FCC Part 15.407

TEST REPORT

For

Hangzhou Arenti Technology Co., Ltd.

Room 1010, 10th Floor, Building 1, No.768 Jianghong Road, Changhe Street, Binjiang District, Hangzhou

FCC ID: 2A2MQ-BULLET9T

Report Type:	**Product Type:**
Original Report	IP CAMERA

Report Producer : Coco Lin

Report Number : RXZ211229005RF02

Report Date : 2022-04-15

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Revision History

Revision	No.	Report Number	Issue Date	Description	Author/ Revised by
0.0	RXZ211229005	RXZ211229005RF02	2022-04-15	Original Report	Coco Lin

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1 General Information

1.1 Product Description for Equipment under Test (EUT)

Applicant	Hangzhou Arenti Technology Co., Ltd. Room 1010, 10th Floor, Building 1, No.768 Jianghong Road, Changhe Street, Binjiang District, Hangzhou
Manufacturer	Hangzhou Arenti Technology Co., Ltd. Room 1010, 10th Floor, Building 1, No.768 Jianghong Road, Changhe Street, Binjiang District, Hangzhou
Brand(Trade) Name	N/A
Product (Equipment)	IP CAMERA
Main Model Name	OUTDOOR1
Series Model Name	Bullet 9S; Bullet 9T; Bullet 9Q
Model Discrepancy	The major electrical and mechanical constructions of series models are identical to the basic model, except different Market segmentation. The model, OUTDOOR1 is the testing sample, and the final test data are shown on this test report.
Frequency Range	5150 MHz ~ 5250 MHz, 5725 MHz ~ 5850 MHz
Maximum Output Power	5150-5250 MHz: IEEE 802.11a Mode: 12.71 dBm IEEE 802.11n HT20 Mode: 12.62 dBm IEEE 802.11n HT40 Mode: 13.46 dBm 5725-5850 MHz: IEEE 802.11a Mode: 14.32 dBm IEEE 802.11n HT20 Mode: 13.90 dBm IEEE 802.11n HT40 Mode: 13.60 dBm
Modulation Technique	IEEE 802.11a Mode: OFDM IEEE 802.11n HT20 Mode: OFDM IEEE 802.11n HT40 Mode: OFDM
Power Operation (Voltage Range)	☐ AC 120V/60Hz ☐ Adapter ☐ By AC Power Cord ☐ PoE
	☒ DC 12V ☐ Battery ☒ DC Power Supply Adapter I/P: 100-240Vac, 50/60Hz, 0.3A Max; O/P: 12Vdc, 1.0A ☐ External from USB Cable ☐ External DC Adapter
	☐ Host System
Received Date	Jan. 06, 2022
Date of Test	Jan. 27, 2022 ~ Apr. 13, 2022

*All measurement and test data in this report was gathered from production sample serial number: RXZ211229005-01(Assigned by BACL, New Taipei Laboratory).

1.2 Objective

This report is prepared on behalf of *Hangzhou Arenti Technology Co., Ltd.* in accordance with Part 2, Subpart J, Part 15, Subparts A, C and E of the Federal Communication Commission's rules.

1.3 Related Submittal(s)/Grant(s)

FCC Part 15.247 DTS submission with FCC ID: 2A2MQ-BULLET9T

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 789033 D02 General U-NII Test Procedures New Rules v02r01

1.5 Statement

Decision Rule: No, (The test results do not include MU judgment)

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.
The determination of the test results does not require consideration of the uncertainty of the measurement, unless the assessment is required by customer agreement, regulation or standard document specification.
Bay Area Compliance Laboratories Corp. (New Taipei Laboratory) is not responsible for the authenticity of the information provided by the applicant that affects the test results.

1.6 Measurement Uncertainty

Parameter		Uncertainty
AC Mains		+/- 2.36 dB
RF output power, conducted		+/- 0.93 dB
Power Spectral Density, conducted		+/- 0.93 dBm
Occupied Bandwidth		+/- 0.35 MHz
Unwanted Emissions, conducted		+/- 1.69 dBm
Emissions, radiated	30 MHz~1GHz	+/- 5.22 dB
	1 GHz~18 GHz	+/- 6.12 dB
	18 GHz~40 GHz	+/- 4.99 dB
Temperature		+/- 1.27 °C
Humidity		+/- 3 %

1.7 Environmental Conditions

Test Site	Test Date	Temperature (℃)	Relative Humidity (%)	ATM Pressure (hPa)	Test Engineer
AC Line Conducted Emissions	2022/02/16	19.2	70	1010	Boris Kao
Radiation Spurious Emissions	2022/1/27~2022/4/13	21.9~23.4	66~69	1010	Howard Ho Aaron Pan
Emission Bandwidth And Occupied Bandwidth	2022/04/12	26	53	1010	Boris Kao
Maximum Output Power	2022/04/12	26	53	1010	Boris Kao
Power Spectral Density	2022/04/12	26	53	1010	Boris Kao

1.8 Test Facility

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

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

Bay Area Compliance Laboratories Corp. (New Taipei Laboratory) is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code: 3732) and the FCC designation No.TW3732 under the Mutual Recognition Agreement (MRA) in FCC Test.

2 System Test Configuration

2.1 Description of Test Configuration

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

The system support 802.11a/n ht20/n ht40.

For 5150 ~ 5250MHz

4 channels are provided for 802.11a, 802.11n HT20:

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

2 channels are provided for 802.11n (HT40):

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

802.11a/n20 mode Channel 36, 40, 48 were tested.
802.11n40 mode Channel 38, 46 were tested.

For 5725 ~ 5850MHz:

5 channels are provided for 802.11a, 802.11n HT20:

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

2 channels are provided for 802.11n (HT40):

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

802.11a/n20 mode Channel 149, 157, 165 were tested.
802.11n40 mode Channel 151, 159 were tested.

2.2 Equipment Modifications

No modification was made to the EUT.

2.3 EUT Exercise Software

The EUT was programmed to be in continuously transmitting mode.

The software was used “Release_v34”.

UNII Band	Mode	Channel	Frequency (MHz)	Power setting
UNII-1	802.11a	36	5180	0
		40	5200	0
		48	5240	0
UNII-3		149	5745	0
		157	5785	0
		165	5825	0
UNII-1	802.11n HT20	36	5180	0
		40	5200	0
		48	5240	0
UNII-3		149	5745	0
		157	5785	0
		165	5825	0
UNII-1	802.11n HT40	38	5190	0
		46	5230	0
UNII-3		151	5755	0
		159	5795	0

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.

802.11a: 6Mbps

802.11n20: MCS0

802.11n40: MCS0

2.4 Test Mode

Full System (Model: OUTDOOR1) tested all measure item.

2.5 Support Equipment List and Details

Description	Manufacturer	Model Number	S/N
SD Card	SanDisk	16G	N/A
NB	DELL	E6410	8N7PXN1

2.6 External Cable List and Details

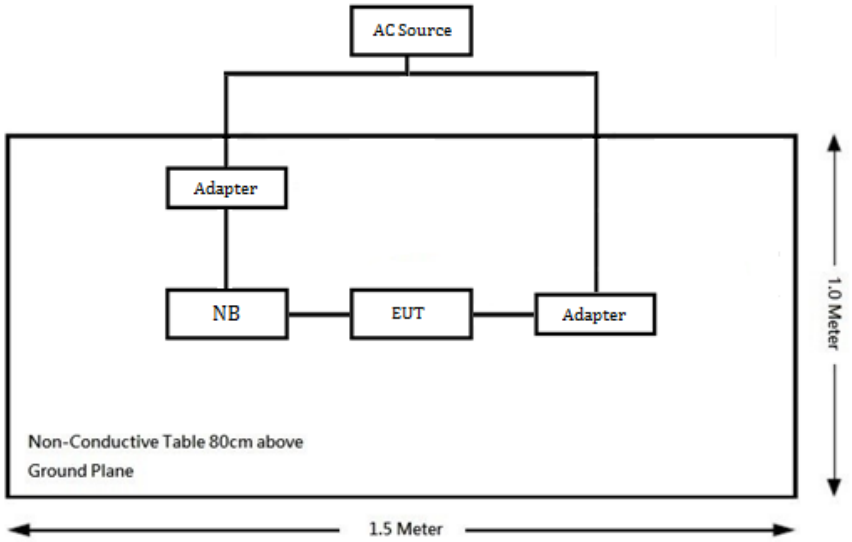
N/A

2.7 Block Diagram of Test Setup

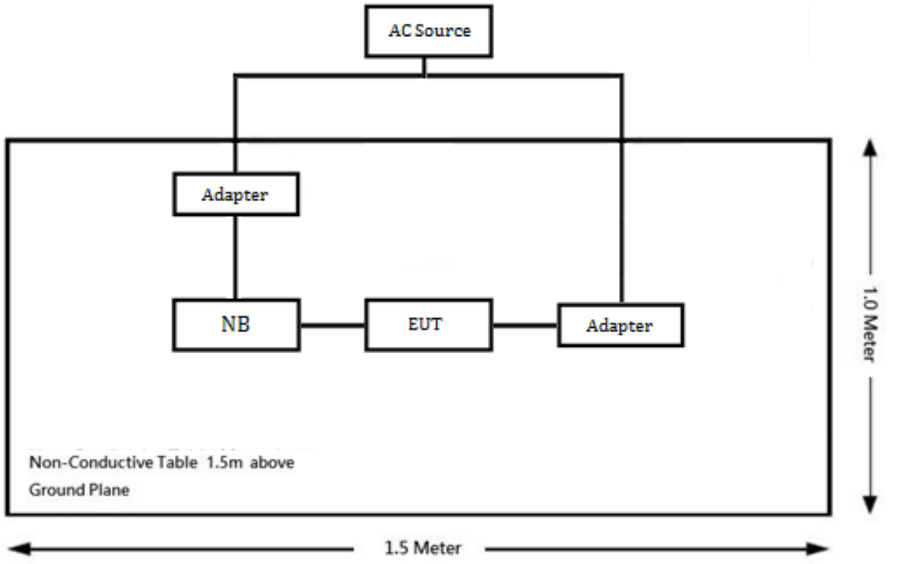
See test photographs attached in setup photos for the actual connections between EUT and support equipment.

Radiation:

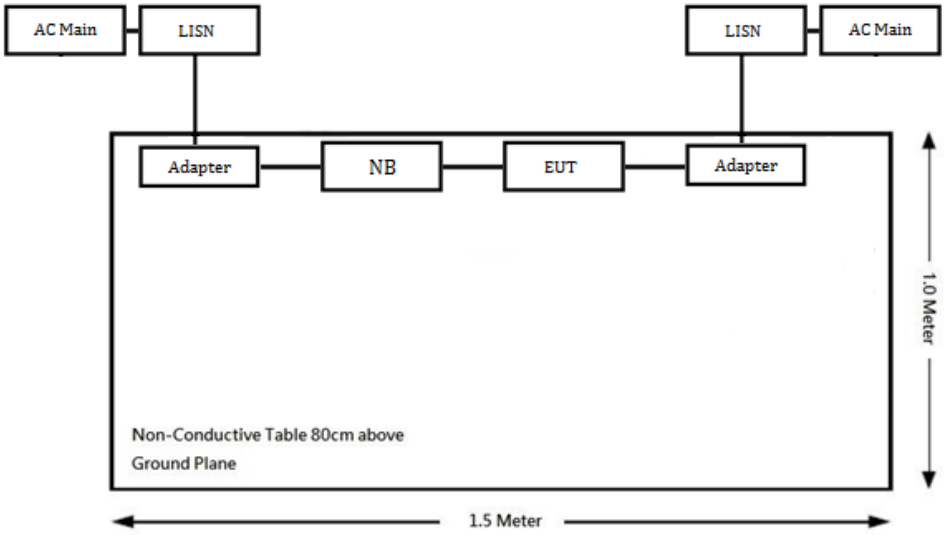
Below 1GHz:



Above 1GHz:



Conduction:


AC Main
LISN
LISN
AC Main
Adapter
NB
EUT
Adapter
1.0 Meter
Non-Conductive Table 80cm above
Ground Plane
1.5 Meter

2.8 Duty Cycle

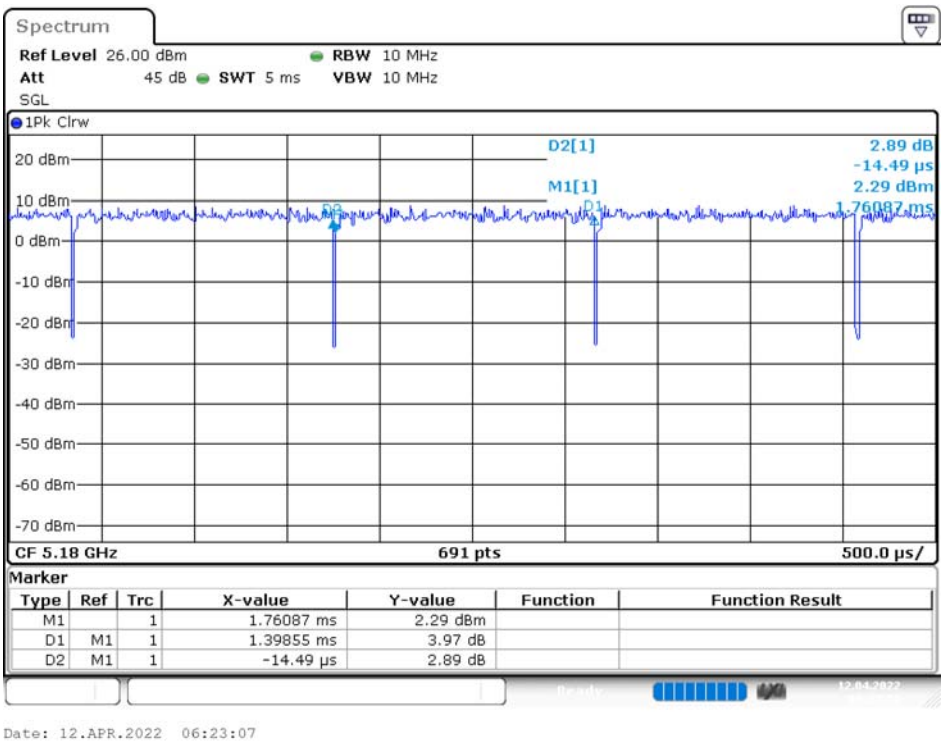
The duty cycle as below:

Radio Mode	T_{on} (ms)	$T_{on}+T_{off}$ (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)
802.11a	1.399	1.413	99	0.04
802.11n20	5.08	5.10	100	0.00
802.11n40	2.47	2.49	99	0.04

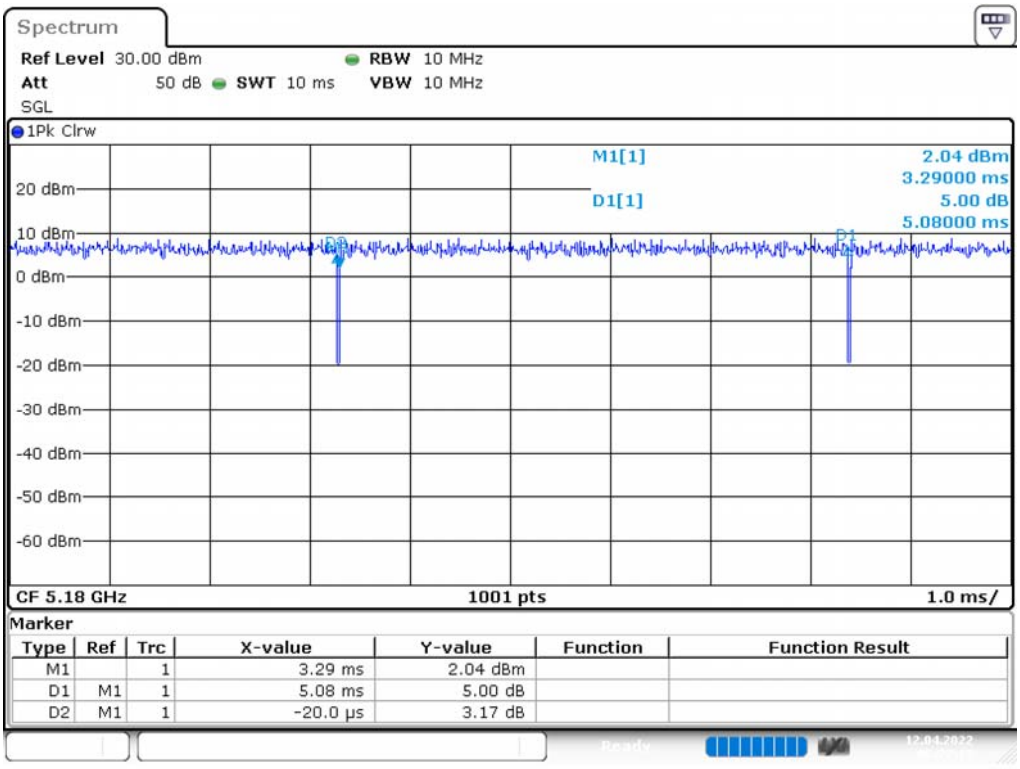
Note: Duty Cycle Correction Factor = 10*log(1/duty cycle)

Please refer to the following plots.

802.11a Mode

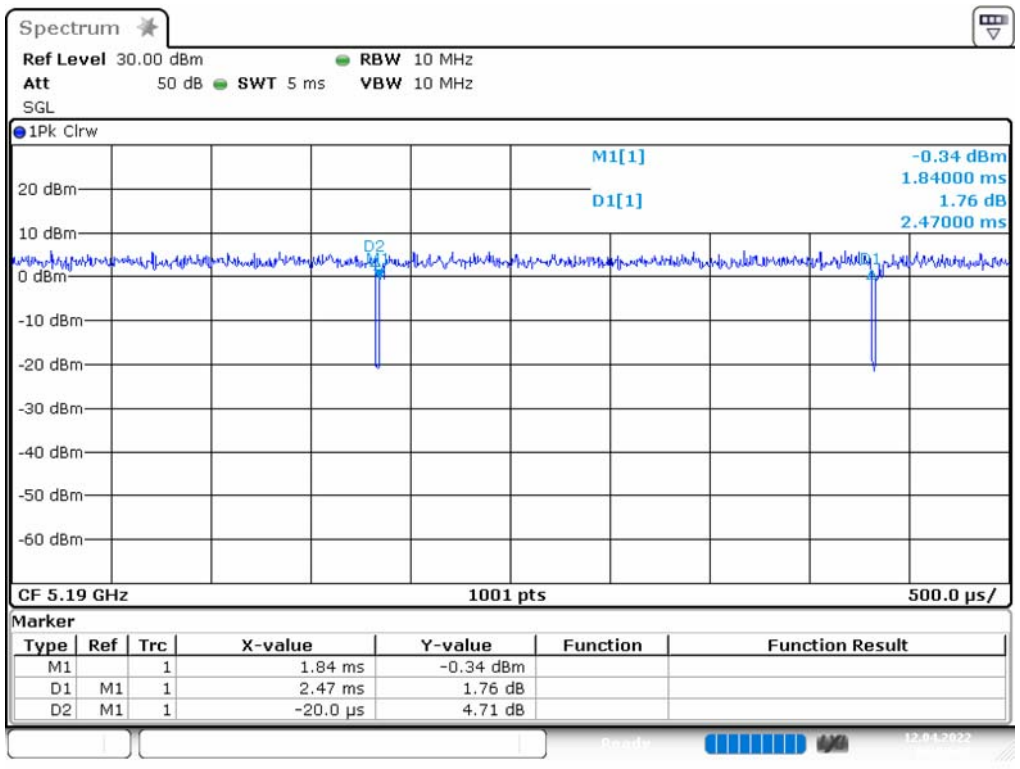


802.11n HT20 Mode



Date: 12.APR.2022 06:27:12

802.11n HT40 Mode



Date: 12.APR.2022 06:34:02

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)(9) & §15.207(a)	AC Line Conducted Emissions	Compliance
§15.205 & §15.209 & §15.407(b)	Unwanted Emission	Compliance
§15.407(a)(e)	Emission Bandwidth	Compliance
§15.407(a)(1)(3)	Conducted Transmitter Output Power	Compliance
§15.407(a)(1)(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	2022/1/14	2023/1/13
LISN	Rohde & Schwarz	ENV216	101248	2021/6/8	2022/6/7
EMI Test Receiver	Rohde & Schwarz	ESW8	100947	2021/7/23	2022/7/22
Pulse Limiter	Rohde & Schwarz	ESH3Z2	TXZEM104	2021/7/29	2022/7/28
RF Cable	EMEC	EM-CB5D	1	2021/6/11	2022/6/10
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	JB3 &EM-ATT6000-6-NN	A090816-2&ATT-09-003	2022/1/20	2023/1/19
Horn Antenna	EMCO	SAS-571	1020	2021/4/23	2022/4/22
Horn Antenna	ETS-Lindgren	3116	62638	2021/8/11	2022/8/10
Preamplifier	Sonoma	310N	130602	2021/6/8	2022/6/7
Preamplifier	A.H. system Inc.	PAM-0118P	466	2021/11/4	2022/11/3
Microware Preamplifier	EM Electronics Corporation	EM18G40G	60656	2021/12/27	2022/12/26
EMI Test Receiver	Rohde & Schwarz	ESR7	101419	2021/11/9	2022/11/8
Spectrum Analyzer	Rohde & Schwarz	FSV40	101435	2022/1/13	2023/1/12
Micro flex Cable	UTIFLEX	UFB197C-1-2362-70U-70U	225757-001	2022/1/24	2023/1/23
Coaxial Cable	COMMATE	PEWC	8Dr	2021/12/24	2022/12/23
Coaxial Cable	UTIFLEX	UFB311A-Q-1440-300300	220490-006	2022/1/24	2023/1/23
Coaxial Cable	JUNFLON	J12J102248-00-B-5	AUG-07-15-044	2021/12/24	2022/12/23
Cable	EMC	EMC105-SM-SM-10000	201003	2022/1/24	2023/1/23

Coaxial Cable	ROSNOL	K1K50-UP0264-K1K50-450CM	160309-1	2022/1/24	2023/1/23
Coaxial Cable	ROSNOL	K1K50-UP0264-K1K50-50CM	15120-1	2022/1/18	2023/1/17
Software	Farad	EZ_EMC	BACL-03A1	N.C.R	N.C.R
Conducted Room					
Spectrum Analyzer	Rohde & Schwarz	FSV40	101204	2021/6/10	2022/6/9
Cable	UTIFLEX	UFA210A	9435	2021/10/5	2022/10/4
Power Sensor	KEYSIGHT	U2021XA	MY54080018	2022/1/24	2023/1/23
Attenuator	MCL	BW-S20W5+	1430	2021/6/23	2022/6/22

***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 subpart 1.1310, 2.1091 systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to RF energy level in excess of the communication guidelines.

Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	**Electric Field Strength (V/m)**	**Magnetic Field Strength (A/m)**	**Power Density (mW/cm^2)**	**Averaging Time (minutes)**
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*($180/f^2$)	30
30-300	27.5	0.073	0.2	30
300-1500	/		f/1500	30
1500-100,000	/		1.0	30

f = frequency in MHz; * = Plane-wave equivalent power density

Calculated Formulary:

Predication of MPE limit at a given distance

$S = PG/4\pi R^2$ = power density (in appropriate units, e.g. mW/cm2);

P = power input to the antenna (in appropriate units, e.g., mW);

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

5.2 RF Exposure Evaluation Result

MPE evaluation:

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	2.99	1.991	24.5	281.838	20	0.112	1
5G WIFI B1	5150-5250	2.78	1.897	13.5	22.387	20	0.008	1
5G WIFI B4	5725-5850	2.87	1.936	14.5	28.184	20	0.011	1

Note: Wi-Fi 2.4G and Wi-Fi 5G can't transmit simultaneously.

Result: MPE evaluation meets the requirements of the **20cm** standard.

6 FCC §15.203 – Antenna Requirements

6.1 Applicable Standard

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

Manufacturer	Model	Antenna Type	Antenna Gain
Hangzhou Arenti Technology Co., Ltd.	YJC-6N120-B33	PFC Antenna	5150~5250MHz: 2.78 dBi 5725~5850MHz: 2.87 dBi

Fulfill the requirement of this section. Please refer to the EUT photos

Result: Compliance

7 FCC §15.407(b)(9) & § 15.207(a) – AC Line Conducted Emissions

7.1 Applicable Standard

As per FCC §15.407(b) (9)

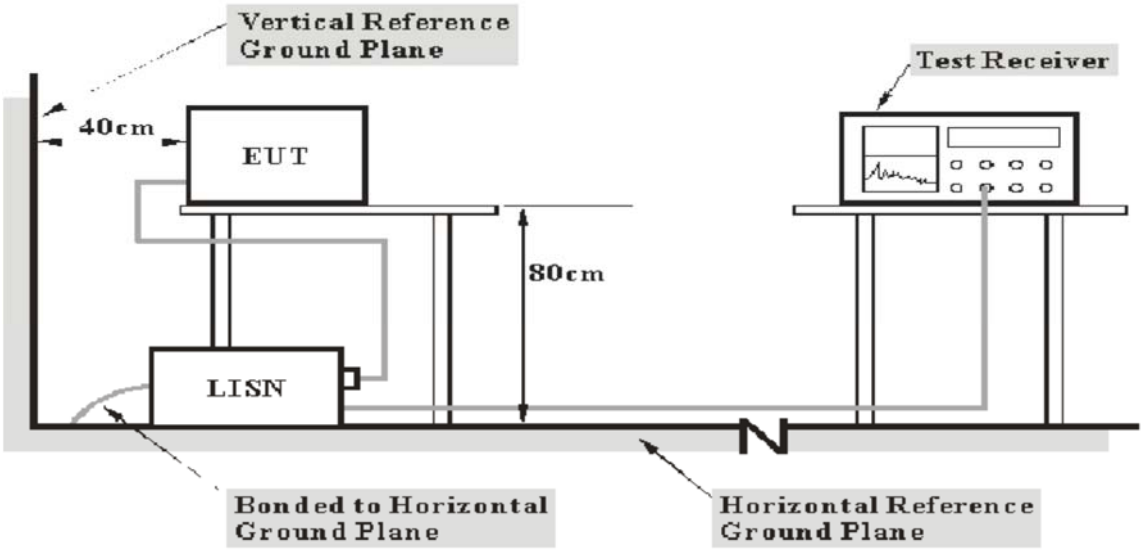
Further, any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in §15.207

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 1
0.5-5	56	46
5-30	60	50

Note 1: Decreases with the logarithm of the frequency.

7.2 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 C63.10-2020 measurement procedure. The specification used was with the FCC Part 15.207 limits.

7.3 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

7.4 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.

7.5 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:

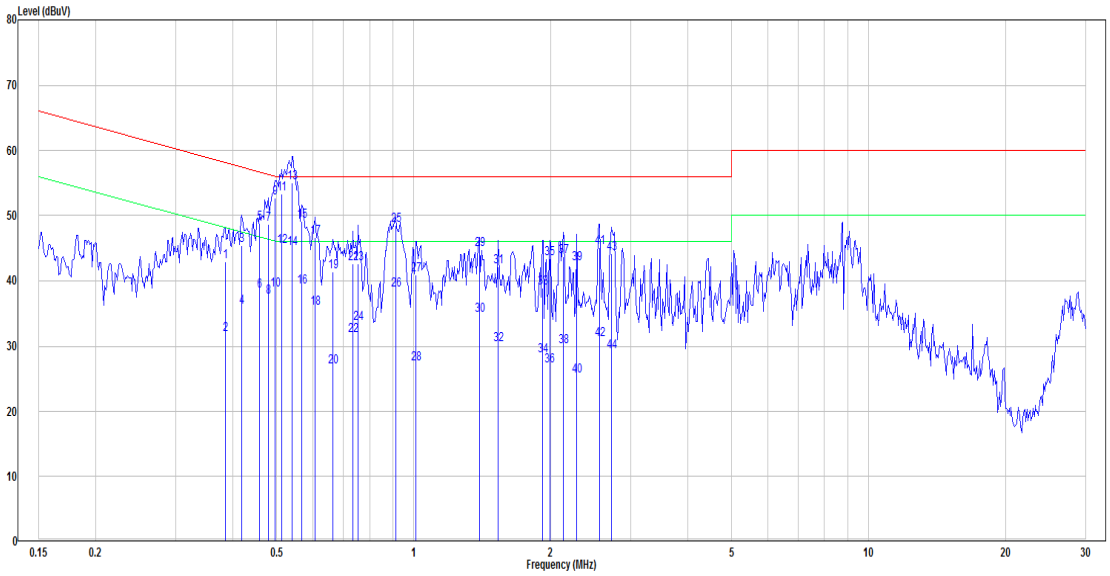
Over Limit = Level – Limit Line

7.6 Test Results

Test Mode: Transmitting

802.11a mode, 5240MHz of 5150~5250MHz (worst case)

Main: AC120 V, 60 Hz, Line



No.	Frequency (MHz)	Reading (dBµV)	Correct Factor(dB)	Result (dBµV)	Limit (dBµV)	Over limit (dB)	Remark
1	0.385	23.41	19.51	42.92	58.17	-15.25	QP
2	0.385	12.26	19.51	31.77	48.17	-16.40	Average
3	0.419	25.99	19.51	45.50	57.46	-11.96	QP
4	0.419	16.40	19.51	35.91	47.46	-11.55	Average
5	0.459	29.35	19.52	48.87	56.71	-7.84	QP
6	0.459	18.89	19.52	38.41	46.71	-8.30	Average
7	0.479	29.14	19.52	48.66	56.36	-7.70	QP
8	0.479	17.97	19.52	37.49	46.36	-8.87	Average
9	0.497	33.24	19.52	52.76	56.05	-3.29	QP
10	0.497	19.15	19.52	38.67	46.05	-7.38	Average
11	0.513	33.85	19.52	53.37	56.00	-2.63	QP
12	0.513	25.69	19.52	45.21	46.00	-0.79	Average
13	0.541	35.55	19.52	55.07	56.00	-0.93	QP
14	0.541	25.37	19.52	44.89	46.00	-1.11	Average
15	0.567	29.61	19.52	49.13	56.00	-6.87	QP
16	0.567	19.59	19.52	39.11	46.00	-6.89	Average
17	0.608	27.17	19.53	46.70	56.00	-9.30	QP
18	0.608	16.36	19.53	35.89	46.00	-10.11	Average

19	0.665	21.94	19.53	41.47	56.00	-14.53	QP
20	0.665	7.24	19.53	26.77	46.00	-19.23	Average
21	0.735	23.04	19.53	42.57	56.00	-13.43	QP
22	0.735	12.03	19.53	31.56	46.00	-14.44	Average
23	0.755	23.05	19.53	42.58	56.00	-13.42	QP
24	0.755	13.93	19.53	33.46	46.00	-12.54	Average
25	0.914	29.03	19.54	48.57	56.00	-7.43	QP
26	0.914	19.06	19.54	38.60	46.00	-7.40	Average
27	1.010	21.38	19.54	40.92	56.00	-15.08	QP
28	1.010	7.79	19.54	27.33	46.00	-18.67	Average
29	1.396	25.29	19.56	44.85	56.00	-11.15	QP
30	1.396	15.14	19.56	34.70	46.00	-11.30	Average
31	1.535	22.66	19.56	42.22	56.00	-13.78	QP
32	1.535	10.60	19.56	30.16	46.00	-15.84	Average
33	1.918	19.30	19.58	38.88	56.00	-17.12	QP
34	1.918	8.89	19.58	28.47	46.00	-17.53	Average
35	1.991	23.76	19.58	43.34	56.00	-12.66	QP
36	1.991	7.44	19.58	27.02	46.00	-18.98	Average
37	2.133	24.07	19.58	43.65	56.00	-12.35	QP
38	2.133	10.29	19.58	29.87	46.00	-16.13	Average
39	2.285	23.05	19.59	42.64	56.00	-13.36	QP
40	2.285	5.91	19.59	25.50	46.00	-20.50	Average
41	2.567	25.57	19.59	45.16	56.00	-10.84	QP
42	2.567	11.48	19.59	31.07	46.00	-14.93	Average
43	2.721	24.57	19.60	44.17	56.00	-11.83	QP
44	2.721	9.57	19.60	29.17	46.00	-16.83	Average

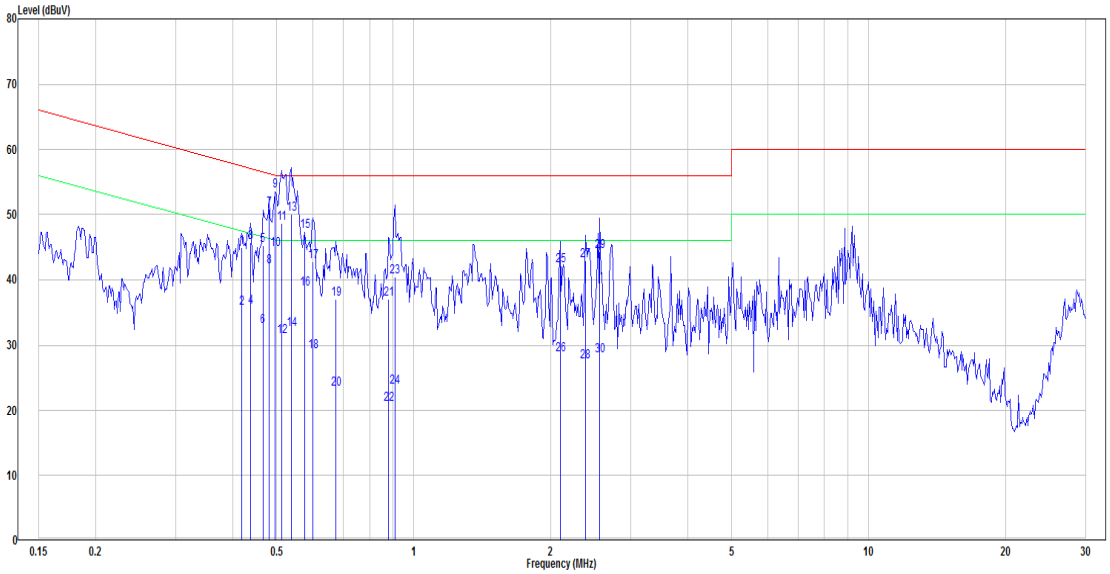
Note:

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	0.419	25.43	19.51	44.94	57.46	-12.52	QP
2	0.419	16.08	19.51	35.59	47.46	-11.87	Average
3	0.437	26.17	19.52	45.69	57.11	-11.42	QP
4	0.437	16.25	19.52	35.77	47.11	-11.34	Average
5	0.466	25.73	19.52	45.25	56.58	-11.33	QP
6	0.466	13.28	19.52	32.80	46.58	-13.78	Average
7	0.481	31.29	19.52	50.81	56.32	-5.51	QP
8	0.481	22.43	19.52	41.95	46.32	-4.37	Average
9	0.497	34.15	19.52	53.67	56.05	-2.38	QP
10	0.497	25.13	19.52	44.65	46.05	-1.40	Average
11	0.513	29.17	19.52	48.69	56.00	-7.31	QP
12	0.513	11.74	19.52	31.26	46.00	-14.74	Average
13	0.538	30.58	19.52	50.10	56.00	-5.90	QP
14	0.538	12.94	19.52	32.46	46.00	-13.54	Average
15	0.576	27.89	19.52	47.41	56.00	-8.59	QP
16	0.576	19.03	19.52	38.55	46.00	-7.45	Average
17	0.601	23.31	19.52	42.83	56.00	-13.17	QP
18	0.601	9.42	19.52	28.94	46.00	-17.06	Average
19	0.675	17.53	19.52	37.05	56.00	-18.95	QP
20	0.675	3.79	19.52	23.31	46.00	-22.69	Average
21	0.880	17.53	19.53	37.06	56.00	-18.94	QP
22	0.880	1.48	19.53	21.01	46.00	-24.99	Average

23	0.909	21.00	19.53	40.53	56.00	-15.47	QP
24	0.909	4.04	19.53	23.57	46.00	-22.43	Average
25	2.099	22.67	19.57	42.24	56.00	-13.76	QP
26	2.099	8.95	19.57	28.52	46.00	-17.48	Average
27	2.384	23.32	19.58	42.90	56.00	-13.10	QP
28	2.384	7.94	19.58	27.52	46.00	-18.48	Average
29	2.567	24.71	19.59	44.30	56.00	-11.70	QP
30	2.567	8.77	19.59	28.36	46.00	-17.64	Average

Note:

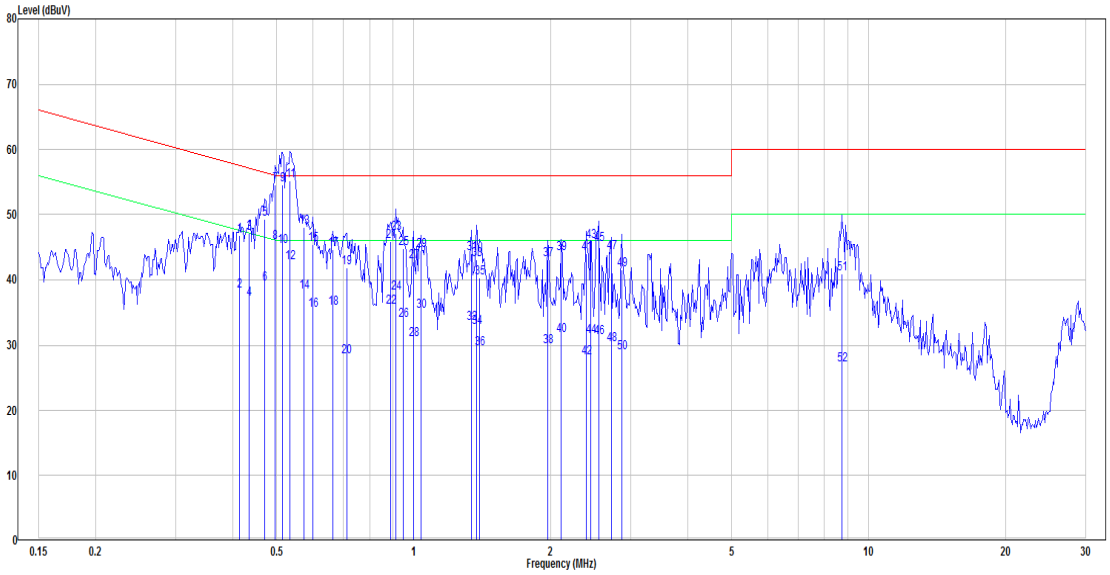
Level = Read Level + Factor

Over Limit = Level – Limit Line

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

802.11a mode, 5745MHz of 5725~5850MHz (worst case)

Main: AC120 V, 60 Hz, Line



No.	Frequency	Reading	Correct	Result	Limit	Over limit	Remark
	(MHz)	(dBµV)	Factor(dB)	(dBµV)	(dBµV)	(dB)	
1	0.415	27.28	19.51	46.79	57.55	-10.76	QP
2	0.415	18.86	19.51	38.37	47.55	-9.18	Average
3	0.435	27.69	19.52	47.21	57.15	-9.94	QP
4	0.435	17.47	19.52	36.99	47.15	-10.16	Average
5	0.471	29.82	19.52	49.34	56.49	-7.15	QP
6	0.471	19.84	19.52	39.36	46.49	-7.13	Average
7	0.497	35.02	19.52	54.54	56.05	-1.51	QP
8	0.497	26.21	19.52	45.73	46.05	-0.32	Average
9	0.516	34.99	19.52	54.51	56.00	-1.49	QP
10	0.516	25.56	19.52	45.08	46.00	-0.92	Average
11	0.535	35.62	19.52	55.14	56.00	-0.86	QP
12	0.535	23.12	19.52	42.64	46.00	-3.36	Average
13	0.573	28.53	19.52	48.05	56.00	-7.95	QP
14	0.573	18.68	19.52	38.20	46.00	-7.80	Average
15	0.601	25.93	19.53	45.46	56.00	-10.54	QP
16	0.601	15.80	19.53	35.33	46.00	-10.67	Average
17	0.665	25.14	19.53	44.67	56.00	-11.33	QP
18	0.665	16.11	19.53	35.64	46.00	-10.36	Average
19	0.712	22.27	19.53	41.80	56.00	-14.20	QP
20	0.712	8.64	19.53	28.17	46.00	-17.83	Average

21	0.890	26.39	19.54	45.93	56.00	-10.07	QP
22	0.890	16.33	19.54	35.87	46.00	-10.13	Average
23	0.914	27.58	19.54	47.12	56.00	-8.88	QP
24	0.914	18.51	19.54	38.05	46.00	-7.95	Average
25	0.948	25.34	19.54	44.88	56.00	-11.12	QP
26	0.948	14.30	19.54	33.84	46.00	-12.16	Average
27	1.000	23.23	19.54	42.77	56.00	-13.23	QP
28	1.000	11.28	19.54	30.82	46.00	-15.18	Average
29	1.037	24.88	19.54	44.42	56.00	-11.58	QP
30	1.037	15.58	19.54	35.12	46.00	-10.88	Average
31	1.338	24.42	19.55	43.97	56.00	-12.03	QP
32	1.338	13.73	19.55	33.28	46.00	-12.72	Average
33	1.374	23.56	19.55	43.11	56.00	-12.89	QP
34	1.374	13.22	19.55	32.77	46.00	-13.23	Average
35	1.396	20.73	19.56	40.29	56.00	-15.71	QP
36	1.396	9.98	19.56	29.54	46.00	-16.46	Average
37	1.970	23.53	19.58	43.11	56.00	-12.89	QP
38	1.970	10.22	19.58	29.80	46.00	-16.20	Average
39	2.110	24.49	19.58	44.07	56.00	-11.93	QP
40	2.110	11.86	19.58	31.44	46.00	-14.56	Average
41	2.396	24.45	19.59	44.04	56.00	-11.96	QP
42	2.396	8.52	19.59	28.11	46.00	-17.89	Average
43	2.448	26.33	19.59	45.92	56.00	-10.08	QP
44	2.448	11.72	19.59	31.31	46.00	-14.69	Average
45	2.554	25.84	19.59	45.43	56.00	-10.57	QP
46	2.554	11.50	19.59	31.09	46.00	-14.91	Average
47	2.721	24.60	19.60	44.20	56.00	-11.80	QP
48	2.721	10.52	19.60	30.12	46.00	-15.88	Average
49	2.869	21.98	19.60	41.58	56.00	-14.42	QP
50	2.869	9.31	19.60	28.91	46.00	-17.09	Average
51	8.729	21.21	19.73	40.94	60.00	-19.06	QP
52	8.729	7.19	19.73	26.92	50.00	-23.08	Average

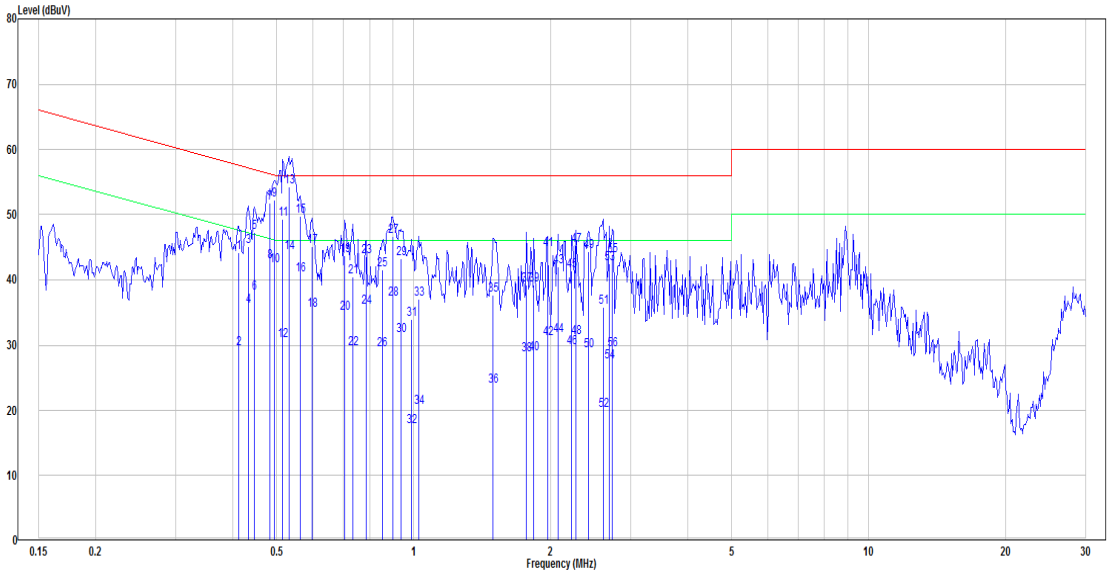
Note:

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	0.413	24.60	19.51	44.11	57.59	-13.48	QP
2	0.413	9.96	19.51	29.47	47.59	-18.12	Average
3	0.433	25.61	19.52	45.13	57.20	-12.07	QP
4	0.433	16.48	19.52	36.00	47.20	-11.20	Average
5	0.447	27.75	19.52	47.27	56.93	-9.66	QP
6	0.447	18.51	19.52	38.03	46.93	-8.90	Average
7	0.484	32.32	19.52	51.84	56.27	-4.43	QP
8	0.484	23.27	19.52	42.79	46.27	-3.48	Average
9	0.494	32.69	19.52	52.21	56.10	-3.89	QP
10	0.494	22.64	19.52	42.16	46.10	-3.94	Average
11	0.516	29.84	19.52	49.36	56.00	-6.64	QP
12	0.516	11.23	19.52	30.75	46.00	-15.25	Average
13	0.532	34.82	19.52	54.34	56.00	-1.66	QP
14	0.532	24.73	19.52	44.25	46.00	-1.75	Average
15	0.564	30.24	19.52	49.76	56.00	-6.24	QP
16	0.564	21.32	19.52	40.84	46.00	-5.16	Average
17	0.598	25.54	19.52	45.06	56.00	-10.94	QP
18	0.598	15.81	19.52	35.33	46.00	-10.67	Average
19	0.705	24.25	19.52	43.77	56.00	-12.23	QP
20	0.705	15.33	19.52	34.85	46.00	-11.15	Average
21	0.735	20.89	19.52	40.41	56.00	-15.59	QP
22	0.735	9.92	19.52	29.44	46.00	-16.56	Average

23	0.788	23.99	19.53	43.52	56.00	-12.48	QP
24	0.788	16.32	19.53	35.85	46.00	-10.15	Average
25	0.853	22.05	19.53	41.58	56.00	-14.42	QP
26	0.853	9.85	19.53	29.38	46.00	-16.62	Average
27	0.899	27.13	19.53	46.66	56.00	-9.34	QP
28	0.899	17.45	19.53	36.98	46.00	-9.02	Average
29	0.938	23.77	19.53	43.30	56.00	-12.70	QP
30	0.938	12.00	19.53	31.53	46.00	-14.47	Average
31	0.989	14.38	19.53	33.91	56.00	-22.09	QP
32	0.989	-1.94	19.53	17.59	46.00	-28.41	Average
33	1.027	17.47	19.53	37.00	56.00	-19.00	QP
34	1.027	0.90	19.53	20.43	46.00	-25.57	Average
35	1.495	18.19	19.55	37.74	56.00	-18.26	QP
36	1.495	4.14	19.55	23.69	46.00	-22.31	Average
37	1.772	19.73	19.56	39.29	56.00	-16.71	QP
38	1.772	8.93	19.56	28.49	46.00	-17.51	Average
39	1.839	19.63	19.56	39.19	56.00	-16.81	QP
40	1.839	9.11	19.56	28.67	46.00	-17.33	Average
41	1.970	25.15	19.57	44.72	56.00	-11.28	QP
42	1.970	11.45	19.57	31.02	46.00	-14.98	Average
43	2.077	22.47	19.57	42.04	56.00	-13.96	QP
44	2.077	11.96	19.57	31.53	46.00	-14.47	Average
45	2.225	21.85	19.58	41.43	56.00	-14.57	QP
46	2.225	9.98	19.58	29.56	46.00	-16.44	Average
47	2.273	25.75	19.58	45.33	56.00	-10.67	QP
48	2.273	11.64	19.58	31.22	46.00	-14.78	Average
49	2.422	24.72	19.58	44.30	56.00	-11.70	QP
50	2.422	9.57	19.58	29.15	46.00	-16.85	Average
51	2.608	16.26	19.59	35.85	56.00	-20.15	QP
52	2.608	0.39	19.59	19.98	46.00	-26.02	Average
53	2.692	22.93	19.59	42.52	56.00	-13.48	QP
54	2.692	7.85	19.59	27.44	46.00	-18.56	Average
55	2.736	24.14	19.59	43.73	56.00	-12.27	QP
56	2.736	9.73	19.59	29.32	46.00	-16.68	Average

Note:

Level = Read Level + Factor

Over Limit = Level – Limit Line

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

7 FCC §15.209, §15.205 , §15.407(b) – 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	608 – 614	4.5 – 5.15
0.495 – 0.505	16.69475 – 16.69525	960 – 1240	5.35 – 5. 46
2.1735 – 2.1905	16.80425 – 16.80475	1300 – 1427	7.25 – 7.75
4.125 – 4.128	25.5 – 25.67	1435 – 1626.5	8.025 – 8.5
4.17725 – 4.17775	37.5 – 38.25	1645.5 – 1646.5	9.0 – 9.2
4.20725 – 4.20775	73 – 74.6	1660 – 1710	9.3 – 9.5
6.215 – 6.218	74.8 – 75.2	1718.8 – 1722.2	10.6 – 12.7
6.26775 – 6.26825	108 – 121.94	2200 – 2300	13.25 – 13.4
6.31175 – 6.31225	123 – 138	2310 – 2390	14.47 – 14.5
8.291 – 8.294	149.9 – 150.05	2483.5 – 2500	15.35 – 16.2
8.362 – 8.366	156.52475 – 156.52525	2690 – 2900	17.7 – 21.4
8.37625 – 8.38675	156.7 – 156.9	3260 – 3267	22.01 – 23.12
8.41425 – 8.41475	162.0125 –167.17	3.332 – 3.339	23.6 – 24.0
12.29 – 12.293	167.72 – 173.2	3 3458 – 3 358	31.2 – 31.8
12.51975 – 12.52025	240 – 285	3.600 – 4.400	36.43 – 36.5
12.57675 – 12.57725	322 – 335.4		Above 38.6
13.36 – 13.41	399.9 – 410		

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)

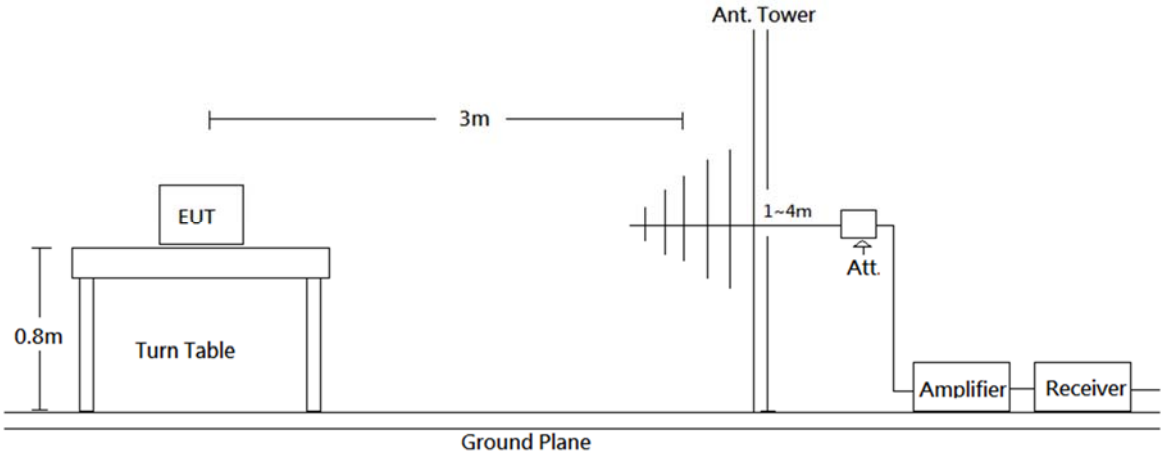
- For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.
- For transmitters operating in the 5.725-5.85 GHz band: All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band 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..

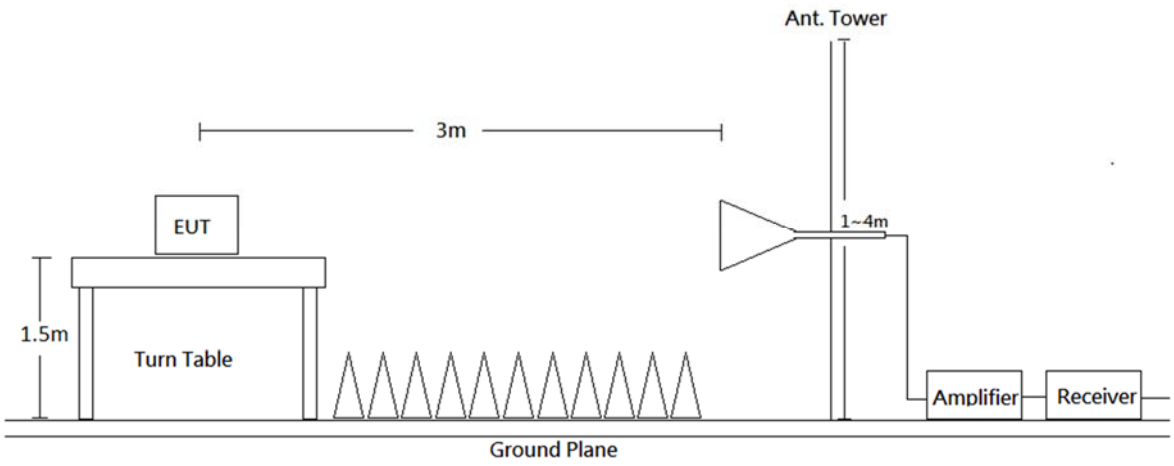
- The emission measurements shall be performed using a minimum resolution bandwidth of 1 MHz. A lower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 1 MHz.
- Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209.

8.2 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 C63.10-2020. The specification used was the FCC Part 15.209 and FCC 15.407 Limits.

8.3 EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 40 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	Duty cycle	Measurement method
30-1000 MHz	120 kHz	/	/	QP
Above 1 GHz	1 MHz	3 MHz	/	PK
	1 MHz	10 Hz	>98%	Ave
	1 MHz	1/T	<98%	Ave

Note: T is minimum transmission duration

8.4 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, emission shall be computed as: E [dBμV/m] = EIRP[dBm] + 95.2, for d = 3 meters.

All emissions under the average limit and under the noise floor have not recorded in the report

8.5 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

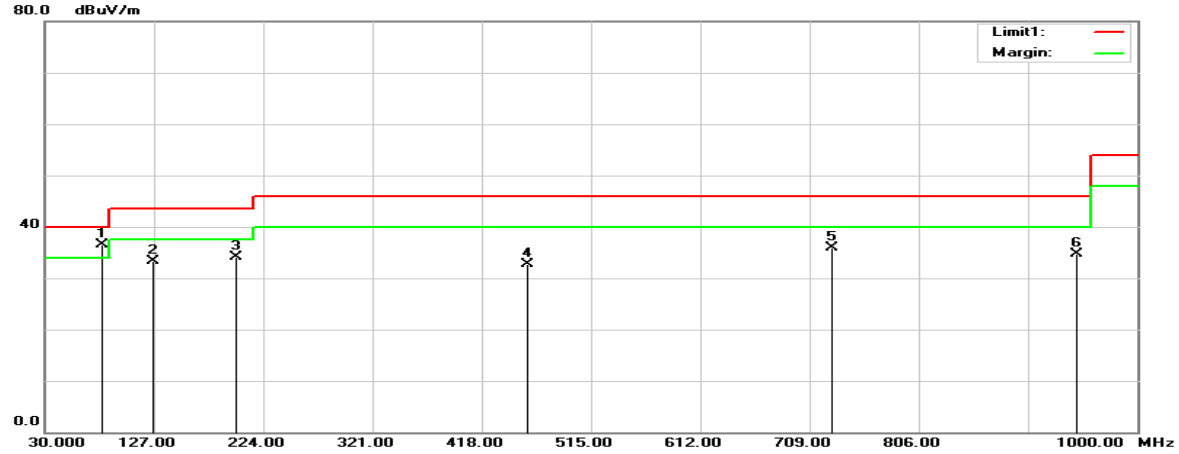
8.6 Test Results

Test Mode: Transmitting

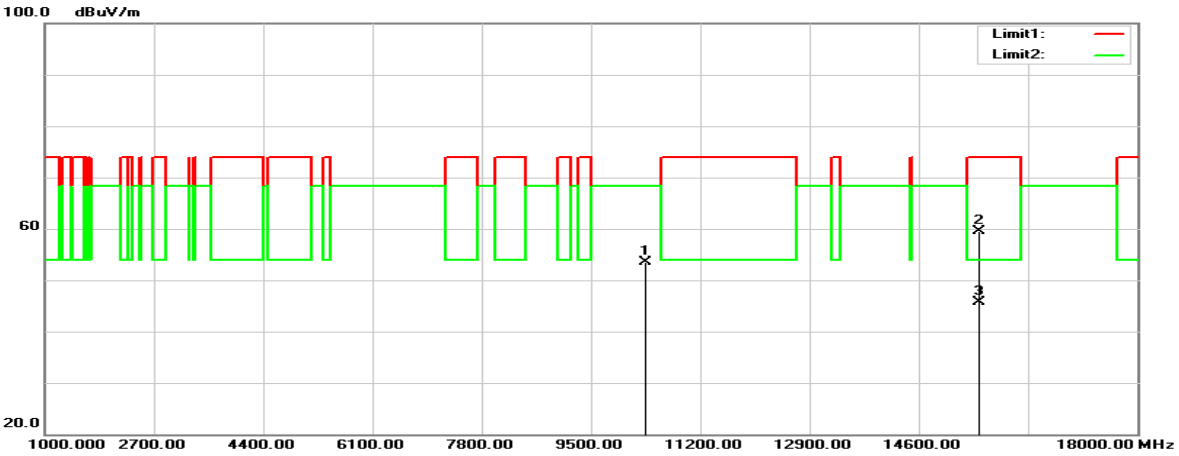
(Pre-scan with three orthogonal axis, and worse case as Y axis.)

Horizontal (worst case is 802.11a mode 5240MHz)

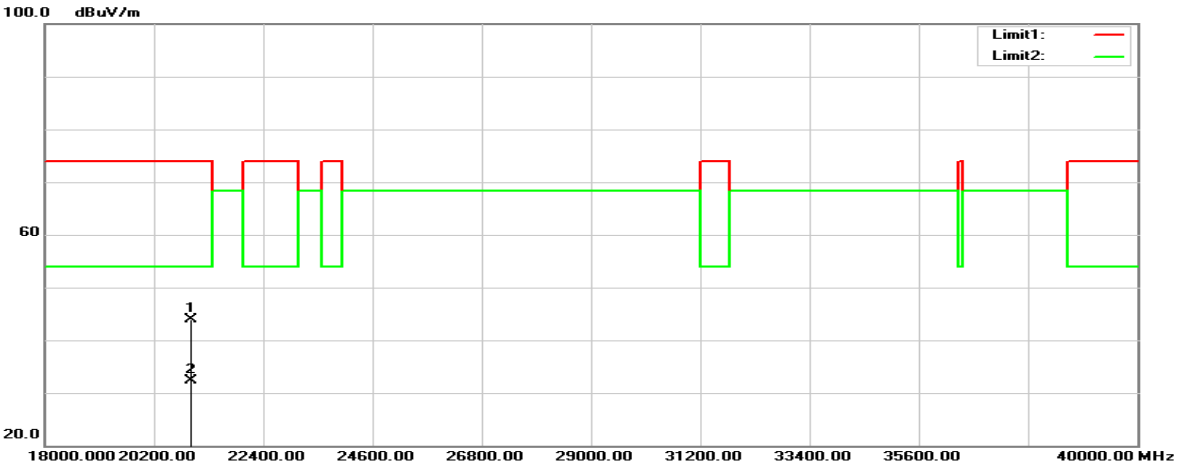
30MHz-1GHz:



1GHz-18GHz:

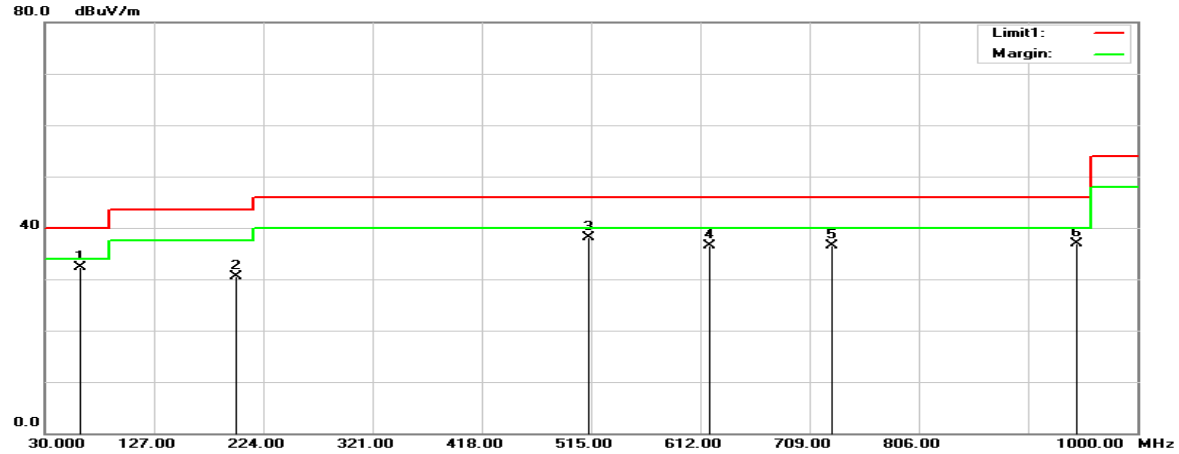


18GHz-40GHz:

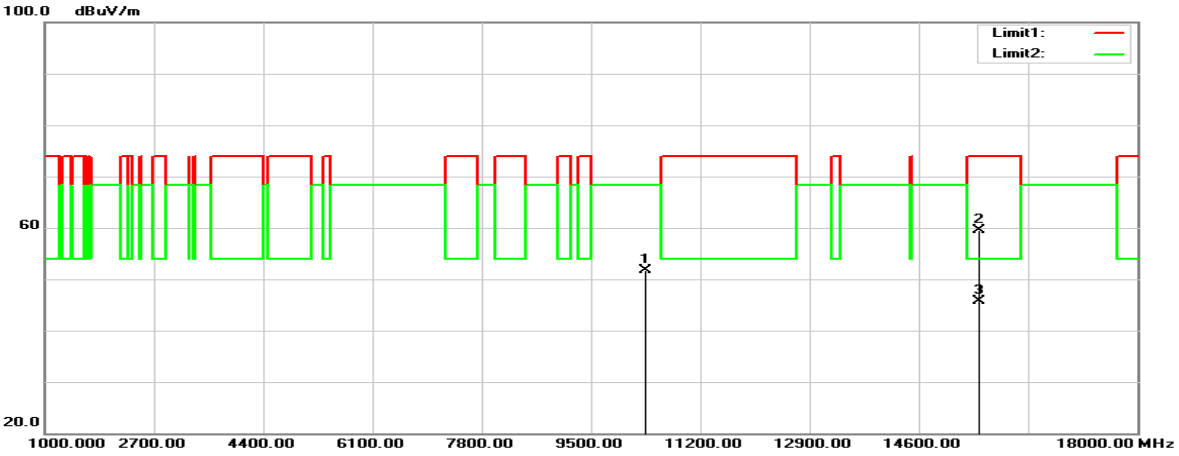


Vertical (worst case is 802.11a mode 5240MHz)

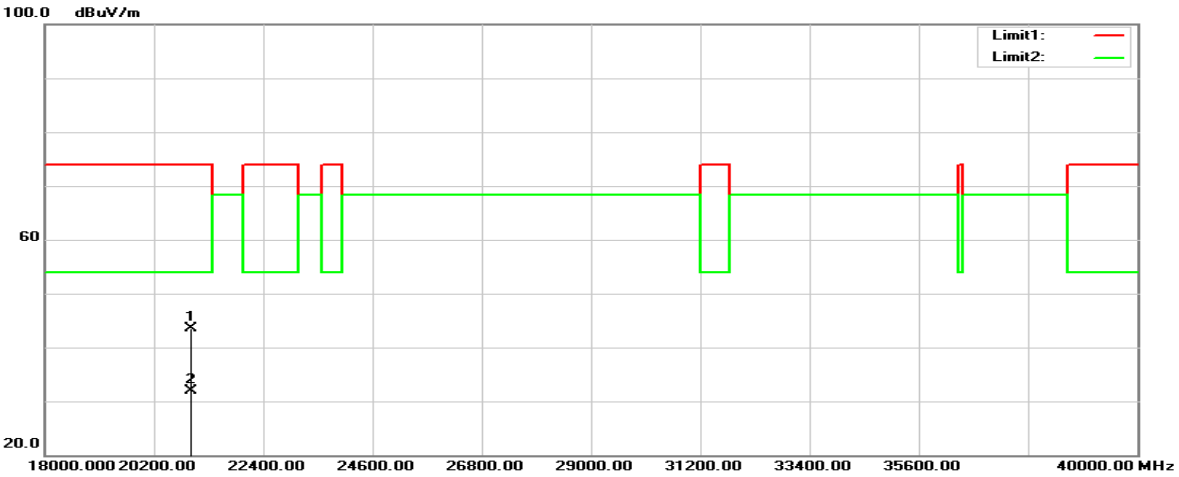
30MHz-1GHz:



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
81.4100	53.07	-16.62	36.45	40.00	-3.55	100	87	QP
126.0300	43.61	-10.34	33.27	43.50	-10.23	100	117	peak
199.7500	45.06	-10.99	34.07	43.50	-9.43	100	315	peak
458.7400	39.19	-6.46	32.73	46.00	-13.27	100	72	peak
729.3700	38.28	-2.35	35.93	46.00	-10.07	100	75	peak
945.6800	32.62	2.13	34.75	46.00	-11.25	100	38	peak

Vertical

Frequency (MHz)	Reading (dBµV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
62.0100	49.43	-17.19	32.24	40.00	-7.76	100	95	peak
199.7500	41.56	-10.99	30.57	43.50	-12.93	100	2	peak
513.0600	43.85	-5.71	38.14	46.00	-7.86	100	272	peak
620.7300	41.43	-4.87	36.56	46.00	-9.44	100	54	peak
729.3700	38.89	-2.35	36.54	46.00	-9.46	100	189	peak
945.6800	34.86	2.13	36.99	46.00	-9.01	100	176	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-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								
5144.200	59.93	-1.01	58.92	74.00	-15.08	132	65	peak
5144.200	47.06	-1.01	46.05	54.00	-7.95	132	65	AVG
10360.000	45.93	7.66	53.59	68.20	-14.61	148	62	peak
15540.000	45.36	14.05	59.41	74.00	-14.59	152	299	peak
15540.000	31.67	14.05	45.72	54.00	-8.28	152	299	AVG
a Mode, Middle channel								
10400.000	44.36	7.97	52.33	68.20	-15.87	153	128	peak
15600.000	44.24	13.74	57.98	74.00	-16.02	144	344	peak
15600.000	31.81	13.74	45.55	54.00	-8.45	144	344	AVG
a Mode, High channel								
5106.990	55.31	-0.85	54.46	74.00	-19.54	135	66	peak
5106.990	42.52	-0.85	41.67	54.00	-12.33	135	66	AVG
5356.680	55.17	-1.54	53.63	74.00	-20.37	135	66	peak
5356.680	42.19	-1.54	40.65	54.00	-13.35	135	66	AVG
10480.000	47.15	8.51	55.66	68.20	-12.54	187	91	peak
15720.000	44.79	13.49	58.28	74.00	-15.72	148	1	peak
15720.000	30.84	13.49	44.33	54.00	-9.67	148	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.

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								
5142.700	57.50	-1.01	56.49	74.00	-17.51	102	6	peak
5142.700	44.06	-1.01	43.05	54.00	-10.95	102	6	AVG
10360.000	44.02	7.66	51.68	68.20	-16.52	153	9	peak
15540.000	45.48	14.05	59.53	74.00	-14.47	144	289	peak
15540.000	31.74	14.05	45.79	54.00	-8.21	144	289	AVG
a Mode, Middle channel								
10400.000	43.04	7.97	51.01	68.20	-17.19	155	1	peak
15600.000	43.92	13.74	57.66	74.00	-16.34	142	304	peak
15600.000	31.69	13.74	45.43	54.00	-8.57	142	304	AVG
a Mode, High channel								
5145.120	55.20	-1.02	54.18	74.00	-19.82	118	101	peak
5145.120	42.36	-1.02	41.34	54.00	-12.66	118	101	AVG
5350.940	55.03	-1.56	53.47	74.00	-20.53	118	101	peak
5350.940	42.07	-1.56	40.51	54.00	-13.49	118	101	AVG
10480.000	42.04	8.51	50.55	68.20	-17.65	152	15	peak
15720.000	45.22	13.49	58.71	74.00	-15.29	145	121	peak
15720.000	30.88	13.49	44.37	54.00	-9.63	145	121	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
n20 Mode, Low channel								
5147.950	60.39	-1.03	59.36	74.00	-14.64	133	62	peak
5147.950	46.23	-1.03	45.20	54.00	-8.80	133	62	AVG
10360.000	42.54	7.66	50.20	68.20	-18.00	145	99	peak
15540.000	43.30	14.05	57.35	74.00	-16.65	148	245	peak
15540.000	31.72	14.05	45.77	54.00	-8.23	148	245	AVG
n20 Mode, Middle channel								
10400.000	42.54	7.97	50.51	68.20	-17.69	153	90	peak
15600.000	43.44	13.74	57.18	74.00	-16.82	156	11	peak
15600.000	33.71	13.74	47.45	54.00	-6.55	156	11	AVG
n20 Mode, High channel								
5102.070	55.45	-0.83	54.62	74.00	-19.38	135	65	peak
5102.070	41.66	-0.83	40.83	54.00	-13.17	135	65	AVG
5382.100	55.06	-1.44	53.62	74.00	-20.38	135	65	peak
5382.100	41.60	-1.44	40.16	54.00	-13.84	135	65	AVG
10480.000	43.55	8.51	52.06	68.20	-16.14	155	92	peak
15720.000	44.79	13.49	58.28	74.00	-15.72	151	213	peak
15720.000	33.46	13.49	46.95	54.00	-7.05	151	213	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
n20 Mode, Low channel								
5149.450	57.36	-1.03	56.33	74.00	-17.67	104	4	peak
5149.450	43.35	-1.03	42.32	54.00	-11.68	104	4	AVG
10360.000	42.66	7.66	50.32	68.20	-17.88	155	16	peak
15540.000	43.99	14.05	58.04	74.00	-15.96	152	95	peak
15540.000	31.84	14.05	45.89	54.00	-8.11	152	95	AVG
n20 Mode, Middle channel								
10400.000	41.74	7.97	49.71	68.20	-18.49	153	359	peak
15600.000	44.62	13.74	58.36	74.00	-15.64	147	188	peak
15600.000	33.93	13.74	47.67	54.00	-6.33	147	188	AVG
n20 Mode, High channel								
5144.710	55.76	-1.01	54.75	74.00	-19.25	109	105	peak
5144.710	41.59	-1.01	40.58	54.00	-13.42	109	105	AVG
5372.670	54.78	-1.48	53.30	74.00	-20.70	109	105	peak
5372.670	41.40	-1.48	39.92	54.00	-14.08	109	105	AVG
10480.000	43.20	8.51	51.71	68.20	-16.49	158	133	peak
15720.000	44.12	13.49	57.61	74.00	-16.39	153	349	peak
15720.000	33.18	13.49	46.67	54.00	-7.33	153	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.

Horizontal

Frequency (MHz)	Reading (dBµV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
n40 Mode, Low channel								
5146.480	71.57	-1.74	69.83	74.00	-4.17	102	293	peak
5146.480	54.19	-1.74	52.45	54.00	-1.55	102	293	AVG
10380.000	43.47	6.88	50.35	68.20	-17.85	150	289	peak
15570.000	44.43	11.05	55.48	74.00	-18.52	151	332	peak
15570.000	33.79	11.05	44.84	54.00	-9.16	151	332	AVG
n40 Mode, High channel								
5146.350	57.50	-1.74	55.76	74.00	-18.24	223	130	peak
5146.350	43.42	-1.74	41.68	54.00	-12.32	223	130	AVG
5416.540	56.13	-2.47	53.66	74.00	-20.34	223	130	peak
5416.540	42.25	-2.47	39.78	54.00	-14.22	223	130	AVG
10460.000	43.67	7.05	50.72	68.20	-17.48	150	311	peak
15690.000	43.50	11.13	54.63	74.00	-19.37	148	302	peak
15690.000	32.15	11.13	43.28	54.00	-10.72	148	302	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
n40 Mode, Low channel								
5146.640	61.59	-1.74	59.85	74.00	-14.15	167	225	peak
5146.640	45.67	-1.74	43.93	54.00	-10.07	167	225	AVG
10380.000	39.19	6.88	46.07	68.20	-22.13	143	244	peak
15570.000	42.26	11.05	53.31	74.00	-20.69	147	302	peak
15570.000	30.76	11.05	41.81	54.00	-12.19	147	302	AVG
n40 Mode, High channel								
5121.750	56.05	-1.75	54.30	74.00	-19.70	175	225	peak
5121.750	42.39	-1.75	40.64	54.00	-13.36	175	225	AVG
5364.060	55.96	-2.38	53.58	74.00	-20.42	175	225	peak
5364.060	42.30	-2.38	39.92	54.00	-14.08	175	225	AVG
10460.000	43.54	7.05	50.59	68.20	-17.61	145	314	peak
15690.000	44.28	11.13	55.41	74.00	-18.59	152	299	peak
15690.000	32.86	11.13	43.99	54.00	-10.01	152	299	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.

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								
5634.120	54.27	-1.75	52.52	68.20	-15.68	150	59	peak
5698.560	57.49	-1.65	55.84	104.13	-48.29	150	59	peak
5716.920	61.72	-1.66	60.06	109.94	-49.88	150	59	peak
5724.120	67.83	-1.68	66.15	120.19	-54.04	150	59	peak
5853.000	54.11	-1.13	52.98	115.36	-62.38	150	59	peak
5857.320	55.60	-1.09	54.51	110.15	-55.64	150	59	peak
5888.280	55.04	-0.79	54.25	95.37	-41.12	150	59	peak
5945.160	54.77	-0.69	54.08	68.20	-14.12	150	59	peak
11490.000	42.34	9.04	51.38	74.00	-22.62	155	235	peak
11490.000	30.31	9.04	39.35	54.00	-14.65	155	235	AVG
17235.000	42.42	16.75	59.17	68.20	-9.03	154	192	peak
a Mode, Middle channel								
5649.600	54.84	-1.73	53.11	68.20	-15.09	146	58	peak
5697.840	55.88	-1.65	54.23	103.60	-49.37	146	58	peak
5710.440	55.96	-1.65	54.31	108.12	-53.81	146	58	peak
5721.240	53.93	-1.67	52.26	113.63	-61.37	146	58	peak
5853.720	54.90	-1.12	53.78	113.72	-59.94	146	58	peak
5870.280	56.60	-0.96	55.64	106.52	-50.88	146	58	peak
5902.680	54.86	-0.63	54.23	84.72	-30.49	146	58	peak
5946.960	54.32	-0.69	53.63	68.20	-14.57	146	58	peak
11570.000	42.73	9.62	52.35	74.00	-21.65	144	315	peak
11570.000	30.48	9.62	40.10	54.00	-13.90	144	315	AVG
17355.000	42.24	16.82	59.06	68.20	-9.14	151	144	peak
a Mode, High channel								
5623.680	53.84	-1.77	52.07	68.20	-16.13	124	88	peak
5696.760	55.02	-1.65	53.37	102.80	-49.43	124	88	peak
5701.440	54.92	-1.65	53.27	105.60	-52.33	124	88	peak
5721.240	54.44	-1.67	52.77	113.63	-60.86	124	88	peak
5850.840	62.12	-1.14	60.98	120.28	-59.30	124	88	peak
5857.320	61.32	-1.09	60.23	110.15	-49.92	124	88	peak
5887.200	56.43	-0.80	55.63	96.17	-40.54	124	88	peak
5938.680	54.69	-0.67	54.02	68.20	-14.18	124	88	peak
11650.000	42.11	9.62	51.73	74.00	-22.27	152	116	peak
11650.000	31.37	9.62	40.99	54.00	-13.01	152	116	AVG
17475.000	42.48	16.32	58.80	68.20	-9.40	154	354	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								
5622.240	54.30	-1.77	52.53	68.20	-15.67	118	16	peak
5699.640	55.87	-1.65	54.22	104.93	-50.71	118	16	peak
5719.080	61.11	-1.67	59.44	110.54	-51.10	118	16	peak
5724.480	66.75	-1.68	65.07	121.01	-55.94	118	16	peak
5854.440	54.99	-1.11	53.88	112.08	-58.20	118	16	peak
5862.720	55.78	-1.03	54.75	108.64	-53.89	118	16	peak
5892.960	55.16	-0.73	54.43	91.91	-37.48	118	16	peak
5925.720	54.24	-0.65	53.59	68.20	-14.61	118	16	peak
11490.000	41.95	9.04	50.99	74.00	-23.01	154	336	peak
11490.000	29.70	9.04	38.74	54.00	-15.26	154	336	AVG
17235.000	42.85	16.75	59.60	68.20	-8.60	158	16	peak
a Mode, Middle channel								
5622.600	54.23	-1.77	52.46	68.20	-15.74	135	20	peak
5698.560	55.48	-1.65	53.83	104.13	-50.30	135	20	peak
5704.320	54.98	-1.66	53.32	106.41	-53.09	135	20	peak
5724.840	54.47	-1.68	52.79	121.84	-69.05	135	20	peak
5851.200	54.25	-1.14	53.11	119.46	-66.35	135	20	peak
5861.640	55.33	-1.05	54.28	108.94	-54.66	135	20	peak
5909.160	55.42	-0.60	54.82	79.92	-25.10	135	20	peak
5949.840	54.33	-0.70	53.63	68.20	-14.57	135	20	peak
11570.000	42.75	9.62	52.37	74.00	-21.63	152	254	peak
11570.000	30.36	9.62	39.98	54.00	-14.02	152	254	AVG
17355.000	42.40	16.82	59.22	68.20	-8.98	151	252	peak
a Mode, High channel								
5612.880	53.82	-1.78	52.04	68.20	-16.16	150	30	peak
5691.720	54.56	-1.66	52.90	99.07	-46.17	150	30	peak
5718.360	54.18	-1.67	52.51	110.34	-57.83	150	30	peak
5722.680	53.76	-1.68	52.08	116.91	-64.83	150	30	peak
5850.840	61.35	-1.14	60.21	120.28	-60.07	150	30	peak
5857.320	58.87	-1.09	57.78	110.15	-52.37	150	30	peak
5907.720	55.75	-0.60	55.15	80.99	-25.84	150	30	peak
5936.520	55.72	-0.66	55.06	68.20	-13.14	150	30	peak
11650.000	42.08	9.62	51.70	74.00	-22.30	153	344	peak
11650.000	30.32	9.62	39.94	54.00	-14.06	153	344	AVG
17475.000	42.71	16.32	59.03	68.20	-9.17	147	107	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
n20 Mode, Low channel								
5610.000	54.50	-1.79	52.71	68.20	-15.49	149	57	peak
5697.840	57.04	-1.65	55.39	103.60	-48.21	149	57	peak
5717.280	64.11	-1.66	62.45	110.04	-47.59	149	57	peak
5724.480	71.38	-1.68	69.70	121.01	-51.31	149	57	peak
5852.280	54.68	-1.14	53.54	117.00	-63.46	149	57	peak
5873.520	55.20	-0.93	54.27	105.61	-51.34	149	57	peak
5887.200	55.52	-0.80	54.72	96.17	-41.45	149	57	peak
5933.280	54.49	-0.65	53.84	68.20	-14.36	149	57	peak
11490.000	41.67	9.04	50.71	74.00	-23.29	155	62	peak
11490.000	29.74	9.04	38.78	54.00	-15.22	155	62	AVG
17235.000	42.83	16.75	59.58	68.20	-8.62	142	165	peak
n20 Mode, Middle channel								
5645.640	53.84	-1.73	52.11	68.20	-16.09	120	56	peak
5698.920	55.63	-1.65	53.98	104.40	-50.42	120	56	peak
5702.520	55.06	-1.66	53.40	105.91	-52.51	120	56	peak
5722.320	53.97	-1.67	52.30	116.09	-63.79	120	56	peak
5850.480	54.89	-1.15	53.74	121.11	-67.37	120	56	peak
5862.000	56.14	-1.05	55.09	108.84	-53.75	120	56	peak
5918.520	55.43	-0.62	54.81	73.00	-18.19	120	56	peak
5925.360	54.86	-0.64	54.22	68.20	-13.98	120	56	peak
11570.000	42.05	9.62	51.67	74.00	-22.33	152	41	peak
11570.000	30.43	9.62	40.05	54.00	-13.95	152	41	AVG
17355.000	42.76	16.82	59.58	68.20	-8.62	146	359	peak
n20 Mode, High channel								
5622.240	54.18	-1.77	52.41	68.20	-15.79	150	90	peak
5685.960	55.78	-1.67	54.11	94.81	-40.70	150	90	peak
5707.560	54.76	-1.67	53.09	107.32	-54.23	150	90	peak
5723.760	53.90	-1.68	52.22	119.37	-67.15	150	90	peak
5850.120	66.89	-1.15	65.74	121.93	-56.19	150	90	peak
5855.520	63.28	-1.11	62.17	110.65	-48.48	150	90	peak
5901.960	55.62	-0.64	54.98	85.25	-30.27	150	90	peak
5926.080	54.82	-0.65	54.17	68.20	-14.03	150	90	peak
11650.000	42.80	9.62	52.42	74.00	-21.58	151	299	peak
11650.000	30.74	9.62	40.36	54.00	-13.64	151	299	AVG
17475.000	42.59	16.32	58.91	68.20	-9.29	153	242	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
n20 Mode, Low channel								
5639.880	54.79	-1.74	53.05	68.20	-15.15	118	15	peak
5698.560	56.28	-1.65	54.63	104.13	-49.50	118	15	peak
5717.640	64.08	-1.67	62.41	110.14	-47.73	118	15	peak
5724.840	70.12	-1.68	68.44	121.84	-53.40	118	15	peak
5850.840	54.82	-1.14	53.68	120.28	-66.60	118	15	peak
5859.120	55.56	-1.07	54.49	109.65	-55.16	118	15	peak
5908.800	55.65	-0.60	55.05	80.19	-25.14	118	15	peak
5925.360	55.80	-0.64	55.16	68.20	-13.04	118	15	peak
11490.000	41.73	9.04	50.77	74.00	-23.23	148	26	peak
11490.000	29.67	9.04	38.71	54.00	-15.29	148	26	AVG
17235.000	42.55	16.75	59.30	68.20	-8.90	151	176	peak
n20 Mode, Middle channel								
5637.720	54.22	-1.74	52.48	68.20	-15.72	135	21	peak
5699.640	54.92	-1.65	53.27	104.93	-51.66	135	21	peak
5712.240	55.15	-1.65	53.50	108.63	-55.13	135	21	peak
5721.600	55.54	-1.67	53.87	114.45	-60.58	135	21	peak
5854.440	54.81	-1.11	53.70	112.08	-58.38	135	21	peak
5867.760	56.89	-0.99	55.90	107.23	-51.33	135	21	peak
5877.480	55.05	-0.89	54.16	103.36	-49.20	135	21	peak
5939.400	55.52	-0.67	54.85	68.20	-13.35	135	21	peak
11570.000	42.13	9.62	51.75	74.00	-22.25	154	165	peak
11570.000	30.18	9.62	39.80	54.00	-14.20	154	165	AVG
17355.000	43.75	16.82	60.57	68.20	-7.63	149	358	peak
n20 Mode, High channel								
5617.560	53.63	-1.77	51.86	68.20	-16.34	134	30	peak
5670.120	54.98	-1.69	53.29	83.09	-29.80	134	30	peak
5719.800	55.02	-1.67	53.35	110.74	-57.39	134	30	peak
5723.400	53.69	-1.68	52.01	118.55	-66.54	134	30	peak
5852.280	64.57	-1.14	63.43	117.00	-53.57	134	30	peak
5855.520	61.52	-1.11	60.41	110.65	-50.24	134	30	peak
5904.120	55.47	-0.61	54.86	83.65	-28.79	134	30	peak
5926.800	55.16	-0.64	54.52	68.20	-13.68	134	30	peak
11650.000	42.50	9.62	52.12	74.00	-21.88	153	40	peak
11650.000	30.40	9.62	40.02	54.00	-13.98	153	40	AVG
17475.000	42.96	16.32	59.28	68.20	-8.92	155	154	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
n40 Mode, Low channel								
5630.520	55.27	-2.28	52.99	68.20	-15.21	146	252	peak
5699.640	65.46	-2.22	63.24	104.93	-41.69	146	252	peak
5719.440	77.64	-2.24	75.40	110.64	-35.24	146	252	peak
5722.320	79.20	-2.24	76.96	116.09	-39.13	146	252	peak
5853.720	55.78	-1.93	53.85	113.72	-59.87	146	252	peak
5862.360	55.67	-1.88	53.79	108.74	-54.95	146	252	peak
5910.240	56.61	-1.51	55.10	79.12	-24.02	146	252	peak
5941.920	55.31	-1.39	53.92	68.20	-14.28	146	252	peak
11510.000	42.24	8.17	50.41	74.00	-23.59	153	228	peak
11510.000	30.86	8.17	39.03	54.00	-14.97	153	228	AVG
17265.000	43.80	13.96	57.76	68.20	-10.44	149	314	peak
n40 Mode, High channel								
5641.680	55.28	-2.27	53.01	68.20	-15.19	125	236	peak
5692.800	54.74	-2.23	52.51	99.87	-47.36	125	236	peak
5718.000	56.27	-2.24	54.03	110.24	-56.21	125	236	peak
5722.320	57.04	-2.24	54.80	116.09	-61.29	125	236	peak
5850.120	61.34	-1.95	59.39	121.93	-62.54	125	236	peak
5856.240	57.04	-1.91	55.13	110.45	-55.32	125	236	peak
5888.640	56.64	-1.70	54.94	95.11	-40.17	125	236	peak
5930.400	55.51	-1.44	54.07	68.20	-14.13	125	236	peak
11590.000	43.26	8.21	51.47	74.00	-22.53	147	227	peak
11590.000	31.58	8.21	39.79	54.00	-14.21	147	227	AVG
17385.000	43.74	14.13	57.87	68.20	-10.33	146	281	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
n40 Mode, Low channel								
5635.560	55.05	-2.27	52.78	68.20	-15.42	177	145	peak
5699.280	59.73	-2.22	57.51	104.67	-47.16	177	145	peak
5719.080	72.19	-2.24	69.95	110.54	-40.59	177	145	peak
5723.040	74.44	-2.25	72.19	117.73	-45.54	177	145	peak
5850.480	55.75	-1.95	53.80	121.11	-67.31	177	145	peak
5873.880	55.60	-1.81	53.79	105.51	-51.72	177	145	peak
5909.160	56.35	-1.51	54.84	79.92	-25.08	177	145	peak
5933.640	55.25	-1.42	53.83	68.20	-14.37	177	145	peak
11510.000	42.58	8.17	50.75	74.00	-23.25	143	294	peak
11510.000	30.62	8.17	38.79	54.00	-15.21	143	294	AVG
17265.000	43.07	13.96	57.03	68.20	-11.17	154	311	peak
n40 Mode, High channel								
5639.880	55.56	-2.27	53.29	68.20	-14.91	206	145	peak
5698.920	54.98	-2.22	52.76	104.40	-51.64	206	145	peak
5717.640	56.31	-2.24	54.07	110.14	-56.07	206	145	peak
5720.520	54.90	-2.24	52.66	111.99	-59.33	206	145	peak
5851.920	55.72	-1.94	53.78	117.82	-64.04	206	145	peak
5869.560	56.24	-1.83	54.41	106.72	-52.31	206	145	peak
5891.520	56.13	-1.68	54.45	92.98	-38.53	206	145	peak
5949.840	55.79	-1.37	54.42	68.20	-13.78	206	145	peak
11590.000	43.08	8.21	51.29	74.00	-22.71	142	246	peak
11590.000	31.43	8.21	39.64	54.00	-14.36	142	246	AVG
17385.000	43.98	14.13	58.11	68.20	-10.09	148	198	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.

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

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%.

Minimum Emission Bandwidth for the band 5.725-5.85 GHz

Section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500 KHz for the band 5.715-5.85 GHz. The following procedure shall be used for measuring this bandwidth:
a) Set RBW = 100 kHz.
b) Set the video bandwidth (VBW) ≥ 3 × RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Sweep = auto couple.
f) Allow the trace to stabilize.
g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

9.3 Test Results

Test mode: Transmitting

UNII Band	Mode	Channel	Frequency (MHz)	26dB Emission Bandwidth (MHz)	99% Emission Bandwidth (MHz)
UNII-1	802.11a	36	5180	20.60	16.94
		40	5200	20.52	16.94
		48	5240	20.56	16.94
	802.11n HT20	36	5180	20.88	17.78
		40	5200	20.84	17.78
		48	5240	20.84	17.82
	802.11n HT40	38	5190	40.80	36.52
		46	5230	40.48	36.60

UNII Band	Mode	Channel	Frequency (MHz)	6dB Emission Bandwidth (MHz)	99% Emission Bandwidth (MHz)	Limit (kHz)	Result
UNII-3	802.11a	149	5745	16.36	16.94	≥500	PASS
		157	5785	16.40	16.98	≥500	PASS
		165	5825	16.36	16.98	≥500	PASS
	802.11n HT20	149	5745	17.60	17.90	≥500	PASS
		157	5785	17.60	17.86	≥500	PASS
		165	5825	17.60	17.78	≥500	PASS
	802.11n HT40	151	5755	36.32	36.52	≥500	PASS
		159	5795	36.32	36.52	≥500	PASS

Note: the 99% Occupied Bandwidth have not fall into the band 5250-5350MHz or 5470-5725MHz, please refer to the test plots of 99% Occupied Bandwidth.

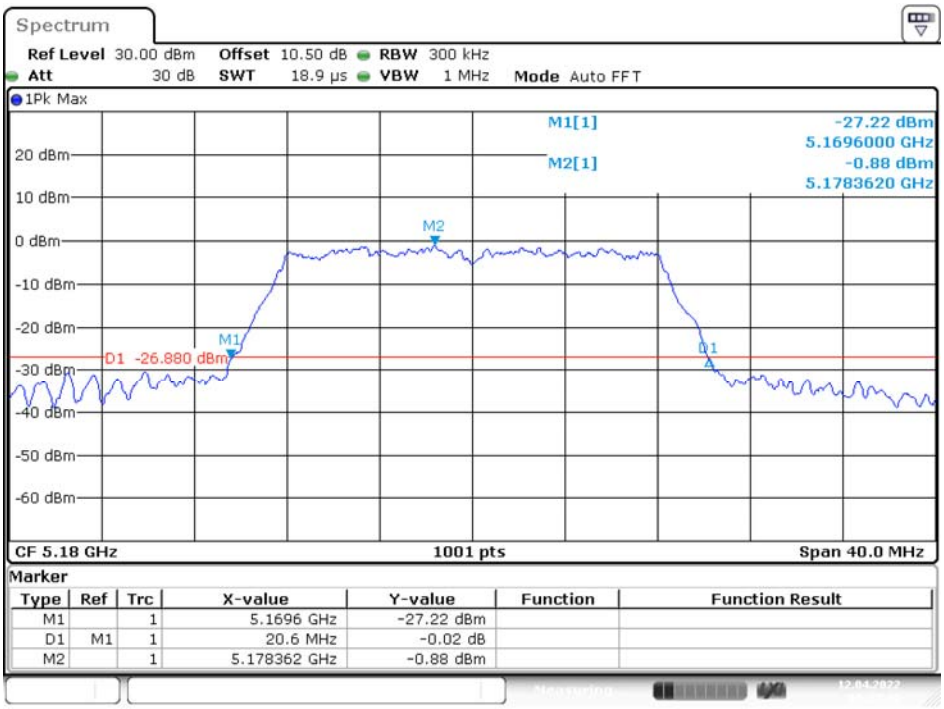
Please refer to the following plots

Transmitting Mode:

UNII-1 Band I / BW 26dBc

IEEE 802.11a Mode / 5150 ~ 5250MHz

5180MHz



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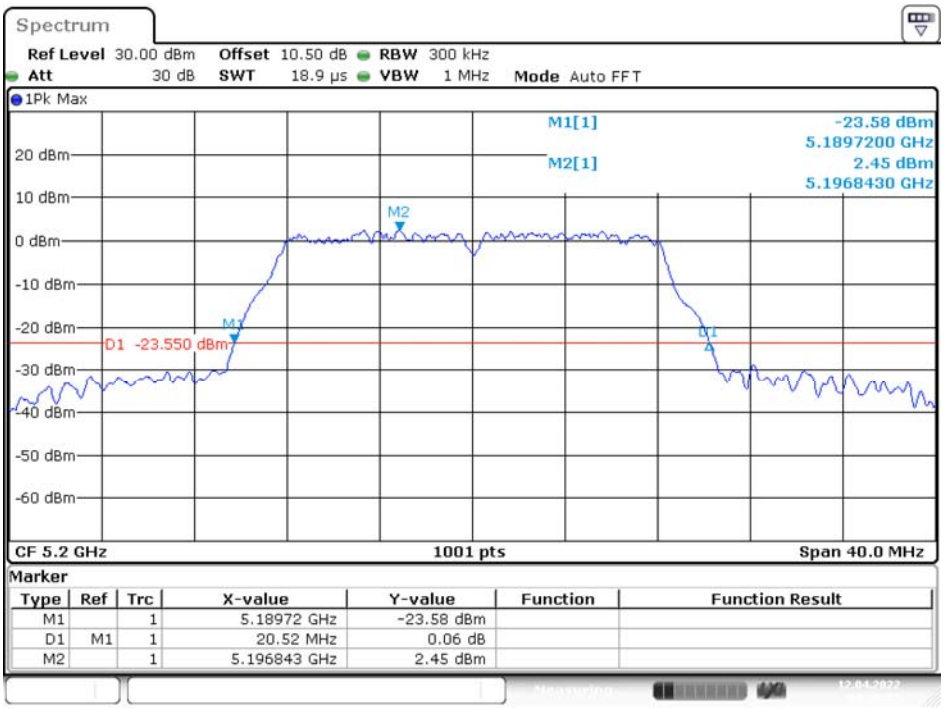
5200MHz



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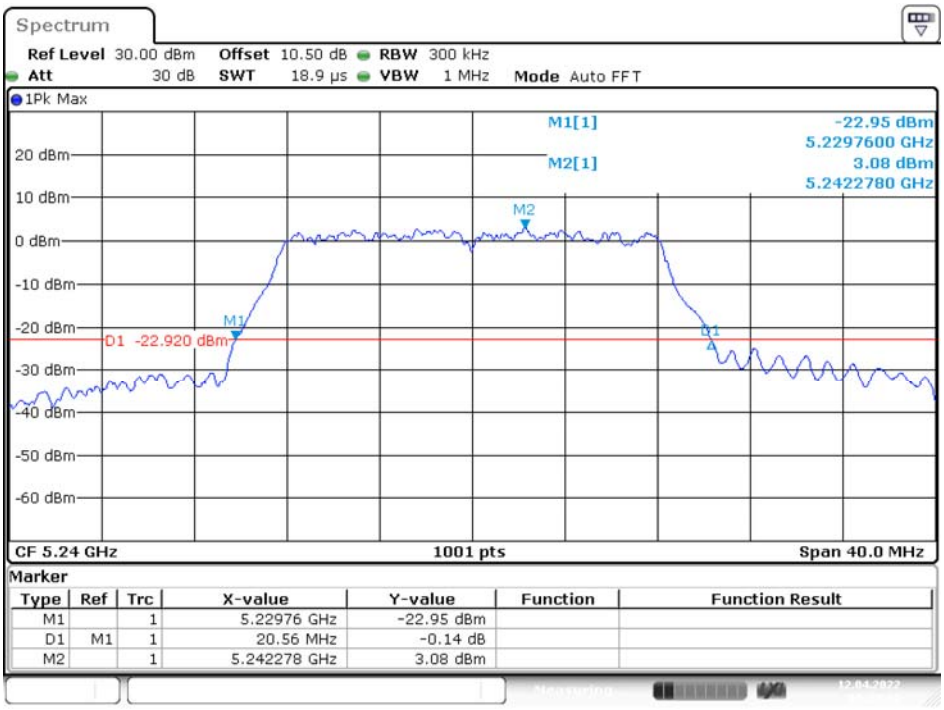
5240MHz



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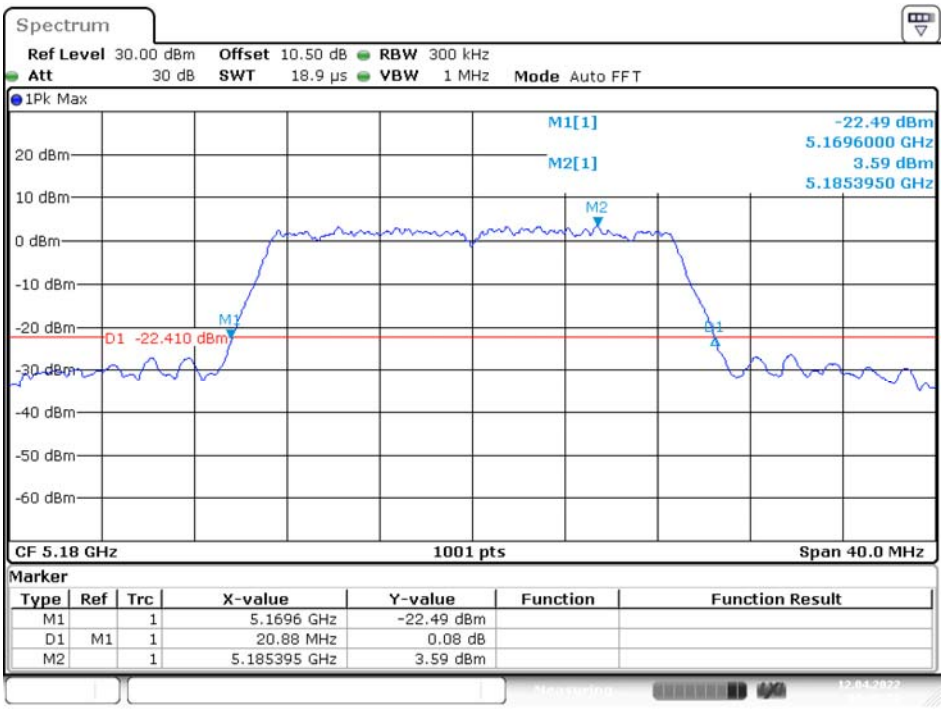
IEEE 802.11n HT20 Mode / 5150 ~ 5250MHz

5180MHz



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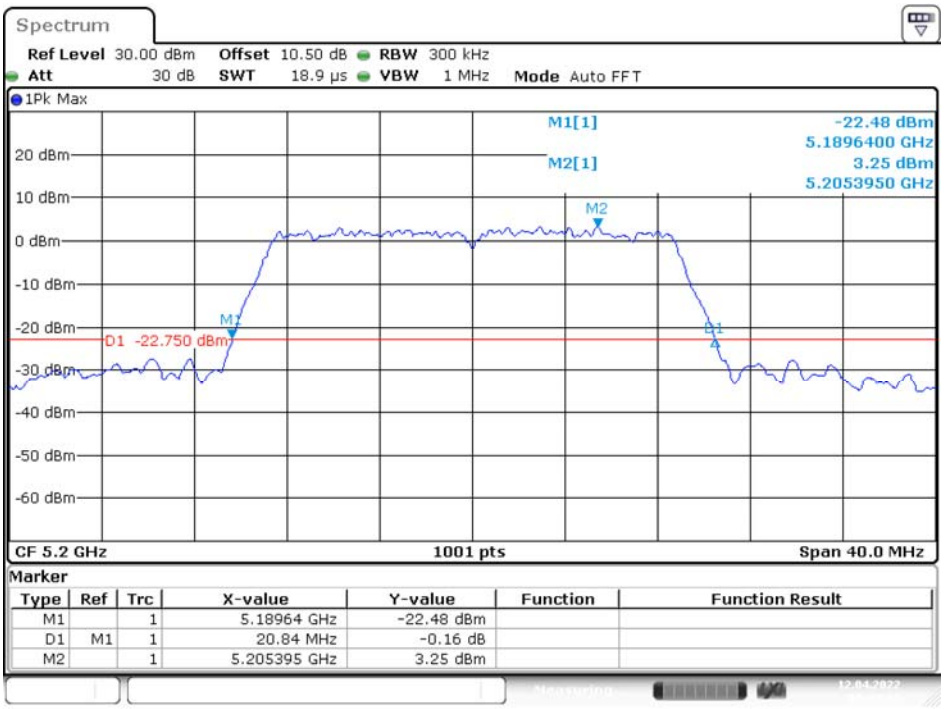
5200MHz



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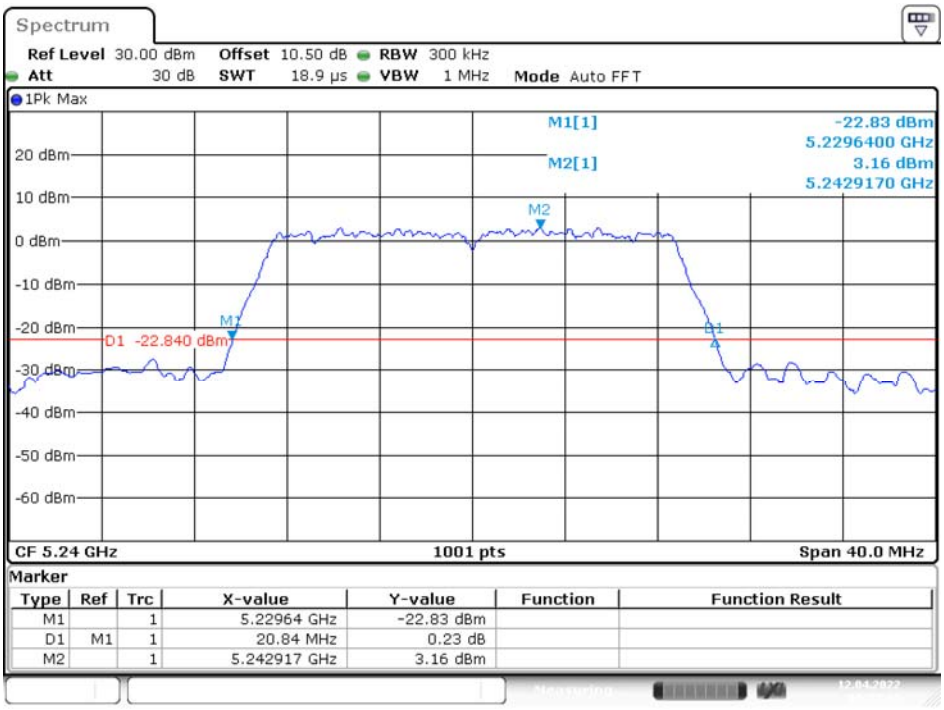
5240MHz



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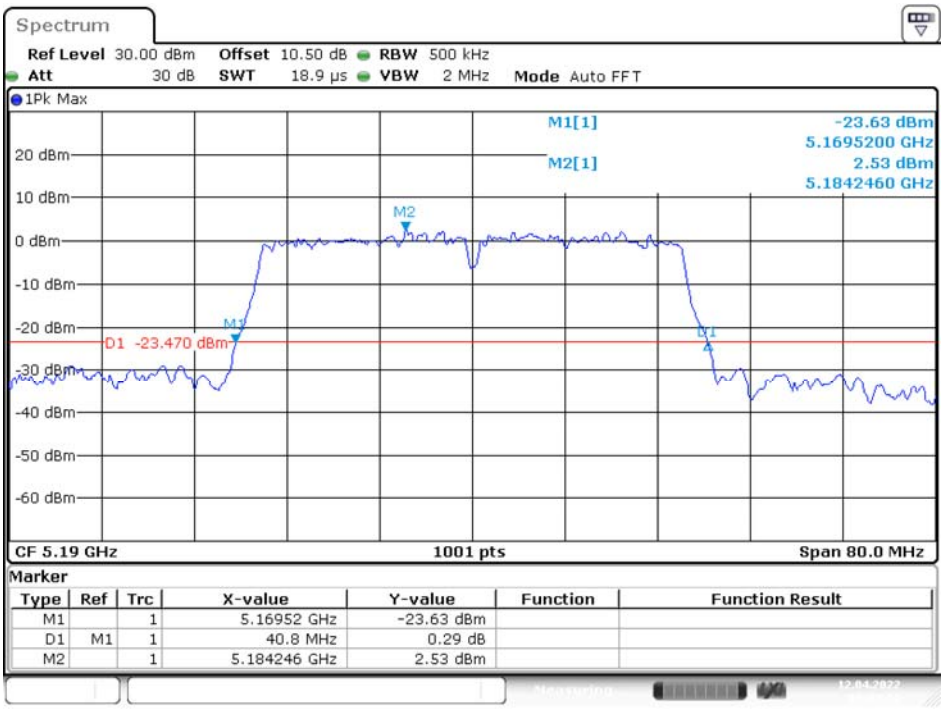
IEEE 802.11n HT40 Mode / 5150 ~ 5250MHz

5190MHz



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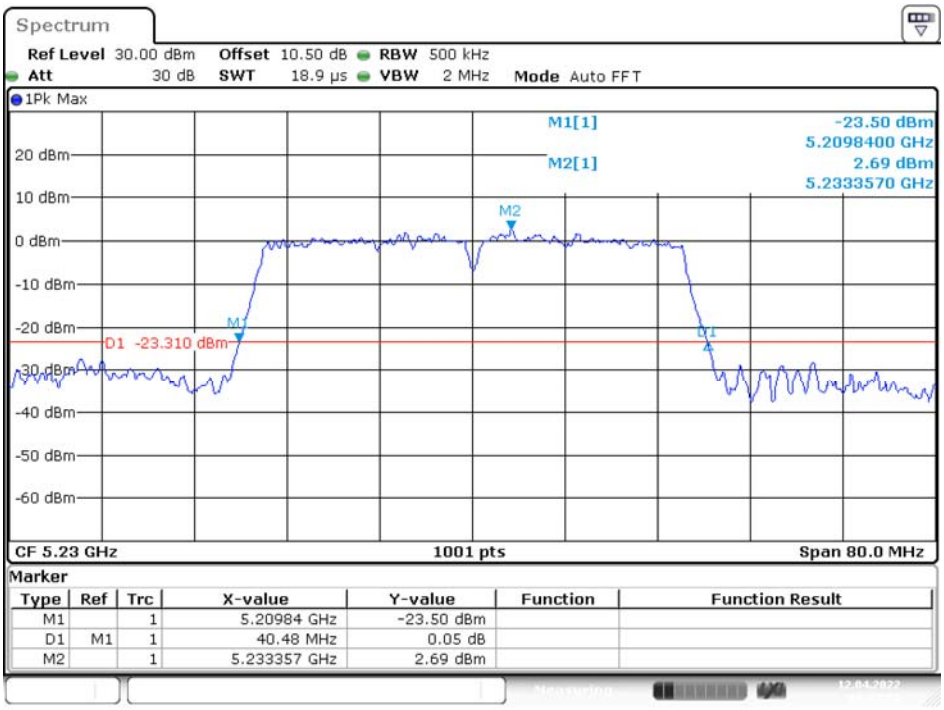
5230MHz



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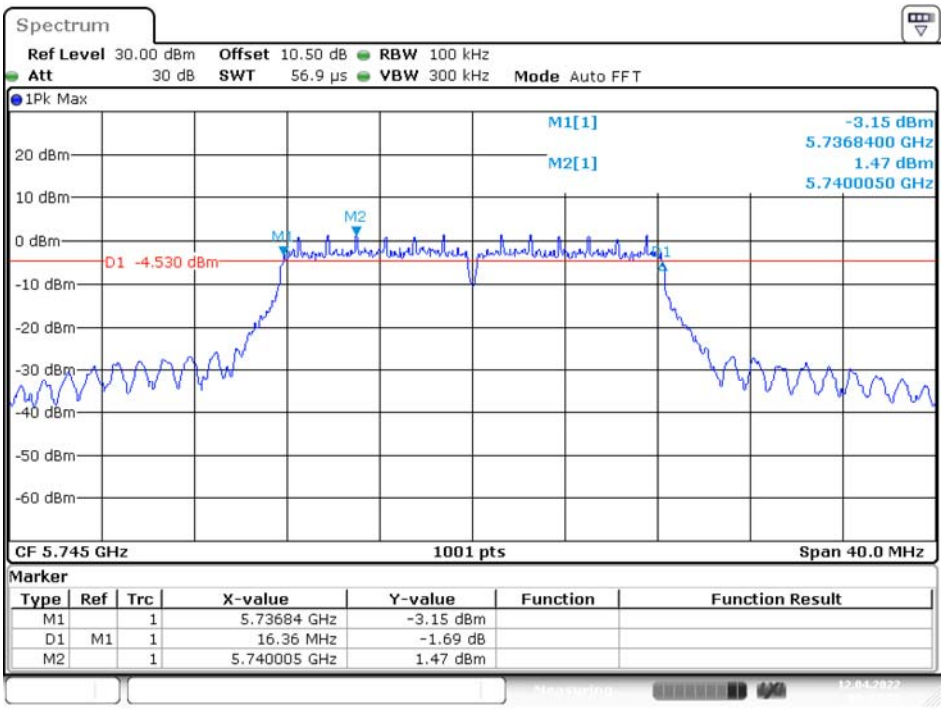
UNII-3 Band IV / BW 6dBc
IEEE 802.11a Mode / 5725 ~ 5850MHz

5745MHz



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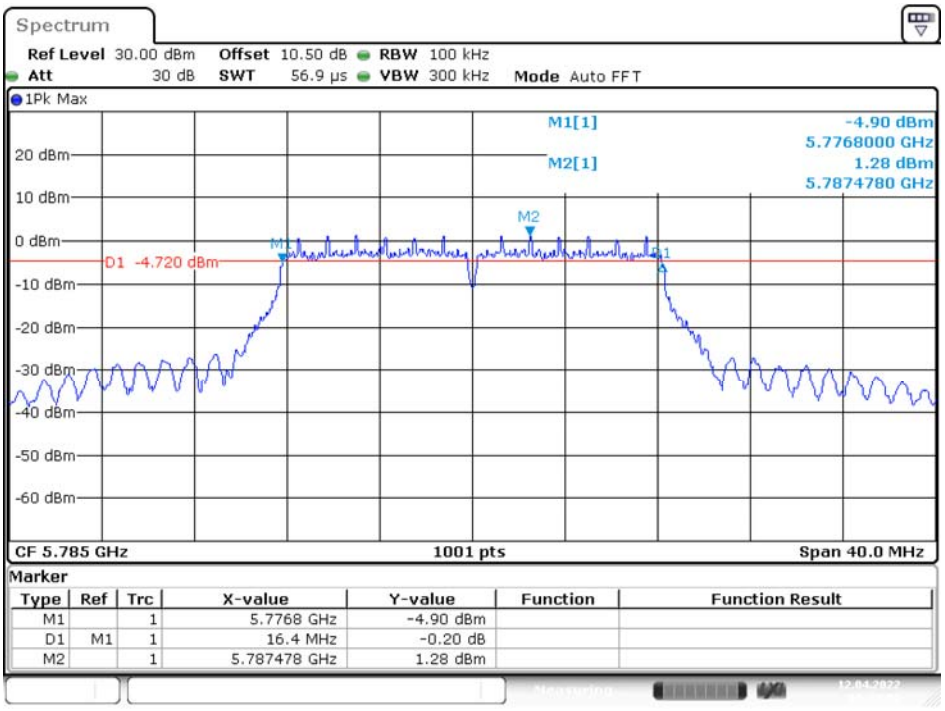
5785MHz



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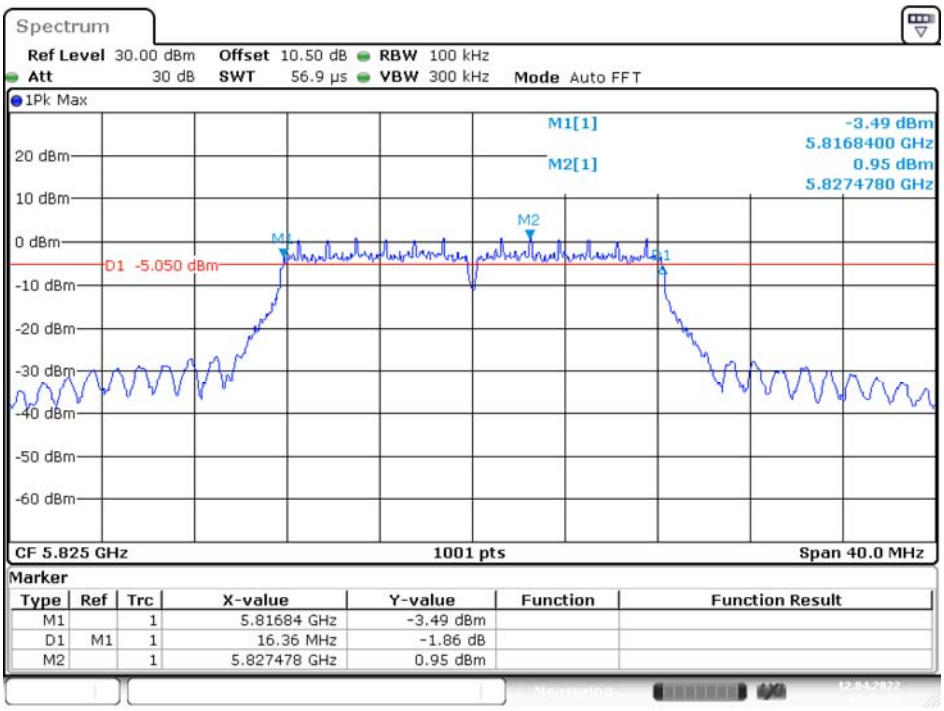
5825MHz



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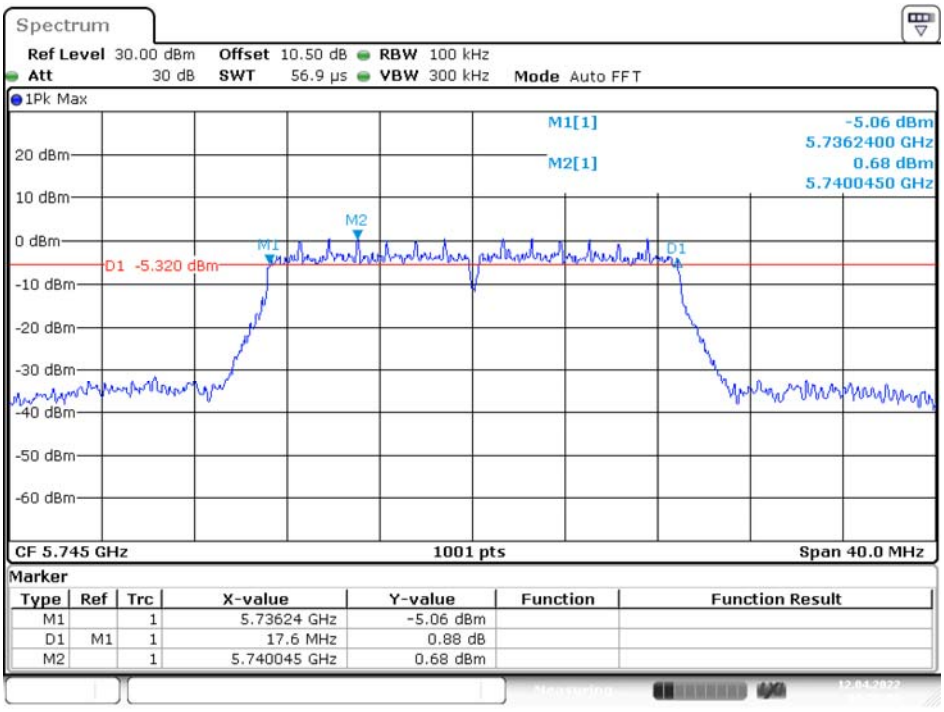
IEEE 802.11n HT20 Mode / 5725 ~ 5850MHz

5745MHz



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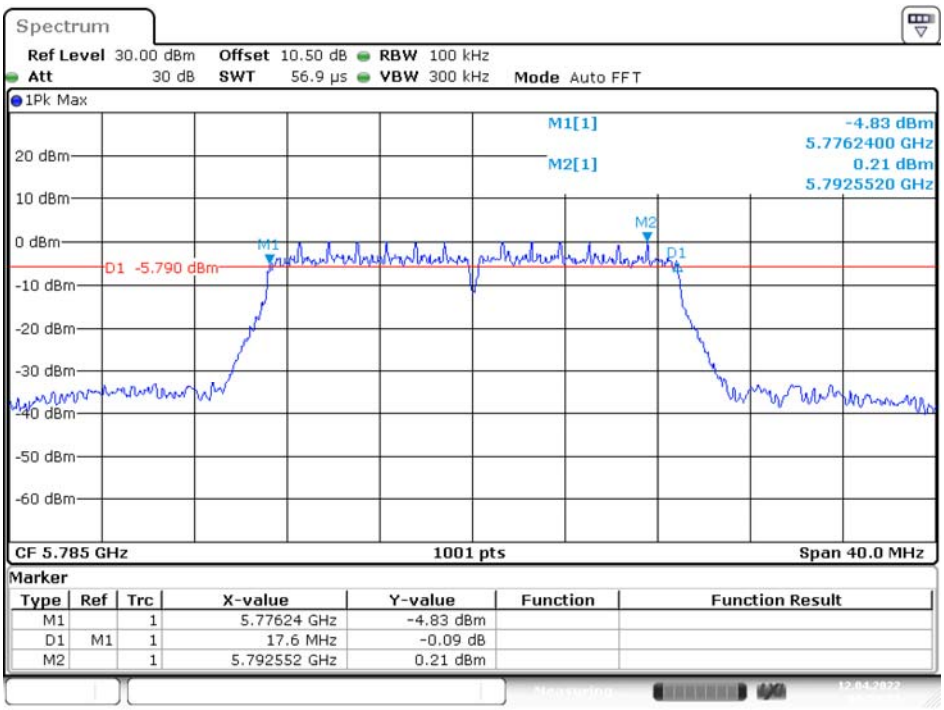
5785MHz



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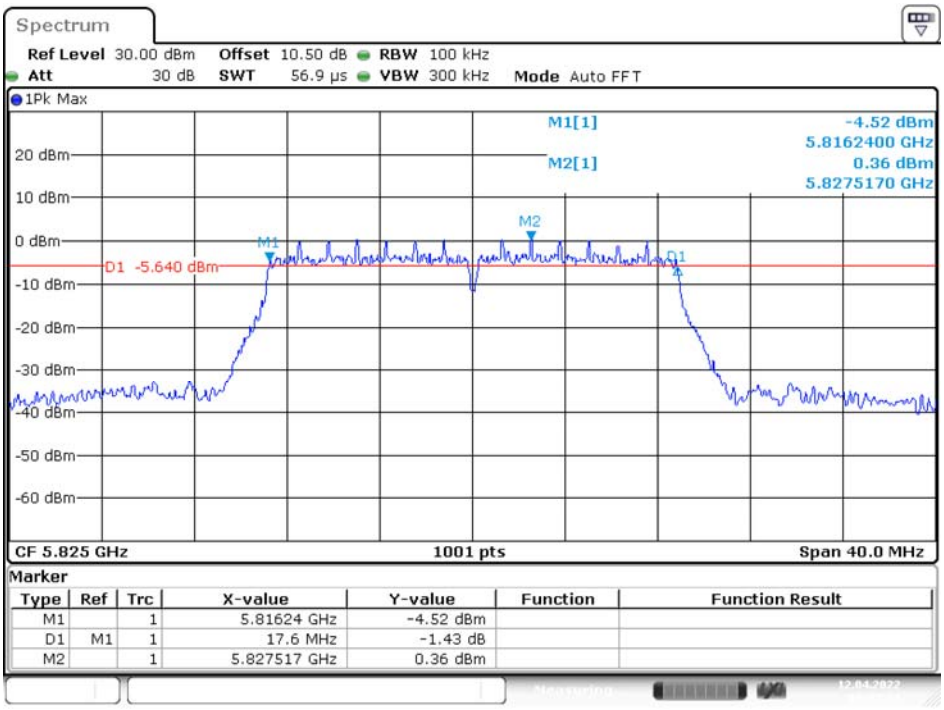
5825MHz



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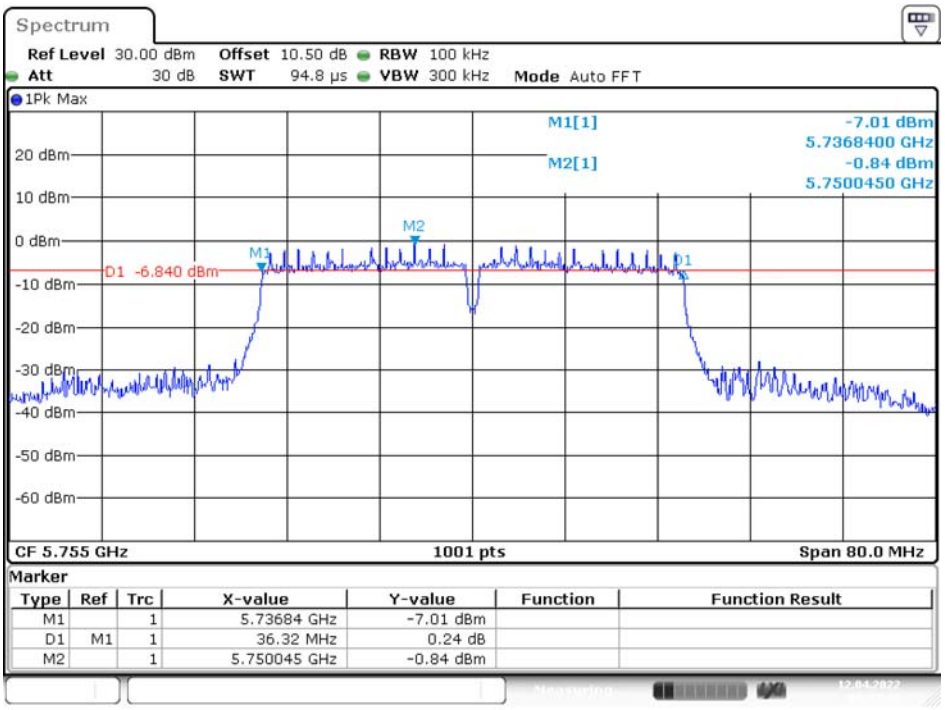
IEEE 802.11n HT40 Mode / 5725 ~ 5850MHz

5755MHz



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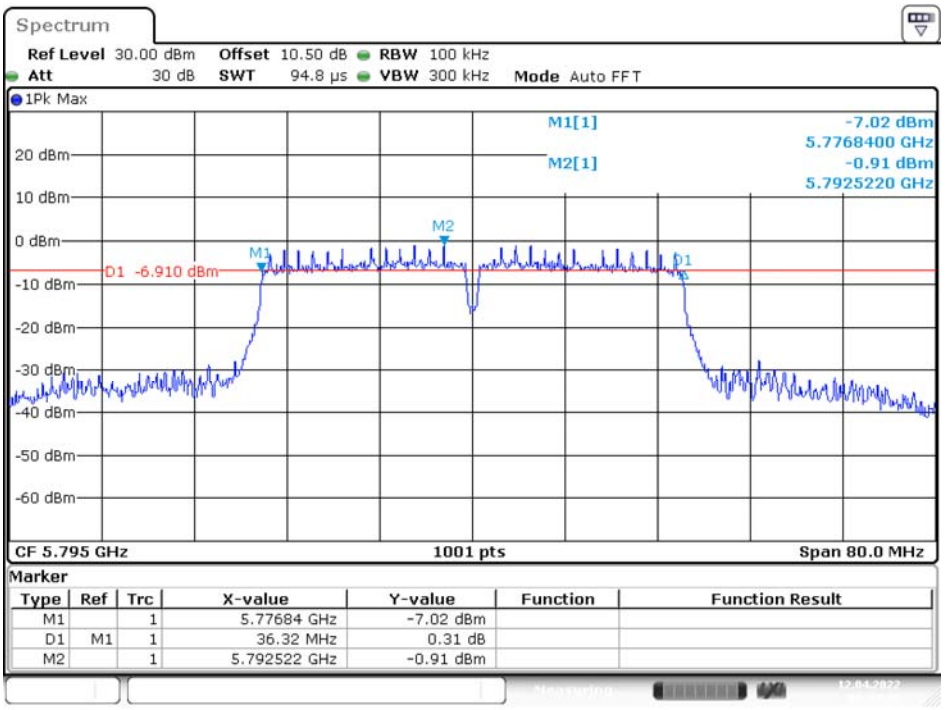
5795MHz



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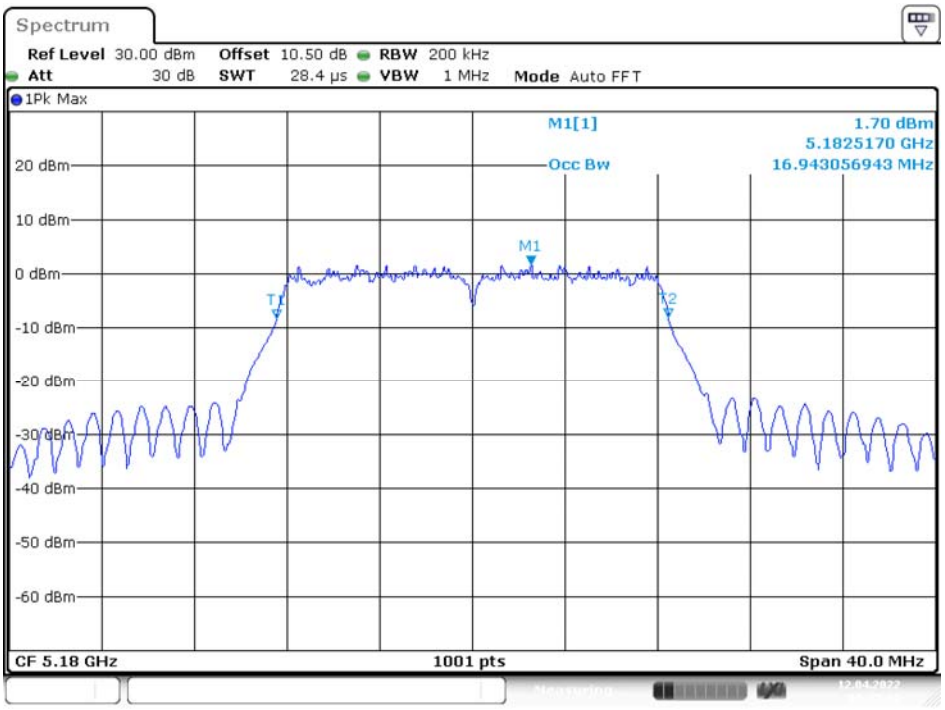
UNII-1 Band I / OBW 99%
IEEE 802.11a Mode / 5150 ~ 5250MHz

5180MHz



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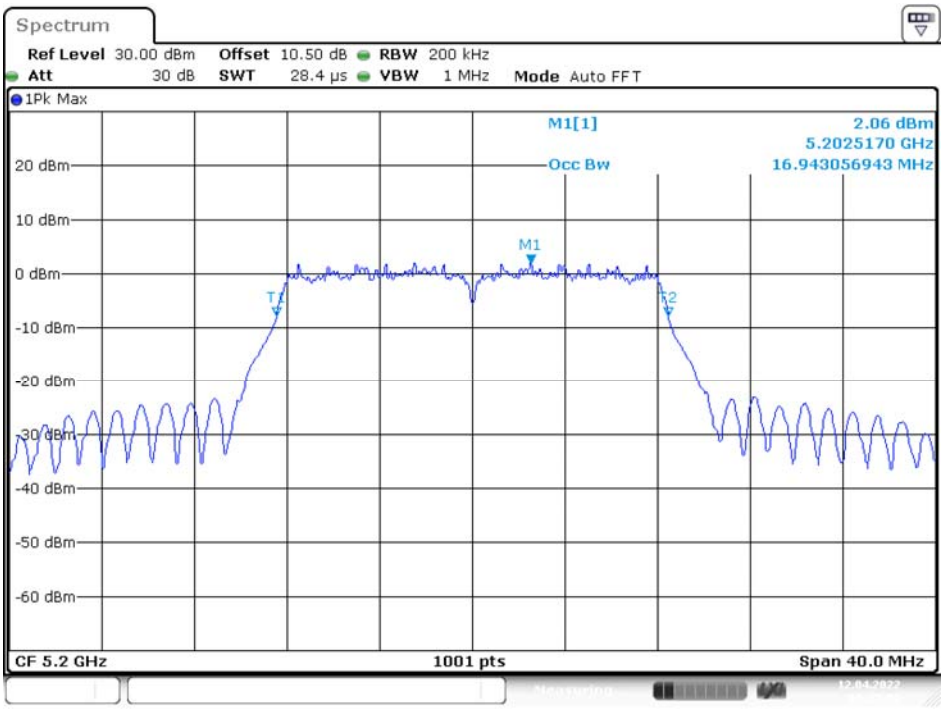
5200MHz



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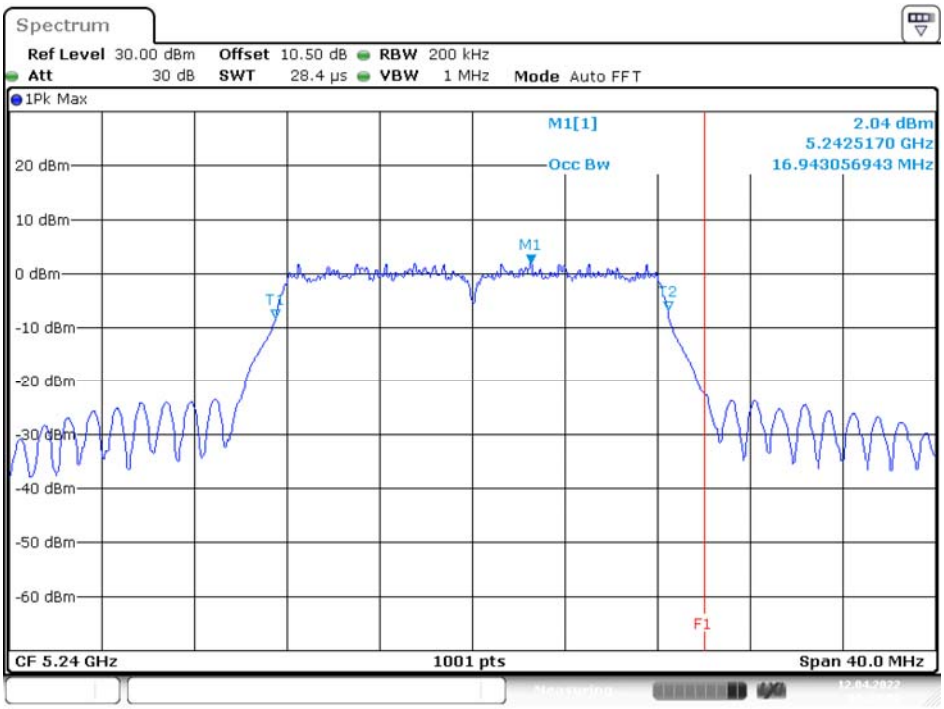
5240MHz



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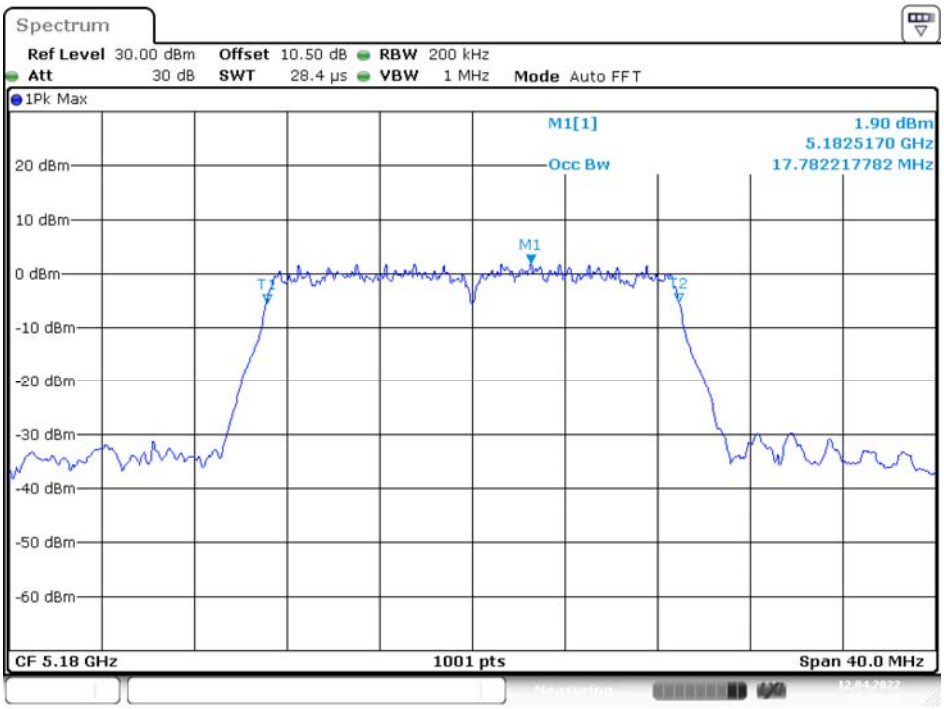
IEEE 802.11n HT20 Mode / 5150 ~ 5250MHz

5180MHz



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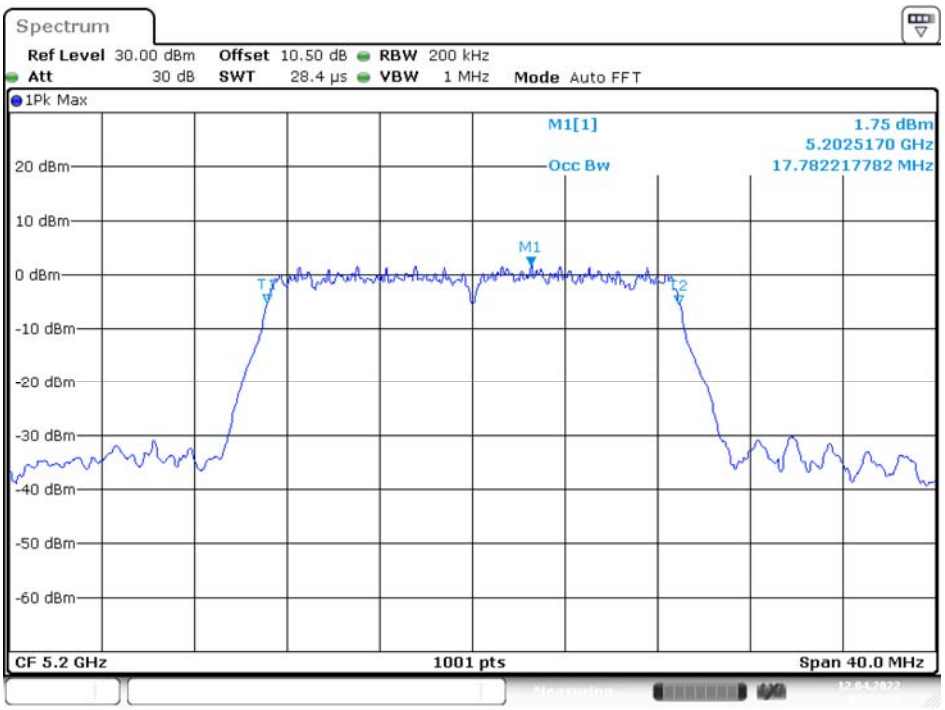
5200MHz



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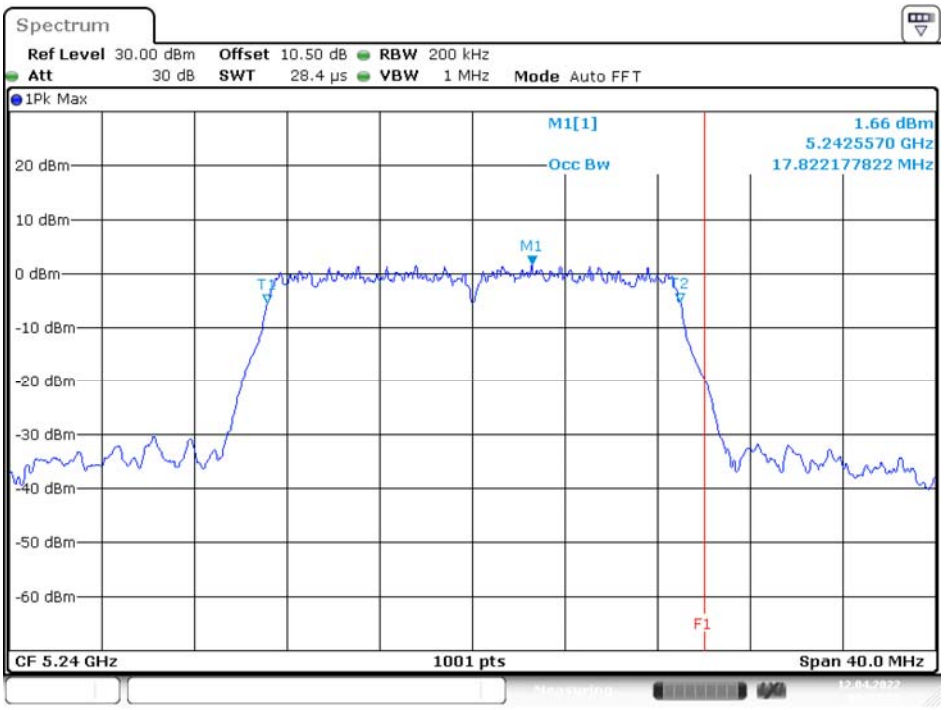
5240MHz



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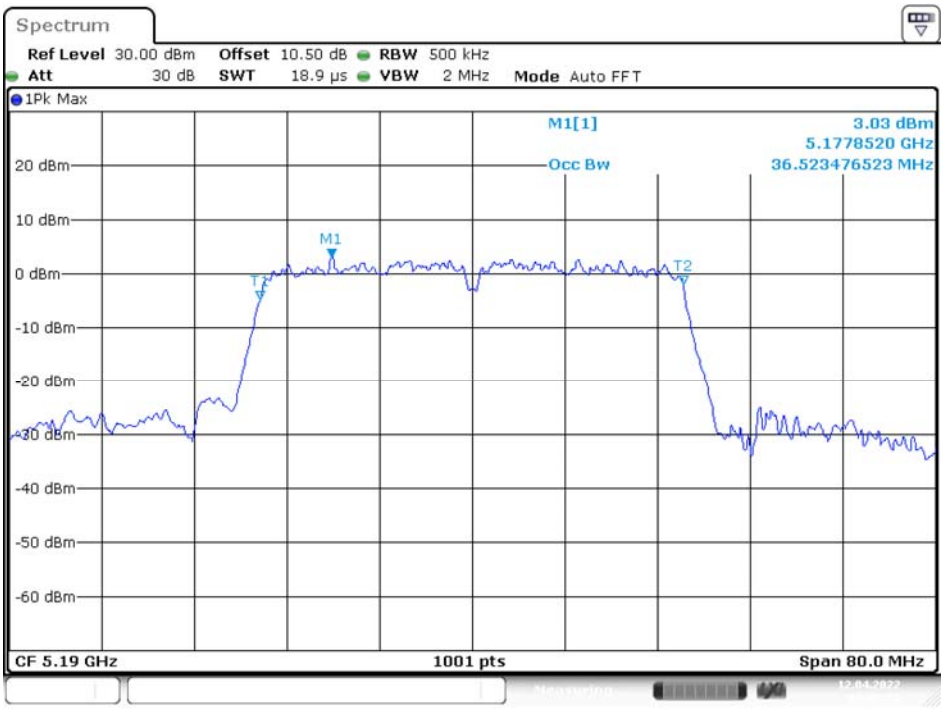
IEEE 802.11n HT40 Mode / 5150 ~ 5250MHz

5190MHz



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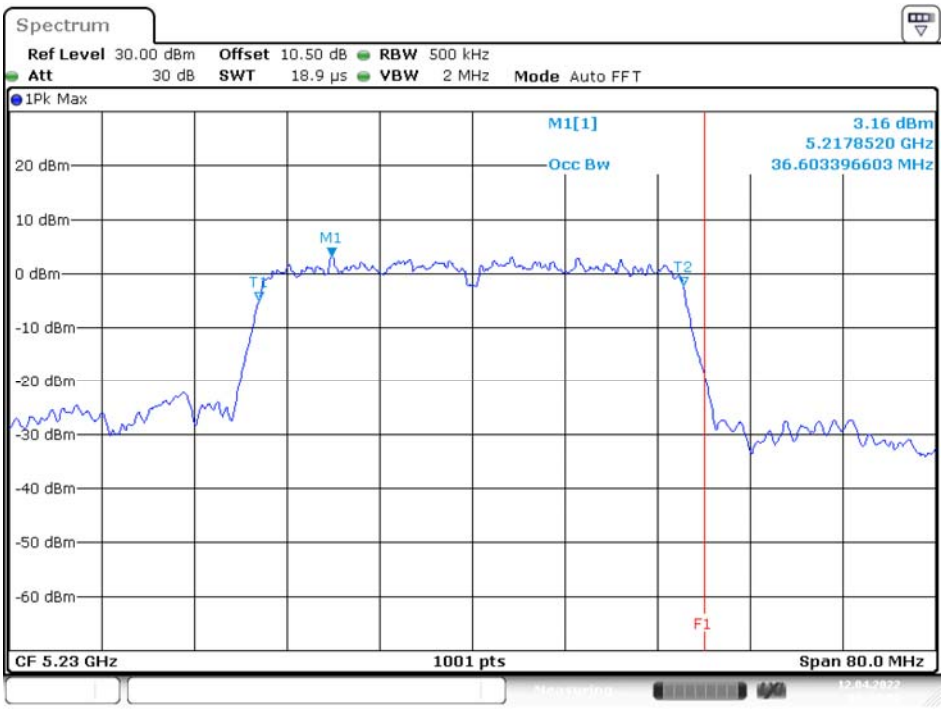
5230MHz



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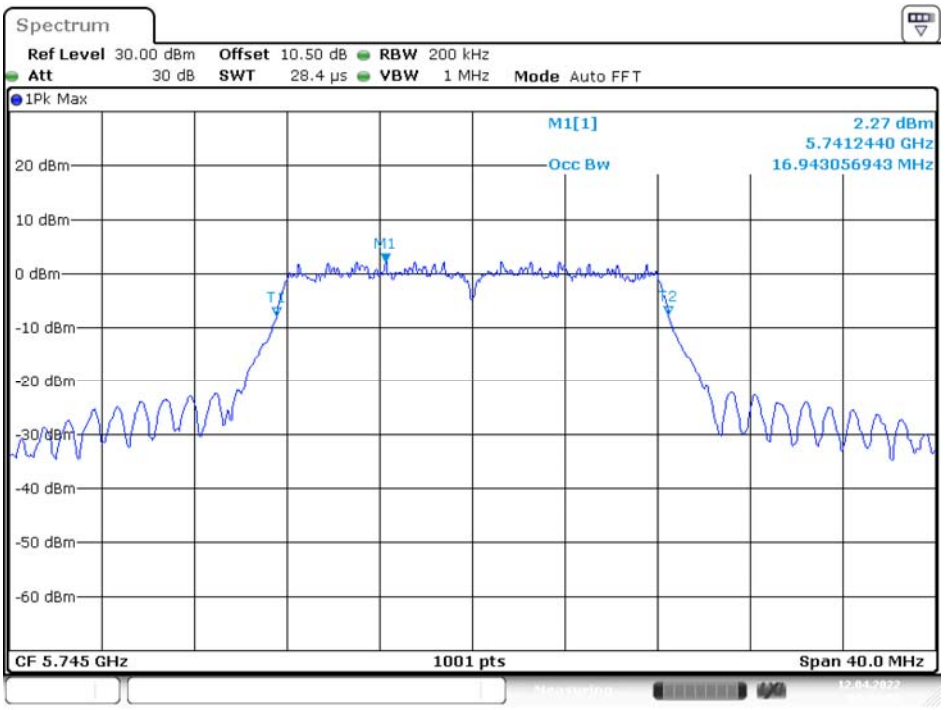
UNII-3 Band IV / OBW 99%
IEEE 802.11a Mode / 5725 ~ 5850MHz

5745MHz



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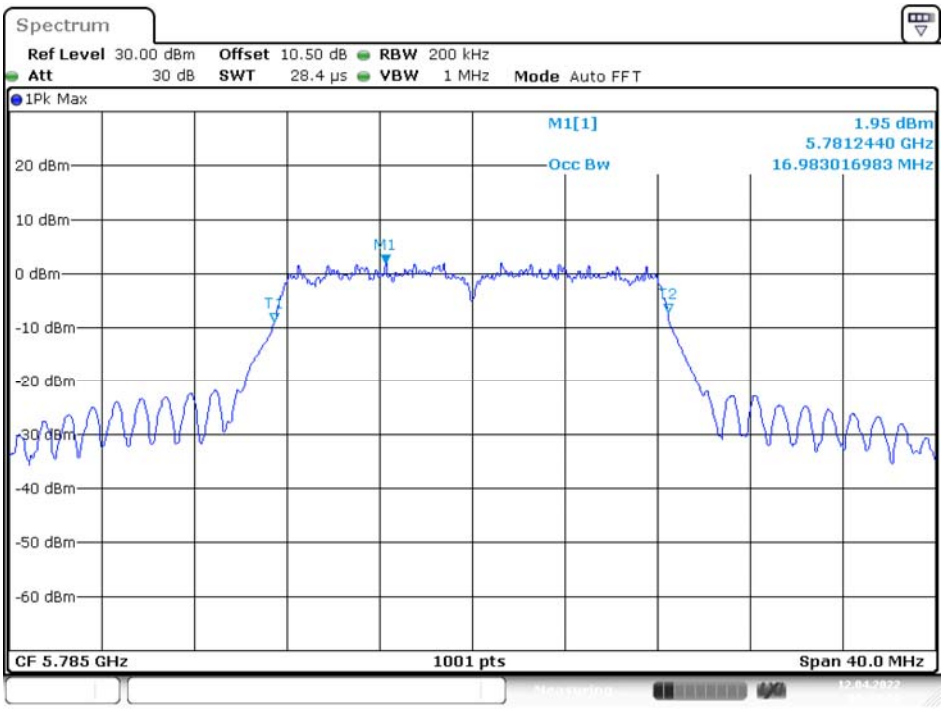
5785MHz



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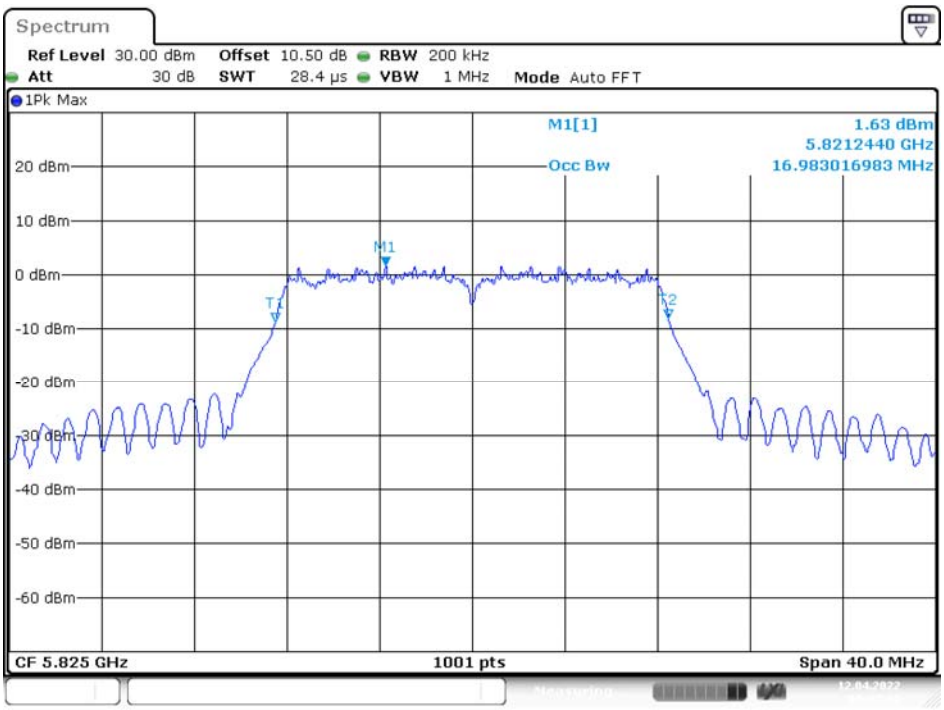
5825MHz



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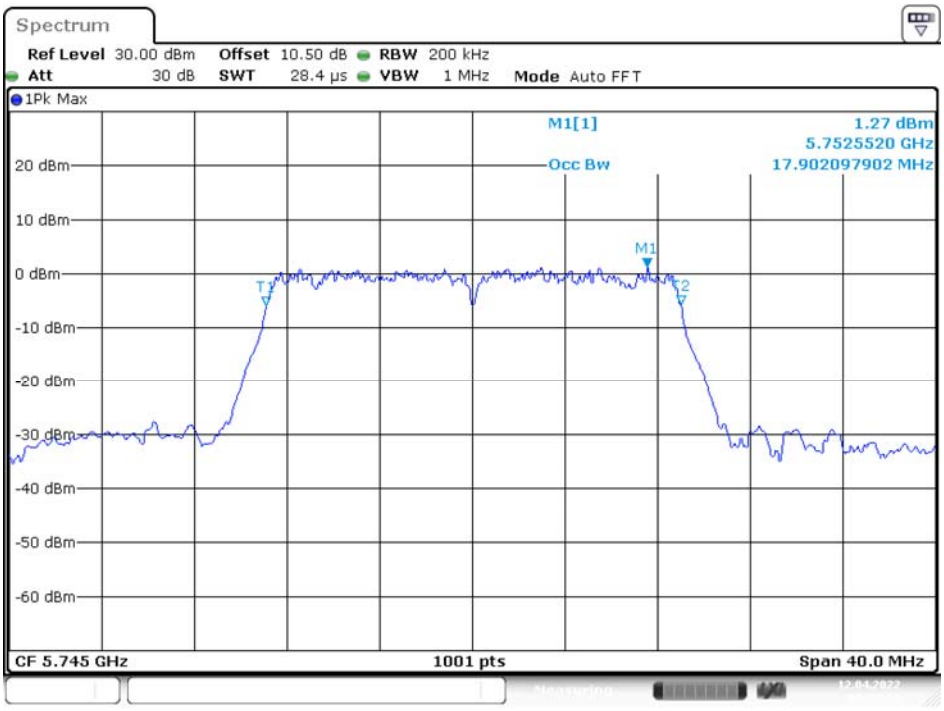
IEEE 802.11n HT20 Mode / 5725 ~ 5850MHz

5745MHz



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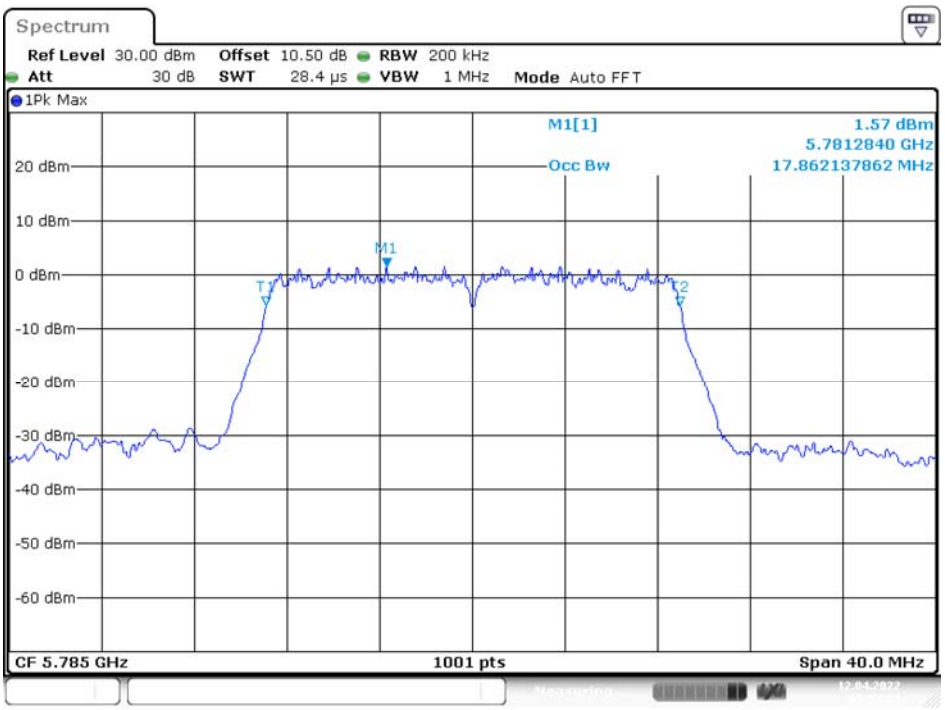
5785MHz



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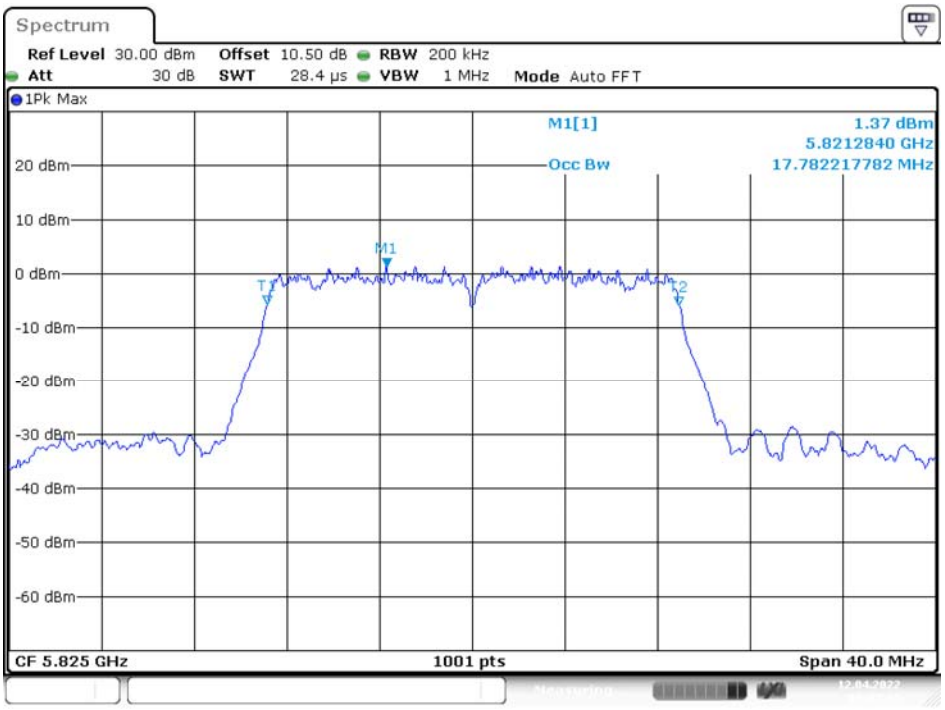
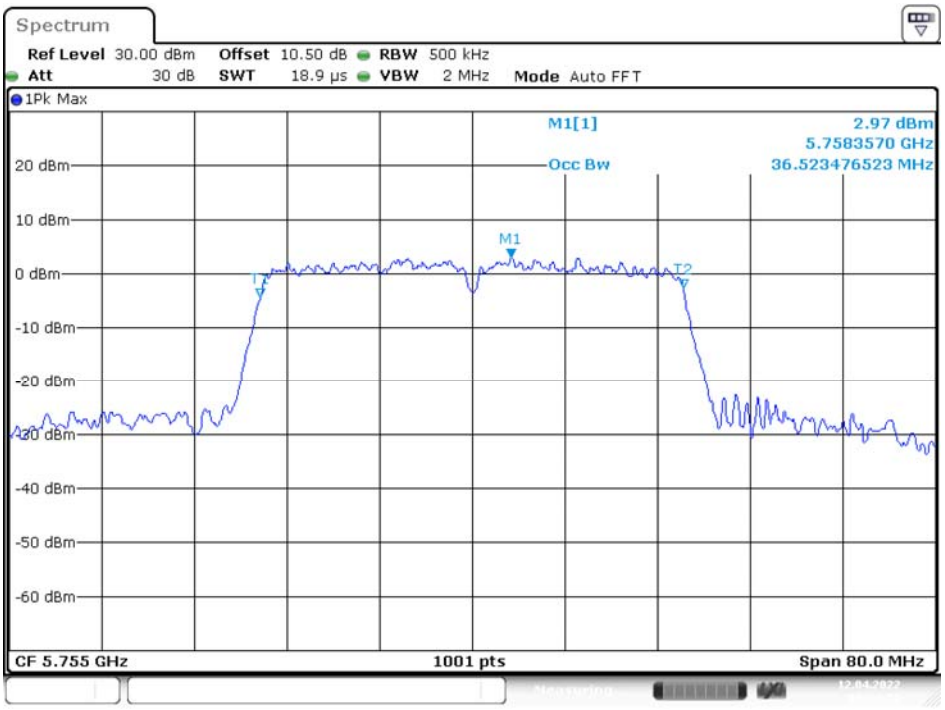
5825MHz



Date: 12.APR.2022 06:03:43

IEEE 802.11n HT40 Mode / 5725 ~ 5850MHz

5755MHz



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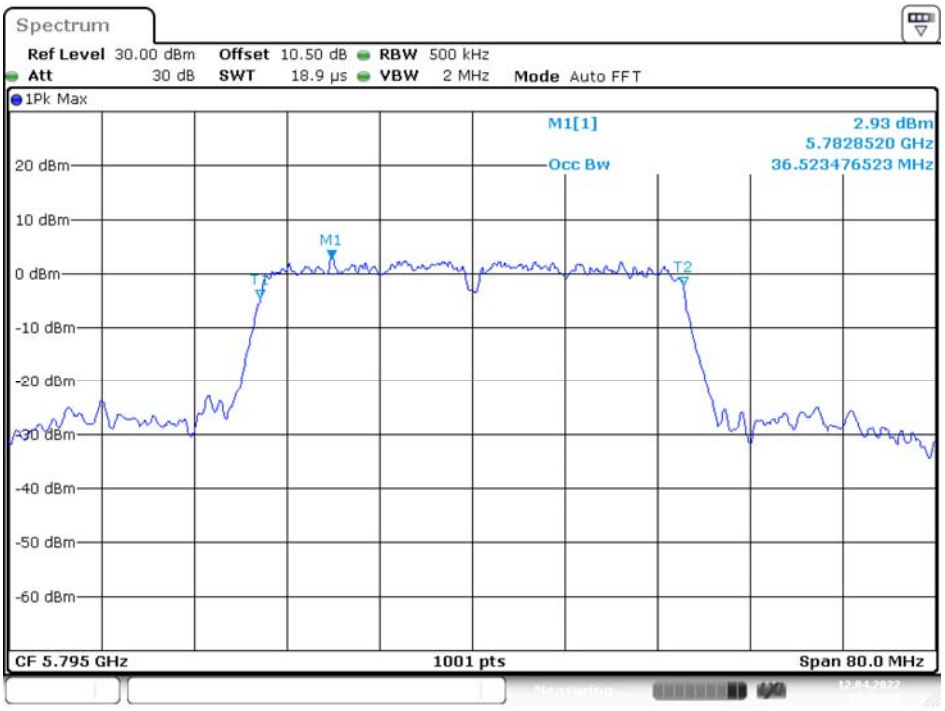
5795MHz



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10 FCC §15.407(a) – Maximum Output Power

10.1 Applicable Standard

According to FCC §15.407(a):

For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. 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.

10.2 Test Procedure

The use Power Meter

1. Place the EUT on a bench and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to a Power sensor.

10.3 Test Results

Maximum Conducted Average Output Power

Test Mode: Transmitting

UNII Band	Mode	Channel	Frequency (MHz)	Maximum Conducted Average Output Power (dBm)	Duty Factor (dB)	Total Maximum Conducted Average Output Power With Duty Factor (dBm)	Limit (dBm)
UNII-1	802.11a	36	5180	12.09	0.04	12.13	24
		40	5200	12.25	0.04	12.29	24
		48	5240	12.67	0.04	12.71	24
UNII-3		149	5745	14.28	0.04	14.32	30
		157	5785	13.86	0.04	13.90	30
		165	5825	13.51	0.04	13.55	30
UNII-1	802.11n HT20	36	5180	12.17	0.00	12.17	24
		40	5200	12.32	0.00	12.32	24
		48	5240	12.62	0.00	12.62	24
UNII-3		149	5745	13.90	0.00	13.90	30
		157	5785	13.72	0.00	13.72	30
		165	5825	13.43	0.00	13.43	30
UNII-1	802.11n HT40	38	5190	13.42	0.04	13.46	24
		46	5230	13.28	0.04	13.32	24
UNII-3		151	5755	13.56	0.04	13.60	30
		159	5795	13.21	0.04	13.25	30

Note: The maximum antenna gain is 2.87 dBi.

11 FCC § 15.407(a) – Power Spectral Density

11.1 Applicable Standard

According to FCC §15.407(a):

For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6dBi 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.

11.2 Test Procedure

The measurements are base on FCC KDB 789033 D02 General UNII Test Procedyres New Rules v02r01: Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices section F: Maximum power spectral density (PPSD)

11.3 Test Results

Test Mode: Transmitting

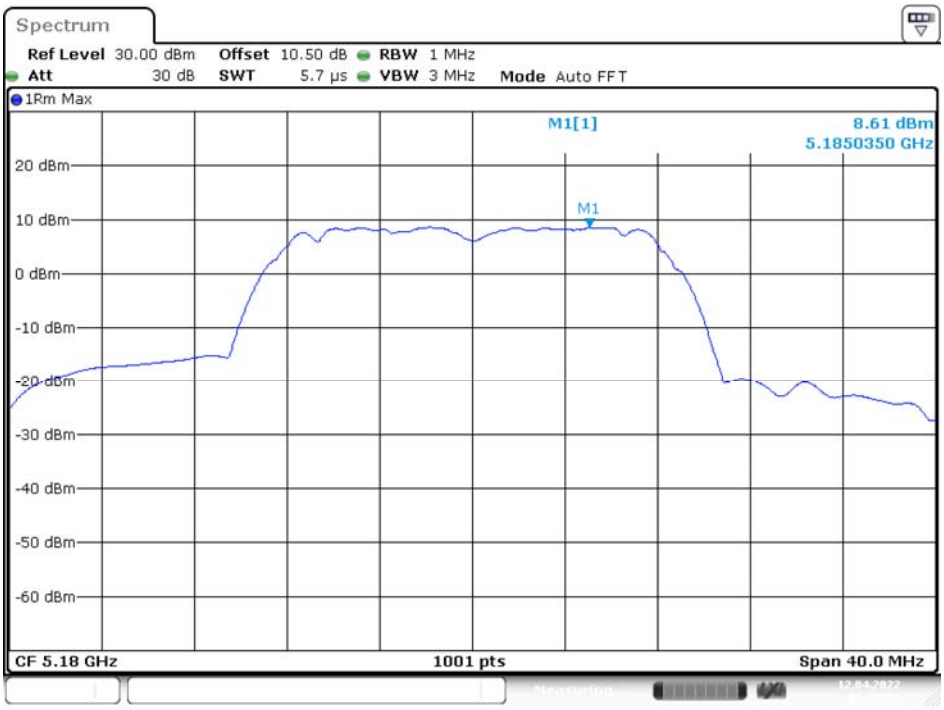
UNII Band	Mode	Channel	Frequency (MHz)	Power Spectral Density (dBm/MHz)	Duty Factor (dB)	Power Spectral Density with duty factor (dBm/MHz)	Limit (dBm/MHz)
UNII-1	802.11a	36	5180	8.61	0.04	8.65	11
		40	5200	10.22	0.04	10.26	11
		48	5240	10.49	0.04	10.53	11
	802.11n HT20	36	5180	8.62	0	8.62	11
		40	5200	8.43	0	8.43	11
		48	5240	8.36	0	8.36	11
	802.11n HT40	38	5190	5.85	0.04	5.89	11
		46	5230	6.33	0.04	6.37	11
UNII Band	**Mode**	**Channel**	**Frequency (MHz)**	**Power Spectral Density (dBm/500kHz)**	**Duty Factor (dB)**	**Power Spectral Density with duty factor (dBm/500kHz)**	**Limit (dBm/500kHz)**
UNII-3	802.11a	149	5745	5.94	0.04	5.98	30
		157	5785	5.82	0.04	5.86	30
		165	5825	5.56	0.04	5.60	30
	802.11n HT20	149	5745	5.51	0	5.51	30
		157	5785	4.67	0	4.67	30
		165	5825	5.01	0	5.01	30
	802.11n HT40	151	5755	3.18	0.04	3.22	30
		159	5795	2.99	0.04	3.03	30

Note: The maximum antenna gain is 2.87 dBi.

Please refer to the following plots

UNII-1 Band I PSD
IEEE 802.11a Mode / 5150 ~ 5250MHz

5180MHz



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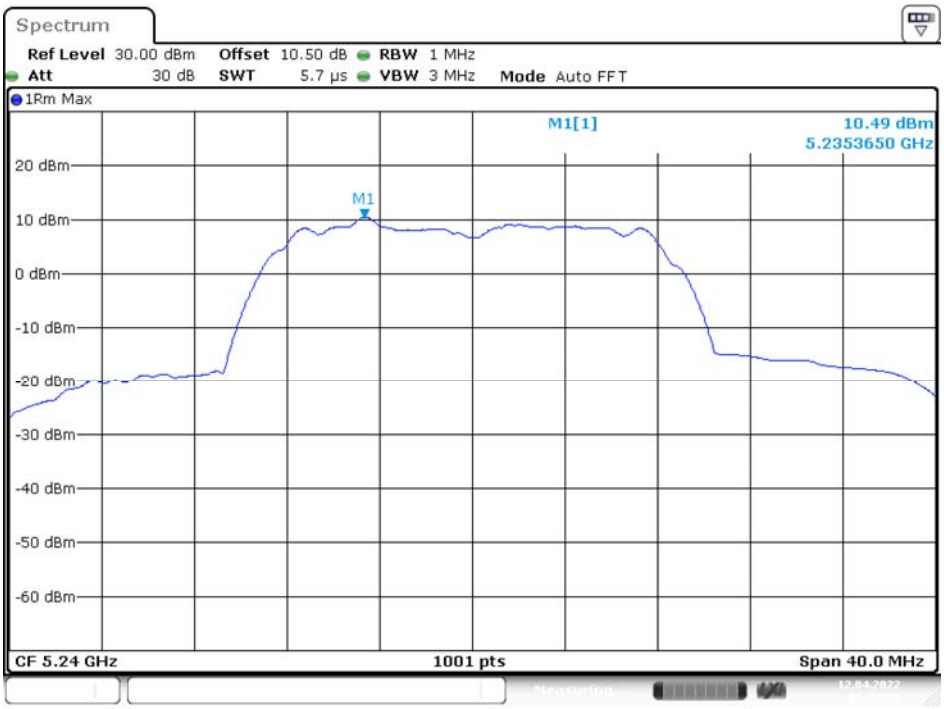
5200MHz

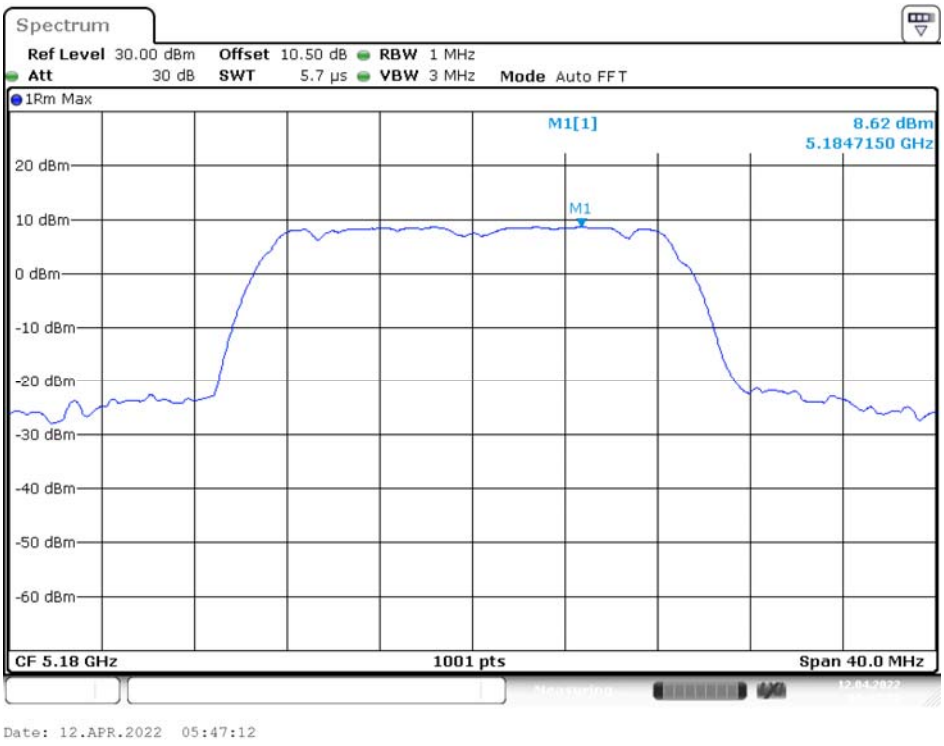
Date: 12.APR.2022 05:24:32

5240MHz

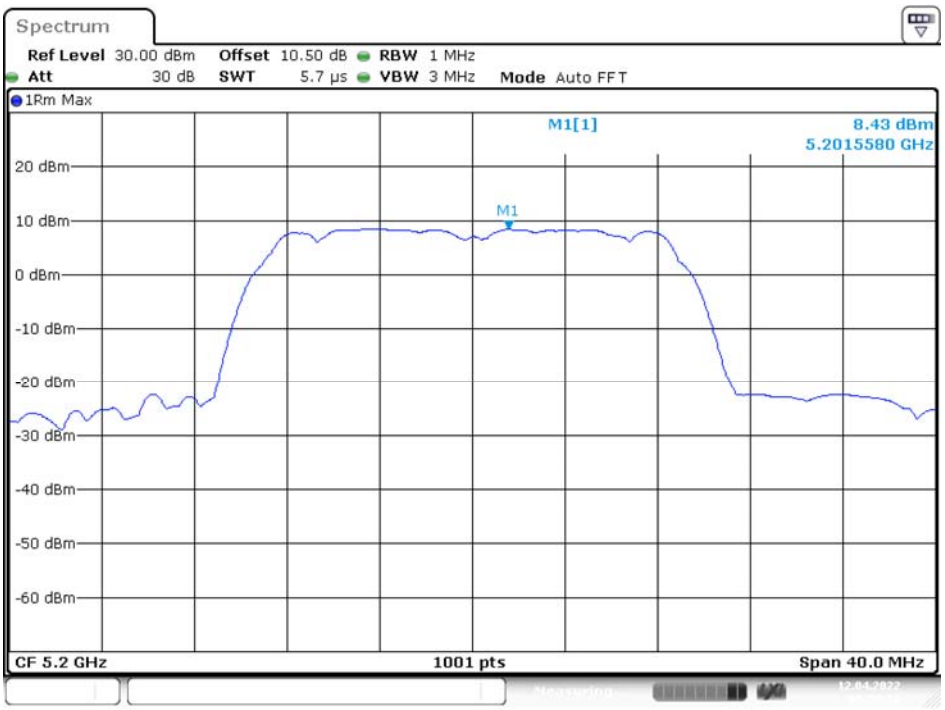


IEEE 802.11n HT20 Mode / 5150 ~ 5250MHz

5180MHz



5200MHz



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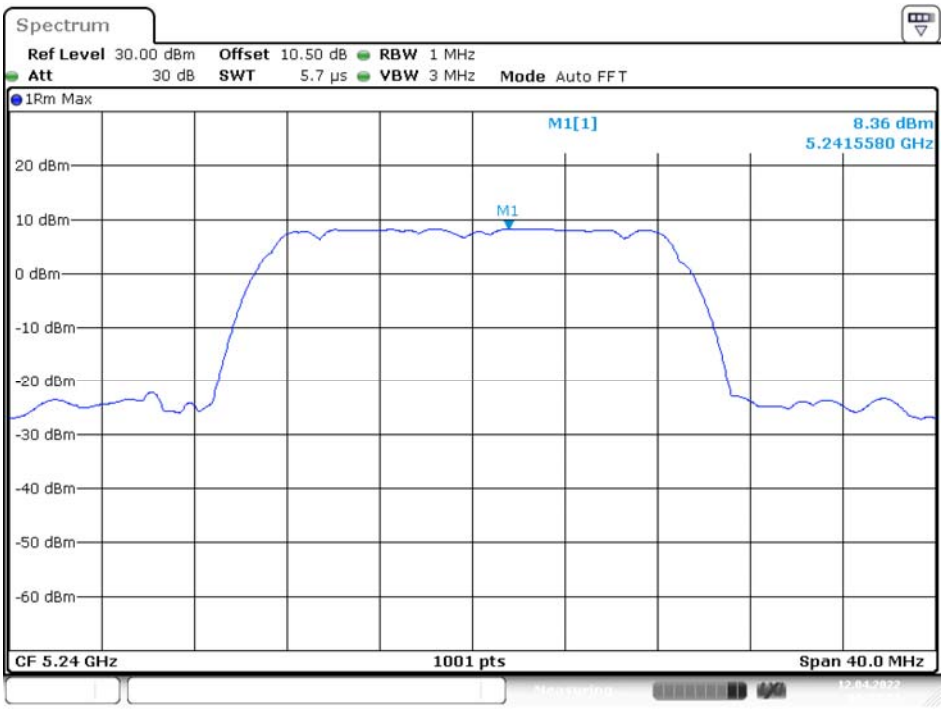
5240MHz



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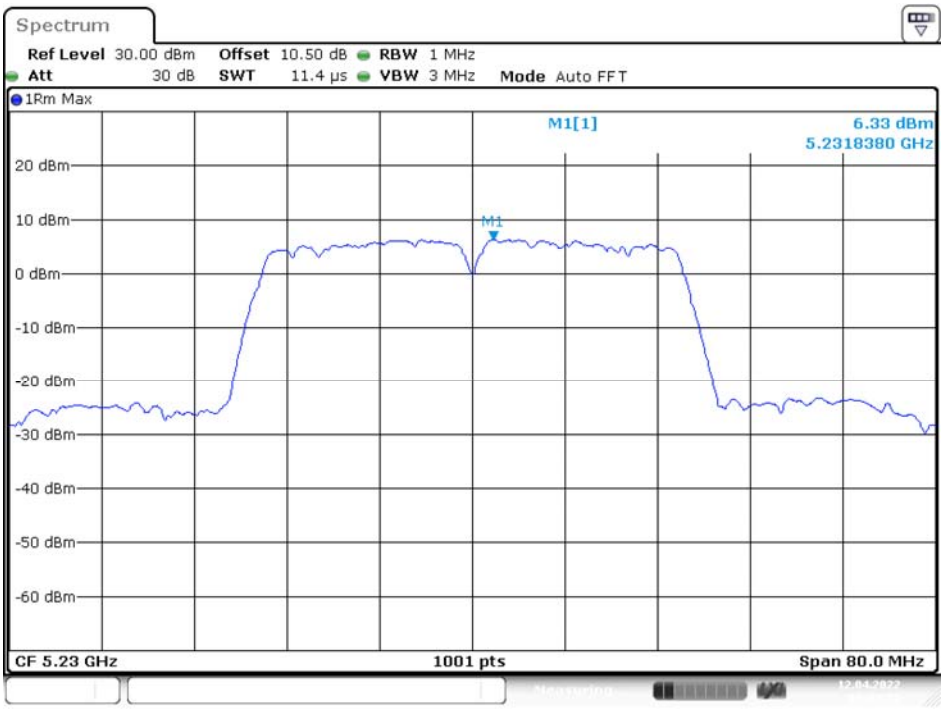
IEEE 802.11n HT40 Mode / 5150 ~ 5250MHz

5190MHz

Date: 12.APR.2022 06:05:44

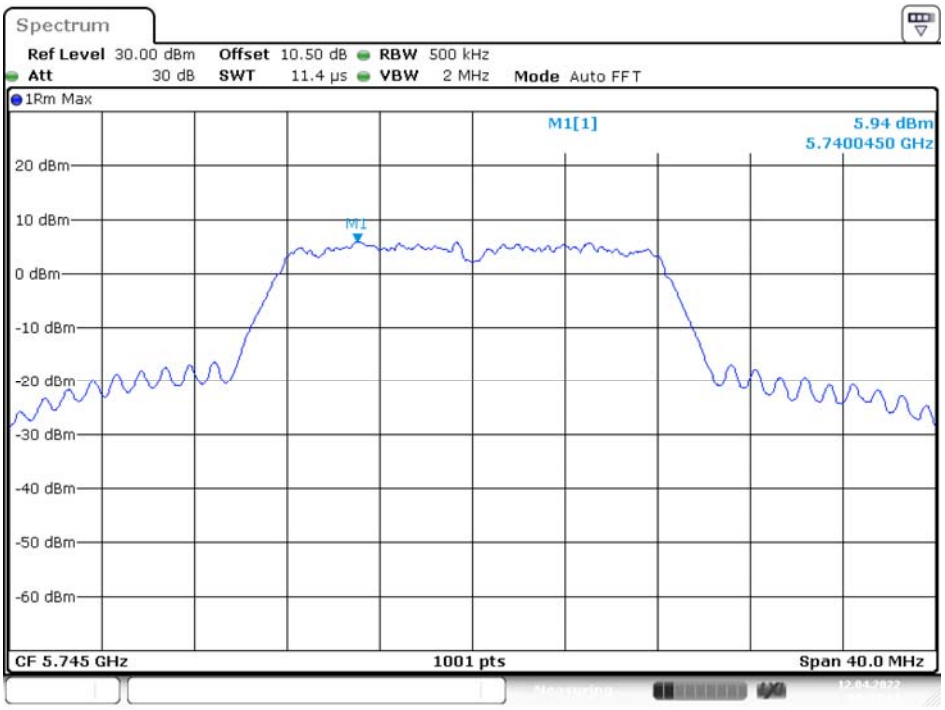
5230MHz



Date: 12.APR.2022 06:09:32

UNII-3 Band IV PSD
IEEE 802.11a mode / 5725 ~ 5850MHz

5745MHz



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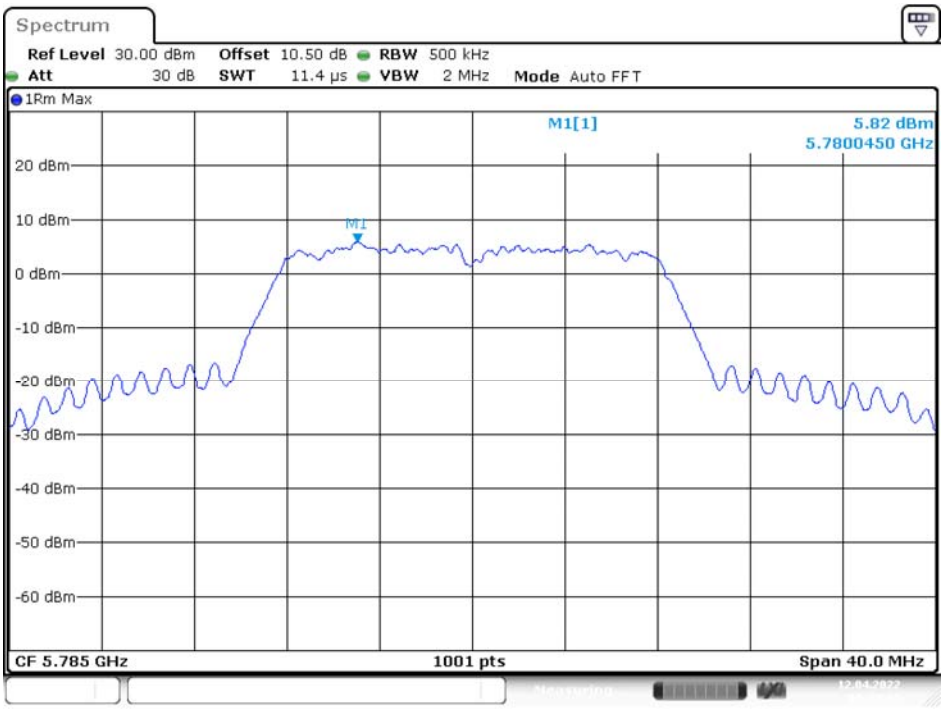
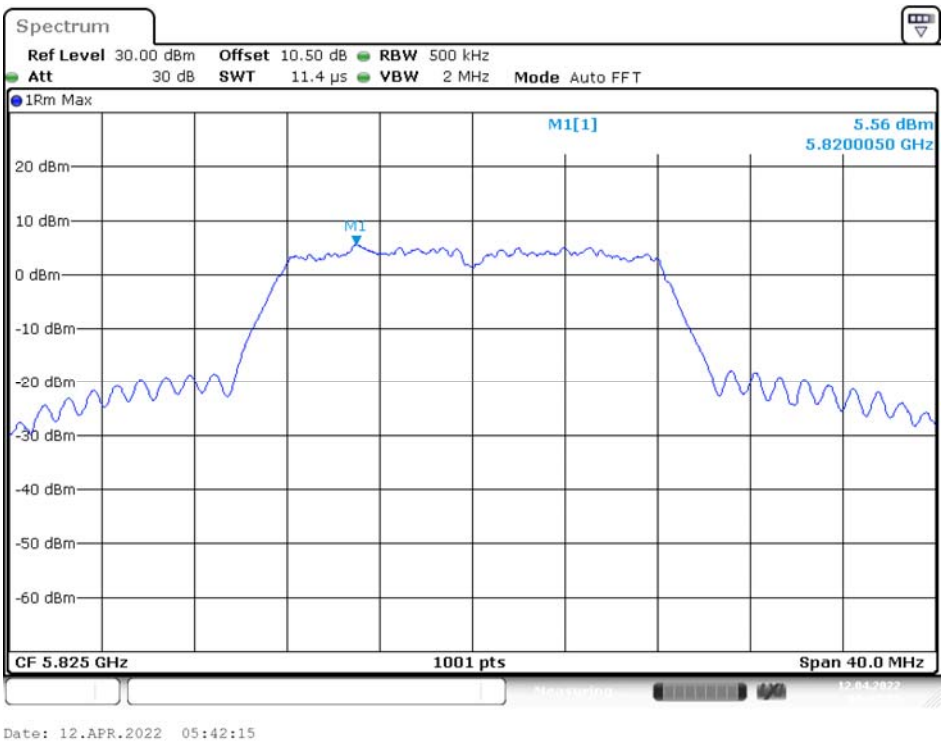
5785MHz



Date: 12.APR.2022 05:38:42

5825MHz



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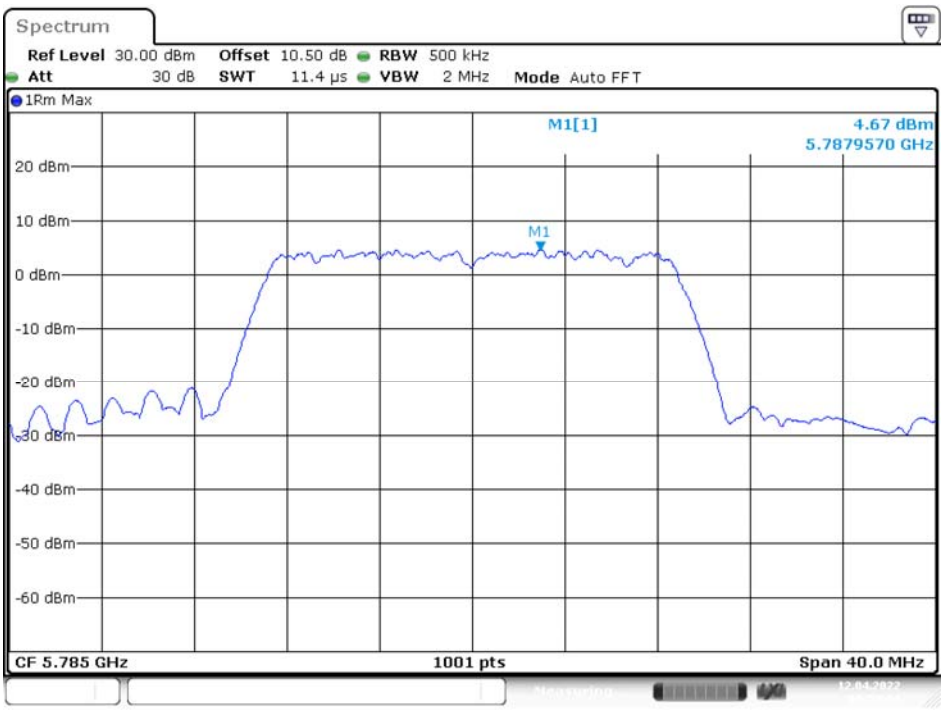
IEEE 802.11n HT20 Mode / 5725 ~ 5850MHz

5745MHz

Date: 12.APR.2022 05:56:51

5785MHz



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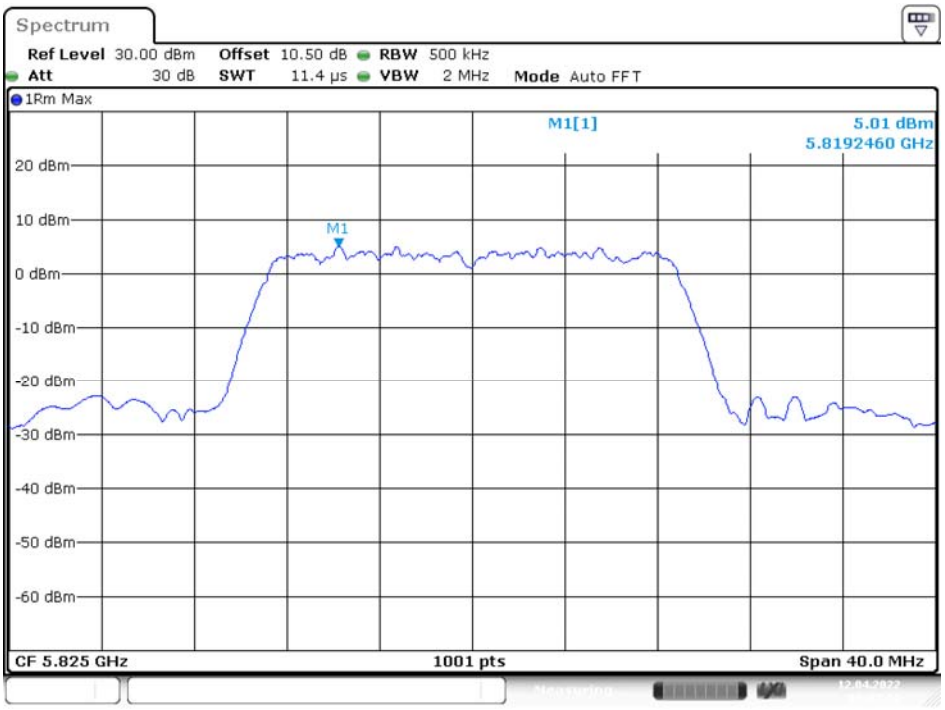
5825MHz



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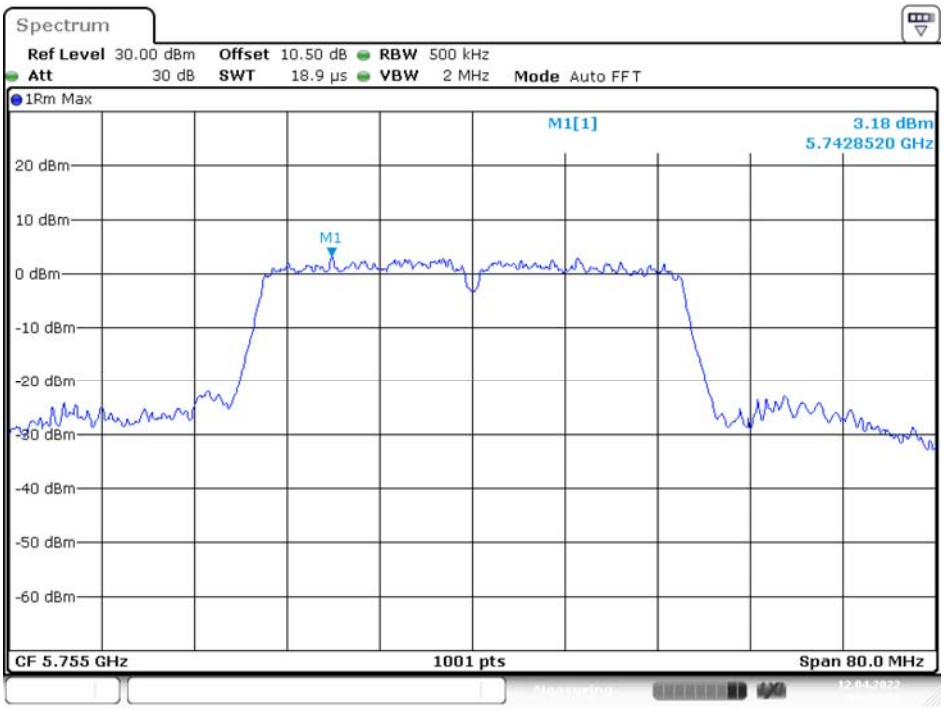
IEEE 802.11n HT40 Mode / 5725 ~ 5850MHz

5755MHz



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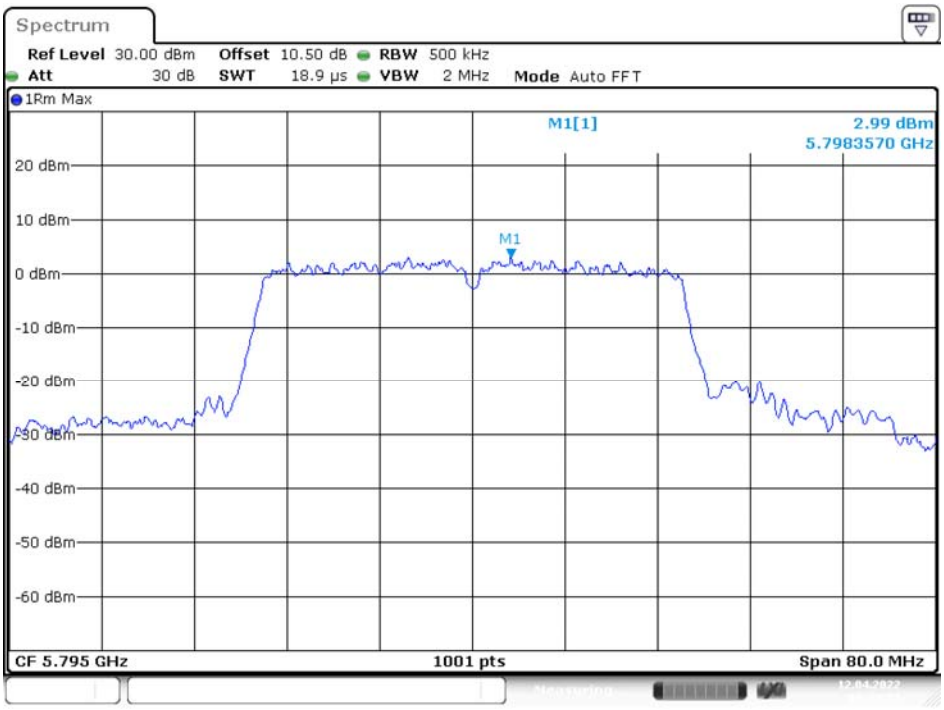
5795MHz



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