TEST REPORT

Application No.:	SHCR2304000695EV
FCC ID:	2BAZLBHZD-A40A
IC:	30442-BHZD40
Applicant:	Nlightend Smart Tech Co.,Ltd
Address of Applicant:	No.528, Daluzhou, Meilin street, Ninghai county, Ningbo, China
Manufacturer:	Nlightend Smart Tech Co.,Ltd
Address of Manufacturer:	No.528, Daluzhou, Meilin street, Ninghai county, Ningbo, China
Factory:	Nlightend Smart Tech Co.,Ltd
Address of Factory:	No.528, Daluzhou, Meilin street, Ninghai county, Ningbo, China
Equipment Under Test (EUT):	
EUT Name:	AC Charging Pile
Model No.:	BHZD-A32A, BHZD-A40A, BHZD-A50A ♣
Remark ♣:	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 RSS-Gen Issue 5 Amendment 2 (February 2021)
Date of Receipt:	2023-04-10
Date of Test:	2023-05-05 to 2023-05-17
Date of Issue:	2023-05-30
Test Result:	**Pass***

* In the configuration tested, the EUT complied with the standards specified above.

Parlam Zhan
Laboratory Manager

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Revision Record			
Version	**Description**	**Date**	**Remark**
00	Original	2023-05-30	/

Authorized for issue by:				
		Bill Wu **Bill Wu/Project Engineer**		
		Parlam Zhan **Parlam Zhan / Reviewer**		

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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 11.10.3	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. The maximum output current of BHZD-A32A is 32A and the maximum output current of BHZD-A40A, BHZD-A50A is 40A, hardware was same, the current is adjust by software, and different currents have no effect on RF circuits, Consider the difference only the model BHZD-A50A was tested since their differences was only the model number and maximum output current.

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4 General Information

4.1 Details of E.U.T.

Power supply:	AC 240V/60Hz
Test Voltage:	AC 240V/60Hz
Operation Frequency:	802.11b/g/n(HT20): 2412MHz to 2462MHz
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
Channel Spacing:	5MHz
Antenna Type:	PCB Antenna
Antenna Gain:	2.54dBi (Provided by manufacturer)
Date Rate:	802.11b:1/2/5.5./11Mbps 802.11g:6/9/12/18/24/36/48/54Mbps 802.11n:MCS0-MCS7
S/N:	BHZD-A40A-A1
Firmware Version:	V2.6

4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
Laptop	LENOVO	L460	-
Serial port adapter plate	-	Test Plate 3	-

4.3 Power level setting using in test

Channel	802.11b	802.11g	802.11n(HT20)
Low	86	90	92
Middle	86	90	92
High	86	90	92

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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	0.4%
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-6GHz)
		5.4dB (6GHz-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.

4.5 Test Location

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Tel: +86 21 6191 5666 Fax: +86 21 6191 5678
No tests were sub-contracted.
Note:
1. SGS is not responsible for wrong test results due to incorrect information (e.g. max. clock frequency, highest internal frequency, antenna gain, cable loss, etc) is provided by the applicant. (if applicable).
2. SGS is not responsible for the authenticity, integrity and the validity of the conclusion based on results of the data provided by applicant. (if applicable).

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• FCC (Designation Number: CN1301)

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been recognized as an accredited testing laboratory.

• ISED (CAB Identifier: CN0020)

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• VCCI (Member No.: 3061)

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4.7 Deviation from Standards

None

4.8 Abnormalities from Standard Conditions

None

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5 Equipment List

Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
RF Conducted Test					
Spectrum Analyzer	R&S	FSP-30	SHEM002-1	2022-12-20	2023-12-19
Spectrum Analyzer	Keysight	N9020B	SHEM241-1	2022-12-20	2023-12-19
Spectrum Analyzer	Agilent	N9020A	SHEM181-1	2022-08-02	2023-08-01
Signal Generator	R&S	SMR20	SHEM006-1	2022-08-02	2023-08-01
Signal Generator	Agilent	N5182A	SHEM182-1	2022-08-02	2023-08-01
Communication Tester	R&S	CMW270	SHEM183-1	2022-07-25	2023-07-24
Communication Tester	R&S	CMW500	SHEM268-1	2022-07-25	2023-07-24
Power Sensor	Keysight	U2021XA * 4	SHEM184-1	2022-08-02	2023-08-01
Splitter	Anritsu	MA1612A	SHEM185-1	/	/
Coupler	e-meca	803-S-1	SHEM186-1	/	/
High-low Temp Cabinet	Suzhou Zhihe	TL-40	SHEM087-1	2022-11-08	2024-11-07
AC Power Stabilizer	APC	KDF-31020T-V0-F0	SHEM216-1	2022-12-20	2023-12-19
DC Power Supply	MCH	MCH-303A	SHEM210-1	2022-12-20	2023-12-19
Conducted test Cable	/	RF01~RF04	/	2022-12-20	2023-12-19
Switcher	Tonscend	JS0806	SHEM184-1	2022-08-02	2023-08-01
Test software	Tonscend	JS Tonscend BT/WIFI System	Version: 2.6	/	/
Coaxial Cable	TST		SHEM263-1	2022-08-02	2023-08-01
Test software	TST	TST PASS	Version: 2.0	/	/
RF Radiated Test					
EMI test Receiver	R&S	ESU40	SHEM051-1	2022-12-20	2023-12-19
Spectrum Analyzer	R&S	FSP-30	SHEM002-1	2022-12-20	2023-12-19
Communication Tester	R&S	CMW500	SHEM268-1	2022-07-25	2023-07-24
Loop Antenna (9kHz-30MHz)	Schwarzbeck	FMZB1519	SHEM135-1	2022-12-20	2023-12-19
Antenna (25MHz-2GHz)	Schwarzbeck	VULB9168	SHEM048-1	2021-09-11	2023-09-10
Antenna (25MHz-2GHz)	Schwarzbeck	VULB9168	SHEM202-1	2022-05-07	2024-05-06
Horn Antenna (1-18GHz)	Schwarzbeck	HF906	SHEM009-1	2022-08-11	2024-08-10
Horn Antenna (1-18GHz)	Schwarzbeck	BBHA9120D	SHEM050-1	2021-09-18	2023-09-17
Horn Antenna (14-40GHz)	Schwarzbeck	BBHA 9170	SHEM049-1	2021-09-18	2023-09-17
Pre-Amplifier	HP	8447D	SHEM236-1	2022-08-02	2023-08-01
High-amplifier (14-40GHz)	Schwarzbeck	10001	SHEM049-2	2022-12-20	2023-12-19
Band Filter	LORCH	9BRX-875/X150	SHEM156-1	/	/
Band Filter	LORCH	13BRX-1950/X500	SHEM083-2	/	/
Band Filter	LORCH	5BRX-2400/X200	SHEM155-1	/	/
Band Filter	LORCH	5BRX-5500/X1000	SHEM157-2	/	/
High pass Filter	Wainwright	WHK3.0/18G	SHEM157-1	/	/
High pass Filter	Wainwright	WHKS1700	SHEM157-3	/	/
Semi/Fully Anechoic	ST	11*6*6M	SHEM078-2	2021-05-25	2024-05-24
RE test Cable	/	RE01, RE02, RE06	/	2023-01-07	2024-01-06
Test software	ESE	E3	Version: 6.111221a	/	/

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Conducted Emissions at Mains Terminals (150kHz-30MHz)					
Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal Date**	**Cal Due Date**
EMI test receiver	Rohde & Schwarz	ESR7	SHEM162-1	2022/12/20	2023/12/19
Line impedance stabilization network	SCHWARZBECK	NSLK8127	SHEM061-1	2022/12/20	2023/12/19
Line impedance stabilization network	EMCO	3816_2	SHEM019-1	2022/12/20	2023/12/19
Pulse limiter	Rohde & Schwarz	ESH3-Z2	SHEM029-1	2022/12/20	2023/12/19
Shielding Room	ZHONGYU	8*4*3M	SHEM079-2	2020/12/20	2023/12/19
CE test Cable	/	/	SHEM172-1	2022/12/20	2023/12/19
Test Software	ESE	e3	Version: 6.191211	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 is PCB antenna and no consideration of replacement. The best case gain of the antenna is 2 dBi.

Antenna location: Refer to internal photo.

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7 Radio Spectrum Matter Test Results

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

Test Requirement 47 CFR Part 15, Subpart C 15.207
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		

7.1.1 E.U.T. Operation

Operating Environment:
Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1010 mbar

7.1.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	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), final test modes are considering the modulation and worse data rates. Only the data of worst case is recorded in the report.

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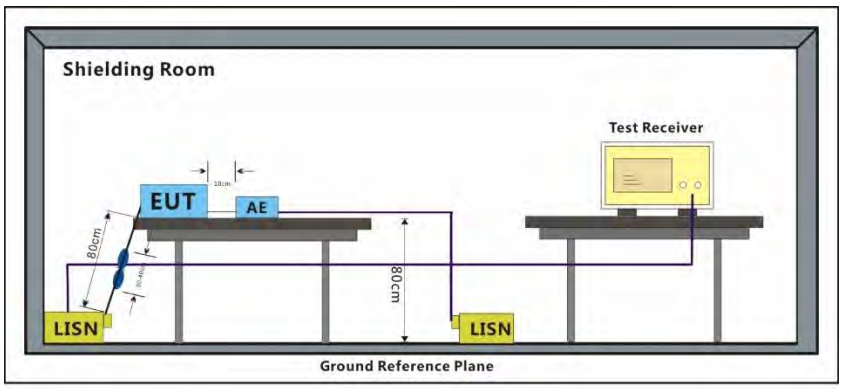
7.1.3 Test Setup Diagram



7.1.4 Measurement Procedure and Data

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: Level=Read Level+ Cable Loss+ LISN Factor

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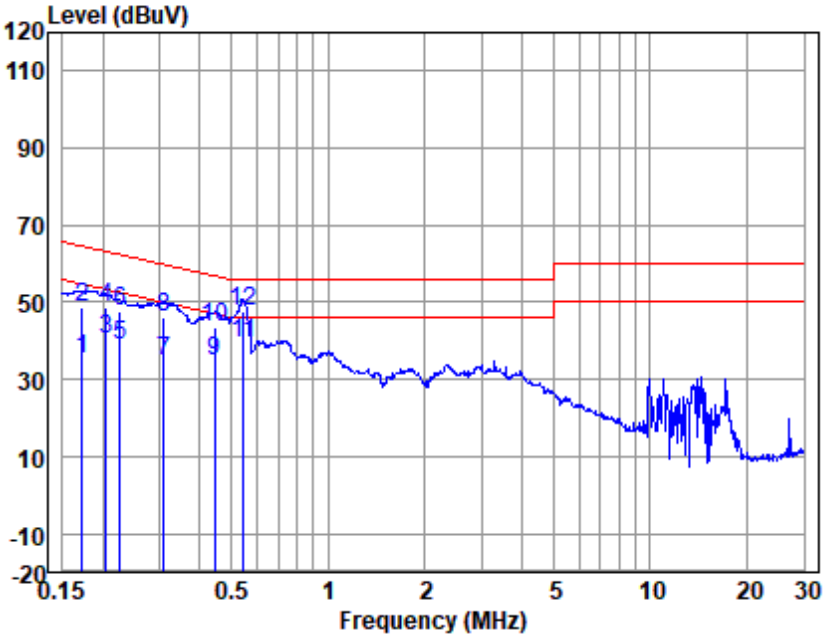
Test Mode: 01; Line: Live line



LISN : LINE
EUT/Project No : 00695EV
Test Mode : 01

	Freq (MHz)	Read level (dBuV)	LISN Factor (dB)	Cable Loss (dB)	Emission Level (dBuV)	Limit (dBuV)	Over Limit (dB)	Remark
1	0.17	24.99	0.40	9.87	35.26	54.86	-19.60	Average
2	0.17	38.64	0.40	9.87	48.91	64.86	-15.95	QP
3	0.20	29.93	0.39	9.87	40.19	53.45	-13.26	Average
4	0.20	38.70	0.39	9.87	48.96	63.45	-14.49	QP
5	0.23	28.70	0.37	9.87	38.94	52.57	-13.63	Average
6	0.23	37.40	0.37	9.87	47.64	62.57	-14.93	QP
7	0.31	24.49	0.30	9.87	34.66	49.97	-15.31	Average
8	0.31	36.14	0.30	9.87	46.31	59.97	-13.66	QP
9	0.44	24.47	0.22	9.87	34.56	46.98	-12.42	Average
10	0.44	33.65	0.22	9.87	43.74	56.98	-13.24	QP
11	0.55	29.26	0.20	9.86	39.32	46.00	-6.68	Average
12	0.55	37.64	0.20	9.86	47.70	56.00	-8.30	QP

Notes: Emission Level = Read Level +LISN Factor + Cable loss

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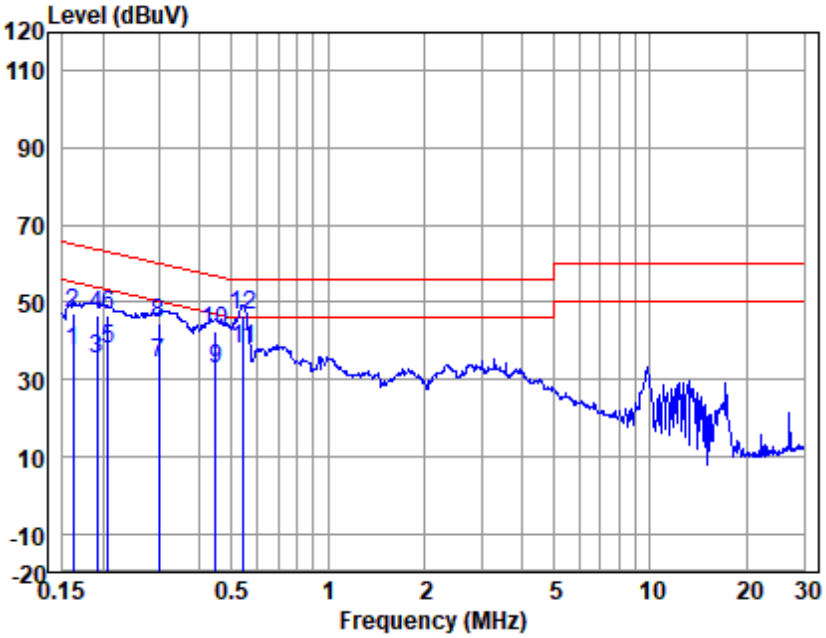
Test Mode: 01; Line: Neutral Line



LISN : NEUTRAL
EUT/Project No : 00695EV
Test Mode : 01

	Freq (MHz)	Read level (dBuV)	LISN Factor (dB)	Cable Loss (dB)	Emission Level (dBuV)	Limit (dBuV)	Over Limit (dB)	Remark
1	0.16	26.91	0.33	9.87	37.11	55.38	-18.27	Average
2	0.16	36.89	0.33	9.87	47.09	65.38	-18.29	QP
3	0.19	25.12	0.30	9.87	35.29	53.93	-18.64	Average
4	0.19	36.66	0.30	9.87	46.83	63.93	-17.10	QP
5	0.21	27.76	0.30	9.87	37.93	53.32	-15.39	Average
6	0.21	36.27	0.30	9.87	46.44	63.32	-16.88	QP
7	0.30	23.87	0.30	9.87	34.04	50.28	-16.24	Average
8	0.30	34.41	0.30	9.87	44.58	60.28	-15.70	QP
9	0.45	22.61	0.30	9.87	32.78	46.93	-14.15	Average
10	0.45	32.08	0.30	9.87	42.25	56.93	-14.68	QP
11	0.55	27.90	0.30	9.86	38.06	46.00	-7.94	Average
12	0.55	36.28	0.30	9.86	46.44	56.00	-9.56	QP

Notes: Emission Level = Read Level +LISN Factor + Cable loss

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7.2 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≤ 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

7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 23.8 °C Humidity: 63.4 % RH Atmospheric Pressure: 1010 mbar

7.2.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	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), final test modes are considering the modulation and worse data rates. Only the data of worst case is recorded in the report.

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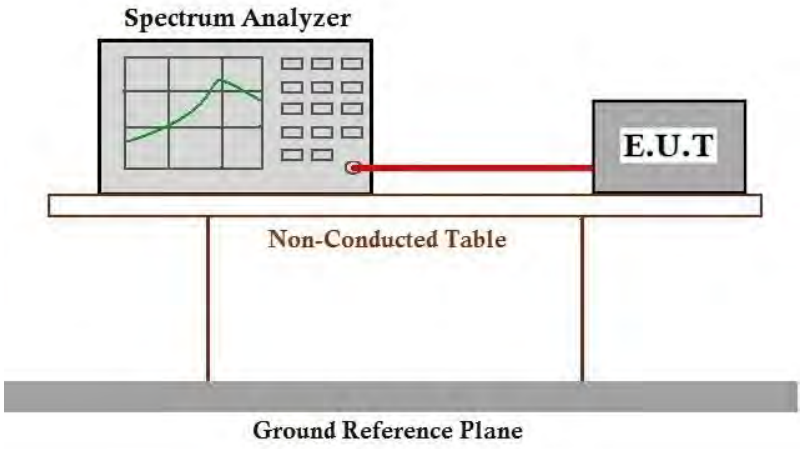
7.2.3 Test Setup Diagram



7.2.4 Measurement Procedure and Data

Note: Since the verify power the same operating range bandwidth and smaller power can be covered by the higher power.

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7.3 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

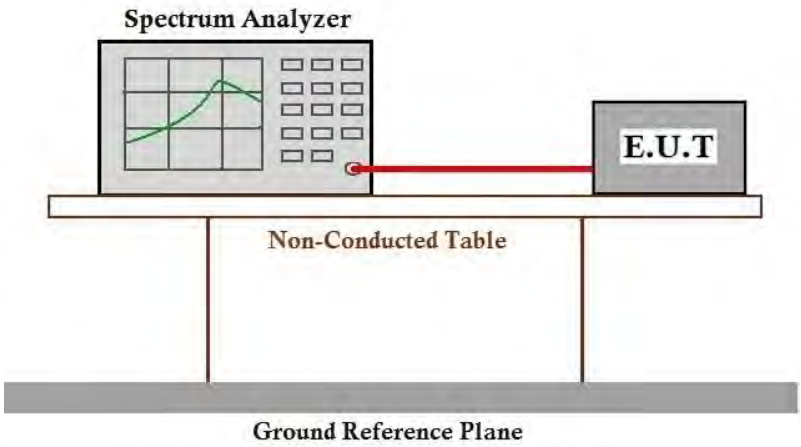
7.3.1 E.U.T. Operation

Operating Environment:
Temperature: 23.8 °C Humidity: 63.2 % RH Atmospheric Pressure: 1010 mbar

7.3.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	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), final test modes are considering the modulation and worse data rates. Only the data of worst case is recorded in the report.

7.3.3 Test Setup Diagram



7.3.4 Measurement Procedure and Data

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7.4 Power Spectrum Density

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

Test Method: ANSI C63.10 (2013) Section 11.10.3

Limit:

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

7.4.1 E.U.T. Operation

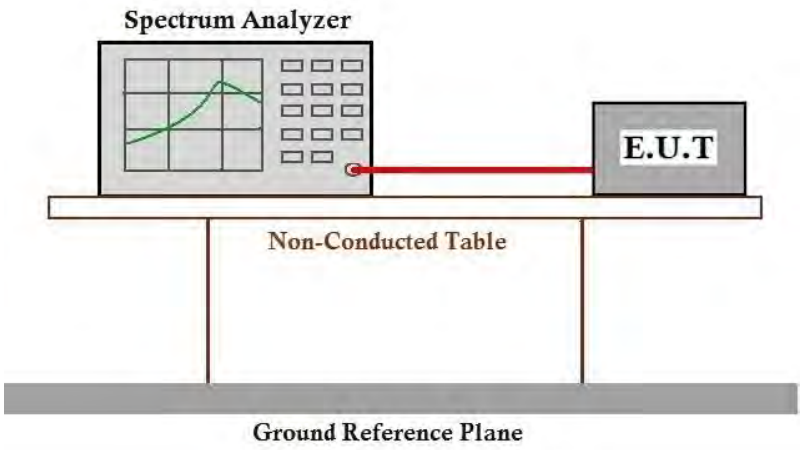
Operating Environment:

Temperature: 23.8 °C Humidity: 63.2 % RH Atmospheric Pressure: 1010 mbar

7.4.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	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), final test modes are considering the modulation and worse data rates. Only the data of worst case is recorded in the report.

7.4.3 Test Setup Diagram



7.4.4 Measurement Procedure and Data

Please Refer to Appendix for Details

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7.5 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).

7.5.1 E.U.T. Operation

Operating Environment:

Temperature: 23.8 °C Humidity: 63.3 % RH Atmospheric Pressure: 1010 mbar

7.5.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	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), final test modes are considering the modulation and worse data rates. Only the data of worst case is recorded in the report.

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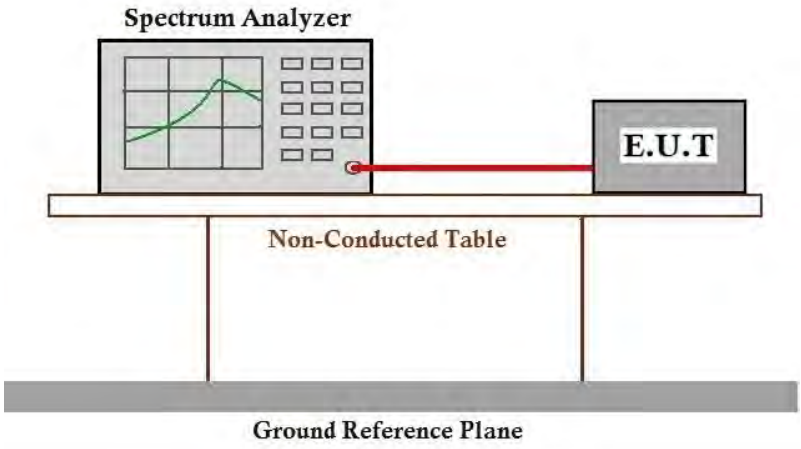
7.5.3 Test Setup Diagram



7.5.4 Measurement Procedure and Data

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7.6 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).

7.6.1 E.U.T. Operation

Operating Environment:

Temperature: 23.8 °C Humidity: 63.4 % RH Atmospheric Pressure: 1010 mbar

7.6.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	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), final test modes are considering the modulation and worse data rates. Only the data of worst case is recorded in the report.

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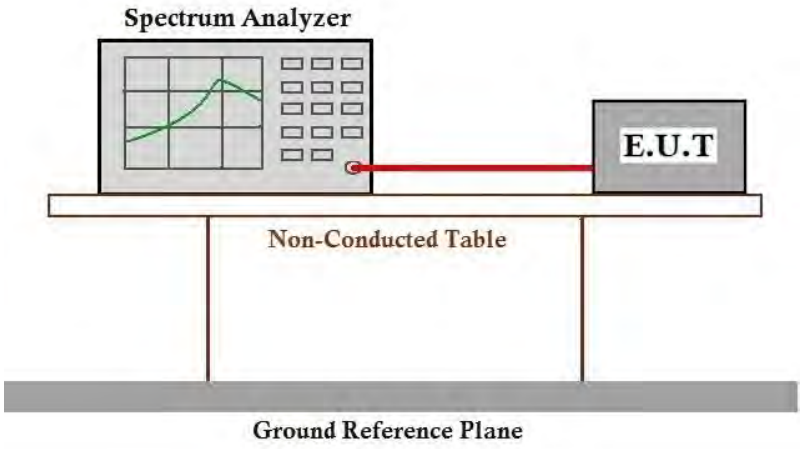
7.6.3 Test Setup Diagram



7.6.4 Measurement Procedure and Data

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7.7 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.		

7.7.1 E.U.T. Operation

Operating Environment:

Temperature: 23.8 °C Humidity: 63.3 % RH Atmospheric Pressure: 1010 mbar

7.7.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	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), final test modes are considering the modulation and worse data rates. Only the data of worst case is recorded in the report.

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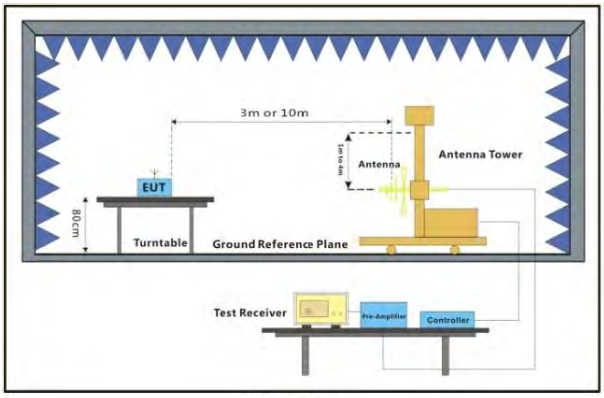
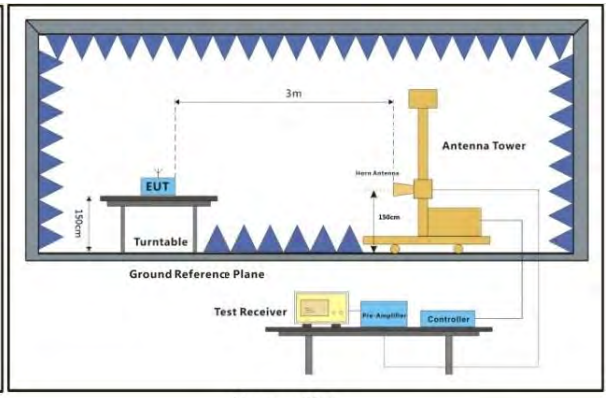
7.7.3 Test Setup Diagram



30MHz-1GHz



Above 1GHz

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. 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.

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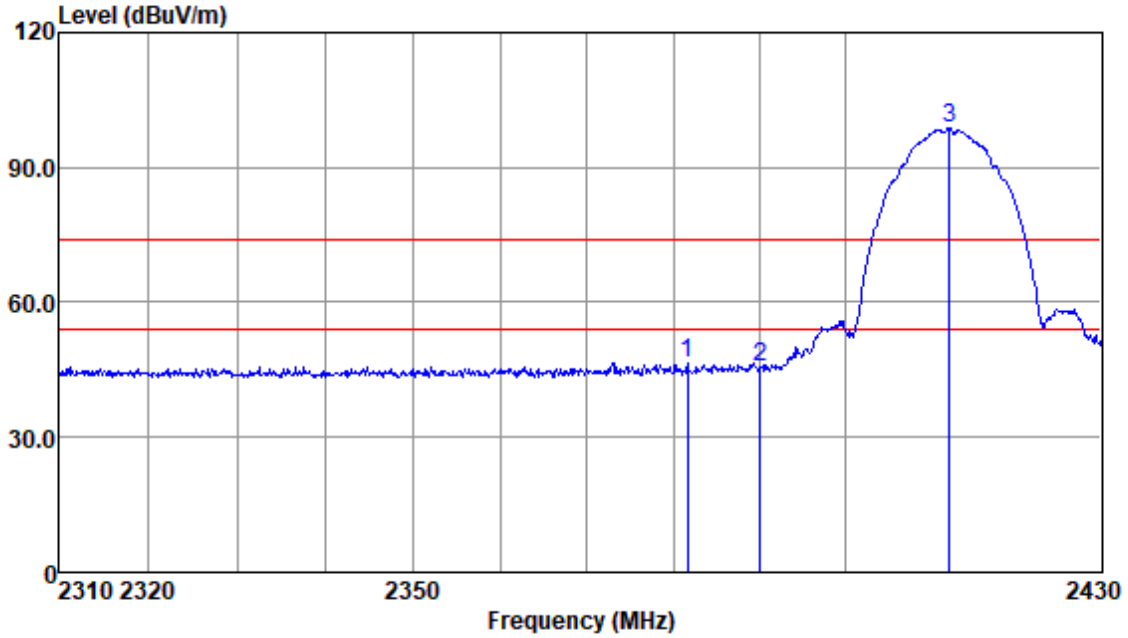
Test Mode: 01; Polarity: Horizontal; Modulation:802.11b; Bandwidth:20MHz; Channel:Low



Antenna Polarity :HORIZONTAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
2381.63	49.78	28.76	3.14	35.17	46.51	74.00	-27.49	Peak
2390.00	48.81	28.80	3.13	35.18	45.56	74.00	-28.44	Peak
2412.10	101.87	28.90	3.13	35.20	98.70	74.00	24.70	Peak

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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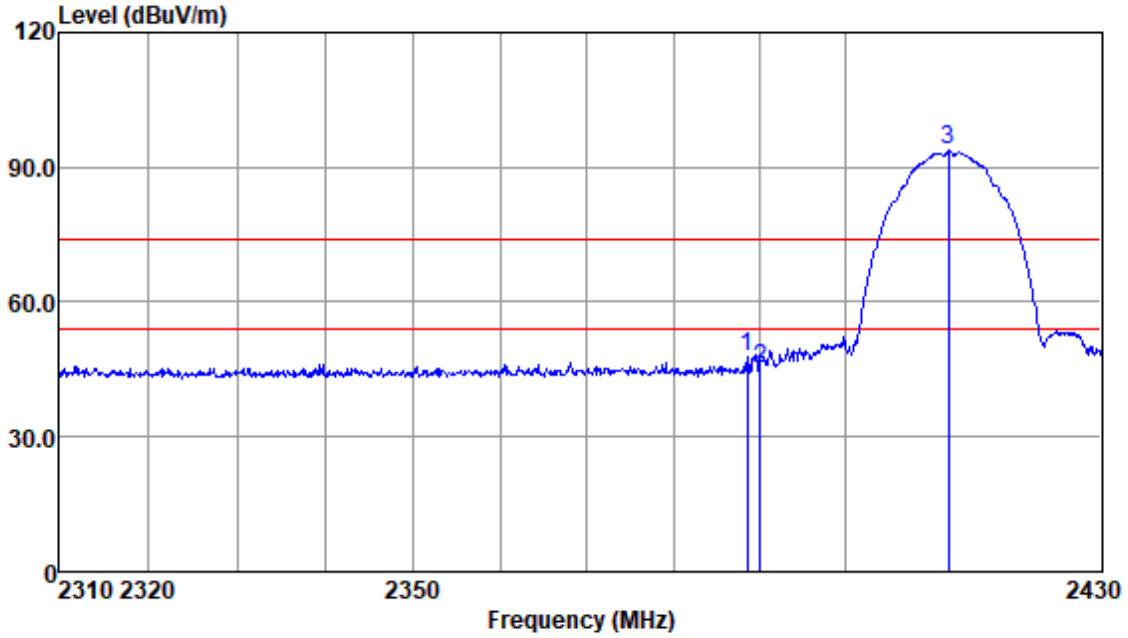
Test Mode: 01; Polarity: Vertical; Modulation:802.11b; Bandwidth:20MHz; Channel:Low



Antenna Polarity :VERTICAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
2388.52	51.23	28.80	3.13	35.18	47.98	74.00	-26.02	Peak
2390.00	48.41	28.80	3.13	35.18	45.16	74.00	-28.84	Peak
2411.98	96.90	28.90	3.13	35.20	93.73	74.00	19.73	Peak

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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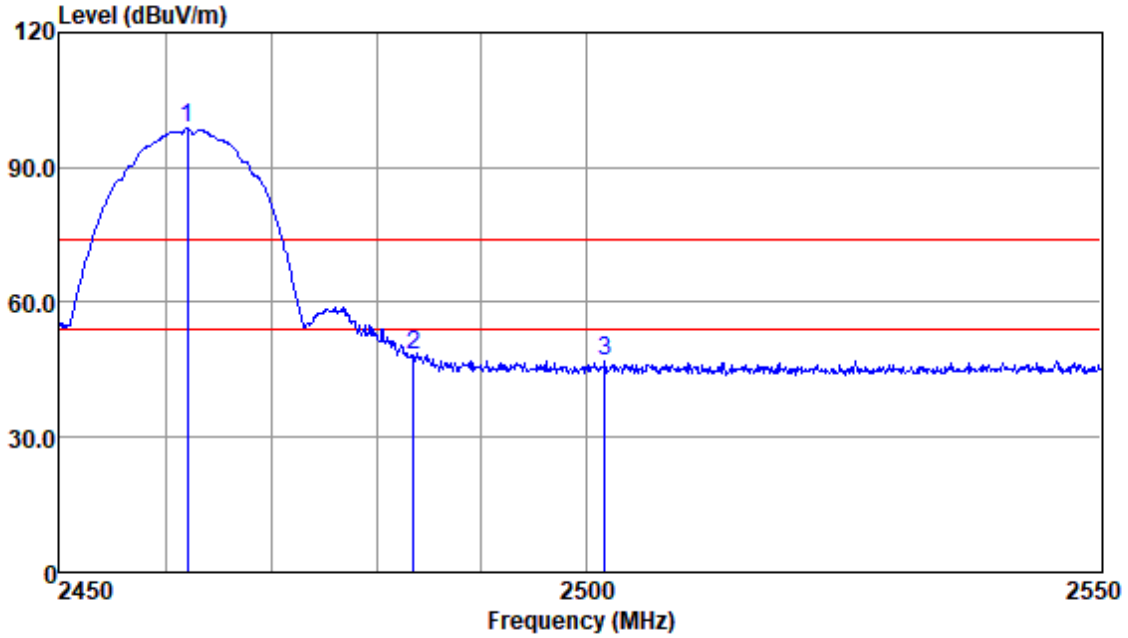
Test Mode: 01; Polarity: Horizontal; Modulation:802.11b; Bandwidth:20MHz; Channel:High



Antenna Polarity :HORIZONTAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
2462.09	101.77	29.05	3.16	35.24	98.74	74.00	24.74	Peak
2483.50	51.40	29.09	3.20	35.26	48.43	74.00	-25.57	Peak
2501.80	49.98	29.12	3.23	35.27	47.06	74.00	-26.94	Peak

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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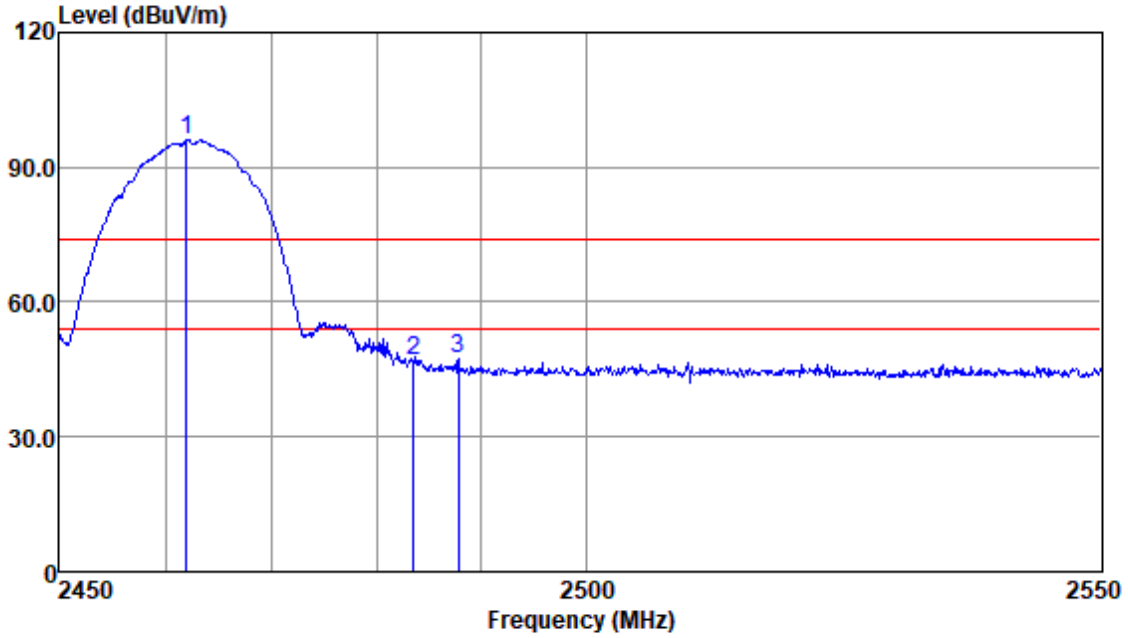
Test Mode: 01; Polarity: Vertical; Modulation:802.11b; Bandwidth:20MHz; Channel:High



Antenna Polarity :VERTICAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
2461.99	99.20	29.05	3.16	35.24	96.17	74.00	22.17	Peak
2483.50	49.88	29.09	3.20	35.26	46.91	74.00	-27.09	Peak
2487.83	50.19	29.09	3.23	35.26	47.25	74.00	-26.75	Peak

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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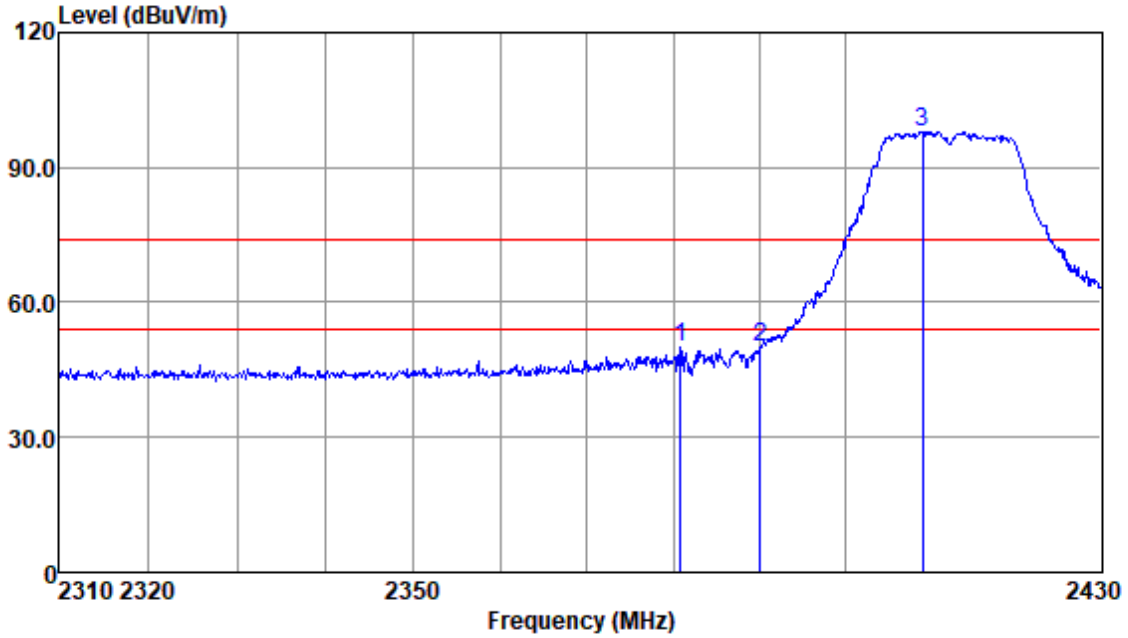
Test Mode: 01; Polarity: Horizontal; Modulation:802.11g; Bandwidth:20MHz; Channel:Low



Antenna Polarity :HORIZONTAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
2380.79	53.21	28.76	3.14	35.17	49.94	74.00	-24.06	Peak
2390.00	53.16	28.80	3.13	35.18	49.91	74.00	-24.09	Peak
2408.93	101.25	28.89	3.13	35.20	98.07	74.00	24.07	Peak

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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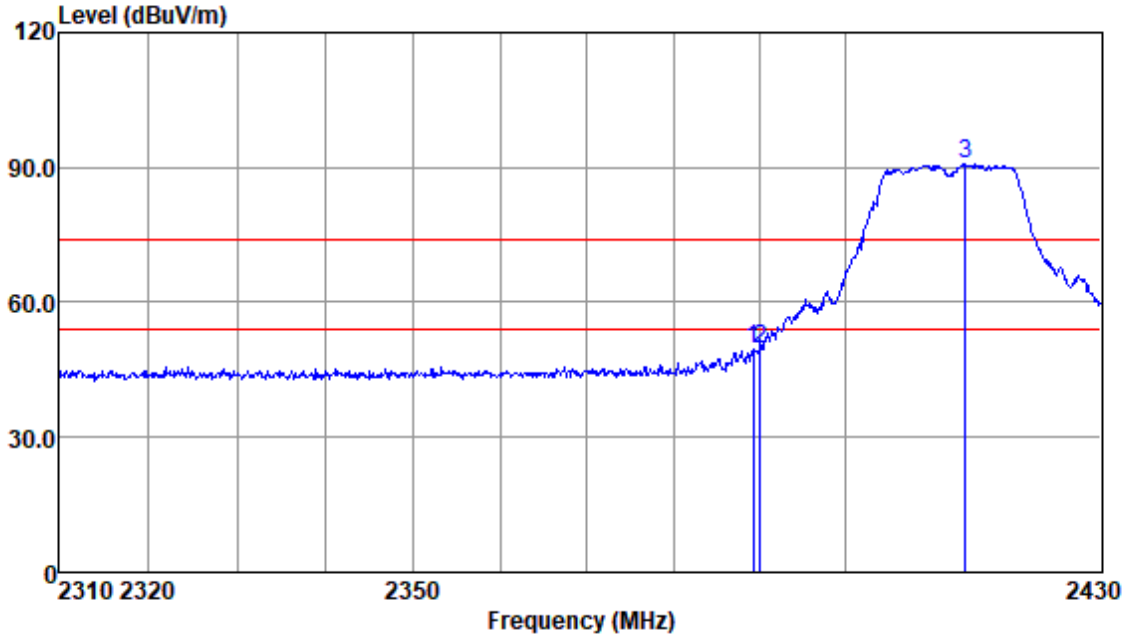
Test Mode: 01; Polarity: Vertical; Modulation:802.11g; Bandwidth:20MHz; Channel:Low



Antenna Polarity :VERTICAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
2389.24	52.69	28.80	3.13	35.18	49.44	74.00	-24.56	Peak
2390.00	52.67	28.80	3.13	35.18	49.42	74.00	-24.58	Peak
2414.05	93.79	28.90	3.13	35.20	90.62	74.00	16.62	Peak

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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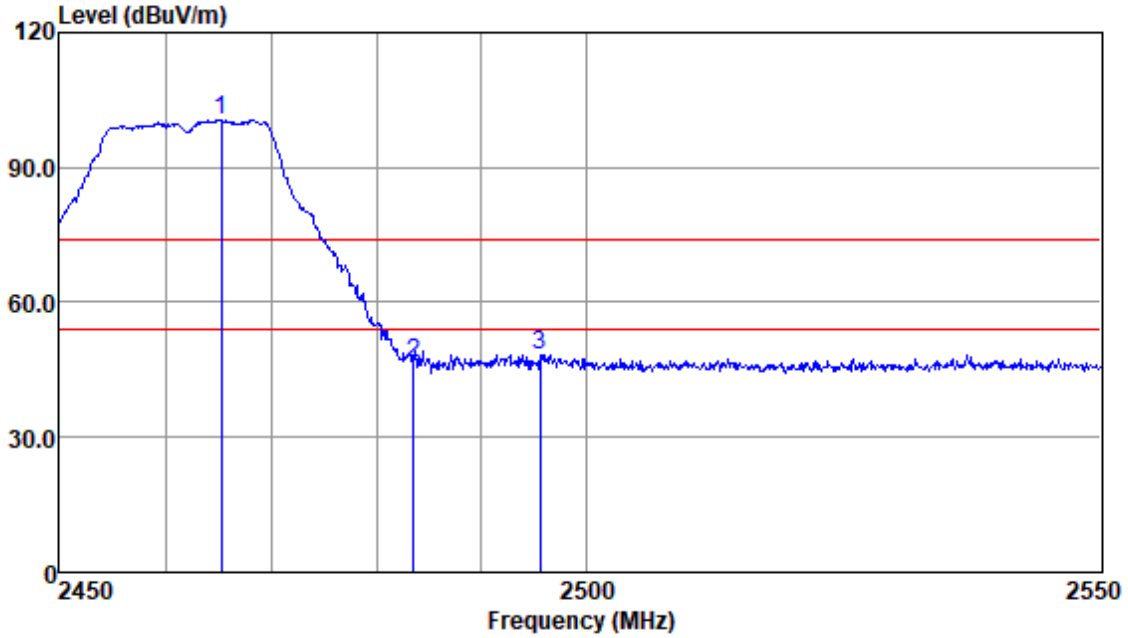
Test Mode: 01; Polarity: Horizontal; Modulation:802.11g; Bandwidth:20MHz; Channel:High



Antenna Polarity :HORIZONTAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
2465.24	103.50	29.05	3.16	35.24	100.47	74.00	26.47	Peak
2483.50	49.58	29.09	3.20	35.26	46.61	74.00	-27.39	Peak
2495.60	51.37	29.10	3.23	35.26	48.44	74.00	-25.56	Peak

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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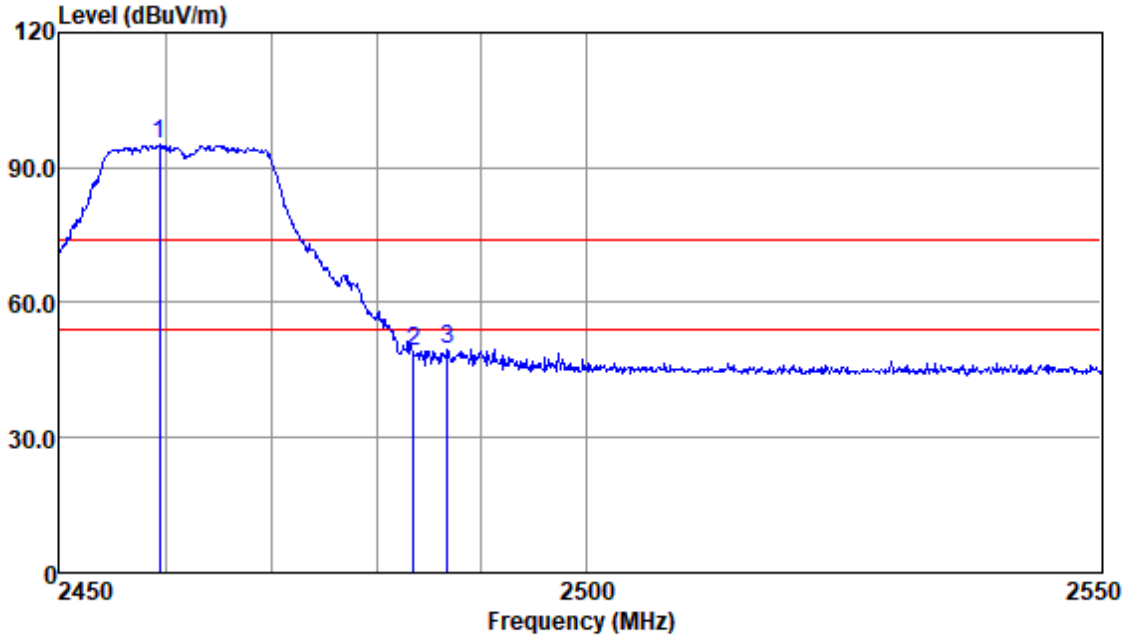
Test Mode: 01; Polarity: Vertical; Modulation:802.11g; Bandwidth:20MHz; Channel:High



Antenna Polarity :VERTICAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
2459.43	98.10	29.04	3.16	35.24	95.06	74.00	21.06	Peak
2483.50	52.03	29.09	3.20	35.26	49.06	74.00	-24.94	Peak
2486.73	52.75	29.09	3.20	35.26	49.78	74.00	-24.22	Peak

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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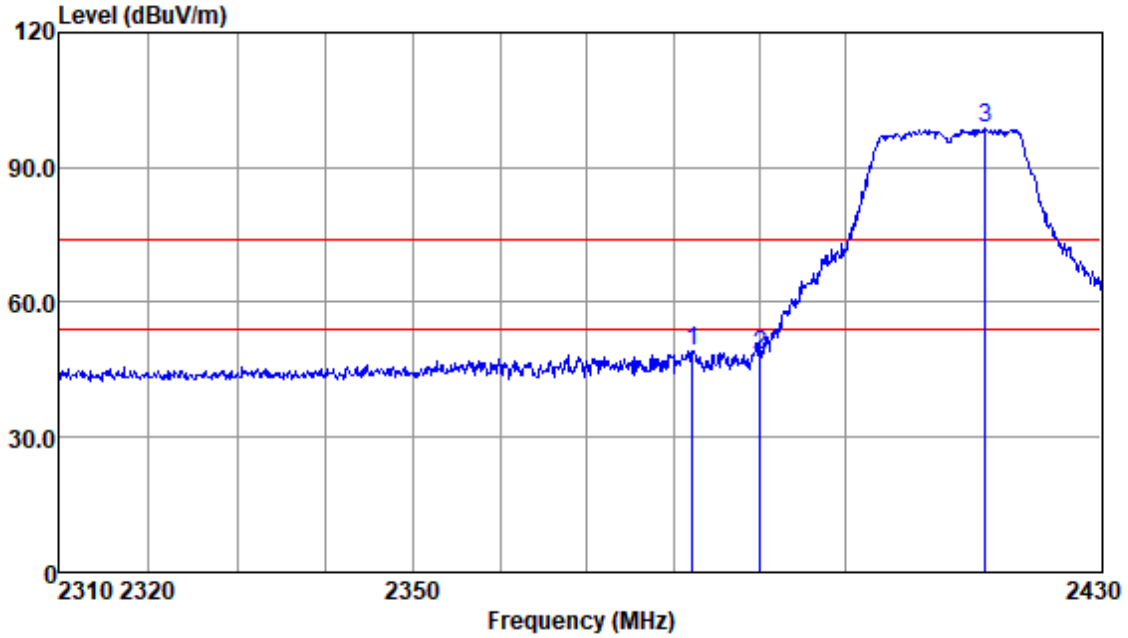
Test Mode: 01; Polarity: Horizontal; Modulation:802.11n; Bandwidth:20MHz; Channel:Low



Antenna Polarity :HORIZONTAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
2382.24	52.30	28.76	3.14	35.17	49.03	74.00	-24.97	Peak
2390.00	51.41	28.80	3.13	35.18	48.16	74.00	-25.84	Peak
2416.38	101.71	28.90	3.13	35.20	98.54	74.00	24.54	Peak

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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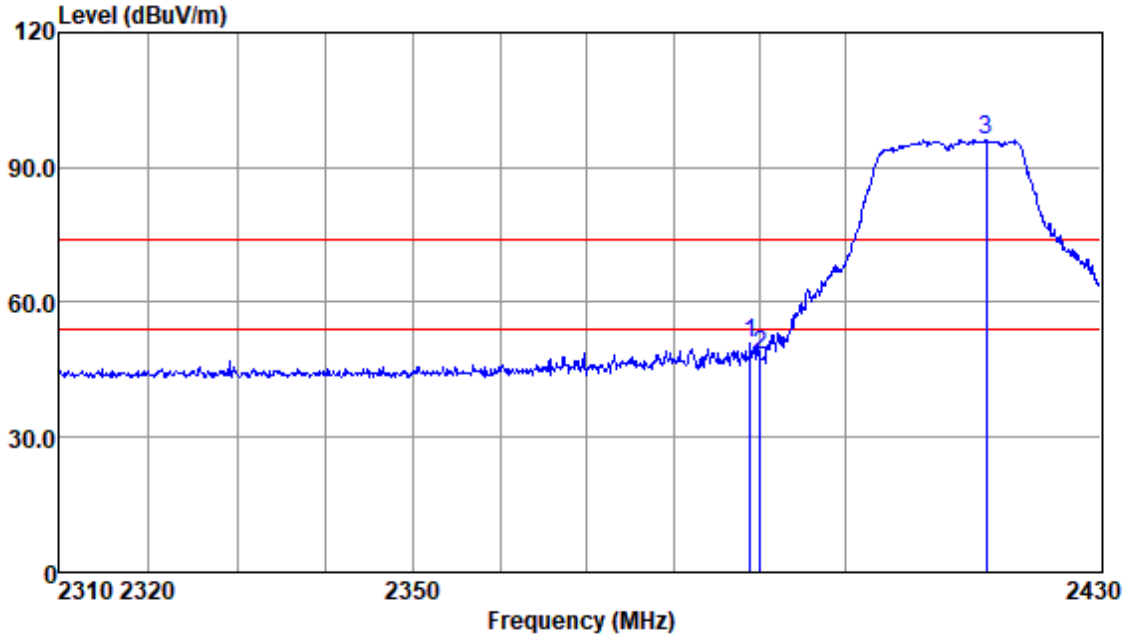
Test Mode: 01; Polarity: Vertical; Modulation:802.11n; Bandwidth:20MHz; Channel:Low



Antenna Polarity :VERTICAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
2388.88	54.37	28.80	3.13	35.18	51.12	74.00	-22.88	Peak
2390.00	51.35	28.80	3.13	35.18	48.10	74.00	-25.90	Peak
2416.50	99.14	28.90	3.13	35.20	95.97	74.00	21.97	Peak

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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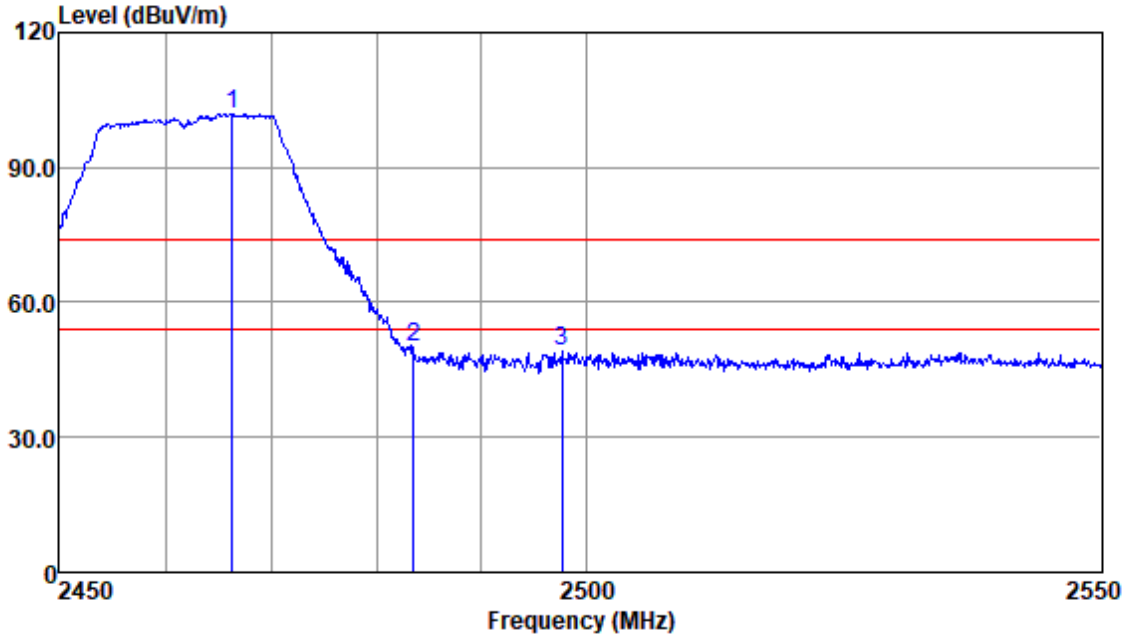
Test Mode: 01; Polarity: Horizontal; Modulation:802.11n; Bandwidth:20MHz; Channel:High



Antenna Polarity :HORIZONTAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
2466.32	104.83	29.05	3.16	35.24	101.80	74.00	27.80	Peak
2483.50	53.22	29.09	3.20	35.26	50.25	74.00	-23.75	Peak
2497.70	52.09	29.12	3.23	35.27	49.17	74.00	-24.83	Peak

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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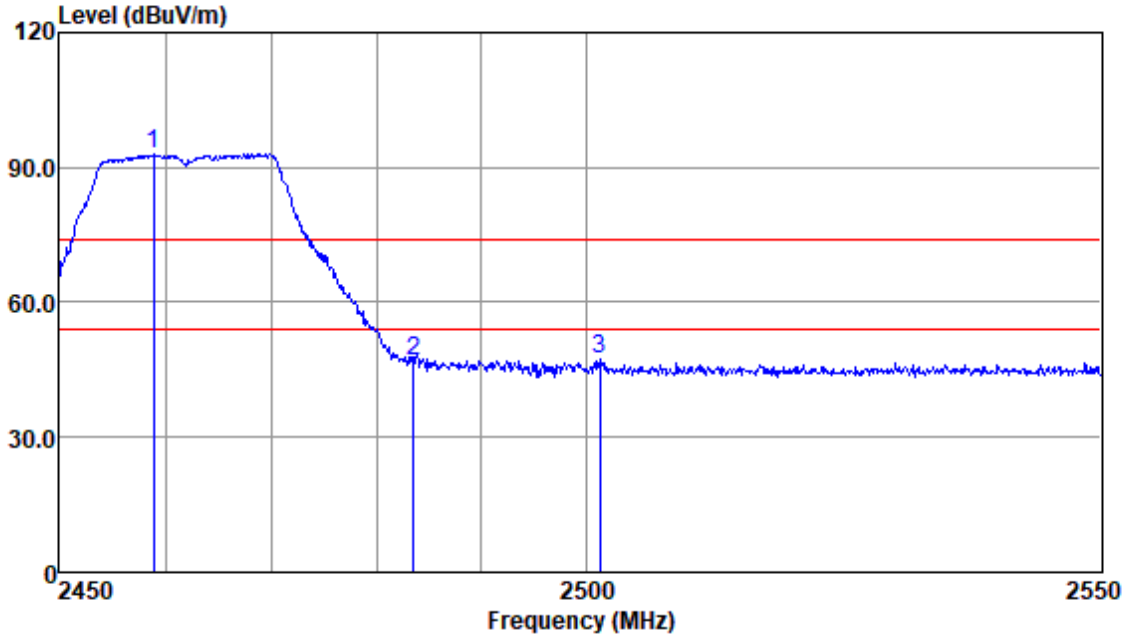
Test Mode: 01; Polarity: Vertical; Modulation:802.11n; Bandwidth:20MHz; Channel:High



Antenna Polarity :VERTICAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
2458.84	96.16	29.04	3.16	35.24	93.12	74.00	19.12	Peak
2483.50	50.02	29.09	3.20	35.26	47.05	74.00	-26.95	Peak
2501.40	50.09	29.12	3.23	35.27	47.17	74.00	-26.83	Peak

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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7.8 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

7.8.1 E.U.T. Operation

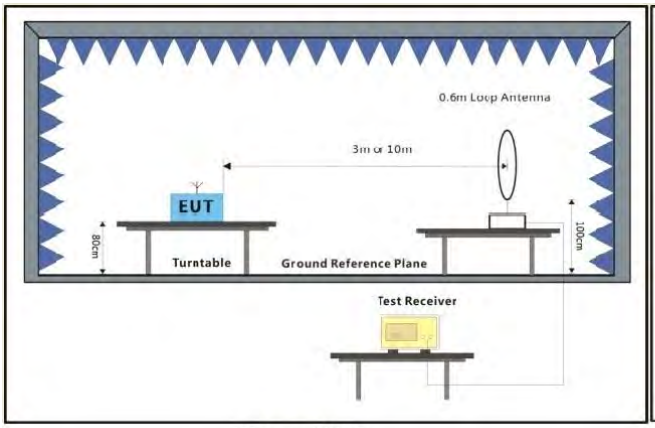
Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1010 mbar

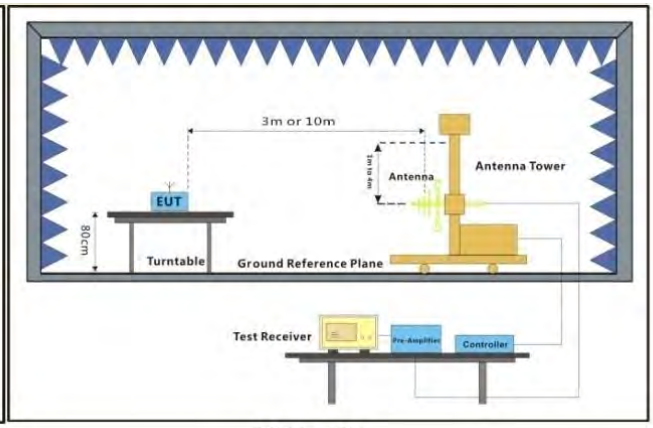
7.8.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	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), final test modes are considering the modulation and worse data rates. Only the data of worst case is recorded in the report.

7.8.3 Test Setup Diagram



Below 30MHz



30MHz-1GHz

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7.8.4 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.

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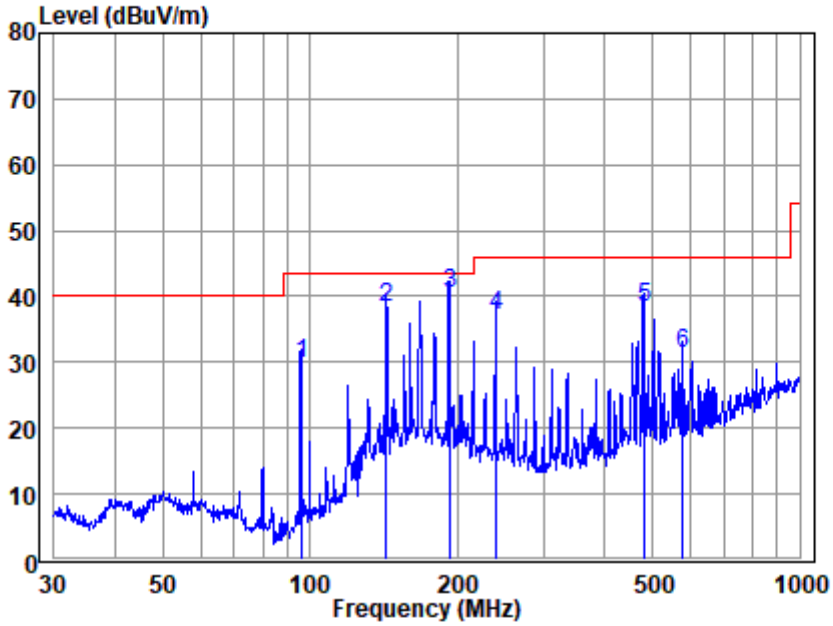
Test Mode: 01; Polarity: Horizontal



Antenna Polarity :Horizontal
EUT/Project :0695EV
Test mode :01

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
1	95.76	53.24	8.35	1.85	33.60	29.84	43.50	-13.66	QP
2	143.33	55.92	13.37	2.47	33.51	38.25	43.50	-5.25	QP
3	192.42	60.59	10.40	2.70	33.33	40.36	43.50	-3.14	QP
4	239.99	56.20	11.00	3.15	33.14	37.21	46.00	-8.79	QP
5	480.53	49.64	17.53	4.22	33.00	38.39	46.00	-7.61	QP
6	576.64	39.30	19.40	5.58	33.00	31.28	46.00	-14.72	QP

Note: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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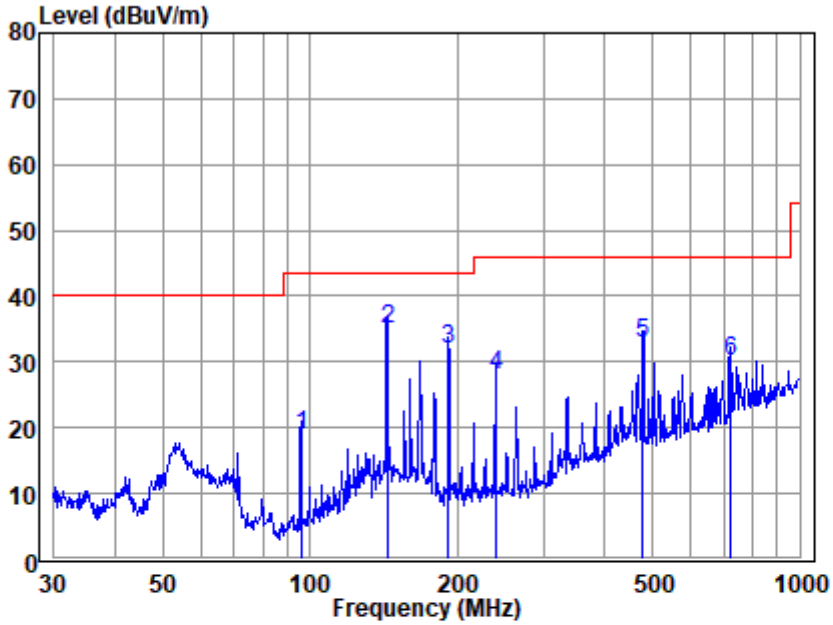
Test Mode: 01; Polarity: Vertical



Antenna Polarity :Vertical
EUT/Project :0695EV
Test mode :01

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
1	96.10	42.28	8.42	1.85	33.60	18.95	43.50	-24.55	QP
2	143.83	52.45	13.47	2.46	33.51	34.87	43.50	-8.63	QP
3	191.07	52.01	10.49	2.64	33.34	31.80	43.50	-11.70	QP
4	239.99	46.85	11.00	3.15	33.14	27.86	46.00	-18.14	QP
5	478.85	44.06	17.50	4.20	33.00	32.76	46.00	-13.24	QP
6	721.73	34.88	21.49	6.64	32.76	30.25	46.00	-15.75	QP

Note: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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7.9 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

7.9.1 E.U.T. Operation

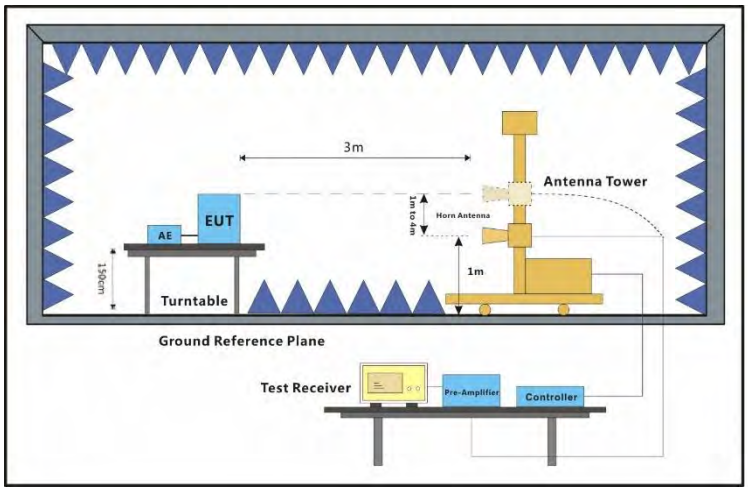
Operating Environment:

Temperature: 23.8 °C Humidity: 63.3 % RH Atmospheric Pressure: 1010 mbar

7.9.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	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), final test modes are considering the modulation and worse data rates. Only the data of worst case is recorded in the report.

7.9.3 Test Setup Diagram



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7.9.4 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.

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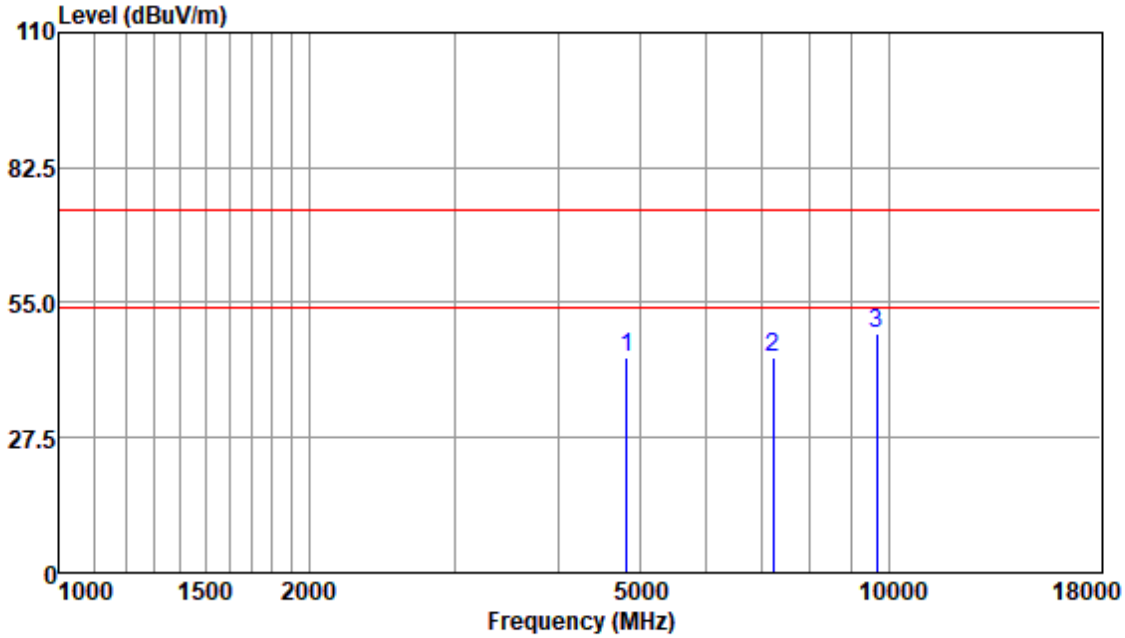
Test Mode: 01; Polarity: Horizontal; Modulation:802.11b; Bandwidth:20MHz; Channel:Low



Antenna Polarity :HORIZONTAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
4824.00	42.61	33.60	4.58	36.79	44.00	74.00	-30.00	Peak
7236.00	36.57	36.29	6.64	35.50	44.00	74.00	-30.00	Peak
9648.00	35.84	37.71	8.58	33.56	48.57	74.00	-25.43	Peak

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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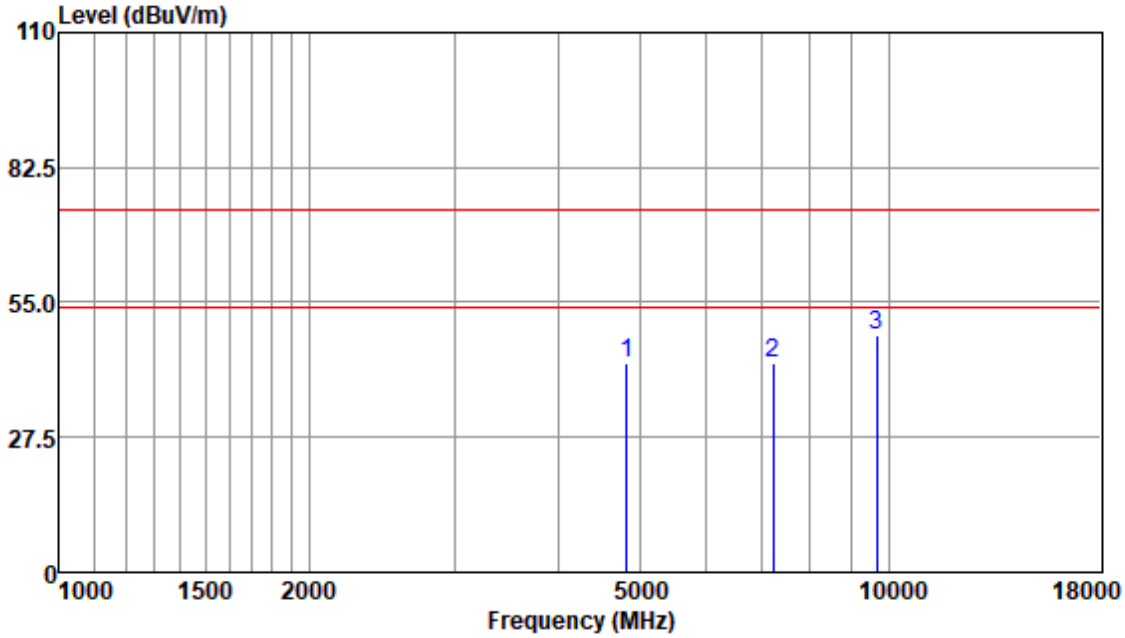
Test Mode: 01; Polarity: Vertical; Modulation:802.11b; Bandwidth:20MHz; Channel:Low



Antenna Polarity :VERTICAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
4824.00	41.09	33.60	4.58	36.79	42.48	74.00	-31.52	Peak
7236.00	35.05	36.29	6.64	35.50	42.48	74.00	-31.52	Peak
9648.00	35.54	37.71	8.58	33.56	48.27	74.00	-25.73	Peak

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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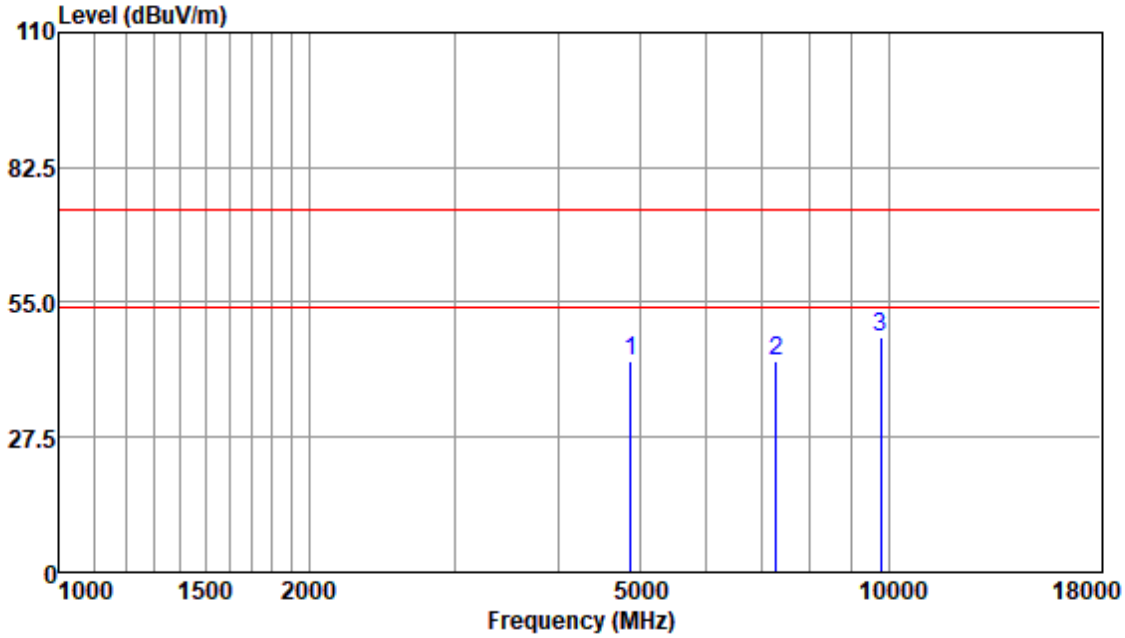
Test Mode: 01; Polarity: Horizontal; Modulation:802.11b; Bandwidth:20MHz; Channel:middle



Antenna Polarity :HORIZONTAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
4874.00	41.51	33.66	4.73	36.81	43.09	74.00	-30.91	Peak
7311.00	35.61	36.32	6.60	35.44	43.09	74.00	-30.91	Peak
9748.00	34.98	37.54	8.69	33.50	47.71	74.00	-26.29	Peak

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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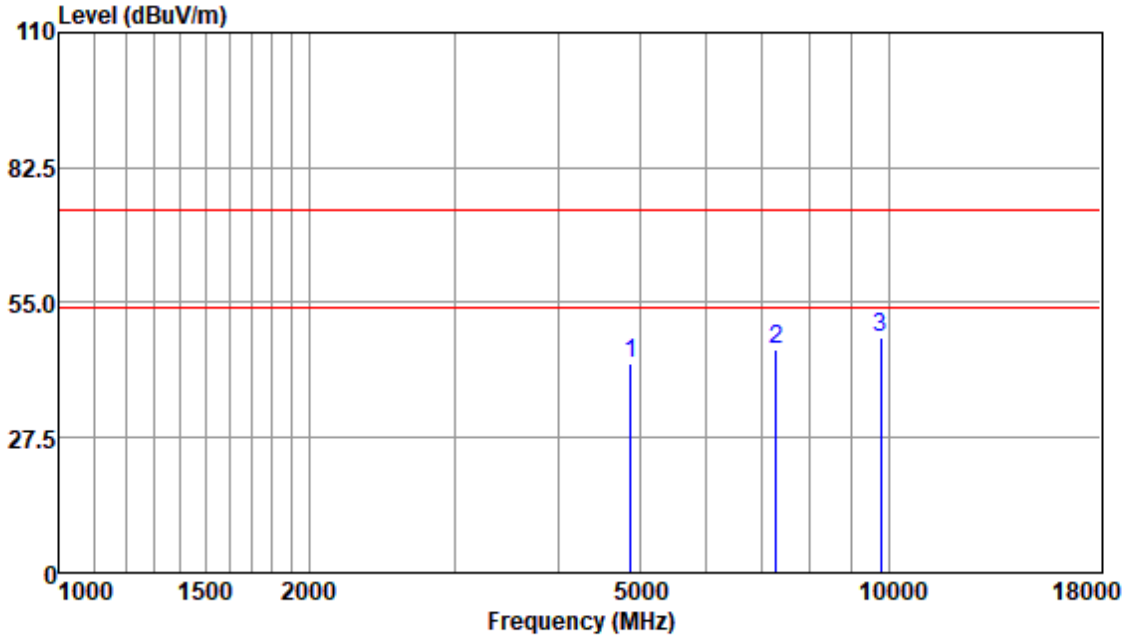
Test Mode: 01; Polarity: Vertical; Modulation:802.11b; Bandwidth:20MHz; Channel:middle



Antenna Polarity :VERTICAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
4874.00	40.96	33.66	4.73	36.81	42.54	74.00	-31.46	Peak
7311.00	38.08	36.32	6.60	35.44	45.56	74.00	-28.44	Peak
9748.00	35.05	37.54	8.69	33.50	47.78	74.00	-26.22	Peak

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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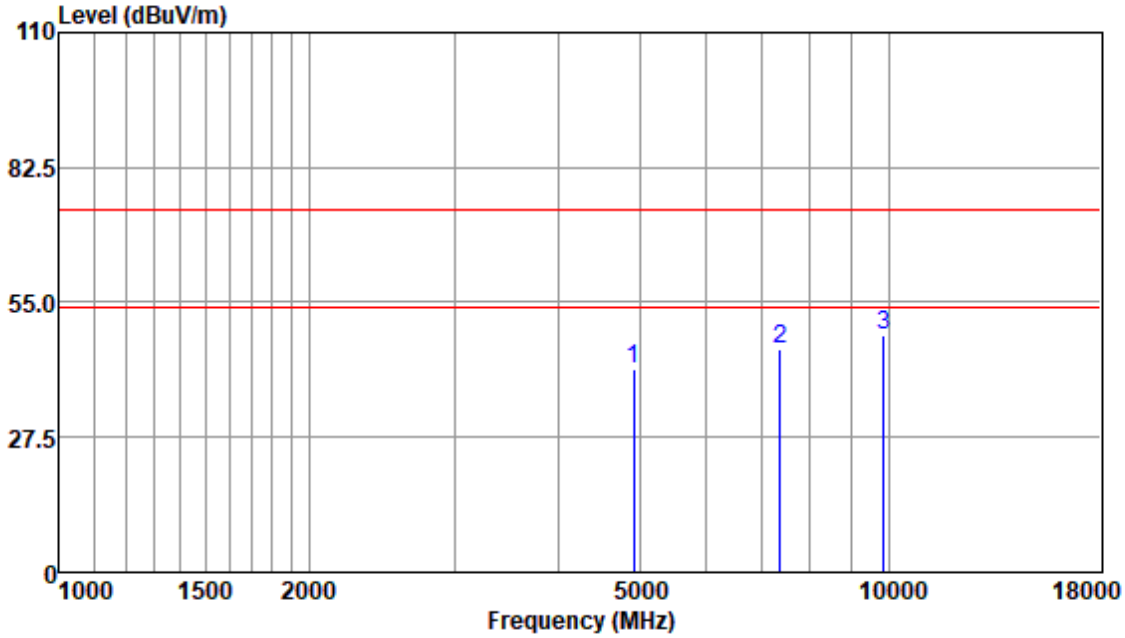
Test Mode: 01; Polarity: Horizontal; Modulation:802.11b; Bandwidth:20MHz; Channel:High



Antenna Polarity :HORIZONTAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
4924.00	39.88	33.64	4.88	36.82	41.58	74.00	-32.42	Peak
7386.00	38.03	36.36	6.56	35.37	45.58	74.00	-28.42	Peak
9848.00	35.30	37.60	8.78	33.45	48.23	74.00	-25.77	Peak

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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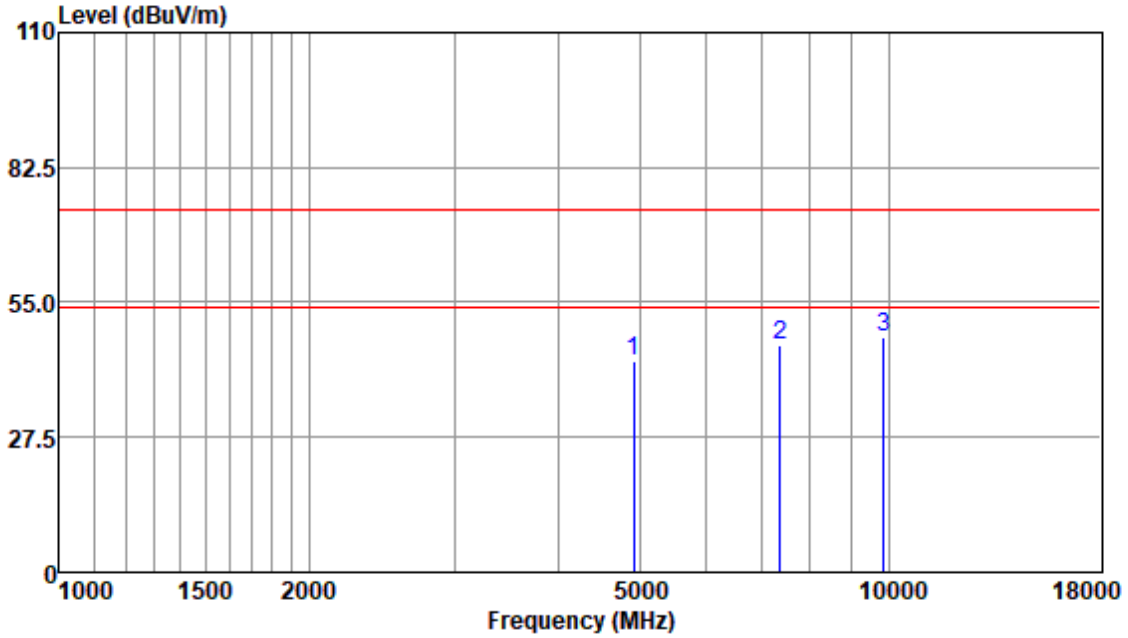
Test Mode: 01; Polarity: Vertical; Modulation:802.11b; Bandwidth:20MHz; Channel:High



Antenna Polarity :VERTICAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
4924.00	41.29	33.64	4.88	36.82	42.99	74.00	-31.01	Peak
7386.00	38.87	36.36	6.56	35.37	46.42	74.00	-27.58	Peak
9848.00	34.98	37.60	8.78	33.45	47.91	74.00	-26.09	Peak

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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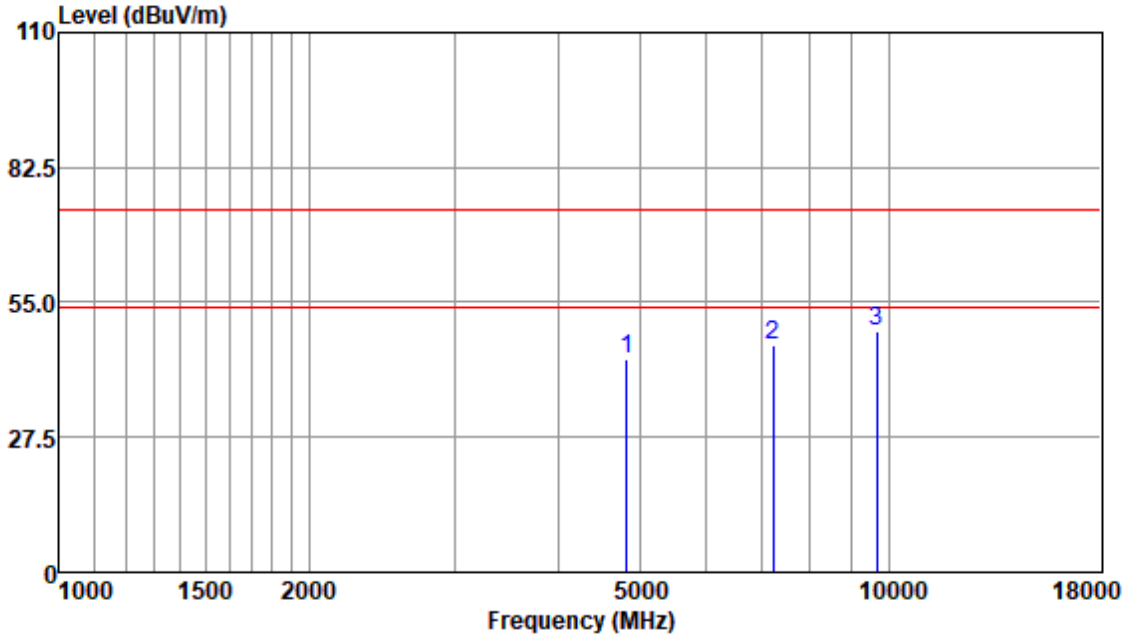
Test Mode: 01; Polarity: Horizontal; Modulation:802.11g; Bandwidth:20MHz; Channel:Low



Antenna Polarity :HORIZONTAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
4824.00	41.92	33.60	4.58	36.79	43.31	74.00	-30.69	Peak
7236.00	38.97	36.29	6.64	35.50	46.40	74.00	-27.60	Peak
9648.00	36.31	37.71	8.58	33.56	49.04	74.00	-24.96	Peak

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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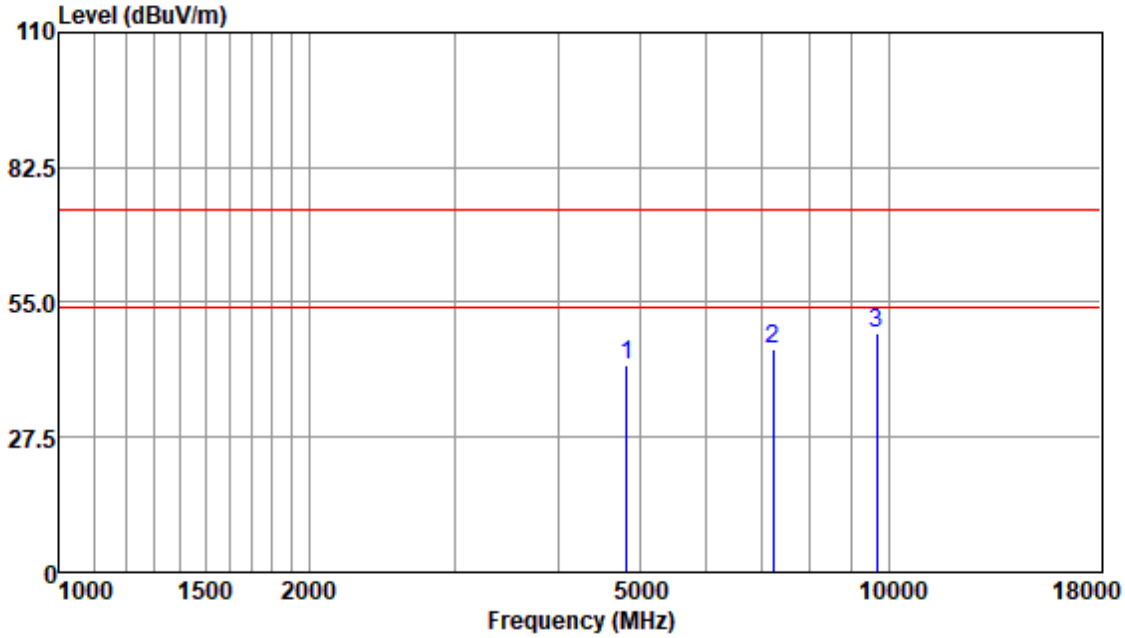
Test Mode: 01; Polarity: Vertical; Modulation:802.11g; Bandwidth:20MHz; Channel:Low



Antenna Polarity :VERTICAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
4824.00	40.72	33.60	4.58	36.79	42.11	74.00	-31.89	Peak
7236.00	38.21	36.29	6.64	35.50	45.64	74.00	-28.36	Peak
9648.00	36.15	37.71	8.58	33.56	48.88	74.00	-25.12	Peak

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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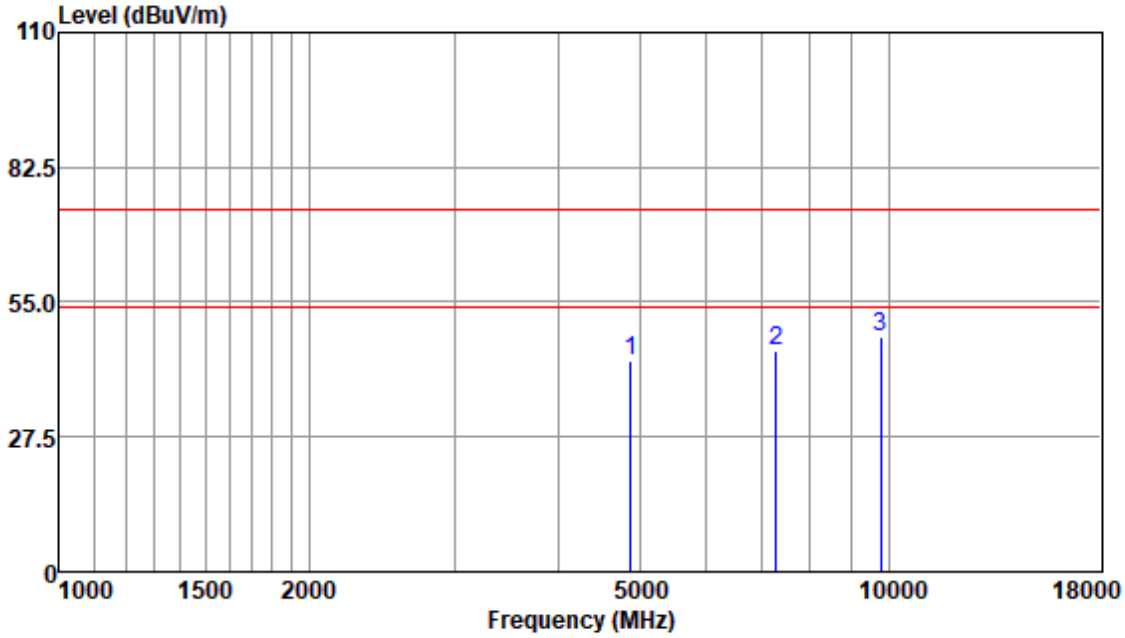
Test Mode: 01; Polarity: Horizontal; Modulation:802.11g; Bandwidth:20MHz; Channel:middle



Antenna Polarity :HORIZONTAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
4874.00	41.49	33.66	4.73	36.81	43.07	74.00	-30.93	Peak
7311.00	37.62	36.32	6.60	35.44	45.10	74.00	-28.90	Peak
9748.00	35.17	37.54	8.69	33.50	47.90	74.00	-26.10	Peak

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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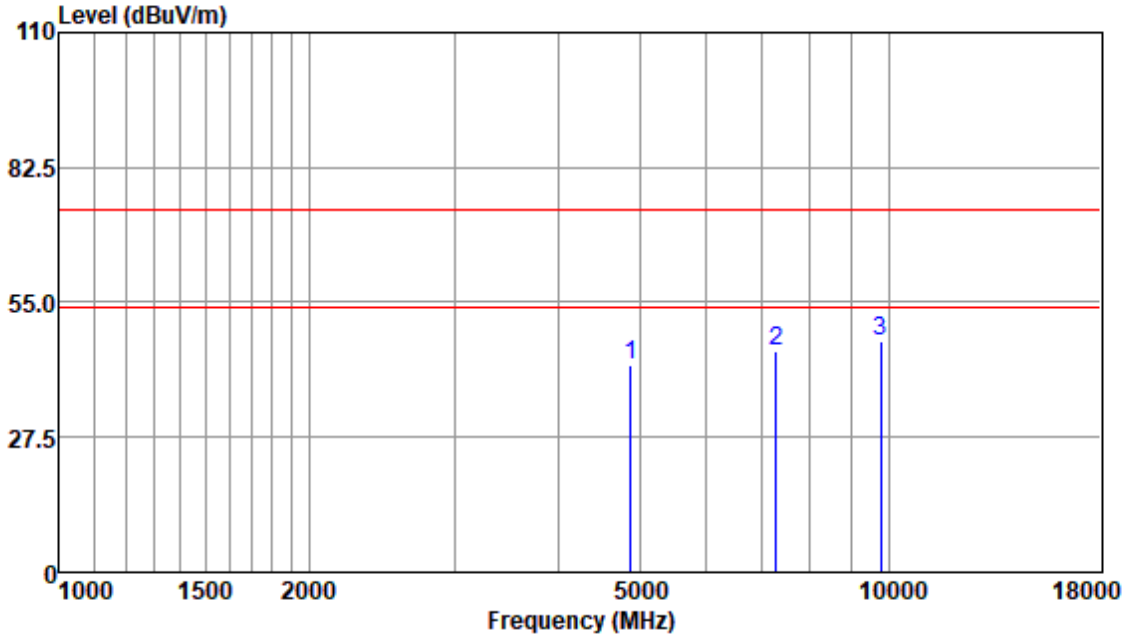
Test Mode: 01; Polarity: Vertical; Modulation:802.11g; Bandwidth:20MHz; Channel:middle



Antenna Polarity :VERTICAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
4874.00	40.80	33.66	4.73	36.81	42.38	74.00	-31.62	Peak
7311.00	37.44	36.32	6.60	35.44	44.92	74.00	-29.08	Peak
9748.00	34.29	37.54	8.69	33.50	47.02	74.00	-26.98	Peak

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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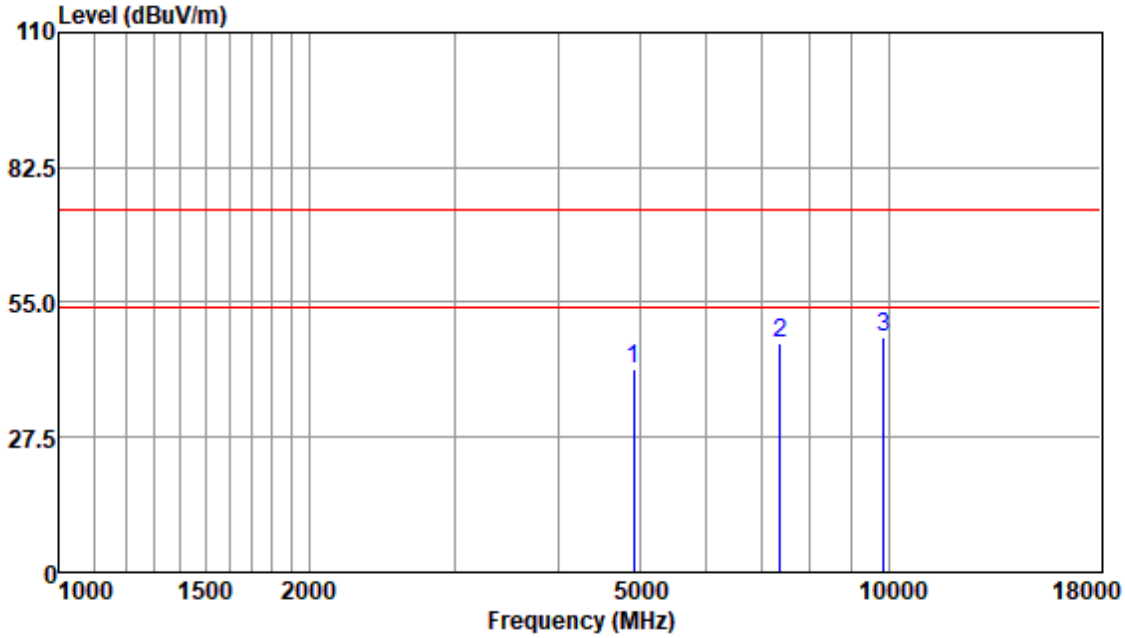
Test Mode: 01; Polarity: Horizontal; Modulation:802.11g; Bandwidth:20MHz; Channel:High



Antenna Polarity :HORIZONTAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
4924.00	39.90	33.64	4.88	36.82	41.60	74.00	-32.40	Peak
7386.00	39.03	36.36	6.56	35.37	46.58	74.00	-27.42	Peak
9848.00	34.85	37.60	8.78	33.45	47.78	74.00	-26.22	Peak

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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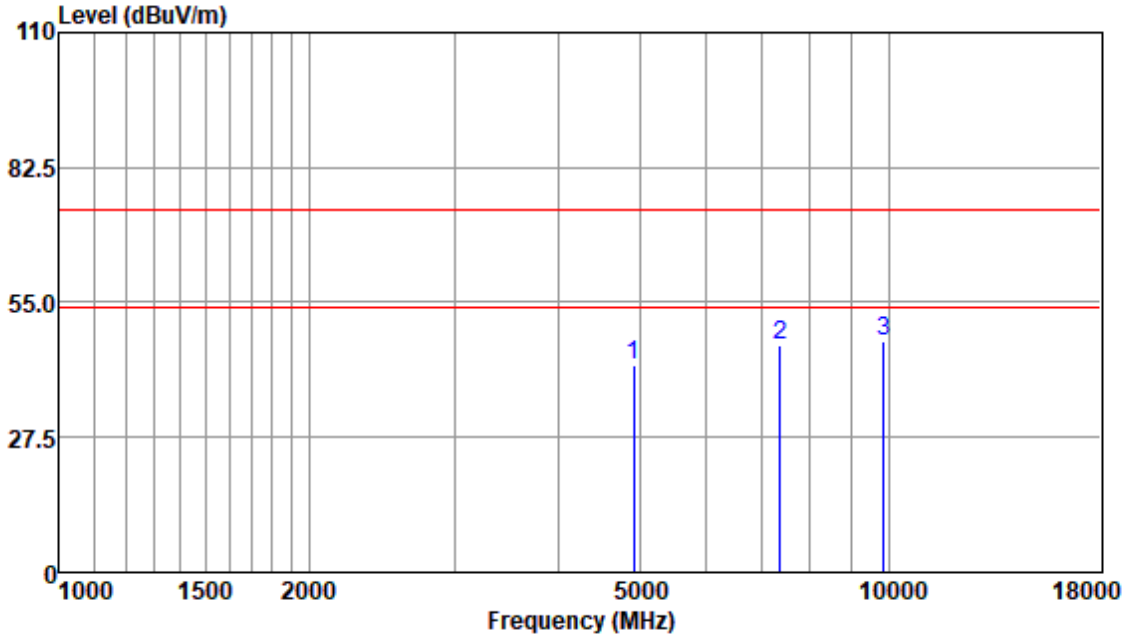
Test Mode: 01; Polarity: Vertical; Modulation:802.11g; Bandwidth:20MHz; Channel:High



Antenna Polarity :VERTICAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
4924.00	40.32	33.64	4.88	36.82	42.02	74.00	-31.98	Peak
7386.00	38.61	36.36	6.56	35.37	46.16	74.00	-27.84	Peak
9848.00	34.17	37.60	8.78	33.45	47.10	74.00	-26.90	Peak

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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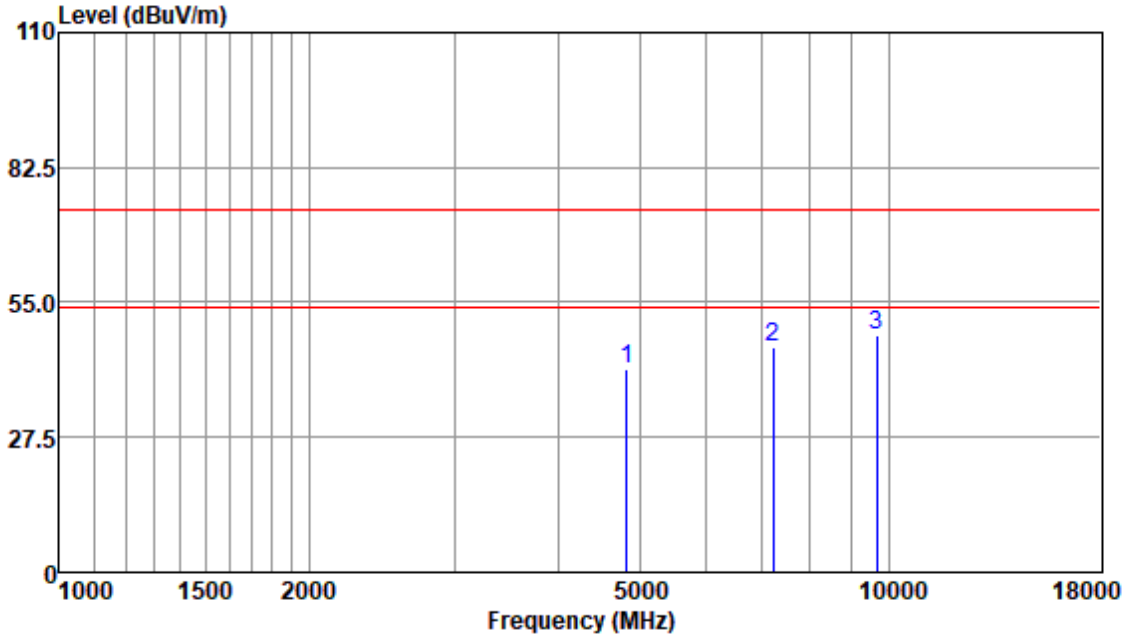
Test Mode: 01; Polarity: Horizontal; Modulation:802.11n; Bandwidth:20MHz; Channel:Low



Antenna Polarity :HORIZONTAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
4824.00	40.09	33.60	4.58	36.79	41.48	74.00	-32.52	Peak
7236.00	38.24	36.29	6.64	35.50	45.67	74.00	-28.33	Peak
9648.00	35.61	37.71	8.58	33.56	48.34	74.00	-25.66	Peak

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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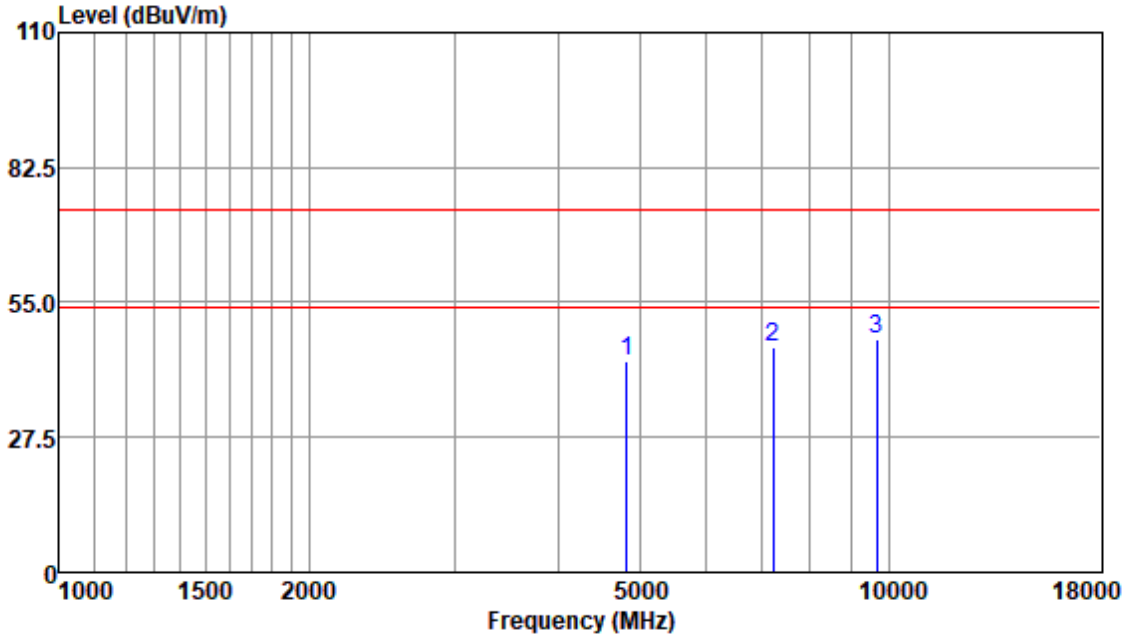
Test Mode: 01; Polarity: Vertical; Modulation:802.11n; Bandwidth:20MHz; Channel:Low



Antenna Polarity :VERTICAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
4824.00	41.55	33.60	4.58	36.79	42.94	74.00	-31.06	Peak
7236.00	38.32	36.29	6.64	35.50	45.75	74.00	-28.25	Peak
9648.00	34.83	37.71	8.58	33.56	47.56	74.00	-26.44	Peak

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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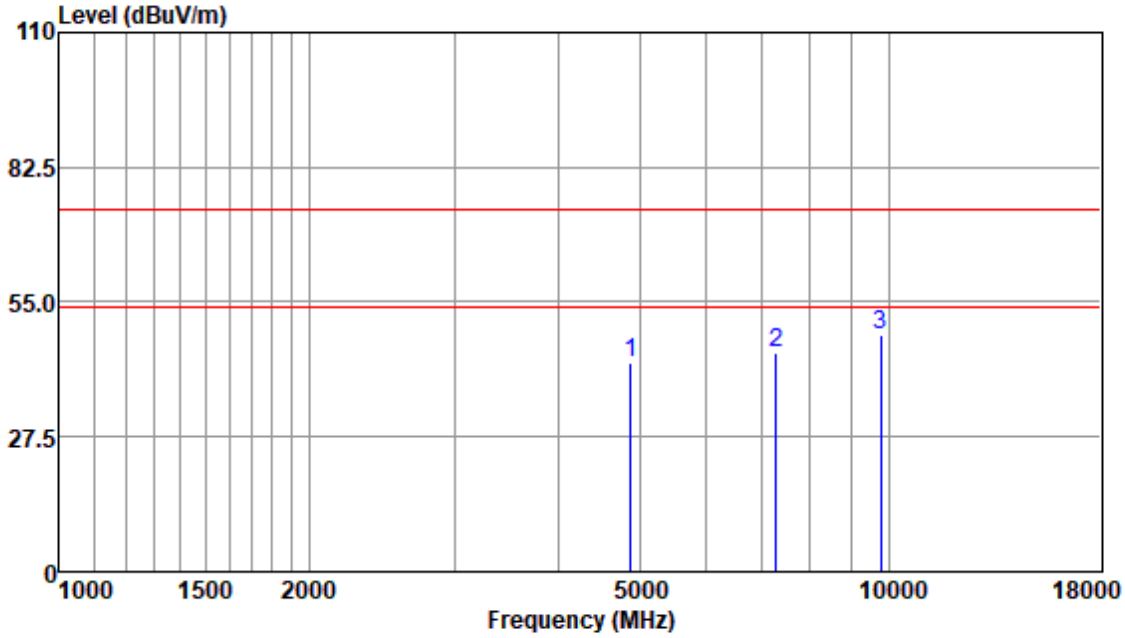
Test Mode: 01; Polarity: Horizontal; Modulation:802.11n; Bandwidth:20MHz; Channel:middle



Antenna Polarity :HORIZONTAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
4874.00	41.11	33.66	4.73	36.81	42.69	74.00	-31.31	Peak
7311.00	37.35	36.32	6.60	35.44	44.83	74.00	-29.17	Peak
9748.00	35.46	37.54	8.69	33.50	48.19	74.00	-25.81	Peak

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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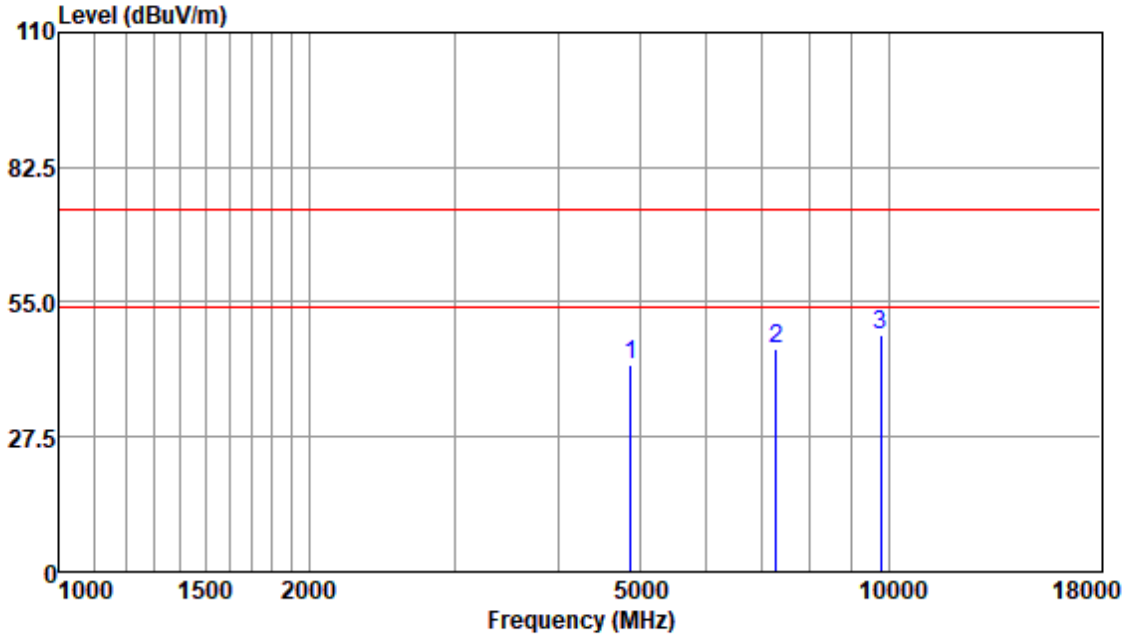
Test Mode: 01; Polarity: Vertical; Modulation:802.11n; Bandwidth:20MHz; Channel:middle



Antenna Polarity :VERTICAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
4874.00	40.72	33.66	4.73	36.81	42.30	74.00	-31.70	Peak
7311.00	38.17	36.32	6.60	35.44	45.65	74.00	-28.35	Peak
9748.00	35.77	37.54	8.69	33.50	48.50	74.00	-25.50	Peak

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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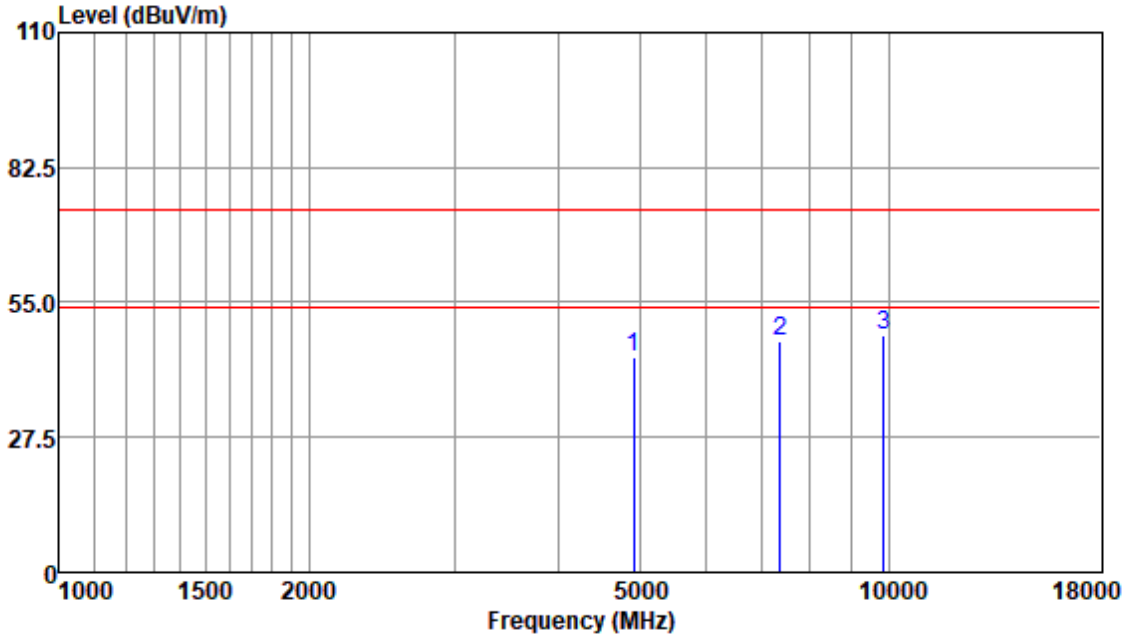
Test Mode: 01; Polarity: Horizontal; Modulation:802.11n; Bandwidth:20MHz; Channel:High



Antenna Polarity :HORIZONTAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
4924.00	41.98	33.64	4.88	36.82	43.68	74.00	-30.32	Peak
7386.00	39.39	36.36	6.56	35.37	46.94	74.00	-27.06	Peak
9848.00	35.35	37.60	8.78	33.45	48.28	74.00	-25.72	Peak

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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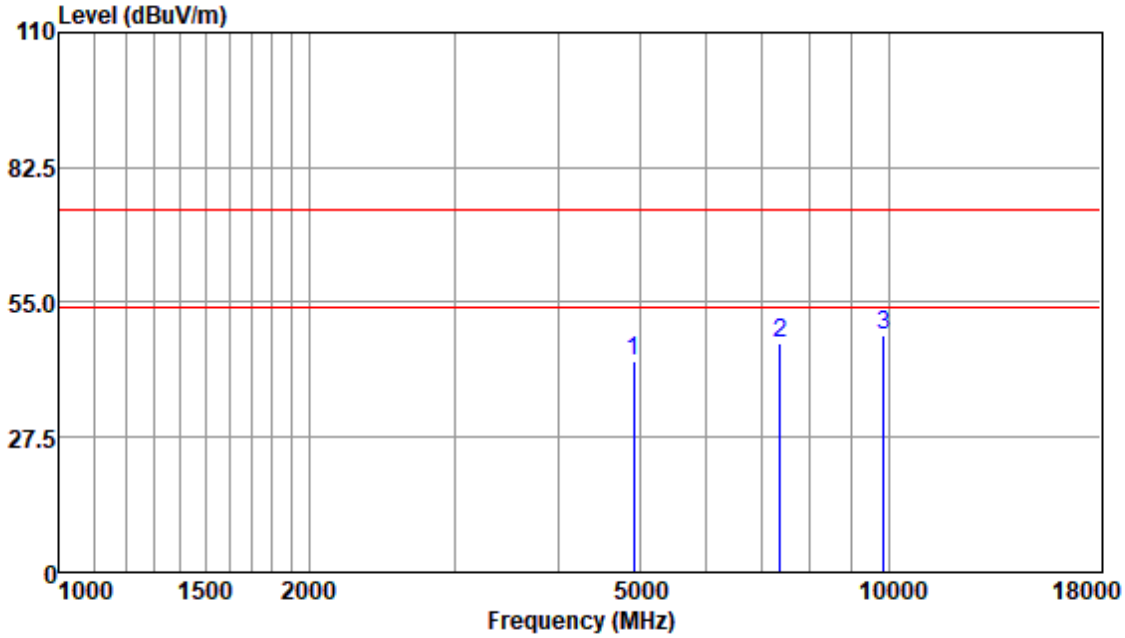
Test Mode: 01; Polarity: Vertical; Modulation:802.11n; Bandwidth:20MHz; Channel:High



Antenna Polarity :VERTICAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
4924.00	41.33	33.64	4.88	36.82	43.03	74.00	-30.97	Peak
7386.00	39.01	36.36	6.56	35.37	46.56	74.00	-27.44	Peak
9848.00	35.53	37.60	8.78	33.45	48.46	74.00	-25.54	Peak

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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7.10 99% Bandwidth

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

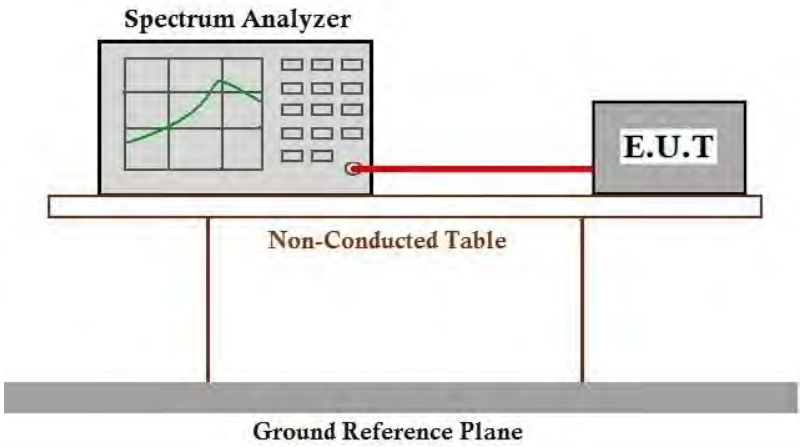
7.10.1 E.U.T. Operation

Operating Environment:
Temperature: 23.8 °C Humidity: 64.1 % RH Atmospheric Pressure: 1010 mbar

7.10.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	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), final test modes are considering the modulation and worse data rates. Only the data of worst case is recorded in the report.

7.10.3 Test Setup Diagram



7.10.4 Measurement Procedure and Data

Please Refer to Appendix for Details

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8 Test Setup Photo

Refer to Appendix - Test Setup Photo for SHCR2304000695EV

9 EUT Constructional Details (EUT Photos)

Refer to Appendix - Photographs of EUT Constructional Details for SHCR2304000695EV

10 Appendix

10.1 Appendix A: DTS Bandwidth

10.1.1 Test Result

TestMode	Antenna	Channel	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	9.520	2407.520	2417.040	≥0.5	PASS
		2437	8.560	2433.000	2441.560	≥0.5	PASS
		2462	9.000	2457.520	2466.520	≥0.5	PASS
11G	Ant1	2412	16.320	2403.880	2420.200	≥0.5	PASS
		2437	16.320	2428.880	2445.200	≥0.5	PASS
		2462	16.320	2453.880	2470.200	≥0.5	PASS
11N20SISO	Ant1	2412	17.360	2403.440	2420.800	≥0.5	PASS
		2437	17.280	2428.280	2445.560	≥0.5	PASS
		2462	17.560	2453.240	2470.800	≥0.5	PASS

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10.1.2 Test Graphs

11B_Ant1_2412

11B_Ant1_2437

11B_Ant1_2462

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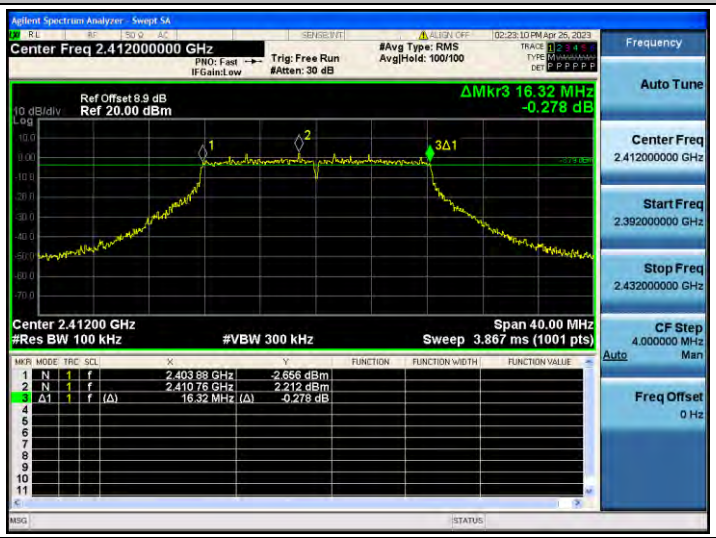
11G_Ant1_2412



11G_Ant1_2437

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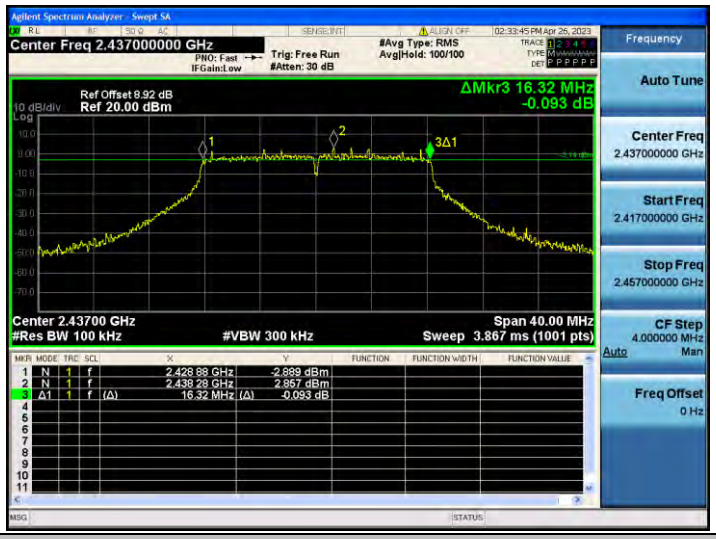
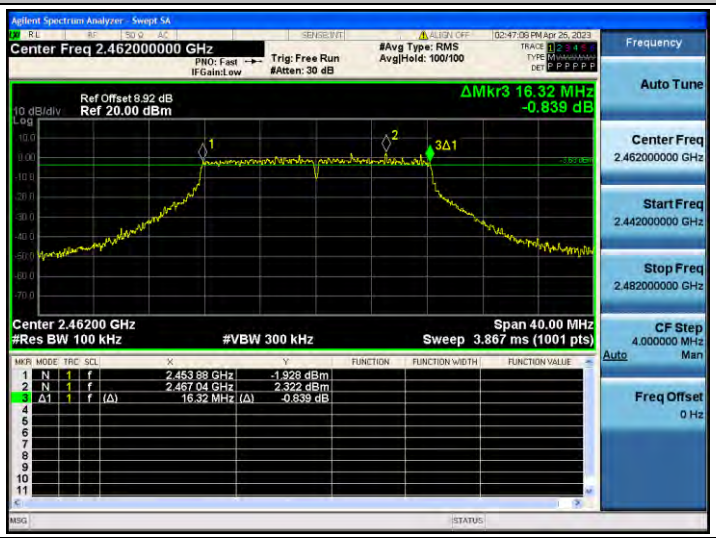


11G_Ant1_2462



11N20SISO_Ant1_2412

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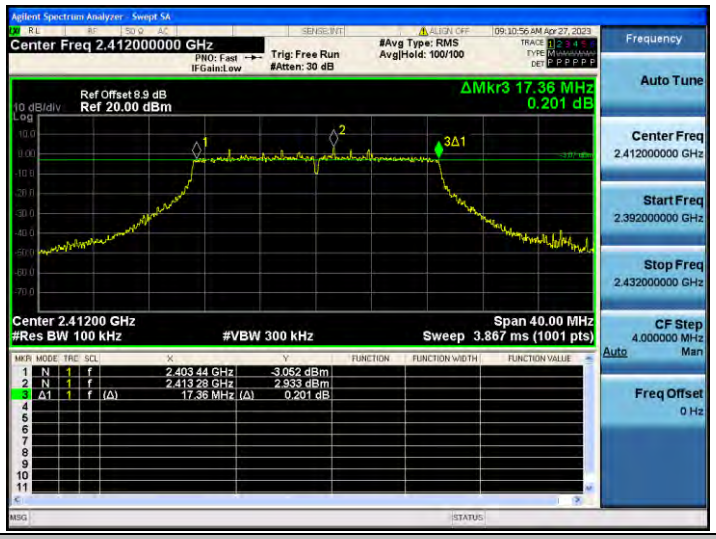

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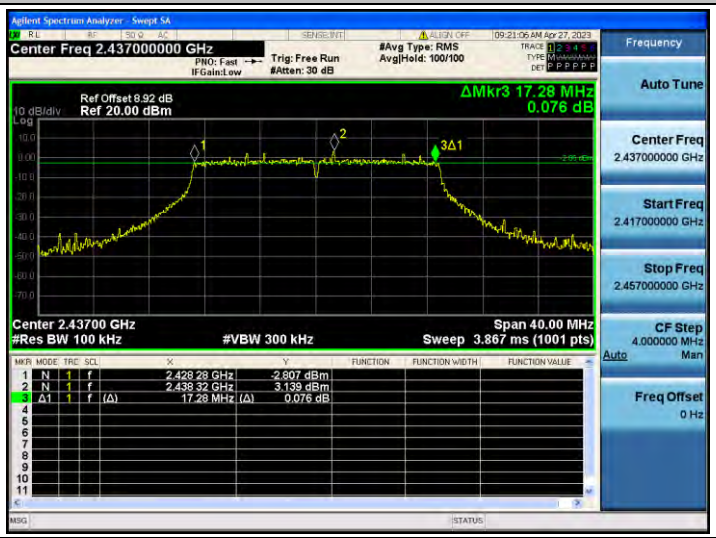

11N20SISO_Ant1_2462

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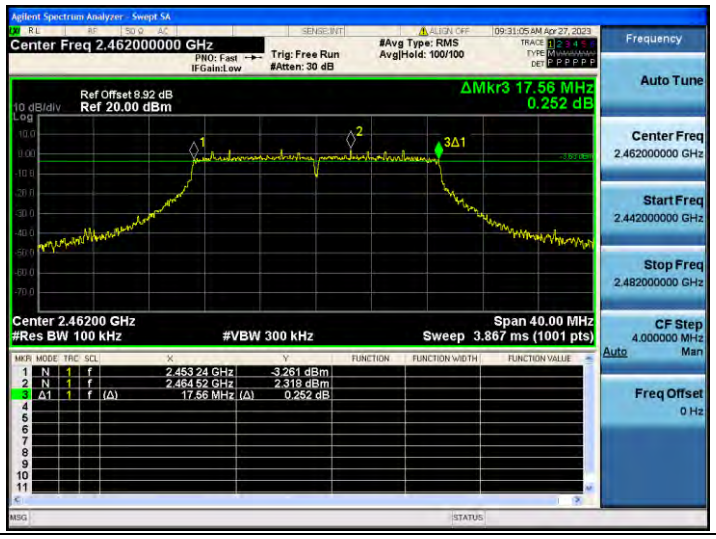

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10.2 Appendix B: Occupied Channel Bandwidth

10.2.1 Test Result

TestMode	Antenna	Channel	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	14.057	2405.0281	2419.0851	---	---
		2437	14.055	2430.0422	2444.0972	---	---
		2462	14.063	2455.0086	2469.0716	---	---
11G	Ant1	2412	16.823	2403.6166	2420.4396	---	---
		2437	16.793	2428.6827	2445.4757	---	---
		2462	16.861	2453.6119	2470.4729	---	---
11N20SISO	Ant1	2412	17.948	2403.1229	2421.0709	---	---
		2437	17.956	2428.0764	2446.0324	---	---
		2462	18.015	2453.0147	2471.0297	---	---

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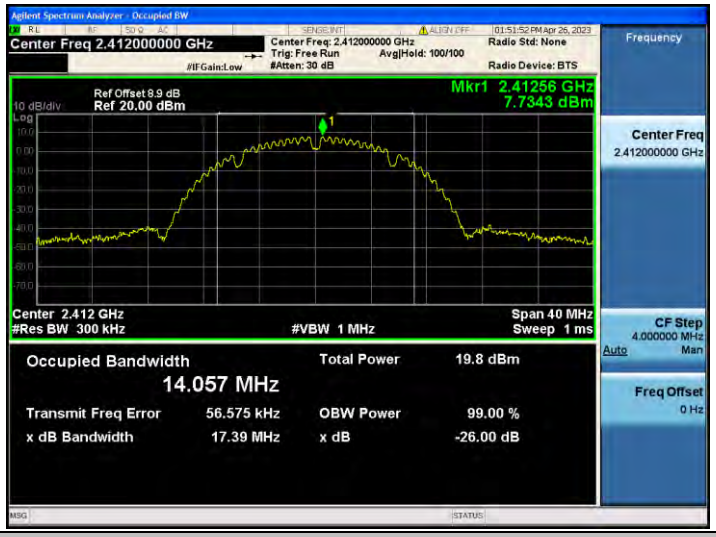
10.2.2 Test Graphs

11B_Ant1_2412



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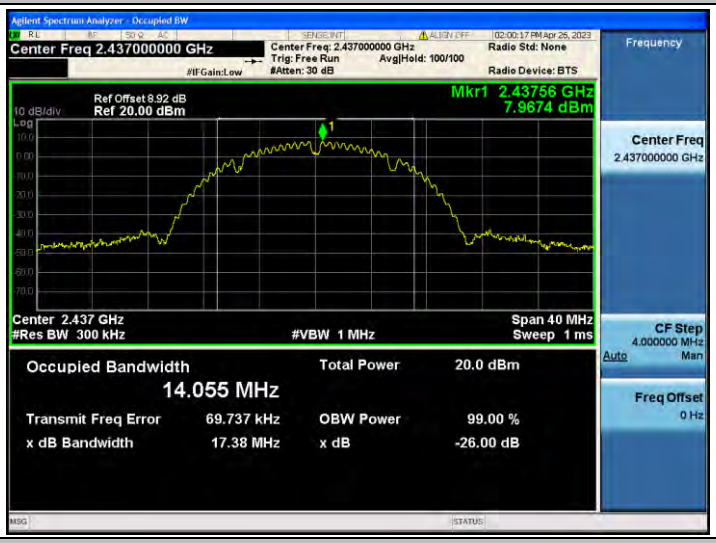

11B_Ant1_2462

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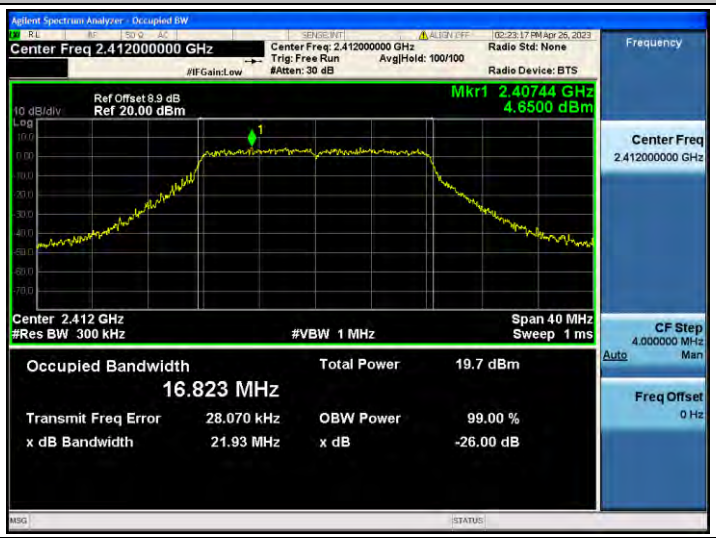
11G_Ant1_2412



11G_Ant1_2437

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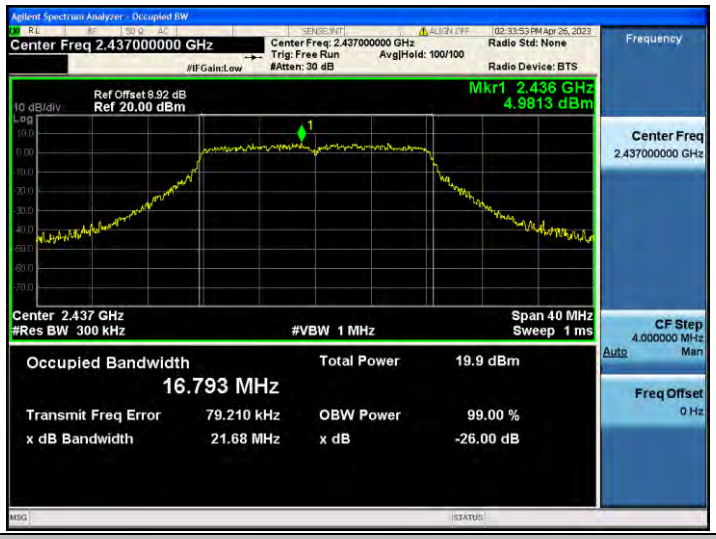

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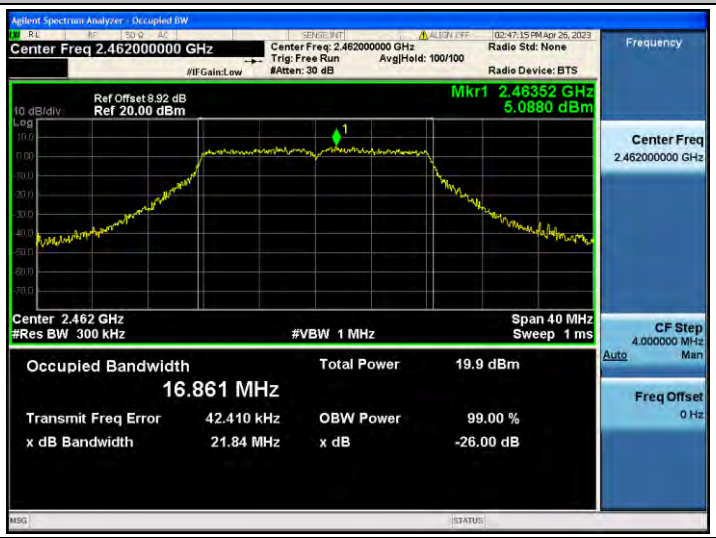

11N20SISO_Ant1_2412

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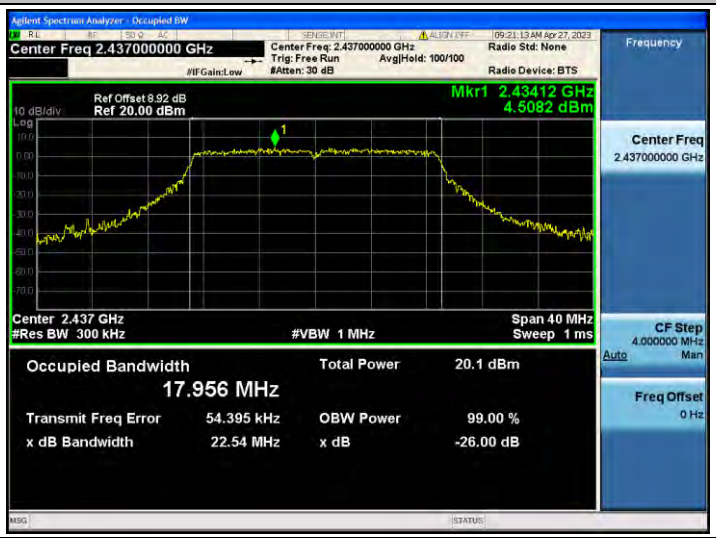
11N20SISO_Ant1_2437



11N20SISO_Ant1_2462

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10.3 Appendix C: Maximum conducted output power

10.3.1 Test Result

TestMode	Antenna	Channel	Level [dBm]	10Log(1/X) Factor [dB]	Power [dBm]	Limit [dBm]	Verdict
11B	Ant1	2412	15.85	0.05	15.90	≤30.00	PASS
		2437	15.98	0.05	16.03	≤30.00	PASS
		2462	16.02	0.05	16.07	≤30.00	PASS
11G	Ant1	2412	13.44	0.29	13.73	≤30.00	PASS
		2437	13.62	0.29	13.91	≤30.00	PASS
		2462	13.64	0.29	13.93	≤30.00	PASS
11N20SISO	Ant1	2412	13.53	0.28	13.81	≤30.00	PASS
		2437	13.77	0.31	14.08	≤30.00	PASS
		2462	13.68	0.31	13.99	≤30.00	PASS

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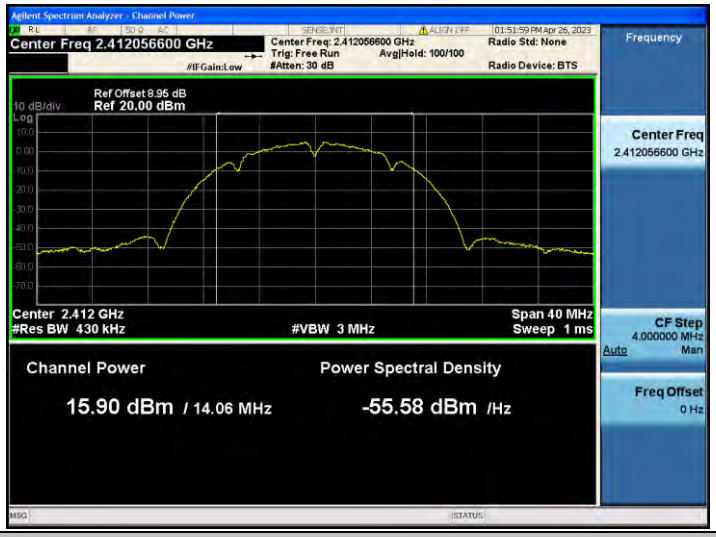
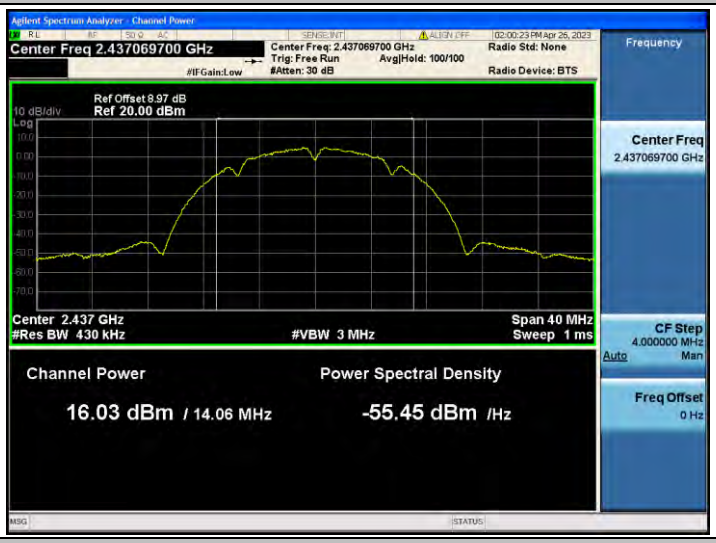
10.3.2 Test Graphs

11B_Ant1_2412



11B_Ant1_2437



11B_Ant1_2462

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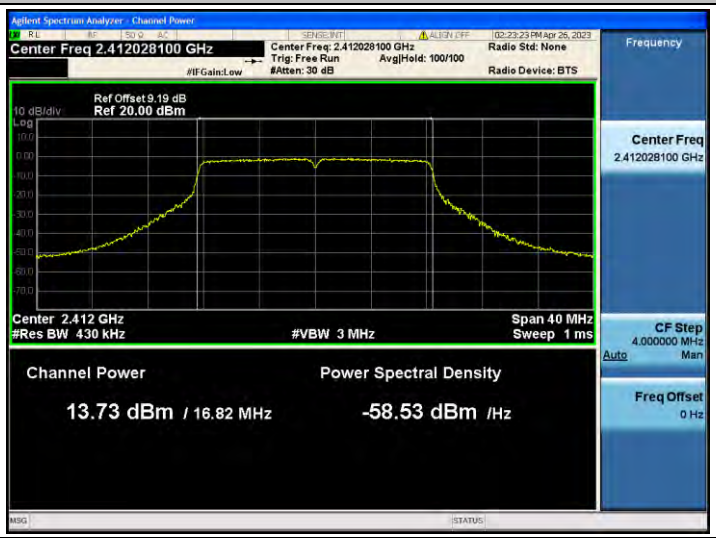
11G_Ant1_2412



11G_Ant1_2437

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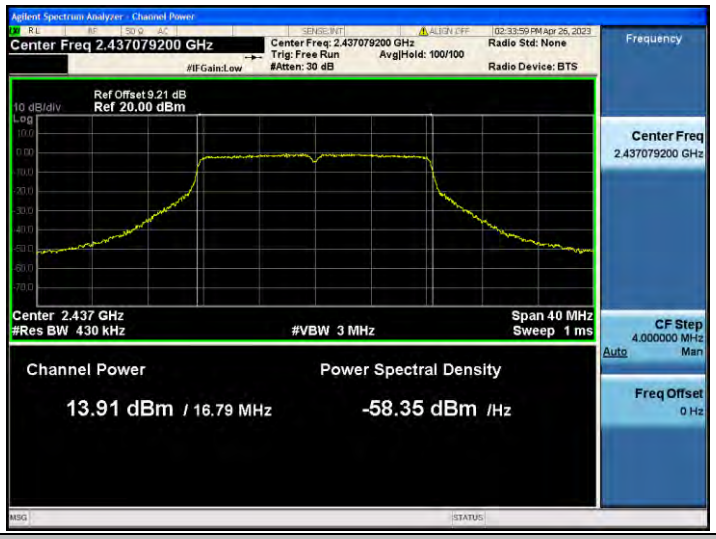

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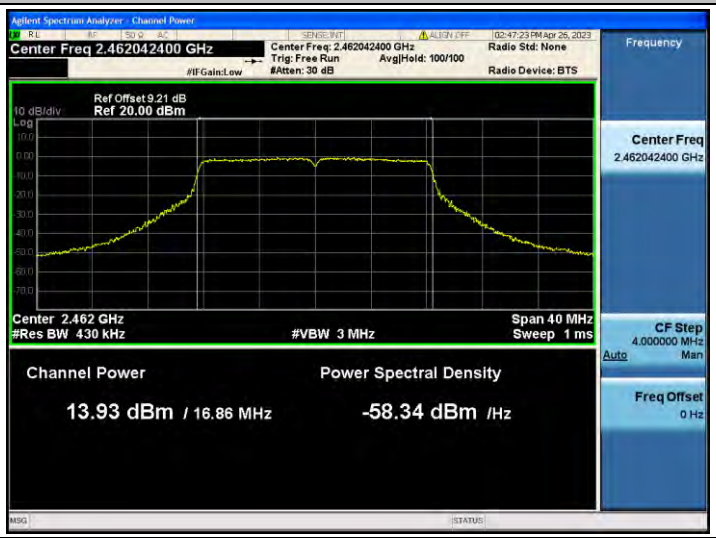

11N20SISO_Ant1_2412

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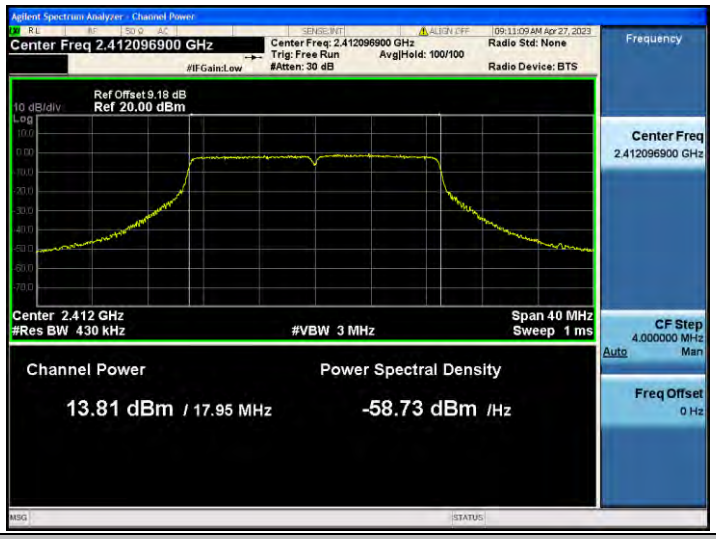

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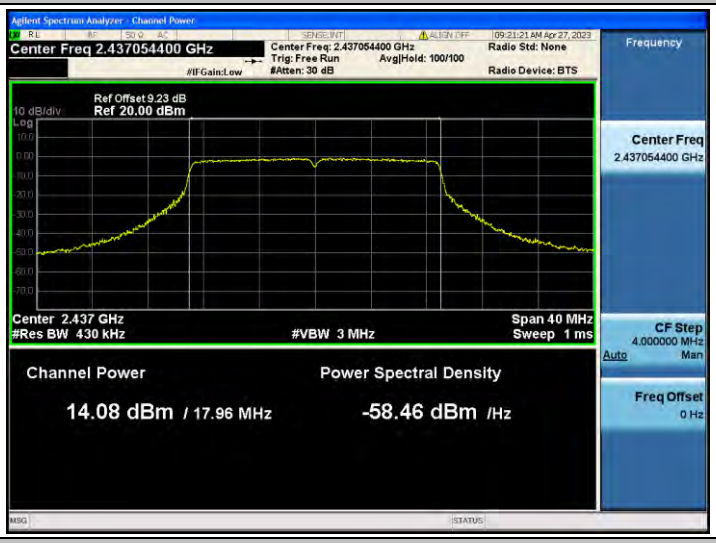

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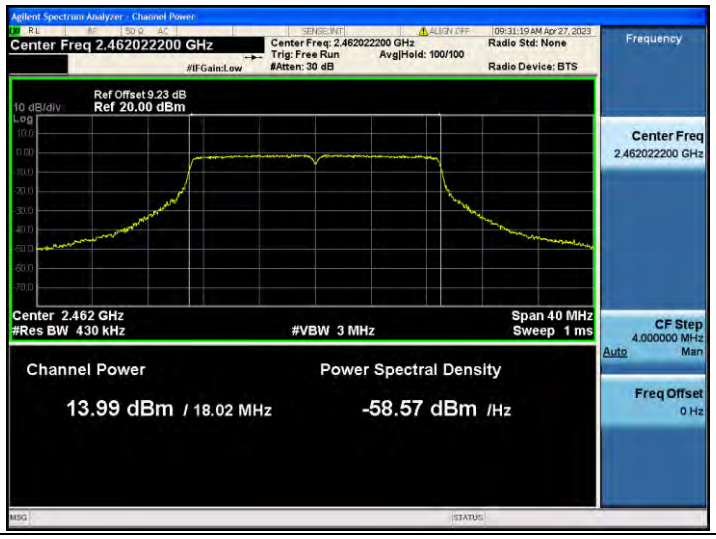

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10.4 Appendix D: Maximum power spectral density

10.4.1 Test Result

TestMode	Antenna	Channel	Level [dBm/3-100kHz]	10Log(1/X) Factor [dB]	PSD [dBm/3-100kHz]	Limit [dBm/3kHz]	Verdict
11B	Ant1	2412	-16.46	0.05	-16.41	≤8.00	PASS
		2437	-16.24	0.05	-16.19	≤8.00	PASS
		2462	-16.11	0.05	-16.06	≤8.00	PASS
11G	Ant1	2412	-21.09	0.29	-20.8	≤8.00	PASS
		2437	-20.61	0.29	-20.32	≤8.00	PASS
		2462	-20.56	0.29	-20.27	≤8.00	PASS
11N20SISO	Ant1	2412	-20.60	0.28	-20.32	≤8.00	PASS
		2437	-20.80	0.31	-20.49	≤8.00	PASS
		2462	-21.30	0.31	-20.99	≤8.00	PASS

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10.4.2 Test Graphs

11B_Ant1_2412

11B_Ant1_2437

11B_Ant1_2462

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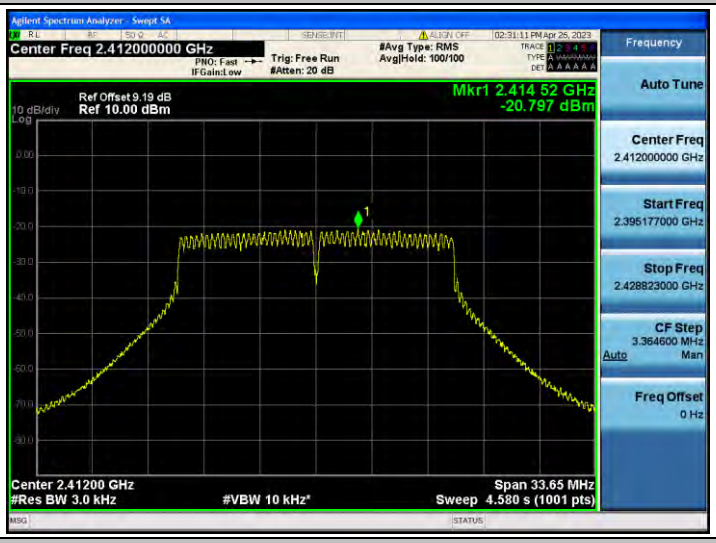

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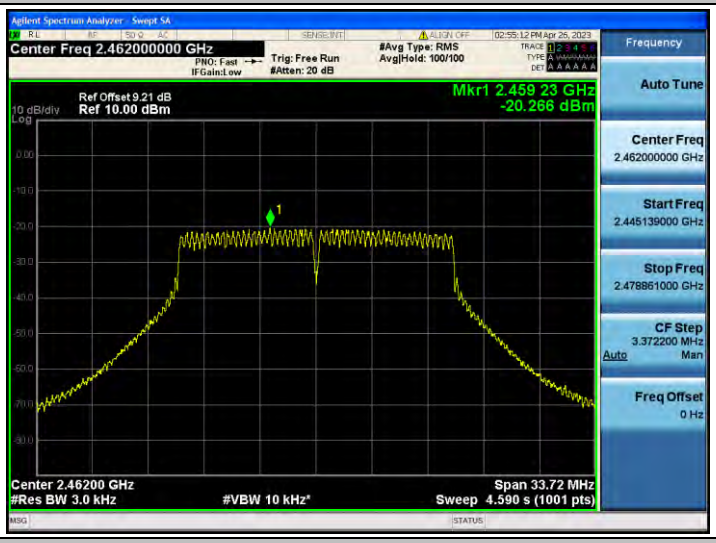

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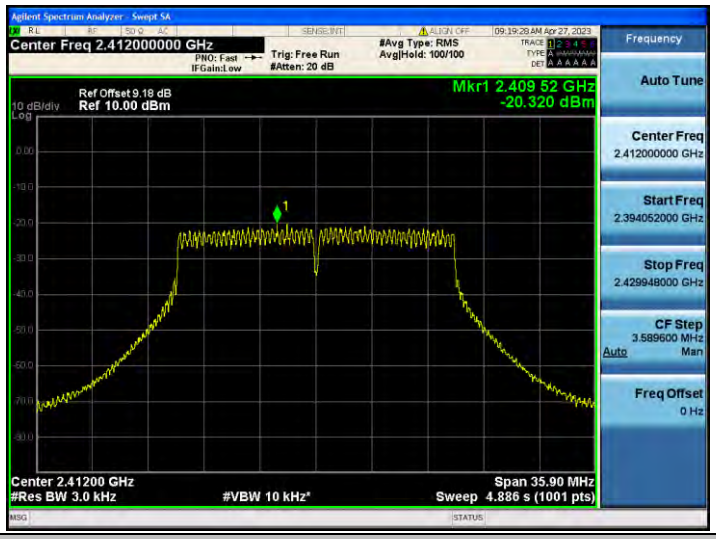

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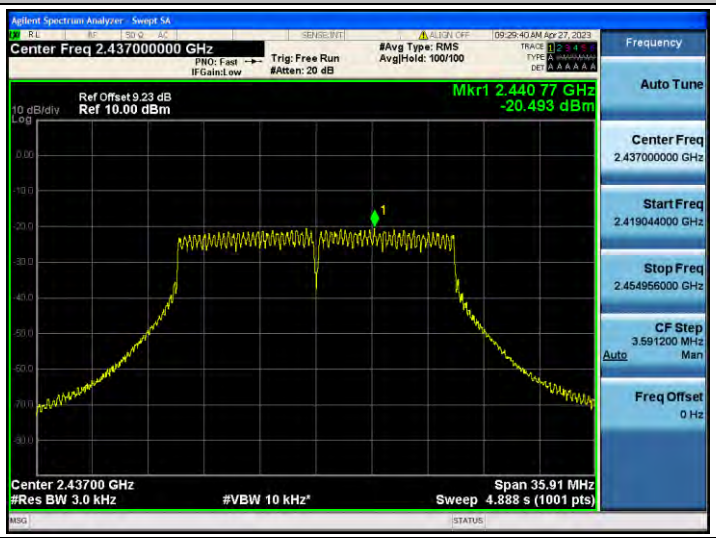

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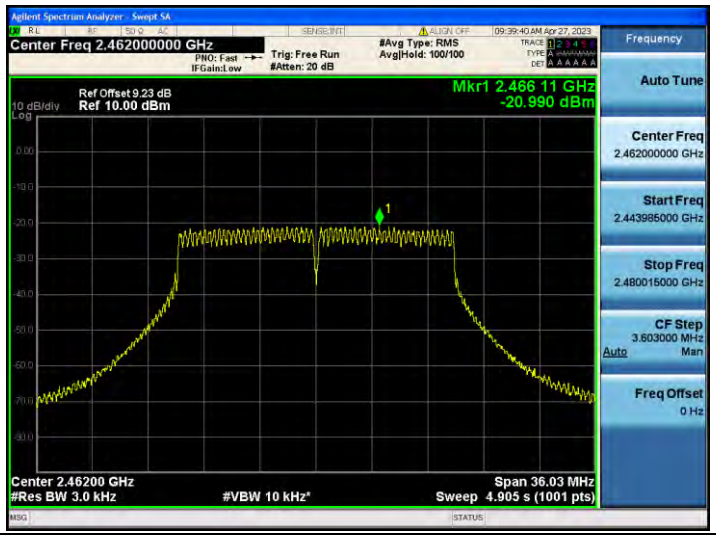

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10.5 Appendix E: Band edge measurements

10.5.1 Test Result

TestMode	Antenna	ChName	Channel	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
11B	Ant1	Low	2412	7.58	-41.53	≤-22.42	PASS
		High	2462	7.57	-48.19	≤-22.44	PASS
11G	Ant1	Low	2412	2.30	-30.74	≤-27.7	PASS
		High	2462	2.55	-47.59	≤-27.45	PASS
11N20SISO	Ant1	Low	2412	2.30	-30.65	≤-27.7	PASS
		High	2462	2.97	-44.67	≤-27.03	PASS

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10.5.2 Test Graphs

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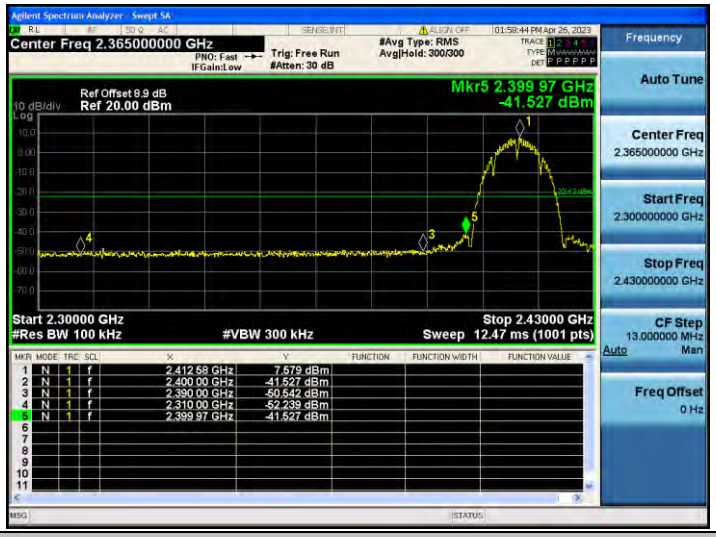

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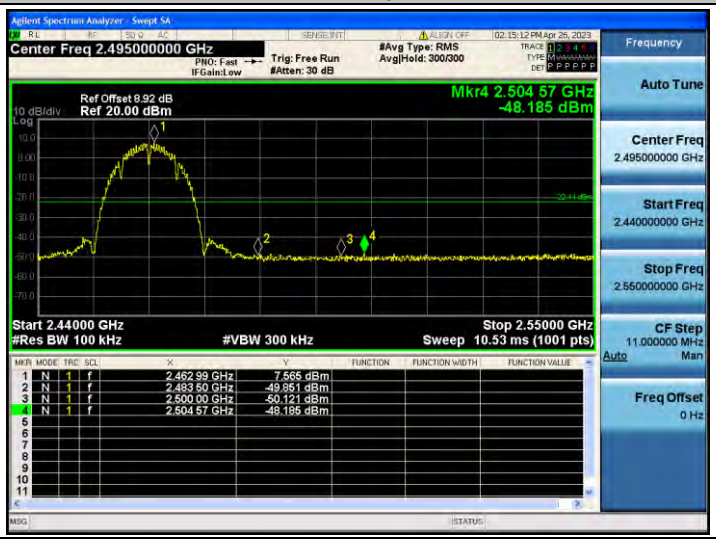

11G_Ant1_Low_2412

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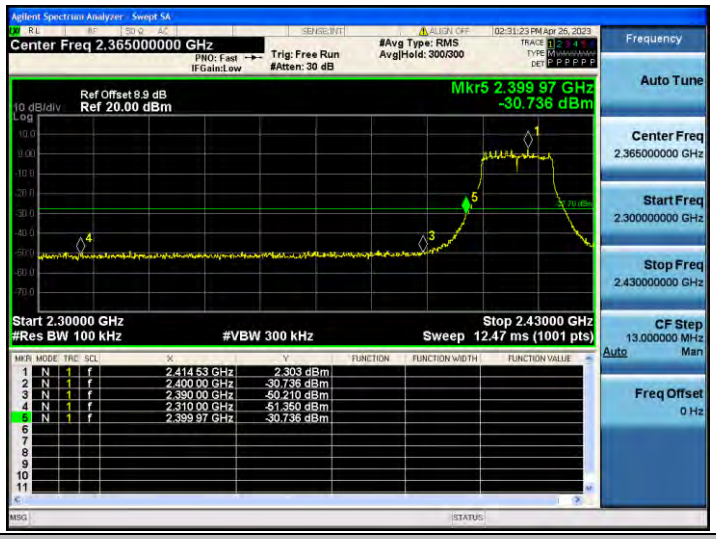

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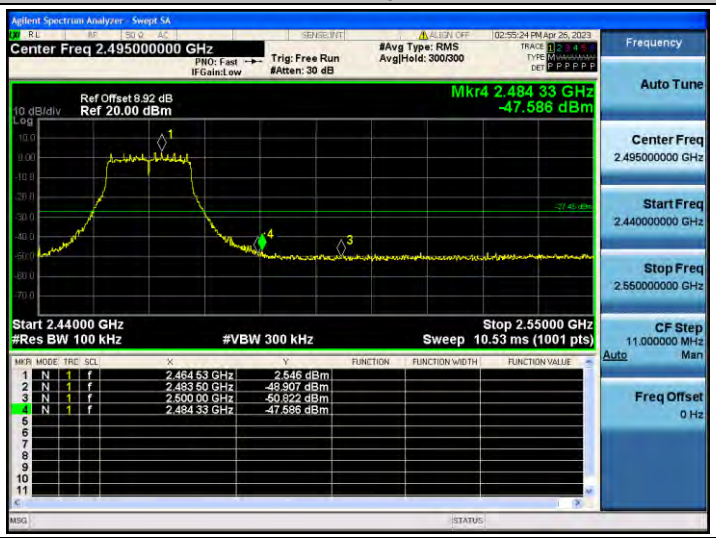

11N20SISO_Ant1_Low_2412

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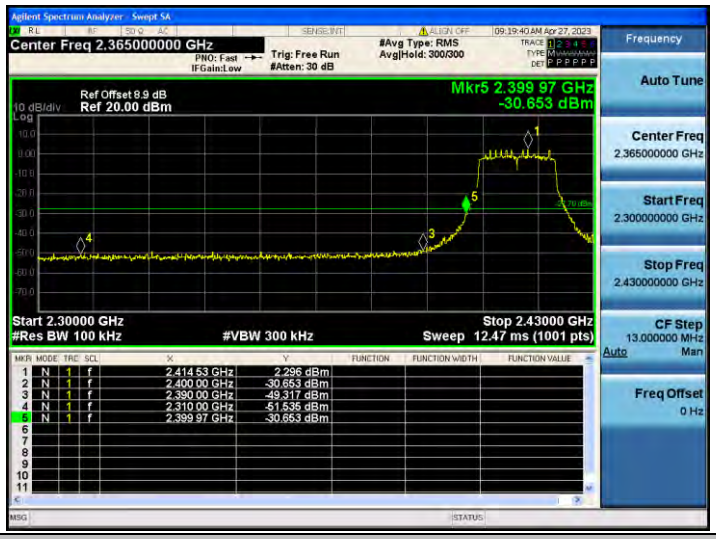

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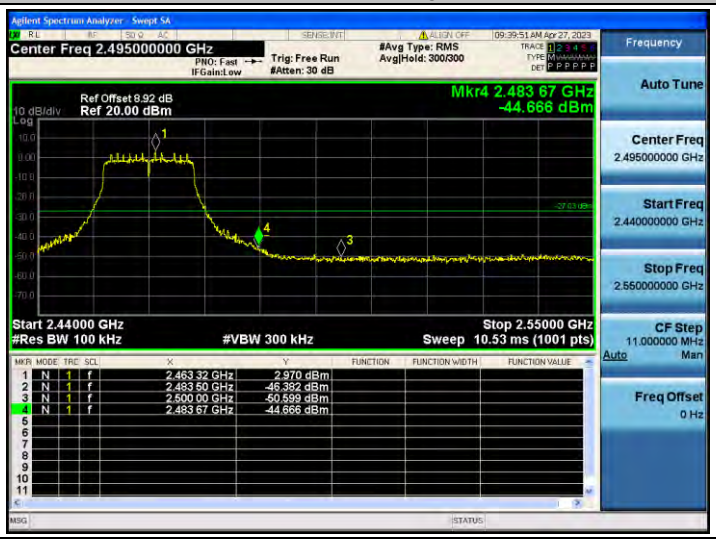

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10.6 Appendix F: Conducted Spurious Emission

10.6.1 Test Result

TestMode	Antenna	Channel	FreqRange [Mhz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
11B	Ant1	2412	Reference	4.95	4.95	---	PASS
			30~1000	4.95	-60.9	≤-25.05	PASS
			1000~26500	4.95	-42.21	≤-25.05	PASS
		2437	Reference	7.10	7.10	---	PASS
			30~1000	7.10	-61.37	≤-22.9	PASS
			1000~26500	7.10	-41.92	≤-22.9	PASS
		2462	Reference	6.65	6.65	---	PASS
			30~1000	6.65	-61.33	≤-23.35	PASS
			1000~26500	6.65	-42.42	≤-23.35	PASS
11G	Ant1	2412	Reference	-0.92	-0.92	---	PASS
			30~1000	-0.92	-61.47	≤-30.92	PASS
			1000~26500	-0.92	-42.59	≤-30.92	PASS
		2437	Reference	0.71	0.71	---	PASS
			30~1000	0.71	-60.9	≤-29.29	PASS
			1000~26500	0.71	-42.83	≤-29.29	PASS
		2462	Reference	-0.30	-0.30	---	PASS
			30~1000	-0.30	-61.47	≤-30.3	PASS
			1000~26500	-0.30	-42.07	≤-30.3	PASS
11N20SISO	Ant1	2412	Reference	0.52	0.52	---	PASS
			30~1000	0.52	-61.1	≤-29.48	PASS
			1000~26500	0.52	-42.82	≤-29.48	PASS
		2437	Reference	1.53	1.53	---	PASS
			30~1000	1.53	-61.29	≤-28.47	PASS
			1000~26500	1.53	-43.9	≤-28.47	PASS
		2462	Reference	2.11	2.11	---	PASS
			30~1000	2.11	-61.49	≤-27.89	PASS
			1000~26500	2.11	-41.85	≤-27.89	PASS

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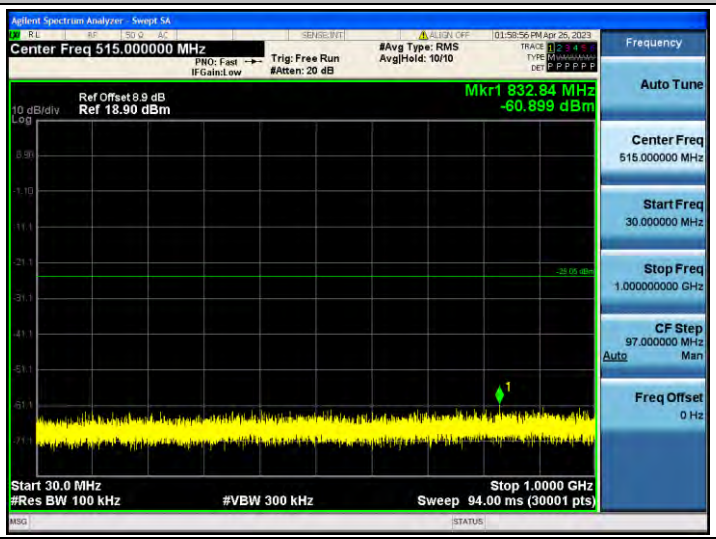
10.6.2 Test Graphs

11B_Ant1_2412_0~Reference

11B_Ant1_2412_30~1000



11B_Ant1_2412_1000~26500

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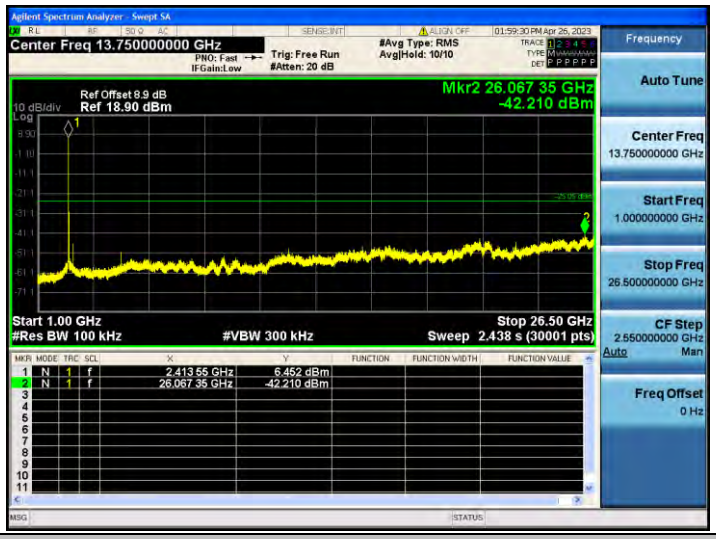

11B_Ant1_2437_0~Reference

11B_Ant1_2437_30~1000

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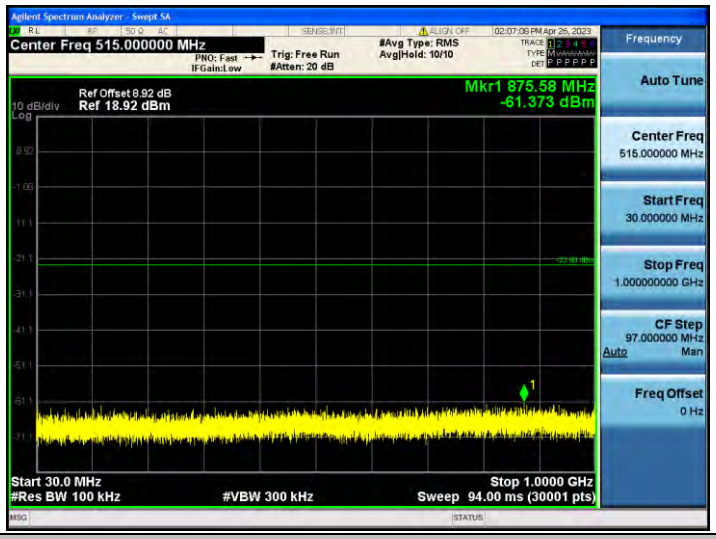

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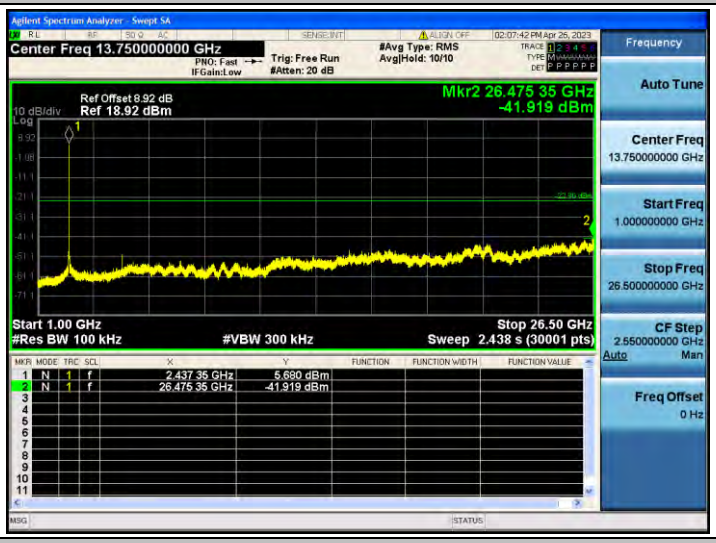

11B_Ant1_2462_0~Reference

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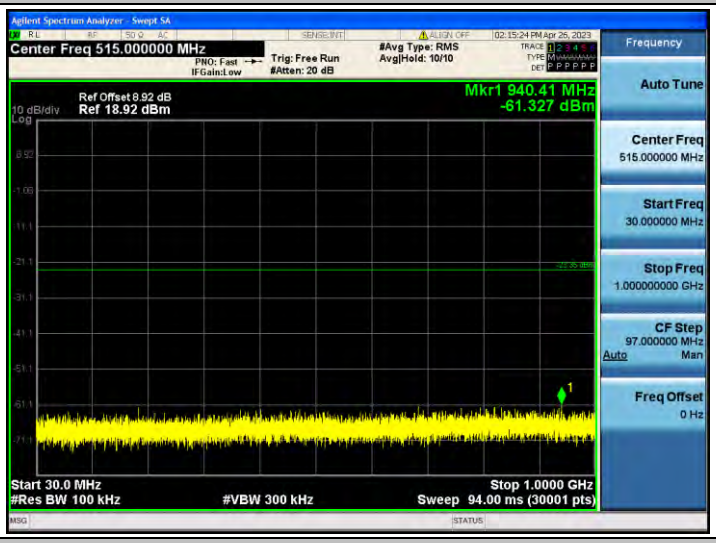

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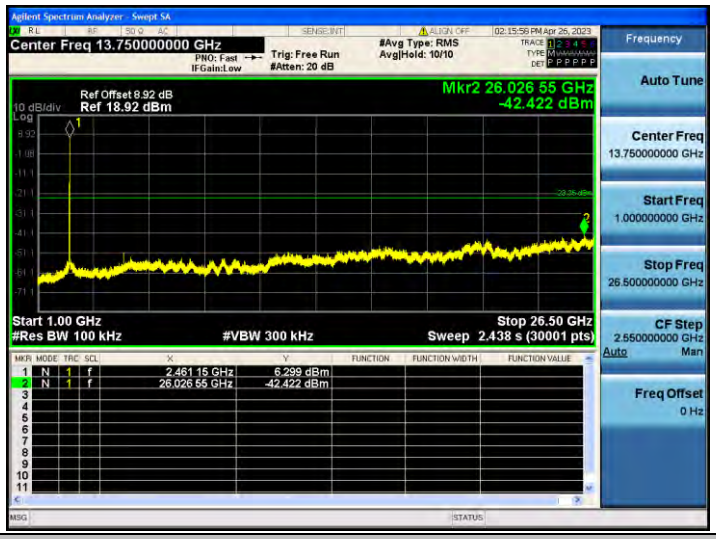

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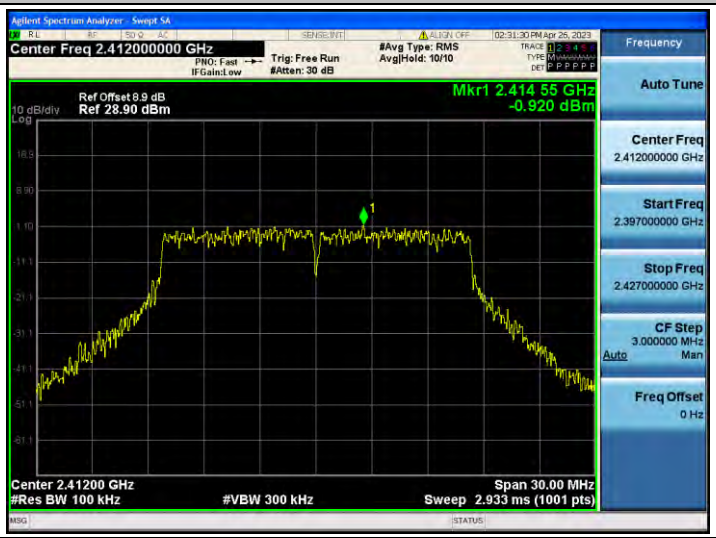

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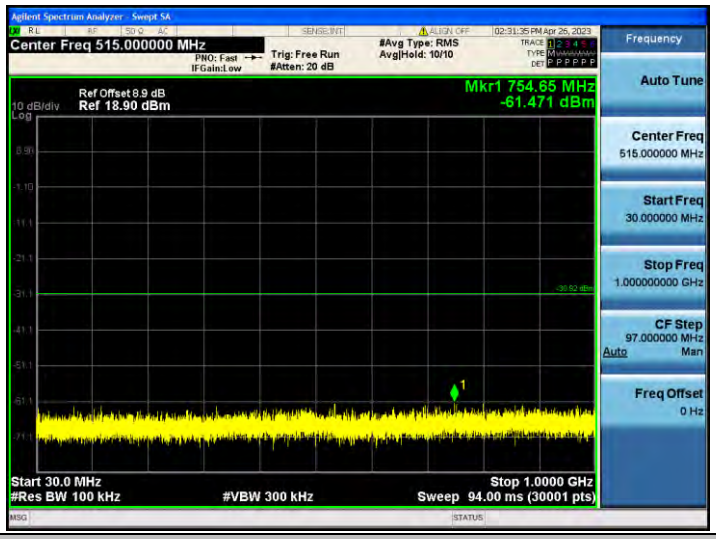

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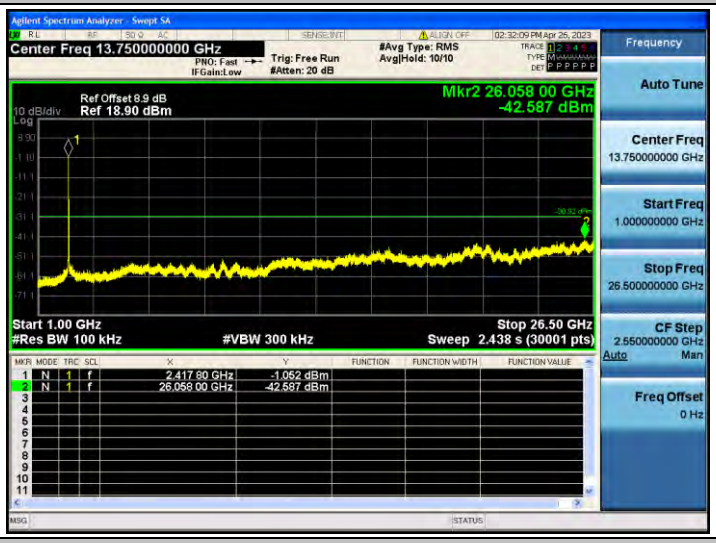

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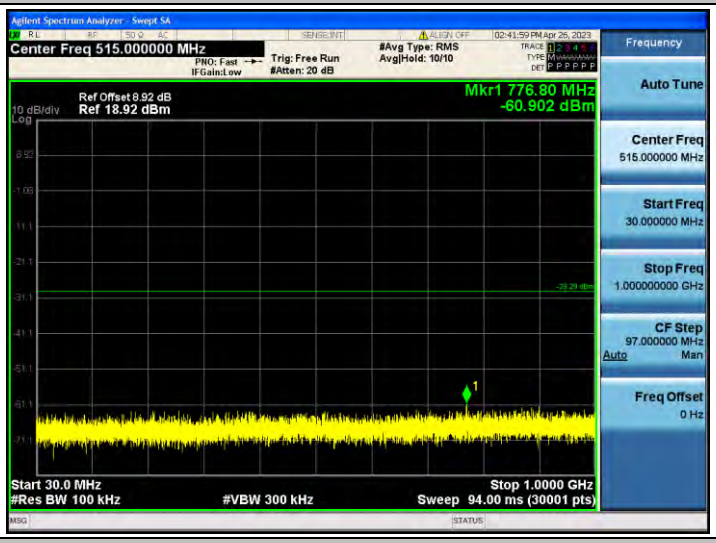

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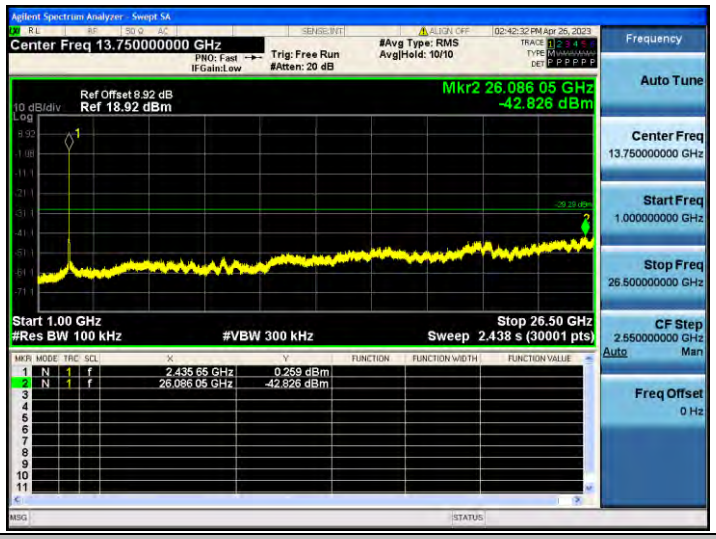

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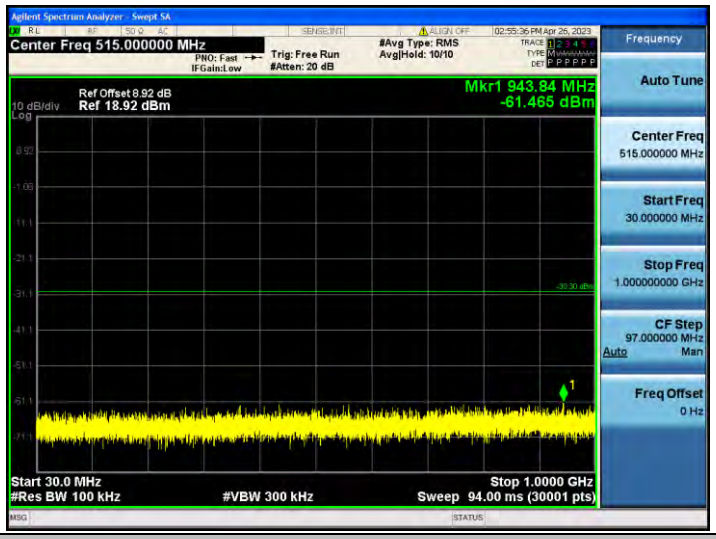

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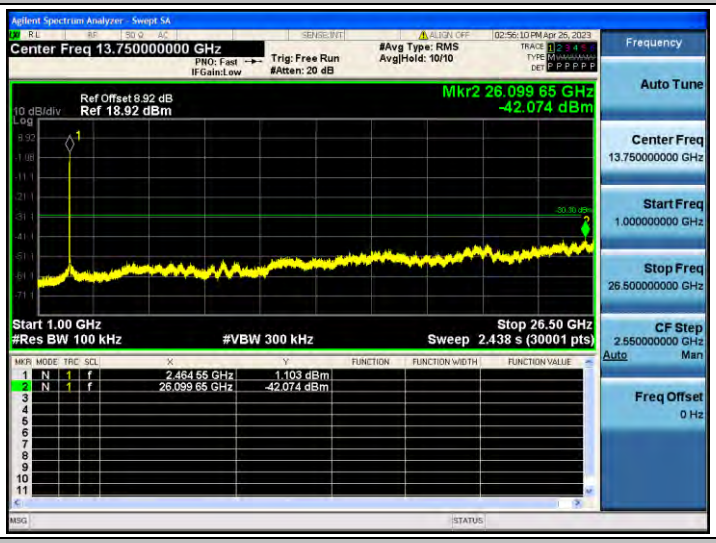

11N20SISO_Ant1_2412_0~Reference

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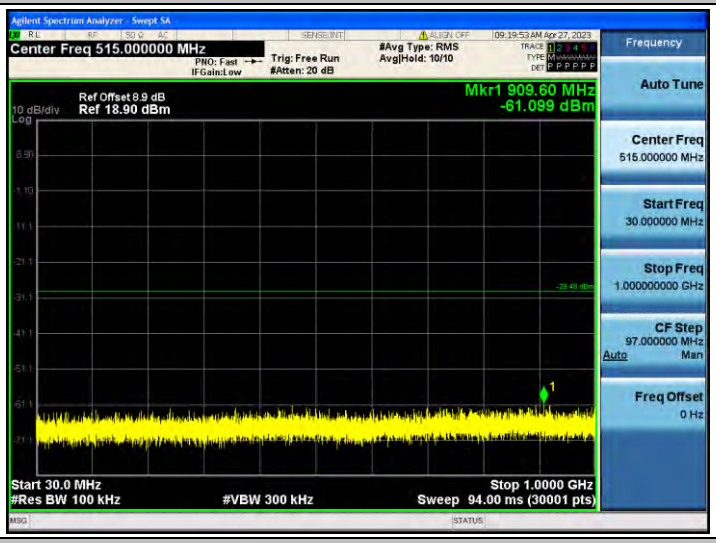

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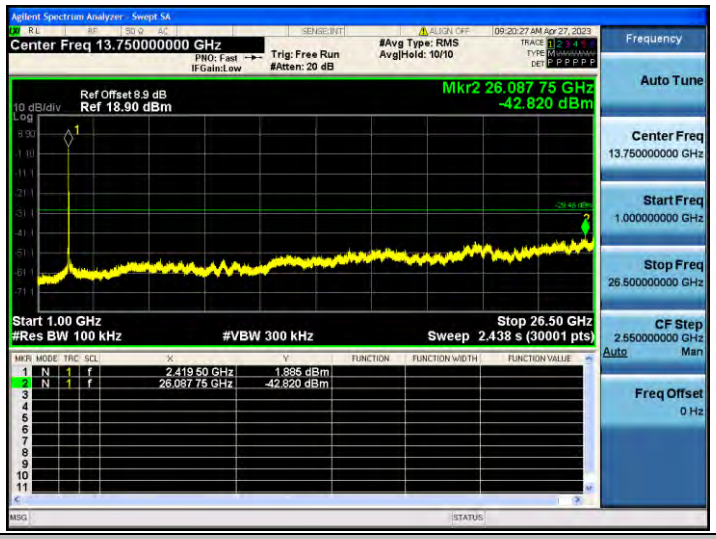

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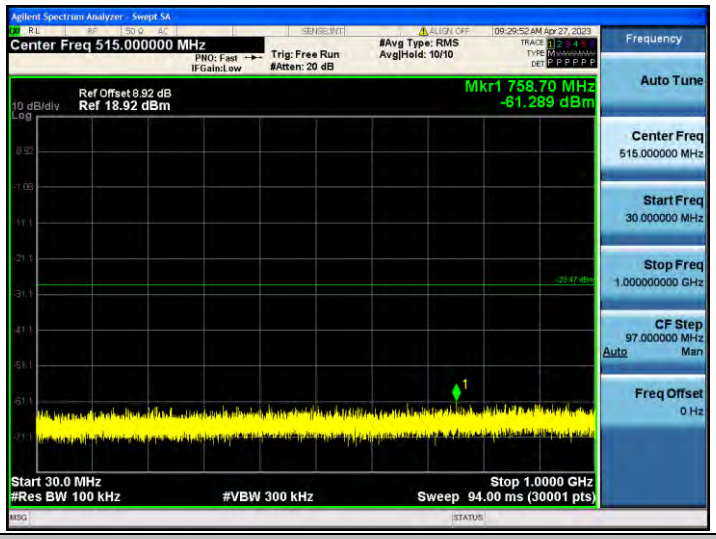

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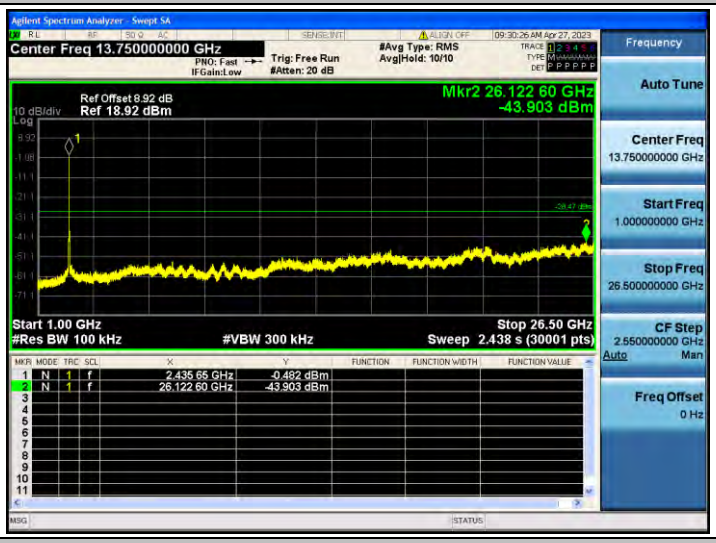

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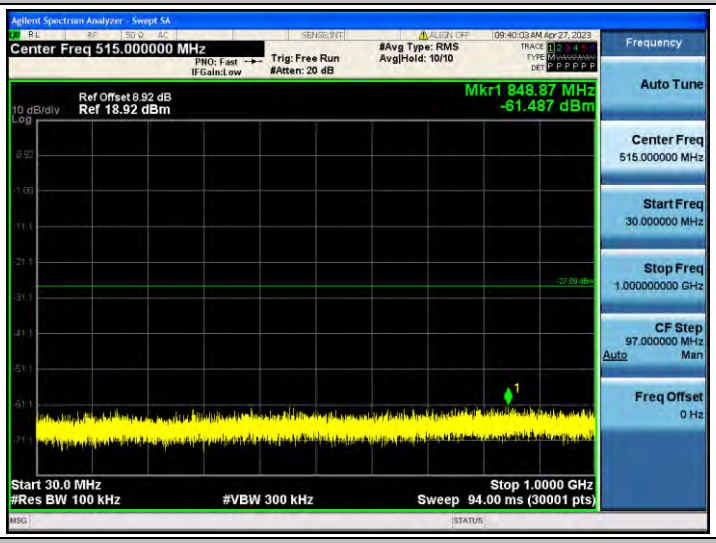

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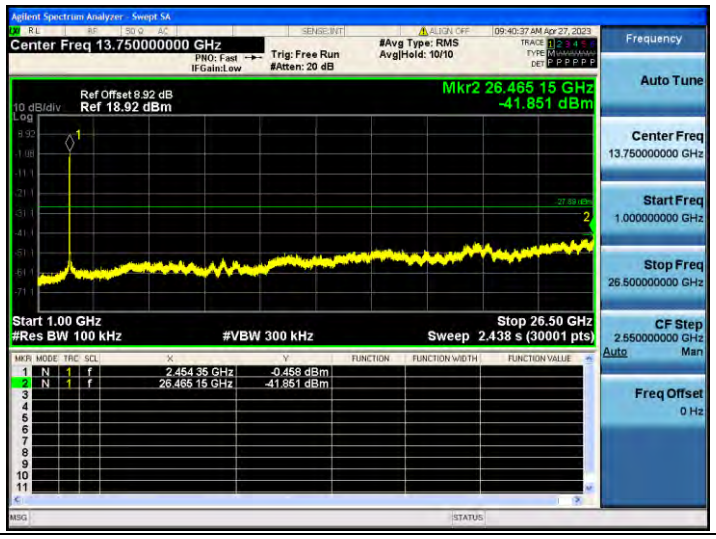

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10.7 Appendix G: Duty Cycle

10.7.1 Test Result

TestMode	Antenna	Channel	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]	Limit	Verdict
11B	Ant1	2412	12.41	12.54	98.96	---	---
		2437	12.41	12.55	98.88	---	---
		2462	12.41	12.54	98.96	---	---
11G	Ant1	2412	2.05	2.19	93.61	---	---
		2437	2.06	2.20	93.64	---	---
		2462	2.06	2.20	93.64	---	---
11N20SISO	Ant1	2412	1.92	2.05	93.66	---	---
		2437	1.91	2.05	93.17	---	---
		2462	1.91	2.05	93.17	---	---

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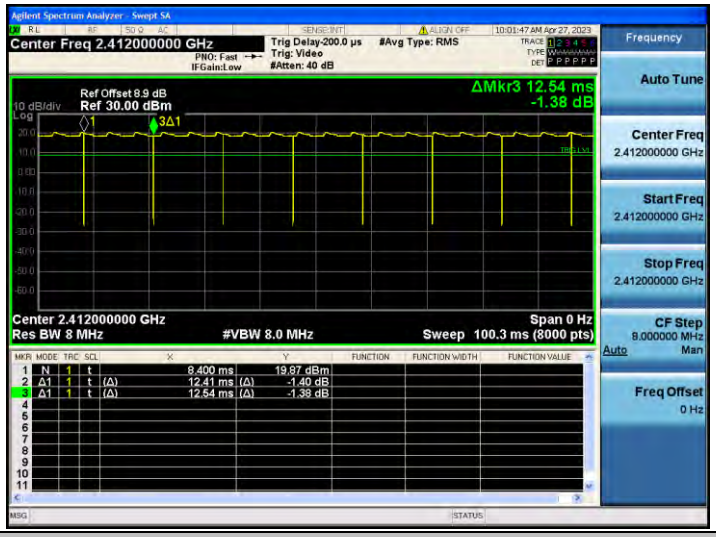
10.7.2 Test Graphs

11B_Ant1_2412



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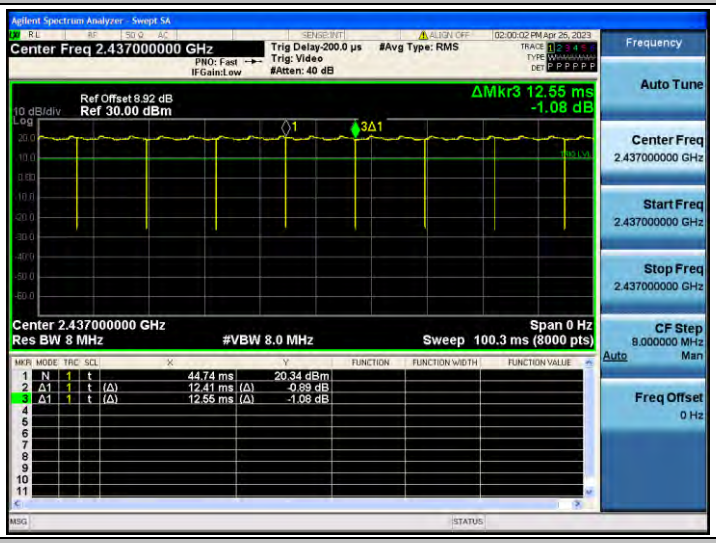

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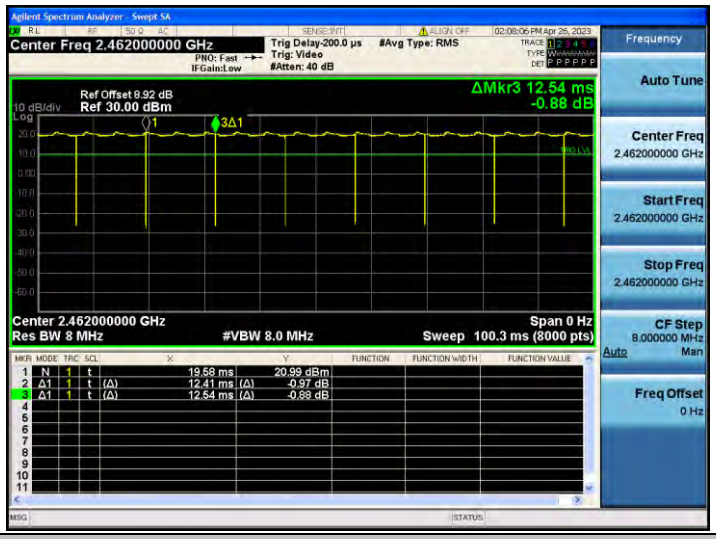

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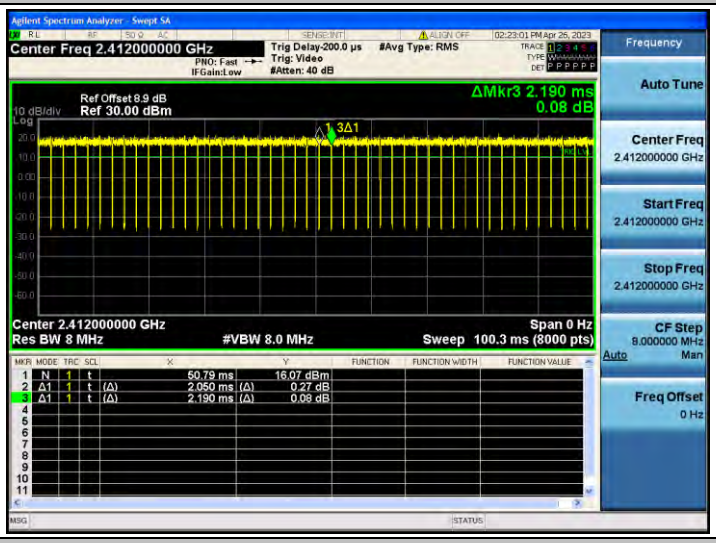

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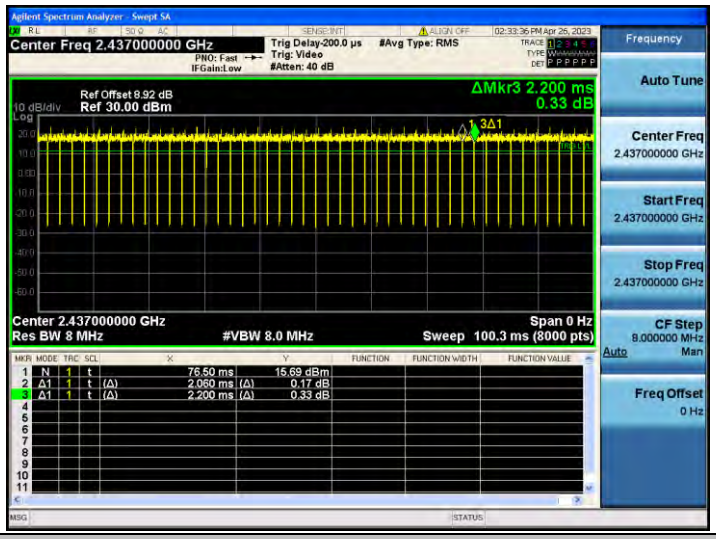

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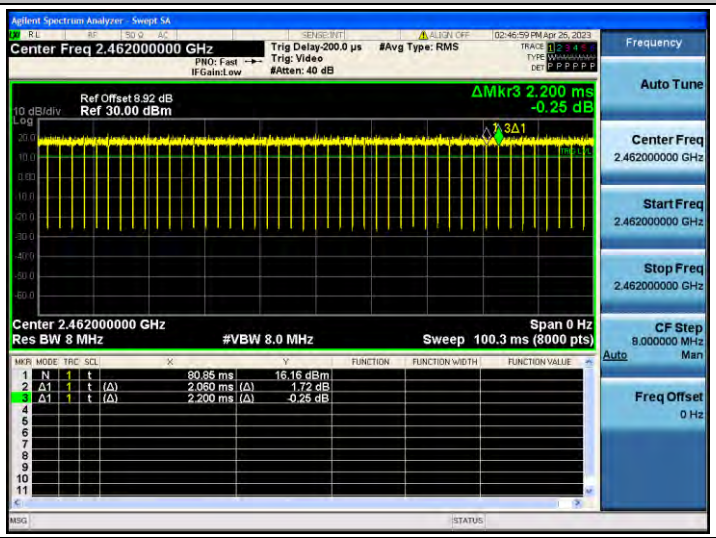

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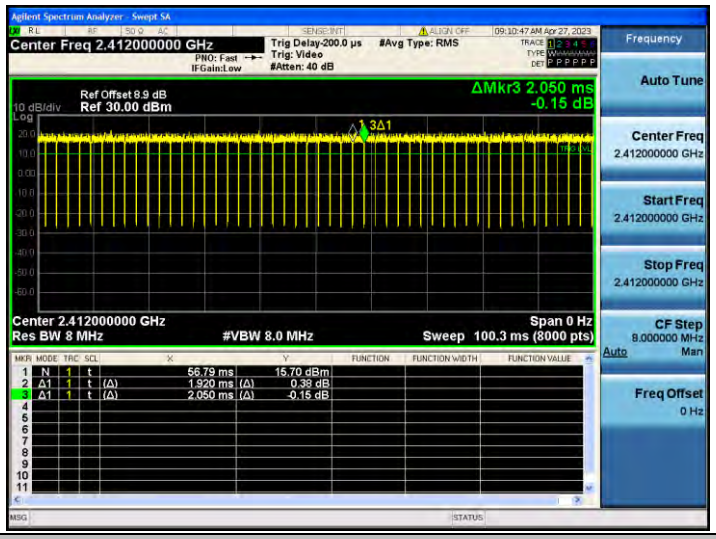

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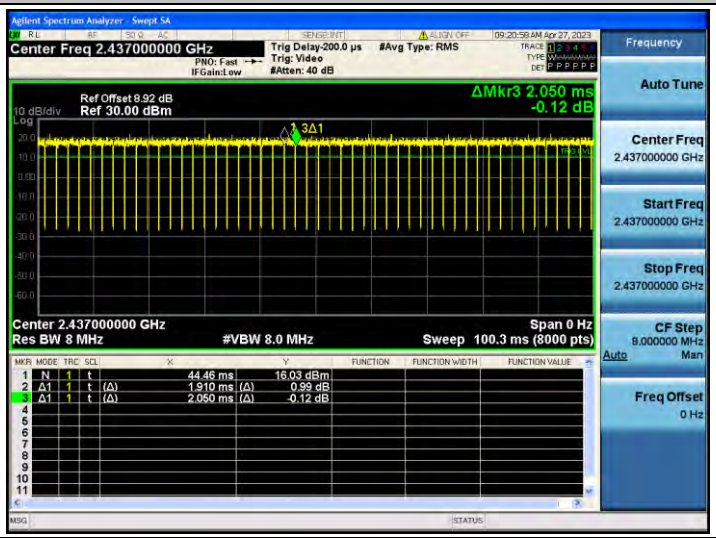

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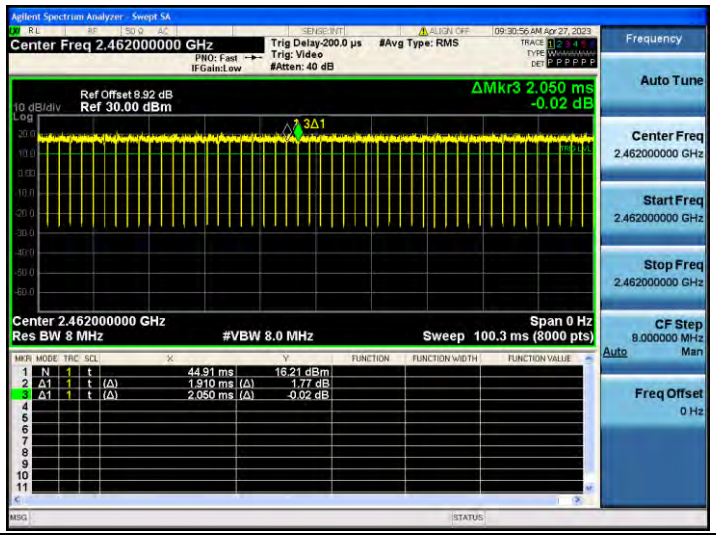

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