TEST REPORT

Applicant Name :	Zhongshan Yueguang Intelligent Imaging Technology Co., Ltd.
Address :	Zone C, R 306, #7, Zhangqi Technology Business Incubator, No. 70, Zhongshan City, China
Report Number :	SZNS1220815-37135E-RF
FCC ID:	2A8ZSU100IGB

Test Standard (s)

FCC PART 15.407

Sample Description

Product:	U100 Remote Camera Assistant
Tested Model:	H0001
Trade Name:	UELERET
Date Received:	2022-08-15
Date of Test	2022-10-13 TO 2022-11-24
Report Date:	2022-11-29

Test Result:	PASS*

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

Prepared and Checked By:

Audy.Yu

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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TABLE OF CONTENTS

DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	SZNS1220815-37135E-RF	Original Report	2022-11-29

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Product	U100 Remote Camera Assistant
Tested Model	H0001
Frequency Range	5G Wi-Fi: 5150-5250 MHz; 5725-5850 MHz (802.11a/ n20)
Maximum Average Conducted Output Power	5150-5250 MHz 14.25dBm (802.11a), 14.65dBm(802.11n20) 5725-5850 MHz 25.10dBm (802.11a), 25.21dBm(802.11n20)
Modulation Technique	OFDM
Antenna Specification*	Band1/ Band4: 1.63dBi (provided by the applicant)
Voltage Range	DC 25.9V from battery
Sample number	SZNS1220815-37135E-RF-S1 (RF Radiated Test) SZNS1220815-37135E-RF-S2 (RF Conducted Test) (Assigned by ATC, Shenzhen)
Sample/EUT Status	Good condition

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, 15.209 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
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 modes, which was declared by manufacturer.

For 5150-5250MHz Band, 4 channels are provided to testing:

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

For 802.11a, 802.11n20, channel 36, 40, 48 were tested;

For 5725-5850MHz Band, 5 channels are provided to testing:

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

For 802.11a, 802.11n20, Channel 149, 157, 165 were tested;

EUT Exercise Software

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

Frequency Range	Mode	Date rate	Power Level*
5150 - 5250 MHz	802.11a	6Mbps	12.5
	802.11n20	MCS0	12.5
5725 - 5850 MHz	802.11a	6Mbps	27
	802.11n20	MCS0	27

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 for 802.11a, 802.11n20 modes. Per pretest the SISO and MIMO modes, and the worst case recorded in this report for MIMO mode. All the antenna ports have the same power level for MIMO modes.

Duty cycle

Please refer to the Appendix.

Equipment Modifications

No modification was made to the EUT tested.

Support Equipment List and Details

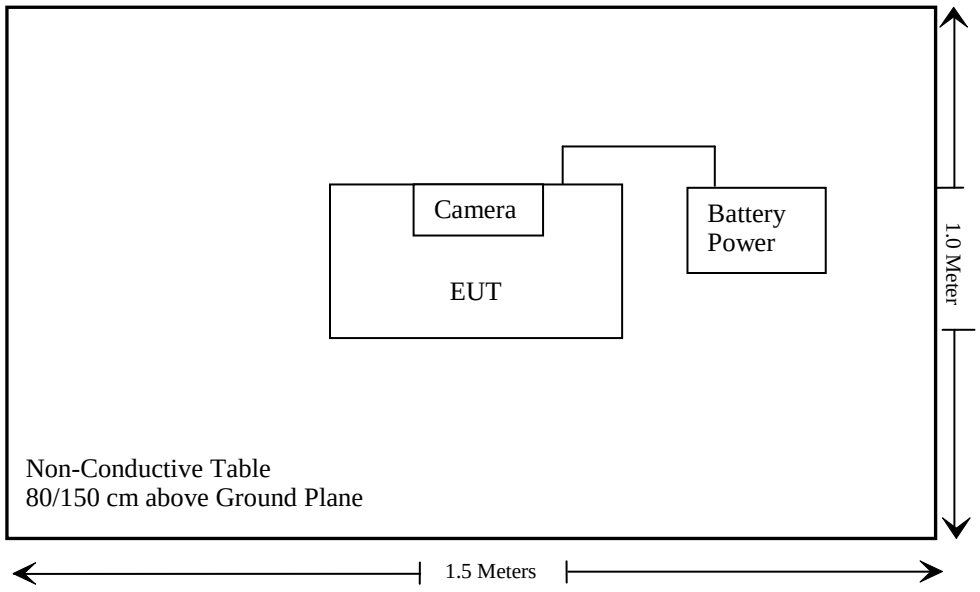
Manufacturer	Description	Model	Serial Number
Canon	Camera	R6	124024000526

External I/O Cable

Cable Description	Length (m)	From/Port	To
Un-shielding Detachable USB Cable	0.5	EUT	Camera
Unshielded detachable Camera shutter cable	0.8	EUT	Camera
shielding Detachable HDMI Cable	1.0	EUT	Camera
Unshielded detachable Camera power interface cable	0.7	EUT	Camera
Unshielded detachable network cable	0.7	EUT	EUT Camera
shielded detachable Gimbal power interface cable	2.0	EUT	Battery Power
shielding Un-detachable Auxiliary Targeting Viewfinder Pitch Adjuster Power cable	0.7	EUT	Viewfinder
shielding Un-detachable Lens zoom controller power cable	0.6	EUT	Lens zoom controller

Block Diagram of Test Setup

For Radiated Emission:



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§1.1307 (b)	RF Exposure	Compliant
§15.203	Antenna Requirement	Compliant
§15.407(b)(8) & §15.207(a)	Conducted Emissions	Not Applicable
§15.205 & §15.209 & §15.407(b) (1), (4), (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

Not Applicable--The device is powered by battery when in use.

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
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	2022/11/08	2023/11/07
Quinstar	Amplifier	QLW-18405536-J0	15964001002	2022/11/08	2023/11/07
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	Band Reject Filter	BRM-5.15/5.35g-45	075	2021/12/14	2022/12/13
CD	Band Reject Filter	BRM-5.725/5.875G-45	065	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
Unknown	RF Coaxial Cable	No.16	N650	2021/12/14	2022/12/13
Radiated Emission Test Software: e3 19821b(V9)					
RF Conducted Test					
Rohde&Schwarz	Spectrum Analyzer	FSV-40	101495	2021/12/13	2022/12/12
Rohde & Schwarz	Open Switch and ControlUnit	OSP120 + OSP-B157	101244 + 100866	2021/12/13	2022/12/12
Agilent	USB wideband power sensor	U2021XA	MY54250003	2022/6/27	2023/6/26
WEINSCHEL	10dB Attenuator	5324	AU 3842	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.31	RF-01	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 §1.1307 (b) – RF EXPOSURE

Applicable Standard

According to FCC §1.1307(b), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

According to KDB 447498 D04 Interim General RF Exposure Guidance v01, clause 2.1.4 –MPE-Based Exemption:

An alternative to the SAR-based exemption is provided in § 1.1307(b)(3)(i)(C), for a much wider frequency range, from 300 kHz to 100 GHz, applicable for separation distances greater or equal to $\lambda/2\pi$, where λ is the free-space operating wavelength in meters. The MPE-based test exemption condition is in terms of ERP, defined as the product of the maximum antenna gain and the delivered maximum time-averaged power. For this case, a RF source is an RF exempt device if its ERP (watts) is no more than a frequency-dependent value, as detailed tabular form in Appendix B. These limits have been derived based on the basic specifications on Maximum Permissible Exposure (MPE) considered for the FCC rules in § 1.1310(e)(1).

Table to § 1.1307(b)(3)(i)(C) - Single RF Sources Subject to Routine Environmental Evaluation

RF Source frequency (MHz)	Threshold ERP (watts)
0.3-1.34	1,920 R^2.
1.34-30	3,450 R^2/f^2.
30-300	3.83 R^2.
300-1,500	0.0128 R^2f.
1,500-100,000	19.2R^2.

f = frequency in MHz;
R = minimum separation distance from the body of a nearby person (appropriate units, e.g., m);

Test result

For worst case:

Mode	Frequency Range (MHz)	Tune-up Output Power		Antenna Gain		ERP		Evaluation Distance (cm)	MPE-Based Exemption Threshold (W)
		(dBm)	(mW)	(dBi)	(dBd)	(dBm)	(W)		
5G Wi-Fi	5150-5250	15	31.62	1.63	-0.52	14.48	0.028	20	0.768
5G Wi-Fi	5725-5850	25.5	354.81	1.63	-0.52	24.98	0.315	20	0.768

Note 1: The tune-up power was declared by the applicant.
Note 2: 0dBd=2.15dBi.

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.
c. 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 Antennas arrangement for 5G Wi-Fi, which was used a unique connector and the antenna gain is 1.63dBi, fulfill the requirement of this section. Please refer to the EUT photos.

Result: Compliant.

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

Applicable Standard

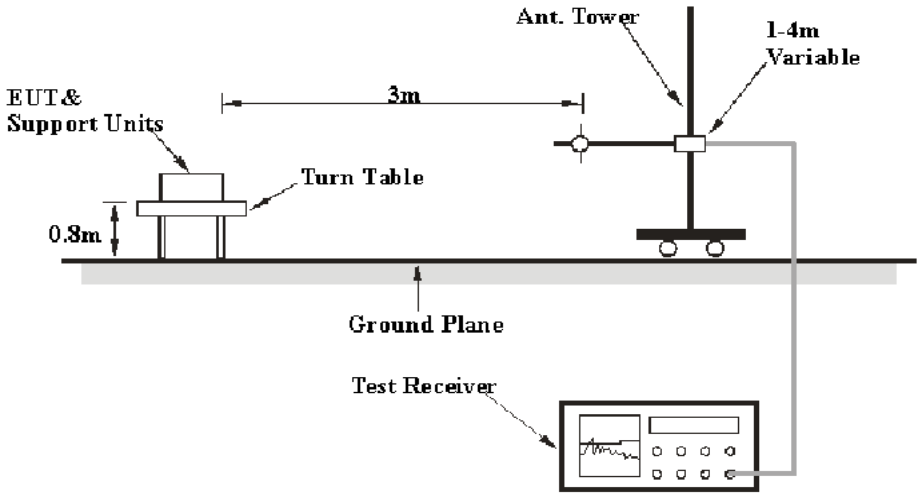
FCC §15.407 (b) (1), (4), (7), (8), (9), (10); §15.209; §15.205;

(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.

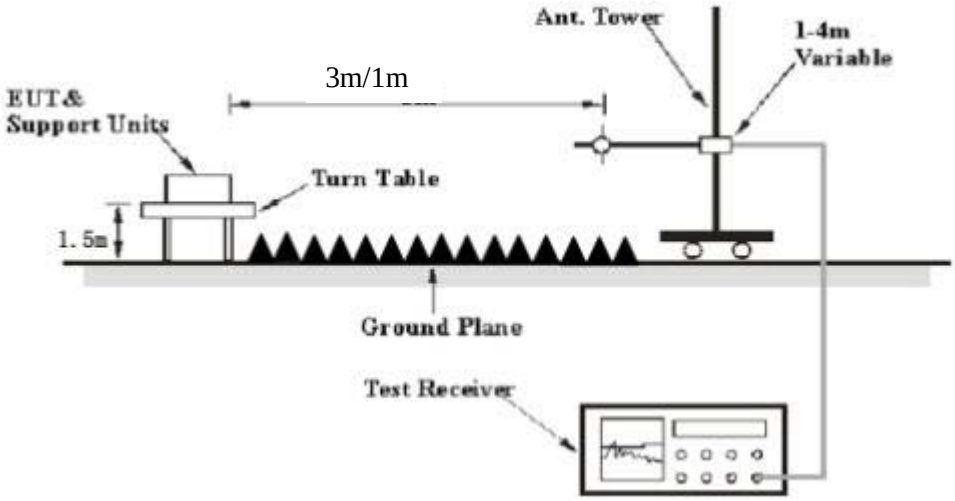
Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209.

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.

Data was recorded in Quasi-peak detection mode for frequency range of 30 MHz-1 GHz, peak and Average detection modes for frequencies above 1 GHz.

According to ANSI C63.10-2013,9.4: For field strength measurements made at other than the distance at which the applicable limit is specified,extrapolate the measured field strength to the field strength at the distance specified by the limit using an inverse distance correction factor (20 dB/decade of distance). In some cases, a different distance correction factor may be required;

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

where

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

So the extrapolation factor of 1m is 20*log(1/3)= -9.5 dB, for 18-40GHz range, the limit of 1m distance was added by 9.5dB from limit of 3m to compared with the result measurement at 1m distance.

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

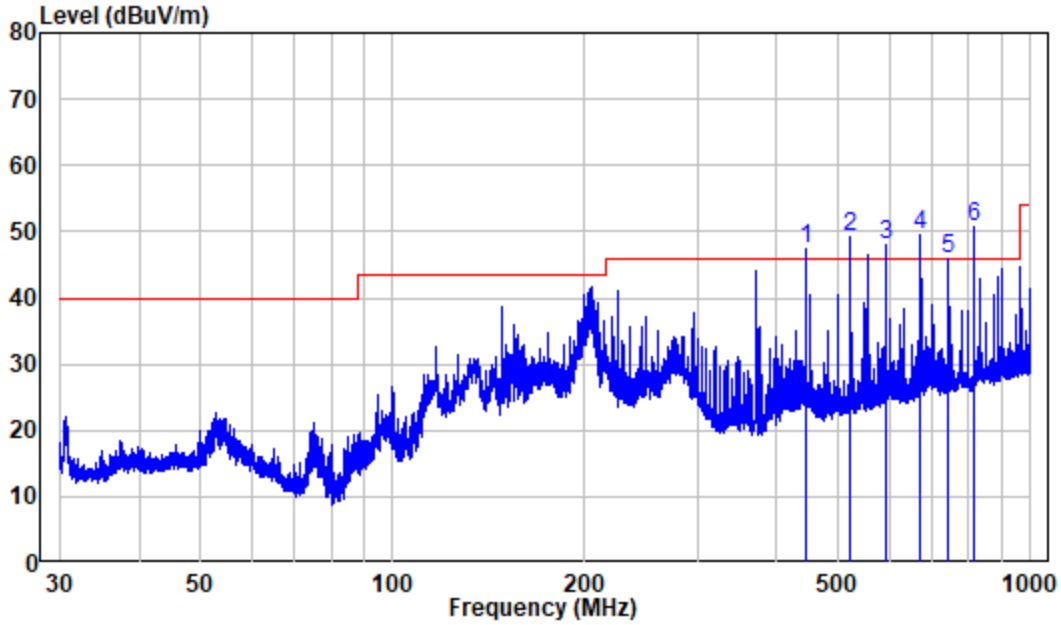
Temperature:	24-25℃
Relative Humidity:	58-59 %
ATM Pressure:	101.0 kPa

The testing was performed by Level Li on 2022-10-13 for below 1GHz and Jimi Zheng on 2022-11-22 for above 1GHz.

EUT operation mode: 5G WIFI Transmitting (Pre-scan in the X, Y and Z axes of orientation, the worst case as setup photos as below)

30 MHz~1 GHz: (worst case for 802.11n20, 5745MHz)

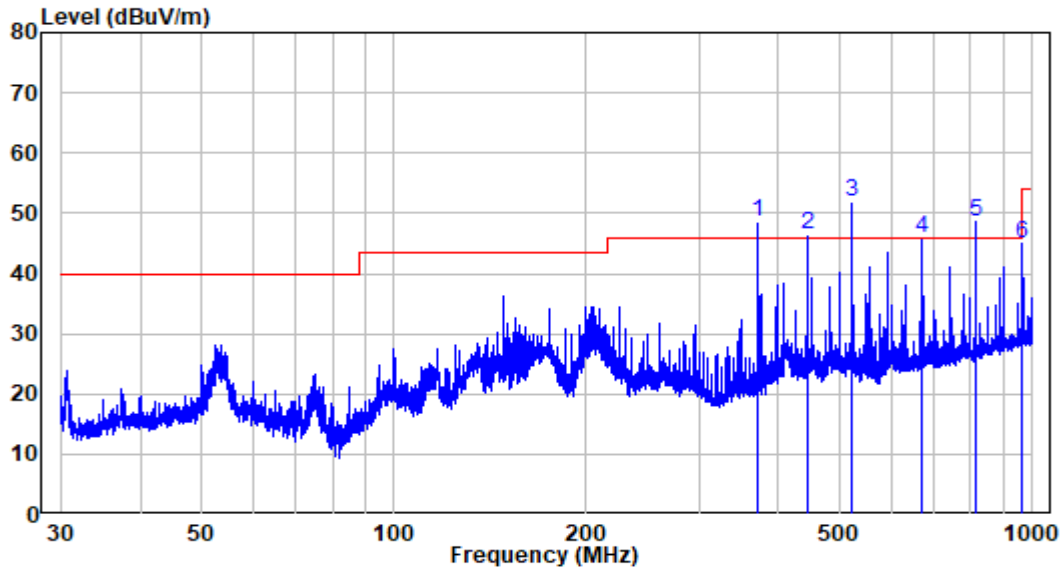
Horizontal:



Site : chamber
Condition: 3m HORIZONTAL
Job No. : SZNS1220815-37135E-RF
Test Mode: 5G WIFI Transmitting

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	445.828	-5.63	52.92	47.29	46.00	1.29	QP *
2	519.976	-4.29	53.64	49.35	46.00	3.35	QP *
3	594.351	-2.70	50.63	47.93	46.00	1.93	QP *
4	668.728	-1.67	51.06	49.39	46.00	3.39	QP *
5	742.910	-0.84	46.87	46.03	46.00	0.03	QP *
6	817.400	-0.11	50.72	50.61	46.00	4.61	QP *

Vertical



Site : chamber
Condition: 3m VERTICAL
Job No. : SZNS1220815-37135E-RF
Test Mode: 5G WIFI Transmitting

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark	
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB		
1	371.516	-7.30	55.92	48.62	46.00	2.62	QP	*
2	445.828	-5.63	52.25	46.62	46.00	0.62	QP	*
3	519.976	-4.29	56.30	52.01	46.00	6.01	QP	*
4	668.728	-1.67	47.51	45.84	46.00	-0.16	QP	
5	817.400	-0.11	48.67	48.56	46.00	2.56	QP	*
6	965.965	2.43	42.67	45.10	54.00	-8.90	QP	

Note *: The data recorded above represents the worst case for all supported operating modes, there were no spurious emission in the range 30MHz -1GHz over the limit in §15.209 caused by radio, the emission list at above table was investigated and was not caused by the radio, the emission was present when the radio was disabled. Those emissions comply with the FCC part 15, subpart B-Unintentional radiators §15.109(b) limit set for Class A digital device as the EUT is a Class A equipment according to the user manual.

5150-5250MHz

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 A, Low Channel									
4500	58.24	PK	125	1.4	H	-4.72	53.52	74	-20.48
4500	57.05	PK	275	1.6	V	-4.72	52.33	74	-21.67
5150	58.18	PK	165	1.9	H	-2.73	55.45	74	-18.55
5150	49.21	AV	165	1.9	H	-2.73	46.48	54	-7.52
5150	58.02	PK	198	1.4	V	-2.73	55.29	74	-18.71
5150	49.4	AV	198	1.4	V	-2.73	46.67	54	-7.33
10360	46.82	PK	206	1.9	H	8.12	54.94	68.2	-13.26
10360	46.93	PK	269	1.5	V	8.12	55.05	68.2	-13.15
802.11 A, Middle Channel									
10400	46.58	PK	148	1.5	H	8.24	54.82	68.2	-13.38
10400	46.45	PK	118	2.1	V	8.24	54.69	68.2	-13.51
802.11 A, High Channel									
5350	58.18	PK	123	1.1	H	-2.33	55.85	74	-18.15
5350	48.7	AV	123	1.1	H	-2.33	46.37	54	-7.63
5350	58.35	PK	45	1.6	V	-2.33	56.02	74	-17.98
5350	49.16	AV	45	1.6	V	-2.33	46.83	54	-7.17
5460	57.9	PK	296	1.7	H	-2.26	55.64	74	-18.36
5460	49.04	AV	296	1.7	H	-2.26	46.78	54	-7.22
5460	58.2	PK	120	1.9	V	-2.26	55.94	74	-18.06
5460	49.16	PK	120	1.9	V	-2.26	46.9	54	-7.10
10480	45.84	PK	254	1.7	H	8.57	54.41	68.2	-13.79
10480	46.67	PK	67	1.5	V	8.57	55.24	68.2	-12.96
802.11 N20, Low Channel									
4500	57.84	PK	136	1.8	H	-4.72	53.12	74	-20.88
4500	59.94	PK	254	1.7	V	-4.72	55.22	74	-18.78
4500	51.09	AV	254	1.7	V	-4.72	46.37	54	-7.63
5150	58.48	PK	67	1.5	H	-2.73	55.75	74	-18.25
5150	49.31	AV	67	1.5	H	-2.73	46.58	54	-7.42
5150	59.52	PK	348	1.2	V	-2.73	56.79	74	-17.21
5150	49.63	AV	348	1.2	V	-2.73	46.9	54	-7.10
10360	46.88	PK	201	1.6	H	8.12	55	68.2	-13.20
10360	47.69	PK	292	2.2	V	8.12	55.81	68.2	-12.39
802.11 N20, Middle Channel									
10400	46.32	PK	352	1.5	H	8.24	54.56	68.2	-13.64
10400	46.76	PK	221	1.3	V	8.24	55.00	68.2	-13.20
802.11 N20, High Channel									
5350	57.68	PK	316	1.7	H	-2.33	55.35	74	-18.65
5350	49.37	AV	316	1.7	H	-2.33	47.04	54	-6.96
5350	58.45	PK	68	2.2	V	-2.33	56.12	74	-17.88
5350	48.98	AV	68	2.2	V	-2.33	46.65	54	-7.35
5460	57.92	PK	309	1.2	H	-2.26	55.66	74	-18.34
5460	49.14	AV	309	1.2	H	-2.26	46.88	54	-7.12
5460	58.31	PK	310	1	V	-2.26	56.05	74	-17.95
5460	48.95	AV	310	1	V	-2.26	46.69	54	-7.31
10480	45.94	PK	127	2.1	H	8.57	54.51	68.2	-13.69
10480	46.09	PK	87	1	V	8.57	54.66	68.2	-13.54

5725-5850MHz

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)				
802.11A, Low Channel									
5650	59.7	PK	174	1.8	H	-1.95	57.75	68.2	-10.45
5650	59.61	PK	309	1.1	V	-1.95	57.66	68.2	-10.54
5700	59	PK	353	2.1	H	-2.02	56.98	105.2	-48.22
5700	62.08	PK	324	1.3	V	-2.02	60.06	105.2	-45.14
5720	61.52	PK	93	1.2	H	-1.96	59.56	110.8	-51.24
5720	73.75	PK	162	1.4	V	-1.96	71.79	110.8	-39.01
5725	67.68	PK	47	1.7	H	-1.96	65.72	122.2	-56.48
5725	83.59	PK	93	1.1	V	-1.96	81.63	122.2	-40.57
11490	48.01	PK	134	1.5	H	6.63	54.64	74	-19.36
11490	36.30	AV	303	1.3	H	6.63	42.93	54	-11.07
11490	53.18	PK	303	1.3	V	6.63	59.81	74	-14.19
11490	38.40	AV	136	1.0	V	6.63	45.03	54	-8.97
802.11A, Middle Channel									
11570	51.50	PK	112	1.1	H	6.59	58.09	74	-15.91
11570	37.30	AV	203	1.0	H	6.59	43.89	54	-10.11
11570	54.87	PK	203	1.0	V	6.59	61.46	74	-12.54
11570	39.80	AV	58	2.0	V	6.59	46.39	54	-7.61
802.11A, High Channel									
5850	61.43	PK	150	1.6	H	-1.81	59.62	122.2	-62.58
5850	73.77	PK	347	2.1	V	-1.81	71.96	122.2	-50.24
5855	59.46	PK	310	1.2	H	-1.82	57.64	110.8	-53.16
5855	70.77	PK	133	1.8	V	-1.82	68.95	110.8	-41.85
5875	59.75	PK	234	1.1	H	-1.84	57.91	105.2	-47.29
5875	60.79	PK	278	2.2	V	-1.84	58.95	105.2	-46.25
5925	45.8	PK	114	1	H	-1.83	43.97	68.2	-24.23
5925	58	PK	102	1.7	V	-1.83	56.17	68.2	-12.03
11650	48.27	PK	172	1.4	H	6.77	55.04	74	-18.96
11650	35.61	AV	348	1.5	H	6.77	42.38	54	-11.62
11650	51.97	PK	172	1.4	V	6.77	58.74	74	-15.26
11650	38.91	AV	348	1.5	V	6.77	45.68	54	-8.32

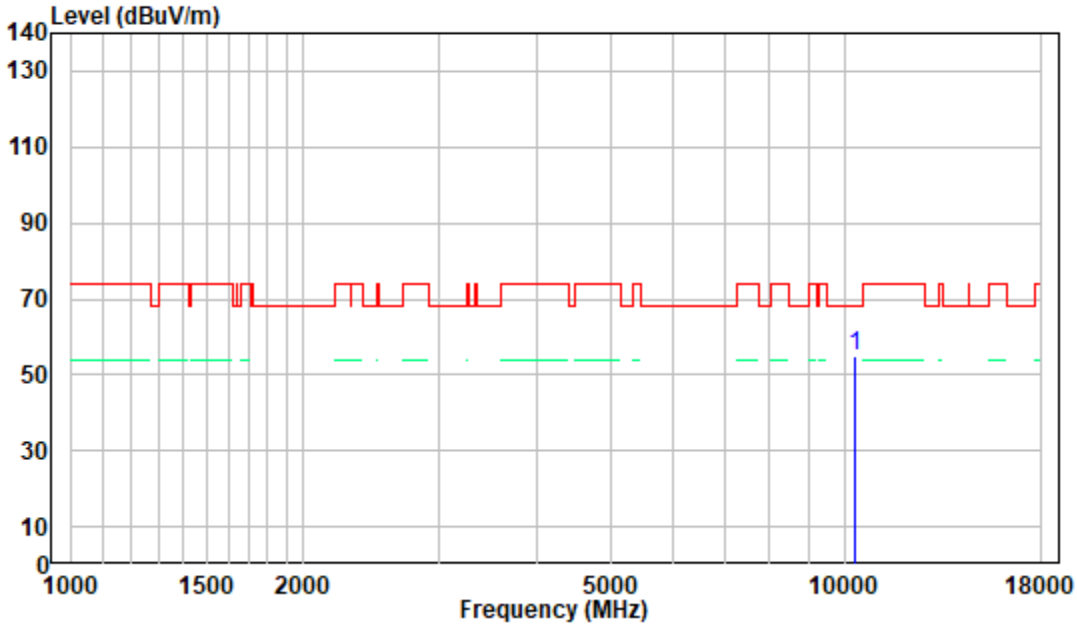
Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBuV)	PK/QP/AV		Height (m)	Polar (H/V)				
802.11N20, Low Channel									
5650	59.57	PK	159	1.4	H	-1.95	57.62	68.2	-10.58
5650	59.92	PK	269	2	V	-1.95	57.97	68.2	-10.23
5700	57.08	PK	161	2.1	H	-2.02	55.06	105.2	-50.14
5700	65.19	PK	250	1.3	V	-2.02	63.17	105.2	-42.03
5720	61.73	PK	351	1.8	H	-1.96	59.77	110.8	-51.03
5720	77.07	PK	333	2.1	V	-1.96	75.11	110.8	-35.69
5725	76.57	PK	137	1.9	H	-1.96	74.61	122.2	-47.59
5725	87.21	PK	214	1.8	V	-1.96	85.25	122.2	-36.95
11490	48.67	PK	8	1.4	H	6.63	55.30	74	-18.7
11490	36.60	AV	308	1.5	H	6.63	43.23	54	-10.77
11490	51.22	PK	308	1.5	V	6.63	57.85	74	-16.15
11490	38.40	AV	22	1.5	V	6.63	45.03	54	-8.97
802.11N20, Middle Channel									
11570	48.06	PK	108	1.3	H	6.59	54.65	74	-19.35
11570	35.60	AV	341	2.1	H	6.59	42.19	54	-11.81
11570	52.18	PK	341	2.1	V	6.59	58.77	74	-15.23
11570	40.00	AV	114	1.8	V	6.59	46.59	54	-7.41
802.11N20, High Channel									
5850	59.75	PK	346	2.1	H	-1.81	57.94	122.2	-64.26
5850	72.77	PK	134	1.5	V	-1.81	70.96	122.2	-51.24
5855	60.58	PK	29	1.6	H	-1.82	58.76	110.8	-52.04
5855	66.3	PK	307	1.4	V	-1.82	64.48	110.8	-46.32
5875	59.09	PK	226	1.8	H	-1.84	57.25	105.2	-47.95
5875	59.92	PK	132	1.8	V	-1.84	58.08	105.2	-47.12
5925	59.34	PK	31	1.6	H	-1.83	57.51	68.2	-10.69
5925	58.66	PK	35	1.2	V	-1.83	56.83	68.2	-11.37
11650	52.03	PK	187	1.7	H	6.77	58.80	74	-15.2
11650	37.21	AV	27	1.9	H	6.77	43.98	54	-10.02
11650	52.58	PK	27	1.9	V	6.77	59.35	74	-14.65
11650	39.21	AV	356	1.3	V	6.77	45.98	54	-8.02

Note:
Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
Corrected Amplitude = Corrected Factor + Reading
Margin = Corrected Amplitude – Limit
The other spurious emission which is in the noise floor level was not recorded.
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.

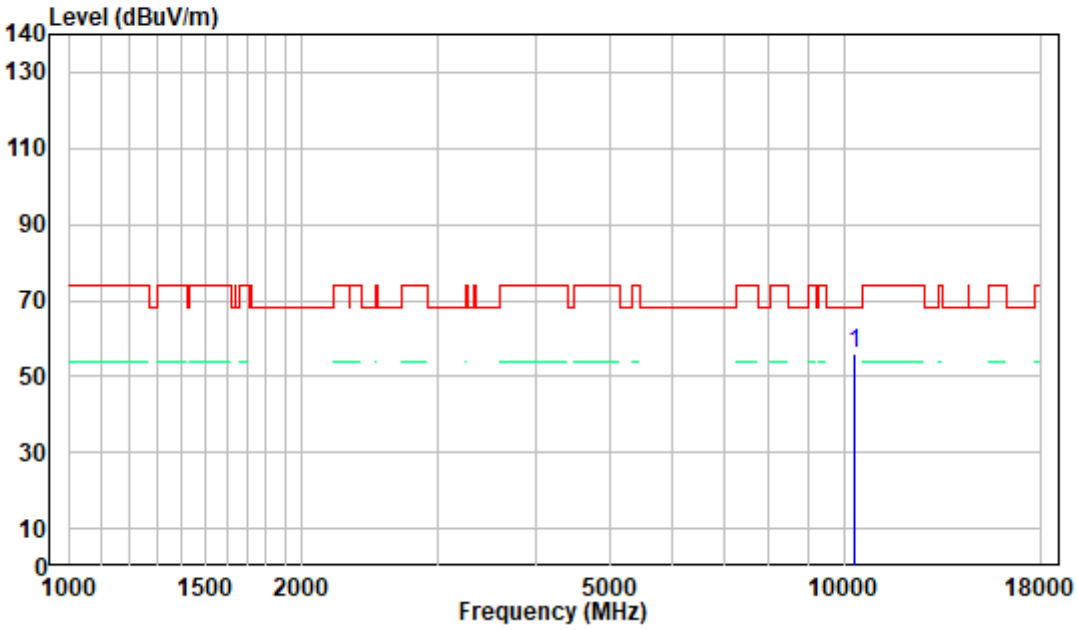
1-18 GHz (Worst case):

Pre-scan plots:

802.11n20, 5180MHz
Horizontal



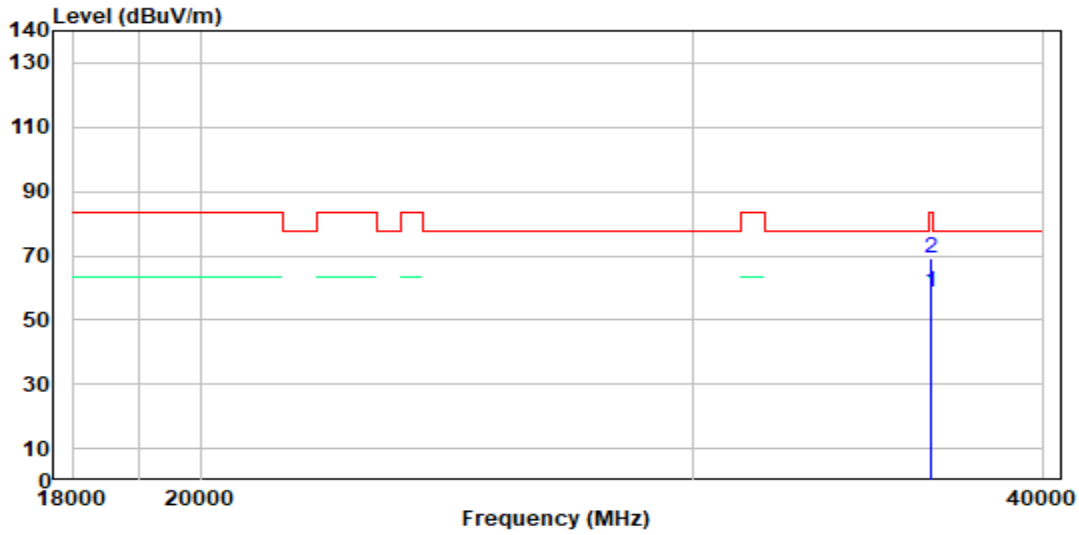
Vertical



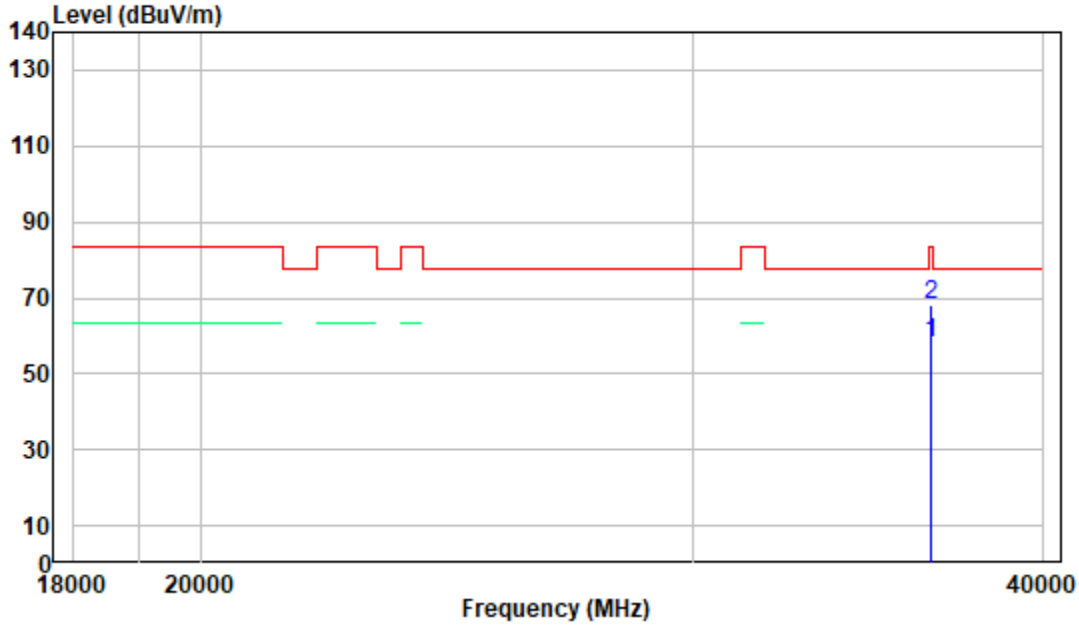
18-40 GHz (Worst case):

Pre-scan plots:

802.11n20, 5150MHz
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

According to KDB789033 D02 section II.C. and section II.D.

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 5.725-5.85 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.

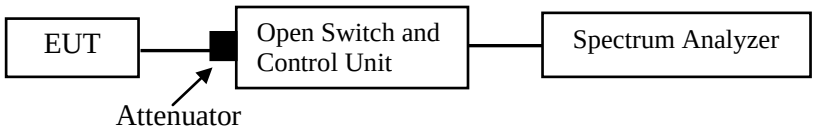
3. **99% Occupied Bandwidth**

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

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

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

Note: For devices that use channel aggregation refer to III.A and III.C for determining 99% bandwidth.



Test Data

Environmental Conditions

Temperature:	24 ℃
Relative Humidity:	58 %
ATM Pressure:	101.0 kPa

The testing was performed by Glenn Jiang on 2022-11-24.

EUT operation mode: Transmitting

Test Result: PASS

Please refer to the Appendix.

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

Applicable Standard

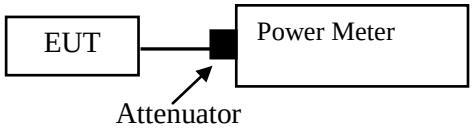
For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting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

According to KDB789033 D02 section II.E.3.a).

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:	24 ℃
Relative Humidity:	58 %
ATM Pressure:	101.0 kPa

The testing was performed by Glenn Jiang on 2022-11-24.

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.

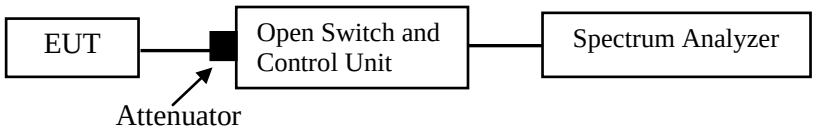
For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum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

According to KDB789033 D02 section II.F.

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:	24 ℃
Relative Humidity:	58 %
ATM Pressure:	101.0 kPa

The testing was performed by Glenn Jiang on 2022-11-24.

EUT operation mode: Transmitting

Test Result: PASS

Please refer to the Appendix.

APPENDIX

Appendix A1: Emission Bandwidth

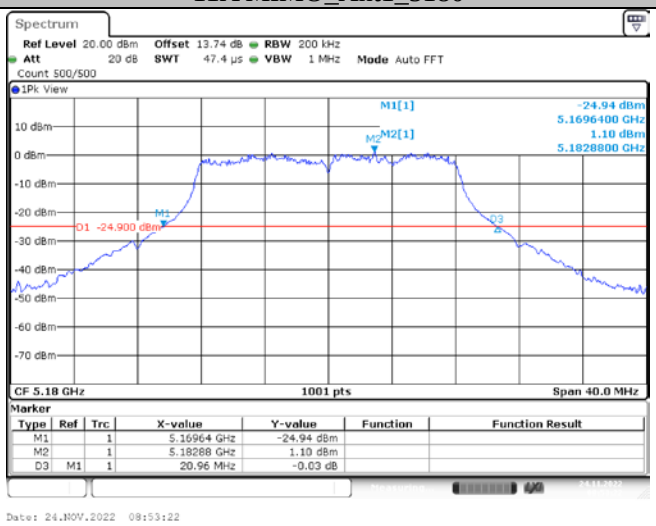
Test Result

5150~5250 MHz:

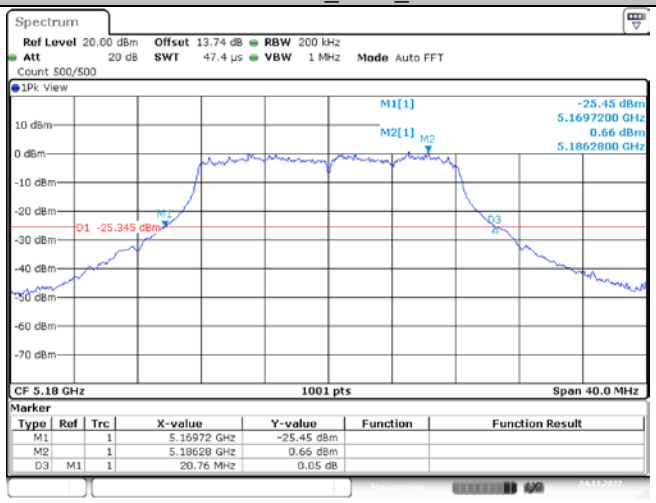
Test Mode	Channel	Antenna	26db EBW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11AMIMO	5180	Ant1	20.96	5169.64	5190.60	---	PASS
		Ant2	20.76	5169.72	5190.48	---	PASS
	5200	Ant1	21.12	5189.32	5210.44	---	PASS
		Ant2	20.24	5189.84	5210.08	---	PASS
	5240	Ant1	21.80	5228.88	5250.68	---	PASS
		Ant2	20.56	5229.96	5250.52	---	PASS
11N20MIMO	5180	Ant1	22.28	5169.04	5191.32	---	PASS
		Ant2	21.68	5169.28	5190.96	---	PASS
	5200	Ant1	21.80	5189.12	5210.92	---	PASS
		Ant2	21.80	5189.04	5210.84	---	PASS
	5240	Ant1	21.96	5229.32	5251.28	---	PASS
		Ant2	21.68	5229.00	5250.68	---	PASS

Test Graphs

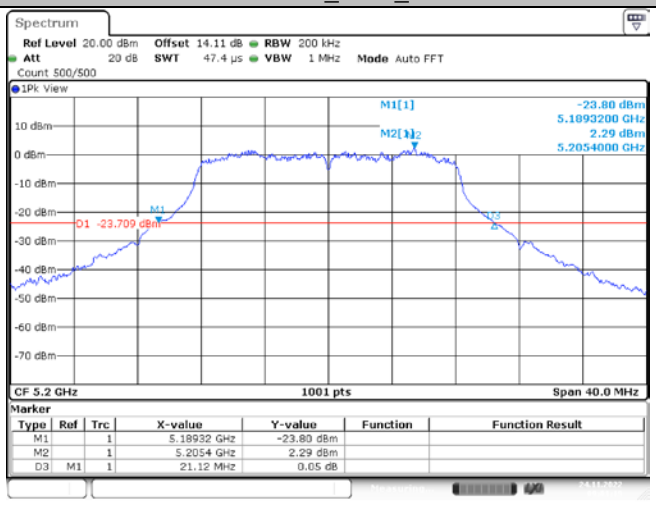
11A MIMO_Ant1_5180



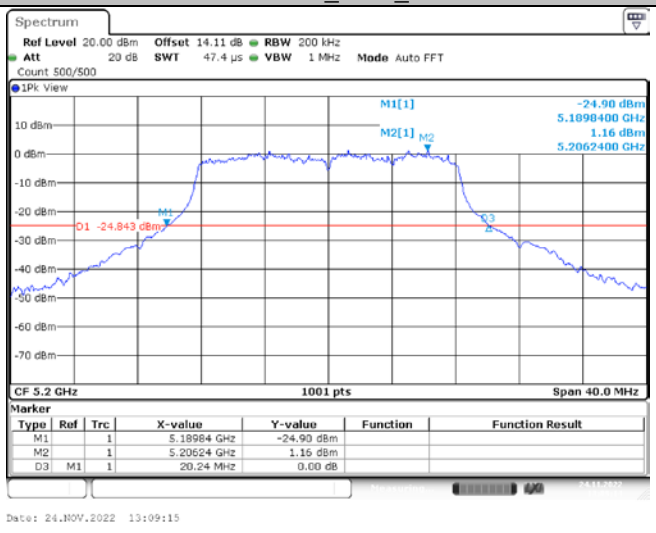
11A MIMO_Ant2_5180



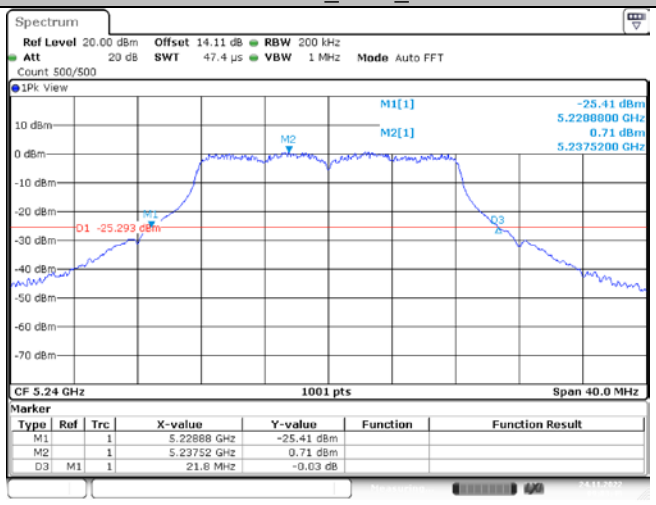
11A MIMO_Ant1_5200



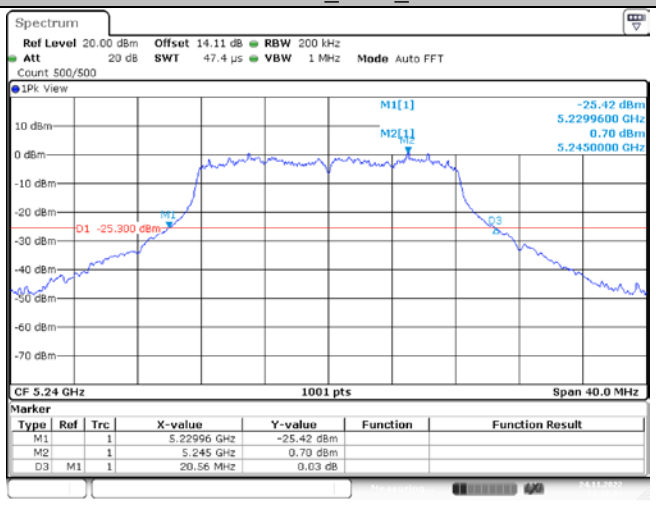
11A MIMO_Ant2_5200



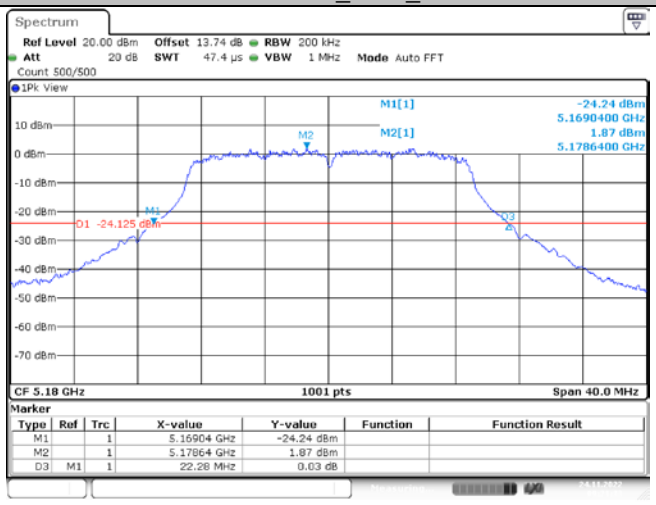
11A MIMO_Ant1_5240



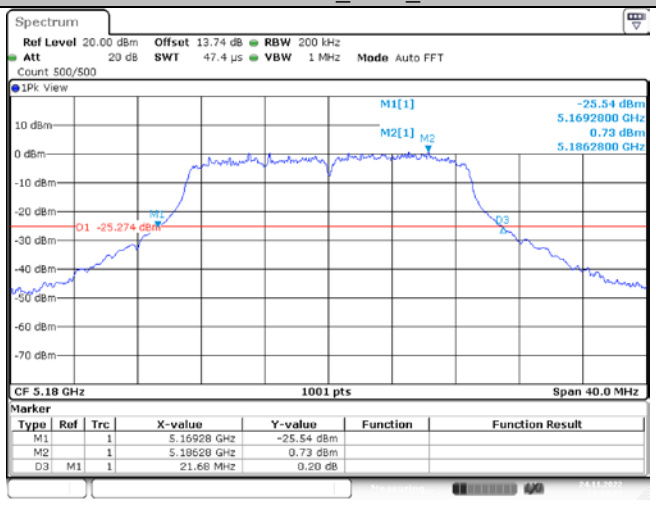
11A MIMO_Ant2_5240



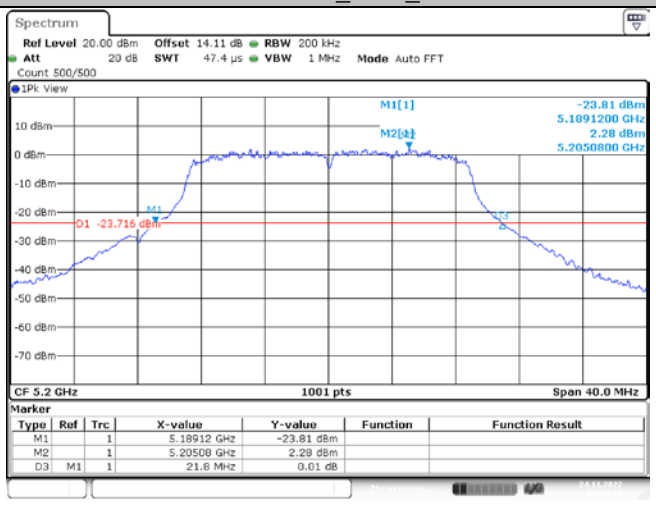
11N20MIMO_Ant1_5180



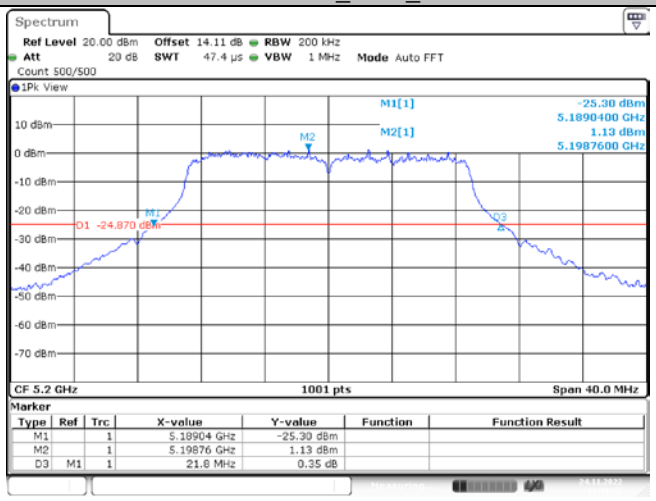
11N20MIMO_Ant2_5180



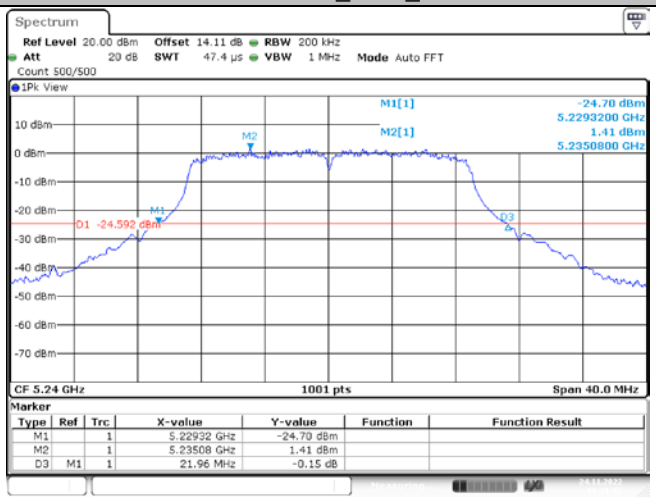
11N20MIMO_Ant1_5200



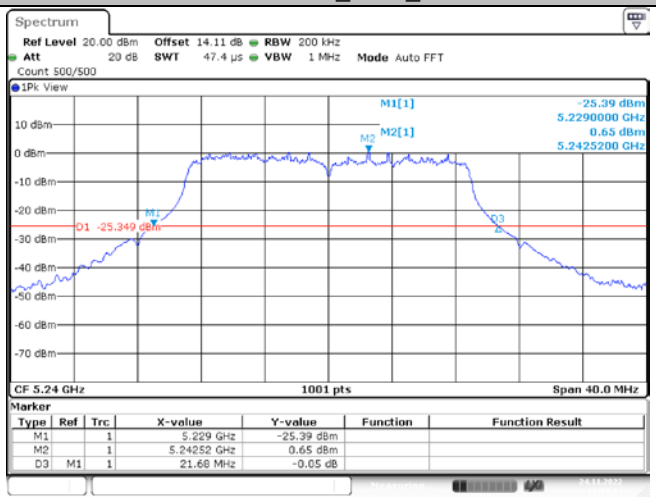
11N20MIMO_Ant2_5200



11N20MIMO_Ant1_5240



11N20MIMO_Ant2_5240



Appendix A2: Occupied Channel Bandwidth

Test Result

5150~5250 MHz:

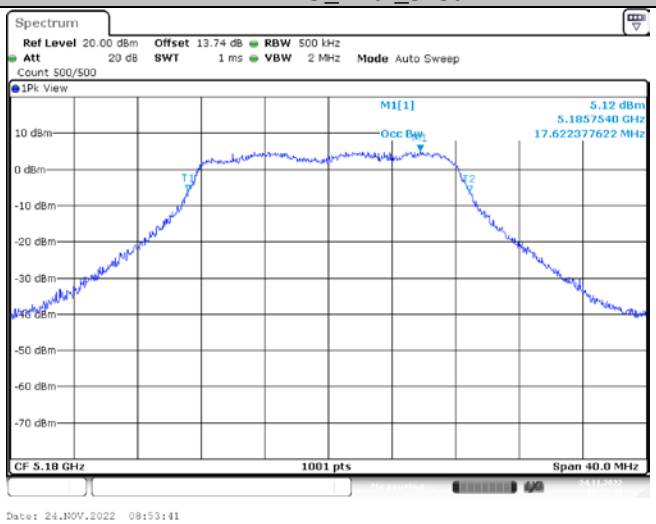
Test Mode	Channel	Antenna	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11AMIMO	5180	Ant1	17.622	5171.209	5188.831	No transmitted signal in the 99% bandwidth extends into the U-NII-2A band	PASS
		Ant2	17.023	5171.528	5188.551		PASS
	5200	Ant1	17.542	5191.209	5208.751		PASS
		Ant2	16.983	5191.568	5208.551		PASS
	5240	Ant1	17.662	5231.169	5248.831		PASS
		Ant2	16.983	5231.568	5248.551		PASS
11N20MIMO	5180	Ant1	18.342	5170.969	5189.311		PASS
		Ant2	18.262	5171.009	5189.271		PASS
	5200	Ant1	18.462	5190.889	5209.351		PASS
		Ant2	18.462	5190.769	5209.231		PASS
	5240	Ant1	18.422	5230.929	5249.351		PASS
		Ant2	18.621	5230.689	5249.311		PASS

5725~5850 MHz：

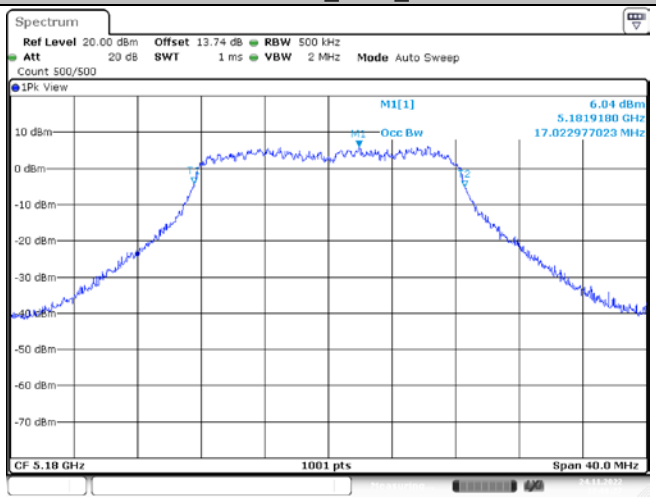
Test Mode	Channel	Antenna	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11AMIMO	5745	Ant1	17.542	5736.289	5753.831	No transmitted signal in the 99% bandwidth extends into the U-NII-2C band	PASS
		Ant2	17.183	5736.409	5753.591		PASS
	5785	Ant1	17.862	5776.209	5794.071		PASS
		Ant2	17.343	5776.369	5793.711		PASS
	5825	Ant1	17.742	5816.289	5834.031		PASS
		Ant2	17.103	5816.489	5833.591		PASS
11N20MIMO	5745	Ant1	18.661	5735.609	5754.271		PASS
		Ant2	18.541	5735.889	5754.431		PASS
	5785	Ant1	18.701	5775.45	5794.151		PASS
		Ant2	18.621	5775.689	5794.311		PASS
	5825	Ant1	18.861	5815.649	5834.51		PASS
		Ant2	18.581	5815.689	5834.271		PASS

Test Graphs

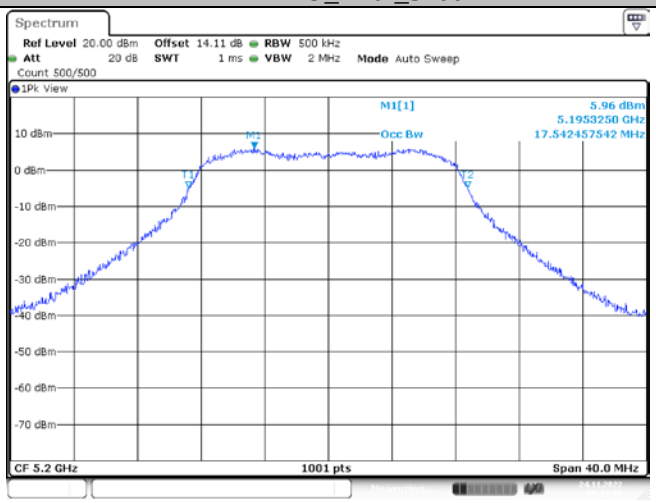
11A MIMO_Ant1_5180



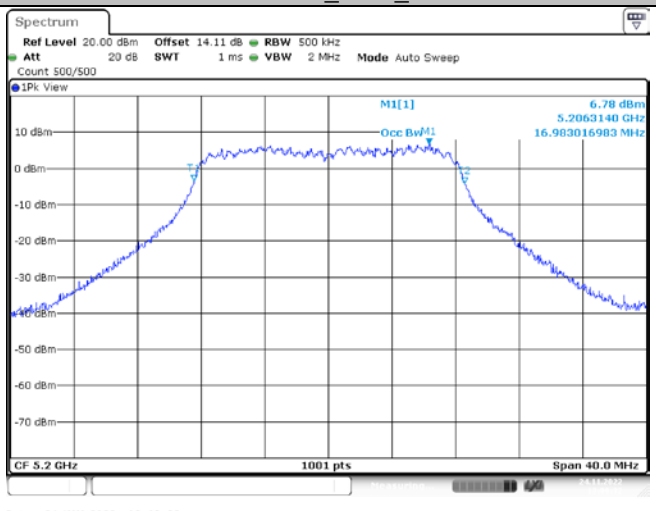
11A MIMO_Ant2_5180



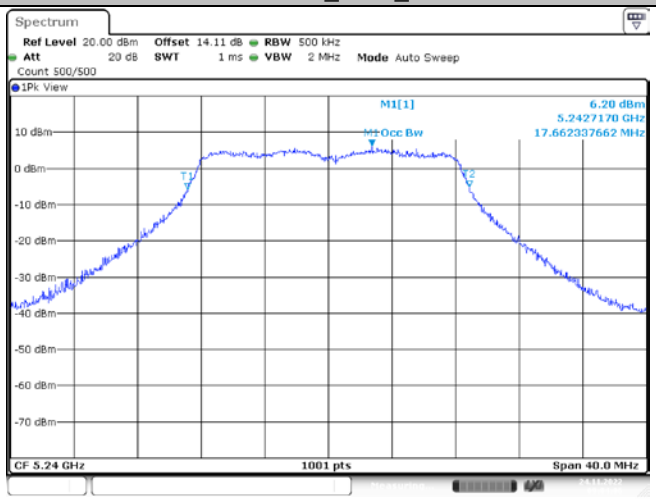
11A MIMO_Ant1_5200



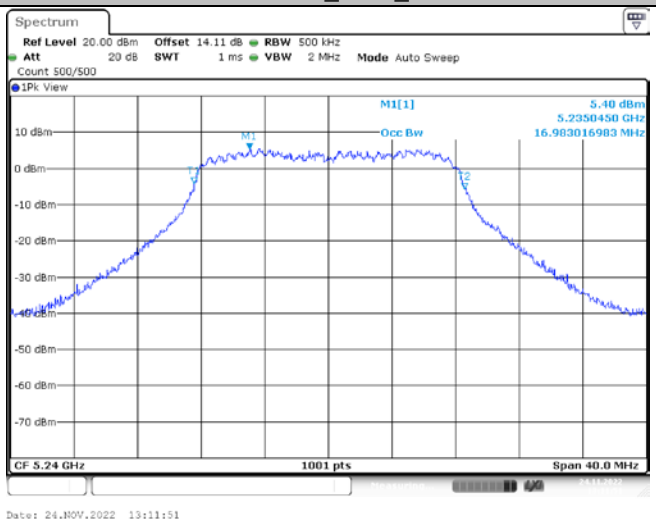
11A MIMO_Ant2_5200



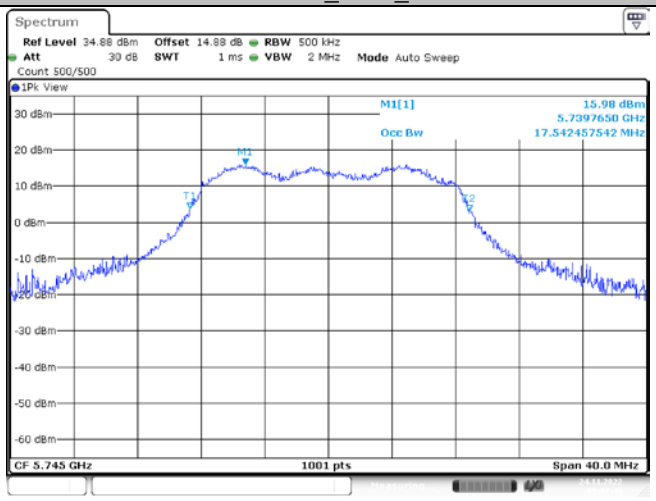
11A MIMO_Ant1_5240



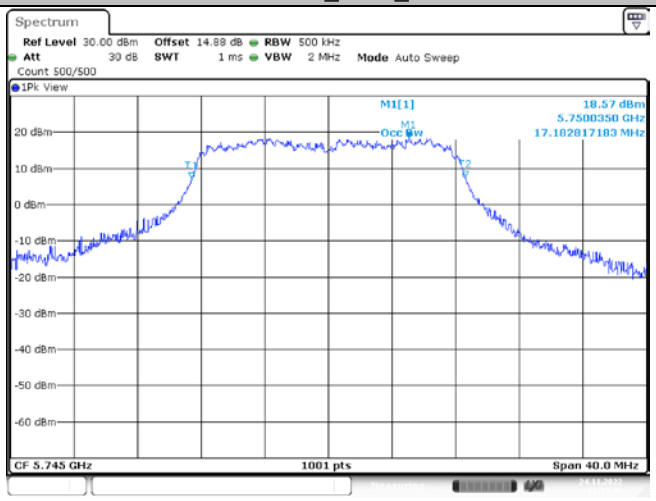
11A MIMO_Ant2_5240



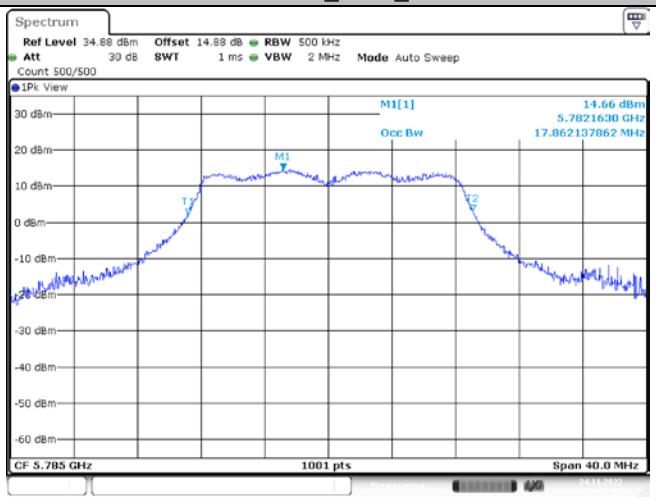
11A MIMO_Ant1_5745



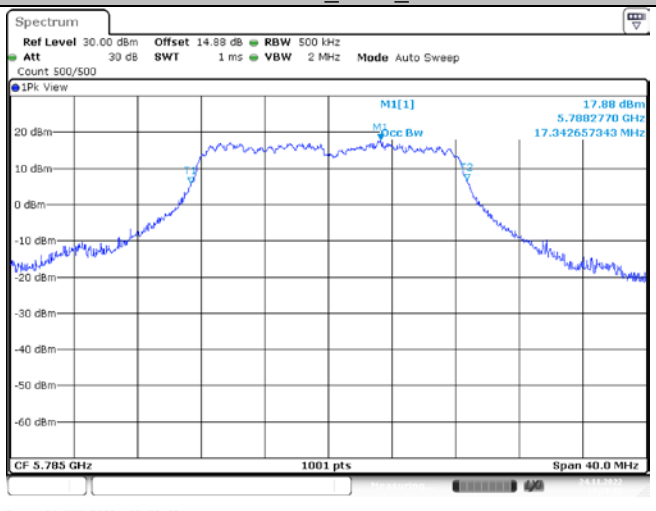
11A MIMO_Ant2_5745



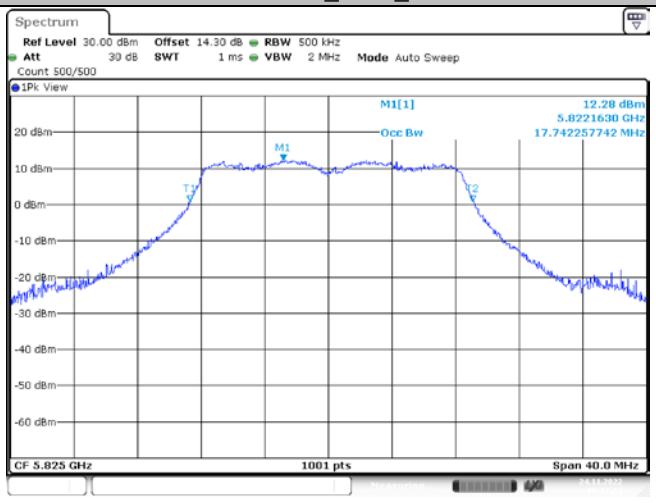
11A MIMO_Ant1_5785



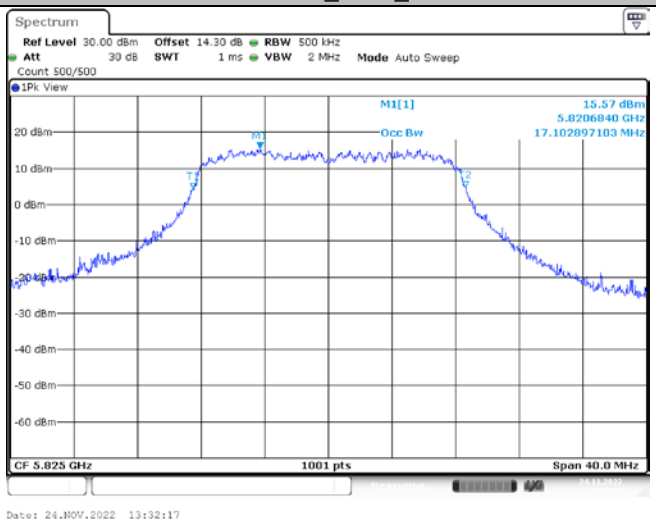
11A MIMO_Ant2_5785

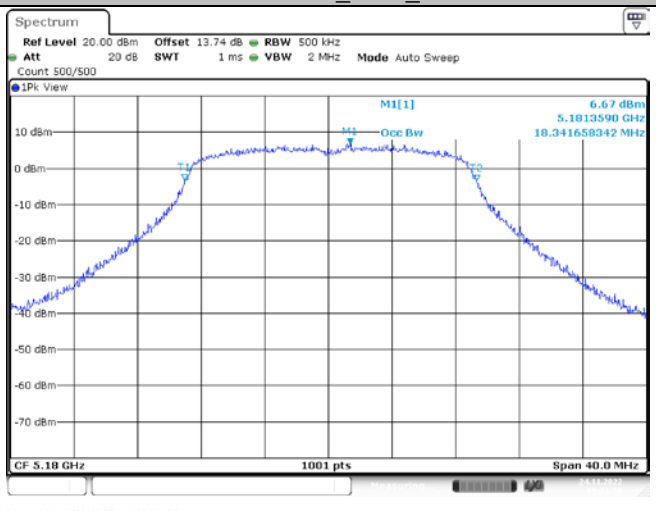
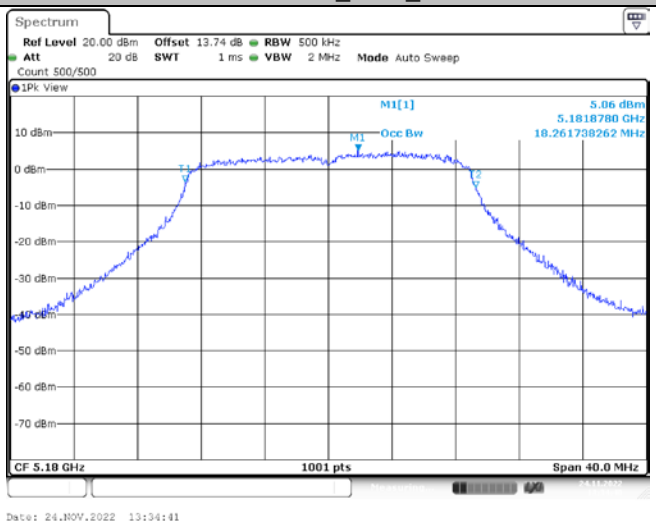
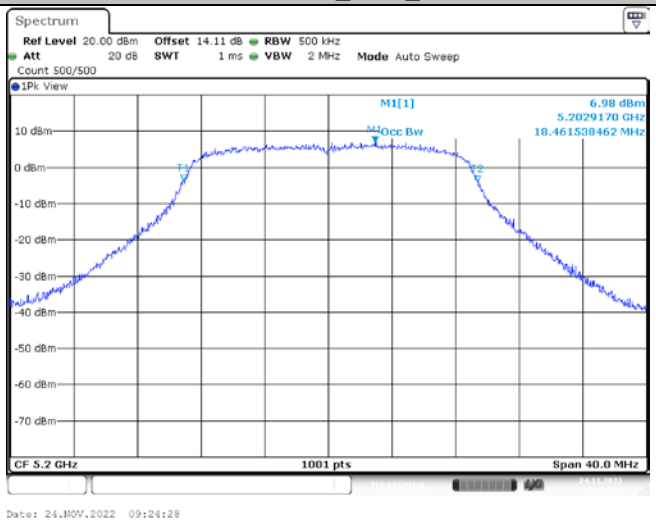


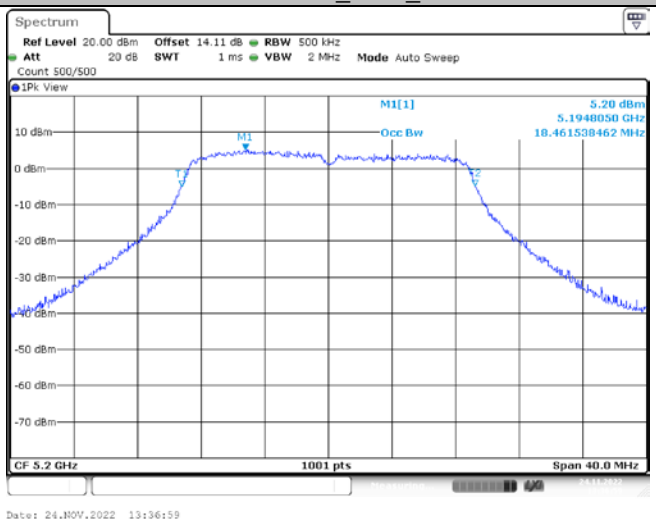
11A MIMO_Ant1_5825

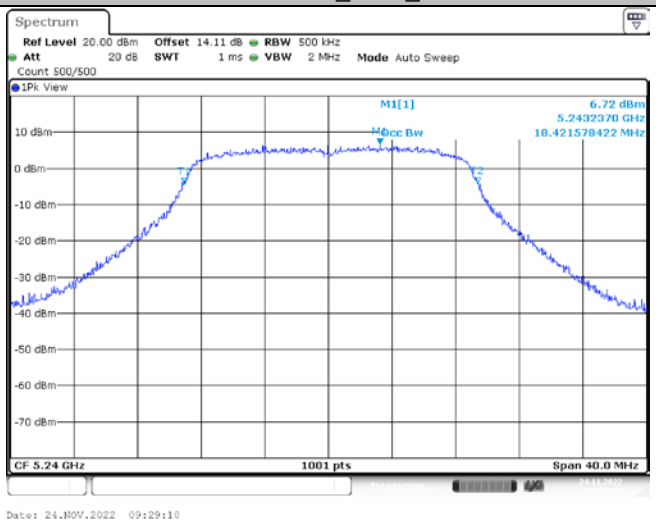


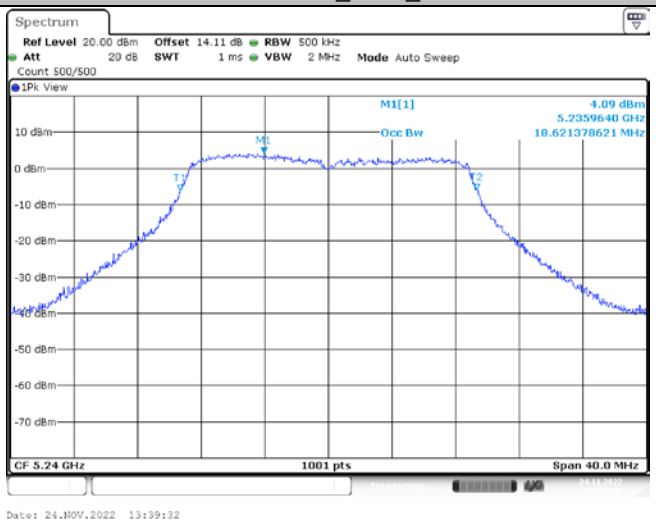
11A MIMO_Ant2_5825



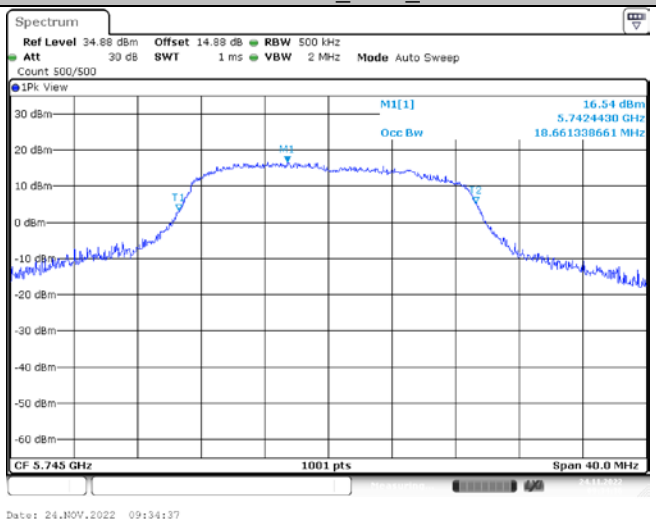
11N20MIMO_Ant1_5180

11N20MIMO_Ant2_5180

11N20MIMO_Ant1_5200


11N20MIMO_Ant2_5200


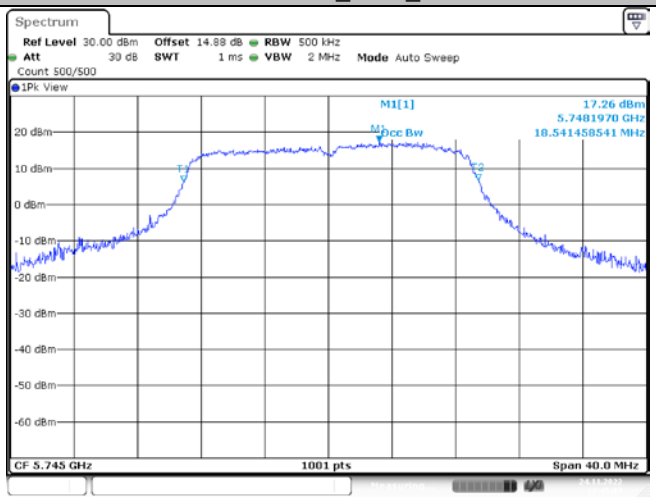
11N20MIMO_Ant1_5240


11N20MIMO_Ant2_5240


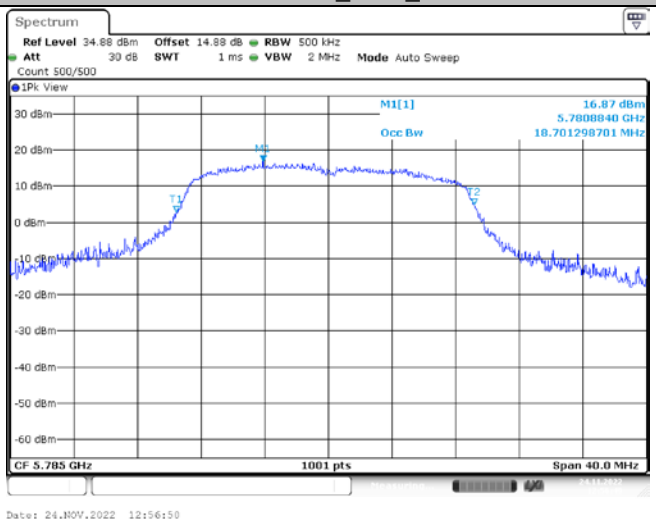
11N20MIMO_Ant1_5745



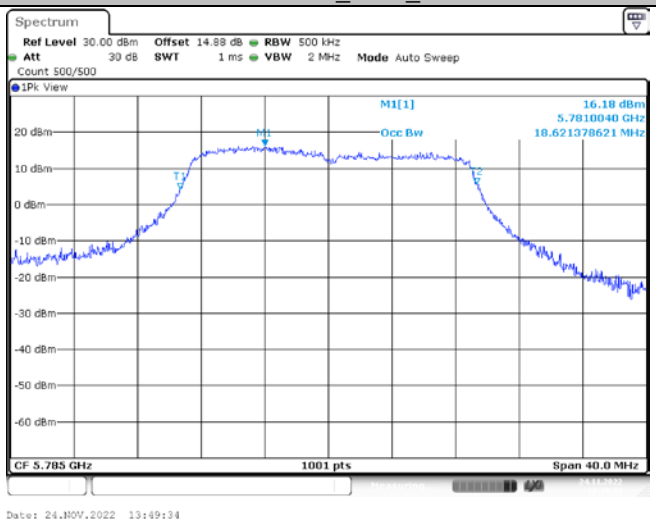
11N20MIMO_Ant2_5745



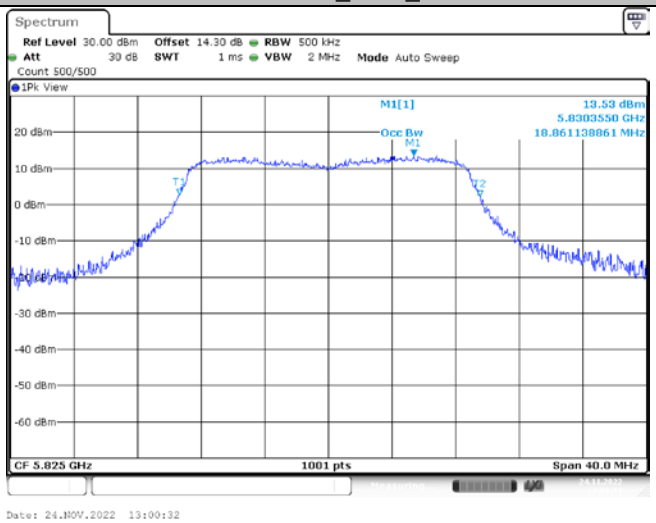
11N20MIMO_Ant1_5785



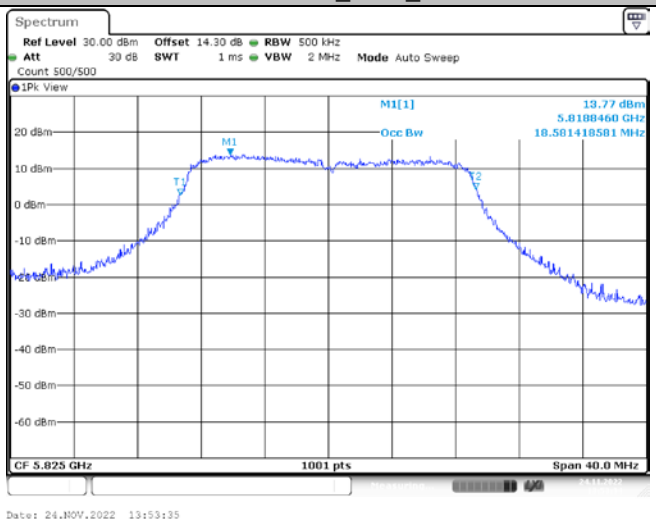
11N20MIMO_Ant2_5785



11N20MIMO_Ant1_5825



11N20MIMO_Ant2_5825



Appendix A3: Min Emission Bandwidth

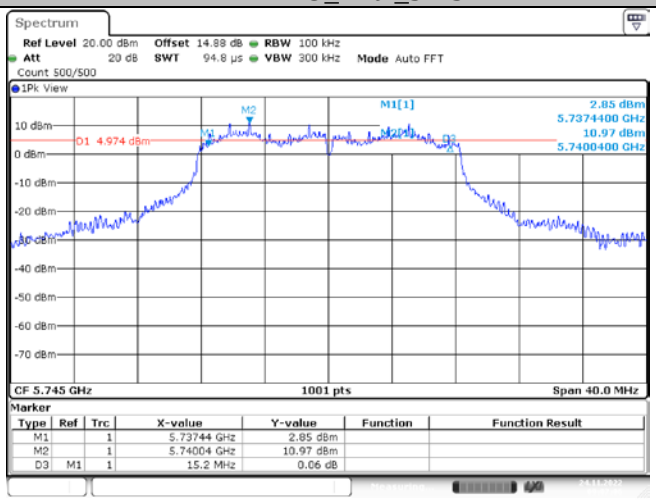
Test Result

5725~5850 MHz:

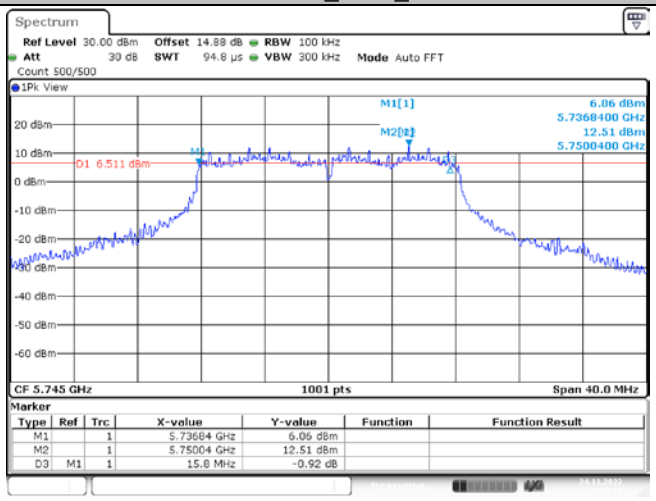
Test Mode	Channel	Antenna	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11AMIMO	5745	Ant1	15.20	5737.44	5752.64	0.5	PASS
		Ant2	15.80	5736.84	5752.64	0.5	PASS
	5785	Ant1	16.44	5776.96	5793.40	0.5	PASS
		Ant2	16.40	5776.84	5793.24	0.5	PASS
	5825	Ant1	16.40	5816.96	5833.36	0.5	PASS
		Ant2	15.80	5816.84	5832.64	0.5	PASS
11N20MIMO	5745	Ant1	15.80	5736.96	5752.76	0.5	PASS
		Ant2	16.28	5737.16	5753.44	0.5	PASS
	5785	Ant1	15.52	5777.04	5792.56	0.5	PASS
		Ant2	17.28	5776.28	5793.56	0.5	PASS
	5825	Ant1	17.36	5816.44	5833.80	0.5	PASS
		Ant2	17.36	5816.28	5833.64	0.5	PASS

Test Graphs

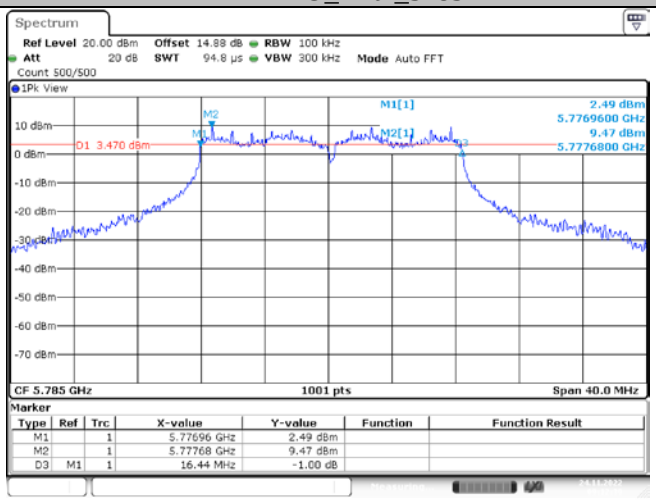
11A MIMO_Ant1_5745



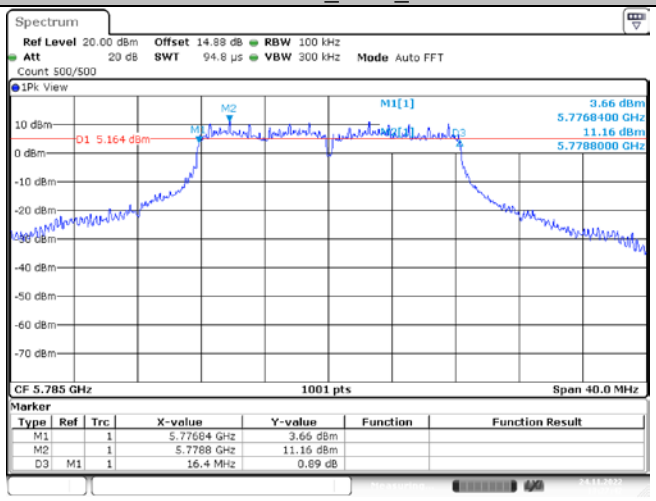
11A MIMO_Ant2_5745



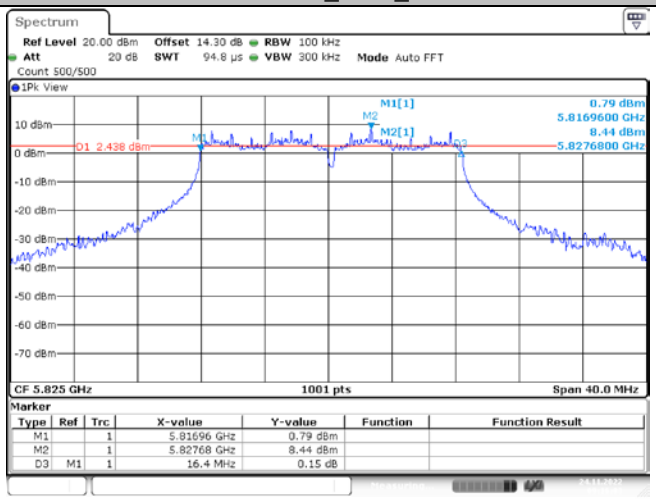
11A MIMO_Ant1_5785



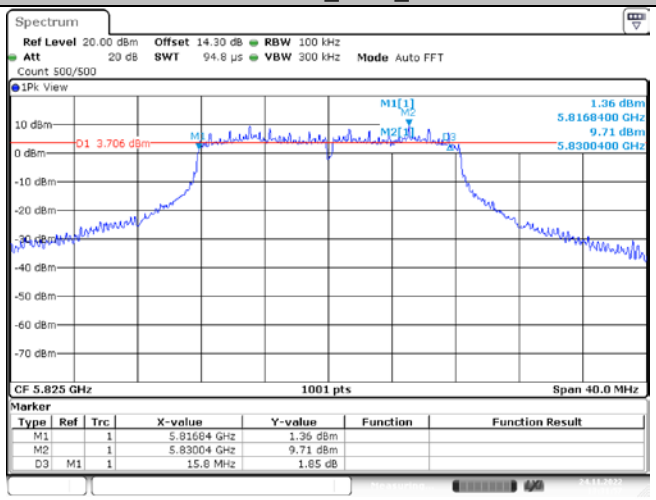
11A MIMO_Ant2_5785



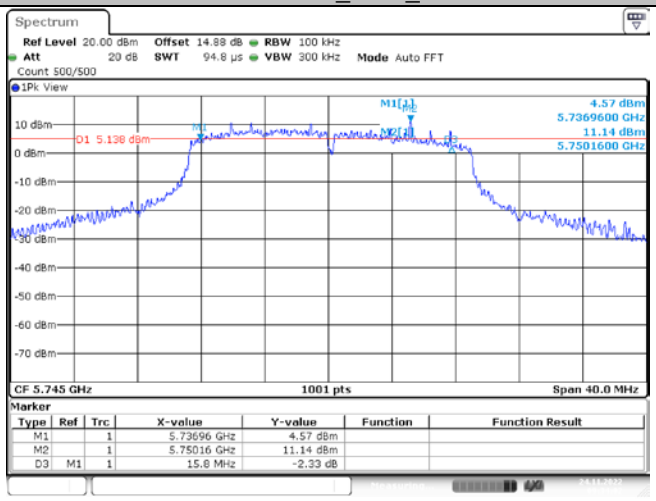
11A MIMO_Ant1_5825



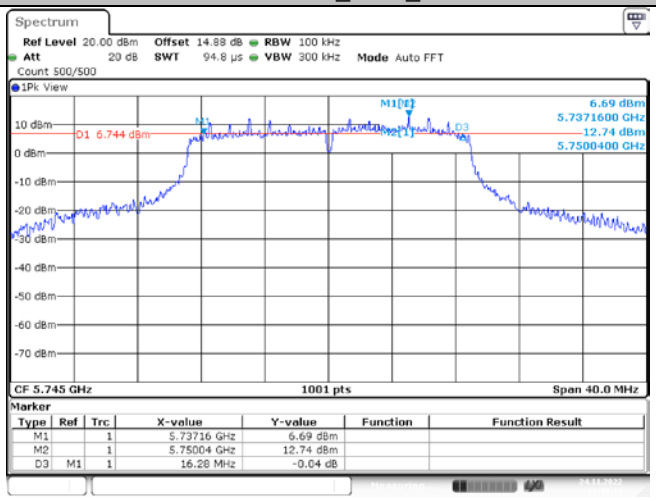
11A MIMO_Ant2_5825



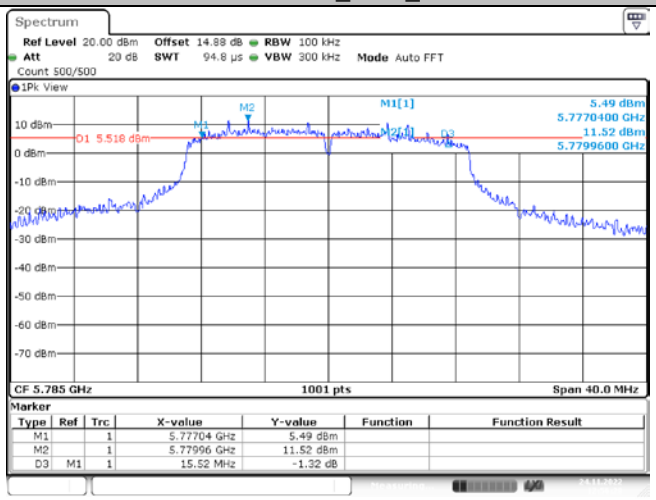
11N20MIMO_Ant1_5745



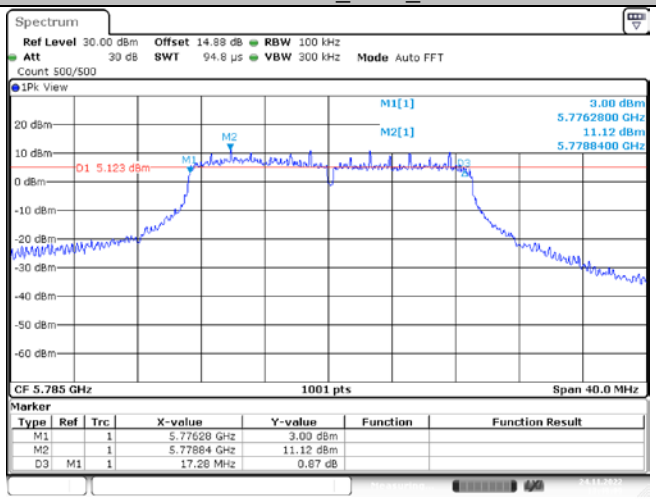
11N20MIMO_Ant2_5745



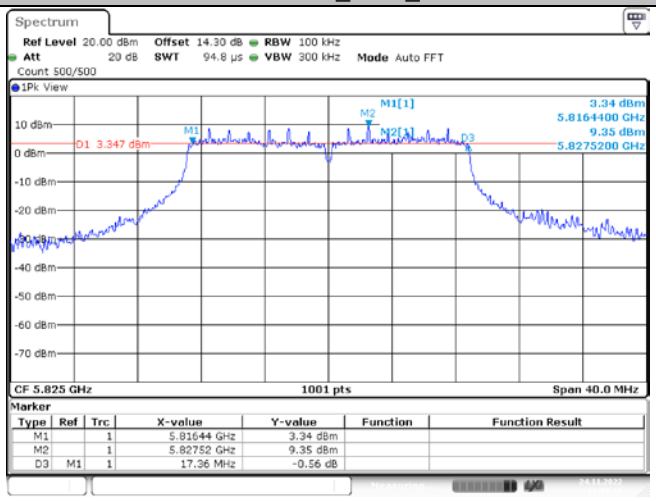
11N20MIMO_Ant1_5785



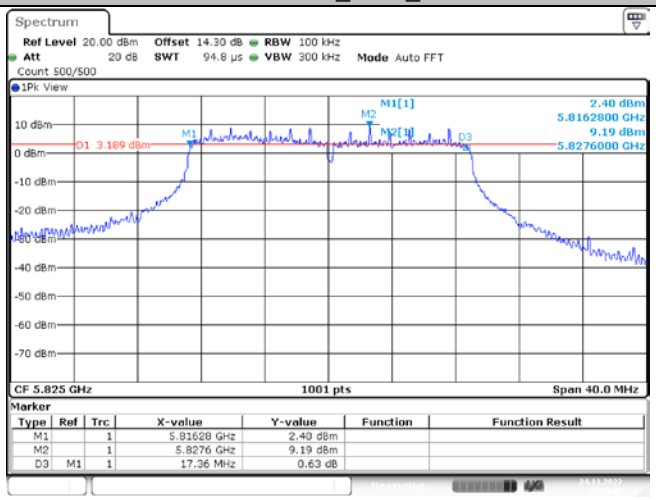
11N20MIMO_Ant2_5785



11N20MIMO_Ant1_5825



11N20MIMO_Ant2_5825



Appendix B: Maximum Conducted Average Output Power

Test Result

5150 MHz – 5250 MHz

Test Mode	Channel	Antenna	Result[dBm]	Limit[dBm]	Verdict
11AMIMO	5180	Ant1	11.12	<=23.98	PASS
		Ant2	10.44	<=23.98	PASS
		Total	13.80	<=23.98	PASS
	5200	Ant1	11.60	<=23.98	PASS
		Ant2	10.85	<=23.98	PASS
		Total	**14.25**	<=23.98	PASS
	5240	Ant1	11.28	<=23.98	PASS
		Ant2	10.02	<=23.98	PASS
		Total	13.71	<=23.98	PASS
11N20MIMO	5180	Ant1	12.34	<=23.98	PASS
		Ant2	10.55	<=23.98	PASS
		Total	14.55	<=23.98	PASS
	5200	Ant1	12.35	<=23.98	PASS
		Ant2	10.79	<=23.98	PASS
		Total	**14.65**	<=23.98	PASS
	5240	Ant1	11.93	<=23.98	PASS
		Ant2	10.21	<=23.98	PASS
		Total	14.16	<=23.98	PASS

Note 1: The Duty Cycle Factor is compensated in the Result.
Note 2: The device is a client device.
Note 3: The maximum antenna gain is 1.63 dBi.

The device employed Cyclic Delay Diversity (CDD) for 802.11 MIMO transmitting, per KDB 662911 D01 Multiple Transmitter Output v02r01, for power measurements on IEEE 802.11 devices:

Array Gain = 0dB (i.e., no array gain) For $N_{ANT} \leqslant 4$;

So: Directional gain=1.63dBi <6dBi

5725 – 5850 MHz:

Test Mode	Channel	Antenna	Result[dBm]	Limit[dBm]	Verdict
11AMIMO	5745	Ant1	21.08	<=30	PASS
		Ant2	22.91	<=30	PASS
		Total	**25.10**	<=30	PASS
	5785	Ant1	19.82	<=30	PASS
		Ant2	21.81	<=30	PASS
		Total	23.94	<=30	PASS
	5825	Ant1	17.73	<=30	PASS
		Ant2	20.01	<=30	PASS
		Total	22.03	<=30	PASS
11N20MIMO	5745	Ant1	21.47	<=30	PASS
		Ant2	22.82	<=30	PASS
		Total	**25.21**	<=30	PASS
	5785	Ant1	21.20	<=30	PASS
		Ant2	21.63	<=30	PASS
		Total	24.43	<=30	PASS
	5825	Ant1	19.26	<=30	PASS
		Ant2	19.76	<=30	PASS
		Total	22.53	<=30	PASS

Note 1: The Duty Cycle Factor is compensated in the Result.
Note 2: The device is a master and client device, and the tighter limit applies in the table.
Note 3: The maximum antenna gain is 1.63 dBi.

The device employed Cyclic Delay Diversity (CDD) for 802.11 MIMO transmitting, per KDB 662911 D01 Multiple Transmitter Output v02r01, for power measurements on IEEE 802.11 devices:

Array Gain = 0dB (i.e., no array gain) For $N_{ANT} \leqslant 4$;

So: Directional gain=1.63dBi <6dBi

Appendix C: Maximum Power Spectral Density

Test Result

5150 MHz – 5250 MHz

Test Mode	Channel	Antenna	Result[dBm/MHz]	Limit[dBm/MHz]	Verdict
11AMIMO	5180	Ant1	5.94	<=11	PASS
		Ant2	5.95	<=11	PASS
		Total	8.96	<=11	PASS
	5200	Ant1	6.37	<=11	PASS
		Ant2	7.00	<=11	PASS
		Total	9.71	<=11	PASS
	5240	Ant1	5.73	<=11	PASS
		Ant2	5.81	<=11	PASS
		Total	8.78	<=11	PASS
11N20MIMO	5180	Ant1	6.77	<=11	PASS
		Ant2	4.72	<=11	PASS
		Total	8.88	<=11	PASS
	5200	Ant1	7.59	<=11	PASS
		Ant2	5.27	<=11	PASS
		Total	9.59	<=11	PASS
	5240	Ant1	7.16	<=11	PASS
		Ant2	4.92	<=11	PASS
		Total	9.19	<=11	PASS

Note 1: The Duty Cycle Factor is compensated in the graph.

Note 2: The maximum antenna gain is 1.63dBi.

The device employed Cyclic Delay Diversity (CDD) for 802.11 MIMO transmitting, per KDB 662911 D01 Multiple Transmitter Output v02r01, for power spectral density (PSD) measurements on the devices

Array Gain = 10 log(N_{ANT}/N_{ss})dB

So:
Directional gain=G_{ANT} + Array Gain =1.63+10*log(2/1)=4.63dBi<6 dBi

5725 – 5850 MHz

Test Mode	Channel	Antenna	Result[dBm/500kHz]	Limit[dBm/500kHz]	Verdict
11AMIMO	5745	Ant1	14.72	<=30	PASS
		Ant2	17.36	<=30	PASS
		Total	19.25	<=30	PASS
	5785	Ant1	13.23	<=30	PASS
		Ant2	16.27	<=30	PASS
		Total	18.02	<=30	PASS
	5825	Ant1	12.48	<=30	PASS
		Ant2	13.94	<=30	PASS
		Total	16.28	<=30	PASS
11N20MIMO	5745	Ant1	15.34	<=30	PASS
		Ant2	16.26	<=30	PASS
		Total	18.83	<=30	PASS
	5785	Ant1	13.93	<=30	PASS
		Ant2	15.19	<=30	PASS
		Total	17.62	<=30	PASS
	5825	Ant1	12.80	<=30	PASS
		Ant2	13.28	<=30	PASS
		Total	16.06	<=30	PASS

Note 1: The Duty Cycle Factor is compensated in the graph.

Note 2: The maximum antenna gain is 1.63 dBi.

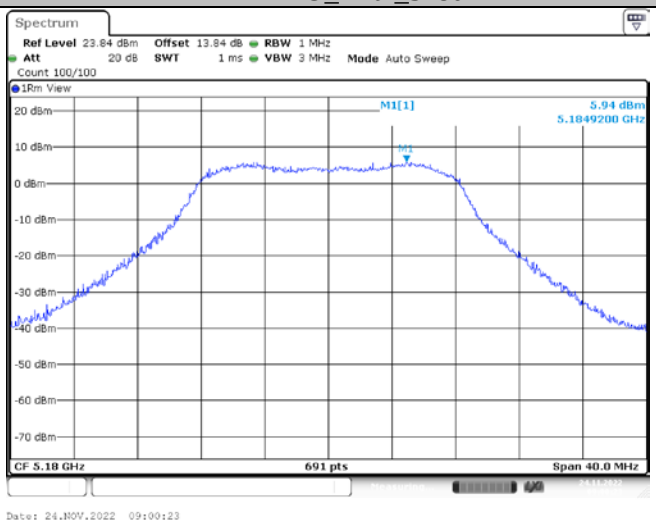
The device employed Cyclic Delay Diversity (CDD) for 802.11 MIMO transmitting, per KDB 662911 D01 Multiple Transmitter Output v02r01, for power spectral density (PSD) measurements on the devices

Array Gain = 10 log(N_{ANT}/N_{ss})dB

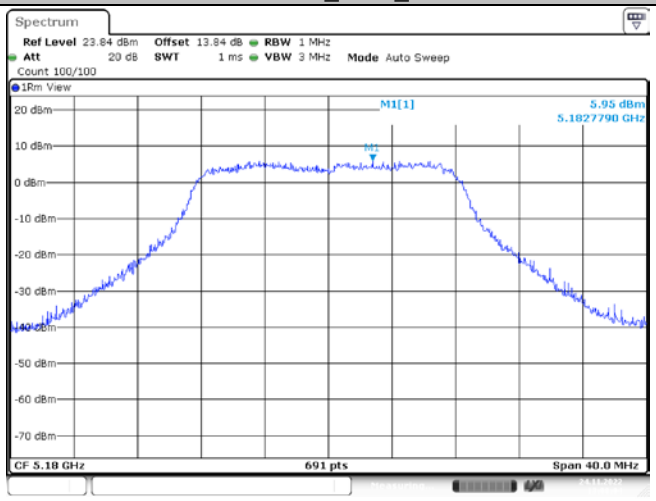
So:
Directional gain=G_{ANT} + Array Gain =1.63+10*log(2/1)=4.63dBi<6 dBi

Test Graphs

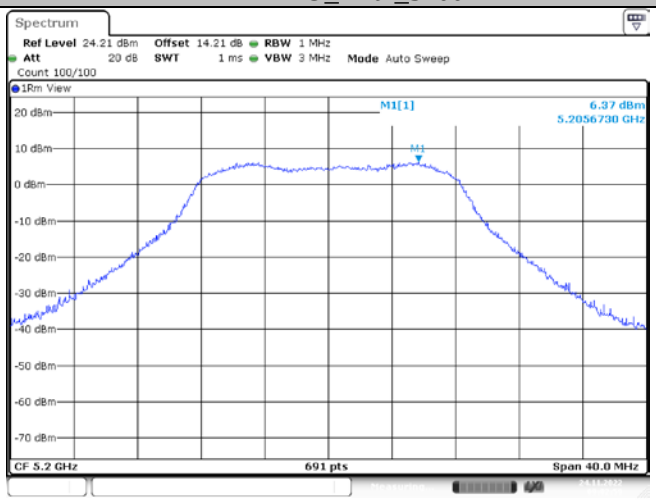
11A MIMO_Ant1_5180



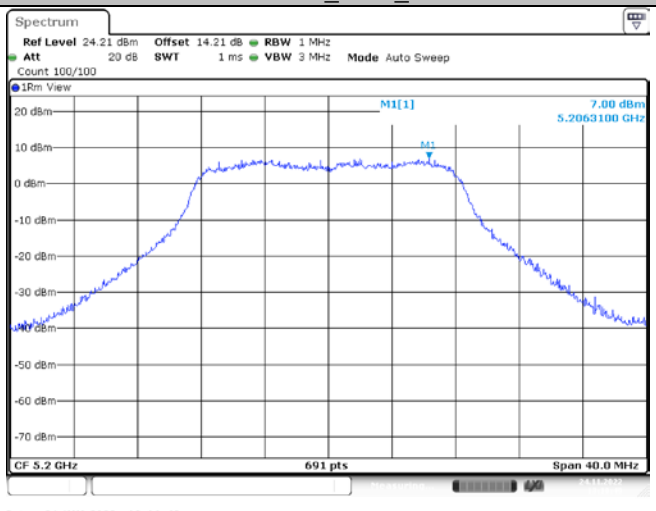
11A MIMO_Ant2_5180



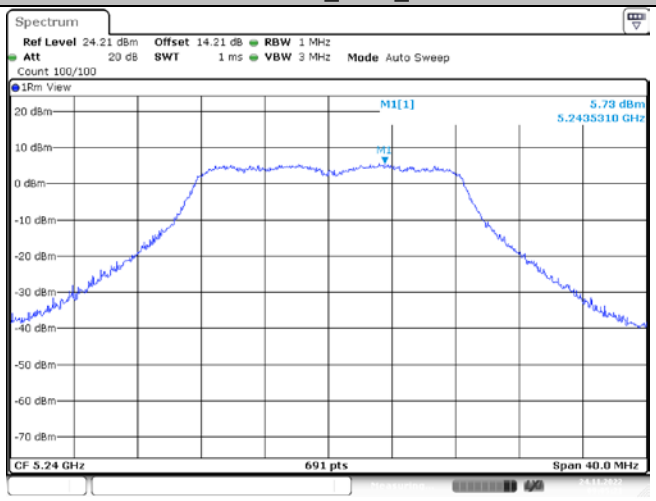
11A MIMO_Ant1_5200



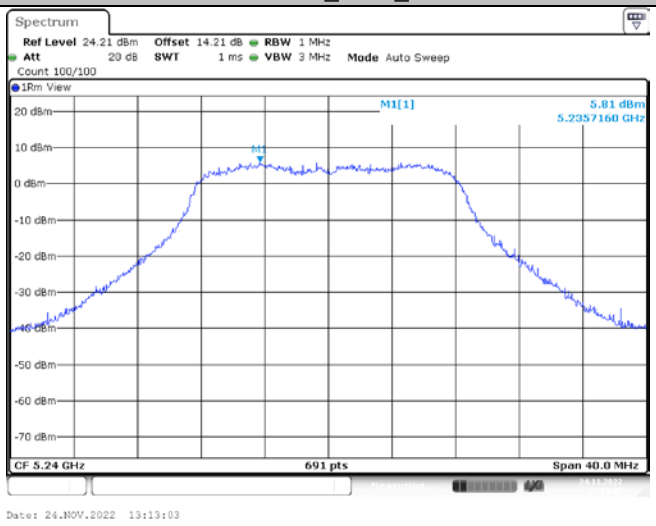
11A MIMO_Ant2_5200



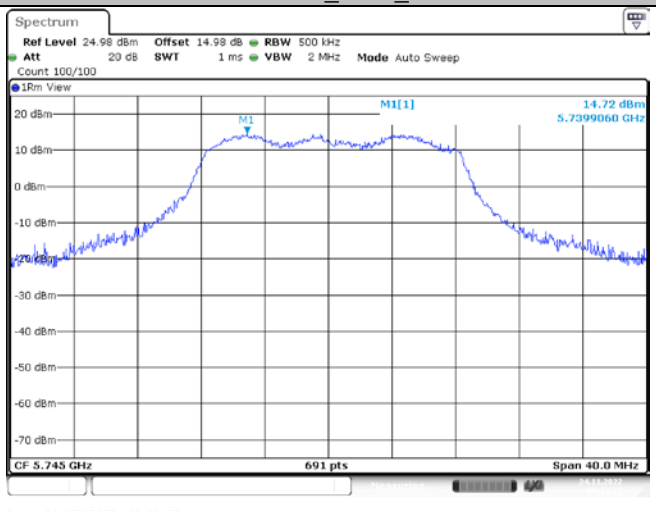
11A MIMO_Ant1_5240



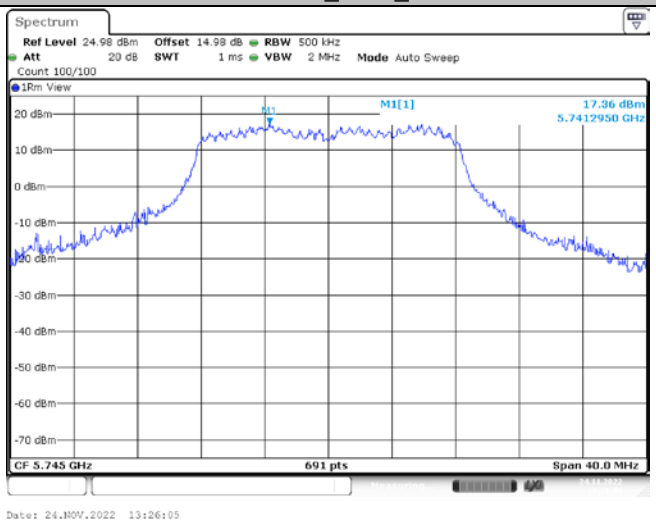
11A MIMO_Ant2_5240



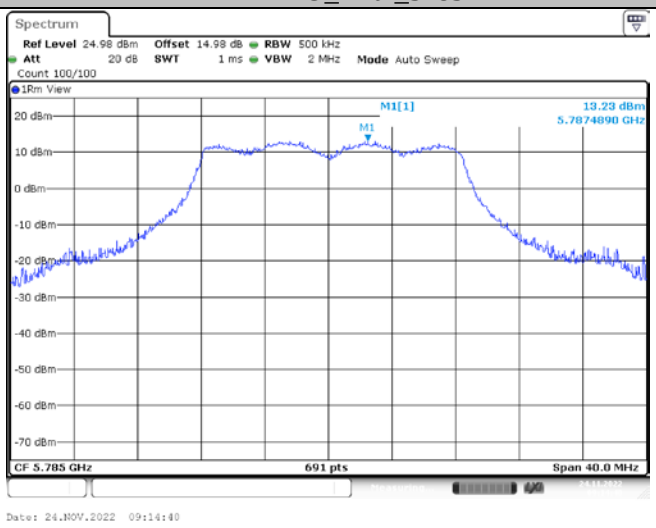
11A MIMO_Ant1_5745



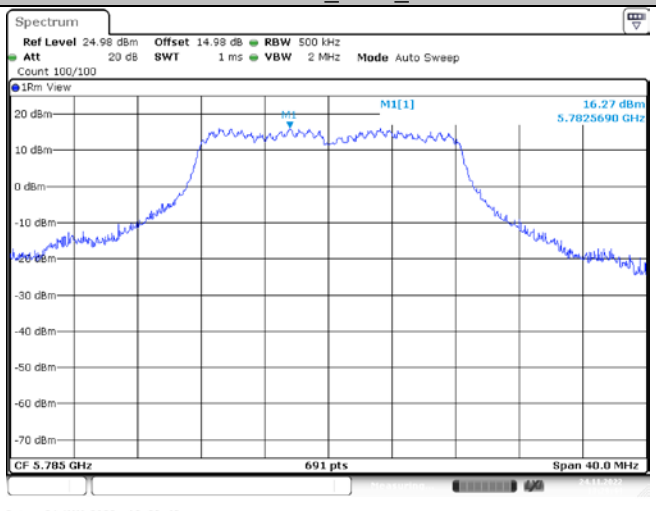
11A MIMO_Ant2_5745



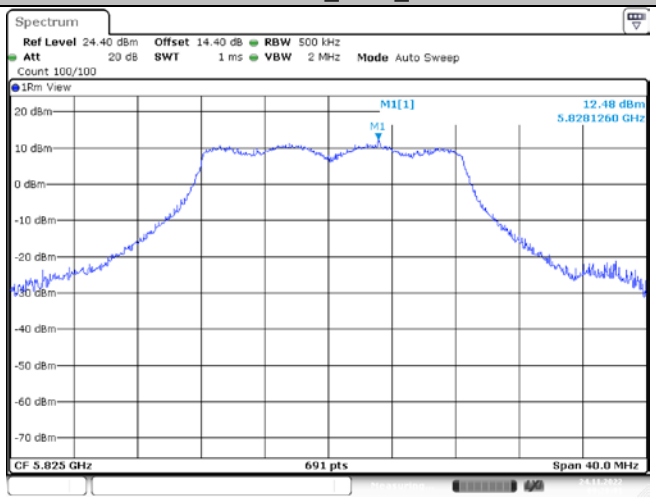
11A MIMO_Ant1_5785



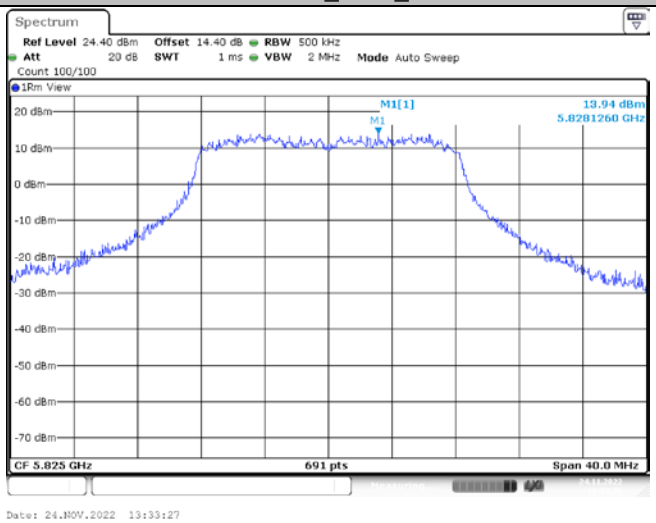
11A MIMO_Ant2_5785



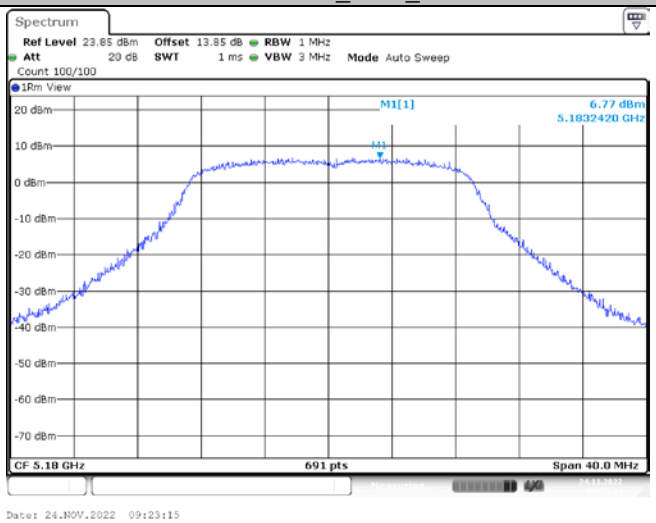
11A MIMO_Ant1_5825



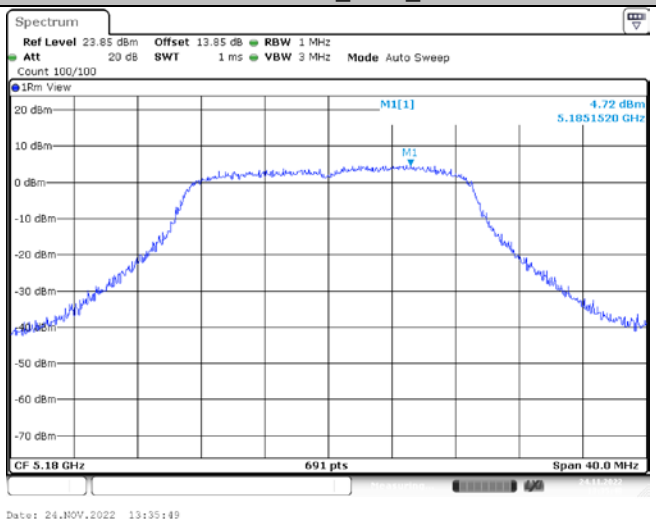
11A MIMO_Ant2_5825



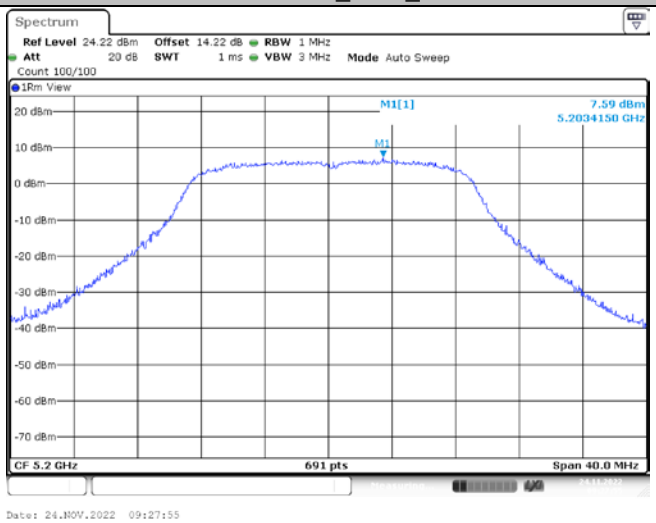
11N20MIMO_Ant1_5180



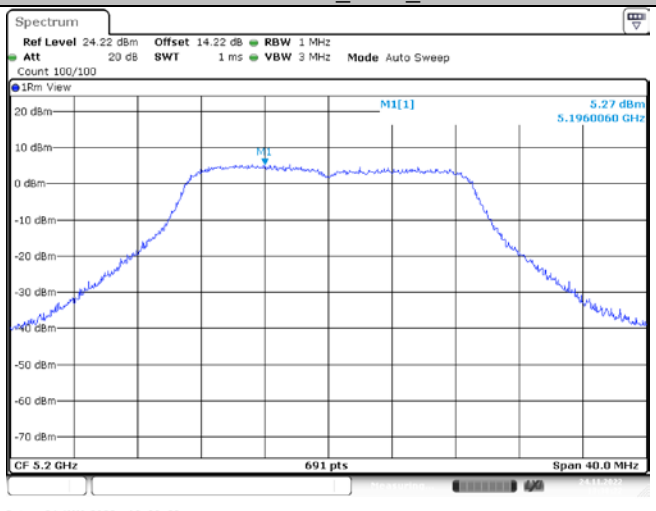
11N20MIMO_Ant2_5180



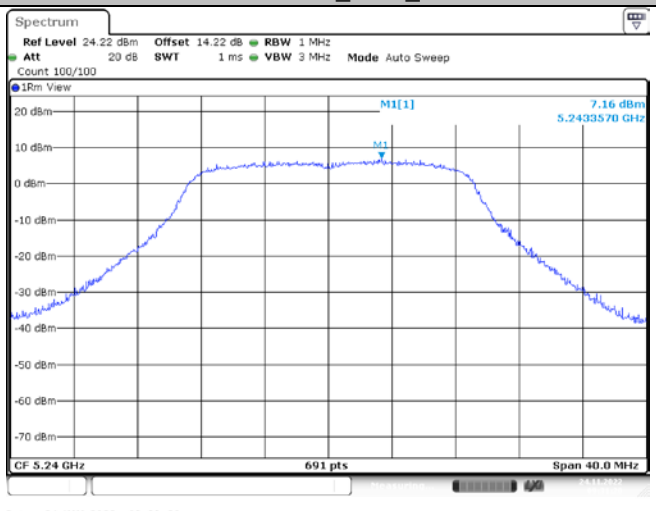
11N20MIMO_Ant1_5200



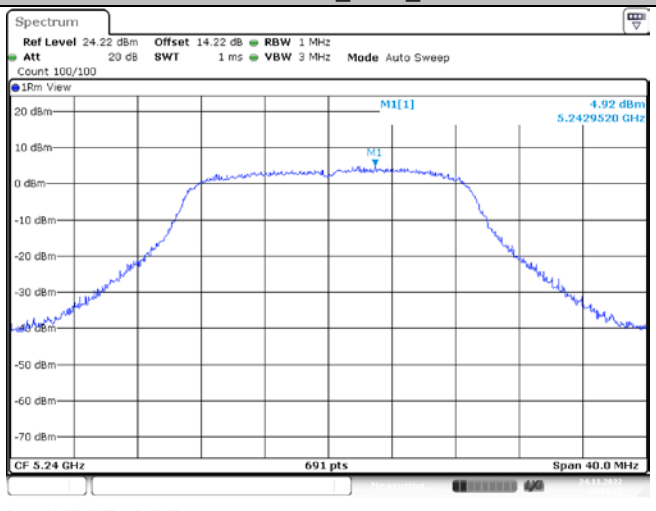
11N20MIMO_Ant2_5200



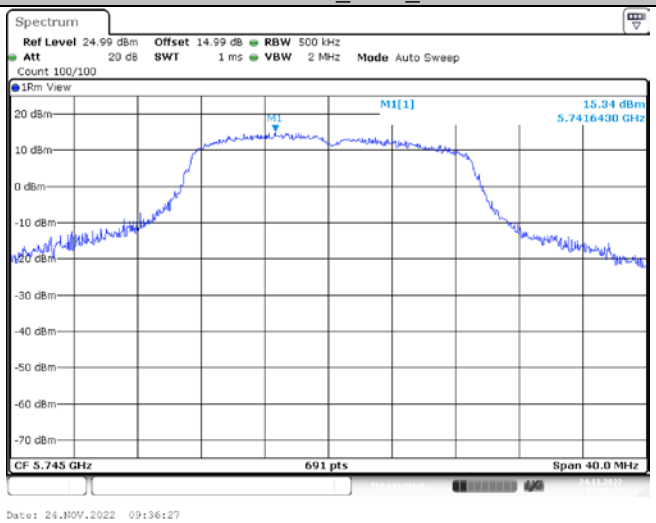
11N20MIMO_Ant1_5240



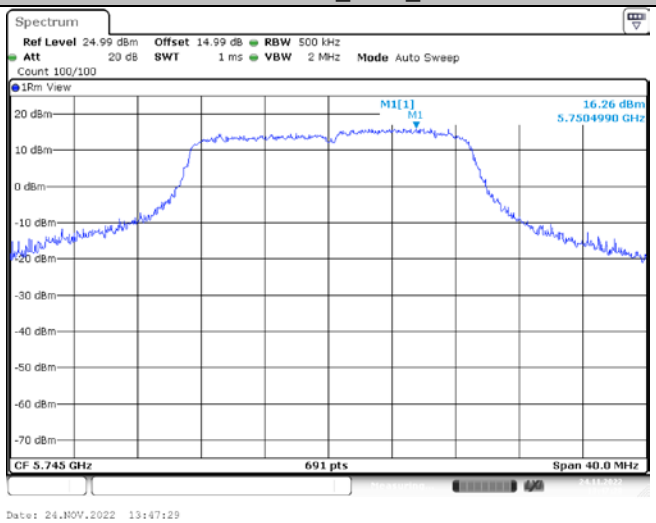
11N20MIMO_Ant2_5240



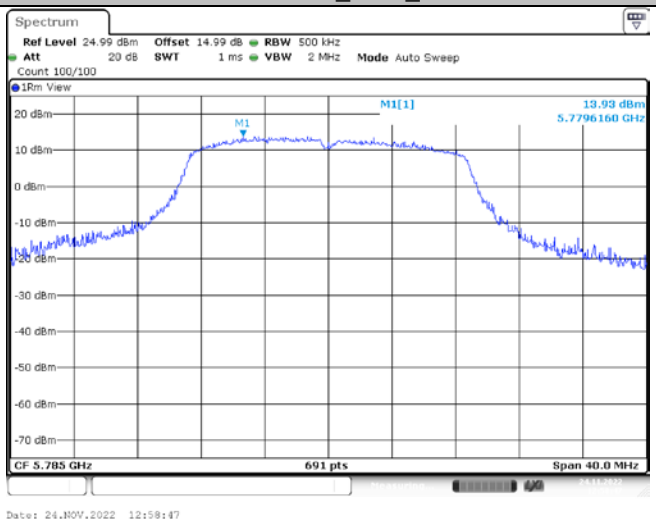
11N20MIMO_Ant1_5745



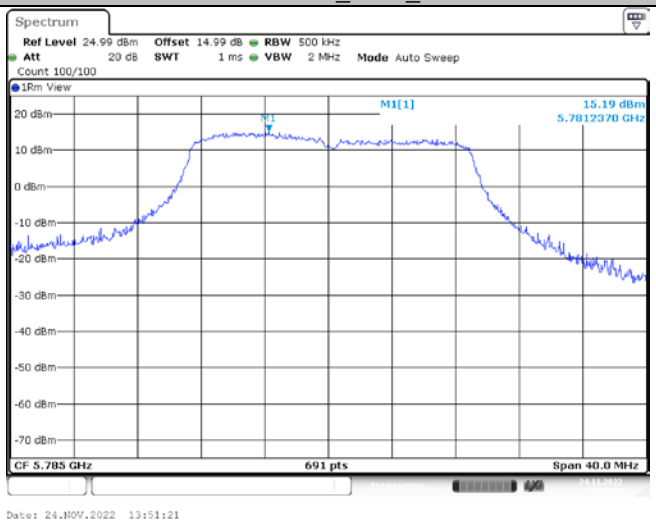
11N20MIMO_Ant2_5745



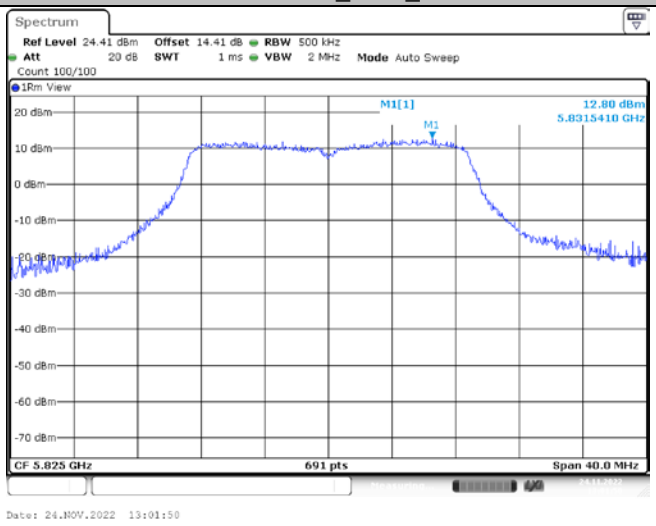
11N20MIMO_Ant1_5785



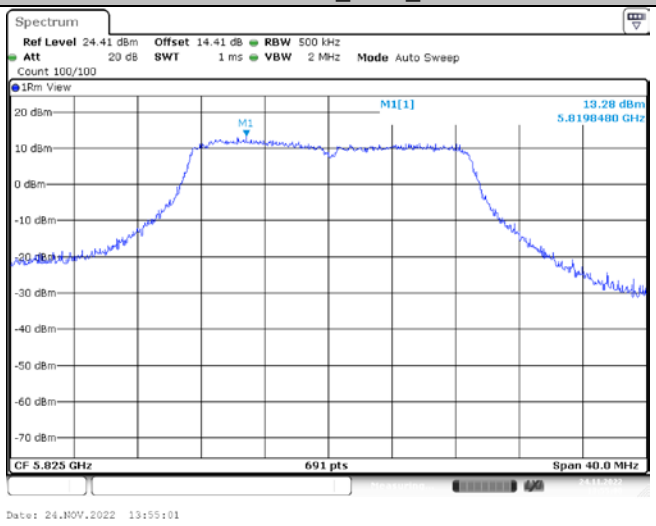
11N20MIMO_Ant2_5785



11N20MIMO_Ant1_5825



11N20MIMO_Ant2_5825



Appendix D: Duty Cycle

Test Result

5150~5250MHz:

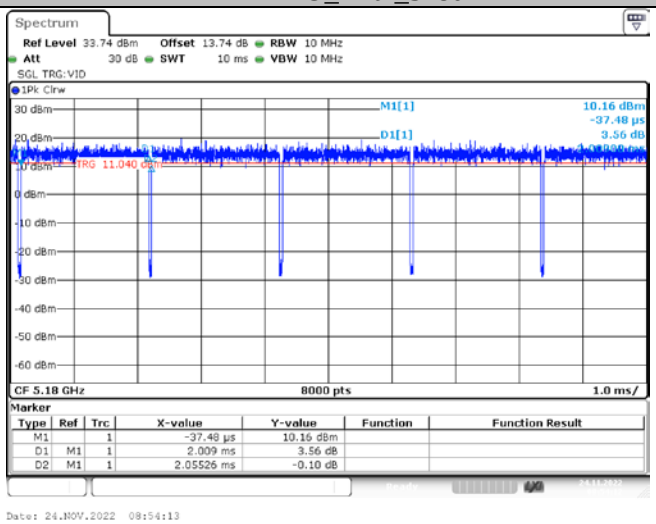
Test Mode	Channel	Antenna	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]	1/T minimum VBW setting(kHz)
11A	5180	Ant1	2.01	2.06	97.75	0.498
		Ant2	2.01	2.06	97.69	0.498
	5200	Ant1	2.01	2.06	97.69	0.498
		Ant2	2.01	2.06	97.75	0.498
	5240	Ant1	2.01	2.06	97.75	0.498
		Ant2	2.01	2.06	97.69	0.498
11N20MIMO	5180	Ant1	1.87	1.92	97.59	0.535
		Ant2	1.87	1.92	97.53	0.535
	5200	Ant1	1.87	1.92	97.59	0.535
		Ant2	1.87	1.92	97.53	0.535
	5240	Ant1	1.87	1.92	97.59	0.535
		Ant2	1.87	1.92	97.53	0.535

5725~5850MHz:

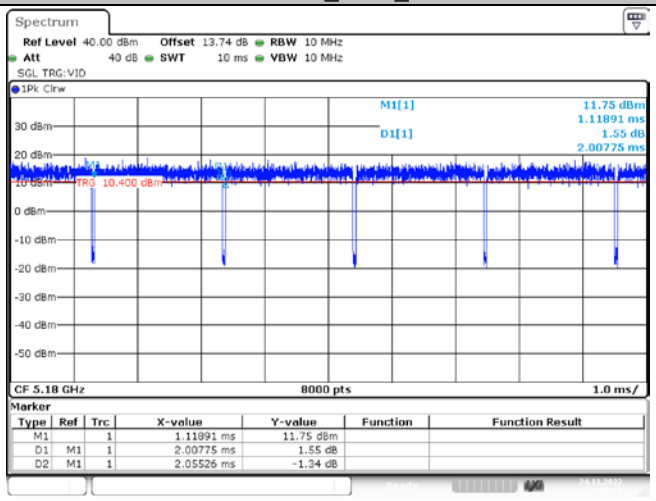
Test Mode	Channel	Antenna	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]	1/T minimum VBW setting(kHz)
11A	5745	Ant1	2.01	2.06	97.75	0.485
		Ant2	2.01	2.06	97.75	0.485
	5785	Ant1	2.01	2.06	97.75	0.485
		Ant2	2.01	2.06	97.75	0.485
	5825	Ant1	2.01	2.06	97.75	0.485
		Ant2	2.01	2.06	97.75	0.485
11N20MIMO	5745	Ant1	1.87	1.92	97.59	0.521
		Ant2	1.87	1.92	97.53	0.521
	5785	Ant1	1.87	1.92	97.59	0.521
		Ant2	1.87	1.92	97.59	0.521
	5825	Ant1	1.87	1.92	97.59	0.521
		Ant2	1.87	1.92	97.59	0.521

Test Graphs

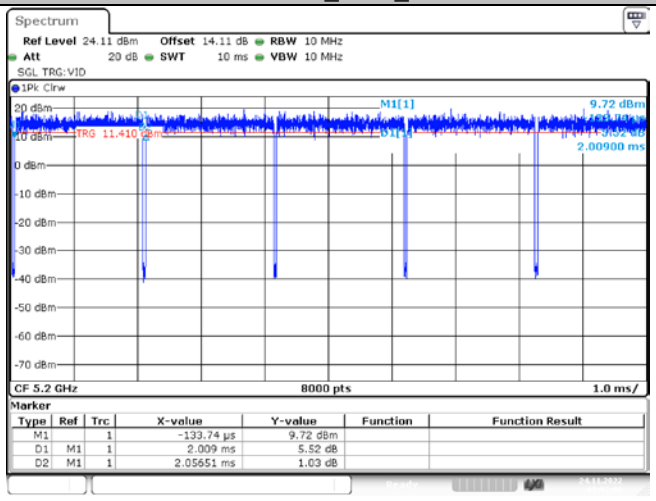
11A MIMO_Ant1_5180



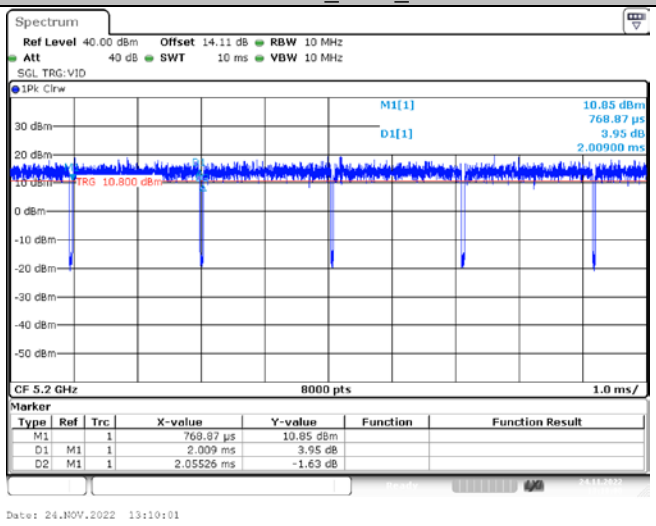
11A MIMO_Ant2_5180



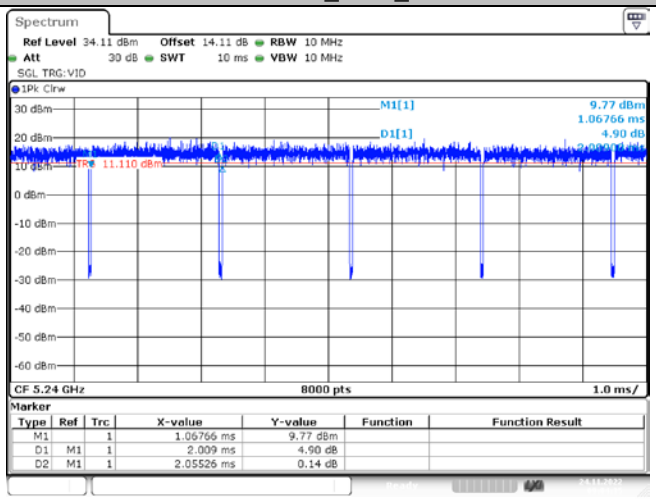
11A MIMO_Ant1_5200



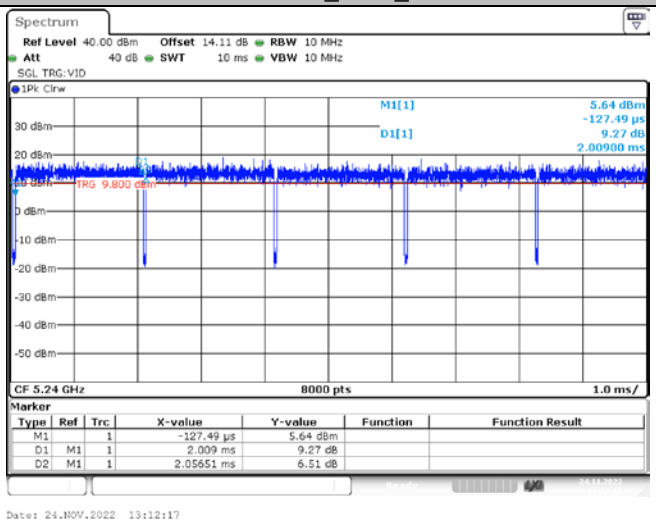
11A MIMO_Ant2_5200



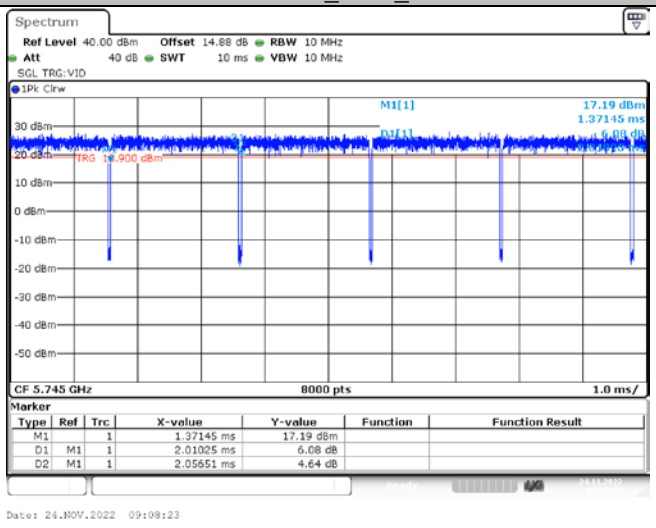
11A MIMO_Ant1_5240



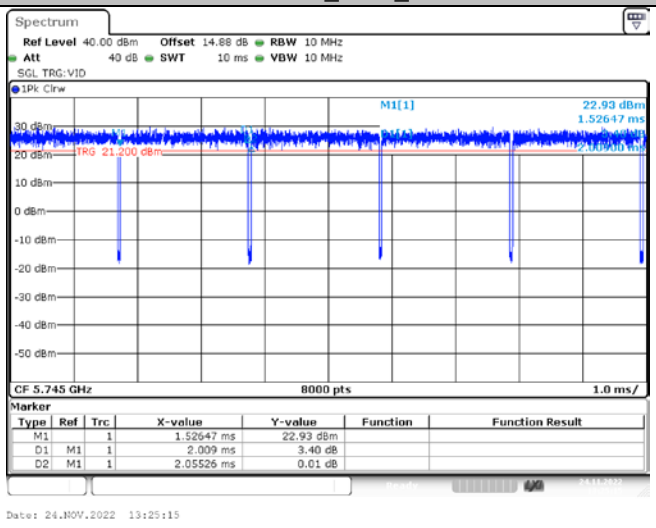
11A MIMO_Ant2_5240



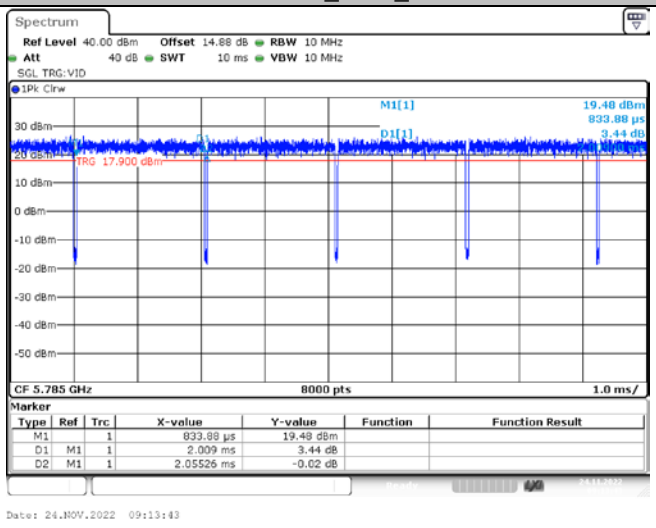
11A MIMO_Ant1_5745



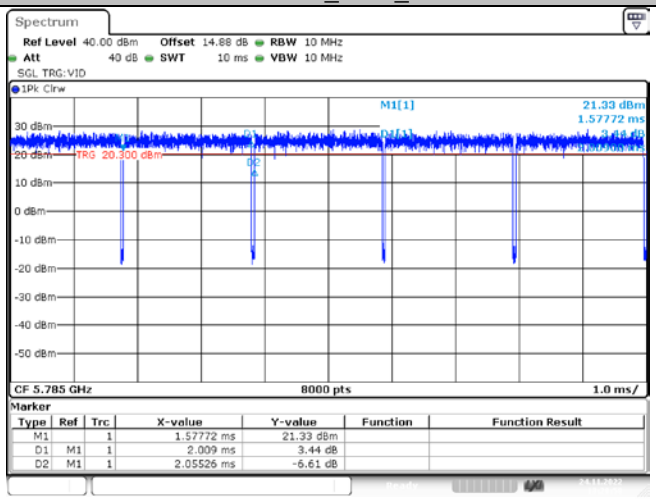
11A MIMO_Ant2_5745



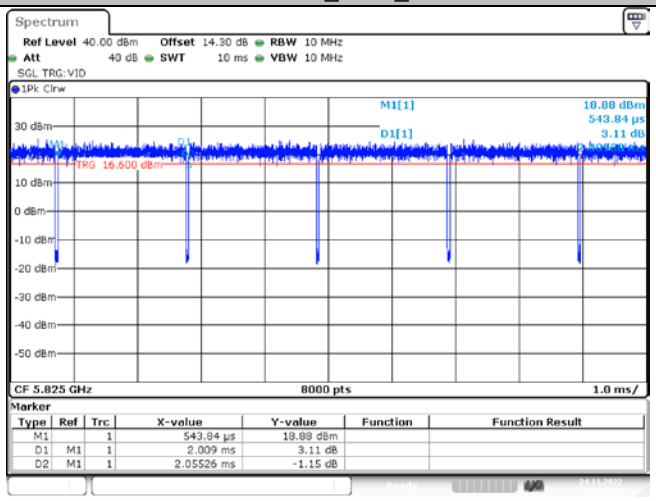
11A MIMO_Ant1_5785



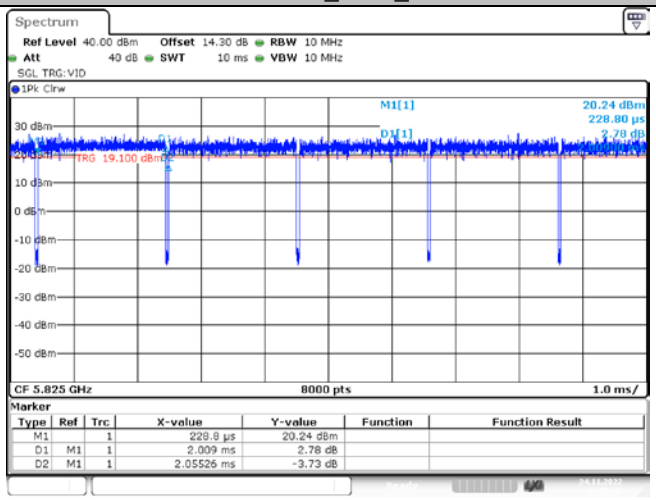
11A MIMO_Ant2_5785



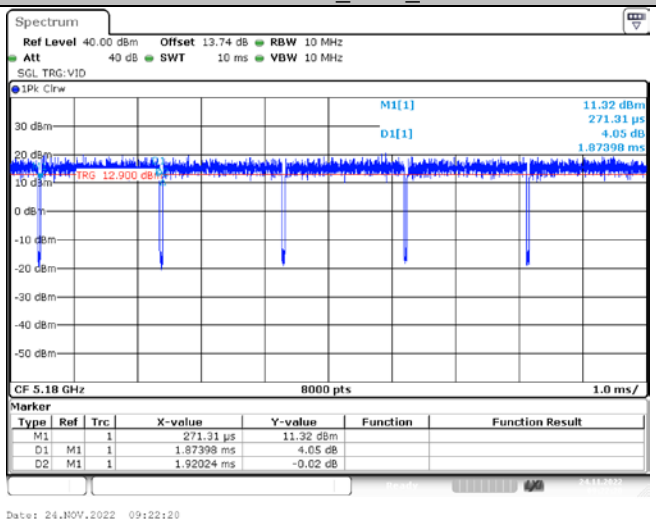
11A MIMO_Ant1_5825



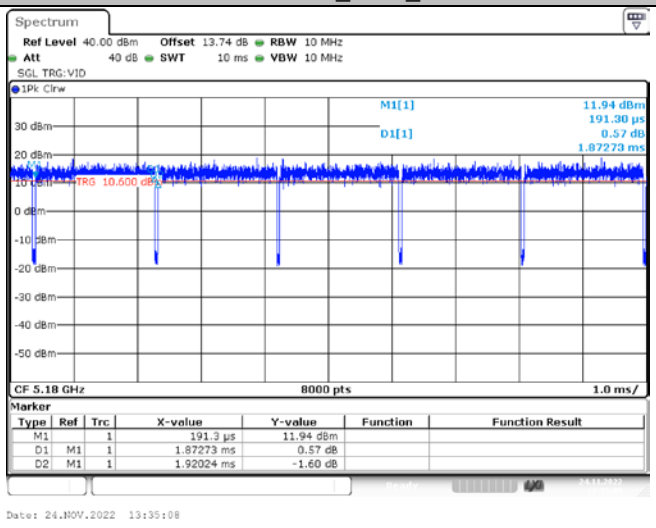
11A MIMO_Ant2_5825



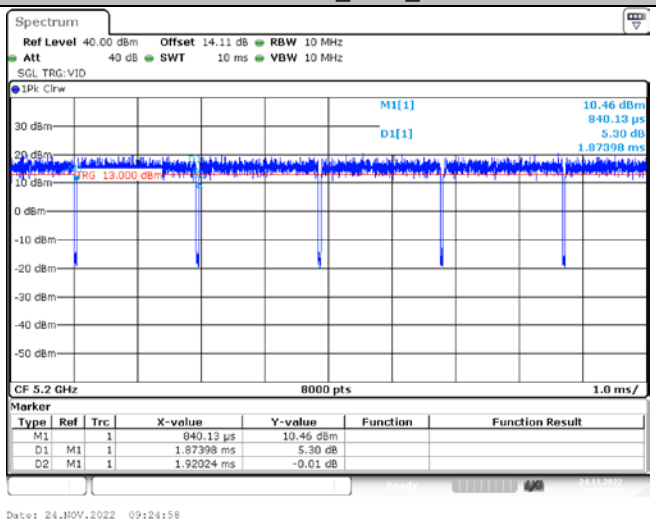
11N20MIMO_Ant1_5180



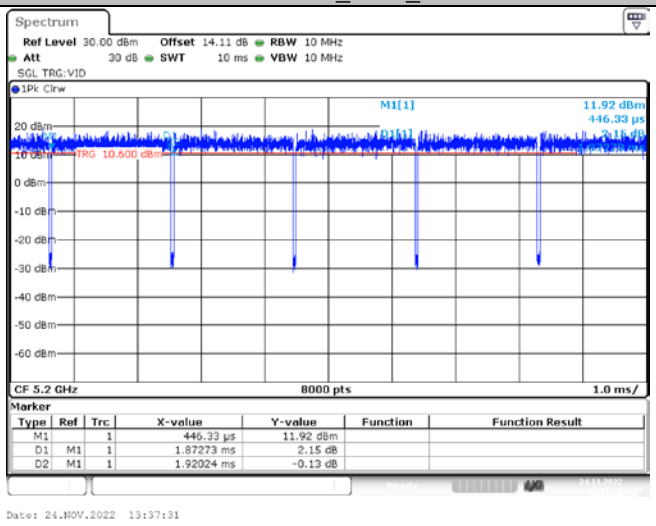
11N20MIMO_Ant2_5180



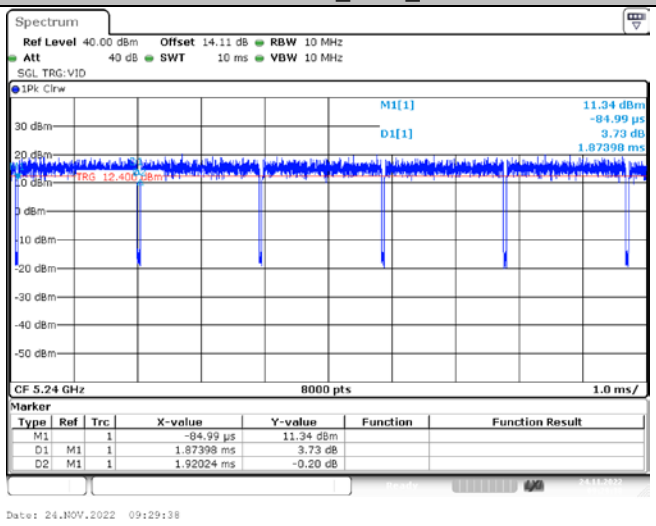
11N20MIMO_Ant1_5200



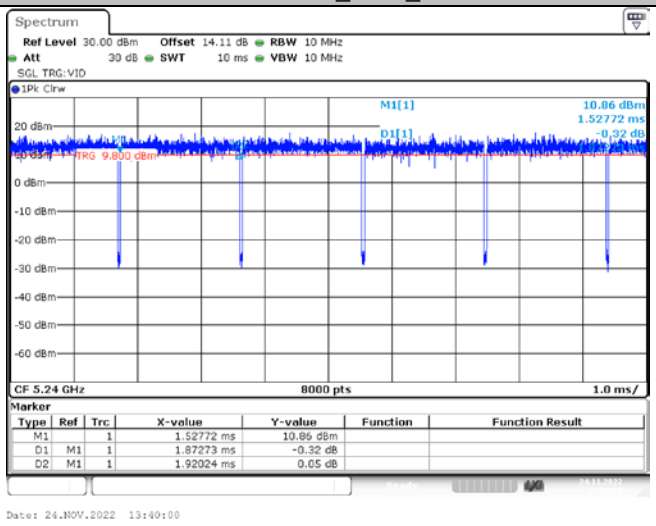
11N20MIMO_Ant2_5200



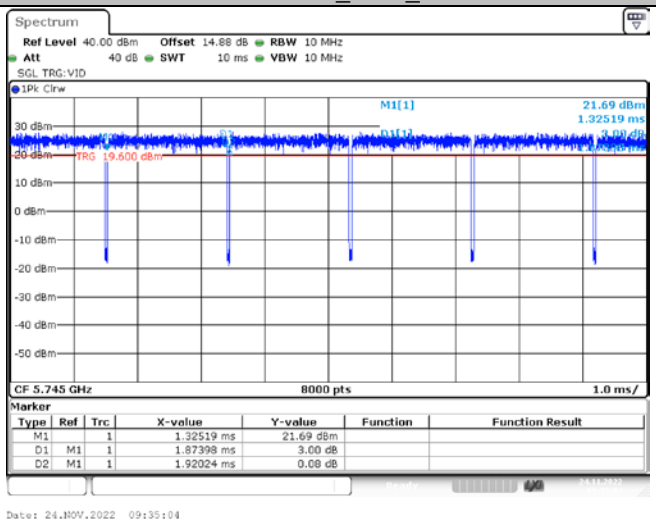
11N20MIMO_Ant1_5240



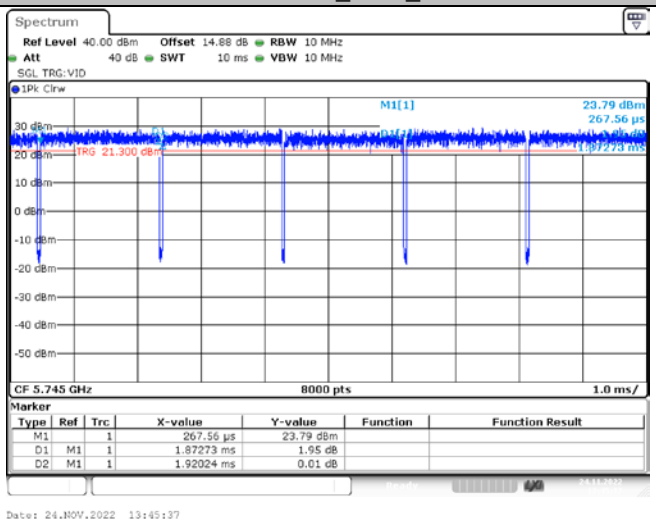
11N20MIMO_Ant2_5240



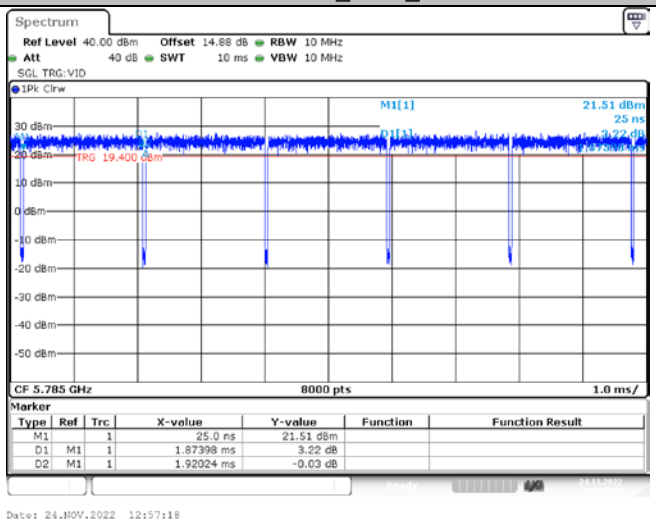
11N20MIMO_Ant1_5745



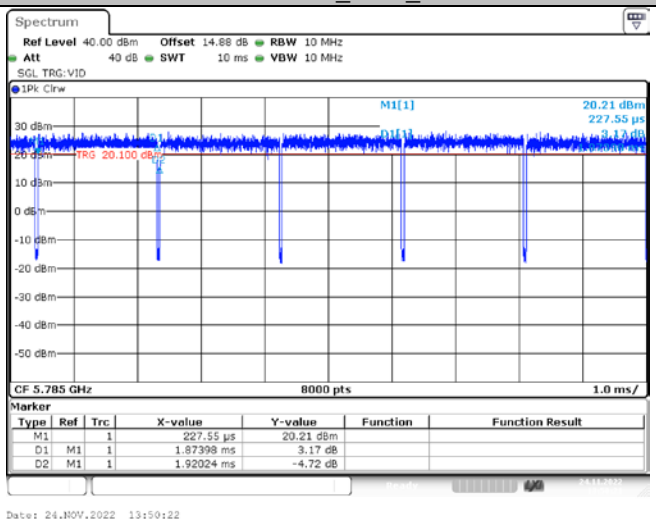
11N20MIMO_Ant2_5745



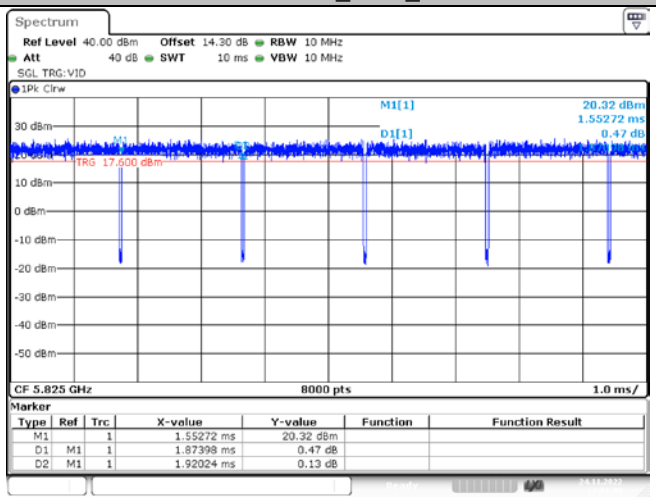
11N20MIMO_Ant1_5785



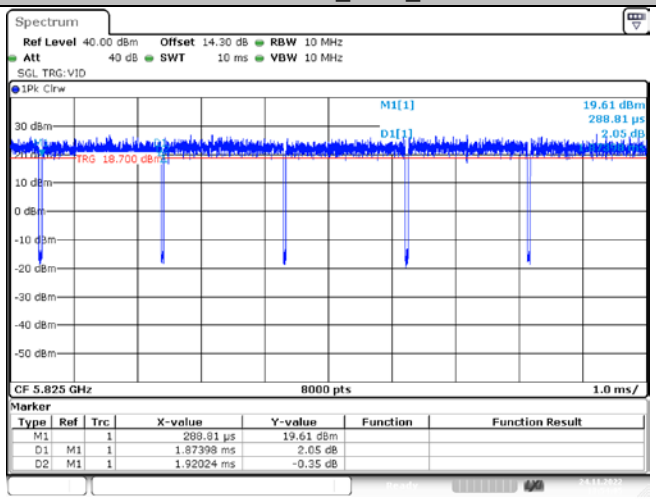
11N20MIMO_Ant2_5785



11N20MIMO_Ant1_5825



11N20MIMO_Ant2_5825



******* END OF REPORT *******