TEST REPORT

Report No.:	BCTC2408996918-7E
Applicant:	Radxa Computer (Shenzhen) Co.,Ltd.
Product Name:	Radxa ROCK 5C
Test Model:	Radxa ROCK 5C D16R26
Tested Date:	2024-08-21 to 2024-08-30
Issued Date:	2024-09-12

Shenzhen BCTC Testing Co., Ltd.

Product Name:	Radxa ROCK 5C
Trademark:	radxa®
Model/Type reference:	Radxa ROCK 5C D16R26 Radxa ROCK 5C D1R26, Radxa ROCK 5C D2R26, Radxa ROCK 5C D4R26, Radxa ROCK 5C D8R26, Radxa ROCK 5C D32R26, Radxa ROCK 5C D1R27, Radxa ROCK 5C D2R27, Radxa ROCK 5C D4R27, Radxa ROCK 5C D8R27, Radxa ROCK 5C D16R27, Radxa ROCK 5C D32R27
Prepared For:	Radxa Computer (Shenzhen) Co.,Ltd.
Address:	1602, Smart Valley, tiezai Road, Gongle community, Xixiang, Baoan, Shenzhen
Manufacturer:	Radxa Computer (Shenzhen) Co.,Ltd.
Address:	1602, Smart Valley, tiezai Road, Gongle community, Xixiang, Baoan, Shenzhen
Prepared By:	Shenzhen BCTC Testing Co., Ltd.
Address:	1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan 1st Road, Zhancheng, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China
Sample Received Date:	2024-08-21
Sample tested Date:	2024-08-21 to 2024-08-30
Issue Date:	2024-09-12
Report No.:	BCTC2408996918-7E
Test Standards	ETSI EN 300 440 V2.2.1 (2018-07)
Test Results	PASS
Remark:	This is WIFI-5.8GHz band radio test report.

Tested by:

Brave Zeng/ Project Handler

Approved by:

Zero Zhou/Reviewer

The test report is effective only with both signature and specialized stamp. This result(s) shown in this report refer only to the sample(s) tested. Without written approval of Shenzhen BCTC Testing Co., Ltd, this report can't be reproduced except in full. The tested sample(s) and the sample information are provided by the client.

Table Of Content

(Note: N/A Means Not Applicable)

1. Version

Report No.	Issue Date	Description	Approved
BCTC2408996918-7E	2024-09-12	Original	Valid

2. Test Summary

The Product has been tested according to the following specifications:

No.	Test Parameter	Clause No.	Results
Transmitter Parameters			
1	Equivalent isotropically radiated power (e.i.r.p.)	4.2.2	PASS
2	Permitted range of operating frequencies	4.2.3	PASS
3	Spurious radiation for transmitter	4.2.4	PASS
4	Duty Cycle	4.2.5.4	No Restriction
5	Additional requirements for FHSS equipment	4.2.6	N/A[1]
6	Adjacent channel selectivity	4.3.3	N/A[2]
7	Blocking or desensitization	4.3.4	PASS
8	Spurious radiation for receiver	4.3.5	PASS
9	Spectrum access techniques	4.4	N/A[3]
10	GBSAR antenna pattern	4.6.4	N/A[4]
11	Limits for GBSAR	Annex I	N/A[4]

This product is equipment Category 2 receivers
Note[1]:Applies to Equipment utilizing FHSS modulation
Note[2]:Applies to equipment Category 1 receivers
Note[3]:Applies to Equipment which are not using duty cycle restrictions for media access
Note[4]:Applies only GBSAR systems

3. Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

RF frequency	1×10^{-7}
RF power, conducted	1.38dB
Conducted spurious emission (30MHz-1GHz)	1.28dB
Conducted spurious emission (1GHz-18GHz)	1.576dB
Radiated Spurious emission (30MHz-1GHz)	4.3dB
Radiated Spurious emission (1GHz-18GHz)	4.5dB
Temperature	0.59℃
Humidity	5.3%

4. Product Information And Test Setup

4.1 Product Information

Model/Type reference	Radxa ROCK 5C D16R26 Radxa ROCK 5C D1R26, Radxa ROCK 5C D2R26, Radxa ROCK 5C D4R26, Radxa ROCK 5C D8R26, Radxa ROCK 5C D32R26, Radxa ROCK 5C D1R27, Radxa ROCK 5C D2R27, Radxa ROCK 5C D4R27, Radxa ROCK 5C D8R27, Radxa ROCK 5C D16R27, Radxa ROCK 5C D32R27
Model differences:	All models are the same circuit and RF module, only the model name and memory size and SoC differ.
Hardware Version:	N/A
Software Version:	N/A
Type of Modulation:	WIFI(5.8GHz): IEEE 802.11a/n/ac HT20/ax HT20:5745MHz-5825MHz IEEE 802.11n/ac HT40/ax HT40:5755 MHz-5795MHz IEEE 802.11ac HT80/ax HT80:5775MHz
Max. RF output power:	WIFI(5.8GHz): 10.32 dBm
Type of Modulation:	WIFI(5.8GHz): DSSS, OFDM
Antenna installation:	WIFI(5.8GHz): FPC antenna
Antenna Gain:	WIFI(5.8GHz): 1.42 dBi Remark: ☐ The antenna gain of the product comes from the antenna report provided by the customer, and the test data is affected by the customer information. ☒ The antenna gain of the product is provided by the customer, and the test data is affected by the customer information.
Ratings:	DC 5V from adapter

Cable of Product

No.	Cable Type	Quantity	Provider	Length (m)	Shielded	Note
1	--	--	Applicant	---	No	With a ferrite ring in mid Detachable
2	--	--	BCTC	--	No	--

4.2 Test Setup Configuration

See test photographs attached in EUT TEST SETUP PHOTOGRAPHS for the actual connections between Product and support equipment.

4.3 Support Equipment

No.	Device Type	Brand	Model	Series No.	Note
1.	Adapter	HP	TPN-LA22	---	---
2.	keyboard	Logitech	1641MG01DLZ8	---	---
3.	Mouse	Logitech	M-U0026	---	---
4.	Earphone	IHIP	SBGE1	---	---
5.	U disk	SanDisk	32G	---	---
6.	Router	HUAWEI	WS318	---	---
7.	HDMI Cable	Belkin	HDMI2.0	---	---
8.	Display	ChangHong	55DBK	---	---

Notes:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

4.4 Channel List

CH	Frequency (MHz)	CH	Frequency (MHz)	CH	Frequency (MHz)	CH	Frequency (MHz)
149	5745	151	5755	153	5765	157	5785
159	5795	161	5805	165	5825		

4.5 Test Mode

All test mode(s) and condition(s) mentioned were considered and evaluated respectively by performing full tests, the worst data were recorded and reported.

Test mode	Low channel	Middle channel	High channel
Transmitting(802.11a)	5745MHz	5785MHz	5825MHz
Transmitting(802.11n HT20)	5745MHz	5785MHz	5825MHz
Transmitting(802.11n HT40)	5755MHz	/	5795MHz
Transmitting(802.11ac HT20)	5745MHz	5785MHz	5825MHz
Transmitting(802.11ac HT40)	5755MHz	/	5795MHz
Transmitting(802.11ac HT80)	/	5775MHz	/
Transmitting(802.11ax HT20)	5745MHz	5785MHz	5825MHz
Transmitting(802.11ax HT40)	5755MHz	/	5795MHz
Transmitting(802.11ax HT80)	/	5775MHz	/
Receiving(802.11a)	5745MHz	5785MHz	5825MHz
Receiving(802.11n HT20)	5745MHz	5785MHz	5825MHz
Receiving(802.11n HT40)	5755MHz	/	5795MHz
Receiving(802.11ac HT20)	5745MHz	5785MHz	5825MHz
Receiving(802.11ac HT40)	5755MHz	/	5795MHz
Receiving(802.11ac HT80)	/	5775MHz	/
Receiving(802.11ax HT20)	5745MHz	5785MHz	5825MHz
Receiving(802.11ax HT40)	5755MHz	/	5795MHz
Receiving(802.11ax HT80)	/	5775MHz	/

4.6 Test Environment

1. Normal Test Conditions:

Humidity(%):	54
Atmospheric Pressure(kPa):	101
Temperature(℃):	26
Test Voltage(DC):	5V

2.Extreme Test Conditions:
For tests at extreme temperatures, measurements shall be made over the extremes of the operating temperature range as declared by the manufacturer.
For tests at extreme voltages, measurements shall be made over the extremes of the power source voltage range as declared by the manufacturer.

Test Conditions	LTLV	LTHV	HTLV	HTHV
Temperature (℃)	0	0	45	45
Test Voltage (DC)	4.5	5.5	4.5	5.5

5. Test Facility And Test Instrument Used

5.1 Test Facility

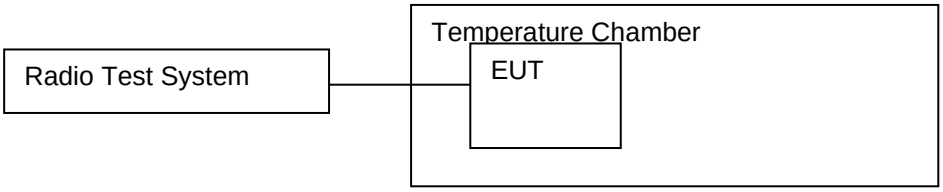
All measurement facilities used to collect the measurement data are located at 1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan 1st Road, Zhancheng, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China. The site and apparatus are constructed in conformance with the requirements of ANSI C63.4 and CISPR 16-1-1 other equivalent standards.

5.2 Test Instrument Used

Item	Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	966 chamber	ChengYu	966 Room	966	May 15, 2023	May 14, 2026
2	Receiver	R&S	ESR3	102075	May 16, 2024	May 15, 2025
3	Receiver	R&S	ESRP	101154	May 16, 2024	May 15, 2025
4	Amplifier	Schwarzbeck	BBV9744	9744-0037	May 16, 2024	May 15, 2025
5	TRILOG Broadband Antenna	Schwarzbeck	VULB 9163	942	May 21, 2024	May 20, 2025
6	Loop Antenna	Schwarzbeck	FMZB1519B	00014	May 21, 2024	May 20, 2025
7	Amplifier	SKET	LAPA_01G18G-45dB	SK2021040901	May 16, 2024	May 15, 2025
8	Horn Antenna	Schwarzbeck	BBHA9120D	1541	May 21, 2024	May 20, 2025
9	Preamplifier	MITEQ	TTA1840-35-HG	2034381	May 16, 2024	May 15, 2025
10	Horn antenna	Schwarzbeck	BBHA9170	00822	May 21, 2024	May 20, 2025
11	Spectrum Analyzer 9kHz-40GHz	R&S	FSP 40	100363	May 16, 2024	May 15, 2025
12	Software	Frad	EZ-EMC	FA-03A2 RE	\	\
13	Spectrum Analyzer	Keysight	N9020A	MY49100060	May 16, 2024	May 15, 2025
14	Signal Generator	Keysight	N5182B	MY56200519	May 16, 2024	May 15, 2025
15	Signal Generator	Keysight	83711B	US37100131	May 16, 2024	May 15, 2025
16	Communication test set	R&S	CMW500	126173	Nov. 13. 2023	Nov. 12, 2024
17	D.C. Power Supply	LongWei	TPR-6405D	\	Nov. 13. 2023	Nov. 12, 2024
18	Programmable constant temperature and humidity test chamber	DGBELL	BTKS5-150C	\	Jul. 01, 2024	Jun. 30, 2025
19	Radio frequency control box	MAIWEI	MW100-RFCB	\	\	\
20	Software	MAIWEI	MTS 8310	\	\	\

6. Equivalent Isotropically Radiated Power (E.I.R.P.)

6.1 Block Diagram Of Test Setup



6.2 Limit

25mW(14dBm)

6.3 Test Procedure

Step 1:
• using a suitable means, the output of the transmitter shall be coupled to a matched diode detector;
• the output of the diode detector shall be connected to the vertical channel of an oscilloscope;
• the combination of the diode detector and the oscilloscope shall be capable of faithfully reproducing the envelope peaks and the duty cycle of the transmitter output signal;
• the observed duty cycle of the transmitter (Tx on/(Tx on + Tx off)) shall be noted as x, (0 < x < 1) and recorded.
Step 2:
• the average output power of the transmitter shall be determined using a wideband, calibrated RF power meter with a matched thermocouple detector or an equivalent thereof and, where applicable, with an integration period that exceeds the repetition period of the transmitter by a factor 5 or more. The observed value shall be recorded as "A" (in dBm);
• the e.i.r.p. shall be calculated from the above measured power output A, the observed duty cycle x, and the applicable antenna assembly gain "G" in dBi, according to the formula:
- P = A + G + 10 log (1/x);

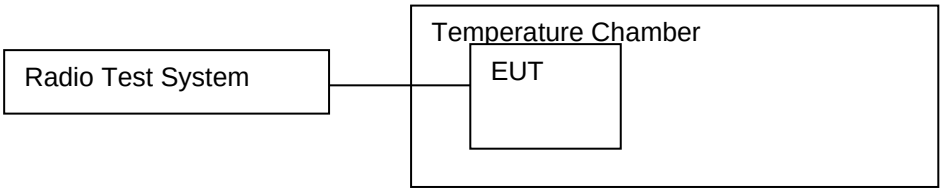
6.4 Test Result

Modulation	Test conditions (Temp. & Volt.)	Low Channel	Middle Channel	High Channel
		EIRP	EIRP	EIRP
802.11a	NVNT	**10.32**	9.52	8.23
	LVLT	10.03	9.17	7.93
	LVHT	9.98	9.03	7.83
	HVLT	9.74	8.79	7.83
	HVHT	9.52	8.76	7.76
802.11n(HT20)	NVNT	9.34	8.71	7.43
	LVLT	9.04	8.61	7.36
	LVHT	9.00	8.37	7.03
	HVLT	8.96	8.30	7.02
	HVHT	8.69	8.02	6.73
802.11n(HT40)	NVNT	7.98	/	7.06
	LVLT	7.88	/	6.80
	LVHT	7.55	/	6.78
	HVLT	7.35	/	6.67
	HVHT	7.01	/	6.63
802.11ac(HT20)	NVNT	8.26	8.56	7.35
	LVLT	8.10	8.39	7.15
	LVHT	7.95	8.22	7.08
	HVLT	7.93	7.87	7.03
	HVHT	7.91	7.53	6.84
802.11ac(HT40)	NVNT	8.02	/	6.90
	LVLT	7.95	/	6.78
	LVHT	7.69	/	6.77
	HVLT	7.48	/	6.44
	HVHT	7.34	/	6.33
802.11ac(HT80)	NVNT	/	6.02	/
	LVLT	/	5.84	/
	LVHT	/	5.81	/
	HVLT	/	5.47	/
	HVHT	/	5.31	/
802.11ax(HT20)	NVNT	9.24	8.50	6.92
	LVLT	8.92	8.31	6.77
	LVHT	8.86	8.01	6.63
	HVLT	8.53	7.95	6.42
	HVHT	8.23	7.78	6.13
802.11ax(HT40)	NVNT	7.83	/	6.84
	LVLT	7.57	/	6.79
	LVHT	7.52	/	6.54
	HVLT	7.17	/	6.44
	HVHT	6.91	/	6.12
802.11ax(HT80)	NVNT	/	5.57	/
	LVLT	/	5.55	/

	LVHT	/	5.45	/
	HVLT	/	5.35	/
	HVHT	/	5.07	/
Limit		≤25mW (14dBm)		
Remark: P = A + G + Y,G=1.42 dBi, x=100%				

7. Permitted Range Of Operating Frequencies

7.1 Block Diagram Of Test Setup



7.2 Limit

5725 MHz to 5875 MHz

7.3 Test Procedure

a) put the spectrum analyser in video averaging mode with a minimum of 50 sweeps selected;
b) select the lowest operating frequency of the equipment under test and activate the transmitter with modulation applied. The RF emission of the equipment shall be displayed on the spectrum analyser;
c) using the marker of the spectrum analyser, find the lowest frequency below the operating frequency at which the spectral power density drops below the level given in clause 4.2.3. This frequency shall be recorded in the test report;
d) select the highest operating frequency of the equipment under test and find the highest frequency at which the spectral power density drops below the value given in clause 4.2.3. This frequency shall be recorded in the test report;
e) the difference between the frequencies measured in steps c) and d) is the operating frequency range. It shall be recorded in the test report.

7.4 Test Result

802.11 a

Test Conditions	Frequencies (MHz) at -30dBm/30kHz (EIRP)		Occupied Channel (MHz)
	Lowest Frequency (fL)	Highest Frequency (fH)	
Normal	5736.28	/	17.197
	/	5833.48	17.238
LTLV	5736.09	/	17.025
	/	5832.59	17.150
LTHV	5735.29	/	16.827
	/	5831.91	17.064
HTHV	5734.45	/	16.576
	/	5831.73	16.956
HTLV	5733.64	/	16.417
	/	5830.75	16.946

802.11 ac20

Test Conditions	Frequencies (MHz) at -30dBm/30kHz (EIRP)		Occupied Channel (MHz)
	Lowest Frequency (fL)	Highest Frequency (fH)	
Normal	5735.76	/	18.272
	/	5834.16	18.342
LTLV	5735.09	/	18.250
	/	5833.57	18.109
LTHV	5735.02	/	18.119
	/	5833.41	18.081
HTHV	5734.74	/	18.051
	/	5832.74	17.821
HTLV	5733.98	/	17.871
	/	5831.96	17.728

802.11 ac40

Test Conditions	Frequencies (MHz) at -30dBm/30kHz (EIRP)		Occupied Channel (MHz)
	Lowest Frequency (fL)	Highest Frequency (fH)	
Normal	5736.44	/	37.214
	/	5813.64	37.427
LTLV	5736.14	/	37.064
	/	5813.02	37.349
LTHV	5735.28	/	37.062
	/	5812.67	37.235
HTHV	5734.39	/	37.056
	/	5812.29	37.203
HTLV	5734.01	/	37.024
	/	5811.45	36.983

802.11 ac80

Test Conditions	Frequencies (MHz) at -30dBm/30kHz (EIRP)		Occupied Channel (MHz)
	Lowest Frequency (fL)	Highest Frequency (fH)	
Normal	5736.30	/	76.120
	/	5813.34	76.115
LTLV	5735.72	/	75.958
	/	5812.47	75.914
LTHV	5735.43	/	75.845
	/	5811.90	75.744
HTHV	5735.36	/	75.786
	/	5811.53	75.699
HTLV	5734.90	/	75.657
	/	5811.49	75.485

802.11 ax20

Test Conditions	Frequencies (MHz) at -30dBm/30kHz (EIRP)		Occupied Channel (MHz)
	Lowest Frequency (fL)	Highest Frequency (fH)	
Normal	5735.36	/	19.320
	/	5834.72	19.349
LTLV	5734.45	/	19.111
	/	5834.13	19.295
LTHV	5733.85	/	18.992
	/	5833.27	19.160
HTHV	5733.83	/	18.893
	/	5833.26	18.951
HTLV	5733.64	/	18.887
	/	5832.66	18.938

802.11 ax40

Test Conditions	Frequencies (MHz) at -30dBm/30kHz (EIRP)		Occupied Channel (MHz)
	Lowest Frequency (fL)	Highest Frequency (fH)	
Normal	5735.56	/	38.486
	/	5814.20	38.614
LTLV	5734.94	/	38.259
	/	5813.29	38.426
LTHV	5734.28	/	38.098
	/	5812.48	38.344
HTHV	5733.87	/	37.804
	/	5812.36	38.318
HTLV	5732.87	/	37.761
	/	5812.33	38.074

802.11 ax80

Test Conditions	Frequencies (MHz) at -30dBm/30kHz (EIRP)		Occupied Channel (MHz)
	Lowest Frequency (fL)	Highest Frequency (fH)	
Normal	5735.58	/	77.924
	/	5814.42	77.779
LTLV	5735.16	/	77.892
	/	5813.87	77.537
LTHV	5734.33	/	77.670
	/	5813.06	77.266
HTHV	5733.50	/	77.405
	/	5812.18	77.076
HTLV	5733.24	/	77.316
	/	5811.53	76.884

802.11 n20

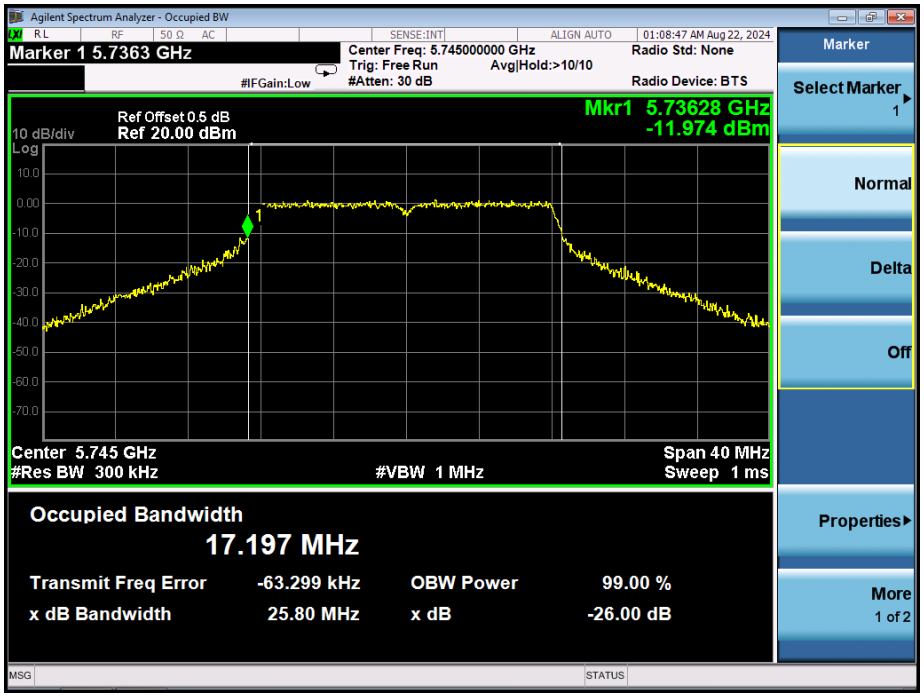
Test Conditions	Frequencies (MHz) at -30dBm/30kHz (EIRP)		Occupied Channel (MHz)
	Lowest Frequency (fL)	Highest Frequency (fH)	
Normal	5735.92	/	18.274
	/	5833.08	18.251
LTLV	5735.23	/	18.042
	/	5832.39	18.164
LTHV	5734.82	/	18.023
	/	5831.72	17.878
HTHV	5734.72	/	17.884
	/	5831.68	17.613
HTLV	5734.59	/	17.832
	/	5831.57	17.326

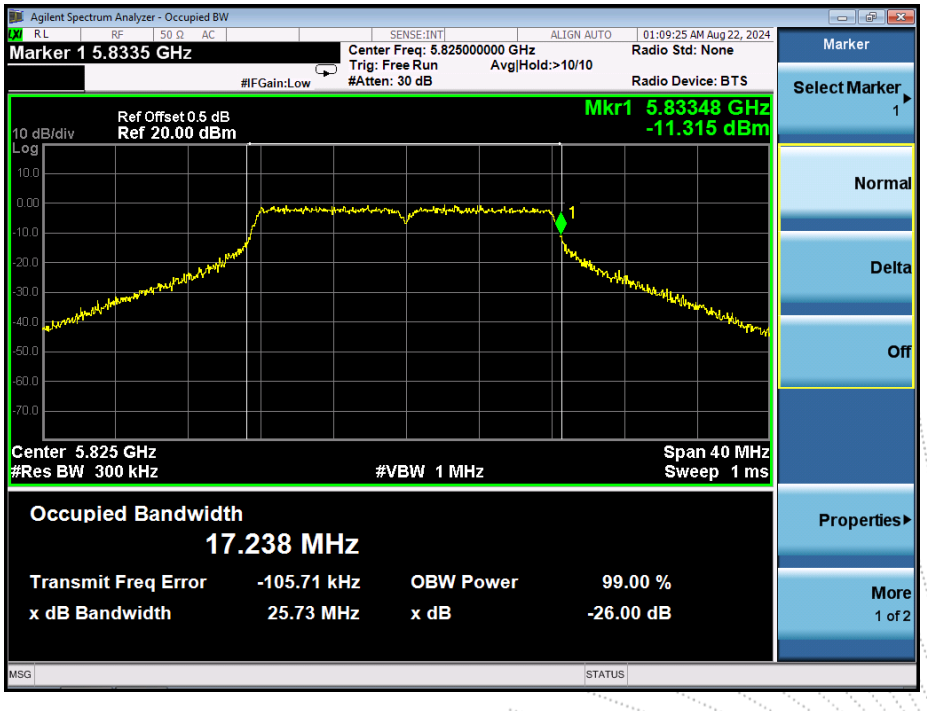
802.11 n40

Test Conditions	Frequencies (MHz) at -30dBm/30kHz (EIRP)		Occupied Channel (MHz)
	Lowest Frequency (fL)	Highest Frequency (fH)	
Normal	5736.24	/	37.385
	/	5813.48	37.314
LTLV	5735.91	/	37.222
	/	5812.67	37.195
LTHV	5735.69	/	36.992
	/	5812.53	36.924
HTHV	5735.22	/	36.967
	/	5812.48	36.775
HTLV	5735.14	/	36.717
	/	5812.04	36.550

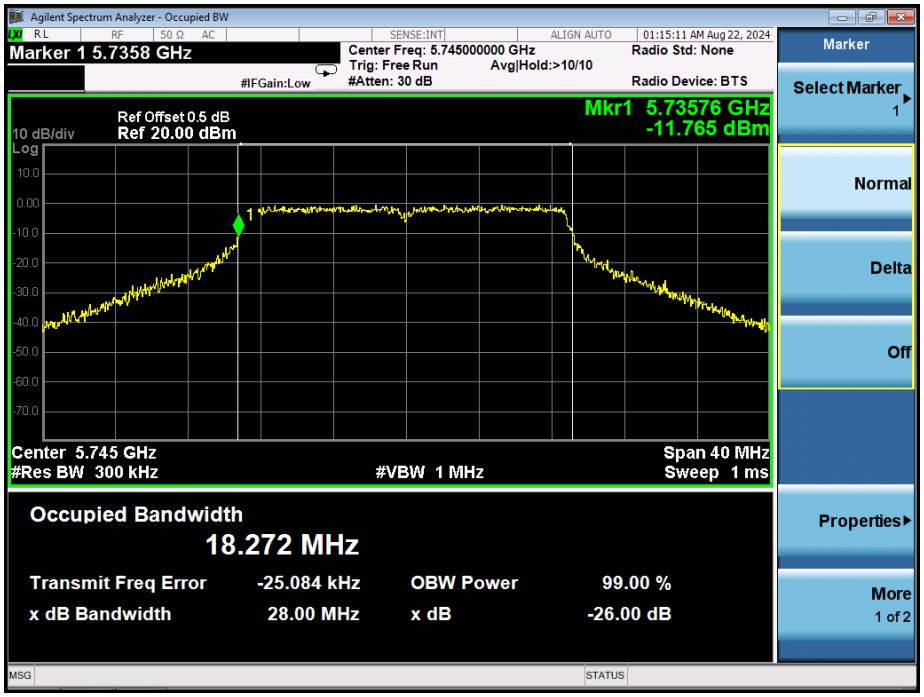
Test plots:

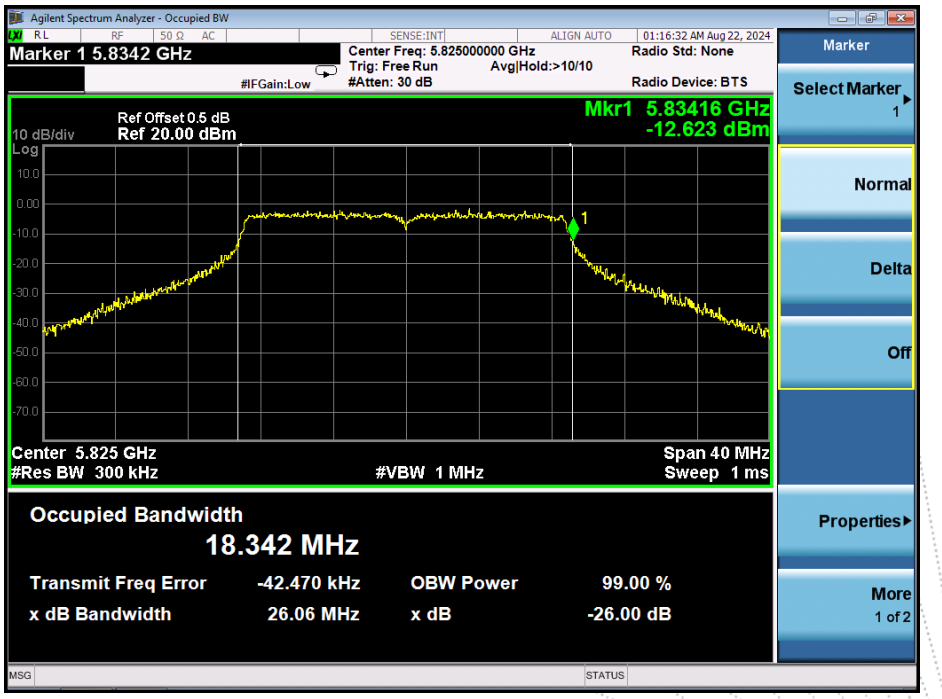
802.11 a



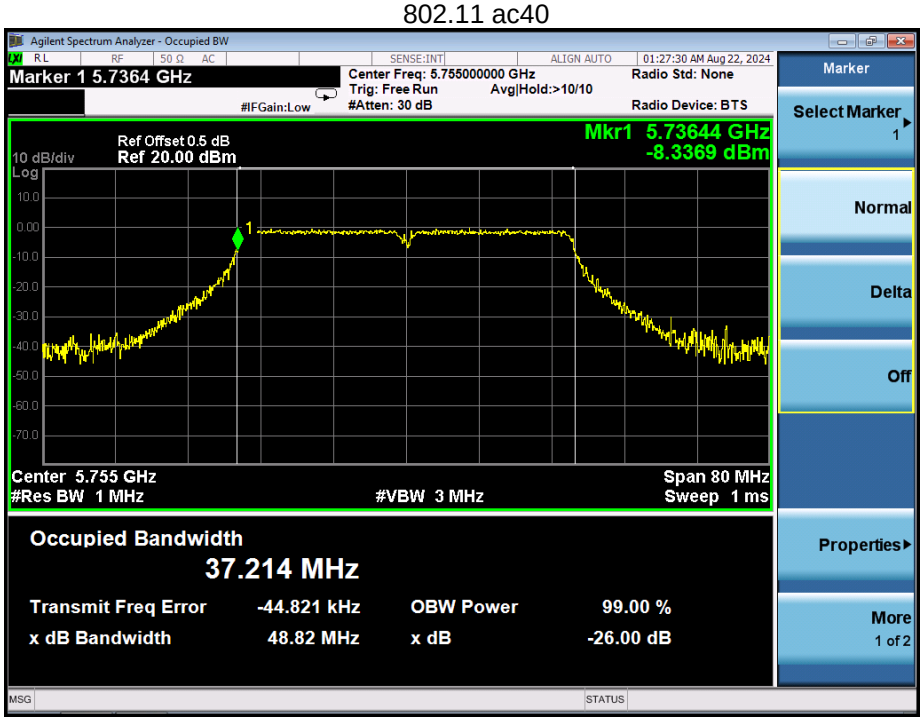


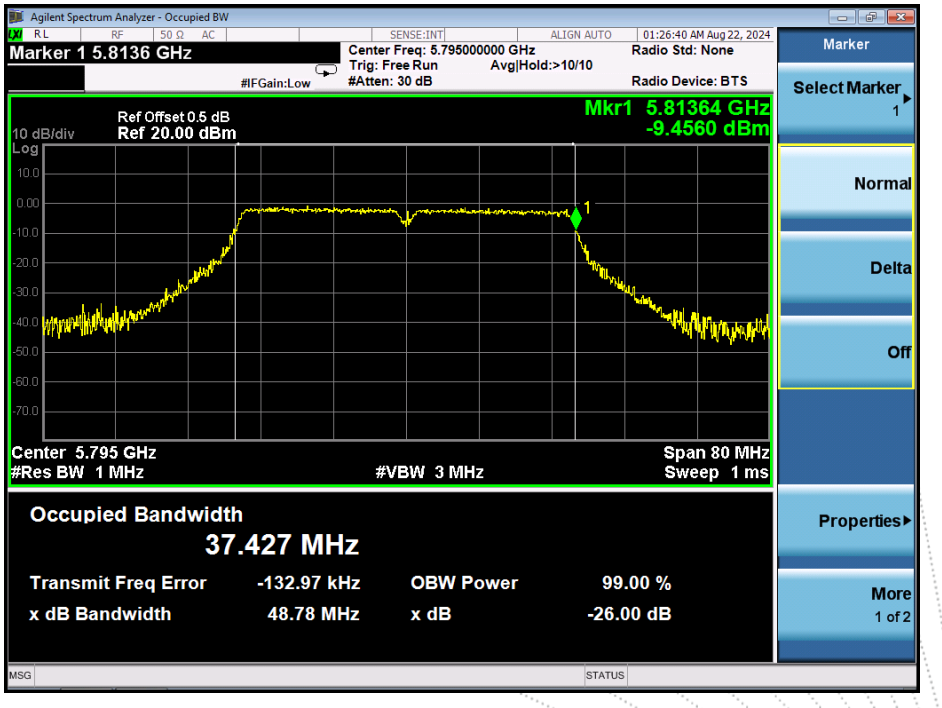
802.11 ac20


Agilent Spectrum Analyzer - Occupied BW
Marker 1 5.7358 GHz
Center Freq: 5.745000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 30 dB
Radio Std: None
Radio Device: BTS
01:15:11 AM Aug 22, 2024
Ref Offset 0.5 dB
10 dB/div
Ref 20.00 dBm
Mkr1 5.73576 GHz
-11.765 dBm
Center 5.745 GHz
#Res BW 300 kHz
#VBW 1 MHz
Span 40 MHz
Sweep 1 ms
Occupied Bandwidth
18.272 MHz
Transmit Freq Error -25.084 kHz
OBW Power 99.00 %
x dB Bandwidth 28.00 MHz
x dB -26.00 dB
Marker
Select Marker
Normal
Delta
Off
Properties
More
1 of 2

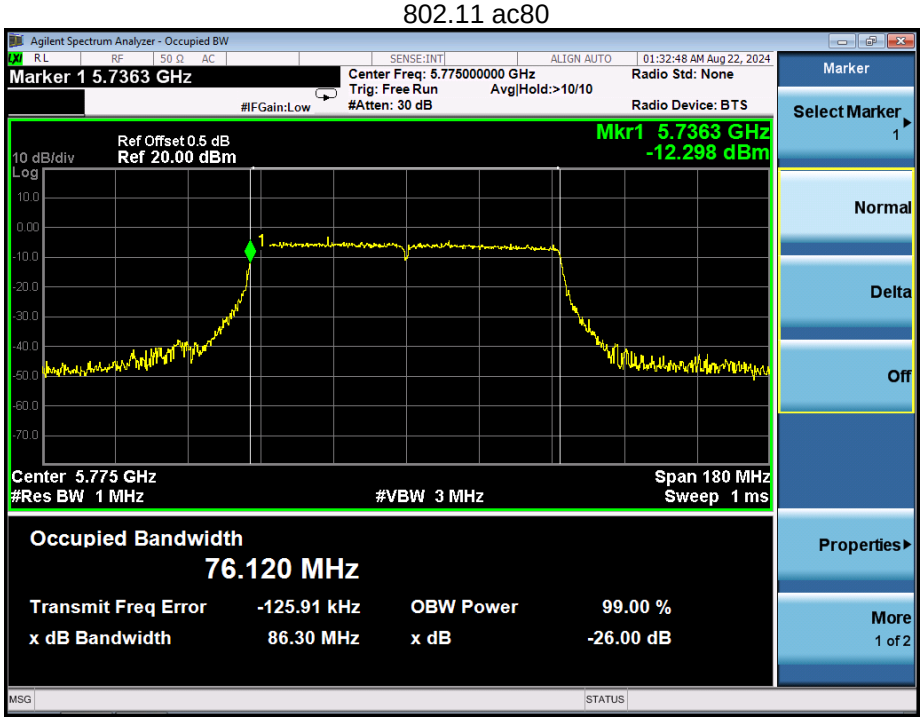

Agilent Spectrum Analyzer - Occupied BW
Marker 1 5.8342 GHz
Center Freq: 5.825000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 30 dB
Radio Std: None
Radio Device: BTS
01:16:32 AM Aug 22, 2024
Ref Offset 0.5 dB
10 dB/div
Ref 20.00 dBm
Mkr1 5.83416 GHz
-12.623 dBm
Center 5.825 GHz
#Res BW 300 kHz
#VBW 1 MHz
Span 40 MHz
Sweep 1 ms
Occupied Bandwidth
18.342 MHz
Transmit Freq Error -42.470 kHz
OBW Power 99.00 %
x dB Bandwidth 26.06 MHz
x dB -26.00 dB
Marker
Select Marker
Normal
Delta
Off
Properties
More
1 of 2

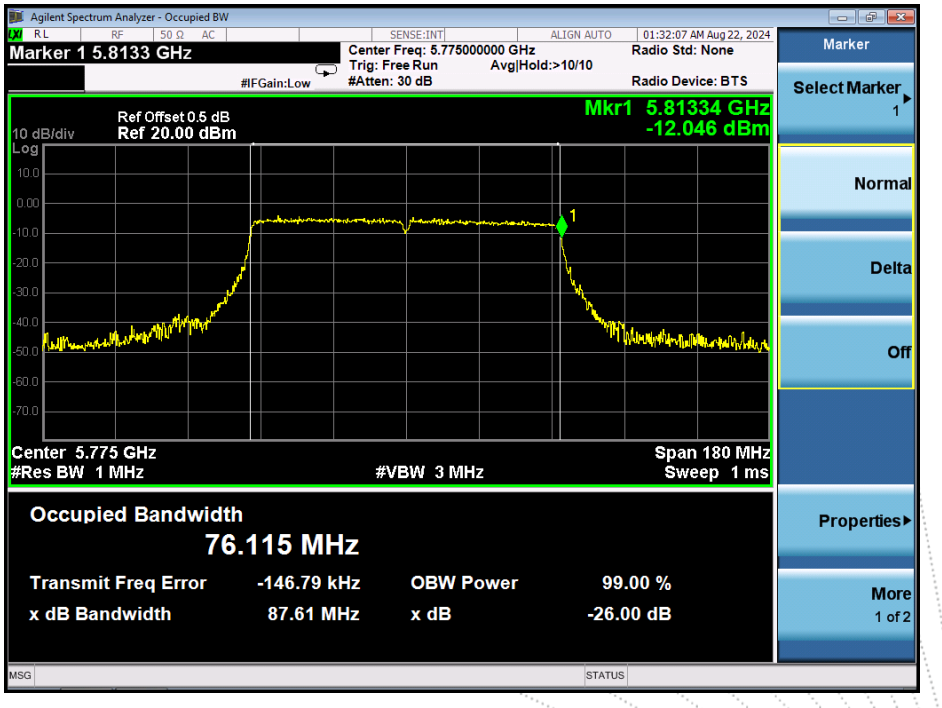
802.11 ac40


Agilent Spectrum Analyzer - Occupied BW
Marker 1 5.7364 GHz
#IFGain:Low
Center Freq: 5.755000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 30 dB
Radio Std: None
Radio Device: BTS
01:27:30 AM Aug 22, 2024
Ref Offset 0.5 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr1 5.73644 GHz
-8.3369 dBm
Center 5.755 GHz
#Res BW 1 MHz
#VBW 3 MHz
Span 80 MHz
Sweep 1 ms
Occupied Bandwidth
37.214 MHz
Transmit Freq Error -44.821 kHz
OBW Power 99.00 %
x dB Bandwidth 48.82 MHz
x dB -26.00 dB
Marker
Select Marker
Normal
Delta
Off
Properties
More
1 of 2
MSG
STATUS

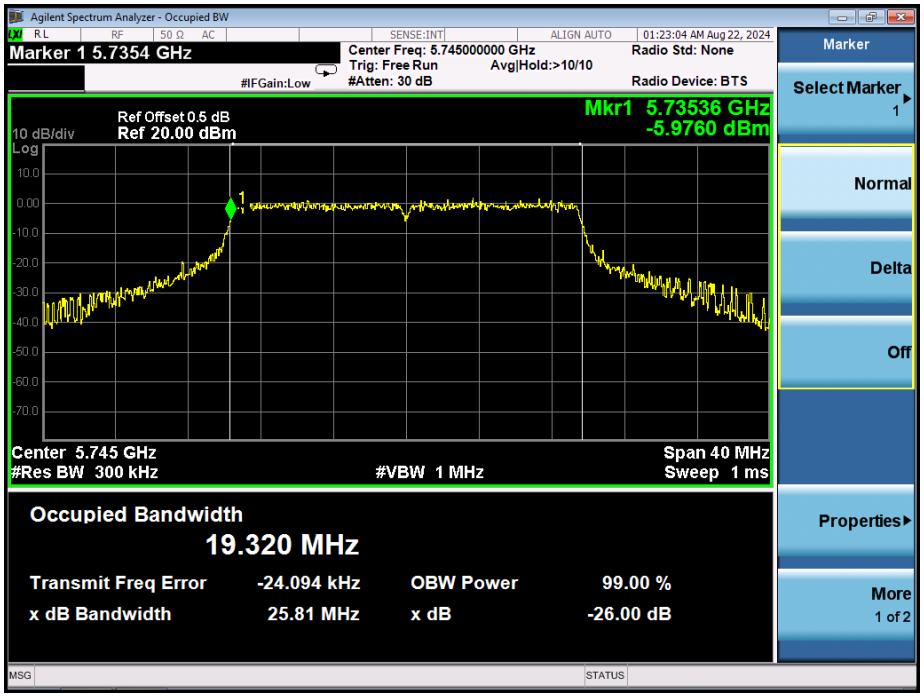

Agilent Spectrum Analyzer - Occupied BW
Marker 1 5.8136 GHz
#IFGain:Low
Center Freq: 5.795000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 30 dB
Radio Std: None
Radio Device: BTS
01:26:40 AM Aug 22, 2024
Ref Offset 0.5 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr1 5.81364 GHz
-9.4560 dBm
Center 5.795 GHz
#Res BW 1 MHz
#VBW 3 MHz
Span 80 MHz
Sweep 1 ms
Occupied Bandwidth
37.427 MHz
Transmit Freq Error -132.97 kHz
OBW Power 99.00 %
x dB Bandwidth 48.78 MHz
x dB -26.00 dB
Marker
Select Marker
Normal
Delta
Off
Properties
More
1 of 2
MSG
STATUS

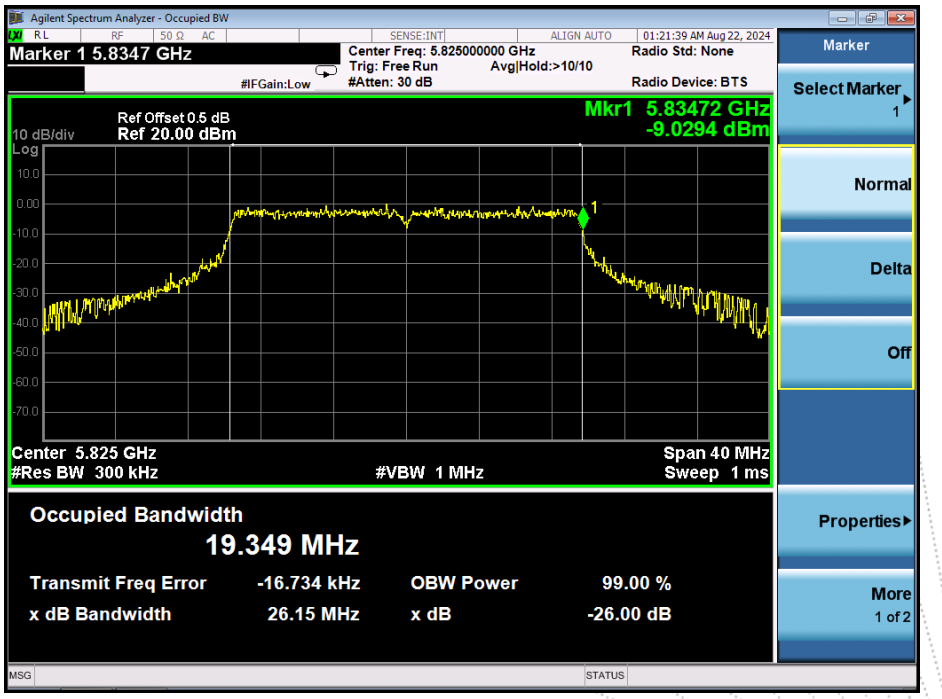
802.11 ac80


Agilent Spectrum Analyzer - Occupied BW
Marker 1 5.7363 GHz
#IFGain:Low
Center Freq: 5.775000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 30 dB
Radio Std: None
Radio Device: BTS
01:32:48 AM Aug 22, 2024
Ref Offset 0.5 dB
10 dB/div
Ref 20.00 dBm
Mkr1 5.7363 GHz
-12.298 dBm
Center 5.775 GHz
#Res BW 1 MHz
#VBW 3 MHz
Span 180 MHz
Sweep 1 ms
Occupied Bandwidth
76.120 MHz
Transmit Freq Error -125.91 kHz
OBW Power 99.00 %
x dB Bandwidth 86.30 MHz
x dB -26.00 dB
Marker
Select Marker
Normal
Delta
Off
Properties
More
1 of 2
MSG
STATUS

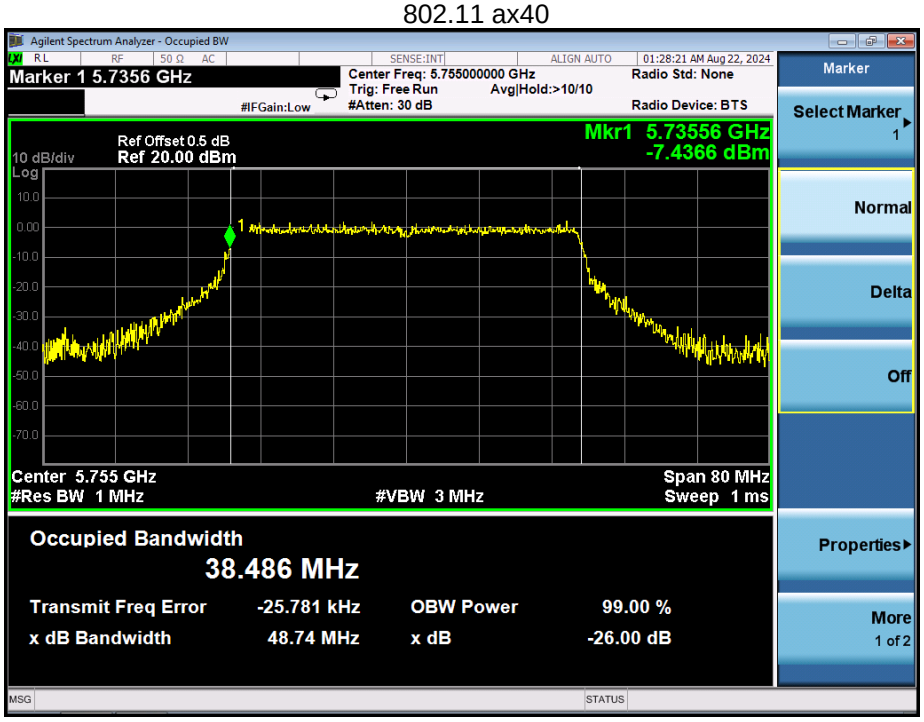

Agilent Spectrum Analyzer - Occupied BW
Marker 1 5.8133 GHz
#IFGain:Low
Center Freq: 5.775000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 30 dB
Radio Std: None
Radio Device: BTS
01:32:07 AM Aug 22, 2024
Ref Offset 0.5 dB
10 dB/div
Ref 20.00 dBm
Mkr1 5.81334 GHz
-12.046 dBm
Center 5.775 GHz
#Res BW 1 MHz
#VBW 3 MHz
Span 180 MHz
Sweep 1 ms
Occupied Bandwidth
76.115 MHz
Transmit Freq Error -146.79 kHz
OBW Power 99.00 %
x dB Bandwidth 87.61 MHz
x dB -26.00 dB
Marker
Select Marker
Normal
Delta
Off
Properties
More
1 of 2
MSG
STATUS

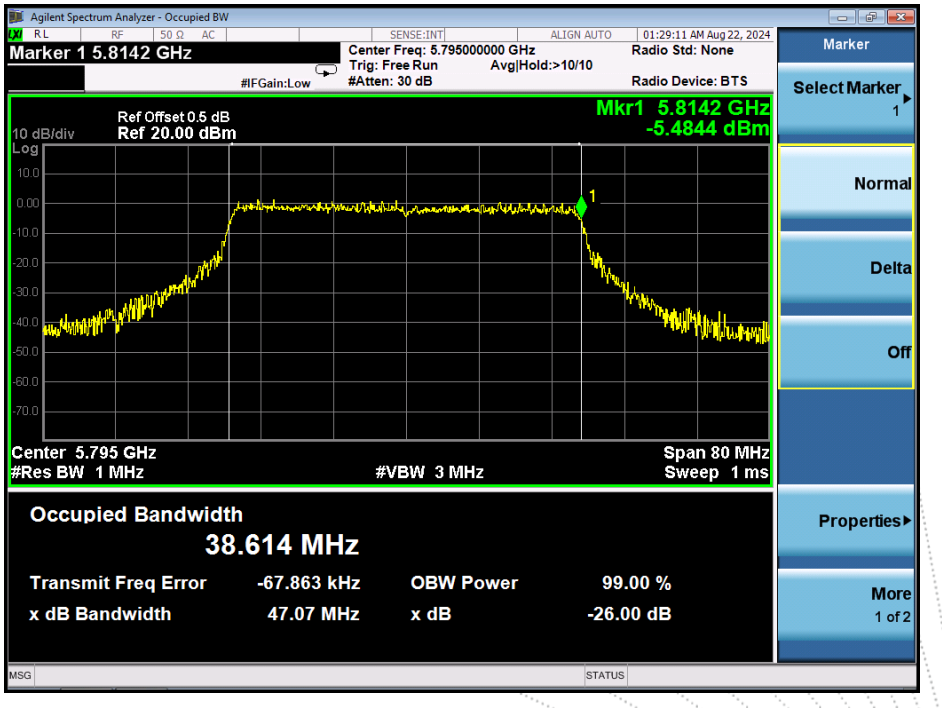
802.11 ax20


Agilent Spectrum Analyzer - Occupied BW
Marker 1 5.7354 GHz
Center Freq: 5.745000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 30 dB
Radio Std: None
Radio Device: BTS
01:23:04 AM Aug 22, 2024
#IFGain:Low
Ref Offset 0.5 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr1 5.73536 GHz
-5.9760 dBm
Center 5.745 GHz
#Res BW 300 kHz
#VBW 1 MHz
Span 40 MHz
Sweep 1 ms
Occupied Bandwidth
19.320 MHz
Transmit Freq Error -24.094 kHz
OBW Power 99.00 %
x dB Bandwidth 25.81 MHz
x dB -26.00 dB
Marker
Select Marker
Normal
Delta
Off
Properties
More
1 of 2
MSG
STATUS

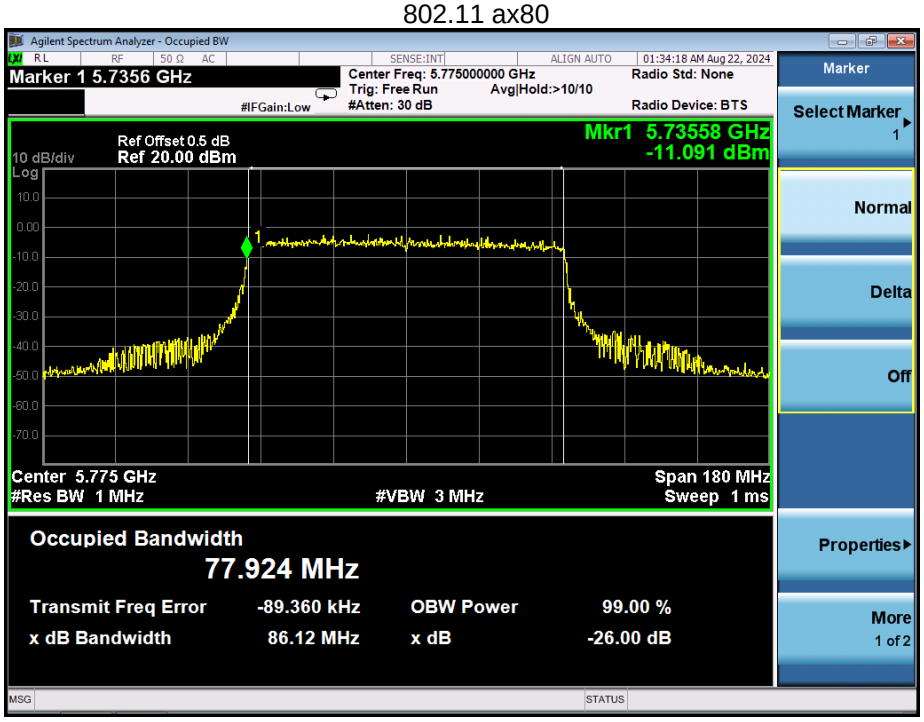

Agilent Spectrum Analyzer - Occupied BW
Marker 1 5.8347 GHz
Center Freq: 5.825000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 30 dB
Radio Std: None
Radio Device: BTS
01:21:39 AM Aug 22, 2024
#IFGain:Low
Ref Offset 0.5 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr1 5.83472 GHz
-9.0294 dBm
Center 5.825 GHz
#Res BW 300 kHz
#VBW 1 MHz
Span 40 MHz
Sweep 1 ms
Occupied Bandwidth
19.349 MHz
Transmit Freq Error -16.734 kHz
OBW Power 99.00 %
x dB Bandwidth 26.15 MHz
x dB -26.00 dB
Marker
Select Marker
Normal
Delta
Off
Properties
More
1 of 2
MSG
STATUS

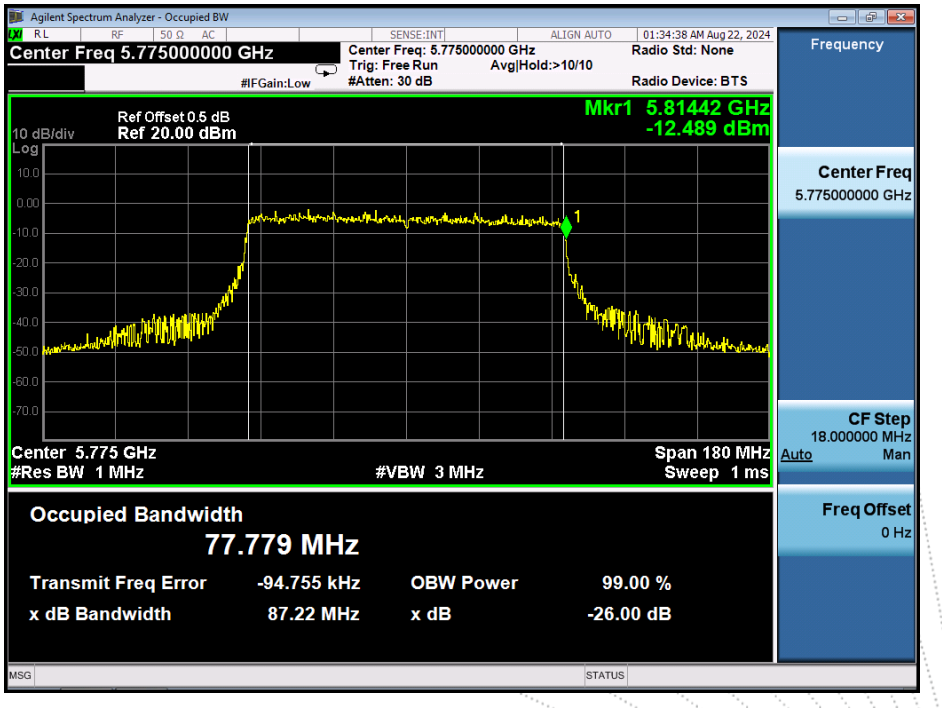
802.11 ax40


Agilent Spectrum Analyzer - Occupied BW
Marker 1 5.7356 GHz
Center Freq: 5.755000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 30 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
01:28:21 AM Aug 22, 2024
Ref Offset 0.5 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr1 5.73556 GHz
-7.4366 dBm
Center 5.755 GHz
#Res BW 1 MHz
#VBW 3 MHz
Span 80 MHz
Sweep 1 ms
Occupied Bandwidth
38.486 MHz
Transmit Freq Error -25.781 kHz
OBW Power 99.00 %
x dB Bandwidth 48.74 MHz
x dB -26.00 dB
Marker
Select Marker
Normal
Delta
Off
Properties
More
1 of 2
MSG
STATUS

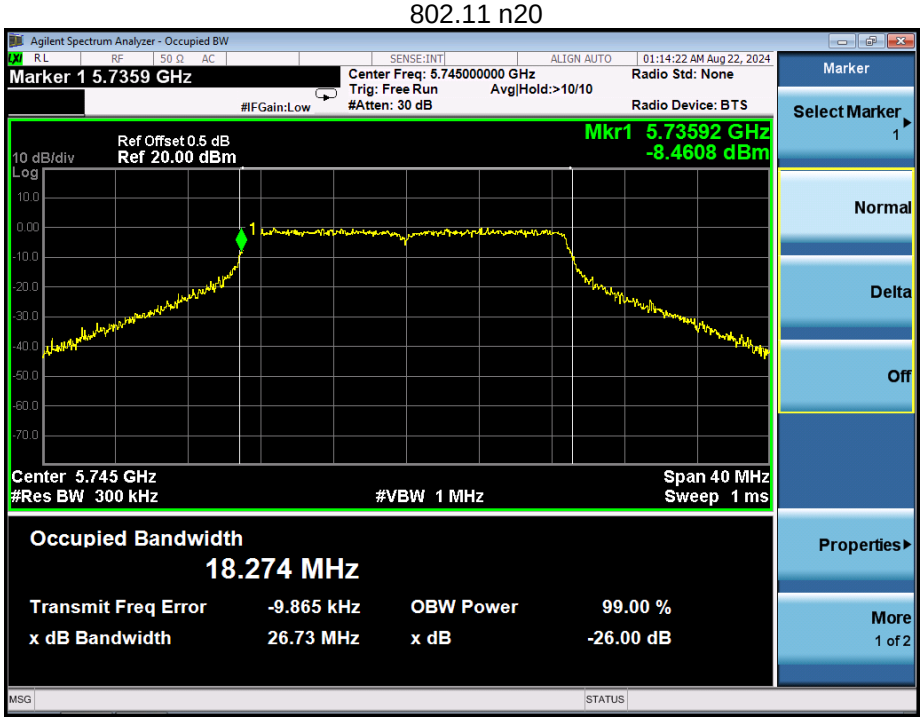

Agilent Spectrum Analyzer - Occupied BW
Marker 1 5.8142 GHz
Center Freq: 5.795000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 30 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
01:29:11 AM Aug 22, 2024
Ref Offset 0.5 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr1 5.8142 GHz
-5.4844 dBm
Center 5.795 GHz
#Res BW 1 MHz
#VBW 3 MHz
Span 80 MHz
Sweep 1 ms
Occupied Bandwidth
38.614 MHz
Transmit Freq Error -67.863 kHz
OBW Power 99.00 %
x dB Bandwidth 47.07 MHz
x dB -26.00 dB
Marker
Select Marker
Normal
Delta
Off
Properties
More
1 of 2
MSG
STATUS

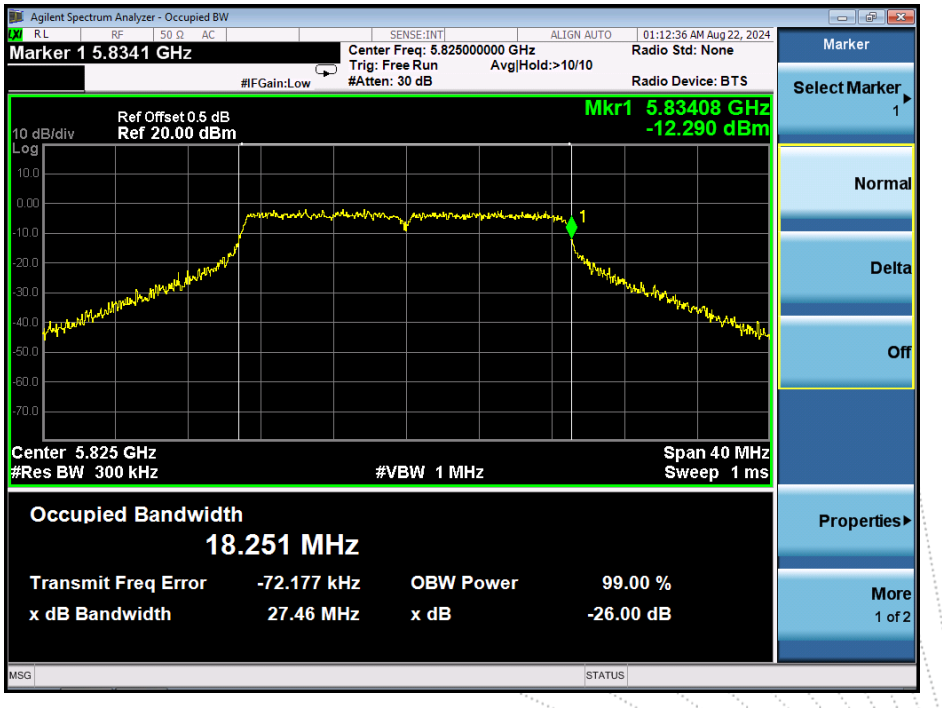
802.11 ax80


Agilent Spectrum Analyzer - Occupied BW
Marker 1 5.7356 GHz
Center Freq: 5.775000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 30 dB
Radio Std: None
Radio Device: BTS
#IFGain:Low
Ref Offset 0.5 dB
10 dB/div
Ref 20.00 dBm
Mkr1 5.73558 GHz
-11.091 dBm
Center 5.775 GHz
#Res BW 1 MHz
#VBW 3 MHz
Span 180 MHz
Sweep 1 ms
Occupied Bandwidth
77.924 MHz
Transmit Freq Error -89.360 kHz
OBW Power 99.00 %
x dB Bandwidth 86.12 MHz
x dB -26.00 dB
Marker
Select Marker
Normal
Delta
Off
Properties
More
1 of 2

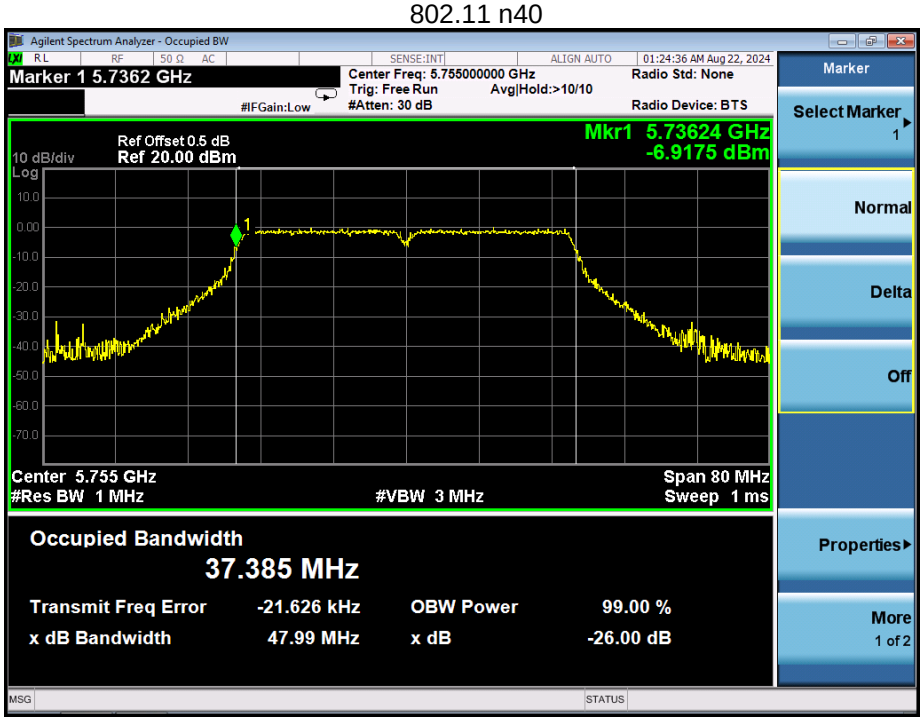

Agilent Spectrum Analyzer - Occupied BW
Center Freq 5.775000000 GHz
Center Freq: 5.775000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 30 dB
Radio Std: None
Radio Device: BTS
#IFGain:Low
Ref Offset 0.5 dB
10 dB/div
Ref 20.00 dBm
Mkr1 5.81442 GHz
-12.489 dBm
Center 5.775 GHz
#Res BW 1 MHz
#VBW 3 MHz
Span 180 MHz
Sweep 1 ms
Occupied Bandwidth
77.779 MHz
Transmit Freq Error -94.755 kHz
OBW Power 99.00 %
x dB Bandwidth 87.22 MHz
x dB -26.00 dB
Frequency
Center Freq
5.775000000 GHz
CF Step
18.000000 MHz
Auto
Man
Freq Offset
0 Hz

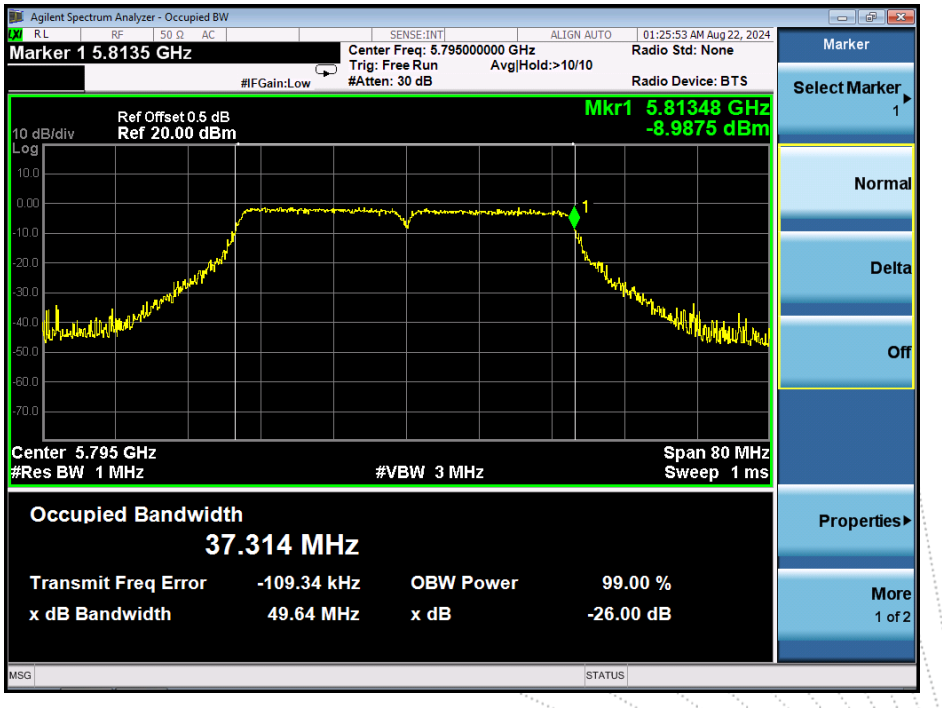
802.11 n20


Agilent Spectrum Analyzer - Occupied BW
Marker 1 5.7359 GHz
#IFGain:Low
Center Freq: 5.745000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 30 dB
Radio Std: None
Radio Device: BTS
01:14:22 AM Aug 22, 2024
Ref Offset 0.5 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr1 5.73592 GHz
-8.4608 dBm
Center 5.745 GHz
#Res BW 300 kHz
#VBW 1 MHz
Span 40 MHz
Sweep 1 ms
Occupied Bandwidth
18.274 MHz
Transmit Freq Error -9.865 kHz
OBW Power 99.00 %
x dB Bandwidth 26.73 MHz
x dB -26.00 dB
Marker
Select Marker
Normal
Delta
Off
Properties
More
1 of 2
MSG
STATUS


Agilent Spectrum Analyzer - Occupied BW
Marker 1 5.8341 GHz
#IFGain:Low
Center Freq: 5.825000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 30 dB
Radio Std: None
Radio Device: BTS
01:12:36 AM Aug 22, 2024
Ref Offset 0.5 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr1 5.83408 GHz
-12.290 dBm
Center 5.825 GHz
#Res BW 300 kHz
#VBW 1 MHz
Span 40 MHz
Sweep 1 ms
Occupied Bandwidth
18.251 MHz
Transmit Freq Error -72.177 kHz
OBW Power 99.00 %
x dB Bandwidth 27.46 MHz
x dB -26.00 dB
Marker
Select Marker
Normal
Delta
Off
Properties
More
1 of 2
MSG
STATUS

802.11 n40

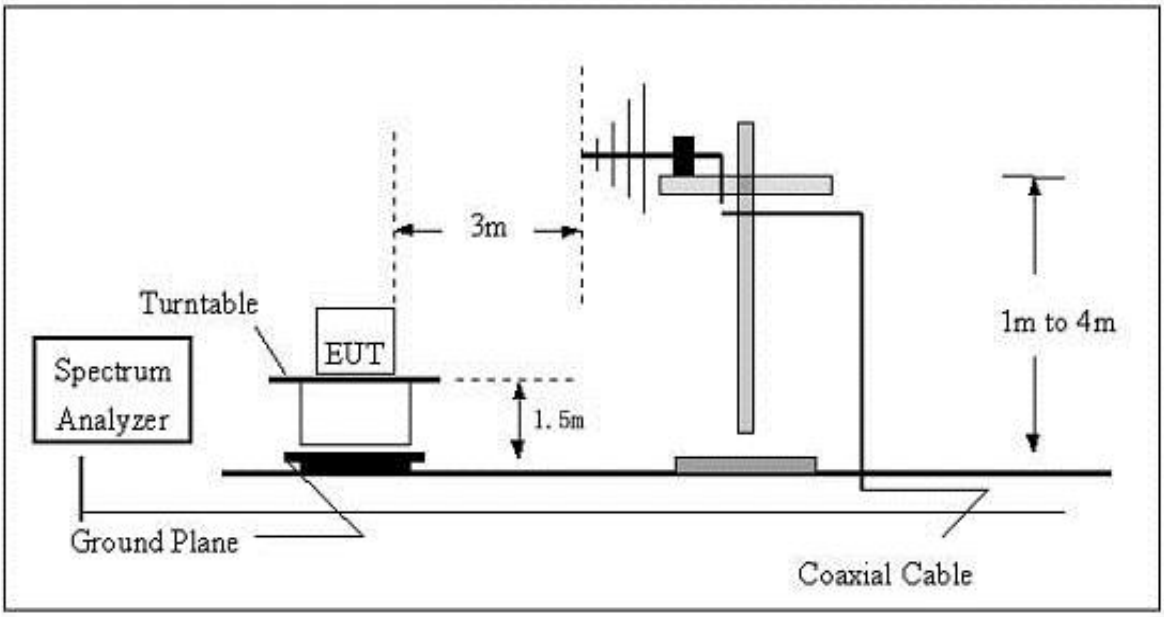

Agilent Spectrum Analyzer - Occupied BW
Marker 1 5.7362 GHz
Center Freq: 5.755000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 30 dB
Radio Std: None
Radio Device: BTS
01:24:36 AM Aug 22, 2024
Ref Offset 0.5 dB
10 dB/div
Ref 20.00 dBm
Mkr1 5.73624 GHz
-6.9175 dBm
Center 5.755 GHz
#Res BW 1 MHz
#VBW 3 MHz
Span 80 MHz
Sweep 1 ms
Occupied Bandwidth
37.385 MHz
Transmit Freq Error -21.626 kHz
OBW Power 99.00 %
x dB Bandwidth 47.99 MHz
x dB -26.00 dB
Marker
Select Marker
Normal
Delta
Off
Properties
More
1 of 2


Agilent Spectrum Analyzer - Occupied BW
Marker 1 5.8135 GHz
Center Freq: 5.795000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 30 dB
Radio Std: None
Radio Device: BTS
01:25:53 AM Aug 22, 2024
Ref Offset 0.5 dB
10 dB/div
Ref 20.00 dBm
Mkr1 5.81348 GHz
-8.9875 dBm
Center 5.795 GHz
#Res BW 1 MHz
#VBW 3 MHz
Span 80 MHz
Sweep 1 ms
Occupied Bandwidth
37.314 MHz
Transmit Freq Error -109.34 kHz
OBW Power 99.00 %
x dB Bandwidth 49.64 MHz
x dB -26.00 dB
Marker
Select Marker
Normal
Delta
Off
Properties
More
1 of 2

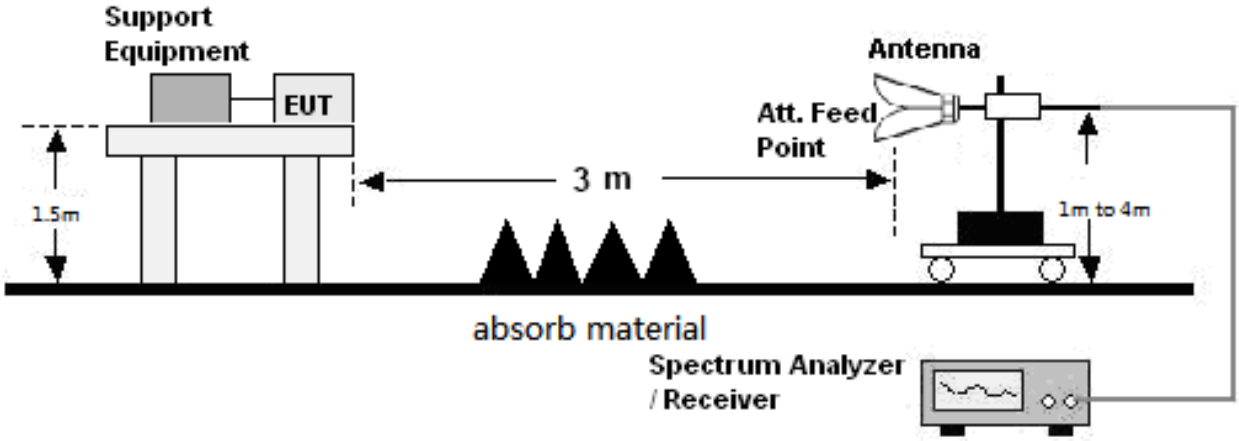
8. Spurious Emissions For Transmitter

8.1 Block Diagram Of Test Setup

(A)Radiated Emission Test Set-Up Frequency Below 1GHz.



(B)Radiated Emission Test Set-Up Frequency Above 1GHz.



8.2 Limits

Table 3: Spurious emissions

Frequency ranges State	47 MHz to 74 MHz 87,5 MHz to 108 MHz 174 MHz to 230 MHz 470 MHz to 862 MHz	Other frequencies ≤ 1 000 MHz	Frequencies > 1 000 MHz
Operating	4 nW	250 nW	1 µW
Standby	2 nW	2 nW	20 nW

8.3 Test Procedure

30MHz ~ 1GHz:
a. The Product was placed on the nonconductive turntable 1.5m above the ground in a full anechoic chamber.
b. Set the spectrum analyzer/receiver in Peak detector, Max Hold mode, and 120 kHz RBW. Record the maximum field strength of all the pre-scan process in the full band when the antenna is varied between 1~4 m in both horizontal and vertical, and the turntable is rotated from 0 to 360 degrees.
c. For each frequency whose maximum record was higher or close to limit, measure its QP value: vary the antenna's height and rotate the turntable from 0 to 360 degrees to find the height and degree where Product radiated the maximum emission, then set the test frequency analyzer/receiver to QP Detector and specified bandwidth with Maximum Hold Mode, and record the maximum value.
Above 1GHz:
a. The Product was placed on the non-conductive turntable 1.5 m above the ground in a full anechoic chamber.
b. Set the spectrum analyzer/receiver in Peak detector, Max Hold mode, and 1MHz RBW. Record the maximum field strength of all the pre-scan process in the full band when the antenna is varied in both horizontal and vertical, and the turntable is rotated from 0 to 360 degrees.
c. For each frequency whose maximum record was higher or close to limit, measure its AV value: rotate the turntable from 0 to 360 degrees to find the degree where Product radiated the maximum emission, then set the test frequency analyzer/receiver to AV value and specified bandwidth with Maximum Hold Mode, and record the maximum value.

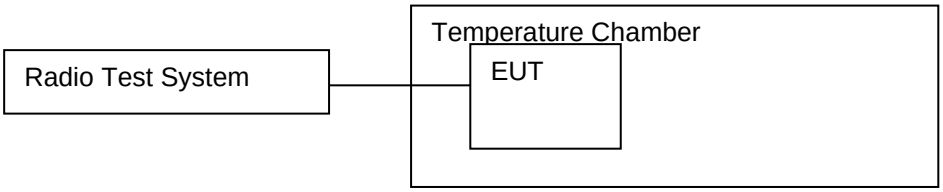
8.4 Test Results

Frequency	Receiver Reading	Turn table Angle	RX Antenna		Correct Factor	Absolute Level	Result	
			Height	Polar			Limit	Margin
(MHz)	(dBm)	Degree	(m)	(H/V)	(dB)	(dBm)	(dBm)	(dB)
802.11a low channel								
542.12	-34.62	208	1.9	H	-27.99	-62.61	-54	-8.61
542.12	-32.70	152	1.7	V	-27.99	-60.69	-54	-6.69
11490.00	-40.53	105	1.6	H	-8.79	-49.32	-30	-19.32
11490.00	-35.83	42	1.6	V	-8.79	-44.62	-30	-14.62
17235.00	-49.92	272	1.3	H	-3.18	-53.10	-30	-23.10
17235.00	-54.15	24	1.6	V	-3.18	-57.33	-30	-27.33
802.11a Mid channel								
542.12	-34.93	72	1.9	H	-27.99	-62.92	-54	-8.92
542.12	-32.78	187	1.0	V	-27.99	-60.76	-54	-6.76
11570.00	-40.68	59	1.3	H	-8.86	-49.54	-30	-19.54
11570.00	-35.05	133	1.2	V	-8.86	-43.91	-30	-13.91
17355.00	-49.08	157	1.5	H	-2.52	-51.60	-30	-21.60
17355.00	-53.80	69	1.5	V	-2.52	-56.32	-30	-26.32
802.11a high channel								
542.12	-34.62	12	1.2	H	-27.99	-62.61	-54	-8.61
542.12	-32.51	113	2.0	V	-27.99	-60.50	-54	-6.50
11650.00	-39.97	318	1.5	H	-8.92	-48.89	-30	-18.89
11650.00	-35.34	152	1.7	V	-8.92	-44.26	-30	-14.26
17475.00	-50.44	313	1.4	H	-1.86	-52.30	-30	-22.30
17475.00	-53.19	110	1.9	V	-1.86	-55.05	-30	-25.05

Remark:
Absolute Level = Receiver Reading + Factor
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

9. TX Duty Cycle

9.1 Block Diagram Of Test Setup



9.2 Limit

No Restriction

9.3 Test Procedure

An assessment of the overall Duty Cycle shall be made for a representative period of Tobs over the observation bandwidth Fobs. Unless otherwise specified, Tobs is 1 hour and the observation bandwidth Fobs is the operational frequency band.
The representative period shall be the most active one in normal use of the device. As a guide "Normal use" is considered as representing the behaviour of the device during transmission of 99 % of the [emissions] generated during its operational lifetime.
Procedures such setup, commissioning, and maintenance are not considered part of normal operation.
For manual operated or event dependant devices, with or without software controlled functions, the manufacturer shall declare whether the device once triggered, follows a pre-programmed cycle, or whether the transmitter remains on until the trigger is released or the device is manually reset. The manufacturer shall also give a description of the application
for the device and include a typical usage pattern. The typical usage pattern as declared by the manufacturer shall be used to determine the duty cycle and compare to the limit in table 4.
Where an acknowledgement is required, the additional transmitter on-time shall be included and declared by the manufacturer.

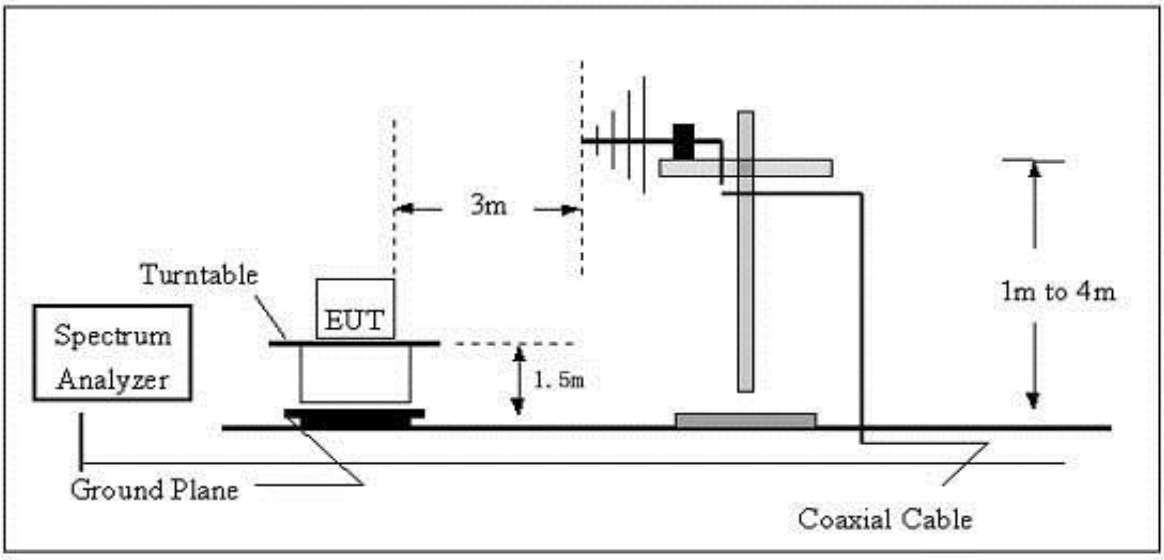
9.4 Test Result

For generic use devices operating at frequency range 5725-5875MHz, according to ETSI EN 300 440 V2.2.1 (2018-07), the duty cycle is no restriction.

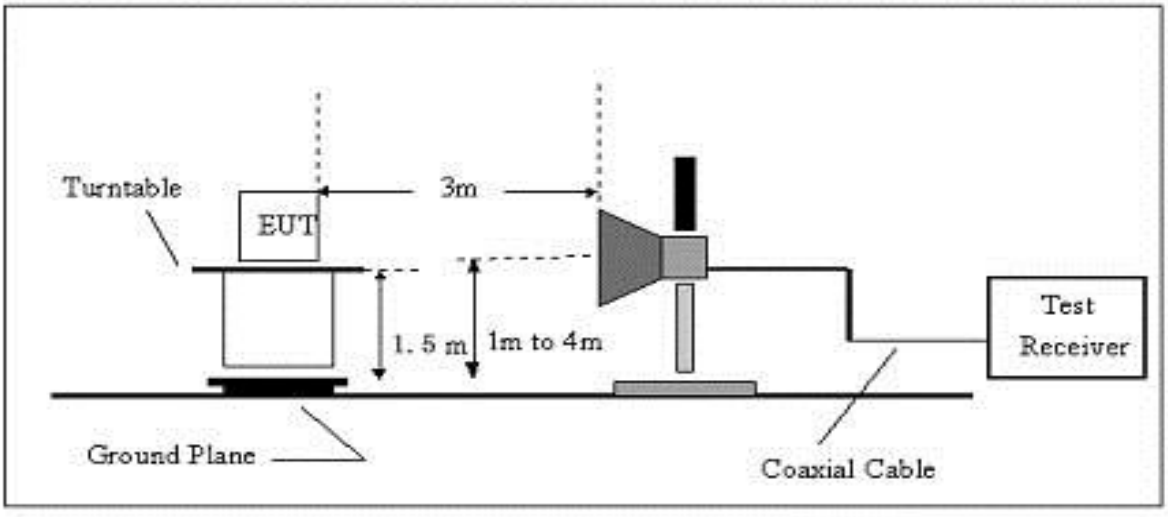
10. Spurious Emissions For Receiver

10.1 Block Diagram Of Test Setup

(A) Radiated Emission Test Set-Up, Frequency Below 1000MHz



(B) Radiated Emission Test Set-Up Frequency Above 1 GHz



10.2 Limits

According to the Final draft ETSI EN 300 440 V2.2.1 (2018-05) Section 4.3.5.4, the power of any spurious emission shall not exceed 2 nW in the range 25 MHz to 1 GHz and shall not exceed 20 nW on frequencies above 1 GHz.

10.3 Test Procedure

30MHz ~ 1GHz:
a. The Product was placed on the nonconductive turntable 1.5m above the ground in a full anechoic chamber.
b. Set the spectrum analyzer/receiver in Peak detector, Max Hold mode, and 120 kHz RBW. Record the maximum field strength of all the pre-scan process in the full band when the antenna is varied between 1~4 m in both horizontal and vertical, and the turntable is rotated from 0 to 360 degrees.
c. For each frequency whose maximum record was higher or close to limit, measure its QP value: vary the antenna's height and rotate the turntable from 0 to 360 degrees to find the height and degree where Product radiated the maximum emission, then set the test frequency analyzer/receiver to QP Detector and specified bandwidth with Maximum Hold Mode, and record the maximum value.
Above 1GHz:
a. The Product was placed on the non-conductive turntable 1.5 m above the ground in a full anechoic chamber.
b. Set the spectrum analyzer/receiver in Peak detector, Max Hold mode, and 1MHz RBW. Record the maximum field strength of all the pre-scan process in the full band when the antenna is varied in both horizontal and vertical, and the turntable is rotated from 0 to 360 degrees.
c. For each frequency whose maximum record was higher or close to limit, measure its AV value: rotate the turntable from 0 to 360 degrees to find the degree where Product radiated the maximum emission, then set the test frequency analyzer/receiver to AV value and specified bandwidth with Maximum Hold Mode, and record the maximum value.

10.4 Test Results

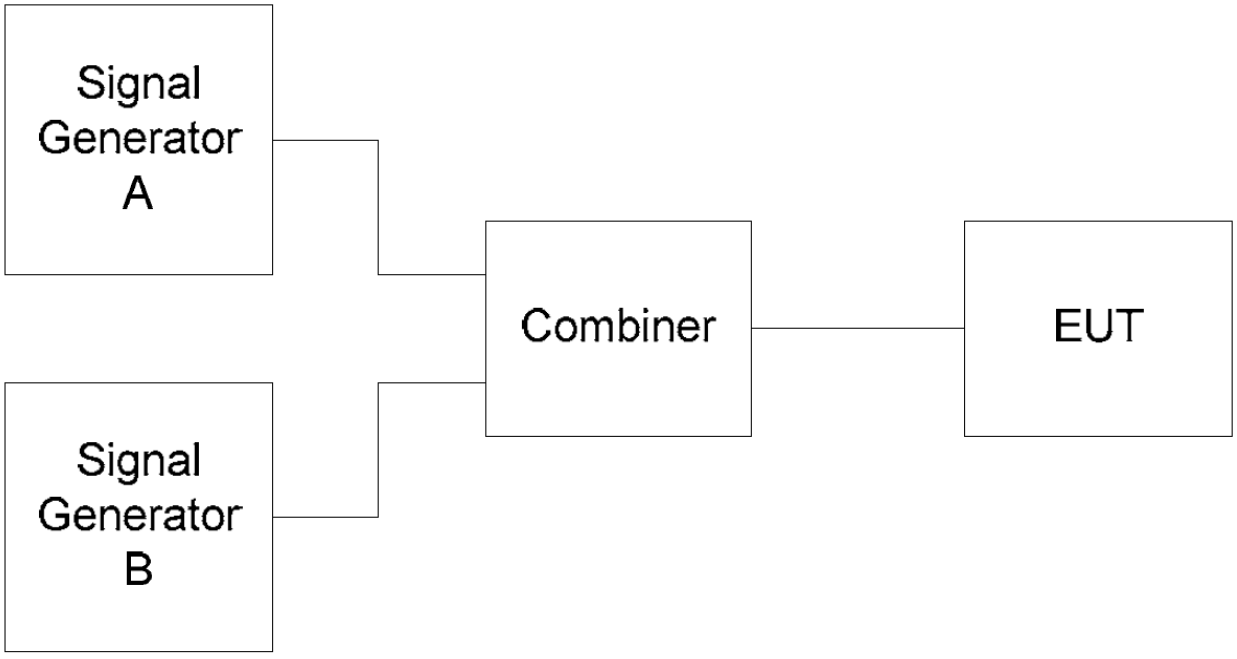
All modes have been tested and reports show data in the worst mode

Frequency	Receiver Reading	Turn table Angle	RX Antenna		Correct Factor	Absolute Level	Result	
			Height	Polar			Limit	Margin
(MHz)	(dBm)	Degree	(m)	(H/V)	(dB)	(dBm)	(dBm)	(dB)
802.11a low channel								
285.46	-34.91	188	1.6	H	-29.13	-64.04	-57.00	-7.04
285.46	-35.96	77	1.2	V	-29.13	-65.09	-57.00	-8.09
3054.06	-35.40	107	1.0	H	-23.49	-58.89	-47.00	-11.89
3054.06	-34.27	260	1.9	V	-23.49	-57.76	-47.00	-10.76
802.11a HT20 Mid channel								
285.46	-35.79	122	1.6	H	-29.13	-64.92	-57.00	-7.92
285.46	-34.99	37	1.8	V	-29.13	-64.12	-57.00	-7.12
3054.06	-36.08	64	1.9	H	-23.49	-59.57	-47.00	-12.57
3054.06	-33.81	24	1.3	V	-23.49	-57.30	-47.00	-10.30
802.11a high channel								
285.46	-33.92	187	1.5	H	-29.13	-63.05	-57.00	-6.05
285.46	-36.95	304	1.8	V	-29.13	-66.07	-57.00	-9.07
3054.06	-35.80	325	1.3	H	-23.49	-59.30	-47.00	-12.30
3054.06	-34.30	190	1.4	V	-23.49	-57.79	-47.00	-10.79

Remark:
Absolute Level = Receiver Reading + Factor
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

11. Blocking Or Desensitization

11.1 Block Diagram Of Test Setup



11.2 Limit

The adjacent channel selectivity of the equipment under specified conditions shall not be less than -30 dBm + k. The correction factor, k, is as follows:

Table 6: Limits for blocking or desensitization

Receiver category	Limit
1	-30 dBm + k
2	-45 dBm + k
3	-60 dBm + k

The correction factor, k, is as follows:

$$k = -20\log f - 10\log BW$$

Where:
-f is the frequency in GHz;
-BW is the occupied bandwidth in MHz.
The factor k is limited within the following:

$$-40\ dB < k < 0\ dB.$$

The measured blocking level shall be stated in the test report.

11.3 Test Procedure

This measurement shall be conducted under normal conditions.
Two signal generators A and B shall be connected to the receiver via a combining network to the receiver, either:
a) via a test fixture or a test antenna to the receiver integrated, dedicated or test antenna; or
b) directly to the receiver permanent or temporary antenna connector.

The method of coupling to the receiver shall be stated in the test report.
Signal generator A shall be at the nominal frequency of the receiver, with normal modulation of the wanted signal. Signal generator B shall be unmodulated and shall be adjusted to a test frequency at approximately 10 times, 20 times and 50 times of the occupied bandwidth above upper band edge of occupied bandwidth. Initially signal generator B shall be switched off and using signal generator A the level which still gives sufficient response shall be established. The output level of generator A shall then be increased by 3 dB. Signal generator B is then switched on and adjusted until the wanted criteria are met. This level shall be recorded.
The measurement shall be repeated with the test frequency for signal generator B at 10 times, 20 times and 50 times of the occupied bandwidth below the lower band edge of the occupied bandwidth.
The blocking or desensitization shall be recorded as the level in dBm of lowest level of the unwanted signal (generator B).
For tagging systems (e.g. RF identification, anti-theft, access control, location and similar systems) signal generator A may be replaced by a physical tag positioned at 70 % of the measured system range in metres. In this case, the blocking or desensitization shall be recorded as the ratio in dB of lowest level of the unwanted signal (generator B) resulting in a non-read of the tag. to the declared sensitivity of the receiver +3 dB.

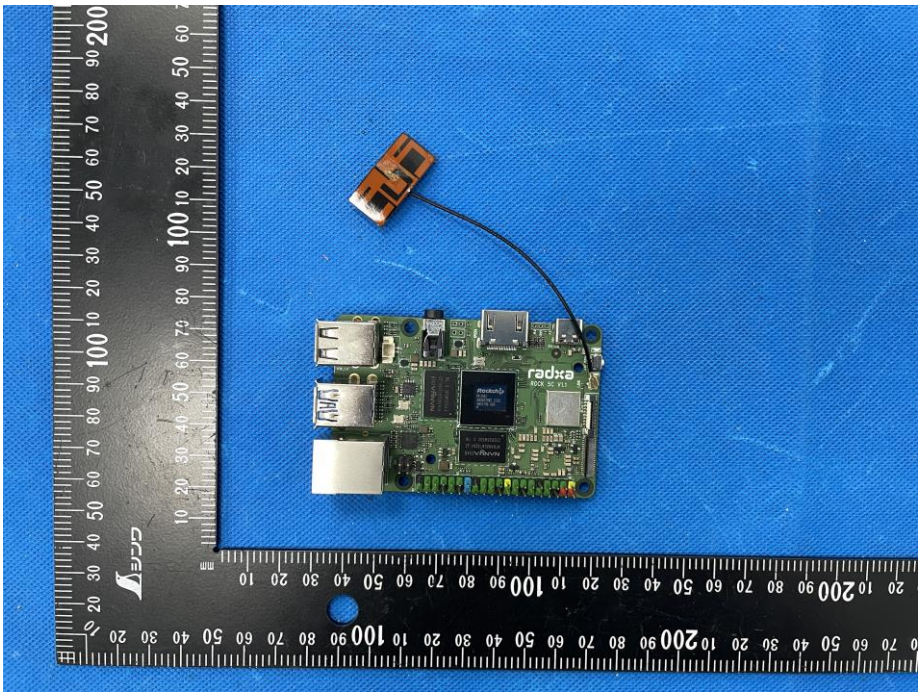
11.4 Test Result

The Worst mode 802.11 a

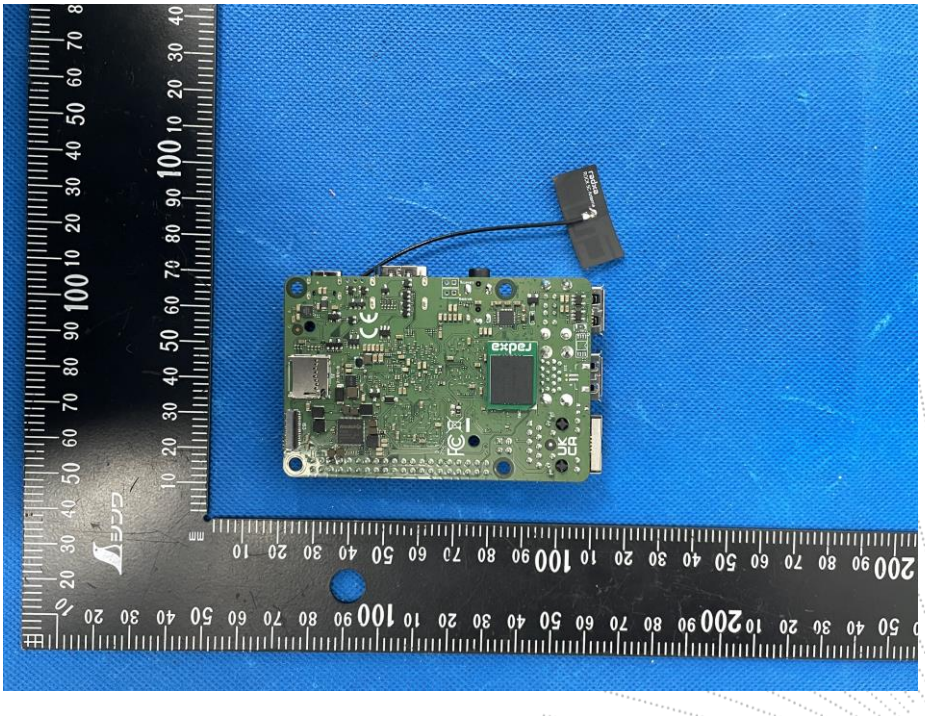
Receiver category 2				
Channel Frequency (MHz)	**unwanted test signal Frequency**	**Signal generator B (Level) (dBm)**	**Limit (dBm)**	**Margin (dB)**
5745	Centre Frequency – 10*BW	-63.00	-72.56	-9.56
	Centre Frequency + 10*BW	-63.00		-9.56
	Centre Frequency – 20*BW	-59.00		-13.56
	Centre Frequency + 20*BW	-60.00		-12.56
	Centre Frequency – 50*BW	-43.00		-29.56
	Centre Frequency + 50*BW	-42.00		-30.56
5825	Centre Frequency – 10*BW	-65.00	-72.68	-7.68
	Centre Frequency + 10*BW	-61.00		-11.68
	Centre Frequency – 20*BW	-56.00		-16.68
	Centre Frequency + 20*BW	-57.00		-15.68
	Centre Frequency – 50*BW	-44.00		-28.68
	Centre Frequency + 50*BW	-43.00		-29.68
Receiver BW=17.269MHz; $K_{5745MHz}$=−20log 5.745 −10log17.269=-27.56 $K_{5825MHz}$=−20log 5.825 −10log17.269=-27.68				

12. EUT Photographs

EUT Photo 1



EUT Photo 2



NOTE: Appendix-Photographs Of EUT Constructional Details

13. EUT Test Setup Photographs

Spurious emissions

STATEMENT

1. The equipment lists are traceable to the national reference standards.

2. The test report can not be partially copied unless prior written approval is issued from our lab.

3. The test report is invalid without the "special seal for inspection and testing".

4. The test report is invalid without the signature of the approver.

5. The test process and test result is only related to the Unit Under Test.

6. Sample information is provided by the client and the laboratory is not responsible for its authenticity.

7. The quality system of our laboratory is in accordance with ISO/IEC17025.

8. If there is any objection to this test report, the client should inform issuing laboratory within 15 days from the date of receiving test report.

Address:
1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan 1st Road, Zhancheng, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China

TEL: 400-788-9558

P.C.: 518103

FAX: 0755-33229357

Website: http://www.chnbctc.com

Consultation E-mail: bctc@bctc-lab.com.cn

Complaint/Advice E-mail: advice@bctc-lab.com.cn

※※※※※ END ※※※※※