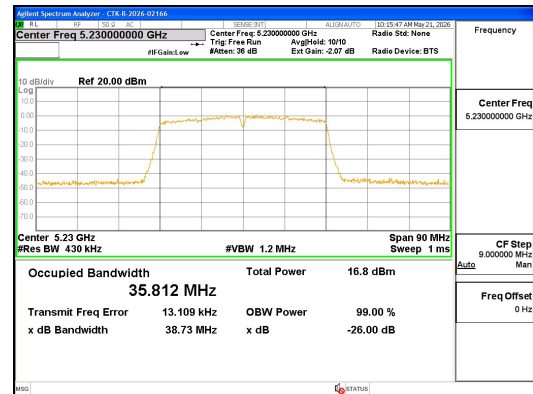
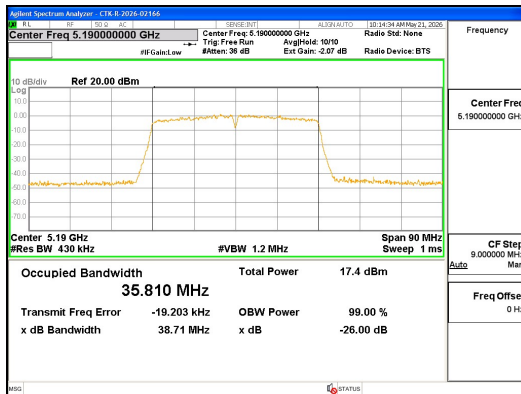




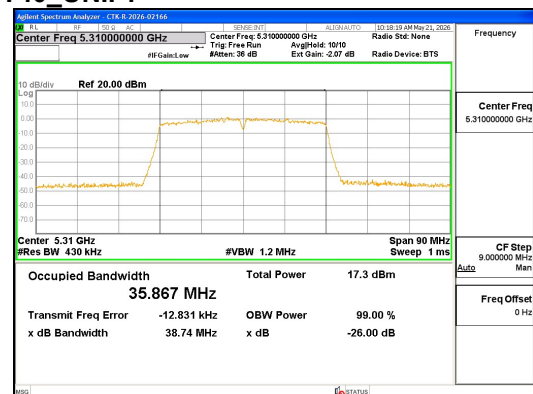
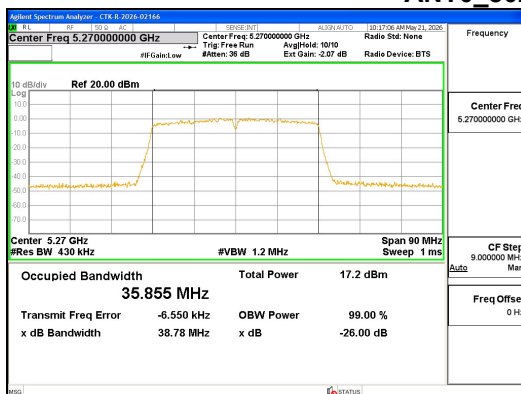
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(Ho-dong), 113, Yejik-ro, Cheoin-gu, Yongin-si,
Gyeonggi-do, Korea
Tel: +82-1551-9871
Fax: +82-31-624-9501

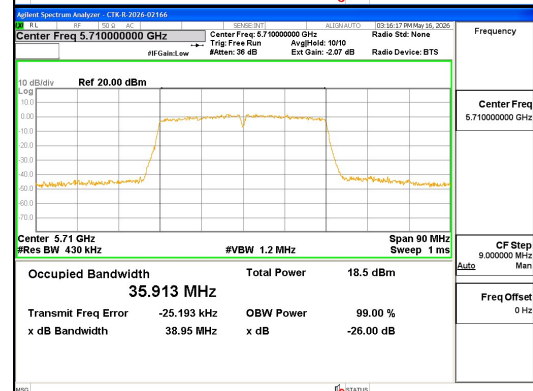
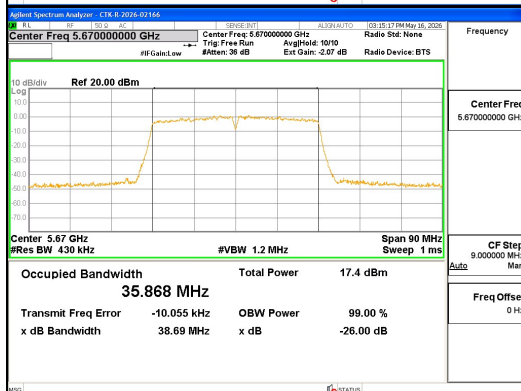
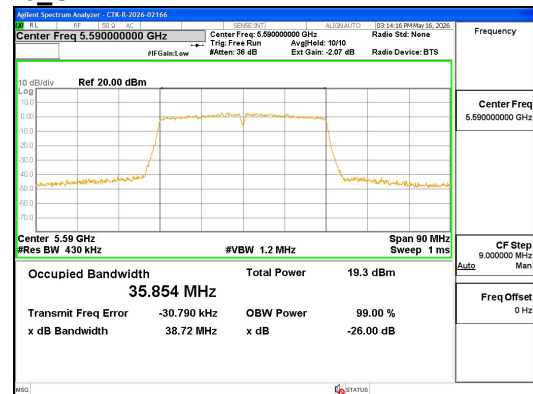
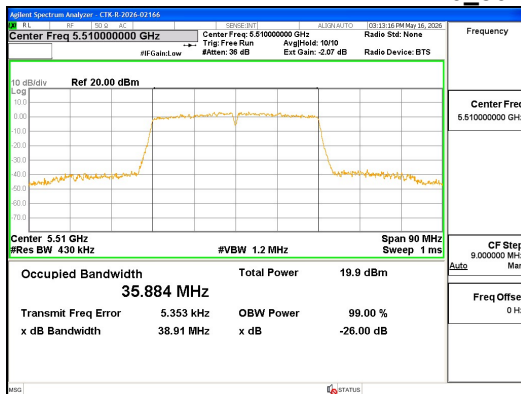
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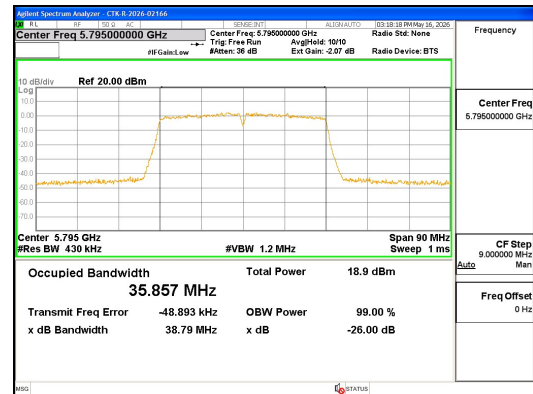
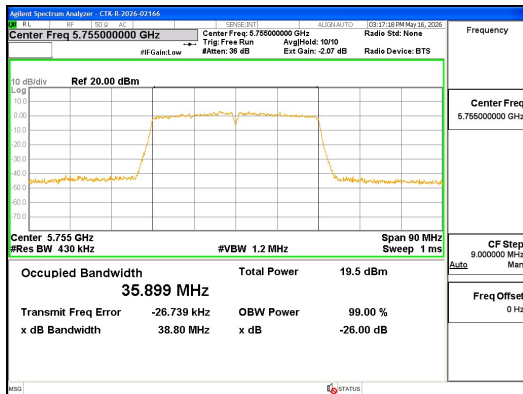
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ANT0_802.11ac_VHT40_UNI1 2A



ANT0_802.11ac_VHT40_UNI1 2C



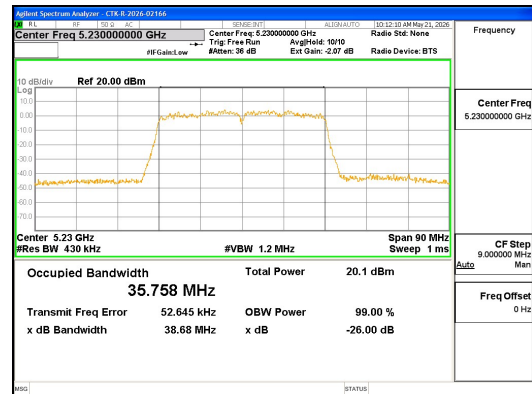
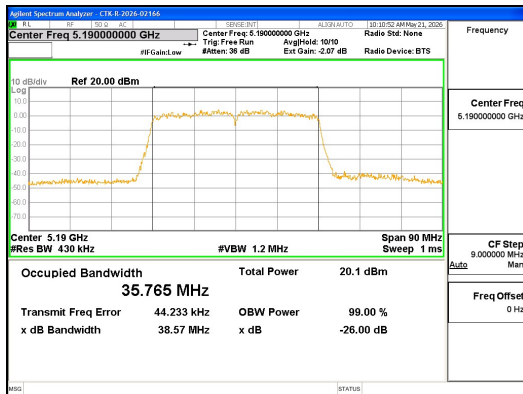
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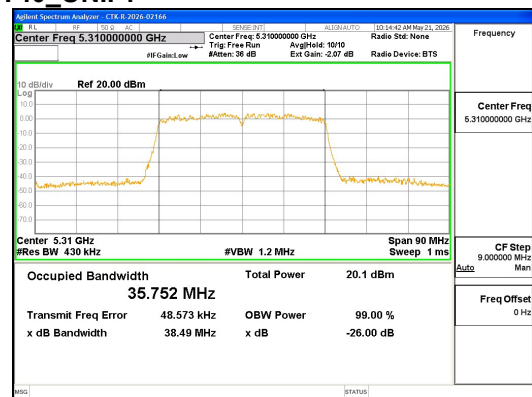
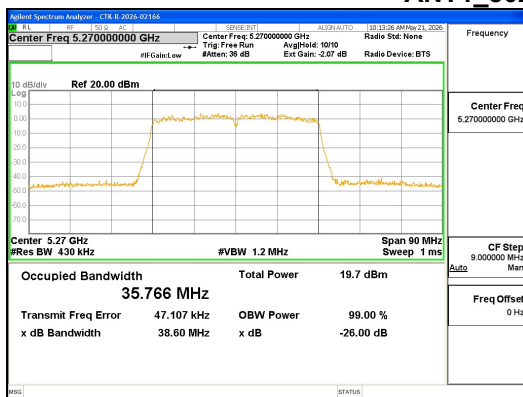
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(Ho-dong), 113, Yejik-ro, Cheoin-gu, Yongin-si,
Gyeonggi-do, Korea
Tel: +82-1551-9871
Fax: +82-31-624-9501

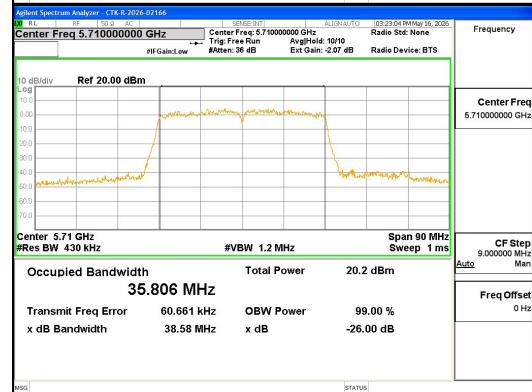
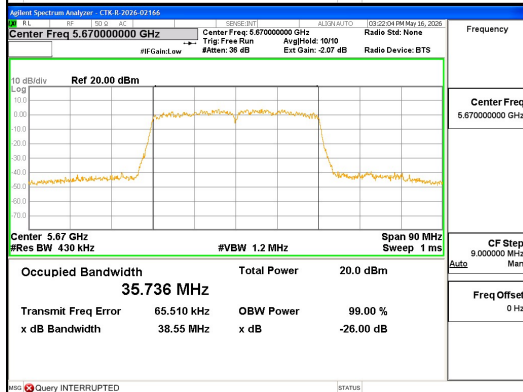
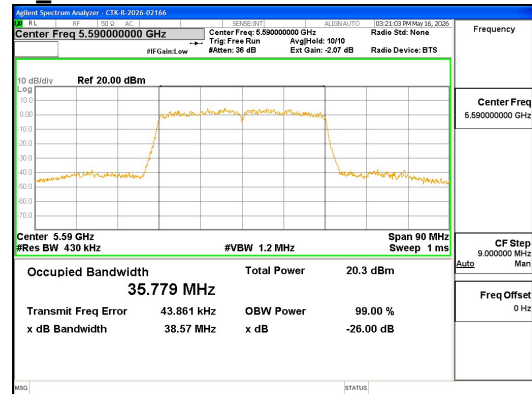
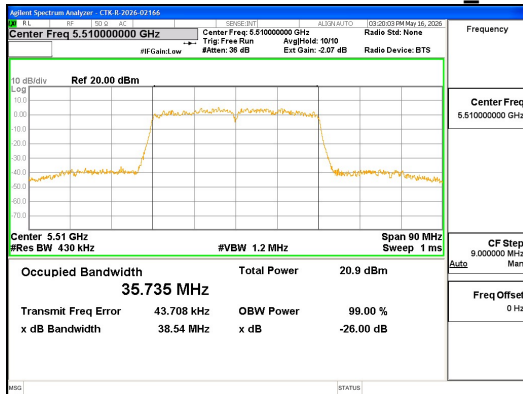
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ANT1_802.11ac_VHT40_UNII 2A



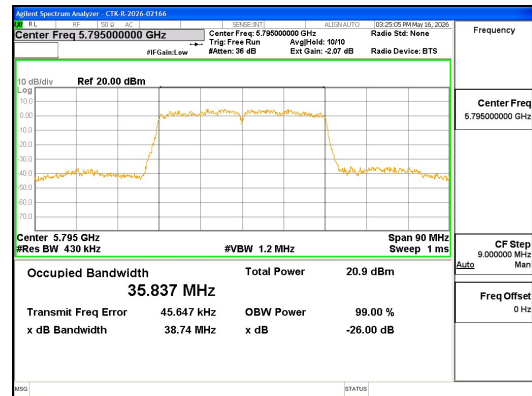
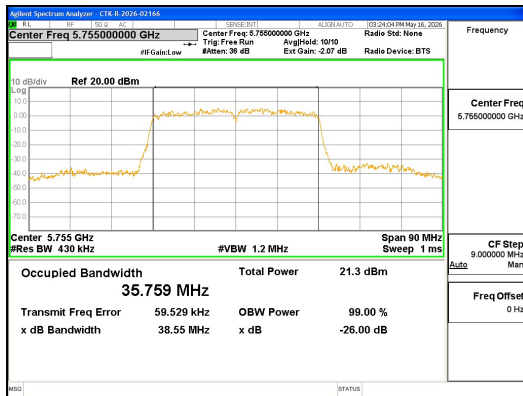
ANT1_802.11ac_VHT40_UNII 2C



CTK Co., Ltd.

(Ho-dong), 113, Yejik-ro, Cheoin-gu, Yongin-si,
Gyeonggi-do, Korea
Tel: +82-1551-9871
Fax: +82-31-624-9501

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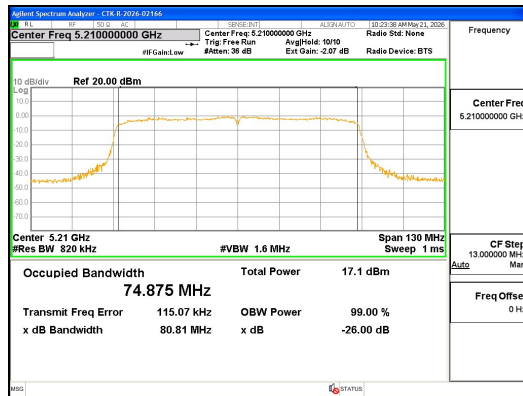
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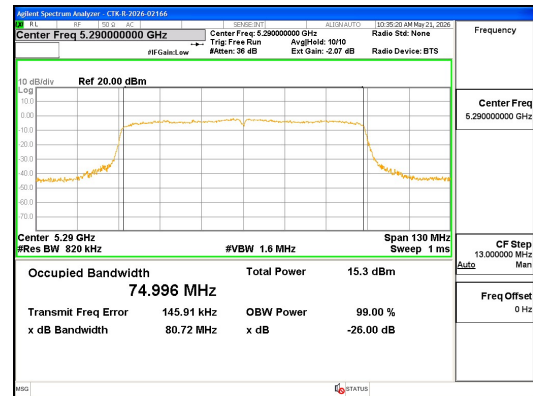
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(Ho-dong), 113, Yejik-ro, Cheoin-gu, Yongin-si,
Gyeonggi-do, Korea
Tel: +82-1551-9871
Fax: +82-31-624-9501

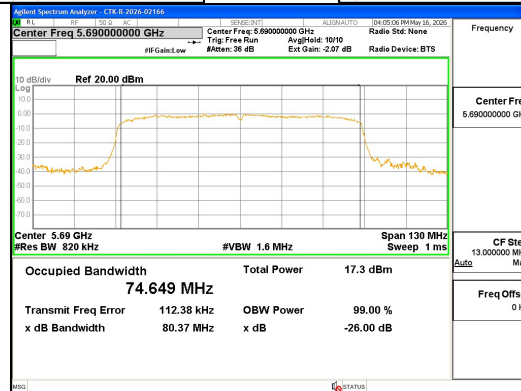
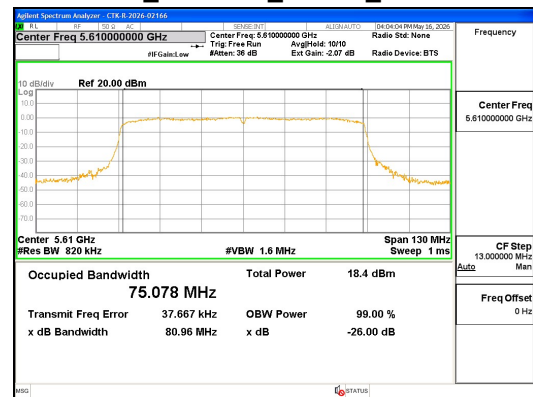
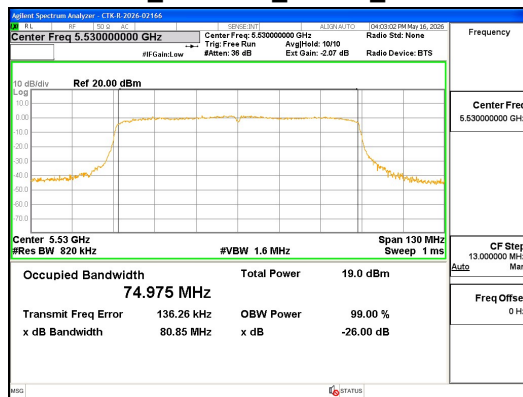
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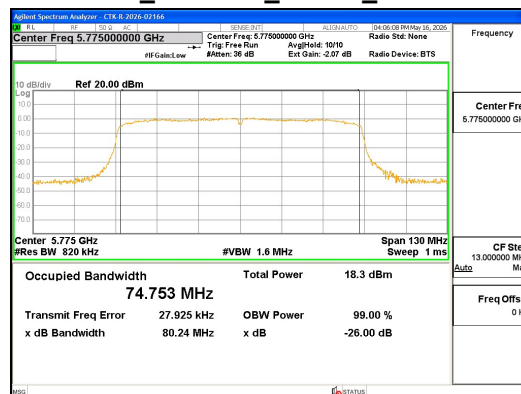
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ANT0_802.11ac_VHT80_UNII 2A



ANT0_802.11ac_VHT80_UNII 2C



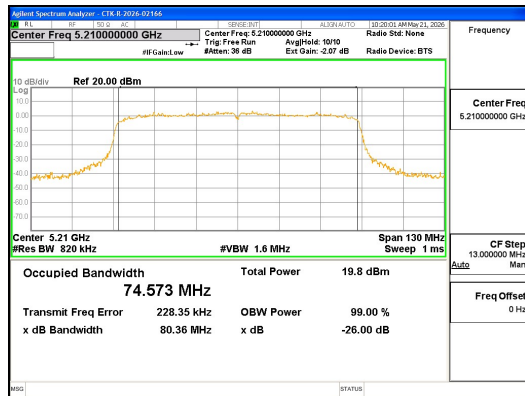
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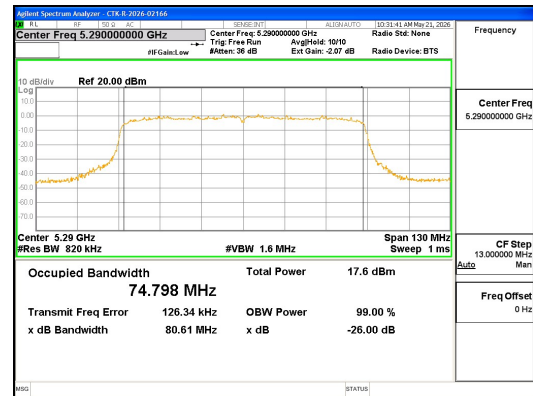
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(Ho-dong), 113, Yejik-ro, Cheoin-gu, Yongin-si,
Gyeonggi-do, Korea
Tel: +82-1551-9871
Fax: +82-31-624-9501

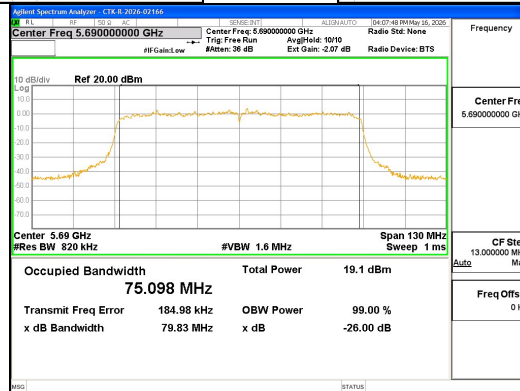
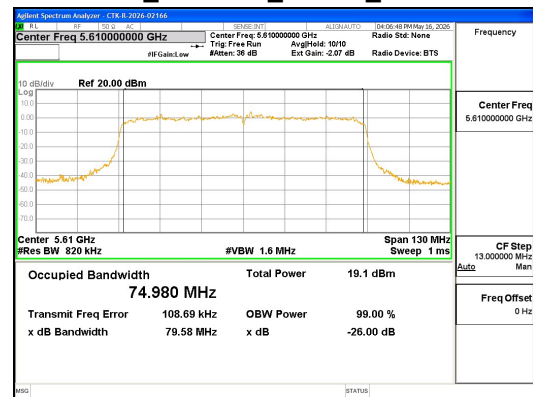
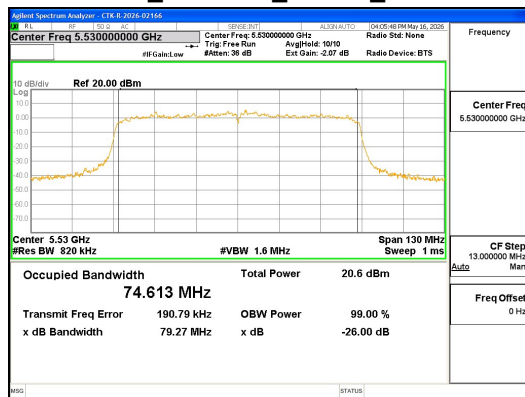
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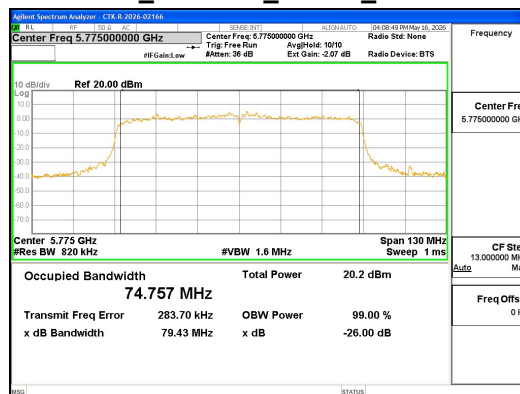
ANT1_802.11ac_VHT80_UNII 1



ANT1_802.11ac_VHT80_UNII 2A



ANT1_802.11ac_VHT80_UNII 2C



ANT1_802.11ac_VHT80_UNII 3



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(Ho-dong), 113, Yejik-ro, Cheoin-gu, Yongin-si,
Gyeonggi-do, Korea
Tel: +82-1551-9871
Fax: +82-31-624-9501

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4.3 Output Power

Test Procedures

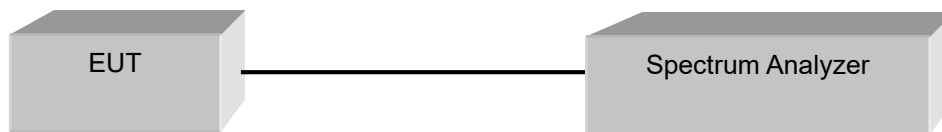
< 802.11a/n/ac Mode >

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

KDB 662911 D01, D02 (Multiple Transmitter Output)

ANSI C63.10-2020 – Section 12.4.2.4

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) Span to encompass the entire 99 % OBW of the signal.

b) RBW = 1 MHz

c) VBW ≥ 3 MHz

d) Number of points in sweep ≥ $[2 \times \text{span} / \text{RBW}]$.

e) Sweep time = auto

f) Detector = Power averaging (rms)

g) Do not use sweep triggering. Allow the sweep to “free run.”

h) Trace average at least 100 traces in power averaging (rms) mode;

i) Compute power by integrating the spectrum across the 99 % OBW of the signal using the instrument's band-power measurement function with band limits set equal to the EBW or OBW band-edges.

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

Test Mode	Duty Cycle Factor [dB]	Test Mode	Duty Cycle Factor [dB]
802.11a	0.09	802.11ac_VHT20	0.09
802.11n_HT20	0.09	802.11ac_VHT40	0.19
802.11n_HT40	0.19	802.11ac_VHT80	0.37

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(Ho-dong), 113, Yejik-ro, Cheoin-gu, Yongin-si,
Gyeonggi-do, Korea
Tel: +82-1551-9871
Fax: +82-31-624-9501

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Limit :

Operating Mode	Mode	ANT Configuration	ANT Gain [dBi]	Band	Limit [dBm]
SISO	802.11a/n/ac	ANT0, ANT1	0.85, 0.69	UNII 1	24.00
				UNII 2A	24.00
			1.39, 0.87	UNII 2C	24.00
				UNII 3	30.00
MIMO (2Tx)	802.11n/ac	ANT0 + ANT1	3.78	UNII 1	24.00
				UNII 2A	24.00
			4.14	UNII 2C	24.00
				UNII 3	30.00

Note :

Per KDB 662911, the MIMO directional gain is calculated using the following formula, Where G_N is the gain of the nth antenna and N_{ANT} , the total number of antennas used.

$$\text{Directional gain} = 10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] \text{ dBi}$$

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(Ho-dong), 113, Yejik-ro, Cheoin-gu, Yongin-si,
Gyeonggi-do, Korea
Tel: +82-1551-9871
Fax: +82-31-624-9501

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**Test Data :
ANT0 (SISO)**

Test Mode	Frequency [MHz]	Measured Output Power [dBm]	Duty Cycle Factor [dB]	Result Output Power [dBm]	Limit [dBm]	Margin [dB]
802.11a	5 180	15.70	0.09	15.79	24.00	15.70
	5 200	15.42	0.09	15.51	24.00	15.42
	5 240	15.17	0.09	15.26	24.00	15.17
	5 260	13.42	0.09	13.51	24.00	13.42
	5 300	13.34	0.09	13.43	24.00	13.34
	5 320	13.24	0.09	13.33	24.00	13.24
	5 500	16.59	0.09	16.68	24.00	16.59
	5 600	15.85	0.09	15.94	24.00	15.85
	5 700	14.68	0.09	14.77	24.00	14.68
	5 720	14.52	0.09	14.61	24.00	14.52
	5 745	15.58	0.09	15.67	30.00	15.58
	5 785	15.28	0.09	15.37	30.00	15.28
	5 825	15.63	0.09	15.72	30.00	15.63
802.11n _HT20	5 180	11.08	0.09	11.17	24.00	11.08
	5 200	10.83	0.09	10.92	24.00	10.83
	5 240	10.55	0.09	10.64	24.00	10.55
	5 260	14.62	0.09	14.71	24.00	14.62
	5 300	14.63	0.09	14.72	24.00	14.63
	5 320	14.43	0.09	14.52	24.00	14.43
	5 500	16.16	0.09	16.25	24.00	16.16
	5 600	15.83	0.09	15.92	24.00	15.83
	5 700	14.80	0.09	14.89	24.00	14.80
	5 720	14.02	0.09	14.11	24.00	14.02
	5 745	15.36	0.09	15.45	30.00	15.36
	5 785	14.97	0.09	15.06	30.00	14.97
	5 825	15.47	0.09	15.56	30.00	15.47
802.11ac _VHT20	5 180	11.19	0.09	11.28	24.00	11.19
	5 200	11.11	0.09	11.20	24.00	11.11
	5 240	10.86	0.09	10.95	24.00	10.86
	5 260	13.23	0.09	13.32	24.00	13.23
	5 300	12.95	0.09	13.04	24.00	12.95
	5 320	12.64	0.09	12.73	24.00	12.64
	5 500	14.47	0.09	14.56	24.00	14.47
	5 600	13.49	0.09	13.58	24.00	13.49
	5 700	12.46	0.09	12.55	24.00	12.46
	5 720	12.41	0.09	12.50	24.00	12.41
	5 745	14.00	0.09	14.09	30.00	14.00
	5 785	13.43	0.09	13.52	30.00	13.43
	5 825	13.75	0.09	13.84	30.00	13.75
802.11n _HT40	5 190	11.31	0.19	11.50	24.00	11.31
	5 230	10.41	0.19	10.60	24.00	10.41
	5 270	11.03	0.19	11.22	24.00	11.03
	5 310	11.12	0.19	11.31	24.00	11.12
	5 510	12.81	0.19	13.00	24.00	12.81
	5 590	12.02	0.19	12.21	24.00	12.02
	5 670	10.67	0.19	10.86	24.00	10.67
	5 710	11.88	0.19	12.07	24.00	11.88
	5 755	14.93	0.19	15.12	30.00	14.93
	5 795	14.21	0.19	14.40	30.00	14.21

**CTK Co., Ltd.**

(Ho-dong), 113, Yejik-ro, Cheoin-gu, Yongin-si,
Gyeonggi-do, Korea
Tel: +82-1551-9871
Fax: +82-31-624-9501

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Test Mode	Frequency [MHz]	Measured Output Power [dBm]	Duty Cycle Factor [dB]	Result Output Power [dBm]	Limit [dBm]	Margin [dB]
802.11ac_VHT40	5 190	11.27	0.19	11.46	24.00	12.54
	5 230	10.75	0.19	10.94	24.00	13.06
	5 270	11.10	0.19	11.29	24.00	12.71
	5 310	11.25	0.19	11.44	24.00	12.56
	5 510	14.02	0.19	14.21	24.00	9.79
	5 590	13.49	0.19	13.68	24.00	10.32
	5 670	11.42	0.19	11.61	24.00	12.39
	5 710	12.57	0.19	12.76	24.00	11.24
	5 755	13.60	0.19	13.79	30.00	16.21
	5 795	12.85	0.19	13.04	30.00	16.96
802.11ac_VHT80	5 210	11.61	0.37	11.98	24.00	12.02
	5 290	9.88	0.37	10.25	24.00	13.75
	5 530	13.25	0.37	13.62	24.00	10.38
	5 610	12.60	0.37	12.97	24.00	11.03
	5 690	11.55	0.37	11.92	24.00	12.08
	5 775	12.57	0.37	12.94	30.00	17.06

**CTK Co., Ltd.**

(Ho-dong), 113, Yejik-ro, Cheoin-gu, Yongin-si,
Gyeonggi-do, Korea
Tel: +82-1551-9871
Fax: +82-31-624-9501

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ANT1 (SISO)

Test Mode	Frequency [MHz]	Measured Output Power [dBm]	Duty Cycle Factor [dB]	Result Output Power [dBm]	Limit [dBm]	Margin [dB]
802.11n _HT20	5 180	12.57	0.09	12.66	24.00	11.34
	5 200	13.04	0.09	13.13	24.00	10.87
	5 240	12.04	0.09	12.13	24.00	11.87
	5 260	15.91	0.09	16.00	24.00	8.00
	5 300	16.19	0.09	16.28	24.00	7.72
	5 320	16.07	0.09	16.16	24.00	7.84
	5 500	15.90	0.09	15.99	24.00	8.01
	5 600	14.26	0.09	14.35	24.00	9.65
	5 700	14.93	0.09	15.02	24.00	8.98
	5 720	13.94	0.09	14.03	24.00	9.97
	5 745	15.97	0.09	16.06	30.00	13.94
	5 785	15.23	0.09	15.32	30.00	14.68
	5 825	15.55	0.09	15.64	30.00	14.36
802.11ac _VHT20	5 180	12.68	0.09	12.77	24.00	11.23
	5 200	12.70	0.09	12.79	24.00	11.21
	5 240	11.81	0.09	11.90	24.00	12.10
	5 260	14.60	0.09	14.69	24.00	9.31
	5 300	15.01	0.09	15.10	24.00	8.90
	5 320	14.79	0.09	14.88	24.00	9.12
	5 500	14.55	0.09	14.64	24.00	9.36
	5 600	13.27	0.09	13.36	24.00	10.64
	5 700	14.16	0.09	14.25	24.00	9.75
	5 720	12.29	0.09	12.38	24.00	11.62
	5 745	14.54	0.09	14.63	30.00	15.37
	5 785	14.30	0.09	14.39	30.00	15.61
	5 825	14.70	0.09	14.79	30.00	15.21
802.11n _HT40	5 190	13.57	0.19	13.76	24.00	10.24
	5 230	13.70	0.19	13.89	24.00	10.11
	5 270	13.13	0.19	13.32	24.00	10.68
	5 310	13.62	0.19	13.81	24.00	10.19
	5 510	13.45	0.19	13.64	24.00	10.36
	5 590	12.81	0.19	13.00	24.00	11.00
	5 670	12.55	0.19	12.74	24.00	11.26
	5 710	12.66	0.19	12.85	24.00	11.15
	5 755	15.96	0.19	16.15	30.00	13.85
	5 795	15.77	0.19	15.96	30.00	14.04

**CTK Co., Ltd.**

(Ho-dong), 113, Yejik-ro, Cheoin-gu, Yongin-si,
Gyeonggi-do, Korea
Tel: +82-1551-9871
Fax: +82-31-624-9501

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Test Mode	Frequency [MHz]	Measured Output Power [dBm]	Duty Cycle Factor [dB]	Result Output Power [dBm]	Limit [dBm]	Margin [dB]
802.11ac_VHT40	5 190	13.72	0.19	13.91	24.00	10.09
	5 230	13.60	0.19	13.79	24.00	10.21
	5 270	13.32	0.19	13.51	24.00	10.49
	5 310	13.85	0.19	14.04	24.00	9.96
	5 510	14.34	0.19	14.53	24.00	9.47
	5 590	13.88	0.19	14.07	24.00	9.93
	5 670	13.73	0.19	13.92	24.00	10.08
	5 710	13.84	0.19	14.03	24.00	9.97
	5 755	14.65	0.19	14.84	30.00	15.16
	5 795	14.32	0.19	14.51	30.00	15.49
802.11ac_VHT80	5 210	14.13	0.37	14.50	24.00	9.50
	5 290	11.90	0.37	12.27	24.00	11.73
	5 530	14.54	0.37	14.91	24.00	9.09
	5 610	12.80	0.37	13.17	24.00	10.83
	5 690	12.99	0.37	13.36	24.00	10.64
	5 775	13.90	0.37	14.27	30.00	15.73

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(Ho-dong), 113, Yejik-ro, Cheoin-gu, Yongin-si,
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Tel: +82-1551-9871
Fax: +82-31-624-9501

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ANT0 + ANT1 (MIMO)

Test Mode	Frequency [MHz]	Measured Output Power [dBm]	Duty Cycle Factor [dB]	Result Output Power [dBm]	Limit [dBm]	Margin [dB]
802.11n _HT20	5 180	14.90	0.09	14.99	24.00	9.01
	5 200	15.08	0.09	15.17	24.00	8.83
	5 240	14.37	0.09	14.46	24.00	9.54
	5 260	18.32	0.09	18.41	24.00	5.59
	5 300	18.49	0.09	18.58	24.00	5.42
	5 320	18.34	0.09	18.43	24.00	5.57
	5 500	19.04	0.09	19.13	24.00	4.87
	5 600	18.13	0.09	18.22	24.00	5.78
	5 700	17.88	0.09	17.97	24.00	6.03
	5 720	16.99	0.09	17.08	24.00	6.92
	5 745	18.69	0.09	18.78	30.00	11.22
	5 785	18.11	0.09	18.20	30.00	11.80
	5 825	18.52	0.09	18.61	30.00	11.39
802.11ac _VHT20	5 180	15.01	0.09	15.10	24.00	8.90
	5 200	14.99	0.09	15.08	24.00	8.92
	5 240	14.37	0.09	14.46	24.00	9.54
	5 260	16.98	0.09	17.07	24.00	6.93
	5 300	17.11	0.09	17.20	24.00	6.80
	5 320	16.86	0.09	16.95	24.00	7.05
	5 500	17.52	0.09	17.61	24.00	6.39
	5 600	16.39	0.09	16.48	24.00	7.52
	5 700	16.40	0.09	16.49	24.00	7.51
	5 720	15.36	0.09	15.45	24.00	8.55
	5 745	17.29	0.09	17.38	30.00	12.62
	5 785	16.90	0.09	16.99	30.00	13.01
802.11n _HT40	5 825	17.26	0.09	17.35	30.00	12.65
	5 190	15.60	0.19	15.79	24.00	8.21
	5 230	15.37	0.19	15.56	24.00	8.44
	5 270	15.22	0.19	15.41	24.00	8.59
	5 310	15.56	0.19	15.75	24.00	8.25
	5 510	16.15	0.19	16.34	24.00	7.66
	5 590	15.44	0.19	15.63	24.00	8.37
	5 670	14.72	0.19	14.91	24.00	9.09
	5 710	15.30	0.19	15.49	24.00	8.51
	5 755	18.49	0.19	18.68	30.00	11.32
	5 795	18.07	0.19	18.26	30.00	11.74

**CTK Co., Ltd.**

(Ho-dong), 113, Yejik-ro, Cheoin-gu, Yongin-si,
Gyeonggi-do, Korea
Tel: +82-1551-9871
Fax: +82-31-624-9501

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Test Mode	Frequency [MHz]	Measured Output Power [dBm]	Duty Cycle Factor [dB]	Result Output Power [dBm]	Limit [dBm]	Margin [dB]
802.11ac_VHT40	5 190	15.68	0.19	15.87	24.00	8.13
	5 230	15.42	0.19	15.61	24.00	8.39
	5 270	15.36	0.19	15.55	24.00	8.45
	5 310	15.75	0.19	15.94	24.00	8.06
	5 510	17.19	0.19	17.38	24.00	6.62
	5 590	16.70	0.19	16.89	24.00	7.11
	5 670	15.74	0.19	15.93	24.00	8.07
	5 710	16.26	0.19	16.45	24.00	7.55
	5 755	17.17	0.19	17.36	30.00	12.64
	5 795	16.66	0.19	16.85	30.00	13.15
802.11ac_VHT80	5 210	16.06	0.37	16.43	24.00	7.57
	5 290	14.02	0.37	14.39	24.00	9.61
	5 530	16.95	0.37	17.32	24.00	6.68
	5 610	15.71	0.37	16.08	24.00	7.92
	5 690	15.34	0.37	15.71	24.00	8.29
	5 775	16.30	0.37	16.67	30.00	13.33

See next pages for actual measured spectrum plots.