FCC PART 15E
TEST REPORT
No.24T04Z200299-008

for

Samsung Electronics Co., Ltd.

Multi-band GSM/WCDMA/LTE/5GNR Mobile Phone with Bluetooth,WLAN

SM-A066M/DS,SM-A066M

FCC ID:ZCASMA066M

with

Hardware Version: REV1.0

Software Version: A066M.001

Issued Date: 2024-12-30

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:

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
24T04Z200299-008	Rev.0	1st edition	2024-12-30

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

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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

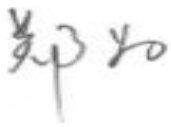
Testing Start Date: 2024-11-20

Testing End Date: 2024-12-30

1.5. Signature

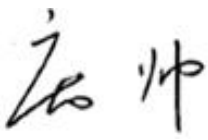
Yao Xingyu

(Prepared this test report)



Zheng Wei

(Reviewed this test report)



Pang Shuai

(Approved this test report)

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2. Client Information

2.1. Applicant Information

Company Name	Samsung Electronics Co., Ltd.
Address	19 Chapin Rd.,Building D Pine Brook, NJ 07058
Contact	Jenni Chun
Email	j1.chun@samsung.com
Tel.	+1-201-937-4203
Fax	/

2.2. Manufacturer Information

Company Name	Samsung Electronics Co., Ltd.
Address	129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, Republic of Korea
Contact	Kobe Cho
Email	ggobi.cho@samsung.com
Tel.	+82 - 10 - 2722 - 4159
Fax:	/

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

3.1. About EUT

Description	Multi-band GSM/WCDMA/LTE/5GNR Mobile Phone with Bluetooth,WLAN
Model name	SM-A066M/DS,SM-A066M
FCC ID	ZCASMA066M
WLAN Frequency Band	ISM Band: 5725MHz~5850MHz
Type of modulation	OFDM
Nominal Voltage	3.88V
Extreme High Voltage	4.3V
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
UT14a	2404200299UT14a	REV1.0	A066M.001	2024-11-27
UT31a	2404200299UT31a	REV1.0	A066M.001	2024-11-20

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

UT14a is used for Conduction test, UT31a is used for Radiation test.

3.3. Internal Identification of AE used during the test

AE ID*	Name	Model	Manufacturer
AE1	Battery	HQ-7160NA	Ningde Amperex Technology Limited
AE2*	Adapter	EP-TA800	DONGGUAN SOLUM ELECTRONICS CO.,LTD
AE3-1	Date Cable1 C-C	EP-DN980BWE	GUANGXI BROAD TELECOMMUNICATION CO.,LTD
AE3-2	Date Cable2 C-C	EP-DN980BWE	Cresyn Electronics(Dongguan)Co.,Ltd.

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

*AE2 is not the AE for EUT, provided by the lab for relevant tests.

3.4. General Description

Equipment Under Test (EUT) is a model of Multi-band GSM/WCDMA/LTE/5GNR Mobile Phone with Bluetooth,WLAN 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.

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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.

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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
6dB Emission 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	3.88V
Humidity	44%

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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	Attenuator	10dB/2W	/	Rosenberger	/	/
4	Shielding Room	S81	/	ETS-Lindgren	/	/

Radiated emission test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Period	Calibration Due date
1	Test Receiver	ESU26	100376	R&S	1 year	2025-06-06
2	Test Receiver	FSV40	101047	R&S	1 year	2025-07-28
3	Loop Antenna	HFH2-Z2	829324/007	R&S	2 years	2026-01-04
4	EMI Antenna	VULB9163	235	Schwarzbeck	1 year	2025-08-27
5	EMI Antenna	3115	00167252	ETS-Lindgren	1 year	2025-03-17
6	EMI Antenna	3117	00119021	ETS-Lindgren	1 year	2025-09-18
7	EMI Antenna	LB-180400-25-C-KF	2110084000006	A-INFO	1 year	2025-05-15

AC Power Line Conducted Emission

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Period	Calibration Due date
1	LISN	ENV216	101459	R&S	1 year	2025-05-16
2	Test Receiver	ESCI	100766	R&S	1 year	2025-04-18

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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

8.6. Radiated Unwanted Emission

Frequency Range	Uncertainty(dB)
9kHz-30MHz	3.96
30MHz ≤ f ≤ 1GHz	5.73
1GHz ≤ f ≤18GHz	5.58
18GHz ≤ f ≤40GHz	3.37

8.7. AC Power-line Conducted Emission

Measurement Uncertainty: 3.10dB, k=2

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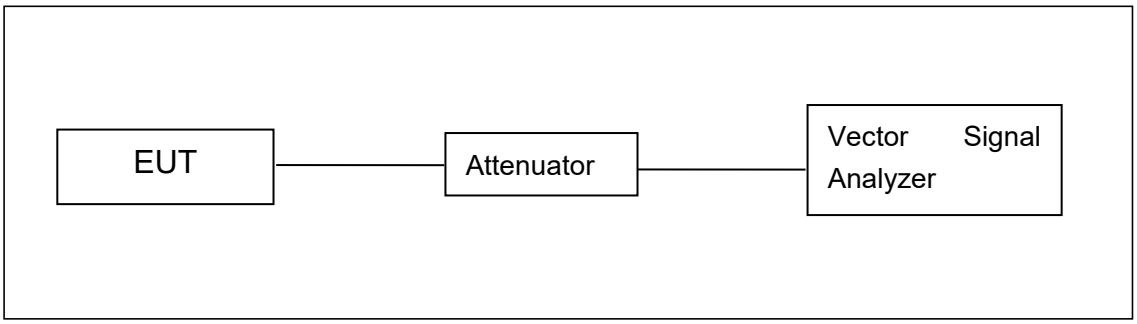
ANNEX A: MEASUREMENT RESULTS

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 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

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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 -5.1dBi and the value is supplied by the applicant or manufacturer.

A.2.2. Maximum Average Output Power-Conducted

EUT ID: UT14a

Measurement Results:

802.11a mode

Mode	Data Rate (Mbps)	Test Result (dBm)		
		5745MHz (Ch149)	5785MHz (Ch157)	5825MHz (Ch165)
802.11a	6	17.31	17.13	16.82
	9	16.97	/	/
	12	16.90	/	/
	18	16.59	/	/
	24	16.33	/	/
	36	15.80	/	/
	48	15.46	/	/
	54	15.44	/	/

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

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802.11n-HT20 mode

Mode	Data Rate (Index)	Test Result (dBm)		
		5745MHz (Ch149)	5785MHz (Ch157)	5825MHz (Ch165)
802.11n (20MHz)	MCS0	16.89	17.14	17.07
	MCS1	16.34	/	/
	MCS2	16.19	/	/
	MCS3	15.46	/	/
	MCS4	15.23	/	/
	MCS5	14.89	/	/
	MCS6	14.87	/	/
	MCS7	14.14	/	/

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	17.28	17.27	17.21
	MCS1	17.02	/	/
	MCS2	16.50	/	/
	MCS3	15.54	/	/
	MCS4	14.54	/	/
	MCS5	13.83	/	/
	MCS6	13.32	/	/
	MCS7	12.69	/	/
	MCS8	11.94	/	/

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

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802.11n-HT40 mode

Mode	Data Rate (Index)	Test Result (dBm)	
		5755MHz (Ch151)	5795MHz (Ch159)
802.11n (40MHz)	MCS0	16.98	16.58
	MCS1	16.61	/
	MCS2	16.01	/
	MCS3	15.40	/
	MCS4	14.77	/
	MCS5	14.19	/
	MCS6	13.68	/
	MCS7	13.66	/

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	16.98	17.04
	MCS1	16.74	/
	MCS2	16.09	/
	MCS3	15.44	/
	MCS4	14.37	/
	MCS5	13.77	/
	MCS6	13.27	/
	MCS7	12.76	/
	MCS8	12.13	/
	MCS9	11.63	/

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

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802.11ac-VHT80 mode

Mode	Data Rate (Index)	Test Result (dBm)
		5775MHz (Ch155)
802.11ac (80MHz)	MCS0	16.89
	MCS1	16.21
	MCS2	15.12
	MCS3	14.54
	MCS4	13.55
	MCS5	12.94
	MCS6	12.45
	MCS7	11.72
	MCS8	11.14
	MCS9	10.55

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

The duty cycle of all mode are 100%

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Maximum output Power：11a CH149

Conclusion: PASS

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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: UT14a

Measurement Results:

TestMode	Frequency[MHz]	Result [dBm/500KHz]	Limit[dBm/500KHz]	Verdict
11A	5745	4.30	≤30.00	PASS
	5785	4.01	≤30.00	PASS
	5825	3.81	≤30.00	PASS
11AC20SISO	5745	4.09	≤30.00	PASS
	5785	4.22	≤30.00	PASS
	5825	4.07	≤30.00	PASS
11AC40SISO	5755	0.63	≤30.00	PASS
	5795	0.86	≤30.00	PASS
11AC80SISO	5775	-2.88	≤30.00	PASS

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Peak Power Spectral Density:11a CH149

Conclusion: PASS

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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: UT14a

Measurement Result:

TestMode	Frequency[MHz]	6db EBW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11A	5745	16.36	5736.80	5753.16	0.5	PASS
	5785	16.32	5776.80	5793.12	0.5	PASS
	5825	16.32	5816.80	5833.12	0.5	PASS
11AC20SISO	5745	17.56	5736.20	5753.76	0.5	PASS
	5785	17.56	5776.20	5793.76	0.5	PASS
	5825	17.56	5816.20	5833.76	0.5	PASS
11AC40SISO	5755	36.32	5736.84	5773.16	0.5	PASS
	5795	36.32	5776.84	5813.16	0.5	PASS
11AC80SISO	5775	76.32	5736.76	5813.08	0.5	PASS

Test graphs as below:

11A_5745

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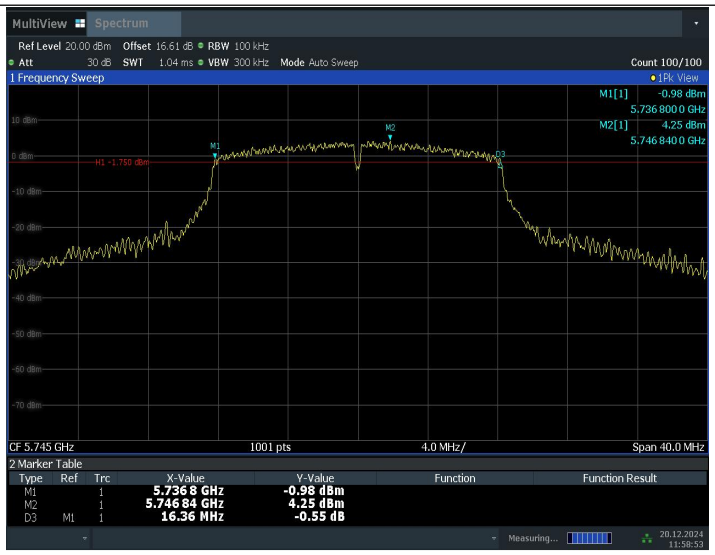

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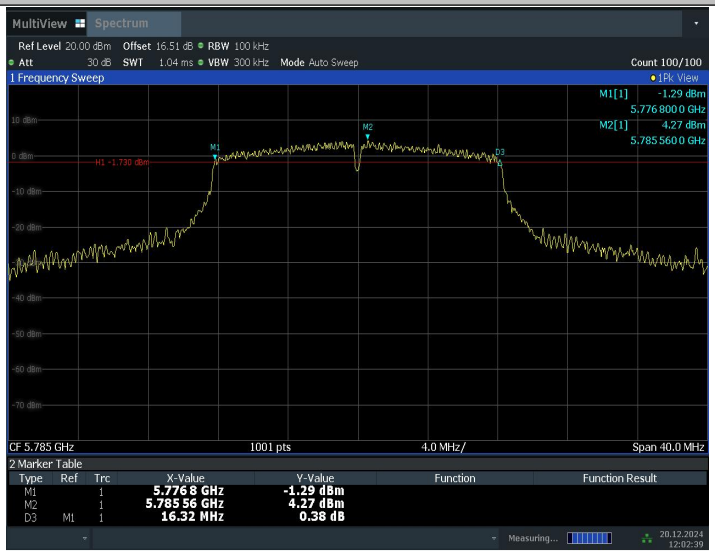

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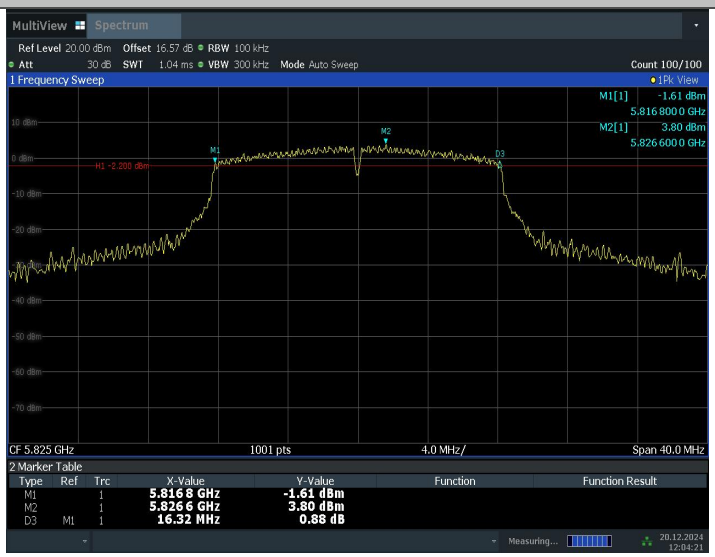

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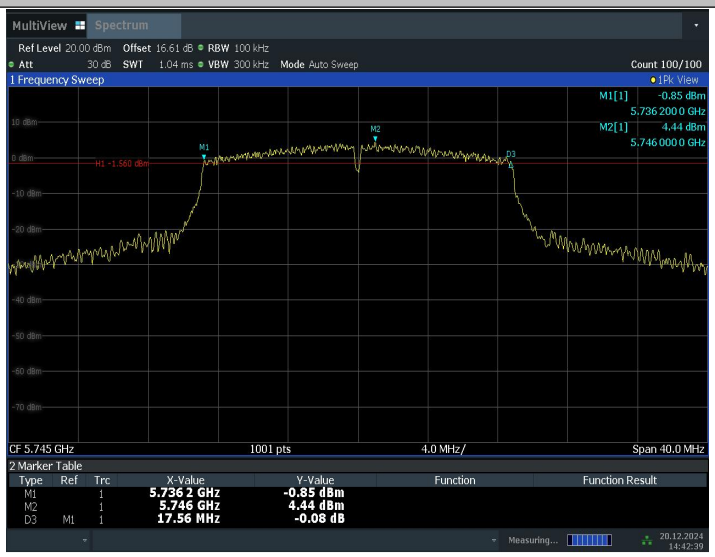 14:42:40 20.12.2024
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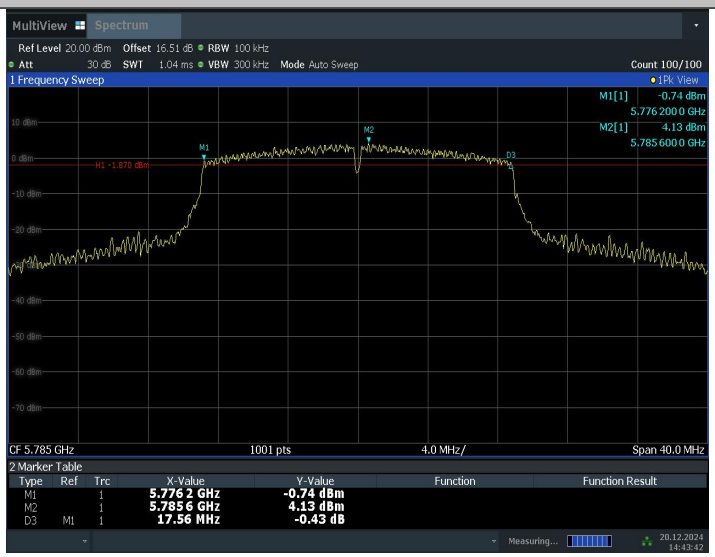 14:43:42 20.12.2024
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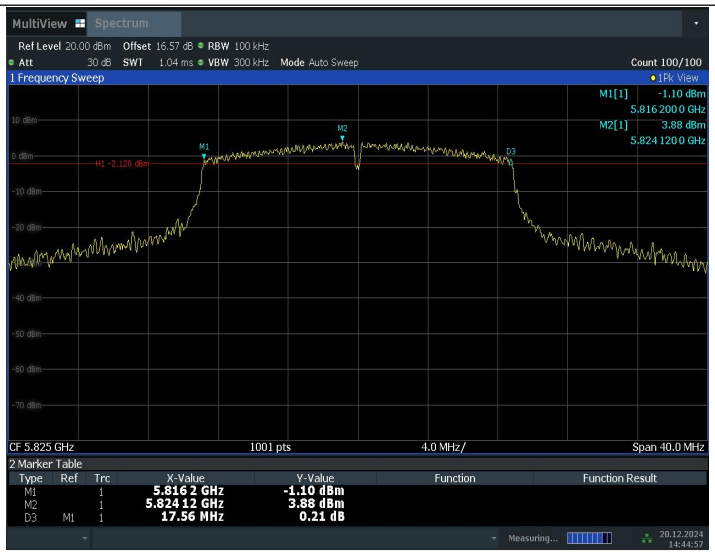

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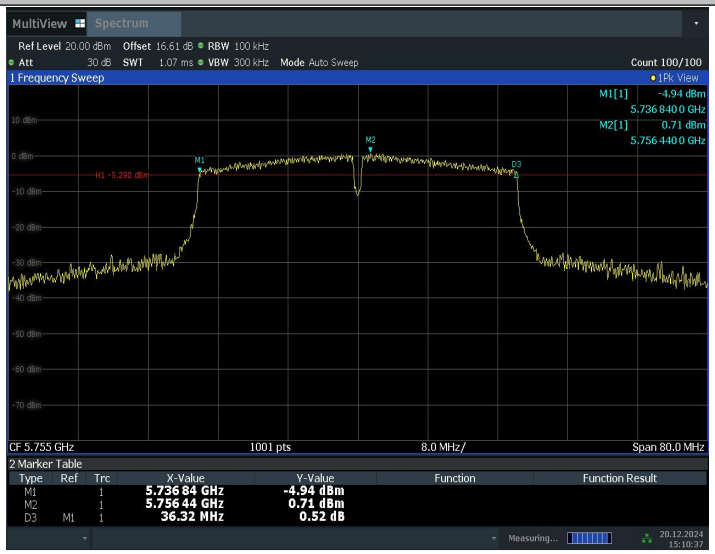

15:10:38 20.12.2024

11AC40SISO_5795

15:11:32 20.12.2024

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11AC80SISO_5775

Conclusion: PASS

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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).

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A.5.2 Test setup

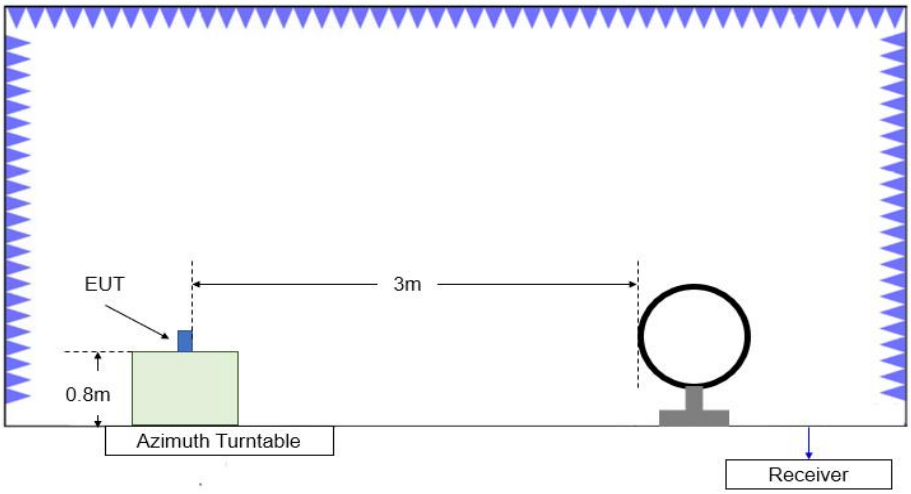

Figure A.5.1. Test Site Diagram (9kHz-30MHz)

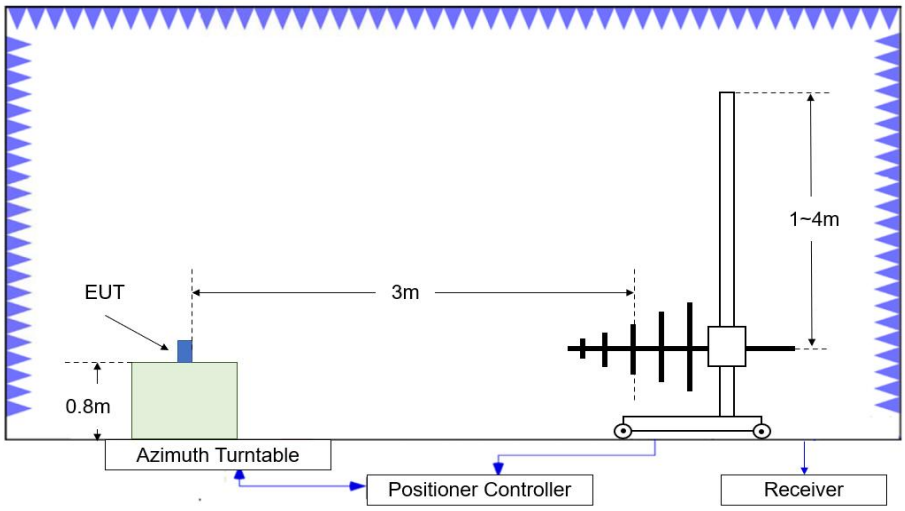

Figure A.5.2. Test Site Diagram (30MHz-1GHz)

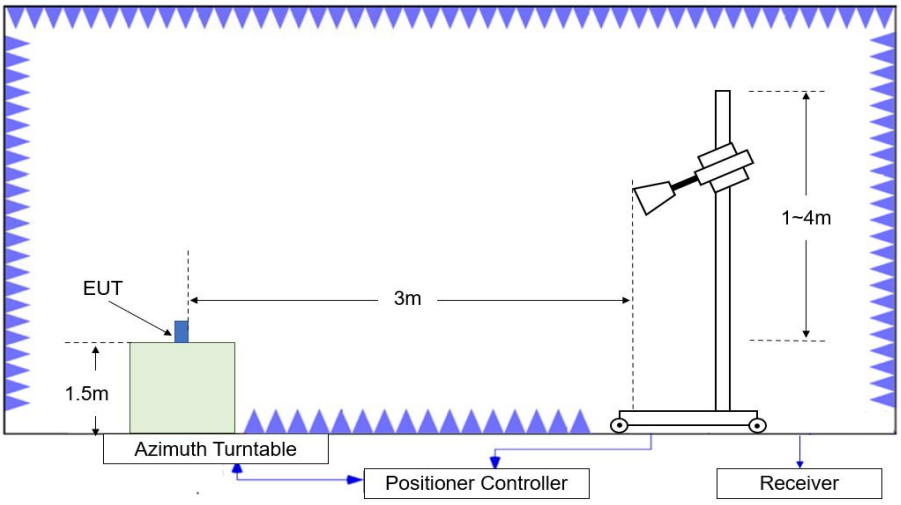

Figure A.5.3. Test Site Diagram (1GHz-40GHz)

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A.5.3 Test Procedures

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

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. Measurement frequencies were performed from 9 kHz to 40GHz.

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A.5.5 Measurement Result

Average Results：

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)
5411.250	45.2	-22.4	34.3	33.31	54.0	8.8	V
5459.100	45.3	-22.5	34.5	33.28	54.0	8.7	V
11490.000	35.4	-28.3	38.1	25.56	54.0	18.6	V
16168.400	39.0	-22.6	41.0	20.55	54.0	15.0	H
17893.600	40.4	-21.0	40.5	20.89	54.0	13.6	V
17950.400	40.5	-20.8	40.6	20.83	54.0	13.5	H

Channel 157

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)
5409.050	45.0	-22.4	34.3	33.12	54.0	9.0	V
5458.850	45.1	-22.5	34.5	33.12	54.0	8.9	V
11570.000	35.2	-28.6	38.4	25.41	54.0	18.8	V
15862.000	39.1	-23.3	40.9	21.55	54.0	14.9	V
17887.200	39.1	-21.0	40.5	19.58	54.0	14.9	H
17950.400	39.1	-20.8	40.6	19.38	54.0	14.9	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)
5454.850	45.3	-22.5	34.5	33.38	54.0	8.7	V
5458.900	45.4	-22.5	34.5	33.39	54.0	8.6	V
11650.000	35.5	-28.4	38.5	25.45	54.0	18.5	H
16001.600	39.3	-23.4	40.8	21.87	54.0	14.7	V
17885.600	39.1	-21.0	40.5	19.51	54.0	14.9	V
17949.600	39.0	-20.8	40.5	19.34	54.0	15.0	V

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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)
5458.250	45.3	-22.5	34.5	33.31	54.0	8.7	V
5459.500	45.3	-22.5	34.5	33.32	54.0	8.7	V
11490.000	34.9	-28.3	38.1	25.12	54.0	19.1	V
16001.600	39.4	-23.4	40.8	21.98	54.0	14.6	H
17882.800	39.3	-21.0	40.5	19.79	54.0	14.7	H
17950.800	39.3	-20.8	40.6	19.59	54.0	14.7	V

Channel 157

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)
5409.650	45.0	-22.4	34.3	33.11	54.0	9.0	V
5458.600	45.0	-22.5	34.5	33.05	54.0	9.0	V
11570.000	35.7	-28.6	38.4	25.86	54.0	18.3	V
15864.400	39.5	-23.3	40.9	21.91	54.0	14.5	V
17883.600	39.5	-21.0	40.5	19.93	54.0	14.5	V
17950.400	39.5	-20.8	40.6	19.79	54.0	14.5	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)
5459.000	45.2	-22.5	34.5	33.26	54.0	8.8	V
5459.800	45.3	-22.5	34.5	33.30	54.0	8.7	V
11650.000	35.6	-28.4	38.5	25.56	54.0	18.4	H
15861.200	39.4	-23.3	40.9	21.91	54.0	14.6	V
17889.600	39.3	-21.0	40.5	19.80	54.0	14.7	V
17953.200	39.4	-20.9	40.6	19.71	54.0	14.6	V

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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)
5459.050	45.1	-22.5	34.5	33.08	54.0	8.9	V
5459.750	45.1	-22.5	34.5	33.10	54.0	8.9	V
11510.000	35.6	-28.4	38.1	25.83	54.0	18.4	V
16168.000	39.5	-22.6	41.0	21.09	54.0	14.5	H
17792.000	39.4	-21.3	40.6	20.14	54.0	14.6	V
17884.800	39.5	-21.0	40.5	19.94	54.0	14.5	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)
5459.100	45.0	-22.5	34.5	33.06	54.0	9.0	V
5459.650	45.1	-22.5	34.5	33.08	54.0	8.9	V
11590.000	36.1	-27.7	38.5	25.36	54.0	17.9	V
16100.400	39.7	-23.5	41.1	22.06	54.0	14.3	H
17886.800	39.7	-21.0	40.5	20.19	54.0	14.3	H
17962.000	39.5	-21.0	40.6	19.87	54.0	14.5	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)
5407.450	45.1	-22.5	34.3	33.24	54.0	8.9	V
5459.600	45.0	-22.5	34.5	33.04	54.0	9.0	V
11490.000	35.4	-28.3	38.1	25.58	54.0	18.6	V
16010.400	39.9	-23.5	40.8	22.63	54.0	14.1	V
17791.200	39.8	-21.3	40.6	20.59	54.0	14.2	H
17885.200	40.1	-21.0	40.5	20.59	54.0	13.9	H

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Channel 157

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)
5411.900	45.0	-22.4	34.3	33.04	54.0	9.0	V
5458.850	45.0	-22.5	34.5	33.04	54.0	9.0	V
11570.000	35.7	-28.6	38.4	25.91	54.0	18.3	H
15988.000	39.7	-23.3	40.8	22.19	54.0	14.3	V
17888.800	40.0	-21.0	40.5	20.52	54.0	14.0	V
17953.200	40.0	-20.9	40.6	20.29	54.0	14.0	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)
5409.300	45.1	-22.4	34.3	33.22	54.0	8.9	V
5460.000	45.0	-22.5	34.5	33.02	54.0	9.0	V
11650.000	35.0	-28.4	38.5	24.89	54.0	19.0	H
16101.200	38.4	-23.5	41.1	20.84	54.0	15.6	H
17843.200	38.9	-21.3	40.6	19.62	54.0	15.1	H
17892.000	39.0	-21.0	40.5	19.48	54.0	15.0	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)
5456.050	45.1	-22.5	34.5	33.13	54.0	8.9	V
5458.350	45.1	-22.5	34.5	33.13	54.0	8.9	V
11510.000	35.4	-28.4	38.1	25.61	54.0	18.6	H
16010.000	39.0	-23.5	40.8	21.73	54.0	15.0	H
17885.200	39.7	-21.0	40.5	20.19	54.0	14.3	H
17952.000	39.7	-20.9	40.6	19.98	54.0	14.3	H

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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)
5448.600	44.9	-22.6	34.5	33.03	54.0	9.1	V
5458.500	45.1	-22.5	34.5	33.12	54.0	8.9	V
11590.000	36.0	-27.7	38.5	25.22	54.0	18.0	H
16101.600	38.4	-23.5	41.1	20.82	54.0	15.6	V
17792.000	39.1	-21.3	40.6	19.90	54.0	14.9	V
17951.200	39.7	-20.8	40.6	20.01	54.0	14.3	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)
5408.250	45.3	-22.4	34.3	33.37	54.0	8.7	H
5455.200	45.3	-22.5	34.5	33.32	54.0	8.7	H
11550.000	35.3	-28.2	38.3	25.22	54.0	18.7	H
16103.600	38.4	-23.5	41.1	20.87	54.0	15.6	V
17828.800	39.7	-21.4	40.6	20.51	54.0	14.3	V
17946.400	39.9	-21.0	40.5	20.36	54.0	14.1	H

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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)
5651.811	57.2	-22.5	34.7	45.04	68.2	11.0	H
5653.565	57.4	-22.5	34.7	45.25	68.2	10.8	H
11490.200	48.7	-28.3	38.1	38.88	74.0	25.3	H
16572.750	53.7	-22.6	41.2	35.06	68.2	14.5	V
17236.050	52.3	-22.4	40.9	33.83	68.2	15.9	H
17542.400	54.2	-20.8	40.8	34.28	68.2	14.0	V

Channel 157

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)
5744.000	59.2	-22.0	34.3	46.91	68.2	9.0	V
5834.200	59.6	-22.0	34.8	46.81	68.2	8.6	V
11569.950	47.4	-28.6	38.4	37.62	74.0	26.6	H
16625.550	53.3	-22.5	41.3	34.55	68.2	14.9	V
17537.450	53.1	-20.9	40.8	33.22	68.2	15.1	V
17354.850	51.5	-21.9	40.7	32.64	68.2	16.7	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)
5920.555	56.5	-22.0	34.8	43.77	68.2	11.7	H
5922.424	56.2	-22.0	34.8	43.38	68.2	12.0	H
11650.250	48.9	-28.4	38.5	38.82	74.0	25.1	H
17438.450	53.4	-21.7	40.7	34.38	68.2	14.8	V
17474.750	51.3	-21.8	40.8	32.39	68.2	16.9	H
17550.650	53.3	-21.5	40.7	34.02	68.2	14.9	H

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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)
5650.109	55.6	-22.5	34.7	43.45	68.2	12.6	H
5650.460	56.9	-22.5	34.7	44.76	68.2	11.3	V
11490.200	47.2	-28.3	38.1	37.36	74.0	26.8	V
16940.150	53.6	-22.4	41.3	34.71	68.2	14.6	H
17234.950	50.6	-22.4	40.9	32.11	68.2	17.6	V
17536.350	53.5	-21.0	40.8	33.75	68.2	14.7	V

Channel 157

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)
5739.400	56.7	-22.2	34.3	44.61	68.2	11.5	V
5853.200	57.2	-21.9	34.9	44.17	68.2	11.0	V
11569.950	47.7	-28.6	38.4	37.93	74.0	26.3	H
16460.550	53.8	-22.7	41.0	35.46	68.2	14.4	V
17005.600	53.2	-22.1	41.1	34.19	68.2	15.0	H
17354.850	52.3	-21.9	40.7	33.48	68.2	15.9	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)
5924.419	56.5	-22.0	34.8	43.68	68.2	11.7	V
5924.632	56.6	-22.0	34.8	43.86	68.2	11.6	V
11650.250	47.8	-28.4	38.5	37.69	74.0	26.2	H
16653.050	54.0	-22.6	41.4	35.27	68.2	14.2	H
17056.200	54.0	-22.4	41.0	35.40	68.2	14.2	H
17474.750	51.2	-21.8	40.8	32.28	68.2	17.0	V

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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)
5650.023	54.6	-22.5	34.7	42.43	68.2	13.6	V
5650.293	55.4	-22.5	34.7	43.19	68.2	12.8	V
11510.000	48.0	-28.4	38.1	38.28	74.0	26.0	H
17034.750	54.0	-22.6	41.1	35.54	68.2	14.2	H
17265.200	50.7	-22.2	40.8	31.99	68.2	17.6	H
17357.050	52.9	-21.9	40.7	34.09	68.2	15.3	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)
5924.897	56.3	-22.0	34.8	43.52	68.2	11.9	H
5924.908	56.6	-22.0	34.8	43.78	68.2	11.6	H
11589.750	49.1	-27.7	38.5	38.36	74.0	24.9	H
16648.100	53.7	-22.7	41.3	35.12	68.2	14.5	V
17385.100	52.3	-21.9	40.7	33.39	68.2	15.9	V
17413.150	53.4	-21.9	40.7	34.54	68.2	14.8	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)
5651.012	55.3	-22.5	34.7	43.18	68.2	12.9	H
5654.715	55.6	-22.5	34.7	43.51	68.2	12.6	H
11488.000	49.1	-28.3	38.1	39.24	74.0	24.9	H
16528.200	53.4	-22.6	41.2	34.79	68.2	14.8	H
17235.500	52.2	-22.4	40.9	33.67	68.2	16.0	H
17654.050	53.7	-21.3	40.6	34.43	68.2	14.5	H

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Channel 157

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)
5742.200	59.5	-22.1	34.3	47.33	68.2	8.7	H
5831.400	58.7	-22.0	34.8	45.92	68.2	9.5	V
11567.200	48.9	-28.5	38.4	39.10	74.0	25.1	V
16293.900	53.6	-22.2	40.9	34.89	68.2	14.6	H
17049.600	53.5	-22.5	41.1	34.93	68.2	14.7	H
17355.400	52.6	-21.9	40.7	33.76	68.2	15.6	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)
5921.458	56.7	-22.0	34.8	43.89	68.2	11.5	V
5924.563	56.6	-22.0	34.8	43.85	68.2	11.6	V
11648.600	48.3	-28.4	38.5	38.28	74.0	25.7	V
16588.150	53.3	-22.3	41.3	34.28	68.2	14.9	H
17091.950	53.5	-22.4	41.0	34.81	68.2	14.7	H
17474.750	52.1	-21.8	40.8	33.14	68.2	16.1	V

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)
5650.006	55.1	-22.5	34.7	42.97	68.2	13.1	V
5650.477	55.3	-22.5	34.7	43.11	68.2	12.9	V
11510.000	49.0	-28.4	38.1	39.20	74.0	25.0	H
16642.050	53.8	-22.7	41.3	35.14	68.2	14.4	V
17112.300	54.3	-22.3	41.0	35.68	68.2	13.9	H
17265.750	51.8	-22.2	40.8	33.15	68.2	16.4	H

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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)
5924.764	56.3	-22.0	34.8	43.50	68.2	11.9	H
5924.822	55.8	-22.0	34.8	43.06	68.2	12.4	H
11588.650	48.9	-27.8	38.5	38.24	74.0	25.1	H
16650.850	53.7	-22.7	41.4	35.08	68.2	14.5	V
17197.550	53.7	-22.2	40.9	34.95	68.2	14.5	V
17385.650	51.6	-21.9	40.7	32.75	68.2	16.6	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)
5653.927	62.1	-22.5	34.7	49.93	68.2	6.1	H
5924.126	63.7	-22.0	34.8	50.94	68.2	4.5	H
11549.050	48.7	-28.2	38.3	38.63	74.0	25.3	V
17106.250	54.1	-22.3	41.0	35.44	68.2	14.1	V
17326.250	53.1	-22.1	40.8	34.39	68.2	15.1	H
17434.600	54.9	-21.7	40.7	35.80	68.2	13.3	V

Conclusion: PASS

Note:

1. The spurious emission above 18G is noise only.
2. All emissions below 30MHz are more than 20 dB below the limit

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Band edge compliance

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 Fig.12	P

Conclusion: PASS

Test graphs as below:

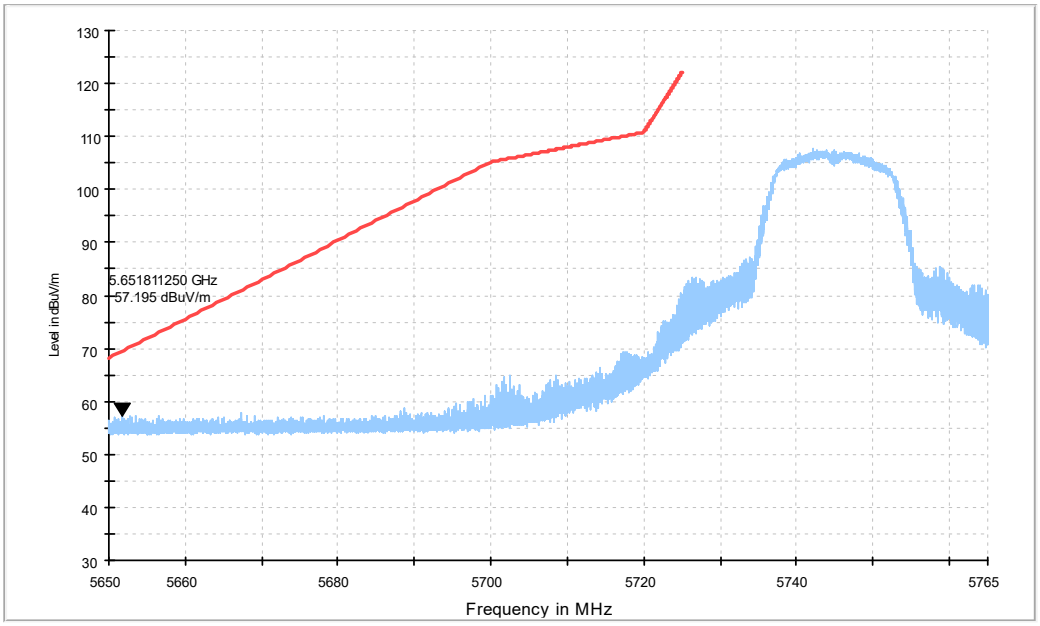

Fig. 1 Band Edges (802.11a Ch149, 5745MHz)

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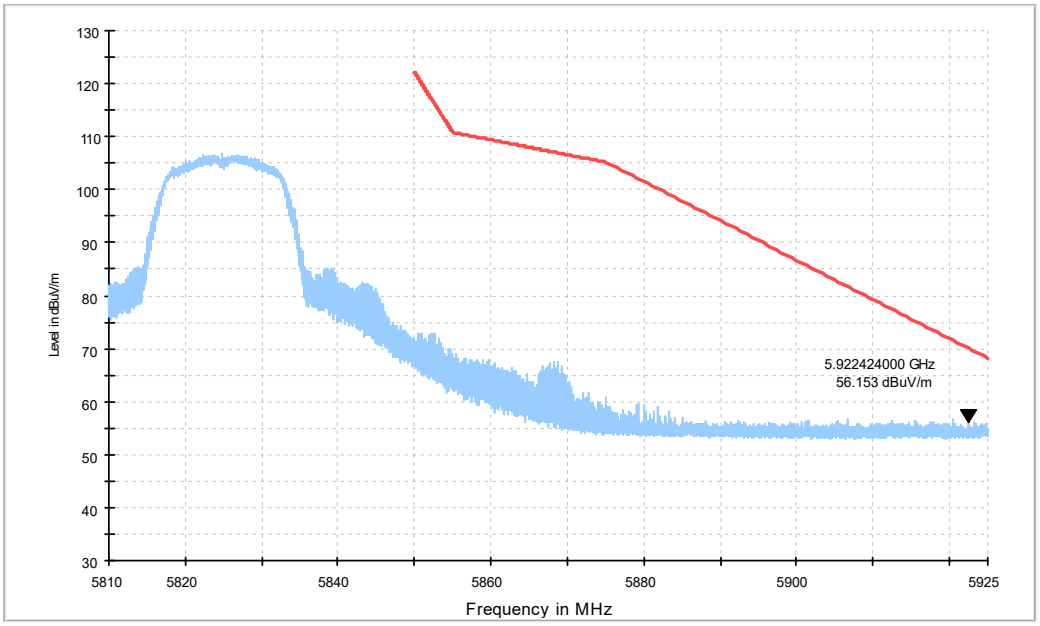

Fig. 2 Band Edges (802.11a Ch165, 5825MHz)

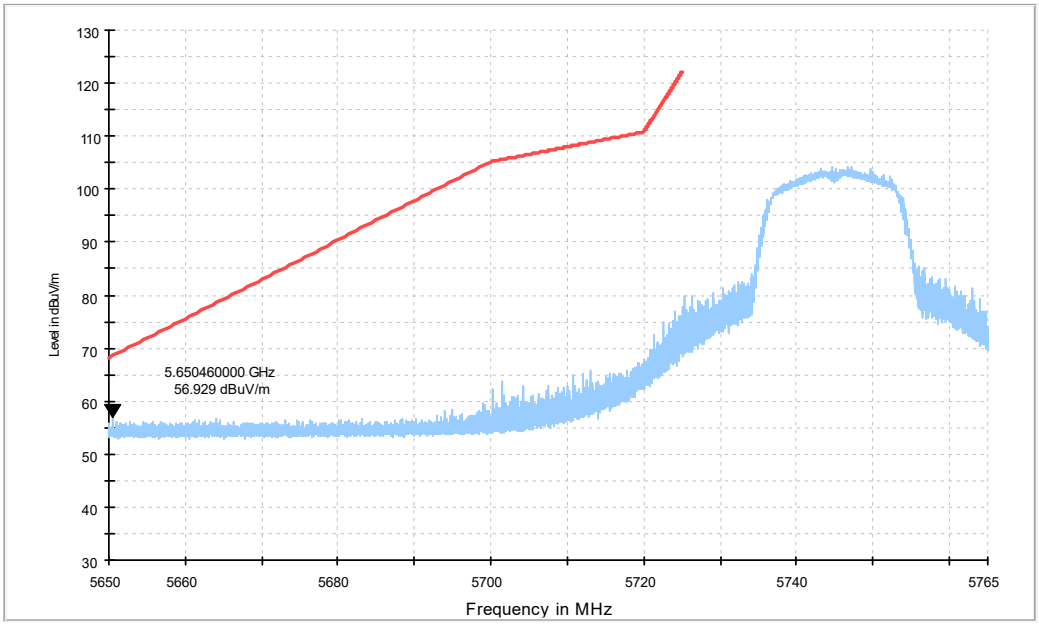

Fig. 3 Band Edges (802.11n-HT20 Ch149, 5745MHz)

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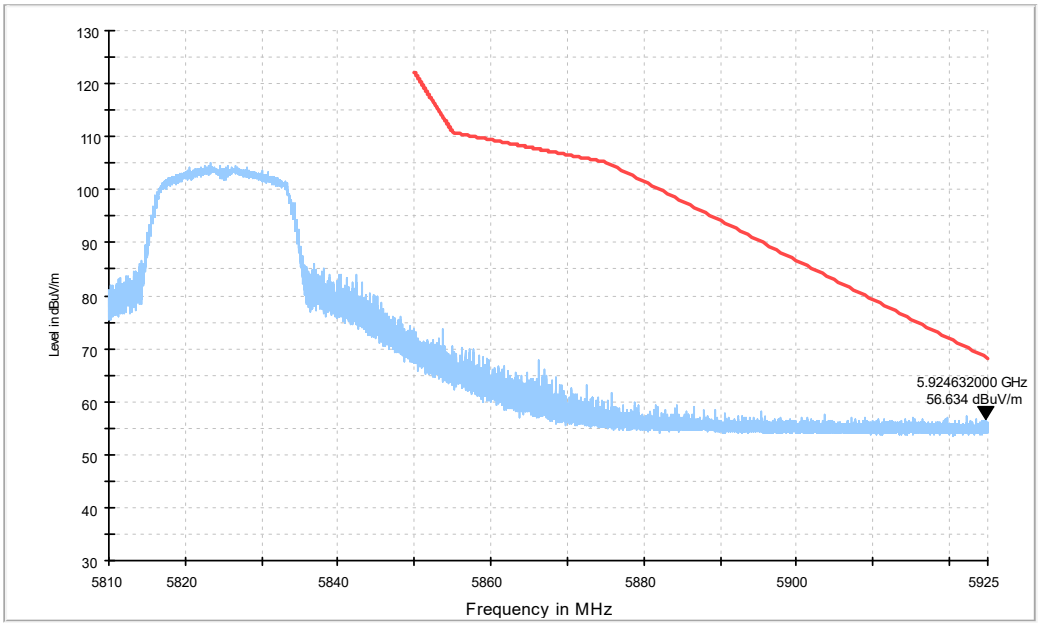

Fig. 4 Band Edges (802.11n-HT20 Ch165, 5825MHz)

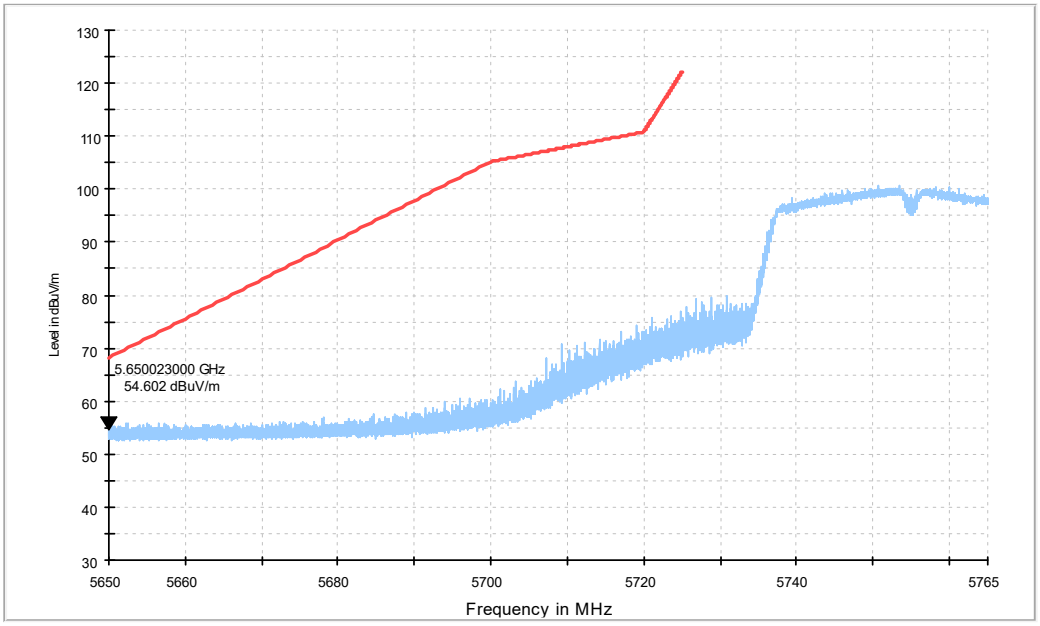

Fig. 5 Band Edges (802.11n-HT40 Ch151, 5755MHz)

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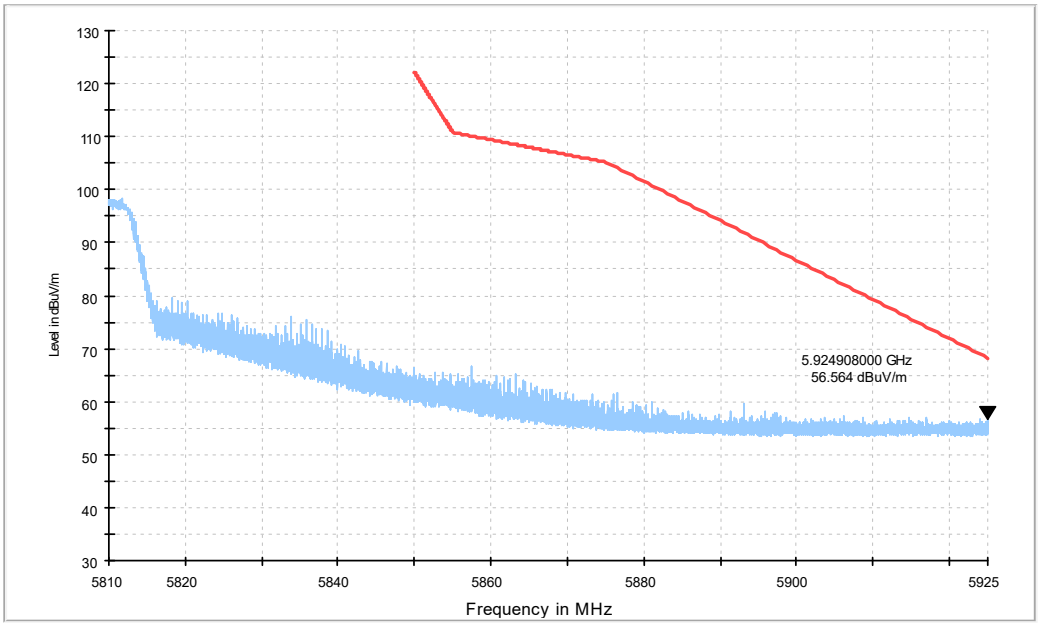

Fig. 6 Band Edges (802.11n-HT40 Ch159, 5795MHz)

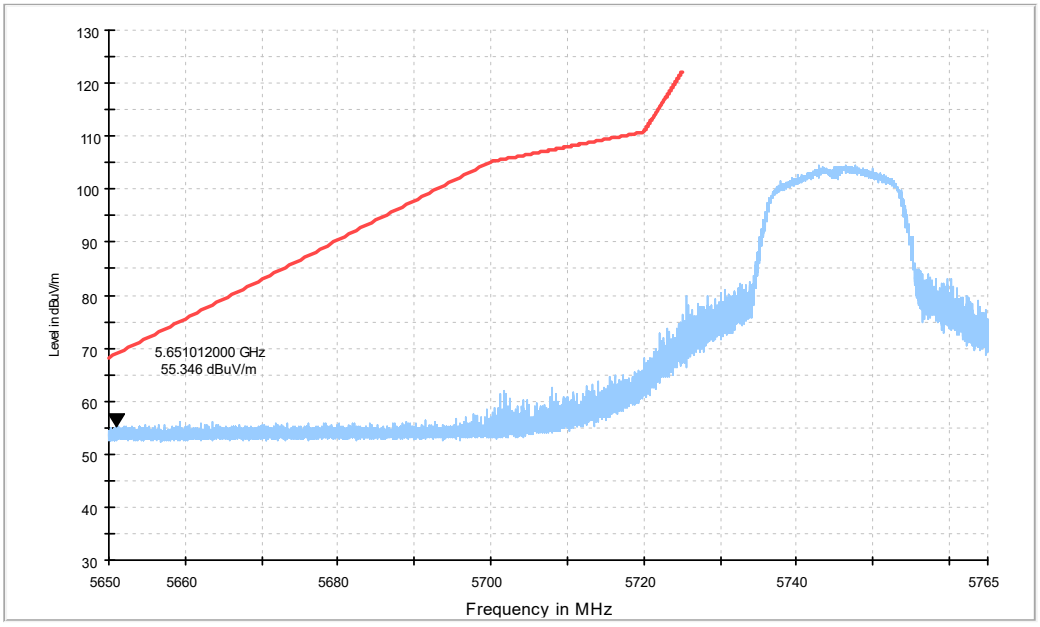

Fig. 7 Band Edges (802.11ac-HT20 Ch149, 5745MHz)

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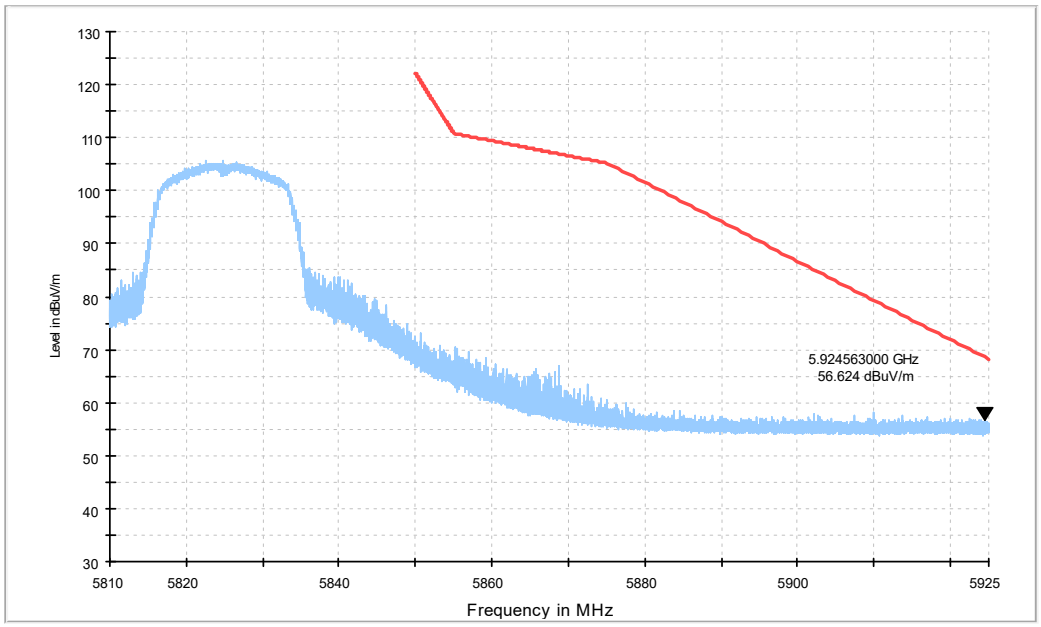

Fig. 8 Band Edges (802.11ac-HT20 Ch165, 5825MHz)

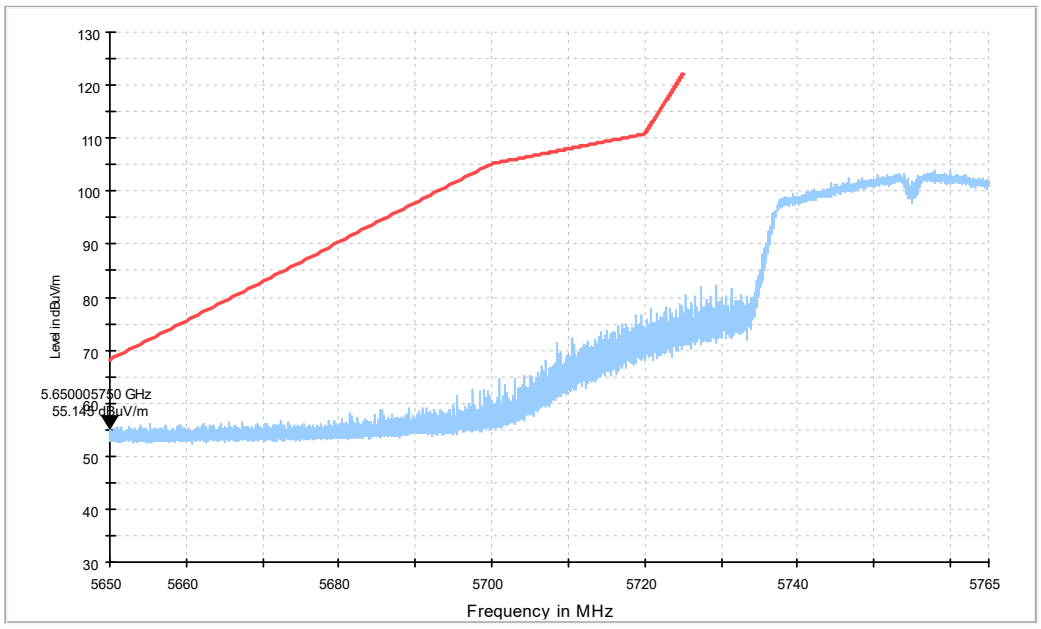

Fig. 9 Band Edges (802.11ac-HT40 Ch151, 5755MHz)

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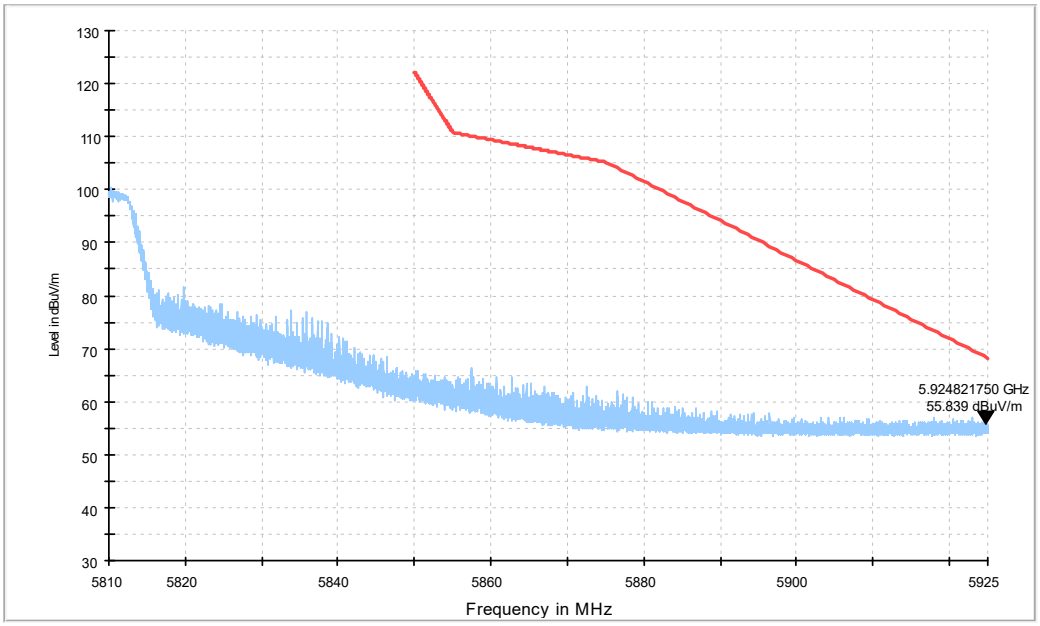

Fig. 10 Band Edges (802.11ac-HT40 Ch159, 5795MHz)

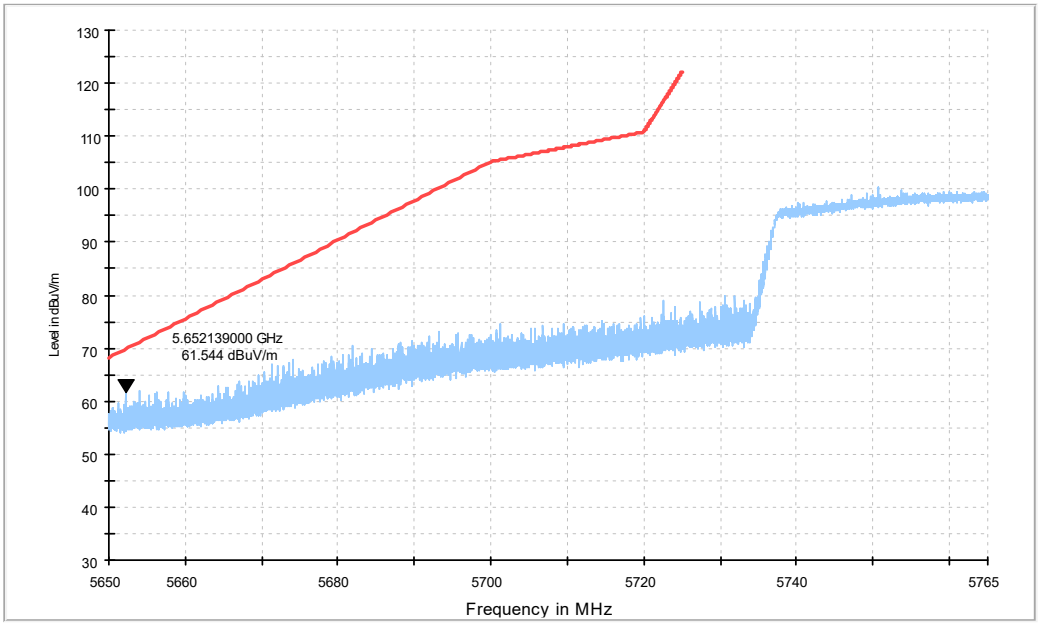

Fig. 11 Band Edges (802.11ac-HT80 Ch155, 5775MHz)

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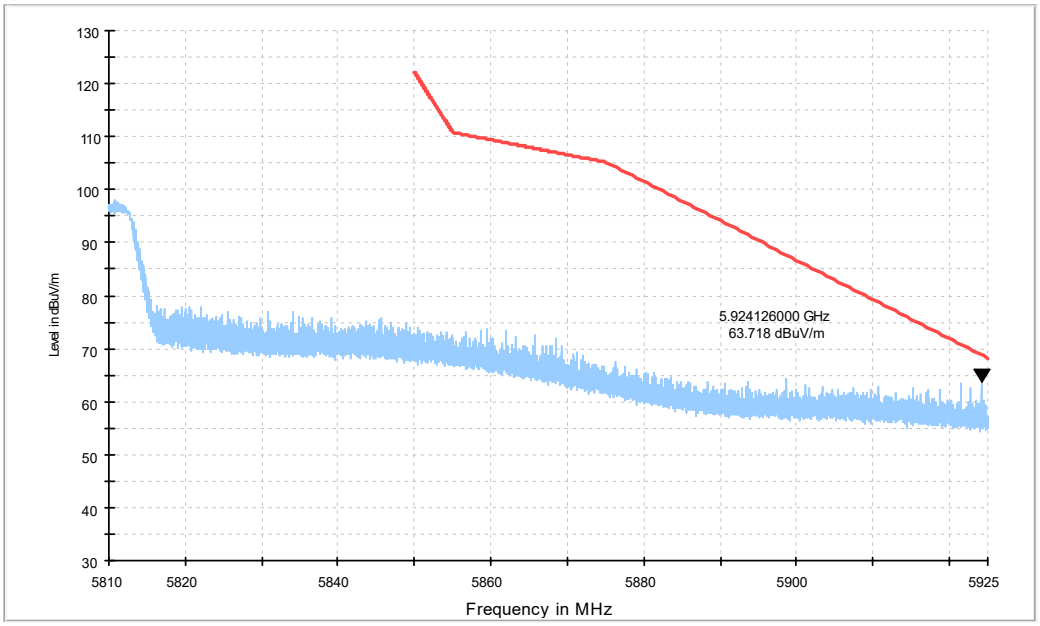

Fig. 12 Band Edges (802.11ac-HT80, Ch155, 5775MHz)

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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.

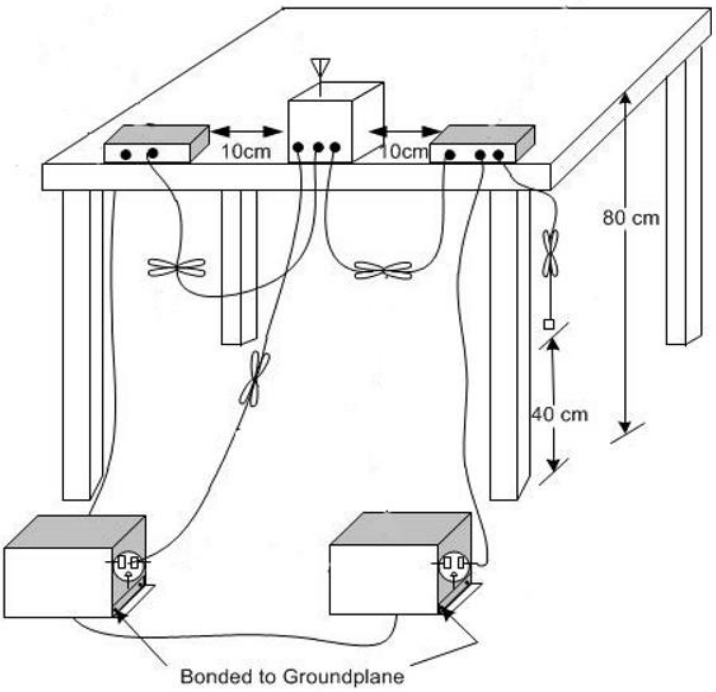
The measurement bandwidth is:

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



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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:

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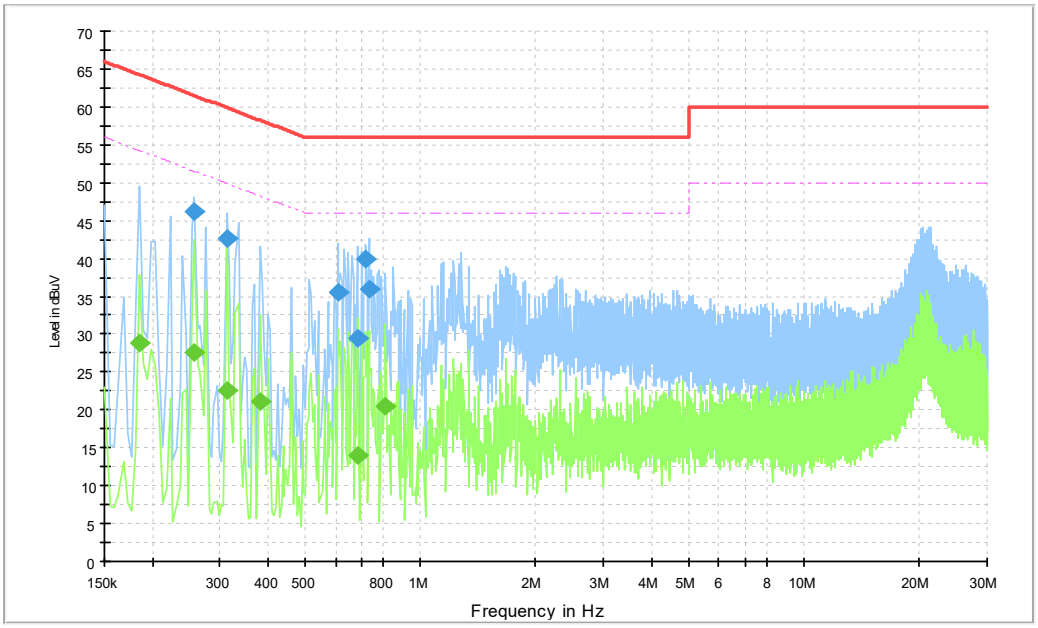

Fig.A.6.1. AC Powerline Conducted Emission-Idle

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.258000	46.2	2000.0	9.000	On	L1	19.8	15.3	61.5
0.312000	42.6	2000.0	9.000	On	L1	19.8	17.3	59.9
0.609000	35.5	2000.0	9.000	On	N	19.9	20.5	56.0
0.685500	29.5	2000.0	9.000	On	N	19.9	26.5	56.0
0.721500	39.9	2000.0	9.000	On	L1	19.9	16.1	56.0
0.735000	35.9	2000.0	9.000	On	N	19.9	20.1	56.0

Final Result 2

Frequency (MHz)	Average (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.186000	28.9	2000.0	9.000	On	N	19.8	25.3	54.2
0.258000	27.6	2000.0	9.000	On	N	19.8	23.9	51.5
0.312000	22.7	2000.0	9.000	On	N	19.8	27.3	49.9
0.384000	21.1	2000.0	9.000	On	N	19.9	27.1	48.2
0.685500	14.0	2000.0	9.000	On	N	19.9	32.0	46.0
0.811500	20.4	2000.0	9.000	On	L1	19.8	25.6	46.0

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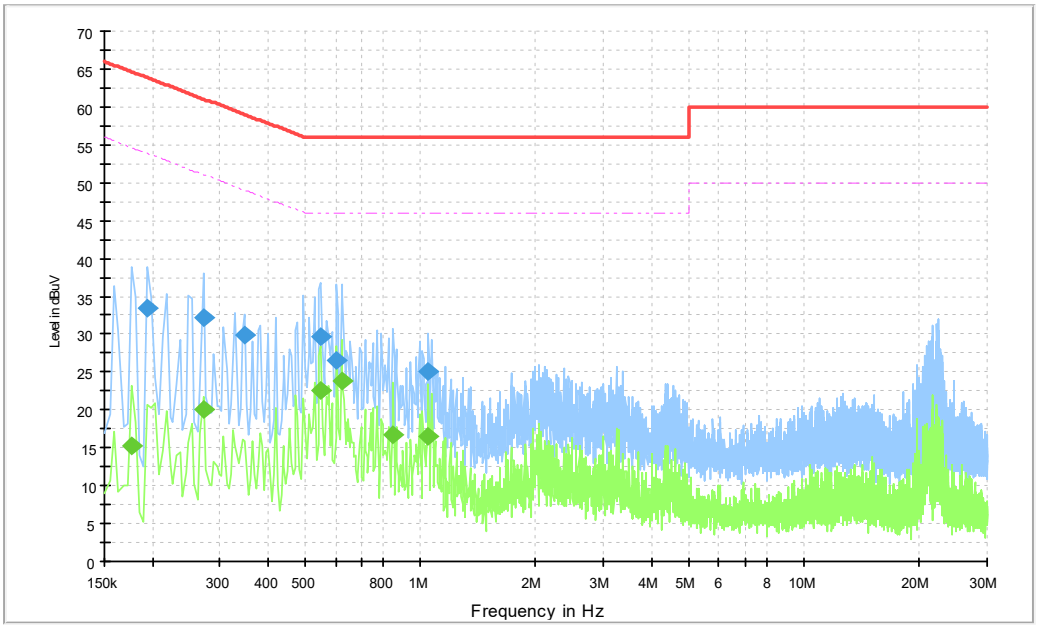

Fig.A.6.2. AC Powerline Conducted Emission-Idle

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.195000	33.5	2000.0	9.000	On	L1	19.9	30.3	63.8
0.271500	32.2	2000.0	9.000	On	L1	19.8	28.9	61.1
0.348000	30.0	2000.0	9.000	On	N	19.8	29.1	59.0
0.550500	29.6	2000.0	9.000	On	N	19.9	26.4	56.0
0.604500	26.4	2000.0	9.000	On	N	19.9	29.6	56.0
1.050000	25.0	2000.0	9.000	On	L1	19.7	31.0	56.0

Final Result 2

Frequency (MHz)	Average (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.177000	15.2	2000.0	9.000	On	L1	19.8	39.5	54.6
0.271500	20.0	2000.0	9.000	On	L1	19.8	31.1	51.1
0.550500	22.6	2000.0	9.000	On	L1	19.9	23.4	46.0
0.622500	23.8	2000.0	9.000	On	L1	19.9	22.2	46.0
0.847500	16.7	2000.0	9.000	On	L1	19.8	29.3	46.0
1.050000	16.5	2000.0	9.000	On	L1	19.7	29.5	46.0

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A.7. 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 *****

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