ISSUED BY Shenzhen BALUN Technology Co., Ltd.

RF

TEST REPOR



FOR

# **Mobile Phone**

ISSUED TO Guangdong OPPO Mobile Telecommunications Corp., Ltd.

NO.18 Haibin Road, Wusha Village, Chang'an Town, Dongguan City, Guangdong, China



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# **Revision History**

Version	Issue Date	Revisions Content
<u>Rev. 01</u> <u>Rev. 02</u>	<u>Dec. 23, 2021</u> Jan. 12, 2022	Initial Issue Updated Section 2.5 Technical Information

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# **1 ADMINISTRATIVE DATA (GENERAL INFORMATION)**

# **1.1 Identification of the Testing Laboratory**

Company Name	Shenzhen BALUN Technology Co., Ltd.	
A dalama a a	Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road,	
Address	Nanshan District, Shenzhen, Guangdong Province, P. R. China	
Phone Number	+86 755 6685 0100	

## **1.2 Identification of the Responsible Testing Location**

Test Location	Shenzhen BALUN Technology Co., Ltd.
Addroop	Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road,
Address	Nanshan District, Shenzhen, Guangdong Province, P. R. China
Accreditation	The laboratory is a testing organization accredited by FCC as a
Certificate	accredited testing laboratory. The designation number is CN1196.
	All measurement facilities used to collect the measurement data are
Description	located at Block B, FL 1, Baisha Science and Technology Park, Shahe
Description	Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R.
	China 518055

## **1.3 Laboratory Condition**

Ambient Temperature	20°C to 25°C
Ambient Relative Humidity	45% to 55%
Ambient Pressure	100 kPa to 102 kPa

## 1.4 Announce

- (1) The test report reference to the report template version v6.6.
- (2) The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.
- (3) The test report is invalid if there is any evidence and/or falsification.
- (4) The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein.
- (5) This document may not be altered or revised in any way unless done so by BALUN and all revisions are duly noted in the revisions section.
- (6) Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.
- (7) The laboratory is only responsible for the data released by the laboratory, except for the part provided by the applicant.



# **2 PRODUCT INFORMATION**

# **2.1 Applicant Information**

Applicant	Guangdong OPPO Mobile Telecommunications Corp., Ltd.
Address	NO.18 Haibin Road, Wusha Village, Chang'an Town, Dongguan
Address	City, Guangdong, China

# 2.2 Manufacturer Information

Manufacturer	Guangdong OPPO Mobile Telecommunications Corp., Ltd.
Address	NO.18 Haibin Road, Wusha Village, Chang'an Town, Dongguan
Address	City, Guangdong, China

# 2.3 Factory Information

Factory	Guangdong OPPO Mobile Telecommunications Corp., Ltd.
Address	NO.18 Haibin Road, Wusha Village, Chang'an Town, Dongguan
Address	City, Guangdong, China

# 2.4 General Description for Equipment under Test (EUT)

EUT Name	Mobile Phone	
Model Name Under Test	CPH2371	
Series Model Name	N/A	
Description of Model	N/A	
name differentiation	N/A	
Hardware Version	11	
Software Version	ColorOS V12	
Dimensions (Approx.)	160.6*73.2*7.81mm	
Weight (Approx.)	173g (with battery)	



# **2.5 Technical Information**

	2G Network GSM/GPRS/EDGE 850/1900 MHz
	3G Network WCDMA/HSDPA/HSUPA/DC-HSDPA/HSPA+
	Band 2/4/5
	4G Network FDD LTE Band 2/4/5/7/12/17/26/66
	TDD LTE Band 38/41
	LTE CA Uplink (UL): CA_7C, CA_38C, CA_41C
	5G Network SA: NR n5/n7/n38/n41
Network and Wireless	NSA(EN-DC): DC_7A_n66A, DC_66A_n66A, DC_5A_n7A,
connectivity	DC_7A_n7A, DC_66A_n7A, DC_7A_n5A
	Bluetooth (BR+EDR+BLE)
	2.4G WIFI 802.11b, 802.11g, 802.11n(HT20/40), 802.11VHT20/40,
	802.11ax(HE20/40)
	5G WIFI 802.11a, 802.11n(HT20/40), 802.11ac(VHT20/40/80),
	802.11ax(HE20/40/80) U-NII-1/2A/2C/3
	GPS, GLONASS, BDS, Galileo, SBAS, NFC

The requirement for the following technical information of the EUT was tested in this report:

	802.11b/g/n/VHT/ax(20 MHz): 2.412 GHz - 2.462 GHz
	$f_c = 2412 \text{ MHz} + (N-1)^*5 \text{ MHz}$ , where
	- $f_c$ = "Operating Frequency" in MHz,
	- N = "Channel Number" with the range from 1 to 11.
Frequency Range	802.11n/VHT/ax(40 MHz): 2.422 GHz - 2.452 GHz
	$f_c = 2412 \text{ MHz} + (N-1)*5 \text{ MHz}$ , where
	- $f_c$ = "Operating Frequency" in MHz,
	- N = "Channel Number" with the range from 3 to 9.
Modulation Type	DSSS, OFDM, OFDMA
Product Type	⊠ Portable
	Fix Location
Antenna System (eg.,	N/A
MIMO, Smart Antenna)	
Categorization as	
Correlated or	N/A
Completely Uncorrelated	
Antenna Type	PIFA Antenna
Antenna Gain	1.0 dBi (In test items related to antenna gain, the final results
	reflect this figure. This value is provided by the applicant.)
About the Product	Only the WIFI 802.11b, 802.11g, 802.11n (HT20/40), 802.11
	(VHT20/40) and 802.11ax (HE20/40) was tested in this report.



Modulation technology	Modulation Type	Transfer Rate (Mbps)(Single RF path)
	DBPSK	1
DSSS (802.11b)	DQPSK	2
	ССК	5.5/11
	BPSK	6/9
OFDM (802.11g)	QPSK	12/18
OFDM (602.119)	16QAM	24/36
	64QAM	48/54
	BPSK	6.5/7.2
OFDM	QPSK	13/19.5/14.4/21.7
(802.11n/VHT-20 MHz)	16QAM	26/39/28.9/43.3
	64QAM	52/58.5/65/57.8/65/72.2
	BPSK	13.5/15
OFDM	QPSK	27/40.5/30/45
(802.11n/VHT-40 MHz)	16QAM	54/81/60/90
	64QAM	108/121.5/135/120/150
	BPSK	4
	QPSK	16/24/17/26
OFDMA	16QAM	33/49/34/52
(802.11ax-20 MHz)	64QAM	65/73/81/69/77/86
	256QAM	98/108/103/115
	1024QAM	122/135/129/143
	BPSK	8/9
	QPSK	33/49/34/52
OFDMA	16QAM	65/98/69/103
(802.11ax-40 MHz)	64QAM	130/146/163/138/155/172
	256QAM	195/217/207/229
	1024QAM	244/271/258/287

Note: Preliminary tests were performed in different data rate in above table to find the worst radiated emission. The data rate shown in the table below is the worst-case rate with respect to the specific test item. Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report.



Test Items	Mode	Data Rate	Cha	nnel
Output Power	11b/11g/11n20/11n40/	1/6/6.5/13.5/	1/6/11	3/6/9
	VHT20/VHT40/ax20/ax40	6.5/13.5/4/8 Mbps	1/0/11	3/0/9
6dB Bandwidth	11b/11g/11n20/11n40/	1/6/6.5/13.5/	1/6/11	3/6/9
	VHT20/VHT40/ax20/ax40	6.5/13.5/4/8 Mbps	1/0/11	3/0/9
Conducted Spurious	11b/11g/11n20/11n40/	1/6/6.5/13.5/	1/6/11	3/6/9
Emission	VHT20/VHT40/ax20/ax40	6.5/13.5/4/8 Mbps	1/0/11	3/0/9
Conducted Emission	11b/11g/11n20/11n40/	1/6/6.5/13.5/	1/6/11	3/6/9
Conducted Emission	VHT20/VHT40/ax20/ax40	6.5/13.5/4/8 Mbps	1/0/11	3/0/9
Radiated Spurious	11b/11g/11n20/11n40/	1/6/6.5/13.5/	1/6/11	3/6/9
Emission	VHT20/VHT40/ax20/ax40	6.5/13.5/4/8 Mbps	1/0/11	3/0/9
Pond Edge	11b/11g/11n20/11n40/	1/6/6.5/13.5/		
Band Edge	VHT20/VHT40/ax20/ax40	6.5/13.5/4/8 Mbps	1/6/11	3/6/9
Power spectral density	11b/11g/11n20/11n40/	1/6/6.5/13.5/	1/6/11	3/6/9
(PSD)	VHT20/VHT40/ax20/ax40	6.5/13.5/4/8 Mbps	1/0/11	3/0/9

Note: The above EUT information in section 2.4 and 2.6 was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.



# 2.6 Additional Instructions

#### EUT Software Settings:

	$\square$	Special software is used.
Mode		The software provided by client to enable the EUT under
Mode		transmission condition continuously at specific channel
		frequencies individually.

During testing, Channel and Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

Power level setup in software			
Test Software Version	*#*#3646633#*#*		
Mode	Channel	Frequency (MHz)	Soft Set
	1	2412	13.00
802.11 b	6	2437	13.00
	11	2462	13.00
	1	2412	12.50
	2	2417	14.00
	3	2422	15.00
902 11 a	4	2427	16.00
802.11 g	6	2437	16.00
	9	2452	16.00
	10	2457	14.00
	11	2462	12.50
	1	2412	12.50
	2	2417	14.00
	3	2422	14.50
802.11 n20	4	2427	16.00
002.11120	6	2437	16.00
	9	2452	16.00
	10	2457	14.00
	11	2462	11.50
	3	2422	10.50
	4	2427	12.00
	5	2432	15.00
802.11 n40	6	2437	16.00
	7	2442	15.00
	8	2447	12.00
	9	2452	11.00
	1	2412	12.00
	2	2417	13.50
802.11 VHT20	3	2422	14.50
002.11 01120	4	2427	16.00
	6	2437	16.00
	9	2452	16.00



	10	2457	12.50
	11	2462	11.50
	3	2422	10.50
	4	2427	12.00
	5	2432	15.50
802.11 VHT40	6	2437	16.00
	7	2442	14.50
	8	2447	12.00
	9	2452	11.00
	1	2412	12.00
	2	2417	13.00
	3	2422	15.00
900 11 ov20 (CLI)	4	2427	16.00
802.11 ax20 (SU)	6	2437	16.00
	9	2452	16.00
	10	2457	13.50
	11	2462	10.50
	3	2422	5.50
	4	2427	10.00
	5	2432	11.50
802.11 ax40 (SU)	6	2437	11.00
	7	2442	10.00
	8	2447	8.50
	9	2452	6.50

Mode	Channel	Frequency (MHz)	RU Config	Soft Set
			26	8.00
	1	2412	52	11.00
			106	12.00
			26	8.00
	2	2417	52	11.00
			106	13.00
		3 2422 6 2437	26	8.00
	20		52	11.00
802.11 ax20			106	14.00
002.11 ax20			26	8.00
			52	11.00
			106	14.00
			26	8.00
	9	2452	52	11.00
			106	14.00
			26	8.00
	10	2457	52	11.00
			106	13.50



			26	8.00
	11	2462	52	10.50
			106	10.50
			26	5.50
	2	0.400	52	5.50
	3	2422	106	5.50
			242	5.50
			26	8.00
	4	2427	52	10.00
	4	2427	106	10.00
			242	10.00
			26	8.00
	5	2432	52	11.00
			106	11.50
			242	11.50
			26	8.00
802.11 ax40	6	2437	52	11.00
002.11 ax40	O	2437	106	11.00
			242	11.00
			26	8.00
	7	2442	52	10.00
	1		106	10.00
			242	10.00
			26	8.00
	8	2447	52	8.50
	0	2447	106	8.50
			242	8.50
			26	6.50
	9	2452	52	6.50
	9	2452	106	6.50
			242	6.50



### Run software:

Channel Info		
Tx0 channel	1 [2412MHz]	-
Channel Bandwidth	BW20	*
Data Bandwidth	BW20	*
Primary Ch	0	
Test Mode		
Mode	continuous packe	*
Package Info		
Pkt length	1024	
Pkt cnt	0	
Preamble	CCK	*
Rate	1M	
Guard interval	normal GI	
FEC	BCC	*
Tx power (dBm)	15.0	
Inter packet gap [0~255]	50	
HW TX		
TX Count	429	-
GO	STO	D



# **3 SUMMARY OF TEST RESULTS**

# **3.1 Test Standards**

No.	Identity	Document Title	
1	47 CFR Part 15, Subpart C	Miscellaneous Wireless Communications Services	
		GUIDANCE FOR COMPLIANCE MEASUREMENTS ON	
2	KDB Publication 558074	DIGITAL TRANSMISSION SYSTEM, FREQUENCY HOPPING	
2	D01v05r02	SPREAD SPECTRUM SYSTEM, AND HYBRID SYSTEM DEVICES	
		OPERATING UNDER SECTION 15.247 OF THE FCC RULES	
3	ANGL CC2 40 2012	American National Standard of Procedures for Compliance Testing of	
3	ANSI C63.10-2013	Unlicensed Wireless Devices	

# 3.2 Verdict

No.	Description	FCC PART No.	Test Result	Verdict		
1	Antenna Requirement	15.203	N/A	Pass <sup>Note 1</sup>		
2	Output Power	15.247 (b)	ANNEX A.1	Pass		
3	6dB Bandwidth	15.247 (a)	ANNEX A.2	Pass		
4	Conducted Spurious Emission	15.247 (d)	ANNEX A.3	Pass		
5	Band Edge(Authorized-band band-edge)	15.247 (d)	ANNEX A.4	Pass		
6	Conducted Emission	15.207	ANNEX A.5	Pass		
7	Radiated Spurious Emission	15.209; 15.247 (d)	ANNEX A.6	Pass		
8	Band Edge(Restricted-band band-edge)	15.209; 15.247 (d)	ANNEX A.7	Pass		
9	Power spectral density (PSD)	15.247 (e)	ANNEX A.8	Pass		
10	Receiver Spurious Emissions	N/A	N/A	N/A Note 2		
NI . ( .	Note 1. Disease refer to postion 5.4					

Note <sup>1</sup>: Please refer to section 5.1.

Note <sup>2</sup>: Only radio communication receivers operating in stand-alone mode within the band 30-960 MHz, as well as scanner receivers, are subject to Industry Canada requirements, so this test is not applicable.



# **4 GENERAL TEST CONFIGURATIONS**

# **4.1 Test Environments**

During the measurement, the normal environmental conditions were within the listed ranges:

Relative Humidity	45% - 55%		
Atmospheric Pressure	100 kPa - 102 kPa		
Temperature	NT (Normal Temperature)	+22°C to +25°C	
Working Voltage of the EUT	NV (Normal Voltage)	7.74 V	

# 4.2 Test Equipment List

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer	ROHDE&SCHWARZ	FSV-40	101544	2021.04.01	2022.03.31
Bluetooth Signaling Unit	ROHDE&SCHWARZ	CMW500	142028	2021.06.01	2022.05.31
EMI Receiver	KEYSIGHT	N9038A	MY53220118	2021.06.01	2022.05.31
EMI Receiver	ROHDE&SCHWARZ	ESRP	101036	2021.06.01	2022.05.31
LISN	SCHWARZBECK	NSLK 8127	8127-687	2021.06.01	2022.05.31
Test Antenna- Loop(9 kHz-30 MHz)	SCHWARZBECK	FMZB 1519	1519-037	2021.04.16	2024.04.15
Test Antenna- Bi-Log(30 MHz-3 GHz)	SCHWARZBECK	VULB 9163	9163-624	2021.08.20	2024.08.19
Test Antenna- Horn(1-18 GHz)	SCHWARZBECK	BBHA 9120D	9120D-1917	2019.07.02	2022.07.01
Test Antenna- Horn (18-40 GHz)	A-INFO	LB- 180400KF	J211060273	2021.07.02	2023.07.01
Anechoic Chamber	RAINFORD	9m*6m*6m	N/A	2017.02.21	2022.02.20
Anechoic Chamber	EMC Electronic Co., Ltd	20.10*11.60 *7.35m	N/A	2019.08.08	2022.08.07
Shielded Enclosure	ChangNing	CN-130701	130703		

# 4.3 Test Software List

Description	Manufacturer	Software Version	Serial No.	Applicable test Setup
BLE410R	BALUN	V2.1.1.488	N/A	The section 4.5.1
BLE410E	BALUN	V19.8.28.435	N/A	The section 4.5.2&4.5.3&4.5.4&4.5.5



# 4.4 Measurement Uncertainty

The following measurement uncertainty levels have been estimated for tests performed on the EUT 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.

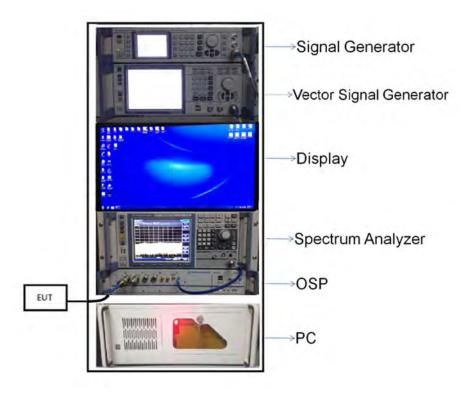
Parameters	Uncertainty
Occupied Channel Bandwidth	2.8%
RF output power, conducted	1.28 dB
Power Spectral Density, conducted	1.30 dB
Unwanted Emissions, conducted	1.84 dB
All emissions, radiated	5.36 dB
Temperature	0.82°C
Humidity	4.1%

# 4.5 Description of Test Setup

4.5.1 For Antenna Port Test

Conducted value (dBm) = Measurement value (dBm) + cable loss (dB)

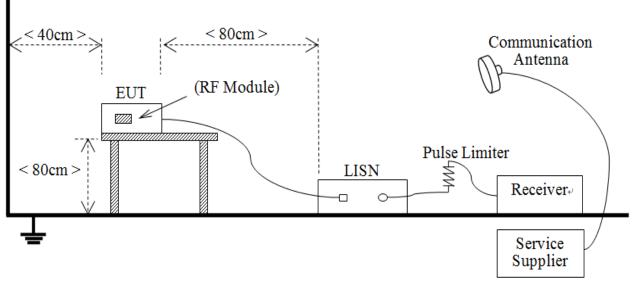
For example: the measurement value is 10 dBm and the cable 0.5dBm used, then the final result of EUT: Conducted value (dBm) = 10 dBm + 0.5 dB = 10.5 dBm



(Diagram 1)

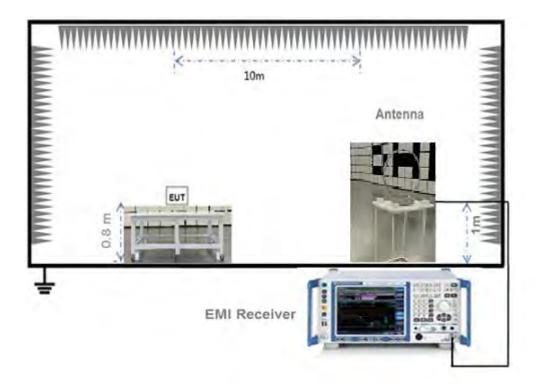


## 4.5.2 For AC Power Supply Port Test





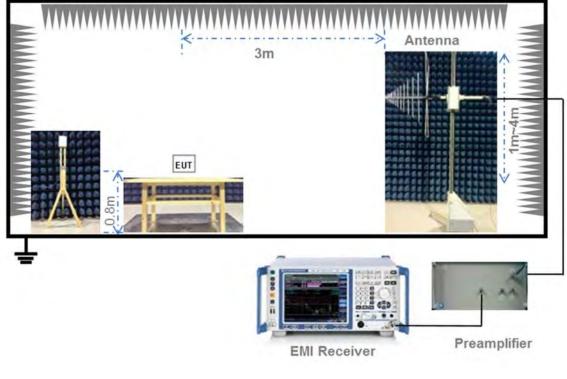
4.5.3 For Radiated Test (Below 30 MHz)





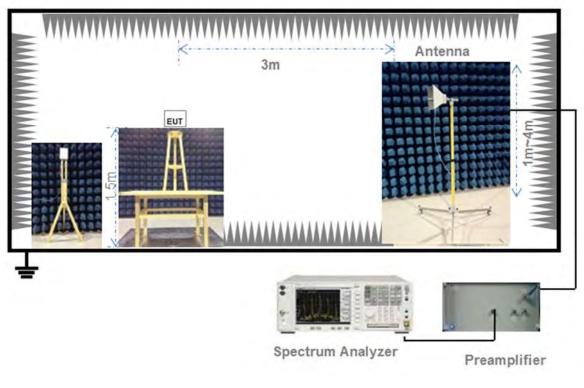


4.5.4 For Radiated Test (30 MHz-1 GHz)



(Diagram 4)

4.5.5 For Radiated Test (Above 1 GHz)







# 4.6 Measurement Results Explanation Example

4.6.1 For conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

4.6.2 For radiated band edges and spurious emission test:

 $\mathsf{E} = \mathsf{EIRP} - 20\mathsf{log} \ \mathsf{D} + 104.8$ 

where:

 $E = electric field strength in dB\mu V/m$ ,

EIRP = equivalent isotropic radiated power in dBm

D = specified measurement distance in meters.

EIRP= Measure Conducted output power Value (dBm) + Maximum transmit antenna gain (dBi) + the appropriate maximum ground reflection factor (dB)



# 5 TEST ITEMS

# **5.1 Antenna Requirements**

## 5.1.1 Relevant Standards

### FCC §15.203

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of § 15.211, § 15.213, § 15.217, § 15.219, or § 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with § 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

If directional gain of transmitting antennas is greater than 6 dBi, the power shall be reduced by the same level in dB comparing to gain minus 6 dBi. For the fixed point-to-point operation, the power shall be reduced by one dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the FCC rule.

## 5.1.2 Antenna Anti-Replacement Construction

### The Antenna Anti-Replacement as following method:

Protected Method	Description
The antenna is embedded in the	An embedded-in antenna design is used.
product.	

Reference Documents	Item
Photo	Please refer to the EUT Photo documents.

## 5.1.3 Antenna Gain

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.



# 5.2 Output Power

### 5.2.1 Test Limit

### FCC § 15.247(b)

For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antennas antennas antennas antennas and antennas and antennas anten

### 5.2.2 Test Setup

See section 4.5.1 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

### 5.2.3 Test Procedure

#### Maximum peak conducted output power

The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall utilize a fast-responding diode detector.

#### Maximum conducted (average) output power (Reporting Only)

a) As an alternative to spectrum analyzer or EMI receiver measurements, measurements may be performed

using a wideband RF power meter with a thermocouple detector or equivalent if all of the conditions listed below are satisfied.

1) The EUT is configured to transmit continuously, or to transmit with a constant duty factor.

2) At all times when the EUT is transmitting, it shall be transmitting at its maximum power control level.

3) The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a

factor of five.

b) If the transmitter does not transmit continuously, measure the duty cycle (x) of the transmitter output signal as

described in Section 6.0.

c) Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.

d) Adjust the measurement in dBm by adding  $10\log(1/x)$ , where x is the duty cycle to the measurement result.

#### Measurements of duty cycle

The zero-span mode on a spectrum analyzer or EMI receiver if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the on and off times of the transmitted signal.

Set the center frequency of the instrument to the center frequency of the transmission.



Set RBW  $\geq$  OBW if possible; otherwise, set RBW to the largest available value.

Set VBW  $\geq$  RBW. Set detector = peak or average.

The zero-span measurement method shall not be used unless both RBW and VBW are > 50/T and the number of sweep points across duration T exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring duty cycle shall not be used if T  $\leq$  16.7 microseconds.)

5.2.4 Test Result

Please refer to ANNEX A.1.



# 5.36dB Bandwidth

5.3.1 Limit

FCC §15.247(a)

Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. In order to make an accurate measurement, set the span greater than RBW. The 6 dB bandwidth must be greater than 500 kHz.

5.3.2 Test Setup

See section 4.5.1 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.3.3 Test Procedure

Use the following spectrum analyzer settings:

Set RBW = 100 kHz.

Set the video bandwidth (VBW)  $\geq$  3 RBW.

Detector = Peak.

Trace mode = max hold.

Sweep = auto couple.

Allow the trace to stabilize.

Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

5.3.4 Test Result

Please refer to ANNEX A.2.



# **5.4 Conducted Spurious Emission**

5.4.1 Limit

FCC §15.247(d)

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

### 5.4.2 Test Setup

See section 4.5.1 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

### 5.4.3 Test Procedure

The DTS rules specify that in any 100 kHz bandwidth outside of the authorized frequency band, the power shall be attenuated according to the following conditions:

a) If the maximum peak conducted output power procedure was used to demonstrate compliance as described in 9.1, then the peak output power measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz (i.e., 20 dBc).

b) If maximum conducted (average) output power was used to demonstrate compliance as described in 9.2, then the peak power in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum in-band peak PSD level in 100 kHz (i.e., 30 dBc).

c) In either case, attenuation to levels below the 15.209 general radiated emissions limits is not required.

The following procedures shall be used to demonstrate compliance to these limits. Note that these procedures can be used in either an antenna-port conducted or radiated test set-up. Radiated tests must conform to the test site requirements and utilize maximization procedures defined herein.

#### Reference level measurement

Establish a reference level by using the following procedure:

Set instrument center frequency to DTS channel center frequency.

Set the span to  $\geq$  1.5 times the DTS bandwidth.

Set the RBW = 100 kHz.

Set the VBW  $\geq$  3 x RBW.

Detector = peak.

Sweep time = auto couple.

Trace mode = max hold.

Allow trace to fully stabilize.

Use the peak marker function to determine the maximum PSD level.



### Emission level measurement

Use the following spectrum analyzer settings:

Span = wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10th harmonic. Typically, several plots are required to cover this entire span.

Set the RBW = 100 kHz.

Set the VBW  $\geq$  3 x RBW.

Detector = peak.

Sweep time = auto couple.

Trace mode = max hold.

Allow trace to fully stabilize.

Use the peak marker function to determine the maximum amplitude level.

Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) are attenuated by at least the minimum requirements specified in 11.1 a) or 11.1 b). Report the three highest emissions relative to the limit.

5.4.4 Test Result

Please refer to ANNEX A.3.



# 5.5 Band Edge (Authorized-band band-edge)

5.5.1 Limit

FCC §15.247(d)

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

### 5.5.2 Test Setup

See section 4.5.1 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

### 5.5.3 Test Procedure

The following procedures may be used to determine the peak or average field strength or power of an unwanted emission that is within 2 MHz of the authorized band edge. If a peak detector is utilized, use the procedure described in 13.2.1. Use the procedure described in 13.2.2 when using an average detector and the EUT can be configured to transmit continuously (i.e., duty cycle  $\geq$  98%). Use the procedure described in 13.2.3 when using an average detector and the EUT cannot be configured to transmit continuously but the duty cycle is constant (i.e., duty cycle variations are less than ± 2 percent). Use the procedure described in 13.2.4 when using an average detector for those cases where the EUT cannot be configured to transmit continuously and the duty cycle is not constant (duty cycle variations equal or exceed 2 percent).

When using a peak detector to measure unwanted emissions at or near the band edge (within 2 MHz of the authorized band), the following integration procedure can be used.

Set instrument center frequency to the frequency of the emission to be measured (must be within 2 MHz of the authorized band edge).

Set span to 2 MHz

RBW = 100 kHz.

VBW  $\geq$  3 x RBW.

Detector = peak.

Sweep time = auto.

Trace mode = max hold.

Allow sweep to continue until the trace stabilizes (required measurement time may increase for low duty cycle applications)

Compute the power by integrating the spectrum over 1 MHz using the analyzer's band power measurement function with band limits set equal to the emission frequency (femission)  $\pm$  0.5 MHz. If the instrument does not have a band power function, then sum the amplitude levels (in power units) at 100 kHz intervals extending across the 1 MHz spectrum defined by femission  $\pm$  0.5 MHz.

Standard method(The 99% OBW of the fundamental emission is without 2 MHz of the authorized band):

Span: Wide enough to capture the peak level of the emission operating on the channel closest to the band edge, as well as any modulation products that fall outside of the authorized band of operation.



Reference level: As required to keep the signal from exceeding the maximum instrument input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than [10 log (OBW/RBW)] below the reference level. Specific guidance is given in 4.1.5.2.

Attenuation: Auto (at least 10 dB preferred).

Sweep time: Coupled.

Resolution bandwidth: 100 kHz.

Video bandwidth: 300 kHz.

Detector: Peak.

Trace: Max hold.

5.5.4 Test Result

Please refer to ANNEX A.4.



# 5.6 Conducted Emission

5.6.1 Limit

## FCC §15.207

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a  $50\mu$ H/50 $\Omega$  line impedance stabilization network (LISN).

Frequency range	Conducted Limit (dBµV)			
(MHz)	Quai-peak	Average		
0.15 - 0.50	66 to 56	56 to 46		
0.50 - 5	56	46		
0.50 - 30	60	50		

## 5.6.2 Test Setup

See section 4.5.2 for test setup description for the AC power supply port. The photo of test setup please refer to ANNEX B.

### 5.6.3 Test Procedure

The maximum conducted interference is searched using Peak (PK), if the emission levels more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines of the power mains connected to the EUT are performed. Refer to recorded points and plots below.

Devices subject to Part 15 must be tested for all available U.S. voltages and frequencies (such as a nominal 120 VAC, 50/60 Hz and 240 VAC, 50/60 Hz) for which the device is capable of operation. A device rated for 50/60 Hz operation need not be tested at both frequencies provided the radiated and line conducted emissions are the same at both frequencies.

### 5.6.4 Test Result

Please refer to ANNEX A.5.



# 5.7 Radiated Spurious Emission

## 5.7.1 Limit

### FCC §15.209&15.247(d)

Radiated emission outside the frequency band attenuation below the general limits specified in FCC section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in FCC section 15.205(a), must also comply with the radiated emission limits specified in FCC section 15.209(a).

According to FCC section 15.209 (a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (µV/m)	Measurement Distance (m)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

Note:

- 1. For Above 1000 MHz, the emission limit in this paragraph is based on measurement instrumentation employing an average detector, measurement using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit.
- 2. For above 1000 MHz, limit field strength of harmonics: 54dBuV/m@3m (AV) and 74dBuV/m@3m (PK).

## 5.7.2 Test Setup

See section 4.5.3 to 4.5.5 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

### 5.7.3 Test Procedure

Since the emission limits are specified in terms of radiated field strength levels, measurements performed to demonstrate compliance have traditionally relied on a radiated test configuration. Radiated measurements remain the principal method for demonstrating compliance to the specified limits; however antenna-port conducted measurements are also now acceptable to demonstrate compliance (see below for details). When radiated measurements are utilized, test site requirements and procedures for maximizing and measuring radiated emissions that are described in ANSI C63.10 shall be followed.

Antenna-port conducted measurements may also be used as an alternative to radiated measurements for demonstrating compliance in the restricted frequency bands. If conducted measurements are performed, then proper impedance matching must be ensured and an additional radiated test for cabinet/case spurious emissions is required.

### General Procedure for conducted measurements in restricted bands

a) Measure the conducted output power (in dBm) using the detector specified (see guidance regarding measurement procedures for determining quasi-peak, peak, and average conducted output power, respectively).



b) Add the maximum transmit antenna gain (in dBi) to the measured output power level to determine the EIRP level (see guidance on determining the applicable antenna gain)

c) Add the appropriate maximum ground reflection factor to the EIRP level (6 dB for frequencies  $\leq$  30 MHz, 4.7 dB for frequencies between 30 MHz and 1000 MHz, inclusive and 0 dB for frequencies > 1000 MHz).

d) For devices with multiple antenna-ports, measure the power of each individual chain and sum the EIRP of all chains in linear terms (e.g., Watts, mW).

e) Convert the resultant EIRP level to an equivalent electric field strength using the following relationship:

### E = EIRP - 20log D + 104.8

where:

 $E = electric field strength in dB\mu V/m$ ,

EIRP = equivalent isotropic radiated power in dBm

D = specified measurement distance in meters.

f) Compare the resultant electric field strength level to the applicable limit.

g) Perform radiated spurious emission test.

#### Quasi-Peak measurement procedure

The specifications for measurements using the CISPR quasi-peak detector can be found in Publication 16 of the International Special Committee on Radio Frequency Interference (CISPR) of the International Electrotechnical Commission.

As an alternative to CISPR quasi-peak measurement, compliance can be demonstrated to the applicable emission limits using a peak detector.

#### Peak power measurement procedure

Peak emission levels are measured by setting the instrument as follows:

- a) RBW = as specified in Table 1.
- b) VBW  $\geq$  3 x RBW.
- c) Detector = Peak.
- d) Sweep time = auto.

e) Trace mode = max hold.

f) Allow sweeps to continue until the trace stabilizes. (Note that the required measurement time may be longer for low duty cycle applications).

Table 1—RBW as a function of frequency

Frequency	RBW
9-150 kHz	200-300 Hz
0.15-30 MHz	9-10 kHz
30-1000 MHz	100-120 kHz



> 1000 MHz 1 MHz

If the peak-detected amplitude can be shown to comply with the average limit, then it is not necessary to perform a separate average measurement.

Trace averaging across on and off times of the EUT transmissions followed by duty cycle correction

If continuous transmission of the EUT (i.e., duty cycle  $\ge$  98 percent) cannot be achieved and the duty cycle is constant (i.e., duty cycle variations are less than  $\pm$  2 percent), then the following procedure shall be used:

a) The EUT shall be configured to operate at the maximum achievable duty cycle.

b) Measure the duty cycle, x, of the transmitter output signal as described in section 6.0.

c) RBW = 1 MHz (unless otherwise specified).

d) VBW  $\geq$  3 x RBW.

e) Detector = RMS, if span/(# of points in sweep)  $\leq$  (RBW/2). Satisfying this condition may require increasing the number of points in the sweep or reducing the span. If this condition cannot be satisfied, then the detector mode shall be set to peak.

f) Averaging type = power (i.e., RMS).

1) As an alternative, the detector and averaging type may be set for linear voltage averaging.

2) Some instruments require linear display mode in order to use linear voltage averaging. Log or dB averaging shall not be used.

g) Sweep time = auto.

h) Perform a trace average of at least 100 traces.

i) A correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100 percent duty cycle. The correction factor is computed as follows:

1) If power averaging (RMS) mode was used in step f), then the applicable correction factor is  $10 \log(1/x)$ , where x is the duty cycle.

2) If linear voltage averaging mode was used in step f), then the applicable correction factor is  $20 \log(1/x)$ , where x is the duty cycle.

3) If a specific emission is demonstrated to be continuous ( $\geq$  98 percent duty cycle) rather than turning on and off with the transmit cycle, then no duty cycle correction is required for that emission.

NOTE: Reduction of the measured emission amplitude levels to account for operational duty factor is not permitted. Compliance is based on emission levels occurring during transmission - not on an average across on and off times of the transmitter.

#### Determining the applicable transmit antenna gain

A conducted power measurement will determine the maximum output power associated with a restricted band emission; however, in order to determine the associated EIRP level, the gain of the transmitting antenna (in dBi) must be added to the measured output power (in dBm).



Since the out-of-band characteristics of the EUT transmit antenna will often be unknown, the use of a conservative antenna gain value is necessary. Thus, when determining the EIRP based on the measured conducted power, the upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands, or 2 dBi, whichever is greater. However, for devices that operate in multiple frequency bands while using the same transmit antenna, the highest gain of the antenna within the operating band nearest in frequency to the restricted band emission being measured may be used in lieu of the overall highest gain when the emission is at a frequency that is within 20 percent of the nearest band edge frequency, but in no case shall a value less than 2 dBi be used.

See KDB 662911 for guidance on calculating the additional array gain term when determining the effective antenna gain for a EUT with multiple outputs occupying the same or overlapping frequency ranges in the same band.

#### Radiated spurious emission test

An additional consideration when performing conducted measurements of restricted band emissions is that unwanted emissions radiating from the EUT cabinet, control circuits, power leads, or intermediate circuit elements will likely go undetected in a conducted measurement configuration. To address this concern, a radiated test shall be performed to ensure that emissions emanating from the EUT cabinet (rather than the antenna port) also comply with the applicable limits.

For these cabinet radiated spurious emission measurements the EUT transmit antenna may be replaced with a termination matching the nominal impedance of the antenna. Procedures for performing radiated measurements are specified in ANSI C63.10. All detected emissions shall comply with the applicable limits.

The measurement frequency range is from 30 MHz to the 10th harmonic of the fundamental frequency. The Turn Table is actuated to turn from 0° to 360°, and both horizontal and vertical polarizations of the Test Antenna are used to find the maximum radiated power. Mid channels on all channel bandwidth verified. Only the worst RB size/offset presented.

The power of the EUT transmitting frequency should be ignored.

All Spurious Emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

Use the following spectrum analyzer settings:

Span = wide enough to fully capture the emission being measured RBW = 1 MHz for  $f \ge 1$  GHz, 100 kHz for f < 1 GHz VBW  $\ge$  RBW Sweep = auto Detector function = peak Trace = max hold

### 5.7.4 Test Result

Please refer to ANNEX A.6.



# 5.8 Band Edge (Restricted-band band-edge)

5.8.1 Limit

FCC §15.209&15.247(d)

Radiated emission outside the frequency band attenuation below the general limits specified in FCC section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in FCC section 15.205(a), must also comply with the radiated emission limits specified in FCC section 15.209(a).

### 5.8.2 Test Setup

See section 4.5.1 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

### 5.8.3 Test Procedure

The measurement frequency range is from 9 kHz to the 10th harmonic of the fundamental frequency. The Turn Table is actuated to turn from 0° to 360°, and both horizontal and vertical polarizations of the Test Antenna are used to find the maximum radiated power. Mid channels on all channel bandwidth verified. Only the worst RB size/offset presented.

The power of the EUT transmitting frequency should be ignored.

All Spurious Emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

Use the following spectrum analyzer settings:

Span = wide enough to fully capture the emission being measured RBW = 1 MHz for  $f \ge 1$  GHz, 100 kHz for f < 1 GHz VBW  $\ge$  RBW Sweep = auto Detector function = peak Trace = max hold

For measurement below 1GHz, If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported, Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

For transmitters operating above 1 GHz repeat the measurement with an average detector.

### 5.8.4 Test Result

Please refer to ANNEX A.7.



# 5.9 Power Spectral density (PSD)

5.9.1 Limit

FCC §15.247(e)

The same method of determining the conducted output power shall be used to determine the power spectral density. If a peak output power is measured, then a peak power spectral density measurement is required. If an average output power is measured, then an average power spectral density measurement should be used.

## 5.9.2 Test Setup

See section 4.5.1 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

### 5.9.3 Test Procedure

Set analyzer center frequency to DTS channel center frequency.

Set the span to 1.5 times the DTS bandwidth.

Set the RBW to: 3 kHz  $\leq$  RBW  $\leq$  100 kHz.

Set the VBW  $\geq$  3 RBW.

Detector = peak.

Sweep time = auto couple.

Trace mode = max hold.

Allow trace to fully stabilize.

Use the peak marker function to determine the maximum amplitude level within the RBW.

If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

5.9.4 Test Result

Please refer to ANNEX A.8.





# ANNEX A TEST RESULT

# A.1 Output Power

## Duty Cycle

Test Mode	On Time (ms)	On+Off time (ms)	Duty Cycle
802.11b	50	50	100.00%
802.11g	50	50	100.00%
802.11n-20 MHz	50	50	100.00%
802.11n-40 MHz	50	50	100.00%
802.11ax-20 MHz	50	50	100.00%
802.11ax-40 MHz	50	50	100.00%

## Peak Power Test Data

### 802.11b Mode:

Channel	Measured Out	put Peak Power	Limit		Verdict	
Channel	dBm	mW	dBm	mW	Verdict	
1	15.87	38.64	30		Pass	
6	15.82	38.19		0 1000	Pass	
11	15.66	36.81			Pass	

## 802.11g Mode:

Channel	Measured Output Peak Power		Lir	nit	Verdict
Channel	dBm	mW	dBm	mW	verdict
1	19.93	98.40		4000	Pass
2	21.38	137.40			Pass
3	22.57	180.72			Pass
4	23.65	231.74	30		Pass
6	23.68	233.35	30	1000	Pass
9	23.80	239.88	-		Pass
10	21.61	144.88			Pass
11	20.06	101.39			Pass



### 802.11n-20 MHz Mode:

Channel	Measured Output Peak Power		Limit		Verdict
Channel	dBm	mW	dBm	mW	verdict
1	19.93	98.40		1000	Pass
2	21.37	137.09			Pass
3	21.99	158.12			Pass
4	23.41	219.28	20		Pass
6	23.78	238.78	30	1000	Pass
9	23.66	232.27			Pass
10	21.51	141.58			Pass
11	19.04	80.17			Pass

#### 802.11n-40 MHz Mode:

Channel	Measured Output Peak Power		Limit		Vordict
	dBm	mW	dBm	mW	Verdict
3	18.11	64.71	30	1000	Pass
4	19.49	88.92			Pass
5	22.63	183.23			Pass
6	23.75	237.14			Pass
7	22.28	169.04			Pass
8	19.67	92.68			Pass
9	18.68	73.79			Pass

## 802.11VHT-20 MHz Mode:

Channel	Measured Output Peak Power		Limit		Verdict
	dBm	mW	dBm	mW	Verdici
1	19.39	86.90	- 30	1000	Pass
2	20.89	122.74			Pass
3	21.83	152.41			Pass
4	23.42	219.79			Pass
6	23.60	229.09			Pass
9	23.56	226.99			Pass
10	19.92	98.17			Pass
11	18.87	77.09			Pass

#### 802.11VHT-40 MHz Mode:

Channel	Measured Output Peak Power		Limit		Verdict
	dBm	mW	dBm	mW	Verdict
3	18.00	63.10	30	1000	Pass
4	19.59	90.99			Pass
5	23.13	205.59			Pass
6	23.57	227.51			Pass
7	21.68	147.23			Pass
8	19.66	92.47			Pass
9	18.43	69.66			Pass



# 802.11ax-20 MHz(SU) Mode:

Channel	Measured Output Peak Power		Limit		Verdict
Channel	dBm	mW	dBm	mW	Verdict
1	20.96	124.74			Pass
2	21.97	157.40			Pass
3	23.97	249.46			Pass
4	24.95	312.61	20	1000	Pass
6	25.18	329.61	30	1000	Pass
9	25.03	318.42	-		Pass
10	22.49	177.42			Pass
11	19.47	88.51			Pass

#### 802.11ax-40 MHz(SU) Mode:

Channel	Measured Output Peak Power		Limit		Verdict			
Channel	dBm	mW	dBm	mW	Verdict			
3	14.25	26.61						Pass
4	18.90	77.62			Pass			
5	20.67	116.68			Pass			
6	20.24	105.68	30	1000	Pass			
7	18.63	72.95			Pass			
8	17.39	54.83				Pass		
9	15.46	35.16			Pass			

## 802.11ax-20 MHz(RU26) Mode:

Channel	Measured Output Peak Power		Limit		Verdict
Channel	dBm	mW	dBm	mW	Verdici
1	17.55	56.89			Pass
2	17.76	59.70			Pass
3	17.86	61.09			Pass
6	17.67	58.48	30	1000	Pass
9	17.49	56.10			Pass
10	17.73	59.29			Pass
11	18.30	67.61			Pass

## 802.11ax-20 MHz(RU52) Mode:

Channel	Measured Output Peak Power		Limit		Verdict
Channel	dBm	mW	dBm	mW	verdict
1	20.58	114.29			Pass
2	20.70	117.49			Pass
3	20.70	117.49			Pass
6	20.95	124.45	30	1000	Pass
9	20.63	115.61			Pass
10	20.75	118.85			Pass
11	20.53	112.98			Pass



# 802.11ax-20 MHz(RU106) Mode:

Channel	Measured Output Peak Power		Limit		Verdict
Channel	dBm	mW	dBm	mW	Verdict
1	21.77	150.31			Pass
2	22.79	190.11			Pass
3	23.69	233.88			Pass
6	23.93	247.17	30	1000	Pass
9	23.79	239.33			Pass
10	23.17	207.49			Pass
11	20.30	107.15			Pass

# 802.11ax-40 MHz(RU26) Mode:

Channel	Measured Output Peak Power		Limit		Verdict
Channel	dBm	mW	dBm	mW	verdict
3	15.11	32.43			Pass
4	17.53	56.62			Pass
5	17.86	61.09			Pass
6	18.01	63.24	30	1000	Pass
7	16.81	47.97			Pass
8	17.52	56.49			Pass
9	16.14	41.11			Pass

# 802.11ax-40 MHz(RU52) Mode:

Channel	Measured Output Peak Power		Limit		Verdict
Channel	dBm	mW	dBm	mW	Verdici
3	15.15	32.73			Pass
4	19.55	90.16			Pass
5	20.55	113.50			Pass
6	20.81	120.50	30	1000	Pass
7	19.14	82.04			Pass
8	17.75	59.57	1		Pass
9	15.91	38.99			Pass

## 802.11ax-40 MHz(RU106) Mode:

Channel	Measured Output Peak Power		Limit		Verdict	
Channel	dBm	mW	dBm	mW	verdict	
3	14.97	31.41				Pass
4	19.61	91.41			Pass	
5	21.07	127.94			Pass	
6	20.65	116.14	30	1000	Pass	
7	19.21	83.37			Pass	
8	17.79	60.12			Pass	
9	15.78	37.84			Pass	



# 802.11ax-40 MHz(RU242) Mode:

Channel	Measured Output Peak Power		Limit		Verdict
Channel	dBm	mW	dBm	mW	verdict
3	14.08	25.59			Pass
4	18.84	76.56			Pass
5	20.43	110.41			Pass
6	19.91	97.95	30	1000	Pass
7	19.21	83.37			Pass
8	17.37	54.58			Pass
9	15.42	34.83			Pass



# Average Power Test Data

## 802.11b Mode:

Channel	Measured Output Average Power		Limit		Verdict
Channel	dBm	mW	dBm	mW	verdict
1	12.44	17.54			Pass
6	12.57	18.07	30	1000	Pass
11	12.75	18.84			Pass

## 802.11g Mode:

Channel	Measured Output Average Power		Limit		Verdict
Channel	dBm	mW	dBm	mW	verdict
1	12.14	16.37			Pass
2	13.77	23.82			Pass
3	14.57	28.64			Pass
4	15.63	36.56	30	1000	Pass
6	15.85	38.46	30	1000	Pass
9	15.76	37.67			Pass
10	13.62	23.01	1		Pass
11	12.03	15.96			Pass

#### 802.11n-20 MHz Mode:

Channel	Measured Output Average Power		Limit		Verdict				
Channel	dBm	mW	dBm	mW	Verdict				
1	11.73	14.89			Pass				
2	13.34	21.58							Pass
3	13.90	24.55			Pass				
4	15.48	35.32	- 30 100	1000	Pass				
6	15.69	37.07	30	1000	Pass				
9	15.56	35.97			Pass				
10	13.41	21.93				Pass			
11	10.94	12.42			Pass				

## 802.11n-40 MHz Mode:

Channel	Measured Output Average Power		Limit		Verdict
Channel	dBm	mW	dBm	mW	Verdict
3	10.22	10.52			Pass
4	10.78	11.97			Pass
5	14.54	28.44			Pass
6	15.76	37.67	30	1000	Pass
7	14.31	26.98			Pass
8	11.80	15.14			Pass
9	10.70	11.75			Pass



## 802.11VHT-20 MHz Mode:

Channel	Measured Output Average Power		Limit		Verdict
Channel	dBm	mW	dBm	mW	Verdict
1	11.30	13.49			Pass
2	12.82	19.14			Pass
3	13.81	24.04			Pass
4	15.34	34.20	20	1000	Pass
6	15.54	35.81	30	1000	Pass
9	14.47	27.99			Pass
10	11.90	15.49			Pass
11	10.75	11.89			Pass

#### 802.11VHT-40 MHz Mode:

Channel	Measured Output Average Power		Limit		Verdict
Channel	dBm	mW	dBm	mW	Verdici
3	10.08	10.19			Pass
4	11.74	14.93			Pass
5	15.23	33.34			Pass
6	15.78	37.84	30	1000	Pass
7	13.87	24.38			Pass
8	11.73	14.89			Pass
9	10.23	10.54			Pass

# 802.11ax-20 MHz(SU) Mode:

Channel	Measured Outp	ut Average Power	Limit		Verdict
Channel	dBm	mW	dBm	mW	Verdict
1	11.55	14.29			Pass
2	12.46	17.62			Pass
3	14.45	27.86			Pass
4	15.50	35.48	30	1000	Pass
6	15.58	36.14	30	1000	Pass
9	15.64	36.64			Pass
10	13.04	20.14			Pass
11	10.19	10.45			Pass

# 802.11ax-40 MHz(SU) Mode:

Channel	Measured Output Average Power		Limit		Verdict
Channel	dBm	mW	dBm	mW	verdict
3	5.29	3.38			Pass
4	9.78	9.51			Pass
5	11.40	13.80			Pass
6	10.96	12.47	30	1000	Pass
7	9.44	8.79			Pass
8	8.24	6.67			Pass
9	6.20	4.17			Pass



# 802.11ax-20 MHz(RU26) Mode:

Channel	Measured Output Average Power		Limit		Verdict
Channel	dBm	mW	dBm	mW	Verdict
1	7.66	5.83			Pass
2	7.73	5.93			Pass
3	7.53	5.66			Pass
6	7.73	5.93	30	1000	Pass
9	7.66	5.83			Pass
10	7.61	5.77			Pass
11	7.72	5.92			Pass

# 802.11ax-20 MHz(RU52) Mode:

Channel	Measured Output Average Power		Limit		Verdict
Channel	dBm	mW	dBm	mW	Verdici
1	10.49	11.19			Pass
2	10.58	11.43			Pass
3	10.65	11.61			Pass
6	10.80	12.02	30	1000	Pass
9	10.44	11.07			Pass
10	10.48	11.17			Pass
11	10.30	10.72			Pass

# 802.11ax-20 MHz(RU106) Mode:

Channel	Measured Output Average Power		Limit		Verdict
Channel	dBm	mW	dBm	mW	verdict
1	11.55	14.29			Pass
2	12.61	18.24			Pass
3	13.56	22.70			Pass
6	13.71	23.50	30	1000	Pass
9	13.54	22.59			Pass
10	12.91	19.54			Pass
11	10.33	10.79			Pass

## 802.11ax-40 MHz(RU26) Mode:

Channel	Measured Output Average Power		Limit		Verdict
Channel	dBm	mW	dBm	mW	Verdici
3	4.97	3.14			Pass
4	7.63	5.79			Pass
5	7.56	5.70			Pass
6	7.69	5.87	30	1000	Pass
7	7.62	5.78			Pass
8	7.52	5.65			Pass
9	6.25	4.22			Pass



# 802.11ax-40 MHz(RU52) Mode:

Channel	Measured Output Average Power		Limit		Verdict
Channel	dBm	mW	dBm	mW	Verdict
3	5.19	3.30			Pass
4	9.45	8.81			Pass
5	10.54	11.32			Pass
6	10.90	12.30	30	1000	Pass
7	9.44	8.79			Pass
8	7.92	6.19			Pass
9	6.27	4.24			Pass

# 802.11ax-40 MHz(RU106) Mode:

Channel	Measured Output Average Power		Limit		Verdict
Channel	dBm	mW	dBm	mW	Verdici
3	5.14	3.27			Pass
4	9.47	8.85			Pass
5	11.00	12.59			Pass
6	10.64	11.59	30	1000	Pass
7	9.53	8.97		Pa	Pass
8	7.97	6.27			Pass
9	6.16	4.13			Pass

# 802.11ax-40 MHz(RU242) Mode:

Channel	Measured Output Average Power		Limit		Verdict					
Channel	dBm	mW	dBm	mW	verdict					
3	4.85	3.05								Pass
4	9.25	8.41			Pass					
5	10.91	12.33			Pass					
6	10.26	10.62	30	1000	Pass					
7	9.69	9.31			Pass					
8	7.93	6.21				Pass				
9	6.06	4.04			Pass					



# A.2 Bandwidth

## Test Data

## 802.11b Mode:

Channel	6 dB Bandwidth (MHz)	99% Bandwidth (MHz)	6 dB Bandwidth Limits (kHz)
1	8.100000	12.776000	≥500
6	8.150000	12.802000	≥500
11	8.100000	12.928000	≥500

# 802.11g Mode:

Channel	6 dB Bandwidth (MHz)	99% Bandwidth (MHz)	6 dB Bandwidth Limits (kHz)
1	15.400000	18.159000	≥500
6	15.800000	18.038000	≥500
11	16.150000	18.460000	≥500

## 802.11n-20MHz Mode:

Channel	6 dB Bandwidth (MHz)	99% Bandwidth (MHz)	6 dB Bandwidth Limits (kHz)
1	15.500000	19.234000	≥500
6	17.100000	19.324000	≥500
11	17.200000	19.551000	≥500

## 802.11n-40MHz Mode:

Channel	6 dB Bandwidth (MHz)	99% Bandwidth (MHz)	6 dB Bandwidth Limits (kHz)
3	35.200000	36.065000	≥500
6	35.200000	36.079000	≥500
9	35.200000	36.048000	≥500

## 802.11VHT-20MHz Mode:

Channel	6 dB Bandwidth (MHz)	99% Bandwidth (MHz)	6 dB Bandwidth Limits (kHz)
1	15.150000	19.021000	≥500
6	15.500000	19.224000	≥500
11	16.500000	19.604000	≥500

## 802.11VHT-40MHz Mode:

Channel	6 dB Bandwidth (MHz)	99% Bandwidth (MHz)	6 dB Bandwidth Limits (kHz)
3	35.200000	36.055000	≥500
6	35.150000	36.062000	≥500
9	35.100000	36.069000	≥500



# 802.11ax-20MHz(SU) Mode:

Channel	6 dB Bandwidth (MHz)	99% Bandwidth (MHz)	6 dB Bandwidth Limits (kHz)
1	18.050000	19.129000	≥500
6	18.700000	19.177000	≥500
11	18.850000	19.339000	≥500

# 802.11ax-40MHz(SU) Mode:

Channel	6 dB Bandwidth 99% Bandwidth		6 dB Bandwidth	
Channel	(MHz)	(MHz)	Limits (kHz)	
3	36.350000	37.603000	≥500	
6	35.200000	37.529000	≥500	
9	35.200000	37.699000	≥500	



## Test plots

#### 6 dB Bandwidth



## 802.11b 6 CHANNEL



#### 802.11b 11 CHANNEL



#### 802.11g 1 CHANNEL



#### 802.11g 6 CHANNEL





# 802.11g 11 CHANNEL



#### 802.11n-20 MHz 1 CHANNEL



#### 802.11n-20 MHz 11 CHANNEL



## 802.11n-20 MHz 6 CHANNEL

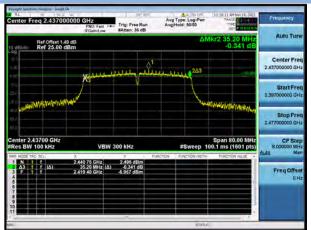




#### 802.11n-40 MHz 3 CHANNEL



#### 802.11n-40 MHz 6 CHANNEI



#### 802.11n-40 MHz 9 CHANNEL



#### 802.11VHT-20 MHz 1 CHANNEL



#### 802.11VHT-20 MHz 6 CHANNE

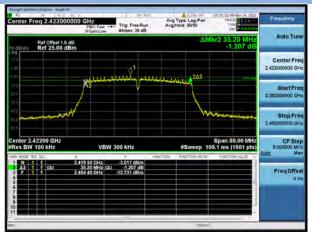




#### 802.11VHT-20 MHz 11 CHANNEL



#### 802.11VHT-40 MHz 3 CHANNEL



#### 802.11VHT-40 MHz 9 CHANNEL

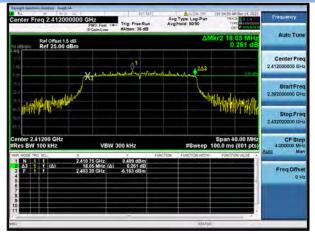


## 802.11VHT-40 MHz 6 CHANNEL

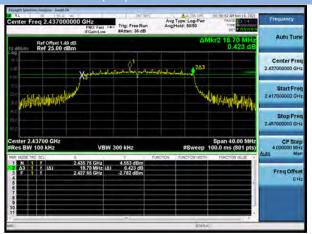




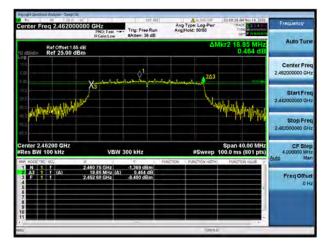
#### 802.11ax-20 MHz(SU) 1 CHANNEI



#### 302.11ax-20 MHz(SU) 6 CHANNE



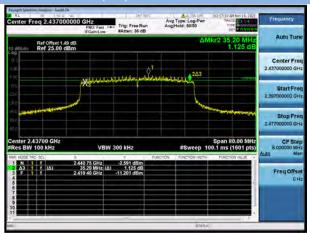
## 802.11ax-20 MHz(SU) 11 CHANNEL



## 802.11ax-40 MHz(SU) 3 CHANNEL



#### 802.11ax-40 MHz(SU) 6 CHANNEL





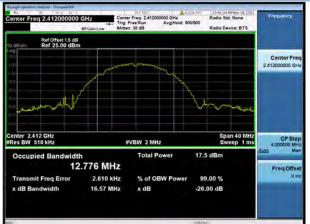
# 802.11ax-40 MHz(SU) 9 CHANNEL





#### 99% Bandwidth





#### 802.11b 6 CHANNEL



#### 802.11b 11 CHANNEL



#### 802.11g 1 CHANNEL



## 802.11g 6 CHANNEL





# 802.11g 11 CHANNEL



#### 802.11n-20 MHz 1 CHANNEL



#### 802.11n-20 MHz 11 CHANNEL



#### 802.11n-20 MHz 6 CHANNEL





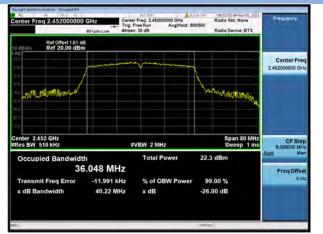
#### 802.11n-40 MHz 3 CHANNEL



#### 302.11n-40 MHz 6 CHANNEL



#### 802.11n-40 MHz 9 CHANNEL



#### 802.11VHT-20 MHz 1 CHANNEL



#### 802.11VHT-20 MHz 6 CHANNE





#### 802.11VHT-20 MHz 11 CHANNEL



#### 802.11VHT-40 MHz 3 CHANNEL



#### 802.11VHT-40 MHz 9 CHANNEL

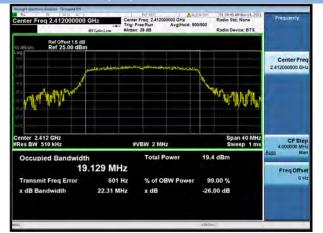


#### 802.11VHT-40 MHz 6 CHANNEL





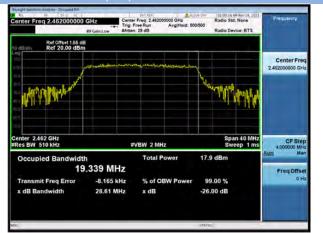
#### 802.11ax-20 MHz(SU) 1 CHANNEI



#### 302.11ax-20 MHz(SU) 6 CHANNE



#### 802.11ax-20 MHz(SU) 11 CHANNEL



#### 802.11ax-40 MHz(SU) 3 CHANNEI



#### 802.11ax-40 MHz(SU) 6 CHANNE





# 802.11ax-40 MHz(SU) 9 CHANNEL





# A.3 Conducted Spurious Emissions

# Test Data

## 802.11b Mode:

Ma	Measured Max. Out of	Limit (dBm)		
Channel	Band Emission (dBm)	Carrier Level	Calculated 20 dBc Limit	Verdict
1	-49.31	7.05	-12.95	Pass
6	-49.32	7.35	-12.65	Pass
11	-47.87	6.59	-13.41	Pass

# 802.11g Mode:

	Measured Max. Out of	Limit (	dBm)	
Channel	Band Emission (dBm)	Carrier Level	Calculated 20 dBc Limit	Verdict
1	-49.58	2.08	-17.92	Pass
2	-48.51	3.63	-16.37	Pass
3	-49.05	4.64	-15.36	Pass
4	-48.70	5.68	-14.32	Pass
6	-48.18	5.83	-14.17	Pass
9	-46.21	5.94	-14.06	Pass
10	-48.35	3.57	-16.43	Pass
11	-47.93	1.85	-18.15	Pass

## 802.11n-20MHz Mode:

	Manaurad Max, Out of	Limit (	dBm)	
Channel	Measured Max. Out of Band Emission (dBm)	Carrier Level	Calculated 20 dBc Limit	Verdict
1	-48.49	2.09	-17.91	Pass
2	-48.45	3.49	-16.51	Pass
3	-48.72	4.14	-15.86	Pass
4	-47.15	5.55	-14.45	Pass
6	-48.50	5.37	-14.63	Pass
9	-48.41	5.77	-14.23	Pass
10	-48.43	3.50	-16.50	Pass
11	-48.93	0.69	-19.31	Pass



## 802.11n-40MHz Mode:

	Measured Max. Out of	Limit (	dBm)	
Channel	Band Emission (dBm)	Carrier Level	Calculated 20 dBc Limit	Verdict
3	-48.49	-2.80	-22.80	Pass
4	-48.19	-1.37	-21.37	Pass
5	-48.38	1.76	-18.24	Pass
6	-48.78	2.72	-17.28	Pass
7	-48.46	1.24	-18.76	Pass
8	-48.49	-0.95	-20.95	Pass
9	-48.23	-1.84	-21.84	Pass

#### 802.11VHT-20MHz Mode:

	Measured Max. Out of	Limit (	dBm)	
Channel	Band Emission (dBm)	Carrier Level	Calculated 20 dBc Limit	Verdict
1	-48.43	1.48	-18.52	Pass
2	-46.49	3.03	-16.97	Pass
3	-47.36	4.03	-15.97	Pass
4	-46.36	5.54	-14.46	Pass
6	-47.44	5.66	-14.34	Pass
9	-47.66	5.87	-14.13	Pass
10	-48.16	1.91	-18.09	Pass
11	-46.78	0.55	-19.45	Pass

## 802.11VHT-40MHz Mode:

	Measured Max. Out of	Limit (		
Channel	Band Emission (dBm)	Carrier Level	Calculated 20 dBc Limit	Verdict
3	-48.12	-2.96	-22.96	Pass
4	-48.79	-1.41	-21.41	Pass
5	-47.69	2.20	-17.80	Pass
6	-48.41	2.72	-17.28	Pass
7	-45.69	0.61	-19.39	Pass
8	-48.11	-1.53	-21.53	Pass
9	-47.98	-1.89	-21.89	Pass



# 802.11ax-20MHz(SU) Mode:

	Measured Max. Out of	Limit (		
Channel	Band Emission (dBm)	Carrier Level	Calculated 20 dBc Limit	Verdict
1	-47.52	0.99	-19.01	Pass
2	-48.30	2.00	-18.00	Pass
3	-48.36	3.39	-16.61	Pass
4	-47.60	4.90	-15.10	Pass
6	-47.98	5.25	-14.75	Pass
9	-47.65	5.21	-14.79	Pass
10	-49.05	1.81	-18.19	Pass
11	-48.83	-0.96	-20.96	Pass

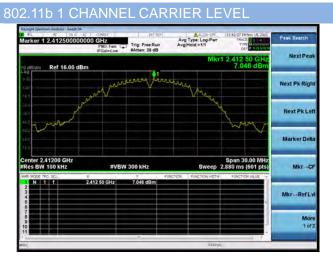
# 802.11ax-40MHz(SU) Mode:

	Measured Max. Out of	Limit (		
Channel	Band Emission (dBm)	Carrier Level	Calculated 20 dBc Limit	Verdict
3	-48.36	-8.33	-28.33	Pass
4	-48.40	-3.95	-23.95	Pass
5	-47.65	-2.10	-22.10	Pass
6	-48.24	-2.30	-22.30	Pass
7	-48.53	-3.95	-23.95	Pass
8	-47.33	-4.78	-24.78	Pass
9	-46.42	-6.30	-26.30	Pass



10:43:10 #1416: 18, 2021

#### Test Plots



## 802.11b 1 CHANNEL, SPURIOUS 30 MHz ~ 3 GHz 802.11b 1 CHANNEL, SPURIOUS 2 GHz ~ 25 GHz

Reyayta Spectrum Analyzer - Swept

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× 2.688.2 GHz	-58.333 dBm	NCTON FUNCTION WOTH	PUNCTION VALUE	Properties
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# 802.11b 6 CHANNEL CARRIER LEVEL





#### 802.11b 6 CHANNEL, SPURIOUS 30 MHz ~ 3 GHz

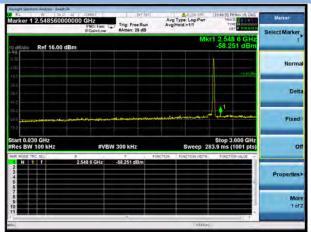
sr 1 2.66736000000 GHz PNO: Fest Cart Atten: 20 dB Avg Type: Log-Pwr Avg(Hold.>1/1 Marke TRACE DO LO Select Marker dkr1 2.667 4 G Ref 16.00 dBm Norm Delt Fixed Stop 3.000 GHz Sweep 283.9 ms (1001 pts) Start 0.030 GHz Res BW 100 kHz #VBW 300 kHz 01 2.667 4 GHz Prop Mor 1 of



## 802.11b 11 CHANNEL CARRIER LEVEL



#### 802.11b 11 CHANNEL, SPURIOUS 30 MHz ~ 3 GHz 802.11b 11 CHANNEL, SPURIOUS 2 GHz ~ 25 GHz







# 802.11g 1 CHANNEL CARRIER LEVEL



## 802.11g 1 CHANNEL, SPURIOUS 30 MHz ~ 3 GHz 802.11g 1 CHANNEL, SPURIOUS 2 GHz ~ 25 GHz

Reyoutes

Marker	10:50:30 PH New 18, 2021 TRACE 12:20 4 4 10 TYPE MANY
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Z man trig: Free Run Avg Type: Log-Per maca AvgHeld:511 MKr1 2:631 MKr1 2:63	Z Trig: Free Run RAtten: 28 dB Arg Type: (op-Per Argiteid.svi) Mite Will Argentiation (Statement Will A

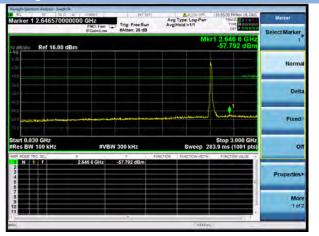
Peak Search		e: Log-Pwr		e Run 6 dB	10000	GHz PNO: Fast C FGain:Low	000000	53250	21.1	12	arker
Next Peak	49.582 dBm	Mkr1 2						16.00	Ref	W	dBJdi
Next Pk Righ											69
Next Pk Lef	4 <sup>1</sup>										10
Marker Delta	Junio and		-	~~~				and states	÷.	-	10 10
MkrC	Stop 25.00 GHz 198 s (4001 pts)		NCTION TR		/ 300 kHz	#VBI	×		100	SW 1	art 2. tes B
Mkr-Ref Lv					-49,582 d	25 GHz				1	
										t	
More 1 of 3											

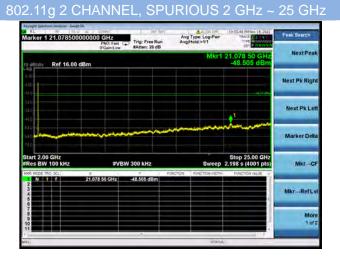
# 802.11g 2 CHANNEL CARRIER LEVEL





802.11g 2 CHANNEL, SPURIOUS 30 MHz ~ 3 GHz

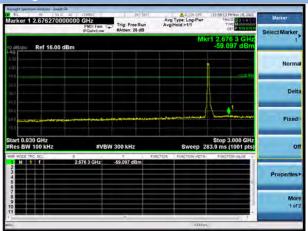




## 802.11g 3 CHANNEL CARRIER LEVEL



#### 802.11g 3 CHANNEL, SPURIOUS 30 MHz ~ 3 GHz 802.11g 3 CHANNEL, SPURIOUS 2 GHz ~ 25 GHz







# 802.11g 4 CHANNEL CARRIER LEVEL



#### 802.11g 4 CHANNEL, SPURIOUS 30 MHz ~ 3 GHz 802.11g 4 CHANNEL, SPURIOUS 2 GHz ~ 25 GHz

arker 1 2.66736000	0000 GHz PNO: Fast	Trig: Free Run	Avg Type: Log-Pwr Avg/Hold>1/1	112(07292040er 18,2021 TRACE 1921	Marker
	IFGaintLow	#Atten: 26 dB		OUT P PINING A	Select Marker
o dBraw Ref 16.00 d	Bm		Mk	-58.688 dBm	
-00 6-00 6-00 6-00					Norma
440 244 440					Deita
543) 140			لنعينين ستحجيمهم	- Internet	Fixed
Start 0.030 GHz Res BW 100 kHz	x	300 kHz		Stop 3.000 GHz 83.9 ms (1001 pts)	or
	2.667 4 GHz	-58.688 dBm			Properties
9 7 8 9 10					More 1 of:
			STATUS	11.5	14 A

Peak Search	100-50 EH fen 18, 2021 TRACZ DE CONT TIPE AND OUT PROVINSION	Type: Log-Pwr Hold > 1/1	Av		0000000 GHz PN0: Fast IFGaint.ow	2.061750	12		R Mar
Next Peak	-48.697 dBm	Mikr1 :			dBm	Ref 16.00		BJdiv	0 di
Next Pk Righ	4122							ī	8 00 8 00 8 00 8 00
Next Pk Le									
Marker Delt	-						-		
MkrC	Stop 25.00 GHz 198 s (4001 pts)			W 300 kHz		DO KHZ		s Bl	Re
Mkr-+Ref L	PUNCTION VALUE	PUNCTION WOTH	FUNCTION		22.061 75 GHz	SCL   .		N	20346
Mor 1 of									678910
								_	22.

# 802.11g 6 CHANNEL CARRIER LEVEL





#### 802.11g 6 CHANNEL, SPURIOUS 30 MHz ~ 3 GHz

 
 Space
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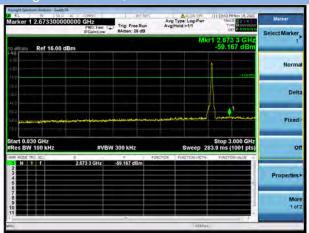
 er 1 2.65822100000000 GHz
 PN0: Fast Car
 Trig: Free Run Adten: 26 dB
 Marke Avg Type: Log-Pwr Avg Hold > 1/1 TRACE DO LA COL TRACE DO LA COL TIPE MUNICIPALITY Select Marker 4kr1 2.682 2 G -57.368 d Ref 16.00 dBm Norm Delt Fixed Stop 3.000 GHz Sweep 283.9 ms (1001 pts) Start 0.030 GHz Res BW 100 kHz #VBW 300 kHz 01 2 682 2 GHz -57 36 Prop Mon



## 802.11g 9 CHANNEL CARRIER LEVEL



#### 802.11g 9 CHANNEL, SPURIOUS 30 MHz ~ 3 GHz 802.11g 9 CHANNEL, SPURIOUS 2 GHz ~ 25 GHz





## 66 / 272



# 802.11g 10 CHANNEL CARRIER LEVEL



# 802.11g 10 CHANNEL, SPURIOUS 30 MHz ~ 3 GHz 802.11g 10 CHANNEL, SPURIOUS 2 GHz ~ 25 GHz

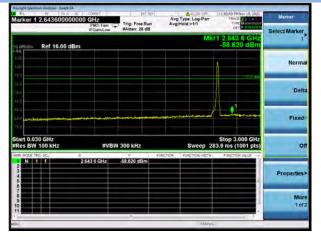
Marker 1 2.65251000	0000 GHz PNO Fast	Trig: Free Run	Avg Type: Log-Pwr Avg/Hold:>1/1	11:16:21 PH No. 18, 2021 TRACE 12:24 4 TUPE MUSIC	Mariner
	IFGain:Low	#Atten: 26 dB			Select Marker,
to dBraw Ref 16.00 d	Bm		MA.	r1 2.652 5 GHz -57.873 dBm	1
4.00				1	Norma
22 () 22 () -31 () -31 ()					Deita
541) 541) 540		ijana dining mahain		1. <b>•</b>	Fixed
Start 0.030 GHz #Res BW 100 kHz		W 300 kHz		Stop 3.000 GHz 83.9 ms (1001 pts)	or
HORE THE SEL	2.852.5 GHz	-57.873 dBm	UNCTION PUNCTION W07H	PUNCTION VALUE	Properties
6 7 8 9 10					Mon 1 of 3
1			STÁTU	11.4	10 - 10 - 10 - 10 - 10 - 10 - 10 - 10 -

Peak Search	11116 52 PH Nov 18, 2021 THACE 10 14 1 THE MUSICINE OCT P HIM NOV	Avg Type: Log-Pwr Avg Hold.>1/1	Trig: Free Run #Atten: 26 dB	00000 GHz PN0: Fast C	21.0842500	Warker 1
Next Pea	21.084 25 GHz -48.352 dBm	Mkr1		Bm	Ref 16.00 d	to aBraiv
Next Pk Righ						4.00
Next Pk Le	<u>_1</u>					34.0 34.0
Marker Delt	· ····································				-	543 <b></b>
MkrC	Stop 25.00 GHz 2.198 s (4001 pts)	Sweep	300 kHz	#VBI	100 kHz	Start 2.00 Res BW
MkrRefL			48.352 dBm	21.084 25 GHz	1 (/	
Mor 1 of						6 7 8 9 10
	11.5	STÂRUS				+ ma]

# 802.11g 11 CHANNEL CARRIER LEVEL



#### 802.11g 11 CHANNEL, SPURIOUS 30 MHz ~ 3 GHz 802.11g 11 CHANNEL, SPURIOUS 2 GHz ~ 25 GHz

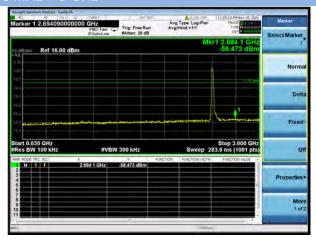




## 802.11n-20MHz 1 CHANNEL CARRIER LEVEL



# 802.11n-20MHz 1 CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



# 802.11n-20MHz 1 CHANNEL, SPURIOUS

2 GHz ~ 25 GHz

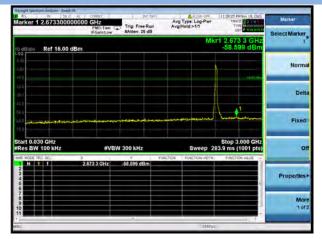




#### 802.11n-20MHz 2 CHANNEL CARRIER LEVE



## 802.11n-20MHz 2 CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



## 802.11n-20MHz 3 CHANNEL CARRIER LEVEL

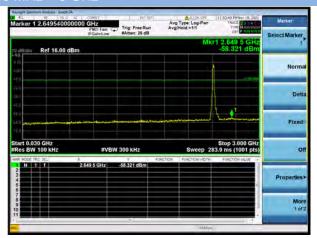


# 802.11n-20MHz 2 CHANNEL, SPURIOUS 2 GHz ~ 25 GHz





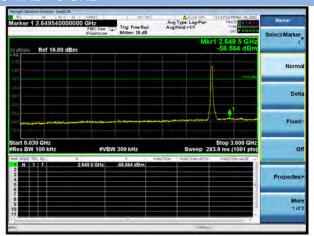
## 802.11n-20MHz 3 CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



#### 802.11n-20MHz 4 CHANNEL CARRIER LEVE

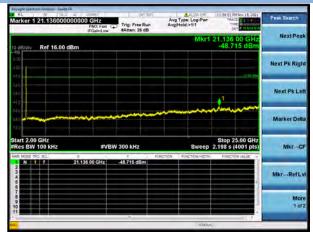


## 802.11n-20MHz 4 CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



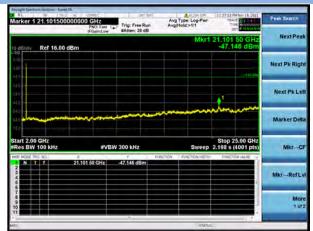
#### 802.11n-20MHz 3 CHANNEL, SPURIOUS

## 2 GHz ~ 25 GHz



# 802.11n-20MHz 4 CHANNEL, SPURIOUS

2 GHz ~ 25 GHz

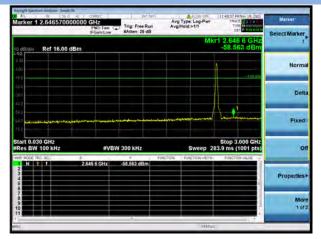




#### 802.11n-20MHz 6 CHANNEL CARRIER LEVE



## 802.11n-20MHz 6 CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



## 802.11n-20MHz 9 CHANNEL CARRIER LEVEL

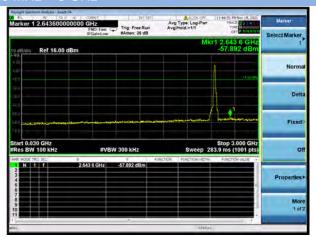


#### 802.11n-20MHz 6 CHANNEL, SPURIOUS 2 GHz ~ 25 GHz

Marker 1 21.12450000	PNO: Fast Trig: Free Run	Avg Type: Log-Pwr Avg(Hold:>1/1	1114100 FM Nov 18, 2021 TRACE 1 2 2 4 000 TYPE MORE AND A	Peak Search
g dBldw Ref 16.00 dBm 48.504 dBm				Next Peak
-99 8-00 -4.00			120	Next Pk Righ
120 220 340 410				Next Pk Lef
543 940 740			muna	Marker Delta
Start 2.00 GHz Res BW 100 kHz	#VBW 300 kHz	Sweep	Stop 25.00 GHz 2.198 s (4001 pts)	MkrCr
N 1 7 7	21.124 50 GHz -48.504 dBm			Mkr-+RefLv
6 7 8 9 10				More 1 of 3



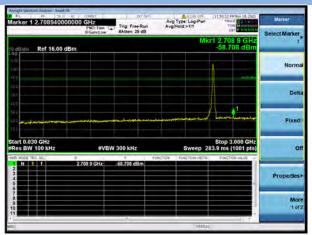
## 802.11n-20MHz 9 CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



#### 802.11n-20MHz 10 CHANNEL CARRIER LEVE



# 802.11n-20MHz 10 CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



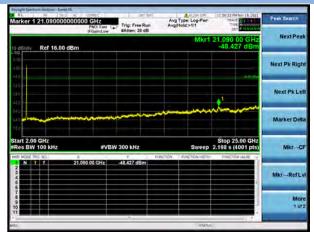
#### 802.11n-20MHz 9 CHANNEL, SPURIOUS

## 2 GHz ~ 25 GHz



# 802.11n-20MHz 10 CHANNEL, SPURIOUS

2 GHz ~ 25 GHz

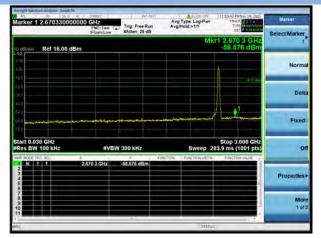




#### 802.11n-20MHz 11 CHANNEL CARRIER LEVEL



## 802.11n-20MHz 11 CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



## 802.11n-40MHz 3 CHANNEL CARRIER LEVEL

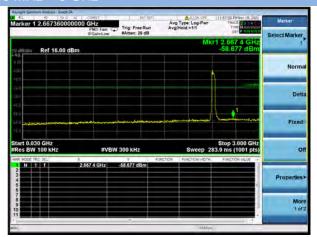


### 802.11n-20MHz 11 CHANNEL, SPURIOUS 2 GHz ~ 25 GHz





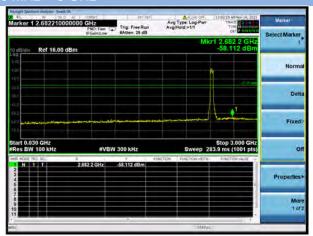
## 802.11n-40MHz 3 CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



#### 802.11n-40MHz 4 CHANNEL CARRIER LEVE

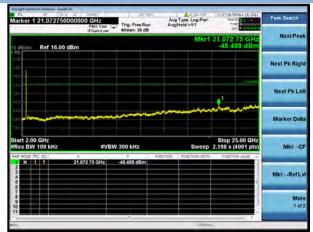


## 802.11n-40MHz 4 CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



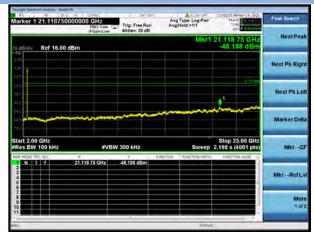
#### 802.11n-40MHz 3 CHANNEL, SPURIOUS

## 2 GHz ~ 25 GHz



## 802.11n-40MHz 4 CHANNEL, SPURIOUS

2 GHz ~ 25 GHz

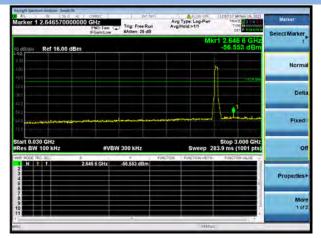




#### 802.11n-40MHz 5 CHANNEL CARRIER LEVE



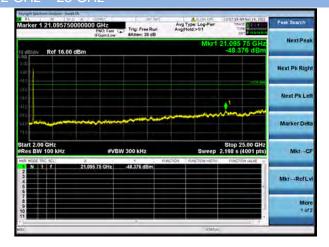
## 802.11n-40MHz 5 CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



## 802.11n-40MHz 6 CHANNEL CARRIER LEVEL

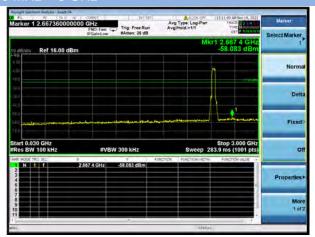


### 802.11n-40MHz 5 CHANNEL, SPURIOUS 2 GHz ~ 25 GHz





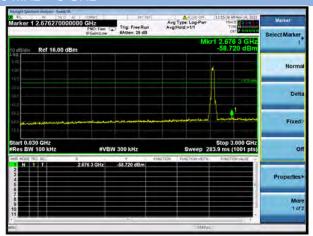
## 802.11n-40MHz 6 CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



#### 802.11n-40MHz 7 CHANNEL CARRIER LEVE

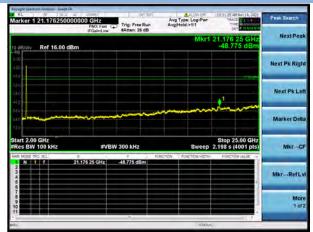


## 802.11n-40MHz 7 CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



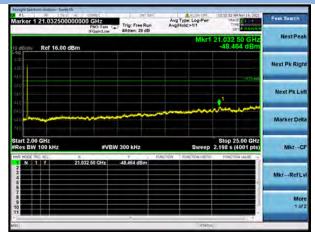
#### 802.11n-40MHz 6 CHANNEL, SPURIOUS

## 2 GHz ~ 25 GHz



## 802.11n-40MHz 7 CHANNEL, SPURIOUS

2 GHz ~ 25 GHz

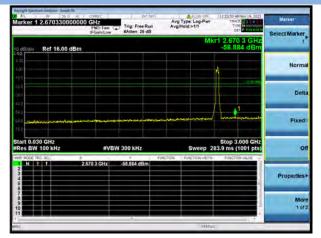




#### 802.11n-40MHz 8 CHANNEL CARRIER LEVE



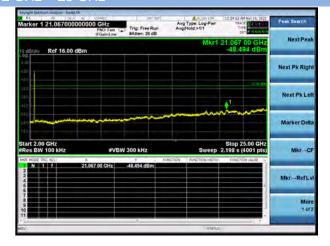
## 802.11n-40MHz 8 CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



## 802.11n-40MHz 9 CHANNEL CARRIER LEVEL

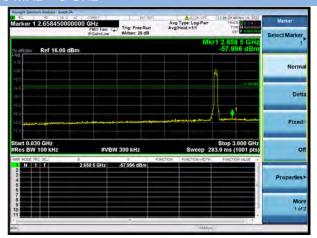


### 802.11n-40MHz 8 CHANNEL, SPURIOUS 2 GHz ~ 25 GHz





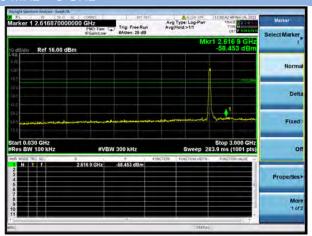
## 802.11n-40MHz 9 CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



#### 802.11VHT-20MHz 1 CHANNEL CARRIER LEVEI



## 802.11VHT-20MHz 1 CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



#### 802.11n-40MHz 9 CHANNEL, SPURIOUS

## 2 GHz ~ 25 GHz



## 802.11VHT-20MHz 1 CHANNEL, SPURIOUS

2 GHz ~ 25 GHz

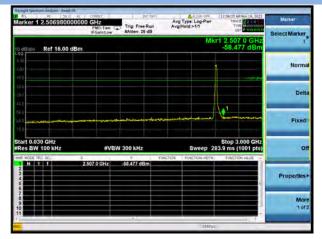




#### 802.11VHT-20MHz 2 CHANNEL CARRIER LEVEL



## 802.11VHT-20MHz 2 CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



#### 802.11VHT-20MHz 3 CHANNEL CARRIER LEVEL

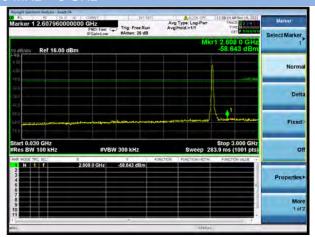


### 802.11VHT-20MHz 2 CHANNEL, SPURIOUS 2 GHz ~ 25 GHz

Peak Search Next Peak	12:35:03 4H Nov 19, 3021 TRACE 03 4 4 TYPE M	Avg Type: Log-Pwr Avg[Hold:>1/1	Trig: Free Run #Atten: 26 dB	DOODO GHZ PNO: Fast C IEGaint.cm	1 24.62625000	Marker 1
	19 etsaw, Ref 16.00 dBm - 46.490 dBm - 46.490 dBm					
Next Pk Righ						8-00 -4.00
Next Pk Lef						320 320 
Marker Delta	· ····································		and the second	نې د د د د د د د د د د د د د د د د د د د		549 549 760
Mkr-CF	Stop 25.00 GHz 2.198 s (4001 pts)		300 kHz	#VBV	/ 100 kHz	Start 2.00 #Res BW
Mkr-+RefLv			46,490 dBm	24.626 25 GHz		N 1 2345
More 1 of 3						6 7 8 9 10
	10	STATUL				A Landa



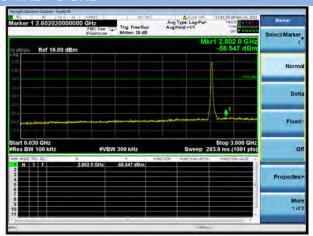
## 802.11VHT-20MHz 3 CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



#### 802.11VHT-20MHz 4 CHANNEL CARRIER LEVE



## 802.11VHT-20MHz 4 CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



### 802.11VHT-20MHz 3 CHANNEL, SPURIOUS

## 2 GHz ~ 25 GHz



## 802.11VHT-20MHz 4 CHANNEL, SPURIOUS

2 GHz ~ 25 GHz

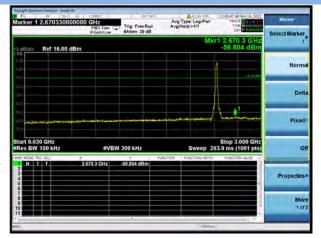




#### 802.11VHT-20MHz 6 CHANNEL CARRIER LEVEL



## 802.11VHT-20MHz 6 CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



#### 802.11VHT-20MHz 9 CHANNEL CARRIER LEVEL

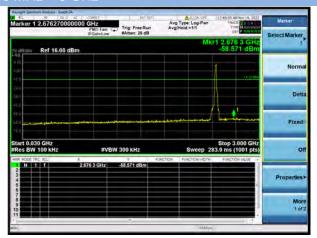


## 802.11VHT-20MHz 6 CHANNEL, SPURIOUS 2 GHz ~ 25 GHz

Marker 1 21.09575000	CONVECTOR	Avg Type: Log-Pwr Avg/Hold.>1/1	12-49.13 AH Nov 19, 3021 TRACE 13 C 4 4 TYPE MINIMUM	Peak Search	
yo dBraw Ref 16.00 dBm -47.438 dBm					
- 09. 8-03 - 4.00				Next PK Righ	
140 240 310 410				Next Pk Lef	
540 940 740	and the second s		· ······	Marker Delta	
Start 2.00 GHz #Res BW 100 kHz	#VBW 300 kHz	Sweep	Stop 25.00 GHz 2.198 s (4001 pts)	Mkr-CF	
N 1 F	21.095 75 GHz -47.438 dBm			Mkr-+RefLv	
6 7 8 9 10				More 1 of 3	
t (ma)		STÁPLE	1.1		



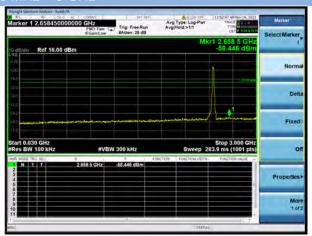
## 802.11VHT-20MHz 9 CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



#### 802.11VHT-20MHz 10 CHANNEL CARRIER LEVEL



## 802.11VHT-20MHz 10 CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



#### 802.11VHT-20MHz 9 CHANNEL, SPURIOUS

## 2 GHz ~ 25 GHz



## 802.11VHT-20MHz 10 CHANNEL, SPURIOUS

2 GHz ~ 25 GHz

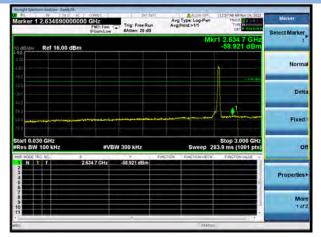




#### 802.11VHT-20MHz 11 CHANNEL CARRIER LEVEL



## 802.11VHT-20MHz 11 CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



## 802.11VHT-40MHz 3 CHANNEL CARRIER LEVEL

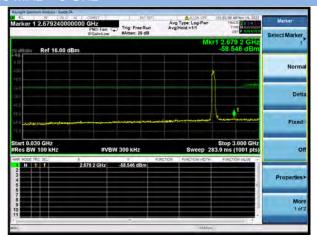


## 802.11VHT-20MHz 11 CHANNEL, SPURIOUS 2 GHz ~ 25 GHz

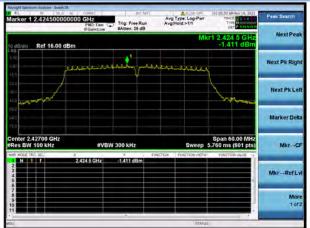
Marker 1 24.60900000	00000 GHz PN0: Fast C IFGaint.ow	Trig: Free Run #Atten: 26 dB	Avg Type: Log-Pwr Avg[Hold,>1/1	112:58:11 AH Nov 19, 3021 TRACE 12 45 45 TIPE ALL CONTRACTOR	Peak Search Next Peak
Mkr1 24.609 00 GHz 0 dB3dw Ref 16.00 dBm -46.783 dBm					
-4.00					Next Pk Right
440				and de la	Next Pk Lef
540 110 740	and the states		munn	manut	Marker Delta
Start 2.00 GHz #Res BW 100 kHz	#VBI	N 300 kHz		Stop 25.00 GHz 2.198 s (4001 pts)	MkrCF
	24.609 00 GHz	-46.783 dBm	ACTOR FORCION WORK	FORCIDAR VALUE	
3 4 5					Mkr-+Ref Lv
3 4					Mkr-+RefLv More 1 of 3



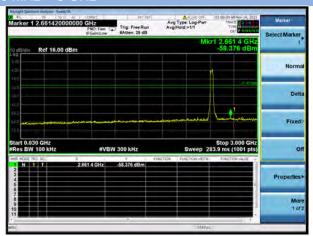
## 802.11VHT-40MHz 3 CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



#### 802.11VHT-40MHz 4 CHANNEL CARRIER LEVEI



## 802.11VHT-40MHz 4 CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



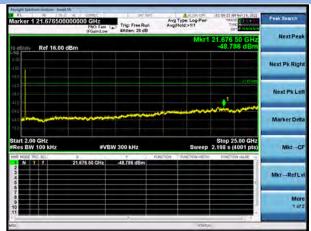
### 802.11VHT-40MHz 3 CHANNEL, SPURIOUS

## 2 GHz ~ 25 GHz



## 802.11VHT-40MHz 4 CHANNEL, SPURIOUS

2 GHz ~ 25 GHz

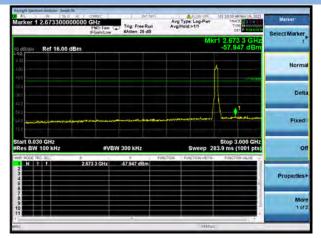




## 802.11VHT-40MHz 5 CHANNEL CARRIER LEVEL



## 802.11VHT-40MHz 5 CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



#### 802.11VHT-40MHz 6 CHANNEL CARRIER LEVEL

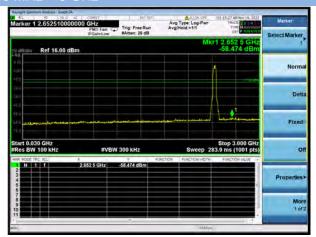


## 802.11VHT-40MHz 5 CHANNEL, SPURIOUS 2 GHz ~ 25 GHz

Marker 1 21.159000000	PNO: Fast C Trig: Free Run FGaintow #Atten: 26 dB	Avg Type: Log-Pwr Avg/Hold >1/1	101-10-41 AH Nov 19, 3021 TRACE 0.2 44	Peak Search	
Mkr1 21,159 00 GHz 10 dBrdw Ref 16.00 dBm - 47,688 dBm					
4.00				Next Pk Righ	
440 240 			1	Next Pk Lef	
510 910	-	مرحرافيين وريعان م	Marana and	Marker Delta	
Start 2.00 GHz #Res BW 100 kHz	#VBW 300 kHz	Sweep	Stop 25.00 GHz 2.198 s (4001 pts)	MkrCF	
N 1 7 21	.159 00 GHz -47,688 dBm			Mkr-+RefLv	
6 7 8 9 10				More 1 of 3	
+ Helaj		STATU	1.1	-	



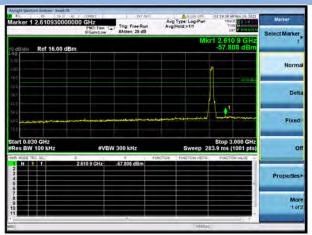
## 802.11VHT-40MHz 6 CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



#### 802.11VHT-40MHz 7 CHANNEL CARRIER LEVE

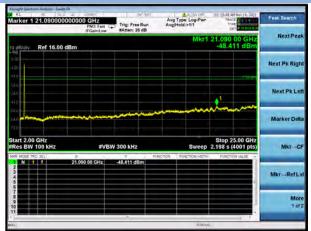


## 802.11VHT-40MHz 7 CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



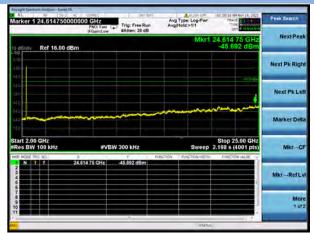
### 802.11VHT-40MHz 6 CHANNEL, SPURIOUS

#### 2 GHz ~ 25 GHz



## 802.11VHT-40MHz 7 CHANNEL, SPURIOUS

2 GHz ~ 25 GHz

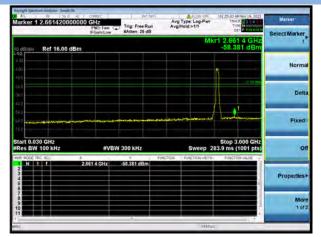




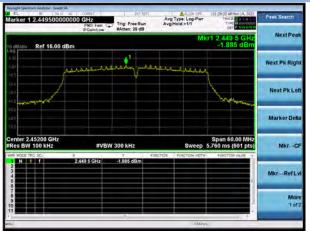
#### 802.11VHT-40MHz 8 CHANNEL CARRIER LEVEL



## 802.11VHT-40MHz 8 CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



## 802.11VHT-40MHz 9 CHANNEL CARRIER LEVEL

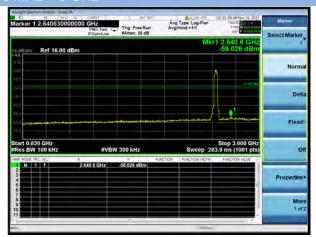


## 802.11VHT-40MHz 8 CHANNEL, SPURIOUS 2 GHz ~ 25 GHz





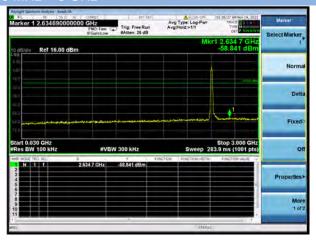
### 802.11VHT-40MHz 9 CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



## 802.11ax-20MHz(SU) 1 CHANNEL CARRIER LEVEL

arker 1 2.413250000000 GHz PNO: FGain	Fast Co Trig: Free Run	Avg Type: Log-Per Avg/Hold.>1/1	01:35:04 AH Nov 19, 3021 TRACE 12 14 15 TIPE ANNUAL	Peak Search Next Peak		
0 dB/dlv Ref 16.00 dBm 0.995 dBm						
00 00	due Namburg me	1		Next Pk Right		
400 410 149 - 10 - 10 - 10 - 10 - 10 - 10 - 10 - 1			alight the fight	Next Pk Len		
940) 140				Marker Delta		
enter 2.41200 GHz Res BW 100 kHz	#VBW 300 kHz	Sweep	Span 30.00 MHz 2.880 ms (601 pts)	MkrCF		
N 1 F 2.413 25 G	Hz 0.995 dBm			MkrRefLv		
6 7 8 9 9				More 1 of 2		
		STATU	1.5	100 C		

## 802.11ax-20MHz(SU) 1 CHANNEL, SPURIOUS 30 MHz ~ 3 GHz

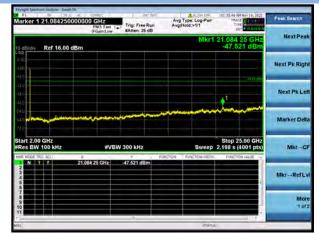


### 802.11VHT-40MHz 9 CHANNEL, SPURIOUS

#### 2 GHz ~ 25 GHz



## 802.11ax-20MHz(SU) 1 CHANNEL, SPURIOUS 2 GHz ~ 25 GHz





## 802.11ax-20MHz(SU) 2 CHANNEL CARRIER LEVEL



## 802.11ax-20MHz(SU) 2 CHANNEL, SPURIOUS 30 MHz ~ 3 GHz

PN0: Fast IFGainsLow					
10 dB/day Ref 16.00 dBm					
030 GHz W 100 kHz #Vi					
1 1 2.655 5 GHz					
#VI					

## 802.11ax-20MHz(SU) 3 CHANNEL CARRIER LEVEL

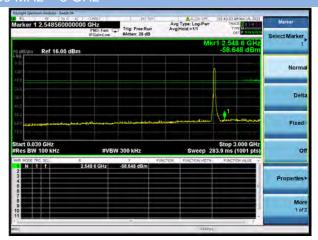


## 802.11ax-20MHz(SU) 2 CHANNEL, SPURIOUS 2 GHz ~ 25 GHz

Marker 1 21.078500000	0000 GHz PNO: Fast C IFGaint on	Trig: Free Run #Atten: 25 dB	Avg Type: Log-Pwr Avg[Hold:>1/1	101-10:00 AH Nov 19, 3021 TRACZ 1 3 3 4 600 TIPE MUSEUM	Peak Search Next Peak
IP dBrave Ref 16.00 dBm -48.302 dBm					
1.0) -1.00					Next Pk Righ
					Next Pk Le
541) 345 780				ain an	Marker Delt
Start 2.00 GHz #Res BW 100 kHz	x		Sweep экстюк Якистон ийтн	Stop 25.00 GHz 2.198 s (4001 pts)	Mkr-C
2 3 4 5	1.078 50 GHz	-48.302 dBm			MkrRef L
6 7 9 9 10					Mor 1 of
1			STATU	104	



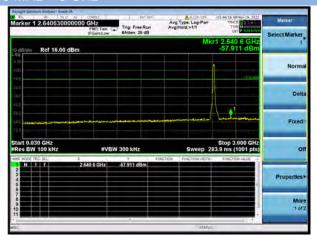
## 802.11ax-20MHz(SU) 3 CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



## 802.11ax-20MHz(SU) 4 CHANNEL CARRIER LEVEL



## 802.11ax-20MHz(SU) 4 CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



### 802.11ax-20MHz(SU) 3 CHANNEL, SPURIOUS

#### 2 GHz ~ 25 GHz

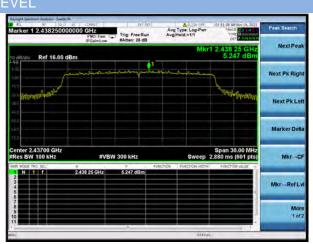


## 802.11ax-20MHz(SU) 4 CHANNEL, SPURIOUS 2 GHz ~ 25 GHz



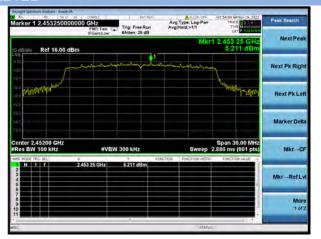


## 802.11ax-20MHz(SU) 6 CHANNEL CARRIER LEVEL



## 802.11ax-20MHz(SU) 6 CHANNEL, SPURIOUS 30 MHz ~ 3 GHz

## 802.11ax-20MHz(SU) 9 CHANNEL CARRIER LEVEL

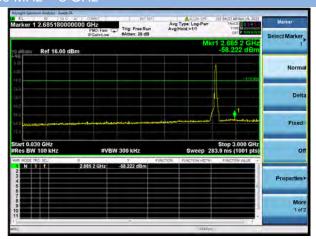


## 802.11ax-20MHz(SU) 6 CHANNEL, SPURIOUS 2 GHz ~ 25 GHz

nker 1 21.078500000	PNO: Fast C Tr	ig: Free Run	Avg Type: Log-Pwr Avg[Hold:>1/1	101515144 Nov 19, 303 TRACE 05 14	Reak Search
Ufdaintow     #Atten: 28 dB     of tautumeter       10 dBtday     Ref 16.00 dBm     Mkr1 21.078 50 GHz     447.984 dBm					
				alone a	Next Pk Righ
0 0 0				1	Next Pk Lei
			a haran a sa	1 mar	Marker Delt
art 2.00 GHz tes BW 100 kHz	#VBW 30	) KHZ		Stop 25.00 GH 2.198 s (4001 pts	MkrC
		984 dBm		PORT LOW MEDE	Mkr-+RefL
					Mor
		×			



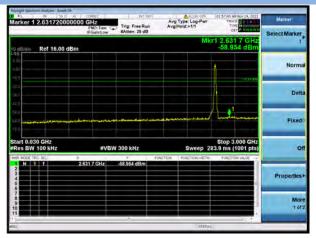
### 802.11ax-20MHz(SU) 9 CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



# 802.11ax-20MHz(SU) 10 CHANNEL CARRIER LEVEL

rker 1 2.455750000000	CH2 PND: Fast C Trig: Free Run #Atten: 26 dB	Avg Type: Log-Pwr Avg(Hold,>1/1	01:57:10 AH Nov 19, 3021 TRACE 13 14 4 TIPE AND AND A	Peak Search Next Peak		
10 dBIdly Ref 16.00 dBm 1.814 dBm						
	Anterio minimpristi	-theil weter friet was		Next Pk Right		
millionarth			Sugar Winner 10	Next Pk Lef		
0 0				Marker Delta		
nter 2.45700 GHz es BW 100 kHz	#VBW 300 kHz		Span 30.00 MHz 2.880 ms (601 pts) FUNCTION VALUE	MkrCf		
N 1 1 2.455	5 75 GHz 1.814 dBm			MkrRef Lv		
				More 1 of S		
		STÁDE		-		

## 802.11ax-20MHz(SU) 10 CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



## 802.11ax-20MHz(SU) 9 CHANNEL, SPURIOUS

#### 2 GHz ~ 25 GHz



# 802.11ax-20MHz(SU) 10 CHANNEL, SPURIOUS 2 GHz ~ 25 GHz





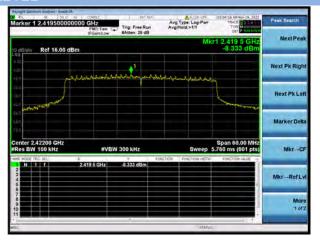
## 802.11ax-20MHz(SU) 11 CHANNEL CARRIER LEVEL



## 802.11ax-20MHz(SU) 11 CHANNEL, SPURIOUS 30 MHz ~ 3 GHz

arker 1 2.685180000	PNO: Fast	Trig: Free Run	Avg Type: Log-Pwr AvgHold >1/1	102-01-17 AH Nov 19, 3021 TRACE D 2 4 4	Mariner	
	IFGaintLow	#Atten: 26 dB	The second second	DET P NINNIN	Seject Marker	
Mkr1 2,685 2 GHz 10 dBtdw Ref 16.00 dBm57.861 dBm						
ού 					Norma	
40 +0				2.0.20		
40					Deita	
10	مارسي فروا والمعالية المسارين			Amandana	Fixed	
tart 0.030 GHz Res BW 100 kHz	#VBV	V 300 kHz	Sweep 2	Stop 3.000 GHz 83.9 ms (1001 pts)	01	
N 1 1	x 2.685 2 GHz	¥ FU -57.861 dBm	NCTION PUNCTION W07H	FUNCTION VALUE		
2 3 4 5					Properties	
5 7 8 9					Mon	
					1 013	

## 802.11ax-40MHz(SU) 3 CHANNEL CARRIER LEVEL

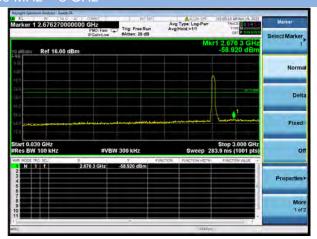


# 802.11ax-20MHz(SU) 11 CHANNEL, SPURIOUS 2 GHz ~ 25 GHz

Peak Search	126 AH Nov 19, 3021 TRACE CON 4 AM	Type: Log-Pwr told:>1/1	Avg Avg	Trig: Free Ru	00000 GHz PNOt Fast	21.057000	arker 1 2
Next Peak	12Geintow #Atten: 28 dB 001 Mkr1 21.067 00 GHz 19 eBlate Ref 15.00 dBm -48.827 dBm						
Next Pk Righ							60 60
Next Pk Lei							10
Marker Delt					the second		ii) 10 <b>Jointy</b>
MkrC	op 25.00 GHz 8 s (4001 pts)	Sweep	; FUNCTION	W 300 kHz	x	100 kHz	art 2.00 C Res BW 1
MkrRef L				-48.827 dBm	21,067 00 GHz		
Mon 1 of 3							
		STATUS					a)



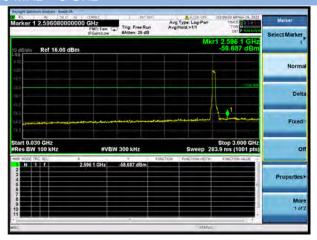
## 802.11ax-40MHz(SU) 3 CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



## 802.11ax-40MHz(SU) 4 CHANNEL CARRIER LEVEL

PeakSearch	102-08-21 AM Nov 19, 3021 TRACE DO 14 TYPE MULTINE OUT P REMEMBER	Type: Log-Pwr Hold >1/1	hun u	100000	000 GHz PNO: Fast 0 IEGaint.com	1 2.418300000
NextPea	1 2.418 3 GHz -3.948 dBm	Mk				Ref 16.00 dB
Next Pk Righ		- John March And	un	-	enertant	٨
Next Pk Le	moon					mont
Marker Del						
MkrC	Span 60.00 MHz 5.760 ms (601 pts) FUNCTION VALUE		FUNCTION		x	.42700 GHz 100 kHz
MkrRef L				-3.948 dB	2.418 3 GHz	r .
Mor 1 of						
-	107	STATUS	_			

## 802.11ax-40MHz(SU) 4 CHANNEL, SPURIOUS 30 MHz ~ 3 GHz

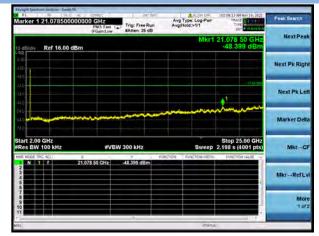


## 802.11ax-40MHz(SU) 3 CHANNEL, SPURIOUS

#### 2 GHz ~ 25 GHz

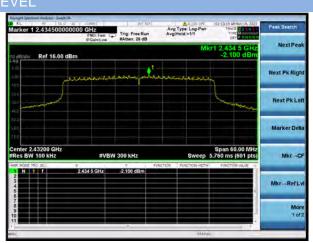


## 802.11ax-40MHz(SU) 4 CHANNEL, SPURIOUS 2 GHz ~ 25 GHz





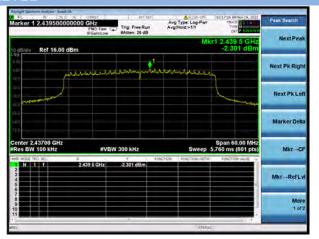
## 802.11ax-40MHz(SU) 5 CHANNEL CARRIER LEVEL



## 802.11ax-40MHz(SU) 5 CHANNEL, SPURIOUS 30 MHz ~ 3 GHz

TRACE DECEM	Type: Log-Pwr	Av	And the second second	000 GHz		
DET P NIMMAN	100.201		#Atten: 26 dB	PNO: Fast C IFGain:Low		-
-58.285 dBm	Mkr			sm	Ref 16.00 d	o dBrdiv
						- 98 8-07 4.00
-22.05,00-						140 240 340
ane and a manufacture	and a state of the second	ed digentic all'	م (د جهوری مر باد م			541) 541) 141)
		EISCICS.			100 kHz	start 0.03 Res BW
			-58,285 dBm	2.700 0 GHz		1 N 1 2 3 4 5
			_			6789
	1 2,700 0 GH2 -56.285 dBm	1 Type Log-Per phode 517 Mikr1 2,700 0 GHz -58,288 dBm -22,859 1 excellent extension	Mkr1 2,700 0 GHz -S5.285 dBm	Ang Type LoopPar     Thick D back to the Magnetic State       Trig: Free Run Avgited State     Thick D back to the Magnetic State       March State     March State       March State     State       March State     State       March State     State       March State     State       M 300 KHz     State       Y March State     March State	0000 GH2 PHO Fast Trig: Free Run BedinLow Trig: Free Run BedinLow Trig: Free Run Avgiried.511 Mkr1 2, 720 0 GH2 Stop 3.000 GH2 Stop 3.00	Z.70003000000 GHz FR00 Fatt     Trig: Free Run BLank.com     Arg Type: Log Per Arg/Heid: k11     Trig: Com Com     Trig: Free Run Com     Arg Type: Log Per Arg/Heid: k11     Trig: Com     Trig: Com

## 802.11ax-40MHz(SU) 6 CHANNEL CARRIER LEVEL

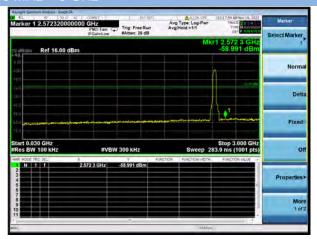


## 802.11ax-40MHz(SU) 5 CHANNEL, SPURIOUS 2 GHz ~ 25 GHz

Peak Search	102-13-5# AH Nov 19, 3021 TRACE DO BY 4 TYPE	Type: Log-Pwr Hold >1/1	eRun A		00000 GHz PN0: Fast C EGaint on	1.130250	ker 1 2'
NextPea	21.130 25 GHz -47.652 dBm	Mkr1	e ob	EAGEN: 20		Ref 16.00 (	Jidiv -
Next Pk Righ							1
Next Pk Le	a sector						
Marker Delt	· ·····		~~~~	مەمەمەنىيەن			lum,
MkrC	Stop 25.00 GHz 2.198 s (4001 pts)	Sweep RUNCTION WETTH	FUNCTIO	W 300 kHz	x	0 kHz	2.00 G BW 10
MkrRef L			Bm	-47.652 dB	21.130 25 GHz	1	N 1
Mor 1 of							
-	117	STATUS				-	_



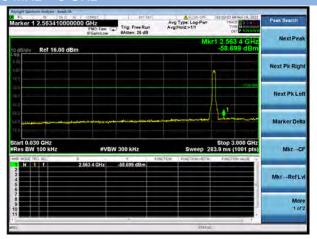
## 802.11ax-40MHz(SU) 6 CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



# 802.11ax-40MHz(SU) 7 CHANNEL CARRIER LEVEL

000000 GHz PNO: Fast	Trig: Free Run	Avg Type: Log-Pwr Avg(Hold>1/1	02-21-29 4H Nov 19, 3021 TRACE 19 14 40 TVRE	Peak Search
	#Atten: 26 dB	M		Next Peak
	1 Jahr Maria markate	MANULLES		Next Pk Righ
				Next Pk Lef
				Marker Delt
#V	Ý ) FL			MkrCl
2.444 5 GHz	-3.950 dBm			Mkr-+RefLv
				Mon
	PNC Fast (F Gained on 0 dBm	PHO: Fair Configure Run Britantice Configure Run Configure Configure Configure Configure Configure Configure Configure Configure Configure Configure Configu	PRO TAXE TARE TARE Run Angliteid-surf Refer to 80	PAD Team 2 and 2 Anglifeld-s17 Team 2 Anglifeld-s17 Te

## 802.11ax-40MHz(SU) 7 CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



## 802.11ax-40MHz(SU) 6 CHANNEL, SPURIOUS

#### 2 GHz ~ 25 GHz

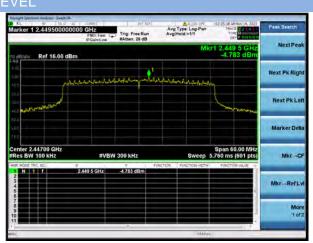


## 802.11ax-40MHz(SU) 7 CHANNEL, SPURIOUS 2 GHz ~ 25 GHz





## 802.11ax-40MHz(SU) 8 CHANNEL CARRIER LEVEL



## 802.11ax-40MHz(SU) 8 CHANNEL, SPURIOUS 30 MHz ~ 3 GHz

	2.6317200	00000 GHz	1000		Avg Type: Log-Pwr Avg/Hold >1/1		Manuer
_		IFGain:Lo		dB		ORT P FIRENCE	Select Marker
0 dB/div	Ref 16.00	dBm			M	kr1 2.631 7 GHz -58.425 dBm	1
- 08 8-02 4.00						A	Norma
140 280 340						-3179.00	Deita
540 540 540 540		ىيىمەمىيەمەرىدۇن.	a	anin salat mar	مەخۇرىيە ھەروھۇرىي	Ale	Fixed
tart 0.03 Res BW	100 kHz		/BW 300 kHz			Stop 3.000 GHz 283.9 ms (1001 pts	or
1 N 1 2 3 4 5		2.631 7 GHz			SH PUNCTION WOTH	FUNCTION VALUE	Properties
6 7 8 9 10							Mor 1 of
-					STÁTU	114	

## 802.11ax-40MHz(SU) 9 CHANNEL CARRIER LEVEL

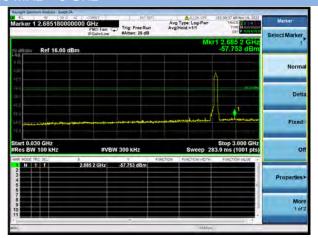


## 802.11ax-40MHz(SU) 8 CHANNEL, SPURIOUS 2 GHz ~ 25 GHz

PeakSearch	H Nov 19, 3021	TRAC	ype: Log-Pwr old:>1/1	Av	Trig: Free Run #Atten: 25 dB	0000 GHz PN0: Fast 0 IFGaint on	1475000	r 1 21	Narke
Next Peak	50 GHz 25 dBm	21.147	Mkr1		10000 C 00		ef 16.00 c	W R	o diBJd
Next Pk Righ									-98 8-00 4.00
Next Pk Le	-3674 (	<b>A</b> 1							440 - 280 340 -
Marker Delt		in						nand <sub>ine</sub>	520 10 10
Mkr-C	5.00 GHz 4001 pts)	2.198 s (	Sweep Function with	FUNCTION	W 300 kHz	x	kHz	.00 GI 3W 10	Res
MkrRef L					-47.325 dBm	21.147 50 GHz		1	N 2345
Mor 1 of									6789 1011
	11	0	STÁPUS	_				_	(m)



## 802.11ax-40MHz(SU) 9 CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



## 802.11ax-40MHz(SU) 9 CHANNEL, SPURIOUS

#### 2 GHz ~ 25 GHz

ICOURT DODO GHZ PNO: Fast IFGain:Low #Atten: 28 dB	Avg Type: Log-Pwr Avg(Hold,>1/1	107:31:12 44 Nov 19, 3021 TRACE 12 45 10 TIPE 10 1000000 DET 12 11 10 NOV	Peek Ssarch
m	Mkr1	24.632 00 GHz -46.417 dBm	NextPeak
			Next Pk Righ
			Next Pk Lef
	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	manul	Marker Delt
#VBW 300 kHz			MkrCl
24.632 00 GHz 46.417 dBm			MkrRef L
			Mor
	10000 GHZ PAO Fait PGahataw Trig: Pree Run ZAtan: 24 db m #VEW 300 kHz 3 v v v v	00000 GHz PRO1eta     Trig: Free Run Bacter: 24 dB     Avg/Trigs: Log-Pur Avg/Holds->11       IFGLIN:100     IMERCIDE     Micro       IFGLIN:100     IMERCIDE     Micro       IFGLIN:100     IFGLIN:100     ImerciDe       IFGLIN:100     ImerciDe     ImerciDe       IFGLIN:100     ImerciDe     ImerciDe       IFGLIN:100     ImerciDe     ImerciDe	ODD00 GHz PHO1 Here IFCain-Low     Trug: Free Run RAgHeid:s-bit     Avg Type: Log-Perr AvgHeid:s-bit     Truck III State (cf)     Truck III State (cf)       Inter: 24 dB     Mkr1 24, 632 Q.00 GHz -46, 417 dBm     Mkr1 24, 632 Q.00 GHz -46, 417 dBm       Imter: 24 dB     Stop 25,00 GHz Stop 25,00 GHz Stop 25,00 GHz     Stop 25,00 GHz Stop 25,00 GHz Stop 25,00 GHz



## A.4 Band Edge (Authorized-band band-edge)

## Test Data

Note: The 99% OBW of the fundamental emission is without 2 MHz of the authorized band.

### 802.11b Mode:

	Measured Max. Band	Limit	(dBm)	
Channel	Edge Emission (dBm)	Carrier Level	Calculated 20 dBc Limit	Verdict
1	-45.81	7.05	-12.95	Pass
11	-57.30	6.59	-13.41	Pass

### 802.11g Mode:

	Measured Max. Band	Limit	(dBm)	
Channel	Edge Emission (dBm)	Carrier Level	Calculated 20 dBc Limit	Verdict
1	-32.34	2.08	-17.92	Pass
2	-37.65	3.63	-16.37	Pass
3	-50.32	4.64	-15.36	Pass
4	-50.48	5.68	-14.32	Pass
9	-52.22	5.94	-14.06	Pass
10	-53.43	3.57	-16.43	Pass
11	-52.59	1.85	-18.15	Pass

### 802.11n-20 MHz Mode:

	Measured Max. Band	Limit	(dBm)	
Channel	Edge Emission (dBm)	Carrier Level	Calculated 20	Verdict
		Camer Lever	dBc Limit	
1	-31.89	2.09	-17.91	Pass
2	-39.35	3.49	-16.51	Pass
3	-50.50	4.14	-15.86	Pass
4	-50.63	5.55	-14.45	Pass
9	-52.04	5.77	-14.23	Pass
10	-53.73	3.50	-16.50	Pass
11	-54.40	0.69	-19.31	Pass



## 802.11n-40 MHz Mode:

	Measured Max. Band	Limit (dBm)		
Channel	Edge Emission (dBm)	Carrier Level	Calculated 20 dBc Limit	Verdict
			UDC LITIIL	
3	-50.39	-2.80	-22.80	Pass
4	-52.37	-1.37	-21.37	Pass
5	-45.25	1.76	-18.24	Pass
7	-54.57	1.24	-18.76	Pass
8	-54.25	-0.95	-20.95	Pass
9	-53.54	-1.84	-21.84	Pass

## 802.11VHT-20 MHz Mode:

	Measured Max. Band	Limit	(dBm)	
Channel	Edge Emission (dBm)	Carrier Level	Calculated 20 dBc Limit	Verdict
1	-32.69	1.48	-18.52	Pass
2	-37.61	3.03	-16.97	Pass
3	-49.05	4.03	-15.97	Pass
4	-50.55	5.54	-14.46	Pass
9	-53.34	5.87	-14.13	Pass
10	-55.13	1.91	-18.09	Pass
11	-53.76	0.55	-19.45	Pass

## 802.11VHT-40 MHz Mode:

Channel	Measured Max. Band Edge Emission (dBm)	Limit (dBm)		
		Carrier Level	Calculated 20 dBc Limit	Verdict
3	-51.10	-2.96	-22.96	Pass
4	-52.27	-1.41	-21.41	Pass
5	-46.84	2.20	-17.80	Pass
7	-54.49	0.61	-19.39	Pass
8	-54.37	-1.53	-21.53	Pass
9	-53.39	-1.89	-21.89	Pass

## 802.11ax-20 MHz(SU) Mode:

	Measured Max. Band	Limit (dBm)		
Channel	Edge Emission (dBm)	Carrier Level	Calculated 20	Verdict
	Edge Emission (dBm)	Camer Lever	dBc Limit	
1	-43.60	0.99	-19.01	Pass
2	-48.77	2.00	-18.00	Pass
3	-49.73	3.39	-16.61	Pass
4	-50.82	4.90	-15.10	Pass
9	-52.49	5.21	-14.79	Pass
10	-55.24	1.81	-18.19	Pass
11	-55.96	-0.96	-20.96	Pass



## 802.11ax-40 MHz(SU) Mode:

Channel	Measured Max. Band Edge Emission (dBm)	Limit (dBm)		
		Carrier Level	Calculated 20 dBc Limit	Verdict
3	-49.66	-8.33	-28.33	Pass
4	-48.60	-3.95	-23.95	Pass
5	-49.29	-2.10	-22.10	Pass
7	-55.76	-3.95	-23.95	Pass
8	-55.83	-4.78	-24.78	Pass
9	-54.31	-6.30	-26.30	Pass



### Test Plots

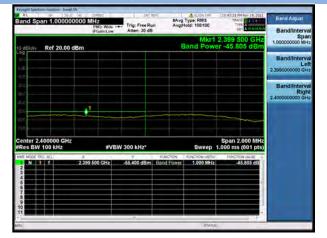




### 802.11b 1 CHANNEL, Reference level



#### 802.11b 1 CHANNEL, Reference level

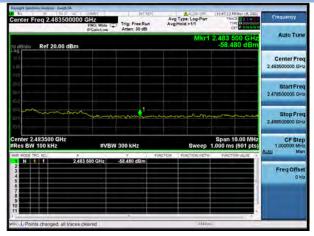


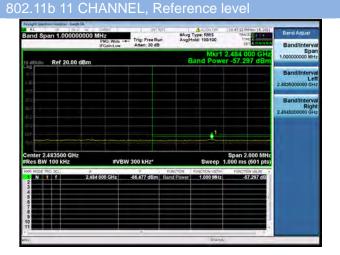
## 802.11b 11 CHANNEL, Carrier level





## 802.11b 11 CHANNEL, Reference level





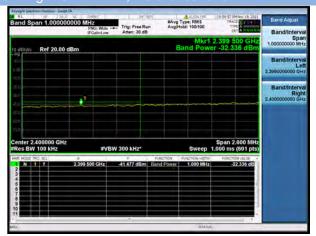
### 802.11g 1 CHANNEL, Carrier level



#### 802.11g 1 CHANNEL, Reference leve



#### 802.11g 1 CHANNEL. Reference leve





## 802.11g 2 CHANNEL, Carrier level



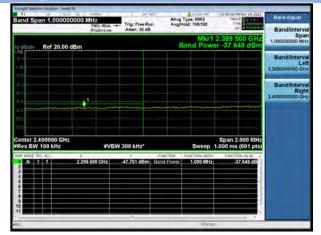
#### 802.11g 2 CHANNEL, Reference leve



## 802.11g 3 CHANNEL, Carrier level

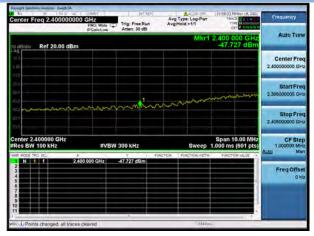


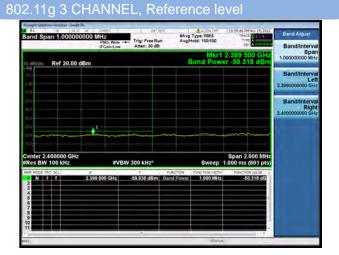
#### 802.11g 2 CHANNEL, Reference level





## 802.11g 3 CHANNEL, Reference level

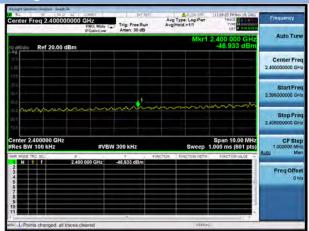




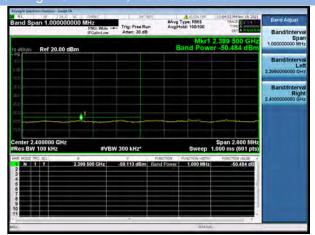
### 802.11g 4 CHANNEL, Carrier level



#### 802.11g 4 CHANNEL, Reference leve



#### 802.11g 4 CHANNEL. Reference leve

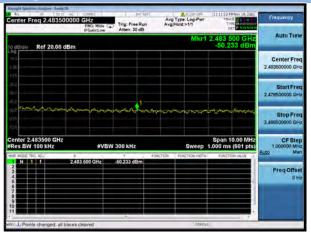




## 802.11g 9 CHANNEL, Carrier level



#### 802.11g 9 CHANNEL, Reference leve



#### 802.11g 10 CHANNEL, Carrier level

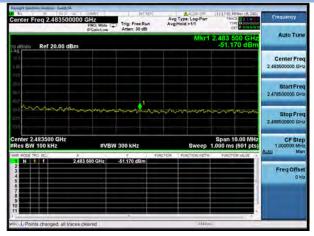


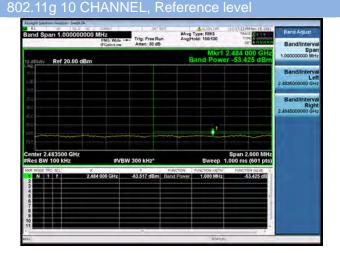
#### 802.11g 9 CHANNEL, Reference level





## 802.11g 10 CHANNEL, Reference level

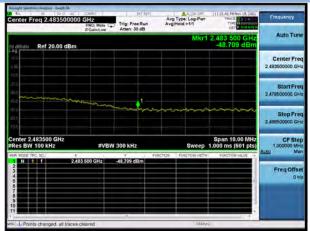




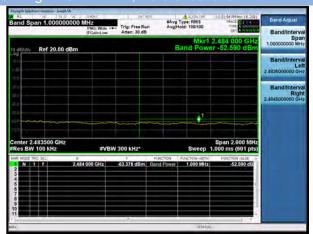
### 802.11g 11 CHANNEL, Carrier level



#### 802.11g 11 CHANNEL, Reference leve



## 802.11g 11 CHANNEL, Reference level





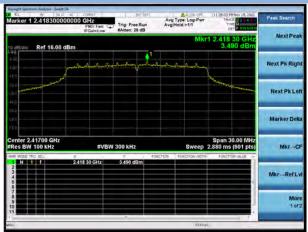
## 802.11n-20 MHz 1 CHANNEL, Carrier level



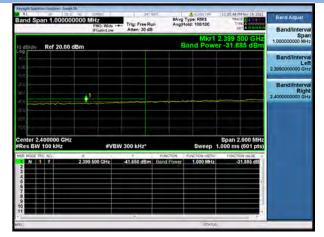
#### 802.11n-20 MHz 1 CHANNEL, Reference level



#### 802.11n-20 MHz 2 CHANNEL, Carrier leve



#### 802.11n-20 MHz 1 CHANNEL, Reference level

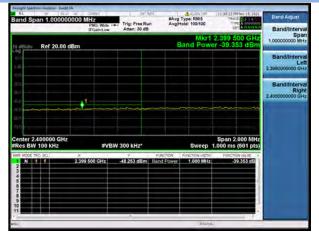




## 802.11n-20 MHz 2 CHANNEL, Reference level



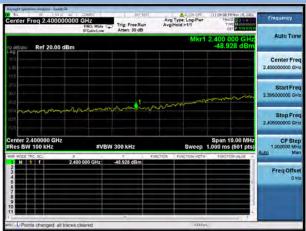
## 802.11n-20 MHz 2 CHANNEL, Reference level



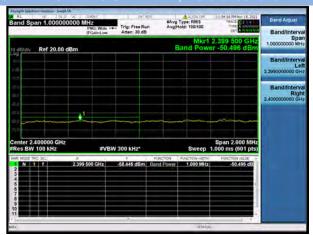
### 802.11n-20 MHz 3 CHANNEL, Carrier level



#### 802.11n-20 MHz 3 CHANNEL, Reference leve



#### 802.11n-20 MHz 3 CHANNEL. Reference level

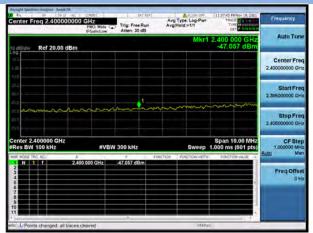




## 802.11n-20 MHz 4 CHANNEL, Carrier level



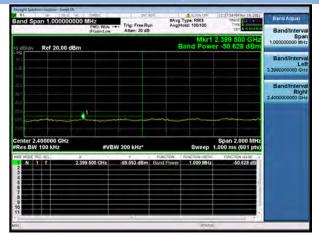
#### 802.11n-20 MHz 4 CHANNEL, Reference level



#### 802.11n-20 MHz 9 CHANNEL, Carrier leve

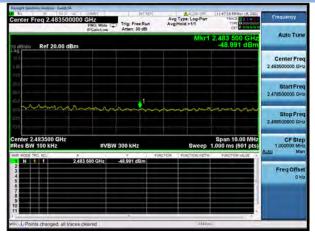


802.11n-20 MHz 4 CHANNEL, Reference level

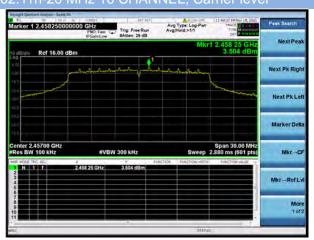




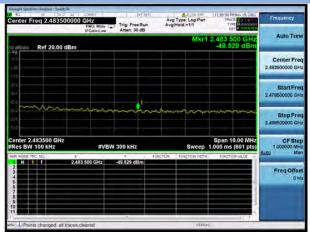
## 802.11n-20 MHz 9 CHANNEL, Reference level

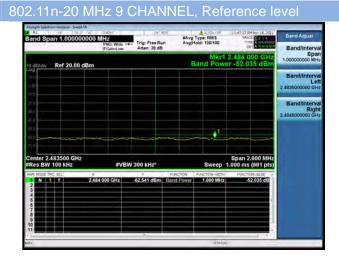


## 802.11n-20 MHz 10 CHANNEL, Carrier level

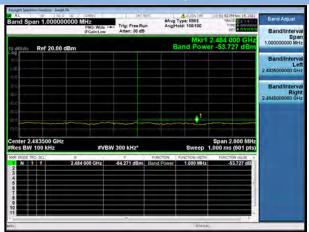


#### 802.11n-20 MHz 10 CHANNEL, Reference leve





#### 802.11n-20 MHz 10 CHANNEL, Reference level

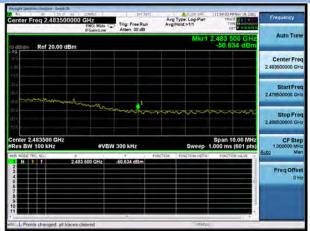




## 802.11n-20 MHz 11 CHANNEL, Carrier level



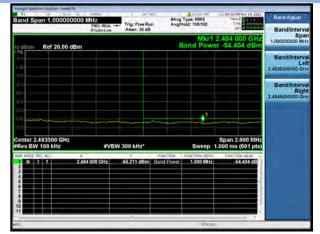
### 802.11n-20 MHz 11 CHANNEL, Reference level



## 802.11n-40 MHz 3 CHANNEL, Carrier level



### 802.11n-20 MHz 11 CHANNEL, Reference level

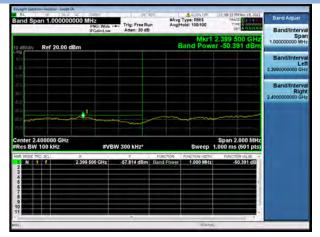




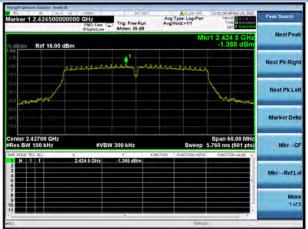
## 802.11n-40 MHz 3 CHANNEL, Reference level



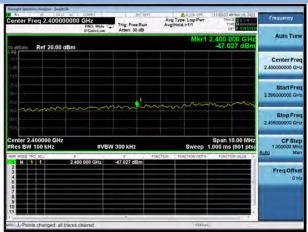
## 802.11n-40 MHz 3 CHANNEL, Reference level



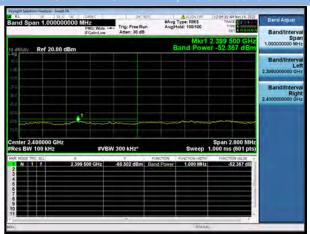
## 802.11n-40 MHz 4 CHANNEL, Carrier level



#### 802.11n-40 MHz 4 CHANNEL, Reference leve

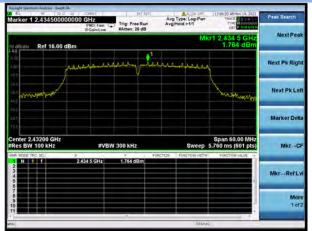


#### 802.11n-40 MHz 4 CHANNEL. Reference leve

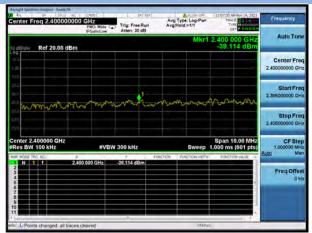




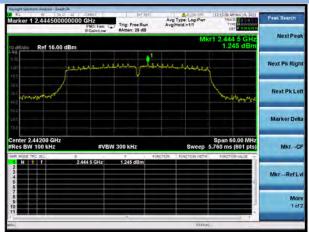
## 802.11n-40 MHz 5 CHANNEL, Carrier level



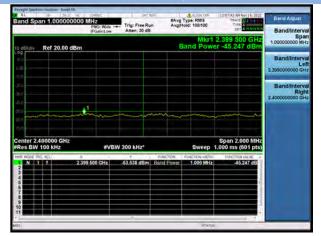
#### 802.11n-40 MHz 5 CHANNEL, Reference level



#### 802.11n-40 MHz 7 CHANNEL, Carrier leve



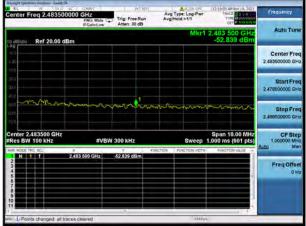
#### 802.11n-40 MHz 5 CHANNEL, Reference level



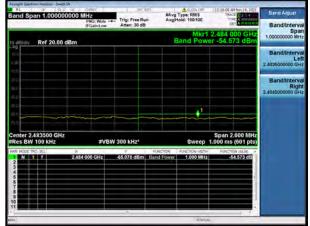


Band Adj

## 802.11n-40 MHz 7 CHANNEL, Reference level



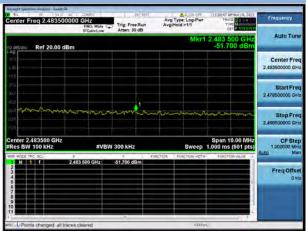
#### Ref 20.00 dBm

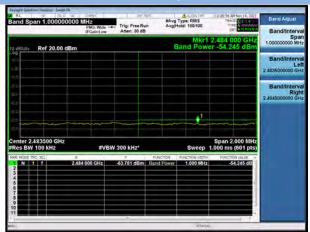


#Avg Type: RMS Avg(Hold: 100/100

## 802.11n-40 MHz 8 CHANNEL, Carrier level

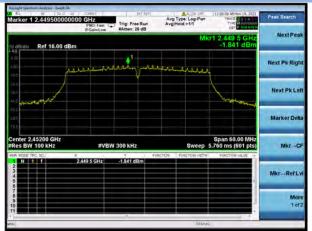




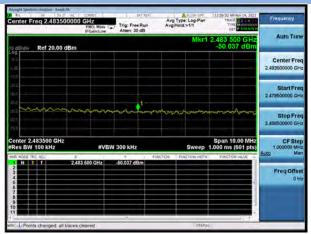




## 802.11n-40 MHz 9 CHANNEL, Carrier level



#### 802.11n-40 MHz 9 CHANNEL, Reference level



#### 802.11VHT-20 MHz 1 CHANNEL, Carrier leve



802.11n-40 MHz 9 CHANNEL, Reference level

