Report No. 427974-10-R01

Test Report

Product	Desktop Collaboration Unit
Name and address of the applicant	Cisco Systems Norway AS Philip Pedersens vei 1 1366 Lysaker, Norway
Name and address of the manufacturer	Cisco Systems, Inc. 170 West Tasman Drive San Jose CA 95134, USA
Model	07-100577
Rating	12VDC,5.8A (Supplied from AC/DC adapter, Input:100-240VAC, otutput:12VDC)
Trademark	Cisco
Serial number	See page 3
Additional information	This test report covers only 5GHz wi-fi.
Tested according to	**FCC Part 15.407** Unlicensed National Information Infrastructure Devices (U-NII) **Industry Canada RSS-247, Issue 2** Licence-Exempt Local Area Network (LE-LAN) Devices
Order number	427974
Tested in period	2021-06-15 to 2021-06-16
Issue date	2021-10-29
Name and address of the testing laboratory	Instituttveien 6 Kjeller, Norway www.nemko.com CAB Number FCC: NO0001 ISED: NO0470 TEL: +47 22 96 03 30 FAX: +47 22 96 05 50

An accredited technical test executed under the Norwegian accreditation scheme

Prepared by [G.Suhanthakumar]	Approved by [Frode Sveinsen]

Nemko Norway
Nemko AS, Instituttveien 6, P.O. Box 96 Kjeller, 2027 Kjeller, Norway
TEL +47 22 96 03 30 FAX +47 22 96 05 50 EMAIL info@nemko.com
ENTERPRISE NUMBER NO974404532

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1 INFORMATION

1.1 Test Item

Name	**Cisco**
Model Number	**07-100577**
Model Number (Host)	**TTC7-30**
Marketing Name (Host)	**Cisco Webex Desk**
FCC ID	**LDK073002357**
ISED ID	**2461N-073002357**
Serial number	**FOC2512N0AC**
Hardware identity and/or version	**DV1**
Software identity and/or version	**RoomOS 10.5x**
Frequency Ranges	**U-NII 1 : 5180 – 5240 MHz: 4 channels** **U-NII 2A : 5260 – 5320 MHz: 4 channels** **U-NII 2C : 5500 – 5720 MHz: 12 channels** **U-NII 3 : 5745 – 5825 MHz: 5 channels**
Operating Modes	**802.11a** **802.11n (20/40/80 MHz BW)**
Type of Modulation	**Digital (OFDM - Orthogonal frequency-division multiplexing)**
Conducted Output Power	**5180 – 5240 MHz: 0.040 W** **5260 – 5320 MHz: 0.087 W** **5500 – 5720 MHz: 0.100 W** **5745 – 5825 MHz: 0.110 W**
Antenna Connector	**None**
Number of Antennas	**2**
Antenna Diversity Supported	**Yes**
Smart Antennas Supported	**Yes**
TPC Supported	**Not implemented. Not required when EIRP is below 500 mW**
DFS Supported	**Client Device without Radar Detection**
Ad-hoc Mode	**EUT does not support Ad-hoc Mode***
Hotspot Mode	**EUT does not support Hotspot Mode***
Power Supply	**Mains Powered**

* EUTs that support Ad-hoc or Hotspot mode in the DFS Bands are considered Master Devices

Description of Test Item

The EUT is a radio module with WiFi and BT/BLE module in a desktop collaboration unit.

This 5 GHz WiFi part has been tested as a U-NII system.

The radio is a certified module LBEE5XV1XA (Cisco FCC ID: LDK073002357, Murata FCC ID: VPYLBEE5XV1XA).

The module is identical, but the antennas are changed, and power levels are reduced for some channels.

1.3 Normal test conditions

Temperature:	**20 - 24 °C**
Relative humidity:	**20 - 50 %**
Normal test voltage:	**120VAC, 60Hz**

The EUT was powered from a regulated Power Source during all tests.

The values are the limit registered during the test period.

1.4 Test Engineer(s)

G.Suhanthakumar

1.5 Antenna Requirement

Is the antenna detachable? ☐ Yes ☒ No

If detachable, is the antenna connector non-standard? ☐ Yes ☐ No

Type of antenna connector: N/A, Integral Antenna

1.6 Worst-Case Configuration

Radiated Emissions and Power Line Conducted Emissions were performed with the EUT set to transmit at the channel with the highest output power as worst-case scenario.

The worst case data rates were:

802.11a mode: 6 Mbps
802.11n HT20 mode: MCS0, MIMO
802.11n HT40 mode : MCS0, MIMO
802.11n HT80 mode : MCS0, MIMO

1.7 EUT Operating Modes

Description of operating modes	Continuous TX, 5 GHz 20/40/80 MHz Mode
Additional information	EUT was controlled from a computer and programmed with test scripts from Putty.

1.8 Comments

It was checked that power variations between 85% and 115% did not have any influence on the measurements.

All ports were populated during spurious emission measurements.

This report covers only radiated emissions tests, all other tests are covered by muRata report no: ER/2020/90109.

1.9 EUT Power Levels

Channel	Freq (MHz)	11a	11n HT20	11n HT40	11ac HT80	11ac HT160
36	5180	10	9			
40	5200	13.5	13.5			
44	5220	13.5	13.5			
48	5240	13.5	13.5			
52	5260	15	15			
56	5280	15	15			
60	5300	15	15			
64	5320	10.5	10			
100	5500	10	10			
104	5520	15	15			
108	5540	15	15			
112	5560	15	15			
116	5580	15	15			
120	5600	15	15			
124	5620	15	15			
128	5640	15	15			
132	5660	15	15			
136	5680	15	15			
140	5700	10	9			
144	5720	15	15			
149	5745	15	15			
153	5765	15	15			
157	5785	15	15			
161	5805	15	15			
165	5825	15	15			
38	5190			7.5		
46	5230			10		
54	5270			14		
62	5310			7		
102	5510			8		
110	5550			14		
118	5590			14		
126	5630			14		
134	5670			9		
142	5710			14		
151	5755			14		
159	5795			14		
42	5210				6	
58	5290				4	
106	5530				D	
112	5610				14	
138	5690				14	
155	5775				10.5	
50	5250					D
114	5550					D

D = Disabled/ Not Used
ISED Canada require that all channels in the TDWR Band (5.60-5.65 GHz) are disabled, also on client devices

2 TEST REPORT SUMMARY

2.1 General

All measurements are tracable to national standards.

The tests were conducted for demonstrating compliance with FCC CFR 47 Part 15, paragraph 15.407 and ISED RSS-247 Issue 2.

Tests were performed in accordance with ANSI C63.4-2014 and ANSI C63.10-2013.

Radiated tests were performed in a semi-anechoic chamber at measuring distances of 1m and 3m.

☐ New Submission	☒ Production Unit
☒ Class II Permissive Change	☐ Pre-production Unit
NII Equipment Code	☐ Family Listing

THIS TEST REPORT APPLIES ONLY TO THE ITEM(S) AND CONFIGURATIONS TESTED.

Deviations from, additions to, or exclusions from the test specifications are described in “Summary of Test Data”.

2.2 Test Summary

Name of test	FCC Part 15 reference	RSS-247 Issue 2 RSS-GEN Issue 5 reference	Result
Supply Voltage Variations	15.31(e)	6.11 (RSS-GEN)	**Complies**
Antenna Requirement	15.203	6.8 (RSS-GEN)	**Complies**
Power Line Conducted Emission	15.107(a) 15.207(a)	7.2 / 8.8 (RSS-GEN)	**N/T**
Maximum Output Power	15.407(a)	6.2	**Complies**
Power Spectral Density	15.407(a)	6.2	**N/T**
Emission Bandwidth	15.407(a)(2)	6.2	**N/T**
Unwanted Emissions	15.407(b)	6.2	**Complies**
Discontinuation of Transmission	15.407(c)	6.3	**N/T[1]**
6 dB Bandwidth	15.407(e)	6.2.4	**N/T**
Transmit Power Control	15.407(h)	6.2.3	**N/A[2]**
Dynamic Frequency Selection	15.407(h)	6.3	**N/T[3]**
Radiated Emissions	15.205 15.209	7.3 (RSS-GEN) 8.9 (RSS-GEN)	**Complies**

[1] See manufacturers declaration

[2] Transmit Power Control is not required when Max EIRP is below 500 mW

[3] The EUT is a Client Device without Radar Detection.

Revision history

Revision	Date	Comment	Sign
00	2021-08-16	First edition	gns
01	2021-10-29	Model references updated in page 1 and 3	gns

3 TEST RESULTS

3.1 Maximum Output Power, EIRP

FCC 15.407 (a)

ISED RSS-247, Issue 2, Clause 6.2

Measurement procedure: ANSI C63.10-2013 Clause 12.3, method SA-1

Test Results: Complies

Measurement Data:

Ch. No.	Nominal Frequency (MHz)	Maximum Field Strength (dBµV/m)		Maximum e.i.r.p. (dBm)	
		802.11a 6M	802.11n MCS0	802.11a 6M	802.11n MCS0
36	5180	110.41	103.89	15.2	8.7
64	5320	111.63	104.63	16.4	9.4
100	5500	107.59	104.63	12.4	9.4
140	5700	109.37	105.37	14.1	10.1
149	5745	116.04	115.65	20.8	20.4
165	5825	116.55	113.35	21.3	18.1
		802.11n HT40	802.11ac HT80	802.11n HT40	802.11ac HT80
38	5190	103.55		8.3	
62	5310	104.52		9.3	
102	5510	105.08		9.9	
134	5670	106.95		11.7	
149	5755	110.30		15.1	
159	5795	110.84		15.6	
42	5210		109.26		14.0
138	5690		102.88		7.7
155	5775		109.29		14.1

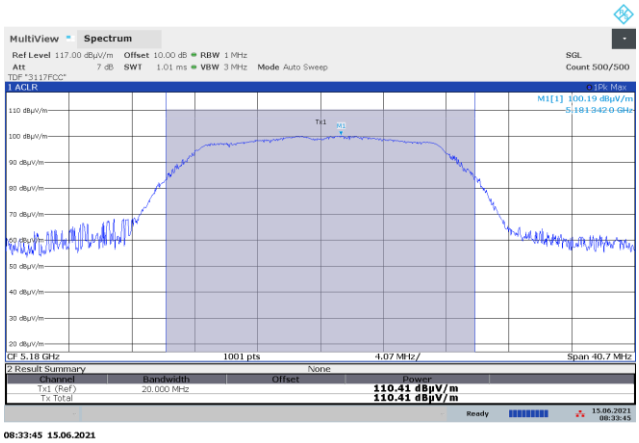
The EUT operates continuously; therefore, method SA-1 of ANSI C63.10-2013 clause 12.3 was used.

EIRP values were calculated from Field Strength values using the method described in KDB 412172 D01.

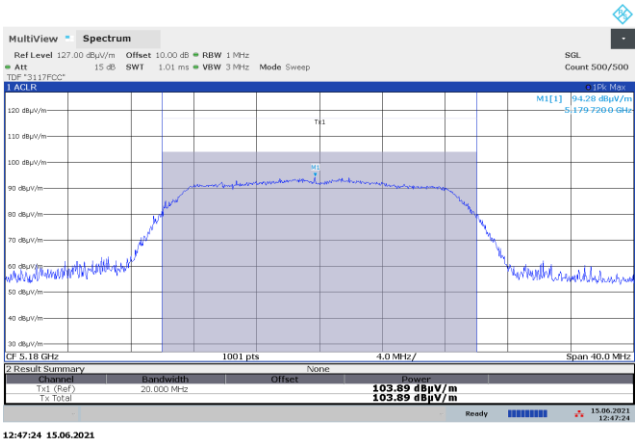
This is an indoor device with directional Antenna Gain less than 6 dBi.

Limits for Indoor Device:

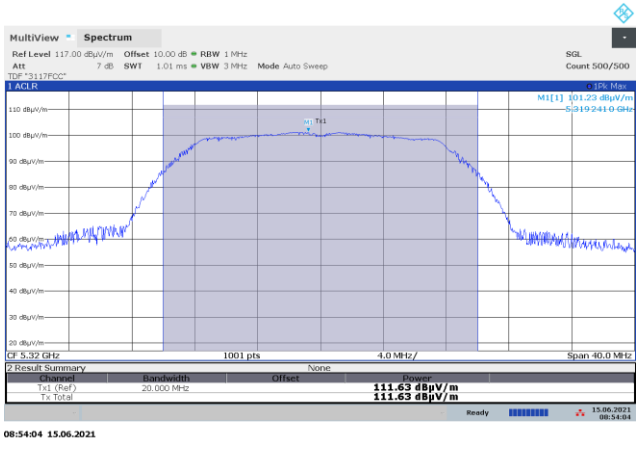
Frequency Band	FCC 15.407(a)	ISED RSS-247 Issue 2
5150 – 5250 MHz	Less than 250 mW (24 dBm) for client device Less than 1 W (30 dBm) for master device	Less than the lesser of 200 mW e.i.r.p. or $10 + 10 \log_{10} B$ dBm e.i.r.p.
5250 – 5350 MHz **5470 – 5725 MHz**	Less than the lesser of 250 mW (24 dBm) or $11 + 10 \log_{10} B$ dBm	Less than the lesser of 250 mW or $11 + 10 \log_{10}$ B dBm, and Less than the lesser of 1 W e.i.r.p. or $17 + 10 \log_{10}$ B dBm e.i.r.p. Devices with e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W
5725 – 5825 MHz	Less than 1 Watt	Less than 1 Watt If Antenna Gain is more than 6 dBi the Power Limit is reduced by the amount exceeding 6 dBi
	If Antenna Gain is more than 6 dBi the Power Limit is reduced by the amount exceeding 6 dBi	
	B is the 26dB emission bandwidth in MHz	*B* is the 99% emission bandwidth in MHz



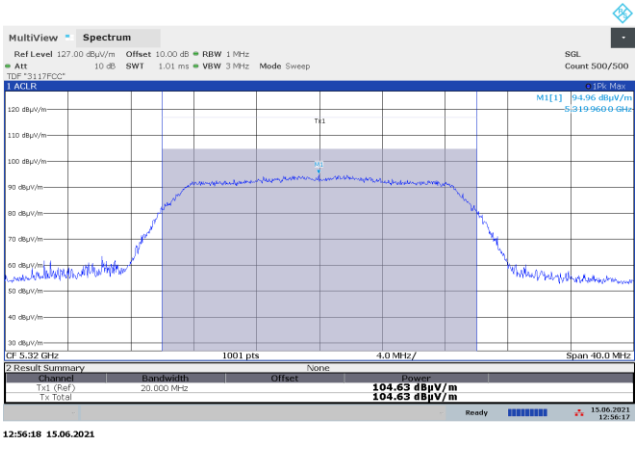
EIRP, 5180 MHz, 802.11a, 6Mb



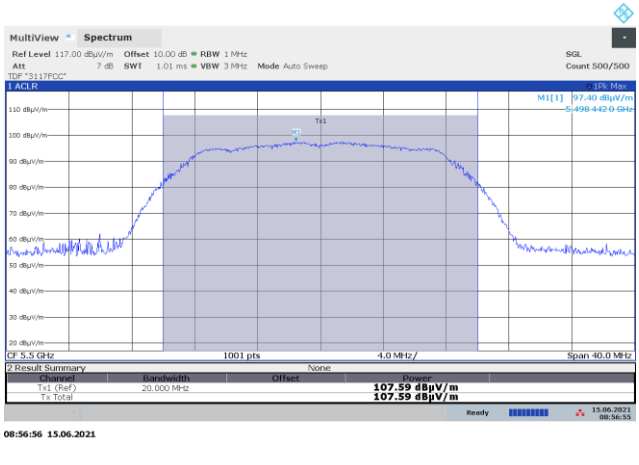
EIRP, 5180 MHz, 802.11n, HT20



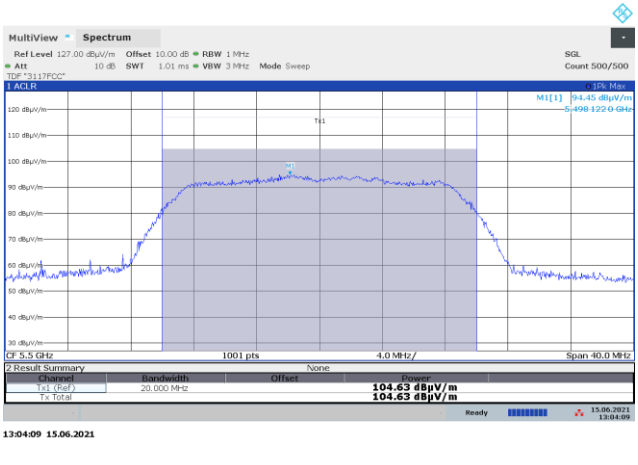
EIRP, 5320 MHz, 802.11a, 6Mb



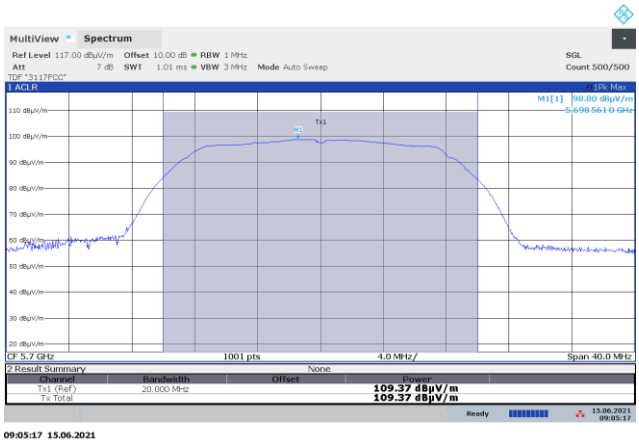
EIRP, 5320 MHz, 802.11n, HT20



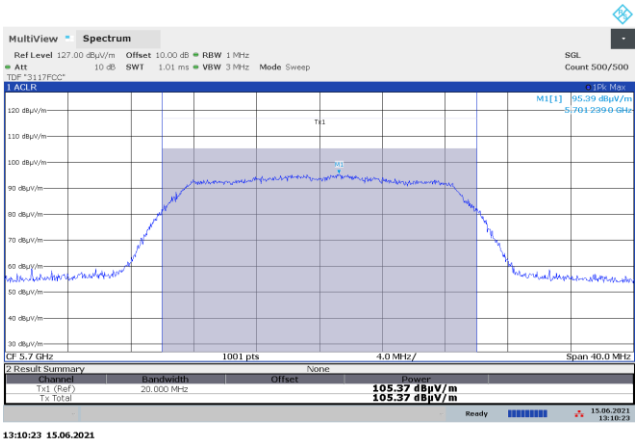
EIRP, 5500 MHz, 802.11a, 6Mb



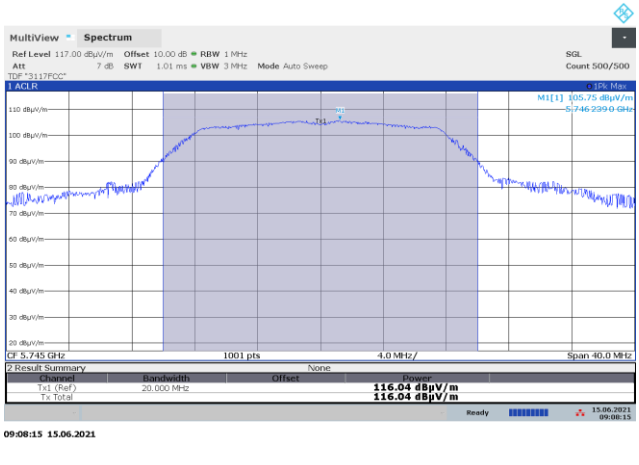
EIRP, 5500 MHz, 802.11n, HT20



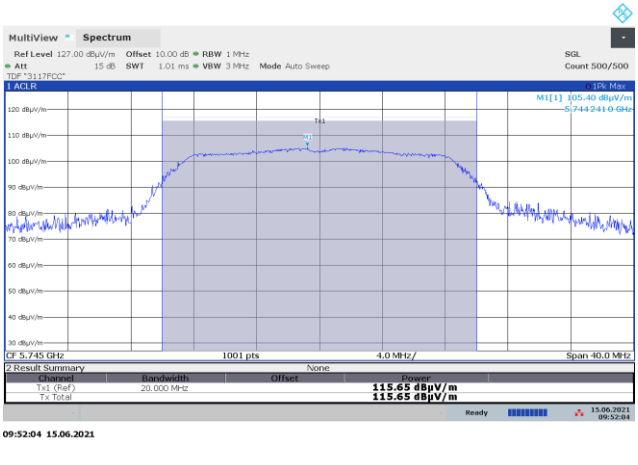
EIRP, 5700 MHz, 802.11a, 6Mb



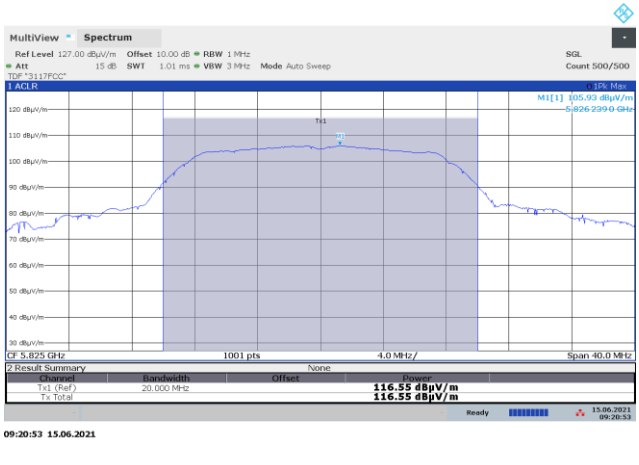
EIRP, 5700 MHz, 802.11n, HT20



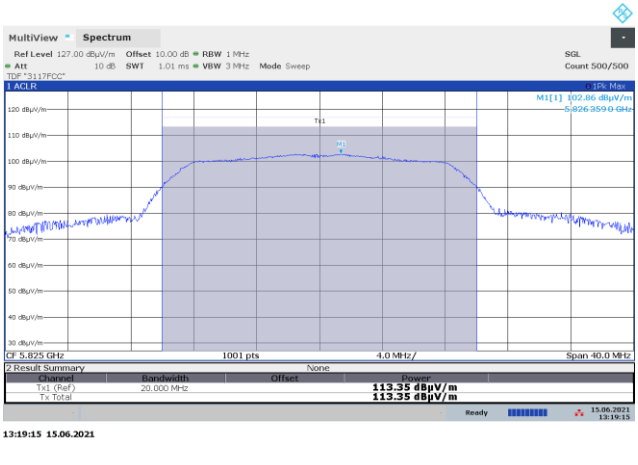
EIRP, 5745 MHz, 802.11a, 6Mb



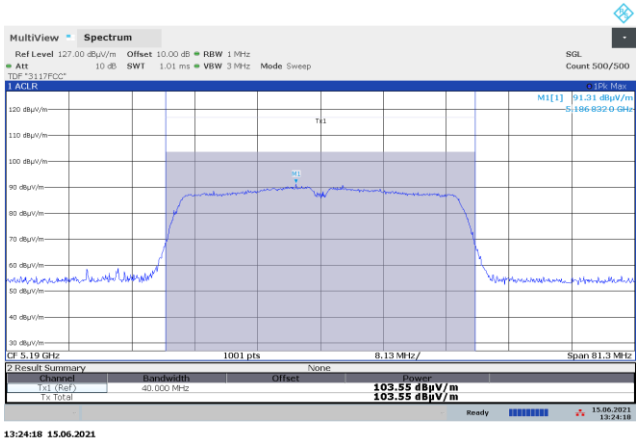
EIRP, 5745 MHz, 802.11n, HT20



EIRP, 5825 MHz, 802.11a, 6Mb



EIRP, 5825 MHz, 802.11n, HT20



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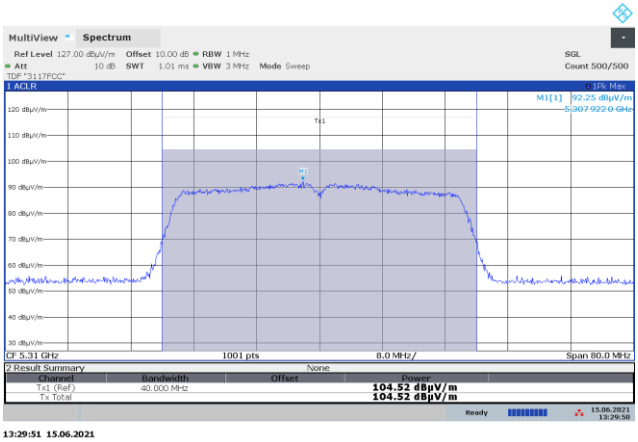
EIRP, 5190 MHz, 802.11n, HT40



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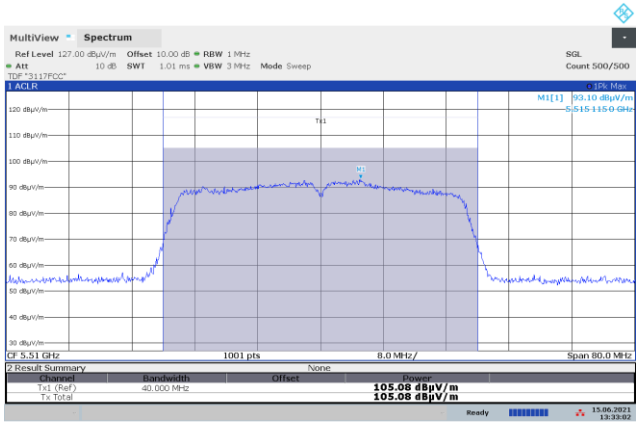
EIRP, 5310 MHz, 802.11n, HT40



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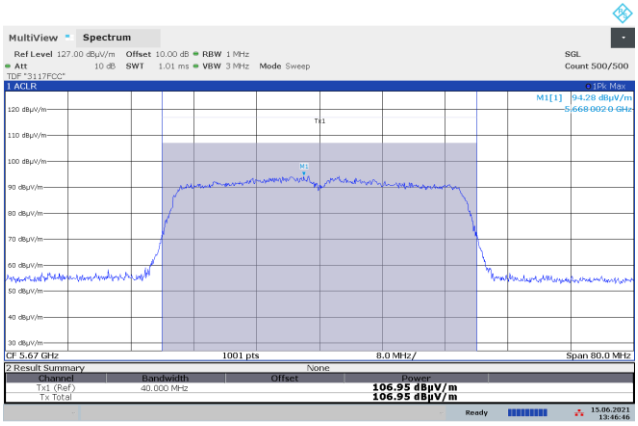
EIRP, 5510 MHz, 802.11n, HT40



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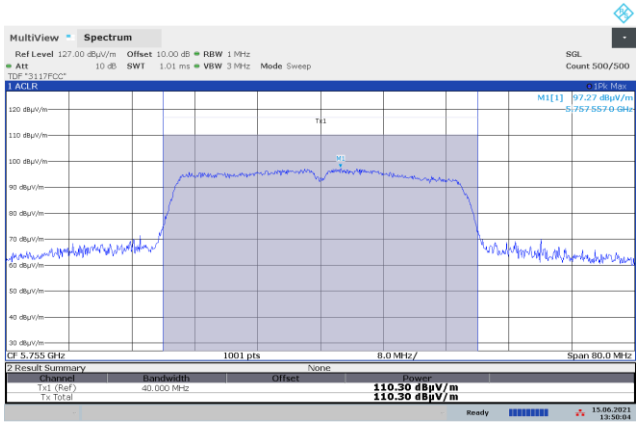
EIRP, 5670 MHz, 802.11n, HT40



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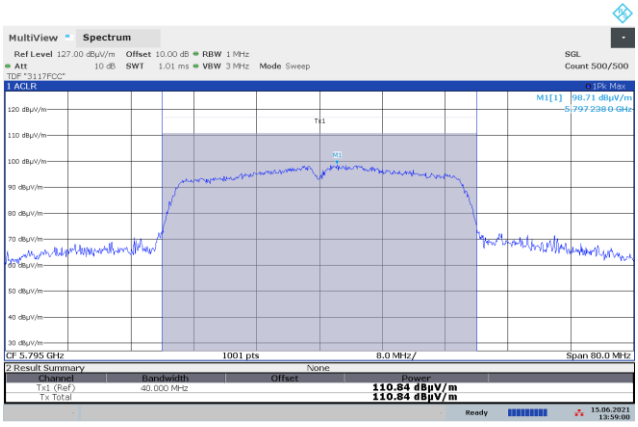
EIRP, 5755 MHz, 802.11n, HT40



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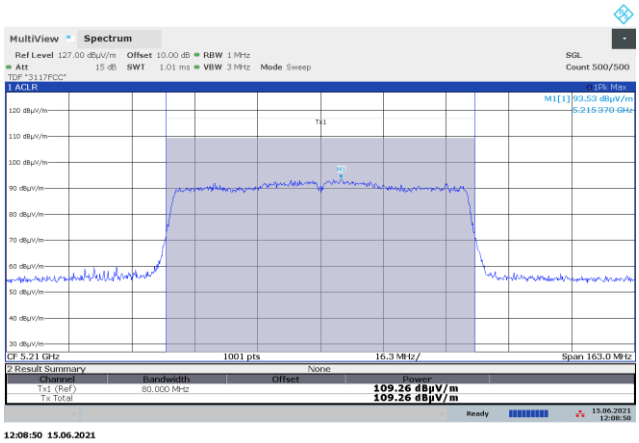
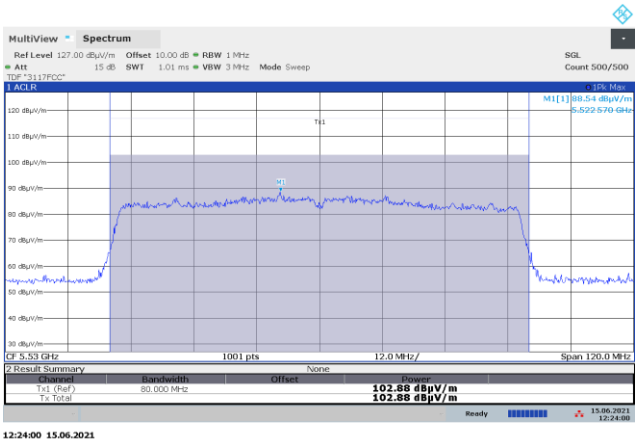
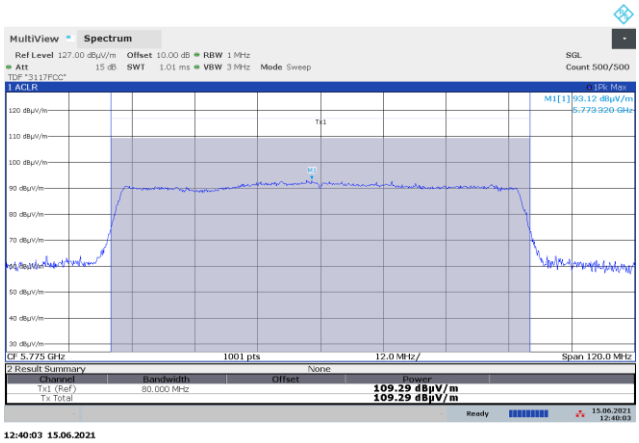
EIRP, 5795 MHz, 802.11n, HT40



EIRP, 5210 MHz, 802.11ac, HT80



EIRP, 5530 MHz, 802.11ac, HT80



EIRP, 5775 MHz, 802.11ac, HT80

3.2 Unwanted Emissions

FCC 15.407 (b)

ISED RSS-247, Issue 2, clause 6.2

Measurement procedure: ANSI C63.10-2013 Clause 12.7

Test Results: Complies

Measurement Data:

Band Edge Emissions:

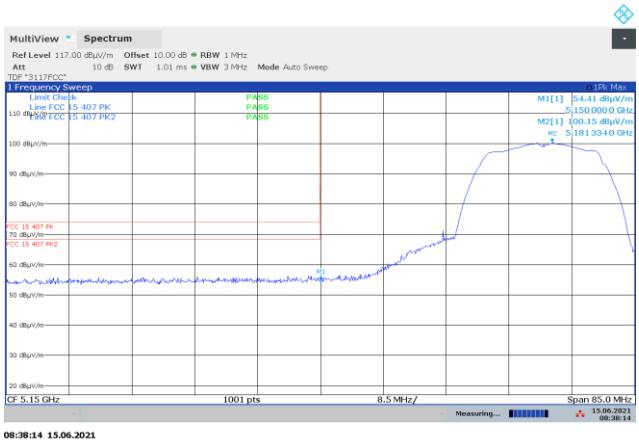
Ch. No.	Carrier Frequency (MHz)	Band Edge Frequency (MHz)	Measured Values (dBm/MHz e.i.r.p.)			
			802.11a 6Mb	802.11n HT20	802.11n HT40	802.11ac HT80
36	5180	5150	-40.82	-39.31		
64	5320	5350	-37.84	-39.45		
100	5500	5470	-39.70	-39.83		
140	5700	5725	-39.09	-39.13		
149	5745	5650	< -40	< -40		
149	5745	5700	< -45	< -45		
165	5825	5875	< -45	< -45		
165	5825	5925	< -40	< -40		
38	5190	5150			-40.33	
62	5310	5350			-39.53	
102	5510	5470			-40.30	
134	5670	5725			-39.17	
151	5755	5650			< -40	
151	5755	5700			< -45	
159	5795	5875			< -45	
159	5795	5925			< -40	
42	5210	5150				-37.45
106	5530	5470				-39.39
155	5775	5650				< -40
155	5775	5700				< -45
155	5775	5875				< -45
155	5775	5925				< -40

The measurement was performed radiated.
EIRP values were calculated from field strength using the method in KDB 412172 D01.
The tested equipment is for indoor use only, no band-edge requirements apply at 5250 MHz.

Limits:

Operating Frequency band	Limit for Emissions Outside Operating Frequency Band
5150 – 5250 MHz	-27 dBm/MHz e.i.r.p.
5250 – 5350 MHz	-27 dBm/MHz e.i.r.p.
5470 – 5725 MHz	-27 dBm/MHz e.i.r.p.
5725 – 5825 MHz	See FCC 15.407(b)(4)(i) or 15.407(b)(4)(ii)

Devices operating in the 5.25-5.35 GHz band that generate emissions in the 5.15-5.25 GHz band must meet all applicable technical requirements for operation in the 5.15-5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5.15-5.25 GHz band.



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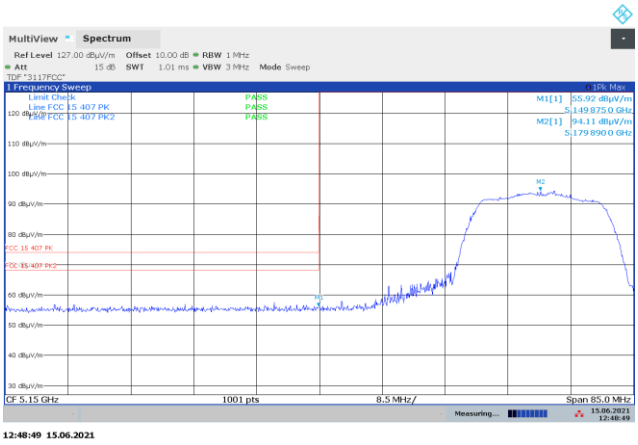
Band Edge 5150 MHz, ch036, 802.11a 6Mb, Radiated, Max



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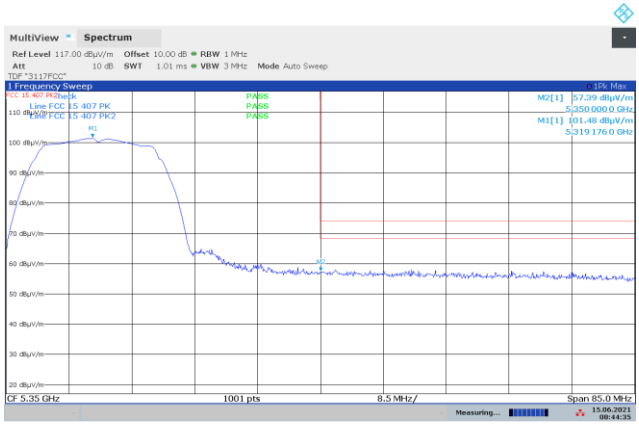
Band Edge 5150 MHz, ch036, 802.11n HT20, Radiated, Max



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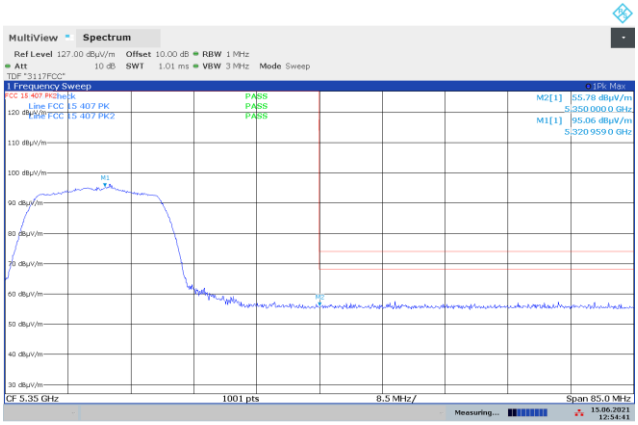
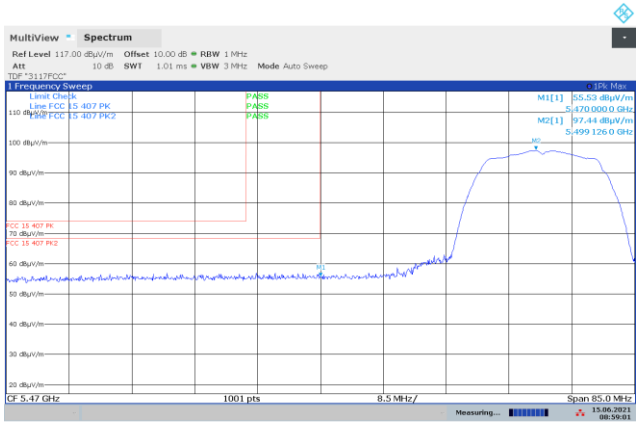
Band Edge 5350 MHz, ch064, 802.11a 6Mb, Radiated, Max



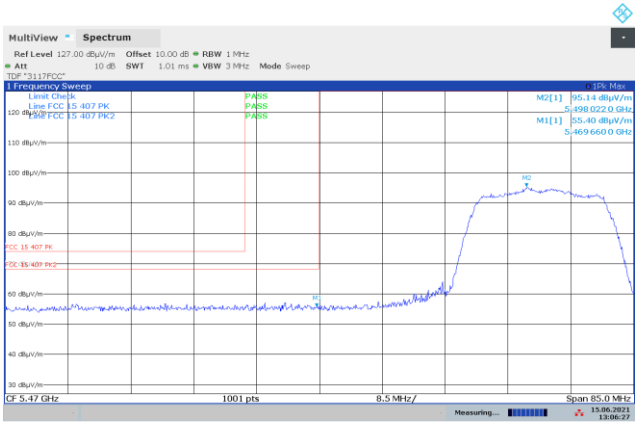
12:54:41 15.06.2021

Band Edge 5350 MHz, ch064, 802.11n HT20, Radiated, Max



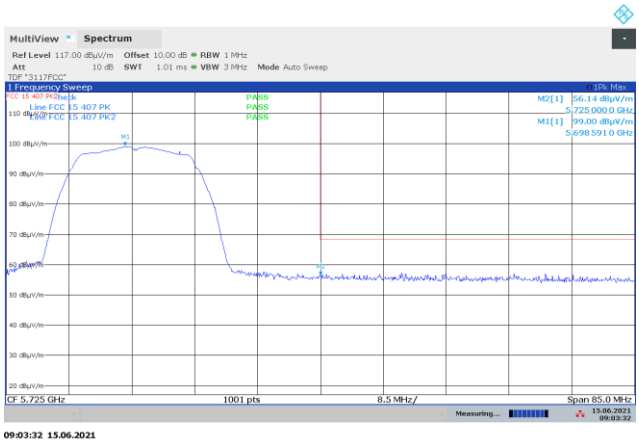
08:59:01 15.06.2021

Band Edge 5470 MHz, ch100, 802.11a 6Mb, Radiated, Max

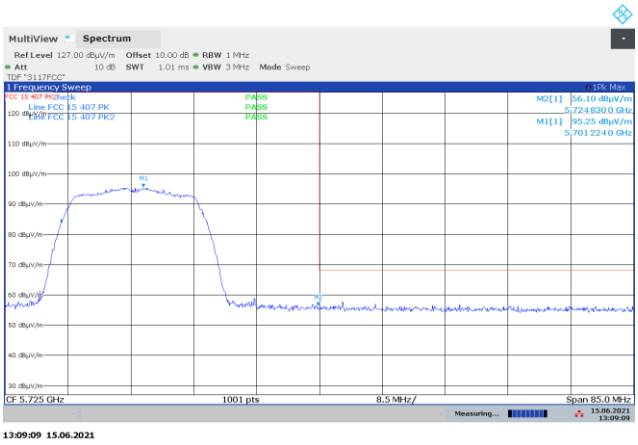


13:06:27 15.06.2021

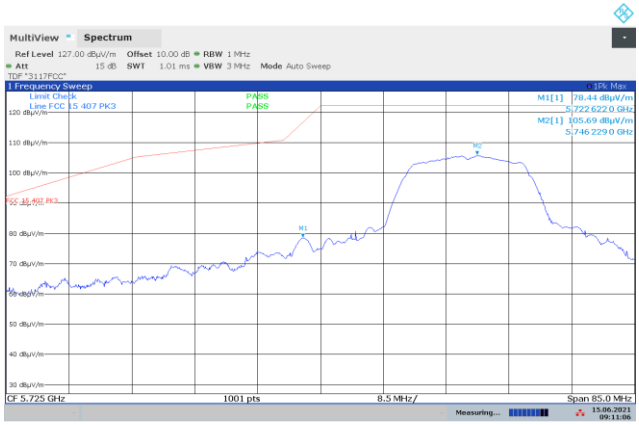
Band Edge 5470 MHz, ch100, 802.11n HT20, Radiated, Max



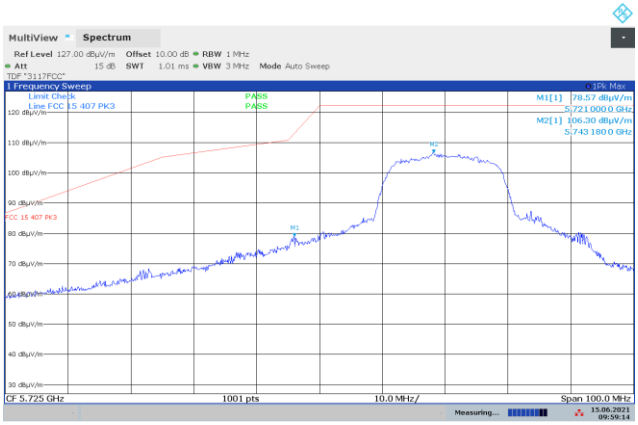
Band Edge 5725 MHz, ch140, 802.11a 6Mb, Radiated, Max



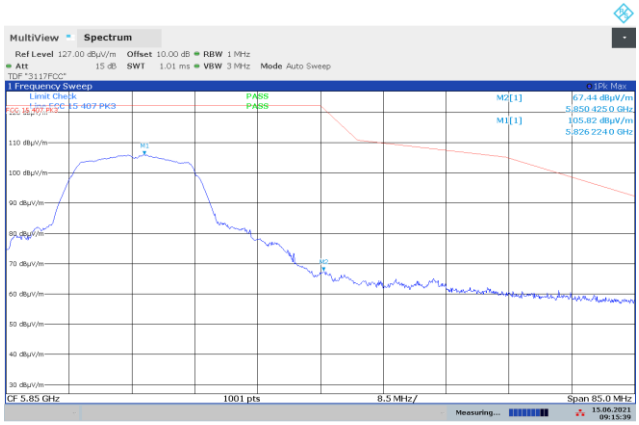
Band Edge 5725 MHz, ch140, 802.11n HT20, Radiated, Max



Band Edge 5725 MHz, ch149, 802.11a 6Mb, Radiated, Max

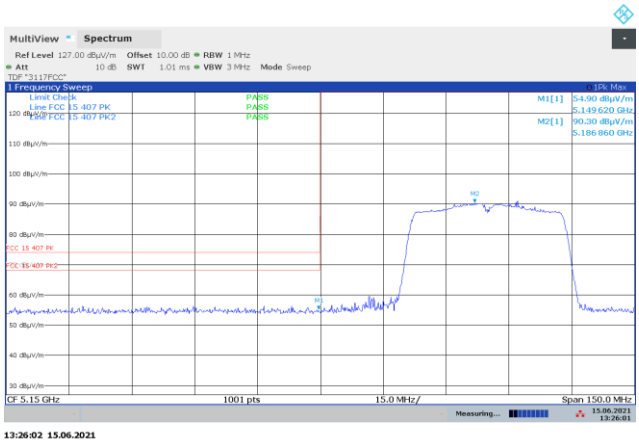


Band Edge 5725 MHz, ch149, 802.11n HT20, Radiated, Max



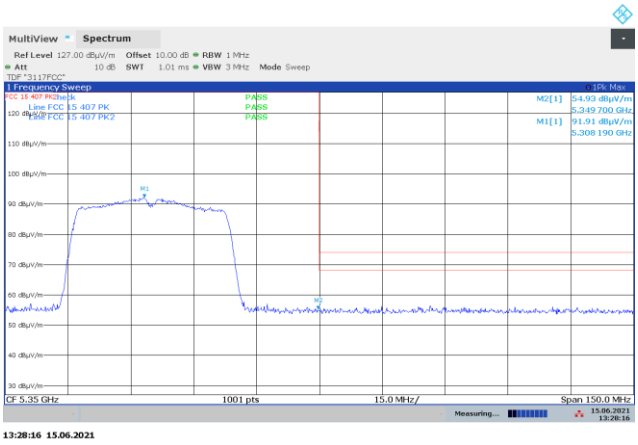
Band Edge 5850 MHz, ch165, 802.11a 6Mb, Radiated, Max

Band Edge 5850 MHz, ch165, 802.11n HT20, Radiated, Max



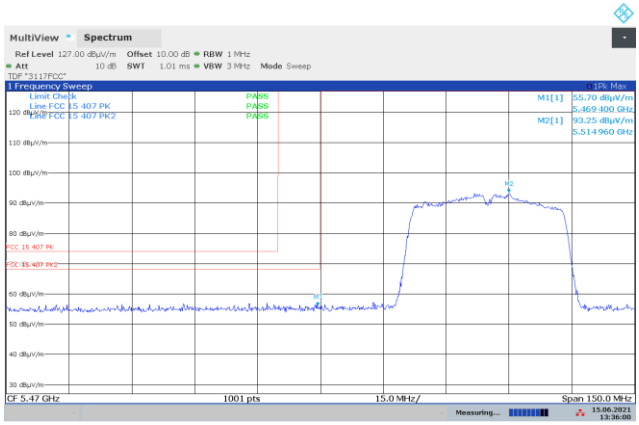
13:26:02 15.06.2021

Band Edge 5150 MHz, ch038, 802.11n HT40, Radiated, Max



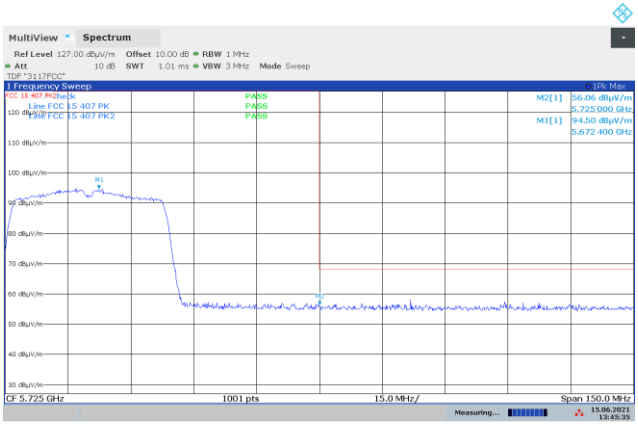
13:28:16 15.06.2021

Band Edge 5350 MHz, ch062, 802. 11n HT40, Radiated, Max



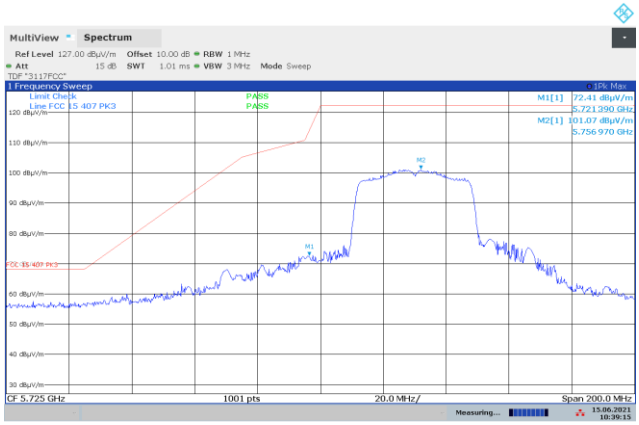
13:36:01 15.06.2021

Band Edge 5470 MHz, ch102, 802. 11n HT40, Radiated, Max



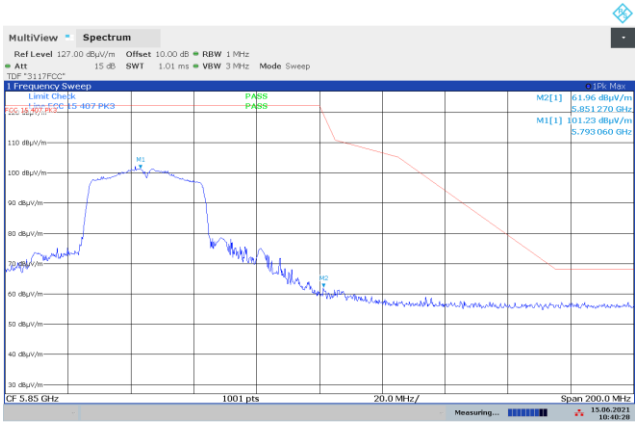
13:45:35 15.06.2021

Band Edge 5725 MHz, ch134, 802. 11n HT40, Radiated, Max



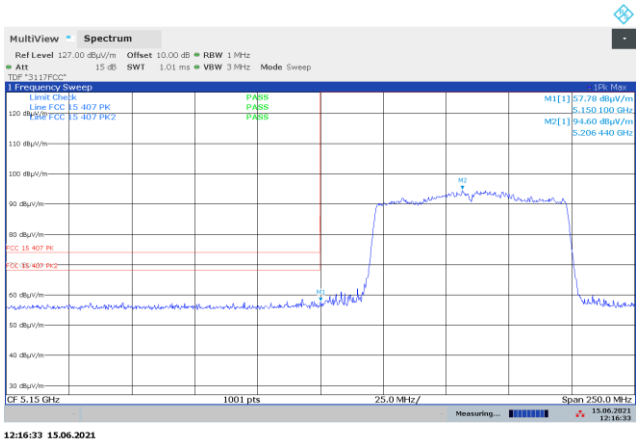
10:39:15 15.06.2021

Band Edge 5725 MHz, ch151, 802. 11n HT40, Radiated, Max



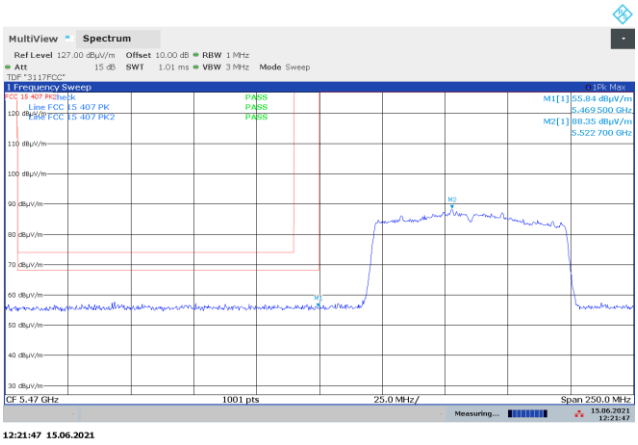
10:40:29 15.06.2021

Band Edge 5850 MHz, ch159, 802. 11n HT40, Radiated, Max



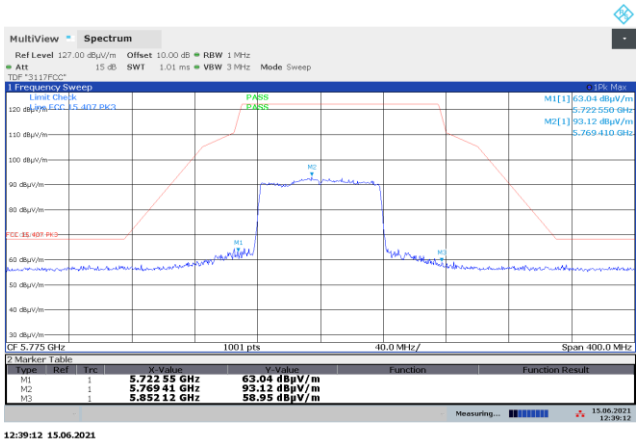
12:16:33 15.06.2021

Band Edge 5150 MHz, ch042, 802.11ac HT80, Radiated, Max



12:21:47 15.06.2021

Band Edge 5470 MHz, ch106, 802. 11ac HT80, Radiated, Max



12:39:12 15.06.2021

Band Edge 5725/5850 MHz, ch155, 802. 11ac HT80, Radiated, Max

3.3 Restricted Bands of operation

Restricted Bands of operation for FCC and ISED are defined in FCC Part 15.205 and ISED RSS-GEN, Issue 5 clause 8.10.

Generally, no fundamentals are allowed in the restricted bands and all emissions must comply with the limits in FCC 15.209 or RSS-GEN, Issue 5, clause 8.9.

FCC (MHz)	ISED (MHz)	FCC (GHz)	ISED (GHz)
0.090-0.110		**0.96-1.24** **1.3-1.427**	**0.96-1.427**
0.495-0.505		1.435-1.6265	
2.1735-2.1905		1.6455-1.6465	
	3.020-3.026	1.660-1.710	
4.125-4.128		1.7188-1.7222	
4.17725-4.17775		2.2-2.3	
4.20725-4.20775		2.31-2.39	
	5.677-5.683	2.4835-2.5	
6.215-6.218		**2.69-2.9**	**2.655-2.9**
6.26775-6.26825		3.26-3.267	
6.31175-6.31225		3.332-3.339	
8.291-8.294		3.3458-3.358	
8.362-8.366		**3.6-4.4**	**3.5-4.4**
8.37625-8.38675		4.5-5.15	
8.41425-8.41475		5.35-5.46	
12.29-12.293		7.25-7.75	
12.51975-12.52025		8.025-8.5	
12.57675-12.57725		9.0-9.2	
13.36-13.41		9.3-9.5	
16.42-16.423		10.6-12.7	
16.69475-16.69525		13.25-13.4	
16.80425-16.80475		14.47-14.5	
25.5-25.67		15.35-16.2	
37.5-38.25		17.7-21.4	
73-74.6		22.01-23.12	
74.8-75.2		23.6-24.0	
108-121.94 **123-138**	**108-138**	31.2-31.8	
149.9-150.05		36.43-36.5	
156.52475-156.52525		Above 38.6	
156.7-156.9			
162.0125-167.17			
167.72-173.2			
240-285			
322-335.4			
399.9-410			
608-614			

Frequencies in **Bold** text are specific for FCC or ISED, all other frequencies are common.

3.4 Radiated Emissions, 30 – 1000 MHz

FCC 15.205, 15.209, 15.407

ISED RSS-GEN, Issue 5, Clause 8.9

Measurement procedure: ANSI C63.10-2013 Clause 12.7

Test Results: Complies

Measurement Data:

Detector: QuasiPeak (Peak for Pre-Scan)

Measuring distance 3m

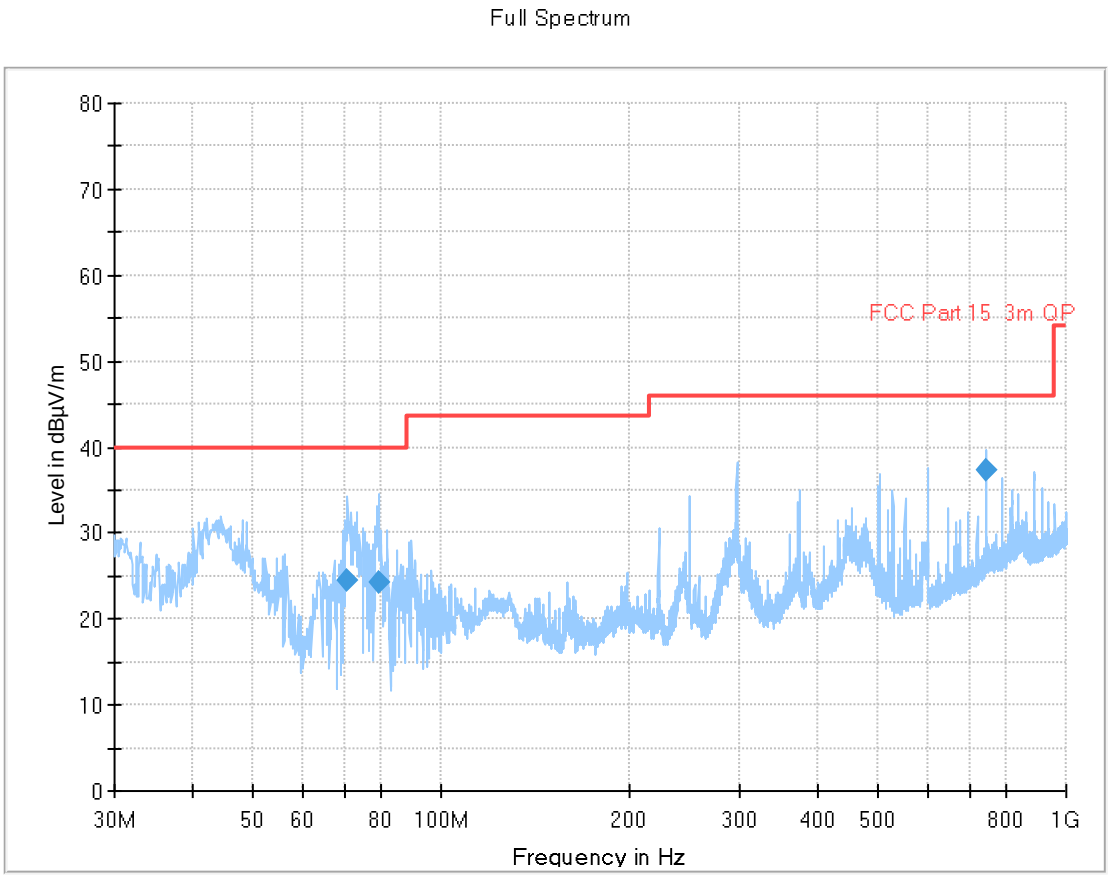
Tested in test mode with EUT transmitting on.

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
70.866250	24.58	40.00	15.42	1000.0	120.000	185.0	V	357.0
79.481900	24.25	40.00	15.75	1000.0	120.000	138.0	V	188.0
742.494450	37.28	46.00	8.72	1000.0	120.000	100.0	H	147.0

See attached plots.

Requirements/Limit

FCC	Part 15.209 @ frequencies defined in §15.205	
ISED	RSS-GEN Issue 5, Clause 8.9 @ frequencies defined in clause 8.10	
Frequency	Radiated emission limit @3 meters	
30 – 88 MHz	100 µV/m	40.0 dBµV/m
88 – 216 MHz	150 µV/m	43.5 dBµV/m
216 – 960 MHz	200 µV/m	46.0 dBµV/m
960 – 1000 MHz	500 µV/m	54.0 dBµV/m
	Limits above are with Quasi Peak Detector	



Radiated Emissions 30-1000 MHz, MIMO

3.5 Radiated Emissions, 1 – 40 GHz

FCC 15.205, 15.209, 15.407

ISED RSS-GEN, Issue 5, Clause 8.9

Measurement procedure: ANSI C63.10-2013 Clause 12.7

Test Results: Complies

Measurement Data:

Measuring distance 3m up to 18 GHz, 1m above 18 GHz.

RBW/VBW = 1MHz/3MHz

Carrier Frequency (MHz)	Measured Frequency (GHz)	Modulation	Measured Emissions (dBµV/m)		Limit (dBµV/m)		Margin (dB)	
			Peak	Average	Peak	Average	Peak	Average
5180	5150	802.11a 6Mbps	/	/	74	/	/	/
5180	5150	802.11n MCS0	/	/	74	/	/	/
5320	5350	802.11a 6Mbps	/	/	74	/	/	/
5320	5350	802.11n MCS0	/	/	74	/	/	/
5500	5460	802.11a 6Mbps	/	/	74	/	/	/
5500	5460	802.11n MCS0	/	/	74	/	/	/
Any	Any	Any	/	/	74	/	/	/

Band Edge values with Peak Detector are reported in clause 2.8

Measured results are for 802.11a 6Mbps and 802.11n MCS0, it was checked that other modulations and/or bitrates did not produce higher emissions.

A notch Filter was used for measurements up to 18 GHz.

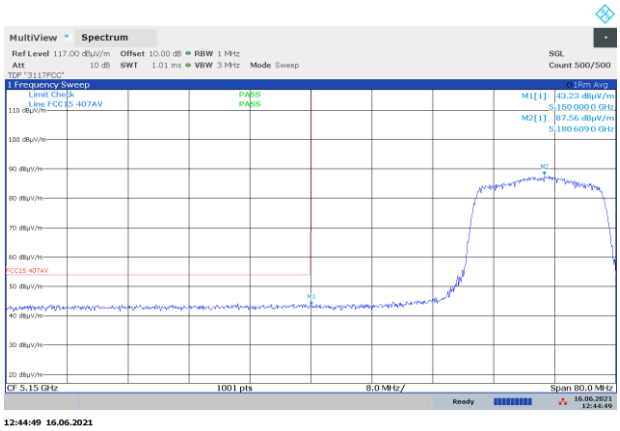
Only harmonics that fall in the restricted bands (ref. §15.205) have been measured.

Antenna factor, amplifier gain and cable loss are included in Spectrum Analyzer “Transducer factor”.

See attached plots.

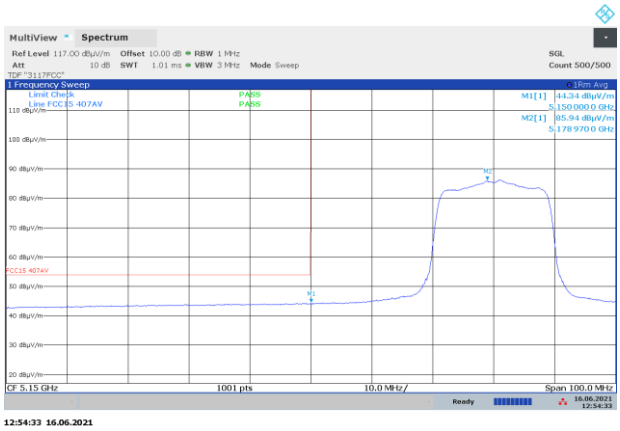
Requirements/Limit

FCC	Part 15.209 @ frequencies defined in §15.205	
ISED	RSS-GEN Issue 5, Clause 8.9 @ frequencies defined in clause 8.10	
	Radiated emission limit @3 meters	
Frequency	Average Detector (dBµV/m)	Peak Detector (dBµV/m)
1 – 40 GHz	54.0	74.0



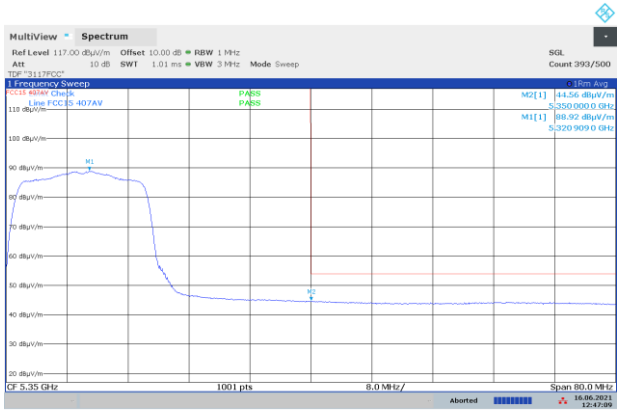
12:44:49 16.06.2021

Band Edge, 5150 MHz, Ch036, 802.11a 6M, AV, Max



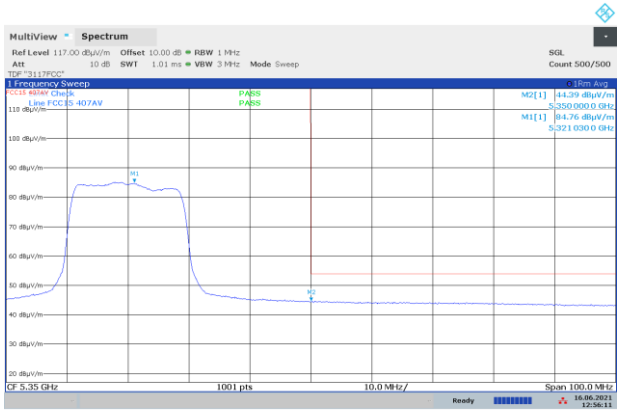
12:54:33 16.06.2021

Band Edge, 5150 MHz, Ch036, 802.11n HT20, AV, Max



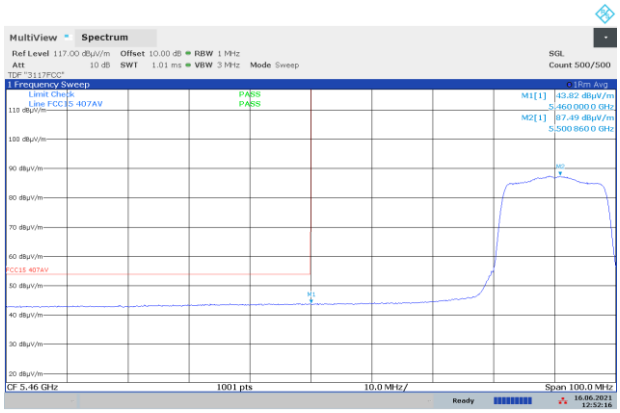
12:47:10 16.06.2021

Band Edge, 5350 MHz, Ch064, 802.11a 6M, AV, Max



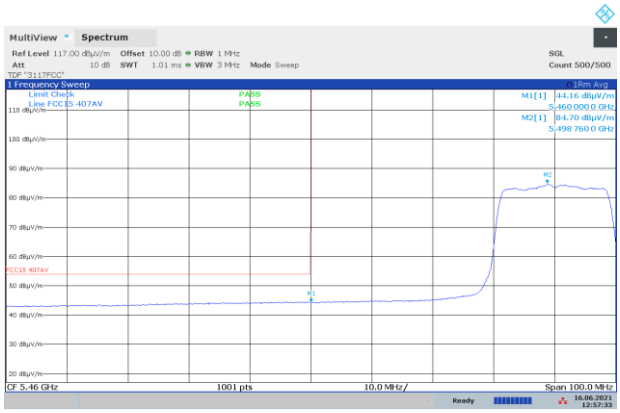
12:56:11 16.06.2021

Band Edge, 5350 MHz, Ch064, 802.11n HT20, AV, Max



12:52:17 16.06.2021

Band Edge, 5460 MHz, Ch100, 802.11a 6M, AV, Max

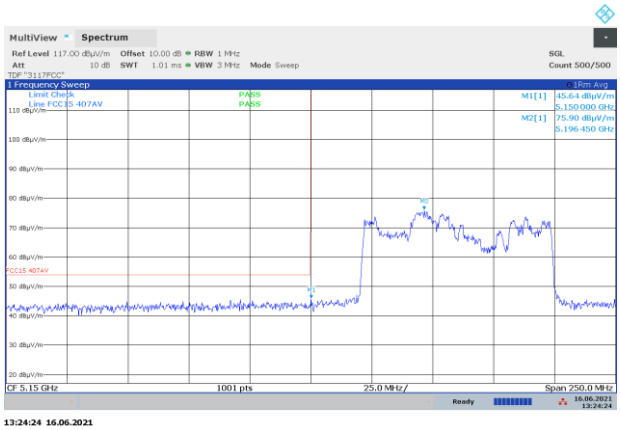


12:57:33 16.06.2021

Band Edge, 5460 MHz, Ch100, 802.11n HT20, AV, Max

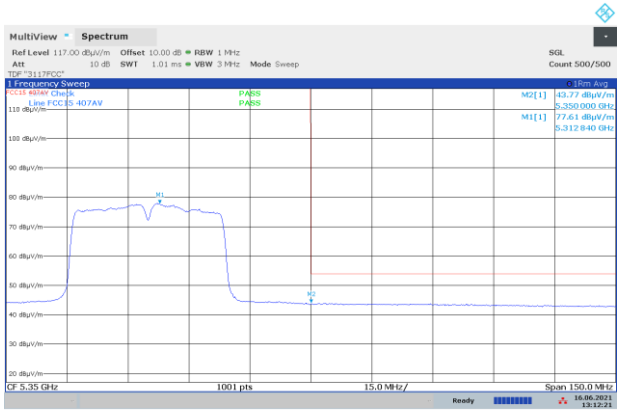
13:10:43 16.06.2021

Band Edge, 5150 MHz, Ch038, 802.11n HT40, AV, Max



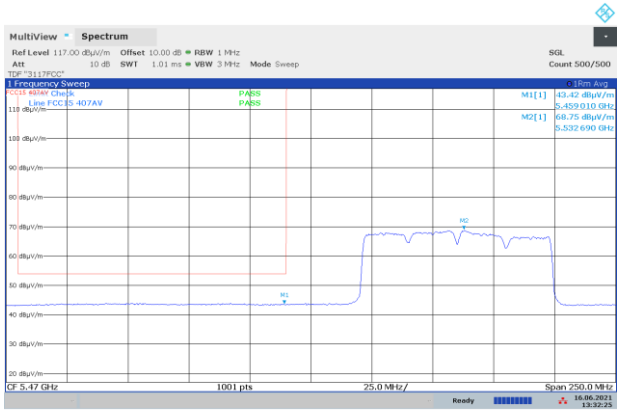
13:24:24 16.06.2021

Band Edge, 5150 MHz, Ch042, 802.11ac HT80, AV, Max



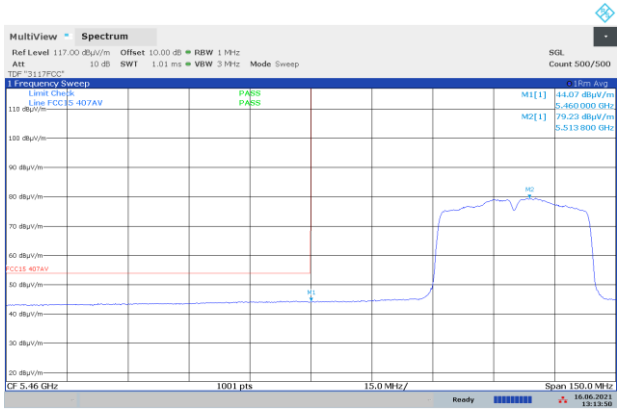
13:12:21 16.06.2021

Band Edge, 5350 MHz, Ch062, 802.11n HT40, AV, Max



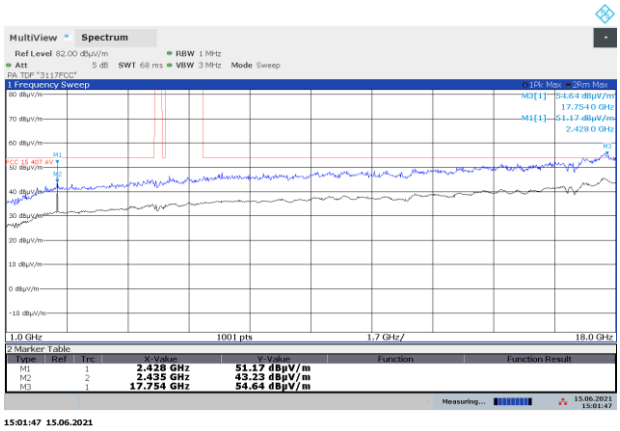
13:32:25 16.06.2021

Band Edge, 5350 MHz, Ch106, 802.11ac HT80, AV, Max

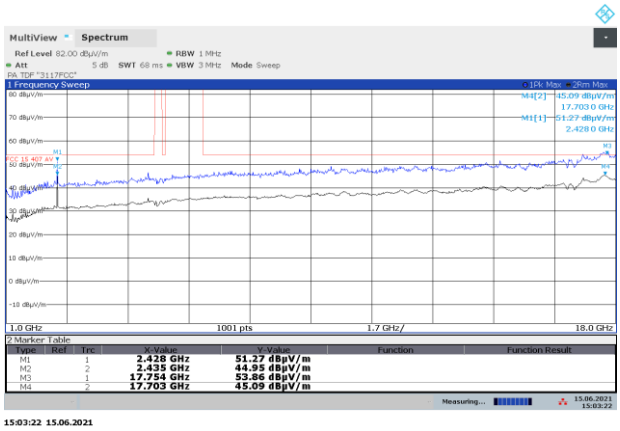


13:13:50 16.06.2021

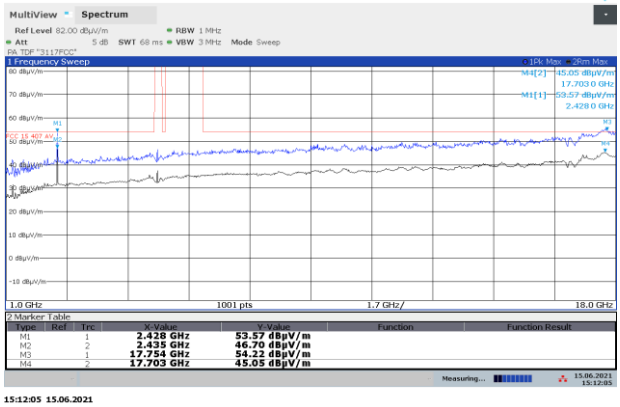
Band Edge, 5460 MHz, Ch102, 802.11n HT40, AV, Max



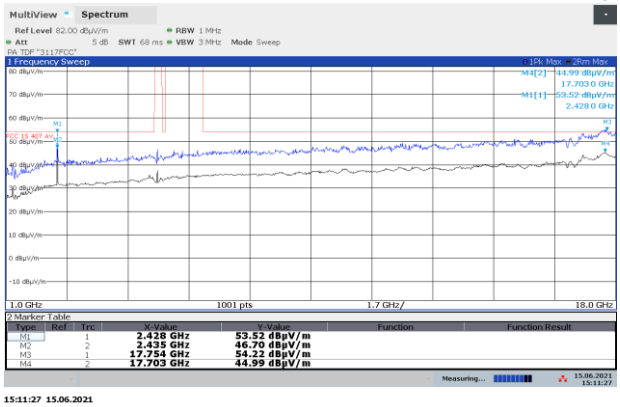
Radiated Emissions 1-18 GHz, Ch36, 802.11a 6M,HP



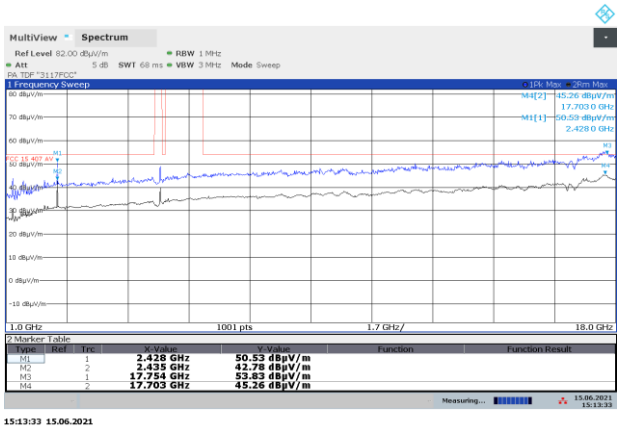
Radiated Emissions 1-18 GHz, Ch36, 802.11a 6M, VP



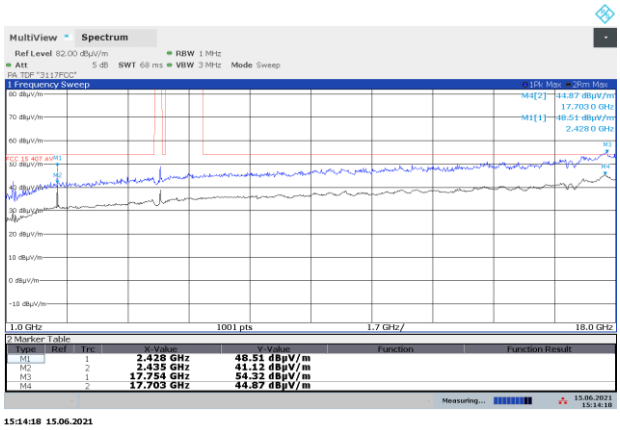
Radiated Emissions 1-18 GHz, Ch44, 802.11a 6M, HP



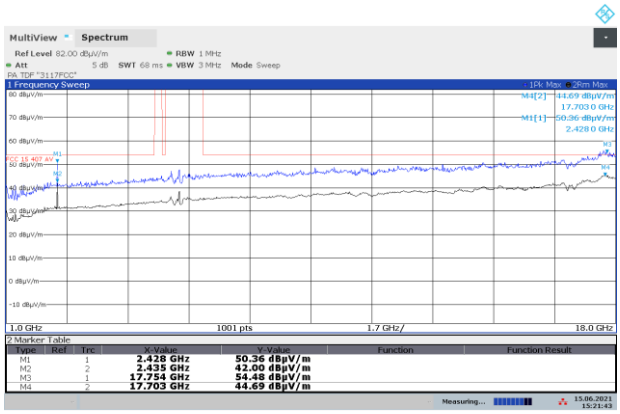
Radiated Emissions 1-18 GHz, Ch44, 802.11a 6M, VP



Radiated Emissions 1-18 GHz, Ch60, 802.11a 6M, HP

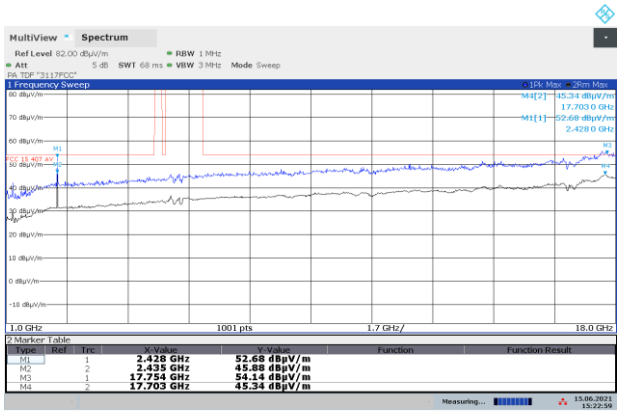


Radiated Emissions 1-18 GHz, Ch60, 802.11a 6M, VP



15:21:43 15.06.2021

Radiated Emissions 1-18 GHz, Ch165, 802.11a 6M, HP



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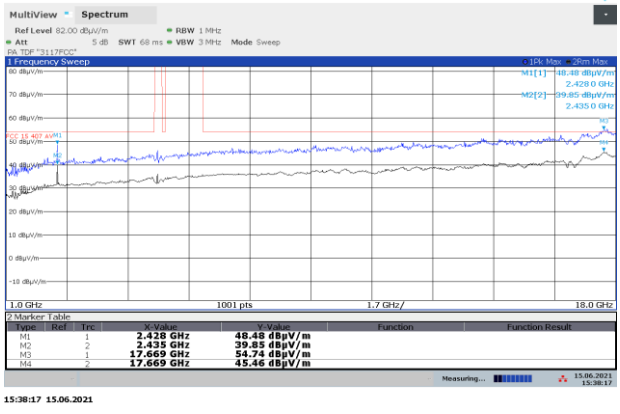
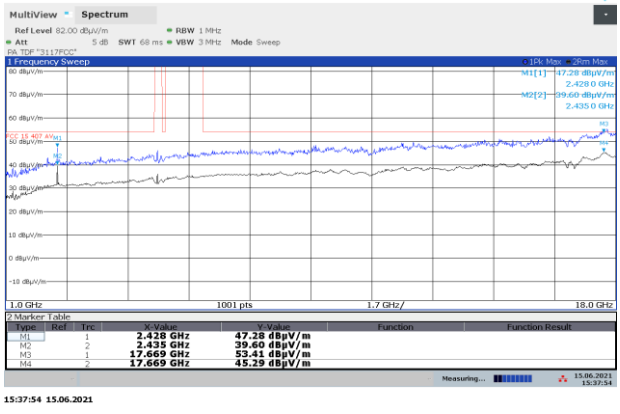
Radiated Emissions 1-18 GHz, Ch165, 802.11a 6M, VP



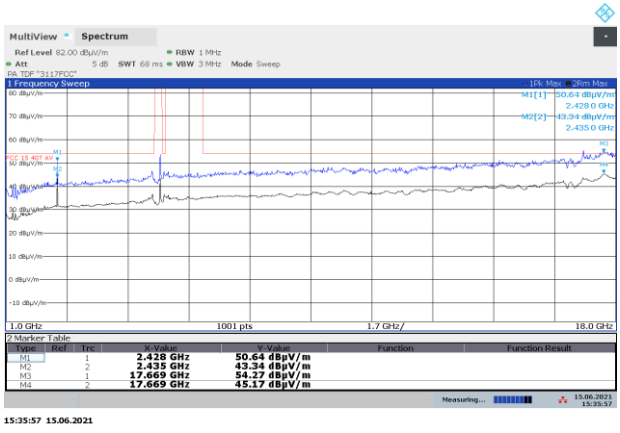
15:38:17 15.06.2021

Radiated Emissions 1-18GHz, Ch44, 802.11n MCS0, MIMO, HP



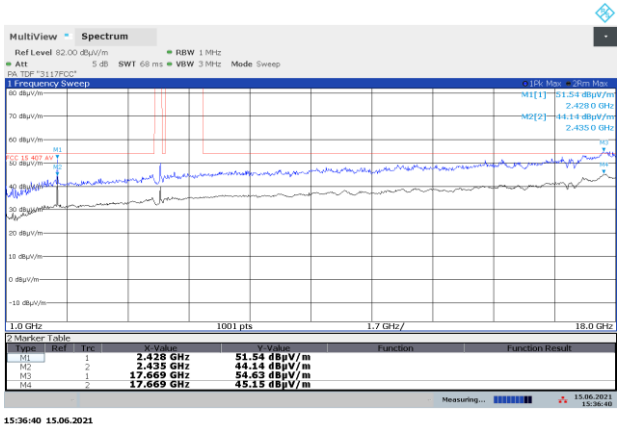
15:37:54 15.06.2021

Radiated Emissions 1-18GHz, Ch44, 802.11n MCS0, MIMO, VP



15:35:57 15.06.2021

Radiated Emissions 1-18GHz, Ch60, 802.11n MCS0, MIMO, HP



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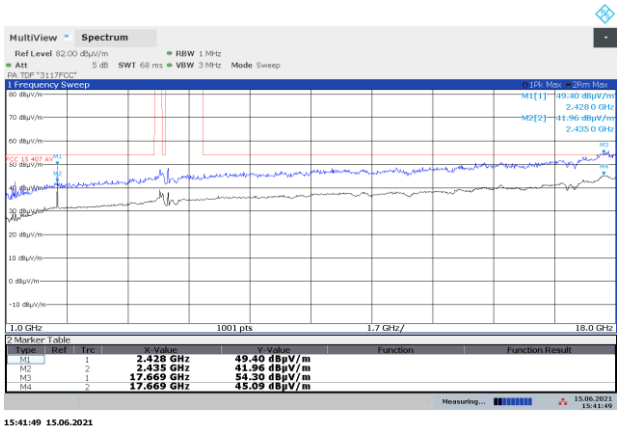
Radiated Emissions 1-18GHz, Ch60, 802.11n MCS0, MIMO, VP



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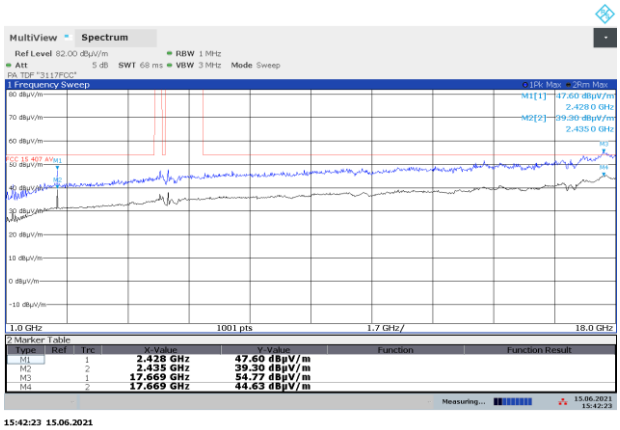
Radiated Emissions 1-18GHz, Ch104, 802.11n MCS0, MIMO, HP



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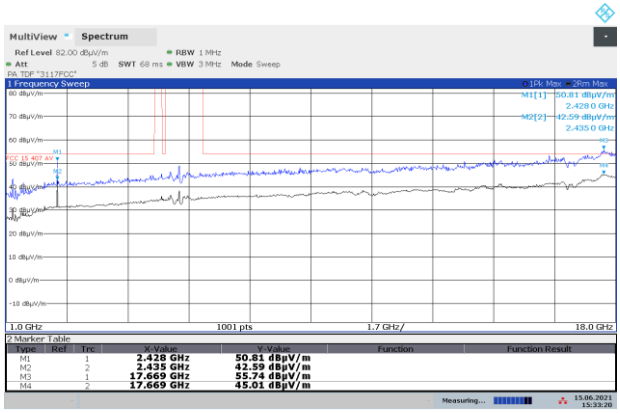
Radiated Emissions 1-18GHz, Ch104, 802.11n MCS0, MIMO, VP



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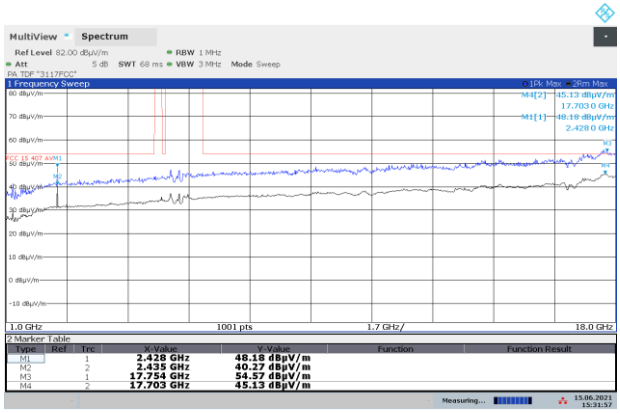
Radiated Emissions 1-18GHz, Ch165, 802.11n MCS0, MIMO, HP



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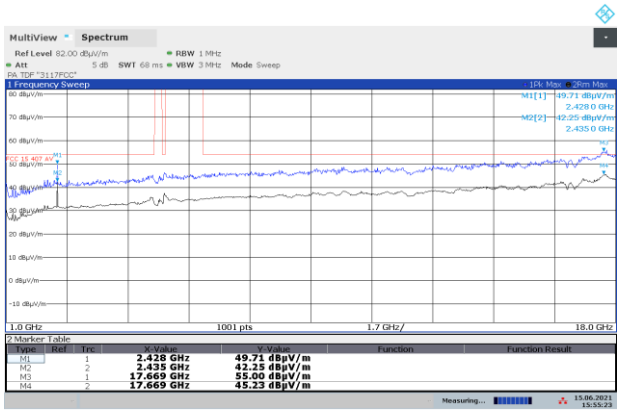
Radiated Emissions 1-18GHz, Ch165, 802.11n MCS0, MIMO, VP



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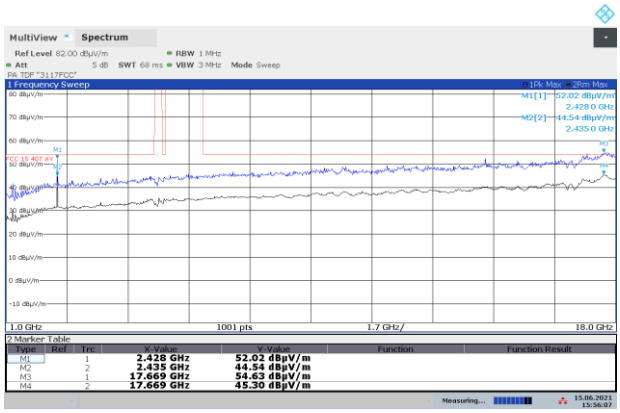
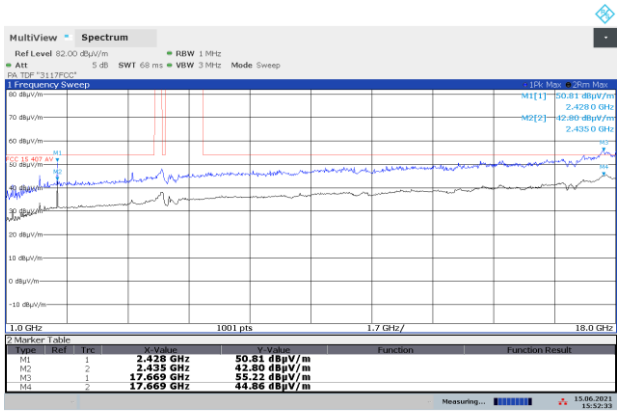
Radiated Emissions 1-18GHz, Ch54, 802.11n MCS8, MIMO, HP

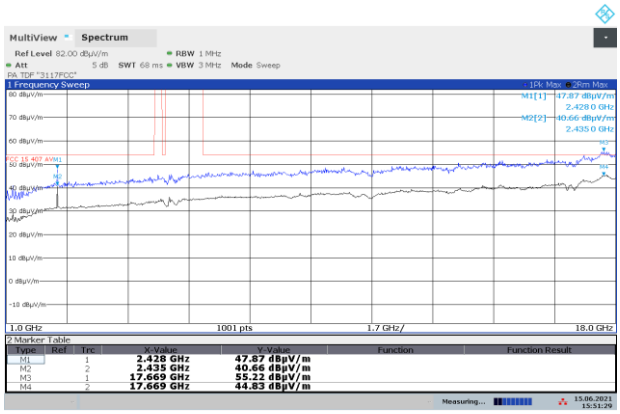


15:56:07 15.06.2021

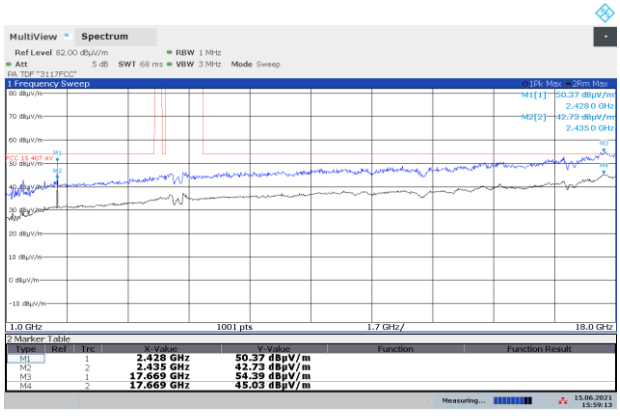
Radiated Emissions 1-18GHz, Ch54, 802.11n MCS8, MIMO, VP



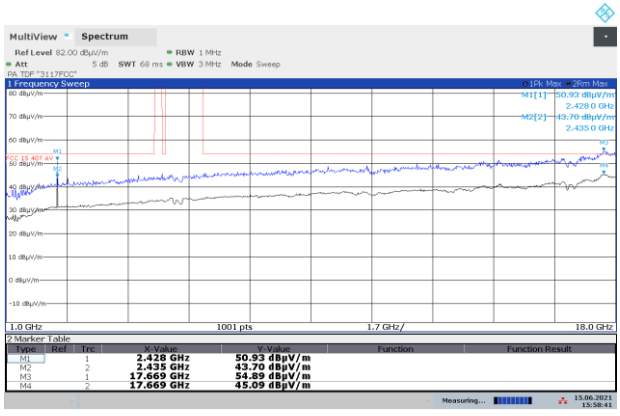
Radiated Emissions 1-18GHz, Ch110, 802.11n MCS8, MIMO, HP



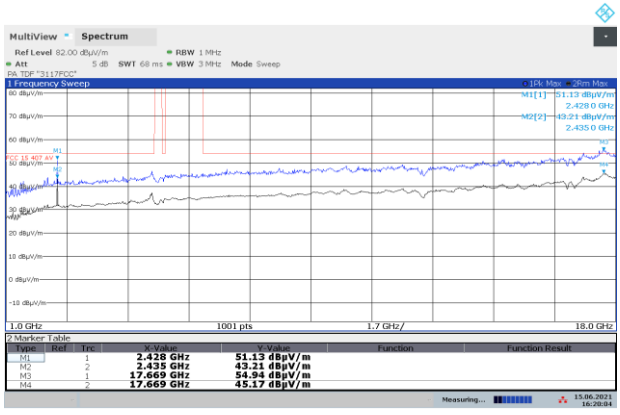
Radiated Emissions 1-18GHz, Ch110, 802.11n MCS8, MIMO, VP



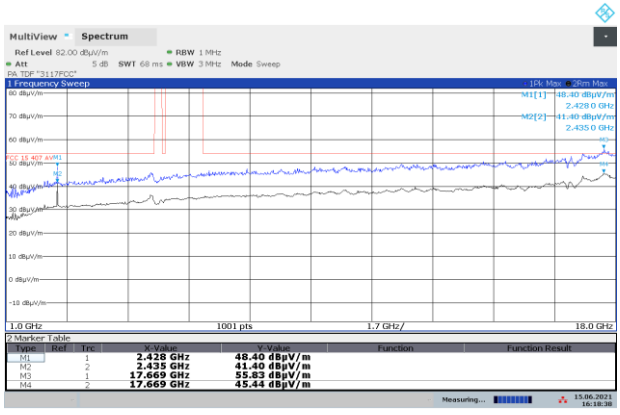
Radiated Emissions 1-18GHz, Ch159, 802.11n MCS8, MIMO, HP



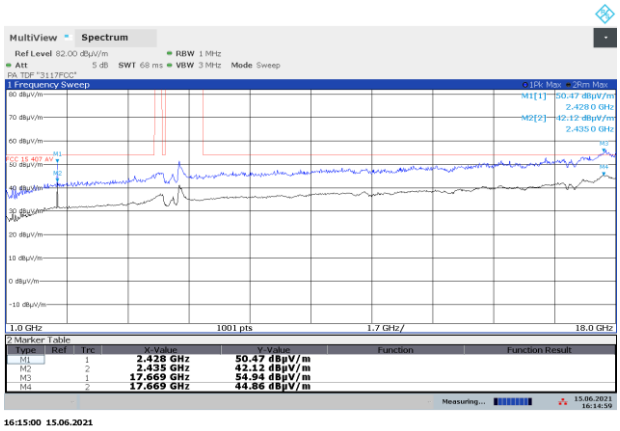
Radiated Emissions 1-18GHz, Ch159, 802.11n MCS8, MIMO, VP



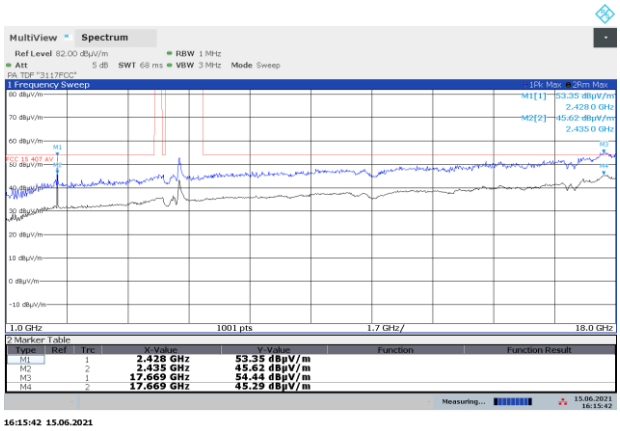
Radiated Emissions 1-18GHz, Ch42, 802.11n MCS0, MIMO, HP



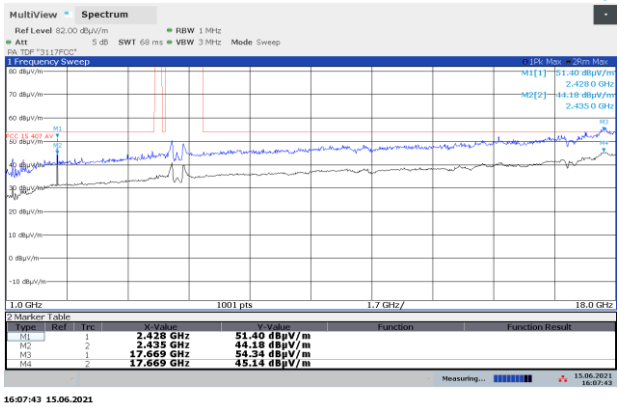
Radiated Emissions 1-18GHz, Ch42, 802.11n MCS0, MIMO, VP



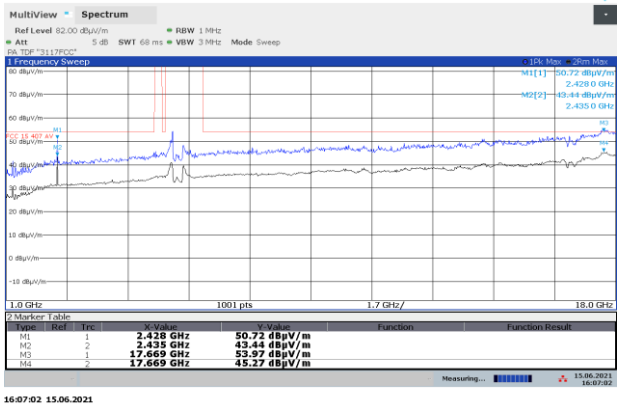
Radiated Emissions 1-18GHz, Ch138, 802.11n MCS0, MIMO, HP



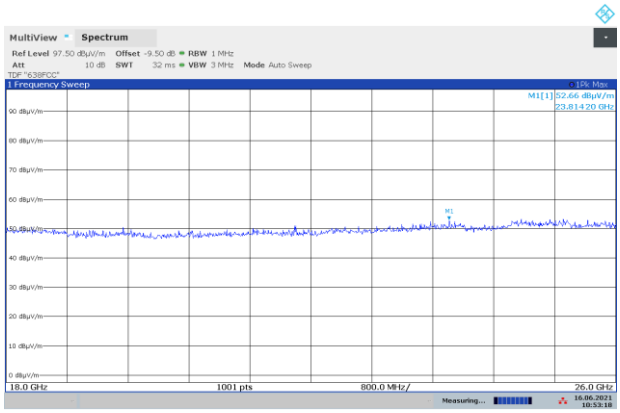
Radiated Emissions 1-18GHz, Ch138, 802.11n MCS0, MIMO, VP



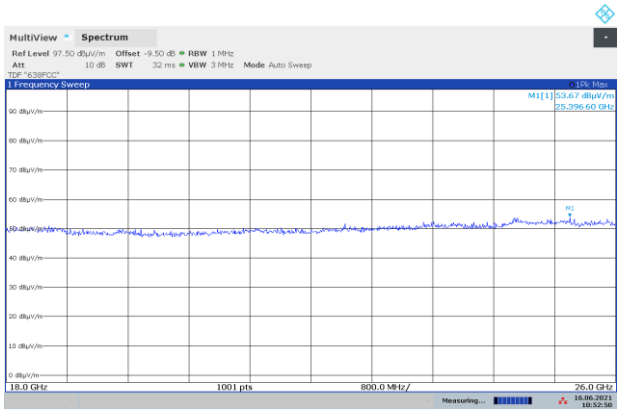
Radiated Emissions 1-18GHz, Ch155, 802.11n MCS0, MIMO, HP



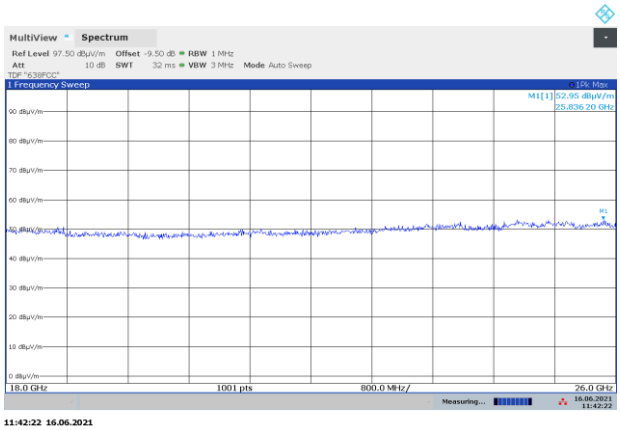
Radiated Emissions 1-18GHz, Ch155, 802.11n MCS0, MIMO, VP



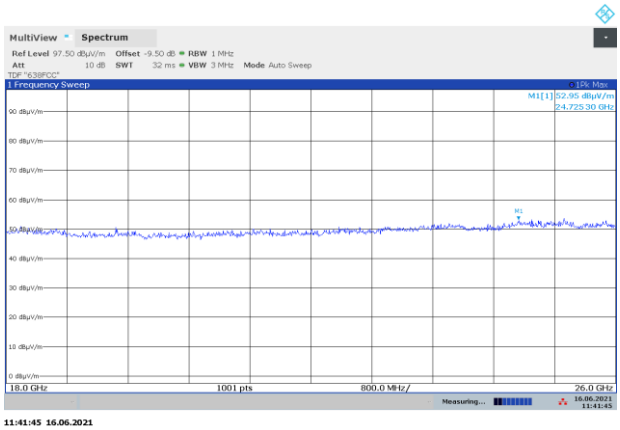
Emissions 18-26 GHz, 6M, 802.11n MCS0, MIMO, HP, @1m



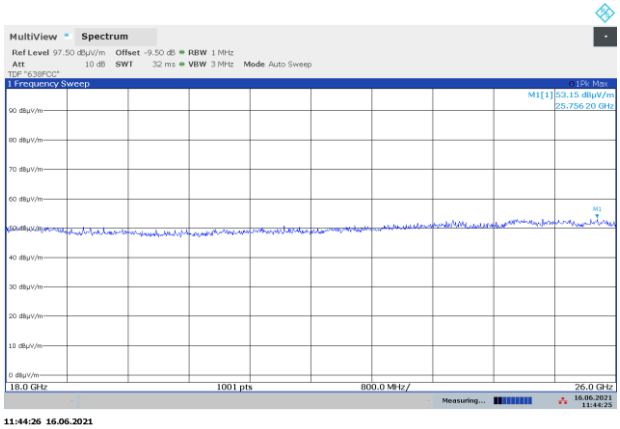
Emissions 18-26 GHz, 6M, 802.11n MCS0, MIMO, VP, @1m



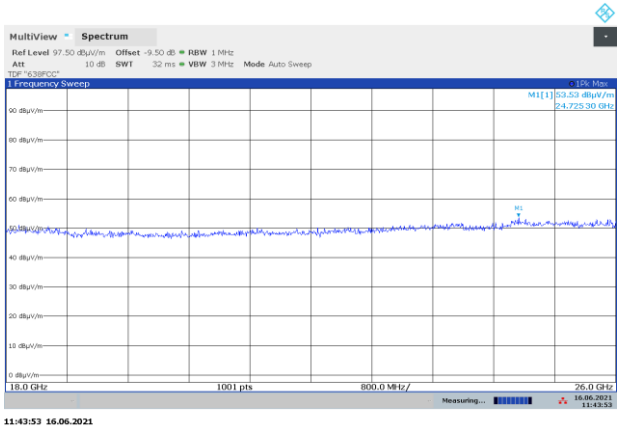
Emissions 18-26 GHz, 802.11n MCS0, MIMO,VT20 HP, @1m



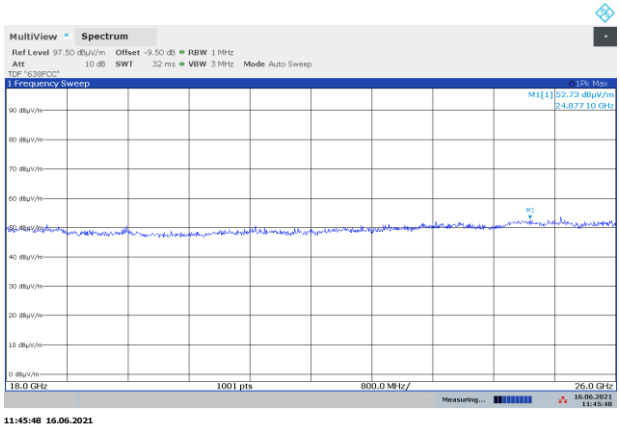
Emissions 18-26 GHz, 802.11n MCS0, MIMO,VT20, VP, @1m



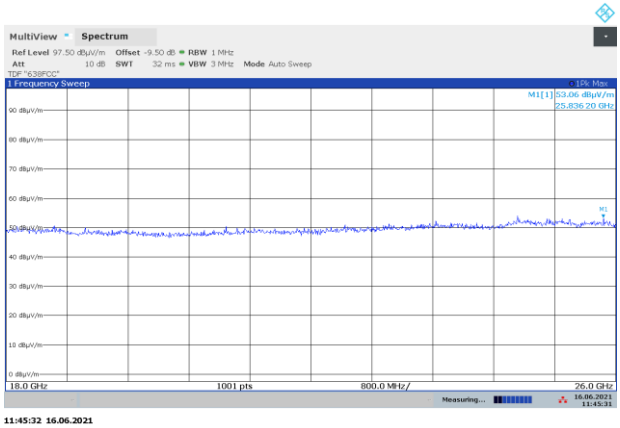
Emissions 18-26 GHz, 802.11n MCS0, MIMO, VT40,HP, @1m



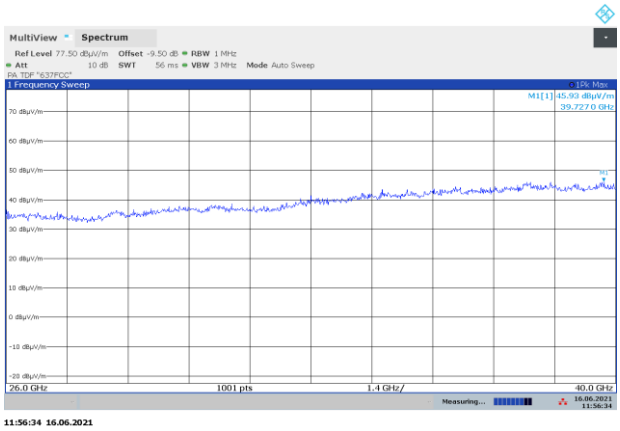
Emissions 18-26 GHz, 802.11n MCS0, MIMO, VT40,VP, @1m



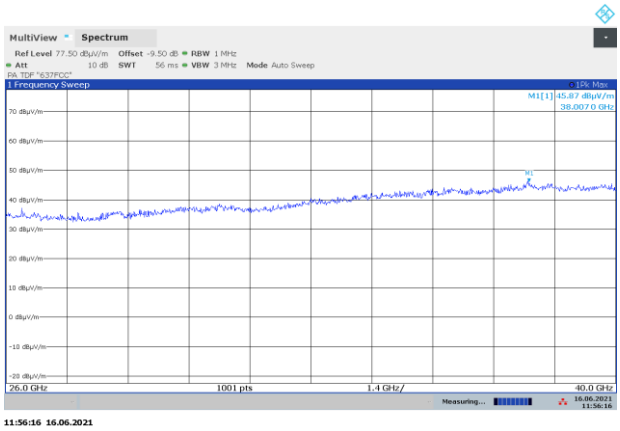
Emissions 18-26 GHz, 802.11ac MCS0, MIMO, VT80,HP, @1m



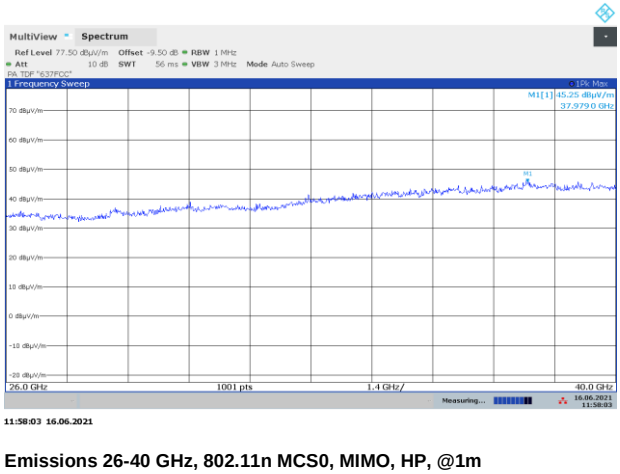
Emissions 18-26 GHz, 802.11ac MCS0, MIMO, VT80,VP, @1m



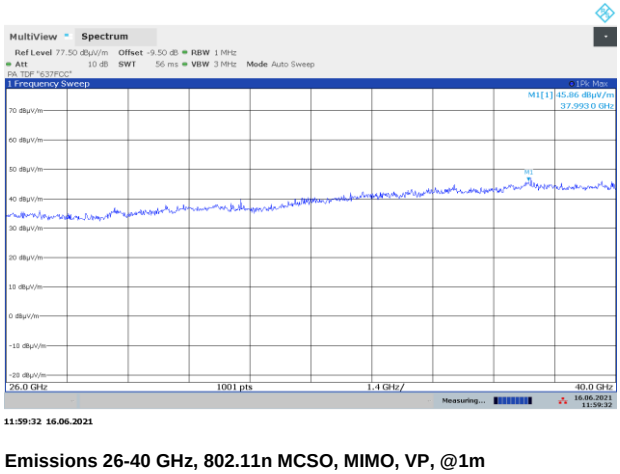
Emissions 26-40 GHz, 802.11n 6M, MIMO, HP, @1m



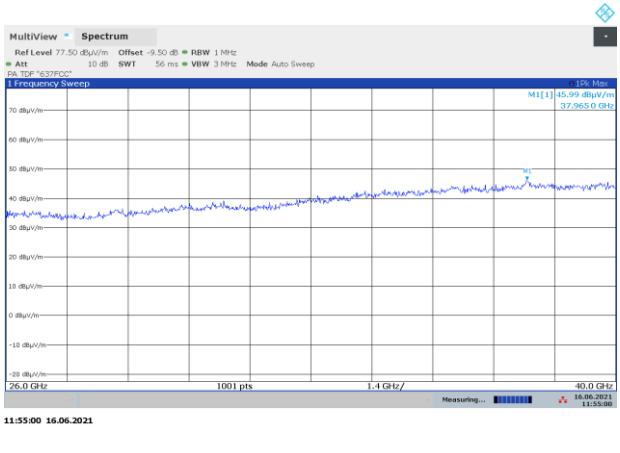
Emissions 26-40 GHz, 802.11n 6M, MIMO, VP, @1m



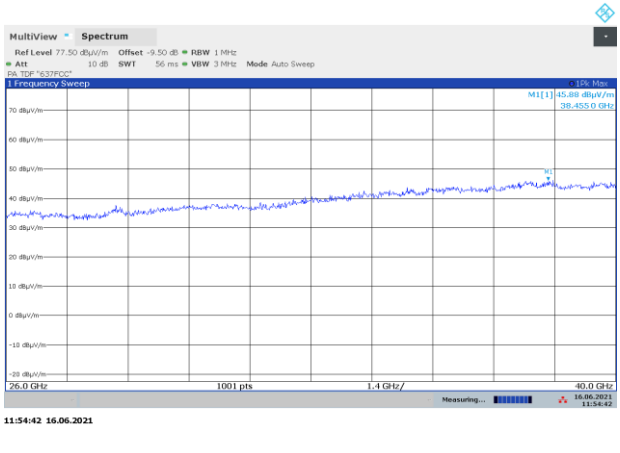
Emissions 26-40 GHz, 802.11n MCS0, MIMO, HP, @1m



Emissions 26-40 GHz, 802.11n MCSO, MIMO, VP, @1m



Emissions 26-40 GHz, 802.11ac MCS0, MIMO, HP, @1m



Emissions 26-40 GHz, 802.11ac MCS0, MIMO, VP, @1m

4 Measurement Uncertainty

Measurement Uncertainty Values		
Test Item		**Uncertainty**
Output Power		±0.5 dB
Power Spectral Density		±0.5 dB
Out of Band Emissions, Conducted	**< 3.6 GHz**	±0.6 dB
	> 3.6 GHz	±0.9 dB
Spurious Emissions, Radiated	**< 1 GHz**	±2.5 dB
	> 1 GHz	±2.2 dB
Emission Bandwidth		±4 %
Power Line Conducted Emissions		+2.9 / -4.1 dB
Spectrum Mask Measurements	**Frequency**	±5 %
	Amplitude	±1.0 dB
Frequency Error		±0.6 ppm
Temperature Uncertainty		±1 °C

All uncertainty values are expanded standard uncertainty to give a confidence level of 95%, based on coverage factor k=2

5 LIST OF TEST EQUIPMENT

To facilitate inclusion on each page of the test equipment used for related tests, each item of test equipment and ancillaries are identified (numbered) by the Test Laboratory.

No.	Model number	Description	Manufacturer	Ref. no.	Cal. date	Cal. Due
1.	FSW43	Spectrum Analyzer	Rohde & Schwarz	LR 1690	2020-10	2021-10
2.	ESU40	Measuring Receiver	Rohde & Schwarz	LR 1639	2021-03	2022-03
3.	6810-17B	Attenuator	Suhner	LR 1669	2020-08	2021-08
4.	N0324415	BandStop Filter	Microwave Circuits	LR 1760	COU	
5.	WLK5-1100-1485-7000-40SS	Low Pass Filter	Wainwright Inst.	LR 1761	COU	
6.	NO452501	Notch filter	Micro circuits	LR 1775	COU	
7.	NO55983	Notch filter	Micro circuits	LR 1774	COU	
8.	NO257881	Notch filter	Micro circuits	LR 1764	COU	
9.	VULB 9163	BiLog Antenna	Schwarzbeck	LR 1616	2020-01	2023-01
10.	317	Preamplifier	Sonoma Inst.	LR 1687	2020-08	2021-08
11.	8449A	Pre-amplifier	Hewlett Packard	LR 1322	2020-08	2021-08
12.	3115	Horn Antenna	EMCO	LR 1330	2016-10	2021-10
13.	3117-PA	Horn Antenna +PreAmp	EMCO	LR 1717	2020-08	2021-08
14.	Model 638	Antenna Horn	Narda	LR 1480	N/A	
15.	Model 87 V	Multimeter	Fluke	LR 1599	2021-02	2023-02
16.	6812B	AC Power Source	Agilent	LR 1515	COU	
17.	ENV216	Two Line V-Network	Rohde & Schwarz	LR 1665	2019-11	2021-11
18.	ESCI3	Measuring Receiver	Rohde & Schwarz	N-4259	2019-10	2021-10
19.	Model V637	Horn Antenna	Narda	LR 099	N/A	
20.	JS4-20004000	Preamplifier	Miteq	LR 1591	2020-08	2021-08
21.	ST18/SMA/N/36	RF Cable	Suhner	LR 1627	COU	
22.	SF102/1000MM	RF Cable	Suhner	SN 50113/2	COU	
23.	SF102/2000MM	RF Cable	Suhner	SN 500100/2	COU	

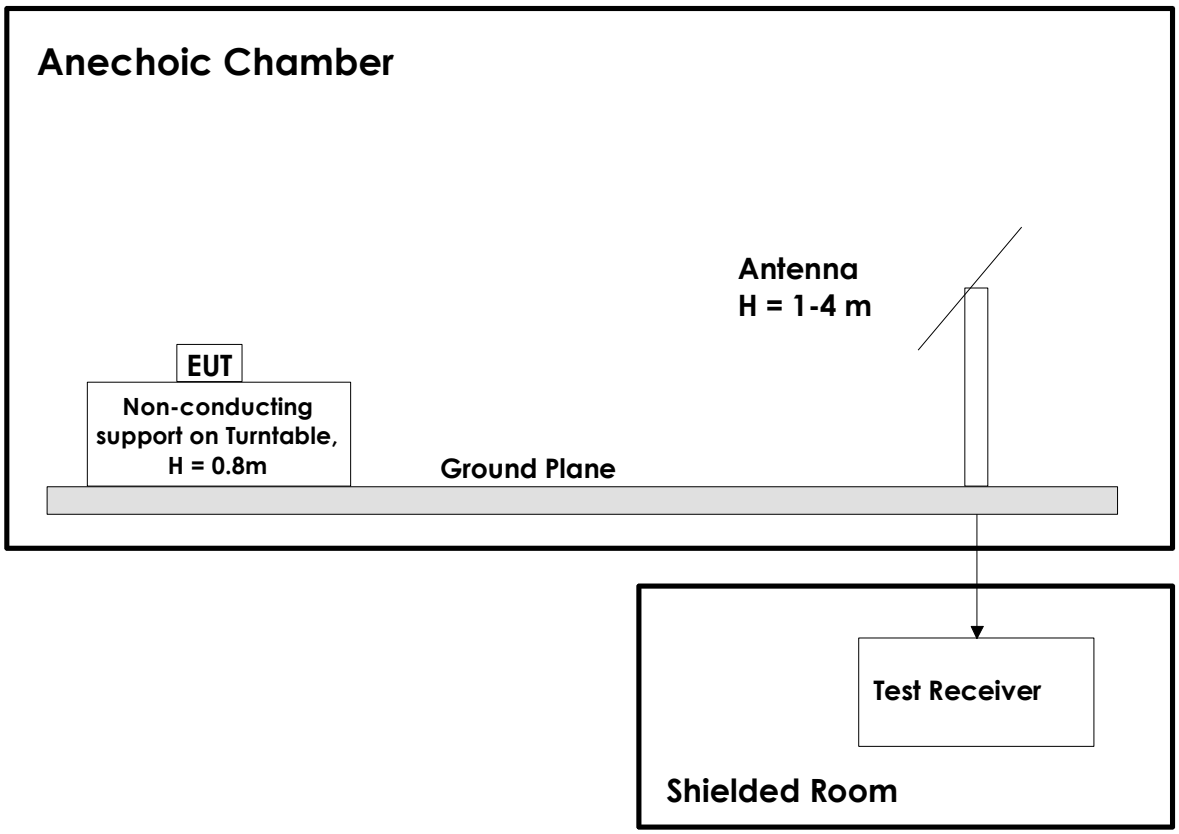
Note: COU – calibrate on use; N/A – Not Applicable

The software listed below has been used for one or more tests.

No.	Manufacturer	Name	Version	Comment
1	Rohde & Schwarz	EMC32	10.40.10	Power Line Conducted test software
2	Nemko AS	RSPlot	1.0.8.0	Screenshots from R&S Spectrum Analyzers

6 BLOCK DIAGRAM

6.1 Test Site Radiated Emission



This test setup is used for all radiated emissions tests. Measuring distance is 3m for all frequencies.

Emissions above 1 GHz are measured with a Spectrum Analyzer and Horn Antenna.

All measurements at 1GHz and above were performed with turntable height 1.5m and with the ground plane covered by absorbers.

A pre-amplifier is used for all measurements, and High-Pass filter is used for all harmonics.