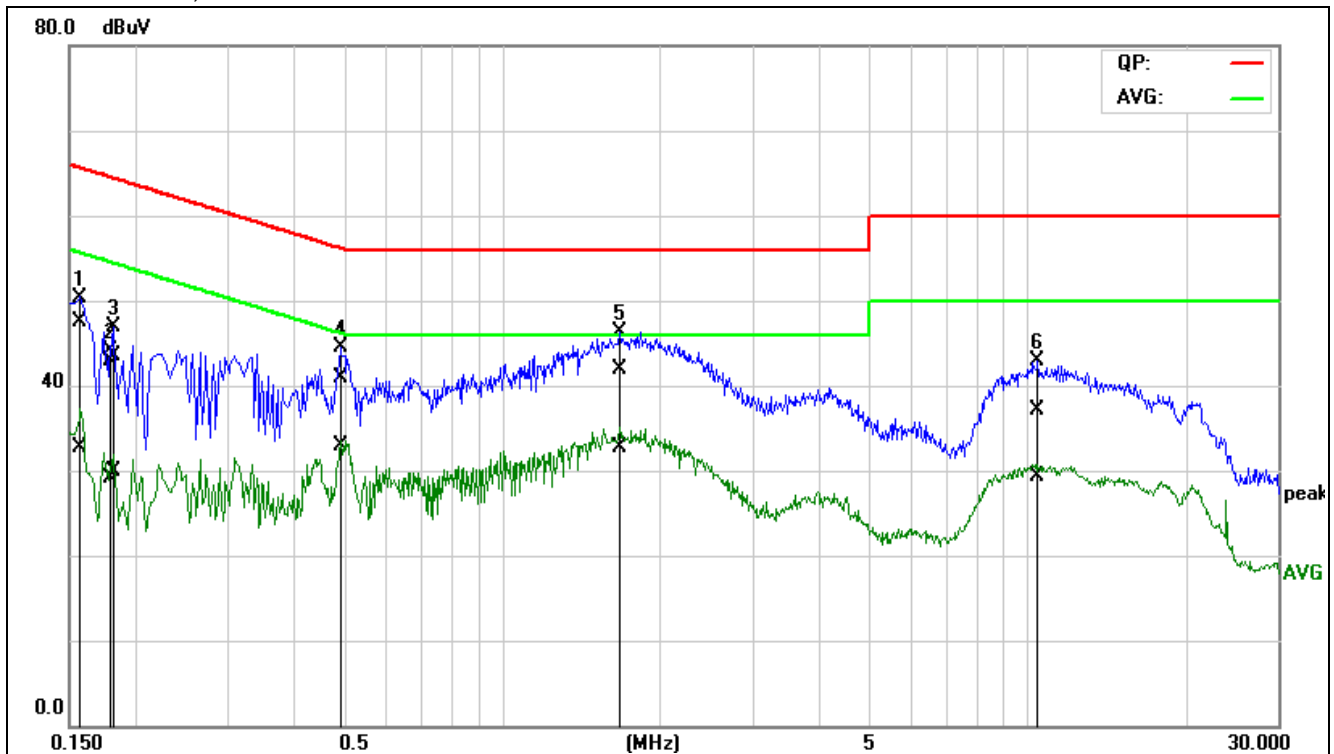
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Test Mode: 00; Line: Neutral Line



No.	Frequency (MHz)	QuasiPeak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	QuasiPeak result (dBuV)	Average result (dBuV)	QuasiPeak limit (dBuV)	Average limit (dBuV)	QuasiPeak margin (dB)	Average margin (dB)	Remark
1	0.1544	27.93	13.26	19.48	47.41	32.74	65.75	55.76	-18.34	-23.02	Pass
2	0.1770	23.38	9.59	19.49	42.87	29.08	64.62	54.63	-21.75	-25.55	Pass
3	0.1795	24.11	10.46	19.49	43.60	29.95	64.50	54.51	-20.90	-24.56	Pass
4*	0.4950	21.31	13.35	19.56	40.87	32.91	56.08	46.08	-15.21	-13.17	Pass
5	1.6559	22.19	12.99	19.63	41.82	32.62	56.00	46.00	-14.18	-13.38	Pass
6	10.5153	17.15	9.18	20.05	37.20	29.23	60.00	50.00	-22.80	-20.77	Pass



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9 Test Setup Photographs

Refer to the < Test Setup photos-FCC>.

10 EUT Constructional Details

Refer to the < External Photos > & < Internal Photos >.

- End of the Report -



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