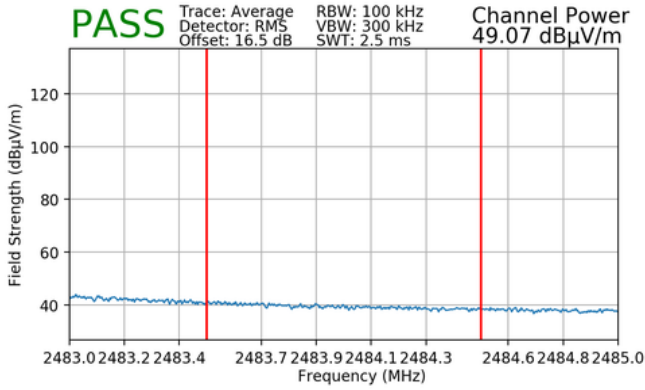
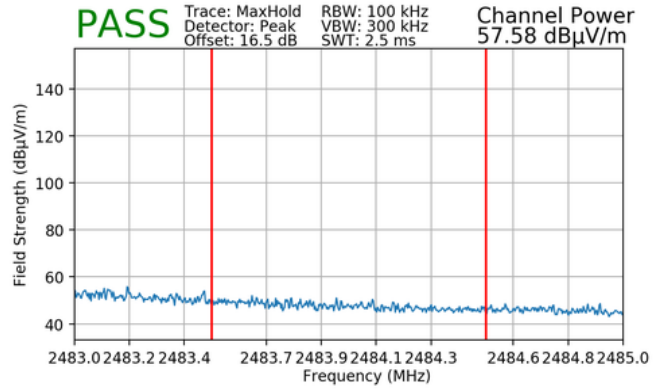




Worst Case Mode: 802.11ax  
 Worst Case Transfer Rate: MCS0  
 Distance of Measurements: 3 Meters  
 Operating Frequency: 2472MHz  
 Channel: 13



**Plot 7-221. Radiated Restricted Upper Band Edge Measurement SISO ANT2 (Average)**



**Plot 7-222. Radiated Restricted Upper Band Edge Measurement SISO ANT2 (Peak)**

FCC ID: C3K1997 IC: 3048A-1997	<b>MEASUREMENT REPORT (CERTIFICATON)</b>		<b>Approved by:</b> Technical Manager
<b>Test Report S/N:</b> 1M2204040049-13-R1.C3K	<b>Test Dates:</b> 3/14/2022-7/1/2022	<b>EUT Type:</b> Portable Computing Device	Page 142 of 164

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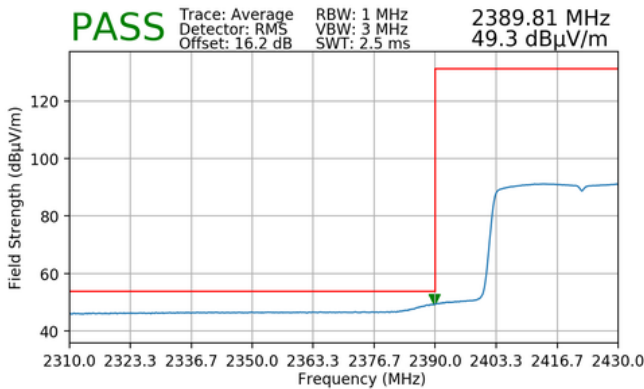
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### 7.7.7 SISO Antenna-2 Radiated Restricted Band Edge Measurements 40MHz

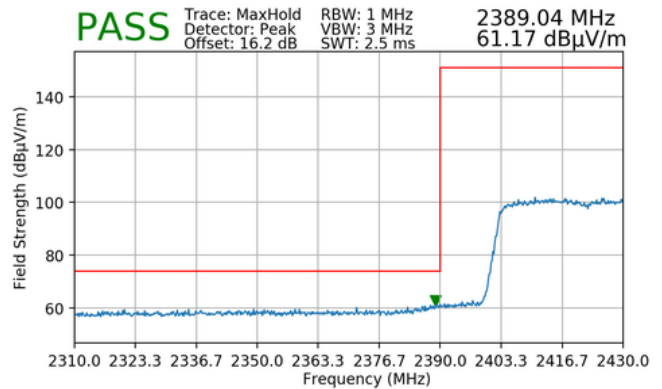
§15.205 §15.209; RSS-Gen [8.9]

The radiated restricted band edge measurements are measured with an EMI test receiver connected to the receive antenna while the EUT is transmitting.

Worst Case Mode:	802.11ax
Worst Case Transfer Rate:	MCS0
Distance of Measurements:	3 Meters
Operating Frequency:	2422MHz
Channel:	3

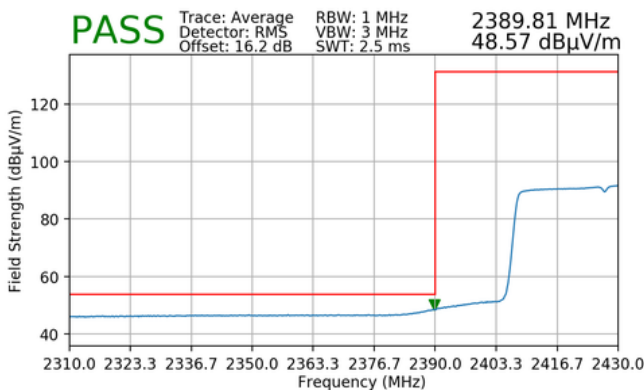


**Plot 7-223. Radiated Restricted Lower Band Edge Measurement SISO ANT2 (Average)**

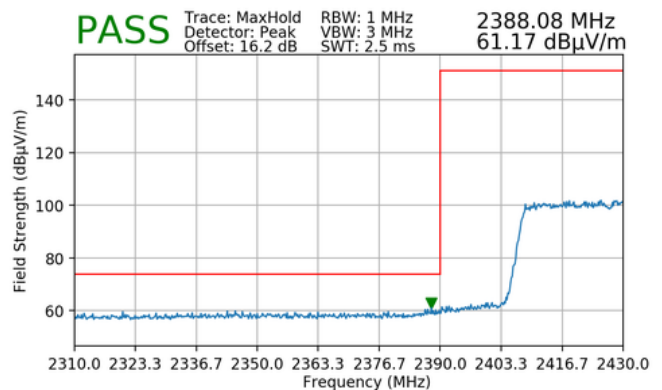


**Plot 7-224. Radiated Restricted Lower Band Edge Measurement SISO ANT2 (Peak)**

Worst Case Mode:	802.11ax
Worst Case Transfer Rate:	MCS0
Distance of Measurements:	3 Meters
Operating Frequency:	2427MHz
Channel:	4



**Plot 7-225. Radiated Restricted Lower Band Edge Measurement SISO ANT2 (Average)**



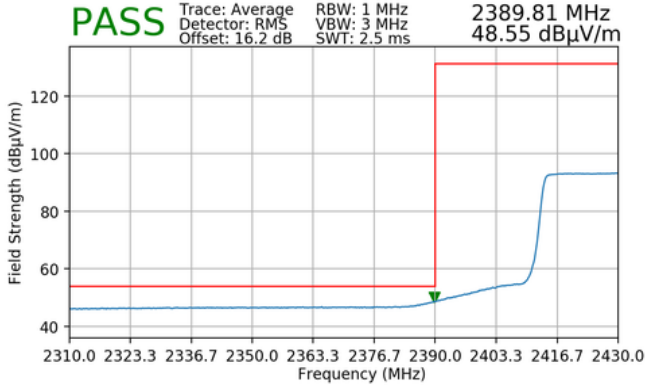
**Plot 7-226. Radiated Restricted Lower Band Edge Measurement SISO ANT2 (Peak)**

Worst Case Mode:	802.11n
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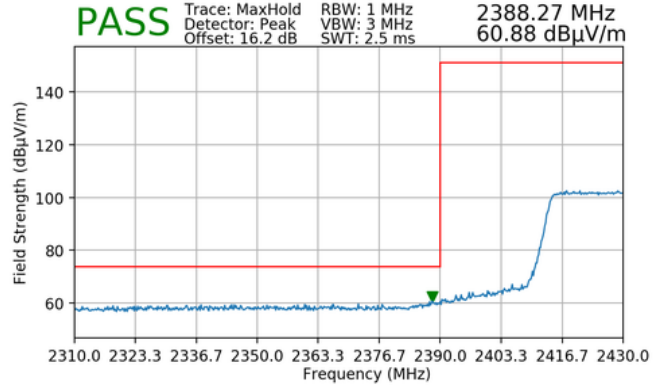
FCC ID: C3K1997 IC: 3048A-1997	<b>MEASUREMENT REPORT (CERTIFICATON)</b>		Approved by: Technical Manager
Test Report S/N: 1M2204040049-13-R1.C3K	Test Dates: 3/14/2022-7/1/2022	EUT Type: Portable Computing Device	Page 143 of 164



Worst Case Transfer Rate:	MCS0
Distance of Measurements:	3 Meters
Operating Frequency:	2432MHz
Channel:	5

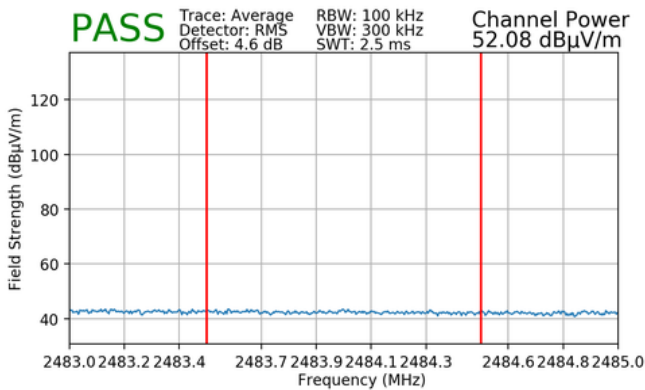


**Plot 7-227. Radiated Restricted Lower Band Edge Measurement SISO ANT2 (Average)**

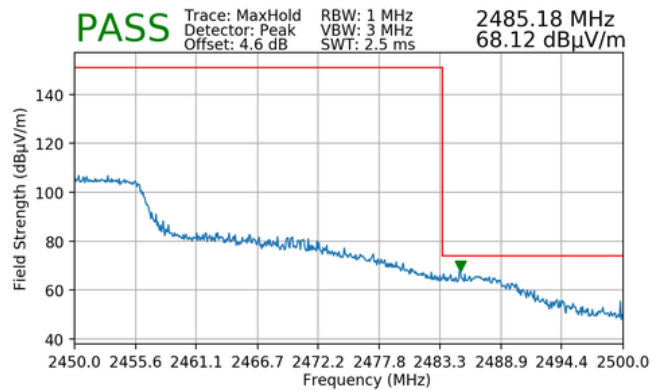


**Plot 7-228. Radiated Restricted Lower Band Edge Measurement SISO ANT2 (Peak)**

Worst Case Mode:	802.11ax
Worst Case Transfer Rate:	MCS0
Distance of Measurements:	3 Meters
Operating Frequency:	2437MHz
Channel:	6



**Plot 7-229. Radiated Restricted Upper Band Edge Measurement SISO ANT2 (Average)**



**Plot 7-230. Radiated Restricted Upper Band Edge Measurement SISO ANT2 (Peak)**

Worst Case Mode:	802.11ax
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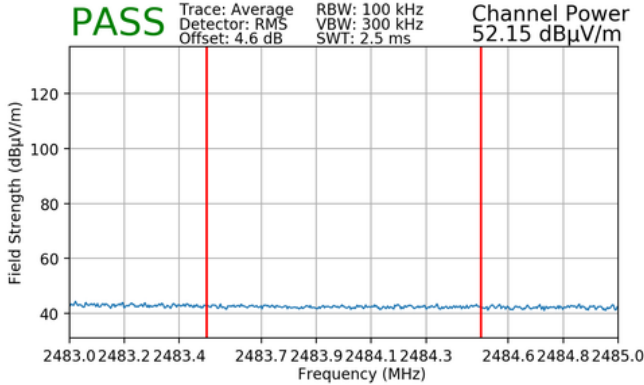
FCC ID: C3K1997 IC: 3048A-1997	<b>MEASUREMENT REPORT (CERTIFICATON)</b>		Approved by: Technical Manager
Test Report S/N: 1M2204040049-13-R1.C3K	Test Dates: 3/14/2022-7/1/2022	EUT Type: Portable Computing Device	Page 144 of 164

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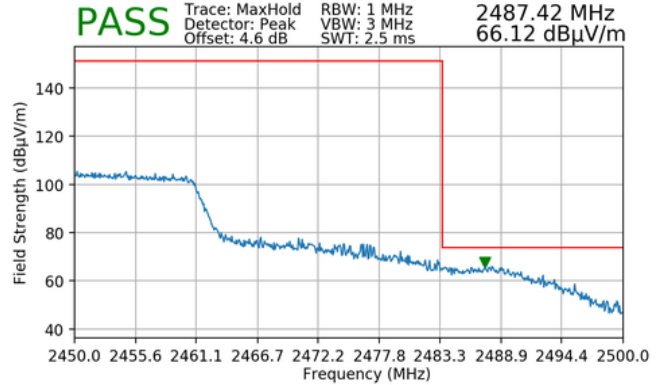
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Worst Case Transfer Rate: MCS0  
 Distance of Measurements: 3 Meters  
 Operating Frequency: 2442MHz  
 Channel: 7

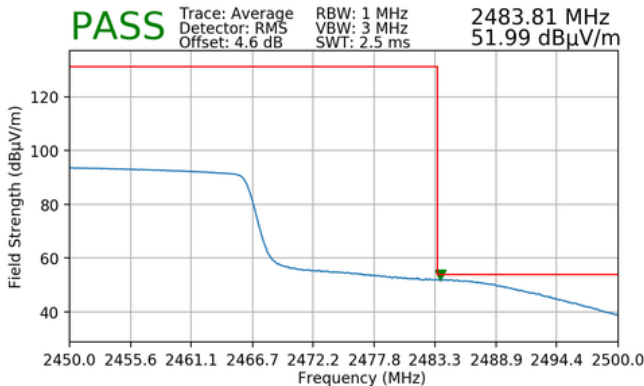


**Plot 7-231. Radiated Restricted Upper Band Edge Measurement SISO ANT2 (Average)**

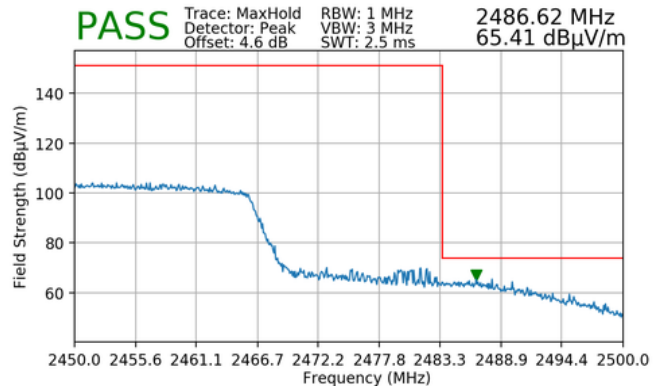


**Plot 7-232. Radiated Restricted Upper Band Edge Measurement SISO ANT2 (Peak)**

Worst Case Mode: 802.11ax  
 Worst Case Transfer Rate: MCS0  
 Distance of Measurements: 3 Meters  
 Operating Frequency: 2447MHz  
 Channel: 8



**Plot 7-233. Radiated Restricted Upper Band Edge Measurement SISO ANT2 (Average)**



**Plot 7-234. Radiated Restricted Upper Band Edge Measurement SISO ANT2 (Peak)**

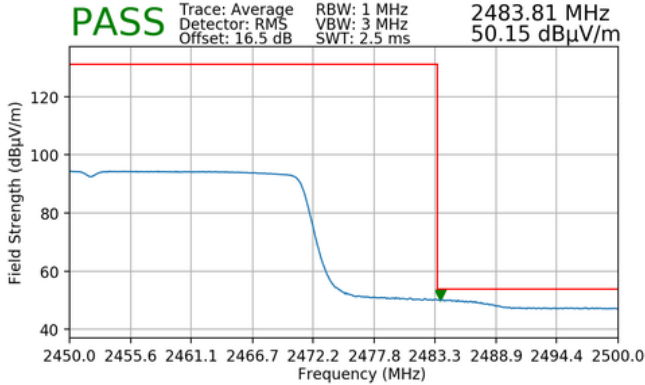
Worst Case Mode: 802.11ax

FCC ID: C3K1997 IC: 3048A-1997	<b>MEASUREMENT REPORT (CERTIFICATON)</b>		Approved by: Technical Manager
Test Report S/N: 1M2204040049-13-R1.C3K	Test Dates: 3/14/2022-7/1/2022	EUT Type: Portable Computing Device	Page 145 of 164

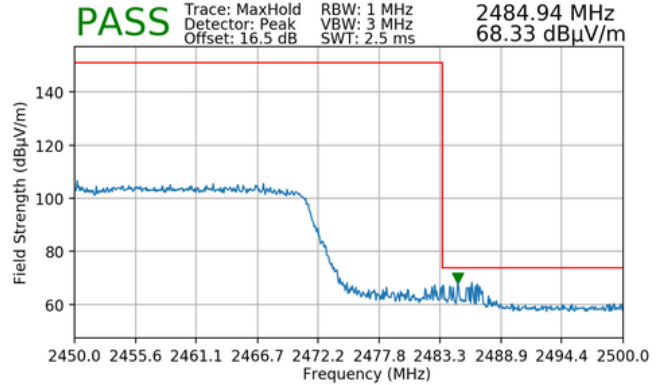
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Worst Case Transfer Rate: MCS0  
 Distance of Measurements: 3 Meters  
 Operating Frequency: 2452MHz  
 Channel: 9

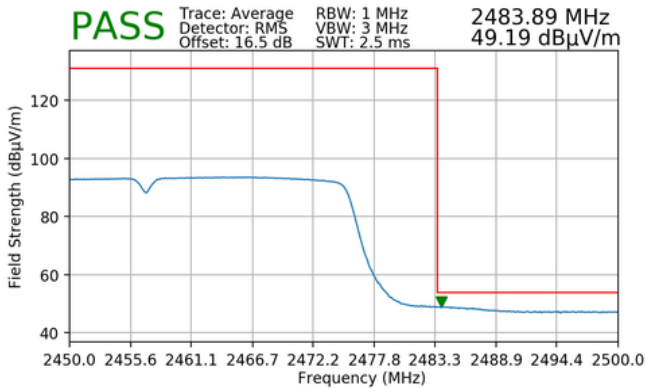


**Plot 7-235. Radiated Restricted Upper Band Edge Measurement SISO ANT2 (Average)**

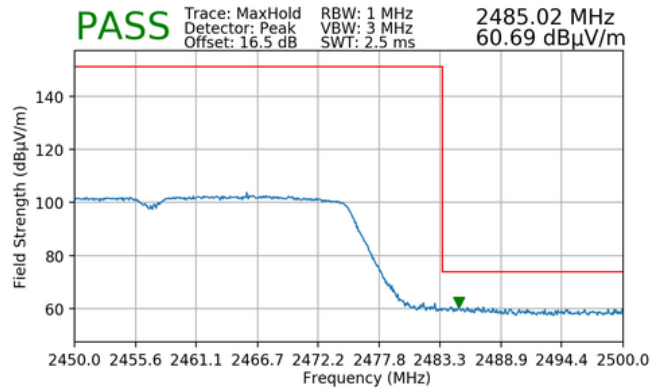


**Plot 7-236. Radiated Restricted Upper Band Edge Measurement SISO ANT2 (Peak)**

Worst Case Mode: 802.11n  
 Worst Case Transfer Rate: MCS0  
 Distance of Measurements: 3 Meters  
 Operating Frequency: 2457MHz  
 Channel: 10



**Plot 7-237. Radiated Restricted Upper Band Edge Measurement SISO ANT2 (Average)**

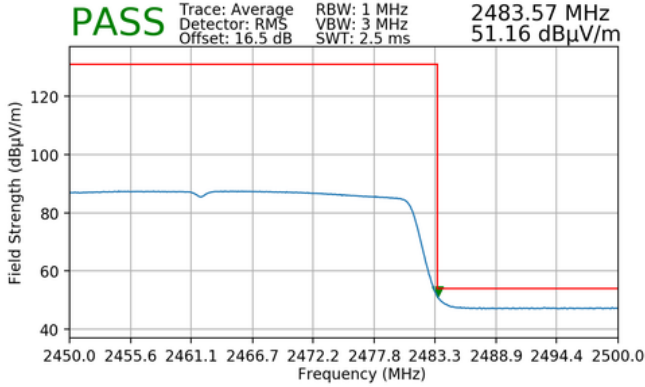


**Plot 7-238. Radiated Restricted Upper Band Edge Measurement SISO ANT2 (Peak)**

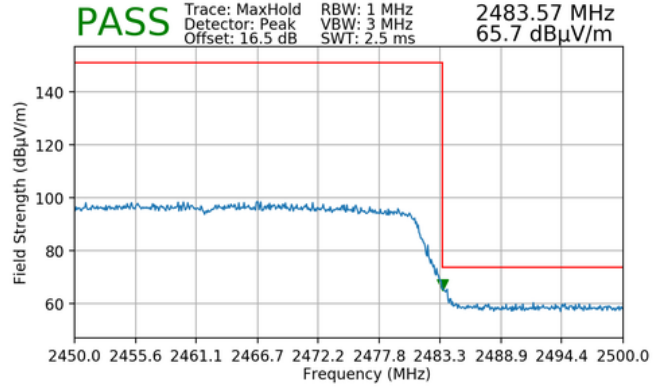
Worst Case Mode: 802.11ax

FCC ID: C3K1997 IC: 3048A-1997	<b>MEASUREMENT REPORT (CERTIFICATON)</b>		Approved by: Technical Manager
Test Report S/N: 1M2204040049-13-R1.C3K	Test Dates: 3/14/2022-7/1/2022	EUT Type: Portable Computing Device	Page 146 of 164

Worst Case Transfer Rate:	MCS0
Distance of Measurements:	3 Meters
Operating Frequency:	2462MHz
Channel:	11



**Plot 7-239. Radiated Restricted Upper Band Edge Measurement SISO ANT2 (Average)**



**Plot 7-240. Radiated Restricted Upper Band Edge Measurement SISO ANT2 (Peak)**

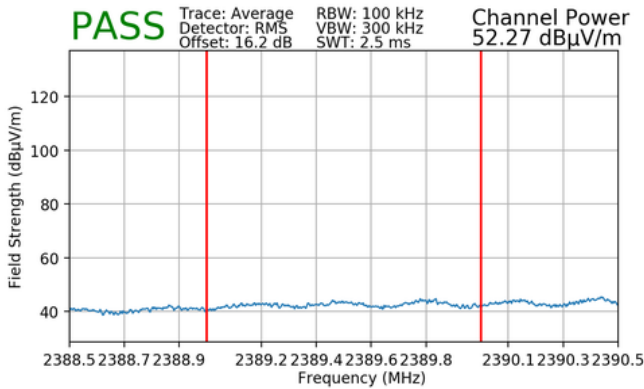
FCC ID: C3K1997 IC: 3048A-1997	<b>MEASUREMENT REPORT (CERTIFICATON)</b>		Approved by: Technical Manager
Test Report S/N: 1M2204040049-13-R1.C3K	Test Dates: 3/14/2022-7/1/2022	EUT Type: Portable Computing Device	Page 147 of 164

### 7.7.8 MIMO Radiated Restricted Band Edge Measurements

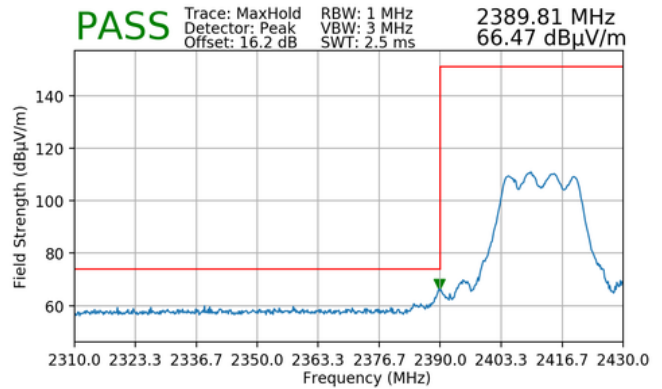
§15.205 §15.209; RSS-Gen [8.9]

The radiated restricted band edge measurements are measured with an EMI test receiver connected to the receive antenna while the EUT is transmitting.

Worst Case Mode:	802.11g
Worst Case Transfer Rate:	6 Mbps
Distance of Measurements:	3 Meters
Operating Frequency:	2412MHz
Channel:	1

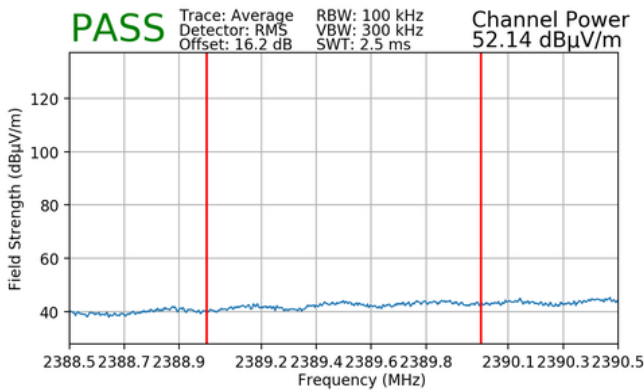


**Plot 7-241. Radiated Restricted Lower Band Edge Measurement MIMO (Average)**

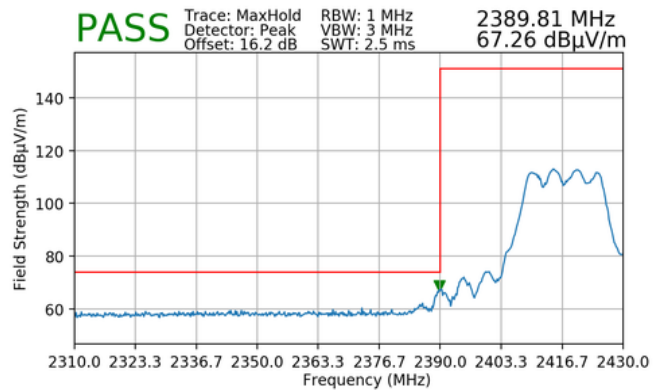


**Plot 7-242. Radiated Restricted Lower Band Edge Measurement MIMO (Peak)**

Worst Case Mode:	802.11g
Worst Case Transfer Rate:	6 Mbps
Distance of Measurements:	3 Meters
Operating Frequency:	2417MHz
Channel:	2



**Plot 7-243. Radiated Restricted Lower Band Edge Measurement MIMO (Average)**

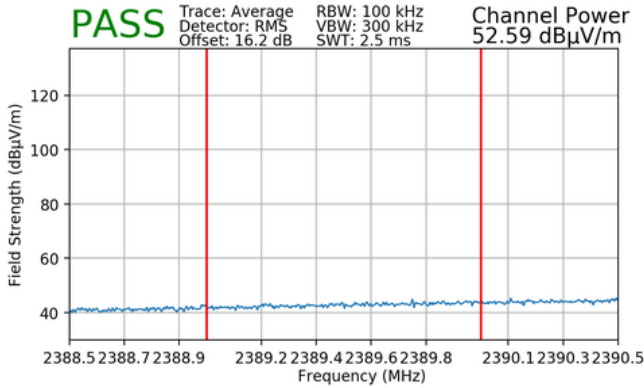


**Plot 7-244. Radiated Restricted Lower Band Edge Measurement MIMO (Peak)**

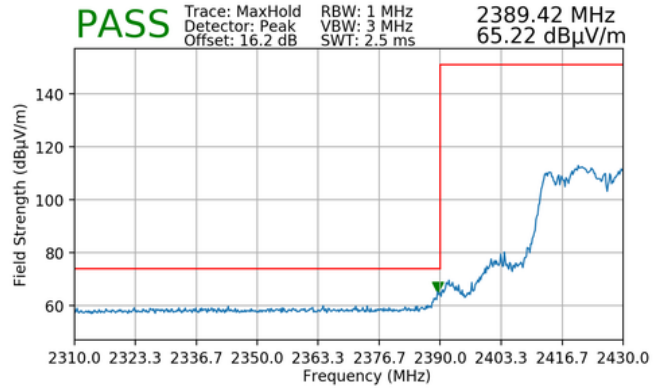
FCC ID: C3K1997 IC: 3048A-1997	<b>MEASUREMENT REPORT (CERTIFICATON)</b>		Approved by: Technical Manager
Test Report S/N: 1M2204040049-13-R1.C3K	Test Dates: 3/14/2022-7/1/2022	EUT Type: Portable Computing Device	Page 148 of 164



Worst Case Mode: 802.11ax  
 Worst Case Transfer Rate: MCS0  
 Distance of Measurements: 3 Meters  
 Operating Frequency: 2422MHz  
 Channel: 3

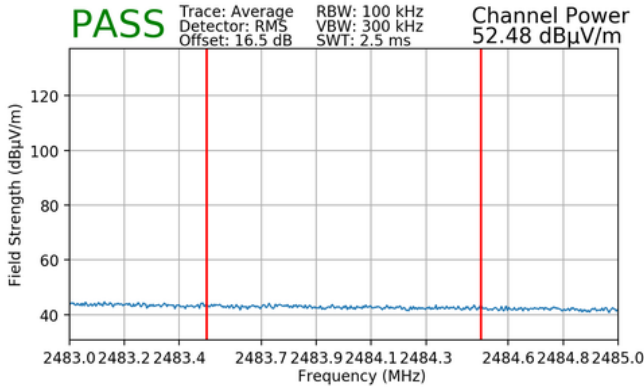


**Plot 7-245. Radiated Restricted Lower Band Edge Measurement MIMO (Average)**

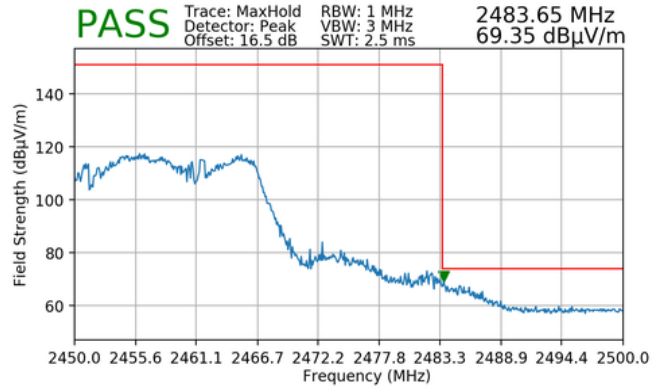


**Plot 7-246. Radiated Restricted Lower Band Edge Measurement MIMO (Peak)**

Worst Case Mode: 802.11ax  
 Worst Case Transfer Rate: MCS0  
 Distance of Measurements: 3 Meters  
 Operating Frequency: 2457MHz  
 Channel: 10



**Plot 7-247. Radiated Restricted Upper Band Edge Measurement MIMO (Average)**



**Plot 7-248. Radiated Restricted Upper Band Edge Measurement MIMO (Peak)**

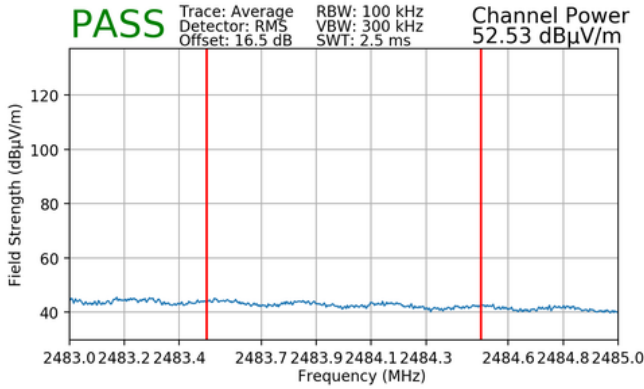
FCC ID: C3K1997 IC: 3048A-1997	<b>MEASUREMENT REPORT (CERTIFICATON)</b>		Approved by: Technical Manager
Test Report S/N: 1M2204040049-13-R1.C3K	Test Dates: 3/14/2022-7/1/2022	EUT Type: Portable Computing Device	Page 149 of 164

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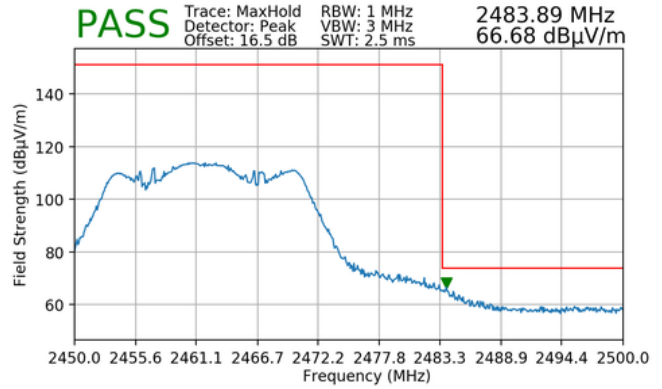
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Worst Case Mode:	802.11n
Worst Case Transfer Rate:	MCS0
Distance of Measurements:	3 Meters
Operating Frequency:	2462MHz
Channel:	11

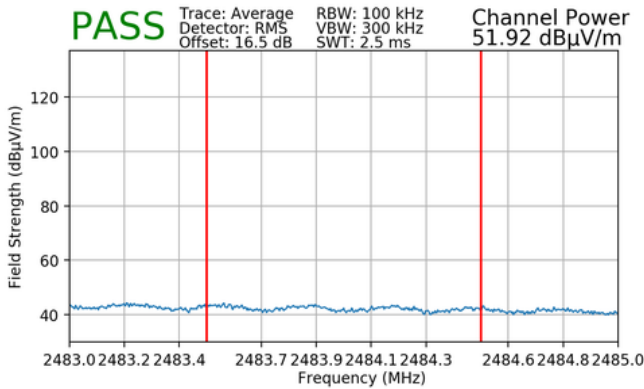


**Plot 7-249. Radiated Restricted Upper Band Edge Measurement MIMO (Average)**

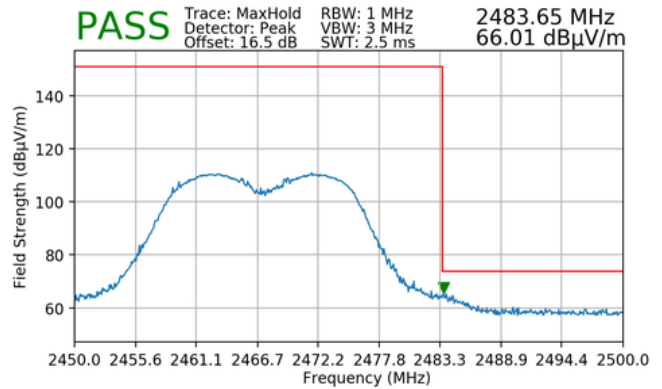


**Plot 7-250. Radiated Restricted Upper Band Edge Measurement MIMO (Peak)**

Worst Case Mode:	802.11n
Worst Case Transfer Rate:	MCS0
Distance of Measurements:	3 Meters
Operating Frequency:	2457MHz
Channel:	12



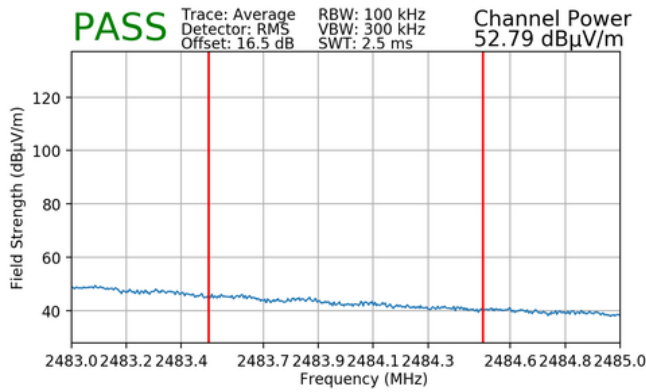
**Plot 7-251. Radiated Restricted Upper Band Edge Measurement MIMO (Average)**



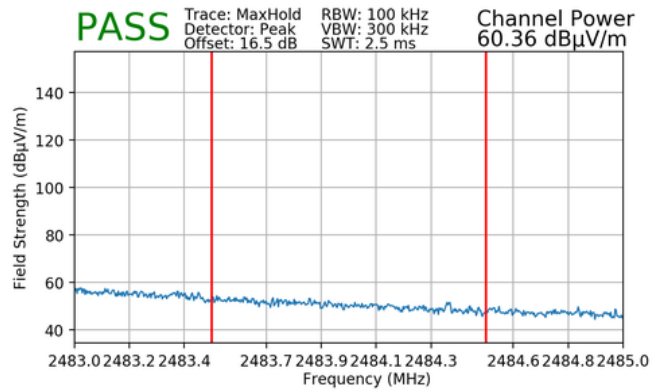
**Plot 7-252. Radiated Restricted Upper Band Edge Measurement MIMO (Peak)**

FCC ID: C3K1997 IC: 3048A-1997	<b>MEASUREMENT REPORT (CERTIFICATON)</b>		Approved by: Technical Manager
Test Report S/N: 1M2204040049-13-R1.C3K	Test Dates: 3/14/2022-7/1/2022	EUT Type: Portable Computing Device	Page 150 of 164

Worst Case Mode: 802.11n  
 Worst Case Transfer Rate: MCS0  
 Distance of Measurements: 3 Meters  
 Operating Frequency: 2472MHz  
 Channel: 13



**Plot 7-253. Radiated Restricted Upper Band Edge Measurement MIMO (Average)**



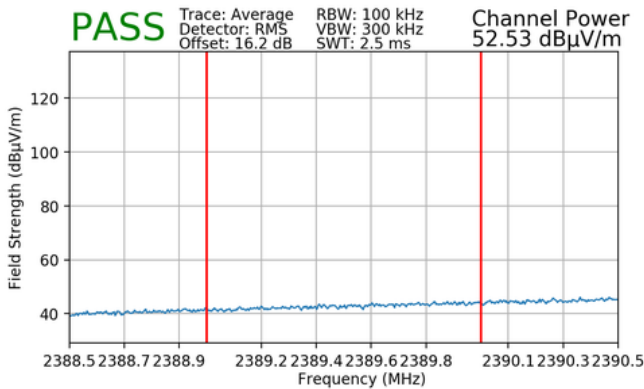
**Plot 7-254. Radiated Restricted Upper Band Edge Measurement MIMO (Peak)**

FCC ID: C3K1997 IC: 3048A-1997	<b>MEASUREMENT REPORT (CERTIFICATON)</b>		<b>Approved by:</b> Technical Manager
<b>Test Report S/N:</b> 1M2204040049-13-R1.C3K	<b>Test Dates:</b> 3/14/2022-7/1/2022	<b>EUT Type:</b> Portable Computing Device	Page 151 of 164

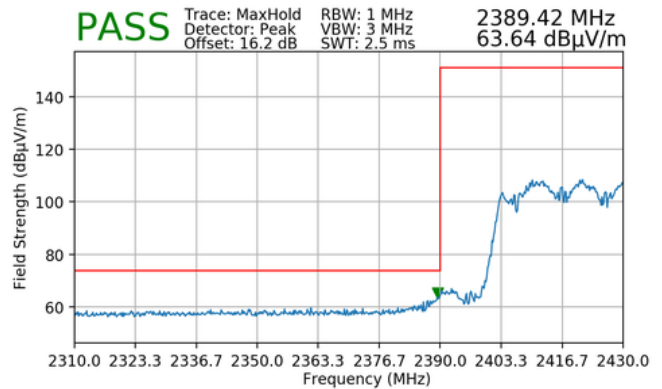
### 7.7.9 MIMO Radiated Restricted Band Edge Measurements 40MHz BW §15.205 §15.209; RSS-Gen [8.9]

The radiated restricted band edge measurements are measured with an EMI test receiver connected to the receive antenna while the EUT is transmitting.

Worst Case Mode:	802.11ax
Worst Case Transfer Rate:	MCS0
Distance of Measurements:	3 Meters
Operating Frequency:	2422MHz
Channel:	3

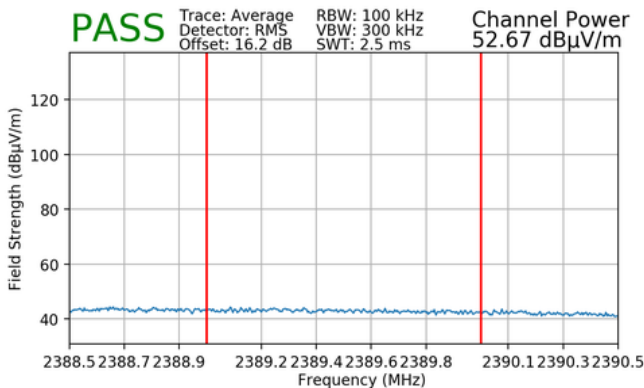


**Plot 7-255. Radiated Restricted Lower Band Edge Measurement MIMO (Average)**

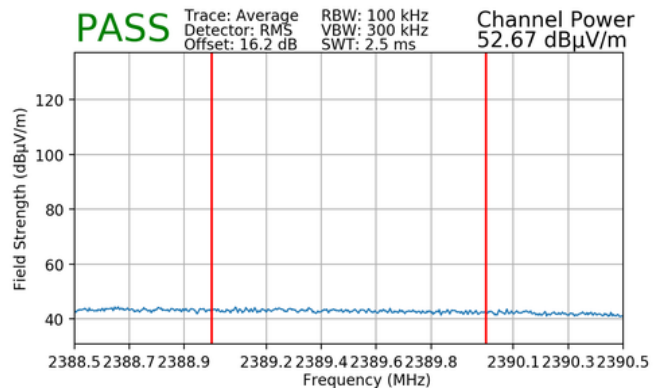


**Plot 7-256. Radiated Restricted Lower Band Edge Measurement MIMO (Peak)**

Worst Case Mode:	802.11ax
Worst Case Transfer Rate:	MCS0
Distance of Measurements:	3 Meters
Operating Frequency:	2427MHz
Channel:	4



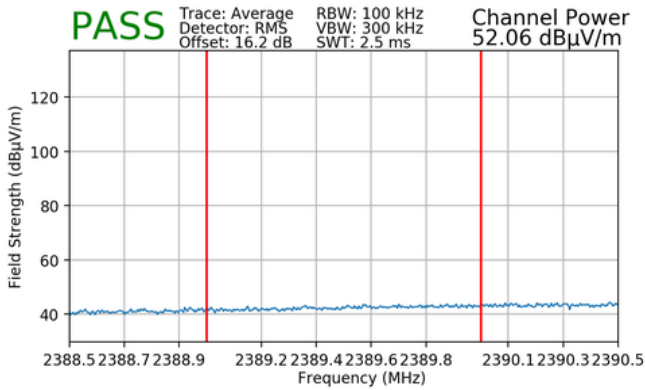
**Plot 7-257. Radiated Restricted Lower Band Edge Measurement MIMO (Average)**



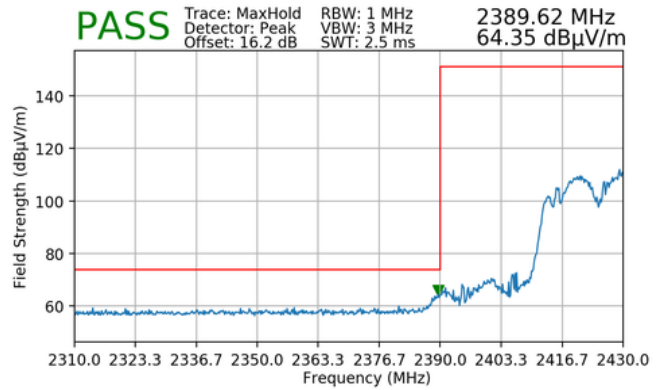
**Plot 7-258. Radiated Restricted Lower Band Edge Measurement MIMO (Peak)**

FCC ID: C3K1997 IC: 3048A-1997	<b>MEASUREMENT REPORT (CERTIFICATON)</b>		Approved by: Technical Manager
Test Report S/N: 1M2204040049-13-R1.C3K	Test Dates: 3/14/2022-7/1/2022	EUT Type: Portable Computing Device	Page 152 of 164

Worst Case Mode: 802.11ax  
 Worst Case Transfer Rate: MCS0  
 Distance of Measurements: 3 Meters  
 Operating Frequency: 2432MHz  
 Channel: 5

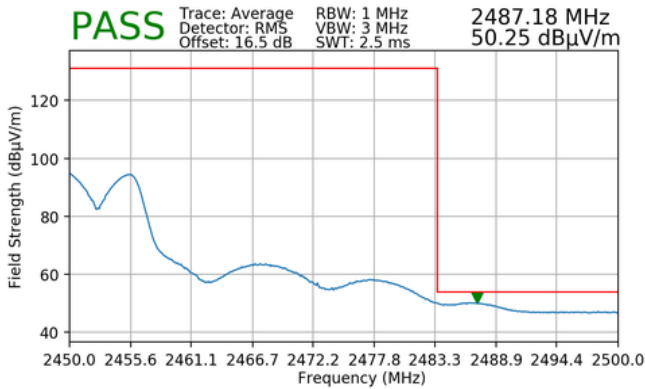


**Plot 7-259. Radiated Restricted Lower Band Edge Measurement MIMO (Average)**

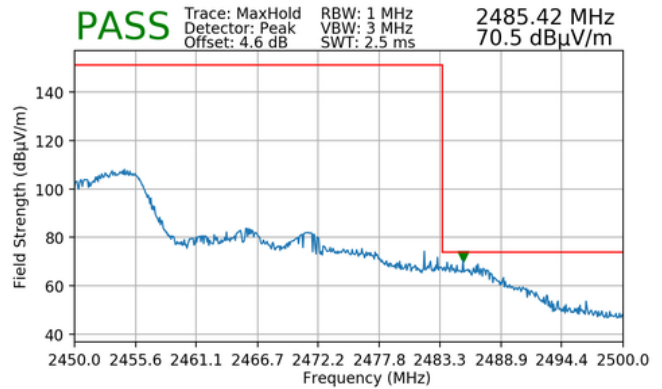


**Plot 7-260. Radiated Restricted Lower Band Edge Measurement MIMO (Peak)**

Worst Case Mode: 802.11ax  
 Worst Case Transfer Rate: MCS0  
 Distance of Measurements: 3 Meters  
 Operating Frequency: 2437MHz  
 Channel: 6



**Plot 7-261. Radiated Restricted Upper Band Edge Measurement MIMO (Average)**

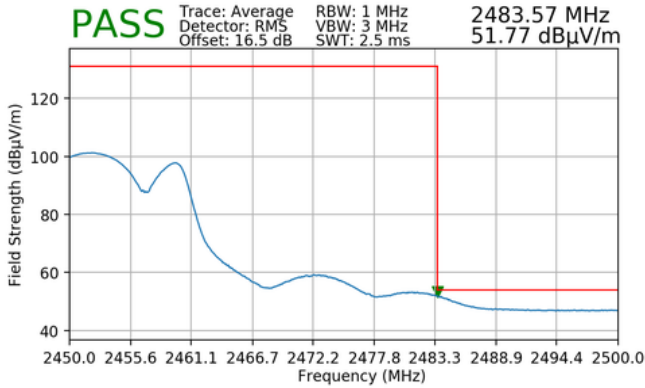


**Plot 7-262. Radiated Restricted Upper Band Edge Measurement MIMO (Peak)**

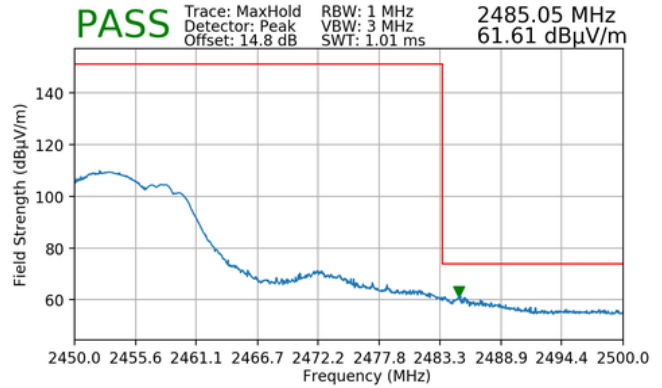
FCC ID: C3K1997 IC: 3048A-1997	<b>MEASUREMENT REPORT (CERTIFICATON)</b>		Approved by: Technical Manager
Test Report S/N: 1M2204040049-13-R1.C3K	Test Dates: 3/14/2022-7/1/2022	EUT Type: Portable Computing Device	Page 153 of 164



Worst Case Mode: 802.11n  
 Worst Case Transfer Rate: MCS0  
 Distance of Measurements: 3 Meters  
 Operating Frequency: 2442MHz  
 Channel: 7

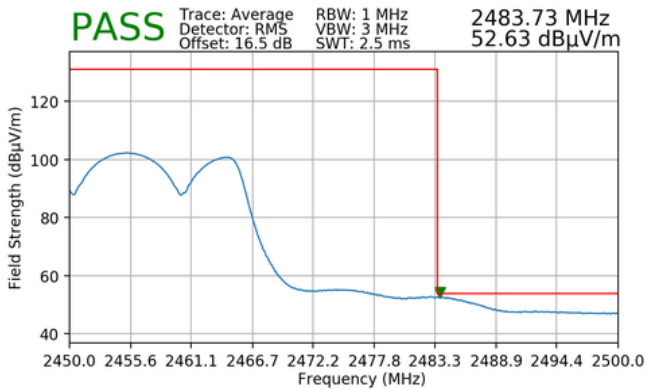


**Plot 7-263. Radiated Restricted Upper Band Edge Measurement MIMO (Average)**

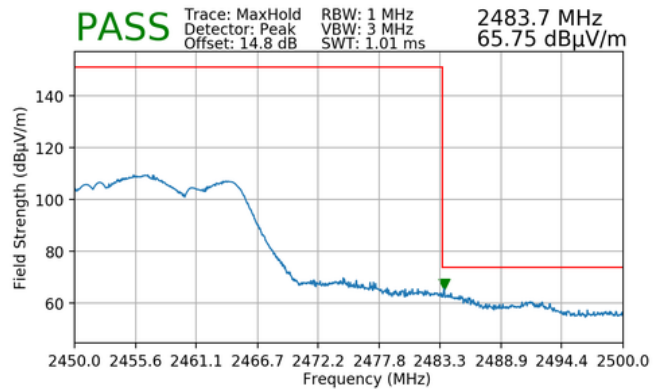


**Plot 7-264. Radiated Restricted Upper Band Edge Measurement MIMO (Peak)**

Worst Case Mode: 802.11n  
 Worst Case Transfer Rate: MCS0  
 Distance of Measurements: 3 Meters  
 Operating Frequency: 2447MHz  
 Channel: 8



**Plot 7-265. Radiated Restricted Upper Band Edge Measurement MIMO (Average)**



**Plot 7-266. Radiated Restricted Upper Band Edge Measurement MIMO (Peak)**

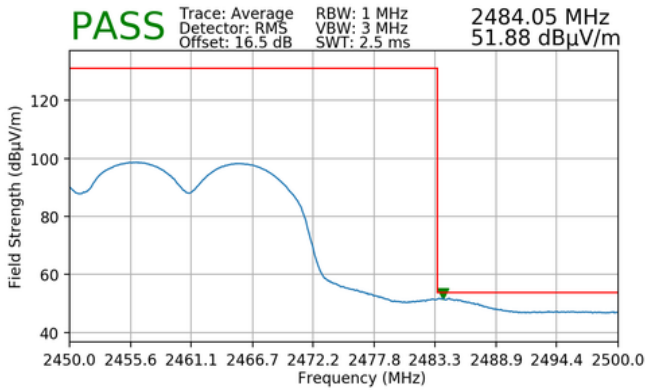
FCC ID: C3K1997 IC: 3048A-1997	<b>MEASUREMENT REPORT (CERTIFICATON)</b>		Approved by: Technical Manager
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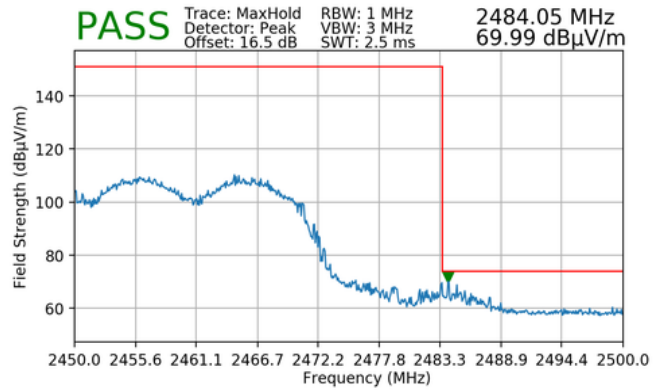
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Worst Case Mode: 802.11n  
 Worst Case Transfer Rate: MCS0  
 Distance of Measurements: 3 Meters  
 Operating Frequency: 2452MHz  
 Channel: 9

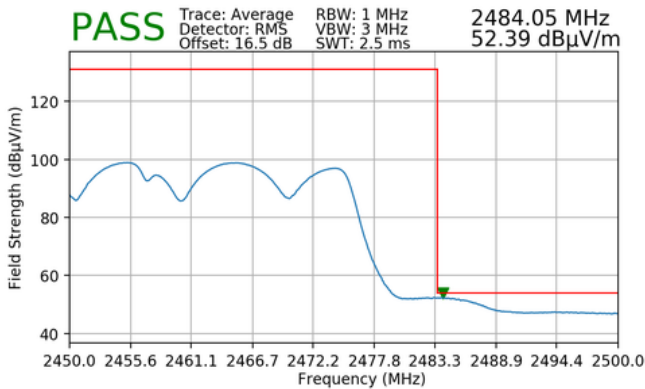


**Plot 7-267. Radiated Restricted Upper Band Edge Measurement MIMO (Average)**

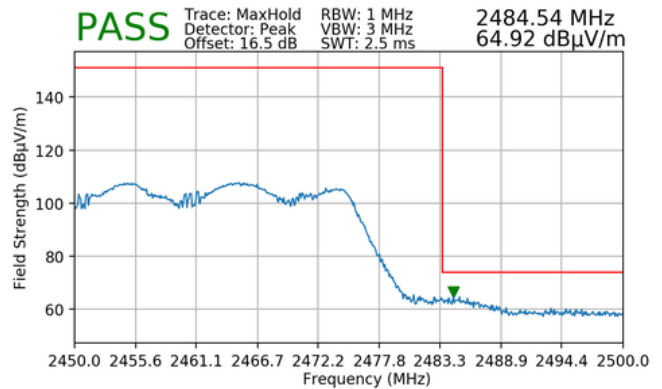


**Plot 7-268. Radiated Restricted Upper Band Edge Measurement MIMO (Peak)**

Worst Case Mode: 802.11n  
 Worst Case Transfer Rate: MCS0  
 Distance of Measurements: 3 Meters  
 Operating Frequency: 2457MHz  
 Channel: 10



**Plot 7-269. Radiated Restricted Upper Band Edge Measurement MIMO (Average)**



**Plot 7-270. Radiated Restricted Upper Band Edge Measurement MIMO (Peak)**

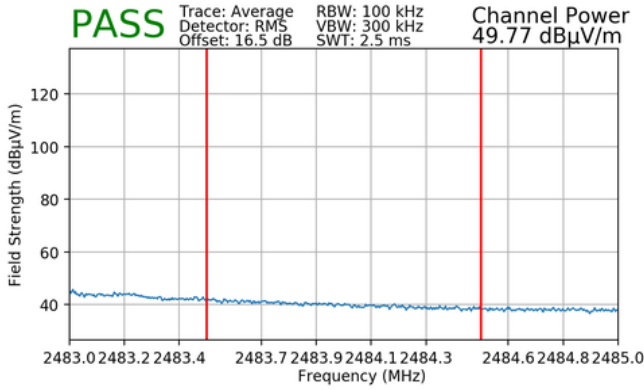
FCC ID: C3K1997 IC: 3048A-1997	<b>MEASUREMENT REPORT (CERTIFICATON)</b>		Approved by: Technical Manager
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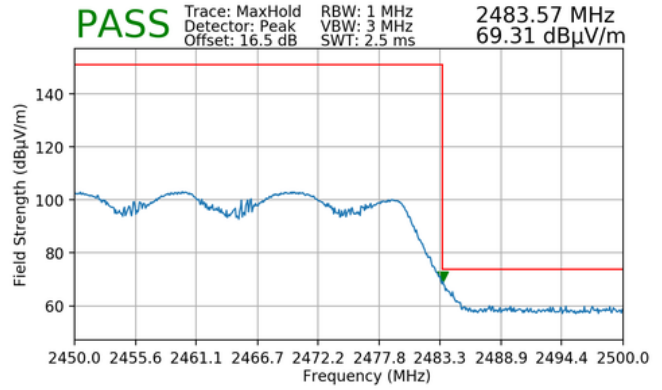
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Worst Case Mode: 802.11n  
 Worst Case Transfer Rate: MCS0  
 Distance of Measurements: 3 Meters  
 Operating Frequency: 2462MHz  
 Channel: 11



**Plot 7-271. Radiated Restricted Upper Band Edge Measurement MIMO (Average)**



**Plot 7-272. Radiated Restricted Upper Band Edge Measurement MIMO (Peak)**

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## 7.8 Radiated Spurious Emissions Measurements – Below 1GHz

§15.209; RSS-Gen [8.9]

### Test Overview and Limit

All out of band radiated spurious emissions are measured with a spectrum analyzer connected to a receive antenna 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 radiated spurious emissions. Only the radiated emissions of the configuration that produced the worst case emissions are reported in this section.

**All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR and Table 6 of RSS-Gen (8.10) must not exceed the limits shown in Table 7-27 per Section 15.209 and RSS-Gen (8.9).**

Frequency	Field Strength [ $\mu\text{V/m}$ ]	Measured Distance [Meters]
0.009 – 0.490 MHz	2400/F (kHz)	300
0.490 – 1.705 MHz	24000/F (kHz)	30
1.705 – 30.00 MHz	30	30
30.00 – 88.00 MHz	100	3
88.00 – 216.0 MHz	150	3
216.0 – 960.0 MHz	200	3
Above 960.0 MHz	500	3

**Table 7-27. Radiated Limits**

### Test Procedures Used

ANSI C63.10-2013

### Test Settings

#### Quasi-Peak Field Strength Measurements

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 120kHz (for emissions from 30MHz – 1GHz)
3. Detector = quasi-peak
4. Sweep time = auto couple
5. Trace mode = max hold
6. Trace was allowed to stabilize

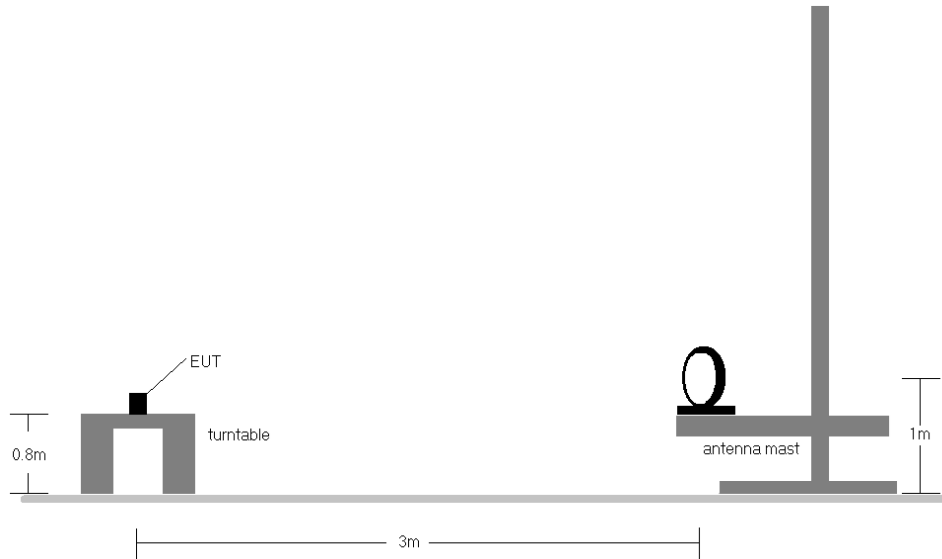
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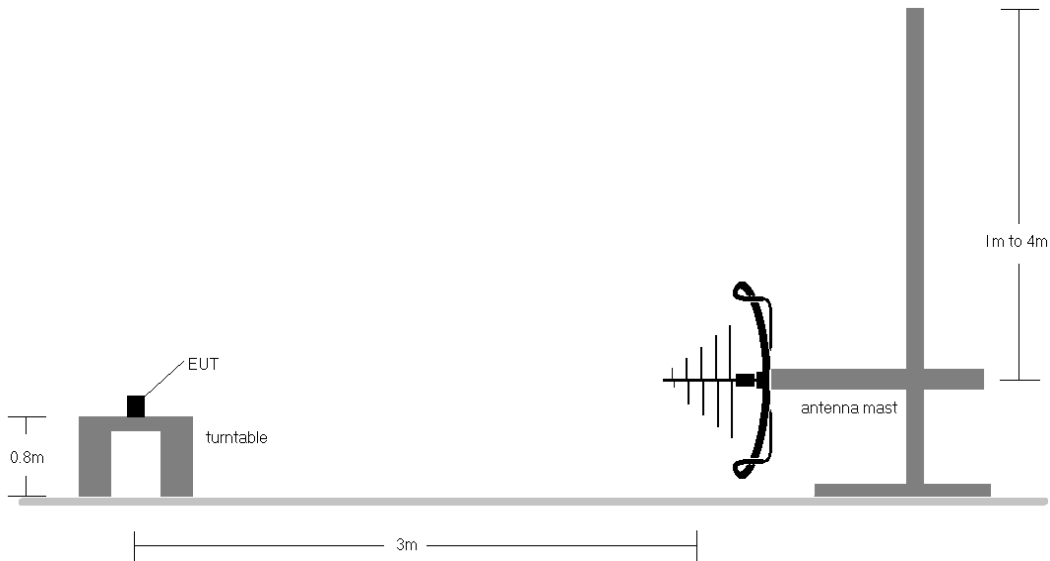


**Test Setup**

The EUT and measurement equipment were set up as shown in the diagrams below.



**Figure 7-7. Radiated Test Setup < 30Mhz**



**Figure 7-8. Radiated Test Setup < 1GHz**

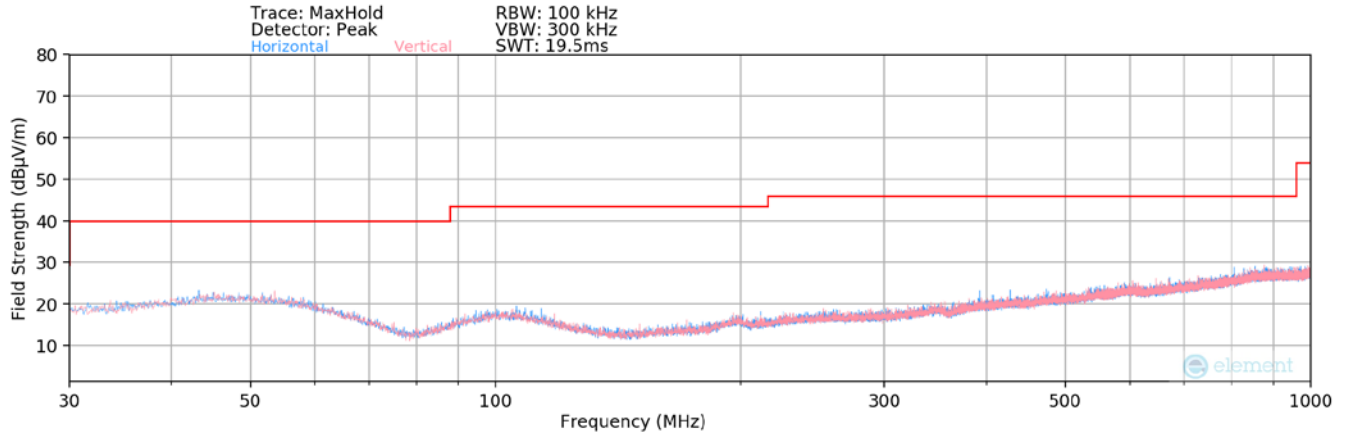
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**Test Notes**

1. All emissions lying in restricted bands specified in §15.205 and RSS-Gen(8.10) are below the limit shown in Table 7-27.
2. The broadband receive antenna is manipulated through vertical and horizontal polarizations during the tests. The EUT is manipulated through three orthogonal planes.
3. This unit was tested with its standard battery.
4. The spectrum is investigated using a peak detector and final measurements are recorded using CISPR quasi peak detector. The worst-case emissions are reported however emissions whose levels were not within 20dB of the respective limits were not reported.
5. Emissions were measured at a 3 meter test distance.
6. Emissions are investigated while operating on the center channel of the mode, band, and modulation that produced the worst case results during the transmitter spurious emissions testing.
7. No spurious emissions were detected within 20dB of the limit below 30MHz.
8. The results recorded using the broadband antenna is known to correlate with the results obtained by using a tuned dipole with an acceptable degree of accuracy. The VSWR for the measurement antenna was found to be less than 2:1.
9. The wide spectrum spurious emissions plots shown on the following pages are used only for the purpose of emission identification. There were no emissions detected in the 30MHz – 1GHz frequency range, as shown in the subsequent plots.

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**MIMO Radiated Spurious Emissions Measurements (Below 1GHz)**  
**§15.209; RSS-Gen [8.9]**



**Plot 7-273. Radiated Spurious Plot below 1GHz MIMO**

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## 7.9 Line-Conducted Test Data

§15.207; RSS-Gen [8.8]

### Test Overview and Limit

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.

**All conducted emissions must not exceed the limits shown in the table below, per Section 15.207 and RSS-Gen (8.8).**

Frequency of emission (MHz)	Conducted Limit (dB $\mu$ V)	
	Quasi-peak	Average
0.15 – 0.5	66 to 56*	56 to 46*
0.5 – 5	56	46
5 – 30	60	50

**Table 7-28. Conducted Limits**

\*Decreases with the logarithm of the frequency.

### Test Procedures Used

ANSI C63.10-2013, Section 6.2

### Test Settings

#### Quasi-Peak Field Strength Measurements

1. Analyzer center frequency was set to the frequency of the spurious emission of interest
2. RBW = 9kHz (for emissions from 150kHz – 30MHz)
3. Detector = quasi-peak
4. Sweep time = auto couple
5. Trace mode = max hold
6. Trace was allowed to stabilize

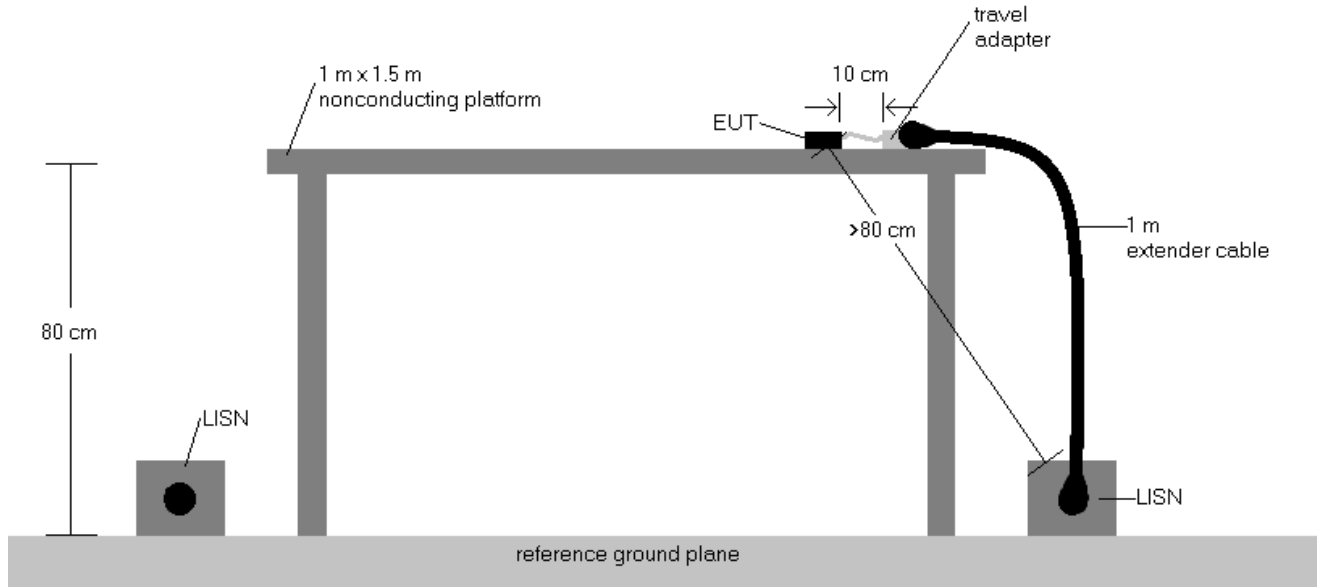
#### Average Field Strength Measurements

1. Analyzer center frequency was set to the frequency of the spurious emission of interest
2. RBW = 9kHz (for emissions from 150kHz – 30MHz)
3. Detector = RMS
4. Sweep time = auto couple
5. Trace mode = max hold
6. Trace was allowed to stabilize

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### Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

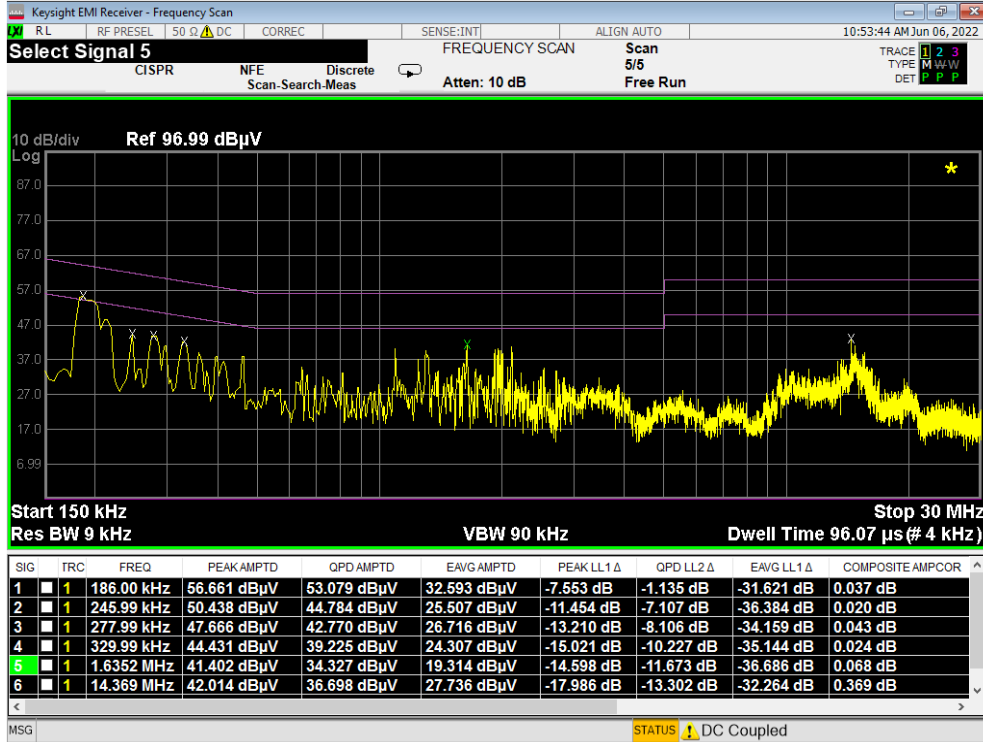


**Figure 7-9. Test Instrument & Measurement Setup**

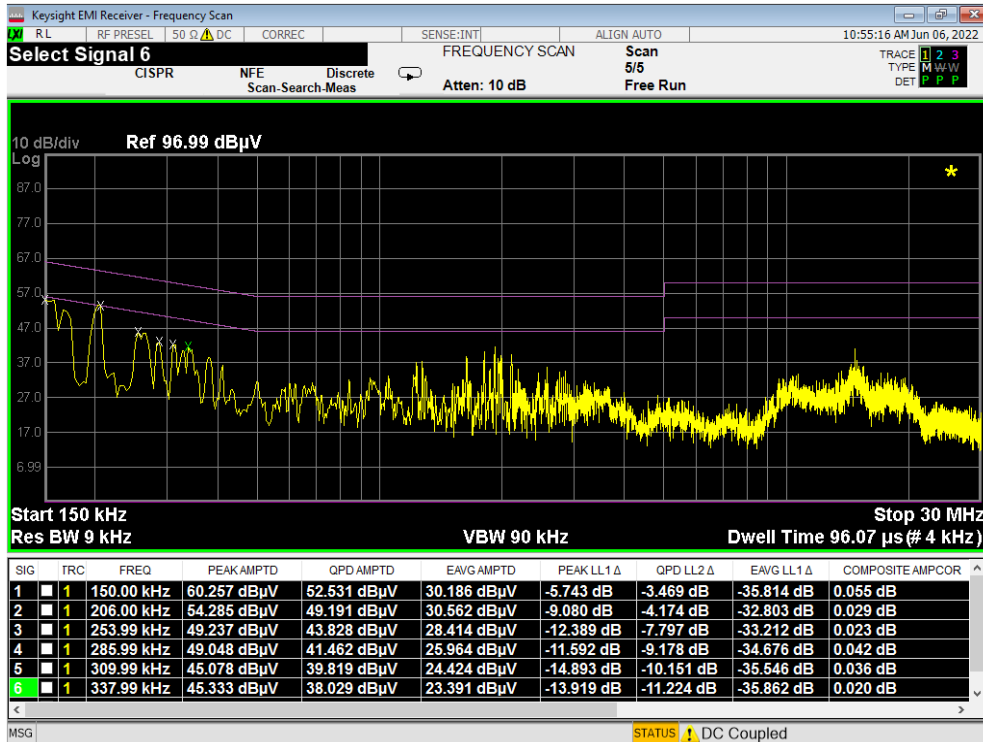
### Test Notes

1. All modes of operation were investigated and the worst-case emissions are reported using mid channel. The emissions found were not affected by the choice of channel used during testing.
2. The limit for an intentional radiator from 150kHz to 30MHz are specified in Part 15.207 and RSS-Gen(8.8).
3.  $\text{Corr. (dB)} = \text{Cable loss (dB)} + \text{LISN insertion factor (dB)}$
4.  $\text{QP/AV Level (dB}\mu\text{V)} = \text{QP/AV Analyzer/Receiver Level (dB}\mu\text{V)} + \text{Corr. (dB)}$
5.  $\text{Margin (dB)} = \text{QP/AV Limit (dB}\mu\text{V)} - \text{QP/AV Level (dB}\mu\text{V)}$
6. Traces shown in plot are made using a peak detector.
7. Deviations to the Specifications: None.

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Plot 7-274. Line Conducted Plot with 802.11b (L1)



Plot 7-275. Line Conducted Plot with 802.11b (N)

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## 8.0 CONCLUSION

The data collected relate only the item(s) tested and show that the **Microsoft Corporation Portable Computing Device FCC ID: C3K1997** is in compliance with Part 15 Subpart C (15.247) of the FCC Rules and with RSS-247 of the Innovation, Science and Economic Development Canada rules.

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