FCC PART 15C
TEST REPORT
No.I22Z60940-IOT02

for

TCL Communication Ltd.

Mobile Hot Spot

MW513U

With

FCC ID: 2ACCJB183

Hardware Version: 06

Software Version: MW513U_ZZ_02.00_06

Issued Date: 2022-08-01

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.

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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
I22Z60940-IOT02	Rev.0	1st edition	2022-07-19
I22Z60940-IOT02	Rev.1	Add the plot of duty cycle. Add the description of LISN date. Update the channel on page 110. Add the information of attenuator. Add the reference Document (KDB 662911). Add mimo result description(CDD&BF).	2022-08-01

CONTENTS

1. Test Laboratory

1.1. Introduction & Accreditation

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

1.2. Testing Location

Location 1:CTTL(Huayuan North Road)

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

1.3. Testing Environment

Normal Temperature: 15-35℃

Relative Humidity: 20-75%

1.4. Project date

Testing Start Date: 2022-05-11

Testing End Date: 2022-07-19

1.5. Signature

Xie Xiuzhen

(Prepared this test report)

Zheng Wei

(Reviewed this test report)

Hu Xiaoyu

(Approved this test report)

2. Client Information

2.1. Applicant Information

Company Name:	TCL Communication Ltd.
Address:	5/F, Building 22E, 22 Science Park East Avenue, Hong Kong Science Park, Shatin, NT, Hong Kong
City:	Hong Kong
Postal Code:	/
Country:	China
Telephone:	+86075536645759
Fax:	/

2.2. Manufacturer Information

Company Name:	TCL Communication Ltd.
Address:	5/F, Building 22E, 22 Science Park East Avenue, Hong Kong Science Park, Shatin, NT, Hong Kong
City:	Hong Kong
Postal Code:	/
Country:	China
Telephone:	+86075536645759
Fax:	/

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

3.1. About EUT

Description	Mobile Hot Spot
Model name	MW513U
FCC ID	2ACCJB183
With WLAN Function	Yes
Frequency Band	ISM 2400MHz~2483.5MHz
Type of Modulation	DSSS/CCK/OFDM/OFDMA
Number of Channels	11
Antenna	Integral Antenna
MAX Conducted Power	20.78dBm
Power Supply	3.8V

3.2. Internal Identification of EUT

EUT ID*	SN or IMEI	HW Version	SW Version
EUT1	352950940201148	06	MW513U_ZZ_02.00_06
EUT2	352950940003795	06	MW513U_ZZ_02.00_06
EUT3	352950940202708	06	MW513U_ZZ_02.00_06

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

3.3. Internal Identification of AE

AE ID*	Description	SN
AE1	Charger	/

*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 Hot Spot 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

3.6. EUT set-ups

EUT set-up No.	Combination of EUT and AE	Remarks
Set.1	EUT1 + AE1	/

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.

Reference	Title	Version
FCC Part15	FCC CFR 47, Part 15, Subpart C: 15.205 Restricted bands of operation; 15.209 Radiated emission limits, general requirements; 15.247 Operation within the bands 902-928MHz, 2400-2483.5 MHz, and 5725-5850 MHz.	2018
ANSI C63.10	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices	2013
KDB 558074 D01	Federal Communications Commission Office of Engineering and Technology Laboratory Division GUIDANCE FOR COMPLIANCE MEASUREMENTS ON DIGITAL TRANSMISSION SYSTEM, FREQUENCY HOPPING SPREAD SPECTRUM SYSTEM, AND HYBRID SYSTEM DEVICES OPERATING UNDER SECTION 15.247 OF THE FCC RULES	2019
KDB 662911 D01	Emissions Testing of Transmitters with Multiple Outputs in the Same Band(e.g., MIMO, Smart Antenna, etc)	2013-10

5. Test Results

5.1. Summary of Test Results

SUMMARY OF MEASUREMENT RESULTS	Sub-clause of Part15C	Sub-clause of IC	Verdict
Maximum Peak Output Power	15.247 (b)	/	P
Peak Power Spectral Density	15.247 (e)	/	P
Occupied 6dB Bandwidth	15.247 (a)	/	P
Band Edges Compliance	15.247 (d)	/	P
Transmitter Spurious Emission - Conducted	15.247 (d)	/	P
Transmitter Spurious Emission - Radiated	15.247, 15.205, 15.209	/	P
AC Powerline Conducted Emission	15.107, 15.207	/	P

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

Terms used in Verdict column

P	Pass, The EUT complies with the essential requirements in the standard.
NP	Not Perform, The test was not performed by CTTL
NA	Not Applicable, The test was not applicable
F	Fail, The EUT does not comply with the essential requirements in the standard

5.2. Statements

The test cases as listed in section 5.1 of this report for the EUT specified in section 3 was performed by CTTL and according to the standards or reference documents listed in section 4.2 The EUT met all requirements of the standards or reference documents, and only the WLAN function was tested in this report.

5.3. Test Conditions

T nom	Normal Temperature
T min	Low Temperature
T max	High Temperature
V nom	Normal Voltage

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

Temperature	T nom	26℃
Voltage	V nom	3.8V
Humidity	H nom	20-75%

6. 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	2023-05-15
2	Test Receiver	ESCI	100344	R&S	1 year	2023-03-21
3	LISN	ENV216	101200	R&S	1 year	2022-06-29
4	Attenuator	10dB/2W	/	Rosenberger	/	/
5	Shielding Room	S81	/	ETS-Lindgren	/	/

The LISN was in calibration due date when used for testing.

Radiated emission test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Period	Calibration Due date
1	Test Receiver	ESW44	103023	R&S	1 year	2022-10-28
2	BiLog Antenna	VULB9163	9163-302	Schwarzbeck	1 year	2022-12-28
3	EMI Antenna	3115	0016725	ETS-Lindgren	1 year	2022-07-01

Note:The radiated emission test system was in calibration due date when used for testing.

7. Measurement Uncertainty

7.1. Maximum Output Power

Measurement Uncertainty: 0.387dB,k=1.96

7.2. Peak Power Spectral Density

Measurement Uncertainty: 0.705dB,k=1.96

7.3. DTS 6-dB Signal Bandwidth

Measurement Uncertainty: 60.80Hz,k=1.96

7.4. Band Edges Compliance

Measurement Uncertainty : 0.62dB,k=1.96

7.5. Transmitter Spurious Emission

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	/
30MHz ≤ f ≤ 1GHz	4.86
1GHz ≤ f ≤18GHz	5.26
18GHz ≤ f ≤40GHz	5.28

7.6. 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

Connect the EUT to the test system as Fig.A.1.1.1 shows.
Set the EUT to the required work mode.
Set the EUT to the required channel.
Set the Vector Signal Analyzer and start measurement.
Record the values. Vector Signal Analyzer

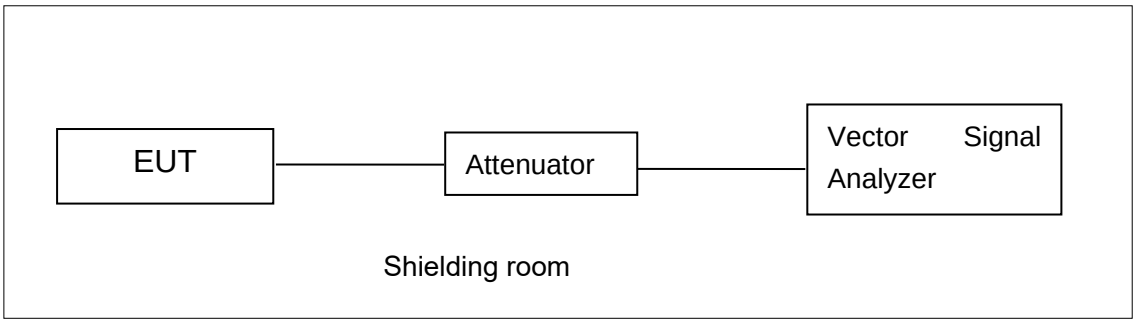


Fig.A.1.1.1: Test Setup Diagram for Conducted Measurements

A.1.2. Radiated Emission Measurements

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

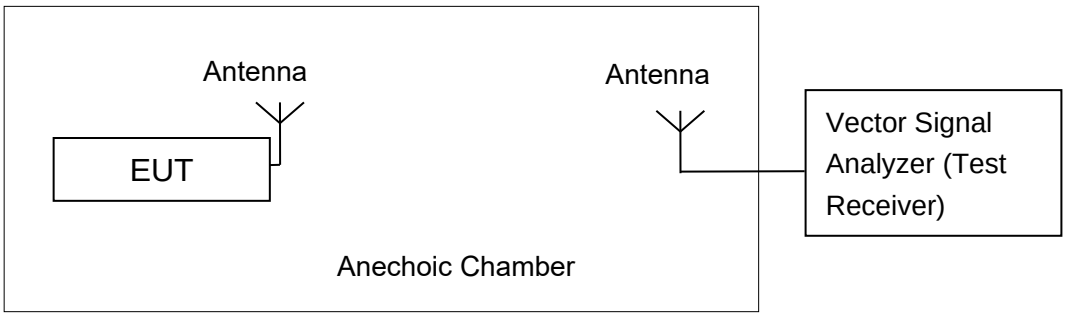


Fig.A.1.2.1: Test Setup Diagram for Radiated Measurements

A.2. Maximum Output Power

Method of Measurement: See ANSI C63.10-2013-clause 11.9.1.1

a) Set the RBW ≥ DTS bandwidth.
b) Set VBW ≥ [3 × RBW].
c) Set span ≥ [3 × RBW].
d) Sweep time = auto couple.
e) Detector = peak.
f) Trace mode = max hold.
g) Allow trace to fully stabilize.
h) Use peak marker function to determine the peak amplitude level.

Measurement Limit:

Standard	Limit (dBm)
FCC CRF Part 15.247(b)	< 30

EUT ID: EUT2

A.2.1. Peak Output Power-conducted

Directional Gain

Mode	Ant9(dBi)	Ant10(dBi)	Power(dBi)
CDD	0.5	1.1	1.1
BF	0.5	1.1	3.82

For CDD transmissions, directional gain is calculated as:

a) For power, the directional gain GANT is set equal to the antenna having the highest gain, i.e.,

Directional gain = GANT MAX (Ant.1 Gain, Ant.2 Gain, …) + Array Gain, as following table for Power, where Array Gain = 0 dB (i.e., no array gain) for NANT ≤ 4;

b) For PSD, the directional gain calculation is following:

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

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

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

Measurement Results:

SISO-Ant9

802.11b/g mode

Mode	Data Rate (Mbps)	Test Result (dBm)		
		2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)
802.11b	1	17.45	17.43	17.90
802.11g	6	18.06	17.93	18.62

The data rate 1Mbps and 6Mbps are selected as worse condition, and the following cases are performed with this condition.

802.11n-HT20 mode

Mode	Data Rate (Index)	Test Result (dBm)		
		2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)
802.11n(20MHz)	MCS0	17.87	17.62	18.18

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

802.11n-HT40 mode

Mode	Data Rate (Index)	Test Result (dBm)		
		2422MHz (Ch3)	2437MHz (Ch6)	2452 MHz (Ch9)
802.11n(40MHz)	MCS0	18.63	18.16	19.28

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

802.11ax-HE20 mode(full RU)

Mode	Data Rate (Index)	Test Result (dBm)		
		2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)
802.11ax(20MHz)	MCS0	17.91	17.65	18.44

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

802.11ax-HE40 mode(full RU)

Mode	Data Rate (Index)	Test Result (dBm)		
		2422MHz (Ch3)	2437MHz (Ch6)	2452 MHz (Ch9)
802.11ax(40MHz)	MCS0	17.96	18.16	18.76

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

SISO-Ant10

802.11b/g mode

Mode	Data Rate (Mbps)	Test Result (dBm)		
		2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)
802.11b	1	19.55	18.18	18.83
802.11g	6	19.87	18.64	19.31

The data rate 1Mbps and 6Mbps are selected as worse condition, and the following cases are performed with this condition.

802.11n-HT20 mode

Mode	Data Rate (Index)	Test Result (dBm)		
		2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)
802.11n(20MHz)	MCS0	19.51	18.25	19.15

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

802.11n-HT40 mode

Mode	Data Rate (Index)	Test Result (dBm)		
		2422MHz (Ch3)	2437MHz (Ch6)	2452 MHz (Ch9)
802.11n(40MHz)	MCS0	20.21	19.26	19.98

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

802.11ax-HE20 mode(full RU)

Mode	Data Rate (Index)	Test Result (dBm)		
		2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)
802.11ax(20MHz)	MCS0	19.81	18.55	19.32

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

802.11ax-HE40 mode(full RU)

Mode	Data Rate (Index)	Test Result (dBm)		
		2422MHz (Ch3)	2437MHz (Ch6)	2452 MHz (Ch9)
802.11ax(40MHz)	MCS0	19.23	19.39	19.19

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

MIMO(CDD&BF)

802.11n-HT20 mode

Mode	Data Rate (Index)	Test Result (dBm)								
		2412MHz (Ch1)			2437MHz (Ch6)			2462 MHz (Ch11)		
		Ant9	Ant10	Sum	Ant9	Ant10	Sum	Ant9	Ant10	Sum
802.11n (20MHz)	MCS0	15.23	17.28	19.39	16.17	16.62	19.41	15.89	16.68	19.31

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

802.11n-HT40 mode

Mode	Data Rate (Index)	Test Result (dBm)								
		2422MHz (Ch3)			2437MHz (Ch6)			2452 MHz (Ch9)		
		Ant9	Ant10	Sum	Ant9	Ant10	Sum	Ant9	Ant10	Sum
802.11n (40MHz)	MCS0	16.10	17.55	19.90	15.78	16.32	19.07	15.64	16.23	18.96

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

802.11ax-HE20 mode(full RU)

Mode	Data Rate (Index)	Test Result (dBm)								
		2412MHz (Ch1)			2437MHz (Ch6)			2462 MHz (Ch11)		
		Ant9	Ant10	Sum	Ant9	Ant10	Sum	Ant9	Ant10	Sum
802.11ax (20MHz)	MCS0	16.58	18.71	20.78	17.34	17.97	20.68	17.00	17.69	20.37

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

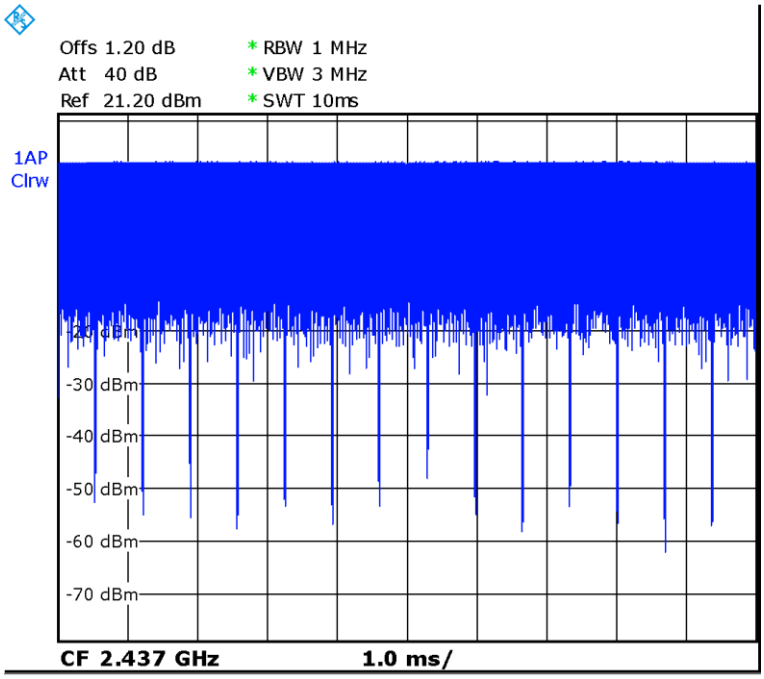
802.11ax-HE40 mode(full RU)

Mode	Data Rate (Index)	Test Result (dBm)								
		2422MHz (Ch3)			2437MHz (Ch6)			2452 MHz (Ch9)		
		Ant9	Ant10	Sum	Ant9	Ant10	Sum	Ant9	Ant10	Sum
802.11ax (40MHz)	MCS0	16.20	18.11	20.27	16.73	18.14	20.50	16.83	17.73	20.31

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

Duty Cycle

Mode	802.11b	802.11g	802.11n20	802.11n40	802.11ax20	802.11ax40
Duty Cycle	100%	95%	95%	95%	95%	95%



Note: The following cases are performed with this condition:

a) 802.11b/g/n20/n40/ax20/ax40 mode (Ant10) are selected as the worst condition (SISO);

b) 802.11n20/n40/ax20/ax40 mode (Ant10) are selected as the worst condition (MIMO);

c) The device only support full RU(11ax20-RU242/11ax40-RU484);

d) Both of the CDD mode and BF mode have the same power setting.

Conclusion: Pass

A.3. Peak Power Spectral Density

Method of Measurement: See ANSI C63.10-2013-clause 11.10.2

a) Set analyzer center frequency to DTS channel center frequency.
b) Set the span to 1.5 times the DTS bandwidth.
c) Set the RBW to RBW = 3 kHz.
d) Set the VBW = 10 kHz.
e) Detector = peak.
f) Sweep time = auto couple.
g) Trace mode = max hold.
h) Allow trace to fully stabilize.
i) Use the peak marker function to determine the maximum amplitude level within the RBW.

Measurement Limit:

Standard	Limit
FCC CRF Part 15.247(e)	< 8 dBm/3 kHz

Measurement Results:

SISO-Ant10

802.11b/g mode

Mode	Channel	Power Spectral Density (dBm/3 kHz)		Conclusion
802.11b	1	Fig.A.3.1	-2.95	P
	6	Fig.A.3.2	-3.55	P
	11	Fig.A.3.3	-2.57	P
802.11g	1	Fig.A.3.4	-7.95	P
	6	Fig.A.3.5	-7.45	P
	11	Fig.A.3.6	-7.69	P

802.11n-HT20 mode

Mode	Channel	Power Spectral Density (dBm/3 kHz)		Conclusion
802.11n (HT20)	1	Fig.A.3.7	-6.09	P
	6	Fig.A.3.8	-7.12	P
	11	Fig.A.3.9	-6.59	P

802.11n-HT40 mode

Mode	Channel	Power Spectral Density (dBm/3 kHz)		Conclusion
802.11n (HT40)	3	Fig.A.3.10	-8.74	P
	6	Fig.A.3.11	-9.72	P
	9	Fig.A.3.12	-9.56	P

802.11ax-HE20 mode(full RU)

Mode	Channel	Power Spectral Density (dBm/3 kHz)		Conclusion
802.11ax (HE20)	1	Fig.A.3.13	-7.59	P
	6	Fig.A.3.14	-8.95	P
	11	Fig.A.3.15	-7.70	P

802.11ax-HE40 mode(full RU)

Mode	Channel	Power Spectral Density (dBm/3 kHz)		Conclusion
802.11ax (HE40)	3	Fig.A.3.16	-10.85	P
	6	Fig.A.3.17	-11.55	P
	9	Fig.A.3.18	-11.86	P

MIMO

802.11n-HT20 mode

Mode	Power Spectral Density (dBm/3 kHz)				Conclusion
802.11n (HT20)	Ant9	2412	-10.96	/	P
	Ant10	2412	-7.87	Fig.A.3.19	P
	total	2412	-6.14	/	P
	Ant9	2437	-10.06	/	P
	Ant10	2437	-8.49	Fig.A.3.20	P
	total	2437	-6.19	/	P
	Ant9	2462	-9.74	/	P
	Ant10	2462	-8.31	Fig.A.3.21	P
	total	2462	-5.96	/	P

802.11n-HT40 mode

Mode	Power Spectral Density (dBm/3 kHz)				Conclusion
802.11n (HT40)	Ant9	2422	-12.96	/	P
	Ant10	2422	-10.88	Fig.A.3.22	P
	total	2422	-8.79	/	P
	Ant9	2437	-12.92	/	P

	Ant10	2437	-12.18	Fig.A.3.23	P
	total	2437	-9.52	/	P
	Ant9	2452	-13.11	/	P
	Ant10	2452	-12.37	Fig.A.3.24	P
	total	2452	-9.71	/	P

802.11ax-HE20 mode(full RU)

Mode	Power Spectral Density (dBm/3 kHz)				Conclusion
802.11ax (HE20)	Ant9	2412	-10.21	/	P
	Ant10	2412	-9.60	Fig.A.3.25	P
	total	2412	-6.88	/	P
	Ant9	2437	-9.63	/	P
	Ant10	2437	-8.64	Fig.A.3.26	P
	total	2437	-6.10	/	P
	Ant9	2462	-9.93	/	P
	Ant10	2462	-9.97	Fig.A.3.27	P
	total	2462	-6.94	/	P

802.11ax-HE40 mode(full RU)

Mode	Power Spectral Density (dBm/3 kHz)				Conclusion
802.11ax (HE40)	Ant9	2422	-13.85	/	P
	Ant10	2422	-12.09	Fig.A.3.28	P
	total	2422	-9.87	/	P
	Ant9	2437	-13.24	/	P
	Ant10	2437	-13.15	Fig.A.3.29	P
	total	2437	-10.18	/	P
	Ant9	2452	-13.56	/	P
	Ant10	2452	-13.01	Fig.A.3.30	P
	total	2452	-10.27		P

Note: All Antenna are tested, only the worst-case plot have been reported.

Conclusion: Pass

Test graphs as below:

SISO-Ant10

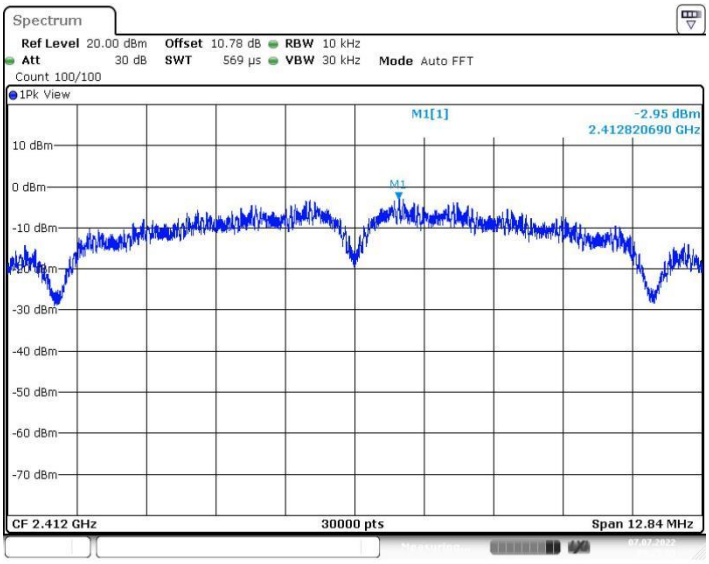


Fig.A.3.1 Power Spectral Density(802.11b,Ch1)

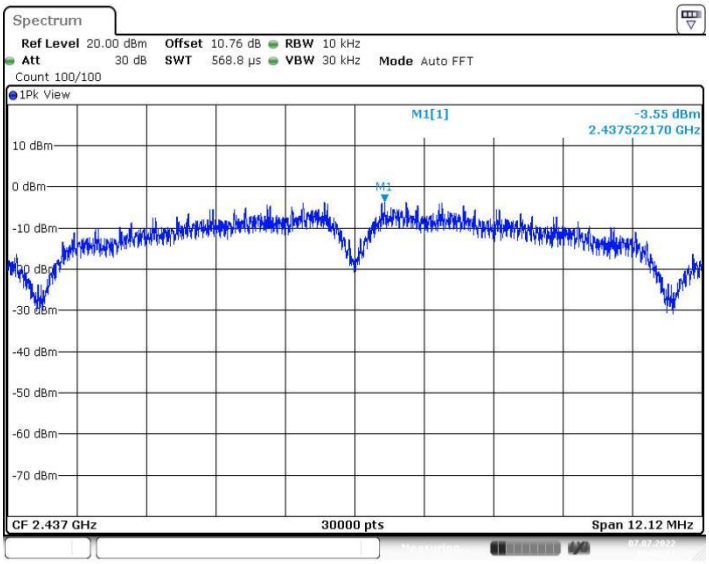


Fig.A.3.2 Power Spectral Density (802.11b, Ch 6)

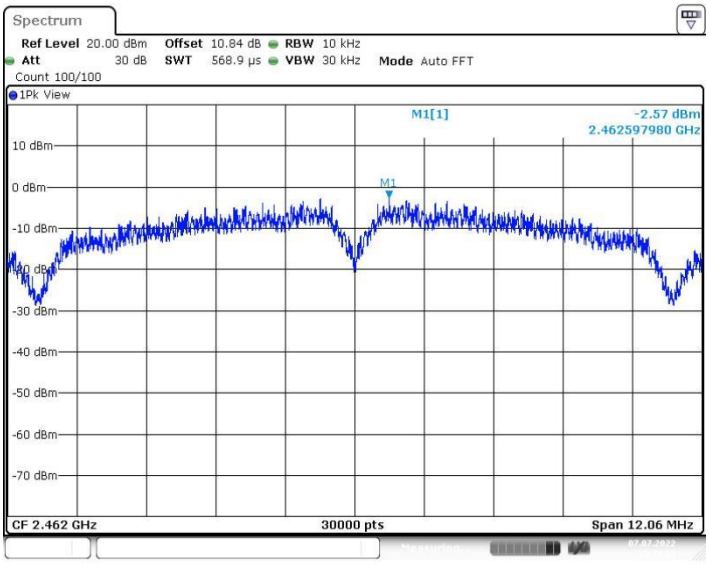


Fig.A.3.3 Power Spectral Density (802.11b, Ch 11)

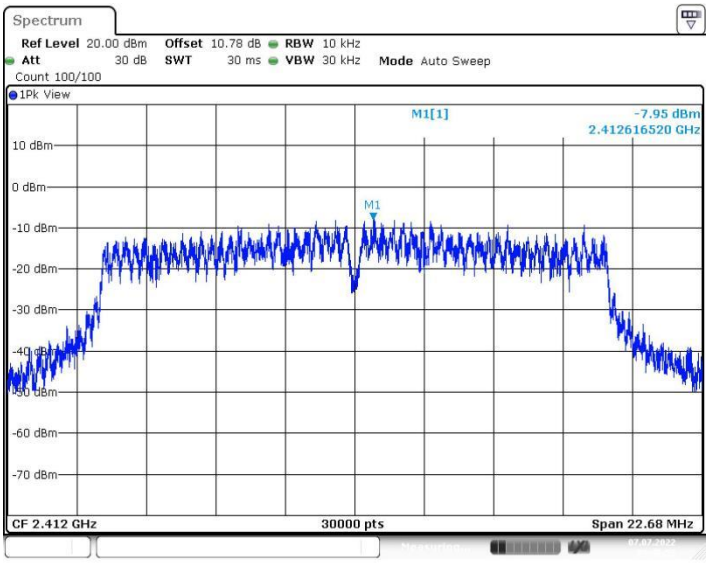


Fig.A.3.4 Power Spectral Density (802.11g, Ch 1)

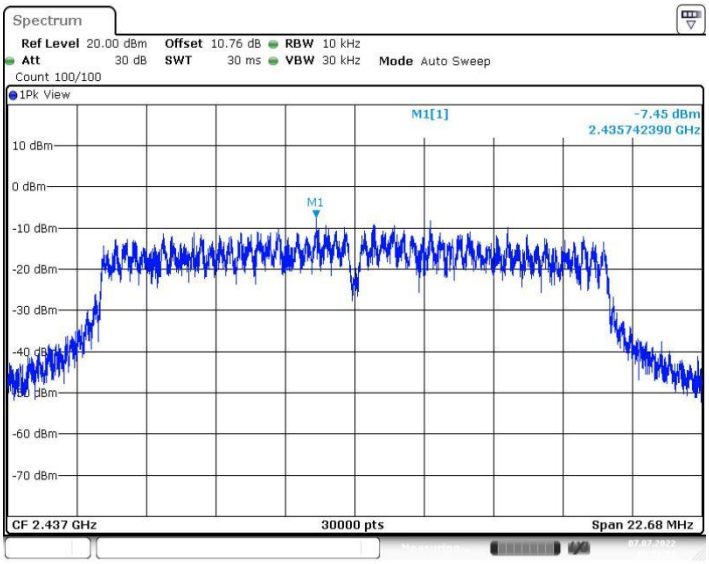


Fig.A.3.5 Power Spectral Density (802.11g, Ch 6)

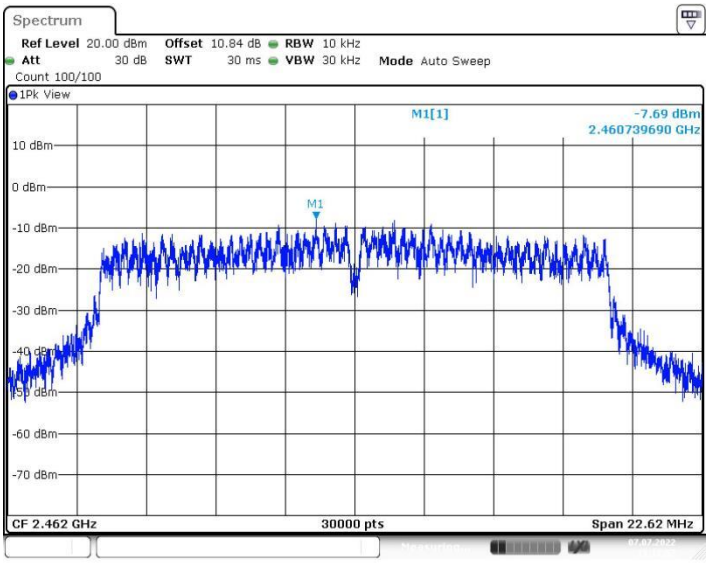


Fig.A.3.6 Power Spectral Density (802.11g, Ch 11)

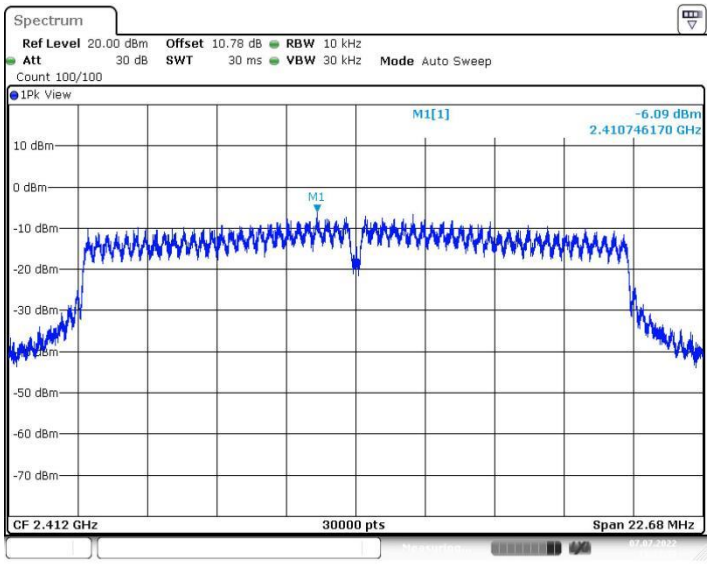


Fig.A.3.7 Power Spectral Density (802.11n-HT20, Ch 1)

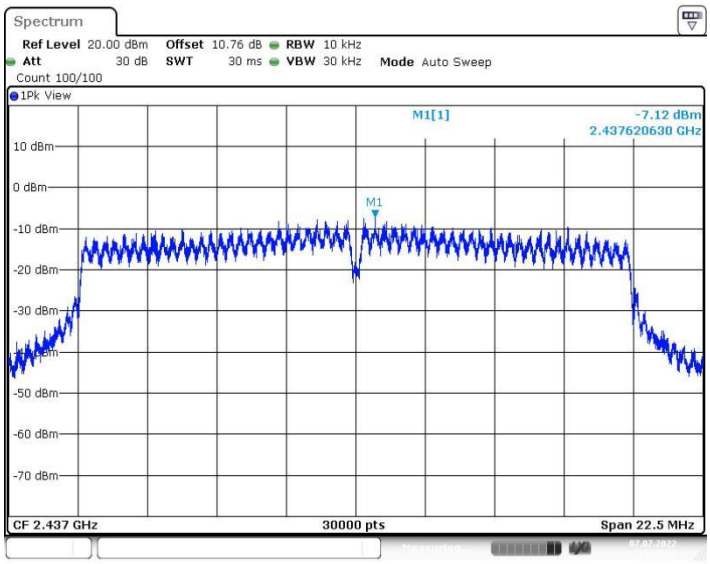


Fig.A.3.8 Power Spectral Density (802.11n-HT20, Ch 6)

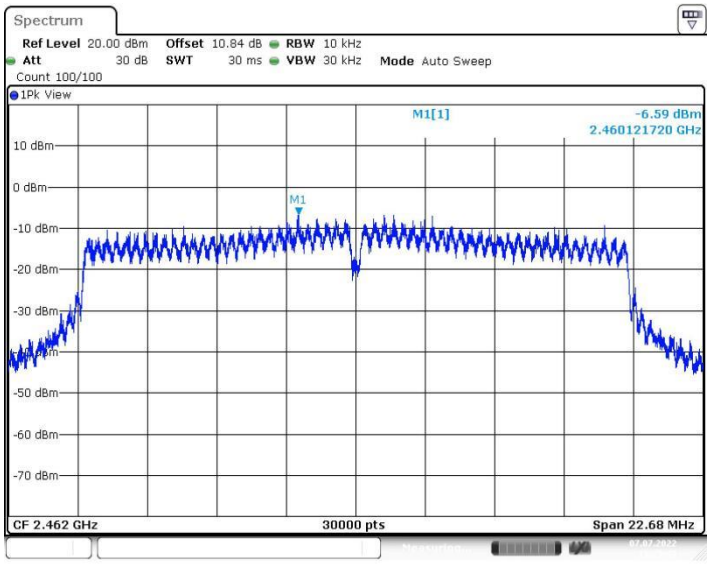


Fig.A.3.9 Power Spectral Density (802.11n-HT20, Ch 11)

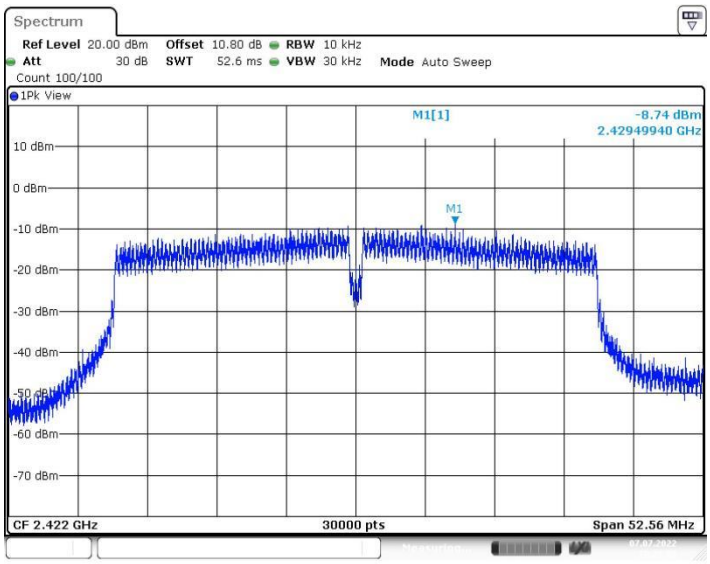


Fig.A.3.10 Power Spectral Density (802.11n-HT40, Ch 3)

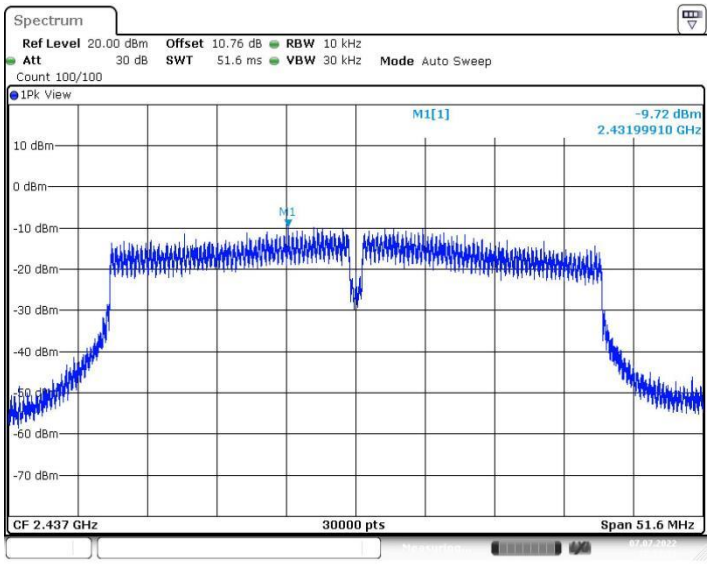


Fig.A.3.11 Power Spectral Density (802.11n-HT40, Ch 6)

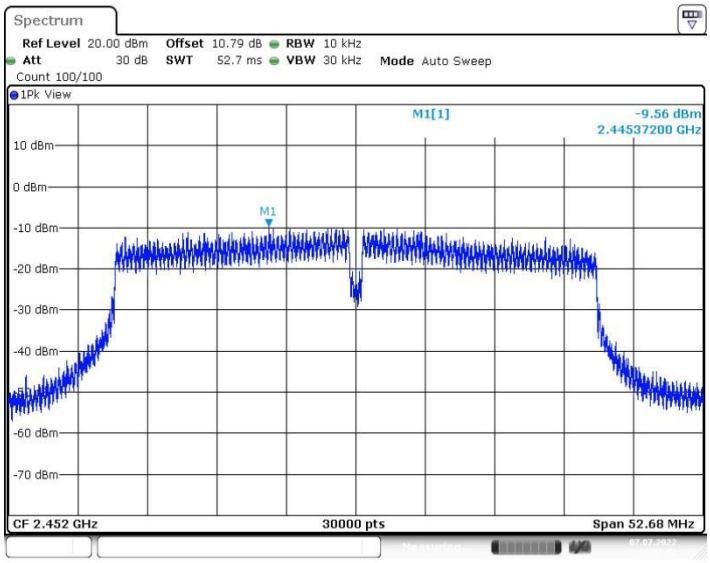


Fig.A.3.12 Power Spectral Density (802.11n-HT40, Ch 9)

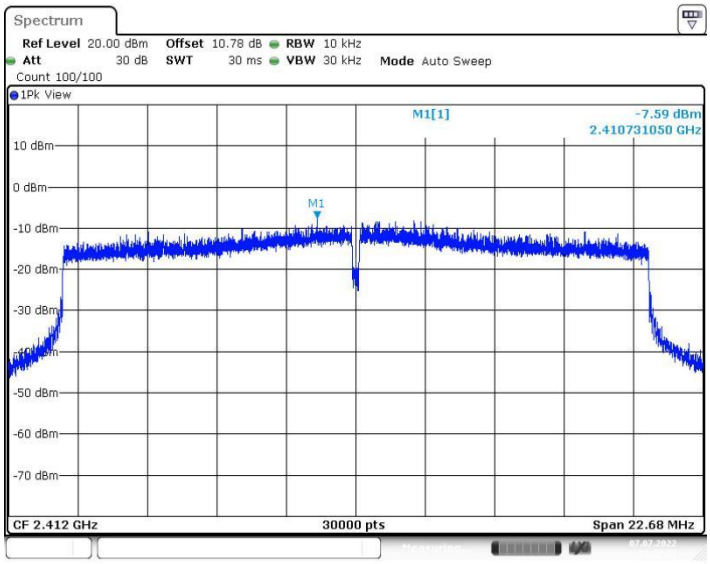


Fig.A.3.13 Power Spectral Density (802.11ax-HE20 full RU, Ch 1)

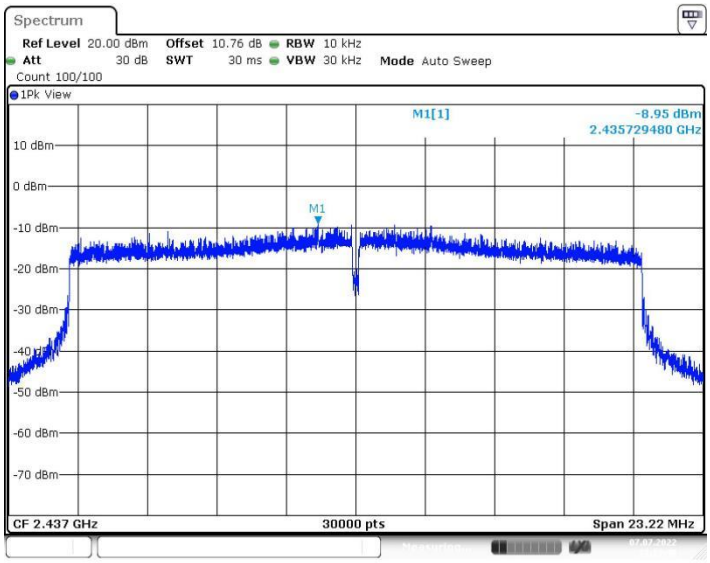


Fig.A.3.14 Power Spectral Density (802.11ax-HE20 full RU, Ch 6)

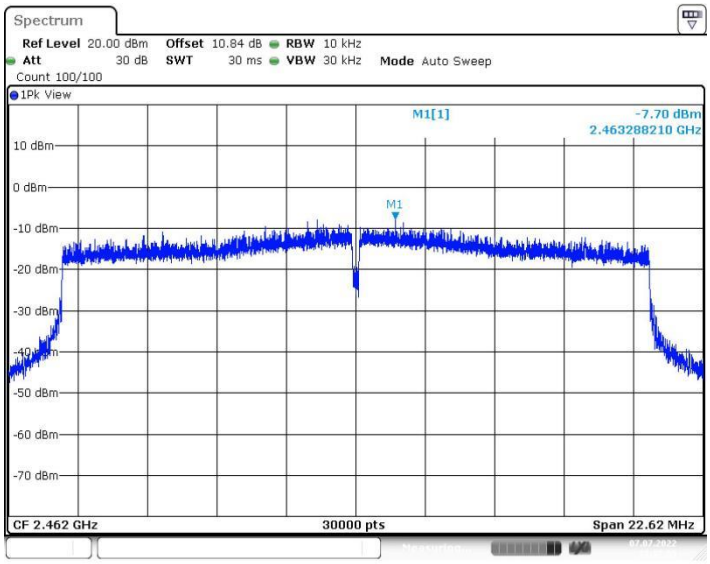


Fig.A.3.15 Power Spectral Density (802.11ax-HE20 full RU, Ch 11)

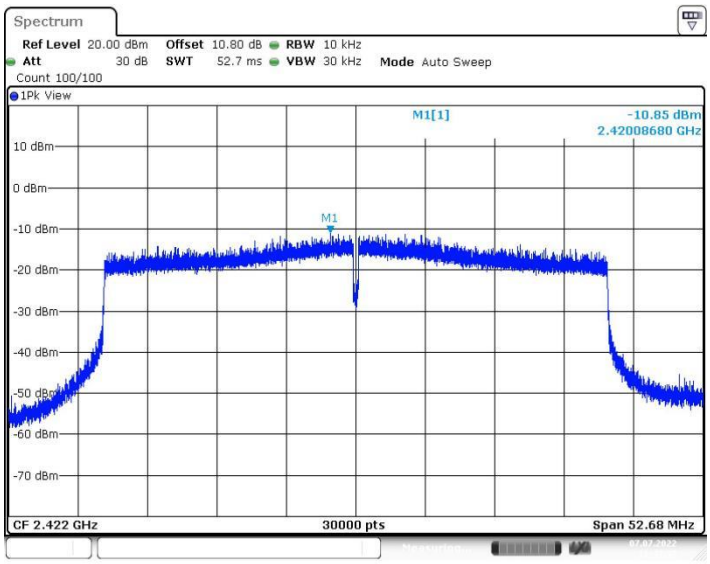


Fig.A.3.16 Power Spectral Density (802.11ax-HE40 full RU, Ch 3)

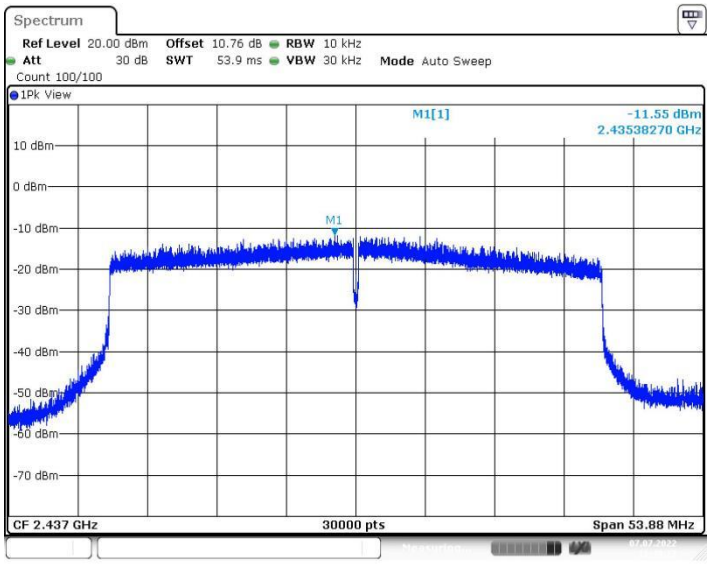


Fig.A.3.17 Power Spectral Density (802.11ax-HE40 full RU, Ch 6)

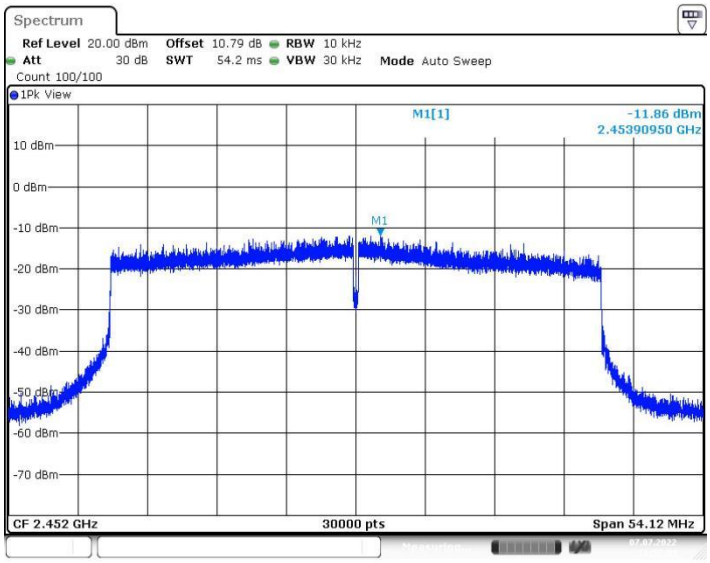


Fig.A.3.18 Power Spectral Density (802.11ax-HE40 full RU, Ch 9)

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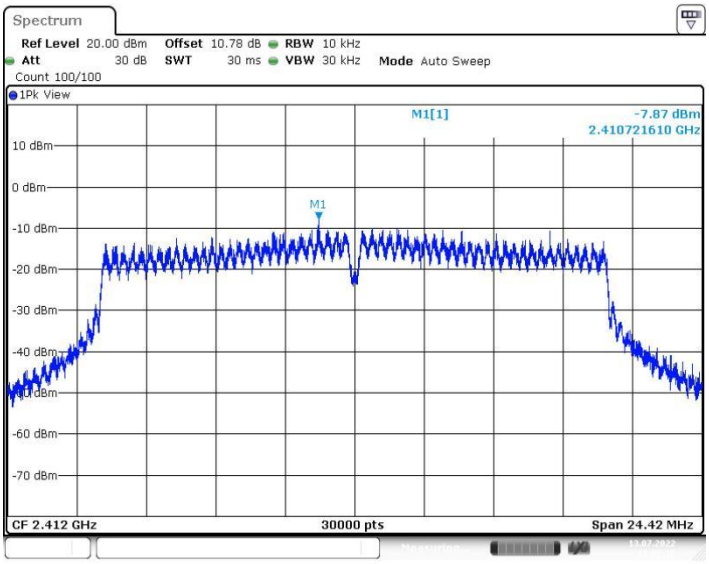

Fig.A.3.19 Power Spectral Density (802.11n-HT20, Ch 1)

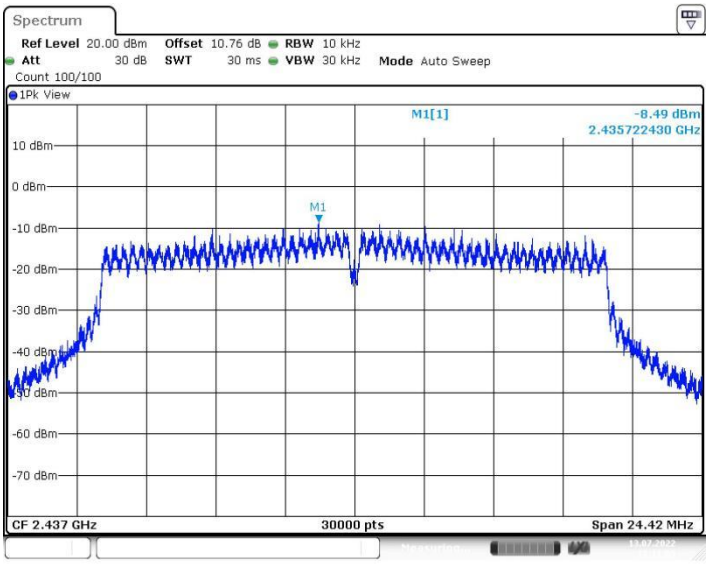

Fig.A.3.20 Power Spectral Density (802.11n-HT20, Ch 6)

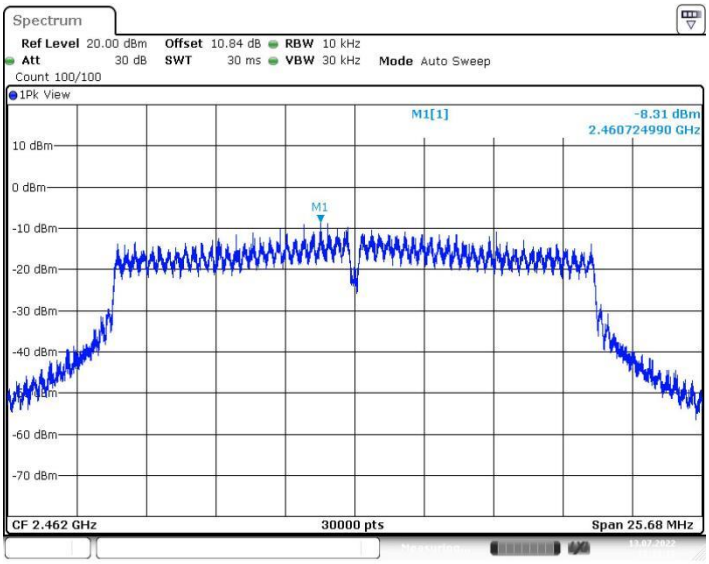

Fig.A.3.21 Power Spectral Density (802.11n-HT20, Ch 11)

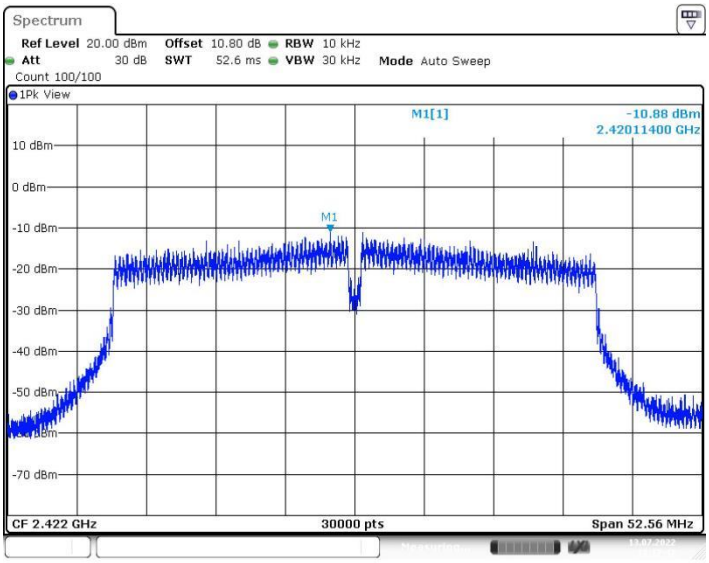

Fig.A.3.22 Power Spectral Density (802.11n-HT40, Ch 3)

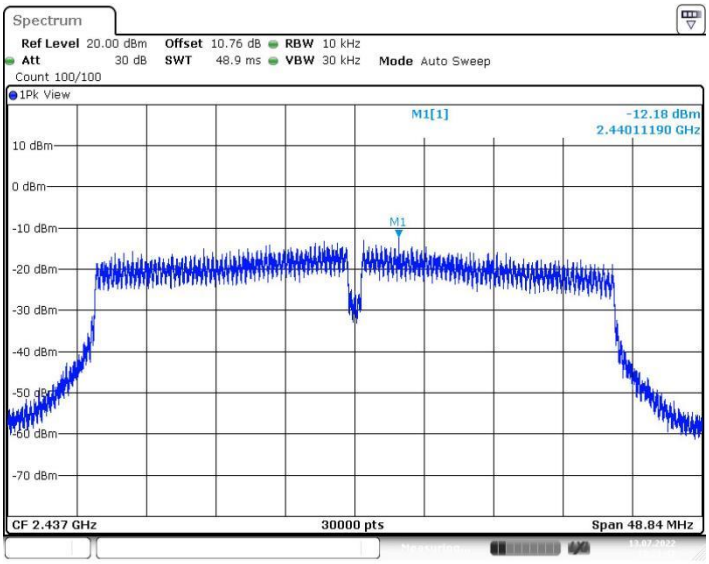

Fig.A.3.23 Power Spectral Density (802.11n-HT40, Ch 6)

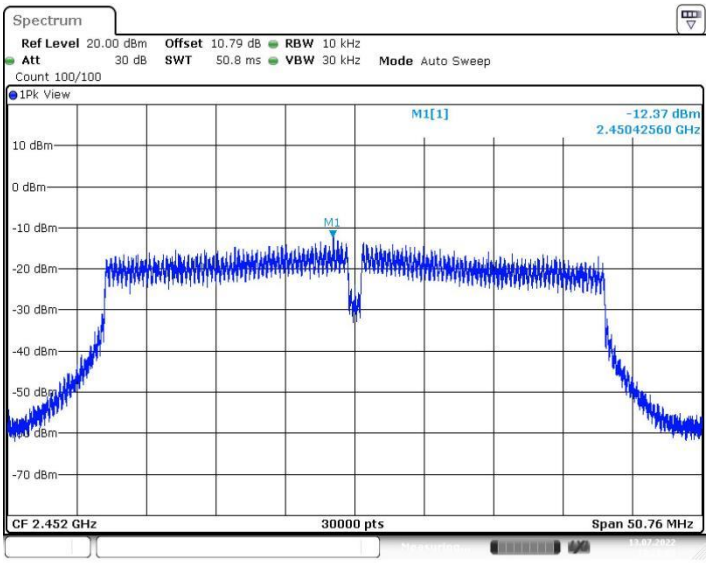

Fig.A.3.24 Power Spectral Density (802.11n-HT40, Ch 9)

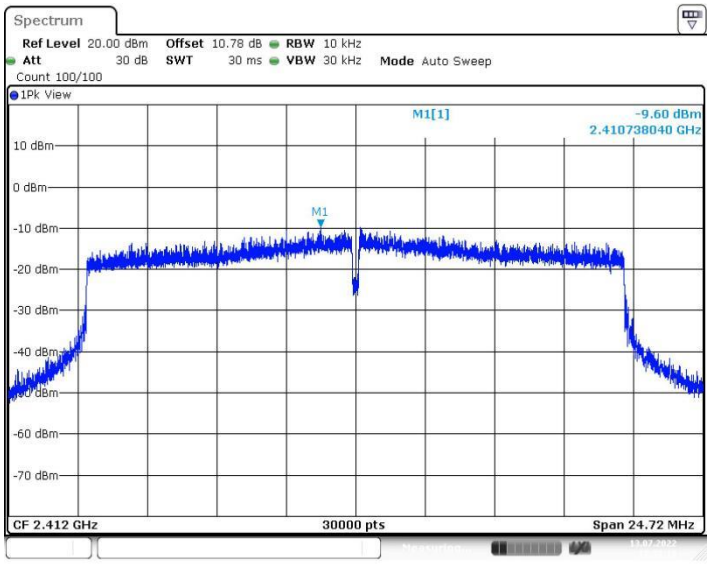

Fig.A.3.25 Power Spectral Density (802.11ax-HE20 full RU, Ch 1)

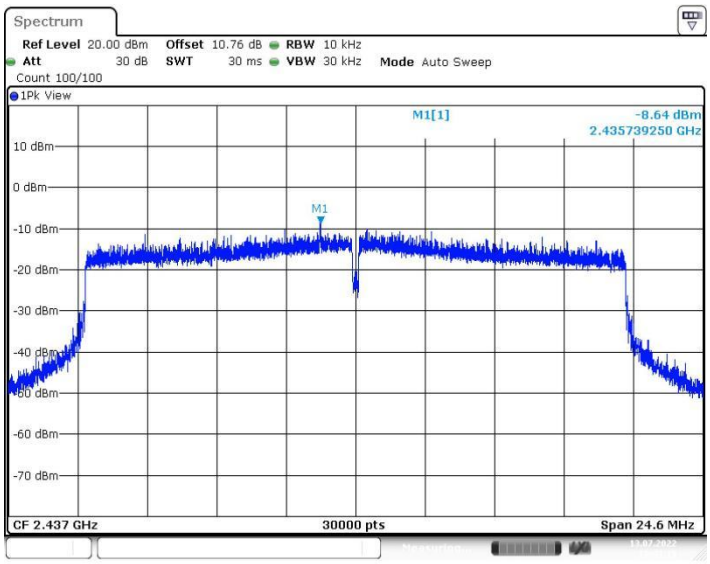

Fig.A.3.26 Power Spectral Density (802.11ax-HE20 full RU, Ch 6)

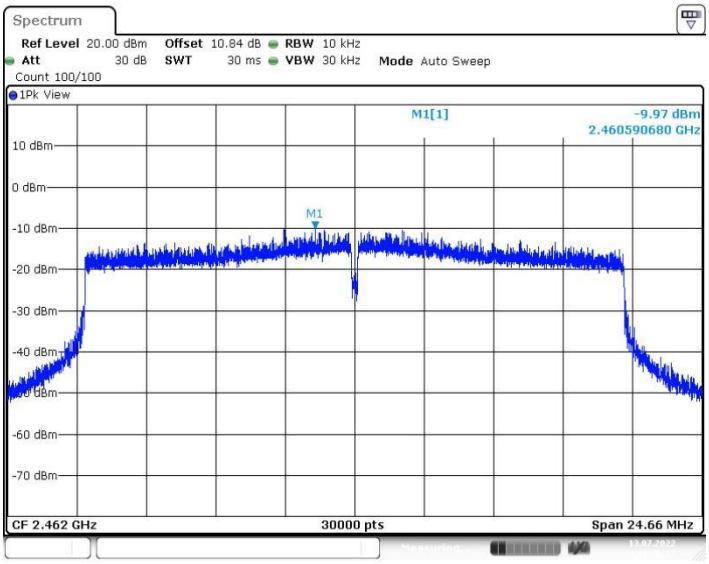

Fig.A.3.27 Power Spectral Density (802.11ax-HE20 full RU, Ch 11)

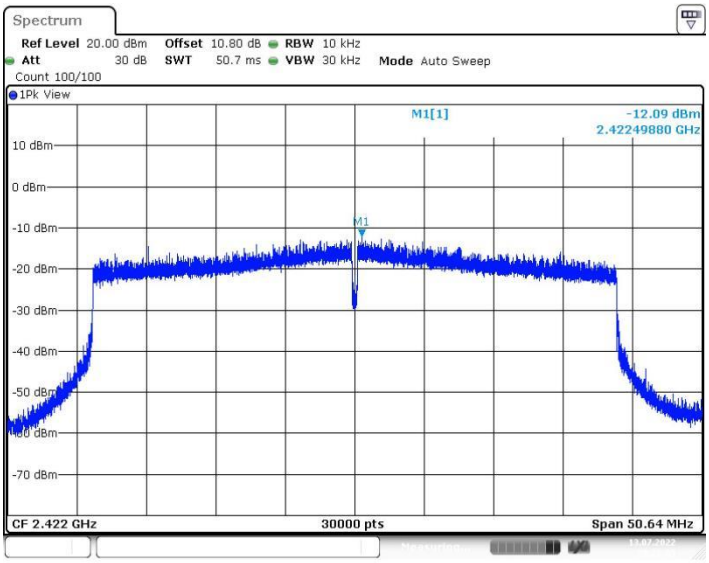

Fig.A.3.28 Power Spectral Density (802.11ax-HE40 full RU, Ch 3)

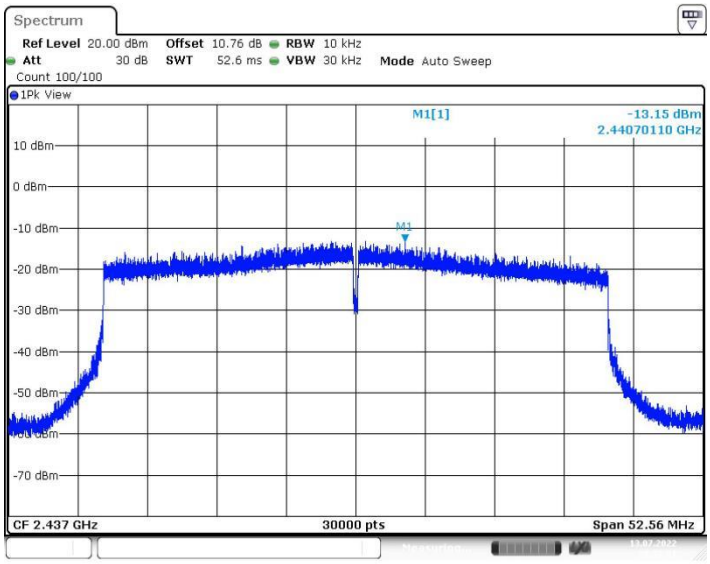

Fig.A.3.29 Power Spectral Density (802.11ax-HE40 full RU, Ch 6)

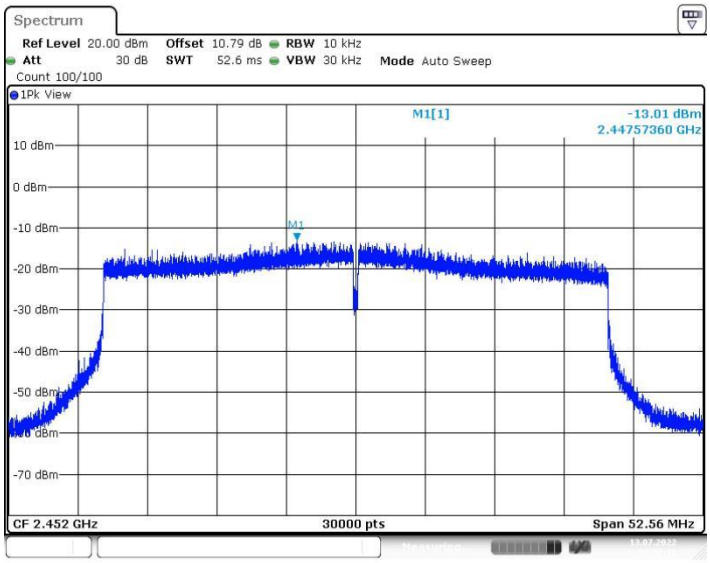

Fig.A.3.30 Power Spectral Density (802.11ax-HE40 full RU, Ch 9)

A.4. DTS 6-dB Signal Bandwidth

Method of Measurement: See ANSI C63.10-2013 section 11.8.1.

a) Set RBW = 100 kHz.
b) Set the video bandwidth (VBW) = 300 kHz.
c) Detector = Peak.
d) Trace mode = max hold.
e) Sweep = auto couple.
f) Allow the trace to stabilize.
g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

Measurement Limit:

Standard	Limit (kHz)
FCC 47 CFR Part 15.247 (a)	≥ 500

EUT ID: EUT3

Measurement Result:

802.11b/g mode

Mode	Channel	Occupied 6dB Bandwidth (MHz)		conclusion
802.11b	1	Fig.A.4.1	8.56	P
	6	Fig.A.4.2	8.08	P
	11	Fig.A.4.3	8.04	P
802.11g	1	Fig.A.4.4	15.12	P
	6	Fig.A.4.5	15.12	P
	11	Fig.A.4.6	15.08	P

802.11n-HT20 mode

Mode	Channel	Occupied 6dB Bandwidth (MHz)		conclusion
802.11n (HT20)	1	Fig.A.4.7	15.12	P
	6	Fig.A.4.8	15.00	P
	11	Fig.A.4.9	15.12	P

802.11n-HT40 mode

Mode	Channel	Occupied 6dB Bandwidth (MHz)		conclusion
802.11n (HT40)	3	Fig.A.4.10	35.04	P
	6	Fig.A.4.11	34.40	P
	9	Fig.A.4.12	35.12	P

802.11ax-HE20 mode(full RU)

Mode	Channel	Occupied 6dB Bandwidth (MHz)		conclusion
802.11ax (HE20)	1	Fig.A.4.13	15.12	P
	6	Fig.A.4.14	15.48	P
	11	Fig.A.4.15	15.08	P

802.11ax-HE40 mode(full RU26)

Mode	Channel	Occupied 6dB Bandwidth (MHz)		conclusion
802.11ax (HE40)	3	Fig.A.4.16	35.12	P
	6	Fig.A.4.17	35.92	P
	9	Fig.A.4.18	36.08	P

Conclusion: Pass

Test graphs as below:

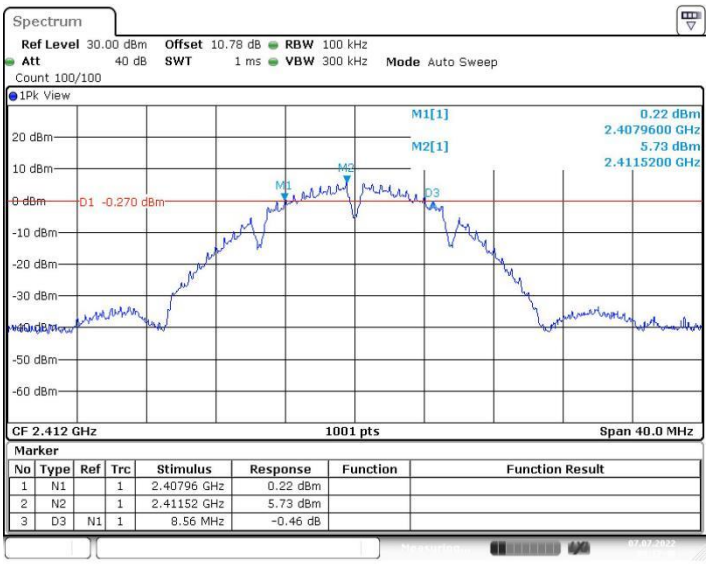

Fig.A.4.1 Occupied 6dB Bandwidth(802.11b,Ch 1)

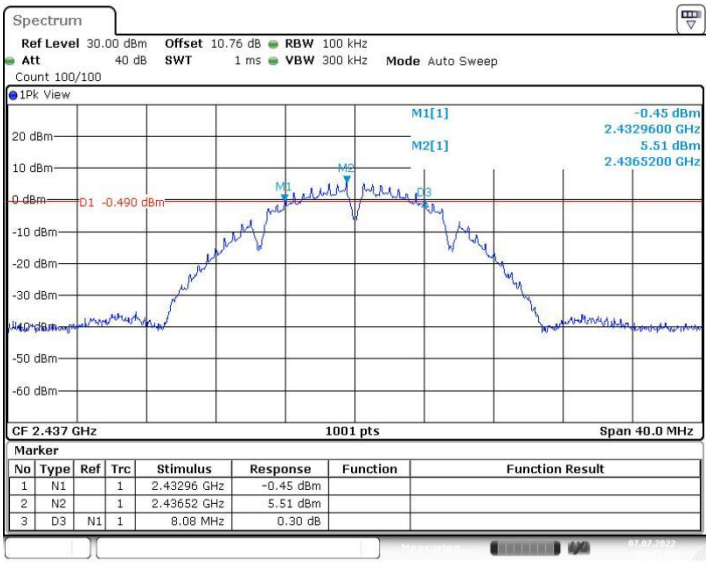

Fig.A.4.2 Occupied 6dB Bandwidth (802.11b, Ch 6)

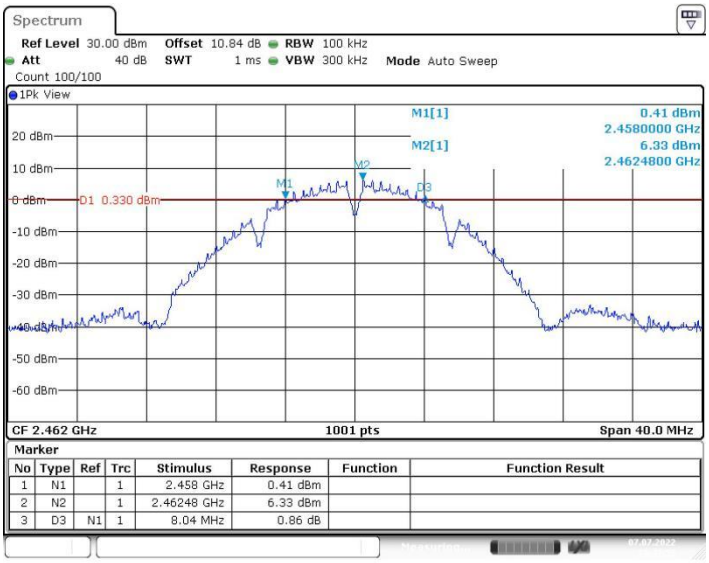

Fig.A.4.3 Occupied 6dB Bandwidth (802.11b, Ch 11)

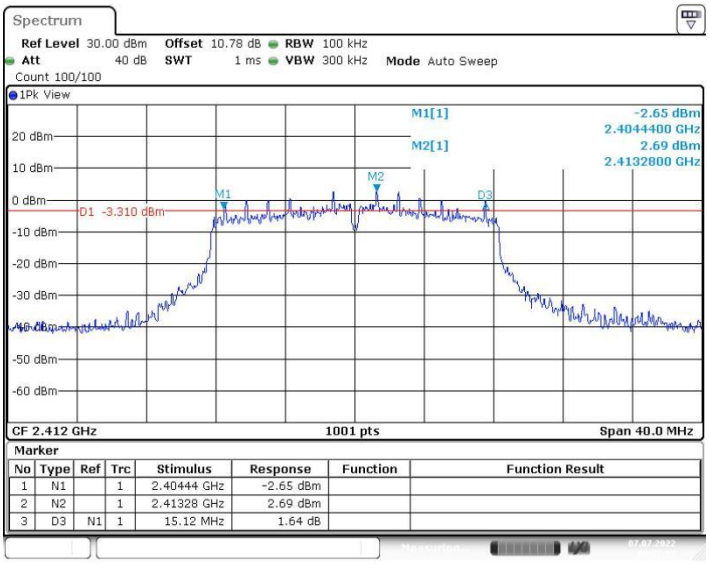

Fig.A.4.4 Occupied 6dB Bandwidth (802.11g, Ch 1)

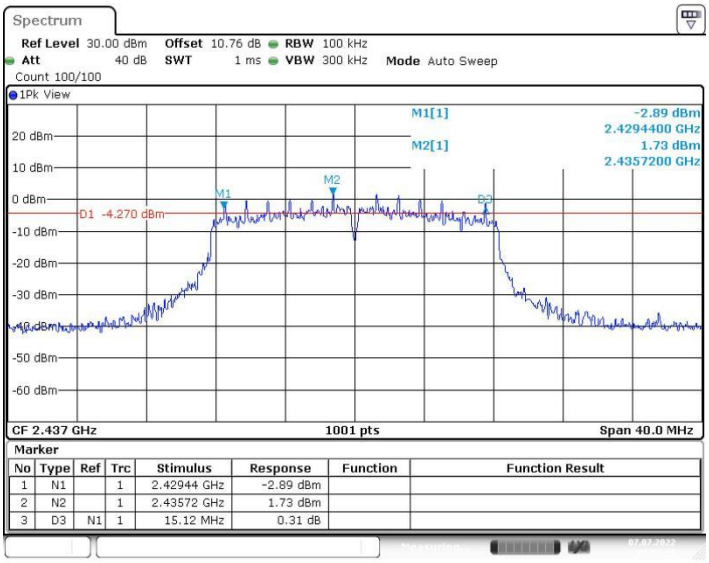

Fig.A.4.5 Occupied 6dB Bandwidth (802.11g, Ch 6)

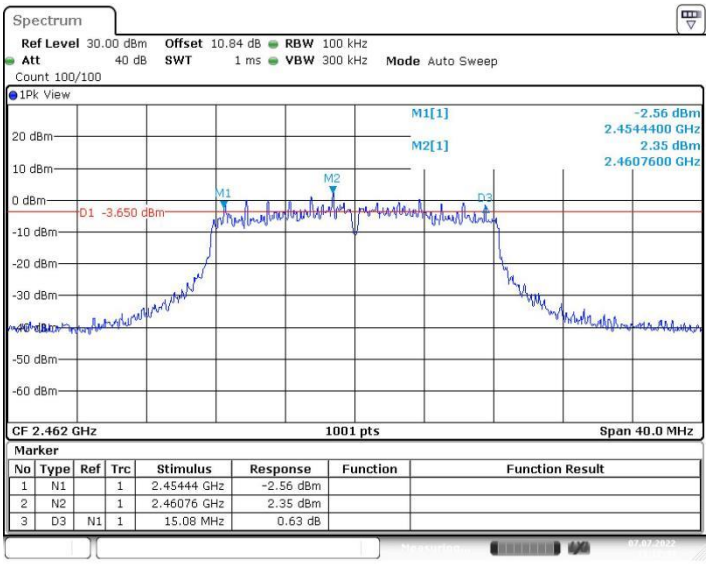

Fig.A.4.6 Occupied 6dB Bandwidth (802.11g, Ch 11)

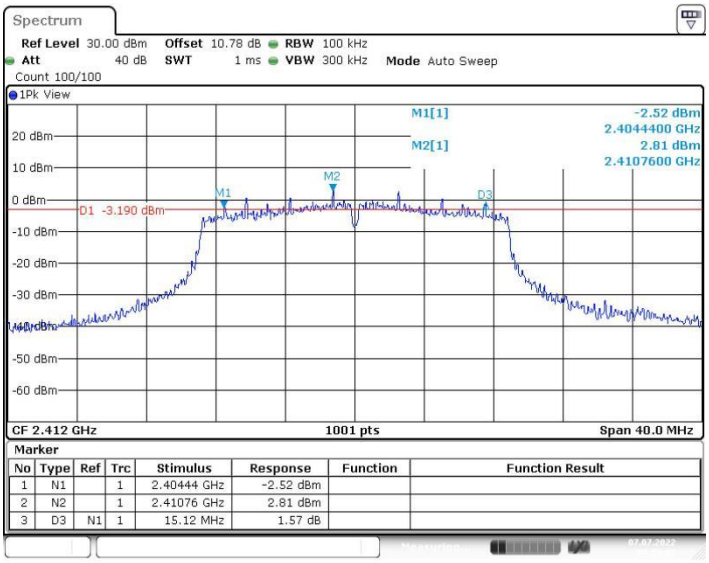

Fig.A.4.7 Occupied 6dB Bandwidth (802.11n-HT20, Ch 1)

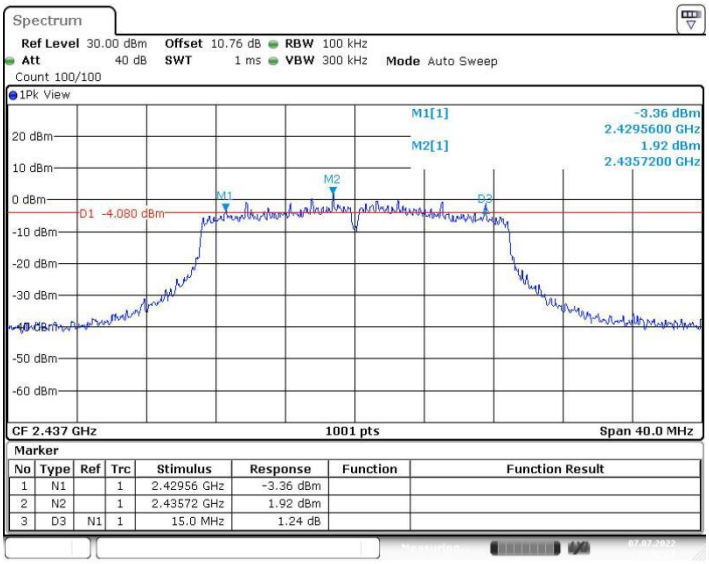

Fig.A.4.8 Occupied 6dB Bandwidth (802.11n-HT20, Ch 6)

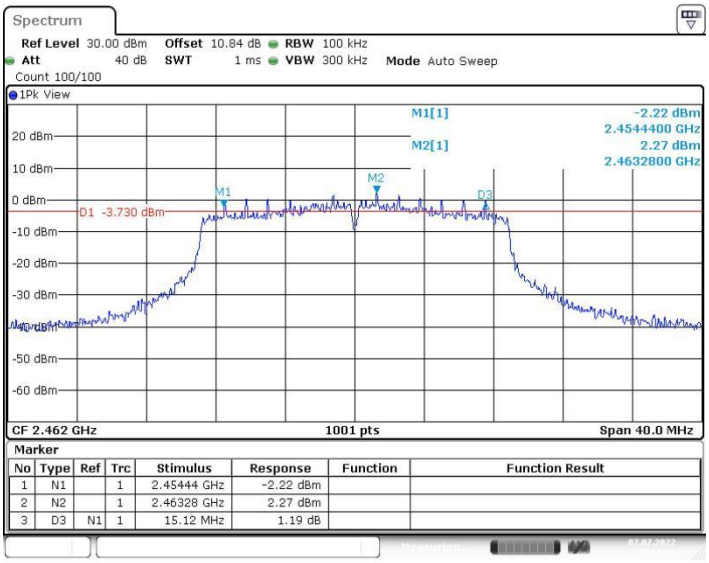

Fig.A.4.9 Occupied 6dB Bandwidth (802.11n-HT20, Ch 11)

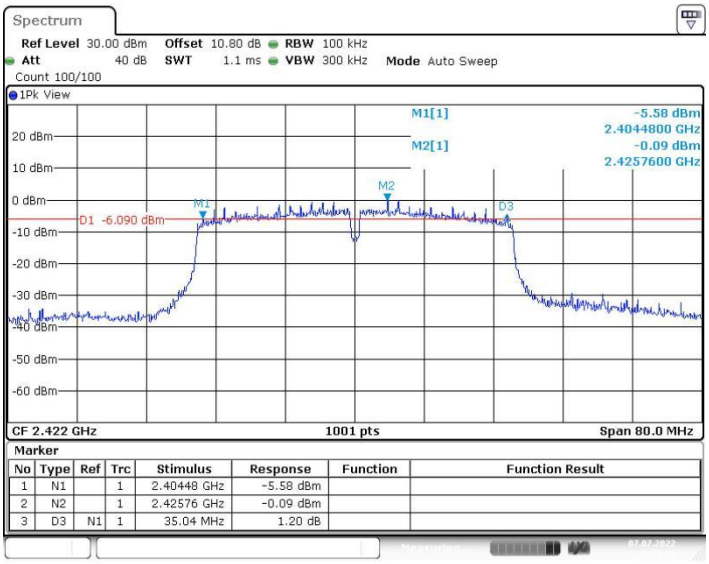

Fig.A.4.10 Occupied 6dB Bandwidth (802.11n-HT40, Ch 3)

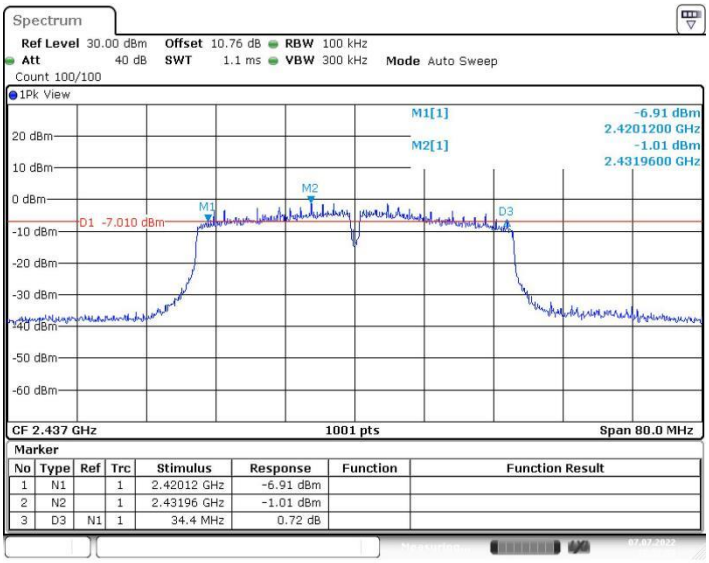

Fig.A.4.11 Occupied 6dB Bandwidth (802.11n-HT40, Ch 6)

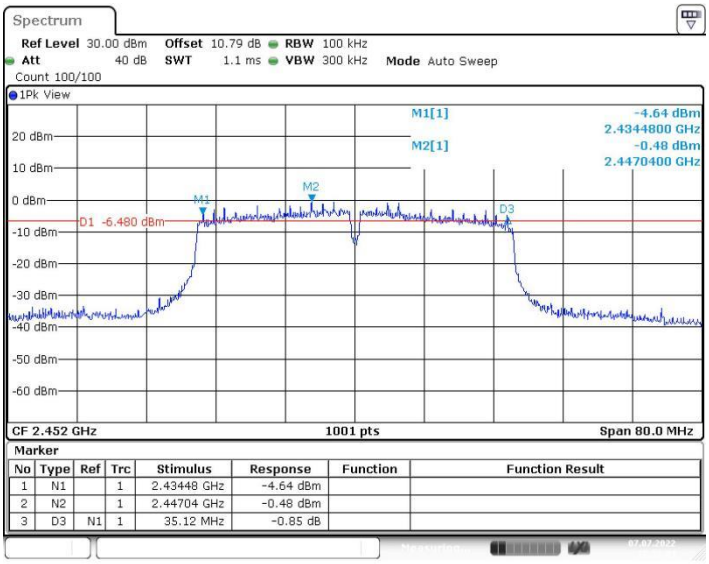

Fig.A.4.12 Occupied 6dB Bandwidth (802.11n-HT40, Ch 9)

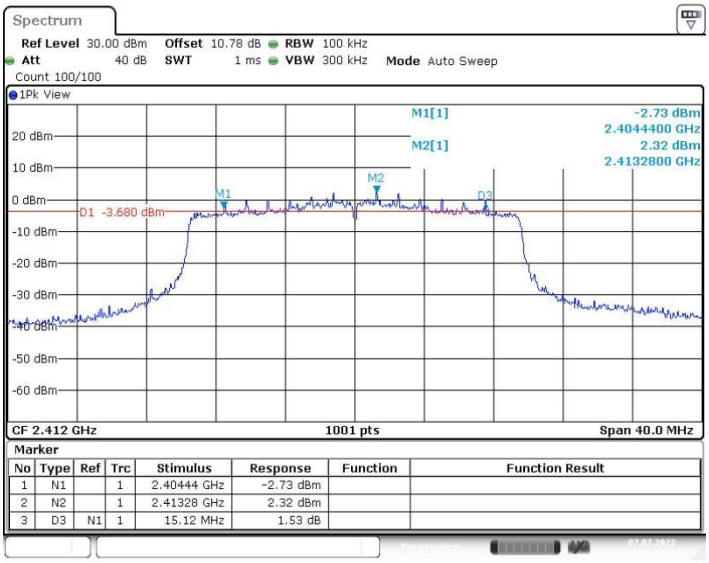

Fig.A.4.13 Occupied 6dB Bandwidth (802.11ax-HE20, Ch 1)

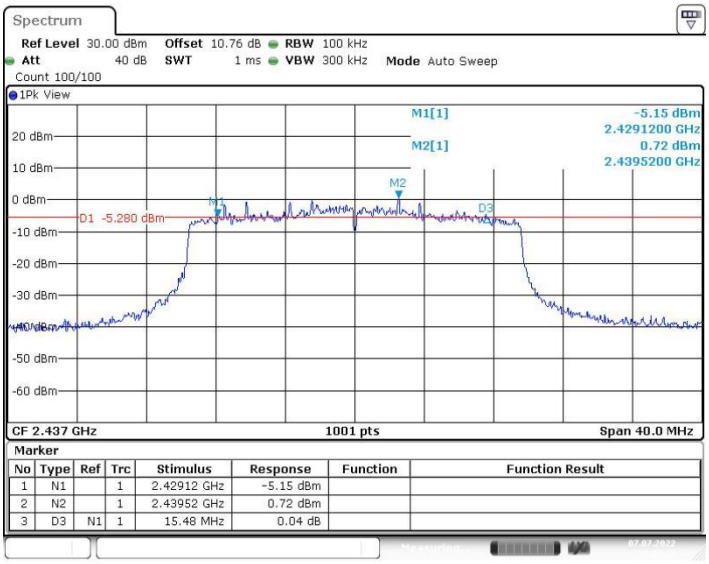

Fig.A.4.14 Occupied 6dB Bandwidth (802.11ax-HE20, Ch 6)

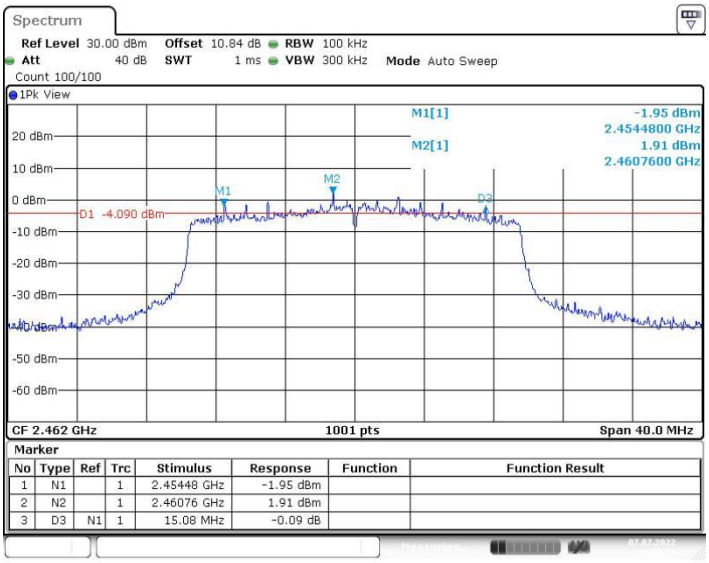

Fig.A.4.15 Occupied 6dB Bandwidth (802.11ax-HE20, Ch 11)

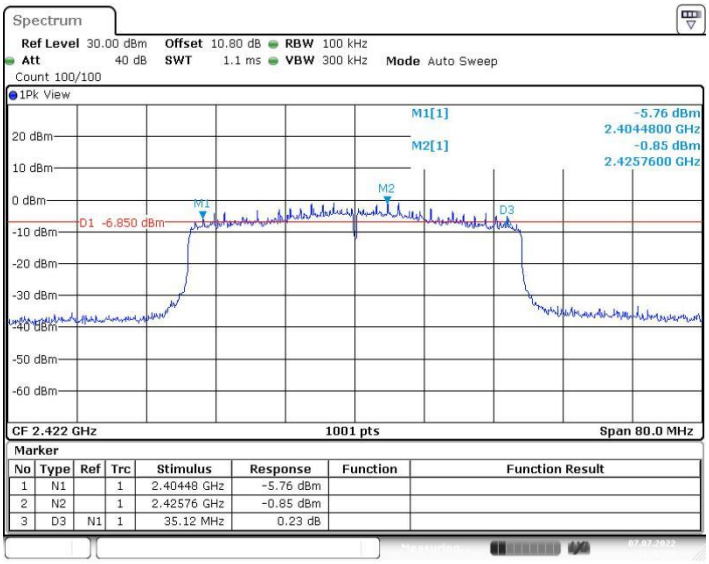

Fig.A.4.16 Occupied 6dB Bandwidth (802.11ax-HE40, Ch 3)

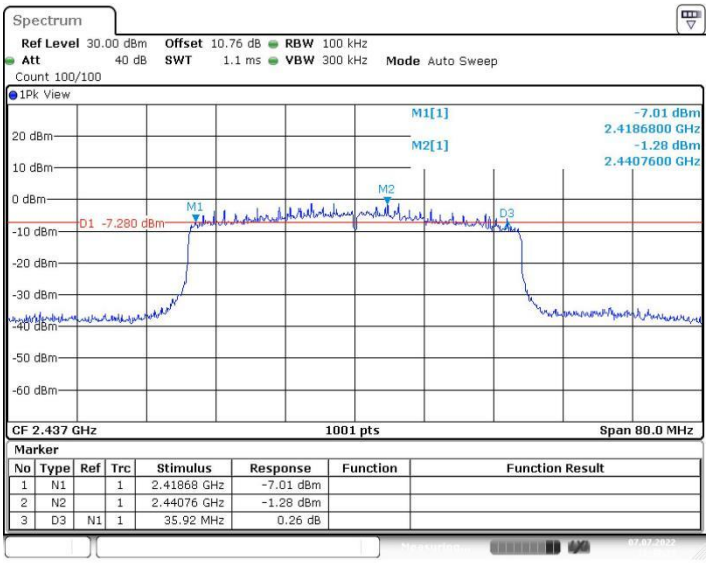

Fig.A.4.17 Occupied 6dB Bandwidth (802.11ax-HE40, Ch 6)

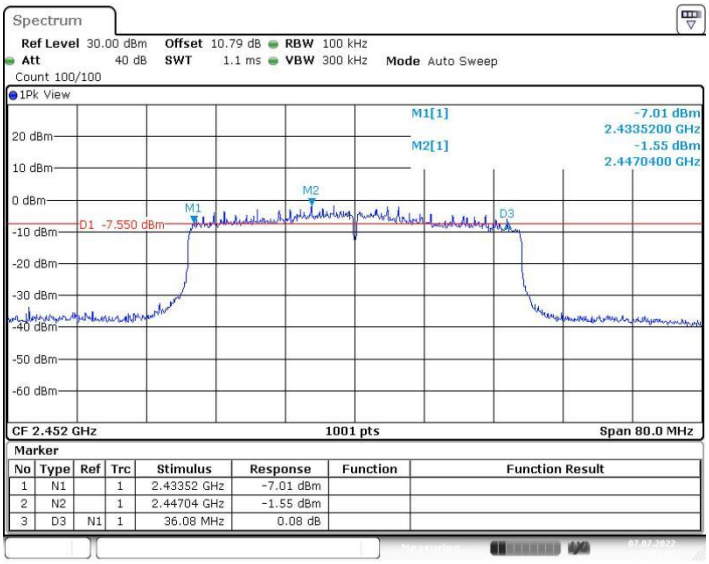

Fig.A.4.18 Occupied 6dB Bandwidth (802.11ax-HE40, Ch 9)

A.5. Band Edges Compliance

Method of Measurement: See ANSI C63.10-2013-clause 6.10.4

Connect the spectrum analyzer to the EUT using an appropriate RF cable connected to the EUT output. Configure the spectrum analyzer settings as described below.

a) Set Span = 100MHz
b) Sweep Time: coupled
c) Set the RBW= 100 kHz
c) Set the VBW= 300 kHz
d) Detector: Peak
e) Trace: Max hold

Measurement Limit:

Standard	Limit (dBc)
FCC 47 CFR Part 15.247 (d)	> 20

EUT ID: EUT3

Measurement Result:

SISO-Ant10

802.11b/g mode

Mode	Channel	Test Results	Conclusion
802.11b	1	Fig.A.5.1	P
	11	Fig.A.5.2	P
802.11g	1	Fig.A.5.3	P
	11	Fig.A.5.4	P

802.11n-HT20 mode

Mode	Channel	Test Results	Conclusion
802.11n (HT20)	1	Fig.A.5.5	P
	11	Fig.A.5.6	P

802.11n-HT40 mode

Mode	Channel	Test Results	Conclusion
802.11n (HT40)	3	Fig.A.5.7	P
	9	Fig.A.5.8	P

802.11ax-HE20 mode(full RU)

Mode	Channel	Test Results	Conclusion
802.11ax (HE20)	1	Fig.A.5.9	P
	11	Fig.A.5.10	P

802.11ax-HE40 mode(full RU)

Mode	Channel	Test Results	Conclusion
802.11ax	3	Fig.A.5.11	P

(HE40)	9	Fig.A.5.12	**P**

MIMO-Ant10

802.11n-HT20 mode

Mode	Channel	Test Results	Conclusion
802.11n (HT20)	1	Fig.A.5.13	**P**
	11	Fig.A.5.14	**P**

802.11n-HT40 mode

Mode	Channel	Test Results	Conclusion
802.11n (HT40)	3	Fig.A.5.15	**P**
	9	Fig.A.5.16	**P**

802.11ax-HE20 mode(full RU)

Mode	Channel	Test Results	Conclusion
802.11ax (HE20)	1	Fig.A.5.17	**P**
	11	Fig.A.5.18	**P**

802.11ax-HE40 mode(full RU)

Mode	Channel	Test Results	Conclusion
802.11ax (HE40)	3	Fig.A.5.19	**P**
	9	Fig.A.5.20	**P**

Note: All Antenna are tested, only the worst-case result have been reported.

Conclusion: Pass

Test graphs as below:

SISO-Ant4

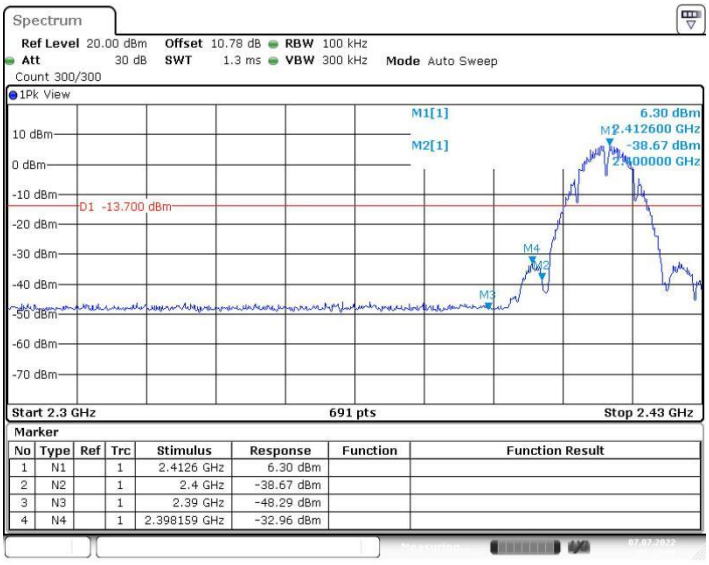

Fig.A.5.1 Band Edges (802.11b, Ch 1)

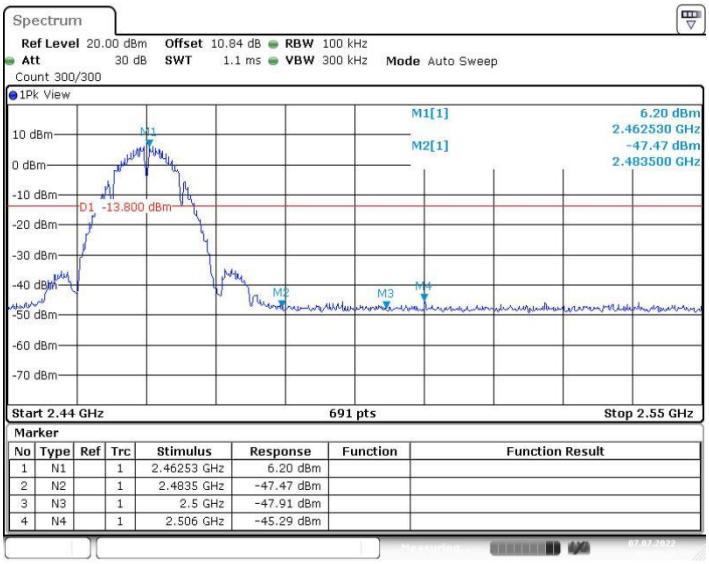

Fig.A.5.2 Band Edges (802.11b, Ch 11)

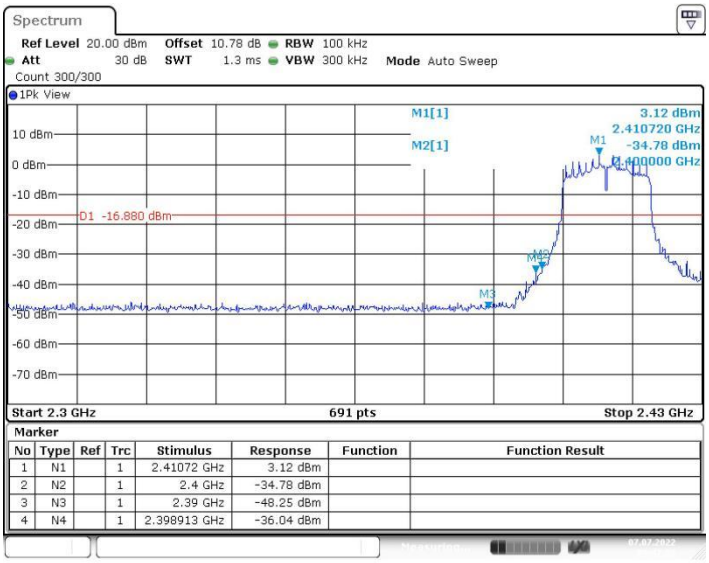

Fig.A.5.3 Band Edges (802.11g, Ch 1)

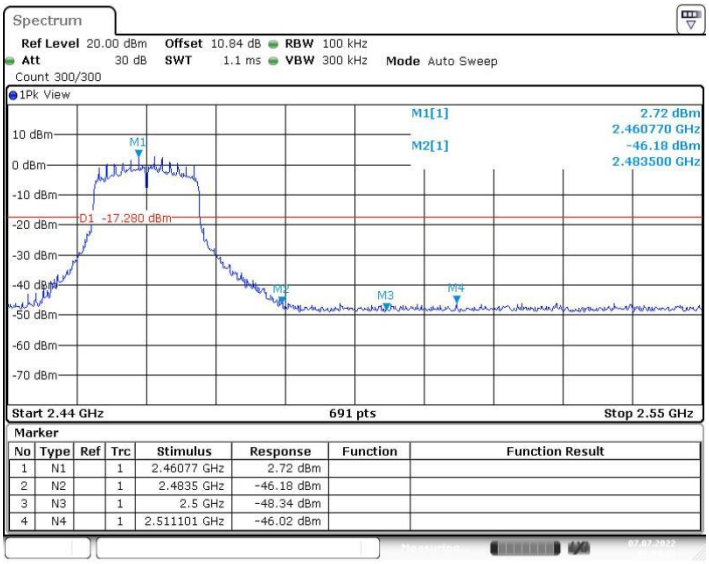

Fig.A.5.4 Band Edges (802.11g, Ch 11)

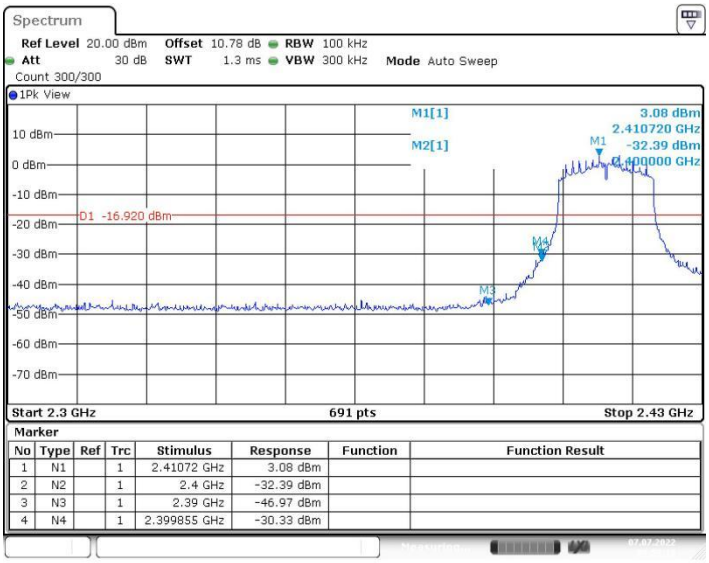

Fig.A.5.5 Band Edges (802.11n-HT20, Ch 1)

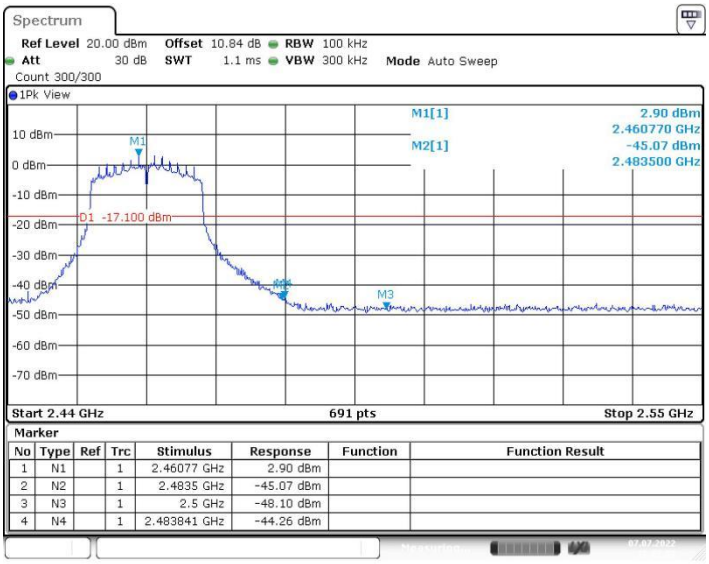

Fig.A.5.6 Band Edges (802.11n-HT20, Ch 11)

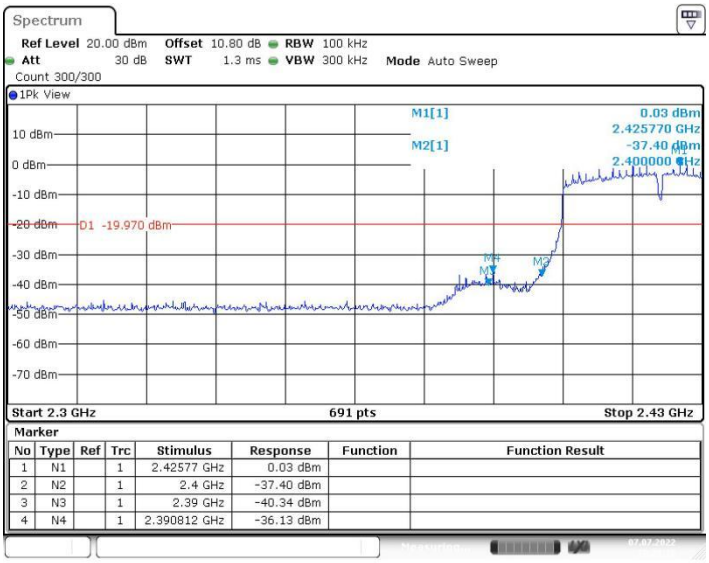

Fig.A.5.7 Band Edges (802.11n-HT40, Ch 3)