FCC Part 15.407

TEST REPORT

For

Actiontec Electronics Inc.

3301 Olcott St. Santa Clara, CA 95054

FCC ID: LNQT3270S

Report Type: Original Report	**Product Type:** Bonded VDSL Wireless AC Gateway Router

Report Producer : Kaylee Chiang

Report Number : RXZ190708006-00C

Report Date : 2019-09-17

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Revision History

Revision	No.	Report Number	Issue Date	Description	Author/ Revised by
1.0	RXZ190708006	RXZ190708006-00C	**Error! Reference source not found.**7	Original Report	Kaylee Chiang

TABLE OF CONTENTS

1 General Information

1.1 Product Description for Equipment under Test (EUT)

Applicant	Actiontec Electronics Inc.
	3301 Olcott St. Santa Clara, CA 95054
Manufacturer	Actiontec Electronics Inc.
	3301 Olcott St. Santa Clara, CA 95054
Brand(Trade) Name	Actiontec
Product (Equipment)	Bonded VDSL Wireless AC Gateway Router
Main Model Name	T3270S
Series Model Name	T3270
Model Discrepancy	The major electrical and mechanical constructions of series models are identical to the basic model, except T3270S has 1 of SFP interface, and T3270 has it removed. The model, T3270S is the testing sample, and the final test data are shown on this test report.
Frequency Range	5150 MHz ~ 5250 MHz, 5250 MHz ~ 5350 MHz, 5470 MHz ~ 5725 MHz, 5745 MHz ~ 5850 MHz
Transmit Power	IEEE 802.11a Mode: 29.34dBm (0.859W) IEEE802.11ac VHT20 Mode: 29.41dBm (0.872W) IEEE 802.11ac VHT40 Mode: 29.27dBm (0.845W) IEEE 802.11ac VHT80 Mode: 29.39dBm (0.868W)
Modulation Technique	IEEE 802.11a Mode: OFDM IEEE 802.11ac VHT 20 Mode: OFDM IEEE 802.11ac VHT 40 Mode: OFDM IEEE 802.11ac VHT 80 Mode: OFDM
Transmit Data Rate	IEEE 802.11a Mode: 54~6 Mbps IEEE 802.11ac VHT20 Mode: MCS 0~9 IEEE 802.11ac VHT40 Mode: MCS 0~9 IEEE 802.11ac VHT80 Mode: MCS 0~9

Number of Channels	For UNII-1 Band I: IEEE 802.11a / IEEE802.11ac VHT20 Mode: 4 Channels IEEE 802.11ac VHT40 Mode: 2 Channels IEEE 802.11ac VHT80 Mode: 1 Channels For UNII-2A Band II: IEEE 802.11a / IEEE802.11ac VHT20 Mode: 4 Channels IEEE 802.11ac VHT40 Mode: 2 Channels IEEE 802.11ac VHT80 Mode: 1 Channels For UNII-2C Band III: IEEE 802.11a / IEEE802.11ac VHT20 Mode: 12 Channels IEEE 802.11ac VHT40 Mode: 6 Channels IEEE 802.11ac VHT80 Mode: 3 Channels For UNII-3 Band IV: IEEE 802.11a / IEEE802.11ac VHT20 Mode: 5 Channels IEEE 802.11ac VHT40 Mode: 2 Channels IEEE 802.11ac VHT80 Mode: 1 Channels
Antenna Specification	Ant1: PIFA Antenna / 3.9 dBi Ant2: PIFA Antenna / 3.3 dBi Ant3: PIFA Antenna / 2.0 dBi Ant4: PIFA Antenna / 1.9 dBi
Power Operation (Voltage Range)	☒ AC 120V/60Hz ☒ Adapter Brand: Actiontec Model: CDS024T-W120U I/P: 120Vac, 50/60Hz, 0.58A O/P: 12Vdc, 2A ☐ By AC Power Cord ☐ PoE
	☐ DC Type ☐ Battery ☐ DC Power Supply ☐ External from USB Cable ☐ External DC Adapter
	☐ Host System
Received Date	Jul 08, 2019
Date of Test	Jul 16, 2019 ~ Jul 30, 2019

**All measurement and test data in this report was gathered from production sample serial number: 190708006 (Assigned by BACL, Taiwan).*

1.2 Objective

This report is prepared on behalf of *Actiontec Electronics Inc.* in accordance with Part 2, Subpart J, Part 15, Subparts A, C and E of the Federal Communication Commission's rules.

The tests were performed in order to determine compliance with FCC Part 15, Subpart E, and section 15.203, 15.205, 15.207, 15.209 and 15.407 rules.

1.3 Related Submittal(s)/Grant(s)

FCC Part 15.247 DTS submission with FCC ID: LNQT3270S

1.4 Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

KDB 662911 D01 Multiple Transmitter Output v02r01

KDB 789033 D02 General U-NII Test Procedures New Rules v02r01

1.5 Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Taiwan) to collect test data is located on

☒70, Lane 169, Sec. 2, Datong Road, Xizhi Dist., New Taipei City 22183, Taiwan, R.O.C.

☐68-3, Lane 169, Sec. 2, Datong Road, Xizhi Dist., New Taipei City 22183, Taiwan, R.O.C.

Bay Area Compliance Laboratories Corp. (Taiwan) Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code: 3180) and the FCC designation No.TW3180 under the Mutual Recognition Agreement (MRA) in FCC Test. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.10.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 974454. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

2 System Test Configuration

2.1 Description of Test Configuration

The system was configured for testing in an engineering mode, which is provided by manufacture.

The system support 802.11a/n ht20/n ht40/ac vht20/ac vht40/ac vht80, the ht20/ht40 were reduced since the identical parameters with 802.11ac vht20 and vht40.

For 5150 ~ 5250MHz

4 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
36	5180	44	5220
40	5200	48	5240

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
38	5190	46	5230

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency (MHz)
42	5210

For 5250 ~ 5350MHz

4 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
52	5260	60	5300
56	5280	64	5320

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
54	5270	62	5310

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency (MHz)
58	5290

For 5470 ~ 5725MHz

11 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
100	5500	124	5620
104	5520	128	5640
108	5540	132	5660
112	5560	136	5680
116	5580	140	5700
120	5600	144	5720

5 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
102	5510	126	5630
110	5550	134	5670
118	5590	142	5710

2 channels are provided for 802.11ac (VHT80):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
106	5530	138	5690
122	5610		

For 5725 ~ 5850MHz:

5 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
149	5745	161	5805
153	5765	165	5825
157	5785		

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
151	5755	159	5795

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency (MHz)
155	5775

2.2 Equipment Modifications

No modification was made to the EUT.

2.3 Test Mode

Mode: Full System (Model: T3270S) tested all measure item.

2.4 EUT Exercise Software

The EUT was programmed to be in continuously transmitting mode.

UNII Band	Mode	Channel	Frequency (MHz)	Power setting
UNII-1	802.11a	36	5180	21
		40	5200	21
		48	5240	21
UNII-2A		52	5260	14
		60	5300	14
		64	5320	14
UNII-2C		100	5500	13
		116	5580	13
		140	5700	13
		144	5720	13
UNII-3		149	5745	21
		157	5785	21
		165	5825	21
UNII-1	802.11n 20 / ac20	36	5180	21
		40	5200	21
		48	5240	21
UNII-2A		52	5260	14
		60	5300	14
		64	5320	14
UNII-2C		100	5500	13
		116	5580	13
		140	5700	13
		144	5720	13
UNII-3		149	5745	21
		157	5785	21
		165	5825	21
UNII-1	802.11n 40 / ac 40	38	5190	21
		46	5230	21
UNII-2A		54	5270	15
		62	5310	15
UNII-2C		102	5510	15
		118	5590	15
		134	5670	15
		142	5710	15
UNII-3		151	5755	21
		159	5795	21
UNII-1	802.11ac 80	42	5210	21
UNII-2A		58	5290	15
UNII-2C		106	5530	15
		122	5610	15
		138	5690	15
UNII-3		155	5775	21

The EUT was configured for testing in an engineering mode which was provided by the manufacturer. The worst-case data rates are determined to be as follows for each mode based upon investigations by measuring the average power and PSD across all data rates bandwidths, and modulations.

2.5 Support Equipment List and Details

Description	Manufacturer	Model Number	BSMI	FCC ID	S/N
Adapter	Actiontec	CDS024T-W120U	N/A	N/A	N/A

2.6 External Cable List and Details

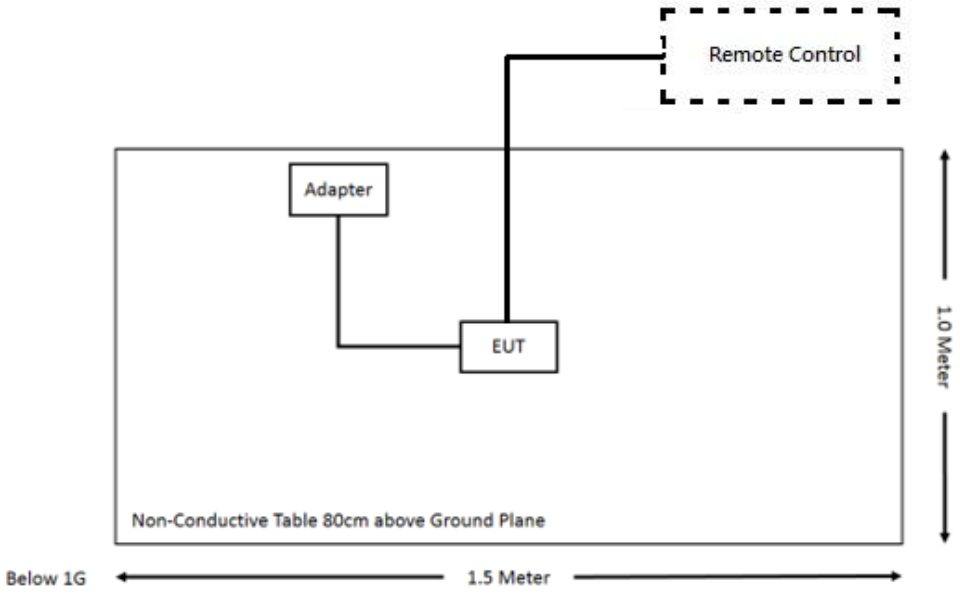
Cable Description	Length (m)	From	To
N/A	N/A	N/A	N/A

2.7 Block Diagram of Test Setup

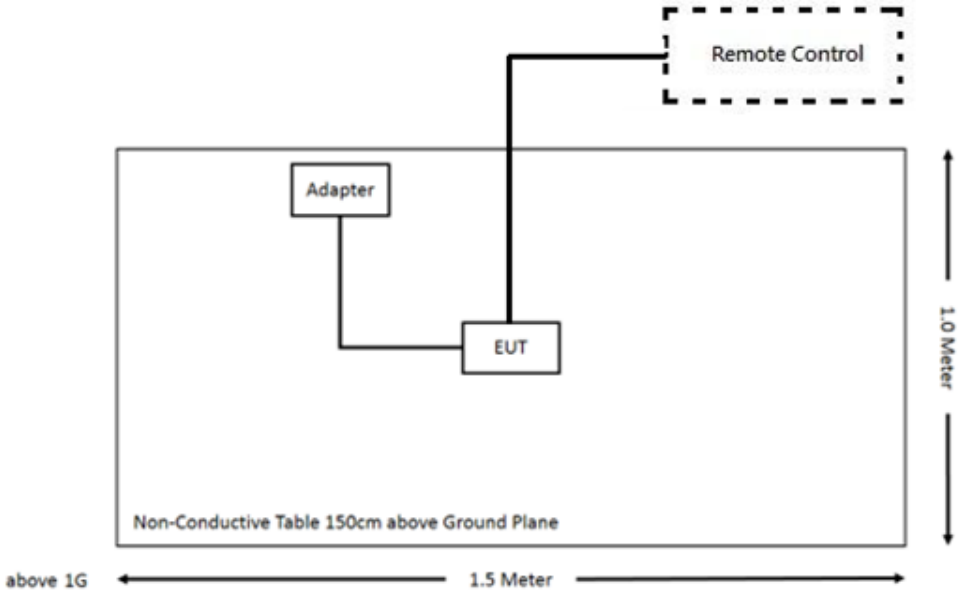
See test photographs attached in setup photos for the actual connections between EUT and support equipment.

Radiation:

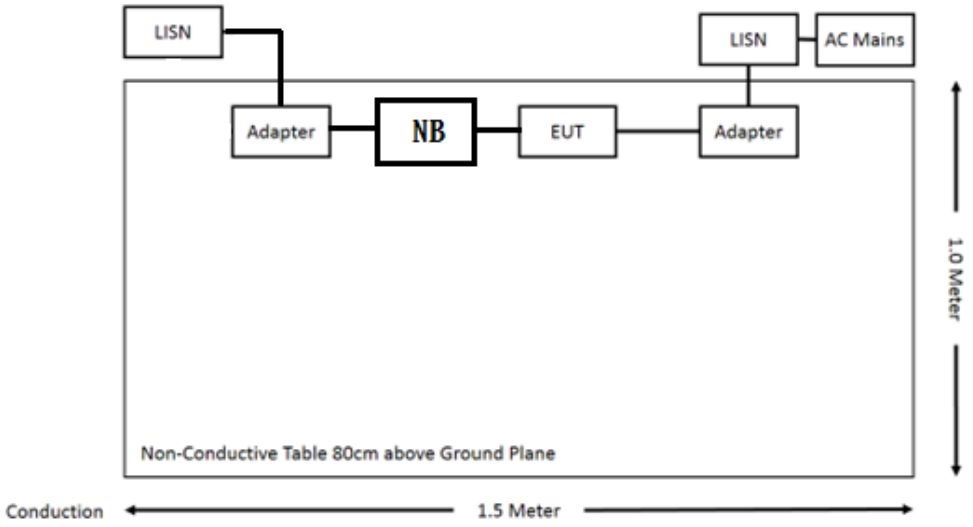
Below 1GHz:



Above 1GHz:



Conduction:



2.8 Duty Cycle

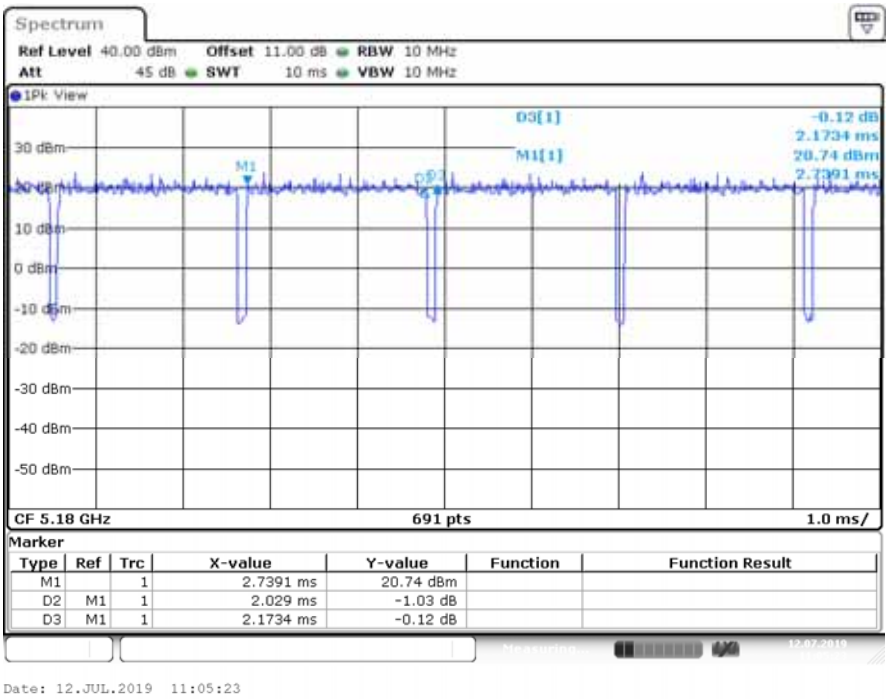
According to KDB 789033 D02 General U-NII Test Procedures New Rules v02r01 section B: Measurements of duty cycle, x, and maximumpower transmission duration, T, are required for each tested mode of operation.

Radio Mode	On Time (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)
CDD Mode				
802.11a	2.03	2.17	94	0.27
802.11ac20	1.87	2.01	93	0.32
802.11ac40	0.88	0.98	90	0.46
802.11ac80	0.44	0.47	94	0.27

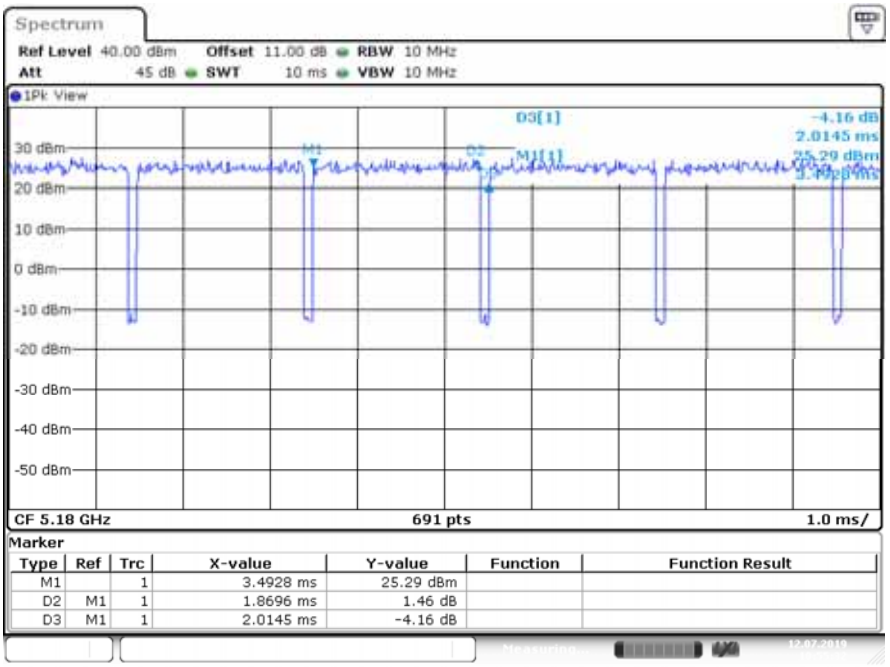
Note: Duty Cycle Correction Factor = 10*log(1/duty cycle)

Please refer to the following plots.

A Mode



AC20 Mode



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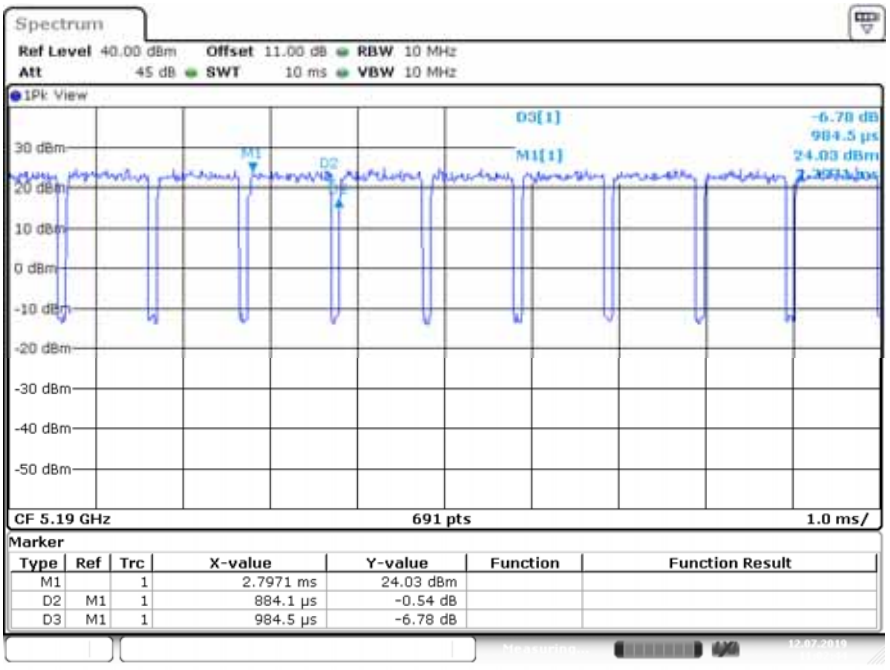
AC40 Mode



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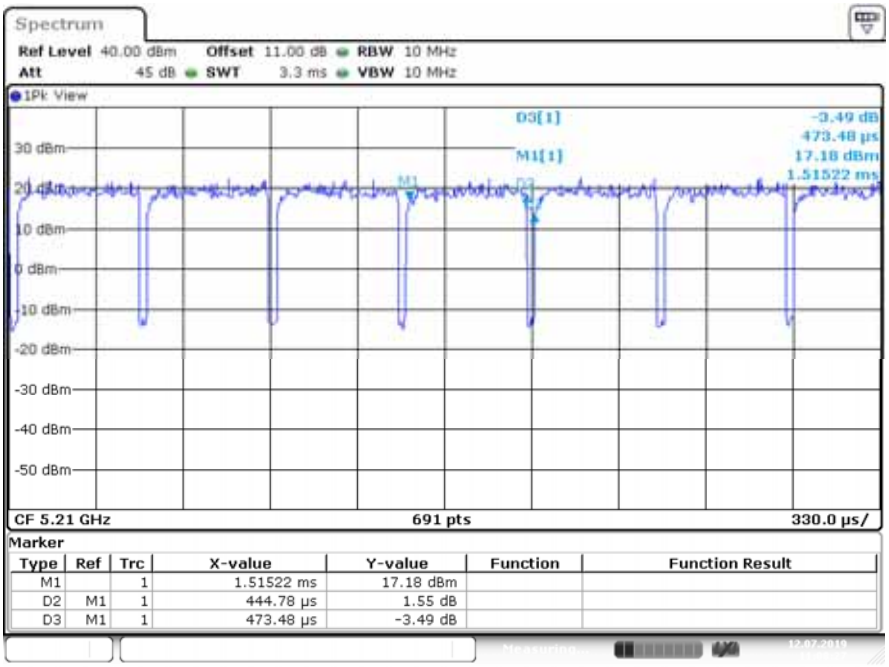
AC80 Mode



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3 Summary of Test Results

FCC Rules	Description of Test	Results
§15.407(f), §1.1310, §2.1091	Maximum Permissible Exposure (MPE)	Compliance
§15.203	Antenna Requirement	Compliance
§15.407(b)(6) & §15.207(a)	AC Line Conducted Emissions	Compliance
§15.205 & §15.209 & §15.407(b)(1),(2),(3),(4),(6),(7)	Unwanted Emission	Compliance
§15.407(a)(e)	Emission Bandwidth	Compliance
§15.407(a)(1),(2),(3)	Conducted Transmitter Output Power	Compliance
§15.407(a)(1),(2),(3)	Power Spectral Density	Compliance

4 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due Date
AC Line Conduction Room (CON-A)					
LISN	Rohde & Schwarz	ENV216	101612	2019/02/21	2020/02/20
LISN	Rohde & Schwarz	ENV216	101248	2019/06/26	2020/06/25
EMI Test Receiver	Rohde & Schwarz	ESR7	101419	2018/10/23	2019/10/22
Pulse Limiter	Rohde & Schwarz	ESH3Z2	TXZEM104	2018/08/03	2019/08/02
RF Cable	EMEC	EM-CB5D	001	2019/07/01	2020/06/30
Software	AUDIX	E3	V9.150826k	N.C.R	N.C.R
Radiated Room (966-A)					
Bilog Antenna with 6 dB Attenuator	SUNOL SCIENCES & MINI-CIRCUITS	JB6/UNAT-6+	A050115/15542_01	2018/12/11	2019/12/10
Horn Antenna	EMCO	SAS-571	1020	2019/04/17	2020/04/16
Horn Antenna	ETS-Lindgren	3116	62638	2018/08/29	2019/08/28
Preamplifier	Sonoma	310N	130602	2019/06/26	2020/06/25
Preamplifier	EM Electronics Corp.	EM01G18G	060657	2018/12/07	2019/12/06
Microware Preamplifier	EM Electronics Corporation	EM18G40G	060656	2019/01/11	2020/01/10
EMI Test Receiver	Rohde & Schwarz	ESR7	101419	2018/10/23	2019/10/22
Spectrum Analyzer	Rohde & Schwarz	FSV40	101435	2019/02/13	2020/02/12
Micro flex Cable	UTIFLEX	FSCM 64639 / (2M)	93D0127	2018/07/31	2019/07/30
Micro flex Cable	UTIFLEX	UFA210A-1-3149-300300	MFR64639 226389-001	2018/11/16	2019/11/15
Micro flex Cable	ROSNOL	K1K50-UP0264-K1K50-450CM	160309-1	2019/03/04	2020/03/03
Micro flex Cable	ROSNOL	K1K50-UP0264-K1K50-80CM	160309-2	2019/01/16	2020/01/15
Turn Table	Champro	TT-2000	060772-T	N.C.R	N.C.R
Antenna Tower	Champro	AM-BS-4500-B	060772-A	N.C.R	N.C.R
Controller	Champro	EM1000	60772	N.C.R	N.C.R
Software	Farad	EZ_EMC	BACL-03A1	N.C.R	N.C.R

Description	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due Date
Conducted Room					
Spectrum Analyzer	Rohde & Schwarz	FSV40	101140	2018/11/22	2019/11/21
Cable	WOKEN	SFL402	S02-160323-07	2019/02/11	2020/02/10
Power Sensor	KEYSIGHT	U2021XA	MY54080018	2019/03/06	2020/03/05
Attenuator	MINI-CIRCUITS	BW-S10W5+	N/A	2019/03/07	2020/03/07

***Statement of Traceability:** BACL Corp. attests that all of the calibrations on the equipment items listed above were traceable to the SI System of Units via the R.O.C. Center for Measurement Standards of the Electronics Testing Center, Taiwan (ETC) or to another internationally recognized National Metrology Institute (NMI), and were compliant with the current Taiwan Accreditation Foundation (TAF) requirements*

5 FCC §15.407(f), §1.1310, § 2.1091 - Maximum Permissible Exposure (MPE)

5.1 Applicable Standard

According to§15.407(f) and §1.1310, U-NII devices are subject to the radio frequency radiation exposure requirements specified in §§ 1.1307(b), and 2.1091 of this chapter, as appropriate. All equipment shall be considered to operate in a "general population/uncontrolled" environment. Applications for equipment authorization of devices operating under this section must contain a statement confirming compliance with these requirements for both fundamental emissions and unwanted emissions. Technical information showing the basis for this statement must be submitted to the Commission upon request.

5.2 RF Exposure Evaluation Result

FCC

Worse case:

MPE evaluation for single transmission:

Mode	Frequency Range (MHz)	Antenna Gain		Target Power		Evaluation Distance (cm)	Power Density (mW/cm^2)	MPE Limit (mW/cm^2)
		(dBi)	(numeric)	(dBm)	(mW)			
2.4G WIFI	2412-2462	4.85	3.055	30	1000	30	0.2701	1.0
5G WIFI B1	5150-5250	5.52	3.565	29.5	891.251	30	0.2809	1.0
5G WIFI B2	5250-5350	5.83	3.828	24	251.189	30	0.0850	1.0
5G WIFI B3	5470-5725	4.85	3.055	24	251.189	30	0.0678	1.0
5G WIFI B4	5725-5825	4.85	3.055	30	1000	30	0.2701	1.0

Note: the maximum antenna gain was used for evaluation.

MPE evaluation for simultaneous transmission:

2.4G WIFI and 5G WIFI can transmit at the same time, MPE evaluation is as below formula:

PD1/Limit1+PD2/Limit2+……＜1, PD (Power Density)

MPE evaluation = MPE of 2.4G WIFI/1 + MPE of 5G WIFI/1 = 0.2701/1+0.2809/1=0.551＜1.0

Result: MPE evaluation of single and simultaneous transmission meet 30cm the requirement of standard.

6 FCC §15.203 – Antenna Requirements

6.1 Applicable Standard

According to § 15.203,

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited.

And according to FCC 47 CFR section 15.247 (b), if the transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna does not exceed 6dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

6.2 Antenna List and Details

Frequency Range (MHz)	PCB No. and Gain (dBi)				Correlated Gain (dBi)
	DB1	DB2	DB3	DB4	
5150	3.9	2.1	-10.8	-3.9	5.52
5250	3.5	1.9	-10.9	-4.6	5.15
5350	3.7	3.3	-7.9	-5.8	5.83
5725	3.6	-0.4	-4.6	-7.0	4.85
5825	-8.0	-5.5	2.0	1.9	4.67

The EUT has four integral antenna arrangement, which was permanently attached; fulfill the requirement of this section.

Result: Compliance

7 FCC §15.407(b)(6) & § 15.207(a) – AC Line Conducted Emissions

7.1 Applicable Standard

As per FCC §15.407(a) (6)

Further, any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in §15.207

As per FCC §15.207

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal.

The lower limit applies at the boundary between the frequencies ranges.

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-Peak	Average
0.15-0.5	66 to 56 Note 1	56 to 46 Note 2
0.5-5	56	46
5-30	60	50

Note 1: Decreases with the logarithm of the frequency.

Note 2: A linear average detector is required

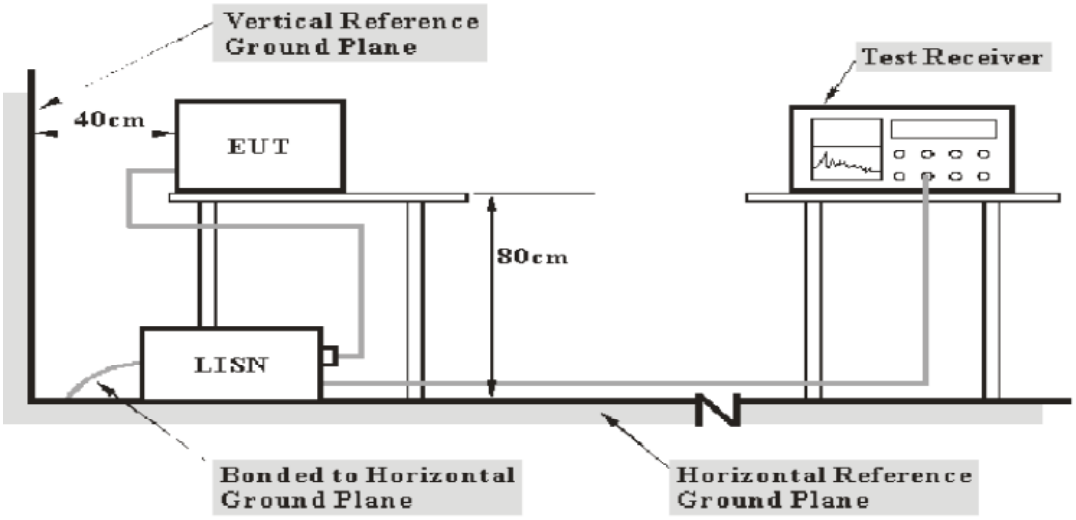
7.2 Measurement Uncertainty

Input quantities to be considered for conducted disturbance measurements maybe receiver reading, attenuation of the connection between LISN/ISN and receiver, LISN/ISN voltage division factor, LISN/ISN VDF frequency interpolation and receiver related input quantities, etc.

Based on CISPR 16-4-2:2011, the expended combined standard uncertainty of conducted disturbance test at Bay Area Compliance Laboratories Corp. (Taiwan) is shown as below. And the uncertainty will not be taken into consideration for the test data recorded in the report.

Port	Expanded Measurement uncertainty
AC Mains	2.71 dB (k=2, 95% level of confidence)

7.3 EUT Setup



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.207 limits.

7.4 EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150kHz to 30MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations

Frequency Range	IF B/W
150kHz – 30MHz	9kHz

7.5 Test Procedure

During the conducted emission test, the adapter was connected to the outlet of the LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

7.6 Corrected Factor & Margin Calculation

The factor is calculated by adding LISN/ISN VDF (Voltage Division Factor), Cable Loss and Transient Limiter Attenuation. The basic equation is as follows:

Factor = LISN VDF + Cable Loss + Transient Limiter Attenuation

The "Over Limit" column of the following data tables indicates the degree of compliance with the applicable limit. For example, an over limit of -7 dB means the emission is 7 dB below the limit. The equation for Over Limit calculation is as follows:

Over Limit = Level – Limit Line

7.7 Environmental Conditions

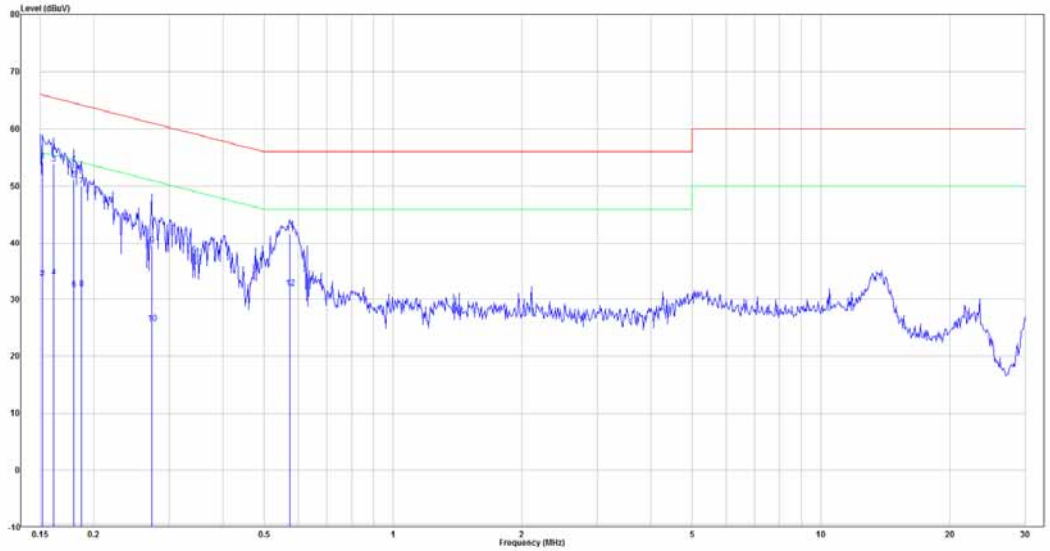
Temperature:	26 ℃
Relative Humidity:	40 %
ATM Pressure:	1009 hPa

The testing was performed by Woods Chen on 2019-07-31.

7.8 Test Results

Test Mode: Transmitting

Main: AC120 V, 60 Hz, Line



No.	Frequency	Reading	Correct	Result	Limit	Over limit	Remark
	(MHz)	(dBµV)	Factor(dB)	(dBµV)	(dBµV)	(dB)	
1	0.152	44.65	9.60	54.25	65.92	-11.67	QP
2	0.152	24.16	9.60	33.76	55.92	-22.16	Average
3	0.161	44.31	9.60	53.91	65.42	-11.51	QP
4	0.161	24.32	9.60	33.92	55.42	-21.50	Average
5	0.179	41.56	9.59	51.15	64.51	-13.36	QP
6	0.179	22.20	9.59	31.79	54.51	-22.72	Average
7	0.187	40.47	9.59	50.06	64.18	-14.12	QP
8	0.187	22.30	9.59	31.89	54.18	-22.29	Average
9	0.273	30.05	9.59	39.64	61.03	-21.39	QP
10	0.273	16.16	9.59	25.75	51.03	-25.28	Average
11	0.573	32.11	9.61	41.72	56.00	-14.28	QP
12	0.573	22.45	9.61	32.06	46.00	-13.94	Average

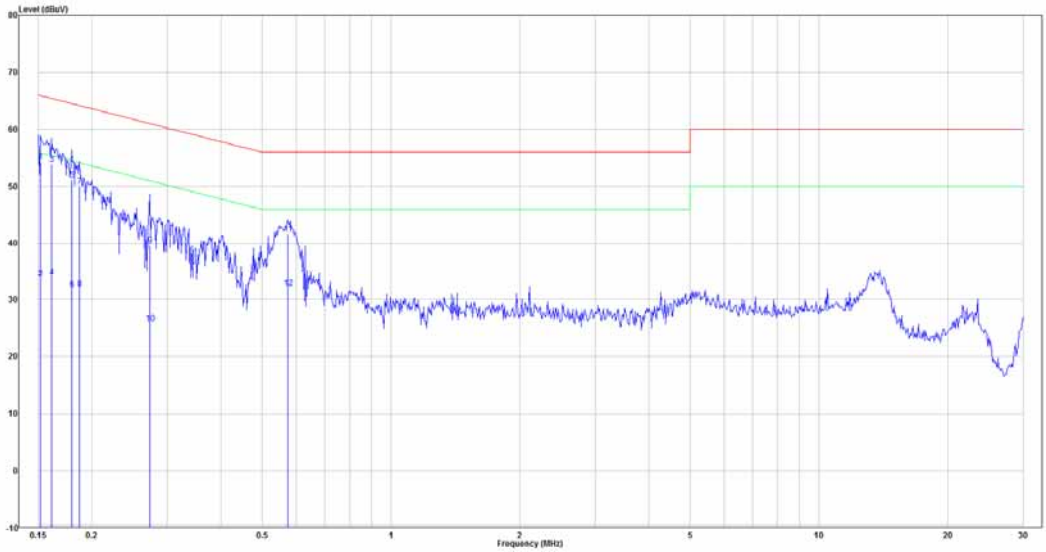
Note:

Level = Read Level + Factor

Over Limit = Level – Limit Line

Factor = (LISN, ISN, PLC or current probe) Factor + Cable Loss + Attenuator

Main: AC120 V, 60 Hz, Neutral



No.	Frequency	Reading	Correct	Result	Limit	Over limit	Remark
	(MHz)	(dBµV)	Factor(dB)	(dBµV)	(dBµV)	(dB)	
1	0.151	44.33	9.61	53.94	65.96	-12.02	QP
2	0.151	23.49	9.61	33.10	55.96	-22.86	Average
3	0.158	44.36	9.61	53.97	65.59	-11.62	QP
4	0.158	24.41	9.61	34.02	55.59	-21.57	Average
5	0.169	42.19	9.60	51.79	65.01	-13.22	QP
6	0.169	22.87	9.60	32.47	55.01	-22.54	Average
7	0.178	40.81	9.60	50.41	64.59	-14.18	QP
8	0.178	21.49	9.60	31.09	54.59	-23.50	Average
9	0.579	30.29	9.61	39.90	56.00	-16.10	QP
10	0.579	20.09	9.61	29.70	46.00	-16.30	Average
11	13.247	20.84	9.88	30.72	60.00	-29.28	QP
12	13.247	14.19	9.88	24.07	50.00	-25.93	Average

Note:

Level = Read Level + Factor

Over Limit = Level – Limit Line

Factor = (LISN, ISN, PLC or current probe) Factor + Cable Loss + Attenuator

8 FCC §15.209, §15.205 , §15.407(b)(1),(2),(3),(4),(6),(7) – Spurious Emissions

8.1 Applicable Standard

As Per FCC §15.205(a) except as show in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 – 0.110	16.42 – 16.423	960 – 1240	4. 5 – 5. 15
0.495 – 0.505	16.69475 – 16.69525	1300 – 1427	5. 35 – 5. 46
2.1735 – 2.1905	25.5 – 25.67	1435 – 1626.5	7.25 – 7.75
4.125 – 4.128	37.5 – 38.25	1645.5 – 1646.5	8.025 – 8.5
4.17725 – 4.17775	73 – 74.6	1660 – 1710	9.0 – 9.2
4.20725 – 4.20775	74.8 – 75.2	1718.8 – 1722.2	9.3 – 9.5
6.215 – 6.218	108 – 121.94	2200 – 2300	10.6 – 12.7
6.26775 – 6.26825	123 – 138	2310 – 2390	13.25 – 13.4
6.31175 – 6.31225	149.9 – 150.05	2483.5 – 2500	14.47 – 14.5
8.291 – 8.294	156.52475 – 156.52525	2690 – 2900	15.35 – 16.2
8.362 – 8.366	156.7 – 156.9	3260 – 3267	17.7 – 21.4
8.37625 – 8.38675	162.0125 –167.17	3.332 – 3.339	22.01 – 23.12
8.41425 – 8.41475	167.72 – 173.2	3 3458 – 3 358	23.6 – 24.0
12.29 – 12.293	240 – 285	3.600 – 4.400	31.2 – 31.8
12.51975 – 12.52025	322 – 335.4		36.43 – 36.5
12.57675 – 12.57725	399.9 – 410		Above 38.6
13.36 – 13.41	608 – 614		

As per FCC §15.209(a): Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (micro volts/meter)	Measurement Distance (meters)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100**	3
88 - 216	150**	3
216 - 960	200**	3
Above 960	500	3

Note 1: Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

As per FCC Part 15.407 (b)

(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

(2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz

(3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

(4) For transmitters operating in the 5.725-5.85 GHz band: All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

(5) The emission measurements shall be performed using a minimum resolution bandwidth of 1 MHz. A lower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 1 MHz.

(6) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209. Further, any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in §15.207.

(7) The provisions of §15.205 apply to intentional radiators operating under this section.

8.2 Measurement Uncertainty

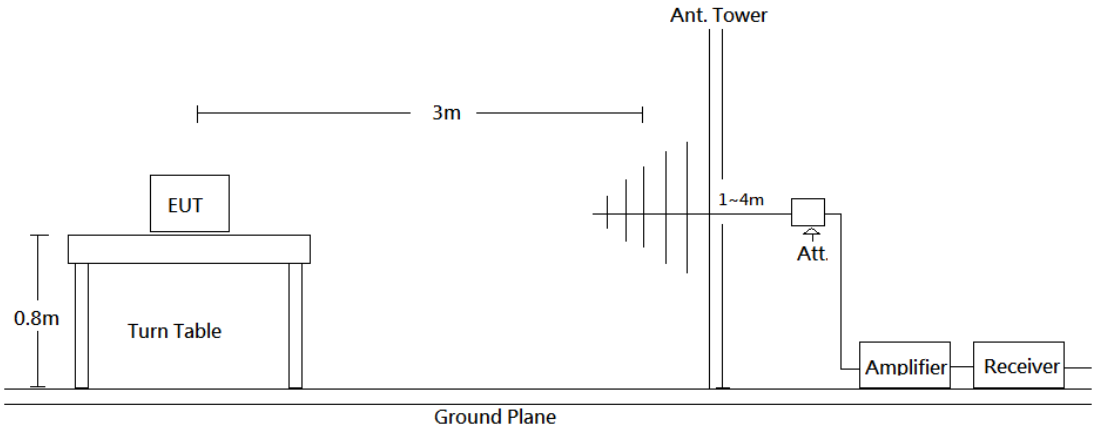
All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on CISPR 16-4-2:2011, the expended combined standard uncertainty of radiation emissions at Bay Area Compliance Laboratories Corp. (Taiwan) is shown in below table. And the uncertainty will not be taken into consideration for the test data recorded in the report.

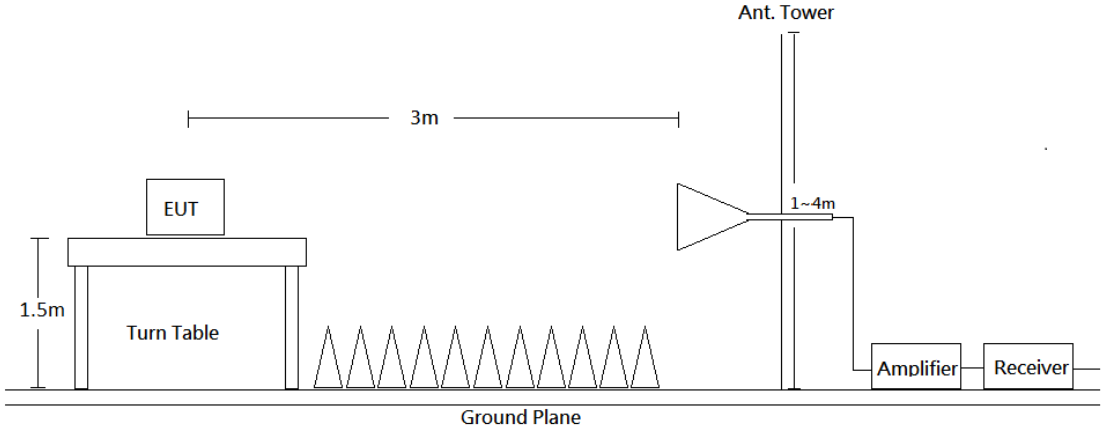
Frequency	Measurement uncertainty
30 MHz~200 MHz	3.75 dB (k=2, 95% level of confidence)
200 MHz~1 GHz	4.21 dB (k=2, 95% level of confidence)
1 GHz~6 GHz	4.83 dB (k=2, 95% level of confidence)
6 GHz~18 GHz	5.18 dB (k=2, 95% level of confidence)
18 GHz~26 GHz	4.55 dB (k=2, 95% level of confidence)
26 GHz~40 GHz	4.67 dB (k=2, 95% level of confidence)

8.3 EUT Setup

Below 1 GHz:



Above 1 GHz:



Radiated emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC Part 15.209 and FCC 15.407 Limits.

8.4 EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 26.5 GHz. During the radiated emission test, the EMI test receiver was set with the following configurations measurement method 6.3 in ANSI C63.10.

Frequency Range	RBW	VBW	Detector	Duty cycle	Measurement method
30-1000 MHz	120 kHz	/	QP		QP
Above 1 GHz	1 MHz	3 MHz	PK		PK
	1 MHz	3 MHz	RMS	>98%	Ave
	1 MHz	1/T	PK	<98%	Ave

8.5 Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

All data was recorded in the Quasi-peak detector mode from 30 MHz to 1 GHz and PK and average detector modes for frequencies above 1 GHz.

According to C63.10-2013, emission shall be computed as: E [dBμV/m] = EIRP[dBm] + 95.2, for d = 3 meters.

Frequency Band 5150~5250 MHz, EIRP Limit -27(dBm/MHz)

Equivalent Field Strength at 3m is 68.23 dBμV/m

Frequency Band 5725~5850 MHz, EIRP is all emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

Equivalent Field Strength at 3m is all emissions shall be limited to a level of 68.2 dBμV/m at 75 MHz or more above or below the band edge increasing linearly to 105.2 dBμV/m at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 110.8 dBμV/m at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 122.2 dBμV/m at the band edge.

According to ANSI C63.10-2013: For field strength measurements made at other than the distance at which the applicable limit is specified,extrapolate the measured field strength to the field strength at the distance specified by the limit using an inverse distance correction factor (20 dB/decade of distance). In some cases, a different distance correction factor may be required;

$$E_{\mathrm{SpecLimit}} = E_{\mathrm{Meas}} + 20\log\left(\frac{d_{\mathrm{Meas}}}{d_{\mathrm{SpecLimit}}}\right)$$

where

$E_{\mathrm{SpecLimit}}$ is the field strength of the emission at the distance specified by the limit, in dBµV/m
E_{Meas} is the field strength of the emission at the measurement distance, in dBµV/m
d_{Meas} is the measurement distance, in m
$d_{\mathrm{SpecLimit}}$ is the distance specified by the limit, in m

So the extrapolation factor of 1m is 20*log (1/3) = -9.5 dB

8.6 Corrected Factor & Margin Calculation

The Correct Factor is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain

The “Margin” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7 dB means the emission is 7 dB below the limit. The equation for margin calculation is as follows:

Margin = Result – Limit

8.7 Test Results Summary

According to the data in the following table, the EUT complied with the FCC §15.407 Limit.

8.8 Environmental Conditions

Temperature:	23-25 ℃
Relative Humidity:	50-60 %
ATM Pressure:	1010 hPa

The Radiation Spurious Emissions testing was performed by David Lee on 2019-07-16 ~ 2019-07-19.

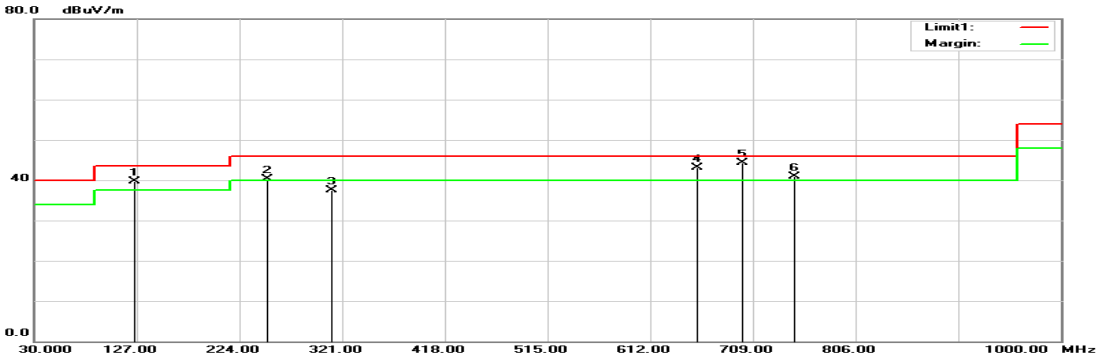
8.9 Test Results

Test Mode: Transmitting

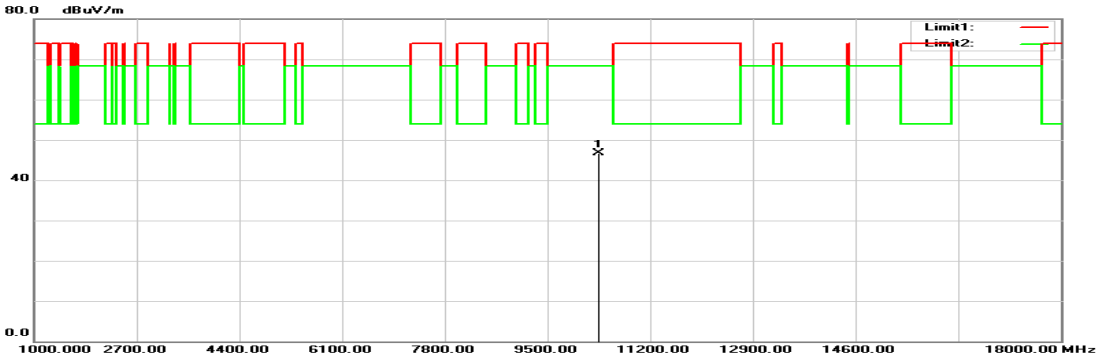
(Pre-scan with three orthogonal axis, and worse case as Y axis.)

Horizontal (*worst case is Wi-Fi a mode 5785MHz)*

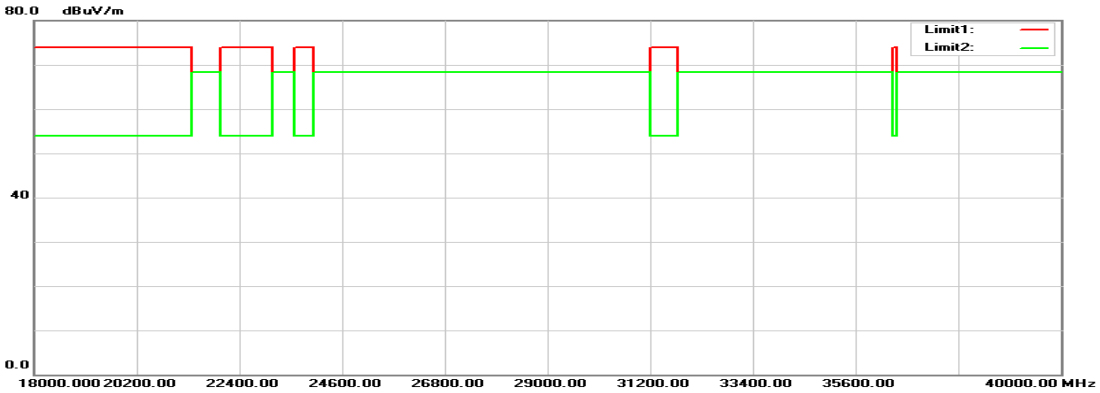
30MHz-1GHz:



1GHz-18GHz:

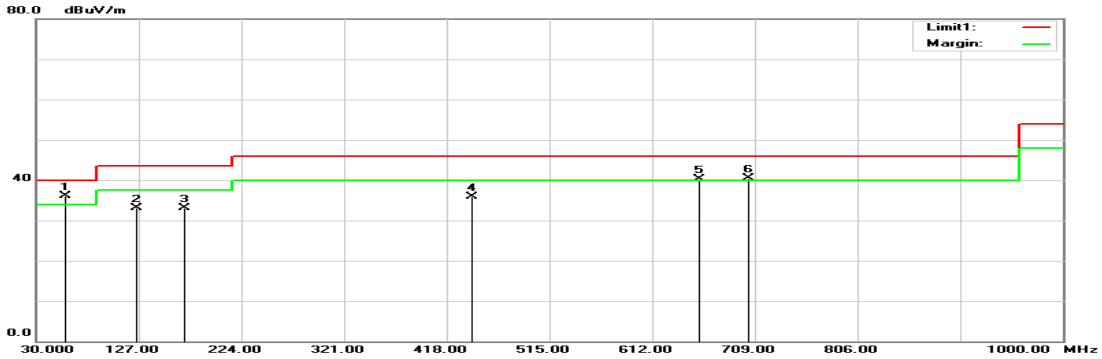


18GHz-40GHz:

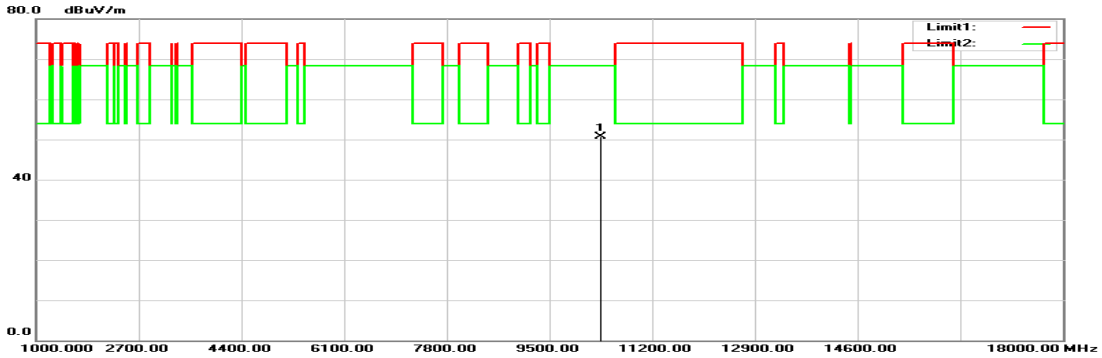


Vertical (*worst case is Wi-Fi a mode 5785MHz*)

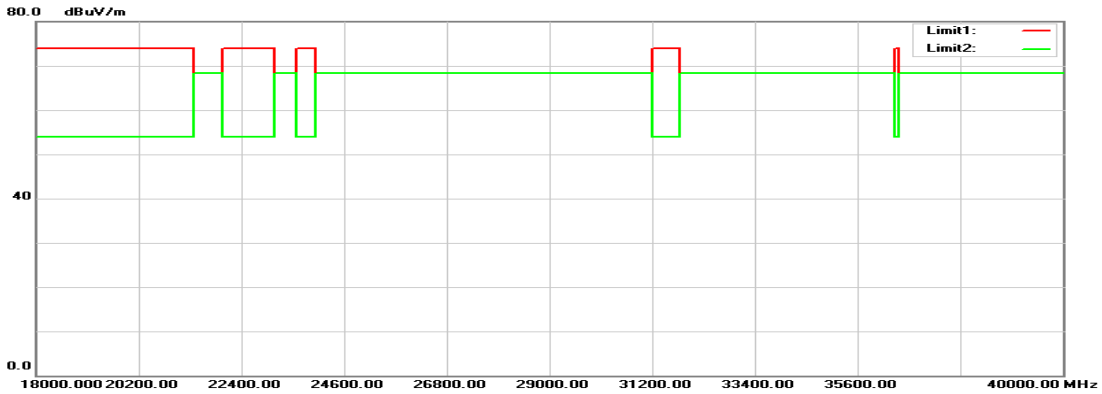
30MHz-1GHz:



1GHz-18GHz:



18GHz-40GHz:



Below 1GHz

Horizontal

Frequency (MHz)	Reading (dBµV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
125.0600	48.91	-9.27	39.64	43.50	-3.86	100	44	QP
250.1900	50.58	-10.22	40.36	46.00	-5.64	100	171	QP
311.3000	45.20	-7.74	37.46	46.00	-8.54	100	156	QP
656.6200	45.89	-2.84	43.05	46.00	-2.95	100	251	QP
699.3000	46.58	-2.34	44.24	46.00	-1.76	100	256	QP
748.7700	42.87	-1.90	40.97	46.00	-5.03	100	256	QP

Vertical

Frequency (MHz)	Reading (dBµV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
58.1300	52.80	-16.61	36.19	40.00	-3.81	100	235	QP
125.0600	42.33	-9.27	33.06	43.50	-10.44	100	107	QP
169.6800	43.82	-10.65	33.17	43.50	-10.33	100	137	QP
442.2500	41.17	-5.31	35.86	46.00	-10.14	100	94	QP
656.6200	43.15	-2.84	40.31	46.00	-5.69	100	230	QP
703.1800	42.79	-2.30	40.49	46.00	-5.51	100	1	QP

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.

For UNII-1 Band I:

Above 1GHz

Horizontal

Frequency (MHz)	Reading (dBµV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
a Mode, Low channel								
5150.000	56.43	3.91	60.34	74.00	-13.66	300	276	peak
5150.000	43.03	3.91	46.94	54.00	-7.06	300	276	AVG
5180.000	100.57	3.74	104.31	N/A	N/A	300	98	peak
5180.000	90.78	3.74	94.52	N/A	N/A	300	98	AVG
10360.000	32.32	14.38	46.70	68.23	-21.53	100	251	peak
a Mode, Middle channel								
5200.000	100.19	3.64	103.83	N/A	N/A	300	96	peak
5200.000	89.72	3.64	93.36	N/A	N/A	300	96	AVG
10400.000	34.36	14.57	48.93	68.23	-19.30	100	145	peak
a Mode, High channel								
5240.000	98.53	3.11	101.64	N/A	N/A	300	94	peak
5240.000	88.54	3.11	91.65	N/A	N/A	300	94	AVG
5350.000	52.11	3.04	55.15	74.00	-18.85	300	69	peak
5350.000	38.32	3.04	41.36	54.00	-12.64	300	69	AVG
10480.000	32.40	14.71	47.11	68.23	-21.12	100	142	peak

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.

Vertical

Frequency (MHz)	Reading (dBµV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
a Mode, Low channel								
5150.000	58.20	3.91	62.11	74.00	-11.89	200	324	peak
5150.000	40.04	3.91	43.95	54.00	-10.05	200	324	AVG
5180.000	103.35	3.74	107.09	N/A	N/A	200	306	peak
5180.000	93.47	3.74	97.21	N/A	N/A	200	306	AVG
10360.000	36.23	14.38	50.61	68.23	-17.62	100	120	peak
a Mode, Middle channel								
5200.000	103.43	3.64	107.07	N/A	N/A	200	299	peak
5200.000	92.31	3.64	95.95	N/A	N/A	200	299	AVG
10400.000	29.92	14.57	44.49	68.23	-23.74	100	337	peak
a Mode, High channel								
5240.000	103.18	3.11	106.29	N/A	N/A	200	302	peak
5240.000	92.16	3.11	95.27	N/A	N/A	200	302	AVG
5350.000	52.23	3.04	55.27	74.00	-18.73	200	179	peak
5350.000	38.41	3.04	41.45	54.00	-12.55	200	179	AVG
10480.000	37.70	14.71	52.41	68.23	-15.82	100	77	peak

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.

Horizontal

Frequency (MHz)	Reading (dBµV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
ac20 Mode, Low channel								
5150.000	58.57	3.91	62.48	74.00	-11.52	300	132	peak
5150.000	39.19	3.91	43.10	54.00	-10.90	300	132	AVG
5180.000	98.80	3.74	102.54	N/A	N/A	300	95	peak
5180.000	89.13	3.74	92.87	N/A	N/A	300	95	AVG
10360.000	30.00	14.38	44.38	68.23	-23.85	100	0	peak
ac20 Mode, Middle channel								
5200.000	99.08	3.64	102.72	N/A	N/A	300	95	peak
5200.000	88.39	3.64	92.03	N/A	N/A	300	95	AVG
10400.000	32.13	14.57	46.70	68.23	-21.53	100	84	peak
ac20 Mode, High channel								
5240.000	98.34	3.11	101.45	N/A	N/A	300	93	peak
5240.000	88.21	3.11	91.32	N/A	N/A	300	93	AVG
5350.000	52.20	3.04	55.24	74.00	-18.76	300	32	peak
5350.000	38.04	3.04	41.08	54.00	-12.92	300	32	AVG
10480.000	34.14	14.71	48.85	68.23	-19.38	100	146	peak

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.

Vertical

Frequency (MHz)	Reading (dBµV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
ac20 Mode, Low channel								
5150.000	61.30	3.91	65.21	74.00	-8.79	200	317	peak
5150.000	40.52	3.91	44.43	54.00	-9.57	200	317	AVG
5180.000	101.54	3.74	105.28	N/A	N/A	200	311	peak
5180.000	92.00	3.74	95.74	N/A	N/A	200	311	AVG
10360.000	35.89	14.38	50.27	68.23	-17.96	100	76	peak
ac20 Mode, Middle channel								
5200.000	102.48	3.64	106.12	N/A	N/A	200	305	peak
5200.000	90.96	3.64	94.60	N/A	N/A	200	305	AVG
10400.000	34.77	14.57	49.34	68.23	-18.89	100	278	peak
ac20 Mode, High channel								
5240.000	102.05	3.11	105.16	N/A	N/A	200	301	peak
5240.000	91.09	3.11	94.20	N/A	N/A	200	301	AVG
5350.000	51.79	3.04	54.83	74.00	-19.17	200	304	peak
5350.000	38.46	3.04	41.50	54.00	-12.50	200	304	AVG
10480.000	34.96	14.71	49.67	68.23	-18.56	100	101	peak

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.

Horizontal

Frequency (MHz)	Reading (dBµV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
ac40 Mode, Low channel								
5150.000	65.92	3.91	69.83	74.00	-4.17	300	248	peak
5150.000	43.18	3.91	47.09	54.00	-6.91	300	248	AVG
5190.000	94.35	3.69	98.04	N/A	N/A	300	93	peak
5190.000	85.63	3.69	89.32	N/A	N/A	300	93	AVG
10380.000	29.81	14.48	44.29	68.23	-23.94	100	306	peak
ac40 Mode, High channel								
5230.000	94.80	3.24	98.04	N/A	N/A	300	96	peak
5230.000	85.64	3.24	88.88	N/A	N/A	300	96	AVG
5350.000	52.04	3.04	55.08	74.00	-18.92	300	167	peak
5350.000	38.38	3.04	41.42	54.00	-12.58	300	167	AVG
10460.000	30.96	14.68	45.64	68.23	-22.59	100	209	peak

Vertical

Frequency (MHz)	Reading (dBµV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
ac40 Mode, Low channel								
5150.000	69.08	3.91	72.99	74.00	-1.01	200	312	peak
5150.000	45.98	3.91	49.89	54.00	-4.11	200	312	AVG
5190.000	98.77	3.69	102.46	N/A	N/A	200	310	peak
5190.000	88.82	3.69	92.51	N/A	N/A	200	310	AVG
10380.000	31.33	14.48	45.81	68.23	-22.42	100	182	peak
ac40 Mode, High channel								
5230.000	98.19	3.24	101.43	N/A	N/A	200	314	peak
5230.000	88.14	3.24	91.38	N/A	N/A	200	314	AVG
5350.000	52.35	3.04	55.39	74.00	-18.61	200	294	peak
5350.000	38.80	3.04	41.84	54.00	-12.16	200	294	AVG
10460.000	32.80	14.68	47.48	68.23	-20.75	100	349	peak

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.

Horizontal

Frequency (MHz)	Reading (dBµV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
ac80 Mode, Middle channel								
5150.000	63.41	3.91	67.32	74.00	-6.68	300	57	peak
5150.000	43.65	3.91	47.56	54.00	-6.44	300	57	AVG
5210.000	92.15	3.51	95.66	N/A	N/A	300	96	peak
5210.000	82.76	3.51	86.27	N/A	N/A	300	96	AVG
5350.000	51.84	3.04	54.88	74.00	-19.12	300	123	peak
5350.000	38.88	3.04	41.92	54.00	-12.08	300	123	AVG
10420.000	30.16	14.60	44.76	68.23	-23.47	100	108	peak

Vertical

Frequency (MHz)	Reading (dBµV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
ac80 Mode, Middle channel								
5150.000	68.34	3.91	72.25	74.00	-1.75	200	168	peak
5150.000	46.76	3.91	50.67	54.00	-3.33	200	168	AVG
5210.000	95.66	3.51	99.17	N/A	N/A	200	311	peak
5210.000	86.13	3.51	89.64	N/A	N/A	200	311	AVG
5350.000	51.97	3.04	55.01	74.00	-18.99	200	235	peak
5350.000	39.40	3.04	42.44	54.00	-11.56	200	235	AVG
10420.000	32.11	14.60	46.71	68.23	-21.52	100	104	peak

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.

For UNII-2A Band II:

Above 1GHz

Horizontal

Frequency (MHz)	Reading (dBµV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
a Mode, Low channel								
5150.000	51.81	3.91	55.72	74.00	-18.28	300	266	peak
5150.000	37.60	3.91	41.51	54.00	-12.49	300	266	AVG
5260.000	91.44	2.92	94.36	N/A	N/A	300	98	peak
5260.000	81.84	2.92	84.76	N/A	N/A	300	98	AVG
10520.000	30.57	14.79	45.36	68.23	-22.87	100	75	peak
a Mode, Middle channel								
5300.000	91.80	2.71	94.51	N/A	N/A	300	94	peak
5300.000	80.82	2.71	83.53	N/A	N/A	300	94	AVG
10600.000	34.49	14.98	49.47	68.23	-18.76	100	84	peak
10600.000	20.76	14.98	35.74	54.00	-18.26	100	84	AVG
a Mode, High channel								
5320.000	92.29	2.85	95.14	N/A	N/A	300	94	peak
5320.000	81.60	2.85	84.45	N/A	N/A	300	94	AVG
5350.000	52.21	3.04	55.25	74.00	-18.75	300	246	peak
5350.000	38.30	3.04	41.34	54.00	-12.66	300	246	AVG
10640.000	34.51	14.96	49.47	74.00	-24.53	100	167	peak
10640.000	20.81	14.96	35.77	54.00	-18.23	100	167	AVG

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.
Peak limit value meets both sections 15.205 and 15.407(b) for restricted bands.

Vertical

Frequency (MHz)	Reading (dBµV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
a Mode, Low channel								
5150.000	51.61	3.91	55.52	74.00	-18.48	200	299	peak
5150.000	37.72	3.91	41.63	54.00	-12.37	200	299	AVG
5260.000	96.03	2.92	98.95	N/A	N/A	200	304	peak
5260.000	86.01	2.92	88.93	N/A	N/A	200	304	AVG
10520.000	30.59	14.79	45.38	68.23	-22.85	100	329	peak
a Mode, Middle channel								
5300.000	96.53	2.71	99.24	N/A	N/A	200	302	peak
5300.000	85.51	2.71	88.22	N/A	N/A	200	302	AVG
10600.000	35.60	14.98	50.58	68.23	-17.65	100	314	peak
10600.000	21.00	14.98	35.98	54.00	-18.02	100	314	AVG
a Mode, High channel								
5320.000	96.09	2.85	98.94	N/A	N/A	200	299	peak
5320.000	85.96	2.85	88.81	N/A	N/A	200	299	AVG
5350.000	51.60	3.04	54.64	74.00	-19.36	200	43	peak
5350.000	38.33	3.04	41.37	54.00	-12.63	200	43	AVG
10640.000	34.49	14.96	49.45	74.00	-24.55	100	343	peak
10640.000	21.29	14.96	36.25	54.00	-17.75	100	343	AVG

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.
Peak limit value meets both sections 15.205 and 15.407(b) for restricted bands.

Horizontal

Frequency (MHz)	Reading (dBµV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
ac20 Mode, Low channel								
5150.000	51.04	3.91	54.95	74.00	-19.05	300	154	peak
5150.000	37.58	3.91	41.49	54.00	-12.51	300	154	AVG
5260.000	92.00	2.92	94.92	N/A	N/A	300	59	peak
5260.000	81.28	2.92	84.20	N/A	N/A	300	59	AVG
10520.000	31.70	14.79	46.49	68.23	-21.74	100	157	peak
ac20 Mode, Middle channel								
5300.000	92.02	2.71	94.73	N/A	N/A	300	53	peak
5300.000	80.99	2.71	83.70	N/A	N/A	300	53	AVG
10600.000	34.26	14.98	49.24	68.23	-18.99	100	61	peak
10600.000	20.88	14.98	35.86	54.00	-18.14	100	61	AVG
ac20 Mode, High channel								
5320.000	92.13	2.85	94.98	N/A	N/A	300	92	peak
5320.000	81.95	2.85	84.80	N/A	N/A	300	92	AVG
5350.000	50.78	3.04	53.82	74.00	-20.18	300	77	peak
5350.000	38.09	3.04	41.13	54.00	-12.87	300	77	AVG
10640.000	34.28	14.96	49.24	74.00	-24.76	100	177	peak
10640.000	20.68	14.96	35.64	54.00	-18.36	100	177	AVG

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.
Peak limit value meets both sections 15.205 and 15.407(b) for restricted bands.

Vertical

Frequency (MHz)	Reading (dBµV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
ac20 Mode, Low channel								
5150.000	51.10	3.91	55.01	74.00	-18.99	200	358	peak
5150.000	37.67	3.91	41.58	54.00	-12.42	200	358	AVG
5260.000	95.74	2.92	98.66	N/A	N/A	200	305	peak
5260.000	84.30	2.92	87.22	N/A	N/A	200	305	AVG
10520.000	31.37	14.79	46.16	68.23	-22.07	100	81	peak
ac20 Mode, Middle channel								
5300.000	95.68	2.71	98.39	N/A	N/A	200	302	peak
5300.000	83.93	2.71	86.64	N/A	N/A	200	302	AVG
10600.000	35.04	14.98	50.02	68.23	-18.21	100	115	peak
10600.000	20.98	14.98	35.96	54.00	-18.04	100	115	AVG
ac20 Mode, High channel								
5320.000	95.67	2.85	98.52	N/A	N/A	200	304	peak
5320.000	84.43	2.85	87.28	N/A	N/A	200	304	AVG
5350.000	53.11	3.04	56.15	74.00	-17.85	200	272	peak
5350.000	38.33	3.04	41.37	54.00	-12.63	200	272	AVG
10640.000	35.47	14.96	50.43	74.00	-23.57	100	114	peak
10640.000	21.73	14.96	36.69	54.00	-17.31	100	114	AVG

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.
Peak limit value meets both sections 15.205 and 15.407(b) for restricted bands.

Horizontal

Frequency (MHz)	Reading (dBµV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
ac40 Mode, Low channel								
5150.000	50.99	3.91	54.90	74.00	-19.10	300	17	peak
5150.000	38.01	3.91	41.92	54.00	-12.08	300	17	AVG
5270.000	88.70	2.87	91.57	N/A	N/A	300	95	peak
5270.000	79.47	2.87	82.34	N/A	N/A	300	95	AVG
10540.000	33.75	14.83	48.58	68.23	-19.65	100	213	peak
ac40 Mode, High channel								
5310.000	88.81	2.78	91.59	N/A	N/A	300	96	peak
5310.000	79.63	2.78	82.41	N/A	N/A	300	96	AVG
5350.000	51.39	3.04	54.43	74.00	-19.57	300	60	peak
5350.000	38.48	3.04	41.52	54.00	-12.48	300	60	AVG
10620.000	34.00	14.97	48.97	74.00	-25.03	100	26	peak
10620.000	21.14	14.97	36.11	54.00	-17.89	100	26	AVG

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.

Vertical

Frequency (MHz)	Reading (dBµV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
ac40 Mode, Low channel								
5150.000	51.97	3.91	55.88	74.00	-18.12	200	17	peak
5150.000	38.06	3.91	41.97	54.00	-12.03	200	17	AVG
5270.000	91.82	2.87	94.69	N/A	N/A	200	315	peak
5270.000	81.16	2.87	84.03	N/A	N/A	200	315	AVG
10540.000	35.53	14.83	50.36	68.23	-17.87	100	120	peak
ac40 Mode, High channel								
5310.000	92.00	2.78	94.78	N/A	N/A	200	315	peak
5310.000	81.45	2.78	84.23	N/A	N/A	200	315	AVG
5350.000	51.97	3.04	55.01	74.00	-18.99	200	259	peak
5350.000	39.00	3.04	42.04	54.00	-11.96	200	259	AVG
10620.000	34.90	14.97	49.87	74.00	-24.13	100	1	peak
10620.000	21.18	14.97	36.15	54.00	-17.85	100	1	AVG

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.

Horizontal

Frequency (MHz)	Reading (dBµV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
ac80 Mode, Middle channel								
5150.000	51.43	3.91	55.34	74.00	-18.66	300	178	peak
5150.000	38.48	3.91	42.39	54.00	-11.61	300	178	AVG
5290.000	85.96	2.76	88.72	N/A	N/A	300	137	peak
5290.000	75.32	2.76	78.08	N/A	N/A	300	137	AVG
5350.000	51.87	3.04	54.91	74.00	-19.09	300	215	peak
5350.000	38.92	3.04	41.96	54.00	-12.04	300	215	AVG
10580.000	34.04	14.93	48.97	68.23	-19.26	100	77	peak

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain

Spurious emissions more than 20 dB below the limit were not reported.

Vertical

Frequency (MHz)	Reading (dBµV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
ac80 Mode, Middle channel								
5150.000	51.12	3.91	55.03	74.00	-18.97	200	157	peak
5150.000	38.45	3.91	42.36	54.00	-11.64	200	157	AVG
5290.000	88.41	2.76	91.17	N/A	N/A	200	312	peak
5290.000	78.50	2.76	81.26	N/A	N/A	200	312	AVG
5350.000	56.95	3.04	59.99	74.00	-14.01	200	354	peak
5350.000	39.13	3.04	42.17	54.00	-11.83	200	354	AVG
10580.000	32.65	14.93	47.58	68.23	-20.65	100	1	peak

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.

For UNII-2C Band III:

Above 1GHz

Horizontal

Frequency (MHz)	Reading (dBµV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
a Mode, 5500MHz								
5460.000	52.02	2.61	54.63	68.23	-13.60	300	182	peak
5460.000	38.00	2.61	40.61	54.00	-13.39	300	182	AVG
5500.000	91.22	2.55	93.77	N/A	N/A	300	205	peak
5500.000	81.02	2.55	83.57	N/A	N/A	300	205	AVG
11000.000	32.49	15.75	48.24	74.00	-25.76	100	324	peak
11000.000	17.96	15.75	33.71	54.00	-20.29	100	324	AVG
a Mode, 5580MHz								
5580.000	92.58	3.23	95.81	N/A	N/A	300	89	peak
5580.000	82.15	3.23	85.38	N/A	N/A	300	89	AVG
11160.000	32.92	15.63	48.55	74.00	-25.45	100	127	peak
11160.000	19.39	15.63	35.02	54.00	-18.98	100	127	AVG
a Mode, 5700MHz								
5700.000	92.85	3.30	96.15	N/A	N/A	300	75	peak
5700.000	83.11	3.30	86.41	N/A	N/A	300	75	AVG
5725.000	53.26	3.23	56.49	68.23	-11.74	300	311	peak
11400.000	35.92	15.61	51.53	74.00	-22.47	100	358	peak
11400.000	22.24	15.61	37.85	54.00	-16.15	100	358	AVG
a Mode, 5720MHz								
5720.000	91.65	3.25	94.90	N/A	N/A	300	259	peak
5720.000	81.52	3.25	84.77	N/A	N/A	300	259	AVG
11440.000	37.91	15.51	53.42	74.00	-20.58	100	48	peak
11440.000	24.02	15.51	39.53	54.00	-14.47	100	48	AVG

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.
Peak limit value meets both sections 15.205 and 15.407(b) for restricted bands.
Pre-scan 5460MHz and 5470MHz, select the highest point as the worst.

Vertical

Frequency (MHz)	Reading (dBµV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
a Mode, 5500MHz								
5460.000	51.62	2.61	54.23	68.23	-14.00	200	142	peak
5460.000	38.12	2.61	40.73	54.00	-13.27	200	142	AVG
5500.000	96.97	2.55	99.52	N/A	N/A	200	78	peak
5500.000	86.21	2.55	88.76	N/A	N/A	200	78	AVG
11000.000	31.81	15.75	47.56	74.00	-26.44	100	298	peak
11000.000	18.00	15.75	33.75	54.00	-20.25	100	298	AVG
a Mode, 5580MHz								
5580.000	96.10	3.23	99.33	N/A	N/A	200	76	peak
5580.000	85.26	3.23	88.49	N/A	N/A	200	76	AVG
11160.000	32.75	15.63	48.38	74.00	-25.62	100	65	peak
11160.000	19.25	15.63	34.88	54.00	-19.12	100	65	AVG
a Mode, 5700MHz								
5700.000	97.06	3.30	100.36	N/A	N/A	200	77	peak
5700.000	85.86	3.30	89.16	N/A	N/A	200	77	AVG
5725.000	53.33	3.23	56.56	68.23	-11.67	200	183	peak
11400.000	33.74	15.61	49.35	74.00	-24.65	100	60	peak
11400.000	20.18	15.61	35.79	54.00	-18.21	100	60	AVG
a Mode, 5720MHz								
5720.000	95.84	3.25	99.09	N/A	N/A	200	84	peak
5720.000	84.72	3.25	87.97	N/A	N/A	200	84	AVG
11440.000	37.59	15.51	53.10	74.00	-20.9	100	202	peak
11440.000	24.21	15.51	39.72	54.00	-14.28	100	202	AVG

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.
Peak limit value meets both sections 15.205 and 15.407(b) for restricted bands.
Pre-scan 5460MHz and 5470MHz, select the highest point as the worst.

Horizontal

Frequency (MHz)	Reading (dBµV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
ac20 Mode, 5500MHz								
5460.000	52.10	2.61	54.71	68.23	-13.52	300	353	peak
5460.000	38.04	2.61	40.65	54.00	-13.35	300	353	AVG
5500.000	91.25	2.55	93.80	N/A	N/A	300	57	peak
5500.000	79.78	2.55	82.33	N/A	N/A	300	57	AVG
11000.000	32.06	15.75	47.81	74.00	-26.19	100	350	peak
11000.000	18.06	15.75	33.81	54.00	-20.19	100	350	AVG
ac20 Mode, 5580MHz								
5580.000	92.11	3.23	95.34	N/A	N/A	300	126	peak
5580.000	81.29	3.23	84.52	N/A	N/A	300	126	AVG
11160.000	32.51	15.63	48.14	74.00	-25.86	100	117	peak
11160.000	20.26	15.63	35.89	54.00	-18.11	100	117	AVG
ac20 Mode, 5700MHz								
5700.000	93.00	3.30	96.30	N/A	N/A	300	137	peak
5700.000	81.62	3.30	84.92	N/A	N/A	300	137	AVG
5725.000	52.72	3.23	55.95	68.23	-12.28	300	79	peak
11400.000	32.51	15.61	48.12	74.00	-25.88	100	344	peak
11400.000	19.20	15.61	34.81	54.00	-19.19	100	344	AVG
ac20 Mode, 5720MHz								
5720.000	91.39	3.25	94.64	N/A	N/A	300	261	peak
5720.000	79.78	3.25	83.03	N/A	N/A	300	261	AVG
11440.000	37.87	15.51	53.38	74.00	-20.62	100	46	peak
11440.000	23.80	15.51	39.31	54.00	-14.69	100	46	AVG

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.
Peak limit value meets both sections 15.205 and 15.407(b) for restricted bands.
Pre-scan 5460MHz and 5470MHz, select the highest point as the worst.

Vertical

Frequency (MHz)	Reading (dBµV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
ac20 Mode, 5500MHz								
5460.000	51.76	2.61	54.37	68.23	-13.86	200	67	peak
5460.000	38.32	2.61	40.93	54.00	-13.07	200	67	AVG
5500.000	95.25	2.55	97.80	N/A	N/A	200	301	peak
5500.000	84.22	2.55	86.77	N/A	N/A	200	301	AVG
11000.000	30.44	15.75	46.19	74.00	-27.81	100	86	peak
11000.000	17.98	15.75	33.73	54.00	-20.27	100	86	AVG
ac20 Mode, 5580MHz								
5580.000	95.37	3.23	98.60	N/A	N/A	200	75	peak
5580.000	84.37	3.23	87.60	N/A	N/A	200	75	AVG
11160.000	32.57	15.63	48.20	74.00	-25.80	100	335	peak
11160.000	20.18	15.63	35.81	54.00	-18.19	100	335	AVG
ac20 Mode, 5700MHz								
5700.000	96.88	3.30	100.18	N/A	N/A	200	322	peak
5700.000	84.74	3.30	88.04	N/A	N/A	200	322	AVG
5725.000	53.68	3.23	56.91	68.23	-11.32	200	86	peak
11400.000	32.86	15.61	48.47	74.00	-25.53	100	224	peak
11400.000	19.39	15.61	35.00	54.00	-19.00	100	224	AVG
ac20 Mode, 5720MHz								
5720.000	95.92	3.25	99.17	N/A	N/A	200	85	peak
5720.000	85.04	3.25	88.29	N/A	N/A	200	85	AVG
11440.000	37.26	15.51	52.77	74.00	-21.23	100	10	peak
11440.000	24.01	15.51	39.52	54.00	-14.48	100	10	AVG

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.
Peak limit value meets both sections 15.205 and 15.407(b) for restricted bands.
Pre-scan 5460MHz and 5470MHz, select the highest point as the worst.

Horizontal

Frequency (MHz)	Reading (dBµV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
ac40 Mode, 5510MHz								
5460.000	52.36	2.61	54.97	68.23	-13.26	300	113	peak
5460.000	38.49	2.61	41.10	54.00	-12.90	300	113	AVG
5510.000	88.38	2.63	91.01	N/A	N/A	300	78	peak
5510.000	77.49	2.63	80.12	N/A	N/A	300	78	AVG
11020.000	31.57	15.74	47.31	74.00	-26.69	100	39	peak
11020.000	18.18	15.74	33.92	54.00	-20.08	100	39	AVG
ac40 Mode, 5590MHz								
5590.000	89.00	3.33	92.33	N/A	N/A	300	87	peak
5590.000	79.73	3.33	83.06	N/A	N/A	300	87	AVG
11180.000	33.96	15.61	49.57	74.00	-24.43	100	358	peak
11180.000	19.96	15.61	35.57	54.00	-18.43	100	358	AVG
ac40 Mode, 5670MHz								
5670.000	88.61	3.36	91.97	N/A	N/A	300	54	peak
5670.000	78.73	3.36	82.09	N/A	N/A	300	54	AVG
5725.000	52.85	3.23	56.08	68.23	-12.15	300	336	peak
11340.000	33.66	15.69	49.35	74.00	-24.65	100	185	peak
11340.000	20.55	15.69	36.24	54.00	-17.76	100	185	AVG
ac40 Mode, 5710MHz								
5710.000	89.38	3.27	92.65	N/A	N/A	300	256	peak
5710.000	78.08	3.27	81.35	N/A	N/A	300	256	AVG
11420.000	38.20	15.55	53.75	74.00	-20.25	100	59	peak
11420.000	24.58	15.55	40.13	54.00	-13.87	100	59	AVG

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.
Peak limit value meets both sections 15.205 and 15.407(b) for restricted bands.
Pre-scan 5460MHz and 5470MHz, select the highest point as the worst.

Vertical

Frequency (MHz)	Reading (dBµV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
ac40 Mode, 5510MHz								
5460.000	51.93	2.61	54.54	68.23	-13.69	200	143	peak
5460.000	38.49	2.61	41.10	54.00	-12.90	200	143	AVG
5510.000	92.80	2.63	95.43	N/A	N/A	200	310	peak
5510.000	81.88	2.63	84.51	N/A	N/A	200	310	AVG
11020.000	31.62	15.74	47.36	74.00	-26.64	100	82	peak
11020.000	18.30	15.74	34.04	54.00	-19.96	100	82	AVG
ac40 Mode, 5590MHz								
5590.000	91.43	3.33	94.76	N/A	N/A	200	36	peak
5590.000	81.42	3.33	84.75	N/A	N/A	200	36	AVG
11180.000	33.13	15.61	48.74	74.00	-25.26	100	359	peak
11180.000	19.85	15.61	35.46	54.00	-18.54	100	359	AVG
ac40 Mode, 5670MHz								
5670.000	91.82	3.36	95.18	N/A	N/A	200	40	peak
5670.000	81.27	3.36	84.63	N/A	N/A	200	40	AVG
5725.000	52.50	3.23	55.73	68.23	-12.50	200	357	peak
11340.000	34.55	15.69	50.24	74.00	-23.76	100	322	peak
11340.000	20.22	15.69	35.91	54.00	-18.09	100	322	AVG
ac40 Mode, 5710MHz								
5710.000	91.49	3.27	94.76	N/A	N/A	200	126	peak
5710.000	79.86	3.27	83.13	N/A	N/A	200	126	AVG
11420.000	37.63	15.55	53.18	74.00	-20.82	100	349	peak
11420.000	24.22	15.55	39.77	54.00	-14.23	100	349	AVG

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.
Peak limit value meets both sections 15.205 and 15.407(b) for restricted bands.
Pre-scan 5460MHz and 5470MHz, select the highest point as the worst.

Horizontal

Frequency (MHz)	Reading (dBµV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
ac80 Mode, 5530MHz								
5460.000	51.71	2.61	54.32	68.23	-13.91	300	220	peak
5460.000	38.87	2.61	41.48	54.00	-12.52	300	220	AVG
5530.000	85.46	2.78	88.24	N/A	N/A	300	126	peak
5530.000	74.99	2.78	77.77	N/A	N/A	300	126	AVG
11060.000	32.04	15.73	47.77	74.00	-26.23	100	359	peak
11060.000	19.11	15.73	34.84	54.00	-19.16	100	359	AVG
ac80 Mode, 5610MHz								
5610.000	85.37	3.42	88.79	N/A	N/A	300	130	peak
5610.000	75.61	3.42	79.03	N/A	N/A	300	130	AVG
5725.000	52.70	3.23	55.93	68.23	-12.30	300	18	peak
11220.000	33.40	15.61	49.01	74.00	-24.99	100	101	peak
11220.000	20.20	15.61	35.81	54.00	-18.19	100	101	AVG
ac80 Mode, 5690MHz								
5690.000	86.62	3.32	89.94	N/A	N/A	300	239	peak
5690.000	75.38	3.32	78.70	N/A	N/A	300	239	AVG
11380.000	37.82	15.64	53.46	74.00	-20.54	100	91	peak
11380.000	24.61	15.64	40.25	54.00	-13.75	100	91	AVG

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.
Peak limit value meets both sections 15.205 and 15.407(b) for restricted bands.
Pre-scan 5460MHz and 5470MHz, select the highest point as the worst.

Vertical

Frequency (MHz)	Reading (dBµV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
ac80 Mode, 5530MHz								
5460.000	52.63	2.61	55.24	68.23	-12.99	200	296	peak
5460.000	38.99	2.61	41.60	54.00	-12.40	200	296	AVG
5530.000	87.97	2.78	90.75	N/A	N/A	200	258	peak
5530.000	77.35	2.78	80.13	N/A	N/A	200	258	AVG
11060.000	31.99	15.73	47.72	74.00	-26.28	100	107	peak
11060.000	19.00	15.73	34.73	54.00	-19.27	100	107	AVG
ac80 Mode, 5610MHz								
5610.000	87.93	3.42	91.35	N/A	N/A	200	271	peak
5610.000	78.58	3.42	82.00	N/A	N/A	200	271	AVG
5725.000	52.23	3.23	55.46	68.23	-12.77	200	56	peak
11220.000	32.64	15.61	48.25	74.00	-25.75	100	192	peak
11220.000	20.33	15.61	35.94	54.00	-18.06	100	192	AVG
ac80 Mode, 5690MHz								
5690.000	89.45	3.32	92.77	N/A	N/A	200	214	peak
5690.000	78.36	3.32	81.68	N/A	N/A	200	214	AVG
11380.000	37.74	15.64	53.38	74.00	-20.62	100	15	peak
11380.000	24.71	15.64	40.35	54.00	-13.65	100	15	AVG

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.
Peak limit value meets both sections 15.205 and 15.407(b) for restricted bands.
Pre-scan 5460MHz and 5470MHz, select the highest point as the worst.

For UNII-3 Band IV:

Above 1GHz

Horizontal

Frequency (MHz)	Reading (dBµV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
a Mode, Low channel								
5616.800	51.17	3.42	54.59	68.20	-13.61	300	74	peak
5699.750	53.43	3.30	56.73	105.02	-48.29	300	129	peak
5719.000	62.74	3.25	65.99	110.52	-44.53	300	72	peak
5724.950	70.36	3.23	73.59	122.09	-48.50	300	46	peak
5745.000	97.87	3.19	101.06	N/A	N/A	300	75	peak
5745.000	88.90	3.19	92.09	N/A	N/A	300	75	AVG
5852.700	52.71	3.58	56.29	116.04	-59.75	300	214	peak
5873.000	52.80	3.73	56.53	105.76	-49.23	300	240	peak
5897.850	53.15	3.92	57.07	88.29	-31.22	300	100	peak
5948.250	53.01	4.31	57.32	68.20	-10.88	300	24	peak
11490.000	31.97	15.40	47.37	74.00	-26.63	100	125	peak
11490.000	18.54	15.40	33.94	54.00	-20.06	100	125	AVG
a Mode, Middle channel								
5642.000	51.98	3.41	55.39	68.20	-12.81	300	246	peak
5671.400	52.06	3.36	55.42	84.04	-28.62	300	243	peak
5708.500	52.56	3.28	55.84	107.58	-51.74	300	121	peak
5723.550	51.97	3.24	55.21	118.89	-63.68	300	311	peak
5785.000	98.14	3.17	101.31	N/A	N/A	300	79	peak
5785.000	89.44	3.17	92.61	N/A	N/A	300	79	AVG
5850.950	52.52	3.56	56.08	120.03	-63.95	300	221	peak
5857.600	53.56	3.62	57.18	110.07	-52.89	300	353	peak
5921.300	53.30	4.11	57.41	70.94	-13.53	300	1	peak
5947.200	53.27	4.30	57.57	68.20	-10.63	300	3	peak
11570.000	33.24	15.19	48.43	74.00	-25.57	100	94	peak
11570.000	20.98	15.19	36.17	54.00	-17.83	100	94	AVG
a Mode, High channel								
5614.350	52.16	3.41	55.57	68.20	-12.63	300	287	peak
5670.350	52.16	3.36	55.52	83.26	-27.74	300	62	peak
5708.150	51.62	3.27	54.89	107.48	-52.59	300	282	peak
5720.750	51.97	3.25	55.22	112.51	-57.29	300	180	peak
5825.000	98.79	3.36	102.15	N/A	N/A	300	73	peak
5825.000	90.06	3.36	93.42	N/A	N/A	300	73	AVG
5850.600	62.21	3.55	65.76	120.83	-55.07	300	125	peak
5867.400	56.56	3.69	60.25	107.33	-47.08	300	78	peak
5898.550	53.35	3.93	57.28	87.77	-30.49	300	47	peak
5947.900	52.38	4.31	56.69	68.20	-11.51	300	252	peak
11650.000	33.50	15.28	48.78	74.00	-25.22	100	97	peak
11650.000	19.32	15.28	34.60	54.00	-19.40	100	97	AVG

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.

Vertical

Frequency (MHz)	Reading (dBµV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
a Mode, Low channel								
5602.450	51.58	3.43	55.01	68.20	-13.19	200	229	peak
5698.700	55.98	3.30	59.28	104.24	-44.96	200	297	peak
5718.300	64.91	3.26	68.17	110.32	-42.15	200	44	peak
5724.950	74.20	3.23	77.43	122.09	-44.66	200	85	peak
5745.000	102.06	3.19	105.25	N/A	N/A	200	78	peak
5745.000	90.70	3.19	93.89	N/A	N/A	200	78	AVG
5850.250	53.13	3.55	56.68	121.63	-64.95	200	309	peak
5870.200	53.33	3.71	57.04	106.54	-49.50	200	37	peak
5892.250	53.85	3.87	57.72	92.44	-34.72	200	231	peak
5944.750	52.85	4.28	57.13	68.20	-11.07	200	321	peak
11490.000	31.67	15.40	47.07	74.00	-26.93	100	158	peak
11490.000	19.15	15.40	34.55	54.00	-19.45	100	158	AVG
a Mode, Middle channel								
5645.500	52.12	3.41	55.53	68.20	-12.67	200	289	peak
5697.650	52.46	3.30	55.76	103.46	-47.70	200	184	peak
5702.200	53.70	3.29	56.99	105.82	-48.83	200	271	peak
5722.150	52.12	3.24	55.36	115.70	-60.34	200	61	peak
5785.000	101.82	3.17	104.99	N/A	N/A	200	75	peak
5785.000	92.26	3.17	95.43	N/A	N/A	200	75	AVG
5852.000	53.19	3.57	56.76	117.64	-60.88	200	170	peak
5863.900	54.02	3.65	57.67	108.31	-50.64	200	129	peak
5878.600	53.20	3.77	56.97	102.54	-45.57	200	330	peak
5944.050	52.41	4.27	56.68	68.20	-11.52	200	293	peak
11570.000	30.53	15.19	45.72	74.00	-28.28	100	311	peak
11570.000	20.54	15.19	35.73	54.00	-18.27	100	311	AVG
a Mode, High channel								
5622.050	51.46	3.42	54.88	68.20	-13.32	200	96	peak
5674.900	51.88	3.35	55.23	86.63	-31.40	200	154	peak
5706.400	52.60	3.27	55.87	106.99	-51.12	200	307	peak
5720.750	51.97	3.25	55.22	112.51	-57.29	200	315	peak
5825.000	100.62	3.36	103.98	N/A	N/A	200	75	peak
5825.000	91.31	3.36	94.67	N/A	N/A	200	75	AVG
5850.950	63.59	3.56	67.15	120.03	-52.88	200	163	peak
5856.550	60.98	3.61	64.59	110.37	-45.78	200	39	peak
5876.500	53.80	3.76	57.56	104.09	-46.53	200	43	peak
5930.050	52.79	4.17	56.96	68.20	-11.24	200	118	peak
11650.000	32.78	15.28	48.06	74.00	-25.94	100	280	peak
11650.000	18.79	15.28	34.07	54.00	-19.93	100	280	AVG

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.

Horizontal

Frequency (MHz)	Reading (dBµV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
ac20 Mode, Low channel								
5645.500	51.43	3.41	54.84	68.20	-13.36	300	122	peak
5692.750	54.22	3.31	57.53	99.84	-42.31	300	117	peak
5718.300	65.60	3.26	68.86	110.32	-41.46	300	316	peak
5724.600	72.97	3.23	76.20	121.29	-45.09	300	66	peak
5745.000	97.43	3.19	100.62	N/A	N/A	300	153	peak
5745.000	87.96	3.19	91.15	N/A	N/A	300	153	AVG
5853.050	52.61	3.58	56.19	115.25	-59.06	300	316	peak
5872.650	52.86	3.73	56.59	105.86	-49.27	300	13	peak
5919.900	52.84	4.09	56.93	71.97	-15.04	300	162	peak
5931.100	52.56	4.19	56.75	68.20	-11.45	300	360	peak
11490.000	31.93	15.40	47.33	74.00	-26.67	100	281	peak
11490.000	18.46	15.40	33.86	54.00	-20.14	100	281	AVG
ac20 Mode, Middle channel								
5647.600	52.41	3.40	55.81	68.20	-12.39	300	358	peak
5692.750	51.93	3.31	55.24	99.84	-44.60	300	254	peak
5715.850	52.30	3.26	55.56	109.64	-54.08	300	271	peak
5723.900	51.96	3.23	55.19	119.69	-64.50	300	359	peak
5785.000	96.86	3.17	100.03	N/A	N/A	300	71	peak
5785.000	87.78	3.17	90.95	N/A	N/A	300	71	AVG
5850.250	52.84	3.55	56.39	121.63	-65.24	300	345	peak
5867.750	53.04	3.70	56.74	107.23	-50.49	300	118	peak
5910.800	53.10	4.01	57.11	78.71	-21.60	300	310	peak
5943.350	52.30	4.27	56.57	68.20	-11.63	300	11	peak
11570.000	33.04	15.19	48.23	74.00	-25.77	100	122	peak
11570.000	19.45	15.19	34.64	54.00	-19.36	100	122	AVG
ac20 Mode, High channel								
5640.250	51.11	3.41	54.52	68.20	-13.68	300	198	peak
5663.350	51.81	3.38	55.19	78.08	-22.89	300	310	peak
5716.550	52.00	3.25	55.25	109.83	-54.58	300	276	peak
5721.450	52.60	3.24	55.84	114.11	-58.27	300	34	peak
5825.000	97.69	3.36	101.05	N/A	N/A	300	115	peak
5825.000	87.43	3.36	90.79	N/A	N/A	300	115	AVG
5850.950	65.04	3.56	68.60	120.03	-51.43	300	298	peak
5856.550	62.12	3.61	65.73	110.37	-44.64	300	66	peak
5875.100	53.89	3.75	57.64	105.13	-47.49	300	63	peak
5934.600	52.73	4.21	56.94	68.20	-11.26	300	0	peak
11650.000	30.33	15.28	45.61	74.00	-28.39	100	359	peak
11650.000	19.76	15.28	35.04	54.00	-18.96	100	359	AVG

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.

Vertical

Frequency (MHz)	Reading (dBµV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
ac20 Mode, Low channel								
5642.700	51.70	3.40	55.10	68.20	-13.10	200	323	peak
5697.650	57.88	3.30	61.18	103.46	-42.28	200	300	peak
5719.350	69.50	3.25	72.75	110.62	-37.87	200	271	peak
5724.950	75.60	3.23	78.83	122.09	-43.26	200	0	peak
5745.000	100.54	3.19	103.73	N/A	N/A	200	321	peak
5745.000	91.07	3.19	94.26	N/A	N/A	200	321	AVG
5854.800	52.53	3.59	56.12	111.26	-55.14	200	37	peak
5862.850	52.94	3.65	56.59	108.60	-52.01	200	328	peak
5898.900	53.19	3.93	57.12	87.51	-30.39	200	264	peak
5938.800	52.60	4.23	56.83	68.20	-11.37	200	105	peak
11490.000	32.01	15.40	47.41	74.00	-26.59	100	133	peak
11490.000	18.63	15.40	34.03	54.00	-19.97	100	133	AVG
ac20 Mode, Middle channel								
5644.800	51.64	3.41	55.05	68.20	-13.15	200	182	peak
5687.850	52.22	3.32	55.54	96.21	-40.67	200	91	peak
5707.100	52.72	3.27	55.99	107.19	-51.20	200	52	peak
5724.250	52.38	3.23	55.61	120.49	-64.88	200	96	peak
5785.000	99.98	3.17	103.15	N/A	N/A	200	75	peak
5785.000	90.18	3.17	93.35	N/A	N/A	200	75	AVG
5850.250	53.29	3.55	56.84	121.63	-64.79	200	142	peak
5862.850	53.56	3.65	57.21	108.60	-51.39	200	228	peak
5893.650	53.69	3.89	57.58	91.40	-33.82	200	255	peak
5936.700	53.63	4.22	57.85	68.20	-10.35	200	130	peak
11570.000	32.88	15.19	48.07	74.00	-25.93	100	315	peak
11570.000	19.15	15.19	34.34	74.00	-39.66	100	315	peak
ac20 Mode, High channel								
5602.800	51.41	3.42	54.83	68.20	-13.37	200	125	peak
5691.000	52.03	3.32	55.35	98.54	-43.19	200	204	peak
5708.500	52.82	3.28	56.10	107.58	-51.48	200	28	peak
5720.050	51.67	3.25	54.92	110.91	-55.99	200	96	peak
5825.000	99.53	3.36	102.89	N/A	N/A	200	44	peak
5825.000	89.67	3.36	93.03	N/A	N/A	200	44	AVG
5853.750	66.76	3.58	70.34	113.65	-43.31	200	33	peak
5855.500	61.95	3.59	65.54	110.66	-45.12	200	189	peak
5875.100	54.06	3.75	57.81	105.13	-47.32	200	360	peak
5938.100	52.72	4.23	56.95	68.20	-11.25	200	207	peak
11650.000	33.71	15.28	48.99	74.00	-25.01	100	127	peak
11650.000	19.85	15.28	35.13	54.00	-18.87	100	127	AVG

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.

Horizontal

Frequency (MHz)	Reading (dBµV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
ac40 Mode, Low channel								
5636.400	51.12	3.42	54.54	68.20	-13.66	300	184	peak
5692.050	60.64	3.31	63.95	99.32	-35.37	300	84	peak
5719.700	71.74	3.25	74.99	110.72	-35.73	300	73	peak
5724.950	73.55	3.23	76.78	122.09	-45.31	300	60	peak
5755.000	95.19	3.18	98.37	N/A	N/A	300	330	peak
5755.000	85.02	3.18	88.20	N/A	N/A	300	330	AVG
5853.750	52.75	3.58	56.33	113.65	-57.32	300	340	peak
5855.850	53.54	3.60	57.14	110.56	-53.42	300	44	peak
5909.050	53.72	4.00	57.72	80.00	-22.28	300	79	peak
5943.350	52.82	4.27	57.09	68.20	-11.11	300	113	peak
11510.000	31.71	15.34	47.05	74.00	-26.95	100	17	peak
11510.000	19.36	15.34	34.70	54.00	-19.30	100	17	AVG
ac40 Mode, High channel								
5647.950	51.66	3.40	55.06	68.20	-13.14	300	258	peak
5694.850	52.10	3.30	55.40	101.39	-45.99	300	332	peak
5717.600	54.64	3.26	57.90	110.13	-52.23	300	332	peak
5724.250	55.26	3.23	58.49	120.49	-62.00	300	51	peak
5795.000	94.53	3.17	97.70	N/A	N/A	300	73	peak
5795.000	86.01	3.17	89.18	N/A	N/A	300	73	AVG
5850.950	61.17	3.56	64.73	120.03	-55.30	300	77	peak
5855.500	59.04	3.59	62.63	110.66	-48.03	300	70	peak
5877.900	54.33	3.77	58.10	103.05	-44.95	300	336	peak
5930.050	53.03	4.17	57.20	68.20	-11.00	300	357	peak
11590.000	32.87	15.14	48.01	74.00	-25.99	100	120	peak
11590.000	19.60	15.14	34.74	54.00	-19.26	100	120	AVG

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.

Vertical

Frequency (MHz)	Reading (dBµV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
ac40 Mode, Low channel								
5649.700	52.79	3.41	56.20	68.20	-12.00	200	191	peak
5699.400	63.76	3.30	67.06	104.76	-37.70	200	270	peak
5719.000	74.73	3.25	77.98	110.52	-32.54	200	318	peak
5722.150	76.22	3.24	79.46	115.70	-36.24	200	53	peak
5755.000	98.58	3.18	101.76	N/A	N/A	200	41	peak
5755.000	86.60	3.18	89.78	N/A	N/A	200	41	AVG
5851.300	53.98	3.56	57.54	119.24	-61.70	200	325	peak
5866.350	53.03	3.68	56.71	107.62	-50.91	200	242	peak
5877.900	53.26	3.77	57.03	103.05	-46.02	200	53	peak
5947.200	53.09	4.30	57.39	68.20	-10.81	200	84	peak
11510.000	32.57	15.34	47.91	74.00	-26.09	100	100	peak
11510.000	19.32	15.34	34.66	54.00	-19.34	100	100	AVG
ac40 Mode, High channel								
5622.400	51.68	3.42	55.10	68.20	-13.10	200	89	peak
5697.650	52.73	3.30	56.03	103.46	-47.43	200	355	peak
5707.100	55.40	3.27	58.67	107.19	-48.52	200	59	peak
5721.800	56.60	3.24	59.84	114.90	-55.06	200	38	peak
5795.000	97.57	3.17	100.74	N/A	N/A	200	40	peak
5795.000	87.12	3.17	90.29	N/A	N/A	200	40	AVG
5853.050	62.20	3.58	65.78	115.25	-49.47	200	316	peak
5857.950	58.04	3.62	61.66	109.97	-48.31	200	95	peak
5877.900	54.83	3.77	58.60	103.05	-44.45	200	66	peak
5927.950	52.72	4.15	56.87	68.20	-11.33	200	183	peak
11590.000	32.43	15.14	47.57	74.00	-26.43	100	225	peak
11590.000	19.35	15.14	34.49	54.00	-19.51	100	225	AVG

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.

Horizontal

Frequency (MHz)	Reading (dBµV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
ac80 Mode, Middle channel								
5645.150	53.87	3.41	57.28	68.20	-10.92	300	309	peak
5695.900	65.61	3.31	68.92	102.17	-33.25	300	57	peak
5719.000	70.73	3.25	73.98	110.52	-36.54	300	77	peak
5722.850	69.48	3.24	72.72	117.30	-44.58	300	83	peak
5775.000	91.93	3.18	95.11	N/A	N/A	300	80	peak
5775.000	80.11	3.18	83.29	N/A	N/A	300	80	AVG
5850.600	67.51	3.55	71.06	120.83	-49.77	300	63	peak
5857.950	65.29	3.62	68.91	109.97	-41.06	300	328	peak
5875.800	59.76	3.75	63.51	104.61	-41.10	300	79	peak
5936.000	53.63	4.22	57.85	68.20	-10.35	300	75	peak
11550.000	32.05	15.24	47.29	74.00	-26.71	100	316	peak
11550.000	19.31	15.24	34.55	54.00	-19.45	100	316	AVG

Vertical

Frequency (MHz)	Reading (dBµV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
ac80 Mode, Middle channel								
5649.000	55.34	3.41	58.75	68.20	-9.45	200	169	peak
5694.500	68.79	3.30	72.09	101.13	-29.04	200	76	peak
5709.900	72.31	3.27	75.58	107.97	-32.39	200	295	peak
5722.150	72.70	3.24	75.94	115.70	-39.76	200	47	peak
5775.000	94.64	3.18	97.82	N/A	N/A	200	304	peak
5775.000	85.09	3.18	88.27	N/A	N/A	200	304	AVG
5850.950	67.09	3.56	70.65	120.03	-49.38	200	172	peak
5855.850	66.35	3.60	69.95	110.56	-40.61	200	282	peak
5876.150	60.66	3.76	64.42	104.35	-39.93	200	185	peak
5936.000	53.74	4.22	57.96	68.20	-10.24	200	321	peak
11550.000	32.17	15.24	47.41	74.00	-26.59	100	78	peak
11550.000	19.25	15.24	34.49	54.00	-19.51	100	78	AVG

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.

9 FCC §15.407(a)(e) – Emission Bandwidth And Occupied Bandwidth

9.1 Applicable Standard

As per FCC §15.407(a): The maximum power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test. If the device cannot be connected directly, alternative techniques acceptable to the Commission may be used. Measurements in the 5.725-5.85 GHz band are made over a reference bandwidth of 500 kHz or the 26 dB emission bandwidth of the device, whichever is less. Measurements in the 5.15-5.25 GHz, 5.25-5.35 GHz, and the 5.47-5.725 GHz bands are made over a bandwidth of 1 MHz or the 26 dB emission bandwidth of the device, whichever is less. A narrower resolution bandwidth can be used, provided that the measured power is integrated over the full reference bandwidth.

As per FCC §15.407(e): for equipment operating in the band 5725 – 5850 MHz, the minimum 6 dB bandwidth of U-NII devices shall be 500 kHz.

9.2 Test Procedure

As per 789033 D02 General U-NII Test Procedures New Rules v02r01

Emission Bandwidth (EBW)

a) Set RBW = approximately 1% of the emission bandwidth.

b) Set the VBW > RBW.

c) Detector = Peak.

d) Trace mode = max hold.

e) Measure the maximum width of the emission that is 26 dB down from the maximum 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%.

99% Occupied Bandwidth

The 99% occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5 % of the total mean power of the given emission. Measurement of the 99% occupied bandwidth is required only as a condition for using the optional band-edge measurement techniques described in II.G.3.d). Measurements of 99% occupied bandwidth may also optionally be used in lieu of the EBW to define the minimum frequency range over which the spectrum is integrated when measuring maximum conducted output power as described in II.E. However, the EBW must be measured to determine bandwidth dependent limits on maximum conducted output power in accordance with 15.407(a).

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 ≥ 3 · 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.

9.3 Environmental Conditions

Temperature:	25.5-27.4 ℃
Relative Humidity:	46-48 %
ATM Pressure:	1010 hPa

The testing was performed by Tom Hsu on 2019-07-29 ~ 2019-07-30.

9.4 Test Results

Test mode: Transmitting

UNII Band	Mode	Channel	Frequency (MHz)	26dB Emission Bandwidth (MHz)			
				chain 0	chain 1	chain 2	chain 3
UNII-1	802.11a	36	5180	21.76	21.64	21.6	21.64
		40	5200	21.72	21.72	21.68	21.68
		48	5240	21.72	21.64	21.6	21.6
	802.11ac20	36	5180	23.8	23.28	27.72	22.36
		40	5200	22.4	24.2	26.52	22.56
		48	5240	22.64	26.64	26.32	21.76
	802.11ac 40	38	5190	69.76	56.64	56.4	57.84
		46	5230	68.72	60.24	65.12	61.52
	802.11ac 80	42	5210	110.08	107.04	95.52	92.16

UNII Band	Mode	Channel	Frequency (MHz)	99% Emission Bandwidth (MHz)			
				chain 0	chain 1	chain 2	chain 3
UNII-1	802.11a	36	5180	16.78	16.78	16.78	16.82
		40	5200	16.82	16.86	16.82	16.86
		48	5240	16.74	16.98	16.78	16.78
	802.11ac20	36	5180	18.14	17.94	18.02	17.98
		40	5200	18.06	17.98	17.94	17.90
		48	5240	17.98	17.94	17.90	17.94
	802.11ac 40	38	5190	36.76	36.52	36.52	36.52
		46	5230	36.76	36.44	36.52	36.44
	802.11ac 80	42	5210	75.28	75.44	75.28	75.28

UNII Band	Mode	Channel	Frequency (MHz)	26dB Emission Bandwidth(MHz)			
				chain 0	chain 1	chain 2	chain 3
UNII-2A Band II	802.11a	52	5260	21.44	21.28	21.32	21.28
		60	5300	21.44	21.24	21.24	21.32
		64	5320	21.48	21.36	21.28	21.24
	802.11ac20	52	5260	21.6	21.56	21.76	21.68
		60	5300	21.72	21.52	21.6	21.68
		64	5320	21.88	21.72	21.76	21.48
	802.11ac 40	54	5270	40.24	39.76	40	40.08
		62	5310	40.48	39.92	40.16	40
	802.11ac 80	58	5290	82.24	82.24	82.08	81.6

UNII Band	Mode	Channel	Frequency (MHz)	99% Emission Bandwidth(MHz)			
				chain 0	chain 1	chain 2	chain 3
UNII-2A Band II	802.11a	52	5260	16.78	16.82	16.66	16.70
		60	5300	16.66	16.78	16.62	16.66
		64	5320	16.82	16.66	16.58	16.74
	802.11ac20	52	5260	17.90	17.82	17.82	17.82
		60	5300	17.98	17.86	17.82	17.78
		64	5320	17.90	17.86	17.82	17.78
	802.11ac 40	54	5270	36.44	36.28	36.36	36.36
		62	5310	36.44	36.28	36.36	36.36
	802.11ac 80	58	5290	75.76	75.92	75.92	75.92

UNII Band	Mode	Channel	Frequency (MHz)	26dB Emission Bandwidth (MHz)			
				chain 0	chain 1	chain 2	chain 3
UNII-2C Band III	802.11a	100	5500	21.4	21.4	21.2	21.2
		118	5580	21.32	21.44	21.36	21.24
		140	5700	21.32	21.4	21.16	21.32
		144	5720	21.4	21.28	21.24	21.16
	802.11ac20	100	5500	21.68	21.8	21.64	21.52
		118	5580	21.4	21.6	21.52	21.24
		140	5700	21.52	21.6	21.64	21.64
		144	5720	21.68	21.72	21.44	21.6
	802.11ac 40	102	5510	40.4	40.08	40.08	39.84
		118	5590	40.4	39.92	40.08	40.16
		134	5670	40.56	40.08	40.08	40.08
		142	5710	40.32	40	40	40
	802.11ac 80	106	5530	82.24	82.24	81.92	81.76
		122	5610	82.4	81.92	81.76	81.92
		138	5690	82.56	83.04	81.76	81.76

UNII Band	Mode	Channel	Frequency (MHz)	99% Emission Bandwidth (MHz)			
				chain 0	chain 1	chain 2	chain 3
UNII-2C Band III	802.11a	100	5500	16.74	16.70	16.70	16.70
		118	5590	16.66	16.86	16.66	16.66
		140	5700	16.82	16.74	16.62	16.70
		144	5720	16.70	16.82	16.70	16.66
	802.11ac20	100	5500	17.82	17.78	17.82	17.78
		118	5590	17.90	17.86	17.78	17.74
		140	5700	17.94	17.90	17.82	17.78
		144	5720	17.90	17.82	17.82	17.82
	802.11ac 40	102	5510	36.52	36.36	36.36	36.36
		118	5590	36.52	36.36	36.36	36.36
		134	5670	36.44	36.28	36.28	36.28
		142	5710	36.44	36.28	36.28	36.28
	802.11ac 80	106	5530	75.92	75.92	75.76	75.92
		122	5610	75.92	75.92	75.76	75.92
		138	5690	75.76	75.92	75.76	75.92

UNII Band	Mode	Channel	Frequency (MHz)	6dB Emission Bandwidth (MHz)				Limit (kHz)	Result
				chain 0	chain 1	chain 2	chain 3		
UNII-3 Band IV	802.11a	149	5745	16.4	16.4	16.4	16.36	≥500	PASS
		157	5785	16.4	16.4	16.4	16.36	≥500	PASS
		165	5825	16.4	16.4	16.4	16.36	≥500	PASS
	802.11ac20	149	5745	17.6	17.6	17.6	17.64	≥500	PASS
		157	5785	17.6	17.6	17.64	17.64	≥500	PASS
		165	5825	17.6	17.64	17.6	17.6	≥500	PASS
	802.11ac 40	151	5755	36.4	36.4	36.4	36.32	≥500	PASS
		159	5795	36.32	36.32	36.32	36.32	≥500	PASS
	802.11ac 80	155	5775	75.84	76.48	76.48	76.48	≥500	PASS

UNII Band	Mode	Channel	Frequency (MHz)	99% Emission Bandwidth (MHz)			
				chain 0	chain 1	chain 2	chain 3
UNII-3 Band IV	802.11a	149	5745	17.06	16.94	16.98	16.98
		157	5785	17.02	17.02	16.98	16.98
		165	5825	17.14	16.86	17.14	16.98
	802.11ac20	149	5745	18.06	17.98	18.26	18.02
		157	5785	18.26	18.02	18.18	17.98
		165	5825	18.18	18.02	18.30	17.98
	802.11ac 40	151	5755	37.16	36.60	36.92	36.76
		159	5795	37.24	36.60	37	36.76
	802.11ac 80	155	5775	76.56	76.24	76.56	76.40

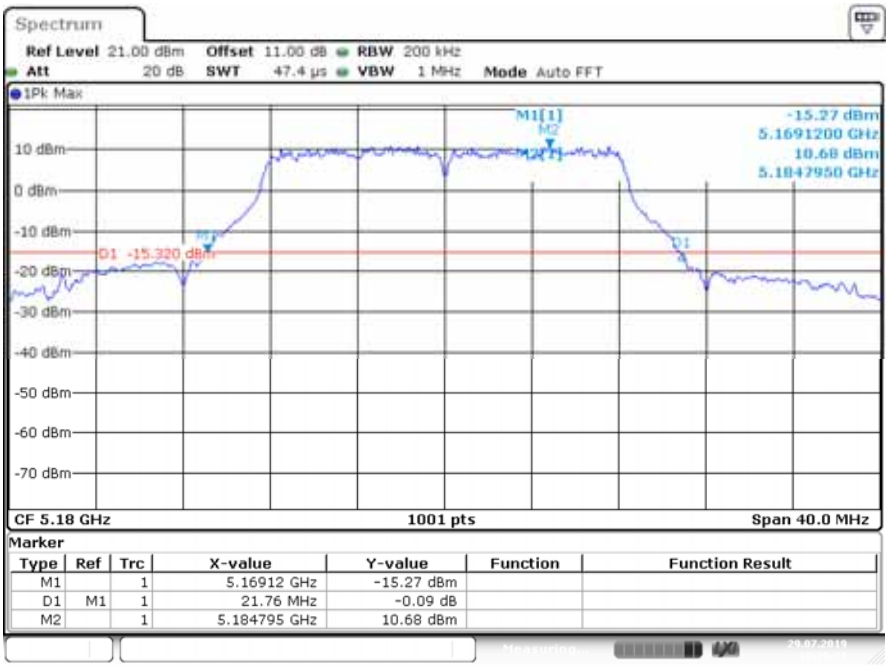
Please refer to the following plots

Transmitting Mode:

UNII-1 Band I / BW 26dBc

IEEE 802.11a Mode / 5150 ~ 5250MHz (chain 0)

5180MHz



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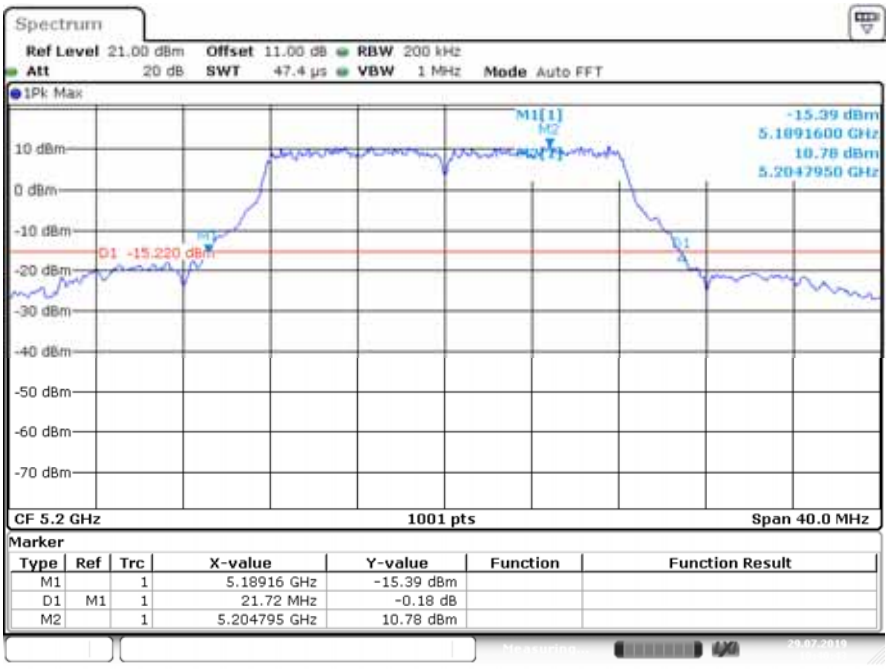
5200MHz



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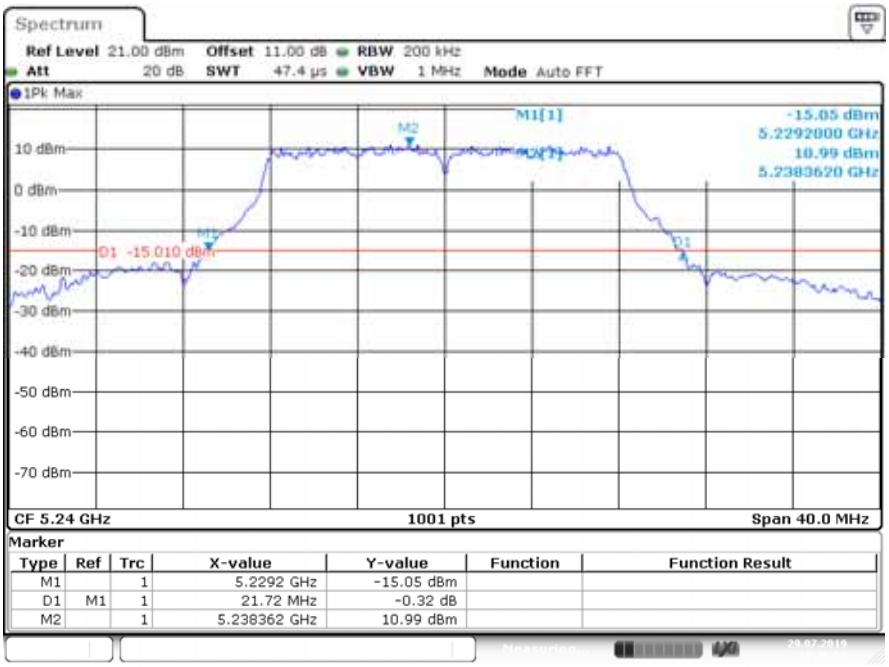
5240MHz



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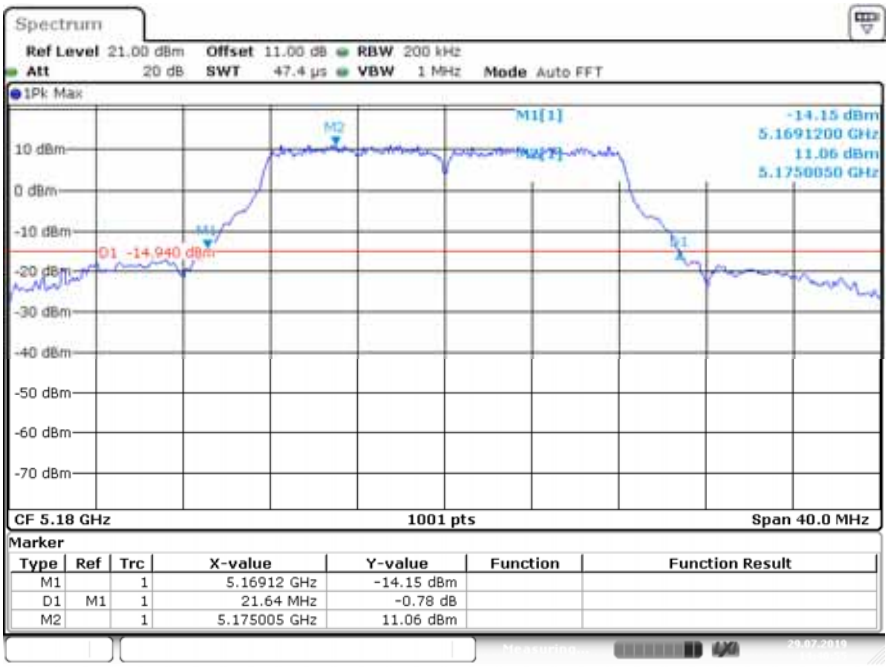
IEEE 802.11a Mode / 5150 ~ 5250MHz (chain 1)

5180MHz



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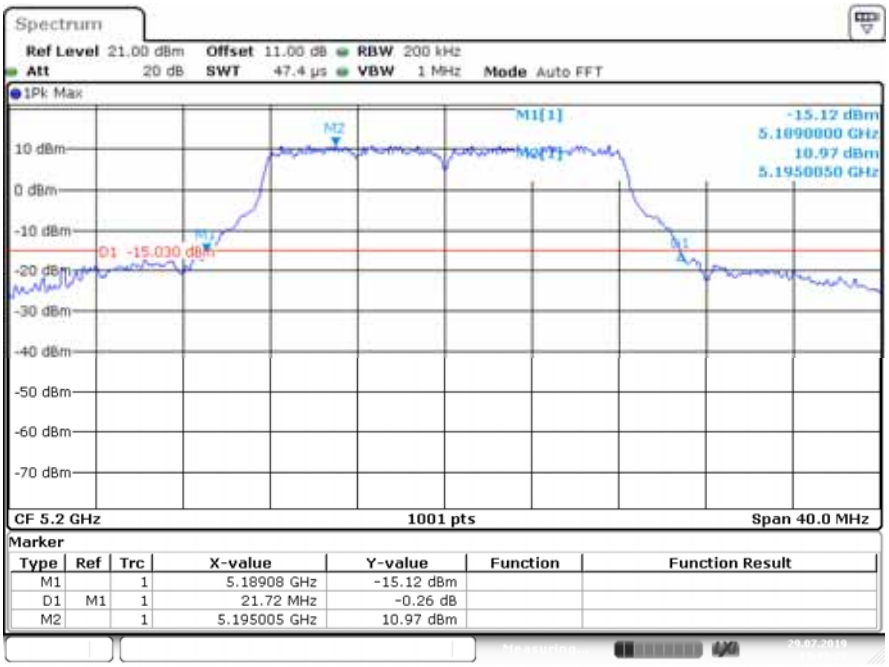
5200MHz



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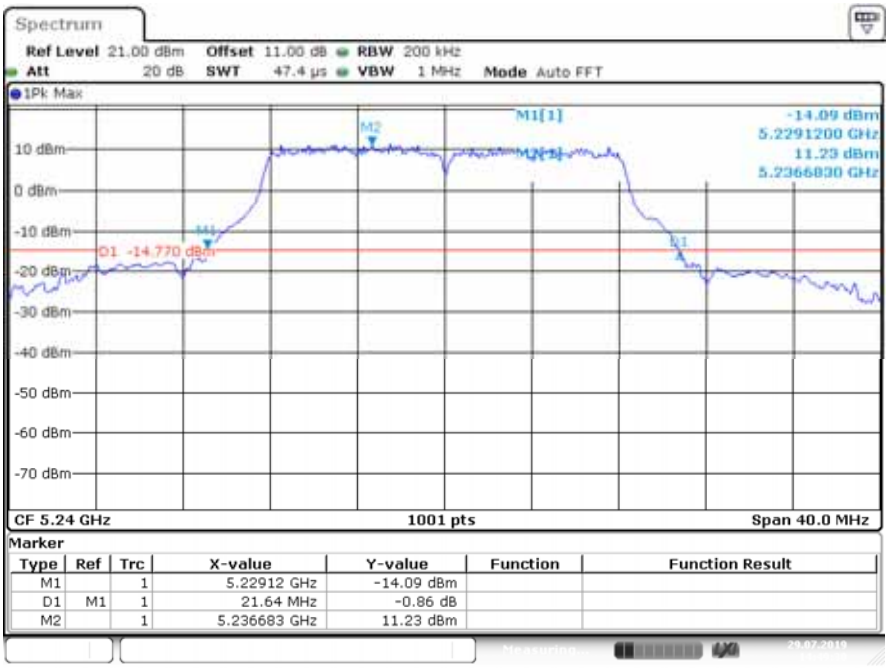
5240MHz



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IEEE 802.11a Mode / 5150 ~ 5250MHz (chain 2)

5180MHz

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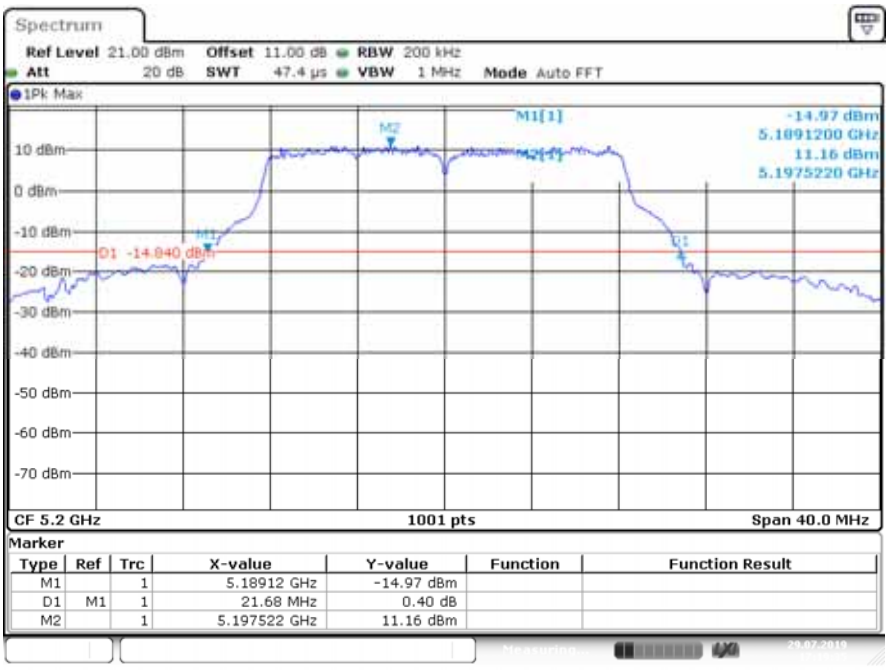
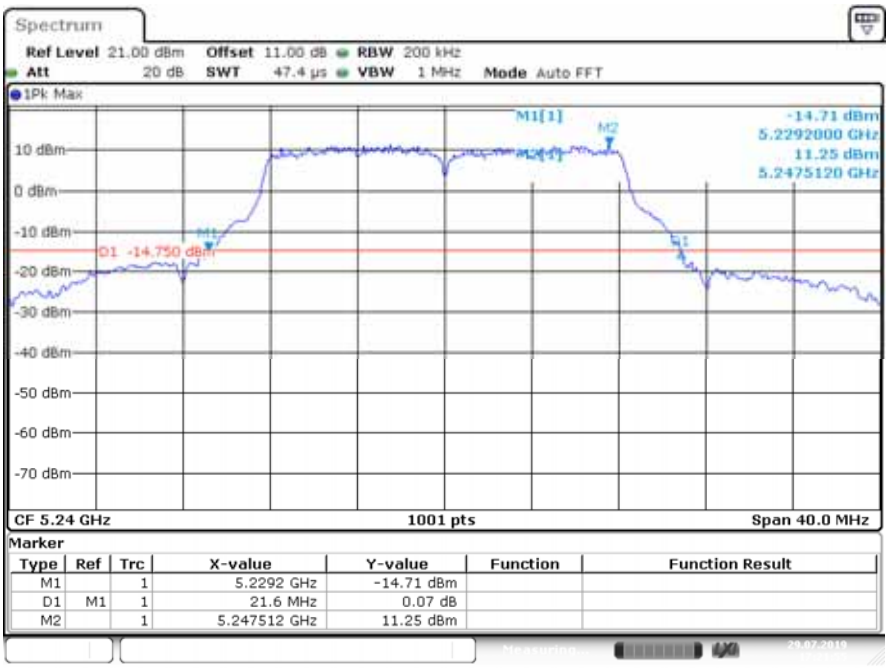
5200MHz



Date: 29.JUL.2019 17:19:36

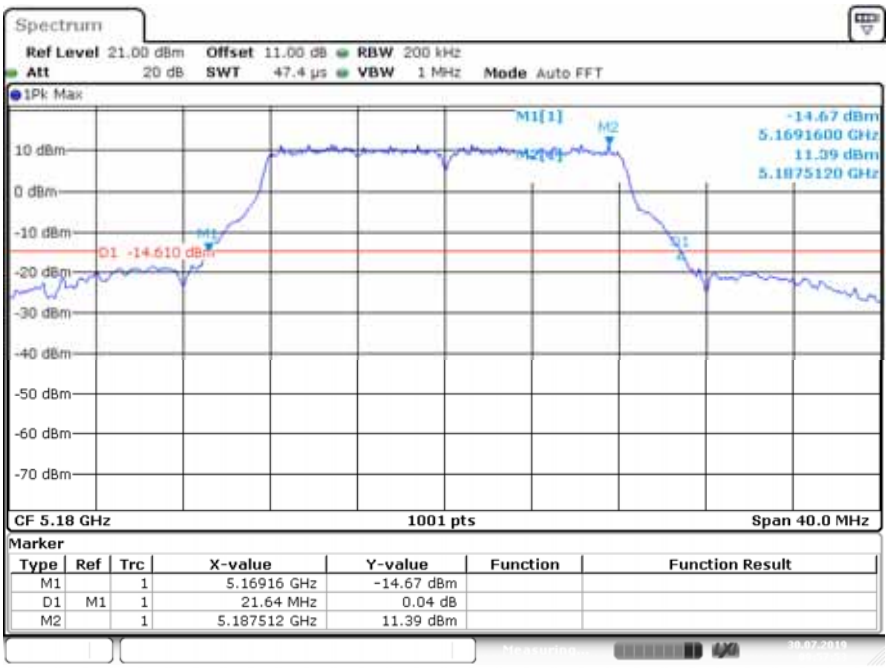
5240MHz



Date: 29.JUL.2019 17:21:55

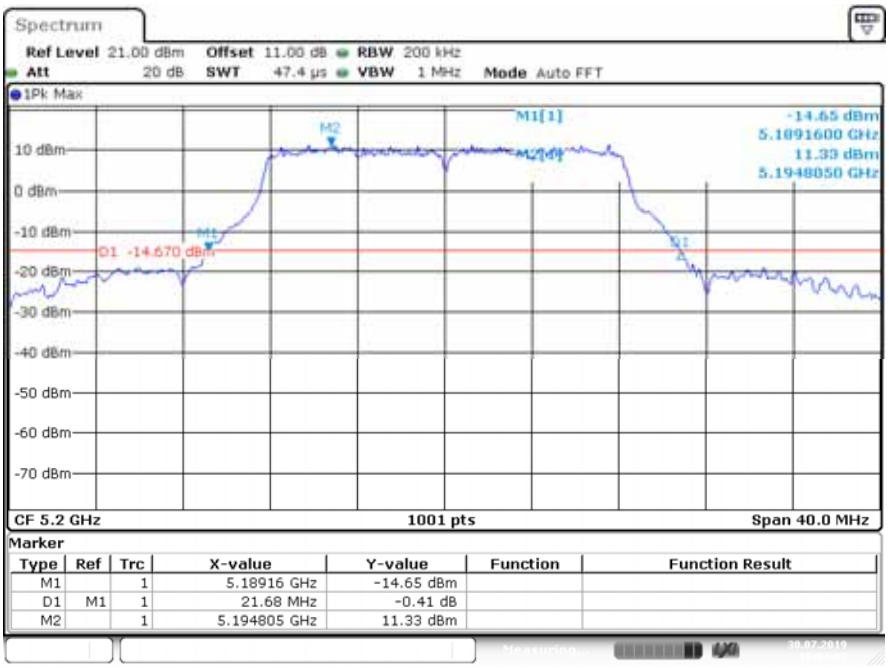
IEEE 802.11a Mode / 5150 ~ 5250MHz (chain 3)

5180MHz



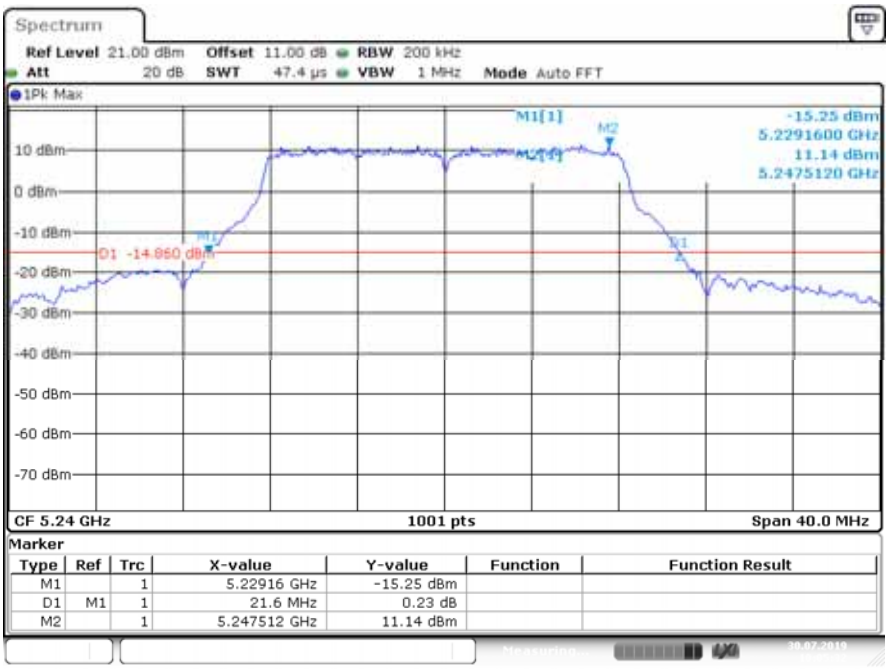
Date: 30.JUL.2019 09:57:53

5200MHz



Date: 30.JUL.2019 10:04:04

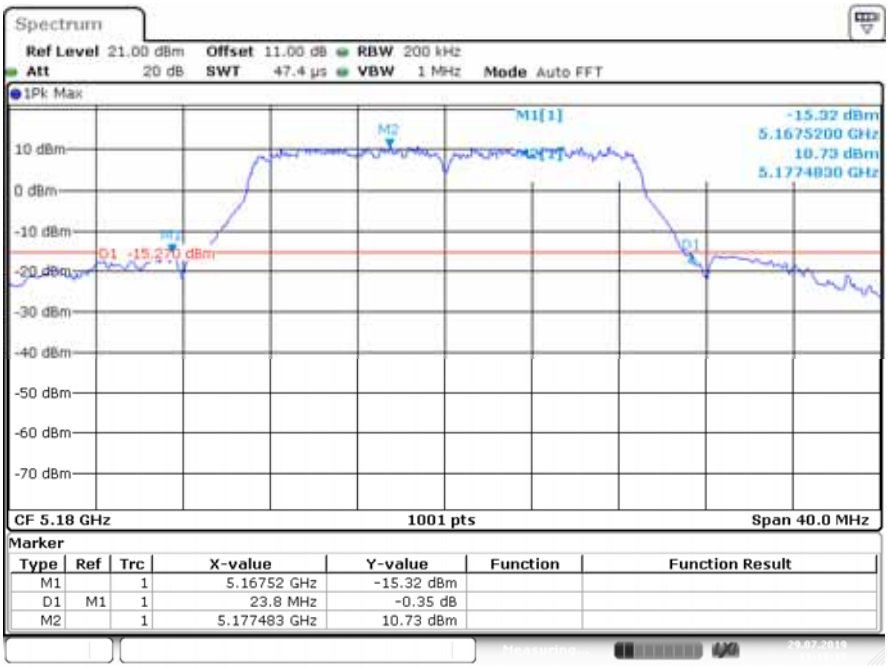
5240MHz



Date: 30.JUL.2019 10:05:32

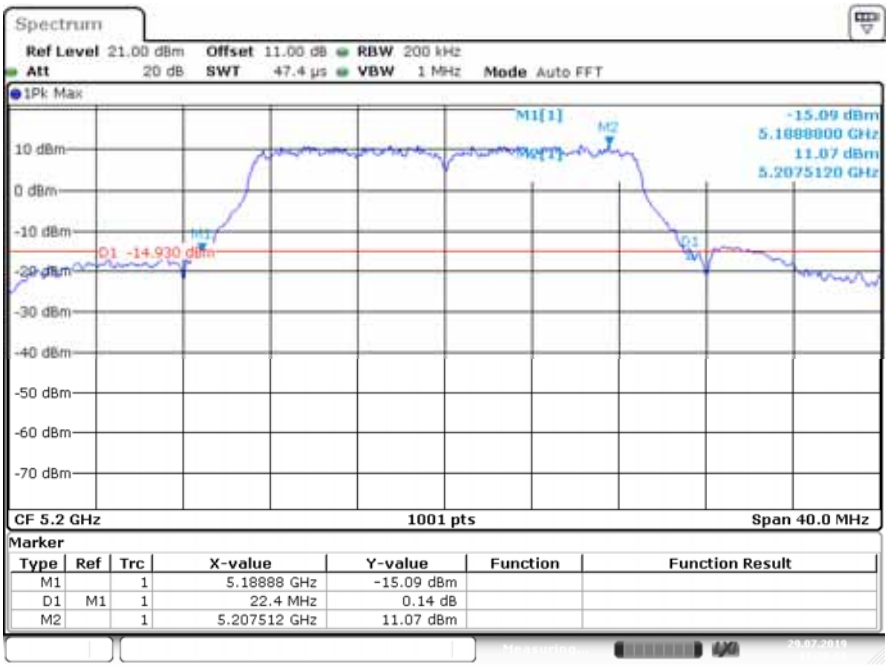
IEEE 802.11ac VHT20 Mode / 5150 ~ 5250MHz (chain 0)

5180MHz



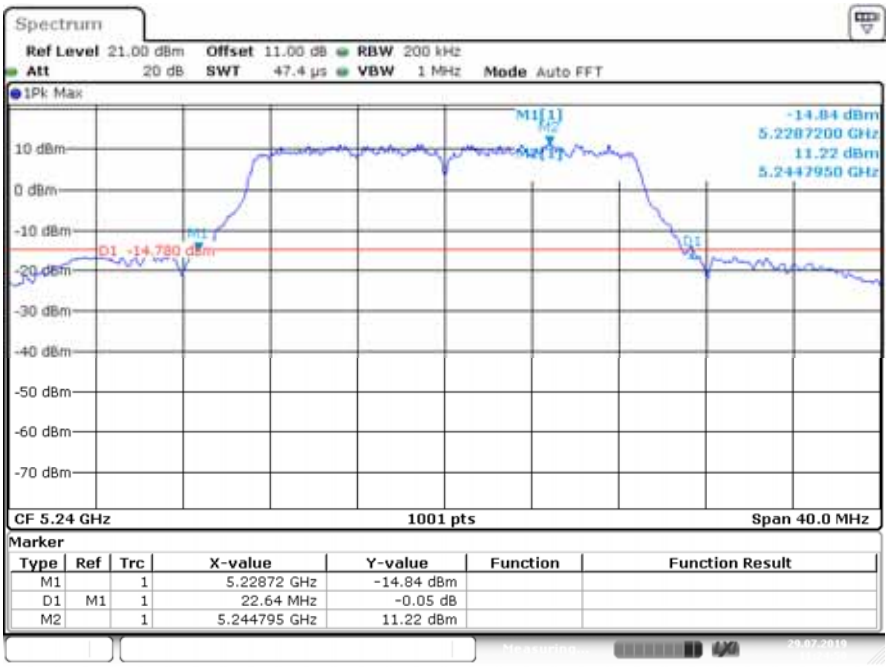
Date: 29.JUL.2019 11:18:18

5200MHz



Date: 29.JUL.2019 11:20:08

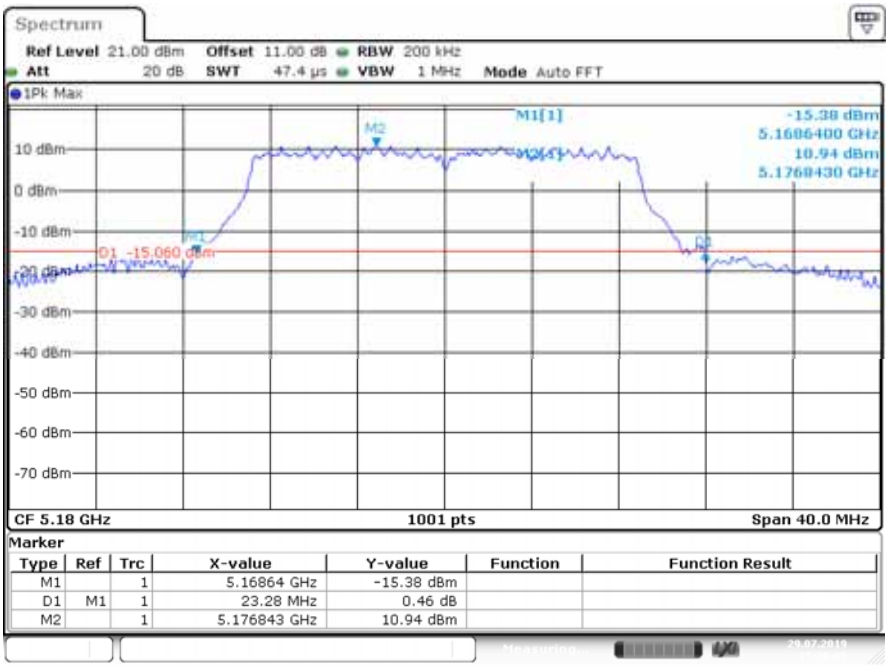
5240MHz



Date: 29.JUL.2019 11:24:50

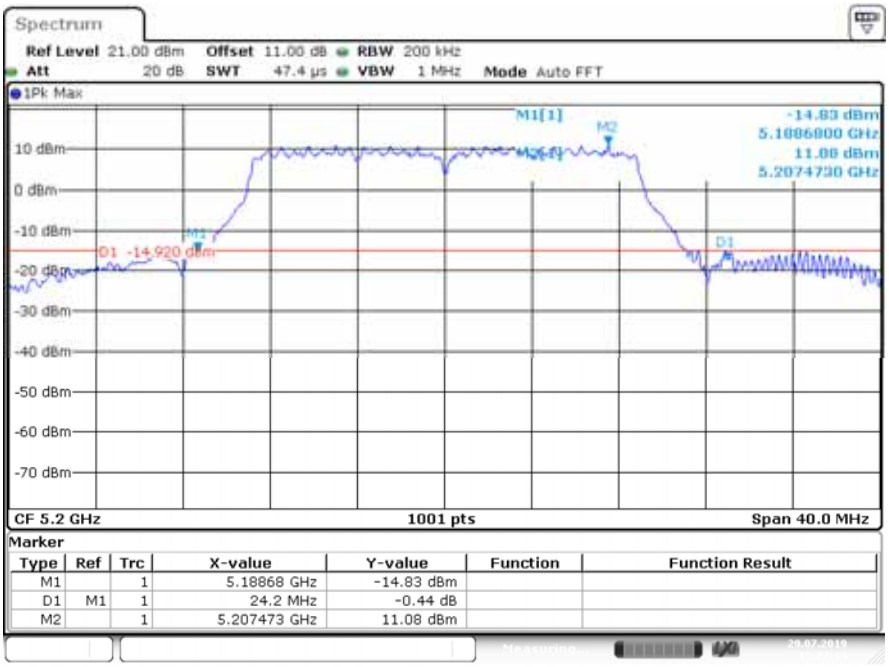
IEEE 802.11ac VHT20 Mode / 5150 ~ 5250MHz (chain 1)

5180MHz



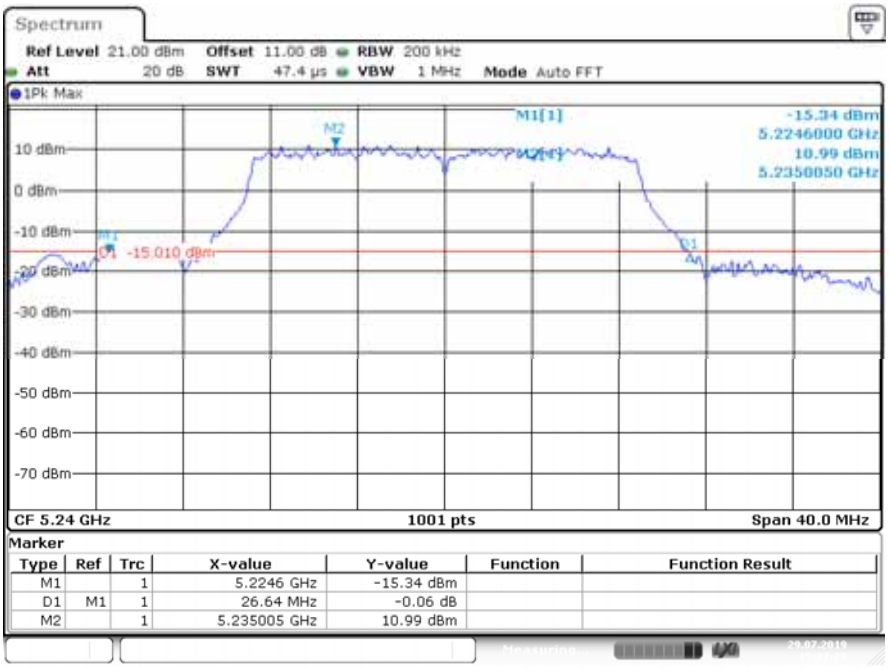
Date: 29.JUL.2019 15:20:06

5200MHz



Date: 29.JUL.2019 15:22:14

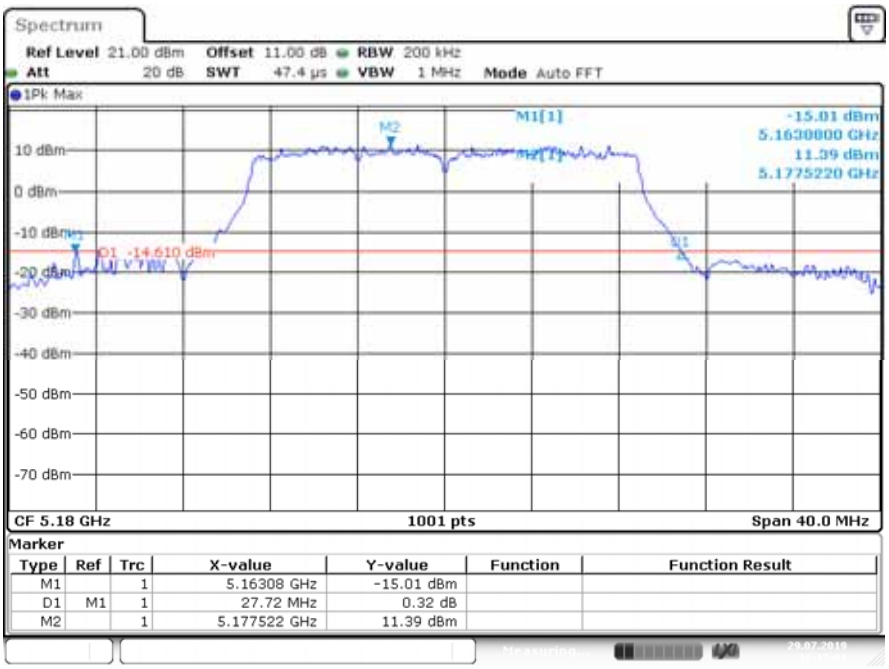
5240MHz



Date: 29.JUL.2019 15:27:29

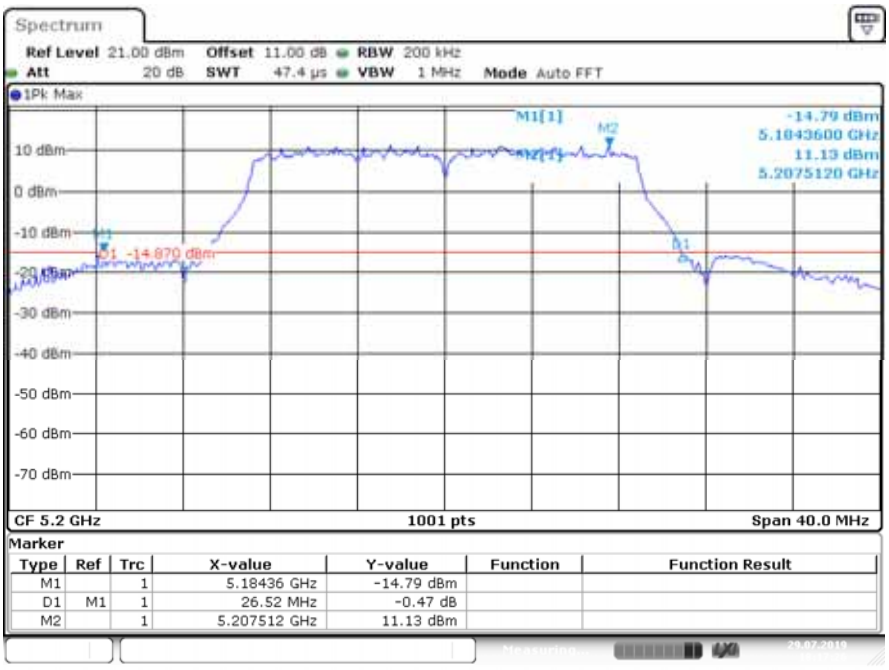
IEEE 802.11ac VHT20 Mode / 5150 ~ 5250MHz (chain 2)

5180MHz



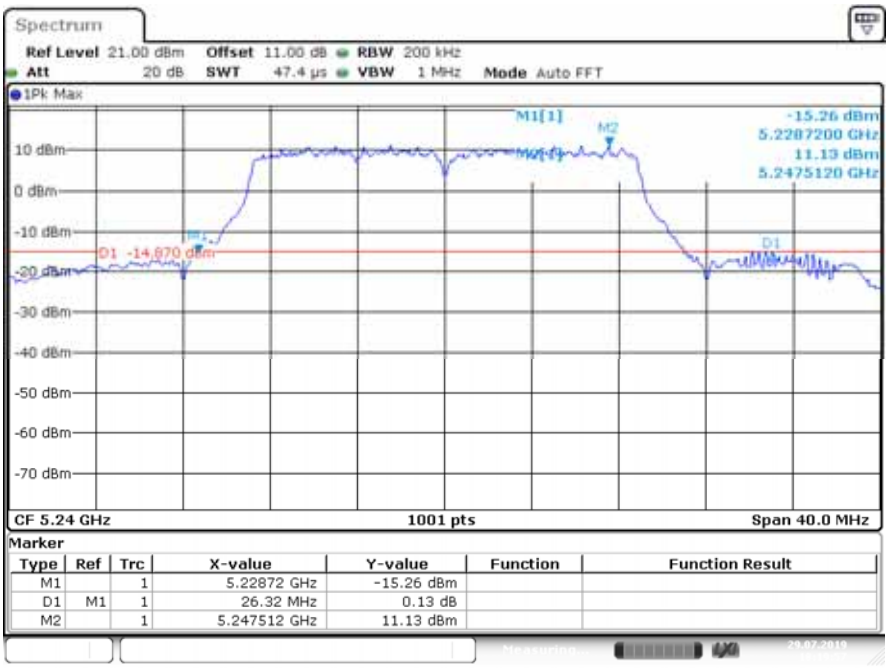
Date: 29.JUL.2019 18:15:01

5200MHz



Date: 29.JUL.2019 18:17:26

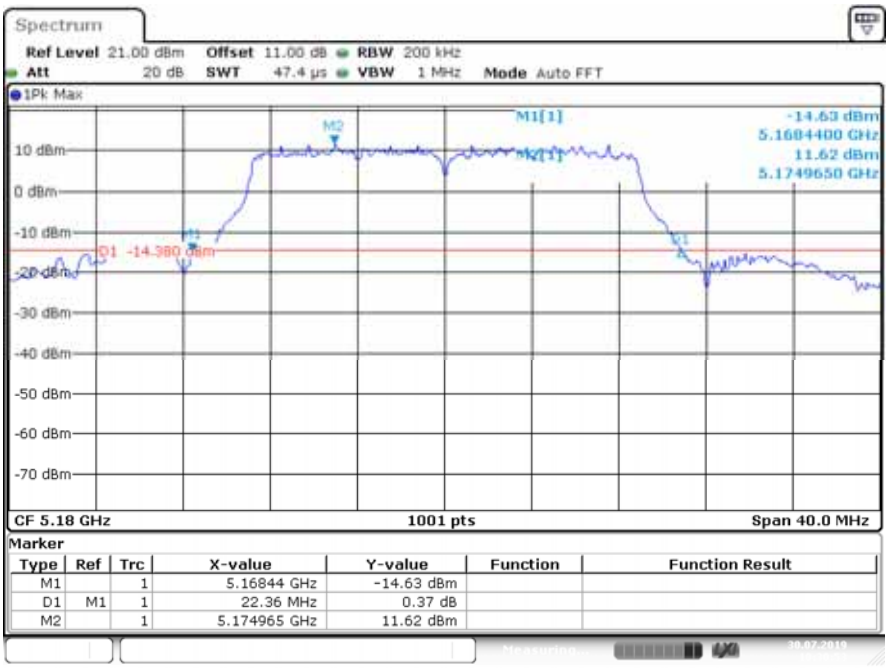
5240MHz



Date: 29.JUL.2019 18:19:58

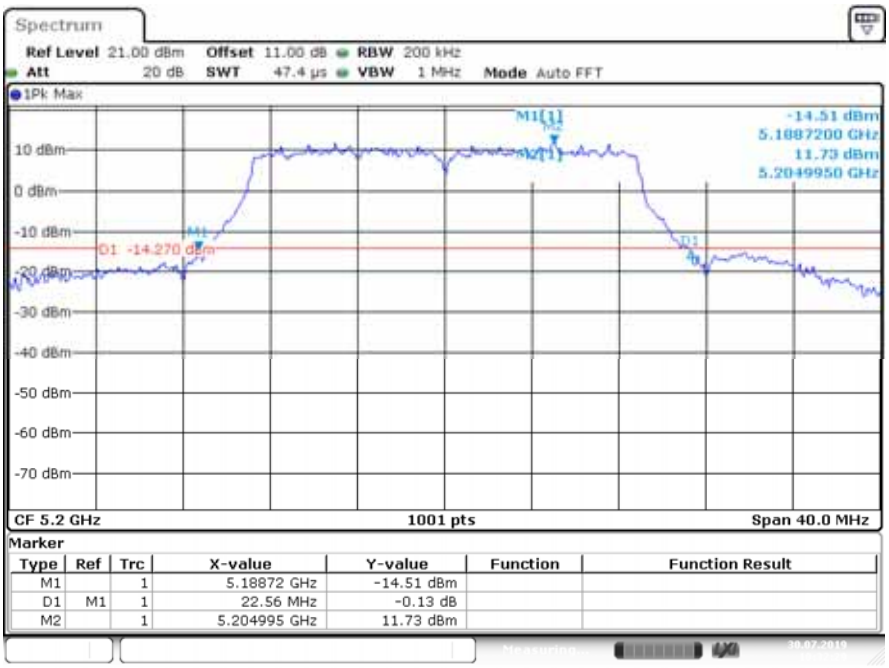
IEEE 802.11ac VHT20 Mode / 5150 ~ 5250MHz (chain 3)

5180MHz



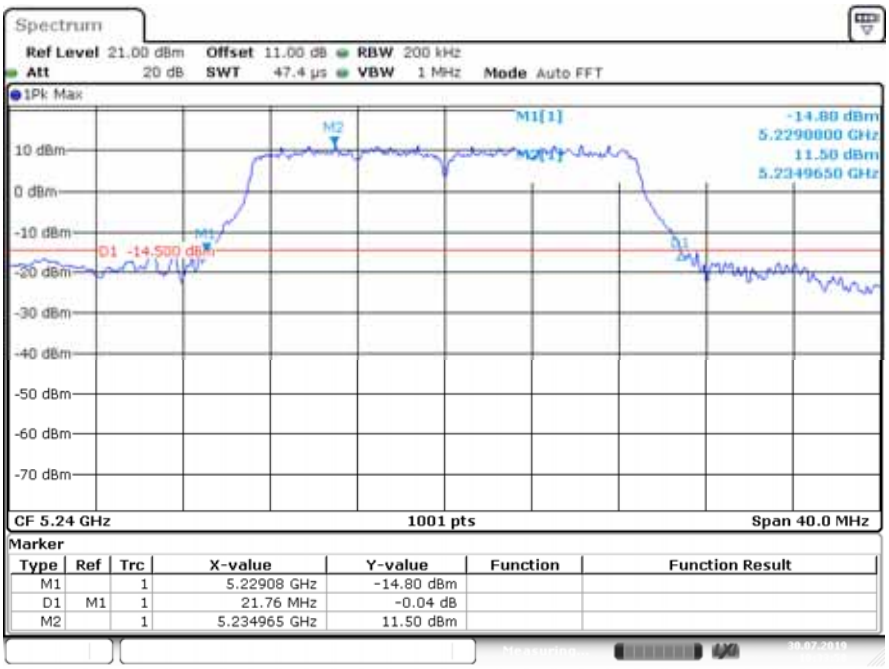
Date: 30.JUL.2019 10:30:54

5200MHz



Date: 30.JUL.2019 10:32:29

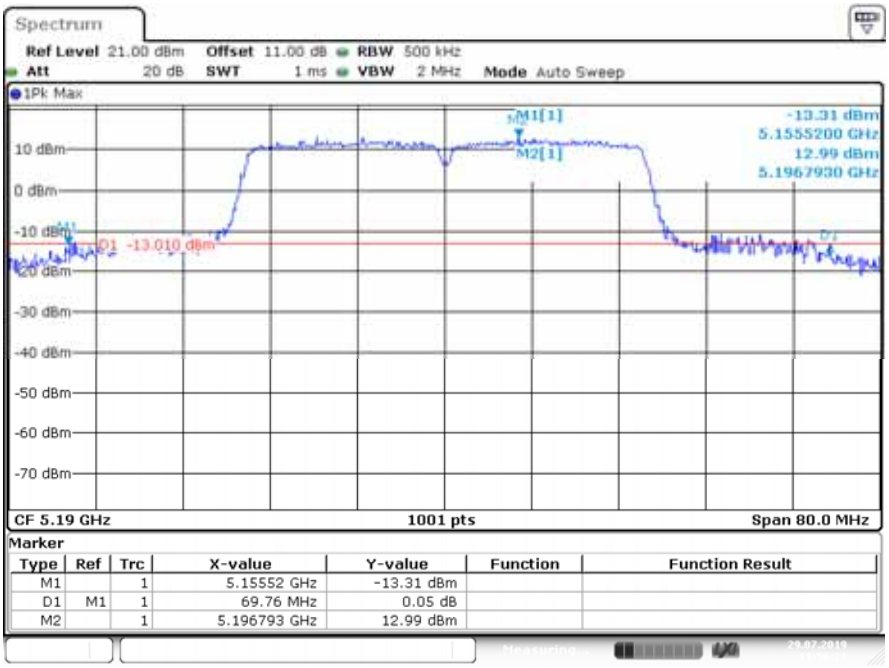
5240MHz



Date: 30.JUL.2019 10:33:58

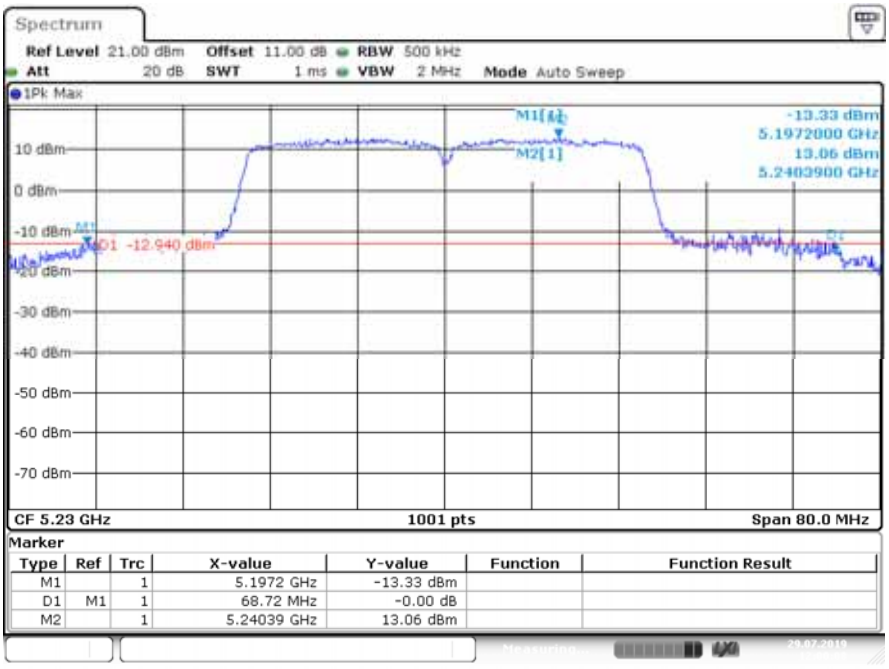
IEEE 802.11ac VHT40 Mode / 5150 ~ 5250MHz (chain 0)

5190MHz



Date: 29.JUL.2019 11:56:22

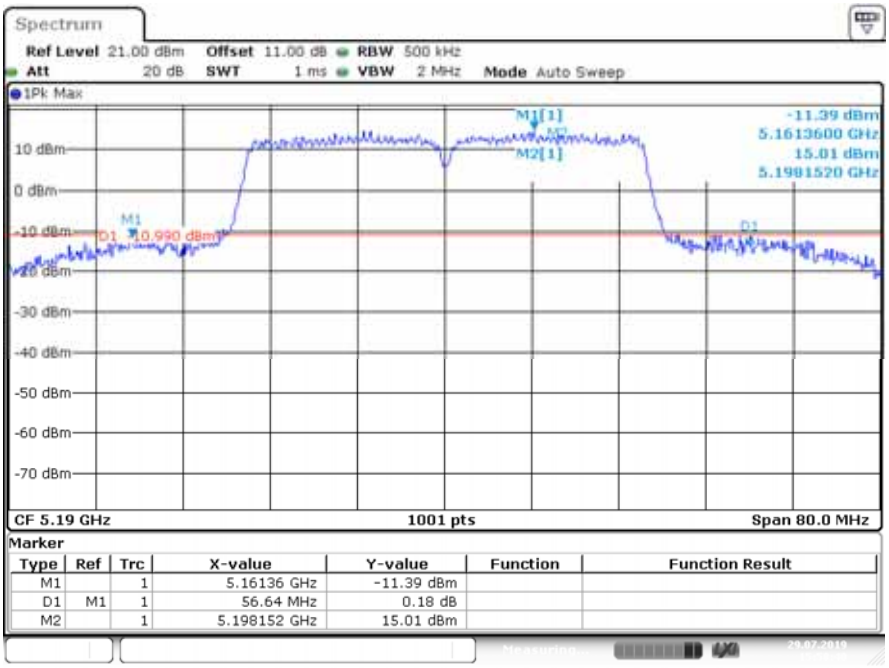
5230MHz



Date: 29.JUL.2019 12:00:08

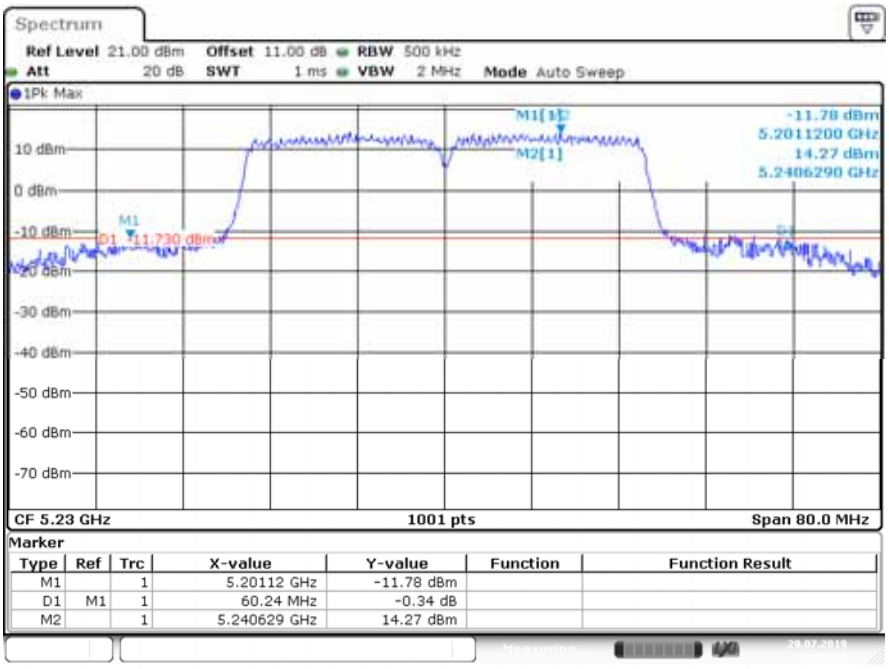
IEEE 802.11ac VHT40 Mode / 5150 ~ 5250MHz (chain 1)

5190MHz



Date: 29.JUL.2019 15:58:40

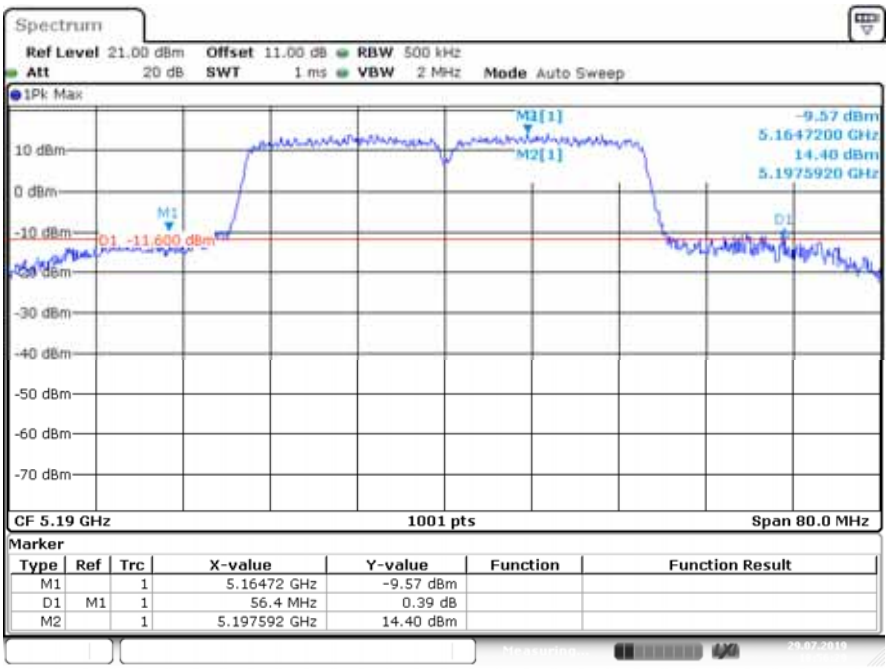
5230MHz



Date: 29.JUL.2019 16:00:49

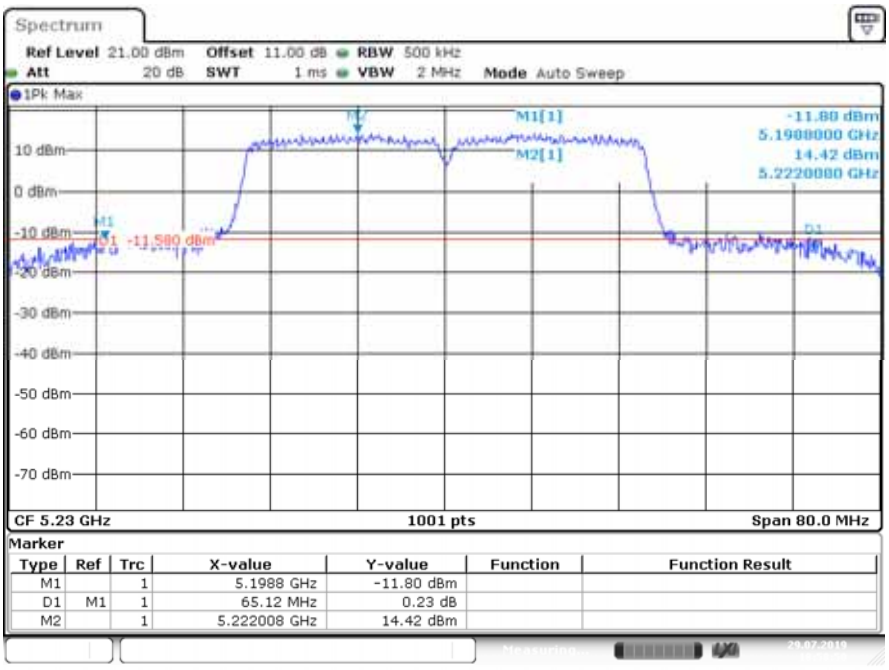
IEEE 802.11ac VHT40 Mode / 5150 ~ 5250MHz (chain 2)

5190MHz



Date: 29.JUL.2019 18:56:29

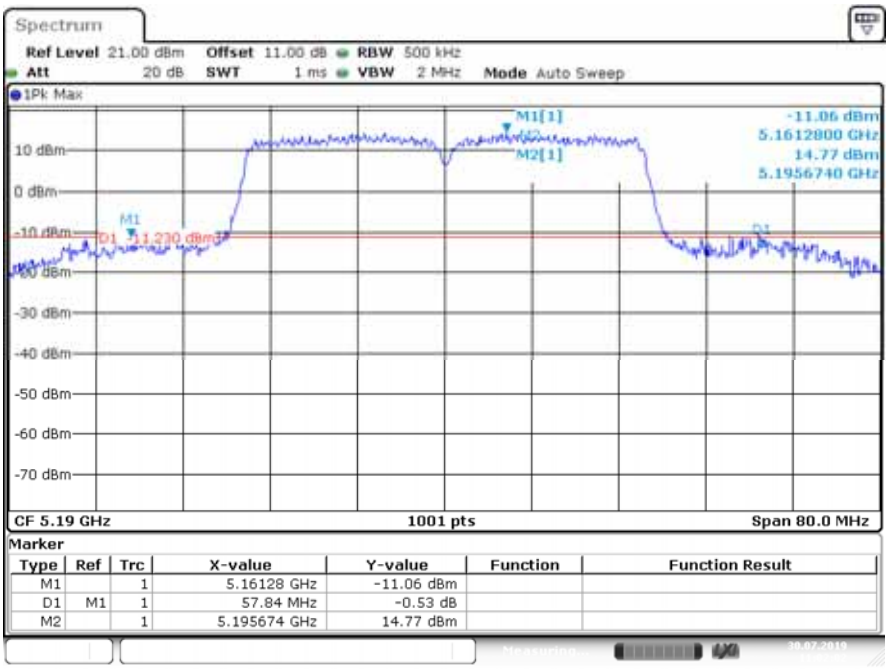
5230MHz



Date: 29.JUL.2019 18:58:50

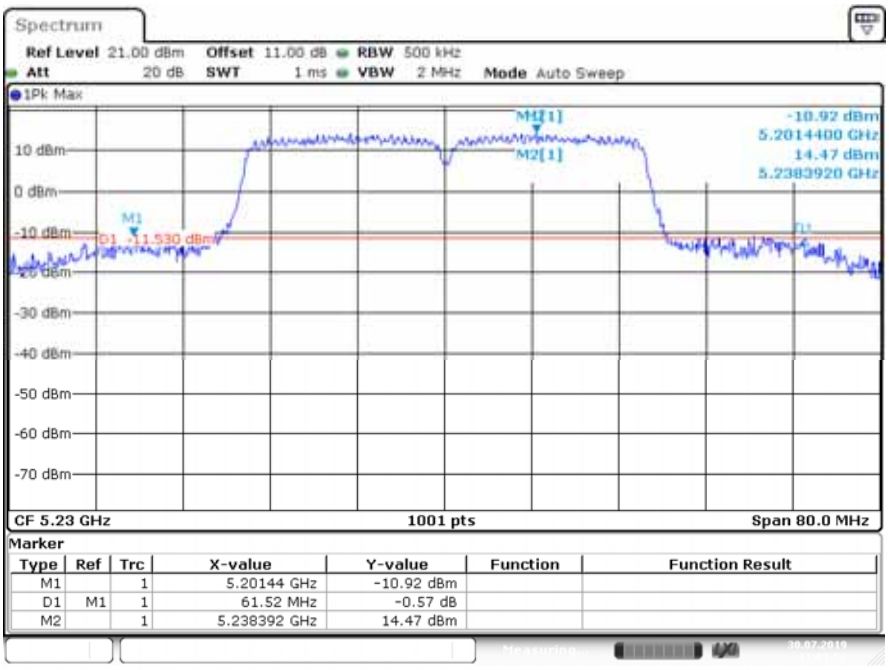
IEEE 802.11ac VHT40 Mode / 5150 ~ 5250MHz (chain 3)

5190MHz



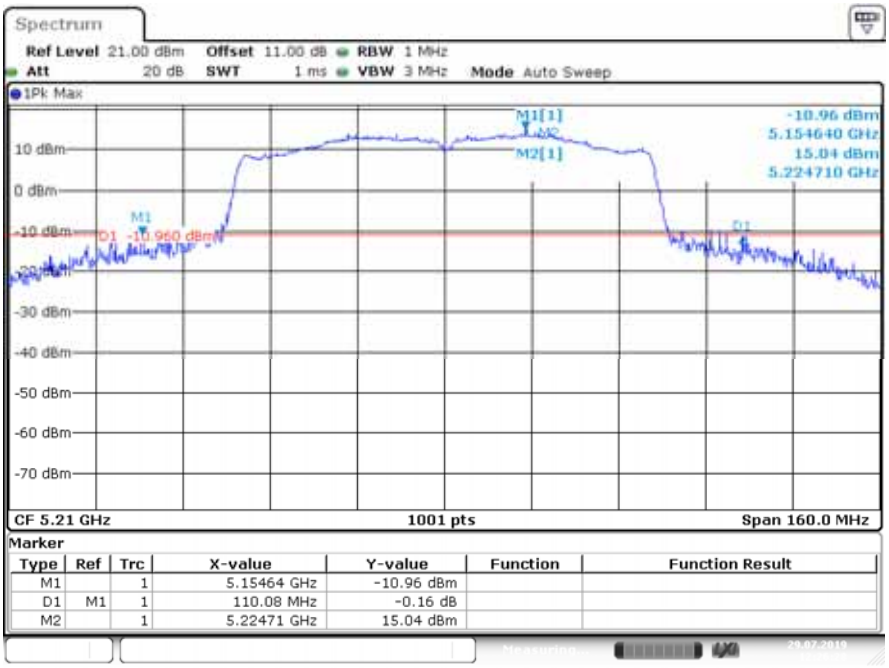
Date: 30.JUL.2019 11:02:03

5230MHz



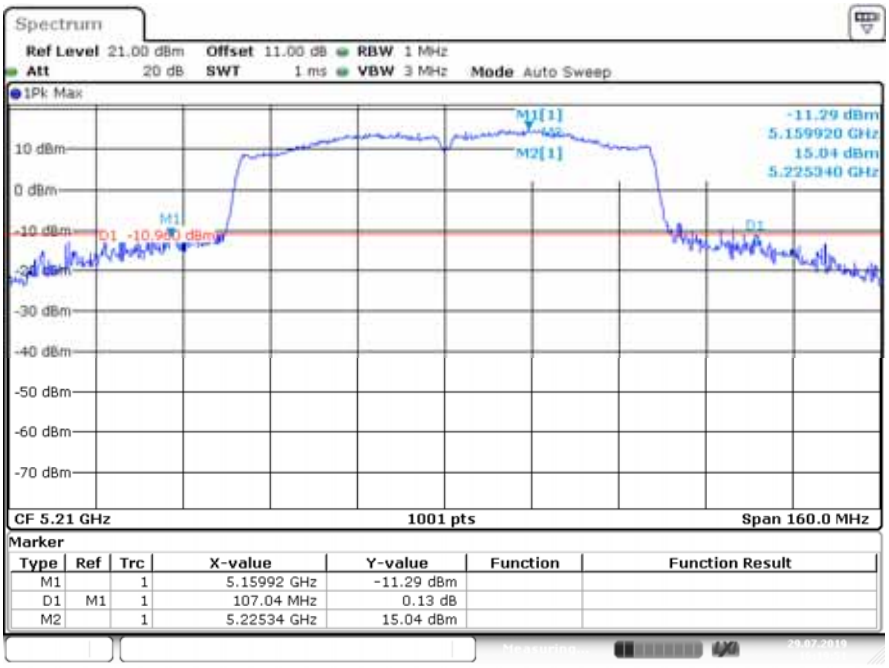
Date: 30.JUL.2019 11:03:52

IEEE 802.11ac VHT80 Mode / 5150 ~ 5250MHz (chain 0)
5210MHz



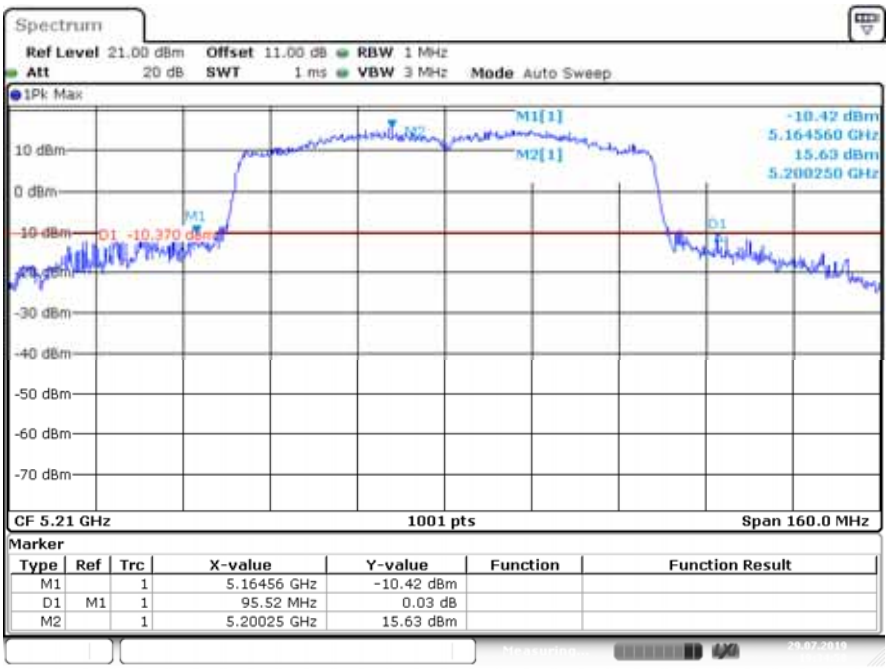
Date: 29.JUL.2019 12:26:28

IEEE 802.11ac VHT80 Mode / 5150 ~ 5250MHz (chain 1)
5210MHz



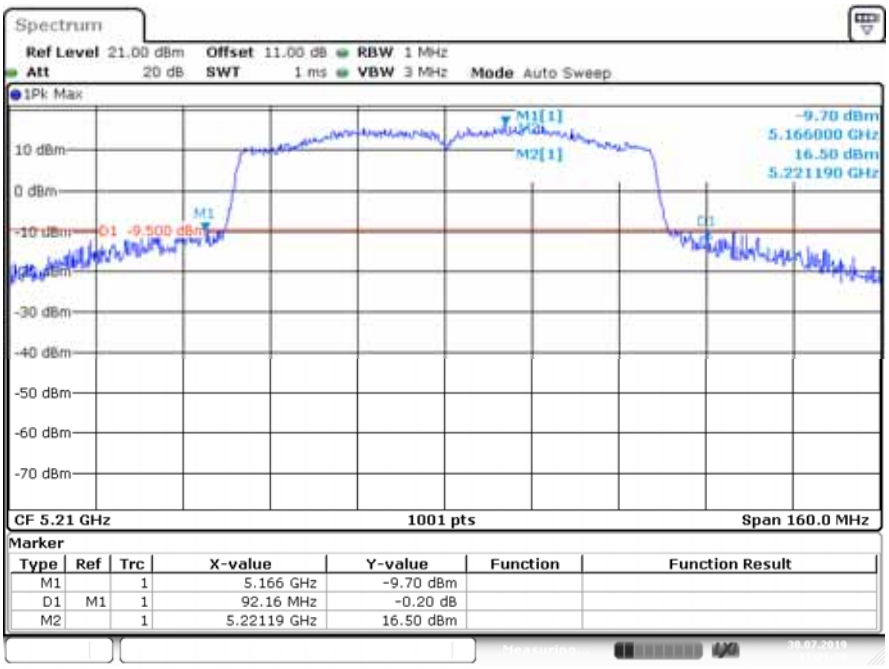
Date: 29.JUL.2019 16:19:51

IEEE 802.11ac VHT80 Mode / 5150 ~ 5250MHz (chain 2)
5210MHz



Date: 29.JUL.2019 19:34:59

IEEE 802.11ac VHT80 Mode / 5150 ~ 5250MHz (chain 3)
5210MHz

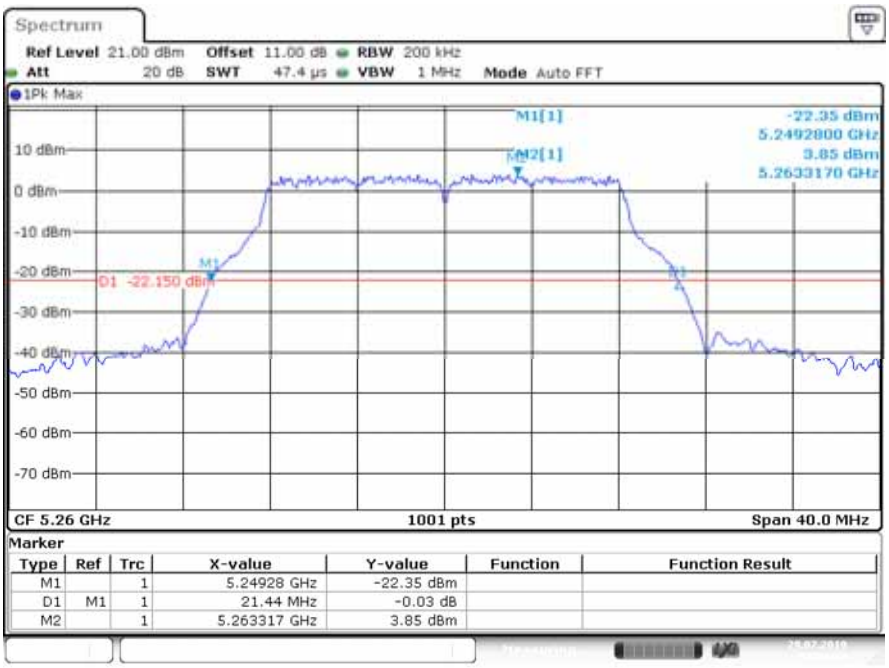


Date: 30.JUL.2019 11:21:31

UNII-2A Band II / BW 26dBc

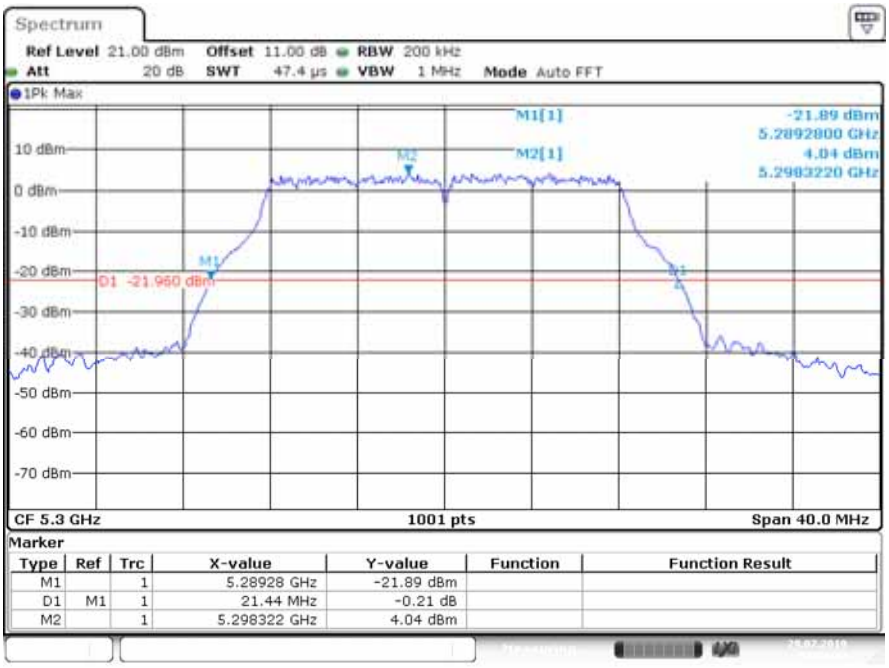
IEEE 802.11a Mode / 5250 ~ 5350MHz (chain 0)

5260MHz



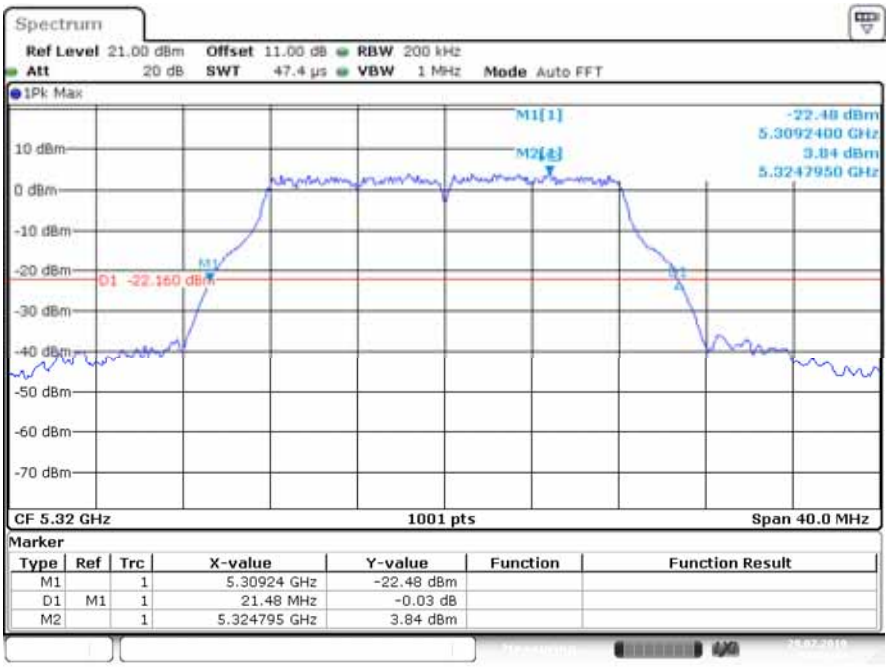
Date: 29.JUL.2019 10:50:20

5300MHz



Date: 29.JUL.2019 10:53:34

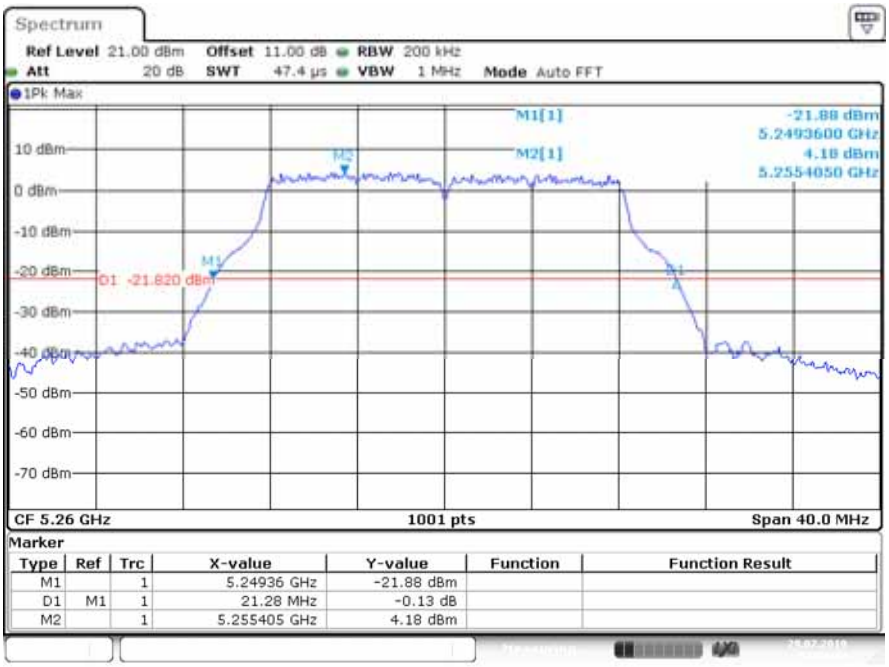
5320MHz



Date: 29.JUL.2019 10:55:43

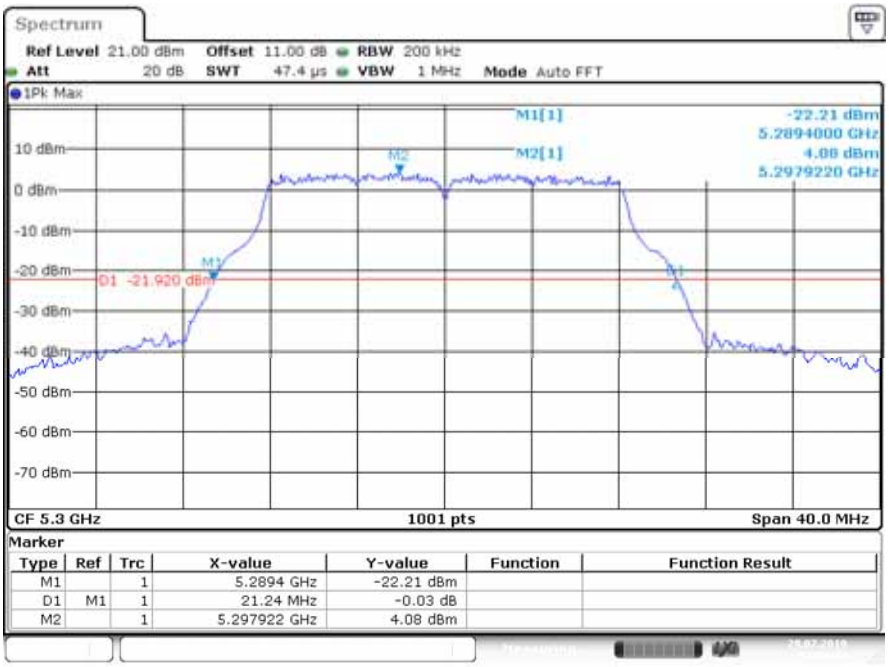
IEEE 802.11a Mode / 5250 ~ 5350MHz (chain 1)

5260MHz



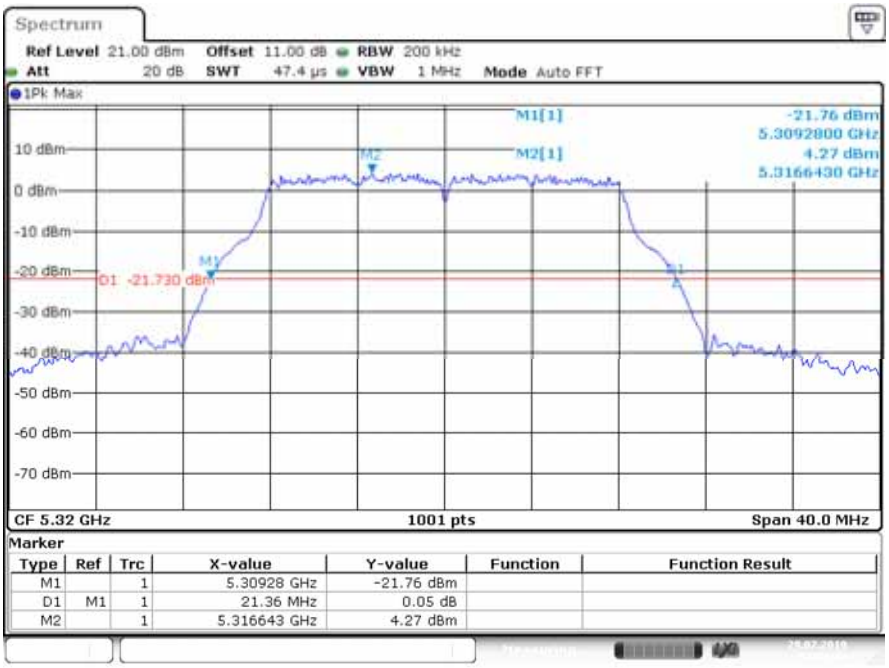
Date: 29.JUL.2019 14:51:48

5300MHz



Date: 29.JUL.2019 14:53:49

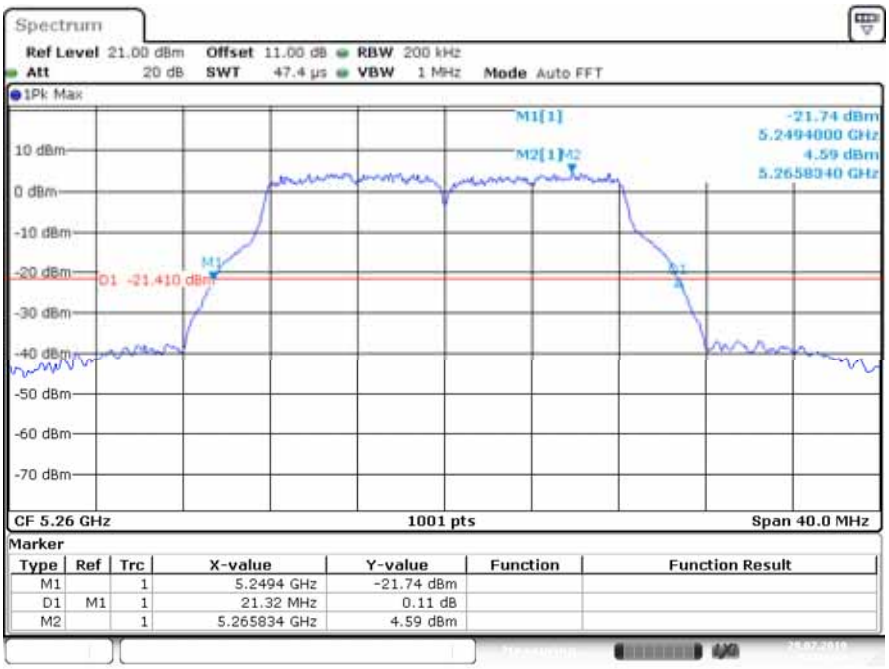
5320MHz



Date: 29.JUL.2019 14:55:47

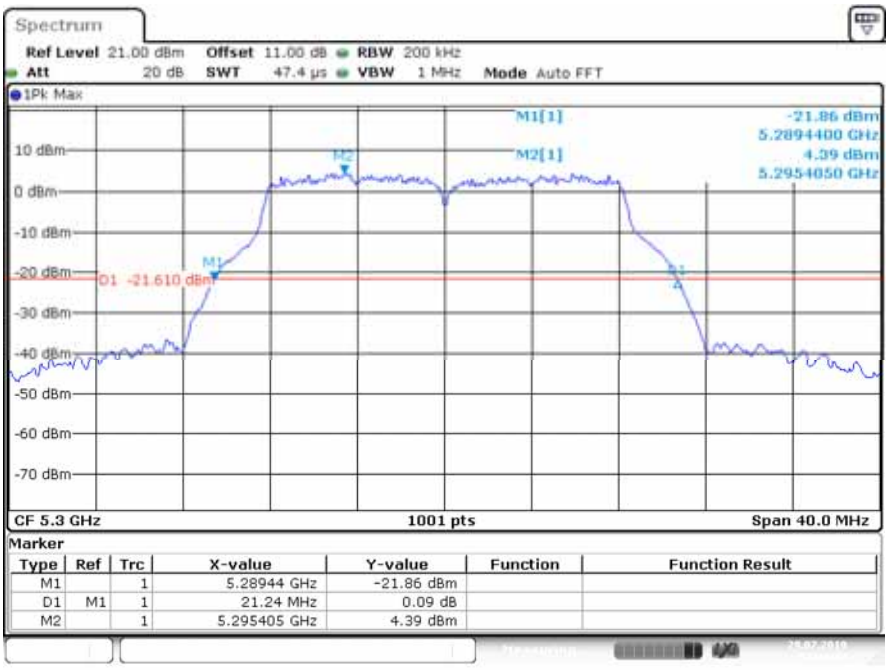
IEEE 802.11a Mode / 5250 ~ 5350MHz (chain 2)

5260MHz



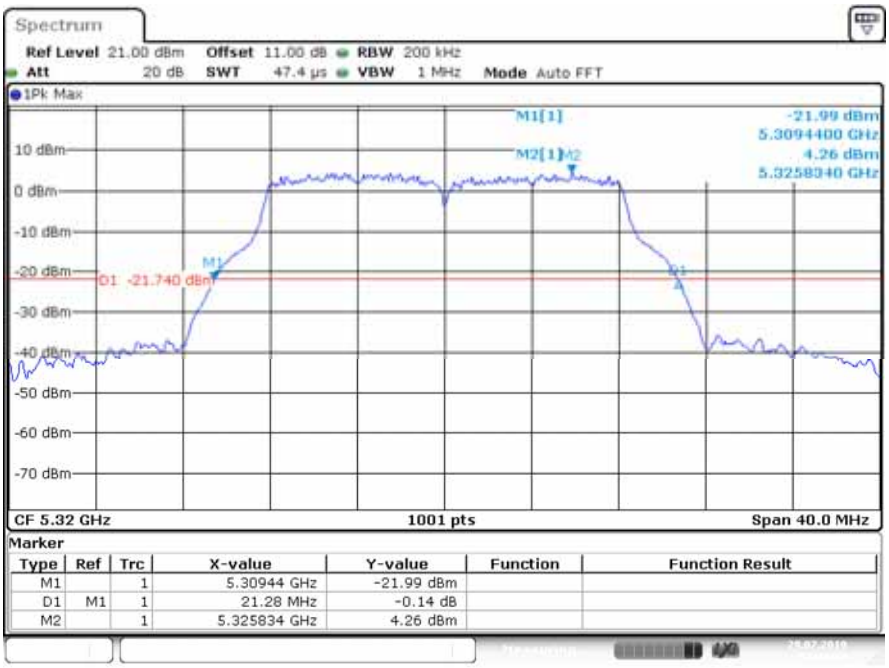
Date: 29.JUL.2019 17:25:10

5300MHz



Date: 29.JUL.2019 17:37:24

5320MHz



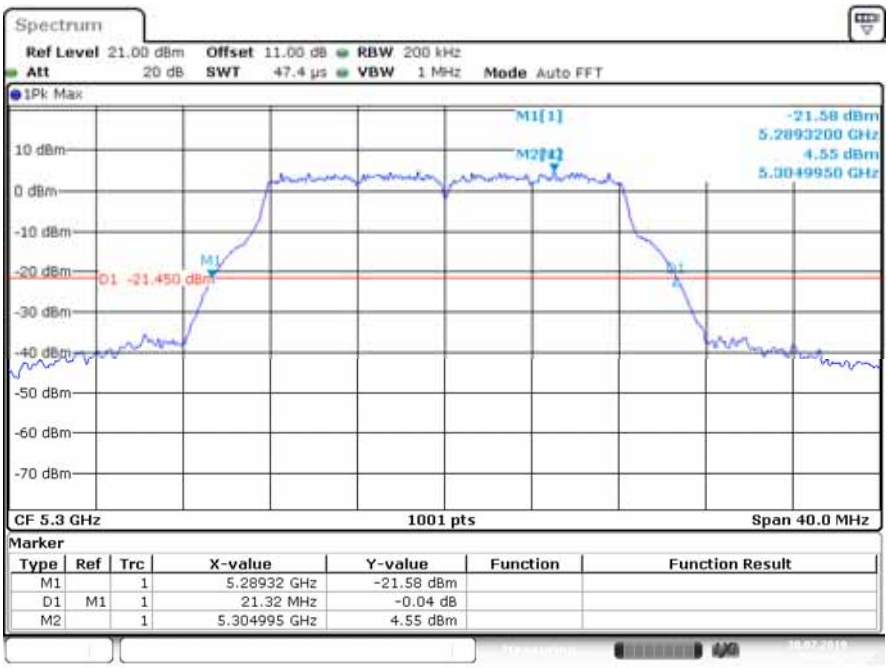
Date: 29.JUL.2019 17:40:20

IEEE 802.11a Mode / 5250 ~ 5350MHz (chain 3)

5260MHz

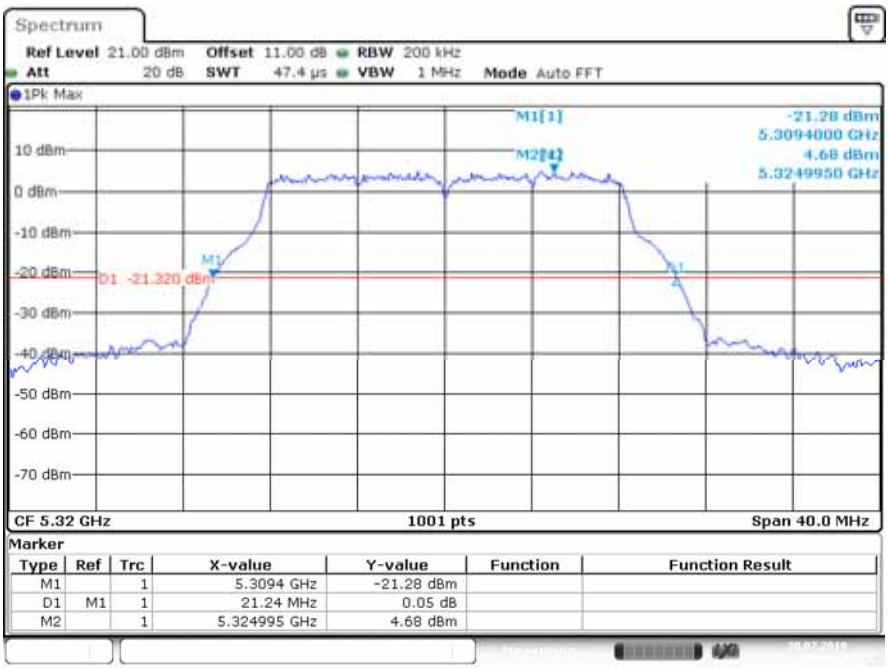
Date: 30.JUL.2019 10:14:56

5300MHz



Date: 30.JUL.2019 10:16:36

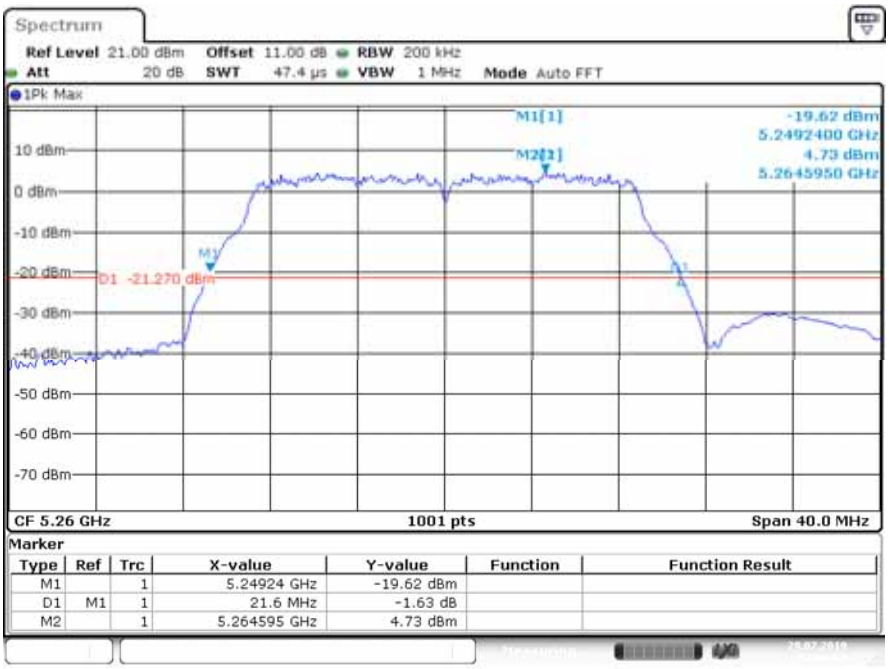
5320MHz



Date: 30.JUL.2019 10:18:36

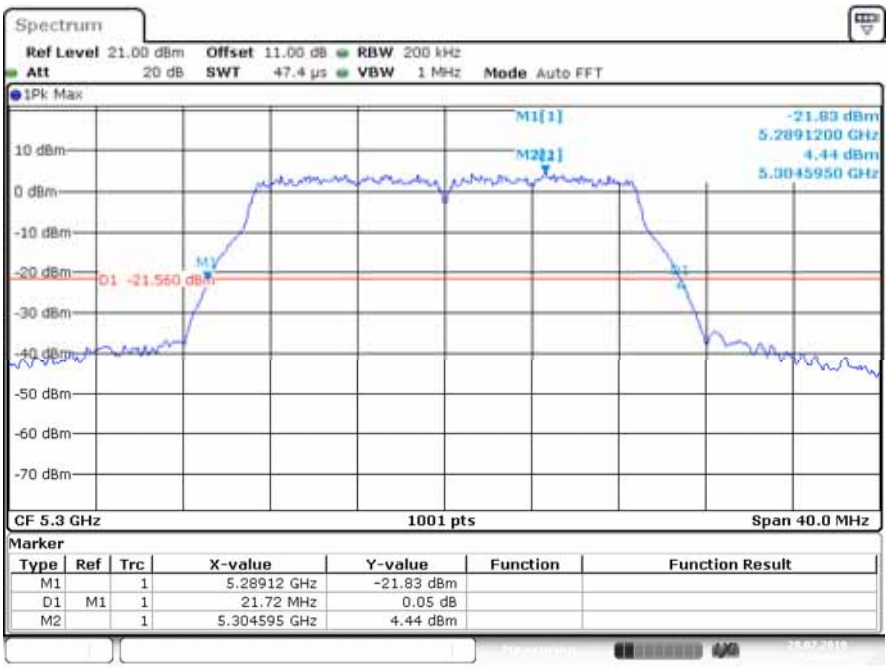
IEEE 802.11ac VHT20 Mode / 5250 ~ 5350MHz (chain 0)

5260MHz



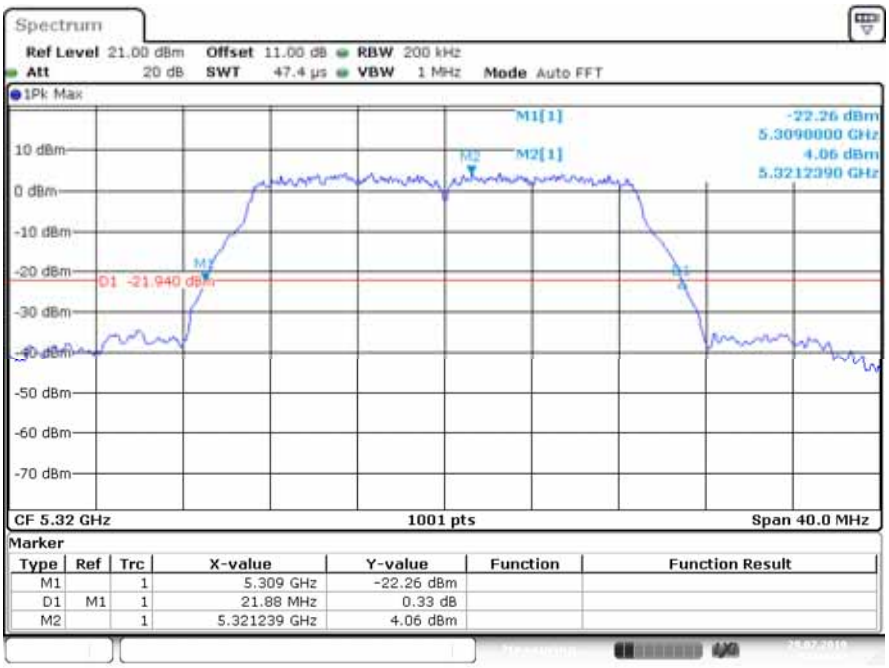
Date: 29.JUL.2019 11:34:58

5300MHz



Date: 29.JUL.2019 11:36:44

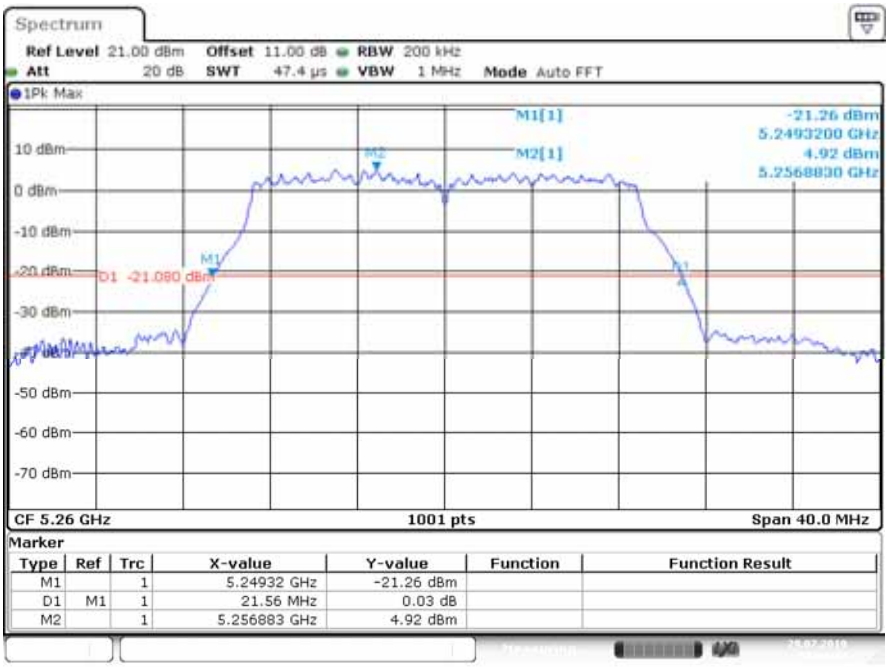
5320MHz



Date: 29.JUL.2019 11:38:32

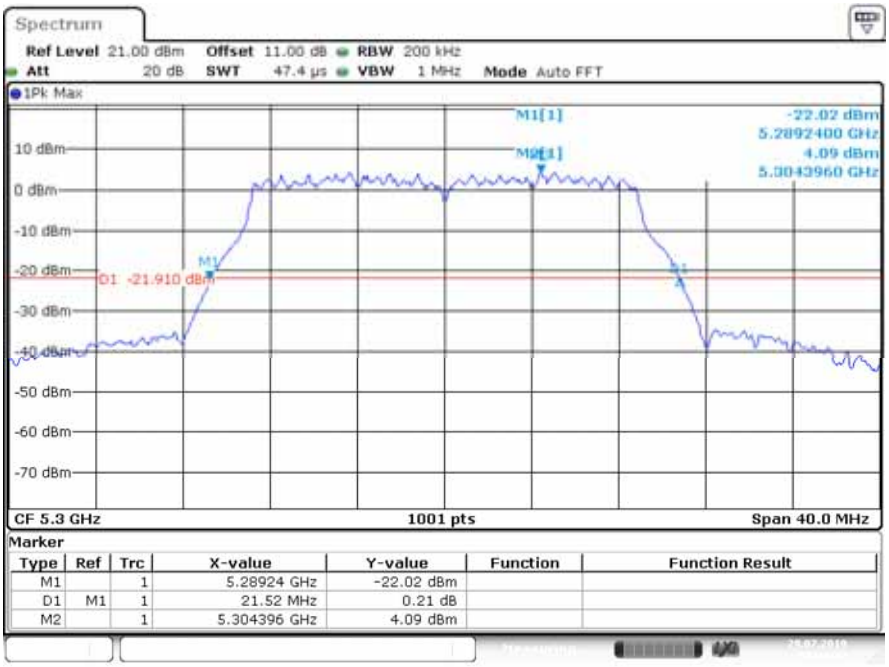
IEEE 802.11ac VHT20 Mode / 5250 ~ 5350MHz (chain 1)

5260MHz



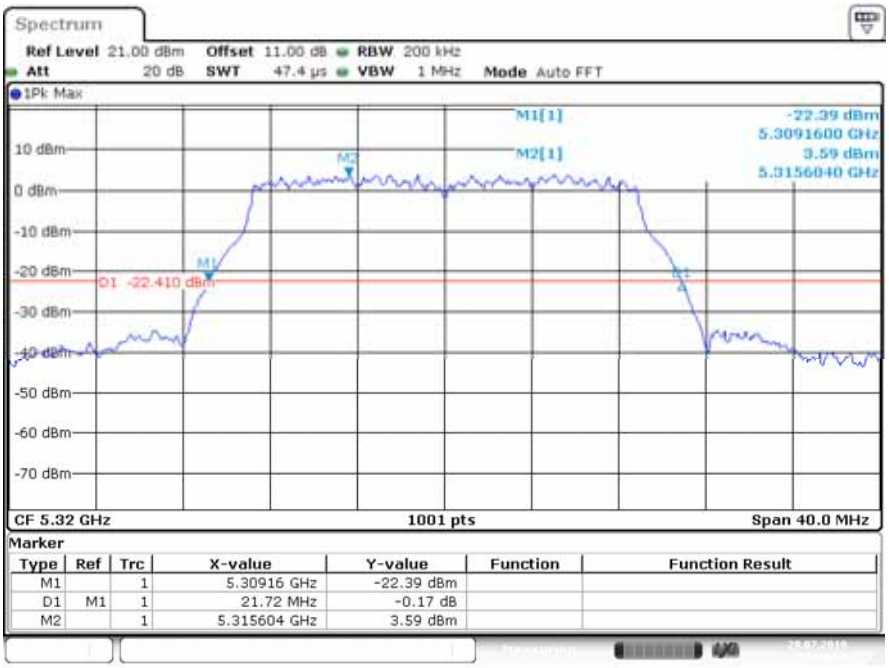
Date: 29.JUL.2019 15:36:34

5300MHz



Date: 29.JUL.2019 15:38:22

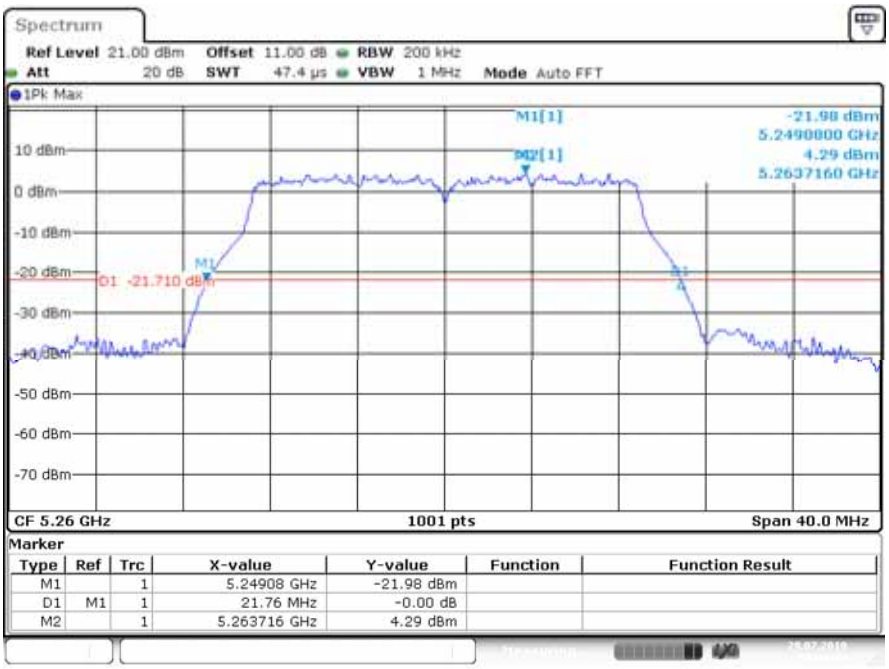
5320MHz



Date: 29.JUL.2019 15:40:00

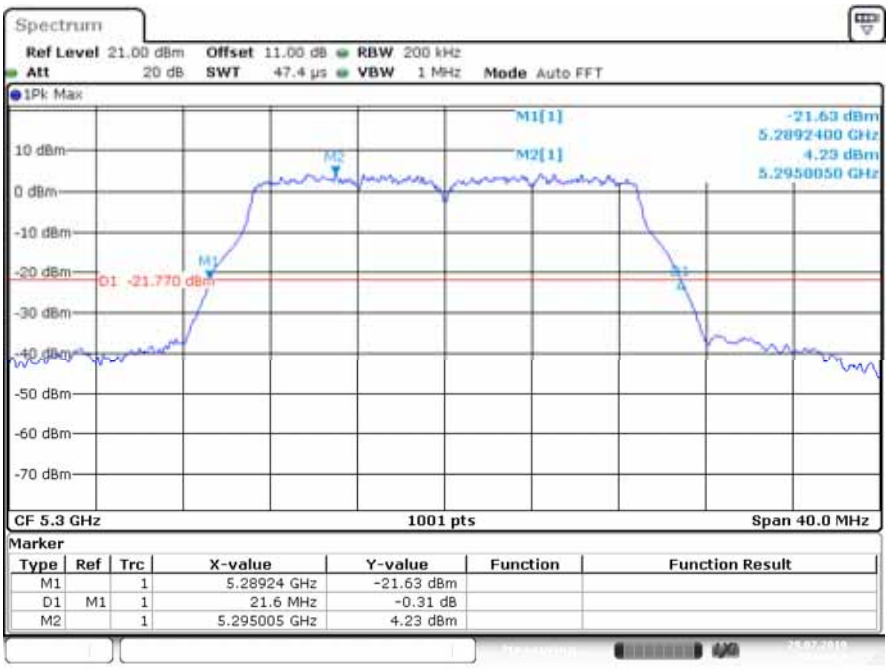
IEEE 802.11ac VHT20 Mode / 5250 ~ 5350MHz (chain 2)

5260MHz



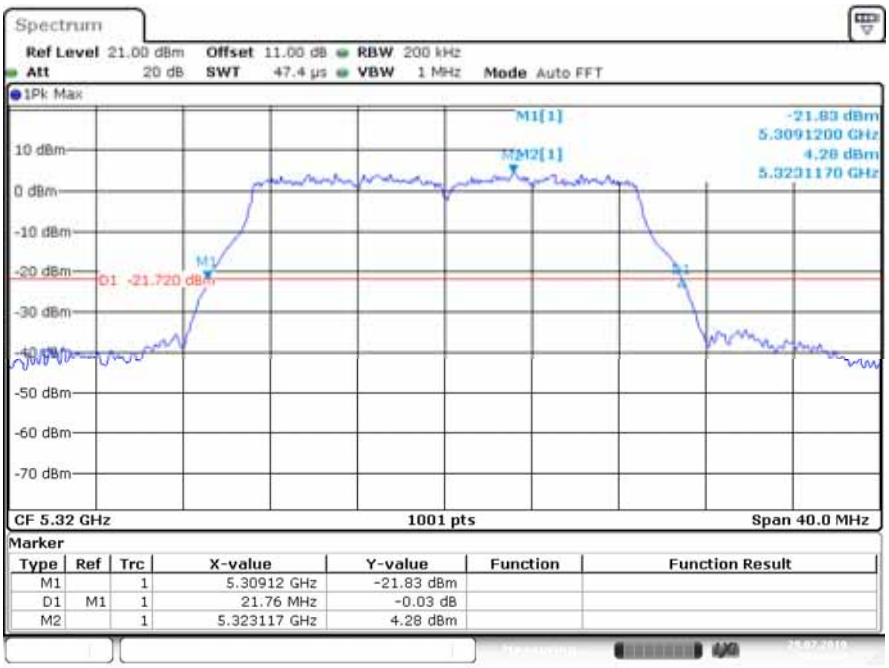
Date: 29.JUL.2019 18:21:45

5300MHz



Date: 29.JUL.2019 18:26:55

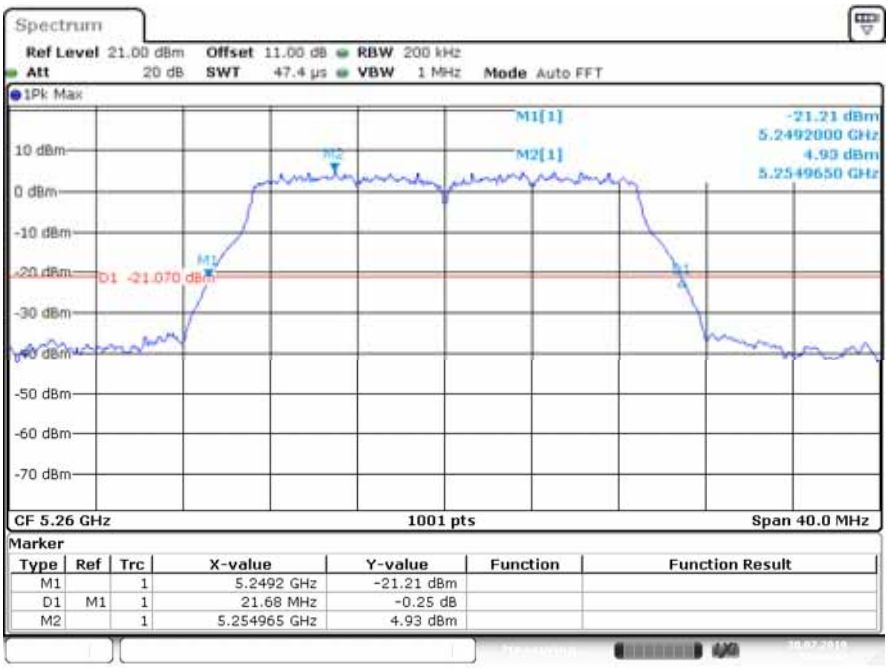
5320MHz



Date: 29.JUL.2019 18:31:07

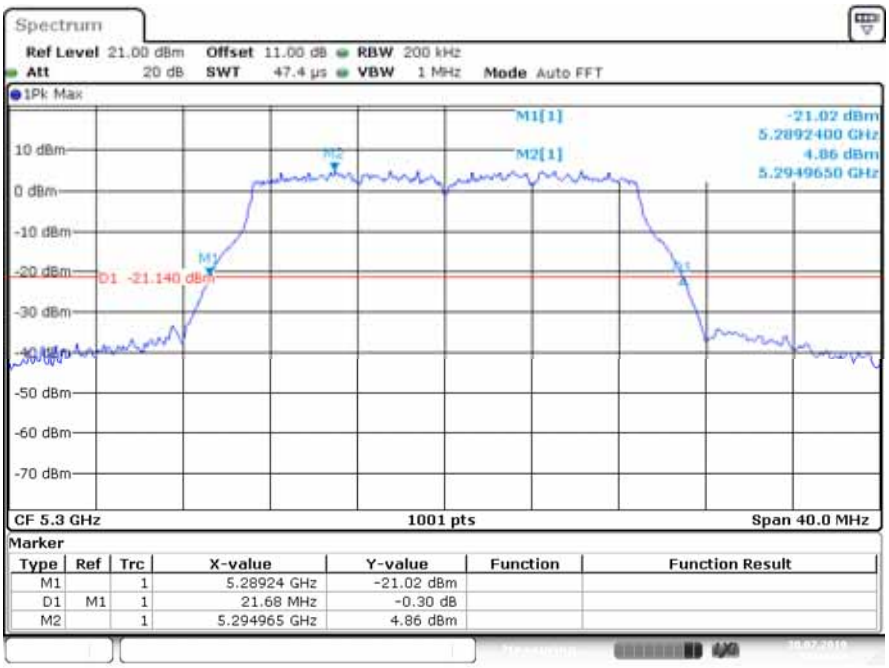
IEEE 802.11ac VHT20 Mode / 5250 ~ 5350MHz (chain 3)

5260MHz



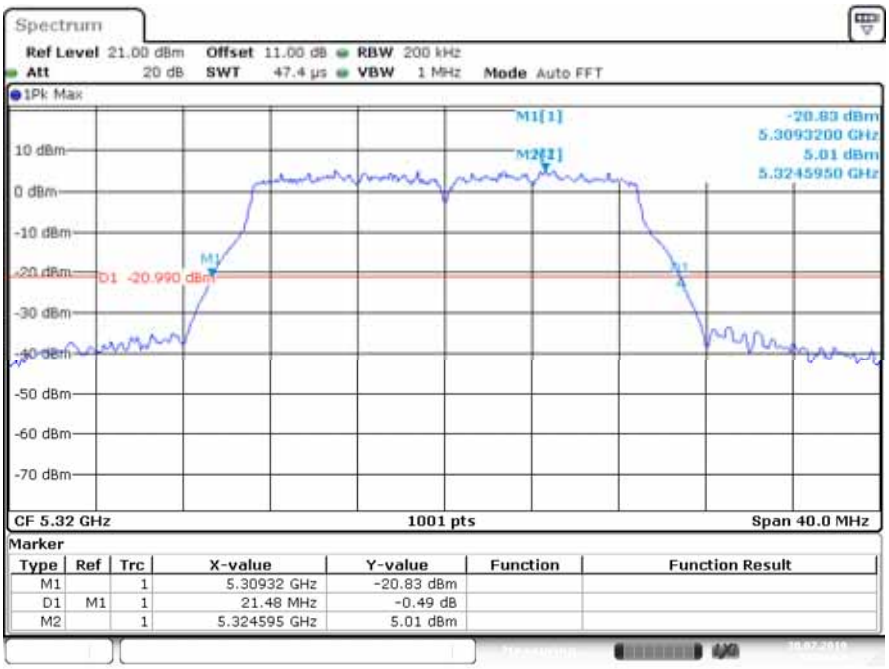
Date: 30.JUL.2019 10:36:33

5300MHz



Date: 30.JUL.2019 10:38:11

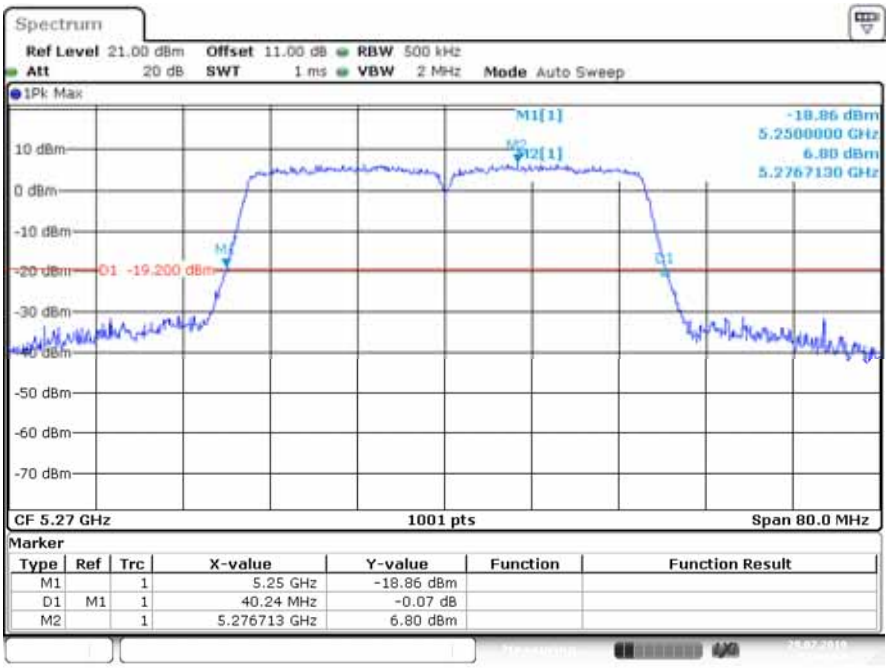
5320MHz



Date: 30.JUL.2019 10:50:09

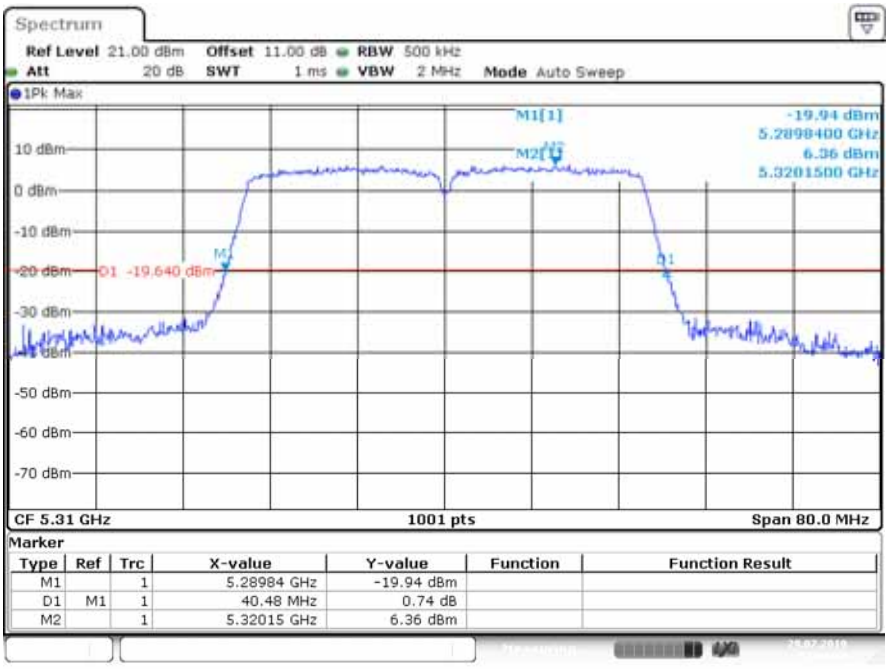
IEEE 802.11ac VHT40 Mode / 5250 ~ 5350MHz (chain 0)

5270MHz



Date: 29.JUL.2019 12:03:00

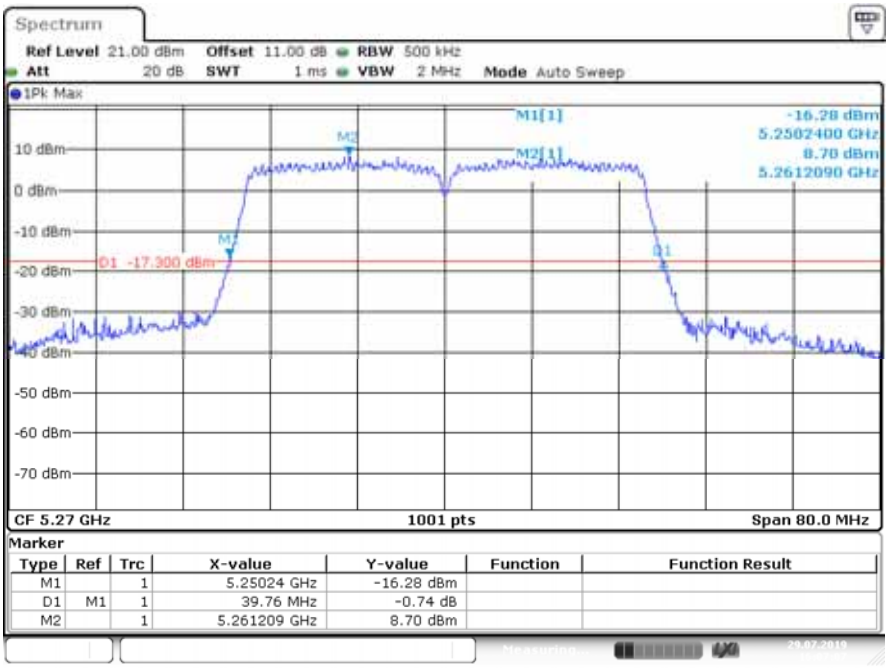
5310MHz



Date: 29.JUL.2019 12:07:21

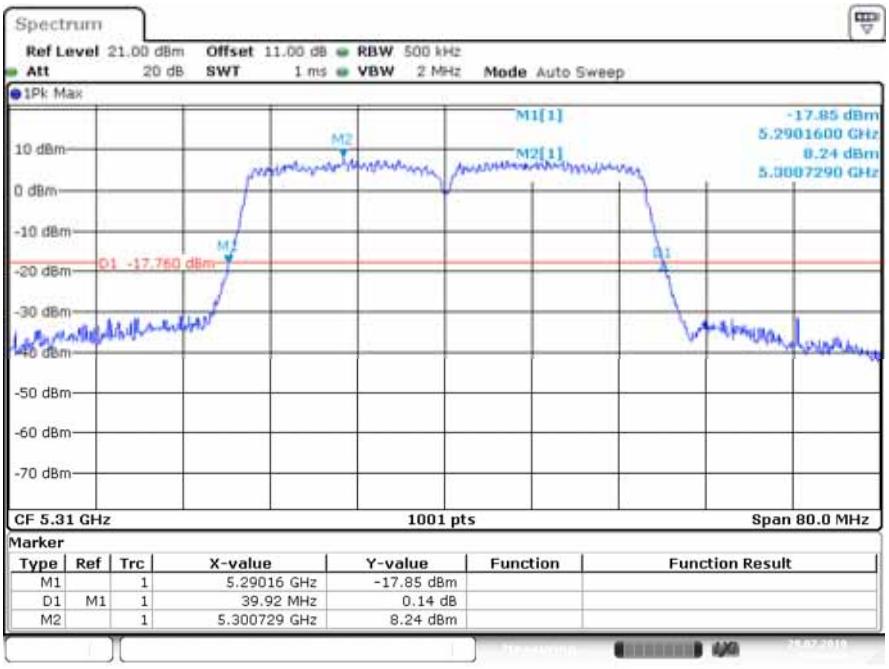
IEEE 802.11ac VHT40 Mode / 5250 ~ 5350MHz (chain 1)

5270MHz



Date: 29.JUL.2019 16:07:08

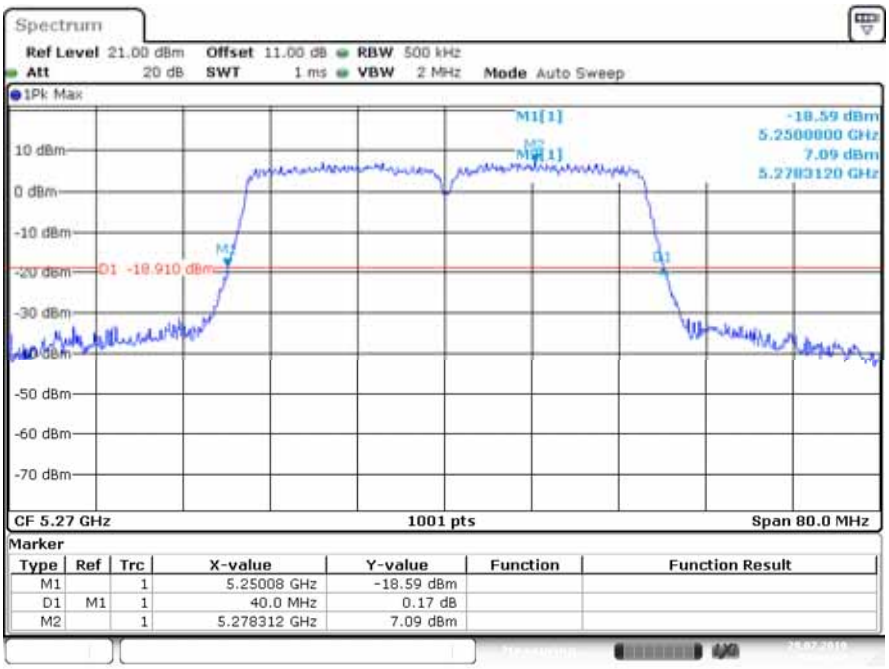
5310MHz



Date: 29.JUL.2019 16:03:19

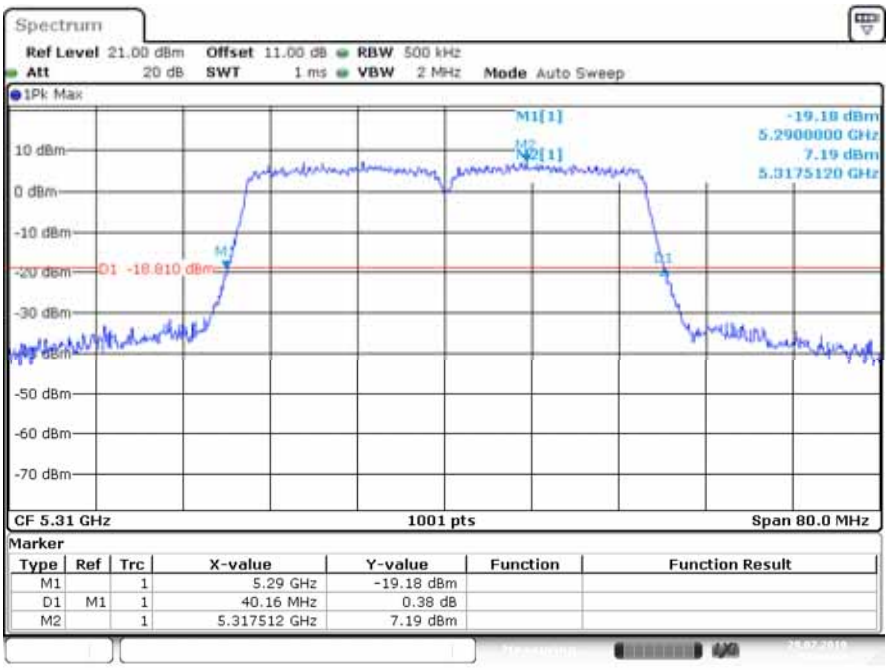
IEEE 802.11ac VHT40 Mode / 5250 ~ 5350MHz (chain 2)

5270MHz



Date: 29.JUL.2019 19:15:08

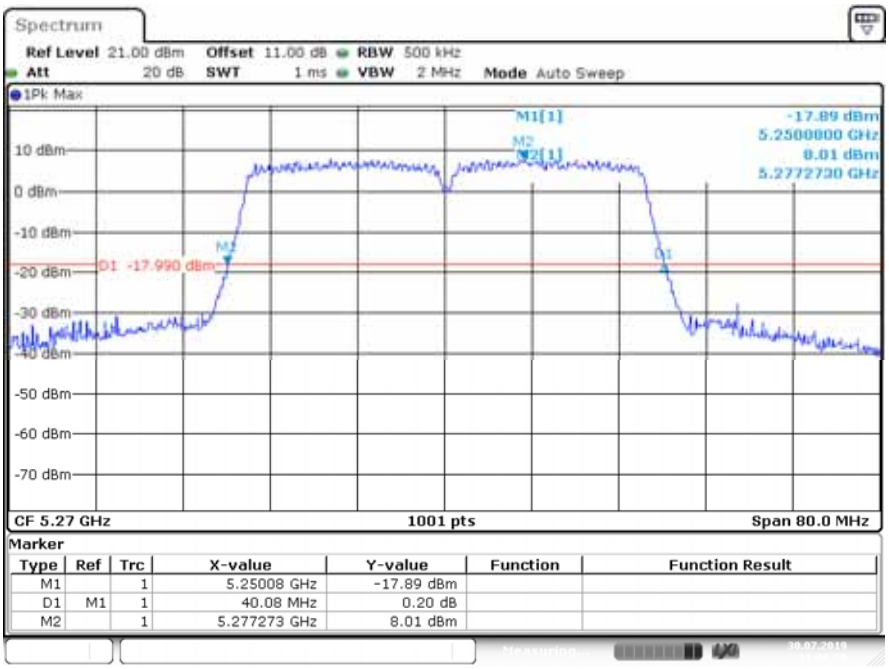
5310MHz



Date: 29.JUL.2019 19:16:54

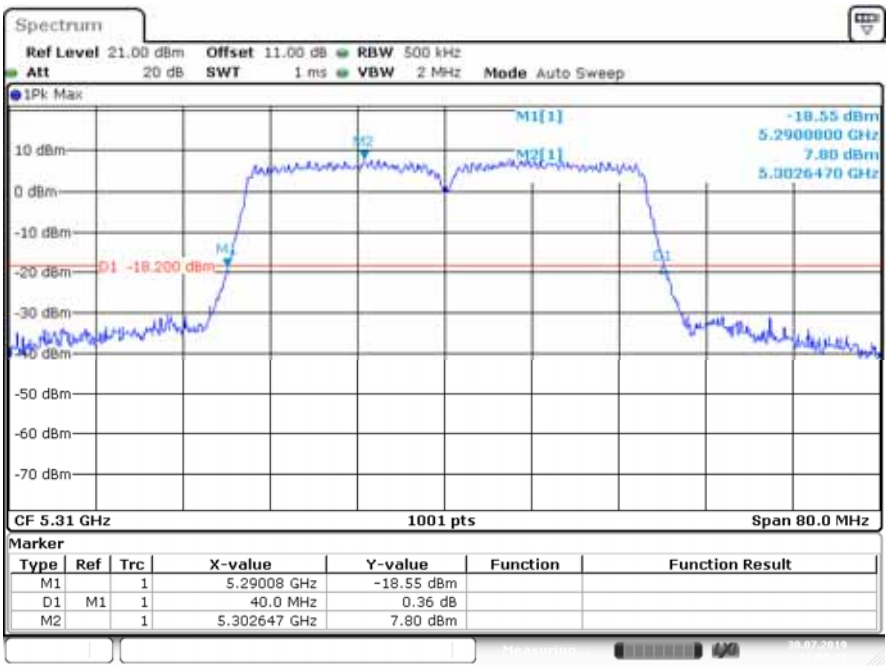
IEEE 802.11ac VHT40 Mode / 5250 ~ 5350MHz (chain 3)

5270MHz



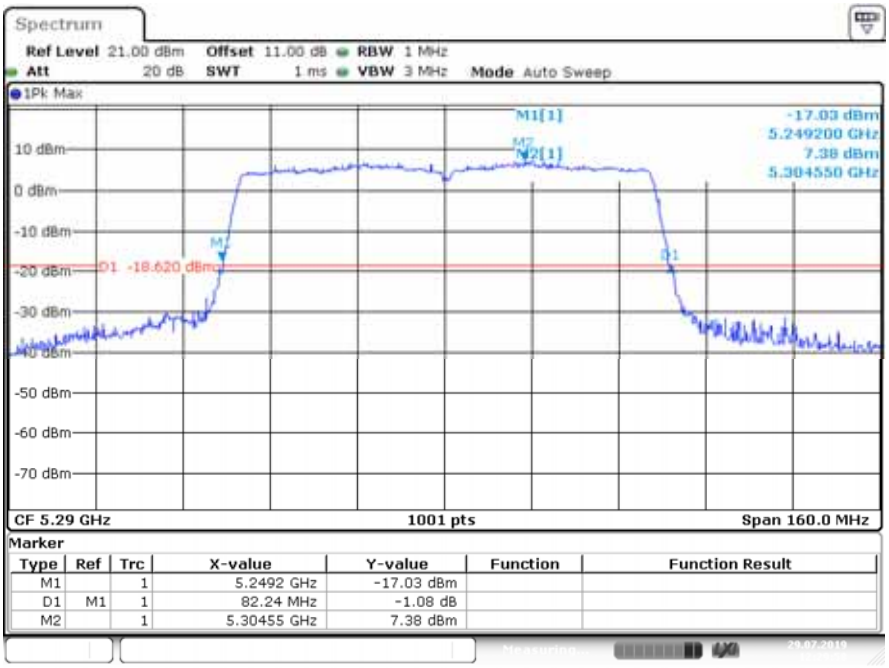
Date: 30.JUL.2019 11:06:50

5310MHz



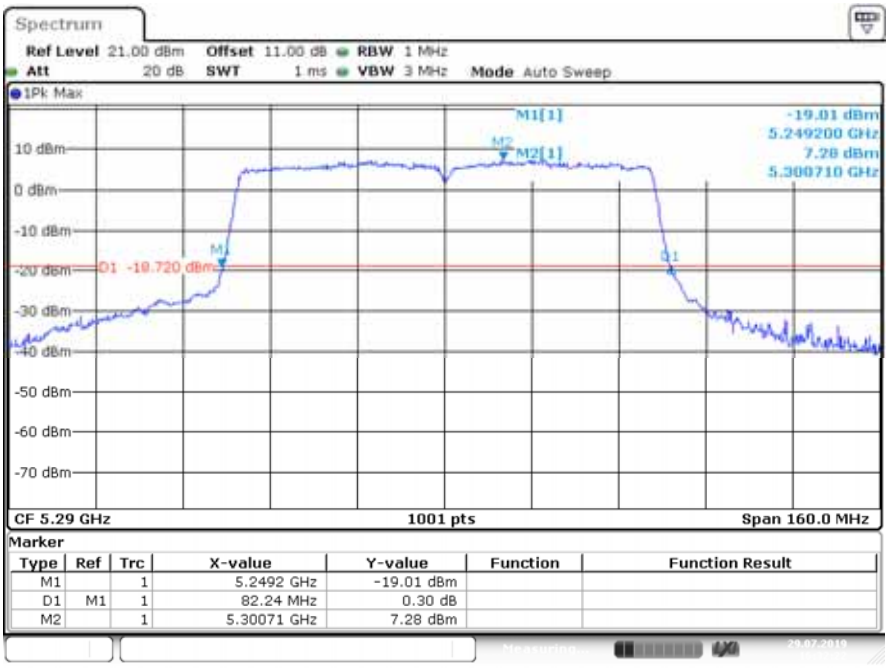
Date: 30.JUL.2019 11:09:08

IEEE 802.11ac VHT80 Mode / 5250 ~ 5350MHz (chain 0)
5290MHz



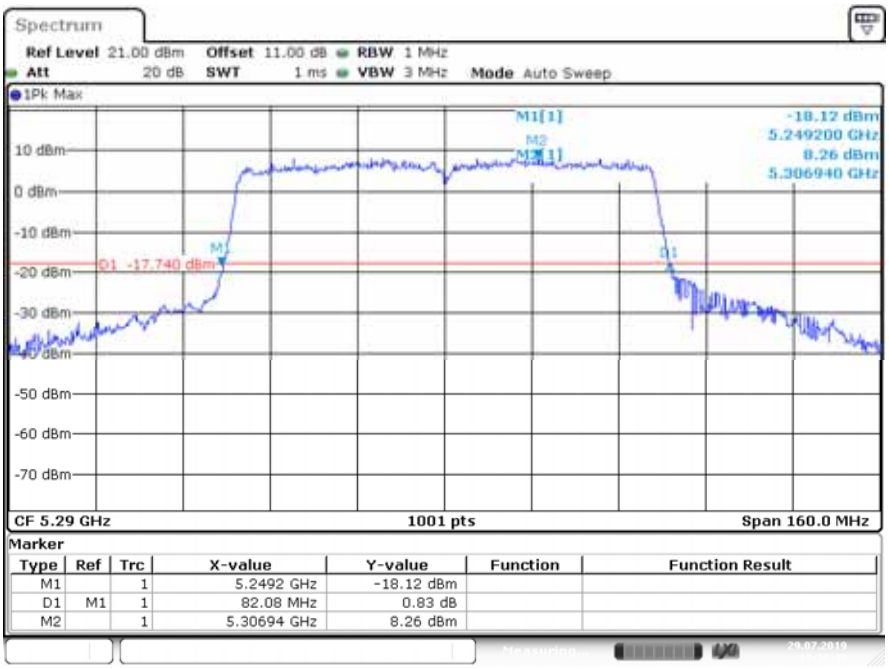
Date: 29.JUL.2019 12:29:59

IEEE 802.11ac VHT80 Mode / 5250 ~ 5350MHz (chain 1)
5290MHz



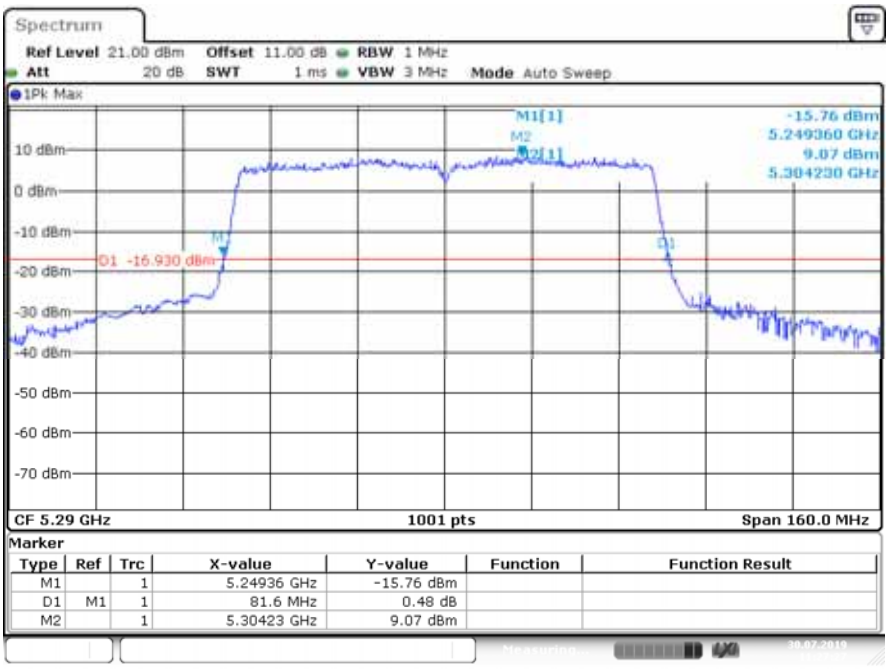
Date: 29.JUL.2019 16:32:22

IEEE 802.11ac VHT80 Mode / 5250 ~ 5350MHz (chain 2)
5290MHz



Date: 29.JUL.2019 19:36:49

IEEE 802.11ac VHT80 Mode / 5250 ~ 5350MHz (chain 3)
5290MHz

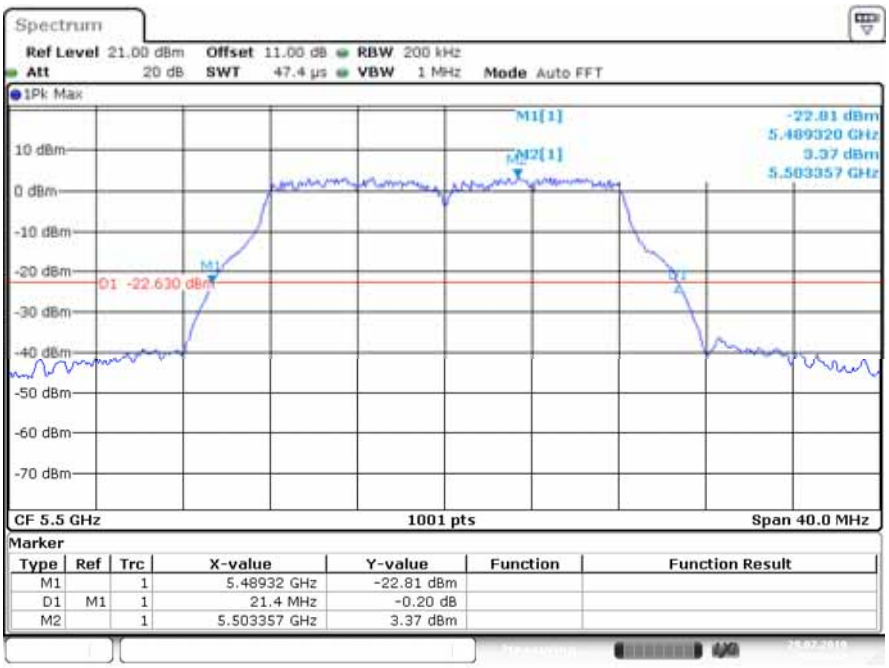


Date: 30.JUL.2019 11:27:27

UNII-2C Band III / BW 26dBc

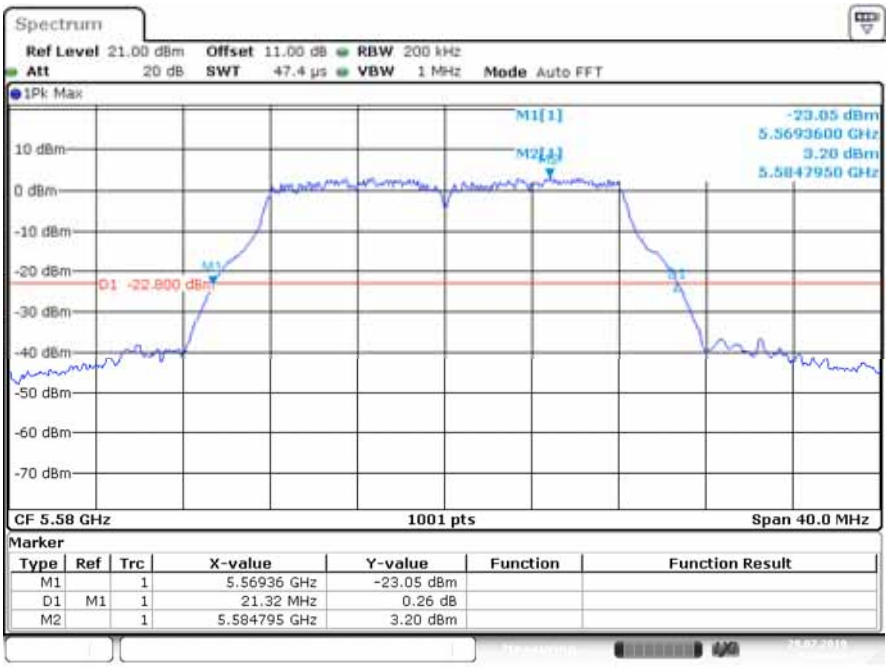
IEEE 802.11a Mode / 5470 ~ 5725MHz (chain 0)

5500MHz



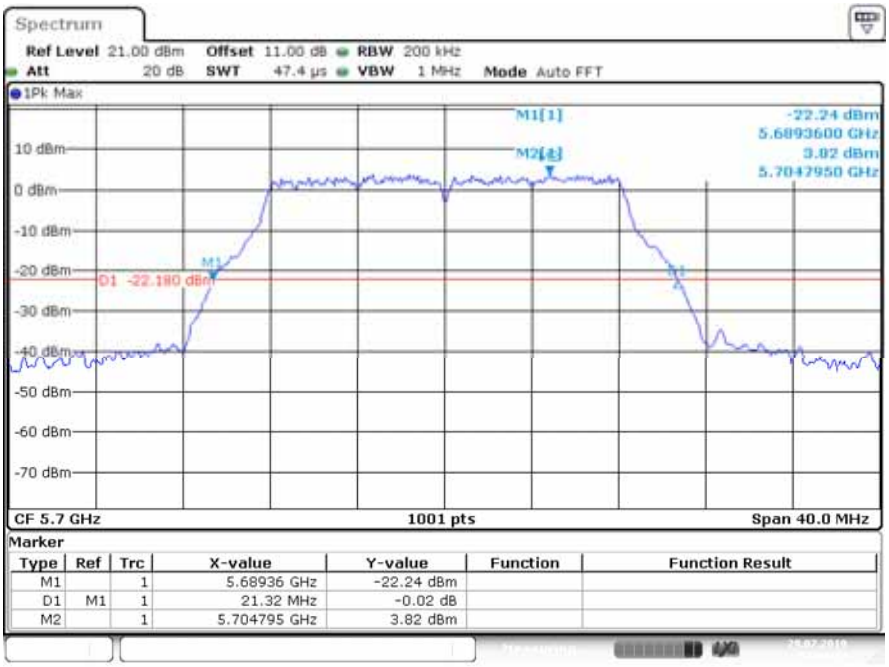
Date: 29.JUL.2019 10:58:11

5580MHz



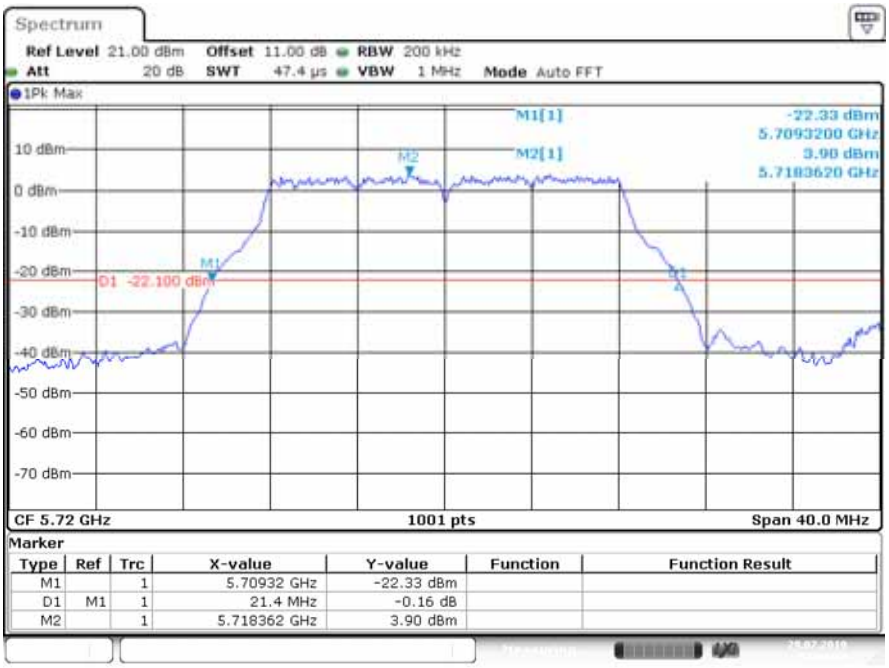
Date: 29.JUL.2019 11:01:26

5700MHz



Date: 29.JUL.2019 11:03:13

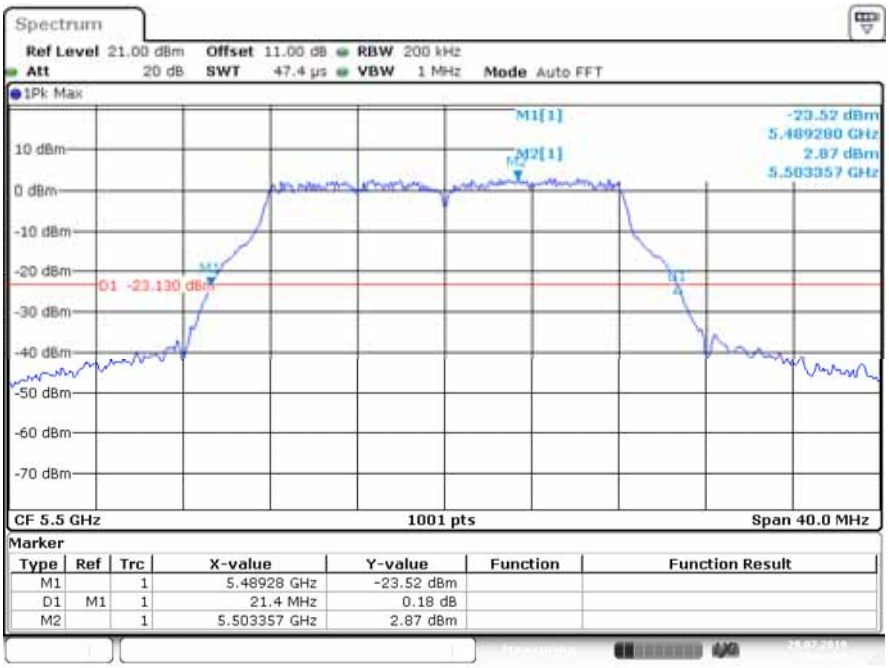
5720MHz



Date: 29.JUL.2019 11:10:54

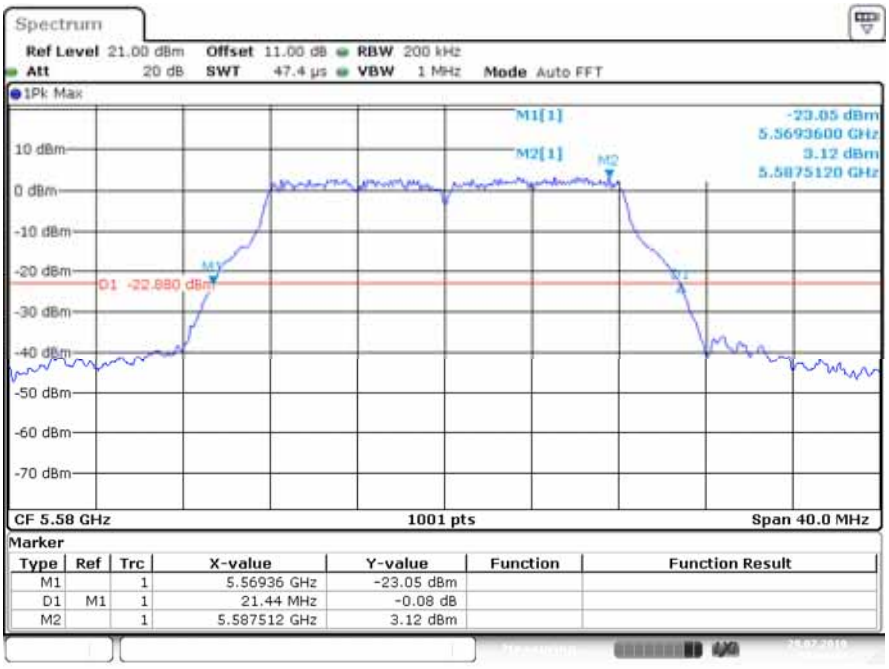
IEEE 802.11a Mode / 5470 ~ 5725MHz (chain 1)

5500MHz



Date: 29.JUL.2019 15:05:27

5580MHz



Date: 29.JUL.2019 15:10:35