FCC PART 15E
TEST REPORT
No.24T04Z102397-014

for

TCL Communication Ltd.

GSM/UMTS/LTE/NR Mobile phone

T440W

FCC ID:2ACCJH185

with

Hardware Version: 04

Software Version: 7ASK

Issued Date: 2024-12-31

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.

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
24T04Z102397-014	Rev.0	1st edition	2024-12-09
24T04Z102397-014	Rev.1	Modified the antenna gain from average gain to peak gain in page 13. Add the plot of duty cycle on page 15. Add the Average power measurement procedures in page 23.	2024-12-31

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. TestingEnvironment

Normal Temperature: 15-35°C

Relative Humidity: 20-75%

1.4. Project date

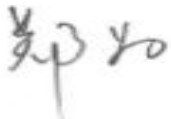
Testing Start Date: 2024-10-24

Testing End Date: 2024-12-09

1.5. Signature

Yao Xingyu

(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:	TCL Communication Ltd.
Address/Post:	5/F, Building 22E, 22 Science Park East Avenue, Hong Kong Science Park, Shatin, NT, Hong Kong
City:	Hong Kong
Postal Code:	/
Country:	China
Contact Person:	Ting Wang
Contact Email:	ting.wang.hz@tcl.com
Telephone:	+86 752 2639091
Fax:	0086-755-36612000-81722

2.2. Manufacturer Information

Company Name:	TCL Communication Ltd.
Address/Post:	5/F, Building 22E, 22 Science Park East Avenue, Hong Kong Science Park, Shatin, NT, Hong Kong
City:	Hong Kong
Postal Code:	/
Country:	China
Contact Person:	Ting Wang
Contact Email:	ting.wang.hz@tcl.com
Telephone:	+86 752 2639091
Fax:	0086-755-36612000-81722

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

3.1. About EUT

Description	GSM/UMTS/LTE/NR Mobile phone
Model name	T440W
FCC ID	2ACCJH185
WLAN Frequency Band	ISM Band: 5725MHz~5850MHz
Type of modulation	OFDM
Nominal Voltage	3.87V
Extreme High Voltage	4.4V
Extreme Low Voltage	3.6V

3.2. Internal Identification of EUT used during the test

EUT ID*	IMEI	HW Version	SW Version	Date of receipt
UT41a	016601000004058/ 016601000004066	04	7ASK	2024-10-22
UT39a	016601000003852/ 016601000003860	04	7ASK	2024-10-24

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

UT41a is used for Conduction test, UT39a is used for Radiation test.

3.3. Internal Identification of AE used during the test

AE ID*	Description	Note	Manufacturer
AE1-1	Battery	TLp029M9	FENGHUA
AE1-2	Battery	TLp029M7	VEKEN
AE2	Charger	/	/
AE3	USB cable	CDA0000302C1	Juwei
AE4	Headset	/	/

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

3.4. General Description

Equipment Under Test (EUT) is a model of GSM/UMTS/LTE/NR Mobile phone with integrated antenna. It consists of normal options: Battery and Charger.

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

Samples undergoing test were selected by the Client.

4. 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	FCC CFR 47, Part 15, Subpart C and E: 15.205 Restricted bands of operation; 15.209 Radiated emission limits, general requirements; 15.407 General technical requirements	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 Peak Output Power	15.407 (a)	/	P
Peak Power Spectral Density	15.407 (a)	/	P
Occupied 6dB Bandwidth	15.407 (e)	/	P
Band Edges Compliance - Conducted& Radiated	15.407 (b)	/	P
Transmitter Spurious Emission - Radiated	15.407, 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.
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	2025-08-12
2	Vector Signal Analyzer	FSW67	104051	Rohde & Schwarz	1 year	2025-04-01
3	Test Receiver	ESCI	100344	R&S	1 year	2025-04-01
4	LISN	ENV216	101200	R&S	1 year	2025-05-16
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	R&S	1 year	2025-06-06
2	Test Receiver	ESW44	103015	R&S	1 year	2025-01-18
3	EMI Antenna	HFH2-Z2	829324/007	R&S	1 year	2025-01-04
4	EMI Antenna	VULB 9163	01222	SCHWARZBECK	1 year	2025-09-11
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 Item	Test Software and Version	Software Vendor
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. 6dB 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

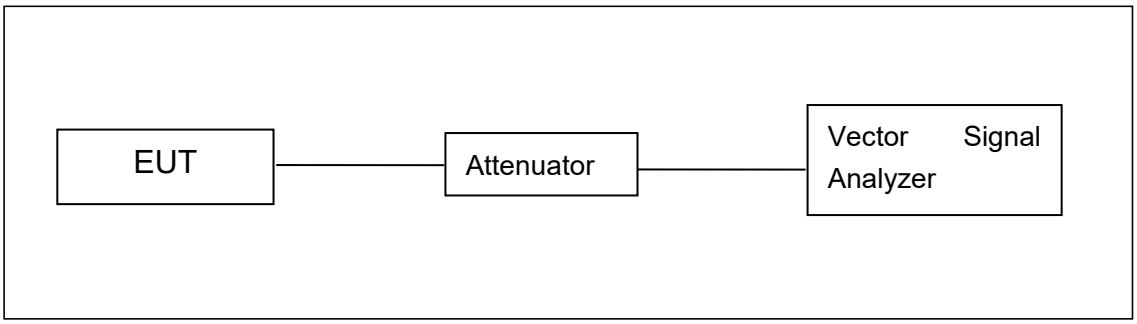
Measurement Uncertainty : 3.08dB,k=2

ANNEX A: MEASUREMENT RESULTS

A.1. Measurement Method

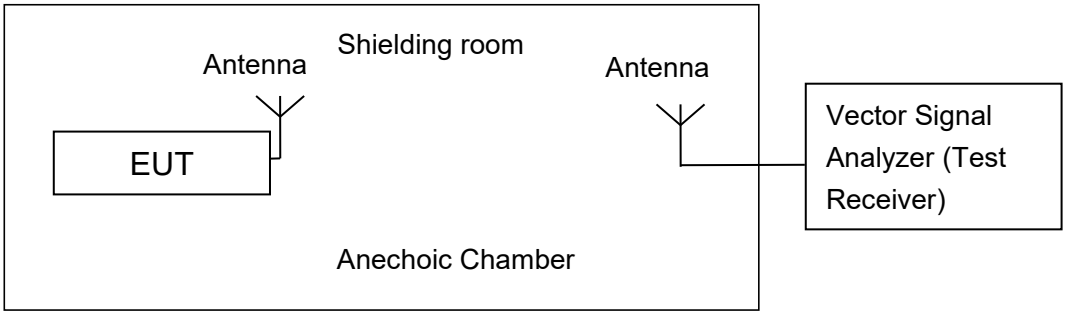
A.1.1. Conducted Measurements

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



A.1.2. Radiated Emission Measurements

In the case of radiated emission, the used settings are as follows,
Sweep frequency from 30 MHz to 1GHz, RBW = 100 kHz, VBW = 300 kHz;
Sweep frequency from 1 GHz to 26GHz, RBW = 1MHz, VBW = 3MHz;



The measurement is made according to ANSI C63.10.
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 Peak Output Power

Measurement Limit and Method:

Standard	Limit (dBm)
FCC CRF Part 15.407(a)	< 30

Set span to encompass the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal.
Set RBW = 1 MHz.
Set VBW ≥ 3 MHz.
Number of points in sweep ≥ 2 × span / RBW.
Sweep time = auto.
Detector = power averaging (rms)
Trace average at least 100 traces in power averaging (rms) mode; however, the number of traces to be averaged shall be increased above 100 as needed to ensure that the average accurately represents the true average over the on and off periods of the transmitter.
Compute power by integrating the spectrum across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal using the instrument's band power measurement function with band limits set equal to the EBW (or occupied bandwidth) band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at 1 MHz intervals extending across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal. Add 10 log (1/x), where x is the duty cycle

A.2.1 Antenna Gain

Antenna peak gain is -2.2dBi and the value is supplied by the applicant or manufacturer.

A.2.2. Maximum Average Output Power-Conducted

EUT ID: UT41a

Measurement Results:

802.11a mode

Mode	Data Rate (Mbps)	Test Result (dBm)		
		5745MHz (Ch149)	5785MHz (Ch157)	5825MHz (Ch165)
802.11a	6	19.10	18.91	18.78

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

802.11n-HT20 mode

Mode	Data Rate (Index)	Test Result (dBm)		
		5745MHz (Ch149)	5785MHz (Ch157)	5825MHz (Ch165)
802.11n (20MHz)	MCS0	19.03	18.76	18.68

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

this condition.

802.11ac-VHT20 mode

Mode	Data Rate (Index)	Test Result (dBm)		
		5745MHz (Ch149)	5785MHz (Ch157)	5825MHz (Ch165)
802.11ac (20MHz)	MCS0	19.05	18.81	18.70

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

802.11n-HT40 mode

Mode	Data Rate (Index)	Test Result (dBm)	
		5755MHz (Ch151)	5795MHz (Ch159)
802.11n (40MHz)	MCS0	17.17	16.74

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

802.11ac-VHT40 mode

Mode	Data Rate (Index)	Test Result (dBm)	
		5755MHz (Ch151)	5795MHz (Ch159)
802.11ac (40MHz)	MCS0	17.15	16.71

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

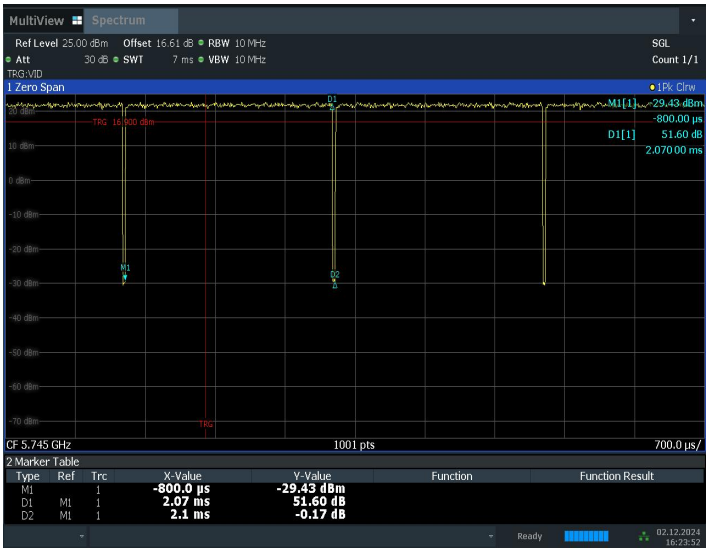
802.11ac-VHT80 mode

Mode	Data Rate (Index)	Test Result (dBm)
		5775MHz (Ch155)
802.11ac (80MHz)	MCS0	16.02

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

Maximum output Power：11a CH149

The duty cycle of all mode are 98%



Duty cycle

Conclusion: PASS

A.3. Peak Power Spectral Density

Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.407(a)	< 30 dBm/500 kHz

Set span to encompass the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal.
Set RBW = 500 kHz.
Set VBW ≥ 3 MHz.
Number of points in sweep ≥ 2 × span / RBW.
Sweep time = auto.
Detector = power averaging (rms)
Trace average at least 100 traces in power averaging (rms) mode; however, the number of traces to be averaged shall be increased above 100 as needed to ensure that the average accurately represents the true average over the on and off periods of the transmitter. Use the peak search function on the instrument to find the peak of the spectrum and record its value. Add 10 log (1/x), where x is the duty cycle.

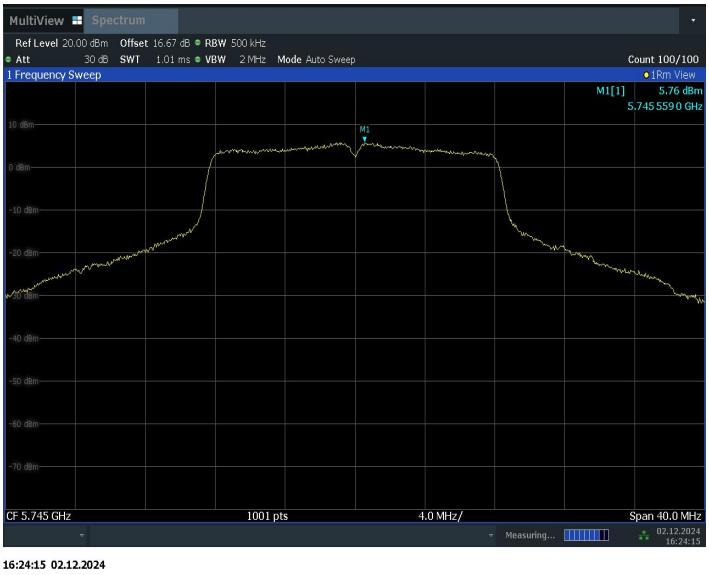
Measurement Uncertainty:

Measurement Uncertainty	0.75dB

EUT ID: UT41a

Measurement Results:

TestMode	Frequency[MHz]	Result [dBm/MHz]	Limit[dBm/MHz]	Verdict
11A	5745	5.76	≤30.00	PASS
	5785	5.70	≤30.00	PASS
	5825	5.71	≤30.00	PASS
11N40SISO	5755	0.45	≤30.00	PASS
	5795	0.20	≤30.00	PASS
11AC20SISO	5745	5.50	≤30.00	PASS
	5785	5.34	≤30.00	PASS
	5825	5.30	≤30.00	PASS
11AC80SISO	5775	-3.99	≤30.00	PASS



Peak Power Spectral Density:11a CH149

Conclusion: PASS

A.4. 6dB Emission Bandwidth

Measurement Limit:

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

Set RBW = 100 kHz.

Set the video bandwidth (VBW) ≥ 3 × RBW.

Detector = Peak.

Trace mode = max hold.

Sweep = auto couple.

Allow the trace to stabilize.

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 Uncertainty:

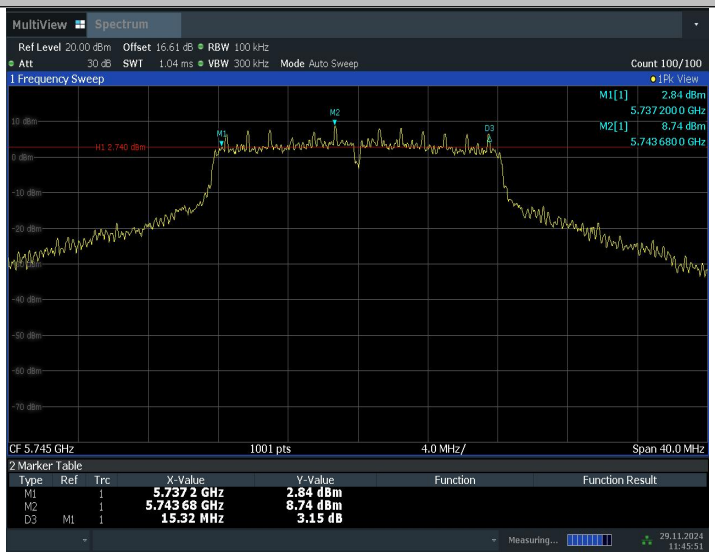
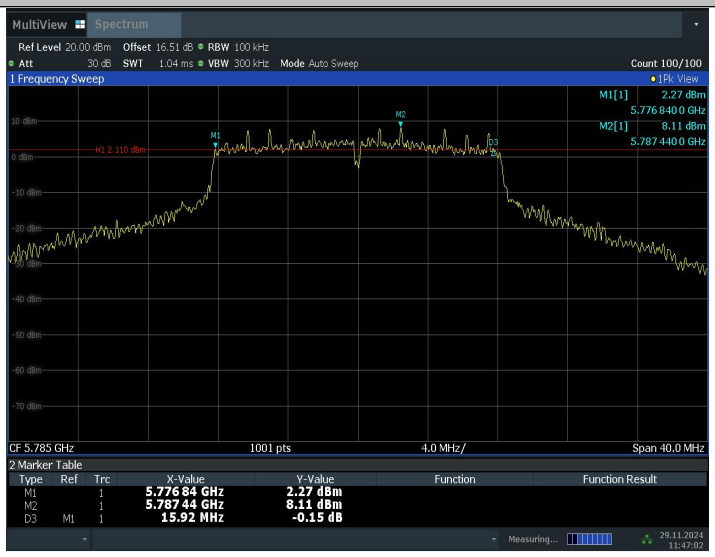
Measurement Uncertainty	60.80Hz

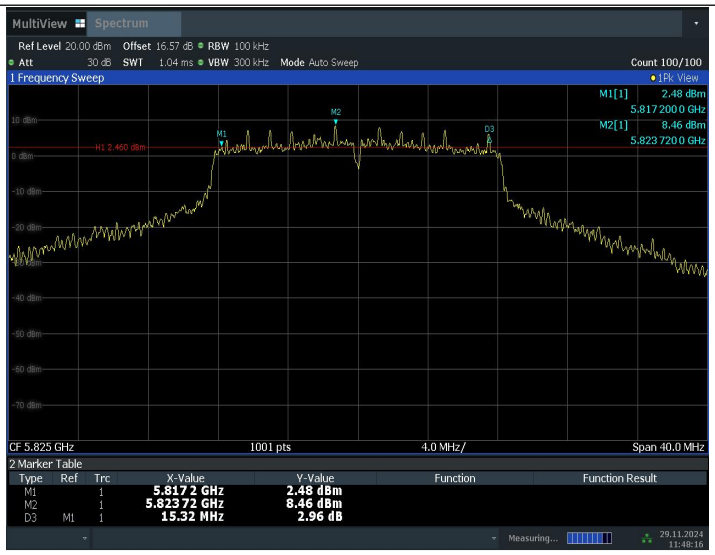
EUT ID: UT41a

Measurement Result:

TestMode	Frequency[MHz]	6db EBW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11A	5745	15.32	5737.20	5752.52	0.5	PASS
	5785	15.92	5776.84	5792.76	0.5	PASS
	5825	15.32	5817.20	5832.52	0.5	PASS
11N40SISO	5755	35.52	5737.00	5772.52	0.5	PASS
	5795	35.68	5776.84	5812.52	0.5	PASS
11AC20SISO	5745	16.52	5736.56	5753.08	0.5	PASS
	5785	15.12	5777.40	5792.52	0.5	PASS
	5825	15.96	5816.56	5832.52	0.5	PASS
11AC80SISO	5775	75.04	5737.40	5812.44	0.5	PASS

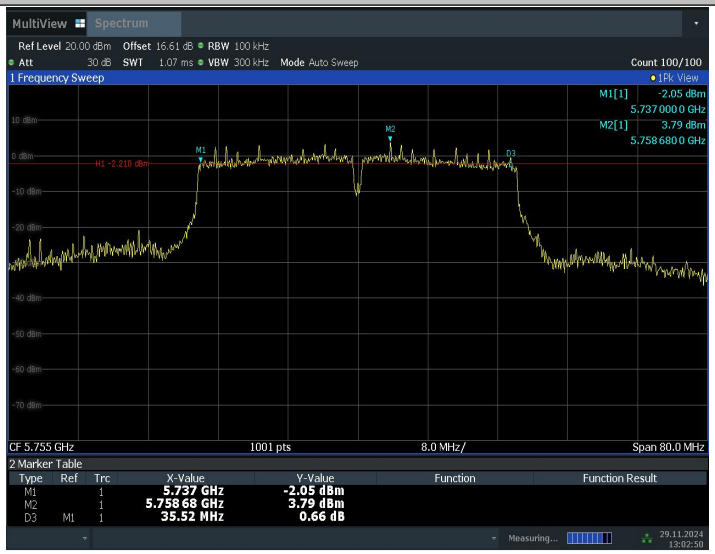
Test graphs as below:

11A_5745
 11:45:52 29.11.2024
11A_5785
 11:47:02 29.11.2024
11A_5825



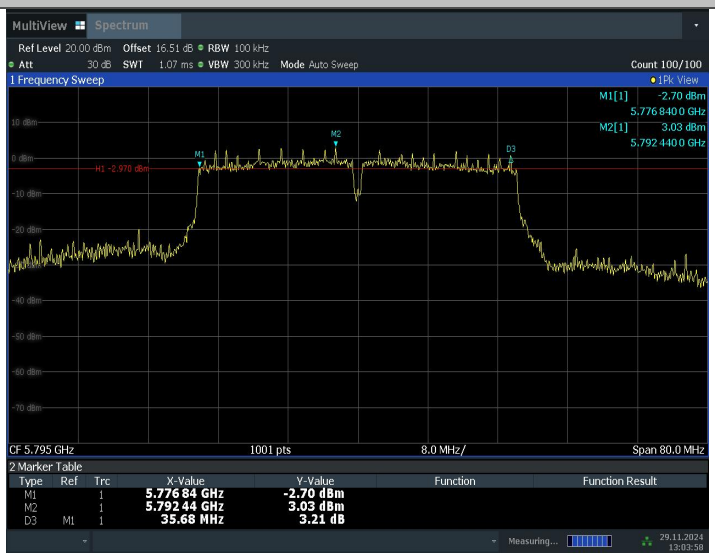
11:48:16 29.11.2024

11N40SISO_5755

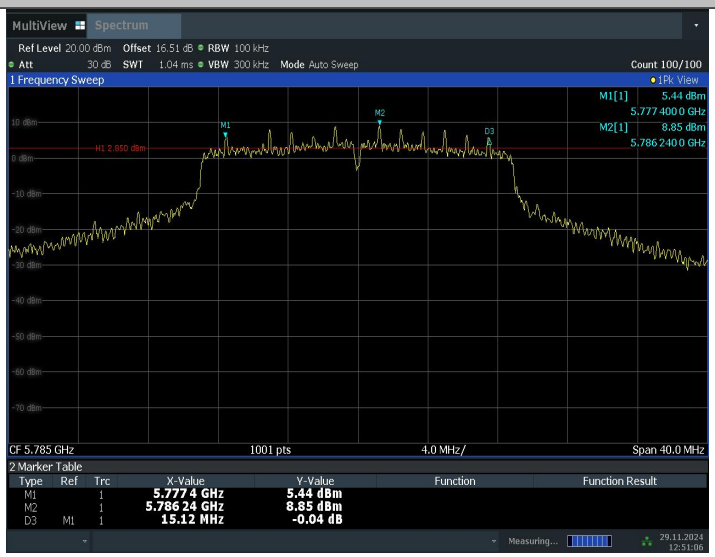


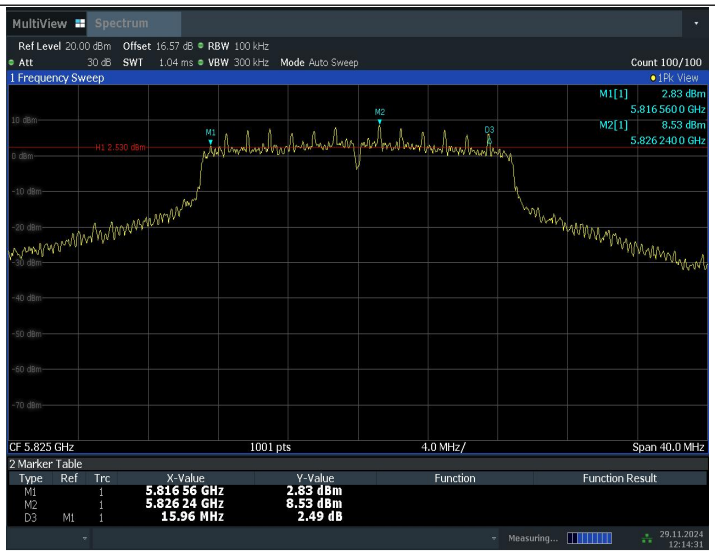
13:02:50 29.11.2024

11N40SISO_5795



13:03:58 29.11.2024

11AC20SISO_5745
 12:49:40 29.11.2024
11AC20SISO_5785
 12:51:06 29.11.2024
11AC20SISO_5825



12:14:31 29.11.2024

11AC80SISO_5775

15:28:40 29.11.2024

Conclusion: PASS

A.5. Transmitter Spurious Emission

A.5.1 Transmitter Spurious Emission - Radiated

Measurement Limit:

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

The measurement is made according to ANSI C63.10 .

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

Limit in restricted band:

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

Average power measurement procedures

According to clause 6.6 and 12.7.8 in ANSI C63.10-2013 and II.G.5, II.G.6 in KDB 789033.

The procedure for method AD is as follows:

a) RBW = 1 MHz.

b) VBW ≥ [3 × RBW].

c) Detector = RMS (power averaging),

d) Averaging type = power (i.e., rms)

e) Sweep time = auto.

f) Perform a trace average of at least 100 traces if the transmission is continuous. If the transmission is not continuous, then the number of traces shall be increased by a factor of 1 / D, where D is the duty cycle. For example, with 50% duty cycle, at least 200 traces shall be averaged. (If a specific emission is demonstrated to be continuous—i.e., 100% duty cycle—then rather than turning ON and OFF with the transmit cycle, at least 100 traces shall be averaged.)

g) If tests are performed with the EUT transmitting at a duty cycle less than 98%, then a correction factor shall be added to the measurement results prior to comparing with the emission limit, to compute the emission level that would have been measured had the test been performed at 100% duty cycle. The correction factor is computed as follows:

If power averaging (rms) mode was used in the preceding step e), then the correction factor is [10 log (1 / D)], where D is the duty cycle. For example, if the transmit duty cycle was 50%, then 3 dB shall be added to the measured emission levels.

The duty cycle is 98%.

Measurement Results:

Note:

A "reference path loss" is established and the A_{Rpl} is the attenuation of “reference path loss”, and

including the gain of receive antenna, the gain of the preamplifier, the cable loss.
P_{Mea} is the field strength recorded from the instrument.

Conclusion: PASS

Average Results：

802.11a

Channel 149

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)
17921.900	45.21	-25.55	42.30	28.46	54.00	8.79	V
17932.300	45.03	-25.55	42.30	28.28	54.00	8.97	V
7660.000	42.51	-34.29	37.30	39.50	54.00	11.49	V
7659.400	39.55	-34.29	37.30	36.54	54.00	14.45	H
14492.600	39.02	-28.78	40.00	27.80	54.00	14.98	H
14482.200	38.87	-28.78	40.00	27.65	54.00	15.13	V

Channel 165

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)
17918.000	45.12	-25.55	42.30	28.37	54.00	8.88	H
17912.000	45.03	-25.55	42.30	28.28	54.00	8.97	V
14498.100	38.97	-28.78	40.00	27.75	54.00	15.03	H
15648.800	38.88	-27.97	38.70	28.15	54.00	15.12	H
11837.800	36.80	-31.75	38.90	29.65	54.00	17.20	H
11857.000	36.76	-31.75	38.90	29.61	54.00	17.24	H

802.11n-HT20

Channel 149

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)
17927.400	45.08	-25.55	42.30	28.33	54.00	8.92	V
17900.500	45.01	-25.55	42.30	28.26	54.00	8.99	V
7659.400	42.08	-34.29	37.30	39.07	54.00	11.92	V
7660.000	41.86	-34.29	37.30	38.85	54.00	12.14	V
14498.100	39.25	-28.78	40.00	28.03	54.00	14.75	H
15579.500	38.99	-27.41	38.60	27.80	54.00	15.01	H

Channel 165

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	45.22	-25.55	42.30	28.47	54.00	8.78	H
17909.800	45.09	-25.55	42.30	28.34	54.00	8.91	V
14481.100	39.30	-28.78	40.00	28.08	54.00	14.70	H
13286.500	39.00	-29.75	40.30	28.45	54.00	15.00	V
11797.600	37.09	-31.84	38.90	30.03	54.00	16.91	H
11836.700	37.00	-31.75	38.90	29.85	54.00	17.00	H

802.11n-HT40

Channel 151

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)
17912.500	44.95	-25.55	42.30	28.20	54.00	9.05	H
17919.200	44.87	-25.55	42.30	28.12	54.00	9.13	V
7673.200	42.67	-34.29	37.30	39.66	54.00	11.33	V
7672.600	41.86	-34.29	37.30	38.85	54.00	12.14	V
15675.700	39.22	-27.97	38.70	28.49	54.00	14.78	H
13289.800	39.02	-29.75	40.30	28.47	54.00	14.98	H

Channel 159

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	45.31	-25.55	42.30	28.56	54.00	8.69	V
17913.700	45.21	-25.55	42.30	28.46	54.00	8.79	V
7726.600	43.31	-34.33	37.10	40.54	54.00	10.69	V
7726.000	41.25	-34.33	37.10	38.48	54.00	12.75	V
14499.800	39.20	-28.78	40.00	27.98	54.00	14.80	H
15669.100	39.06	-27.97	38.70	28.33	54.00	14.94	V

802.11ac-HT20

Channel 149

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)
17909.200	45.07	-25.55	42.30	28.32	54.00	8.93	V
17922.500	45.05	-25.55	42.30	28.30	54.00	8.95	H
7659.400	41.73	-34.29	37.30	38.72	54.00	12.27	V
7660.000	41.41	-34.29	37.30	38.40	54.00	12.59	V
14497.000	39.16	-28.78	40.00	27.94	54.00	14.84	H
14495.400	38.99	-28.78	40.00	27.77	54.00	15.01	V

Channel 165

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	45.34	-25.55	42.30	28.59	54.00	8.66	V
17910.300	45.02	-25.55	42.30	28.27	54.00	8.98	H
14480.000	39.06	-28.78	40.00	27.84	54.00	14.94	V
13277.700	38.97	-29.75	40.30	28.42	54.00	15.03	V
11861.500	36.93	-31.75	38.90	29.78	54.00	17.07	H
11857.000	36.84	-31.75	38.90	29.69	54.00	17.16	H

802.11ac-HT40

Channel 151

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	45.32	-25.55	42.30	28.57	54.00	8.68	V
17928.500	45.22	-25.55	42.30	28.47	54.00	8.78	H
7673.200	42.59	-34.29	37.30	39.58	54.00	11.41	V
7672.600	40.49	-34.29	37.30	37.48	54.00	13.51	V
16188.300	39.22	-27.86	39.90	27.18	54.00	14.78	V
15680.100	39.20	-27.97	38.70	28.47	54.00	14.80	H

Channel 159

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	45.56	-25.55	42.30	28.81	54.00	8.44	H
17918.600	45.47	-25.55	42.30	28.72	54.00	8.53	H
7726.600	42.97	-34.33	37.10	40.20	54.00	11.03	V
7726.000	41.75	-34.33	37.10	38.98	54.00	12.25	V
16190.000	39.61	-27.86	39.90	27.57	54.00	14.39	V
15675.100	39.14	-27.97	38.70	28.41	54.00	14.86	H

802.11ac-HT80

Channel 155

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)
17915.300	45.28	-25.55	42.30	28.53	54.00	8.72	V
17914.800	45.00	-25.55	42.30	28.25	54.00	9.00	H
7699.600	41.65	-34.29	37.10	38.84	54.00	12.35	V
7700.100	39.99	-34.29	37.10	37.18	54.00	14.01	V
16188.300	39.33	-27.86	39.90	27.29	54.00	14.67	H
16192.700	39.33	-27.86	39.90	27.29	54.00	14.67	H

Peak Results：

802.11a

Channel 149

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)
17928.000	56.39	-25.55	42.30	39.64	74.00	17.61	H
17930.700	56.31	-25.55	42.30	39.56	74.00	17.69	H
16984.200	51.96	-27.30	41.20	38.06	68.30	16.34	V
16957.200	51.90	-27.30	41.20	38.00	68.30	16.40	V
11766.300	48.17	-31.84	38.90	41.11	74.00	25.83	H
11945.000	48.10	-31.07	38.80	40.37	74.00	25.90	V

Channel 165

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)
17974.200	56.05	-25.55	42.30	39.30	74.00	17.95	V
17943.300	56.01	-25.55	42.30	39.26	74.00	17.99	V
16988.500	52.30	-27.30	41.20	38.40	68.30	16.00	V
13724.300	52.04	-29.41	40.70	40.75	68.30	16.26	V
11911.000	48.23	-31.75	38.80	41.18	74.00	25.77	V
11857.600	48.19	-31.75	38.90	41.04	74.00	25.81	H

802.11n-HT20

Channel 149

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)
17903.800	56.13	-25.55	42.30	39.38	74.00	17.87	V
17926.300	56.06	-25.55	42.30	39.31	74.00	17.94	H
16704.200	52.41	-27.66	40.90	39.17	68.30	15.89	H
16687.200	52.31	-27.66	40.90	39.07	68.30	15.99	H
10870.400	48.83	-32.55	38.80	42.58	74.00	25.17	V
11883.500	48.34	-31.75	38.80	41.29	74.00	25.66	H

Channel 165

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)
17947.800	55.79	-25.55	42.30	39.04	74.00	18.21	V
17842.200	55.75	-25.55	42.30	39.00	74.00	18.25	H
16973.700	52.66	-27.30	41.20	38.76	68.30	15.64	V
16972.600	52.56	-27.30	41.20	38.66	68.30	15.74	V
11966.000	48.88	-31.07	38.80	41.15	74.00	25.12	H
11855.400	48.72	-31.75	38.90	41.57	74.00	25.28	V

802.11n-HT40

Channel 151

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)
17940.000	55.90	-25.55	42.30	39.15	74.00	18.10	V
17908.200	55.86	-25.55	42.30	39.11	74.00	18.14	V
16663.500	52.10	-27.66	40.90	38.86	68.30	16.20	H
16983.600	52.09	-27.30	41.20	38.19	68.30	16.21	V
11768.000	48.08	-31.84	38.90	41.02	74.00	25.92	H
11796.500	47.95	-31.84	38.90	40.89	74.00	26.05	H

Channel 159

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)
17936.800	55.64	-25.55	42.30	38.89	74.00	18.36	V
17917.500	55.61	-25.55	42.30	38.86	74.00	18.39	H
16784.500	52.68	-27.70	40.90	39.48	68.30	15.62	H
16788.300	52.54	-27.70	40.90	39.34	68.30	15.76	V
11849.900	48.24	-31.75	38.90	41.09	74.00	25.76	H
11818.500	48.06	-31.84	38.90	41.00	74.00	25.94	H

802.11ac-HT20

Channel 149

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)
17940.600	56.12	-25.55	42.30	39.37	74.00	17.88	V
17935.700	56.06	-25.55	42.30	39.31	74.00	17.94	H
16841.200	52.29	-27.70	41.10	38.89	68.30	16.01	V
16494.100	52.28	-27.85	40.50	39.63	68.30	16.02	H
11848.200	48.27	-31.75	38.90	41.12	74.00	25.73	H
11831.800	48.21	-31.75	38.90	41.06	74.00	25.79	H

Channel 165

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)
17925.800	56.12	-25.55	42.30	39.37	74.00	17.88	V
17881.200	56.10	-25.55	42.30	39.35	74.00	17.90	V
16638.200	52.72	-27.66	40.90	39.48	68.30	15.58	V
16974.200	52.57	-27.30	41.20	38.67	68.30	15.73	H
10542.000	48.10	-32.74	38.70	42.14	68.30	20.20	V
11739.400	48.05	-31.84	38.90	40.99	74.00	25.95	H

802.11ac-HT40

Channel 151

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)
17933.500	56.00	-25.55	42.30	39.25	74.00	18.00	H
17920.800	55.98	-25.55	42.30	39.23	74.00	18.02	V
16569.500	52.59	-27.85	40.70	39.74	68.30	15.71	H
16575.500	52.26	-27.85	40.70	39.41	68.30	16.04	V
11369.200	48.90	-32.12	38.90	42.12	74.00	25.10	V
11909.900	48.26	-31.75	38.80	41.21	74.00	25.74	V

Channel 159

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)
17913.100	55.95	-25.55	42.30	39.20	74.00	18.05	H
17924.100	55.67	-25.55	42.30	38.92	74.00	18.33	H
16980.300	52.85	-27.30	41.20	38.95	68.30	15.45	V
16675.600	52.53	-27.66	40.90	39.29	68.30	15.77	H
11786.100	48.81	-31.84	38.90	41.75	74.00	25.19	H
11948.900	48.74	-31.07	38.80	41.01	74.00	25.26	H

802.11ac-HT80

Channel 155

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)
17907.600	56.07	-25.55	42.30	39.32	74.00	17.93	V
17954.900	56.04	-25.55	42.30	39.29	74.00	17.96	V
16984.700	53.55	-27.30	41.20	39.65	68.30	14.75	V
16977.000	52.97	-27.30	41.20	39.07	68.30	15.33	V
11841.600	48.49	-31.75	38.90	41.34	74.00	25.51	V
11428.600	48.36	-32.12	38.90	41.58	74.00	25.64	V

A.6. Band Edges Compliance

A6.1 Band Edges - Radiated

Measurement Limit:

Standard	Limit (dBm/MHz)	
FCC 47 CFR Part 15.407	at the band edge	27
	at 5 MHz above or below the band edge	15.6
	at 25 MHz above or below the band edge	10
	at 75 MHz or more above or below the band edge	-27
	Note：increasing linearly from point to point.	

The measurement is made according to KDB 789033 D02
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)).

Measurement Result:

Mode	Channel	Test Results	Conclusion
802.11a	5745 MHz	Fig.1	P
	5825 MHz	Fig.2	P
802.11n HT20	5745 MHz	Fig.3	P
	5825 MHz	Fig.4	P
802.11n HT40	5755 MHz	Fig.5	P
	5795 MHz	Fig.6	P
802.11ac HT20	5745 MHz	Fig.7	P
	5825 MHz	Fig.8	P
802.11ac HT40	5755 MHz	Fig.9	P
	5795 MHz	Fig.10	P
802.11ac HT80	5775 MHz	Fig.11	P
		Fig.12	P

Conclusion: PASS
Test graphs as below:

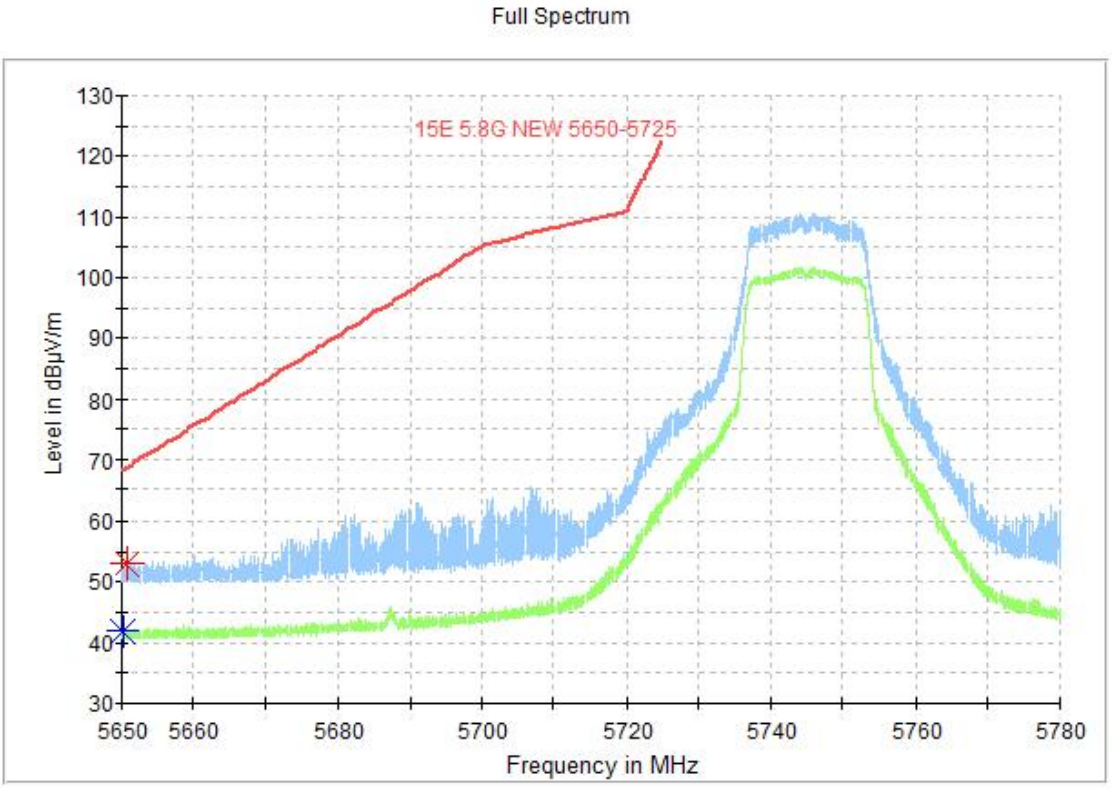


Fig. 1 Band Edges (802.11a Ch149,5745MHz)

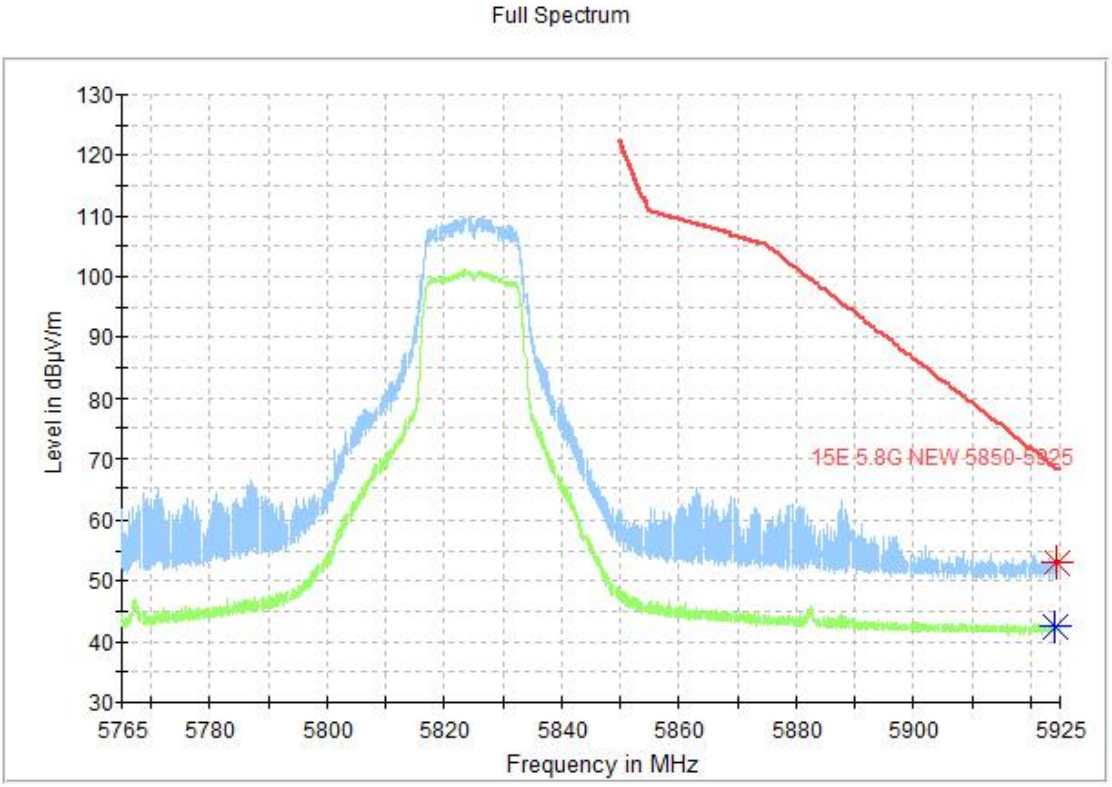


Fig. 2 Band Edges (802.11a Ch165, 5825MHz)

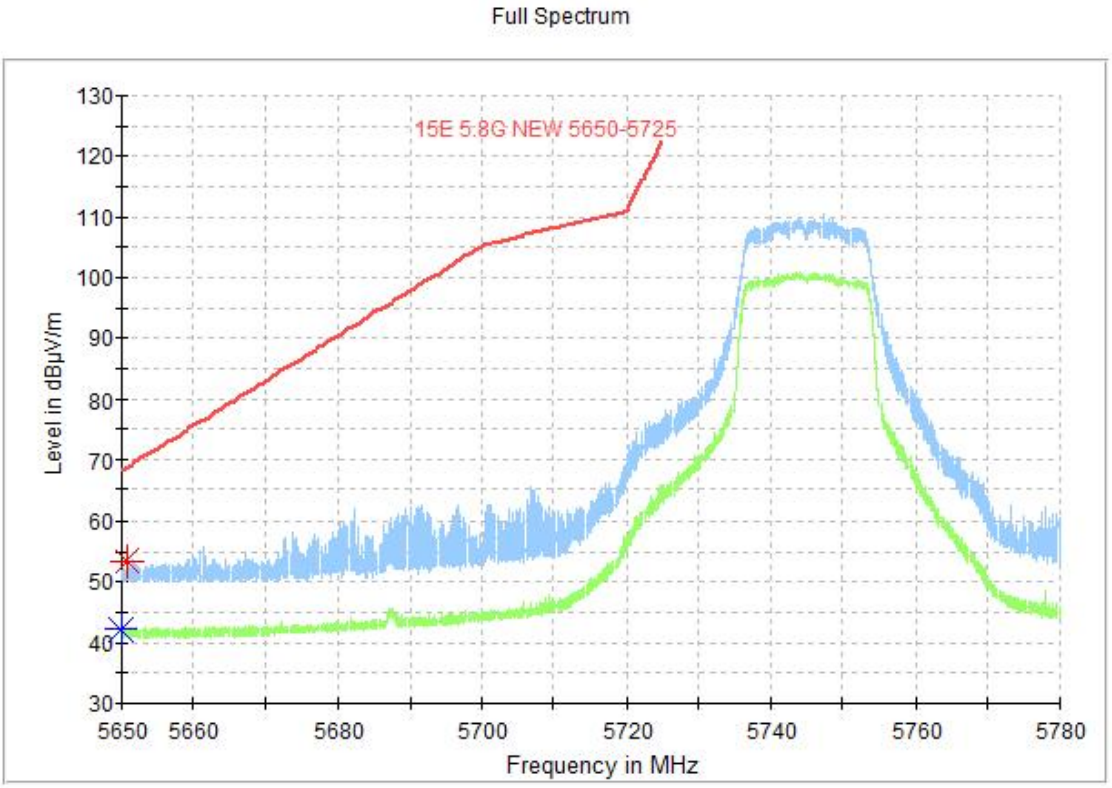


Fig. 3 Band Edges (802.11n-HT20 Ch149, 5745MHz)

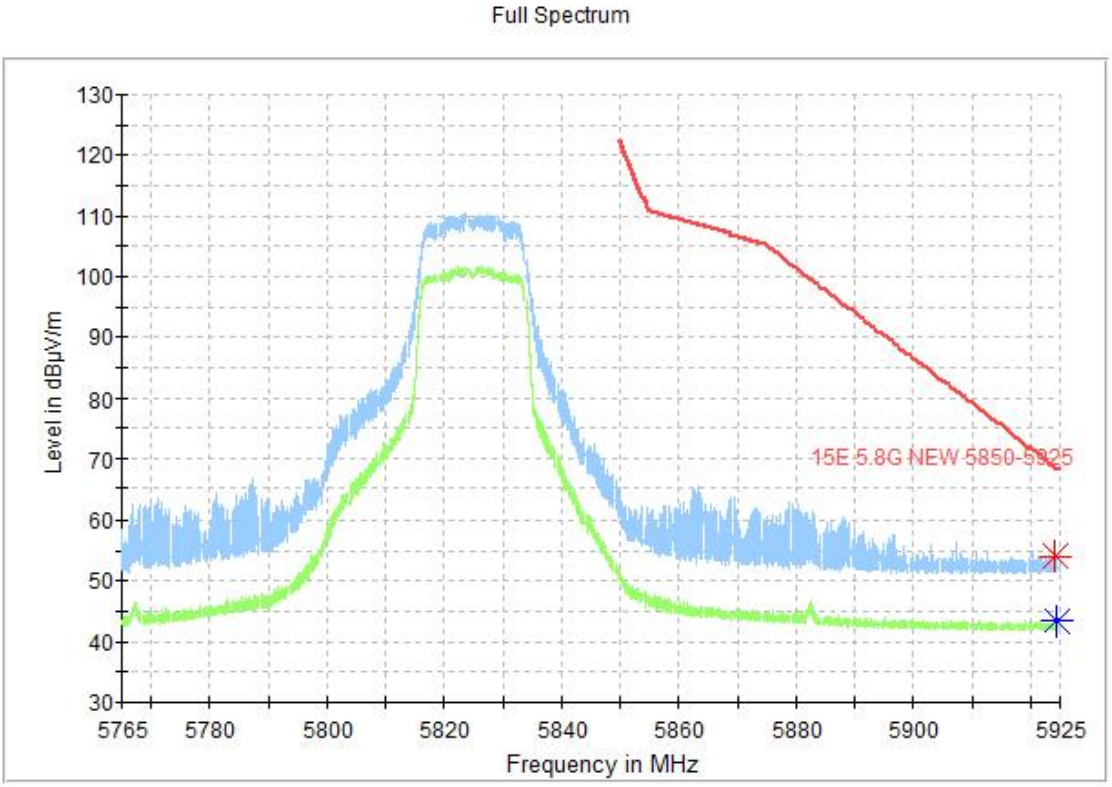


Fig. 4 Band Edges (802.11n-HT20 Ch165, 5825MHz)

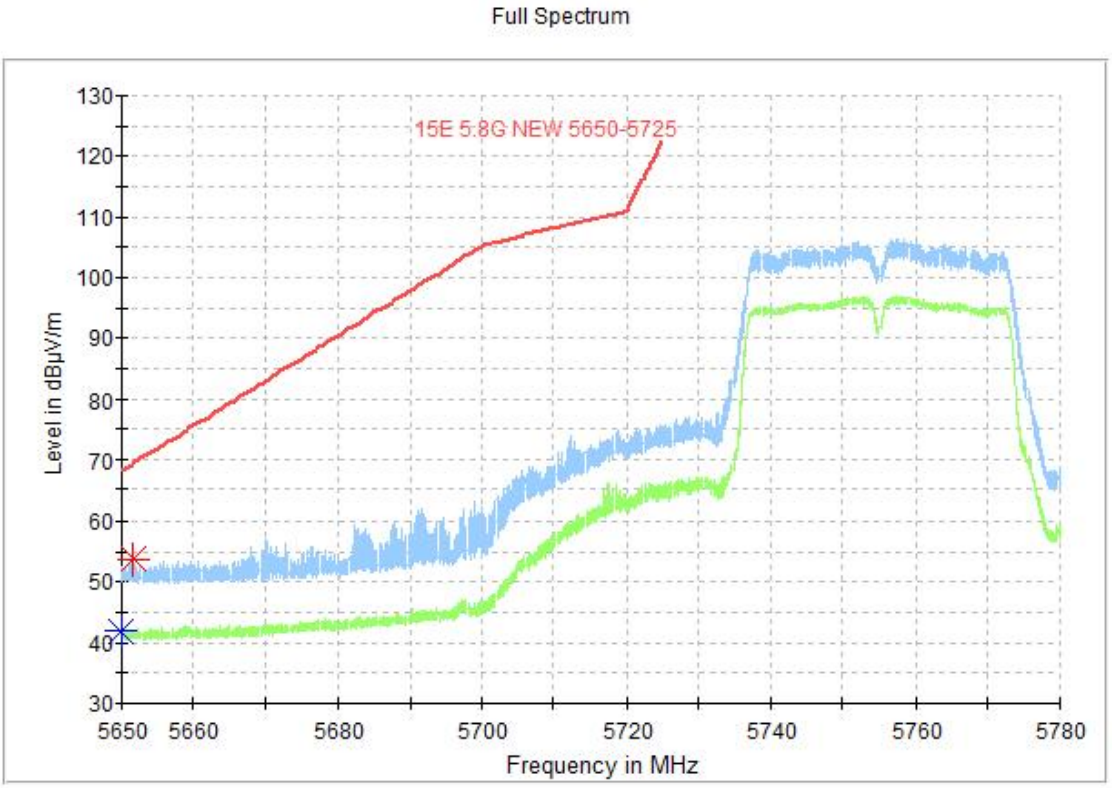


Fig. 5 Band Edges (802.11n-HT40 Ch151, 5755MHz)

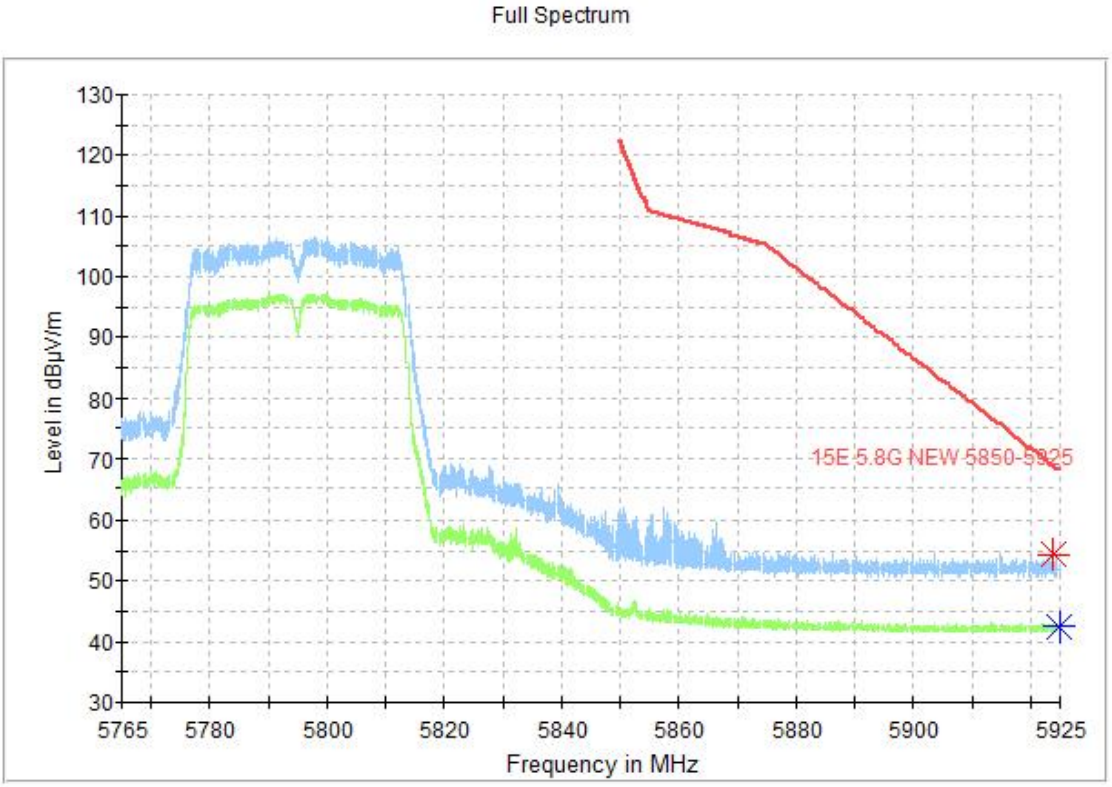


Fig. 6 Band Edges (802.11n-HT40 Ch159, 5795MHz)

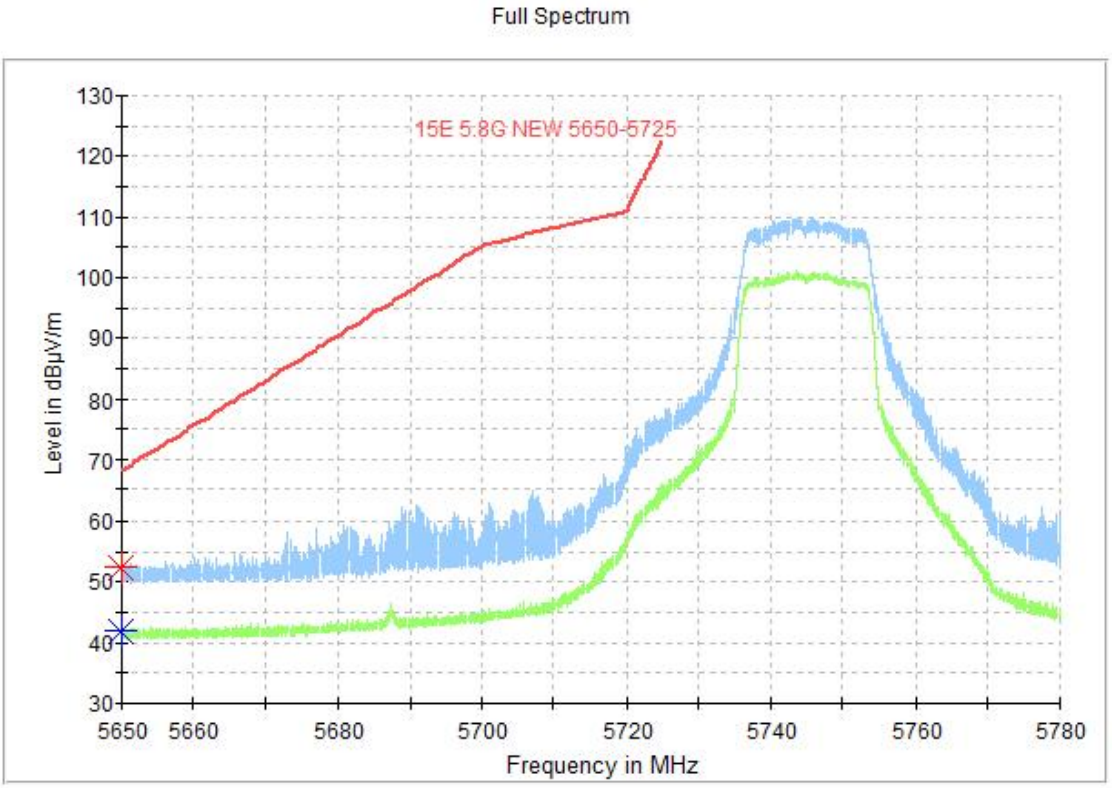


Fig. 7 Band Edges (802.11ac-HT20 Ch149, 5745MHz)

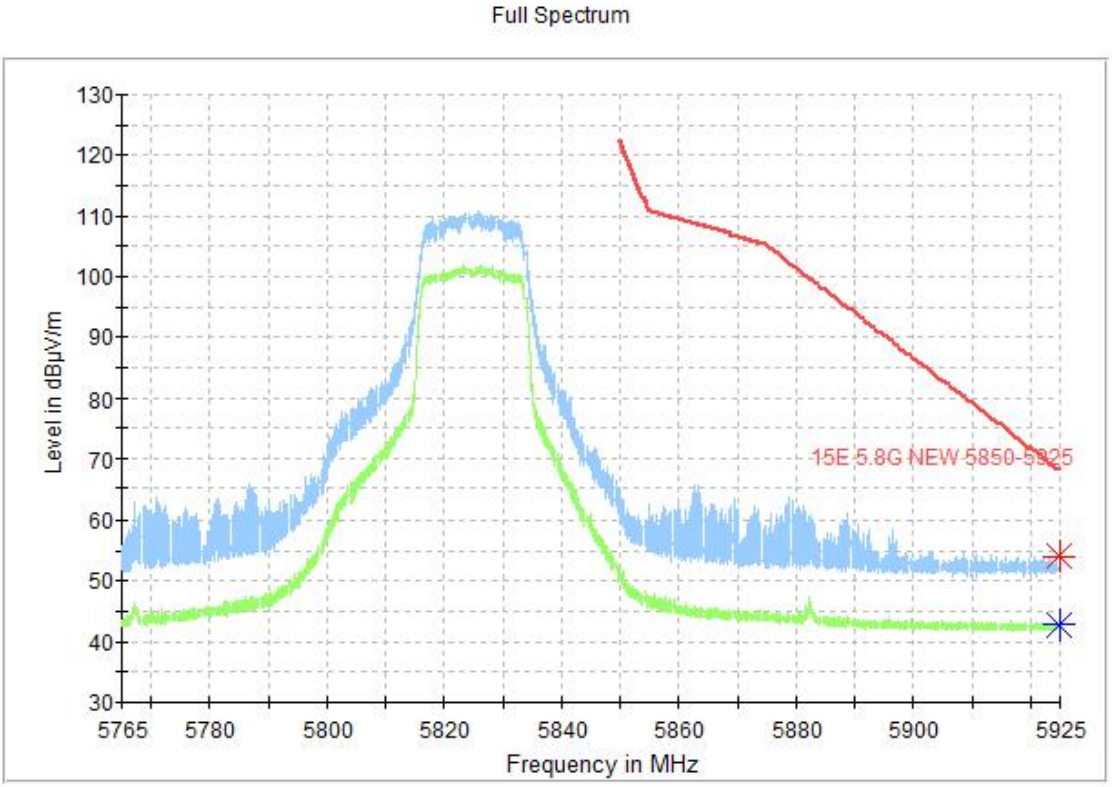


Fig. 8 Band Edges (802.11ac-HT20 Ch165, 5825MHz)

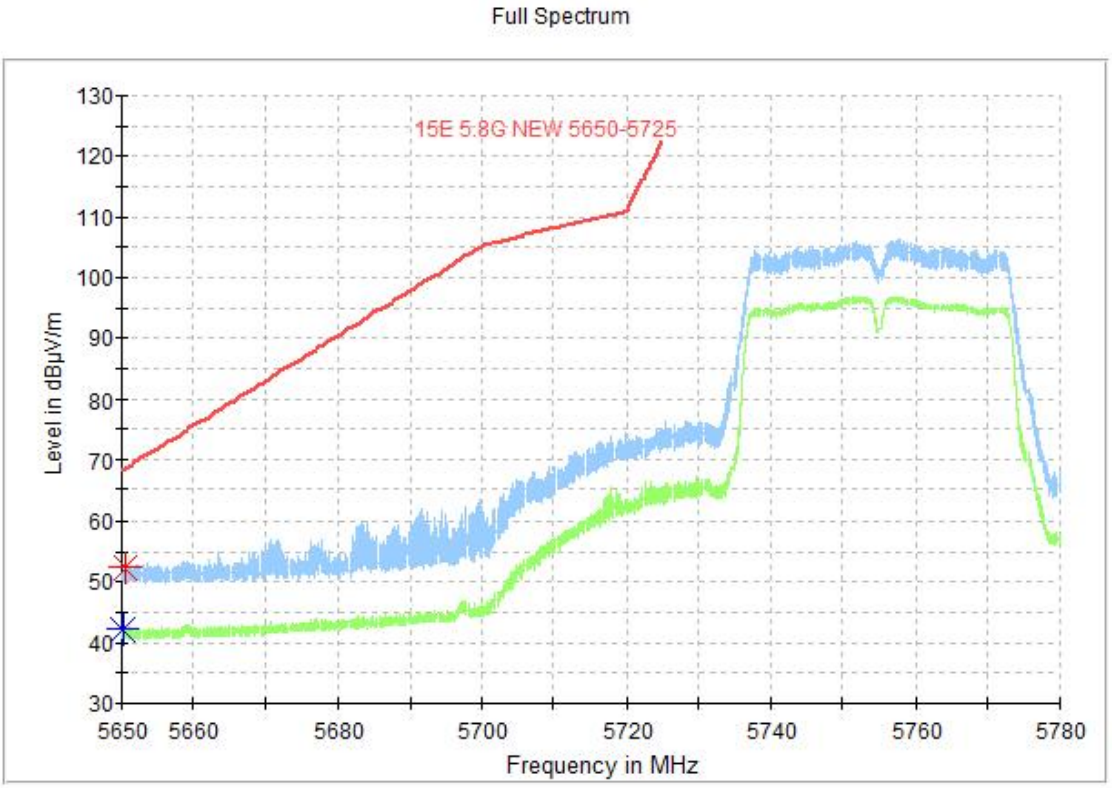


Fig. 9 Band Edges (802.11ac-HT40 Ch151, 5755MHz)

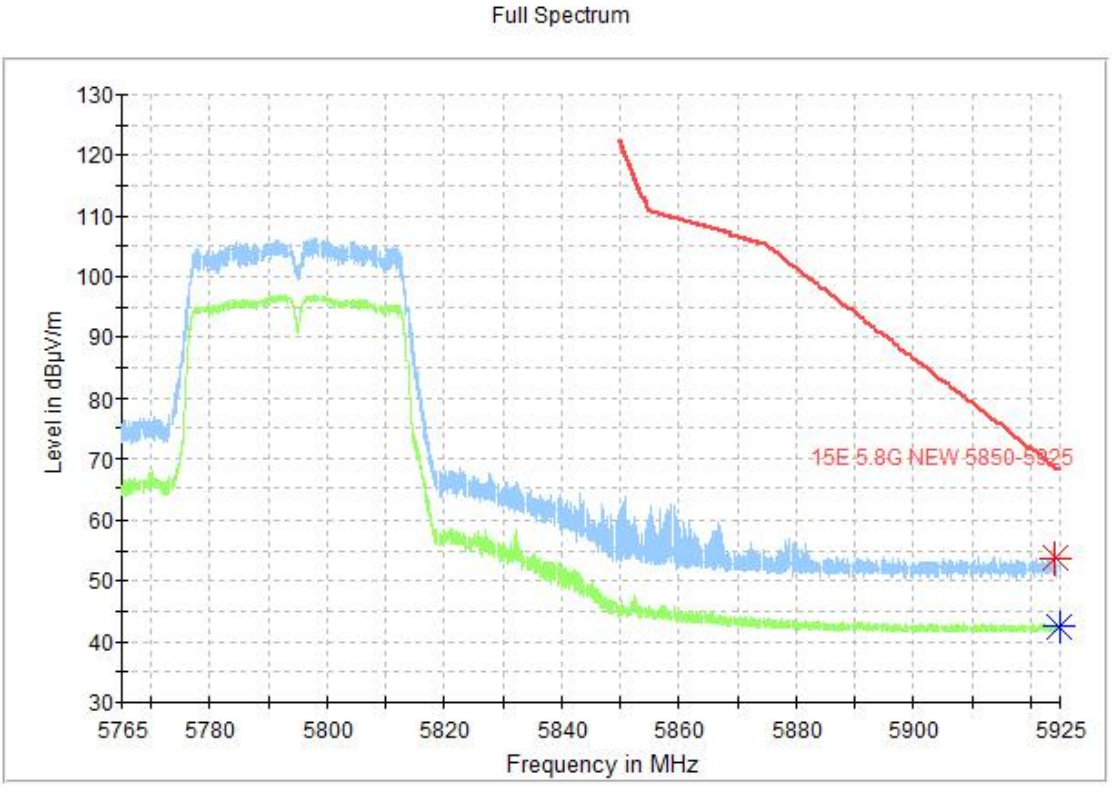


Fig. 10 Band Edges (802.11ac-HT40 Ch159, 5795MHz)

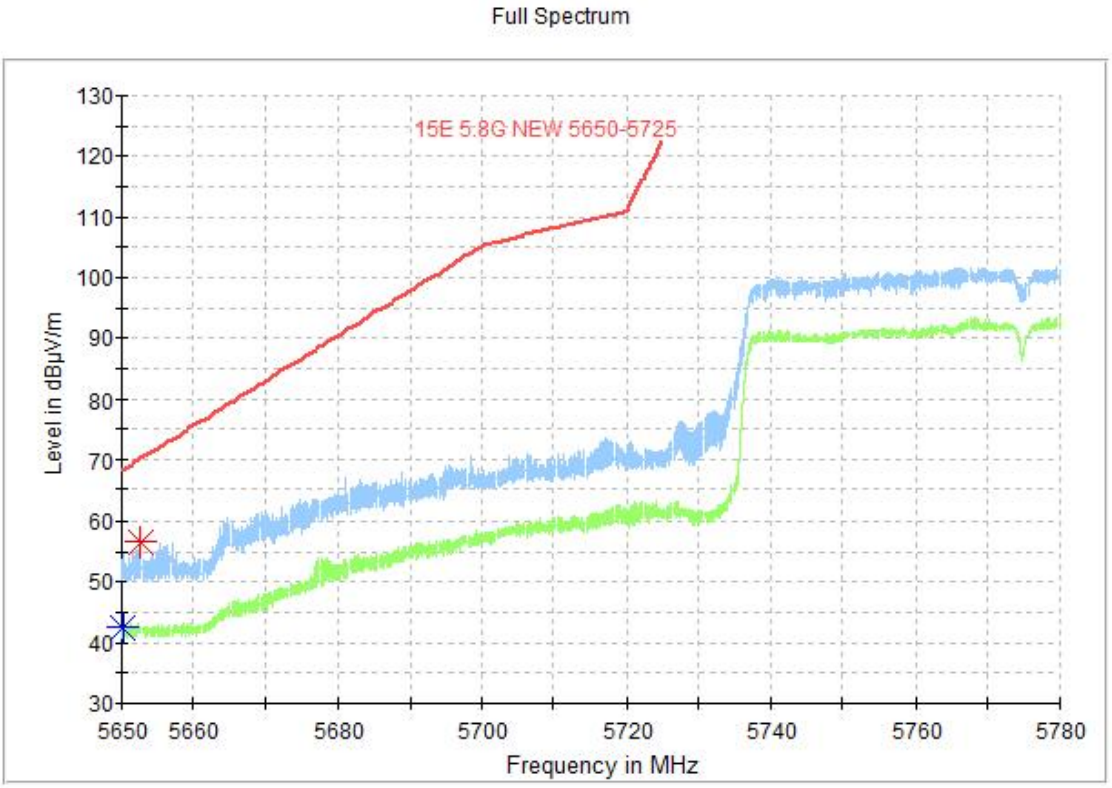


Fig. 11 Band Edges (802.11ac-HT80 Ch155, 5775MHz)

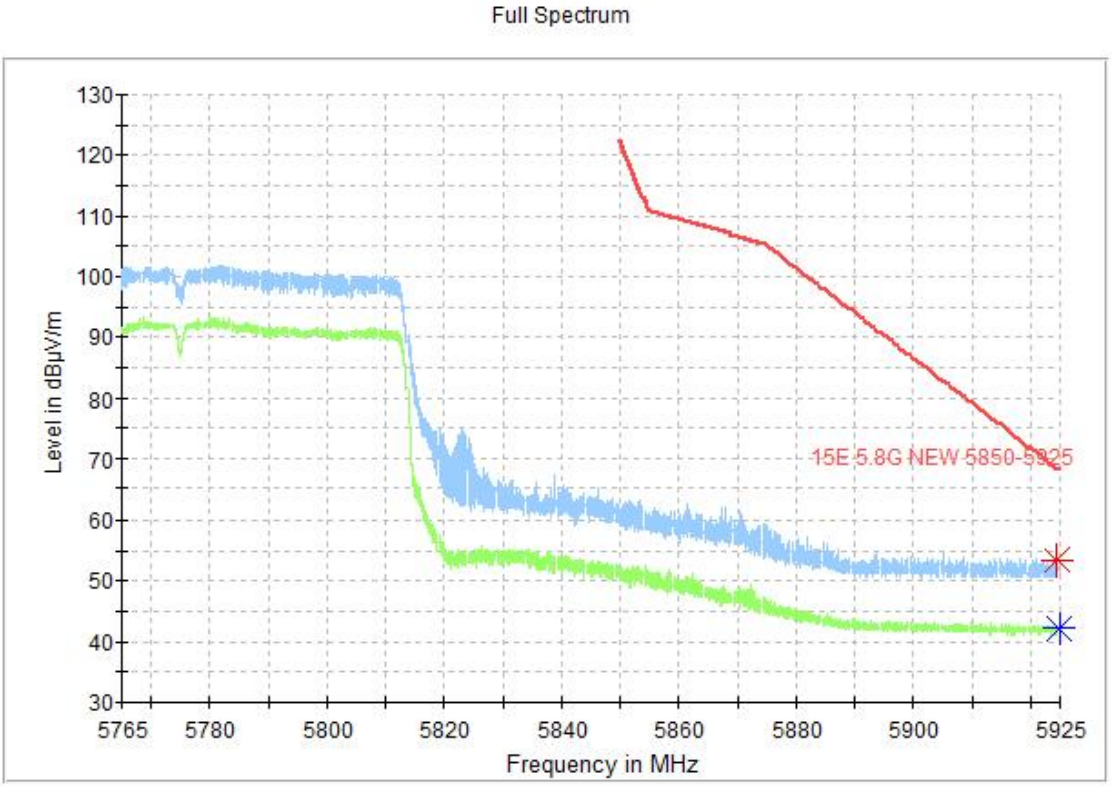


Fig. 12 Band Edges (802.11ac-HT80, 5775MHz)

A.7. AC Powerline Conducted Emission

Test Condition:

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.

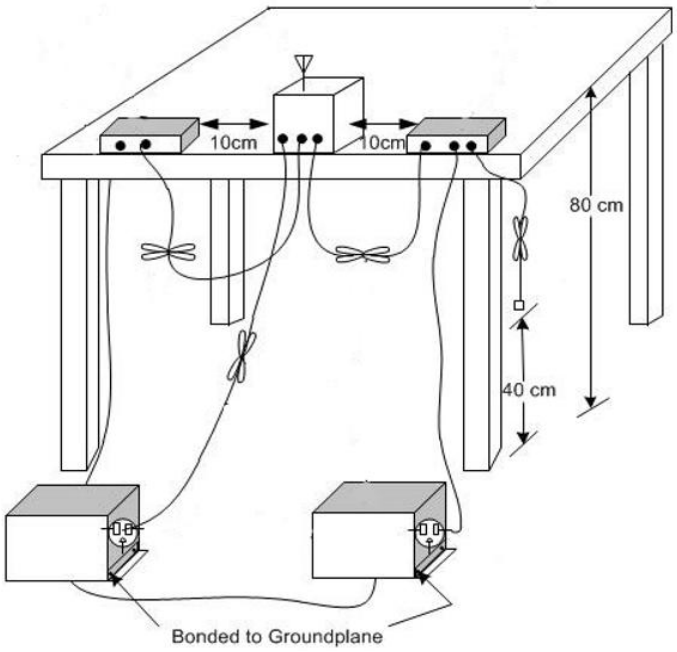
The measurement bandwidth is:

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		
		802.11a	Idle	
0.15 to 0.5	66 to 56	Fig.13	Fig.14	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		
		802.11a	Idle	
0.15 to 0.5	56 to 46	Fig.13	Fig.14	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.				

The measurement is made according to ANSI C63.10 .

Conclusion: PASS

Test graphs as below:

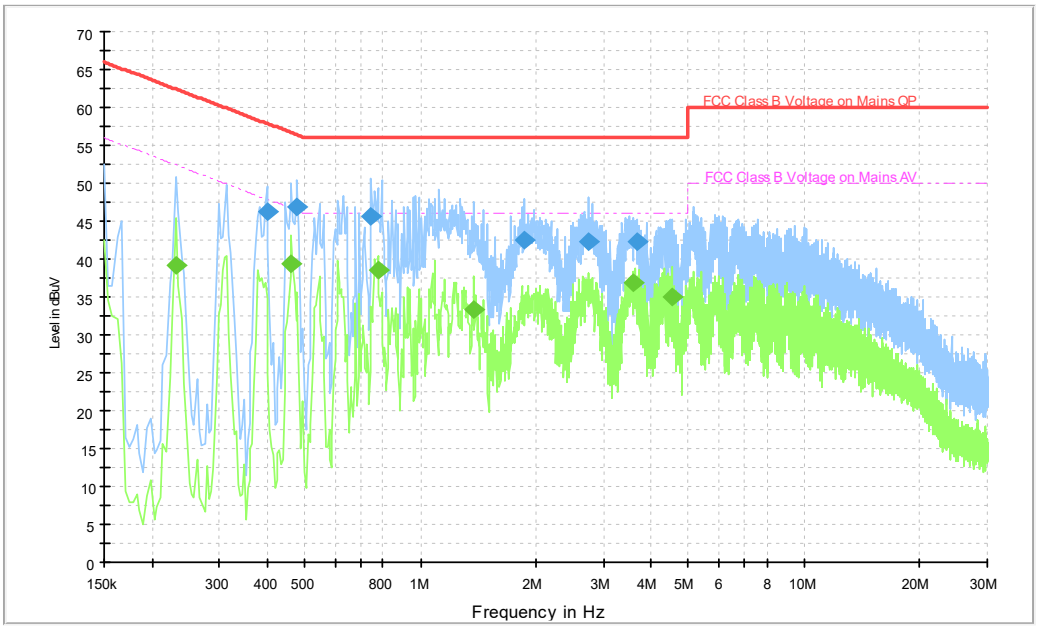


Fig. 13 AC Powerline Conducted Emission-802.11a

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)
0.398000	46.3	2000.	9.000	On	L1	20.0	11.6	57.9
0.478000	47.0	2000.	9.000	On	L1	20.0	9.4	56.4
0.746000	45.6	2000.	9.000	On	N	19.8	10.4	56.0
1.866000	42.4	2000.	9.000	On	L1	19.8	13.6	56.0
2.738000	42.3	2000.	9.000	On	L1	19.8	13.7	56.0
3.670000	42.4	2000.	9.000	On	N	19.6	13.6	56.0

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.230000	39.2	2000.	9.000	On	L1	19.9	13.2	52.4
0.462000	39.3	2000.	9.000	On	L1	20.0	7.3	46.7
0.774000	38.5	2000.	9.000	On	L1	19.9	7.5	46.0
1.374000	33.4	2000.	9.000	On	N	19.7	12.6	46.0
3.602000	36.9	2000.	9.000	On	N	19.6	9.1	46.0
4.530000	34.9	2000.	9.000	On	N	19.6	11.1	46.0

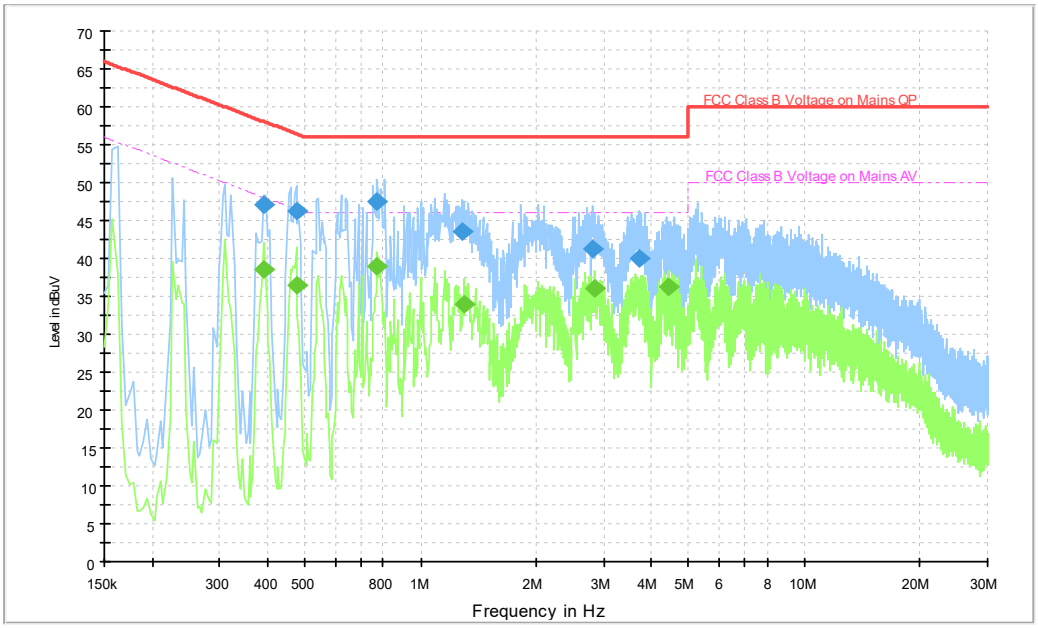


Fig. 14 AC Powerline Conducted Emission-Idle

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)
0.390000	47.0	2000.	9.000	On	L1	19.9	11.0	58.1
0.474000	46.3	2000.	9.000	On	L1	20.0	10.2	56.4
0.770000	47.5	2000.	9.000	On	L1	19.9	8.5	56.0
1.282000	43.4	2000.	9.000	On	L1	19.9	12.6	56.0
2.818000	41.2	2000.	9.000	On	N	19.6	14.8	56.0
3.706000	40.0	2000.	9.000	On	L1	19.8	16.0	56.0

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.390000	38.6	2000.	9.000	On	L1	19.9	9.5	48.1
0.474000	36.4	2000.	9.000	On	L1	20.0	10.0	46.4
0.770000	38.9	2000.	9.000	On	L1	19.9	7.1	46.0
1.302000	34.0	2000.	9.000	On	N	19.7	12.0	46.0
2.838000	36.0	2000.	9.000	On	N	19.6	10.0	46.0
4.422000	36.2	2000.	9.000	On	N	19.6	9.8	46.0

A.8. 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 *****