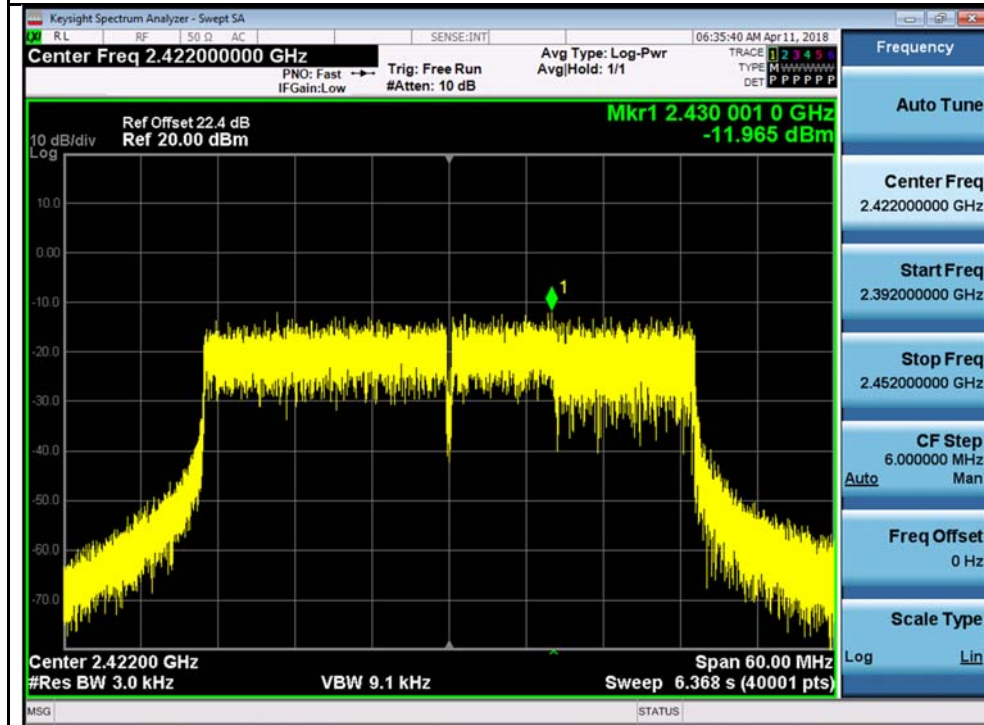
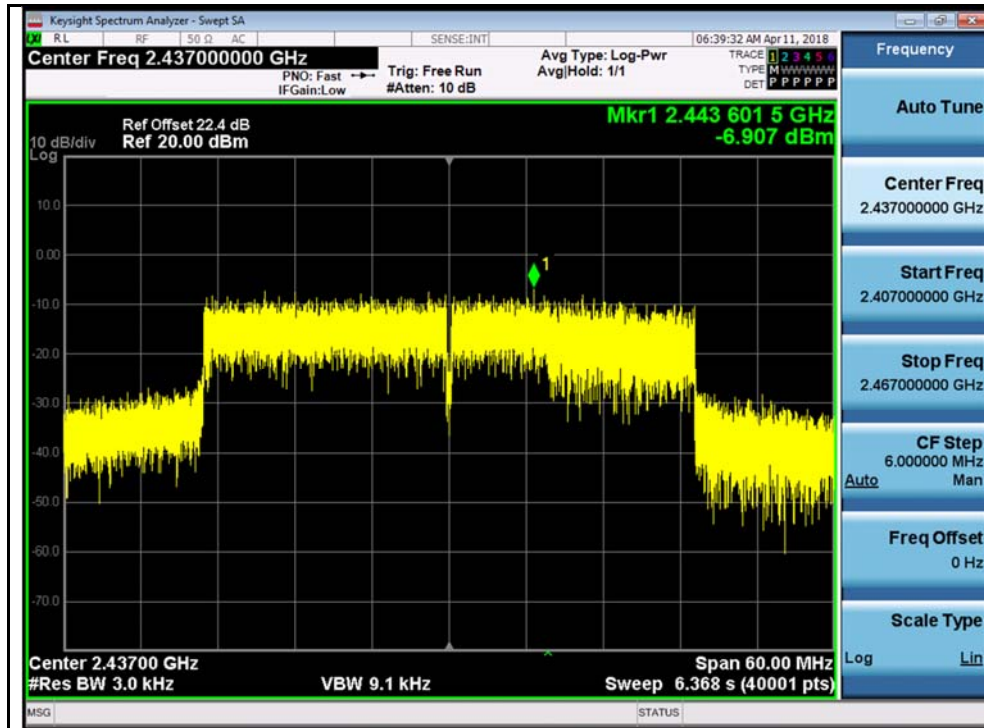


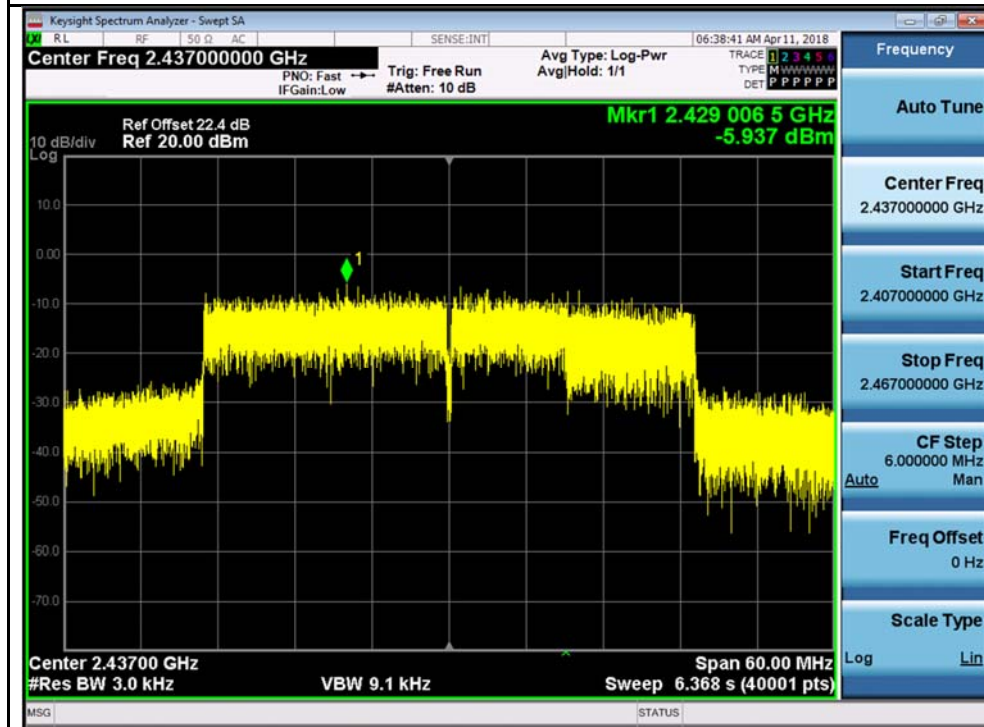
802.11ax40 2422MHz Chain 2



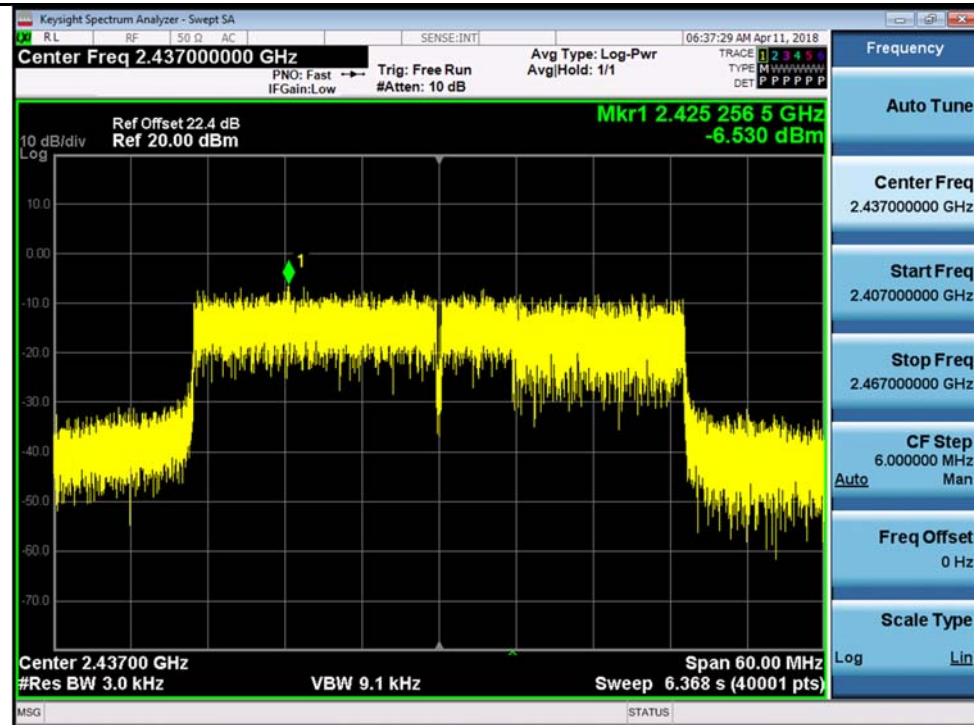
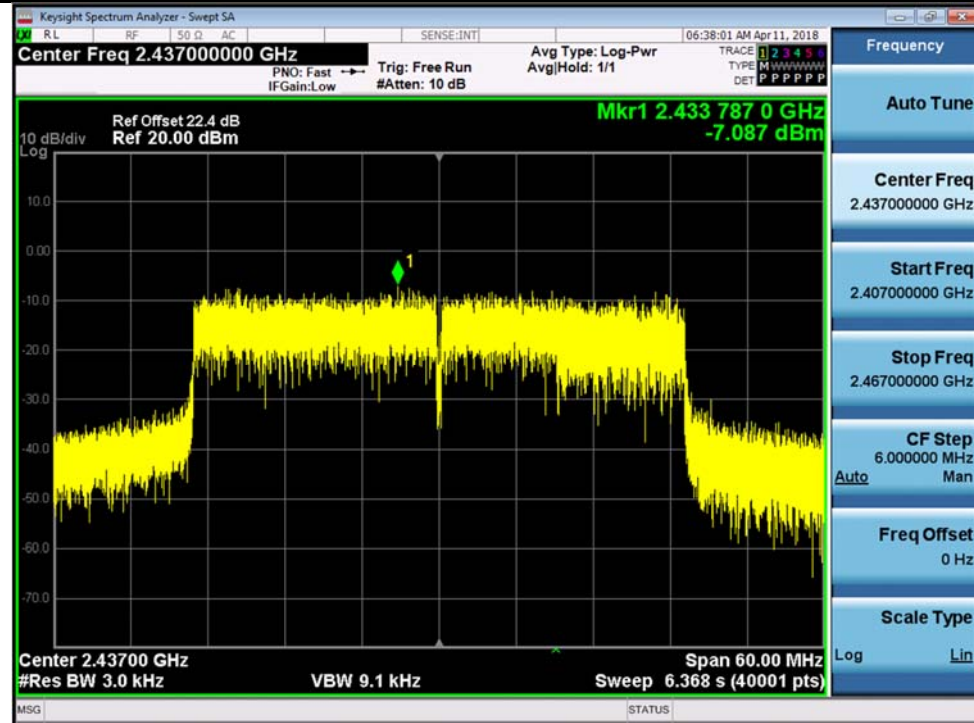
802.11ax40 2422MHz Chain 3

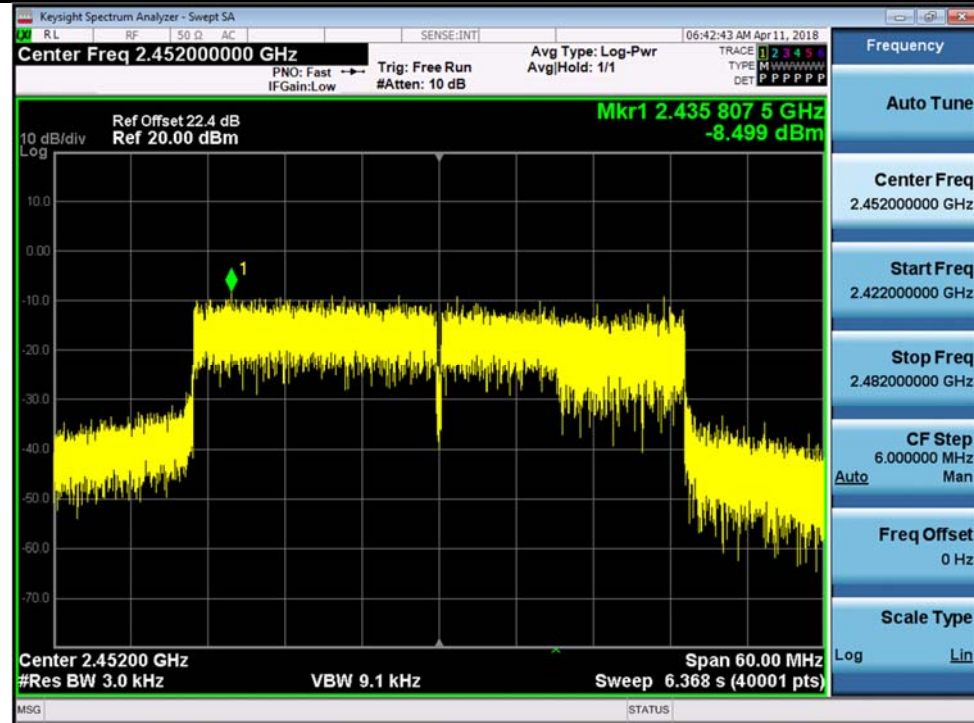


802.11ax40 2437MHz Chain 0

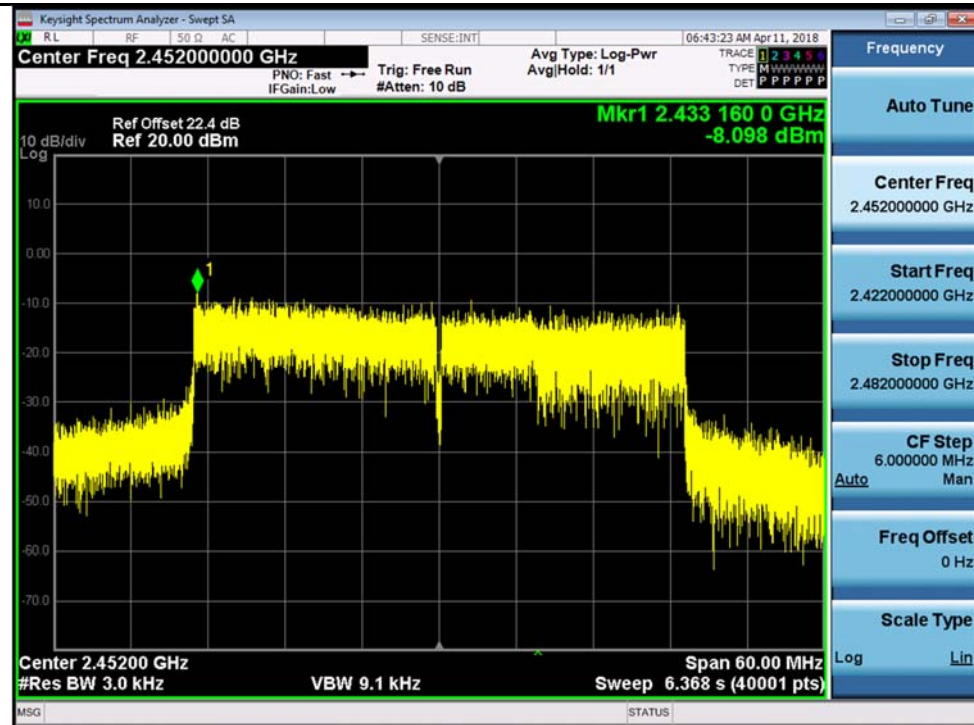


802.11ax40 2437MHz Chain 1

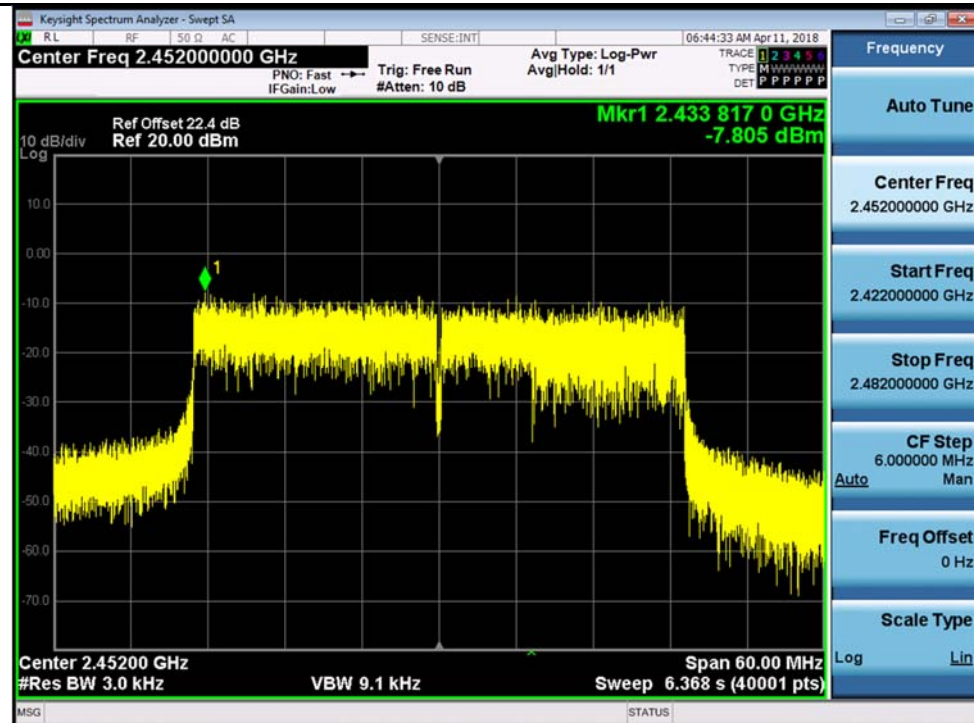
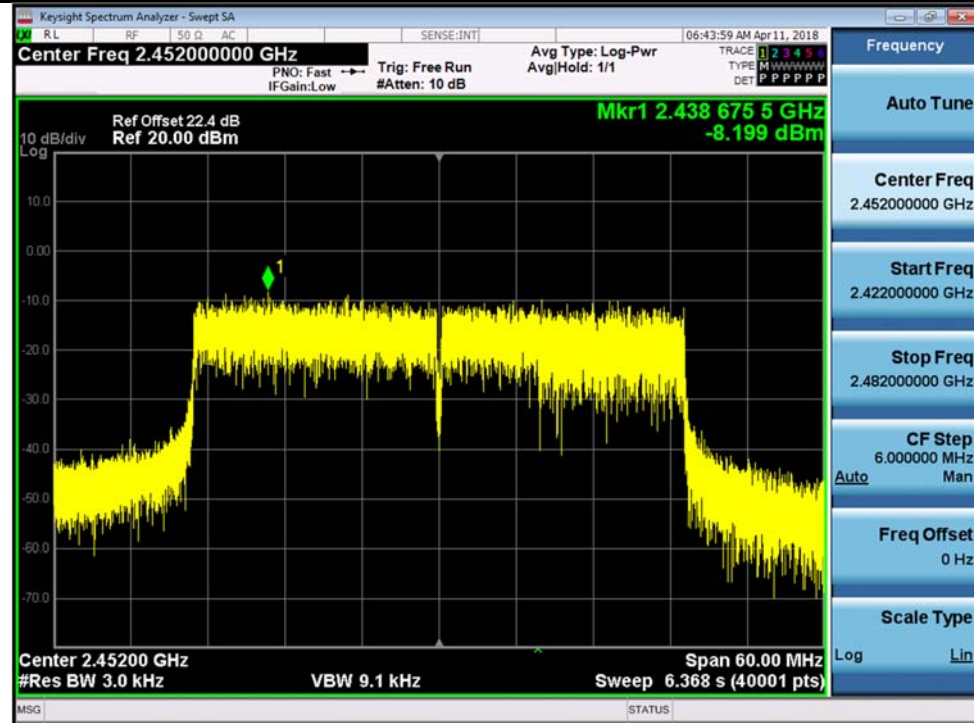




802.11ax40 2452MHz Chain 0

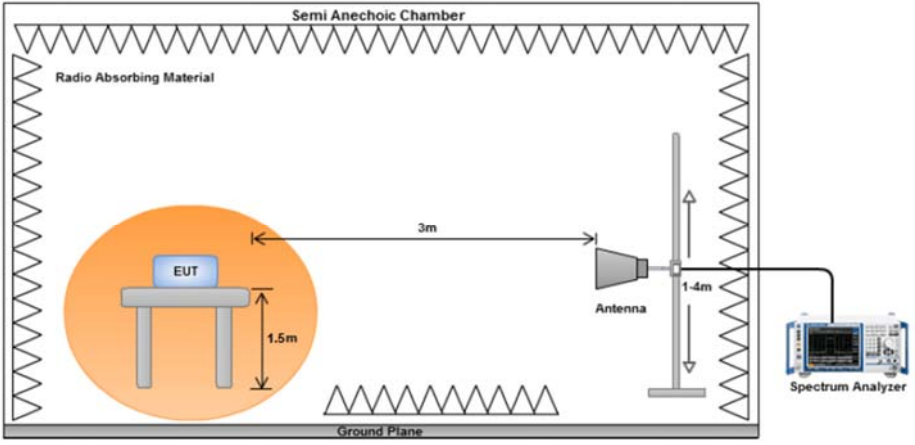


802.11ax40 2452MHz Chain 1



10.7 Radiated Spurious Emissions in restricted band

Requirement(s):

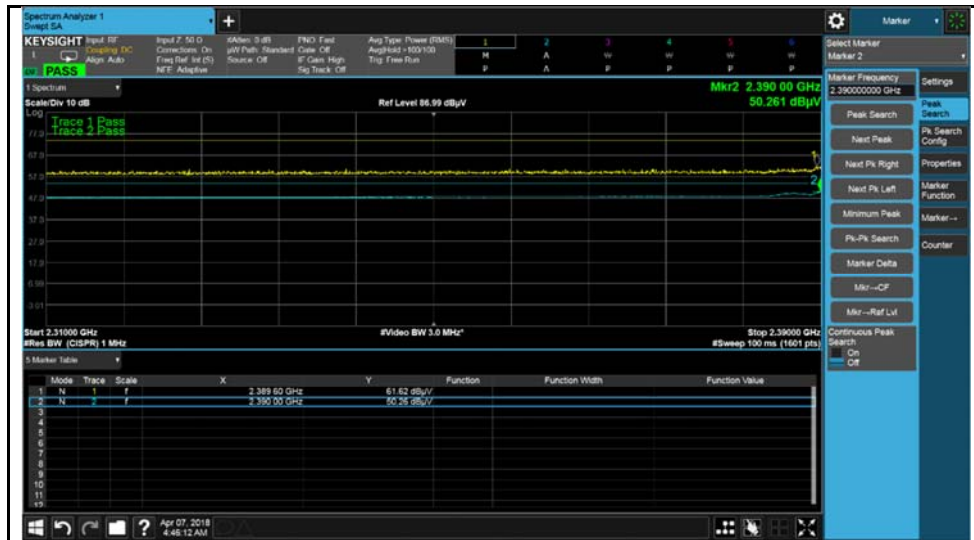
Spec	Item	Requirement	Applicable
47CFR§15.247(d), RSS247(A8.5)	a)	For non-restricted band, In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB or 30dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, determined by the measurement method on output power to be used. Attenuation below the general limits specified in § 15.209(a) is not required <input type="checkbox"/> 20 dB down <input checked="" type="checkbox"/> 30 dB down	<input checked="" type="checkbox"/>
	b)	or restricted band, emission must also comply with the radiated emission limits specified in 15.209	<input checked="" type="checkbox"/>
Test Setup			
Procedure	<ol style="list-style-type: none"> The EUT was switched on and allowed to warm up to its normal operating condition. The test was carried out at the selected frequency points obtained from the EUT characterisation. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner: <ol style="list-style-type: none"> Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen. The EUT was then rotated to the direction that gave the maximum emission. Finally, the antenna height was adjusted to the height that gave the maximum emission. An average measurement was then made for that frequency point. Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured. 		
Remark	The EUT was scanned up to 40GHz. Both horizontal and vertical polarities were investigated. The results show only the worst case. Radiated measurement was measured with antenna port terminated, there isn't outstanding emission found at the edge of restricted frequency, within x dB margin		
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail		

Test Data ☐ Yes (See below) ☒ N/A

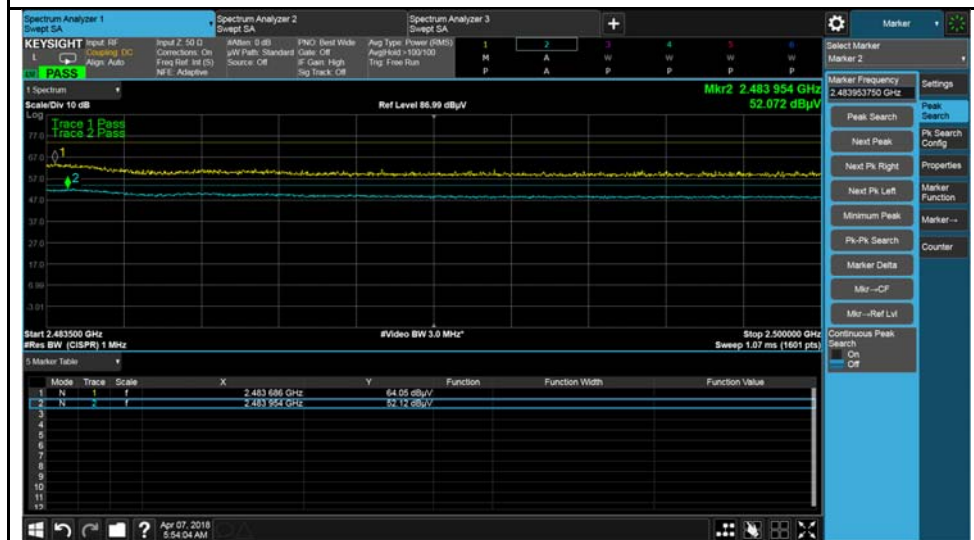
Test Plot ☒ Yes (See below) ☐ N/A

Test was done by Gary Chou at 10m chamber.

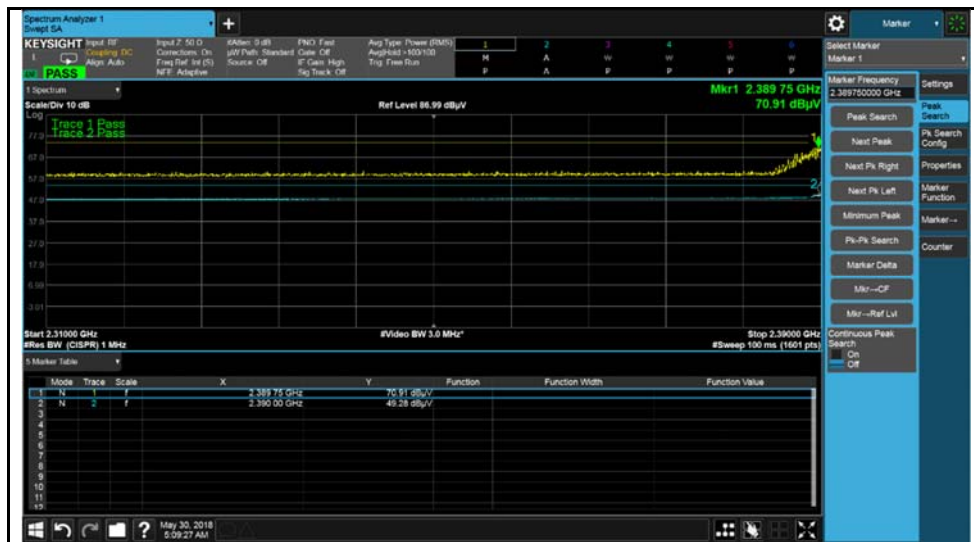
Restricted Band Measurement Plots:



802.11b-2412MHz



802.11b-2462MHz



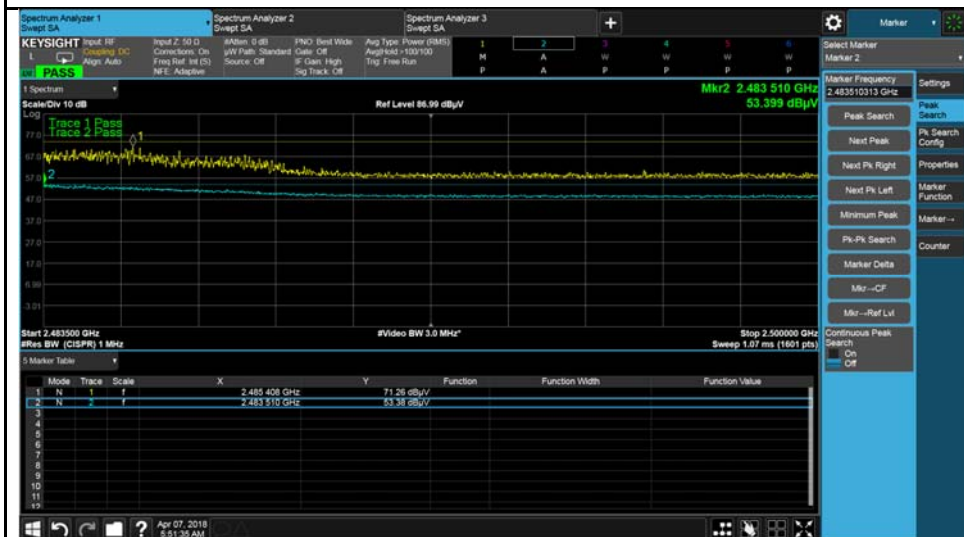
802.11g-2412MHz



802.11g-2462MHz



802.11ax20-2412MHz



802.11ax20-2462MHz



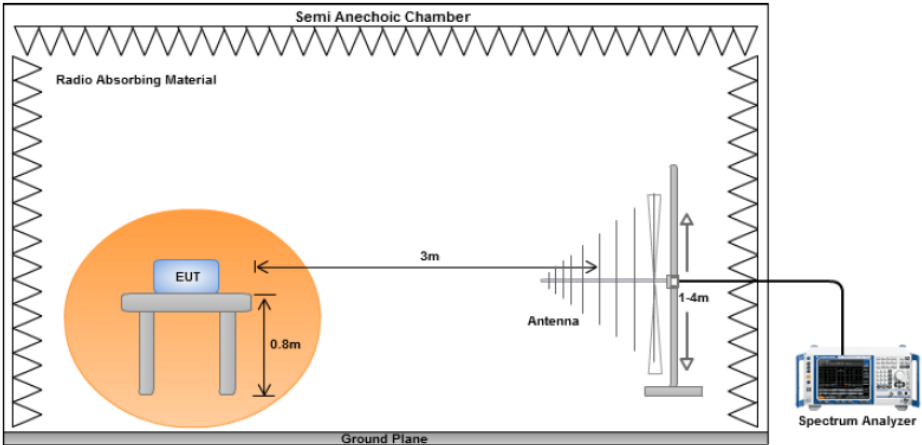
802.11ax40-2422MHz



802.11ax40-2452MHz

10.8 Radiated Spurious Emissions below 1GHz

Requirement(s):

Spec	Item	Requirement	Applicable										
47CFR§15.247(d) RSS247 (5.5)	a)	<p>Except higher limit as specified elsewhere in other section, the emissions from the low-power radio-frequency devices shall not exceed the field strength levels specified in the following table and the level of any unwanted emissions shall not exceed the level of the fundamental emission. The tighter limit applies at the band edges</p> <table><tr><th>Frequency range (MHz)</th><th>Field Strength (uV/m)</th></tr><tr><td>30 – 88</td><td>100</td></tr><tr><td>88 – 216</td><td>150</td></tr><tr><td>216 960</td><td>200</td></tr><tr><td>Above 960</td><td>500</td></tr></table>	Frequency range (MHz)	Field Strength (uV/m)	30 – 88	100	88 – 216	150	216 960	200	Above 960	500	<input checked="" type="checkbox"/>
Frequency range (MHz)	Field Strength (uV/m)												
30 – 88	100												
88 – 216	150												
216 960	200												
Above 960	500												
Test Setup													
Procedure	<div><div>1.</div><div>2.</div></div> <p>The EUT was switched on and allowed to warm up to its normal operating condition. The test was carried out at the selected frequency points obtained from the EUT characterisation. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner:</p> <div><div>a.</div><div>b.</div><div>c.</div></div> <div><div>3.</div><div>4.</div></div> <p>A Quasi-peak measurement was then made for that frequency point. Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.</p>												
Remark	The EUT was scanned up to 1GHz. Both horizontal and vertical polarities were investigated. The results show only the worst case.												
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail												

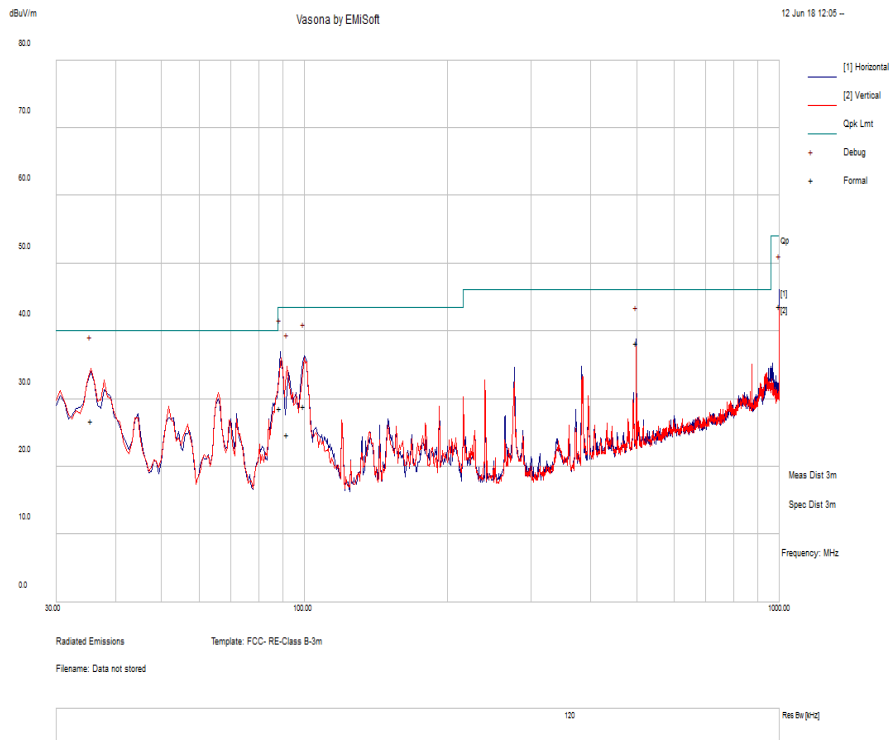
Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

Test was done by Gary Chou at 10m chamber.

Radiated Emission Test Results (Below 1GHz)

Test specification	below 1GHz			
Environmental Conditions:	Temp (°C):	26	Result	Pass
	Humidity (%)	47		
	Atmospheric (mbar):	1020		
Mains Power:	120VAC, 60Hz			
Tested by:	Gary Chou			
Test Date:	06/12/2018			
Remarks:	802.11ax40, 2437MHz			

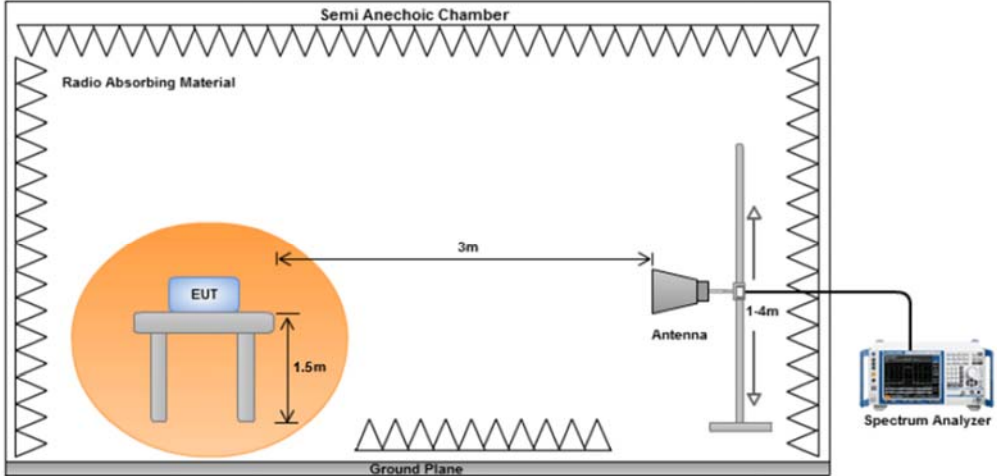


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Po l	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
35.59	33.44	11.21	-17.87	26.79	Quasi Max	V	325	225	40	-13.21	Pass
88.86	44.7	11.78	-27.85	28.62	Quasi Max	H	247	127	43.5	-14.88	Pass
91.87	40.36	11.81	-27.34	24.83	Quasi Max	V	254	280	43.5	-18.67	Pass
99.54	42.64	11.88	-25.57	28.94	Quasi Max	H	146	248	43.5	-14.56	Pass
500.01	42.73	14.17	-18.55	38.35	Quasi Max	H	167	112	46	-7.65	Pass
1000.00	40.31	16.28	-12.92	43.67	Quasi Max	H	106	143	54	-10.33	Pass

Note: Both horizontal and vertical polarities were investigated. The results above show only the worst case.

10.9 Radiated Spurious Emissions between 1GHz – 25GHz

Requirement(s):

Spec	Item	Requirement	Applicable
47CFR§15.247(d), RSS247(A8.5)	a)	For non-restricted band, In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB or 30dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, determined by the measurement method on output power to be used. Attenuation below the general limits specified in § 15.209(a) is not required <input type="checkbox"/> 20 dB down <input checked="" type="checkbox"/> 30 dB down	<input checked="" type="checkbox"/>
	b)	or restricted band, emission must also comply with the radiated emission limits specified in 15.209	<input checked="" type="checkbox"/>
Test Setup			
Procedure	<ol style="list-style-type: none"> The EUT was switched on and allowed to warm up to its normal operating condition. The test was carried out at the selected frequency points obtained from the EUT characterisation. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner: <ol style="list-style-type: none"> Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen. The EUT was then rotated to the direction that gave the maximum emission. Finally, the antenna height was adjusted to the height that gave the maximum emission. An average measurement was then made for that frequency point. Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured. 		
Remark	The EUT was scanned up to 40GHz. Both horizontal and vertical polarities were investigated. The results show only the worst case. There isn't outstanding emission found at the edge of restricted frequency.		
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail		

Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☐ Yes (See below) ☒ N/A

Test was done by Gary Chou at 3m chamber.

Radiated Emission Test Results (Above 1GHz)

Above 1GHz-25GHz – 802.11b – 2412MHz

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
3024.81	49.87	3.29	-14.09	39.07	Peak Max	V	266	304	74	-34.93	Pass
4824.35	60.66	4.12	-10.92	53.86	Peak Max	H	227	47	74	-20.14	Pass
8494.46	41.14	5.53	-6.86	39.81	Peak Max	V	168	159	74	-34.19	Pass
3024.81	40.01	3.29	-14.09	29.21	Average Max	H	266	304	54	-24.79	Pass
4824.35	51.58	4.12	-10.92	44.78	Average Max	V	227	47	54	-9.22	Pass
8494.46	32.03	5.53	-6.86	30.7	Average Max	V	168	159	54	-23.3	Pass

Above 1GHz-25GHz- 802.11b - 2437MHz

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
3821.31	49.8	3.65	-12.93	40.52	Peak Max	H	268	304	74	-33.48	Pass
4873.36	60.36	4.17	-11.01	53.52	Peak Max	H	232	49	74	-20.48	Pass
8096.01	42.32	5.4	-7.07	40.65	Peak Max	H	164	160	74	-33.35	Pass
3821.31	40.67	3.65	-12.93	31.39	Average Max	V	268	304	54	-22.61	Pass
4873.36	51.33	4.17	-11.01	44.49	Average Max	V	232	49	54	-9.51	Pass
8096.01	32.41	5.4	-7.07	30.74	Average Max	H	164	160	54	-23.26	Pass

Above 1GHz-25GHz – 802.11b – 2462MHz

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
3040.75	49.39	3.3	-14.02	38.67	Peak Max	H	269	304	74	-35.33	Pass
4924.33	60.24	4.22	-11.11	53.35	Peak Max	V	234	45	74	-20.65	Pass
8338.02	42.01	5.41	-7.03	40.39	Peak Max	H	169	153	74	-33.61	Pass
3040.75	39.45	3.3	-14.02	28.73	Average Max	V	269	304	54	-25.27	Pass
4924.33	51.11	4.22	-11.11	44.22	Average Max	V	234	45	54	-9.78	Pass
8338.02	32.03	5.41	-7.03	30.41	Average Max	V	169	153	54	-23.59	Pass

Above 1GHz-25GHz- 802.11g - 2412MHz

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
3154.74	49.74	3.39	-13.81	39.32	Peak Max	V	265	295	74	-34.68	Pass
4825.00	48.6	4.12	-10.92	41.8	Peak Max	H	225	49	74	-32.2	Pass
8617.57	43.32	5.58	-6.67	42.23	Peak Max	H	169	159	74	-31.77	Pass
3154.74	39.85	3.39	-13.81	29.43	Average Max	V	265	295	54	-24.57	Pass
4825.00	39.52	4.12	-10.92	32.72	Average Max	H	225	49	54	-21.28	Pass
8617.57	33.97	5.58	-6.67	32.88	Average Max	V	169	159	54	-21.12	Pass

Above 1GHz-25GHz – 802.11g – 2437MHz

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
3735.19	50.66	3.57	-13.13	41.1	Peak Max	H	271	304	74	-32.9	Pass
4873.76	48.35	4.17	-11.01	41.51	Peak Max	H	226	47	74	-32.49	Pass
8011.44	42.3	5.43	-7.03	40.7	Peak Max	V	167	158	74	-33.3	Pass
3735.19	40.86	3.57	-13.13	31.3	Average Max	V	271	304	54	-22.7	Pass
4873.76	39.08	4.17	-11.01	32.24	Average Max	H	226	47	54	-21.76	Pass
8011.44	32.64	5.43	-7.03	31.04	Average Max	V	167	158	54	-22.96	Pass

Above 1GHz-25GHz- 802.11g - 2462MHz

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
3091.64	49.8	3.34	-13.87	39.27	Peak Max	H	269	302	74	-34.73	Pass
4924.08	48.27	4.22	-11.11	41.38	Peak Max	H	233	43	74	-32.62	Pass
8371.97	42.28	5.44	-6.99	40.73	Peak Max	H	168	160	74	-33.27	Pass
3091.64	40.61	3.34	-13.87	30.08	Average Max	H	269	302	54	-23.92	Pass
4924.08	38.71	4.22	-11.11	31.82	Average Max	H	233	43	54	-22.18	Pass
8371.97	32.88	5.44	-6.99	31.33	Average Max	V	168	160	54	-22.67	Pass

Above 1GHz-25GHz- 802.11ax20 - 2412MHz

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
3876.64	49.23	3.71	-12.8	40.14	Peak Max	V	266	296	74	-33.86	Pass
4824.86	60.61	4.12	-10.92	53.81	Peak Max	V	230	45	74	-20.19	Pass
8872.45	41.81	5.63	-6.18	41.26	Peak Max	V	163	155	74	-32.74	Pass
3876.64	39.98	3.71	-12.8	30.89	Average Max	H	266	296	54	-23.11	Pass
4824.86	50.7	4.12	-10.92	43.9	Average Max	V	230	45	54	-10.1	Pass
8872.45	32.76	5.63	-6.18	32.21	Average Max	V	163	155	54	-21.79	Pass

Above 1GHz-25GHz – 802.11ax20 – 2437MHz

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
3423.88	49.58	3.55	-13.73	39.4	Peak Max	H	269	297	74	-34.6	Pass
4873.81	60.35	4.17	-11.01	53.51	Peak Max	V	230	43	74	-20.49	Pass
8918.49	41.4	5.62	-6.11	40.91	Peak Max	H	168	160	74	-33.09	Pass
3423.88	39.99	3.55	-13.73	29.81	Average Max	V	269	297	54	-24.19	Pass
4873.81	50.67	4.17	-11.01	43.83	Average Max	H	230	43	54	-10.17	Pass
8918.49	31.52	5.62	-6.11	31.03	Average Max	H	168	160	54	-22.97	Pass

Above 1GHz-25GHz- 802.11ax20 - 2462MHz

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
3894.65	49.24	3.73	-12.76	40.21	Peak Max	H	264	296	74	-33.79	Pass
4924.39	60.24	4.22	-11.11	53.35	Peak Max	V	225	45	74	-20.65	Pass
8938.38	42.06	5.62	-6.07	41.61	Peak Max	H	161	159	74	-32.39	Pass
3894.65	40.24	3.73	-12.76	31.21	Average Max	H	264	296	54	-22.79	Pass
4924.39	50.3	4.22	-11.11	43.41	Average Max	H	225	45	54	-10.59	Pass
8938.38	32.84	5.62	-6.07	32.39	Average Max	H	161	159	54	-21.61	Pass

Above 1GHz-25GHz- 802.11ax40 - 2422MHz

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
3517.92	49.74	3.58	-13.7	39.62	Peak Max	V	271	295	74	-34.38	Pass
4843.31	61.36	4.14	-10.94	54.56	Peak Max	H	229	50	74	-19.44	Pass
8827.41	42.01	5.63	-6.26	41.38	Peak Max	H	165	156	74	-32.62	Pass
3517.92	40.34	3.58	-13.7	30.22	Average Max	V	271	295	54	-23.78	Pass
4843.31	51.89	4.14	-10.94	45.09	Average Max	H	229	50	54	-8.91	Pass
8827.41	32.52	5.63	-6.26	31.89	Average Max	H	165	156	54	-22.11	Pass

Above 1GHz-25GHz – 802.11ax40 – 2437MHz

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
3561.91	49.24	3.58	-13.64	39.18	Peak Max	V	268	295	74	-34.82	Pass
4873.14	60.36	4.17	-11.01	53.52	Peak Max	V	231	46	74	-20.48	Pass
8596.46	42.25	5.57	-6.7	41.12	Peak Max	H	169	155	74	-32.88	Pass
3561.91	39.51	3.58	-13.64	29.45	Average Max	H	268	295	54	-24.55	Pass
4873.14	50.43	4.17	-11.01	43.59	Average Max	H	231	46	54	-10.41	Pass
8596.46	32.28	5.57	-6.7	31.15	Average Max	H	169	155	54	-22.85	Pass
















Above 1GHz-25GHz- 802.11ax40 - 2452MHz







Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
3685.83	49.33	3.57	-13.28	39.62	Peak Max	V	265	298	74	-34.38	Pass
4904.67	60.64	4.2	-11.09	53.75	Peak Max	H	231	41	74	-20.25	Pass
8536.95	42.07	5.54	-6.83	40.78	Peak Max	V	165	154	74	-33.22	Pass
3685.83	40.26	3.57	-13.28	30.55	Average Max	V	265	298	54	-23.45	Pass
4904.67	50.87	4.2	-11.09	43.98	Average Max	V	231	41	54	-10.02	Pass
8536.95	32.26	5.54	-6.83	30.97	Average Max	V	165	154	54	-23.03	Pass

Annex A. TEST INSTRUMENT

Instrument	Model	Serial #	Cal Date	Cal Cycle	Cal Due	In use
Conducted Emissions						
R & S Receiver	ESIB 40	100179	06/08/2018	1 Year	06/08/2019	<input checked="" type="checkbox"/>
CHASE LISN	MN2050B	1018	08/07/2017	1 Year	08/07/2018	<input checked="" type="checkbox"/>
Radiated Emissions						
Spectrum Analyzer	N9010A	10SL0219	08/20/2017	1 Year	08/20/2018	<input checked="" type="checkbox"/>
Bi-Log antenna (30MHz~2GHz)	JB1	A030702	08/12/2017	1 Year	08/12/2018	<input checked="" type="checkbox"/>
Horn Antenna (1GHz~26GHz)	3115	100059	08/25/2017	1 Year	08/25/2018	<input checked="" type="checkbox"/>
Horn Antenna (26GHz~40GHz)	AH-840	101013	08/28/2017	1 Year	08/28/2018	<input checked="" type="checkbox"/>
Pre-Amp (30MHz~40GHz)	LPA-6-30	11140711	02/10/2018	1 Year	02/10/2019	<input checked="" type="checkbox"/>
RF Conducted Measurement						
Spectrum Analyzer	N9010A	10SL0219	08/20/2017	1 Year	08/20/2018	<input checked="" type="checkbox"/>

Annex B. SIEMIC Accreditation

Accreditations	Document	Scope / Remark
ISO 17025 (A2LA)		Please see the documents for the detailed scope
ISO Guide 65 (A2LA)		Please see the documents for the detailed scope
TCB Designation		A1 , A2 , A3 , A4 , B1 , B2 , B3 , B4 , C
FCC DoC Accreditation		FCC Declaration of Conformity Accreditation
FCC Site Registration		3 meter site
FCC Site Registration		10 meter site
IC Site Registration		3 meter site
IC Site Registration		10 meter site
EU NB		Radio & Telecommunications Terminal Equipment: EN45001 – EN ISO/IEC 17025
		Electromagnetic Compatibility: EN45001 – EN ISO/IEC 17025
Singapore iDA CB(Certification Body)		Phase I , Phase II
Vietnam MIC CAB Accreditation		Please see the document for the detailed scope
Hong Kong OFCA		(Phase II) OFCA Foreign Certification Body for Radio and Telecom
		(Phase I) Conformity Assessment Body for Radio and Telecom
Industry Canada CAB		Radio: Scope A – All Radio Standard Specification in Category I
		Telecom: CS-03 Part I, II, V, VI, VII, VIII

Japan Recognized Certification Body Designation		Radio: A1. Terminal equipment for purpose of calling Telecom: B1. Specified radio equipment specified in Article 38-2, Paragraph 1, Item 1 of the Radio Law
Korea CAB Accreditation		EMI: KCC Notice 2008-39, RRL Notice 2008-3: CA Procedures for EMI KN22: Test Method for EMI EMS: KCC Notice 2008-38, RRL Notice 2008-4: CA Procedures for EMS KN24, KN61000-4-2, -4-3, -4-4, -4-5, -4-6, -4-8, -4-11: Test Method for EMS Radio: RRL Notice 2008-26, RRL Notice 2008-2, RRL Notice 2008-10, RRL Notice 2007-49, RRL Notice 2007-20, RRL Notice 2007-21, RRL Notice 2007-80, RRL Notice 2004-68 Telecom: President Notice 20664, RRL Notice 2007-30, RRL Notice 2008-7 with attachments 1, 3, 5, 6; President Notice 20664, RRL Notice 2008-7 with attachment 4
Taiwan NCC CAB Recognition		LP0002, PSTN01, ADSL01, ID0002, IS6100, CNS14336, PLMN07, PLMN01, PLMN08
Taiwan BSMI CAB Recognition		CNS 13438
Japan VCCI		R-3083: Radiation 3 meter site C-3421: Main Ports Conducted Interference Measurement T-1597: Telecommunication Ports Conducted Interference Measurement
Australia CAB Recognition		EMC: AS/NZS CISPR 11, AS/NZS CISPR 14.1, AS/NZS CISPR22, AS/NZS 61000.6.3, AS/NZS 61000.6.4 Radio communications: AS/NZS 4281, AS/NZS 4268, AS/NZS 4280.1, AS/NZS 4280.2, AS/NZS 4295, AS/NZS 4582, AS/NZS 4583, AS/NZS 4769.1, AS/NZS 4769.2, AS/NZS 4770, AS/NZS 4771 Telecommunications: AS/ACIF S002:05, AS/ACIF S003:06, AS/ACIF S004:06, AS/ACIF S006:01, AS/ACIF S016:01, AS/ACIF S031:01, AS/ACIF S038:01, AS/ACIF S040:01, AS/ACIF S041:05, AS/ACIF S043.2:06, AS/ACIF S60950.1
Australia NATA Recognition		AS/ACIF S002, AS/ACIF S003, AS/ACIF S004, AS/ACIF S006, AS/ACIF S016, AS/ACIF S031, AS/ACIF S038, AS/ACIF S040, AS/ACIF S041, AS/ACIF S043.2