TEST REPORT

Applicant Name :	Shenzhen Jiteng Network Technology Co., Ltd
Address :	No.1202, Bitian Pavilion, Bizhong Garden, No.10 Bibo First Street, Bibo Community, Huangbei Street, Luohu District, Shenzhen City, China
Report Number :	SZNS1220505-18180E-00C
FCC ID:	2AY4C-GM04

Test Standard (s)

FCC PART 15.407

Sample Description

Product:	Mini PC
Trademark:	GEEKOM
Tested Model:	MiniAir 11
Date Received:	2022-05-05
Date of Test:	2022-05-10 to 2022-05-27
Report Date:	2022-05-31

Test Result:	Pass*

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

Prepared and Checked By:

Black Ding
EMC Engineer

Approved By:

Candy Li
EMC Engineer

Note: This report may contain data that are not covered by the A2LA accreditation and are marked with an asterisk "★".

Shenzhen Accurate Technology Co., Ltd. is not responsible for the authenticity of any test data provided by the applicant. Data included from the applicant that may affect test results are marked with an asterisk '*'. Customer model name, addresses, names, trademarks etc. are not considered data.

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Product	Mini PC
Tested Model	MiniAir 11
Frequency Range	5G Wi-Fi: 5150-5250 MHz; 5725-5850 MHz
Maximum Average Conducted Output Power	5150-5250 MHz 15.36dBm (802.11a), 14.26dBm(802.11n20), 14.39dBm(802.11n40), 14.59dBm (802.11ac20), 14.23dBm (802.11ac40), 14.13dBm (802.11ac80) , 5725-5850 MHz 15.58dBm (802.11a), 14.33dBm(802.11n20), 14.50dBm(802.11n40), 14.63dBm (802.11ac20), 14.48dBm (802.11ac40), 14.25dBm (802.11ac80)
Modulation Technique	OFDM
Antenna Specification*	Internal Antenna: Ant 1: Band1: 3.39dBi, Band4: 3.86dBi (provided by the applicant) Ant 2: Band1: 2.85dBi, Band4: 4.31dBi (provided by the applicant)
Voltage Range	DC 19V from Adapter
Sample number	SZNS1220505-18180E-RF-S1 (Assigned by ATC)
Sample/EUT Status	Good condition
Adapter 1 information	Model: BSY065T1903423D, Input: 100-240V~50/60Hz, 1.5A, Output: 19V/3.42A
Adapter 2 information	Model: A481-1902360U, Input: 100-240V~50/60Hz 1.5A, Output: 19V/2.36A

Objective

This type approval report is in accordance with Part 2-Subpart J, Part 15-Subparts A and E of the Federal Communication Commissions rules.

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

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. And KDB789033D02 General U-NII Test Procedures New Rules v02r01.

All emissions measurement was performed at Shenzhen Accurate Technology Co., Ltd. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Measurement Uncertainty

Parameter		Uncertainty
Occupied Channel Bandwidth		5%
RF output power, conducted		0.73dB
Unwanted Emission, conducted		1.6dB
AC Power Lines Conducted Emissions		2.72dB
Emissions, Radiated	30MHz - 1GHz	4.28dB
	1GHz - 18GHz	4.98dB
	18GHz - 26.5GHz	5.06dB
	26.5GHz - 40GHz	4.72dB
Temperature		1℃
Humidity		6%
Supply voltages		0.4%

Note: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

Test Facility

The test site used by Shenzhen Accurate Technology Co., Ltd. to collect test data is located on the 1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China.

The test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No.: 708358, the FCC Designation No.: CN1189. Accredited by American Association for Laboratory Accreditation (A2LA) The Certificate Number is 4297.01 .

Listed by Innovation, Science and Economic Development Canada (ISEDC), the Registration Number is 5077A.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

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

The device only supports 5G Wi-Fi 802.11a/n20/n40/ac20/ac40/ac80 modes, which was declared by manufacturer.

For 5150-5250MHz Band, 7 channels are provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
36	5180	44	5220
38	5190	46	5230
40	5200	48	5240
42	5210	/	/

For 802.11a, 802.11n20, 802.11ac20 channel 36, 40, 48 were tested;
For 802.11n40/ac40 channel 38, 46 were tested.
For 802.11ac80 channel 42 was tested

For 5725-5850MHz Band, 8 channels are provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
149	5745	157	5785
151	5755	159	5795
153	5765	161	5805
155	5775	165	5825

For 802.11a, 802.11n20, 802.11ac20 channel 149, 157, 165 were tested; For 802.11n40/ac40, channel 151, 159 were tested. For 802.11ac80, channel 155 were tested.

EUT Exercise Software

“DRTU”* software was used to test and power level as below:

Frequency Range (MHz)	Mode	Data Rate	Power Level* (Ant 1 & Ant 2)		
			Low Channel	Middle Channel	High Channel
5150-5250/ 5725-5850	802.11a	6Mbps	14	14	14
	802.11n20	MCS0	13	13	13
	802.11n40	MCS0	13	/	13
	802.11 ac20	MCS0	13	13	13
	802.11 ac40	MCS0	13	/	13
	802.11 ac80	MCS0	/	13	/

The worst-case data rates are determined to be as above for each mode based upon investigations by measuring the average power and PSD across all data rates, bandwidths and modulations.

The device supports SISO and MIMO in all modes for Wi-Fi, per pretest, the MIMO mode was the worst mode for all the modes. All the antenna ports have the same power level for SISO and MIMO modes.

Duty cycle

Please refer to the Appendix.

Equipment Modifications

No modification was made to the EUT tested.

Support Equipment List and Details

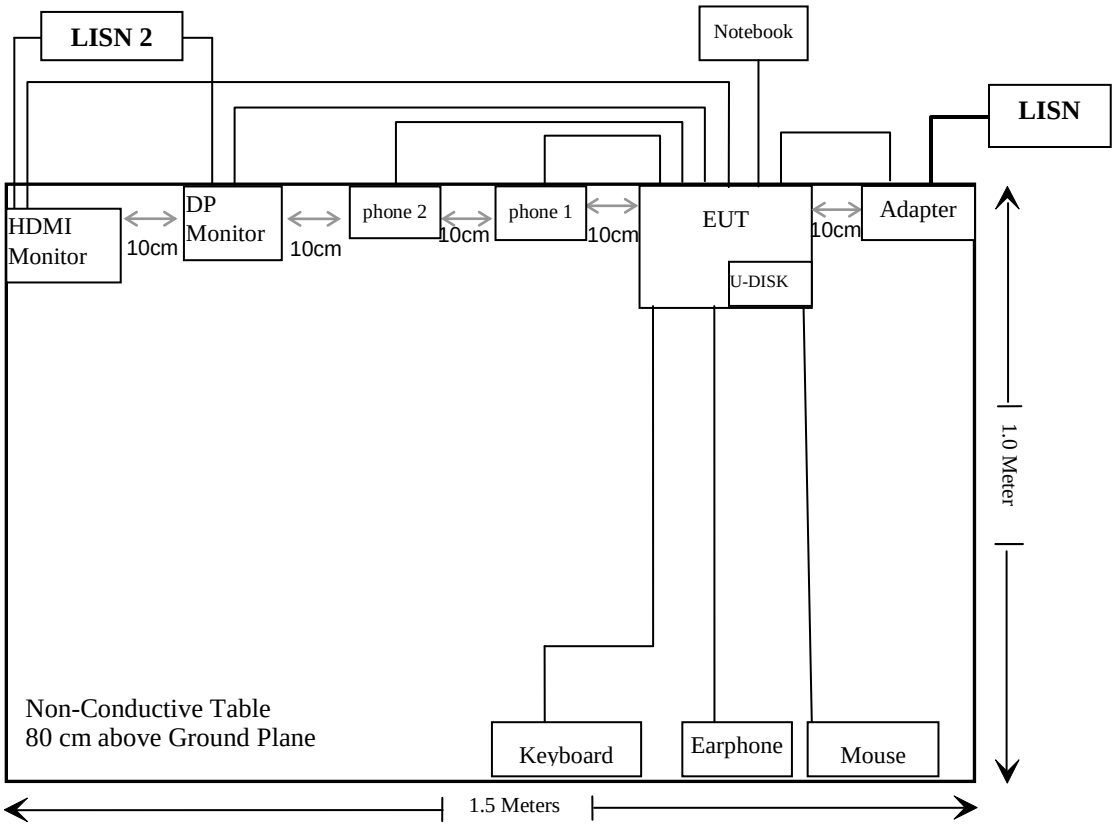
Manufacturer	Description	Model	Serial Number
DELL	Keyboard	L100	CN0RH66658985C018C
DELL	Mouse	MOC5UG	Unknown
PHILIPS	DP Monitor	275M7C	Unknown
DELL	HDMI Monitor	ST2310f	CN-05MKKK-72872-053
Unknown	U Disk	Unknown	Unknown
Huawei	Phone 1	TAS-AL00	88Y5T19A03011842
Shenzhen Wanplas Technology Co., LTD	Phone 2	GM1900	2a0a4328
SCI	Earphone	SCRC-130A	Unknown
Lenovo	Notebook	T430	Unknown

External I/O Cable

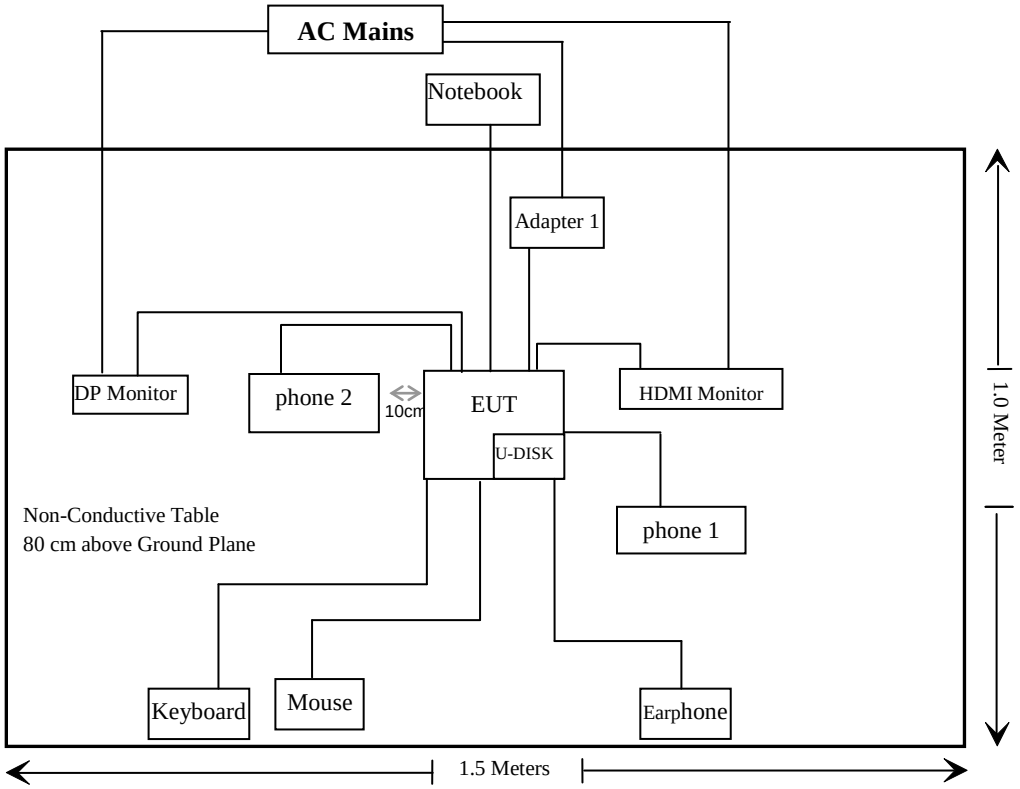
Cable Description	Length (m)	From Port	To
Unshielded Detachable DC output Cable	1.2	Adapter 1	EUT
Unshielded Detachable DC output Cable	1.2	Adapter 2	EUT
Unshielded Detachable AC power Cable	1.0	EUT	Adapter 1
Shielded Detachable HDMI Cable	2.0	EUT	HDMI Monitor
Shielded Detachable DP Cable	1.0	EUT	DP Monitor
Unshielded Detachable USB Cable	1.5	EUT	Mouse
Unshielded Detachable USB Cable	1.5	EUT	Keyboard
Unshielded Detachable TYPE-C Cable 1	1.0	EUT	Phone
Unshielded Detachable TYPE-C2 Cable 2	1.0	EUT	Phone
Unshielded Detachable earphone Cable	0.75	EUT	Earphone
Unshielded Detachable RJ45 Cable	10.0	EUT	Notebook

Block Diagram of Test Setup

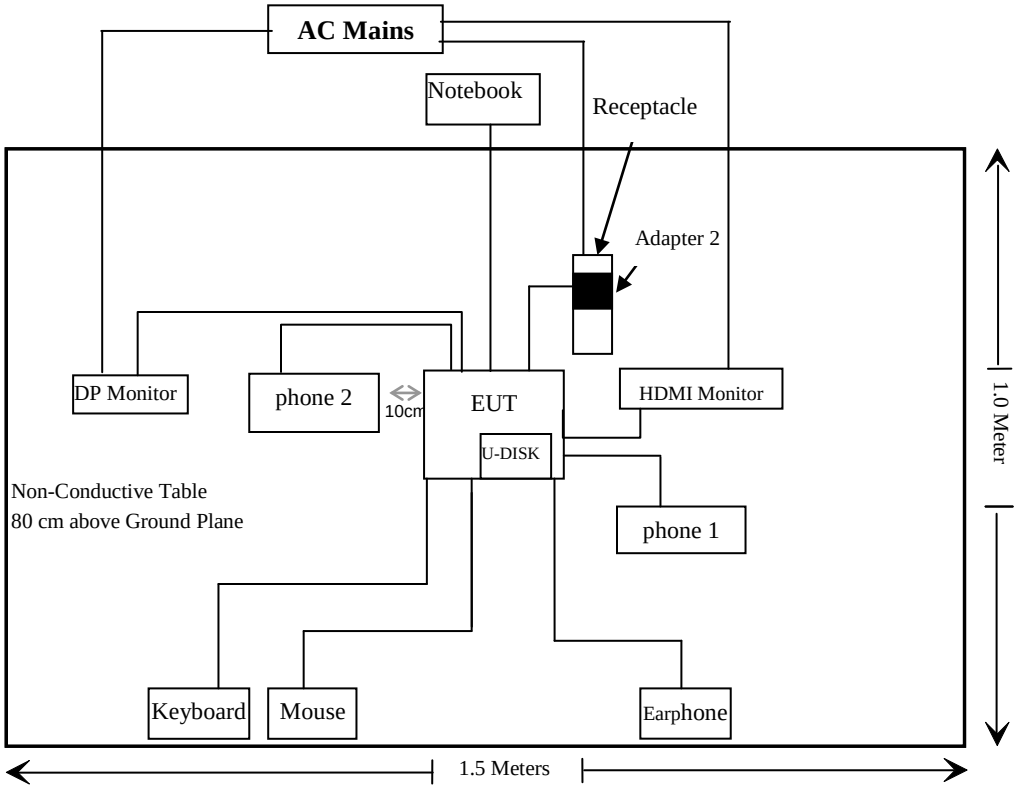
For conducted emission:



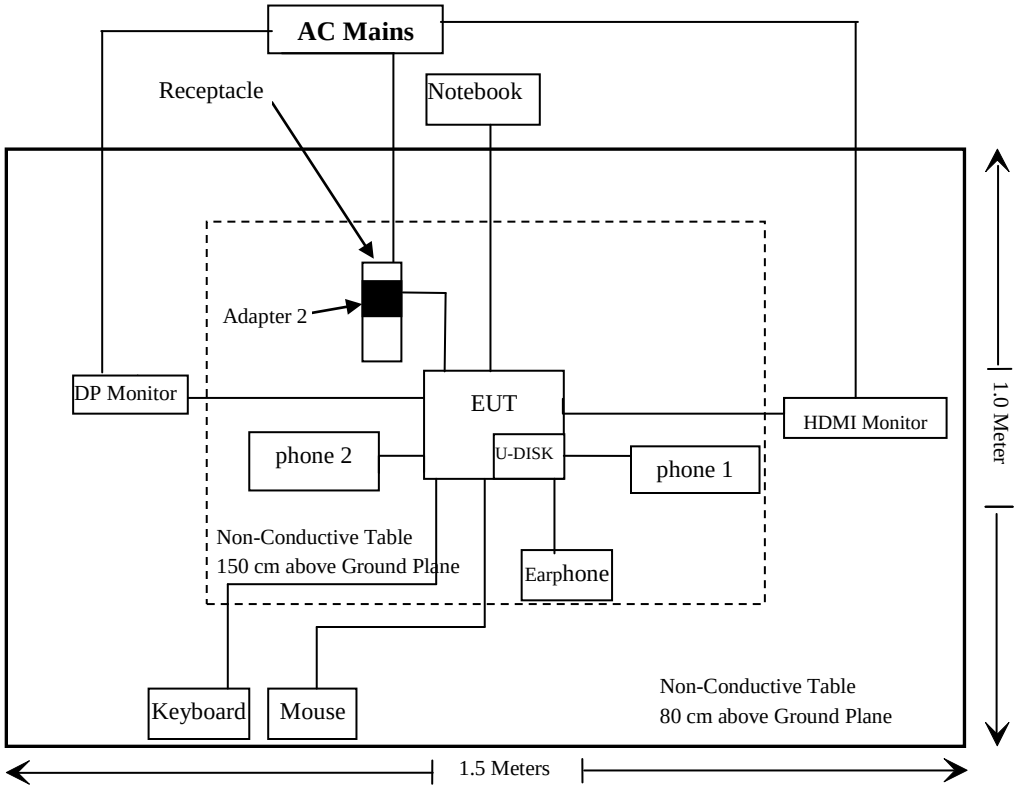
For Radiated emission:
Below 1GHz:
Adapter 1:



Adapter 2:



Above 1GHz:


AC Mains
Receptacle
Notebook
Adapter 2
DP Monitor
EUT
HDMI Monitor
phone 2
U-DISK
phone 1
Non-Conductive Table
150 cm above Ground Plane
Earphone
Keyboard
Mouse
Non-Conductive Table
80 cm above Ground Plane
1.0 Meter
1.5 Meters

SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§1.1310 & §2.1091	Maximum Permissible Exposure (MPE)	Compliant
§15.203	Antenna Requirement	Compliant
§15.407(b)(8) & §15.207(a)	Conducted Emissions	Compliant
§15.205 & §15.209 & §15.407(b) (1), (4), (7), (8), (9), (10)	Undesirable Emission& Restricted Bands	Compliant
§15.407(a) (12), (e)	Bandwidth	Compliant
§15.407(a) (1), (3)	Conducted Transmitter Output Power	Compliant
§15.407 (a) (1), (3)	Power Spectral Density	Compliant

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Conducted Emissions Test					
Rohde & Schwarz	EMI Test Receiver	ESCI	100784	2021/12/13	2022/12/12
R & S	L.I.S.N.	ENV216	101314	2021/12/13	2022/12/12
Anritsu Corp	50Ω Coaxial Switch	MP59B	6200506474	2021/12/13	2022/12/12
Unknown	RF Coaxial Cable	No.17	N0350	2021/12/14	2022/12/13
Conducted Emission Test Software: e3 19821b(V9)					
Radiated Emissions Test					
Rohde & Schwarz	Test Receiver	ESR	102725	2021/12/13	2022/12/12
Rohde & Schwarz	Spectrum Analyzer	FSV40	101949	2021/12/13	2022/12/12
SONOMA INSTRUMENT	Amplifier	310 N	186131	2021/11/09	2022/11/08
A.H. Systems, inc.	Preamplifier	PAM-0118P	135	2021/11/09	2022/11/08
Quinstar	Amplifier	QLW-18405536-J0	15964001002	2021/11/11	2022/11/10
Schwarzbeck	Bilog Antenna	VULB9163	9163-323	2021/07/06	2024/07/05
Schwarzbeck	Horn Antenna	BBHA9120D	9120D-1067	2020/01/05	2023/01/04
Schwarzbeck	HORN ANTENNA	BBHA9170	9170-359	2020/01/05	2023/01/04
CD	High Pass Filter	HPM-8.0/18G-60	020	2021/12/14	2022/12/13
Mini-Circuits	High Pass Filter	NHP-600+	15542	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.10	N050	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.11	N1000	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.12	N040	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.13	N300	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.14	N800	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.15	N600	2021/12/14	2022/12/13
Radiated Emission Test Software: e3 19821b(V9)					

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
RF Conducted Test					
Rohde & Schwarz	Spectrum Analyzer	FSV-40	101495	2021/12/13	2022/12/12
Rohde & Schwarz	Open Switch and Control Unit	OSP120 + OSP-B157	101244 + 100866	2021/12/13	2022/12/12
WEINSCHEL	10dB Attenuator	5324	AU 3842	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.33	RF-03	Each time	

*** Statement of Traceability:** Shenzhen Accurate Technology Co., Ltd. attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

FCC §1.1310 & §2.1091 –MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to subpart §2.1091 and subpart §1.1310, systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

(B) 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;

According to §1.1310 and §2.1091 RF exposure is calculated.

Calculated Formulary:
Predication of MPE limit at a given distance
$S = PG/4\pi R^2$ = power density (in appropriate units, e.g. mW/cm^2);
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);

Calculated Data:

For simultaneously transmit system, the calculated power density should comply with:

$$\sum_i \frac{S_i}{S_{Limit,i}} \leq 1$$

For worst case:

Mode	Frequency Range (MHz)	Antenna Gain		Tune-up Output Power		Evaluation Distance (cm)	Power Density (mW/cm^2)	MPE Limit (mW/cm^2)
		(dBi)	(numeric)	(dBm)	(mW)			
BT	2402-2480	2.68	1.85	3.5	2.24	20	0.0008	1.0
BLE	2402-2480	2.68	1.85	2.0	1.58	20	0.0006	1.0
2.4G Wi-Fi	2412-2462	2.68	1.85	16.0	39.81	20	0.0147	1.0
5G Wi-Fi Band 1	5150-5250	3.39	2.18	15.5	35.48	20	0.0154	1.0
5G Wi-Fi Band 4	5725-5850	4.31	2.70	16.0	39.81	20	0.0214	1.0

Note: 1. The BT function can transmit at the same time with the Wi-Fi function.
2. The 2.4G Wi-Fi function can't transmit at the same time with the 5G Wi-Fi function.

Simultaneous transmitting consideration:

The ratio= MPE_{BT}/limit + $MPE_{5G\ Wi\text{-}Fi}$/limit=0.0008/1+0.0214/1=0.0222＜1.0

To maintain compliance with the FCC's RF exposure guidelines, place the equipment at least 20cm from nearby persons.

Result: Compliant.

FCC §15.203 – ANTENNA REQUIREMENT

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. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

a. Antenna must be permanently attached to the unit.
b. Antenna must use a unique type of connector to attach to the EUT.

Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

And according to FCC 47 CFR section 15.407 (a), if the transmitting antennas of directional gain greater than 6dBi are used, the transmit power and power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Antenna Connector Construction

The EUT has two internal antennas used arrangement for Wi-Fi, which was permanently attached and the antenna gain is 3.39dBi (Ant1, Band 1), 3.86dBi (Ant1, Band 4), 2.85dBi (Ant2, Band 1) and 4.31dBi (Ant2, Band 4), fulfill the requirement of this section. Please refer to the EUT photos.

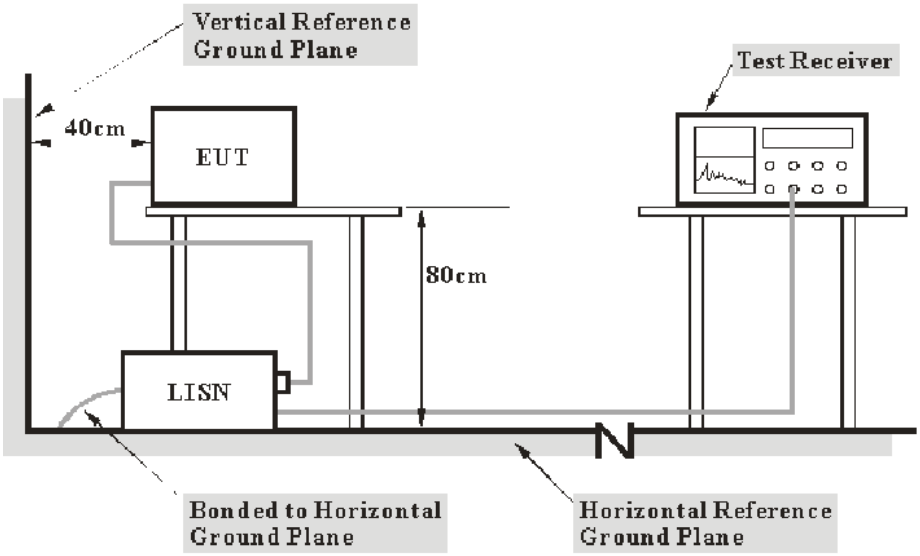
Result: Compliant.

FCC §15.407 (B) (8) §15.207 (A) – CONDUCTED EMISSIONS

Applicable Standard

FCC §15.207, §15.407(b) (8)

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.

The spacing between the peripherals was 10 cm.

EMI Test Receiver Setup

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

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

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

Test Procedure

During the conducted emission test, the adapter was connected to 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.

Factor & Margin Calculation

The factor is calculated by adding LISN VDF (Voltage Division Factor) and Cable Loss. The basic equation is as follows:

Factor = LISN VDF + Cable Loss

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 calculation is as follows:

Over Limit = Level – Limit
Level = Read Level + Factor

Test Data

Environmental Conditions

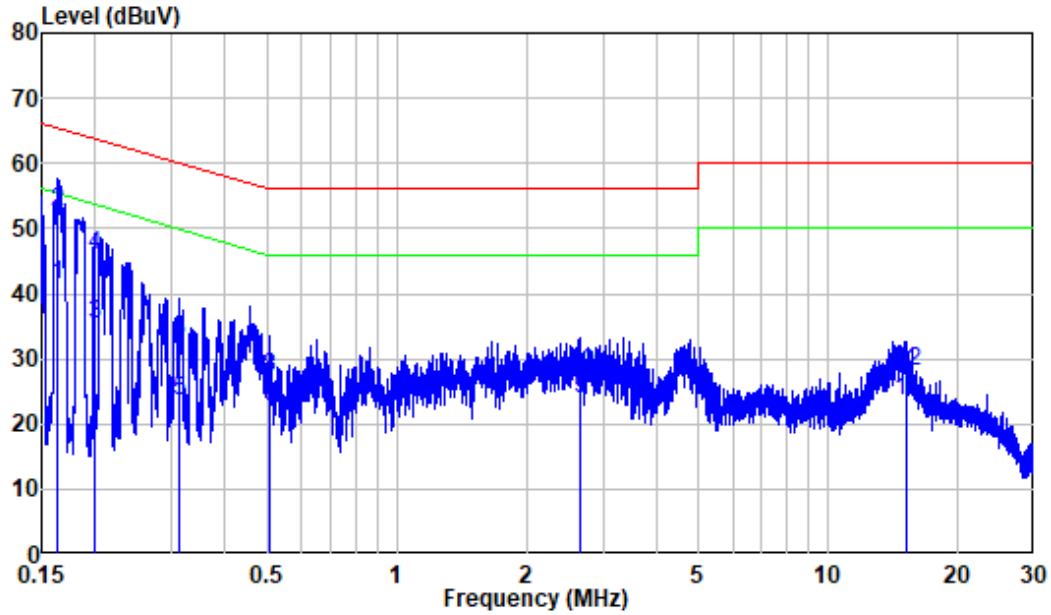
Temperature:	23 ℃
Relative Humidity:	49 %
ATM Pressure:	101.1 kPa

The testing was performed by Jason Liu on 2022-05-27.

EUT operation mode: 5G Wi-Fi Transmitting (Worst case for 802.11ac80, 5210MHz as below)

Adapter 1:

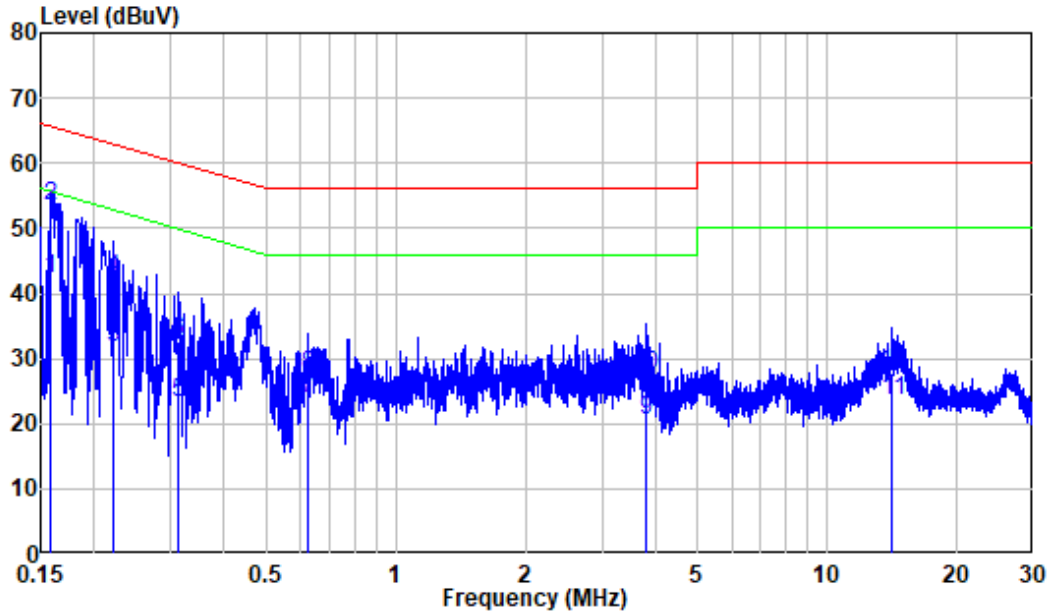
AC 120V/60 Hz, Line



Site : Shielding Room
Condition: Line
Job No. : SZNS1220505-18180E-RF
Mode : 5G WIFI Transmitting
Power : AC 120V 60Hz
Adapter : BSY065T1903423D

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dBuV	dBuV	dB	
1	0.164	9.80	31.51	41.31	55.27	-13.96	Average
2	0.164	9.80	42.60	52.40	65.27	-12.87	QP
3	0.200	9.80	25.66	35.46	53.61	-18.15	Average
4	0.200	9.80	36.22	46.02	63.61	-17.59	QP
5	0.313	9.80	13.61	23.41	49.88	-26.47	Average
6	0.313	9.80	22.95	32.75	59.88	-27.13	QP
7	0.507	9.80	12.87	22.67	46.00	-23.33	Average
8	0.507	9.80	17.24	27.04	56.00	-28.96	QP
9	2.652	9.83	14.14	23.97	46.00	-22.03	Average
10	2.652	9.83	17.91	27.74	56.00	-28.26	QP
11	15.166	9.95	13.46	23.41	50.00	-26.59	Average
12	15.166	9.95	18.03	27.98	60.00	-32.02	QP

AC 120V/60 Hz, Neutral

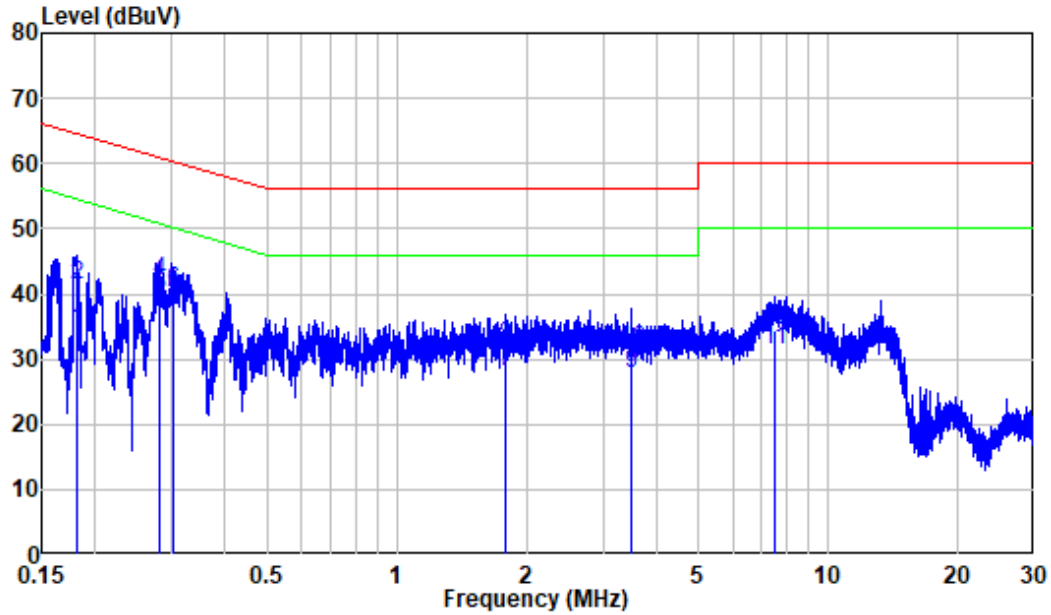


Site : Shielding Room
Condition: Neutral
Job No. : SZNS1220505-18180E-RF
Mode : 5G WIFI Transmitting
Power : AC 120V 60Hz
Adapter : BSY065T1903423D

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dBuV	dBuV	dB	
1	0.158	9.80	32.59	42.39	55.56	-13.17	Average
2	0.158	9.80	43.52	53.32	65.56	-12.24	QP
3	0.222	9.80	21.91	31.71	52.76	-21.05	Average
4	0.222	9.80	32.61	42.41	62.76	-20.35	QP
5	0.313	9.80	13.33	23.13	49.89	-26.76	Average
6	0.313	9.80	22.68	32.48	59.89	-27.41	QP
7	0.626	9.81	13.99	23.80	46.00	-22.20	Average
8	0.626	9.81	17.70	27.51	56.00	-28.49	QP
9	3.779	9.84	10.59	20.43	46.00	-25.57	Average
10	3.779	9.84	17.55	27.39	56.00	-28.61	QP
11	14.119	10.04	13.61	23.65	50.00	-26.35	Average
12	14.119	10.04	17.67	27.71	60.00	-32.29	QP

Adapter 2:

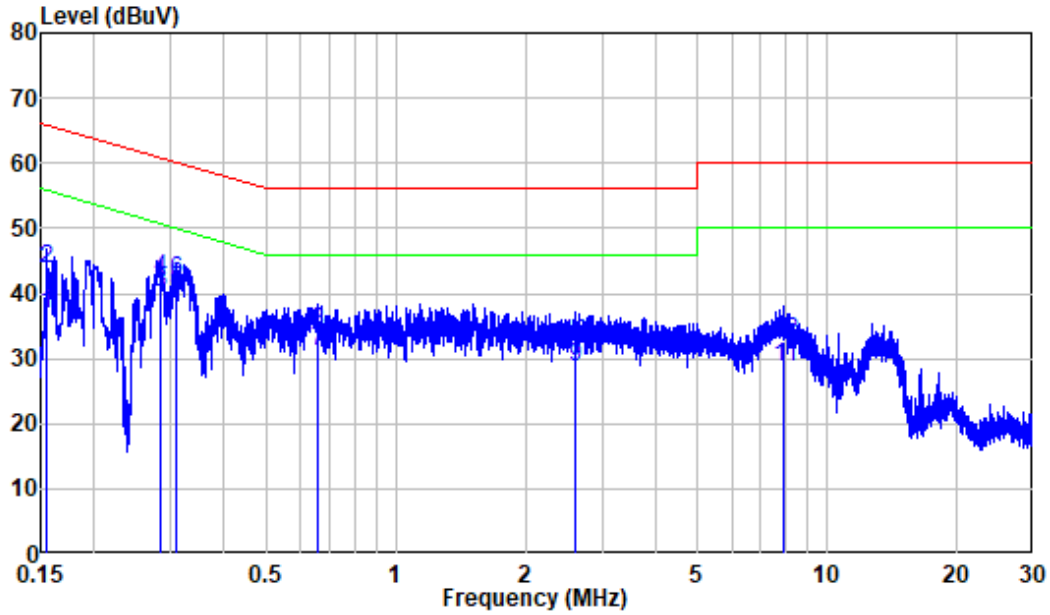
AC 120V/60 Hz, Line



Site : Shielding Room
Condition: Line
Job No. : SZNS1220505-18180E-RF
Mode : 5G WIFI Transmitting
Power : AC 120V 60Hz
Adapter : A481-1902360U

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dBuV	dBuV	dB	
1	0.181	9.80	24.48	34.28	54.45	-20.17	Average
2	0.181	9.80	31.54	41.34	64.45	-23.11	QP
3	0.282	9.80	30.10	39.90	50.76	-10.86	Average
4	0.282	9.80	32.20	42.00	60.76	-18.76	QP
5	0.302	9.80	29.19	38.99	50.17	-11.18	Average
6	0.302	9.80	30.66	40.46	60.17	-19.71	QP
7	1.786	9.82	18.35	28.17	46.00	-17.83	Average
8	1.786	9.82	22.11	31.93	56.00	-24.07	QP
9	3.502	9.83	18.00	27.83	46.00	-18.17	Average
10	3.502	9.83	21.62	31.45	56.00	-24.55	QP
11	7.511	9.88	21.50	31.38	50.00	-18.62	Average
12	7.511	9.88	24.60	34.48	60.00	-25.52	QP

AC 120V/60 Hz, Neutral



Site : Shielding Room
Condition: Neutral
Job No. : SZNS1220505-18180E-RF
Mode : 5G WIFI Transmitting
Power : AC 120V 60Hz
Adapter : A481-1902360U

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dBuV	dBuV	dB	
1	0.155	9.80	26.91	36.71	55.74	-19.03	Average
2	0.155	9.80	33.94	43.74	65.74	-22.00	QP
3	0.283	9.80	30.31	40.11	50.71	-10.60	Average
4	0.283	9.80	32.60	42.40	60.71	-18.31	QP
5	0.309	9.80	30.57	40.37	50.00	-9.63	Average
6	0.309	9.80	32.16	41.96	60.00	-18.04	QP
7	0.658	9.81	21.27	31.08	46.00	-14.92	Average
8	0.658	9.81	24.44	34.25	56.00	-21.75	QP
9	2.591	9.83	18.85	28.68	46.00	-17.32	Average
10	2.591	9.83	22.51	32.34	56.00	-23.66	QP
11	7.941	9.98	18.85	28.83	50.00	-21.17	Average
12	7.941	9.98	22.67	32.65	60.00	-27.35	QP

§15.205 & §15.209 & §15.407(B) (1), (4), (7), (8) , (9), (10) – UNDESIRABLE EMISSION

Applicable Standard

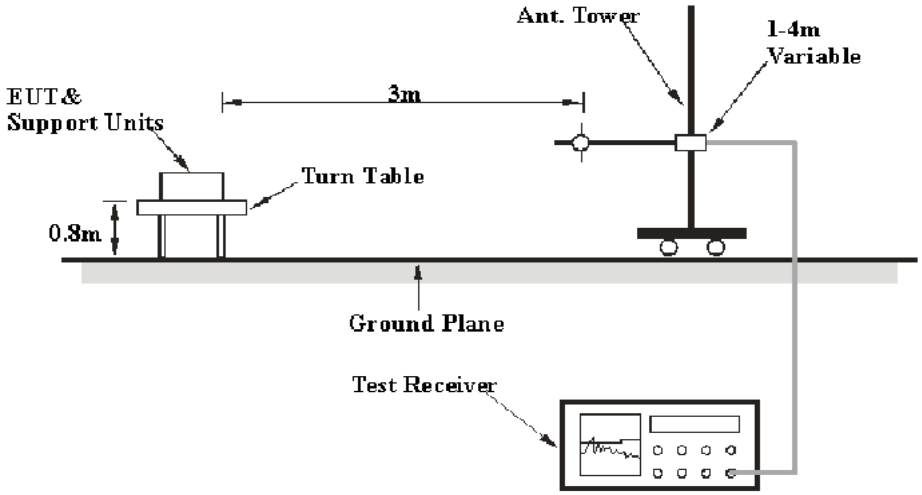
FCC §15.407 (b) (1), (4), (7), (8), (9), (10); §15.209; §15.205;

(b) Undesirable emission limits. Except as shown in paragraph (b) (7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:
(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.
(4) For transmitters operating in the 5.725-5.85 GHz band:
(i) 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.

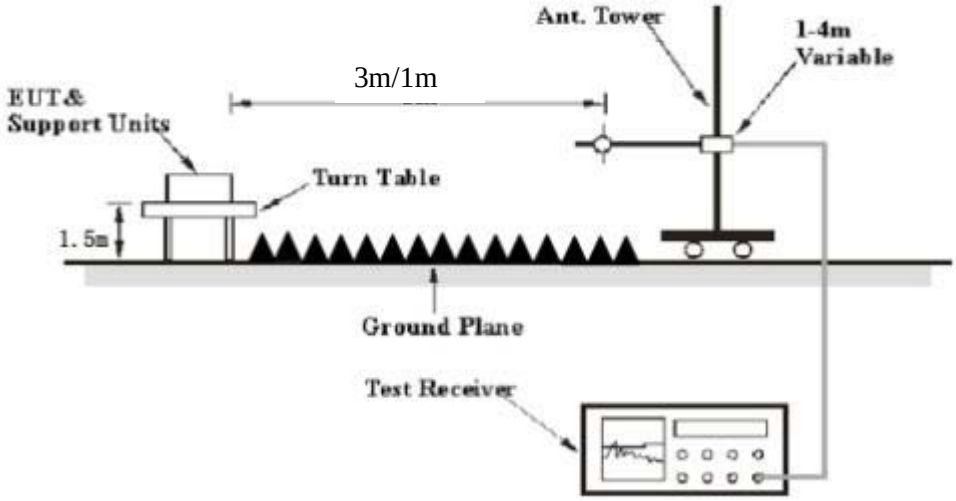
Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209.

EUT Setup

Below 1 GHz:



Above 1 GHz:



Note: 1-18GHz tested @3m, 18-40GHz tested @1m.

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC 15.209 and FCC 15.407 limits.

EMI Test Receiver & Spectrum Analyzer Setup

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Measurement
30 MHz – 1000 MHz	100 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1 MHz	3 MHz	/	PK
	1MHz	10 Hz Note 1	/	Average
	1MHz	＞1/T Note 2	/	Average

Note 1: when duty cycle is no less than 98%
Note 2: when duty cycle is less than 98%

If the maximized peak measured value complies with the limit, then it is unnecessary to perform QP/Average measurement.

Test Procedure

Radiated Spurious Emission

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

Factor & Margin Calculation

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

Factor = Antenna Factor + Cable Loss - Amplifier Gain

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

Over Limit/Margin = Level / Corrected Amplitude – Limit
Level / Corrected Amplitude = Read Level + Factor

Test Data

Environmental Conditions

Temperature:	22-24℃
Relative Humidity:	49-61 %
ATM Pressure:	101.0-103.0 kPa

The testing was performed by Level Li on 2022-05-27 for below 1GHz and Leo Li from 2022-05-10 to 2022-05-18 for above 1GHz.

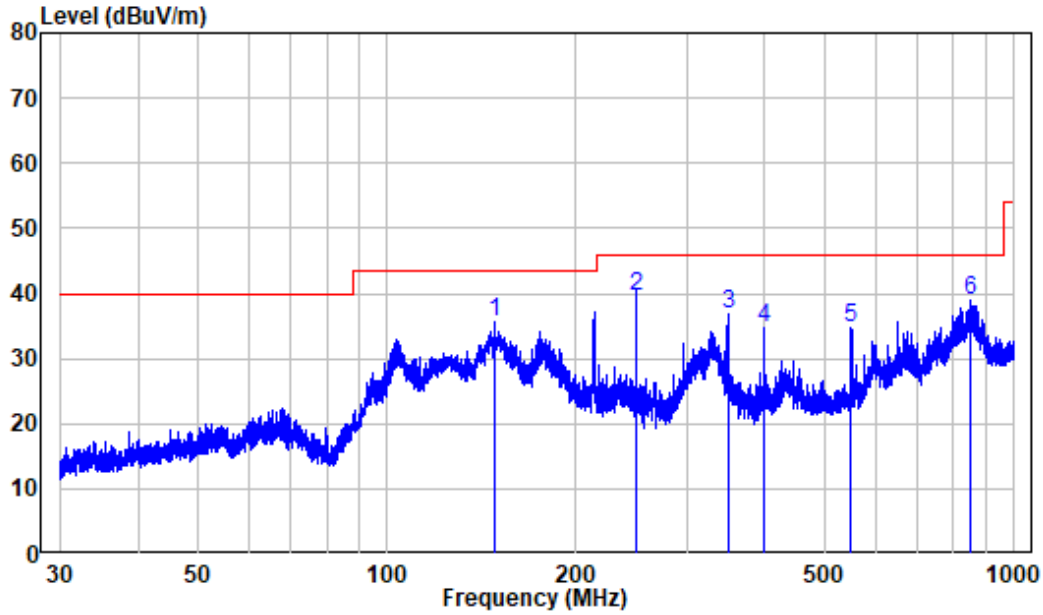
EUT operation mode: 5G WIFI Transmitting

(Scan with 802.11a/n20/n40/ac20/ac40/ac80 modes, the worst case as below)

30 MHz~1 GHz: (worst case for 802.11ac80, 5210MHz)

Adapter 1:

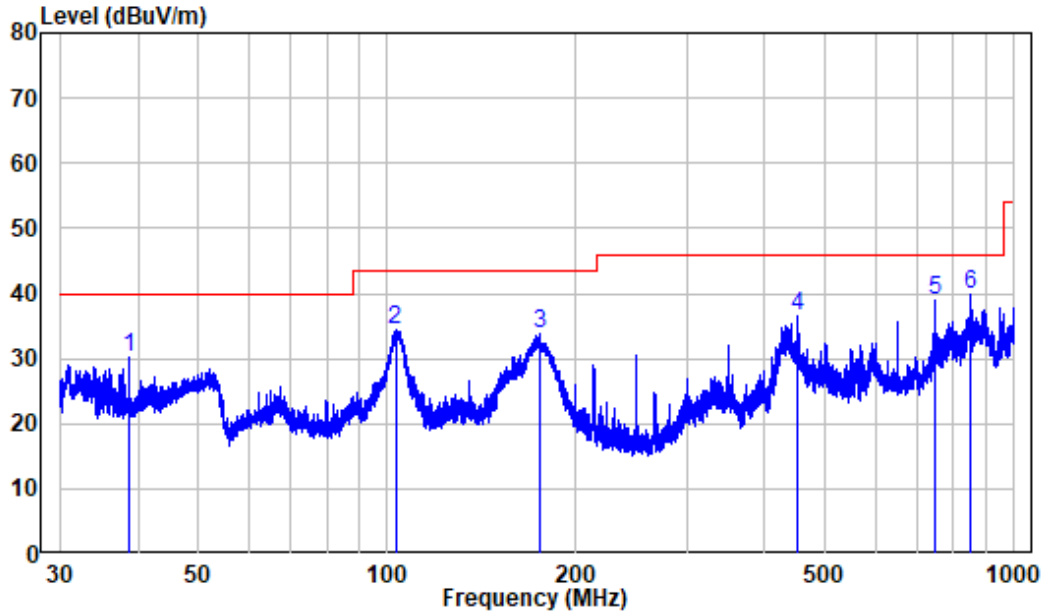
Horizontal:



Site : chamber
Condition: 3m HORIZONTAL
Job No. : SZNS1220505-18180E-RF
Test Mode: 5G WIFI Transmitting
Adepter : BSY065t1903423D

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	148.506	-15.35	51.11	35.76	43.50	-7.74	Peak
2	249.972	-10.74	50.18	39.44	46.00	-6.56	QP
3	350.016	-7.31	44.19	36.88	46.00	-9.12	Peak
4	400.081	-6.73	41.42	34.69	46.00	-11.31	Peak
5	549.983	-4.03	38.85	34.82	46.00	-11.18	Peak
6	850.290	0.36	38.57	38.93	46.00	-7.07	Peak

Vertical

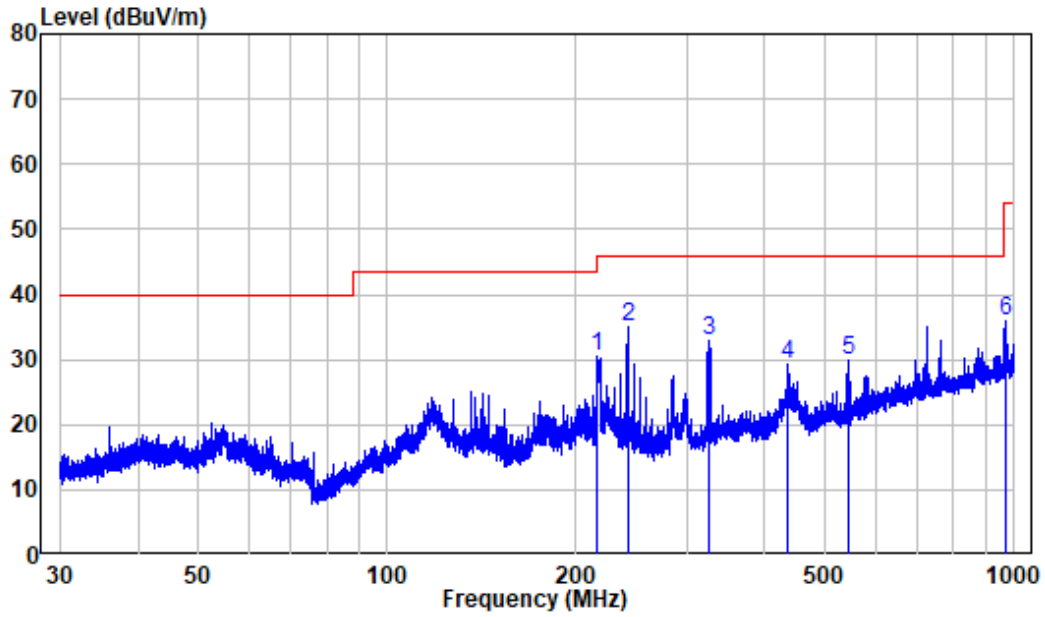


Site : chamber
Condition: 3m VERTICAL
Job No. : SZNS1220505-18180E-RF
Test Mode: 5G WIFI Transmitting
Adepter : BSY065t1903423D

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	38.650	-10.67	41.00	30.33	40.00	-9.67	Peak
2	102.990	-11.66	46.06	34.40	43.50	-9.10	Peak
3	174.654	-13.14	46.81	33.67	43.50	-9.83	Peak
4	450.147	-5.62	42.16	36.54	46.00	-9.46	Peak
5	750.108	-0.87	39.83	38.96	46.00	-7.04	Peak
6	850.290	0.36	39.62	39.98	46.00	-6.02	Peak

Adapter 2:

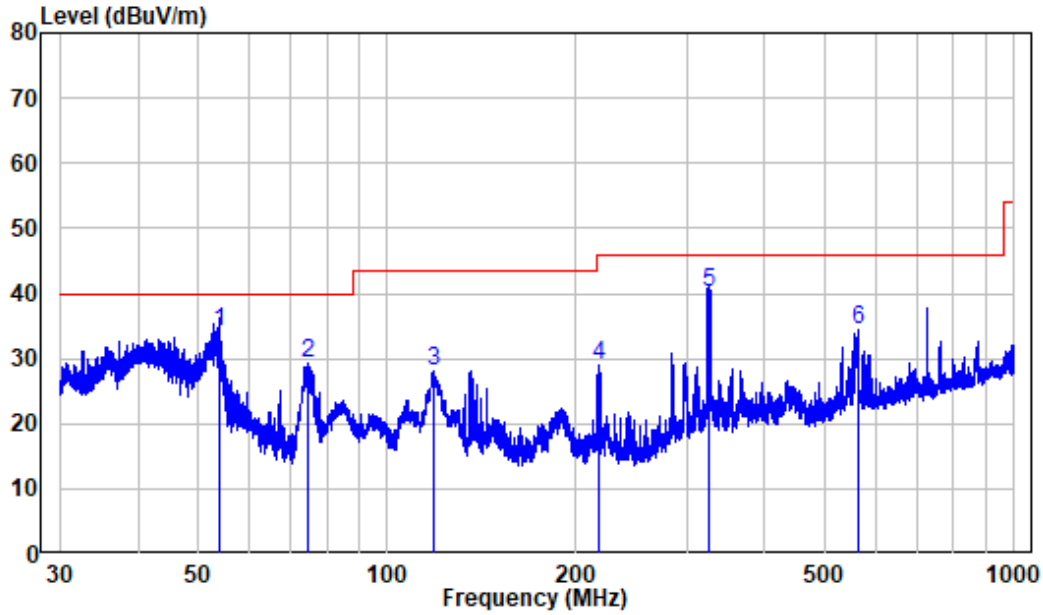
Horizontal:



Site : chamber
Condition: 3m HORIZONTAL
Job No. : SZNS1220505-18180E-RF
Test Mode: 5G WIFI Transmitting
Adepter : A481-1902360U

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	216.214	-11.61	41.97	30.36	46.00	-15.64	Peak
2	241.570	-10.81	45.92	35.11	46.00	-10.89	Peak
3	325.881	-8.22	41.13	32.91	46.00	-13.09	Peak
4	436.163	-5.69	34.86	29.17	46.00	-16.83	Peak
5	545.661	-4.02	34.03	30.01	46.00	-15.99	Peak
6	966.389	2.44	33.58	36.02	54.00	-17.98	Peak

Vertical



Site : chamber
Condition: 3m VERTICAL
Job No. : SZNS1220505-18180E-RF
Test Mode: 5G WIFI Transmitting
Adepter : A481-1902360U

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	53.858	-10.32	44.53	34.21	40.00	-5.79	QP
2	74.722	-16.18	45.33	29.15	40.00	-10.85	Peak
3	118.342	-13.22	41.34	28.12	43.50	-15.38	Peak
4	218.213	-11.51	40.60	29.09	46.00	-16.91	Peak
5	324.883	-8.27	48.51	40.24	46.00	-5.76	QP
6	562.662	-3.96	38.51	34.55	46.00	-11.45	Peak

1 ~ 40 GHz: Worst case for 2TX Mode, Adapter 2
Band 1: 5150-5250MHz

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit	Margin
	Reading (dBuV)	PK/QP/AV		Height (m)	Polar (H/V)			(dBμV/m)	(dB)
Band1 802.11 A Low Channel (5180 MHz)									
4500	55.17	PK	248	1.9	H	-4.72	50.45	74	-23.55
4500	54.47	PK	235	1.1	V	-4.72	49.75	74	-24.25
5150	62.66	PK	119	1.7	H	-2.73	59.93	74	-14.07
5150	48.77	AV	119	1.7	H	-2.73	46.04	54	-7.96
5150	61.31	PK	82	1.4	V	-2.73	58.58	74	-15.42
5150	47.00	AV	82	1.4	V	-2.73	44.27	54	-9.73
10360	43.91	PK	6	1.5	H	8.12	52.03	68.2	-16.17
10360	44.40	PK	117	1.6	V	8.12	52.52	68.2	-15.68
Band1 802.11 A Middle Channel (5200 MHz)									
10400	42.71	PK	79	1.7	H	8.24	50.95	68.2	-17.25
10400	43.57	PK	207	1.7	V	8.24	51.81	68.2	-16.39
Band1 802.11 A High Channel (5240 MHz)									
5350	57.11	PK	11	1.1	H	-2.33	54.78	74	-19.22
5350	43.25	AV	11	1.1	H	-2.33	40.92	54	-13.08
5350	55.91	PK	209	1.7	V	-2.33	53.58	74	-20.42
5460	53.68	PK	99	1.3	H	-2.26	51.42	74	-22.58
5460	52.74	PK	89	1.5	V	-2.26	50.48	74	-23.52
10480	42.07	PK	256	1.7	H	8.57	50.64	68.2	-17.56
10480	42.58	PK	293	1.5	V	8.57	51.15	68.2	-17.05
Band1 802.11 N20 Low Channel (5180 MHz)									
4500	54.14	PK	180	1.1	H	-4.72	49.42	74	-24.58
4500	54.60	PK	44	1.5	V	-4.72	49.88	74	-24.12
5150	60.38	PK	329	1.3	H	-2.73	57.65	74	-16.35
5150	46.35	AV	329	1.3	H	-2.73	43.62	54	-10.38
5150	62.89	PK	101	1.1	V	-2.73	60.16	74	-13.84
5150	47.52	AV	101	1.1	V	-2.73	44.79	54	-9.21
10360	42.23	PK	84	1.3	H	8.12	50.35	68.2	-17.85
10360	42.87	PK	341	1.2	V	8.12	50.99	68.2	-17.21
Band1 802.11 N20 Middle Channel (5200 MHz)									
10400	41.98	PK	333	1.8	H	8.24	50.22	68.2	-17.98
10400	42.61	PK	103	1.4	V	8.24	50.85	68.2	-17.35
Band1 802.11 N20 High Channel (5240 MHz)									
5350	56.21	PK	278	1.8	H	-2.33	53.88	74	-20.12
5350	56.09	PK	4	1.3	V	-2.33	53.76	74	-20.24
5460	53.28	PK	289	1.6	H	-2.26	51.02	74	-22.98
5460	52.58	PK	11	1.8	V	-2.26	50.32	74	-23.68
10480	41.28	PK	226	1.4	H	8.57	49.85	68.2	-18.35
10480	42.08	PK	227	2.1	V	8.57	50.65	68.2	-17.55

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBuV)	PK/QP/AV		Height (m)	Polar (H/V)				
Band1 802.11 N40 Low Channel (5190 MHz)									
4500	55.18	PK	96	2.0	H	-4.72	50.46	74	-23.54
4500	55.85	PK	261	1.7	V	-4.72	51.13	74	-22.87
5150	60.84	PK	256	2.1	H	-2.73	58.11	74	-15.89
5150	47.61	AV	256	2.1	H	-2.73	44.88	54	-9.12
5150	61.86	PK	322	2.1	V	-2.73	59.13	74	-14.87
5150	48.25	AV	322	2.1	V	-2.73	45.52	54	-8.48
10380	42.80	PK	188	1.8	H	8.19	50.99	68.2	-17.21
10380	43.03	PK	279	2.2	V	8.19	51.22	68.2	-16.98
Band1 802.11 N40 High Channel (5230 MHz)									
5350	56.24	PK	145	1.5	H	-2.33	53.91	74	-20.09
5350	55.79	PK	58	1.4	V	-2.33	53.46	74	-20.54
5460	53.33	PK	201	1.7	H	-2.26	51.07	74	-22.93
5460	54.01	PK	67	1.6	V	-2.26	51.75	74	-22.25
10460	42.13	PK	179	1.4	H	8.48	50.61	68.2	-17.59
10460	42.31	PK	277	2.0	V	8.48	50.79	68.2	-17.41
Band1 802.11 AC20 Low Channel (5180 MHz)									
4500	54.40	PK	13	1.4	H	-4.72	49.68	74	-24.32
4500	54.77	PK	294	1.5	V	-4.72	50.05	74	-23.95
5150	59.08	PK	158	1.5	H	-2.73	56.35	74	-17.65
5150	46.35	AV	158	1.5	H	-2.73	43.62	54	-10.38
5150	60.97	PK	101	1.7	V	-2.73	58.24	74	-15.76
5150	47.36	AV	101	1.7	V	-2.73	44.63	54	-9.37
10360	42.59	PK	54	2.1	H	8.12	50.71	68.2	-17.49
10360	41.85	PK	94	1.6	V	8.12	49.97	68.2	-18.23
Band1 802.11 AC20 Middle Channel (5200 MHz)									
10400	41.61	PK	107	2.0	H	8.24	49.85	68.2	-18.35
10400	42.11	PK	240	1.9	V	8.24	50.35	68.2	-17.85
Band1 802.11 AC20 High Channel (5240 MHz)									
5350	56.15	PK	135	1.7	H	-2.33	53.82	74	-20.18
5350	55.76	PK	86	1.3	V	-2.33	53.43	74	-20.57
5460	50.94	PK	49	1.4	H	-2.26	48.68	74	-25.32
5460	51.67	PK	17	1.5	V	-2.26	49.41	74	-24.59
10480	42.00	PK	211	2.2	H	8.57	50.57	68.2	-17.63
10480	41.69	PK	18	1.4	V	8.57	50.26	68.2	-17.94

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBuV)	PK/QP/AV		Height (m)	Polar (H/V)				
Band1 802.11 AC40 Low Channel (5190 MHz)									
4500	55.03	PK	278	1.9	H	-4.72	50.31	74	-23.69
4500	54.60	PK	188	2.1	V	-4.72	49.88	74	-24.12
5150	65.72	PK	201	1.4	H	-2.73	62.99	74	-11.01
5150	53.25	AV	201	1.4	H	-2.73	50.52	54	-3.48
5150	66.15	PK	295	1.5	V	-2.73	63.42	74	-10.58
5150	53.35	AV	295	1.5	V	-2.73	50.62	54	-3.38
10380	42.08	PK	119	1.7	H	8.19	50.27	68.2	-17.93
10380	42.73	PK	94	1.8	V	8.19	50.92	68.2	-17.28
Band1 802.11 AC40 High Channel (5230 MHz)									
5350	57.40	PK	244	1.5	H	-2.33	55.07	74	-18.93
5350	44.38	AV	244	1.5	H	-2.33	42.05	54	-11.95
5350	56.10	PK	186	1.8	V	-2.33	53.77	74	-20.23
5460	50.86	PK	166	2.1	H	-2.26	48.60	74	-25.4
5460	51.41	PK	356	1.9	V	-2.26	49.15	74	-24.85
10460	41.55	PK	68	1.6	H	8.48	50.03	68.2	-18.17
10460	41.87	PK	37	1.5	V	8.48	50.35	68.2	-17.85
Band1 802.11 AC80 (5210 MHz)									
4500	55.14	PK	79	1.8	H	-4.72	50.42	74	-23.58
4500	56.13	PK	282	1.6	V	-4.72	51.41	74	-22.59
5150	62.81	PK	91	1.7	H	-2.73	60.08	74	-13.92
5150	50.49	AV	91	1.7	H	-2.73	47.76	54	-6.24
5150	63.08	PK	121	1.4	V	-2.73	60.35	74	-13.65
5150	50.68	AV	121	1.4	V	-2.73	47.95	54	-6.05
5350	55.45	PK	46	1.8	H	-2.33	53.12	74	-20.88
5350	55.23	PK	322	1.6	V	-2.33	52.90	74	-21.1
5460	53.39	PK	60	1.7	H	-2.26	51.13	74	-22.87
5460	54.33	PK	305	1.9	V	-2.26	52.07	74	-21.93
10420	42.92	PK	61	1.4	H	8.31	51.23	68.2	-16.97
10420	42.95	PK	148	2.2	V	8.31	51.26	68.2	-16.94

Band 4:5725-5850MHz

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit	Margin
	Reading (dBuV)	PK/QP/AV		Height (m)	Polar (H/V)			(dBμV/m)	(dB)
802.11A BAND4 5745, Low Channel									
5650	56.23	PK	340	1.7	H	-1.95	54.28	68.2	-13.92
5650	56.05	PK	298	2.2	V	-1.95	54.10	68.2	-14.1
5700	56.07	PK	90	1.6	H	-2.02	54.05	105.2	-51.15
5700	59.25	PK	262	1.5	V	-2.02	57.23	105.2	-47.97
5720	58.84	PK	149	1.7	H	-1.96	56.88	110.8	-53.92
5720	63.80	PK	53	1.5	V	-1.96	61.84	110.8	-48.96
5725	61.74	PK	307	2.2	H	-1.96	59.78	122.2	-62.42
5725	72.56	PK	306	1.9	V	-1.96	70.60	122.2	-51.6
11490	44.62	PK	328	1.7	H	6.63	51.25	74	-22.75
11490	43.83	PK	297	1.8	V	6.63	50.46	74	-23.54
802.11A BAND4 5785, Middle Channel									
11570	44.36	PK	311	1.6	H	6.59	50.95	74	-23.05
11570	43.84	PK	112	1.7	V	6.59	50.43	74	-23.57
802.11A BAND4 5825, High Channel									
5850	58.35	PK	146	1.6	H	-1.81	56.54	122.2	-65.66
5850	60.88	PK	341	1.4	V	-1.81	59.07	122.2	-63.13
5855	56.95	PK	116	1.6	H	-1.82	55.13	110.8	-55.67
5855	58.51	PK	119	1.7	V	-1.82	56.69	110.8	-54.11
5875	56.80	PK	87	1.5	H	-1.84	54.96	105.2	-50.24
5875	56.40	PK	139	1.8	V	-1.84	54.56	105.2	-50.64
5925	55.12	PK	274	1.6	H	-1.83	53.29	68.2	-14.91
5925	55.42	PK	283	2.0	V	-1.83	53.59	68.2	-14.61
11650	43.67	PK	326	2.1	H	6.77	50.44	74	-23.56
11650	43.25	PK	322	1.5	V	6.77	50.02	74	-23.98
802.11N20 BAND4, Low Channel									
5650	55.00	PK	202	1.5	H	-1.95	53.05	68.2	-15.15
5650	56.32	PK	306	1.9	V	-1.95	54.37	68.2	-13.83
5700	56.03	PK	226	1.7	H	-2.02	54.01	105.2	-51.19
5700	59.35	PK	152	1.9	V	-2.02	57.33	105.2	-47.87
5720	61.77	PK	13	1.7	H	-1.96	59.81	110.8	-50.99
5720	65.39	PK	65	2.0	V	-1.96	63.43	110.8	-47.37
5725	70.49	PK	20	1.6	H	-1.96	68.53	122.2	-53.67
5725	73.22	PK	248	1.6	V	-1.96	71.26	122.2	-50.94
11490	42.99	PK	133	1.9	H	6.63	49.62	74	-24.38
11490	41.78	PK	241	1.6	V	6.63	48.41	74	-25.59
802.11N20 BAND4, Middle Channel									
11570	44.02	PK	51	1.3	H	6.59	50.61	74	-23.39
11570	41.74	PK	66	1.8	V	6.59	48.33	74	-25.67

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBuV)	PK/QP/AV		Height (m)	Polar (H/V)				
802.11N20 BAND4, High Channel									
5850	60.45	PK	217	1.6	H	-1.81	58.64	122.2	-63.56
5850	63.26	PK	317	2.2	V	-1.81	61.45	122.2	-60.75
5855	58.22	PK	239	1.8	H	-1.82	56.40	110.8	-54.4
5855	59.63	PK	174	1.7	V	-1.82	57.81	110.8	-52.99
5875	55.41	PK	333	2.1	H	-1.84	53.57	105.2	-51.63
5875	55.31	PK	268	2.1	V	-1.84	53.47	105.2	-51.73
5925	54.39	PK	209	1.7	H	-1.83	52.56	68.2	-15.64
5925	54.93	PK	246	1.5	V	-1.83	53.10	68.2	-15.1
11650	43.98	PK	250	1.9	H	6.77	50.75	74	-23.25
11650	42.85	PK	58	1.4	V	6.77	49.62	74	-24.38
802.11N40 BAND4, Low Channel									
5650	55.25	PK	198	2.1	H	-1.95	53.30	68.2	-14.9
5650	57.35	PK	260	1.9	V	-1.95	55.40	68.2	-12.8
5700	58.67	PK	323	2.0	H	-2.02	56.65	105.2	-48.55
5700	62.99	PK	272	1.9	V	-2.02	60.97	105.2	-44.23
5720	64.38	PK	147	1.6	H	-1.96	62.42	110.8	-48.38
5720	69.74	PK	59	1.5	V	-1.96	67.78	110.8	-43.02
5725	62.70	PK	295	1.4	H	-1.96	60.74	122.2	-61.46
5725	69.25	PK	178	1.8	V	-1.96	67.29	122.2	-54.91
11510	43.31	PK	137	1.7	H	6.59	49.90	74	-24.1
11510	42.38	PK	149	1.4	V	6.59	48.97	74	-25.03
802.11N40 BAND4, High Channel									
5850	55.06	PK	7	1.7	H	-1.81	53.25	122.2	-68.95
5850	57.10	PK	325	1.1	V	-1.81	55.29	122.2	-66.91
5855	56.69	PK	11	1.0	H	-1.82	54.87	110.8	-55.93
5855	56.76	PK	110	1.4	V	-1.82	54.94	110.8	-55.86
5875	55.07	PK	331	1.7	H	-1.84	53.23	105.2	-51.97
5875	56.89	PK	225	1.3	V	-1.84	55.05	105.2	-50.15
5925	54.49	PK	247	2.1	H	-1.83	52.66	68.2	-15.54
5925	54.82	PK	244	1.2	V	-1.83	52.99	68.2	-15.21
11590	43.96	PK	30	1.7	H	6.57	50.53	74	-23.47
11590	42.68	PK	34	1.7	V	6.57	49.25	74	-24.75

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBuV)	PK/QP/AV		Height (m)	Polar (H/V)				
802.11AC20 BAND4, Low Channel									
5650	56.37	PK	4	1.8	H	-1.95	54.42	68.2	-13.78
5650	56.08	PK	220	1.6	V	-1.95	54.13	68.2	-14.07
5700	55.77	PK	88	1.6	H	-2.02	53.75	105.2	-51.45
5700	58.16	PK	227	2.0	V	-2.02	56.14	105.2	-49.06
5720	59.88	PK	345	1.9	H	-1.96	57.92	110.8	-52.88
5720	65.24	PK	232	1.8	V	-1.96	63.28	110.8	-47.52
5725	65.75	PK	258	1.5	H	-1.96	63.79	122.2	-58.41
5725	71.88	PK	260	2.1	V	-1.96	69.92	122.2	-52.28
11490	43.36	PK	221	1.5	H	6.63	49.99	74	-24.01
11490	41.70	PK	117	1.7	V	6.63	48.33	74	-25.67
802.11 AC20 BAND4, Middle Channel									
11570	43.73	PK	339	1.3	H	6.59	50.32	74	-23.68
11570	43.03	PK	33	1.8	V	6.59	49.62	74	-24.38
802.11 AC20 BAND4, High Channel									
5850	59.41	PK	310	1.5	H	-1.81	57.60	122.2	-64.6
5850	60.74	PK	233	1.3	V	-1.81	58.93	122.2	-63.27
5855	56.73	PK	317	1.9	H	-1.82	54.91	110.8	-55.89
5855	58.02	PK	60	1.9	V	-1.82	56.20	110.8	-54.6
5875	56.83	PK	44	1.7	H	-1.84	54.99	105.2	-50.21
5875	55.66	PK	356	1.2	V	-1.84	53.82	105.2	-51.38
5925	55.23	PK	273	1.9	H	-1.83	53.40	68.2	-14.8
5925	55.36	PK	234	1.3	V	-1.83	53.53	68.2	-14.67
11650	44.11	PK	296	1.5	H	6.77	50.88	74	-23.12
11650	41.71	PK	20	1.4	V	6.77	48.48	74	-25.52
802.11 AC40 BAND4 5755, Low Channel									
5650	55.17	PK	72	1.8	H	-1.95	53.22	68.2	-14.98
5650	56.29	PK	278	1.5	V	-1.95	54.34	68.2	-13.86
5700	59.92	PK	262	1.7	H	-2.02	57.90	105.2	-47.3
5700	60.36	PK	216	1.7	V	-2.02	58.34	105.2	-46.86
5720	65.02	PK	56	1.9	H	-1.96	63.06	110.8	-47.74
5720	71.86	PK	104	1.6	V	-1.96	69.90	110.8	-40.9
5725	66.56	PK	66	1.2	H	-1.96	64.60	122.2	-57.6
5725	71.60	PK	90	1.9	V	-1.96	69.64	122.2	-52.56
11510	44.22	PK	45	1.7	H	6.59	50.81	74	-23.19
11510	43.39	PK	161	1.9	V	6.59	49.98	74	-24.02

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBuV)	PK/QP/AV		Height (m)	Polar (H/V)				
802.11 AC40 BAND4 5795, High Channel									
5850	55.67	PK	118	2.2	H	-1.81	53.86	122.2	-68.34
5850	56.16	PK	223	1.9	V	-1.81	54.35	122.2	-67.85
5855	55.28	PK	209	2.0	H	-1.82	53.46	110.8	-57.34
5855	56.34	PK	134	1.8	V	-1.82	54.52	110.8	-56.28
5875	56.11	PK	295	1.6	H	-1.84	54.27	105.2	-50.93
5875	54.78	PK	113	2.1	V	-1.84	52.94	105.2	-52.26
5925	54.70	PK	356	2.1	H	-1.83	52.87	68.2	-15.33
5925	56.49	PK	285	1.8	V	-1.83	54.66	68.2	-13.54
11590	43.88	PK	161	1.8	H	6.57	50.45	74	-23.55
11590	42.58	PK	255	1.9	V	6.57	49.15	74	-24.85
802.11AC80 BAND4 5775									
5650	57.56	PK	1	1.6	H	-1.95	55.61	68.2	-12.59
5650	61.50	PK	282	2.2	V	-1.95	59.55	68.2	-8.65
5700	70.29	PK	136	2.0	H	-2.02	68.27	105.2	-36.93
5700	75.67	PK	68	1.6	V	-2.02	73.65	105.2	-31.55
5720	73.83	PK	329	2.0	H	-1.96	71.87	110.8	-38.93
5720	76.87	PK	151	1.8	V	-1.96	74.91	110.8	-35.89
5725	71.53	PK	181	1.6	H	-1.96	69.57	122.2	-52.63
5725	75.94	PK	261	1.9	V	-1.96	73.98	122.2	-48.22
5850	71.16	PK	179	1.6	H	-1.81	69.35	122.2	-52.85
5850	71.95	PK	213	1.5	V	-1.81	70.14	122.2	-52.06
5855	69.20	PK	115	1.6	H	-1.82	67.38	110.8	-43.42
5855	73.22	PK	106	2.0	V	-1.82	71.40	110.8	-39.4
5875	60.97	PK	271	1.5	V	-1.84	59.13	105.2	-46.07
5875	63.92	PK	103	1.3	H	-1.84	62.08	105.2	-43.12
5925	54.94	PK	252	1.8	V	-1.83	53.11	68.2	-15.09
5925	54.93	PK	275	1.7	H	-1.83	53.10	68.2	-15.1
11550	43.54	PK	297	1.9	H	6.61	50.15	74	-23.85
11550	42.16	PK	45	2.2	V	6.61	48.77	74	-25.23

Bluetooth & 5G Wi-Fi (802.11a mode, 5180MHz) Simultaneously Transmission:
Worst case for adapter2:

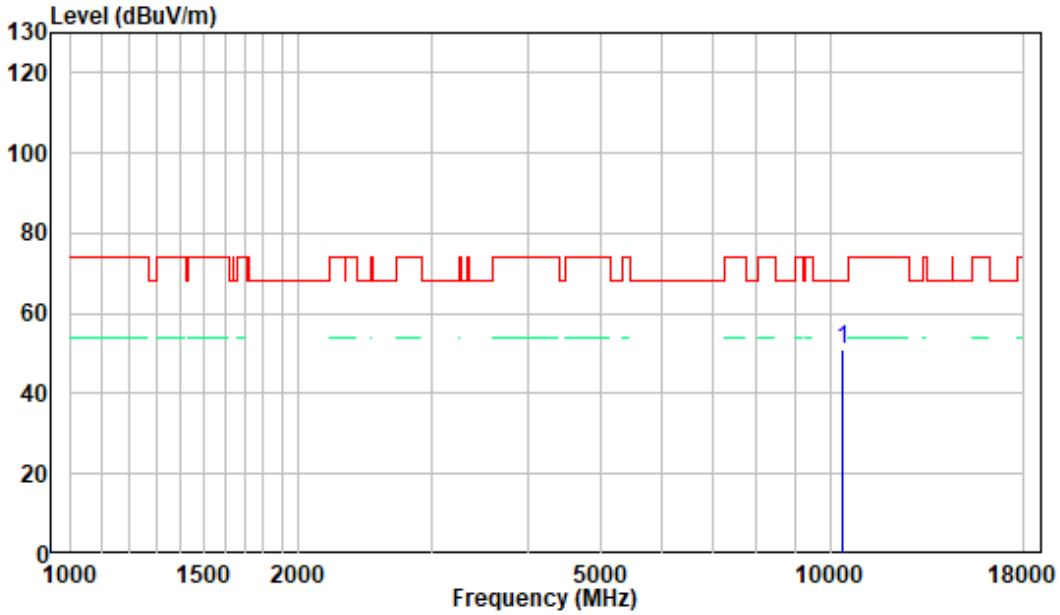
Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	PK/QP/Ave.		Height (m)	Polar (H/V)				
324.46	44.13	QP	193	1.6	H	-8.29	35.84	46	-10.16
324.31	50.29	QP	321	2.2	V	-8.30	41.99	46	-4.01
6845.79	41.15	PK	33	1.6	H	4.41	45.56	74	-28.44
7123.64	40.62	PK	289	1.8	V	5.47	46.09	74	-27.91

Note:
Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
Absolute Level (Corrected Amplitude) = Factor + Reading
Margin = Absolute Level (Corrected Amplitude) – Limit
The other spurious emission which is in the noise floor level was not recorded.
For above 1GHz, the test result of peak was 20dB below to the limit of peak, which can be compliant to the average limit, so just peak value was recorded.

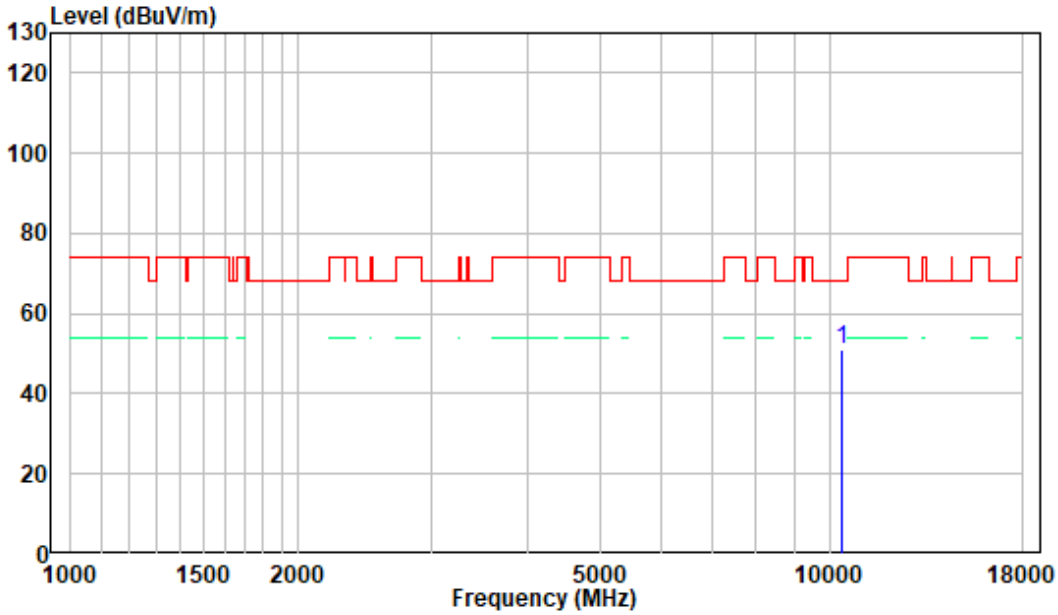
1-18 GHz:

Pre-scan plots:

802.11ac80, 5210MHz
Horizontal



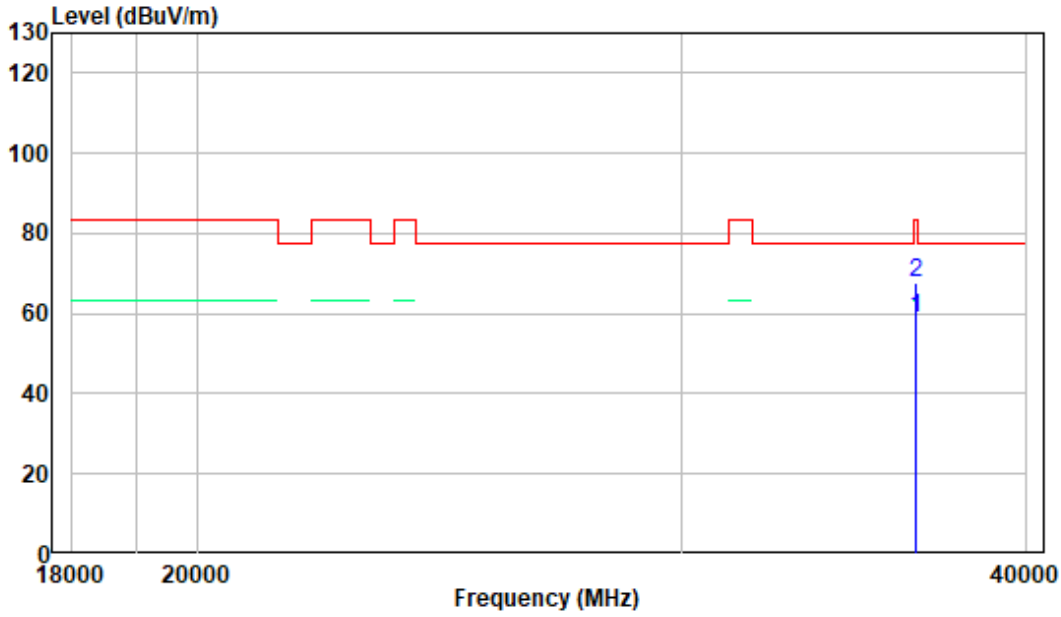
Vertical



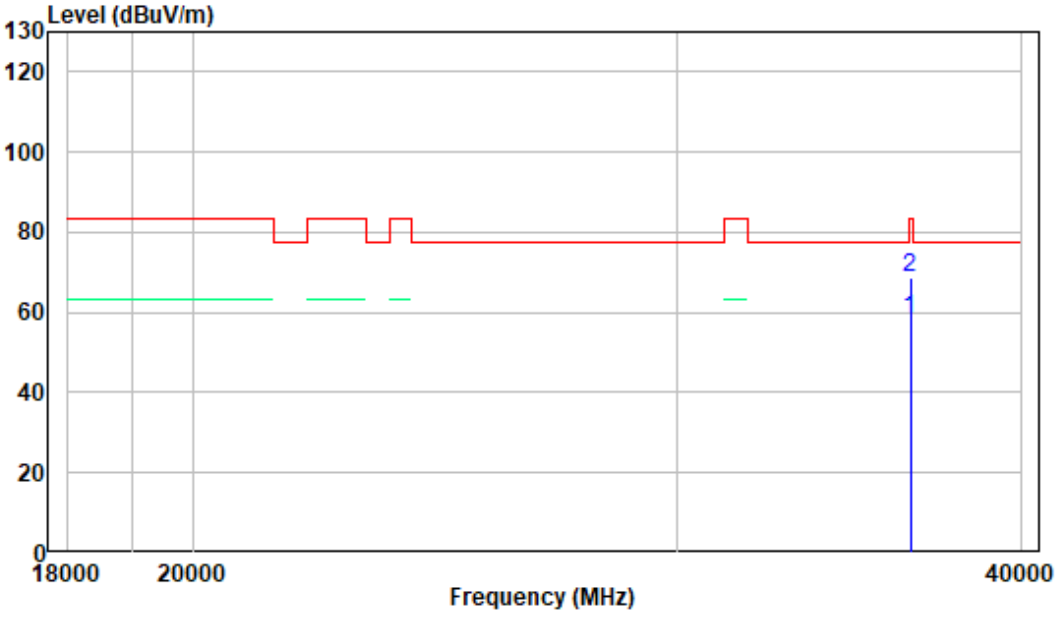
18-40 GHz:

Pre-scan plots:

802.11ac80, 5210MHz
Horizontal



Vertical



FCC §15.407(a)(e) – BANDWIDTH

Applicable Standard

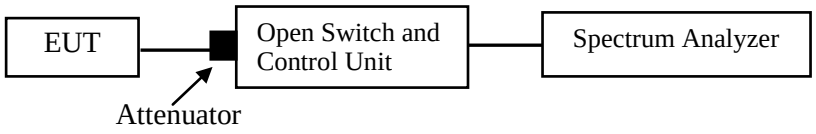
The maximum power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test. If the device cannot be connected directly, alternative techniques acceptable to the Commission may be used. Measurements in the 5.725-5.85 GHz band 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.

Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

Test Procedure

1. 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%.

2. **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.



Test Data

Environmental Conditions

Temperature:	23~26 ℃
Relative Humidity:	49~55 %
ATM Pressure:	101.0~101.2 kPa

The testing was performed by Cat Kang from 2022-05-10 to 2022-05-16.

EUT operation mode: Transmitting

Test Result: Pass; please refer to the Appendix.

FCC §15.407(a) (1) (3) – CONDUCTED TRANSMITTER OUTPUT POWER

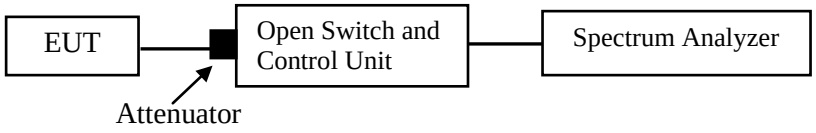
Applicable Standard

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.

Test Procedure

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 one test equipment.
3. Add a correction factor to the display.



Test Data

Environmental Conditions

Temperature:	23~24℃
Relative Humidity:	51~52%
ATM Pressure:	101.1~101.2 kPa

The testing was performed by Cat Kang from 2022-05-10 to 2022-05-16.

EUT operation mode: Transmitting

Test Result: Pass

Please refer to the Appendix.

FCC §15.407(a) (1) (3) - POWER SPECTRAL DENSITY

Applicable Standard

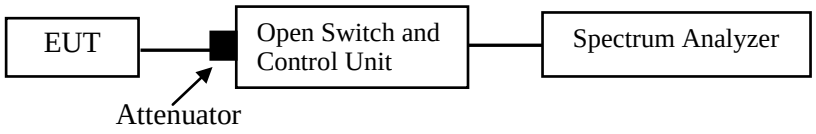
For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting 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.

Test Procedure

For devices operating in the bands 5.15-5.25 GHz, 5.25-5.35 GHz, and 5.47-5.725 GHz, the above procedures make use of 1 MHz RBW to satisfy directly the 1 MHz reference bandwidth specified in § 15.407(a)(5). For devices operating in the band 5.725-5.85 GHz, the rules specify a measurement bandwidth of 500 kHz. Many spectrum analyzers do not have 500 kHz RBW, thus a narrower RBW may need to be used. The rules permit the use of a RBWs less than 1 MHz, or 500 kHz, "provided that the measured power is integrated over the full reference bandwidth" to show the total power over the specified measurement bandwidth (i.e., 1 MHz, or 500 kHz). If measurements are performed using a reduced resolution bandwidth (< 1 MHz, or < 500 kHz) and integrated over 1 MHz, or 500 kHz bandwidth, the following adjustments to the procedures apply:

a) Set RBW $\geqslant$ 1/T, where T is defined in section II.B.l.a).
b) Set VBW $\geqslant$ 3 RBW.
c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add 10 log (500 kHz/RBW) to the measured result, whereas RBW (< 500 kHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.
d) If measurement bandwidth of Maximum PSD is specified in 1 MHz, add 10 log (1MHz/RBW) to the measured result, whereas RBW (< 1 MHz) is the reduced resolution bandwidth of spectrum analyzer set during measurement.
e) Care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.



Test Data

Environmental Conditions

Temperature:	23~26℃
Relative Humidity:	49~55%
ATM Pressure:	101.0~101.2 kPa

The testing was performed by Cat Kang from 2022-05-10 to 2022-05-16.

EUT operation mode: Transmitting

Test Result: Pass

Please refer to the Appendix.

APPENDIX

Appendix A1: Emission Bandwidth

Test Result

5150~5250 MHz:

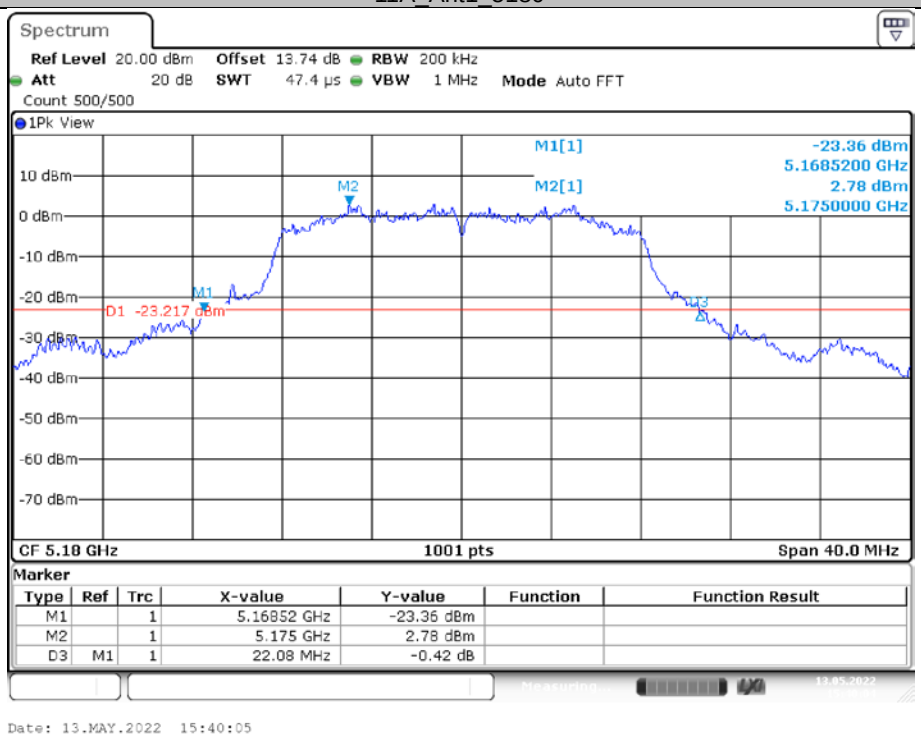
TestMode	Antenna	Channel	26dB EBW[MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11A	Ant1	5180	22.080	5168.520	5190.600	---	PASS
	Ant2	5180	22.120	5168.360	5190.480	---	PASS
	Ant1	5200	20.800	5189.600	5210.400	---	PASS
	Ant2	5200	21.920	5188.640	5210.560	---	PASS
	Ant1	5240	21.280	5229.160	5250.440	---	PASS
	Ant2	5240	21.440	5228.680	5250.120	---	PASS
11N20MIMO	Ant1	5180	22.040	5168.960	5191.000	---	PASS
	Ant2	5180	21.880	5169.080	5190.960	---	PASS
	Ant1	5200	21.920	5188.920	5210.840	---	PASS
	Ant2	5200	22.120	5188.600	5210.720	---	PASS
	Ant1	5240	22.280	5229.240	5251.520	---	PASS
	Ant2	5240	22.280	5228.840	5251.120	---	PASS
11N40MIMO	Ant1	5190	42.640	5168.720	5211.360	---	PASS
	Ant2	5190	41.680	5169.440	5211.120	---	PASS
	Ant1	5230	42.800	5208.720	5251.520	---	PASS
	Ant2	5230	41.680	5209.280	5250.960	---	PASS
11AC20MIMO	Ant1	5180	22.080	5168.960	5191.040	---	PASS
	Ant2	5180	22.080	5169.040	5191.120	---	PASS
	Ant1	5200	22.360	5188.720	5211.080	---	PASS
	Ant2	5200	22.520	5188.880	5211.400	---	PASS
	Ant1	5240	21.360	5229.320	5250.680	---	PASS
	Ant2	5240	22.200	5229.000	5251.200	---	PASS
11AC40MIMO	Ant1	5190	42.640	5168.560	5211.200	---	PASS
	Ant2	5190	42.320	5168.960	5211.280	---	PASS
	Ant1	5230	42.640	5208.640	5251.280	---	PASS
	Ant2	5230	42.160	5208.800	5250.960	---	PASS
11AC80MIMO	Ant1	5210	81.760	5169.200	5250.960	---	PASS
	Ant2	5210	81.920	5169.360	5251.280	---	PASS

5725~5850 MHz:

TestMode	Antenna	Channel	26db EBW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11A	Ant1	5745	23.480	5733.240	5756.720	---	PASS
	Ant2	5745	23.160	5733.480	5756.640	---	PASS
	Ant1	5785	22.960	5773.360	5796.320	---	PASS
	Ant2	5785	22.200	5773.840	5796.040	---	PASS
	Ant1	5825	22.680	5813.280	5835.960	---	PASS
	Ant2	5825	21.320	5814.000	5835.320	---	PASS
11N20MIMO	Ant1	5745	21.880	5734.280	5756.160	---	PASS
	Ant2	5745	22.440	5733.960	5756.400	---	PASS
	Ant1	5785	21.680	5774.440	5796.120	---	PASS
	Ant2	5785	22.520	5773.800	5796.320	---	PASS
	Ant1	5825	22.320	5813.760	5836.080	---	PASS
	Ant2	5825	21.680	5814.080	5835.760	---	PASS
11N40MIMO	Ant1	5755	43.840	5732.920	5776.760	---	PASS
	Ant2	5755	42.240	5733.960	5776.200	---	PASS
	Ant1	5795	44.560	5772.280	5816.840	---	PASS
	Ant2	5795	42.240	5773.960	5816.200	---	PASS
11AC20MIMO	Ant1	5745	22.520	5733.600	5756.120	---	PASS
	Ant2	5745	22.400	5733.640	5756.040	---	PASS
	Ant1	5785	22.720	5773.440	5796.160	---	PASS
	Ant2	5785	22.000	5773.920	5795.920	---	PASS
	Ant1	5825	23.000	5813.280	5836.280	---	PASS
	Ant2	5825	22.040	5813.440	5835.480	---	PASS
11AC40MIMO	Ant1	5755	43.760	5732.840	5776.600	---	PASS
	Ant2	5755	42.080	5733.800	5775.880	---	PASS
	Ant1	5795	44.640	5772.280	5816.920	---	PASS
	Ant2	5795	42.480	5773.720	5816.200	---	PASS
11AC80MIMO	Ant1	5775	79.840	5735.160	5815.000	---	PASS
	Ant2	5775	80.160	5735.000	5815.160	---	PASS

Test Graphs

11A_Ant1_5180



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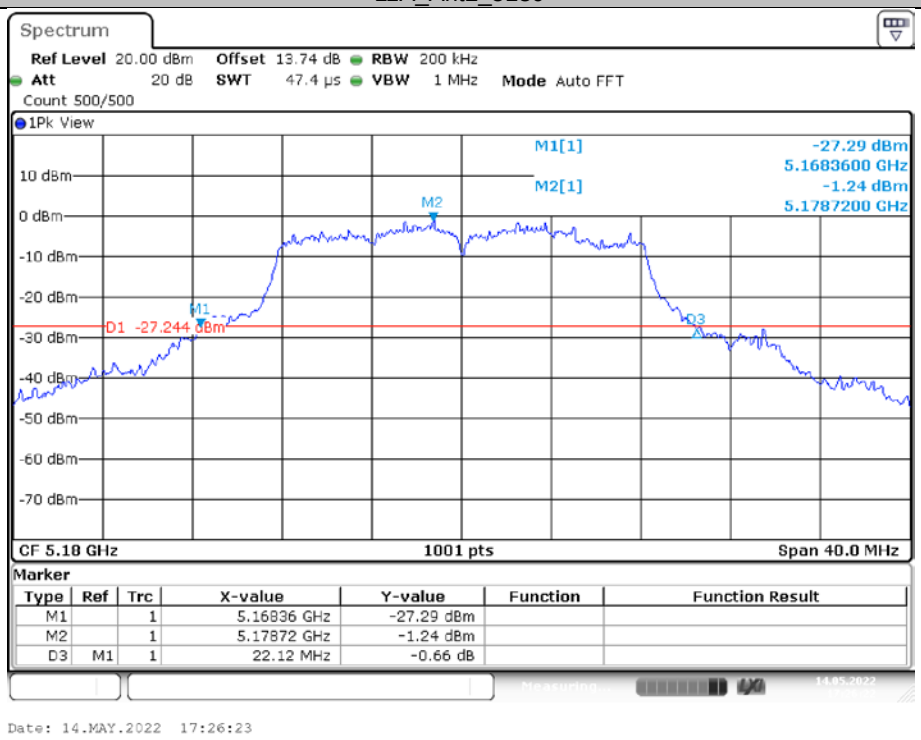
11A_Ant2_5180



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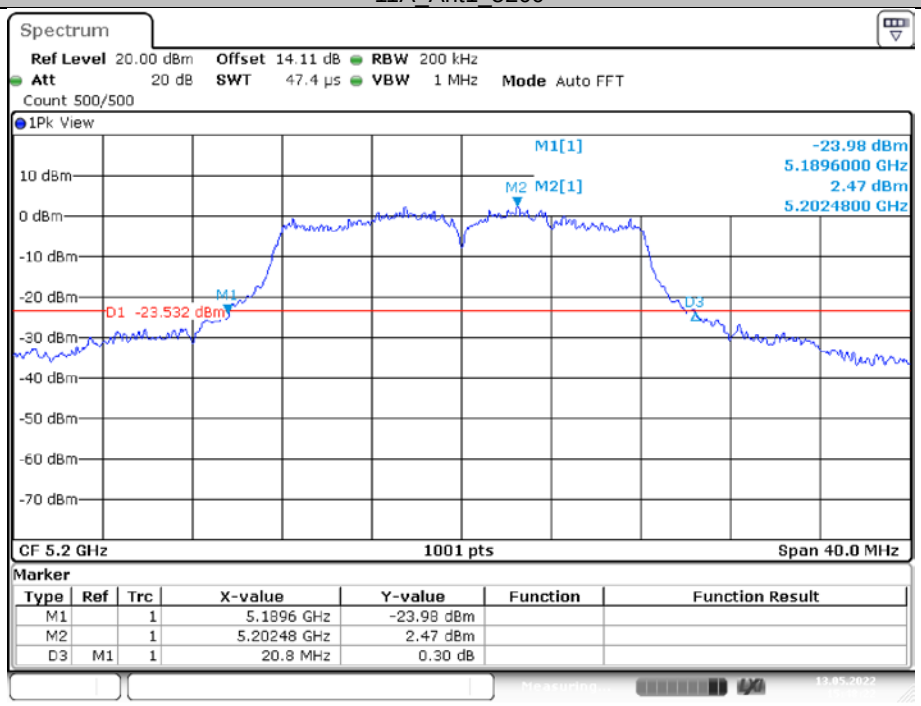

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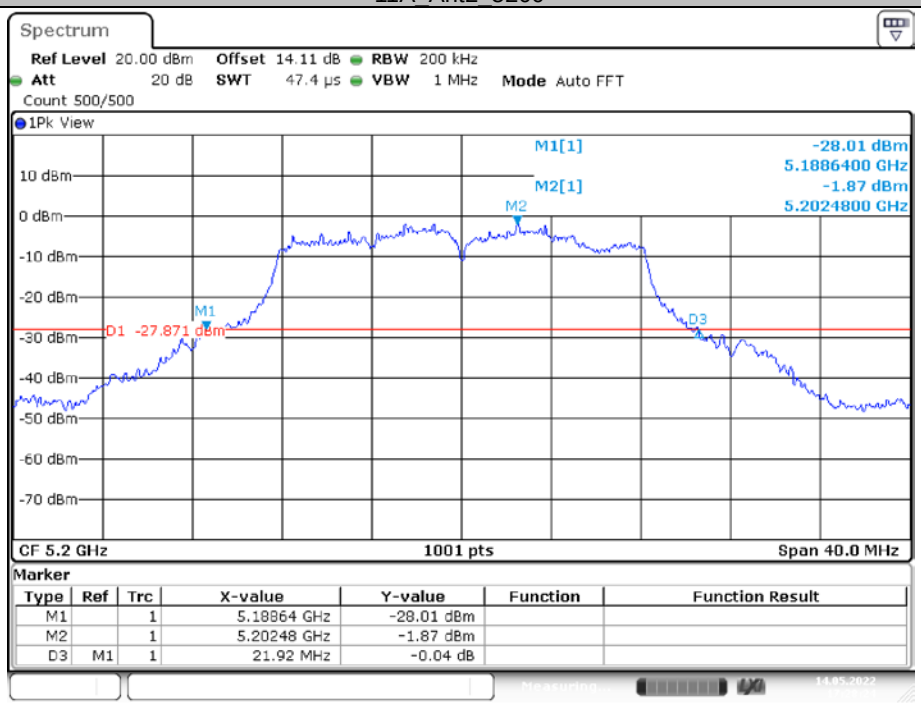

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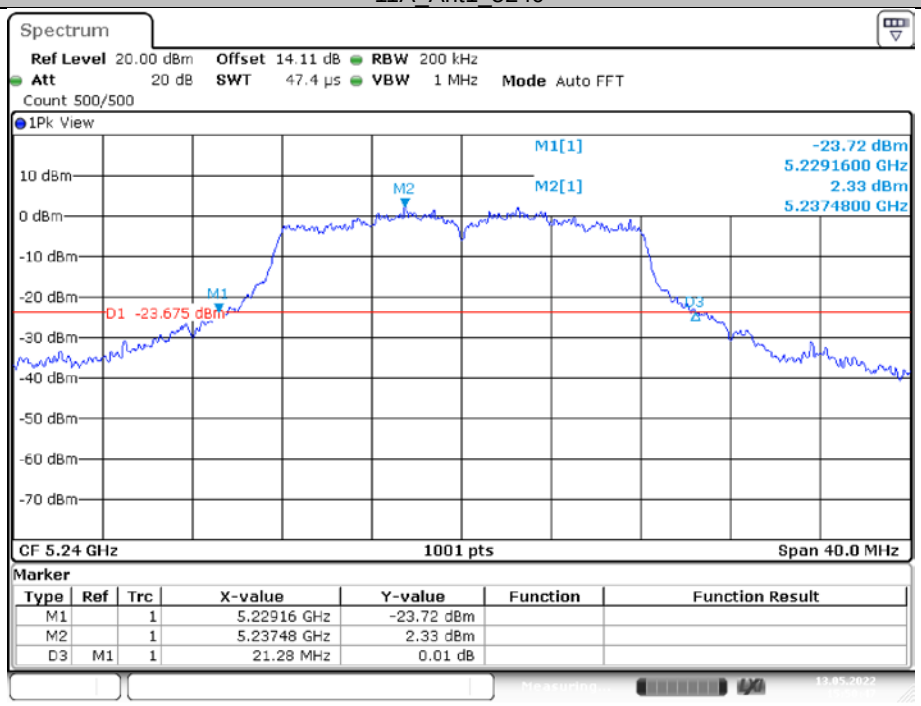

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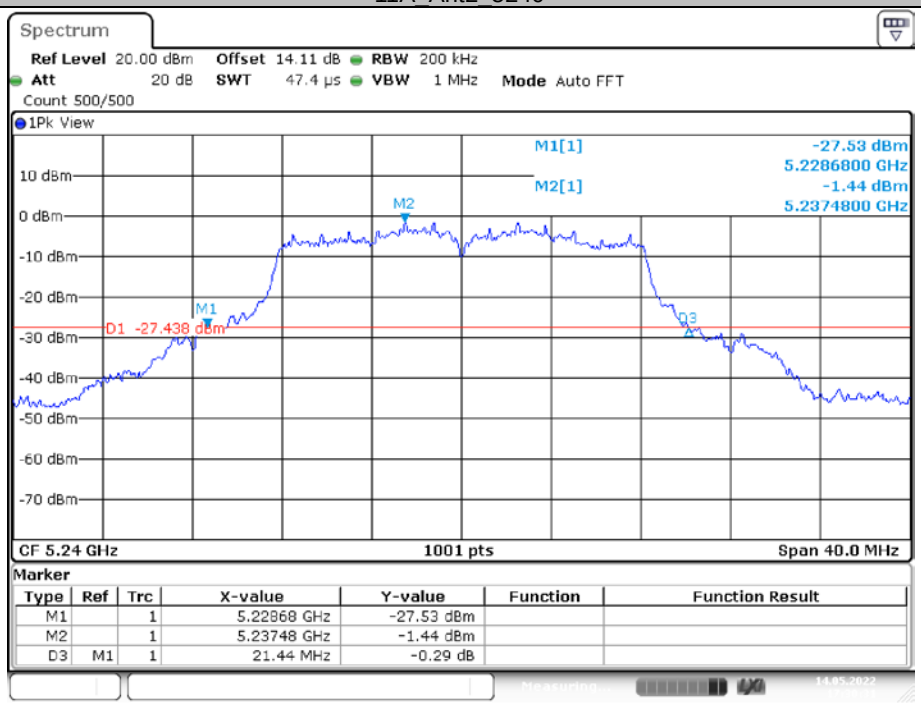

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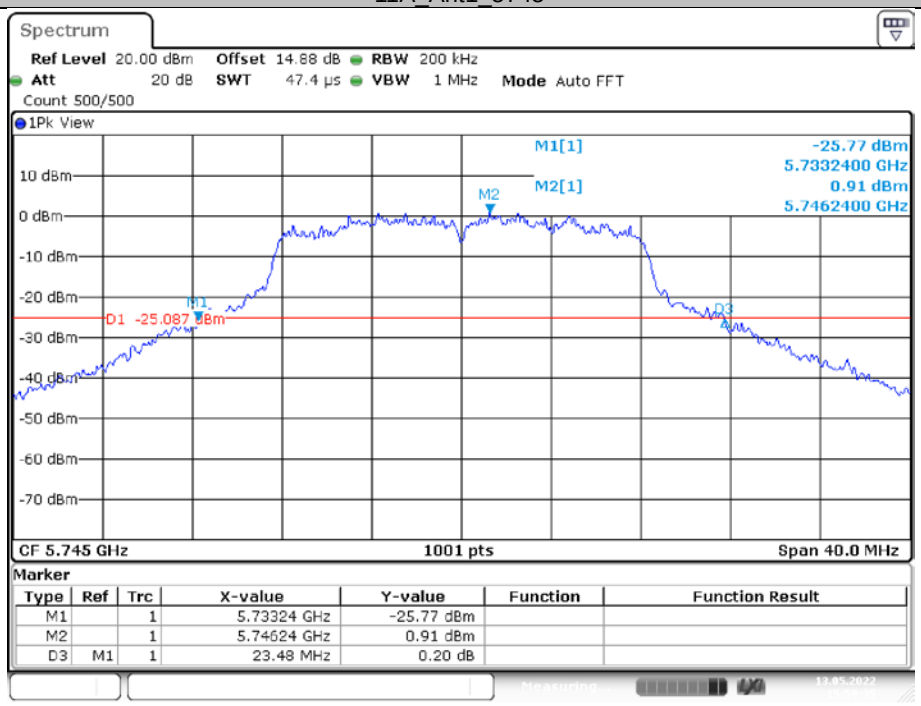
11A_Ant1_5745



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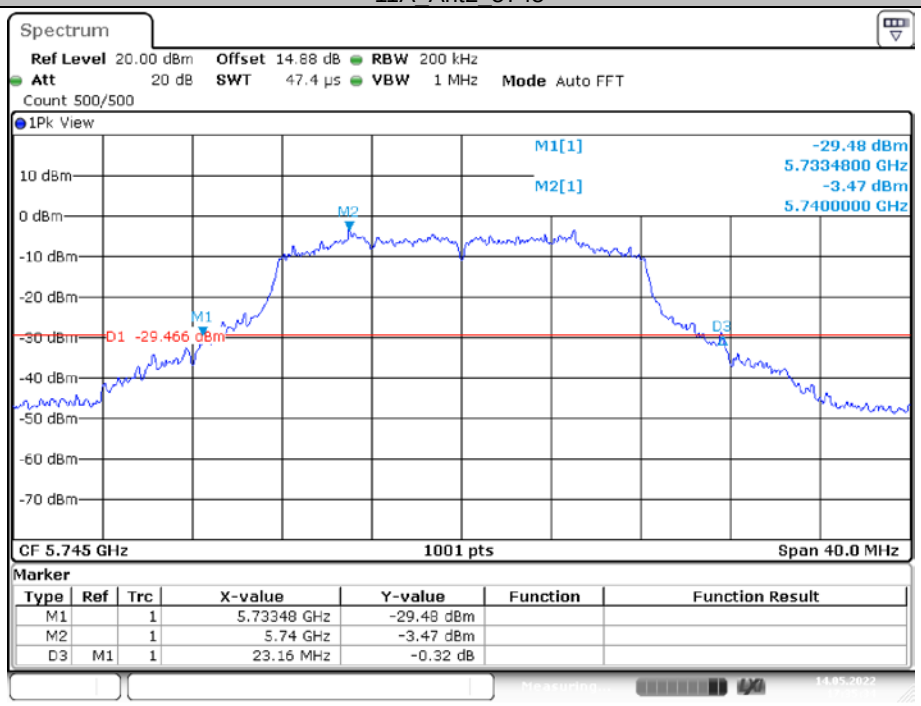

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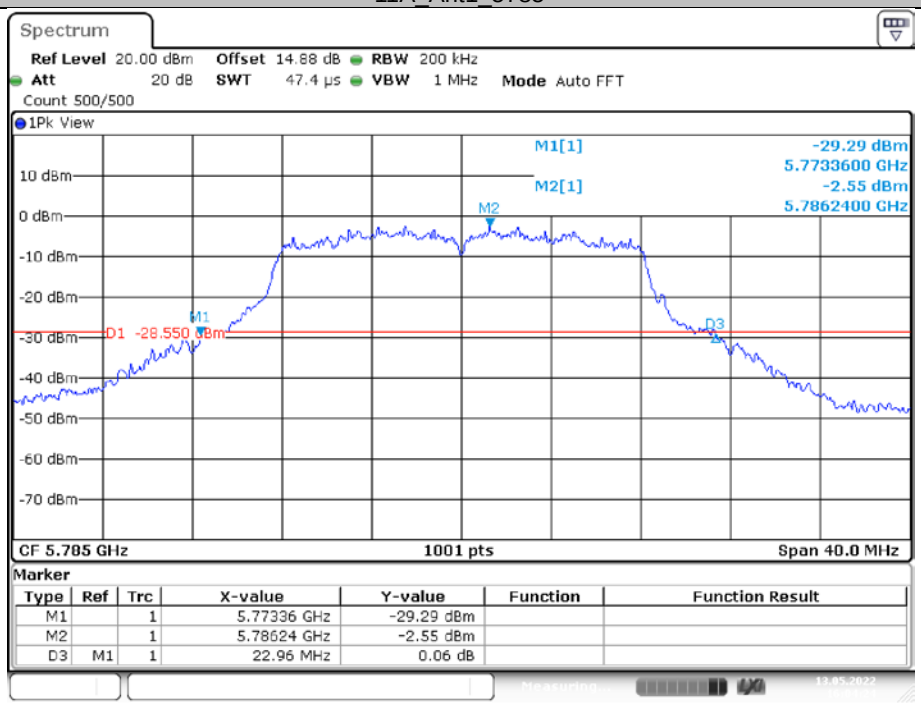

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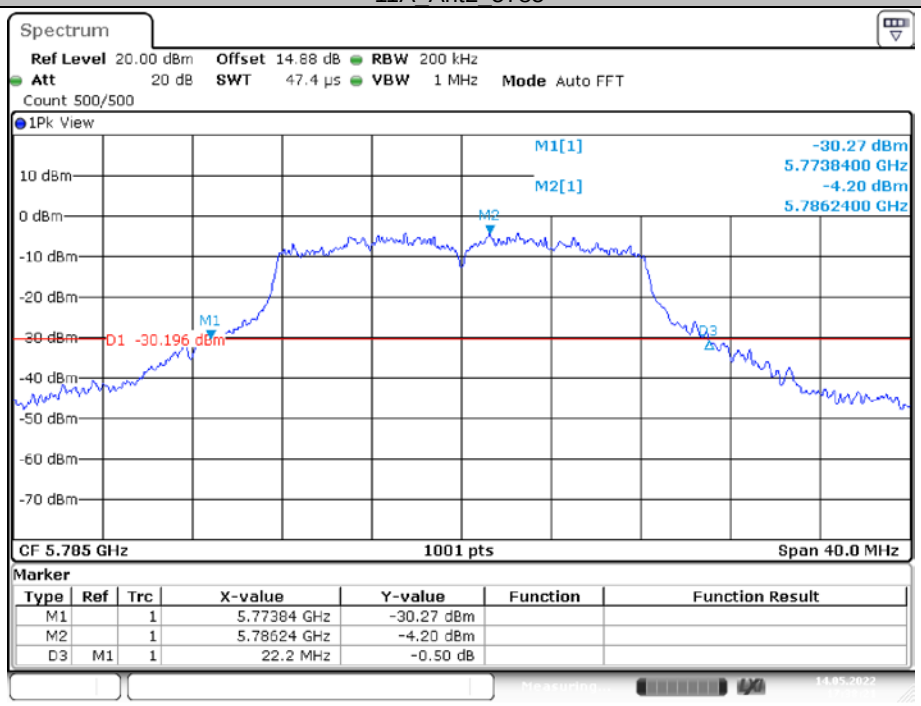

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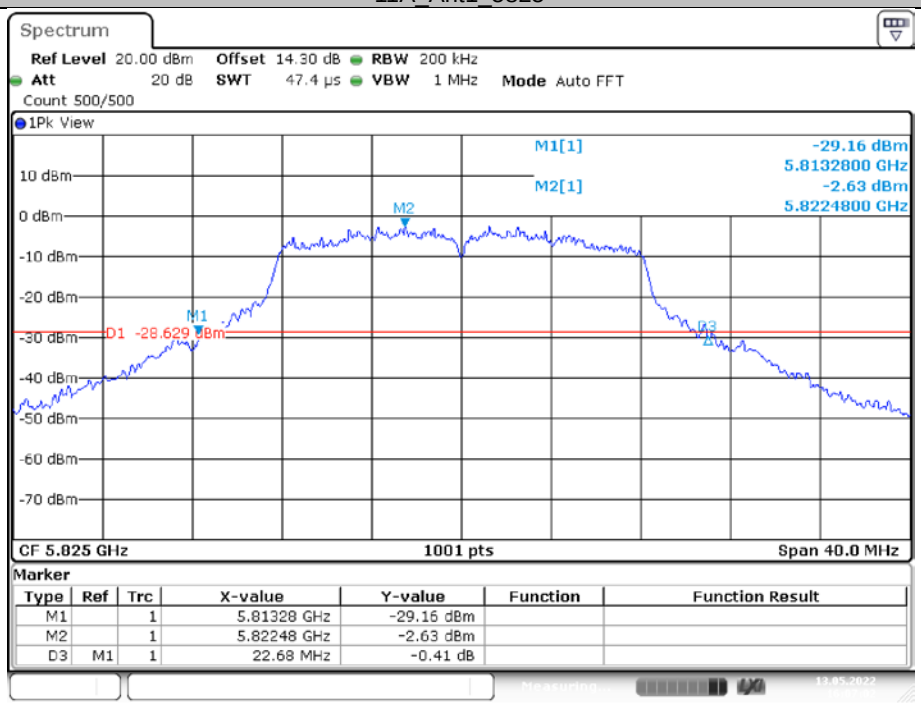

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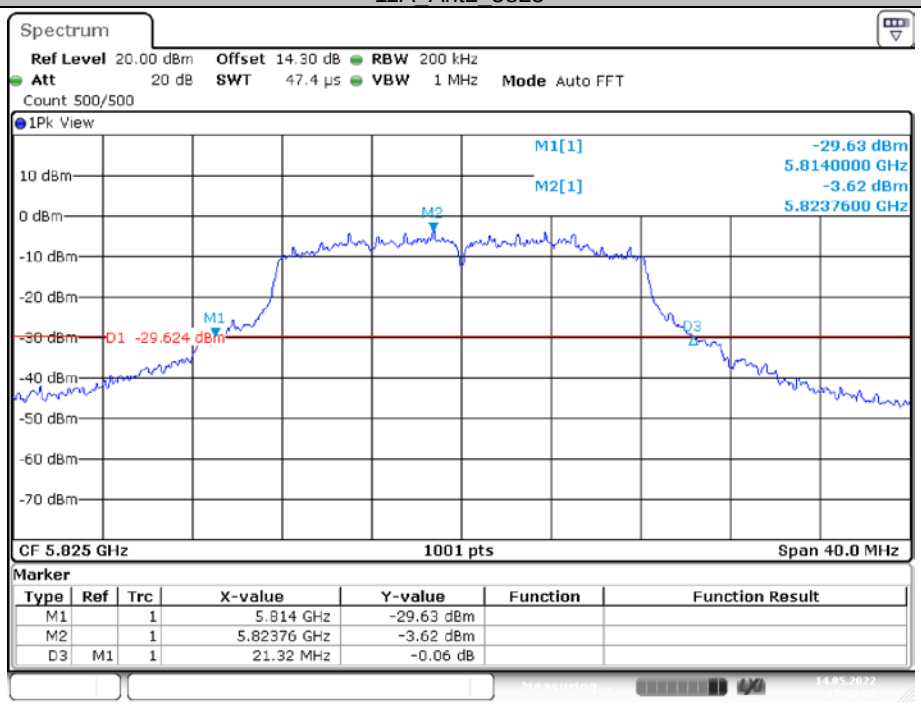

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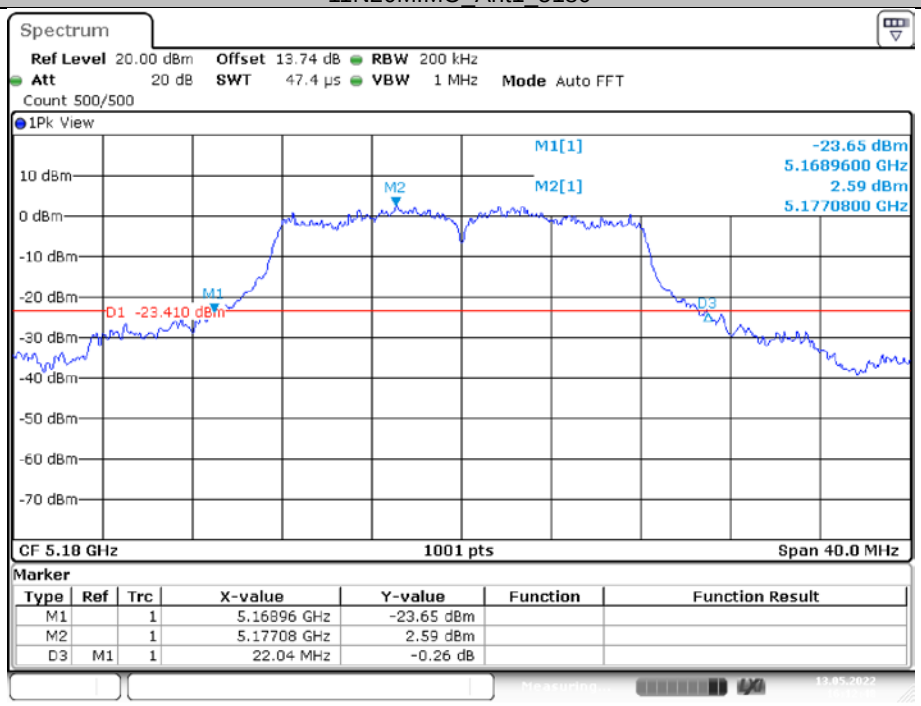
11N20MIMO_Ant1_5180



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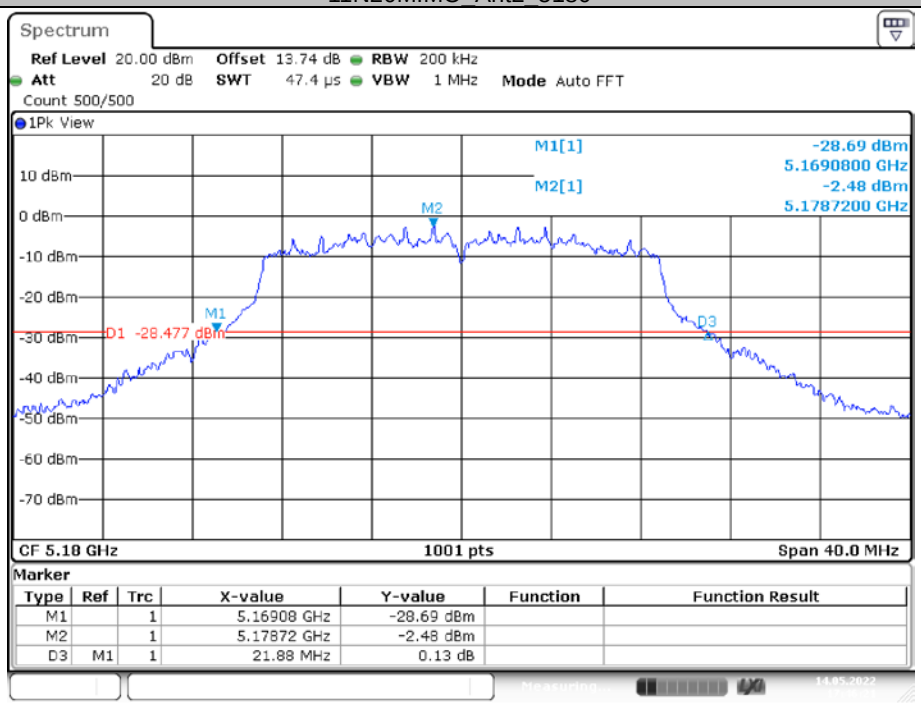

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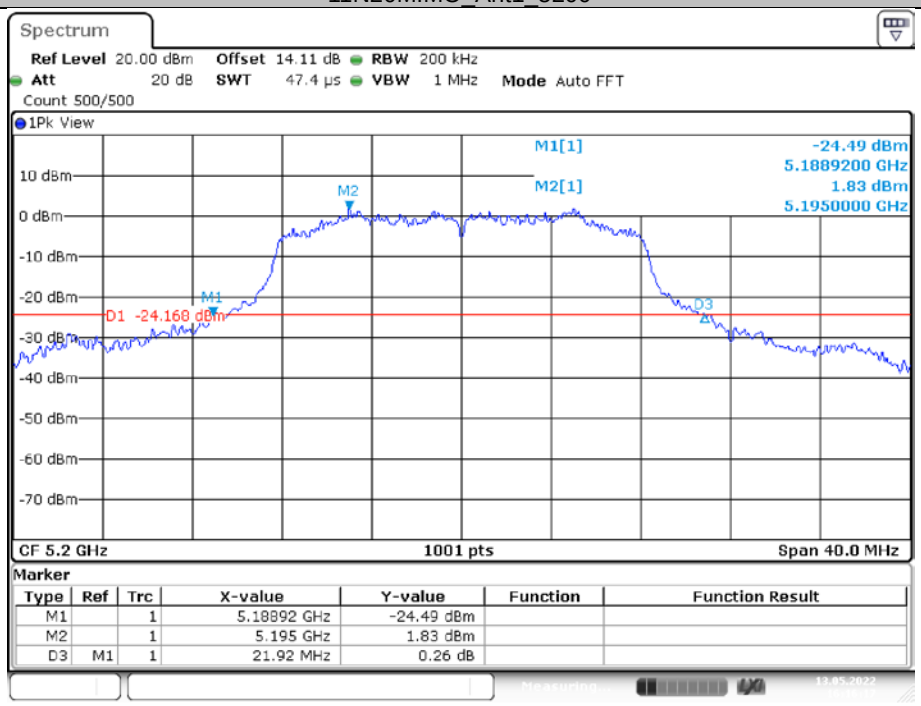

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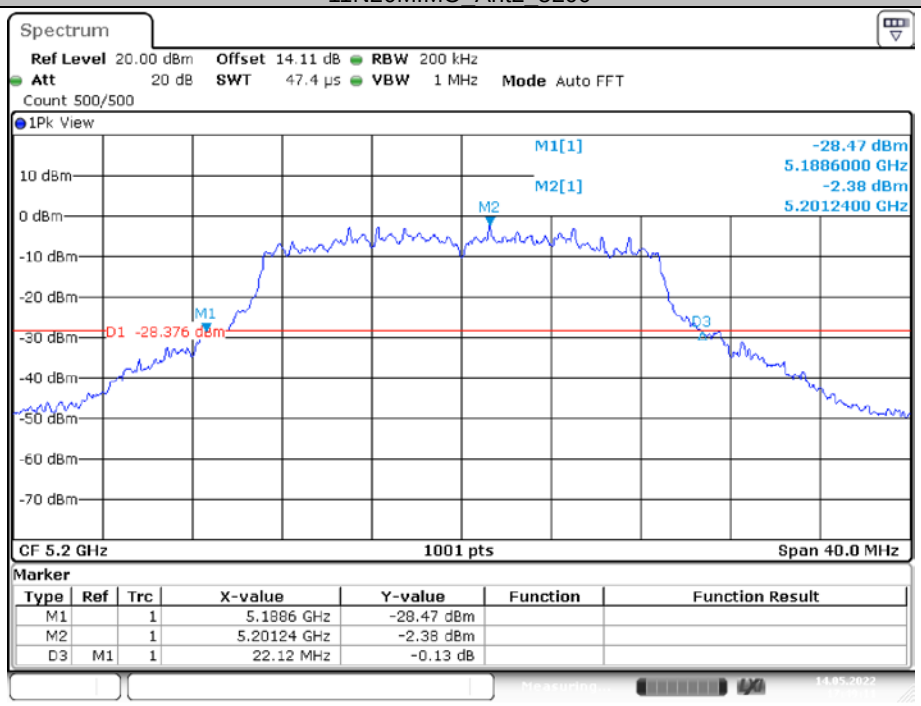

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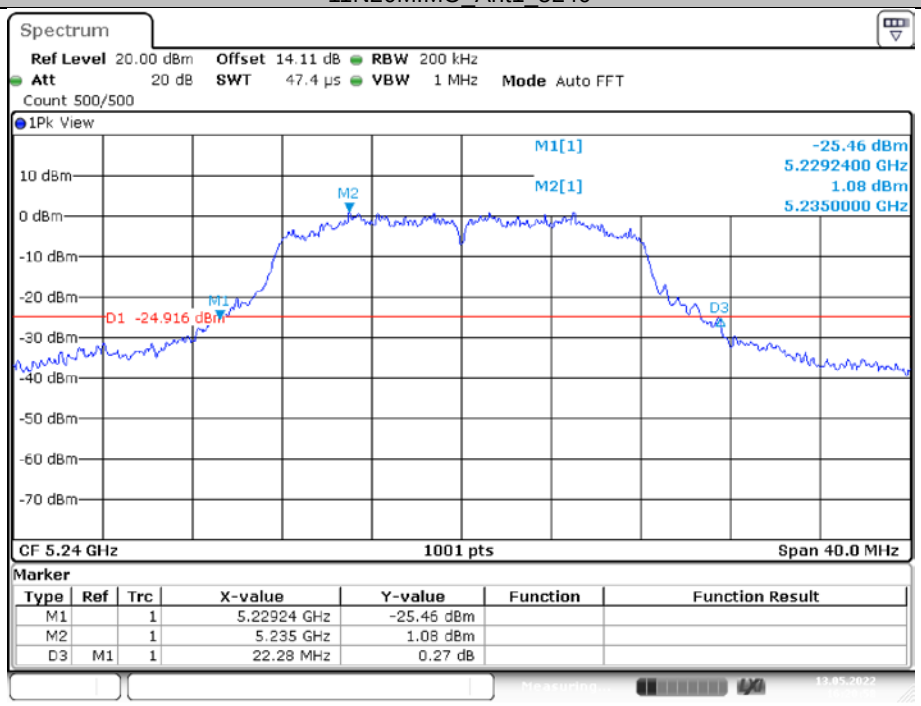

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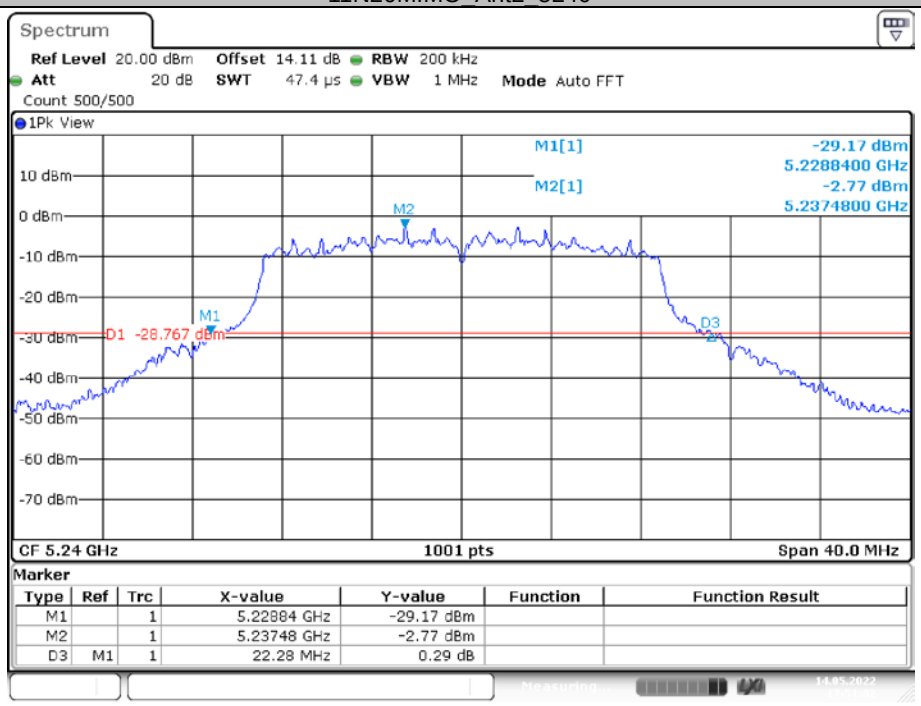

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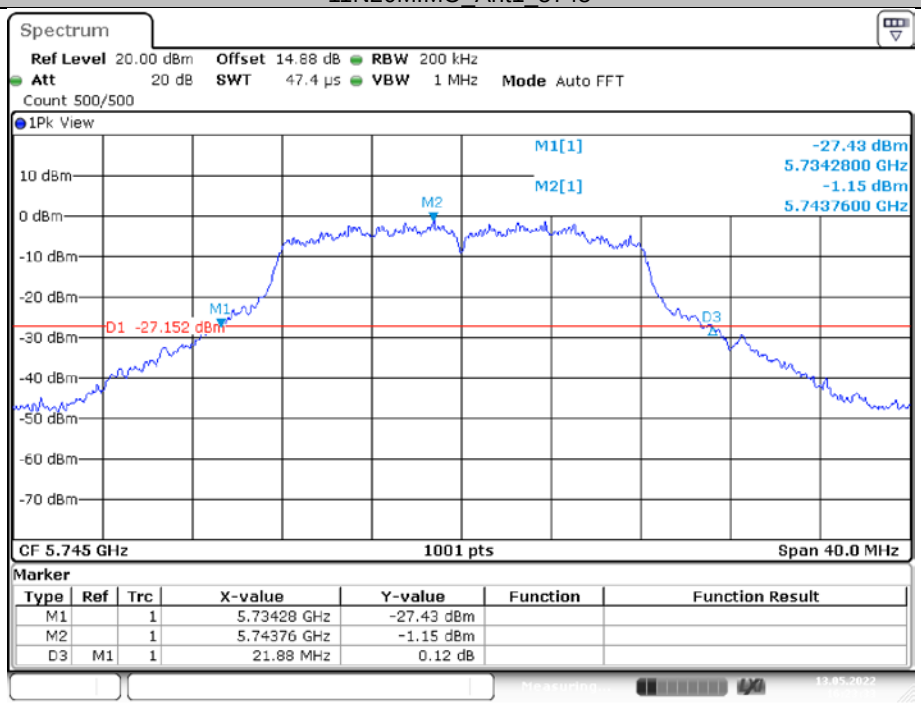

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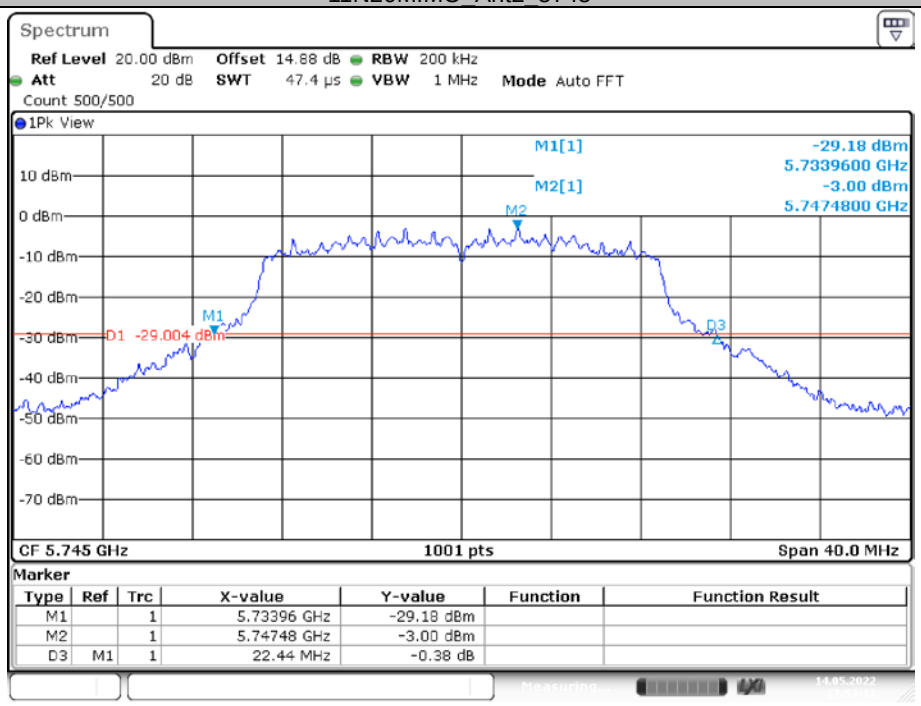

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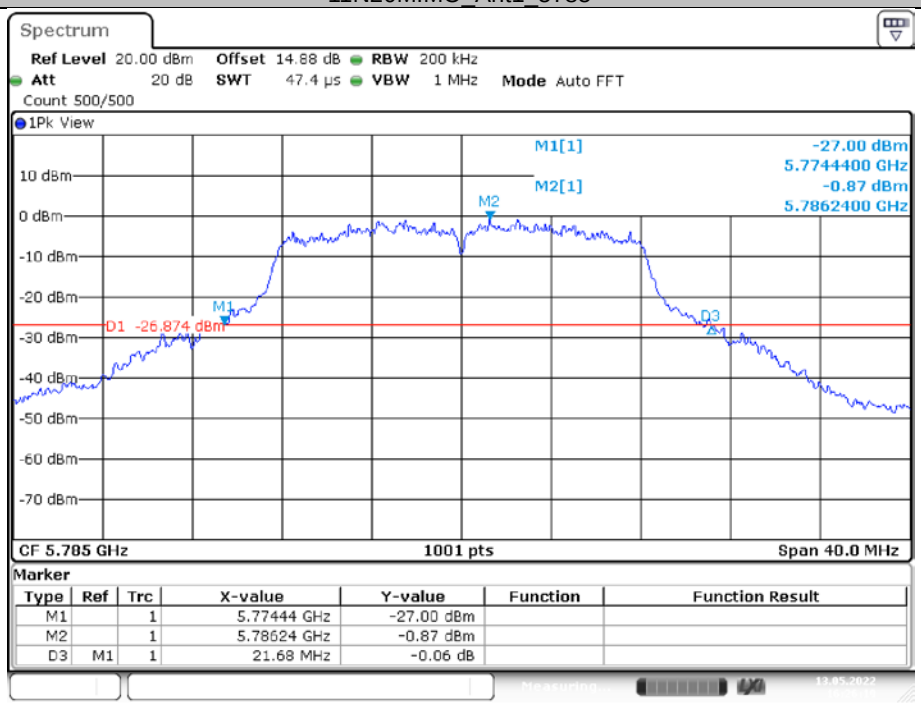

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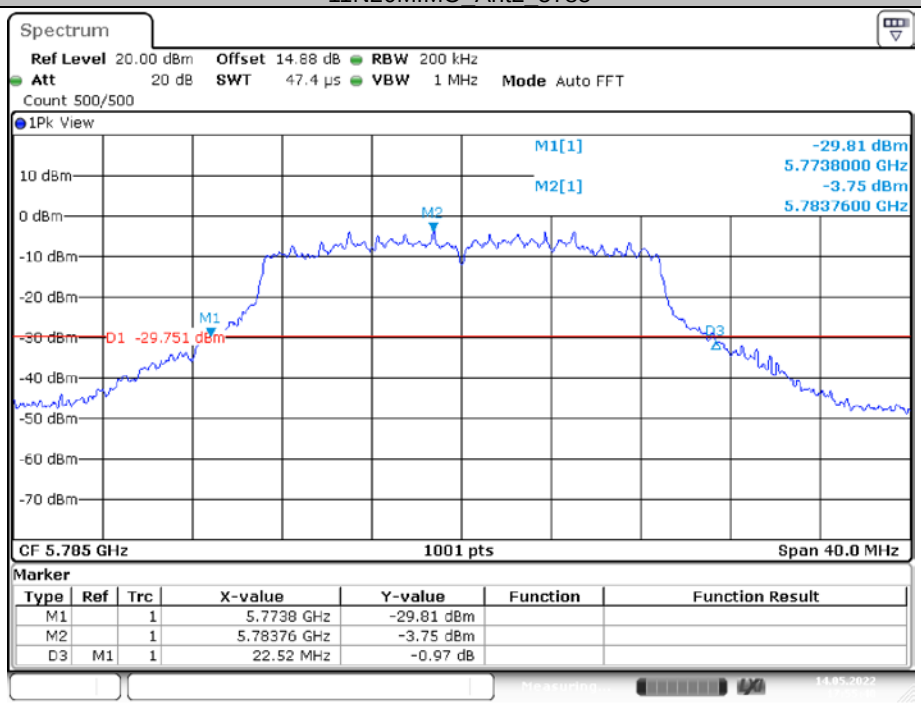

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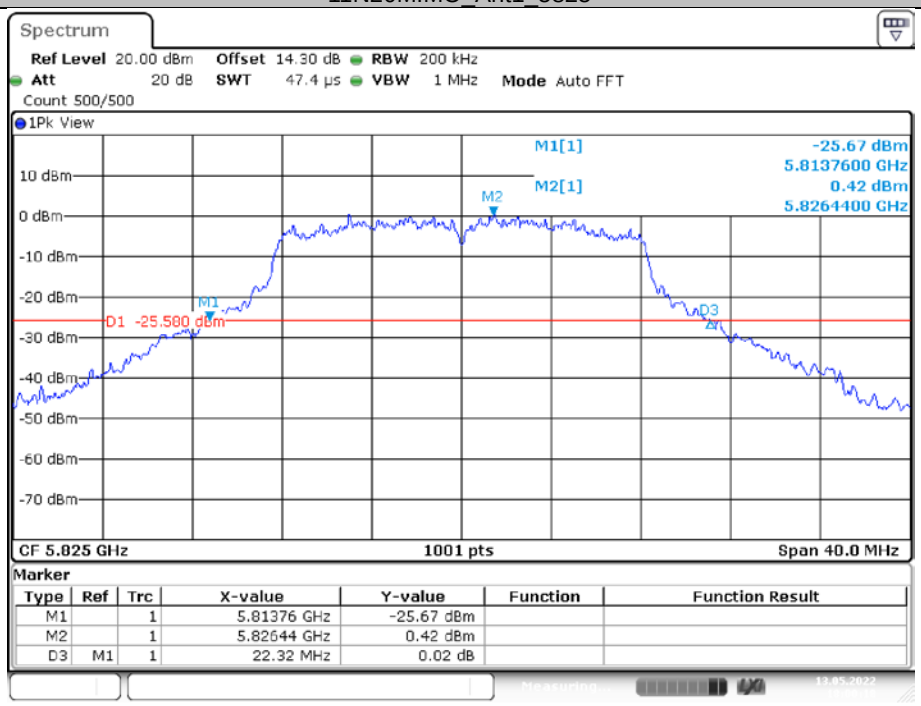

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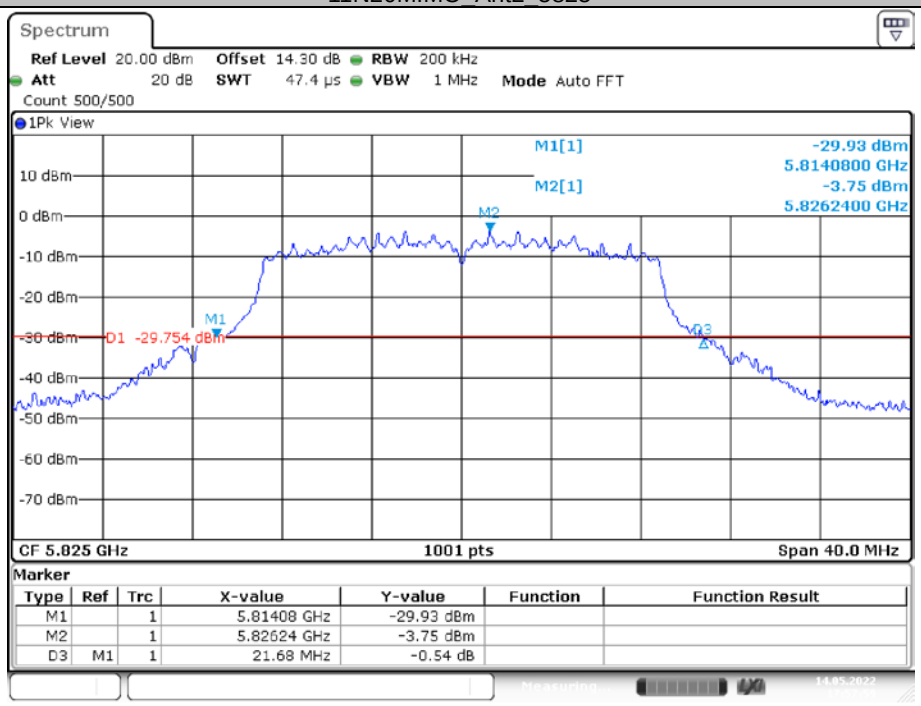

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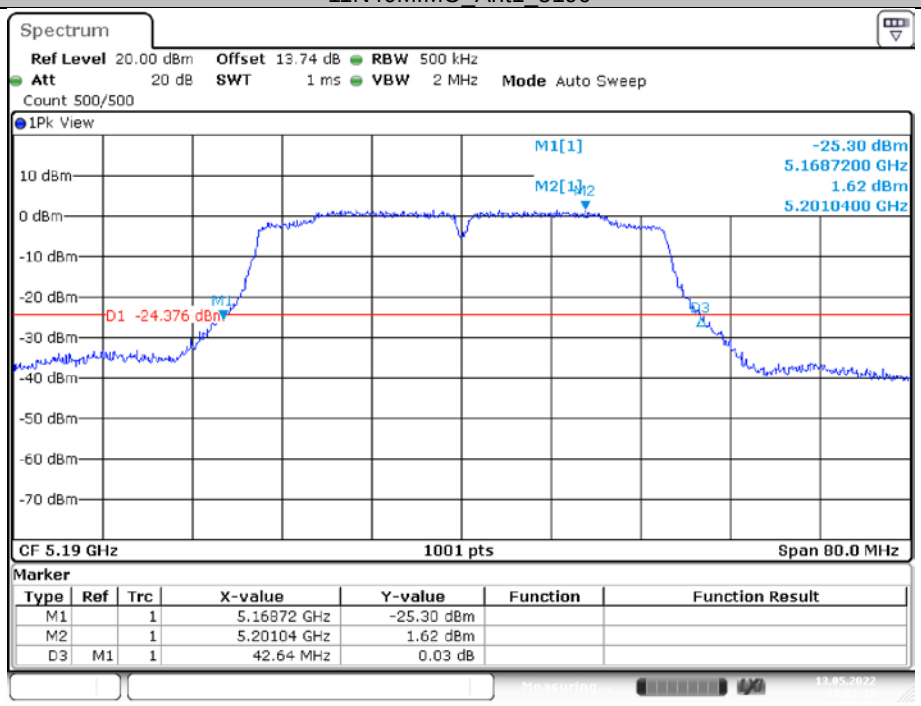

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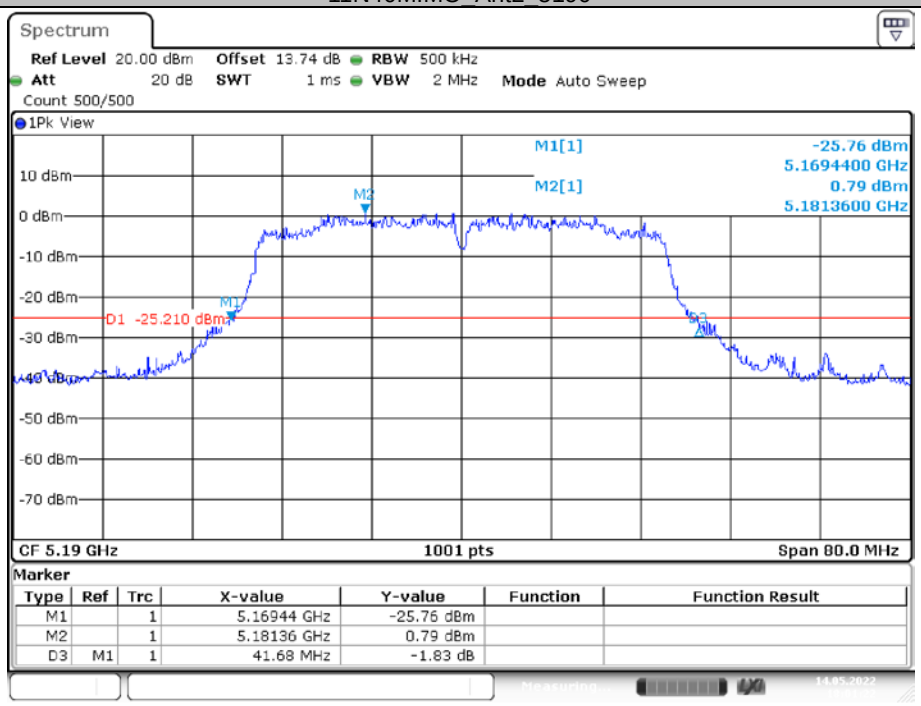

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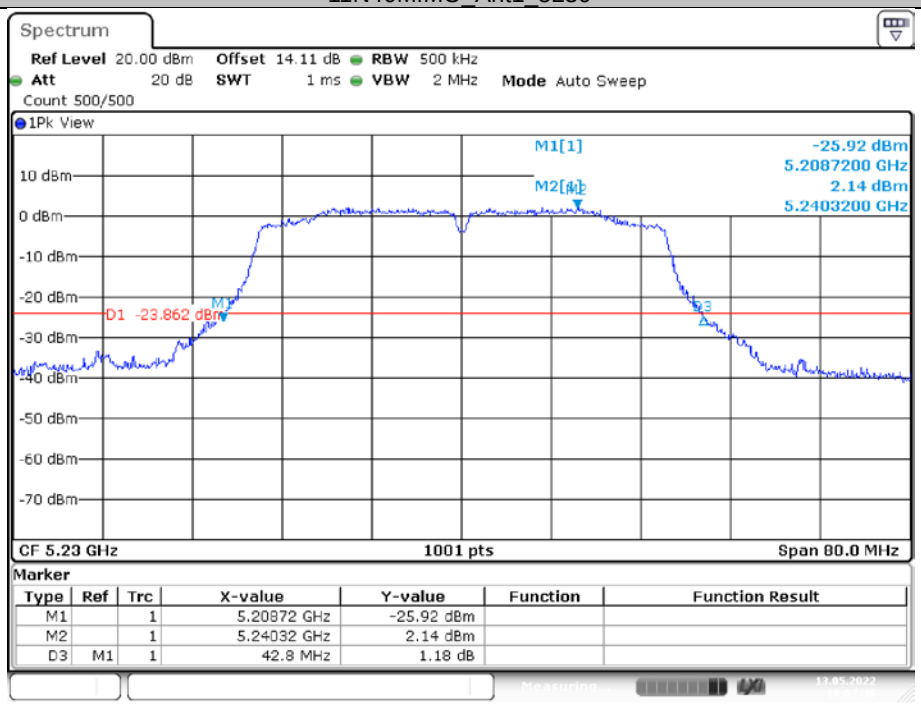

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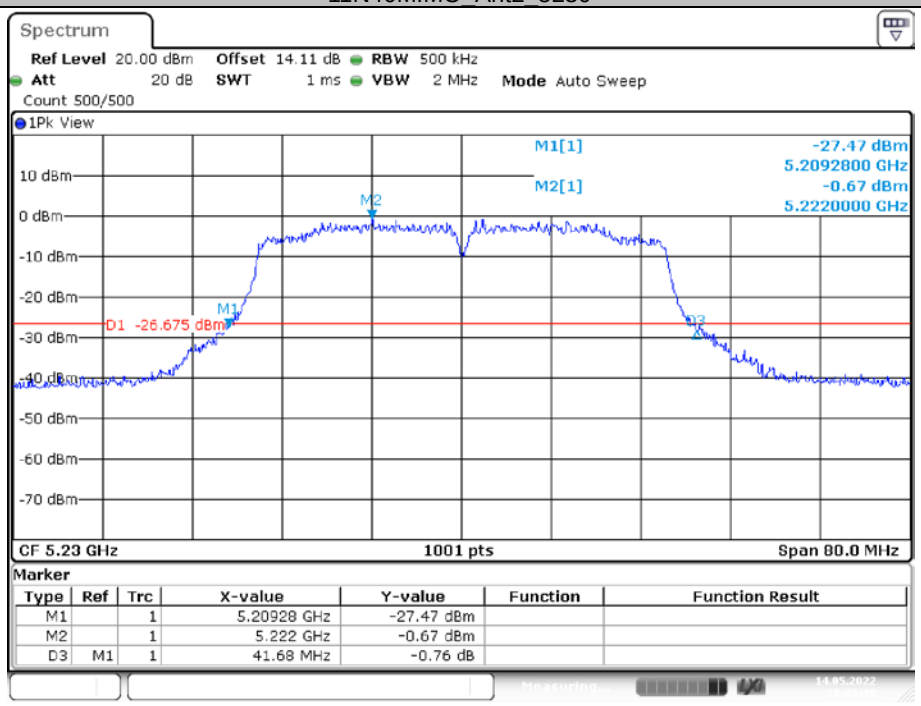

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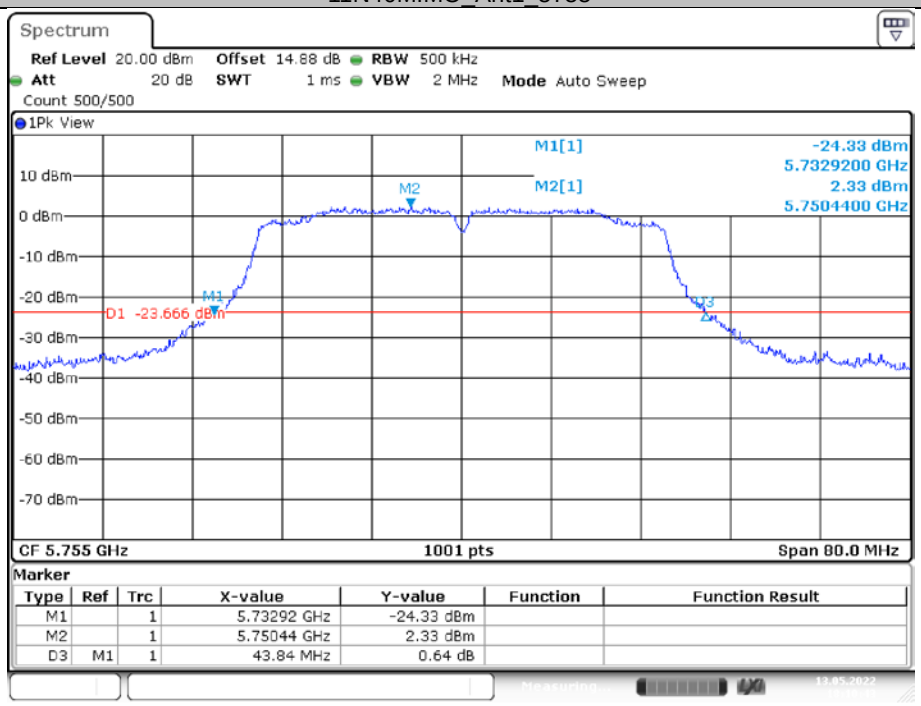

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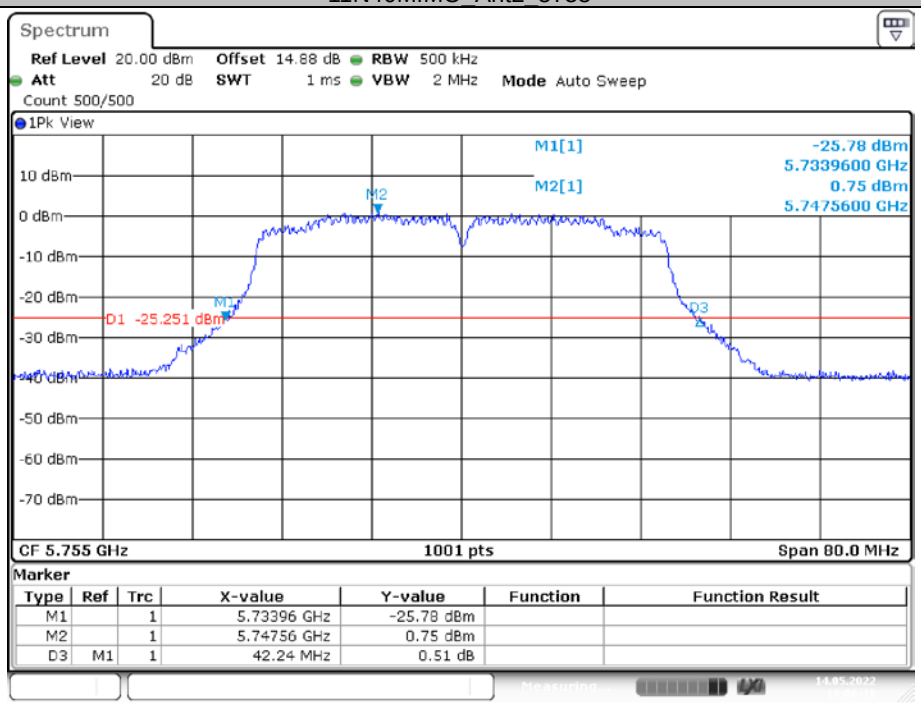

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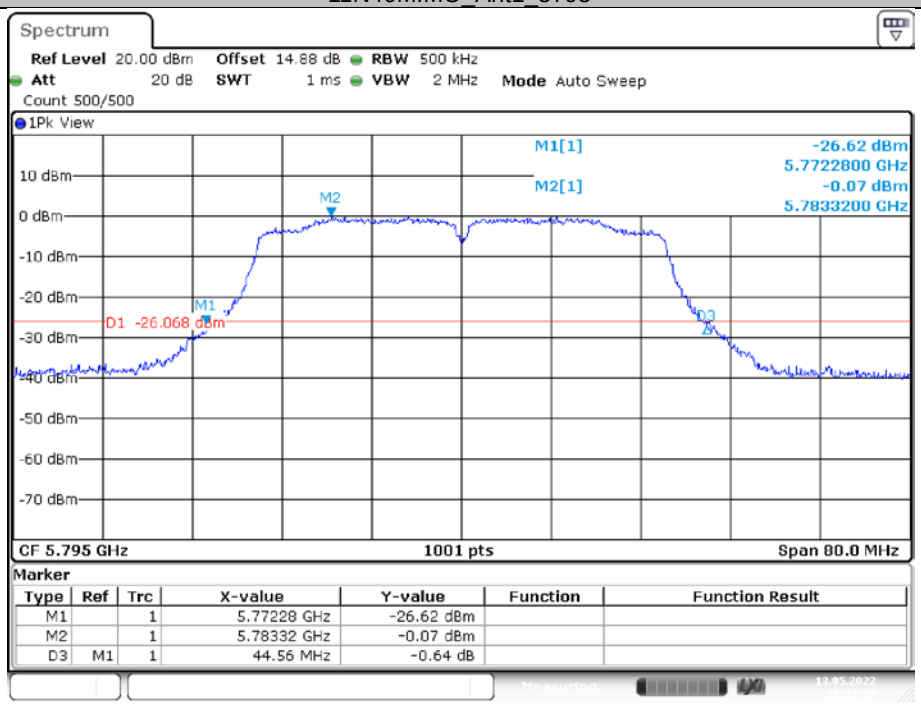

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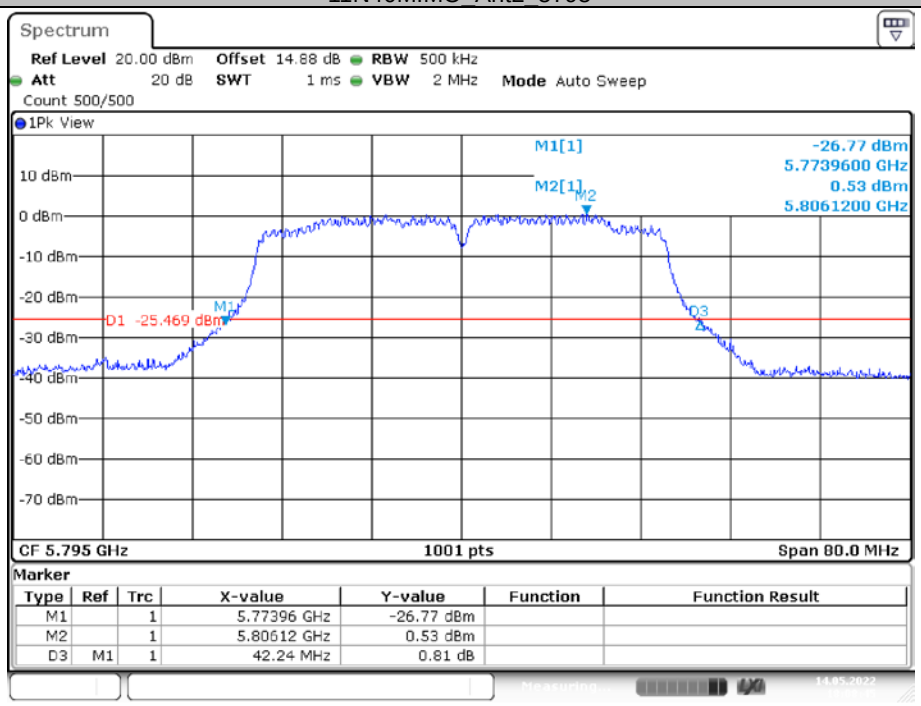

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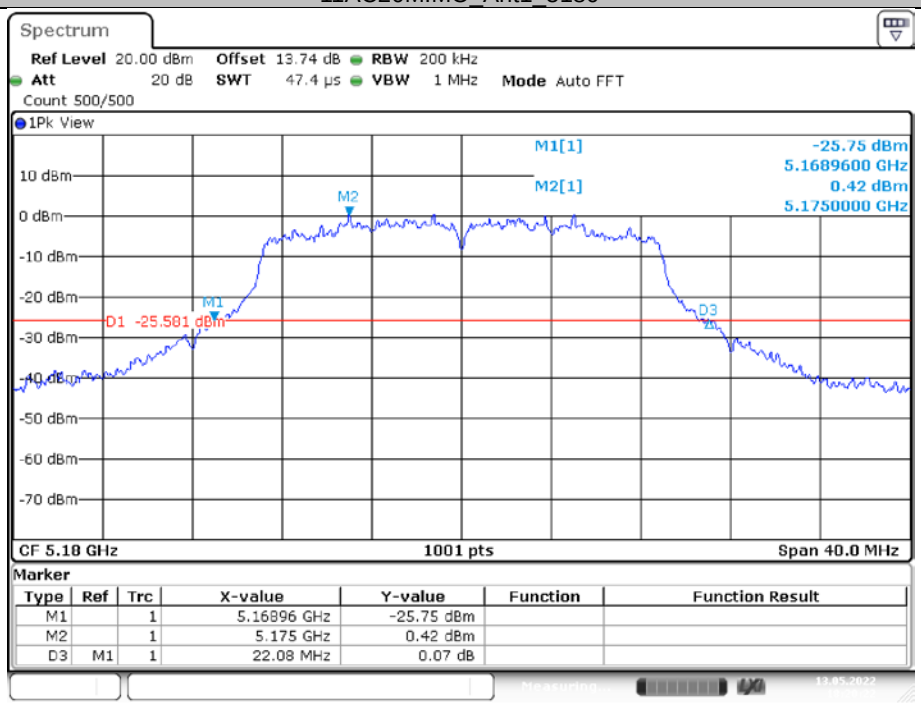

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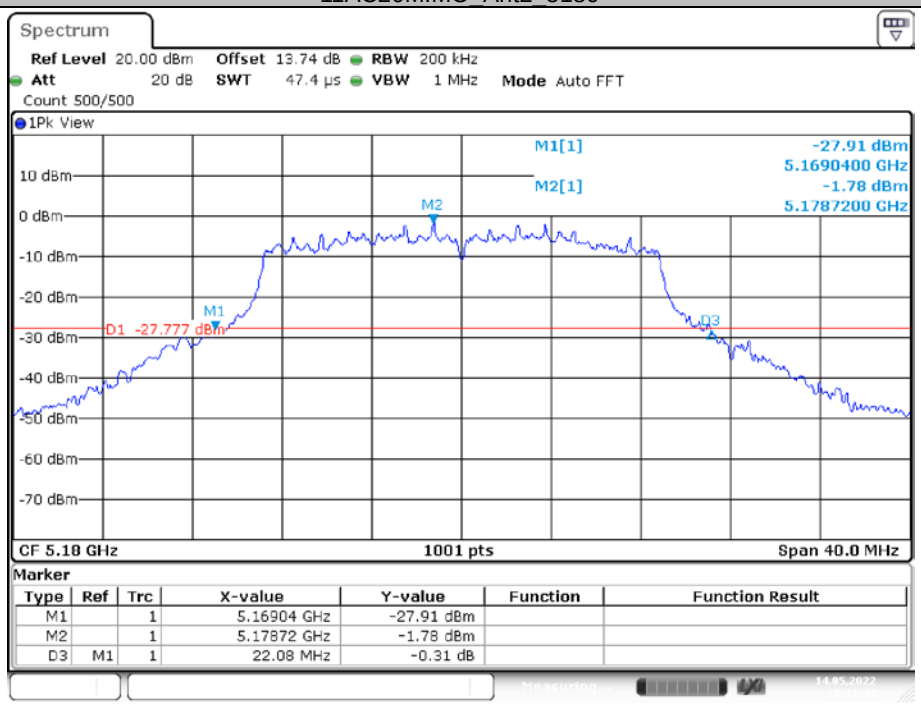

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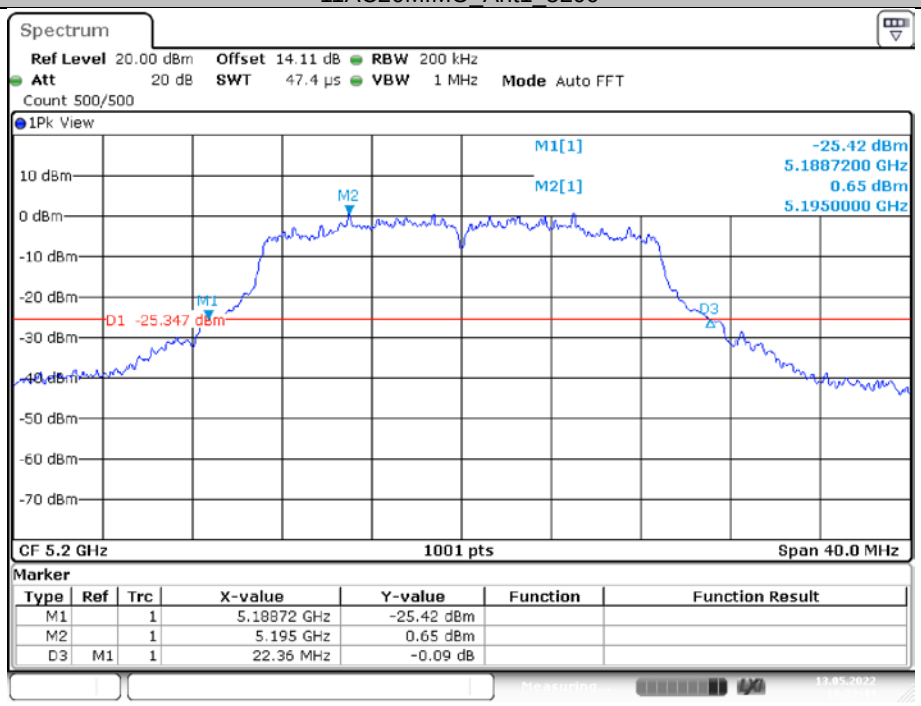

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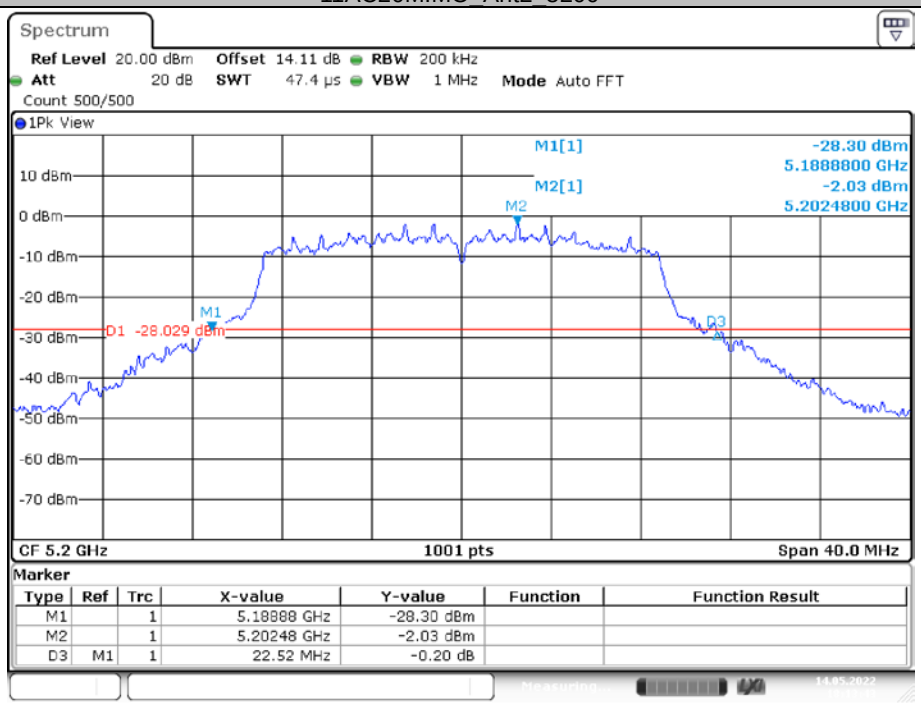

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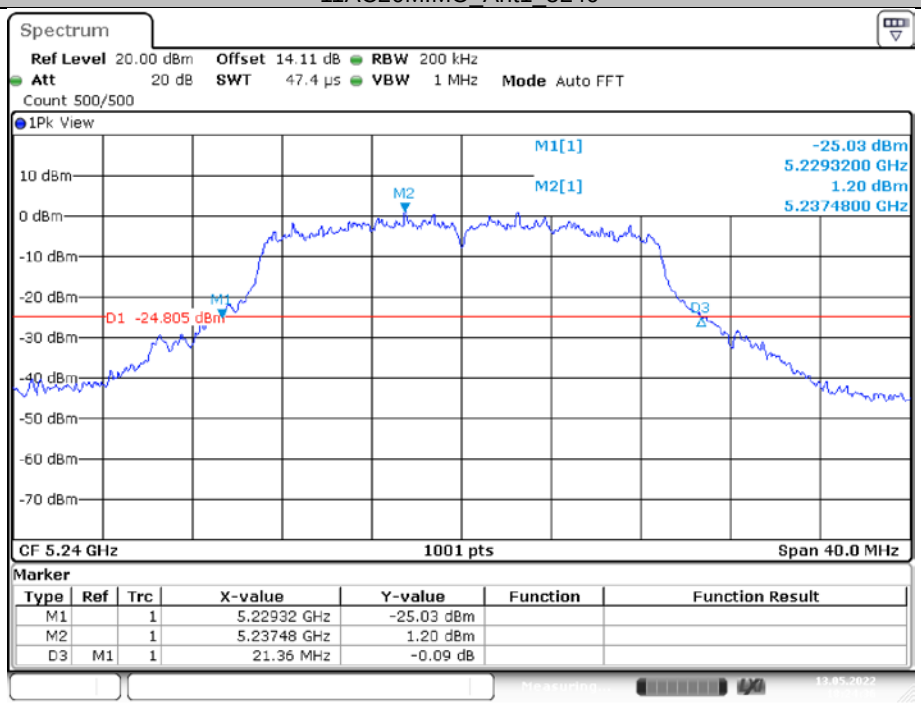

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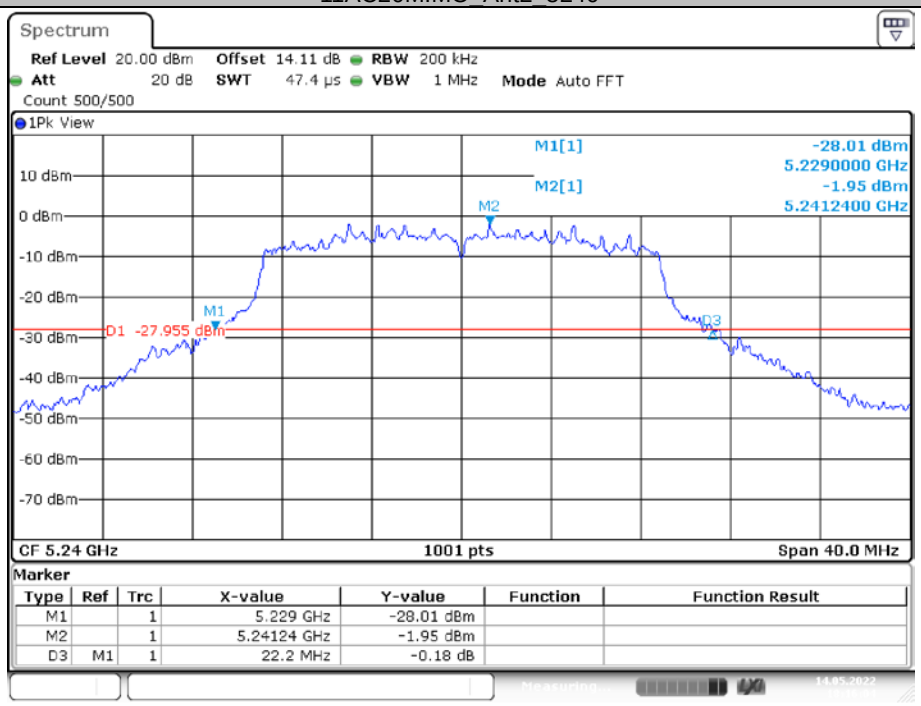

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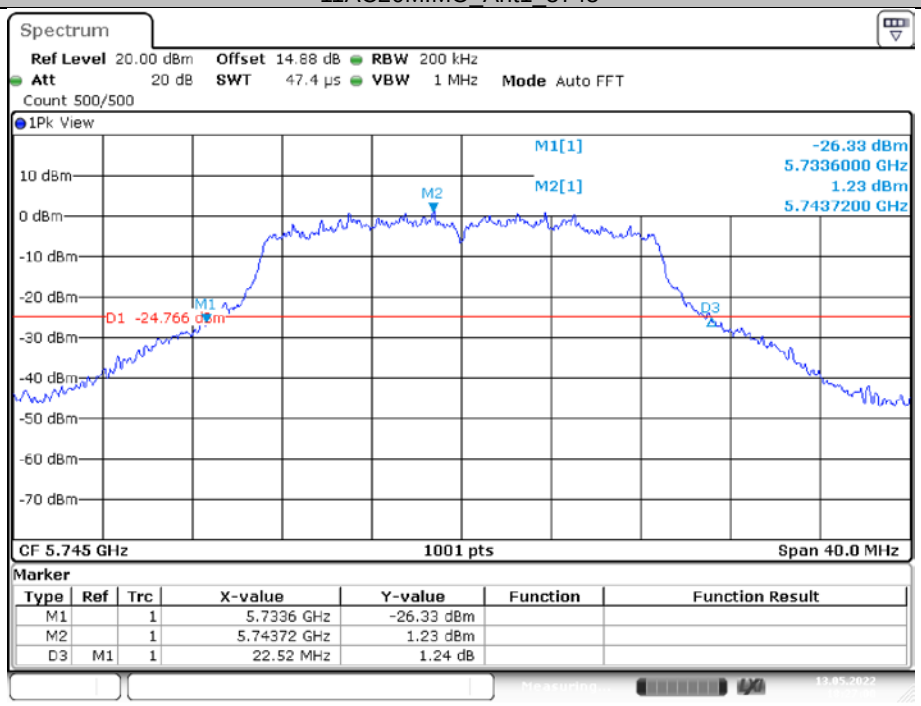

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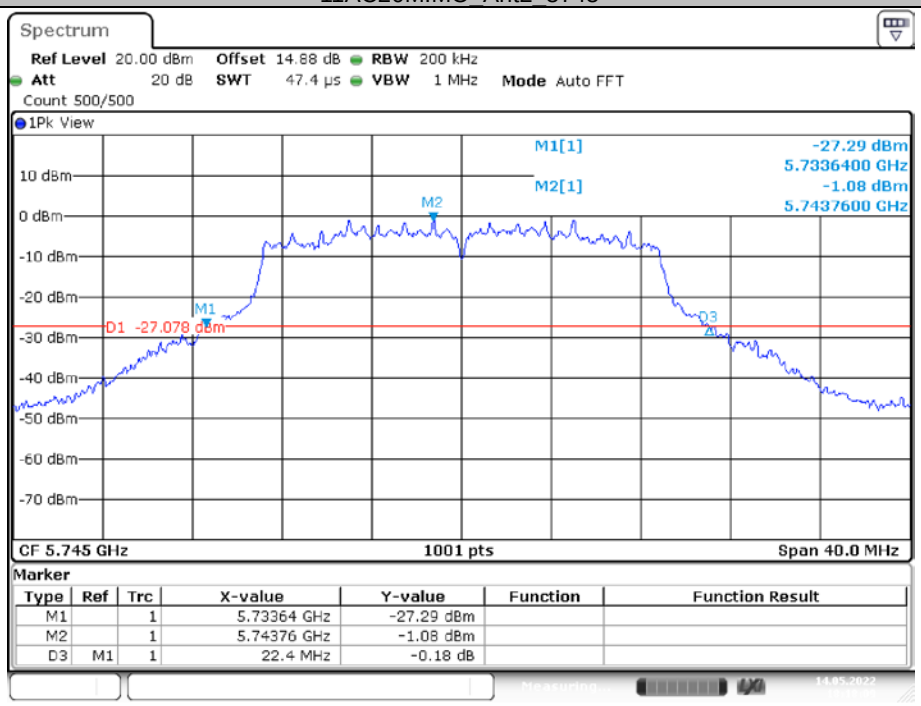

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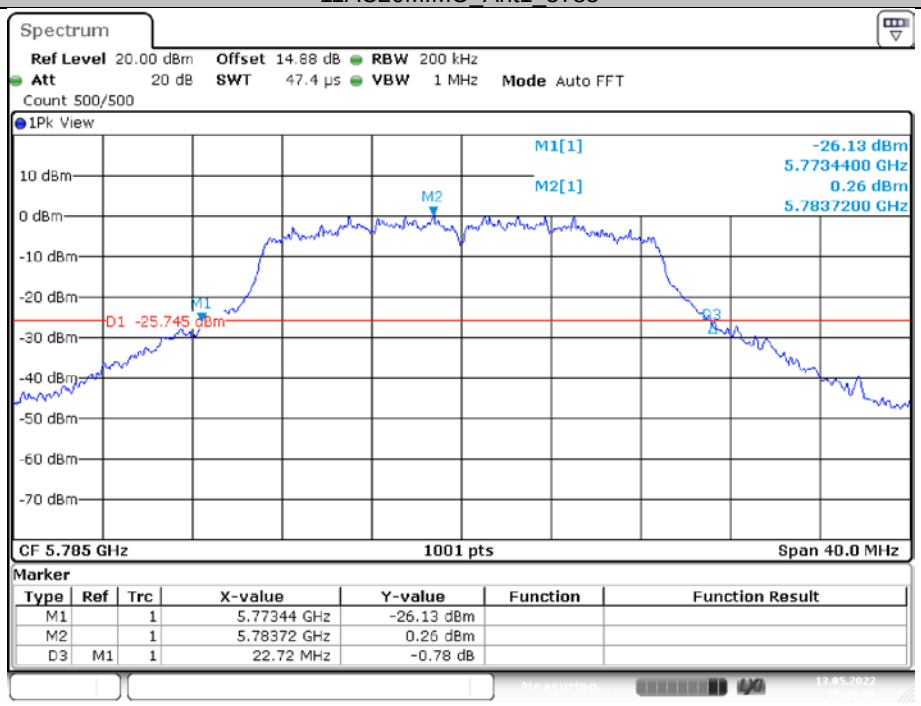

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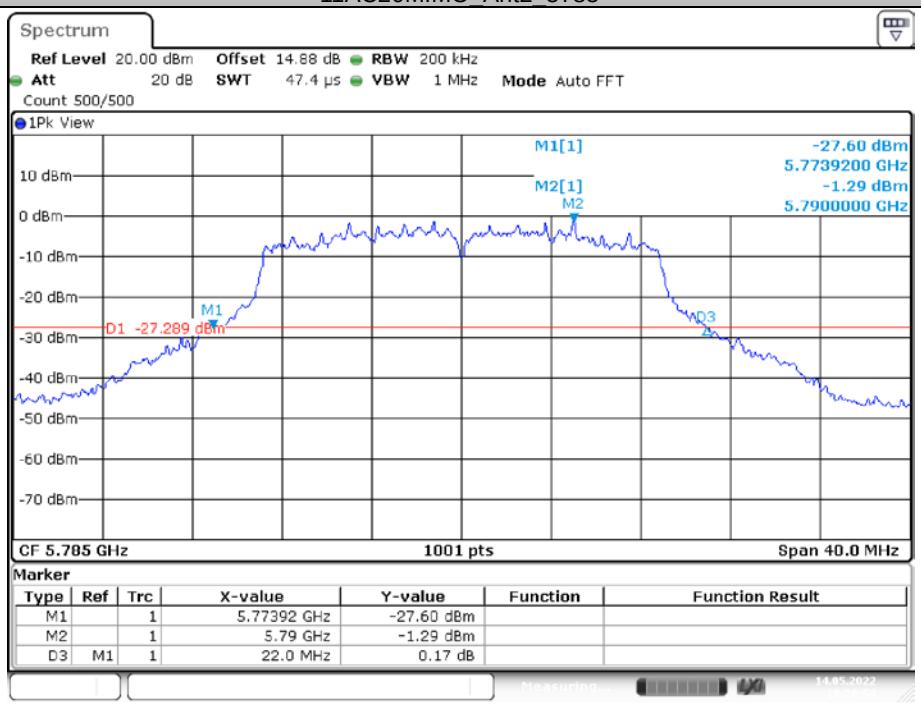

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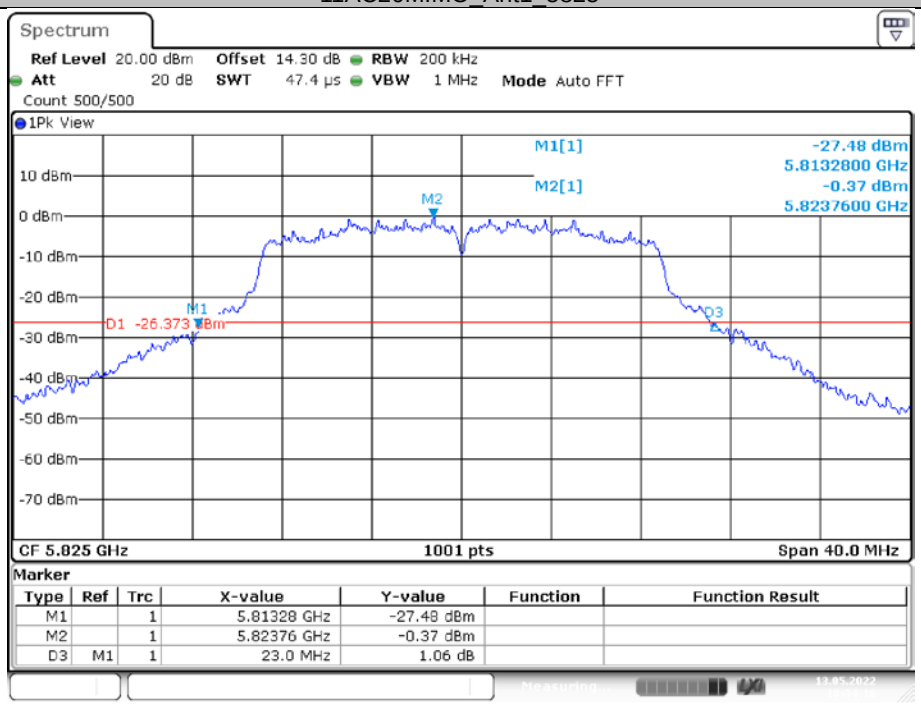

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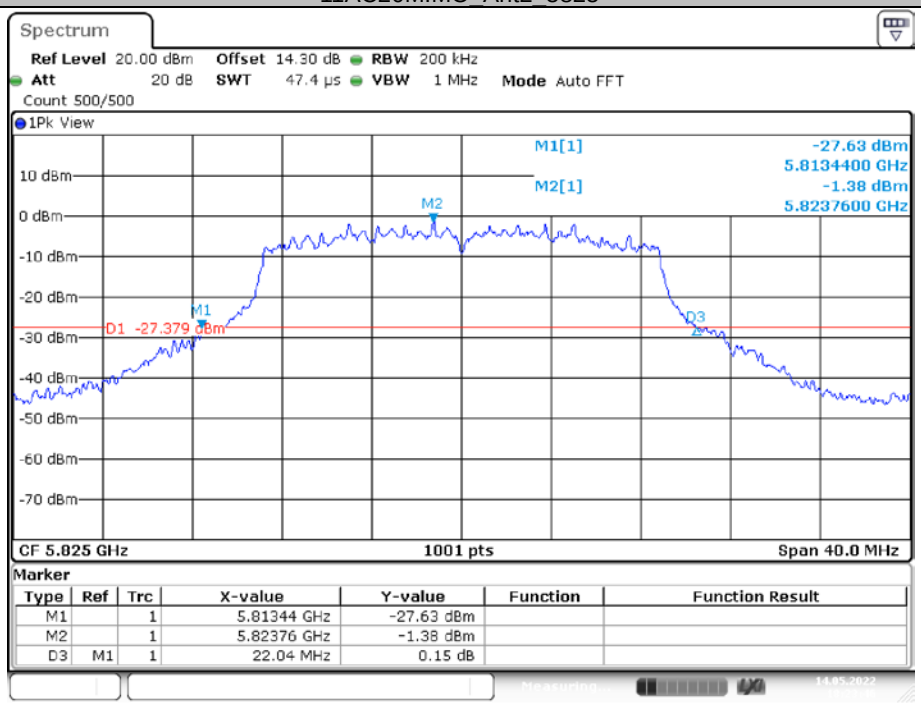

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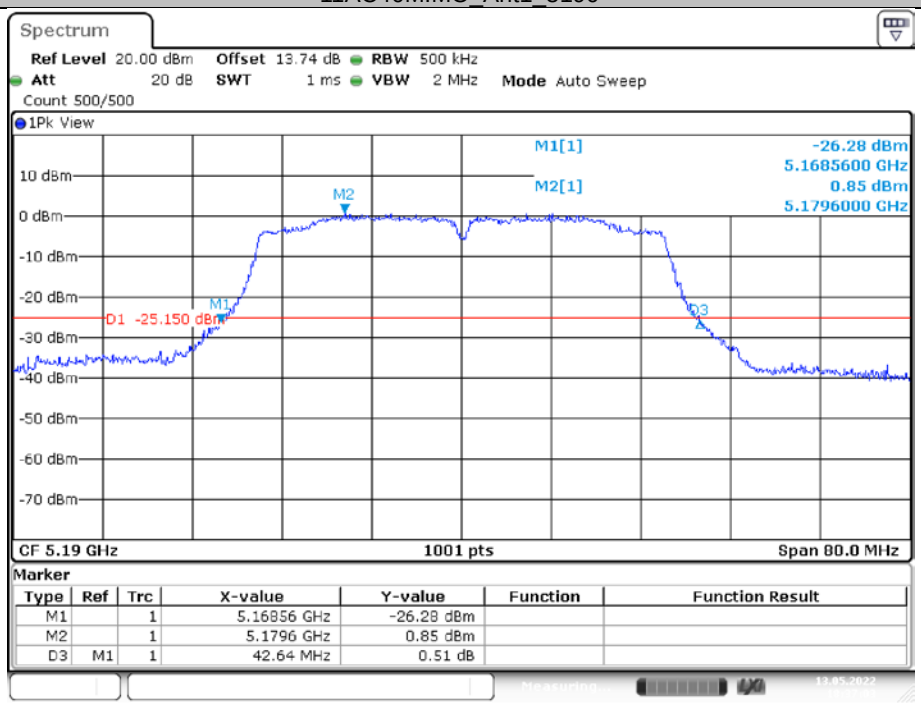

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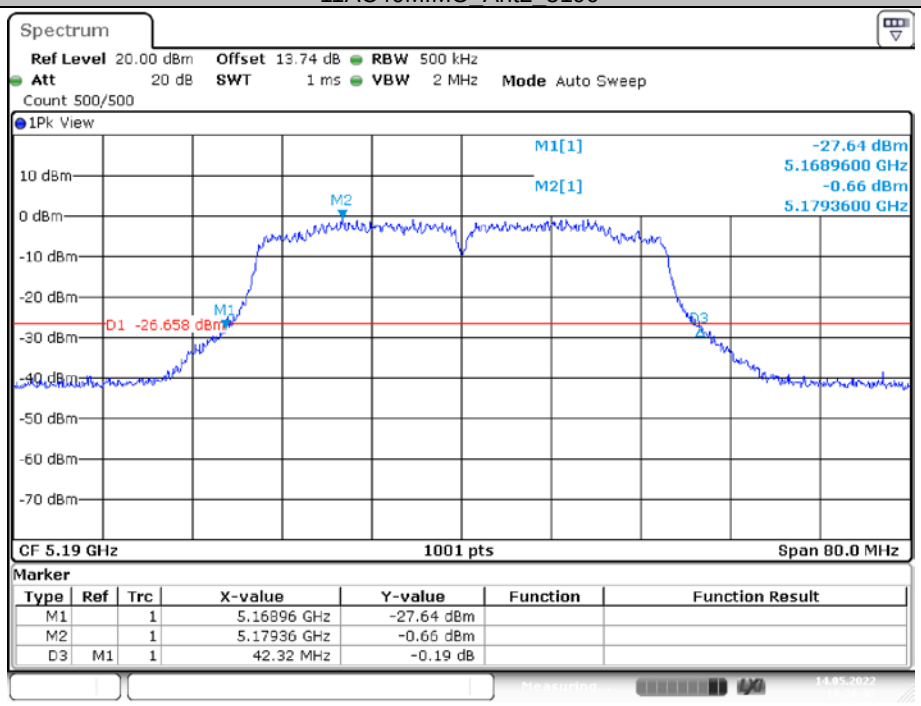

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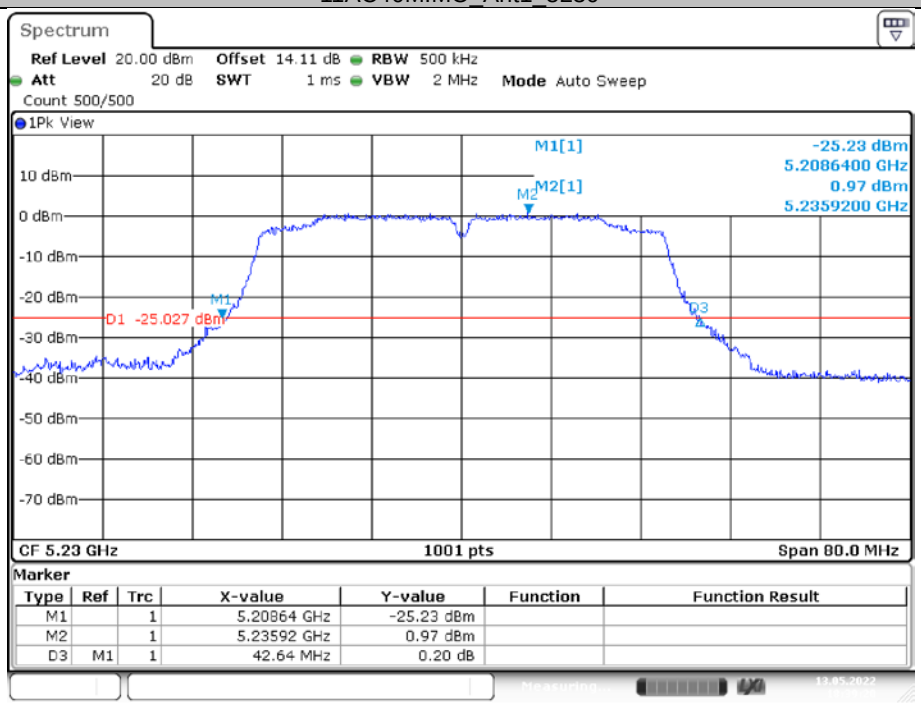

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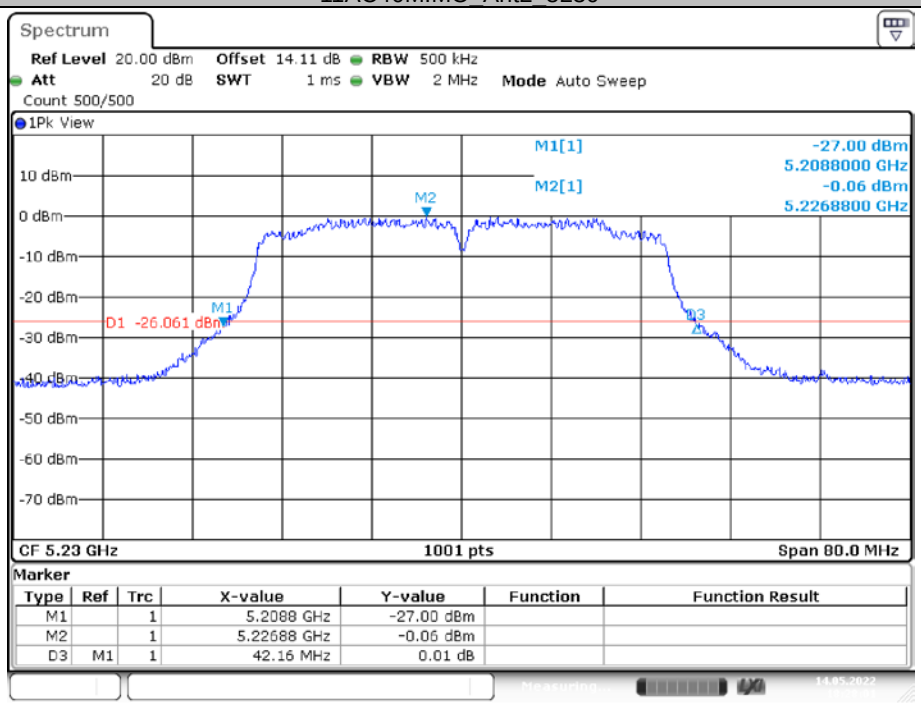

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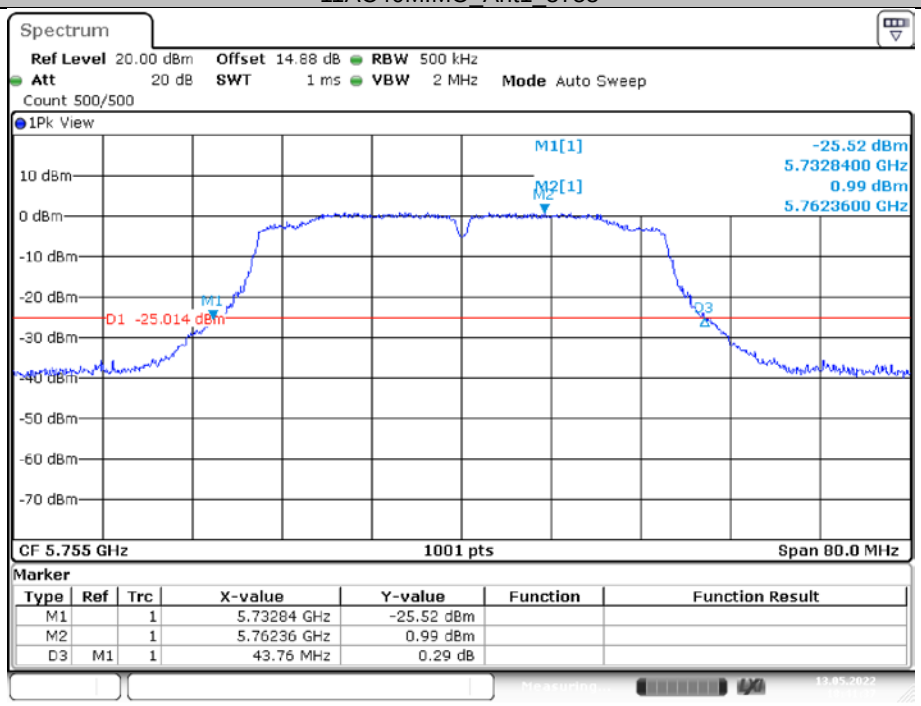

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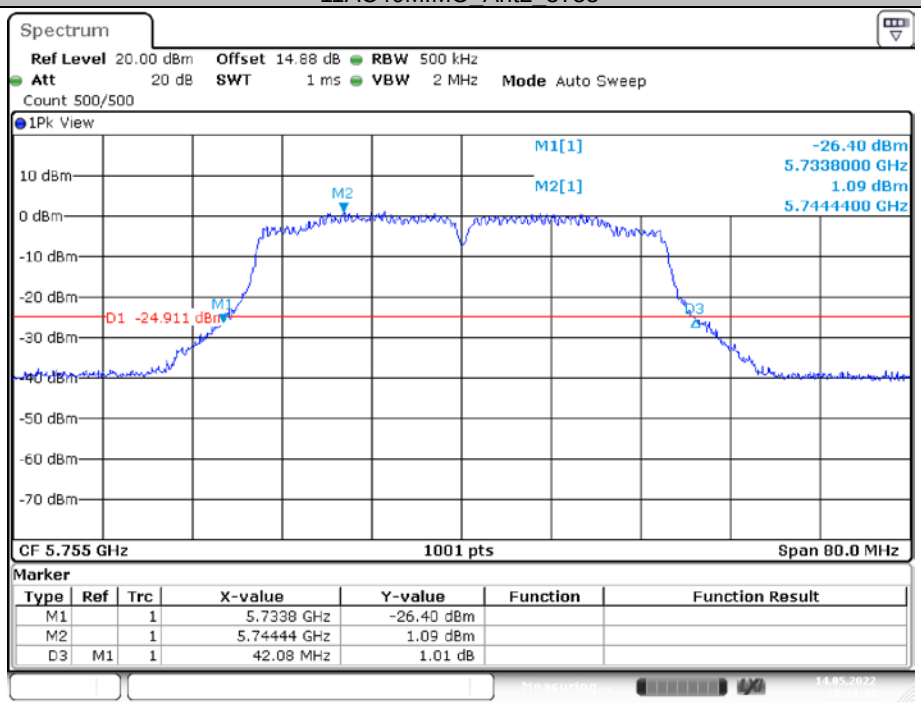

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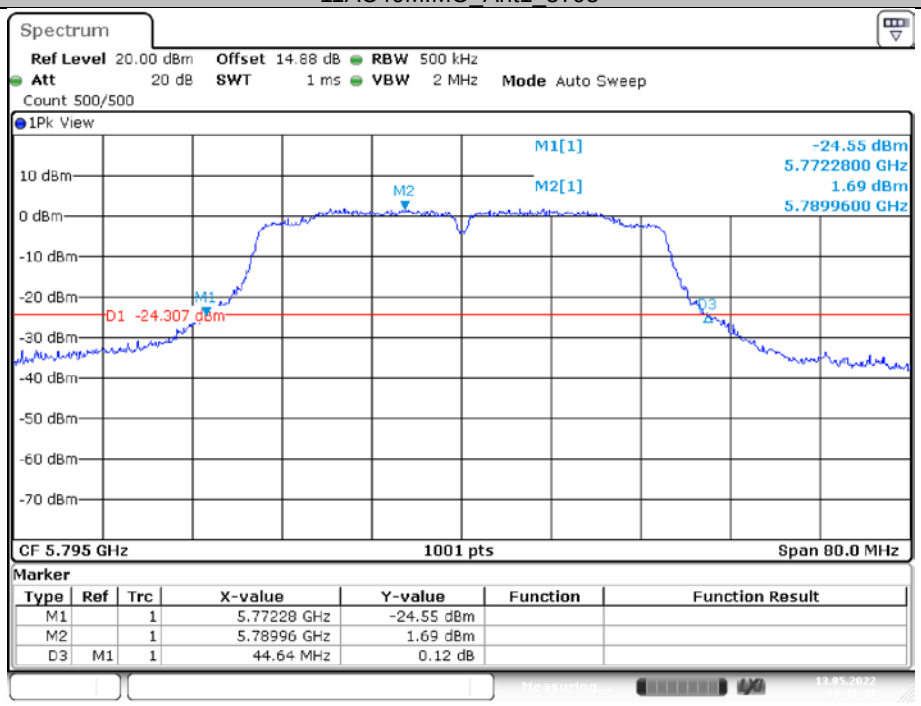

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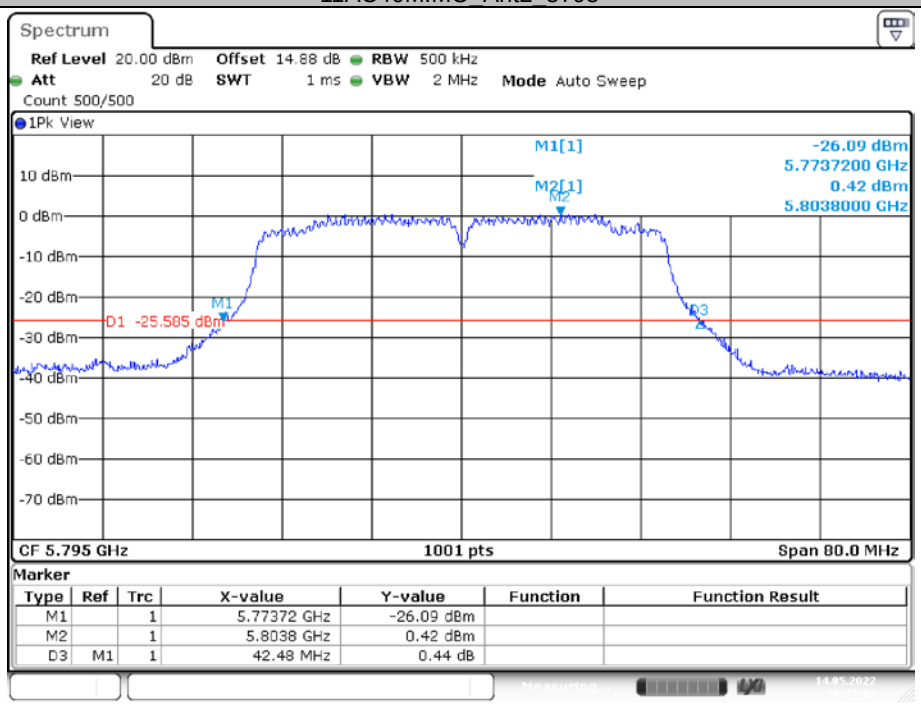

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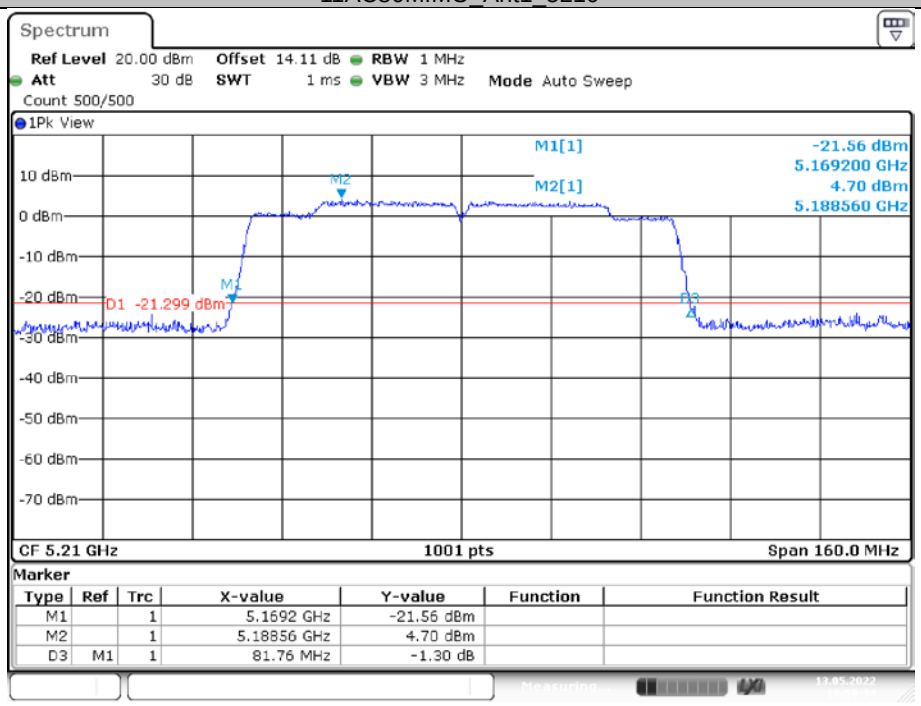

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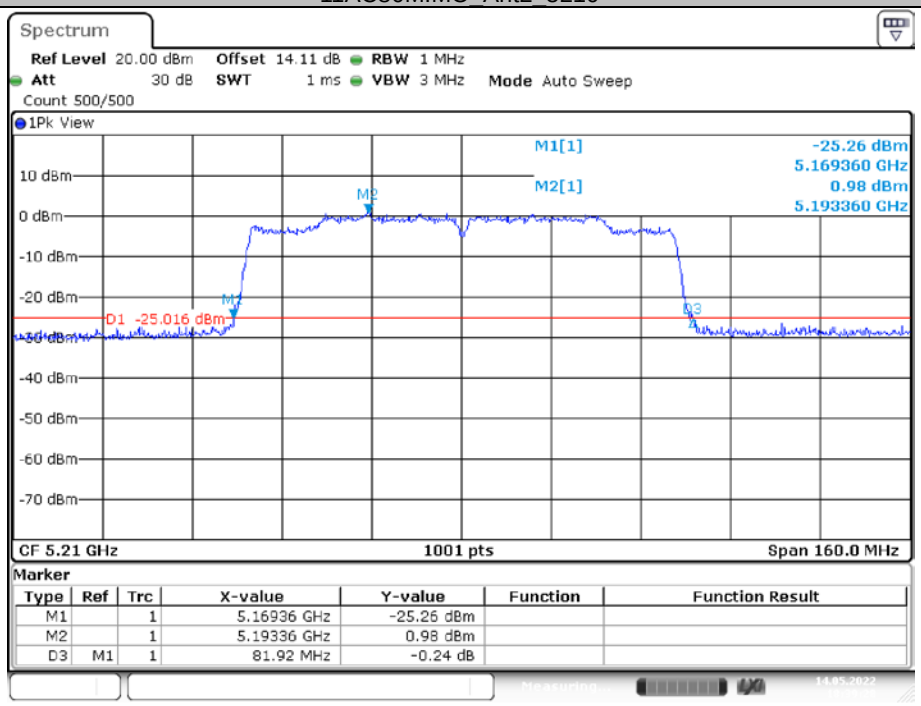

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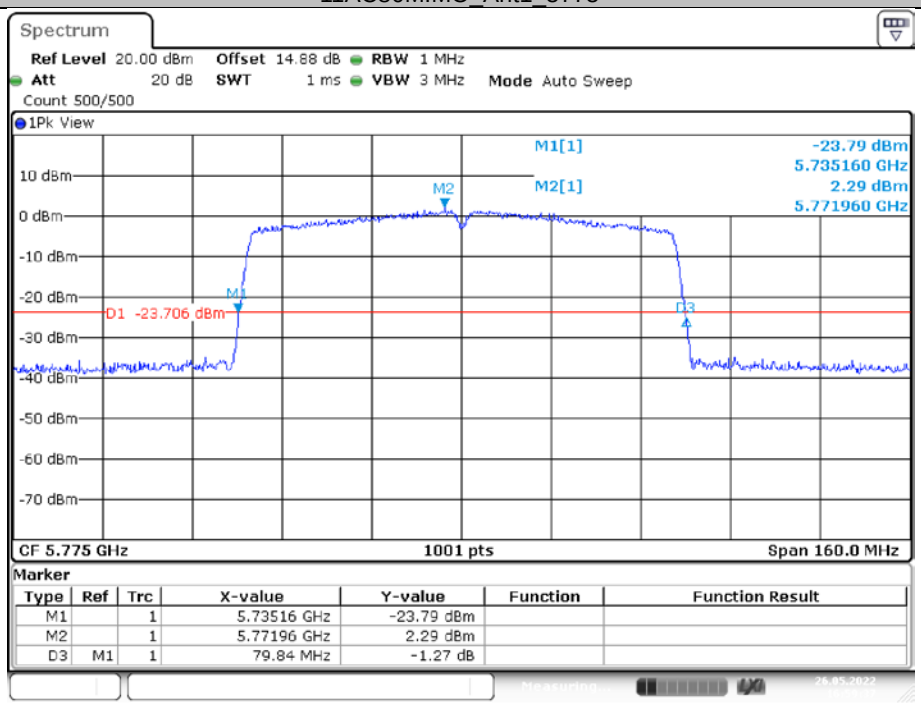

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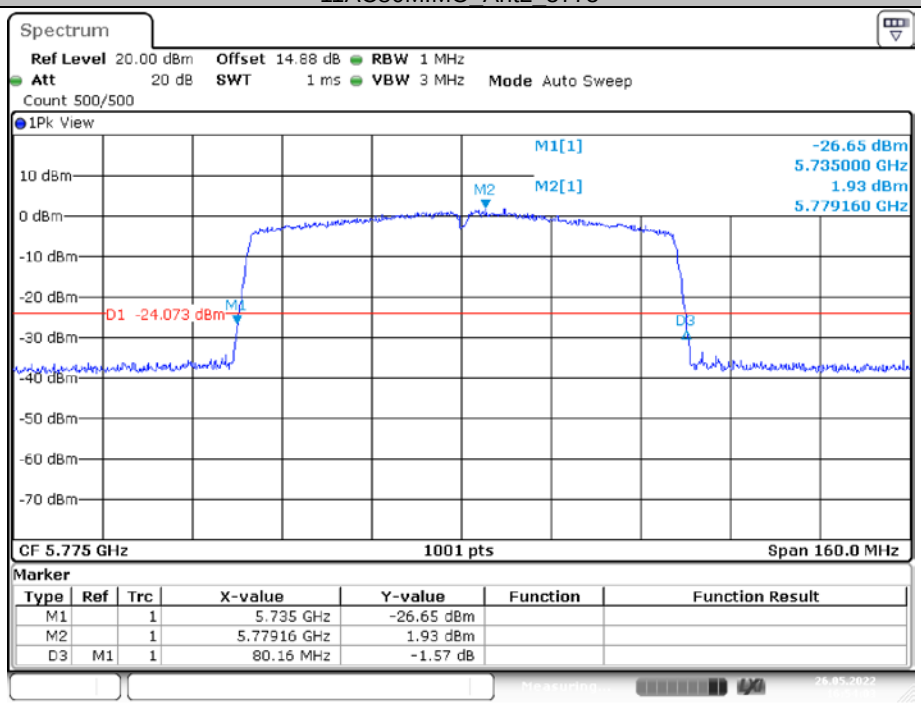

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