



SGS-CSTC Standards Technical Services Co., Ltd. Guangzhou Branch

EMC-TRF-01 Rev 1.1

Report No.: GZCR231100119902

Page: 1 of 92

FCC ID: 2AHVL-EWBTWIFI01

TEST REPORT

Application No.: GZCR2311001199HS
Applicant: Dyaco International Inc.
Address of Applicant: 12F, No.111, Songjiang Road, Taipei 104, Taiwan, China
Manufacturer: Dyaco International Inc.
Address of Manufacturer: 12F, No.111, Songjiang Road, Taipei 10486, Taiwan, China
Factory: Dyaco International Inc.
Address of Factory: No.1, Gong 1st Rd., Cyuan Sing Industrial Park, Hemei Town, Changhua County, 50843, Taiwan, China
Product Name: Bluetooth & WiFi module
Model No.: EWBTWIFI-01
Standard(s): 47 CFR Part 15, Subpart C 15.247
Date of Receipt: 2023-11-23
Date of Test: 2023-12-08 to 2024-01-04
Date of Issue: 2024-06-12

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

Ricky Liu

Ricky Liu
Manager



SGS-CSTC Standards Technical Services Co., Ltd.
Guangzhou Branch Testing & Calibration Laboratory

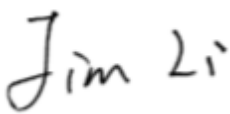
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Revision Record			
Version	Report No.	Date	Remark
01	GZCR231100119902	2024-06-12	Original

Authorized for issue by			
			
		Jim Li/Project Engineer	
			
		Vico Cui/Reviewer	

2 Test Summary

Radio Spectrum Technical Requirement				
Item	Standard	Method	Requirement	Result
Antenna Requirement	47 CFR Part 15, Subpart C 15.247	N/A	47 CFR Part 15, Subpart C 15.203 & 15.247(b)(4)	Pass

Radio Spectrum Matter Part				
Item	Standard	Method	Requirement	Result
Conducted Emissions at AC Power Line (150kHz-30MHz)	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.2	47 CFR Part 15, Subpart C 15.207	Pass
Conducted Peak Output Power		ANSI C63.10 (2013) Section 11.9.2	47 CFR Part 15, Subpart C 15.247(b)(3)	Pass
Minimum 6dB Bandwidth		ANSI C63.10 (2013) Section 11.8.1	47 CFR Part 15, Subpart C 15.247a(2)	Pass
Power Spectrum Density		ANSI C63.10 (2013) Section 11.10.2	47 CFR Part 15, Subpart C 15.247(e)	Pass
Conducted Band Edges Measurement		ANSI C63.10 (2013) Section 11.13.3.2	47 CFR Part 15, Subpart C 15.247(d)	Pass
Conducted Spurious Emissions		ANSI C63.10 (2013) Section 11.11	47 CFR Part 15, Subpart C 15.247(d)	Pass
Radiated Emissions which fall in the restricted bands		ANSI C63.10 (2013) Section 11.12	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass**
Radiated Spurious Emissions Below 1GHz		ANSI C63.10 (2013) Section 6.4,6.5	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass
Radiated Spurious Emissions Above 1GHz		ANSI C63.10 (2013) Section 6.6	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass
**: The EUT passed Radiated Emissions which fall in the restricted bands test after modification.				

Note:

E.U.T./EUT means Equipment Under Test.

Pass means the test result passed the test standard requirement, please find the detailed decision rule in the report relative section.



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4 General Information

4.1 Details of E.U.T.

Power supply:	DC 12V
Cable(s):	N/A
Test Voltage:	AC 120 V, 60 Hz (Powered by electronic screen)
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:	Integral Antenna
Antenna Gain:	2.16 dBi according to the antenna specification

4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
Note Book Computer	LENOVO	ThinkPad T490	PF1D1MVJ
Electronic screen	Supplied by applicant	/	/

4.3 Measurement Uncertainty

Test Item	Measurement Uncertainty
Conducted Emissions at AC Power Line (150kHz-30MHz)	±2.76dB
Conducted Peak Output Power	± 0.75dB
Minimum 6dB Bandwidth	± 3%
Power Spectrum Density	± 2.84dB
Conducted Band Edges Measurement	± 0.75dB
Conducted Spurious Emissions	± 0.75dB
Radiated Emissions which fall in the restricted bands	±5.00dB (30MHz-1GHz; 3m);±4.38dB (30MHz-1GHz; 10m);± 5.12dB (1GHz-6GHz); ±5.38dB (6GHz-18GHz); ±5.61dB(18GHz-40GHz)
Radiated Spurious Emissions Below 1GHz	±5.00dB (3m); ±4.38dB (10m)
Radiated Spurious Emissions Above 1GHz	±5.12dB (1GHz-6GHz); ±5.38dB (6GHz-18GHz); ±5.61dB(18GHz-40GHz)
Remark: The U _{lab} (lab Uncertainty) is less than U _{ETSI} (ETSI Uncertainty), so the test results – compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit; – non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.	

4.4 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou Branch EMC Laboratory,
No.198, Kezhu Road, Science City, Economic & Technological Development Area, Guangzhou,
Guangdong, China 510663

Tel: +86 20 82155555

No tests were sub-contracted.

4.5 Test Facility

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

● ACMA

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory can also perform testing for the Australian/New Zealand Regulatory Compliance Mark (RCM).

● SGS UK(Certificate No.: 32), SGS-TUV SAARLAND and SGS-FIMKO

Have approved SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory as a supplier of EMC TESTING SERVICES and SAFETY TESTING SERVICES.

● FCC Recognized Accredited Test Firm(Registration No.: 486818)

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been accredited and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Designation Number: CN5016, Test Firm Registration Number: 486818.

● ISED (Registration No.: 4620B, CAB identifier: CN0052)

SGS-CSTC Standards Technical Services Co., Ltd., has been registered by Innovation Science and Economic Development Canada for Wireless Device Testing laboratories to test to Canadian radio equipment requirements. Registration No. 4620B, CAB identifier: CN0052.

● VCCI (Registration No.: R-12460, C-12584, G-20107 and T-11179)

The 10m Semi-anechoic chamber, 966 Anechoic Chamber and Shielded Room of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-12460, C-12584, G-20107 and T-11179 respectively.

● CBTL (Lab Code: TL129)

SGS-CSTC Standards Technical Services Co., Ltd., E&E Laboratory has been assessed and fully comply with the requirements of ISO/IEC 17025:2017, the Basic Rules, IECEE 01 and Rules of procedure IECEE 02, and the relevant IECEE CB-Scheme Operational documents.

4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None



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5 Equipment List

Conducted Emissions at AC Power Line (150kHz-30MHz)					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Coaxial Cable	HangTianXing	2m	EMC0107	2023-08-04	2024-08-03
Shielding Room	ChangZhou ZhongYu	8m x 3m x 3.8m	EMC0306	2022-10-16	2025-10-15
Two-Line V-Network-GZ	Rohde & Schwarz	ENV216	EMC2135	2023-09-08	2024-09-07
EMI Test Receiver (9kHz-3.6GHz)	Rohde & Schwarz	ESR3	EMC2221	2023-05-19	2024-05-18
Test Software E3r	Audix	Ver.6.11812	GZE100-77	N/A	N/A

Conducted Peak Output Power					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
MI CABLE	SGS-EMC	0.8M	EMC2137	2023-11-02	2025-11-01
EXA Signal Analyzer (10Hz-44GHz)	Keysight	N9010A	EMC2138	2023-08-23	2024-08-22
4X4 Power sensor Unit	TST	TSPS2023R	EMC2226	2023-08-23	2024-08-22
Test Software	TST	V2.0	GZE100-78	N/A	N/A

Minimum 6dB Bandwidth					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
MI CABLE	SGS-EMC	0.8M	EMC2137	2023-11-02	2025-11-01
EXA Signal Analyzer (10Hz-44GHz)	Keysight	N9010A	EMC2138	2023-08-23	2024-08-22
4X4 Power sensor Unit	TST	TSPS2023R	EMC2226	2023-08-23	2024-08-22
Test Software	TST	V2.0	GZE100-78	N/A	N/A

Power Spectrum Density					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
MI CABLE	SGS-EMC	0.8M	EMC2137	2023-11-02	2025-11-01
EXA Signal Analyzer (10Hz-44GHz)	Keysight	N9010A	EMC2138	2023-08-23	2024-08-22
4X4 Power sensor Unit	TST	TSPS2023R	EMC2226	2023-08-23	2024-08-22
Test Software	TST	V2.0	GZE100-78	N/A	N/A



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Conducted Band Edges Measurement					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
MI CABLE	SGS-EMC	0.8M	EMC2137	2023-11-02	2025-11-01
EXA Signal Analyzer (10Hz-44GHz)	Keysight	N9010A	EMC2138	2023-08-23	2024-08-22
4X4 Power sensor Unit	TST	TSPS2023R	EMC2226	2023-08-23	2024-08-22
Test Software	TST	V2.0	GZE100-78	N/A	N/A

Conducted Spurious Emissions					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
MI CABLE	SGS-EMC	0.8M	EMC2137	2023-11-02	2025-11-01
EXA Signal Analyzer (10Hz-44GHz)	Keysight	N9010A	EMC2138	2023-08-23	2024-08-22
4X4 Power sensor Unit	TST	TSPS2023R	EMC2226	2023-08-23	2024-08-22
Test Software	TST	V2.0	GZE100-78	N/A	N/A

Radiated Emissions which fall in the restricted bands					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
1GHz-26.5 GHz Pre-Amplifier	Agilent	8449B	EMC0521	2023-11-10	2024-11-09
EMI Test Receiver (10Hz-26.5GHz)	Rohde & Schwarz	ESIB26	EMC0522	2023-12-15	2024-12-14
Chamber cable (Above 1GHz)	Scoflex	KMKM-8.0m	EMC0545	2022-08-24	2024-08-23
Horn Antenna (1GHz-18GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120D	EMC2026	2022-09-23	2025-09-22
Horn Antenna (14-40GHz)	SCHWARZBECK	BBHA 9170	EMC2041	2023-06-18	2026-06-17
EXA Signal Analyzer (10Hz-44GHz)	Keysight	N9010A	EMC2138	2023-08-23	2024-08-22
MXE EMI Receiver (10Hz-8.4GHz)	Keysight	N9038A	EMC2139	2023-10-20	2024-10-19
966 Anechoic Chamber	C.R.T	9m x 6m x 6m	EMC2142	2023-12-20	2026-12-19
Test Software E3	Audix	Ver.6.120110a	GZE100-61	N/A	N/A



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Radiated Spurious Emissions Below 1GHz					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
966 Anechoic Chamber	Shenzhen C.R.T	CRTSGSSAC966	EMC2230	2022-04-12	2025-04-11
EMI Test Receiver(1Hz-8GHz)	Rohde & Schwarz	ESW8	EMC2229	2023-02-20	2024-02-19
Amplifier(9k-1000MHz)	SONOMA	310	EMC2237	2023-04-13	2024-04-12
TRILOG Broadband Antenna (25M-2GHz)	SCHWRZBECK	VULB 9168	EMC2238	2022-04-20	2025-04-19
Coaxial Cable	Mirco-COAX UTIFLEX ve	LA2-C125-8000	EMC2239	2023-06-14	2025-06-13
Test Software E3	Audix	Ver.6.191211	GZE100-81	N/A	N/A
Active Loop Antenna-RED	ETS-Lindgren	6502	EMC2190	2022-04-06	2024-04-05

Radiated Spurious Emissions Above 1GHz					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
1GHz-26.5 GHz Pre-Amplifier	Agilent	8449B	EMC0521	2023-11-10	2024-11-09
EMI Test Receiver (10Hz-26.5GHz)	Rohde & Schwarz	ESIB26	EMC0522	2023-12-15	2024-12-14
Chamber cable (Above 1GHz)	Scoflex	KMKM-8.0m	EMC0545	2022-08-24	2024-08-23
Horn Antenna (1GHz-18GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120D	EMC2026	2022-09-23	2025-09-22
Horn Antenna (14-40GHz)	SCHWARZBECK	BBHA 9170	EMC2041	2023-06-18	2026-06-17
2.4GHz Filter	Micro-Tronics	BRM 50702	EMC2069	2023-11-10	2024-11-09
EXA Signal Analyzer (10Hz-44GHz)	Keysight	N9010A	EMC2138	2023-08-23	2024-08-22
MXE EMI Receiver (10Hz-8.4GHz)	Keysight	N9038A	EMC2139	2023-10-20	2024-10-19
966 Anechoic Chamber	C.R.T	9m x 6m x 6m	EMC2142	2023-12-20	2026-12-19
Test Software E3	Audix	Ver.6.120110a	GZE100-61	N/A	N/A

General used equipment					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
DMM	Fluke	73	EMC0006	2023-06-11	2024-06-10



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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 integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 2.16 dBi.

Antenna location: Refer to internal photo.

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: 23.6 °C Humidity: 50.4 % RH Atmospheric Pressure: 1021 mbar

7.1.2 Test Mode Description

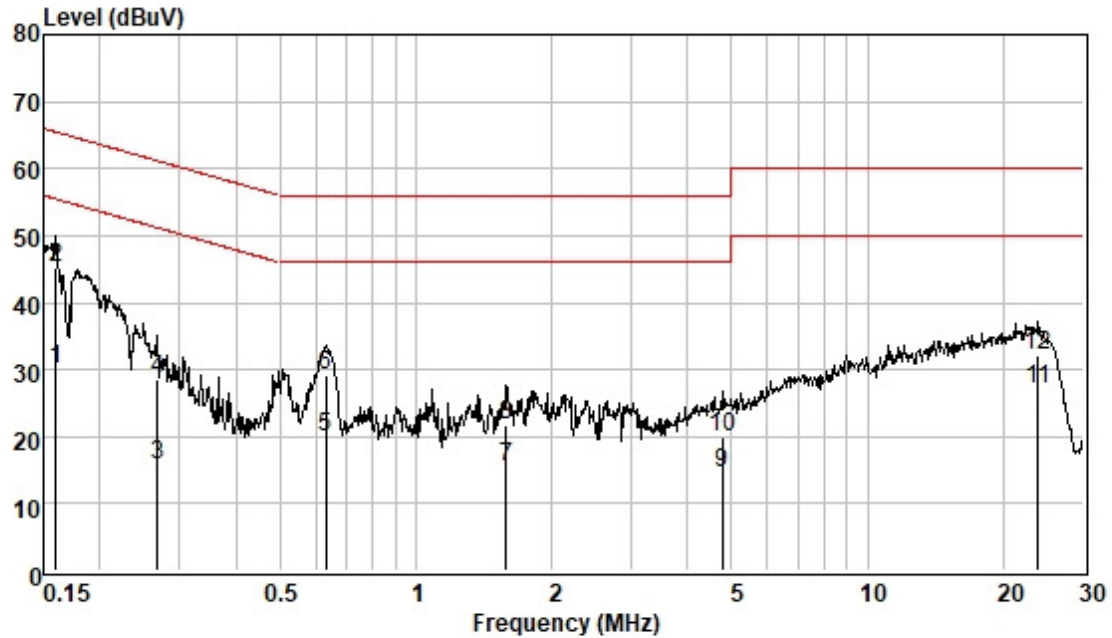
Pre-scan / Final test	Mode Code	Description
Final test	03	Normal operating_Keep the EUT communication with the companion device.



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Test Mode: 03; Line: Live line



Pol : LINE
Mode :
Model :
Power :

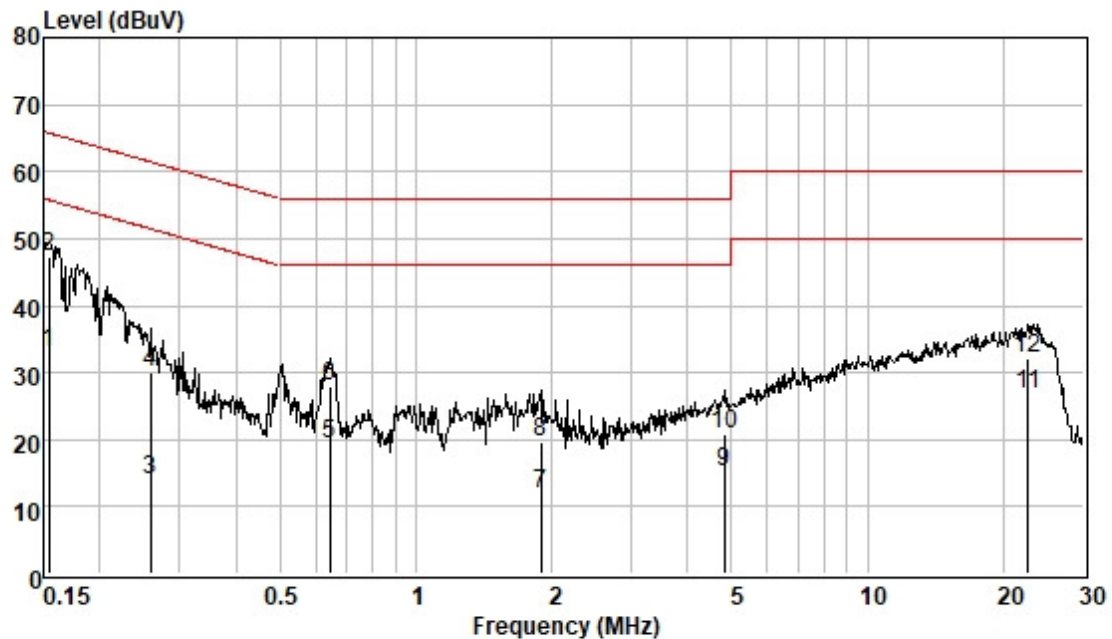
	Frequency MHz	Read Level dBuV	Cable Loss dB	LISN Factor dB	Measured Level dBuV	Limit Line dBuV	Over Limit dB	Remark
1	0.160	20.45	0.04	9.55	30.04	55.47	-25.43	Average
2	0.160	35.50	0.04	9.55	45.09	65.47	-20.38	QP
3	0.269	6.14	0.04	9.56	15.74	51.16	-35.42	Average
4	0.269	19.07	0.04	9.56	28.67	61.16	-32.49	QP
5	0.634	10.41	0.06	9.57	20.04	46.00	-25.96	Average
6	0.634	19.56	0.06	9.57	29.19	56.00	-26.81	QP
7	1.585	5.86	0.11	9.56	15.53	46.00	-30.47	Average
8	1.585	12.00	0.11	9.56	21.67	56.00	-34.33	QP
9	4.772	4.67	0.19	9.62	14.48	46.00	-31.52	Average
10	4.772	9.98	0.19	9.62	19.79	56.00	-36.21	QP
11	23.762	16.72	0.42	9.86	27.00	50.00	-23.00	Average
12	23.762	21.96	0.42	9.86	32.24	60.00	-27.76	QP



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Test Mode: 03; Line: Neutral Line



Pol : NEUTRAL
Mode :
Model :
Power :

	Frequency MHz	Read Level dBuV	Cable Loss dB	LISN Factor dB	Measured Level dBuV	Limit Line dBuV	Over Limit dB	Remark
1	0.154	23.32	0.04	9.52	32.88	55.78	-22.90	Average
2	0.154	37.82	0.04	9.52	47.38	65.78	-18.40	QP
3	0.259	4.38	0.04	9.53	13.95	51.47	-37.52	Average
4	0.259	20.35	0.04	9.53	29.92	61.47	-31.55	QP
5	0.644	9.86	0.06	9.55	19.47	46.00	-26.53	Average
6	0.644	18.21	0.06	9.55	27.82	56.00	-28.18	QP
7	1.888	2.18	0.12	9.55	11.85	46.00	-34.15	Average
8	1.888	10.10	0.12	9.55	19.77	56.00	-36.23	QP
9	4.822	5.40	0.19	9.62	15.21	46.00	-30.79	Average
10	4.822	10.90	0.19	9.62	20.71	56.00	-35.29	QP
11	22.655	16.28	0.41	9.94	26.63	50.00	-23.37	Average
12	22.655	21.81	0.41	9.94	32.16	60.00	-27.84	QP



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7.2 Conducted Peak 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

7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 21.3 °C

Humidity: 49.7 % RH

Atmospheric Pressure: 1021 mbar

7.2.2 Test Mode Description

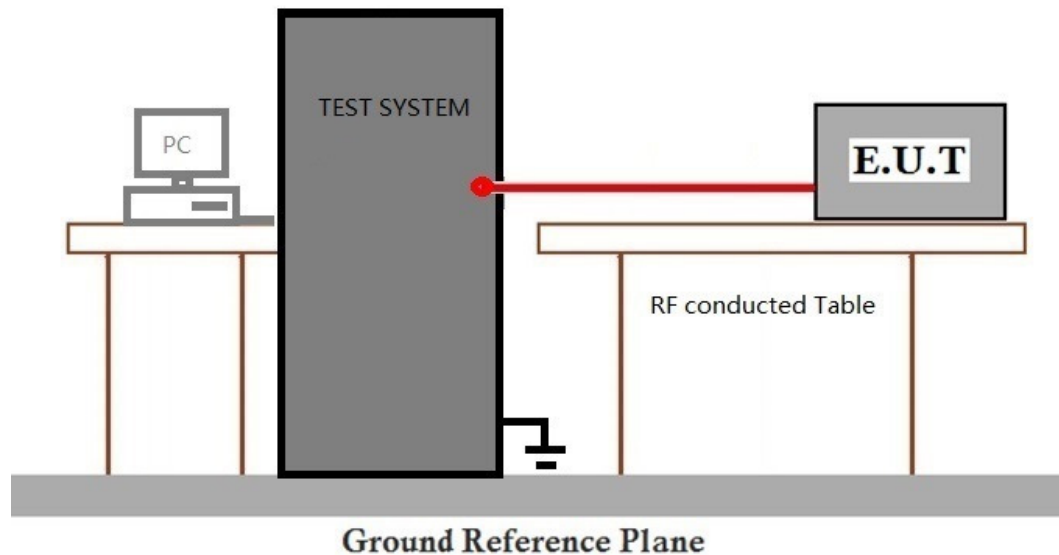
Pre-scan / Final test	Mode Code	Description
Final test	02	TX mode_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of 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.

Please Refer to Appendix for Details

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

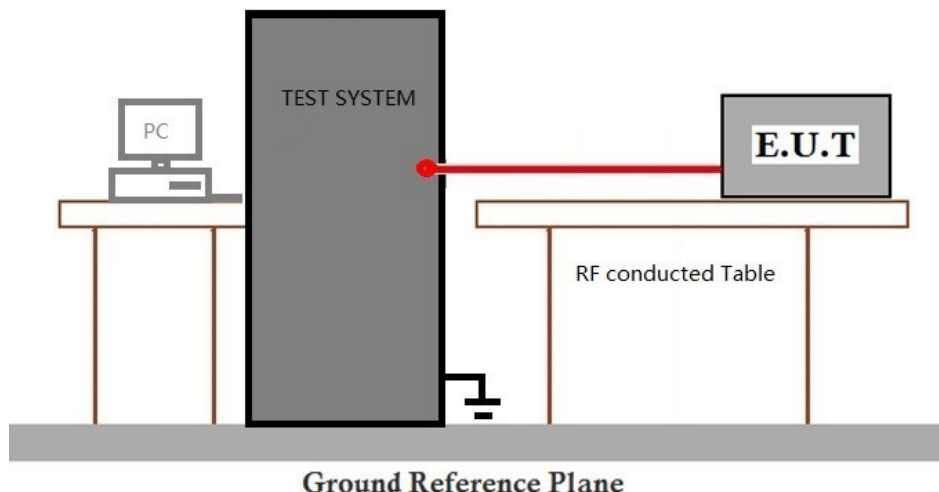
Operating Environment:

Temperature: 21.3 °C Humidity: 49.7 % RH Atmospheric Pressure: 1021 mbar

7.3.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	02	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

Please Refer to Appendix for Details



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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 11.10.2
 Limit:
 ≤8dBm in any 3 kHz band during any time interval of continuous transmission

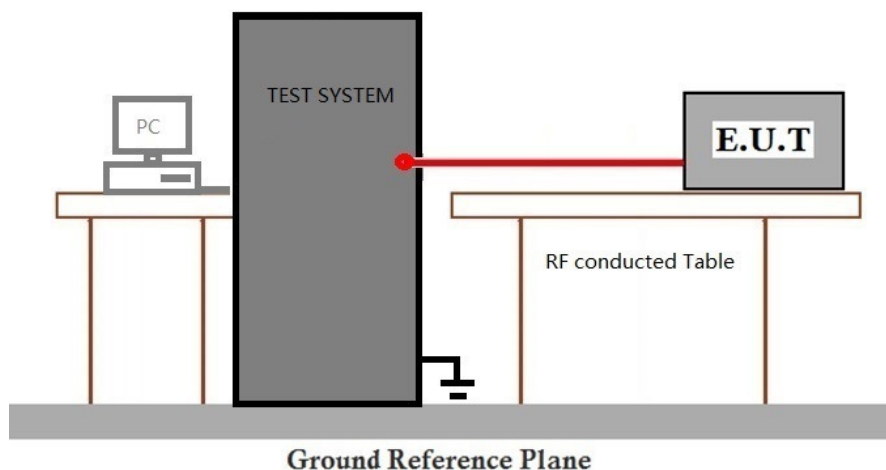
7.4.1 E.U.T. Operation

Operating Environment:
 Temperature: 21.3 °C Humidity: 49.7 % RH Atmospheric Pressure: 1021 mbar

7.4.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	02	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: 21.3 °C

Humidity: 49.7 % RH

Atmospheric Pressure: 1021 mbar

7.5.2 Test Mode Description

Pre-scan / Mode
Final test Code

Description

Final test 02

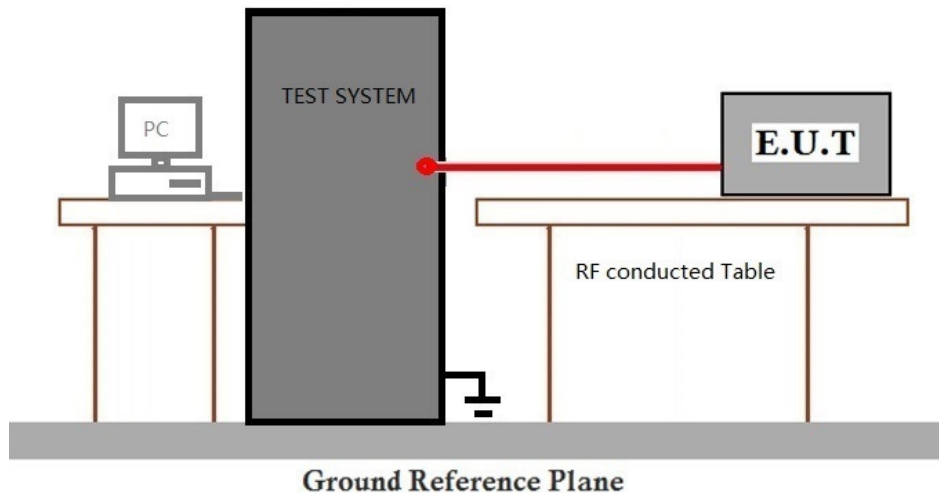
TX mode_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 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

Please Refer to Appendix for Details

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: 21.3 °C

Humidity: 49.7 % RH

Atmospheric Pressure: 1021 mbar

7.6.2 Test Mode Description

Pre-scan / Mode
Final test Code

Description

Final test 02

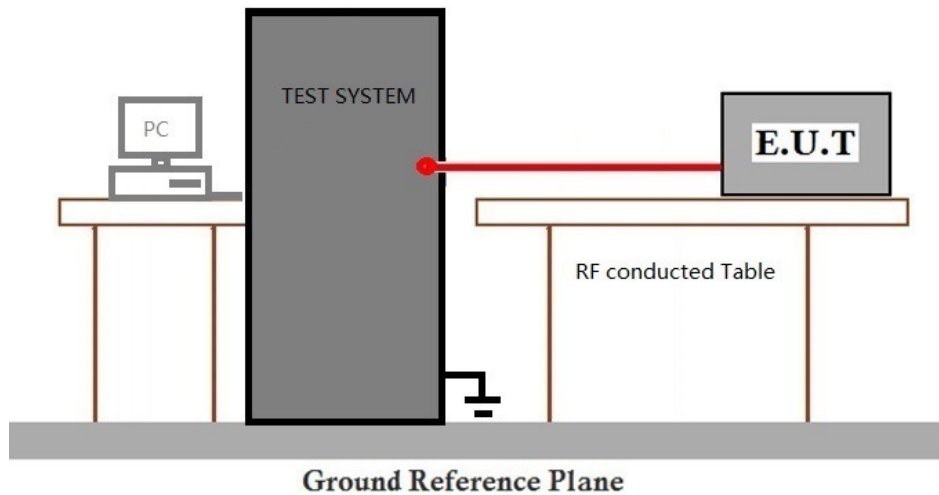
TX mode_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 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

Please Refer to Appendix for Details

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 11.12

Limit:

Test Distance: 3 m

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: 24.0 °C

Humidity: 54.8 % RH

Atmospheric Pressure: 1021 mbar

7.7.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
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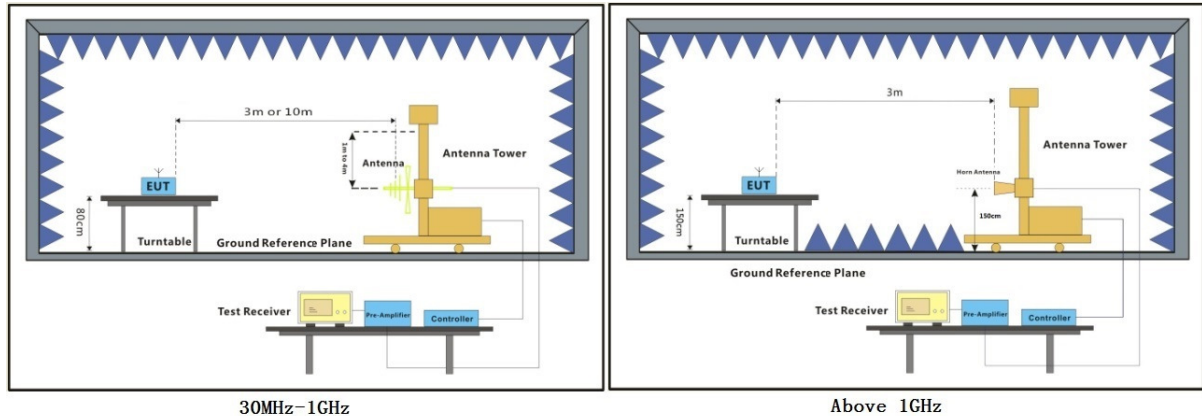
Final test	02	TX mode_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst 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



7.7.4 Measurement Procedure and Data

- 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.
- 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.
- 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.
- 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.
- 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.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- 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.
- Test the EUT in the lowest channel, the Highest channel.
- 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.
- 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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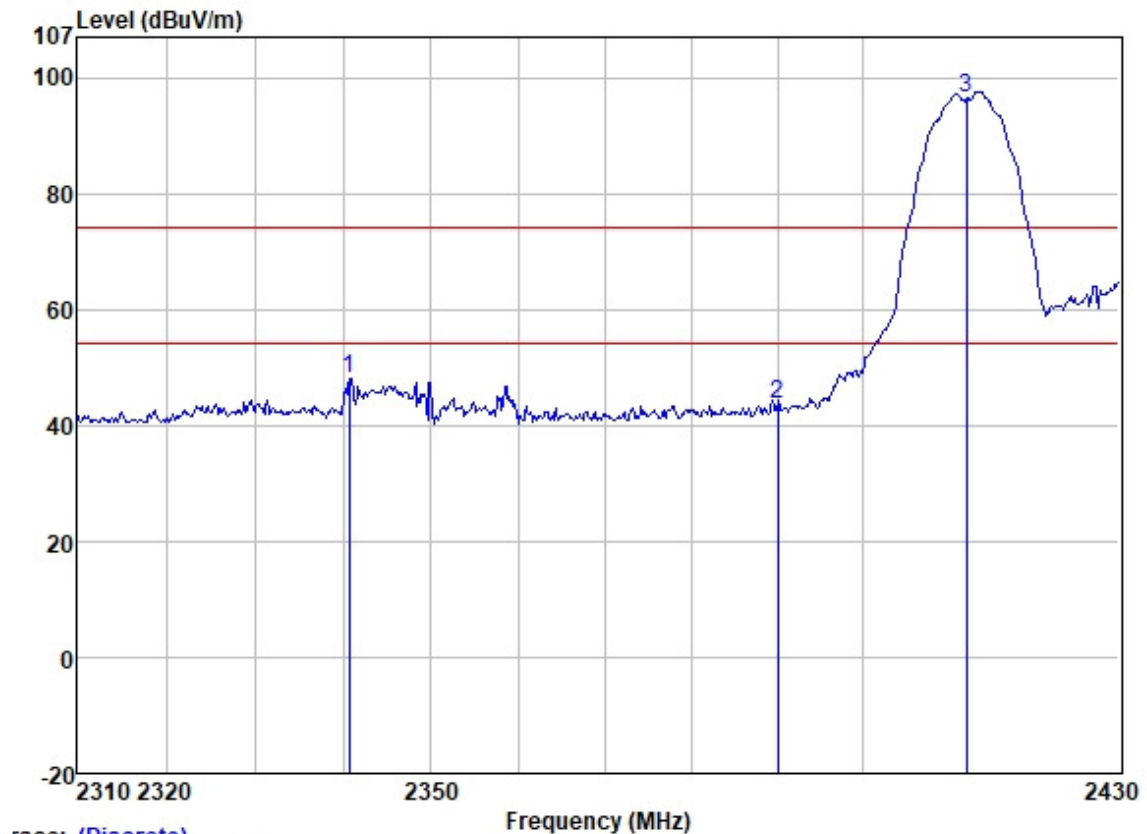
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Test Mode: 02; Polarity: Vertical; Modulation:802.11b; Bandwidth:20MHz; Channel:Low



race: (Discrete)

	ReadAntenna	Cable	Preamp		Limit	Over			
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2340.736	54.10	27.57	3.73	37.23	48.17	74.00	-25.83	VERTICAL peak
2	2390.000	49.36	27.68	3.77	37.21	43.60	74.00	-30.40	VERTICAL peak
3 *	2412.000	102.13	27.74	3.79	37.21	96.45	74.00	22.45	VERTICAL peak



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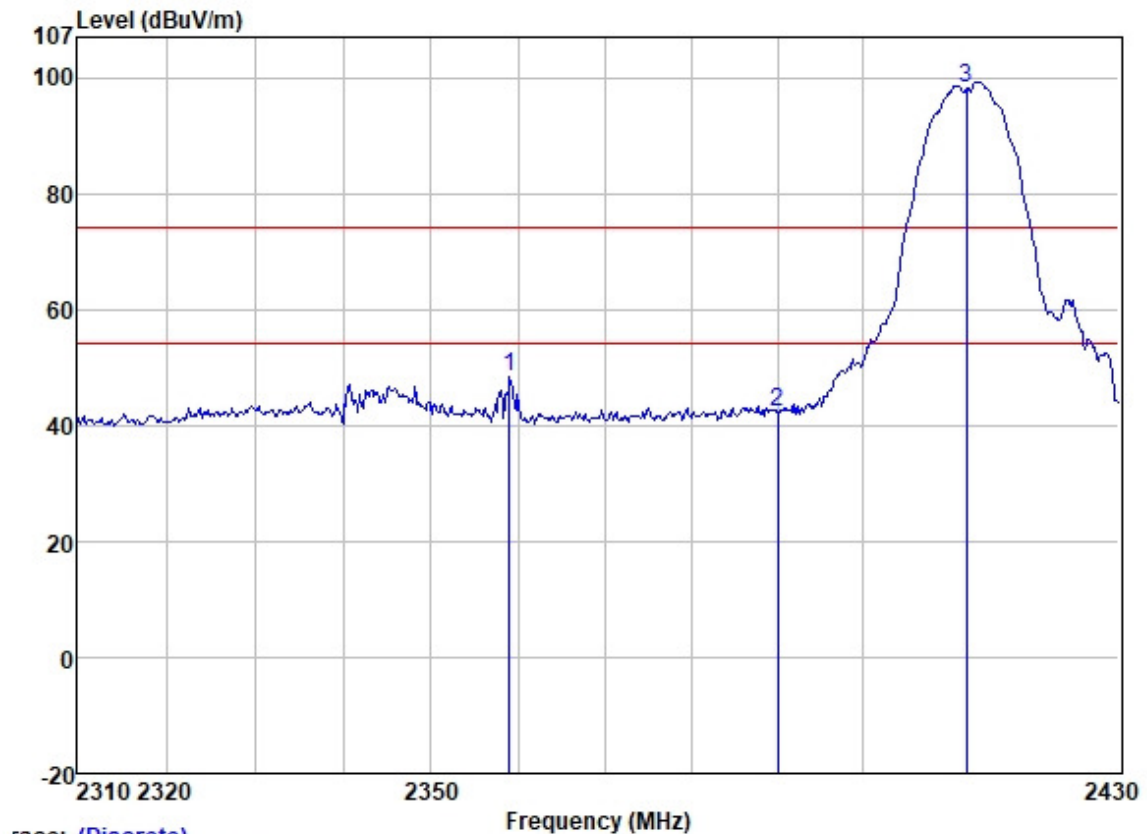
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t (86-20) 82155555 sgs.china@sgs.com

Test Mode: 02; Polarity: Horizontal; Modulation:802.11b; Bandwidth:20MHz; Channel:Low



race: (Discrete)

	ReadAntenna	Cable	Preamp		Limit	Over			
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1 2359.063	54.35	27.62	3.75	37.23	48.49	74.00	-25.51	HORIZONTAL	peak
2 2390.000	47.98	27.68	3.77	37.21	42.22	74.00	-31.78	HORIZONTAL	peak
3 * 2412.000	103.75	27.74	3.79	37.21	98.07	74.00	24.07	HORIZONTAL	peak



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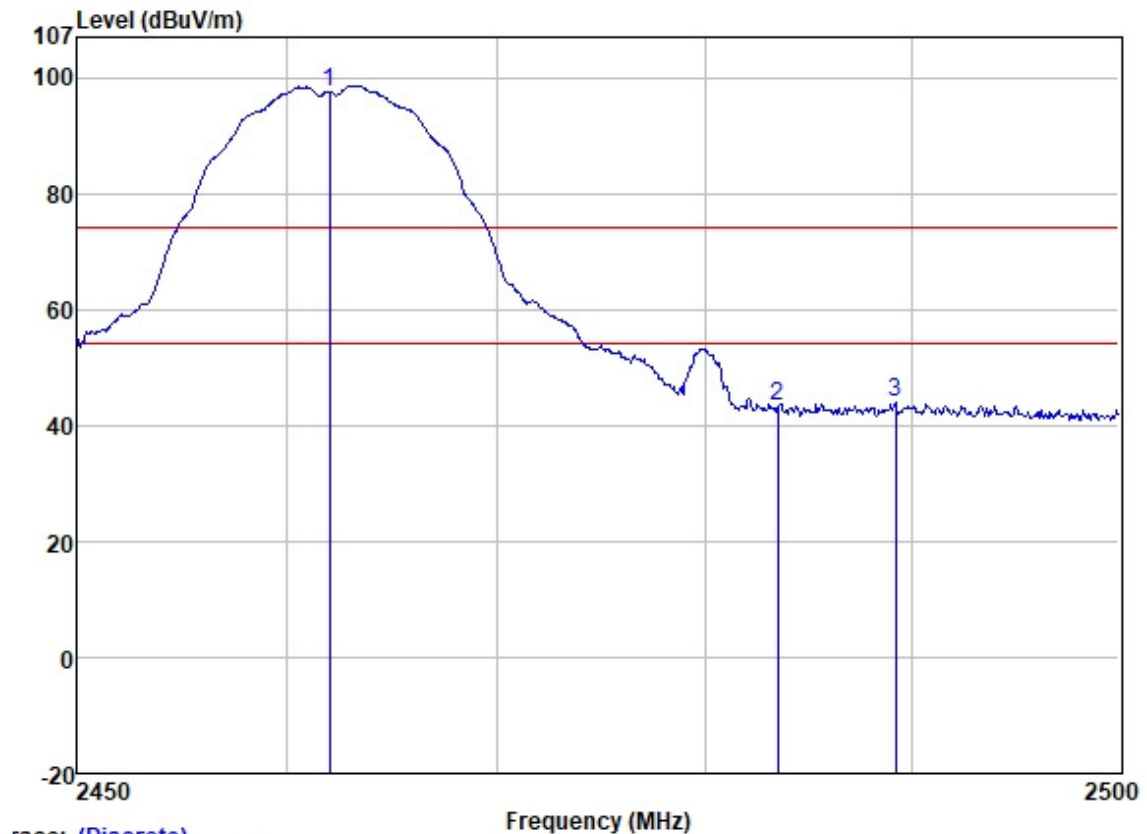
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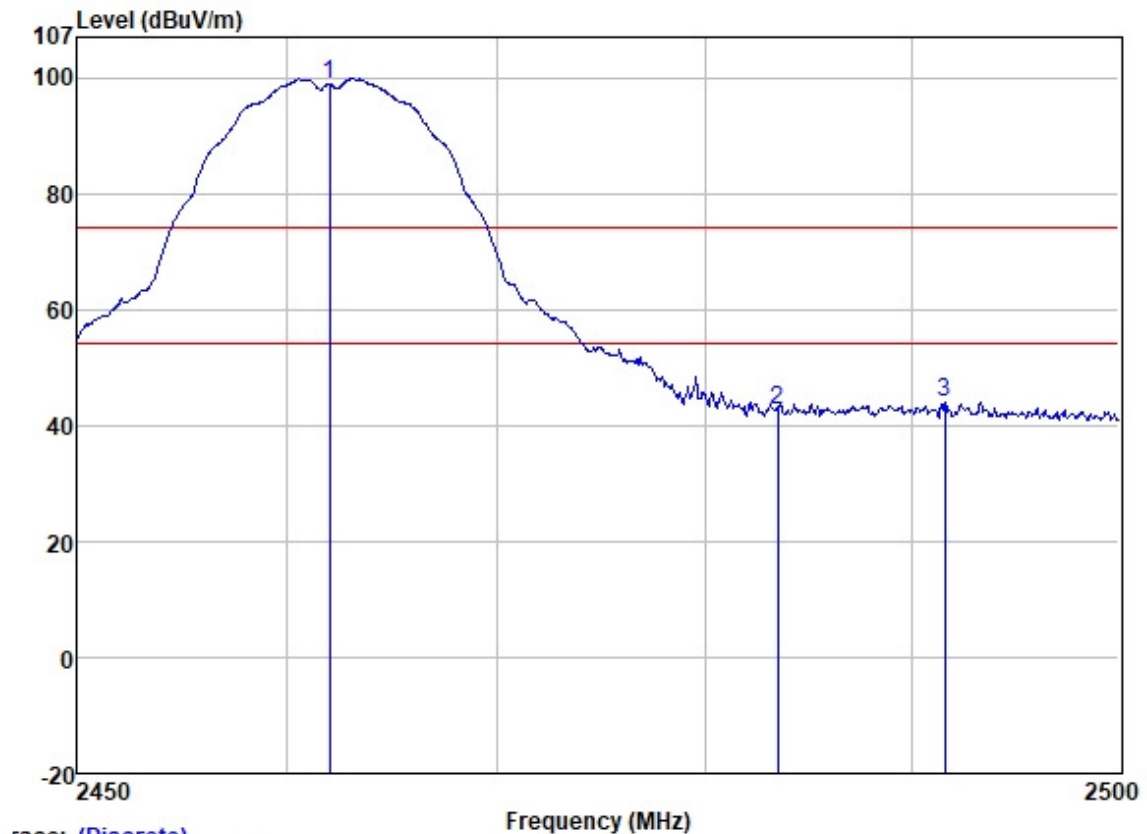
Test Mode: 02; Polarity: Vertical; Modulation:802.11b; Bandwidth:20MHz; Channel:High



race: (Discrete)

	Freq	ReadAntenna Level	Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1 *	2462.000	103.25	27.82	3.81	37.20	97.68	74.00	23.68	VERTICAL	peak
2	2483.500	48.88	27.85	3.82	37.19	43.36	74.00	-30.64	VERTICAL	peak
3	2489.165	49.34	27.86	3.83	37.19	43.84	74.00	-30.16	VERTICAL	peak

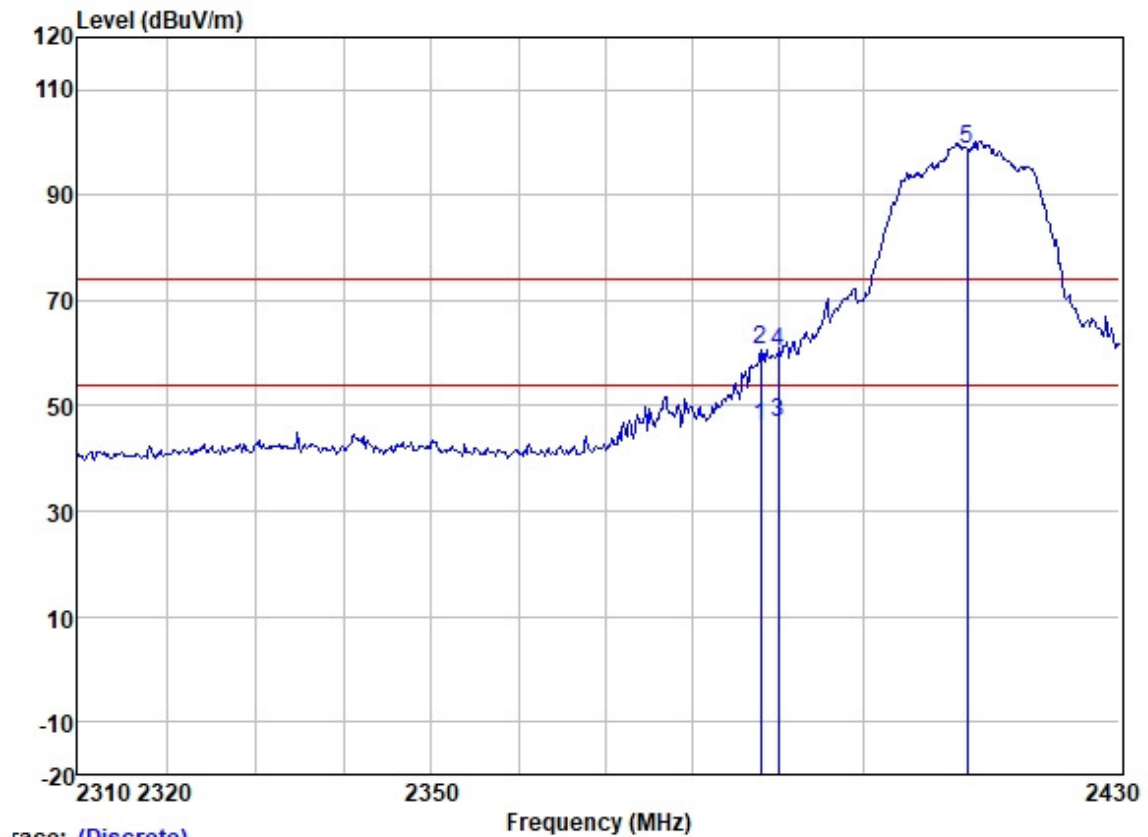
Test Mode: 02; Polarity: Horizontal; Modulation:802.11b; Bandwidth:20MHz; Channel:High



race: (Discrete)

	Freq	ReadAntenna Level Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1 *	2462.000	104.45	27.82	3.81	37.20	98.88	74.00	24.88	HORIZONTAL peak
2	2483.500	48.12	27.85	3.82	37.19	42.60	74.00	-31.40	HORIZONTAL peak
3	2491.580	49.60	27.86	3.83	37.19	44.10	74.00	-29.90	HORIZONTAL peak

Test Mode: 02; Polarity: Vertical; Modulation:802.11g; Bandwidth:20MHz; Channel:Low



race: (Discrete)

	ReadAntenna	Cable	Preamp		Limit	Over			
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2387.912	51.99	27.68	3.77	37.22	46.22	54.00	-7.78	VERTICAL
2	2387.912	66.52	27.68	3.77	37.22	60.75	74.00	-13.25	VERTICAL
3	2390.000	52.65	27.68	3.77	37.21	46.89	54.00	-7.11	VERTICAL
4	2390.000	66.21	27.68	3.77	37.21	60.45	74.00	-13.55	VERTICAL
5 *	2412.000	104.53	27.74	3.79	37.21	98.85	74.00	24.85	VERTICAL



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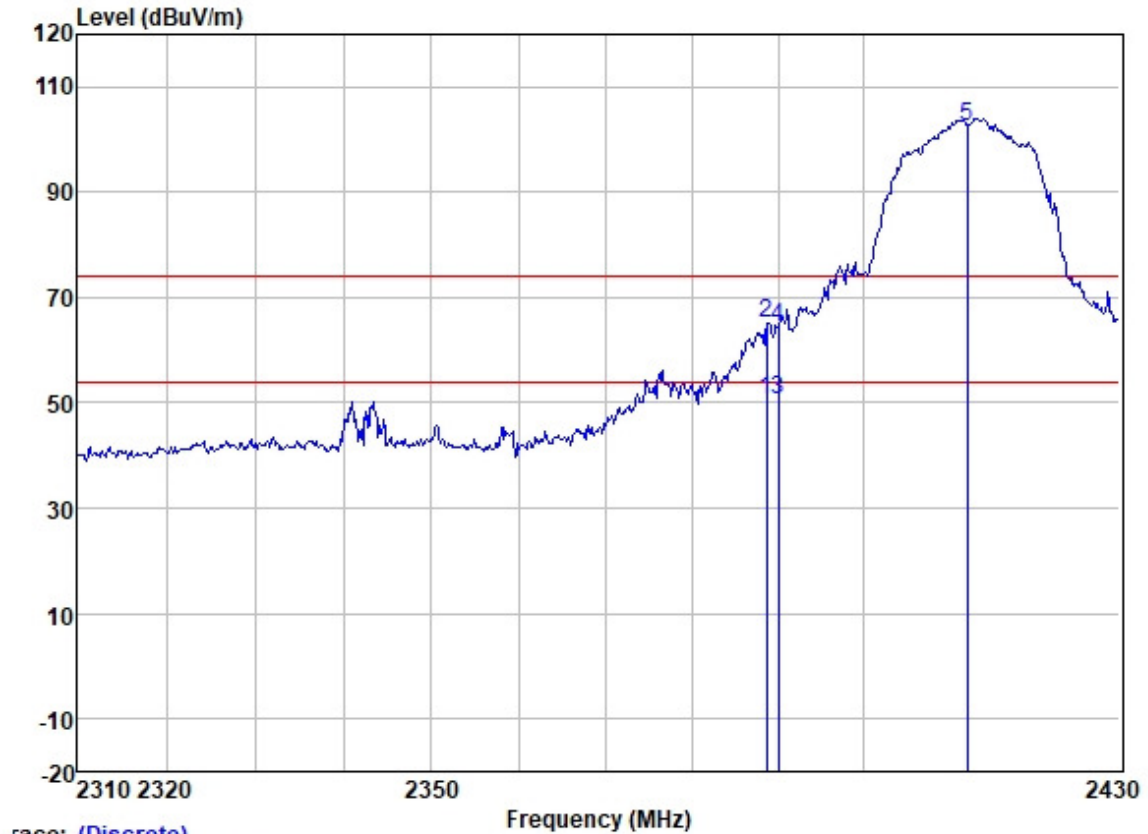
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Test Mode: 02; Polarity: Horizontal; Modulation:802.11g; Bandwidth:20MHz; Channel:Low



race: (Discrete)

	ReadAntenna	Cable	Preamp		Limit	Over			
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2388.637	56.51	27.68	3.77	37.22	50.74	54.00	-3.26	HORIZONTAL Average
2	2388.637	71.05	27.68	3.77	37.22	65.28	74.00	-8.72	HORIZONTAL peak
3	2390.000	56.25	27.68	3.77	37.21	50.49	54.00	-3.51	HORIZONTAL Average
4	2390.000	70.28	27.68	3.77	37.21	64.52	74.00	-9.48	HORIZONTAL peak
5 *	2412.000	108.18	27.74	3.79	37.21	102.50	74.00	28.50	HORIZONTAL peak



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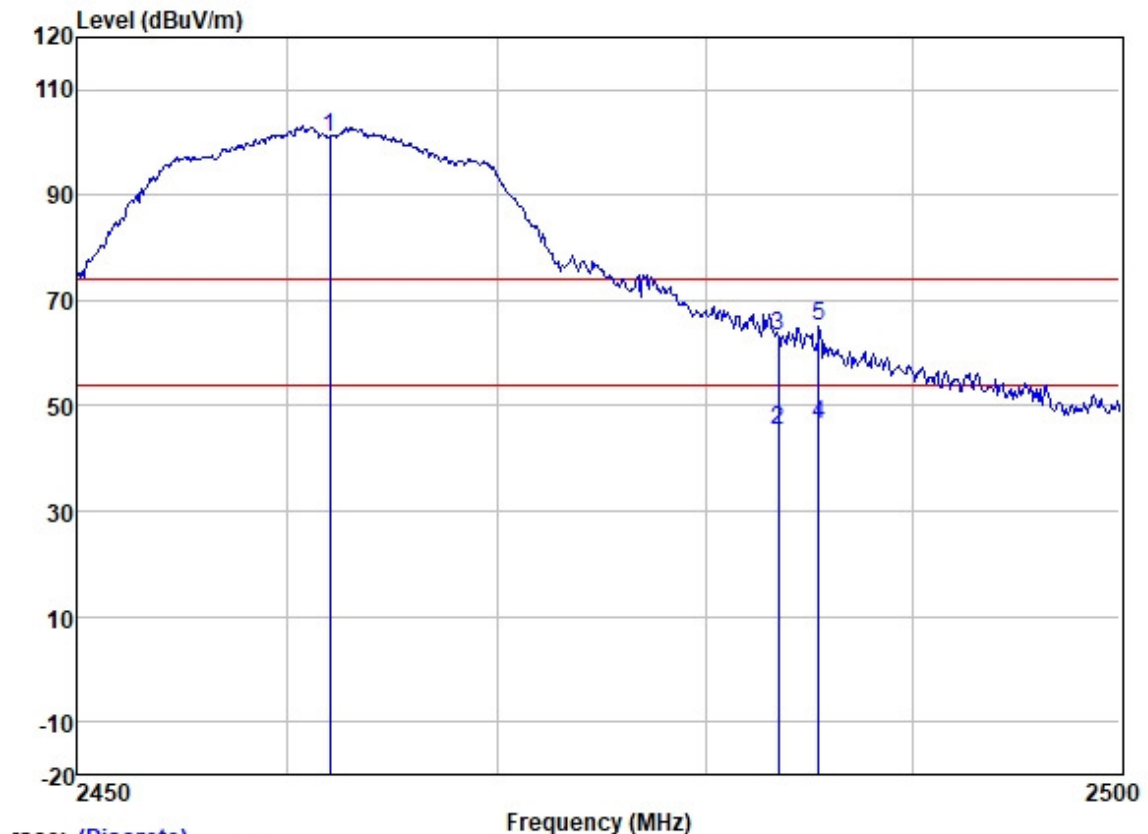
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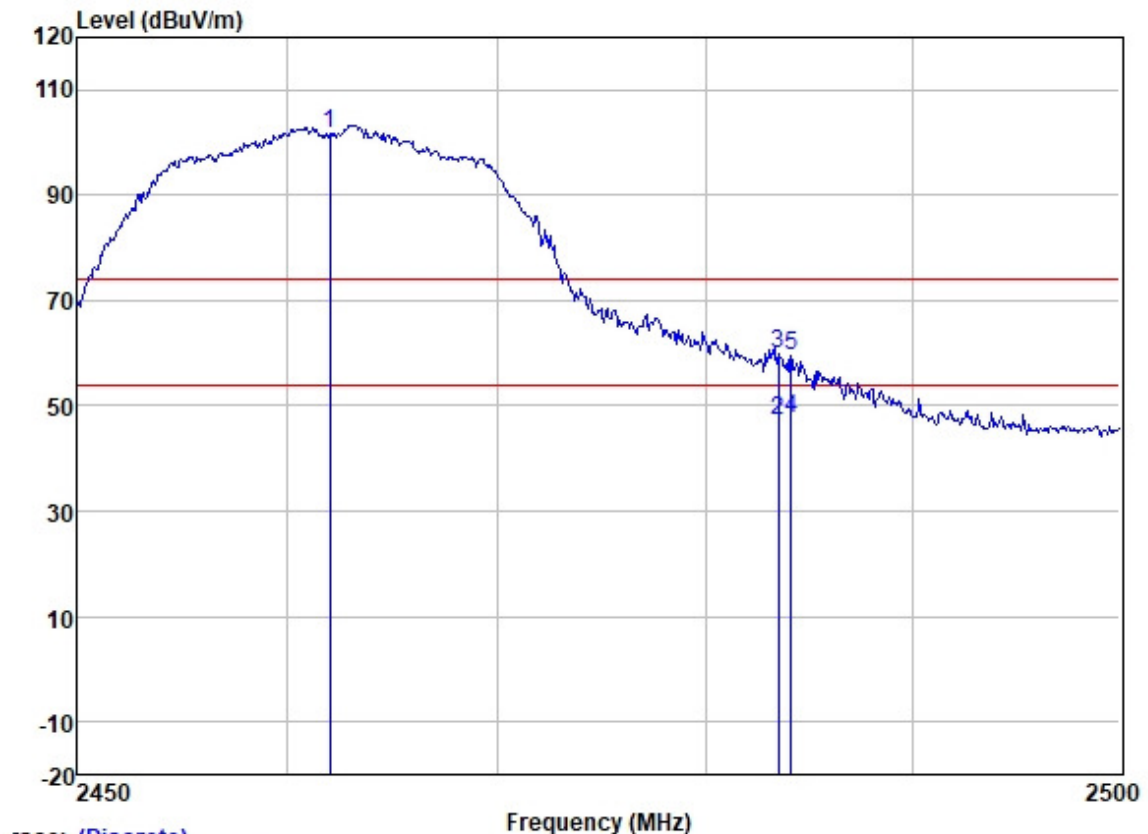
Test Mode: 02; Polarity: Vertical; Modulation:802.11g; Bandwidth:20MHz; Channel:High



race: (Discrete)

		ReadAntenna		Cable	Preamp		Limit	Over		
	Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1 *	2462.000	106.71	27.82	3.81	37.20	101.14	74.00	27.14	VERTICAL	peak
2	2483.500	50.98	27.85	3.82	37.19	45.46	54.00	-8.54	VERTICAL	Average
3	2483.500	68.84	27.85	3.82	37.19	63.32	74.00	-10.68	VERTICAL	peak
4	2485.446	51.96	27.85	3.82	37.19	46.44	54.00	-7.56	VERTICAL	Average
5	2485.446	70.46	27.85	3.82	37.19	64.94	74.00	-9.06	VERTICAL	peak

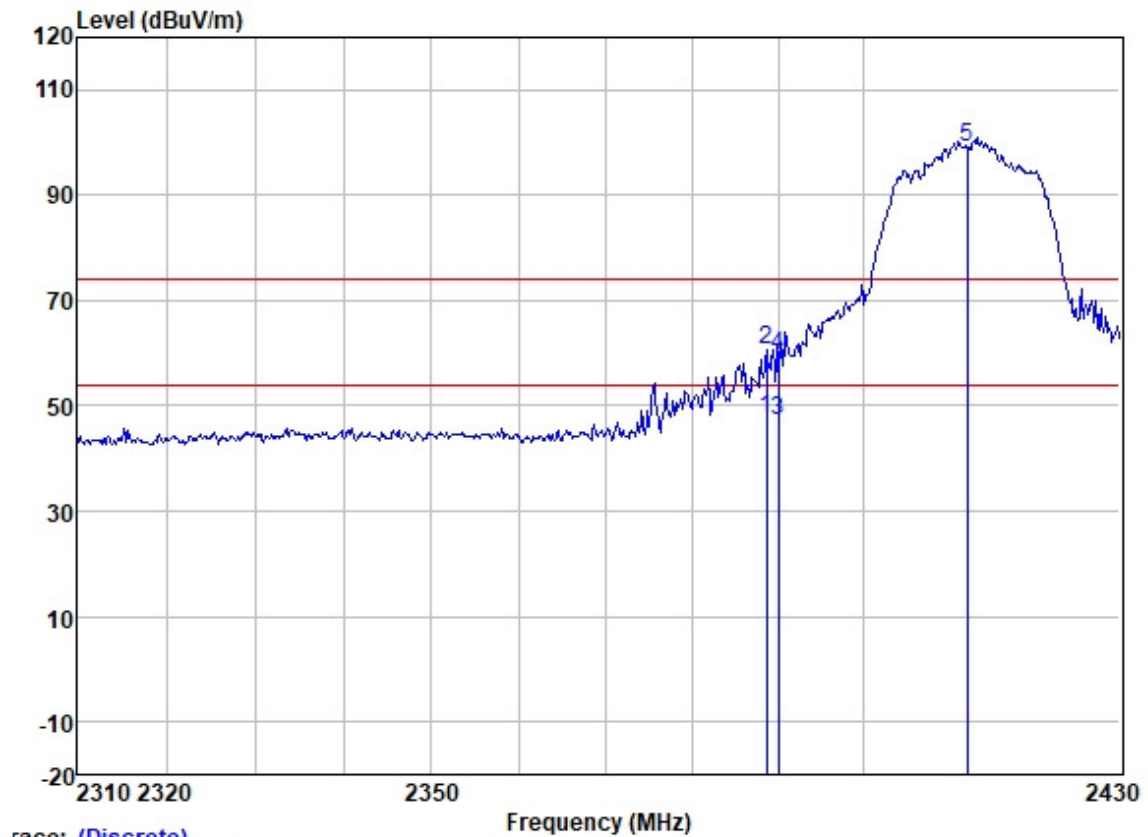
Test Mode: 02; Polarity: Horizontal; Modulation:802.11g; Bandwidth:20MHz; Channel:High



race: (Discrete)

		ReadAntenna		Cable	Preamp		Limit	Over		
	Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1 *	2462.000	107.27	27.82	3.81	37.20	101.70	74.00	27.70	HORIZONTAL	peak
2	2483.500	52.56	27.85	3.82	37.19	47.04	54.00	-6.96	HORIZONTAL	Average
3	2483.500	65.24	27.85	3.82	37.19	59.72	74.00	-14.28	HORIZONTAL	peak
4	2484.091	53.02	27.85	3.82	37.19	47.50	54.00	-6.50	HORIZONTAL	Average
5	2484.091	65.12	27.85	3.82	37.19	59.60	74.00	-14.40	HORIZONTAL	peak

Test Mode: 02; Polarity: Vertical; Modulation:802.11n; Bandwidth:20MHz; Channel:Low



race: (Discrete)

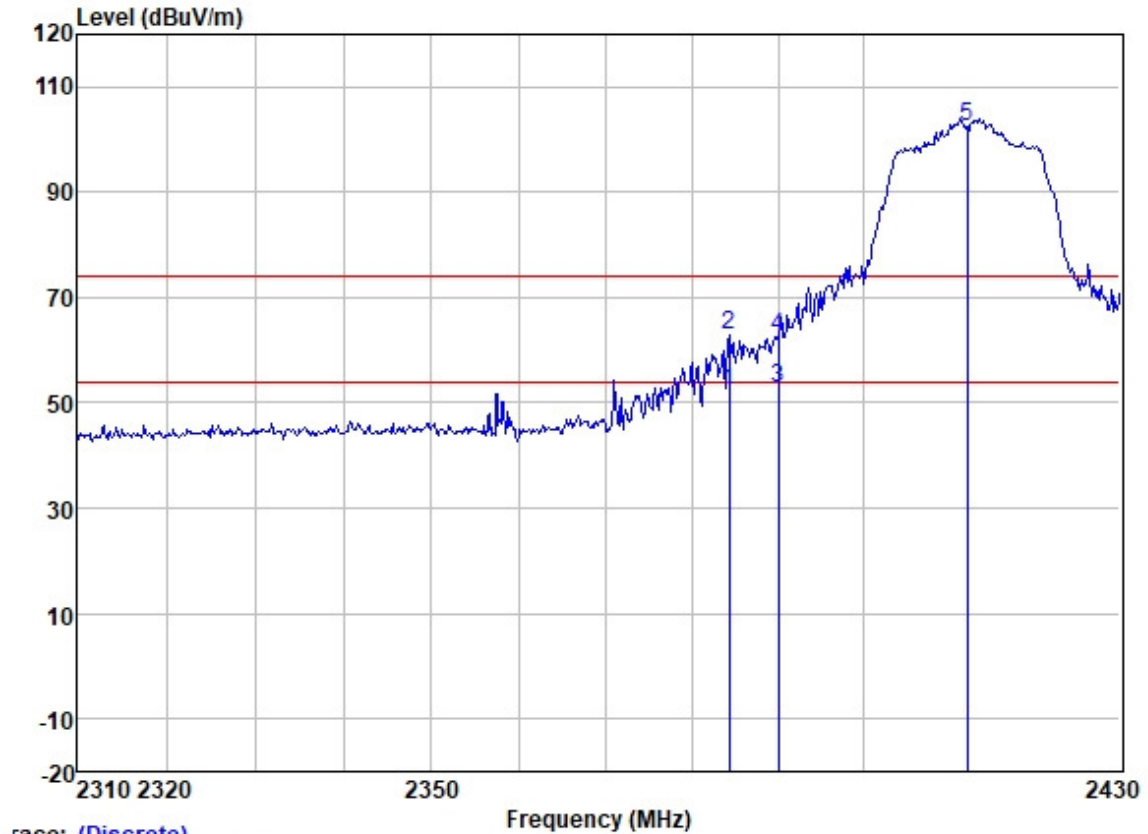
	ReadAntenna	Cable	Preamp		Limit	Over			
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2388.637	53.32	27.68	3.77	37.22	47.55	54.00	-6.45	VERTICAL
2	2388.637	66.36	27.68	3.77	37.22	60.59	74.00	-13.41	VERTICAL
3	2390.000	52.80	27.68	3.77	37.21	47.04	54.00	-6.96	VERTICAL
4	2390.000	65.23	27.68	3.77	37.21	59.47	74.00	-14.53	VERTICAL
5 *	2412.000	104.74	27.74	3.79	37.21	99.06	74.00	25.06	VERTICAL



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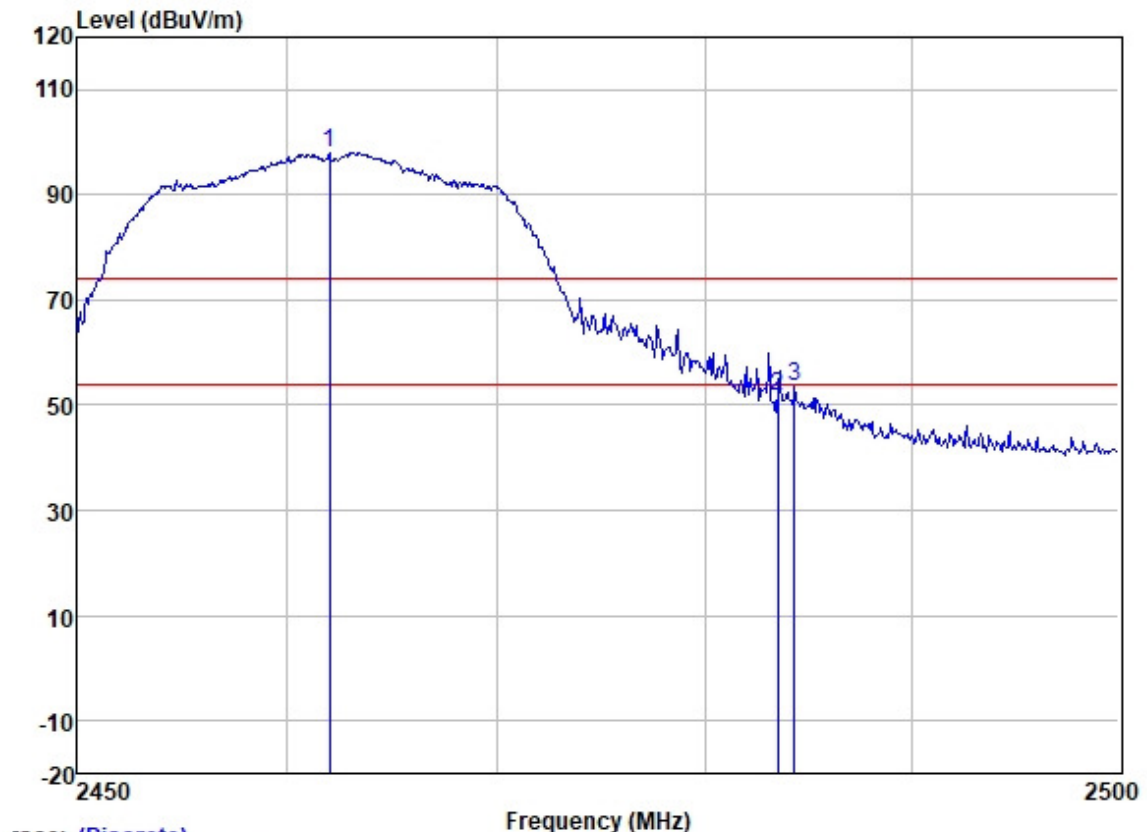


race: (Discrete)

	ReadAntenna	Cable	Preamp		Limit	Over			
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2384.286	57.64	27.68	3.77	37.22	51.87	54.00	-2.13	HORIZONTAL Average
2	2384.286	68.64	27.68	3.77	37.22	62.87	74.00	-11.13	HORIZONTAL peak
3	2390.000	58.58	27.68	3.77	37.21	52.82	54.00	-1.18	HORIZONTAL Average
4	2390.000	68.32	27.68	3.77	37.21	62.56	74.00	-11.44	HORIZONTAL peak
5 *	2412.000	108.27	27.74	3.79	37.21	102.59	74.00	28.59	HORIZONTAL peak



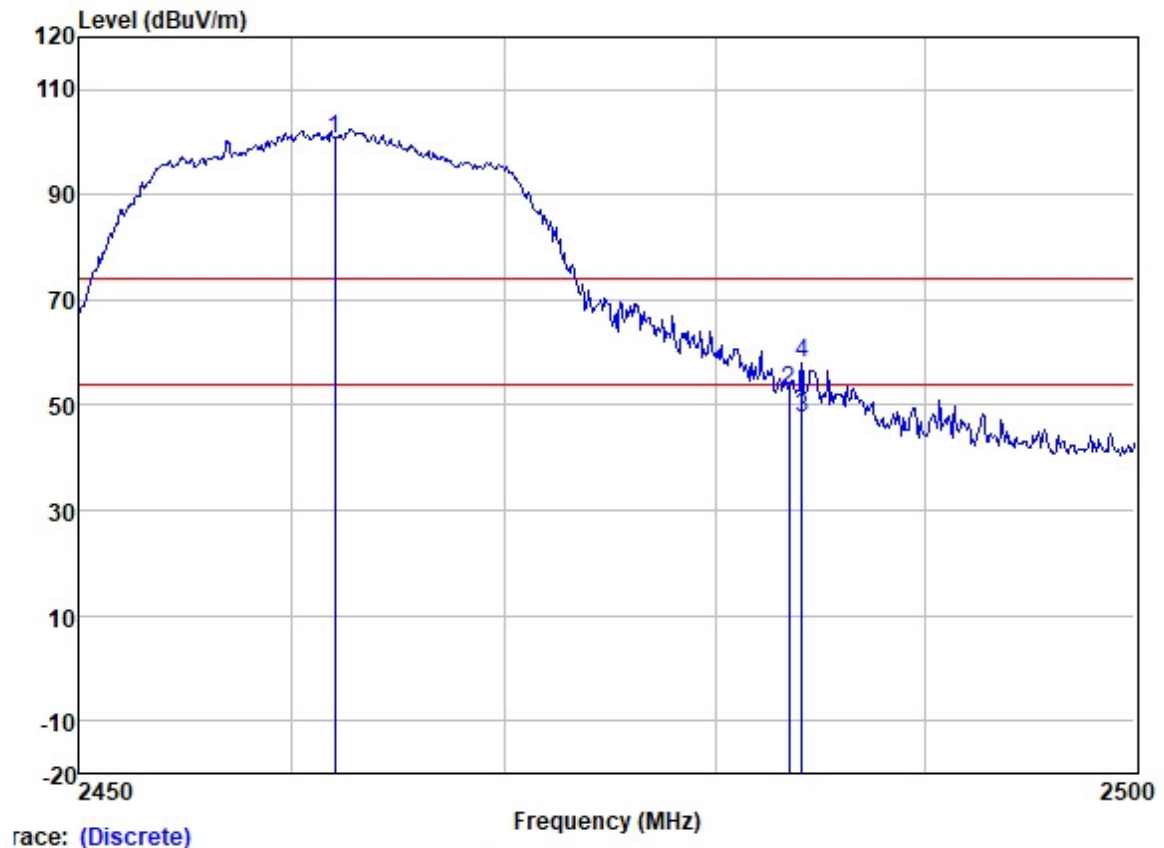
Test Mode: 02; Polarity: Vertical; Modulation:802.11n; Bandwidth:20MHz; Channel:High



race: (Discrete)

	Freq	ReadAntenna	Cable	Preamp		Limit	Over			
		Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1 *	2462.000	103.52	27.82	3.81	37.20	97.95	74.00	23.95	VERTICAL	peak
2	2483.500	57.31	27.85	3.82	37.19	51.79	74.00	-22.21	VERTICAL	peak
3	2484.292	59.04	27.85	3.82	37.19	53.52	74.00	-20.48	VERTICAL	peak

Test Mode: 02; Polarity: Horizontal; Modulation:802.11n; Bandwidth:20MHz; Channel:High



Trace: (Discrete)

	Read	Antenna	Cable	Preamp		Limit	Over		
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1 *	2462.000	106.26	27.82	3.81	37.20	100.69	74.00	26.69	HORIZONTAL peak
2	2483.500	58.26	27.85	3.82	37.19	52.74	74.00	-21.26	HORIZONTAL peak
3	2484.091	53.01	27.85	3.82	37.19	47.49	54.00	-6.51	HORIZONTAL Average
4	2484.091	63.67	27.85	3.82	37.19	58.15	74.00	-15.85	HORIZONTAL peak



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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:

Test Distance: 3 m

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: 23.1 °C

Humidity: 53.6 % RH

Atmospheric Pressure: 1021 mbar

7.8.2 Test Mode Description

Pre-scan / Mode
Final test Code Description

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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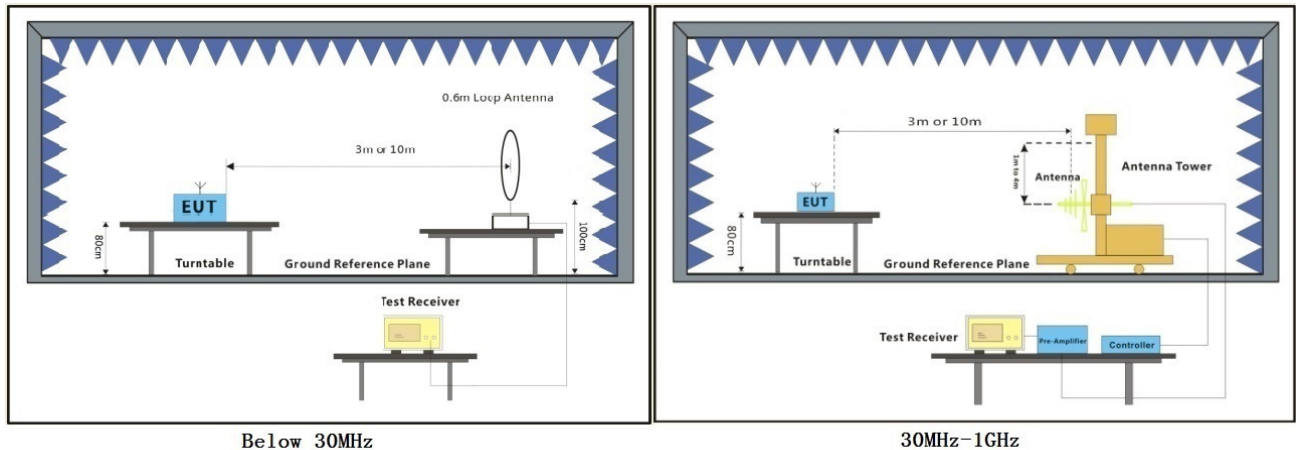
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7.8.3 Test Setup Diagram



7.8.4 Measurement Procedure and Data

- 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.
- 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.
- 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.
- 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.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- 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.
- Test the EUT in the lowest channel, the middle channel, the Highest channel.
- 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.
- Repeat above procedures until all frequencies measured was complete.

Remark:

- Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor
- 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.



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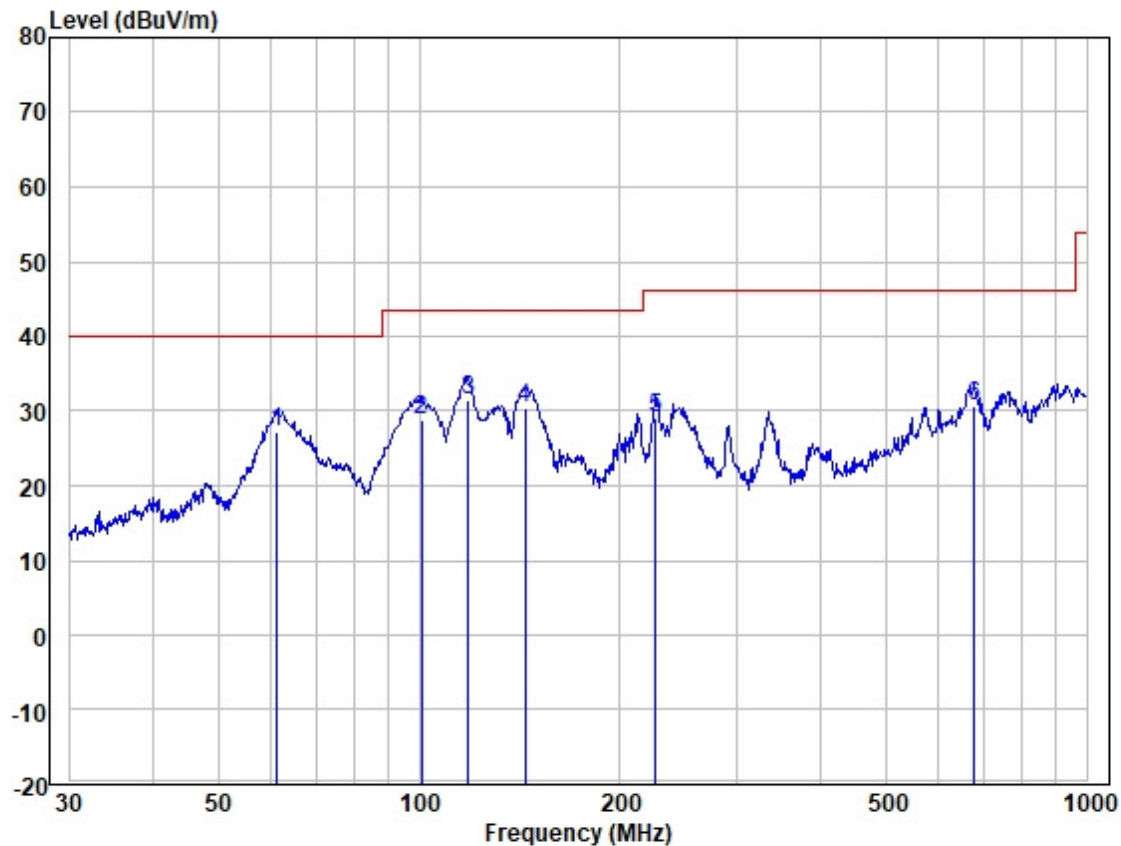
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Test Mode: 02; Polarity: Horizontal



Site : 966 Chamber
Job :
Model :
Power :
Test Mode :

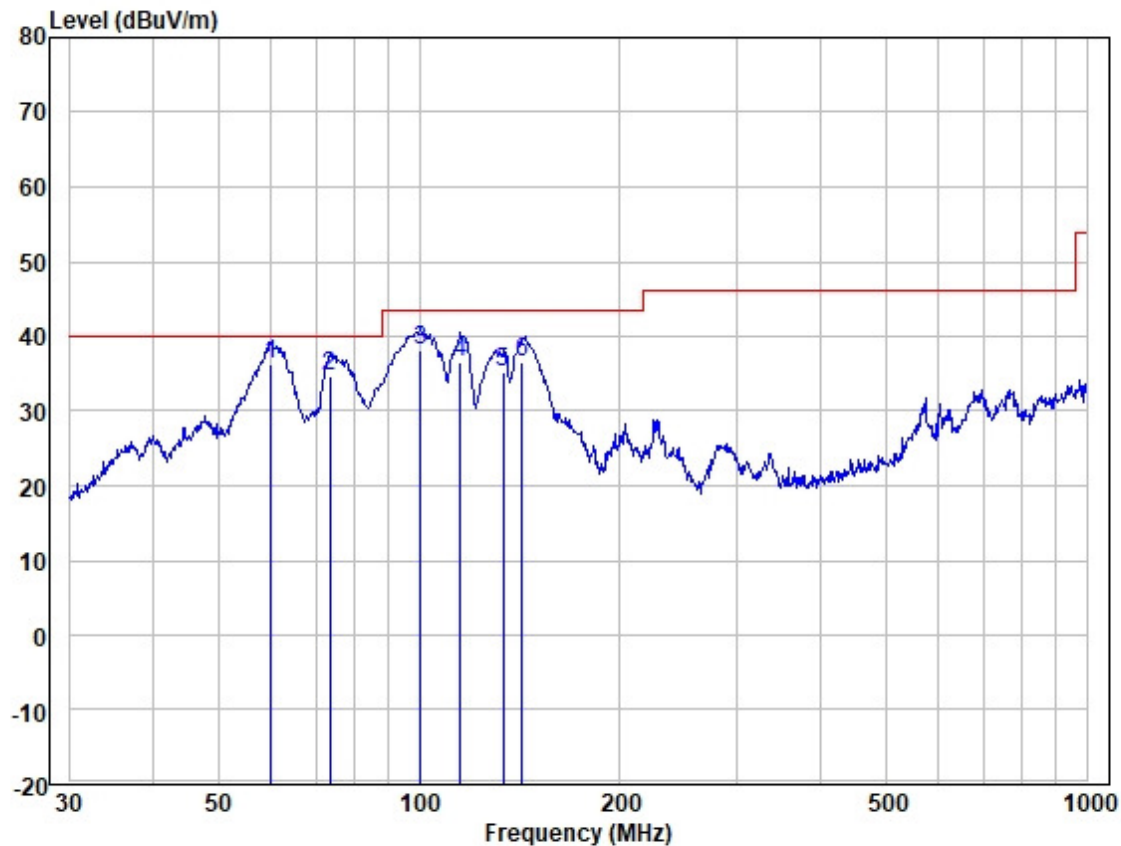
	Freq	Read Level	Antenna Factor	Cable Loss	Preamplifier Factor	Measured Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	61.346	40.62	18.63	0.90	33.00	27.15	40.00	-12.85	HORIZONTAL	QP
2	100.934	45.92	14.71	1.11	33.00	28.74	43.52	-14.78	HORIZONTAL	QP
3	118.601	46.21	17.04	1.20	33.00	31.45	43.52	-12.07	HORIZONTAL	QP
4	144.335	43.21	18.80	1.36	33.00	30.37	43.52	-13.15	HORIZONTAL	QP
5	226.099	44.12	16.01	1.90	33.03	29.00	46.02	-17.02	HORIZONTAL	QP
6	677.580	34.08	26.50	3.48	33.32	30.74	46.02	-15.28	HORIZONTAL	QP



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Test Mode: 02; Polarity: Vertical



Site : 966 Chamber
Job :
Model :
Power :
Test Mode :

	Freq	Read Level	Antenna Factor	Cable Loss	Preamplifier Factor	Measured Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	60.069	49.62	18.79	0.90	33.00	36.31	40.00	-3.69	VERTICAL	QP
2	73.617	50.22	16.44	1.00	33.00	34.66	40.00	-5.34	VERTICAL	QP
3	100.581	55.25	14.71	1.11	33.00	38.07	43.52	-5.45	VERTICAL	QP
4	115.321	51.61	16.72	1.18	33.00	36.51	43.52	-7.01	VERTICAL	QP
5	133.619	48.63	18.34	1.29	33.00	35.26	43.52	-8.26	VERTICAL	QP
6	142.824	49.45	18.74	1.35	33.00	36.54	43.52	-6.98	VERTICAL	QP



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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:

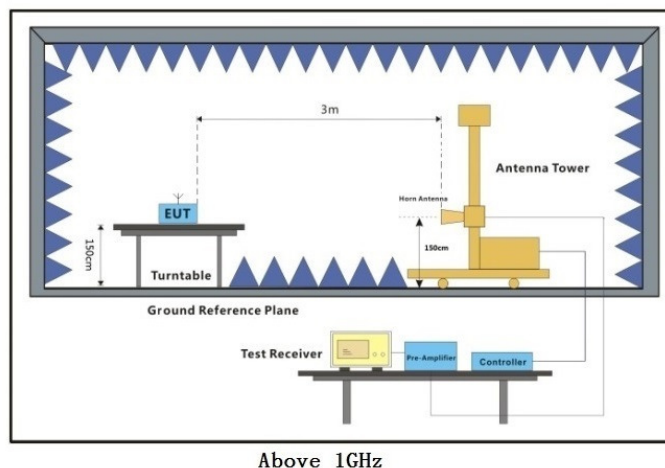
Temperature: 24.0 °C Humidity: 54.8 % RH Atmospheric Pressure: 1021 mbar

7.9.2 Test Mode Description

Pre-scan / Mode
Final test Code Description

Final test 02 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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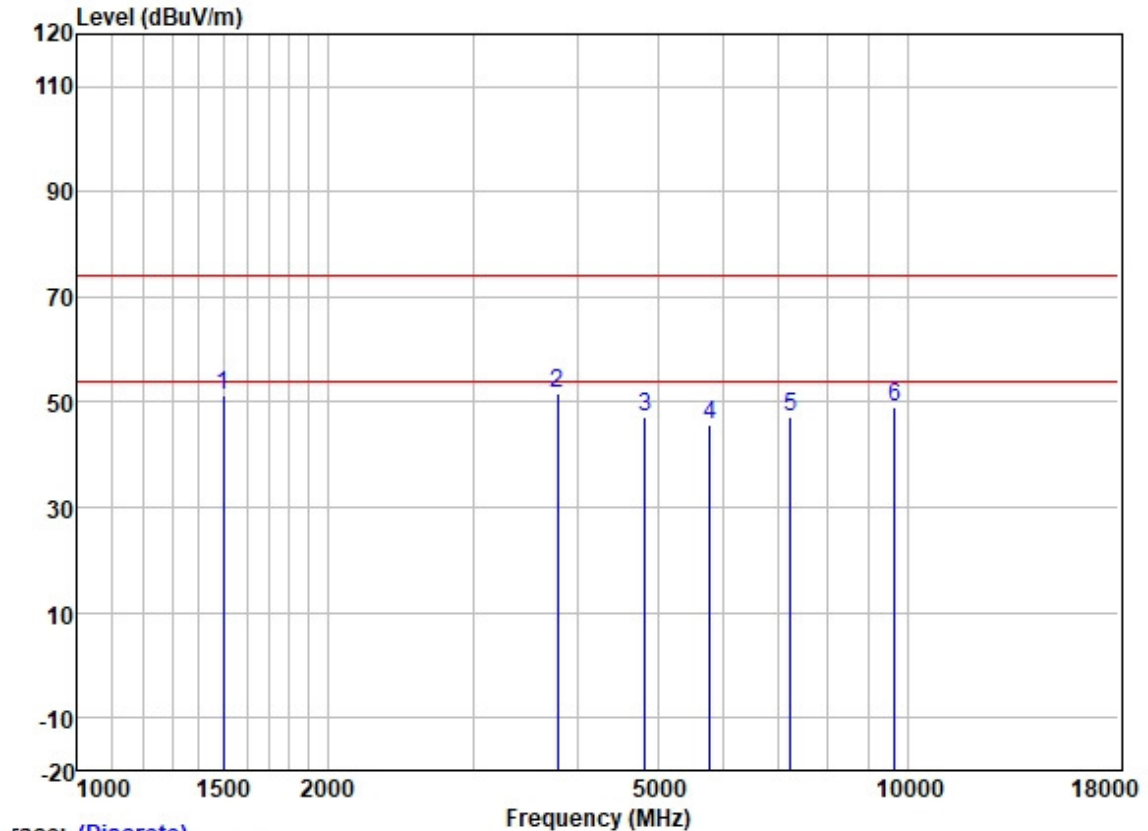
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Test Mode: 02; Polarity: Vertical; Modulation:802.11b; Bandwidth:20MHz; Channel:Low

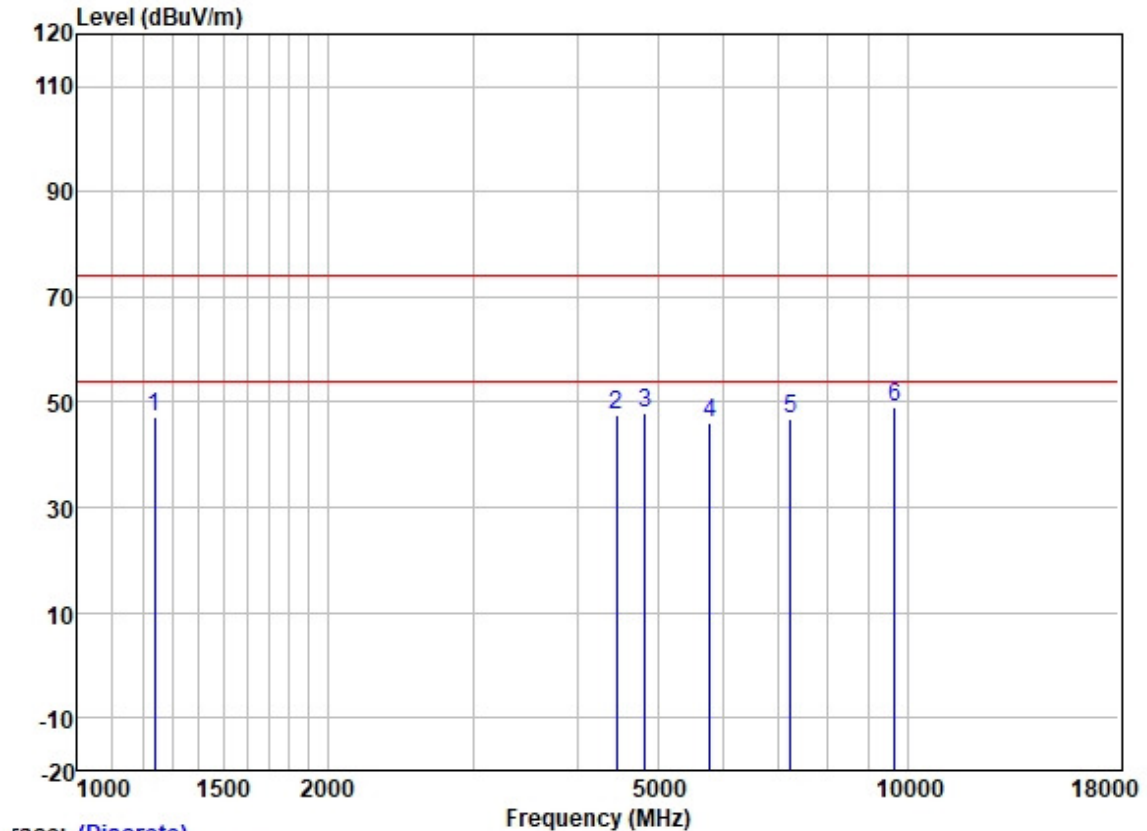


Trace: (Discrete)

	Read	Antenna	Cable	Preamp		Limit	Over		
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1498.781	61.56	24.43	2.94	37.50	51.43	74.00	-22.57	VERTICAL peak
2	3790.361	53.44	30.08	4.81	36.64	51.69	74.00	-22.31	VERTICAL peak
3	4824.000	44.57	34.16	5.16	36.67	47.22	74.00	-26.78	VERTICAL peak
4	5780.300	44.24	32.66	5.76	36.79	45.87	74.00	-28.13	VERTICAL peak
5	7236.000	41.30	35.78	6.90	36.94	47.04	74.00	-26.96	VERTICAL peak
6	9648.000	39.38	38.70	7.65	36.82	48.91	74.00	-25.09	VERTICAL peak



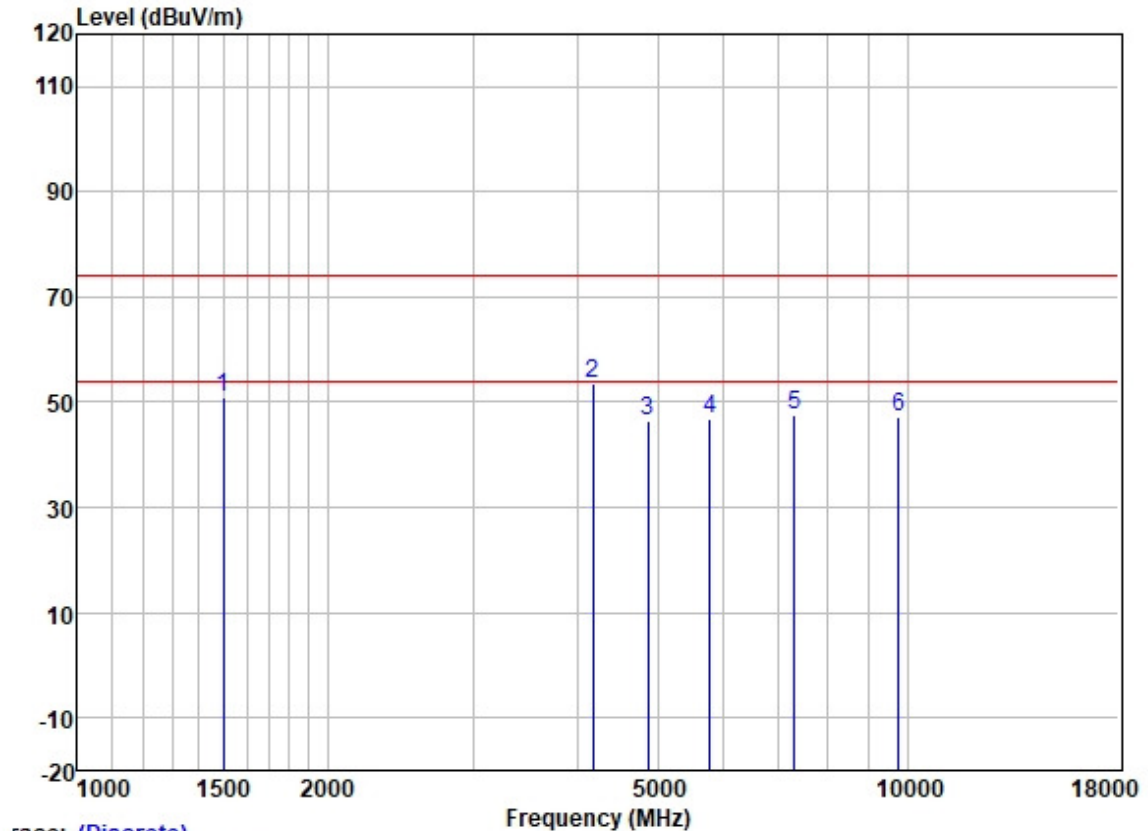
Test Mode: 02; Polarity: Horizontal; Modulation:802.11b; Bandwidth:20MHz; Channel:Low



Trace: (Discrete)

	Freq	ReadAntenna	Cable	Preamp		Limit	Over			
	MHz	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1238.483	58.46	23.59	2.68	37.64	47.09	74.00	-26.91	HORIZONTAL	peak
2	4456.315	45.37	34.00	4.79	36.63	47.53	74.00	-26.47	HORIZONTAL	peak
3	4824.000	45.16	34.16	5.16	36.67	47.81	74.00	-26.19	HORIZONTAL	peak
4	5780.300	44.61	32.66	5.76	36.79	46.24	74.00	-27.76	HORIZONTAL	peak
5	7236.000	41.14	35.78	6.90	36.94	46.88	74.00	-27.12	HORIZONTAL	peak
6	9648.000	39.39	38.70	7.65	36.82	48.92	74.00	-25.08	HORIZONTAL	peak

Test Mode: 02; Polarity: Vertical; Modulation:802.11b; Bandwidth:20MHz; Channel:middle



Trace: (Discrete)

		ReadAntenna		Cable	Preamp		Limit	Over		
	Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1498.781	61.22	24.43	2.94	37.50	51.09	74.00	-22.91	VERTICAL	peak
2	4181.768	53.65	31.73	4.86	36.61	53.63	74.00	-20.37	VERTICAL	peak
3	4874.000	43.62	34.15	5.22	36.67	46.32	74.00	-27.68	VERTICAL	peak
4	5780.300	45.13	32.66	5.76	36.79	46.76	74.00	-27.24	VERTICAL	peak
5	7311.000	41.87	36.00	6.83	36.95	47.75	74.00	-26.25	VERTICAL	peak
6	9748.000	37.73	38.81	7.65	36.81	47.38	74.00	-26.62	VERTICAL	peak



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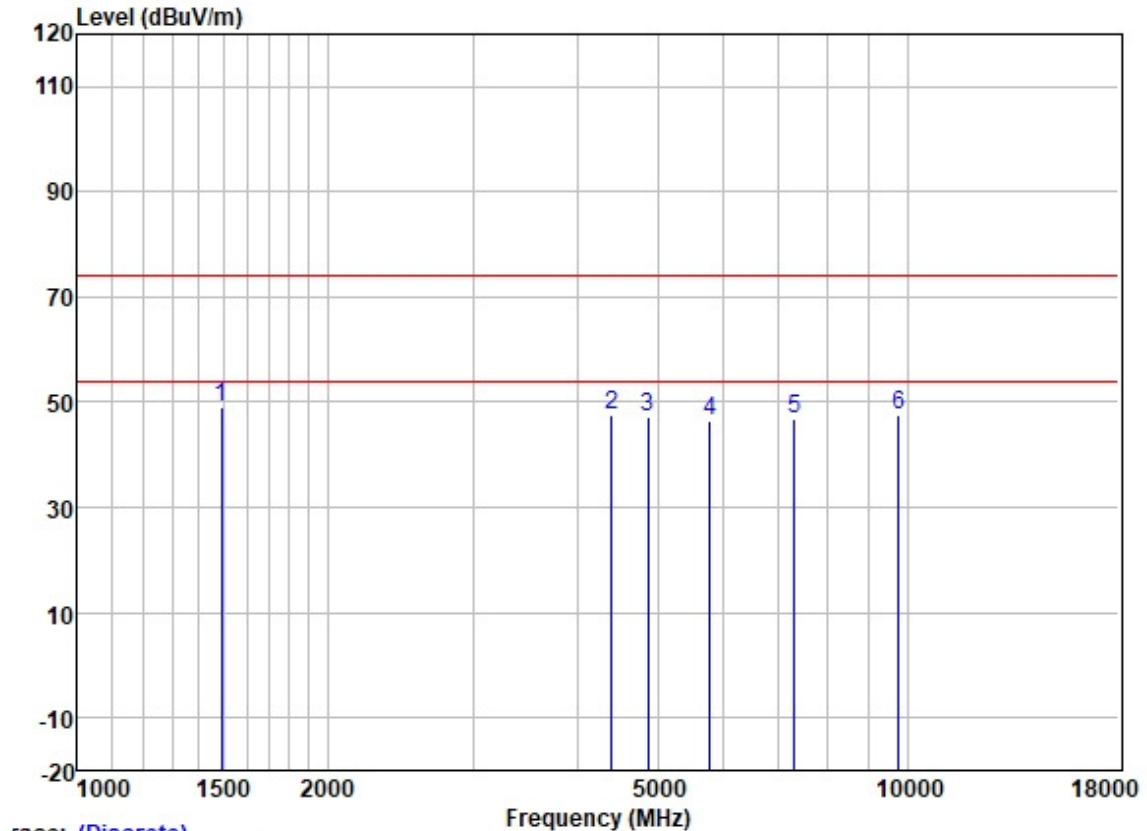
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Test Mode: 02; Polarity: Horizontal; Modulation:802.11b; Bandwidth:20MHz; Channel:middle

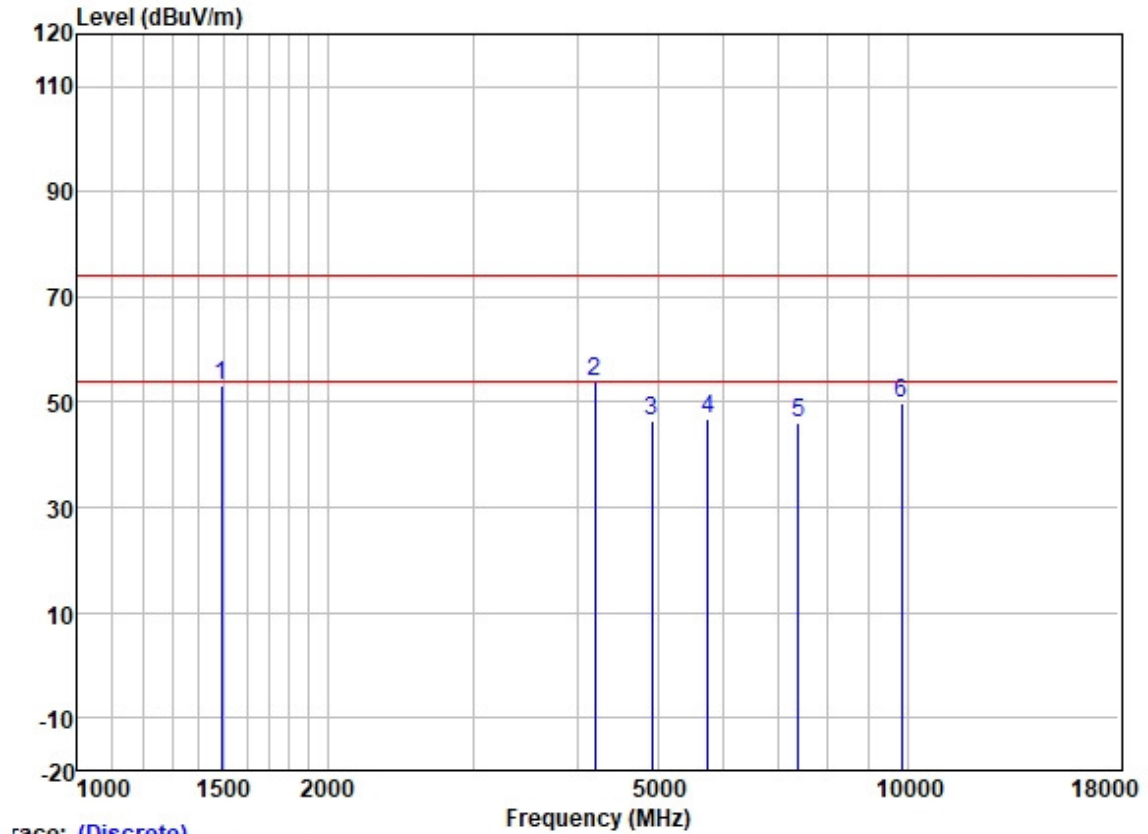


Trace: (Discrete)

	ReadAntenna	Cable	Preamp		Limit	Over			
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1490.142	59.16	24.42	2.94	37.52	49.00	74.00	-25.00	HORIZONTAL peak
2	4405.090	45.56	33.74	4.79	36.62	47.47	74.00	-26.53	HORIZONTAL peak
3	4874.000	44.46	34.15	5.22	36.67	47.16	74.00	-26.84	HORIZONTAL peak
4	5780.300	44.93	32.66	5.76	36.79	46.56	74.00	-27.44	HORIZONTAL peak
5	7311.000	41.12	36.00	6.83	36.95	47.00	74.00	-27.00	HORIZONTAL peak
6	9748.000	37.82	38.81	7.65	36.81	47.47	74.00	-26.53	HORIZONTAL peak



Test Mode: 02; Polarity: Vertical; Modulation:802.11b; Bandwidth:20MHz; Channel:High



Trace: (Discrete)

	Read	Antenna	Cable	Preamp		Limit	Over		
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1490.142	63.36	24.42	2.94	37.52	53.20	74.00	-20.80	VERTICAL peak
2	4206.011	53.62	31.96	4.85	36.61	53.82	74.00	-20.18	VERTICAL peak
3	4924.000	43.71	34.15	5.26	36.68	46.44	74.00	-27.56	VERTICAL peak
4	5746.982	45.40	32.65	5.74	36.79	47.00	74.00	-27.00	VERTICAL peak
5	7386.000	39.97	36.23	6.75	36.96	45.99	74.00	-28.01	VERTICAL peak
6	9848.000	39.97	38.88	7.66	36.81	49.70	74.00	-24.30	VERTICAL peak



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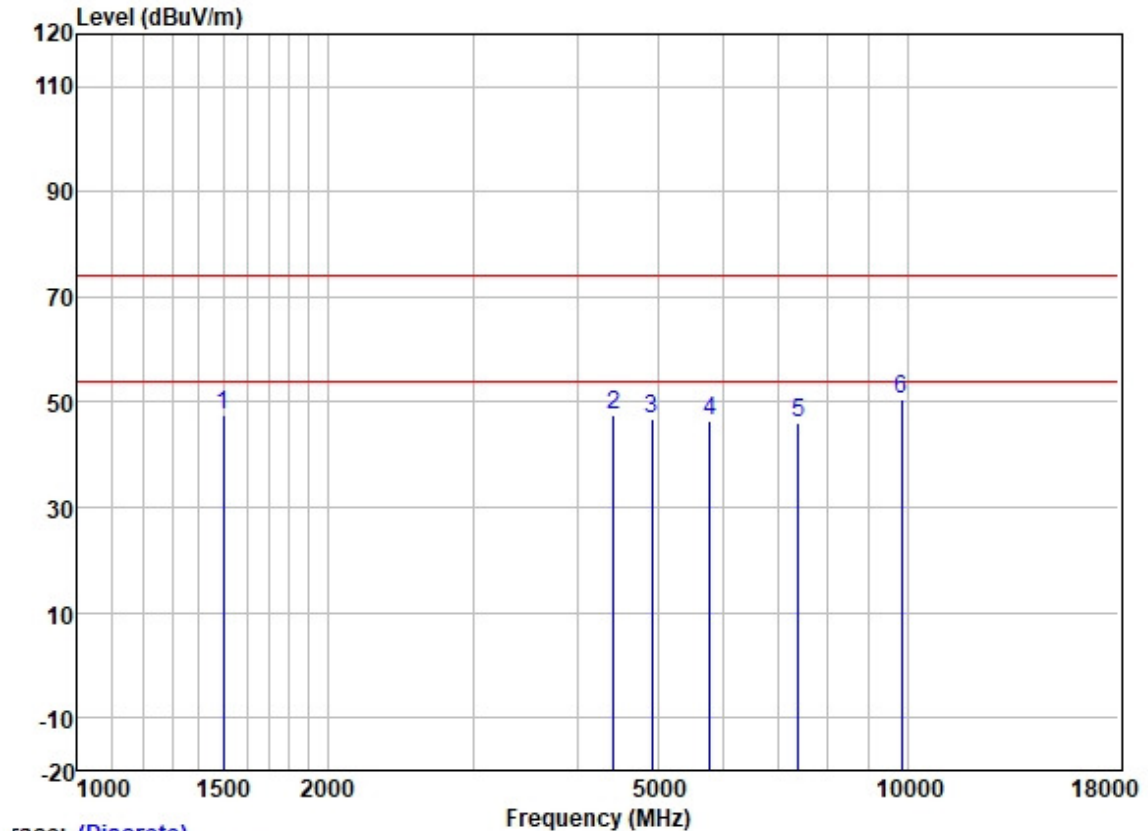
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Test Mode: 02; Polarity: Horizontal; Modulation:802.11b; Bandwidth:20MHz; Channel:High



Trace: (Discrete)

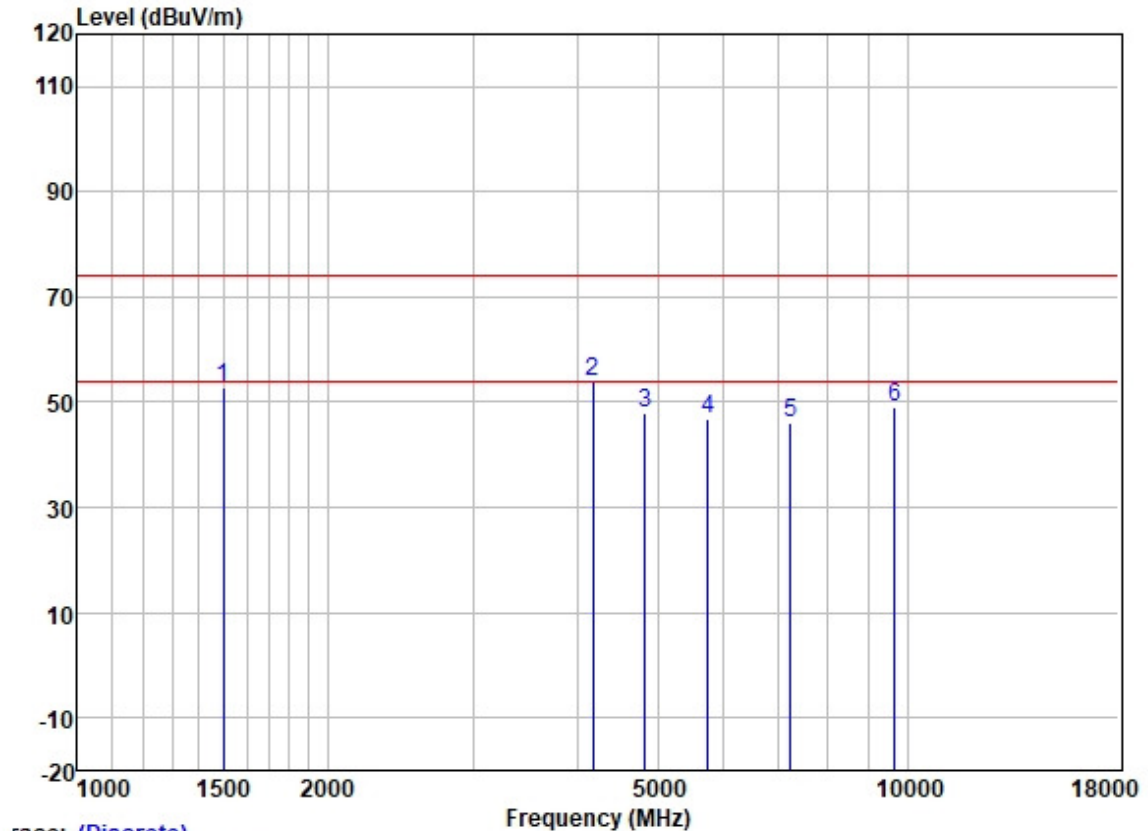
	ReadAntenna	Cable	Preamp		Limit	Over			
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1498.781	57.83	24.43	2.94	37.50	47.70	74.00	-26.30	HORIZONTAL peak
2	4430.628	45.41	33.87	4.79	36.63	47.44	74.00	-26.56	HORIZONTAL peak
3	4924.000	44.15	34.15	5.26	36.68	46.88	74.00	-27.12	HORIZONTAL peak
4	5780.300	44.75	32.66	5.76	36.79	46.38	74.00	-27.62	HORIZONTAL peak
5	7386.000	40.22	36.23	6.75	36.96	46.24	74.00	-27.76	HORIZONTAL peak
6	9848.000	40.74	38.88	7.66	36.81	50.47	74.00	-23.53	HORIZONTAL peak



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Trace: (Discrete)

	ReadAntenna	Cable	Preamp		Limit	Over			
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1498.781	62.77	24.43	2.94	37.50	52.64	74.00	-21.36	VERTICAL peak
2	4181.768	53.92	31.73	4.86	36.61	53.90	74.00	-20.10	VERTICAL peak
3	4824.000	45.11	34.16	5.16	36.67	47.76	74.00	-26.24	VERTICAL peak
4	5746.982	45.41	32.65	5.74	36.79	47.01	74.00	-26.99	VERTICAL peak
5	7236.000	40.44	35.78	6.90	36.94	46.18	74.00	-27.82	VERTICAL peak
6	9648.000	39.61	38.70	7.65	36.82	49.14	74.00	-24.86	VERTICAL peak



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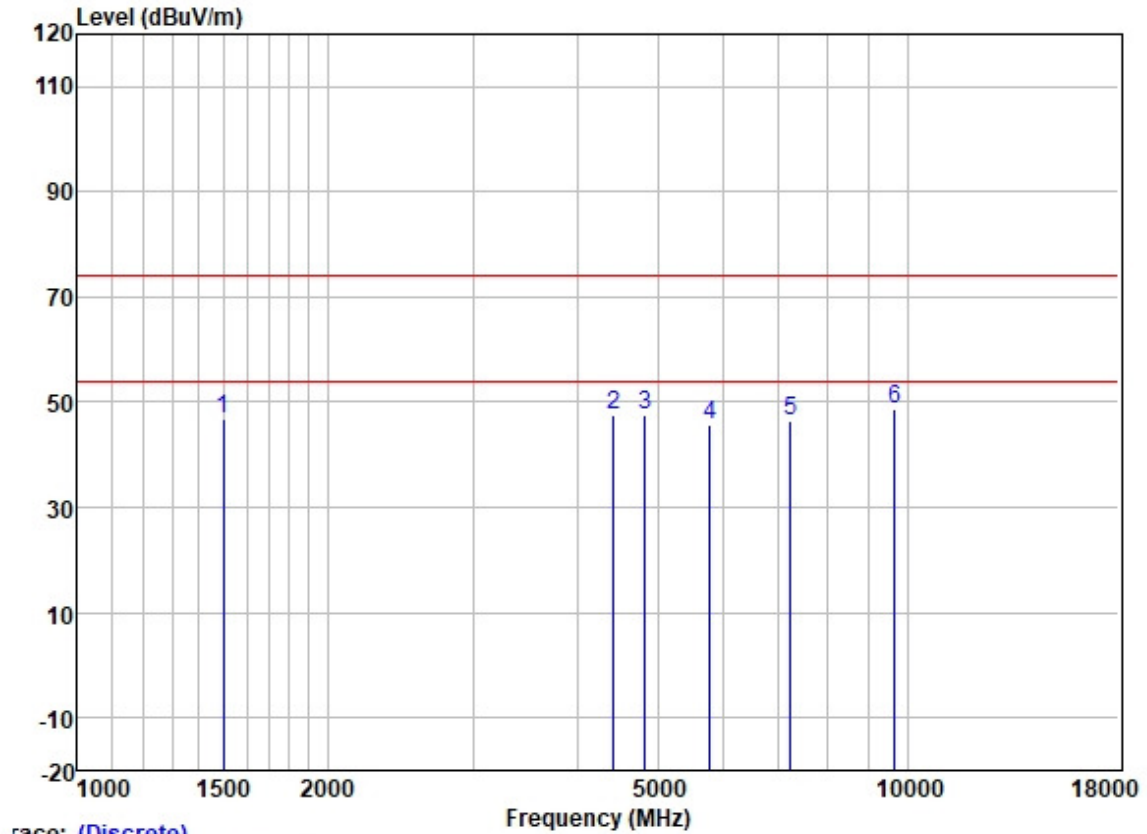
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Test Mode: 02; Polarity: Horizontal; Modulation:802.11g; Bandwidth:20MHz; Channel:Low



Trace: (Discrete)

	ReadAntenna	Cable	Preamp		Limit	Over			
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1498.781	56.87	24.43	2.94	37.50	46.74	74.00	-27.26	HORIZONTAL peak
2	4430.628	45.60	33.87	4.79	36.63	47.63	74.00	-26.37	HORIZONTAL peak
3	4824.000	44.86	34.16	5.16	36.67	47.51	74.00	-26.49	HORIZONTAL peak
4	5780.300	44.18	32.66	5.76	36.79	45.81	74.00	-28.19	HORIZONTAL peak
5	7236.000	40.89	35.78	6.90	36.94	46.63	74.00	-27.37	HORIZONTAL peak
6	9648.000	39.24	38.70	7.65	36.82	48.77	74.00	-25.23	HORIZONTAL peak



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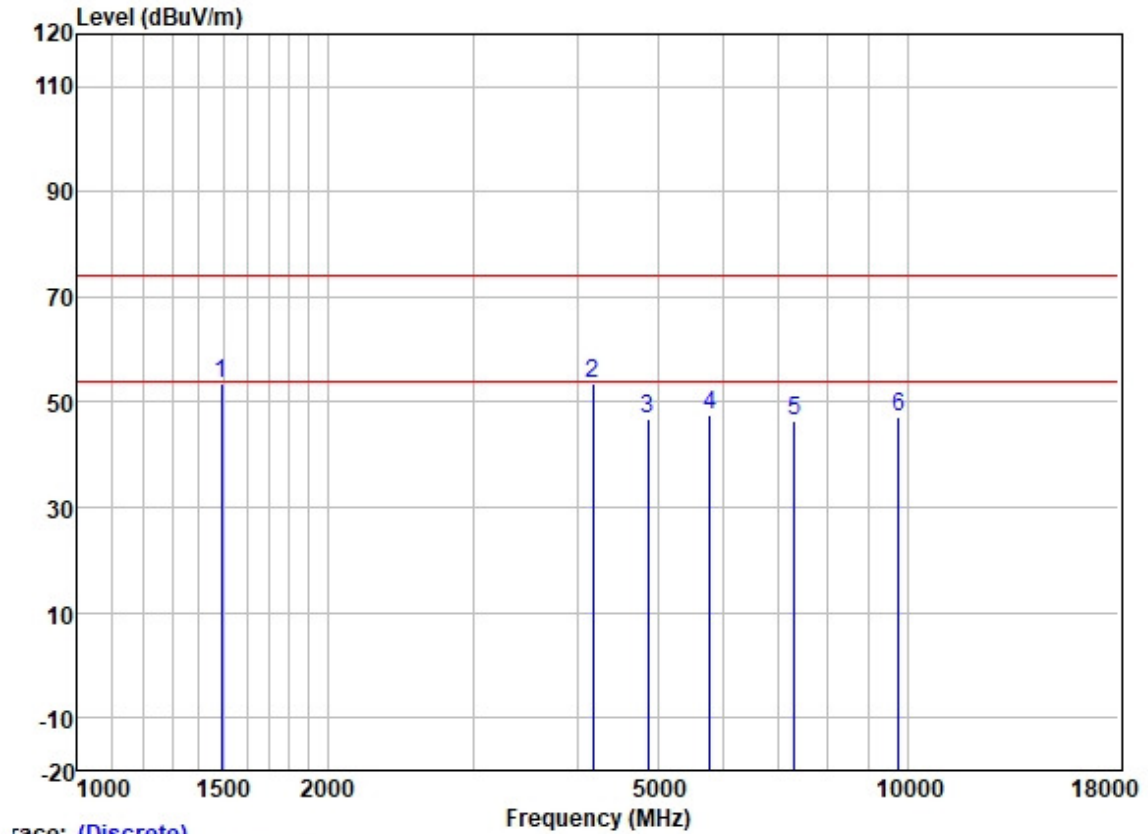
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Test Mode: 02; Polarity: Vertical; Modulation:802.11g; Bandwidth:20MHz; Channel:middle

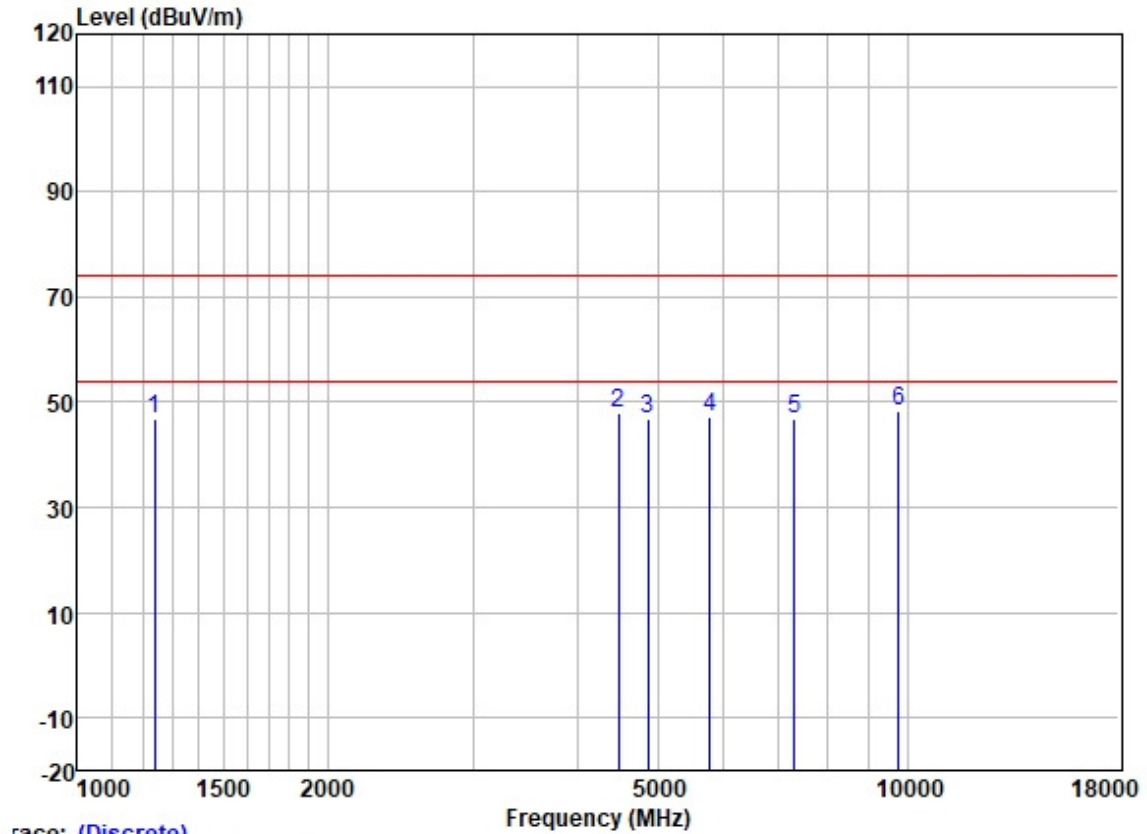


Trace: (Discrete)

	ReadAntenna	Cable	Preamp		Limit	Over			
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1490.142	63.61	24.42	2.94	37.52	53.45	74.00	-20.55	VERTICAL peak
2	4181.768	53.75	31.73	4.86	36.61	53.73	74.00	-20.27	VERTICAL peak
3	4874.000	44.16	34.15	5.22	36.67	46.86	74.00	-27.14	VERTICAL peak
4	5780.300	45.91	32.66	5.76	36.79	47.54	74.00	-26.46	VERTICAL peak
5	7311.000	40.72	36.00	6.83	36.95	46.60	74.00	-27.40	VERTICAL peak
6	9748.000	37.62	38.81	7.65	36.81	47.27	74.00	-26.73	VERTICAL peak



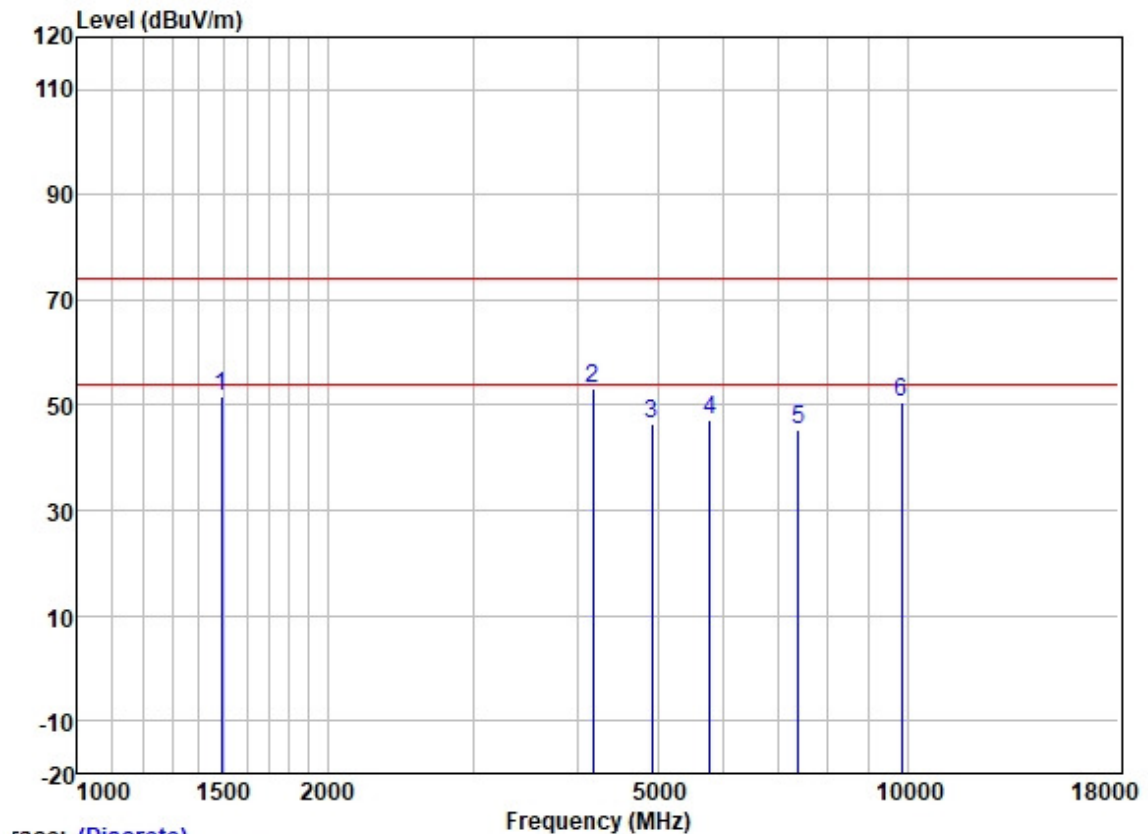
Test Mode: 02; Polarity: Horizontal; Modulation:802.11g; Bandwidth:20MHz; Channel:middle



Trace: (Discrete)

	ReadAntenna	Cable	Preamp		Limit	Over			
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1238.483	58.20	23.59	2.68	37.64	46.83	74.00	-27.17	HORIZONTAL peak
2	4482.150	45.81	34.12	4.78	36.63	48.08	74.00	-25.92	HORIZONTAL peak
3	4874.000	44.12	34.15	5.22	36.67	46.82	74.00	-27.18	HORIZONTAL peak
4	5780.300	45.55	32.66	5.76	36.79	47.18	74.00	-26.82	HORIZONTAL peak
5	7311.000	41.04	36.00	6.83	36.95	46.92	74.00	-27.08	HORIZONTAL peak
6	9748.000	38.79	38.81	7.65	36.81	48.44	74.00	-25.56	HORIZONTAL peak

Test Mode: 02; Polarity: Vertical; Modulation:802.11g; Bandwidth:20MHz; Channel:High



Trace: (Discrete)

	ReadAntenna	Cable	Preamp		Limit	Over			
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1490.142	61.99	24.42	2.94	37.52	51.83	74.00	-22.17	VERTICAL peak
2	4181.768	53.13	31.73	4.86	36.61	53.11	74.00	-20.89	VERTICAL peak
3	4924.000	43.80	34.15	5.26	36.68	46.53	74.00	-27.47	VERTICAL peak
4	5780.300	45.60	32.66	5.76	36.79	47.23	74.00	-26.77	VERTICAL peak
5	7386.000	39.26	36.23	6.75	36.96	45.28	74.00	-28.72	VERTICAL peak
6	9848.000	40.79	38.88	7.66	36.81	50.52	74.00	-23.48	VERTICAL peak



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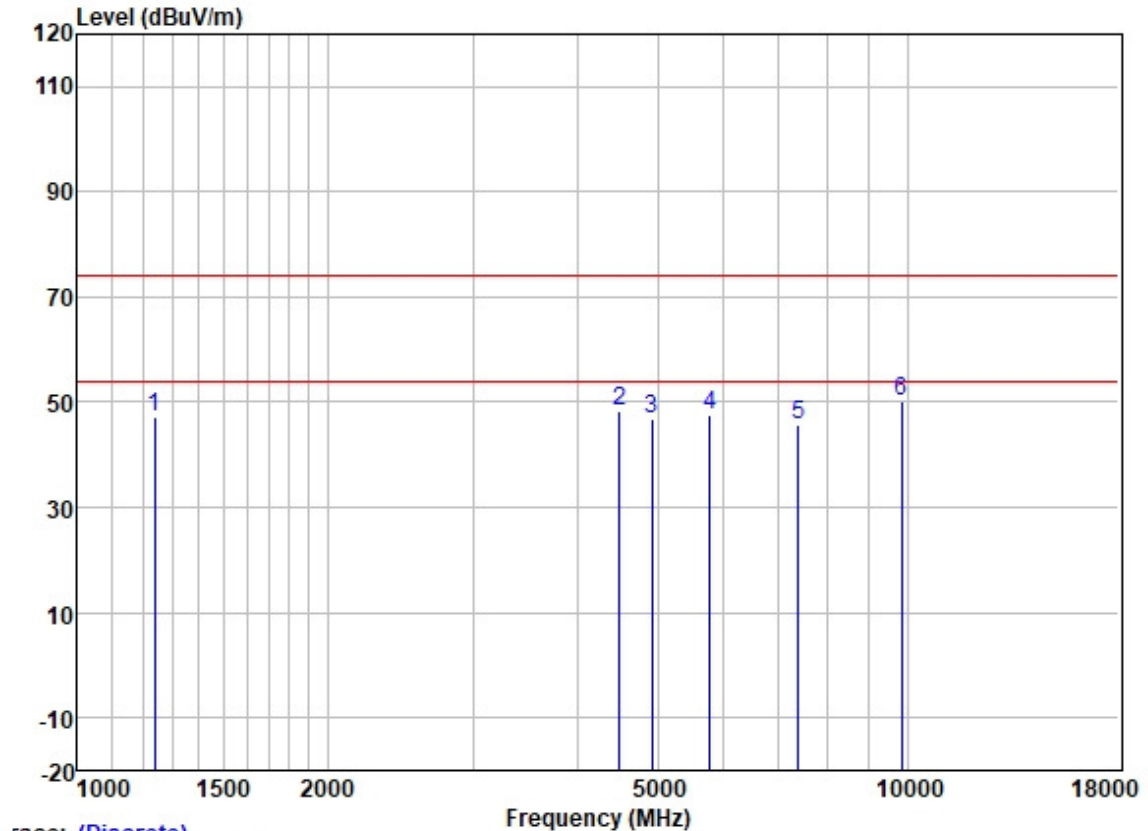
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Test Mode: 02; Polarity: Horizontal; Modulation:802.11g; Bandwidth:20MHz; Channel:High



	ReadAntenna	Cable	Preamp		Limit	Over			
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1238.483	58.44	23.59	2.68	37.64	47.07	74.00	-26.93	HORIZONTAL peak
2	4495.125	45.99	34.17	4.78	36.63	48.31	74.00	-25.69	HORIZONTAL peak
3	4924.000	44.12	34.15	5.26	36.68	46.85	74.00	-27.15	HORIZONTAL peak
4	5780.300	46.04	32.66	5.76	36.79	47.67	74.00	-26.33	HORIZONTAL peak
5	7386.000	39.61	36.23	6.75	36.96	45.63	74.00	-28.37	HORIZONTAL peak
6	9848.000	40.28	38.88	7.66	36.81	50.01	74.00	-23.99	HORIZONTAL peak



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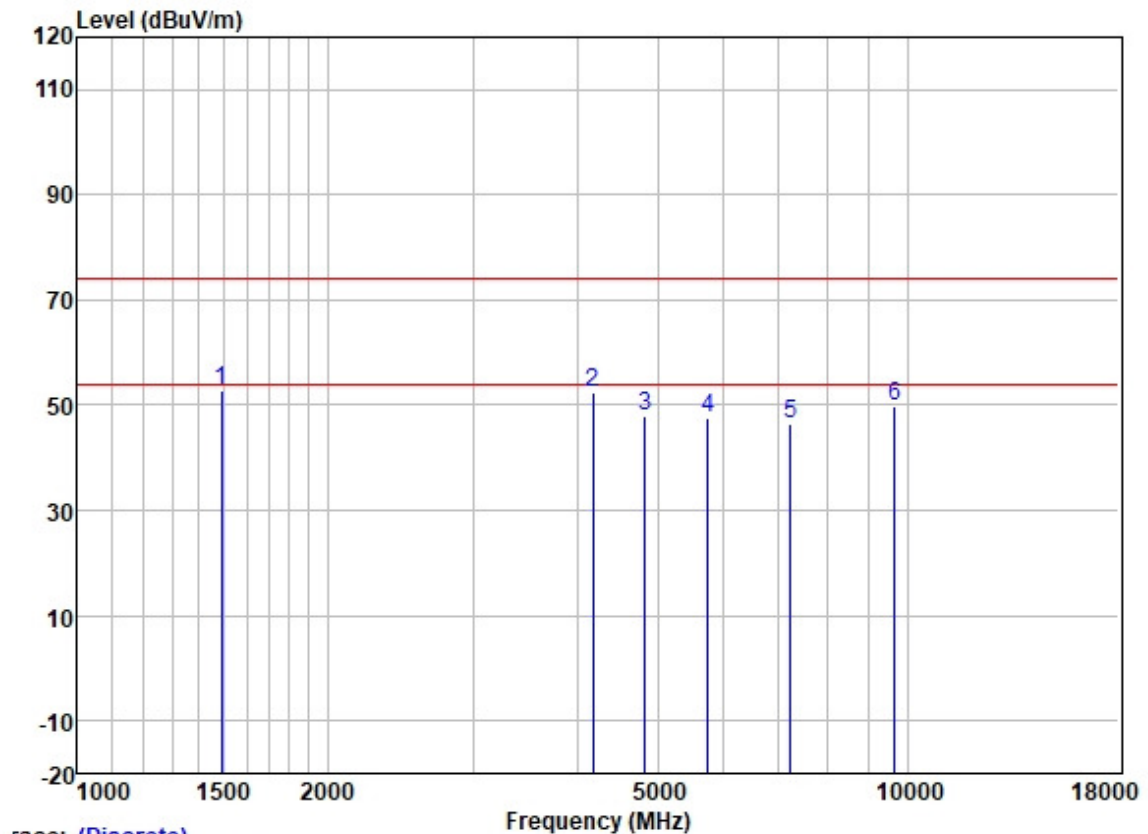
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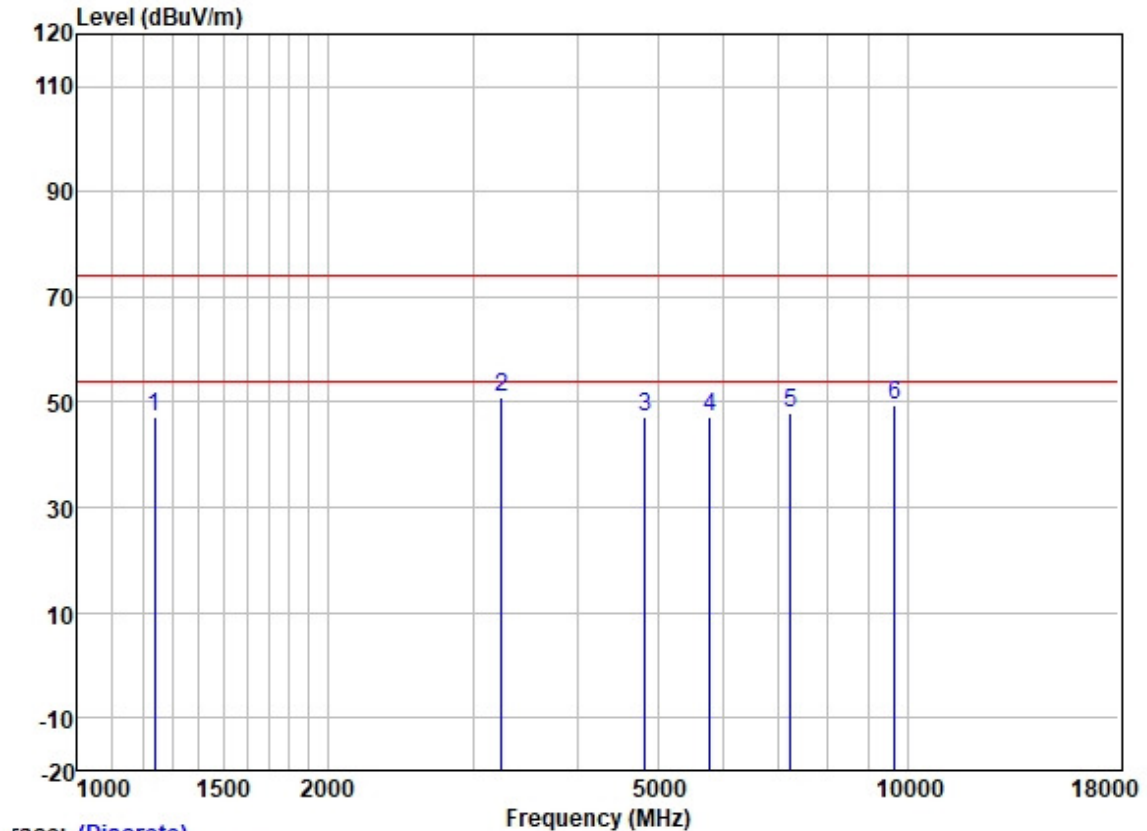
Test Mode: 02; Polarity: Vertical; Modulation:802.11n; Bandwidth:20MHz; Channel:Low



Trace: (Discrete)

	ReadAntenna	Cable	Preamp		Limit	Over			
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1490.142	63.12	24.42	2.94	37.52	52.96	74.00	-21.04	VERTICAL peak
2	4181.768	52.43	31.73	4.86	36.61	52.41	74.00	-21.59	VERTICAL peak
3	4824.000	45.41	34.16	5.16	36.67	48.06	74.00	-25.94	VERTICAL peak
4	5746.982	45.91	32.65	5.74	36.79	47.51	74.00	-26.49	VERTICAL peak
5	7236.000	40.90	35.78	6.90	36.94	46.64	74.00	-27.36	VERTICAL peak
6	9648.000	40.25	38.70	7.65	36.82	49.78	74.00	-24.22	VERTICAL peak

Test Mode: 02; Polarity: Horizontal; Modulation:802.11n; Bandwidth:20MHz; Channel:Low



	ReadAntenna	Cable	Preamp		Limit	Over			
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1238.483	58.68	23.59	2.68	37.64	47.31	74.00	-26.69	HORIZONTAL peak
2	3242.619	54.30	28.87	4.48	36.80	50.85	74.00	-23.15	HORIZONTAL peak
3	4824.000	44.68	34.16	5.16	36.67	47.33	74.00	-26.67	HORIZONTAL peak
4	5780.300	45.48	32.66	5.76	36.79	47.11	74.00	-26.89	HORIZONTAL peak
5	7236.000	42.28	35.78	6.90	36.94	48.02	74.00	-25.98	HORIZONTAL peak
6	9648.000	39.74	38.70	7.65	36.82	49.27	74.00	-24.73	HORIZONTAL peak



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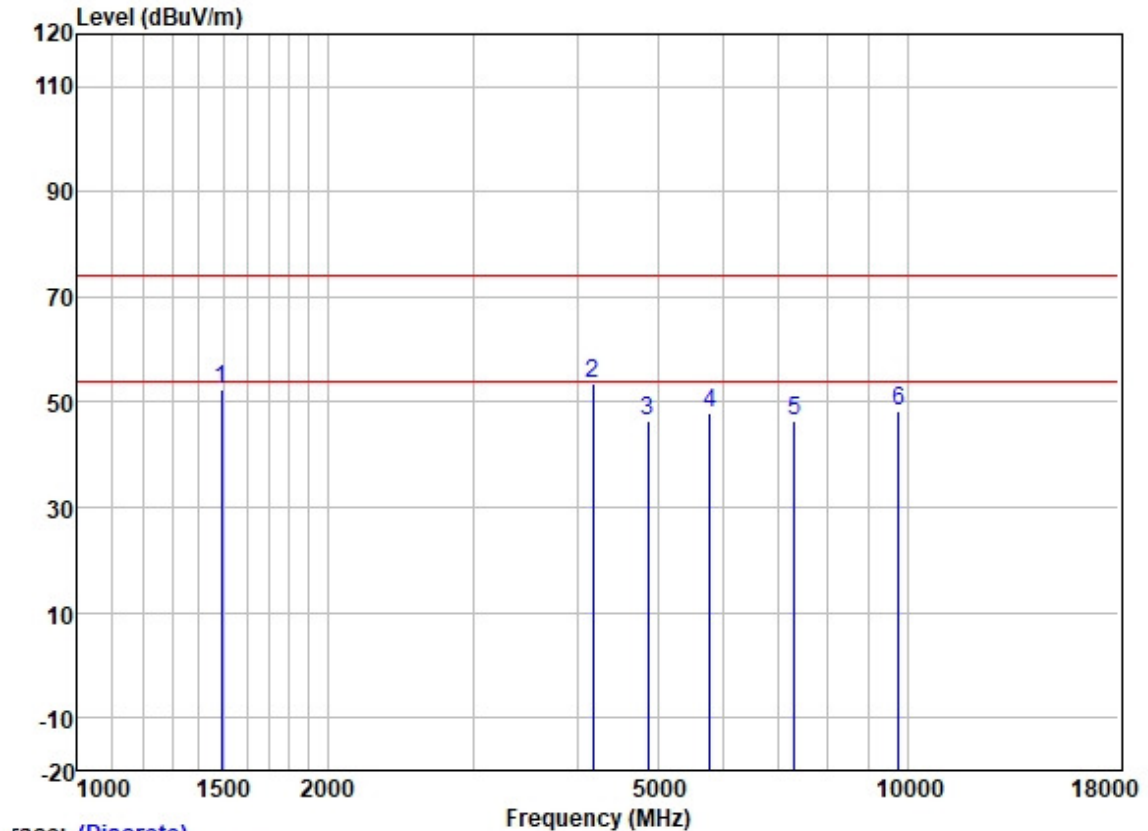
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Test Mode: 02; Polarity: Vertical; Modulation:802.11n; Bandwidth:20MHz; Channel:middle

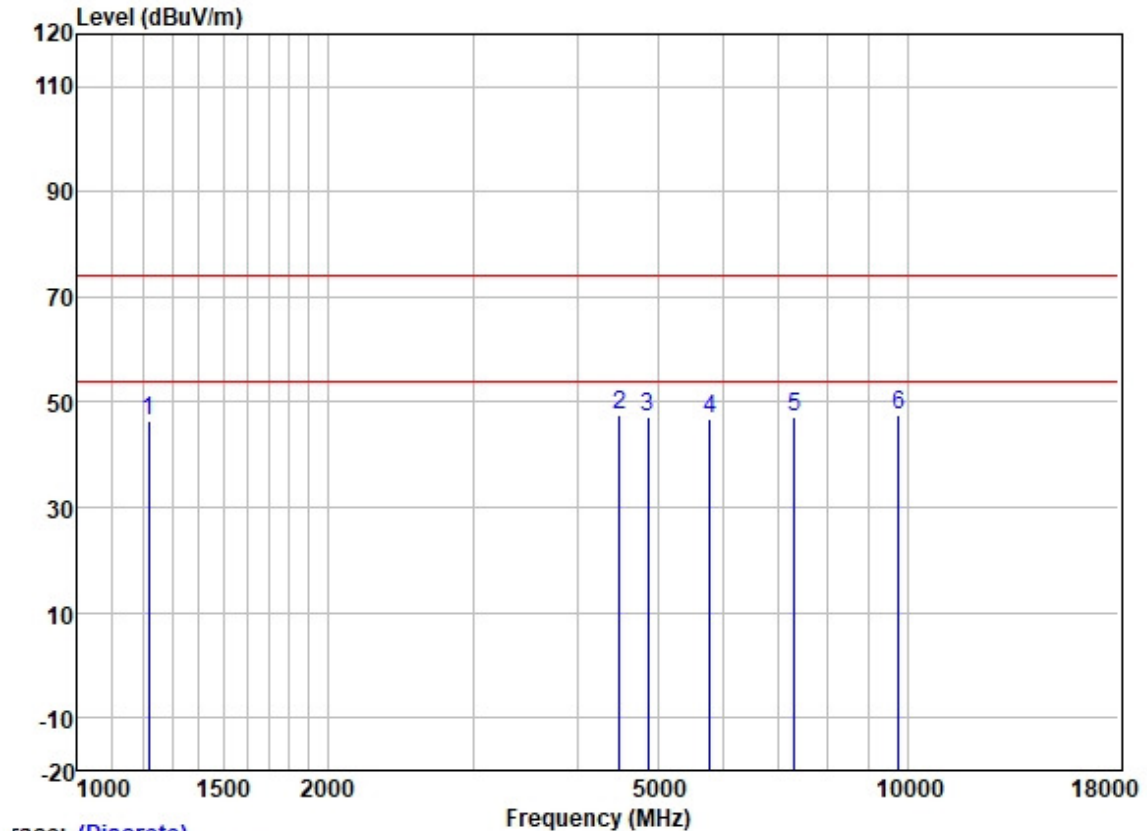


Trace: (Discrete)

	ReadAntenna	Cable	Preamp		Limit	Over			
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1490.142	62.43	24.42	2.94	37.52	52.27	74.00	-21.73	VERTICAL peak
2	4181.768	53.54	31.73	4.86	36.61	53.52	74.00	-20.48	VERTICAL peak
3	4874.000	43.68	34.15	5.22	36.67	46.38	74.00	-27.62	VERTICAL peak
4	5780.300	46.50	32.66	5.76	36.79	48.13	74.00	-25.87	VERTICAL peak
5	7311.000	40.43	36.00	6.83	36.95	46.31	74.00	-27.69	VERTICAL peak
6	9748.000	38.63	38.81	7.65	36.81	48.28	74.00	-25.72	VERTICAL peak



Test Mode: 02; Polarity: Horizontal; Modulation:802.11n; Bandwidth:20MHz; Channel:middle



Trace: (Discrete)

	ReadAntenna	Cable	Preamp		Limit	Over			
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1217.190	57.98	23.34	2.61	37.64	46.29	74.00	-27.71	HORIZONTAL peak
2	4495.125	45.33	34.17	4.78	36.63	47.65	74.00	-26.35	HORIZONTAL peak
3	4874.000	44.43	34.15	5.22	36.67	47.13	74.00	-26.87	HORIZONTAL peak
4	5780.300	45.11	32.66	5.76	36.79	46.74	74.00	-27.26	HORIZONTAL peak
5	7311.000	41.20	36.00	6.83	36.95	47.08	74.00	-26.92	HORIZONTAL peak
6	9748.000	37.93	38.81	7.65	36.81	47.58	74.00	-26.42	HORIZONTAL peak



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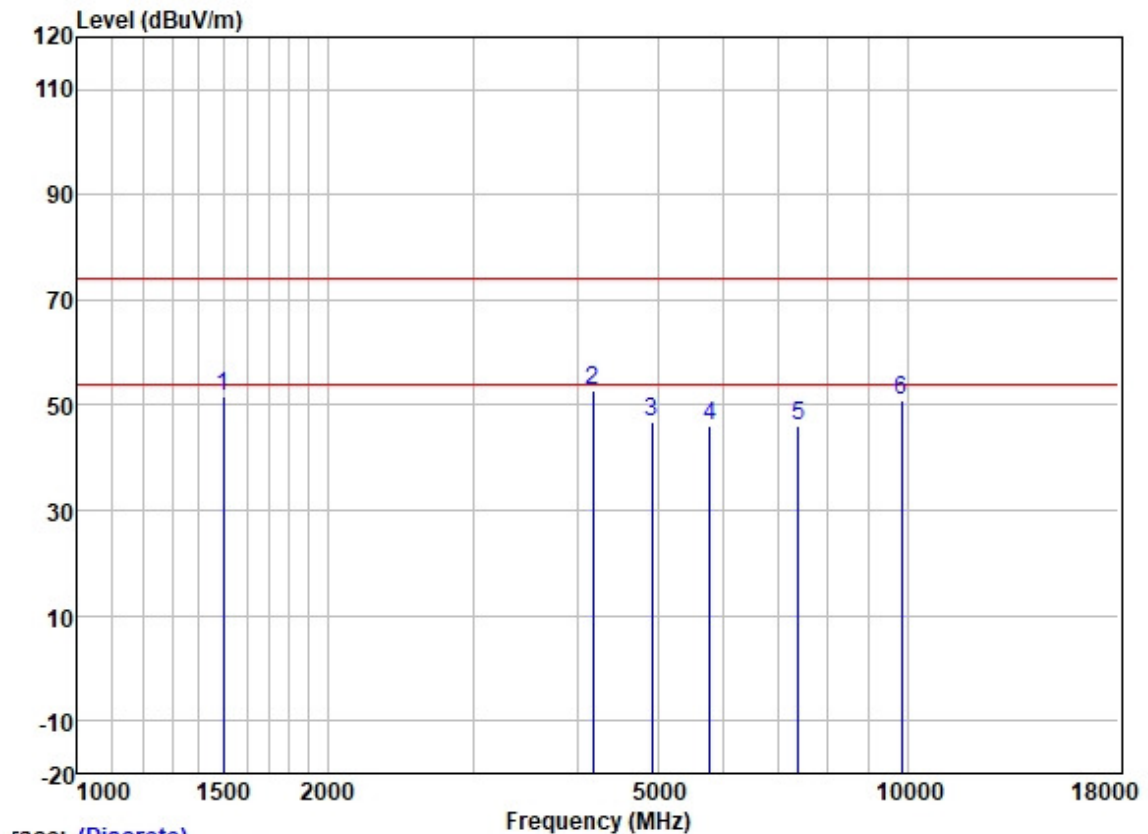
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Test Mode: 02; Polarity: Vertical; Modulation:802.11n; Bandwidth:20MHz; Channel:High

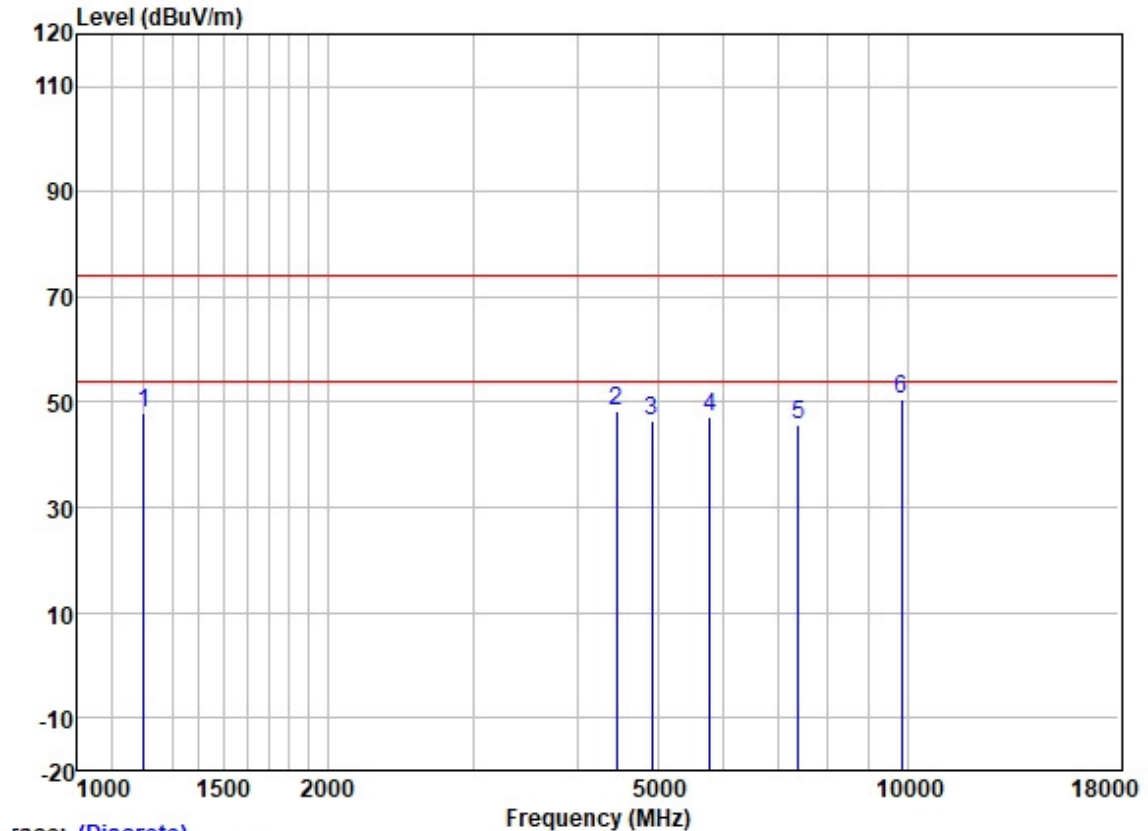


Trace: (Discrete)

	ReadAntenna	Cable	Preamp		Limit	Over			
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1498.781	61.82	24.43	2.94	37.50	51.69	74.00	-22.31	VERTICAL peak
2	4181.768	52.84	31.73	4.86	36.61	52.82	74.00	-21.18	VERTICAL peak
3	4924.000	43.96	34.15	5.26	36.68	46.69	74.00	-27.31	VERTICAL peak
4	5780.300	44.63	32.66	5.76	36.79	46.26	74.00	-27.74	VERTICAL peak
5	7386.000	39.94	36.23	6.75	36.96	45.96	74.00	-28.04	VERTICAL peak
6	9848.000	41.35	38.88	7.66	36.81	51.08	74.00	-22.92	VERTICAL peak



Test Mode: 02; Polarity: Horizontal; Modulation:802.11n; Bandwidth:20MHz; Channel:High



	ReadAntenna	Cable	Preamp		Limit	Over			
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1203.199	59.83	23.20	2.57	37.64	47.96	74.00	-26.04	HORIZONTAL peak
2	4456.315	46.05	34.00	4.79	36.63	48.21	74.00	-25.79	HORIZONTAL peak
3	4924.000	43.77	34.15	5.26	36.68	46.50	74.00	-27.50	HORIZONTAL peak
4	5780.300	45.53	32.66	5.76	36.79	47.16	74.00	-26.84	HORIZONTAL peak
5	7386.000	39.54	36.23	6.75	36.96	45.56	74.00	-28.44	HORIZONTAL peak
6	9848.000	40.68	38.88	7.66	36.81	50.41	74.00	-23.59	HORIZONTAL peak



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8 Test Setup Photo

Refer to Appendix - Test Setup Photo for GZCR231100119902



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9 EUT Constructional Details (EUT Photos)

Refer to Appendix - External and Internal Photos for GZCR2311001199HS



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