

TEST REPORT



CTK Co., Ltd.
(Ho-dong), 113, Yejik-ro, Cheoin-gu,
Yongin-si, Gyeonggi-do, Korea
Tel: +82-31-339-9970
Fax: +82-31-624-9501

Report No.:
CTK-2021-01436
Page (1) / (105) Pages

1. Client

- Name : Samsung Electronics Co Ltd
- Address : 19 Chapin Rd, Building D. Pine Brook, New Jersey, United States
- Date of Receipt : 2021-03-16

2. Manufacturer

- Name : Samsung Electronics Co., Ltd.
- Address : 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea

3. Use of Report : For FCC Conformance

4. Test Sample / Model: Wi-Fi/BT Transceiver / WCA943M



5. Date of Test : 2021-03-31 to 2021-04-13

6. Test Standard(method) used : FCC 47 CFR part 15 subpart E 15.407

7. Testing Environment: Temp.: (23 ± 1) °C, Humidity: (49 ± 3) % R.H

8. Test Results : Compliance

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This Test Report cannot be reproduced, except in full.

Affirmation	Tested by  Ji-Hye, Kim: (Signature)	Technical Manager  Won-Jae, Hwang: (Signature)
-------------	--	---

2021-04-14

Republic of KOREA **CTK Co., Ltd.**



CTK Co., Ltd.
(Ho-dong), 113, Yejik-ro, Cheoin-gu,
Yongin-si, Gyeonggi-do, Korea
Tel: +82-31-339-9970
Fax: +82-31-624-9501

Report No.:
CTK-2021-01436
Page (2) / (105) Pages

REPORT REVISION HISTORY

Date	Revision	Page No
2021-04-14	Issued (CTK-2021-01436)	all

This report shall not be reproduced except in full, without the written approval of CTK Co., Ltd. This document may be altered or revised by CTK Co., Ltd. personnel only, and shall be noted in the revision section of the document. Any alteration of this document not carried out by CTK Co., Ltd. will constitute fraud and shall nullify the document.



CTK Co., Ltd.
(Ho-dong), 113, Yejik-ro, Cheoin-gu,
Yongin-si, Gyeonggi-do, Korea
Tel: +82-31-339-9970
Fax: +82-31-624-9501

Report No.:
CTK-2021-01436
Page (3) / (105) Pages

CONTENTS

1. General Product Description	4
1.1 Client Information	4
1.2 Product Information	4
1.3 Peripheral Devices	5
1.4 Model Differences	5
2. Facility and Accreditations	6
2.1 Test Facility	6
2.2 Laboratory Accreditations and Listings	6
2.3 Calibration Details of Equipment Used for Measurement	6
3. Test Specifications	7
3.1 Standards	7
3.2 Mode of operation during the test	8
3.3 Device Modifications	9
3.4 Maximum Measurement Uncertainty	9
3.5 Test Software	9
4. Technical Characteristic Test	10
4.1 26 dB Bandwidth and 99% Bandwidth	10
4.2 OUTPUT POWER	26
4.3 Power Spectral Density	43
4.4 In-Band Emissions	60
4.5 Frequency Stability	74
4.6 Contention Based Protocol	75
4.7 Unwanted Emissions	79
4.8 AC Conducted Emissions	102
APPENDIX A – Test Equipment Used For Tests	105



CTK Co., Ltd.
 (Ho-dong), 113, Yejik-ro, Cheoin-gu,
 Yongin-si, Gyeonggi-do, Korea
 Tel: +82-31-339-9970
 Fax: +82-31-624-9501

Report No.:
 CTK-2021-01436
 Page (4) / (105) Pages

1. General Product Description

1.1 Client Information

Company	Samsung Electronics Co., Ltd.
Contact Point	129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea
Contact Person	Name : Youngjoong Noh E-mail : monk.noh@samsung.com Tel : +82-277-0598 Fax : -

1.2 Product Information

FCC ID	A3LWCA942M
Product Description	Wi-Fi/BT Transceiver
Model name	WCA943M
Variant Model name	-
Device Type	Indoor Client
Operating Frequency	UNII 5 : 5 955 MHz – 6 415 MHz (20 MHz_BW) 5 965 MHz – 6 405 MHz (40 MHz_BW) 5 985 MHz – 6 385 MHz (80 MHz_BW) UNII 6 : 6 435 MHz – 6 515 MHz (20 MHz_BW) 6 445 MHz – 6 485 MHz (40 MHz_BW) 6 465 MHz (80 MHz_BW) UNII 7 : 6 535 MHz – 6 855 MHz (20 MHz_BW) 6 525 MHz – 6 845 MHz (40 MHz_BW) 6 545 MHz – 6 865 MHz (80 MHz_BW) UNII 8 : 6 875 MHz – 7 115 MHz (20 MHz_BW) 6 885 MHz – 7 085 MHz (40 MHz_BW) 6 945 MHz – 7 025 MHz (80 MHz_BW)
RF Output Power	802.11ax_HE20 : 6.32 dBm/4.29 mW(EIRP: 8.53 dBm/7.13 mW) 802.11ax_HE40 : 8.75 dBm/7.50 mW(EIRP: 10.96 dBm/12.47 mW) 802.11ax_HE80 : 11.49 dBm/14.09 mW(EIRP: 13.70 dBm/23.44 mW)
Antenna Specification	Antenna type : Chip Antenna Peak Gain : 2.26 dBi (ANT1), -5.58 dBi (ANT2)
Type of Modulation	OFDMA
Data Rate	802.11ax : up to 1 200 Mbps
Power Source	DC 5 V
Hardware Rev	V2.0
Software Rev	FC2



CTK Co., Ltd.
(Ho-dong), 113, Yejik-ro, Cheoin-gu,
Yongin-si, Gyeonggi-do, Korea
Tel: +82-31-339-9970
Fax: +82-31-624-9501

Report No.:
CTK-2021-01436
Page (5) / (105) Pages

1.3 Peripheral Devices

Device	Manufacturer	Model No.	Serial No.
Note Computer	HP	15-bs563TU	CND7253R6N
AC/DC Adapter	HP	HSTNN-CA40	-

1.4 Model Differences

Not applicable



CTK Co., Ltd.
(Ho-dong), 113, Yejik-ro, Cheoin-gu,
Yongin-si, Gyeonggi-do, Korea
Tel: +82-31-339-9970
Fax: +82-31-624-9501

Report No.:
CTK-2021-01436
Page (6) / (105) Pages

2. Facility and Accreditations

2.1 Test Facility

The measurement facility is located at (Ho-dong), 113, Yejik-ro, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea.

2.2 Laboratory Accreditations and Listings

Country	Agency	Registration Number
USA	FCC	805871
CANADA	ISED	8737A-2
KOREA	NRRA	KR0025

2.3 Calibration Details of Equipment Used for Measurement

Test equipment and test accessories are calibrated on regular basis. The maximum time between calibrations is one year or what is recommended by the manufacturer, whichever is less. All test equipment calibrations are traceable to the Korea Research Institute of Standards and Science (KRISS), therefore, all test data recorded in this report is traceable to KRISS.



CTK Co., Ltd.
 (Ho-dong), 113, Yejik-ro, Cheoin-gu,
 Yongin-si, Gyeonggi-do, Korea
 Tel: +82-31-339-9970
 Fax: +82-31-624-9501

Report No.:
 CTK-2021-01436
 Page (7) / (105) Pages

3. Test Specifications

3.1 Standards

FCC Part Section(s)	Requirement(s)	Limit	Status (Note 1)	Test Condition
15.407(a)(10)	26 dB Bandwidth and 99% Bandwidth	<= 320 MHz	C	Conducted
15.407(a)(8)	Conducted Output Power	< 24 dBm EIRP	C	
15.407(a)(8)	Power Spectral Density	< -1 dBm/MHz EIRP	C	
15.407(b)(6)	In-Band Emissions	a. Suppressed by 20 dB at 1MHz outside of the channel edge b. Suppressed by 28 dB at one channel bandwidth from the channel center. c. Suppressed by 40 dB at one-and one-half times the channel bandwidth from the channel center.	C	
15.407(g)	Frequency Stability	NA	C	
15.407(d)(6)	Contention Based Protocol	Detect co-channel energy with 90% or greater certainty	C	
15.407 (b)(5)	Undesirable emission	< -27 dBm/MHz EIRP	C	Radiated
15.205, 15.407 (b)(7),(8)	Radiated Spurious Emission	15.209(a)	C	
15.407 (b)(8)	AC Conducted Emissions	15.207(a)	C	Line Conducted
<i>Note 1:</i> C=Complies NC=Not Complies NT=Not Tested NA=Not Applicable				
<i>Note 2:</i> The data in this test report are traceable to the national or international standards.				
<i>Note 3:</i> The sample was tested according to the following specification: FCC Part 15.407, ANSI C63.10-2013				
<i>Note 4:</i> The tests were performed according to the method of measurements prescribed in KDB No.987594, No.789033				



3.2 Mode of operation during the test

The EUT is operated in a manner representative of the typical of the equipments.
 During at testing, system components were manipulated within the confines of typical usage to maximize each emission.
 For WLAN function, the engineering test program was provided and enabled to make EUT continuous transmit.
 All modulation modes were tests. The results are only attached worst cases.

Test Frequency

- 802.11ax_HE20

	Lowest channel	Middle channel	Highest1 channel	Highest2 channel
UNII 5	5 955 MHz	6 175 MHz	6 415 MHz	-
UNII 6	6 435 MHz	6 475 MHz	6 515 MHz	-
UNII 7	6 535 MHz	6 695 MHz	6 855 MHz	-
UNII 8	6 875 MHz	6 995 MHz	7 095 MHz	7 115 MHz

- 802.11ax_HE40

	Lowest channel	Middle channel	Highest channel
UNII 5	5 965 MHz	6 165 MHz	6 405 MHz
UNII 6	6 445 MHz	-	6 485 MHz
UNII 7	6 525 MHz	6 685 MHz	6 845 MHz
UNII 8	6 885 MHz	7 005 MHz	7 085 MHz

- 802.11ax_HE80

	Lowest channel	Middle channel	Highest channel
UNII 5	5 985 MHz	6 145 MHz	6 385 MHz
UNII 6	6 465 MHz	-	-
UNII 7	6 545 MHz	6 705 MHz	6 865 MHz
UNII 8	6 945 MHz	-	7 025 MHz

Test mode

Test mode	Modulation	Data rate	Duty Cycle	Duty Cycle Factor
802.11ax_HE20	OFDMA	MCS 0	83.3 %	0.80 dB
802.11ax_HE40	OFDMA	MCS 0	83.0 %	0.81 dB
802.11ax_HE80	OFDMA	MCS 0	81.9 %	0.87 dB



CTK Co., Ltd.
(Ho-dong), 113, Yejik-ro, Cheoin-gu,
Yongin-si, Gyeonggi-do, Korea
Tel: +82-31-339-9970
Fax: +82-31-624-9501

Report No.:
CTK-2021-01436
Page (9) / (105) Pages

3.3 Device Modifications

The following modifications were necessary for compliance:

Not applicable

3.4 Maximum Measurement Uncertainty

The value of the measurement uncertainty for the measurement of each parameter.

Coverage factor $k = 2$, Confidence levels of 95 %

Description	Uncertainty
Conducted RF Output Power	1.5 dB (C.L.: Approx. 95 %, $k = 2$)
Power Spectral Density	1.5 dB (C.L.: Approx. 95 %, $k = 2$)
Occupied Bandwidth	0.1 MHz (C.L.: Approx. 95 %, $k = 2$)
Unwanted Emission(conducted)	3.0 dB (C.L.: Approx. 95 %, $k = 2$)
Radiated Emissions (9 kHz to 30 MHz)	1.16 dB (C.L.: Approx. 95 %, $k = 2$)
Radiated Emissions (30 MHz to 1 GHz)	4.54 dB (C.L.: Approx. 95 %, $k = 2$)
Radiated Emissions (1 GHz Above)	4.98 dB (C.L.: Approx. 95 %, $k = 2$)

3.5 Test Software

Conducted Test	Ics Pro Ver. 6.0.3
Radiated Test	TOYO EMI software EP5RE Ver. 6.0.1.0
Line Conducted Test	ESC17, ESC13 : EMC32 Ver. 8.50.0 ESR7 : EMC32 Ver. 8.53.0



CTK Co., Ltd.
(Ho-dong), 113, Yejik-ro, Cheoin-gu,
Yongin-si, Gyeonggi-do, Korea
Tel: +82-31-339-9970
Fax: +82-31-624-9501

Report No.:
CTK-2021-01436
Page (10) / (105) Pages

4. Technical Characteristic Test

4.1 26 dB Bandwidth and 99% Bandwidth

Test Procedures

KDB 987594 – Section C
KDB 789033 – Section C.1
ANSI C63.10-2013 - Section 12.4.1

Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 26 dB relative to the maximum level measured in the fundamental emission.

Test Procedures

KDB 987594 – Section D
KDB 789033 – Section D
ANSI C63.10-2013 - Section 6.9.3

The occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission.

Use the 99% power bandwidth function of the instrument and report the measured bandwidth.

Test Settings :

Center frequency = the highest, middle and the lowest channels

- a) RBW = approximately 1 % of the emission bandwidth
- b) VBW \geq RBW
- c) Detector = peak
- d) Trace mode = Max hold
- e) Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

Minimum Standard:

<= 320 MHz



CTK Co., Ltd.
 (Ho-dong), 113, Yejik-ro, Cheoin-gu,
 Yongin-si, Gyeonggi-do, Korea
 Tel: +82-31-339-9970
 Fax: +82-31-624-9501

Report No.:
 CTK-2021-01436
 Page (11) / (105) Pages

Test Data

ANT1

26 dB Bandwidth and 99 % Bandwidth (MHz)		
Mode	802.11ax_HE20	
Frequency	26 dB	99 %
5 955 MHz	22.68	19.01
6 175 MHz	22.91	18.97
6 415 MHz	22.87	18.99
6 435 MHz	22.18	18.98
6 475 MHz	23.39	18.97
6 515 MHz	22.95	19.04
6 535 MHz	22.34	18.98
6 695 MHz	21.64	19.03
6 855 MHz	24.33	18.97
6 875 MHz	22.69	18.99
6 995 MHz	21.89	18.99
7 095 MHz	23.99	18.99
7 115 MHz	21.84	19.01
Measurement uncertainty	0.1 MHz	

26 dB Bandwidth and 99 % Bandwidth (MHz)		
Mode	802.11ax_HE40	
Frequency	26 dB	99 %
5 965 MHz	39.33	37.40
6 165 MHz	39.41	37.50
6 405 MHz	39.32	37.45
6 445 MHz	39.43	37.52
6 485 MHz	39.25	37.47
6 525 MHz	39.29	37.54
6 685 MHz	39.34	37.52
6 845 MHz	39.43	37.47
6 885 MHz	39.54	37.47
7 005 MHz	39.34	37.57
7 085 MHz	39.37	37.49
Measurement uncertainty	0.1 MHz	



CTK Co., Ltd.
 (Ho-dong), 113, Yejik-ro, Cheoin-gu,
 Yongin-si, Gyeonggi-do, Korea
 Tel: +82-31-339-9970
 Fax: +82-31-624-9501

Report No.:
 CTK-2021-01436
 Page (12) / (105) Pages

	26 dB Bandwidth and 99 % Bandwidth (MHz)	
Mode	802.11ax_HE80	
Frequency	26 dB	99 %
5 985 MHz	79.98	76.67
6 145 MHz	79.88	76.78
6 385 MHz	79.96	76.81
6 465 MHz	80.03	76.63
6 545 MHz	79.93	76.86
6 705 MHz	79.92	76.74
6 865 MHz	80.22	76.93
6 945 MHz	79.89	76.79
7 025 MHz	79.99	76.69
Measurement uncertainty	0.1 MHz	

ANT2

	26 dB Bandwidth and 99 % Bandwidth (MHz)	
Mode	802.11ax_HE20	
Frequency	26 dB	99 %
5 955 MHz	25.06	19.00
6 175 MHz	22.63	19.03
6 415 MHz	24.53	19.00
6 435 MHz	22.93	19.02
6 475 MHz	24.00	18.98
6 515 MHz	22.74	19.03
6 535 MHz	22.92	18.98
6 695 MHz	23.66	18.99
6 855 MHz	22.53	19.00
6 875 MHz	22.99	19.00
6 995 MHz	22.89	19.00
7 095 MHz	22.30	18.99
7 115 MHz	25.67	19.02
Measurement uncertainty	0.1 MHz	



CTK Co., Ltd.
 (Ho-dong), 113, Yejik-ro, Cheoin-gu,
 Yongin-si, Gyeonggi-do, Korea
 Tel: +82-31-339-9970
 Fax: +82-31-624-9501

Report No.:
 CTK-2021-01436
 Page (13) / (105) Pages

26 dB Bandwidth and 99 % Bandwidth (MHz)		
Mode	802.11ax_HE40	
Frequency	26 dB	99 %
5 965 MHz	39.45	37.45
6 165 MHz	39.40	37.58
6 405 MHz	39.49	37.49
6 445 MHz	39.40	37.53
6 485 MHz	39.41	37.54
6 525 MHz	39.53	37.52
6 685 MHz	39.43	37.46
6 845 MHz	39.40	37.41
6 885 MHz	39.47	37.51
7 005 MHz	39.50	37.45
7 085 MHz	39.40	37.47
Measurement uncertainty	0.1 MHz	

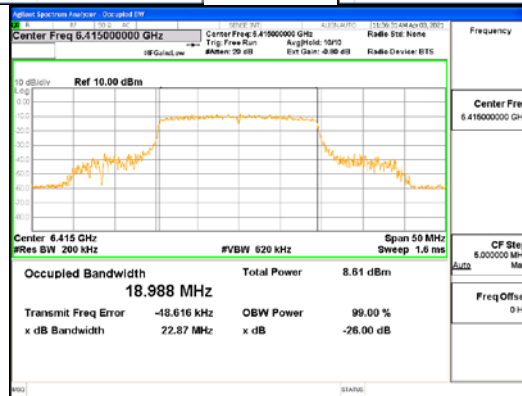
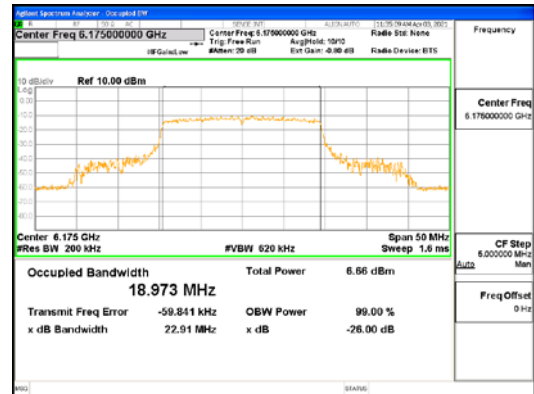
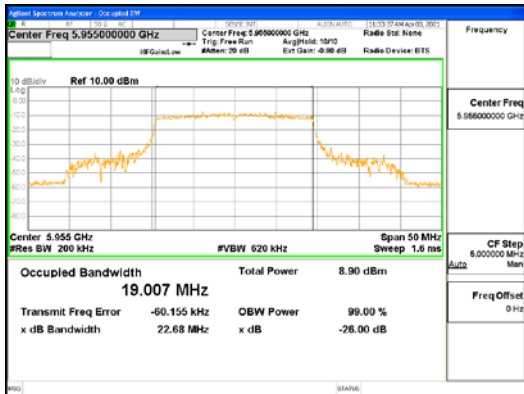
26 dB Bandwidth and 99 % Bandwidth (MHz)		
Mode	802.11ax_HE80	
Frequency	26 dB	99 %
5 985 MHz	79.96	76.80
6 145 MHz	79.93	76.79
6 385 MHz	79.91	76.74
6 465 MHz	79.94	76.63
6 545 MHz	80.00	76.81
6 705 MHz	80.03	76.90
6 865 MHz	80.05	76.68
6 945 MHz	80.00	76.75
7 025 MHz	79.99	76.73
Measurement uncertainty	0.1 MHz	

See next pages for actual measured spectrum plots.

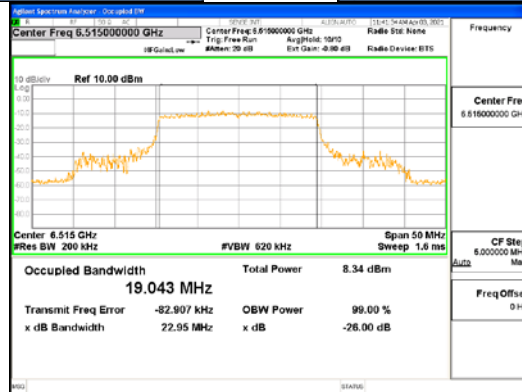
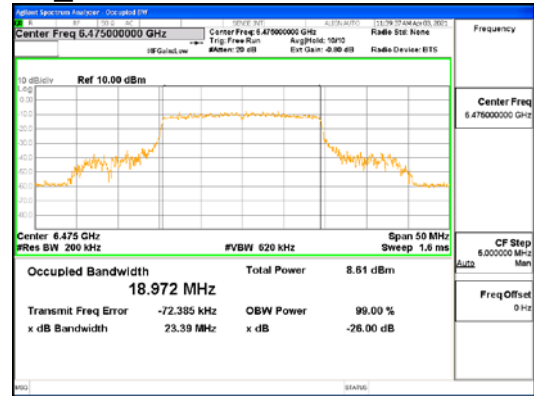
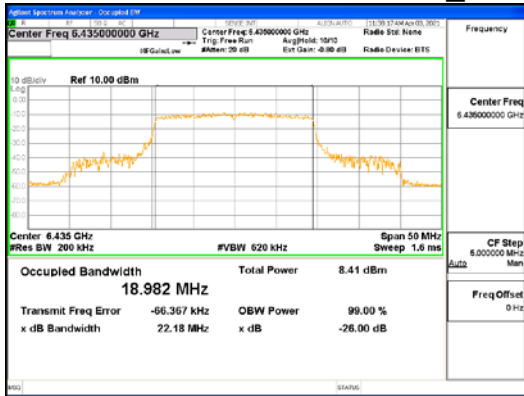


CTK Co., Ltd.
 (Ho-dong), 113, Yejik-ro, Cheoin-gu,
 Yongin-si, Gyeonggi-do, Korea
 Tel: +82-31-339-9970
 Fax: +82-31-624-9501

Report No.:
 CTK-2021-01436
 Page (14) / (105) Pages



ANT1_802.11ax_HE20_UNII 5

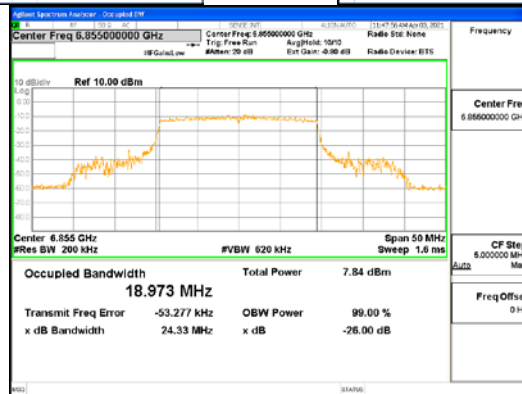
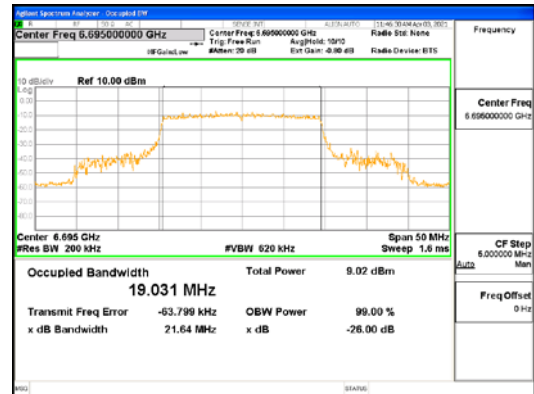
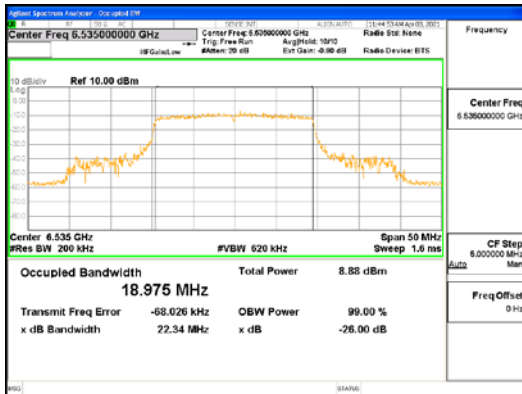


ANT1_802.11ax_HE20_UNII 6

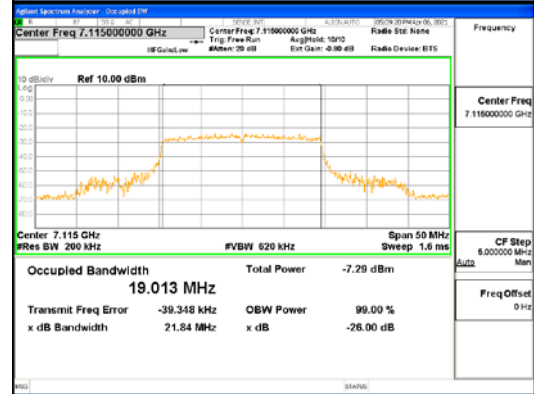
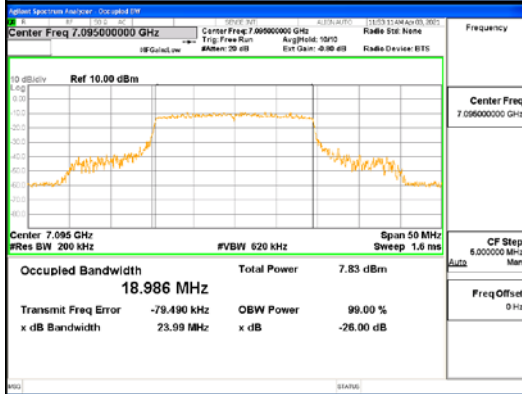
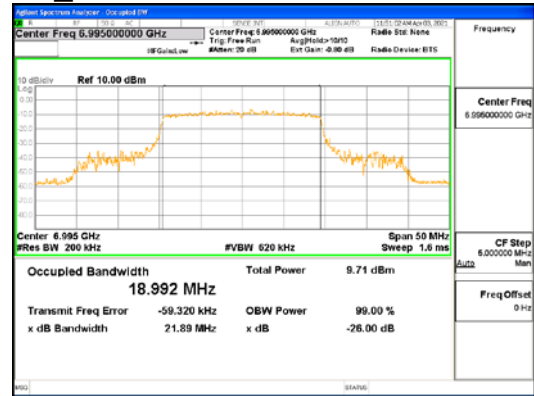
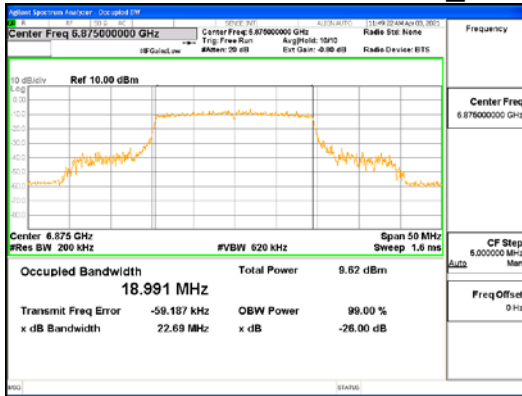


CTK Co., Ltd.
 (Ho-dong), 113, Yejik-ro, Cheoin-gu,
 Yongin-si, Gyeonggi-do, Korea
 Tel: +82-31-339-9970
 Fax: +82-31-624-9501

Report No.:
 CTK-2021-01436
 Page (15) / (105) Pages



ANT1_802.11ax_HE20_UNII 7

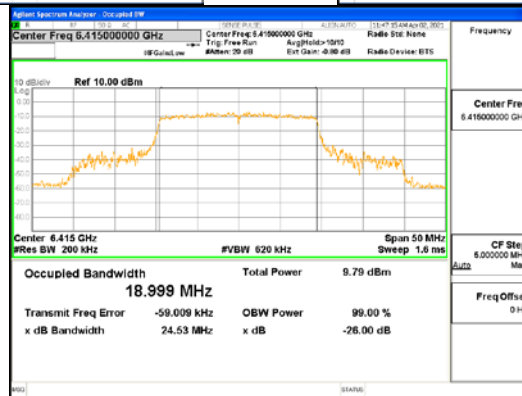
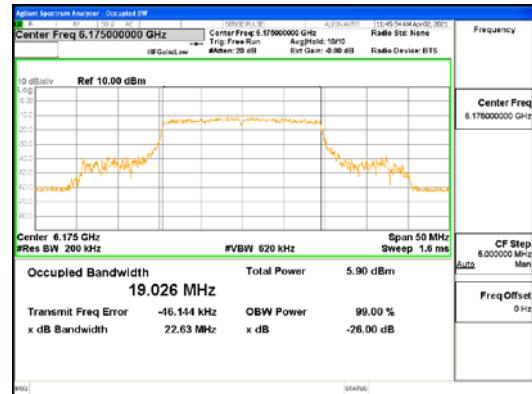
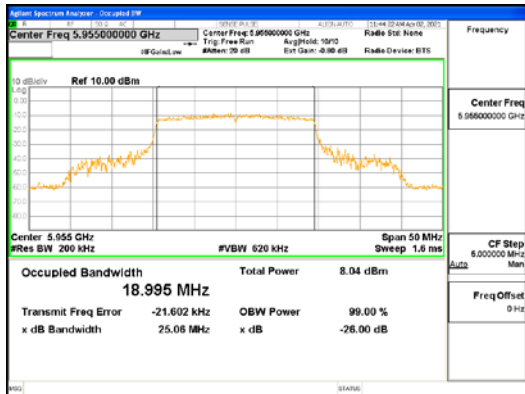


ANT1_802.11ax_HE20_UNII 8

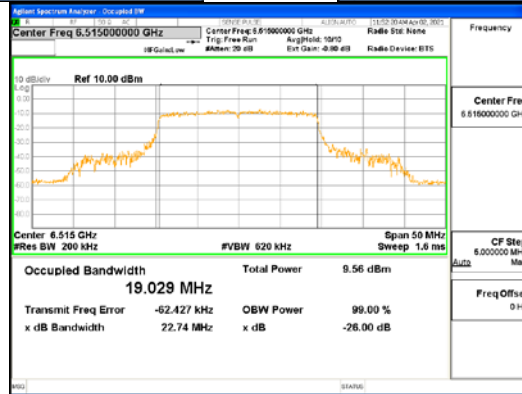
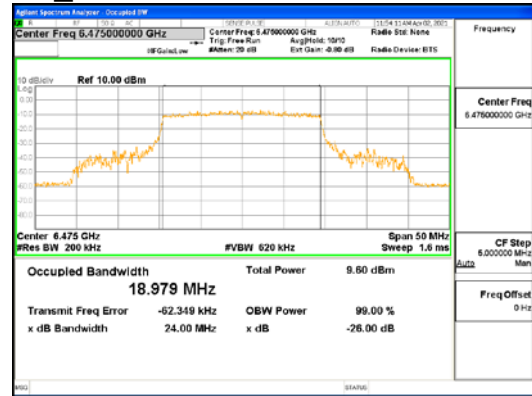
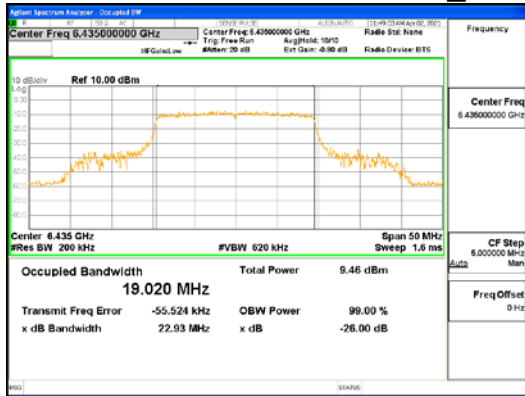


CTK Co., Ltd.
 (Ho-dong), 113, Yejik-ro, Cheoin-gu,
 Yongin-si, Gyeonggi-do, Korea
 Tel: +82-31-339-9970
 Fax: +82-31-624-9501

Report No.:
 CTK-2021-01436
 Page (16) / (105) Pages



ANT2_802.11ax_HE20_UNII 5

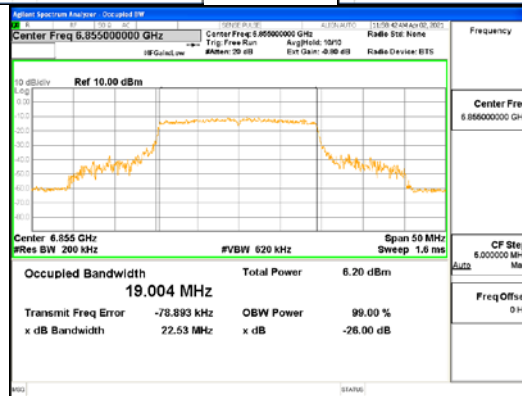
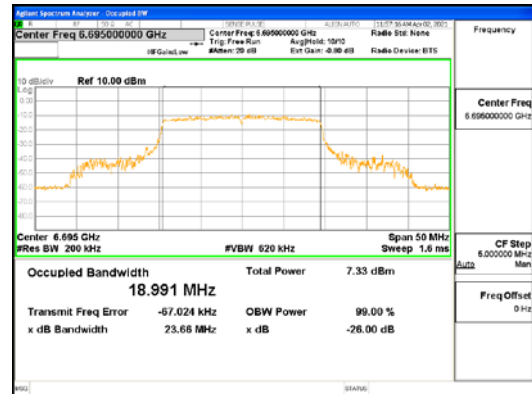
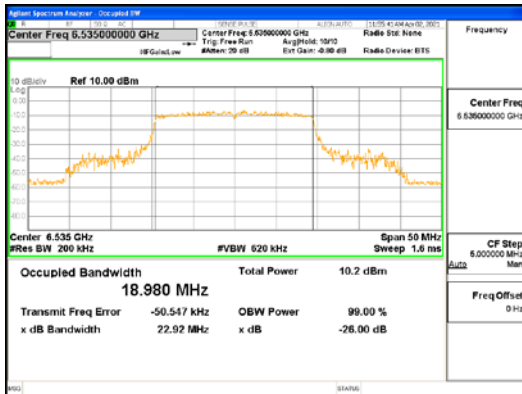


ANT2_802.11ax_HE20_UNII 6

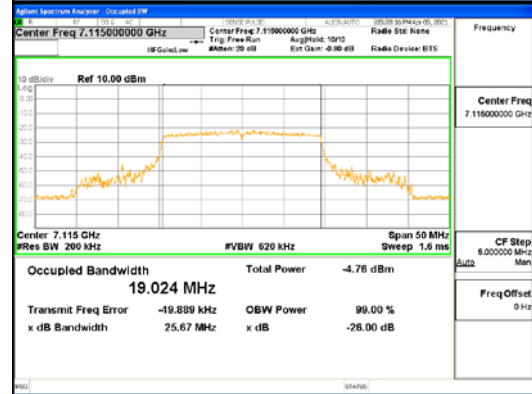
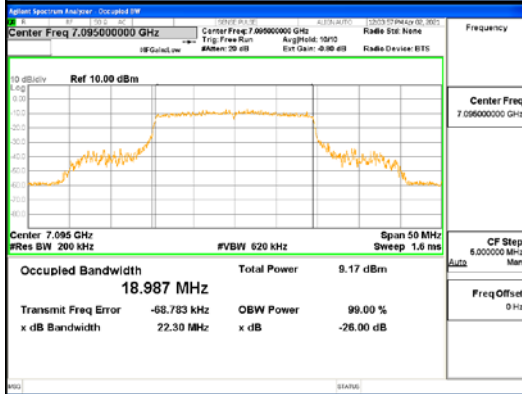
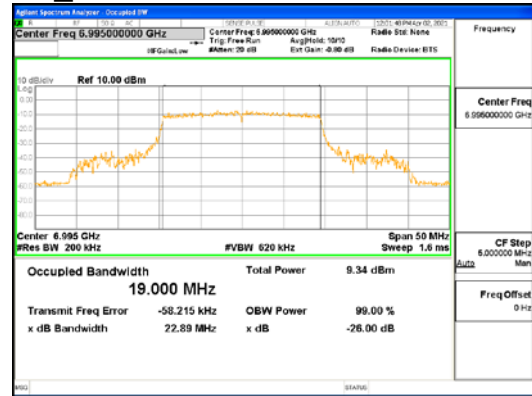
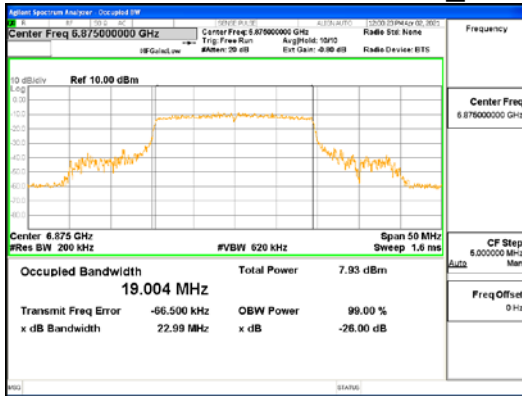


CTK Co., Ltd.
 (Ho-dong), 113, Yejik-ro, Cheoin-gu,
 Yongin-si, Gyeonggi-do, Korea
 Tel: +82-31-339-9970
 Fax: +82-31-624-9501

Report No.:
 CTK-2021-01436
 Page (17) / (105) Pages



ANT2_802.11ax_HE20_UNI1 7

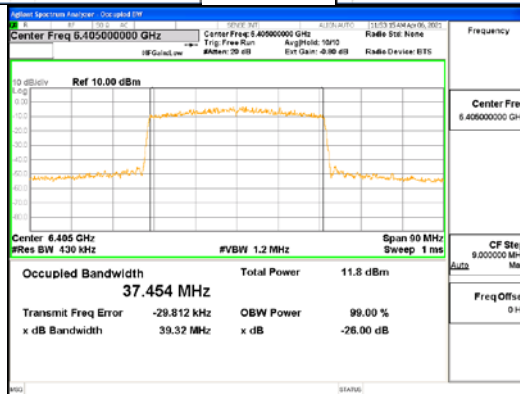
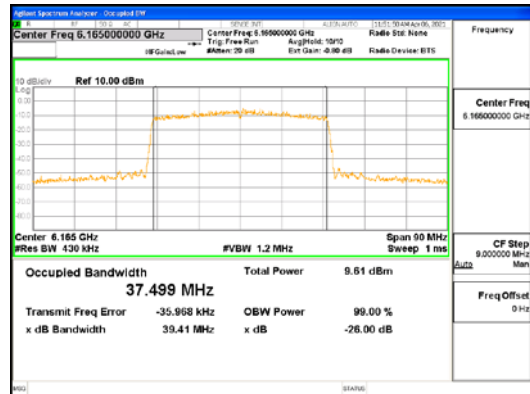
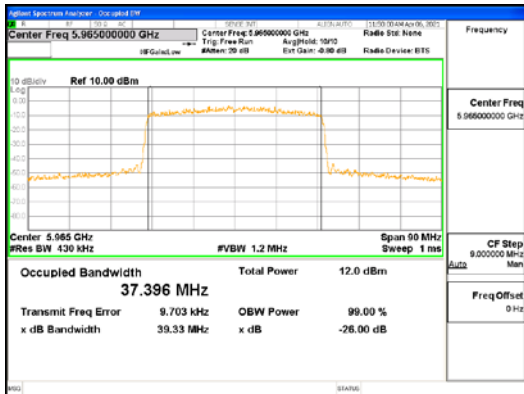


ANT2_802.11ax_HE20_UNI1 8

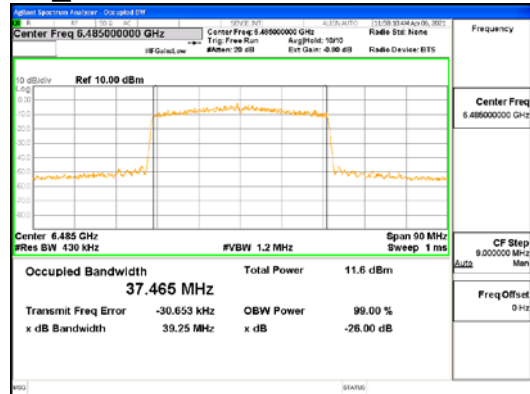
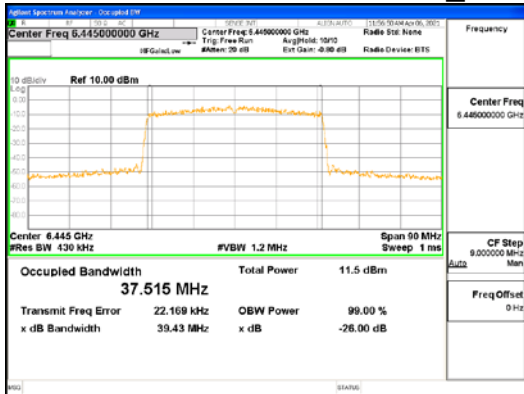


CTK Co., Ltd.
 (Ho-dong), 113, Yejik-ro, Cheoin-gu,
 Yongin-si, Gyeonggi-do, Korea
 Tel: +82-31-339-9970
 Fax: +82-31-624-9501

Report No.:
 CTK-2021-01436
 Page (18) / (105) Pages



ANT1_802.11ax_HE40_UNI 5

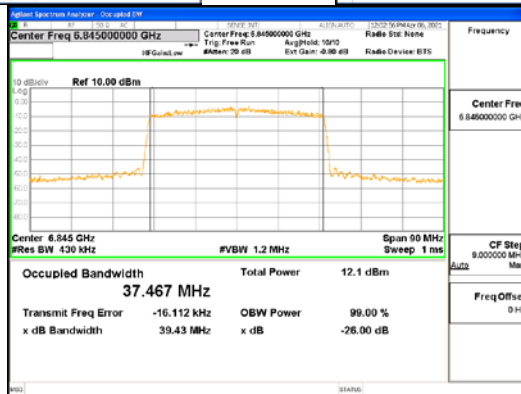
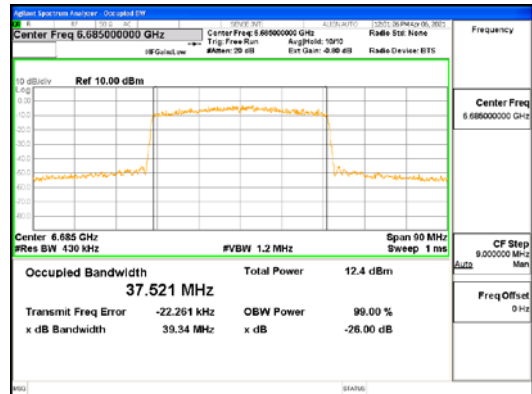
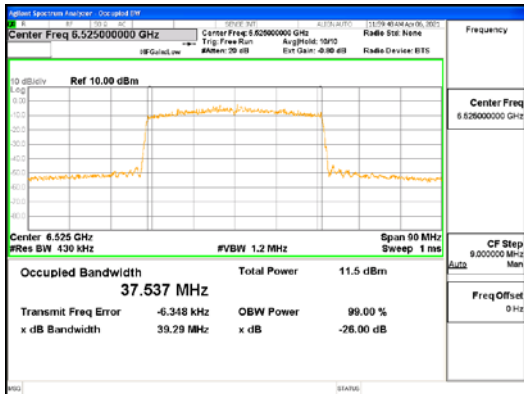


ANT1_802.11ax_HE40_UNI 6

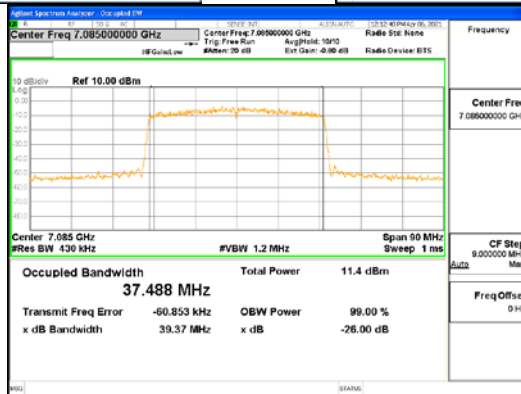
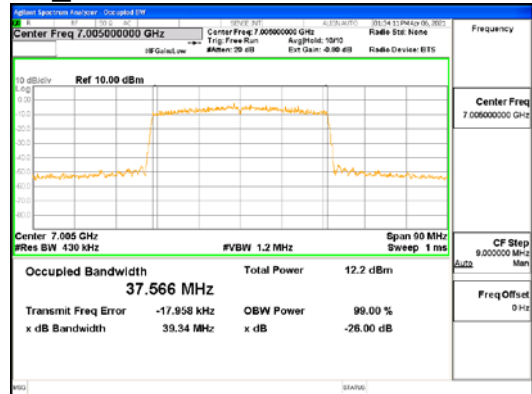
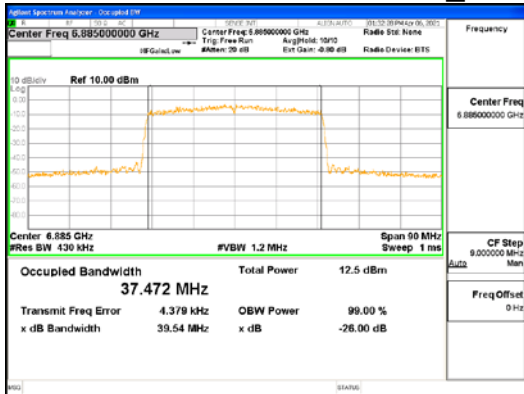


CTK Co., Ltd.
 (Ho-dong), 113, Yejik-ro, Cheoin-gu,
 Yongin-si, Gyeonggi-do, Korea
 Tel: +82-31-339-9970
 Fax: +82-31-624-9501

Report No.:
 CTK-2021-01436
 Page (19) / (105) Pages



ANT1_802.11ax_HE40_UNII 7

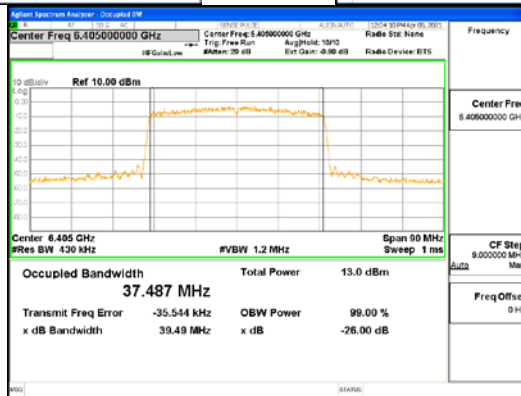
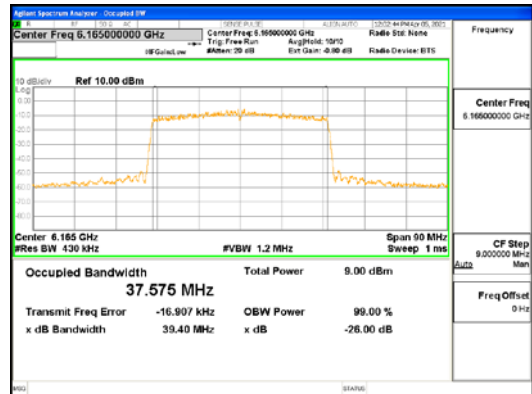
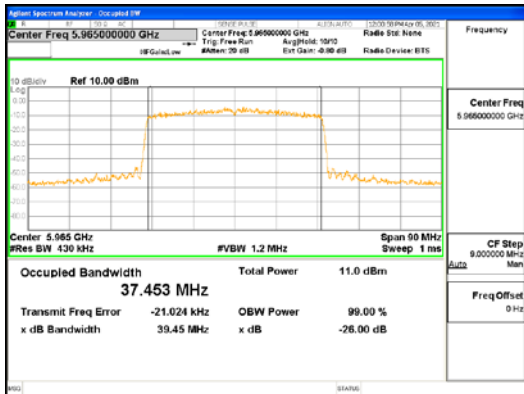


ANT1_802.11ax_HE40_UNII 8

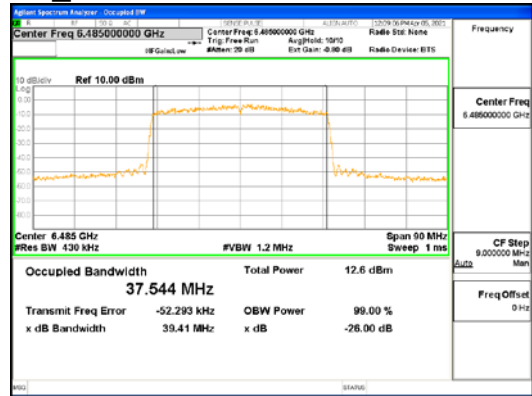
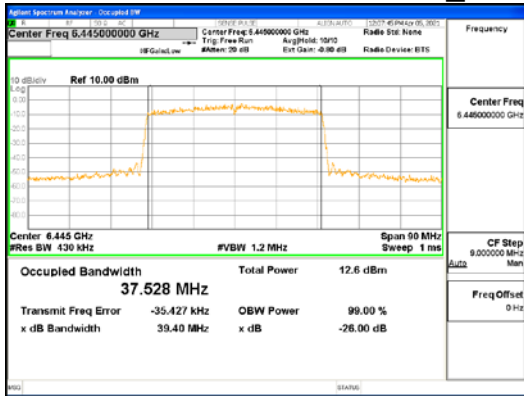


CTK Co., Ltd.
 (Ho-dong), 113, Yejik-ro, Cheoin-gu,
 Yongin-si, Gyeonggi-do, Korea
 Tel: +82-31-339-9970
 Fax: +82-31-624-9501

Report No.:
 CTK-2021-01436
 Page (20) / (105) Pages



ANT2_802.11ax_HE40_UNI 5

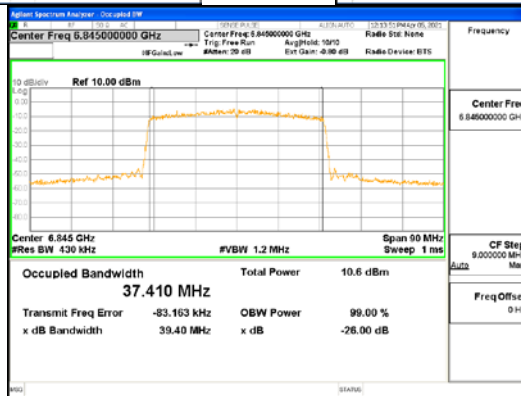
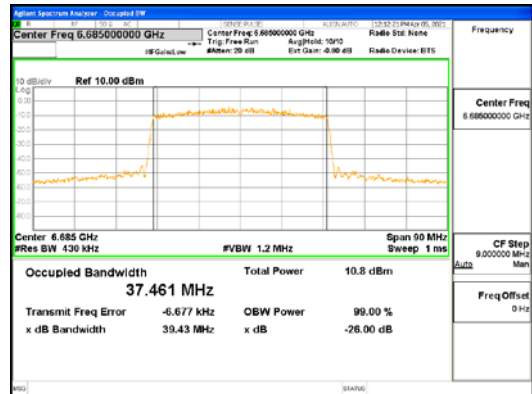
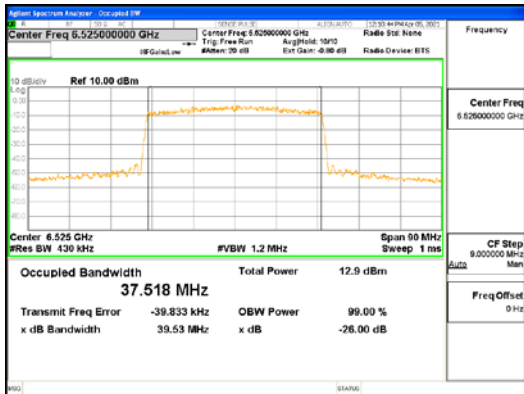


ANT2_802.11ax_HE40_UNI 6

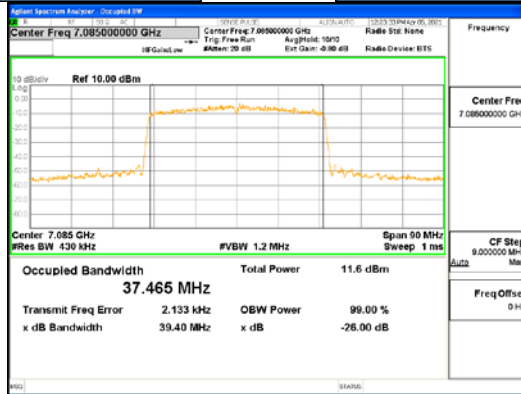
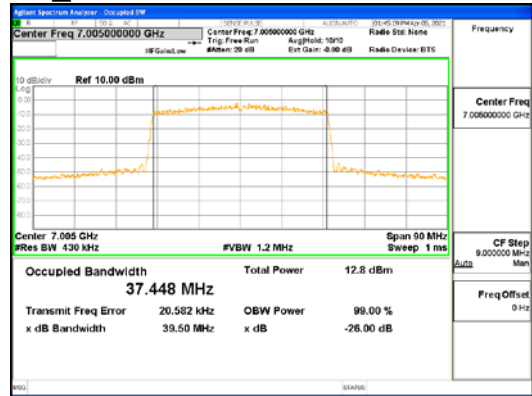
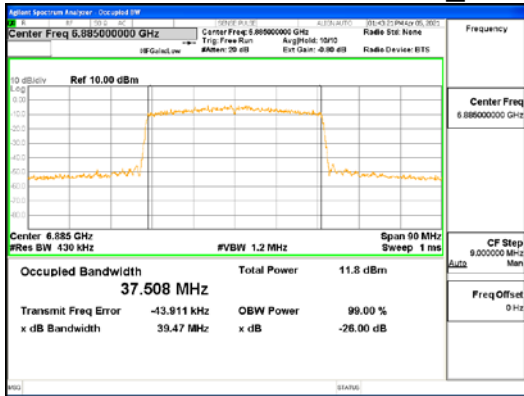


CTK Co., Ltd.
 (Ho-dong), 113, Yejik-ro, Cheoin-gu,
 Yongin-si, Gyeonggi-do, Korea
 Tel: +82-31-339-9970
 Fax: +82-31-624-9501

Report No.:
 CTK-2021-01436
 Page (21) / (105) Pages



ANT2_802.11ax_HE40_UNII 7

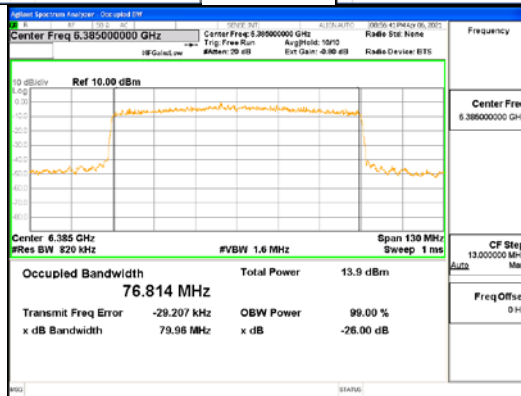
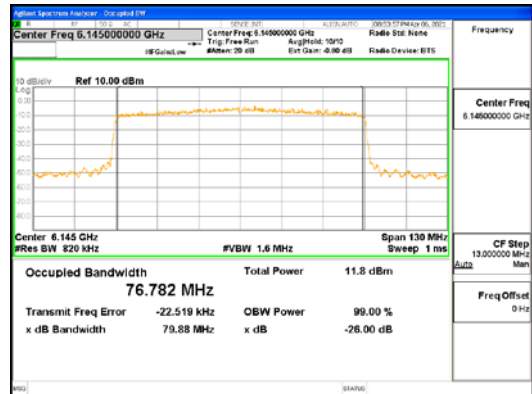
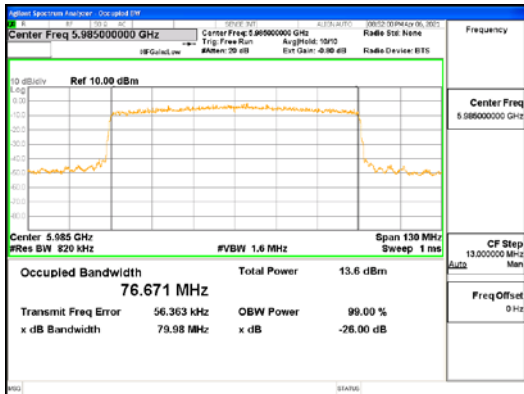


ANT2_802.11ax_HE40_UNII 8

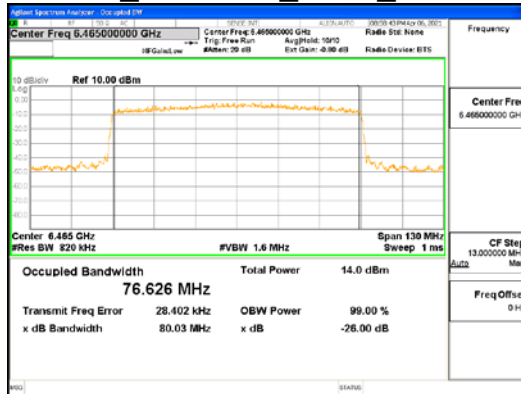


CTK Co., Ltd.
 (Ho-dong), 113, Yejik-ro, Cheoin-gu,
 Yongin-si, Gyeonggi-do, Korea
 Tel: +82-31-339-9970
 Fax: +82-31-624-9501

Report No.:
 CTK-2021-01436
 Page (22) / (105) Pages



ANT1_802.11ax_HE80_UNI I 5

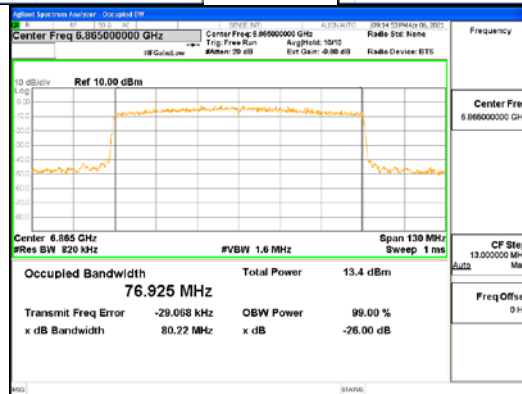
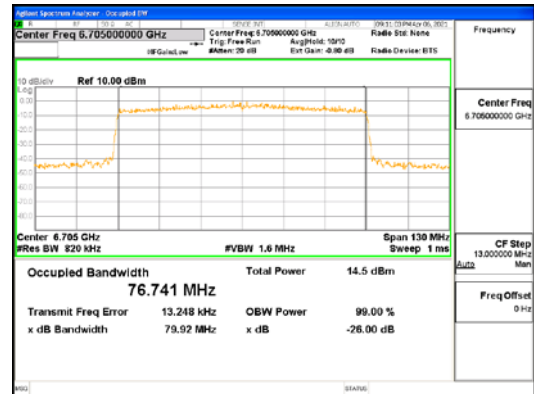
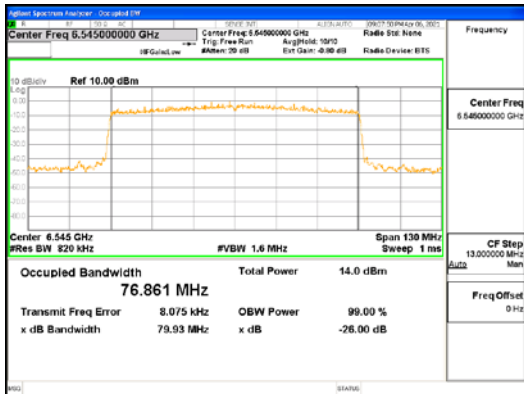


ANT1_802.11ax_HE80_UNI I 6

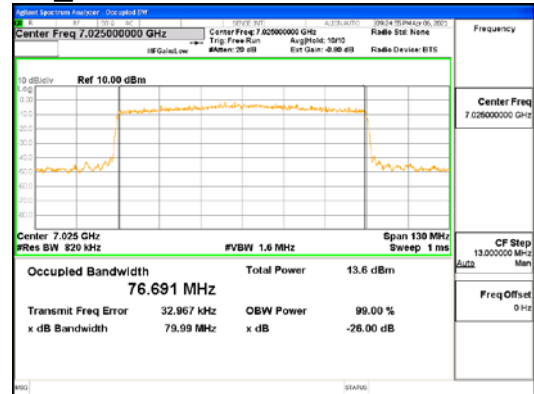
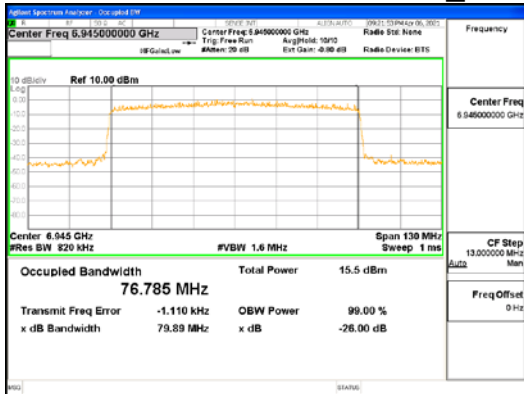


CTK Co., Ltd.
 (Ho-dong), 113, Yejik-ro, Cheoin-gu,
 Yongin-si, Gyeonggi-do, Korea
 Tel: +82-31-339-9970
 Fax: +82-31-624-9501

Report No.:
 CTK-2021-01436
 Page (23) / (105) Pages



ANT1_802.11ax_HE80_UNI1 7

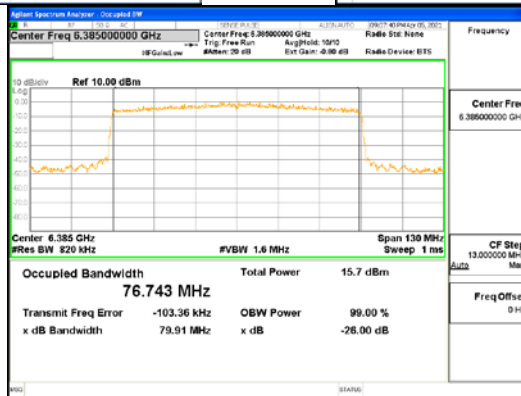
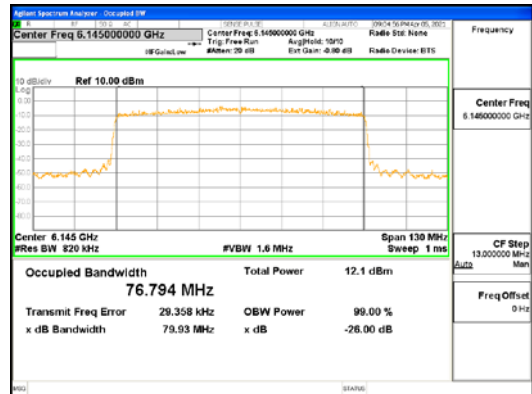
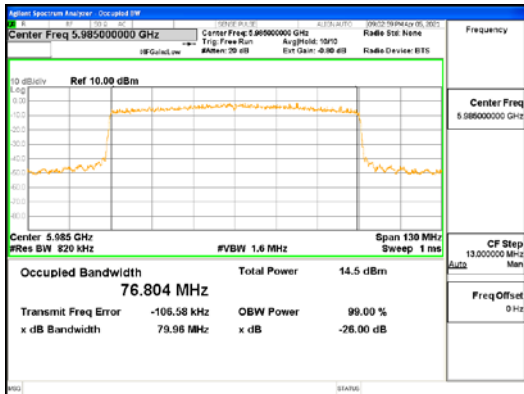


ANT1_802.11ax_HE80_UNI1 8

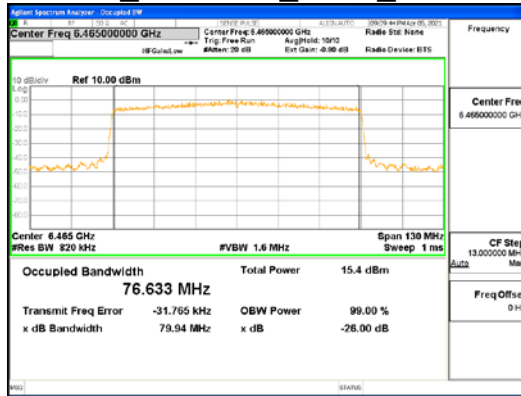


CTK Co., Ltd.
 (Ho-dong), 113, Yejik-ro, Cheoin-gu,
 Yongin-si, Gyeonggi-do, Korea
 Tel: +82-31-339-9970
 Fax: +82-31-624-9501

Report No.:
 CTK-2021-01436
 Page (24) / (105) Pages



ANT2_802.11ax_HE80_UNI I 5

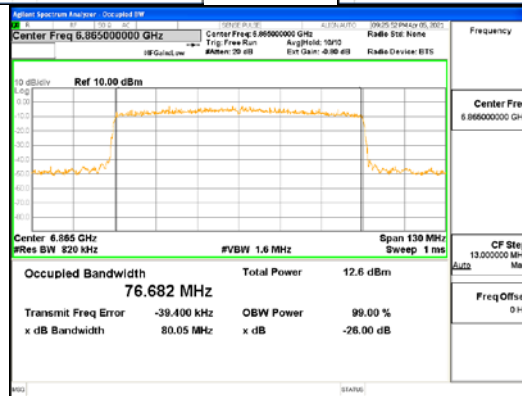
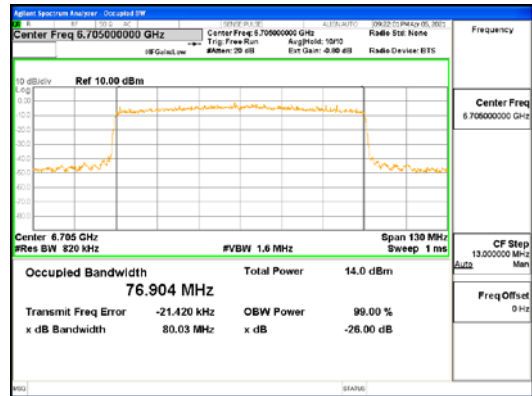
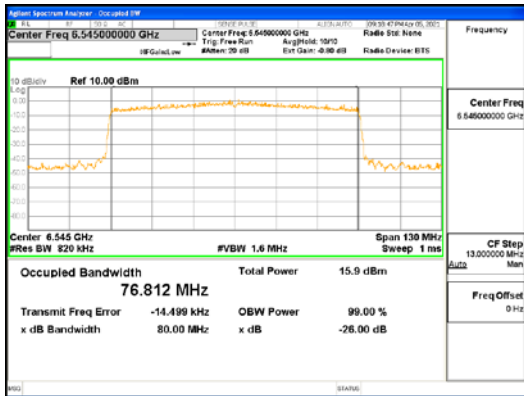


ANT2_802.11ax_HE80_UNI I 6

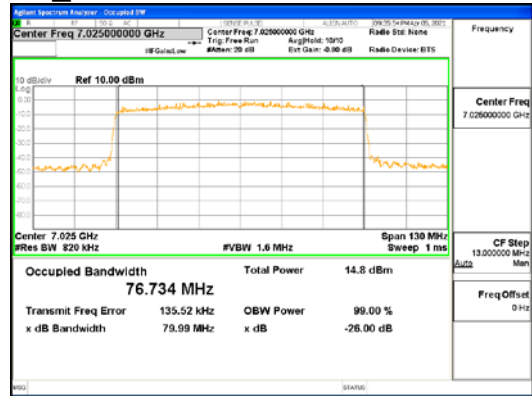
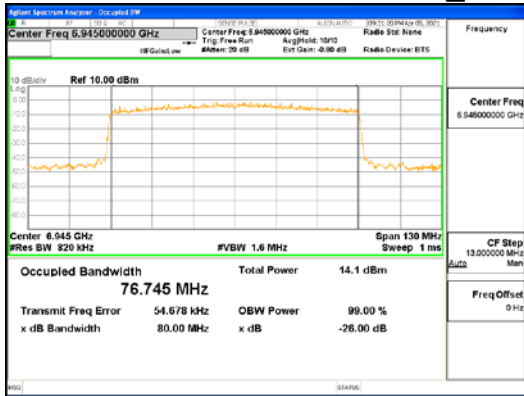


CTK Co., Ltd.
 (Ho-dong), 113, Yejik-ro, Cheoin-gu,
 Yongin-si, Gyeonggi-do, Korea
 Tel: +82-31-339-9970
 Fax: +82-31-624-9501

Report No.:
 CTK-2021-01436
 Page (25) / (105) Pages



ANT2_802.11ax_HE80_UNI1 7



ANT2_802.11ax_HE80_UNI1 8

4.2 OUTPUT POWER

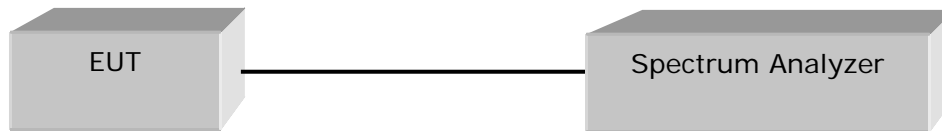
Test Procedures

KDB 987594 – Section E

KDB 789033 – Section E.2.d (Method SA-2, Maximum Conducted Output Power)

KDB 662911 D01, D02 (Multiple Transmitter Output)

The transmitter output is connected to a spectrum analyzer and the analyzer's internal channel power integration function is used to integrate the power over a bandwidth greater than or equal to the 99% bandwidth.



Test Settings :

Center frequency = the highest, middle and the lowest channels

a) RBW = 1 MHz

b) VBW \geq 3 x RBW

c) Sweep time = auto

d) Detector = power averaging (rms)

e) Trace mode = Average at least 100

f) Duty cycle factor = $10\log(1/x)$

Test mode	Duty Cycle Factor (dB)
802.11ax_HE20	0.80
802.11ax_HE40	0.81
802.11ax_HE80	0.87



CTK Co., Ltd.
 (Ho-dong), 113, Yejik-ro, Cheoin-gu,
 Yongin-si, Gyeonggi-do, Korea
 Tel: +82-31-339-9970
 Fax: +82-31-624-9501

Report No.:
 CTK-2021-01436
 Page (27) / (105) Pages

Limit

Operating Mode	ANT Configuration	ANT Gain (dBi)	Mode	Band	Limit (dBm)
SISO	ANT1, ANT2	2.26, -5.58	802.11ax	UNII 5	24.00 EIRP
				UNII 6	
				UNII 7	
				UNII 8	
MIMO (2Tx)	ANT1 + ANT2	2.21	802.11ax	UNII 5	
				UNII 6	
				UNII 7	
				UNII 8	



CTK Co., Ltd.
 (Ho-dong), 113, Yejik-ro, Cheoin-gu,
 Yongin-si, Gyeonggi-do, Korea
 Tel: +82-31-339-9970
 Fax: +82-31-624-9501

Report No.:
 CTK-2021-01436
 Page (28) / (105) Pages

Test Data
ANT1

Test Mode	Frequency (MHz)	Measured Output Power (dBm)	Duty cycle Factor (dB)	Antenna Gain (dBi)	Result Output Power (dBm)	Limit (dBm)	Margin (dB)
802.11ax _HE20	5 955	1.89	0.80	2.26	4.95	24.00	19.05
	6 175	-0.23	0.80		2.83	24.00	21.17
	6 415	1.62	0.80		4.68	24.00	19.32
	6 435	1.48	0.80		4.54	24.00	19.46
	6 475	1.65	0.80		4.71	24.00	19.29
	6 515	1.36	0.80		4.42	24.00	19.58
	6 535	1.78	0.80		4.84	24.00	19.16
	6 695	1.98	0.80		5.04	24.00	18.96
	6 855	0.78	0.80		3.84	24.00	20.16
	6 875	2.66	0.80		5.72	24.00	18.28
	6 995	2.73	0.80		5.79	24.00	18.21
	7 095	0.80	0.80		3.86	24.00	20.14
	7 115	-14.17	0.80		-11.11	24.00	35.11
802.11ax _HE40	5 965	4.33	0.81	2.26	7.40	24.00	16.60
	6 165	1.93	0.81		5.00	24.00	19.00
	6 405	4.08	0.81		7.15	24.00	16.85
	6 445	3.62	0.81		6.69	24.00	17.31
	6 485	3.73	0.81		6.80	24.00	17.20
	6 525	3.52	0.81		6.59	24.00	17.41
	6 685	4.41	0.81		7.48	24.00	16.52
	6 845	4.32	0.81		7.39	24.00	16.61
	6 885	5.02	0.81		8.09	24.00	15.91
	7 005	4.70	0.81		7.77	24.00	16.23
7 085	3.54	0.81	6.61	24.00	17.39		
802.11ax _HE80	5 985	6.35	0.87	2.26	9.48	24.00	14.52
	6 145	4.51	0.87		7.64	24.00	16.36
	6 385	6.56	0.87		9.69	24.00	14.31
	6 465	6.53	0.87		9.66	24.00	14.34
	6 545	6.56	0.87		9.69	24.00	14.31
	6 705	7.16	0.87		10.29	24.00	13.71
	6 865	6.00	0.87		9.13	24.00	14.87
	6 945	8.09	0.87		11.22	24.00	12.78
7 025	6.29	0.87	9.42	24.00	14.58		
Measurement uncertainty		1.5 dB					



ANT2

Test Mode	Frequency (MHz)	Measured Output Power (dBm)	Duty cycle Factor (dB)	Antenna Gain (dBi)	Result Output Power (dBm)	Limit (dBm)	Margin (dB)
802.11ax _HE20	5 955	0.82	0.80	-5.58	-3.96	24.00	27.96
	6 175	-1.25	0.80		-6.03	24.00	30.03
	6 415	2.61	0.80		-2.17	24.00	26.17
	6 435	2.35	0.80		-2.43	24.00	26.43
	6 475	2.48	0.80		-2.30	24.00	26.30
	6 515	2.50	0.80		-2.28	24.00	26.28
	6 535	3.14	0.80		-1.64	24.00	25.64
	6 695	0.30	0.80		-4.48	24.00	28.48
	6 855	-1.07	0.80		-5.85	24.00	29.85
	6 875	0.86	0.80		-3.92	24.00	27.92
	6 995	2.12	0.80		-2.66	24.00	26.66
	7 095	2.00	0.80		-2.78	24.00	26.78
	7 115	-11.84	0.80		-16.62	24.00	40.62
802.11ax _HE40	5 965	3.12	0.81	-5.58	-1.65	24.00	25.65
	6 165	1.06	0.81		-3.71	24.00	27.71
	6 405	5.07	0.81		0.30	24.00	23.70
	6 445	4.67	0.81		-0.10	24.00	24.10
	6 485	4.66	0.81		-0.11	24.00	24.11
	6 525	4.97	0.81		0.20	24.00	23.80
	6 685	2.80	0.81		-1.97	24.00	25.97
	6 845	2.53	0.81		-2.24	24.00	26.24
	6 885	4.15	0.81		-0.62	24.00	24.62
	7 005	5.14	0.81		0.37	24.00	23.63
7 085	3.73	0.81	-1.04	24.00	25.04		
802.11ax _HE80	5 985	7.14	0.87	-5.58	2.43	24.00	21.57
	6 145	4.73	0.87		0.02	24.00	23.98
	6 385	8.40	0.87		3.69	24.00	20.31
	6 465	7.90	0.87		3.19	24.00	20.81
	6 545	8.46	0.87		3.75	24.00	20.25
	6 705	6.77	0.87		2.06	24.00	21.94
	6 865	5.26	0.87		0.55	24.00	23.45
	6 945	6.73	0.87		2.02	24.00	21.98
7 025	7.45	0.87	2.74	24.00	21.26		
Measurement uncertainty		1.5 dB					



ANT1 + ANT2

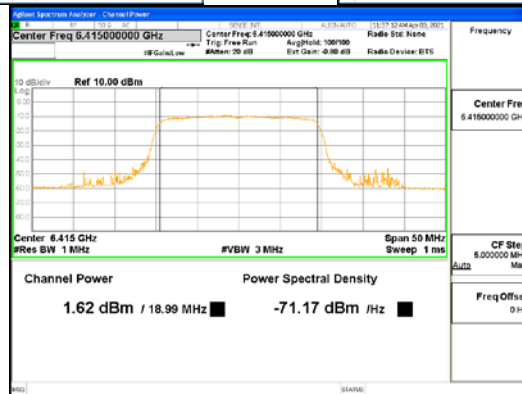
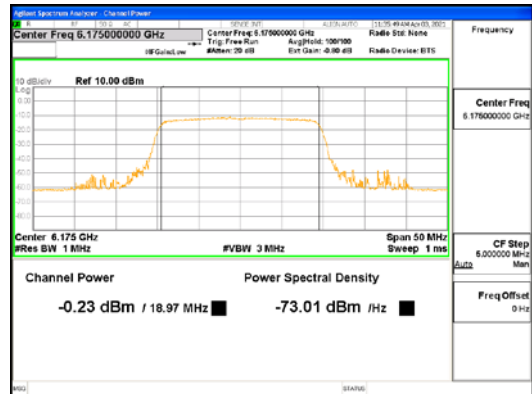
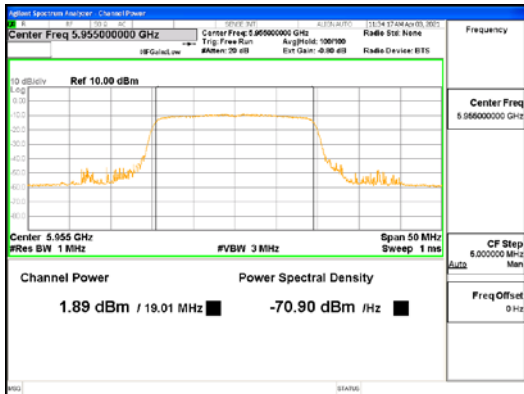
Test Mode	Frequency (MHz)	Measured Output Power (dBm)	Duty cycle Factor (dB)	Antenna Gain (dBi)	Result Output Power (dBm)	Limit (dBm)	Margin (dB)
802.11ax _HE20	5 955	4.40	0.80	2.21	7.41	24.00	16.59
	6 175	2.30	0.80		5.31	24.00	18.69
	6 415	5.15	0.80		8.16	24.00	15.84
	6 435	4.95	0.80		7.96	24.00	16.04
	6 475	5.10	0.80		8.11	24.00	15.89
	6 515	4.98	0.80		7.99	24.00	16.01
	6 535	5.52	0.80		8.53	24.00	15.47
	6 695	4.23	0.80		7.24	24.00	16.76
	6 855	2.96	0.80		5.97	24.00	18.03
	6 875	4.86	0.80		7.87	24.00	16.13
	6 995	5.45	0.80		8.46	24.00	15.54
	7 095	4.45	0.80		7.46	24.00	16.54
	7 115	-9.84	0.80		-6.83	24.00	30.83
802.11ax _HE40	5 965	6.78	0.81	2.21	9.80	24.00	14.20
	6 165	4.53	0.81		7.55	24.00	16.45
	6 405	7.61	0.81		10.63	24.00	13.37
	6 445	7.19	0.81		10.21	24.00	13.79
	6 485	7.23	0.81		10.25	24.00	13.75
	6 525	7.32	0.81		10.34	24.00	13.66
	6 685	6.69	0.81		9.71	24.00	14.29
	6 845	6.53	0.81		9.55	24.00	14.45
	6 885	7.62	0.81		10.64	24.00	13.36
	7 005	7.94	0.81		10.96	24.00	13.04
802.11ax _HE80	7 085	6.65	0.81	2.21	9.67	24.00	14.33
	5 985	9.77	0.87		12.85	24.00	11.15
	6 145	7.63	0.87		10.71	24.00	13.29
	6 385	10.59	0.87		13.67	24.00	10.33
	6 465	10.28	0.87		13.36	24.00	10.64
	6 545	10.62	0.87		13.70	24.00	10.30
	6 705	9.98	0.87		13.06	24.00	10.94
	6 865	8.66	0.87		11.74	24.00	12.26
	6 945	10.47	0.87		13.55	24.00	10.45
7 025	9.92	0.87	13.00	24.00	11.00		
Measurement uncertainty		1.5 dB					

See next pages for actual measured spectrum plots.

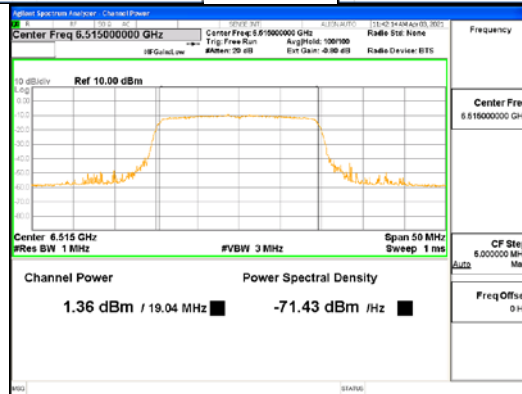
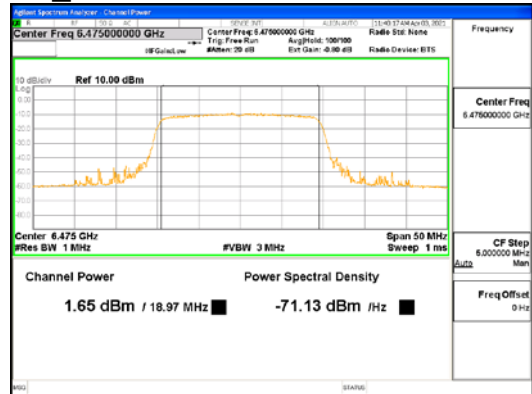
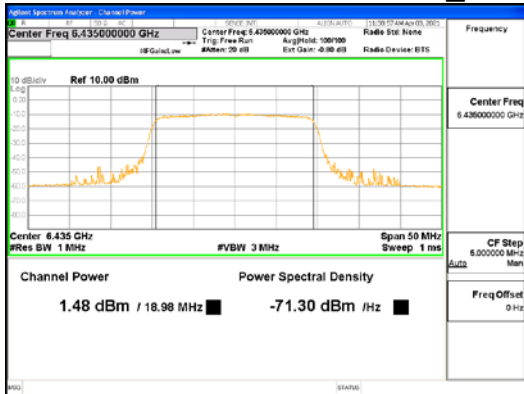


CTK Co., Ltd.
 (Ho-dong), 113, Yejik-ro, Cheoin-gu,
 Yongin-si, Gyeonggi-do, Korea
 Tel: +82-31-339-9970
 Fax: +82-31-624-9501

Report No.:
 CTK-2021-01436
 Page (31) / (105) Pages



ANT1_802.11ax_HE20_UNII 5

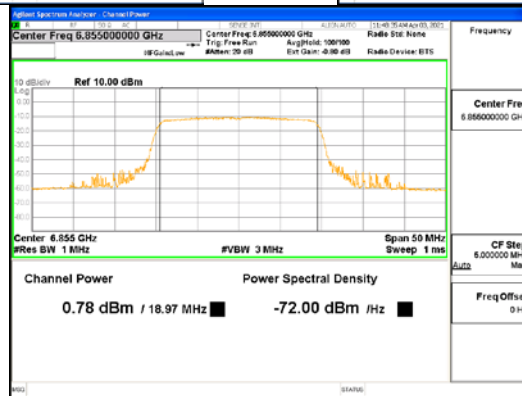
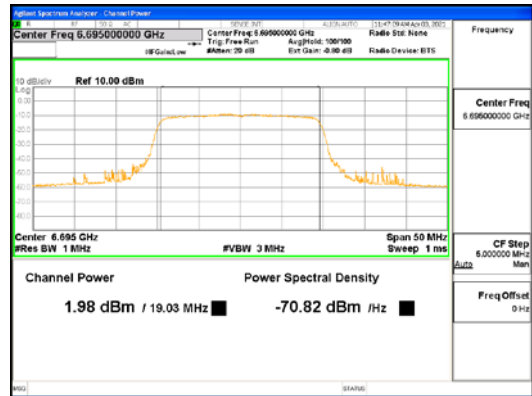
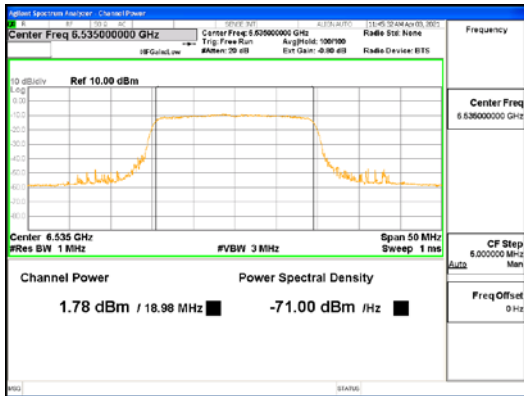


ANT1_802.11ax_HE20_UNII 6

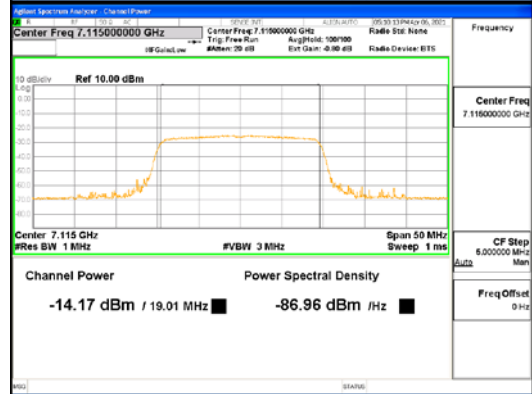
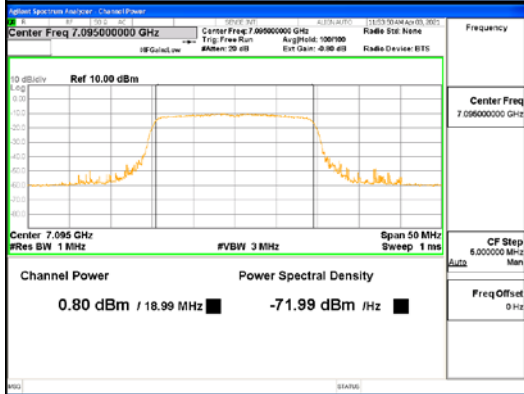
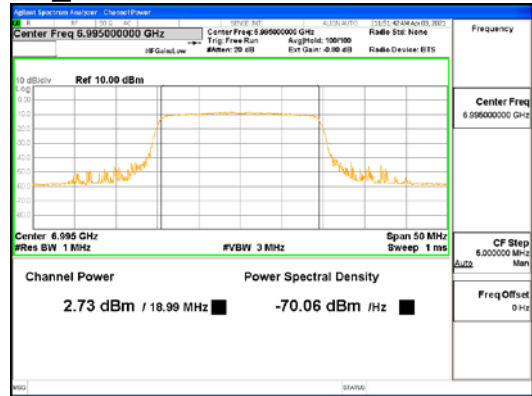
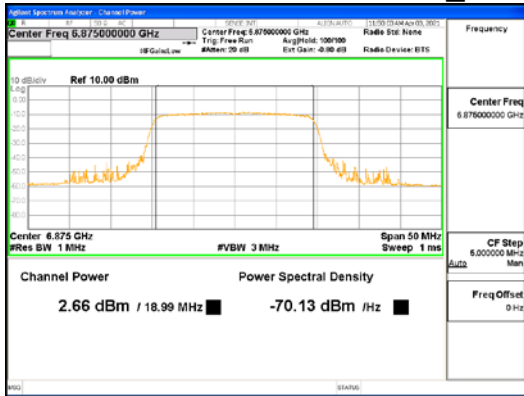


CTK Co., Ltd.
 (Ho-dong), 113, Yejik-ro, Cheoin-gu,
 Yongin-si, Gyeonggi-do, Korea
 Tel: +82-31-339-9970
 Fax: +82-31-624-9501

Report No.:
 CTK-2021-01436
 Page (32) / (105) Pages



ANT1_802.11ax_HE20_UNII 7

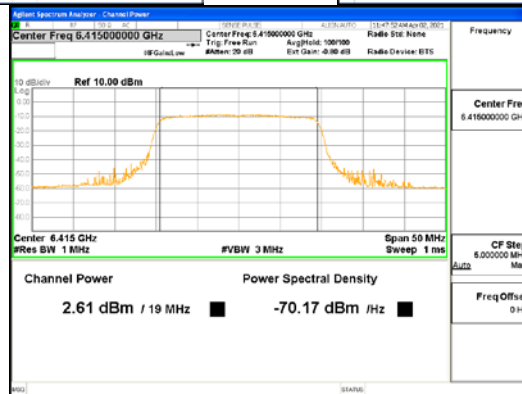
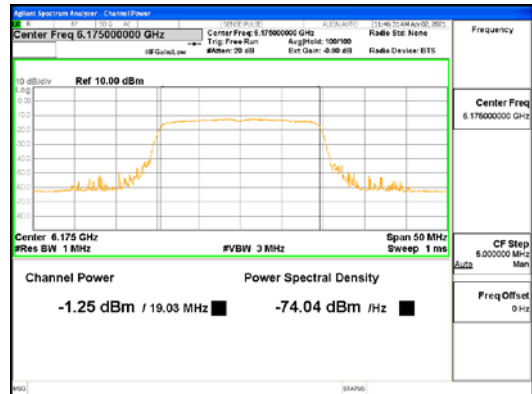
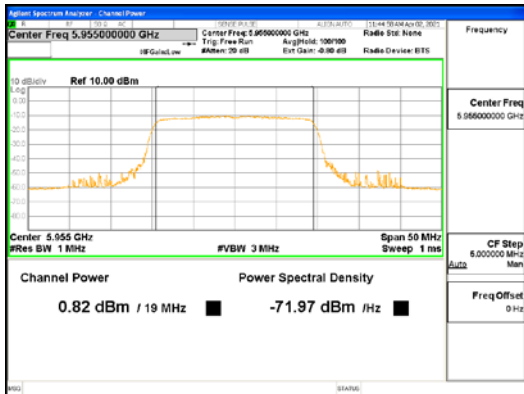


ANT1_802.11ax_HE20_UNII 8

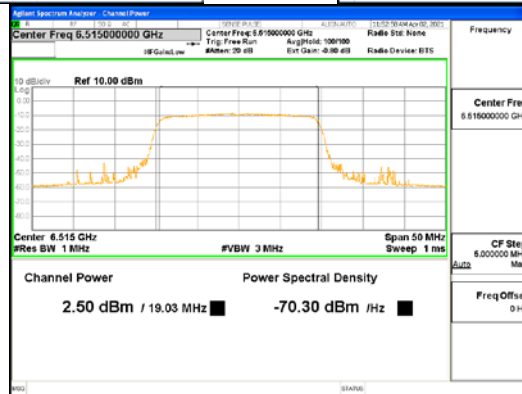
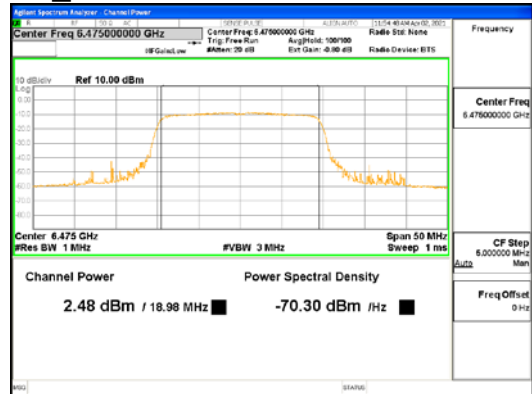
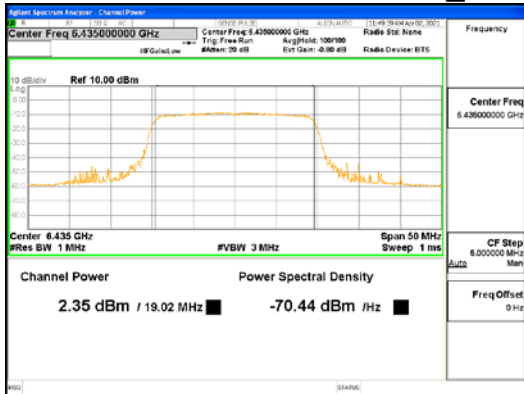


CTK Co., Ltd.
 (Ho-dong), 113, Yejik-ro, Cheoin-gu,
 Yongin-si, Gyeonggi-do, Korea
 Tel: +82-31-339-9970
 Fax: +82-31-624-9501

Report No.:
 CTK-2021-01436
 Page (33) / (105) Pages



ANT2_802.11ax_HE20_UNII 5

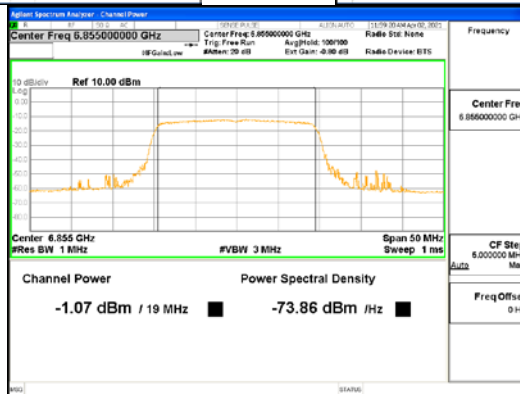
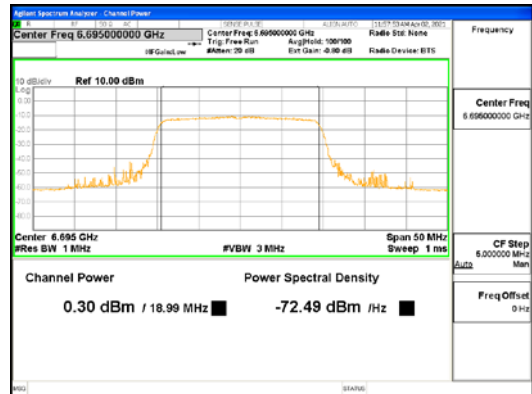
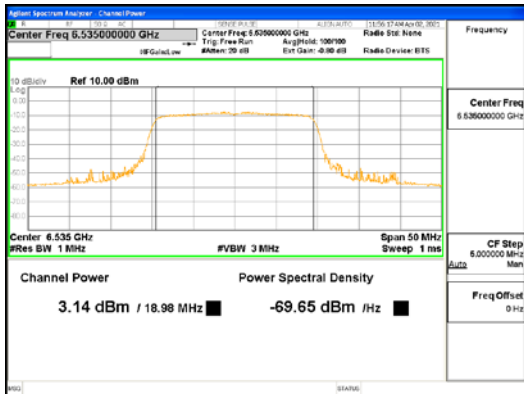


ANT2_802.11ax_HE20_UNII 6

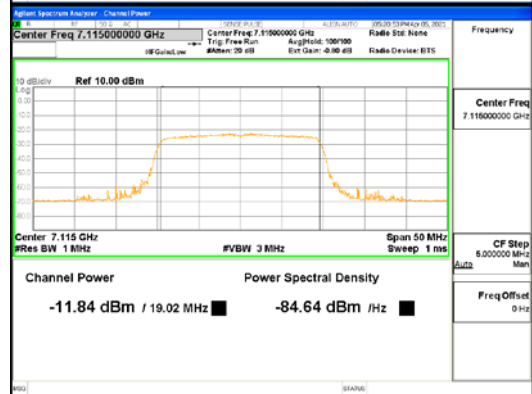
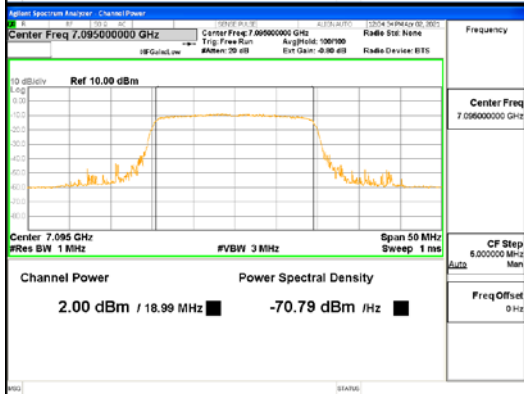
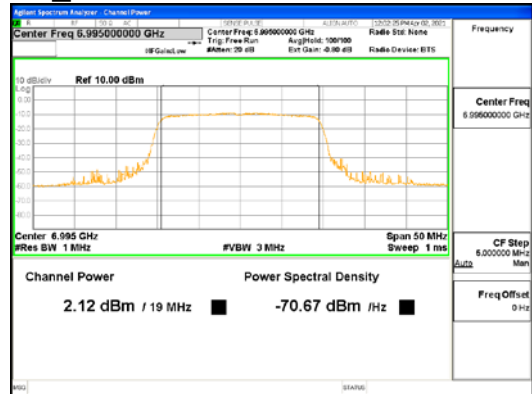
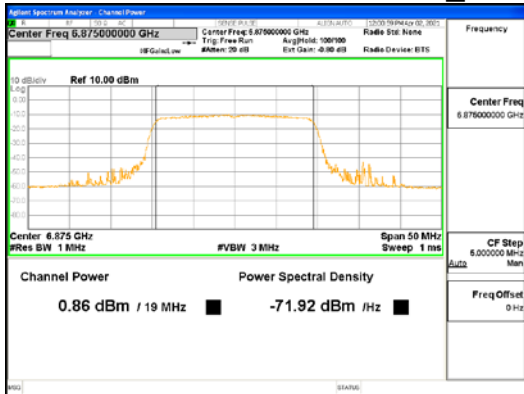


CTK Co., Ltd.
 (Ho-dong), 113, Yejik-ro, Cheoin-gu,
 Yongin-si, Gyeonggi-do, Korea
 Tel: +82-31-339-9970
 Fax: +82-31-624-9501

Report No.:
 CTK-2021-01436
 Page (34) / (105) Pages



ANT2_802.11ax_HE20_UNI1 7

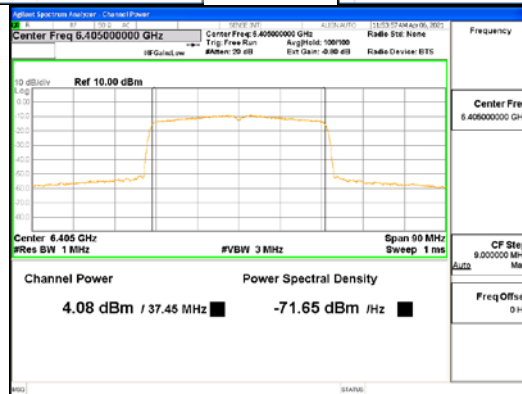
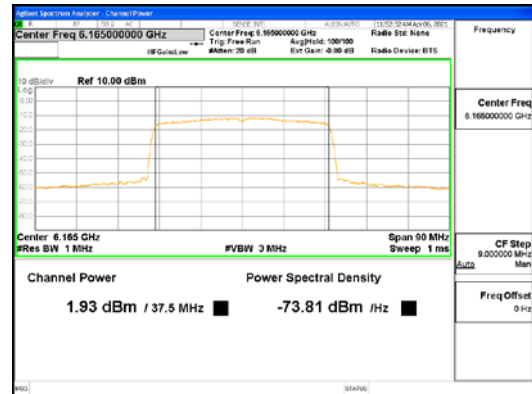
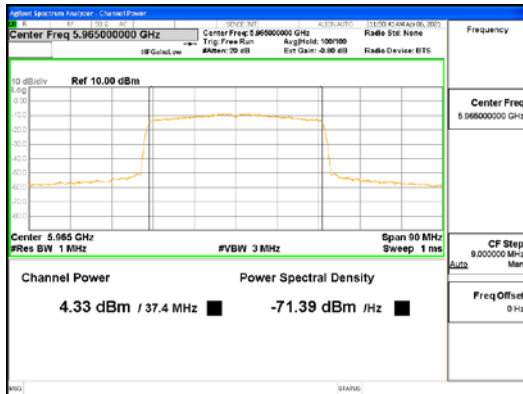


ANT2_802.11ax_HE20_UNI1 8

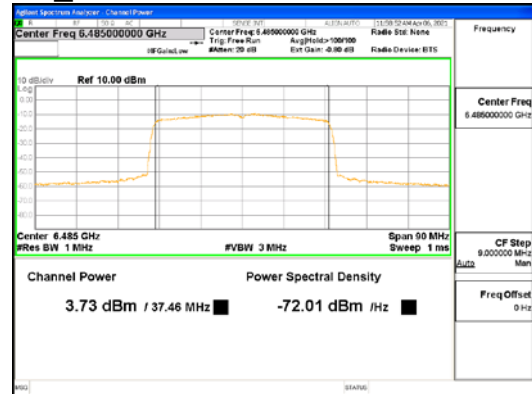
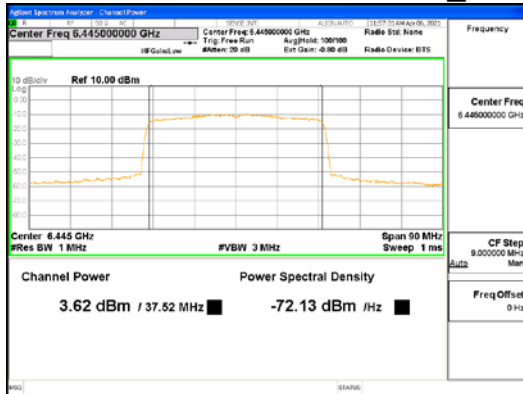


CTK Co., Ltd.
 (Ho-dong), 113, Yejik-ro, Cheoin-gu,
 Yongin-si, Gyeonggi-do, Korea
 Tel: +82-31-339-9970
 Fax: +82-31-624-9501

Report No.:
 CTK-2021-01436
 Page (35) / (105) Pages



ANT1_802.11ax_HE40_UNI I 5

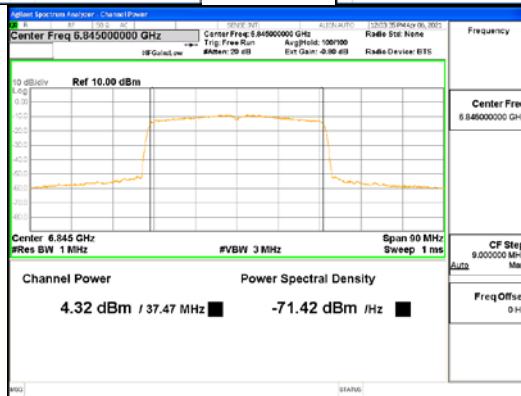
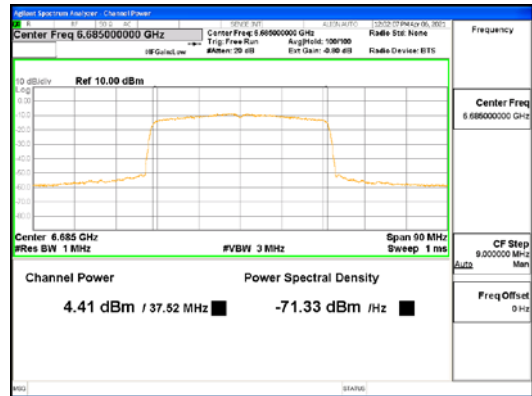
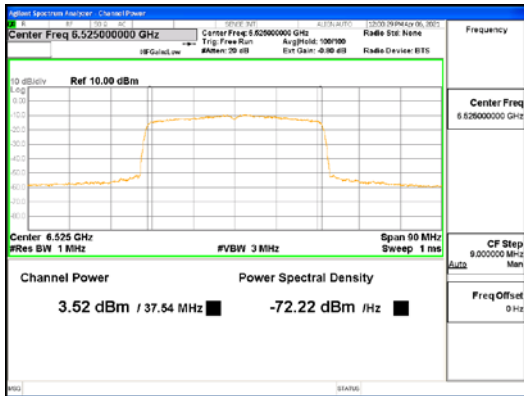


ANT1_802.11ax_HE40_UNI I 6

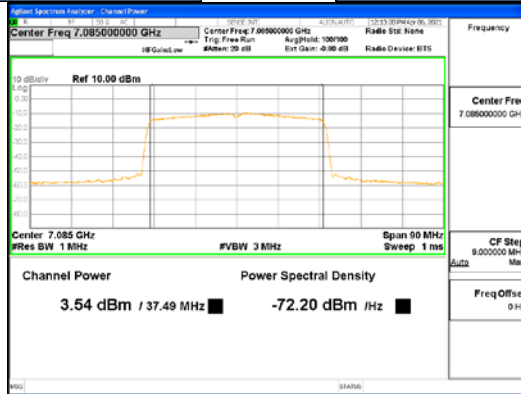
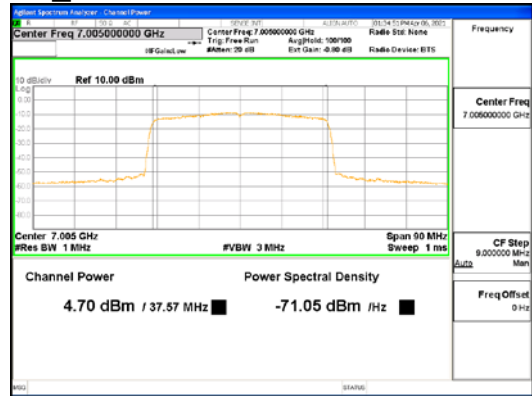
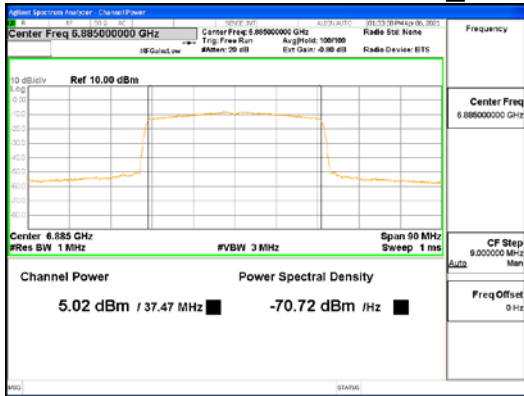


CTK Co., Ltd.
 (Ho-dong), 113, Yejik-ro, Cheoin-gu,
 Yongin-si, Gyeonggi-do, Korea
 Tel: +82-31-339-9970
 Fax: +82-31-624-9501

Report No.:
 CTK-2021-01436
 Page (36) / (105) Pages



ANT1_802.11ax_HE40_UNII 7

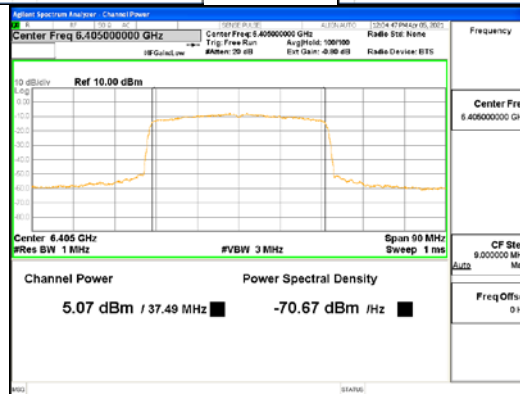
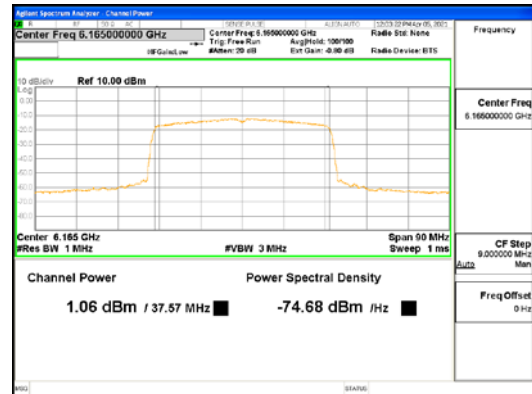
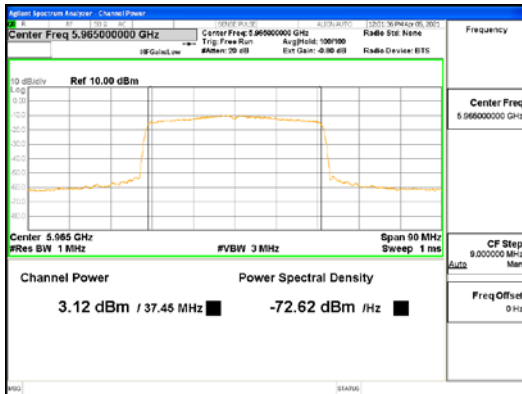


ANT1_802.11ax_HE40_UNII 8

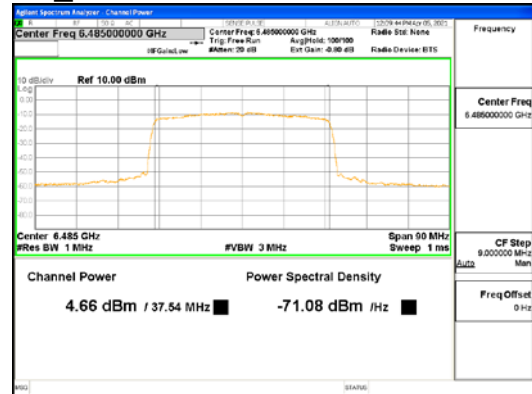
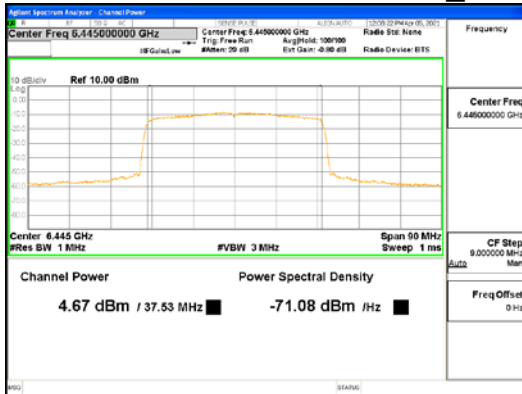


CTK Co., Ltd.
 (Ho-dong), 113, Yejik-ro, Cheoin-gu,
 Yongin-si, Gyeonggi-do, Korea
 Tel: +82-31-339-9970
 Fax: +82-31-624-9501

Report No.:
 CTK-2021-01436
 Page (37) / (105) Pages



ANT2_802.11ax_HE40_UNI I 5

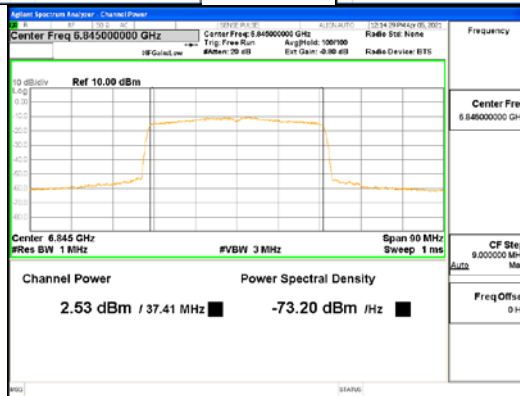
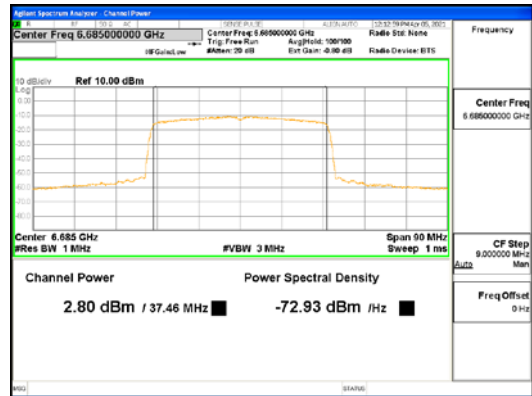
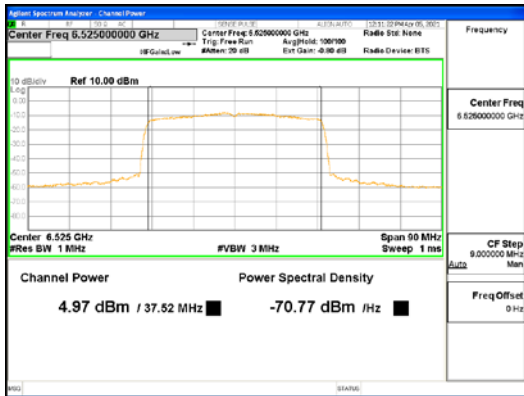


ANT2_802.11ax_HE40_UNI I 6

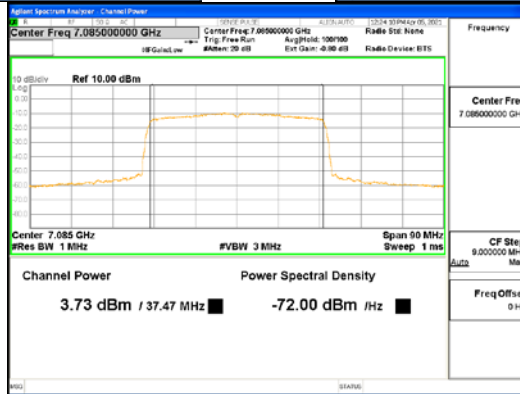
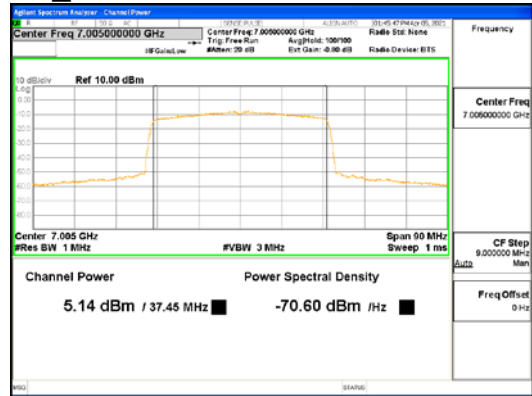
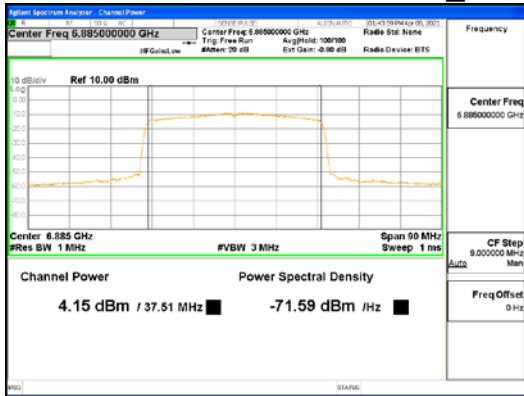


CTK Co., Ltd.
(Ho-dong), 113, Yejik-ro, Cheoin-gu,
Yongin-si, Gyeonggi-do, Korea
Tel: +82-31-339-9970
Fax: +82-31-624-9501

Report No.:
CTK-2021-01436
Page (38) / (105) Pages



ANT2_802.11ax_HE40_UNII 7

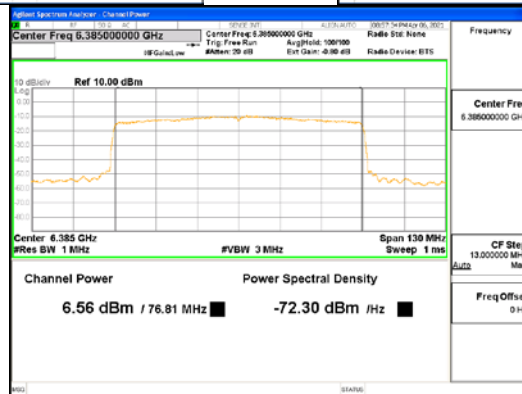
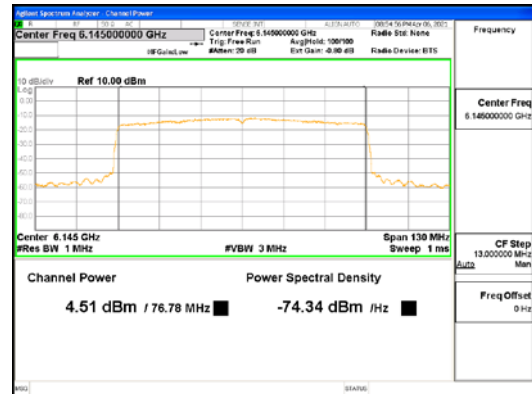
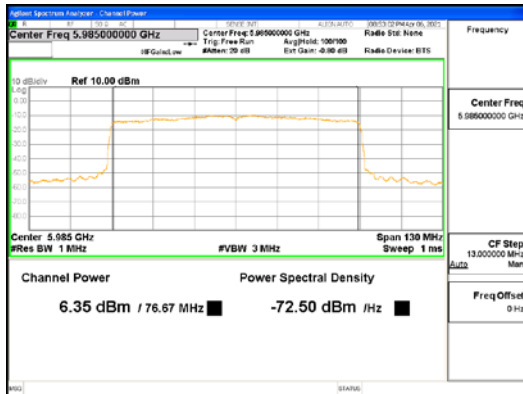


ANT2_802.11ax_HE40_UNII 8

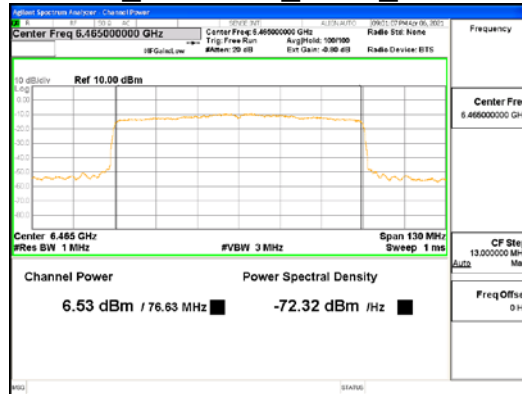


CTK Co., Ltd.
 (Ho-dong), 113, Yejik-ro, Cheoin-gu,
 Yongin-si, Gyeonggi-do, Korea
 Tel: +82-31-339-9970
 Fax: +82-31-624-9501

Report No.:
 CTK-2021-01436
 Page (39) / (105) Pages



ANT1_802.11ax_HE80_UNI I 5

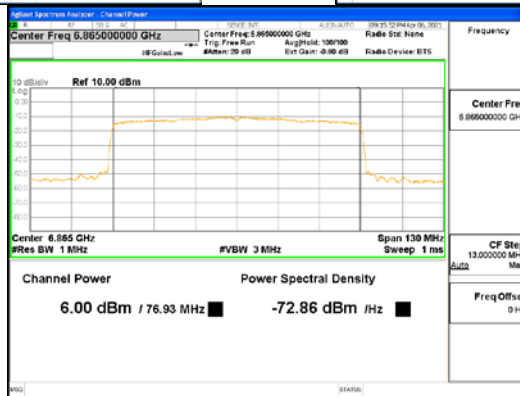
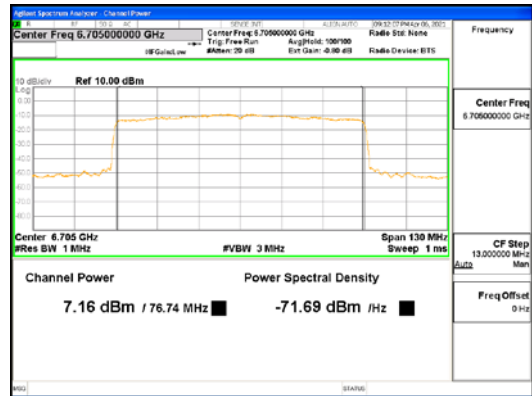
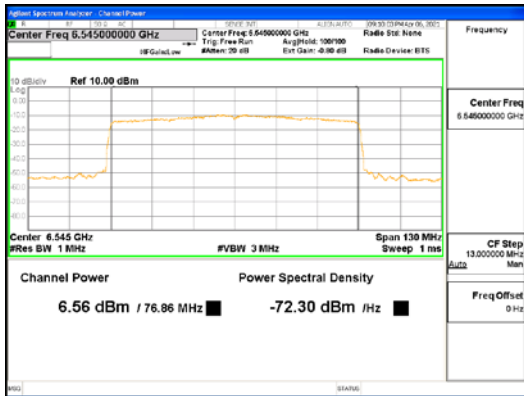


ANT1_802.11ax_HE80_UNI I 6

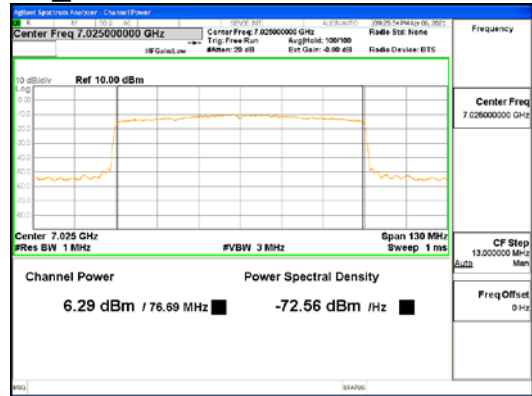
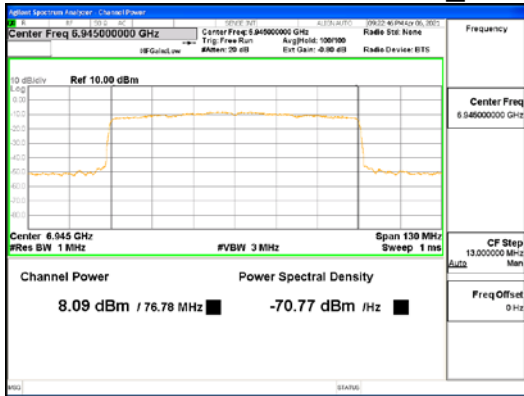


CTK Co., Ltd.
(Ho-dong), 113, Yejik-ro, Cheoin-gu,
Yongin-si, Gyeonggi-do, Korea
Tel: +82-31-339-9970
Fax: +82-31-624-9501

Report No.:
CTK-2021-01436
Page (40) / (105) Pages



ANT1_802.11ax_HE80_UNI I 7

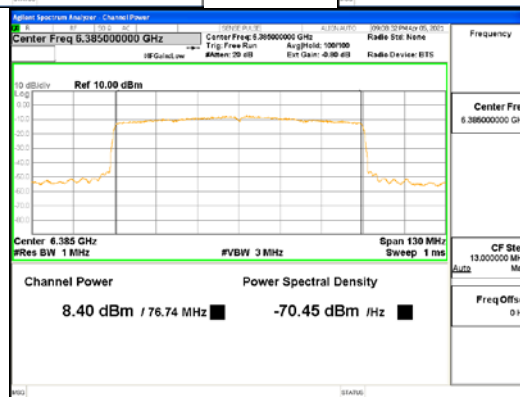
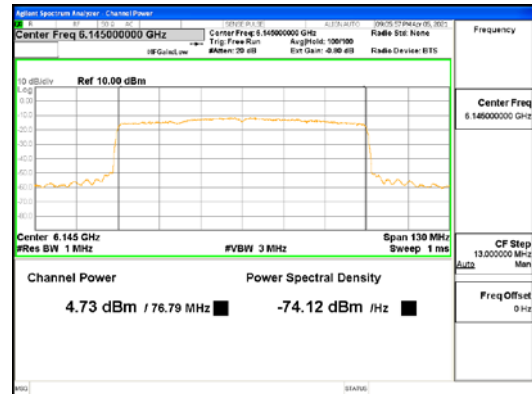
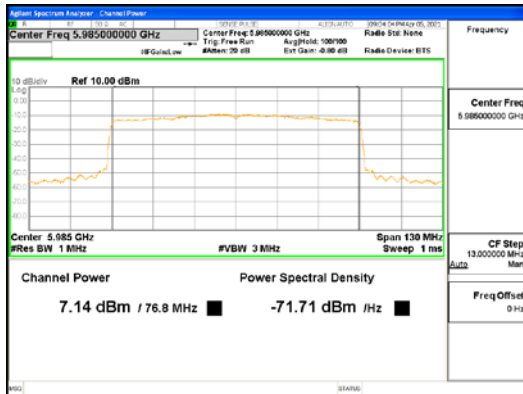


ANT1_802.11ax_HE80_UNI I 8

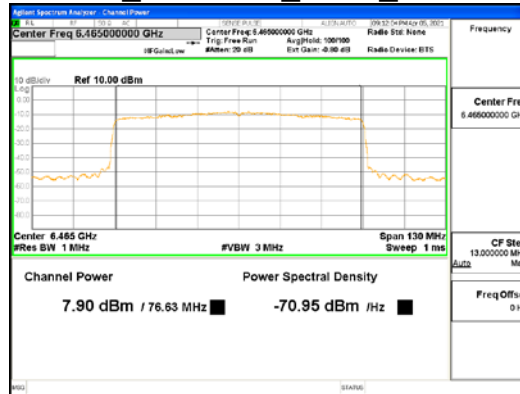


CTK Co., Ltd.
 (Ho-dong), 113, Yejik-ro, Cheoin-gu,
 Yongin-si, Gyeonggi-do, Korea
 Tel: +82-31-339-9970
 Fax: +82-31-624-9501

Report No.:
 CTK-2021-01436
 Page (41) / (105) Pages



ANT2_802.11ax_HE80_UNI I 5

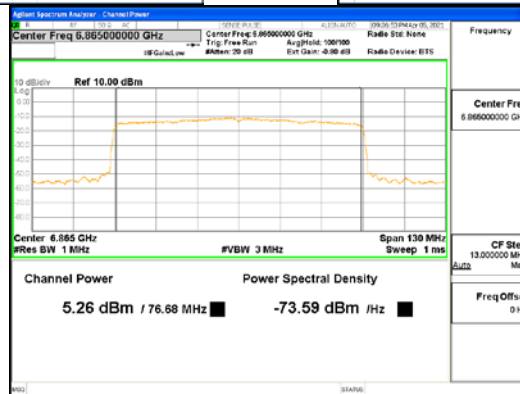
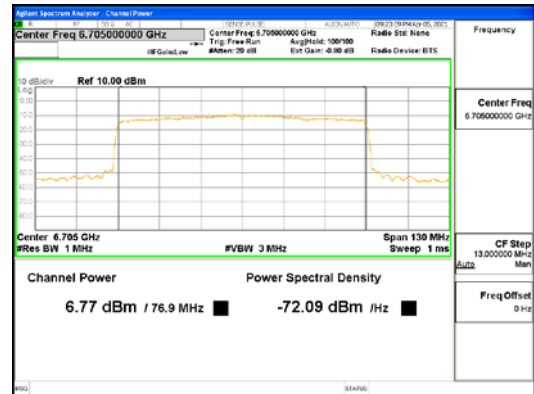
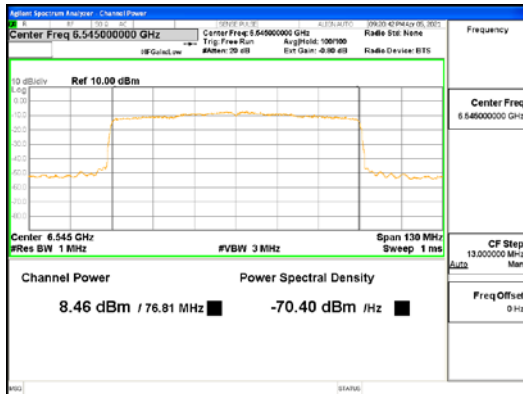


ANT2_802.11ax_HE80_UNI I 6

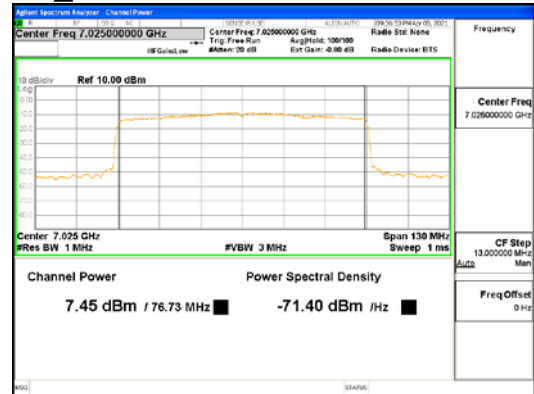
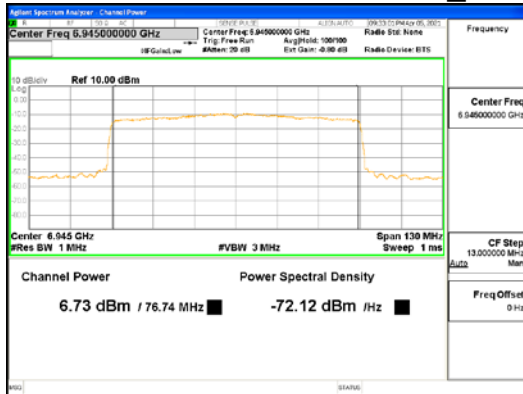


CTK Co., Ltd.
(Ho-dong), 113, Yejik-ro, Cheoin-gu,
Yongin-si, Gyeonggi-do, Korea
Tel: +82-31-339-9970
Fax: +82-31-624-9501

Report No.:
CTK-2021-01436
Page (42) / (105) Pages



ANT2_802.11ax_HE80_UNI I 7



ANT2_802.11ax_HE80_UNI I 8