

Produkte
Products

Prüfbericht - Nr.: 012000002 001		Seite 1 von 73	
<i>Test Report No.:</i>		<i>Page 1 of 73</i>	
Auftraggeber: <i>Client:</i>		BW Technologies Limited. 2840- 2nd Avenue S.E., Calgary, AB, Canada T2A 7X9,	
Gegenstand der Prüfung: <i>Test item:</i>		ImpactXtreme	
Bezeichnung: <i>Identification:</i>	IXW01	Serien-Nr.: <i>Serial No.</i>	Engineering Sample
Wareneingangs-Nr.: <i>Receipt No.:</i>	1403011050	Eingangsdatum: <i>Data of receipt:</i>	07.08.2010
Prüfart: <i>Testing location:</i>		Refer Page 4 of 73 for test facilities	
Prüfgrundlage: <i>Test specification:</i>		FCC Part 15, Subpart E ANSI C63.10-2009 KDB789033	
Prüfergebnis: <i>Test Result:</i>		Der Prüfgegenstand entspricht oben genannter Prüfgrundlage(n). <i>The test items passed the test specification(s).</i>	
Prüflaboratorium: <i>Testing Laboratory:</i>		TÜV Rheinland (India) Pvt. Ltd. 82/A, 3rd Main, West Wing, Electronic City Phase 1 Hosur Road, Bangalore – 560 100. India	
geprüft / tested by:		kontrolliert / reviewed by:	
08.10.2012 Vinay.N _____ Datum Name/Stellung Unterschrift Date Name/Position Signature		10.10.2012 Raghavendra Kulkarni _____ Datum Name/Stellung Unterschrift Date Name/Position Signature	
Sonstiges / Other Aspects:		FCC ID: R90-IX-WL-1, This product has FCC Part 15 Subpart C test report with report number 01200001 001 by TÜV Rheinland.	
Abkürzungen: P(ass) = entspricht Prüfgrundlage F(ail) = entspricht nicht Prüfgrundlage N/A = nicht anwendbar N/T = nicht getestet		Abbreviations: P(ass) = passed F(ail) = failed N/A = not applicable N/T = not tested	
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any safety mark on this or similar products.</i>			

Test Result Summary

Clause	Test Item	Result
15.407 (a)	99% And 26 dB Occupied Bandwidth	Pass
15.407 (a)	Maximum Conducted Output Power	Pass
15.407 (a)	Power Spectral Density	Pass
15.407 (a)	Peak Excursion	Pass
15.209	Radiated Emissions	Pass
15.205	Restricted Bands of operation	Pass
15.407 (b)	Unwanted emission	Pass

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List of Type and Measurement Instruments

TÜV Rheinland (India) Pvt. Ltd, Bangalore

Equipment	Manufacturer	Model	S/N	Calibration Due Date
EMI Test Receiver	Rohde & Schwarz	ESU 40	100288	21.07.2013
EMI Test Receiver	Rohde & Schwarz	ESCI	100661	17.03.2013
Hybrid Log Periodic antenna	ETS Lindgren	3142D	00081354	26.07.2013
Broadband Horn Antenna	Frankonia	HAX-18	HAX18-802	23.03.2013
Double-Ridged Waveguide Horn Antenna	ETS Lindgren	116794	00133356	01-09-2013
Emission Horn Antenna	ETS Lindgren	116706	00107323	24-08-2013
Active Loop Antenna	Frankonia	LAX-10	LAX-10-800	11-04-2013
Spectrum Analyser	Agilent Technologies	E4407B	US41192772	17.03.2013

Honeywell Technology Solutions, Bangalore

Kind of Equipment	Manufacturer	Type	S/N	Calibrated Due Date
EMI Test Receiver	R&S	ESU26	100229	14.12.2012
Log Periodic Antenna	EMCO	3148	66012	27.10.2012
E8257D-PSG Analog Signal Generator	Agilent	E8257D	US46461028	25.09.2013
Double Ridge Guide Horn Antenna	EMCO	3117	64055	01.11.2012
Double Ridge Guide Horn Antenna	ETS Lindgren	3177	00119022	24.02.2013
Biconical Antenna	EMCO	3104C	69263	27.10.2012

Testing Facilities

- 1) TÜV Rheinland (India) Private Limited
No. 108, West Wing
Electronic city Phase I
Bangalore – 560100
India
- 2) Honeywell Technology Solutions Lab (HTSL)
Survey No. 19/2, Devarabisanahalli Village
KR Puram Hobli,
Bangalore East Taluk
Bangalore – 560 037

General Product Information

Product Function and Intended Use

The Impact Xtreme is a compact, portable gas monitor designed to be carried or worn without hindering the user. Its purpose is to monitor the atmosphere continuously for hazardous levels of up to six gases. Audible and visual alarms alert the user to danger when hazardous conditions are detected. The Impact Xtreme has been designed to alert the user to potentially hazardous atmospheres while carrying out his/her normal duties. Therefore, the monitor must be kept switched on and worn as close to the breathing area as possible, and several accessories are provided to allow the monitor to be worn in a number of different ways:

- a. On the chest b. On a belt c. Attached to a body harness

The monitor is provided with various methods to enable the user to comply safely and easily with confined space regulations.

Ratings and System Details

Operating Frequency	2400MHz – 2483.5MHz → (Covered in FCC Part 15C Report) 5725MHz – 5850MHz → 5150MHz - 5725MHz	
No. of channel	Please refer Table of Carrier Frequencies	
Channel Spacing	20MHz for 5GHz band	
Transmitted Power	802.11a	9.49dBm
Data Rate	802.11a:6, 9, 12, 18, 24, 36, 48, 54 Mbps	
Antenna Type	PCB Antenna	
Number of antenna	2	
Antenna Gain	2.35dBi max	
Supply Voltage	6V DC (Battery)	
Dimensions	130mm x 120mm x 50mm	
Environmental	Rechargeable battery: -40°C to +60°C (-40°F to 140°F)	

Test Conditions: **Voltage:** 6V Battery

Environmental conditions: **Temperature:** +23 °C **RH:** 62%

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Operation Descriptions

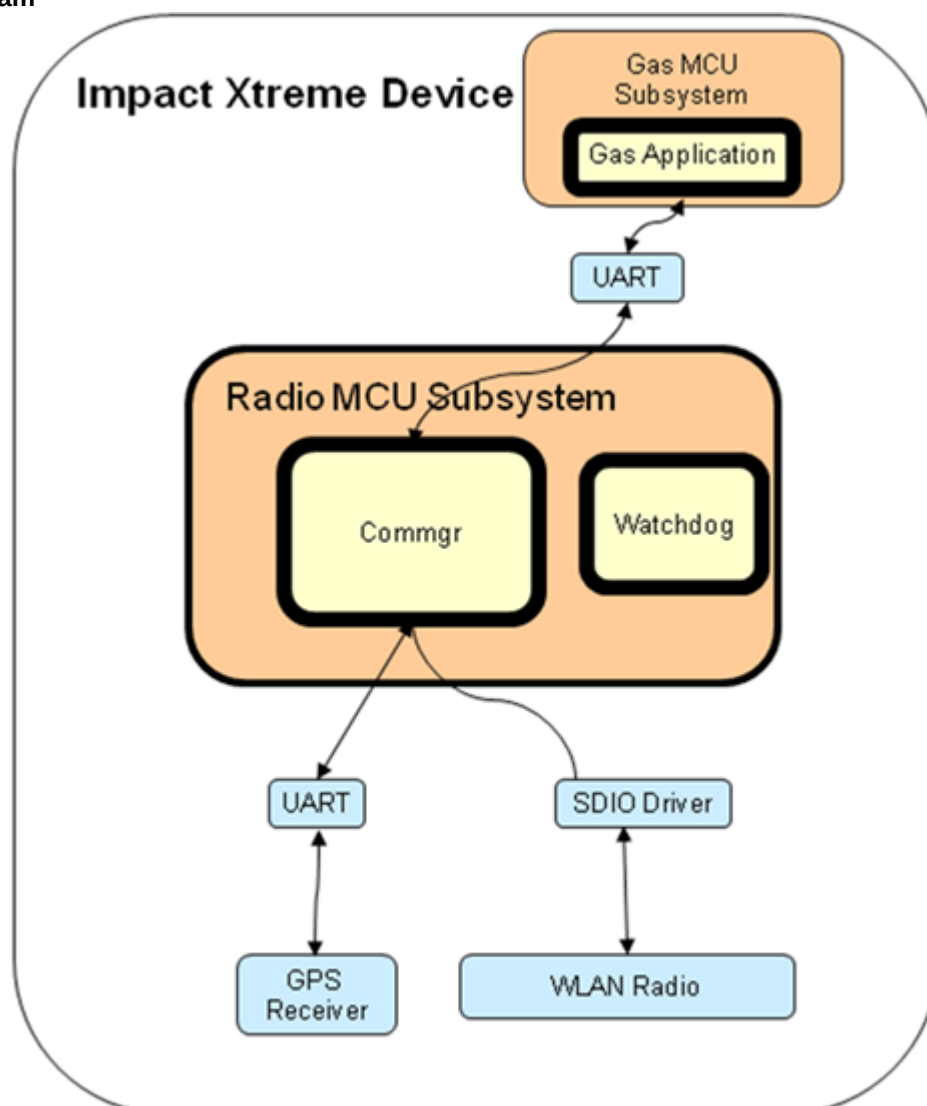
The monitor can be supplied with six gas sensors, for detecting oxygen (enrichment and deficiency), flammable gases (up to the Lower Explosive Limit) and two toxic gases (for personal safety) all housed in an easily replaceable cartridge. An alternative arrangement using infrared sensors for flammable is also available. Various sensor technologies are used to achieve this. In the vast majority of cases, electrochemical technology is used to detect oxygen and toxic gases while catalytic combustion technology is used to detect flammable gases. Infrared technology is used to detect flammable gases.

Two types of cartridges are available.

One is disposable where the cartridge has a fixed life and once this has expired the cartridge is disposed of.

The other is a Serviceable Cartridge where the sensors can be individually replaced when required. The serviceable cartridge type can be only used in the ImpactXtreme.

Block Diagram



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Test Set-up and Operation Mode

Principle of Configuration Selection

Emission: The test was performed under continuous transmission to obtain the maximum emissions.

Test Operation and Test Software

Continuous transmission was enabled through test software and Channel / data rate selection was done with the software. All the tests were performed at 16dBm power setting for 2.4GHz band and at 13dBm setting for 5GHz band which are maximum available power settings for this product.

Special Accessories and Auxiliary Equipment

The EUT was tested together with the following additional accessory:

- .

Countermeasures to achieve EMC Compliance

- None

Test Modes – Data Rates and Modulations

For Unwanted emission and restricted bands of operation tests, the tests were performed for all data rates and only worst results are reported in this report.

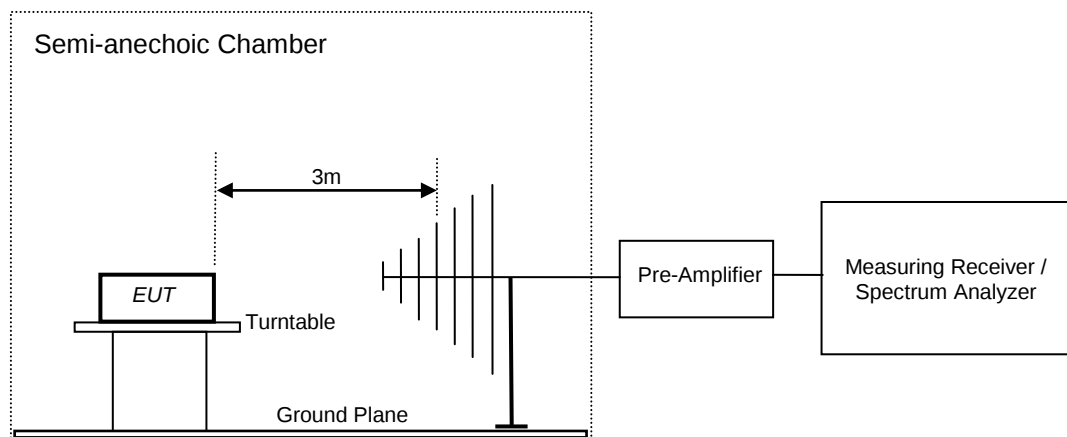
Table of carrier frequencies

Frequency Band (MHz)	Channel No.	Frequency (MHz)
5150 – 5250	36	5180
	40	5200
	44	5220
	48	5240
5250 – 5350	52	5260
	56	5280
	60	5300
	64	5320
5470 – 5725	100	5500
	104	5520
	108	5540
	112	5560
	116	5580
	132	5660
	136	5680
	140	5700

Test Methodology

Radiated Emission Test

The radiated emission measurement was performed according to the procedures in ANSI C63.10-2009. The equipment under test (EUT) was placed at the middle of the 80 cm high turntable, and the EUT is 3 meters far from the measuring antenna. The turntable was rotated 360° for obtaining the maximum emission. The height of the measuring antennas was scanned between 1m and 4m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations. Repeat the measurement steps until the maximum emissions were obtained. The measurement above 1000MHz was performed by horn antenna. The measurement below 30MHz was performed by loop antenna. The EUT was rotated around the X-, Y-, and Z-Axis and the results from worst case axis are recorded.



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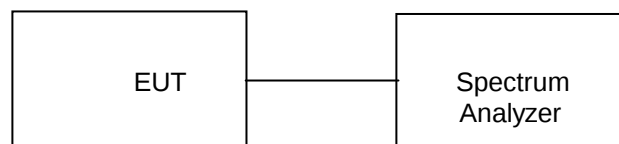
Test Results

99% and 26 dB Occupied Bandwidth

Section 15.407 (a)

Test Specification FCC Part 15 Section 15.407(a)
Measurement Bandwidth (RBW) 300 kHz

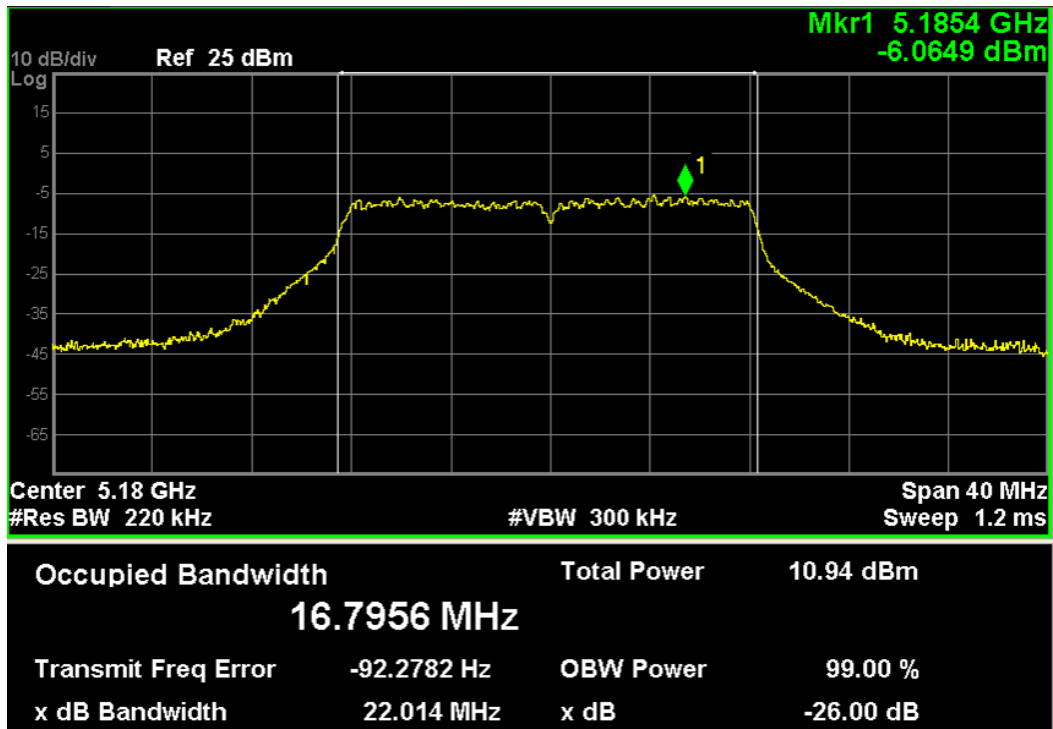
Test Method:



Test Result:

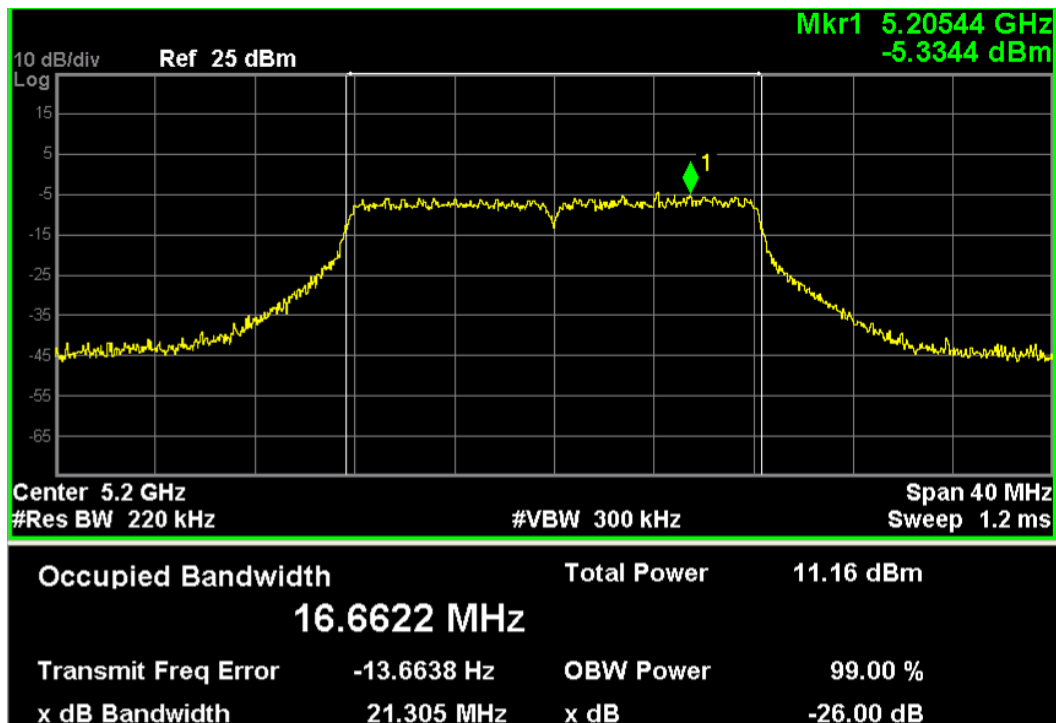
Modulation: 802.11a

Data Rate (Mbps)	Channel	Frequency (MHz)	26 dB Band width (MHz)	99% Occupied Bandwidth (MHz)
6	36	5180	16.79	22.01
	40	5200	16.66	21.31
	48	5240	16.66	21.47
	52	5260	16.72	21.87
	56	5280	16.68	21.56
	64	5320	16.71	21.51
24	36	5180	16.57	21.70
	40	5200	16.56	21.48
	48	5240	16.56	20.95
	52	5260	16.56	21.81
	56	5280	16.58	21.26
	64	5320	16.59	21.42
54	36	5180	16.58	21.37
	40	5200	16.58	20.91
	48	5240	16.63	21.58
	52	5260	16.55	20.70
	56	5280	16.56	21.34
	64	5320	16.57	21.64



Data Rate:6 Mbps

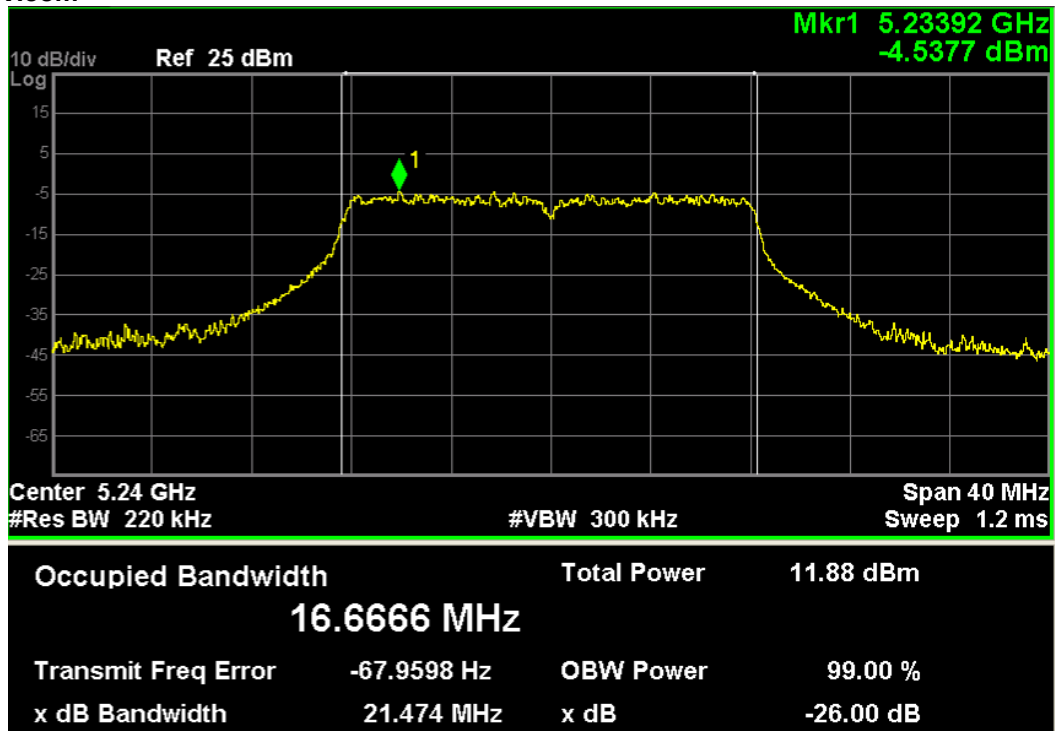
Channel Frequency: 5180MHz



Data Rate:6 Mbps

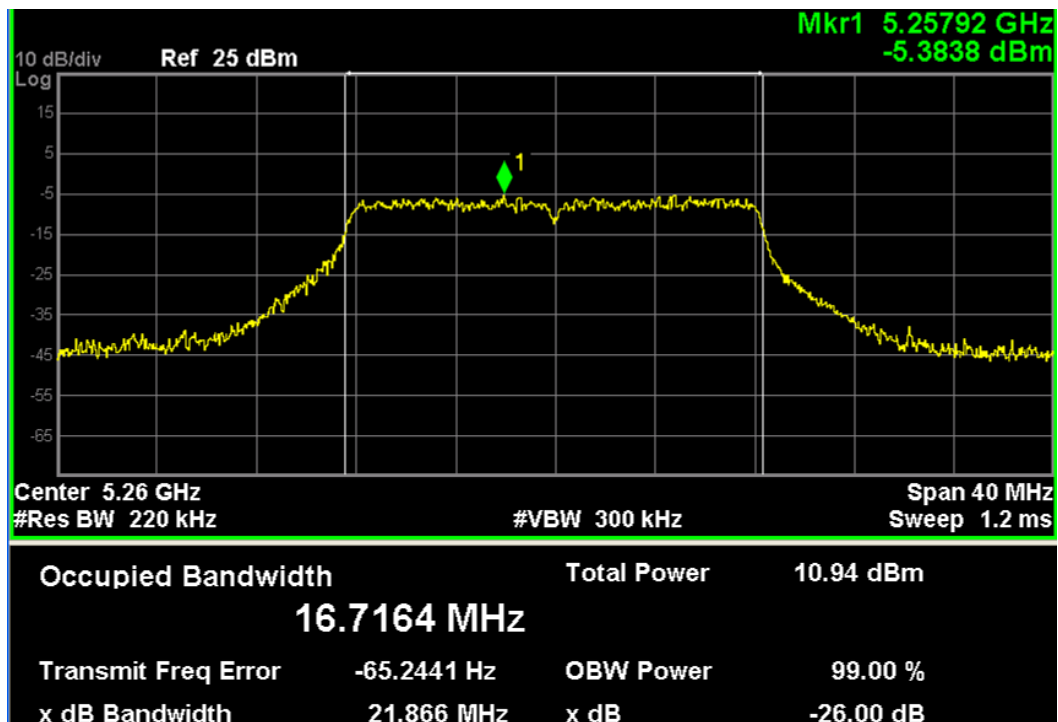
Channel Frequency: 5200MHz

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Data Rate:6 Mbps

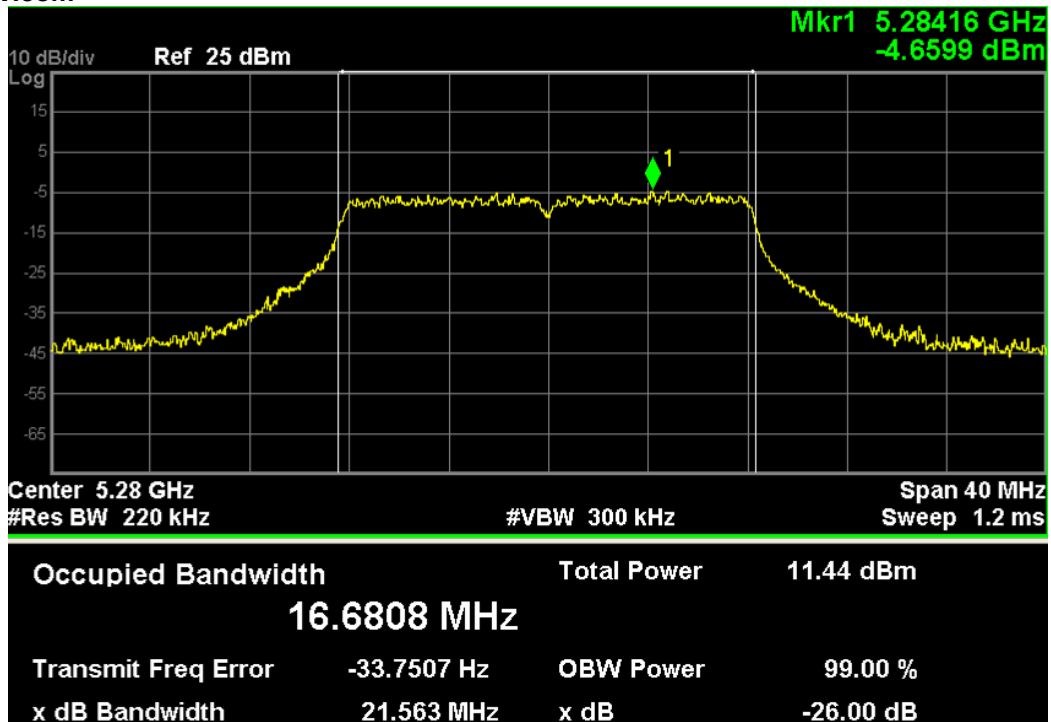
Channel Frequency: 5240MHz



Data Rate:6 Mbps

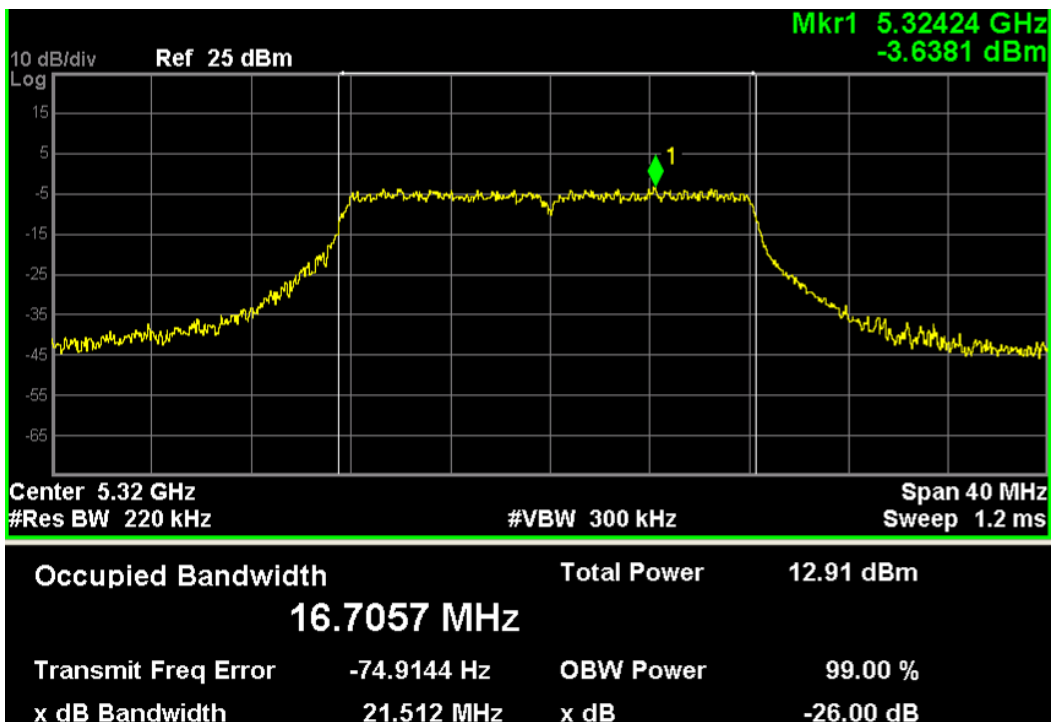
Channel Frequency: 5260MHz

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Data Rate:6 Mbps

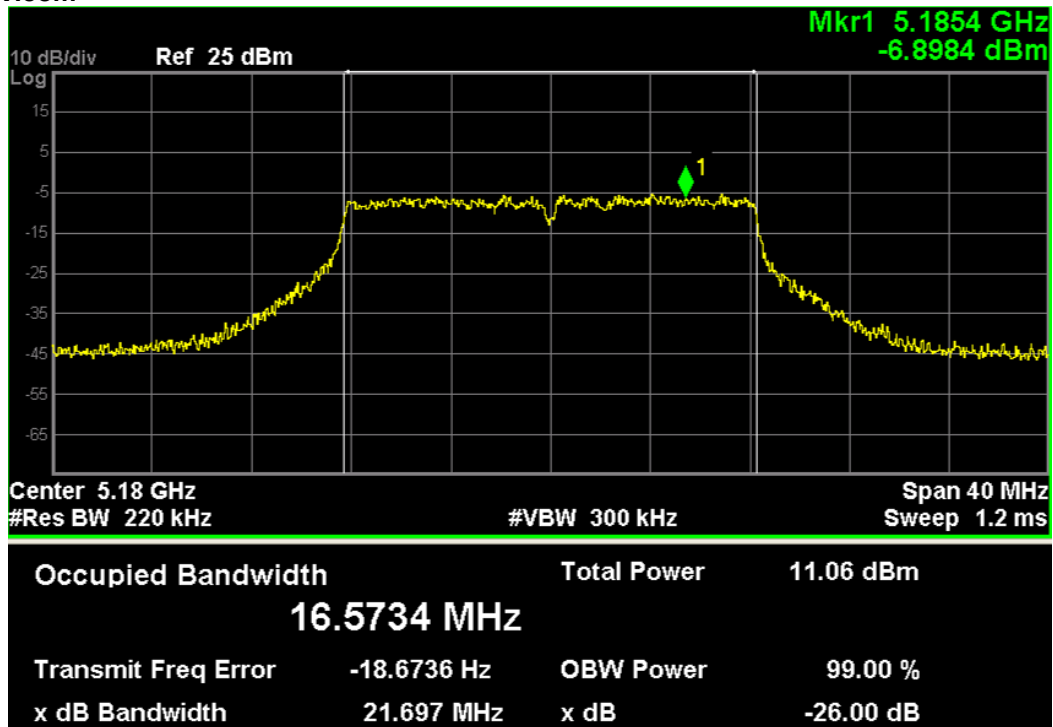
Channel Frequency: 5280MHz



Data Rate:6 Mbps

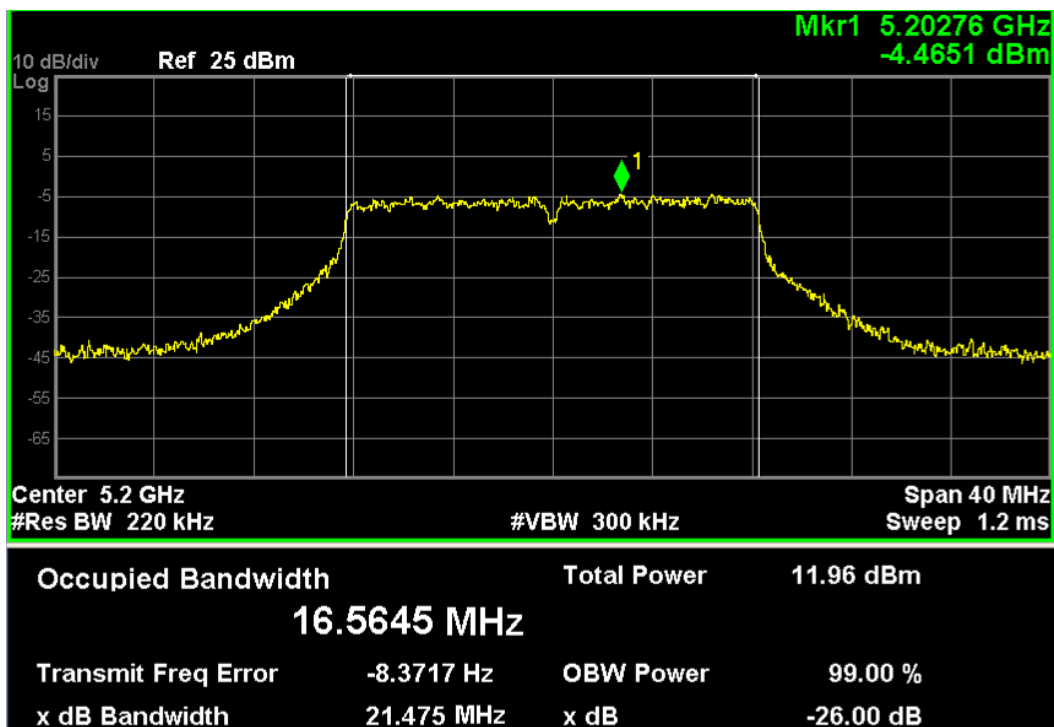
Channel Frequency: 5320MHz

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Data Rate:24 Mbps

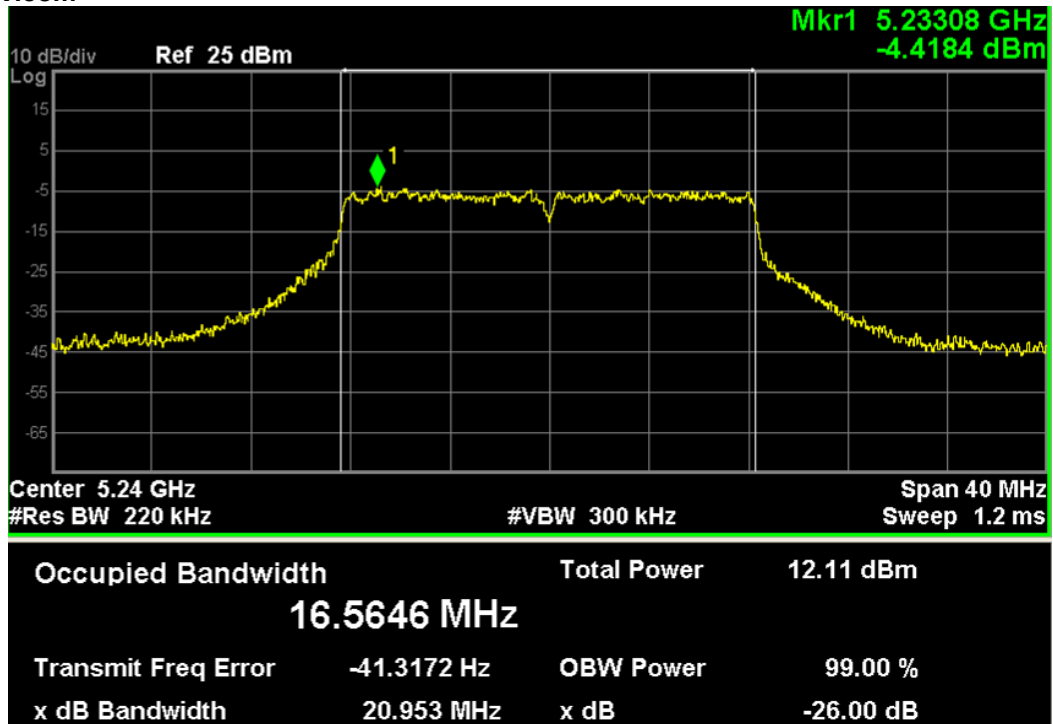
Channel Frequency: 5180MHz



Data Rate:24 Mbps

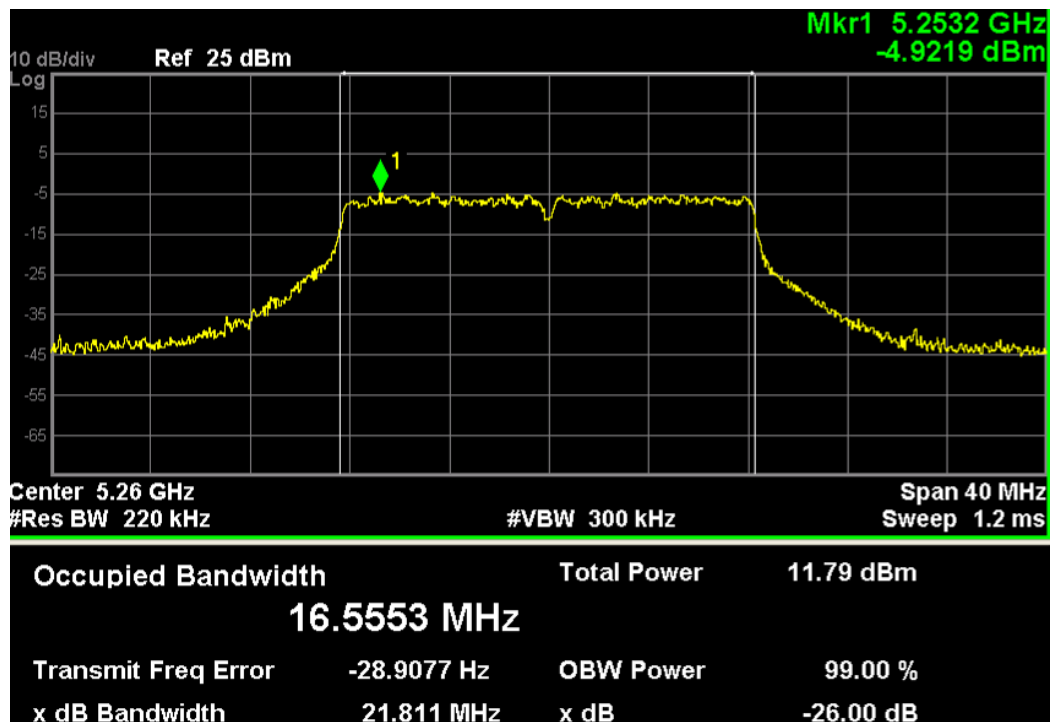
Channel Frequency: 5200MHz

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Data Rate:24 Mbps

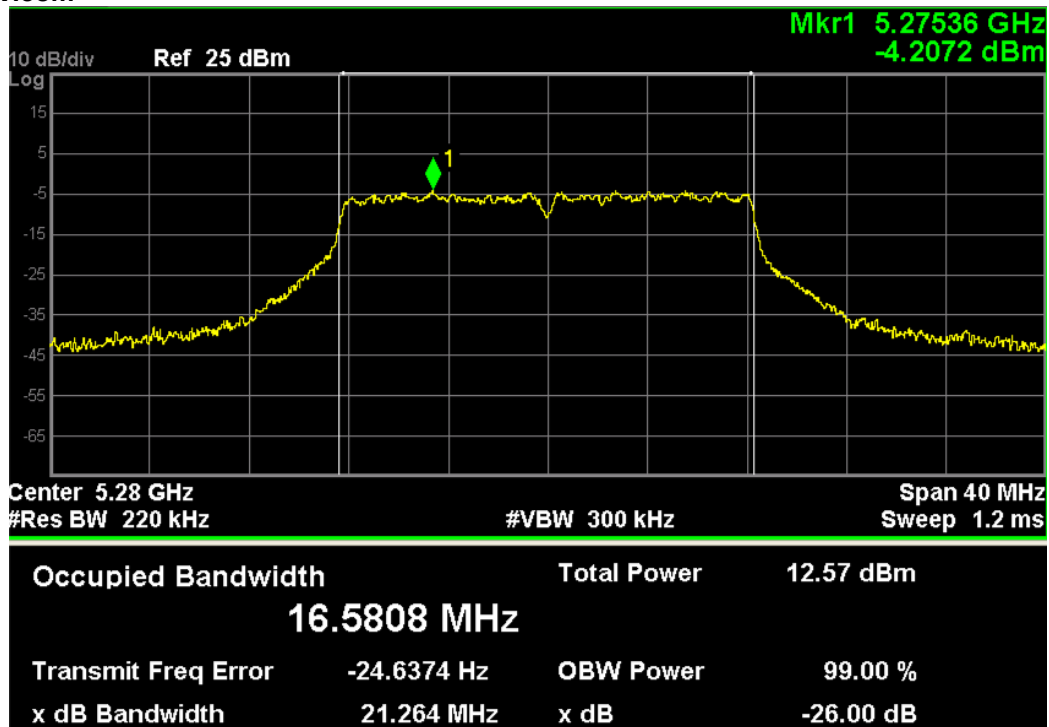
Channel Frequency: 5240MHz



Data Rate:24 Mbps

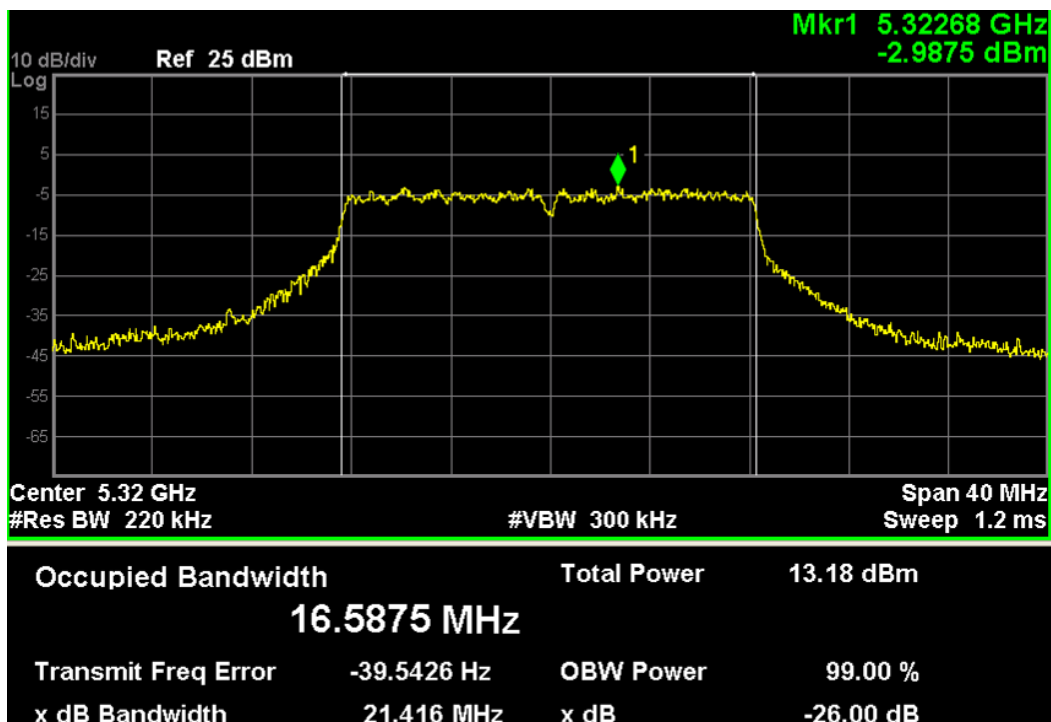
Channel Frequency: 5260MHz

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Data Rate:24 Mbps

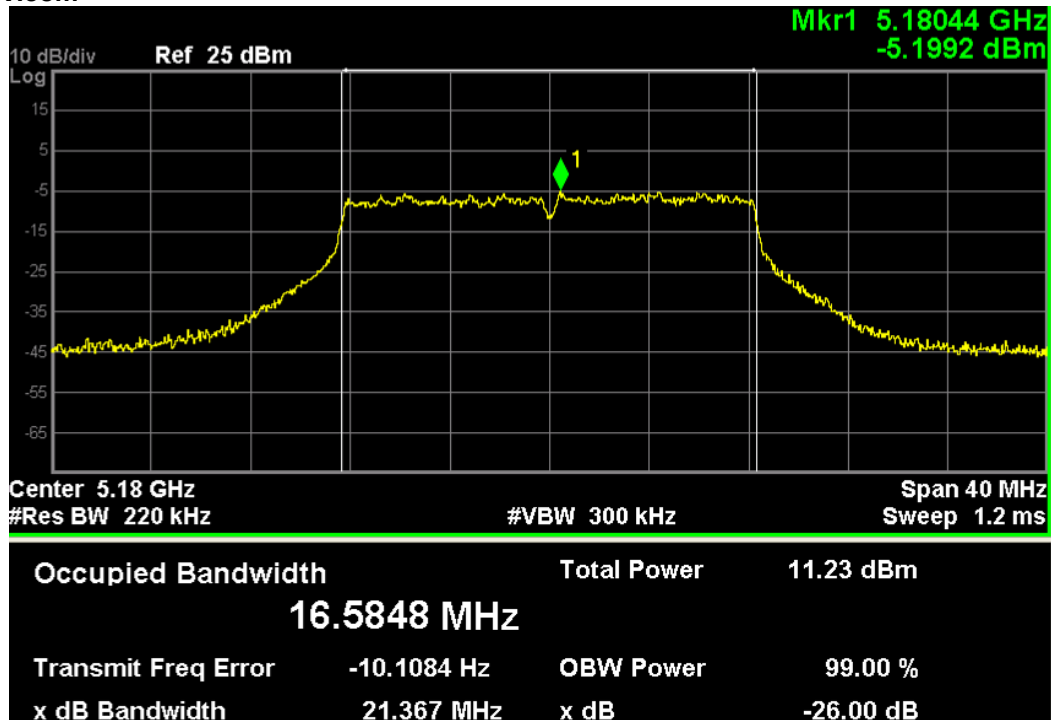
Channel Frequency: 5280MHz



Data Rate:24 Mbps

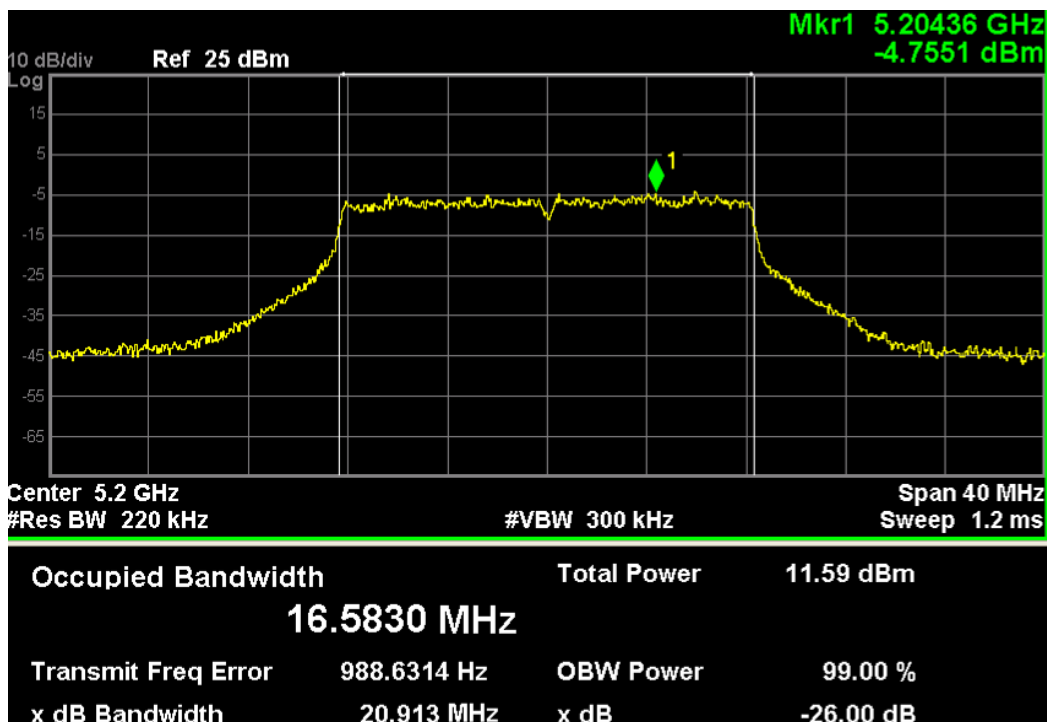
Channel Frequency: 5320MHz

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Data Rate:54 Mbps

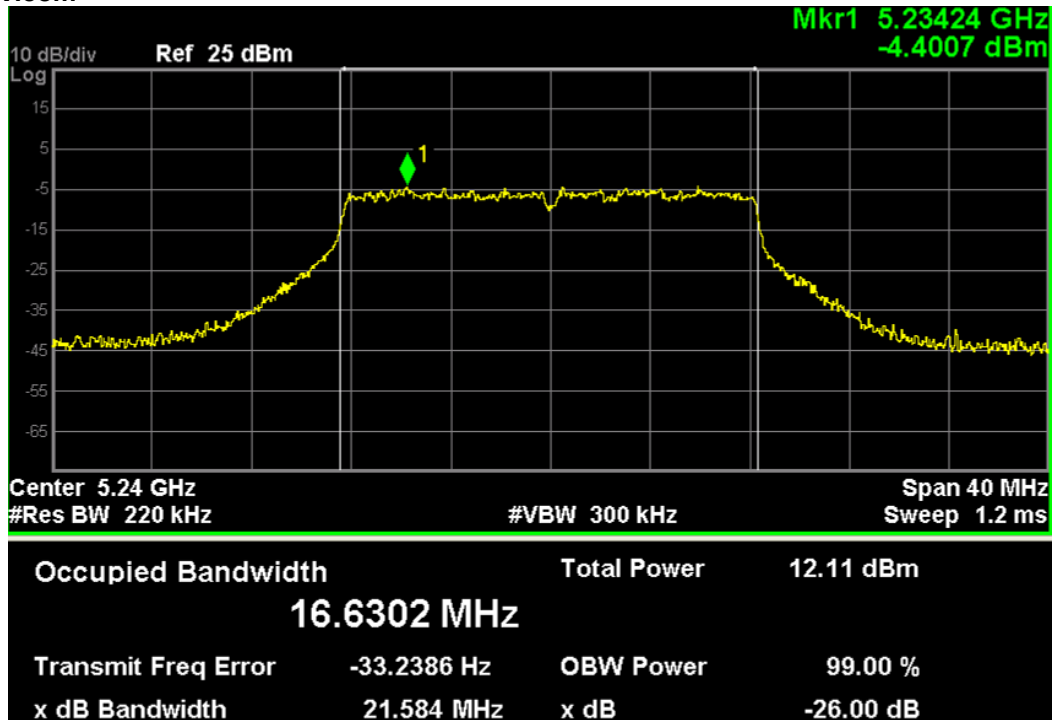
Channel Frequency: 5180MHz



Data Rate:54 Mbps

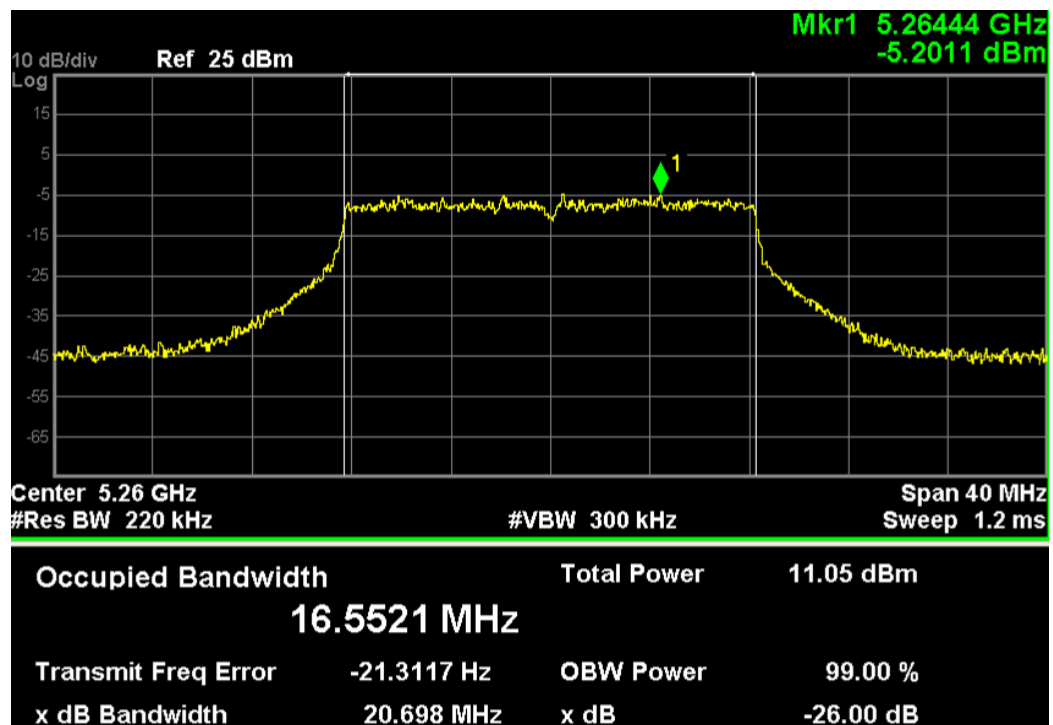
Channel Frequency: 5200MHz

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Data Rate:54 Mbps

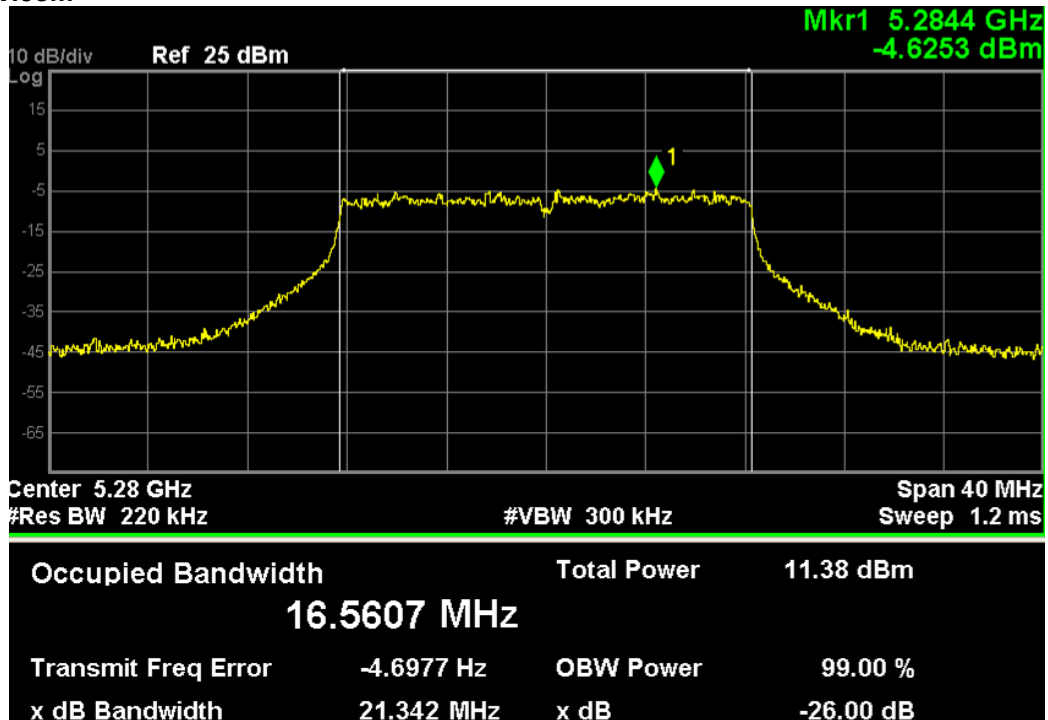
Channel Frequency: 5540MHz



Data Rate:54 Mbps

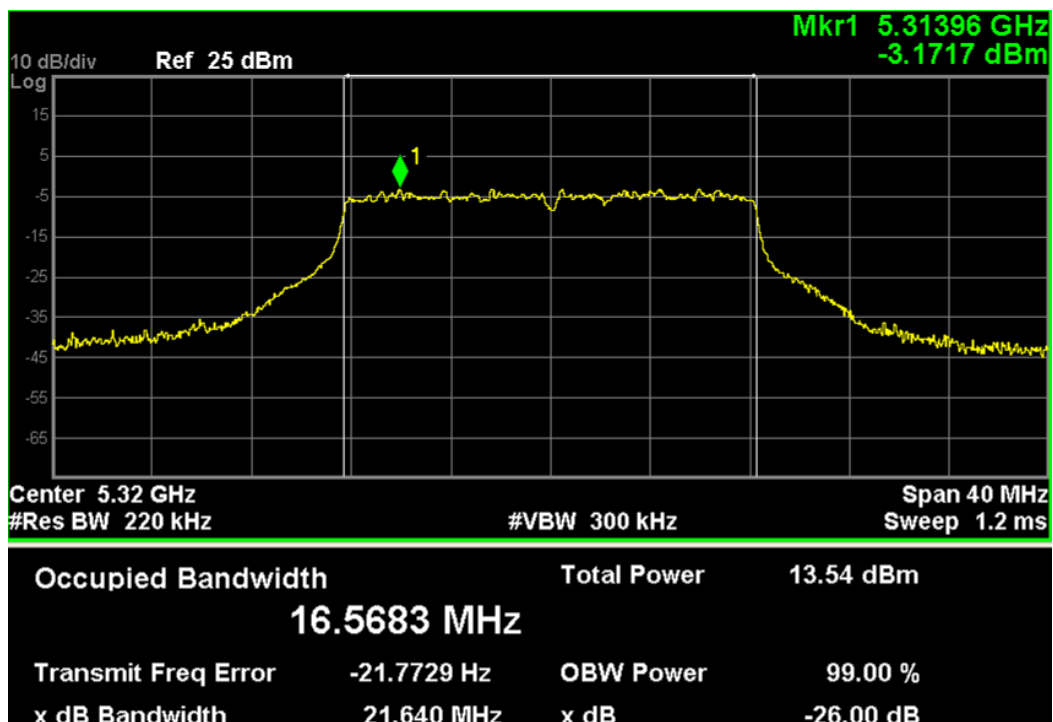
Channel Frequency: 5260MHz

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Data Rate:54 Mbps

Channel Frequency: 5280MHz



Data Rate:54 Mbps

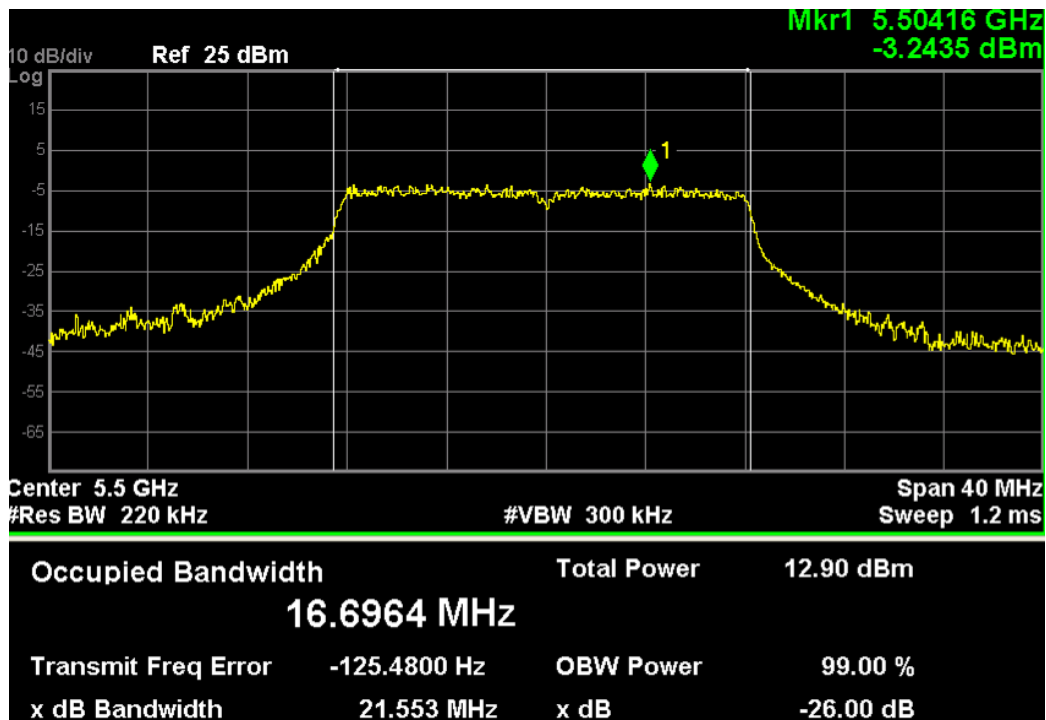
Channel Frequency: 5320MHz

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Test Result:

Modulation: 802.11a

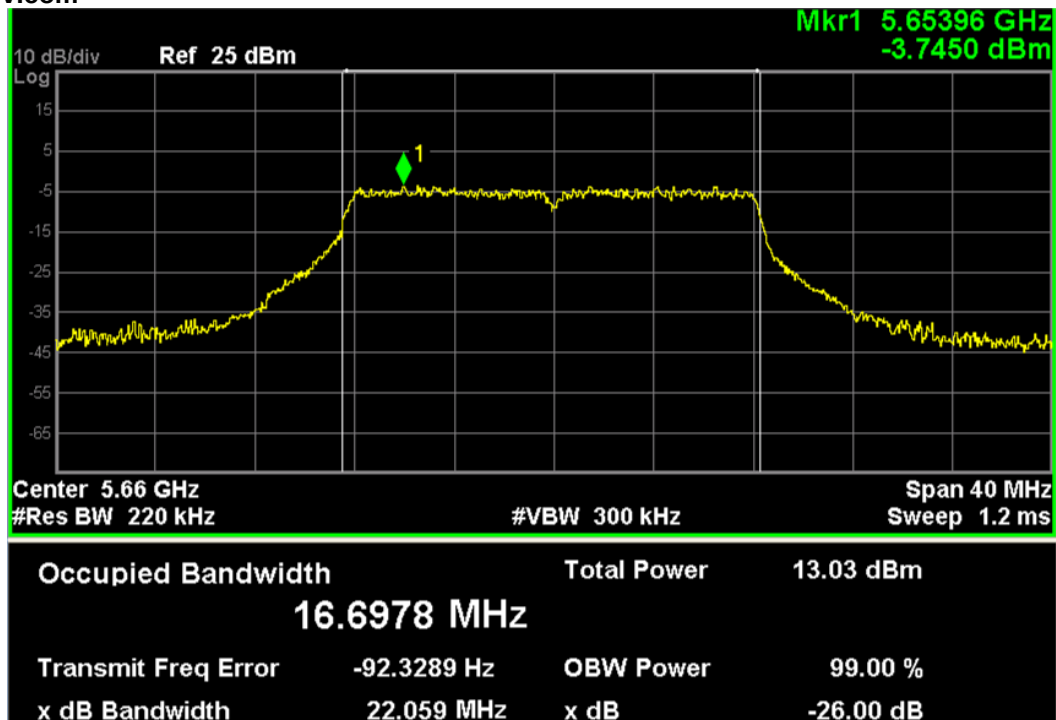
Data Rate (Mbps)	Channel	Frequency (MHz)	26 Mbps dB Band width (MHz)	99% Occupied Bandwidth (MHz)
6	100	5500	16.70	21.55
	132	5660	16.70	22.06
	140	5700	16.74	21.47
24	100	5500	16.54	20.88
	132	5660	16.57	21.09
	140	5700	16.58	20.98
54	100	5500	16.59	21.19
	132	5660	16.58	20.67
	140	5700	16.59	21.32



Data rate: 6 Mbps

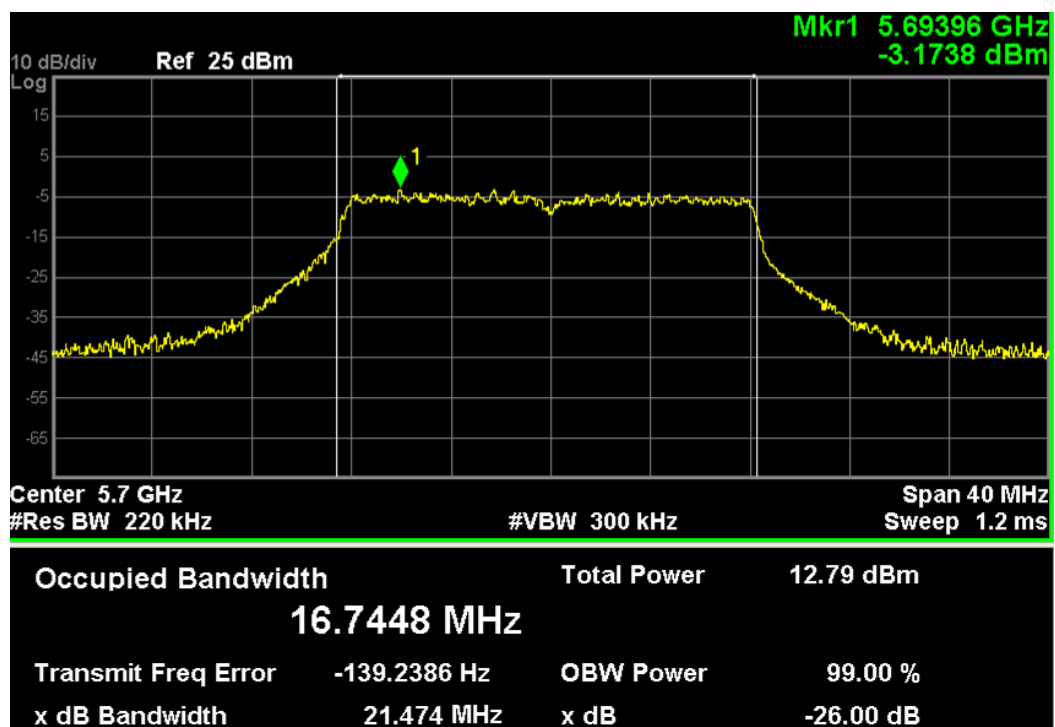
Channel Frequency: 5500MHz

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Data rate: 6 Mbps

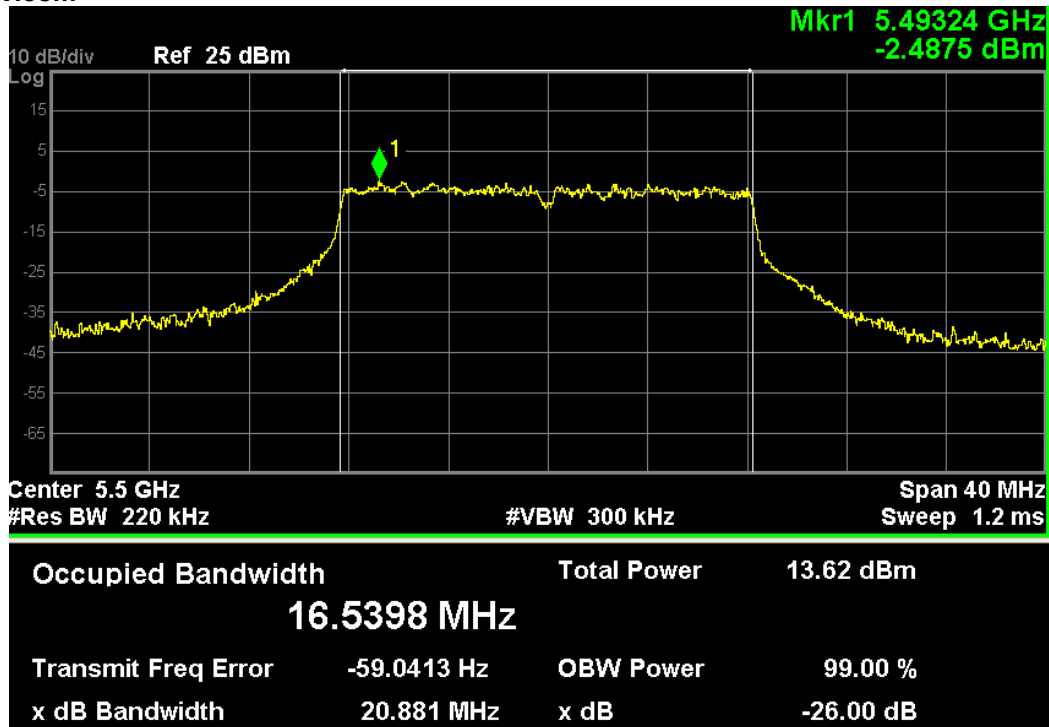
Channel Frequency: 5660MHz



Data rate: 6 Mbps

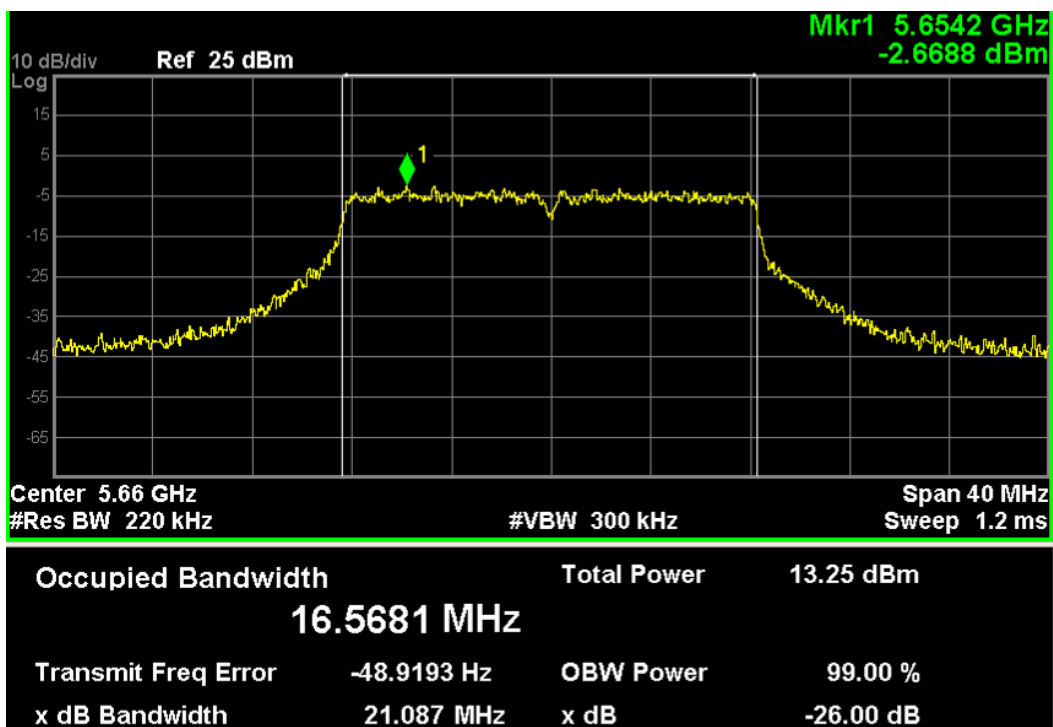
Channel Frequency: 5700MHz

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Data rate: 24 Mbps

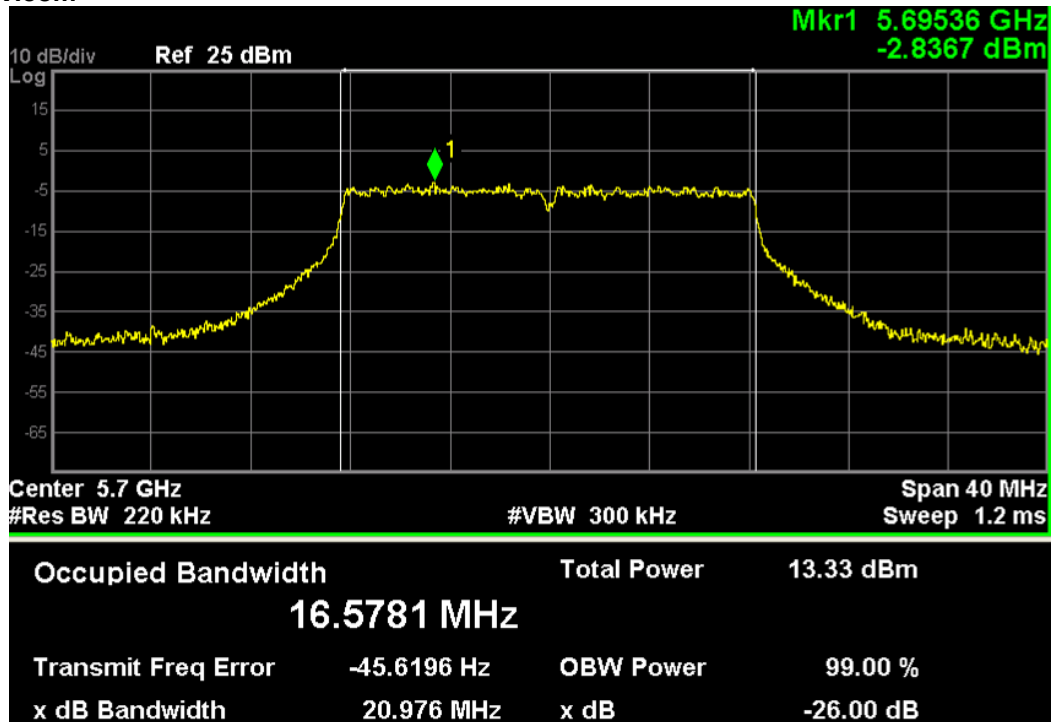
Channel Frequency: 5500MHz



Data rate: 24 Mbps

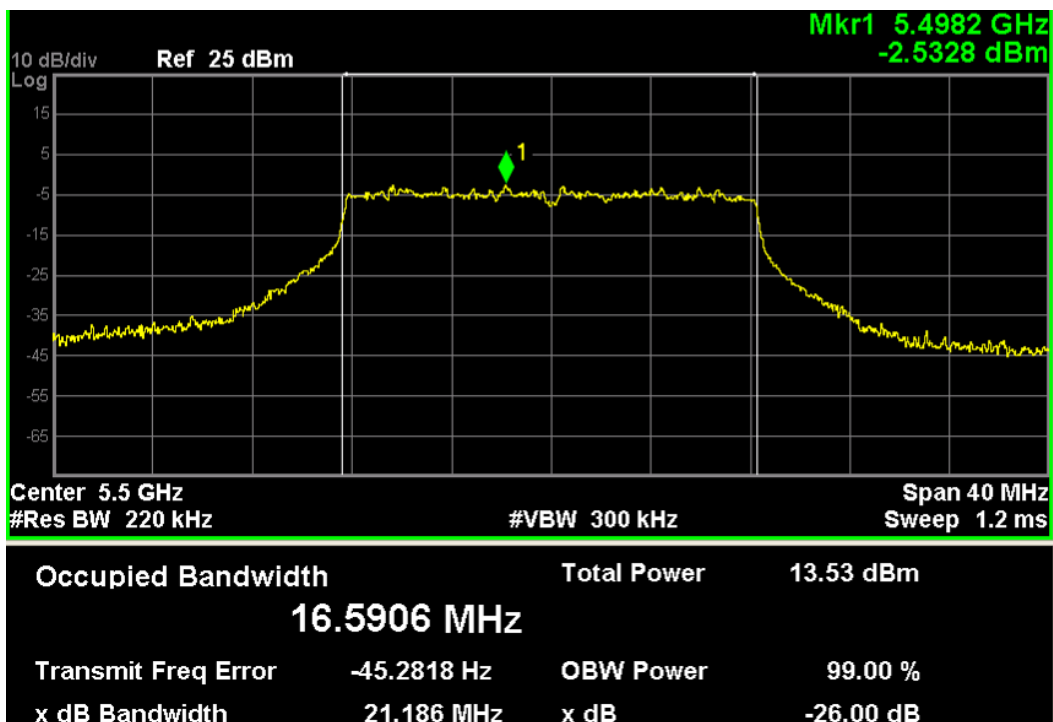
Channel Frequency: 5660MHz

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Data rate: 24 Mbps

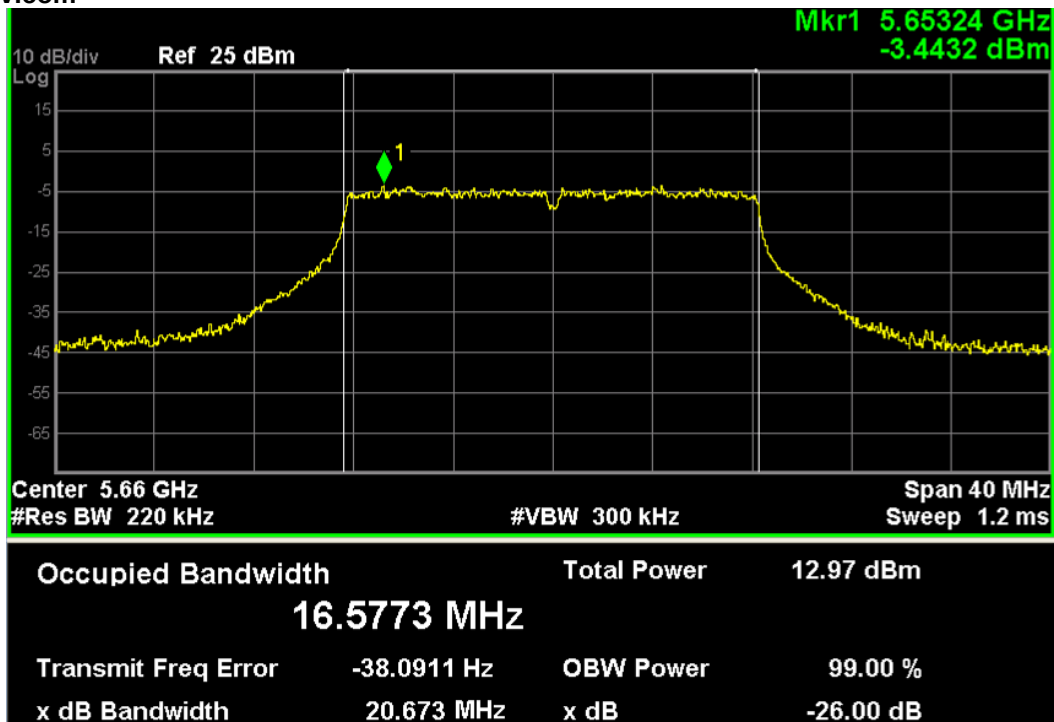
Channel Frequency: 5700MHz



Data rate: 54 Mbps

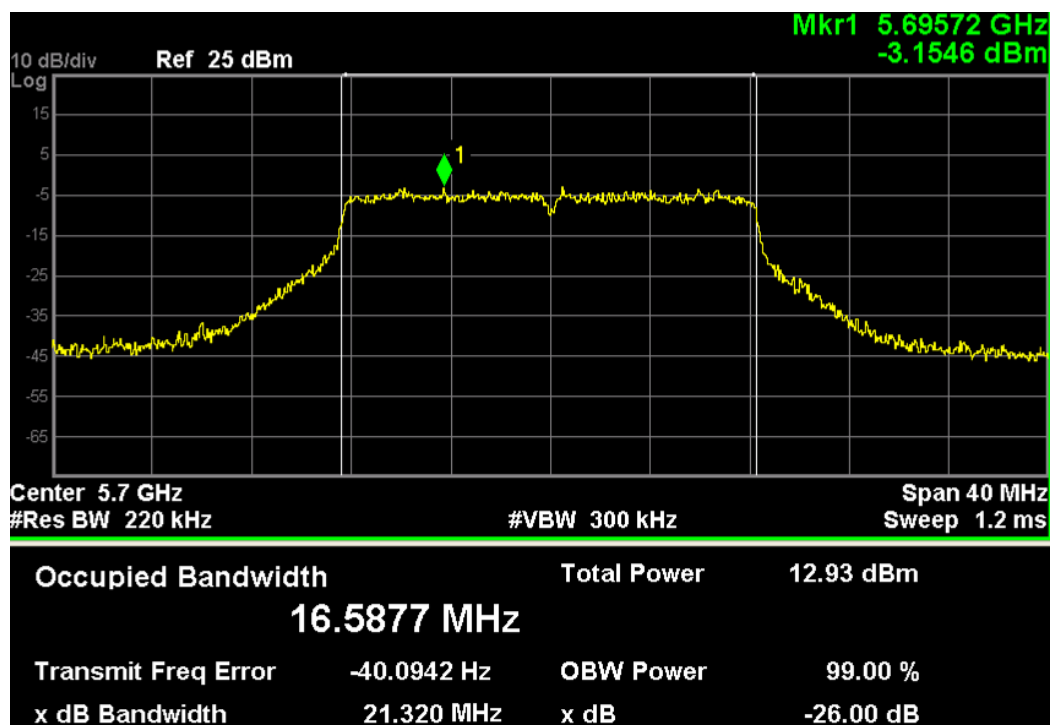
Channel Frequency: 5500MHz

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Data rate: 54 Mbps

Channel Frequency: 5660MHz



Data rate: 54 Mbps

Channel Frequency: 5700MHz

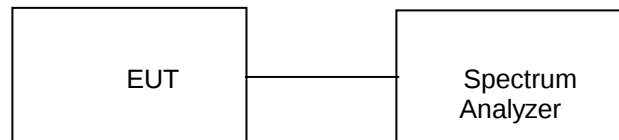
Maximum Conducted Output Power Result

Section 15.407 (a)
Pass

Test Specification
Measurement Bandwidth (RBW)
Requirement

FCC Part 15 Section 15.407
1 MHz
For the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or 4 dBm + 10log B, where B is the 26- dB emission bandwidth in MHz
For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10log B, where B is the 26 dB emission bandwidth in MHz

Test Method:



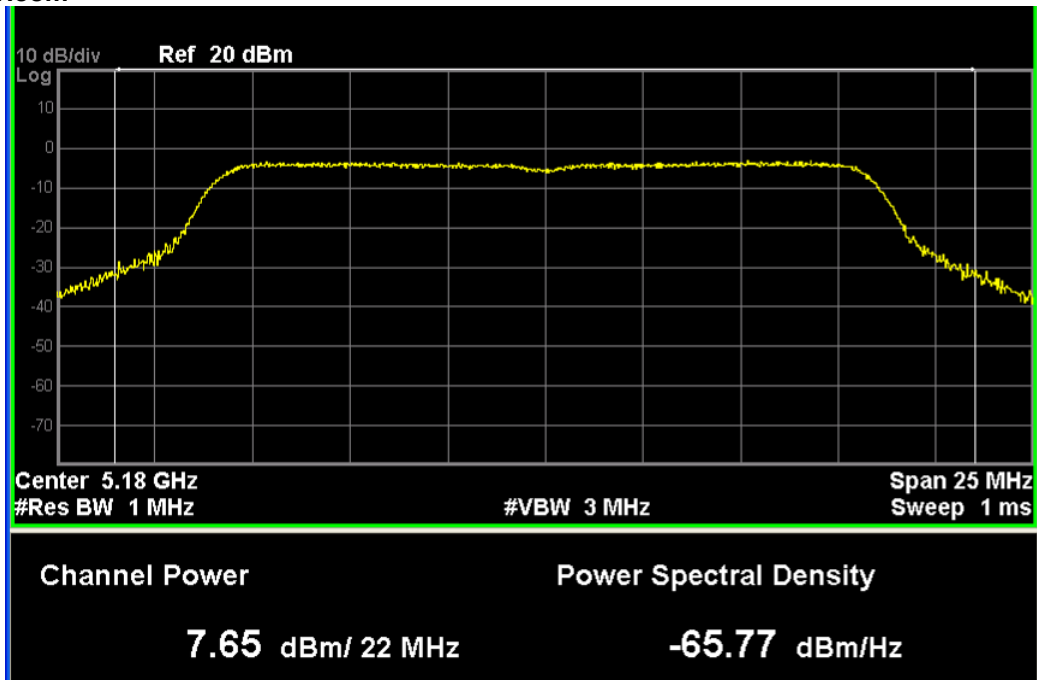
Test Result:

Modulation: 802.11a

Cable Loss: 0.6dB

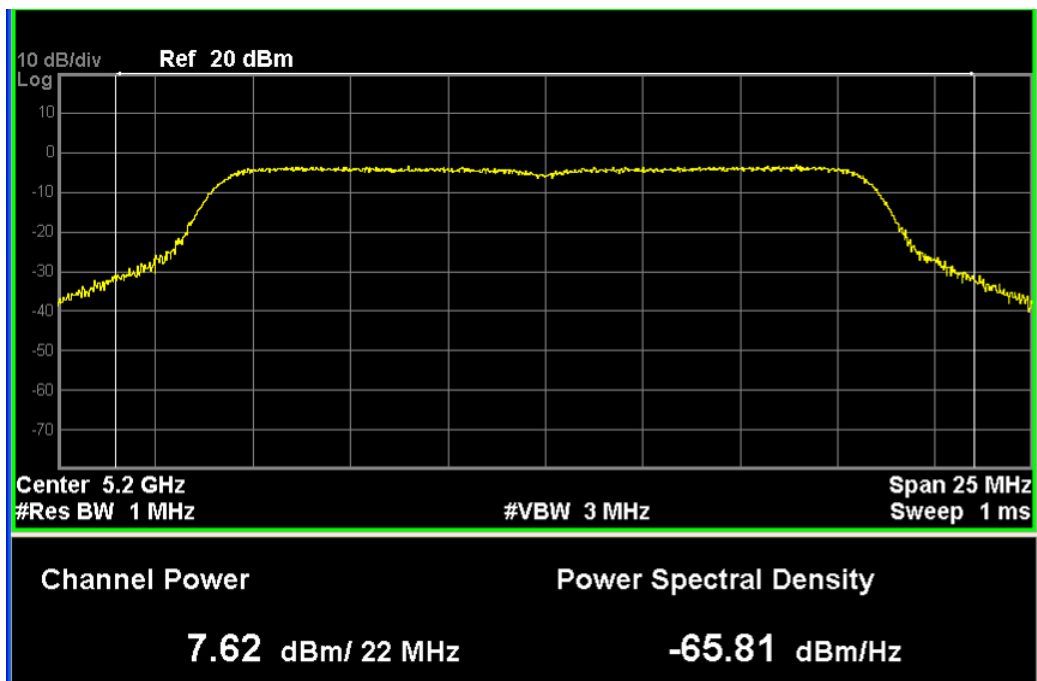
Data Rate (Mbps)	Channel No.	Frequency (MHz)	Measured RF Output power (dBm)	Total Output power (dBm)	Limit (dBm)	Margin (dB)
6	36	5180	7.65	8.25	17.00	-8.75
	40	5200	7.62	8.22	17.00	-8.78
	48	5240	7.62	8.22	17.00	-8.78
	52	5260	7.49	8.09	24.00	-15.91
	56	5280	8.14	8.74	24.00	-15.26
	64	5320	9.01	9.61	24.00	-14.39
24	36	5180	7.58	8.18	17.00	-8.82
	40	5200	7.53	8.13	17.00	-8.87
	48	5240	7.55	8.15	17.00	-8.85
	52	5260	7.40	8.00	24.00	-16.00
	56	5280	8.10	8.70	24.00	-15.30
	64	5320	8.83	9.43	24.00	-14.57
54	36	5180	7.48	8.08	17.00	-8.92
	40	5200	7.48	8.08	17.00	-8.92
	48	5240	7.51	8.11	17.00	-8.89
	52	5260	7.37	7.97	24.00	-16.03
	56	5280	8.05	8.65	24.00	-15.35
	64	5320	8.89	9.49	24.00	-14.51

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Data Rate:6 Mbps

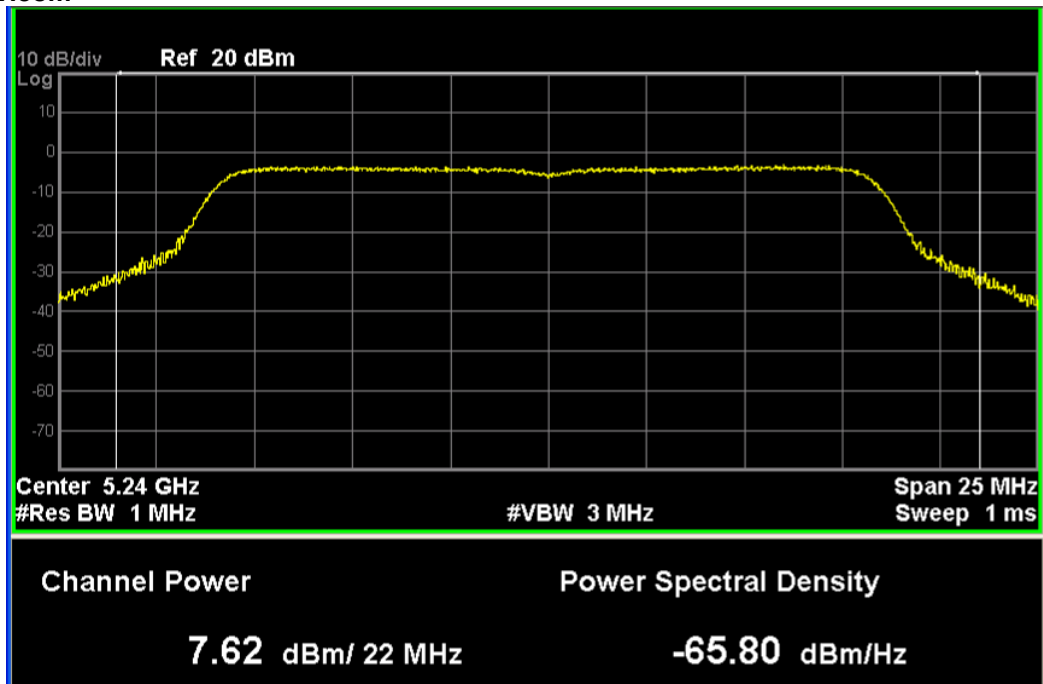
Channel Frequency: 5180 MHz



Data Rate:6 Mbps

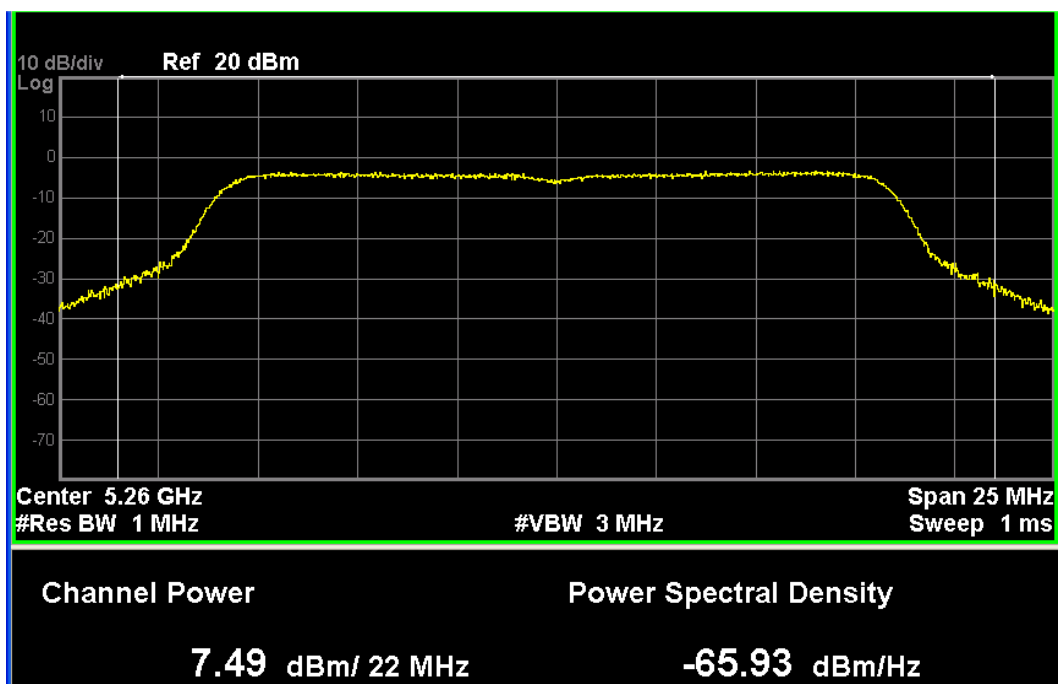
Channel Frequency: 5200 MHz

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Data Rate:6 Mbps

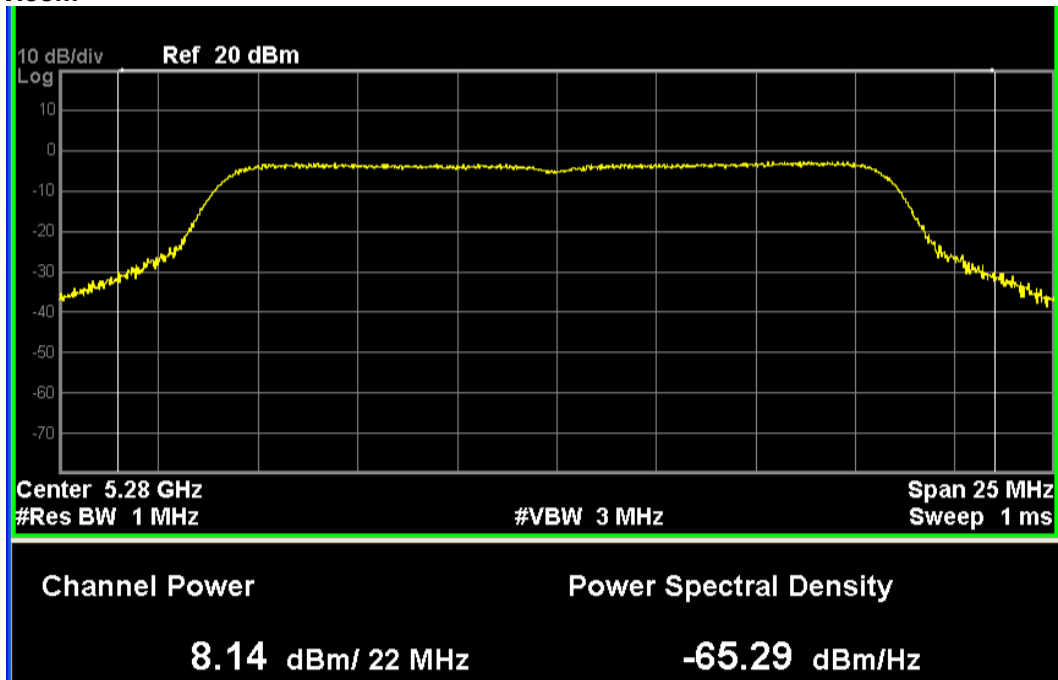
Channel Frequency: 5240MHz



Data Rate:6 Mbps

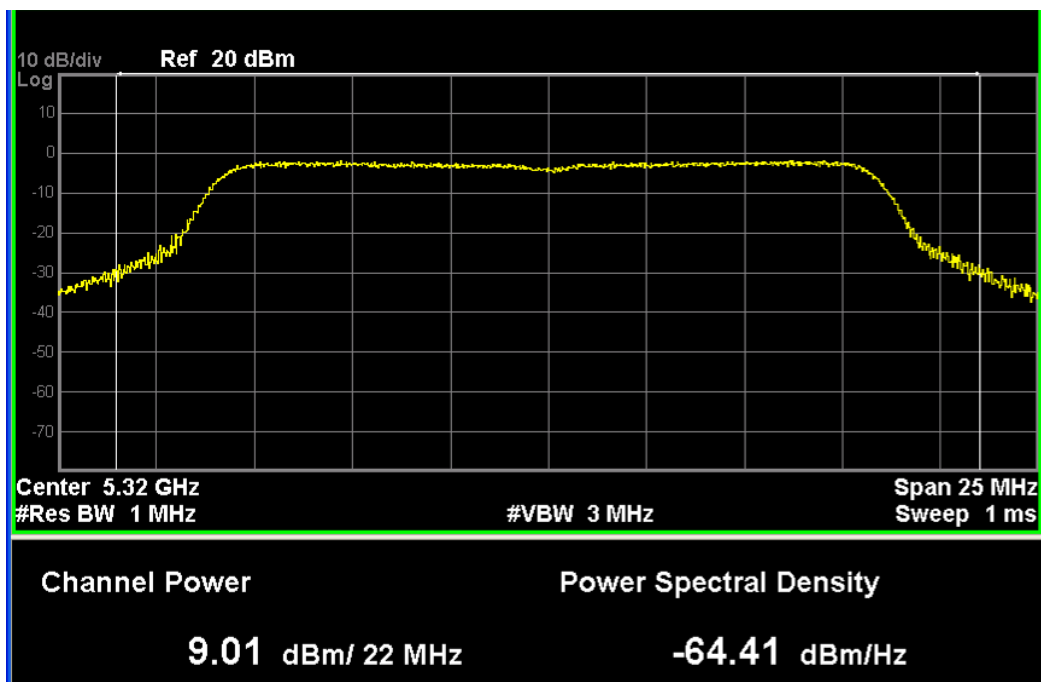
Channel Frequency: 5260MHz

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Data Rate:6 Mbps

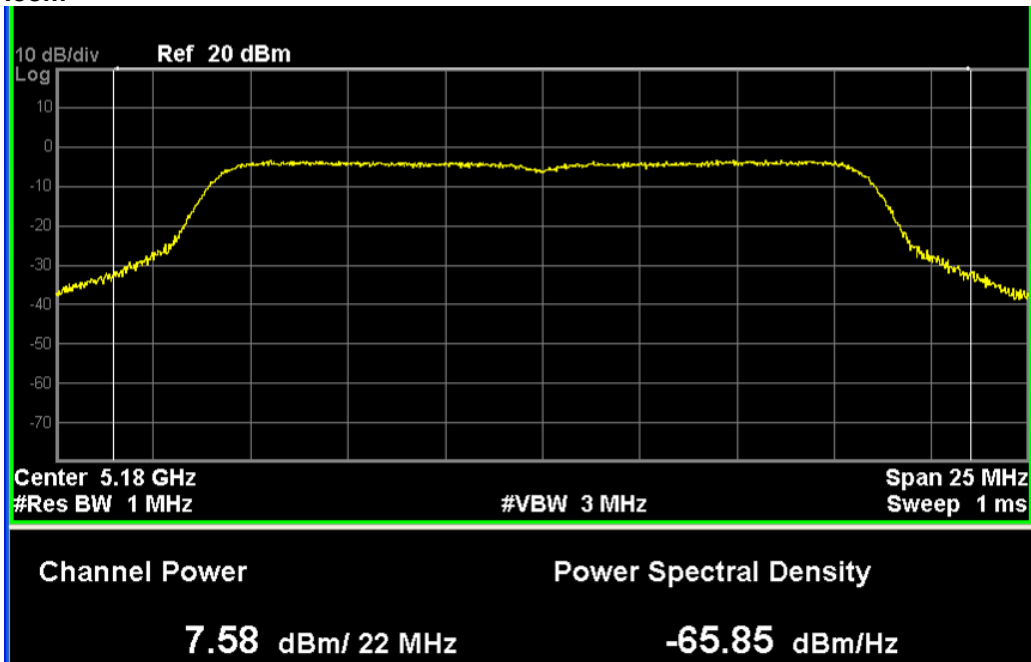
Channel Frequency: 5280MHz



Data Rate:6 Mbps

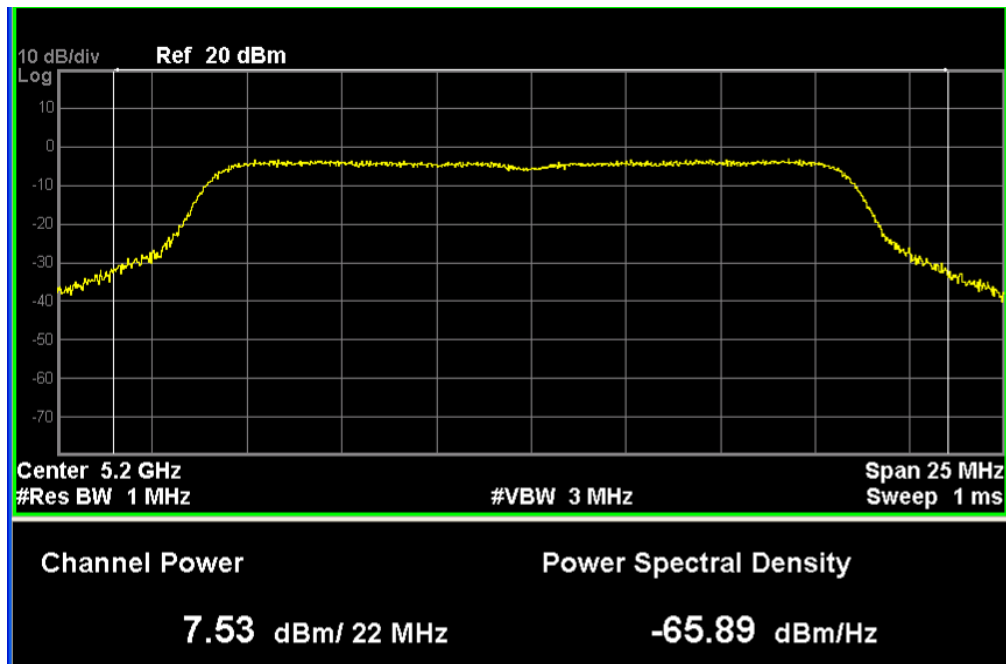
Channel Frequency: 5320MHz

www.tuv.com



Data Rate:24 Mbps

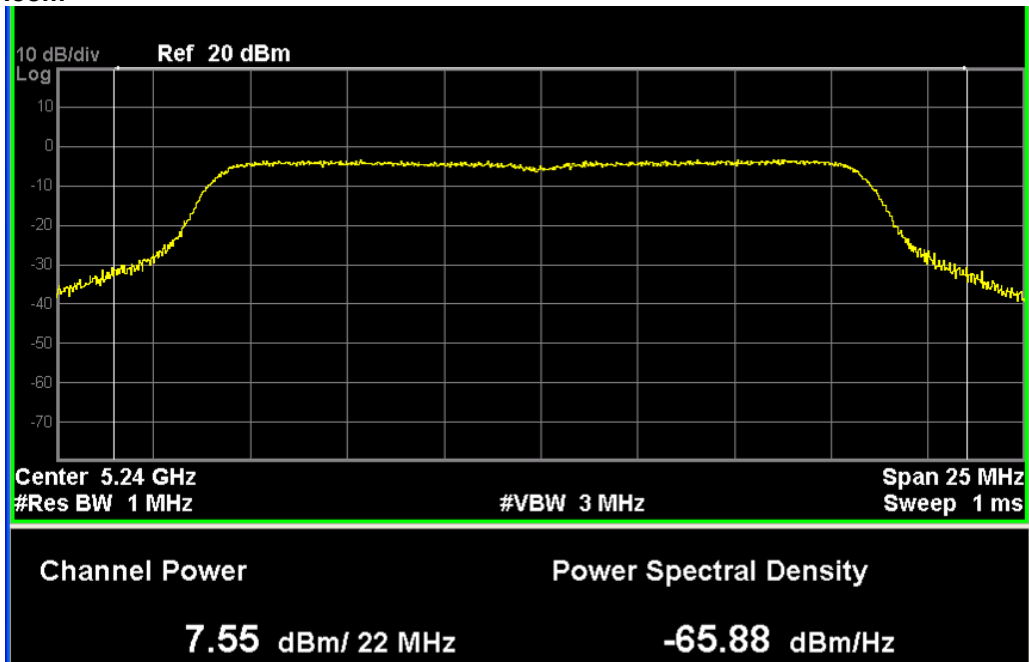
Channel Frequency: 5180MHz



Data Rate:24 Mbps

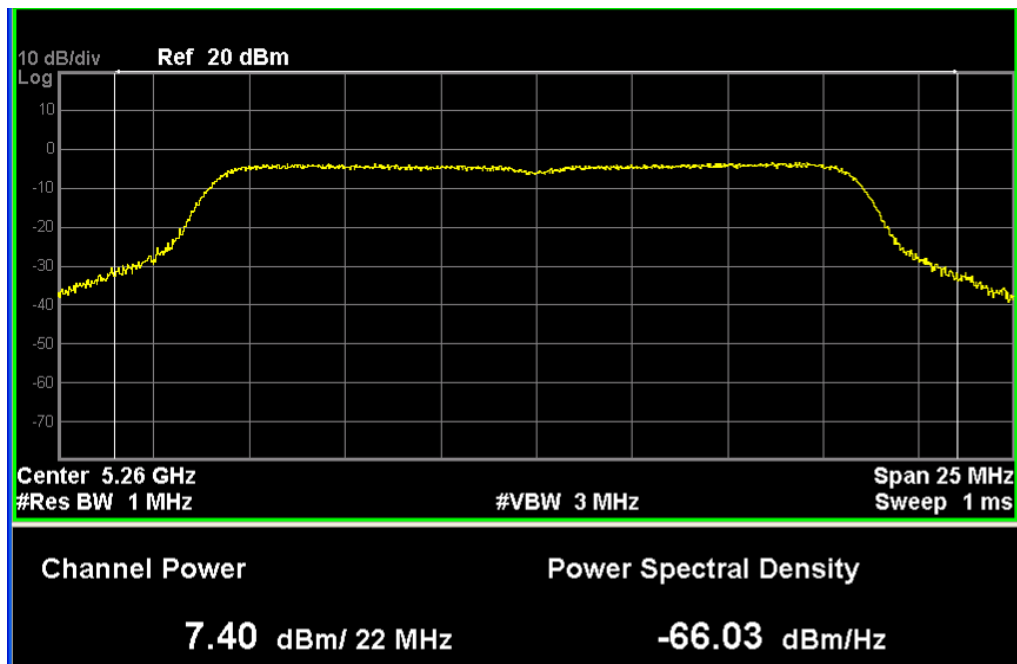
Channel Frequency: 5200MHz

www.tuv.com



Data Rate:24 Mbps

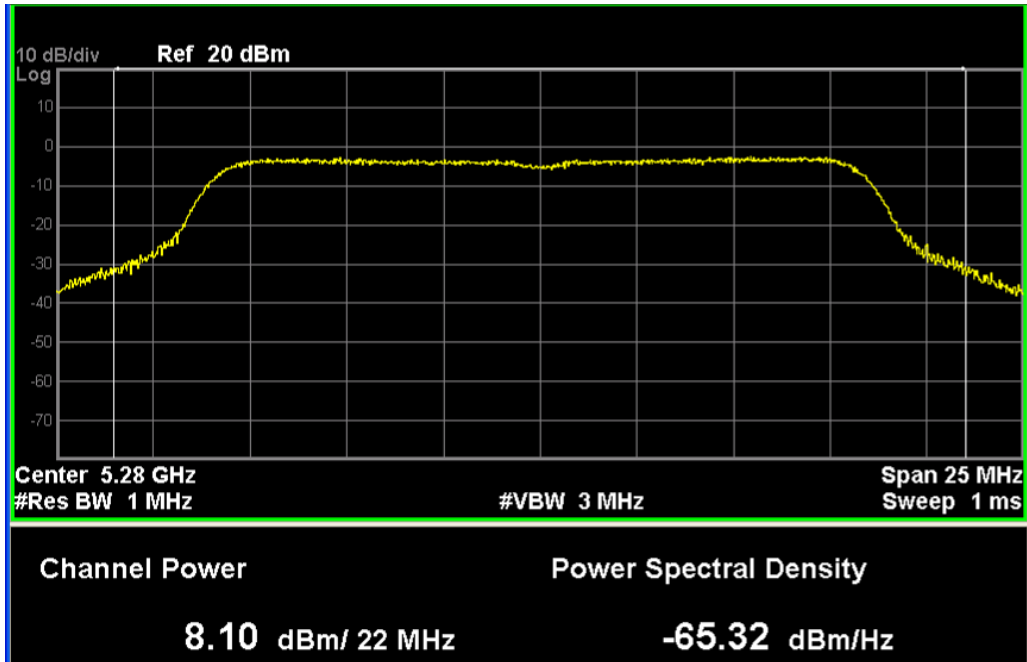
Channel Frequency: 5240MHz



Data Rate:24 Mbps

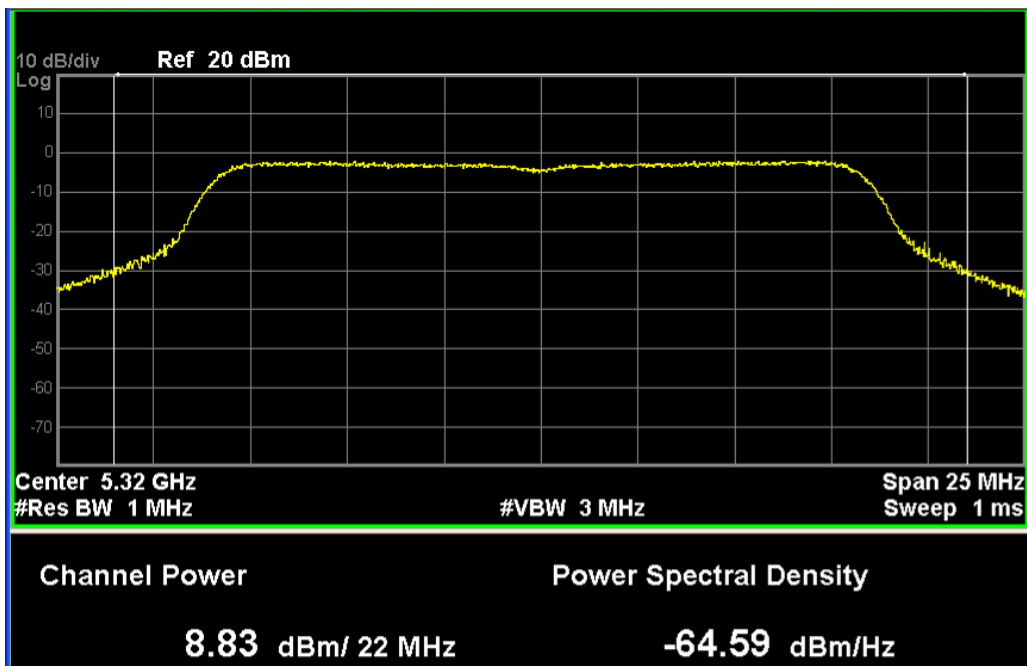
Channel Frequency: 5260MHz

www.tuv.com



Data Rate:24 Mbps

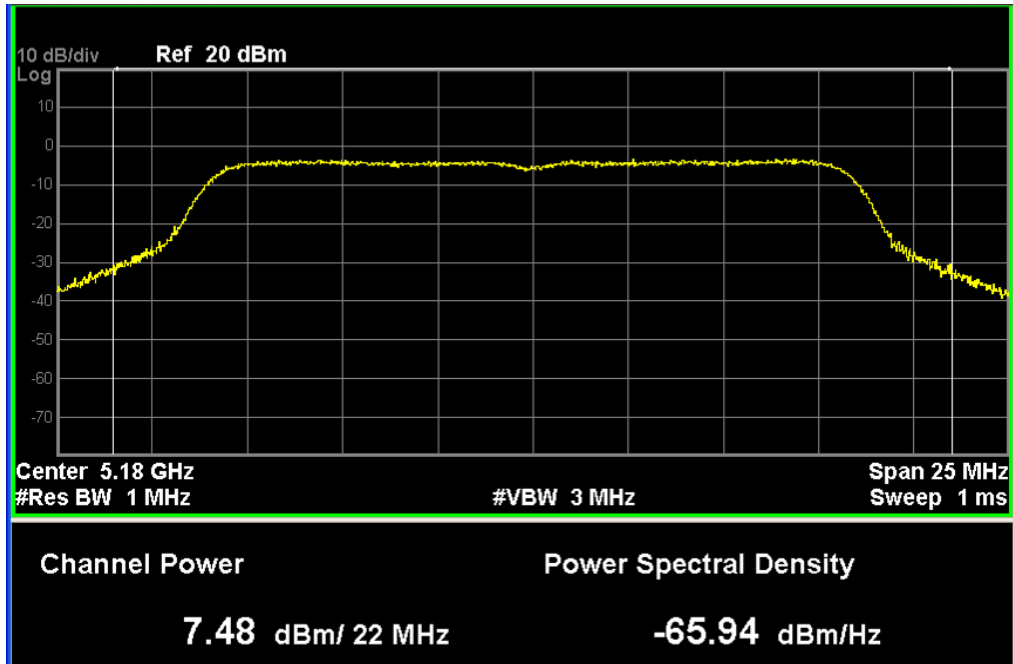
Channel Frequency: 5280MHz



Data Rate:24 Mbps

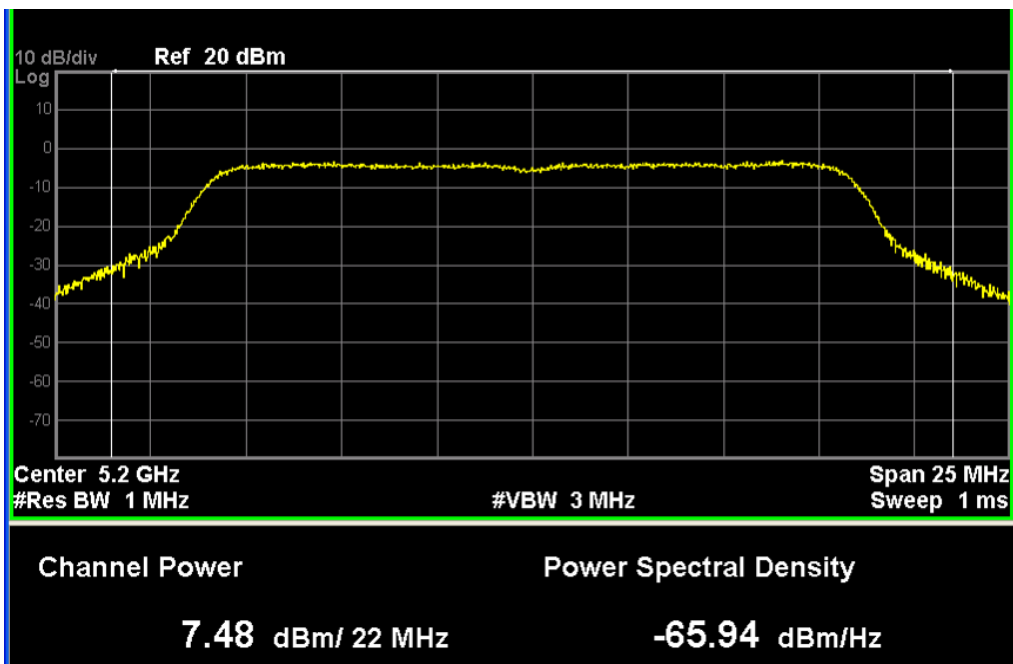
Channel Frequency: 5320MHz

www.tuv.com



Data Rate:54 Mbps

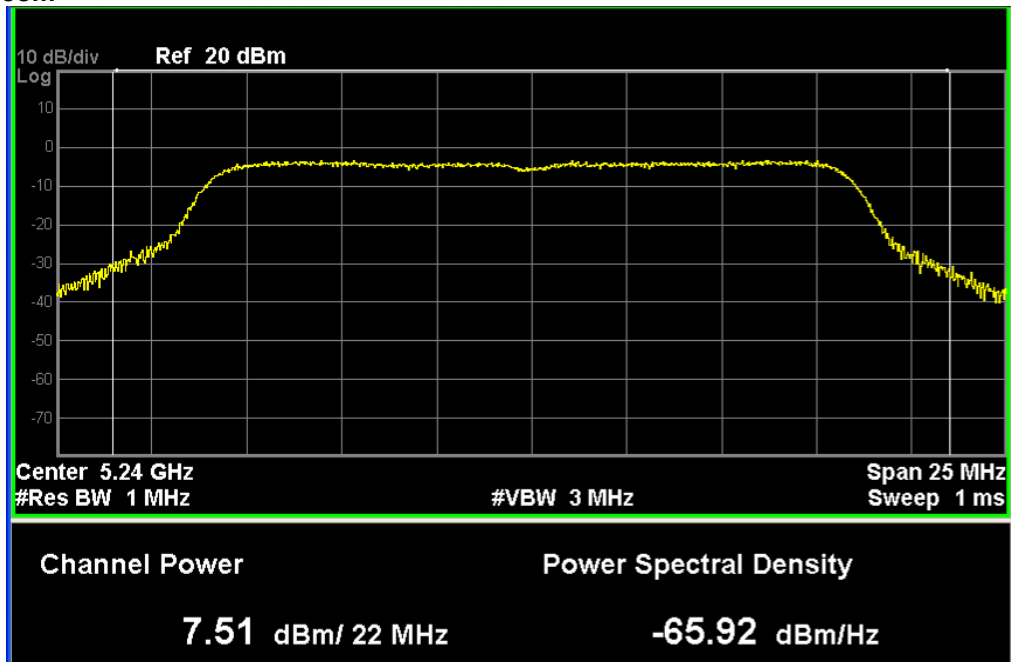
Channel Frequency: 5180MHz



Data Rate:54 Mbps

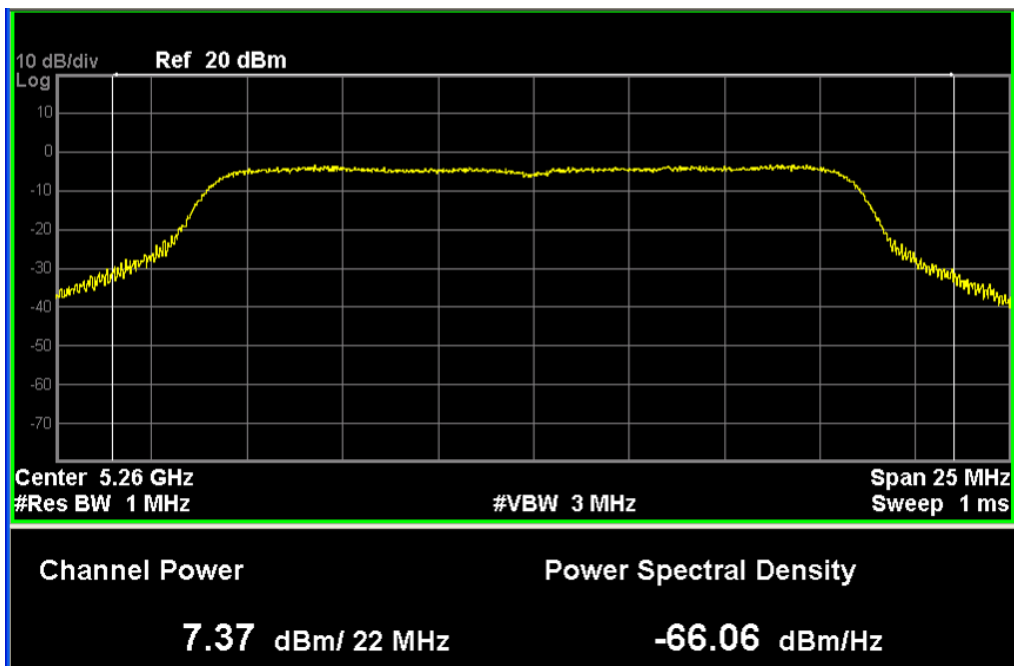
Channel Frequency: 5200MHz

www.tuv.com



Data Rate:54 Mbps

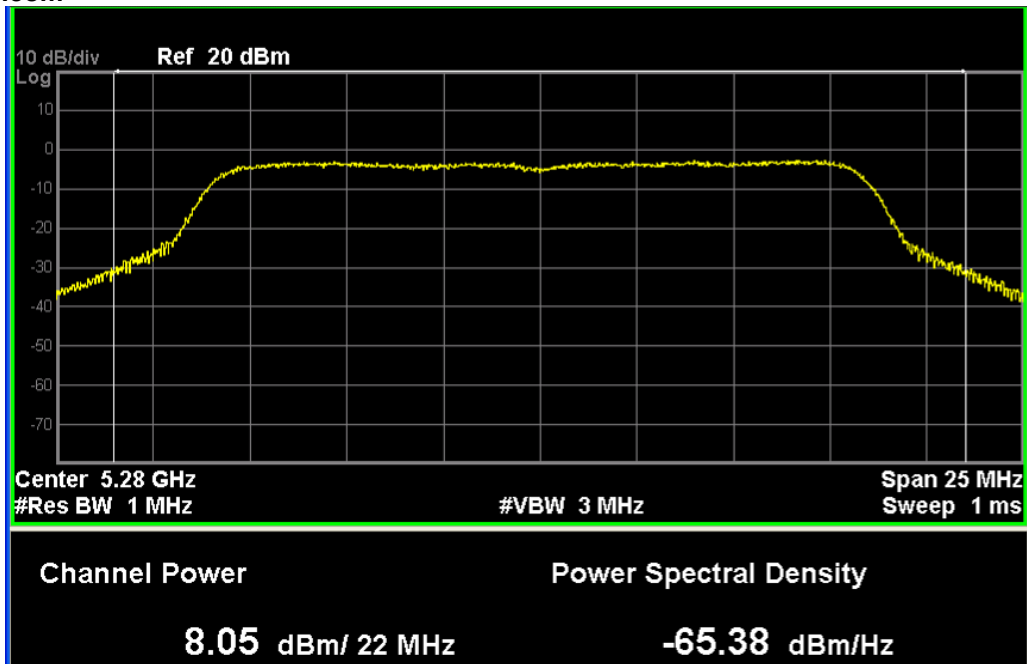
Channel Frequency: 5240MHz



Data Rate:54 Mbps

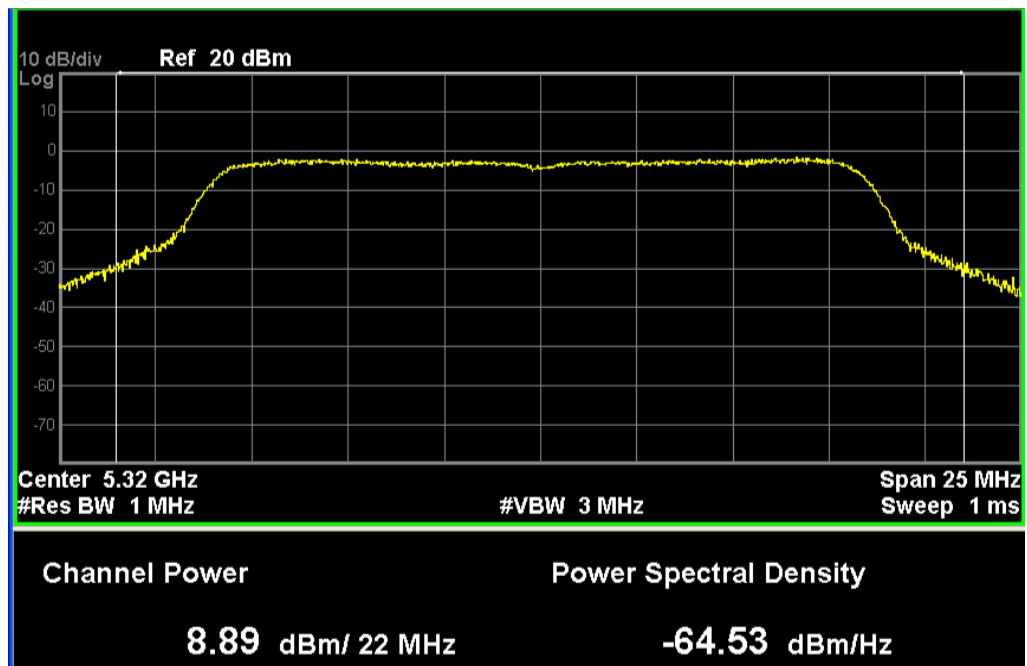
Channel Frequency: 5260MHz

www.tuv.com



Data Rate:54 Mbps

Channel Frequency: 5280MHz



Data Rate:54 Mbps

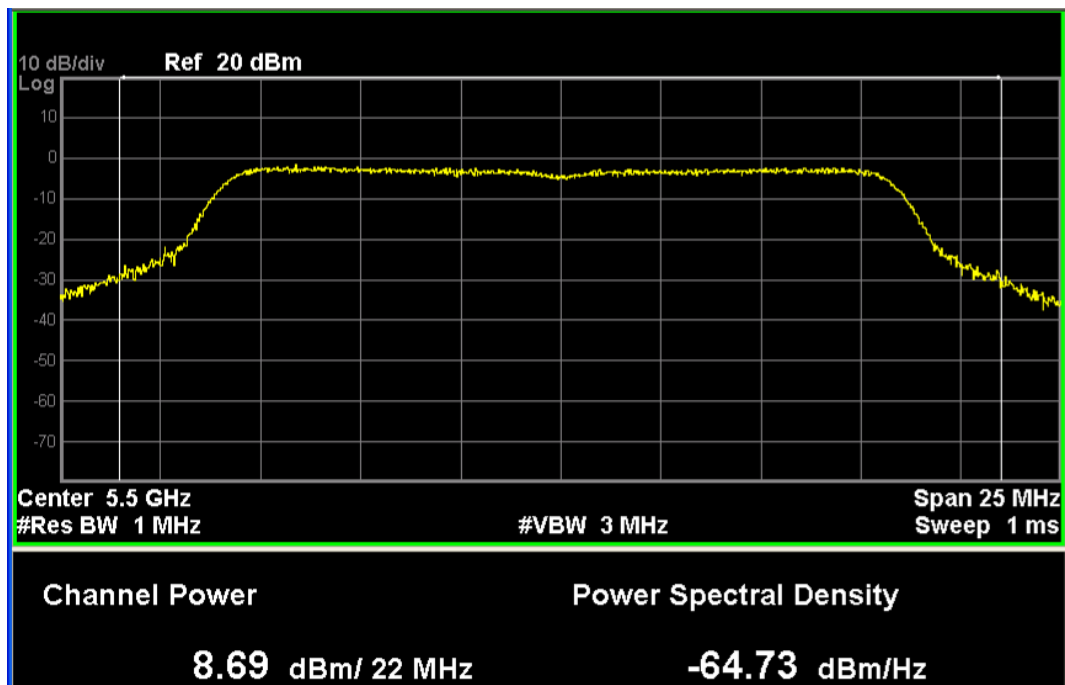
Channel Frequency: 5320MHz

www.tuv.com

Modulation: 802.11a

Cable Loss: 0.6dB

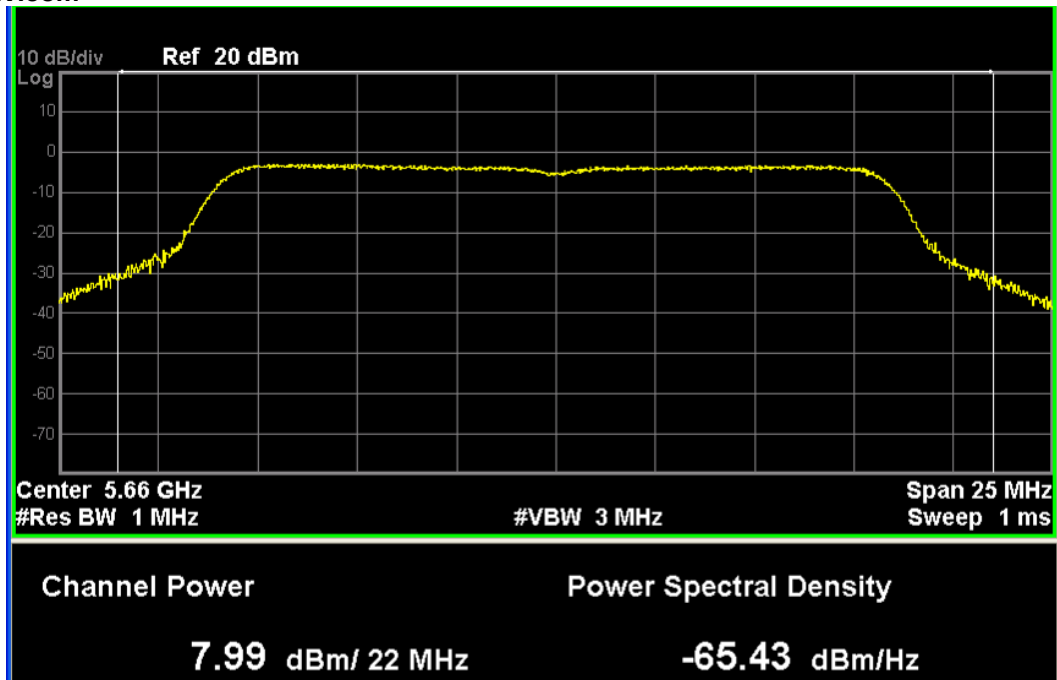
Data Rate (Mbps)	Channel	Frequency (MHz)	Measured RF Output power (dBm)	Total Output power (dBm)	Limit (dBm)	Margin (dBm)
6	100	5500	8.69	9.29	24.00	-14.71
	132	5660	7.99	8.59	24.00	-15.41
	140	5700	8.86	9.46	24.00	-14.54
24	100	5500	8.60	9.20	24.00	-14.80
	132	5660	7.88	8.48	24.00	-15.52
	140	5700	8.75	9.35	24.00	-14.65
54	100	5500	7.43	8.03	24.00	-15.97
	132	5660	7.91	8.51	24.00	-15.49
	140	5700	8.77	9.37	24.00	-14.63



Data Rate: 6 Mbps

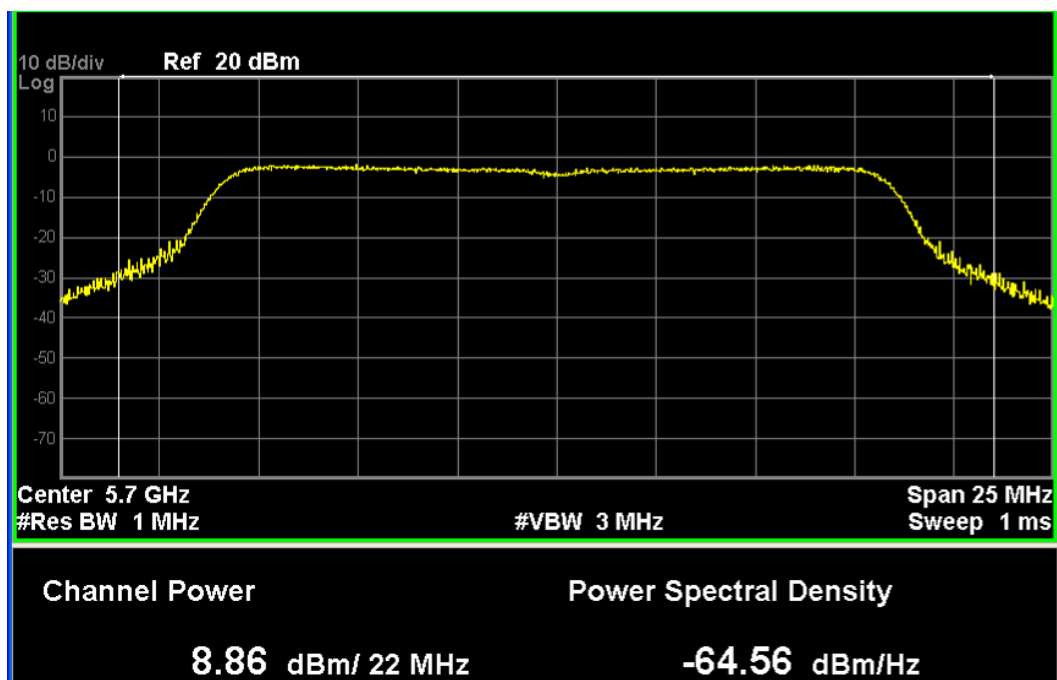
Channel Frequency: 5500 MHz

www.tuv.com



Data Rate:6 Mbps

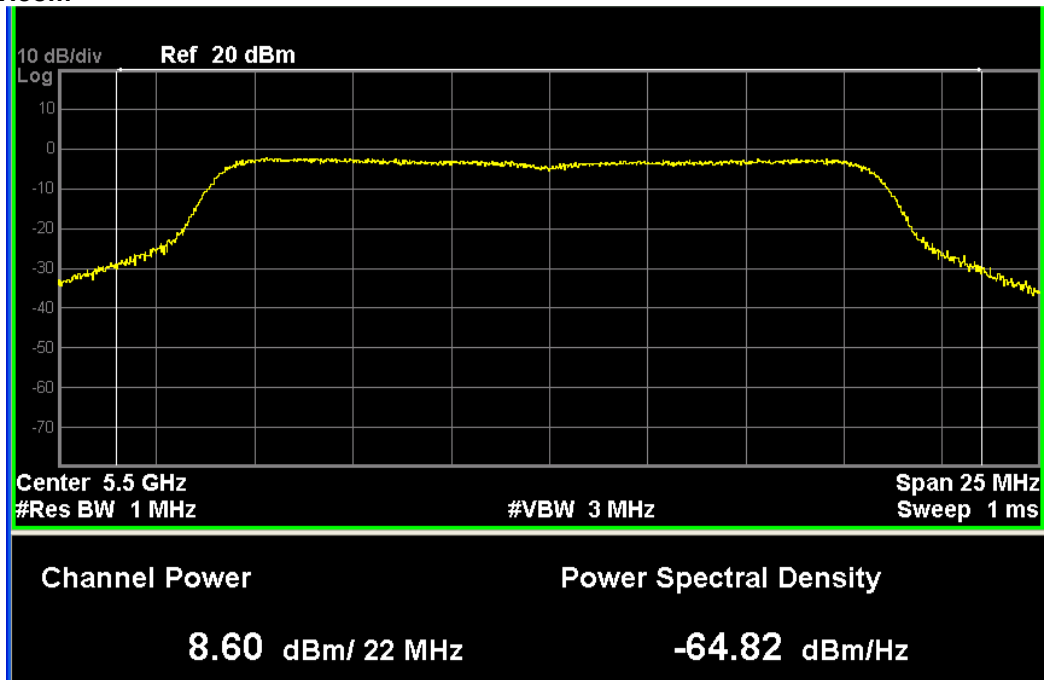
Channel Frequency: 5660MHz



Data Rate:6

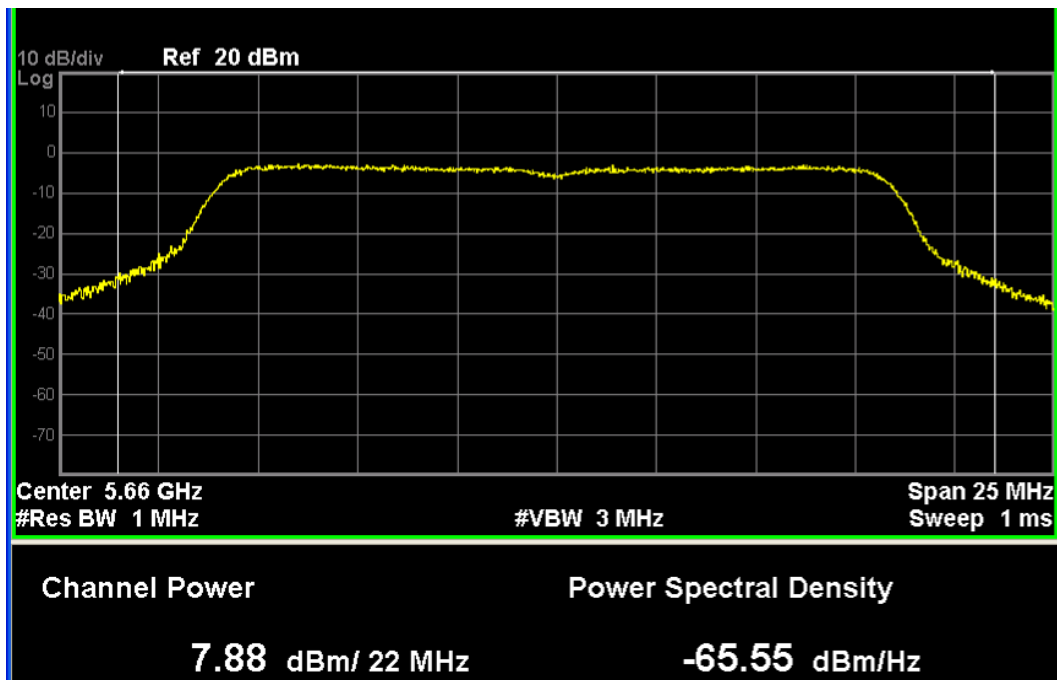
Channel Frequency: 5700MHz

www.tuv.com



Data Rate:24 Mbps

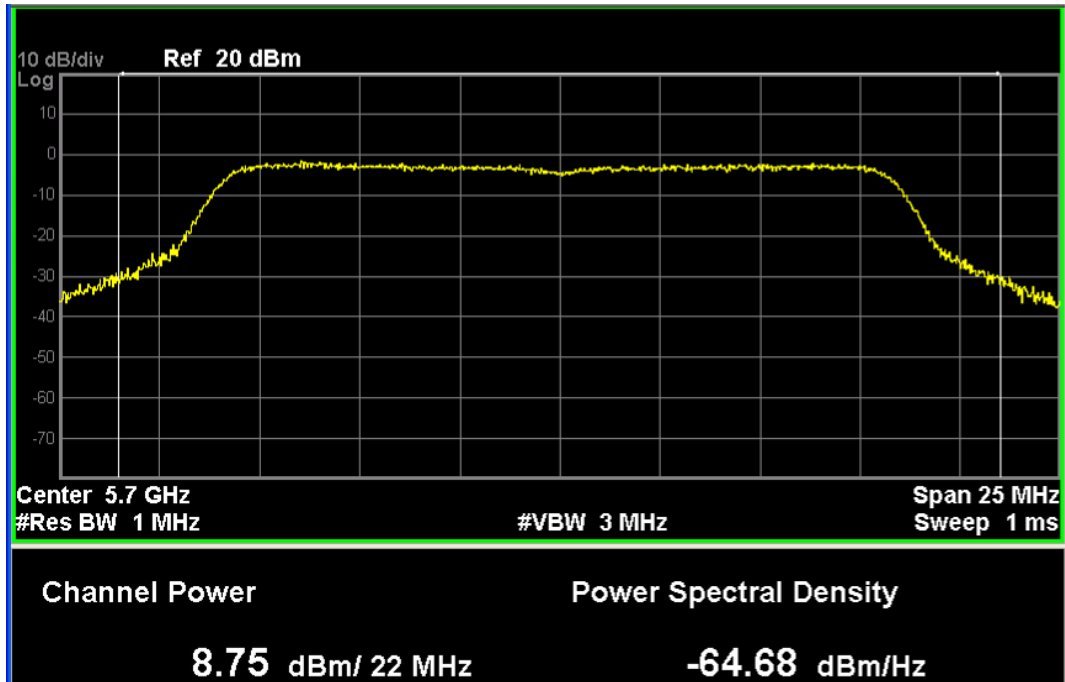
Channel Frequency: 5500MHz



Data Rate:24 Mbps

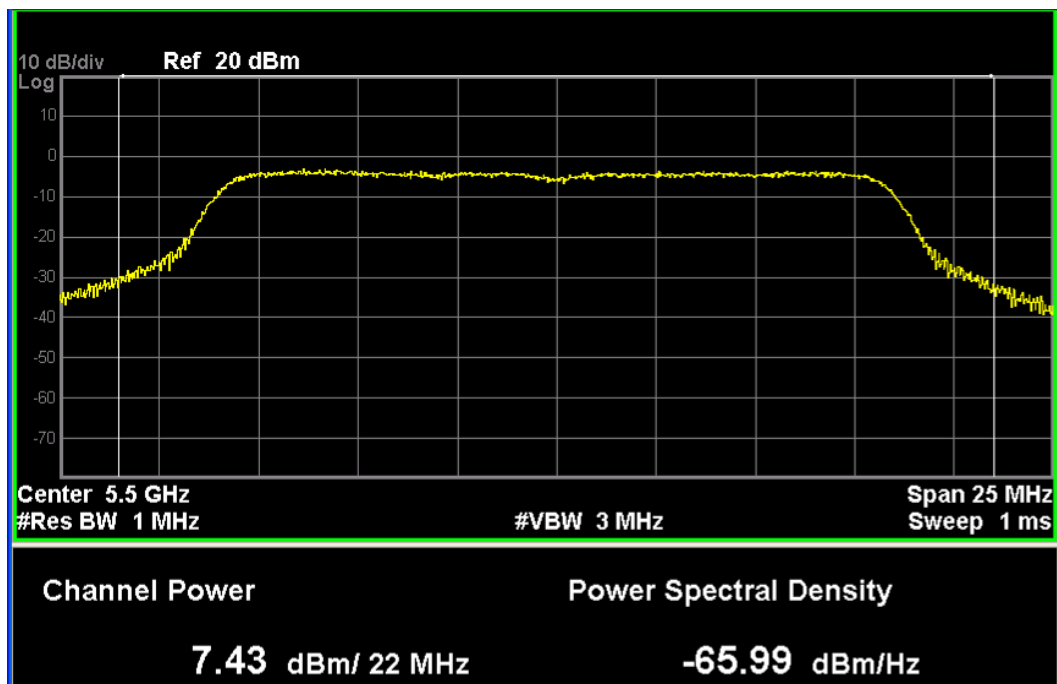
Channel Frequency: 5660MHz

www.tuv.com



Data Rate:24 Mbps

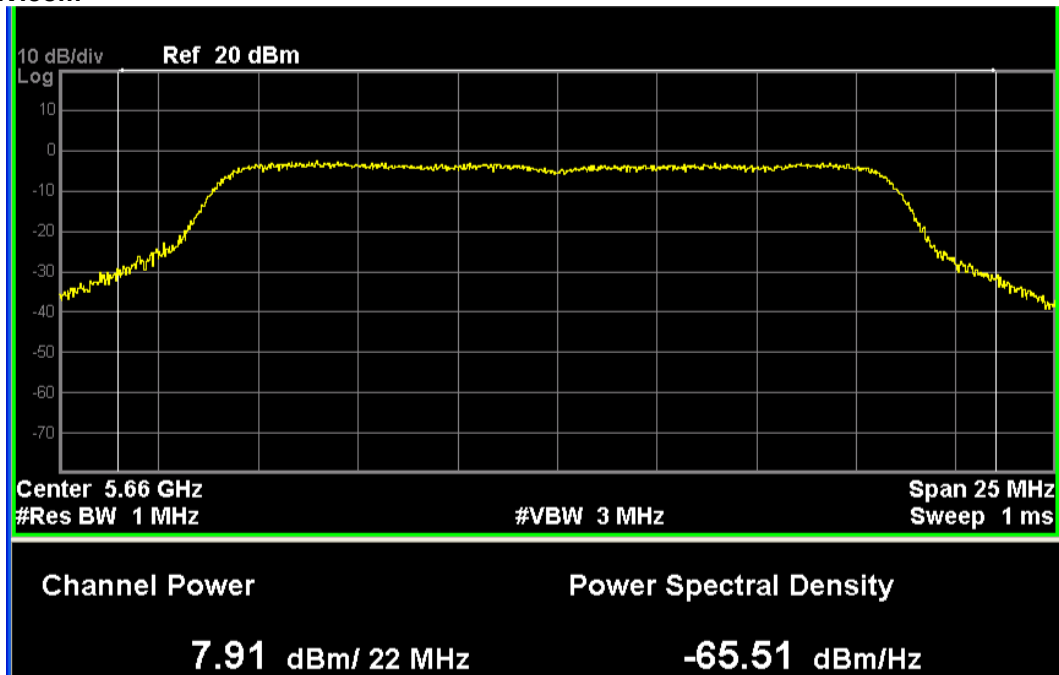
Channel Frequency: 5700MHz



Data Rate:54 Mbps

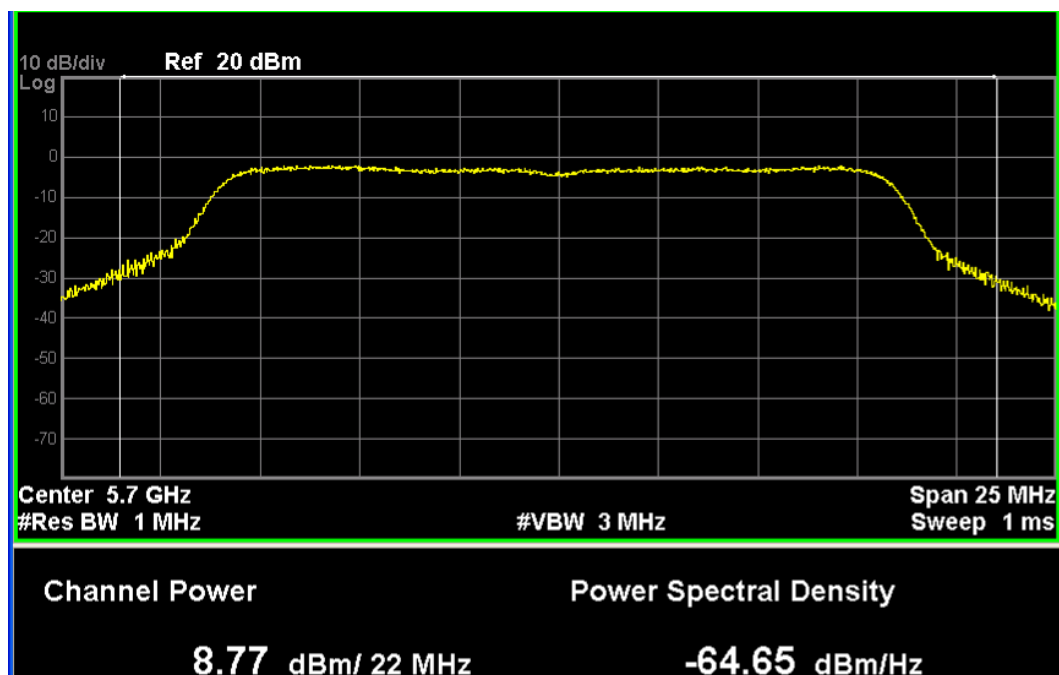
Channel Frequency: 5500MHz

www.tuv.com



Data Rate:54 Mbps

Channel Frequency: 5660MHz



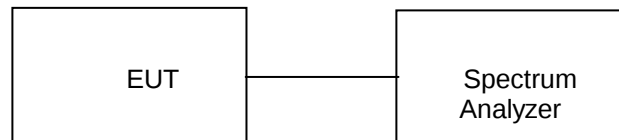
Data Rate:54 Mbps

Channel Frequency: 5700MHz

**Power Spectral Density
Result**
**Section 15.407 (a)
Pass**

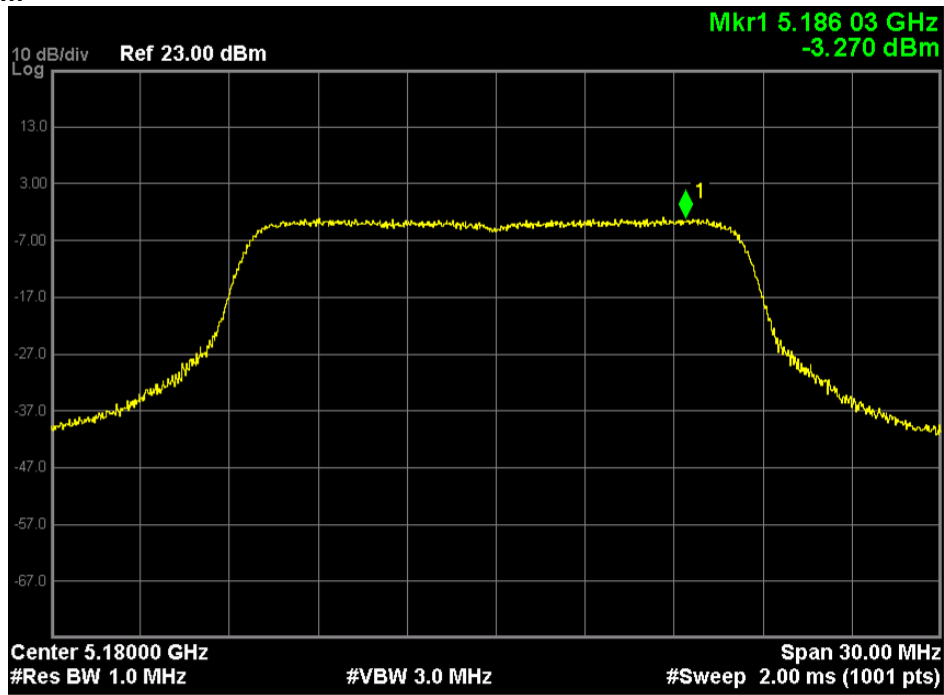
Test Specification
Detector Function
Requirement

FCC Part 15 Section 15.407 (a)
Sample
For the band 5.15-5.25 GHz, the peak power spectral density shall not exceed 4 dBm in any 1-MHz band.
For the 5.25-5.35 GHz and 5.47-5.725 GHz bands the peak power spectral density shall not exceed 11 dBm in any 1-MHz band
For the 5.745-5.785 GHz bands the peak power spectral density shall not exceed 17 dBm in any 1-MHz band

Test Method:

Test Result:
Modulation: 802.11a

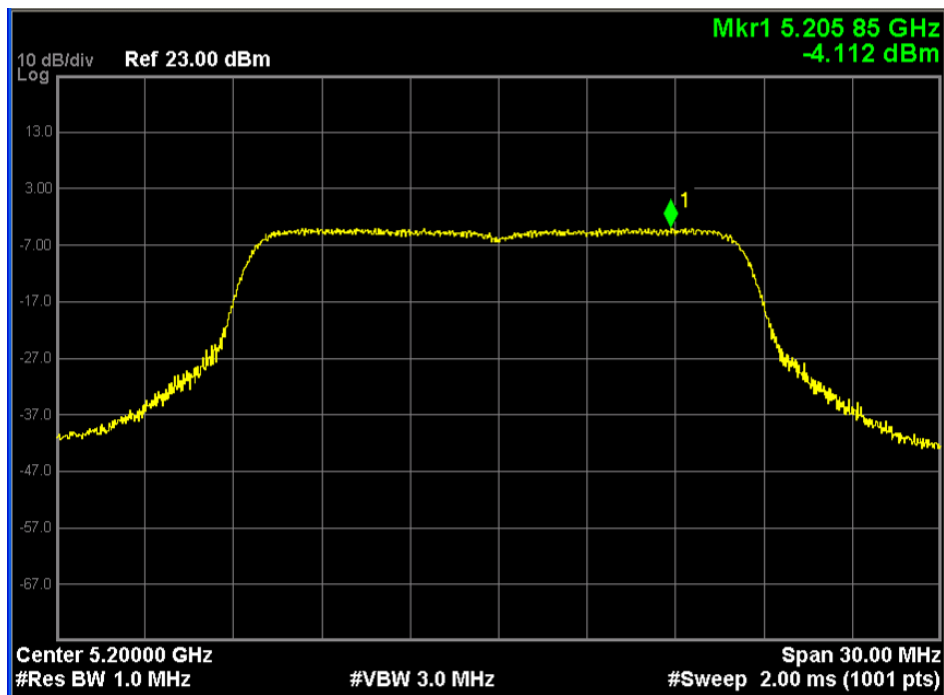
Data Rate (Mbps)	Channel No.	Frequency (MHz)	Measured RF Output power (dBm)	Total Output power (dBm)	Limit (dBm)	Margin (dB)
6	36	5180	-3.27	-2.67	4.00	-6.67
	40	5200	-4.11	-3.51	4.00	-7.51
	48	5240	-5.48	-4.88	4.00	-8.88
	52	5260	-6.44	-5.84	11.00	-16.84
	56	5280	-6.95	-6.35	11.00	-17.35
	64	5320	-8.03	-7.43	11.00	-18.43
24	36	5180	-3.41	-2.81	4.00	-6.81
	40	5200	-4.25	-3.65	4.00	-7.65
	48	5240	-5.27	-4.67	4.00	-8.67
	52	5260	-9.72	-9.12	11.00	-20.12
	56	5280	-6.58	-5.98	11.00	-16.98
	64	5320	-7.37	-6.77	11.00	-17.77
54	36	5180	-3.30	-2.70	4.00	-6.70
	40	5200	-4.31	-3.71	4.00	-7.71
	48	5240	-5.10	-4.50	4.00	-8.50
	52	5260	-6.10	-5.50	11.00	-16.50
	56	5280	-6.76	-6.16	11.00	-17.16
	64	5320	-7.37	-6.77	11.00	-17.77

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Data Rate: 6 Mbps

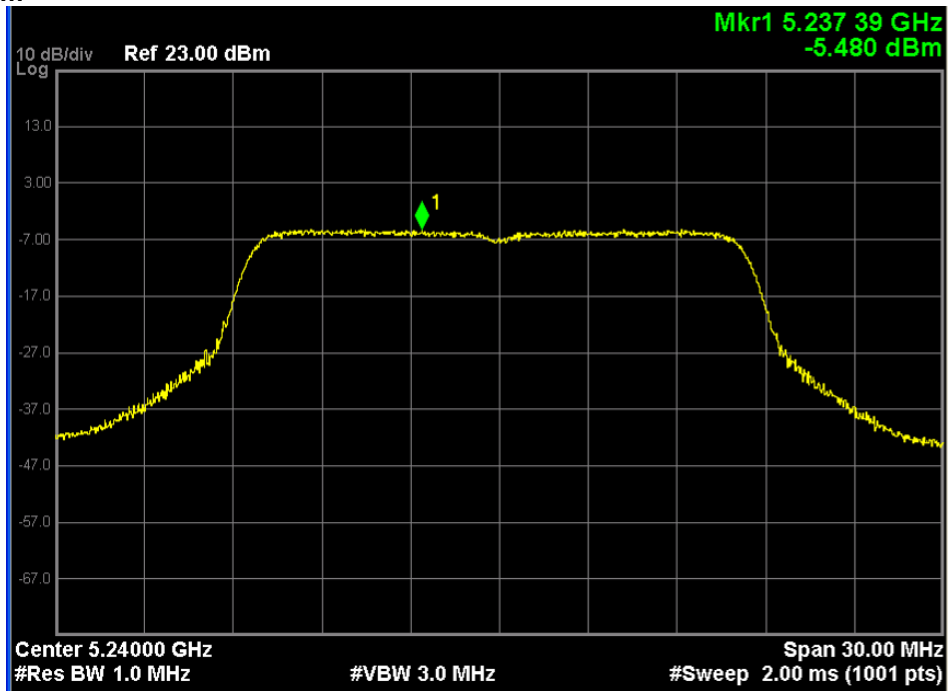
Channel Frequency: 5180MHz



Data Rate: 6 Mbps

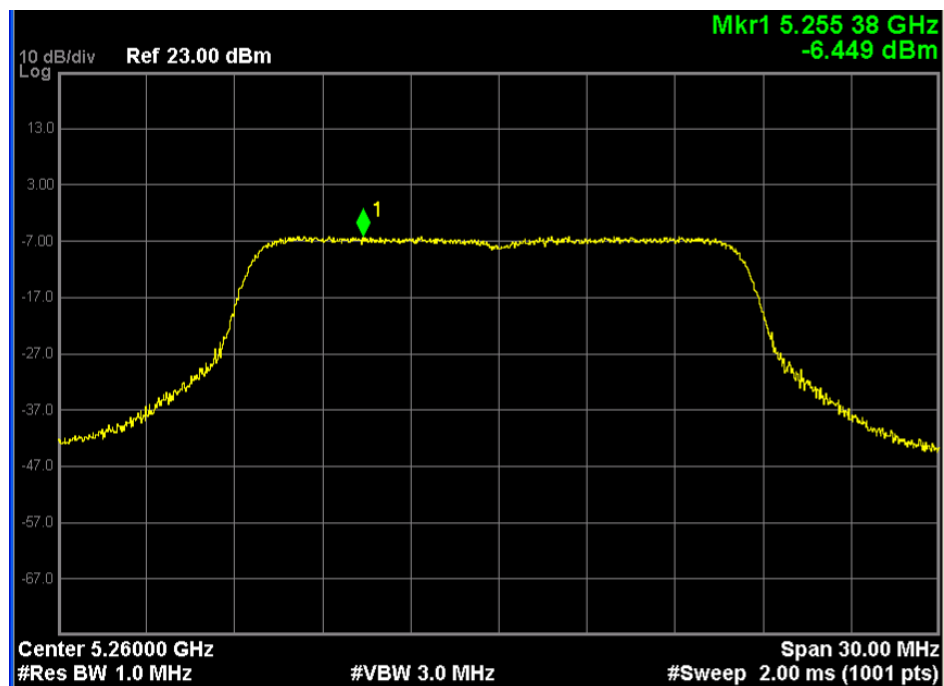
Channel Frequency: 5200MHz

www.tuv.com



Data Rate: 6 Mbps

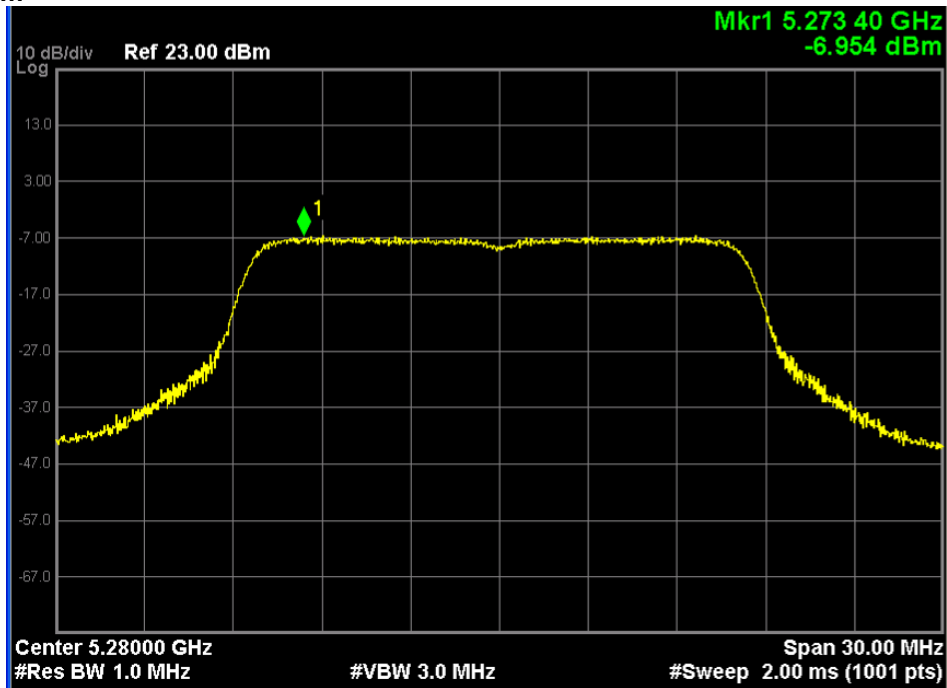
Channel Frequency: 5240MHz



Data Rate: 6 Mbps

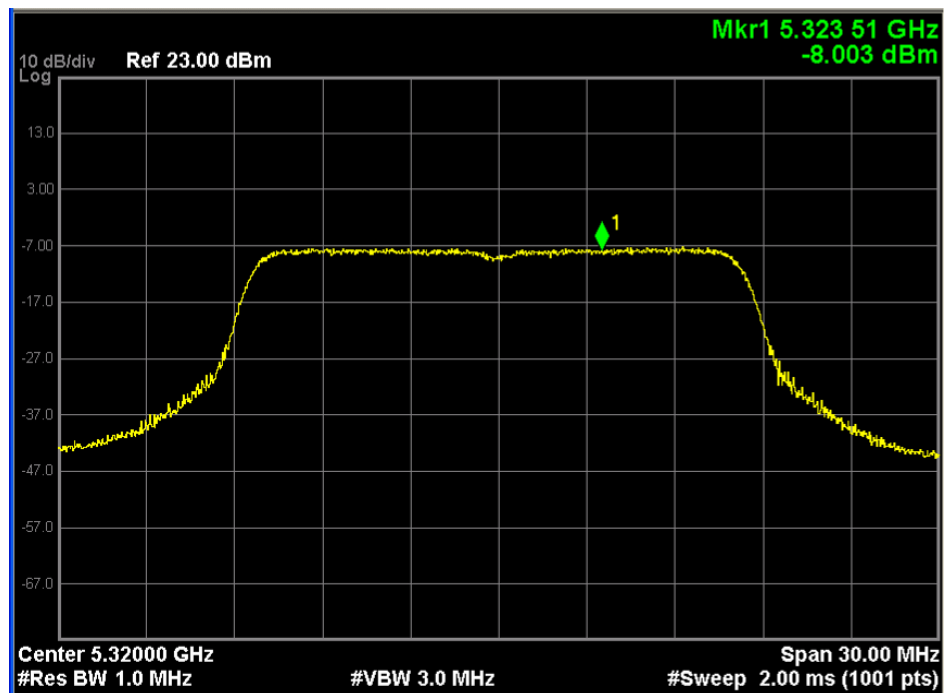
Channel Frequency: 5260MHz

www.tuv.com



Data Rate: 6 Mbps

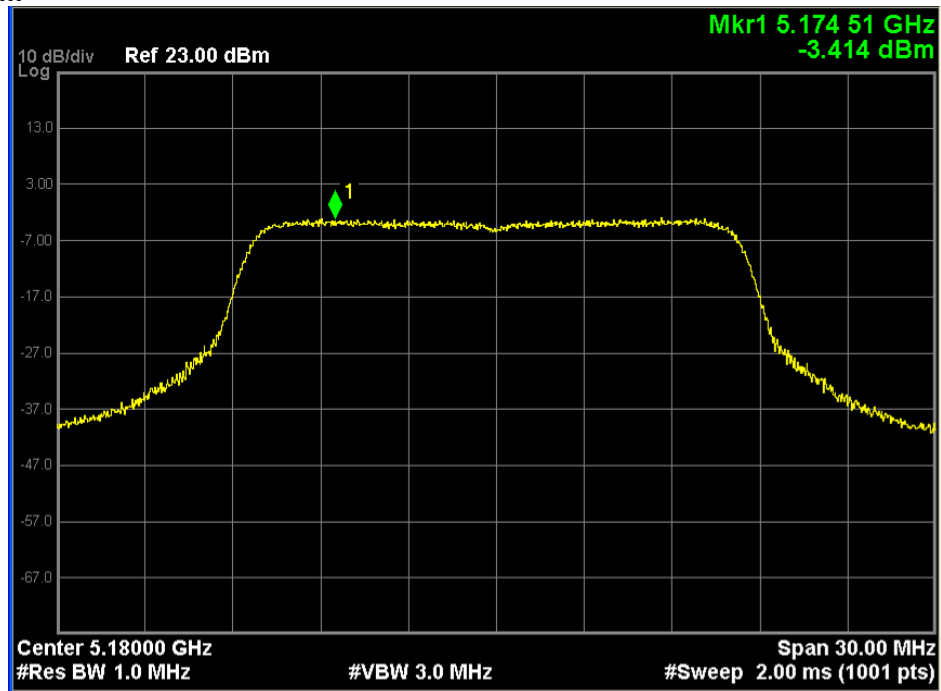
Channel Frequency: 5280MHz



Data Rate: 6 Mbps

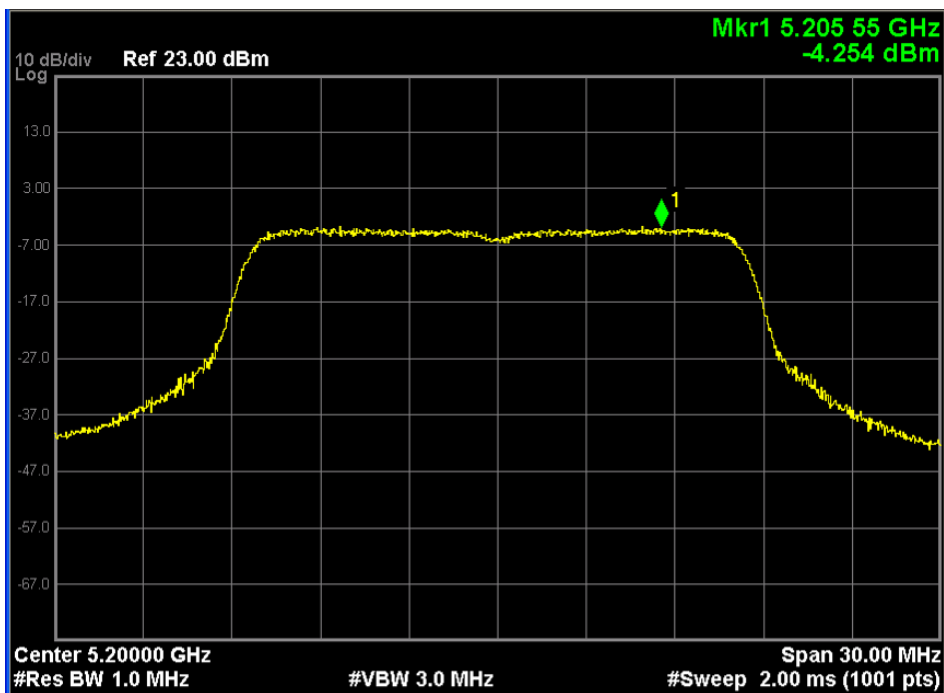
Channel Frequency: 5320MHz

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Data Rate: 24 Mbps

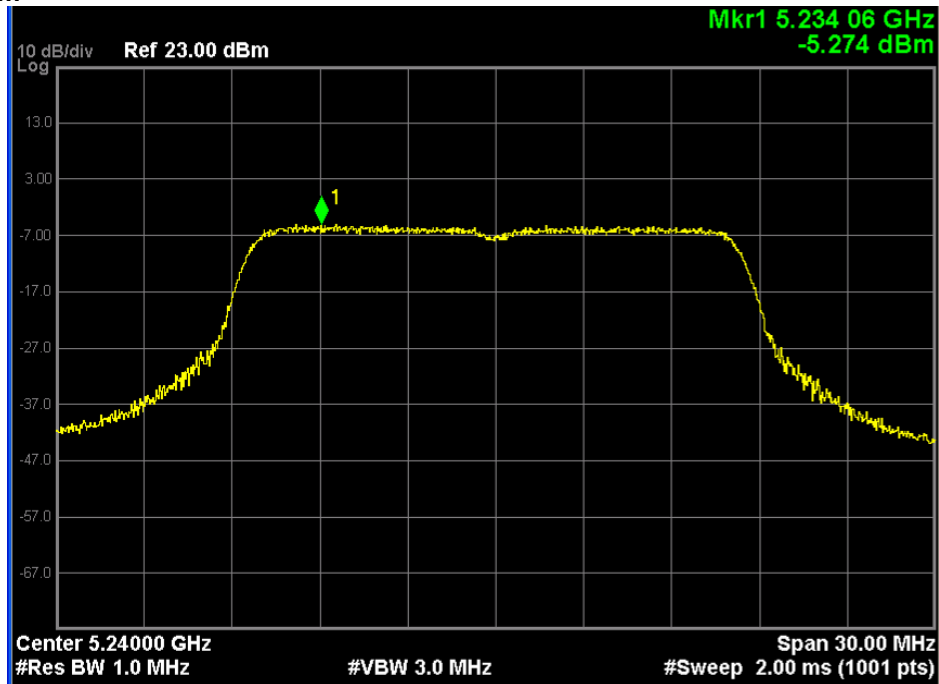
Channel Frequency: 5180MHz



Data Rate: 24 Mbps

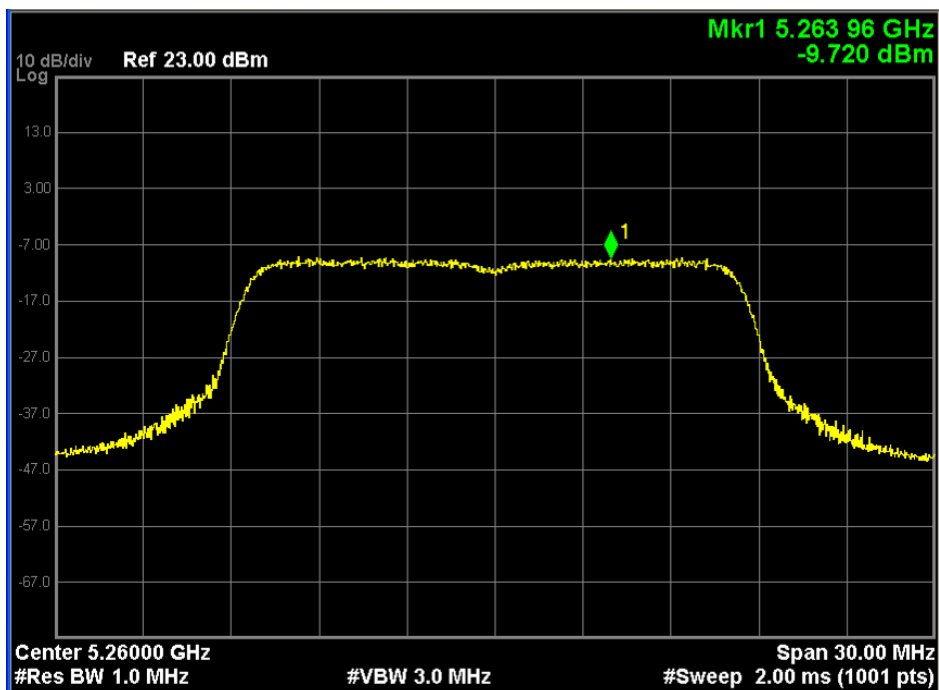
Channel Frequency: 5200MHz

www.tuv.com



Data Rate: 24 Mbps

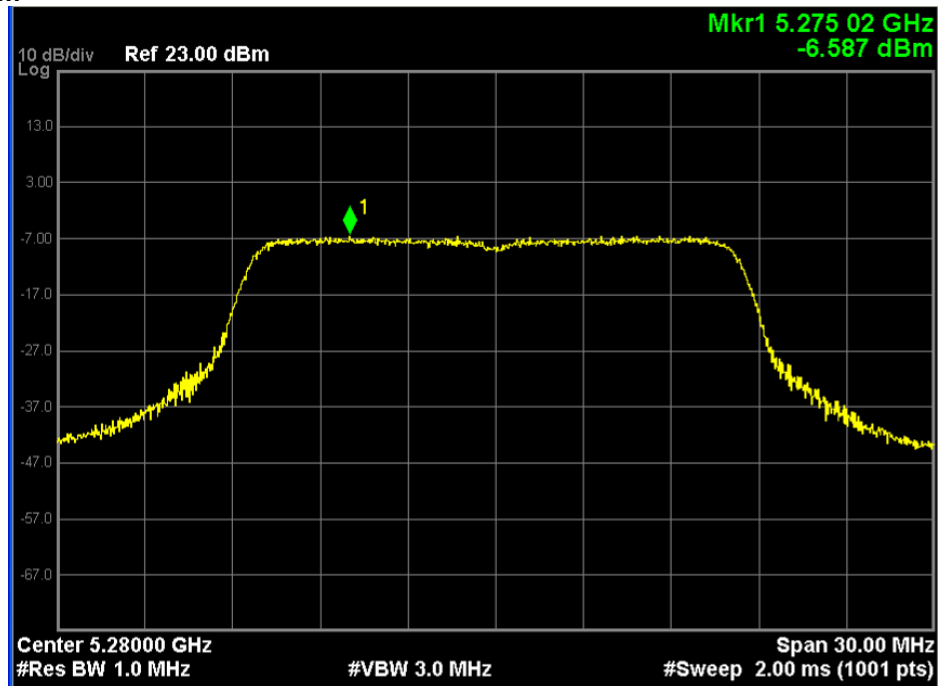
Channel Frequency: 5240MHz



Data Rate: 24 Mbps

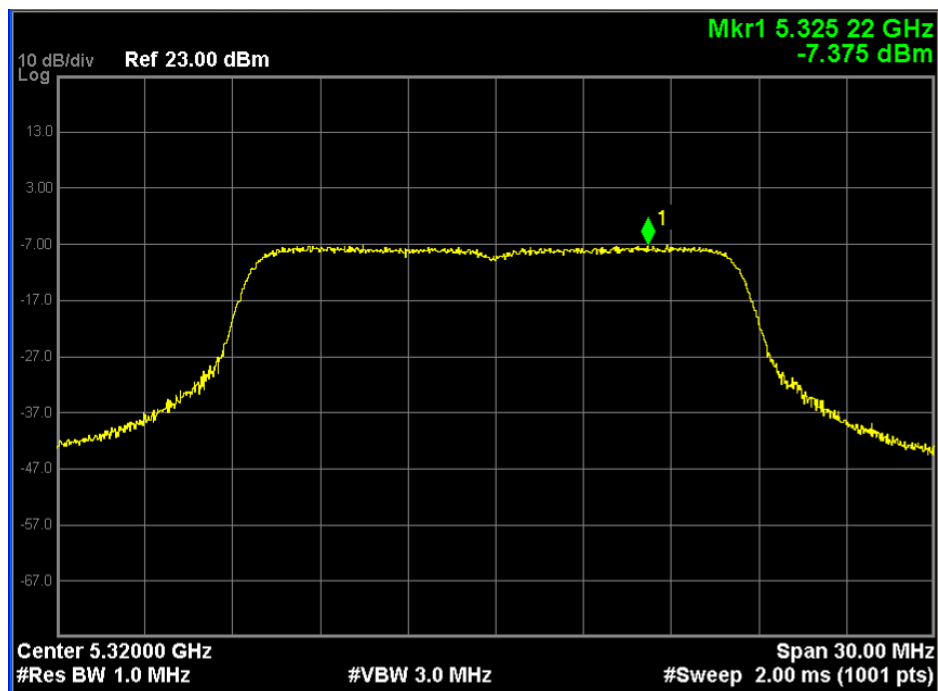
Channel Frequency: 5260MHz

www.tuv.com



Data Rate: 24 Mbps

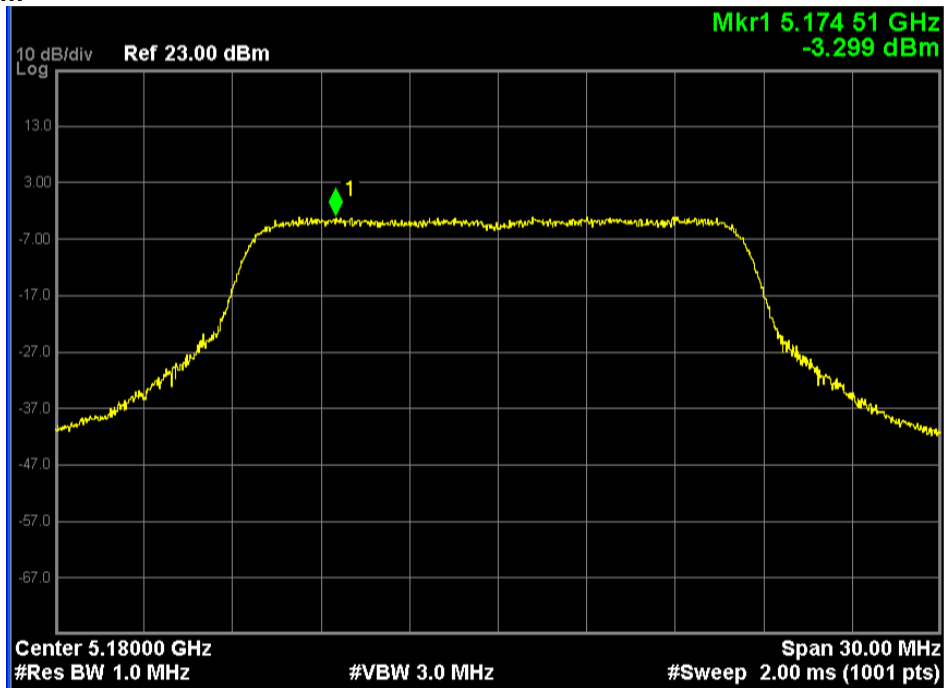
Channel Frequency: 5280MHz



Data Rate: 24 Mbps

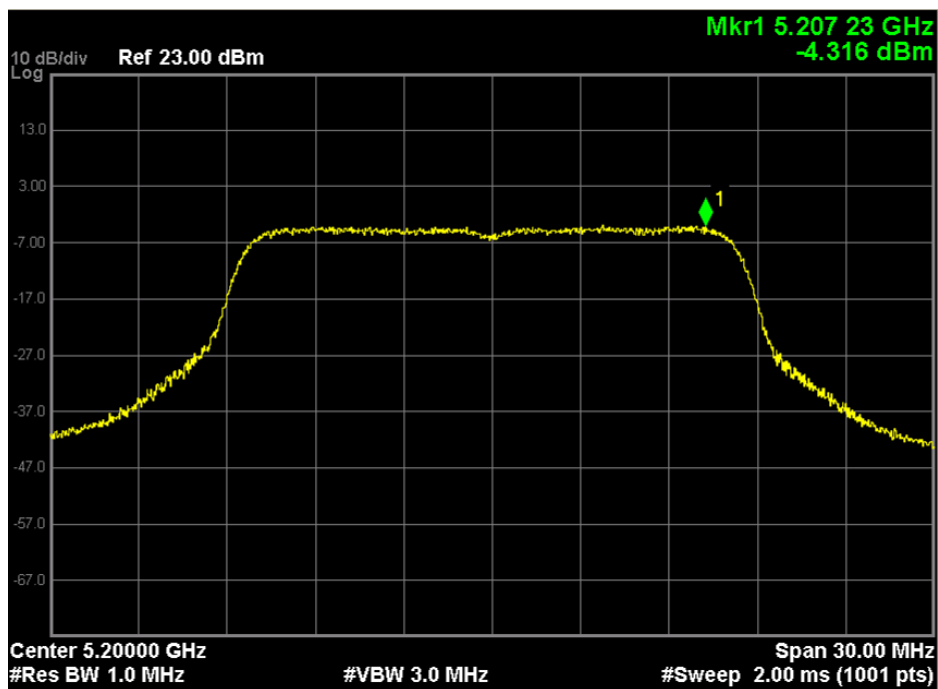
Channel Frequency: 5320MHz

www.tuv.com



Data Rate: 54 Mbps

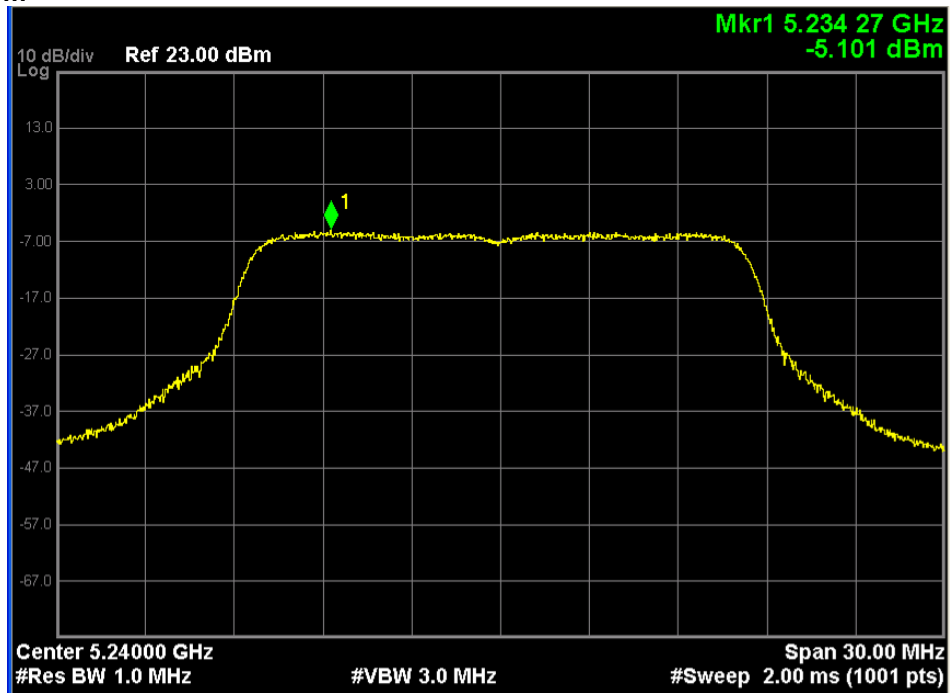
Channel Frequency: 5180MHz



Data Rate: 54 Mbps

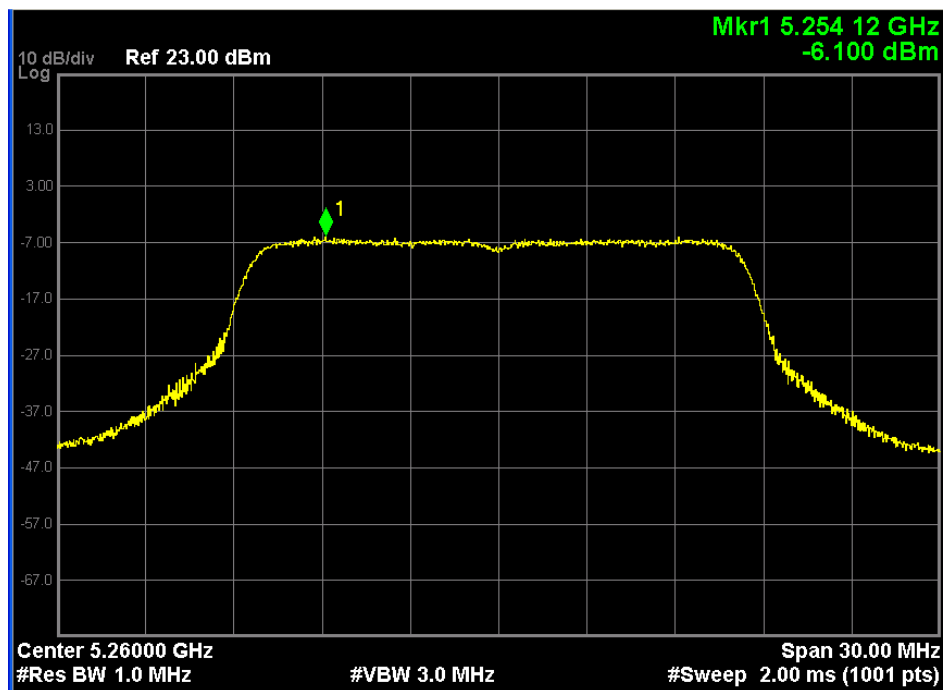
Channel Frequency: 5200MHz

www.tuv.com



Data Rate: 54 Mbps

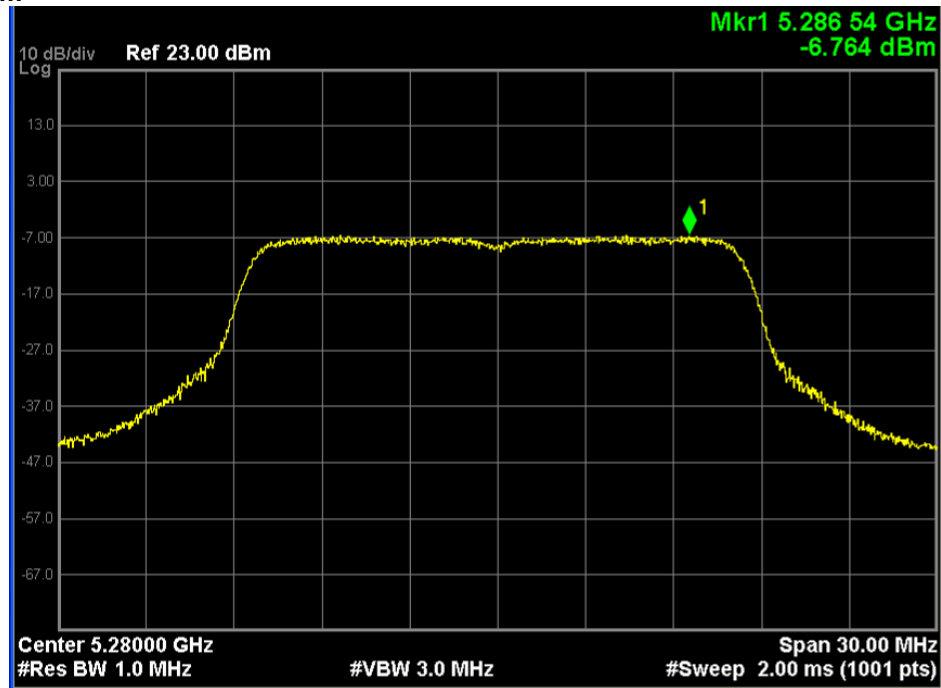
Channel Frequency: 5240MHz



Data Rate: 54 Mbps

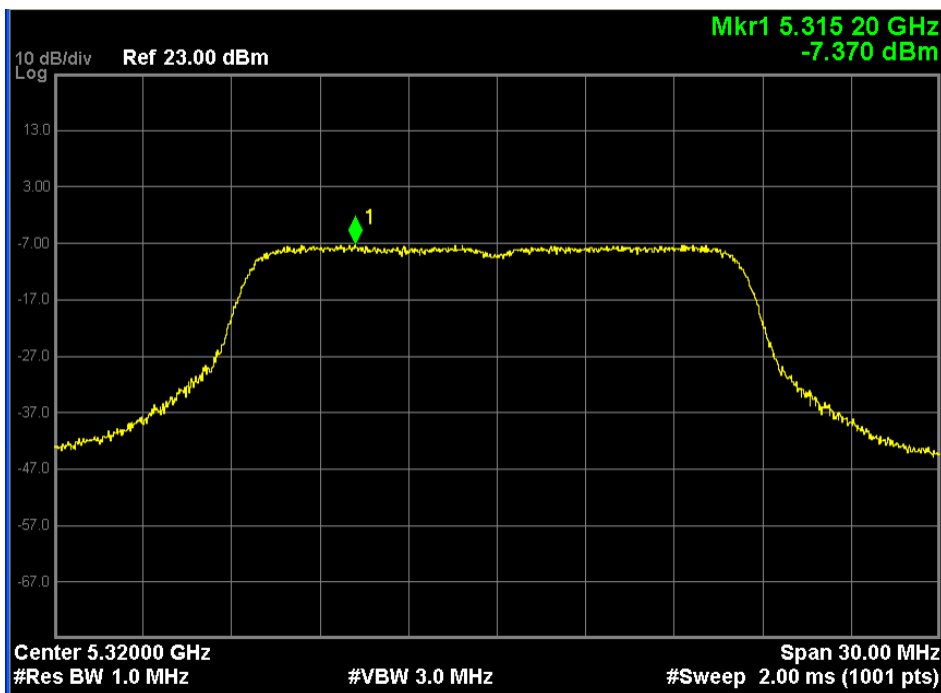
Channel Frequency: 5260MHz

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Data Rate: 54 Mbps

Channel Frequency: 5280MHz



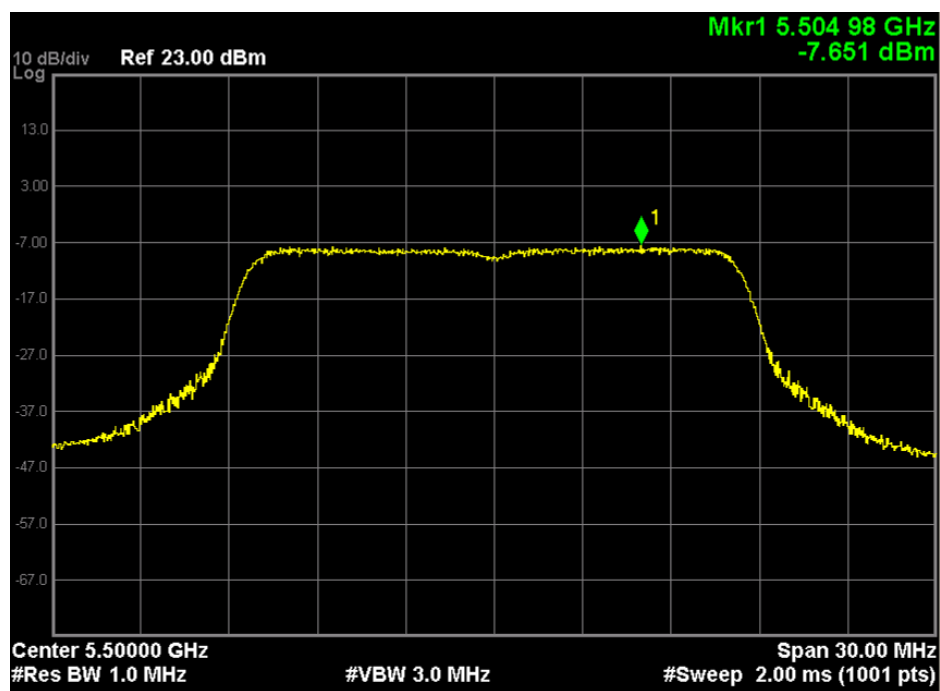
Data Rate: 54 Mbps

Channel Frequency: 5320MHz

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Modulation: 802.11a

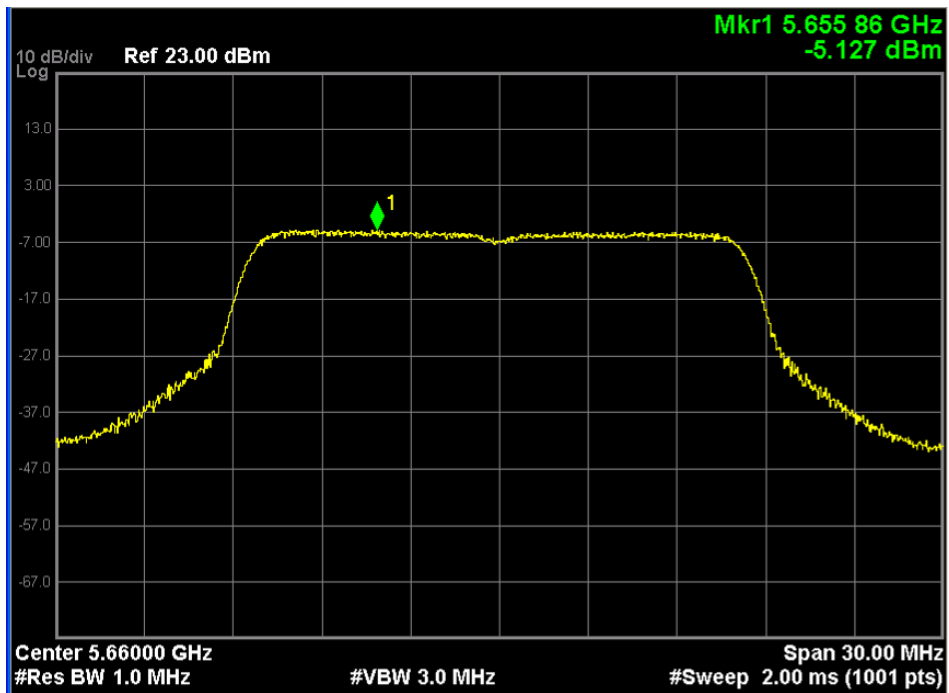
Data Rate (Mbps)	Channel No.	Frequency (MHz)	Measured RF Output power (dBm)	Total Output power (dBm)	Limit (dBm)	Margin (dB)
6	100	5500	-7.65	-7.05	11.00	-18.05
	132	5660	-5.12	-4.52	11.00	-15.52
	140	5700	-3.82	-3.22	11.00	-14.22
24	100	5500	-8	-7.40	11.00	-18.40
	132	5660	-4.72	-4.12	11.00	-15.12
	140	5700	-8.65	-8.05	11.00	-19.05
54	100	5500	-7.66	-7.06	11.00	-18.06
	132	5660	-4.71	-4.11	11.00	-15.11
	140	5700	-3.73	-3.13	11.00	-14.13



Data Rate: 6 Mbps

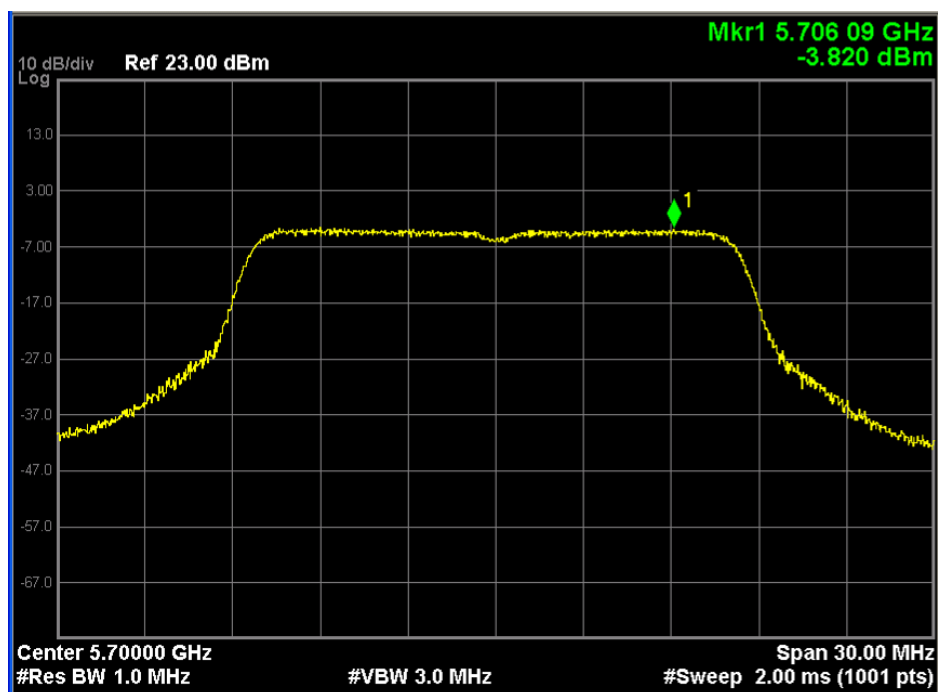
Channel Frequency: 5500MHz

www.tuv.com



Data Rate: 6 Mbps

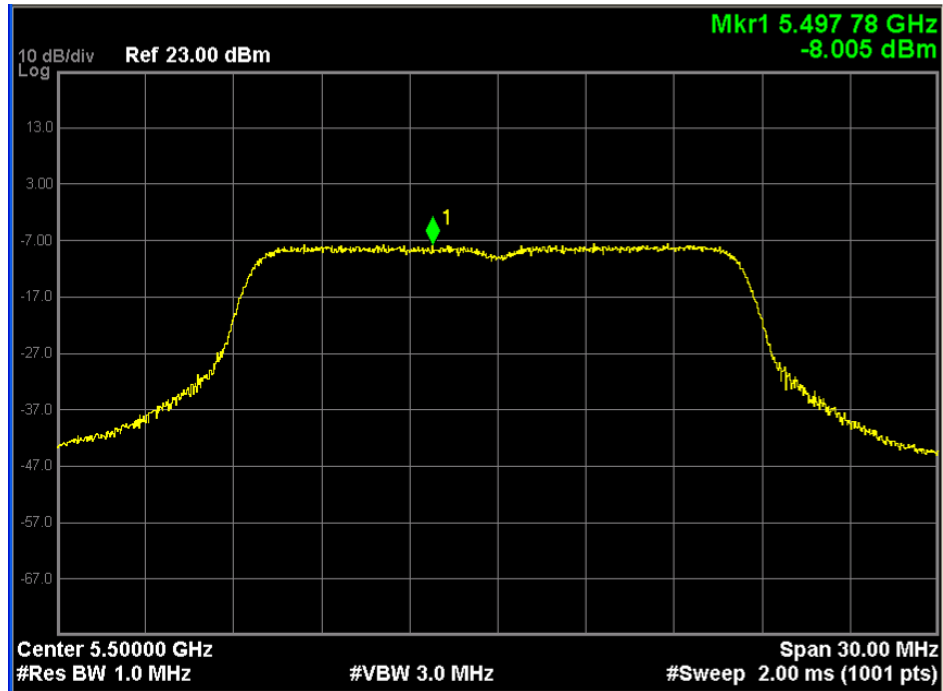
Channel Frequency: 5660MHz



Data Rate: 6 Mbps

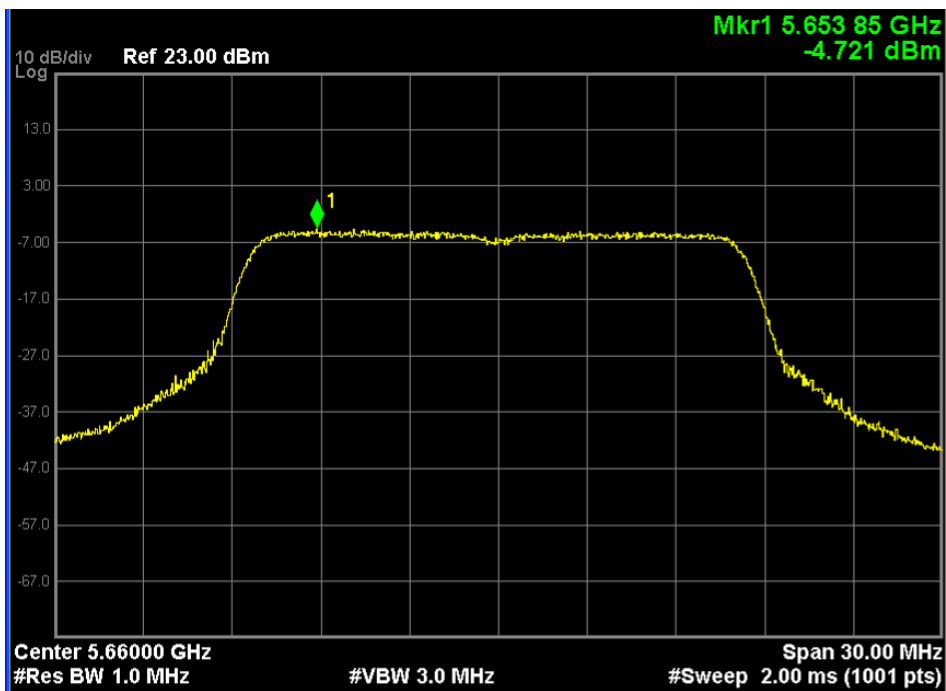
Channel Frequency: 5700MHz

www.tuv.com



Data Rate: 24 Mbps

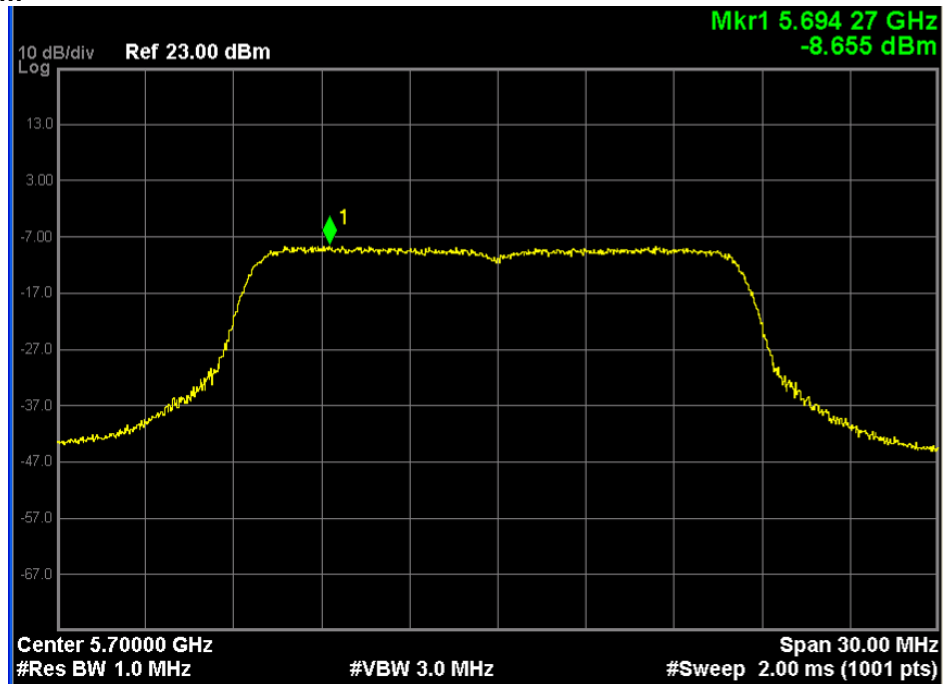
Channel Frequency: 5500MHz



Data Rate: 24 Mbps

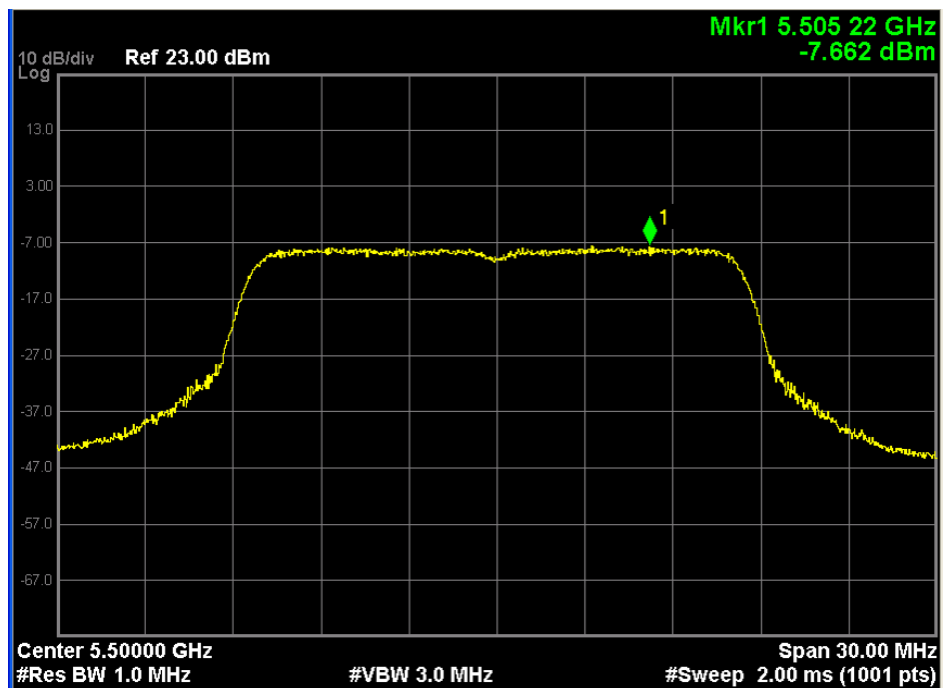
Channel Frequency: 5660MHz

www.tuv.com



Data Rate: 24 Mbps

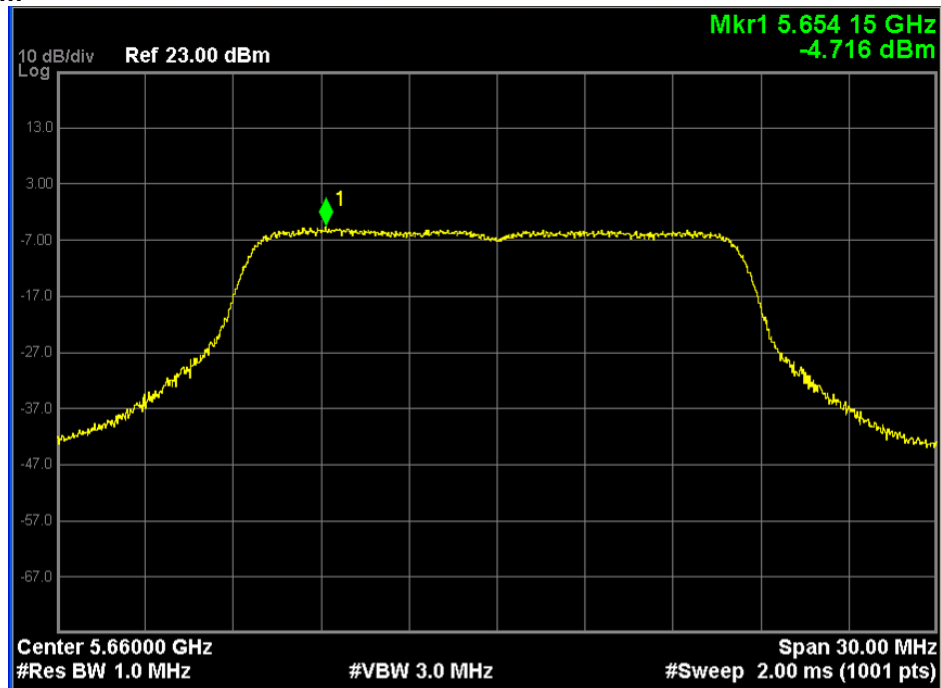
Channel Frequency: 5700MHz



Data Rate: 54 Mbps

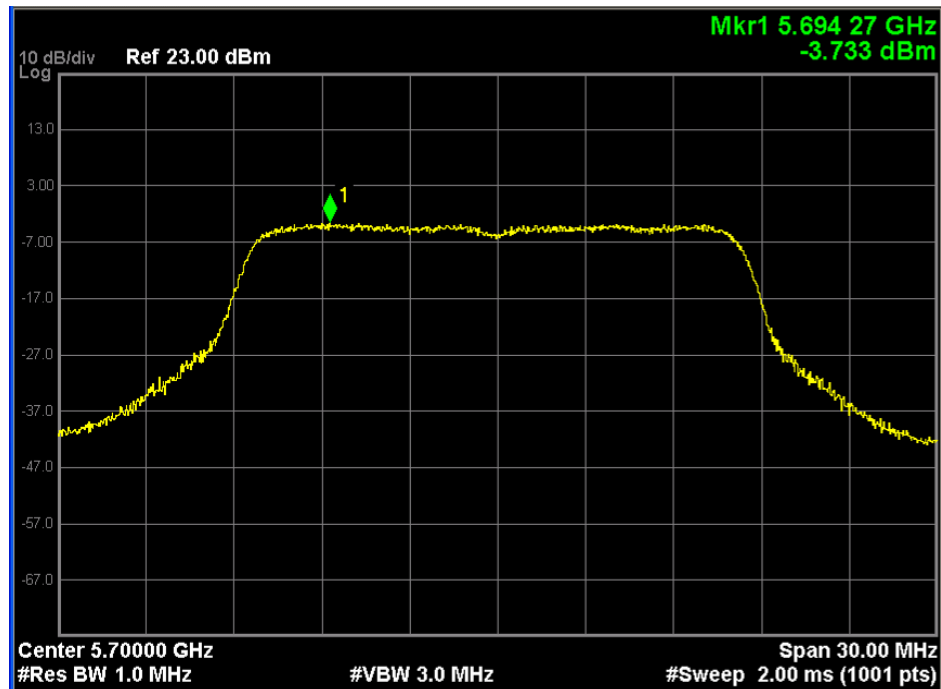
Channel Frequency: 5500MHz

www.tuv.com



Data Rate: 54 Mbps

Channel Frequency: 5660MHz



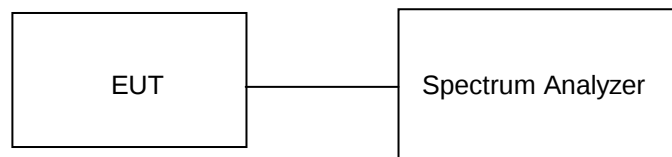
Data Rate: 54 Mbps

Channel Frequency: 5700MHz

**Peak Excursion
Result**
**Section 15.407 (a)
Pass**

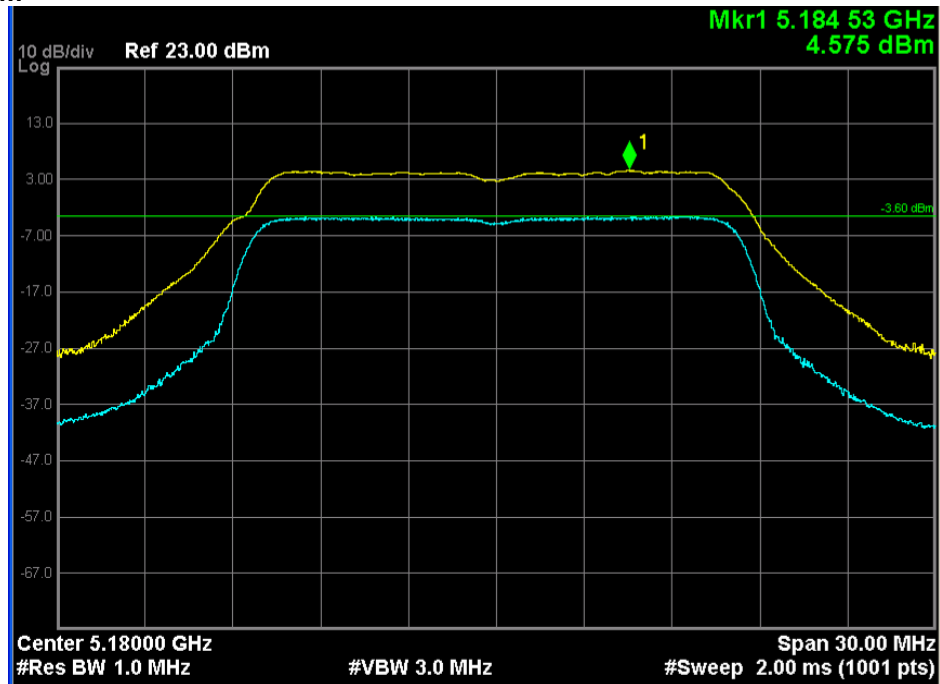
Test Specification
Requirement

FCC Part 15 Section 15.407 (a)
The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the maximum conducted output power shall not exceed 13 dB across any 1-MHz bandwidth or the emission bandwidth whichever is less.

Test Method:

Test Result:
Modulation: 802.11a

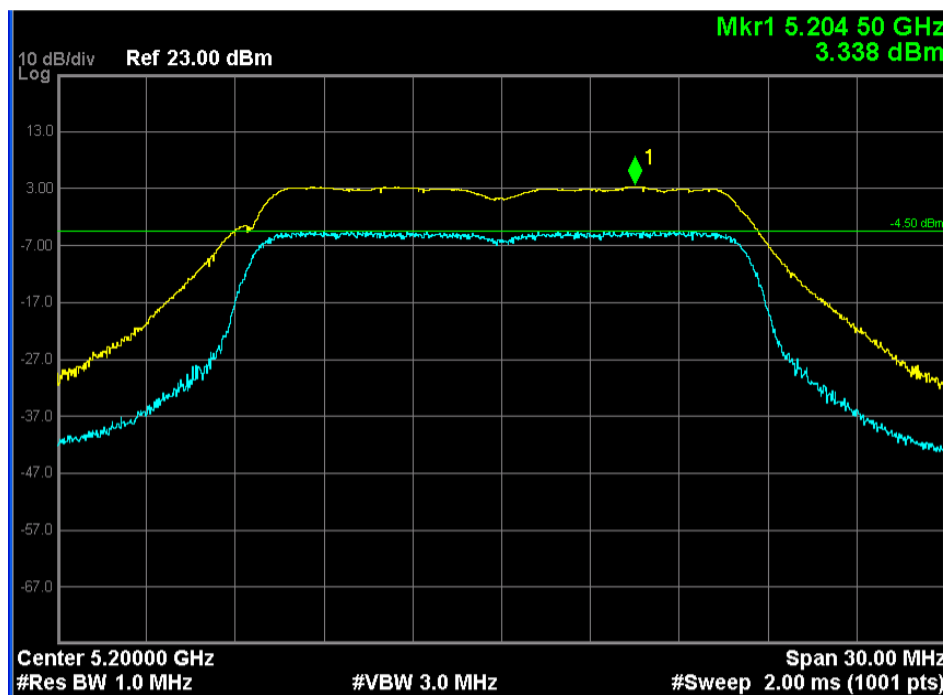
Data Rate (Mbps)	Channel No.	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
6	36	5180	8.18	13	-4.82
	40	5200	7.84	13	-5.16
	48	5240	7.64	13	-5.36
	52	5260	7.86	13	-5.14
	56	5280	7.57	13	-5.43
	64	5320	7.70	13	-5.30
24	36	5180	9.36	13	-3.64
	40	5200	9.03	13	-3.97
	48	5240	9.12	13	-3.88
	52	5260	9.37	13	-3.63
	56	5280	9.15	13	-3.85
	64	5320	9.14	13	-3.86
54	36	5180	9.32	13	-3.68
	40	5200	8.86	13	-4.14
	48	5240	7.55	13	-5.45
	52	5260	8.69	13	-4.31
	56	5280	8.04	13	-4.96
	64	5320	8.76	13	-4.24

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Data Rate: 6 Mbps

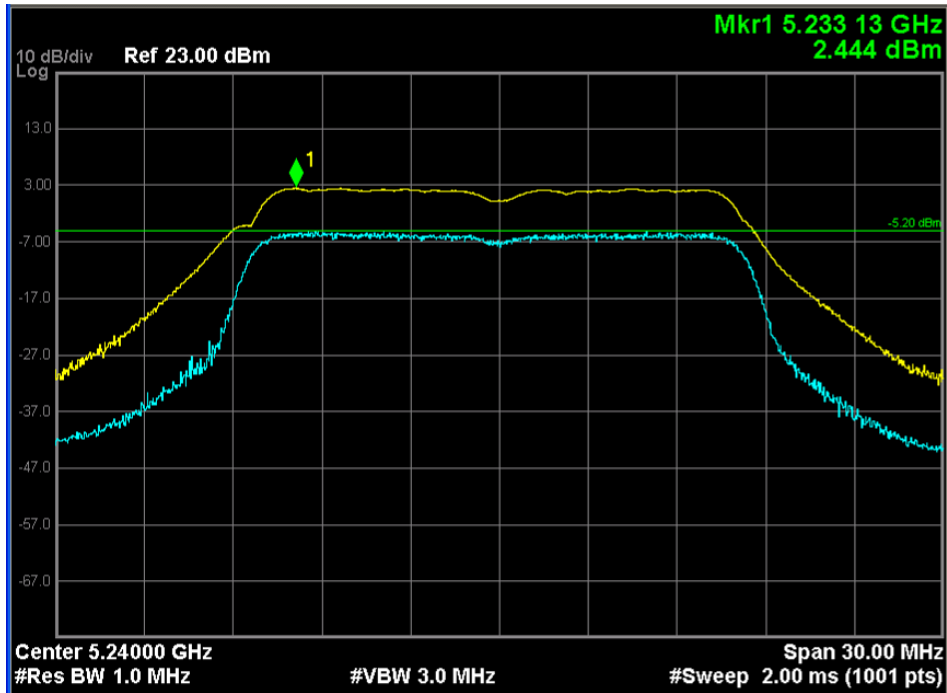
Channel Frequency: 5180MHz



Data Rate: 6 Mbps

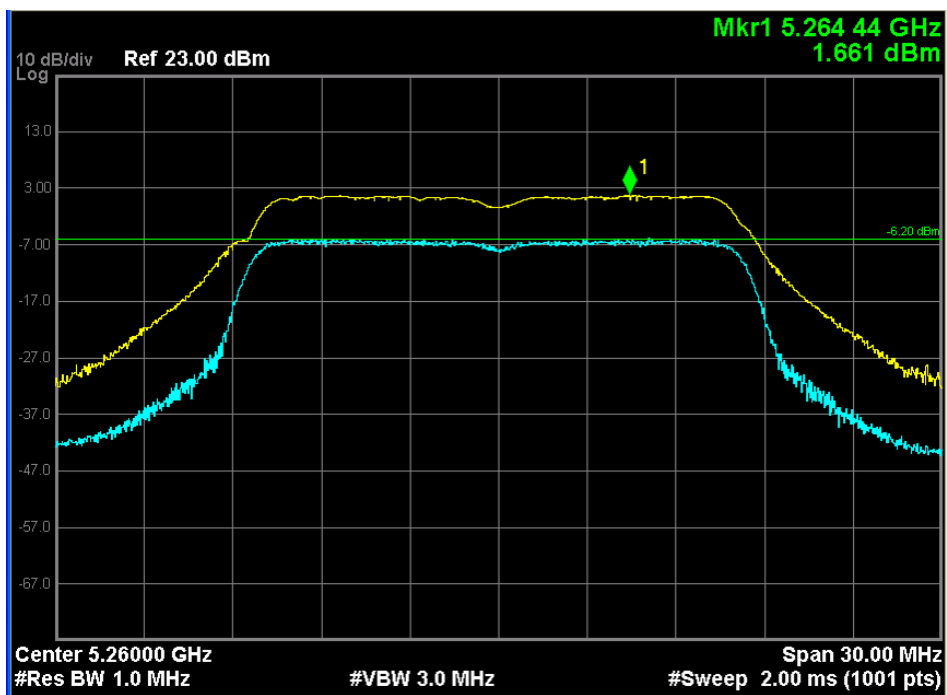
Channel Frequency: 5200MHz

www.tuv.com



Data Rate: 6 Mbps

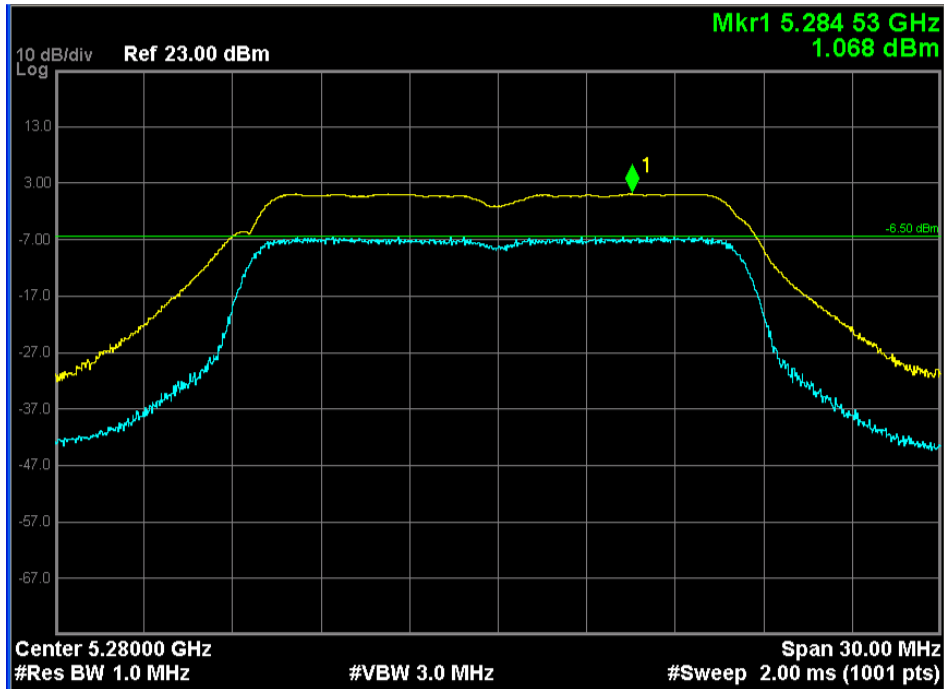
Channel Frequency: 5240MHz



Data Rate: 6 Mbps

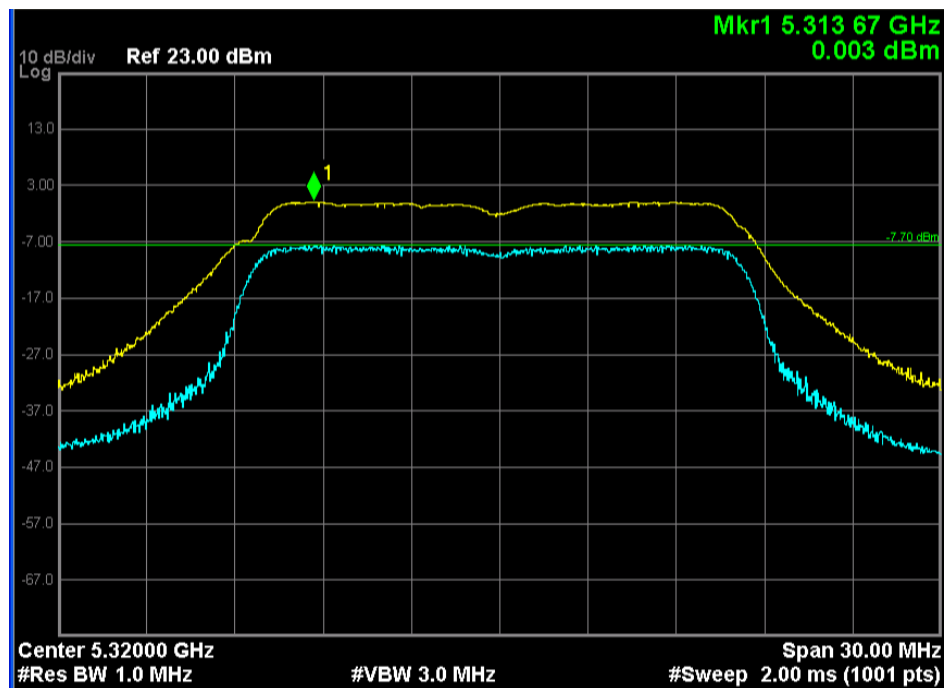
Channel Frequency: 5260MHz

www.tuv.com



Data Rate: 6 Mbps

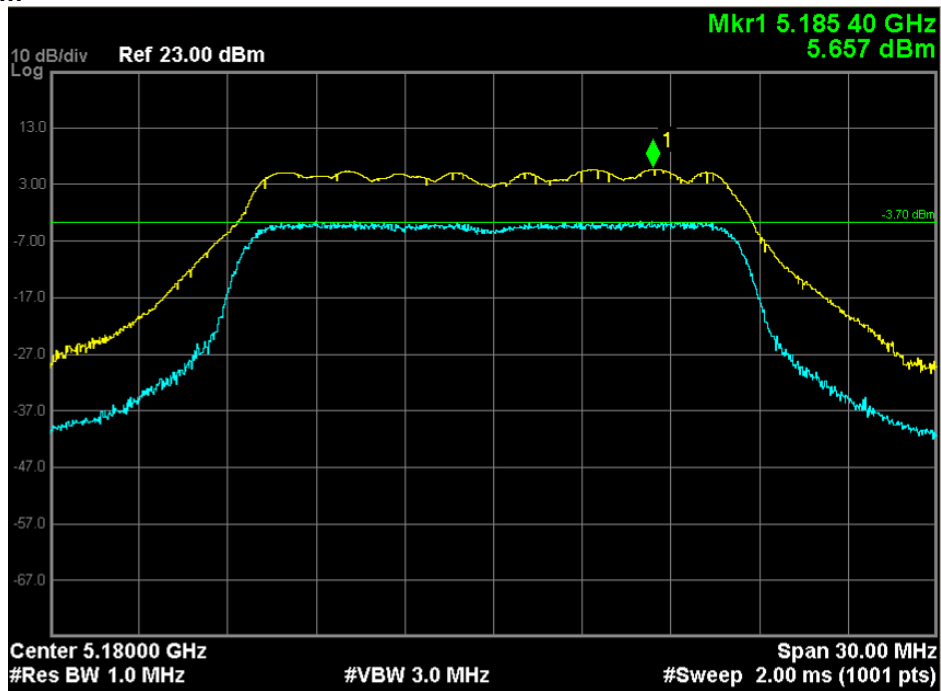
Channel Frequency: 5280MHz



Data Rate: 6 Mbps

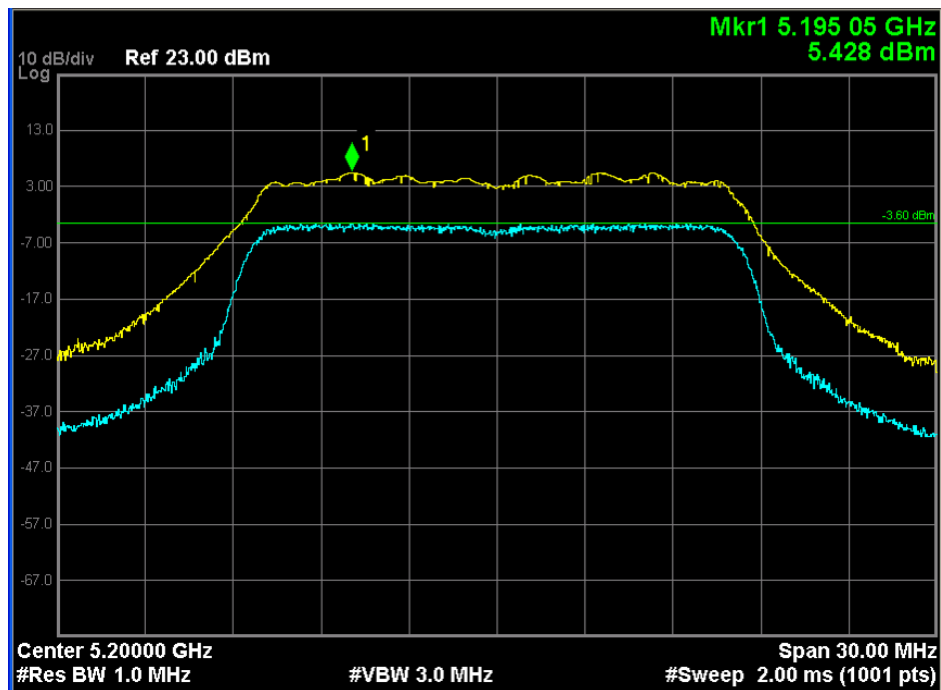
Channel Frequency: 5320MHz

www.tuv.com



Data Rate: 24 Mbps

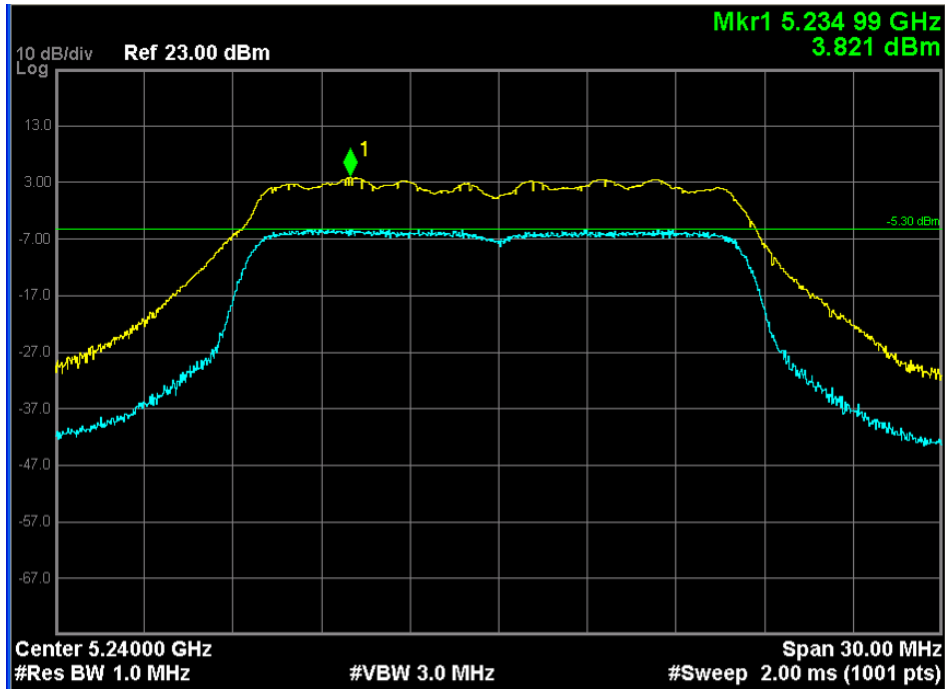
Channel Frequency: 5180MHz



Data Rate: 24 Mbps

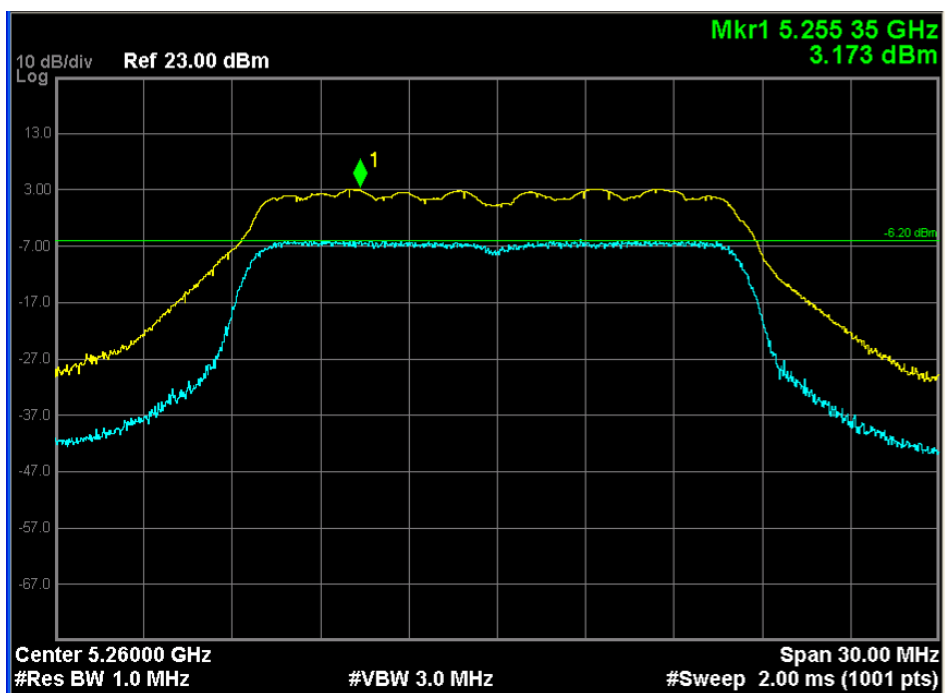
Channel Frequency: 5200MHz

www.tuv.com



Data Rate: 24 Mbps

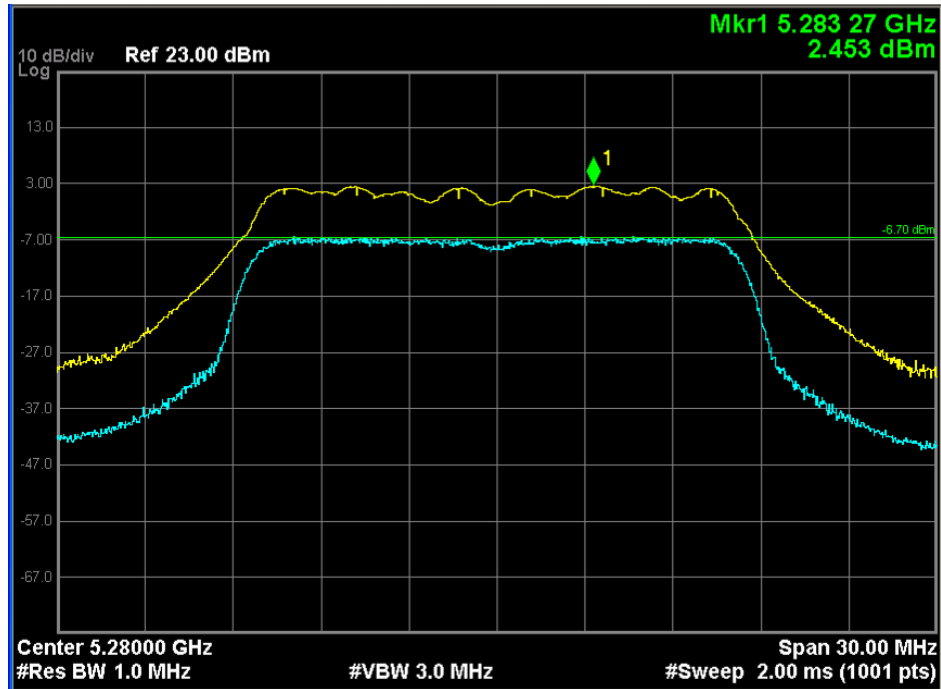
Channel Frequency: 5240MHz



Data Rate: 24 Mbps

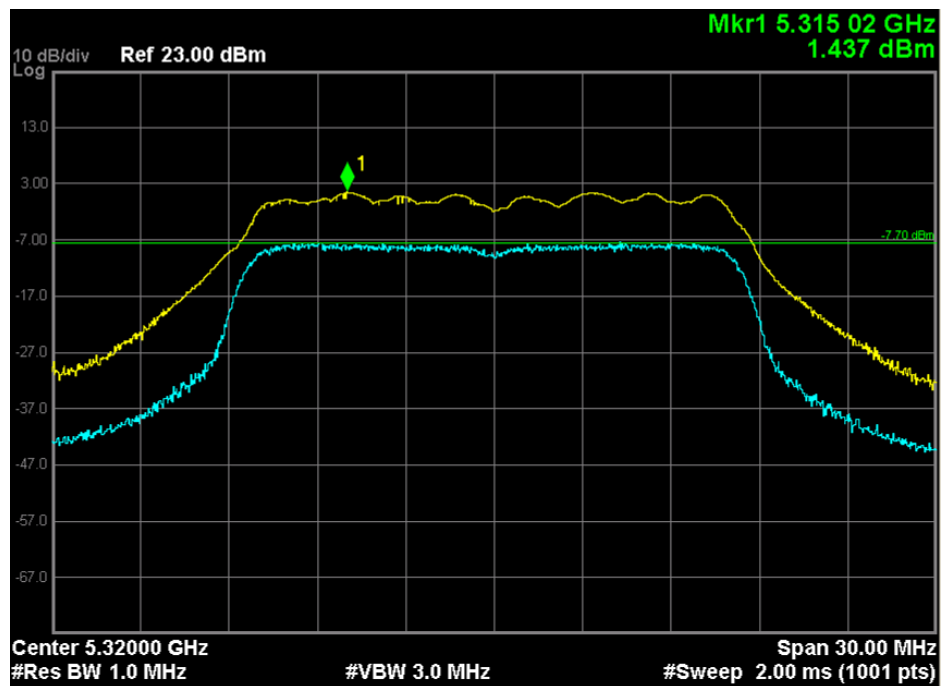
Channel Frequency: 5260MHz

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Data Rate: 24 Mbps

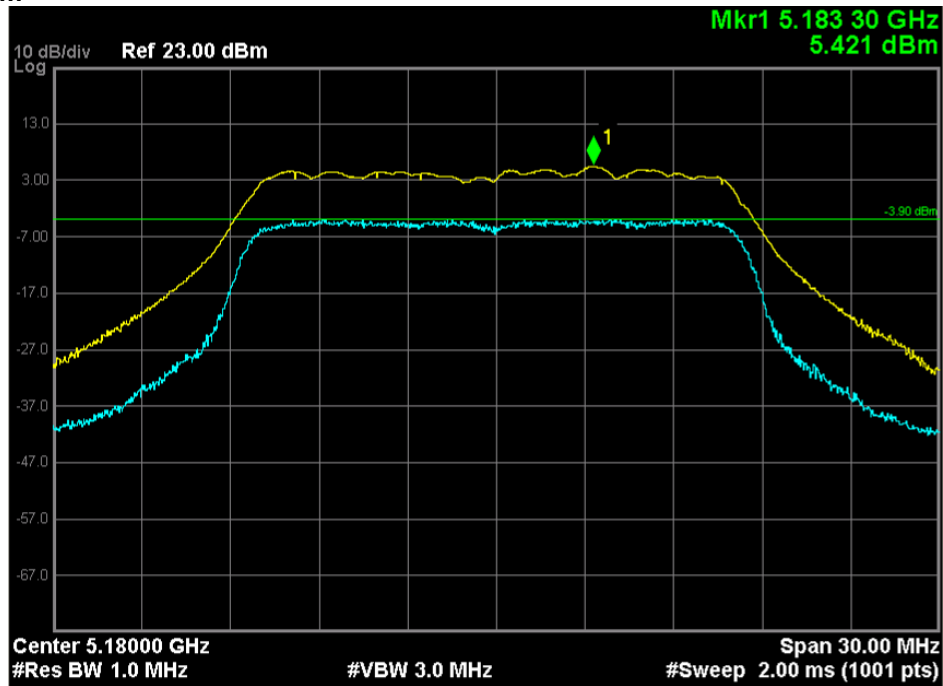
Channel Frequency: 5280MHz



Data Rate: 24 Mbps

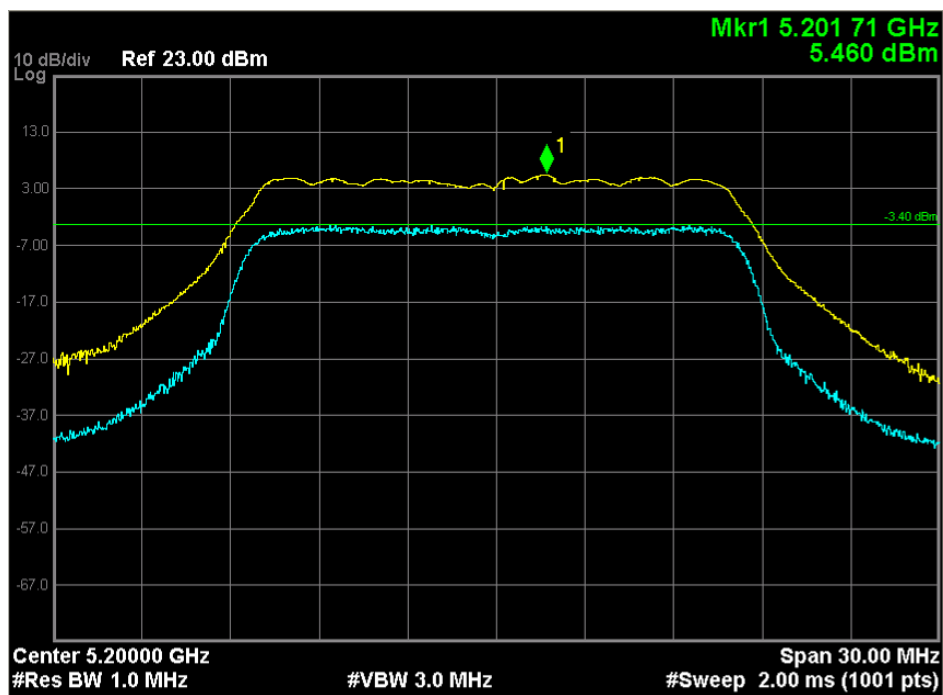
Channel Frequency: 5320MHz

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Data Rate: 54 Mbps

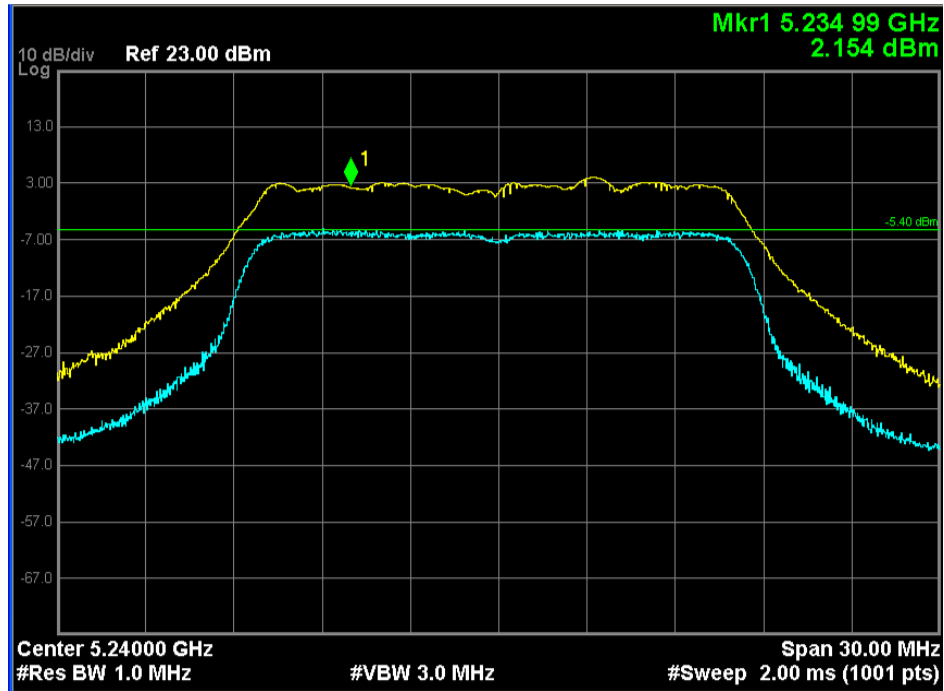
Channel Frequency: 5180MHz



Data Rate: 54 Mbps

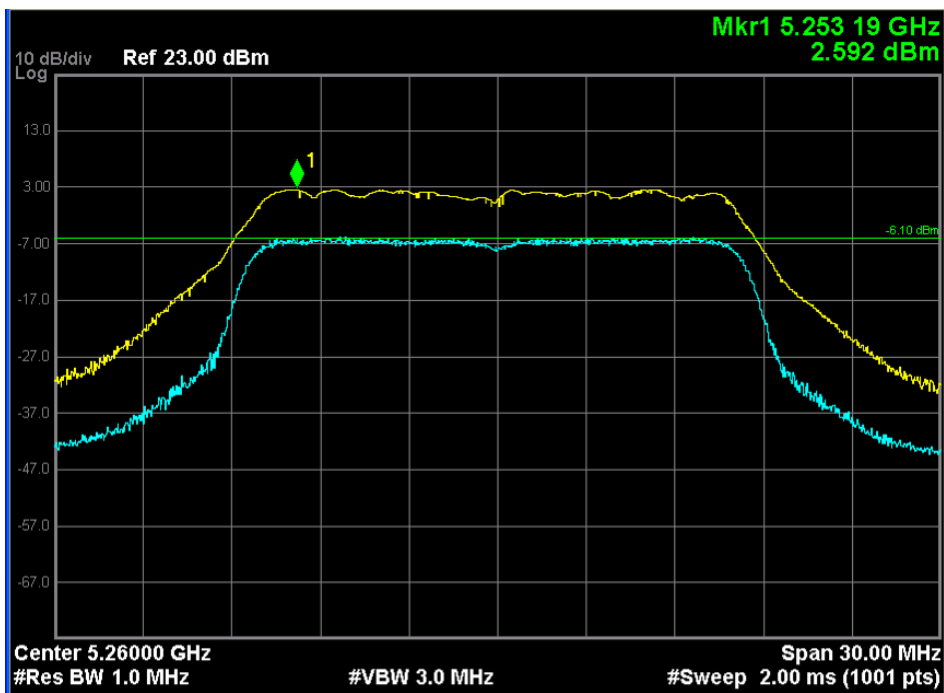
Channel Frequency: 5200MHz

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Data Rate: 54 Mbps

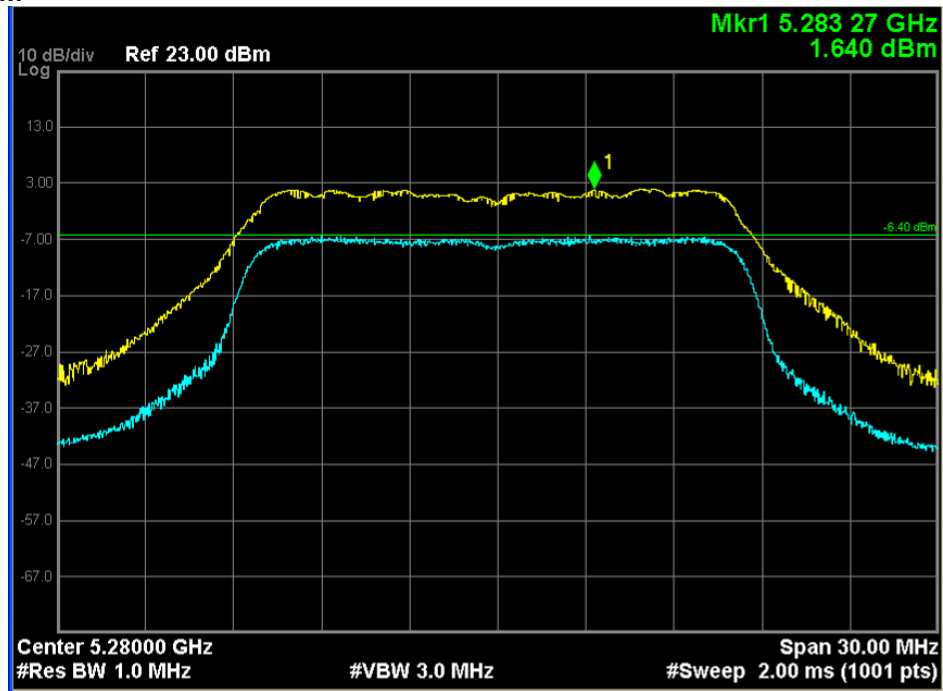
Channel Frequency: 5240MHz



Data Rate: 54 Mbps

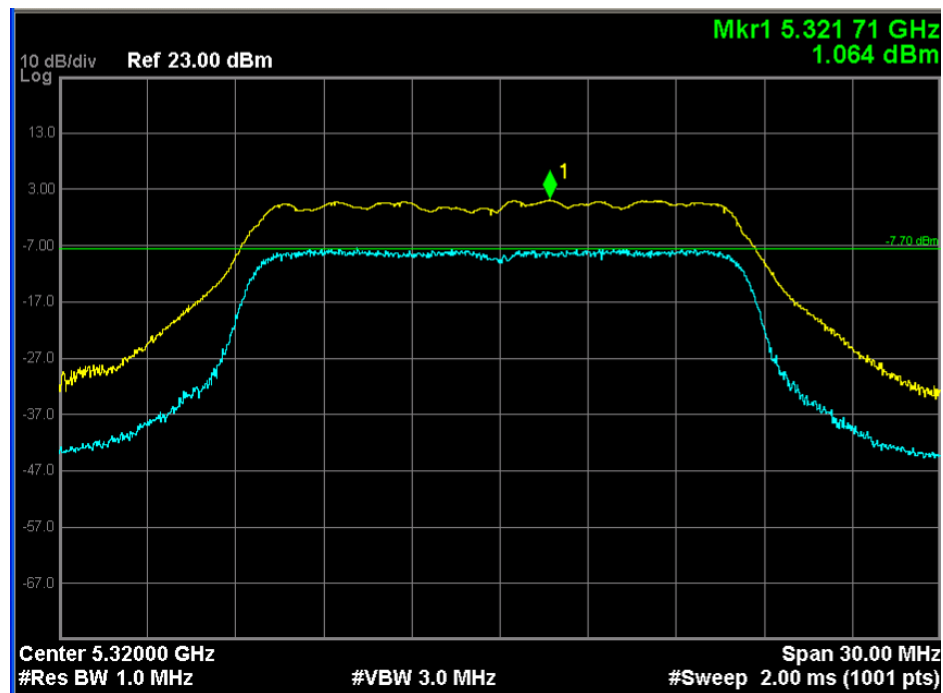
Channel Frequency: 5260MHz

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Data Rate: 54 Mbps

Channel Frequency: 5280MHz



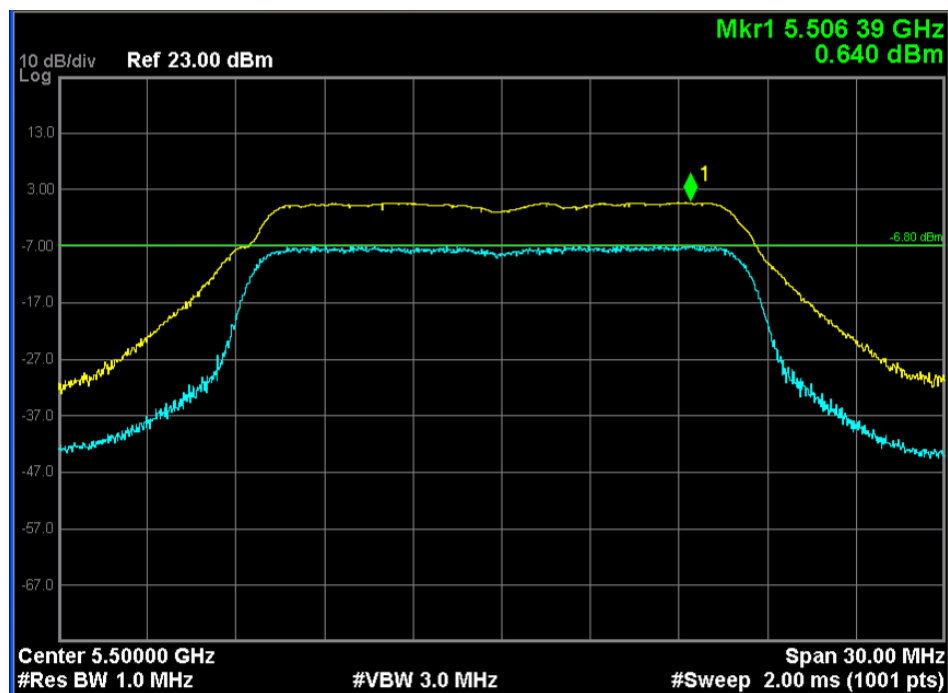
Data Rate: 54 Mbps

Channel Frequency: 5320MHz

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Modulation: 802.11a

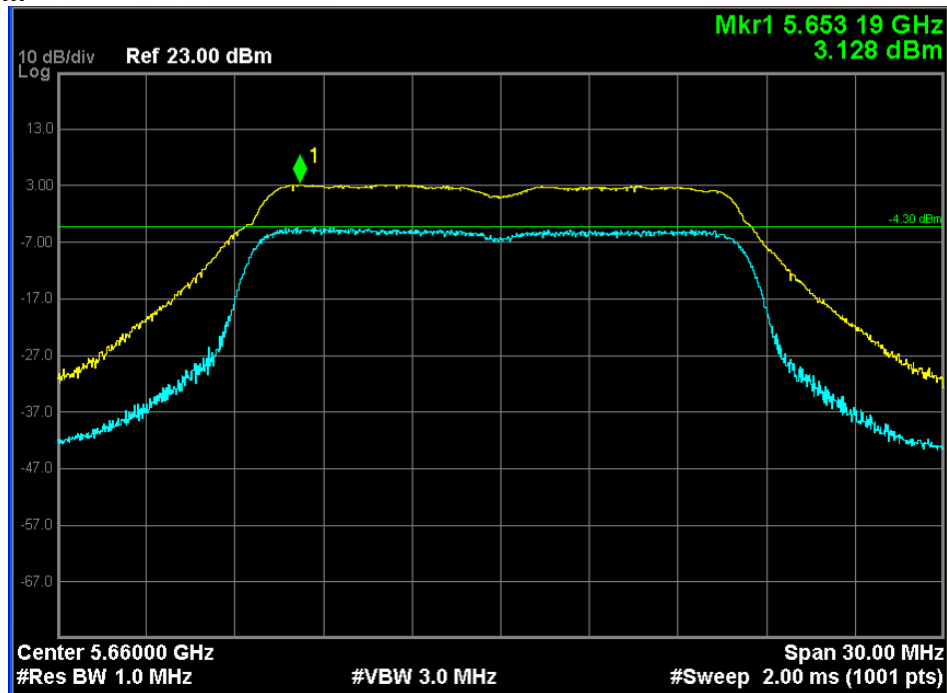
Data Rate (Mbps)	Channel No.	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
6	100	5500	7.44	13.00	-5.56
	132	5660	7.428	13.00	-5.572
	140	5700	7.612	13.00	-5.388
24	100	5500	8.618	13.00	-4.382
	132	5660	8.55	13.00	-4.45
	140	5700	8.834	13.00	-4.166
54	100	5500	9.356	13.00	-3.644
	132	5660	8.16	13.00	-4.84
	140	5700	8.705	13.00	-4.295



Data Rate: 6 Mbps

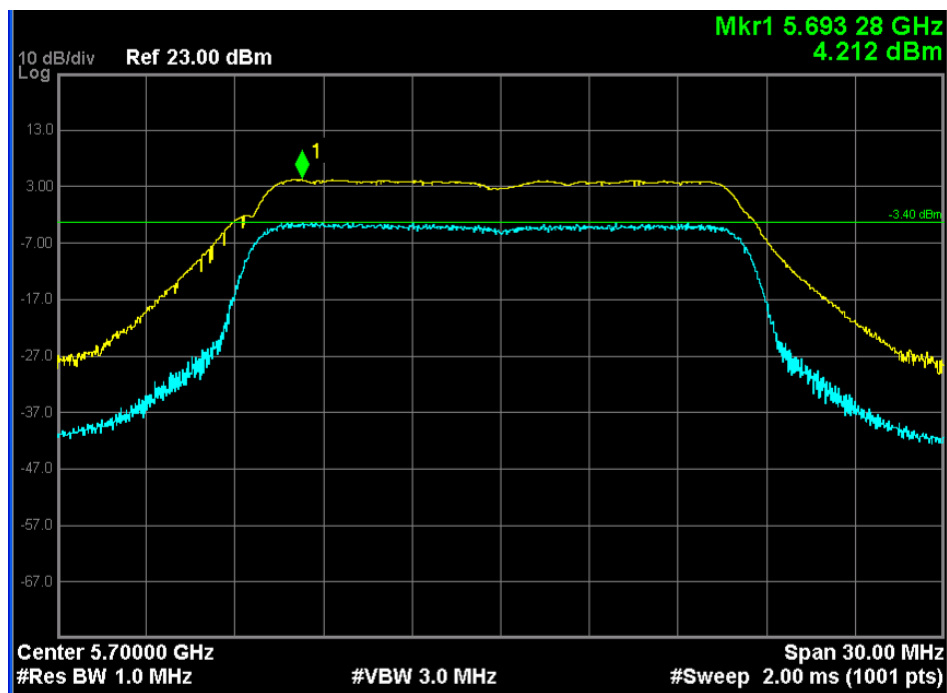
Channel Frequency: 5500MHz

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Data Rate: 6 Mbps

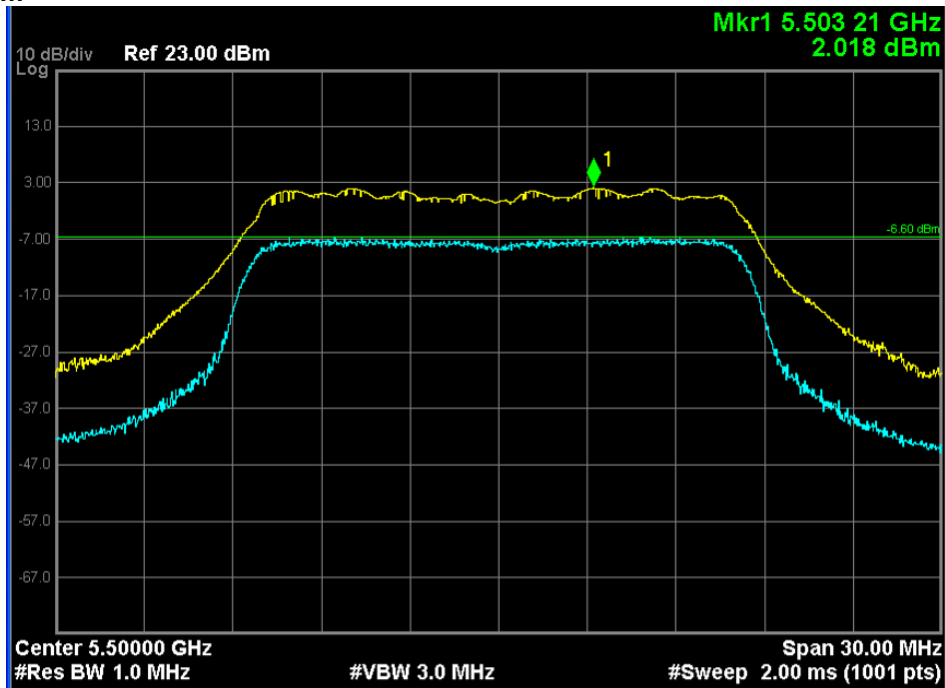
Channel Frequency: 5660MHz



Data Rate: 6 Mbps

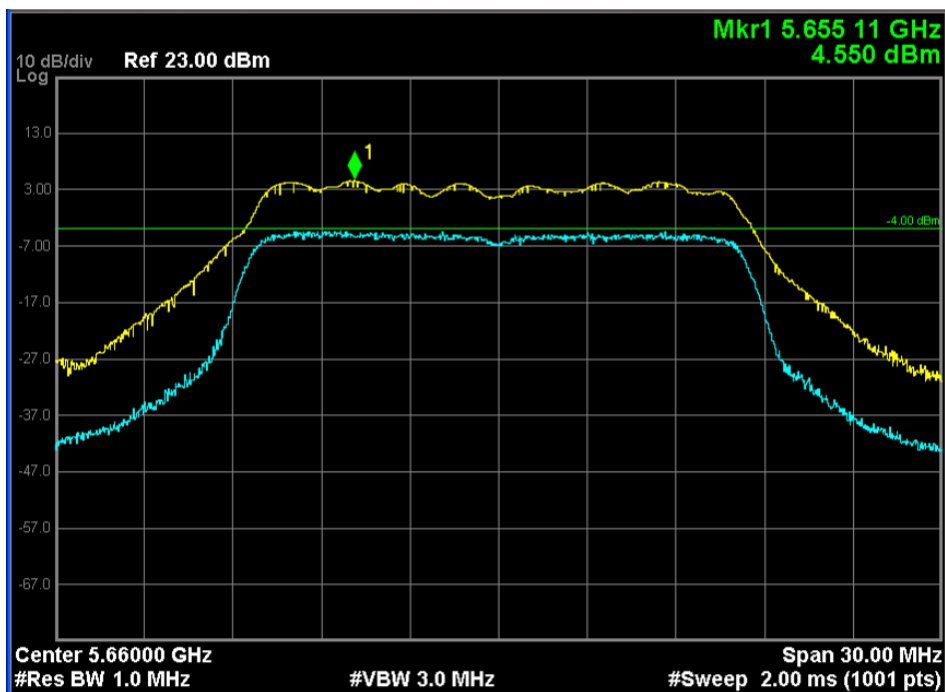
Channel Frequency: 5700MHz

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Data Rate: 24 Mbps

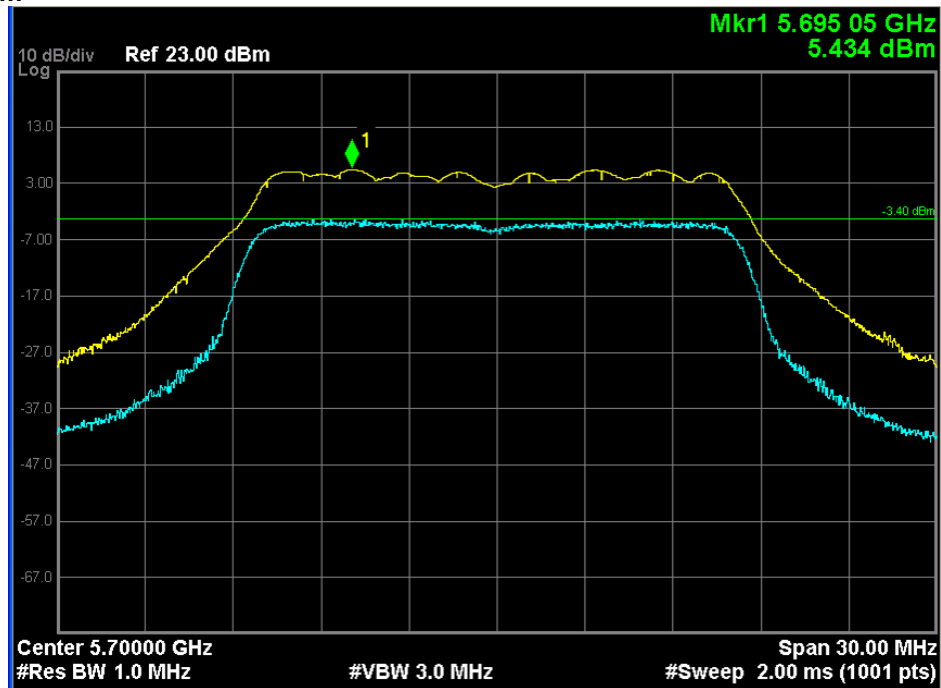
Channel Frequency: 5500MHz



Data Rate: 24 Mbps

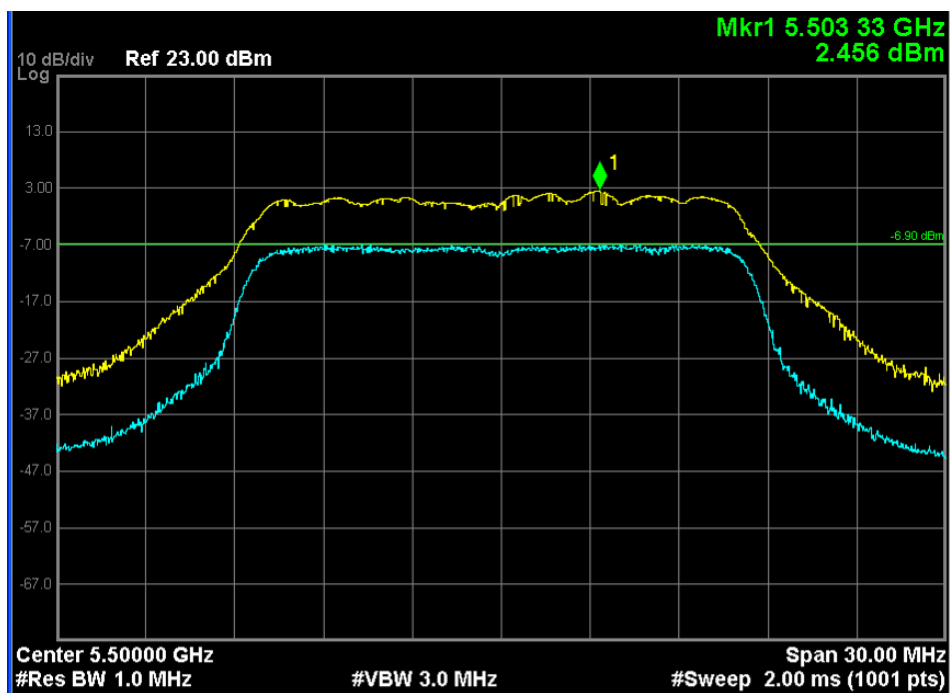
Channel Frequency: 5660MHz

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Data Rate: 24 Mbps

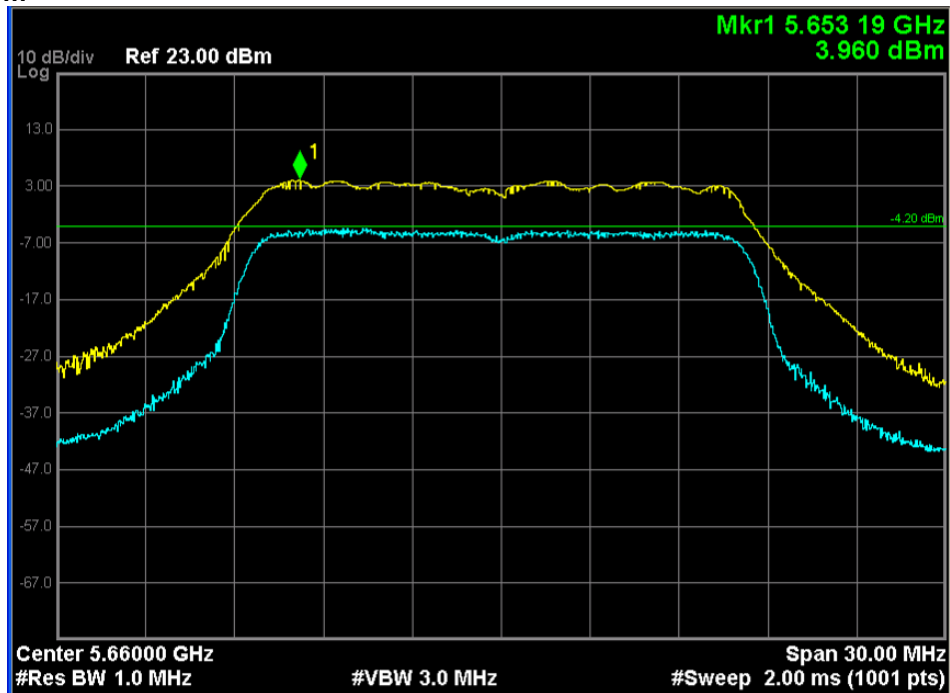
Channel Frequency: 5700MHz



Data Rate: 54 Mbps

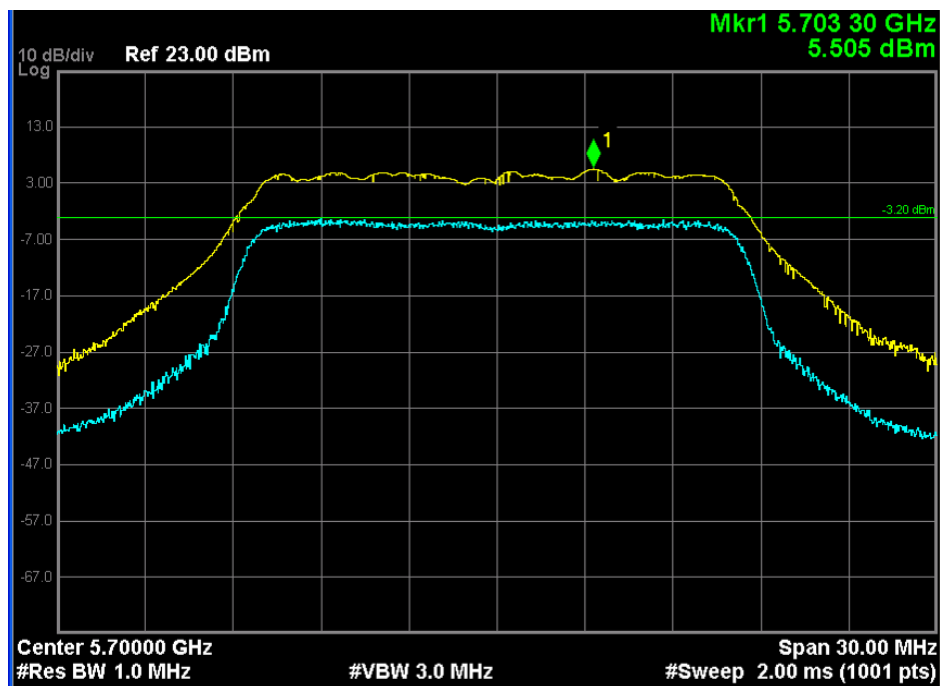
Channel Frequency: 5500MHz

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Data Rate: 54 Mbps

Channel Frequency: 5660MHz



Data Rate: 54 Mbps

Channel Frequency: 5700MHz

**Unwanted Emissions
Result**
Section 15.209 /15.407 (b)
Pass

Test Specification	FCC Part 15 Section 15.209 and 14.407(b)(6)
Test Method	ANSI C63.10-2009
Measurement Location	Semi Anechoic Chamber
Measuring Distance	3m
Detection	QP for frequency below 1GHz, Peak/Average for frequency above 1GHz
Requirement	For transmitters operating in the 5.15-5.25 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz. For transmitters operating in the 5.25-5.35 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz. For transmitters operating in the 5.25-5.35 GHz band: all emissions outside of the 5.47-5.725 GHz band shall not exceed an EIRP of -27 dBm/MHz. Unwanted Emissions below 1GHz should comply with FCC15.209.

Limit for Radiated Emission of Section 15.209:

Frequency (MHz)	Field strength (μV/m)	Field strength (dBμV/m)	Distance of Measurement (m)
0.009 – 0.490	2400/F(kHz)	48.50 – 13.80	300*
0.490 – 1.705	24000/F(kHz)	33.80 – 23.00	30*
1.705 -30	30	29.54	30*
30-88	100	40.0	3
88-216	150	43.5	3
216-960	200	46.0	3
Above 960	500	54.0	3

Remark: * the limit shows in the table above of frequency range 0.009 – 0.490, 0.490 – 1.705 MHz and 1.705-30MHz is at 300 meter, 30 meter and 30 meter range respectively, which corresponds to 88,50 – 53.80, 53.80 – 43.00 and 49.5dBμV/m at 3m range by extrapolation calculation and the measurement of loop antenna.

The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz Radiated emission limits in these three bands are based on measurements employing an average detector.

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Test results:

Polarization	Frequency (MHz)	Field Strength (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
V	199.79	19.55	53.98	-34.43
	400.21	23.77	56.90	-33.13
H	199.97	33.40	53.98	-20.58
	299.98	38.06	56.90	-18.84
	349.99	40.69	56.90	-16.21
	383.36	40.60	56.90	-16.30
	399.99	43.35	56.90	-13.55
	416.67	38.34	56.90	-18.56

Modulation: 802.11a

Fundamental Frequency (MHz)	Antenna Polarization	Spurious Emission (MHz)	Field Strength (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
5180	H	5180.00 (Pk)	94.59	-	*
		10360.00(Pk)	NF	68.23	-
	V	5180.00 (Pk)	102.34	-	*
		10360.00(Pk)	NF	68.23	-
5260	H	5260.00(Pk)	97.25	-	*
		10520.00(Pk)	NF	68.23	-
	V	5260.00(Pk)	102.76	-	*
		10520.00(Pk)	NF	68.23	-
5320	H	5320.00(Pk)	98.19	-	*
		10640.00(Pk)	NF	68.23	-
	V	5320.00(Pk)	104.52	-	*
		10640.00(Pk)	NF	68.23	-

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Modulation: 802.11a

Fundamental Frequency (MHz)	Antenna Polarization	Spurious Emission (MHz)	Field Strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
5500	H	5500.00 (Pk)	97.61	-	*
		11000.00(Pk)	54.5	68.3	-13.8
	V	5500.00 (Pk)	104.89	-	*
		11000.00(Pk)	54.8	68.3	-13.5
5700	H	5700.00(Pk)	99.34	-	*
		11400.00(Pk)	58.23	68.3	-10.07
	V	5700.00(Pk)	104.45	-	*
		11400.00(Pk)	60.56	68.3	-7.74

Pk---> Peak detector

Av-->Average Detector

NF→ Noise Floor = 54dBμV/m

**Restricted Bands of Operation
Result**
**Section 15.205
Pass**

Test Specification	FCC Part 15 Section 15.205
Test Method	ANSI C63.10-2009
Measurement Location	Semi Anechoic Chamber
Measuring Distance	3m
Detection	Peak and Average for frequency above 1GHz

Fundamental Frequency (MHz)	Antenna Polarization	Spurious Emission (MHz)	Field Strength (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
5180	H	5150 (Pk)	59.25	68.23	-8.98
		5150 (Av)	50.35	54.00	-3.65
	V	5150 (Pk)	59.06	68.23	-9.17
		5150 (Av)	50.16	54.00	-3.84
5320	H	5350 (Pk)	59.01	68.23	-9.22
		5350 (Av)	50.11	54.00	-3.89
	V	5350 (Pk)	61.65	68.23	-6.58
		5350 (Av)	52.75	54.00	-1.25
5500	H	5470 (Pk)	60.01	68.23	-8.22
		5470 (Av)	51.11	54.00	-2.89
	V	5470 (Pk)	61.41	68.23	-6.82
		5470 (Av)	52.51	54.00	-1.49

Pk---> Peak detector
 Av-->Average Detector

Version Details of EUT

Board Name	BOM No.	Schematics	PCB Versions
Main PCB Module	3101B2101_5	3101C0551_4	3101D0501_3
IX Top PCB Module	3101B2102_5	3101C0553_4	3101D0502_4
IX Top Radio PCB Module	3101B2103_5	3101C0553_4	3101D0503_4
IX Rechargeable Battery PCB Module	3101B2105_4	3101C0555_3	3101D0505_3
IX Cartridge PCB Module	3101B2106_4	3101C0556_4	3101D0506_2
IX O2 Sensor PCB Module	3101B2107_3	3101C0557_3	3101D0507_2
IX Toxic Sensor PCB Module	3101B2108_3	3101C0558_3	3101D0508_2
IX FL Sensor PCB Module	3101B2110_3	3101C0560_3	3101D0510_2
IX IR COM Sensor PCB Module	3101B2111_3	3101C0561_3	3101D0511_2
IX Terminal PCB Module	3101B2113_4	3101C0567_3	3101D0517_2
IX PID Sensor PCB Module	3101B2114_3	3101C0564_3	3101D0514_2
IX GPS PCB Module	3101B2116_1	3101C0566_1	3101D0516_1
IX Wi-Fi USI PCB Module	3101B2118_5	3101C0568_3	3101D0518_1
IX Wi-Fi Power PCB Module	3101B2119_4	3101C0569_3	3101D0519_4
IX Pump PCB Module	3101B2120_3	3101C0570_3	3101D0520_1
IX Maru PCB Module	3101B2121_4	3101C0571_3	3101D0521_3