





FCC PART 15C TEST REPORT No.I22Z60808-IOT08

for

Razer Inc.

Gaming Tablet

RZ45-0460VWQ

With

FCC ID: RWO-RZ450460

Hardware Version: V4

Software Version: Razer Edge 5G-12-user

Issued Date: 2022-09-28

Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of CTTL.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S.Government.

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
I22Z60808-IOT08	Rev.0	1st edition	2022-08-05
I22Z60808-IOT08	Rev.1	Add the power result graph.	2022-08-26
		Add thePSD result graph.	
		Update the description of A.1.2.	
I22Z60808-IOT08	Rev.2	Update the Test graphs in A8.1.	2022-09-01
I22Z60808-IOT08	Rev.3	Update the result table of PSD.	2022-09-28
		Add the result of 26dB.	





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1. TEST LATORATORY

1.1. Introduction & Accreditation

Telecommunication Technology Labs, CAICT is an ISO/IEC 17025:2017 accredited test laboratory under NATIONAL VOLUNTARY LABORATORY ACCREDITATION PROGRAM (NVLAP) with lab code 600118-0, and is also an FCC accredited test laboratory (CN5017), and ISED accredited test laboratory (ISED#: 24849). The detail accreditation scope can be found on NVLAP website.

1.2. Testing Location

Conducted testing Location: CTTL(huayuan North Road)

Address: No. 52, Huayuan North Road, Haidian District, Beijing, P. R. China100191 Radiated testing Location: CTTL(huayuan North Road)

Address: No. 52, Huayuan North Road, Haidian District, Beijing, P. R. China100191

1.3. TestingEnvironment

Normal Temperature:	15-35°C
Relative Humidity:	20-75%

1.4. Project date

Testing Start Date:	2022-04-20
Testing End Date:	2022-09-28

1.5. Signature

谢禹药

Xie Xiuzhen (Prepared this test report)

2320

Zheng Wei (Reviewed this test report)

Hu Xiaoyu (Approved this test report)





2. CLIENT INFORMATION

2.1. Applicant Information

Company Name:
Address /Post:
Contact:
Email:
Telephone:

Razer Inc. 9 Pasteur, Suite 100, Irvine, CA 92618, USA. Johnsen Tia Johnsen.tia@razer.com +65 6571 6828

2.2. Manufacturer Information

Company Name:	Razer Inc.
Address /Post:	9 Pasteur, Suite 100, Irvine, CA 92618, USA.
Contact:	Johnsen Tia
Email:	Johnsen.tia@razer.com
Telephone:	+65 6571 6828





3. EQUIPMENT UNDER TEST (EUT) AND ANCILLARY

EQUIPMENT(AE)

3.1. About EUT

Description	Gaming Tablet
Model name	RZ45-0460VWQ
FCC ID	RWO-RZ450460
WLAN Frequency Band	ISM Band: 5850MHz~5895MHz
Type of modulation	OFDM/OFDMA
Antenna	Embedded Antenna
Voltage	3.87V

3.2. Internal Identification of EUT used during the test

EUT ID*	IMEI	HW Version	SW Version
UT65a	867034040041429	V4	Razer Edge 5G-12-user
UT35a	867034040041816	V4	Razer Edge 5G-12-user

*EUT ID: is used to identify the test sample in the lab internally.

* UT35a is used for Conduction test, UT65ais used for Radiation test.

3.3. Internal Identification of AE used during the test

AE ID*	Description	Туре	SN
AE1	Battery	/	CAC4060002C2
AE2	Dummy battery	/	/
AE3	USB Cable	/	LS2-A001A
AE4	Adapter	/	A849-200225C-US 1

*AE ID: is used to identify the test sample in the lab internally.

3.4. General Description

Equipment Under Test (EUT) is a model of Gaming Tablet with embedded antenna. It consists of normal options: Battery and Charger.

Manual and specifications of the EUT were provided to fulfil the test.

Samples undergoing test were selected by the Client.





4. <u>REFERENCE DOCUMENTS</u>

4.1. Documents supplied by applicant

EUT feature information is supplied by the applicant or manufacturer, which is the basis of testing.

4.2. Reference Documents for testing

The following documents listed in this section are referred for testing.

FCC Part15	FCC CFR 47, Part 15, Subpart E: 15.205 Restricted bands of operation; 15.209 Radiated emission limits, general requirements; 15.407 General technical requirements	2018
ANSI C63.10	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz	2013
UNII: KDB 789033 D02	General U-NII Test Procedures New Rules v02r01	2017-12
KDB 291074 D02	GUIDELINES FOR COMPLIANCE TESTING OF UNLICENSED NATIONAL INFORMATION INFRASTRUCTURE (U-NII) 5.9 GHz DEVICES UNDER PART 15, SUBPART E	2022-03
KDB 662911 D01	Emissions Testing of Transmitters with Multiple Outputs in the Same Band(e.g., MIMO, Smart Antenna, etc)	2013-10

5. LABORATORY ENVIRONMENT

Conducted RF performance testing is performed in shielding room.

EMC performance testing is performed in Semi-anechoic chamber.





6. SUMMARY OF TEST RESULTS

6.1. Summary of Test Results

SUMMARY OF MEASUREMENT RESULTS	Sub-clause of Part15C	Sub-clause of IC	Verdict
Maximum Peak Output Power	15.407 (a)	1	Р
Peak Power Spectral Density	15.407 (a)	1	Р
Occupied 6dB Bandwidth	15.407 (e)	/	Р
99% Occupied Bandwidth	15.407 (b)	/	Р
Out of Band Emissions	15.407 (b)	/	Р
Transmitter Spurious Emission - Radiated	15.407, 15.205, 15.209	/	Р
AC Powerline Conducted Emission	15.107, 15.207	1	Р

Please refer to **ANNEX A** for detail.

Terms used in Verdict column

Р	Pass, The EUT complies with the essential requirements in the standard.					
NM	Not measured, The test was not measured by CTTL					
NA	Not Applicable, The test was not applicable					
F	Fail, The EUT does not comply with the essential requirements in the standard					

6.2. Statements

CTTL has evaluated the test cases requested by the client/manufacturer as listed in section 6.1 of this report for the EUT specified in section 3 according to the standards or reference documents listed in section 4.1.

This report only deals with the WLAN function among the features described in section 3. KDB 291074 is not accredited by the NVLAP.

6.3. Test Conditions

For this report, all the test cases are tested under normal temperature and normal voltage, and also under norm humidity, the specific condition is shown as follows:

Temperature	26° ℃
Voltage	3.87V
Humidity	44%





7. TEST EQUIPMENTS UTILIZED

Conducted test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibratio n Period	Calibration Due date
1	Vector Signal Analyzer	FSQ40	200089	Rohde & Schwarz	1 year	2023-05-15
2	Test Receiver	ESCI 3	100344	Rohde & Schwarz	1 year	2023-02-21
3	LISN	ENV216	101200	Rohde & Schwarz	1 year	2022-06-29
4	Attenuator	10dB/2W	/	Rosenberger	/	/
5	Shielding Room	S81	/	ETS-Lindgren	/	/

Note:

The test dates were before the calibration due dates of equipment used (the LISN which series number is 101200)

Radiated emission test system

No	Equipment	Model	Serial Number	Manufacturer	Calibration Period	Calibratio n Due date
1	Test Receiver	ESW44	103023	103023 Rohde & 1 year	2022-10-28	
i lest Receiver		200044	103023	Schwarz		i yeai
2	EMI Antenna	VULB	400	SCHWARZBE	1.voor	2022-08-24
2	Eivii Antenna	Antenna 9163 483		СК	1 year	2022-00-24
3	EMI Antenna	3115	00167250	ETS-Lindgren	1 year	2022-07-01
4	EMI Antenna	3116	2663	ETS-Lindgren	1 Year	2022-08-11

Note:

The test dates were before the calibration due dates of equipment used (the EMI Antenna which series number is 00167250)





8. Measurement Uncertainty

8.1. Transmitter Output Power

Measurement Uncertainty: 0.387dB,k=1.96

8.2. Peak Power Spectral Density

Measurement Uncertainty: 0.705dB,k=1.96

8.3. Occupied 6dB Bandwidth

Measurement Uncertainty: 60.80Hz,k=1.96

8.4. 99% Occupied Bandwidth

Measurement Uncertainty: 60.80Hz,k=1.96

8.5. Band Edges Compliance

Measurement Uncertainty : 0.62dB,k=1.96

8.6. Spurious Emissions

Conducted	(k=1.96)
-----------	----------

Frequency Range	Uncertainty(dB)
30MHz ≤ f ≤ 2GHz	1.22
2GHz ≤ f ≤3.6GHz	1.22
3.6GHz ≤ f ≤8GHz	1.22
8GHz ≤ f ≤12.75GHz	1.51
12.75GHz ≤ f ≤26GHz	1.51
26GHz ≤ f ≤40GHz	1.59

Radiated (k=2)

Frequency Range	Uncertainty(dB)
9kHz-30MHz	4.92
30MHz ≤ f ≤ 1GHz	5.15
1GHz ≤ f ≤18GHz	5.54
18GHz ≤ f ≤40GHz	5.26

8.7. AC Power-line Conducted Emission

Measurement Uncertainty : 3.08dB,k=2



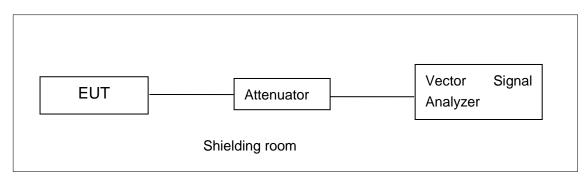


ANNEX A: MEASUREMENT RESULTS

A.1. Measurement Method

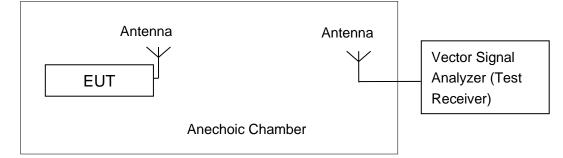
A.1.1. Conducted Measurements

- 1). Connect the EUT to the test system correctly.
- 2). Set the EUT to the required work mode.
- 3). Set the EUT to the required channel.
- 4). Set the spectrum analyzer to start measurement.
- 5). Record the values. Vector Signal Analyzer



A.1.2. Radiated Emission Measurements

In the case of radiated emission, the used settings are as follows, Sweep frequency from 30 MHz to 1GHz, RBW = 100 kHz, VBW = 300 kHz; Sweep frequency from 1 GHz to 26GHz, RBW = 1MHz, VBW = 10Hz;



The measurement is made according to ANSI C63.10 and KDB Publication 987594 D01.

The distance from the EUT to the reference point of measurement antenna is 3m. The test is carried out on both vertical and horizontal polarization and only maximization result of both polarizations is kept. During the test, the turntable is rotated 360° and the measurement antenna is moved from 1m to 4m to get the maximization result. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.





A.2. Maximum Peak Output Power

Measurement Limit and Method:

Standard	e.i.r.p Limit (dBm)
FCC CRF Part 15.407(a)	30

The measurementmethod SA-2 is made according to KDB 789033 and KDB 291074.

A.2.1 Directional Gain

Ant4(dBi)	Ant5(dBi)	DG(dBi)
		beamforming
-3.2	-3.3	-0.24

For BF transmissions, power and PSD directional gain is calculated as:

Directional gain = $10 \log [(10G1 / 20 + 10G2 / 20 + ... + 10Gn / 20) 2 / NANT] dBi, as following table for PSD. NANT = number of transmit antennas NSS = number of spatial streams. (The worst case directional gain will occur when NSS = 1).$

A.2.2. Maximum Average Output Power-Conducted

Measurement Results:

SISO

		R				
Mode	Channel	ANT4		ANT5		Conclusion
		Conducted	e.i.r.p	Conducted	e.i.r.p	
	5845MHz(Ch169)	11.30	8.44	11.02	7.72	Р
802.11a	5865MHz(Ch173)	11.85	8.65	10.82	7.52	Р
	5885MHz(Ch177)	11.77	8.57	11.15	7.85	Р
	5845MHz(Ch169)	11.70	8.50	11.05	7.75	Р
802.11n-HT20	5865MHz(Ch173)	11.33	8.13	11.01	7.71	Р
	5885MHz(Ch177)	11.38	8.18	10.62	7.32	Р
	5845MHz(Ch169)	11.52	8.32	10.78	7.48	Р
802.11ac-VHT20	5865MHz(Ch173)	11.59	8.39	10.91	7.61	Р
	5885MHz(Ch177)	11.59	8.39	10.63	7.33	Р
900 11 ov UE 20	5845MHz(Ch169)	13.59	10.39	12.75	9.45	Р
802.11ax-HE20	5865MHz(Ch173)	13.37	10.17	12.67	9.37	Р
(full RU)	5885MHz(Ch177)	13.34	10.14	12.62	9.32	Р
802.11n-HT40	5835MHz(Ch167)	11.71	8.51	11.25	7.95	Р
802.11N-⊓140	5875MHz(Ch175)	11.34	8.14	11.01	7.71	Р
902 11 cc \// IT40	5835MHz(Ch167)	11.77	8.57	10.80	7.50	Р
802.11ac-VHT40	5875MHz(Ch175)	11.54	8.34	11.08	7.78	Р
802.11ax-HE40	5835MHz(Ch167)	13.46	10.26	12.80	9.50	Р
(full RU)	5875MHz(Ch175)	13.52	10.32	12.48	9.18	Р
802.11ac-VHT80	5855MHz(Ch171)	10.22	7.02	10.33	7.03	Р

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802.11ax-HE80 (full RU)	5855MHz(Ch171)	13.45	10.25	12.76	9.46	Р
802.11ac-VHT160	5815MHz(Ch163)	9.16	5.96	8.81	5.51	Р
802.11ax-HE160 (full RU)	5815MHz(Ch163)	13.55	10.35	12.47	9.17	Р

The data rate 6Mbps(802.11b), MCS0(802.11n/ac/ax) is selected as worse condition, and the following cases are performed with this condition.

Conclusion: PASS

MIMO

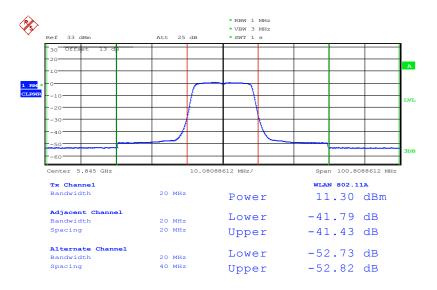
Mode	Channel		Conclusion			
MODE		ANT4	ANT5	Conducted	e.i.r.p	Conclusion
	5845MHz (Ch169)	11.77	11.15	14.48	14.24	Р
802.11a	5865MHz (Ch173)	11.60	11.18	14.41	14.17	Р
	5885MHz(Ch177)	11.52	11.22	14.38	14.14	Р
	5845MHz (Ch169)	11.71	10.81	14.29	14.05	Р
802.11n-HT20	5865MHz (Ch173)	11.66	10.8	14.26	14.02	Р
	5885MHz(Ch177)	11.38	10.95	14.18	13.94	Р
	5845MHz (Ch169)	11.48	10.59	14.07	13.83	Р
802.11ac-VHT20	5865MHz (Ch173)	11.39	10.62	14.03	13.79	Р
	5885MHz(Ch177)	11.41	10.61	14.04	13.80	Р
	5845MHz (Ch169)	13.57	13.10	16.35	16.11	Р
802.11ax-HE20	5865MHz (Ch173)	13.50	12.66	16.11	15.87	Р
	5885MHz(Ch177)	13.38	12.31	15.89	15.65	Р
902 11 m LIT 40	5835MHz (Ch167)	11.95	10.87	14.45	14.21	Р
802.11n-HT40	5875MHz(Ch175)	11.91	10.76	14.38	14.14	Р
	5835MHz (Ch167)	12.18	10.93	14.61	14.37	Р
802.11ac-VHT40	5875MHz(Ch175)	11.77	10.89	14.36	14.12	Р
802.11ax-HE40	5835MHz (Ch167)	13.51	12.58	16.08	15.84	Р
(full RU)	5875MHz(Ch175)	13.39	12.52	15.99	15.75	Р
802.11ac-VHT80	5855MHz(Ch171)	10.15	10.45	13.31	13.07	Р
802.11ax-HE80		40.00	10.00	15.05	15.61	Р
(full RU)	5855MHz(Ch171)	13.32	12.30	15.85		
802.11ac-VHT160	5815MHz(Ch163)	9.32	9.02	12.18	11.94	Р
802.11ax-HE160 (full RU)	5815MHz(Ch163)	13.58	12.03	15.88	15.64	Р

The data rate 6Mbps(802.11b), MCS0(802.11n/ac/ax) is selected as worse condition, and the following cases are performed with this condition.





802.11a-5845MHz-ant4:



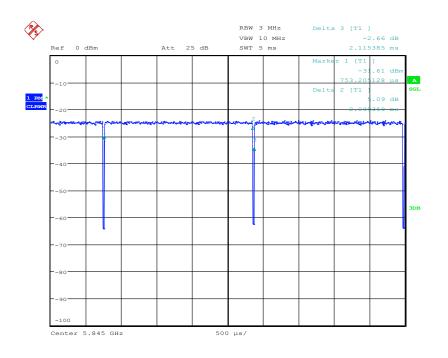
Date: 27.AUG.2022 04:22:05

Duty Cycle

Mode	11a	11n20	11ac20	11ax20	11n40	11ac40	11ax40	11ac80	11ax80	11ac160	11ax160
Duty Cycle	99%	99%	99%	99%	99%	99%	99%	99%	98%	99%	98%







Date: 4.AUG.2022 17:32:36

Note: The following cases are performed with this condition:

- a) 802.11a/n20/ac40/ac160 mode (Ant4) are selected as the worst condition (SISO),
 802.11ax20/40/80/160 (full RU) mode (Ant4) is selected as the worst condition (SISO);
- b) 802.11a/n20/ac40/ac160 mode (Ant4) are selected as the worst condition (MIMO);

802.11ax20/40/80/160 (full RU) mode (Ant4) is selected as the worst condition (MIMO);

- c) The 802.11ax20 (full RU) mode (compare with 802.11n20/ac20), 802.11ax40 (full RU) mode (compare with 802.11n40/ac40), 802.11ax80 (full RU) mode (compare with 802.11ac80), 802.11ax160 (full RU) mode (compare with 802.11ac160) are selected as the worst condition (SISO Ant4).
- d) The 802.11ax20 (full RU) mode (compare with 802.11n20/ac20), 802.11ax40 (full RU) mode (compare with 802.11n40/ac40), 802.11ax80 (full RU) mode (compare with 802.11ac80), 802.11ax160 (full RU) mode (compare with 802.11ac160) are selected as the worst condition (MIMO Ant4).
- e) After evaluation, the maximum power and PSD of 802.11ax20/40/80/160 is in full RU, so all testing done under full RU.

Conclusion: PASS





A.3. Peak Power Spectral Density

Measurement Limit:

Standard	e.i.r.p Limit
FCC 47 CFR Part 15.407(a)	14 dBm/MHz

The measurement is made according to ANSI C63.10, KDB789033 D02 and KDB 291074.

Measurement Uncertainty:

Measurement Uncertainty	0.75dB
-------------------------	--------

Measurement Results:

SISO-Ant4

Mode	Channel	Power Spectral Density (dBm/MHz)	Conclusion	
	169	-2.92	Р	
802.11a	173	-2.40	Р	
	177	-2.62	Р	
002.11	169	-2.85	Р	
802.11n	173	-3.06	Р	
HT20	177	-2.90	Р	
802.11ac	167	-5.74	Р	
VHT40	175	-6.07	Р	
802.11ac VHT160	163	-14.46	Р	
000 44 av LIE00	169	-1.19	Р	
802.11ax HE20	173	-1.18	Р	
(full RU)	177	-1.19	Р	
802.11ax HE40	167	-3.93	Р	
(full RU)	175	-4.19	Р	
802.11ax HE80	171	7.14	Р	
(full RU)	171	-7.14	P	
802.11ax HE160	163	-9.74	Р	
(full RU)	105	-3.14	Г	

SISO-Ant5

Mode Channel		Power Spectral Density (dBm/500kHz)	Conclusion	
802.11ac VHT80	171	-10.51	Р	

ΜΙΜΟ

Mode	Channel		Conclusion			
MODE	Channel	ANT4	ANT5	Conducted	e.i.r.p	Conclusion
	5845MHz (Ch169)	0.66	0.09	3.39	3.16	Р
802.11a	5865MHz (Ch173)	0.70	0.31	3.52	3.28	Р
	5885MHz(Ch177)	0.47	-0.21	3.15	2.91	Р
802.11n-HT20	5845MHz (Ch169)	0.31	-0.15	3.10	2.86	Р

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	5865MHz (Ch173)	0.09	-0.53	2.80	2.56	Р
	5885MHz(Ch177)	0.24	-0.68	2.81	2.58	Р
	5845MHz (Ch169)	2.33	1.42	4.91	4.67	Р
802.11ax-HE20	5865MHz (Ch173)	2.15	0.88	4.57	4.33	Р
	5885MHz(Ch177)	2.05	0.64	4.41	4.17	Р
902 11 oo \/UT40	5835MHz (Ch167)	-2.59	-3.10	0.17	-0.07	Р
802.11ac-VHT40	5875MHz(Ch175)	-2.46	-2.91	0.33	0.09	Р
802.11ax-HE40	5835MHz (Ch167)	-0.60	-1.53	1.97	1.73	Р
(full RU)	5875MHz(Ch175)	-0.79	-1.53	1.87	1.63	Р
802.11ac-VHT80	5855MHz(Ch171)	-7.53	-6.94	-4.21	-4.45	Р
802.11ax-HE80 (full RU)	5855MHz(Ch171)	-3.84	-4.71	-1.24	-1.48	Р
802.11ac-VHT160	5815MHz(Ch163)	-11.33	-11.34	-8.32	-8.56	Р
802.11ax-HE160 (full RU)	5815MHz(Ch163)	-6.58	-7.61	-4.05	-4.29	Р

802.11a-5845MHz-mimo ant4:



16:38:05 23.06.2022

Conclusion: PASS

A.4. Occupied 6dB Bandwidth

- a) Set RBW = 100 kHz.
- b) Set the video bandwidth (VBW) \geq 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.

Measurement Limit:

Standard	Limit (kHz)
FCC 47 CFR Part 15.407 (e)	≥ 500

Measurement Result:

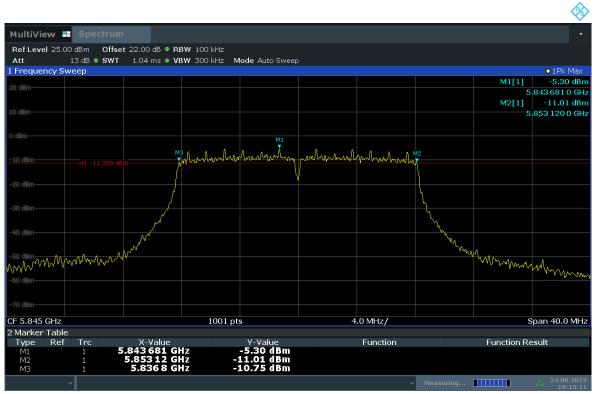
Mode	Channel	Occupied 6d (N	conclusion	
	169	Fig.1	16.32	Р
802.11a	173	Fig.2	16.32	Р
	177	Fig.3	16.32	Р
802.11ax	169	Fig.4	19.07	Р
HE20	173	Fig.5	19.06	Р
HE20	177	Fig.6	19.05	Р
802.11ax	167	Fig.7	38.09	Р
HE40	175	Fig.8	38.08	Р
802.11ax HE80	171	Fig.9	78.05	Р
802.11ax HE160	163	Fig.10	158.08	Р

Conclusion: PASS

Test graphs as below:







19:15:11 24.06.2022



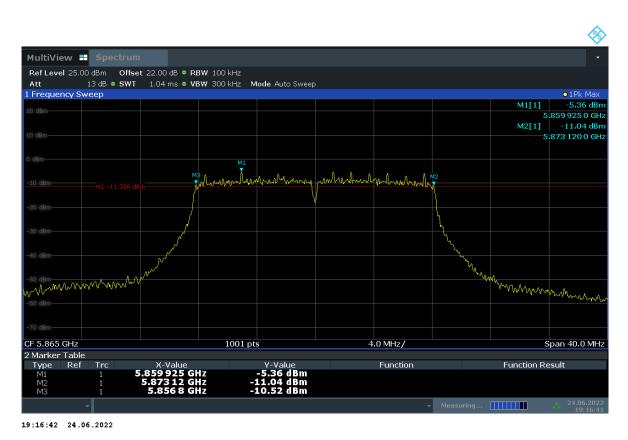
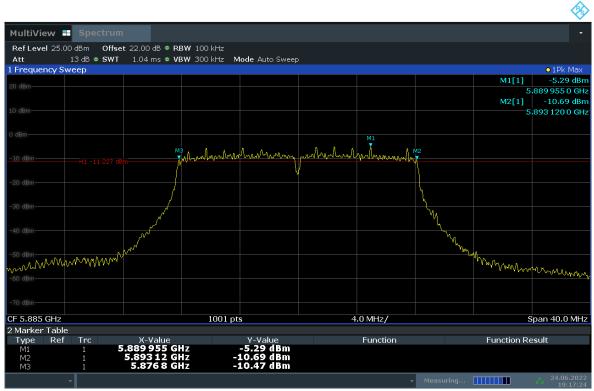


Fig. 2 Occupied 6dB Bandwidth (802.11a, Ch 173)







19:17:25 24.06.2022



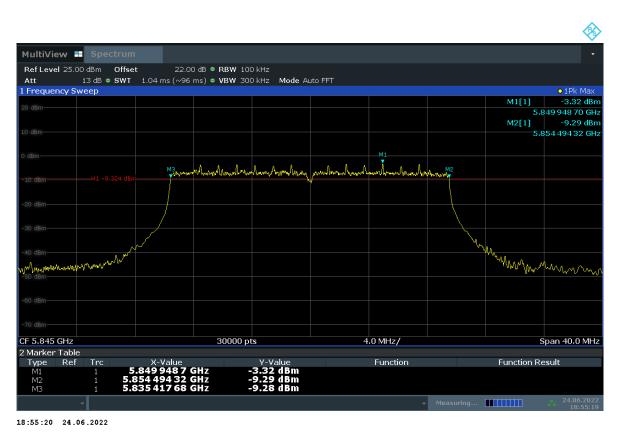
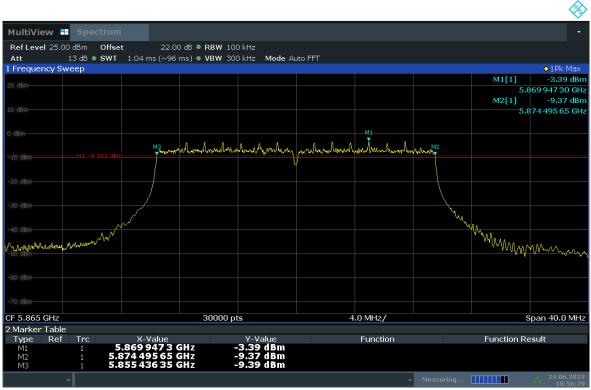


Fig. 4 Occupied 6dB Bandwidth (802.11ax-HE20, Ch 169)







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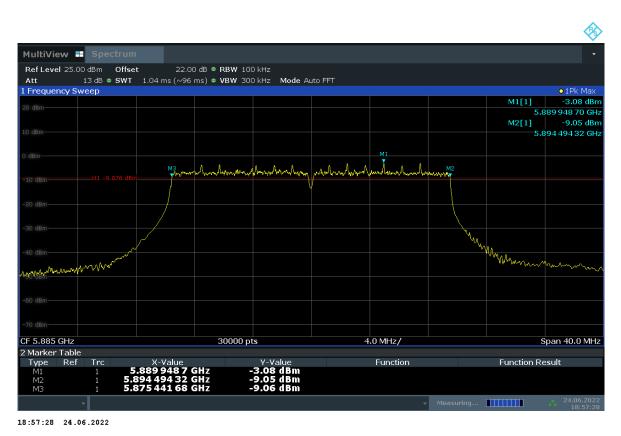
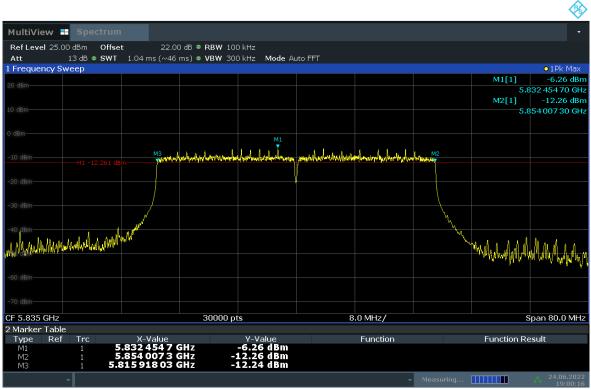


Fig. 6 Occupied 6dB Bandwidth (802.11ax-HE20, Ch 177)







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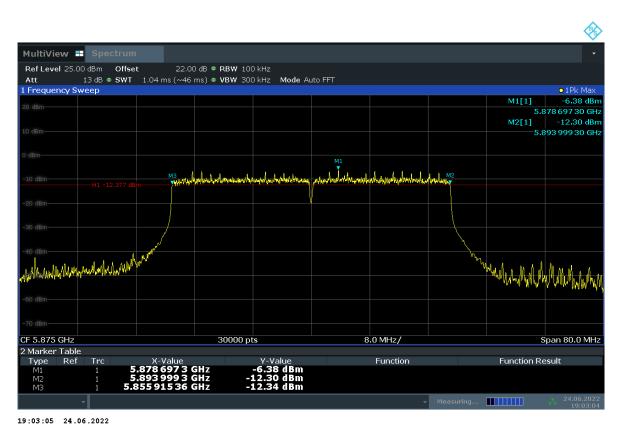
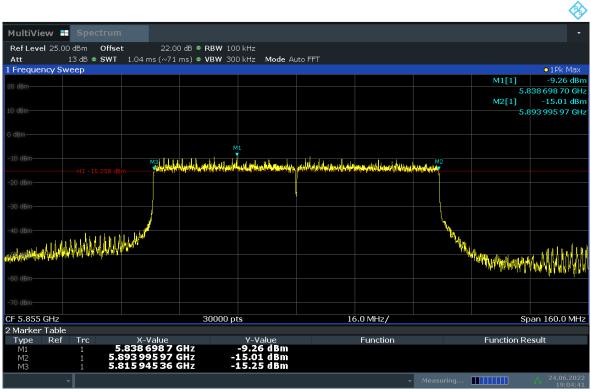


Fig. 8 Occupied 6dB Bandwidth (802.11ax-HE40, Ch 175)

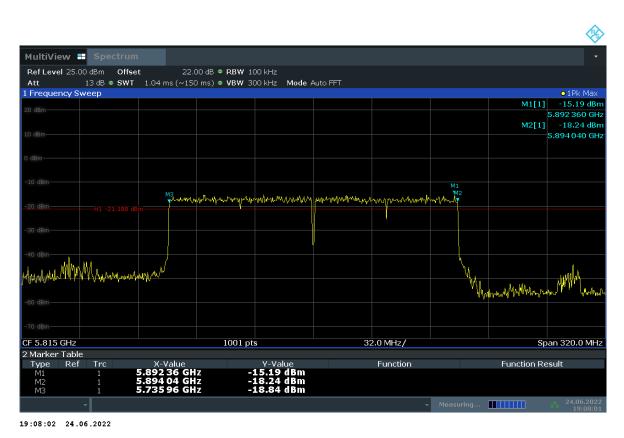






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A.5. 99% Occupied Bandwidth

Method of Measurement: See ANSI C63.10-2013 12.4.2.

a) The instrument center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be between 1.5 times and 5.0 times the OBW.
b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW, and VBW shall be approximately three times the RBW, unless otherwise specified by the applicable requirement.

c) Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than [10 log (OBW/RBW)] below the reference level. Specific guidance is given in 4.1.5.2.

d) Step a) through step c) might require iteration to adjust within the specified range.

e) 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.

f) Use the 99% power bandwidth function of the instrument (if available) and report the measured bandwidth. Authorized licensed use limited to: China Academy of Telecom Research (CATR).
Downloaded on November 22,2013 at 00:08:06 UTC from IEEE Xplore. Restrictions apply. ANSI C63.10-2013 American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices Copyright © 2013 IEEE. All rights reserved.

g) If the instrument does not have a 99% power bandwidth function, then the trace data points are recovered and directly summed in linear power terms. 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% power bandwidth is the difference between these two frequencies.

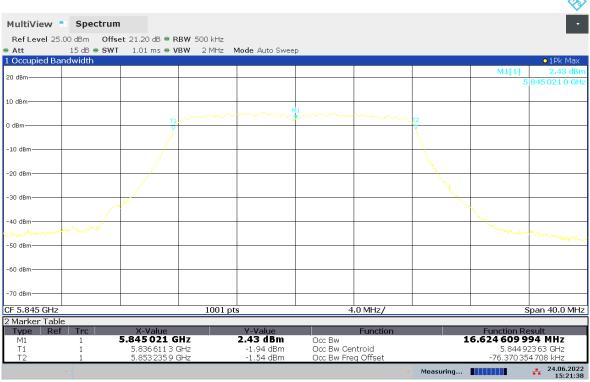
h) The occupied bandwidth shall be reported by providing plot(s) of the measuring instrument display; the plot axes and the scale units per division shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

Mode	Channel	99% Occupie (N	conclusion	
	169	Fig.11	16.62	Р
802.11a	173	Fig.12	16.61	Р
	177	Fig.13	16.58	Р
902 11 ov	169	Fig.14	19.25	Р
802.11ax HE20	173	Fig.15	19.23	Р
nezu	177	Fig.16	19.23	Р
802.11ax	167	Fig.17	38.44	Р
HE40	175	Fig.18	38.49	Р
802.11ax HE80	171	Fig.19	78.46	Р
802.11ax HE160	163	Fig.20	157.27	Р

Measurement Result:

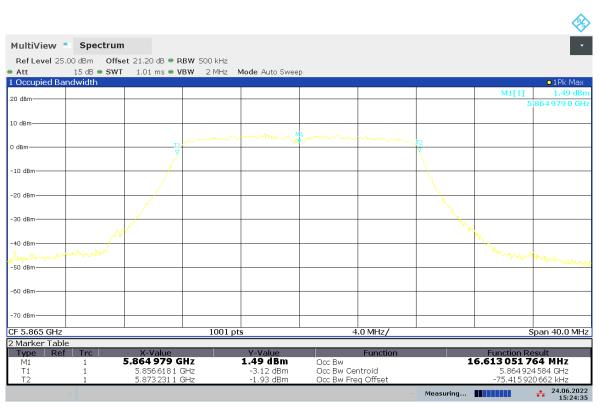






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15:24:35 24.06.2022

Fig. 12 99% Occupied Bandwidth (802.11a, Ch 173)

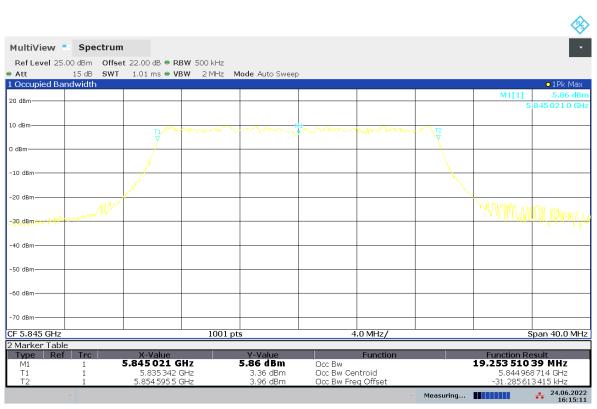




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D dBm									" WWWWW
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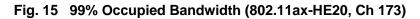
Fig. 14 99% Occupied Bandwidth (802.11ax-HE20, Ch 169)

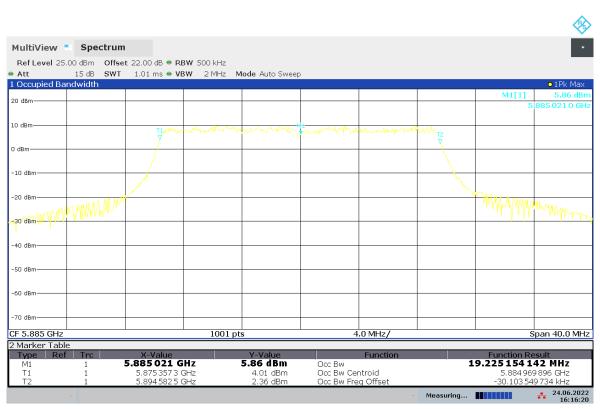




									
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40 dBm									
50 dBm									
60 dBm									
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CF 5.865 GHz			1001 pt	s	4	.0 MHz/		۱ ٤	 Span 40.0 MH:
2 Marker Tabl									
Type Ref M1 T1 T2		X-Value 5.864 979 G 5.855 330 2 0 5.874 5596 0	GHz	Y-Value 6.16 dBm 3.17 dBm 3.22 dBm	Occ Bw Occ Bw Cer Occ Bw Fre		1	Function R 9.229 367 4 5.864 94 -55.117 90	78 MHz 4882 GHz
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16:16:21 24.06.2022

Fig. 16 99% Occupied Bandwidth (802.11ax-HE20, Ch 177)





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Marker Tab									<u> </u>
Type Re M1 T1 T2 T2		X-Value 5.835 021 G 5.815 901 2 0	GHz	Y-Value 6.22 dBm 4.71 dBm	Occ Bw Occ Bw Cer		3		96 MHz 8944 GHz
12	-	5.85433670		4.49 dBm	Occ Bw Fre	eq orrset	Measuring	118.9443	20 446 KHZ 24.06.202: 16:20:54

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Marker Tal		X-Value	Y-Value	Function		Function R	esult
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T1 T2	1	5.855897 GHz 5.8943823 GHz	4.78 dBm 3.44 dBm	Occ Bw Centroid Occ Bw Freg Offset			39 639 GHz 87 451 kHz

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Fig. 18 99% Occupied Bandwidth (802.11ax-HE40, Ch 175)





									
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T2	1	5.815744 Gr 5.894204 Gr		4.28 dBm	Occ Bw Cel			-26.232.82	
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T1	1	5.73626 G	H7	4.38 dBm	Occ Bw Ce	ntroid		5 81/1 8	96 778 GHz

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Fig. 20 99% Occupied Bandwidth (802.11ax-HE160, Ch 163)





A.6. Out of Band Emissions

Measurement Limit:

Standard	Limit (kHz)
	For a client device or an outdoor access point, all emissions at or
	above 5.895 GHz shall not exceed an EIRP of -5 dBm/MHz and shall
	decrease linearly to an EIRP of -27 dBm/MHz at or above 5.925 GHz.
	For a client device or indoor access point or subordinate device, all
FCC 47 CFR Part 15.407 (b)	emissions below 5.725 GHz shall not exceed an EIRP of -27 dBm/MHz
	at 5.65 GHz increasing linearly to 10 dBm/MHz at 5.7 GHz, and from
	5.7 GHz increasing linearly to a level of 15.6 dBm/MHz at 5.72 GHz,
	and from 5.72 GHz increasing linearly to a level of 27 dBm/MHz at
	5.725 GHz.

The measurement is made according to C63.10 2020-clause 12.7, KDB 789033 and KDB 291074

EUT ID: EUT2

Measurement Results:

SISO-Ant4

Mode	Channel	Out of Band Emissions	conclusion
	160	Fig.21	Р
802.11a	169	Fig.22	Р
	477	Fig.23	Р
	177	Fig.24	Р
	169	Fig.25	Р
802.11n HT20	169	Fig.26	Р
	177	Fig.27	Р
	177	Fig.28	Р
802.11ac VHT40	107	Fig.29	Р
	167	Fig.30	Р
	175	Fig.31	Р
	175	Fig.32	Р
802.11ac VHT160	163	Fig.33	Р
002.11ac VH1100	103	Fig.34	Р
	169	Fig.35	Р
802.11ax HE20	169	Fig.36	Р
(full RU)	177	Fig.37	Р
	177	Fig.38	Р
	167	Fig.39	Р
802.11ax HE40	107	Fig.40	Р
(full RU)	175	Fig.41	Р
	175	Fig.42	Р
802.11ax HE80	171	Fig.43	Р

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	(full RU)		Fig.44	Р
8	02.11ax HE160	162	Fig.45	Р
	(full RU)	163	Fig.46	Р

SISO-Ant5

Mode	Channel	Out of Band Emissions	conclusion
802.11ac VHT80	171	Fig.47	Р
002.11aC VH100	171	Fig.48	Р

MIMO-Ant4

Mode	Channel	Out of Band Emissions	conclusion
	400	Fig.49	Р
000.44 -	169	Fig.50	Р
802.11a	477	Fig.51	Р
	177	Fig.52	Р
	160	Fig.53	Р
802.11n	169	Fig.54	Р
HT20	177	Fig.55	Р
	177	Fig.56	Р
	167	Fig.57	Р
802.11ac	107	Fig.58	Р
VHT40	175	Fig.59	Р
	175	Fig.60	Р
802.11ac VHT160	163	Fig.61	Р
002.11ac VH1100	103	Fig.62	Р
	169	Fig.63	Р
802.11ax HE20	109	Fig.64	Р
(full RU)	177	Fig.65	Р
	177	Fig.66	Р
	167	Fig.67	Р
802.11ax HE40	107	Fig.68	Р
(full RU)	175	Fig.69	Р
	175	Fig.70	Р
802.11ax HE80	171	Fig.71	Р
(full RU)	171	Fig.72	Р
802.11ax HE160	163	Fig.73	Р
(full RU)	103	Fig.74	Р

MIMO-Ant5

Mode	Channel	Out of Band Emissions	conclusion
802.11ac VHT80	171	Fig.75	Р

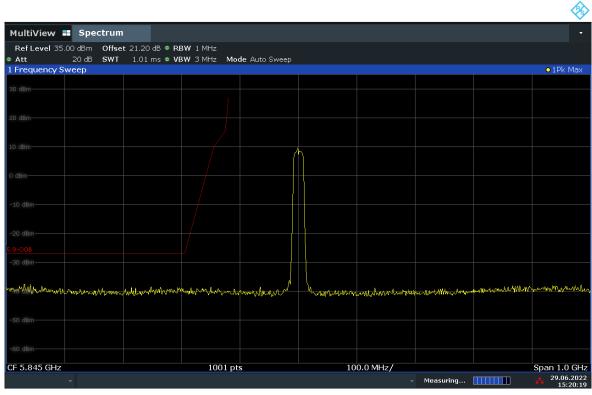




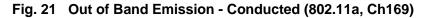
	Fig.76	Р
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Note: All Antenna are tested, only the worst-case emissions have been reported.

SISO-Ant4



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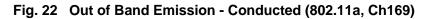






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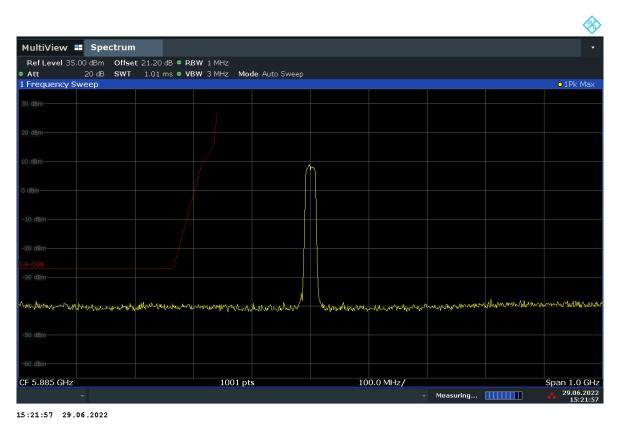


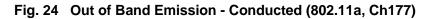
Fig. 23 Out of Band Emission - Conducted (802.11a, Ch177)





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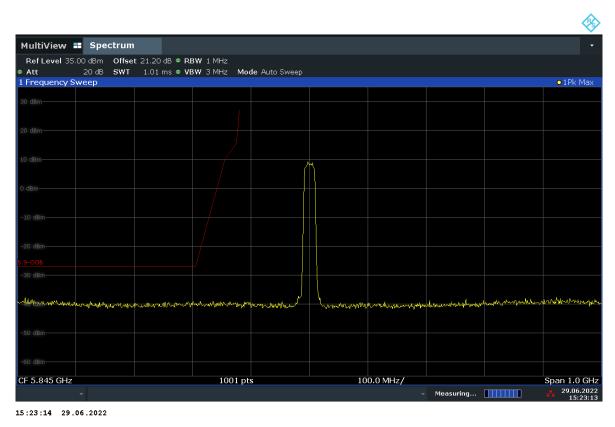


Fig. 25 Out of Band Emission - Conducted (802.11n-HT20, Ch169)





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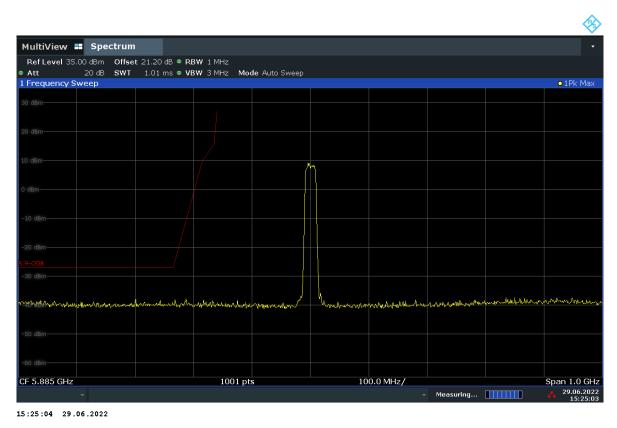


Fig. 27 Out of Band Emission - Conducted (802.11n-HT20, Ch177)

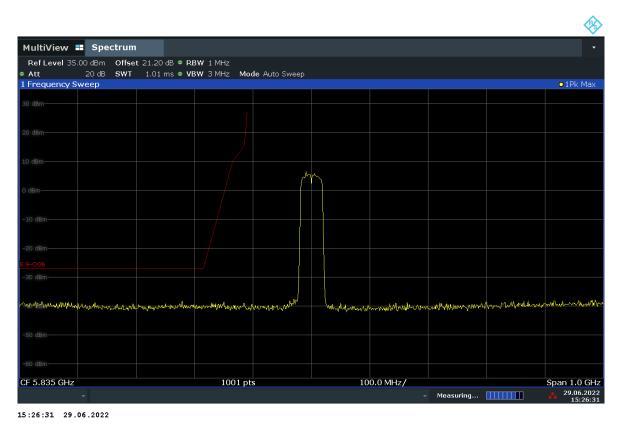




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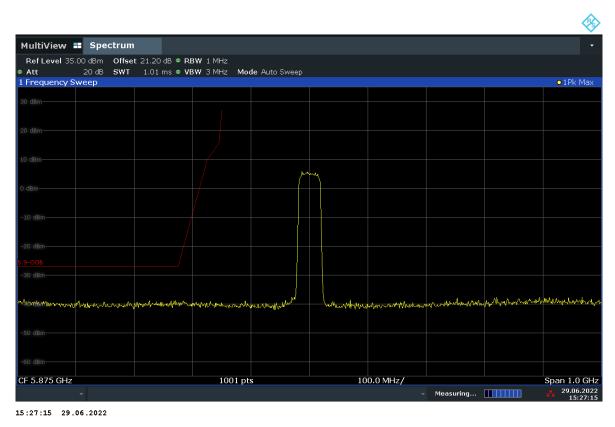




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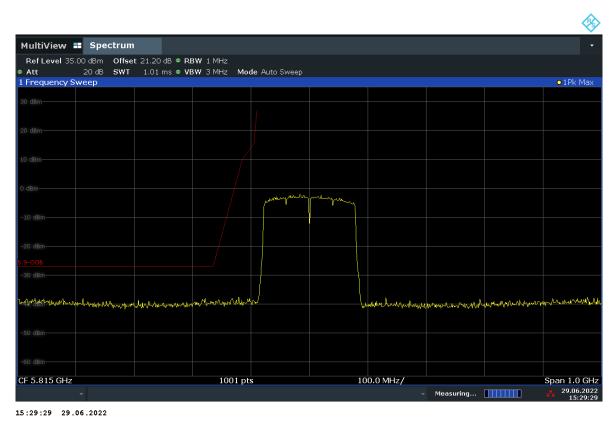




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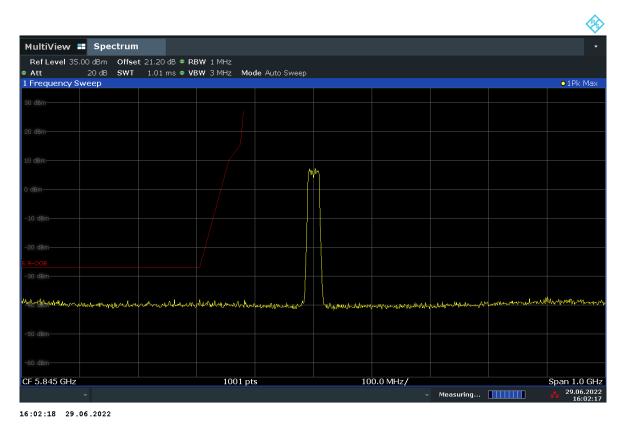




									
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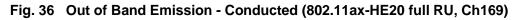


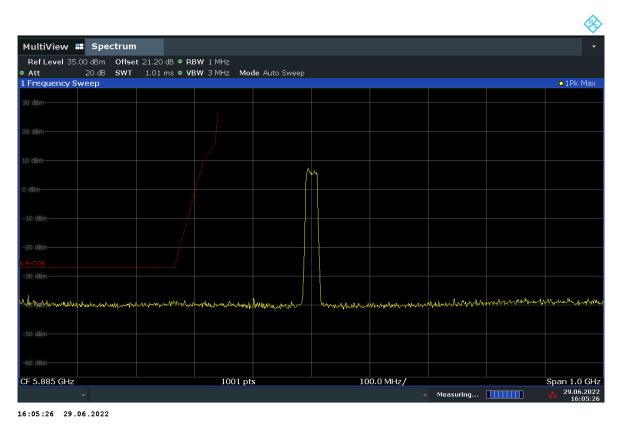




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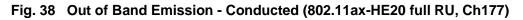


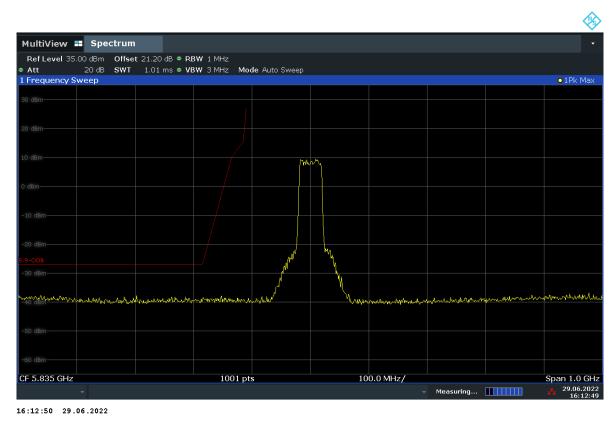




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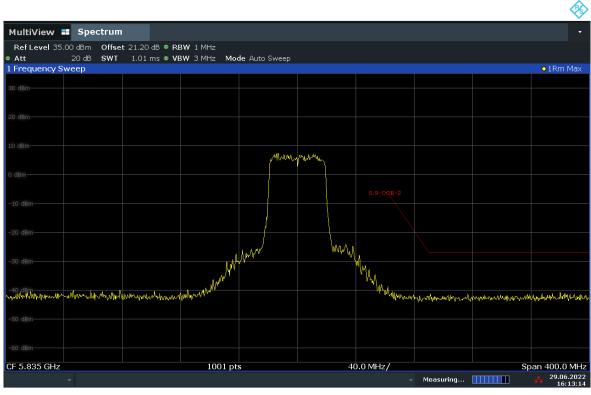




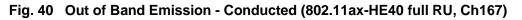


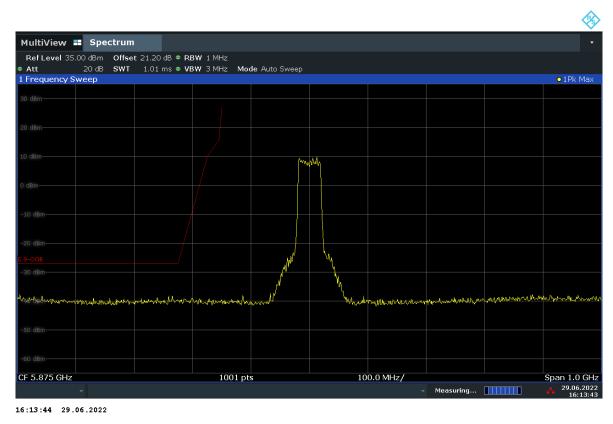






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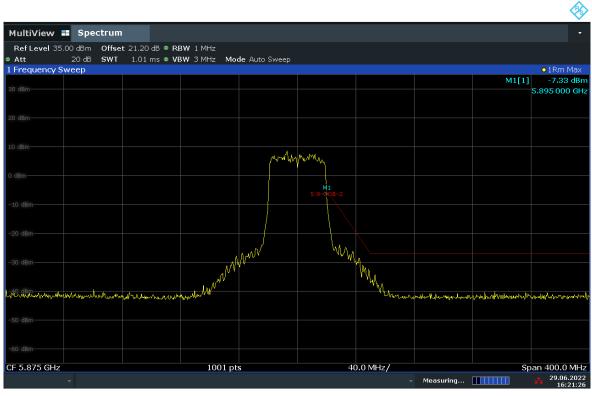




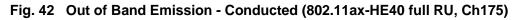


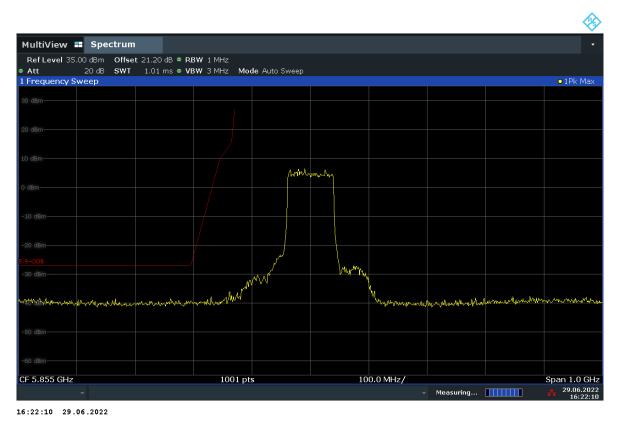






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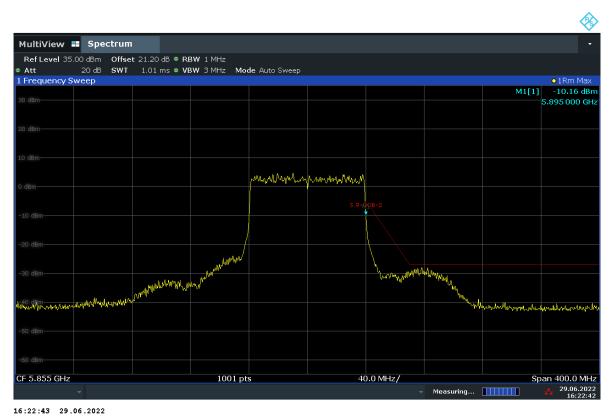














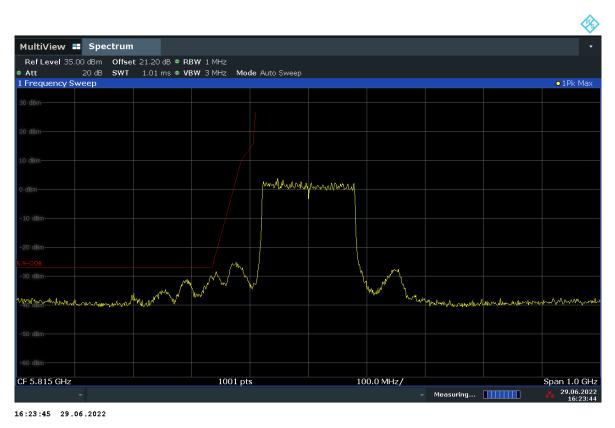
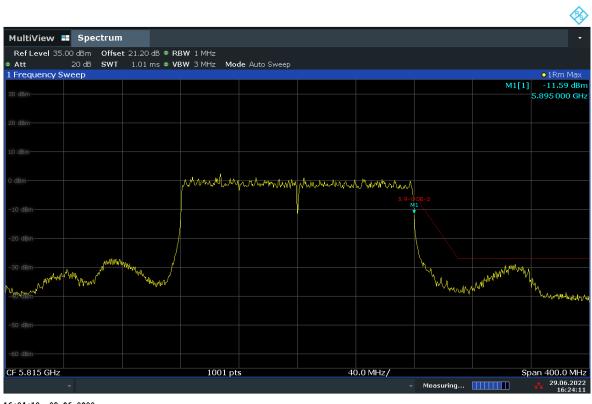


Fig. 45 Out of Band Emission - Conducted (802.11ax-HE160 full RU, Ch163)

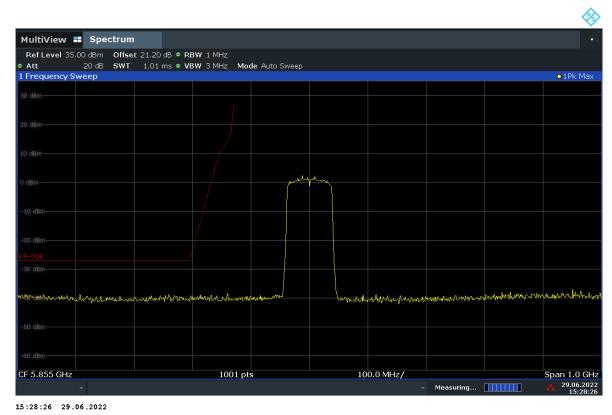






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Fig. 46 Out of Band Emission - Conducted (802.11ax-HE160 full RU, Ch163) SISO-Ant5



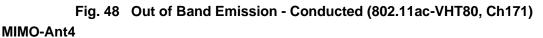






MultiView Spectrum Ref Level 35.00 dBm Offset 21.20 dB * RBW 1 MHz • Att 20 dB * SWT 1 Frequency Sweep • 1 Rm N 20 dBm • 1 Rm N 20 dBm • 1 Rm N 10 dBm • 1 Rm N -10 dBm • 1 Rm N -20 dBm • 1 Rm N	8
• Att 20 dB SWT 1.01 ms • VBW 3 MHz Mode Auto Sweep • Frequency Sweep • IRm M 90 dBm M1[1] -20.73 90 dBm - - M1[1] -20.73 90 dBm - - - - 5.895 000 20 dBm - - - - - 5.895 000 20 dBm - - - - - - - 10 dBm - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - <	
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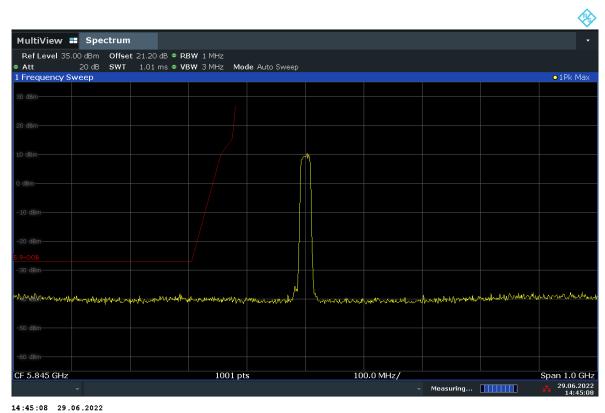


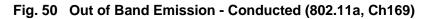
Fig. 49 Out of Band Emission - Conducted (802.11a, Ch169)





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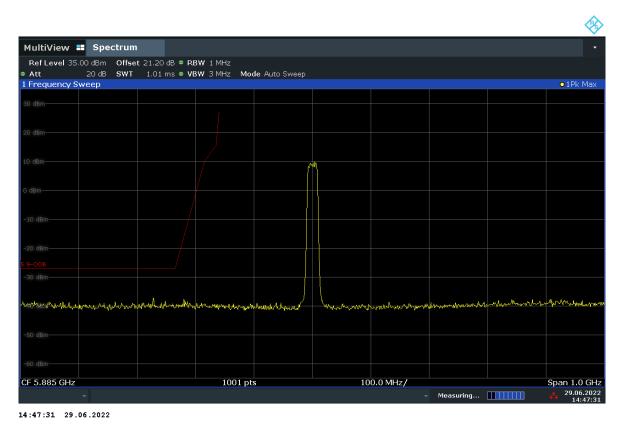


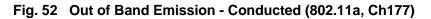
Fig. 51 Out of Band Emission - Conducted (802.11a, Ch177)

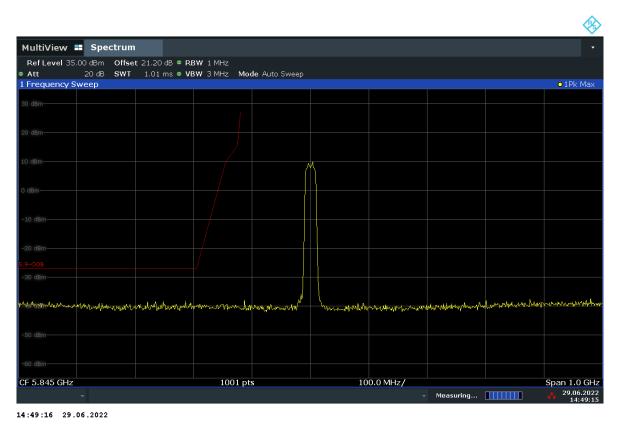




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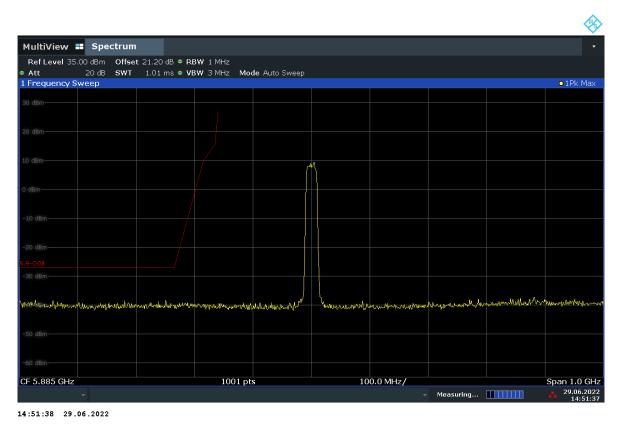




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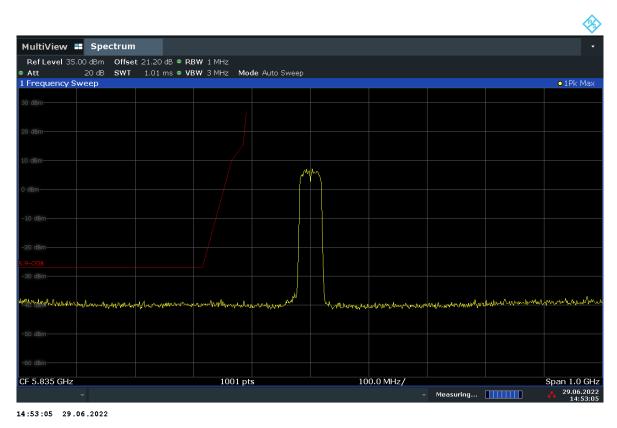




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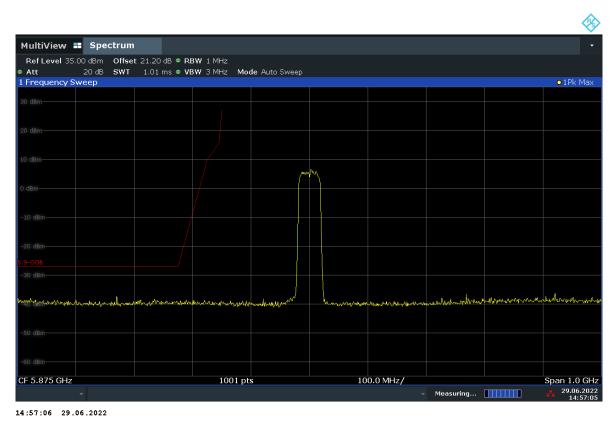




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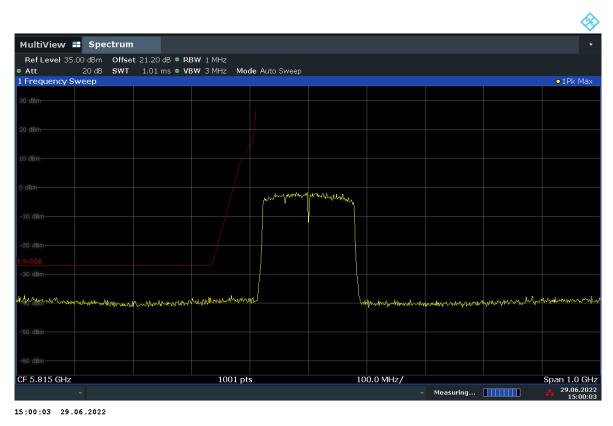




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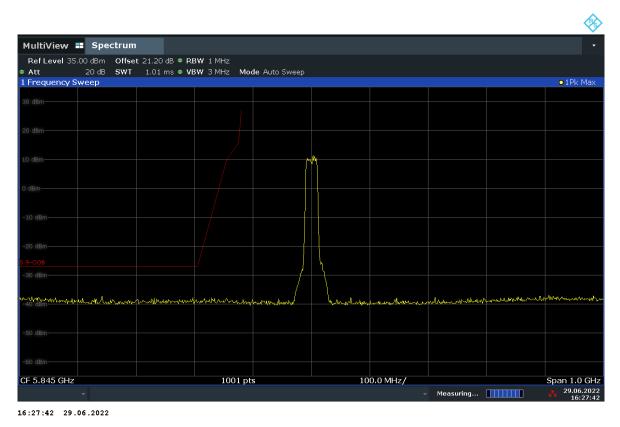




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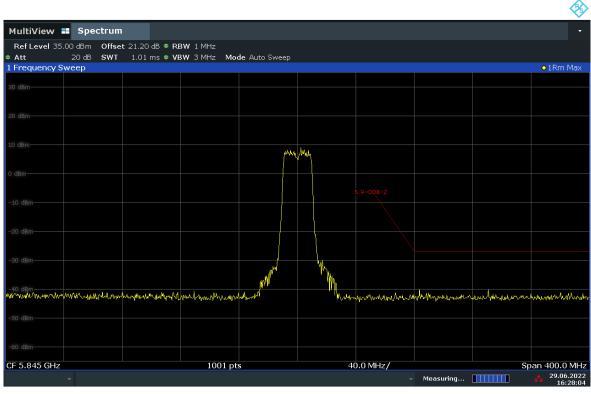




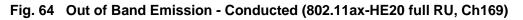


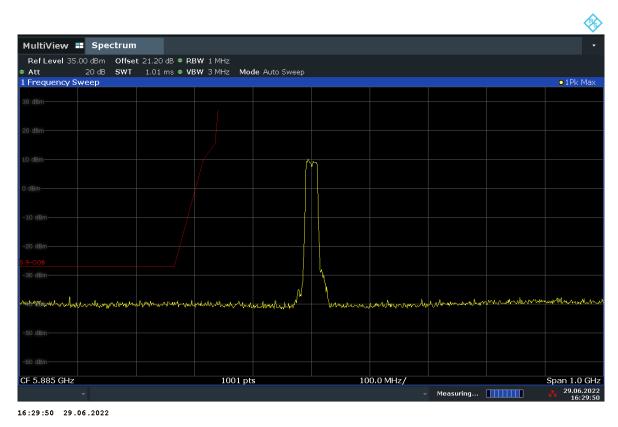






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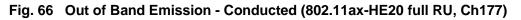


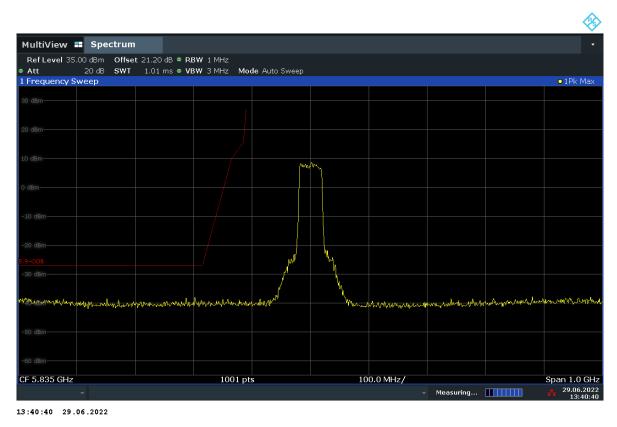


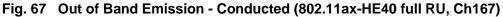


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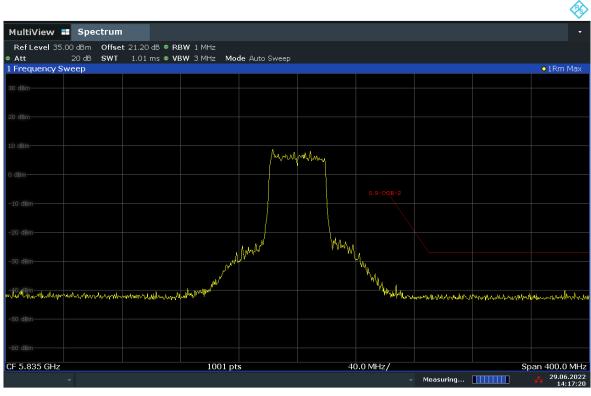




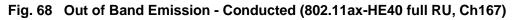


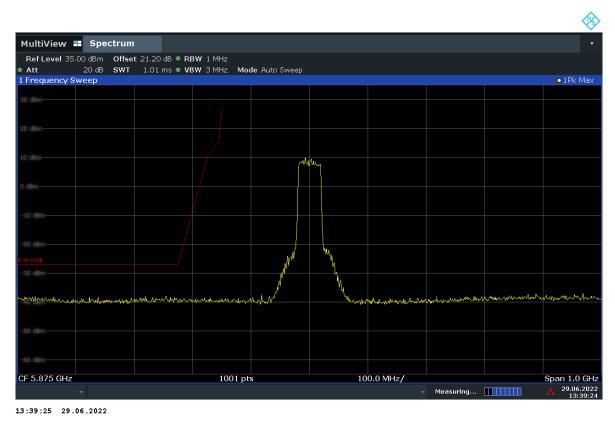






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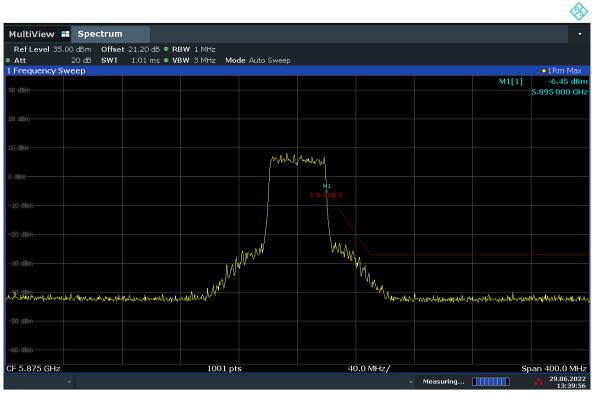




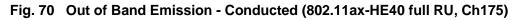


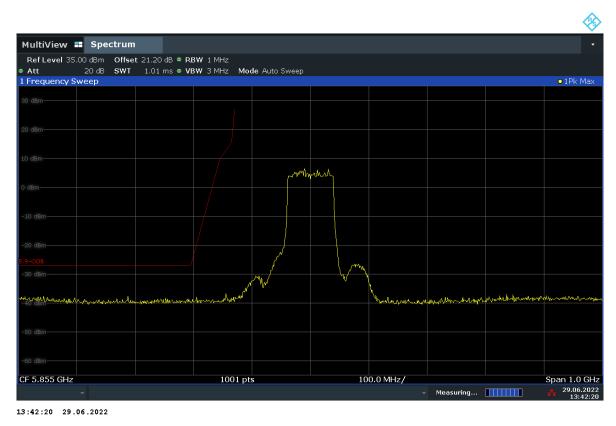






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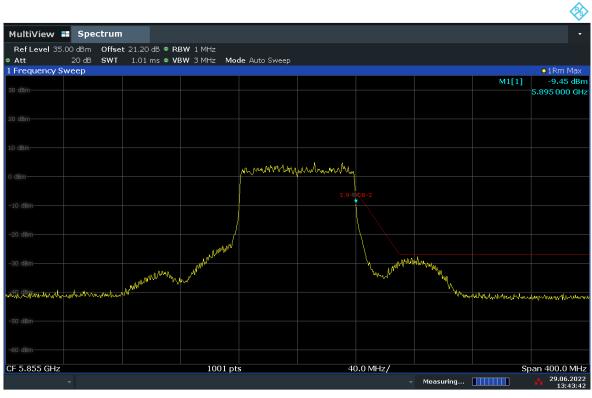




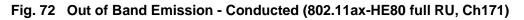


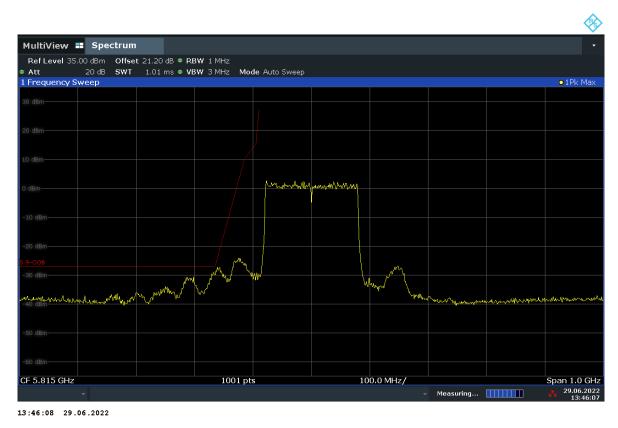






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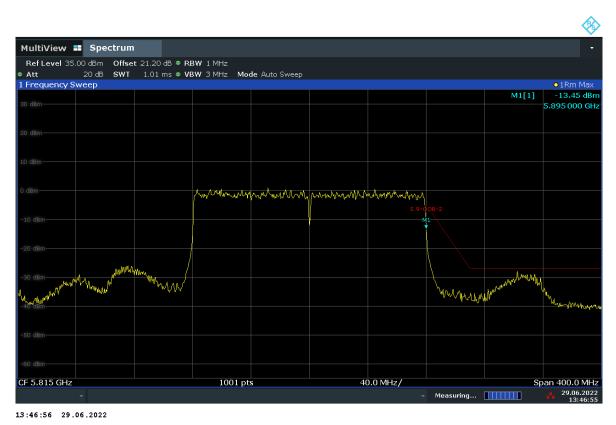
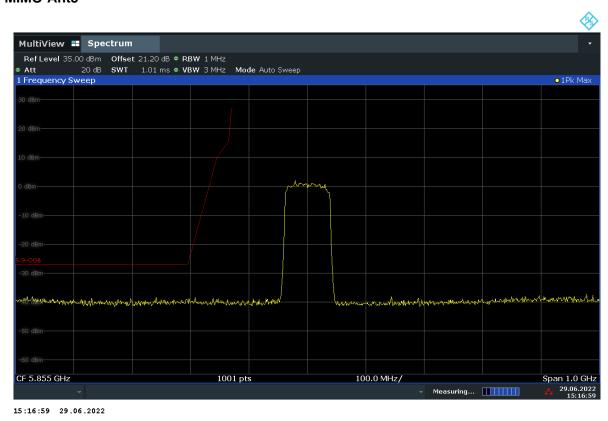


Fig. 74 Out of Band Emission - Conducted (802.11ax-HE160 full RU, Ch163) MIMO-Ant5









lultiView 📰 Spectrum				
	21.20 dB • RBW 1 MHz 1.01 ms • VBW 3 MHz Moo	e Auto Sween		
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A.7. Occupied 26dB Bandwidth(conducted)

Measurement Limit and Method:

Standard	Limit (kHz)
FCC 47 CFR Part 15.403 (i)	/

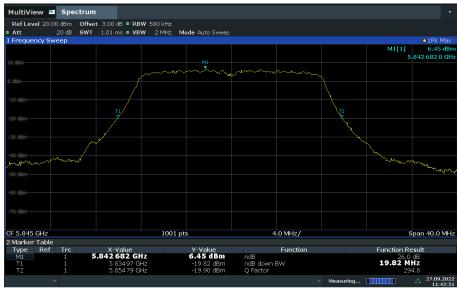
The measurement is made according to KDB 291074 and KDB 789033

Measurement Result:

Mode	Channel	-	Occupied 26dB Bandwidth (MHz)		
	169	Fig.77	19.82	Р	
802.11a	173	Fig.78	19.70	Р	
	177	Fig.79	19.78	Р	
000 11 av	169	Fig.80	22.94	Р	
802.11ax HE20	173	Fig.81	23.14	Р	
TE20	177	Fig.82	23.14	Р	
802.11ax	167	Fig.83	43.40	Р	
HE40	175	Fig.84	42.60	Р	
802.11ax HE80	171	Fig.85	87.27	Р	
802.11ax HE160	163	Fig.86	167.19	Р	







11:42:51 27.09.2022

Fig. 77 Occupied 26dB Bandwidth (802.11a, channel 169)



Fig. 78 Occupied 26dB Bandwidth (802.11a, channel 173)







Fig. 79 Occupied 26dB Bandwidth (802.11a, channel 177)



Fig. 80 Occupied 26dB Bandwidth (802.11ax-HE20, channel 169)







11:58:48 27.09.2022





Fig. 82 Occupied 26dB Bandwidth (802.11ax-HE20, channel 177)







Fig. 83 Occupied 26dB Bandwidth (802.11ax-HE40, channel 167)



Fig. 84 Occupied 26dB Bandwidth (802.11ax-HE40, channel 175)







Fig. 85 Occupied 26dB Bandwidth (802.11ax-HE80, channel 171)



Fig. 86 Occupied 26dB Bandwidth (802.11ax-HE160, channel 163)





A.8. Transmitter Spurious Emission

A.8.1 Transmitter Spurious Emission - Radiated

Measurement Limit:

Standard	Frequency (MHz)	Limit (dBm/MHz)
FCC 47 CFR Part 15.407	5725MHz~5850MHz	< -27

The measurement is made according to ANSI C63.10.

In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

Limit in restricted band:

Frequency of emission	Field strength	Field strength	Measurement
(MHz)	(uV/m)	(dBµV/m)	distance(m)
30-88	100	40.0	3
88-216	150	43.5	3
216-960	200	46.0	3
Above 960	500	54.0	3

Measurement Results:

Note:

A "reference path loss" is established and the A_{Rpl} is the attenuation of "reference path loss", and including the gain of receive antenna, the gain of the preamplifier, the cable loss.

 $\mathsf{P}_{\mathsf{Mea}}$ is the field strength recorded from the instrument.

Average Results:

802.11a

Ch169

Frequency (MHz)	Meas. Result (dBµV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBµV)	Limit (dBµV/m)	Margin (dB)	Antenna Pol. (H/V)
17855.350	42.67	-25.50	46.66	21.51	54.00	11.33	Н
17941.150	42.62	-25.50	46.66	21.46	54.00	11.38	Н
15919.350	41.85	-27.35	38.54	30.66	54.00	12.15	н
15973.250	41.75	-27.35	38.54	30.56	54.00	12.25	Н
11990.150	37.51	-31.48	39.09	29.90	54.00	16.49	V
11986.850	37.28	-31.48	39.09	29.67	54.00	16.72	V

Ch173

Frequency (MHz)	Meas. Result (dBµV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBµV/m)	Margin (dB)	Antenna Pol. (H/V)
17941.150	43.21	-25.50	46.66	22.05	54.00	10.79	н
17857.550	43.03	-25.50	46.66	21.87	54.00	10.97	Н

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16021.650	41.90	-27.35	38.54	30.71	54.00	12.10	Н
16005.150	41.89	-27.35	38.54	30.70	54.00	12.11	V
11993.450	37.28	-31.48	39.09	29.67	54.00	16.72	Н
11719.550	37.08	-31.99	38.98	30.09	54.00	16.92	V

Ch177

Fraguanay	Meas.	Cable	Antenna	Receiver	Limit	Margin	Antenna
Frequency (MHz)	Result	loss	Factor	Reading	(dBµV/m)	(dB)	Pol.
(101112)	(dBµV/m)	(dB)	(dB/m)	(dBµV)	(ασμν/π)	(ub)	(H/V)
17967.000	42.86	-25.50	46.66	21.70	54.00	11.14	V
17985.700	42.47	-25.50	46.66	21.31	54.00	11.53	н
15958.400	41.91	-27.35	38.54	30.72	54.00	12.09	н
16036.500	41.73	-27.35	38.54	30.54	54.00	12.27	Н
11982.450	37.14	-31.48	39.09	29.53	54.00	16.86	V
11997.300	37.00	-31.48	39.09	29.39	54.00	17.00	Н