4.5 Frequency Stability

Test Procedures

The EUT was placed inside of an environmental chamber as the temperature in the chamber was varied between 0 ℃ and +45 ℃(Declaration by the Manufacturer). The temperature was incremented by 10 ℃(5 ℃) intervals and the unit was allowed to stabilize at each temperature before each measurement. The center frequency of the transmitting channel was evaluated at each temperature and the frequency deviation from the channel's center frequency was recorded.

Data for the worst case channel is shown below.

Temperature (℃)	-40	-30	-20	-10	0	10
Frequency	Measured Frequency Error (kHz)					
5 180 MHz	-21.231	14.153	33.091	40.168	36.110	42.279
5 200 MHz	-20.879	14.294	33.382	40.274	36.323	42.413
5 240 MHz	-20.856	14.585	33.588	40.716	36.644	42.720
5 745 MHz	-22.417	16.150	37.123	44.544	40.187	46.595
5 785 MHz	-22.703	16.122	37.303	44.836	40.483	46.928
5 825 MHz	-23.090	16.234	37.519	45.250	40.649	47.332

Temperature (℃)	20	30	40	50	60	65
Frequency	Measured Frequency Error (kHz)					
5 180 MHz	15.404	-7.427	-24.930	-38.846	-45.572	-44.725
5 200 MHz	15.101	-7.549	-25.099	-39.127	-45.756	-44.798
5 240 MHz	15.141	-7.683	-25.316	-39.539	-46.042	-45.132
5 745 MHz	16.228	-8.547	-27.905	-43.485	-50.487	-49.366
5 785 MHz	16.303	-8.572	-28.090	-43.852	-50.877	-49.712
5 825 MHz	16.421	-8.670	-28.256	-44.078	-51.230	-50.052

Note :

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature range as tested.

4.6 Unwanted Emissions

Test Location

☒ 10 m SAC (test distance : ☐ 10 m, ☒ 3 m)
☒ 3 m SAC (test distance : 3 m)

Test Procedures

1) In the frequency range of 9 kHz to 30 MHz, magnetic field is measured with Loop Antenna. The Test Antenna is positioned with its plane vertical at 1m distance from the EUT. The center of the Loop Test Antenna is 1m above the ground. During the measurement the Loop Test Antenna rotates about its vertical axis for maximum response at each azimuth about the EUT.
2) In the frequency rage above 30 MHz, Bi-Log Test Antenna(30 MHz to 1 GHz) and Horn Test Antenna(above 1 GHz) are used. Test Antenna is 3m away from the EUT. Test Antenna height is carried from 1m to 4m above the ground to determine the maximum value of the field strength. The emissions levels at both horizontal and vertical polarizations should be tested.

Test Settings:

Frequency Range = 9 kHz ~ 1 GHz

a) RBW = 100 kHz for f < 1 GHz, 9 kHz for f < 30 MHz

b) VBW ≥ RBW

c) Detector = CISPR Quasi-peak

d) Sweep time = auto couple

- Peak

Frequency Range = 1 GHz ~ 40 GHz

a) RBW = 1 MHz

b) VBW ≥ 3 x RBW

c) Detector = Peak

d) Sweep time = auto

e) Trace mode = max hold

- Average (duty cycle ≥ 98%)

Frequency Range = 1 GHz ~ 40 GHz

a) RBW = 1 MHz

b) VBW ≥ 3 x RBW

c) Detector = RMS

d) Sweep time = auto

e) Averaging type = power (i.e., RMS)

f) Trace mode = average (at least 100 traces)

- Average (duty cycle < 98%)

Frequency Range = 1 GHz ~ 40 GHz

a) RBW = 1 MHz

b) VBW ≥ 3 x RBW

c) Detector = RMS

d) Sweep time = auto

e) Averaging type = power (i.e., RMS)

f) Trace mode = average (at least 100 traces)

If power averaging (RMS) mode, then the applicable correction factor is 10 log(1/x), where x is the duty cycle.

Test mode	Duty Cycle Factor (dB)
802.11a	0.11
802.11n_HT20	0.00
802.11n_HT40	0.10
802.11ac_VHT20	0.00
802.11ac_VHT40	0.09
802.11ac_VHT80	0.24

Limit

- **15.209(a)**

Frequency(MHz)	Field Strength uV/m@3m	Field Strength dBuV/m@3m	Deasurement Distance (meters)
0.009-0.490	2400/F(kHz)	-	300
0.490-1.705	24000/F(kHz)	-	30
1.705-30	30	-	30
30-88	100**	40	3
88-216	150**	43.5	3
216-960	200**	46	3
Above 960	500	54	3

** Except as provided in 15.209(g).fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72MHz, 76-88MHz, 174-216MHz, 470-806MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g.15.231 and 15.241.

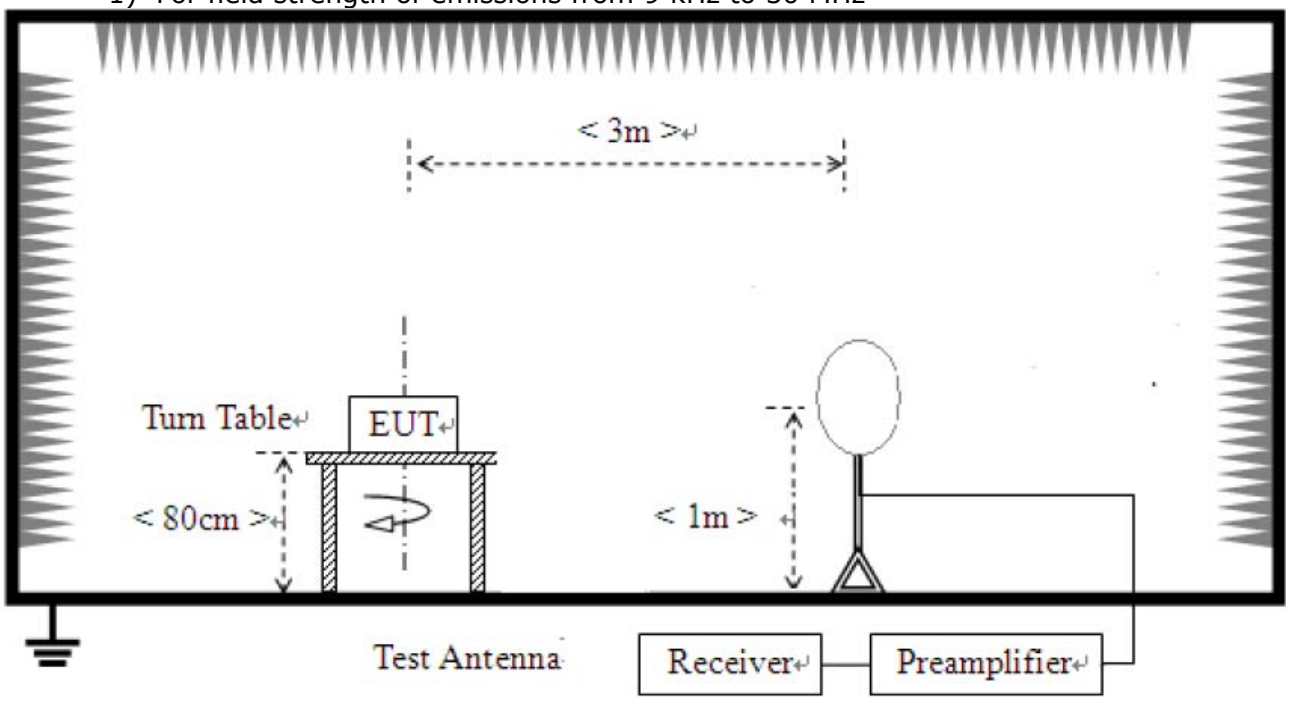
- **15.407, KDB 789033**

E.I.R.P -27 dBm/MHz

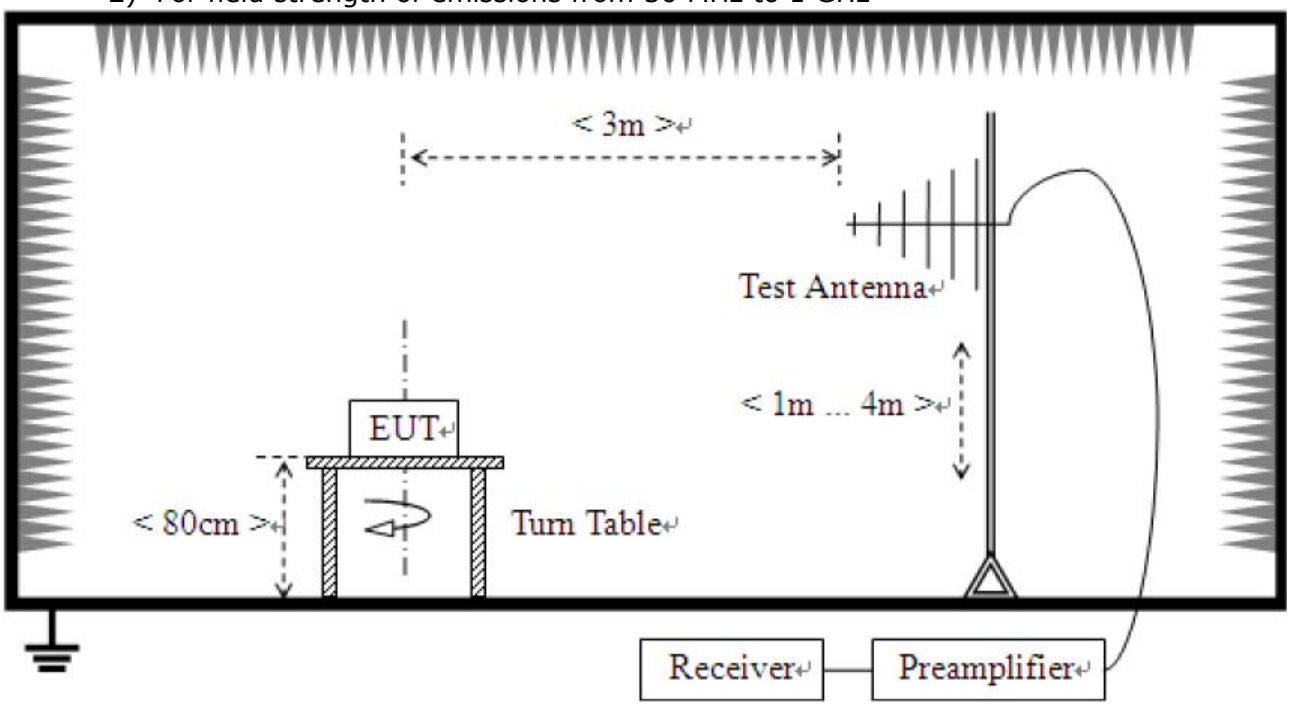
E[dBuV/m] = EIRP[dBm] + 95.2, for d = 3m

Test Setup:

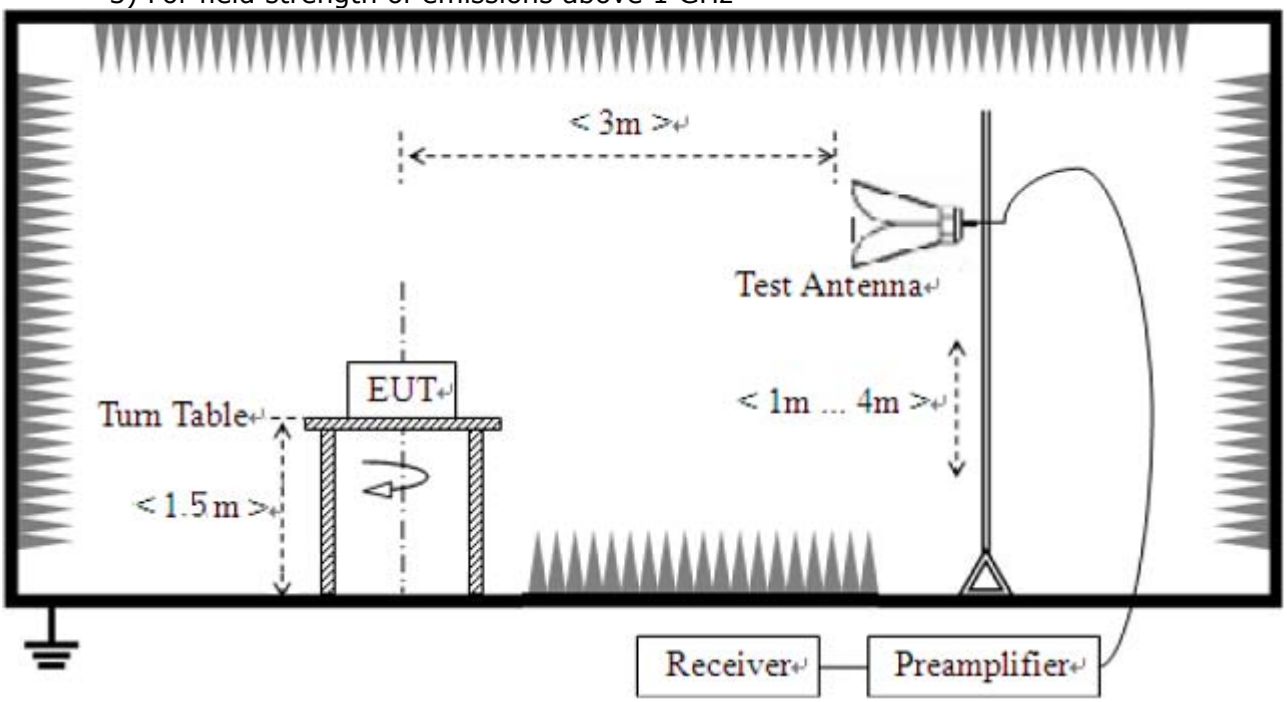
1) For field strength of emissions from 9 kHz to 30 MHz



2) For field strength of emissions from 30 MHz to 1 GHz



3) For field strength of emissions above 1 GHz



Test Mode

We have done all test mode.
The worst case antenna configuration and Test mode are determined to be as follows.

802.11a mode : ANT0 + ANT1 + ANT2 + ANT3 (MIMO)
802.11n CDD mode : ANT0 + ANT1 + ANT2 + ANT3 (MIMO)
802.11ac CDD mode : ANT0 + ANT1 + ANT2 + ANT3 (MIMO)

So the results are only attached worst cases.

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Test Results

1) 9 kHz to 30 MHz

Test mode : Transmitter, 802.11a, 802.11n, 802.11ac (Worst case)

The requirements are:
☒ Complies

Frequency (MHz)	Measured Data (dBuV/m)	Margin (dB)	Remark
-	-	-	See note

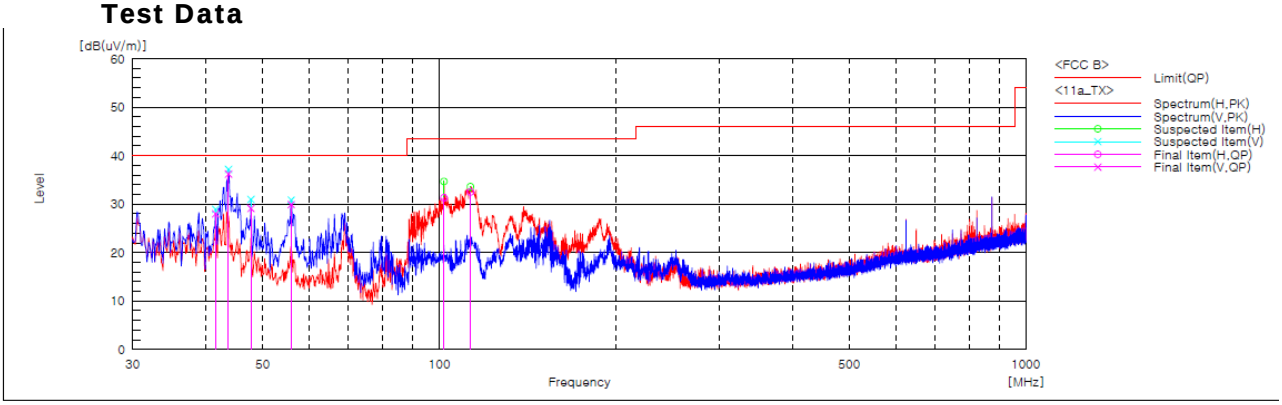
Note :
The amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.
Distance extrapolation factor = 40 log (specific distance / test distance) (dB)

2) 30 MHz to 1 GHz

Test mode : Transmitter, 802.11a(Worst Case)

The requirements are:
☒ Complies

Test Data



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	Remark
1	41.540	V	40.9	-12.9	28.0	40.0	12.0	99.8	325.5	
2	43.717	V	48.7	-12.5	36.2	40.0	3.8	99.8	315.5	
3	47.745	V	41.5	-12.4	29.1	40.0	10.9	99.8	10.0	
4	55.911	V	42.9	-13.0	29.9	40.0	10.1	99.8	255.8	
5	101.853	H	45.4	-14.1	31.3	43.5	12.2	99.8	151.6	
6	112.957	H	47.4	-14.9	32.5	43.5	11.0	99.8	175.3	

Remark :
1. The EUT was tested in three orientations in order to determine that "Z axis" was the worst case.
2. Result = Reading + c.f(Correction factor)
3. Correction factor = Antenna factor + Cable loss + 6 dB attenuator - Amp Gain

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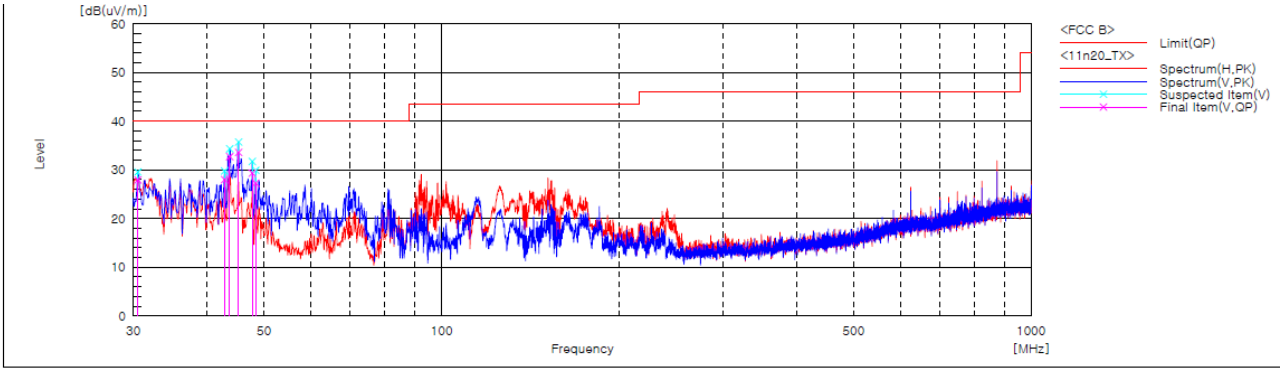
Test mode : Transmitter, 802.11n_HT20(Worst Case)

The requirements are:
☒ Complies

Test Data



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	Remark
1	30.544	V	43.1	-15.2	27.9	40.0	12.1	99.8	189.4	
2	42.846	V	40.6	-12.6	28.0	40.0	12.0	99.8	0.0	
3	43.717	V	45.2	-12.5	32.7	40.0	7.3	99.8	2.6	
4	45.241	V	46.0	-12.4	33.6	40.0	6.4	99.8	19.4	
5	47.745	V	41.7	-12.4	29.3	40.0	10.7	99.8	5.1	
6	48.399	V	39.7	-12.4	27.3	40.0	12.7	99.8	87.8	

Remark :
1. The EUT was tested in three orientations in order to determine that "Z axis" was the worst case.
2. Result = Reading + c.f(Correction factor)
3. Correction factor = Antenna factor + Cable loss + 6 dB attenuator - Amp Gain

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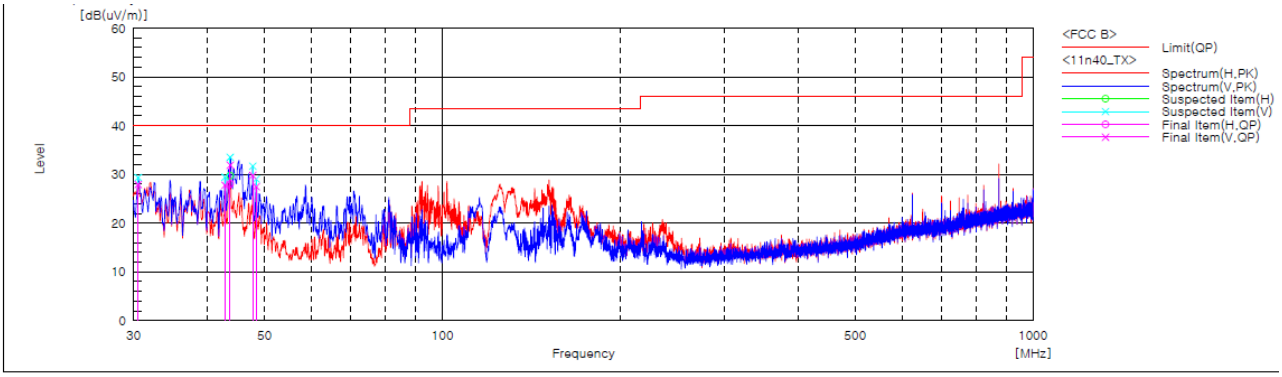
Test mode : Transmitter, 802.11n_HT40(Worst Case)

The requirements are:
☒ Complies

Test Data



Final Result

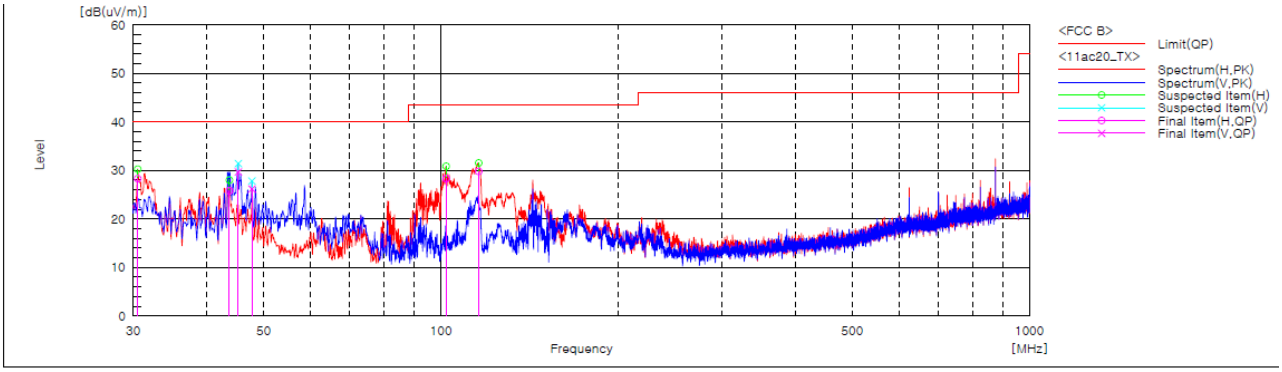
No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	Remark
1	30.544	V	43.1	-15.2	27.9	40.0	12.1	99.8	271.3	
2	42.846	V	40.4	-12.6	27.8	40.0	12.2	99.8	359.0	
3	43.717	V	44.4	-12.5	31.9	40.0	8.1	99.8	359.0	
4	43.717	H	40.6	-12.5	28.1	40.0	11.9	99.8	136.1	
5	47.745	V	42.2	-12.4	29.8	40.0	10.2	99.8	63.9	
6	48.399	V	39.9	-12.4	27.5	40.0	12.5	99.8	359.0	

Remark :
1. The EUT was tested in three orientations in order to determine that "Z axis" was the worst case.
2. Result = Reading + c.f(Correction factor)
3. Correction factor = Antenna factor + Cable loss + 6 dB attenuator - Amp Gain

Test mode : Transmitter, 802.11ac_VHT20(Worst Case)

The requirements are:
☒ Complies

Test Data



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	Remark
1	30.544	H	43.5	-15.2	28.3	40.0	11.7	99.8	42.5	
2	43.717	H	38.3	-12.5	25.8	40.0	14.2	99.8	246.5	
3	45.241	V	42.1	-12.4	29.7	40.0	10.3	99.8	0.7	
4	47.745	V	38.6	-12.4	26.2	40.0	13.8	99.8	110.0	
5	102.070	H	42.5	-14.2	28.3	43.5	15.2	99.8	10.3	
6	115.897	H	45.1	-15.3	29.8	43.5	13.7	99.8	167.9	

Remark :
1. The EUT was tested in three orientations in order to determine that "Z axis" was the worst case.
2. Result = Reading + c.f(Correction factor)
3. Correction factor = Antenna factor + Cable loss + 6 dB attenuator - Amp Gain

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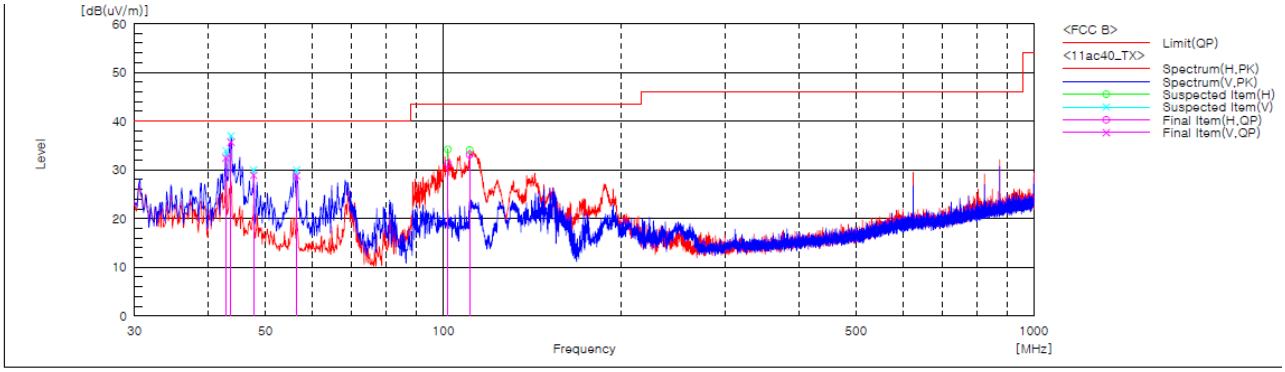
Test mode : Transmitter, 802.11ac_VHT40(Worst Case)

The requirements are:
☒ Complies

Test Data



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	Remark
1	42.846	V	45.0	-12.6	32.4	40.0	7.6	99.8	321.3	
2	43.717	V	48.2	-12.5	35.7	40.0	4.3	99.8	297.4	
3	47.745	V	41.3	-12.4	28.9	40.0	11.1	99.8	321.3	
4	56.455	V	41.9	-13.1	28.8	40.0	11.2	99.8	274.3	
5	101.853	H	45.4	-14.1	31.3	43.5	12.2	99.8	32.0	
6	110.780	H	47.8	-14.7	33.1	43.5	10.4	99.8	349.3	

Remark :
1. The EUT was tested in three orientations in order to determine that "Z axis" was the worst case.
2. Result = Reading + c.f(Correction factor)
3. Correction factor = Antenna factor + Cable loss + 6 dB attenuator - Amp Gain

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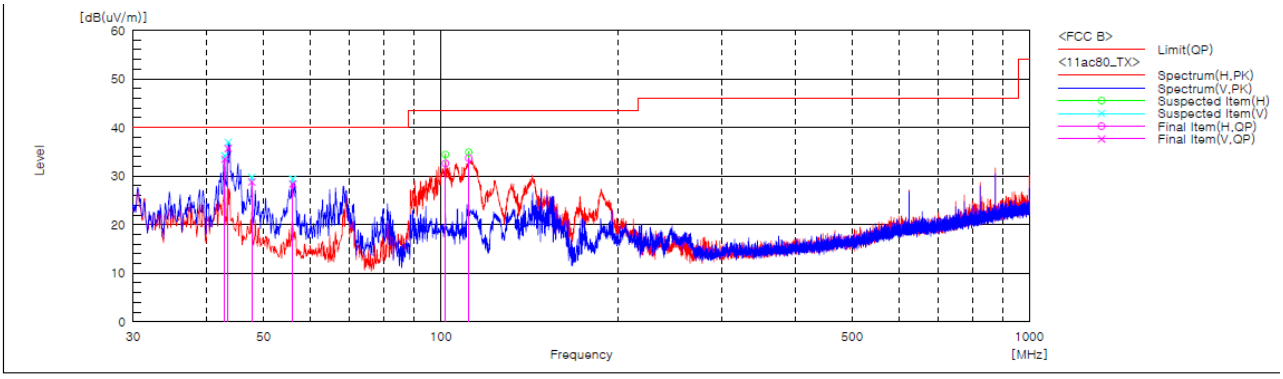
Test mode : Transmitter, 802.11ac_VHT80(Worst Case)

The requirements are:
☒ Complies

Test Data



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	Remark
1	42.955	V	46.1	-12.6	33.5	40.0	6.5	99.8	354.9	
2	43.500	V	48.2	-12.5	35.7	40.0	4.3	99.8	339.6	
3	47.745	V	41.2	-12.4	28.8	40.0	11.2	99.8	267.4	
4	56.019	V	41.4	-13.0	28.4	40.0	11.6	99.8	219.4	
5	101.853	H	46.7	-14.1	32.6	43.5	10.9	99.8	350.2	
6	111.542	H	48.5	-14.8	33.7	43.5	9.8	99.8	24.6	

Remark :
1. The EUT was tested in three orientations in order to determine that "Z axis" was the worst case.
2. Result = Reading + c.f(Correction factor)
3. Correction factor = Antenna factor + Cable loss + 6 dB attenuator - Amp Gain

3) above 1 GHz

Test mode : Transmitter, 802.11a

The requirements are:
☒ Complies

Test Data

Ch.36(5 180 MHz)

Frequency [MHz]	(P)	Limit AV [dBuV/m]	Limit PK [dBuV/m]	Result AV [dBuV/m]	Result PK [dBuV/m]	Margin AV [dB]	Margin PK [dB]
5 150.00	H	54.00	74.00	48.51	59.50	5.49	14.50
5 150.00	V	54.00	74.00	49.51	60.20	4.49	13.80

Ch.40(5 200 MHz)

Frequency [MHz]	(P)	Limit AV [dBuV/m]	Limit PK [dBuV/m]	Result AV [dBuV/m]	Result PK [dBuV/m]	Margin AV [dB]	Margin PK [dB]
No emissions were detected at a level greater than 20dB below limit.							

Ch.48(5 240 MHz)

Frequency [MHz]	(P)	Limit AV [dBuV/m]	Limit PK [dBuV/m]	Result AV [dBuV/m]	Result PK [dBuV/m]	Margin AV [dB]	Margin PK [dB]
No emissions were detected at a level greater than 20dB below limit.							

Ch.149(5 745 MHz)

Frequency [MHz]	(P)	Limit AV [dBuV/m]	Limit PK [dBuV/m]	Result AV [dBuV/m]	Result PK [dBuV/m]	Margin AV [dB]	Margin PK [dB]
5 559.83	H	-	68.20	-	61.20	-	7.00
5 561.08	V	-	68.20	-	62.10	-	6.10

Ch.157(5 785 MHz)

Frequency [MHz]	(P)	Limit AV [dBuV/m]	Limit PK [dBuV/m]	Result AV [dBuV/m]	Result PK [dBuV/m]	Margin AV [dB]	Margin PK [dB]
No emissions were detected at a level greater than 20dB below limit.							

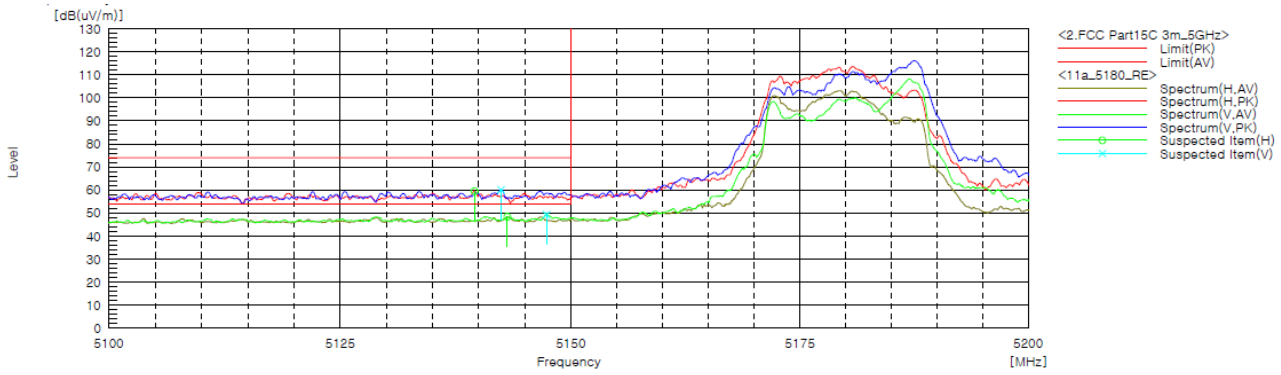
Ch.165(5 825 MHz)

Frequency [MHz]	(P)	Limit AV [dBuV/m]	Limit PK [dBuV/m]	Result AV [dBuV/m]	Result PK [dBuV/m]	Margin AV [dB]	Margin PK [dB]
5 949.51	H	-	68.20	-	64.30	-	3.90
5 932.04	V	-	68.20	-	64.10	-	4.10

Remarks

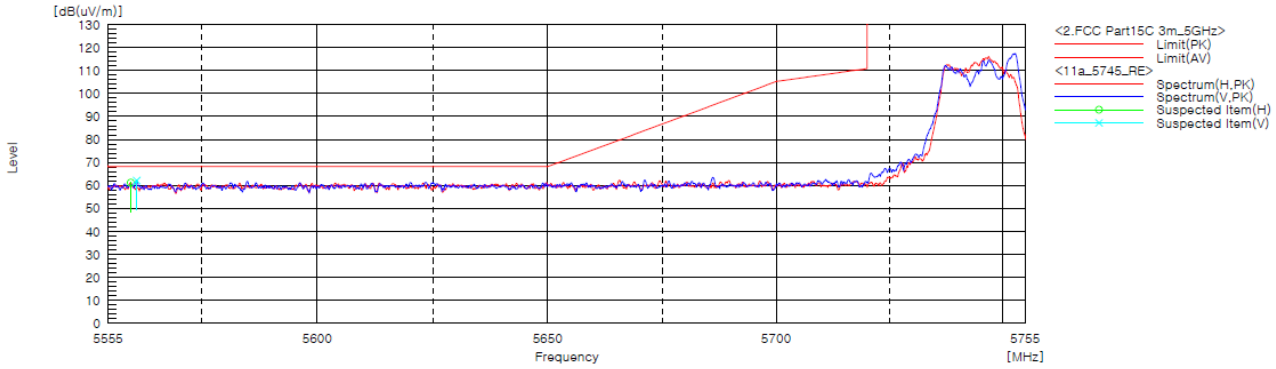
1. The EUT was tested in three orientations in order to determine that "Z axis" was the worst case.

Worst Case Mode :	802.11a
Worst Case Transfer Rate :	6 Mbps
Distance of Measurements :	3 Meters
Operating Frequency :	5 180 MHz
Channel :	36



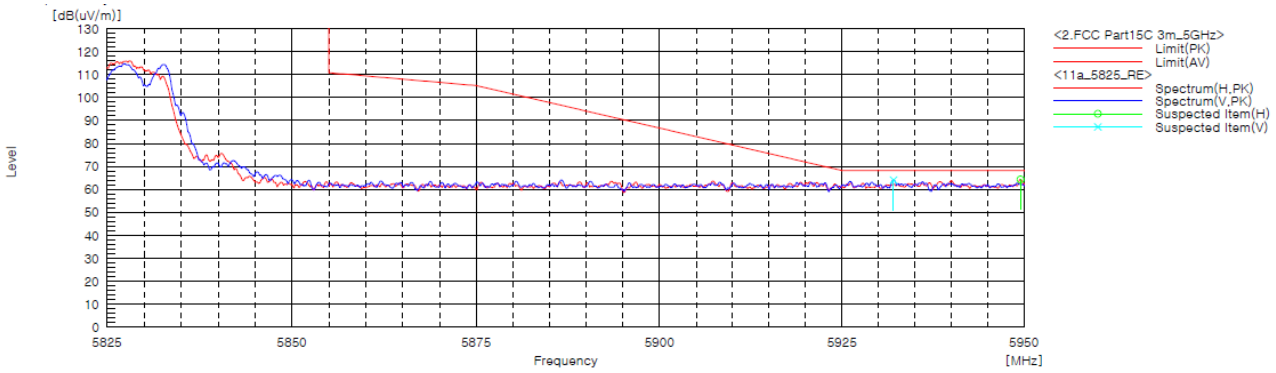
Radiated Restricted Lower Band Edge Plot

Worst Case Mode :	802.11a
Worst Case Transfer Rate :	6 Mbps
Distance of Measurements :	3 Meters
Operating Frequency :	5 745 MHz
Channel :	149



Radiated Restricted Lower Band Edge Plot

Worst Case Mode :	802.11a
Worst Case Transfer Rate :	6 Mbps
Distance of Measurements :	3 Meters
Operating Frequency :	5 825 MHz
Channel :	165



Radiated Restricted Upper Band Edge Plot

Test mode : Transmitter, 802.11n_HT20

The requirements are:
☒ Complies

Test Data

Ch.36(5 180 MHz)

Frequency [MHz]	(P)	Limit AV [dBuV/m]	Limit PK [dBuV/m]	Result AV [dBuV/m]	Result PK [dBuV/m]	Margin AV [dB]	Margin PK [dB]
5 150.00	H	54.00	74.00	48.70	59.50	5.30	14.50
5 150.00	V	54.00	74.00	50.00	60.70	4.00	13.30

Ch.40(5 200 MHz)

Frequency [MHz]	(P)	Limit AV [dBuV/m]	Limit PK [dBuV/m]	Result AV [dBuV/m]	Result PK [dBuV/m]	Margin AV [dB]	Margin PK [dB]
No emissions were detected at a level greater than 20dB below limit.							

Ch.48(5 240 MHz)

Frequency [MHz]	(P)	Limit AV [dBuV/m]	Limit PK [dBuV/m]	Result AV [dBuV/m]	Result PK [dBuV/m]	Margin AV [dB]	Margin PK [dB]
No emissions were detected at a level greater than 20dB below limit.							

Ch.149(5 745 MHz)

Frequency [MHz]	(P)	Limit AV [dBuV/m]	Limit PK [dBuV/m]	Result AV [dBuV/m]	Result PK [dBuV/m]	Margin AV [dB]	Margin PK [dB]
5 564.00	H	-	68.20	-	62.10	-	6.10
5 642.27	V	-	68.20	-	62.90	-	5.30

Ch.157(5 785 MHz)

Frequency [MHz]	(P)	Limit AV [dBuV/m]	Limit PK [dBuV/m]	Result AV [dBuV/m]	Result PK [dBuV/m]	Margin AV [dB]	Margin PK [dB]
No emissions were detected at a level greater than 20dB below limit.							

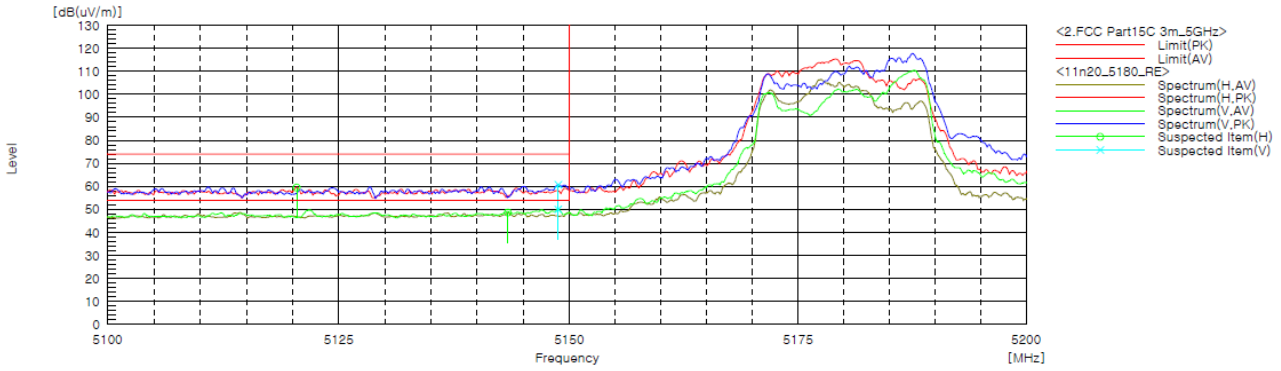
Ch.165(5 825 MHz)

Frequency [MHz]	(P)	Limit AV [dBuV/m]	Limit PK [dBuV/m]	Result AV [dBuV/m]	Result PK [dBuV/m]	Margin AV [dB]	Margin PK [dB]
5 947.07	H	-	68.20	-	64.30	-	3.90
5 948.68	V	-	68.20	-	63.90	-	4.30

Remarks

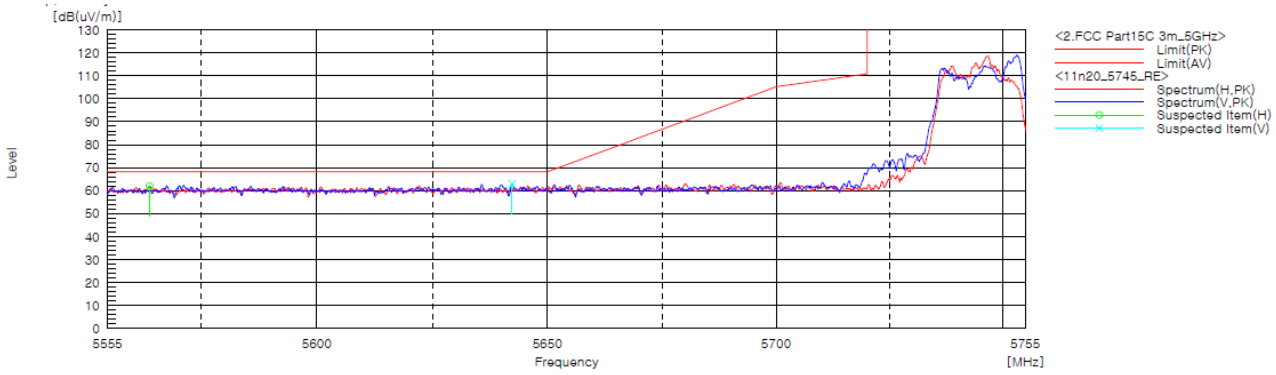
1. The EUT was tested in three orientations in order to determine that "Z axis" was the worst case.

Worst Case Mode :	802.11n_HT20
Worst Case Transfer Rate :	MCS 0
Distance of Measurements :	3 Meters
Operating Frequency :	5 180 MHz
Channel :	36



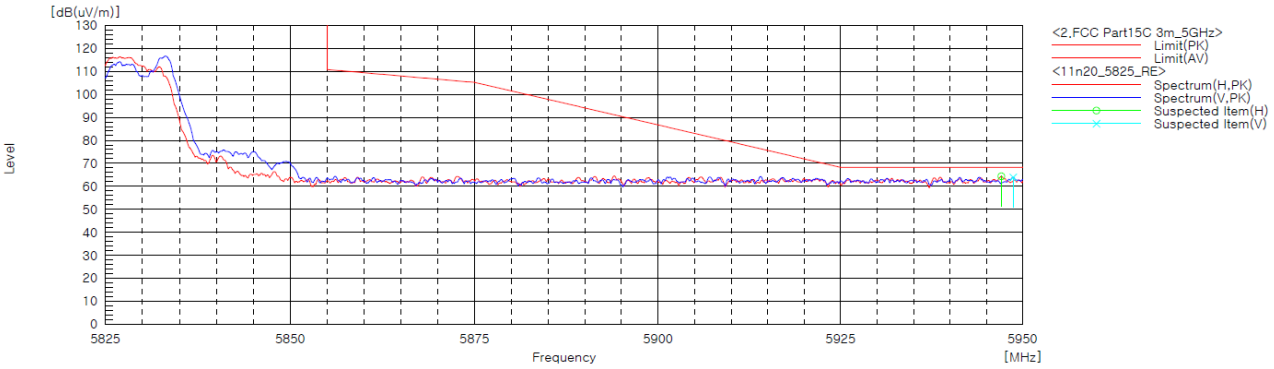
Radiated Restricted Lower Band Edge Plot

Worst Case Mode :	802.11n_HT20
Worst Case Transfer Rate :	MCS 0
Distance of Measurements :	3 Meters
Operating Frequency :	5 745 MHz
Channel :	149



Radiated Restricted Lower Band Edge Plot

Worst Case Mode :	802.11n_HT20
Worst Case Transfer Rate :	MCS 0
Distance of Measurements :	3 Meters
Operating Frequency :	5 825 MHz
Channel :	165



Radiated Restricted Upper Band Edge Plot

Test mode : Transmitter, 802.11ac_VHT20

The requirements are:
☒ Complies

Test Data

Ch.36(5 180 MHz)

Frequency [MHz]	(P)	Limit AV [dBuV/m]	Limit PK [dBuV/m]	Result AV [dBuV/m]	Result PK [dBuV/m]	Margin AV [dB]	Margin PK [dB]
5 150.00	H	54.00	74.00	49.30	59.80	4.70	14.20
5 150.00	V	54.00	74.00	50.80	60.20	3.20	13.80

Ch.40(5 200 MHz)

Frequency [MHz]	(P)	Limit AV [dBuV/m]	Limit PK [dBuV/m]	Result AV [dBuV/m]	Result PK [dBuV/m]	Margin AV [dB]	Margin PK [dB]
No emissions were detected at a level greater than 20dB below limit.							

Ch.48(5 240 MHz)

Frequency [MHz]	(P)	Limit AV [dBuV/m]	Limit PK [dBuV/m]	Result AV [dBuV/m]	Result PK [dBuV/m]	Margin AV [dB]	Margin PK [dB]
No emissions were detected at a level greater than 20dB below limit.							

Ch.149(5 745 MHz)

Frequency [MHz]	(P)	Limit AV [dBuV/m]	Limit PK [dBuV/m]	Result AV [dBuV/m]	Result PK [dBuV/m]	Margin AV [dB]	Margin PK [dB]
5 584.63	H	-	68.20	-	62.80	-	5.40
5 591.66	V	-	68.20	-	62.40	-	5.80

Ch.157(5 785 MHz)

Frequency [MHz]	(P)	Limit AV [dBuV/m]	Limit PK [dBuV/m]	Result AV [dBuV/m]	Result PK [dBuV/m]	Margin AV [dB]	Margin PK [dB]
No emissions were detected at a level greater than 20dB below limit.							

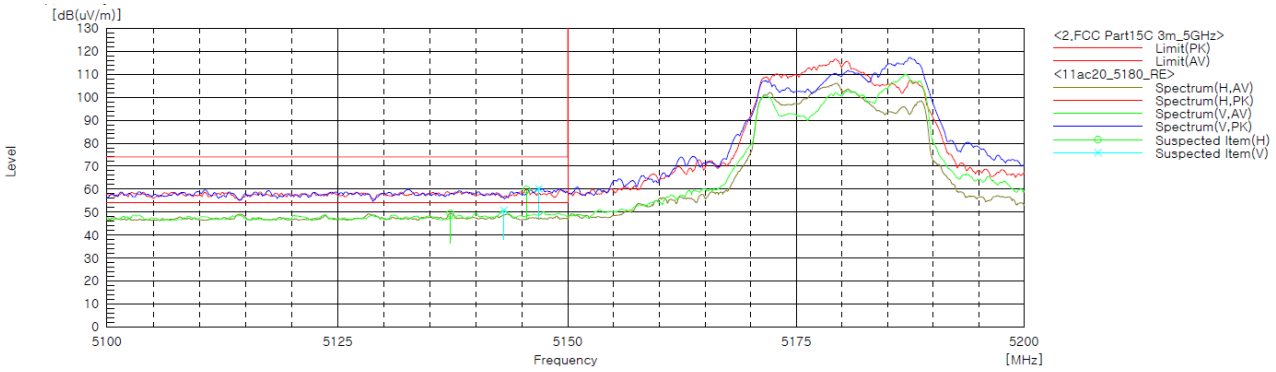
Ch.165(5 825 MHz)

Frequency [MHz]	(P)	Limit AV [dBuV/m]	Limit PK [dBuV/m]	Result AV [dBuV/m]	Result PK [dBuV/m]	Margin AV [dB]	Margin PK [dB]
5 946.72	H	-	68.20	-	64.60	-	3.60
5 925.07	V	-	68.20	-	65.30	-	2.90

Remarks

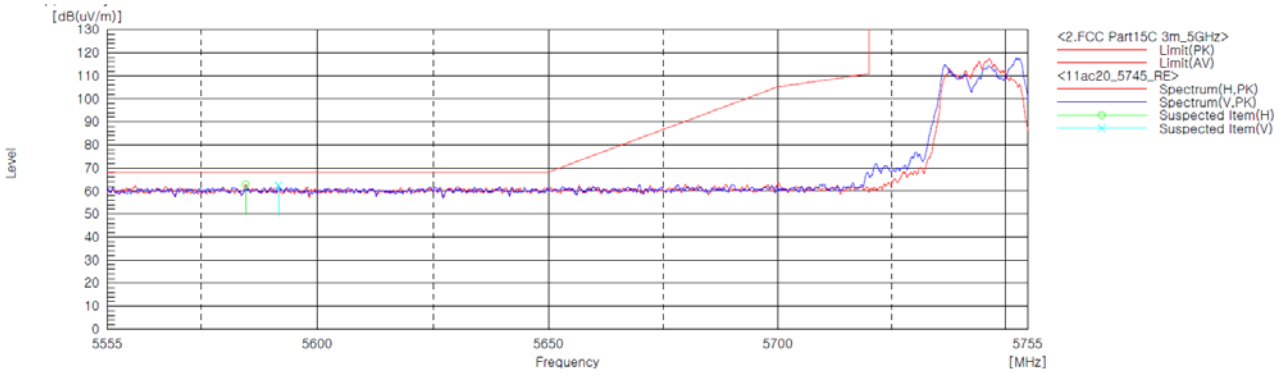
1. The EUT was tested in three orientations in order to determine that "Z axis" was the worst case.

Worst Case Mode :	802.11ac_VHT20
Worst Case Transfer Rate :	MNSS 0
Distance of Measurements :	3 Meters
Operating Frequency :	5 180 MHz
Channel :	36



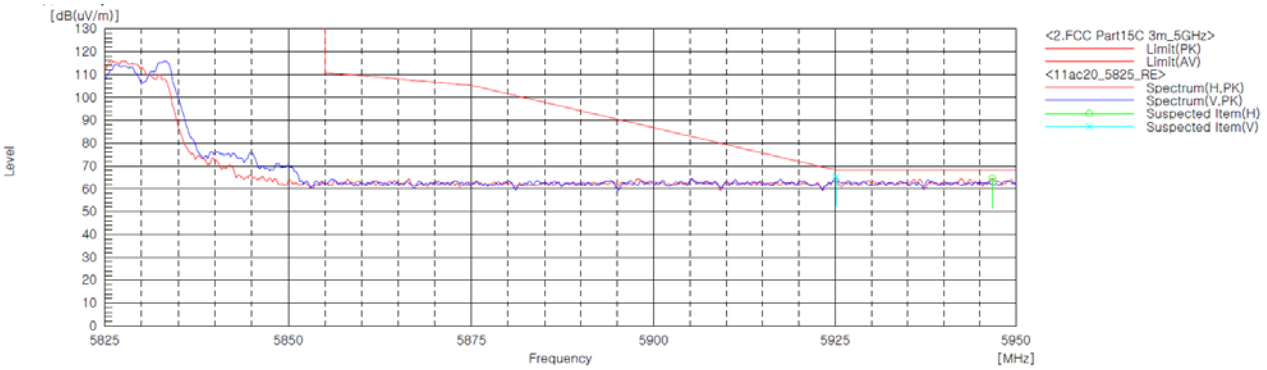
Radiated Restricted Lower Band Edge Plot

Worst Case Mode :	802.11ac_VHT20
Worst Case Transfer Rate :	MNSS 0
Distance of Measurements :	3 Meters
Operating Frequency :	5 745 MHz
Channel :	149



Radiated Restricted Lower Band Edge Plot

Worst Case Mode :	802.11ac_VHT20
Worst Case Transfer Rate :	MNSS 0
Distance of Measurements :	3 Meters
Operating Frequency :	5 825 MHz
Channel :	165



Radiated Restricted Upper Band Edge Plot

Test mode : Transmitter, 802.11n_HT40

The requirements are:
☒ Complies

Test Data

Ch.38(5 190 MHz)

Frequency [MHz]	(P)	Limit AV [dBuV/m]	Limit PK [dBuV/m]	Result AV [dBuV/m]	Result PK [dBuV/m]	Margin AV [dB]	Margin PK [dB]
5 150.00	H	54.00	74.00	49.40	58.80	4.60	15.20
5 150.00	V	54.00	74.00	51.20	63.00	2.80	11.00

Ch.46(5 230 MHz)

Frequency [MHz]	(P)	Limit AV [dBuV/m]	Limit PK [dBuV/m]	Result AV [dBuV/m]	Result PK [dBuV/m]	Margin AV [dB]	Margin PK [dB]
No emissions were detected at a level greater than 20dB below limit.							

Ch.151(5 755 MHz)

Frequency [MHz]	(P)	Limit AV [dBuV/m]	Limit PK [dBuV/m]	Result AV [dBuV/m]	Result PK [dBuV/m]	Margin AV [dB]	Margin PK [dB]
5 460.21	H	-	68.20	-	57.70	-	10.50
5 643.78	V	-	68.20	-	58.60	-	9.60

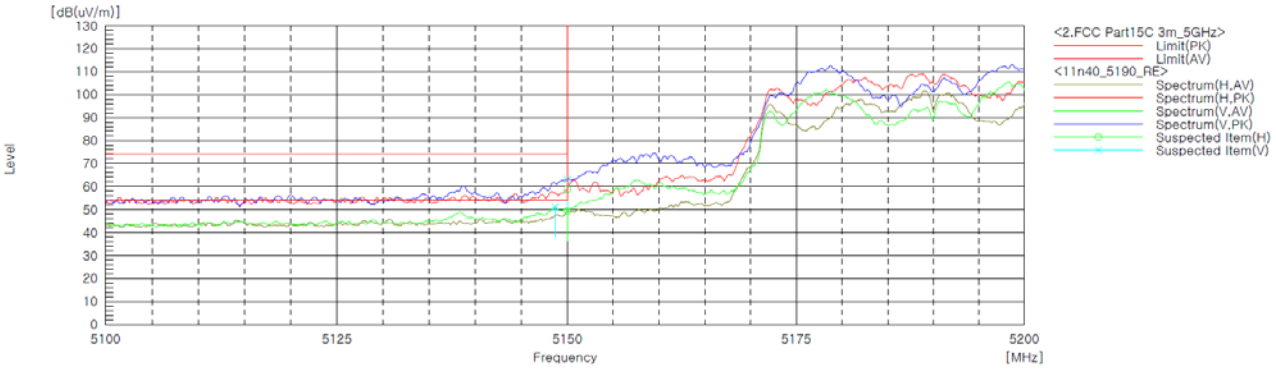
Ch.159(5 795 MHz)

Frequency [MHz]	(P)	Limit AV [dBuV/m]	Limit PK [dBuV/m]	Result AV [dBuV/m]	Result PK [dBuV/m]	Margin AV [dB]	Margin PK [dB]
5 925.22	H	-	68.20	-	60.20	-	8.00
5 948.48	V	-	68.20	-	60.80	-	7.40

Remarks

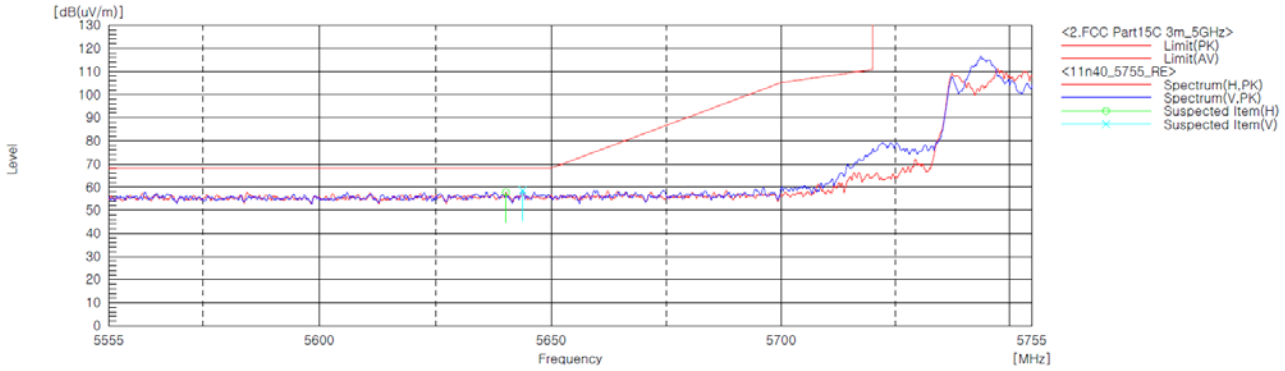
1. The EUT was tested in three orientations in order to determine that "Z axis" was the worst case.

Worst Case Mode :	802.11n_HT40
Worst Case Transfer Rate :	MCS 0
Distance of Measurements :	3 Meters
Operating Frequency :	5 190 MHz
Channel :	38



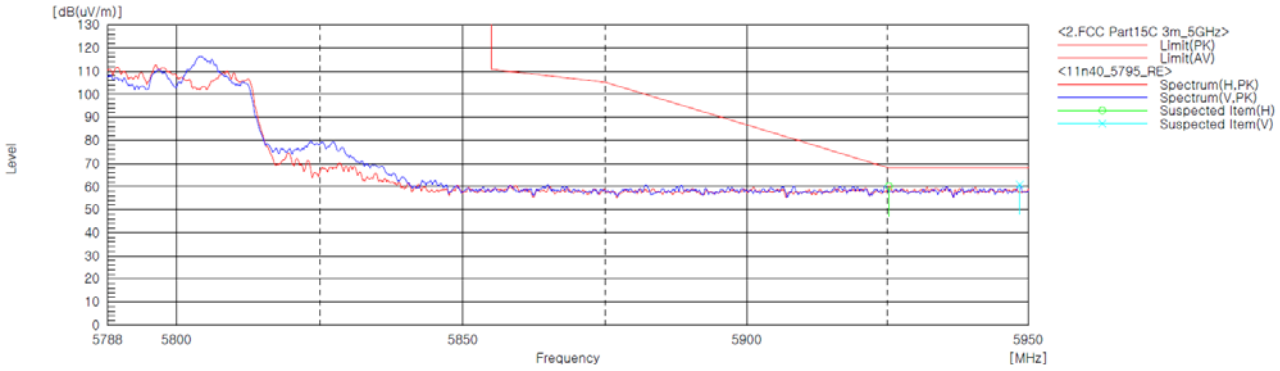
Radiated Restricted Lower Band Edge Plot

Worst Case Mode :	802.11n_HT40
Worst Case Transfer Rate :	MCS 0
Distance of Measurements :	3 Meters
Operating Frequency :	5 755 MHz
Channel :	151



Radiated Restricted Lower Band Edge Plot

Worst Case Mode :	802.11n_HT40
Worst Case Transfer Rate :	MCS 0
Distance of Measurements :	3 Meters
Operating Frequency :	5 795 MHz
Channel :	159



Radiated Restricted Upper Band Edge Plot

Test mode : Transmitter, 802.11ac_VHT40

The requirements are:
☒ Complies

Test Data

Ch.38(5 190 MHz)

Frequency [MHz]	(P)	Limit AV [dBuV/m]	Limit PK [dBuV/m]	Result AV [dBuV/m]	Result PK [dBuV/m]	Margin AV [dB]	Margin PK [dB]
5 150.00	H	54.00	74.00	47.99	58.40	6.01	15.60
5 150.00	V	54.00	74.00	51.09	61.10	2.91	12.90

Ch.46(5 230 MHz)

Frequency [MHz]	(P)	Limit AV [dBuV/m]	Limit PK [dBuV/m]	Result AV [dBuV/m]	Result PK [dBuV/m]	Margin AV [dB]	Margin PK [dB]
No emissions were detected at a level greater than 20dB below limit.							

Ch.151(5 755 MHz)

Frequency [MHz]	(P)	Limit AV [dBuV/m]	Limit PK [dBuV/m]	Result AV [dBuV/m]	Result PK [dBuV/m]	Margin AV [dB]	Margin PK [dB]
5 582.16	H	-	68.20	-	61.80	-	6.40
5 614.80	V	-	68.20	-	62.00	-	6.20

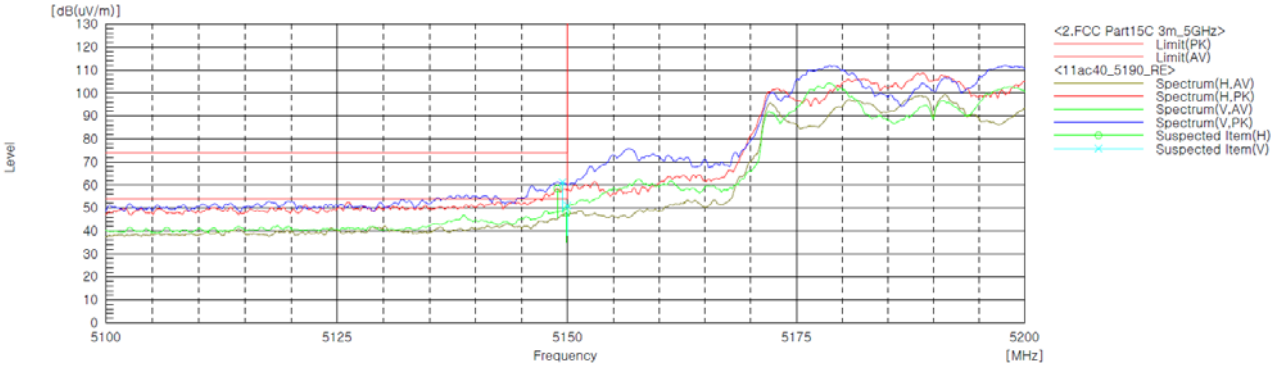
Ch.159(5 795 MHz)

Frequency [MHz]	(P)	Limit AV [dBuV/m]	Limit PK [dBuV/m]	Result AV [dBuV/m]	Result PK [dBuV/m]	Margin AV [dB]	Margin PK [dB]
5 934.86	H	-	68.20	-	63.90	-	4.30
5 937.92	V	-	68.20	-	63.40	-	4.80

Remarks

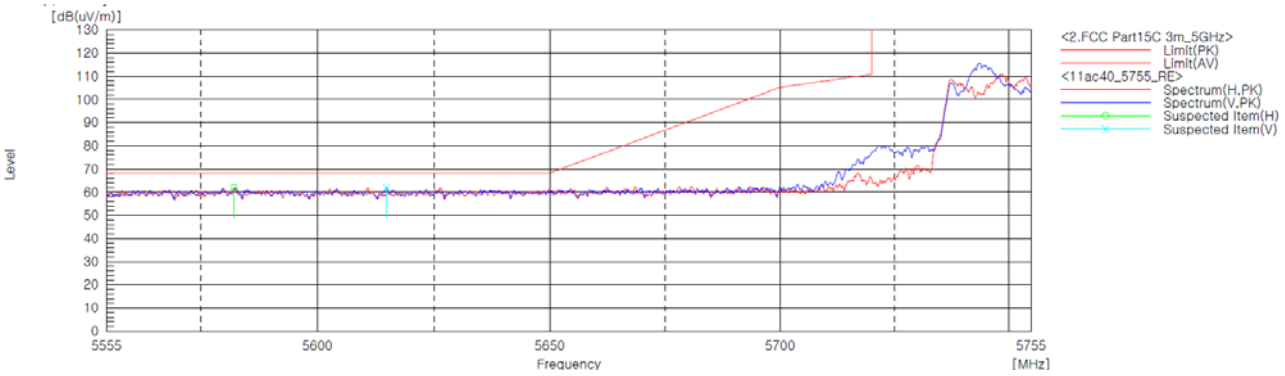
1. The EUT was tested in three orientations in order to determine that "Z axis" was the worst case.

Worst Case Mode :	802.11ac_VHT40
Worst Case Transfer Rate :	MNSS 0
Distance of Measurements :	3 Meters
Operating Frequency :	5 190 MHz
Channel :	38



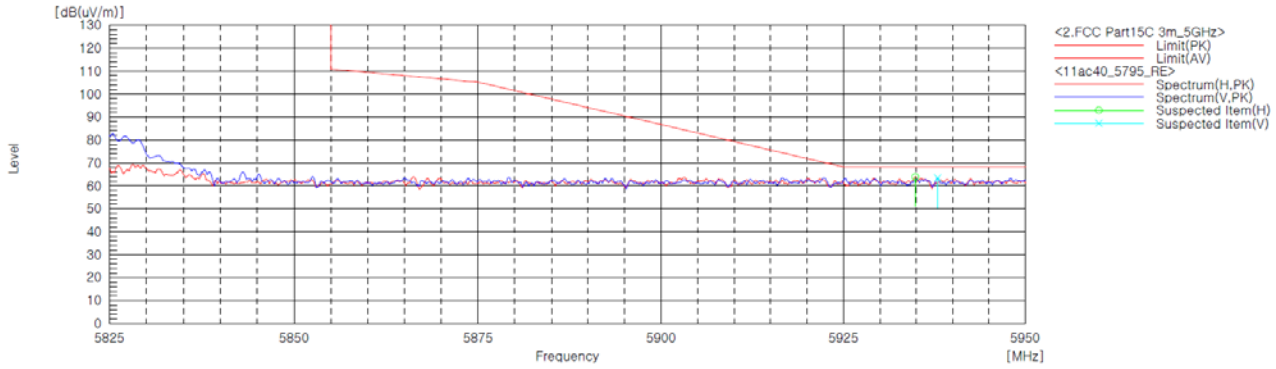
Radiated Restricted Lower Band Edge Plot

Worst Case Mode :	802.11ac_VHT40
Worst Case Transfer Rate :	MNSS 0
Distance of Measurements :	3 Meters
Operating Frequency :	5 755 MHz
Channel :	151



Radiated Restricted Lower Band Edge Plot

Worst Case Mode :	802.11ac_VHT40
Worst Case Transfer Rate :	MNSS 0
Distance of Measurements :	3 Meters
Operating Frequency :	5 795 MHz
Channel :	159



Radiated Restricted Upper Band Edge Plot

Test mode : Transmitter, 802.11ac_VHT80

The requirements are:
☒ Complies

Test Data

Ch.42(5 210 MHz)

Frequency [MHz]	(P)	Limit AV [dBuV/m]	Limit PK [dBuV/m]	Result AV [dBuV/m]	Result PK [dBuV/m]	Margin AV [dB]	Margin PK [dB]
5 150.00	H	54.00	74.00	46.44	58.40	7.56	15.60
5 150.00	V	54.00	74.00	52.04	63.60	1.96	10.40

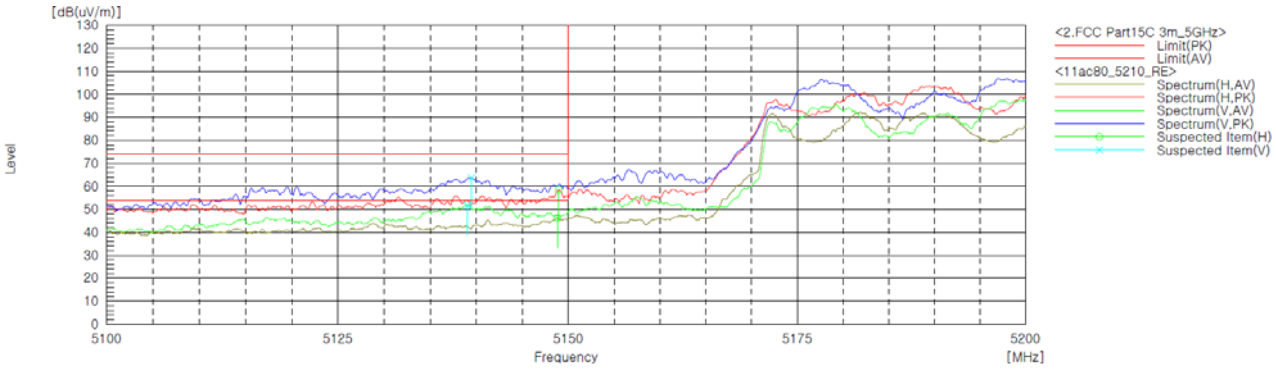
Ch.155(5 775 MHz)

Frequency [MHz]	(P)	Limit AV [dBuV/m]	Limit PK [dBuV/m]	Result AV [dBuV/m]	Result PK [dBuV/m]	Margin AV [dB]	Margin PK [dB]
5 613.68	H	-	68.20	-	62.00	-	6.20
5 639.13	V	-	68.20	-	62.40	-	5.80
5 932.27	H	-	68.20	-	64.30	-	3.90
5 944.81	V	-	68.20	-	63.90	-	4.30

Remarks

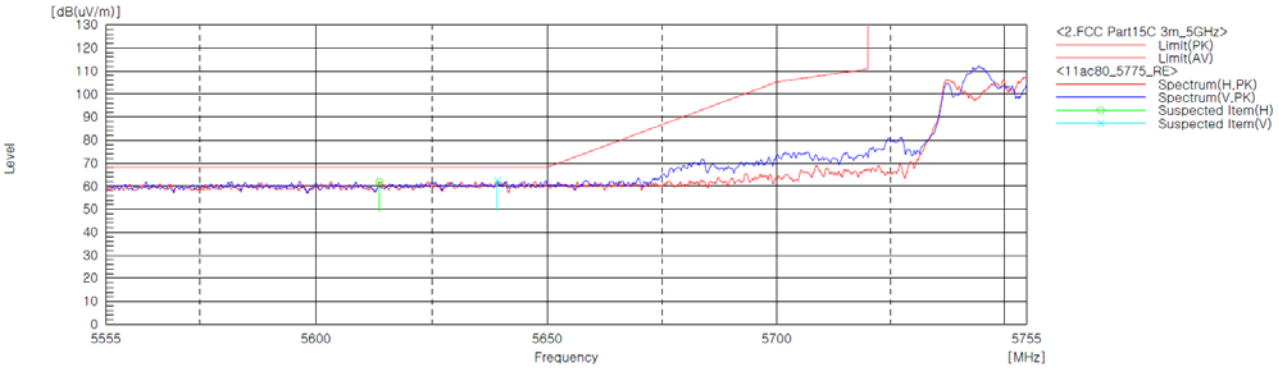
1. The EUT was tested in three orientations in order to determine that "Z axis" was the worst case.

Worst Case Mode :	802.11ac_VHT80
Worst Case Transfer Rate :	MNSS 0
Distance of Measurements :	3 Meters
Operating Frequency :	5 210 MHz
Channel :	42



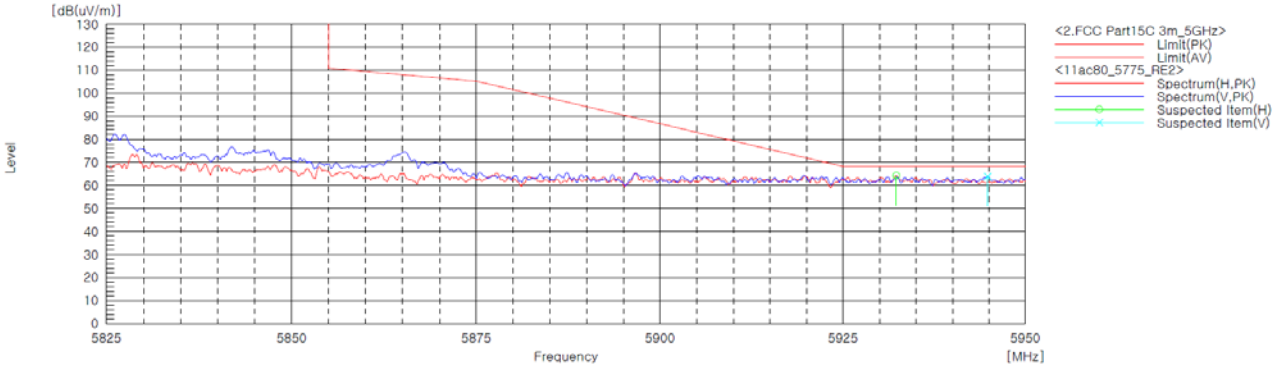
Radiated Restricted Lower Band Edge Plot

Worst Case Mode :	802.11ac_VHT80
Worst Case Transfer Rate :	MNSS 0
Distance of Measurements :	3 Meters
Operating Frequency :	5 775 MHz
Channel :	155



Radiated Restricted Lower Band Edge Plot

Worst Case Mode :	802.11ac_VHT80
Worst Case Transfer Rate :	MNSS 0
Distance of Measurements :	3 Meters
Operating Frequency :	5 775 MHz
Channel :	155



Radiated Restricted Upper Band Edge Plot

4.7 AC Conducted Emissions

Test Location
Shielded Room

Frequency Range of Measurement
150 kHz to 30 MHz

Instrument Settings
IF Band Width: 9 kHz

Test Procedures

The EUT was placed on a non-metallic table 0.8m above the metallic, grounded floor and 0.4m from the reference ground plane wall. The distance to other metallic surfaces was at least 0.8m.
Amplitude measurements were performed with a quasi-peak detector and an average detector.

Limit

- **15.207(a)**

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 ~ 0.5	66 to 56*	56 to 46*
0.5 ~ 5	56	46
5 ~ 30	60	50

* Decreases with the logarithm of the frequency.

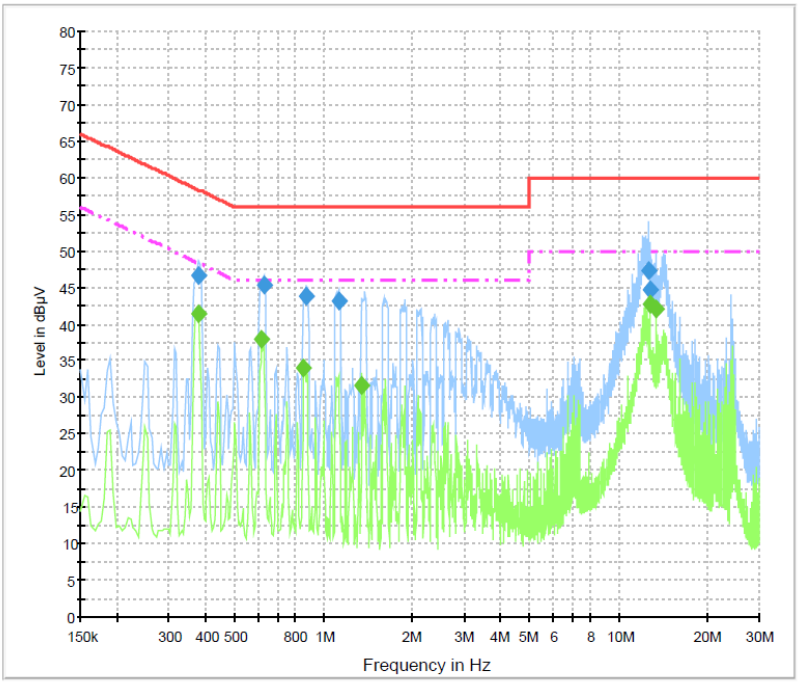
Test Results
The requirements are:

☒ Complies

Test Data

[LINE]

Class B_L1



Final Result 1

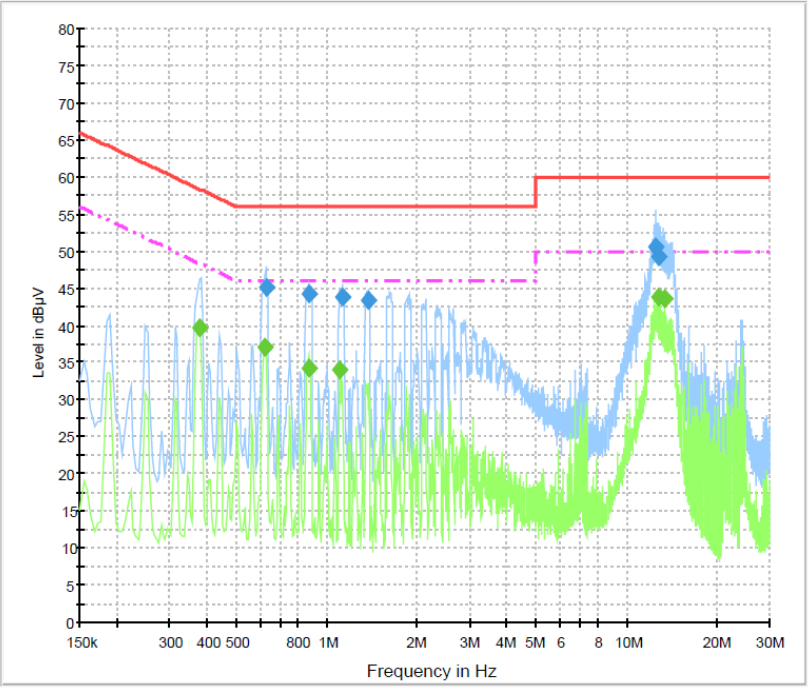
Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.375000	46.5	1000.0	9.000	On	L1	9.9	11.8	58.4
0.627000	45.3	1000.0	9.000	On	L1	9.9	10.7	56.0
0.874500	43.8	1000.0	9.000	On	L1	9.8	12.2	56.0
1.126500	43.3	1000.0	9.000	On	L1	9.8	12.7	56.0
12.610500	47.3	1000.0	9.000	On	L1	9.9	12.7	60.0
12.858000	44.6	1000.0	9.000	On	L1	9.9	15.4	60.0

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.375000	41.4	1000.0	9.000	On	L1	9.9	7.0	48.4
0.618000	37.9	1000.0	9.000	On	L1	9.9	8.1	46.0
0.856500	34.1	1000.0	9.000	On	L1	9.8	11.9	46.0
1.347000	31.5	1000.0	9.000	On	L1	9.7	14.5	46.0
12.808500	42.7	1000.0	9.000	On	L1	9.9	7.3	50.0
13.357500	42.1	1000.0	9.000	On	L1	10.0	7.9	50.0

[NEUTRAL]

Class B_N



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.627000	45.1	1000.0	9.000	On	N	9.9	10.9	56.0
0.874500	44.2	1000.0	9.000	On	N	9.8	11.8	56.0
1.131000	43.9	1000.0	9.000	On	N	9.8	12.1	56.0
1.374000	43.3	1000.0	9.000	On	N	9.7	12.7	56.0
12.484500	50.5	1000.0	9.000	On	N	9.9	9.5	60.0
12.858000	49.2	1000.0	9.000	On	N	9.9	10.8	60.0

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.375000	39.6	1000.0	9.000	On	N	9.9	8.8	48.4
0.622500	37.1	1000.0	9.000	On	N	9.9	8.9	46.0
0.870000	34.2	1000.0	9.000	On	N	9.8	11.8	46.0
1.108500	34.0	1000.0	9.000	On	N	9.8	12.0	46.0
12.808500	43.8	1000.0	9.000	On	N	9.9	6.2	50.0
13.357500	43.6	1000.0	9.000	On	N	10.0	6.4	50.0

APPENDIX A – Test Equipment Used For Tests

	Name of Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	Signal Analyzer	Agilent	N9020A	MY48011598	2017-11-01	2018-11-01
2	Signal Generator	Rohde & Schwarz	SMB100A	175528	2017-11-01	2018-11-01
3	EMI Test Receiver	Rohde & Schwarz	ESCI7	100814	2017-10-25	2018-10-25
4	Bilog Antenna	Schaffner	CBL6111C	2551	2018-05-10	2020-05-10
5	Active Loop Antenna	SCHWARZBECK	FMZB 1513	1513-125	2018-05-02	2020-05-02
6	6dB Attenuator	R&S	DNF	272.4110.50-2	2017-10-25	2018-10-25
7	AMPLIFIER	SONOMA	310	291721	2018-02-02	2019-02-02
8	EMI Test Receiver	Rohde & Schwarz	ESU40	100336	2018-02-01	2019-02-01
9	LISN	Rohde & Schwarz	ENV216	101235	2018-01-31	2019-01-31
10	Preamplifier	Agilent	8449B	3008A02011	2017-11-30	2018-11-30
11	Horn Antenna	ETS-Lindgren	3116	00062504	2017-12-04	2019-12-04
12	Horn Antenna	ETS-Lindgren	3117	00154525	2017-02-17	2019-02-17
13	Singnal Canditioning Unit	R&S	SCU-40	10023	2017-11-01	2018-11-01
14	Band Reject Filter	Micro Tronics	BRM50716	G184	2018-01-26	2019-01-26
15	Temp&Humi Chamber	ESPEC CORP.	SH-242	93008423	2017-09-18	2018-09-18