FCC PART 15E
TEST REPORT
No.24T04Z100816-018

for

Shenzhen Tinno Mobile Technology Corp.

Smart Phone

U655AA, U655AC

FCC ID: XD6U655AA

with

Hardware Version: V1.0

Software Version: U655AAV01.03_9.10/U655ACV01.02.10

Issued Date: 2024-07-05

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

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

REPORT HISTORY

Report Number	Revision	Description	Issue Date
24T04Z100816-018	Rev.0	1st edition	2024-07-05

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(BDA)

Address: No.18A, Kangding Street, Beijing Economic-Technology Development Area, Beijing, P. R. China 100176

1.3. TestingEnvironment

Normal Temperature: 15-35°C

Relative Humidity: 20-75%

1.4. Project date

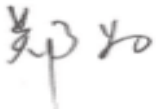
Testing Start Date: 2024-05-10

Testing End Date: 2024-07-04

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:	Shenzhen Tinno Mobile Technology Corp.
Address:	27-001, South Side of Tianlong Mobile Headquarters Building, Tongfa South Road, Xili Community, Xili Street, Nanshan District, Shenzhen ,PRC
Contact:	xiaoping.li
Email:	xiaoping.li@tinno.com
Telephone:	0755-86095550
Fax:	0755-86095551

2.1. Manufacturer Information

Company Name:	Shenzhen Tinno Mobile Technology Corp.
Address:	27-001, South Side of Tianlong Mobile Headquarters Building, Tongfa South Road, Xili Community, Xili Street, Nanshan District, Shenzhen ,PRC
Contact:	xiaoping.li
Email:	xiaoping.li@tinno.com
Telephone:	0755-86095550
Fax:	0755-86095551

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

3.1. About EUT

Description	Smart Phone
Model name	U655AA，U655AC
FCC ID	XD6U655AA
WLAN Frequency Band	ISM Band: 5725MHz~5850MHz
Type of modulation	OFDM
Nominal Voltage	3.85V

3.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version	Date of receipt
UT36a	861709070010412	V1.0	U655AAV01.03_9.10	2024-05-15
UT43a	861709070008598	V1.0	U655AAV01.03_9.10	2024-05-15
UT44a	861709070008689	V1.0	U655AAV01.03_9.10	2024-05-15

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

UT36a is used for Conduction test, UT43a and UT44a is used for Radiation test.

3.3. Internal Identification of AE

AE ID*	Description	Model	Manufacturer
AE1-1	Battery	486786	Guangdong Fenghua New Energy Co.,Ltd.
AE2-1	Charger	TN-050200U3	Guangdong Beicom Electronics Co.,Ltd
AE3-1	USB Cable	T365-011B-1	Shenzhen Yihuaxing Electronics Co. Ltd.
AE3-2	USB Cable	336275	SUNTOPS (SHENZHEN) ELECTRONICS CO., LTD.

*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 Smart 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
Radiated Unwanted Emission	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	3.85V
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	2024-07-04
2	Vector Signal Analyzer	FSW67	104051	Rohde & Schwarz	1 year	2025-04-06
3	Test Receiver	ESCI 3	100766	R&S	1 year	2025-05-18
4	LISN	ENV216	101459	R&S	1 year	2025-06-16
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	FSV40	101047	R&S	1 year	2025-03-06
2	Test Receiver	ESU26	100376	R&S	1 year	2024-11-08
3	EMI Antenna	VULB 9163	302	SCHWARZBECK	1 year	2024-08-28
4	EMI Antenna	3117	00119024	ETS-Lindgren	1 year	2024-08-13
5	EMI Antenna	LB-180400 -25-C-KF	J211060826	A-INFO	1 year	2024-07-11

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. 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

8.5. Radiated Unwanted Emission

Frequency Range	Uncertainty(dB)
9kHz-30MHz	/
30MHz ≤ f ≤ 1GHz	5.73
1GHz ≤ f ≤18GHz	5.58
18GHz ≤ f ≤40GHz	3.37

8.6. AC Power-line Conducted Emission

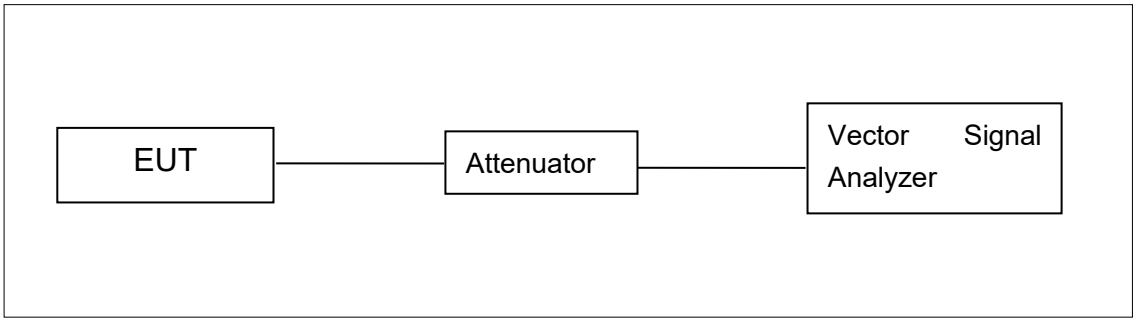
Measurement Uncertainty : 3.10dB,k=2

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

Measurement performed according to Clause 6.4, 6.5, 6.6 in ANSI C63.10-2013 and II.G.4, II.G.5, II.G.6 in KDB 789033.

The radiated emission test is performed in semi-anechoic chamber. The EUT was placed on a non-conductive table with 80cm above the ground plane for measurement below 1GHz and 1.5m above the ground plane for measurement above 1GHz. The measurement antenna was placed at a distance of 3 meters from the EUT. 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 from 0° to 360°and the measurement antenna is moved from 1m to 4m to get the maximization result. The maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

A.2. Maximum Peak Output Power

Measurement Limit and Method:

Standard	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 gain is -0.1dBi and the value is supplied by the applicant or manufacturer.

A.2.2. Maximum Average Output Power-Conducted

EUT ID: UT36a

Measurement Results:

802.11a mode

Mode	Data Rate (Mbps)	Test Result (dBm)		
		5745MHz (Ch149)	5785MHz (Ch157)	5825MHz (Ch165)
802.11a	6	17.35	17.61	17.59
	9	/	/	/
	12	/	/	/
	18	/	/	/
	24	/	/	/
	36	/	/	/
	48	/	/	/
	54	/	/	/

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	17.48	17.50	17.43
	MCS1	/	/	/
	MCS2	/	/	/
	MCS3	/	/	/
	MCS4	/	/	/
	MCS5	/	/	/
	MCS6	/	/	/
	MCS7	/	/	/

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

802.11ac-HT20 mode

Mode	Data Rate (Index)	Test Result (dBm)		
		5745MHz (Ch149)	5785MHz (Ch157)	5825MHz (Ch165)
802.11ac (20MHz)	MCS0	16.57	16.65	16.76
	MCS1	/	/	/
	MCS2	/	/	/
	MCS3	/	/	/
	MCS4	/	/	/
	MCS5	/	/	/
	MCS6	/	/	/
	MCS7	/	/	/
	MCS8	/	/	/

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	17.73	17.63
	MCS1	/	/
	MCS2	/	/
	MCS3	/	/
	MCS4	/	/
	MCS5	/	/
	MCS6	/	/
	MCS7	/	/

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

802.11ac-HT40 mode

Mode	Data Rate (Index)	Test Result (dBm)	
		5755MHz (Ch151)	5795MHz (Ch159)
802.11ac (40MHz)	MCS0	16.85	16.64
	MCS1	/	/
	MCS2	/	/
	MCS3	/	/
	MCS4	/	/
	MCS5	/	/
	MCS6	/	/
	MCS7	/	/
	MCS8	/	/
	MCS9	/	/

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

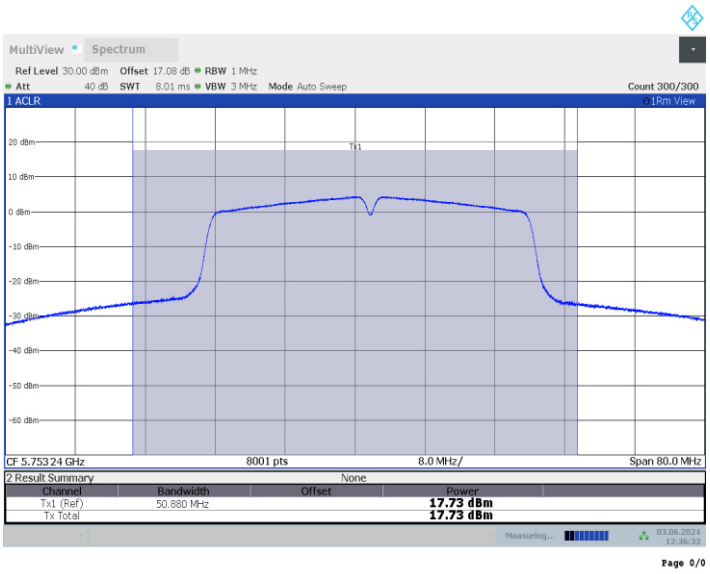
802.11ac-HT80 mode

Mode	Data Rate (Index)	Test Result (dBm)
		5775MHz (Ch155)
802.11ac (80MHz)	MCS0	16.08
	MCS1	/
	MCS2	/
	MCS3	/
	MCS4	/
	MCS5	/
	MCS6	/
	MCS7	/
	MCS8	/
	MCS9	/

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

duty cycle

Mode	11a		
Duty Cycle	100%		
Mode	11N 20M	11N 40M	
Duty Cycle	100%	100%	
Mode	11ac-20M	11ac- 40M	11ac- 80M
Duty Cycle	100%	100%	100%



Maximum output Power

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.

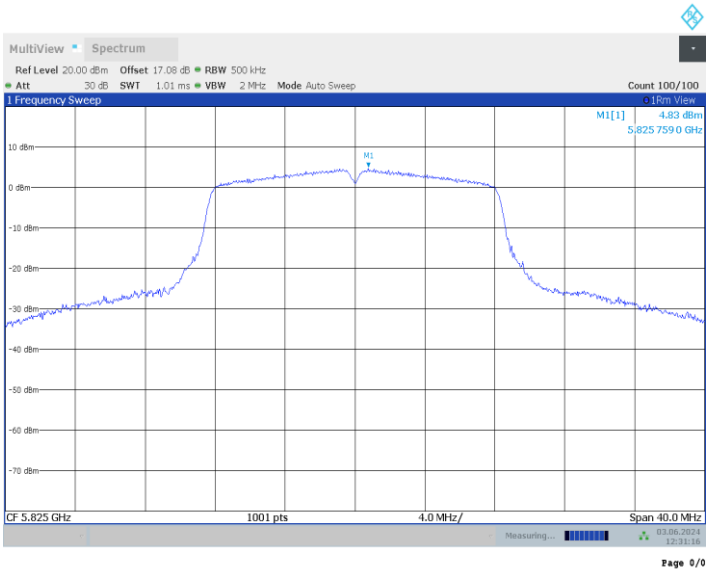
Measurement Uncertainty:

Measurement Uncertainty	0.75dB

EUT ID: UT36a

Measurement Results:

Mode	Channel	Power Spectral Density (dBm/500kHz)	Conclusion
802.11a	149	4.20	P
	157	4.64	P
	165	4.83	P
802.11n HT20	149	4.38	P
	157	4.28	P
	165	4.11	P
802.11n HT40	151	1.81	P
	159	1.68	P
802.11ac VHT80	155	-3.31	P



Peak Power Spectral Density

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: UT36a

Measurement Result:

Mode	Channel	6dB Emission Bandwidth (MHz)		conclusion
802.11a	149	Fig.1	16.36	P
	157	Fig.2	16.32	P
	165	Fig.3	16.32	P
802.11n HT20	149	Fig.4	17.56	P
	157	Fig.5	17.56	P
	165	Fig.6	17.56	P
802.11n HT40	151	Fig.7	36.00	P
	159	Fig.8	36.32	P
802.11ac (VHT80)	155	Fig.9	76.48	P

Test graphs as below:

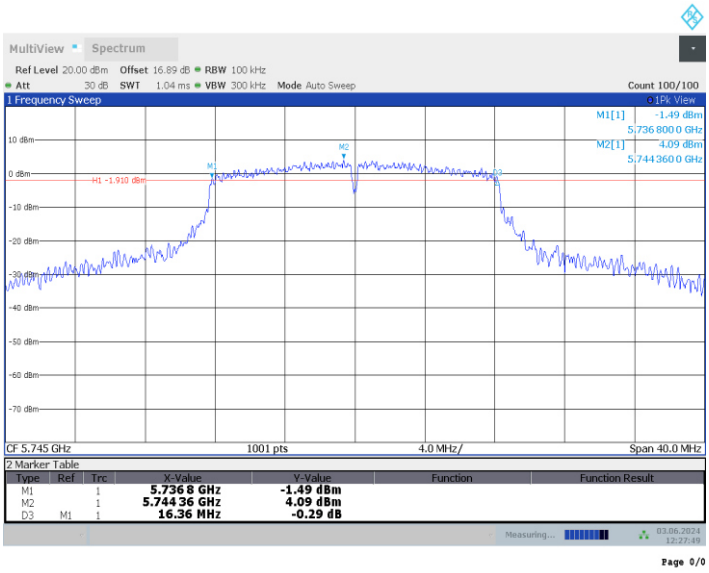


Fig. 1 6dB Emission Bandwidth (802.11a, Ch 149)

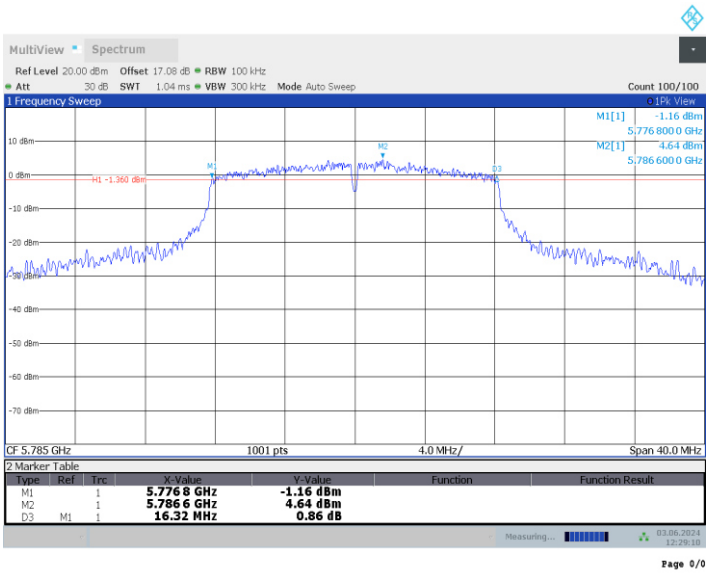


Fig. 2 6dB Emission Bandwidth (802.11a, Ch 157)

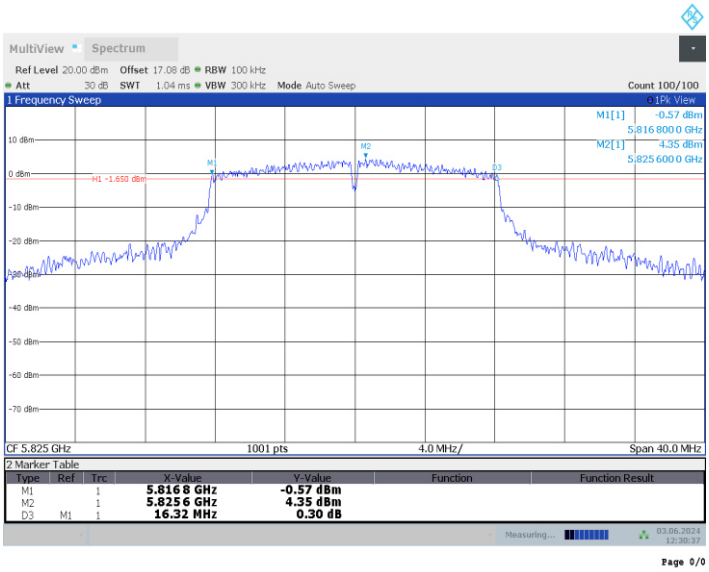


Fig. 3 6dB Emission Bandwidth (802.11a, Ch 165)

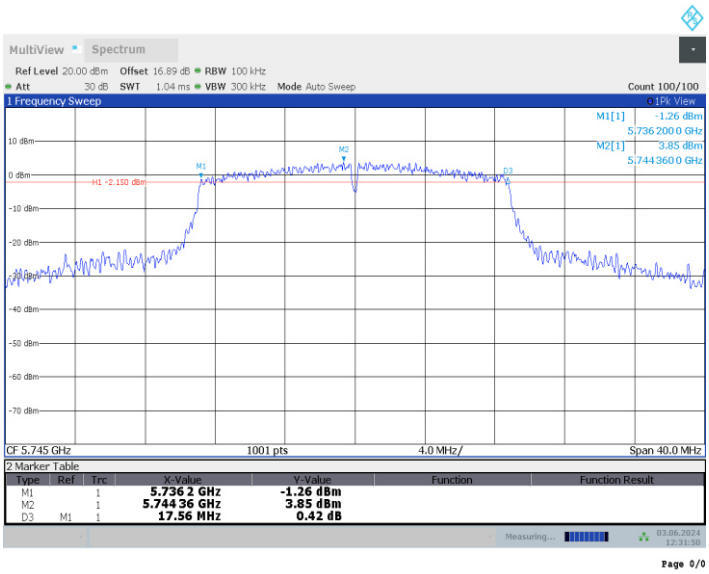


Fig. 4 6dB Emission Bandwidth (802.11n-HT20, Ch 149)

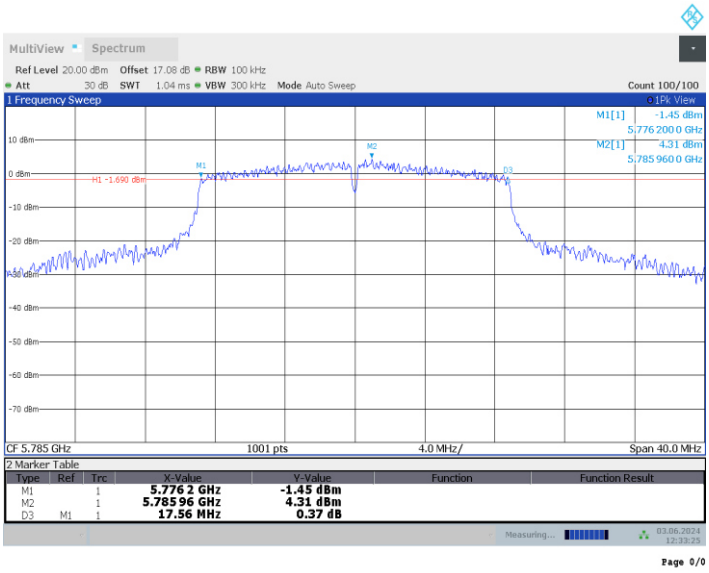


Fig. 5 6dB Emission Bandwidth (802.11n-HT20, Ch 157)

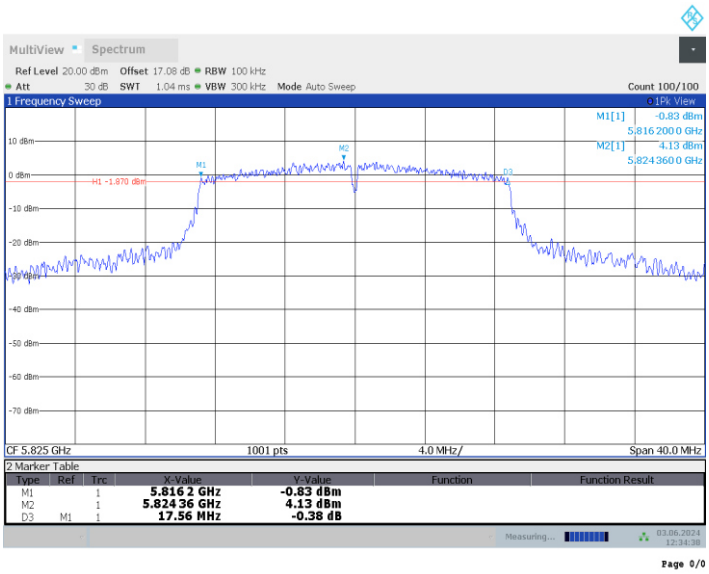


Fig. 6 6dB Emission Bandwidth (802.11n-HT20, Ch 165)

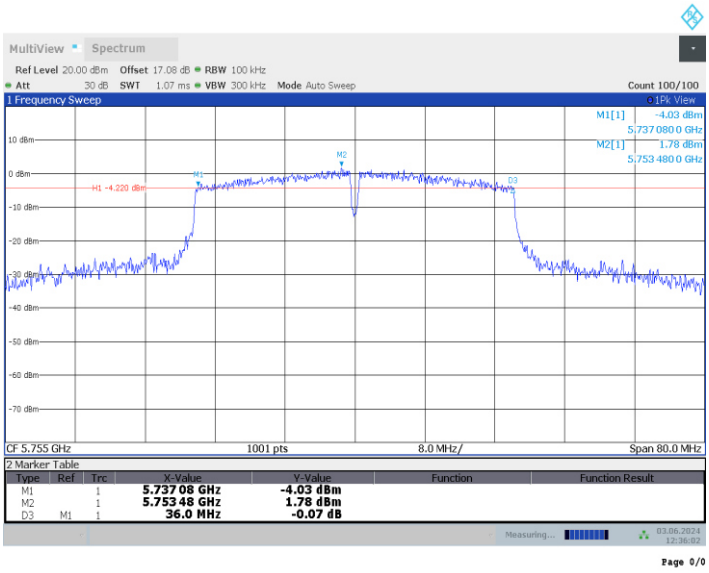


Fig. 7 6dB Emission Bandwidth (802.11n-HT40, Ch 151)

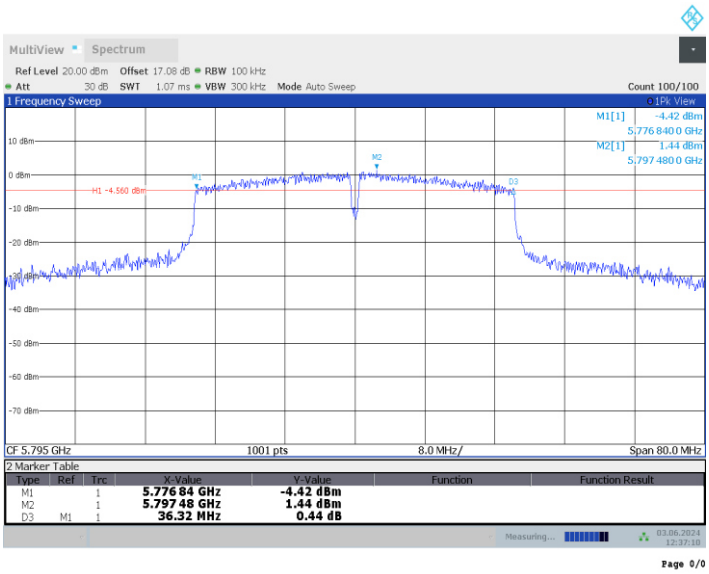


Fig. 8 6dB Emission Bandwidth (802.11n-HT40, Ch 159)

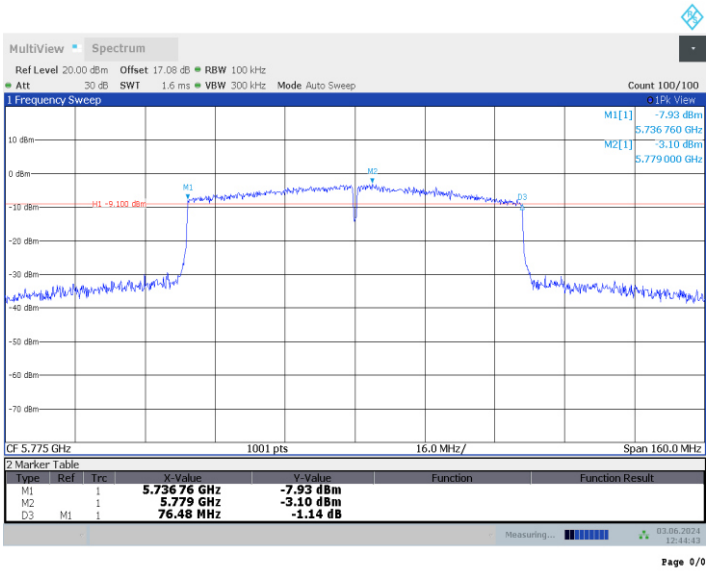


Fig. 9 6dB Emission Bandwidth (802.11ac-VHT80, Ch 155)

Conclusion: PASS

A.5. Radiated Unwanted Emission

A.5.1 Limits

Unwanted Emissions in the unrestricted bands shall not exceed the limits that shown in 15.407:

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.	

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))

Frequency (MHz)	Field strength(μV/m)	Measurement distance (m)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30

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

Note: When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor (as defined in KDB 789033 II.G.2.d).

A.5.2 Test setup

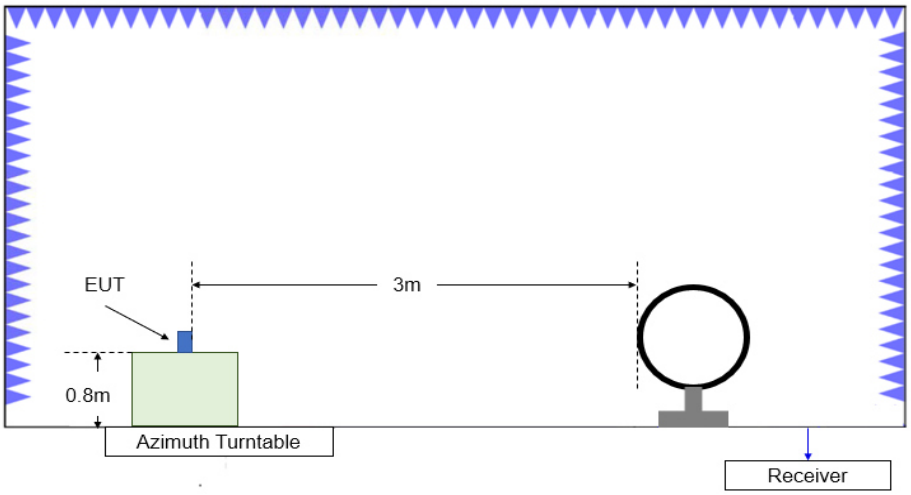


Figure A.5.1. Test Site Diagram (9kHz-30MHz)

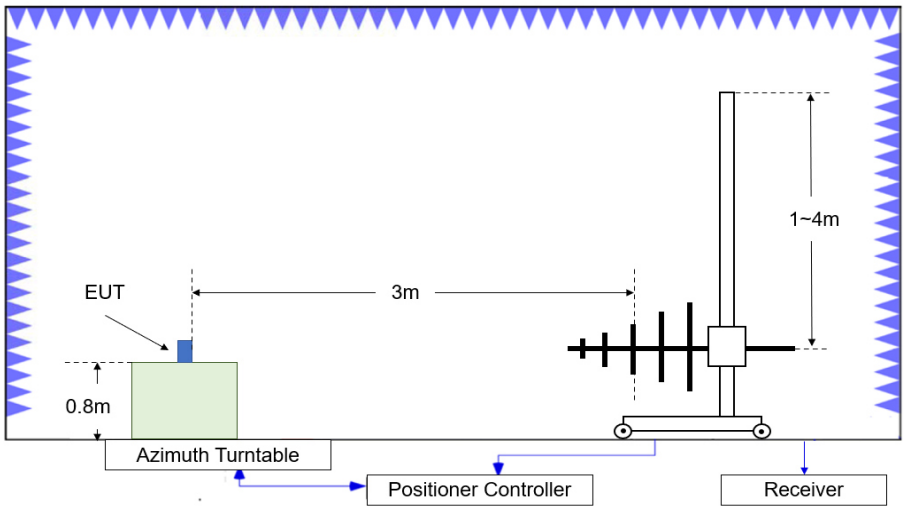


Figure A.5.2. Test Site Diagram (30MHz-1GHz)

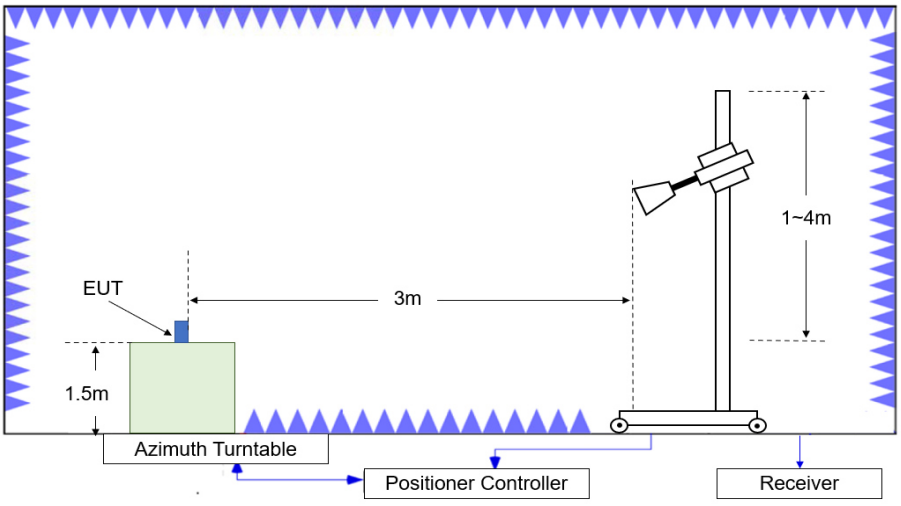


Figure A.5.3. Test Site Diagram (1GHz-40GHz)

A.5.3 Test Procedures

Radiated unwanted emissions from the EUT were measured according to ANSI C63.10and KDB 789033 D02 v02r01.

Test setting

Frequency of emission (MHz)	RBW/VBW
30-1000	100kHz/300kHz
1000-4000	1MHz/3MHz
4000-18000	1MHz/3MHz
18000-26500	1MHz/3MHz
26500-40000	1MHz/3MHz

A.5.4 Calculation

1. The measurement results reported below is calculated by:

Measurement Results (dBμV/m) = $P_{measurement}$ (dBμV) + Cable Loss(dB) + Antenna Factor (dB/m)

Where: $P_{measurement}$ is the field strength recorded from the instrument

2. Convert the resultant EIRP level to an equivalent electric field strength using the following relationship:

E=EIRP- 20log (*D*) +104.77

Where:

E is the field strength in dBμV/m

D is the measurement distance in meters

EIRP is the equivalent isotropically radiated power in dBm

Test note

1. The EUT is operating at its maximum duty cycle and its maximum power control level.
2. Investigation has been done on all modes and modulations/data rates. Only the radiated emissions of the configuration that produced the worst case emissions are reported in this section.
3. Spurious emissions for all channels were investigated and almost the same below 1GHz. According to FCC 47 CFR §15.31, emission levels are not report much lower than the limit by over 20dB
4. The test is carried out on both vertical and horizontal polarization and only maximization result of both polarizations is kept.
5. EUT in each of three orthogonal axis emissions had been tested out only the worst case (axis data) recorded in the report.
6. Measurement frequencies were performed from 9 kHz to the 10^{th} harmonic of highest fundamental frequency or 40GHz, whichever is lower.
7. No spurious emissions were detected within 20dBof the limit below 30MHz. OFS and semi-chamber comparison testing had been performed and the result came out very similar. (KDB 414788)
8. The low/mid/high channels of UNII-3 of all working mode with different bandwidths were tested, only the worst ones were reported.

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 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)
5458.250	44.42	-23.32	34.18	33.56	54.00	9.58	V
5459.000	44.36	-23.30	34.18	33.48	54.00	9.64	V
11650.000	33.70	-30.47	38.35	25.82	54.00	20.30	H
16068.000	37.98	-24.93	40.90	22.01	54.00	16.02	H
17827.200	37.58	-23.17	40.50	20.25	54.00	16.42	H
17840.000	37.56	-23.25	40.50	20.31	54.00	16.44	V

802.11n-HT20

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)
5457.050	44.35	-23.33	34.19	33.50	54.00	9.65	V
5458.300	44.34	-23.32	34.18	33.48	54.00	9.66	V
11650.000	33.67	-30.47	38.35	25.79	54.00	20.33	H
16020.400	37.99	-24.94	40.90	22.03	54.00	16.02	H
17829.200	38.30	-23.04	40.50	20.83	54.00	15.71	H
17843.600	38.16	-23.38	40.50	21.04	54.00	15.84	H

802.11n-HT40

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)
5459.600	44.34	-23.30	34.18	33.46	54.00	9.66	V
5459.900	44.36	-23.29	34.18	33.47	54.00	9.64	V
11590.000	33.57	-29.77	38.18	25.16	54.00	20.43	V
16021.600	38.20	-24.98	40.90	22.29	54.00	15.80	H
17828.000	38.27	-23.12	40.50	20.89	54.00	15.73	V
17842.000	38.19	-23.32	40.50	21.01	54.00	15.81	V

802.11ac-HT20

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)
5457.750	44.31	-23.32	34.18	33.45	54.00	9.69	V
5459.200	44.34	-23.30	34.18	33.46	54.00	9.66	V
11650.000	33.77	-30.47	38.35	25.89	54.00	20.23	H
16064.400	37.84	-24.92	40.90	21.85	54.00	16.16	H
17826.000	38.36	-23.25	40.50	21.11	54.00	15.64	H
17839.600	38.33	-23.24	40.50	21.06	54.00	15.67	V

802.11ac-HT40

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)
5458.850	44.39	-23.31	34.18	33.52	54.00	9.61	V
5459.500	44.43	-23.30	34.18	33.55	54.00	9.57	V
11590.000	33.73	-29.77	38.18	25.32	54.00	20.27	V
16015.200	38.20	-25.01	40.90	22.31	54.00	15.80	H
17828.400	38.46	-23.09	40.50	21.05	54.00	15.54	H
17842.800	38.28	-23.35	40.50	21.13	54.00	15.72	V

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)
5458.100	44.3	-23.3	34.2	33.39	48.3	4.0	V
5459.800	44.3	-23.3	34.2	33.39	48.3	4.0	V
11550.000	34.0	-29.9	38.1	25.74	48.3	14.3	V
16056.000	37.9	-25.1	40.9	22.03	48.3	10.4	H
17826.800	38.5	-23.2	40.5	21.16	48.3	9.8	H
17845.200	38.4	-23.4	40.5	21.30	48.3	9.9	H

Peak Results：

802.11a

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)
5924.908	53.89	-23.97	34.80	43.06	68.27	14.37	V
5924.954	54.50	-23.97	34.80	43.67	68.23	13.73	V
11650.250	45.39	-30.45	38.35	37.49	74.00	28.61	H
16770.750	51.59	-24.62	41.36	34.84	68.30	16.71	V
16946.200	51.65	-24.11	41.21	34.54	68.30	16.66	H
17473.650	49.89	-24.33	40.63	33.59	68.30	18.41	H

802.11n-HT20

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)
5924.943	54.10	-23.97	34.80	43.26	68.24	14.14	V
5924.978	54.50	-23.97	34.80	43.67	68.22	13.72	V
11652.450	46.18	-30.30	38.36	38.13	74.00	27.82	V
16640.950	52.66	-24.58	41.44	35.80	68.30	15.64	H
17431.850	52.67	-23.98	40.67	35.99	68.30	15.63	H
17474.200	49.89	-24.33	40.63	33.60	68.30	18.41	H

802.11n-HT40

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)
5924.914	54.42	-23.97	34.80	43.58	68.26	13.85	V
5924.960	54.42	-23.97	34.80	43.59	68.23	13.81	V
11589.200	46.31	-29.80	38.18	37.93	74.00	27.69	H
16631.050	52.13	-24.71	41.43	35.40	68.30	16.17	V
16717.400	52.72	-24.54	41.47	35.80	68.30	15.58	H
17385.100	49.93	-24.06	40.71	33.27	68.30	18.38	V

802.11ac-HT20

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)
5924.948	54.10	-23.97	34.80	43.27	68.24	14.14	H
5924.966	54.38	-23.97	34.80	43.55	68.23	13.84	V
11650.250	45.67	-30.45	38.35	37.78	74.00	28.33	H
16644.250	51.93	-24.62	41.44	35.11	68.30	16.37	H
16818.050	52.08	-24.75	41.30	35.52	68.30	16.23	H
17473.100	50.05	-24.33	40.63	33.75	68.30	18.25	H

802.11ac-HT40

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)
5924.782	55.07	-23.96	34.80	44.23	68.36	13.29	H
5924.851	54.59	-23.96	34.80	43.75	68.31	13.72	V
11590.300	45.85	-29.78	38.18	37.44	74.00	28.16	V
16761.950	52.06	-24.58	41.38	35.27	68.30	16.24	H
16938.500	52.07	-24.25	41.22	35.09	68.30	16.23	V
17383.450	50.04	-24.02	40.72	33.34	68.30	18.26	V

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)
5923.816	59.8	-23.9	34.8	48.95	68.3	8.5	V
5924.385	59.3	-24.0	34.8	48.50	68.3	9.0	V
11550.150	45.9	-29.9	38.1	37.69	68.3	22.4	V
16647.000	52.1	-24.7	41.4	35.28	68.3	16.2	H
16743.800	51.9	-24.7	41.4	35.15	68.3	16.4	V
17325.150	49.8	-24.4	40.8	33.41	68.3	18.5	V

Band edge compliance

Mode	Channel	Test Results	Conclusion
802.11a	5745 MHz	Fig.10	P
	5825 MHz	Fig.11	P
802.11n HT20	5745 MHz	Fig.12	P
	5825 MHz	Fig.13	P
802.11n HT40	5755 MHz	Fig.14	P
	5795 MHz	Fig.15	P
802.11ac HT20	5745 MHz	Fig.16	P
	5825 MHz	Fig.17	P
802.11ac HT40	5755 MHz	Fig.18	P
	5795 MHz	Fig.19	P
802.11ac HT80	5775 MHz	Fig.20 Fig.21	P

Conclusion: PASS

Test graphs as below:

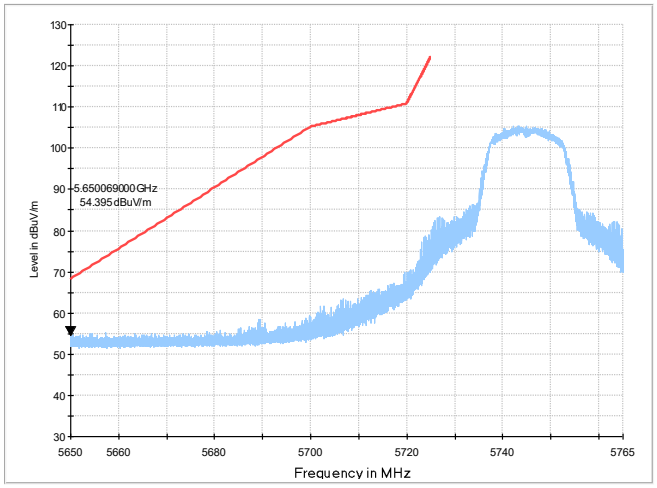


Fig. 15 Band Edges (802.11a Ch149,5745MHz)

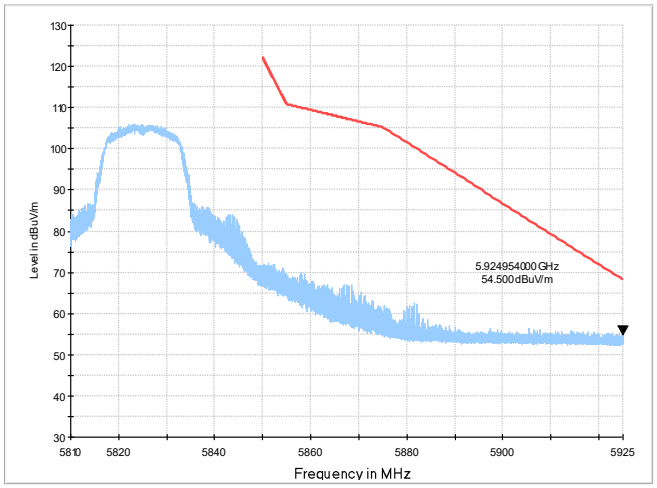


Fig. 16 Band Edges (802.11a Ch165, 5825MHz)

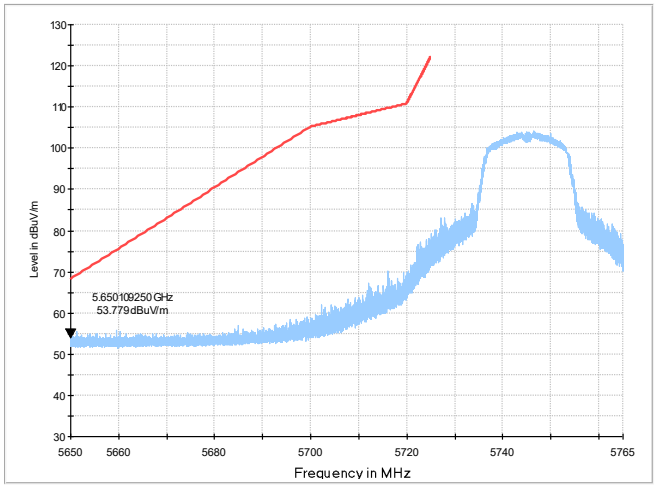


Fig. 17 Band Edges (802.11n-HT20 Ch149, 5745MHz)

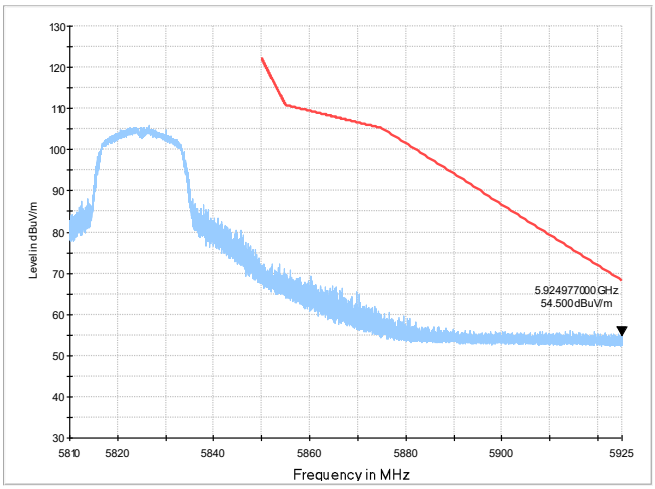


Fig. 18 Band Edges (802.11n-HT20 Ch165, 5825MHz)

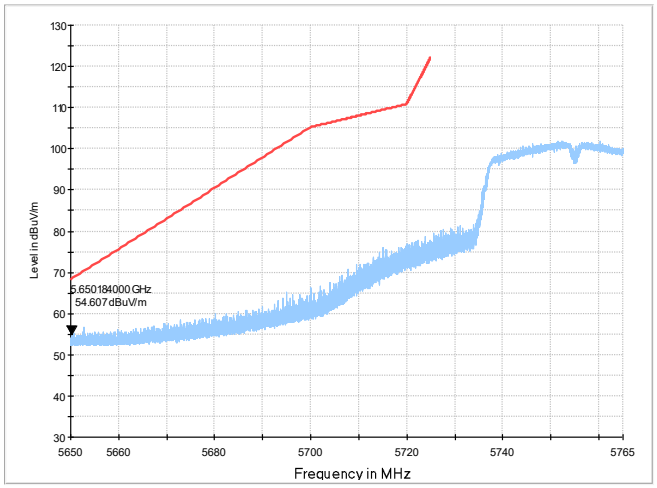


Fig. 19 Band Edges (802.11n-HT40 Ch151, 5755MHz)

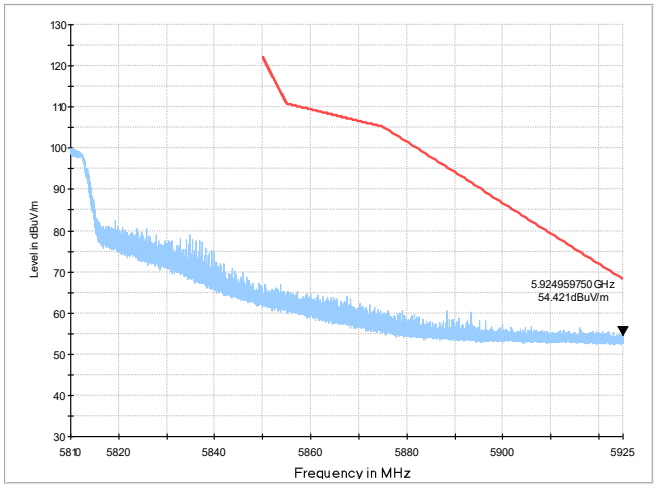


Fig. 20 Band Edges (802.11n-HT40 Ch159, 5795MHz)

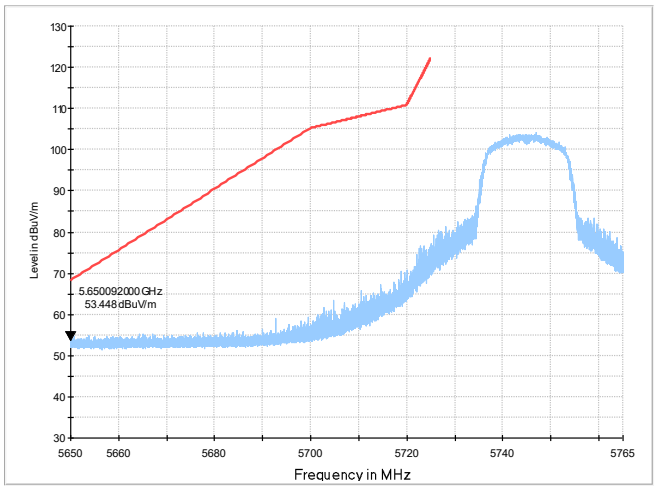


Fig. 21 Band Edges (802.11ac-HT20 Ch149, 5745MHz)

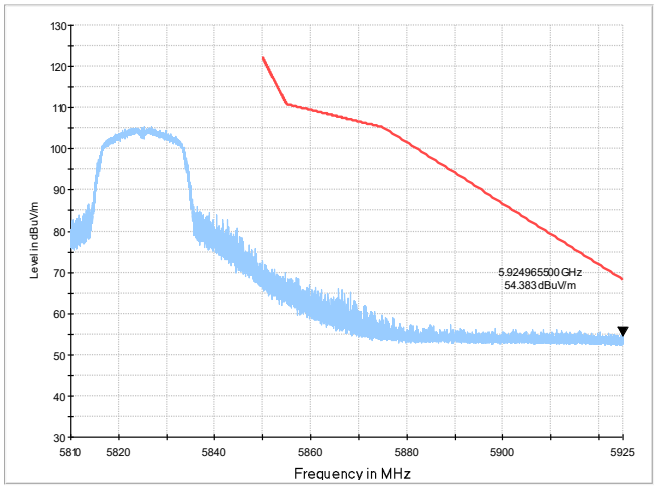


Fig. 22 Band Edges (802.11ac-HT20 Ch165, 5825MHz)

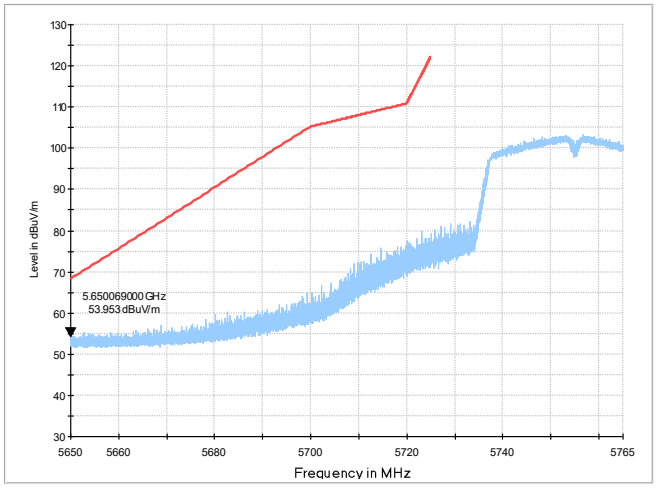


Fig. 23 Band Edges (802.11ac-HT40 Ch151, 5755MHz)

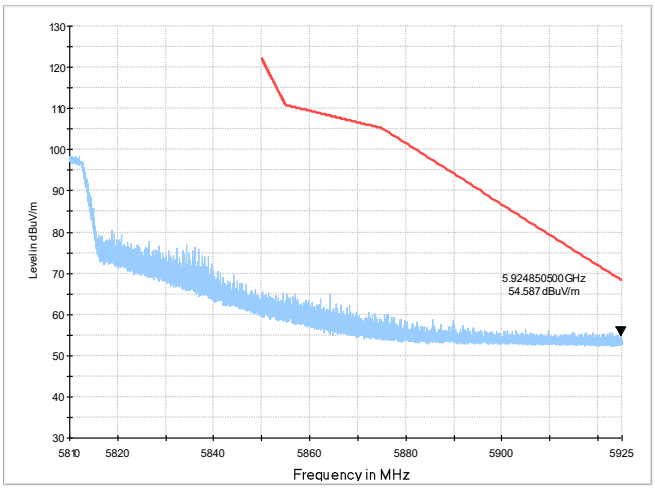


Fig. 24 Band Edges (802.11ac-HT40 Ch159, 5795MHz)

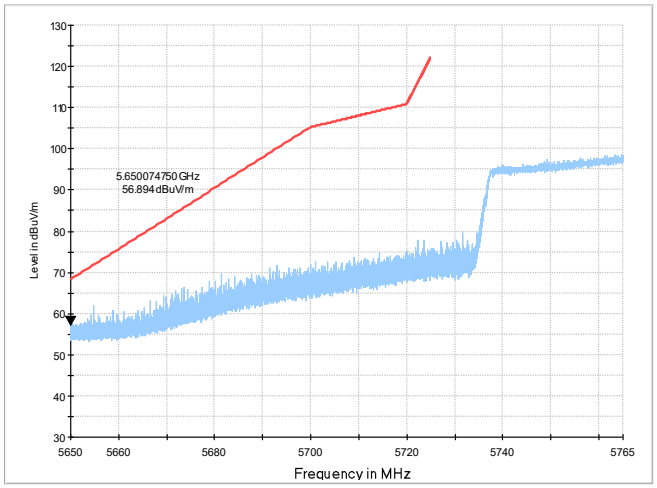


Fig. 25 Band Edges (802.11ac-HT80 Ch155, 5775MHz)

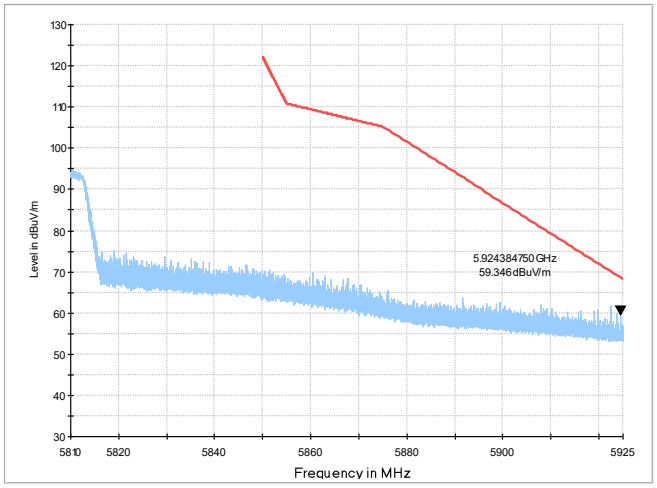


Fig. 26 Band Edges (802.11ac-HT80 Ch155, 5775MHz)

A.6. AC Powerline Conducted Emission

A.6.1 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

A.6.2 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.

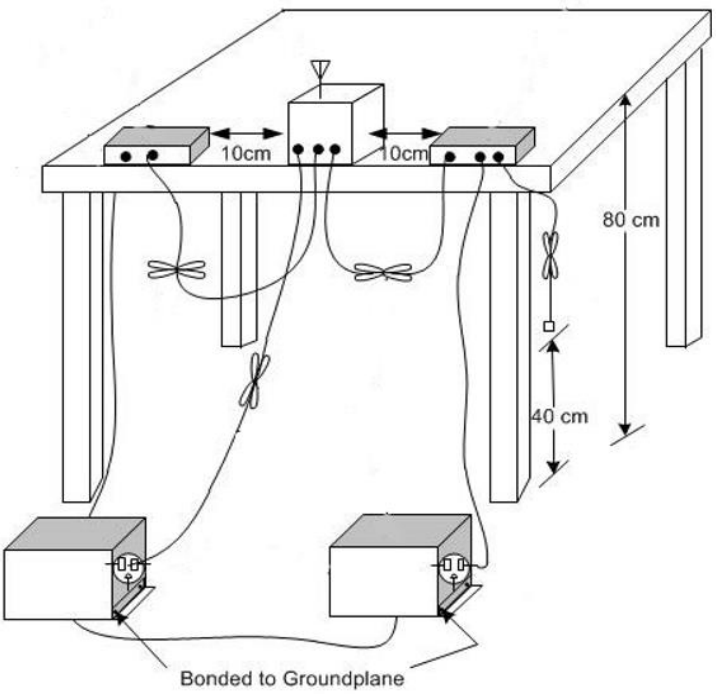
The measurement bandwidth is:

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

A.6.3 Test Condition

Voltage（V）	Frequency（Hz）
120	60

A.6.4 Test setup



A.6.5 Measurement Result and limit

Wi-Fi (Quasi-peak Limit)

Frequency range (MHz)	Quasi-peak Limit (dBμV)	Result (dBμV)		Conclusion
		With charger		
		Wi-Fi	Idle	
0.15 to 0.5	66 to 56	Fig.A.6.1	Fig. A.6.2	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.				

Wi-Fi (Average Limit)

Frequency range (MHz)	Average Limit (dBμV)	Result (dBμV)		Conclusion
		With charger		
		Wi-Fi	Idle	
0.15 to 0.5	56 to 46	Fig.A.6.1	Fig. A.6.2	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:

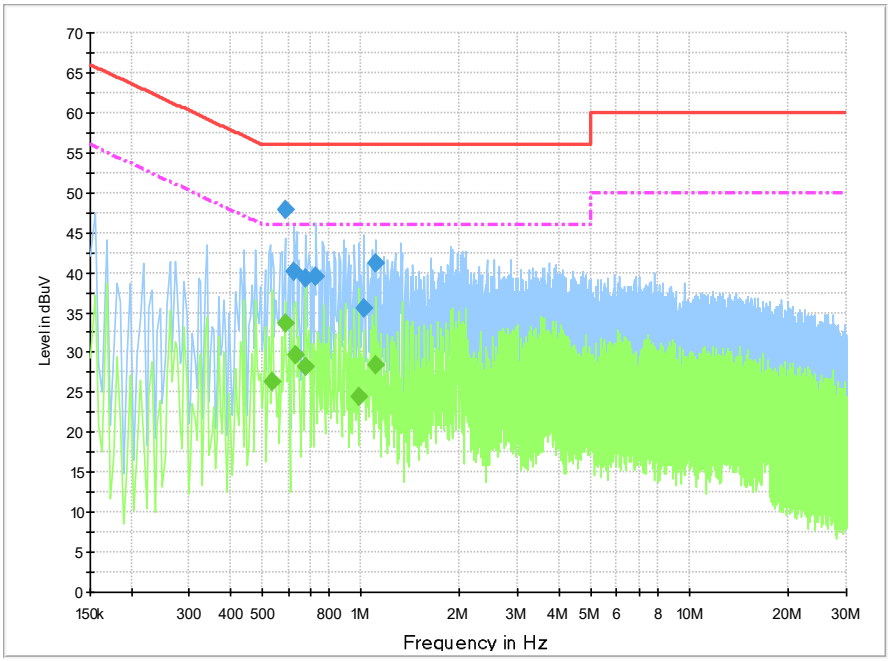


Fig.A.6.1. AC Powerline Conducted Emission-802.11a CH149

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.586500	**47.9**	**2000.0**	**9.000**	**On**	**L1**	**20.0**	**8.1**	**56.0**	
0.627000	**40.1**	**2000.0**	**9.000**	**On**	**L1**	**20.0**	**15.9**	**56.0**	
0.681000	**39.4**	**2000.0**	**9.000**	**On**	**L1**	**20.0**	**16.6**	**56.0**	
0.730500	**39.5**	**2000.0**	**9.000**	**On**	**L1**	**20.0**	**16.5**	**56.0**	
1.018500	**35.5**	**2000.0**	**9.000**	**On**	**N**	**20.0**	**20.5**	**56.0**	
1.113000	**41.1**	**2000.0**	**9.000**	**On**	**L1**	**19.9**	**14.9**	**56.0**	

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.586500	**47.9**	**2000.0**	**9.000**	**On**	**L1**	**20.0**	**8.1**	**56.0**	
0.627000	**40.1**	**2000.0**	**9.000**	**On**	**L1**	**20.0**	**15.9**	**56.0**	
0.681000	**39.4**	**2000.0**	**9.000**	**On**	**L1**	**20.0**	**16.6**	**56.0**	
0.730500	**39.5**	**2000.0**	**9.000**	**On**	**L1**	**20.0**	**16.5**	**56.0**	
1.018500	**35.5**	**2000.0**	**9.000**	**On**	**N**	**20.0**	**20.5**	**56.0**	
1.113000	**41.1**	**2000.0**	**9.000**	**On**	**L1**	**19.9**	**14.9**	**56.0**	

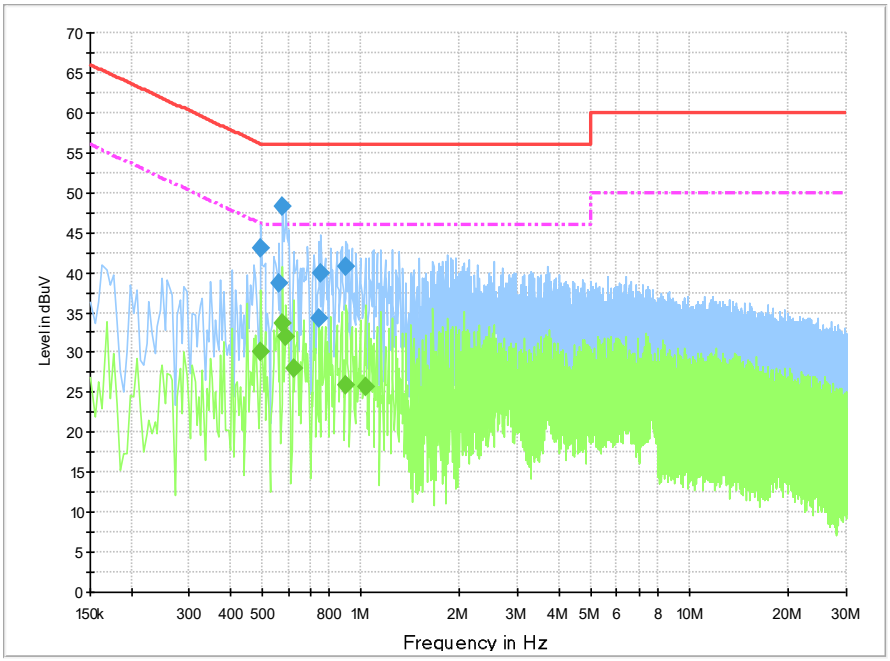


Fig.A.6.2. AC Powerline Conducted Emission-Idle

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.496500	43.1	2000.0	9.000	On	L1	20.1	13.0	56.1	
0.564000	38.7	2000.0	9.000	On	N	20.2	17.3	56.0	
0.577500	48.2	2000.0	9.000	On	L1	20.0	7.8	56.0	
0.748500	34.2	2000.0	9.000	On	N	20.1	21.8	56.0	
0.757500	39.9	2000.0	9.000	On	L1	20.0	16.1	56.0	
0.901500	40.8	2000.0	9.000	On	L1	19.9	15.2	56.0	

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.496500	30.0	2000.0	9.000	On	L1	20.1	16.0	46.1	
0.577500	33.6	2000.0	9.000	On	L1	20.0	12.4	46.0	
0.591000	32.0	2000.0	9.000	On	N	20.1	14.0	46.0	
0.622500	27.9	2000.0	9.000	On	L1	20.0	18.1	46.0	
0.901500	25.9	2000.0	9.000	On	N	20.1	20.1	46.0	
1.027500	25.8	2000.0	9.000	On	N	20.0	20.2	46.0	

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 26th day of June 2023.

Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 7049.01
Valid to July 31, 2024

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

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