

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT



FCC Applicant: Murata Manufacturing Co., Ltd.
1-10-1, Higashikotari, Nagaokakyo-shi, Kyoto 617-8555 Japan
Product Name: Communication Module
Brand Name: muRata
FCC Model No.: LBEE5CJ1XK, LBEE5CJ2XK
IC Model No.: LBEE5CJ1XK, LBEE5CJ2XK
Model Difference: Different Antenna type
Report Number: E2/2021/30019
FCC ID VPYLB1XK
IC: 772C-LB1XK
Issue Date: Sep.10,2021
Date of Test: Mar.11,2021 ~ Aug.11,2021
Date of EUT Received: Mar.11,2021

Approved By


Jay Lin

We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd. Central RF Lab The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10:2013 and the energy emitted by the sample EUT comply with FCC rule part §15.407, ISSED RSS-247.

The results of this report relate only to the sample identified in this report.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

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Revision History

Report Number	Revision	Description	Issue Date	Revised By
E2/2021/30019	Rev.00	Original	Sep.10,2021	Viola Su

Note:

- 1、Antenna information is provided by the applicant, test results of this report are applicable to the sample EUT received.

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1 GENERAL INFORMATION

1.1 Product Description

Product Name:	Communication Module
Brand Name:	muRata
FCC Model No.:	LBEE5CJ1XK, LBEE5CJ2XK
IC Model No.:	LBEE5CJ1XK, LBEE5CJ2XK
Model Difference:	Different Antenna type
Hardware Version:	1.0
Firmware Version:	1.0
EUT Series No.:	Conducted : EVB NO.13 , Radiated dipole:EVB NO.13 Radiated momopole: EVB NO.03
Power Supply:	3.3Vdc

1.2 Modulation & Data Rate

Modulation type:	64QAM, 16QAM, QPSK, BPSK for OFDM
Transition Rate:	802.11 a: 6 - 54 Mbps
	802.11 n_20MHz: 6.5 - 72.2 Mbps
	802.11 n_40MHz: 13.5 - 150 Mbps

1.3 Antenna Designation

Antenna Type	Supplier	Antenna Part No.	Freq. (MHz)	Peak Antenna Gain (dBi)	Worst Antenna Gain
Monopole	Murata	LBEE5CJ1XK-Antenna	5150~5825	4.6	V
Dipole	Molex	146187	5150~5825	4.75	V
Dipole	Molex	146153	5150~5825	4.25	

Note:

1. Pre-scanned was done on the above antennas, measurements were demonstrated by using the antenna with the highest gain as the worst case scenarios.
2. Antenna information is provided by the applicant.

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1.4 FCC

WLAN 5 GHz				
Wi-Fi	Frequency Range	Channels	Rated Power(Avg) (dBm) (Worst Case)	Modulation Technology
a n_HT 20M	5180~5240	4	17.90 dBm	OFDM
	5260~5320	4	17.96 dBm	OFDM
	5500~5720	12	16.92 dBm	OFDM
	5745-5825	5	16.73 dBm	OFDM
n_HT 40M	5190~5230	2	15.82 dBm	OFDM
	5270~5310	2	15.95 dBm	OFDM
	5510~5710	6	15.92 dBm	OFDM
	5755-5795	2	15.91 dBm	OFDM

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1.5 ISED

WLAN 5 GHz for ISED(Slave)					
Wi-Fi	Frequency Range	Channels	EIRP/Avg	Rated Power(EIRP/Avg) (dBm) (Worst Case)	Modulation Technology
a n_HT 20M	5180~5240	4	EIRP	21.23 dBm	OFDM
	5260~5320	4	Avg	17.96 dBm	OFDM
	5500~5700	8	Avg	16.92 dBm	OFDM
	5720 (U-NII 2C)	1	Avg	14.37 dBm	OFDM
	5720 (U-NII 3)	1	Avg	9.91 dBm	OFDM
	5745-5825	5	Avg	16.73 dBm	OFDM
n_HT 40M	5190~5230	2	EIRP	20.57 dBm	OFDM
	5270~5310	2	Avg	15.95 dBm	OFDM
	5510~5670	3	Avg	15.92 dBm	OFDM
	5710 (U-NII 2C)	1	Avg	13.26 dBm	OFDM
	5710 (U-NII 3)	1	Avg	4.99 dBm	OFDM
	5755-5795	2	Avg	15.91 dBm	OFDM

Note:

As per guidance in presentation 2018-04-10-03 IC Certification updates of April 2018 TCB workshop, Client (Slave mode) devices without active scanning function, but with the capability of operating in 5600-5650 MHz solely under the control of a certified master device meeting the requirement of RSS-247, are allowed in Canada.

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SGS Taiwan Ltd.
台灣檢驗科技股份有限公司

No.134,Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan/新北市五股區新北產業園區五工路 134 號
t (886-2) 2299-3279 f (886-2) 2298-0488
www.sgs.com.tw

Member of SGS Group

1.6 Test Methodology of Applied Standards

FCC Part 15, Subpart E §15.407

FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

RSS-247 issue 2 Feb. 2017

RSS-Gen Issue 5, Amendment 2, February 2021

ANSI C63.10:2013

1.7 Test Facility

Laboratory	Test Site Address	Test Site Name	FCC Designation number	IC CAB identifier
SGS Taiwan Ltd. Central RF Lab. (TAF code 3702)	No.134, Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan.	SAC 1	TW0027	TW3702
		SAC 3		
		Conduction 1		
		Conducted 1		
		Conducted 2		
		Conducted 3		
		Conducted 4		
		Conducted 5		
		Conducted 6		
	No.2, Keji 1st Rd., Guishan District, Taoyuan City, Taiwan 333	Conduction A	TW0028	
		SAC C		
		SAC D		
		SAC G		
		Conducted A		
		Conducted B		
		Conducted C		
		Conducted D		
		Conducted E		
		Conducted F		
		Conducted G		
Note: Test site name is remarked on the equipment list in each section of this report as an indication where measurements occurred in specific test site and address.				

1.8 Special Accessories

There are no special accessories used while test was conducted.

1.9 Equipment Modifications

There was no modification incorporated into the EUT.

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2 SYSTEM TEST CONFIGURATION

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

An engineering test mode (software/firmware) that applicant provided was utilized to manipulate the EUT into transmit, selection of the test channel, and modulation scheme.

2.3 Test Procedure

2.3.1 Conducted Emissions

The EUT is placed on a table which is 0.8 m above ground plane. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz. The CISPR Quasi-Peak and Average detector mode is employed. The two LISNs provide 50uH/50 ohm of coupling impedance for the measuring instrument. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

2.3.2 Conducted Test (RF)

The active antenna port of the unlicensed wireless device is connected to the spectrum analyzer with attenuator to protect the instrumentation. If a second antenna port is available, it is tested at one operating frequency, with other port(s) appropriately terminated, to verify it has similar output characteristics as the fully tested port.

2.3.3 Radiated Emissions

The EUT is placed on a turn table. For emissions testing at or below 1 GHz, the table height shall be 0.8 m above the reference ground plane. For emission measurements above 1 GHz, the table height shall be 1.5 m. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this transmitter (EUT) was rotated through three orthogonal axes and measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made "while keeping the antenna in the 'cone of radiation' from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response." is still within the 3dB illumination BW of the measurement antenna.

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2.4 Measurement Results Explanation Example

2.4.1 Radiated Emission Test Sites For Measurements From 9 kHz To 30 MHz

Radiated emission below 30MHz is measured in a 9m*9m*6m semi-anechoic chamber, the measurements correspond to those obtained at an open-field test site.

There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

2.4.2 For all conducted test items:

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

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2.5 Configuration of Tested System

Fig. 2-1 Conducted Setup & Radiated Setup

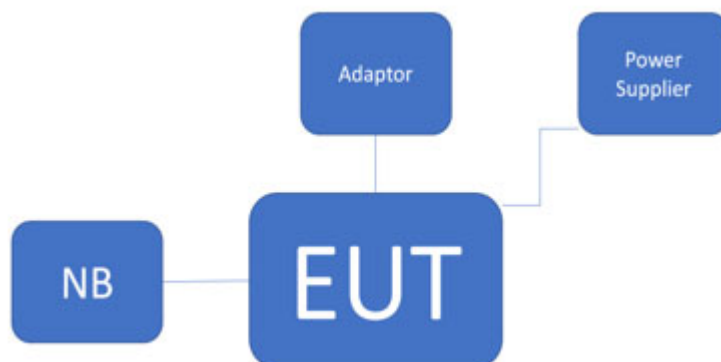


Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	Power Cord
1.	Notebook	Lenovo	T420	S0012599	N/A	N/A
2.	DC Power Supply	Agilent	E3640A	MY53130054	N/A	N/A
3.	DutApiSisoBt	N/A	N/A	N/A	N/A	N/A

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3 SUMMARY OF TEST RESULT

FCC Rules	IC Rules	Description Of Test	Result
§15.207	RSS-Gen §8.8	AC Power Line Conducted Emission	N/A
§15.407(e)	RSS-Gen §6.7 RSS-247 §6.2.4.1	Emission Bandwidth	Compliant
§15.407(a)	RSS-247 §6.2.1~ 4 (1)	Maximum Conducted Output Power	Compliant
§15.407(a)	RSS-247 §6.2.1~ 4 (1)	Power Spectral Density	Compliant
§15.205 §15.209 §15.407(b)	RSS-247 §6.2.1~ 4 (2)	Undesirable Radiated Emissions	Compliant
§15.407(c)	RSS-247 §6.4	Transmission in case of Absence of Information	Compliant
§15.203 §15.407(a)	N/A	Antenna Requirement	Compliant

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4 DESCRIPTION OF TEST MODES

Operating Frequencies

Operated band in 5150 MHz ~5250 MHz:

20 M		40 M	
CH	Freq (MHz)	CH	Freq (MHz)
36	5180	38	5190
40	5200	46	5230
44	5220		
48	5240		

Operated band in 5250 MHz ~5350 MHz:

20 M		40 M	
CH	Freq (MHz)	CH	Freq (MHz)
52	5260	54	5270
56	5280	62	5310
60	5300		
64	5320		

Operated band in 5470 MHz ~5725 MHz:

20 M		40 M	
CH	Freq (MHz)	CH	Freq (MHz)
100	5500	102	5510
104	5520	110	5550
108	5540	118	5590
112	5560	126	5630
116	5580	134	5670
120	5600	142	5710
124	5620		
128	5640		
132	5660		
136	5680		
140	5700		
144	5720		

Operated band in 5745 MHz ~5850 MHz:

20 M		40 M	
CH	Freq (MHz)	CH	Freq (MHz)
149	5745	151	5755
153	5765	159	5795
157	5785		
161	5805		
165	5825		

Note: Operating in 5600~5650MHz is prohibited in Canada for Master device

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4.1 The Worst Test Modes and Channel Details

1. The EUT has been tested under operating condition.
2. Test program used to control the EUT for staying in continuous transmitting mode is programmed.
3. Investigation has been done on all the possible configurations for searching the worst case. The given UE is pre-scanned among below modes.

Modulation	Transmission Chain				Single Transmission Spatial	Multiple Transmission Spatial
☒ 802.11 a	☒ Ch0	☐ Ch1	☐ Ch2	☐ Ch3	☒ 1TX	☐ 2TX
☒ 802.11 n	☒ Ch0	☐ Ch1	☐ Ch2	☐ Ch3	☒ SISO	☐ MIMO
☐ 802.11 ac	☐ Ch0	☐ Ch1	☐ Ch2	☐ Ch3	☐ SISO	☐ MIMO
☐ 802.11 ax	☐ Ch0	☐ Ch1	☐ Ch2	☐ Ch3	☐ SISO	☐ MIMO

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4.1.1 RADIATED EMISSION TEST:

RADIATED EMISSION TEST (BELOW 1 GHz)						
MODE	FREQUENCY BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DAT A RATE (Mbps)	ANTENNA PORT
802.11a	5180~5240	36 to 48	44	OFDM	6	ch0
	5260~5320	52 to 64	60			
	5500~5720	100 to 144	116			
	5745~5825	149 to 165	157			

RADIATED EMISSION TEST (ABOVE 1 GHz)						
MODE	FREQUENCY BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DAT A RATE (Mbps)	ANTENNA PORT
802.11a	5180~5240	36 to 48	36,44,48	OFDM	6	ch0
	5260~5320	52 to 64	52,60,64			
	5500~5720	100 to 144	100,116,140,144			
	5745~5825	149 to 165	149,157,165			
802.11n_HT20	5180~5240	36 to 48	36,44,48	OFDM	MCS0	ch0
	5260~5320	52 to 64	52,60,64			
	5500~5720	100 to 144	100,116,140,144			
	5745~5825	149 to 165	149,157,165			
802.11n_HT40	5190~5230	38 to 46	38,46	OFDM	MCS0	ch0
	5270~5310	54 to 62	54,62			
	5510~5670	102 to 142	102,110,134,142			
	5755~5795	151 to 159	151,159			

Note:

The field strength of radiation emission was measured as EUT three orthogonal plans, E1 / E2 / H, are positioned to pre-scan the emission generating the highest one. The worst **E1 plane & E2 Plane** position is tested, and recorded.

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4.1.2 ANTENNA PORT CONDUCTED MEASUREMENT:

CONDUCTED TEST						
MODE	FREQUENCY BAND (MHz)	AVAILABLE	TESTED	MODULATION	DATA RATE	ANTENNA
		CHANNEL	CHANNEL		(Mbps)	PORT
802.11a	5180~5240	36 to 48	36,44,48	OFDM	6	ch0
	5260~5320	52 to 64	52,60,64			
	5500~5720	100 to 144	100,116,140,144			
	5745~5825	149 to 165	149,157,165			
802.11n_HT20	5180~5240	36 to 48	36,44,48	OFDM	MCS0	ch0
	5260~5320	52 to 64	52,60,64			
	5500~5720	100 to 144	100,116,140,144			
	5745~5825	149 to 165	149,157,165			
802.11n_HT40	5190~5230	38 to 46	38,46	OFDM	MCS0	ch0
	5270~5310	54 to 62	54,62			
	5510~5670	102 to 142	102,110,134,142			
	5755~5795	151 to 159	151,159			

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5 MEASUREMENT UNCERTAINTY

Test Items	Uncertainty
AC Power Line Conducted Emission	+/- 2.34 Db
Emission Bandwidth	+/- 1.53 Hz
The Maximum Output Power Measurement	+/- 1 Db
Peak Power Spectral Density Measurement	+/- 1.53 Db
Frequency Stability	+/- 1.53 Hz
Temperature	+/- 0.4 °C
Humidity	+/- 3.5 %
DC / AC Power Source	+/- 1 %

Radiated Spurious Emission Measurement Uncertainty			
Polarization: Vertical	+/-	2.64 Db	9kHz~30MHz
	+/-	4.93 Db	30MHz – 1000MHz
	+/-	4.81 Db	1GHz – 18GHz
	+/-	4.52 Db	18GHz – 40GHz
Polarization: Horizontal	+/-	2.64 Db	9kHz~30MHz
	+/-	4.45 Db	30MHz – 1000MHz
	+/-	4.81 Db	1GHz – 18GHz
	+/-	4.52 Db	18GHz – 40GHz

Note:

1. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
2. The conformity assessment statement in this report is based solely on the test results, measurement uncertainty is excluded.

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6 CONDUCTED EMISSION TEST

6.1 Standard Applicable

Frequency range within 150 kHz to 30 MHz shall not exceed the Limit table as below.

Frequency range MHz	Limits Db(Uv)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

Note

- 1.The lower limit shall apply at the transition frequencies
- 2.The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

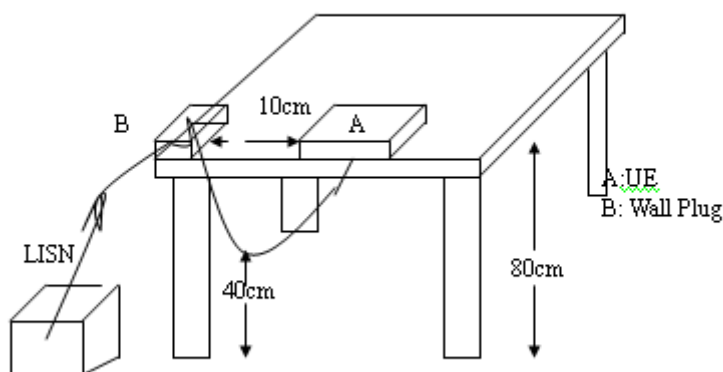
6.2 Measurement Equipment Used

N/A

6.3 EUT Setup

1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI C63.10:2013.
2. The AC/DC Power adaptor of EUT was plug-in LISN. The rear of the EUT and peripherals were placed flushed with the rear of the tabletop.
3. The LISN was connected with 120Vac/60Hz power source.

6.4 Test SET-UP



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6.5 Measurement Procedure

1. The EUT was placed on a table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all phases of power being supplied by given UE are completed.

6.6 Measurement Result

N/A; Powered from power supply.

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7 DUTY CYCLE TEST SIGNAL

Pre-analysis Check: While conducting average power measurement, duty cycle of each mode shall be checked to ensure its duty cycle in order to compensate for the loss due to insufficient ratio of duty cycle.

All duty cycle is pre-scanned, and result as obtained below shows only the most representative ones where duty cycle is conducted as the given transmission with given virtual operation that expresses the percentage.

7.1 Measurement Procedure:

1. Set span = Zero
2. RBW = 8MHz
3. VBW = 8MHz,
4. Detector = Peak

Duty Cycle:

Duty Cycle

Mode	Duty Cycle (%) =Ton / (Ton+Toff)	Duty Factor (dB) =10*log (1/Duty Cycle)	1/T (kHz)	VBW setting (kHz)
802.11a	94.24	0.26	0.58	1.00
802.11n_20	93.88	0.27	0.62	1.00
802.11n_40	88.88	0.51	1.25	2.00

Duty Cycle Factor: $10 * \log(1/0.9424) = 0.26$

Duty Cycle Factor: $10 * \log(1/0.9388) = 0.27$

Duty Cycle Factor: $10 * \log(1/0.8888) = 0.51$

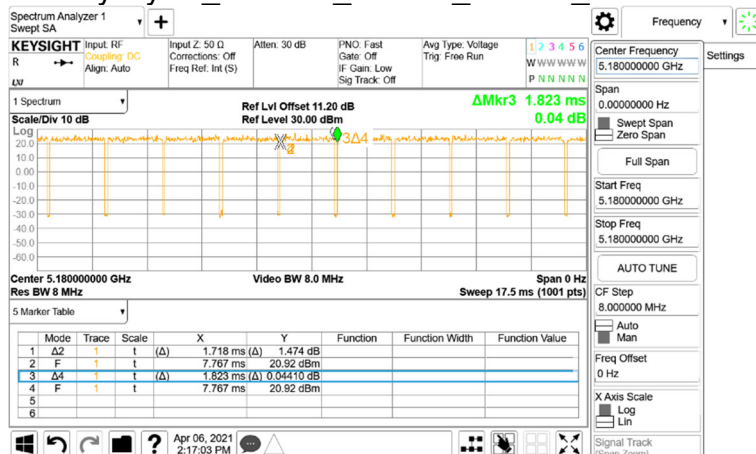
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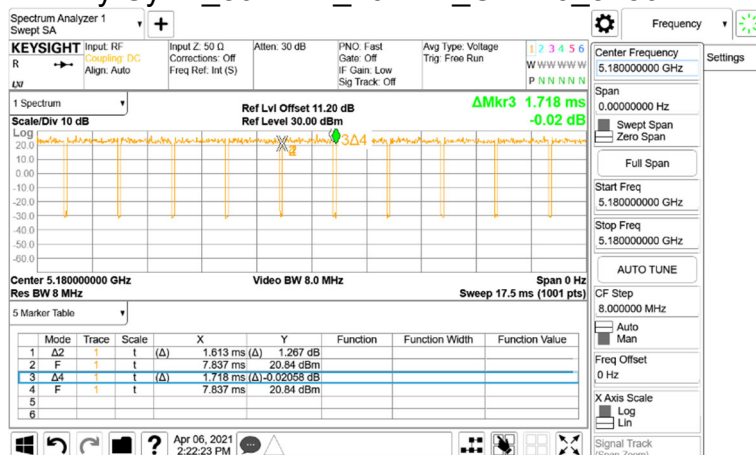
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7.2 DUTY CYCLE TEST SIGNAL MEASUREMENT RESULT

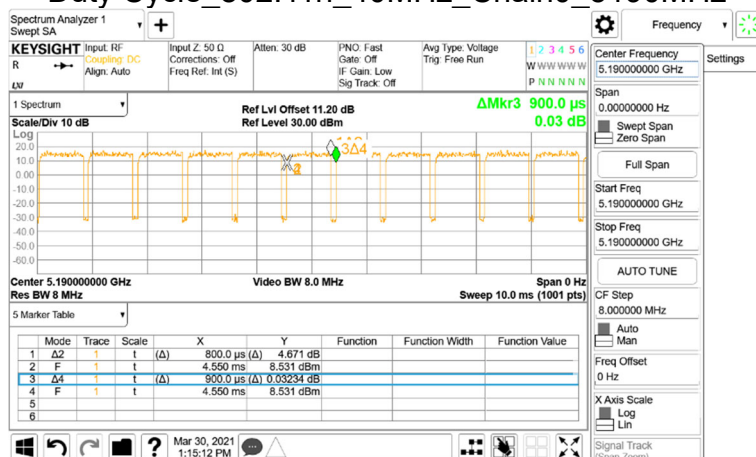
Duty Cycle_802.11a_20MHz_Chain0_5180MHz



Duty Cycle_802.11n_20MHz_Chain0_5180MHz



Duty Cycle_802.11n_40MHz_Chain0_5190MHz



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8 EMISSION BANDWIDTH MEASUREMENT

8.1 Standard Applicable

There is no limit bandwidth for U-NII-1, U-NII-2-A and U-NII-2-C.

The minimum of 6dB Bandwidth measurement is 0.5 MHz for U-NII-3

8.2 Measurement Procedure

1. Place the EUT on the table and set it in transmitting mode.
2. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules.
3. Remove the antenna from the EUT and then connect a low loss RF cable from the Antenna port to the spectrum analyzer.
 - 3.a. 26dB Band width Measurement: Set the spectrum analyzer as 1% of emission BW
Sweep=auto,
Detector = Peak,
Trace Mode = Max Hold,
Manually readjust RBW until the RBW/EBW ratio is 1% based on EBW as observed on the result of pre-sequence measurement.
 - 3.b. Mark the peak frequency and -26dB (upper and lower) frequency.
4. Repeat the procedures as list above until all test default channels (low, middle, and high) are completed.
5. Minimum Emission Bandwidth for the band 5.725-5.850GHz.
 - a. Set the spectrum analyzer as
RBW = 100 kHz,
VBW = 3*RBW,
Span = 30M/50MHz,
Detector=Peak,
Sweep=auto
 - b. Mark the peak frequency and -6dB (upper and lower) frequency.
6. For 99% Bandwidth: Set the spectrum analyzer as
RBW=1%,
VBW = 3*RBW,
Span = 30M/50MHz,
Detector=Sample,
Sweep=auto.
7. Turn on the 99% bandwidth function, max reading.
8. Repeat above procedures until all frequency of interest measured was complete.

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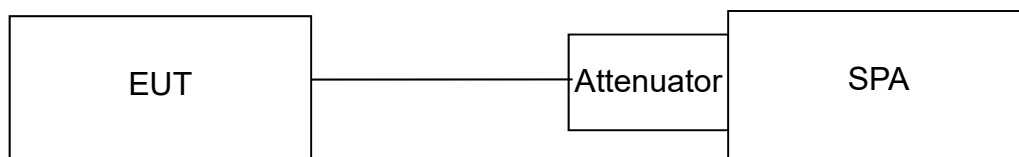
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8.3 Measurement Equipment Used

Conducted Emission Test Site: Conducted A					
EQUIPMENT TYPE	MFR/BRAND	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	KEYSIGHT	N9010B	MY59071573	06/26/2020	06/25/2021
DC Power Supply	Agilent	E3640A	MY53130054	09/07/2020	09/06/2021
Attenuator	Marvelous	MVE2213-10	RF09	11/19/2020	11/18/2021
DC Block	PASTERNAK	PE8210	RF151	11/19/2020	11/18/2021

8.4 Test Set-up



8.5 Measurement Result

8.5.1 FCC 26dB Bandwidth

802.11a_Ch0		
Freq. (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5180	22.75	13.570
5220	30.00	14.770
5240	28.69	14.580
5260	28.98	14.620
5300	30.00	14.770
5320	23.63	13.730
5500	24.33	13.860
5580	28.49	14.550
5700	29.04	14.630
5720(U-NII 2C)	15.58	11.930
5720(U-NII 3)	5.58	7.470

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802.11n_HT20_Ch0

Freq. (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5180	22.00	13.420
5220	27.89	14.450
5240	28.77	14.590
5260	28.79	14.590
5300	29.07	14.630
5320	20.39	13.090
5500	20.27	13.070
5580	20.09	13.030
5700	27.28	14.360
5720(U-NII 2C)	15.48	11.900
5720(U-NII 3)	5.48	7.380

802.11n_HT40_Ch0

Freq. (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5190	40.26	16.050
5230	50.00	16.990
5270	49.97	16.990
5310	40.54	16.080
5510	42.50	16.280
5550	47.87	16.800
5670	49.28	16.930
5710(U-NII 2C)	35.25	15.470
5710(U-NII 3)	5.25	7.200

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8.5.2 6dB Bandwidth (5725 MHz~ 5850 MHz) measure with Peak detector for FCC

802.11a_Ch0		
Freq. (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5745	16.41	12.150
5785	16.38	12.140
5825	16.33	12.130

802.11n_HT20_Ch0		
Freq. (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5745	17.64	12.460
5785	17.28	12.380
5825	17.57	12.450

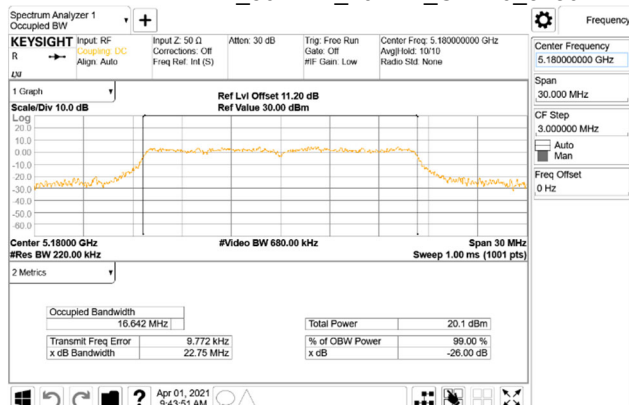
802.11n_HT40_Ch0		
Freq. (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5755	35.77	15.540
5795	35.70	15.530

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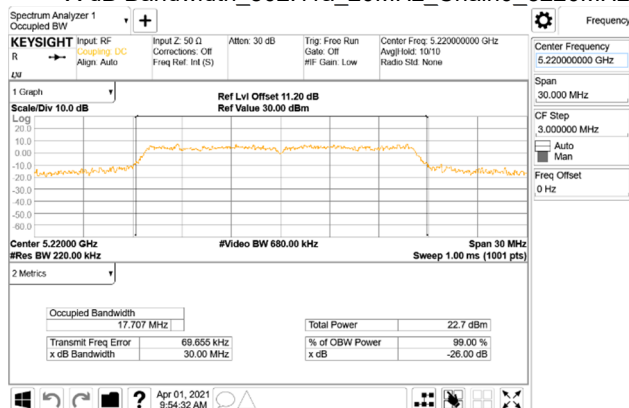
X dB Bandwidth_802.11a_20MHz_Chain0_5180MHz



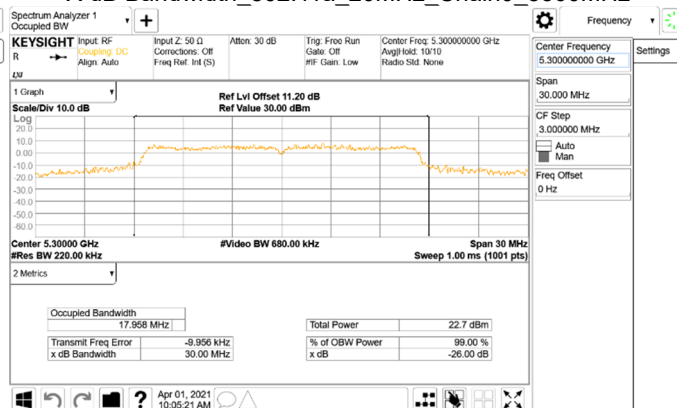
X dB Bandwidth_802.11a_20MHz_Chain0_5260MHz



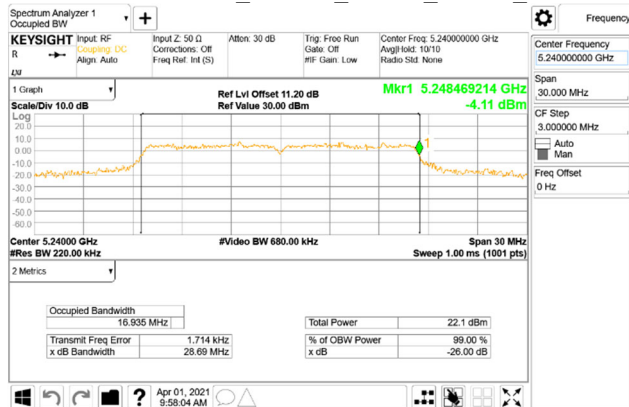
X dB Bandwidth_802.11a_20MHz_Chain0_5220MHz



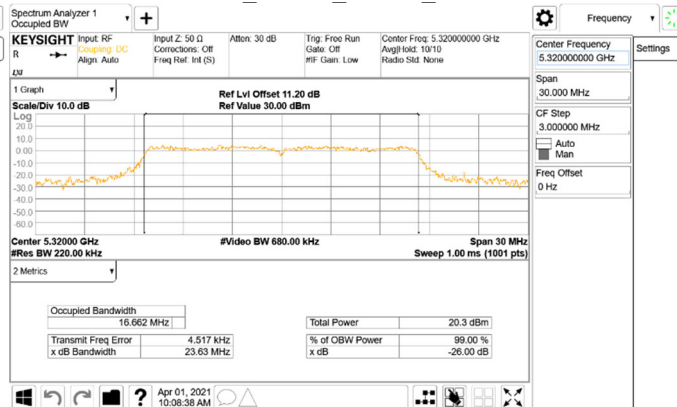
X dB Bandwidth_802.11a_20MHz_Chain0_5300MHz



X dB Bandwidth_802.11a_20MHz_Chain0_5240MHz



802.11a_20MHz_Chain0_5320MHz

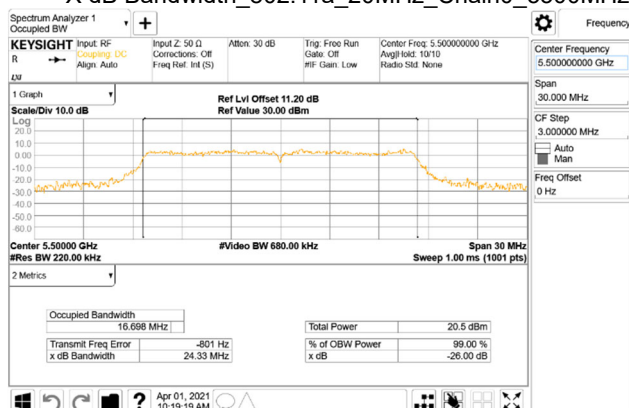


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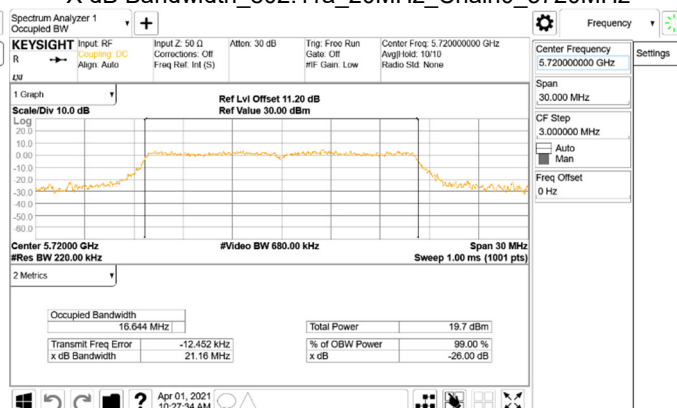
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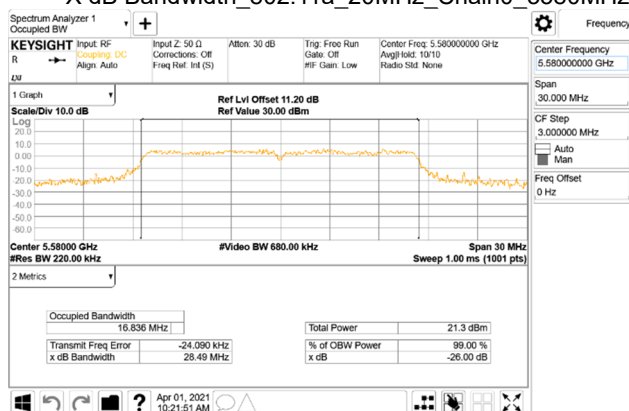
X dB Bandwidth_802.11a_20MHz_Chain0_5500MHz



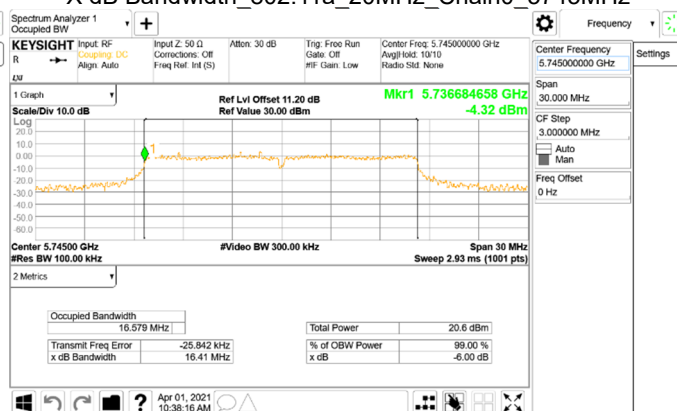
X dB Bandwidth_802.11a_20MHz_Chain0_5720MHz



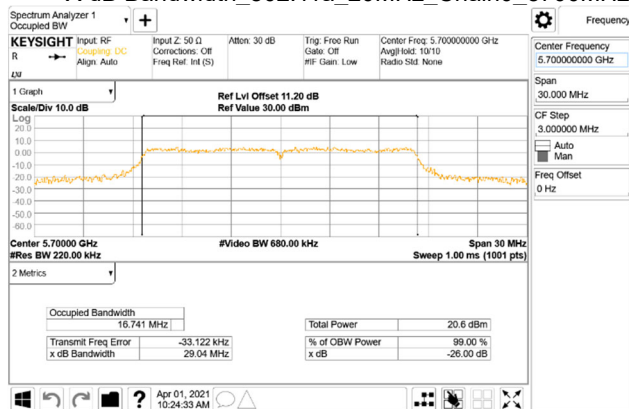
X dB Bandwidth_802.11a_20MHz_Chain0_5580MHz



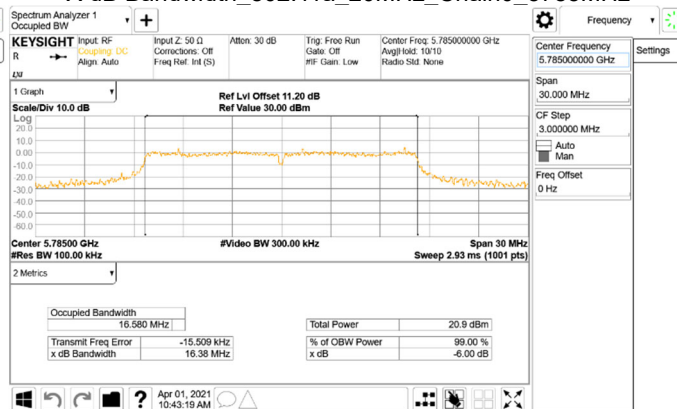
X dB Bandwidth_802.11a_20MHz_Chain0_5745MHz



X dB Bandwidth_802.11a_20MHz_Chain0_5700MHz



X dB Bandwidth_802.11a_20MHz_Chain0_5785MHz

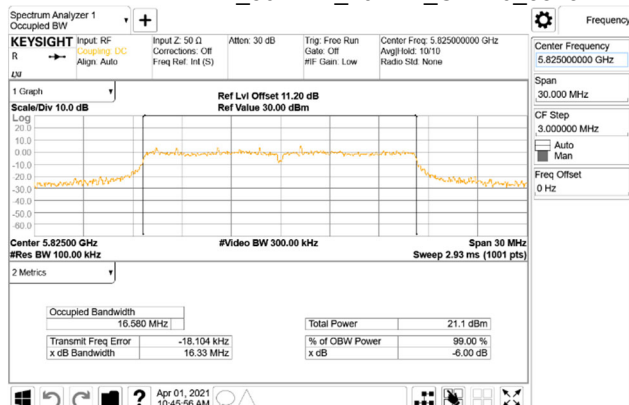


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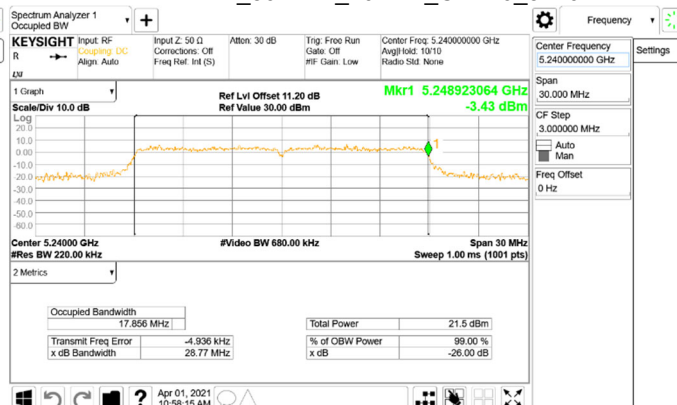
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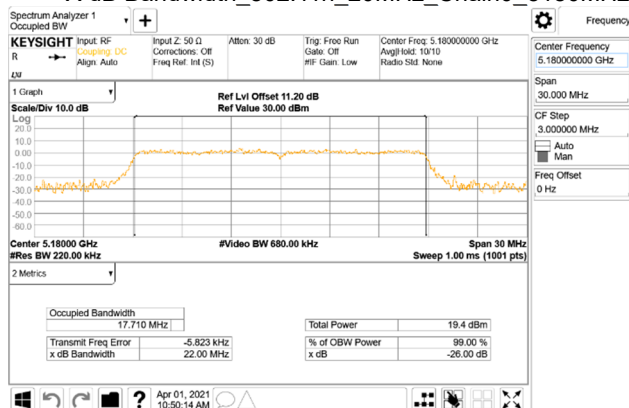
X dB Bandwidth_802.11a_20MHz_Chain0_5825MHz



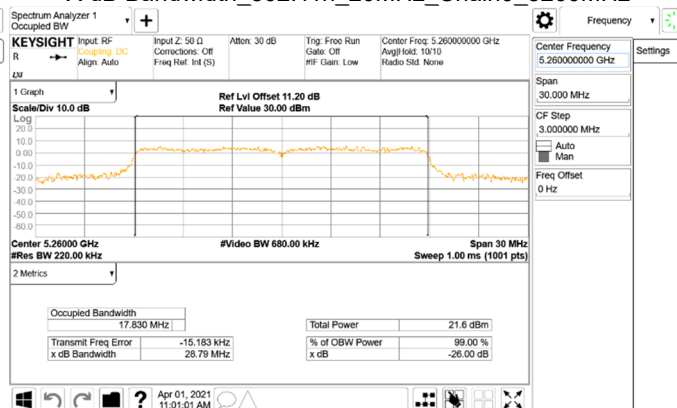
X dB Bandwidth_802.11n_20MHz_Chain0_5240MHz



X dB Bandwidth_802.11n_20MHz_Chain0_5180MHz



X dB Bandwidth_802.11n_20MHz_Chain0_5260MHz



X dB Bandwidth_802.11n_20MHz_Chain0_5220MHz



X dB Bandwidth_802.11n_20MHz_Chain0_5300MHz

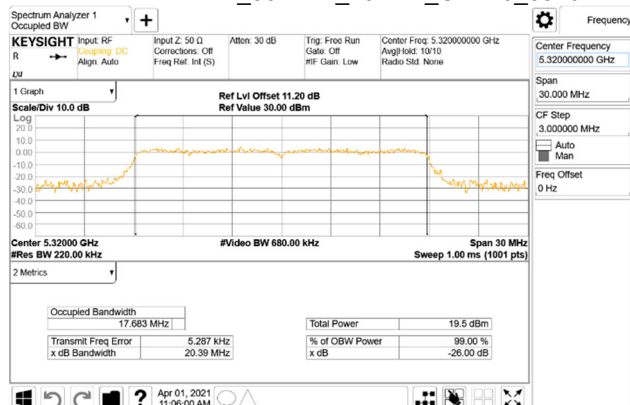


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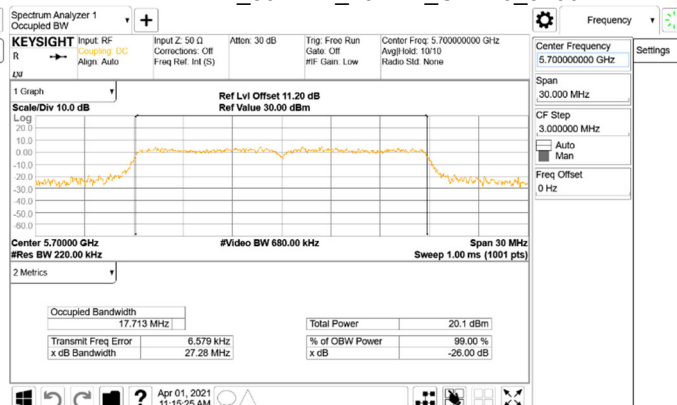
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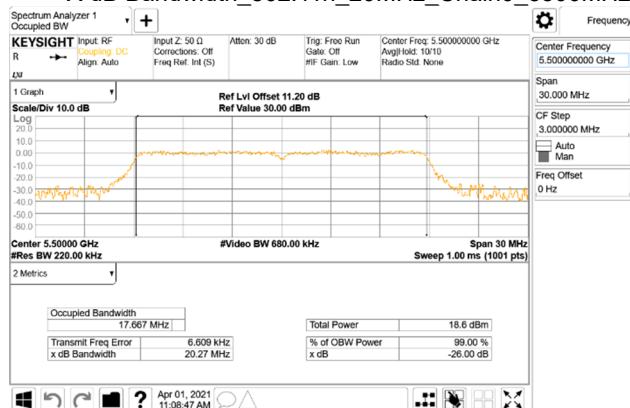
X dB Bandwidth 802.11n 20MHz Chain0 5320MHz



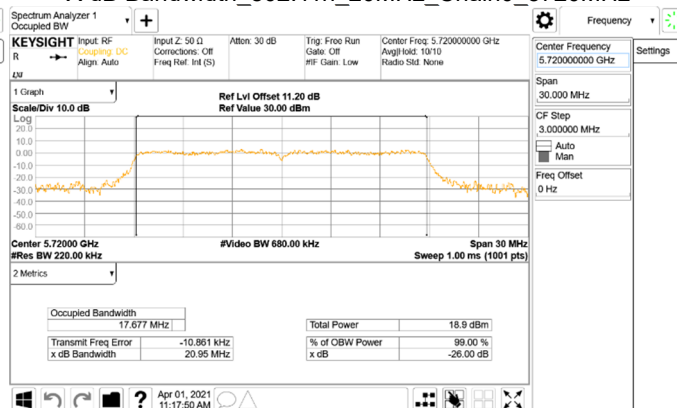
X dB Bandwidth 802.11n 20MHz Chain0 5700MHz



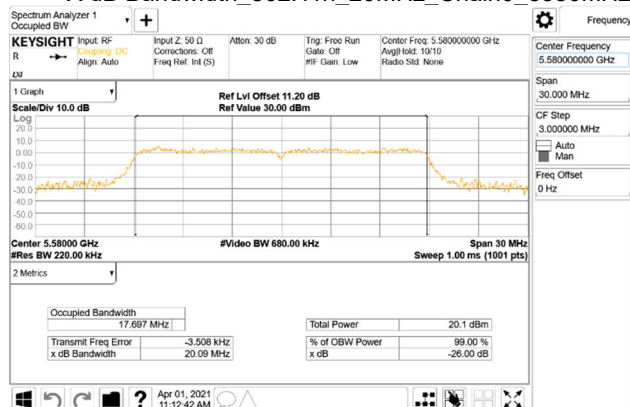
X dB Bandwidth 802.11n 20MHz Chain0 5500MHz



X dB Bandwidth 802.11n 20MHz Chain0 5720MHz



X dB Bandwidth 802.11n 20MHz Chain0 5580MHz



X dB Bandwidth 802.11n 20MHz Chain0 5745MHz

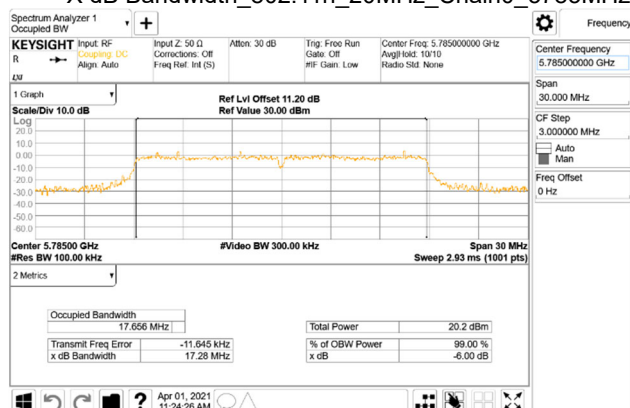


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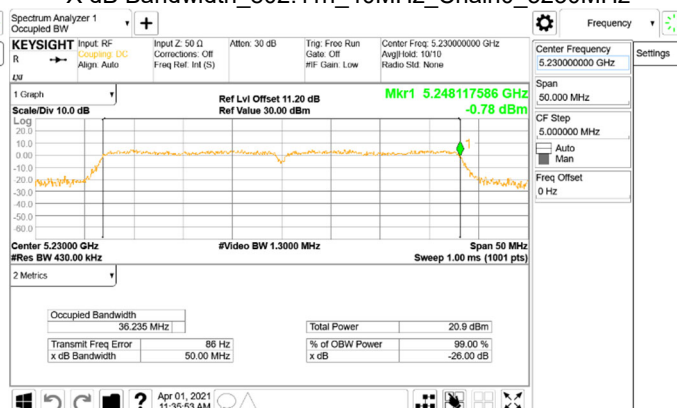
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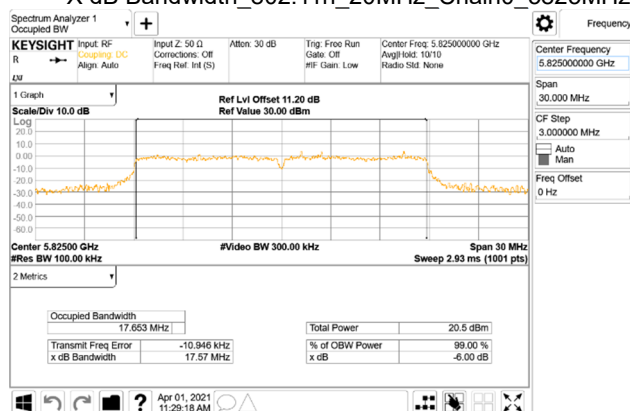
X dB Bandwidth_802.11n_20MHz_Chain0_5785MHz



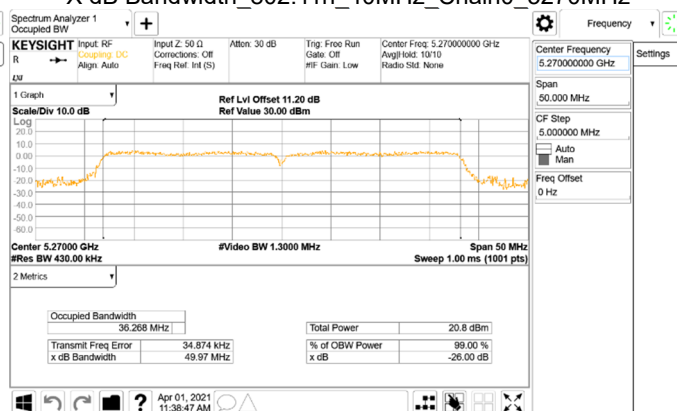
X dB Bandwidth_802.11n_40MHz_Chain0_5230MHz



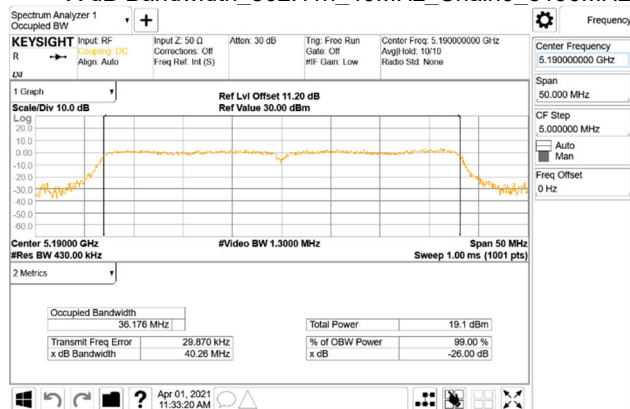
X dB Bandwidth_802.11n_20MHz_Chain0_5825MHz



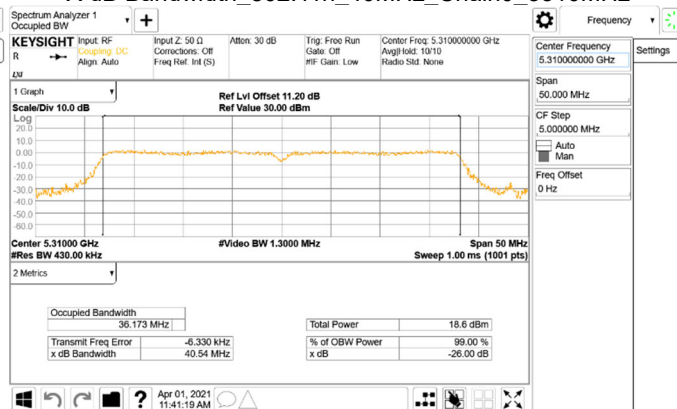
X dB Bandwidth_802.11n_40MHz_Chain0_5270MHz



X dB Bandwidth_802.11n_40MHz_Chain0_5190MHz



X dB Bandwidth_802.11n_40MHz_Chain0_5310MHz

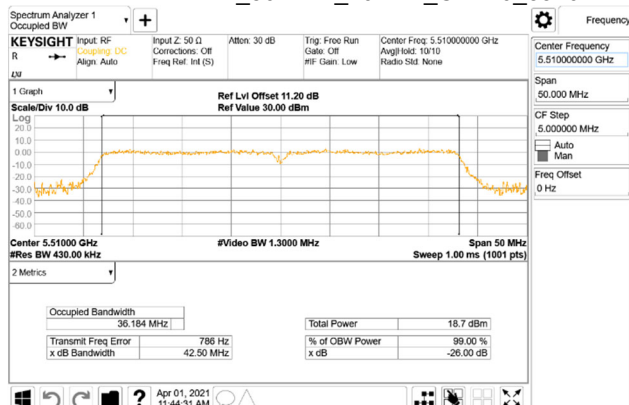


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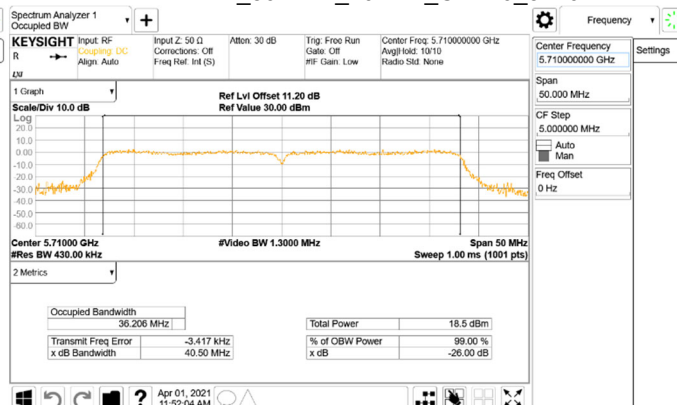
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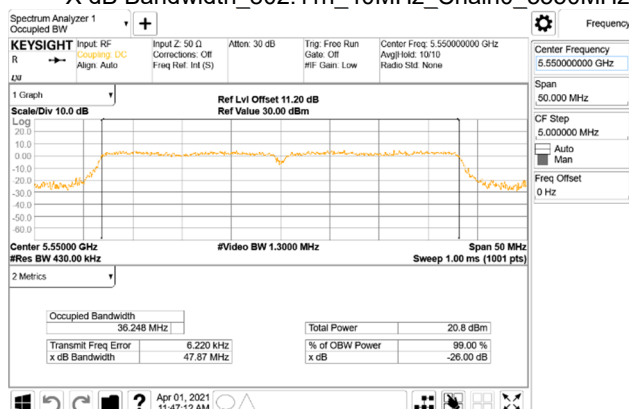
X dB Bandwidth_802.11n_40MHz_Chain0_5510MHz



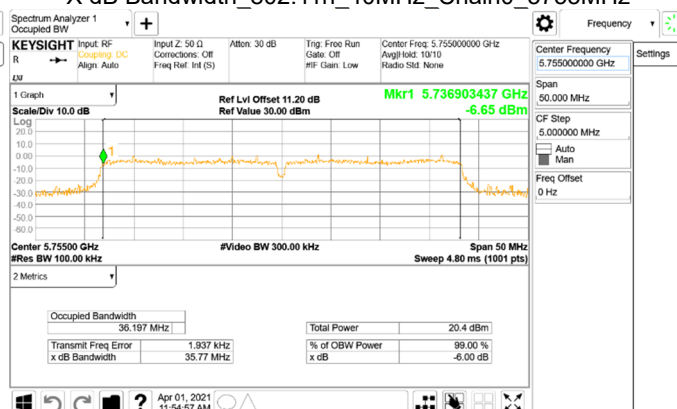
X dB Bandwidth_802.11n_40MHz_Chain0_5710MHz



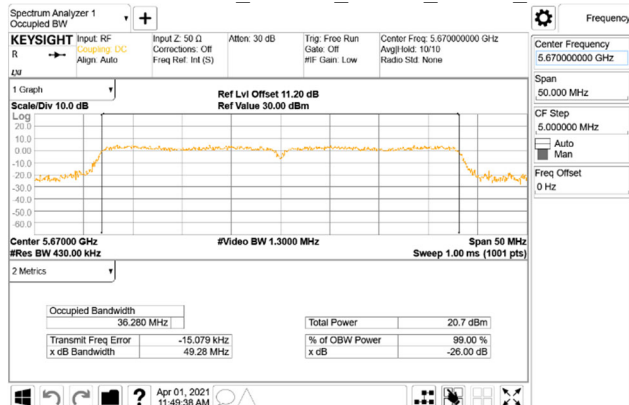
X dB Bandwidth_802.11n_40MHz_Chain0_5550MHz



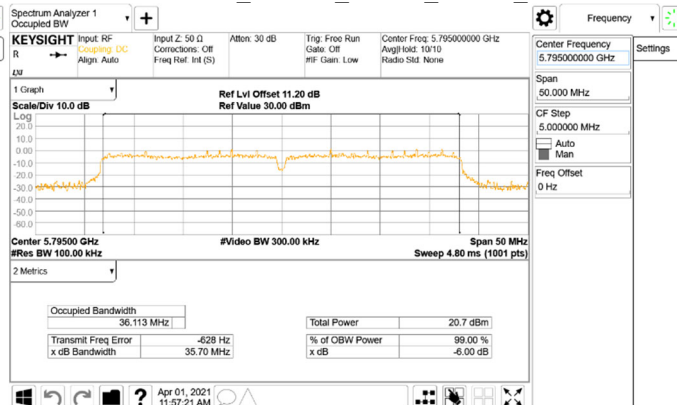
X dB Bandwidth_802.11n_40MHz_Chain0_5755MHz



X dB Bandwidth_802.11n_40MHz_Chain0_5670MHz



X dB Bandwidth_802.11n_40MHz_Chain0_5795MHz



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8.5.3 ISED 99% Bandwidth

802.11a_Ch0

Frequency (MHz)	99% BW (MHz)	10 Log (B) (dB)
5180	16.633	12.210
5220	17.684	12.480
5240	16.884	12.270
5260	16.910	12.280
5300	17.686	12.480
5320	16.635	12.210
5500	16.650	12.210
5580	16.721	12.230
5700	16.682	12.220
5720	16.641	12.210

802.11n_HT20_Ch0

Frequency (MHz)	99% BW (MHz)	10 Log (B) (dB)
5180	17.633	12.460
5220	17.794	12.500
5240	17.788	12.500
5260	17.799	12.500
5300	17.787	12.500
5320	17.672	12.470
5500	17.638	12.460
5580	17.632	12.460
5700	17.688	12.480
5720	17.658	12.470

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802.11n_HT40_Ch0

Frequency (MHz)	99% BW (MHz)	10 Log (B) (dB)
5190	36.158	15.580
5230	36.216	15.590
5270	36.264	15.590
5310	36.198	15.590
5510	36.132	15.580
5550	36.229	15.590
5670	36.188	15.590
5710	36.159	15.580

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8.5.4 6dB Bandwidth (5725 MHz~ 5850 MHz) measure with sample detector for ISED

802.11a_Ch0

Frequency (MHz)	99% BW (MHz)	6dB BW (MHz)
5745	16.757	16.510
5785	16.755	16.420
5825	16.756	16.520

802.11n_HT20_Ch0

Frequency (MHz)	99% BW (MHz)	6dB BW (MHz)
5745	17.743	17.550
5785	17.718	17.580
5825	17.723	17.580

802.11n_HT40_Ch0

Frequency (MHz)	99% BW (MHz)	6dB BW (MHz)
5755	36.233	36.310
5795	36.259	36.240

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8.5.1 BW Verification for DFS Function

802.11a_Ch0		
Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5240	5248.47	< 5250
5745	5736.68	> 5725

802.11n_HT20_Ch0		
Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5240	5248.92	< 5250
5745	5736.15	> 5725

802.11n_HT40_Ch0		
Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5230	5248.11	< 5250
5755	5736.90	> 5725

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