

Test Report for FCC

FCC ID : 2AWCDRP70A-BIO

Report Number		ESTRFC2004-005	
Applicant	Company name	Gen2wave	
	Address	7th fl., Point town B/D, 187-4, Gumi-ro, Bundang-gu, Seongnam-si, Gyeonggi-do, Rep of Korea	
	Telephone	+82 607 7537	
	Contact person	Sungkil Lee	
Product	Product name	Tablet PC	
	Model No.	PR70A BIO	Manufacturer Gen2wave
	Serial No.	None	Country of origin KOREA
Test date	23-Mar-20 ~ 31-Mar-20	Date of issue	28-Apr-20
Testing location	140-16, Eongmalli-ro, Majang-myeon, Icheon-si, Gyeonggi-do, Korea		
Standard	FCC PART 15 Subpart E (15.407):2015 , ANSI C 63.10(2013) , KDB 789033 D02(2016)		
Measurement facility registration number		659627	
Tested by	Senior Engineer H.G. Lee	(Signature)	
Reviewed by	Engineering Manager I.K. Hong	(Signature)	
Abbreviation	OK, Pass = Passed, Fail = Failed, N/A = not applicable		
<p>* Note</p> <ul style="list-style-type: none"> - This test report is not permitted to copy partly without our permission - This test result is dependent on only equipment to be used - This test result based on a single evaluation of one sample of the above mentioned - This test report is not related to KOLAS accreditation - Additional models name: MetaDolce MD7200-BIO, RP70 - (Basic and additional Model(s) are same products, only model name are different) 			

Contents 1

1. Laboratory Information	4
2. Description of EUT	5
3. Test Standards	7
4. Measurement condition	8
4.1 Measurement equipment	8
4.2 EUT Operation	9
4.3 Configuration and Peripherals	9
4.4 EUT and Support equipment	10
4.5 Cable Connecting	10
5. Measurement of radiated emission.....	11
5.1 Measurement equipment	11
5.2 Environmental conditions	11
5.3 Measurement Instrument setting for Radiated Emission	12
5.4 Test data (Below 1 GHz).....	13
5.4-3 Test data (Above 1 GHz).....	15
6. Measurement of conducted disturbance	85
6.1 Measurement equipments	85
6.2 Environmental Condition	85
6.3 Test data	86
7. On Time, Duty Cycle and Measurement Methods	90
7.1 Test procedure	90
7.2 Test instruments and measurement setup	90
7.3 Measurement results	90
7.4 Trace data	91

8. Emission bandwidth and 99% Occupied Bandwidth	93
8.1 Test procedure	93
8.2 Test instruments and measurement setup	93
8.3 Measurement results	94
8.4 Trace data	95
9. 6dB Bandwidth Measurement	101
9.1 Test procedure	101
9.2 Test instruments and measurement setup	101
9.3 Test setup	101
9.4 Measurement results.....	102
9.5 Trace data.....	103
10. MAXIMUM CONDUCTED OUTPUT POWER	109
10.1 Test procedure	109
10.2 Test instruments and measurement setup	109
10.3 Measurement results	110
11. Peak power spectral density (PPSD)	112
11.1 Test procedure	112
11.2 Test instruments and measurement setup	112
11.3 Measurement results.....	113
11.4 Trace data.....	114
11.5 Measurement results.....	120
11.6 Trace data.....	121
12. Frequency Stability	127
12.1 Test procedure	127
12.2 Test instruments and measurement setup	127
13.1 Band edge and Emission Mask.....	129
13.1 Test procedure	129
13.2 Test instruments and measurement setup	129
13.3 Measurement results.....	129
13.4 Trace data of band-edge.....	131

Appendix I Special diagram
Appendix II Antenna Information



1. Laboratory Information

1.1 General

This EUT (Equipment Under Test) has been shown to be capable of compliance with the applicable technical standards and is tested in accordance with the measurement procedures as indicated in this report.

ESTECH Lab attests to accuracy of test data. All measurement reported herein were performed by ESTECH Co., Ltd.

ESTECH Lab assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

1.2 Test Lab.

Corporation Name : ESTECH Co., Ltd.

Head Office : Suite 1015 World Meridian II, 123 Gasan Digital 2-ro, Geumcheon-gu, Seoul 153-759, R. O. Korea

EMC Test Lab. : 347-69, Jungbu-daero 147beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do 467-811, R. O. Korea

1.3 Official Qualification(s)

KCC : Granted Accreditation from Ministry of Information & Communication for EMC, Safety and Telecommunication

FCC : Conformity Assessment Body(CAB) with registration number 659627 under APEC TEL MRA between the RRA and the FCC

VCCI : Granted Accreditation from Voluntary Control Council for Interference from ITE

2. Description of EUT

2.1 Summary of Equipment Under Test (WLAN)

Modulation Type	:	WLAN(OFDM)
Rating	:	INPUT: AC(100 – 240) V, (50–60)Hz, 1 A OUTPUT: DC 5 V, 5 A
Receipt Date	:	18-Feb-20
X-tal list(s) or Frequencies generated	:	The highest operating frequency is 5825 MHz(WLAN) XTAL : 32.768 kHz , OSC : 24 MHz

2.2 General descriptions of EUT

Category	Specification	
Performance Characteristics	CPU	Hexa core CPU Cortex A72 Dual-core 1.8GHz, Cortex A53 Quad core 1.4Ghz
	RAM	4GB
	ROM	32GB (64GB / 128GB optional)
	OS	Android 8.1 Oreo
Integrated Radios	Wireless WAN	LTE, HSPA+
	Wireless LAN	IEEE 802.11 a/b/g/n/ac (2.4, 5GHz)
	Bluetooth	Bluetooth 4.2 BLE
	GPS	AGPS (GLONASS optional)
	Camera	Front Camera : 2MP / Rear Camera : 13MP Auto Focus
		LED Flash
	1D/2D Imager	2D Imager (SW Decoder) : Zebra SE4710
	RFID	NXP PN548 HF 13.56MHz, Read Tag : 14443A/B, 15693
DATA CAPTURE	SAM	2 SAM Slot
	OCR(MRZ)	Font : OCR B MRZ Lines : 1 line : IDL, CAN, etc 2 line : ID2 cards, Epp
	Fingerprint	Module : BM-Slim 2 (Suprema) Sensor Type : Optical Sensor Sensing Area : 16.5mm(W) x 21.0mm(L) Pixel Resolution : 500 ppi Gray Scale : 256 level Output Image Format : RAW, BMP, WSQ, ISO 19794-4 Format : FBI PIV certified, FBI Mobile ID FAP 20 certified



Category	Specification	
DATA CAPTURE	Contact Smart Card	Contact type Smart Card Reader (gemalto) : ISO7816
	Iris Recognition (Opal)	Camera : 5MP B&W CMOS sensor Operating Range : 320±0mm (11"~14") Resolution : Above 160 pixel/cm Iris Capture Volume : 130mm x 45mm x 80mm Illumination : IR LED Image : 2592 x 920 x 30 Frame
Physical Characteristics	Demensions	213mm(H) x 195.3mm(W) x 30.55mm / 21mm : Minimum Thickness (D)
	Weight	850g
	Display	7.0Inch / HD(1280x800)
	Display Visibility	700 nits (cd/m2)
	Touchpanel	Capacitive Touch / 10 point multi touch / Gorilla Glass 3
	Keypad	3 Front Key / 5 Side Key (Programmable)
	Battery	Built in Battery : Li-Polymer, 3.7V, 10,050mAh
	Expansion Slot	MicroSDXC upto 2TB supported Communication
ETC	Communication	Tablet side : USB3.0 Host, USB2.0 Client(OTG) Extension 10pin connector : Serial, USB2.0 Host I/O 25pin connector : USB2.0 Host, HDMI, Serial, Ethernet (with cradle)
	Audio	Dual Speaker, MIC
	Jack	DC jack, USB3.0 Host, USB2.0 Client, 3.5phi Ear-Mic Jack
	IO connector	POGO 25 pin (Power, RS232, USB 3port, HDMI, Ethernet)
	Extention pin	POGO 10 pin
	LED	Front 2 LED : Charging, Power
	Sensor	Acceleration Sensor, Compass, Ambient Light Sensor
	power	DC Jack 5V / 5A Adaptor
User Environment	Use time	Stand-by time : > 150hr Working time : > 8hr
	Operating Temp	-20℃~ 70℃
	storage Temp	-30℃~ 70℃
	umidity	Non-condensing, 93%
	Drop	1.2 m

3. Test Standards

Test Standard : FCC PART 15 Subpart E (15.407) : 2015

This Standard sets out the regulations under which an intentional, unintentional, or incidental radiator may be operated without an individual license. It also contains the technical specifications, administrative requirements and other conditions relating to the marketing of Part 15 devices.

Test Method : ANSI C 63.10 (2013) & KDB 789033 D02 (2017)

This standard sets forth uniform methods of measurement of radio-frequency (RF) signals and noise emitted from both unintentional and intentional emitters of RF energy in the frequency range 9 kHz to 40 GHz. Methods for the measurement of radiated and AC power-line conducted radio noise are covered and may be applied to any such equipment unless otherwise specified by individual equipment requirements. These methods cover measurement of certain devices that deliberately radiate energy, such as intentional emitters, but does not cover licensed transmitters. This standard is not intended for certification/approval of avionic equipment or for industrial, scientific, and medical (ISM) equipment. These methods apply to the measurement of individual units or systems comprised of multiple units.

Summary of Test Results

Applied Standard : 47 CFR Part 15 Subpart E				remark
Standard	Test Type	Result	Remark	
15.207	AC Power Conducted Emission	Pass	Meet the requirement	LINE CONDUCTED
15.205 15.209 15.407(b.1) 15.407(b.2) 15.407(b.3)	Transmitter radiated spurious emissions and Conducted spurious emission	Pass	Meet the requirement	RADIATED
15.407(a.1,3)	26 dB Bandwidth	Pass	Meet the requirement	CONDUCTED
15.407(a.1,3)	6 dB Bandwidth	Pass	Meet the requirement	
15.407(a.1,3)	Maximum output power/average output power	Pass	Meet the requirement	
15.407(a.1,3)	Power Spectral Density	Pass	Meet the requirement	
15.407(g)	Frequency Stability	Pass	Meet the requirement	
15.407(b)(1)(4)	Band Edge Measurement	Pass	Meet the requirement	
15.407(b) & 15.205 & 15.209	Spurious emission	Pass	Meet the requirement	

4. Measurement Condition

4.1 EUT Operation

a. Channel

Mode	UNII Band	Channel Bandwidth (MHz)	Conducted Power	MAX Power(dBm)
802.11a	1	20	5180 – 5240	6.25
	4	20	5745 – 5825	7.98
802.11n HT20	1	20	5180 – 5240	6.86
	4	20	5745 – 5825	4.75
802.11n HT40	1	40	5190 – 5230	3.4
	4	40	5755 – 5795	2.53
802.11ac VHT80	1	80	5210	0.66
	4	80	5775	0.57

b. Measurement Channel :

802.11a (5180 MHz),(5220 MHz),(5240 MHz), 802.11a (5745 MHz),(5785 MHz),(5825 MHz)
 802.11n HT20 (5180 MHz),(5220 MHz),(5240 MHz), 802.11n HT20 (5745 MHz),(5785 MHz),(5825 MHz)
 802.11n HT40 (5190 MHz), 802.11n HT40 (5795 MHz)
 802.11ac VHT80 (5210 MHz), 802.11ac VHT80 (5775 MHz)

c. Test Mode : 802.11a, 802.11n HT20, 802.11n HT40, 802.11n VHT80

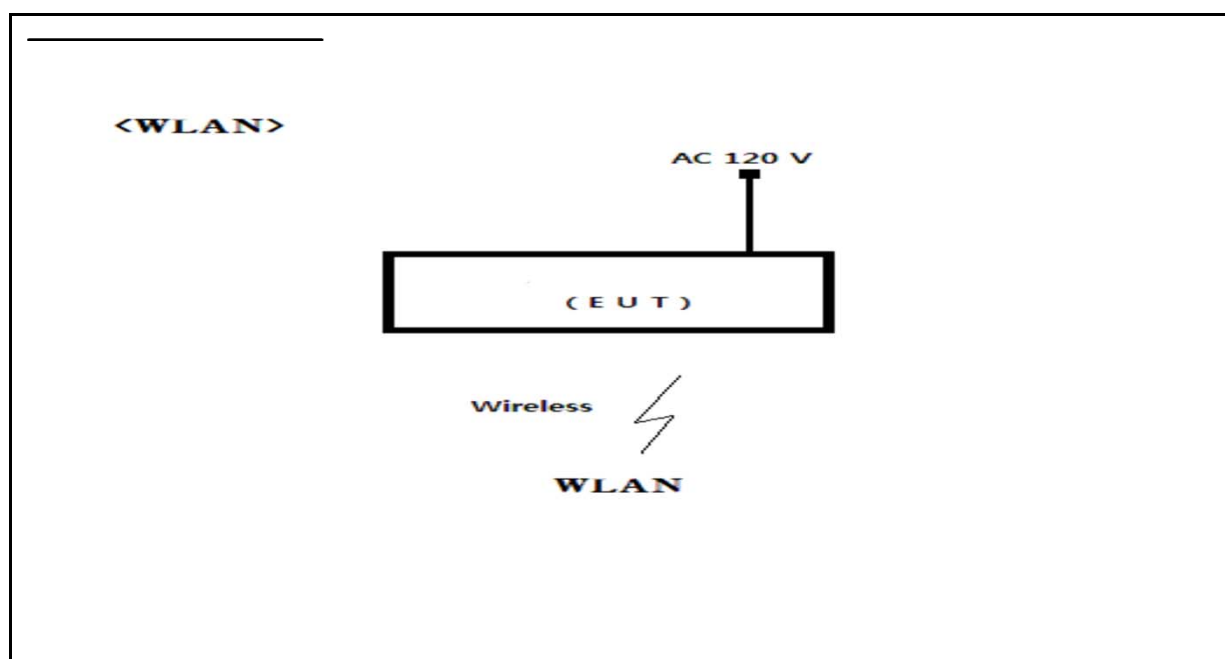
d. Test rate : the worst case of rate

802.11a:54 Mbps, 802.11n HT20: Mcs7, 802.11n HT40: Mcs7, 802.11ac VHT80: VHT9

4.2 EUT Operation.

- The EUT was in the following operation mode during all testing
 - * Wireless LAN 5 GHz operation check
 - * Transmit mode were measured each channels(802.11a, 802.11n HT20, 802.11n HT40, 802.11ac VHT80)

4.3 Configuration and Peripherals



4.4 EUT and Support equipment

Equipment Name	Model Name	S/N	Manufacturer	Remark (FCC ID)
Tablet PC	PR70A BIO	NONE	Gen2wave	EUT
Adapter	ATS036T-P050	NONE	Boayang Electronics Co., Ltd.	

4.5 Cable Connecting

Start Equipment		End Equipment		Cable Standard		Remark
Name	I/O port	Name	I/O port	Length	Shielded	
Tablet PC	Power	Adapter	-	2	Unshielded	

5. Measurement of radiated disturbance

Above 30 MHz Electric Field strength was measured in accordance with FCC PART 15.205, 15.209. The test setup was made according to ANSI C 63.10 (2013) & KDB 789033 D02 Semi-anechoic chamber, which allows a 3 m distance measurement. The EUT was placed in the center of styrofoam turntable. The height of this table was 0.8 m. The measurement was conducted with both horizontal and vertical antenna polarization. The turntable has fully rotated. For further description of the configuration refer to the picture of the test setup.

5.1 Measurement equipments

Equipment Name	Type	Manufacturer	Serial No.	Next Calibration date
TEST Receiver	ESCI7	ROHDE & SCHWARZ	100916	9-Sep-20
Logbicon Antenna	VULB 9168	SCHWARZBECK	193	14-Jan-22
Turn Table	DT3000-2t	Innco System GmbH	N/A	-
Antenna Mast	MA4000-EP	Innco System GmbH	N/A	-
PREAMPLIFIER	8449B	AGILENT	3008A00581	9-Sep-20
Horn Antenna	BBHA9120D	SCHWARZBECK	469	6-Jan-21
Test Receiver	ESPI7	ROHDE & SCHWARZ	100185	9-Sep-20
Signal Analyzer	FSV40	ROHDE & SCHWARZ	100393	2-Dec-20
Turn Table	DT1500-S	Innco System GmbH	N/A	-
Antenna Mast	MA4000-EP	Innco System GmbH	N/A	-
Horn Antenna	BBHA 9170	SCHWARZBECK	752	1-Nov-20
Antenna Master & Turn table controller	C02000-P	Innco System GmbH	CO2000/642 /28051111/L	-

5.2 Environmental Condition

Below 1 GHz -Test Place : 10 m Semi-anechoic chamber

Wireless LAN 802.11a, 802.11n HT20, 802.11n HT40, 802.11ac VHT80

Temperature (°C) : (21.2 ~ 22.4) °C

Humidity (% R.H.) : (48.1 ~ 49.5) % R.H.

5.3 Measurement Instrument setting for Radiated Emission

5.3.1 Frequency range below 1 GHz

RBW: 120 kHz , VBW: 3 x RBW , Detector: Quasi Peak

5.3.2 Frequency range above 1 GHz

Peak Power Measurement Procedure (KDB 789033 section H3) 5)

a.RBW: 1 MHz , VBW: 3 MHz

b.Trace mode = max hold

c.Detector: Peak

d.Sweep time = auto

Average Power Measurement Procedures (KDB 789033 section H3) 6)

a.Set analyzer center frequency to the frequency associated with the emission

b.RBW: 1 MHz , VBW: 3 MHz

c.Detector : RMS detector

d.Sweep time = auto

Note

Band	Duty cycle(%)	Ton (ms)	Ton + Toff (ms)	DCF=10*log(1/Duty) (dB)
802.11a	63.70	0.179	0.281	1.958
802.11n HT20	62.10	0.167	0.269	2.069
802.11n HT40	48.80	0.098	0.201	3.115
802.11ac VHT80	76.40	0.331	0.433	1.169

*This was applied of duty cycle factor for average value because of measured with the EUT transmitting continuously less than 100% duty cycle at its maximum power control level.

5.4-1 Test Data for wireless LAN (802.11a)

Test Date : 23-Mar-20

Measurement Distance : 3 m

Frequency (MHz)	Reading (dB μ V)	Position (V/H)	Height (m)	Correction Factor		Result Value		
				Ant Factor (dB)	Cable (dB)	Limit (dB μ V/m)	Result (dB μ V/m)	Margin (dB)
40.70	13.23	V	1.0	12.91	1.51	40.00	27.65	12.35
200.00	19.59	H	1.8	9.90	2.21	43.50	31.70	11.80
400.00	15.63	H	1.6	15.40	3.21	46.00	34.24	11.76
600.00	18.13	V	1.5	19.50	3.96	46.00	41.59	4.41
800.00	13.05	V	1.4	22.40	4.64	46.00	40.09	5.91
1000.00	9.17	V	1.8	24.29	5.22	54.00	38.68	15.32
Remark	<p>H : Horizontal, V : Vertical TEST MODE : 802.11a</p> <p>*Result Value = Reading + Ant Factor + Cable loss</p> <p>*The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection at frequency below 1 GHz.</p>							

5.4-3 Test Data for wireless LAN (802.11a) – CH 36

Test Date : 24-Mar-20

Measurement Distance : 3 m

Frequency (MHz)	Reading (dBμV)	Position (V/H)	Height (m)	Correction Factor		Duty Cycle Correction (dB)	Result Value		
				Ant Factor (dB)	Cable (dB)		Limit (dBμV/m)	Result (dBμV/m)	Margin (dB)
PEAK (RBW:1 MHz VBW:3 MHz)									
5150.00	46.10	H	1.5	31.93	-27.13	/	74.00	50.89	-23.11
5150.00	44.67	V	1.5	31.93	-27.13	/	74.00	49.46	-24.54
10360.00	46.52	H	1.5	39.54	-23.14	/	74.00	62.92	-11.08
10360.00	46.37	V	1.5	39.54	-23.14	/	74.00	62.77	-11.23
Average (RBW:1 MHz VBW:3 MHz)									
5150.00	33.77	H	1.5	31.93	-27.13	1.958	54.00	40.52	-13.48
5150.00	33.60	V	1.5	31.93	-27.13	1.958	54.00	40.35	-13.65
10360.00	32.77	H	1.5	39.54	-23.14	1.958	54.00	51.13	-2.87
10360.00	32.69	V	1.5	39.54	-23.14	1.958	54.00	51.05	-2.95
Remark	<p>H : Horizontal, V : Vertical TEST MODE : 802.11a-CH 36 (5180 MHz)</p> <p>*The TX signal wasn't detected from 3th harmonics.</p> <p>*Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Duty Cycle Correction</p> <p>*This test was radiated up to 26.5 GHz but no noise was measured.</p>								

5.4-4 Test Data for wireless LAN (802.11a) – CH 44

Test Date : 24-Mar-20

Measurement Distance : 3 m

Frequency (MHz)	Reading (dBμV)	Position (V/H)	Height (m)	Correction Factor		Duty Cycle Correction (dB)	Result Value		
				Ant Factor (dB)	Cable (dB)		Limit (dBμV/m)	Result (dBμV/m)	Margin (dB)
PEAK (RBW:1 MHz VBW:3 MHz)									
10440.00	46.67	H	1.6	39.74	-23.11	/	74.00	63.30	-10.70
10440.00	46.52	V	1.6	39.74	-23.11	/	74.00	63.15	-10.85
Average (RBW:1 MHz VBW:3 MHz)									
10440.00	32.59	H	1.6	39.74	-23.11	1.958	54.00	51.18	-2.82
10440.00	32.60	V	1.6	39.74	-23.11	1.958	54.00	51.19	-2.81
Remark	<p>H : Horizontal, V : Vertical TEST MODE : 802.11ac-CH 44 (5220 MHz)</p> <p>*The TX signal wasn't detected from 3th harmonics.</p> <p>*Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Duty Cycle Correction</p> <p>*This test was radiated up to 26.5 GHz but no noise was measured.</p>								

5.4-5 Test Data for wireless LAN (802.11a) – CH 48

Test Date : 24-Mar-20

Measurement Distance : 3 m

Frequency (MHz)	Reading (dBμV)	Position (V/H)	Height (m)	Correction Factor		Duty Cycle Correction (dB)	Result Value		
				Ant Factor (dB)	Cable (dB)		Limit (dBμV/m)	Result (dBμV/m)	Margin (dB)
PEAK (RBW:1 MHz VBW:3 MHz)									
5350.00	44.89	H	1.6	31.93	-26.98	/	74.00	49.84	-24.16
5350.00	45.63	V	1.6	31.93	-26.98	/	74.00	50.58	-23.42
10480.00	47.06	H	1.6	39.85	-23.10	/	74.00	63.81	-10.19
10480.00	47.52	V	1.6	39.85	-23.10	/	74.00	64.27	-9.73
Average (RBW:1 MHz VBW:3 MHz)									
5350.00	34.29	H	1.6	31.93	-26.98	1.958	54.00	41.19	-12.81
5350.00	33.94	V	1.6	31.93	-26.98	1.958	54.00	40.84	-13.16
10480.00	32.69	H	1.6	39.85	-23.10	1.958	54.00	51.40	-2.60
10480.00	32.80	V	1.6	39.85	-23.10	1.958	54.00	51.51	-2.49
Remark	<p>H : Horizontal, V : Vertical TEST MODE : 802.11a-CH 48 (5240 MHz)</p> <p>*The TX signal wasn't detected from 3th harmonics.</p> <p>*Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Duty Cycle Correction</p> <p>*This test was radiated up to 26.5 GHz but no noise was measured.</p>								

5.4-6 Test Data for wireless LAN (802.11a) – CH 149

Test Date : 24-Mar-20

Measurement Distance : 3 m

Frequency (MHz)	Reading (dBμV)	Position (V/H)	Height (m)	Correction Factor		Duty Cycle Correction (dB)	Result Value		
				Ant Factor (dB)	Cable (dB)		Limit (dBμV/m)	Result (dBμV/m)	Margin (dB)
PEAK (RBW:1 MHz VBW:3 MHz)									
5460.00	45.05	H	1.6	31.90	-26.92	/	74.00	50.03	-23.97
5460.00	44.85	V	1.6	31.90	-26.92	/	74.00	56.92	-17.08
11490.00	47.12	H	1.6	40.22	-21.78	/	74.00	65.56	-8.44
11490.00	47.04	V	1.6	40.22	-21.78	/	74.00	65.48	-8.52
Average (RBW:1 MHz VBW:3 MHz)									
5460.00	33.84	H	1.6	31.90	-26.92	1.958	54.00	40.77	-13.23
5460.00	33.81	V	1.6	31.90	-26.92	1.958	54.00	40.74	-13.26
11490.00	32.05	H	1.6	40.22	-21.78	1.958	54.00	52.45	-1.55
11490.00	32.21	V	1.6	40.22	-21.78	1.958	54.00	52.61	-1.39
Remark	<p>H : Horizontal, V : Vertical TEST MODE : 802.11a-CH 149 (5745 MHz)</p> <p>*The TX signal wasn't detected from 3th harmonics. *Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Duty Cycle Correction *This test was radiated up to 26.5 GHz but no noise was measured.</p>								

5.4-7 Test Data for wireless LAN (802.11a) – CH 157

Test Date : 24-Mar-20

Measurement Distance : 3 m

Frequency (MHz)	Reading (dBμV)	Position (V/H)	Height (m)	Correction Factor		Duty Cycle Correction (dB)	Result Value		
				Ant Factor (dB)	Cable (dB)		Limit (dBμV/m)	Result (dBμV/m)	Margin (dB)
PEAK (RBW:1 MHz VBW:3 MHz)									
11570.00	46.91	H	1.5	40.02	-21.70	/	74.00	65.23	-8.77
11570.00	46.84	V	1.5	40.02	-21.70		74.00	65.16	-8.84
Average (RBW:1 MHz VBW:3 MHz)									
11570.00	32.11	H	1.5	40.02	-21.70	1.958	54.00	52.39	-1.61
11570.00	32.30	V	1.5	40.02	-21.70	1.958	54.00	52.58	-1.42
Remark	<p>H : Horizontal, V : Vertical TEST MODE : 802.11a-CH 157 (5785 MHz)</p> <p>*The TX signal wasn't detected from 3th harmonics. *Total = Reading Value + Antenna Factor + Cable Loss – Amp Gain + Duty Cycle Correction *This test was radiated up to 26.5 GHz but no noise was measured.</p>								

5.4-8 Test Data for wireless LAN (802.11a) – CH 165

Test Date : 24-Mar-20

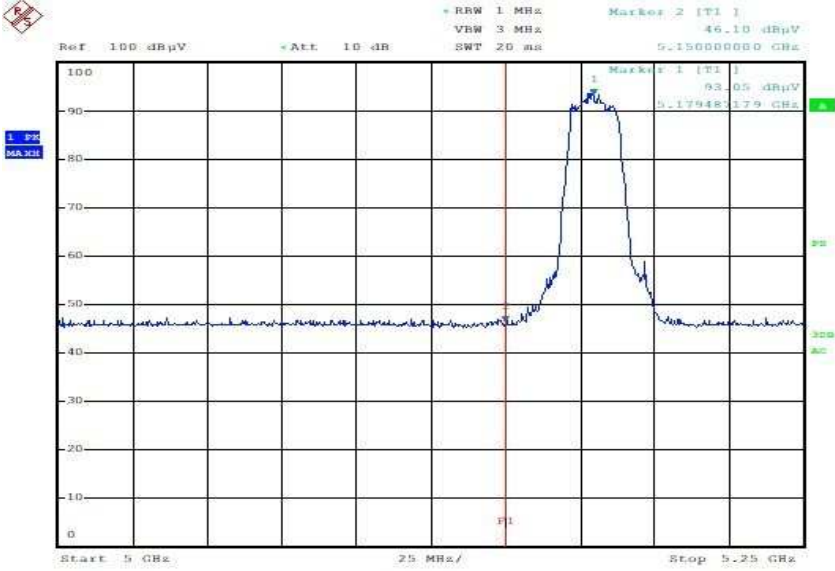
Measurement Distance : 3 m

Frequency (MHz)	Reading (dBμV)	Position (V/H)	Height (m)	Correction Factor		Duty Cycle Correction (dB)	Result Value		
				Ant Factor (dB)	Cable (dB)		Limit (dBμV/m)	Result (dBμV/m)	Margin (dB)
PEAK (RBW:1 MHz VBW:3 MHz)									
5460.00	44.29	H	1.5	31.90	-26.92	/	74.00	49.27	-24.73
5460.00	44.57	V	1.5	31.90	-26.92	/	74.00	49.55	-24.45
11610.00	46.73	H	1.5	39.91	-21.66	/	74.00	64.99	-9.01
11610.00	46.69	V	1.5	39.91	-21.66	/	74.00	64.95	-9.05
Average (RBW:1 MHz VBW:3 MHz)									
5460.00	33.85	H	1.5	31.90	-26.92	1.958	54.00	40.78	-13.22
5460.00	33.85	V	1.5	31.90	-26.92	1.958	54.00	40.78	-13.22
11610.00	32.06	H	1.5	39.91	-21.66	1.958	54.00	52.27	-1.73
11610.00	32.14	V	1.5	39.91	-21.66	1.958	54.00	52.35	-1.65
Remark	<p>H : Horizontal, V : Vertical TEST MODE : 802.11ac-CH 165 (5825 MHz)</p> <p>*The TX signal wasn't detected from 3th harmonics. *Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Duty Cycle Correction *This test was radiated up to 26.5 GHz but no noise was measured.</p>								

5.4-9 Restricted Band Edges (802.11a)-CH 36

Detector mode:Peak

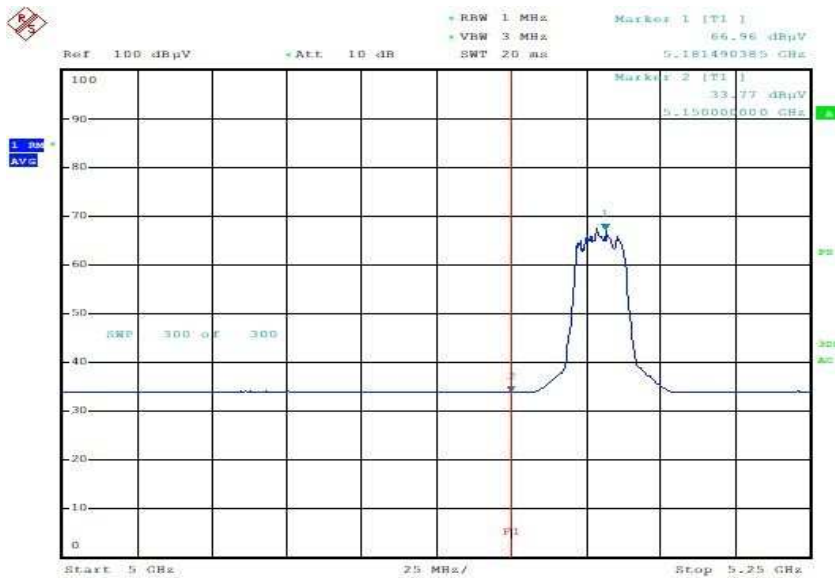
Polarity:Horizontal



RF70A BIO_11a_CH36_PEAK_HOR

Detector mode:Average

Polarity:Horizontal

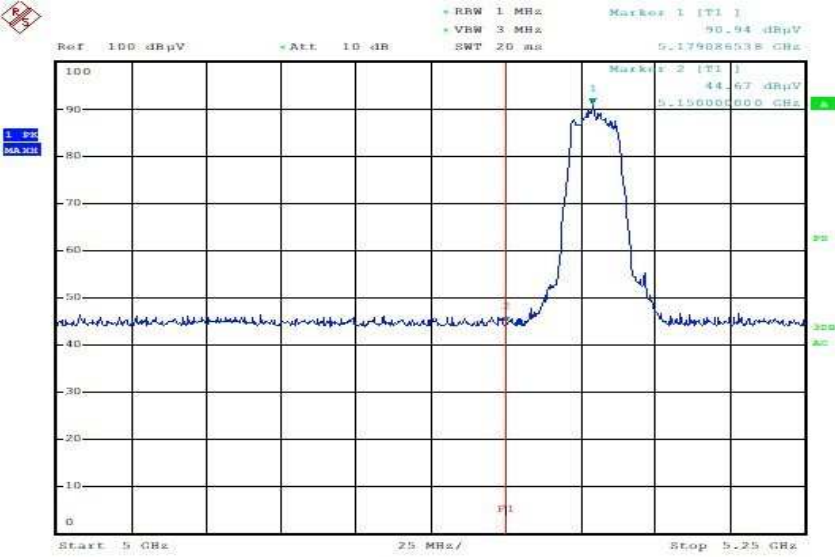


RF70A BIO_11a_CH36_AV_HOR

Restricted Band Edges (802.11a)-CH 36

Detector mode:Peak

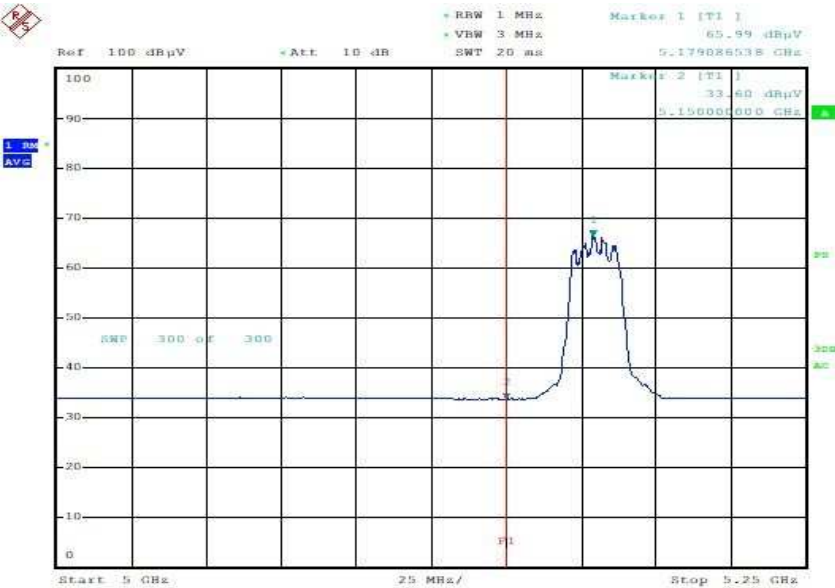
Polarity:Vertical



RP70A BIO_11a_CH36_PEAK_VER

Detector mode:Average

Polarity:Vertical

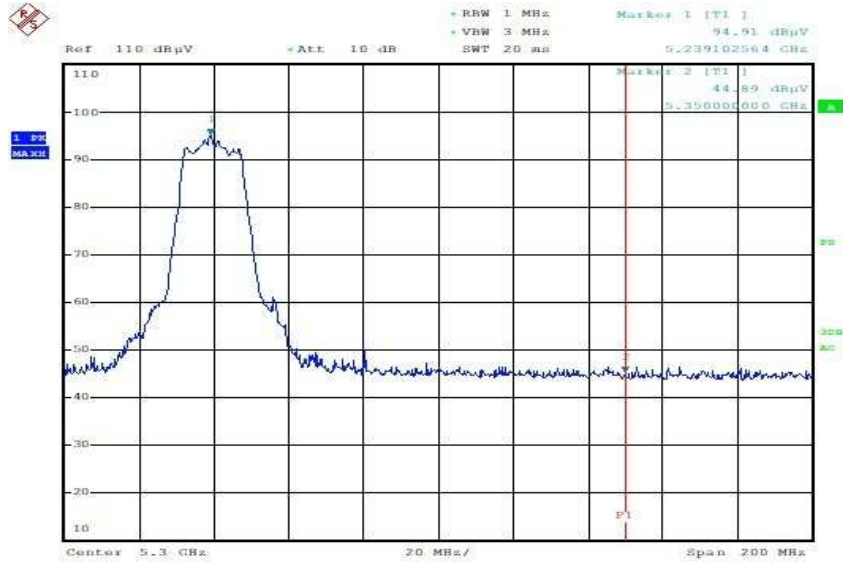


RP70A BIO_11a_CH36_AV_VER

Restricted Band Edges (802.11a)-CH 48

Detector mode:Peak

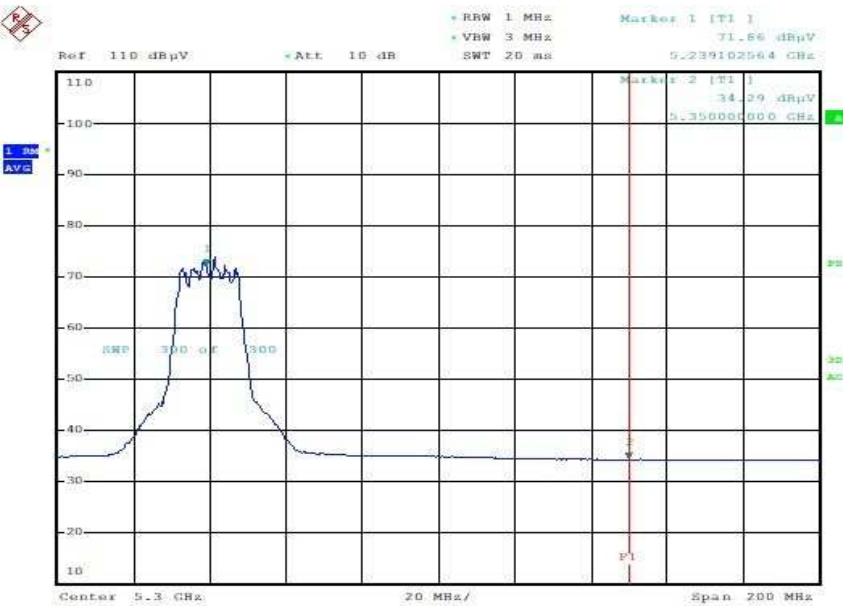
Polarity:Horizontal



RF70A BIO_11a_CH48_PEAK_HOR

Detector mode:Average

Polarity:Horizontal

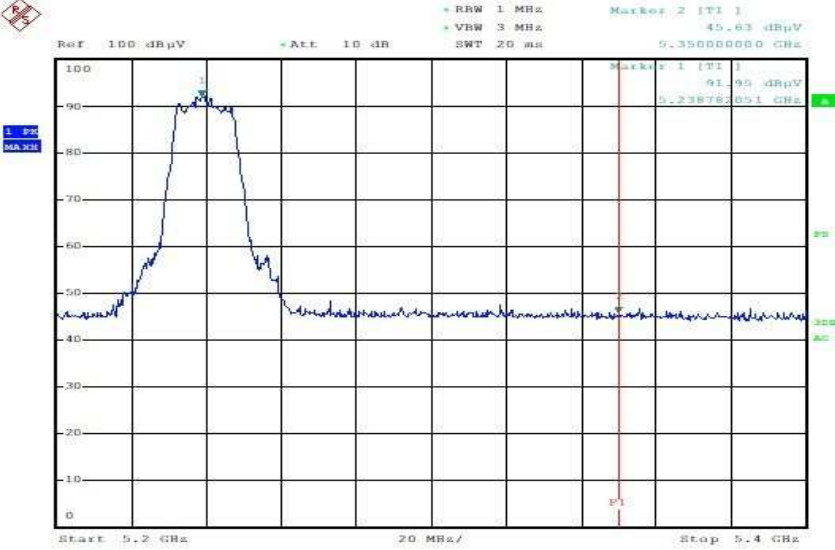


RF70A BIO_11a_CH48_AV_HOR

Restricted Band Edges (802.11a)-CH 48

Detector mode:Peak

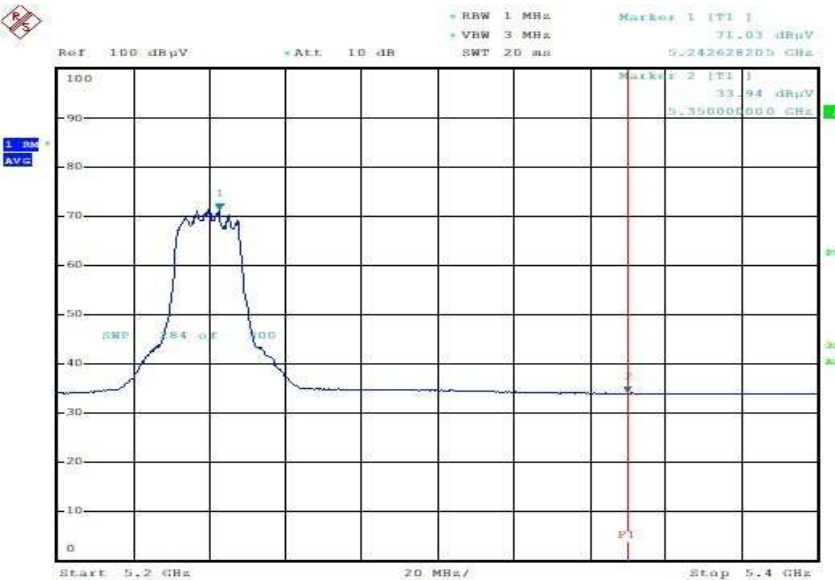
Polarity:Vertical



RF70A BIO_11a_CH48_PEAK_VER.

Detector mode:Average

Polarity:Vertical

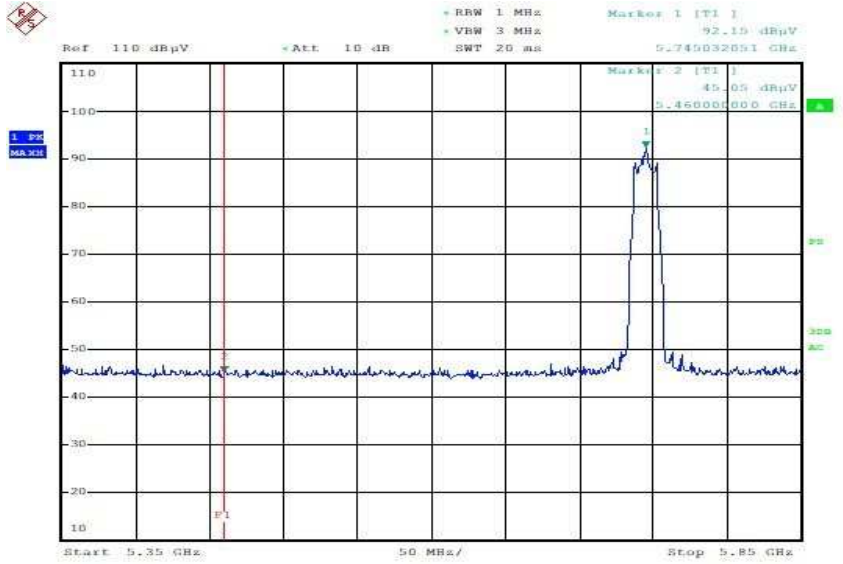


RF70A BIO_11a_CH48_AV_VER

Restricted Band Edges (802.11a)-CH 149

Detector mode:Peak

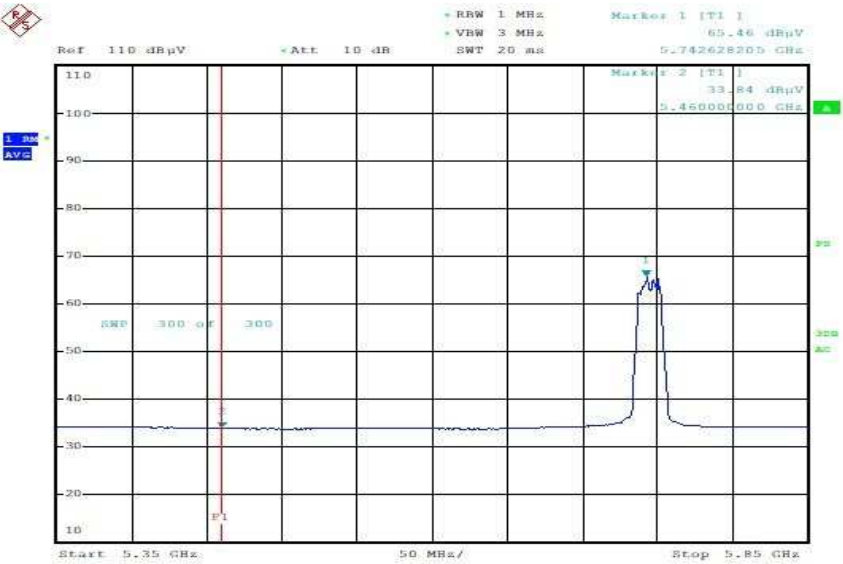
Polarity:Horizontal



RF70A BIO_11a_CH149_PEAK_HOR

Detector mode:Average

Polarity:Horizontal

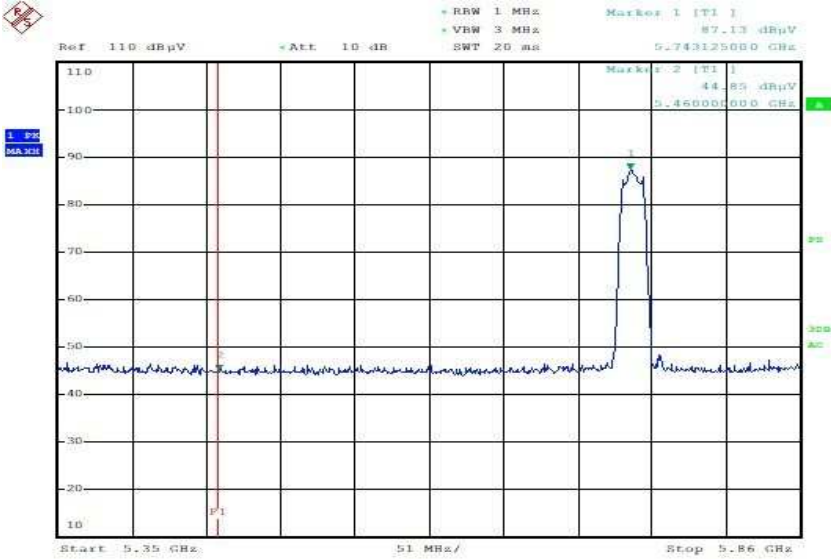


RF70A BIO_11a_CH149_AV_HOR

Restricted Band Edges (802.11a)-CH 149

Detector mode:Peak

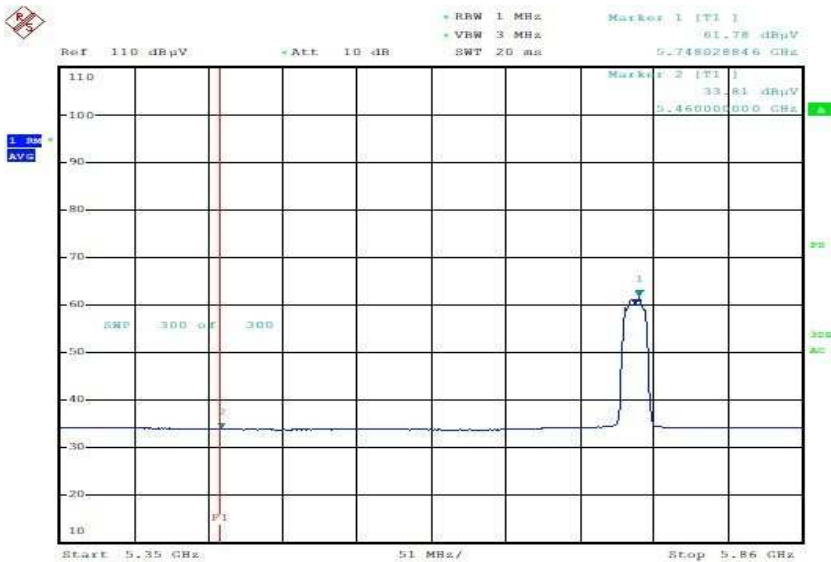
Polarity:Vertical



RF70A BIO_11a_CH149_PEAK_VER

Detector mode:Average

Polarity:Vertical



RF70A BIO_11a_CH149_AV_VER

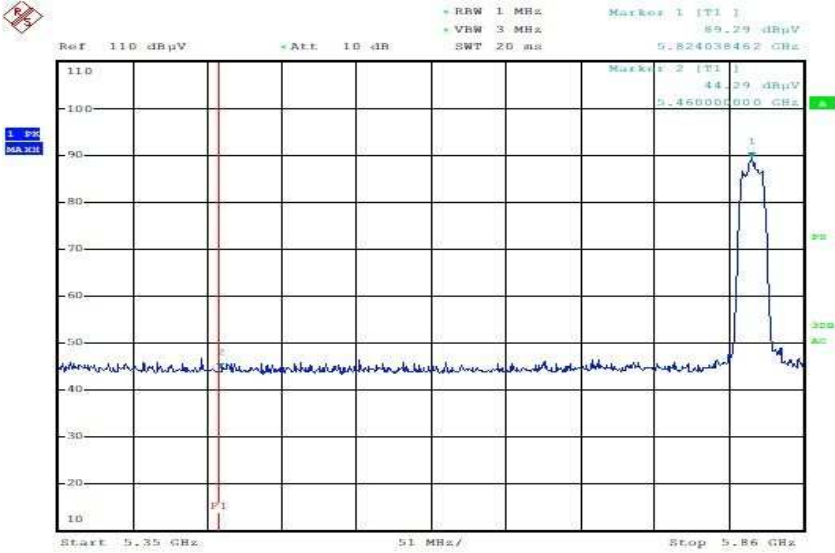


Estech
your best partner

Restricted Band Edges (802.11a)-CH 165

Detector mode:Peak

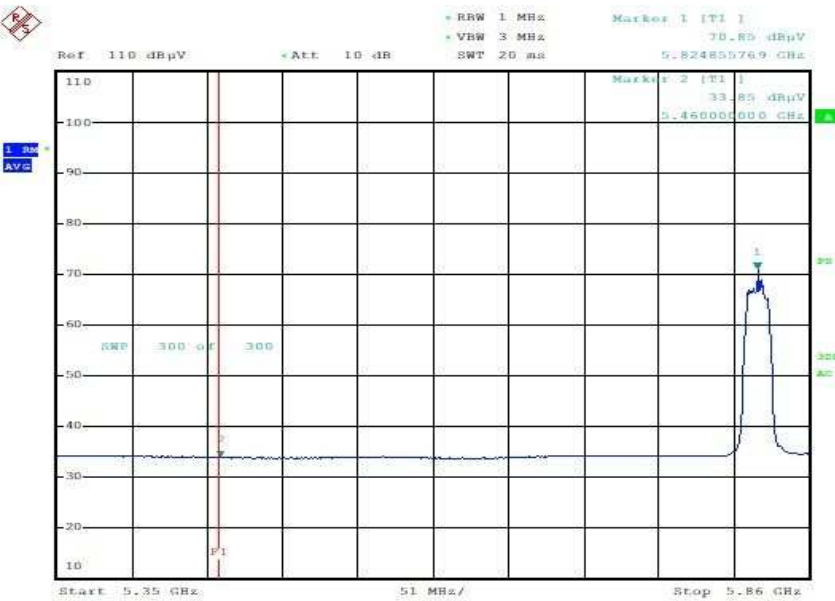
Polarity:Horizontal



RP70A_BIO_11a_CH165_PEAK_HOR

Detector mode:Average

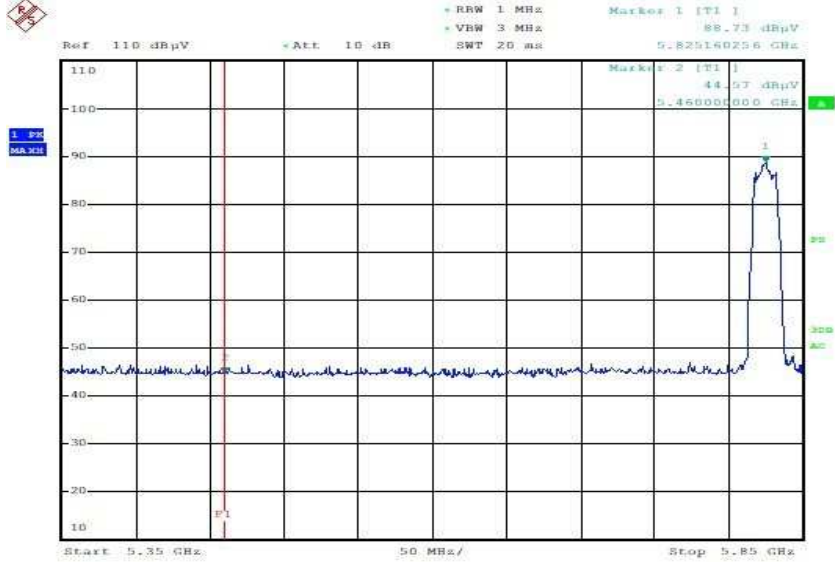
Polarity:Horizontal



RP70A_BIO_11a_CH165_AV_HOR

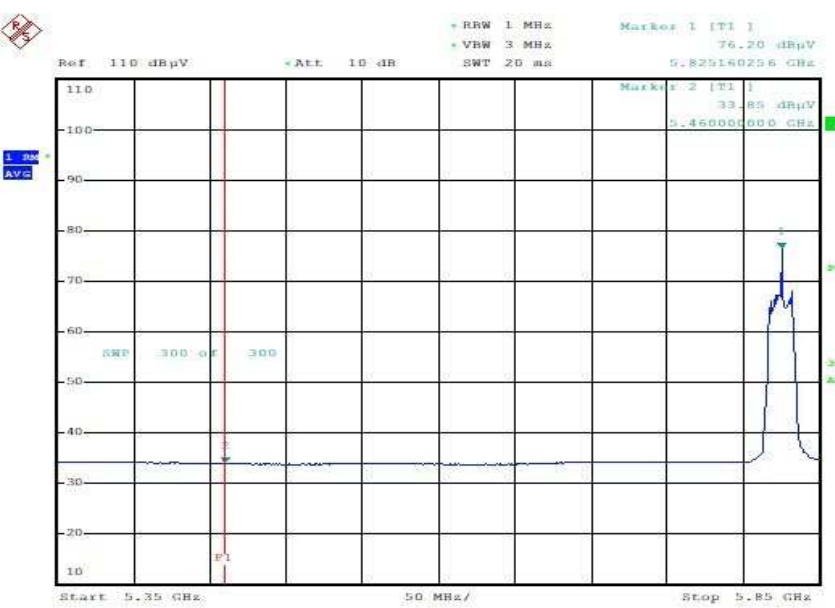
Restricted Band Edges (802.11a)-CH 165

Detector mode:Peak Polarity:Vertical



RF70A BIO_11a_CH165_PEAK_VER

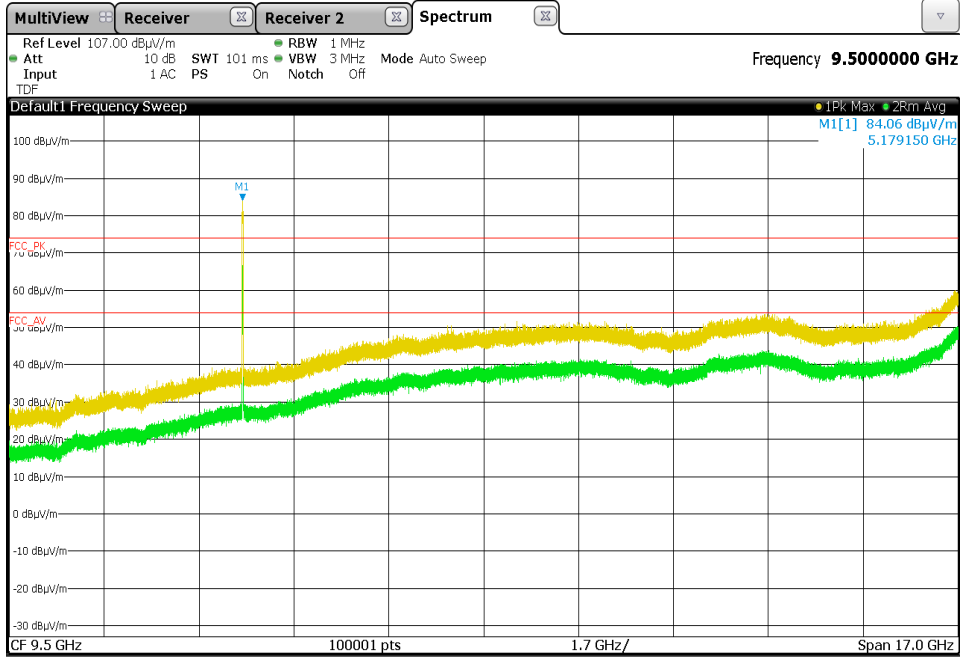
Detector mode:Average Polarity:Vertical



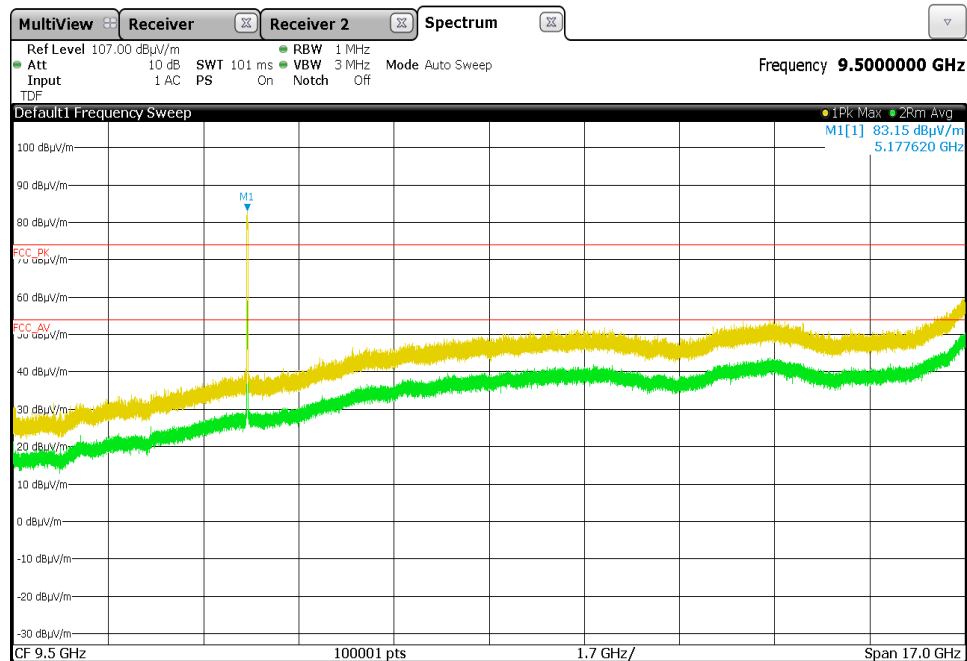
RF70A BIO_11a_CH165_AV_VER

5.4-10 Restricted Band Edges (802.11a)-CH 36

Polarity:Horizontal



Polarity:Vertical

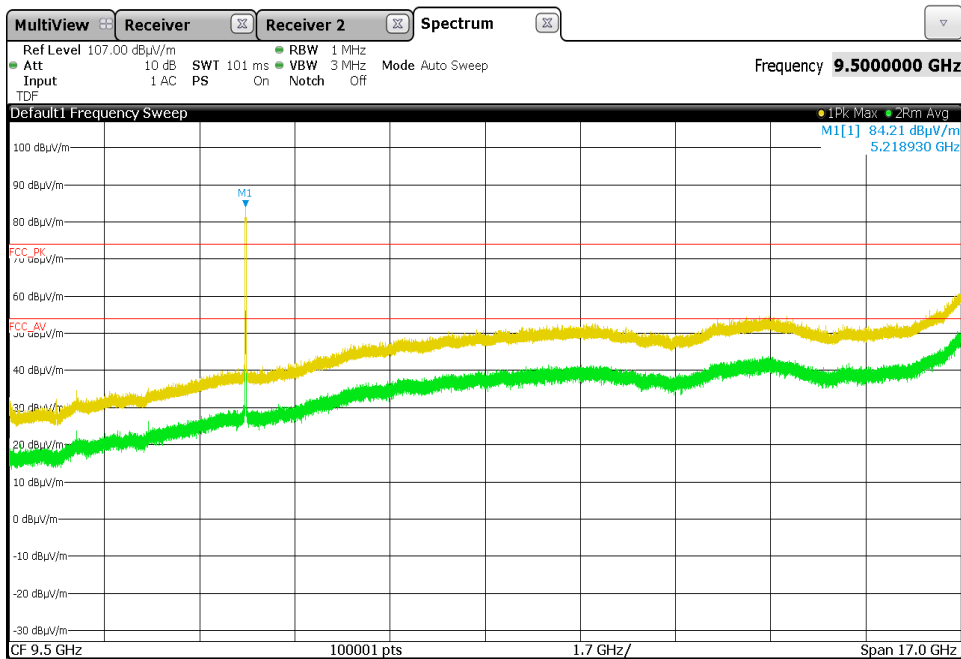


Restricted Band Edges (802.11a)-CH 44

Polarity:Horizontal

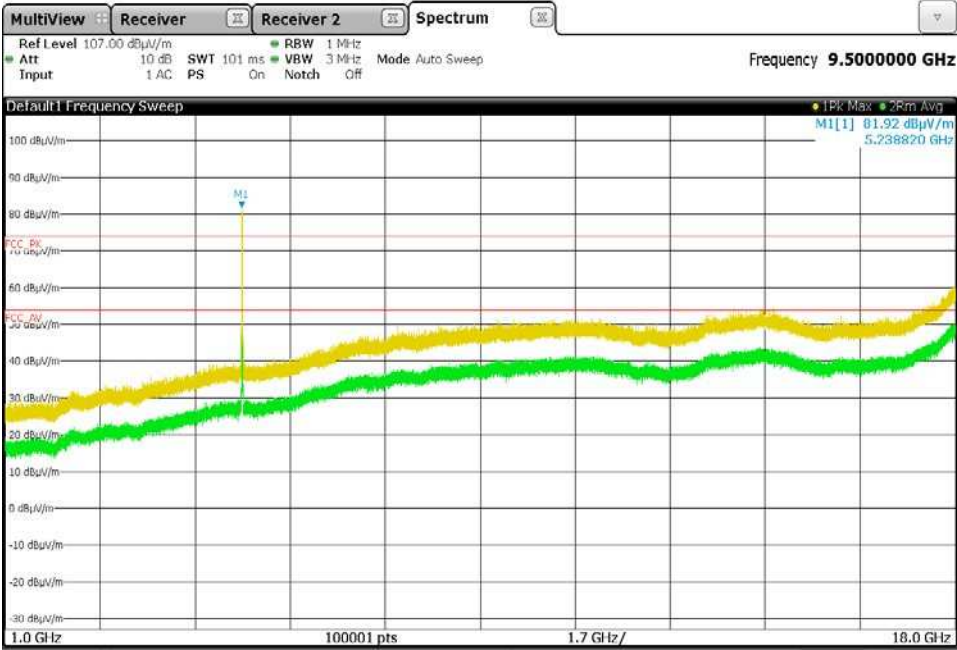


Polarity:Vertical

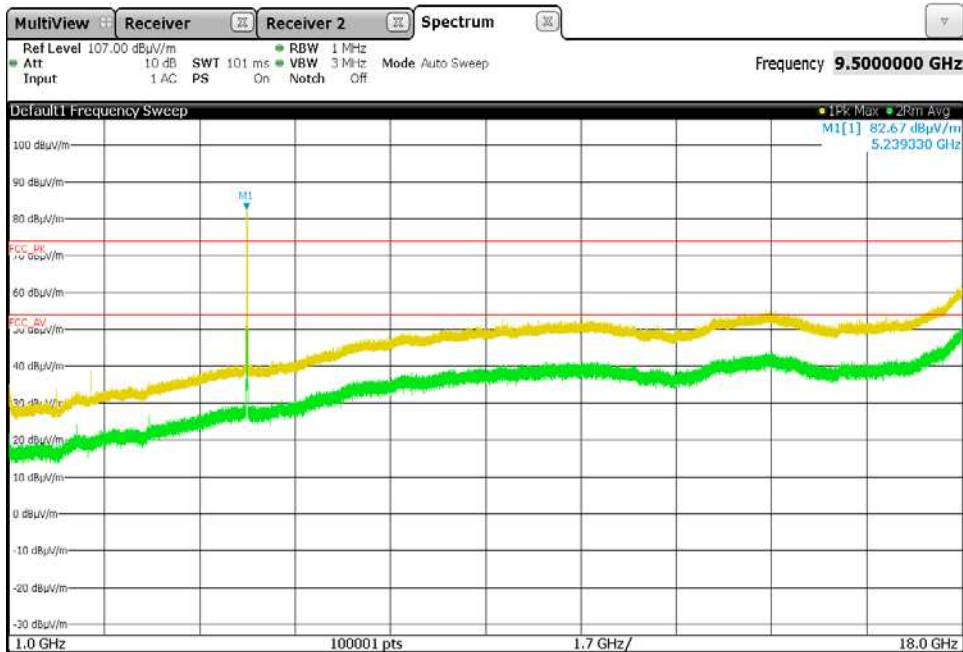


Restricted Band Edges (802.11a)-CH 48

Polarity:Horizontal

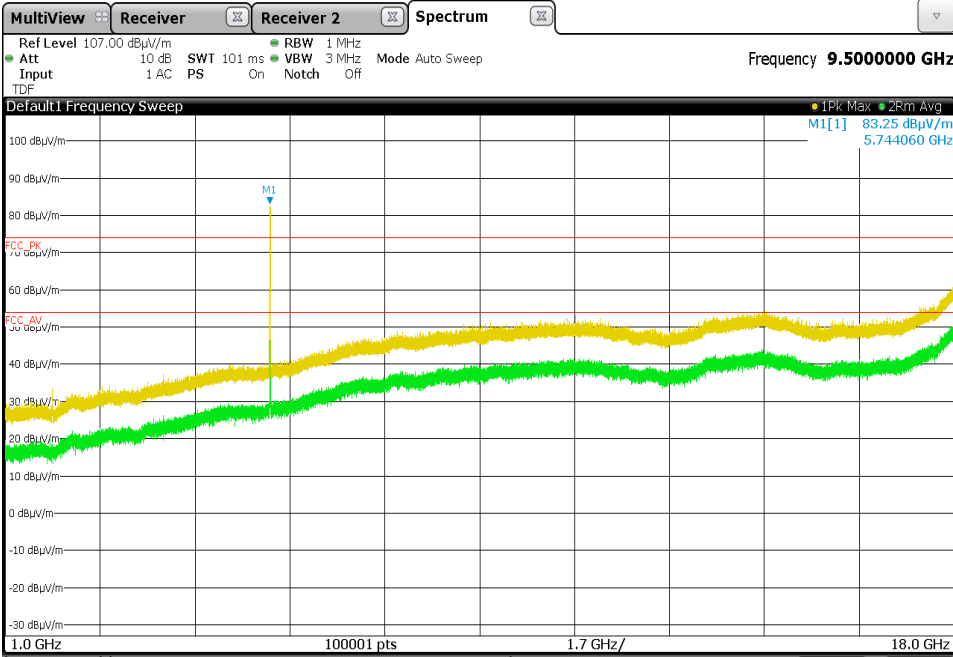


Polarity:Vertical

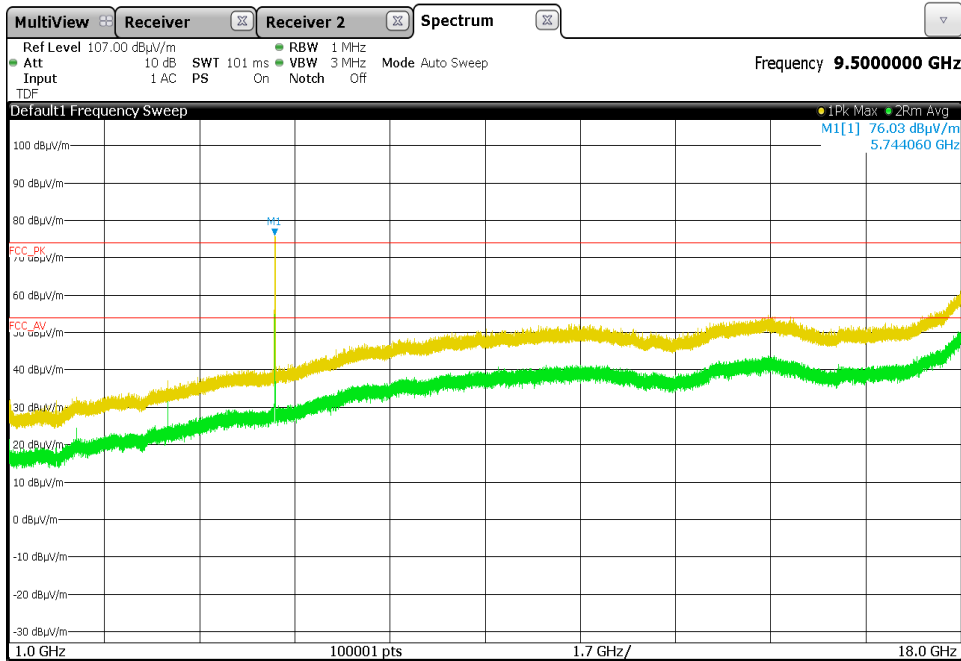


Restricted Band Edges (802.11a)-CH 149

Polarity:Horizontal

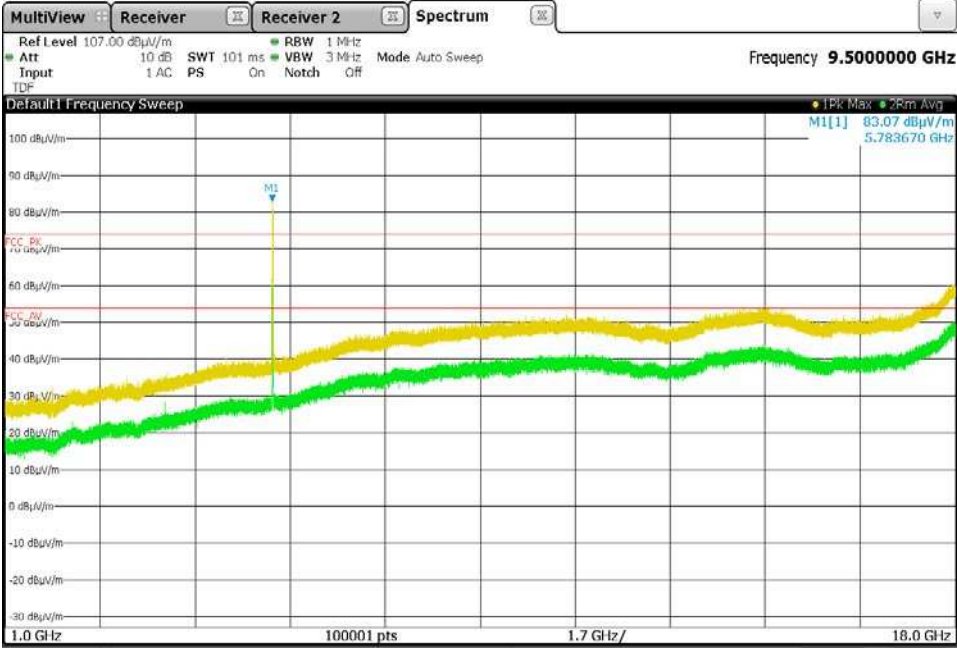


Polarity:Vertical



Restricted Band Edges (802.11a)-CH 157

Polarity:Horizontal

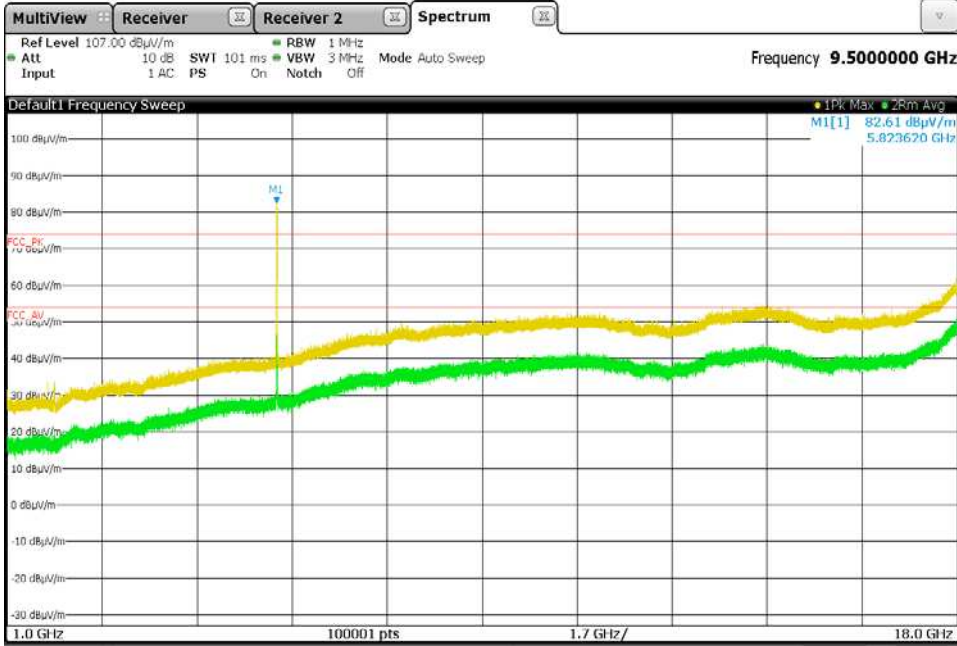


Polarity:Vertical



Restricted Band Edges (802.11a)-CH 165

Polarity:Horizontal



Polarity:Vertical



5.4-11 Test Data for wireless LAN (802.11n HT20)

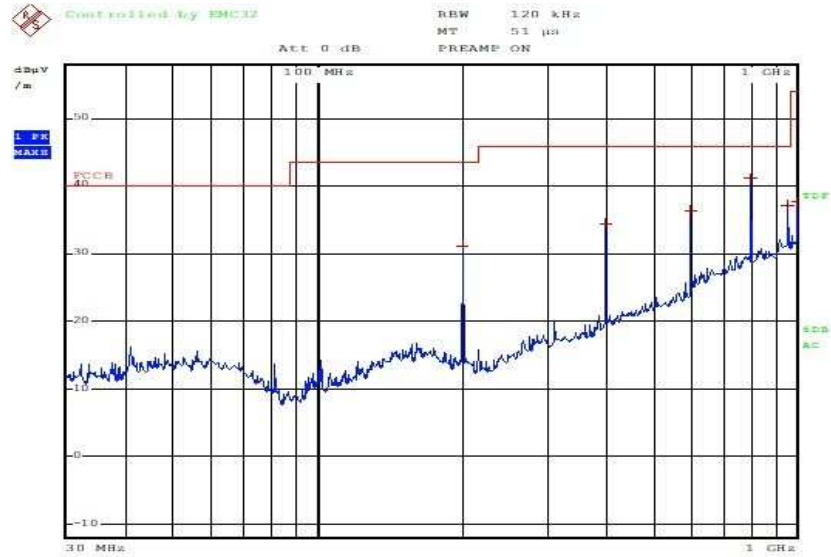
Test Date : 23-Mar-20

Measurement Distance : 3 m

Frequency (MHz)	Reading (dB μ V)	Position (V/H)	Height (m)	Correction Factor		Result Value		
				Ant Factor (dB)	Cable (dB)	Limit (dB μ V/m)	Result (dB μ V/m)	Margin (dB)
40.70	12.99	V	1.0	12.91	1.51	40.00	27.41	12.59
200.00	19.18	H	1.6	9.90	2.21	43.50	31.29	12.21
400.00	15.88	H	1.4	15.40	3.21	46.00	34.49	11.51
600.00	17.45	V	1.4	19.50	3.96	46.00	40.91	5.09
800.00	14.23	H	1.0	22.40	4.64	46.00	41.27	4.73
949.80	8.05	H	1.8	24.00	5.10	46.00	37.15	8.85
1000.00	12.95	V	1.8	24.29	5.22	54.00	42.46	11.54
Remark	<p>H : Horizontal, V : Vertical TEST MODE : 802.11a</p> <p>*Result Value = Reading + Ant Factor + Cable loss</p> <p>*The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection at frequency below 1 GHz.</p>							

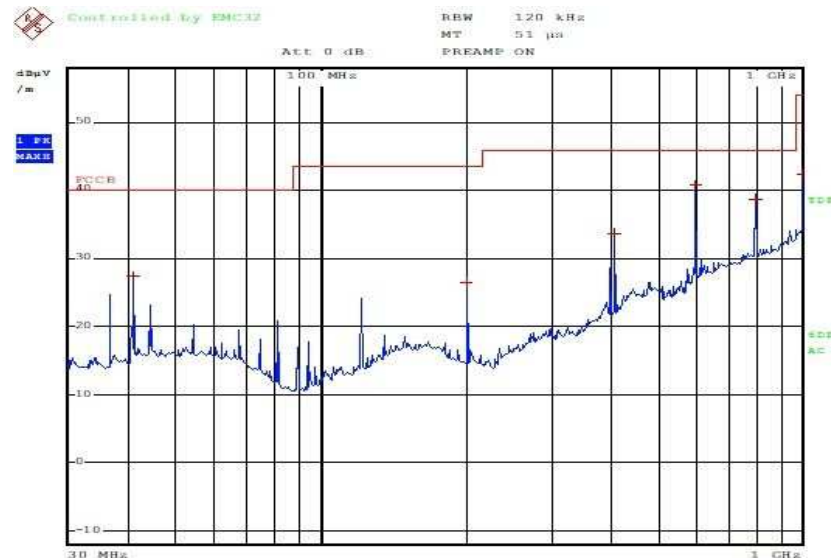
5.4-12 Radiated Graph(30 MHz ~ 1 GHz)802.11n HT20

Polarity:Horizontal



ESTR-20-00077_11n20_HOR

Polarity:Vertical



ESTR-20-00077_11n20_VER

5.4-13 Test Data for wireless LAN (802.11n HT20) – CH 36

Test Date : 25-Mar-20

Measurement Distance : 3 m

Frequency (MHz)	Reading (dBμV)	Position (V/H)	Height (m)	Correction Factor		Duty Cycle Correction (dB)	Result Value		
				Ant Factor (dB)	Cable (dB)		Limit (dBμV/m)	Result (dBμV/m)	Margin (dB)
PEAK (RBW:1 MHz VBW:3 MHz)									
5150.00	46.10	H	1.5	31.93	-27.13	/	74.00	50.89	-23.11
5150.00	45.49	V	1.5	31.93	-27.13	/	74.00	50.28	-23.72
10360.00	46.11	H	1.5	39.54	-23.14	/	74.00	62.51	-11.49
10360.00	46.20	V	1.5	39.54	-23.14	/	74.00	62.60	-11.40
Average (RBW:1 MHz VBW:3 MHz)									
5150.00	34.41	H	1.5	31.93	-27.13	2.069	54.00	41.27	-12.73
5150.00	34.53	V	1.5	31.93	-27.13	2.069	54.00	41.39	-12.61
10360.00	32.15	H	1.5	39.54	-23.14	2.069	54.00	50.62	-3.38
10360.00	32.05	V	1.5	39.54	-23.14	2.069	54.00	50.52	-3.48
Remark	<p>H : Horizontal, V : Vertical TEST MODE : 802.11a-CH 36 (5180 MHz)</p> <p>*The TX signal wasn't detected from 3th harmonics.</p> <p>*Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Duty Cycle Correction</p> <p>*This test was radiated up to 26.5 GHz but no noise was measured.</p>								

5.4-14 Test Data for wireless LAN (802.11n HT20) – CH 44

Test Date : 25-Mar-20

Measurement Distance : 3 m

Frequency (MHz)	Reading (dBμV)	Position (V/H)	Height (m)	Correction Factor		Duty Cycle Correction (dB)	Result Value		
				Ant Factor (dB)	Cable (dB)		Limit (dBμV/m)	Result (dBμV/m)	Margin (dB)
PEAK (RBW:1 MHz VBW:3 MHz)									
10440.00	46.57	H	1.6	39.74	-23.11	/	74.00	63.20	-10.80
10440.00	45.98	V	1.6	39.74	-23.11	/	74.00	62.61	-11.39
Average (RBW:1 MHz VBW:3 MHz)									
10440.00	32.34	H	1.6	39.74	-23.11	2.069	54.00	51.04	-2.96
10440.00	32.40	V	1.6	39.74	-23.11	2.069	54.00	51.10	-2.90
Remark	<p>H : Horizontal, V : Vertical TEST MODE : 802.11ac-CH 44 (5220 MHz)</p> <p>*The TX signal wasn't detected from 3th harmonics. *Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Duty Cycle Correction *This test was radiated up to 26.5 GHz but no noise was measured.</p>								

5.4-15 Test Data for wireless LAN (802.11n HT20) – CH 48

Test Date : 25-Mar-20

Measurement Distance : 3 m

Frequency (MHz)	Reading (dBμV)	Position (V/H)	Height (m)	Correction Factor		Duty Cycle Correction (dB)	Result Value		
				Ant Factor (dB)	Cable (dB)		Limit (dBμV/m)	Result (dBμV/m)	Margin (dB)
PEAK (RBW:1 MHz VBW:3 MHz)									
5350.00	45.45	H	1.6	31.93	-26.98	/	74.00	50.40	-23.60
5350.00	45.56	V	1.6	31.93	-26.98	/	74.00	50.51	-23.49
10480.00	45.87	H	1.6	39.85	-23.10	/	74.00	62.62	-11.38
10480.00	45.67	V	1.6	39.85	-23.10	/	74.00	62.42	-11.58
Average (RBW:1 MHz VBW:3 MHz)									
5350.00	34.67	H	1.6	31.93	-26.98	2.069	54.00	41.69	-12.32
5350.00	34.62	V	1.6	31.93	-26.98	2.069	54.00	41.64	-12.37
10480.00	32.52	H	1.6	39.85	-23.10	2.069	54.00	51.34	-2.66
10480.00	32.37	V	1.6	39.85	-23.10	2.069	54.00	51.19	-2.81
Remark	<p>H : Horizontal, V : Vertical TEST MODE : 802.11a-CH 48 (5240 MHz)</p> <p>*The TX signal wasn't detected from 3th harmonics.</p> <p>*Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Duty Cycle Correction</p> <p>*This test was radiated up to 26.5 GHz but no noise was measured.</p>								

5.4-16 Test Data for wireless LAN (802.11n HT20) – CH 149

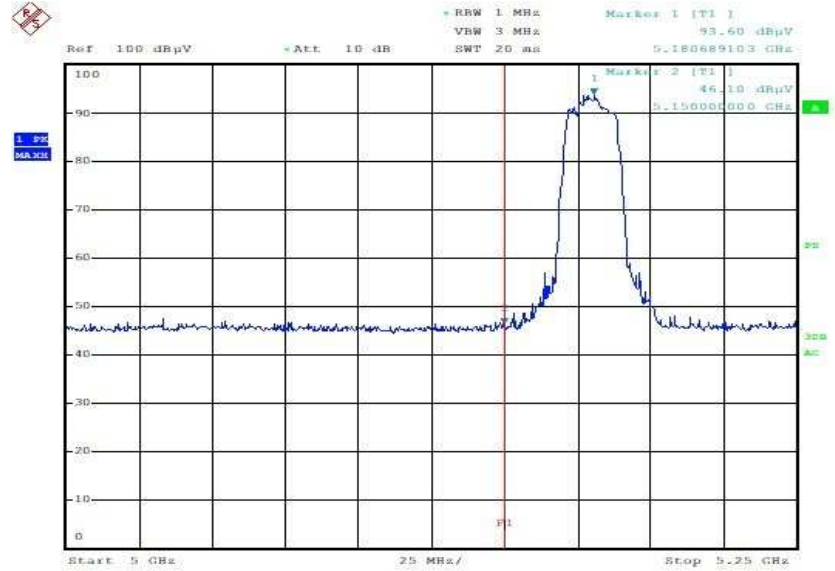
Test Date : 25-Mar-20

Measurement Distance : 3 m

Frequency (MHz)	Reading (dBμV)	Position (V/H)	Height (m)	Correction Factor		Duty Cycle Correction (dB)	Result Value		
				Ant Factor (dB)	Cable (dB)		Limit (dBμV/m)	Result (dBμV/m)	Margin (dB)
PEAK (RBW:1 MHz VBW:3 MHz)									
5460.00	44.95	H	1.6	31.90	-26.92	/	74.00	49.93	-24.07
5460.00	44.45	V	1.6	31.90	-26.92	/	74.00	56.92	-17.08
11490.00	46.37	H	1.6	40.22	-21.78	/	74.00	64.81	-9.19
11490.00	46.22	V	1.6	40.22	-21.78	/	74.00	64.66	-9.34
Average (RBW:1 MHz VBW:3 MHz)									
5460.00	34.31	H	1.6	31.90	-26.92	2.069	54.00	41.36	-12.64
5460.00	34.23	V	1.6	31.90	-26.92	2.069	54.00	41.28	-12.72
11490.00	32.34	H	1.6	40.22	-21.78	2.069	54.00	52.85	-1.15
11490.00	32.27	V	1.6	40.22	-21.78	2.069	54.00	52.78	-1.22
Remark	<p>H : Horizontal, V : Vertical TEST MODE : 802.11a-CH 149 (5745 MHz)</p> <p>*The TX signal wasn't detected from 3th harmonics.</p> <p>*Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Duty Cycle Correction</p> <p>*This test was radiated up to 26.5 GHz but no noise was measured.</p>								

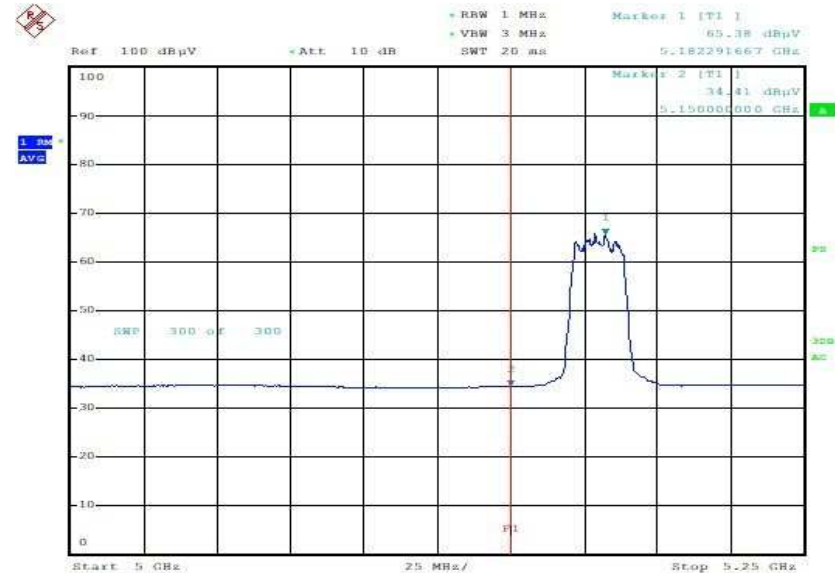
5.4-19 Restricted Band Edges (802.11n HT20)-CH 36

Detector mode:Peak Polarity:Horizontal



RP70A BIO_11A_HT20_CH36_PEAK_HOR

Detector mode:Average Polarity:Horizontal

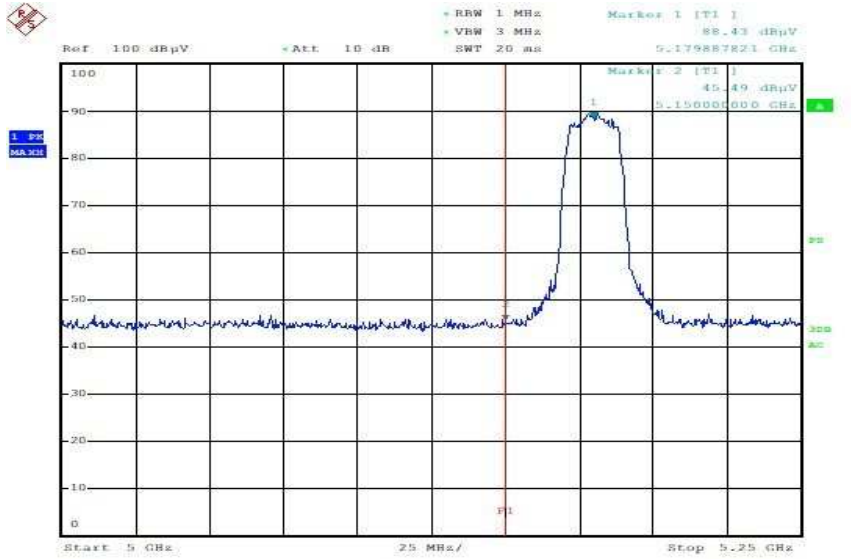


RP70A BIO_11A_HT20_CH36_AV_HOR

6.3-9 Restricted Band Edges (802.11n HT20)-CH 36

Detector mode:Peak

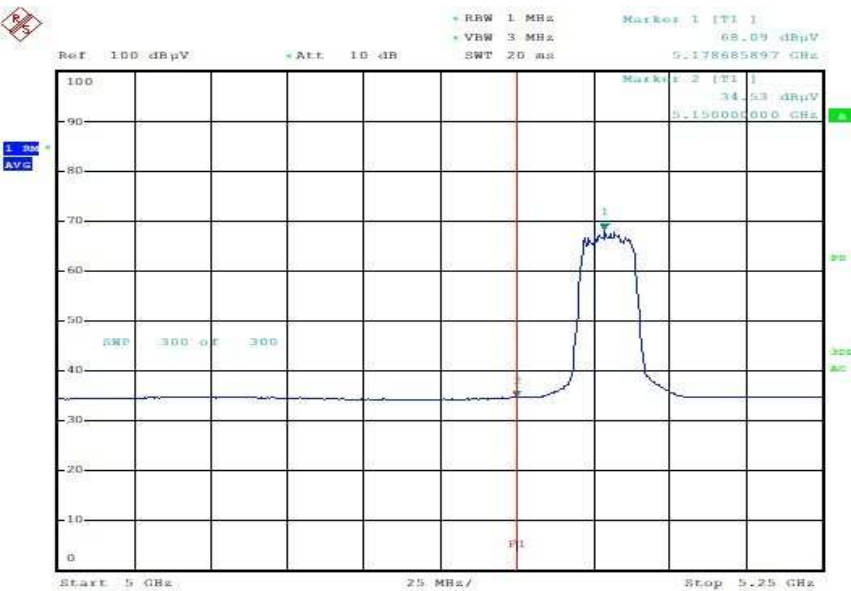
Polarity:Vertical



RP70A BIO_11A_HT20_CH36_PEAK_VER

Detector mode:Average

Polarity:Vertical

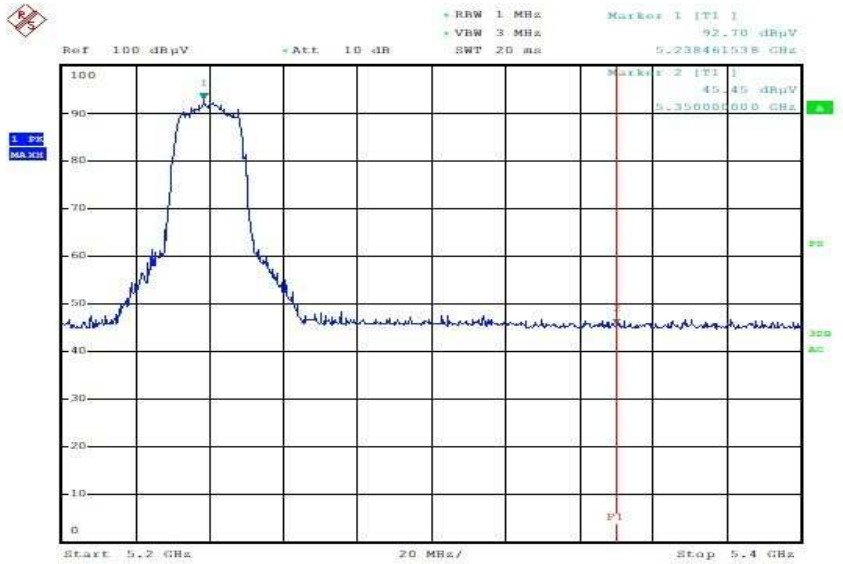


RP70A BIO_11A_HT20_CH36_AV_VER

6.3-10 Restricted Band Edges (802.11n HT20)-CH 48

Detector mode:Peak

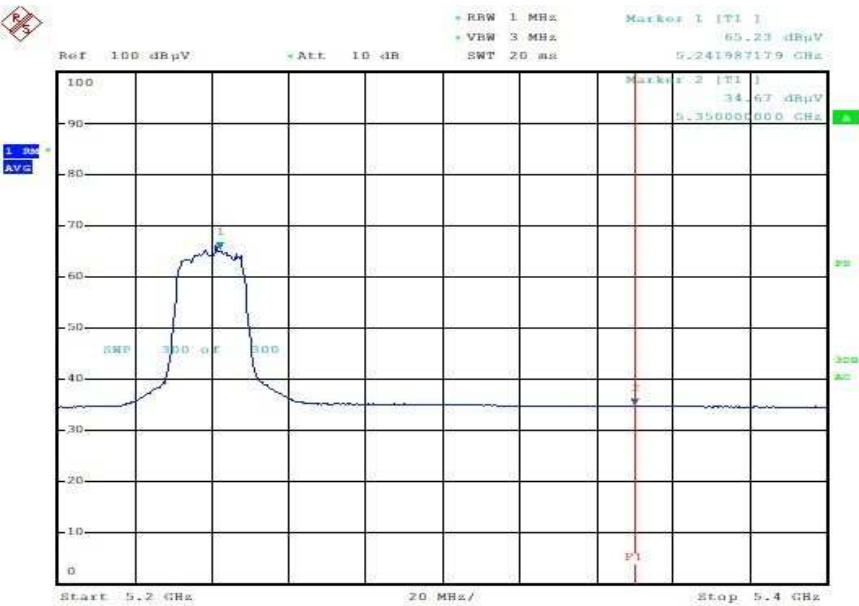
Polarity:Horizontal



RF70A BIO_11A_HT20_CH48_PEAK_HOR

Detector mode:Average

Polarity:Horizontal

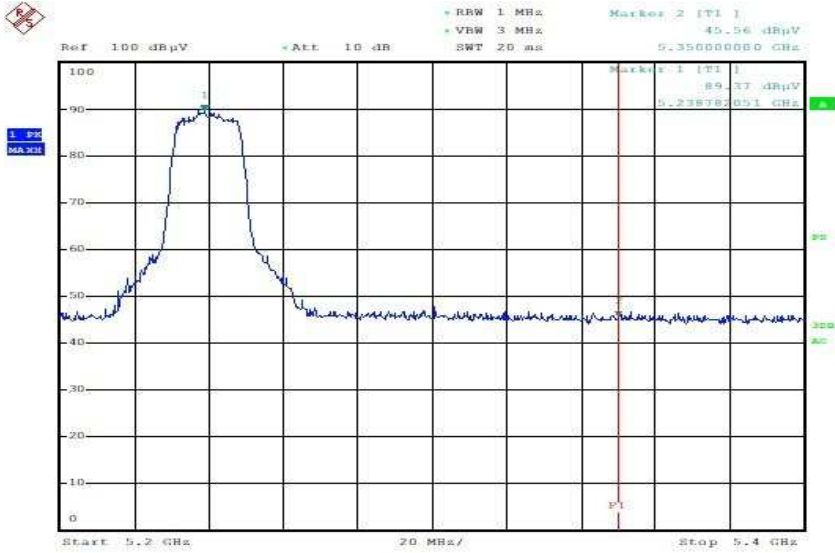


RF70A BIO_11A_HT20_CH48_AV_HOR

6.3-11 Restricted Band Edges (802.11n HT20)-CH 48

Detector mode:Peak

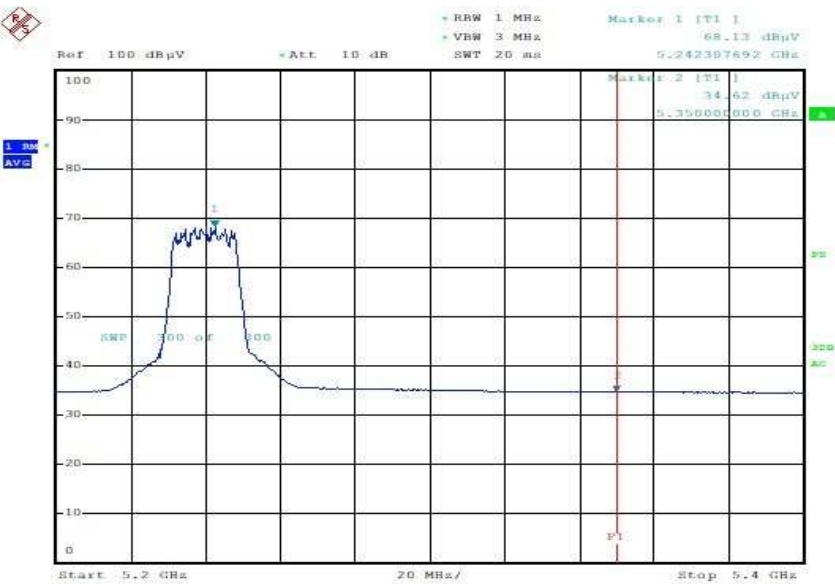
Polarity:Vertical



RP70A BIO_11A_HT20_CH48_PEAK_VER

Detector mode:Average

Polarity:Vertical

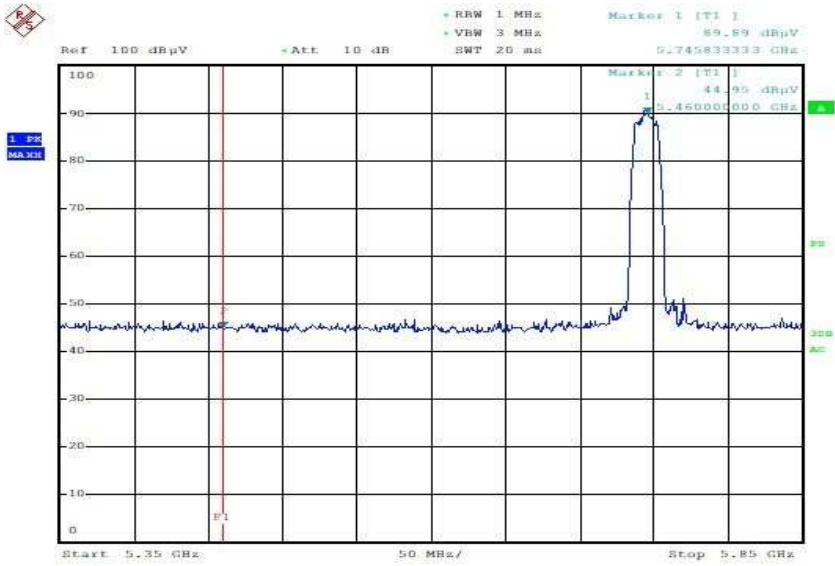


RP70A BIO_11A_HT20_CH48_AV_VER

6.3-12 Restricted Band Edges (802.11n HT20)-CH 149

Detector mode:Peak

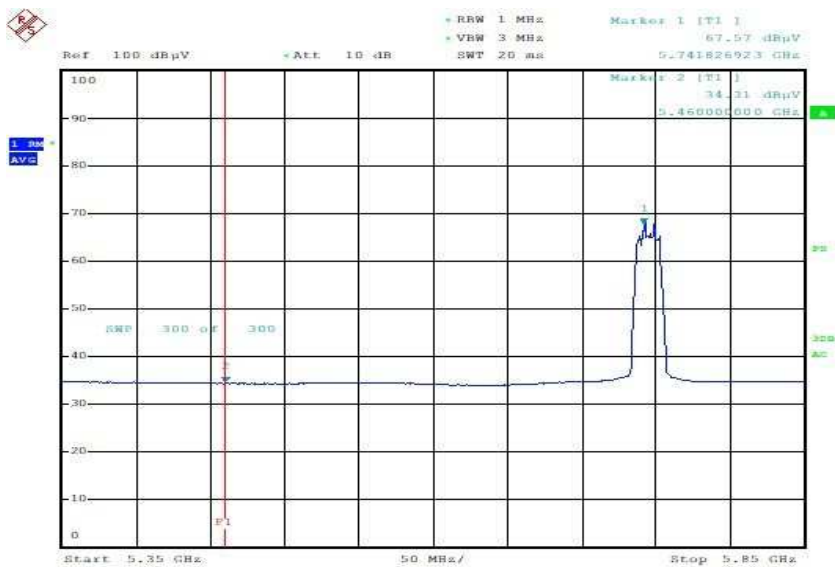
Polarity:Horizontal



RF70A BIO_11A_HT20_CH149_PEAK_HOR

Detector mode:Average

Polarity:Horizontal

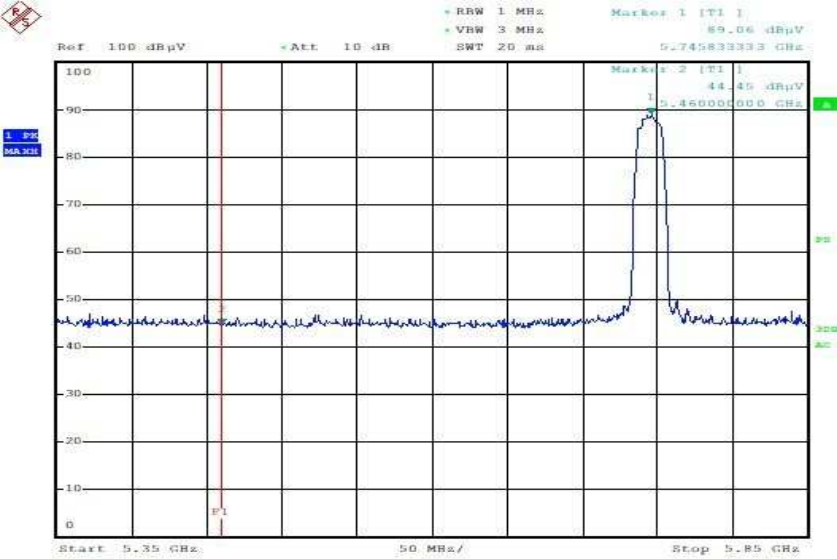


RF70A BIO_11A_HT20_CH149_AV_HOR

6.3-13 Restricted Band Edges (802.11n HT20)-CH 149

Detector mode:Peak

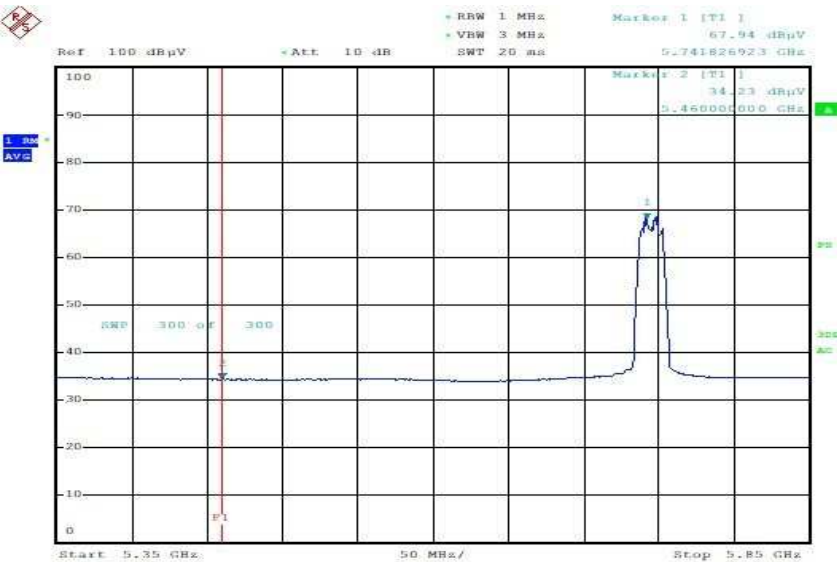
Polarity:Vertical



RP70A BIO_11A_HT20_CH149_PEAK_VER

Detector mode:Average

Polarity:Vertical

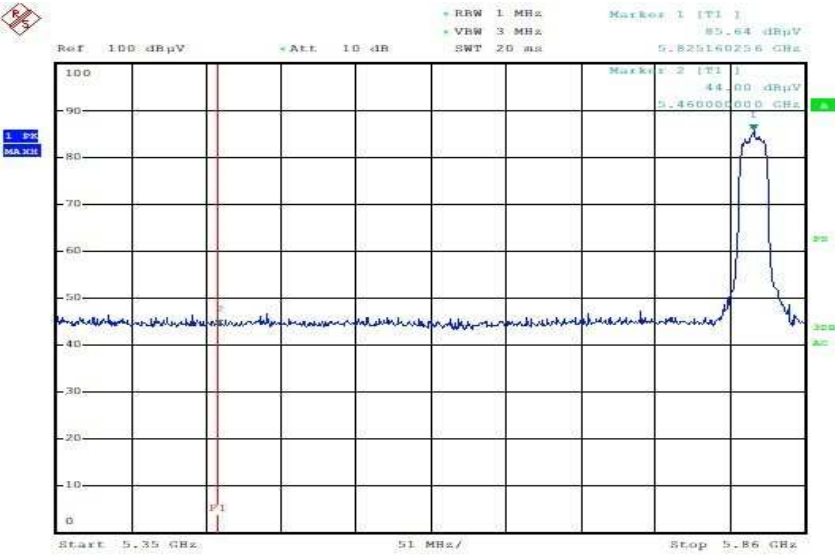


RP70A BIO_11A_HT20_CH149_AV_VER

6.3-14 Restricted Band Edges (802.11n HT20)-CH 165

Detector mode:Peak

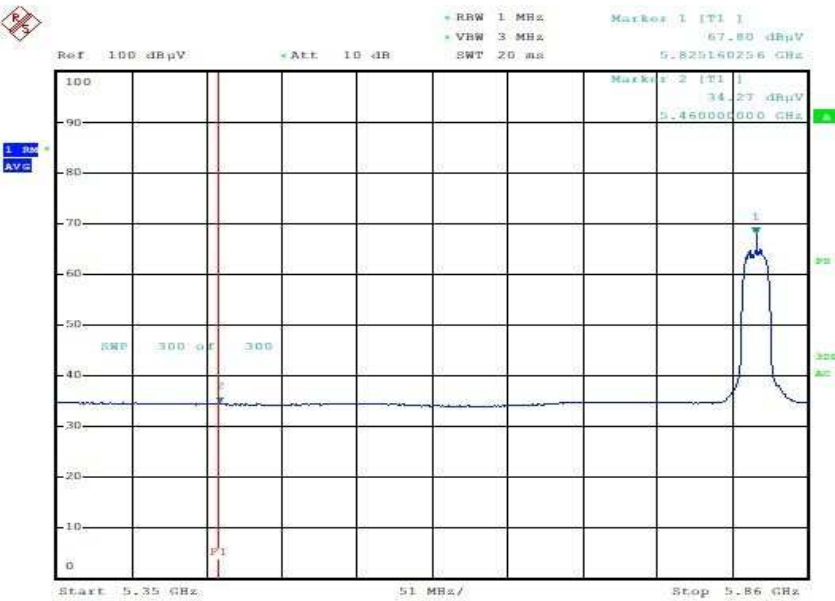
Polarity:Horizontal



RF70A_BIO_11A_HT20_CH165_PEAK_HOR

Detector mode:Average

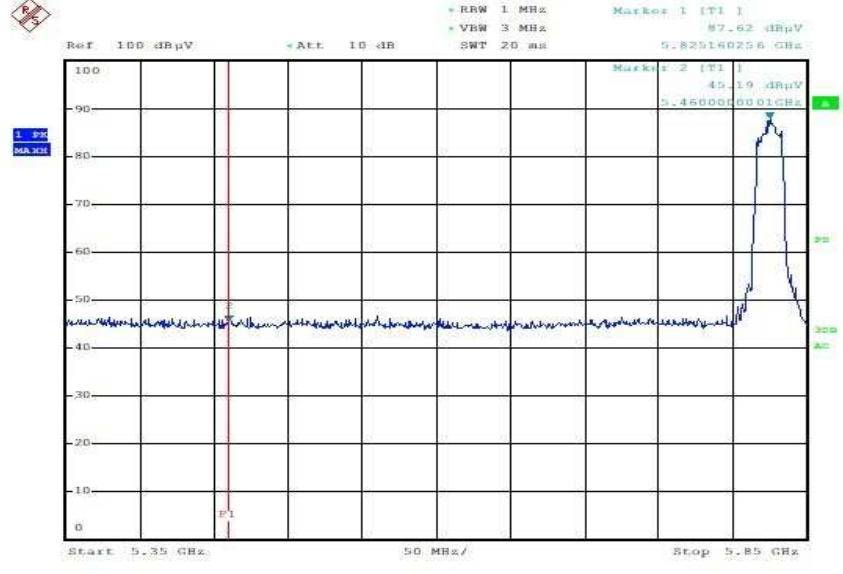
Polarity:Horizontal



RF70A_BIO_11A_HT20_CH165_AV_HOR

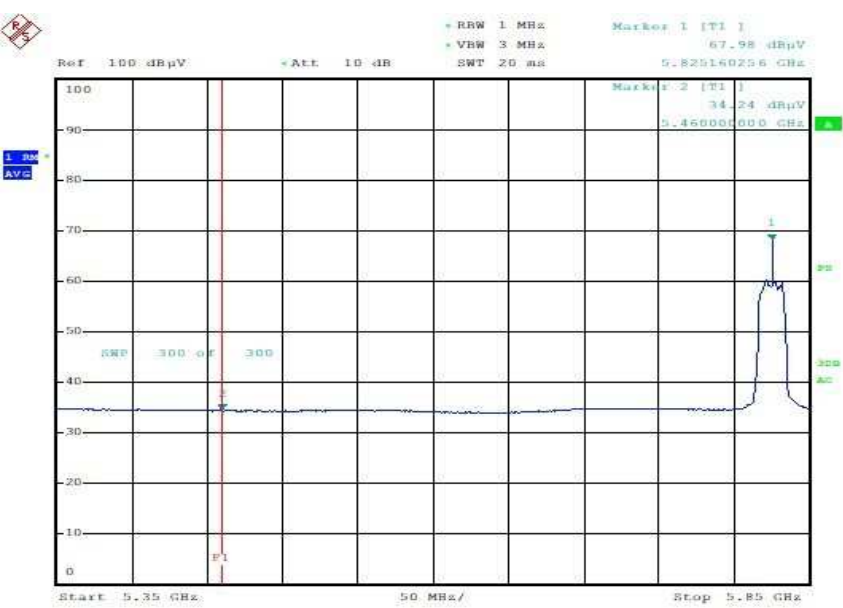
6.3-15 Restricted Band Edges (802.11n HT20)-CH 165

Detector mode:Peak Polarity:Vertical



RF70A_BIO_11A_HT20_CH165_PEAK_VER

Detector mode:Average Polarity:Vertical



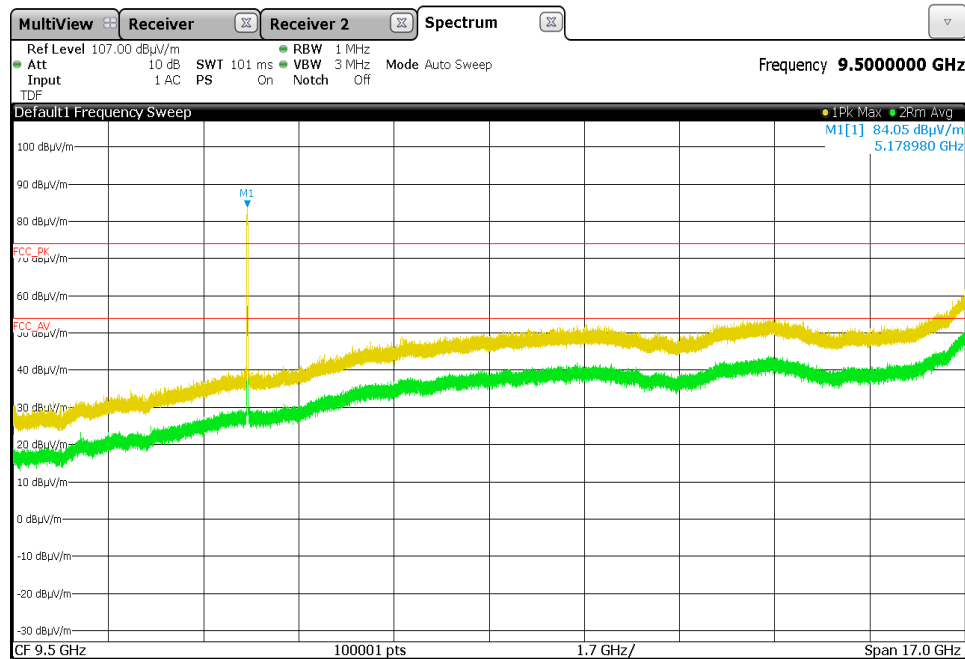
RF70A_BIO_11A_HT20_CH165_AV_VER

5.4-20 Restricted Band Edges (802.11n HT20)-CH 36

Polarity:Horizontal



Polarity:Vertical

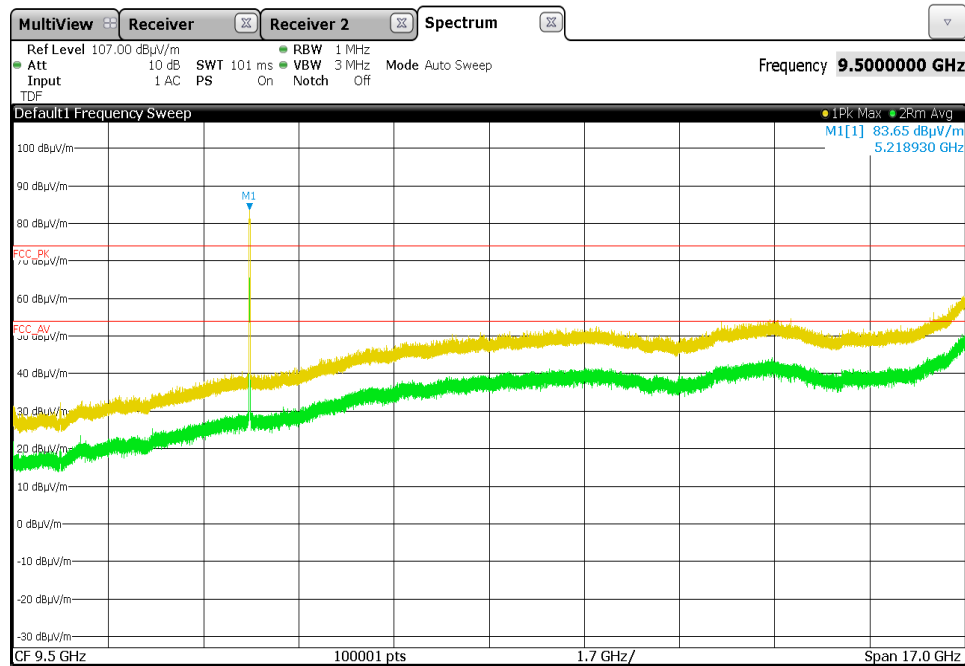


Restricted Band Edges (802.11n HT20)-CH 44

Polarity:Horizontal



Polarity:Vertical

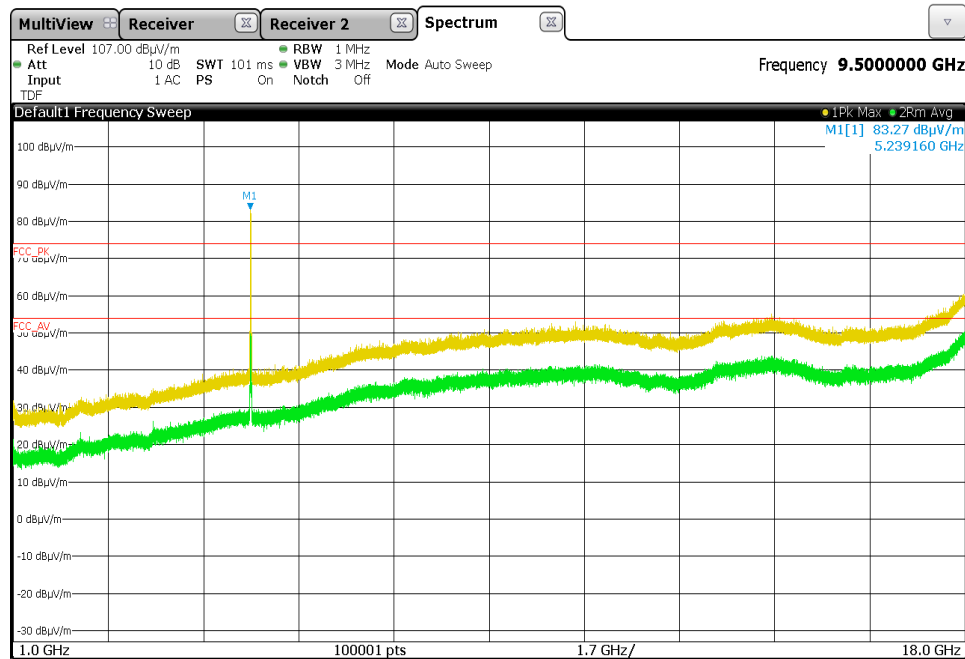


Restricted Band Edges (802.11n HT20)-CH 48

Polarity:Horizontal



Polarity:Vertical

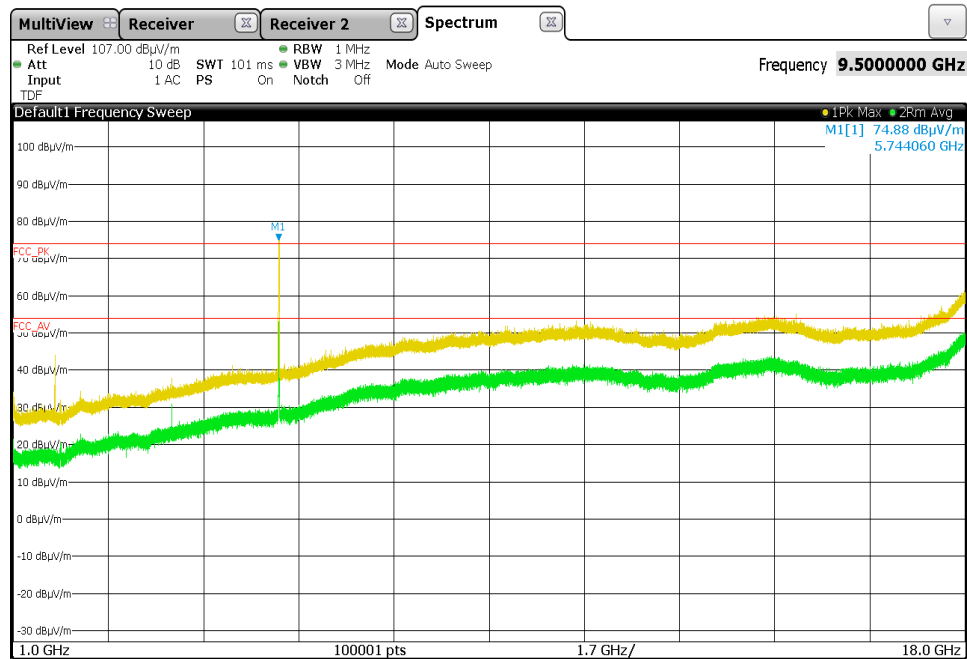


Restricted Band Edges (802.11n HT20)-CH 149

Polarity:Horizontal

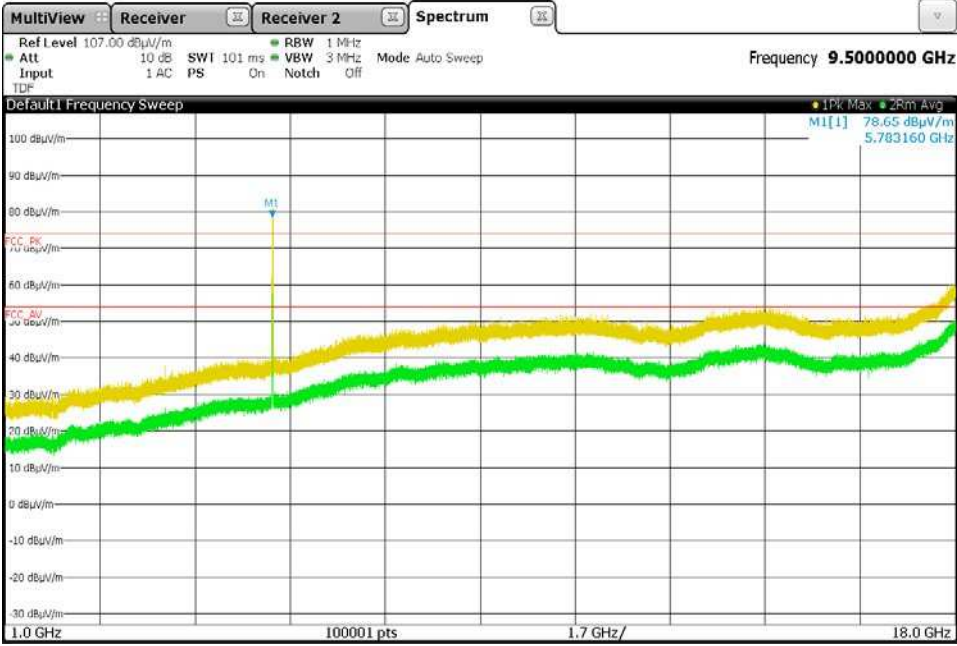


Polarity:Vertical



Restricted Band Edges (802.11n HT20)-CH 157

Polarity:Horizontal

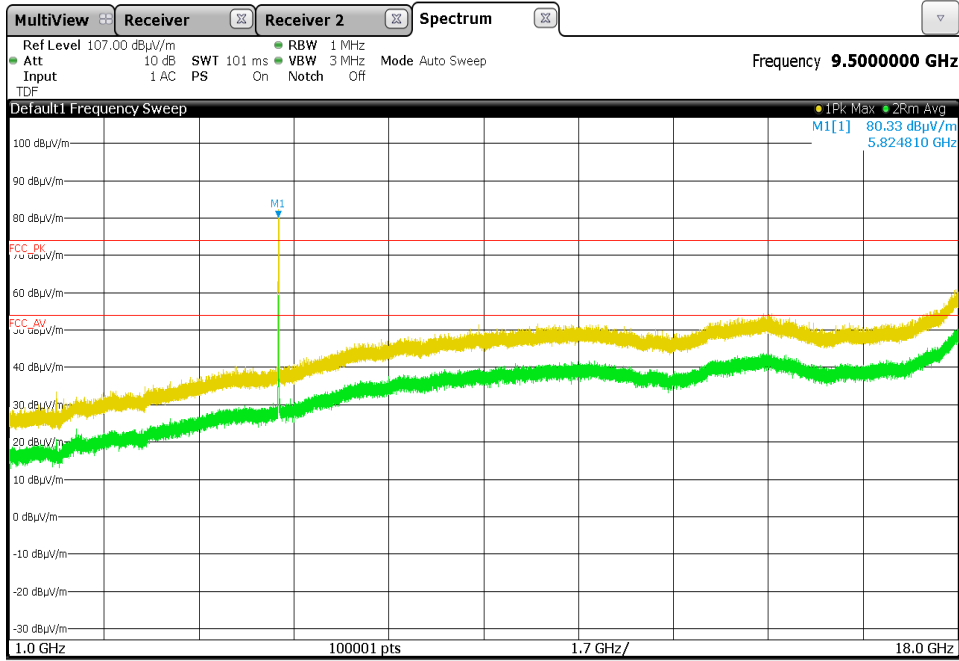


Polarity:Vertical



Restricted Band Edges (802.11n HT20)-CH 165

Polarity:Horizontal



Polarity:Vertical





5.4-21 Test Data for wireless LAN (802.11n HT40)

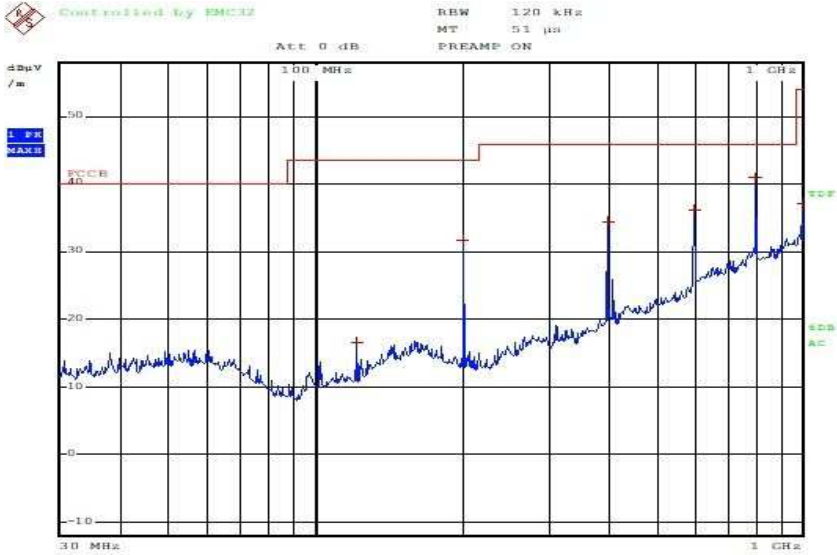
Test Date : 23-Mar-20

Measurement Distance : 3 m

Frequency (MHz)	Reading (dB μ V)	Position (V/H)	Height (m)	Correction Factor		Result Value		
				Ant Factor (dB)	Cable (dB)	Limit (dB μ V/m)	Result (dB μ V/m)	Margin (dB)
40.70	14.23	V	1.0	12.91	1.51	40.00	28.65	11.35
200.00	19.77	H	1.8	9.90	2.21	43.50	31.88	11.62
400.00	16.01	H	1.6	15.40	3.21	46.00	34.62	11.38
600.00	17.32	V	1.4	19.50	3.96	46.00	40.78	5.22
800.00	14.03	H	1.0	22.40	4.64	46.00	41.07	4.93
1000.00	9.30	V	1.7	24.29	5.22	54.00	38.81	15.19
Remark	<p>H : Horizontal, V : Vertical TEST MODE : 802.11a</p> <p>*Result Value = Reading + Ant Factor + Cable loss</p> <p>*The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection at frequency below 1 GHz.</p>							

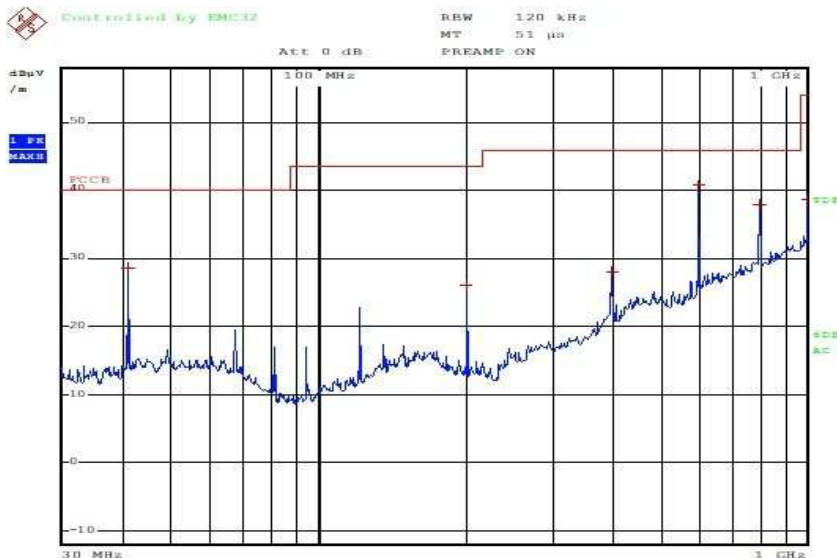
5.4-22 Radiated Graph(30 MHz ~ 1 GHz)802.11n HT40

Polarity:Horizontal



ESTR-20-00077_11n40_HOR

Polarity:Vertical



ESTR-20-00077_11n40_VER

5.4-23 Test Data for wireless LAN (802.11n HT40) – CH 38

Test Date : 26-Mar-20

Measurement Distance : 3 m

Frequency (MHz)	Reading (dBμV)	Position (V/H)	Height (m)	Correction Factor		Duty Cycle Correction (dB)	Result Value		
				Ant Factor (dB)	Cable (dB)		Limit (dBμV/m)	Result (dBμV/m)	Margin (dB)
PEAK (RBW:1 MHz VBW:3 MHz)									
5150.00	46.13	H	1.5	31.93	-27.13	/	74.00	50.92	-23.08
5150.00	45.37	V	1.5	31.93	-27.13	/	74.00	50.16	-23.84
10380.00	46.11	H	1.5	39.59	-23.13	/	74.00	62.56	-11.44
10380.00	46.20	V	1.5	39.59	-23.13	/	74.00	62.65	-11.35
Average (RBW:1 MHz VBW:3 MHz)									
5150.00	34.20	H	1.5	31.93	-27.13	3.115	54.00	42.11	-11.89
5150.00	34.20	V	1.5	31.93	-27.13	3.115	54.00	42.11	-11.89
10380.00	32.60	H	1.5	39.59	-23.13	3.115	54.00	52.17	-1.83
10380.00	32.58	V	1.5	39.59	-23.13	3.115	54.00	52.15	-1.85
Remark	<p>H : Horizontal, V : Vertical TEST MODE : 802.11a-CH 36 (5180 MHz)</p> <p>*The TX signal wasn't detected from 3th harmonics.</p> <p>*Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Duty Cycle Correction</p> <p>*This test was radiated up to 26.5 GHz but no noise was measured.</p>								

5.4-24 Test Data for wireless LAN (802.11n HT40) – CH 46

Test Date : 26-Mar-20

Measurement Distance : 3 m

Frequency (MHz)	Reading (dBμV)	Position (V/H)	Height (m)	Correction Factor		Duty Cycle Correction (dB)	Result Value		
				Ant Factor (dB)	Cable (dB)		Limit (dBμV/m)	Result (dBμV/m)	Margin (dB)
PEAK (RBW:1 MHz VBW:3 MHz)									
5150.00	45.25	H	1.5	31.93	-27.13	/	74.00	50.04	-23.96
5150.00	46.39	V	1.5	31.93	-27.13	/	74.00	51.18	-22.82
10460.00	46.20	H	1.5	39.80	-23.10	/	74.00	62.89	-11.11
10460.00	46.24	V	1.5	39.80	-23.10	/	74.00	62.93	-11.07
Average (RBW:1 MHz VBW:3 MHz)									
5150.00	34.20	H	1.5	31.93	-27.13	3.115	54.00	42.11	-11.89
5150.00	34.18	V	1.5	31.93	-27.13	3.115	54.00	42.09	-11.91
10460.00	32.70	H	1.5	39.80	-23.10	3.115	54.00	52.51	-1.49
10460.00	32.65	V	1.5	39.80	-23.10	3.115	54.00	52.46	-1.54
Remark	<p>H : Horizontal, V : Vertical TEST MODE : 802.11ac-CH 44 (5220 MHz)</p> <p>*The TX signal wasn't detected from 3th harmonics. *Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Duty Cycle Correction *This test was radiated up to 26.5 GHz but no noise was measured.</p>								

5.4-25 Test Data for wireless LAN (802.11n HT40) – CH 151

Test Date : 26-Mar-20

Measurement Distance : 3 m

Frequency (MHz)	Reading (dBμV)	Position (V/H)	Height (m)	Correction Factor		Duty Cycle Correction (dB)	Result Value		
				Ant Factor (dB)	Cable (dB)		Limit (dBμV/m)	Result (dBμV/m)	Margin (dB)
PEAK (RBW:1 MHz VBW:3 MHz)									
5470.00	45.32	H	1.6	31.90	-26.92	/	74.00	50.30	-23.70
5470.00	44.45	V	1.6	31.90	-26.92	/	74.00	49.43	-24.57
11510.00	45.68	H	1.6	40.17	-23.00	/	74.00	62.85	-11.15
11510.00	46.14	V	1.6	40.17	-23.00	/	74.00	63.31	-10.69
Average (RBW:1 MHz VBW:3 MHz)									
5470.00	34.29	H	1.6	31.90	-26.92	3.115	54.00	42.38	-11.62
5470.00	34.29	V	1.6	31.90	-26.92	3.115	54.00	42.38	-11.62
11510.00	32.60	H	1.6	40.17	-23.00	3.115	54.00	52.89	-1.11
11510.00	32.74	V	1.6	40.17	-23.00	3.115	54.00	53.03	-0.97
Remark	<p>H : Horizontal, V : Vertical TEST MODE : 802.11a-CH 48 (5240 MHz)</p> <p>*The TX signal wasn't detected from 3th harmonics. *Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Duty Cycle Correction *This test was radiated up to 26.5 GHz but no noise was measured.</p>								

5.4-26 Test Data for wireless LAN (802.11n HT40) – CH 159

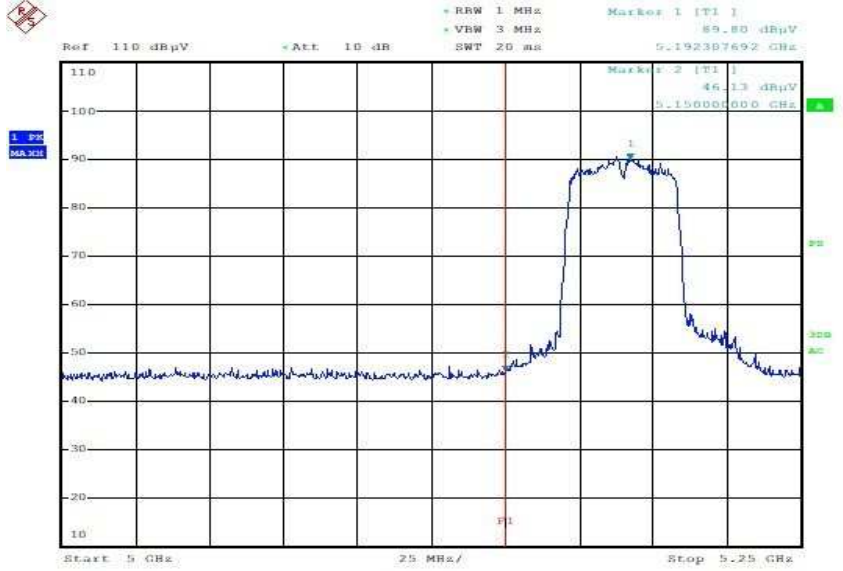
Test Date : 26-Mar-20

Measurement Distance : 3 m

Frequency (MHz)	Reading (dBμV)	Position (V/H)	Height (m)	Correction Factor		Duty Cycle Correction (dB)	Result Value		
				Ant Factor (dB)	Cable (dB)		Limit (dBμV/m)	Result (dBμV/m)	Margin (dB)
PEAK (RBW:1 MHz VBW:3 MHz)									
5470.00	45.95	H	1.6	31.90	-26.92	/	74.00	50.93	-23.07
5470.00	45.26	V	1.6	31.90	-26.92	/	74.00	56.92	-17.08
11590.00	46.36	H	1.6	39.97	-22.90	/	74.00	63.43	-10.57
11590.00	46.19	V	1.6	39.97	-22.90	/	74.00	63.26	-10.74
Average (RBW:1 MHz VBW:3 MHz)									
5470.00	34.33	H	1.6	31.90	-26.92	3.115	54.00	42.42	-11.58
5470.00	34.30	V	1.6	31.90	-26.92	3.115	54.00	42.39	-11.61
11590.00	32.21	H	1.6	39.97	-22.90	3.115	54.00	52.39	-1.61
11590.00	32.40	V	1.6	39.97	-22.90	3.115	54.00	52.58	-1.42
Remark	<p>H : Horizontal, V : Vertical TEST MODE : 802.11a-CH 149 (5745 MHz)</p> <p>*The TX signal wasn't detected from 3th harmonics.</p> <p>*Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Duty Cycle Correction</p> <p>*This test was radiated up to 26.5 GHz but no noise was measured.</p>								

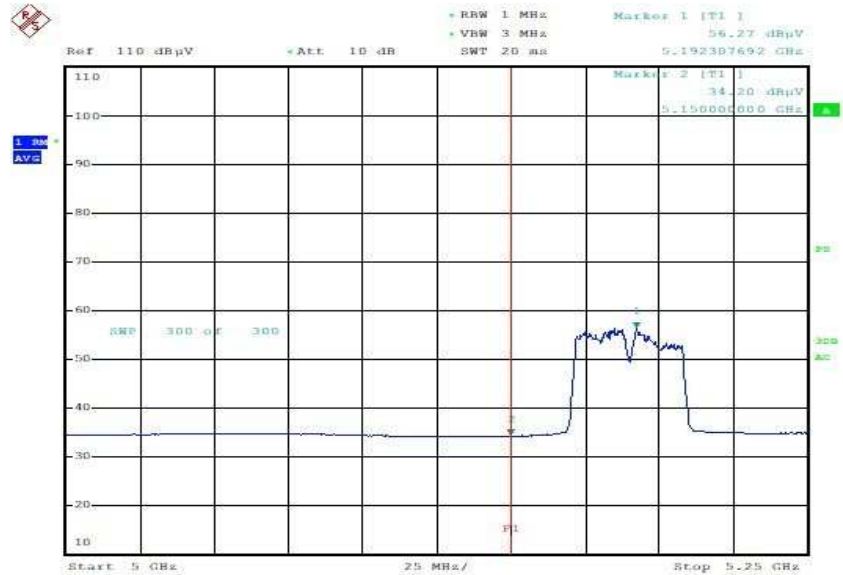
5.4-27 Restricted Band Edges (802.11n HT40)-CH 38

Detector mode:Peak Polarity:Horizontal



RF70A BIO_11a_n40_CH38_PEAK_HOR

Detector mode:Average Polarity:Horizontal

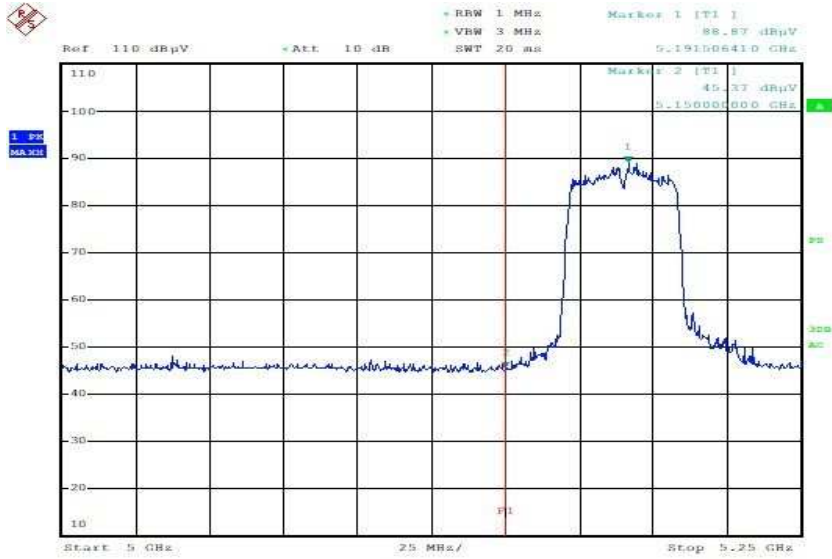


RF70A BIO_11a_n40_CH38_AV_HOR

Restricted Band Edges (802.11n HT40)-CH 38

Detector mode:Peak

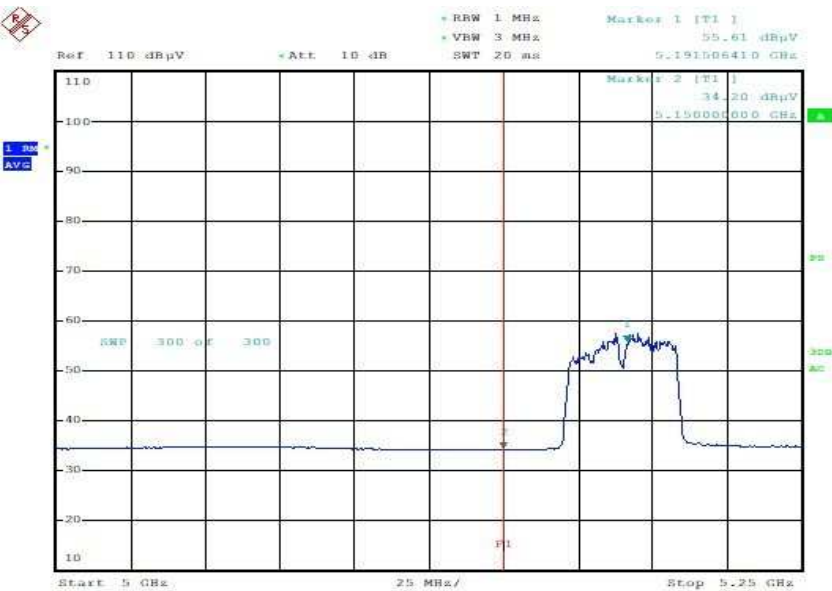
Polarity:Vertical



RP70A BIO_11a_n40_CH38_PEAR_VER

Detector mode:Average

Polarity:Vertical

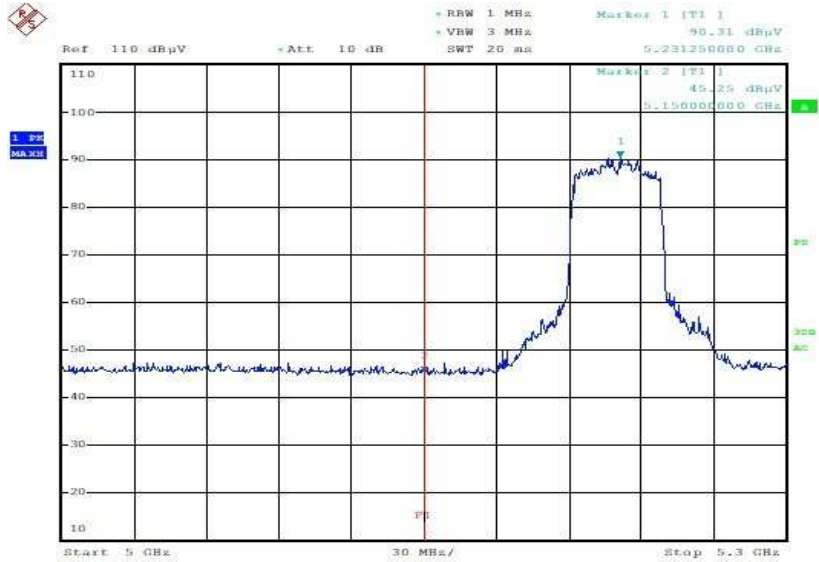


RP70A BIO_11a_n40_CH38_AV_VER

Restricted Band Edges (802.11n HT40)-CH 46

Detector mode:Peak

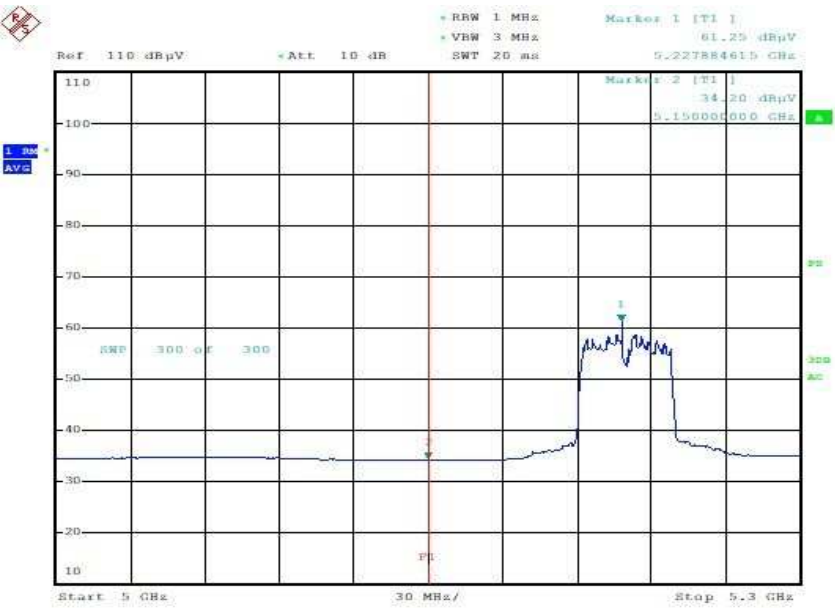
Polarity:Horizontal



RF70A_BIO_11a_n40_CH46_PEAK_HOR

Detector mode:Average

Polarity:Horizontal

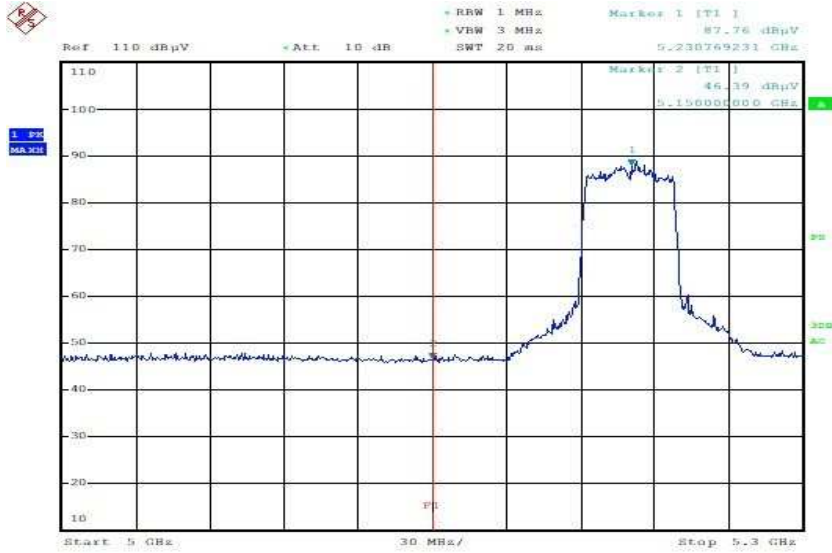


RF70A_BIO_11a_n40_CH46_AV_HOR

Restricted Band Edges (802.11n HT40)-CH 46

Detector mode:Peak

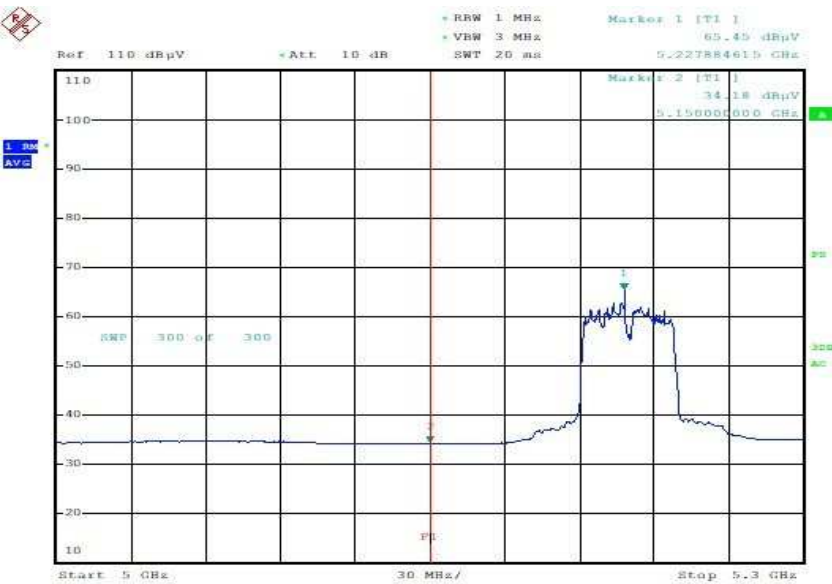
Polarity:Vertical



RF70A_BIO_11a_n40_CH46_PEAK_VER

Detector mode:Average

Polarity:Vertical

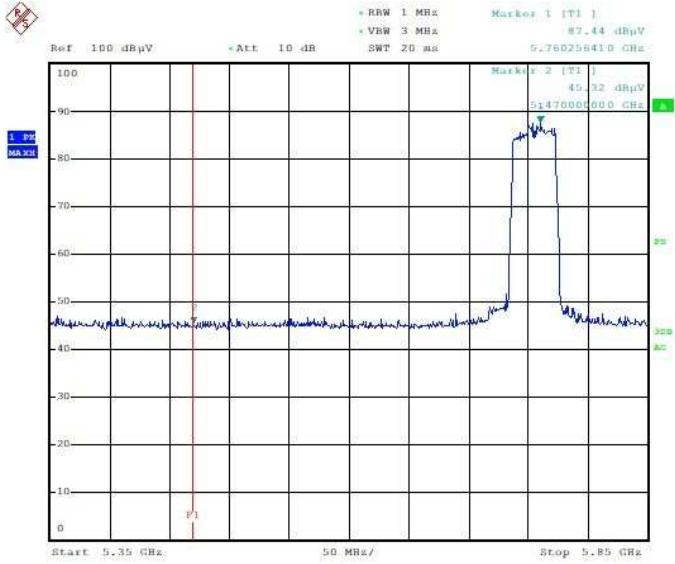


RF70A_BIO_11a_n40_CH46_AV_VER

Restricted Band Edges (802.11n HT40)-CH 151

Detector mode:Peak

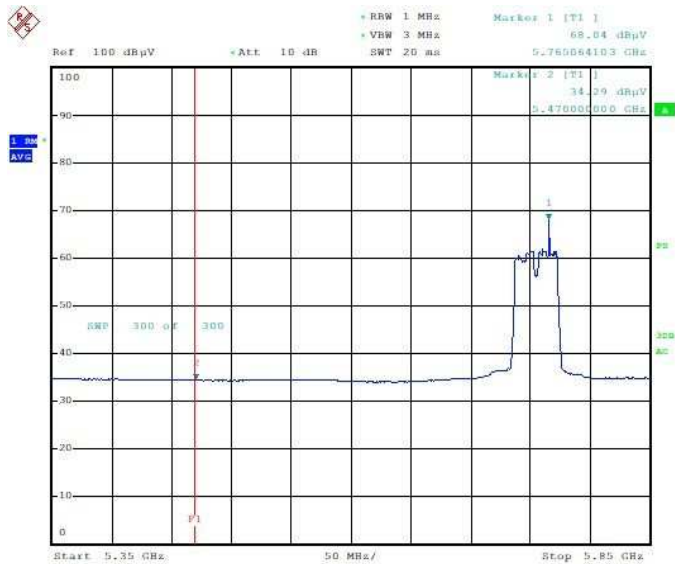
Polarity:Horizontal



RP70A_BIO_11a_HT40_CH151_PEAK_HOR

Detector mode:Average

Polarity:Horizontal

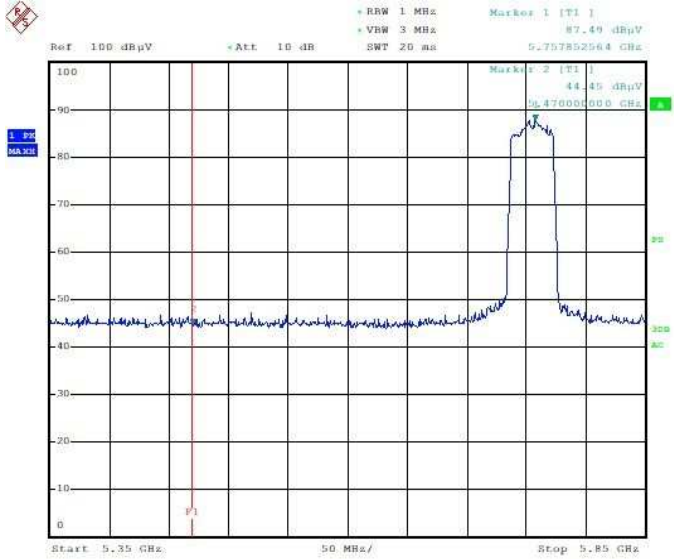


RP70A_BIO_11a_HT40_CH151_AV_HOR

Restricted Band Edges (802.11n HT40)-CH 151

Detector mode:Peak

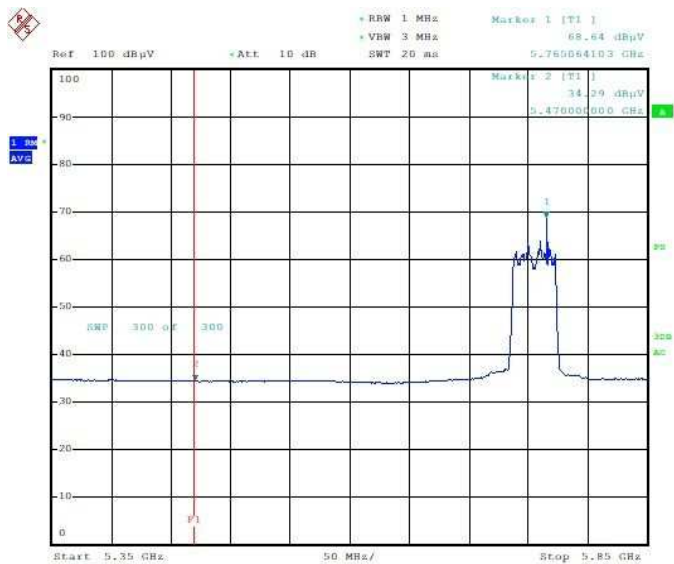
Polarity:Vertical



RP70A BIO_11a_HT40_CH151_PEAR_VER

Detector mode:Average

Polarity:Vertical

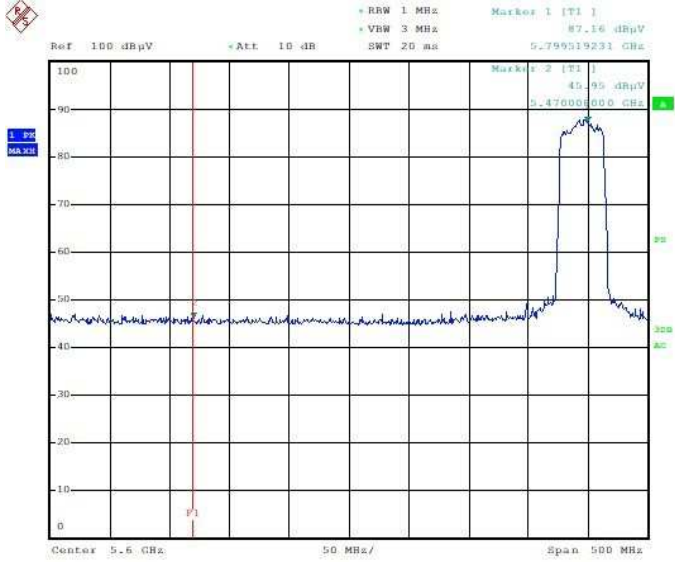


RP70A BIO_11a_HT40_CH151_AV_VER

Restricted Band Edges (802.11n HT40)-CH 159

Detector mode:Peak

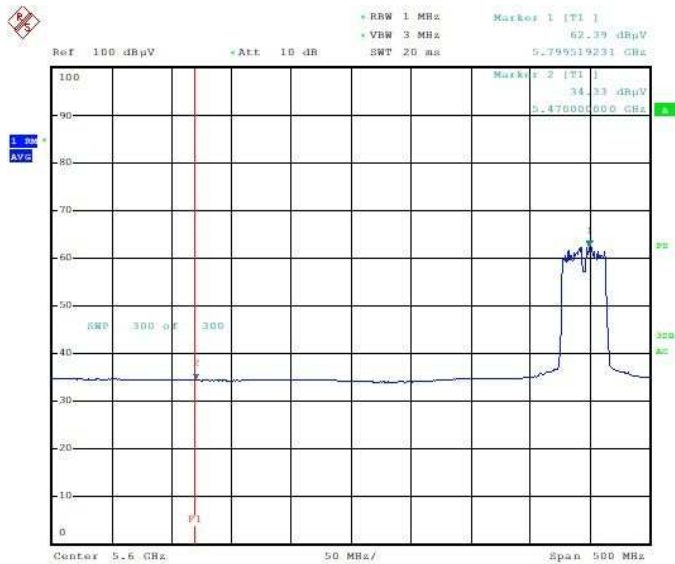
Polarity:Horizontal



RP70A_BIO_11a_HT40_CH159_PEAK_HOR

Detector mode:Average

Polarity:Horizontal

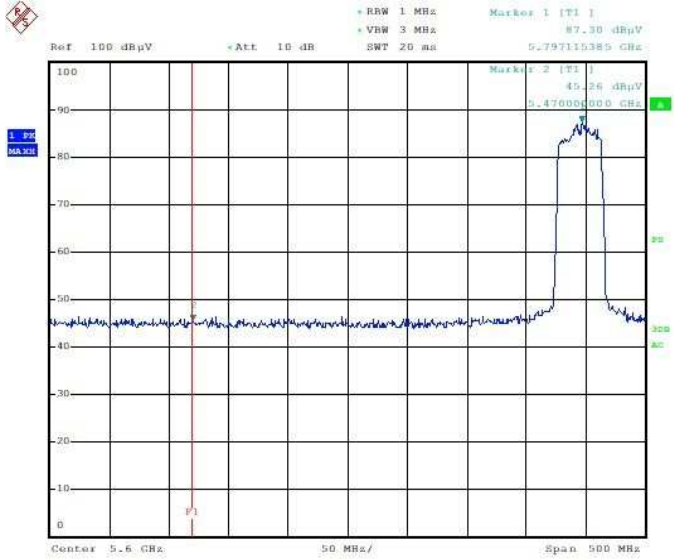


RP70A_BIO_11a_HT40_CH159_AV_HOR

Restricted Band Edges (802.11n HT40)-CH 159

Detector mode:Peak

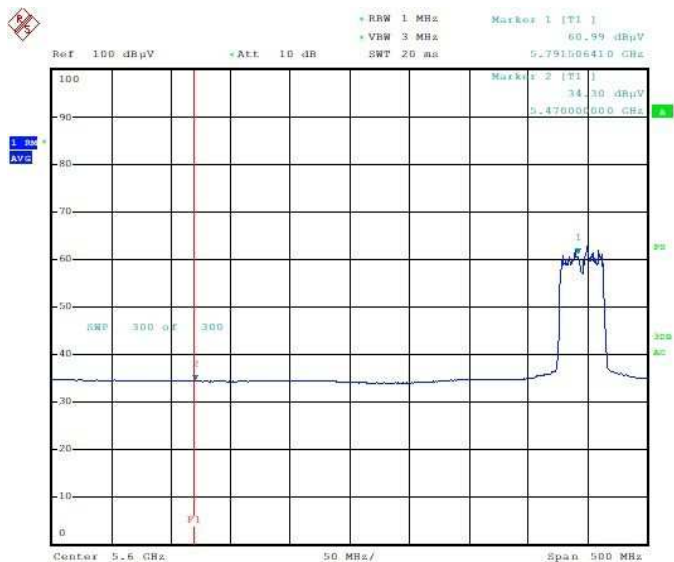
Polarity:Vertical



RP70A B10_11a_HT40_CH159_PEAR_VER

Detector mode:Average

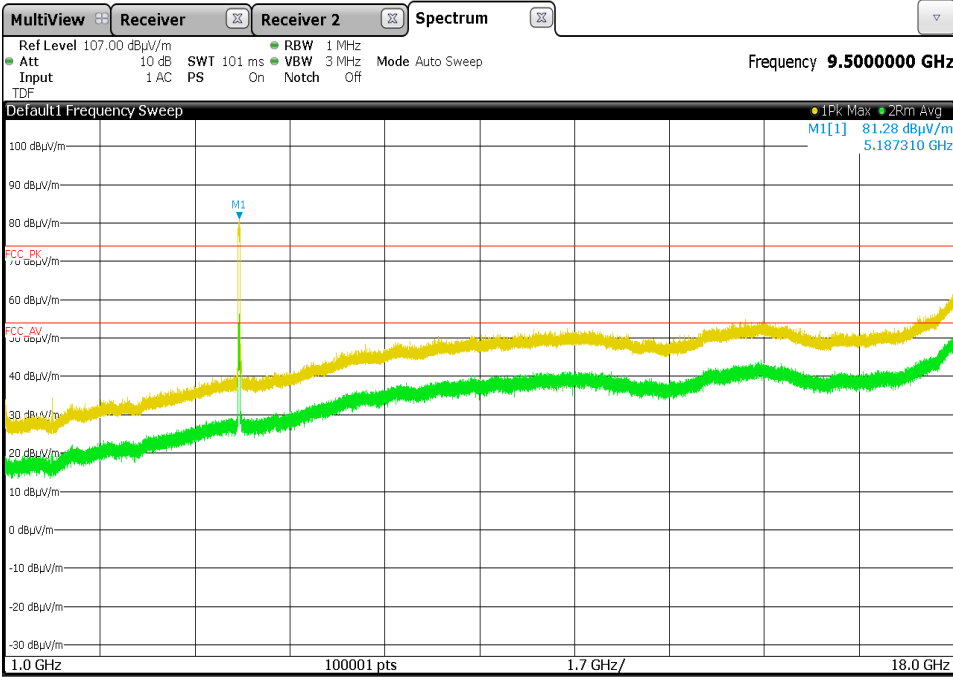
Polarity:Vertical



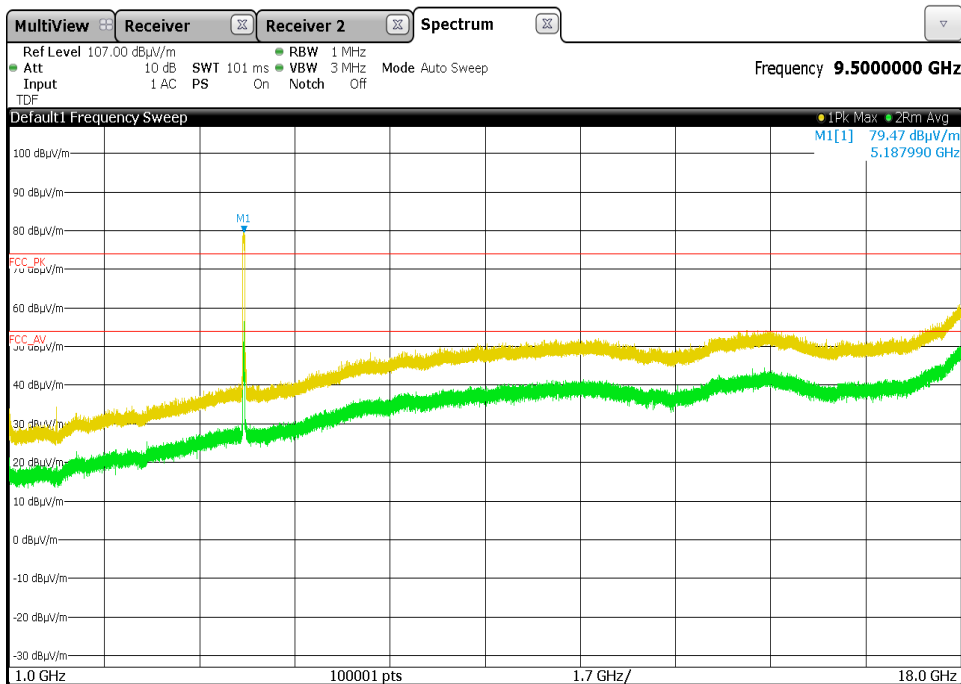
RP70A B10_11a_HT40_CH159_AV_VER

5.4-28 Restricted Band Edges (802.11n HT40)-CH 38

Polarity:Horizontal

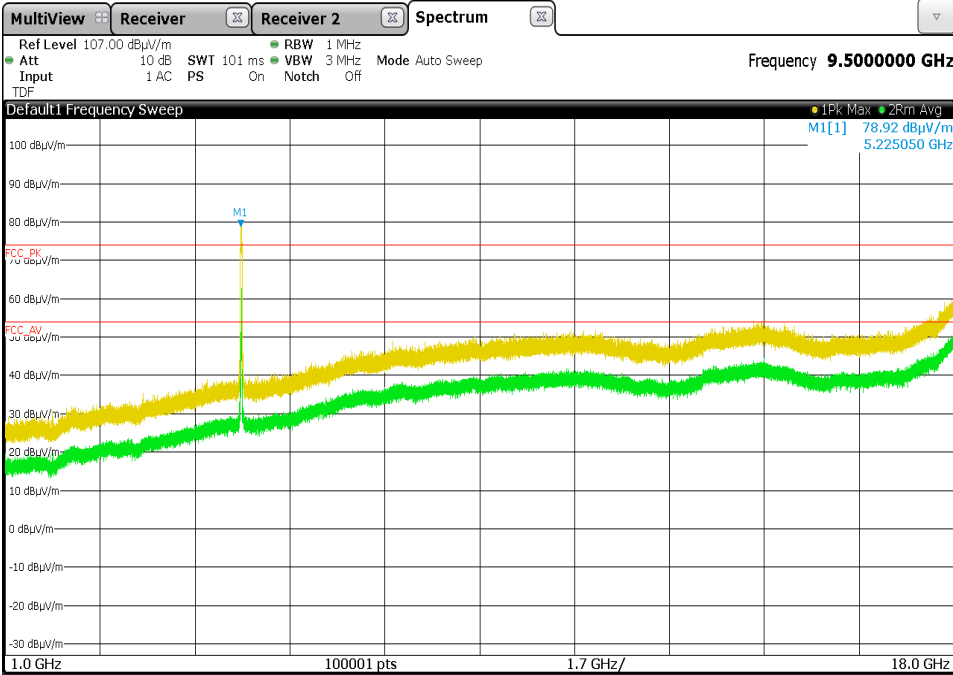


Polarity:Vertical

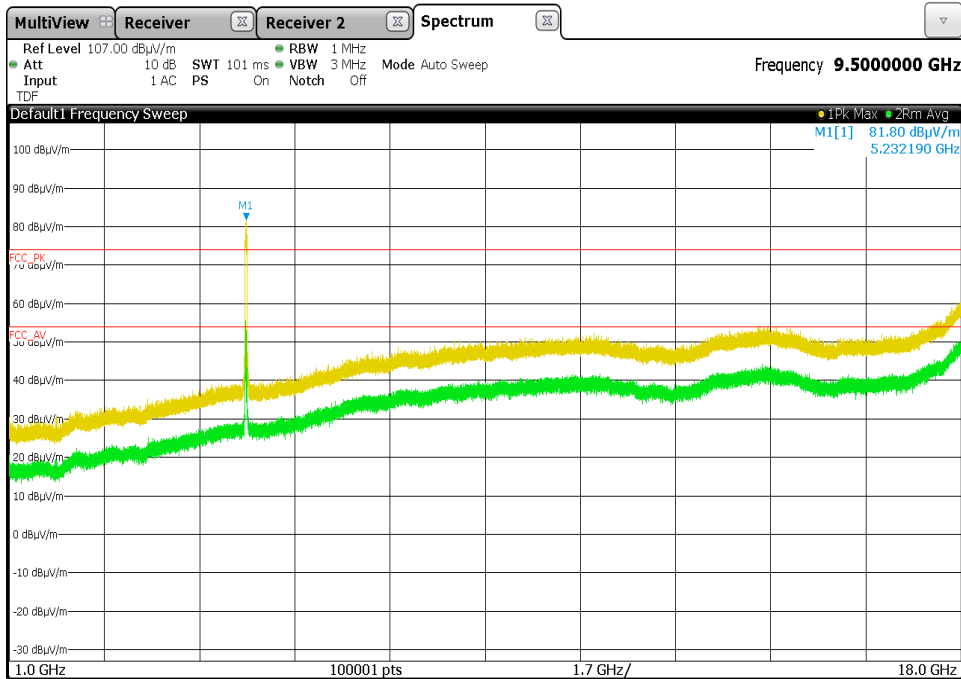


Restricted Band Edges (802.11n HT40)-CH 46

Polarity:Horizontal



Polarity:Vertical

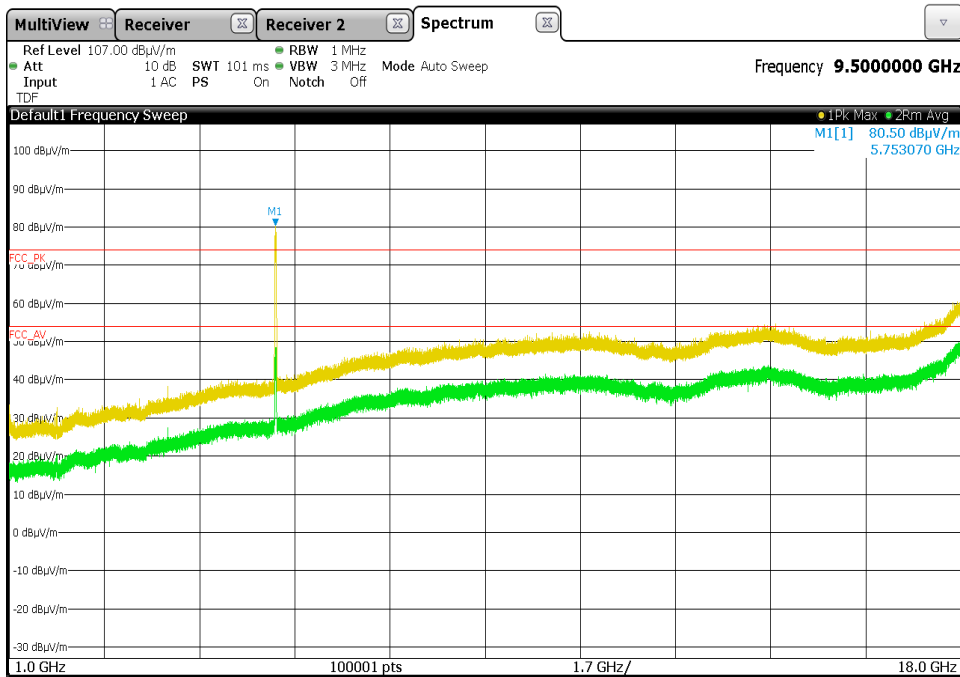


Restricted Band Edges (802.11n HT40)-CH 151

Polarity:Horizontal

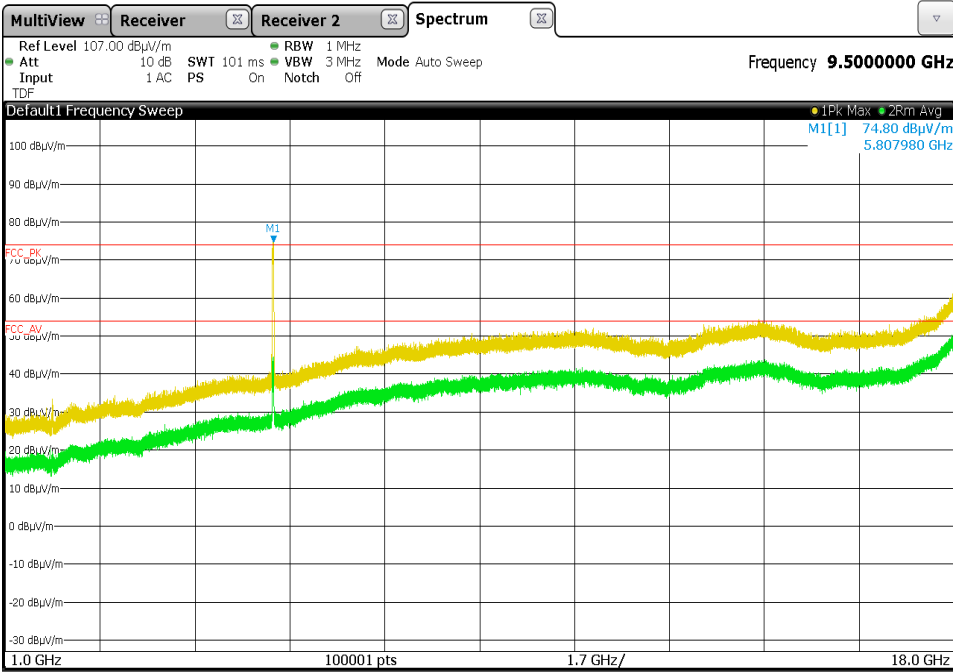


Polarity:Vertical

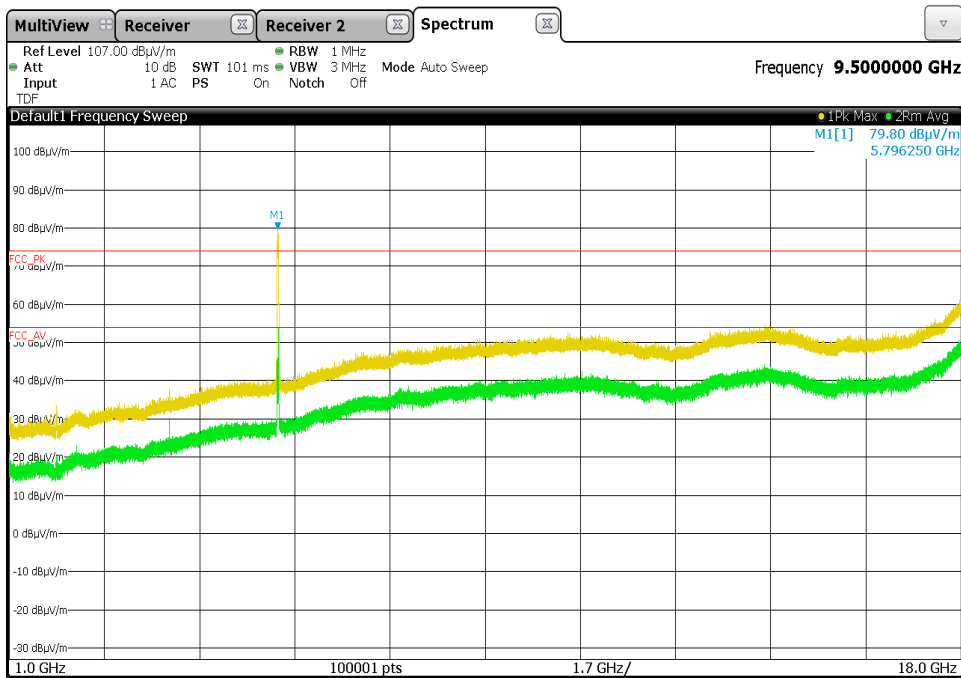


Restricted Band Edges (802.11n HT40)-CH 159

Polarity:Horizontal



Polarity:Vertical



5.4-29 Test Data for wireless LAN (802.11ac VHT80)

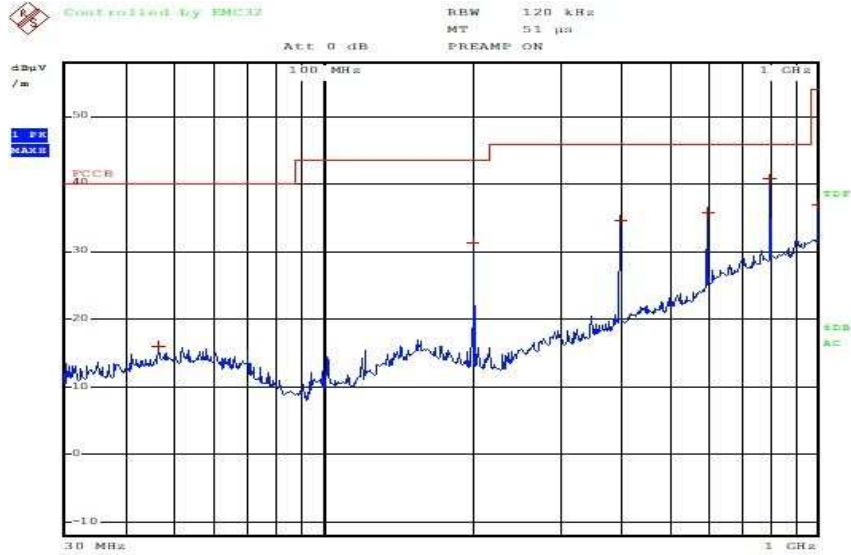
Test Date : 23-Mar-20

Measurement Distance : 3 m

Frequency (MHz)	Reading (dB μ V)	Position (V/H)	Height (m)	Correction Factor		Result Value		
				Ant Factor (dB)	Cable (dB)	Limit (dB μ V/m)	Result (dB μ V/m)	Margin (dB)
40.70	12.61	V	1.0	12.91	1.51	40.00	27.03	12.97
200.00	19.26	H	1.6	9.90	2.21	43.50	31.37	12.13
400.00	16.06	H	1.4	15.40	3.21	46.00	34.67	11.33
600.00	17.69	V	1.5	19.50	3.96	46.00	41.15	4.85
800.00	13.80	H	1.0	22.40	4.64	46.00	40.84	5.16
1000.00	7.53	H	1.0	24.29	5.22	54.00	37.04	16.96
Remark	<p>H : Horizontal, V : Vertical TEST MODE : 802.11a</p> <p>*Result Value = Reading + Ant Factor + Cable loss</p> <p>*The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection at frequency below 1 GHz.</p>							

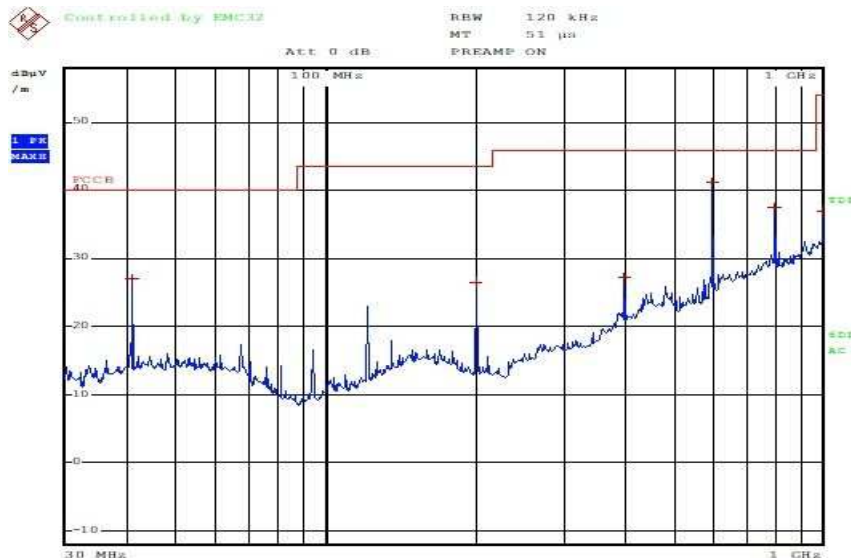
5.4-30 Radiated Graph(30 MHz ~ 1 GHz)802.11ac VHT80

Polarity:Horizontal



ESTR-20-00077_11n80_HOR

Polarity:Vertical



ESTR-20-00077_11n80_VER

5.5-17 Test Data for wireless LAN (802.11ac VHT80) – CH 42

Test Date : 26-Mar-20

Measurement Distance : 3 m

Frequency (MHz)	Reading (dBμV)	Position (V/H)	Height (m)	Correction Factor		Duty Cycle Correction (dB)	Result Value		
				Ant Factor (dB)	Cable (dB)		Limit (dBμV/m)	Result (dBμV/m)	Margin (dB)
PEAK (RBW:1 MHz VBW:3 MHz)									
5150.00	47.30	H	1.6	31.93	-27.13	/	74.00	52.09	-21.91
5150.00	46.34	V	1.6	31.93	-27.13	/	74.00	51.13	-22.87
10420.00	46.31	H	1.6	39.69	-23.12	/	74.00	62.88	-11.12
10420.00	46.25	V	1.6	39.69	-23.12	/	74.00	62.82	-11.18
Average (RBW:1 MHz VBW:3 MHz)									
5150.00	34.78	H	1.6	31.93	-27.13	1.169	54.00	40.74	-13.26
5150.00	34.65	V	1.6	31.93	-27.13	1.169	54.00	40.61	-13.39
10420.00	32.52	H	1.6	39.69	-23.12	1.169	54.00	50.26	-3.74
10420.00	32.37	V	1.6	39.69	-23.12	1.169	54.00	50.11	-3.89
Remark	<p>H : Horizontal, V : Vertical TEST MODE : 802.11a-CH 48 (5240 MHz)</p> <p>*The TX signal wasn't detected from 3th harmonics.</p> <p>*Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Duty Cycle Correction</p> <p>*This test was radiated up to 26.5 GHz but no noise was measured.</p>								

5.5-18 Test Data for wireless LAN (802.11ac VHT80) – CH 155

Test Date : 26-Mar-20

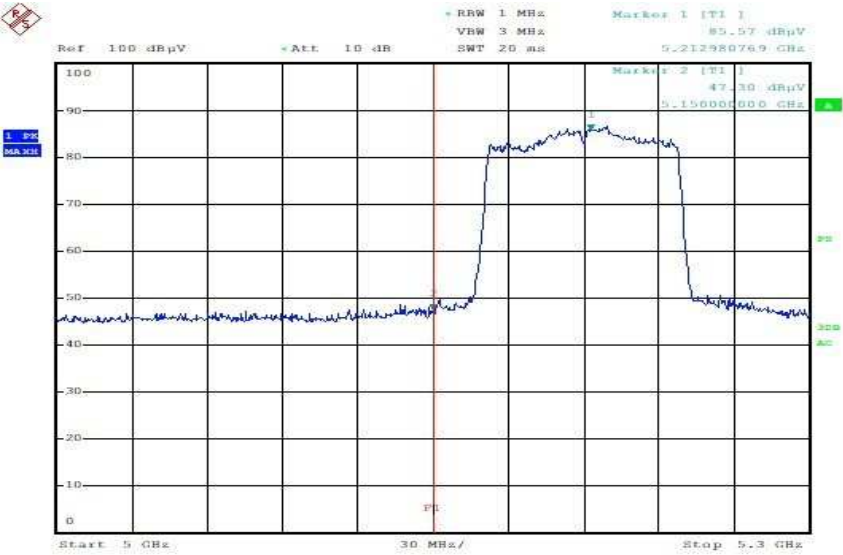
Measurement Distance : 3 m

Frequency (MHz)	Reading (dBμV)	Position (V/H)	Height (m)	Correction Factor		Duty Cycle Correction (dB)	Result Value		
				Ant Factor (dB)	Cable (dB)		Limit (dBμV/m)	Result (dBμV/m)	Margin (dB)
PEAK (RBW:1 MHz VBW:3 MHz)									
5470.00	45.51	H	1.6	31.90	-26.92	/	74.00	50.49	-23.51
5470.00	44.57	V	1.6	31.90	-26.92	/	74.00	56.92	-17.08
11550.00	46.37	H	1.6	40.07	-22.70	/	74.00	63.74	-10.26
11550.00	46.22	V	1.6	40.07	-22.70	/	74.00	63.59	-10.41
Average (RBW:1 MHz VBW:3 MHz)									
5470.00	33.98	H	1.6	31.90	-26.92	1.169	54.00	40.13	-13.87
5470.00	33.92	V	1.6	31.90	-26.92	1.169	54.00	40.07	-13.93
11550.00	32.44	H	1.6	40.07	-22.70	1.169	54.00	50.98	-3.02
11550.00	32.34	V	1.6	40.07	-22.70	1.169	54.00	50.88	-3.12
Remark	<p>H : Horizontal, V : Vertical TEST MODE : 802.11a-CH 149 (5745 MHz)</p> <p>*The TX signal wasn't detected from 3th harmonics. *Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Duty Cycle Correction *This test was radiated up to 26.5 GHz but no noise was measured.</p>								

6.3-24 Restricted Band Edges (802.11ac VHT80)-CH 42

Detector mode:Peak

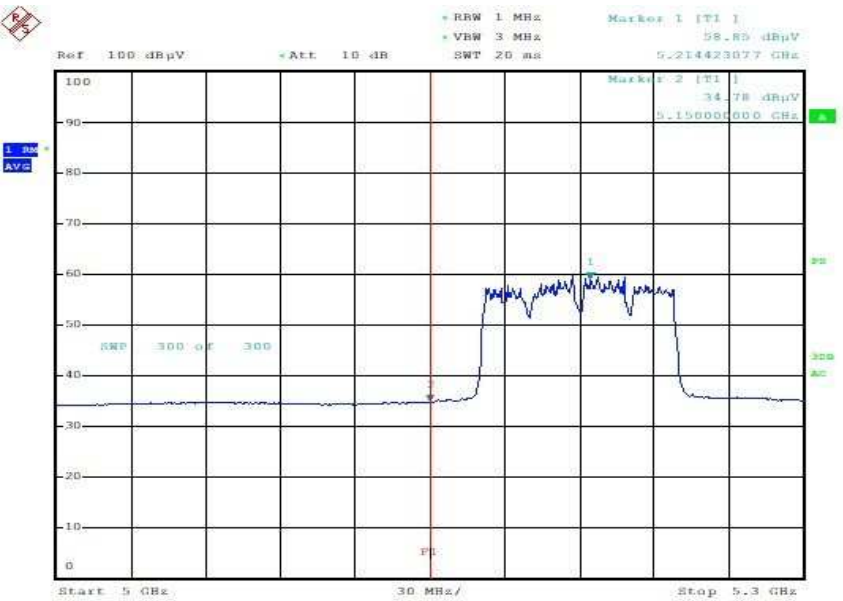
Polarity:Horizontal



RF70A_BIO_11a_AC80_CH42_PEAK_HOR

Detector mode:Average

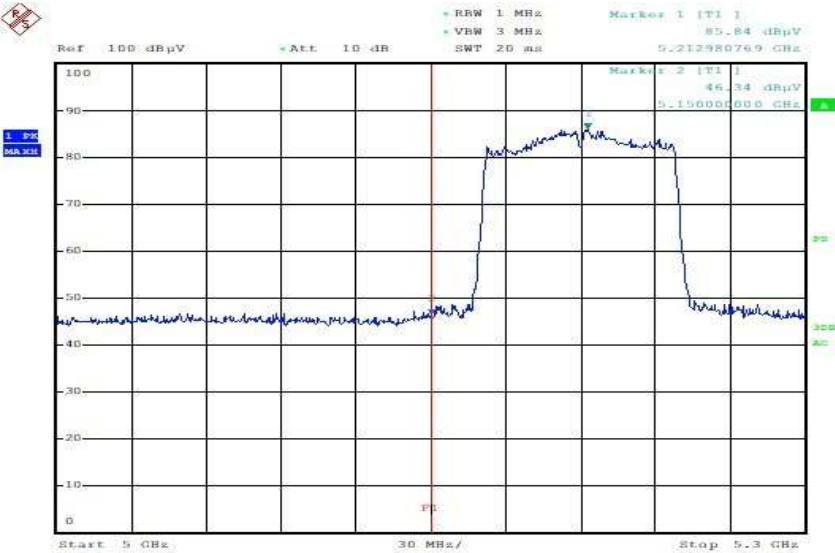
Polarity:Horizontal



RF70A_BIO_11a_AC80_CH42_AV_HOR

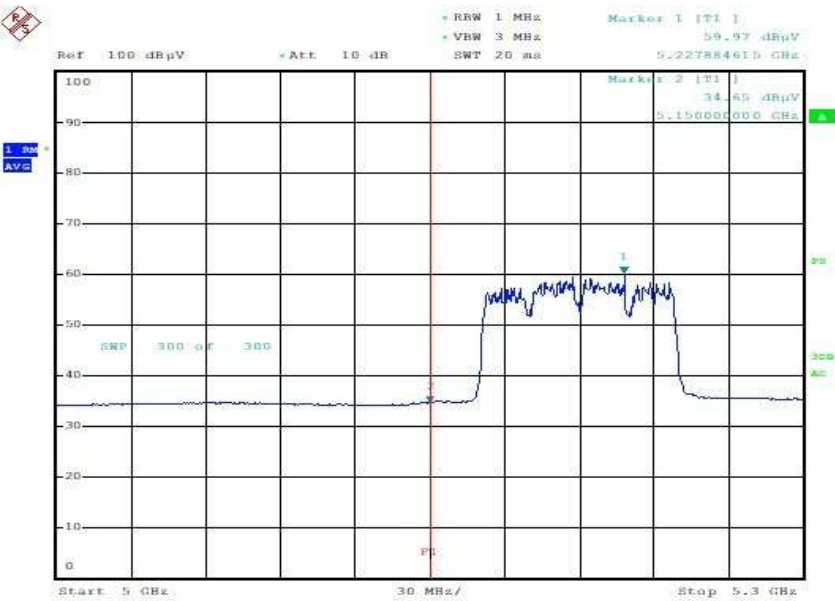
6.3-25 Restricted Band Edges (802.11ac VHT80)-CH 42

Detector mode:Peak Polarity:Vertical



RF70A_BIO_11a_AC80_CH42_PEAK_VER
1

Detector mode:Average Polarity:Vertical

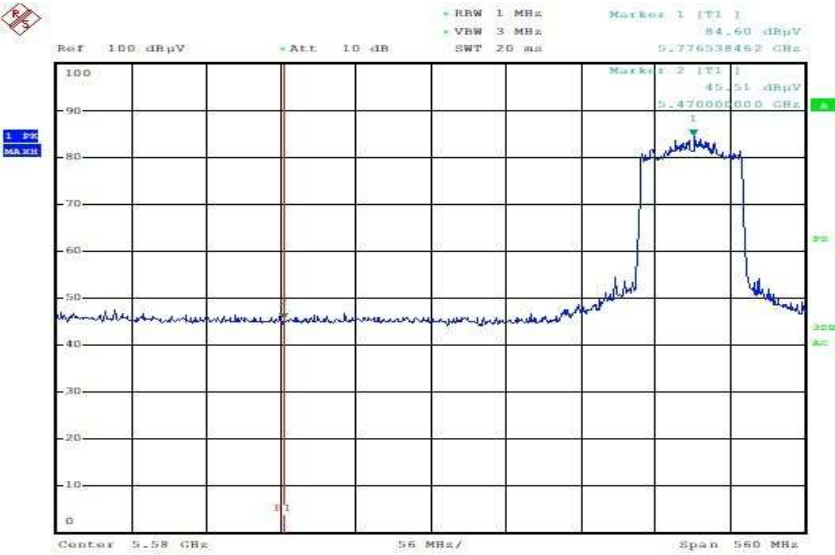


RF70A_BIO_11a_AC80_CH42_AV_VER
1

6.3-26 Restricted Band Edges (802.11ac VHT80)-CH 155

Detector mode:Peak

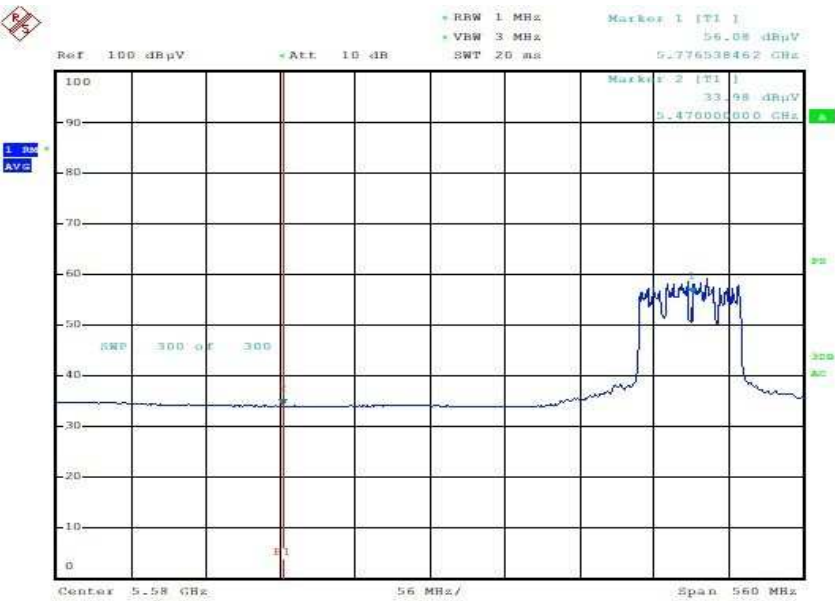
Polarity:Horizontal



RF70A_BIO_11a_AC80_CH155_PEAK_HOR

Detector mode:Average

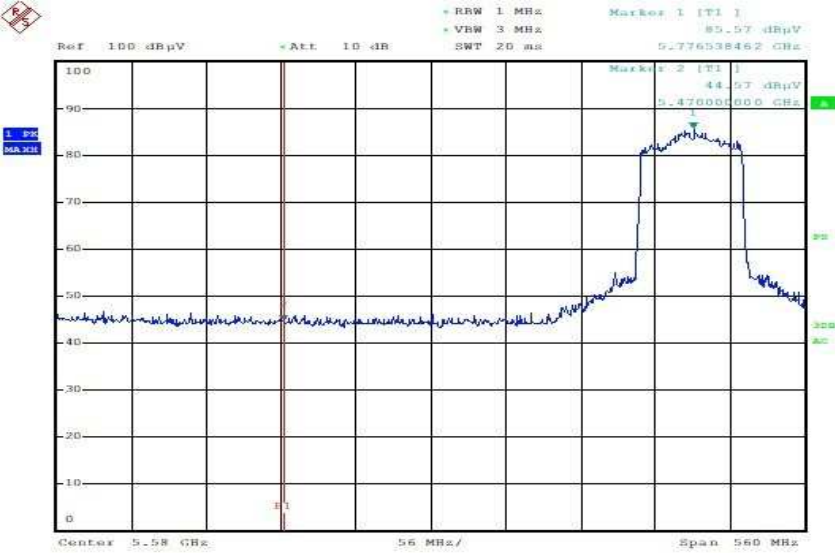
Polarity:Horizontal



RF70A_BIO_11a_AC80_CH155_AV_HOR

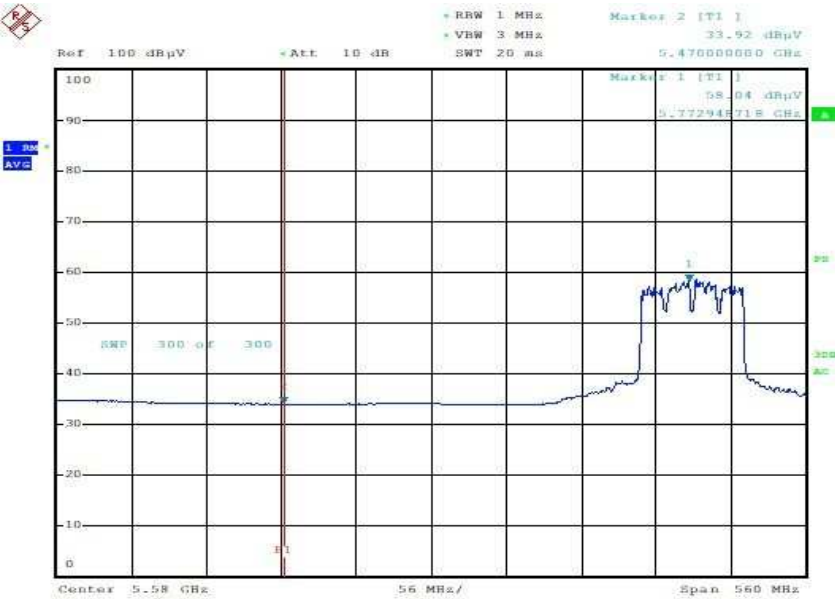
6.3-27 Restricted Band Edges (802.11ac VHT80)-CH 155

Detector mode:Peak Polarity:Vertical



RF70A_BIO_11a_AC80_CH155_PEAK_VER

Detector mode:Average Polarity:Vertical



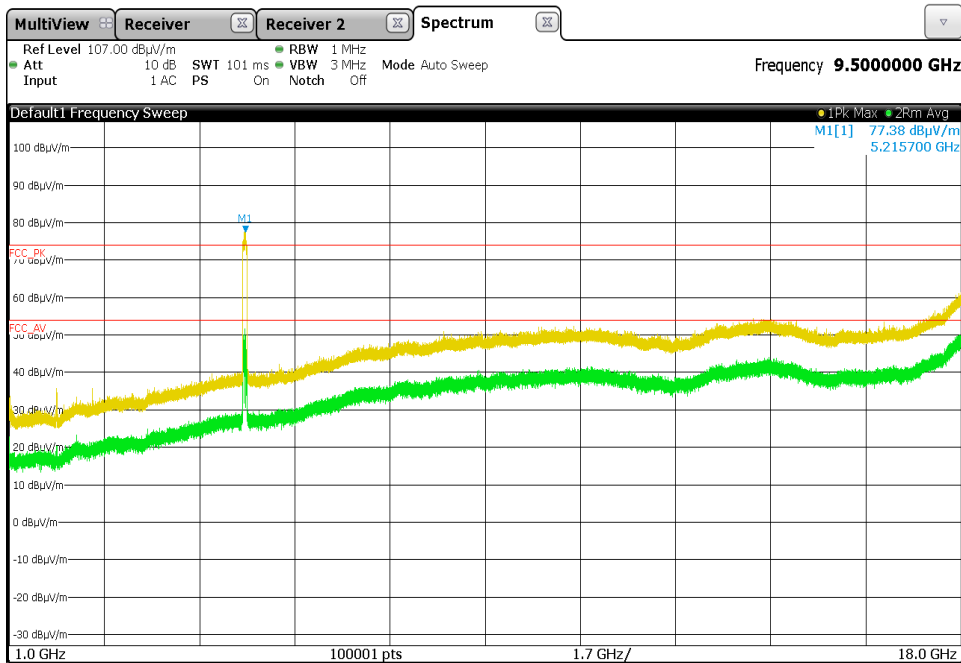
RF70A_BIO_11a_AC80_CH155_AV_VER

Restricted Band Edges (802.11ac VHT80)-CH 42

Polarity:Horizontal

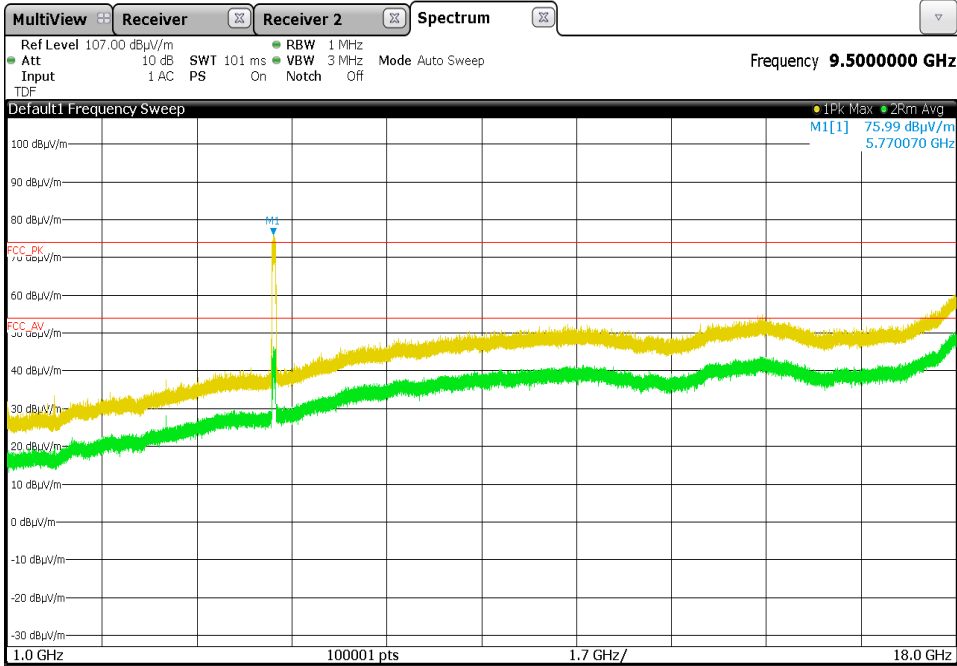


Polarity:Vertical

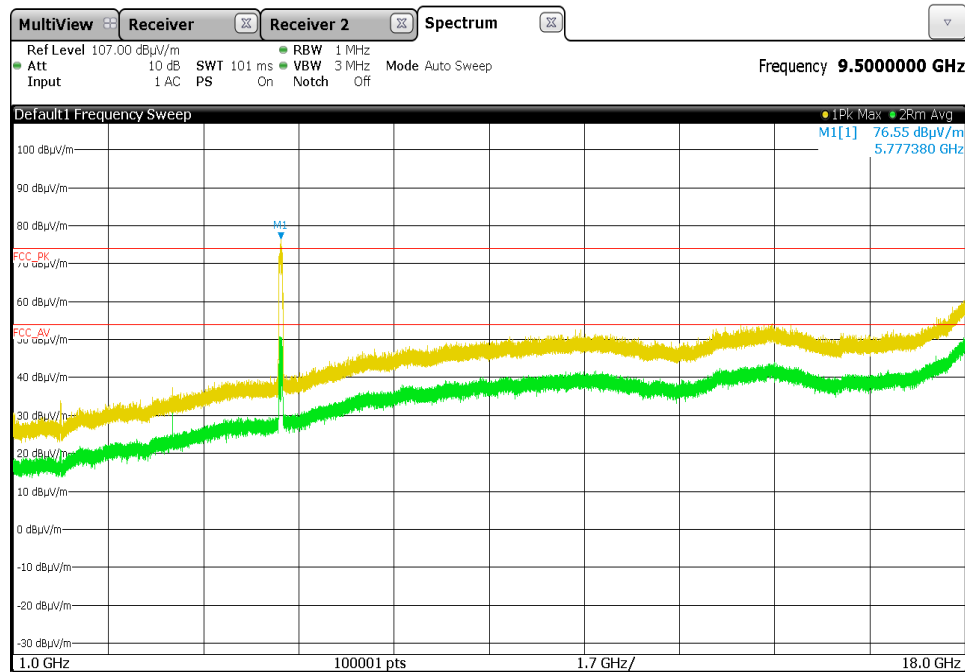


Restricted Band Edges (802.11ac VHT80)-CH 155

Polarity:Horizontal



Polarity:Vertical



6. Measurement of conducted disturbance

The continuous disturbance voltage of AC Mains in the frequency from 0.15 MHz to 30 MHz was measured in accordance to FCC PART 15.207. The test setup was made according to ANSI C 63.10 (2013) in a shielded room. The EUT was placed on a non-conductive table at least 0.8 m above the ground plan. A grounded vertical reference plane was positioned in a distance of 0.4 m from the EUT. The distance from the EUT to other metal surfaces was at least 0.8 m. The EUT was only earthen by its power cord through the line impedance stabilizing network. The power cord has been bundled to a length of 1.0 m. The test receiver with Quasi Peak detector complies with CISPR 16.

6.1 Measurement equipments

Equipment Name	Type	Manufacturer	Serial No.	Next Calibration date
EMI TEST Receiver	ESPI	Rohde & Schwarz	100005	9-Sep-20
LISN	ESH3-Z5	Rohde & Schwarz	836679/025	9-Sep-20
Pulse Limiter	ESH3Z2	Rohde & Schwarz	NONE	9-Sep-20

6.2 Environmental Condition

Test Place : Shielded Room

Wireless LAN 802.11a, 802.11n HT20, 802.11n HT40, 802.11ac VHT80

Temperature (°C) : 21.5 °C

Humidity (% R.H.) : 47.6 % R.H.



6.3-1 Test Data for wireless LAN (802.11a)

Test Date : 27-Mar-20

Frequency (MHz)	Correction Factor		Line (H/N)	Quasi-peak Value			Average Value		
	Lisn (dB)	Cable (dB)		Limit (dB μ V)	Reading (dB μ V)	Result (dB μ V)	Limit (dB μ V)	Reading (dB μ V)	Result (dB)
0.16	0.12	0.12	N	65.52	44.96	45.20	55.52	31.24	31.48
0.18	0.12	0.13	N	64.63	42.96	43.21	54.63	30.58	30.83
0.19	0.12	0.14	N	63.32	40.60	40.86	53.32	28.65	28.91
0.39	0.12	0.39	N	62.41	41.30	41.81	52.41	33.72	34.23
13.46	0.53	0.39	N	60.00	36.21	37.13	50.00	27.65	28.57
26.98	0.66	0.39	N	60.00	24.16	25.21	50.00	14.88	15.93
Remark	TEST MODE : 802.11a CH 44 H : Hot Line, N : Neutral Line *Correction Factor = Lisn + Cable *Result = Correction Factor + Reading								

6.3-2 Test Data for wireless LAN (802.11n HT20)

Test Date : 27-Mar-20

Frequency (MHz)	Correction Factor		Line (H/N)	Quasi-peak Value			Average Value		
	Lisn (dB)	Cable (dB)		Limit (dB μ V)	Reading (dB μ V)	Result (dB μ V)	Limit (dB μ V)	Reading (dB μ V)	Result (dB)
0.16	0.12	0.12	N	65.52	44.55	44.79	55.52	31.06	31.30
0.18	0.12	0.13	H	64.63	43.02	43.27	54.63	30.47	30.72
0.19	0.12	0.14	H	63.32	40.90	41.16	53.32	28.89	29.15
0.39	0.12	0.39	H	62.41	40.89	41.40	52.41	34.22	34.73
13.46	0.53	0.39	H	60.00	35.53	36.45	50.00	26.85	27.77
26.98	0.66	0.39	H	60.00	24.17	25.22	50.00	14.04	15.09
Remark	TEST MODE : 802.11a CH 44 H : Hot Line, N : Neutral Line *Correction Factor = Lisn + Cable *Result = Correction Factor + Reading								



6.3-3 Test Data for wireless LAN (802.11n HT40)

Test Date : 27-Mar-20

Frequency (MHz)	Correction Factor		Line (H/N)	Quasi-peak Value			Average Value		
	Lisn (dB)	Cable (dB)		Limit (dB μ V)	Reading (dB μ V)	Result (dB μ V)	Limit (dB μ V)	Reading (dB μ V)	Result (dB)
0.15	0.12	0.12	H	66.00	43.21	43.45	56.00	29.72	29.96
0.16	0.12	0.13	N	64.63	44.74	44.99	54.63	31.11	31.36
0.18	0.12	0.14	N	63.32	42.16	42.42	53.32	30.42	30.68
0.19	0.12	0.39	N	62.41	40.97	41.48	52.41	28.71	29.22
0.40	0.14	0.39	H	57.85	40.68	41.21	47.85	33.23	33.76
13.62	0.66	0.39	H	60.00	35.11	36.16	50.00	26.54	27.59
Remark	TEST MODE : 802.11a CH 44 H : Hot Line, N : Neutral Line *Correction Factor = Lisn + Cable *Result = Correction Factor + Reading								



6.3-4 Test Data for wireless LAN (802.11ac VHT80)

Test Date : 27-Mar-20

Frequency (MHz)	Correction Factor		Line (H/N)	Quasi-peak Value			Average Value		
	Lisn (dB)	Cable (dB)		Limit (dB μ V)	Reading (dB μ V)	Result (dB μ V)	Limit (dB μ V)	Reading (dB μ V)	Result (dB)
0.16	0.12	0.12	N	65.52	44.06	44.30	55.52	31.06	31.30
0.18	0.12	0.13	N	64.63	42.97	43.22	54.63	30.49	30.74
0.19	0.12	0.14	N	63.32	41.00	41.26	53.32	28.82	29.08
0.39	0.12	0.39	N	62.41	40.41	40.92	52.41	34.37	34.88
13.46	0.53	0.39	N	60.00	35.10	36.02	50.00	26.70	27.62
26.98	0.66	0.39	H	60.00	24.79	25.84	50.00	14.04	15.09
Remark	TEST MODE : 802.11a CH 44 H : Hot Line, N : Neutral Line *Correction Factor = Lisn + Cable *Result = Correction Factor + Reading								

7. On Time, Duty Cycle and Measurement Methods

7.1 Test procedure

KDB 789033 D02 v02r01– Section B Duty Cycle (x), Transmission Duration (T), and Maximum Power Control Level

7.2 Test instruments and measurement setup

The spectrum analyzer is set to as following.

- . RBW= 1 MHz
- . VBW= 3 MHz
- . Span= Zero

6dB Bandwidth Test Instruments

Description	Model	Serial Number	Cal. Due Date
Spectrum Analyzer	FSV40	100393	2020-12-02

7.3 Measurement results

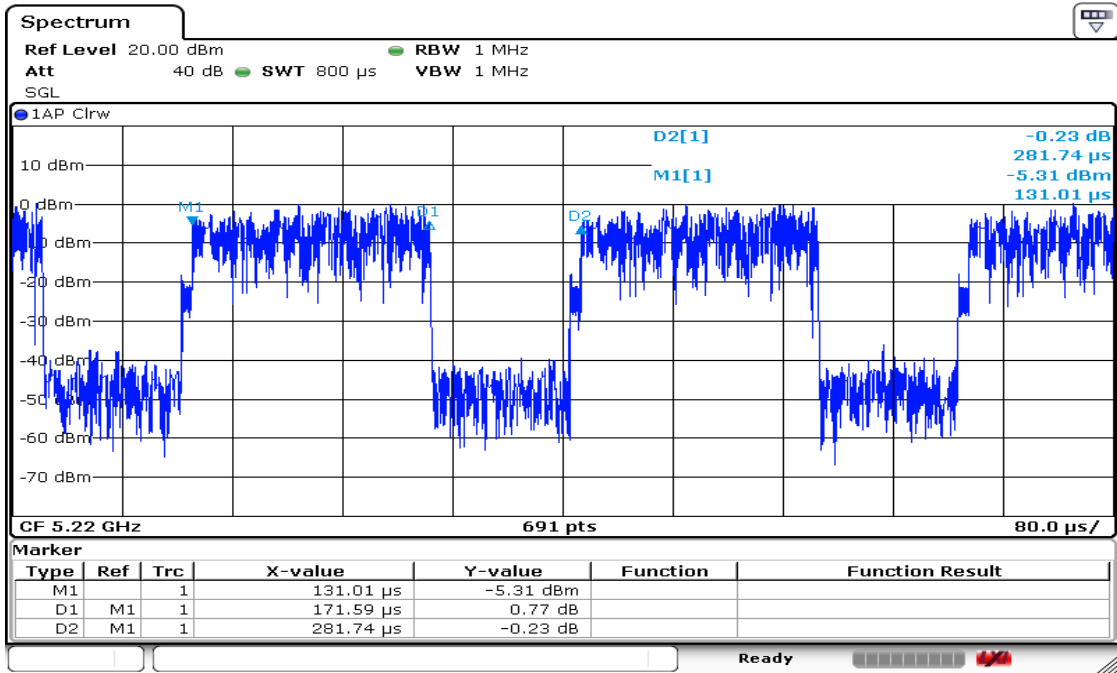
EUT	Tablet PC	MODEL	PR70A BIO
MODE	OFDM	ENVIRONMENTAL CONDITION	24 °C, 44 % R.H.
INPUT POWER	DC 3.7 V		

(802.11a)

Mode	On Time B (msec)	Period (msec)	Duty Cycle (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dBm)	Minimum VBW (KHz)
802.11a	0.179	0.281	0.637	63.701	1.959	5.59
802.11n HT20	0.167	0.269	0.621	62.082	2.070	5.99
802.11n HT40	0.098	0.201	0.488	48.756	3.120	10.20
802.11ac VHT80	0.331	0.433	0.764	76.443	1.167	3.02

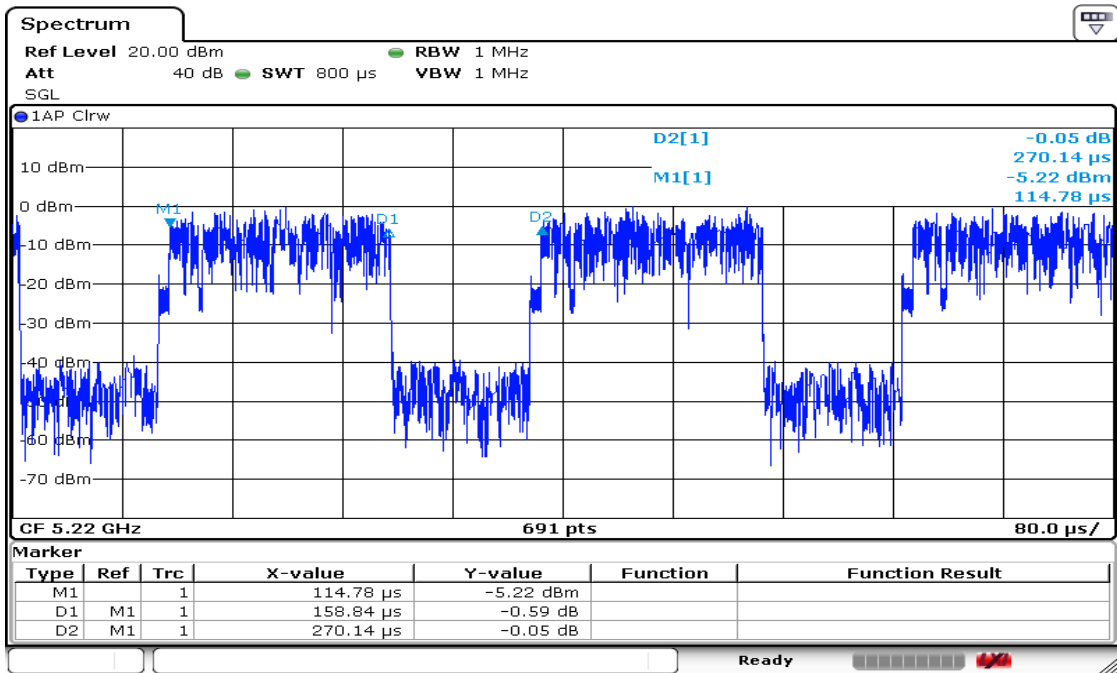
8.4-1 Trace data

UNII Band1 OFDM (802.11a-44ch)



00233

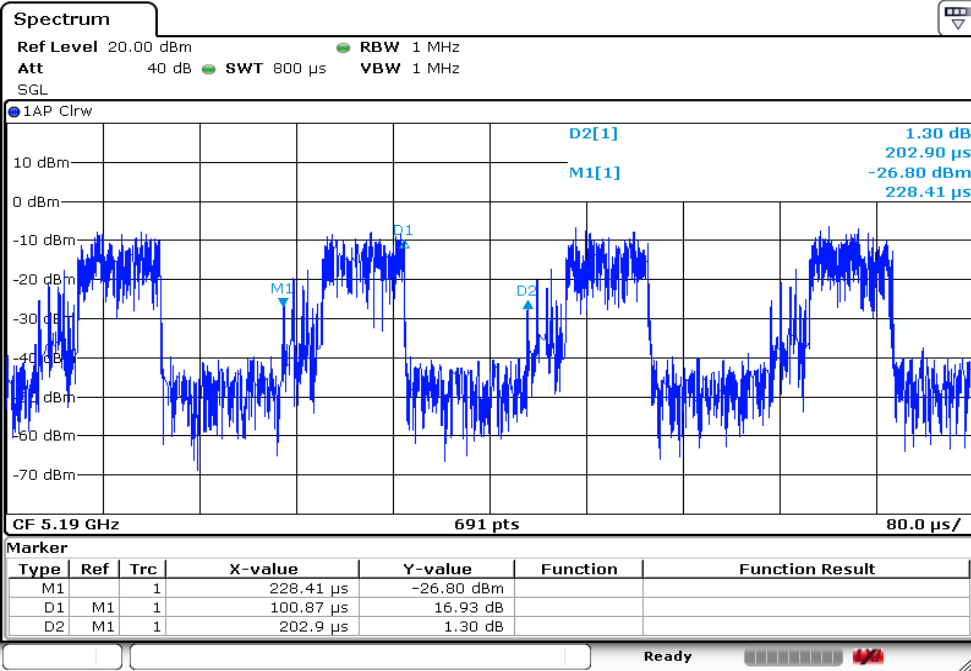
UNII Band1 OFDM (802.11n HT20-44ch)



00233

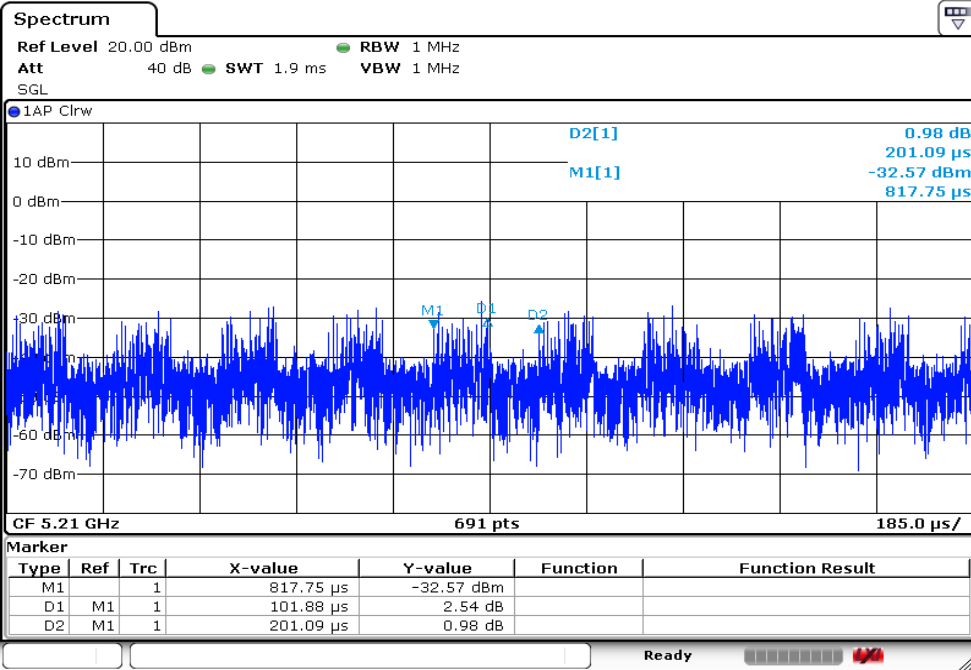
8.4-2 Trace data

UNII Band1 OFDM (802.11n HT40-38ch)



00233

UNII Band1 OFDM (802.11ac VHT80-42ch)



00233

8. Emission bandwidth and 99% Occupied Bandwidth

8.1 Test procedure

KDB 789033 v02r01– Section C and D Emission bandwidth and 99 Percent Occupied Bandwidth

8.2 Test instruments and measurement setup

The spectrum analyzer is set to as following.

- 1) Set RBW = approximately 1% of the emission bandwidth.
- 2) Set the VBW > RBW.
- 3) Detector = Peak
- 4) Trace mode = max hold.
- 5) Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

The following procedure shall be used for measuring (99 %) power bandwidth.

- 1) Set center frequency to the nominal EUT channel center frequency.
- 2) Set span = 1.5 times to 5.0 times the OBW.
- 3) Set RBW = 1 % to 5 % of the OBW
- 4) Set VBW $\geq 3 \cdot$ RBW
- 5) Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.
- 6) Use the 99 % power bandwidth function of the instrument (if available).
- 7) If the instrument does not have a 99 % power bandwidth function, the trace data points are recovered and directly summed in power units. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5 % of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5 % of the total is reached; that frequency is recorded as the upper frequency. The 99% occupied bandwidth is the difference between these two frequencies.

. Sweep= suitable duration based on the EUT specification.

Description	Model	Serial Number	Cal. Due Date
Spectrum Analyzer	E4440A	US42041281	2020-12-02

8.3 Measurement results

EUT	Tablet PC	MODEL	PR70A BIO
MODE	OFDM	ENVIRONMENTAL CONDITION	24 °C, 44 % R.H.
INPUT POWER	DC 3.7 V		

UNII Band1(802.11a)

Channel Frequency (MHz)	99% bandwidth	Bandwidth at 26dB below(MHz)	Minimum limit (kHz)	Pass/Fail
5180	16.46	20.37	N/A	Pass
5220	16.42	20.64	N/A	Pass
5240	16.44	20.62	N/A	Pass

UNII Band1(802.11n HT20)

Channel Frequency (MHz)	99% bandwidth	Bandwidth at 26dB below(MHz)	Minimum limit (kHz)	Pass/Fail
5180	17.62	20.80	N/A	Pass
5220	17.64	20.83	N/A	Pass
5240	17.62	20.70	N/A	Pass

UNII Band1(802.11n HT40)

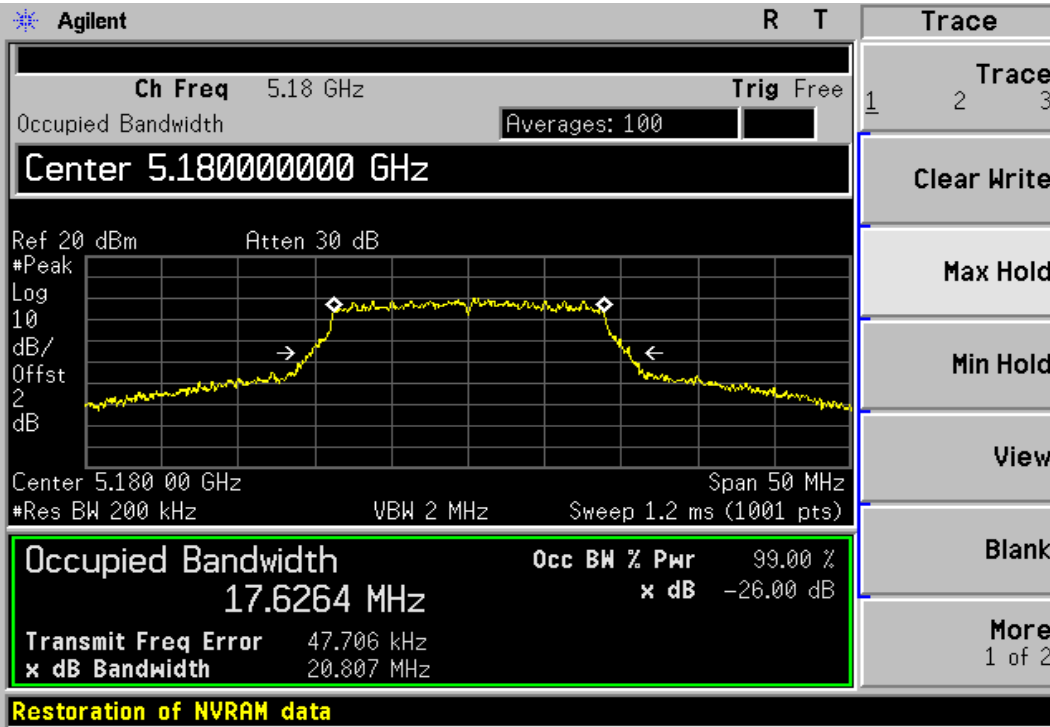
Channel Frequency (MHz)	99% bandwidth	Bandwidth at 26dB below(MHz)	Minimum limit (kHz)	Pass/Fail
5190	36.15	39.15	N/A	Pass
5230	36.05	38.84	N/A	Pass

UNII Band1(802.11ac VHT80)

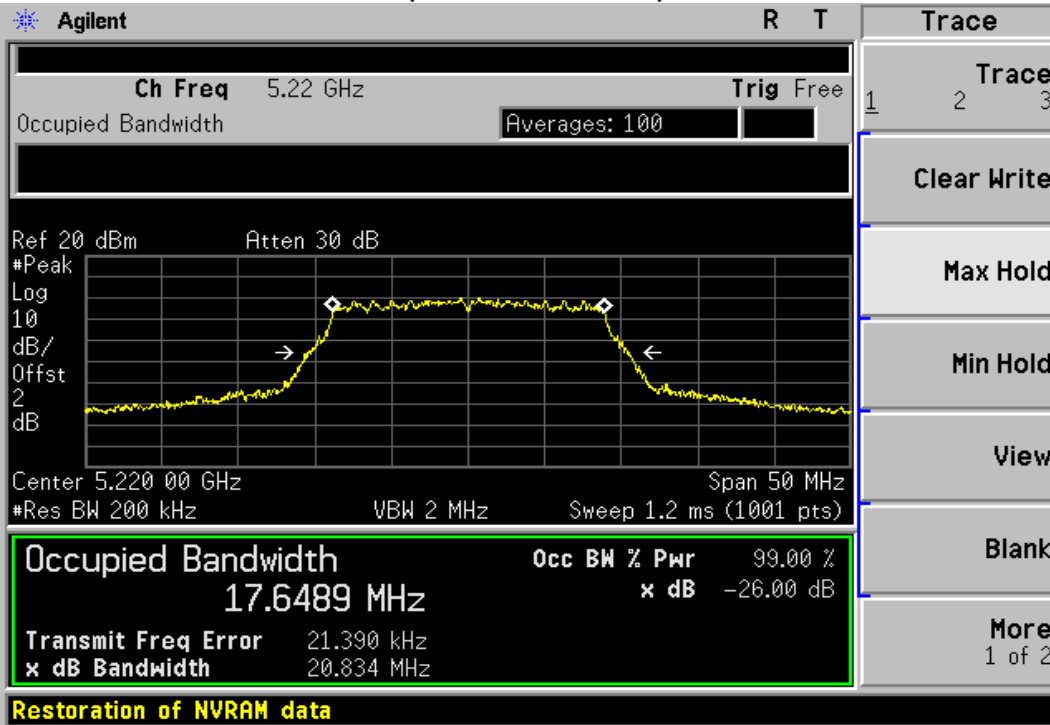
Channel Frequency (MHz)	99% bandwidth	Bandwidth at 26dB below(MHz)	Minimum limit (kHz)	Pass/Fail
5210	75.29	80.51	N/A	Pass

8.4 Trace data

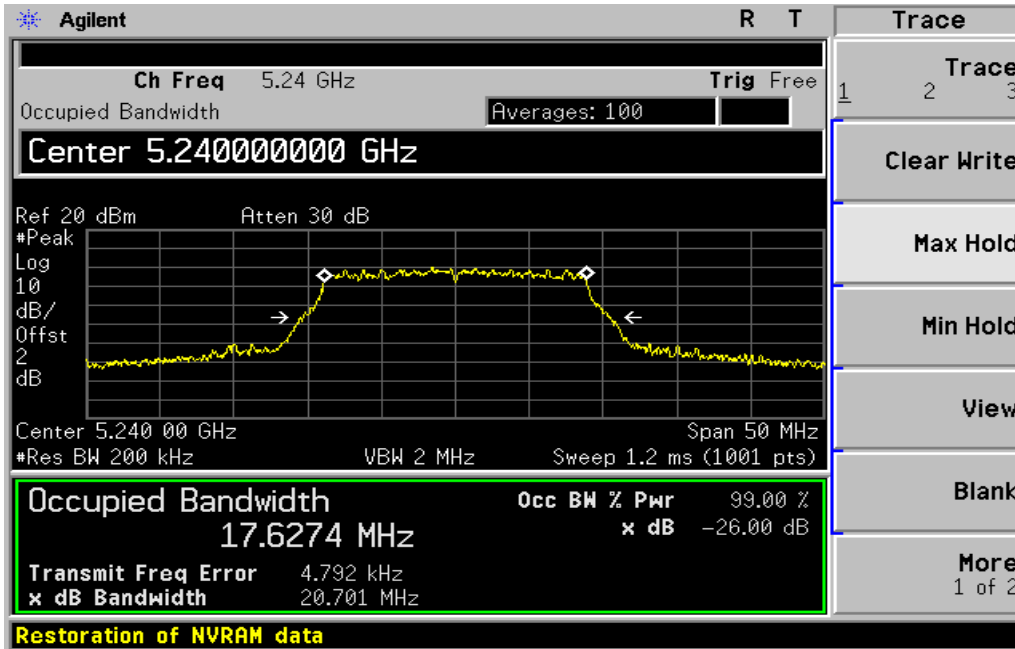
UNII Band1 OFDM (802.11a 36ch)



UNII Band1 OFDM (802.11a 44ch)

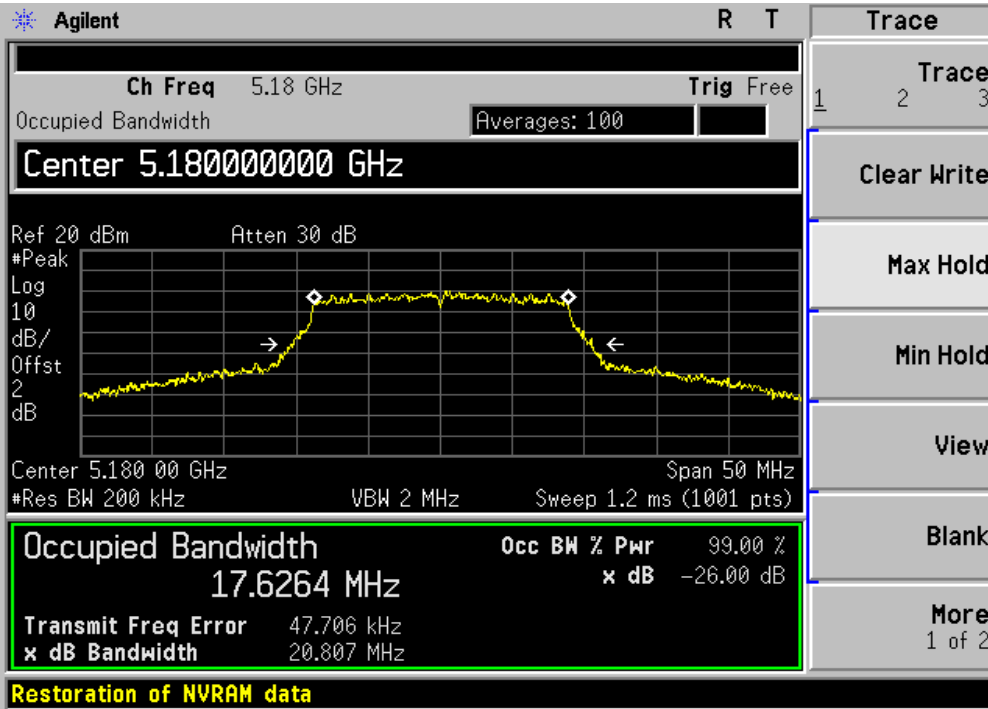


UNII Band1 OFDM (802.11a-48ch)

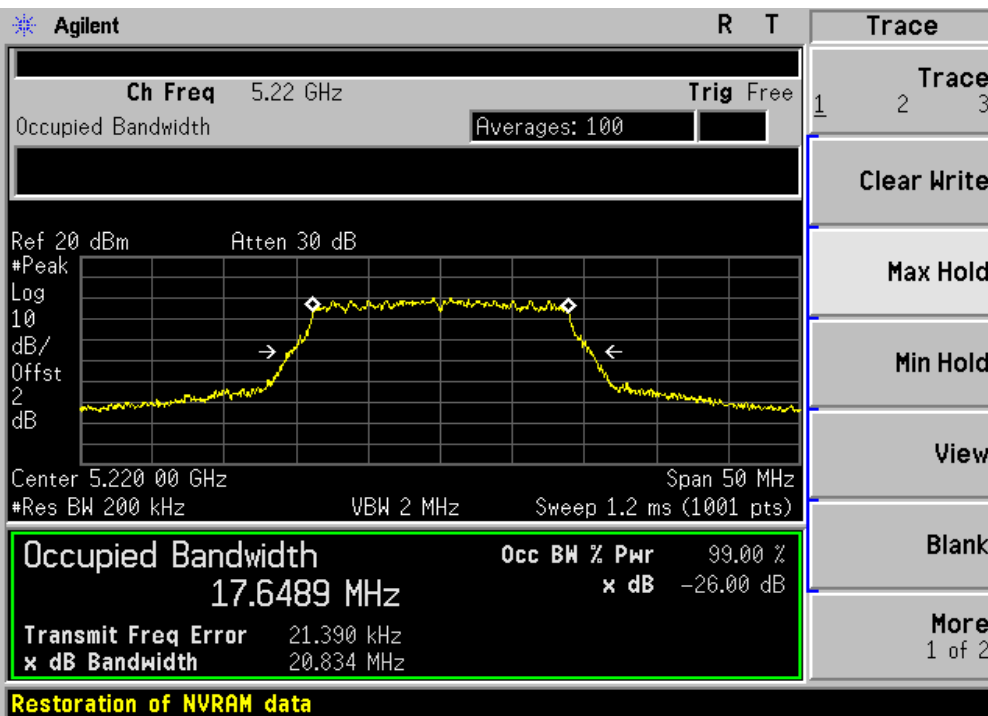




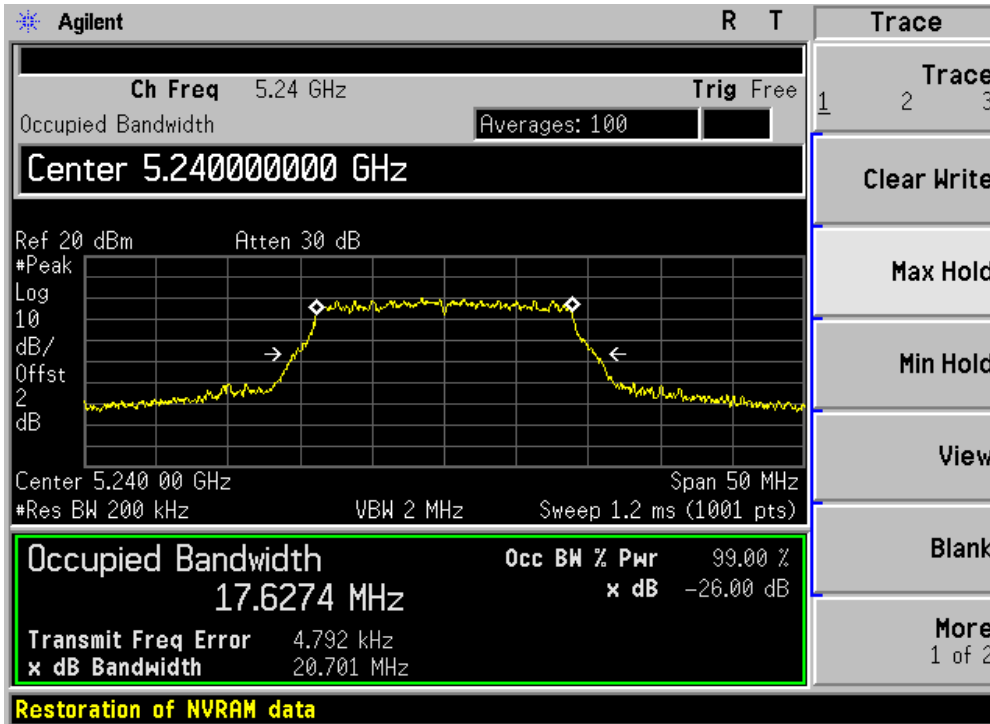
UNII Band1 OFDM (802.11n HT20 36ch)



UNII Band1 OFDM (802.11n HT20 44ch)

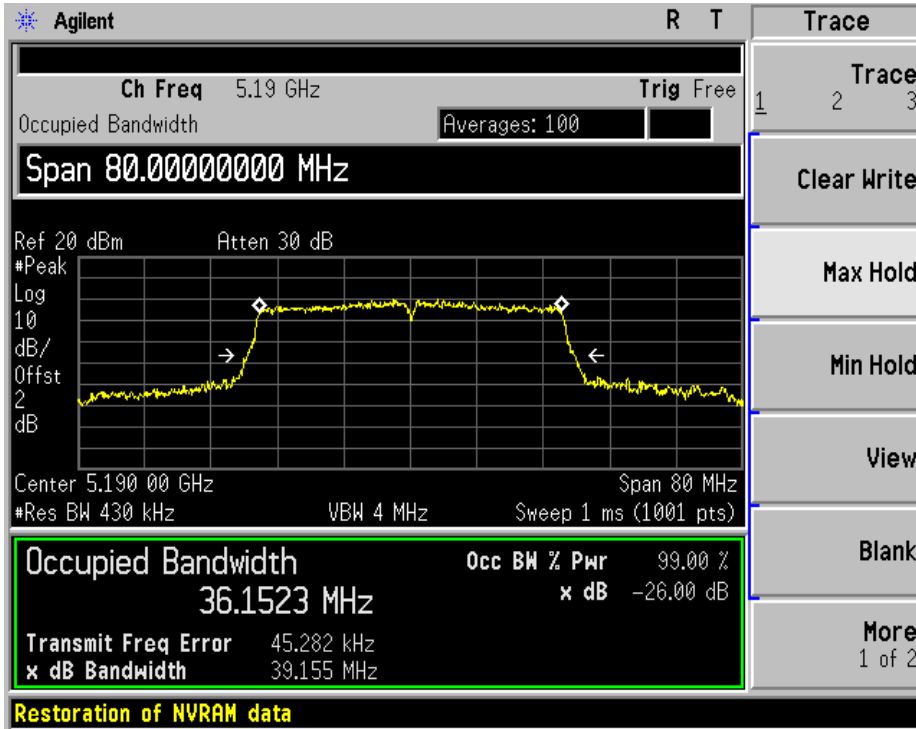


UNII Band1 OFDM (802.11n HT20 48ch)

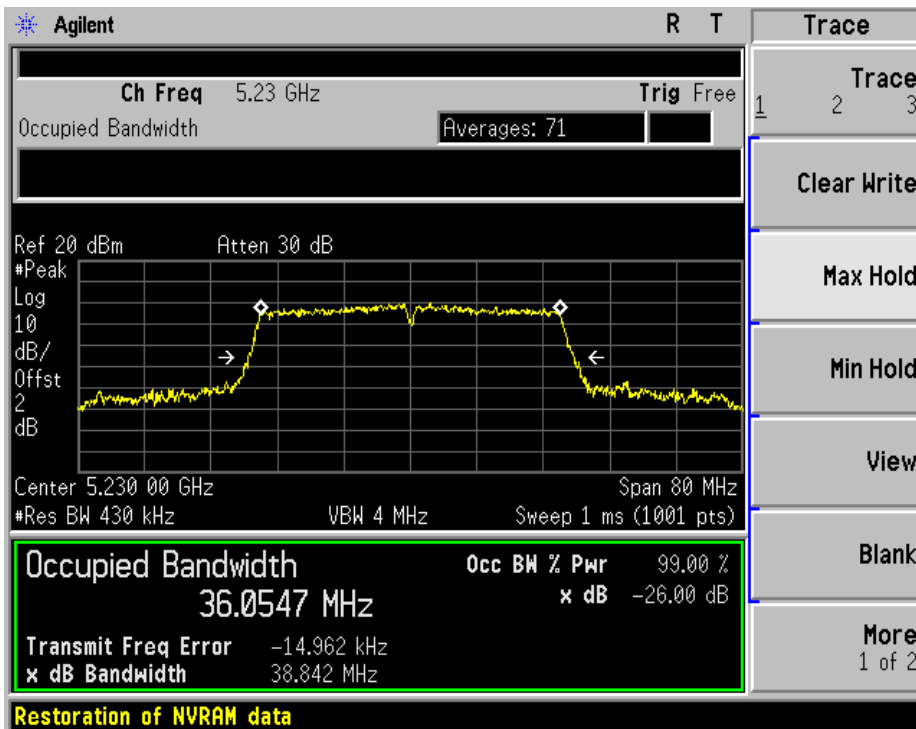




UNII Band1 OFDM (802.11n HT40 38ch)

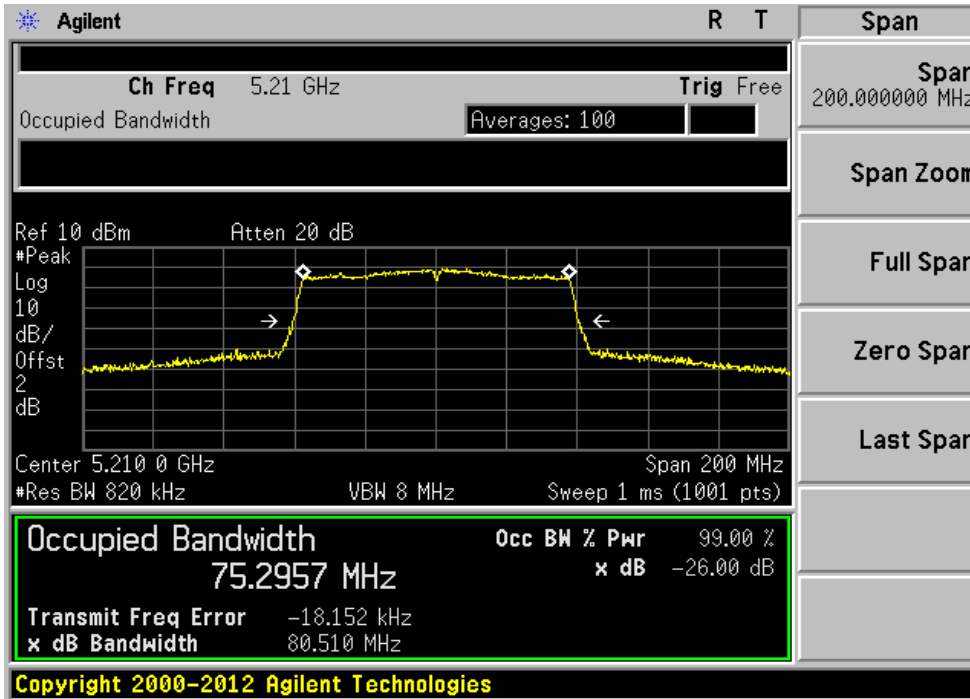


UNII Band1 OFDM (802.11a 46ch)





UNII Band1 OFDM (802.11ac VHT80-42ch)



9. 6dB Bandwidth Measurement

9.1 Test procedure

KDB 789033 D02 v02r01 – Section C & 15.407(a)(1)(3)

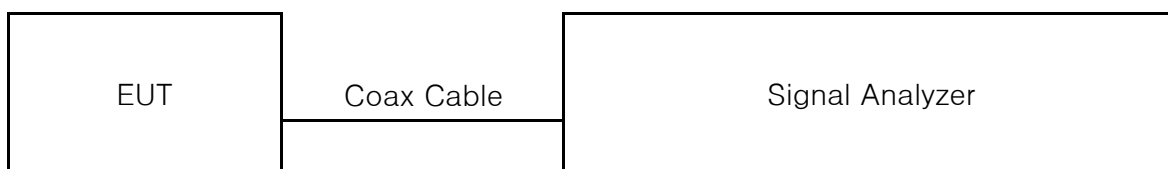
Test Overview and Limit

The bandwidth at 6dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating at its maximum duty cycle, at its maximum duty cycle, at power control level, as defined in KDB 789033 D02 v02r01, and at the appropriate frequencies. The spectrum analyzer's bandwidth measurement function is configured to measure the 6dB bandwidth

9.2 Test instruments and measurement setup

1. Set RBW = 100 kHz
2. Set the video bandwidth (VBW) ≥ 3 RBW
3. Detector = Peak
4. Trace mode = max hold
6. Sweep = auto couple
7. Allow the trace to stabilize
8. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

9.3 Test setup



Test instrument & Measurement Setup

9.4 Measurement results

EUT	Tablet PC	MODEL	PR70A BIO
MODE	OFDM	ENVIRONMENTAL CONDITION	23 °C, 42 % R.H.
INPUT POWER	DC 3.7 V		

UNII Band3(802.11a)

Channel Frequency (MHz)	99% bandwidth	Bandwidth at 6dB below(MHz)	Minimum limit (kHz)	Pass/Fail
5745	16.36	16.23	500 kHz	Pass
5785	16.36	16.01	500 kHz	Pass
5805	16.36	16.39	500 kHz	Pass

UNII Band1(802.11n HT20)

Channel Frequency (MHz)	99% bandwidth	Bandwidth at 6dB below(MHz)	Minimum limit (kHz)	Pass/Fail
5745	17.61	17.51	500 kHz	Pass
5785	17.59	17.60	500 kHz	Pass
5805	17.59	17.40	500 kHz	Pass

UNII Band1(802.11n HT40)

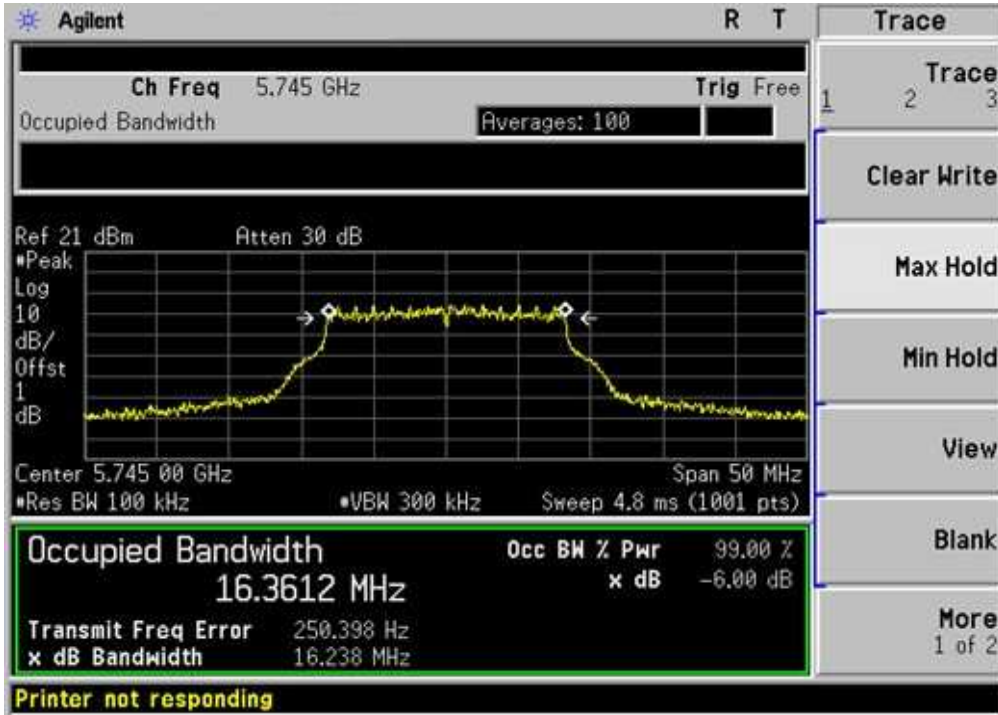
Channel Frequency (MHz)	99% bandwidth	Bandwidth at 6dB below(MHz)	Minimum limit (kHz)	Pass/Fail
5755	36.03	35.94	500 kHz	Pass
5795	36.00	36.06	500 kHz	Pass

UNII Band1(802.11ac VHT80)

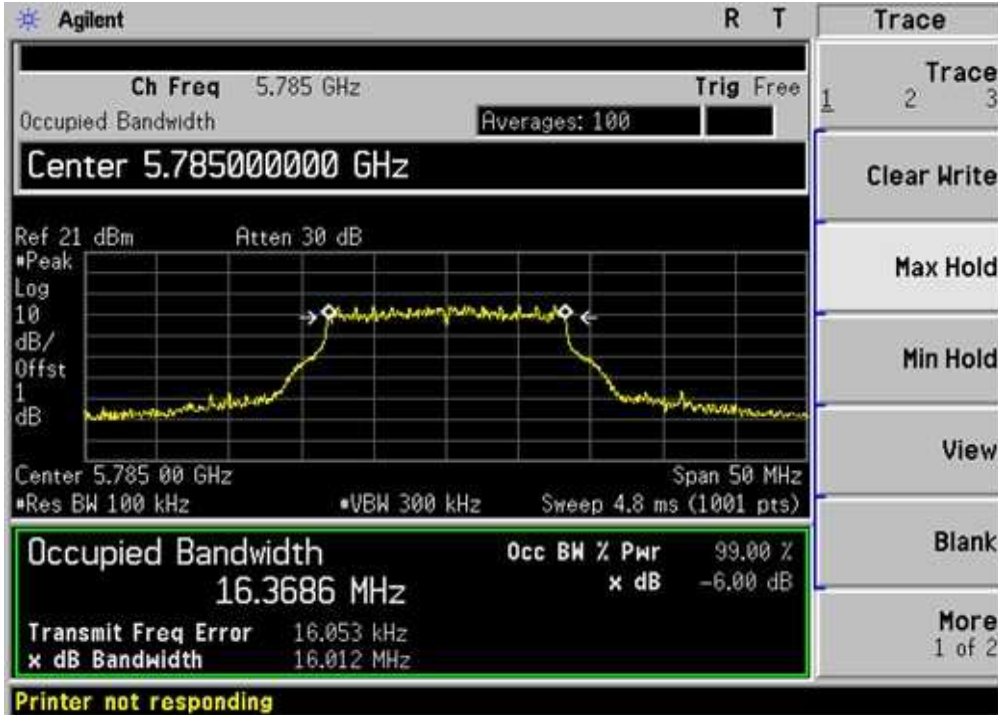
Channel Frequency (MHz)	99% bandwidth	Bandwidth at 6dB below(MHz)	Minimum limit (kHz)	Pass/Fail
5775	75.30	75.71	500 kHz	Pass

9.5 Trace data

UNII Band3 OFDM (802.11a-149ch)



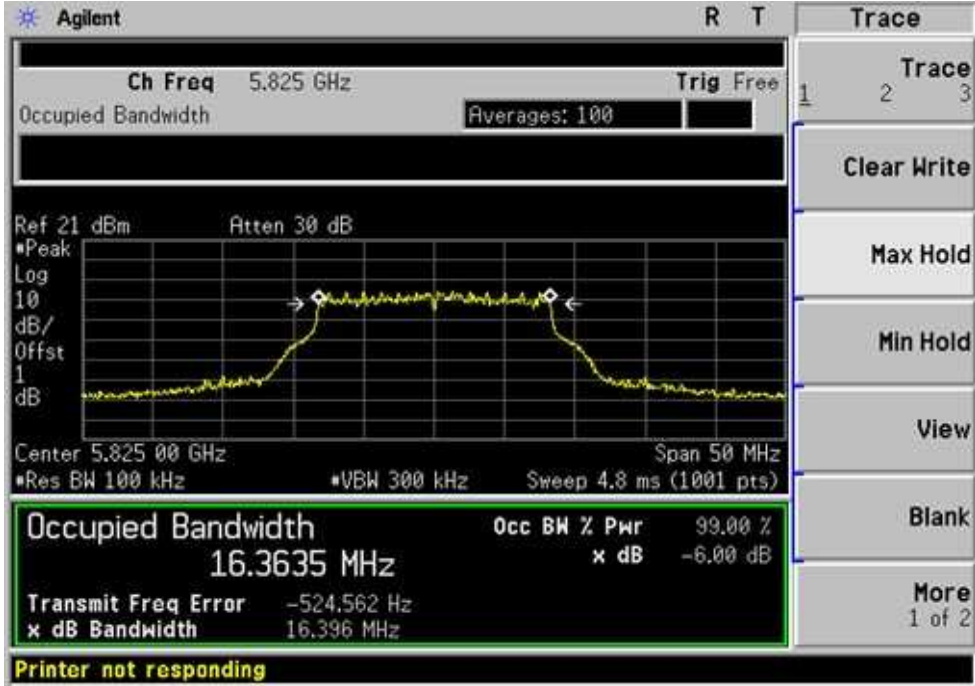
UNII Band3 OFDM (802.11a-157ch)



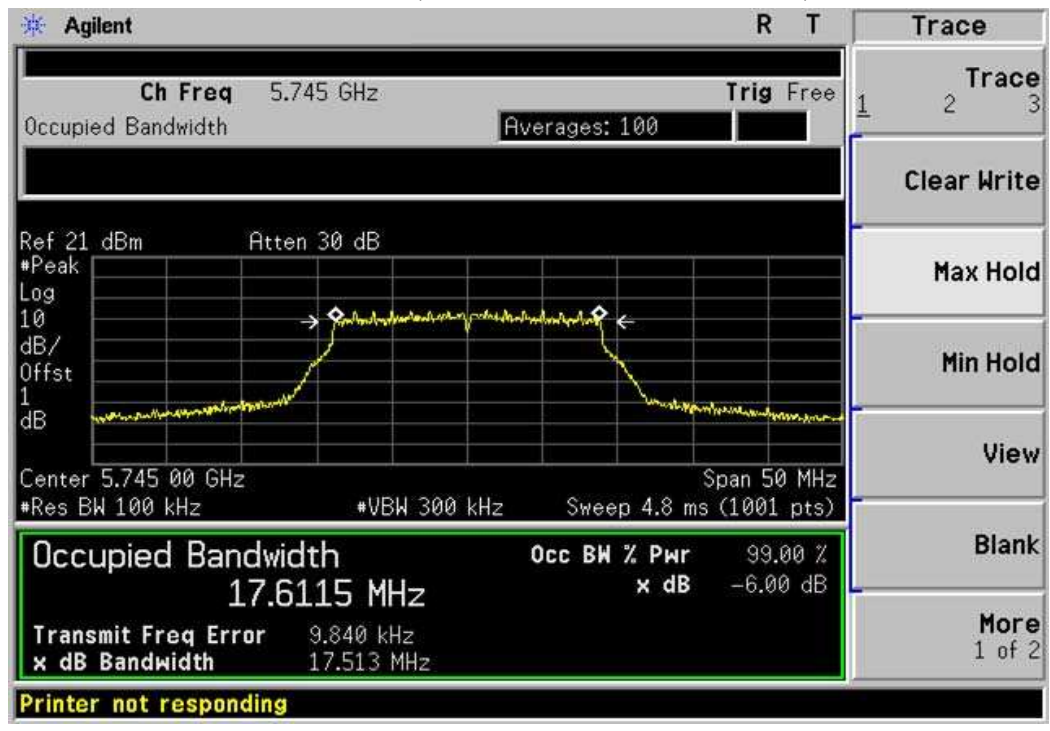


Estech
your best partner

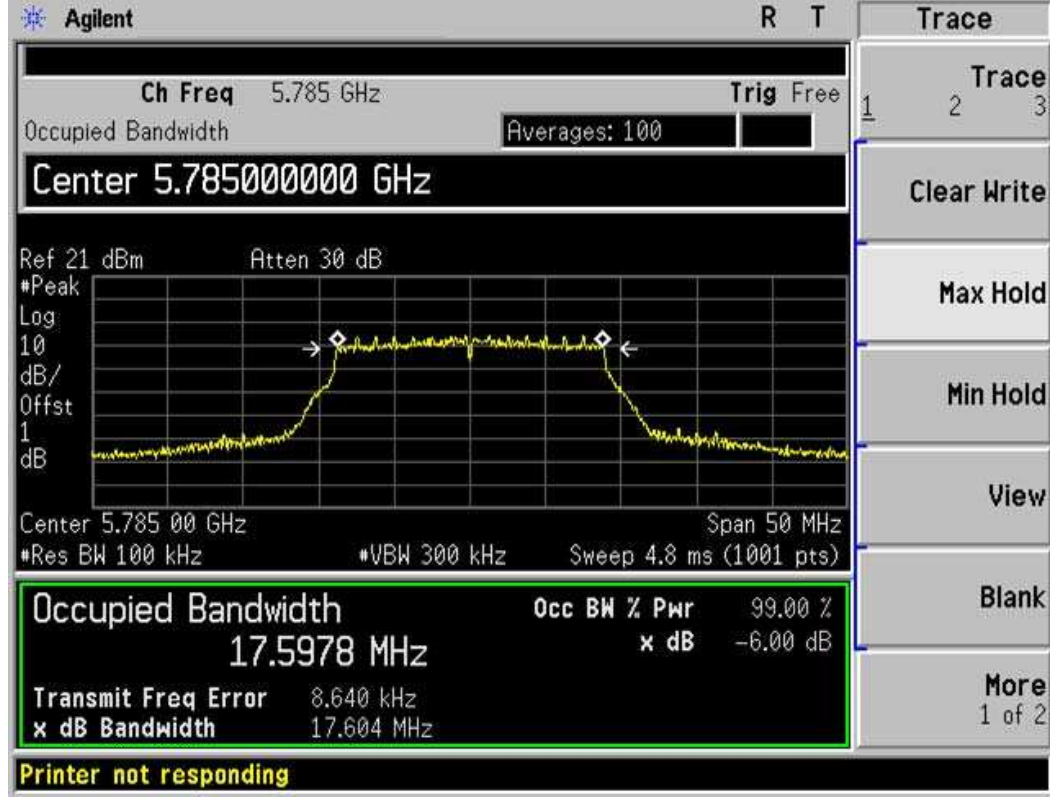
UNII Band3 OFDM (802.11a-161ch)



UNII Band3 OFDM (802.11n HT20-149ch)



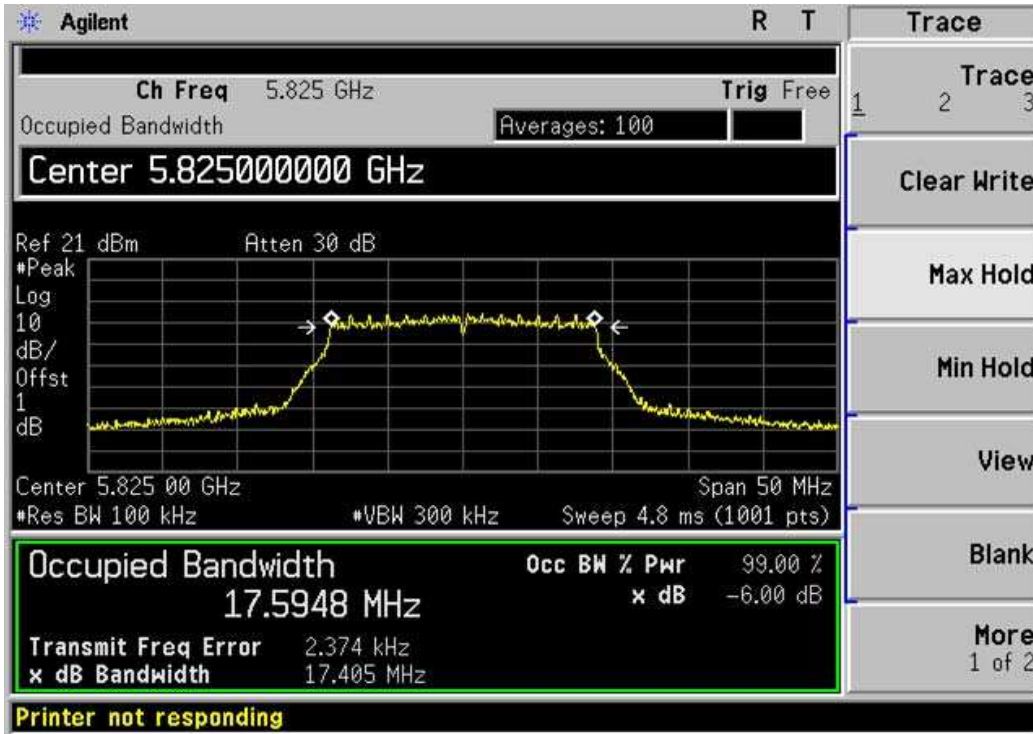
UNII Band3 OFDM (802.11n HT20-157ch)





Estech
your best partner

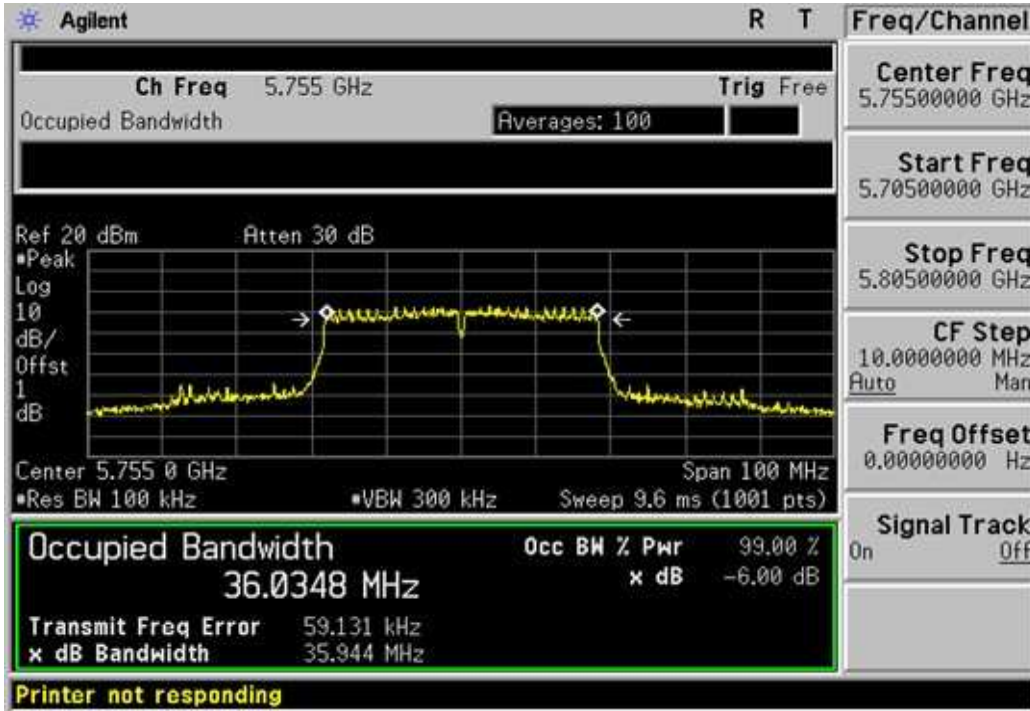
UNII Band3 OFDM (802.11n HT20-165ch)



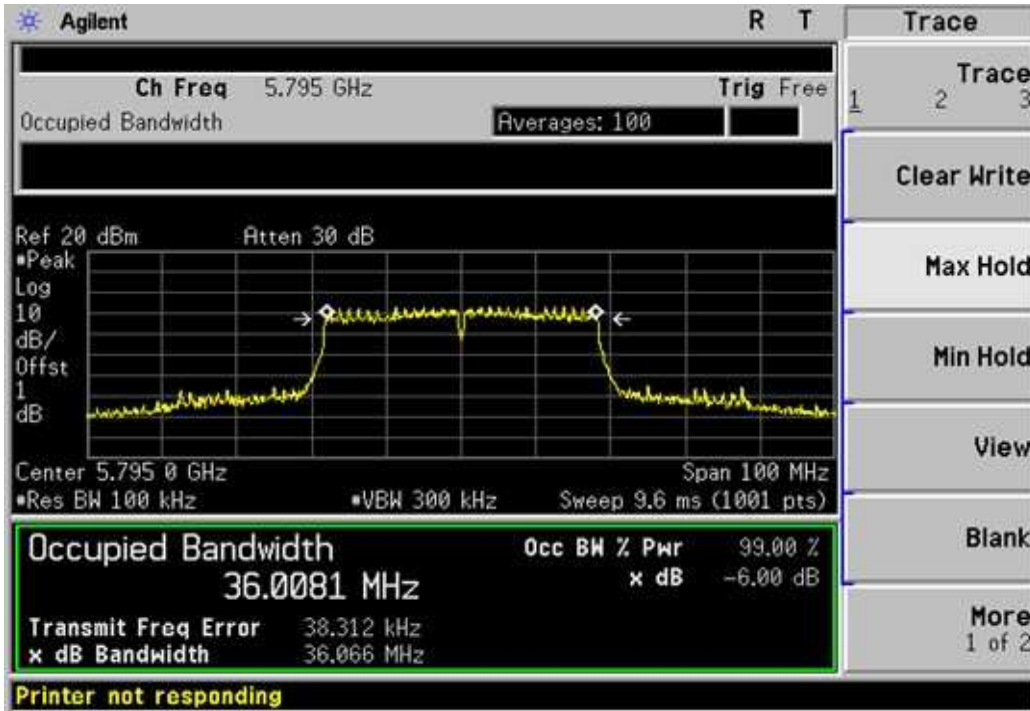


Estech
your best partner

UNII Band3 OFDM (802.11n HT40-151ch)



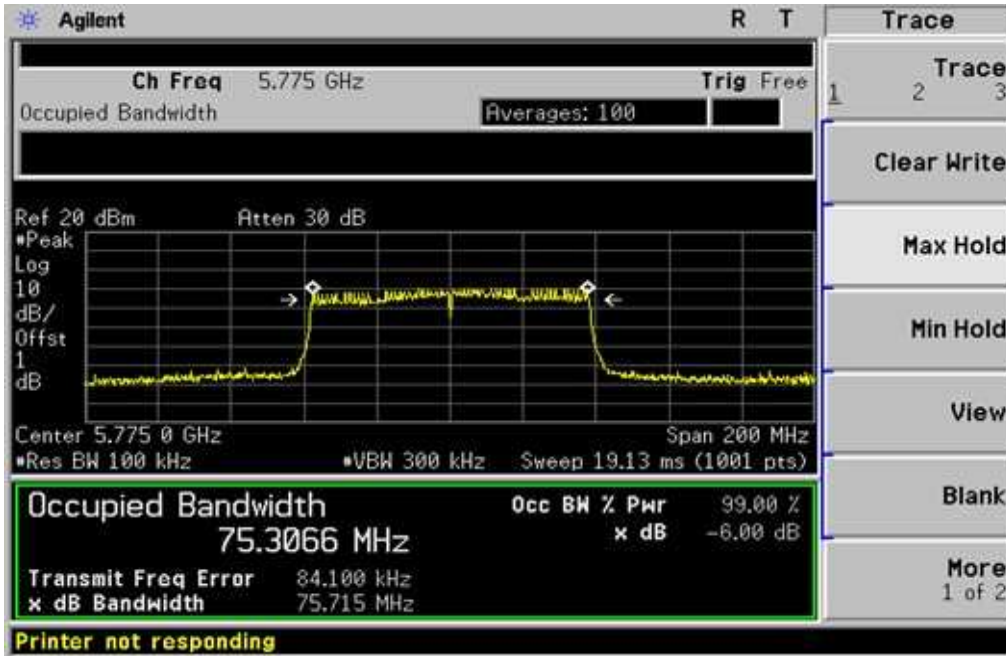
UNII Band3 OFDM (802.11n HT40-159ch)





Estech
your best partner

UNII Band3 OFDM (802.11ac VHT80-155ch)



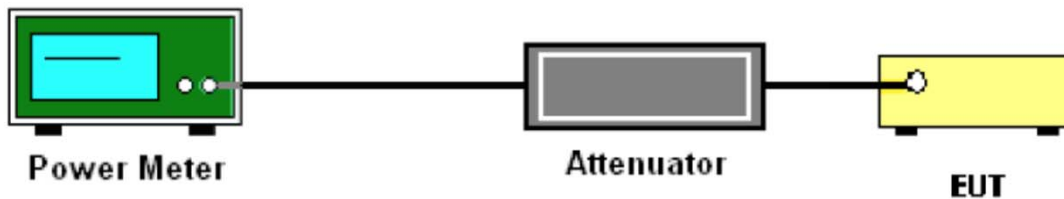
10. Output Power Measurement

10.1 Test procedure

KDB 789033 v02r01 – Section E d) output power Measurement

10.2 Test instruments and measurement setup

1. The testing follows the Measurement Procedure of FCC KDB No. 789033 D02 v02r01
2. The RF output of EUT was connected to the spectrum analyzer RF Cable Attenuator. The path loss was compensated to the results for each measurement
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Measure The conducted output power and record the results in the test report.



Maximum Peak Output Power Test Instruments

Description	Model	Serial Number	Cal. Due Date
Power Meter	N1921A	MY45100570	2020-12-02
Power Sensor	N1921A	MY45240427	2020-12-02
Power Meter <=> EUT	Loss: 1 dB	-	

10.3 Measurement results

EUT	Tablet PC	MODEL	RP70A BIO
MODE	OFDM	ENVIRONMENTAL CONDITION	24 °C, 43 % R.H.
INPUT POWER	DC 3.7 V		

UNII Band1,4(802.11a)

CHANNEL	Channel frequency (MHz)	Conducted Power output			Measured+Duty cycle (dBm)	Measured +Duty cycle (mW)
		Detector	Measured (dBm)	Duty Cycle		
36	5180	PEAK	6.01		6.01	3.99
44	5220		5.75		5.75	3.76
48	5240		6.25		6.25	4.22
149	5745		7.94		7.94	6.22
157	5785		7.07		7.07	5.09
165	5825		7.98		7.98	6.28

UNII Band1,4(802.11a)

CHANNEL	Channel frequency (MHz)	Conducted Power output			Measured+Duty cycle (dBm)	Measured +Duty cycle (mW)
		Detector	Measured (dBm)	Duty Cycle		
36	5180	Average	-2.34	1.96	-0.38	0.92
44	5220		-2.84	1.96	-0.88	0.82
48	5240		-2.63	1.96	-0.67	0.86
149	5745		-8.18	1.96	-6.22	0.24
157	5785		-9.24	1.96	-7.28	0.19
165	5825		-8.91	1.96	-6.95	0.20

UNII Band1,4(802.11n HT20)

CHANNEL	Channel frequency (MHz)	Conducted Power output			Measured+Duty cycle (dBm)	Measured +Duty cycle (mW)
		Detector	Measured (dBm)	Duty Cycle		
36	5180	PEAK	6.64		6.64	4.61
44	5220		6.24		6.24	4.21
48	5240		6.86		6.86	4.85
149	5745		4.75		4.75	2.99
157	5785		4.26		4.26	2.67
165	5825		3.67		3.67	2.33

UNII Band1,4(802.11n HT20)

CHANNEL	Channel frequency (MHz)	Conducted Power output			Measured+Duty cycle (dBm)	Measured +Duty cycle (mW)
		Detector	Measured (dBm)	Duty Cycle		
36	5180	Average	-1.85	2.07	0.22	1.05
44	5220		-1.54	2.07	0.53	1.13
48	5240		-1.39	2.07	0.68	1.17
149	5745		-3.12	2.07	-1.05	0.79
157	5785		-3.34	2.07	-1.27	0.75
165	5825		-3.62	2.07	-1.55	0.70

UNII Band1,4(802.11n HT40)

CHANNEL	Channel frequency (MHz)	Conducted Power output			Measured+Duty cycle (dBm)	Measured +Duty cycle (mW)
		Detector	Measured (dBm)	Duty Cycle		
38	5190	PEAK	3.26		3.26	2.12
46	5230		3.40		3.40	2.19
151	5755		2.53		2.53	1.79
159	5795		1.76		1.76	1.50

UNII Band1,4(802.11n HT40)

CHANNEL	Channel frequency (MHz)	Conducted Power output			Measured+Duty cycle (dBm)	Measured +Duty cycle (mW)
		Detector	Measured (dBm)	Duty Cycle		
38	5190	Average	-0.79	3.12	2.33	1.71
46	5230		-1.24	3.12	1.88	1.54
151	5755		-1.31	3.12	1.81	1.52
159	5795		-1.43	3.12	1.69	1.48

UNII Band1,4(802.11ac VHT80)

CHANNEL	Channel frequency (MHz)	Conducted Power output			Measured+Duty cycle (dBm)	Measured +Duty cycle (mW)
		Detector	Measured (dBm)	Duty Cycle		
42	5210	PEAK	0.66		0.66	1.16
155	5775		0.57		0.57	1.14

UNII Band1,4(802.11ac VHT80)

CHANNEL	Channel frequency (MHz)	Conducted Power output			Measured+Duty cycle (dBm)	Measured +Duty cycle (mW)
		Detector	Measured (dBm)	Duty Cycle		
42	5210	Average	-4.11	1.17	-2.94	0.51
155	5775		-4.30	1.17	-3.13	0.49

11. Maximum power spectral density level in the fundamental emission

11.1 Test procedure

KDB 789033 D02 v02r01– Section F) Peak power spectral density (PPSD)

11.2 Test instruments and measurement setup

- a) Set the RBW to: 500 kHz, 1 MHz
- b) Set the VBW to: ≥ 1 M, 3 M

The peak power density Test Instruments

Description	Model	Serial Number	Cal. Due Date
Spectrum Analyzer	E4440A	US42041281	2020-12-02

11.3 Measurement results

EUT	Tablet PC	MODEL	RP70A BIO
MODE	OFDM	ENVIRONMENTAL CONDITION	23 °C, 43 % R.H.
INPUT POWER	DC 5 V		

UNII Band1 802.11a

CHANNEL	Channel Frequency (MHz)	Measured PPSD (dBm)	PPSD Limit [dBm/MHz]	Margin [dB]
36	5180	-2.24	11.00	13.24
44	5220	-1.90	11.00	12.90
48	5240	-2.69	11.00	13.69

UNII Band1 802.11n HT20

CHANNEL	Channel Frequency (MHz)	Measured PPSD (dBm)	PPSD Limit [dBm/MHz]	Margin [dB]
36	5180	-3.63	11.00	14.63
44	5220	-3.35	11.00	14.35
48	5240	-3.26	11.00	14.26

UNII Band1 802.11n HT40

CHANNEL	Channel Frequency (MHz)	Measured PPSD (dBm)	PPSD Limit [dBm/MHz]	Margin [dB]
38	5190	-7.86	11.00	18.86
46	5230	-8.12	11.00	19.12

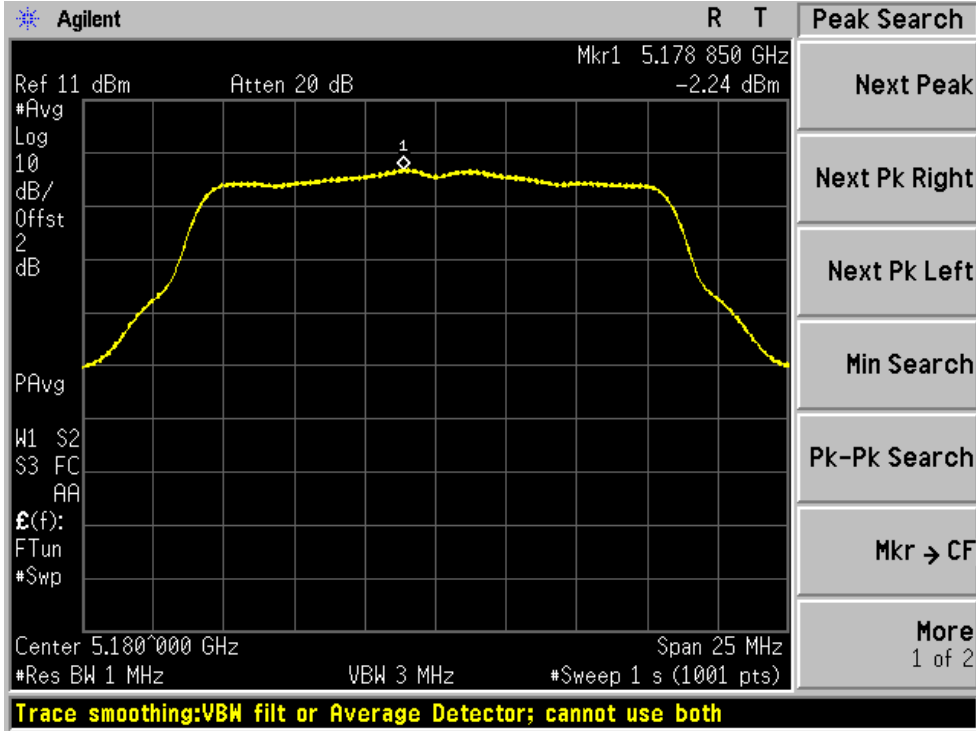
UNII Band1 802.11ac VHT80

CHANNEL	Channel Frequency (MHz)	Measured PPSD (dBm)	PPSD Limit [dBm/500 kHz]	Margin [dB]
42	5210	-8.69	11.00	19.69

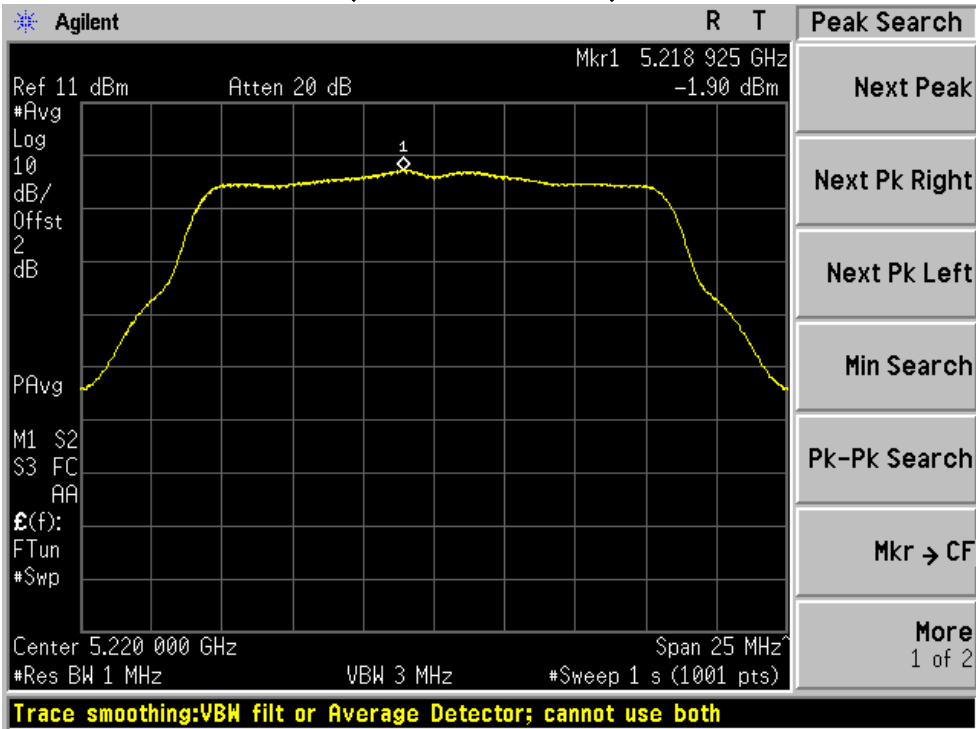


11.4 Trace data

UNII Band1 OFDM (802.11a-36ch)

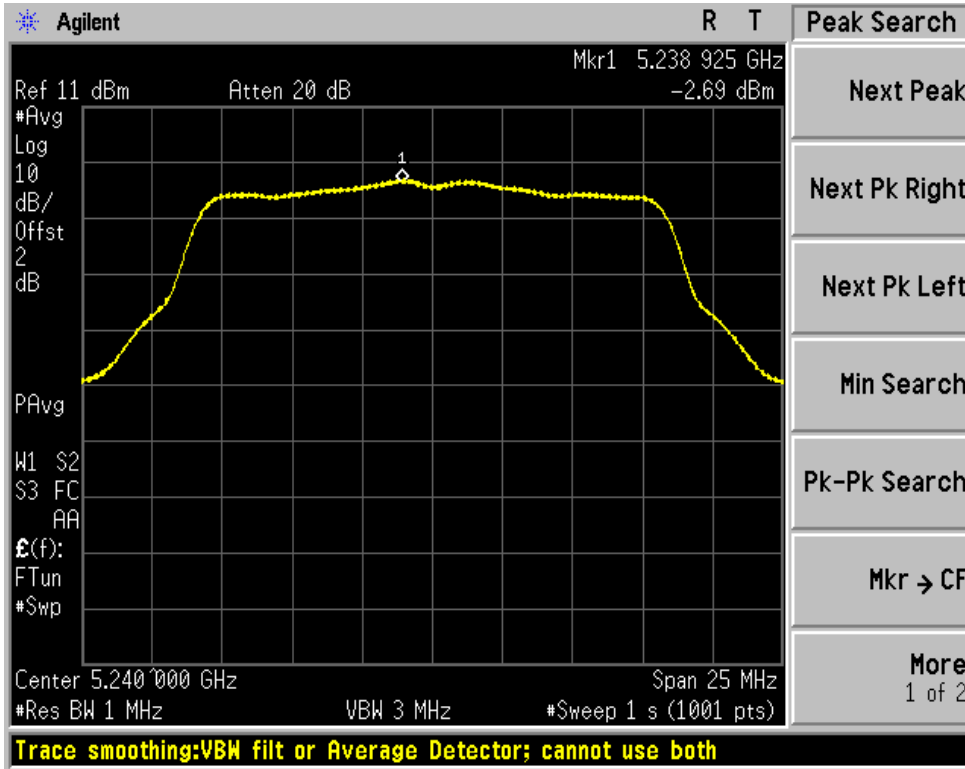


UNII Band1 OFDM (802.11a-44ch)



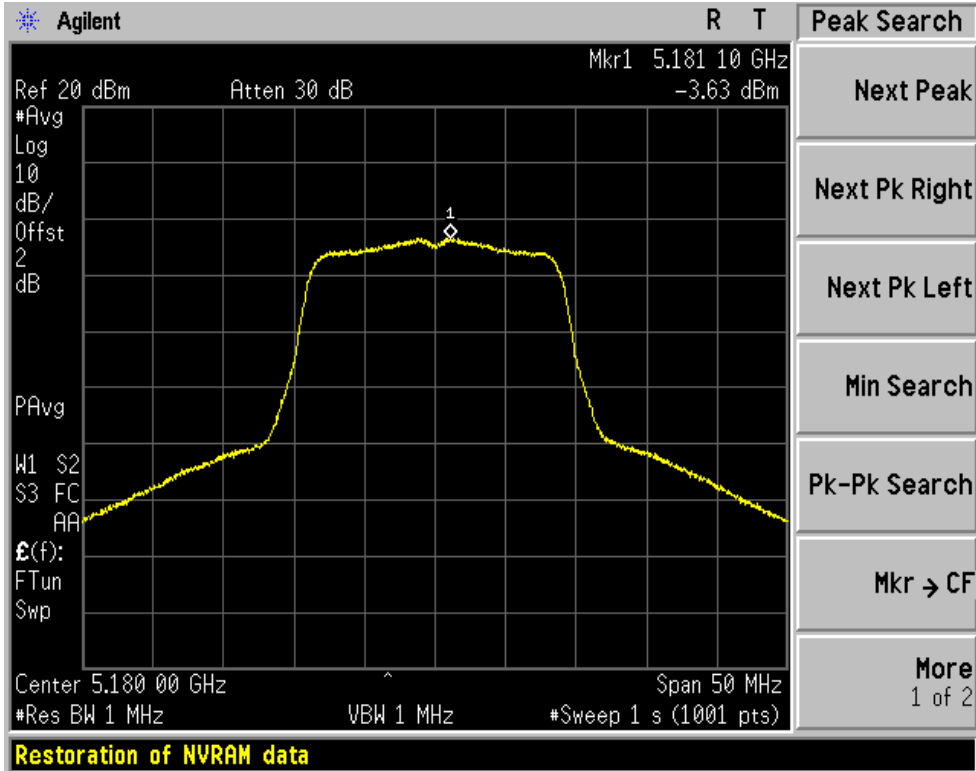


UNII Band1 OFDM (802.11a-48ch)

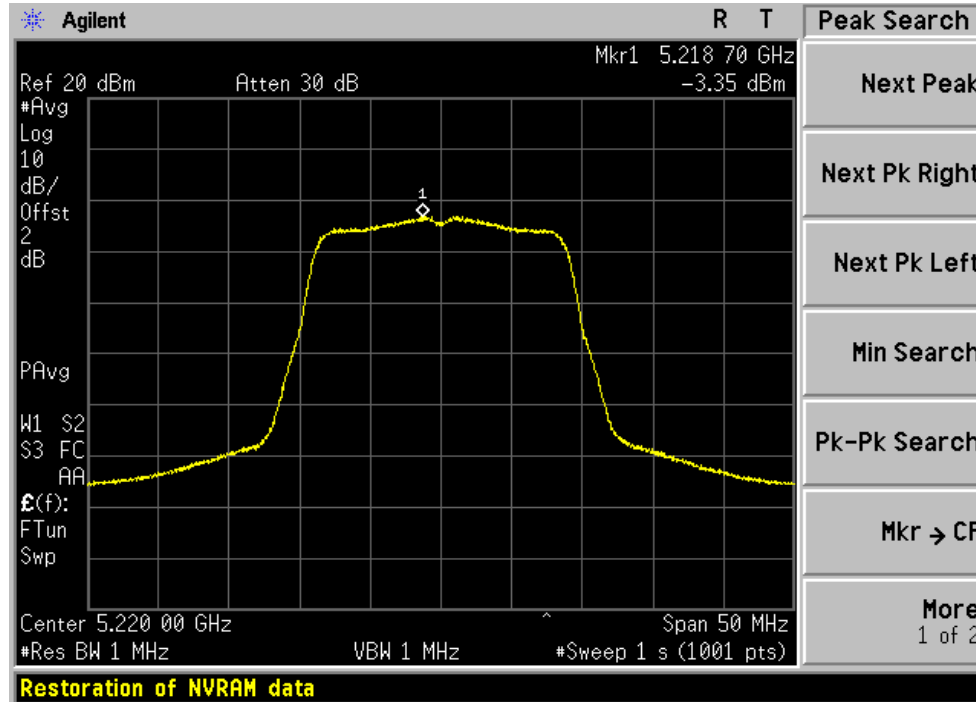




UNII Band1 OFDM (802.11n HT20 -36ch)



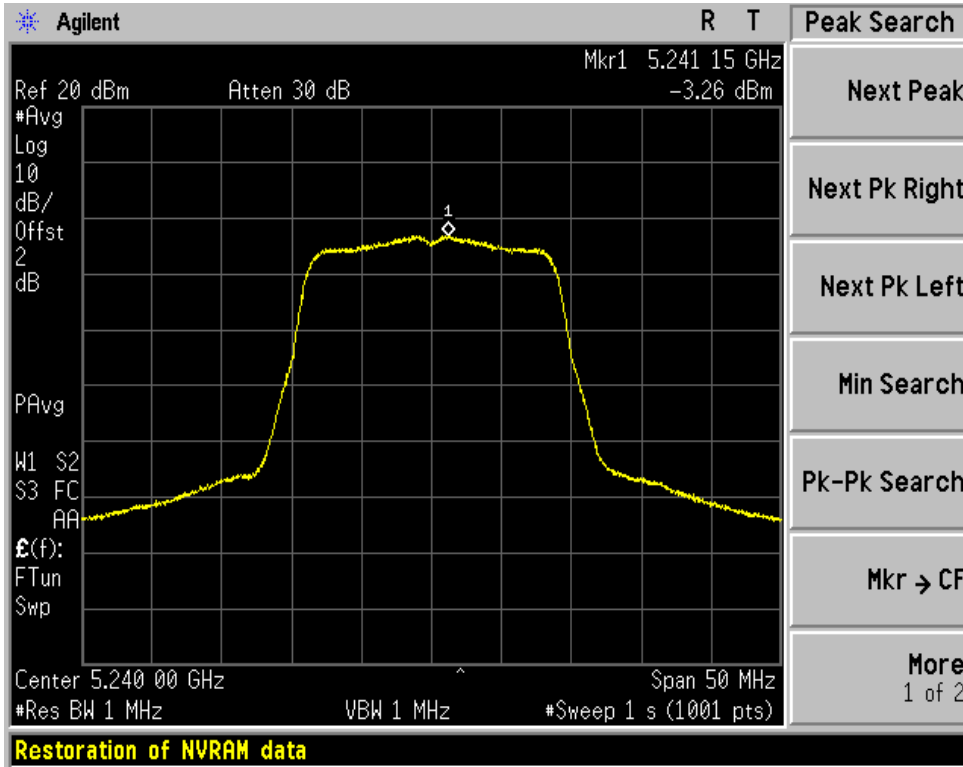
UNII Band1 OFDM (802.11n HT20 -44ch)





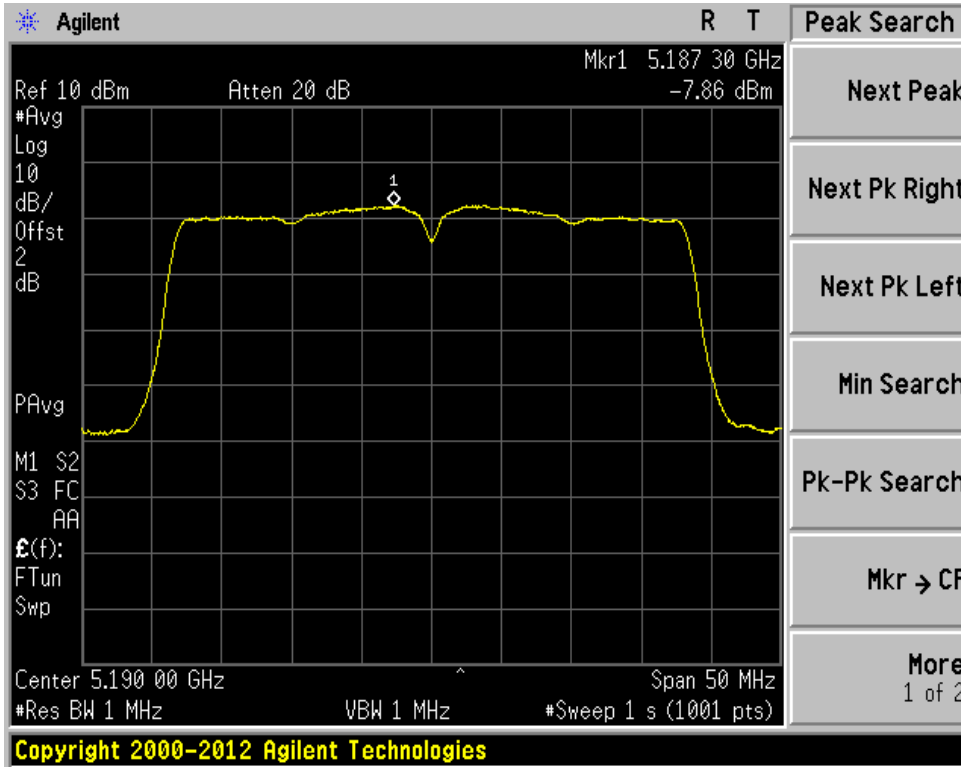
Estech
your best partner

UNII Band1 OFDM (802.11n HT20 -48ch)

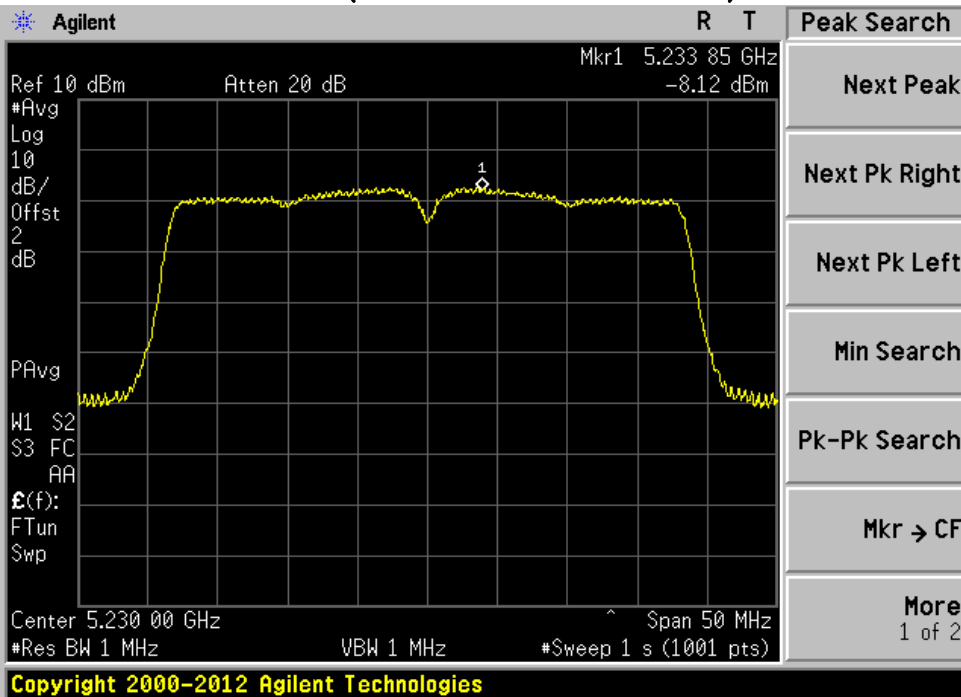




UNII Band1 OFDM (802.11n HT40 -38ch)

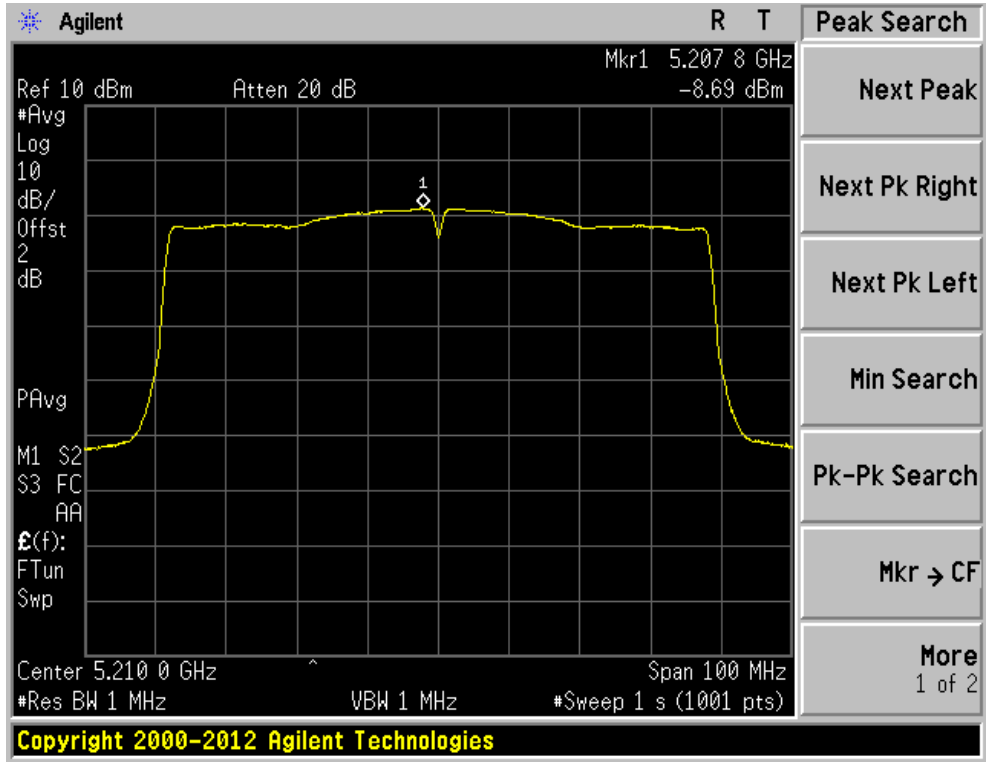


UNII Band1 OFDM (802.11n HT40 -46ch)





UNII Band1 OFDM (802.11ac-VHT80 42ch)



11.5 Measurement results

EUT	Tablet PC	MODEL	RP70A BIO
MODE	OFDM	ENVIRONMENTAL CONDITION	23 °C, 43 % R.H.
INPUT POWER	DC 3.7 V		

UNII Band3 802.11a

CHANNEL	Channel Frequency (MHz)	Measured PPSD (dBm)	PPSD Limit [dBm/MHz]	Margin [dB]
149	5745	-7.99	30.0	37.99
157	5785	-7.86	30.0	37.86
165	5825	-8.08	30.0	38.08

UNII Band3 802.11n HT20

CHANNEL	Channel Frequency (MHz)	Measured PPSD (dBm)	PPSD Limit [dBm/MHz]	Margin [dB]
149	5745	-8.81	30.00	38.81
157	5785	-8.65	30.00	38.65
165	5825	-8.80	30.00	38.80

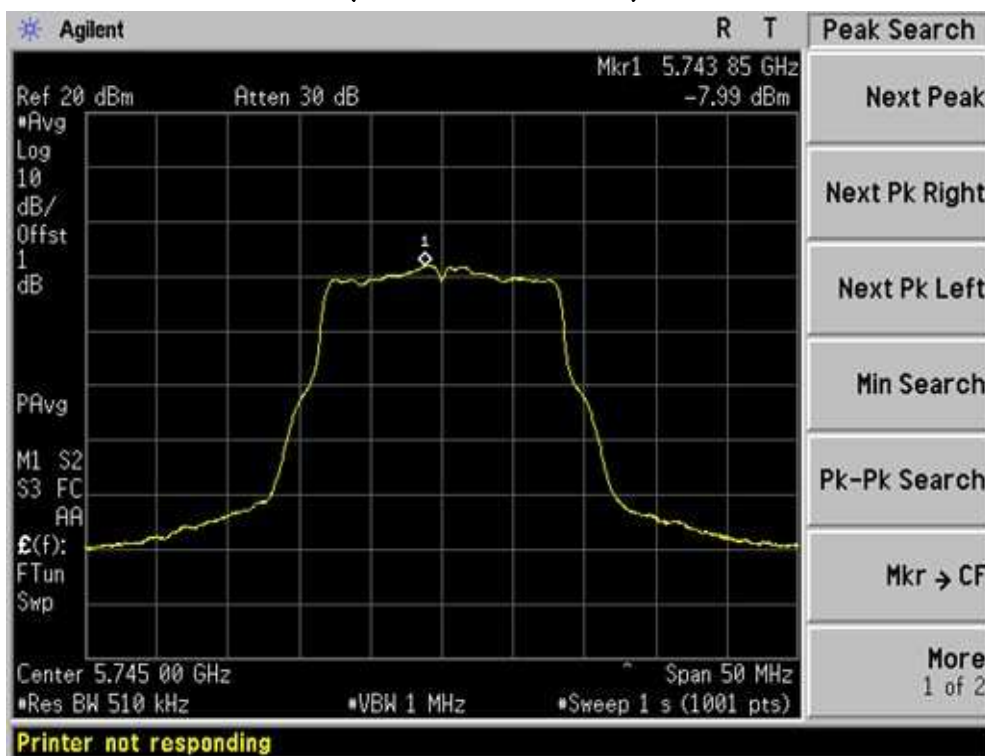
UNII Band3 802.11n HT40

CHANNEL	Channel Frequency (MHz)	Measured PPSD (dBm)	PPSD Limit [dBm/MHz]	Margin [dB]
151	5755	-12.76	30.00	42.76
159	5795	-11.98	30.00	41.98

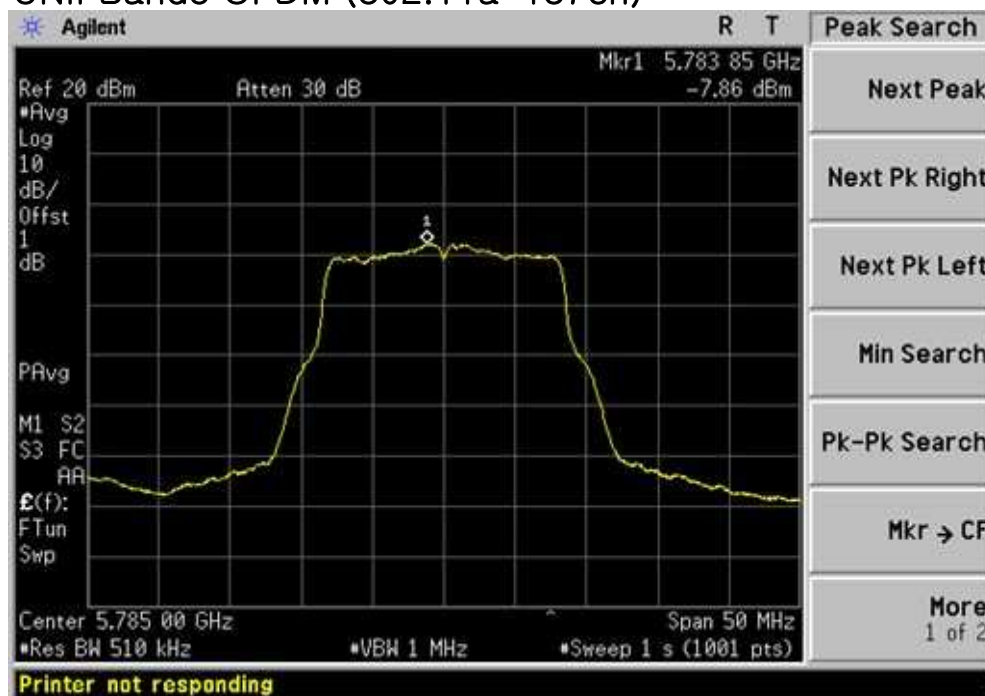
UNII Band3 802.11ac VHT80

CHANNEL	Channel Frequency (MHz)	Measured PPSD (dBm)	PPSD Limit [dBm/MHz]	Margin [dB]
155	5775	-15.76	30.00	45.76

11.6 Trace data
 UNII Band3 OFDM (802.11a-149ch)

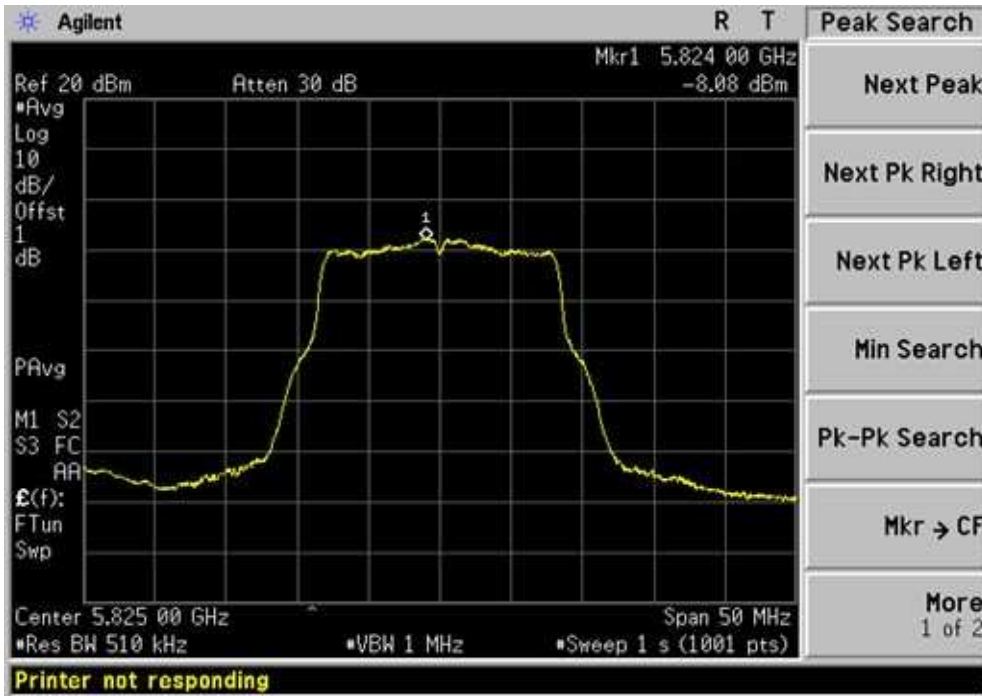


UNII Band3 OFDM (802.11a-157ch)



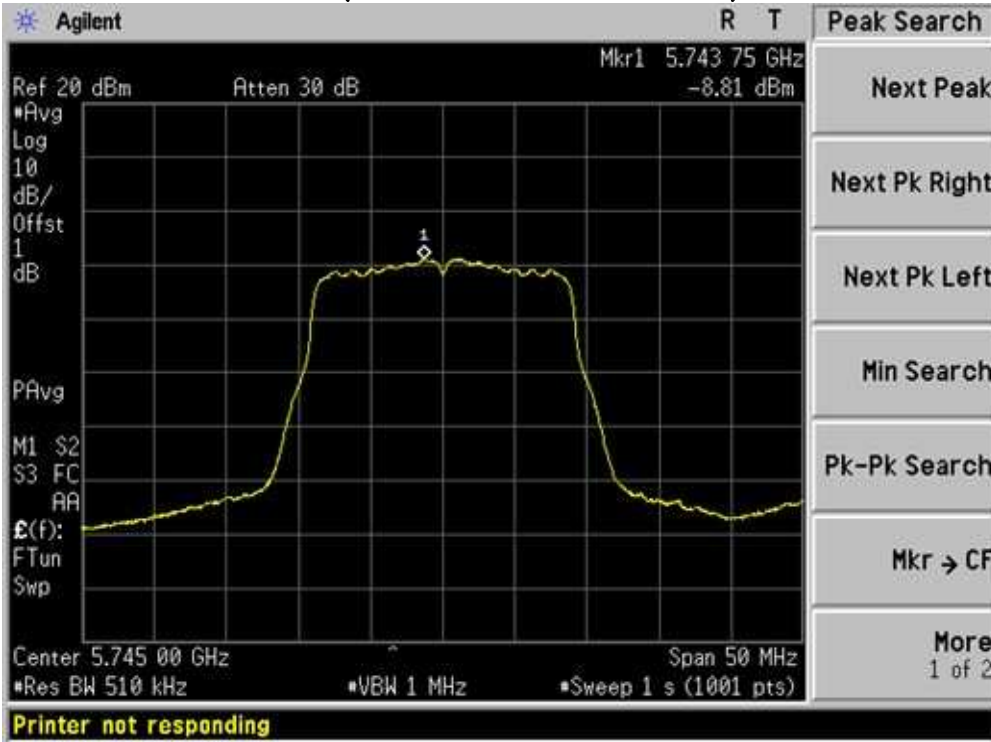


UNII Band3 OFDM (802.11a-165ch)

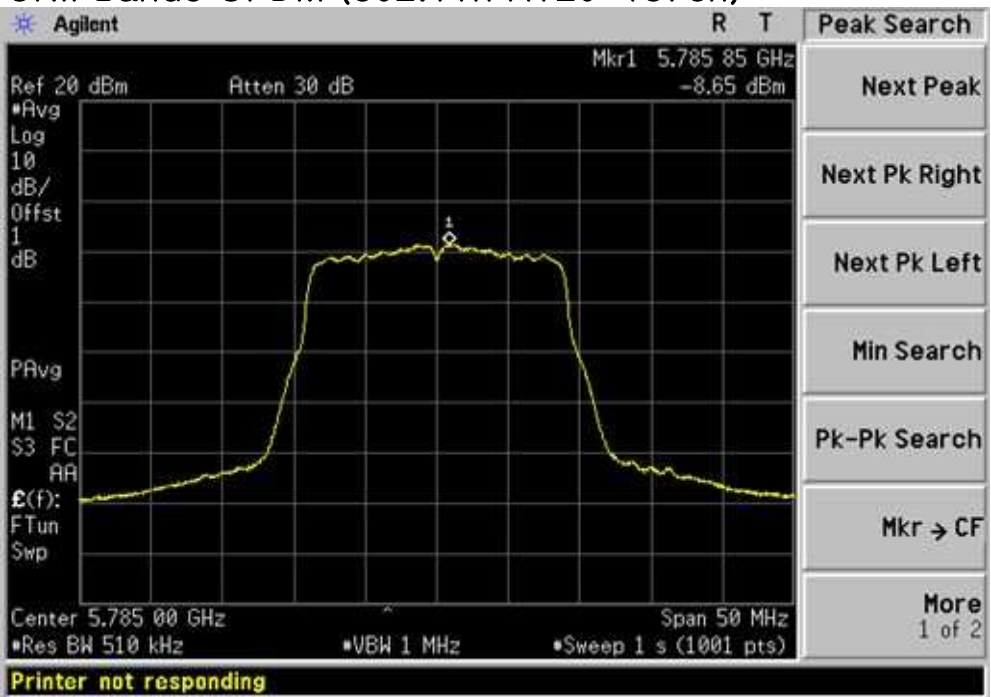




UNII Band3 OFDM (802.11n HT20-149ch)

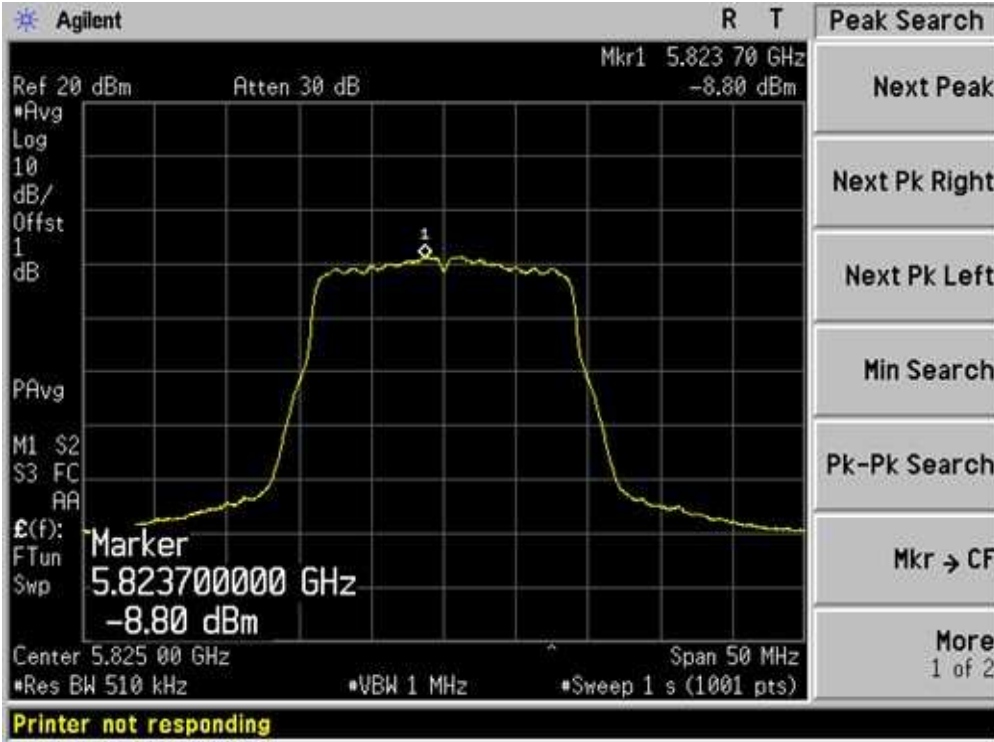


UNII Band3 OFDM (802.11n HT20-157ch)



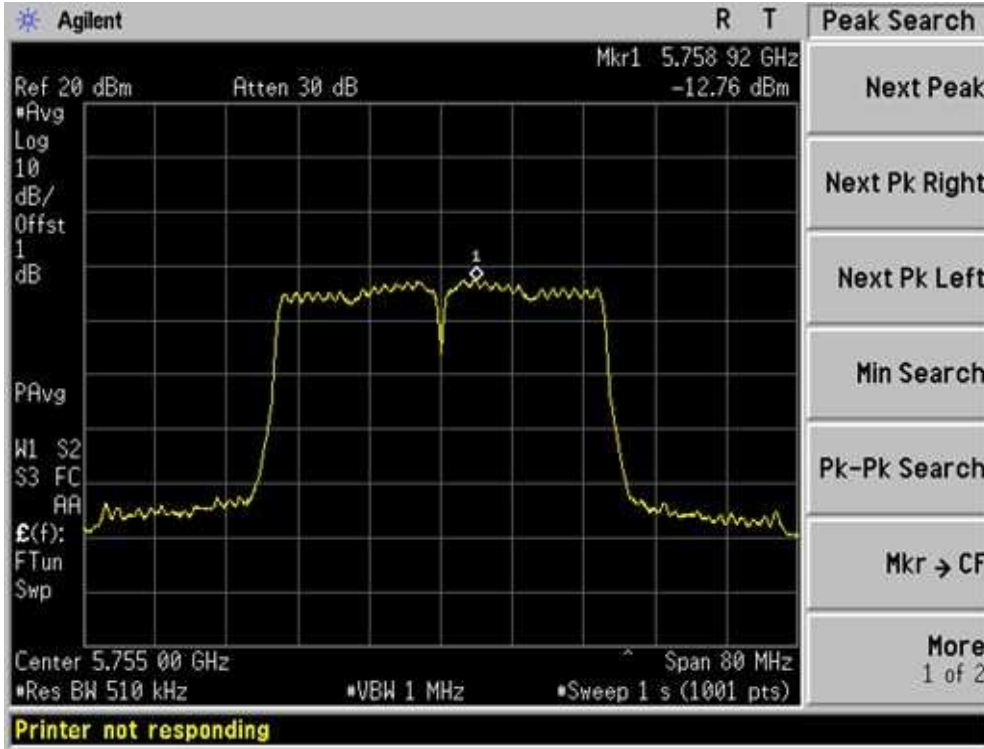


UNII Band3 OFDM (802.11n HT20-165ch)

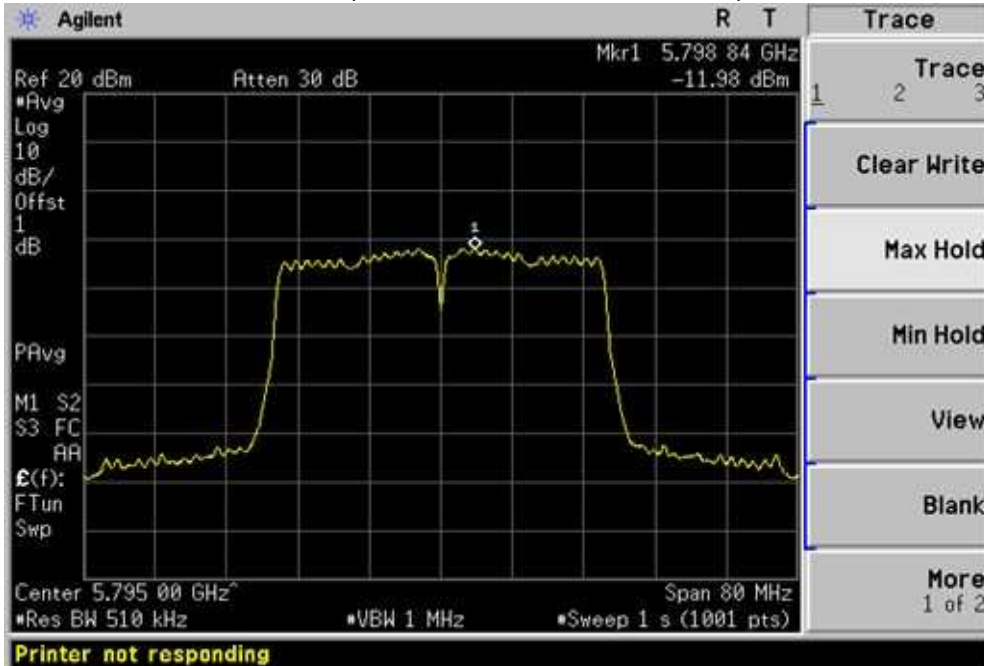




UNII Band3 OFDM (802.11n HT40-151ch)

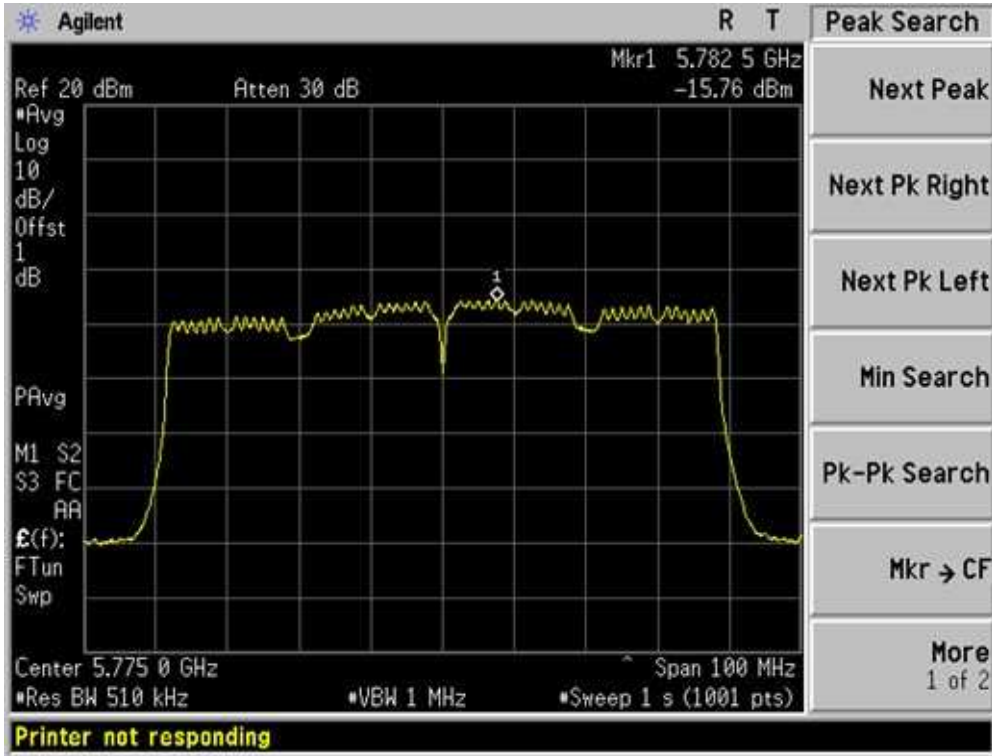


UNII Band3 OFDM (802.11n HT40-159ch)





UNII Band3 OFDM (802.11ac VHT80-155ch)



12. Frequency Stability

12.1 Test procedure

KDB 789033 v02r01 &15.407(g)

12.2 Test instruments and measurement setup

The EUT was placed inside of an environmental chamber as the temperature in the chamber was varied between -30°C and $+50^{\circ}\text{C}$. The temperature was incremented by 10° Intervals and the unit was allowed to stabilize at each temperature before each measurement. the center frequency of the transmitting channel was evaluated at each temperature and the frequency deviation from the channel's center frequency was recorded. Data for the worst case channel is shown below.

12.3-1 Test results

OPERATING FREQUENCY: 5,180,000,000 Hz
 CHANNEL: 36
 REFERENCE VOLTAGE: 5 VDC

VOLTAGE (%)	POWER (VDC)	TEMP ($^{\circ}\text{C}$)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100%	3.7	+ 20(Ref)	5,179,999,951	-49	-0.0000000365
100%		-30	5,179,999,575	-425	-0.0000000820
100%		-20	5,179,999,239	-761	-0.0000001469
100%		-10	5,180,000,124	124	0.0000000239
100%		0	5,180,000,122	122	0.0000000236
100%		+10	5,179,999,113	-887	-0.0000001712
100%		+20	5,179,999,821	-179	-0.0000000346
100%		+30	5,179,999,861	-139	-0.0000000268
100%		+40	5,179,999,816	-184	-0.0000000355
100%		+50	5,179,999,791	-209	-0.0000000403
85%		3.145	+20	5,179,999,771	-229
BATT.ENDPOINT	4.07	+20	5,179,999,451	-549	-0.0000001060

13.3-2 Test results

OPERATING FREQUENCY: 5,745,000,000 Hz
 CHANNEL: 36
 REFERENCE VOLTAGE: 5 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100%	3.7	+ 20(Ref)	5,744,999,235	-765	-0.0000000365
100%		-30	5,744,999,821	-179	-0.0000000312
100%		-20	5,744,999,675	-325	-0.0000000566
100%		-10	5,745,000,334	334	0.0000000581
100%		0	5,745,000,224	224	0.0000000390
100%		+10	5,744,999,763	-237	-0.0000000413
100%		+20	5,744,999,845	-155	-0.0000000270
100%		+30	5,745,000,443	443	0.0000000771
100%		+40	5,744,999,199	-801	-0.0000001394
100%		+50	5,744,999,291	-709	-0.0000001234
85%	3.145	+20	5,744,999,509	-491	-0.0000000855
BATT.ENDPOINT	4.07	+20	5,744,999,799	-201	-0.0000000350

13. Band edge and Emission Mask

13.1 Test procedure

KDB 789033 D02 v02r01– Section G) Peak excursion measurement

13.2 Test instruments and measurement setup

The spectrum analyzer is set to as following.

- a) Set RBW = 100 kHz.
- b) VBW ≥ 300 kHz.
- c) Detector = peak.
- d) Trace mode = max–hold.
- e) Allow the sweeps to continue until the trace stabilizes.
- f) Use the peak search function to find the peak of the spectrum

Limit : FCC § 15.407 (a) (6)

Band Edge&Out of Emission Test Instruments

Description	Model	Serial Number	Cal. Due Date
Spectrum Analyzer	E4440A	US41421291	2020-12-02
Spectrum Analyzer	FSV40	100939	2020-12-02

13.3 Measurement results

802.11a

EUT	Tablet PC	MODEL	RP70A BIO
MODE	OFDM	ENVIRONMENTAL CONDITION	23 °C, 43 % R.H.
INPUT POWER	DC 3.7 V		

Mode (Data Rate)	Band	PASS/FAIL
802.11a(54Mbps)	was1	PASS
802.11a(54Mbps)	was4	PASS

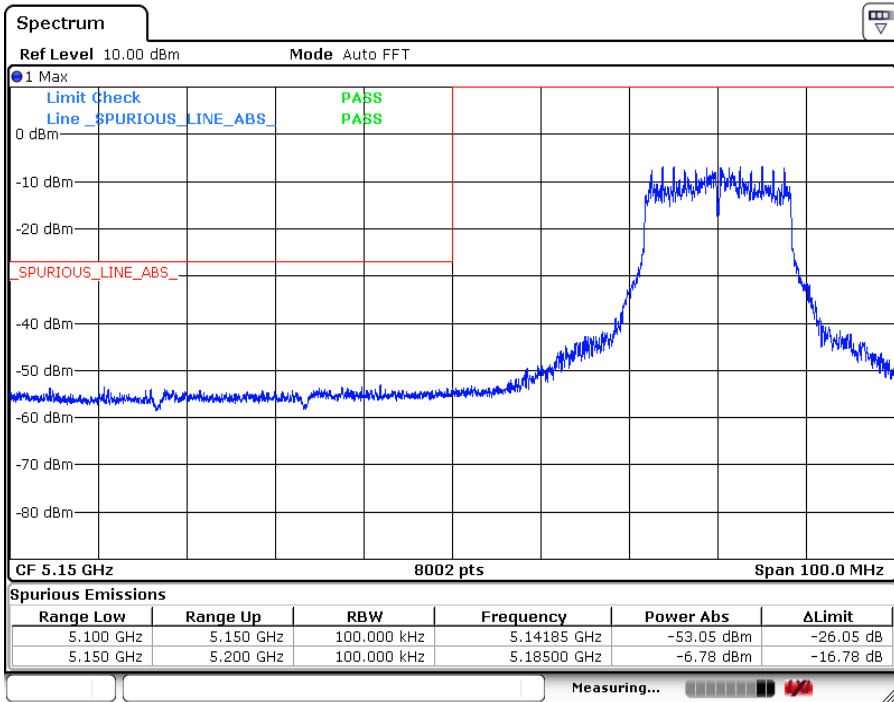


Mode (Data Rate)	Band	PASS/FAIL
802.11n HT20 (Mcs7)	was1	PASS
802.11n HT20 (Mcs7)	was4	PASS

Mode (Data Rate)	Band	PASS/FAIL
802.11n HT40 (Mcs7)	was1	PASS
802.11n HT40 (Mcs7)	was4	PASS

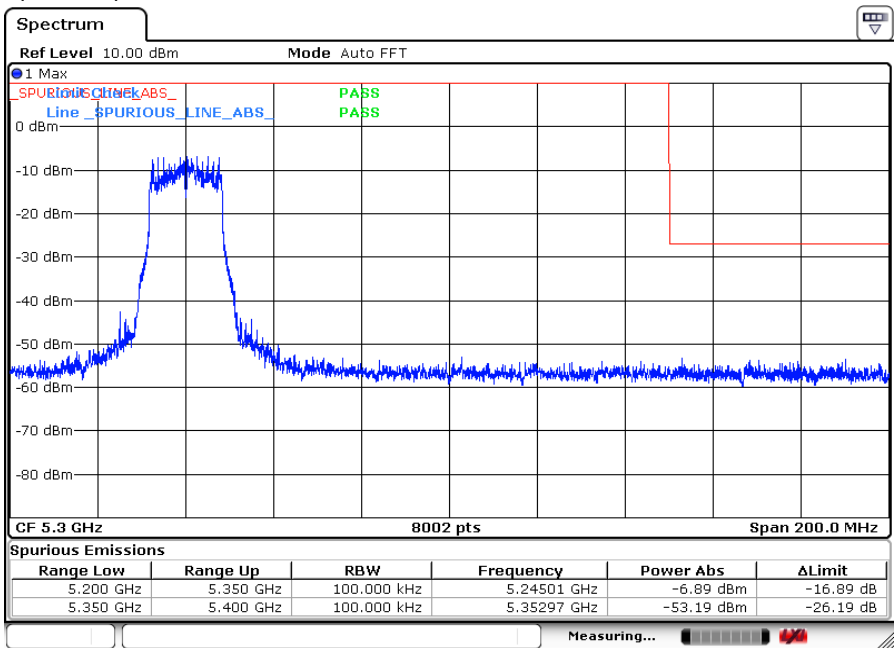
Mode (Data Rate)	Band	PASS/FAIL
802.11ac VHT80 (VHT9)	was1	PASS
802.11ac VHT80 (VHT9)	was4	PASS

13.4 Trace data of band-edge-802.11a (36ch)



00077

(48ch)

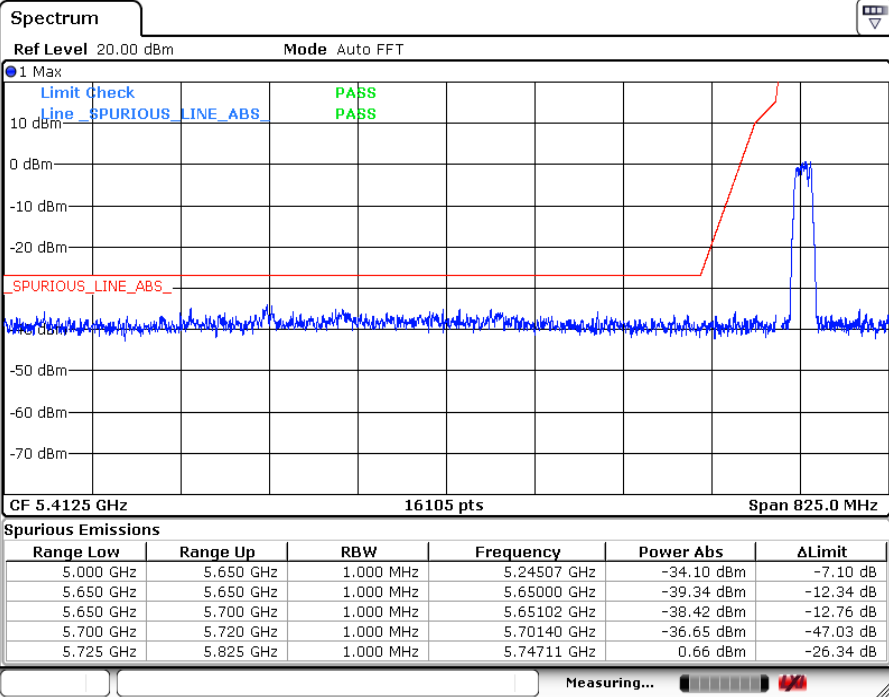


00077



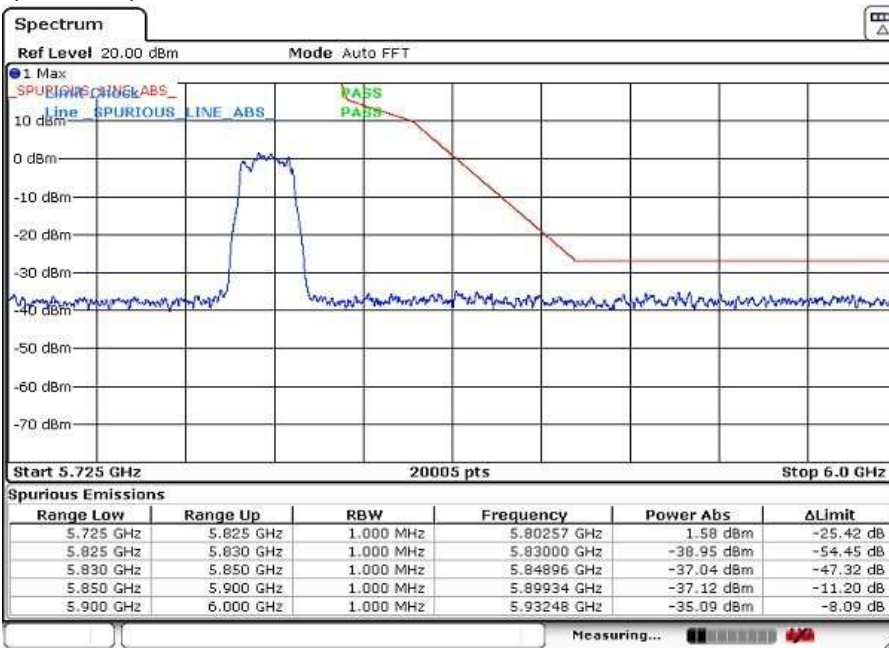
Estech
your best partner

14.4 Trace data of band-edge-802.11a (149ch)



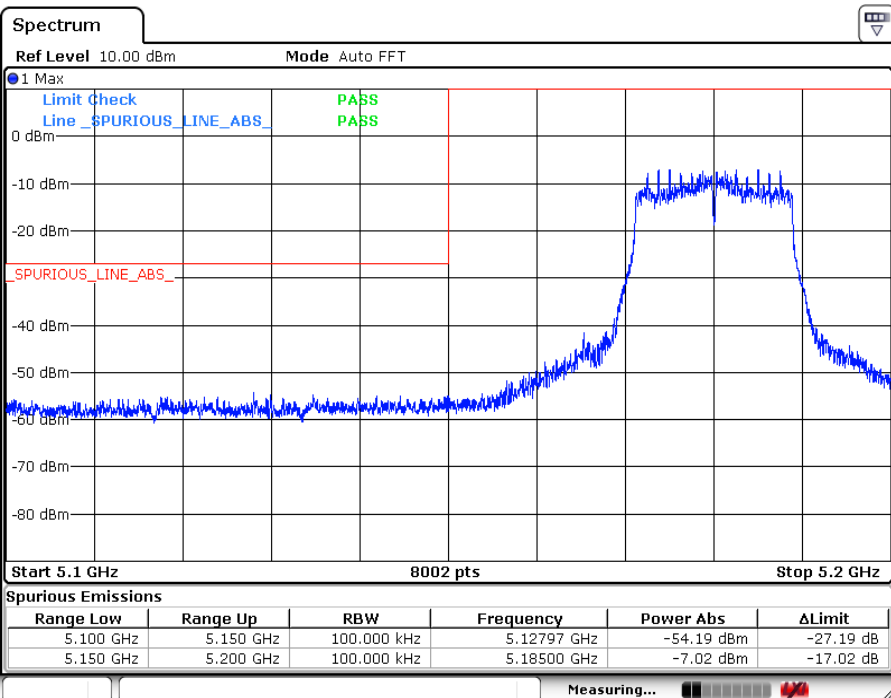
00077

(161ch)



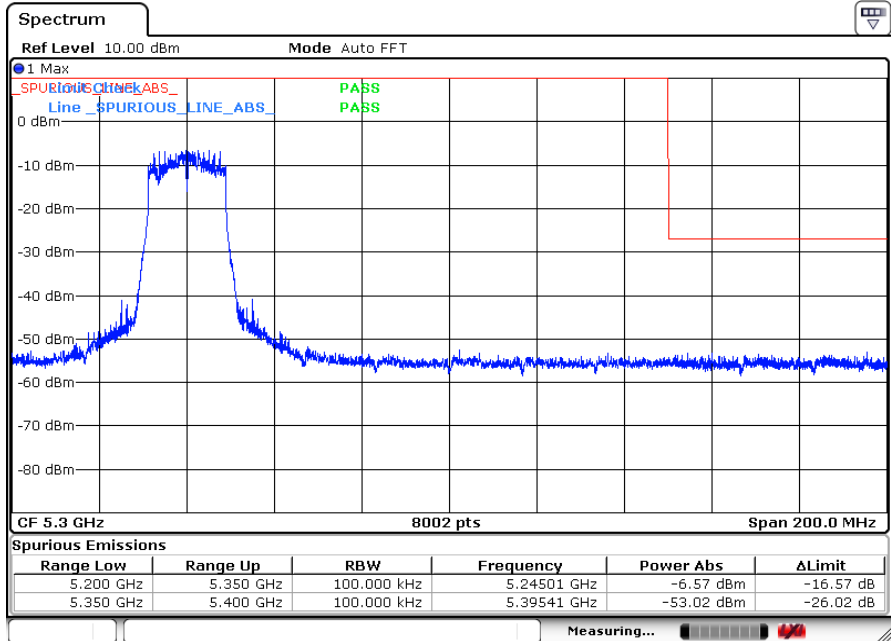
00077

14.4 Trace data of band-edge-802.11n HT20 (36ch)



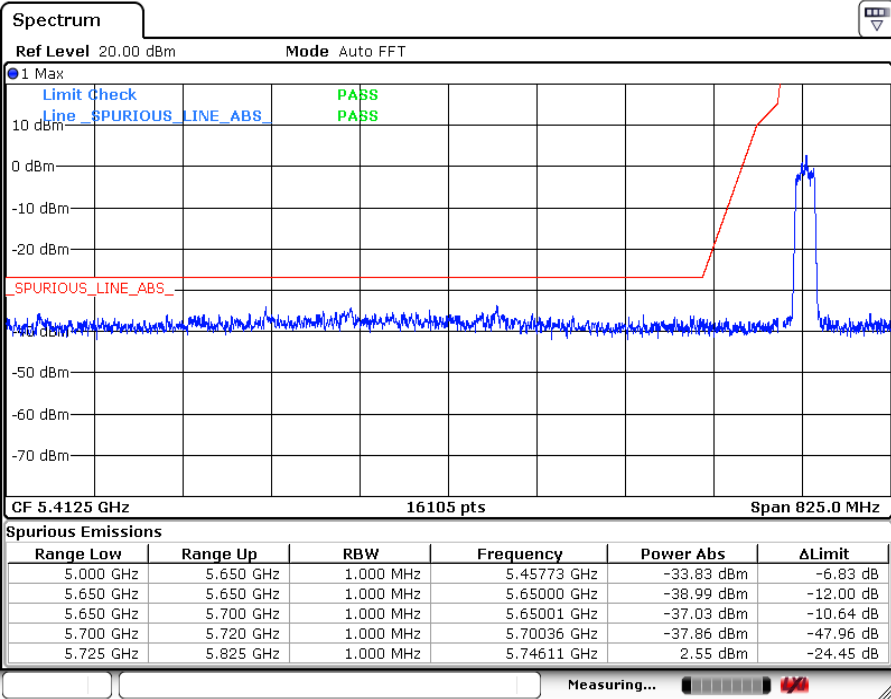
00077

(48ch)



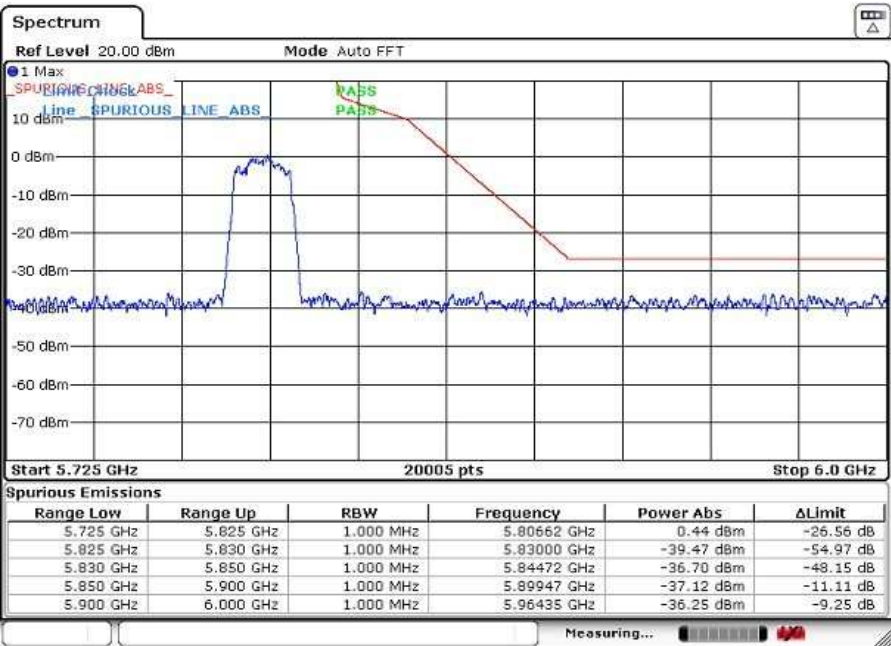
00077

14.4 Trace data of band-edge-802.11n HT20 (149ch)



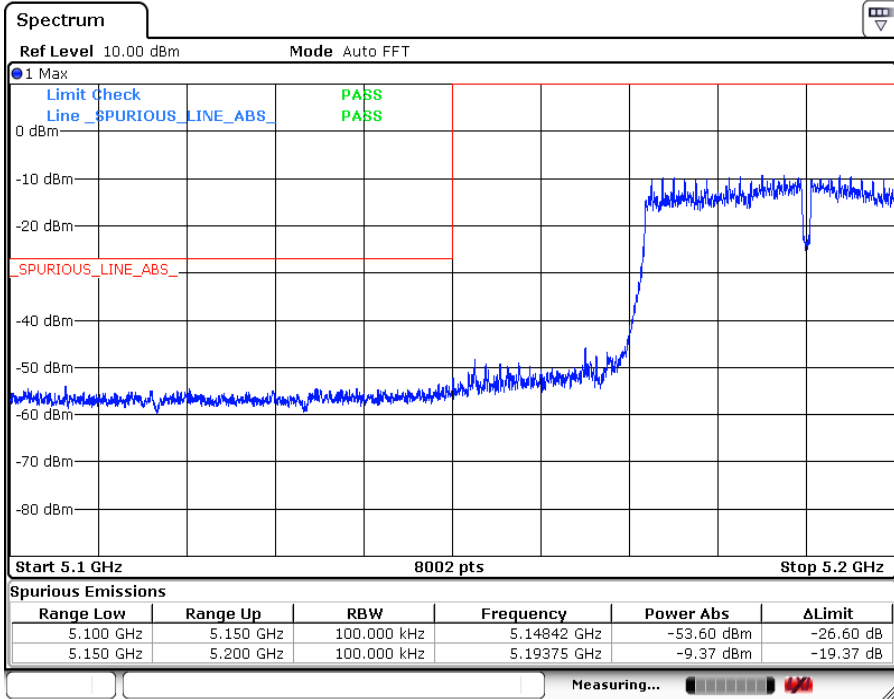
00077

(161ch)



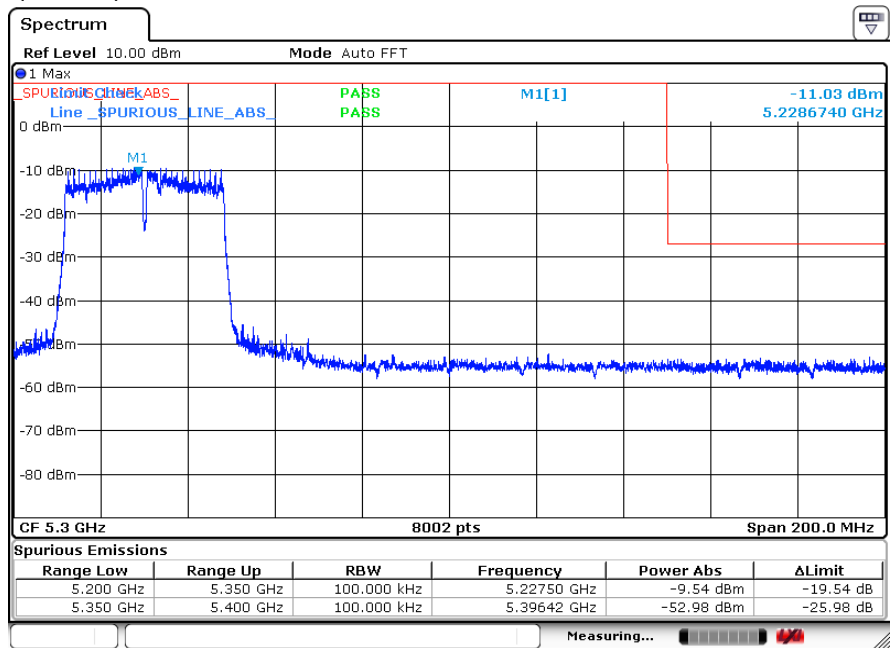
00077

14.4 Trace data of band-edge-802.11n HT40 (38ch)



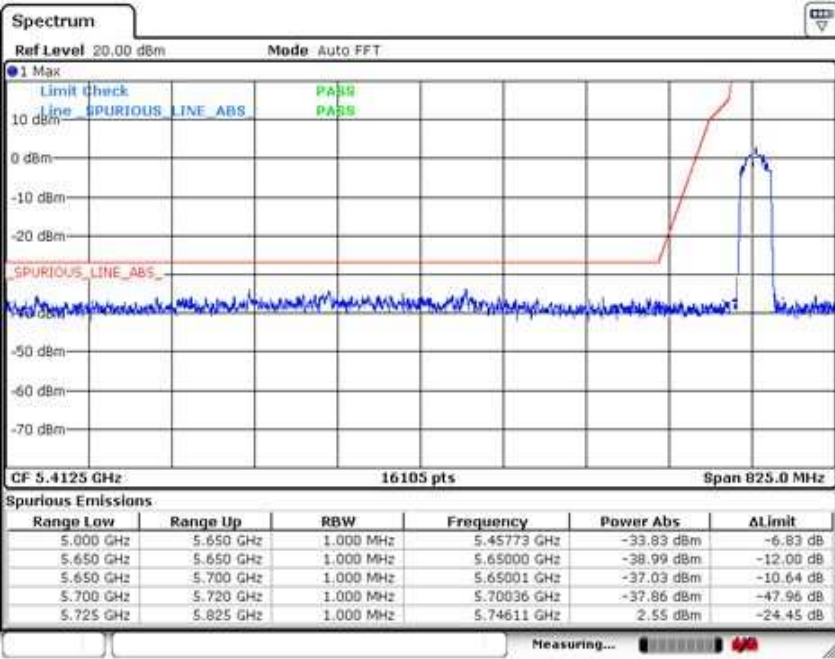
00077

(46ch)

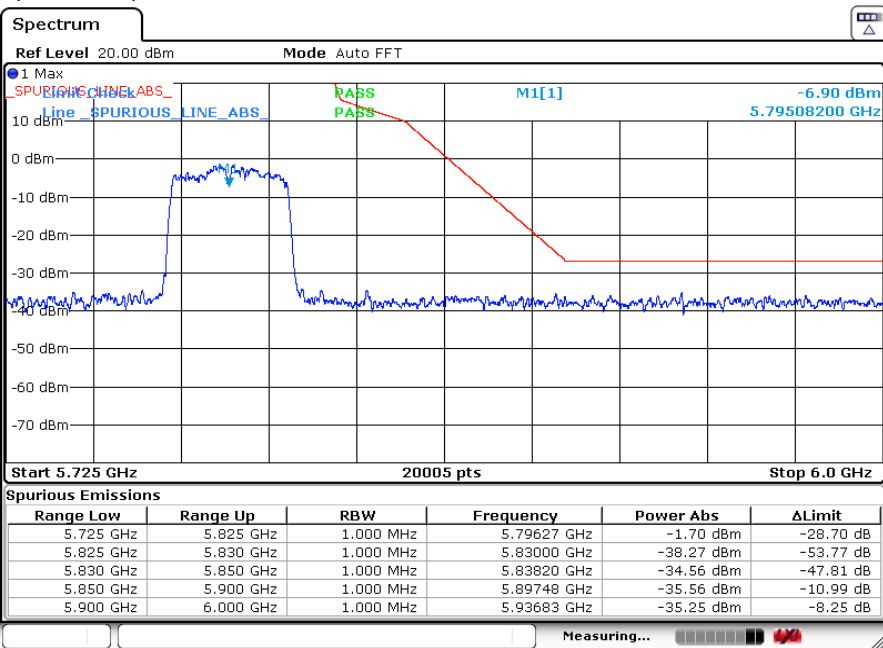


00077

14.4 Trace data of band-edge-802.11n HT40 (151ch)

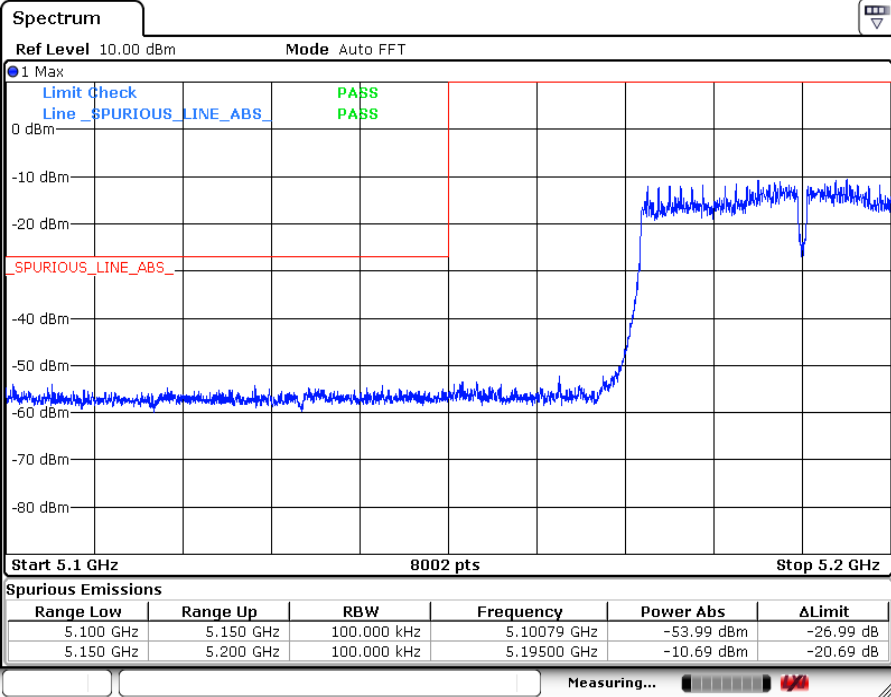


(159ch)



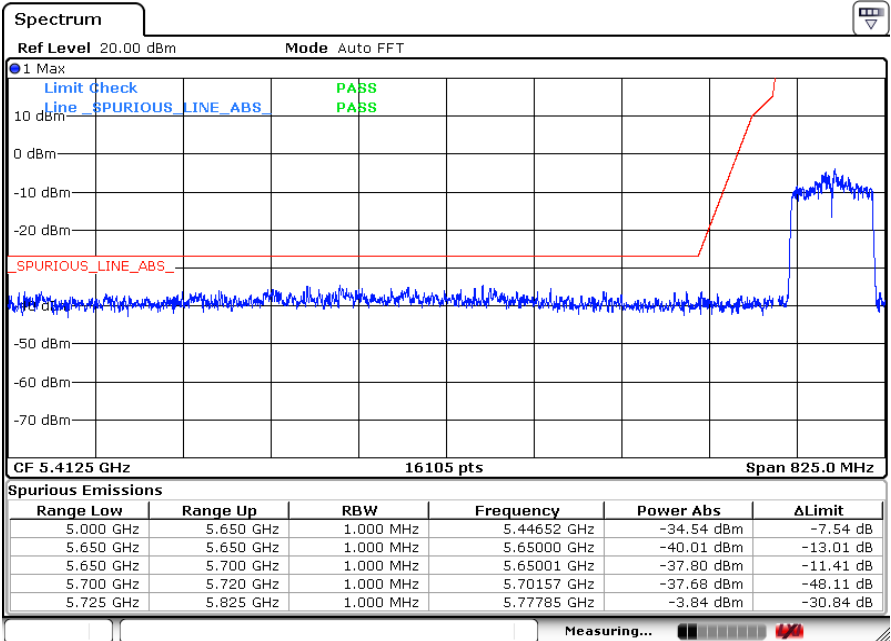


14.4 Trace data of band-edge-802.11ac VHT80 (42ch)



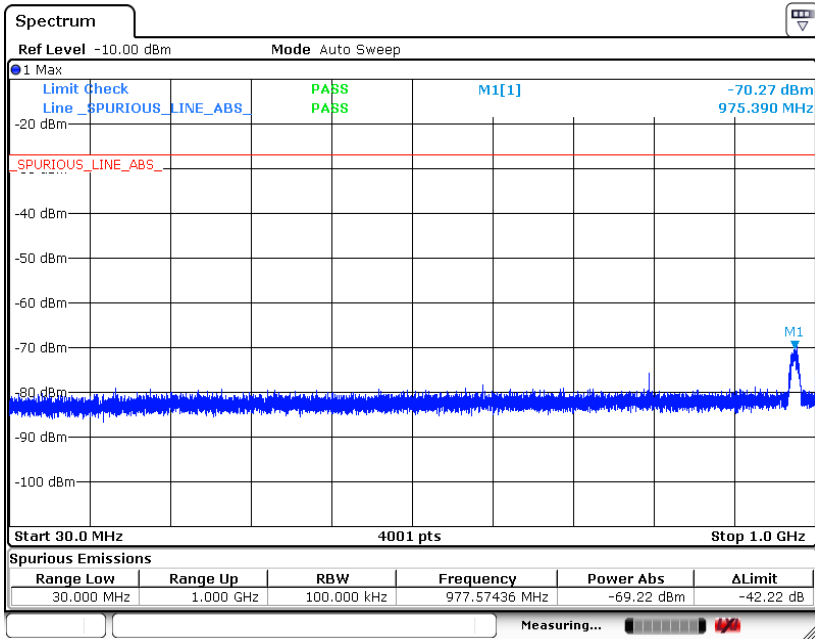
00077

(155ch)

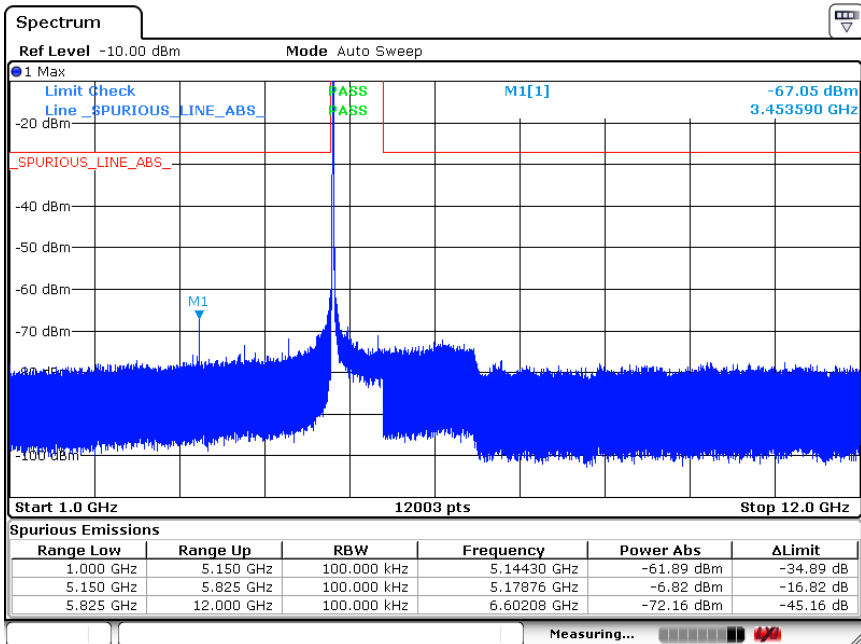


00077

14.4 Trace data of band-edge-802.11a (36ch)

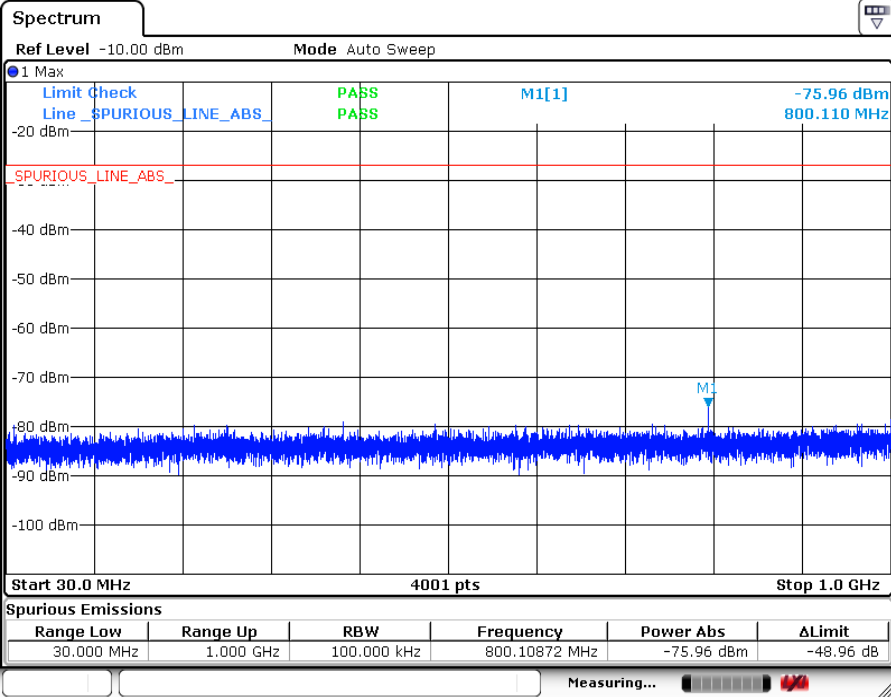


00077

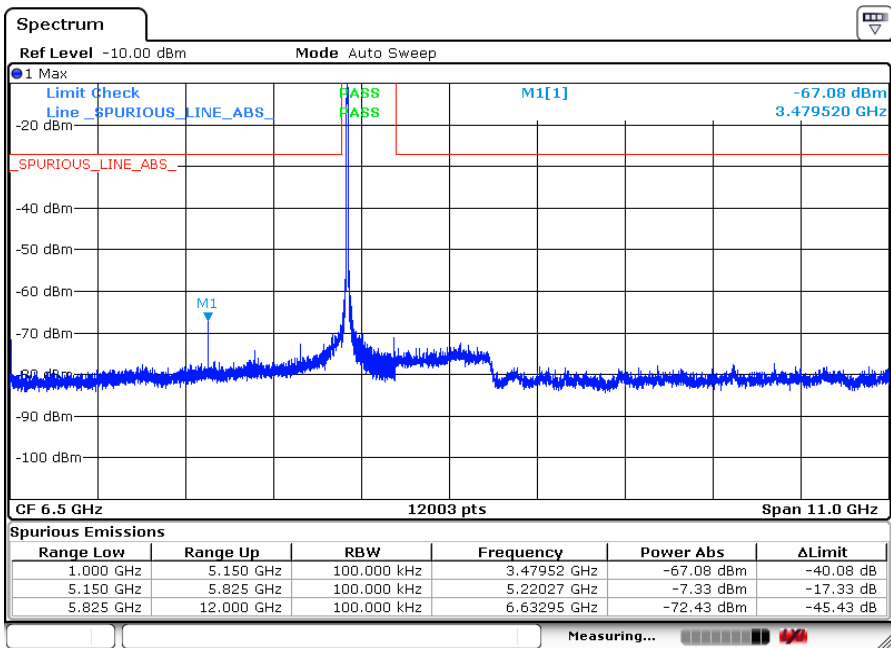


00077

14.4 Trace data of band-edge-802.11a (44ch)

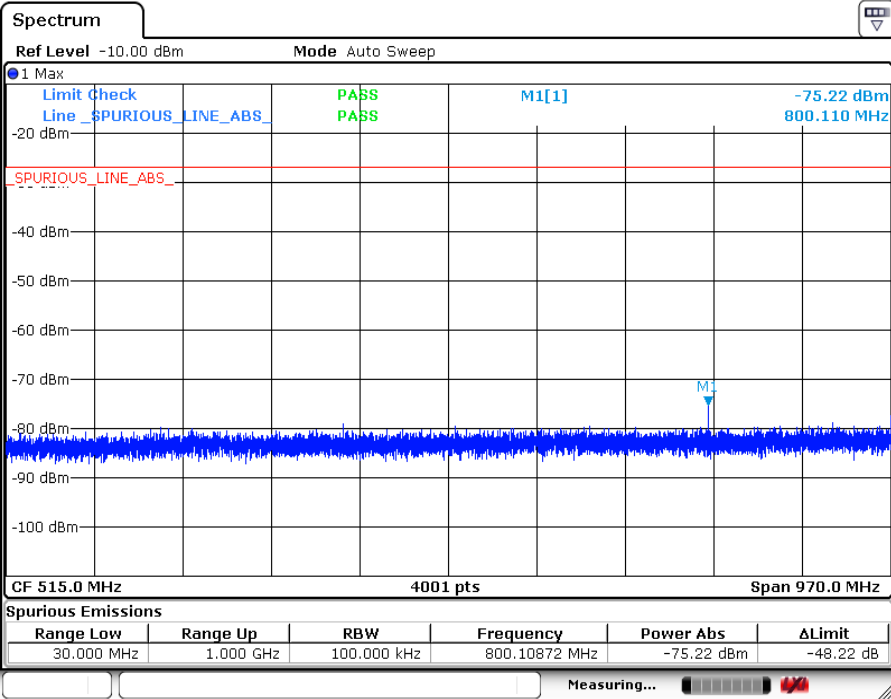


00077

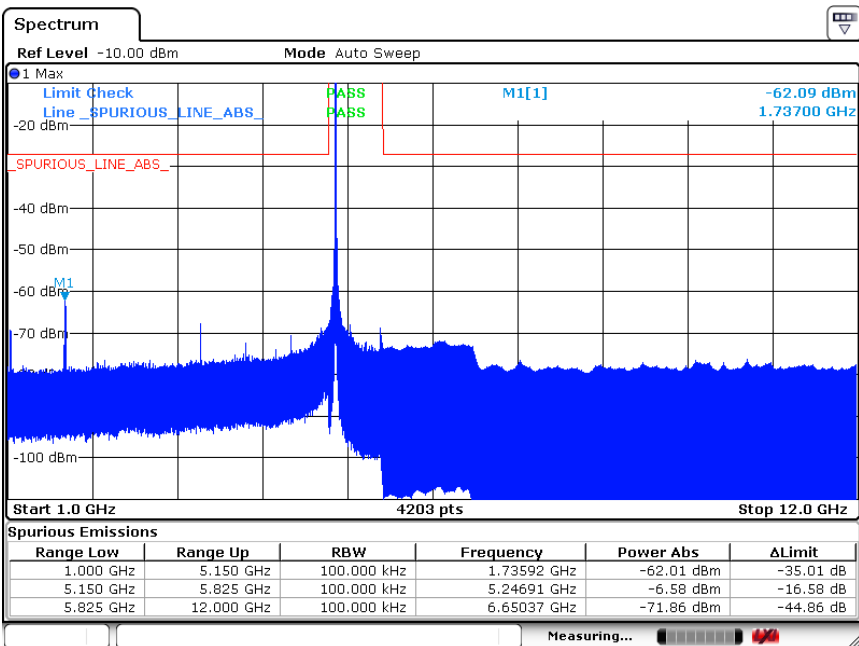


00077

14.4 Trace data of band-edge-802.11a (48ch)

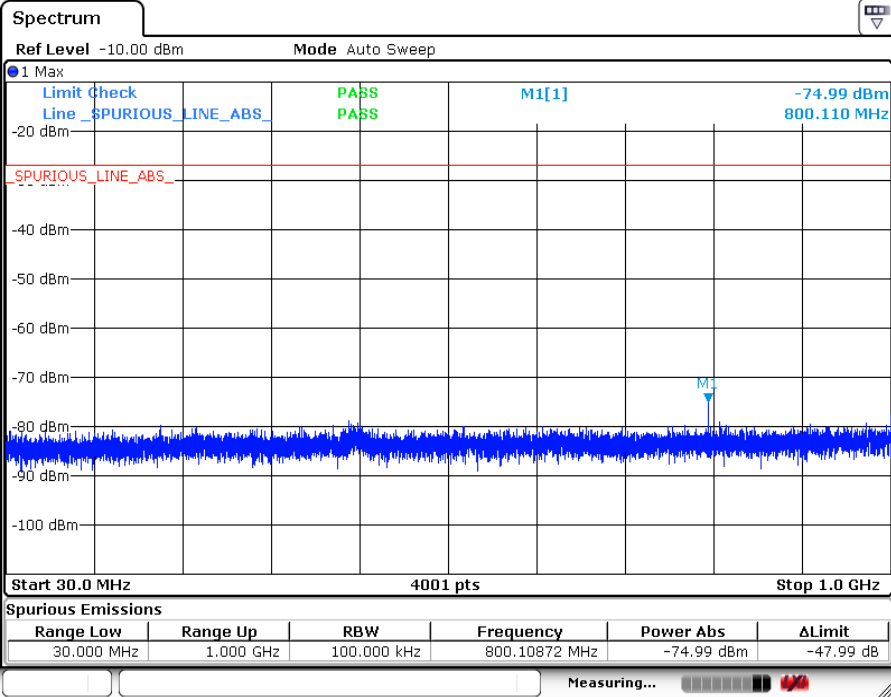


00077

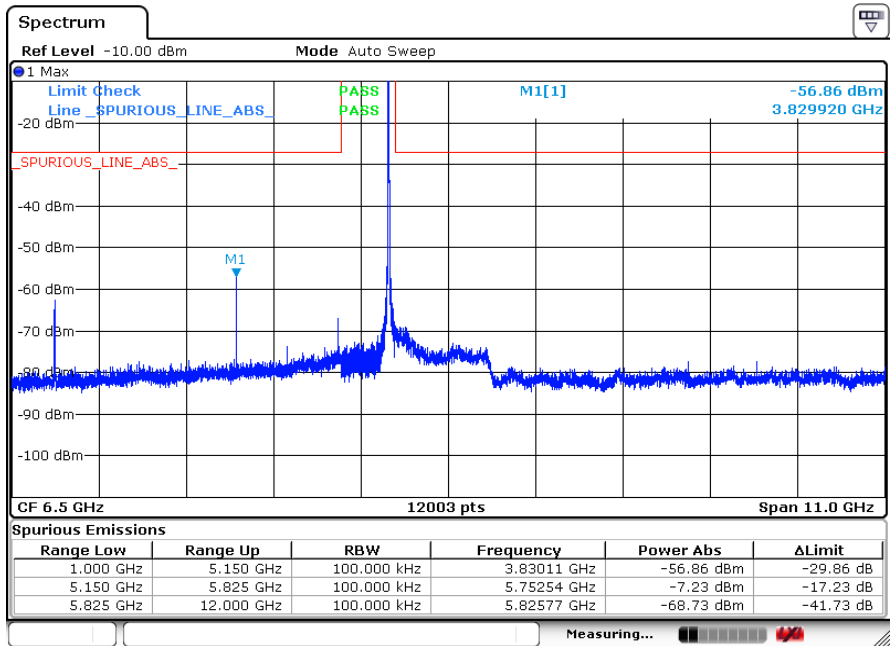


00077

14.4 Trace data of band-edge-802.11a (149ch)

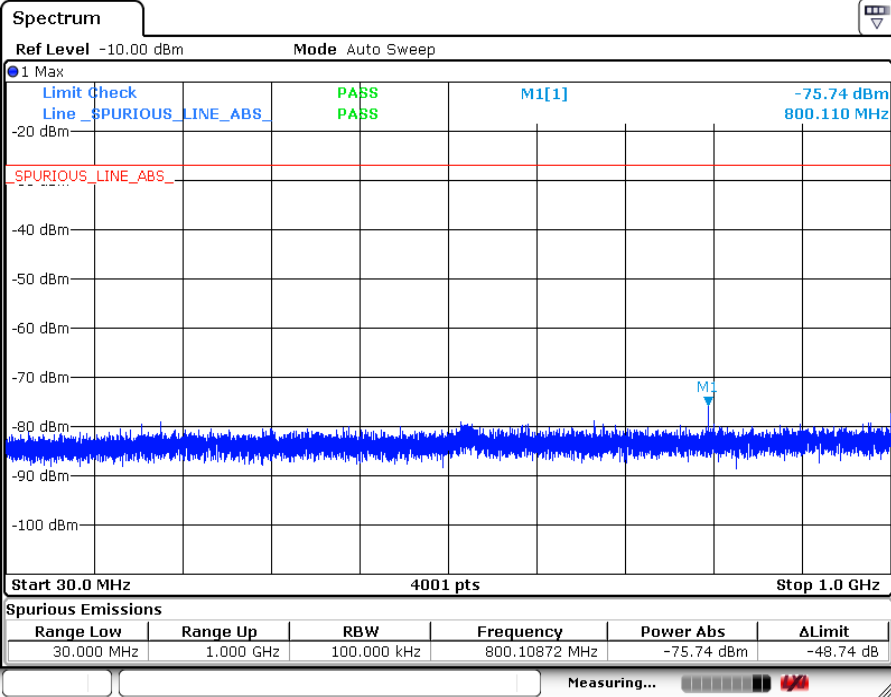


00077

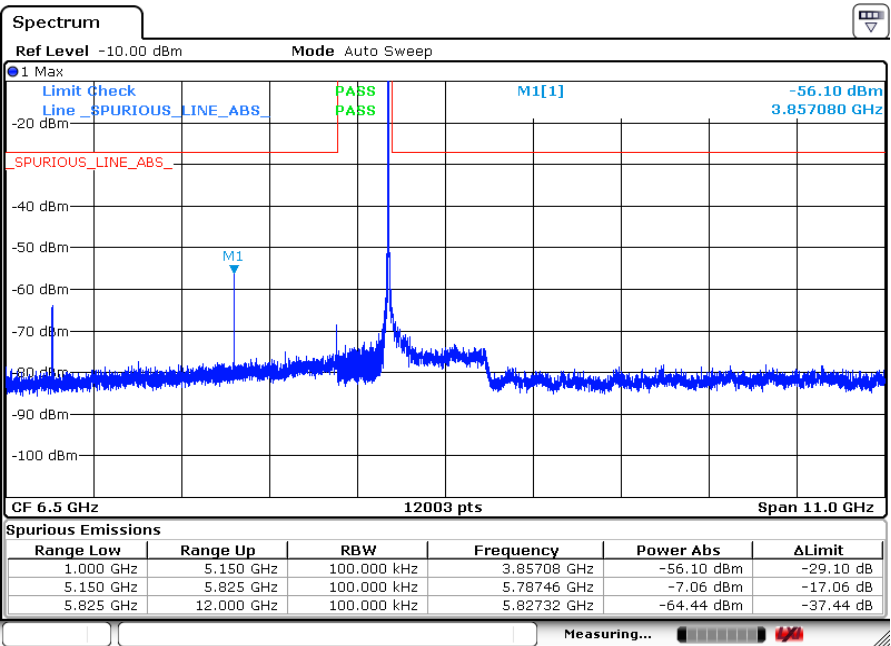


00077

14.4 Trace data of band-edge-802.11a (157ch)

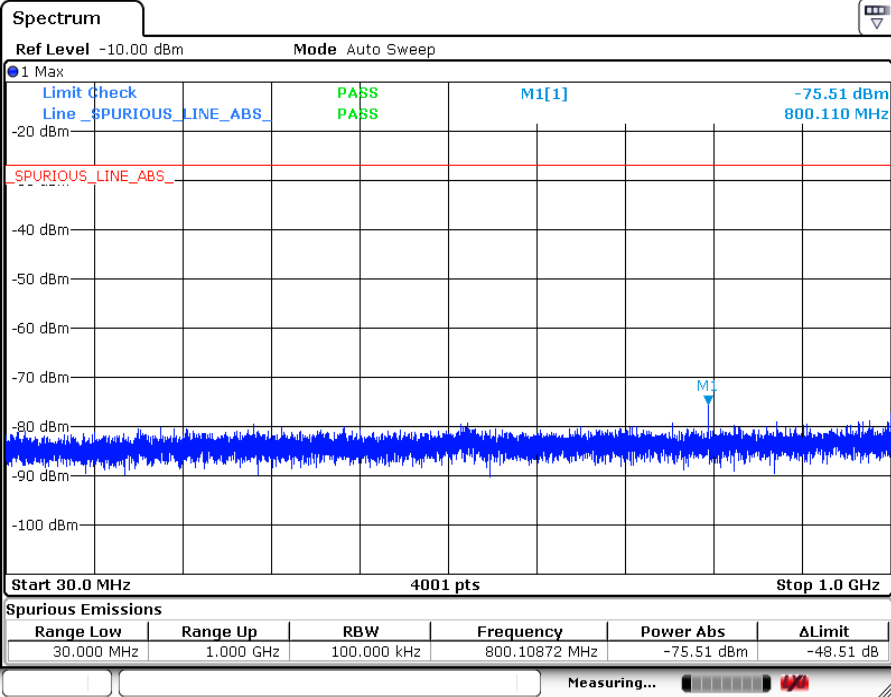


00077

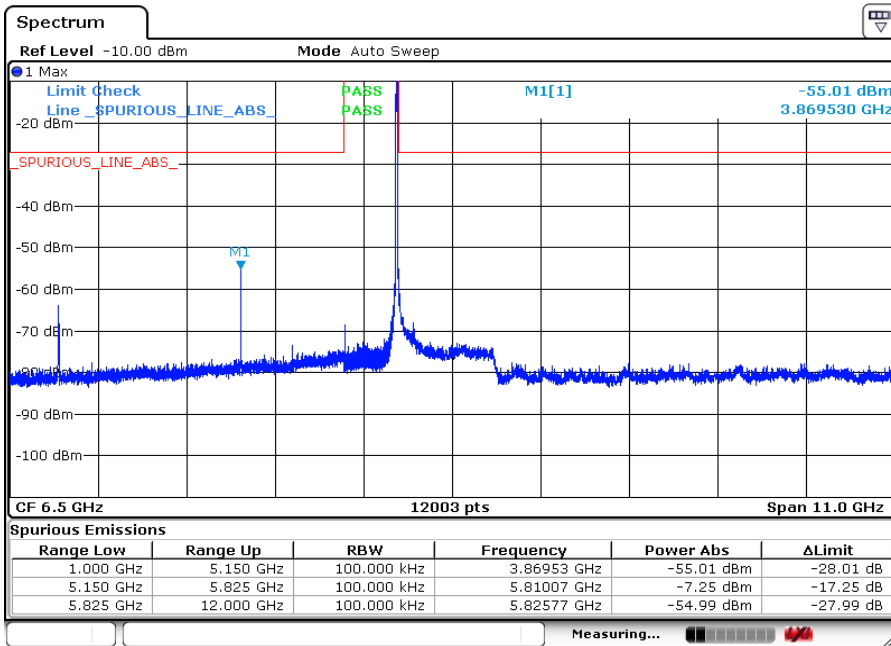


00077

14.4 Trace data of band-edge-802.11a (165ch)

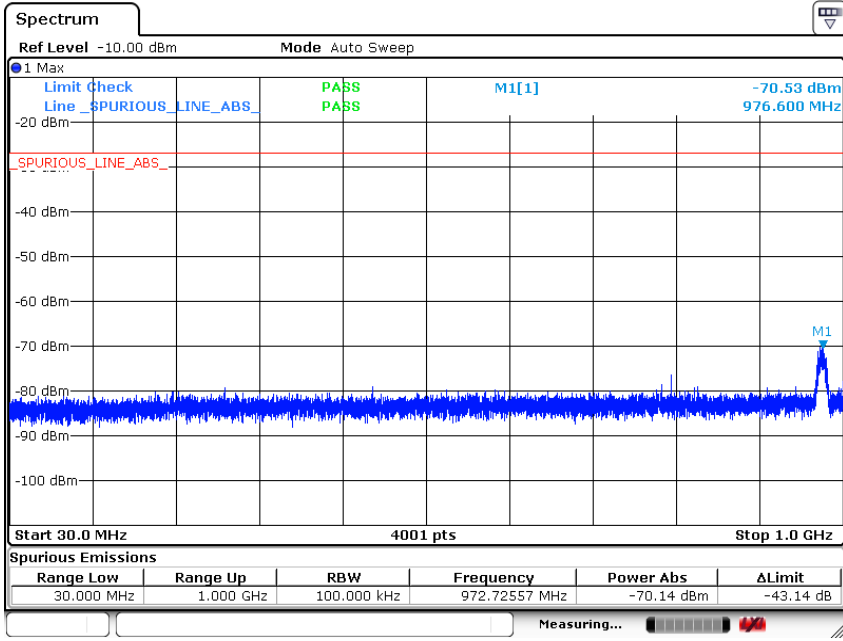


00077

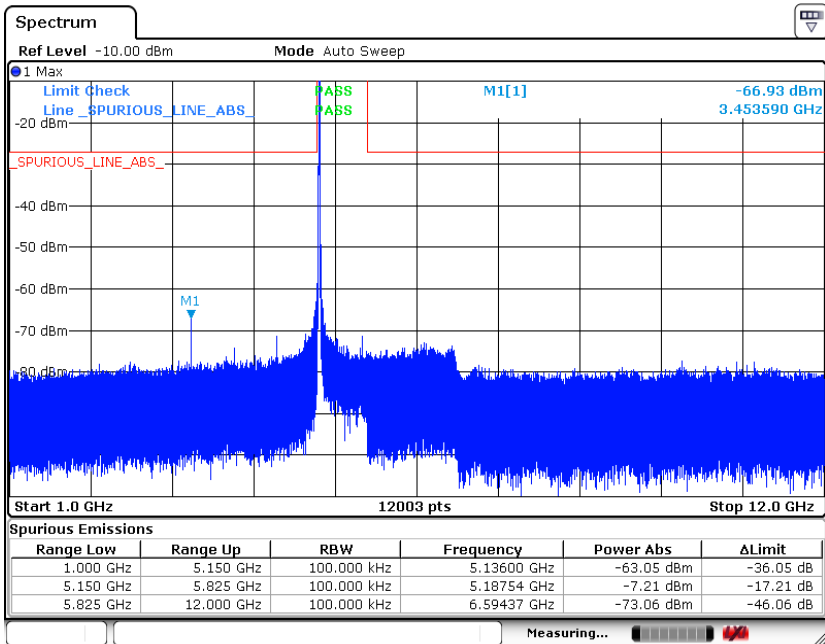


00077

14.4 Trace data of band-edge-802.11n HT20 (36ch)

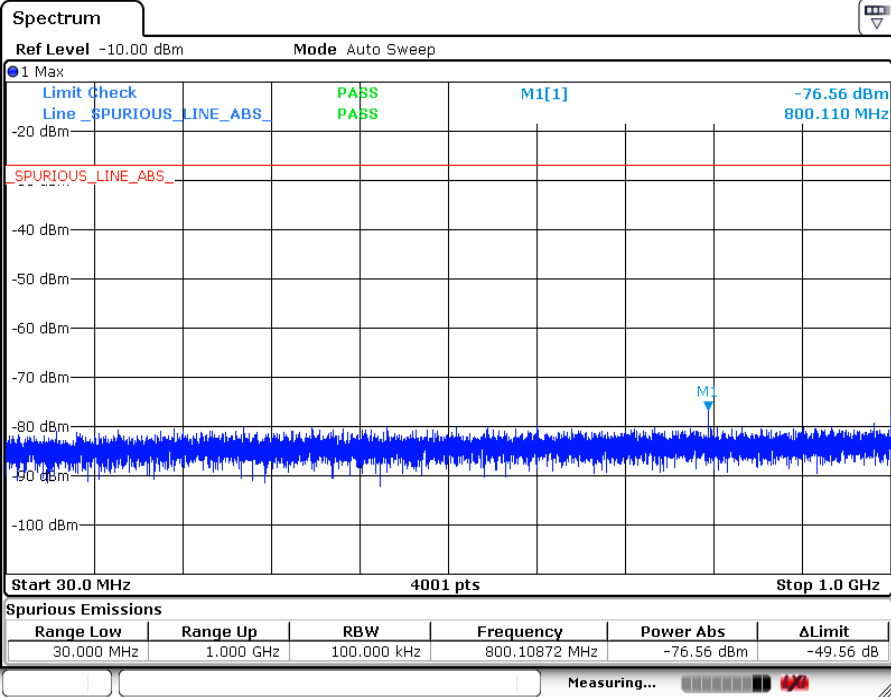


00077

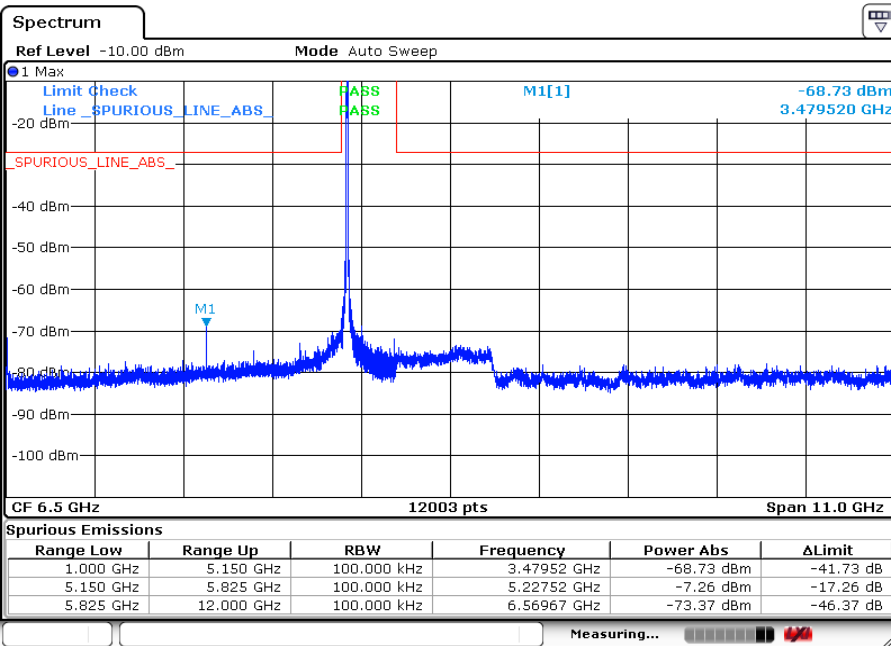


00077

14.4 Trace data of band-edge-802.11n HT20 (44ch)

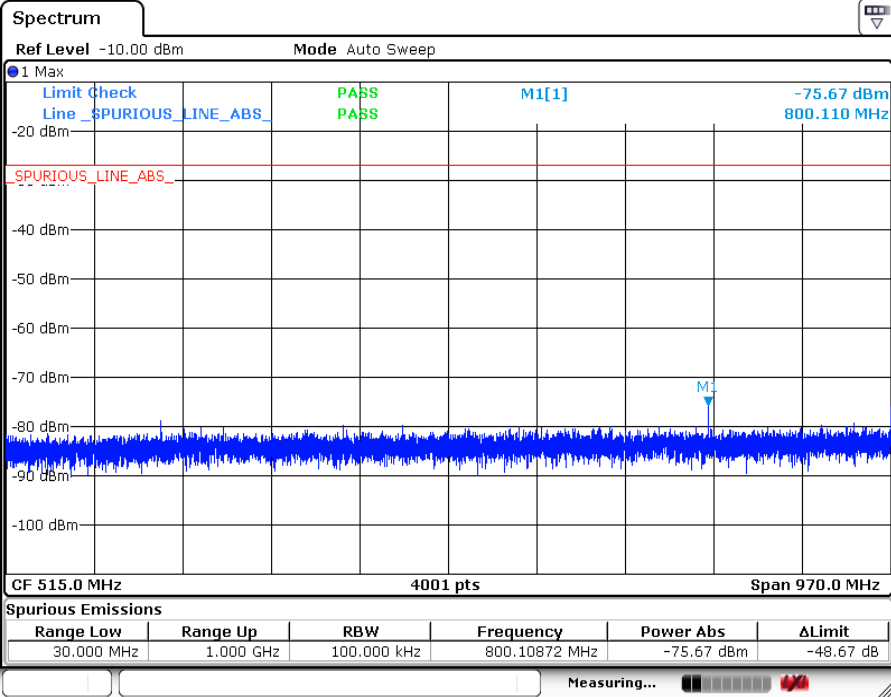


00077

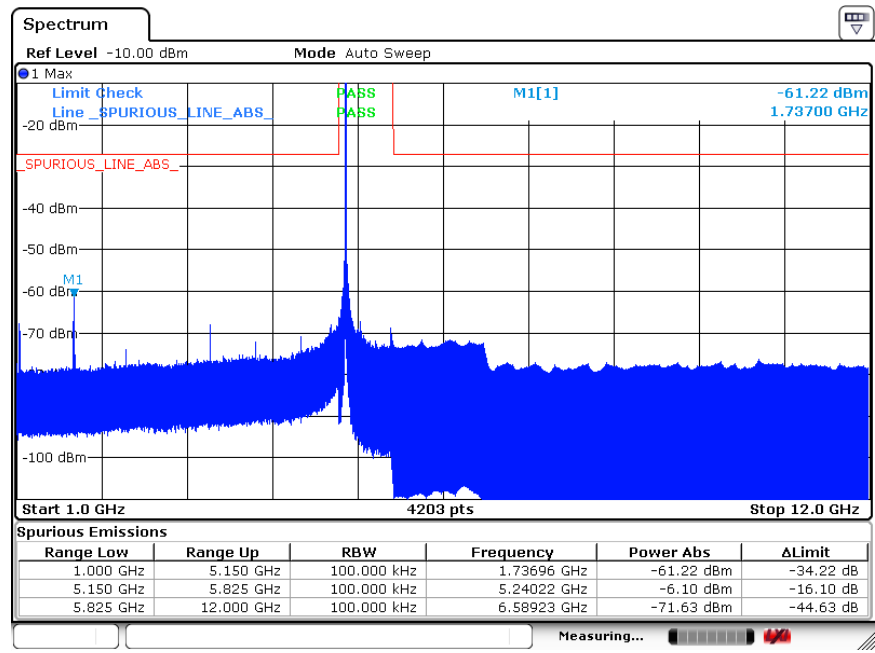


00077

14.4 Trace data of band-edge-802.11n HT20 (48ch)

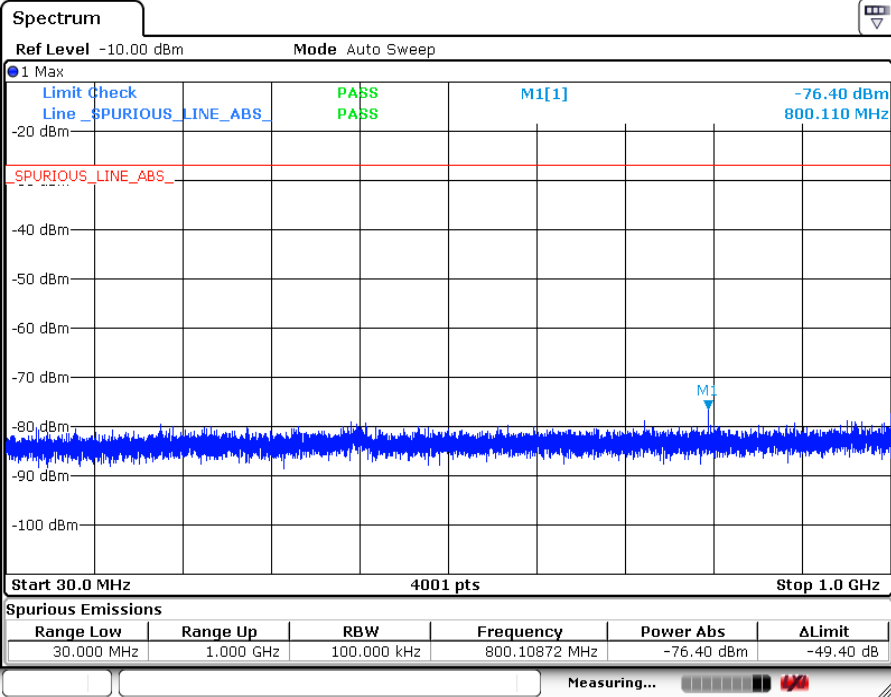


00077

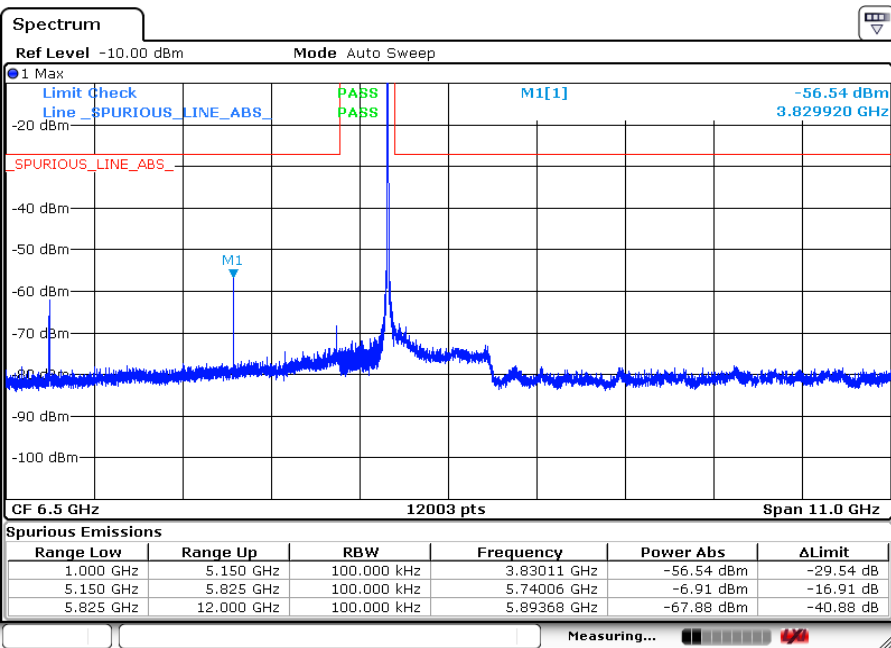


00077

14.4 Trace data of band-edge-802.11n HT20 (149ch)

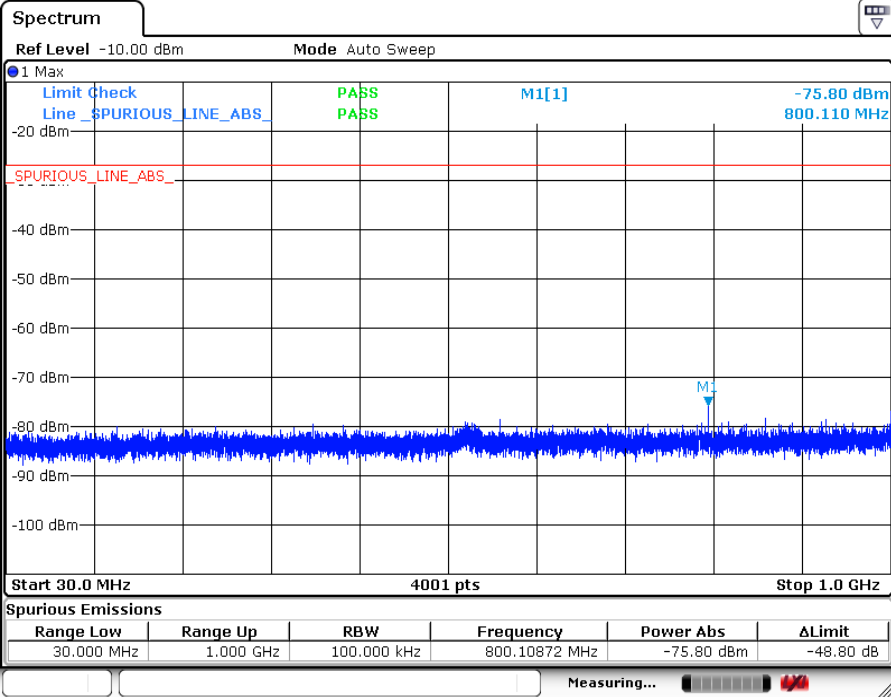


00077

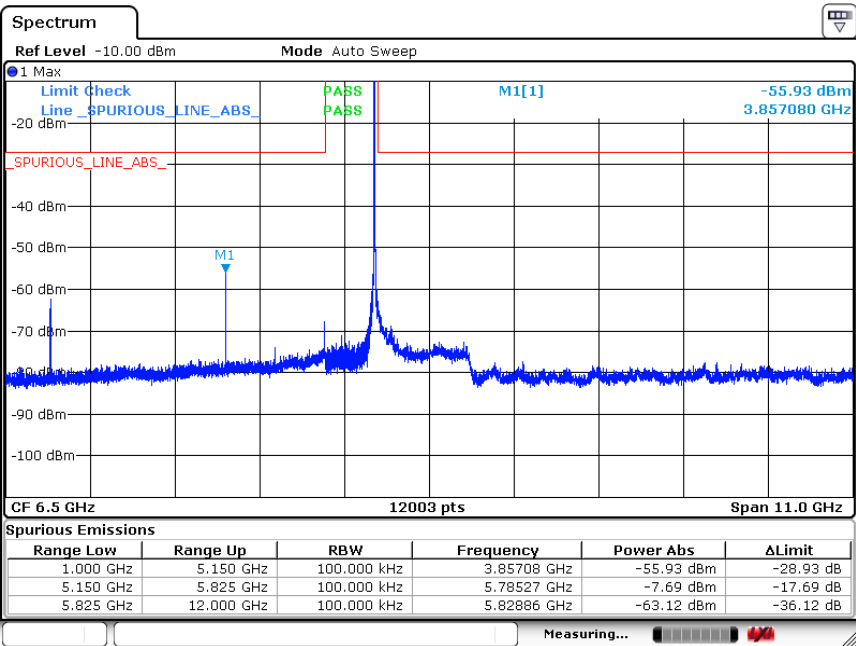


00077

14.4 Trace data of band-edge-802.11n HT20 (157ch)

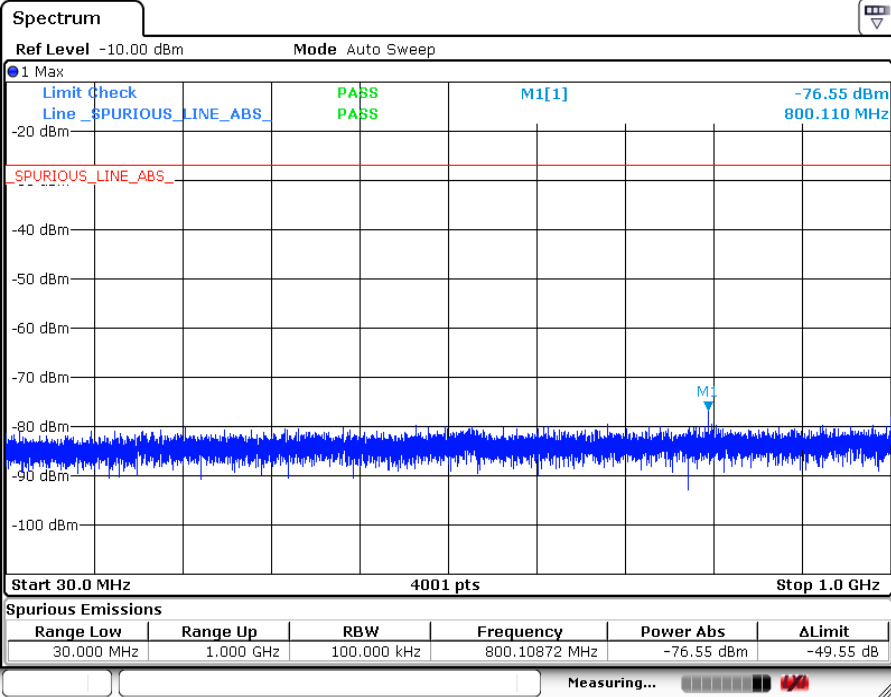


00077

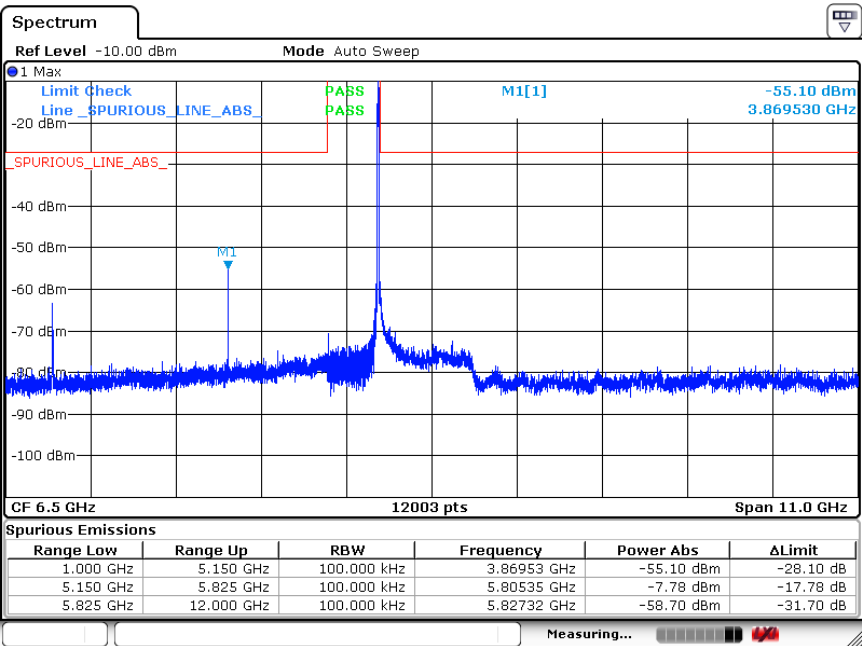


00077

14.4 Trace data of band-edge-802.11n HT20 (165ch)

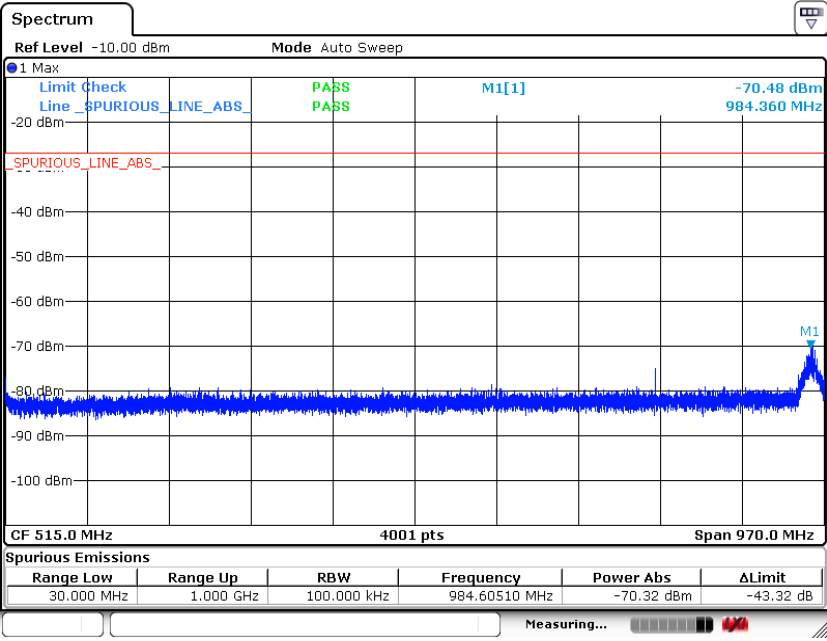


00077

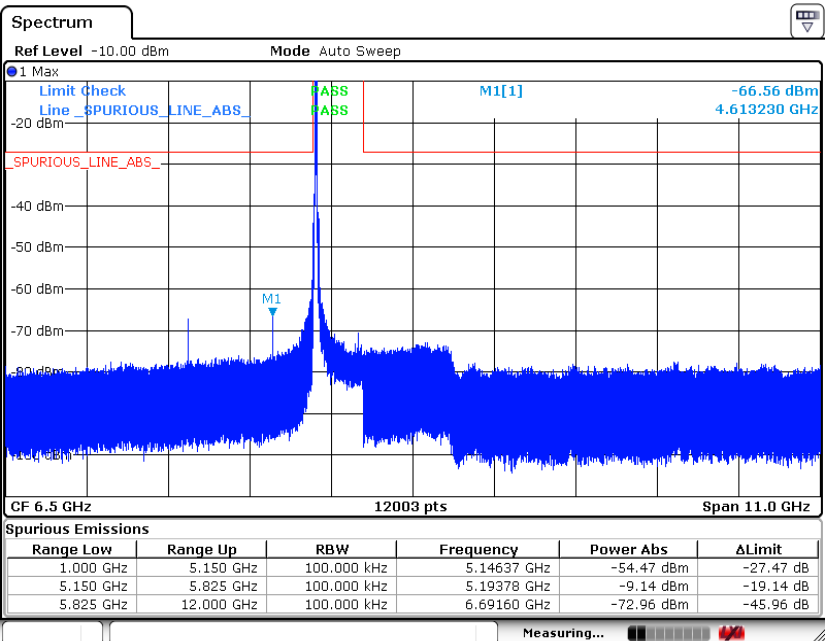


00077

14.4 Trace data of band-edge-802.11n HT40 (38ch)

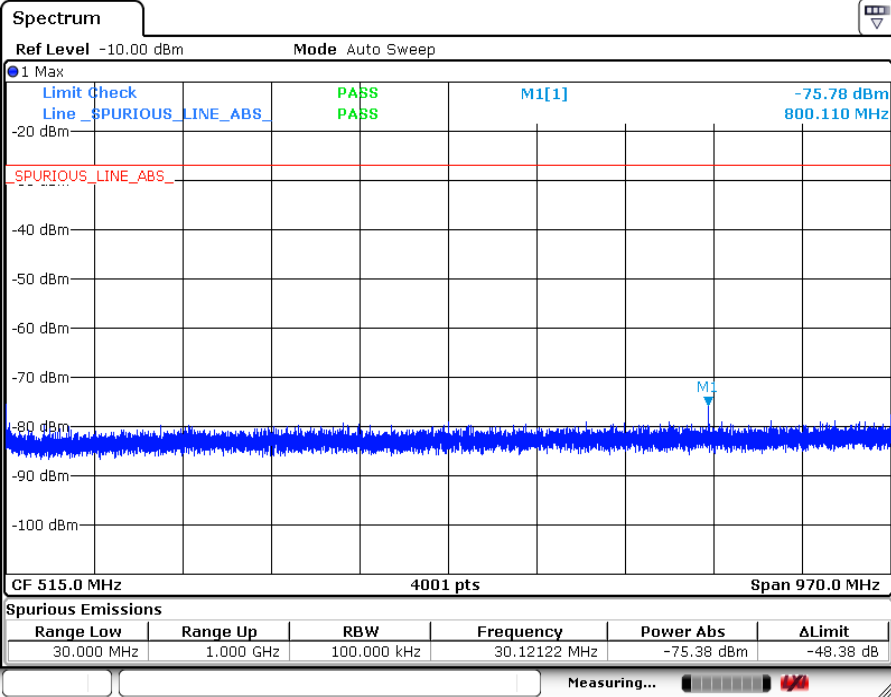


00077

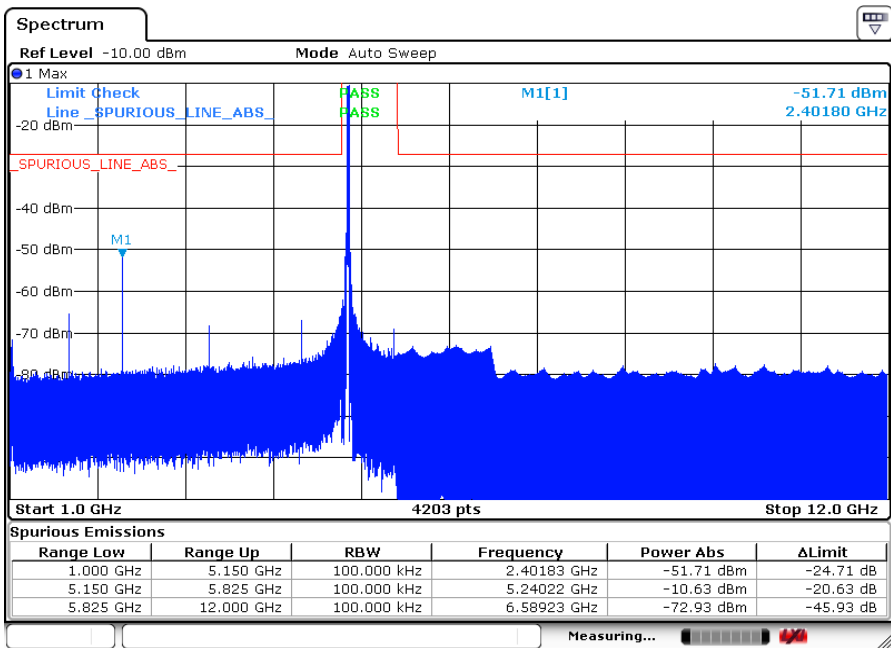


00077

14.4 Trace data of band-edge-802.11n HT40 (46ch)

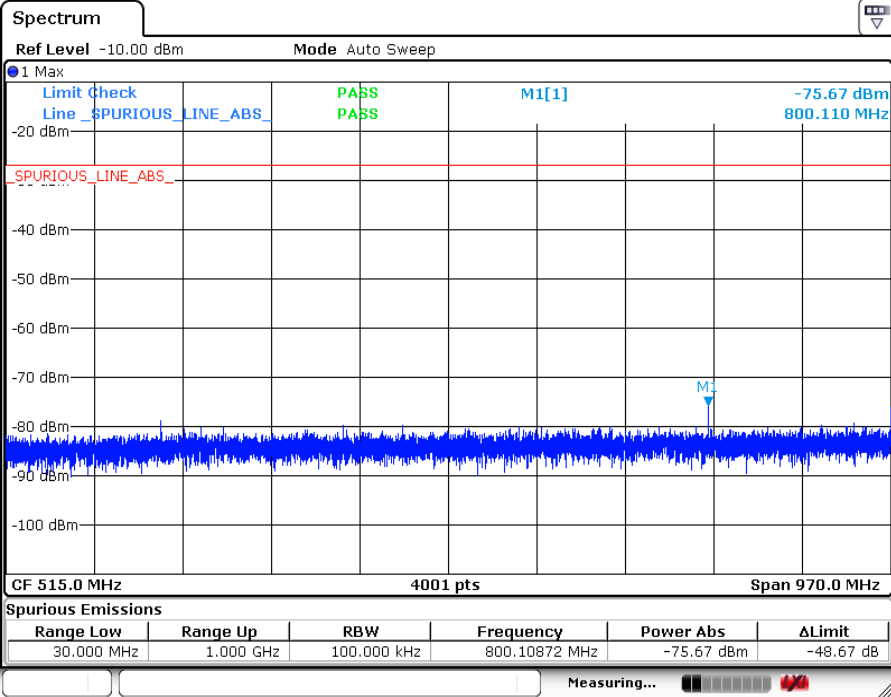


00077

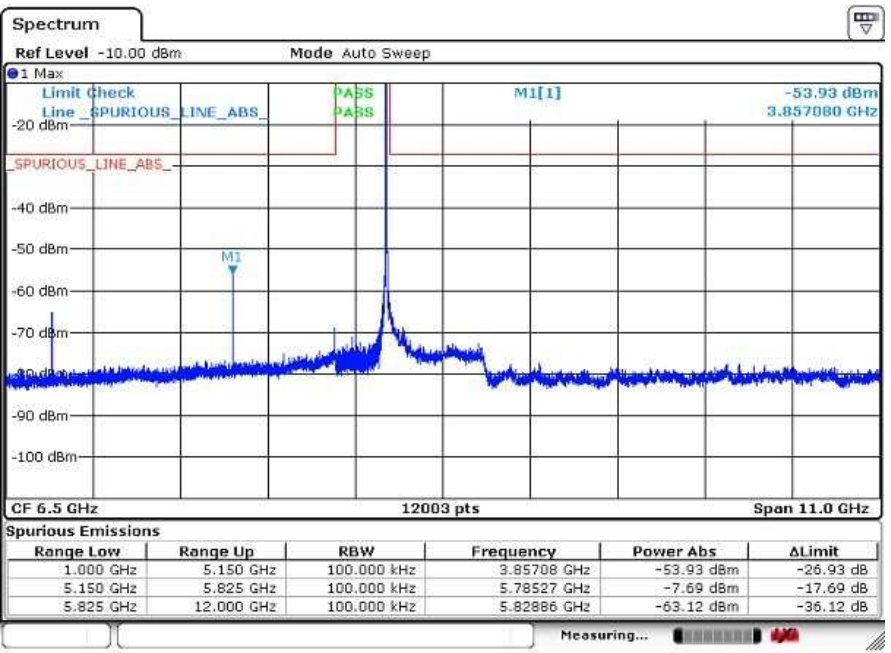


00077

14.4 Trace data of band-edge-802.11n HT40 (151ch)



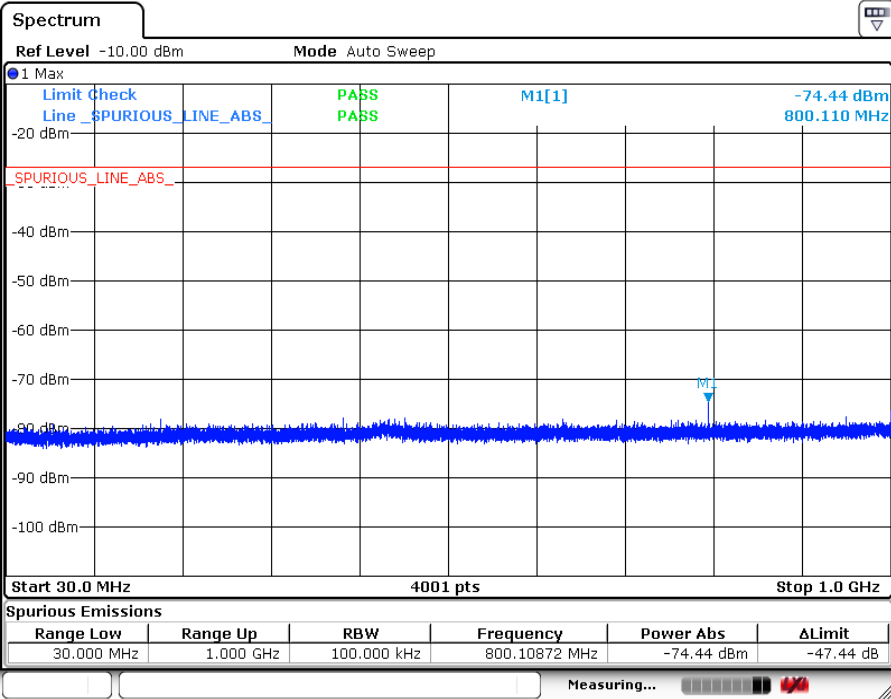
00077



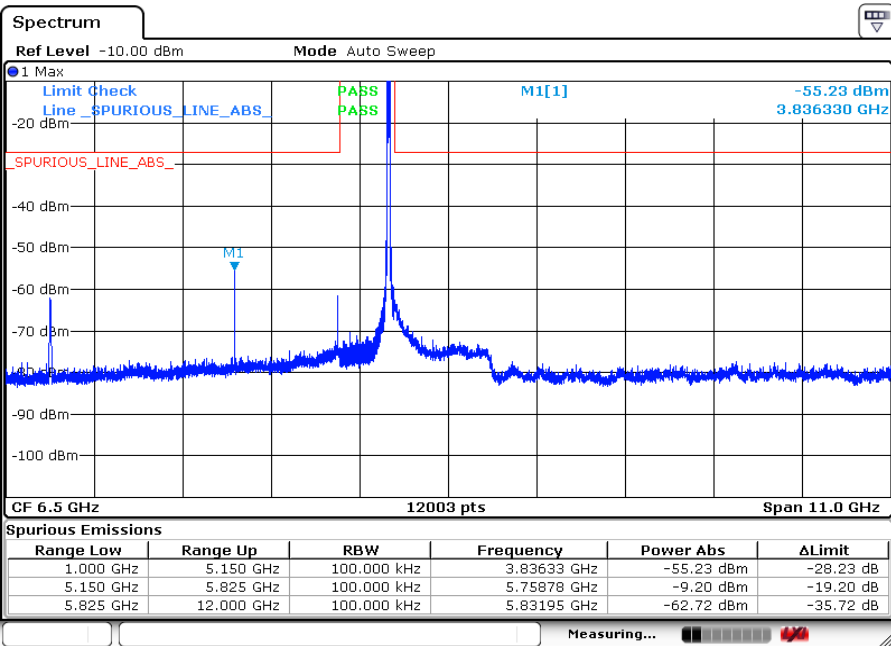
00077



14.4 Trace data of band-edge-802.11n HT40 (159ch)

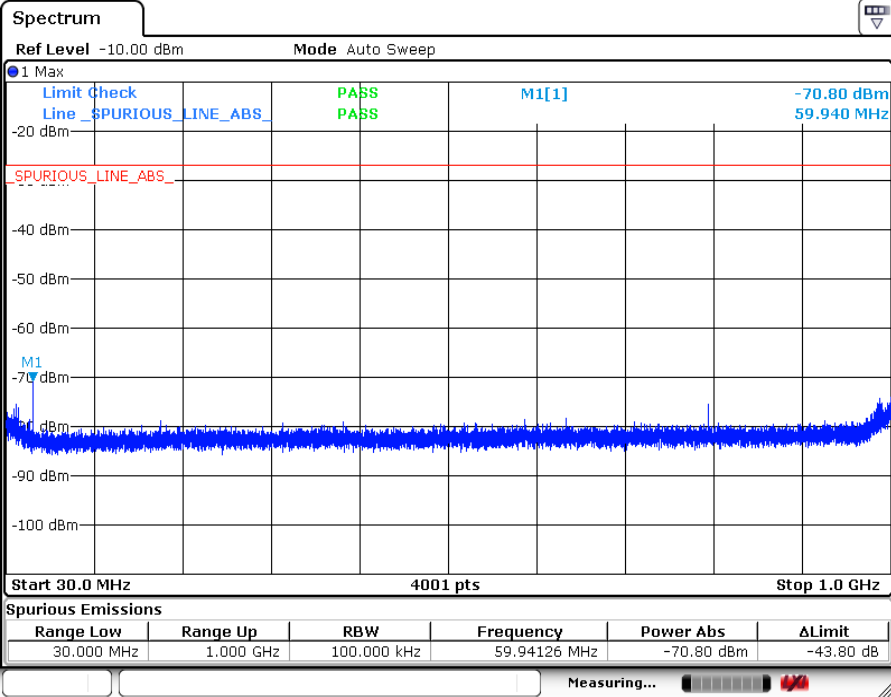


00077

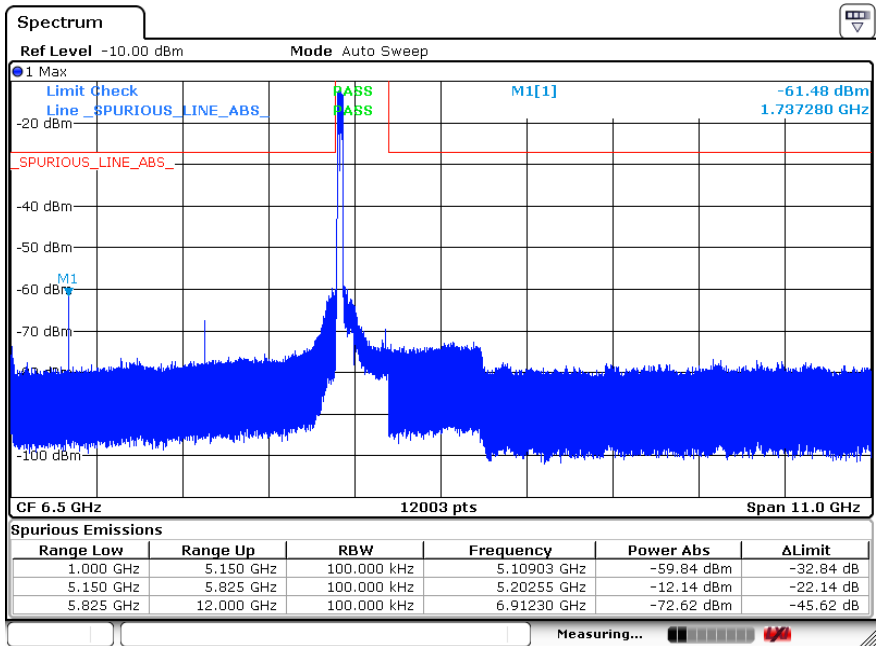


00077

14.4 Trace data of band-edge-802.11ac VHT80 (42ch)

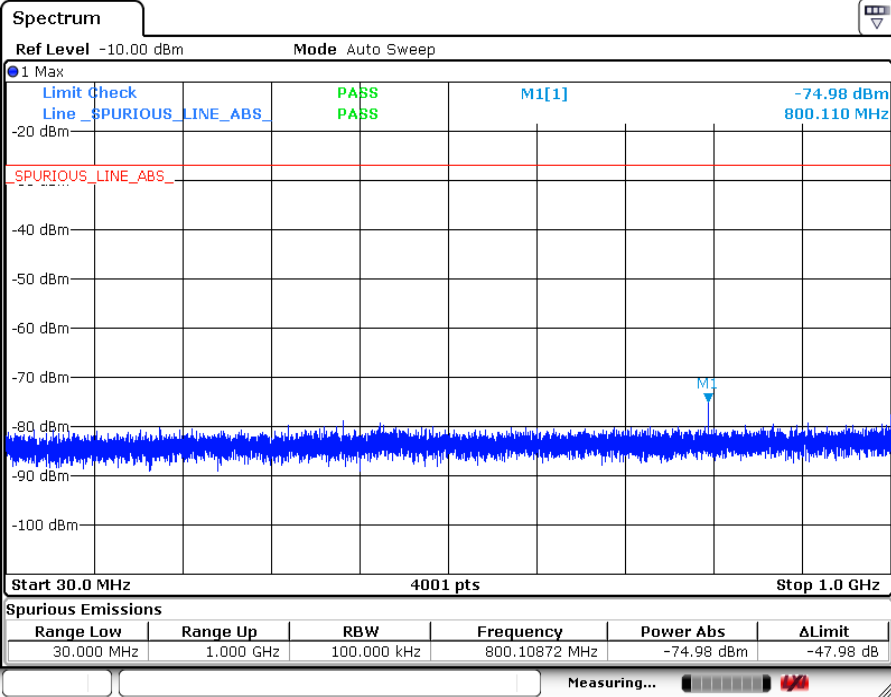


00077

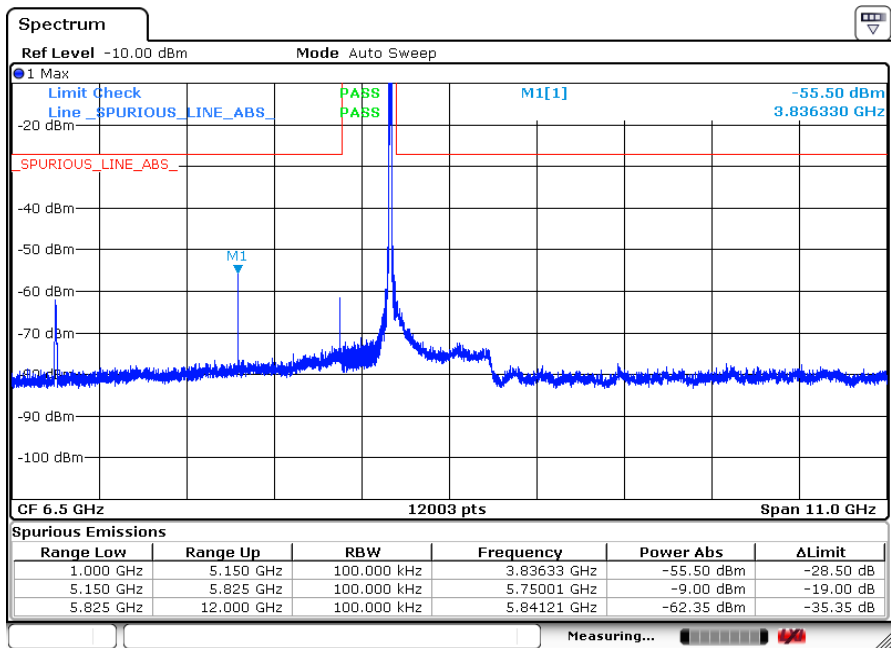


00077

14.4 Trace data of band-edge-802.11ac VHT80 (155ch)



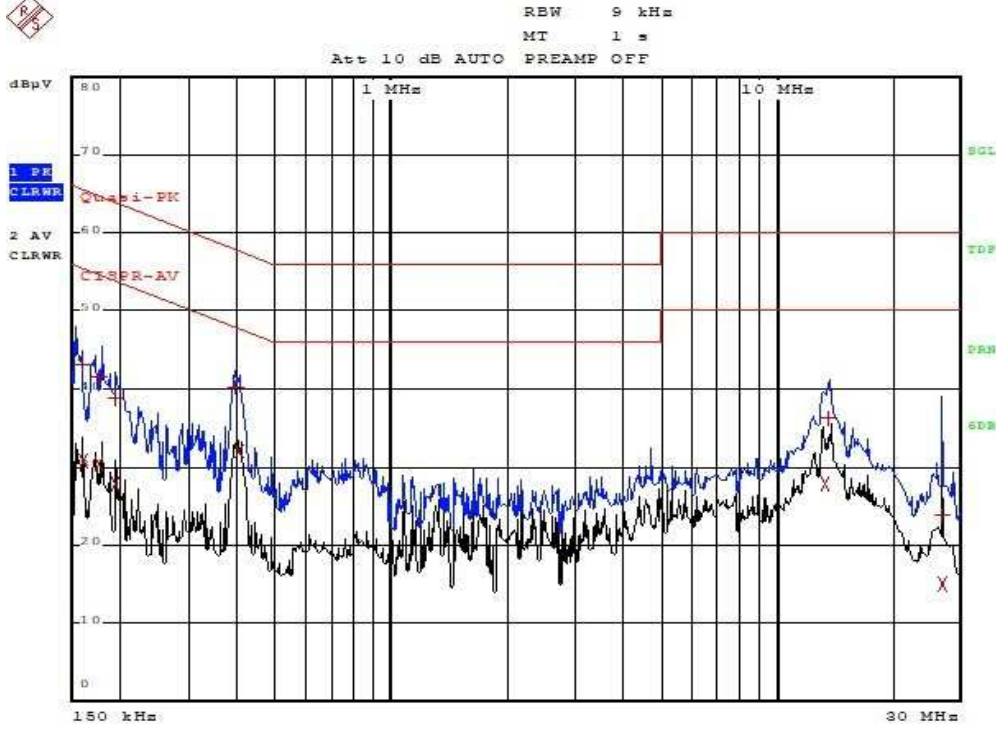
00077



00077

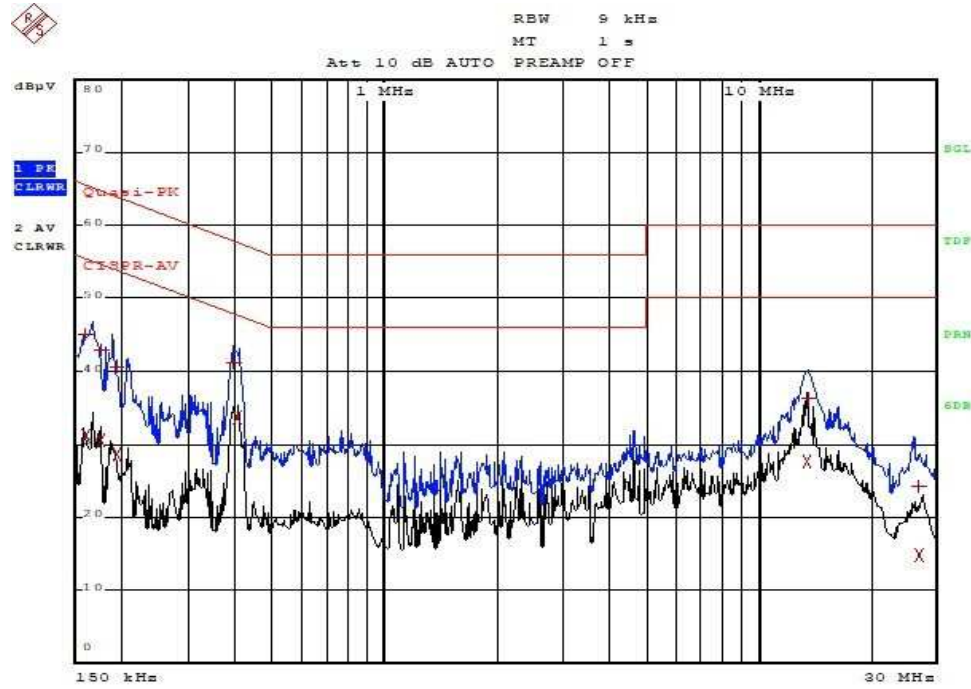
Appendix 1. Special diagram for Wireless LAN

- * 802.11a
- * HOT LINE



Comment: ESTR-20-00077_11A_HOT

- * NEUTRAL LINE

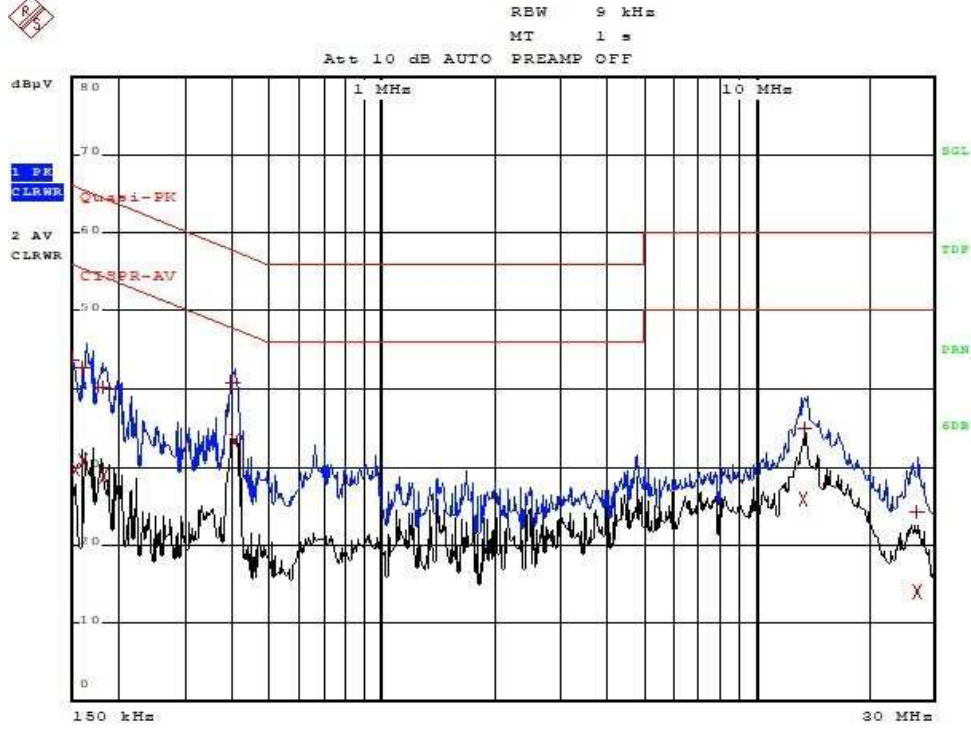


Comment: ESTR-20-00077_11A_NEUTRAL

Appendix 1. Special diagram for Wireless LAN

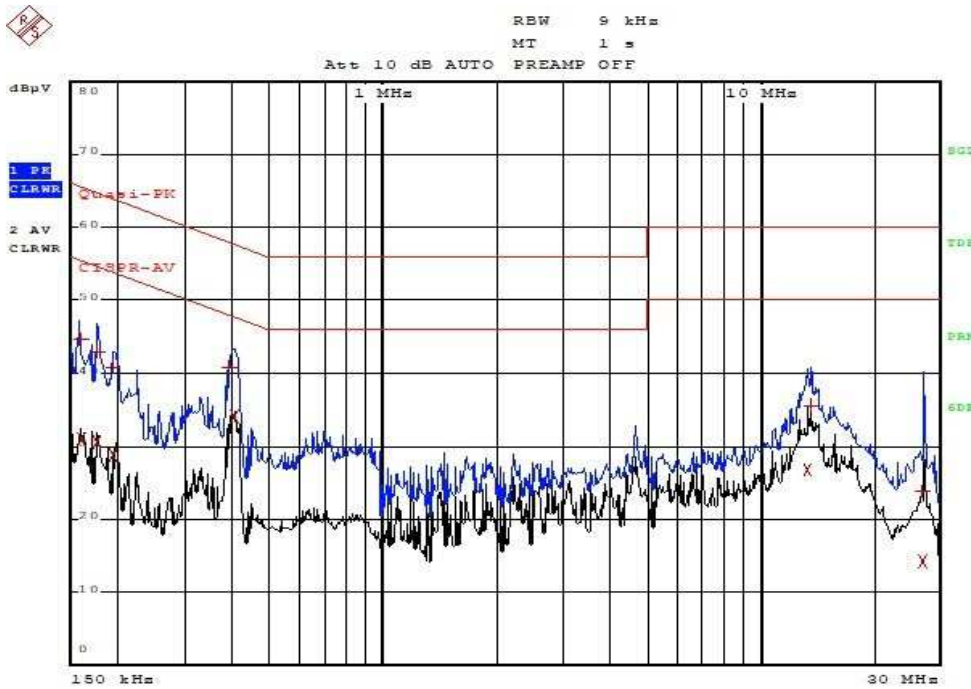
* 802.11n HT20

* HOT LINE



Comment: ESTR-20-00077_11A_HT20_HOT

* NEUTRAL LINE

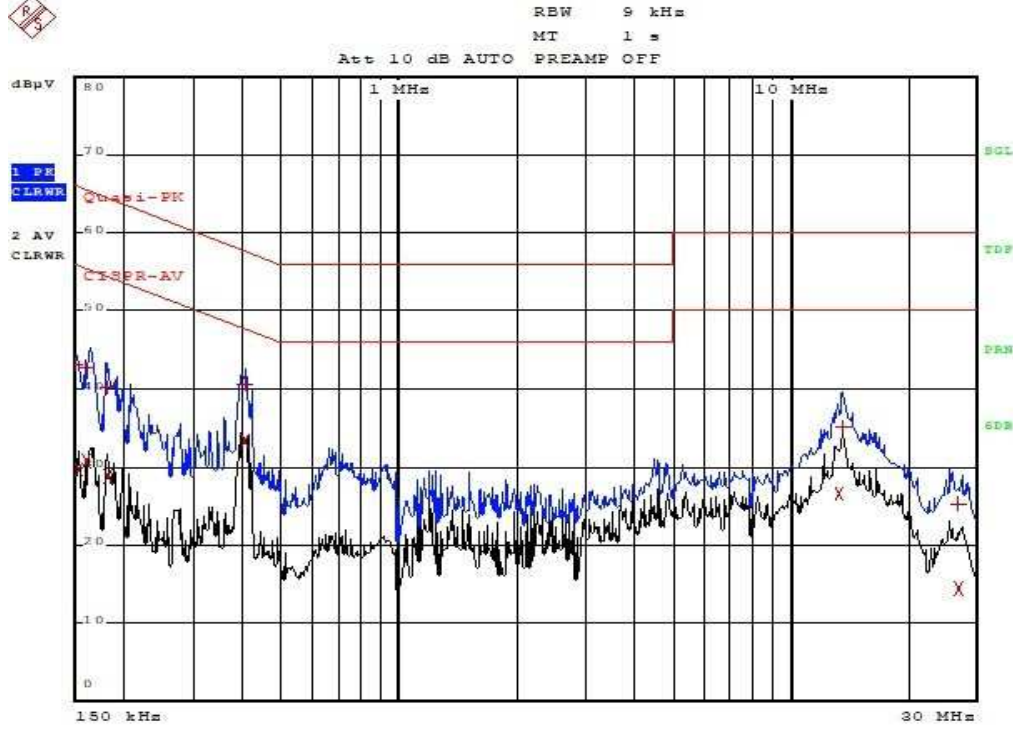


Comment: ESTR-20-00077_11A_HT20_NEUTRAL

Appendix 1. Special diagram for Wireless LAN

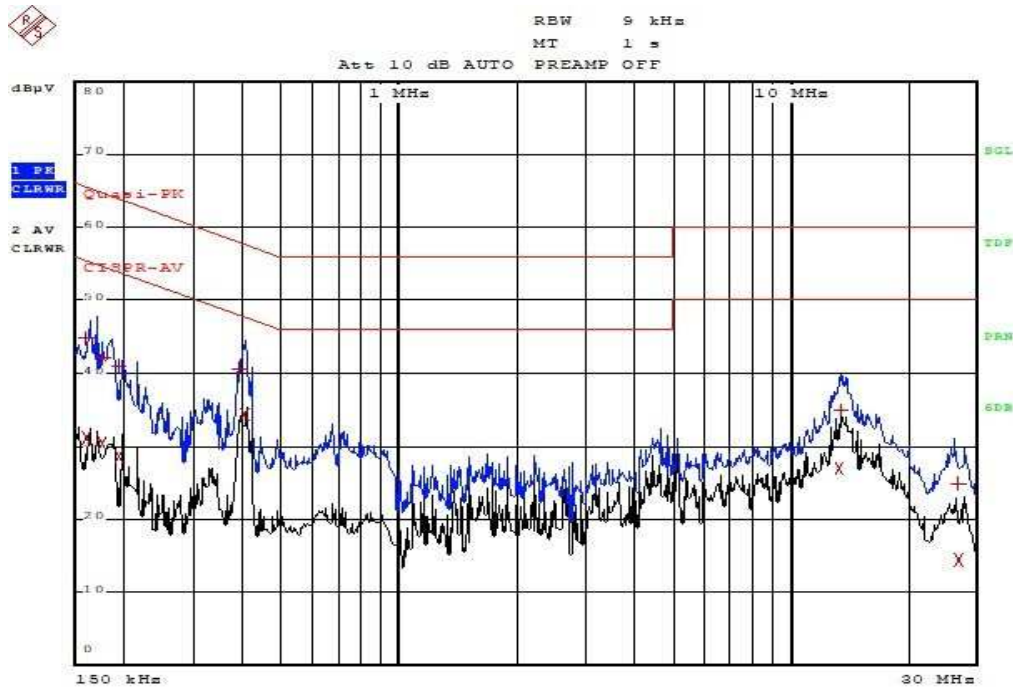
* 802.11n HT40

* HOT LINE



Comment: ESTR-20-00077_11A_HT40_HOT

* NEUTRAL LINE

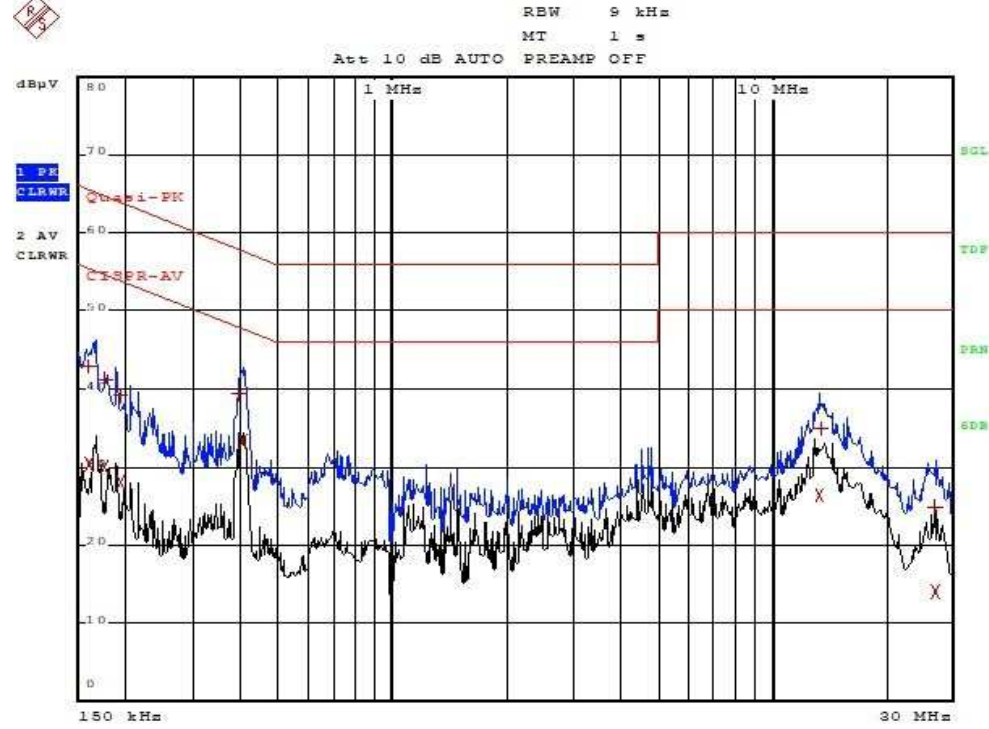


Comment: ESTR-20-00077_11A_HT40_NEUTRAL

Appendix 1. Special diagram for Wireless LAN

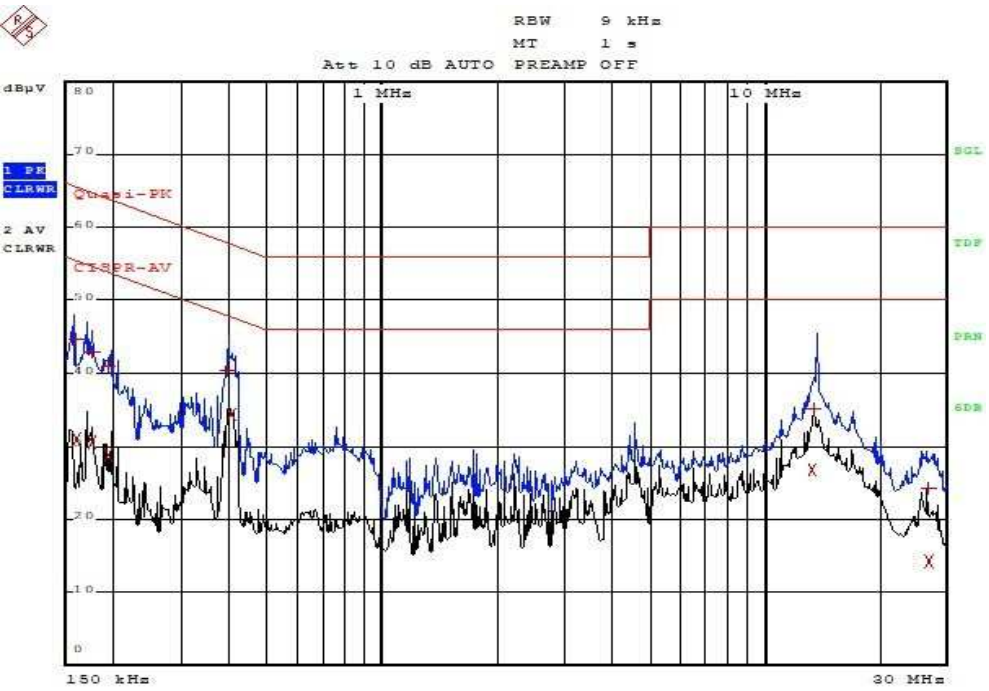
* 802.11ac VHT80

* HOT LINE



Comment: ESTR-20-00077_11A_AC80_HOT

* NEUTRAL LINE



Comment: ESTR-20-00077_11A_AC80_NEUTRAL

Appendix 2. Antenna Requirement

1. Antenna Requirement

antenna type : WIFI Dual Band ANTENNA.

antenna location : Integral

antenna gain : 3.812 dBi

No temporary RF connector provided