

0659



FCC Radio Test Report FCC ID: RWO-RZ090484

This report concerns: Class II Permissive Change

Report No. : BTL-FCCP-5-2208C205

Equipment : Notebook PC
Model Name : RZ09-0484
Brand Name : RAZER
Applicant : Razer Inc.

Address : 9 Pasteur, Suite 100, Irvine, CA92618, USA.

Manufacturer : Razer Inc.

Address : 9 Pasteur, Suite 100, Irvine, CA92618, USA.

Equipment Class: 6XD - 15E 6 GHz Low Power Indoor Client

Radio Function : U-NII 6 GHz (U-NII 5, U-NII 6, U-NII 7, U-NII 8)

FCC Rule Part(s) : FCC CFR Title 47, Part15, Subpart E (15.407)

Measurement : ANSI C63.10-2013

Procedure(s)

Date of Receipt : 2022/10/18

Date of Test : 2022/11/23~2022/1/17

Issued Date : 2022/1/18

The above equipment has been tested and found in compliance with the requirement of the above standards by BTL Inc.

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Declaration

BTL represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with standards traceable to international standard(s) and/or national standard(s).

BTL's reports apply only to the specific samples tested under conditions. It is manufacture's responsibility to ensure that additional production units of this model are manufactured with the identical electrical and mechanical components. **BTL** shall have no liability for any declarations, inferences or generalizations drawn by the client or others from **BTL** issued reports.

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The information, data and test plan are provided by manufacturer which may affect the validity of results, so it is manufacturer's responsibility to ensure that the apparatus meets the essential requirements of applied standards and in all the possible configurations as representative of its intended use.

Limitation

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.

Please note that the measurement uncertainty is provided for informational purpose only and are not use in determining the Pass/Fail results.

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REVISION HISTORY

Report No.	Version	Description	Issued Date	Note
BTL-FCCP-5-2208C205	R00	Original Report.	2022/12/22	Invalid
BTL-FCCP-5-2208C205	R01	Revised report to address TAF Audit's	2023/1/18	Valid
		comments.		

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1 SUMMARY OF TEST RESULTS

Test procedures according to the technical standards.

Standard(s) Section	Description	Test Result	Judgement	Remark
15.407(b)(9)	AC power line conducted emissions	APPENDIX A	Pass	
15.407(b)(6)(9)	Undesirable emissions	APPENDIX B APPENDIX C	Pass	
15.407(a)(4)(5)(6)(7)(8)	Maximum e.i.r.p.	APPENDIX D	Pass	
15.203 15.407(a)(9)	Antenna requirement	NOTE (3)	Pass	
15.407(a)(12)	Maximum power spectral density	NOTE (3)	Pass	
15.407(b)(7)	In-band emission (Mask)	NOTE (3)	Pass	
15.407(b)(10)	Restricted bands of operation	NOTE (3)	Pass	
15.407(c)	Automatically discontinue transmission	NOTE (3)	Pass	
15.407(d)	Operational restrictions for 6 GHz U-NII devices	NOTE (3)	Pass	
15.407(d)(6)	Contention-based protocol	APPENDIX D	Pass	
15.407(g) 2.1055	Frequency stability	NOTE (3)	Pass	

NOTE:

- (1) "N/A" denotes test is not applicable in this Test Report.
- (2) The report format version is TP.1.1.1.
- (3) This item is demonstrated to full compliance referring to the test report number 200611-01.TR38 & 200611-01.TR39 of the integrated module (model name: AX211NGW, FCC ID: PD9AX211NG), according to KDB 996369 D02 Q1 a) 2).
- (4) The ac power lines conducted emissions and radiated emissions are tested to demonstrate full compliance of both modules integrated into the host and host itself.
- (5) The antenna gain of EUT is smaller than that of the module. So in this report the worst cases of radiated spurious emissions and AC Power Line Conducted Emissions were evaluated and recorded. And evaluated the output power items and contention-based protocol and recorded in the report. For the test results of all other test items please refer to module test reports.

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⊠ CB21

1.1 TEST FACILITY

The test facilities used to collect the test data in this report:

No. 68-1, Ln. 169, Sec. 2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan
The test sites and facilities are covered under ECC PN: 674415 and DN: TW0659

The test sites and facilities are covered under FCC RN: 674415 and DN: TW0659.

□ CB08 □ CB11 □ CB15

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $\mathbf{y} \pm \mathbf{U}$, where expanded uncertainty \mathbf{U} is based on a standard uncertainty multiplied by a coverage factor of $\mathbf{k} = \mathbf{2}$, providing a level of confidence of approximately $\mathbf{95}$ %. The measurement instrumentation uncertainty considerations contained in CISPR 16-4-2. The BTL measurement uncertainty is less than the CISPR 16-4-2 \mathbf{U}_{cispr} requirement.

A. AC power line conducted emissions test:

Test Site	Method	Measurement Frequency Range	U (dB)
C05	CISPR	150 kHz ~ 30MHz	3.44

B. Radiated emissions test:

Test Site	Measurement Frequency Range	U,(dB)
	0.03 GHz ~ 0.2 GHz	4.17
	0.2 GHz ~ 1 GHz	4.72
CB15	1 GHz ~ 6 GHz	5.21
CB15	6 GHz ~ 18 GHz	5.51
	18 GHz ~ 26 GHz	3.69
	26 GHz ~ 40 GHz	4.23

C. Conducted test:

Test Item	U,(dB)
Output Power	0.3669
Contention-based protocol	-

NOTE:

Unless specifically mentioned, the uncertainty of measurement has not been taken into account to declare the compliance or non-compliance to the specification.

1.3 TEST ENVIRONMENT CONDITIONS

Test Item	Environment Condition	Test Voltage	Tested by
AC Power Line Conducted Emissions	23°C, 58%	AC 120 V	Jay Tien
Radiated emissions below 1 GHz	23°C, 59%	AC 120 V	Mark Luo
Radiated emissions above 1 GHz	23°C, 59%	AC 120 V	Mark Luo
Output Power	21.6°C, 52%	AC 120 V	Angela Wang
Contention-based protocol	23.4°C, 55%	AC 120 V	Tim Lee

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1.4 TABLE OF PARAMETERS OF TEST SOFTWARE SETTING

Test Software DRTU V02999.22.180.0					
		UNII-5			
Mode	5955 MHz	6175 MHz	6415 MHz		Data Rate
IEEE 802.11ax (HEW20)	1.625	1.625	1.625		HE0
Mode	5965 MHz	6165 MHz	6405 MHz		Data Rate
IEEE 802.11ax (HEW40)	4.5	4	4.125		HE0
Mode	5985 MHz	6145 MHz	6385 MHz		Data Rate
IEEE 802.11ax (HEW80)	7.25	7.125	7.125		HE0
Mode	6025 MHz	6345 MHz			Data Rate
IEEE 802.11ax (HEW160)	9.875	9.875			HE0

		UNII-6		
Mode	6435 MHz	6475 MHz	6515 MHz	Data Rate
IEEE 802.11ax (HEW20)	2.25	2.25	2.25	HE0
Mode	6445 MHz	6485 MHz		Data Rate
IEEE 802.11ax (HEW40)	4.75	5.125		HE0
Mode	6465 MHz	6545 MHz		Data Rate
IEEE 802.11ax (HEW80)	7.5	7.625		HE0
Mode	6505 MHz			Data Rate
IEEE 802.11ax (HEW160)	10.25			HE0

		UNII-7		
Mode	6535 MHz	6695 MHz	6855 MHz	Data Rate
IEEE 802.11ax (HEW20)	1.875	1.875	1.875	HE0
Mode	6525 MHz	6685 MHz	6845 MHz	Data Rate
IEEE 802.11ax (HEW40)	5.25	4.25	4.25	HE0
Mode	6625 MHz	6785 MHz		Data Rate
IEEE 802.11ax (HEW80)	7.375	7.375		HE0
Mode	6665 MHz			Data Rate
IEEE 802.11ax (HEW160)	10			HE0

		UNII-8			
Mode	6875 MHz	6895 MHz	7095 MHz	7115 MHz	Data Rate
IEEE 802.11ax (HEW20)	1.875	1.875	1.875	-5.75	HE0
Mode	6885 MHz	7085 MHz			Data Rate
IEEE 802.11ax (HEW40)	5.25	5.25			HE0
Mode	6865 MHz	6945 MHz	7025 MHz		Data Rate
IEEE 802.11ax (HEW80)	7.375	8	8		HE0
Mode	6985 MHz				Data Rate
IEEE 802.11ax (HEW160)	10				HE0

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2 GENERAL INFORMATION

2.1 DESCRIPTION OF EUT

Equipment	Notebook PC
Model Name	RAZER
Brand Name	RZ09-0484
Model Difference	N/A
Power Source	1# DC voltage supplied from AC adapter. 1) Model: RC30-0484 2) Model: RC30-042 2# Supplied from battery. Model: RC30-0484
Power Rating	1# 1) I/P: 100-240V~ 4.5A 50/60Hz O/P: 19.5V==16.92A TOTAL 330W 2) I/P: 100-240V~ 4A MAX 50/60Hz O/P: 19.5V==14.36A TOTAL 280.0W 2# DC 15.4V, 5955mAh, 91.7Wh
Products Covered	2* Power Adapter 1* AC Cable
Operation Band	UNII-5: 5925 MHz ~ 6425 MHz UNII-6: 6425 MHz ~ 6525 MHz UNII-7: 6525 MHz ~ 6875 MHz UNII-8: 6875 MHz ~ 7125 MHz
Maximum E.I.R.P. for UNII-5	IEEE 802.11ax (HE20): 4.94 dBm (0.0031W) IEEE 802.11ax (HE0): 7.83 dBm (0.0061W) IEEE 802.11ax (HE80): 10.59 dBm (0.0114W) IEEE 802.11ax (HE160): 13.48dBm (0.0223W)
Maximum E.I.R.P. for UNII-6	IEEE 802.11ax (HE20): 5.70 dBm (0.0037W) IEEE 802.11ax (HE40): 8.35 dBm (0.0068W) IEEE 802.11ax (HE80): 10.97 dBm (0.0125W) IEEE 802.11ax (HE160): 13.73dBm (0.0236W)
Maximum E.I.R.P. for UNII-7	IEEE 802.11ax (HE20): 4.80 dBm (0.0030W) IEEE 802.11ax (HE40): 8.70 dBm (0.0074W) IEEE 802.11ax (HE80): 10.57dBm (0.0114W) IEEE 802.11ax (HE160): 13.58dBm (0.0228W)
Maximum E.I.R.P. for UNII-8	IEEE 802.11ax (HE20): 5.08 dBm (0.0032W) IEEE 802.11ax (HE40): 8.45 dBm (0.0070W) IEEE 802.11ax (HE80): 11.10 dBm (0.0129W) IEEE 802.11ax (HE160): 13.36dBm (0.0217W)
Test Model	RZ09-0484
Sample Status	Engineering Sample
EUT Modification(s)	N/A

NOTE:

(1) The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or user's manual.

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(2) Channel List:

(2) Chamiler	UNII-5						
IEEE 802.1	1ax (HE20)	IEEE 802.1	1ax (HE40)	IEEE 802.1	1ax (HE80)	IEEE 802.11ax (HE160)	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	5955	3	5965	7	5985	15	6025
5	5975	11	6005	23	6065	47	6185
9	5995	19	6045	39	6145	79	6345
13	6015	27	6085	55	6225		
17	6035	35	6125	71	6305		
21	6055	43	6165	87	6385		
25	6075	51	6205				
29	6095	59	6245				
33	6115	67	6285				
37	6135	75	6325				
41	6155	83	6365				
45	6175	91	6405				
49	6195						
53	6215						
57	6235						
61	6255						
65	6275						
69	6295						
73	6315						
77	6335						
81	6355						
85	6375						
89	6395						
93	6415						

	UNII-6							
IEEE 802.1	1ax (HE20)	IEEE 802.1	1ax (HE40)	IEEE 802.1	1ax (HE80)	IEEE 802.11ax (HE160)		
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	
97	6435	99	6445	103	6465	111	6505	
101	6455	107	6485					
105	6475	115	6525					
109	6495							
113	6515							



	UNII-7						
IEEE 802.1	1ax (HE20)	IEEE 802.1	1ax (HE40)	IEEE 802.1	1ax (HE80)	IEEE 802.11ax (HE160)	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
117	6535	123	6565	119	6545	143	6665
121	6555	131	6605	135	6625	175	6825
125	6575	139	6645	151	6705		
129	6595	147	6685	167	6785		
133	6615	155	6725				
137	6635	163	6765				
141	6655	171	6805				
145	6675	179	6845				
149	6695						
153	6715						
157	6735						
161	6755						
165	6775						
169	6795						
173	6815						
177	6835						
181	6855						

	UNII-8							
IEEE 802.1	1ax (HE20)	IEEE 802.1	1ax (HE40)	IEEE 802.1	1ax (HE80)	IEEE 802.1	IEEE 802.11ax (HE160)	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	
185	6875	187	6885	183	6865	207	6985	
189	6895	195	6925	199	6945			
193	6915	203	6965	215	7025			
197	6935	211	7005					
201	6955	219	7045					
205	6975	227	7085					
209	6995							
213	7015							
217	7035							
221	7055							
225	7075							
229	7095							
233	7115							
		•	•	•	•	•		



(3) Table for Filed Antenna:

Ant.	Manufacturer	P/N	Туре	Connector	Gain(dBi)
1	Amphenol Taiwan	BY5963-16-001-C	PIFA	N/A	4.18
2	Corporation	BY5963-16-001-C	PIFA	N/A	4.21

Note:

- 1) This EUT supports MIMO 2X2, any transmit signals are uncorrelated with each other, so Directional gain = $10\log[(10^{G1/10}+10^{G2/10}+...10^{GN/10})/N]dBi$, that is Directional gain= $10\log[(10^{4.18/10}+10^{4.21/10})/2]dBi$ = 4.20.
- 2) Ant.1 refers to main antenna, Ant.2 refers to aux antenna.
- 3) The AUX antenna connector of the module connected to the MAIN antenna of the EUT and the MAIN antenna connector of the module connected to the AUX antenna of the EUT.
- 4) The above Antenna information are derived from the antenna data sheet provided by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.

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2.2 TEST MODES

Test Items	Test mode	Channel	Note
AC power line conducted emissions	Normal/Idle	-	-
Transmitter Radiated Emissions (below 1GHz)	IEEE 802.11ax (HEW160)	111	-
	IEEE 802.11ax (HEW20)	233	Bandedge
Transmitter Radiated Emissions	IEEE 802.11ax (HEW160)	79/111/143/207	Dandedge
(above 1GHz)	IEEE 802.11ax (HEW20)	233	
	IEEE 802.11ax (HEW160)	79/111/143/207	Harmonic
	IEEE 802.11ax (HEW20)	1/45/93/97/105/113 /117/149/181/185/ 189/213/233	
Output Power	IEEE 802.11ax (HEW40)	3/43/91/99/107/115 /147/179/187/227	-
	IEEE 802.11ax (HEW80)	7/39/87/103/119/ 135/167/183/199/ 215	
	IEEE 802.11ax (HEW160)	15/79/111/143/207	
Contention Board Brot!	IEEE 802.11ax (HEW20)	45/105/149/233	
Contention Based Protocol	IEEE 802.11ax (HEW160)	47/111/143/207	-

NOTE:

- (1) The Radiated emissions test was verified based on the worst conducted power and Bandwidth test results reported in the original report.
- (2) For radiated emission band edge test, both Vertical and Horizontal are evaluated, but only the worst case (Vertical) is recorded.
- (3) This Notebook PC has two mainboards with two adapters. Both mainboard APF22003_MB (with adapter RC09-0484) and mainboard APF22003_MB2 (with adapter RC30-042) had been pre-tested and in this report only recorded the worst case.

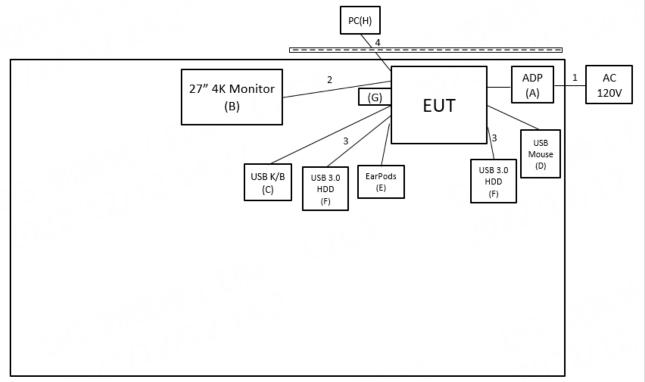
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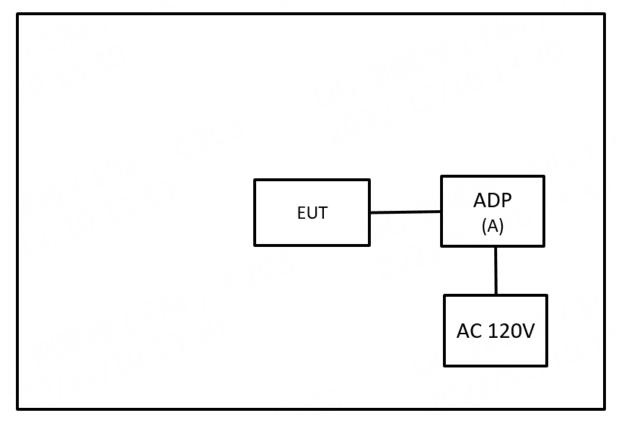
2.3 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Equipment letters and Cable numbers refer to item numbers described in the tables of clause 0.

AC power line conducted emissions



Radiated Emissions





2.4 SUPPORT UNITS

AC power line conducted emissions

Item	Equipment	Brand	Model No.	Series No.	Remarks
Α	ADP	Razer	RC30-0484	N/A	Supplied by test requester
В	27" 4K Monitor	DELL	U2720Q	CN-083VF- WSL00-0B7-332L	Furnished by test lab.
С	USB K/B	DELL	KB216t	CN-0W33XP- L0300-797-05TY- A03	Furnished by test lab.
D	USB Mouse	DELL	MOCZUL	CN-049TWY- PRC00-79E-01HA	Furnished by test lab.
Е	EarPods	Apple	A1472	N/A	Furnished by test lab.
F	USB 3.0 HDD	WD	WDBC3C0010BSL- 0B	WX81A88ALJUC	Furnished by test lab.
G	USB Dongle	Kingston	DataTraveler Exodia	N/A	Furnished by test lab.
Н	PC	DELL	OptiPlex 790 MT	64NJVBX	Furnished by test lab.

Radiated Emissions

Item	Shielded	Ferrite Core	Length	Cable Type	Remarks
1	NO	NO	1.2m	Power Cable	Furnished by test lab.
2	NO	NO	1.7m	HDMI Cable	Furnished by test lab.
3	NO	NO	18cm	TypeC to TypeC Cable	Furnished by test lab.
4	NO	NO	2m	RJ-45 Cable	Furnished by test lab.

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3 AC POWER LINE CONDUCTED EMISSIONS TEST

3.1 LIMIT

Frequency	Limit (dBμV)
(MHz)	Quasi-peak	Average
0.15 - 0.5	66 - 56 *	56 - 46 *
0.50 - 5.0	56	46
5.0 - 30.0	60	50

NOTE:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.
- (3) The test result calculated as following:

Measurement Value = Reading Level + Correct Factor

Correct Factor = Insertion Loss + Cable Loss + Attenuator Factor (if use)

Margin Level = Measurement Value - Limit Value

Calculation example:

Reading Level		Correct Factor		Measurement Value
38.22	+	3.45	II	41.67

Measurement Value		Limit Value		Margin Level
41.67	•	60	=	-18.33

The following table is the setting of the receiver.

Receiver Parameter	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 KHz

3.2 TEST PROCEDURE

- a. The EUT was placed 0.8 m above the horizontal ground plane with the EUT being connected to the power mains through a line impedance stabilization network (LISN).
 - All other support equipment were powered from an additional LISN(s).
 - The LISN provides 50 Ohm/50uH of impedance for the measuring instrument.
- b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle to keep the cable above 40 cm.
- c. Excess I/O cables that are not connected to a peripheral shall be bundled in the center.
 - The end of the cable will be terminated, using the correct terminating impedance.
 - The overall length shall not exceed 1 m.
- d. The LISN is spaced at least 80 cm from the nearest part of the EUT chassis.
- e. For the actual test configuration, please refer to the related Item EUT TEST PHOTO.

NOTE:

- (1) In the results, each reading is marked as Peak, QP or AVG per the detector used. BW=9 kHz (6 dB Bandwidth)
- (2) All readings are Peak unless otherwise stated QP or AVG in column of Note. Both the QP and the AVG readings must be less than the limit for compliance.

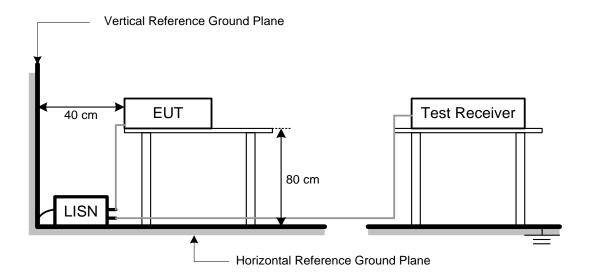
3.3 DEVIATION FROM TEST STANDARD

No deviation.

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3.4 TEST SETUP



3.5 TEST RESULT

Please refer to the APPENDIX A.



4 UNDESIRABLE EMISSIONS TEST

4.1 LIMIT

According to 15.407(b)(6) the limits are as follows:

For transmitters operating within the 5.925-7.125 GHz band: Any emissions outside of the 5.925-7.125 GHz band must not exceed an e.i.r.p. of -27 dBm/MHz.

According to FCC KDB 987594 D02, clause G. Unwanted Emission Measurement: Use guidance in KDB 789033 for measurements below 1000 MHz and above 1000 MHz. Unwanted emissions outside of restricted bands are measured with a RMS detector. In addition, 15.35(b) applies where the peak emissions must be limited to no more than 20 dB above the average limit

Item	Maximum e.i.r.p. Limit	Maximum field strength Limit @ 3m
Any emissions outside of the 5.925-	Peak: -7 dBm/MHz	88.2 dBuV/m
7.125 GHz band	Average: -27 dBm/MHz	68.2 dBuV/m

Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in § 15.209.

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(kHz)	300
0.490~1.705	24000/F(kHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
960~1000	500	3

According to 15.407(b)(9) the limits are as follows:

Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in § 15.209.

Frequency	Field Strength	Measurement Distance		
(MHz)	(microvolts/meter)	(meters)		
0.009~0.490	2400/F(kHz)	300		
0.490~1.705	24000/F(kHz)	30		
1.705~30.0	30	30		
30~88	100	3		
88~216	150	3		
216~960	200	3		
960~1000	500	3		

NOTE:

- (1) e.i.r.p. Limit (dBuV/m at 3m) = Power Limit(dBm) + 95.2. (Referring to FCC KDB 987594 D02, clause G.2.d)(iii))
- (2) Emission level (dBuV/m) = 20log Emission level (uV/m). 3 m Emission level = 10 m Emission level + 20log(10 m/3 m).
- (3) The test result calculated as following:

Measurement Value = Reading Level + Correct Factor

Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain (if use)

Margin Level = Measurement Value - Limit Value

Calculation example:

Reading Level		Correct Factor		Measurement Value
19.11	+	2.11	II	21.22

Measurement Value		Limit Value		Margin Level
21.22	•	68.2	=	-46.98

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Spectrum Parameter	Setting	
Attenuation	Auto	
Start Frequency	1000 MHz	
Stop Frequency	10th carrier harmonic	
RBW / VBW	1MHz / 3MHz for Peak,	
(Emission in restricted band)	1MHz / 1/T for Average	

Spectrum Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9KHz~90KHz for PK/AVG detector
Start ~ Stop Frequency	90KHz~110KHz for QP detector
Start ~ Stop Frequency	110KHz~490KHz for PK/AVG detector
Start ~ Stop Frequency	490KHz~30MHz for QP detector
Start ~ Stop Frequency	30MHz~1000MHz for QP detector

4.2 TEST PROCEDURE

Referring to FCC KDB 987594 D02, clause G. and FCC KDB 789033 D02, clause G. Unwanted Emission Measurement:

For measurements below 30 MHz:

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

For measurements 30 MHz to 40 GHz:

- a. The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation. (between 30 MHz to 1 GHz)
- b. The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 1.5 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation. (between 1 GHz to 40 GHz)
- c. The height of the equipment or of the substitution antenna shall be 0.8 m or 1.5 m, the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights find the maximum reading (used Bore sight function).
- e. The receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1GHz.
- f. The initial step in collecting radiated emission data is a receiver peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- g. All readings are Peak unless otherwise stated QP in column of Note. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't 't perform. (between 30 MHz to 1 GHz)
- h. All readings are Peak Mode value unless otherwise stated AVG in column of Note. If the Peak Mode Measured value compliance with the Peak Limits and lower than AVG Limits, the EUT shall be deemed to meet both Peak & AVG Limits and then only Peak Mode was measured, but AVG Mode didn't perform. (between 30 MHz to 1 GHz)

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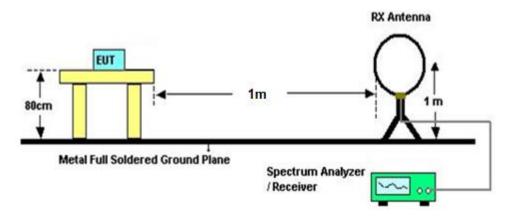


4.3 DEVIATION FROM TEST STANDARD

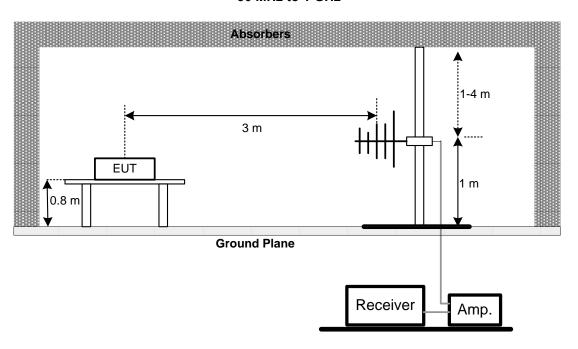
No deviation.

4.4 TEST SETUP

9 kHz to 30 MHz

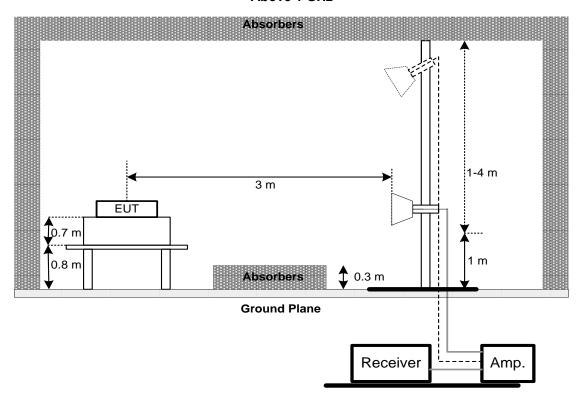


30 MHz to 1 GHz





Above 1 GHz



4.5 EUT OPERATING CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

NOTE:

- (1) Distance extrapolation factor = 40 log (specific distance / test distance) (dB).
- (2) Limit line = specific limits (dBuV) + distance extrapolation factor.

4.6 TEST RESULT - BELOW 30 MHZ

There were no emissions found below 30 MHz within 20 dB of the limit.

4.7 TEST RESULT - 30 MHZ TO 1 GHZ

Please refer to the APPENDIX B.

4.8 TEST RESULT – ABOVE 1 GHZ

Please refer to the APPENDIX C.

NOTE:

(1) No limit: This is fundamental signal, the judgment is not applicable. For fundamental signal judgment was referred to Peak output test.



5 MAXIMUM E.I.R.P. TEST

5.1 LIMIT

Equipment Category	Band	Maximum e.i.r.p. Limit
Standard power access point*	U-NII 5 (5.925-6.425 GHz)	Waximam c.i.i.p. Eiriit
Fixed client*	U-NII 7 (6.525-6.875 GHz)	36 dBm
Fixed Client	1	
	U-NII 5 (5.925-6.425 GHz)	
Indoor access point	U-NII 6 (6.425-6.525 GHz)	30 dBm
Subordinate device	U-NII 7 (6.525-6.875 GHz)	OO GEIII
	U-NII 8 (6.875-7.125 GHz)	
	U-NII 5 (5.925-6.425 GHz)	30 dBm and the device must limit its
Standard power access point	U-NII 6 (6.425-6.525 GHz)	power to no more than 6 dB below its
client devices	U-NII 7 (6.525-6.875 GHz)	associated standard power access
	U-NII 8 (6.875-7.125 GHz)	point's authorized transmit power
	U-NII 5 (5.925-6.425 GHz)	
Indoor access point client	U-NII 6 (6.425-6.525 GHz)	24 dBm
devices	U-NII 7 (6.525-6.875 GHz)	Z+ dDIII
	U-NII 8 (6.875-7.125 GHz)	

^{*} For outdoor devices, the maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

According to 15.407(a)(11):

The maximum conducted output power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage.

5.2 TEST PROCEDURE

Referring to FCC KDB 987594 D02, clause E. and FCC KDB 789033 D02, clause E. 3 Measurement using a Power Meter (PM):

a. The maximum peak conducted output power was performed in accordance with method of clause E. 3.
 b) Method PM-G (Measurement using a gated RF average power meter):
 Measurements may be performed using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.

Referring to FCC KDB 987594 D02, clause H. Measurement of emission at elevation angles higher than 30° from horizon:

Note: Elevation angle is defined as 0° is horizontal and 90° is straight-up.

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For fixed infrastructure, not electrically or mechanically steerable beam antenna

- a. If the elevation plane radiation pattern is not available, but the antenna type (such as dipole omnidirectional, Yagi, parabolic, or sector antenna) has a symmetrical elevation plane pattern referenced at the main beam and all lobes on the main beam elevation plane have highest gains, then the following measurement method is acceptable to determine compliance:
 - (i) Determine the device's intended mounting elevation angle referenced to the horizon.
 - (ii) Rotate the EUT antenna by 90° around the main beam axis in a horizontal position to transform the measurement in elevation angle into an azimuth angle and define a 0° reference angle based on the device's intended mounting elevation angle.
 - (iii) Move the test antenna along the horizontal arc, or rotate the turntable with the EUT antenna placed at the center, between 30° and 90° relative to the 0° reference angle, and then continuing down from 90° to 30° on the other side of the pattern, while maintaining the test antenna pointing with constant distance to the EUT antenna. Search for the spot which has the highest measured emission. Both horizontal and vertical polarization shall be investigated to determine the maximum radiated emission level.

Note: Moving the test antenna along the horizontal arc, or rotating the turntable, shall be performed in an angular step size as small as possible, but not larger than 3°.

- (iv) Calculate the EIRP based on the highest measured emission. Compare to the limit of 125 mW to determine compliance.
- (v) The antenna pattern measurements must be included in the filing.

For All Other Antenna Types

For all other antenna types (such as patch antennas, array antennas, antennas with irregular radiator shapes, etc.) which have any combination of following characteristics:

- · Asymmetrical, complex radiation patterns
- · 2-D or 3-D steerable beam
- · Portable/mobile, not fixed infrastructure device

Provide the following information in the report:

- a. Describe what type of antenna is used.
- b. Determine by calculation, measurement or simulation, all radiation lobes/beams, which have EIRP higher than 125 mW within a 3-dB elevation beamwidth.
 - Provide an explanation of how these antenna beams are controlled to be kept below the 30° elevation angle. The explanation should include device installation instructions, mechanical control, electromechanical control or software algorithms, if the beams are electrically controlled by software.

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5.3 DEVIATION FROM TEST STANDARD

No deviation.

5.4 TEST SETUP



5.5 EUT OPERATING CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

5.6 TEST RESULT

Please refer to the APPENDIX D.

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6 Contention Based Protocol

6.1 LIMIT

Indoor access points, subordinate devices and client devices operating in the 5.925-7.125 GHz band (herein referred to as unlicensed devices) are required to use technologies that include a contention-based protocol to avoid co-channel interference with incumbent devices sharing the band. To ensure incumbent co-channel operations are detected in a technology-agnostic manner, unlicensed devices are required to detect co-channel radio frequency energy (energy detect) and avoid simultaneous transmission.

Unlicensed low-power indoor devices must detect co-channel radio frequency power that is at least -62 dBm or lower. Upon detection of energy in the band, unlicensed low power indoor devices must vacate the channel and stay off the channel as long as detected radio frequency power is equal to or greater than the threshold (-62 dBm). The -62 dBm (or lower) threshold is referenced to a 0 dBi antenna gain. (See note) To ensure incumbent operations are reliably detected in the band, low power indoor devices must detect RF energy throughout their intended operating channel. For example, an 802.11 device that plans to transmit a 40 MHz- wide signal (on a primary 20 MHz channel and a secondary 20 MHz channel) must detect energy throughout the entire 40 MHz channel. Additionally, low-power indoor devices must detect co-channel energy with 90% or greater certainty.

Note: The EUT with a lowest gain is 4.12dBi. All power injected into EUT should be -62+4.12=-57.88dBm.

6.2 TEST PROCEDURE

a. Number of times detection threshold:

If	Number of Tests	Placement of Incumbent Transmission	
BW _{EUT} ≪BW _{Inc}	Once	Tune incumbent and EUT transmissions (f _{c1} =f _{c2})	
BW _{Inc} <bw<sub>EUT \$\leq 2BW_{Inc}</bw<sub>	Once	Incumbent transmission is contained within BW _{E∪T}	
2BW _{Inc} <bw<sub>EUT<4BW_{Inc}</bw<sub>	Twice. Incumbent transmission is contained within BW _{EUT}	Incumbent transmission is located as closely as possible to the lower edge and upper edge, respectively, of the EUT channel	
BW _{EUT} >4BW _{Inc}	Three times	Incumbent transmission is located as closely as possible to the lower edge of the EUT channel, in the middle of EUT channel, and as closely as possible ☐to the upper edge of the EUT channel	

Where:

BW_{EUT}: Transmission bandwidth of EUT signal.

BW_{Inc}: Transmission bandwidth of the simulated incumbent signal (10 MHz wide AWGN signal).

f_{c1}: Center frequency of EUT transmission.

fc2: Center frequency of simulated incumbent signal.

- b. Using an AWGN signal source, generate (but do not transmit, i.e., RF OFF) a 10 MHz-wide AWGN signal. Use step b table to determine the center frequency of the 10 MHz AWGN signal relative to the EUT's channel bandwidth and center frequency.
- c. Set the AWGN signal power to an extremely low level (more than 20 dB below the -62 dBm threshold). Connect the AWGN signal source, via a 3-dB splitter, to the signal analyzer and the EUT as show in the block diagram below.
- d. Transmit the AWGN signal (RF ON) and verify its characteristics on the signal analyzer.
- e. Monitor the signal analyzer to verify if the AWGN signal has been detected and the EUT has ceased transmission. If the EUT continues to transmit, then incrementally increase the AWGN signal power level until the EUT stops transmitting.

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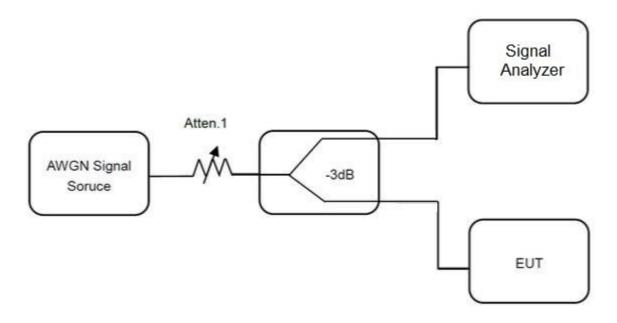


- f. (Including all losses in the RF paths) Determine and record the AWGN signal power level (at the EUT's antenna port) at which the EUT ceased transmission. Repeat the procedure at least 10 times to verify the EUT can detect an AWGN signal with 90% (or better) level of certainty.
- g. Refer to step b table to determine number of times the detection threshold testing needs to be repeated. If testing is required more than once, then go back to step c, choose a different center frequency for the AWGN signal and repeat the process.

6.3 DEVIATION FROM STANDARD

No deviation.

6.4 TEST SETUP



6.5 EUT OPERATION CONDITIONS

The EUT was Configured to be in normally transmitting mode with a constant duty cycle.

6.6 TEST RESULTS

Please refer to the APPENDIX E.

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7 LIST OF MEASURING EQUIPMENTS

	AC Power Line Conducted Emissions							
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated Until		
1	TWO-LINE V- NETWORK	R&S	ENV216	101521	2022/9/28	2023/9/27		
2	Test Cable	EMCI	EMCCFD300-BM- BMR-5000	220331	2022/3/31	2023/3/30		
3	EMI Test Receiver	R&S	ESR 7	101433	2022/11/16	2023/11/15		
4	Measurement Software	EZ	EZ_EMC (Version NB-03A1-01)	N/A	N/A	N/A		

	Undesirable Emissions							
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated Until		
1	Preamplifier	EMCI	EMC330N	980850	2022/9/19	2023/9/18		
2	Preamplifier	EMCI	EMC118A45SE	980819	2022/3/8	2023/3/7		
3	Preamplifier	EMCI	EMC184045SE	980882	2022/2/9	2023/2/8		
4	Preamplifier	EMCI	EMC001340	980579	2022/9/30	2023/9/29		
5	Test Cable	EMCI	EMC104-SM-SM- 1000	220319	2022/3/15	2023/3/14		
6	Test Cable	EMCI	EMC104-SM-SM- 3000	220322	2022/3/15	2023/3/14		
7	Test Cable	EMCI	EMC104-SM-SM- 7000	220324	2022/3/15	2023/3/14		
8	EXA Signal Analyzer	keysight	N9020B	MY57120120	2022/3/7	2023/3/6		
9	Loop Ant	Electro-Metrics	EMCI-LPA600	291	2022/9/19	2023/9/18		
10	Horn Antenna	RFSPIN	DRH18-E	211202A18E N	2022/5/18	2023/5/17		
11	Horn Ant	Schwarzbeck	BBHA 9170D	1136	2022/5/18	2023/5/17		
12	Log-bicon Antenna	Schwarzbeck	VULB9168	1369	2022/5/20	2023/5/19		
13	6dB Attenuator	EMCI	EMCI-N-6-06	AT-N0625	2022/5/20	2023/5/19		
14	Test Cable	EMCI	EMC101G-KM-KM- 3000	220329	2022/3/15	2023/3/14		
15	Test Cable	EMCI	EMC102-KM-KM- 1000	220327	2022/3/15	2023/3/14		
16	Measurement Software	EZ	EZ_EMC (Version NB-03A1-01)	N/A	N/A	N/A		

	Maximum e.i.r.p.						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated Until	
1	Power Meter	Anritsu	ML2495A	1128008	2022/6/1	2023/5/31	
2	Power Sensor	Anritsu	MA2411B	1126001	2022/6/1	2023/5/31	

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	Contention Based Protocol										
Item	Kind of Equipment	Manufacturer	Type No.	Calibrated Date	Calibrated Until						
1	Spectrum Analyzer	Keysight	N9010A	MY54200240	2022/6/9	2023/6/8					
2	MXG Vector Signal Generator	Agilent	N5182B	MY51350711	2022/4/14	2023/4/13					
3	POWER SPLITTER Mini-Circuits		ZFRSC-183-S+	N/A	2022/5/12	2023/5/11					
4	POWER SPLITTER	Mini-Cicuits	ZFRSC-123-S+	N/A	2022/5/12	2023/5/11					

Remark: "N/A" denotes no model name, no serial no. or no calibration specified. All calibration period of equipment list is one year.

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8 EUT TEST PHOTO
Please refer to document Appendix No.: TP-2208C205-1 (APPENDIX-TEST PHOTOS).
9 EUT PHOTOS
Please refer to document Appendix No.: EP-2208C205-1 (APPENDIX-EUT PHOTOS).

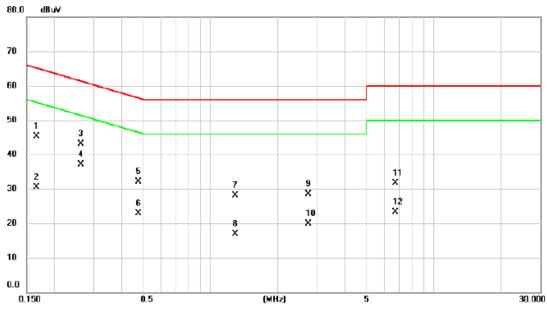
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APPENDIX A AC POWER LINE CONDUCTED EMISSIONS

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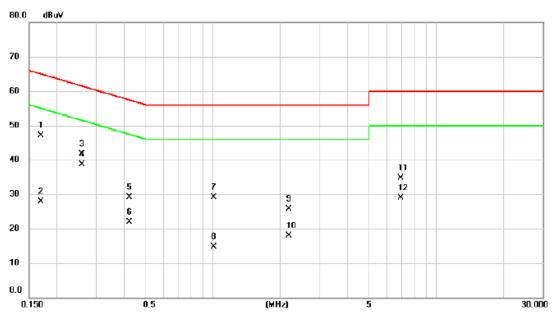
Те	st Mode	Normal	Tested Date	2022/11/25
Те	st Frequency	-	Phase	Line



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margin		
		MHz	dBu∀	dB	dBu∀	dBu∀	dB	Detector	Comment
1		0.1658	35.69	9.64	45.33	65.17	-19.84	QP	
2		0.1658	20.81	9.64	30.45	55.17	-24.72	AVG	
3		0.2625	33.39	9.63	43.02	61.35	-18.33	QP	
4	*	0.2625	27.39	9.63	37.02	51.35	-14.33	AVG	
5		0.4762	22.52	9.63	32.15	56.41	-24.26	QP	
6		0.4762	13.22	9.63	22.85	46.41	-23.56	AVG	
7		1.2908	18.51	9.68	28.19	56.00	-27.81	QP	
8		1.2908	7.26	9.68	16.94	46.00	-29.06	AVG	
9		2.7420	18.81	9.72	28.53	56.00	-27.47	QP	
10		2.7420	10.20	9.72	19.92	46.00	-26.08	AVG	
11		6.7313	21.90	9.80	31.70	60.00	-28.30	QP	
12		6.7313	13.54	9.80	23.34	50.00	-26.66	AVG	

- (1) Measurement Value = Reading Level + Correct Factor.(2) Margin Level = Measurement Value Limit Value.

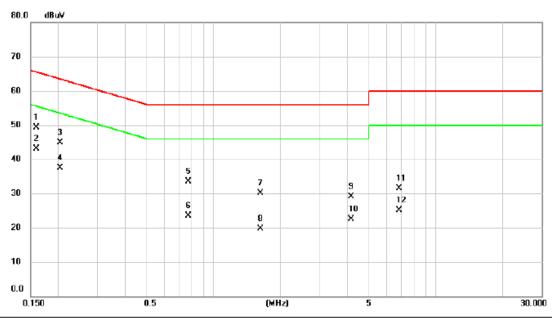
ı				
	Test Mode	Normal	Tested Date	2022/11/25
	Test Frequency	-	Phase	Neutral



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margin		
		MHz	dBu∀	dB	dBu∀	dBu∀	dB	Detector	Comment
1		0.1703	37.51	9.65	47.16	64.95	-17.79	QP	
2		0.1703	18.23	9.65	27.88	54.95	-27.07	AVG	
3		0.2602	32.03	9.64	41.67	61.43	-19.76	QP	
4	*	0.2602	29.01	9.64	38.65	51.43	-12.78	AVG	
5		0.4222	19.42	9.64	29.06	57.40	-28.34	QP	
6		0.4222	12.33	9.64	21.97	47.40	-25.43	AVG	
7		1.0072	19.38	9.68	29.06	56.00	-26.94	QP	
8		1.0072	5.09	9.68	14.77	46.00	-31.23	AVG	
9		2.1840	15.99	9.72	25.71	56.00	-30.29	QP	
10		2.1840	8.23	9.72	17.95	46.00	-28.05	AVG	
11		6.9180	24.93	9.83	34.76	60.00	-25.24	QP	
12		6.9180	18.99	9.83	28.82	50.00	-21.18	AVG	

- (1) Measurement Value = Reading Level + Correct Factor.(2) Margin Level = Measurement Value Limit Value.

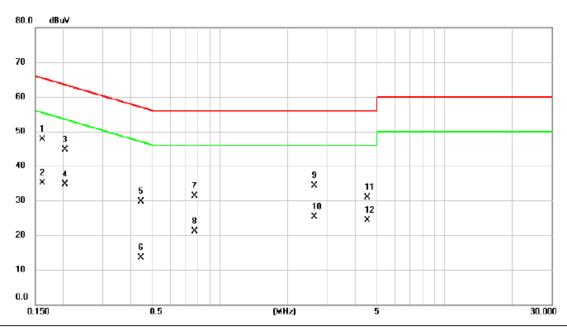
Test Mode	Idle	Tested Date	2022/11/25
Test Frequency	-	Phase	Line



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margin		
		MHz	dBu∀	dB	dBu∀	dBu∀	dB	Detector	Comment
1		0.1590	39.70	9.64	49.34	65.52	-16.18	QP	
2	*	0.1590	33.38	9.64	43.02	55.52	-12.50	AVG	
3		0.2040	35.22	9.63	44.85	63.45	-18.60	QP	
4		0.2040	27.79	9.63	37.42	53.45	-16.03	AVG	
5		0.7710	23.75	9.66	33.41	56.00	-22.59	QP	
6		0.7710	13.81	9.66	23.47	46.00	-22.53	AVG	
7		1.6283	20.36	9.69	30.05	56.00	-25.95	QP	
8		1.6283	9.95	9.69	19.64	46.00	-26.36	AVG	
9		4.1774	19.44	9.75	29.19	56.00	-26.81	QP	
10		4.1774	12.85	9.75	22.60	46.00	-23.40	AVG	
11		6.8348	21.78	9.81	31.59	60.00	-28.41	QP	
12		6.8348	15.35	9.81	25.16	50.00	-24.84	AVG	

- (1) Measurement Value = Reading Level + Correct Factor.(2) Margin Level = Measurement Value Limit Value.

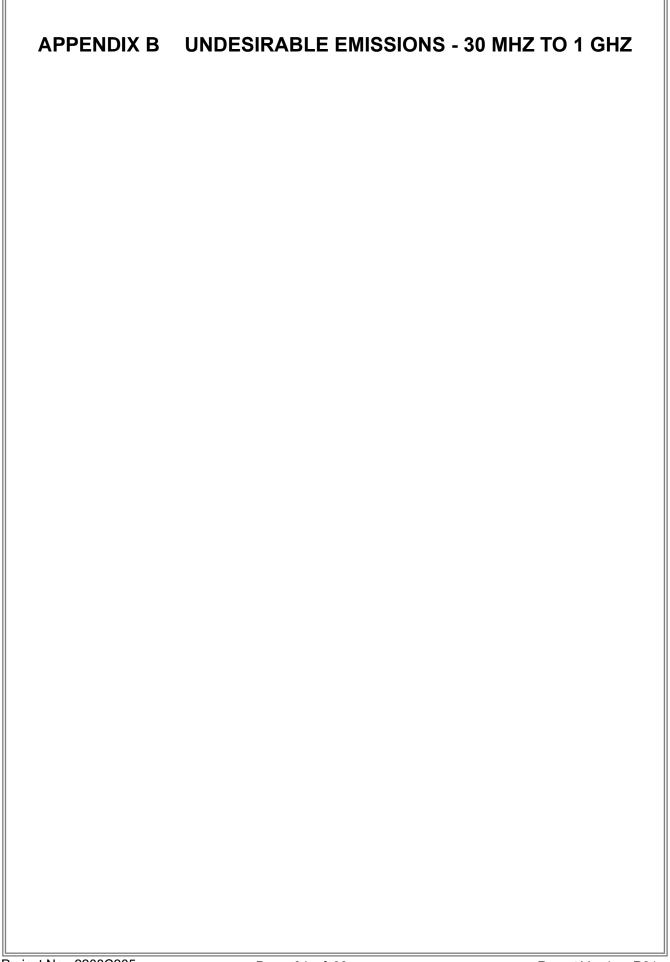
Test Mode	Idle	Tested Date	2022/11/25
Test Frequency	-	Phase	Neutral



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margin		
		MHz	dBu∀	dB	dBu∨	dBu∀	dB	Detector	Comment
1	*	0.1612	38.01	9.65	47.66	65.40	-17.74	QP	
2		0.1612	25.51	9.65	35.16	55.40	-20.24	AVG	
3		0.2040	34.97	9.64	44.61	63.45	-18.84	QP	
4		0.2040	24.98	9.64	34.62	53.45	-18.83	AVG	
5		0.4447	19.97	9.64	29.61	56.97	-27.36	QP	
6		0.4447	3.83	9.64	13.47	46.97	-33.50	AVG	
7		0.7710	21.72	9.67	31.39	56.00	-24.61	QP	
8		0.7710	11.39	9.67	21.06	46.00	-24.94	AVG	
9		2.6362	24.49	9.73	34.22	56.00	-21.78	QP	
10		2.6362	15.67	9.73	25.40	46.00	-20.60	AVG	
11		4.5240	21.15	9.78	30.93	56.00	-25.07	QP	
12		4.5240	14.51	9.78	24.29	46.00	-21.71	AVG	

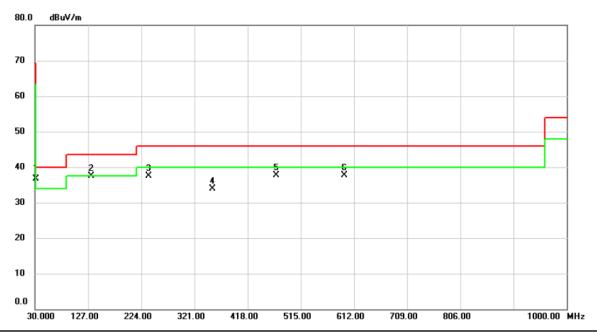
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





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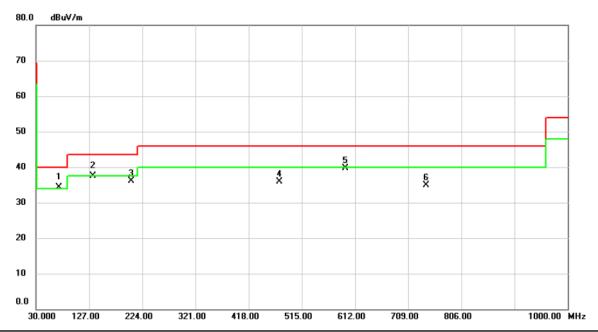
Test Mode	IEEE 802.11ax (HEW160)	Test Date	2023/1/17
Test Frequency	6505MHz	Polarization	Vertical
Temp	23°C	Hum.	59%



	No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
-			MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
-	1	*	31.5196	49.37	-12.70	36.67	40.00	-3.33	QP	
-	2		133.1433	50.49	-13.06	37.43	43.50	-6.07	peak	
-	3		237.3536	51.13	-13.71	37.42	46.00	-8.58	peak	
-	4		353.5595	44.13	-10.24	33.89	46.00	-12.11	peak	
-	5		470.2183	44.75	-7.05	37.70	46.00	-8.30	peak	
-	6		594.0226	42.14	-4.34	37.80	46.00	-8.20	peak	

- (1) Measurement Value = Reading Level + Correct Factor.(2) Margin Level = Measurement Value Limit Value.

Test Mode	IEEE 802.11ax (HEW160)	Test Date	2023/1/17
Test Frequency	6505MHz	Polarization	Horizontal
Temp	23°C	Hum.	59%



	No.	Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
-			MHz	dBu∨	dB	dBuV/m	dBuV/m	dB	Detector	Comment
-	1	*	71.4836	48.74	-14.44	34.30	40.00	-5.70	QP	
-	2		134.0810	50.41	-12.98	37.43	43.50	-6.07	QP	
-	3		203.8887	51.42	-15.29	36.13	43.50	-7.37	peak	
-	4		474.3247	42.95	-6.98	35.97	46.00	-10.03	peak	
-	5		593.9903	43.96	-4.34	39.62	46.00	-6.38	peak	
-	6		742.4973	36.55	-1.74	34.81	46.00	-11.19	peak	

- (1) Measurement Value = Reading Level + Correct Factor.(2) Margin Level = Measurement Value Limit Value.

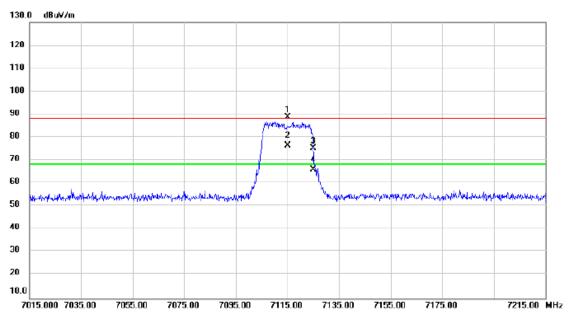


APPENDIX C UNDESIRABLE EMISSIONS - ABOVE 1 GHZ

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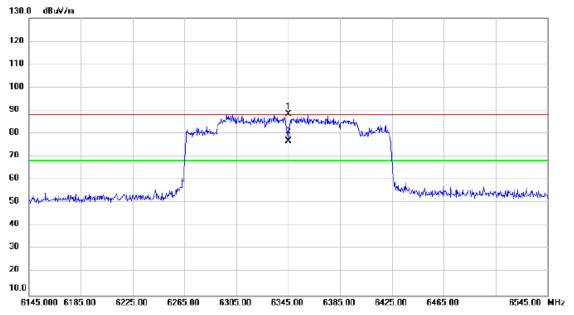
Test Mode	IEEE 802.11ax(HE20)	Test Date	2022/12/2
Test Frequency	7115MHz	Polarization	Vertical
Temp	23°C	Hum.	59%



No.	Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	Χ	7115.000	83.15	5.51	88.66	88.20	0.46	peak	No Limit
2	*	7115.000	70.89	5.51	76.40	68.20	8.20	AVG	No Limit
3		7125.000	69.81	5.52	75.33	88.20	-12.87	peak	
4		7125.000	60.57	5.52	66.09	68.20	-2.11	AVG	

- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.

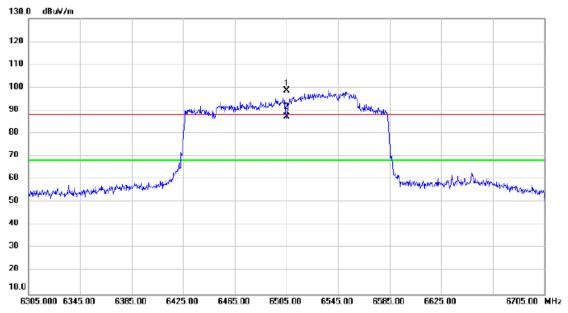
Test Mode	IEEE 802.11ax(HE160)	Test Date	2022/12/1
Test Frequency	6345MHz	Polarization	Vertical
Temp	23°C	Hum.	59%



No.	M	1k.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
			MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	Х	(6:	345.000	84.15	4.26	88.41	88.20	0.21	peak	No Limit
2	*	6	345.000	72.54	4.26	76.80	68.20	8.60	AVG	No Limit

- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.

Test Mode	IEEE 802.11ax(HE160)	Test Date	2022/12/1
Test Frequency	6505MHz	Polarization	Vertical
Temp	23°C	Hum.	59%

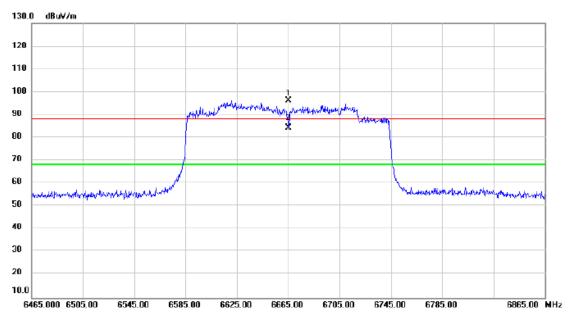


No.	М	k.	Freq.			Measure- ment		Over		
			MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	X	65	05.000	93.54	5.05	98.59	88.20	10.39	peak	No Limit
2	*	65	05.000	82.08	5.05	87.13	68.20	18.93	AVG	No Limit

REMARKS:

(1) Measurement Value = Reading Level + Correct Factor.(2) Margin Level = Measurement Value - Limit Value.

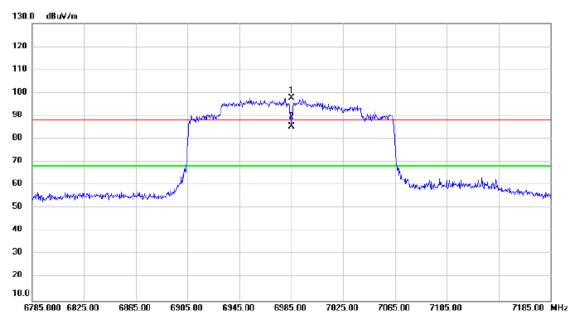
Test Mode	IEEE 802.11ax(HE160)	Test Date	2022/12/1
Test Frequency	6665MHz	Polarization	Vertical
Temp	23°C	Hum.	59%



No.	Mk	. Freq		Correct Factor	Measure- ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	Χ	6665.00	0 91.09	5.19	96.28	88.20	8.08	peak	No Limit
2	*	6665.00	79.01	5.19	84.20	68.20	16.00	AVG	No Limit

- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.

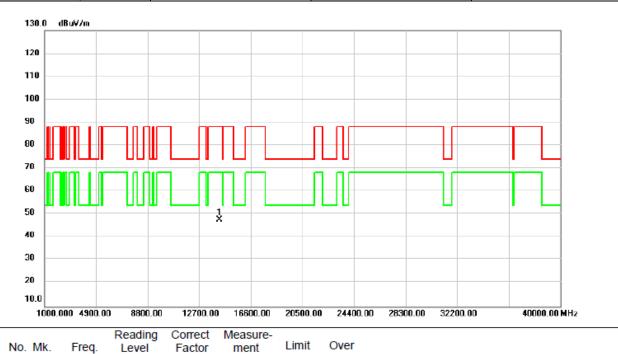
Test Mode	IEEE 802.11ax (HE160)	Test Date	2022/12/1
Test Frequency	6985MHz	Polarization	Vertical
Temp	23°C	Hum.	59%



No.	Mk	c. Freq.		Correct Factor	Measure- ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	Х	6985.000	92.26	5.47	97.73	88.20	9.53	peak	No Limit
2	*	6985.000	80.07	5.47	85.54	68.20	17.34	AVG	No Limit

- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.

Test Mode	IEEE 802.11ax(HE20)	Test Date	2022/12/2
Test Frequency	7115MHz	Polarization	Vertical
Temp	23°C	Hum.	59%



REMARKS:

MHz

14230.00

(1) Measurement Value = Reading Level + Correct Factor.

7.24

dBuV/m

47.66

dBuV/m

88.20

dΒ

-40.54

Detector

peak

Comment

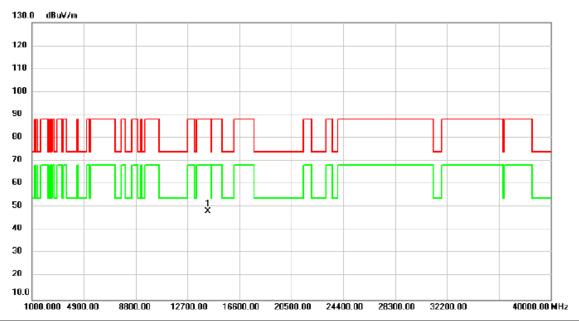
(2) Margin Level = Measurement Value - Limit Value.

dBuV

40.42

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Test Mode	IEEE 802.11ax(HE20)	Test Date	2022/12/2
Test Frequency	7115MHz	Polarization	Horizontal
Temp	23°C	Hum.	59%



No.	Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	14230.00	41.04	7.24	48.28	88.20	-39.92	peak	

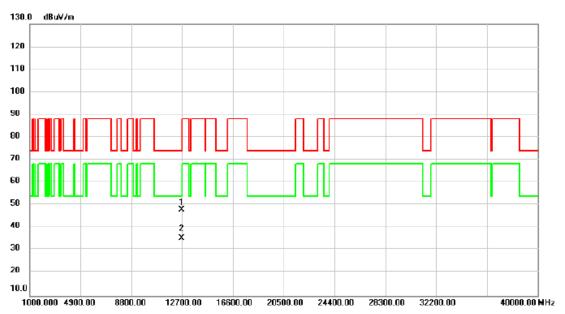
REMARKS:

- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.

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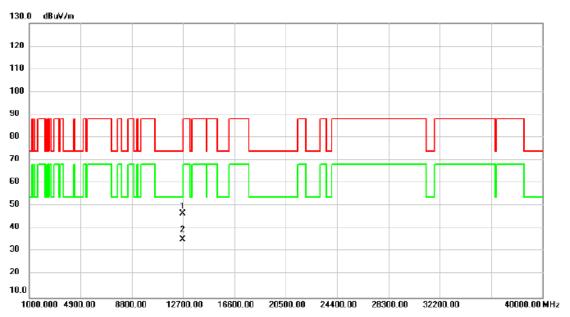
Test Mode	IEEE 802.11ax(HE160)	Test Date	2022/12/2
Test Frequency	6345MHz	Polarization	Vertical
Temp	23°C	Hum.	59%



No. M	lk. Freq.		Correct Factor	Measure- ment	Limit	Over		
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	12690.00	40.54	7.44	47.98	74.00	-26.02	peak	
2 *	12690.00		7.44	35.32	54.00	-18.68	AVG	

- (1) Measurement Value = Reading Level + Correct Factor.(2) Margin Level = Measurement Value Limit Value.

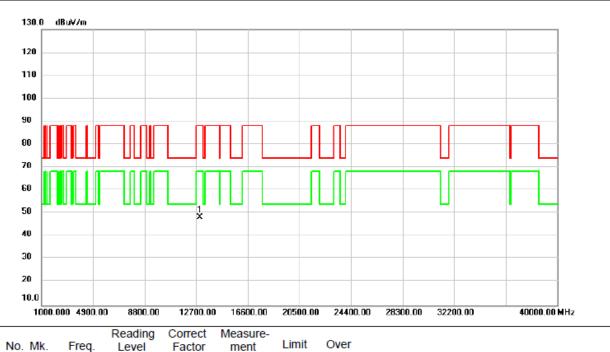
Test Mode	IEEE 802.11ax(HE160)	Test Date	2022/12/2
Test Frequency	6345MHz	Polarization	Horizontal
Temp	23°C	Hum.	59%



No.	Mk.	Freq.			Measure- ment		Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	1	12690.00	39.26	7.44	46.70	74.00	-27.30	peak	
2	* 1	12690.00	27.82	7.44	35.26	54.00	-18.74	AVG	

- (1) Measurement Value = Reading Level + Correct Factor.(2) Margin Level = Measurement Value Limit Value.

Test Mode	IEEE 802.11ax(HE160)	Test Date	2022/12/2
Test Frequency	6505MHz	Polarization	Vertical
Temp	23°C	Hum.	59%



dBuV/m

88.20

dΒ

-40.08

Detector

peak

Comment

REMARKS:

MHz

* 13010.00

(1) Measurement Value = Reading Level + Correct Factor.

dΒ

7.66

dBuV/m

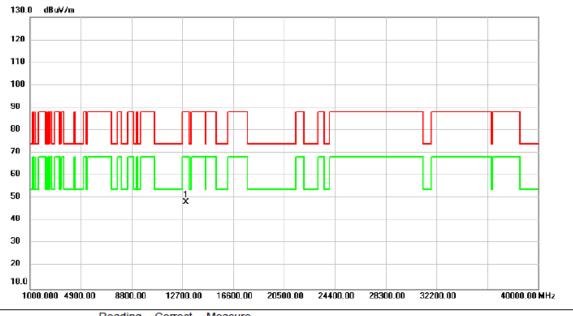
48.12

(2) Margin Level = Measurement Value - Limit Value.

dBuV

40.46

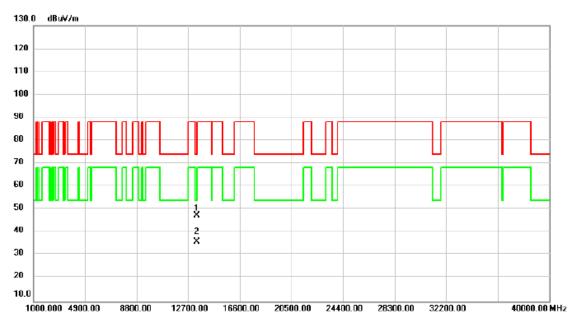
Test Mode	IEEE 802.11ax(HE160)	Test Date	2022/12/2
Test Frequency	6505MHz	Polarization	Horizontal
Temp	23°C	Hum.	59%



No. Mi	k. Freq.		Factor	ment	Limit	Over		
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	13010.00	40.72	7.66	48.38	88.20	-39.82	peak	

- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.

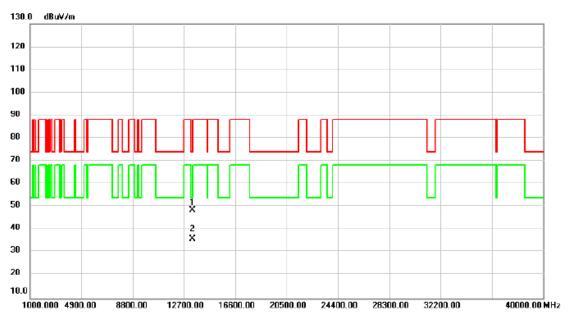
Test Mode	IEEE 802.11ax(HE160)	Test Date	2022/12/2
Test Frequency	6665MHz	Polarization	Vertical
Temp	23°C	Hum.	59%



No.	Mk	c. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		13330.00	40.16	7.23	47.39	74.00	-26.61	peak	
2	*	13330.00		7.23	35.83	54.00	-18.17	AVG	

- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.

Test Mode	IEEE 802.11ax(HE160)	Test Date	2022/12/2
Test Frequency	6665MHz	Polarization	Horizontal
Temp	23°C	Hum.	59%

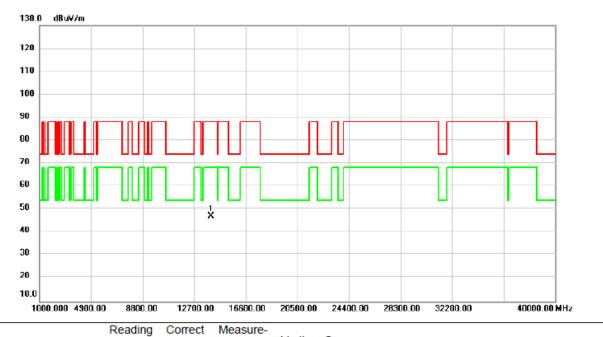


No.	Mk	. Freq.	Reading Level		Measure- ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		13330.00	41.19	7.23	48.42	74.00	-25.58	peak	
2	*	13330.00	28.60	7.23	35.83	54.00	-18.17	AVG	

- (1) Measurement Value = Reading Level + Correct Factor.(2) Margin Level = Measurement Value Limit Value.

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Test Mode	IEEE 802.11ax(HE160)	Test Date	2022/12/2
Test Frequency	6985MHz	Polarization	Vertical
Temp	23°C	Hum.	59%



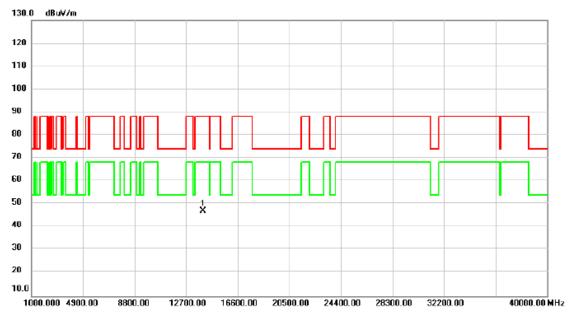
No. Mk	. Freq.	Level	Factor	ment	Limit	Over		
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	13970.00	39.83	7.22	47.05	88.20	-41.15	peak	

REMARKS:

- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.

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Test Mode	IEEE 802.11ax(HE160)	Test Date	2022/12/2
Test Frequency	6985MHz	Polarization	Horizontal
Temp	23°C	Hum.	59%



No. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	13970.00	39.87	7.22	47.09	88.20	-41.11	peak	

REMARKS:

- (1) Measurement Value = Reading Level + Correct Factor.(2) Margin Level = Measurement Value Limit Value.

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	-		
Test Mode	IEEE 802.11ax (HE20)_Main	Tested Date	2022/12/6

Test Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)	E.I.R.P. (dBm)	E.I.R.P. (W)	E.I.R.P. Limit (dBm)	E.I.R.P. Limit (W)	Result
5955	1.29	0.0013	5.50	0.0035	24.00	0.2512	Pass
6175	1.59	0.0014	5.80	0.0038	24.00	0.2512	Pass
6415	1.24	0.0013	5.45	0.0035	24.00	0.2512	Pass
6435	2.02	0.0016	6.23	0.0042	24.00	0.2512	Pass
6475	1.87	0.0015	6.08	0.0041	24.00	0.2512	Pass
6515	2.20	0.0017	6.41	0.0044	24.00	0.2512	Pass
6535	1.40	0.0014	5.61	0.0036	24.00	0.2512	Pass
6695	1.23	0.0013	5.44	0.0035	24.00	0.2512	Pass
6855	1.46	0.0014	5.67	0.0037	24.00	0.2512	Pass
6875	1.35	0.0014	5.56	0.0036	24.00	0.2512	Pass
6995	1.88	0.0015	6.09	0.0041	24.00	0.2512	Pass
7095	1.63	0.0015	5.84	0.0038	24.00	0.2512	Pass
7115	-7.19	0.0002	-2.98	0.0005	24.00	0.2512	Pass

Test Mode IEEE 802.11ax (HE20)_Aux Tested Date 2022/12/6
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Test Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)	E.I.R.P. (dBm)	E.I.R.P. (W)	E.I.R.P. Limit (dBm)	E.I.R.P. Limit (W)	Result
5955	2.26	0.0017	6.47	0.0044	24.00	0.2512	Pass
6175	2.25	0.0017	6.46	0.0044	24.00	0.2512	Pass
6415	2.38	0.0017	6.59	0.0046	24.00	0.2512	Pass
6435	3.27	0.0021	7.48	0.0056	24.00	0.2512	Pass
6475	2.92	0.0020	7.13	0.0052	24.00	0.2512	Pass
6515	2.61	0.0018	6.82	0.0048	24.00	0.2512	Pass
6535	2.12	0.0016	6.33	0.0043	24.00	0.2512	Pass
6695	2.16	0.0016	6.37	0.0043	24.00	0.2512	Pass
6855	2.09	0.0016	6.30	0.0043	24.00	0.2512	Pass
6875	2.16	0.0016	6.37	0.0043	24.00	0.2512	Pass
6995	2.25	0.0017	6.46	0.0044	24.00	0.2512	Pass
7095	1.90	0.0015	6.11	0.0041	24.00	0.2512	Pass
7115	-7.83	0.0002	-3.62	0.0004	24.00	0.2512	Pass



Test Mode	IEEE 802.11ax (HE20)_Total	Tested Date	2022/12/6

Test Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)	E.I.R.P. (dBm)	E.I.R.P. (W)	E.I.R.P. Limit (dBm)	E.I.R.P. Limit (W)	Result
5955	4.81	0.0030	9.02	0.0080	24.00	0.2512	Pass
6175	4.94	0.0031	9.15	0.0082	24.00	0.2512	Pass
6415	4.86	0.0031	9.07	0.0081	24.00	0.2512	Pass
6435	5.70	0.0037	9.91	0.0098	24.00	0.2512	Pass
6475	5.44	0.0035	9.65	0.0092	24.00	0.2512	Pass
6515	5.42	0.0035	9.63	0.0092	24.00	0.2512	Pass
6535	4.79	0.0030	9.00	0.0079	24.00	0.2512	Pass
6695	4.73	0.0030	8.94	0.0078	24.00	0.2512	Pass
6855	4.80	0.0030	9.01	0.0080	24.00	0.2512	Pass
6875	4.78	0.0030	8.99	0.0079	24.00	0.2512	Pass
6995	5.08	0.0032	9.29	0.0085	24.00	0.2512	Pass
7095	4.78	0.0030	8.99	0.0079	24.00	0.2512	Pass
7115	-4.49	0.0004	-0.28	0.0009	24.00	0.2512	Pass



6845

6885

7085

4.36

5.10

5.33

0.0027

0.0032

0.0034

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0.2512

0.2512

0.2512

Pass

Pass

Pass

24.00

24.00

24.00

Test Mode	IEEE 802.11a	x (HE40)_Ma	in	Tested Date	2022/12/	6	
Test Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)	E.I.R.P. (dBm)	E.I.R.P. (W)	E.I.R.P. Limit (dBm)	E.I.R.P. Limit (W)	Result
5965	4.60	0.0029	8.81	0.0076	24.00	0.2512	Pass
6165	4.27	0.0027	8.48	0.0070	24.00	0.2512	Pass
6405	4.41	0.0028	8.62	0.0073	24.00	0.2512	Pass
6445	5.03	0.0032	9.24	0.0084	24.00	0.2512	Pass
6485	5.25	0.0033	9.46	0.0088	24.00	0.2512	Pass
6525	5.56	0.0036	9.77	0.0095	24.00	0.2512	Pass
6685	4.23	0.0026	8.44	0.0070	24.00	0.2512	Pass

Test Mode IEEE 802.11ax (HE40)_Aux	Tested Date	2022/12/6	
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0.0072

0.0085

0.0090

8.57

9.31

9.54

Test Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)	E.I.R.P. (dBm)	E.I.R.P. (W)	E.I.R.P. Limit (dBm)	E.I.R.P. Limit (W)	Result
5965	5.03	0.0032	9.24	0.0084	24.00	0.2512	Pass
6165	4.80	0.0030	9.01	0.0080	24.00	0.2512	Pass
6405	5.14	0.0033	9.35	0.0086	24.00	0.2512	Pass
6445	5.63	0.0037	9.84	0.0096	24.00	0.2512	Pass
6485	5.71	0.0037	9.92	0.0098	24.00	0.2512	Pass
6525	5.81	0.0038	10.02	0.0100	24.00	0.2512	Pass
6685	4.65	0.0029	8.86	0.0077	24.00	0.2512	Pass
6845	4.68	0.0029	8.89	0.0077	24.00	0.2512	Pass
6885	5.58	0.0036	9.79	0.0095	24.00	0.2512	Pass
7085	5.54	0.0036	9.75	0.0094	24.00	0.2512	Pass

Test Mode IEEE 802.11ax (HE40)_Total Tested Date 2022/12/6	;
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Test Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)	E.I.R.P. (dBm)	E.I.R.P. (W)	E.I.R.P. Limit (dBm)	E.I.R.P. Limit (W)	Result
5965	7.83	0.0061	12.04	0.0160	24.00	0.2512	Pass
6165	7.55	0.0057	11.76	0.0150	24.00	0.2512	Pass
6405	7.80	0.0060	12.01	0.0159	24.00	0.2512	Pass
6445	8.35	0.0068	12.56	0.0180	24.00	0.2512	Pass
6485	8.50	0.0071	12.71	0.0187	24.00	0.2512	Pass
6525	8.70	0.0074	12.91	0.0195	24.00	0.2512	Pass
6685	7.46	0.0056	11.67	0.0147	24.00	0.2512	Pass
6845	7.53	0.0057	11.74	0.0149	24.00	0.2512	Pass
6885	8.36	0.0069	12.57	0.0181	24.00	0.2512	Pass
7085	8.45	0.0070	12.66	0.0185	24.00	0.2512	Pass

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7025

7.63

0.0058

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0.2512

Pass

24.00

Test Mode	IEEE 802.11a	x (HE80) _Ma	ain		Tested Date	2022/12/	6
Test Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)	E.I.R.P. (dBm)	E.I.R.P. (W)	E.I.R.P. Limit (dBm)	E.I.R.P. Limit (W)	Result
5985	7.44	0.0055	11.65	0.0146	24.00	0.2512	Pass
6145	7.40	0.0055	11.61	0.0145	24.00	0.2512	Pass
6385	7.29	0.0054	11.50	0.0141	24.00	0.2512	Pass
6465	7.63	0.0058	11.84	0.0153	24.00	0.2512	Pass
6545	7.78	0.0060	11.99	0.0158	24.00	0.2512	Pass
6625	7.46	0.0056	11.67	0.0147	24.00	0.2512	Pass
6785	7.40	0.0055	11.61	0.0145	24.00	0.2512	Pass
6865	7.32	0.0054	11.53	0.0142	24.00	0.2512	Pass
6945	8.05	0.0064	12.26	0.0168	24.00	0.2512	Pass

Test Mode IEEE 802.11ax (HE80) _Aux	Tested Date	2022/12/6	
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0.0153

11.84

Test Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)	E.I.R.P. (dBm)	E.I.R.P. (W)	E.I.R.P. Limit (dBm)	E.I.R.P. Limit (W)	Result
5985	7.71	0.0059	11.92	0.0156	24.00	0.2512	Pass
6145	7.67	0.0058	11.88	0.0154	24.00	0.2512	Pass
6385	7.77	0.0060	11.98	0.0158	24.00	0.2512	Pass
6465	8.19	0.0066	12.40	0.0174	24.00	0.2512	Pass
6545	8.14	0.0065	12.35	0.0172	24.00	0.2512	Pass
6625	7.65	0.0058	11.86	0.0153	24.00	0.2512	Pass
6785	7.58	0.0057	11.79	0.0151	24.00	0.2512	Pass
6865	7.64	0.0058	11.85	0.0153	24.00	0.2512	Pass
6945	8.13	0.0065	12.34	0.0171	24.00	0.2512	Pass
7025	8.01	0.0063	12.22	0.0167	24.00	0.2512	Pass

Test Mode	IEEE 802.11ax (HE80) _Total	Tested Date	2022/12/6

Test Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)	E.I.R.P. (dBm)	E.I.R.P. (W)	E.I.R.P. Limit (dBm)	E.I.R.P. Limit (W)	Result
5985	10.59	0.0114	14.80	0.0302	24.00	0.2512	Pass
6145	10.55	0.0113	14.76	0.0299	24.00	0.2512	Pass
6385	10.55	0.0113	14.76	0.0299	24.00	0.2512	Pass
6465	10.93	0.0124	15.14	0.0327	24.00	0.2512	Pass
6545	10.97	0.0125	15.18	0.0330	24.00	0.2512	Pass
6625	10.57	0.0114	14.78	0.0301	24.00	0.2512	Pass
6785	10.50	0.0112	14.71	0.0296	24.00	0.2512	Pass
6865	10.49	0.0112	14.70	0.0295	24.00	0.2512	Pass
6945	11.10	0.0129	15.31	0.0340	24.00	0.2512	Pass
7025	10.83	0.0121	15.04	0.0319	24.00	0.2512	Pass

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Test Mode	IEEE 802.11ax (HE160)_Main	Tested Date	2022/12/6
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Test Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)	E.I.R.P. (dBm)	E.I.R.P. (W)	E.I.R.P. Limit (dBm)	E.I.R.P. Limit (W)	Result
6025	10.31	0.0107	14.52	0.0283	24.00	0.2512	Pass
6345	10.17	0.0104	14.38	0.0274	24.00	0.2512	Pass
6505	10.50	0.0112	14.71	0.0296	24.00	0.2512	Pass
6665	10.34	0.0108	14.55	0.0285	24.00	0.2512	Pass
6985	10.09	0.0102	14.30	0.0269	24.00	0.2512	Pass

Test Mode IEEE 802.11ax (HE160)_Aux	Tested Date	2022/12/6
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Test Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)	E.I.R.P. (dBm)	E.I.R.P. (W)	E.I.R.P. Limit (dBm)	E.I.R.P. Limit (W)	Result
6025	10.55	0.0114	14.76	0.0299	24.00	0.2512	Pass
6345	10.75	0.0119	14.96	0.0313	24.00	0.2512	Pass
6505	10.93	0.0124	15.14	0.0327	24.00	0.2512	Pass
6665	10.78	0.0120	14.99	0.0316	24.00	0.2512	Pass
6985	10.59	0.0115	14.80	0.0302	24.00	0.2512	Pass

Test Mode IEEE 802.11ax (HE160)_Total	Tested Date	2022/12/6
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Test Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)	E.I.R.P. (dBm)	E.I.R.P. (W)	E.I.R.P. Limit (dBm)	E.I.R.P. Limit (W)	Result
6025	13.44	0.0221	17.65	0.0582	24.00	0.2512	Pass
6345	13.48	0.0223	17.69	0.0587	24.00	0.2512	Pass
6505	13.73	0.0236	17.94	0.0622	24.00	0.2512	Pass
6665	13.58	0.0228	17.79	0.0601	24.00	0.2512	Pass
6985	13.36	0.0217	17.57	0.0571	24.00	0.2512	Pass

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APPENDIX E CONTENTION BASED PROTOCOL

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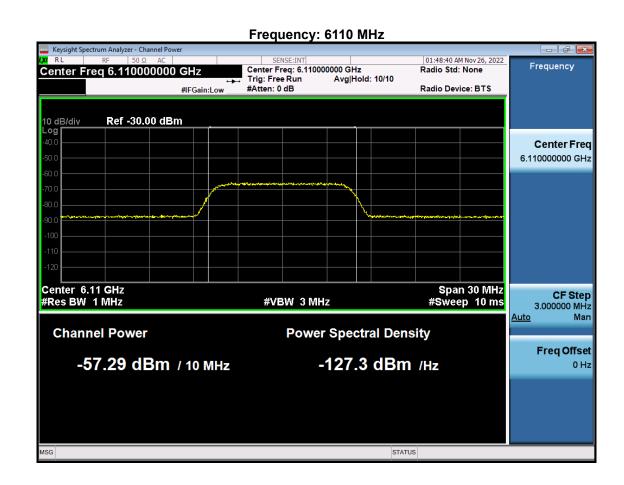


Test Mode UNII-5, UNII-6, UNII-7, UNII-8

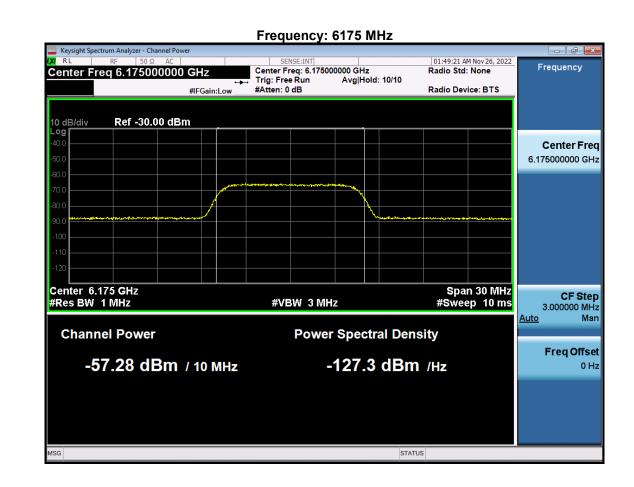
Incumbent Signal (AWGN) Frequency: 6175 MHz



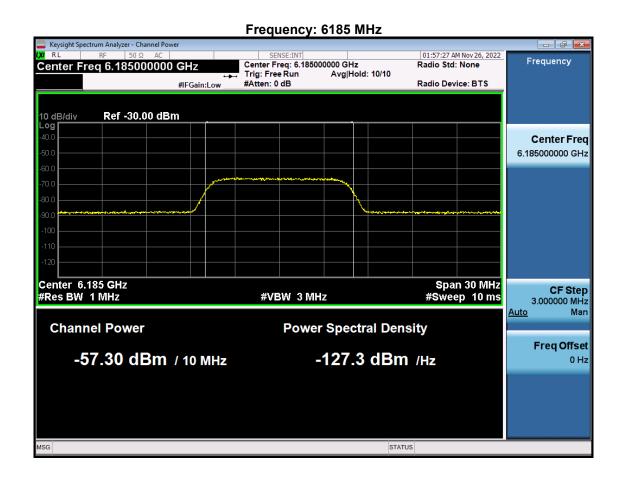




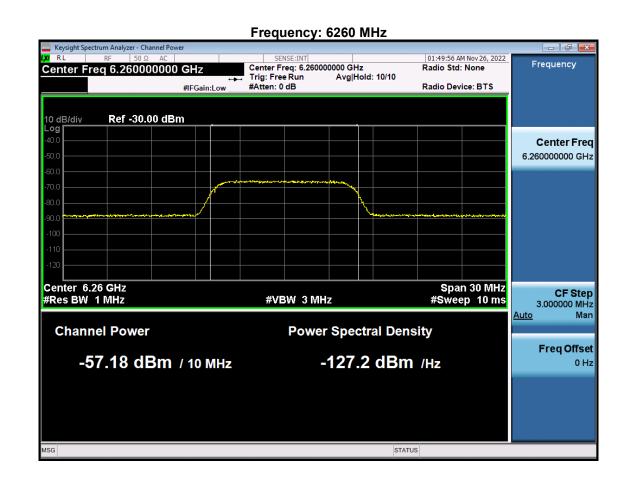




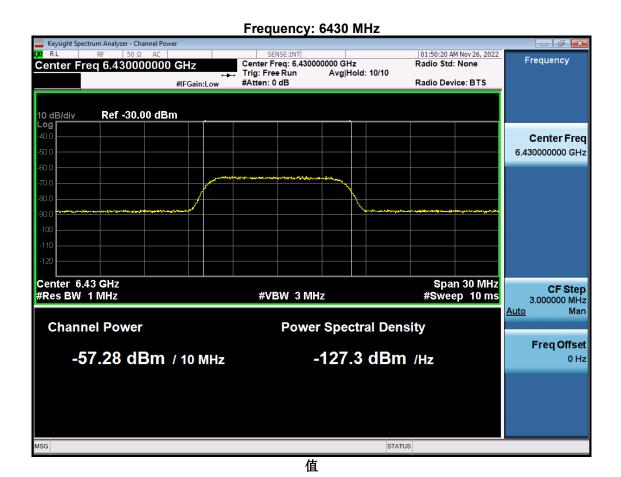






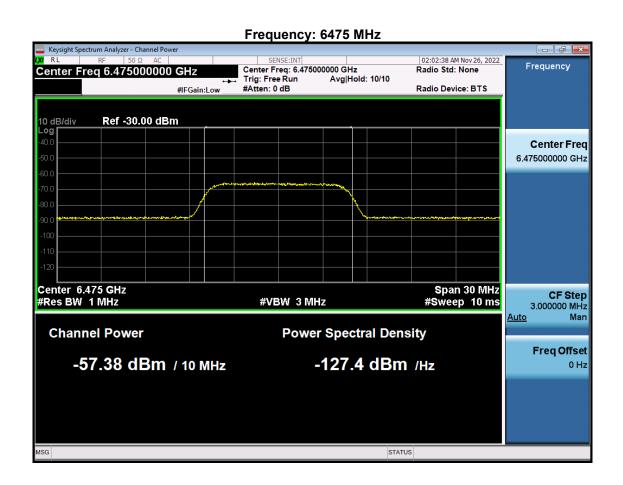




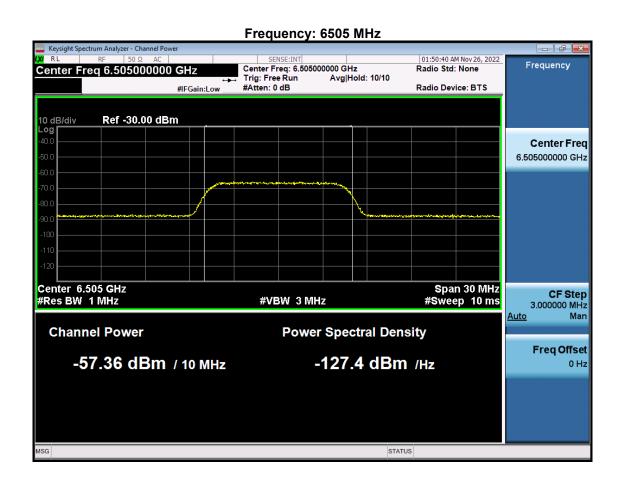


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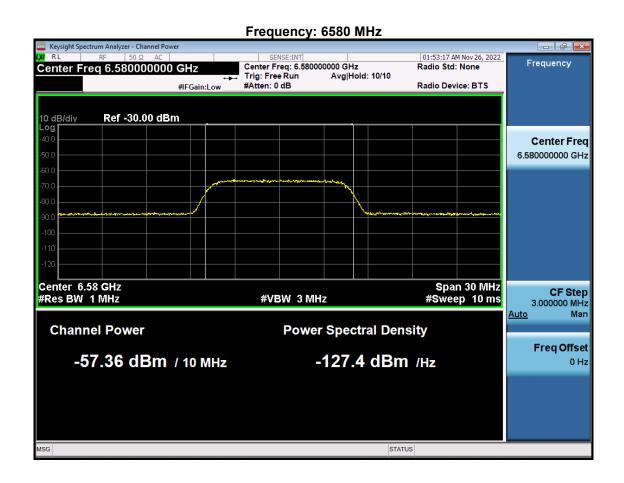




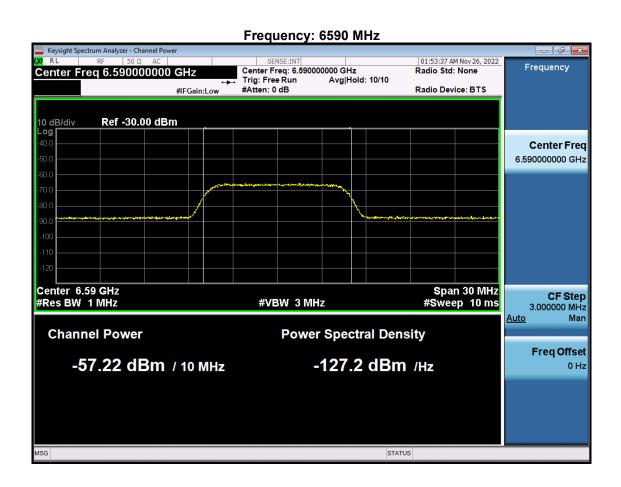




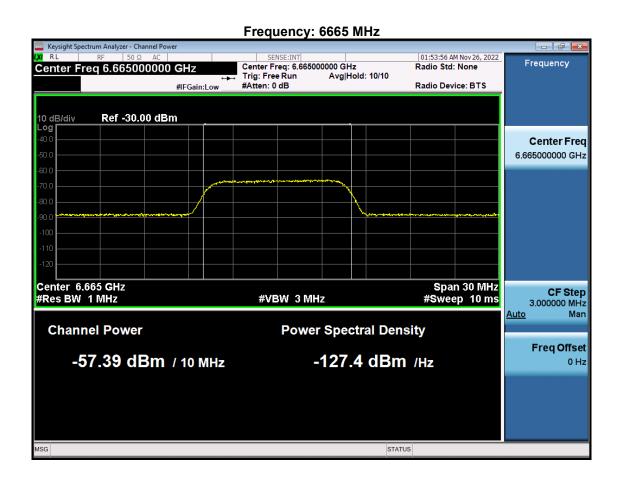




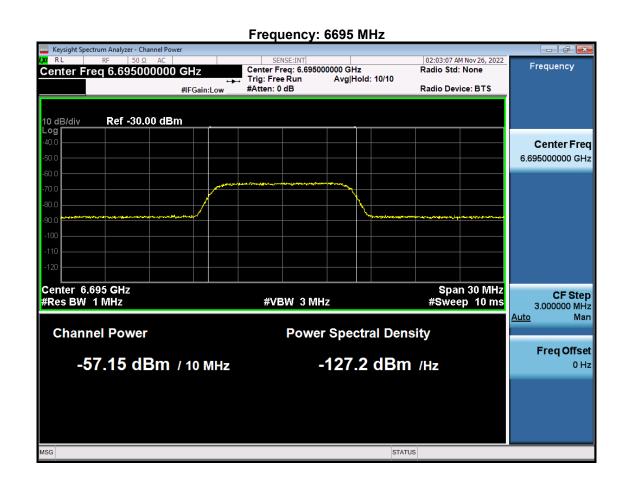




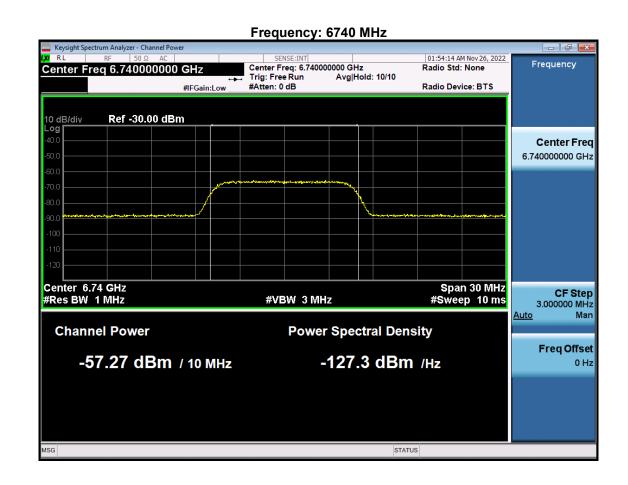




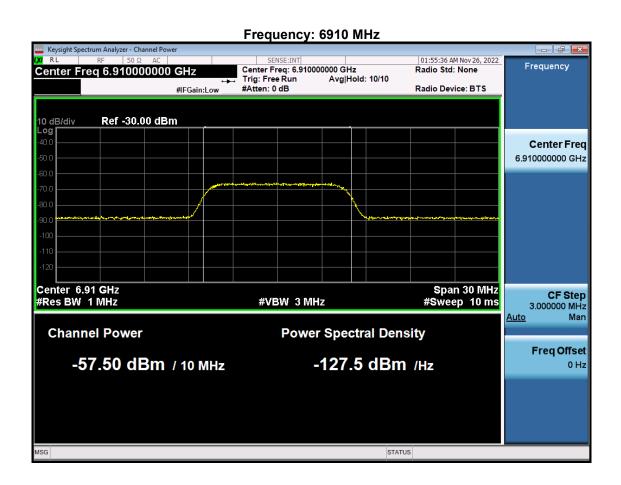




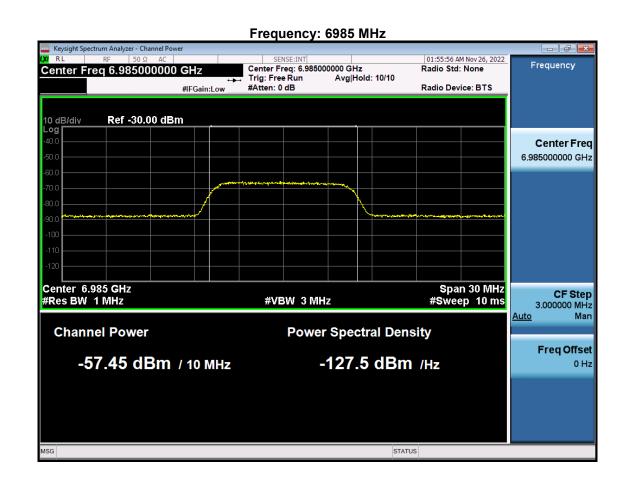




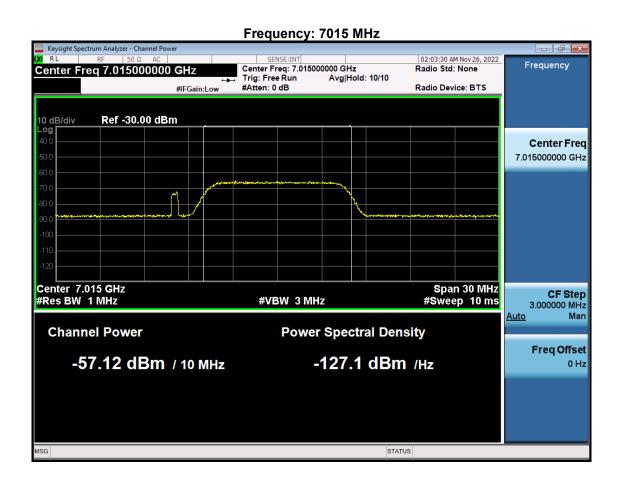




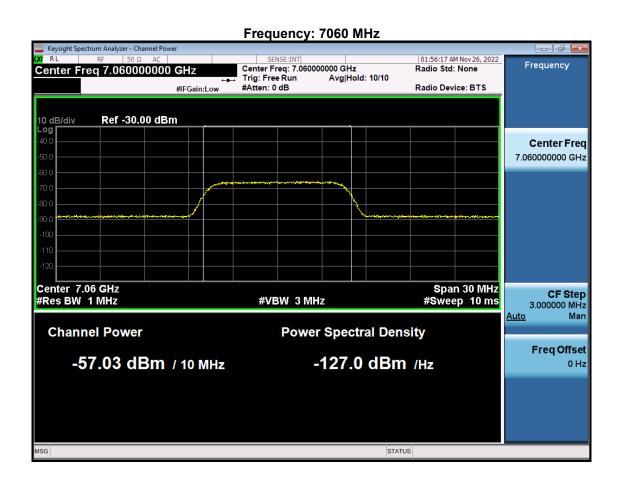














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Detection power level and detection probability

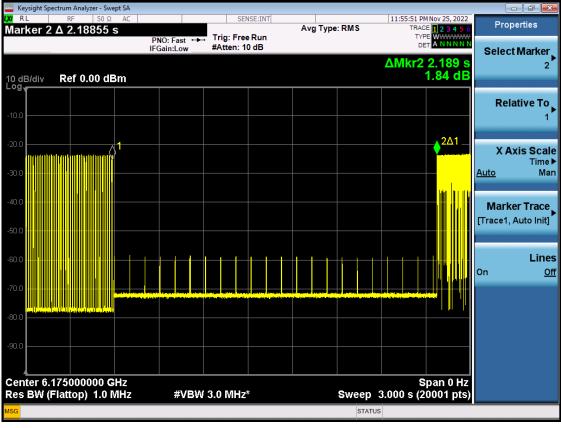
Bands	Test Mode	Bandwidth (MHz)	Channel	Frequency (MHz)	interference Frequency (MHz)	Detection power level (dBm)	Detection Power Limit (dBm)	Number of Times	Number of Detected	Detection Probability	Detection Probability Limit	Test Result
UNII-5	802.11a	20	45	6175	6175	-65.40	-59.14	10	9	90%	90%	Pass
	802.11ax	160	47	6185	6110	-67.12	-57.29	10	9	90%	90%	Pass
					6185	-65.25	-57.29	10	10	100%	90%	Pass
					6260	-66.09	-57.29	10	10	100%	90%	Pass
UNII-6	802.11a	20	105	6475	6475	-70.90	-57.29	10	10	100%	90%	Pass
					6430	-71.71	-57.29	10	10	100%	90%	Pass
	802.11ax	160	111	6505	6505	-68.90	-57.29	10	9	90%	90%	Pass
					6580	-72.41	-57.29	10	10	100%	90%	Pass
UNII-7	802.11a	20	149	6695	6695	-68.15	-57.29	10	10	100%	90%	Pass
					6590	-66.92	-57.29	10	9	90%	90%	Pass
	802.11ax	160	143	6665	6665	-65.37	-57.29	10	10	100%	90%	Pass
					6740	-70.58	-57.29	10	9	90%	90%	Pass
UNII-8	802.11a	20	213	7015	7015	-66.92	-57.29	10	9	90%	90%	Pass
					6910	-67.39	-57.29	10	10	100%	90%	Pass
	802.11ax	160	207	6985	6985	-69.51	-57.29	10	10	100%	90%	Pass
					7060	-66.11	-57.29	10	10	100%	90%	Pass

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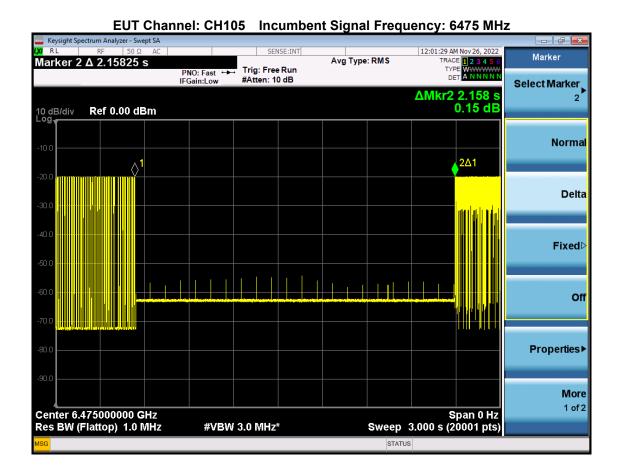




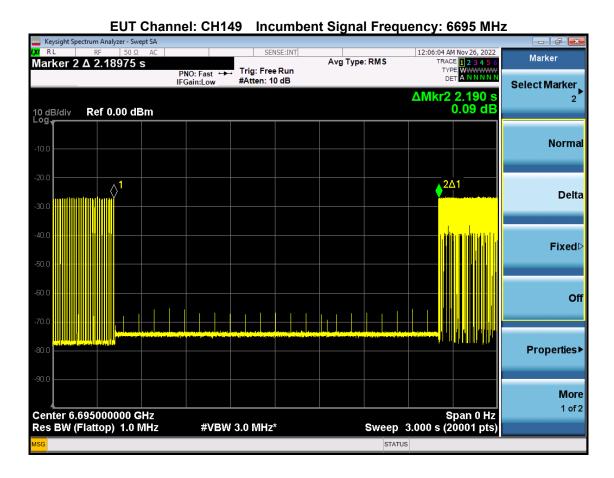
Contention-Based Protocol
EUT Channel: CH45 Incumbent Signal Frequency: 6175 MHz



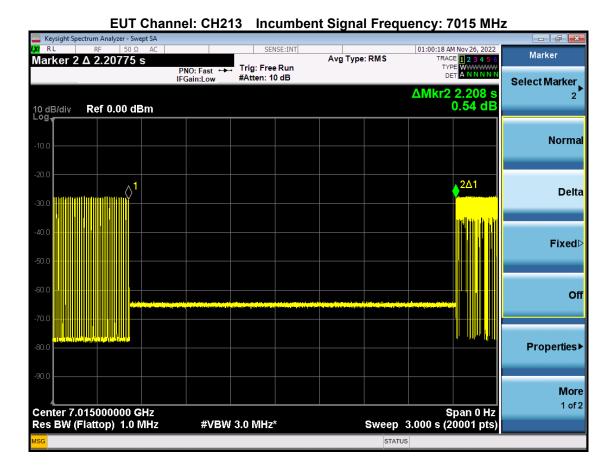




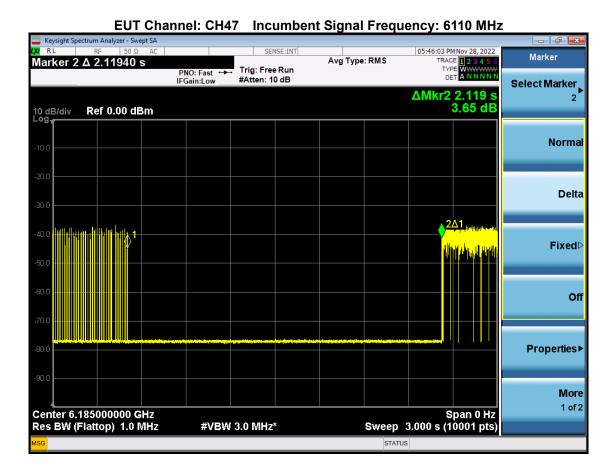




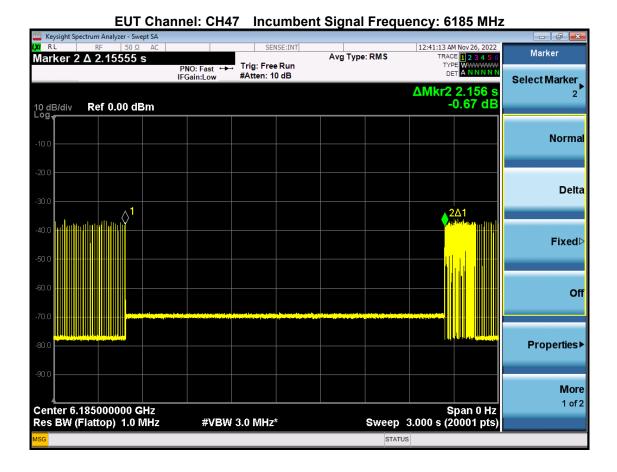




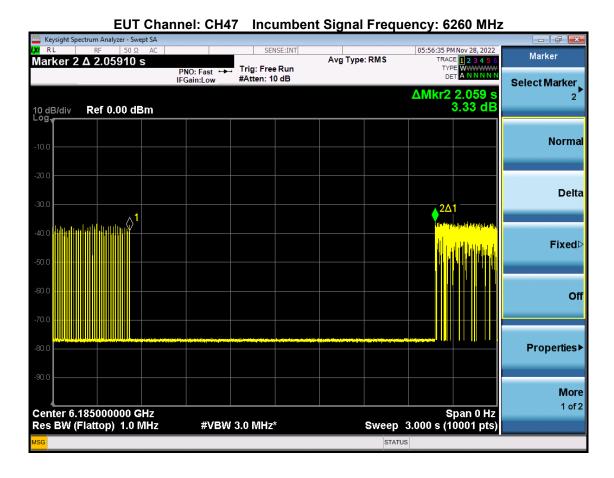




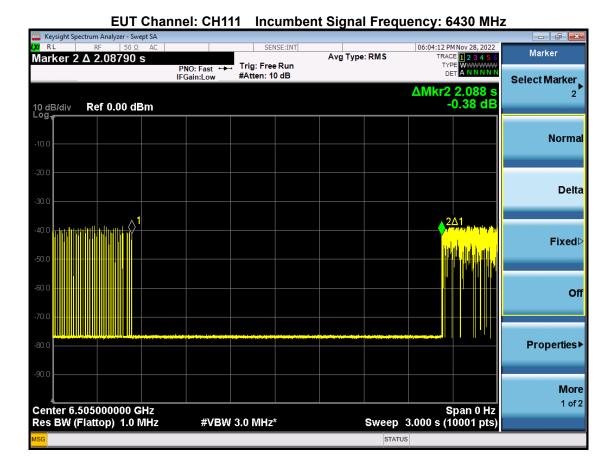




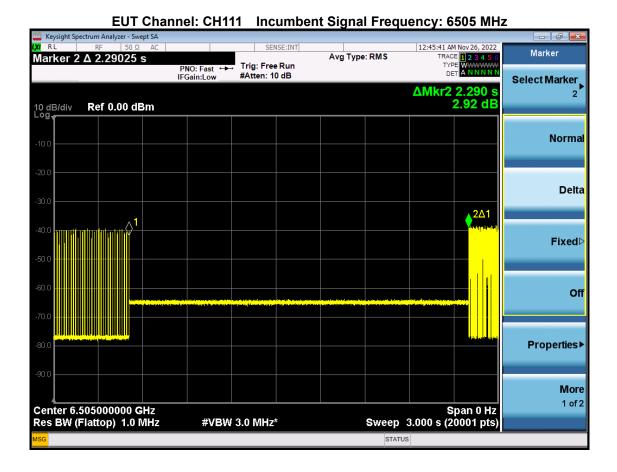




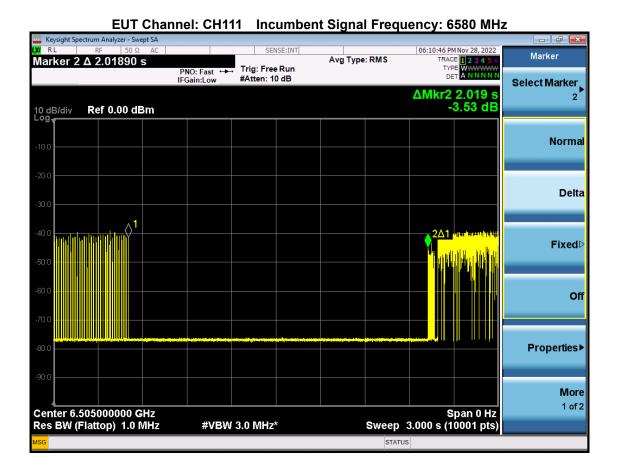




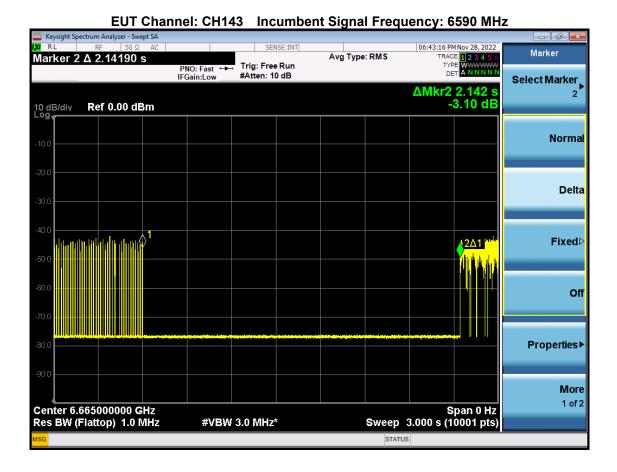




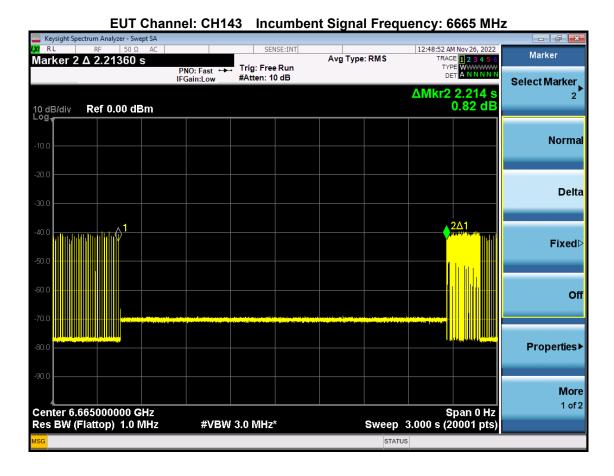




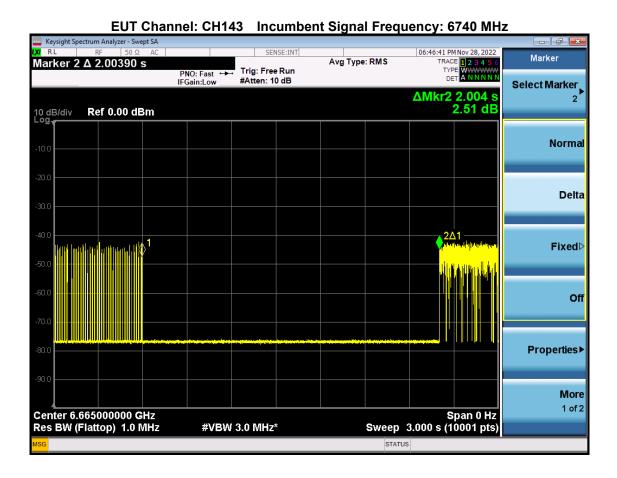






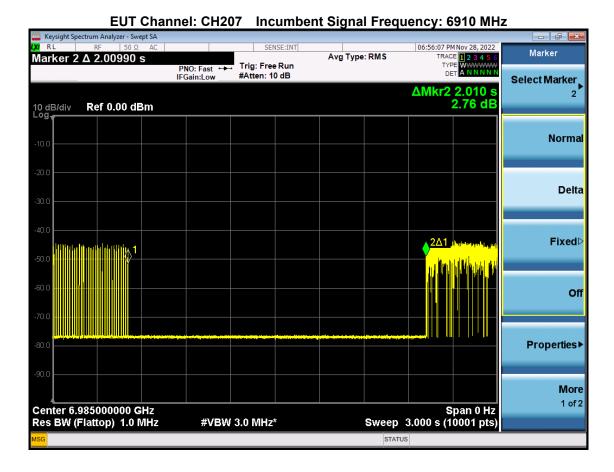












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