FCC PART 15E
TEST REPORT
No.24T04Z101721-004

for

HMD Global Oy

Mobile Phone

TA-1658

FCC ID: 2AJOTTA-1658

with

Hardware Version: V1.0

Software Version: 000T_0_362

Issued Date: 2024-09-05

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.

Test Laboratory:

CTTL-Telecommunication Technology Labs, CAICT

No. 52, Huayuan North Road, Haidian District, Beijing, P. R. China 100191.

Tel:+86(0)10-62304633-2512, Fax:+86(0)10-62304633-2504

Email: cttl_terminals@caict.ac.cn, website: www.caict.ac.cn

REPORT HISTORY

Report Number	Revision	Description	Issue Date
24T04Z101721-004	Rev.0	1st edition	2024-09-05

Note: the latest revision of the test report supersedes all previous version.

CONTENTS

1. Test Laboratory

1.1. Introduction & Accreditation

Telecommunication Technology Labs, CAICT is an ISO/IEC 17025:2017 accredited test laboratory under American Association for Laboratory Accreditation (A2LA) with lab code 7049.01, and is also an FCC accredited test laboratory (CN1349), and ISED accredited test laboratory (CAB identifier:CN0066). The detail accreditation scope can be found on A2LA 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, 100191, P. R. China

1.3. Testing Environment

Normal Temperature: 15-35°C

Relative Humidity: 20-75%

1.4. Project date

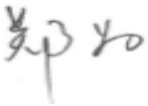
Testing Start Date: 2024-07-23

Testing End Date: 2024-09-04

1.5. Signature

Dong Jiaxuan

(Prepared this test report)



Zheng Wei

(Reviewed this test report)

Pang Shuai

(Approved this test report)

2. Client Information

2.1 Applicant Information

Company Name:	HMD Global Oy
Address:	Bertel Jungin aukio 9, 02600 Espoo, Finland
Contact:	Reza Serafat
Email:	reza.serafat@hmdglobal.com
Telephone:	+491735287964
Fax:	/

2.2 Manufacturer Information

Company Name:	HMD Global Oy
Address:	Bertel Jungin aukio 9, 02600 Espoo, Finland
Contact:	Reza Serafat
Email:	reza.serafat@hmdglobal.com
Telephone:	+491735287964
Fax:	/

3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

Description	Mobile Phone
Model name	TA-1658
FCC ID	2AJOTTA-1658
WLAN Frequency Band	ISM Bands: -5150MHz~5250MHz -5250MHz~5350MHz -5470MHz~5725MHz
Type of modulation	OFDM
Antenna	Integral Antenna
Nominal Voltage	3.87V

3.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version	Date of receipt
UT05a	353401640000108 353401640000116	V1.0	000T_0_362	2024-07-31
UT20a	353401640000249 353401640000256	V1.0	000T_0_362	2024-07-31

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

UT05a is used for Conduction test, UT20a is used for Radiation test.

3.3. Internal Identification of AE used during the test

AE ID*	Description	Note	Manufacturer
AE1-1	Battery	HBA5033AA	Huizhou Highpower Technology Co., Ltd.
AE1-2	Battery	HBA5033AA	HuiZhou GanFeng LiEnergy Battery Technology Co., Ltd.
AE2-1	Charger US	HAD-020U	Shenzhen BaiJunDa Electronic Co.,Ltd.
AE2-2	Charger EU	HAD-020E	Shenzhen BaiJunDa Electronic Co.,Ltd.
AE2-3	Charger UK	HAD-020X	Shenzhen BaiJunDa Electronic Co.,Ltd.
AE2-4	Charger AU	HAD-020A	Shenzhen BaiJunDa Electronic Co.,Ltd.
AE3-1	USB cable	CC-3A	Saibao(jiangxi)Communication industrial Co.,Ltd.
AE3-2	USB cable	CC-3A	Huizhou Juwei Electronics Co.,Ltd

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

3.4. General Description

The Equipment under Test (EUT) is a model of Mobile Phone with integrated antenna and inbuilt battery.

It consists of normal options: travel charger, USB cable.

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

Samples undergoing test were selected by the client.

3.5. Interpretation of the Test Environment

For the test methods, the test environment uncertainty figures correspond to an expansion factor k=2.

Measurement Uncertainty

Parameter	Uncertainty
temperature	0.48°C
humidity	2 %
DC voltages	0.003V

4. Reference Documents

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	Title 47 of the Code of Federal Regulations; Chapter I Part 15 - Radio frequency devices	2021
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

5. Laboratory Environment

Conducted RF performance testing is performed in shielding room.

EMC performance testing is performed in Semi-anechoic chamber.

6. Test Results

6.1. Summary of Test Results

SUMMARY OF MEASUREMENT RESULTS	Sub-clause of Part15E	Sub-clause of IC	Verdict
Maximum Output Power	15.407	/	**P**
Peak Power Spectral Density	15.407	/	**P**
Occupied 26dB Bandwidth	15.403	/	**P**
Band edge compliance (Radiated)	15.209	/	**P**
Transmitter spurious emissions (Radiated)	15.407	/	**P**
AC Powerline Conducted Emission (150kHz- 30MHz)	15.407	/	**P**
99% Occupied bandwidth	/	/	**P**
Transmit Power Control	15.407	/	**NA**

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

Terms used in Verdict column

P	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 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.

This report only deals with the WLAN function among the features described in section 3.

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°C
Voltage	3.87V
Humidity	44%

7. Test Facilities Utilized

Conducted test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Period	Calibration Due date
1	Vector Signal Analyzer	FSQ40	200089	Rohde & Schwarz	1 year	2025-07-04
2	Vector Signal Analyzer	FSW67	104051	Rohde & Schwarz	1 year	2025-04-01
3	LISN	ENV216	101200	R&S	1 year	2024-06-05
4	Test Receiver	ESCI	100344	R&S	1 year	2024-02-21
5	Attenuator	10dB/2W	/	Rosenberger	/	/
6	Shielding Room	S81	/	ETS-Lindgren	/	/

Radiated emission test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Period	Calibration Due date
1	Test Receiver	ESW44	103023	Rohde & Schwarz	1 year	2025-06-06
2	Antenna	HFH2-Z2	829324/007	Rohde & Schwarz	1 year	2025-01-04
3	EMI Antenna	VULB 9163	01223	SCHWARZBECK	2 years	2025-07-18
4	EMI Antenna	VULB 9163	01222	SCHWARZBECK	1 year	2025-07-30
5	EMI Antenna	3115	00167250	ETS-Lindgren	1 year	2025-04-11
6	EMI Antenna	3116	2663	ETS-Lindgren	1 year	2025-02-21

Test software information(HL)		
Test Item	Software	Manufacturer
Conducted emission	EMC32 V8.53.0	R&S
Radiated emission	EMC32 V11.50.00	R&S

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 26dB Emission Bandwidth

Measurement Uncertainty: 60.80Hz,k=1.96

8.4 Band Edges Compliance

Measurement Uncertainty : 0.62dB,k=1.96

8.5 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	4.72
1GHz ≤ f ≤18GHz	4.84
18GHz ≤ f ≤40GHz	5.12

8.6 AC Power-line Conducted Emission

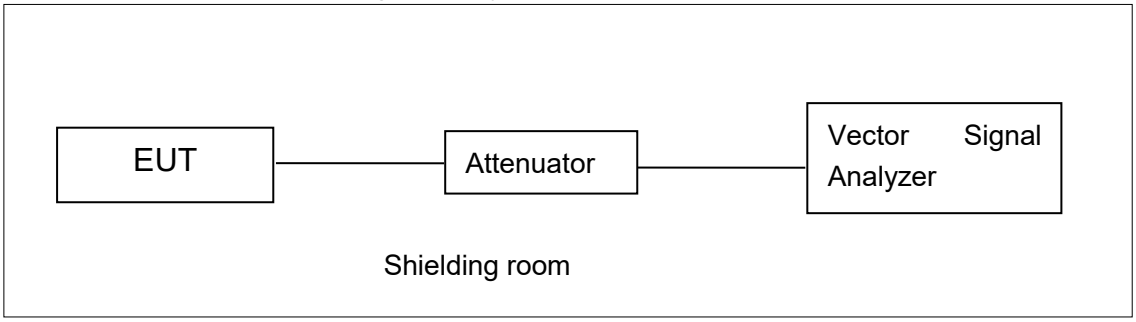
Measurement Uncertainty : 3.08dB,k=2

ANNEX A: Detailed Test Results

A.1. Measurement Method

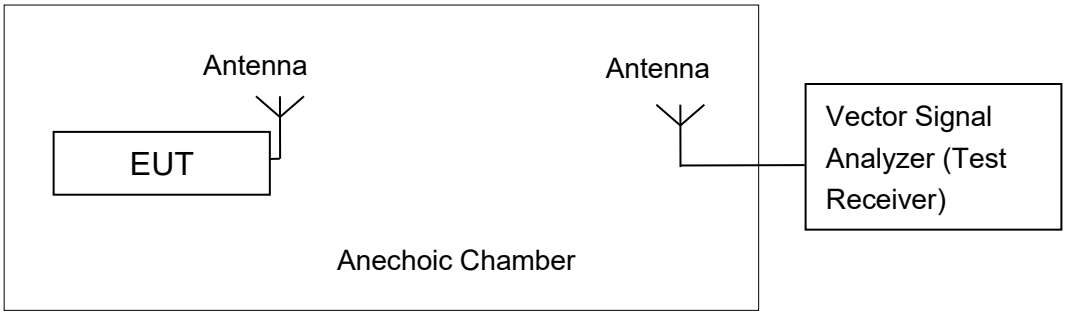
A.1.1. Conducted Measurements

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 = 3MHz;



The measurement is made according to KDB 789033
The radiated emission test is performed in semi-anechoic chamber. 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.

A.2. Maximum output Power

Measurement Limit and Method:

Standard	Frequency (MHz)	Limit (dBm)
FCC CRF Part 15.407(a)	5150MHz~5250MHz	24dBm
	5250MHz~5350MHz	24dBm or 11+10logB
	5470MHz~5725MHz	24dBm or 11+10logB

Limit use the less value, and B is the 26dB bandwidth.

The measurementmethod SA-2 is made according to KDB 789033

A.2.1 Maximum output Power-Conducted

EUT ID: UT05a

Measurement Results:

802.11a mode

Mode	Frequency	Test Result (dBm)							
		Data Rate (Mbps)							
		6	9	12	18	24	36	48	54
802.11a	5180MHz	17.32	/	/	/	/	/	/	/
	5200MHz	17.74	/	/	/	/	/	/	/
	5240MHz	17.93	/	/	/	/	/	/	/
	5260MHz	18.35	/	/	/	/	/	/	/
	5280MHz	18.16	/	/	/	/	/	/	/
	5320MHz	18.30	/	/	/	/	/	/	/
	5500MHz	17.50	/	/	/	/	/	/	/
	5580MHz	17.52	/	/	/	/	/	/	/
	5700MHz	16.65	/	/	/	/	/	/	/
	5720MHz	16.96	/	/	/	/	/	/	/

The data rate 6Mbps is selected as worst condition, and the following cases are performed with this condition.

802.11n-HT20 mode

Mode	Frequency	Test Result (dBm)							
		Data Rate							
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
802.11n (HT20)	5180MHz	17.05	/	/	/	/	/	/	/
	5200MHz	17.73	/	/	/	/	/	/	/
	5240MHz	17.97	/	/	/	/	/	/	/
	5260MHz	18.38	/	/	/	/	/	/	/
	5280MHz	18.24	/	/	/	/	/	/	/
	5320MHz	18.34	/	/	/	/	/	/	/
	5500MHz	17.56	/	/	/	/	/	/	/
	5580MHz	17.59	/	/	/	/	/	/	/
	5700MHz	16.68	/	/	/	/	/	/	/

	5720MHz	16.94	/	/	/	/	/	/	/

The data rate MCS0 is selected as worst condition, and the following cases are performed with this condition.

802.11ac-VHT20 mode

Mode	Frequency	Test Result (dBm)								
		Data Rate								
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8
802.11ac (VHT20)	5180MHz	16.98	/	/	/	/	/	/	/	/
	5200MHz	17.76	/	/	/	/	/	/	/	/
	5240MHz	17.98	/	/	/	/	/	/	/	/
	5260MHz	18.40	/	/	/	/	/	/	/	/
	5280MHz	18.24	/	/	/	/	/	/	/	/
	5320MHz	18.32	/	/	/	/	/	/	/	/
	5500MHz	17.66	/	/	/	/	/	/	/	/
	5580MHz	17.64	/	/	/	/	/	/	/	/
	5700MHz	16.68	/	/	/	/	/	/	/	/
	5720MHz	16.97	/	/	/	/	/	/	/	/

The data rate MCS0 is selected as worst condition, and the following cases are performed with this condition.

802.11n-HT40 mode

Mode	Frequency	Test Result (dBm)							
		Data Rate							
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
802.11n (HT40)	5190MHz	14.86	/	/	/	/	/	/	/
	5230MHz	17.47	/	/	/	/	/	/	/
	5270MHz	17.76	/	/	/	/	/	/	/
	5310MHz	14.84	/	/	/	/	/	/	/
	5510MHz	14.61	/	/	/	/	/	/	/
	5550MHz	16.94	/	/	/	/	/	/	/
	5670MHz	16.10	/	/	/	/	/	/	/
	5710MHz	16.23	/	/	/	/	/	/	/

The data rate MCS0 is selected as worst condition, and the following cases are performed with this condition.

802.11ac-VHT40 mode

Mode	Frequency	Test Result (dBm)									
		Data Rate									
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8	MCS9
802.11ac (VHT40)	5190MHz	14.96	/	/	/	/	/	/	/	/	/
	5230MHz	17.52	/	/	/	/	/	/	/	/	/
	5270MHz	17.78	/	/	/	/	/	/	/	/	/
	5310MHz	14.87	/	/	/	/	/	/	/	/	/
	5510MHz	14.61	/	/	/	/	/	/	/	/	/
	5550MHz	16.96	/	/	/	/	/	/	/	/	/
	5670MHz	16.13	/	/	/	/	/	/	/	/	/
	5710MHz	16.26	/	/	/	/	/	/	/	/	/

The data rate MCS0 is selected as worst condition, and the following cases are performed with this condition.

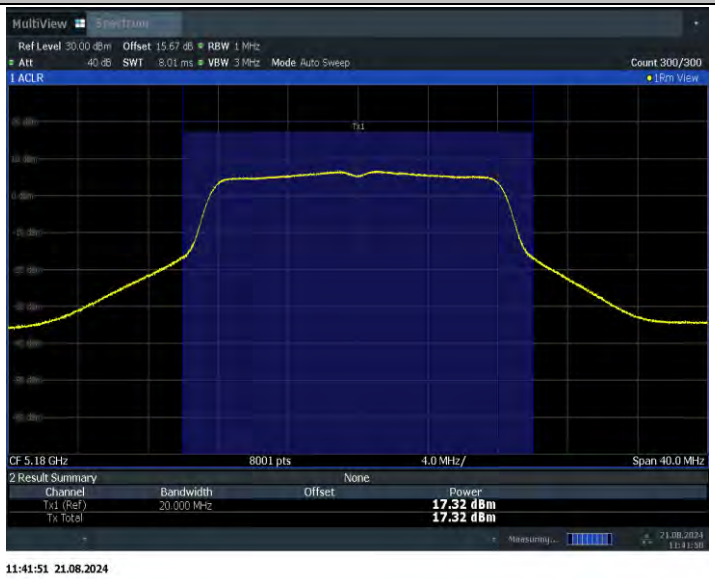
802.11ac-VHT80 mode

Mode	Frequency	Test Result (dBm)									
		Data Rate									
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8	MCS9
802.11ac (VHT80)	5210MHz	11.99	/	/	/	/	/	/	/	/	/
	5290MHz	13.97	/	/	/	/	/	/	/	/	/
	5530MHz	13.24	/	/	/	/	/	/	/	/	/
	5610MHz	15.82	/	/	/	/	/	/	/	/	/
	5690MHz	15.15	/	/	/	/	/	/	/	/	/

The data rate MCS0 is selected as worst condition, and the following cases are performed with this condition.

Duty cycle

TestMode	Antenna	Frequency[MHz]	Duty Cycle [%]
11A	Ant1	5180	98.07
11AC20SISO	Ant1	5180	97.94
11AC40SISO	Ant1	5190	95.92
11AC80SISO	Ant1	5210	92.00

11A_Ant1_5180


Maximum output Power

Conclusion: PASS

A.3. Peak Power Spectral Density (conducted)

Measurement Limit:

Standard	Frequency (MHz)	Limit (dBm/MHz)
FCC CRF Part 15.407(a)	5150MHz~5250MHz	11
	5250MHz~5350MHz	11
	5470MHz~5725MHz	11

The output power measurement method Section F is made according to KDB 789033

EUT ID: UT05a

Measurement Results:

TestMode	Antenna	Frequency[MHz]	Result [dBm/MHz]	Limit[dBm/MHz]	Verdict
11A	Ant1	5180	6.79	≤11.00	PASS
		5200	6.83	≤11.00	PASS
		5240	6.98	≤11.00	PASS
		5260	6.83	≤11.00	PASS
		5280	7.29	≤11.00	PASS
		5320	7.26	≤11.00	PASS
		5500	7.31	≤11.00	PASS
		5580	6.54	≤11.00	PASS
		5700	6.67	≤11.00	PASS
		5720	6.34	≤11.00	PASS
11AC20SISO	Ant1	5180	6.29	≤11.00	PASS
		5200	6.45	≤11.00	PASS
		5240	6.61	≤11.00	PASS
		5260	6.52	≤11.00	PASS
		5280	6.99	≤11.00	PASS
		5320	6.81	≤11.00	PASS
		5500	6.91	≤11.00	PASS
		5580	6.14	≤11.00	PASS
		5700	6.33	≤11.00	PASS
		5720	6.18	≤11.00	PASS
11AC40SISO	Ant1	5190	3.00	≤11.00	PASS
		5230	3.11	≤11.00	PASS
		5270	3.18	≤11.00	PASS
		5310	3.23	≤11.00	PASS
		5510	3.18	≤11.00	PASS
		5550	3.23	≤11.00	PASS
		5670	2.36	≤11.00	PASS
		5710	2.96	≤11.00	PASS
11AC80SISO	Ant1	5210	-0.72	≤11.00	PASS
		5290	-0.04	≤11.00	PASS
		5530	-0.63	≤11.00	PASS

		5610	-1.35	≤11.00	PASS
		5690	-1.09	≤11.00	PASS

11A_Ant1_5180


Peak Power Spectral Density

Conclusion: PASS

A.4. 26dB Emission Bandwidth (conducted)

Measurement Limit:

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

The measurement is made according to KDB 789033

Measurement Uncertainty:

Measurement Uncertainty	60.80Hz

EUT ID: UT05a

Measurement Result:

TestMode	Antenna	Frequency[MHz]	26db EBW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11A	Ant1	5180	23.28	5168.24	5191.52	---	---
		5200	22.80	5188.20	5211.00	---	---
		5240	22.64	5228.60	5251.24	---	---
		5260	23.32	5248.00	5271.32	---	---
		5280	23.00	5268.64	5291.64	---	---
		5320	22.56	5308.56	5331.12	---	---
		5500	22.96	5488.64	5511.60	---	---
		5580	23.28	5568.24	5591.52	---	---
		5700	23.08	5688.28	5711.36	---	---
		5720	23.72	5708.00	5731.72	---	---
11AC20SISO	Ant1	5180	24.52	5167.64	5192.16	---	---
		5200	23.96	5187.68	5211.64	---	---
		5240	23.32	5228.28	5251.60	---	---
		5260	23.24	5248.12	5271.36	---	---
		5280	23.68	5268.80	5292.48	---	---
		5320	23.44	5307.92	5331.36	---	---
		5500	23.36	5488.56	5511.92	---	---
		5580	24.72	5567.68	5592.40	---	---
		5700	23.32	5688.24	5711.56	---	---
		5720	23.92	5707.80	5731.72	---	---
11AC40SISO	Ant1	5190	41.36	5169.20	5210.56	---	---
		5230	41.84	5208.96	5250.80	---	---
		5270	41.92	5248.88	5290.80	---	---
		5310	41.68	5288.96	5330.64	---	---
		5510	41.84	5489.04	5530.88	---	---
		5550	42.00	5528.88	5570.88	---	---
		5670	42.16	5648.64	5690.80	---	---
		5710	56.48	5689.12	5745.60	---	---
11AC80SISO	Ant1	5210	82.56	5168.72	5251.28	---	---
		5290	83.36	5248.40	5331.76	---	---

		5530	83.68	5487.92	5571.60	---	---
		5610	83.84	5568.08	5651.92	---	---
		5690	83.68	5647.92	5731.60	---	---

Test graphs as below:

11A_Ant1_5180

11:41:15 21.08.2024

11A_Ant1_5200

11:42:43 21.08.2024

11A_Ant1_5240

11:43:51 21.08.2024

11A_Ant1_5260

11:45:02 21.08.2024

11A_Ant1_5280

11:46:20 21.08.2024

11A_Ant1_5320

11A_Ant1_5500

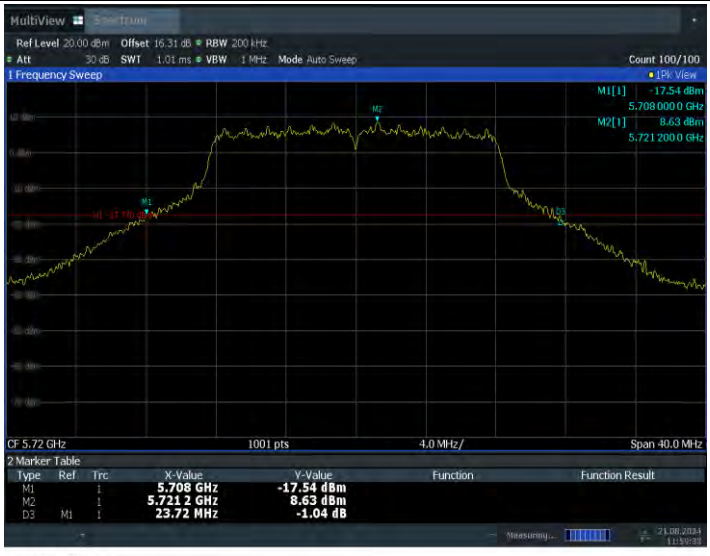
11A_Ant1_5580

11:57:13 21.08.2024

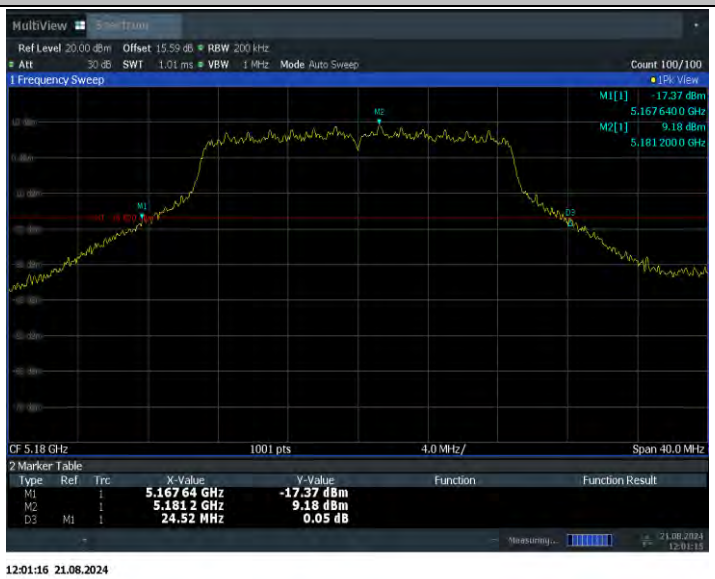
11A_Ant1_5700

11:58:23 21.08.2024

11A_Ant1_5720



11:59:33 21.08.2024

11AC20SISO_Ant1_5180

11AC20SISO_Ant1_5200

11AC20SISO_Ant1_5240

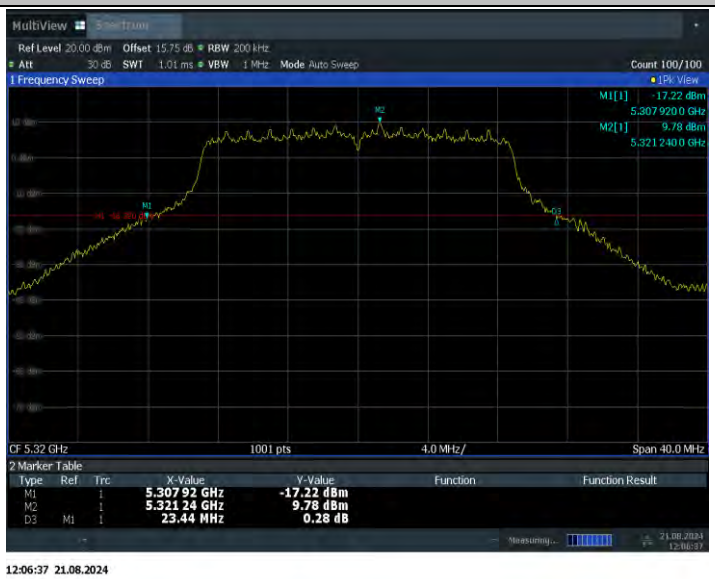
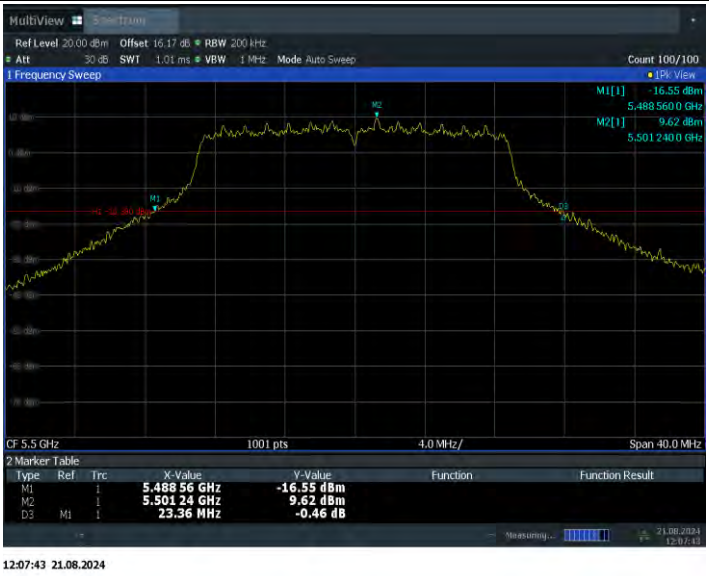
12:03:23 21.08.2024

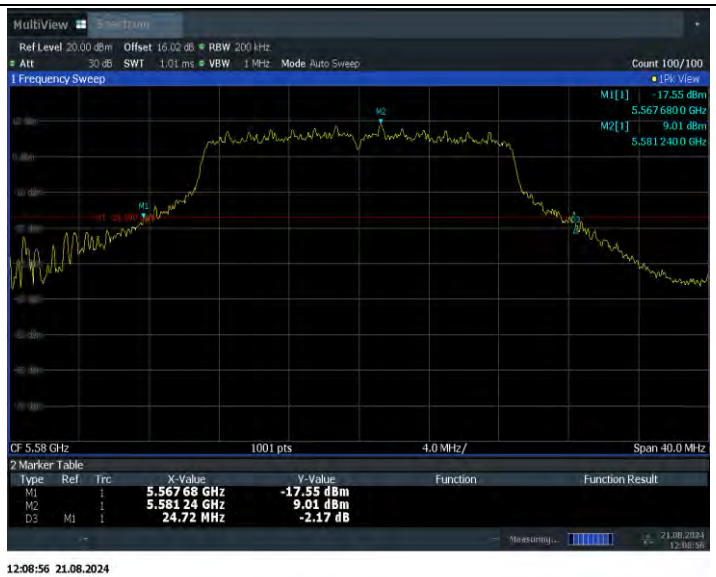
11AC20SISO_Ant1_5260

12:04:27 21.08.2024

11AC20SISO_Ant1_5280

12:05:31 21.08.2024

11AC20SISO_Ant1_5320

11AC20SISO_Ant1_5500

11AC20SISO_Ant1_5580

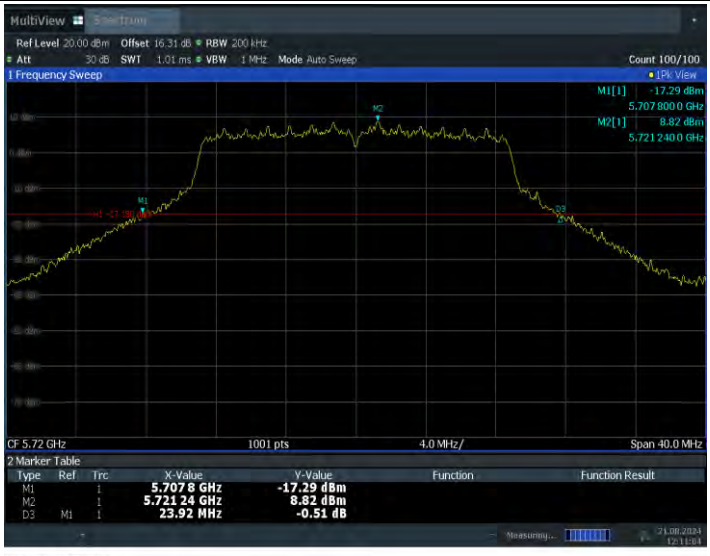


12:08:56 21.08.2024

11AC20SISO_Ant1_5700

12:10:04 21.08.2024

11AC20SISO_Ant1_5720

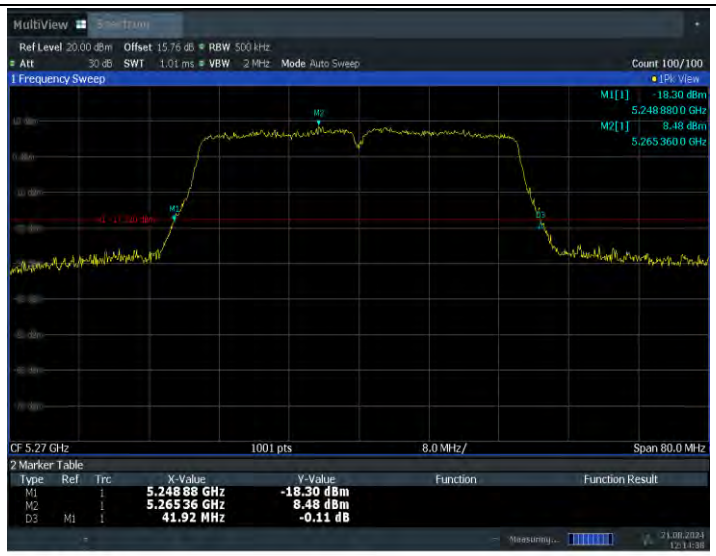


12:11:04 21.08.2024

11AC40SISO_Ant1_5190

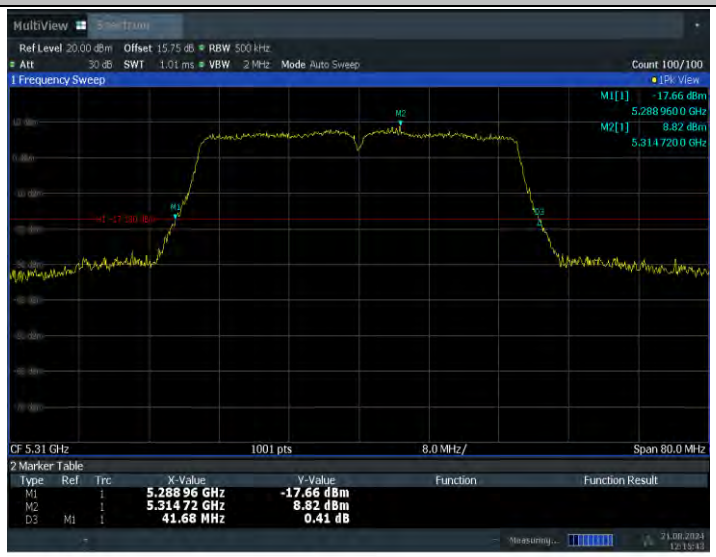
11AC40SISO_Ant1_5230

11AC40SISO_Ant1_5270



12:14:38 21.08.2024

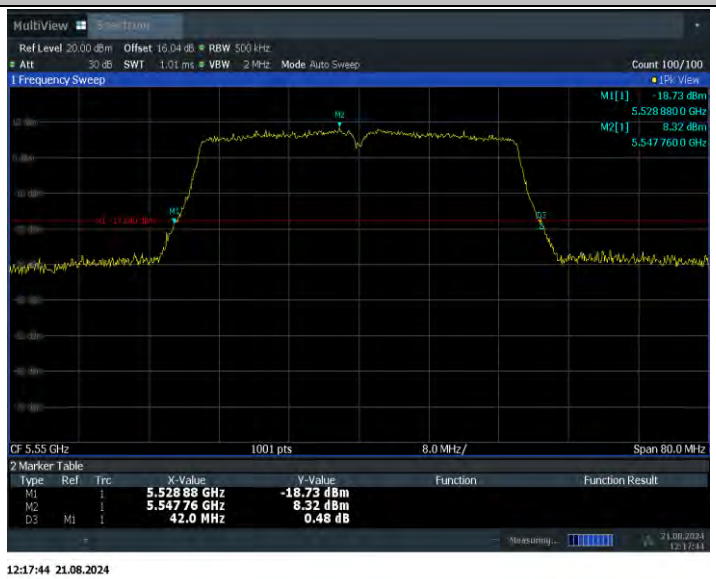
11AC40SISO_Ant1_5310



12:15:44 21.08.2024

11AC40SISO_Ant1_5510

12:16:46 21.08.2024

11AC40SISO_Ant1_5550
 12:17:44 21.08.2024
11AC40SISO_Ant1_5670
 12:18:50 21.08.2024
11AC40SISO_Ant1_5710

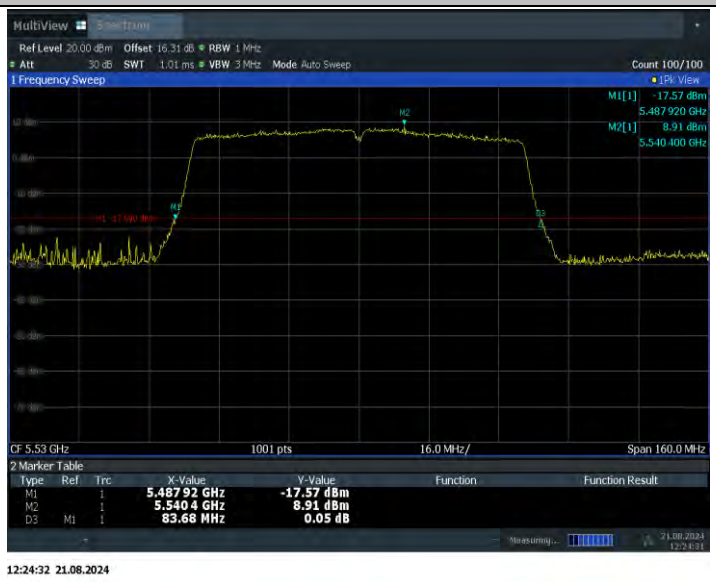
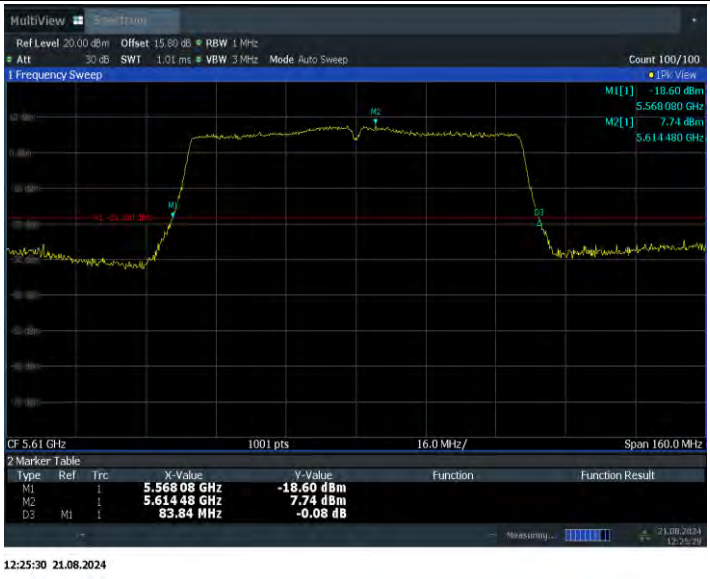
12:20:08 21.08.2024

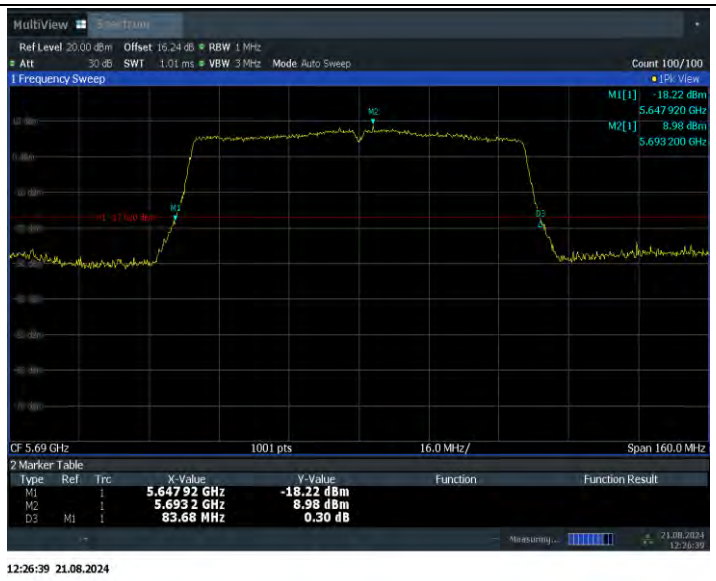
11AC80SISO_Ant1_5210

12:22:15 21.08.2024

11AC80SISO_Ant1_5290

12:23:22 21.08.2024

11AC80SISO_Ant1_5530

11AC80SISO_Ant1_5610

11AC80SISO_Ant1_5690



Conclusion: PASS

A.5. Band Edges Compliance

A5.1 Band Edges - Radiated

Measurement Limit:

Standard	Limit (dB μ V/m)	
FCC 47 CFR Part 15.209	Peak	74
	Average	54

The measurement is made according to KDB 789033

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 (MHz)	Field strength(uV/m)	Field strength(dBuV/m)	Measurement distance(m)
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

The measurement is made according to ANSI C63.10-2013 and KDB 789033

Measurement Result:

Mode	Channel	Test Results	Conclusion
802.11a	5180 MHz	Fig.1	P
	5200 MHz	Fig.2	P
	5320 MHz	Fig.3	P
	5500 MHz	Fig.4	P
	5700 MHz	Fig.5	P
802.11n HT20	5180 MHz	Fig.6	P
	5200 MHz	Fig.7	P
	5320 MHz	Fig.8	P
	5500 MHz	Fig.9	P
	5700 MHz	Fig.10	P
802.11n HT40	5190 MHz	Fig.11	P
	5230 MHz	Fig.12	P
	5270 MHz	Fig.13	P
	5310 MHz	Fig.14	P
	5510 MHz	Fig.15	P
	5550 MHz	Fig.16	P
	5670 MHz	Fig.17	P
802.11ac HT20	5180 MHz	Fig.18	P
	5200 MHz	Fig.19	P
	5320 MHz	Fig.20	P
	5500 MHz	Fig.21	P
	5700 MHz	Fig.22	P

802.11ac HT40	5190 MHz	Fig.23	P
	5230 MHz	Fig.24	P
	5270 MHz	Fig.25	P
	5310 MHz	Fig.26	P
	5510 MHz	Fig.27	P
	5550 MHz	Fig.28	P
	5670 MHz	Fig.29	P
802.11ac HT80	5210 MHz	Fig.30	P
	5290 MHz	Fig.31	P
	5290 MHz	Fig.32	P
	5530 MHz	Fig.33	P
	5610 MHz	Fig.34	P
	5610 MHz	Fig.35	P

Conclusion: PASS

Test graphs as below:

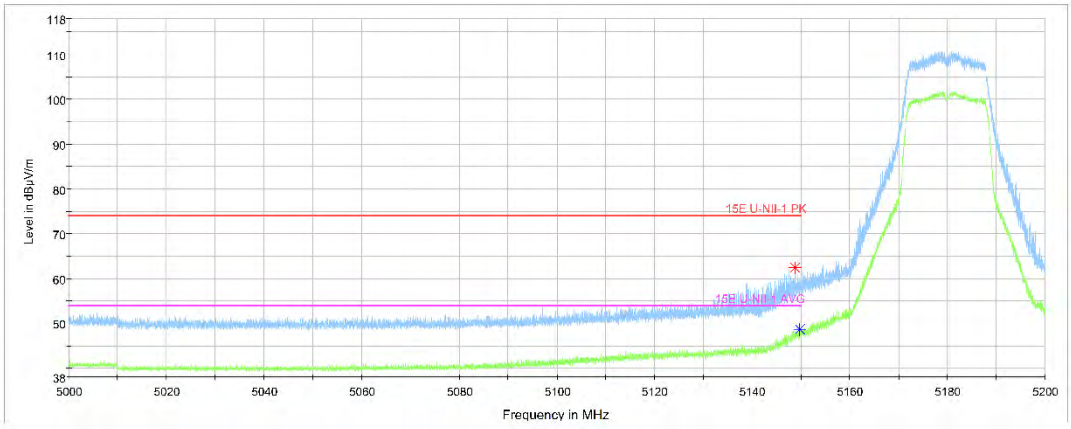


Fig. 1 Band Edges (802.11a Ch36, 5180MHz)

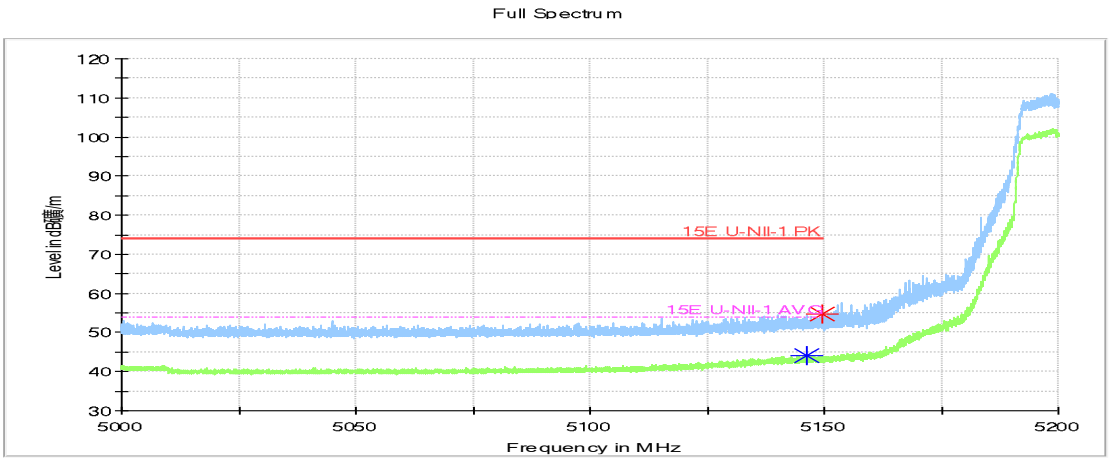


Fig. 2 Band Edges (802.11a Ch40, 5200MHz)

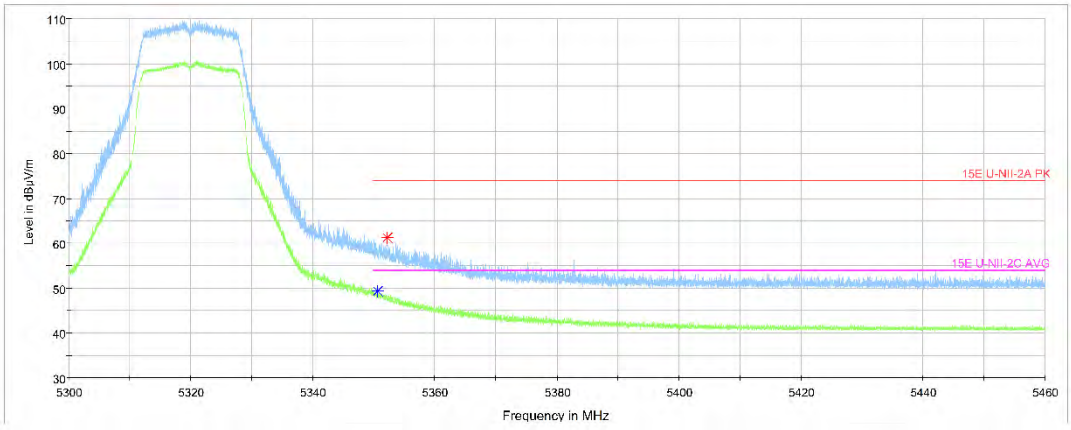


Fig. 3 Band Edges (802.11a Ch64, 5320MHz)

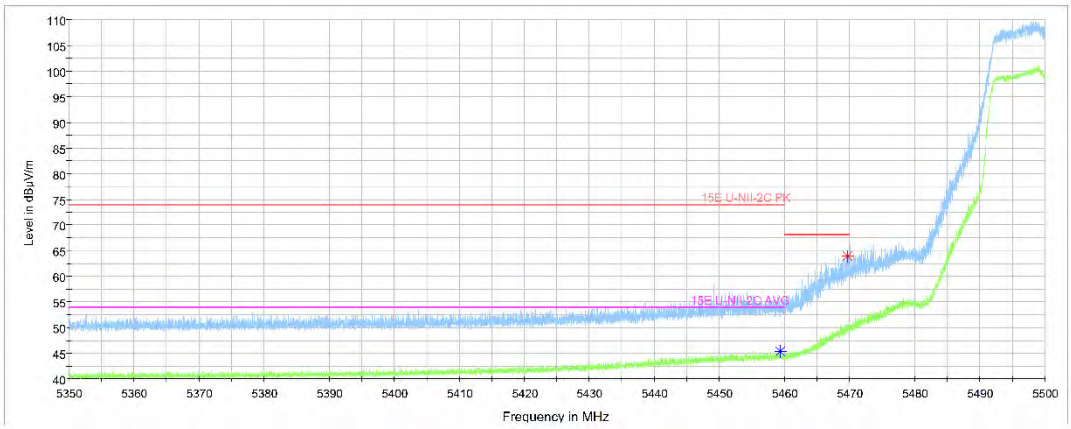


Fig. 4 Band Edges (802.11a Ch100, 5500MHz)

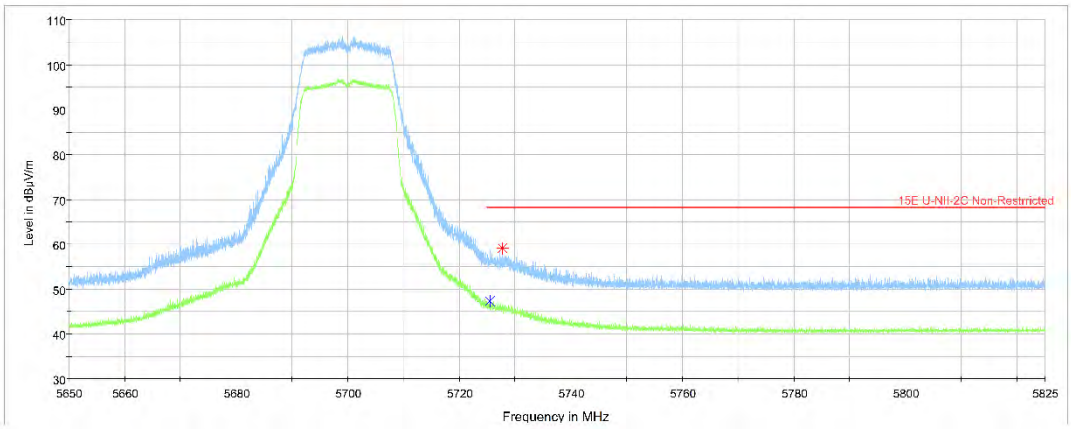


Fig. 5 Band Edges (802.11a Ch140, 5700MHz)

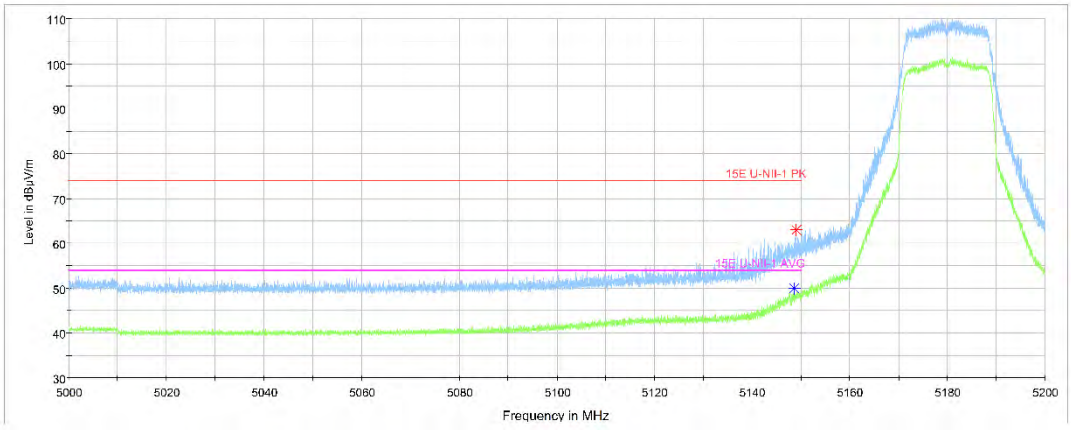


Fig. 6 Band Edges (802.11n-HT20 Ch36, 5180MHz)

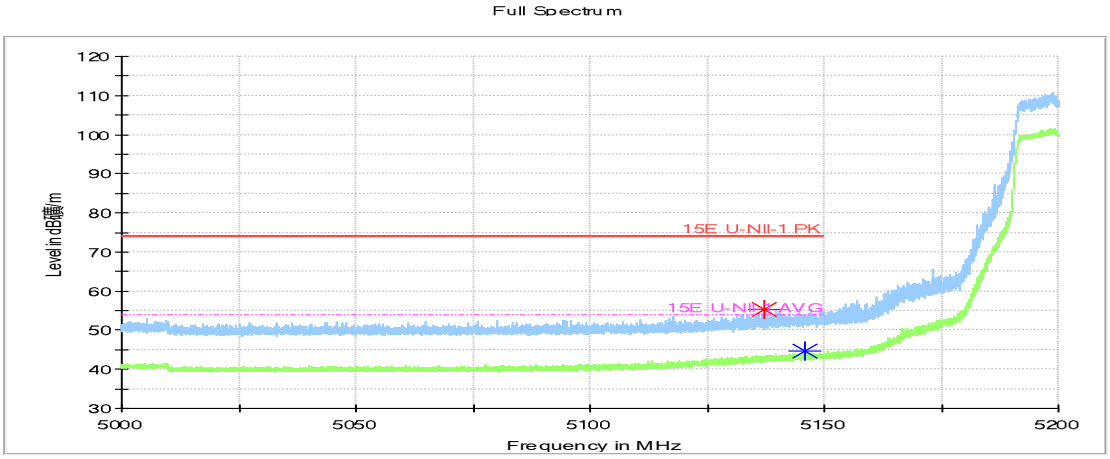


Fig. 7 Band Edges (802.11n-HT20 Ch40, 5200MHz)

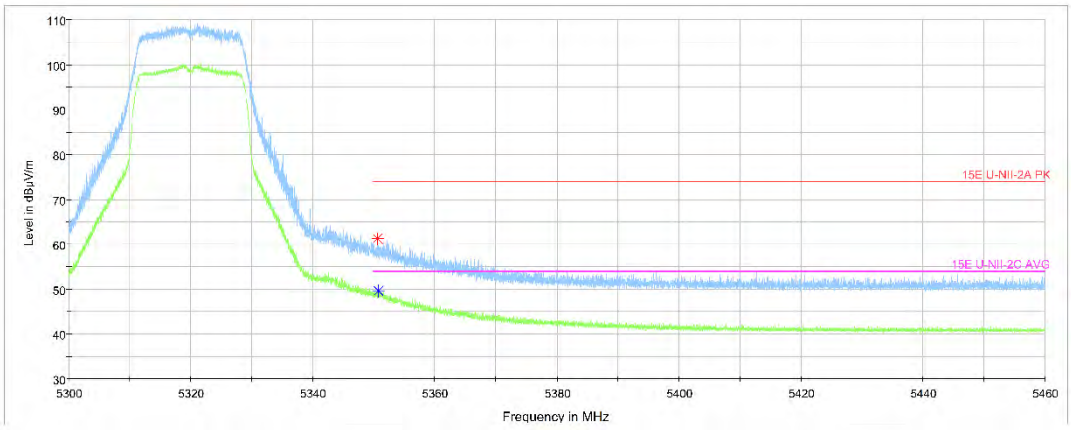


Fig. 8 Band Edges (802.11n-HT20 Ch64, 5320MHz)

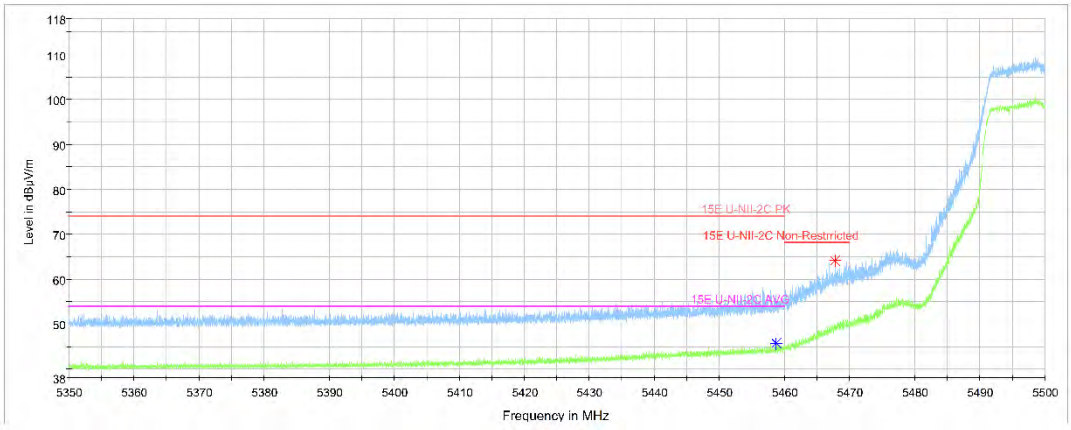


Fig. 9 Band Edges (802.11n-HT20 Ch100, 5500MHz)

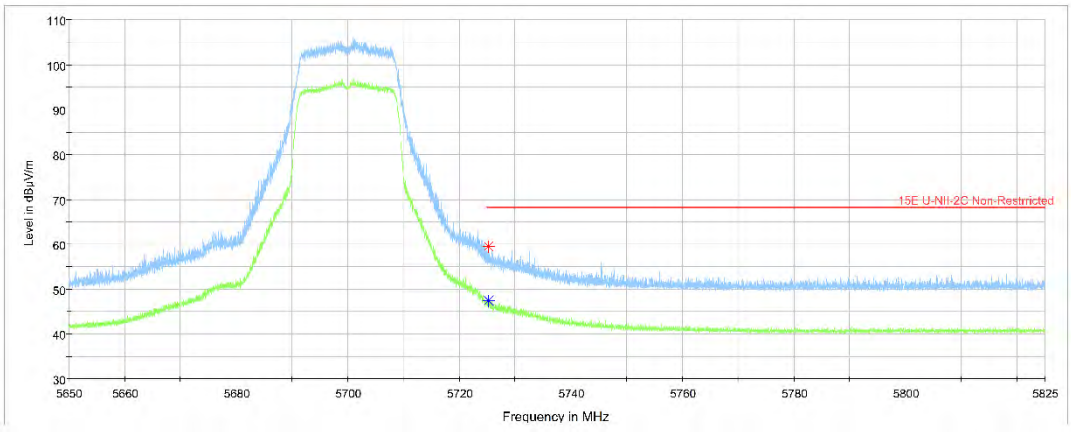


Fig. 10 Band Edges (802.11n-HT20 Ch140, 5700MHz)

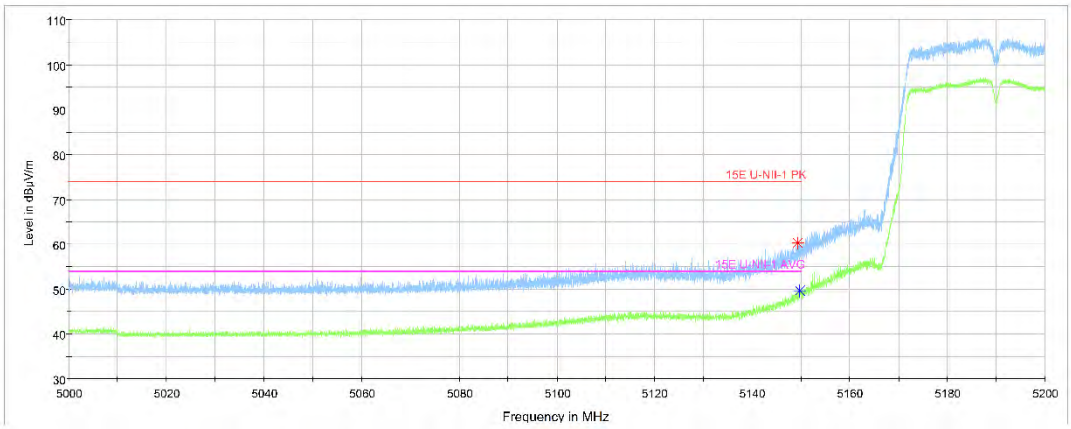


Fig. 11 Band Edges (802.11n-HT40 Ch38, 5190MHz)

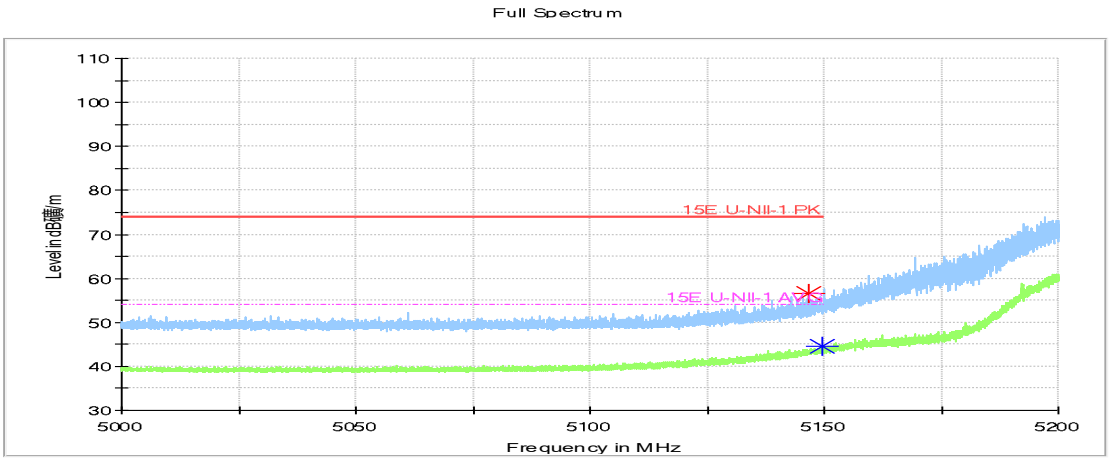


Fig. 12 Band Edges (802.11n-HT40 Ch46, 5230MHz)

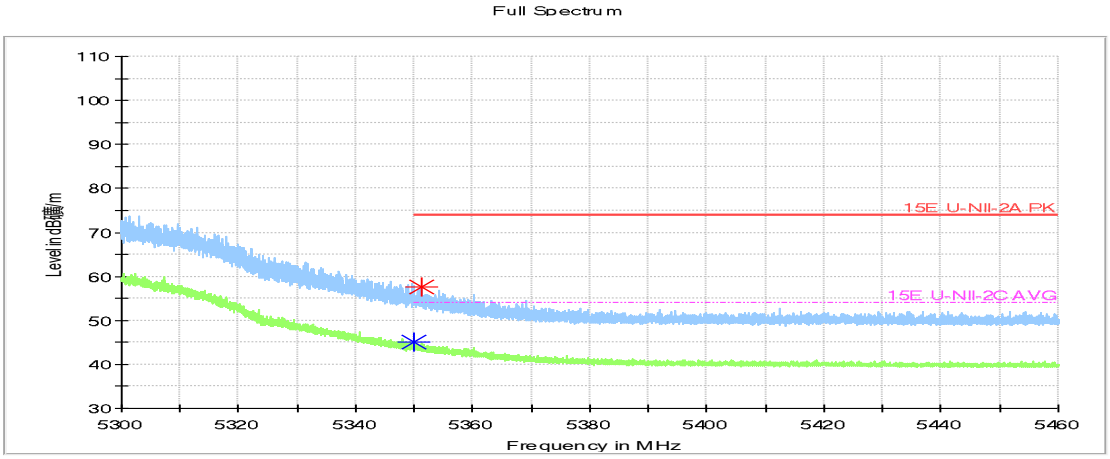


Fig. 13 Band Edges (802.11n-HT40 Ch54, 5270MHz)

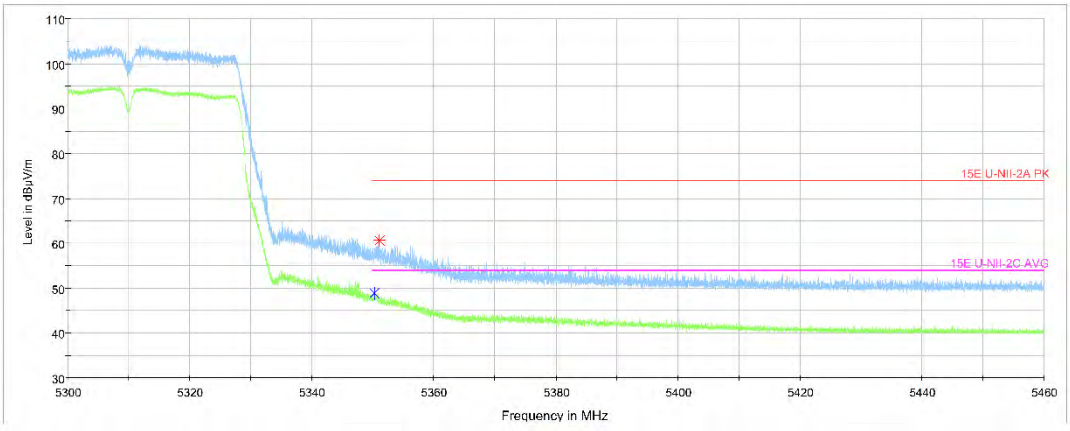


Fig. 14 Band Edges (802.11n-HT40 Ch62, 5310MHz)

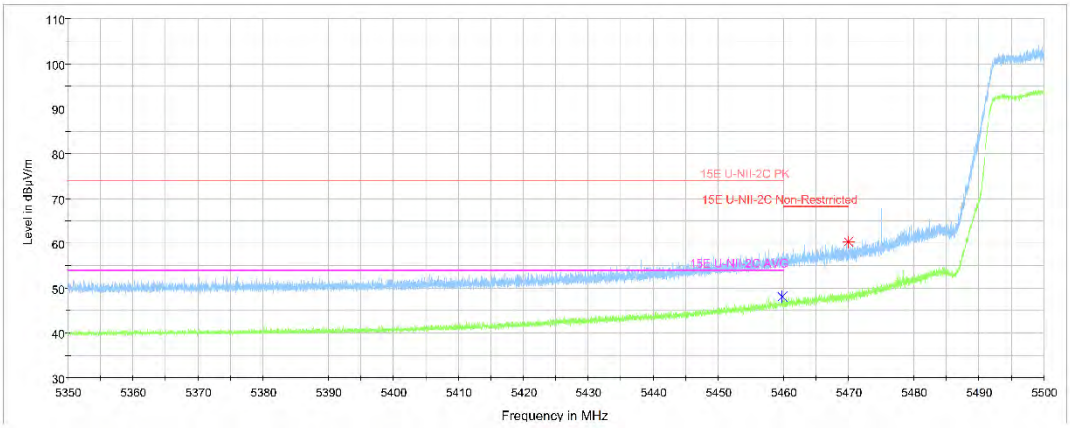


Fig. 15 Band Edges (802.11n-HT40 Ch102, 5510MHz)

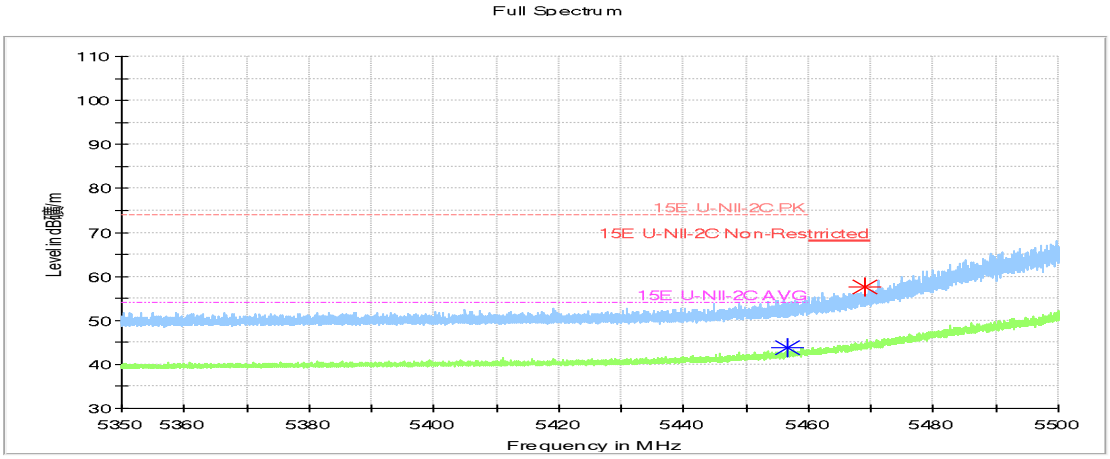


Fig. 16 Band Edges (802.11n-HT40 Ch110, 5550MHz)

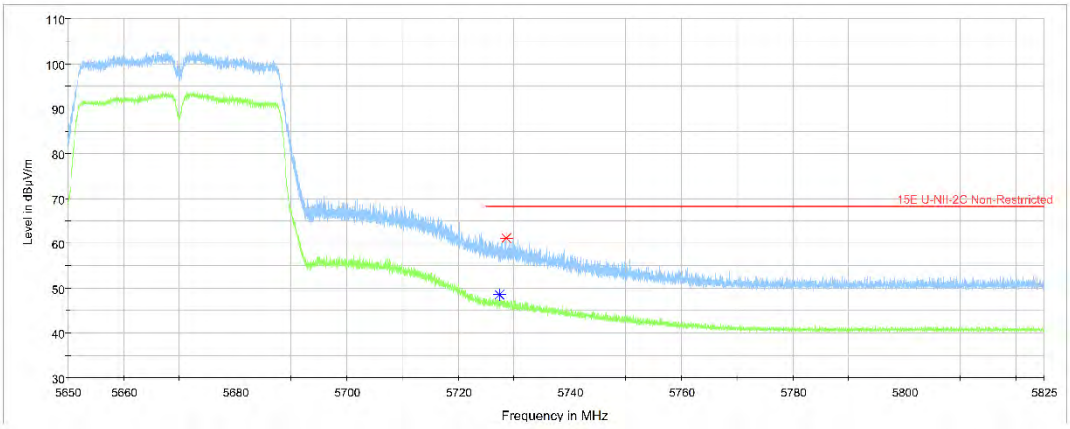


Fig. 17 Band Edges (802.11n-HT40 Ch134, 5670MHz)

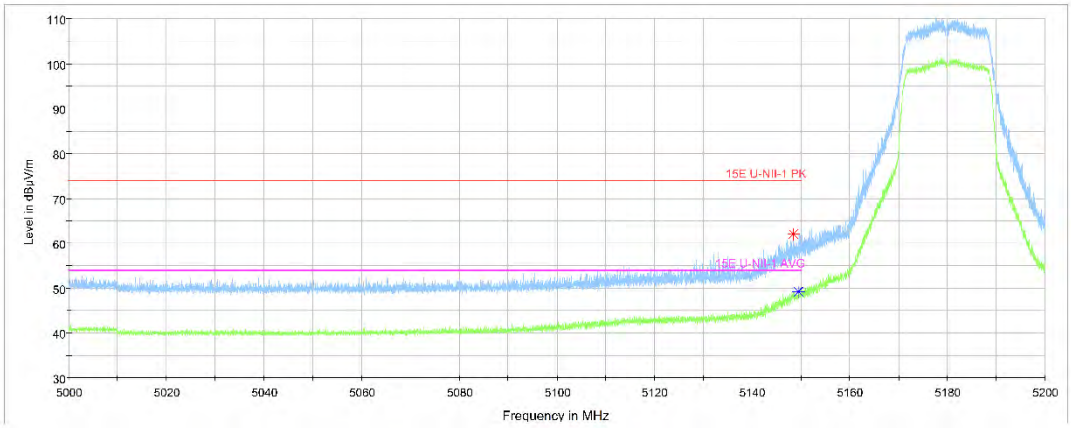


Fig. 18 Band Edges (802.11ac-HT20 Ch36, 5180MHz)

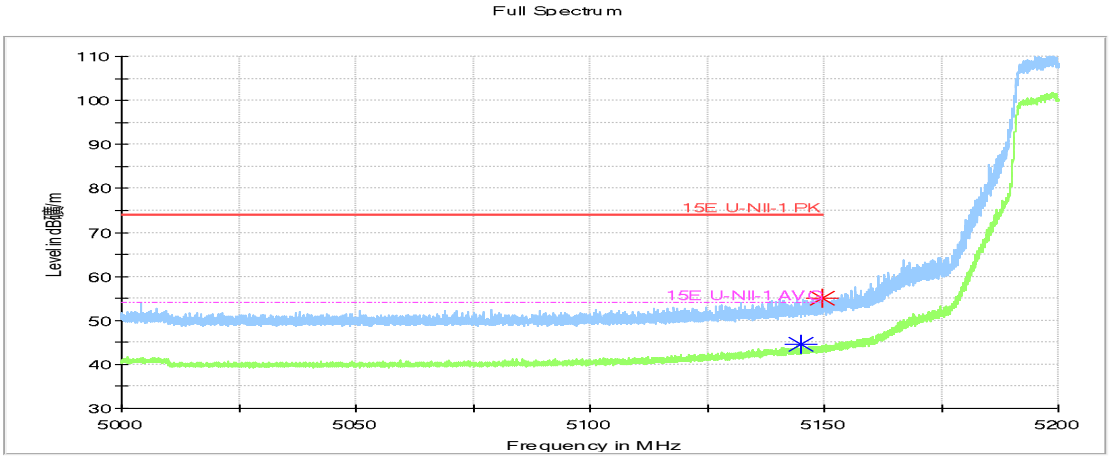


Fig. 19 Band Edges (802.11ac-HT20 Ch40, 5200MHz)

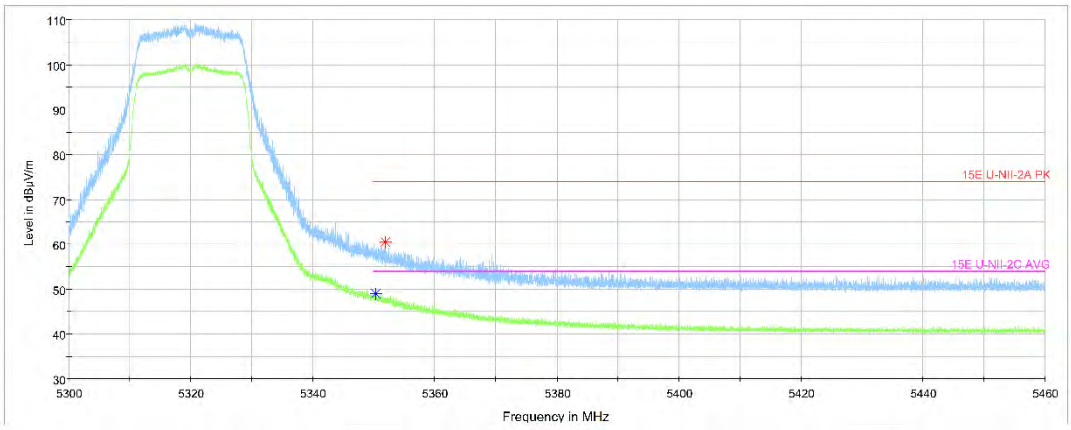


Fig. 20 Band Edges (802.11ac-HT20 Ch64, 5320MHz)

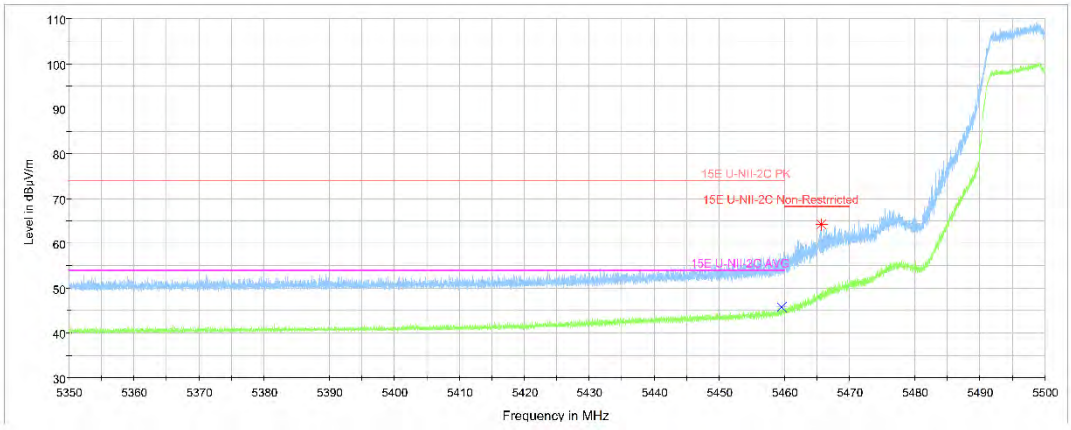


Fig. 21 Band Edges (802.11ac-HT20 Ch100, 5500MHz)

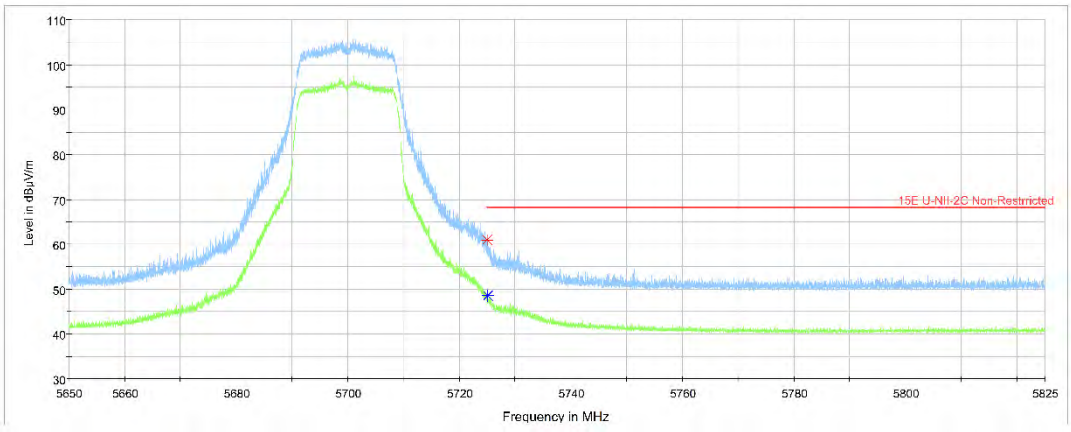


Fig. 22 Band Edges (802.11ac-HT20 Ch140, 5700MHz)

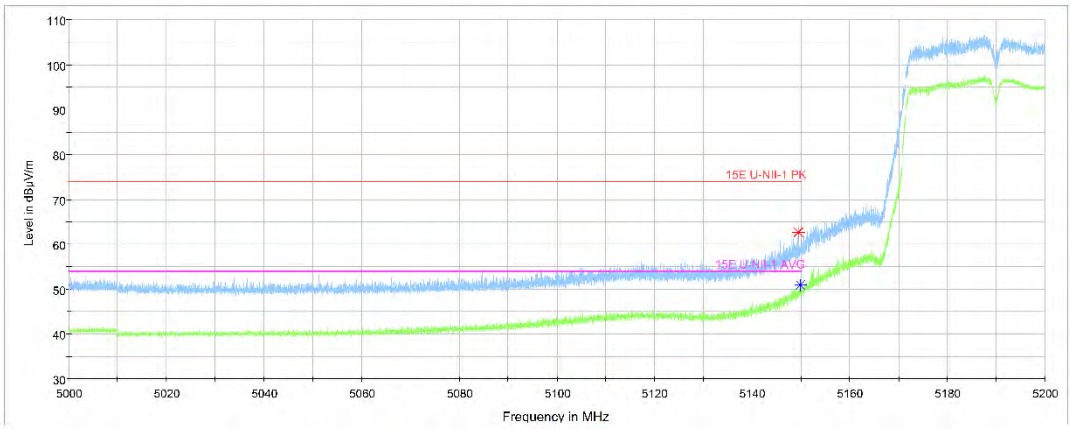


Fig. 23 Band Edges (802.11ac-HT40 Ch38, 5190MHz)

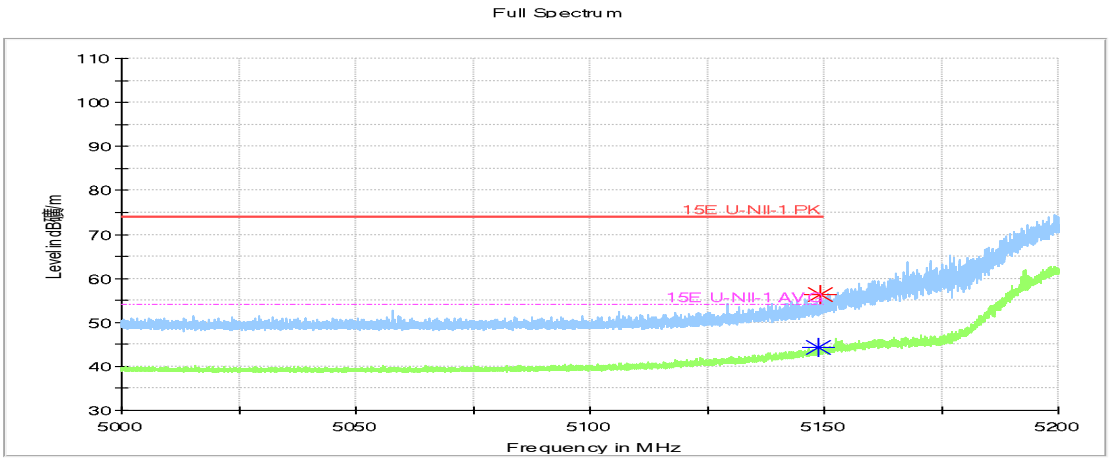


Fig. 24 Band Edges (802.11ac-HT40 Ch46, 5230MHz)

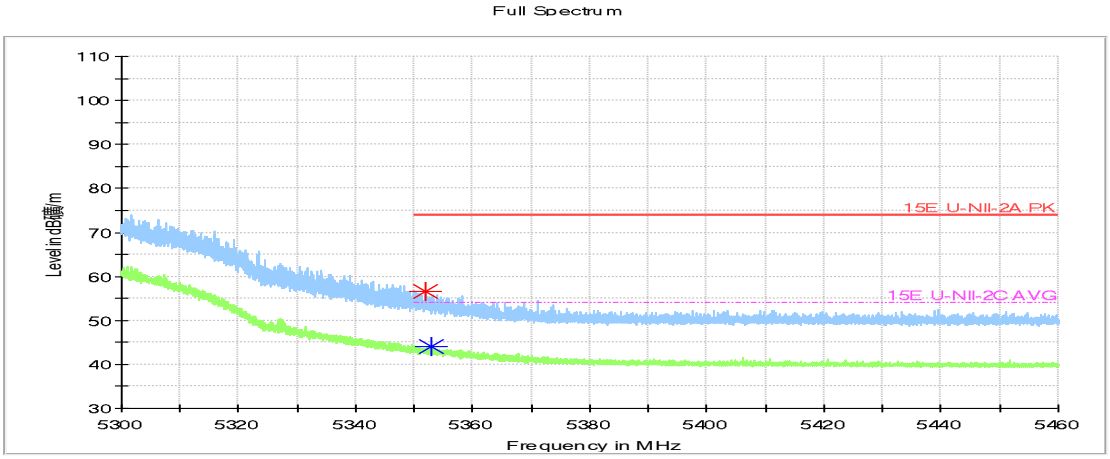


Fig. 25 Band Edges (802.11ac-HT40 Ch54, 5270MHz)

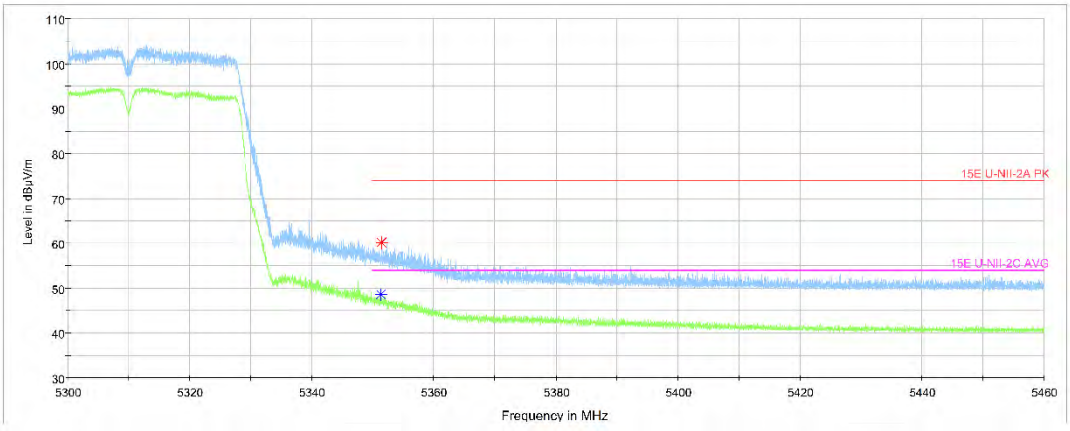


Fig. 26 Band Edges (802.11ac-HT40 Ch62, 5310MHz)

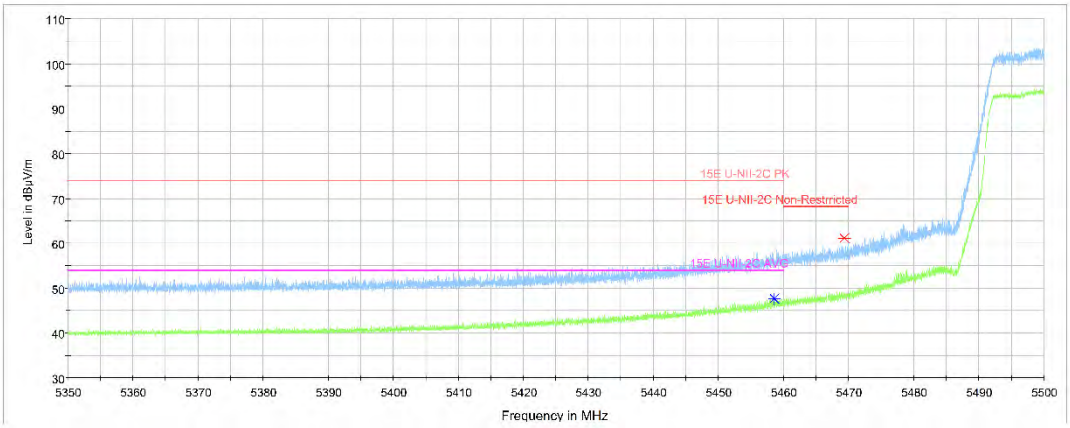


Fig. 27 Band Edges (802.11ac-HT40 Ch102, 5510MHz)

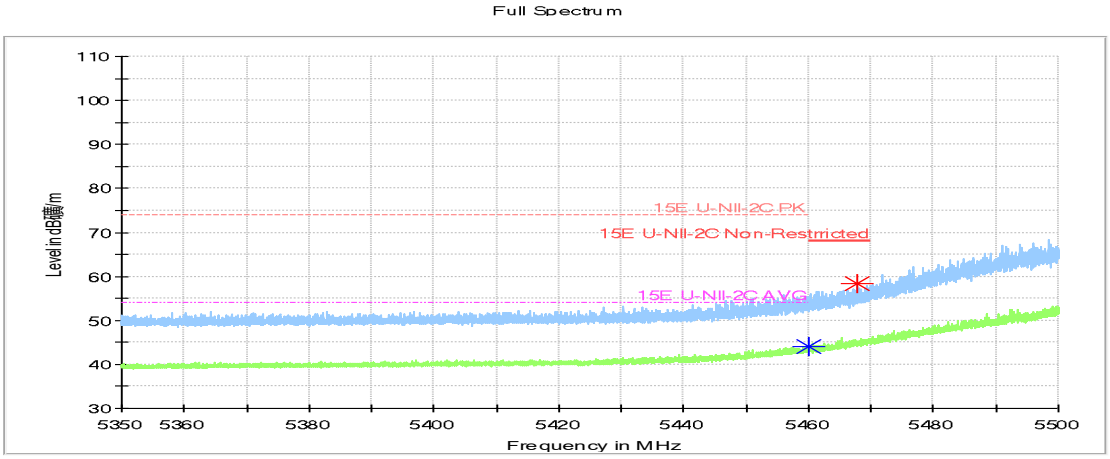


Fig. 28 Band Edges (802.11ac-HT40 Ch110, 5550MHz)

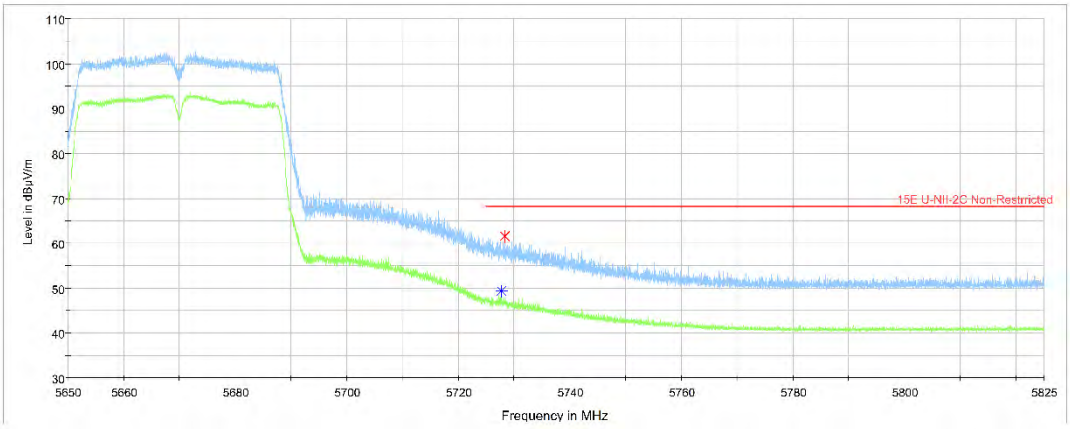


Fig. 29 Band Edges (802.11ac-HT40 Ch134, 5670MHz)

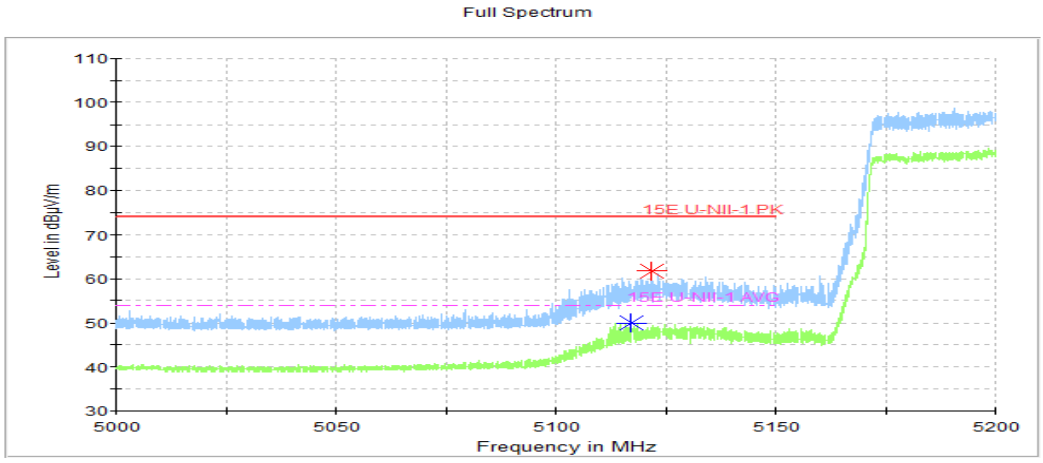


Fig. 30 Band Edges (802.11ac-HT80 Ch42 , 5210MHz)

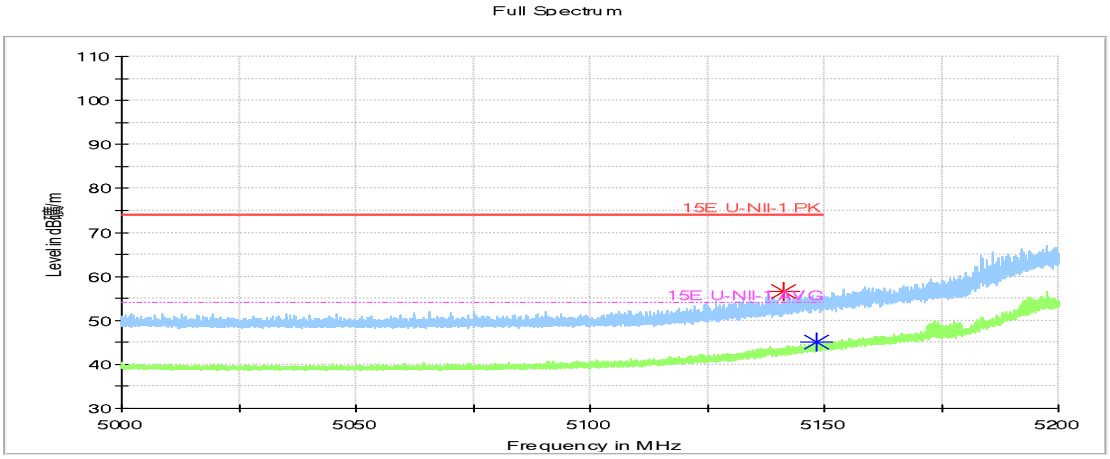


Fig. 31 Band Edges (802.11ac-HT80 Ch58 , 5290MHz)

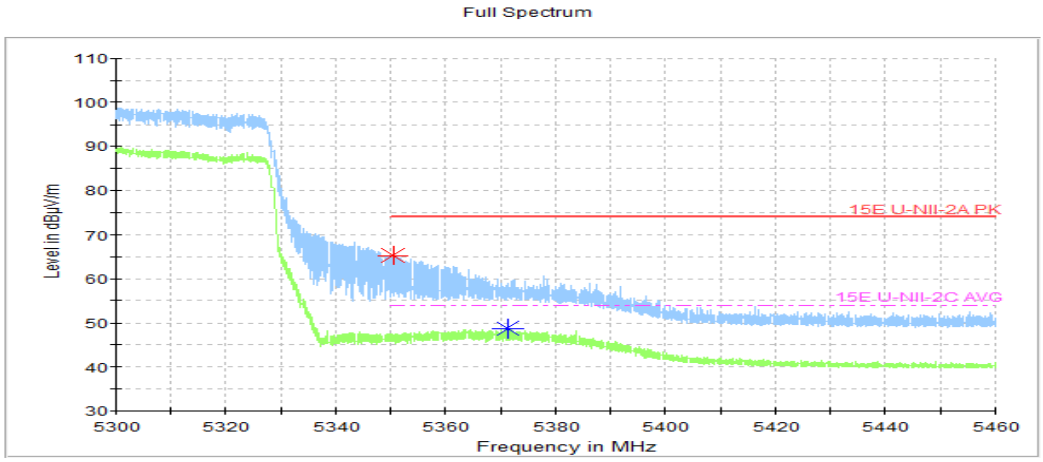


Fig. 32 Band Edges (802.11ac-HT80 Ch58, 5290MHz)

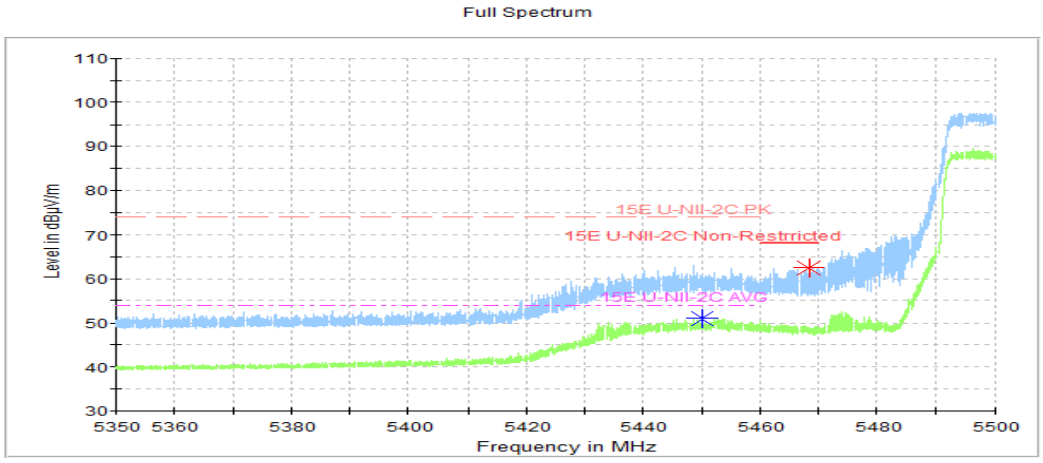


Fig. 33 Band Edges (802.11ac-HT80 Ch106, 5530MHz)

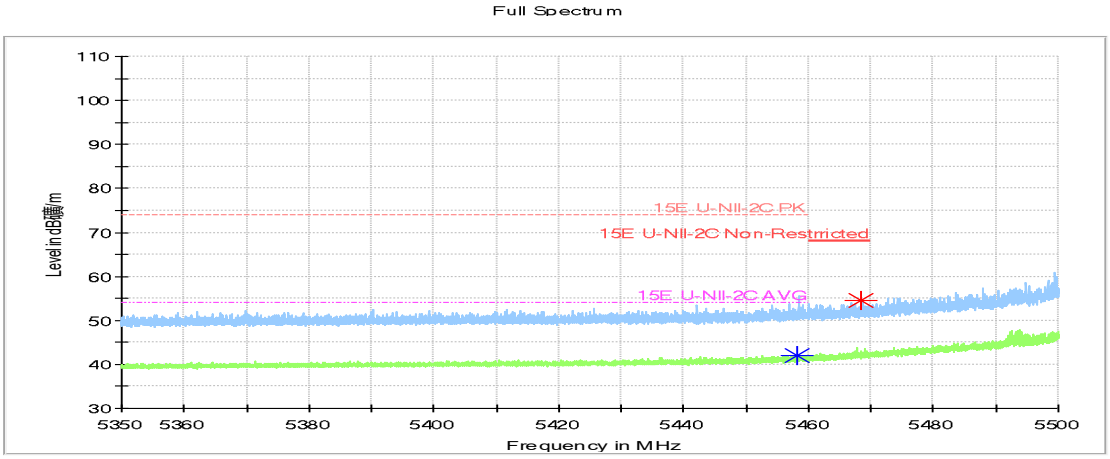


Fig. 34 Band Edges (802.11ac-HT80 Ch122, 5610MHz)

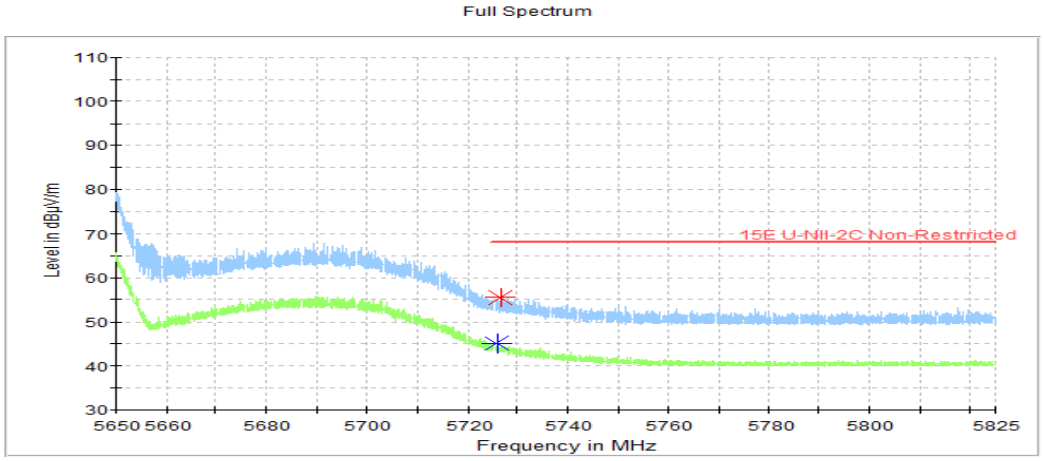


Fig. 35 Band Edges (802.11ac-HT80 Ch122, 5610MHz)

A.6. Transmitter Spurious Emission

Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.407	-27 dBm/MHz

The measurement is made according to KDB 789033

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 (MHz)	Field strength(dBμV/m)	Measurement distance(m)
30-88	40.0	3
88-216	43.5	3
216-960	46.0	3
Above 960	54.0	3

Note: for frequency range below 960MHz, the limit in 15.209 is defined in 10m test distance. The limit used above is calculated from 10m to 3m

Measurement Results:

Conclusion: PASS

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.

P_{Mea} is the field strength recorded from the instrument.

The measurement results are obtained as described below:

Result=P_{Mea}+A_{Rpl}= P_{Mea}+Cable Loss+Antenna Factor

Average Results:

802.11a

Channel 36

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17929.600	44.68	-26.18	45.95	24.91	54.00	9.32	V
17912.000	44.59	-26.18	45.95	24.82	54.00	9.41	V
14486.050	38.46	-28.77	41.90	25.33	54.00	15.54	H
14499.250	38.46	-28.77	41.90	25.33	54.00	15.54	H
5149.780	48.62	-27.28	34.00	41.90	54.00	5.38	H
5149.620	48.47	-27.28	34.00	41.75	54.00	5.53	H

Channel 64

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17922.450	44.72	-26.18	45.95	24.95	54.00	9.28	V
17925.750	44.67	-26.18	45.95	24.90	54.00	9.33	V
14495.950	39.04	-28.77	41.90	25.91	54.00	14.96	V
14498.700	38.87	-28.77	41.90	25.74	54.00	15.13	V
5350.656	49.37	-27.12	34.20	42.29	54.00	4.63	H
5350.016	49.12	-27.12	34.20	42.04	54.00	4.88	H

Channel 100

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17917.500	44.84	-26.18	45.95	25.07	54.00	9.16	V
17904.300	44.73	-26.18	45.95	24.96	54.00	9.27	H
14498.150	38.59	-28.77	41.90	25.46	54.00	15.41	V
14498.700	38.58	-28.77	41.90	25.45	54.00	15.42	V
5459.335	45.46	-27.10	34.20	38.36	54.00	8.54	H
5455.165	45.44	-27.10	34.20	38.34	54.00	8.56	H

802.11n-HT20

Channel 36

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17913.650	45.26	-26.18	45.95	25.49	54.00	8.74	V
17962.050	44.80	-26.18	45.95	25.03	54.00	9.20	H
14486.050	38.55	-28.77	41.90	25.42	54.00	15.45	V
14488.250	38.43	-28.77	41.90	25.30	54.00	15.57	V
5148.680	49.93	-27.28	34.00	43.21	54.00	4.07	H
5147.720	49.24	-27.29	34.00	42.53	54.00	4.76	H

Channel 64

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17919.700	44.63	-26.18	45.95	24.86	54.00	9.37	V
17908.700	44.62	-26.18	45.95	24.85	54.00	9.38	V
14482.200	38.61	-28.77	41.90	25.48	54.00	15.39	V
14493.750	38.54	-28.77	41.90	25.41	54.00	15.46	V
5350.784	49.65	-27.12	34.20	42.57	54.00	4.35	H
5350.496	49.53	-27.12	34.20	42.45	54.00	4.47	H

Channel 100

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17914.750	44.89	-26.18	45.95	25.12	54.00	9.11	H
17930.150	44.67	-26.18	45.95	24.90	54.00	9.33	V
13276.600	38.68	-30.02	40.60	28.10	54.00	15.32	V
14471.200	38.63	-28.77	41.90	25.50	54.00	15.37	V
5458.735	45.73	-27.10	34.20	38.63	54.00	8.27	H
5457.895	45.39	-27.10	34.20	38.29	54.00	8.61	H

802.11n-HT40

Channel 38

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17911.450	44.57	-26.18	45.95	24.80	54.00	9.43	H
17926.300	44.51	-26.18	45.95	24.74	54.00	9.49	V
14483.300	38.63	-28.77	41.90	25.50	54.00	15.37	H
14477.250	38.56	-28.77	41.90	25.43	54.00	15.44	V
5149.780	49.60	-27.28	34.00	42.88	54.00	4.40	H
5149.080	49.55	-27.28	34.00	42.83	54.00	4.45	H

Channel 62

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17909.800	44.72	-26.18	45.95	24.95	54.00	9.28	H
17912.550	44.55	-26.18	45.95	24.78	54.00	9.45	V
10621.200	38.83	-32.86	38.30	33.39	54.00	15.17	V
14488.800	38.71	-28.77	41.90	25.58	54.00	15.29	V
5350.272	48.80	-27.12	34.20	41.72	54.00	5.20	H
5350.320	48.72	-27.12	34.20	41.64	54.00	5.28	H

Channel 102

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17916.950	44.62	-26.18	45.95	24.85	54.00	9.38	V
17921.350	44.52	-26.18	45.95	24.75	54.00	9.48	H
14491.000	38.75	-28.77	41.90	25.62	54.00	15.25	H
14477.800	38.70	-28.77	41.90	25.57	54.00	15.30	V
5459.725	48.13	-27.10	34.20	41.03	54.00	5.87	H
5457.700	47.87	-27.10	34.20	40.77	54.00	6.13	H

802.11ac-HT20

Channel 36

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17939.500	44.81	-26.18	45.95	25.04	54.00	9.19	V
17929.050	44.70	-26.18	45.95	24.93	54.00	9.30	V
14484.400	38.89	-28.77	41.90	25.76	54.00	15.11	V
14494.850	38.86	-28.77	41.90	25.73	54.00	15.14	H
5149.500	49.16	-27.28	34.00	42.44	54.00	4.84	H
5148.520	49.00	-27.28	34.00	42.28	54.00	5.00	H

Channel 64

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17918.050	44.62	-26.18	45.95	24.85	54.00	9.38	V
17914.750	44.48	-26.18	45.95	24.71	54.00	9.52	V
10641.000	39.69	-32.86	38.30	34.25	54.00	14.31	V
10639.350	39.44	-32.86	38.30	34.00	54.00	14.56	H
5350.320	49.06	-27.12	34.20	41.98	54.00	4.94	H
5350.096	48.68	-27.12	34.20	41.60	54.00	5.32	H

Channel 100

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17901.000	44.54	-26.18	45.95	24.77	54.00	9.46	V
17912.550	44.53	-26.18	45.95	24.76	54.00	9.47	H
14474.500	38.53	-28.77	41.90	25.40	54.00	15.47	H
14482.750	38.50	-28.77	41.90	25.37	54.00	15.50	V
5459.575	45.84	-27.10	34.20	38.74	54.00	8.16	H
5459.800	45.60	-27.10	34.20	38.50	54.00	8.40	H

802.11ac-HT40

Channel 38

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17903.200	44.57	-26.18	45.95	24.80	54.00	9.43	V
17945.550	44.53	-26.18	45.95	24.76	54.00	9.47	H
14486.600	38.58	-28.77	41.90	25.45	54.00	15.42	V
14480.550	38.55	-28.77	41.90	25.42	54.00	15.45	H
5149.940	50.87	-27.28	34.00	44.15	54.00	3.13	H
5148.600	49.96	-27.28	34.00	43.24	54.00	4.04	H

Channel 62

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17927.950	44.52	-26.18	45.95	24.75	54.00	9.48	V
17930.150	44.49	-26.18	45.95	24.72	54.00	9.51	H
14499.800	38.69	-28.77	41.90	25.56	54.00	15.31	V
14492.100	38.60	-28.77	41.90	25.47	54.00	15.40	H
5351.312	48.55	-27.12	34.20	41.47	54.00	5.45	H
5351.200	48.48	-27.12	34.20	41.40	54.00	5.52	H

Channel 102

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17910.900	44.47	-26.18	45.95	24.70	54.00	9.53	V
17914.200	44.42	-26.18	45.95	24.65	54.00	9.58	V
14493.750	39.15	-28.77	41.90	26.02	54.00	14.85	V
14476.150	38.72	-28.77	41.90	25.59	54.00	15.28	H
5458.555	47.72	-27.10	34.20	40.62	54.00	6.28	H
5458.270	47.68	-27.10	34.20	40.58	54.00	6.32	H

802.11ac-HT80

Channel 42

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17903.750	44.68	-26.18	45.95	24.91	54.00	9.32	V
17918.600	44.67	-26.18	45.95	24.90	54.00	9.33	H
14484.400	39.31	-28.77	41.90	26.18	54.00	14.69	V
14478.900	38.91	-28.77	41.90	25.78	54.00	15.09	H
5117.360	49.98	-27.29	34.00	43.27	54.00	4.02	H
5113.620	49.97	-27.29	34.00	43.26	54.00	4.03	H

Channel 58

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17901.000	44.70	-26.18	45.95	24.93	54.00	9.30	V
17908.700	44.57	-26.18	45.95	24.80	54.00	9.43	V
14497.600	38.80	-28.77	41.90	25.67	54.00	15.20	V
14491.000	38.77	-28.77	41.90	25.64	54.00	15.23	H
5371.408	48.64	-27.12	34.20	41.56	54.00	5.36	H
5370.816	48.52	-27.12	34.20	41.44	54.00	5.48	H

Channel 106

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17893.850	44.65	-26.18	45.95	24.88	54.00	9.35	V
17929.050	44.46	-26.18	45.95	24.69	54.00	9.54	V
14497.600	39.16	-28.77	41.90	26.03	54.00	14.84	H
14480.000	38.70	-28.77	41.90	25.57	54.00	15.30	V
5449.975	50.85	-27.10	34.20	43.75	54.00	3.15	H
5452.285	50.80	-27.10	34.20	43.70	54.00	3.20	H

PEAK Results:

802.11a

Channel 36

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17908.150	55.97	-26.18	45.95	36.20	74.00	18.03	H
17902.650	55.58	-26.18	45.95	35.81	74.00	18.42	H
14103.250	51.46	-28.90	41.70	38.66	68.20	16.74	H
14076.300	51.15	-28.90	41.70	38.35	68.20	17.05	V
5148.800	62.42	-27.28	34.00	55.70	74.00	11.58	H
5147.620	61.97	-27.29	34.00	55.26	74.00	12.03	H

Channel 64

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17934.550	55.73	-26.18	45.95	35.96	74.00	18.27	V
17937.850	55.38	-26.18	45.95	35.61	74.00	18.62	V
14109.850	51.02	-28.86	41.70	38.18	68.20	17.18	H
14237.450	50.97	-28.94	41.75	38.16	68.20	17.23	H
5352.272	61.24	-27.12	34.20	54.16	74.00	12.76	H
5350.096	60.73	-27.12	34.20	53.65	74.00	13.27	H

Channel 100

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17904.850	56.03	-26.18	45.95	36.26	74.00	17.97	V
17956.000	55.76	-26.18	45.95	35.99	74.00	18.24	H
14106.550	51.84	-28.90	41.70	39.04	68.20	16.36	V
14123.050	51.64	-28.86	41.70	38.80	68.20	16.56	V
5449.135	58.19	-27.10	34.20	51.09	74.00	15.81	H
5469.655	63.96	-27.10	34.20	56.86	68.20	4.24	H

802.11n-HT20

Channel 36

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17948.850	55.90	-26.18	45.95	36.13	74.00	18.10	H
17952.700	55.72	-26.18	45.95	35.95	74.00	18.28	V
14113.700	51.81	-28.86	41.70	38.97	68.20	16.39	V
14253.950	51.64	-28.94	41.75	38.83	68.20	16.56	H
5149.060	63.01	-27.28	34.00	56.29	74.00	10.99	H
5148.760	61.45	-27.28	34.00	54.73	74.00	12.55	H

Channel 64

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17957.100	56.01	-26.18	45.95	36.24	74.00	17.99	H
17929.600	55.62	-26.18	45.95	35.85	74.00	18.38	V
14097.750	51.12	-28.90	41.70	38.32	68.20	17.08	V
14142.850	50.90	-28.86	41.70	38.06	68.20	17.30	H
5350.672	61.23	-27.12	34.20	54.15	74.00	12.77	H
5352.288	60.80	-27.12	34.20	53.72	74.00	13.20	H

Channel 100

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17869.100	56.91	-26.18	45.95	37.14	74.00	17.09	V
17914.750	55.78	-26.18	45.95	36.01	74.00	18.22	H
14129.100	51.71	-28.86	41.70	38.87	68.20	16.49	H
14109.300	51.37	-28.86	41.70	38.53	68.20	16.83	H
5456.665	58.08	-27.10	34.20	50.98	74.00	15.92	H
5467.780	64.18	-27.10	34.20	57.08	68.20	4.02	H

802.11n-HT40

Channel 38

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17904.300	55.46	-26.18	45.95	35.69	74.00	18.54	V
17788.250	55.35	-26.18	45.95	35.58	74.00	18.65	H
14108.750	51.81	-28.90	41.70	39.01	68.20	16.39	H
14097.750	50.98	-28.90	41.70	38.18	68.20	17.22	H
5149.300	60.36	-27.28	34.00	53.64	74.00	13.64	H
5149.820	60.16	-27.28	34.00	53.44	74.00	13.84	H

Channel 62

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17924.650	56.22	-26.18	45.95	36.45	74.00	17.78	H
17868.550	55.87	-26.18	45.95	36.10	74.00	18.13	H
14063.650	51.39	-28.90	41.70	38.59	68.20	16.81	V
14136.800	51.39	-28.86	41.70	38.55	68.20	16.81	V
5351.056	60.57	-27.12	34.20	53.49	74.00	13.43	H
5350.800	59.45	-27.12	34.20	52.37	74.00	14.55	H

Channel 102

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17925.200	55.46	-26.18	45.95	35.69	74.00	18.54	V
17882.850	55.29	-26.18	45.95	35.52	74.00	18.71	H
13693.500	51.79	-29.51	41.00	40.30	68.20	16.41	H
14064.200	51.09	-28.90	41.70	38.29	68.20	17.11	V
5457.730	58.42	-27.10	34.20	51.32	74.00	15.58	H
5469.985	60.33	-27.10	34.20	53.23	68.20	7.87	H

802.11ac-HT20

Channel 36

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17934.000	55.54	-26.18	45.95	35.77	74.00	18.46	V
17927.400	55.07	-26.18	45.95	35.30	74.00	18.93	H
13669.300	51.83	-29.51	41.00	40.34	68.20	16.37	H
14104.900	51.43	-28.90	41.70	38.63	68.20	16.77	H
5148.460	61.95	-27.29	34.00	55.24	74.00	12.05	H
5149.460	61.86	-27.28	34.00	55.14	74.00	12.14	H

Channel 64

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17890.550	55.68	-26.18	45.95	35.91	74.00	18.32	H
17940.050	55.64	-26.18	45.95	35.87	74.00	18.36	V
13646.200	51.23	-29.68	40.90	40.01	68.20	16.97	H
13709.450	51.15	-29.51	41.00	39.66	68.20	17.05	V
5351.872	60.43	-27.12	34.20	53.35	74.00	13.57	H
5350.016	60.14	-27.12	34.20	53.06	74.00	13.86	H

Channel 100

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17918.600	55.40	-26.18	45.95	35.63	74.00	18.60	H
17884.500	55.36	-26.18	45.95	35.59	74.00	18.64	H
13696.800	51.72	-29.51	41.00	40.23	68.20	16.48	V
13655.550	51.22	-29.68	40.90	40.00	68.20	16.98	V
5459.875	58.04	-27.10	34.20	50.94	74.00	15.96	H
5465.575	64.26	-27.10	34.20	57.16	68.20	3.94	H

802.11ac-HT40

Channel 38

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17901.000	56.79	-26.18	45.95	37.02	74.00	17.21	H
17924.650	56.03	-26.18	45.95	36.26	74.00	17.97	V
13630.800	51.48	-29.68	40.90	40.26	68.20	16.72	V
14089.500	51.25	-28.90	41.70	38.45	68.20	16.95	V
5149.520	62.69	-27.28	34.00	55.97	74.00	11.31	H
5148.180	62.08	-27.29	34.00	55.37	74.00	11.92	H

Channel 62

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17923.550	55.67	-26.18	45.95	35.90	74.00	18.33	V
17934.550	55.37	-26.18	45.95	35.60	74.00	18.63	H
13716.600	51.51	-29.40	41.10	39.81	68.20	16.69	V
14192.350	51.41	-28.90	41.70	38.61	68.20	16.79	H
5351.408	60.14	-27.12	34.20	53.06	74.00	13.86	H
5352.320	59.73	-27.12	34.20	52.65	74.00	14.27	H

Channel 102

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17978.550	55.19	-26.18	45.95	35.42	74.00	18.81	H
17930.700	55.12	-26.18	45.95	35.35	74.00	18.88	H
13751.800	52.09	-29.40	41.10	40.39	68.20	16.11	H
13773.250	51.26	-29.37	41.20	39.43	68.20	16.94	H
5458.960	58.69	-27.10	34.20	51.59	74.00	15.31	H
5469.370	61.14	-27.10	34.20	54.04	68.20	7.06	H

802.11ac-HT80

Channel 42

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17942.250	55.69	-26.18	45.95	35.92	74.00	18.31	V
17905.950	55.57	-26.18	45.95	35.80	74.00	18.43	H
14160.450	51.86	-28.90	41.70	39.06	68.20	16.34	V
14082.900	51.33	-28.90	41.70	38.53	68.20	16.87	H
5121.780	61.64	-27.29	34.00	54.93	74.00	12.36	H
5123.480	61.19	-27.29	34.00	54.48	74.00	12.81	H

Channel 58

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17939.500	55.75	-26.18	45.95	35.98	74.00	18.25	H
17424.700	55.72	-27.37	43.80	39.29	68.20	12.48	H
13768.850	51.61	-29.37	41.20	39.78	68.20	16.59	V
13779.850	51.60	-29.37	41.20	39.77	68.20	16.60	V
5350.416	65.30	-27.12	34.20	58.22	74.00	8.70	H
5351.120	65.19	-27.12	34.20	58.11	74.00	8.81	H

Channel 106

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17967.550	55.48	-26.18	45.95	35.71	74.00	18.52	H
17947.200	55.38	-26.18	45.95	35.61	74.00	18.62	H
14100.500	51.27	-28.90	41.70	38.47	68.20	16.93	H
14258.350	51.12	-28.96	41.80	38.28	68.20	17.08	H
5448.505	62.97	-27.10	34.20	55.87	74.00	11.03	H
5468.350	62.55	-27.10	34.20	55.45	68.20	5.65	H

Conclusion: PASS

A.7. AC Powerline Conducted Emission (150kHz- 30MHz)

Summary

All AC line conducted spurious emissions are measured with a receiver connected to a grounded LISN while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates and modes were investigated for conducted spurious emissions. Only the conducted emissions of the configuration that produced the worst case emissions are reported in this section

Method of Measurement:

See Clause 6.2 of ANSI C63.10 specifically.

See Clause 4 and Clause 5 of ANSI C63.10 generally.

The conducted emissions from the AC port of the EUT are measured in a shielding room. The EUT is connected to a Line Impedance Stabilization Network (LISN). An overview sweep with peak detection was performed. The measurements were performed with a quasi-peak detector and if required, an average detector.

The conducted emission measurements were made with the following detector of the test receiver: Quasi-Peak / Average Detector.

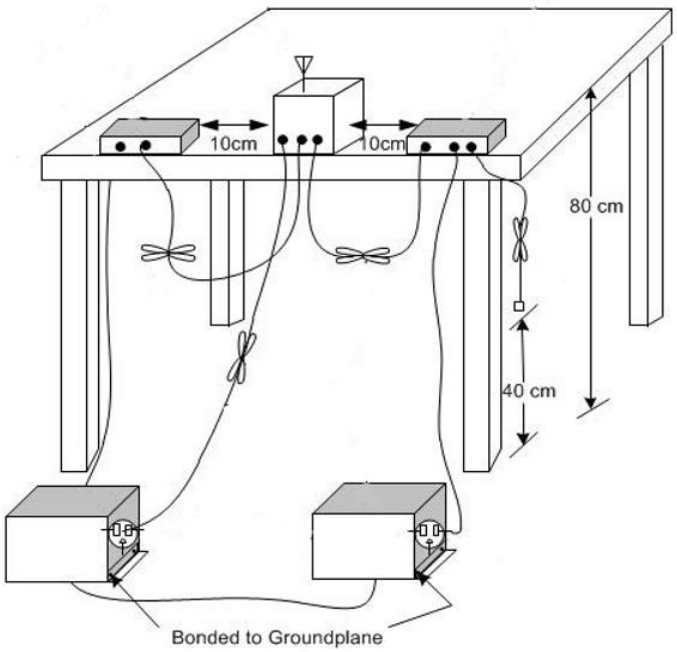
The measurement bandwidth is:

Frequency of Emission (MHz)	RBW/IF bandwidth
0.15-30	9kHz

Test Condition:

Voltage（V）	Frequency（Hz）
120	60

Test setup



Measurement Result and limit:

WLAN (Quasi-peak Limit)

Frequency range (MHz)	Quasi-peak Limit (dBμV)	Result (dBμV)		Conclusion
		With charger		
		11a mode	Idle	
0.15 to 0.5	66 to 56	Fig.36	Fig.37	P
0.5 to 5	56			
5 to 30	60			
NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.				

WLAN (Average Limit)

Frequency range (MHz)	Average Limit (dBμV)	Result (dBμV)		Conclusion
		With charger		
		11a mode	Idle	
0.15 to 0.5	56 to 46	Fig.36	Fig.37	P
0.5 to 5	46			
5 to 30	50			
NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.				

Conclusion: PASS

Test graphs as below:

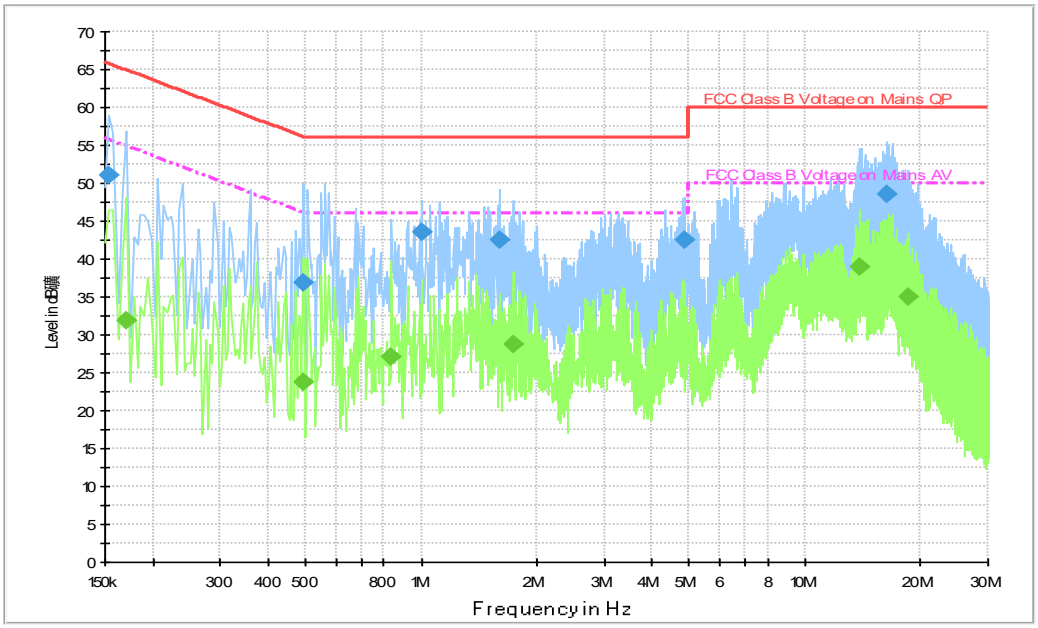


Fig. 36 Conducted Emission(802.11a, Ch40, TX)

Note: The graphic result above is the maximum of the measurements for both phase line and neutral line.

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.154000	51.1	2000.0	9.000	On	N	20.0	14.7	65.8
0.494000	37.0	2000.0	9.000	On	L1	20.0	19.1	56.1
1.002000	43.5	2000.0	9.000	On	L1	19.9	12.5	56.0
1.594000	42.5	2000.0	9.000	On	L1	19.8	13.5	56.0
4.870000	42.5	2000.0	9.000	On	L1	19.8	13.5	56.0
16.330000	48.6	2000.0	9.000	On	L1	20.0	11.4	60.0

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.170000	31.9	2000.0	9.000	On	N	19.8	23.0	55.0
0.494000	23.7	2000.0	9.000	On	L1	20.0	22.4	46.1
0.838000	27.2	2000.0	9.000	On	L1	19.9	18.8	46.0
1.730000	28.8	2000.0	9.000	On	L1	19.8	17.2	46.0
13.930000	38.9	2000.0	9.000	On	L1	20.0	11.1	50.0
18.598000	35.0	2000.0	9.000	On	L1	20.0	15.0	50.0

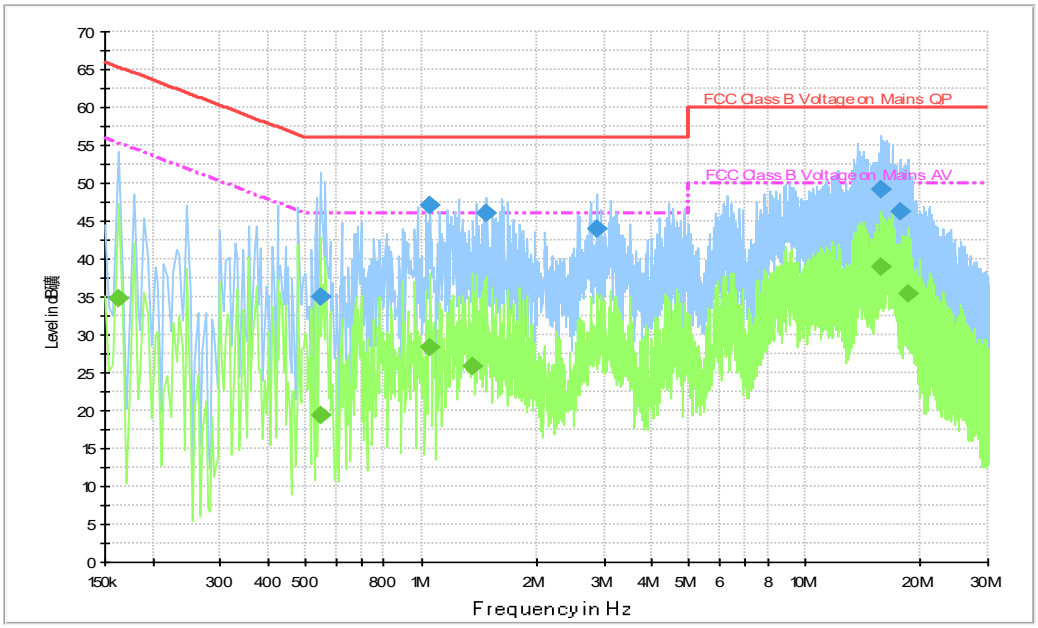


Fig. 37 Conducted Emission(802.11a, IDLE)

Note: The graphic result above is the maximum of the measurements for both phase line and neutral line.

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.546000	34.9	2000.0	9.000	On	L1	20.0	21.1	56.0
1.058000	47.0	2000.0	9.000	On	L1	19.9	9.0	56.0
1.486000	46.1	2000.0	9.000	On	L1	19.9	9.9	56.0
2.882000	43.9	2000.0	9.000	On	L1	19.8	12.1	56.0
15.810000	49.1	2000.0	9.000	On	L1	20.0	10.9	60.0
17.830000	46.2	2000.0	9.000	On	L1	20.0	13.8	60.0

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.162000	34.8	2000.0	9.000	On	N	19.8	20.6	55.4
0.546000	19.5	2000.0	9.000	On	L1	20.0	26.5	46.0
1.058000	28.3	2000.0	9.000	On	L1	19.9	17.7	46.0
1.362000	25.7	2000.0	9.000	On	L1	19.9	20.3	46.0
15.838000	38.9	2000.0	9.000	On	L1	20.0	11.1	50.0
18.510000	35.4	2000.0	9.000	On	L1	20.0	14.6	50.0

A.8. 99% Occupied bandwidth

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

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% ofthe 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).

Measurement Uncertainty:

Measurement Uncertainty	60.80Hz

EUT ID: UT05a

Measurement Result:

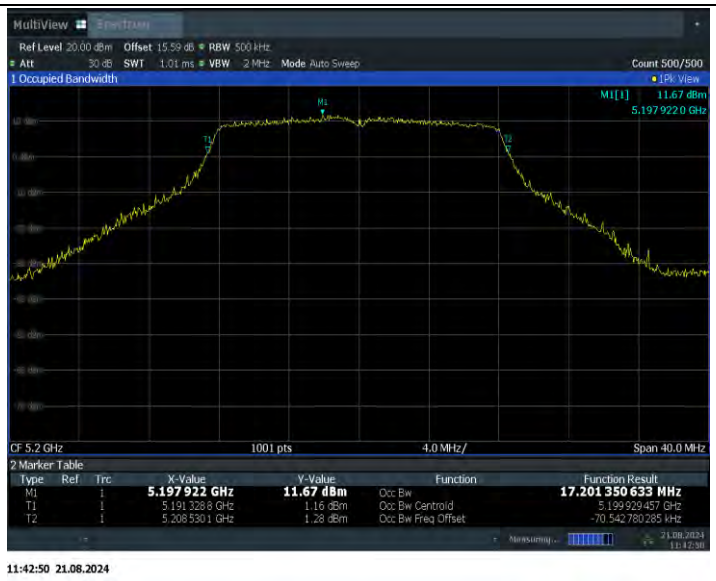
TestMode	Antenna	Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11A	Ant1	5180	17.315	5171.3266	5188.6418	---	---
		5200	17.201	5191.3288	5208.5301	---	---
		5240	17.226	5231.3805	5248.6066	---	---
		5260	17.289	5251.2678	5268.5567	---	---
		5280	17.259	5271.3917	5288.6510	---	---
		5320	17.288	5311.3288	5328.6168	---	---
		5500	17.282	5491.3452	5508.6275	---	---
		5580	17.331	5571.2767	5588.6074	---	---
		5700	17.246	5691.3376	5708.5836	---	---
		5720	17.333	5711.2778	5728.6109	---	---
11AC20SISO	Ant1	5180	18.425	5170.7627	5189.1877	---	---

		5200	18.39	5190.7089	5209.0992	---	---
		5240	18.374	5230.7998	5249.1735	---	---
		5260	18.429	5250.7044	5269.1336	---	---
		5280	18.354	5270.8211	5289.1747	---	---
		5320	18.437	5310.7212	5329.1581	---	---
		5500	18.399	5490.7634	5509.1620	---	---
		5580	18.39	5570.7478	5589.1381	---	---
		5700	18.346	5690.7738	5709.1194	---	---
		5720	18.405	5710.7256	5729.1305	---	---
11AC40SISO	Ant1	5190	36.6	5171.6684	5208.2684	---	---
		5230	36.675	5211.6422	5248.3171	---	---
		5270	36.655	5251.6099	5288.2649	---	---
		5310	36.659	5291.6029	5328.2616	---	---
		5510	36.58	5491.7052	5528.2853	---	---
		5550	36.583	5531.6244	5568.2073	---	---
		5670	36.628	5651.6033	5688.2308	---	---
		5710	36.555	5691.6494	5728.2046	---	---
11AC80SISO	Ant1	5210	75.924	5172.0476	5247.9716	---	---
		5290	75.901	5252.1221	5328.0234	---	---
		5530	75.831	5491.9310	5567.7620	---	---
		5610	76.175	5571.8949	5648.0696	---	---
		5690	76.072	5651.8005	5727.8727	---	---

Test graphs as below:

11A_Ant1_5180

11A_Ant1_5200



11:42:50 21.08.2024

11A_Ant1_5240

11:43:58 21.08.2024

11A_Ant1_5260

11A_Ant1_5280

11A_Ant1_5320

11A_Ant1_5500

11A_Ant1_5580

11A_Ant1_5700

11A_Ant1_5720

11AC20SISO_Ant1_5180

11AC20SISO_Ant1_5200

11AC20SISO_Ant1_5240

11AC20SISO_Ant1_5260

11AC20SISO_Ant1_5280

11AC20SISO_Ant1_5320

11AC20SISO_Ant1_5500

11AC20SISO_Ant1_5580

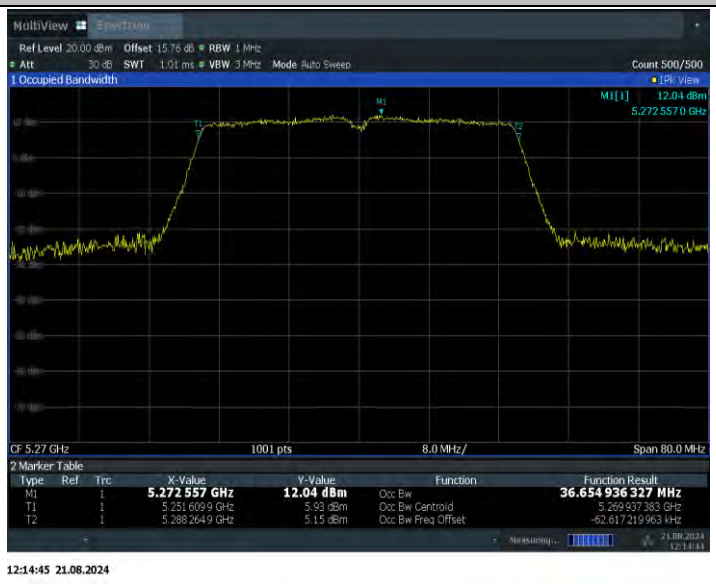
11AC20SISO_Ant1_5700

11AC20SISO_Ant1_5720

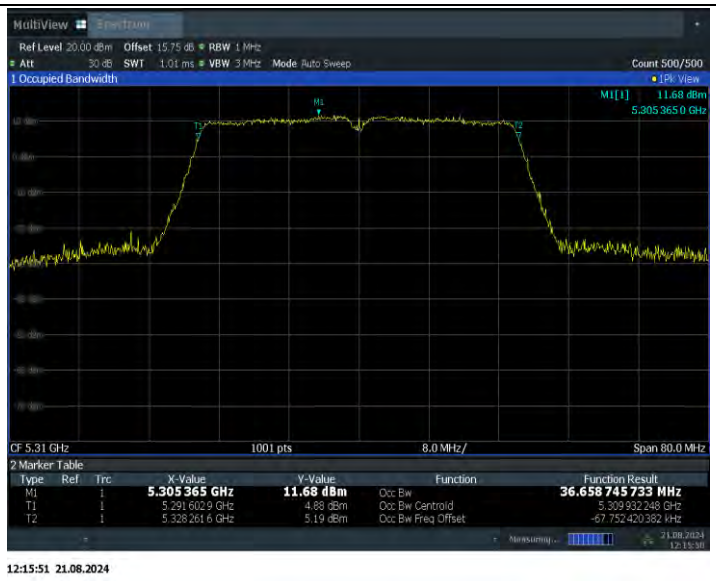
11AC40SISO_Ant1_5190

11AC40SISO_Ant1_5230

11AC40SISO_Ant1_5270



11AC40SISO_Ant1_5310



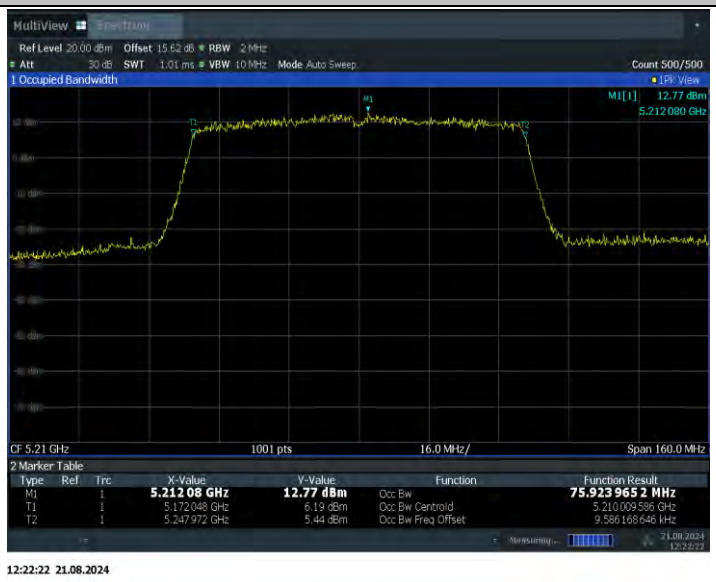
11AC40SISO_Ant1_5510

11AC40SISO_Ant1_5550

11AC40SISO_Ant1_5670

11AC40SISO_Ant1_5710

11AC80SISO_Ant1_5210



11AC80SISO_Ant1_5290

11AC80SISO_Ant1_5530

11AC80SISO_Ant1_5610

11AC80SISO_Ant1_5690

Conclusion: PASS

A.9. Power control

A Transmission Power Control mechanism is not required for systems with an e.i.r.p. of less than 27dBm (500 mW).

A.10. Antenna Requirement

The antenna of the device is permanently attached. There are no provisions for connection to an external antenna.

The unit complies with the requirement of FCC Part 15.203.

ANNEX B: EUT parameters

Disclaimer: The antenna gain and worse case provided by the client may affect the validity of the measurement results in this report, and the client shall bear the impact and consequences arising therefrom.

ANNEX C: Accreditation Certificate

Accredited Laboratory

A2LA has accredited

TELECOMMUNICATION TECHNOLOGY LABS, CAICT

Beijing, People's Republic of China

for technical competence in the field of

Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 *General requirements for the competence of testing and calibration laboratories*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (*refer to joint ISO-ILAC-IAF Communiqué dated April 2017*).

Presented this 23rd day of July 2024.

Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 7049.01
Valid to July 31, 2026

For the tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.

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