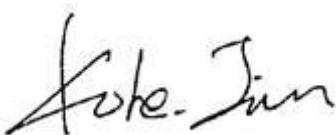


Report No.: GZEM191001633601
Page: 1 of 113
FCC ID: 2AV4Z-SSLV1

TEST REPORT

Application No.:	GZEM1910016336CR
Applicant:	Henkel AG & Co KGaA
Address of Applicant:	Henkel Street 67, 40589 Dusseldorf, Germany
Manufacturer:	Henkel AG & Co KGaA
Address of Manufacturer:	Henkel Street 67, 40589 Dusseldorf, Germany
Factory:	Jianhui Plastic & Electronic Industry (Shenzhen) Co. Ltd.
Address of Factory:	No. 127, Sili Road, Guanlan Zhen, Longhua District, Shenzhen, Guangdong
Equipment Under Test (EUT):	
FCC ID: 2AV4Z-SSLV1	
EUT Name:	SOMAT SMART
Model No.:	SS-LL-V1.0
Trade Mark:	SOMAT SMART
Standard(s) :	47 CFR Part 15, Subpart C 15.247
Date of Receipt:	2019-10-12
Date of Test:	2019-11-20 to 2019-11-26
Date of Issue:	2020-06-01
Test Result:	Pass*

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



Kobe Jian
EMC Laboratory Manager



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Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2020-06-01		Original

Authorized for issue by:			
Tested By	 Curry_Wu /Project Engineer		2019-11-20 to 2019-11-26
Checked By	 Ricky_Liu /Reviewer		Date 2019-12-05
			Date



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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(c)	Pass

Radio Spectrum Matter Part				
Item	Standard	Method	Requirement	Result
Minimum 6dB Bandwidth	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.8.1	47 CFR Part 15, Subpart C 15.247a(2)	Pass
Conducted Peak Output Power	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.9.1	47 CFR Part 15, Subpart C 15.247(b)(3)	Pass
Power Spectrum Density	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.10.2	47 CFR Part 15, Subpart C 15.247(e)	Pass
Conducted Band Edges Measurement	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.13.3.2	47 CFR Part 15, Subpart C 15.247(d)	Pass
Conducted Spurious Emissions	47 CFR Part 15, Subpart C 15.247	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	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.10.5	47 CFR Part 15, Subpart C 15.209 & 15.247(d)	Pass
Radiated Spurious Emissions	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.4,6.5,6.6	47 CFR Part 15, Subpart C 15.209 & 15.247(d)	Pass

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4 General Information

4.1 Details of E.U.T.

Power Supply:	DC 3V = Size CR17450 battery
Test Voltage:	DC 3V
Antenna Gain	0dBi
Antenna Type	Integral antenna
Channel Spacing	5MHz
Modulation Type	802.11b: DSSS (CCK, DQPSK, DBPSK) 802.11g/n: OFDM (64QAM, 16QAM, QPSK, BPSK)
Number of Channels	802.11b/g/n(HT20):11 802.11n(HT40):7
Operation Frequency	802.11b/g/n(HT20): 2412MHz to 2462MHz 802.11n(HT40): 2422MHz to 2452MHz
Function:	Push washing coil through WIFI function.
S/N	30174893
Hardware Version	94V-0BS-M1
Firmware	DACH_SOM_DWC_IL_Smart_Starter_Refill_Kit_0220.indd
Test Software	Argui.exe
Power Setting	20 dBm

4.2 Description of Support Units

The EUT has been tested with corresponding accessories as below:

Description	Manufacturer	Model No.	Serial No.
Laptop	Lenovo	T430u	REF. No. SEA1800
BT test board	SGS EMC	RF 07	RF 07



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4.3 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	$\pm 5.5 \times 10^{-8}$
2	Duty cycle	$\pm 0.57\%$
3	Occupied Bandwidth	$\pm 3\%$
4	RF Conducted power	$\pm 0.68\text{dB}$
5	RF Power Density	$\pm 1.50\text{dB}$
6	Conducted Spurious Emissions	$\pm 1.04\text{dB}$
7	RF Radiated Power	$\pm 4.5\text{dB}$ (below 1GHz)
		$\pm 4.8\text{dB}$ (above 1GHz)
8	Radiated Spurious Emission Test	$\pm 4.5\text{dB}$ (30MHz-1GHz)
		$\pm 4.8\text{dB}$ (1GHz-18GHz)
9	Temperature	$\pm 0.4^\circ\text{C}$
10	Humidity	$\pm 1.3\%$
11	Supply Voltages	$\pm 1.5\%$
12	Time	$\pm 3\%$

4.4 Test Location

All tests were performed at:

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Guangzhou, China 510663

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No tests were sub-contracted.

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4.5 Test Facility

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

● **NVLAP (Lab Code: 200611-0)**

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP/NIST). NVLAP Code: 200611-0.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

● **ACMA**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our NVLAP accreditation.

● **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.

● **CNAS (Lab Code: L0167)**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been assessed and in compliance with CNAS-CL01:2018 accreditation criteria for testing laboratories (identical to ISO/IEC 17025:2017 General Requirements) for the Competence of Testing Laboratories.

● **FCC Recognized 2.948 Listed Test Firm(Registration No.: 282399)**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 282399, May 31, 2002.

● **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, Jul 13, 2017.

● **Industry Canada (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-10449 and T-11179)**

The 10m Semi-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-10449 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 17025:2005, the Basic Rules, IECEE 01 and Rules of procedure IECEE 02, and the relevant IECEE CB-Scheme Operational documents.



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4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None



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5 Equipment List

Minimum 6dB Bandwidth						
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date	
EXA Signal Analyzer	Agilent Technologies	N9010A	EMC2138	2019-11-18	2020-11-17	
6dB Attenuator	HP	8491A	EMC2062	2018-04-04	2020-04-03	
Test Software JS1120-3	HangTianXing	V2.6	GZE100-69	N/A	N/A	
MI CABLE	SGS	0.8M	EMC2136	2019-11-02	2021-11-01	
MI CABLE	SGS	0.8M	EMC2137	2019-11-02	2021-11-01	

Conducted Peak Output Power					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
EXA Signal Analyzer	Agilent Technologies	N9010A	EMC2138	2019-11-18	2020-11-17
6dB Attenuator	HP	8491A	EMC2062	2018-04-04	2020-04-03
Test Software JS1120-3	HangTianXing	V2.6	GZE100-69	N/A	N/A
MI CABLE	SGS	0.8M	EMC2136	2019-11-02	2021-11-01
MI CABLE	SGS	0.8M	EMC2137	2019-11-02	2021-11-01

Power Spectrum Density					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
EXA Signal Analyzer	Agilent Technologies	N9010A	EMC2138	2019-11-18	2020-11-17
6dB Attenuator	HP	8491A	EMC2062	2018-04-04	2020-04-03
Test Software JS1120-3	HangTianXing	V2.6	GZE100-69	N/A	N/A
MI CABLE	SGS	0.8M	EMC2136	2019-11-02	2021-11-01
MI CABLE	SGS	0.8M	EMC2137	2019-11-02	2021-11-01

Conducted Band Edges Measurement					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
MXA Signal Analyzer	Agilent Technologies	N9020A	SEM004-10	2019-02-24	2020-02-23
ESG Vector Signal Generator	Keysight	E4438C	SEM006-03	2019-04-05	2020-04-04
EXG Analog Signal Generator	Agilent Technologies	N5171B	SEM006-04	2017-07-26	2020-07-25
Power Meter	Agilent Technologies	U2021XA_Ch2	SEM009-02	2019-05-29	2020-05-28
Power Meter	Agilent Technologies	U2021XA_Ch3	SEM009-03	2019-05-29	2020-05-28
EXA Signal Analyzer	Agilent Technologies	N9010A	EMC2138	2019-11-18	2020-11-17
6dB Attenuator	HP	8491A	EMC2062	2018-04-04	2020-04-03
Test Software JS1120-3	HangTianXing	V2.6	GZE100-69	N/A	N/A
MI CABLE	SGS	0.8M	EMC2136	2019-11-02	2021-11-01
MI CABLE	SGS	0.8M	EMC2137	2019-11-02	2021-11-01

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Conducted Spurious Emissions					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
EXA Signal Analyzer	AgilentTechnologies	N9010A	EMC2138	2019-11-18	2020-11-17
6dB Attenuator	HP	8491A	EMC2062	2018-04-04	2020-04-03
Test Software JS1120-3	HangTianXing	V2.6	GZE100-69	N/A	N/A
MI CABLE	SGS	0.8M	EMC2136	2019-11-02	2021-11-01
MI CABLE	SGS	0.8M	EMC2137	2019-11-02	2021-11-01

Radiated Emissions which fall in the restricted bands					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
EMI Test Receiver	Rohde & Schwarz	ESIB26	EMC0522	2019-01-20	2020-01-19
EMI Test Receiver	Rohde & Schwarz	ESCI	EMC0056	2019-01-20	2020-01-19
Chamber cable	HangTianXing	N/A	EMC0542	2019-06-28	2021-06-27
Trilog Broadband Antenna 25MHz-1GHz	SCHWARZBECKMESTE ELEKTRONIK	VULB 9168	EMC2174	2018-09-06	2021-09-05
Bi-log Type Antenna	Schaffner -Chase	CBL6143	EMC0519	2017-05-04	2020-05-03
Horn Antenna 1GHz-18GHz	R & S	HF906	EMC0518	2018-09-02	2021-09-01
1GHz-26.5 GHz Pre-Amplifier	Agilent	8449B	EMC0521	2019-01-07	2020-01-08
Amplifier	HP	8447F	EMC2065	2019-05-29	2020-05-28
Pre-Amplifier MH648A	ANRITSU CORP	MH648A	EMC2086	2019-11-18	2020-11-17
Active Loop Antenna	EMCO	6502	EMC0523	2018-03-05	2020-03-04
High Pass Filter(915MHz)	FSY MICROWAVE	HM1465-9SS	EMC2079	2019-01-11	2020-01-10
2.4GHz Filter	Micro-Tronics	BRM 50702	EMC2069	2019-01-11	2020-01-10
10m Semi-Anechoic Chamber	ETS	N/A	EMC0530	2019-10-20	2022-10-19
966 Anechoic Chamber	C.R.T	9m x 6m x 6m	EMC2142	2017-12-19	2019-12-18
MXE EMI Receiver	Keysight	N9038A	EMC2139	2019-11-18	2020-11-17
EXA Signal Analyzer	Keysight	N9010A	EMC2138	2019-11-18	2020-11-17
Trilog Broadband Antenna 30MHz-1GHz	SCHWARZBECKMESTE ELEKTRONIK	VULB 9168	SEM003-18	2019-02-22	2022-02-22
Test Software E3	Audix	Ver.6.120110a	GZE100-61	N/A	N/A

Radiated Spurious Emissions					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
EMI Test Receiver	Rohde & Schwarz	ESIB26	EMC0522	2019-01-20	2020-01-19
EMI Test Receiver	Rohde & Schwarz	ESCI	EMC0056	2019-01-20	2020-01-19
Chamber cable	HangTianXing	N/A	EMC0542	2019-06-28	2021-06-27
Trilog Broadband Antenna 25MHz-1GHz	SCHWARZBECKMESTE ELEKTRONIK	VULB 9168	EMC2174	2018-09-06	2021-09-05
Bi-log Type Antenna	Schaffner -Chase	CBL6143	EMC0519	2017-05-04	2020-05-03

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Horn Antenna 1GHz-18GHz	R & S	HF906	EMC0518	2018-09-02	2021-09-01
1GHz-26.5 GHz Pre-Amplifier	Agilent	8449B	EMC0521	2019-01-07	2020-01-08
Amplifier	HP	8447F	EMC2065	2019-05-29	2020-05-28
Pre-Amplifier MH648A	ANRITSU CORP	MH648A	EMC2086	2019-11-18	2020-11-17
Active Loop Antenna	EMCO	6502	EMC0523	2018-03-05	2020-03-04
High Pass Filter(915MHz)	FSY MICROWAVE	HM1465-9SS	EMC2079	2019-01-11	2020-01-10
2.4GHz Filter	Micro-Tronics	BRM 50702	EMC2069	2019-01-11	2020-01-10
10m Semi-Anechoic Chamber	ETS	N/A	EMC0530	2019-10-20	2022-10-19
966 Anechoic Chamber	C.R.T	9m x 6m x 6m	EMC2142	2017-12-19	2019-12-18
MXE EMI Receiver	Keysight	N9038A	EMC2139	2019-11-18	2020-11-17
EXA Signal Analyzer	Keysight	N9010A	EMC2138	2019-11-18	2020-11-17
Trilog Broadband Antenna 30MHz-1GHz	SCHWARZBECKME SS-ELEKTRONIK	VULB 9168	SEM003-18	2019-02-22	2022-02-22
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	2019-07-16	2020-07-15
DMM	Fluke	73	EMC0007	2019-07-16	2020-07-15

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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(c)

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 0dBi.



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7 Radio Spectrum Matter Test Results

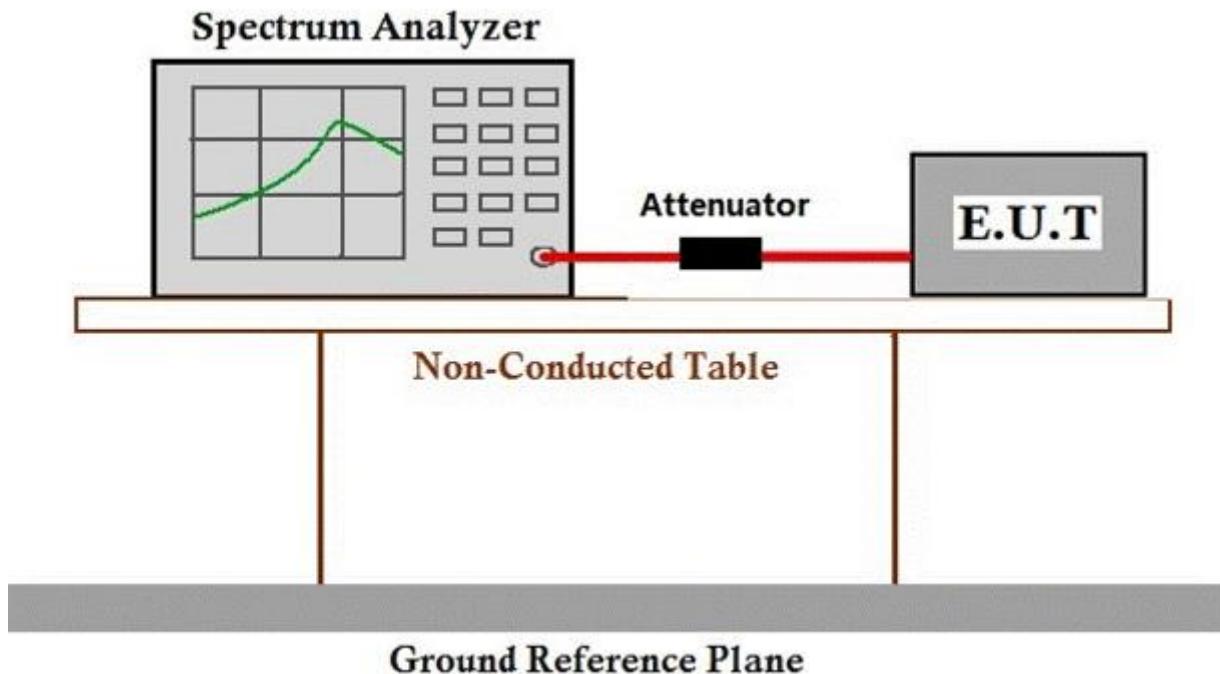
7.1 Minimum 6dB Bandwidth

Test Requirement 47 CFR Part 15, Subpart C 15.247a(2)
Test Method: ANSI C63.10 (2013) Section 11.8.1
Limit: ≥ 500 kHz

7.1.1 E.U.T. Operation

Operating Environment:
Temperature: 26.2 °C Humidity: 50.8 % RH Atmospheric Pressure: 1020 mbar
Test mode a:TX mode_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40). Only the data of worst case is recorded in the report.

7.1.2 Test Setup Diagram



7.1.3 Measurement Procedure and Data

The detailed test data see: Appendix 15.247

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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 11.9.1.2

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



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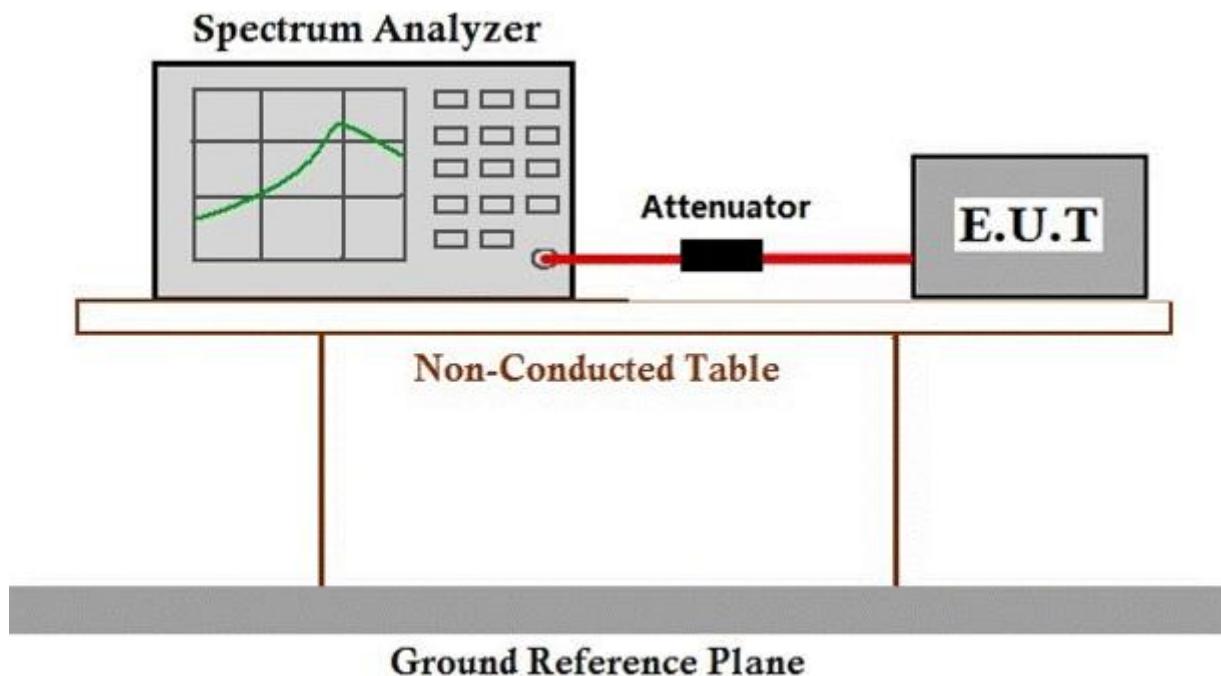
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7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 26.2 °C Humidity: 50.8 % RH Atmospheric Pressure: 1020 mbar
Test mode a:TX mode_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40). Only the data of worst case is recorded in the report.

7.2.2 Test Setup Diagram



7.2.3 Measurement Procedure and Data

The detailed test data see: Appendix 15.247

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7.3 Power Spectrum Density

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

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

Limit: $\leq 8\text{dBm}$ in any 3 kHz band during any time interval of continuous transmission

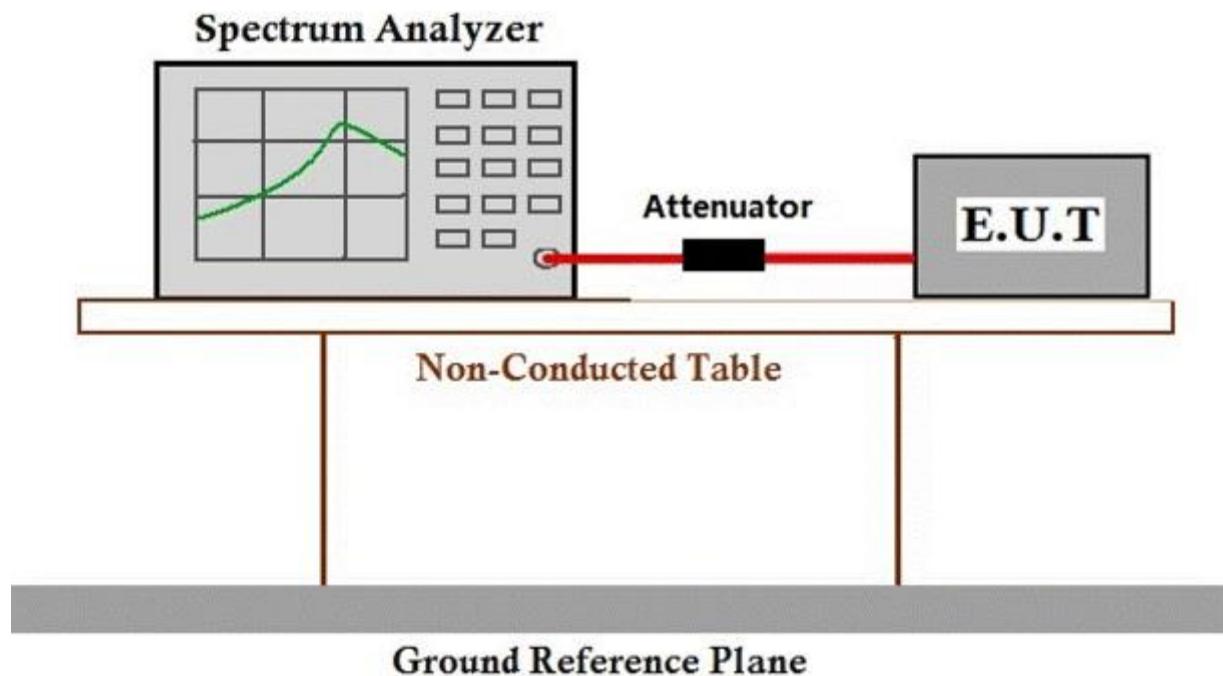
7.3.1 E.U.T. Operation

Operating Environment:

Temperature: 26.2 °C Humidity: 50.8 % RH Atmospheric Pressure: 1020 mbar

Test mode a:TX mode_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40). Only the data of worst case is recorded in the report.

7.3.2 Test Setup Diagram



7.3.3 Measurement Procedure and Data

The detailed test data see: Appendix 15.247

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7.4 Conducted Band Edges Measurement

Test Requirement

47 CFR Part 15, Subpart C 15.247(d)

Test Method:

ANSI C63.10 (2013) Section 11.13.3.2

Limit:

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



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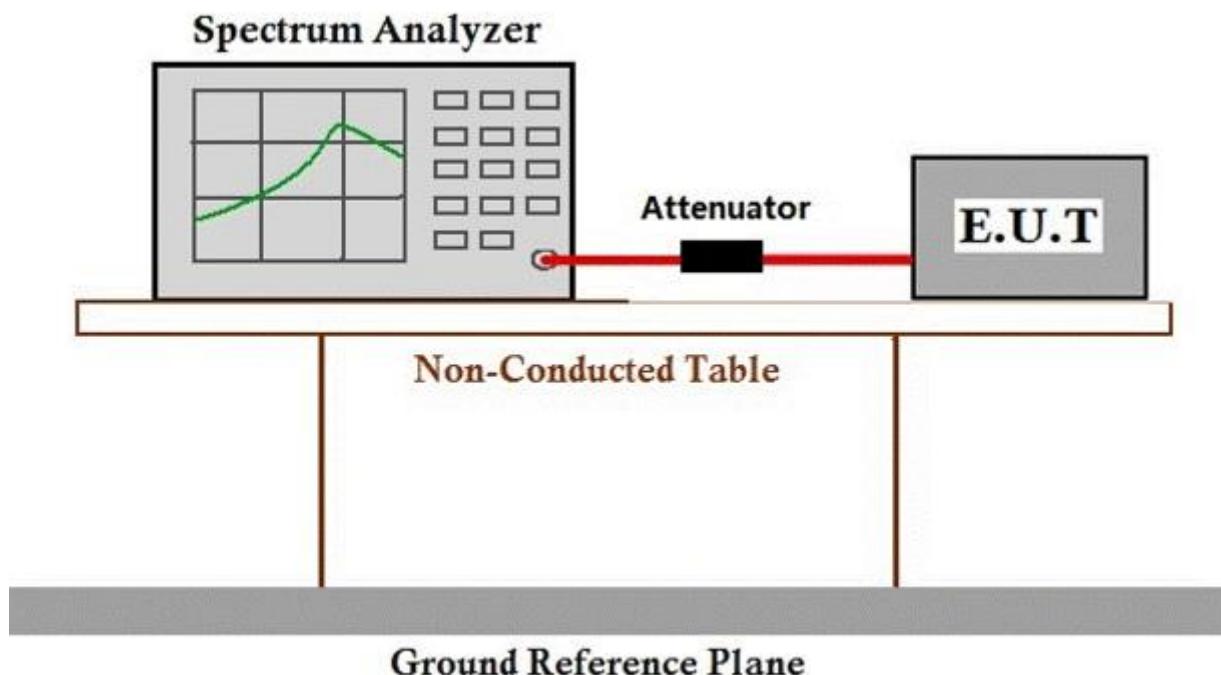
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7.4.1 E.U.T. Operation

Operating Environment:

Temperature: 26.2 °C Humidity: 50.8 % RH Atmospheric Pressure: 1020 mbar
Test mode a:TX mode_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40). Only the data of worst case is recorded in the report.

7.4.2 Test Setup Diagram**7.4.3 Measurement Procedure and Data**

The detailed test data see: Appendix 15.247

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7.5 Conducted Spurious Emissions

Test Requirement

47 CFR Part 15, Subpart C 15.247(d)

Test Method:

ANSI C63.10 (2013) Section 11.11

Limit:

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



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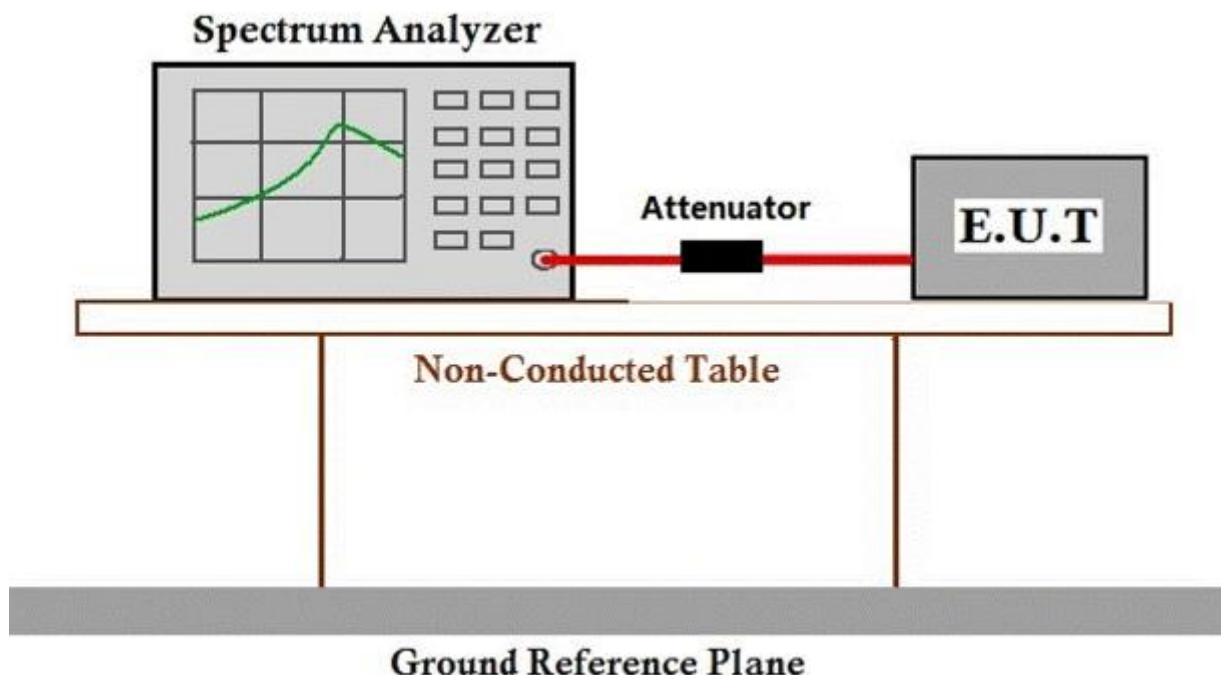
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7.5.1 E.U.T. Operation

Operating Environment:

Temperature: 26.2 °C Humidity: 50.8 % RH Atmospheric Pressure: 1020 mbar
Test mode a:TX mode_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40). Only the data of worst case is recorded in the report.

7.5.2 Test Setup Diagram



7.5.3 Measurement Procedure and Data

The detailed test data see: Appendix 15.247

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7.6 Radiated Emissions which fall in the restricted bands

Test Requirement 47 CFR Part 15, Subpart C 15.209 & 15.247(d)

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

Measurement Distance: 3m

Limit:

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

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

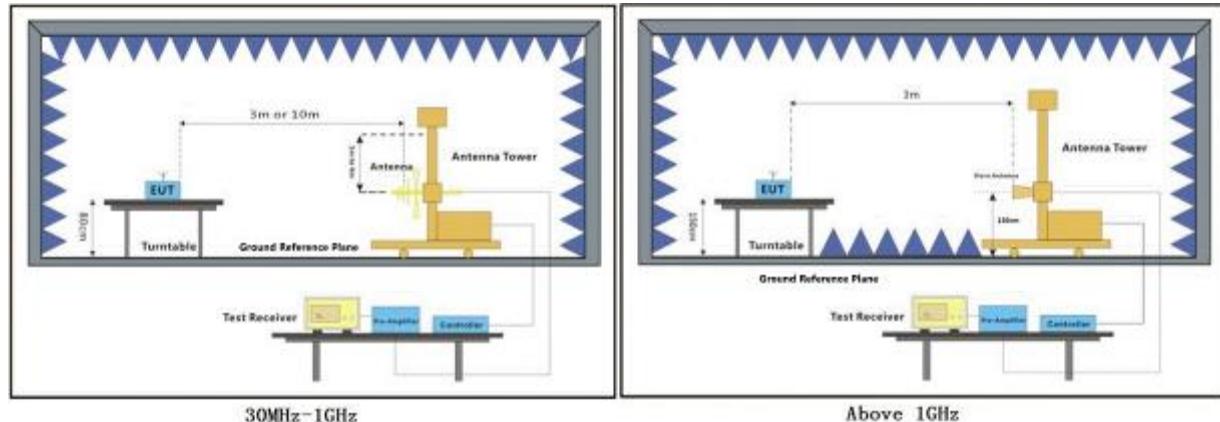
7.6.1 E.U.T. Operation

Operating Environment:

Temperature: 23.6 °C Humidity: 52.4 % RH Atmospheric Pressure: 1020 mbar

Test mode a:TX mode_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40). Only the data of worst case is recorded in the report.

7.6.2 Test Setup Diagram



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7.6.3 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.

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



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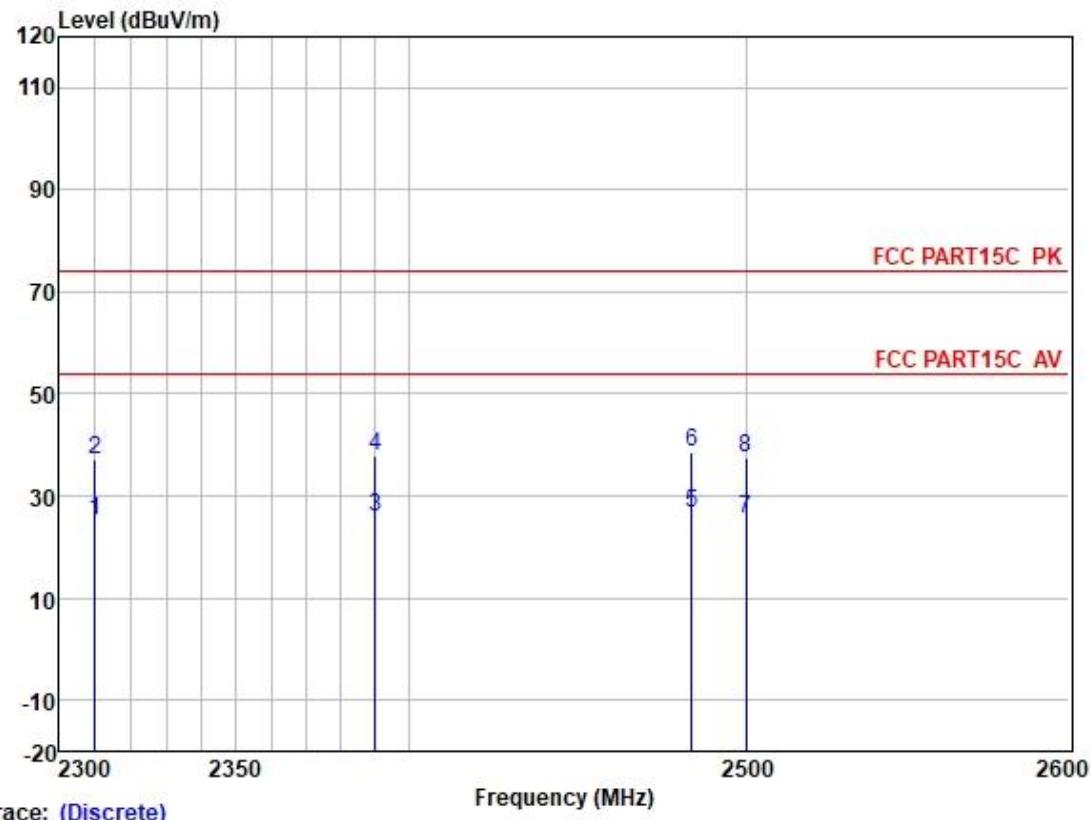
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Mode:a; Polarization:Horizontal; Modulation:b; bandwidth:20MHz; Channel:Low



Trace: (Discrete)

Freq	Read	Antenna	Cable	Preamp	Limit	Over	Limit	Pol/Phase	Remark
	Freq	Level	Factor	Loss					
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2310.000	33.20	26.25	3.32	37.44	25.33	54.00	-28.67	HORIZONTAL Average
2	2310.000	45.16	26.25	3.32	37.44	37.29	74.00	-36.71	HORIZONTAL Peak
3	2390.000	33.49	26.43	3.48	37.42	25.98	54.00	-28.02	HORIZONTAL Average
4	2390.000	45.48	26.43	3.48	37.42	37.97	74.00	-36.03	HORIZONTAL Peak
5	2483.500	33.83	26.58	3.53	37.40	26.54	54.00	-27.46	HORIZONTAL Average
6	2483.500	45.86	26.58	3.53	37.40	38.57	74.00	-35.43	HORIZONTAL Peak
7	2500.000	33.07	26.60	3.40	37.39	25.68	54.00	-28.32	HORIZONTAL Average
8	2500.000	44.84	26.60	3.40	37.39	37.45	74.00	-36.55	HORIZONTAL Peak

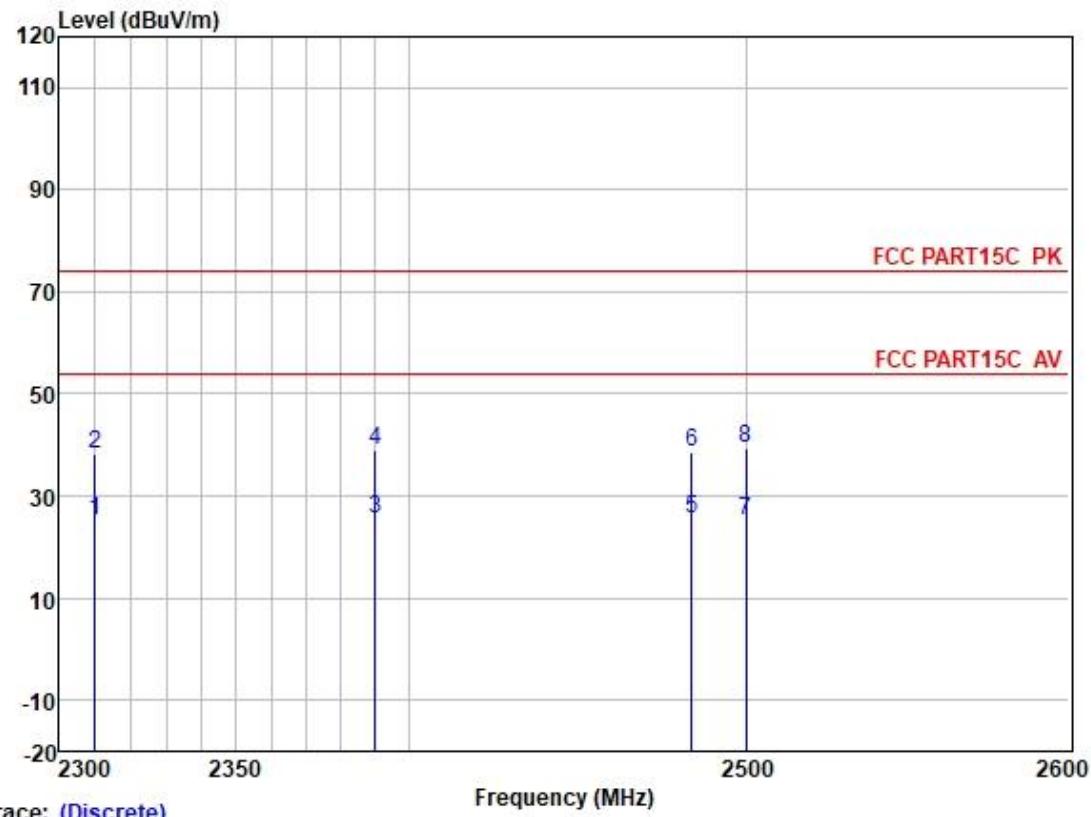
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Mode:a; Polarization:Vertical; Modulation:b; bandwidth:20MHz; Channel:Low



Trace: (Discrete)

Freq	Read	Antenna	Cable	Preamp	Limit	Over	Limit	Pol/Phase	Remark
	Freq	Level	Factor	Loss					
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2310.000	33.12	26.25	3.32	37.44	25.25	54.00	-28.75	VERTICAL Average
2	2310.000	46.02	26.25	3.32	37.44	38.15	74.00	-35.85	VERTICAL Peak
3	2390.000	33.07	26.43	3.48	37.42	25.56	54.00	-28.44	VERTICAL Average
4	2390.000	46.48	26.43	3.48	37.42	38.97	74.00	-35.03	VERTICAL Peak
5	2483.500	32.77	26.58	3.53	37.40	25.48	54.00	-28.52	VERTICAL Average
6	2483.500	45.75	26.58	3.53	37.40	38.46	74.00	-35.54	VERTICAL Peak
7	2500.000	32.42	26.60	3.40	37.39	25.03	54.00	-28.97	VERTICAL Average
8	2500.000	46.88	26.60	3.40	37.39	39.49	74.00	-34.51	VERTICAL Peak

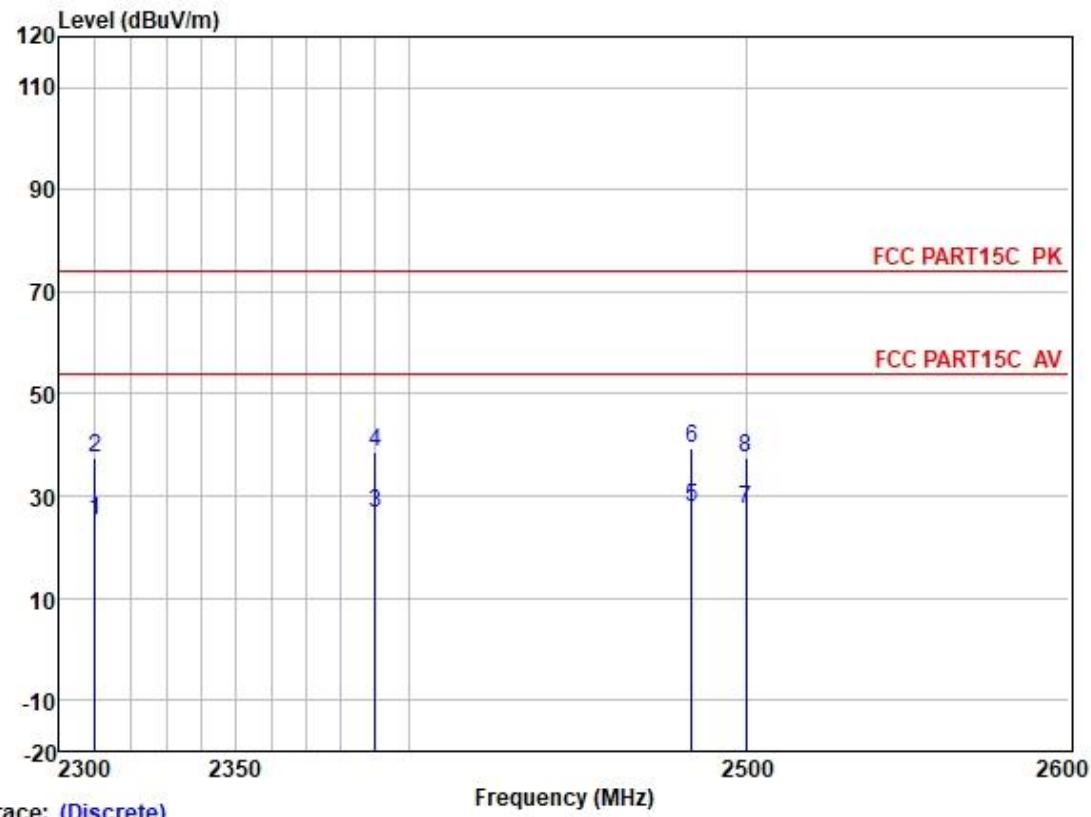
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Mode:a; Polarization:Horizontal; Modulation:b; bandwidth:20MHz; Channel:High



Trace: (Discrete)

Freq	Read	Antenna	Cable	Preamp	Limit	Over	Limit	Pol/Phase	Remark
	Freq	Level	Factor	Loss					
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2310.000	32.99	26.25	3.32	37.44	25.12	54.00	-28.88	HORIZONTAL Average
2	2310.000	45.51	26.25	3.32	37.44	37.64	74.00	-36.36	HORIZONTAL Peak
3	2390.000	34.08	26.43	3.48	37.42	26.57	54.00	-27.43	HORIZONTAL Average
4	2390.000	46.24	26.43	3.48	37.42	38.73	74.00	-35.27	HORIZONTAL Peak
5	2483.500	35.02	26.58	3.53	37.40	27.73	54.00	-26.27	HORIZONTAL Average
6	2483.500	46.68	26.58	3.53	37.40	39.39	74.00	-34.61	HORIZONTAL Peak
7	2500.000	34.67	26.60	3.40	37.39	27.28	54.00	-26.72	HORIZONTAL Average
8	2500.000	44.81	26.60	3.40	37.39	37.42	74.00	-36.58	HORIZONTAL Peak

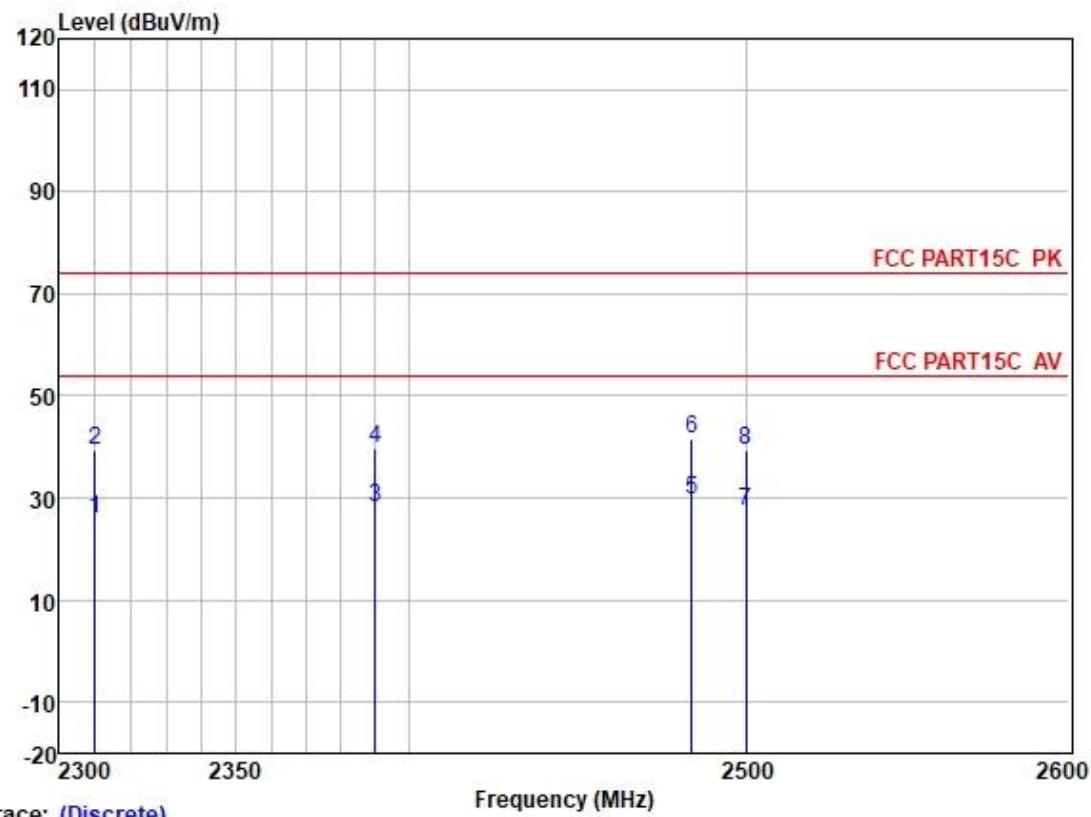
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Mode:a; Polarization:Vertical; Modulation:b; bandwidth:20MHz; Channel:High



Trace: (Discrete)

Freq	Read	Antenna	Cable	Preamp	Limit	Over	Limit	Pol/Phase	Remark
	Freq	Level	Factor	Loss					
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2310.000	33.72	26.25	3.32	37.44	25.85	54.00	-28.15	VERTICAL Average
2	2310.000	47.25	26.25	3.32	37.44	39.38	74.00	-34.62	VERTICAL Peak
3	2390.000	35.61	26.43	3.48	37.42	28.10	54.00	-25.90	VERTICAL Average
4	2390.000	47.12	26.43	3.48	37.42	39.61	74.00	-34.39	VERTICAL Peak
5	2483.500	37.01	26.58	3.53	37.40	29.72	54.00	-24.28	VERTICAL Average
6	2483.500	48.85	26.58	3.53	37.40	41.56	74.00	-32.44	VERTICAL Peak
7	2500.000	34.64	26.60	3.40	37.39	27.25	54.00	-26.75	VERTICAL Average
8	2500.000	46.64	26.60	3.40	37.39	39.25	74.00	-34.75	VERTICAL Peak

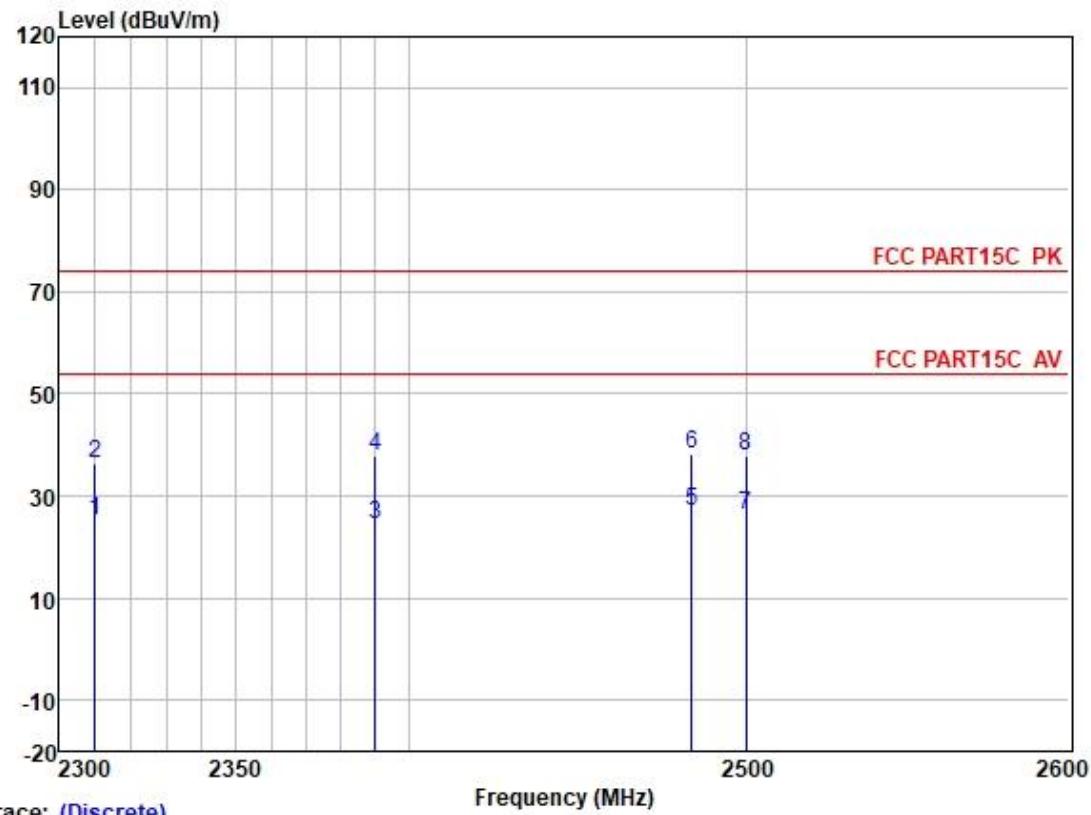
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Mode:a; Polarization:Horizontal; Modulation:g; bandwidth:20MHz; Channel:Low



Trace: (Discrete)

Freq	Read	Antenna	Cable	Preamp	Limit	Over	Limit	Pol/Phase	Remark
	Freq	Level	Factor	Loss					
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2310.000	32.88	26.25	3.32	37.44	25.01	54.00	-28.99	HORIZONTAL Average
2	2310.000	44.32	26.25	3.32	37.44	36.45	74.00	-37.55	HORIZONTAL Peak
3	2390.000	32.07	26.43	3.48	37.42	24.56	54.00	-29.44	HORIZONTAL Average
4	2390.000	45.20	26.43	3.48	37.42	37.69	74.00	-36.31	HORIZONTAL Peak
5	2483.500	34.37	26.58	3.53	37.40	27.08	54.00	-26.92	HORIZONTAL Average
6	2483.500	45.50	26.58	3.53	37.40	38.21	74.00	-35.79	HORIZONTAL Peak
7	2500.000	33.61	26.60	3.40	37.39	26.22	54.00	-27.78	HORIZONTAL Average
8	2500.000	45.37	26.60	3.40	37.39	37.98	74.00	-36.02	HORIZONTAL Peak

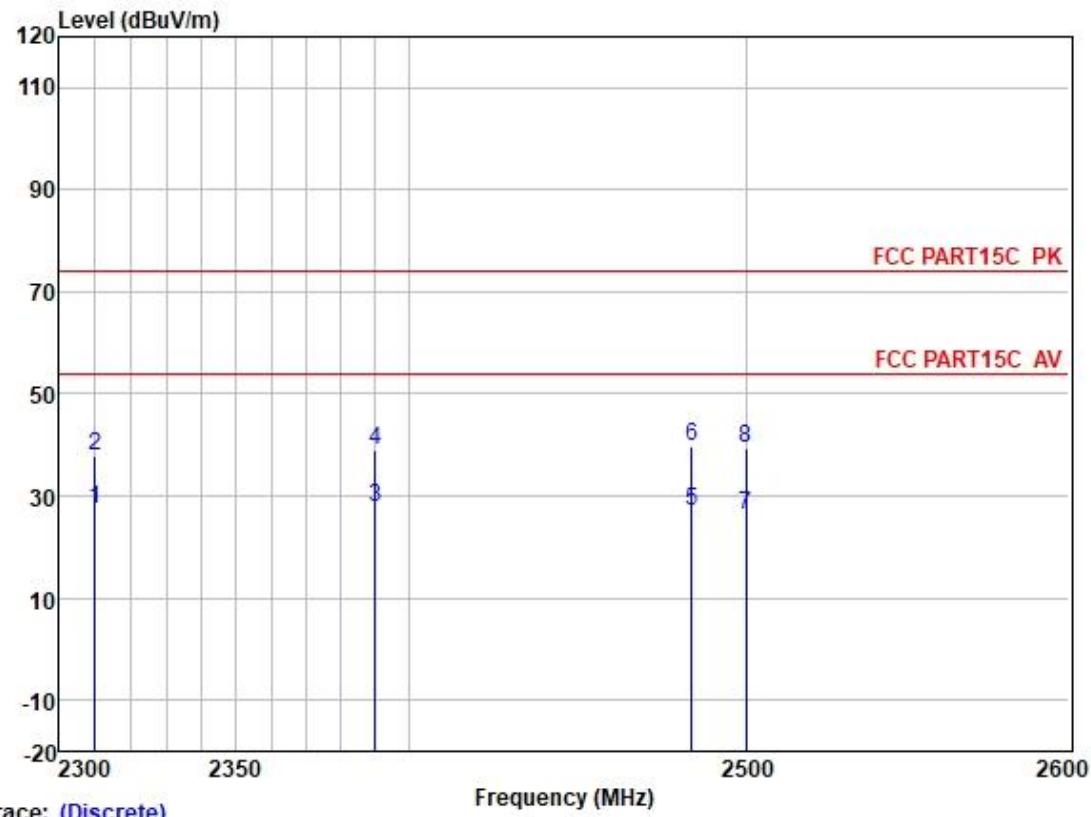
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Mode:a; Polarization:Vertical; Modulation:g; bandwidth:20MHz; Channel:Low



Trace: (Discrete)	ReadAntenna		Cable		Preamp	Limit	Over	Limit	Pol/Phase	Remark
	Freq	Level	Factor	Loss						
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2310.000	35.13	26.25	3.32	37.44	27.26	54.00	-26.74	VERTICAL	Average
2	2310.000	45.77	26.25	3.32	37.44	37.90	74.00	-36.10	VERTICAL	Peak
3	2390.000	35.16	26.43	3.48	37.42	27.65	54.00	-26.35	VERTICAL	Average
4	2390.000	46.37	26.43	3.48	37.42	38.86	74.00	-35.14	VERTICAL	Peak
5	2483.500	34.44	26.58	3.53	37.40	27.15	54.00	-26.85	VERTICAL	Average
6	2483.500	46.88	26.58	3.53	37.40	39.59	74.00	-34.41	VERTICAL	Peak
7	2500.000	33.68	26.60	3.40	37.39	26.29	54.00	-27.71	VERTICAL	Average
8	2500.000	46.67	26.60	3.40	37.39	39.28	74.00	-34.72	VERTICAL	Peak

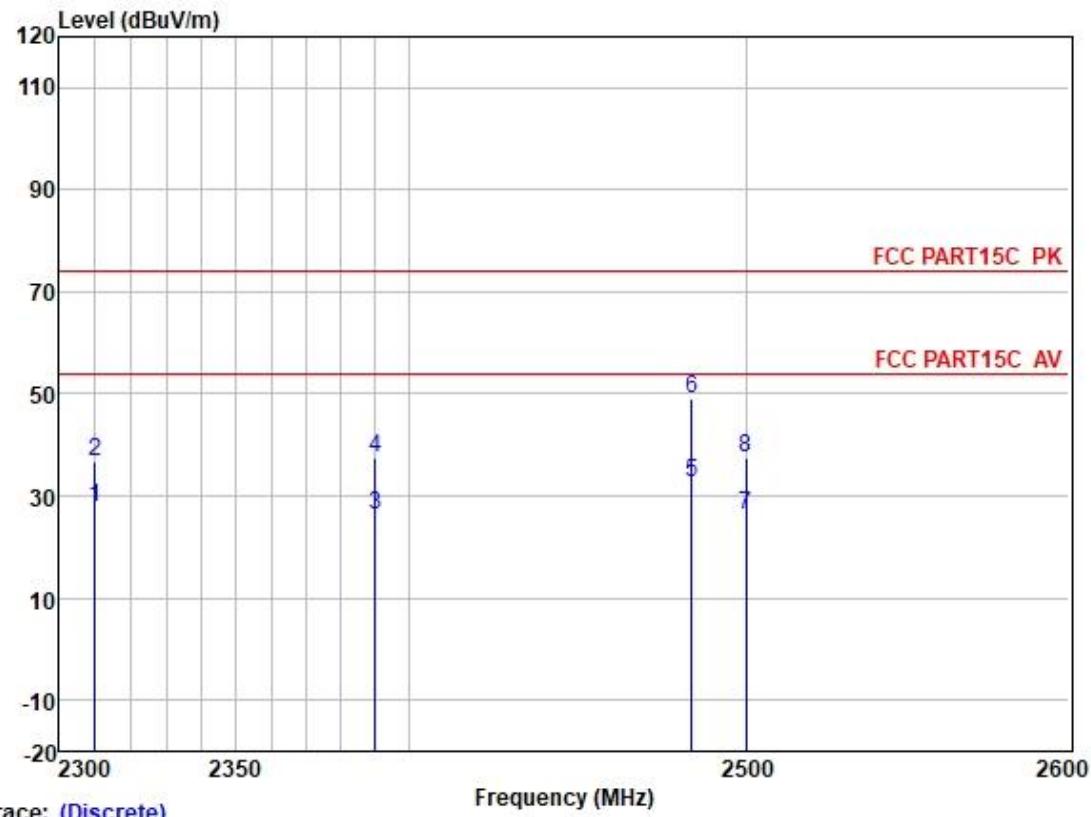
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Mode:a; Polarization:Horizontal; Modulation:g; bandwidth:20MHz; Channel:High



Trace: (Discrete)

Freq	Read	Antenna	Cable	Preamp	Limit	Over	Limit	Pol/Phase	Remark
	Freq	Level	Factor	Loss					
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2310.000	35.61	26.25	3.32	37.44	27.74	54.00	-26.26	HORIZONTAL Average
2	2310.000	44.48	26.25	3.32	37.44	36.61	74.00	-37.39	HORIZONTAL Peak
3	2390.000	33.72	26.43	3.48	37.42	26.21	54.00	-27.79	HORIZONTAL Average
4	2390.000	45.12	26.43	3.48	37.42	37.61	74.00	-36.39	HORIZONTAL Peak
5	2483.500	39.78	26.58	3.53	37.40	32.49	54.00	-21.51	HORIZONTAL Average
6	2483.500	56.53	26.58	3.53	37.40	49.24	74.00	-24.76	HORIZONTAL Peak
7	2500.000	33.54	26.60	3.40	37.39	26.15	54.00	-27.85	HORIZONTAL Average
8	2500.000	45.04	26.60	3.40	37.39	37.65	74.00	-36.35	HORIZONTAL Peak

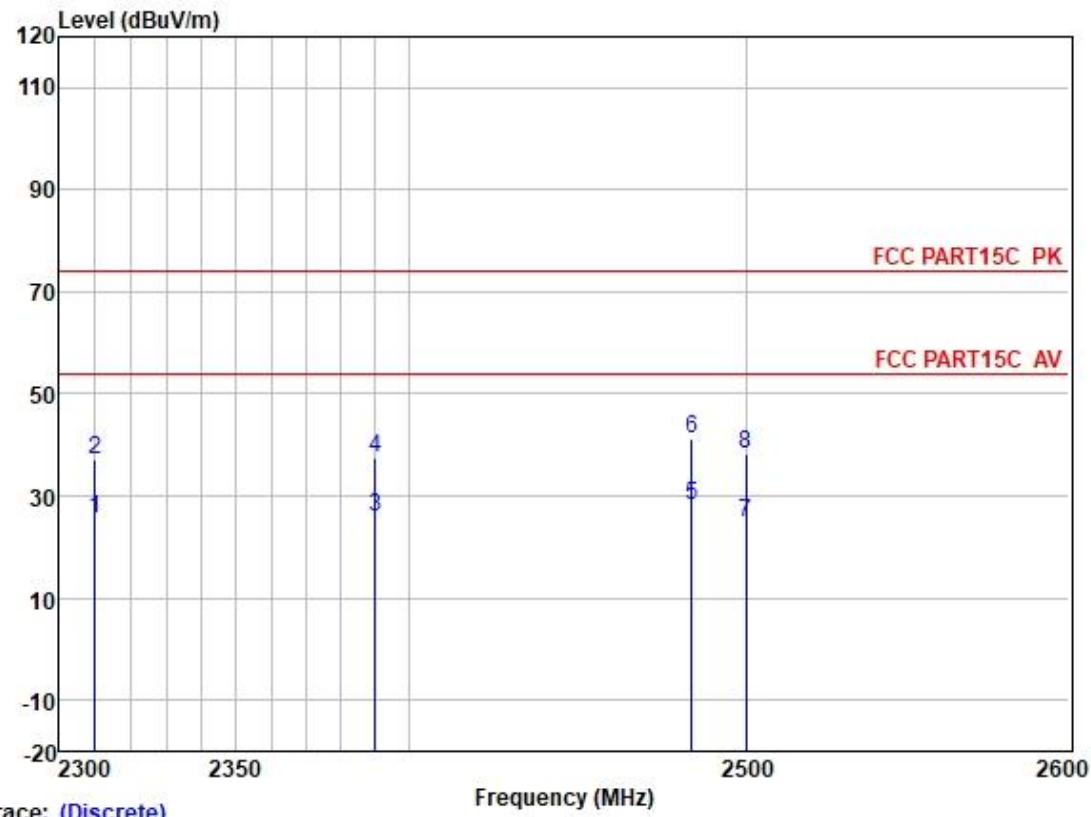
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Mode:a; Polarization:Vertical; Modulation:g; bandwidth:20MHz; Channel:High



Trace: (Discrete)	Freq	ReadAntenna		Cable		Preamp	Limit	Over	Limit	Over	Pol/Phase	Remark
		Level	Factor	Loss	Factor							
	MHz	dBuV	dB/m		dB	dBuV/m	dBuV/m					
1	2310.000	33.47	26.25	3.32	37.44	25.60	54.00	-28.40	VERTICAL	Average		
2	2310.000	45.05	26.25	3.32	37.44	37.18	74.00	-36.82	VERTICAL	Peak		
3	2390.000	33.58	26.43	3.48	37.42	26.07	54.00	-27.93	VERTICAL	Average		
4	2390.000	44.92	26.43	3.48	37.42	37.41	74.00	-36.59	VERTICAL	Peak		
5	2483.500	35.59	26.58	3.53	37.40	28.30	54.00	-25.70	VERTICAL	Average		
6	2483.500	48.62	26.58	3.53	37.40	41.33	74.00	-32.67	VERTICAL	Peak		
7	2500.000	32.02	26.60	3.40	37.39	24.63	54.00	-29.37	VERTICAL	Average		
8	2500.000	45.50	26.60	3.40	37.39	38.11	74.00	-35.89	VERTICAL	Peak		

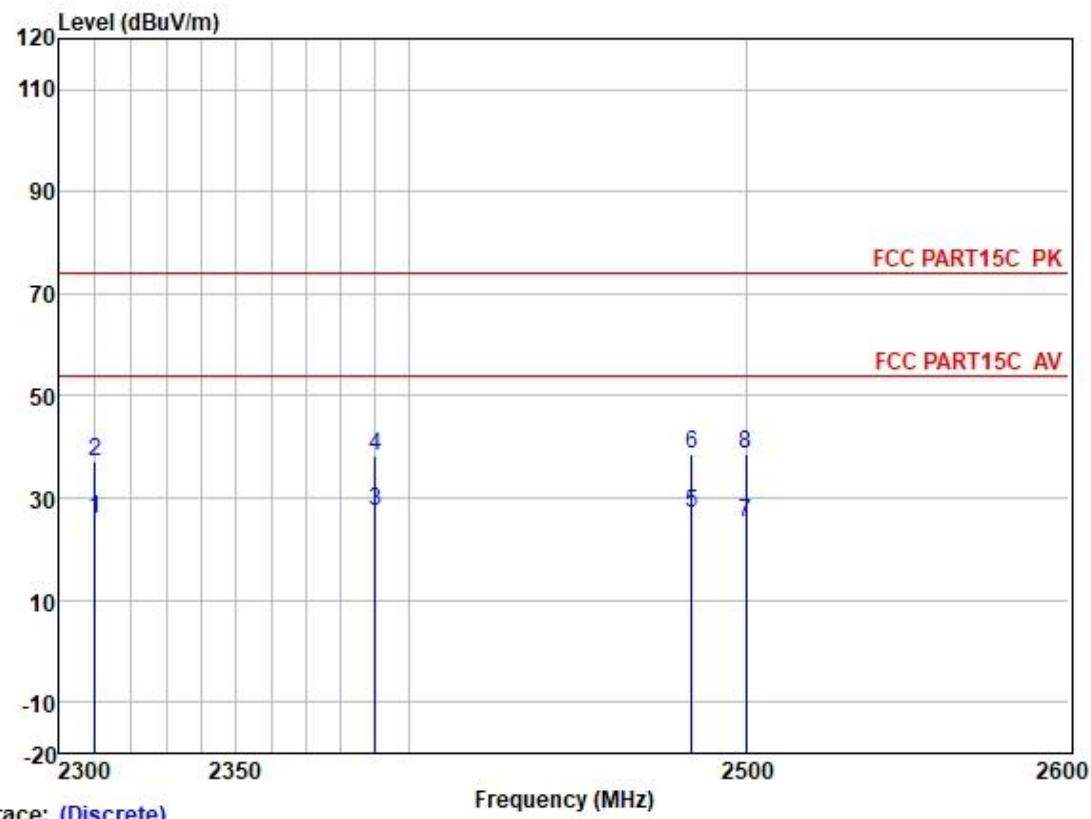
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Mode:a; Polarization:Horizontal; Modulation:n; bandwidth:20MHz; Channel:Low



Trace: (Discrete)

Freq	Read	Antenna	Cable	Preamp	Limit	Over	Limit	Pol/Phase	Remark
	Freq	Level	Factor	Loss					
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2310.000	33.66	26.25	3.32	37.44	25.79	54.00	-28.21	HORIZONTAL Average
2	2310.000	44.87	26.25	3.32	37.44	37.00	74.00	-37.00	HORIZONTAL Peak
3	2390.000	35.01	26.43	3.48	37.42	27.50	54.00	-26.50	HORIZONTAL Average
4	2390.000	45.62	26.43	3.48	37.42	38.11	74.00	-35.89	HORIZONTAL Peak
5	2483.500	34.48	26.58	3.53	37.40	27.19	54.00	-26.81	HORIZONTAL Average
6	2483.500	46.08	26.58	3.53	37.40	38.79	74.00	-35.21	HORIZONTAL Peak
7	2500.000	32.64	26.60	3.40	37.39	25.25	54.00	-28.75	HORIZONTAL Average
8	2500.000	46.05	26.60	3.40	37.39	38.66	74.00	-35.34	HORIZONTAL Peak

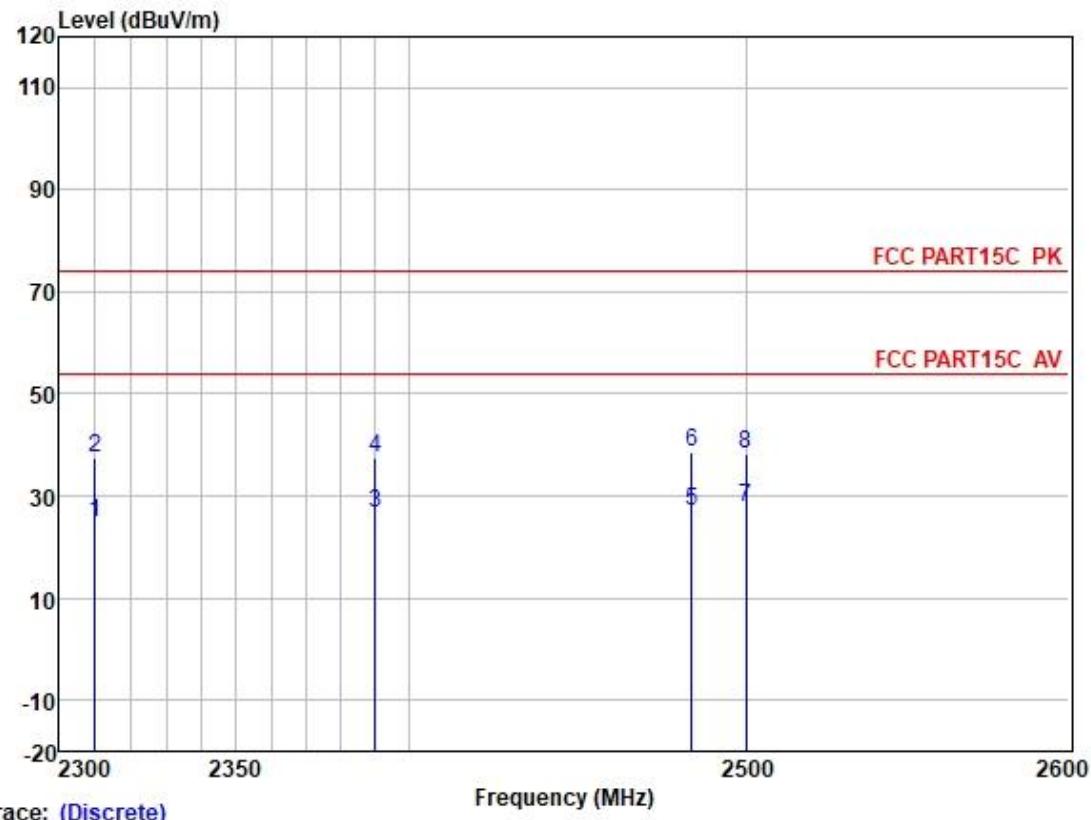
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Mode:a; Polarization:Vertical; Modulation:n; bandwidth:20MHz; Channel:Low



Trace: (Discrete)	Freq	ReadAntenna		Cable		Preamp	Limit	Over	Limit	Pol/Phase	Remark
		Level	Factor	Loss	Factor						
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB			
1	2310.000	32.64	26.25	3.32	37.44	24.77	54.00	-29.23	VERTICAL	Average	
2	2310.000	45.26	26.25	3.32	37.44	37.39	74.00	-36.61	VERTICAL	Peak	
3	2390.000	34.26	26.43	3.48	37.42	26.75	54.00	-27.25	VERTICAL	Average	
4	2390.000	44.94	26.43	3.48	37.42	37.43	74.00	-36.57	VERTICAL	Peak	
5	2483.500	34.46	26.58	3.53	37.40	27.17	54.00	-26.83	VERTICAL	Average	
6	2483.500	45.82	26.58	3.53	37.40	38.53	74.00	-35.47	VERTICAL	Peak	
7	2500.000	35.14	26.60	3.40	37.39	27.75	54.00	-26.25	VERTICAL	Average	
8	2500.000	45.45	26.60	3.40	37.39	38.06	74.00	-35.94	VERTICAL	Peak	

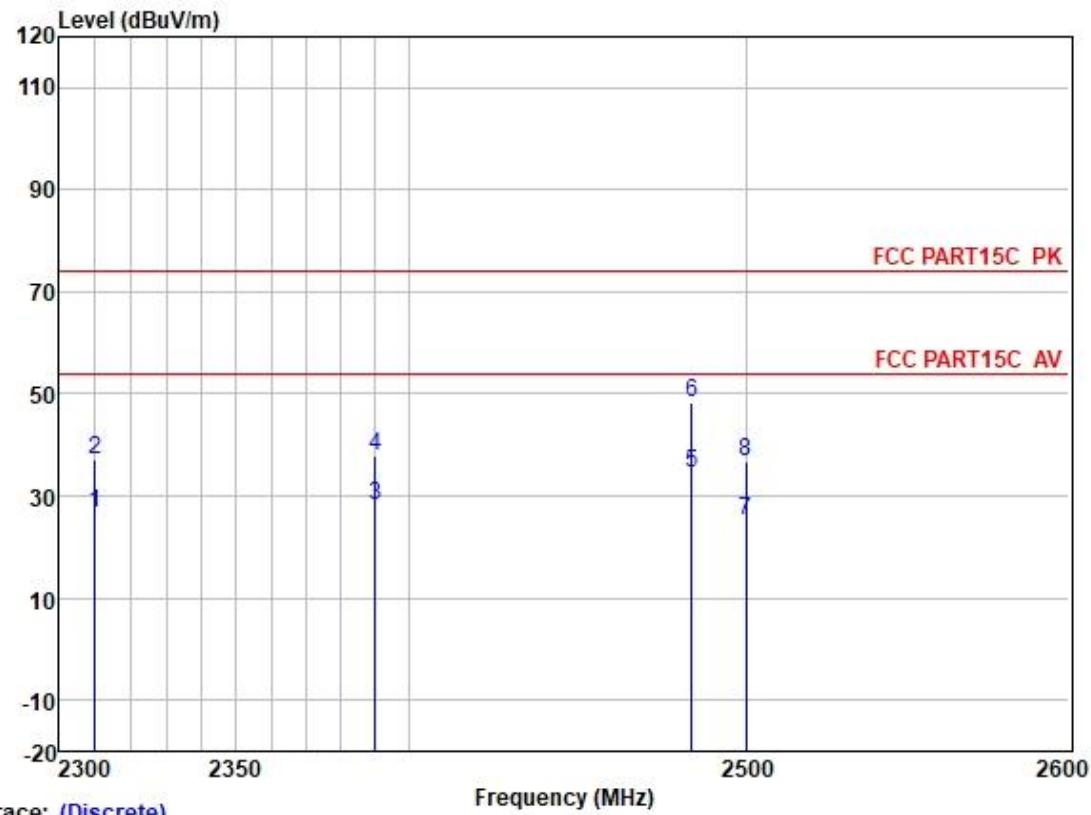
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Mode:a; Polarization:Horizontal; Modulation:n; bandwidth:20MHz; Channel:High



Trace: (Discrete)

Freq	Read	Antenna	Cable	Preamp	Limit	Over	Limit	Pol/Phase	Remark
	Freq	Level	Factor	Loss					
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2310.000	34.42	26.25	3.32	37.44	26.55	54.00	-27.45	HORIZONTAL Average
2	2310.000	44.91	26.25	3.32	37.44	37.04	74.00	-36.96	HORIZONTAL Peak
3	2390.000	35.86	26.43	3.48	37.42	28.35	54.00	-25.65	HORIZONTAL Average
4	2390.000	45.49	26.43	3.48	37.42	37.98	74.00	-36.02	HORIZONTAL Peak
5	2483.500	41.87	26.58	3.53	37.40	34.58	54.00	-19.42	HORIZONTAL Average
6	2483.500	55.52	26.58	3.53	37.40	48.23	74.00	-25.77	HORIZONTAL Peak
7	2500.000	32.72	26.60	3.40	37.39	25.33	54.00	-28.67	HORIZONTAL Average
8	2500.000	44.31	26.60	3.40	37.39	36.92	74.00	-37.08	HORIZONTAL Peak

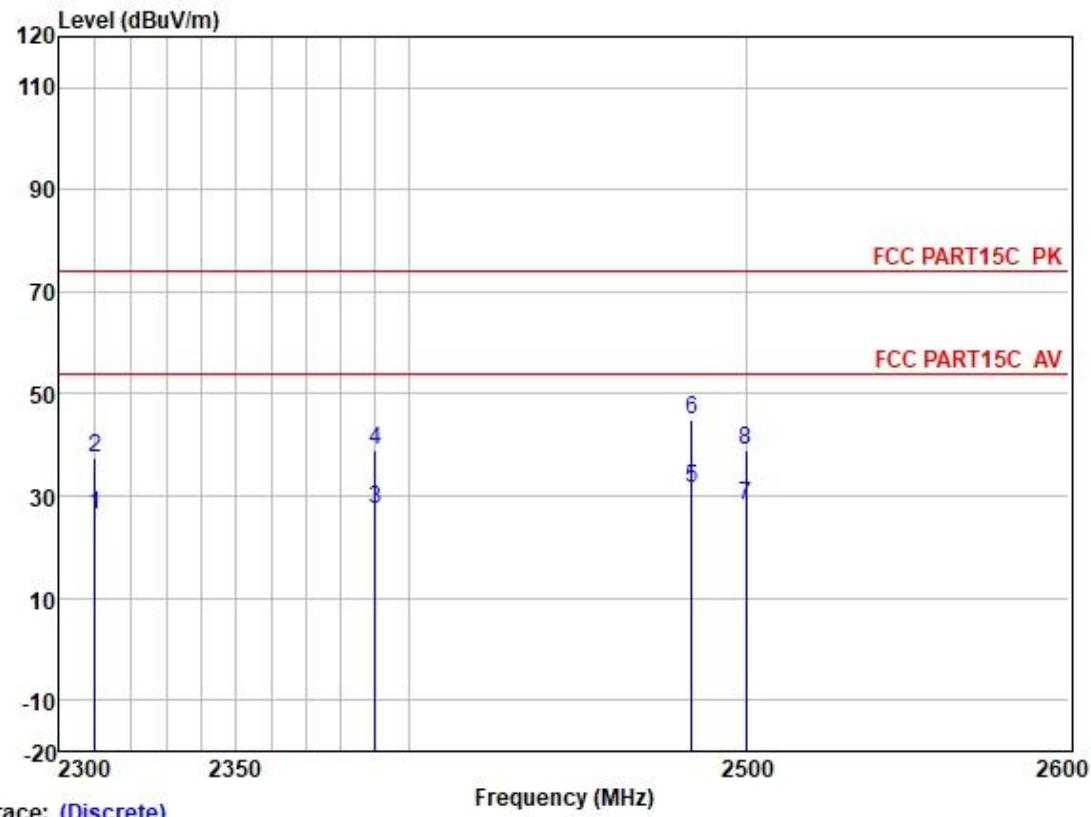
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Mode:a; Polarization:Vertical; Modulation:n; bandwidth:20MHz; Channel:High



Trace: (Discrete)	Freq	ReadAntenna		Cable		Preamp	Limit	Over	Limit	Pol/Phase	Remark
		Level	Factor	Loss	Factor						
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB			
1	2310.000	34.23	26.25	3.32	37.44	26.36	54.00	-27.64	VERTICAL	Average	
2	2310.000	45.20	26.25	3.32	37.44	37.33	74.00	-36.67	VERTICAL	Peak	
3	2390.000	34.89	26.43	3.48	37.42	27.38	54.00	-26.62	VERTICAL	Average	
4	2390.000	46.51	26.43	3.48	37.42	39.00	74.00	-35.00	VERTICAL	Peak	
5	2483.500	38.81	26.58	3.53	37.40	31.52	54.00	-22.48	VERTICAL	Average	
6	2483.500	52.38	26.58	3.53	37.40	45.09	74.00	-28.91	VERTICAL	Peak	
7	2500.000	35.57	26.60	3.40	37.39	28.18	54.00	-25.82	VERTICAL	Average	
8	2500.000	46.21	26.60	3.40	37.39	38.82	74.00	-35.18	VERTICAL	Peak	

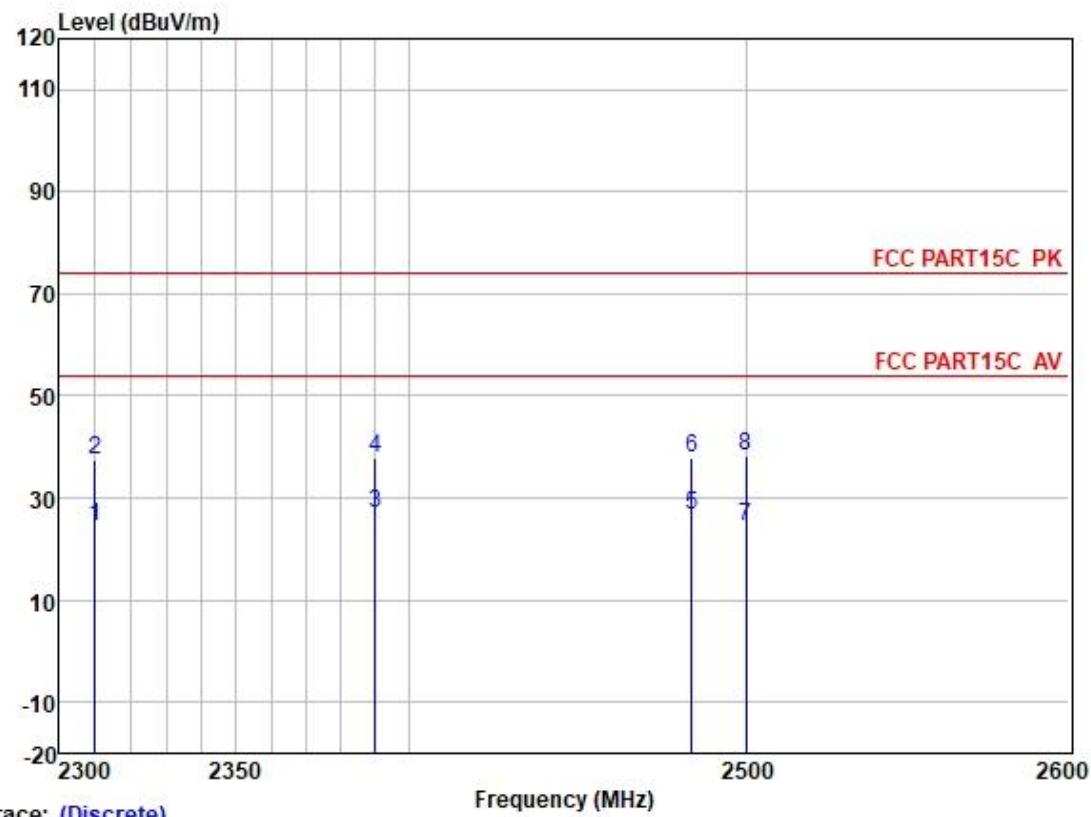
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Mode:a; Polarization:Horizontal; Modulation:n; bandwidth:40MHz; Channel:Low



Trace: (Discrete)

Freq	Read	Antenna	Cable	Preamp	Limit	Over	Limit	Pol/Phase	Remark
	Freq	Level	Factor	Loss					
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2310.000	32.37	26.25	3.32	37.44	24.50	54.00	-29.50	HORIZONTAL Average
2	2310.000	45.36	26.25	3.32	37.44	37.49	74.00	-36.51	HORIZONTAL Peak
3	2390.000	34.64	26.43	3.48	37.42	27.13	54.00	-26.87	HORIZONTAL Average
4	2390.000	45.25	26.43	3.48	37.42	37.74	74.00	-36.26	HORIZONTAL Peak
5	2483.500	33.96	26.58	3.53	37.40	26.67	54.00	-27.33	HORIZONTAL Average
6	2483.500	45.11	26.58	3.53	37.40	37.82	74.00	-36.18	HORIZONTAL Peak
7	2500.000	31.86	26.60	3.40	37.39	24.47	54.00	-29.53	HORIZONTAL Average
8	2500.000	45.79	26.60	3.40	37.39	38.40	74.00	-35.60	HORIZONTAL Peak

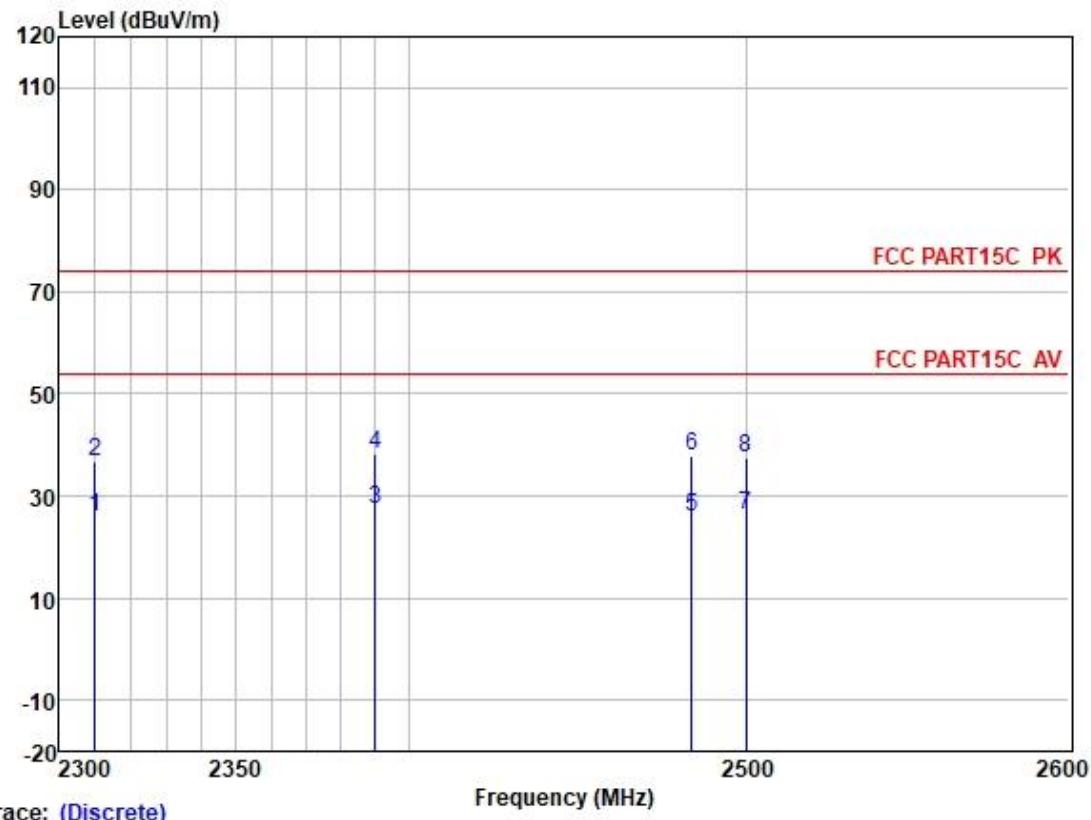
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Mode:a; Polarization:Vertical; Modulation:n; bandwidth:40MHz; Channel:Low



Trace: (Discrete)	Freq	Read	Antenna	Cable	Preamp	Limit	Over	Limit	Pol/Phase	Remark
		Level	Factor	Loss	Factor					
	MHz	dBuV	dB/m		dB	dBuV/m	dBuV/m			
1	2310.000	33.62	26.25	3.32	37.44	25.75	54.00	-28.25	VERTICAL	Average
2	2310.000	44.58	26.25	3.32	37.44	36.71	74.00	-37.29	VERTICAL	Peak
3	2390.000	34.85	26.43	3.48	37.42	27.34	54.00	-26.66	VERTICAL	Average
4	2390.000	45.86	26.43	3.48	37.42	38.35	74.00	-35.65	VERTICAL	Peak
5	2483.500	33.38	26.58	3.53	37.40	26.09	54.00	-27.91	VERTICAL	Average
6	2483.500	45.26	26.58	3.53	37.40	37.97	74.00	-36.03	VERTICAL	Peak
7	2500.000	33.67	26.60	3.40	37.39	26.28	54.00	-27.72	VERTICAL	Average
8	2500.000	44.79	26.60	3.40	37.39	37.40	74.00	-36.60	VERTICAL	Peak

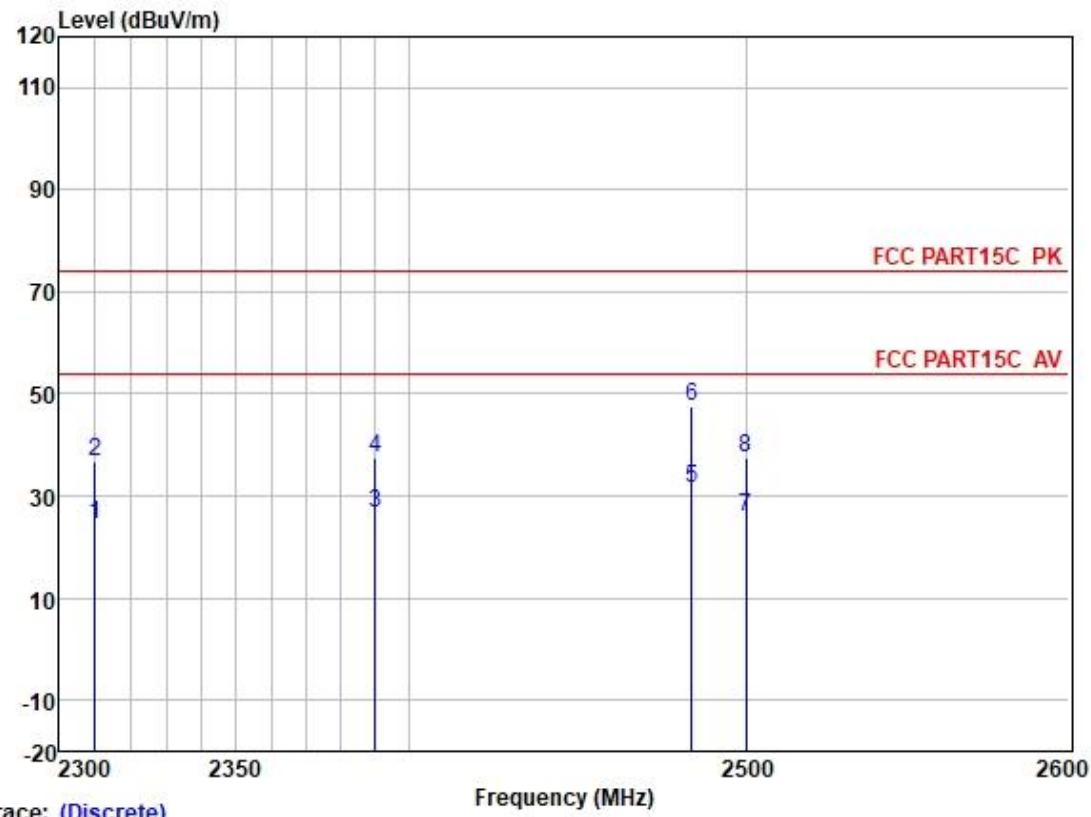
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Mode:a; Polarization:Horizontal; Modulation:n; bandwidth:40MHz; Channel:High



Trace: (Discrete)

Freq	Read	Antenna	Cable	Preamp	Limit	Over	Limit	Pol/Phase	Remark
	Freq	Level	Factor	Loss					
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2310.000	32.46	26.25	3.32	37.44	24.59	54.00	-29.41	HORIZONTAL Average
2	2310.000	44.70	26.25	3.32	37.44	36.83	74.00	-37.17	HORIZONTAL Peak
3	2390.000	34.02	26.43	3.48	37.42	26.51	54.00	-27.49	HORIZONTAL Average
4	2390.000	44.89	26.43	3.48	37.42	37.38	74.00	-36.62	HORIZONTAL Peak
5	2483.500	38.70	26.58	3.53	37.40	31.41	54.00	-22.59	HORIZONTAL Average
6	2483.500	54.99	26.58	3.53	37.40	47.70	74.00	-26.30	HORIZONTAL Peak
7	2500.000	33.27	26.60	3.40	37.39	25.88	54.00	-28.12	HORIZONTAL Average
8	2500.000	45.01	26.60	3.40	37.39	37.62	74.00	-36.38	HORIZONTAL Peak

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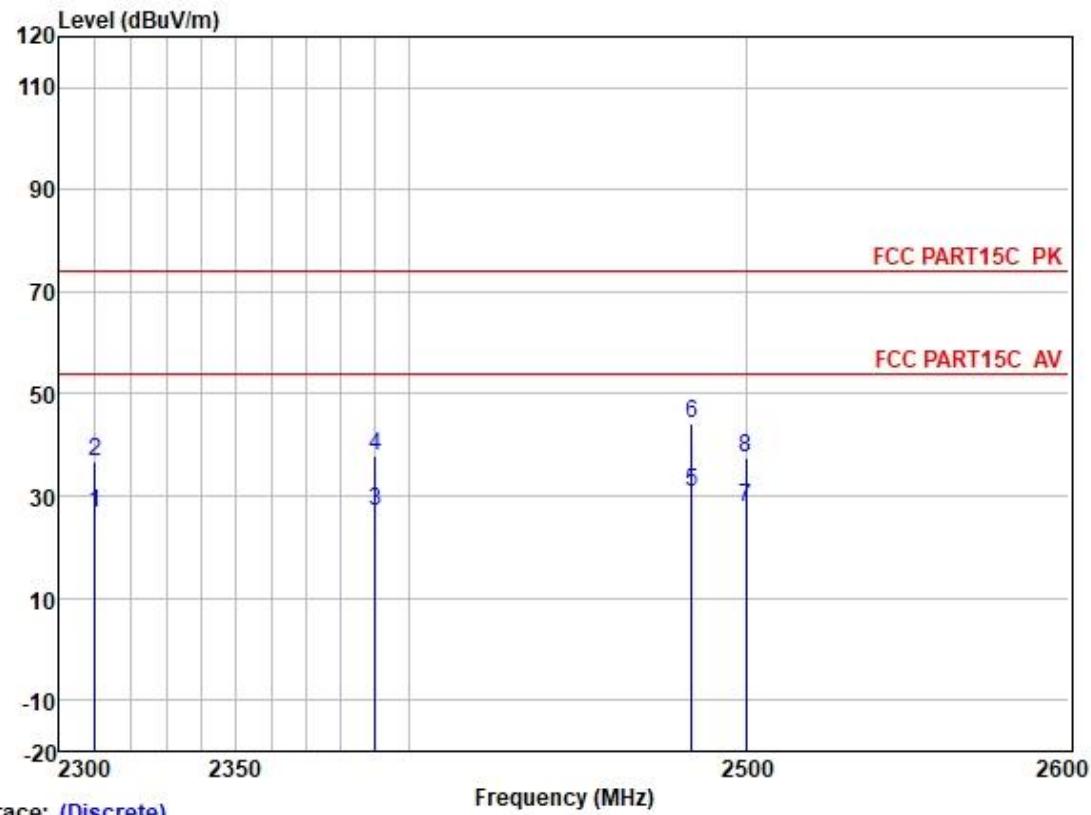
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Mode:a; Polarization:Vertical; Modulation:n; bandwidth:40MHz; Channel:High



Trace: (Discrete)

Freq	Read	Antenna	Cable	Preamp	Limit	Over	Limit	Pol/Phase	Remark
	Freq	Level	Factor	Loss					
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2310.000	34.43	26.25	3.32	37.44	26.56	54.00	-27.44	VERTICAL Average
2	2310.000	44.69	26.25	3.32	37.44	36.82	74.00	-37.18	VERTICAL Peak
3	2390.000	34.62	26.43	3.48	37.42	27.11	54.00	-26.89	VERTICAL Average
4	2390.000	45.44	26.43	3.48	37.42	37.93	74.00	-36.07	VERTICAL Peak
5	2483.500	38.14	26.58	3.53	37.40	30.85	54.00	-23.15	VERTICAL Average
6	2483.500	51.61	26.58	3.53	37.40	44.32	74.00	-29.68	VERTICAL Peak
7	2500.000	35.21	26.60	3.40	37.39	27.82	54.00	-26.18	VERTICAL Average
8	2500.000	45.04	26.60	3.40	37.39	37.65	74.00	-36.35	VERTICAL Peak

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7.7 Radiated Spurious Emissions

Test Requirement 47 CFR Part 15, Subpart C 15.209 & 15.247(d)

Test Method: ANSI C63.10 (2013) Section 6.4,6.5,6.6

Measurement Distance: 3m

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.



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7.7.1 E.U.T. Operation

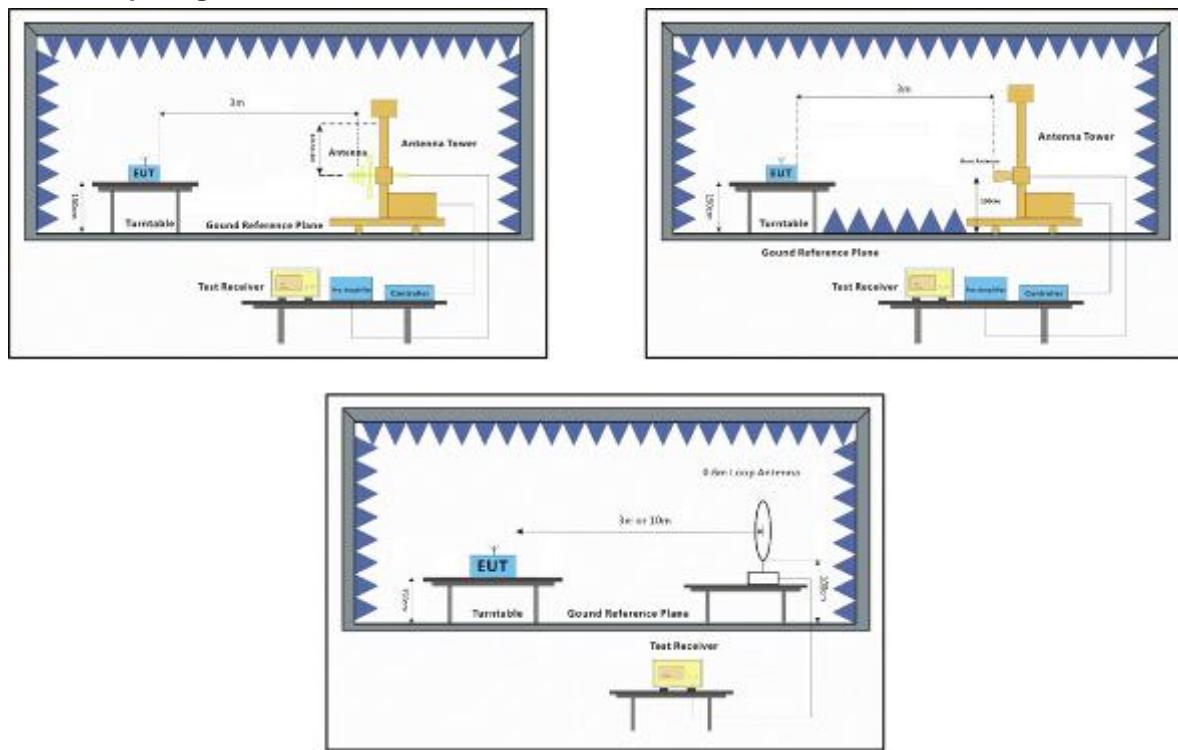
Operating Environment:

Temperature: 23.6 °C Humidity: 52.4 % RH Atmospheric Pressure: 1020 mbar

Test mode

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

7.7.2 Test Setup Diagram



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7.7.3 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) For emission below 1GHz, through pre-scan found the worst case is the lowest channel for of IEEE 802.11b. Only the worst case is recorded in the report.

2) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level =Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor

3) Scan from 9kHz to 25GHz, the disturbance above 18GHz and 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.

4) 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



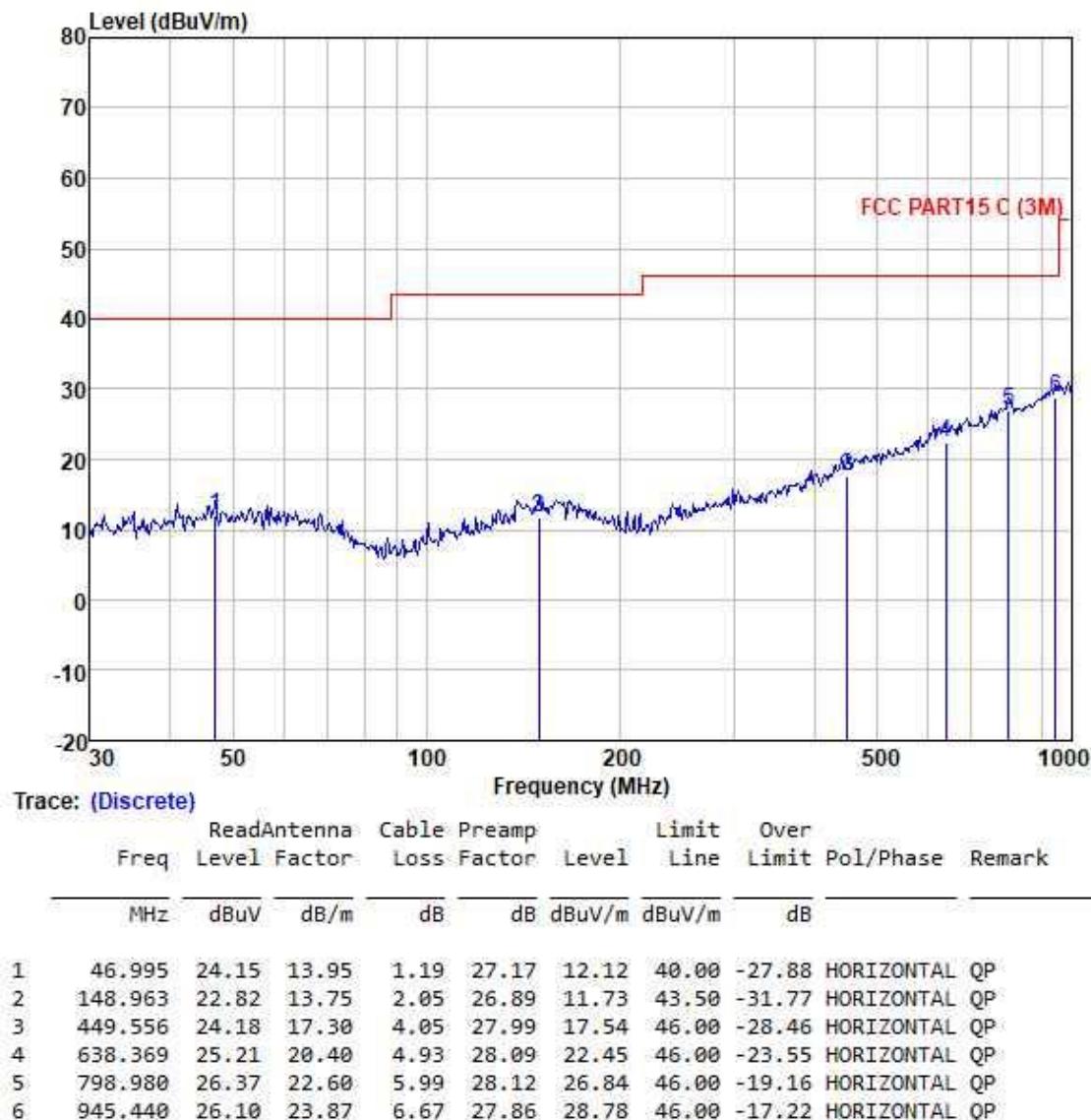
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Mode:a; Polarization:Horizontal; Modulation:b; bandwidth:20MHz; Channel:Low



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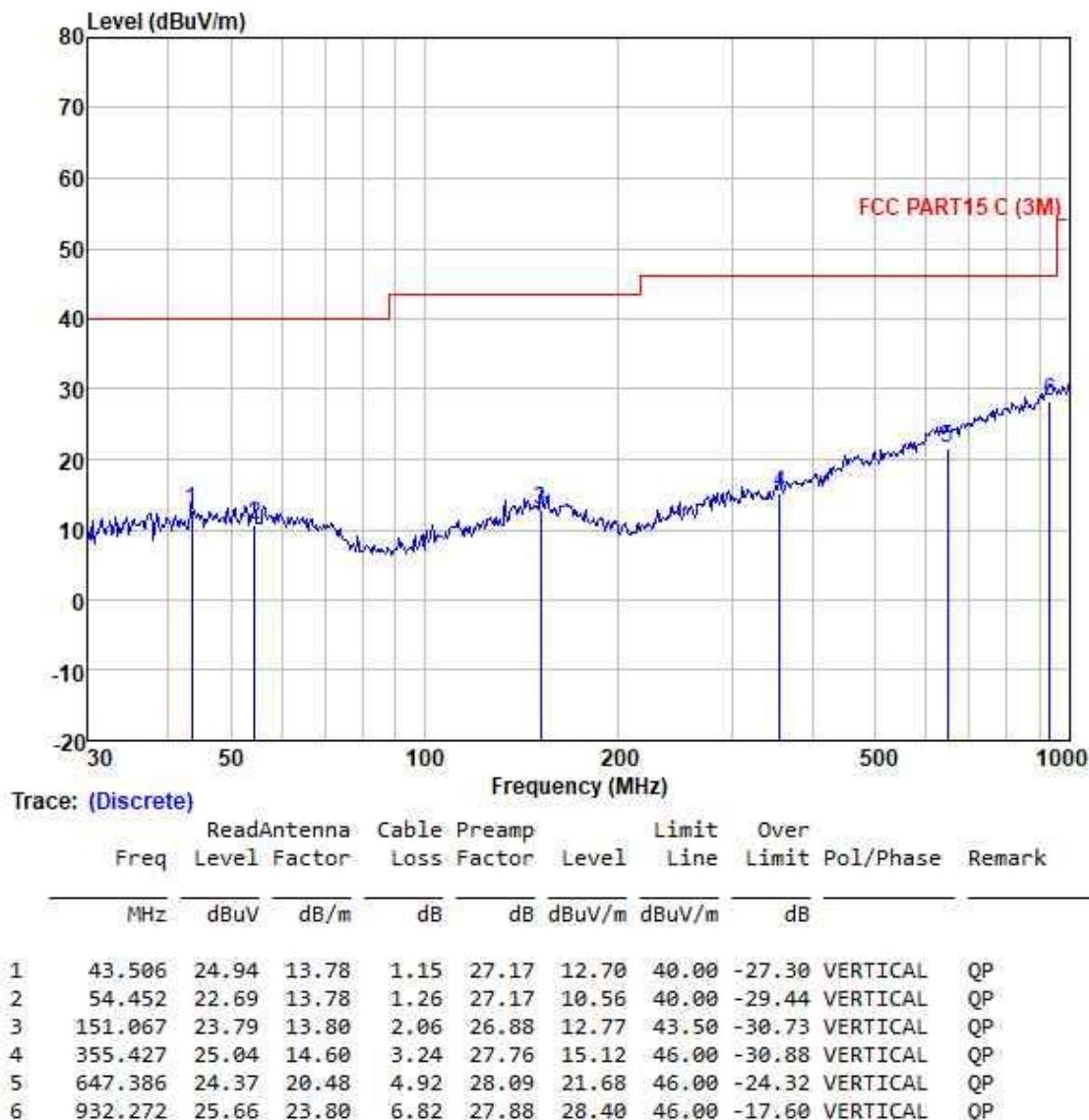
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Mode:a; Polarization:Vertical; Modulation:b; bandwidth:20MHz; Channel:Low



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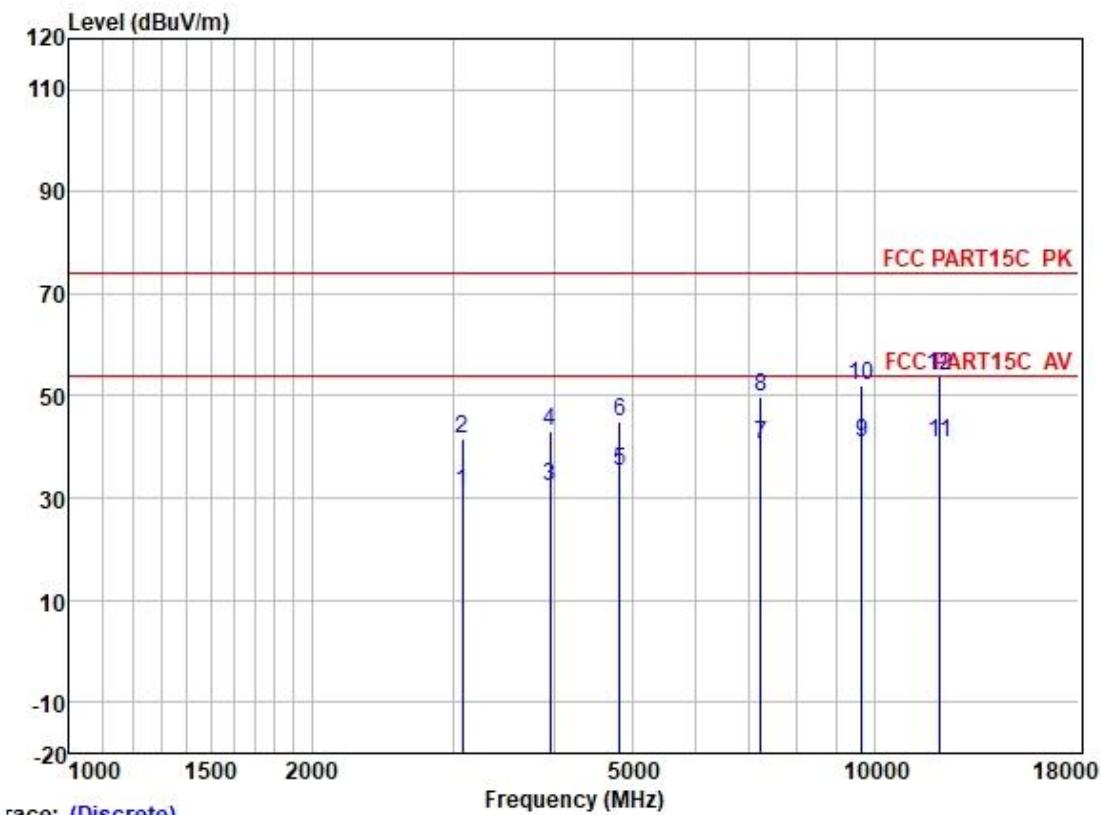
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Mode:a; Polarization:Horizontal; Modulation:b; bandwidth:20MHz; Channel:Low



Index	Freq	ReadAntenna		Cable		Preamp	Limit	Over	Limit Pol/Phase	Remark
		Level	Factor	Loss	Factor					
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	3078.229	36.24	27.90	3.88	37.04	30.98	54.00	-23.02	HORIZONTAL	Average
2	3078.229	46.70	27.90	3.88	37.04	41.44	74.00	-32.56	HORIZONTAL	Peak
3	3958.309	35.21	29.42	4.60	36.90	32.33	54.00	-21.67	HORIZONTAL	Average
4	3958.309	45.89	29.42	4.60	36.90	43.01	74.00	-30.99	HORIZONTAL	Peak
5	4824.948	35.89	30.82	5.42	36.94	35.19	54.00	-18.81	HORIZONTAL	Average
6	4824.948	45.69	30.82	5.42	36.94	44.99	74.00	-29.01	HORIZONTAL	Peak
7	7236.741	35.76	35.55	6.03	36.93	40.41	54.00	-13.59	HORIZONTAL	Average
8	7236.741	45.17	35.55	6.03	36.93	49.82	74.00	-24.18	HORIZONTAL	Peak
9	9648.149	33.17	37.54	7.06	37.08	40.69	54.00	-13.31	HORIZONTAL	Average
10	9648.149	44.50	37.54	7.06	37.08	52.02	74.00	-21.98	HORIZONTAL	Peak
11	12060.130	30.28	39.46	8.17	37.17	40.74	54.00	-13.26	HORIZONTAL	Average
12	12060.130	43.64	39.46	8.17	37.17	54.10	74.00	-19.90	HORIZONTAL	Peak

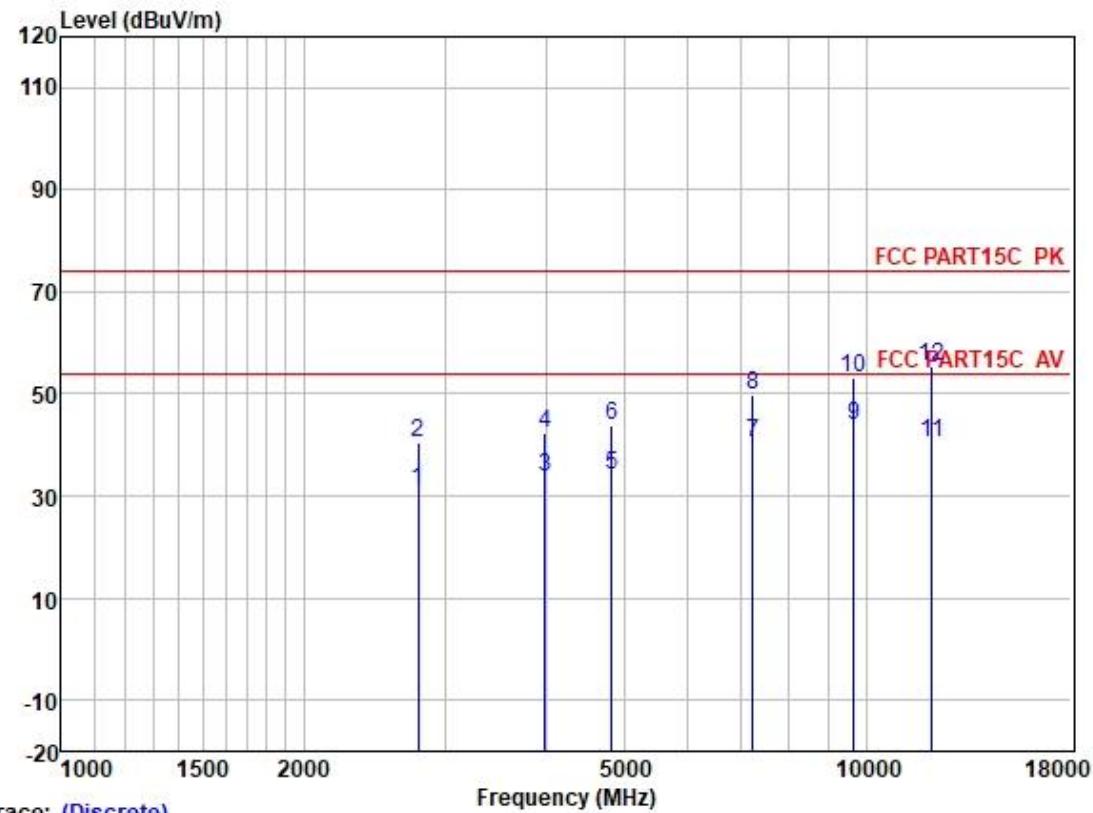
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Mode:a; Polarization:Vertical; Modulation:b; bandwidth:20MHz; Channel:Low



Race: (Discrete)	Freq	Read	Antenna	Cable	Preamp	Limit	Over	Limit	Pol/Phase	Remark
		Level	Factor	Loss	Factor					
	MHz	dBuV	dB/m		dB	dBuV/m	dBuV/m			
1	2774.030	37.28	27.43	3.68	37.26	31.13	54.00	-22.87	VERTICAL	Average
2	2774.030	46.56	27.43	3.68	37.26	40.41	74.00	-33.59	VERTICAL	Peak
3	3992.781	36.42	29.48	4.60	36.90	33.60	54.00	-20.40	VERTICAL	Average
4	3992.781	45.35	29.48	4.60	36.90	42.53	74.00	-31.47	VERTICAL	Peak
5	4824.419	34.79	30.82	5.42	36.94	34.09	54.00	-19.91	VERTICAL	Average
6	4824.419	44.57	30.82	5.42	36.94	43.87	74.00	-30.13	VERTICAL	Peak
7	7236.006	35.81	35.55	6.03	36.93	40.46	54.00	-13.54	VERTICAL	Average
8	7236.006	44.99	35.55	6.03	36.93	49.64	74.00	-24.36	VERTICAL	Peak
9	9648.497	36.42	37.54	7.06	37.08	43.94	54.00	-10.06	VERTICAL	Average
10	9648.497	45.55	37.54	7.06	37.08	53.07	74.00	-20.93	VERTICAL	Peak
11	12060.560	30.02	39.46	8.17	37.17	40.48	54.00	-13.52	VERTICAL	Average
12	12060.560	44.96	39.46	8.17	37.17	55.42	74.00	-18.58	VERTICAL	Peak

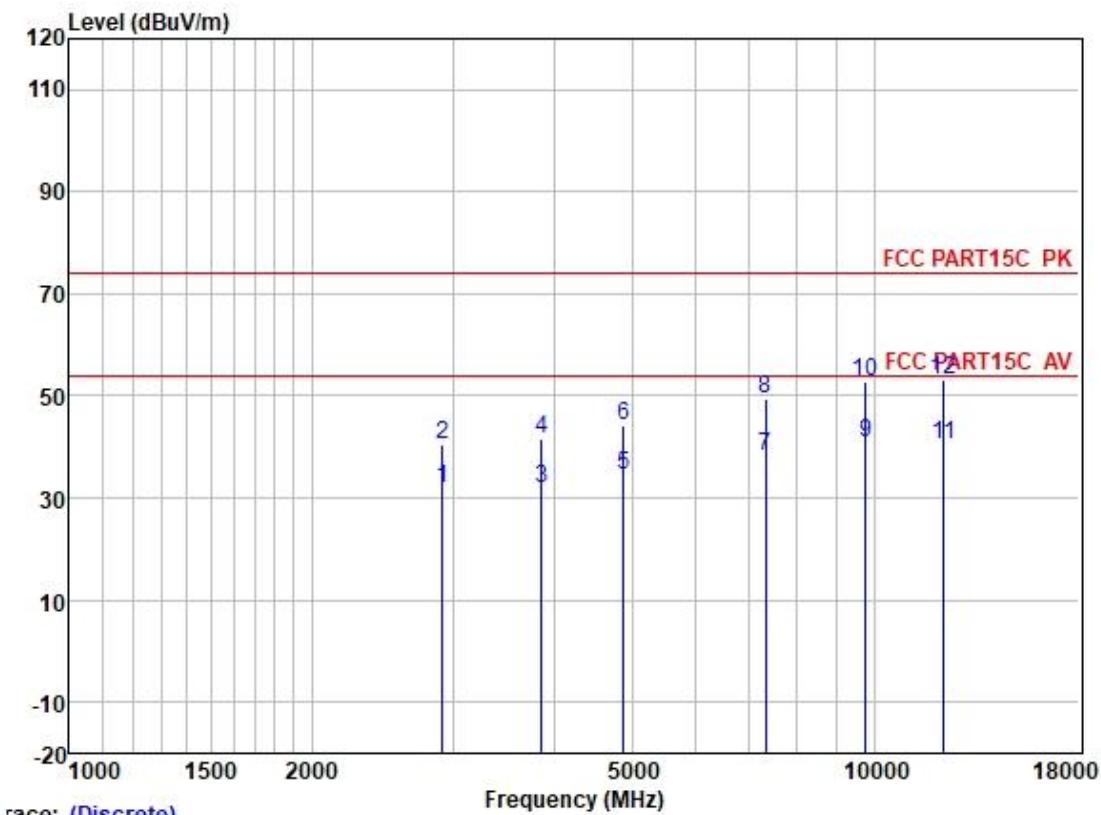
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Mode:a; Polarization:Horizontal; Modulation:b; bandwidth:20MHz; Channel:middle



Race: (Discrete)	Freq	Read	Antenna	Cable	Preamp	Limit	Over	Limit	Pol/Phase	Remark
		Level	Factor	Loss	Level					
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2905.331	37.40	27.76	3.71	37.13	31.74	54.00	-22.26	HORIZONTAL	Average
2	2905.331	46.29	27.76	3.71	37.13	40.63	74.00	-33.37	HORIZONTAL	Peak
3	3856.668	34.84	29.19	4.60	36.91	31.72	54.00	-22.28	HORIZONTAL	Average
4	3856.668	44.76	29.19	4.60	36.91	41.64	74.00	-32.36	HORIZONTAL	Peak
5	4884.490	34.97	30.95	5.52	36.95	34.49	54.00	-19.51	HORIZONTAL	Average
6	4884.490	44.84	30.95	5.52	36.95	44.36	74.00	-29.64	HORIZONTAL	Peak
7	7326.015	33.15	35.74	6.13	36.92	38.10	54.00	-15.90	HORIZONTAL	Average
8	7326.015	44.48	35.74	6.13	36.92	49.43	74.00	-24.57	HORIZONTAL	Peak
9	9768.432	33.29	37.74	7.01	37.09	40.95	54.00	-13.05	HORIZONTAL	Average
10	9768.432	45.04	37.74	7.01	37.09	52.70	74.00	-21.30	HORIZONTAL	Peak
11	12210.130	30.29	39.21	8.08	37.06	40.52	54.00	-13.48	HORIZONTAL	Average
12	12210.130	42.80	39.21	8.08	37.06	53.03	74.00	-20.97	HORIZONTAL	Peak

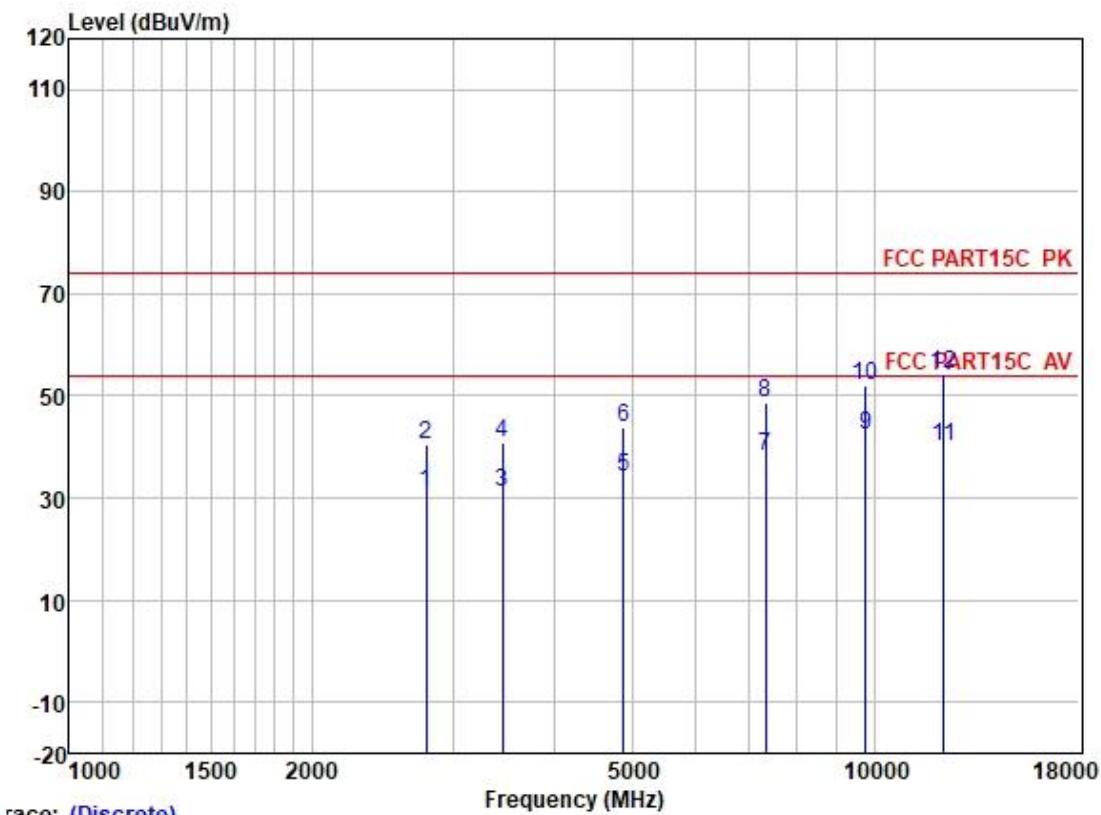
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Mode:a; Polarization:Vertical; Modulation:b; bandwidth:20MHz; Channel:middle



Index: (Discrete)	Freq	Read	Antenna	Cable	Preamp	Limit	Over	Pol/Phase	Remark
		Level	Factor	Loss	Level	Line	Limit		
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2774.030	37.14	27.43	3.68	37.26	30.99	54.00	-23.01	VERTICAL Average
2	2774.030	46.69	27.43	3.68	37.26	40.54	74.00	-33.46	VERTICAL Peak
3	3455.508	35.89	27.90	4.20	36.96	31.03	54.00	-22.97	VERTICAL Average
4	3455.508	45.88	27.90	4.20	36.96	41.02	74.00	-32.98	VERTICAL Peak
5	4884.396	34.74	30.95	5.52	36.95	34.26	54.00	-19.74	VERTICAL Average
6	4884.396	44.49	30.95	5.52	36.95	44.01	74.00	-29.99	VERTICAL Peak
7	7326.052	33.29	35.74	6.13	36.92	38.24	54.00	-15.76	VERTICAL Average
8	7326.052	43.87	35.74	6.13	36.92	48.82	74.00	-25.18	VERTICAL Peak
9	9768.151	34.76	37.74	7.01	37.09	42.42	54.00	-11.58	VERTICAL Average
10	9768.151	44.51	37.74	7.01	37.09	52.17	74.00	-21.83	VERTICAL Peak
11	12210.390	30.06	39.21	8.08	37.06	40.29	54.00	-13.71	VERTICAL Average
12	12210.390	44.01	39.21	8.08	37.06	54.24	74.00	-19.76	VERTICAL Peak

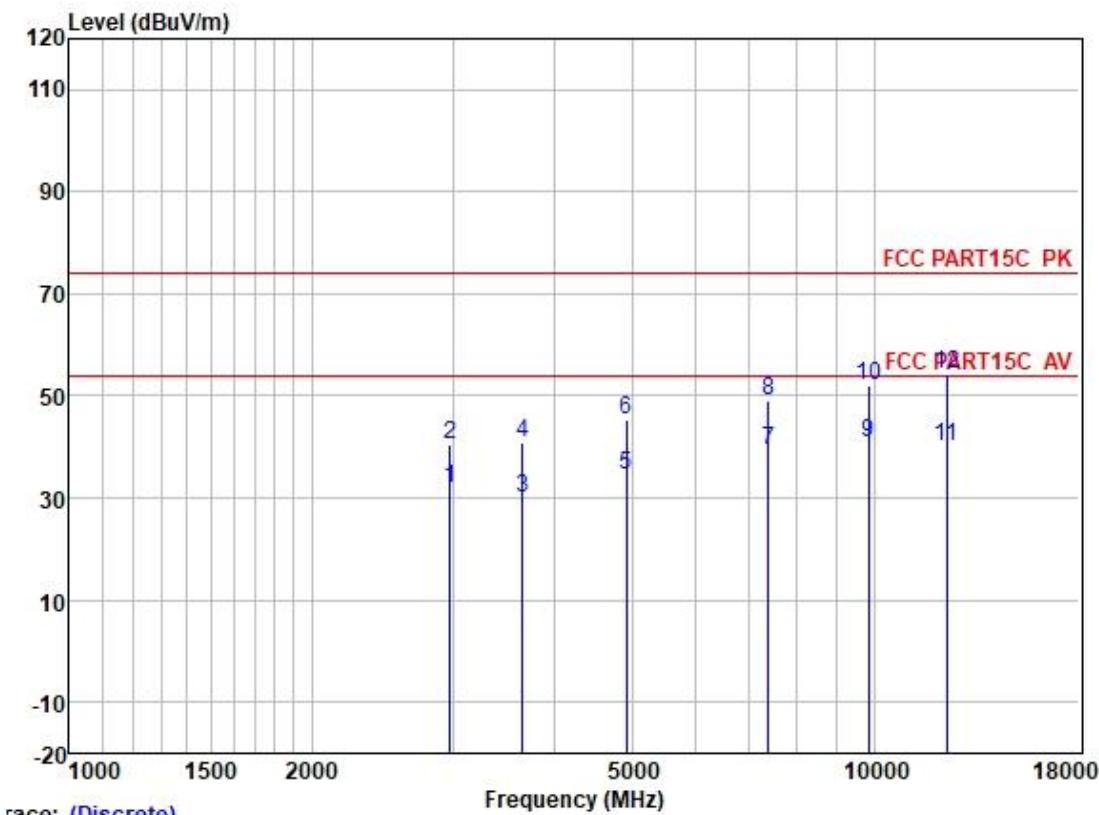
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Mode:a; Polarization:Horizontal; Modulation:b; bandwidth:20MHz; Channel:High



Race: (Discrete)	Freq	Read	Antenna	Cable	Preamp	Limit	Over	Pol/Phase	Remark
		Level	Factor	Loss	Factor	Level	Line		
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2973.293	37.48	27.87	3.78	37.09	32.04	54.00	-21.96	HORIZONTAL Average
2	2973.293	46.04	27.87	3.78	37.09	40.60	74.00	-33.40	HORIZONTAL Peak
3	3661.149	34.25	28.34	4.53	36.93	30.19	54.00	-23.81	HORIZONTAL Average
4	3661.149	44.79	28.34	4.53	36.93	40.73	74.00	-33.27	HORIZONTAL Peak
5	4924.058	34.75	31.01	5.60	36.95	34.41	54.00	-19.59	HORIZONTAL Average
6	4924.058	45.69	31.01	5.60	36.95	45.35	74.00	-28.65	HORIZONTAL Peak
7	7386.015	34.13	35.85	6.19	36.92	39.25	54.00	-14.75	HORIZONTAL Average
8	7386.015	44.04	35.85	6.19	36.92	49.16	74.00	-24.84	HORIZONTAL Peak
9	9848.430	33.28	37.82	6.99	37.09	41.00	54.00	-13.00	HORIZONTAL Average
10	9848.430	44.47	37.82	6.99	37.09	52.19	74.00	-21.81	HORIZONTAL Peak
11	12310.760	30.20	39.03	8.01	36.97	40.27	54.00	-13.73	HORIZONTAL Average
12	12310.760	44.22	39.03	8.01	36.97	54.29	74.00	-19.71	HORIZONTAL Peak

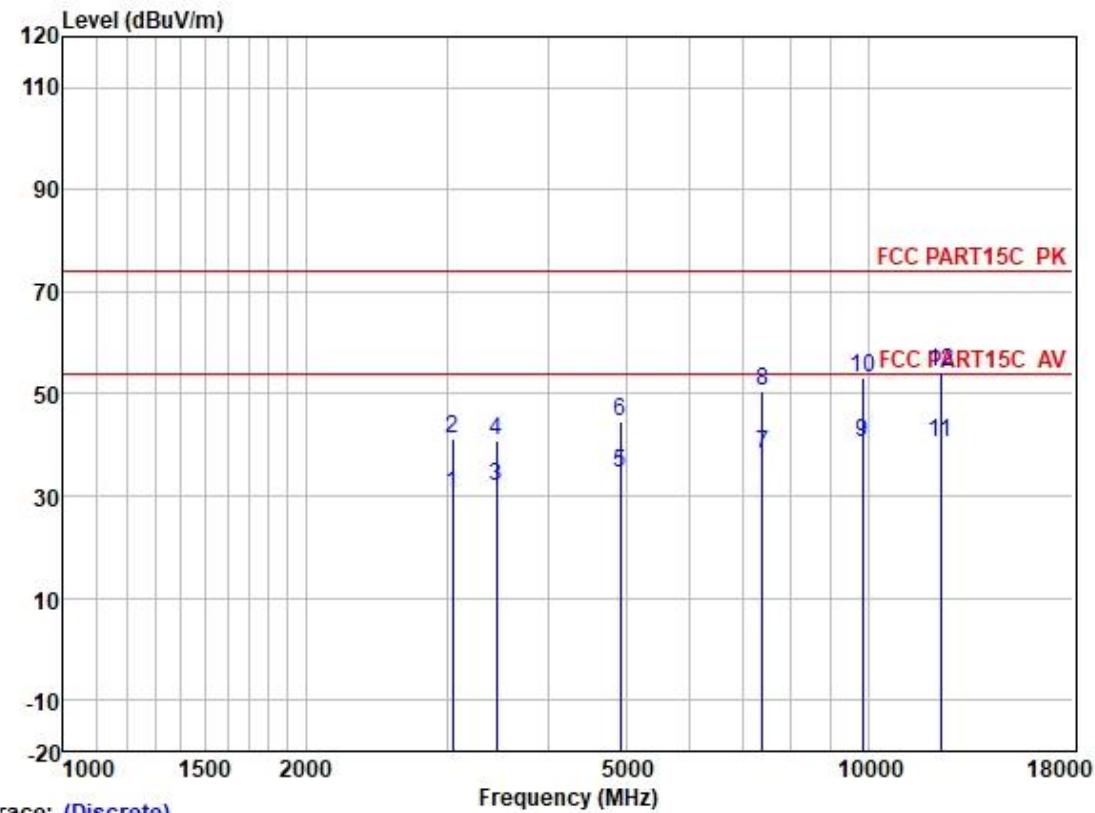
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Mode:a; Polarization:Vertical; Modulation:b; bandwidth:20MHz; Channel:High



Mode: (Discrete)

Freq	Read	Antenna	Cable	Preamp	Limit	Over	Limit	Pol/Phase	Remark
	Level	Factor	Loss	Factor					
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	3042.846	35.57	27.90	3.84	37.05	30.26	54.00	-23.74	VERTICAL Average
2	3042.846	46.66	27.90	3.84	37.05	41.35	74.00	-32.65	VERTICAL Peak
3	3455.508	36.78	27.90	4.20	36.96	31.92	54.00	-22.08	VERTICAL Average
4	3455.508	45.80	27.90	4.20	36.96	40.94	74.00	-33.06	VERTICAL Peak
5	4924.948	34.79	31.01	5.60	36.95	34.45	54.00	-19.55	VERTICAL Average
6	4924.948	45.06	31.01	5.60	36.95	44.72	74.00	-29.28	VERTICAL Peak
7	7386.832	33.29	35.85	6.19	36.92	38.41	54.00	-15.59	VERTICAL Average
8	7386.832	45.59	35.85	6.19	36.92	50.71	74.00	-23.29	VERTICAL Peak
9	9848.151	32.71	37.82	6.99	37.09	40.43	54.00	-13.57	VERTICAL Average
10	9848.151	45.36	37.82	6.99	37.09	53.08	74.00	-20.92	VERTICAL Peak
11	12310.470	30.29	39.03	8.01	36.97	40.36	54.00	-13.64	VERTICAL Average
12	12310.470	44.36	39.03	8.01	36.97	54.43	74.00	-19.57	VERTICAL Peak

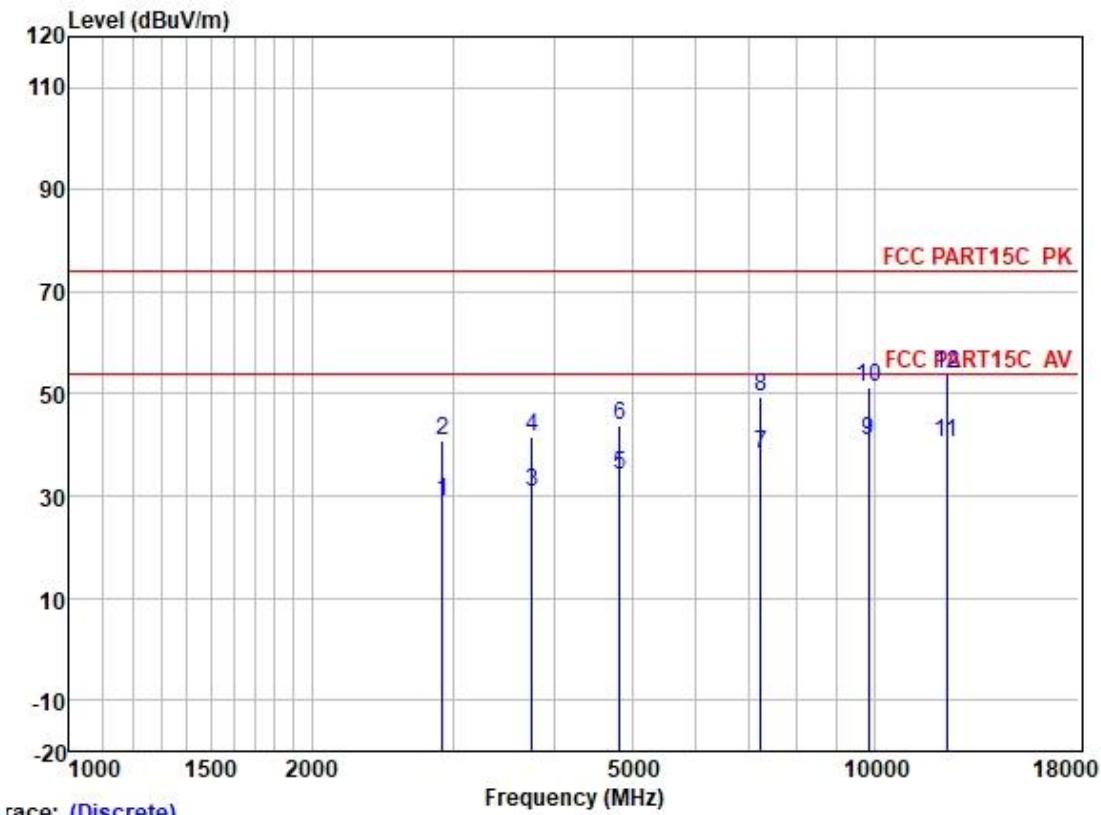
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Mode:a; Polarization:Horizontal; Modulation:g; bandwidth:20MHz; Channel:Low



Index	Freq	ReadAntenna		Cable		Preamp	Limit	Over	Pol/Phase	Remark
		Level	Factor	Loss	Factor					
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2905.331	34.75	27.76	3.71	37.13	29.09	54.00	-24.91	HORIZONTAL	Average
2	2905.331	46.36	27.76	3.71	37.13	40.70	74.00	-33.30	HORIZONTAL	Peak
3	3757.637	34.28	28.82	4.58	36.92	30.76	54.00	-23.24	HORIZONTAL	Average
4	3757.637	44.97	28.82	4.58	36.92	41.45	74.00	-32.55	HORIZONTAL	Peak
5	4824.515	34.76	30.82	5.42	36.94	34.06	54.00	-19.94	HORIZONTAL	Average
6	4824.515	44.64	30.82	5.42	36.94	43.94	74.00	-30.06	HORIZONTAL	Peak
7	7236.741	33.70	35.55	6.03	36.93	38.35	54.00	-15.65	HORIZONTAL	Average
8	7236.741	44.69	35.55	6.03	36.93	49.34	74.00	-24.66	HORIZONTAL	Peak
9	9848.149	33.22	37.82	6.99	37.09	40.94	54.00	-13.06	HORIZONTAL	Average
10	9848.149	43.59	37.82	6.99	37.09	51.31	74.00	-22.69	HORIZONTAL	Peak
11	12310.350	30.25	39.03	8.01	36.97	40.32	54.00	-13.68	HORIZONTAL	Average
12	12310.350	43.93	39.03	8.01	36.97	54.00	74.00	-20.00	HORIZONTAL	Peak

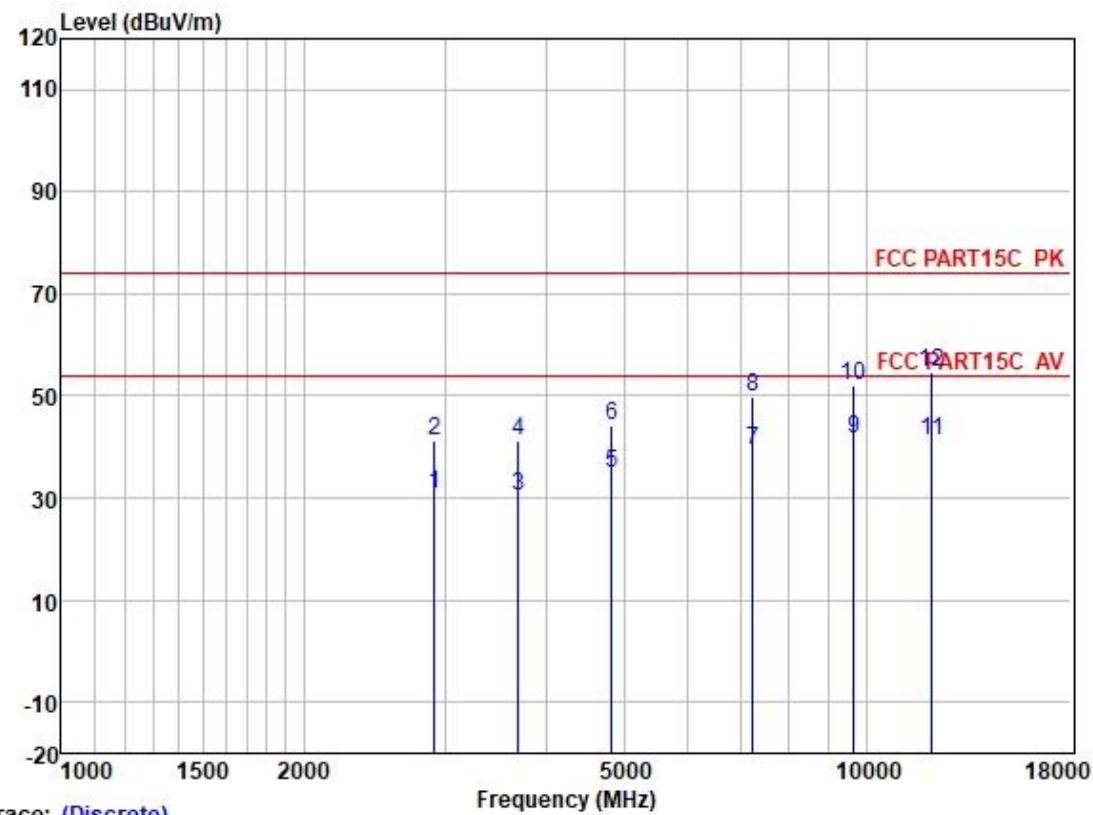
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Mode:a; Polarization:Vertical; Modulation:g; bandwidth:20MHz; Channel:Low



Freq	Read	Antenna	Cable	Preamp	Limit	Over	Limit	Pol/Phase	Remark
	Freq	Level	Factor	Loss					
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2905.331	36.28	27.76	3.71	37.13	30.62	54.00	-23.38	VERTICAL Average
2	2905.331	46.86	27.76	3.71	37.13	41.20	74.00	-32.80	VERTICAL Peak
3	3693.033	34.26	28.47	4.55	36.93	30.35	54.00	-23.65	VERTICAL Average
4	3693.033	45.09	28.47	4.55	36.93	41.18	74.00	-32.82	VERTICAL Peak
5	4824.760	35.47	30.82	5.42	36.94	34.77	54.00	-19.23	VERTICAL Average
6	4824.760	45.06	30.82	5.42	36.94	44.36	74.00	-29.64	VERTICAL Peak
7	7236.833	34.75	35.55	6.03	36.93	39.40	54.00	-14.60	VERTICAL Average
8	7236.833	45.15	35.55	6.03	36.93	49.80	74.00	-24.20	VERTICAL Peak
9	9648.479	34.13	37.54	7.06	37.08	41.65	54.00	-12.35	VERTICAL Average
10	9648.479	44.45	37.54	7.06	37.08	51.97	74.00	-22.03	VERTICAL Peak
11	12060.280	30.84	39.46	8.17	37.17	41.30	54.00	-12.70	VERTICAL Average
12	12060.280	44.11	39.46	8.17	37.17	54.57	74.00	-19.43	VERTICAL Peak

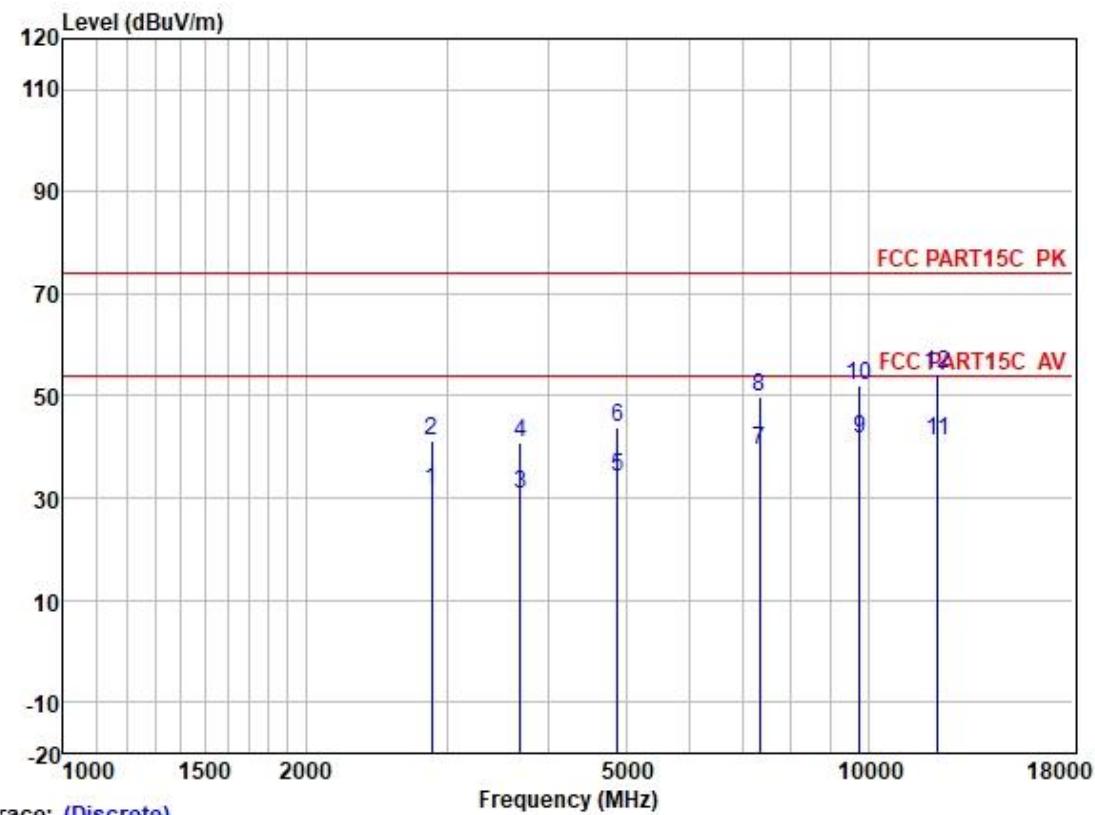
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Mode:a; Polarization:Horizontal; Modulation:g; bandwidth:20MHz; Channel:middle



Index	Freq	ReadAntenna		Cable		Limit	Over	Pol/Phase	Remark
		Freq	Level	Factor	Loss				
	MHz	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB
1	2871.934	37.41	27.70	3.70	37.15	31.66	54.00	-22.34	HORIZONTAL Average
2	2871.934	47.02	27.70	3.70	37.15	41.27	74.00	-32.73	HORIZONTAL Peak
3	3693.033	34.60	28.47	4.55	36.93	30.69	54.00	-23.31	HORIZONTAL Average
4	3693.033	44.73	28.47	4.55	36.93	40.82	74.00	-33.18	HORIZONTAL Peak
5	4884.592	34.59	30.95	5.52	36.95	34.11	54.00	-19.89	HORIZONTAL Average
6	4884.592	44.49	30.95	5.52	36.95	44.01	74.00	-29.99	HORIZONTAL Peak
7	7326.015	34.28	35.74	6.13	36.92	39.23	54.00	-14.77	HORIZONTAL Average
8	7326.015	44.71	35.74	6.13	36.92	49.66	74.00	-24.34	HORIZONTAL Peak
9	9768.543	33.96	37.74	7.01	37.09	41.62	54.00	-12.38	HORIZONTAL Average
10	9768.543	44.53	37.74	7.01	37.09	52.19	74.00	-21.81	HORIZONTAL Peak
11	12210.210	30.97	39.21	8.08	37.06	41.20	54.00	-12.80	HORIZONTAL Average
12	12210.210	44.15	39.21	8.08	37.06	54.38	74.00	-19.62	HORIZONTAL Peak

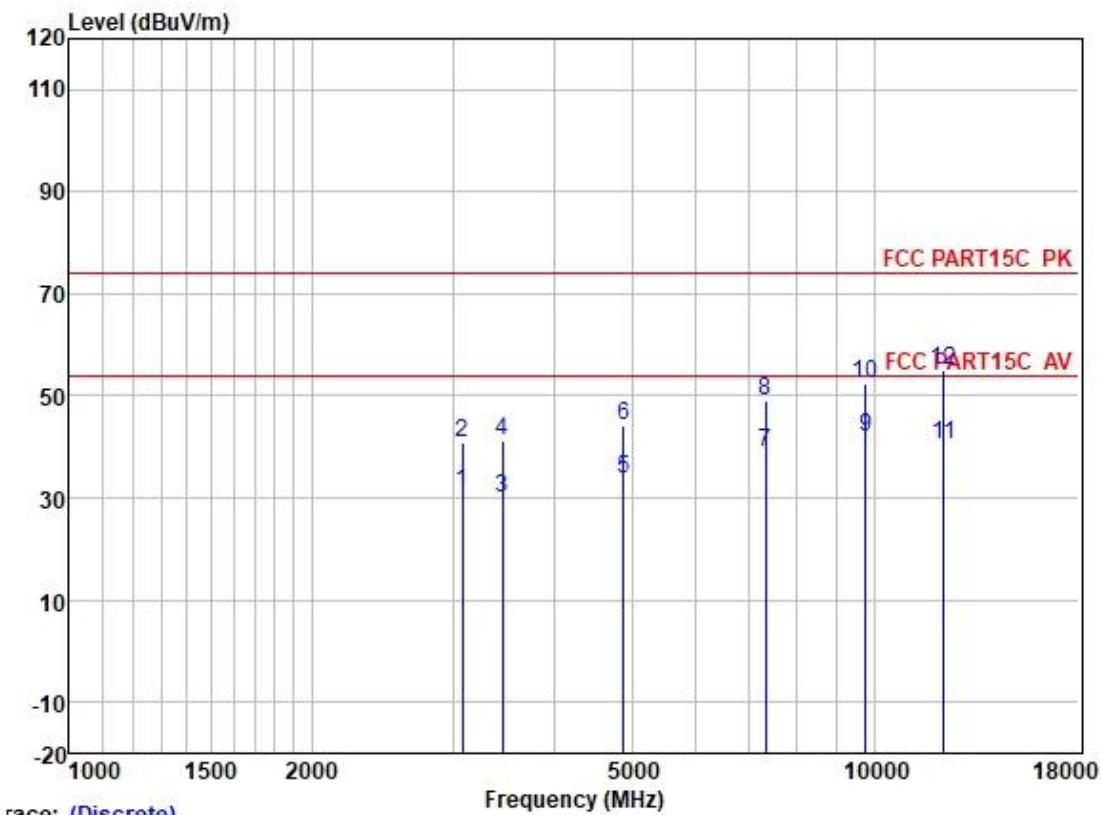
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Mode:a; Polarization:Vertical; Modulation:g; bandwidth:20MHz; Channel:middle



Race: (Discrete)	Freq	Read	Antenna	Cable	Preamp	Limit	Over	Limit	Pol/Phase	Remark
		Level	Factor	Loss	Level					
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	3078.229	36.27	27.90	3.88	37.04	31.01	54.00	-22.99	VERTICAL	Average
2	3078.229	46.10	27.90	3.88	37.04	40.84	74.00	-33.16	VERTICAL	Peak
3	3455.508	34.89	27.90	4.20	36.96	30.03	54.00	-23.97	VERTICAL	Average
4	3455.508	46.21	27.90	4.20	36.96	41.35	74.00	-32.65	VERTICAL	Peak
5	4884.760	34.17	30.95	5.52	36.95	33.69	54.00	-20.31	VERTICAL	Average
6	4884.760	44.55	30.95	5.52	36.95	44.07	74.00	-29.93	VERTICAL	Peak
7	7326.741	34.21	35.74	6.13	36.92	39.16	54.00	-14.84	VERTICAL	Average
8	7326.741	44.27	35.74	6.13	36.92	49.22	74.00	-24.78	VERTICAL	Peak
9	9768.710	34.15	37.74	7.01	37.09	41.81	54.00	-12.19	VERTICAL	Average
10	9768.710	44.85	37.74	7.01	37.09	52.51	74.00	-21.49	VERTICAL	Peak
11	12210.380	30.28	39.21	8.08	37.06	40.51	54.00	-13.49	VERTICAL	Average
12	12210.380	44.72	39.21	8.08	37.06	54.95	74.00	-19.05	VERTICAL	Peak

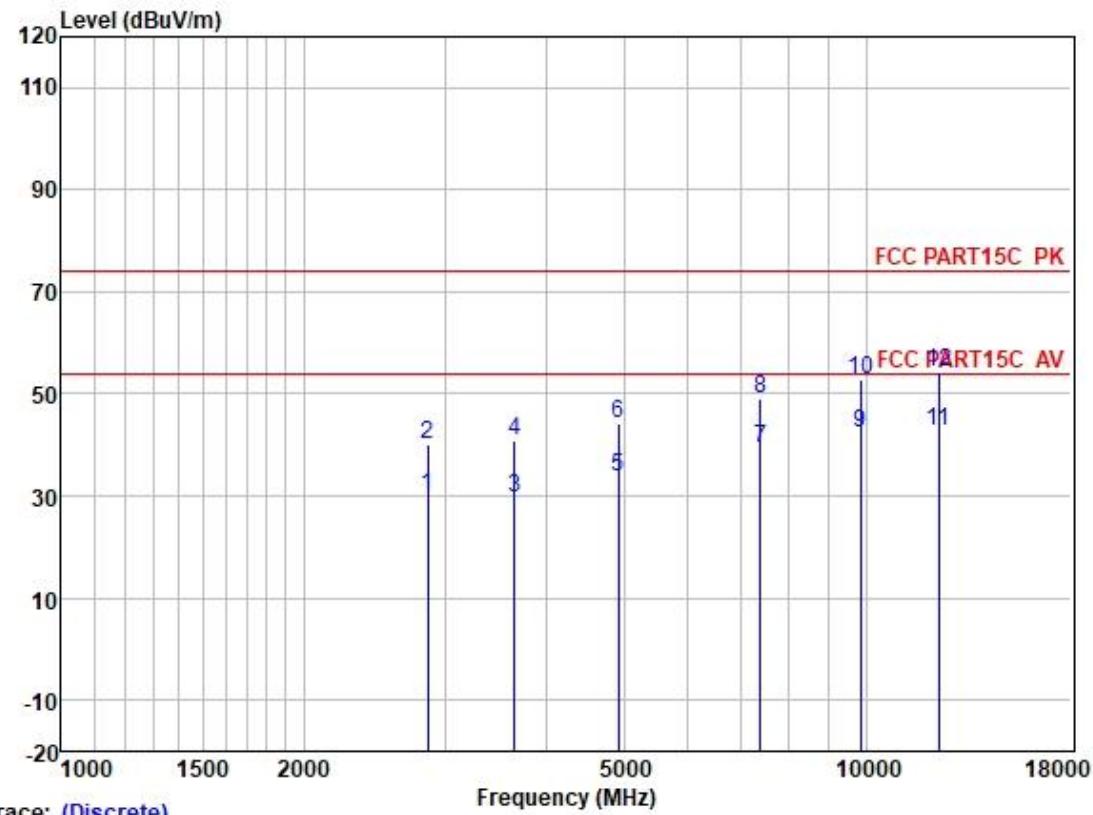
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Mode:a; Polarization:Horizontal; Modulation:g; bandwidth:20MHz; Channel:High



Trace: (Discrete)	Freq	Read	Antenna	Cable	Preamp	Limit	Over	Limit	Pol/Phase	Remark
		Level	Factor	Loss	Factor					
	MHz	dBuV	dB/m		dB	dBuV/m	dBuV/m			
1	2855.380	35.74	27.67	3.70	37.17	29.94	54.00	-24.06	HORIZONTAL	Average
2	2855.380	45.86	27.67	3.70	37.17	40.06	74.00	-33.94	HORIZONTAL	Peak
3	3661.149	33.61	28.34	4.53	36.93	29.55	54.00	-24.45	HORIZONTAL	Average
4	3661.149	44.97	28.34	4.53	36.93	40.91	74.00	-33.09	HORIZONTAL	Peak
5	4924.396	34.28	31.01	5.60	36.95	33.94	54.00	-20.06	HORIZONTAL	Average
6	4924.396	44.47	31.01	5.60	36.95	44.13	74.00	-29.87	HORIZONTAL	Peak
7	7386.070	34.19	35.85	6.19	36.92	39.31	54.00	-14.69	HORIZONTAL	Average
8	7386.070	44.06	35.85	6.19	36.92	49.18	74.00	-24.82	HORIZONTAL	Peak
9	9848.497	34.61	37.82	6.99	37.09	42.33	54.00	-11.67	HORIZONTAL	Average
10	9848.497	45.21	37.82	6.99	37.09	52.93	74.00	-21.07	HORIZONTAL	Peak
11	12310.390	32.53	39.03	8.01	36.97	42.60	54.00	-11.40	HORIZONTAL	Average
12	12310.390	44.17	39.03	8.01	36.97	54.24	74.00	-19.76	HORIZONTAL	Peak

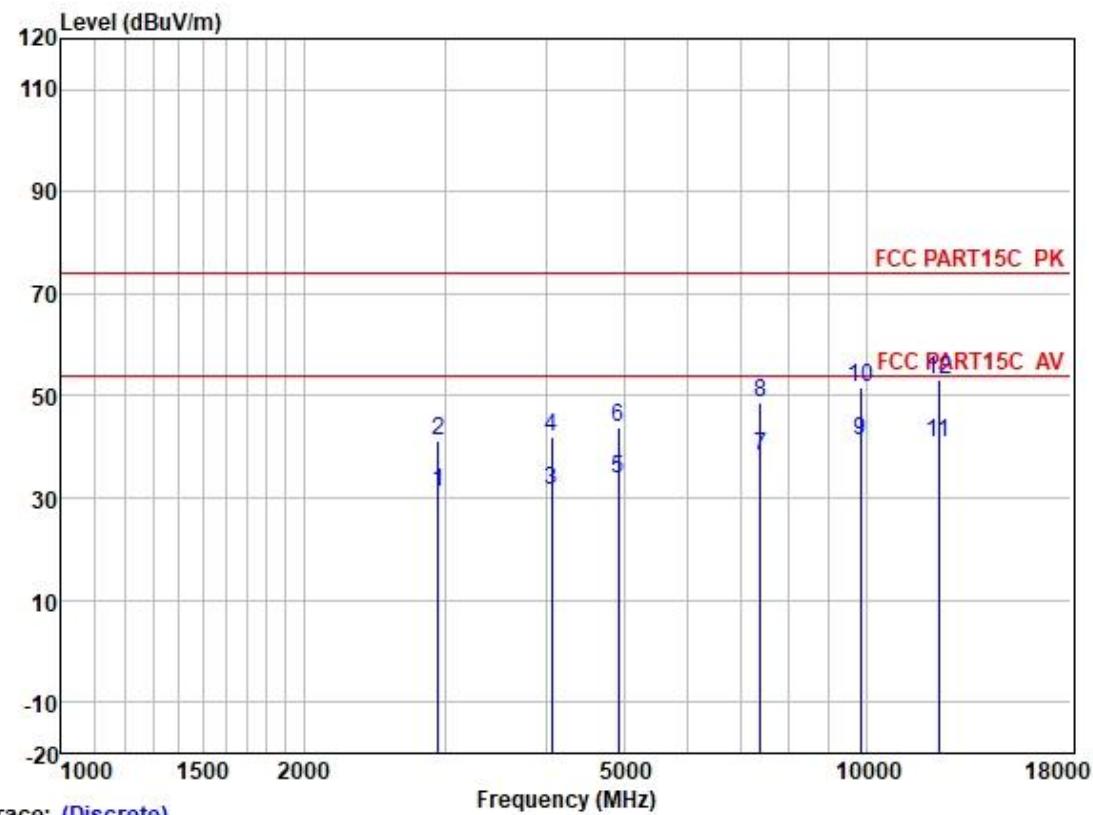
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Mode:a; Polarization:Vertical; Modulation:g; bandwidth:20MHz; Channel:High



Trace: (Discrete)

Freq	Read	Antenna	Cable	Preamp	Limit	Over	Limit	Pol/Phase	Remark
	Freq	Level	Factor	Loss					
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2939.115	36.51	27.82	3.74	37.10	30.97	54.00	-23.03	VERTICAL Average
2	2939.115	46.58	27.82	3.74	37.10	41.04	74.00	-32.96	VERTICAL Peak
3	4062.629	34.18	29.55	4.60	36.90	31.43	54.00	-22.57	VERTICAL Average
4	4062.629	44.88	29.55	4.60	36.90	42.13	74.00	-31.87	VERTICAL Peak
5	4924.058	34.19	31.01	5.60	36.95	33.85	54.00	-20.15	VERTICAL Average
6	4924.058	44.11	31.01	5.60	36.95	43.77	74.00	-30.23	VERTICAL Peak
7	7386.122	33.18	35.85	6.19	36.92	38.30	54.00	-15.70	VERTICAL Average
8	7386.122	43.42	35.85	6.19	36.92	48.54	74.00	-25.46	VERTICAL Peak
9	9848.151	33.69	37.82	6.99	37.09	41.41	54.00	-12.59	VERTICAL Average
10	9848.151	43.91	37.82	6.99	37.09	51.63	74.00	-22.37	VERTICAL Peak
11	12310.130	30.84	39.03	8.01	36.97	40.91	54.00	-13.09	VERTICAL Average
12	12310.130	43.15	39.03	8.01	36.97	53.22	74.00	-20.78	VERTICAL Peak

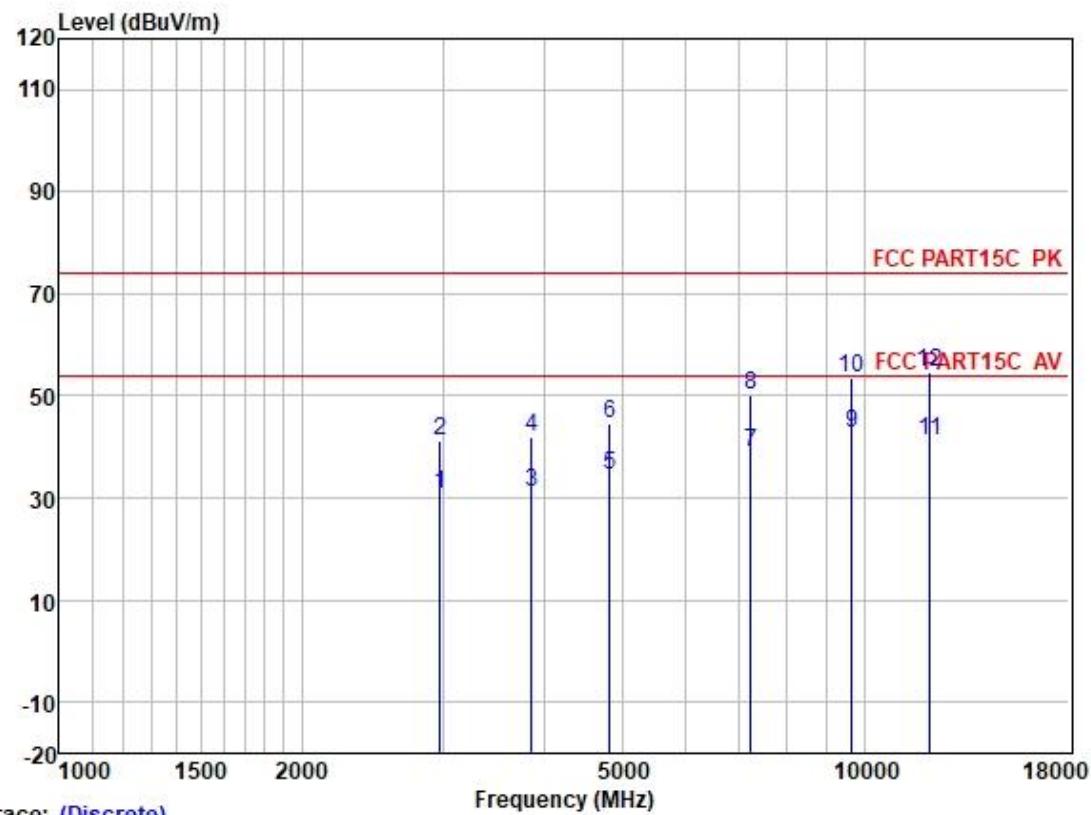
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Mode:a; Polarization:Horizontal; Modulation:n; bandwidth:20MHz; Channel:Low



Trace: (Discrete)	Freq	Read	Antenna	Cable	Preamp	Limit	Over	Limit	Over	Pol/Phase	Remark
		Level	Factor	Loss	Factor						
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	dB		
1	2973.293	36.28	27.87	3.78	37.09	30.84	54.00	-23.16	HORIZONTAL	Average	
2	2973.293	46.63	27.87	3.78	37.09	41.19	74.00	-32.81	HORIZONTAL	Peak	
3	3856.668	34.16	29.19	4.60	36.91	31.04	54.00	-22.96	HORIZONTAL	Average	
4	3856.668	44.92	29.19	4.60	36.91	41.80	74.00	-32.20	HORIZONTAL	Peak	
5	4824.396	35.25	30.82	5.42	36.94	34.55	54.00	-19.45	HORIZONTAL	Average	
6	4824.396	45.46	30.82	5.42	36.94	44.76	74.00	-29.24	HORIZONTAL	Peak	
7	7236.052	34.18	35.55	6.03	36.93	38.83	54.00	-15.17	HORIZONTAL	Average	
8	7236.052	45.60	35.55	6.03	36.93	50.25	74.00	-23.75	HORIZONTAL	Peak	
9	9648.684	35.28	37.54	7.06	37.08	42.80	54.00	-11.20	HORIZONTAL	Average	
10	9648.684	45.96	37.54	7.06	37.08	53.48	74.00	-20.52	HORIZONTAL	Peak	
11	12060.070	30.94	39.46	8.17	37.17	41.40	54.00	-12.60	HORIZONTAL	Average	
12	12060.070	44.34	39.46	8.17	37.17	54.80	74.00	-19.20	HORIZONTAL	Peak	

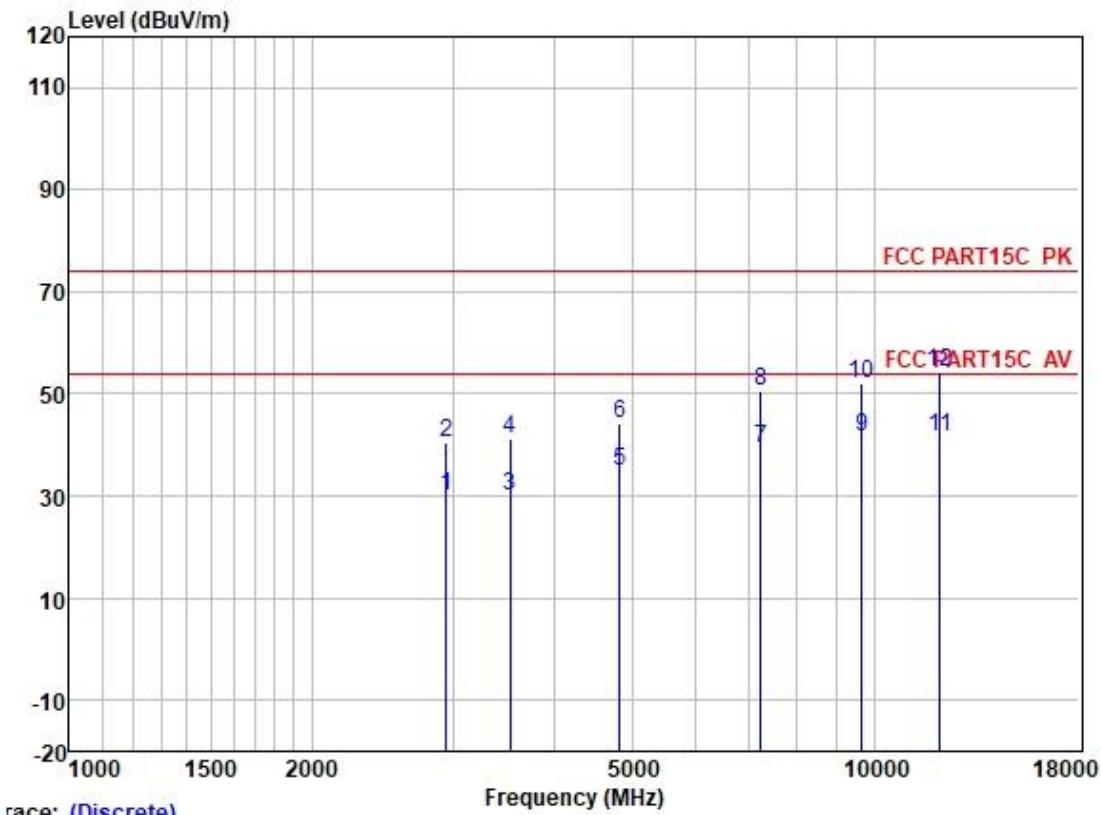
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Mode:a; Polarization:Vertical; Modulation:n; bandwidth:20MHz; Channel:Low



Race: (Discrete)	Freq	Read	Antenna	Cable	Preamp	Limit	Over	Limit	Pol/Phase	Remark
		Level	Factor	Loss	Factor					
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2939.115	35.45	27.82	3.74	37.10	29.91	54.00	-24.09	VERTICAL	Average
2	2939.115	46.01	27.82	3.74	37.10	40.47	74.00	-33.53	VERTICAL	Peak
3	3526.134	34.76	27.96	4.38	36.95	30.15	54.00	-23.85	VERTICAL	Average
4	3526.134	45.78	27.96	4.38	36.95	41.17	74.00	-32.83	VERTICAL	Peak
5	4824.339	35.69	30.82	5.42	36.94	34.99	54.00	-19.01	VERTICAL	Average
6	4824.339	45.06	30.82	5.42	36.94	44.36	74.00	-29.64	VERTICAL	Peak
7	7236.646	34.77	35.55	6.03	36.93	39.42	54.00	-14.58	VERTICAL	Average
8	7236.646	45.78	35.55	6.03	36.93	50.43	74.00	-23.57	VERTICAL	Peak
9	9648.371	34.18	37.54	7.06	37.08	41.70	54.00	-12.30	VERTICAL	Average
10	9648.371	44.48	37.54	7.06	37.08	52.00	74.00	-22.00	VERTICAL	Peak
11	12060.760	31.06	39.46	8.17	37.17	41.52	54.00	-12.48	VERTICAL	Average
12	12060.760	43.83	39.46	8.17	37.17	54.29	74.00	-19.71	VERTICAL	Peak

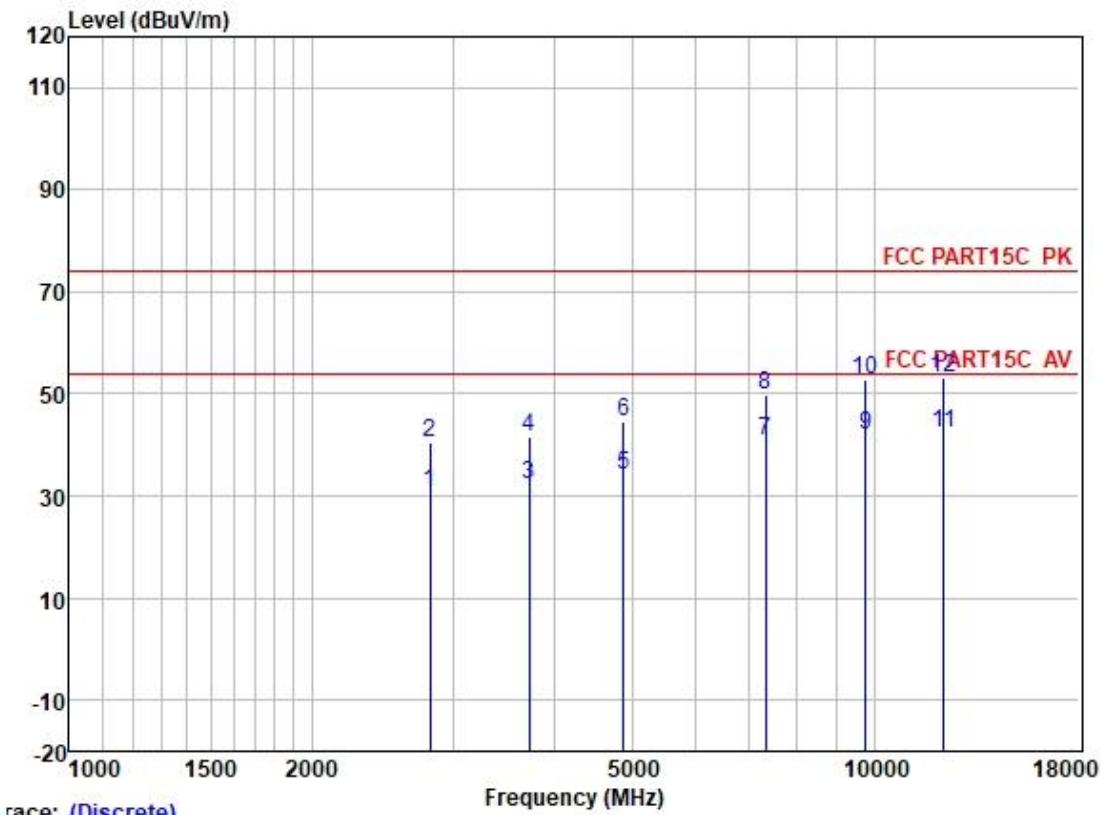
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Mode:a; Polarization:Horizontal; Modulation:n; bandwidth:20MHz; Channel:middle



Race: (Discrete)	Read Antenna		Cable Preamp		Limit Line	Over Limit	Pol/Phase	Remark
	Freq	Level	Factor	Loss				
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB
1	2806.288	36.90	27.54	3.70	37.22	30.92	54.00	-23.08 HORIZONTAL Average
2	2806.288	46.47	27.54	3.70	37.22	40.49	74.00	-33.51 HORIZONTAL Peak
3	3725.195	35.83	28.64	4.57	36.92	32.12	54.00	-21.88 HORIZONTAL Average
4	3725.195	45.16	28.64	4.57	36.92	41.45	74.00	-32.55 HORIZONTAL Peak
5	4884.993	34.76	30.95	5.52	36.95	34.28	54.00	-19.72 HORIZONTAL Average
6	4884.993	45.05	30.95	5.52	36.95	44.57	74.00	-29.43 HORIZONTAL Peak
7	7326.461	35.91	35.74	6.13	36.92	40.86	54.00	-13.14 HORIZONTAL Average
8	7326.461	45.05	35.74	6.13	36.92	50.00	74.00	-24.00 HORIZONTAL Peak
9	9768.151	34.17	37.74	7.01	37.09	41.83	54.00	-12.17 HORIZONTAL Average
10	9768.151	44.99	37.74	7.01	37.09	52.65	74.00	-21.35 HORIZONTAL Peak
11	12210.270	32.16	39.21	8.08	37.06	42.39	54.00	-11.61 HORIZONTAL Average
12	12210.270	42.94	39.21	8.08	37.06	53.17	74.00	-20.83 HORIZONTAL Peak

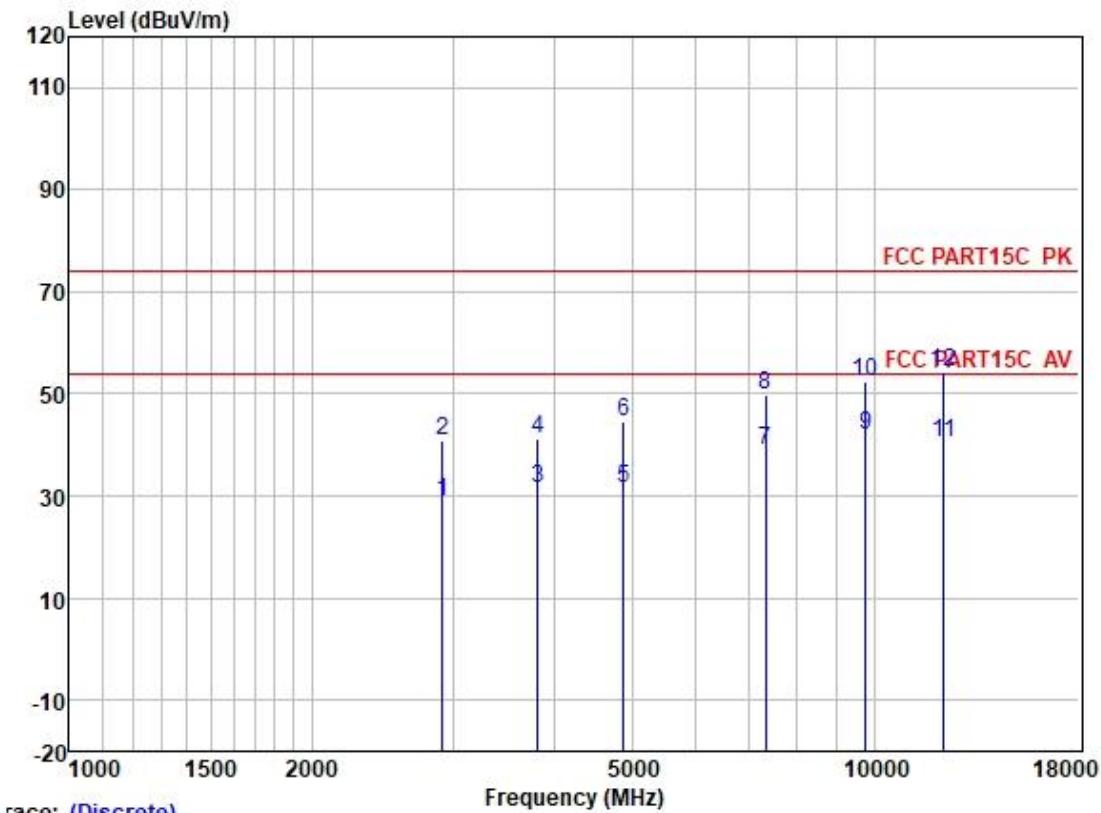
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Mode:a; Polarization:Vertical; Modulation:n; bandwidth:20MHz; Channel:middle



Index: (Discrete)	Freq	ReadAntenna		Cable		Preamp	Limit	Over	Limit Pol/Phase	Remark
		Level	Factor	Loss	Factor					
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2905.331	34.71	27.76	3.71	37.13	29.05	54.00	-24.95	VERTICAL	Average
2	2905.331	46.34	27.76	3.71	37.13	40.68	74.00	-33.32	VERTICAL	Peak
3	3823.371	34.65	29.08	4.60	36.91	31.42	54.00	-22.58	VERTICAL	Average
4	3823.371	44.46	29.08	4.60	36.91	41.23	74.00	-32.77	VERTICAL	Peak
5	4884.490	32.18	30.95	5.52	36.95	31.70	54.00	-22.30	VERTICAL	Average
6	4884.490	45.24	30.95	5.52	36.95	44.76	74.00	-29.24	VERTICAL	Peak
7	7326.267	34.17	35.74	6.13	36.92	39.12	54.00	-14.88	VERTICAL	Average
8	7326.267	44.72	35.74	6.13	36.92	49.67	74.00	-24.33	VERTICAL	Peak
9	9768.018	34.29	37.74	7.01	37.09	41.95	54.00	-12.05	VERTICAL	Average
10	9768.018	44.63	37.74	7.01	37.09	52.29	74.00	-21.71	VERTICAL	Peak
11	12210.420	30.28	39.21	8.08	37.06	40.51	54.00	-13.49	VERTICAL	Average
12	12210.420	43.90	39.21	8.08	37.06	54.13	74.00	-19.87	VERTICAL	Peak

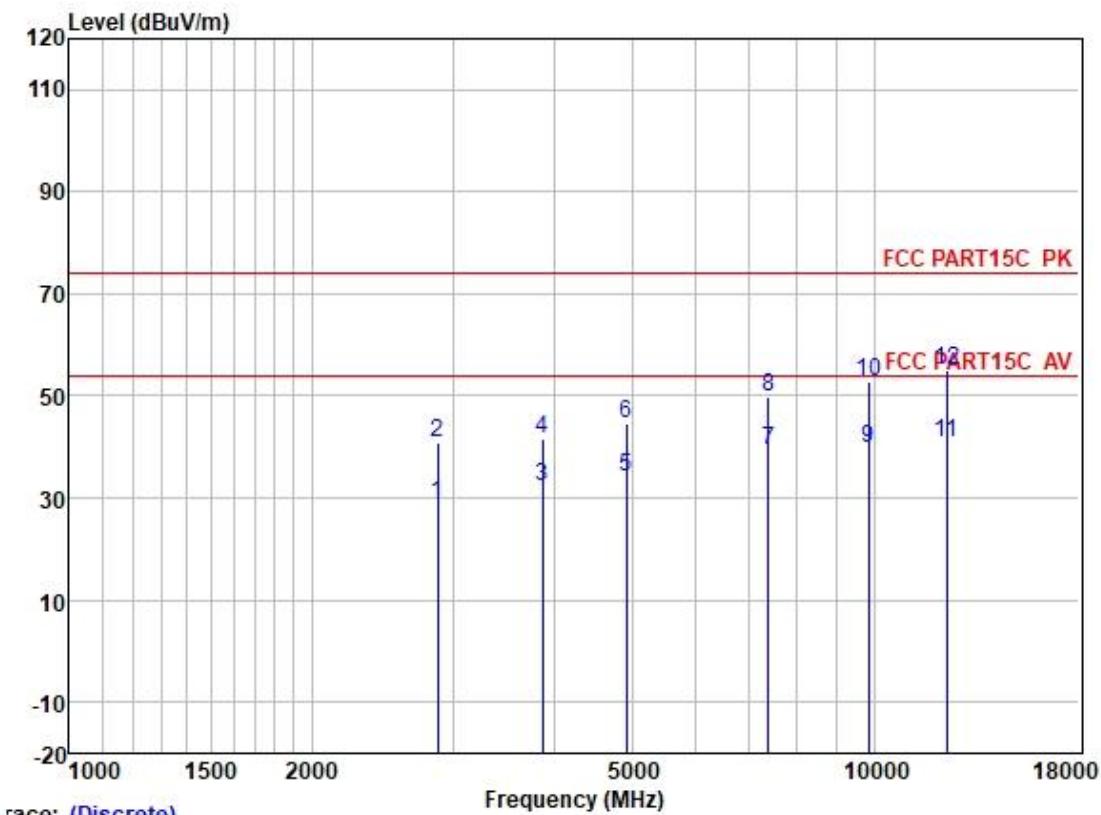
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Mode:a; Polarization:Horizontal; Modulation:n; bandwidth:20MHz; Channel:High



Trace: (Discrete)

Freq	Read	Antenna	Cable	Preamp	Limit	Over	Limit	Pol/Phase	Remark
	Freq	Level	Factor	Loss					
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2871.934	34.76	27.70	3.70	37.15	29.01	54.00	-24.99	HORIZONTAL Average
2	2871.934	46.61	27.70	3.70	37.15	40.86	74.00	-33.14	HORIZONTAL Peak
3	3867.831	35.21	29.22	4.60	36.91	32.12	54.00	-21.88	HORIZONTAL Average
4	3867.831	44.75	29.22	4.60	36.91	41.66	74.00	-32.34	HORIZONTAL Peak
5	4924.490	34.30	31.01	5.60	36.95	33.96	54.00	-20.04	HORIZONTAL Average
6	4924.490	44.88	31.01	5.60	36.95	44.54	74.00	-29.46	HORIZONTAL Peak
7	7386.461	34.18	35.85	6.19	36.92	39.30	54.00	-14.70	HORIZONTAL Average
8	7386.461	44.72	35.85	6.19	36.92	49.84	74.00	-24.16	HORIZONTAL Peak
9	9848.991	32.18	37.82	6.99	37.09	39.90	54.00	-14.10	HORIZONTAL Average
10	9848.991	44.93	37.82	6.99	37.09	52.65	74.00	-21.35	HORIZONTAL Peak
11	12310.130	30.70	39.03	8.01	36.97	40.77	54.00	-13.23	HORIZONTAL Average
12	12310.130	45.05	39.03	8.01	36.97	55.12	74.00	-18.88	HORIZONTAL Peak

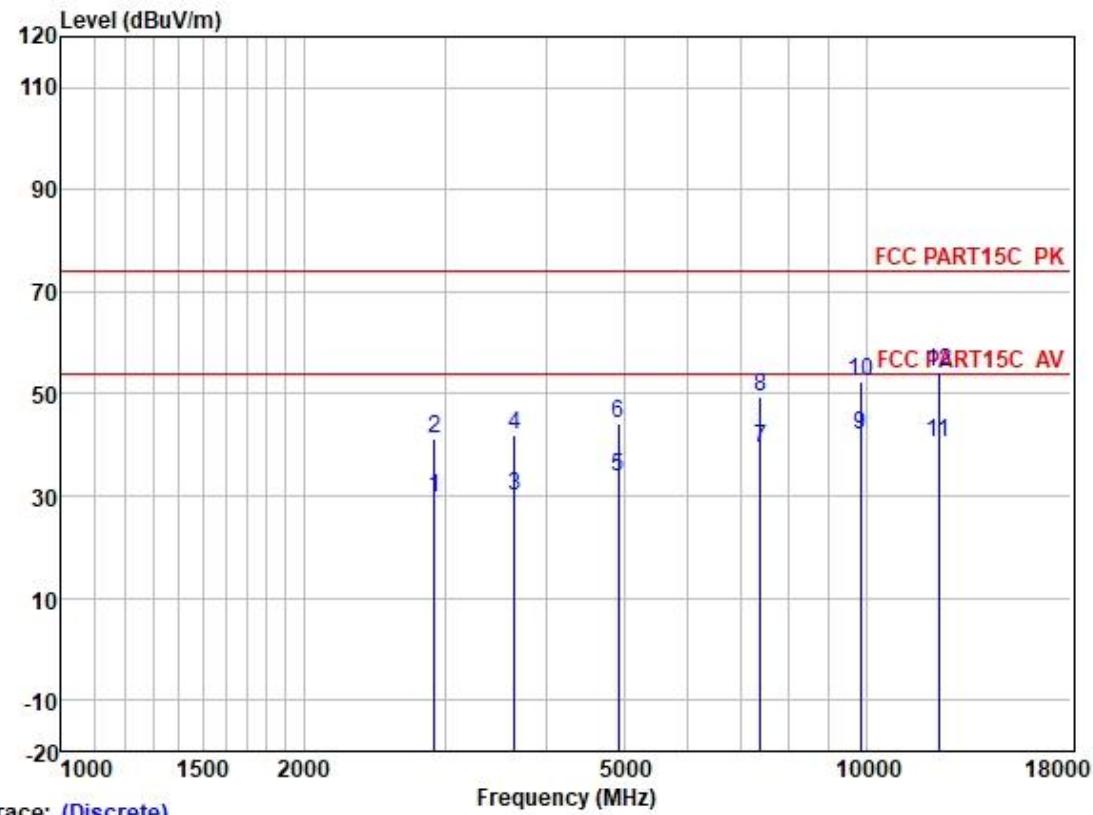
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Mode:a; Polarization:Vertical; Modulation:n; bandwidth:20MHz; Channel:High



Trace: (Discrete)

Freq	Read	Antenna	Cable	Preamp	Limit	Over	Limit	Pol/Phase	Remark
	Freq	Level	Factor	Loss					
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2905.331	35.18	27.76	3.71	37.13	29.52	54.00	-24.48	VERTICAL Average
2	2905.331	46.93	27.76	3.71	37.13	41.27	74.00	-32.73	VERTICAL Peak
3	3661.149	34.17	28.34	4.53	36.93	30.11	54.00	-23.89	VERTICAL Average
4	3661.149	46.06	28.34	4.53	36.93	42.00	74.00	-32.00	VERTICAL Peak
5	4924.339	34.27	31.01	5.60	36.95	33.93	54.00	-20.07	VERTICAL Average
6	4924.339	44.43	31.01	5.60	36.95	44.09	74.00	-29.91	VERTICAL Peak
7	7386.052	34.22	35.85	6.19	36.92	39.34	54.00	-14.66	VERTICAL Average
8	7386.052	44.19	35.85	6.19	36.92	49.31	74.00	-24.69	VERTICAL Peak
9	9848.430	34.28	37.82	6.99	37.09	42.00	54.00	-12.00	VERTICAL Average
10	9848.430	44.56	37.82	6.99	37.09	52.28	74.00	-21.72	VERTICAL Peak
11	12310.520	30.26	39.03	8.01	36.97	40.33	54.00	-13.67	VERTICAL Average
12	12310.520	44.40	39.03	8.01	36.97	54.47	74.00	-19.53	VERTICAL Peak

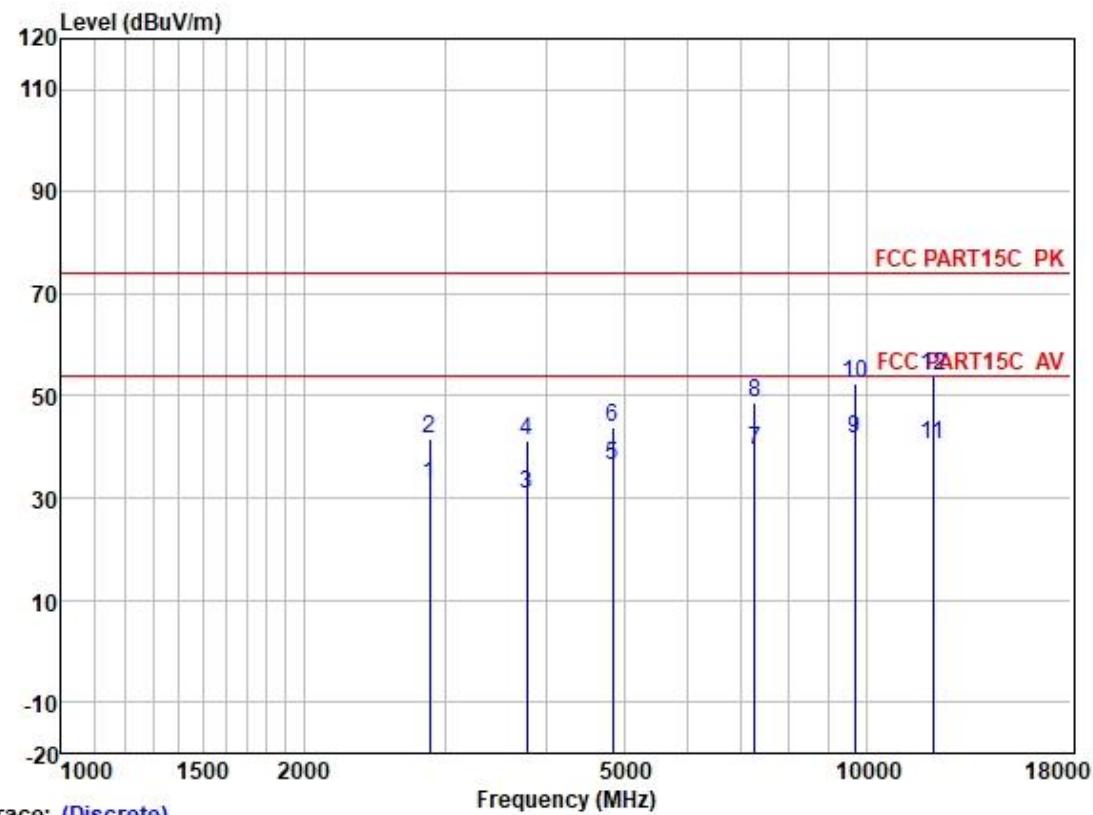
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Mode:a; Polarization:Horizontal; Modulation:n; bandwidth:40MHz; Channel:Low



Race: (Discrete)	Freq	Read	Antenna	Cable	Preamp	Limit	Over	Pol/Phase	Remark
		Level	Factor	Loss	Factor	Level	Line		
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2871.934	38.49	27.70	3.70	37.15	32.74	54.00	-21.26	HORIZONTAL Average
2	2871.934	47.24	27.70	3.70	37.15	41.49	74.00	-32.51	HORIZONTAL Peak
3	3790.361	34.17	28.97	4.60	36.92	30.82	54.00	-23.18	HORIZONTAL Average
4	3790.361	44.48	28.97	4.60	36.92	41.13	74.00	-32.87	HORIZONTAL Peak
5	4844.525	36.98	30.88	5.45	36.94	36.37	54.00	-17.63	HORIZONTAL Average
6	4844.525	44.61	30.88	5.45	36.94	44.00	74.00	-30.00	HORIZONTAL Peak
7	7266.144	34.72	35.60	6.06	36.92	39.46	54.00	-14.54	HORIZONTAL Average
8	7266.144	44.08	35.60	6.06	36.92	48.82	74.00	-25.18	HORIZONTAL Peak
9	9688.151	34.18	37.61	7.04	37.08	41.75	54.00	-12.25	HORIZONTAL Average
10	9688.151	44.76	37.61	7.04	37.08	52.33	74.00	-21.67	HORIZONTAL Peak
11	12110.760	30.25	39.37	8.14	37.12	40.64	54.00	-13.36	HORIZONTAL Average
12	12110.760	43.60	39.37	8.14	37.12	53.99	74.00	-20.01	HORIZONTAL Peak

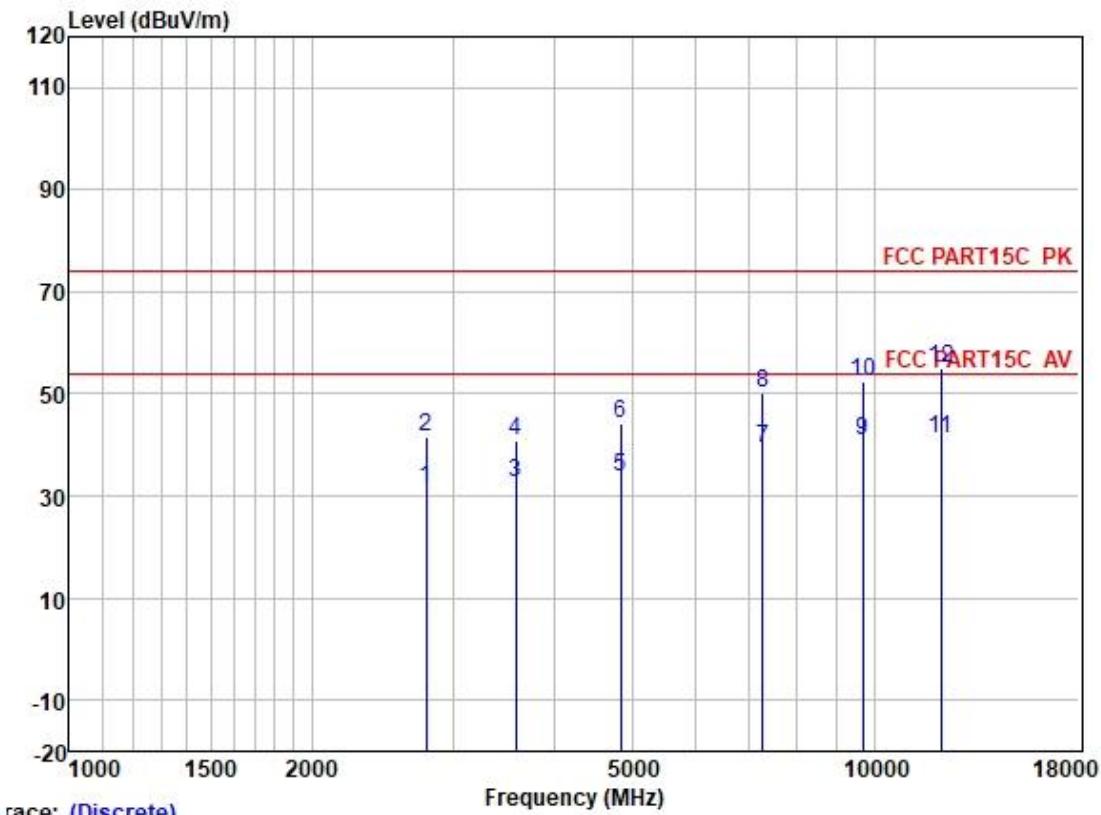
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Mode:a; Polarization:Vertical; Modulation:n; bandwidth:40MHz; Channel:Low



Index	Freq	ReadAntenna		Cable		Preamp	Limit	Over	Pol/Phase	Remark
		MHz	Level	Factor	Loss					
		MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2774.030	37.48	27.43	3.68	37.26	31.33	54.00	-22.67	VERTICAL	Average
2	2774.030	47.63	27.43	3.68	37.26	41.48	74.00	-32.52	VERTICAL	Peak
3	3587.818	36.98	28.11	4.49	36.94	32.64	54.00	-21.36	VERTICAL	Average
4	3587.818	45.22	28.11	4.49	36.94	40.88	74.00	-33.12	VERTICAL	Peak
5	4844.419	34.22	30.88	5.45	36.94	33.61	54.00	-20.39	VERTICAL	Average
6	4844.419	45.00	30.88	5.45	36.94	44.39	74.00	-29.61	VERTICAL	Peak
7	7266.052	34.72	35.60	6.06	36.92	39.46	54.00	-14.54	VERTICAL	Average
8	7266.052	45.37	35.60	6.06	36.92	50.11	74.00	-23.89	VERTICAL	Peak
9	9688.430	33.19	37.61	7.04	37.08	40.76	54.00	-13.24	VERTICAL	Average
10	9688.430	44.87	37.61	7.04	37.08	52.44	74.00	-21.56	VERTICAL	Peak
11	12110.250	30.74	39.37	8.14	37.15	41.10	54.00	-12.90	VERTICAL	Average
12	12110.250	44.58	39.37	8.14	37.15	54.94	74.00	-19.06	VERTICAL	Peak

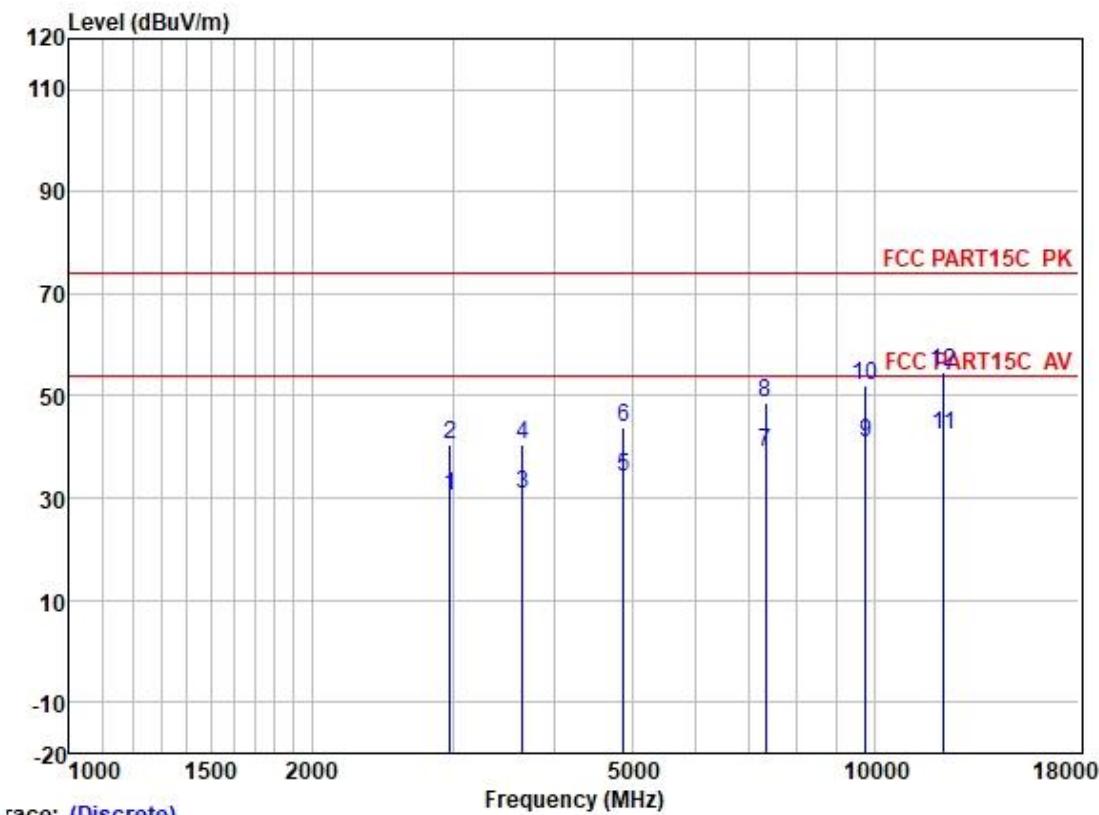
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Mode:a; Polarization:Horizontal; Modulation:n; bandwidth:40MHz; Channel:middle



Index	Freq	ReadAntenna		Cable		Preamp	Limit	Over	Limit Pol/Phase	Remark
		Level	Factor	Loss	Factor					
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2973.293	35.69	27.87	3.78	37.09	30.25	54.00	-23.75	HORIZONTAL	Average
2	2973.293	45.94	27.87	3.78	37.09	40.50	74.00	-33.50	HORIZONTAL	Peak
3	3661.149	34.81	28.34	4.53	36.93	30.75	54.00	-23.25	HORIZONTAL	Average
4	3661.149	44.56	28.34	4.53	36.93	40.50	74.00	-33.50	HORIZONTAL	Peak
5	4884.888	34.67	30.95	5.52	36.95	34.19	54.00	-19.81	HORIZONTAL	Average
6	4884.888	44.27	30.95	5.52	36.95	43.79	74.00	-30.21	HORIZONTAL	Peak
7	7326.267	33.98	35.74	6.13	36.92	38.93	54.00	-15.07	HORIZONTAL	Average
8	7326.267	43.92	35.74	6.13	36.92	48.87	74.00	-25.13	HORIZONTAL	Peak
9	9768.149	33.17	37.74	7.01	37.09	40.83	54.00	-13.17	HORIZONTAL	Average
10	9768.149	44.23	37.74	7.01	37.09	51.89	74.00	-22.11	HORIZONTAL	Peak
11	12210.390	32.22	39.21	8.08	37.06	42.45	54.00	-11.55	HORIZONTAL	Average
12	12210.390	44.52	39.21	8.08	37.06	54.75	74.00	-19.25	HORIZONTAL	Peak

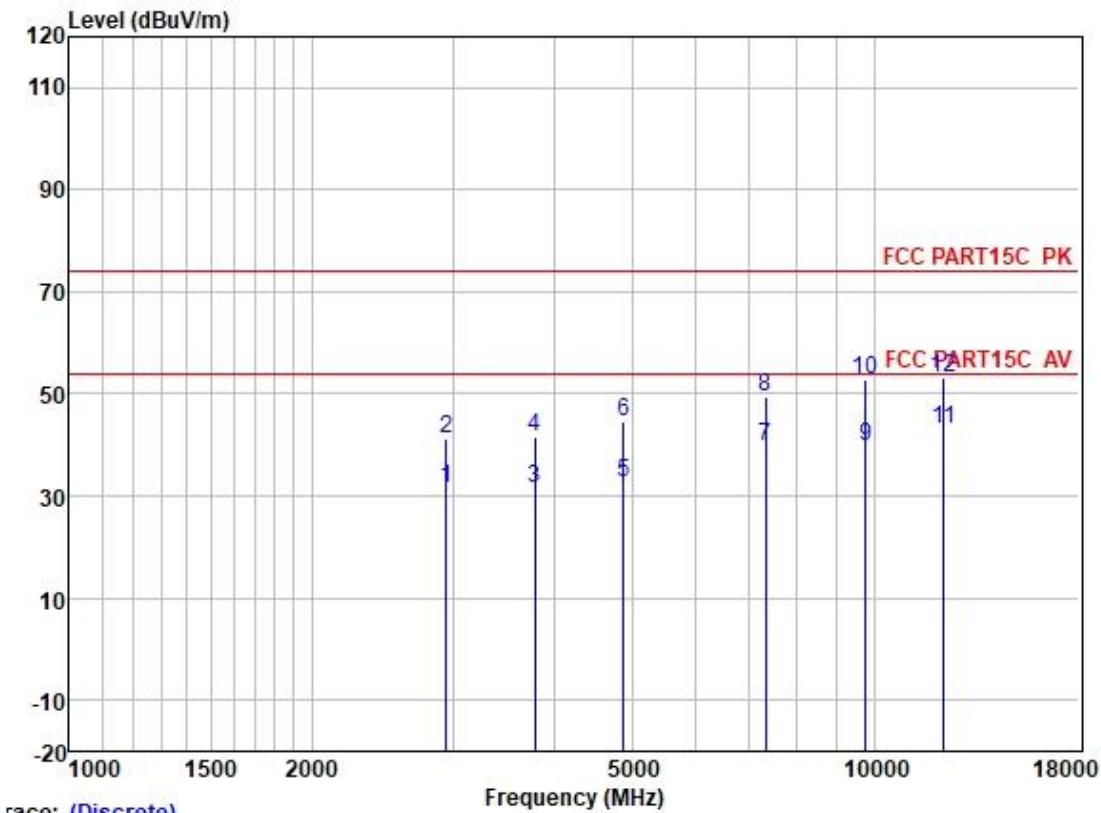
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Mode:a; Polarization:Vertical; Modulation:n; bandwidth:40MHz; Channel:middle



Trace: (Discrete)

Freq	Read	Antenna	Cable	Preamp	Limit	Over	Limit	Pol/Phase	Remark
	Level	Factor	Loss	Factor					
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2939.115	36.97	27.82	3.74	37.10	31.43	54.00	-22.57	VERTICAL Average
2	2939.115	46.85	27.82	3.74	37.10	41.31	74.00	-32.69	VERTICAL Peak
3	3790.361	34.77	28.97	4.60	36.92	31.42	54.00	-22.58	VERTICAL Average
4	3790.361	44.85	28.97	4.60	36.92	41.50	74.00	-32.50	VERTICAL Peak
5	4884.993	33.19	30.95	5.52	36.95	32.71	54.00	-21.29	VERTICAL Average
6	4884.993	44.93	30.95	5.52	36.95	44.45	74.00	-29.55	VERTICAL Peak
7	7326.914	34.87	35.74	6.13	36.92	39.82	54.00	-14.18	VERTICAL Average
8	7326.914	44.60	35.74	6.13	36.92	49.55	74.00	-24.45	VERTICAL Peak
9	9768.430	32.19	37.74	7.01	37.09	39.85	54.00	-14.15	VERTICAL Average
10	9768.430	44.98	37.74	7.01	37.09	52.64	74.00	-21.36	VERTICAL Peak
11	12210.470	32.85	39.21	8.08	37.06	43.08	54.00	-10.92	VERTICAL Average
12	12210.470	42.88	39.21	8.08	37.06	53.11	74.00	-20.89	VERTICAL Peak

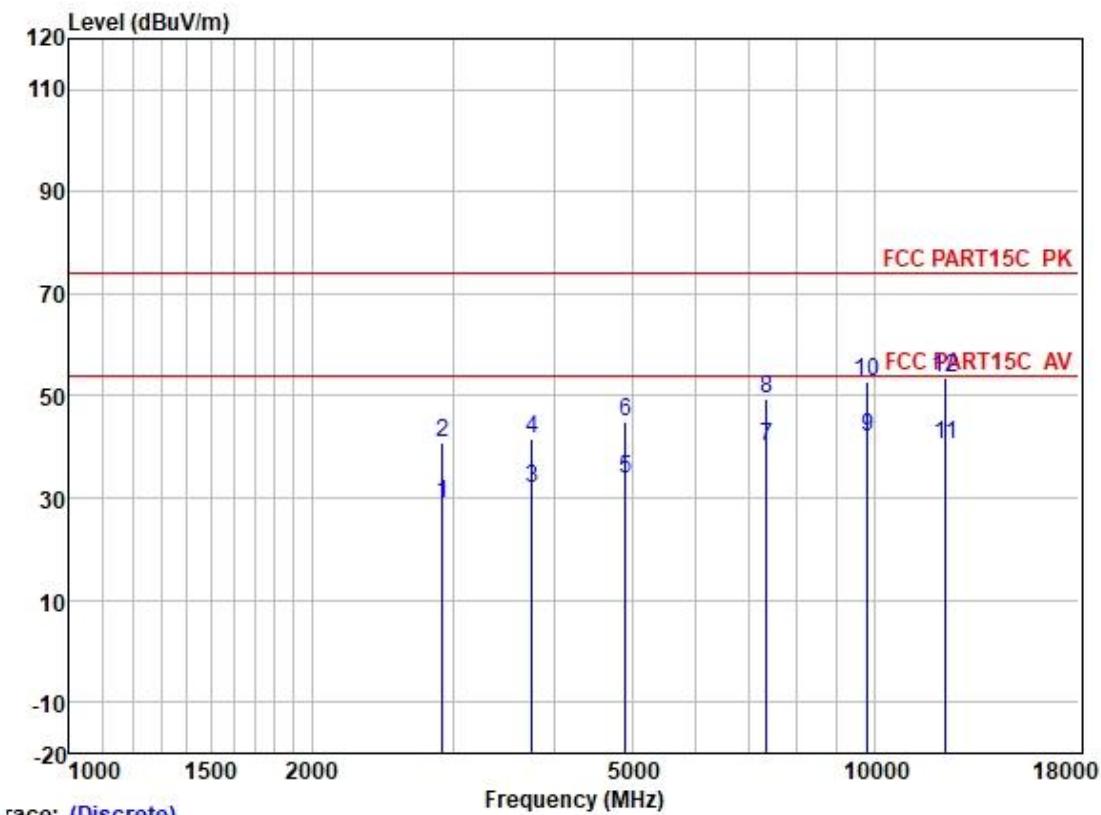
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Mode:a; Polarization:Horizontal; Modulation:n; bandwidth:40MHz; Channel:High



Trace: (Discrete)

Freq	Read	Antenna	Cable	Preamp	Limit	Over	Limit	Pol/Phase	Remark
	Freq	Level	Factor	Loss					
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2905.331	34.71	27.76	3.71	37.13	29.05	54.00	-24.95	HORIZONTAL Average
2	2905.331	46.41	27.76	3.71	37.13	40.75	74.00	-33.25	HORIZONTAL Peak
3	3757.637	35.44	28.82	4.58	36.92	31.92	54.00	-22.08	HORIZONTAL Average
4	3757.637	45.15	28.82	4.58	36.92	41.63	74.00	-32.37	HORIZONTAL Peak
5	4904.751	34.19	30.97	5.55	36.95	33.76	54.00	-20.24	HORIZONTAL Average
6	4904.751	45.25	30.97	5.55	36.95	44.82	74.00	-29.18	HORIZONTAL Peak
7	7356.052	34.96	35.78	6.15	36.92	39.97	54.00	-14.03	HORIZONTAL Average
8	7356.052	44.60	35.78	6.15	36.92	49.61	74.00	-24.39	HORIZONTAL Peak
9	9808.257	34.44	37.79	7.00	37.09	42.14	54.00	-11.86	HORIZONTAL Average
10	9808.257	45.09	37.79	7.00	37.09	52.79	74.00	-21.21	HORIZONTAL Peak
11	12260.740	30.47	39.15	8.06	37.03	40.65	54.00	-13.35	HORIZONTAL Average
12	12260.740	43.22	39.15	8.06	37.03	53.40	74.00	-20.60	HORIZONTAL Peak

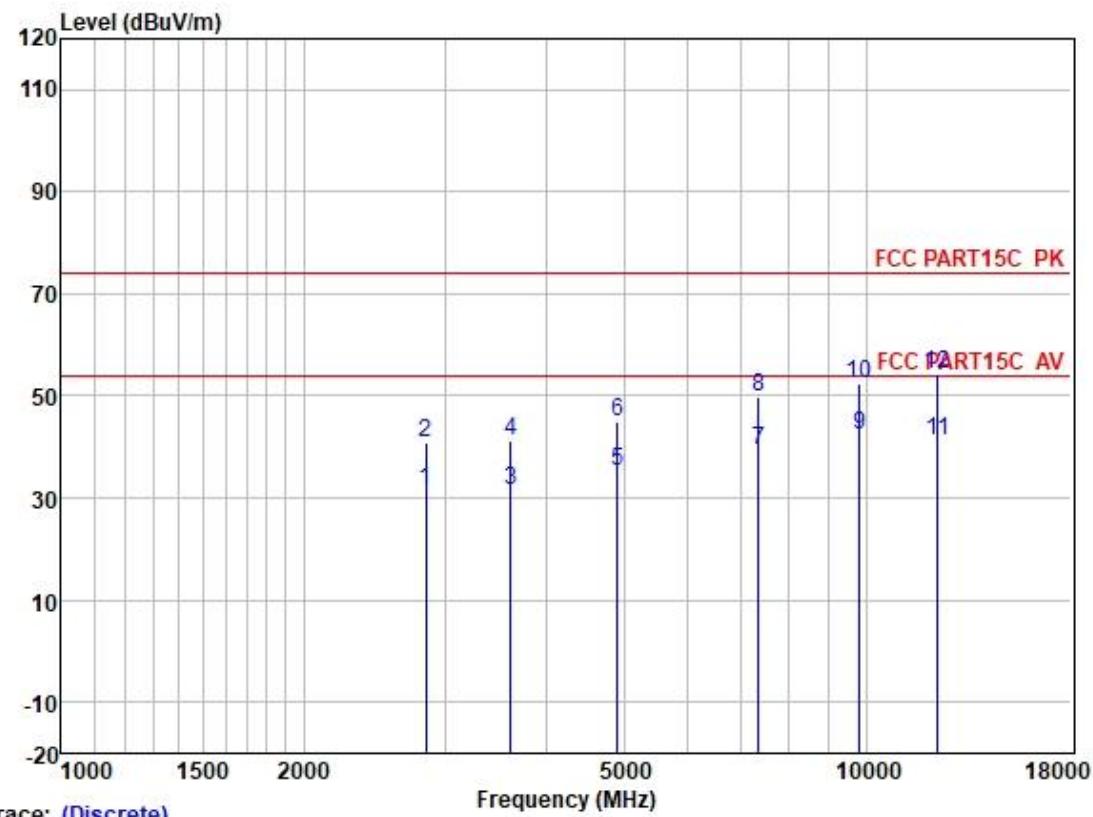
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Mode:a; Polarization:Vertical; Modulation:n; bandwidth:40MHz; Channel:High



Race: (Discrete)

Freq	Read	Antenna	Cable	Preamp	Limit	Over	Limit	Pol/Phase	Remark
	Level	Factor	Loss	Level					
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2838.921	37.48	27.63	3.70	37.19	31.62	54.00	-22.38	VERTICAL Average
2	2838.921	46.62	27.63	3.70	37.19	40.76	74.00	-33.24	VERTICAL Peak
3	3619.064	35.64	28.20	4.51	36.94	31.41	54.00	-22.59	VERTICAL Average
4	3619.064	45.36	28.20	4.51	36.94	41.13	74.00	-32.87	VERTICAL Peak
5	4902.751	35.82	30.97	5.55	36.95	35.39	54.00	-18.61	VERTICAL Average
6	4902.751	45.56	30.97	5.55	36.95	45.13	74.00	-28.87	VERTICAL Peak
7	7356.461	34.19	35.78	6.15	36.92	39.20	54.00	-14.80	VERTICAL Average
8	7356.461	44.96	35.78	6.15	36.92	49.97	74.00	-24.03	VERTICAL Peak
9	9808.588	34.68	37.79	7.00	37.09	42.38	54.00	-11.62	VERTICAL Average
10	9808.588	44.87	37.79	7.00	37.09	52.57	74.00	-21.43	VERTICAL Peak
11	12260.910	30.93	39.15	8.06	37.03	41.11	54.00	-12.89	VERTICAL Average
12	12260.910	44.10	39.15	8.06	37.03	54.28	74.00	-19.72	VERTICAL Peak

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8 Appendix

8.1 Appendix 15.247

(Cable loss =0.9dB)

1. 6dB Bandwidth

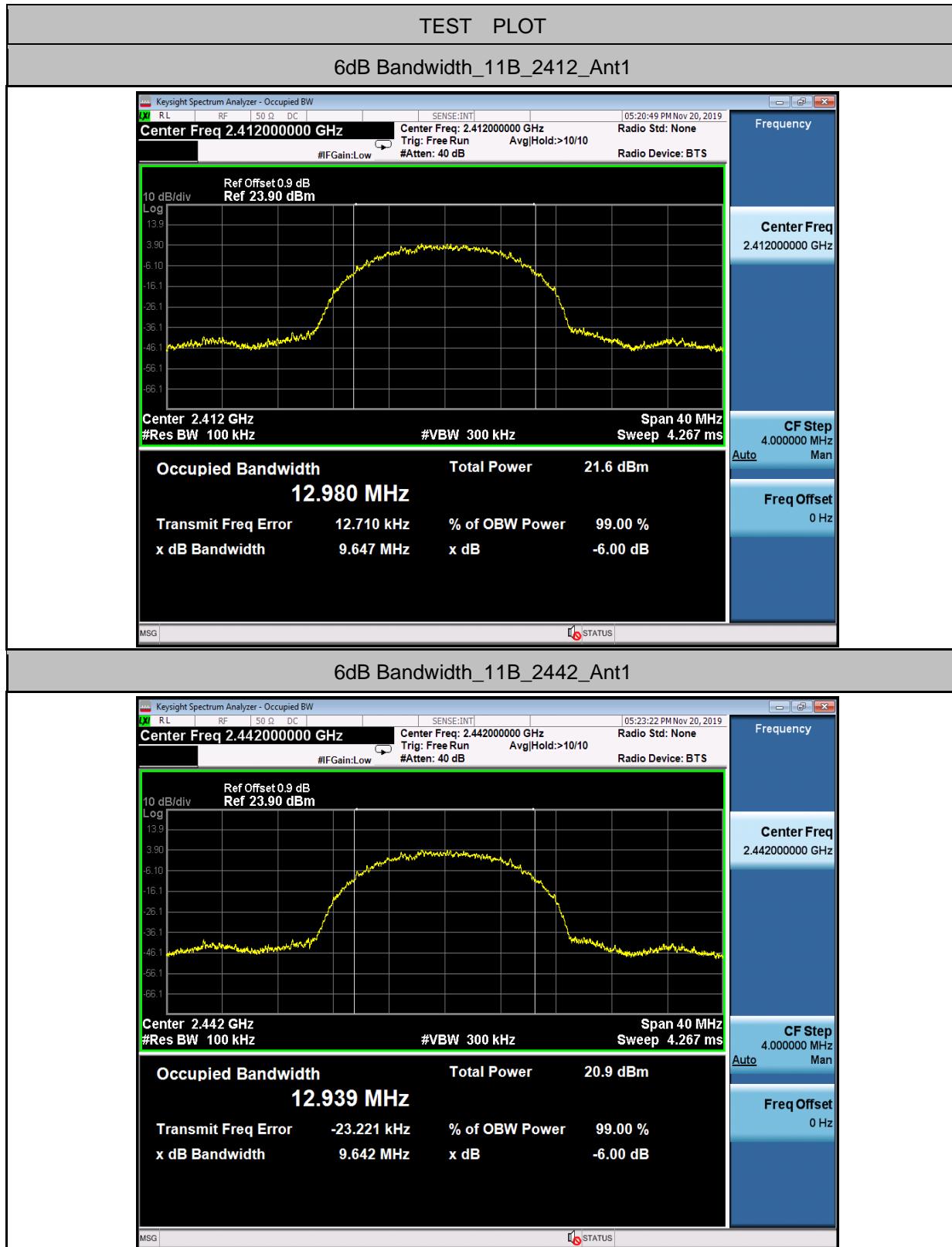
Test Mode	Test Channel	Ant	OBW[MHz]	EBW[MHz]	Limit	Verdict
11B	2412	Ant1	12.982	9.647	0.5	PASS
11B	2442	Ant1	12.941	9.642	0.5	PASS
11B	2462	Ant1	12.901	9.637	0.5	PASS
11G	2412	Ant1	16.415	16.52	0.5	PASS
11G	2442	Ant1	16.418	16.51	0.5	PASS
11G	2462	Ant1	16.418	16.52	0.5	PASS
11N20SISO	2412	Ant1	17.465	17.64	0.5	PASS
11N20SISO	2442	Ant1	17.463	17.65	0.5	PASS
11N20SISO	2462	Ant1	17.474	17.66	0.5	PASS
11N40SISO	2422	Ant1	36.100	36.44	0.5	PASS
11N40SISO	2442	Ant1	36.133	36.45	0.5	PASS
11N40SISO	2452	Ant1	36.138	36.45	0.5	PASS

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