TEST REPORT

Report Number. : R13687586-E3

Applicant	:	Sonos Inc. 614 Chapala Street Santa Barbara, CA, 93101, U.S.A
Model	:	S36
FCC ID	:	SBVRM036
IC	:	5373A-RM036
EUT Description	:	Wireless Smart Speaker
Test Standard(s)	:	FCC 47 CFR PART 15 SUBPART E: 2021 ISED RSS-247 ISSUE 2: 2017 ISED RSS-GEN ISSUE 5 + A1: 2019 + A2: 2021

Date Of Issue:
2022-03-08

Prepared by:
UL LLC
12 Laboratory Dr.
Research Triangle Park, NC 27709 U.S.A.
TEL: (919) 549-1400

ACCREDITED
CERT #0751.06

REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	2021-05-25	Initial Issue	Cristian Melara
V2	2021-11-17	Updated firmware	Cristian Melara
V3	2022-02-02	Corrected Section 9.5.1 (High Channel frequency)	Niklas Haydon
V4	2022-02-07	Editorial corrections, simultaneous transmission	Niklas Haydon
V5	2022-03-08	Updated firmware in section 6.4	Lariah Ijames

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TABLE OF CONTENTS

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: Sonos Inc.
614 Chapala Street
Santa Barbara, CA, 93101, U.S.A

EUT DESCRIPTION: Wireless Smart Speaker

MODEL: S36

SERIAL NUMBER: Radiated Sample: 00-0E-58-02-A8-F0:5
Conducted Samples: 00-00-03-3F-66-BZ:6
00-00-00-3F-5F-97:E

SAMPLE RECEIPT DATE: 2021-05-10

DATE TESTED: 2021-05-12 to 2021-05-18

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart E: 2021	Complies
ISED RSS-247 Issue 2: 2017	Complies
ISED RSS-GEN Issue 5 + A1: 2019 + A2: 2021	Complies

UL LLC tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.

This document may not be altered or revised in any way unless done so by UL LLC and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL LLC will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by A2LA, NIST, or any agency of the U.S. government.

Approved & Released For
UL LLC. By:

Jeffrey Moser
Operations Manager
Consumer Technology Division
UL LLC.

Prepared By:

Cristian Melara
Engineer
Consumer Technology Division
UL LLC.

2. TEST RESULT SUMMARY

FCC Clause	ISED Clause	Requirement	Result	Comment
See Comment		Duty Cycle	Reporting purposes only	Per ANSI C63.10, Section 12.2.
See Comment	RSS-GEN 6.7	26dB BW/99% OBW	Reporting purposes only	Per ANSI C63.10 Sections 6.9.2 and 6.9.3
15.407 (e)	RSS-247 6.2.4.1	6 dB BW	Complies	None.
15.407 (a) (1-4), (h) (1)	RSS-247 6.2	Output Power	Complies	None.
15.407 (a) (1-3, 5)	RSS-247 6.2	PSD	Complies	None.
15.209, 15.205, 15.407 (b)	RSS-GEN 8.9, 8.10, RSS-247 6.2	Radiated Emissions	Complies	None.
15.207	RSS-Gen 8.8	AC Mains Conducted Emissions	Complies	None.

This report contains data provided by the applicant which can impact the validity of results. UL LLC is only responsible for the validity of results after the integration of the data provided by the customer.

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3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with;

- FCC CFR 47 Part 2: 2021
- FCC CFR 47 Part 15: 2021,
- FCC KDB 662911 D01 v02r01,
- FCC KDB 905462 D06 v02
- FCC KDB 789033 D02 v02r01,
- ANSI C63.10-2013,
- RSS-GEN Issue 5: A2:2021
- RSS-247 Issue 2: 2017

4. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 12 Laboratory Drive, Research Triangle Park, North Carolina, USA and 2800 Perimeter Park Dr., Suite B, Morrisville, North Carolina, USA. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

	Address	ISED CABID	ISED Company Number	FCC Registration
☐	Building: 12 Laboratory Dr RTP, NC 27709, U.S.A	US0067	2180C	703469
☒	Building: 2800 Perimeter Park Dr., Suite B Morrisville, NC, 27560 U.S.A			

UL LLC (RTP), CABID US00067, is accredited by NVLAP, Laboratory Code 200246-0

5. DECISION RULES AND MEASUREMENT UNCERTAINTY

5.1. METROLOGICAL TRACEABILITY

All test and measuring equipment utilized to perform the tests documented in this report are calibrated on a regular basis, with a maximum time between calibrations of one year or the manufacturers' recommendation, whichever is less, and where applicable is traceable to recognized national standards.

5.2. DECISION RULES

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4:2012 Clause 8.2. (Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)

5.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Radio Frequency (Spectrum Analyzer)	141.2 Hz
Occupied Channel Bandwidth	1.22%
RF output power, conducted	1.3 dB (PK) 0.45 dB (AV)
Power Spectral Density, conducted	2.47 dB
Unwanted Emissions, conducted	1.94 dB
All emissions, radiated	6.01 dB
Conducted Emissions (0.150-30MHz) - LISN	3.40 dB
Temperature	2.26°C
Humidity	6.79%
DC Supply voltages	1.70%
Time	3.39%

Uncertainty figures are valid to a confidence level of 95%.

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5.4. SAMPLE CALCULATION

RADIATED EMISSIONS

Where relevant, the following sample calculation is provided:
Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)
36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

MAINS CONDUCTED EMISSIONS

Where relevant, the following sample calculation is provided:
Final Voltage (dBuV) = Measured Voltage (dBuV) + Cable Loss (dB) + Limiter Factor (dB) + LISN Insertion Loss.
36.5 dBuV + 0 dB +10.1 dB+ 0 dB = 46.6 dBuV

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6. EQUIPMENT UNDER TEST

6.1. EUT DESCRIPTION

The EUT is a wireless smart speaker with a BLE radio and 2.4GHz/5GHz WLAN radio. This report covers 5GHz WLAN testing only.

6.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

5.2 GHz BAND (FCC/IC)

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5.2 GHz band, 2TX			
5180-5240	802.11a	14.67	29.31
5180-5240	802.11n HT20	14.43	27.73

SISO and MIMO per chain power are set to the same level

5.3 GHz BAND (FCC/IC)

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5.3 GHz band, 2TX			
5260 - 5320	802.11a	21.21	132.13
5260 - 5320	802.11n HT20	21.18	131.22

SISO and MIMO per chain power are set to the same level

5.6 GHz BAND (FCC/IC)

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5.6 GHz band, 2TX			
5500-5700	802.11a	19.57	90.57
5500-5700	802.11n HT20	20.18	104.23

SISO and MIMO per chain power are set to the same level

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5.8 GHz BAND (FCC/IC)

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5.8 GHz band, 2TX			
5745-5825	802.11a	22.95	197.24
5745-5825	802.11n HT20	22.87	193.64

SISO and MIMO per chain power are set to the same level

6.3. DESCRIPTION OF AVAILABLE ANTENNAS

The EUT supports 2 antennas. The antenna gain and type, as provided by the manufacturer, are as follows:

The radio utilizes 2 dual band di-pole antennas. Tx chains are uncorrelated for power and correlated for PSD due to the device supporting CDD in all MIMO modes. The directional gains are as follows:

Band (GHz)	Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Uncorrelated Chains Directional Gain (dBi)	Correlated Chains Directional Gain (dBi)
5.2	4.30	4.50	4.40	7.41
5.3	4.7	4.8	4.75	7.76
5.6	5.1	4.5	4.81	7.82
5.8	5.2	4.5	4.86	7.87

6.4. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was 64-0.13201-diag-S36-rel-202101050731.

6.5. WORST-CASE CONFIGURATION AND MODE

Radiated emissions below 1GHz, above 18GHz, and power line conducted emission were performed with the EUT set to transmit at the channel with highest output power and PSD as worst-case scenario.

Band edge and radiated emissions between 1GHz and 18GHz were performed with the EUT set to transmit at the highest power on low, middle and high channels.

The fundamental of the EUT was investigated in two orthogonal orientations X and Z; it was determined that X orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in X orientation. Y orientation is not used in the field as declared by the client.

All radios that can transmit simultaneously have been evaluated for radiated for all possible combinations of transmission and found to be in compliance.

Radiated and AC mains emissions testing were performed with both antennas transmitting.
Note – The per chain power setting is the same whether in SISO or MIMO modes.

Worst-case data rates as provided by the client were:

802.11a mode: 6 Mbps
802.11n HT20mode: MCS0

6.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Laptop	Lenovo	X220	R9LB8CG	QDS-BRCM1046
Laptop	Lenovo	T440p	PB0294NN	NA
AC Adapter	Lenovo	42T4438	NA	NA
AC Adapter	Lenovo	ADLX90NLC2A	NA	NA

I/O CABLES

I/O Cable List						
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	1	1	Ethernet	Un-shielded	>3m	None
2	2	1	I/O	Shielded	>3m	Connected to AC Mains

SETUP DIAGRAMS

Please refer to R13687586-EP1 for setup diagrams

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7. MEASUREMENT METHOD

On Time and Duty Cycle: KDB 789033 D02 v02r01, Section B.

6 dB Emission BW: KDB 789033 D02 v02r01, Section C.2

26 dB Emission BW: KDB 789033 D02 v02r01, Section C.1

99% Occupied BW: KDB 789033 D02 v02r01, Section D.

Conducted Output Power: KDB 789033 D02 v02r01, Section E.3.b (Method PM-G)

Power Spectral Density: KDB 789033 D02 v02r01, Section F

Unwanted emissions in restricted bands: KDB 789033 D02 v02r01, Sections G.1, G.3, G.4, G.5, and G.6.

Unwanted emissions in non-restricted bands: KDB 789033 D02 v02r01, Sections G.2, G.3, G.4, and G.5.

AC Power Line Conducted Emissions: ANSI C63.10-2013, Section 6.2.

General Radiated Emissions: ANSI C63.10-2013 Section 6.3-6.6, 6.10.5

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8. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

Test Equipment Used - Radiated Disturbance Emissions Test Equipment (Morrisville - South Chamber)

Equip. ID	Description	Manufacturer /Brand	Model Number	Last Cal.	Next Cal.
	0.009-30MHz				
AT0079	Active Loop Antenna	ETS-Lindgren	6502	2020-08-20	2021-08-20
	30-1000 MHz				
AT0075	Hybrid Broadband Antenna	Sunol Sciences Corp.	JB3	2020-10-27	2021-10-27
	1-18 GHz				
AT0072	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2021-05-03	2022-05-03
	18-40 GHz				
AT0063	Horn Antenna, 18-26.5GHz	ARA	MWH-1826/B	2020-10-30	2021-10-30
AT0061	Horn Antenna, 26-40GHz	ARA	MWH-2640/B	2020-10-30	2021-10-30
	Gain-Loss Chains				
S-SAC01	Gain-loss string: 0.009-30MHz	Various	Various	2020-07-10	2021-07-10
S-SAC02	Gain-loss string: 25-1000MHz	Various	Various	2020-07-10	2021-07-10
S-SAC03	Gain-loss string: 1-18GHz	Various	Various	2020-07-06	2021-07-06
S-SAC04	Gain-loss string: 18-40GHz	Various	Various	2020-07-07	2021-07-07
	Receiver & Software				
197955	Spectrum Analyzer	Rohde & Schwarz	ESW44	2021-03-10	2022-03-10
SA0026	Spectrum Analyzer	Agilent	N9030A	2020-07-16	2021-07-16
SOFTEMI	EMI Software	UL	Version 9.5 (04 Mar 2021)		
ATA176 (in S-SAC)	10dB, DC-18GHz, 5W	Mini-Circuits	BW-N10W5		

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Test Equipment Used - Line-Conducted Emissions – Voltage (Morrisville – Conducted 1)

Equip. ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
CBL087	Coax cable, RG223, N-male to BNC-male, 20-ft.	Pasternack	PE3W06143-240	2021-04-05	2022-04-05
HI0090	Environmental Meter	Fisher Scientific	15-077-963	2020-06-26	2021-06-26
LISN003	LISN, 50-ohm/50-uH, 250uH 2-conductor, 25A	Fischer Custom Com.	FCC-LISN-50/250-25-2-01	2020-08-18	2021-08-18
75141	EMI Test Receiver 9kHz-7GHz	Rohde & Schwarz	ESCI 7	2020-08-18	2021-08-18
ATA222	Transient Limiter, 0.009-100MHz	Electro-Metrics	EM-7600	2021-04-05	2022-04-05
PS214	AC Power Source	Elgar	CW2501M (s/n 1523A02396)	NA	NA
SOFTEMI	EMI Software	UL	Version 9.5 (04 MAR 2021)		
	Miscellaneous (if needed)				
LISN008	LISN, 50-ohm/50-uH, 2-conductor, 25A (For support gear only.)	Solar Electronics	8012-50-R-24-BNC	2020-08-08	2021-08-08

Test Equipment Used - Wireless Conducted Measurement Equipment

Equip. ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
	Conducted Room 2				
SA0025	Spectrum Analyzer	Agilent	N9030A	2021-04-01	2022-04-01
PWM002 (PRE0137344)	RF Power Meter	Keysight Technologies	N1911A	2020-07-31	2021-07-31
PWS001 (PRE0137347)	Peak and Avg Power Sensor, 50MHz to 18GHz	Keysight Technologies	N1921A	2020-05-27	2021-05-27
HI0090 (PRE0191271)	Environmental Meter	Fisher Scientific	15-077-963	2020-06-26	2021-06-26
SOFTEMI	Antenna Port Software	UL	Version 2021.04.29, 2021.05.13	NA	NA

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9. ANTENNA PORT TEST RESULTS

9.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

PROCEDURE

KDB 558074 Zero-Span Spectrum Analyzer Method.

ON TIME AND DUTY CYCLE RESULTS

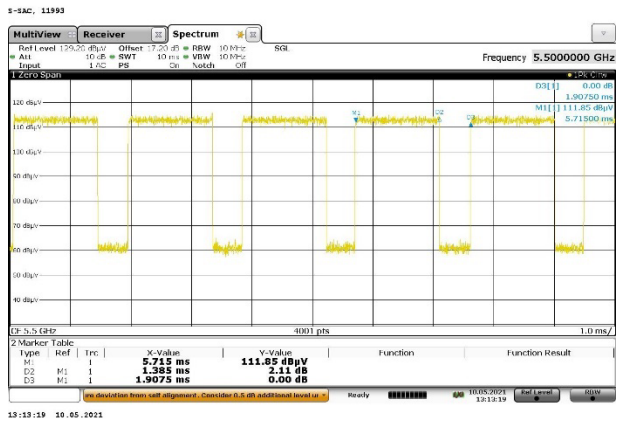
Voltage Averaging Duty Cycle (Radiated Testing)

Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW (kHz)
802.11a CDD Mode	1.385	1.908	0.726	72.61%	2.78	0.722
802.11n HT20 CDD Mode	1.305	1.835	0.711	71.12%	2.96	0.766

Power Averaging Duty Cycle (Conducted Testing)

Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW (kHz)
802.11a CDD Mode	1.385	1.908	0.726	72.59%	1.39	0.722
802.11n HT20 CDD Mode	1.305	1.835	0.711	71.12%	1.48	0.766

DUTY CYCLE PLOTS



DUTY CYCLE 802.11a CDD MODE

DUTY CYCLE 802.11n HT20 CDD MODE

9.2. 26 dB BANDWIDTH

LIMITS

None; for reporting purposes only.

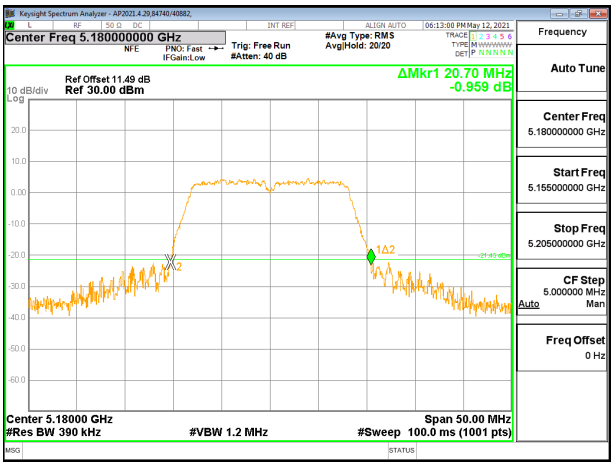
RESULTS

9.2.1. 802.11a MODE IN THE 5.2 GHz BAND

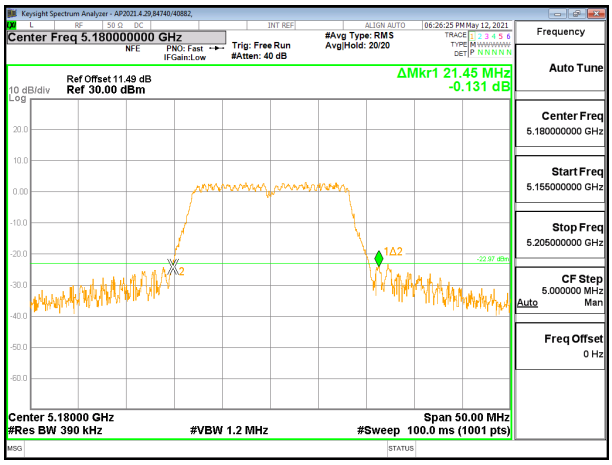
2TX Antenna 0 + Antenna 1 CDD MODE

Channel	Frequency (MHz)	26 dB Bandwidth Antenna 0 (MHz)	26 dB Bandwidth Antenna 1 (MHz)
Low	5180	20.70	21.45
Mid	5200	20.65	20.40
High	5240	20.70	20.50

LOW CHANNEL

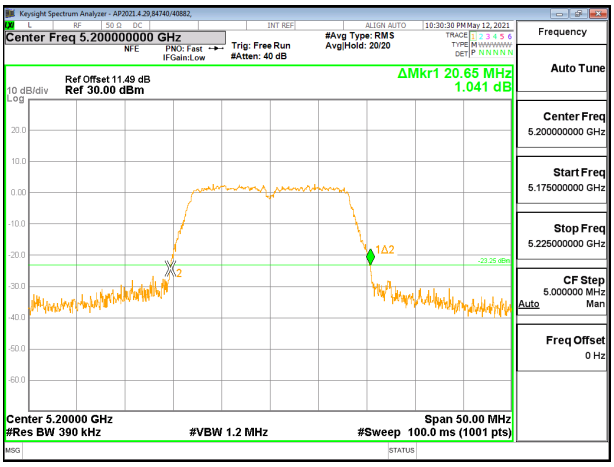


LOW CHANNEL ANTENNA 0



LOW CHANNEL ANTENNA 1

MID CHANNEL



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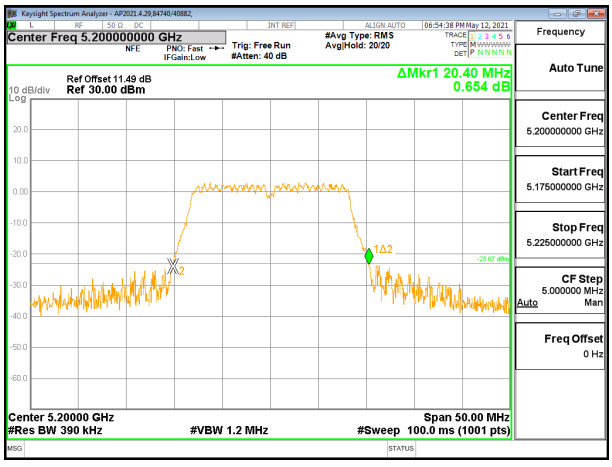

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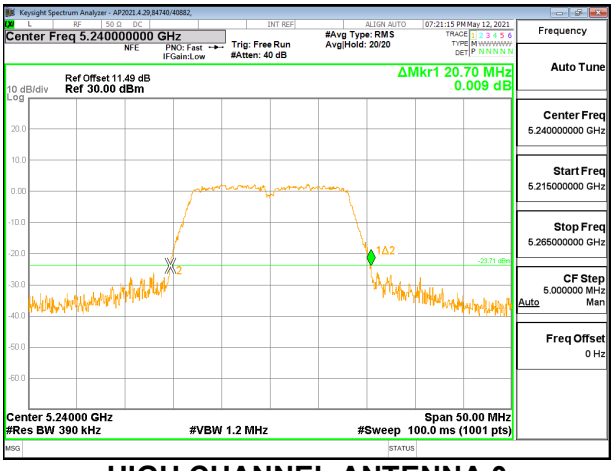
HIGH CHANNEL



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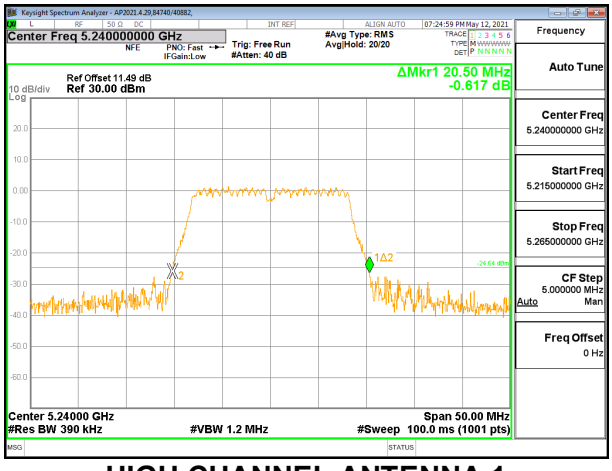


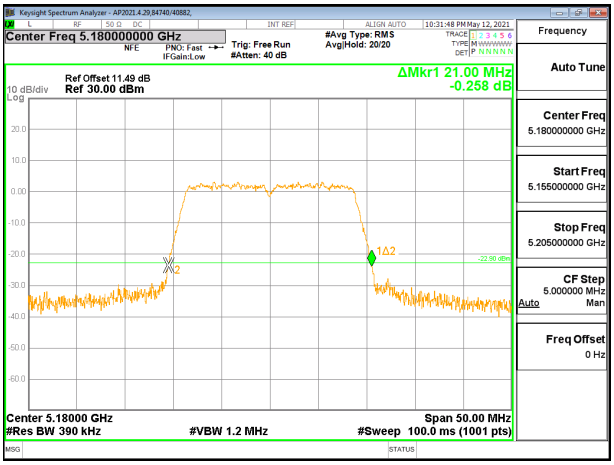
HIGH CHANNEL ANTENNA 1

9.2.2. 802.11n HT20 MODE IN THE 5.2 GHz BAND

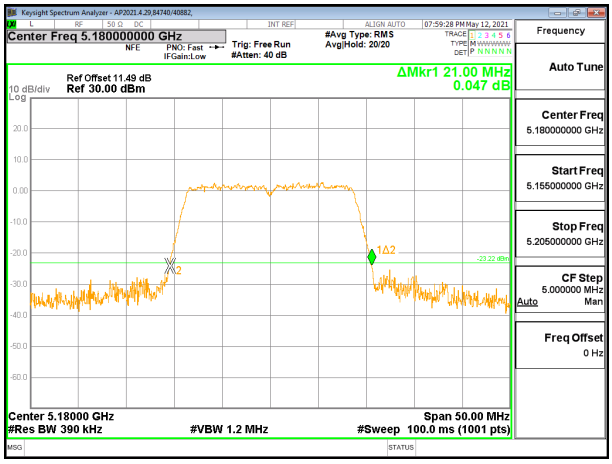
2TX Antenna 0 + Antenna 1 CDD MODE

Channel	Frequency (MHz)	26 dB Bandwidth Antenna 0 (MHz)	26 dB Bandwidth Antenna 1 (MHz)
Low	5180	21.00	21.00
Mid	5200	21.00	20.95
High	5240	21.25	21.05

LOW CHANNEL

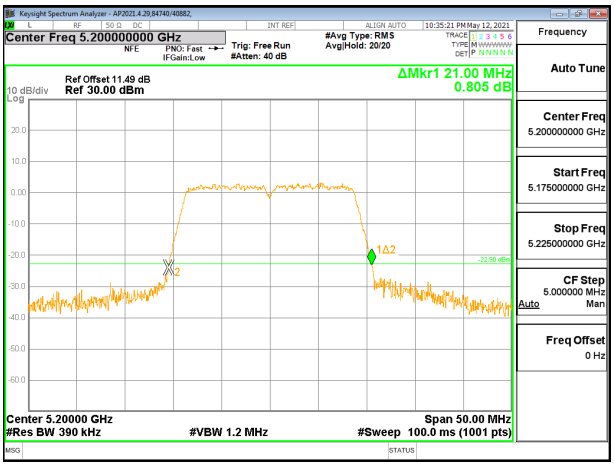


LOW CHANNEL ANTENNA 0



LOW CHANNEL ANTENNA 1

MID CHANNEL



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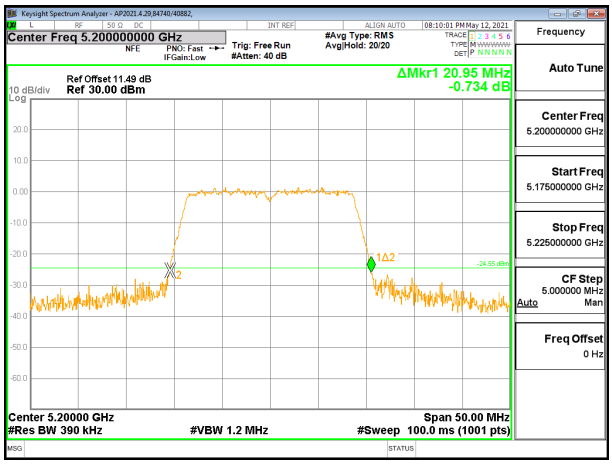
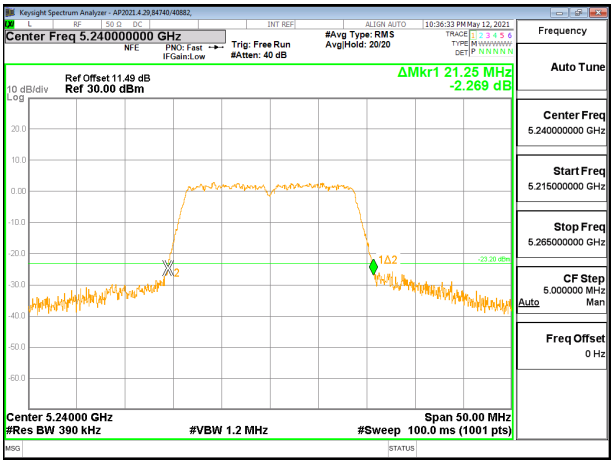
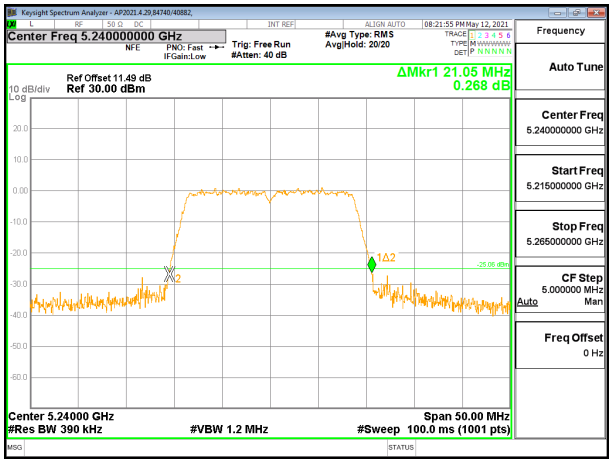


MID CHANNEL ANTENNA 1

HIGH CHANNEL



HIGH CHANNEL ANTENNA 0



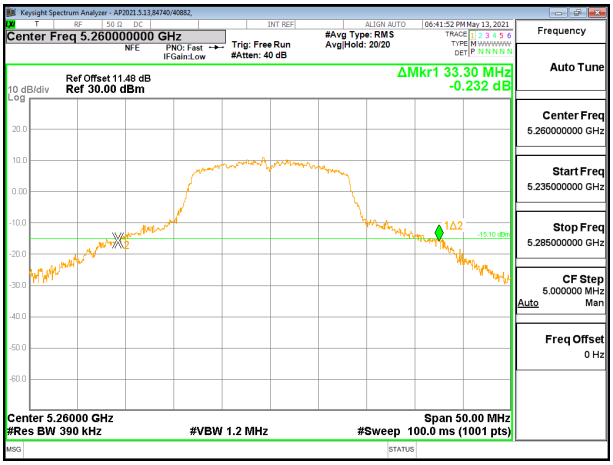
HIGH CHANNEL ANTENNA 1

9.2.3. 802.11a MODE IN THE 5.3 GHz BAND

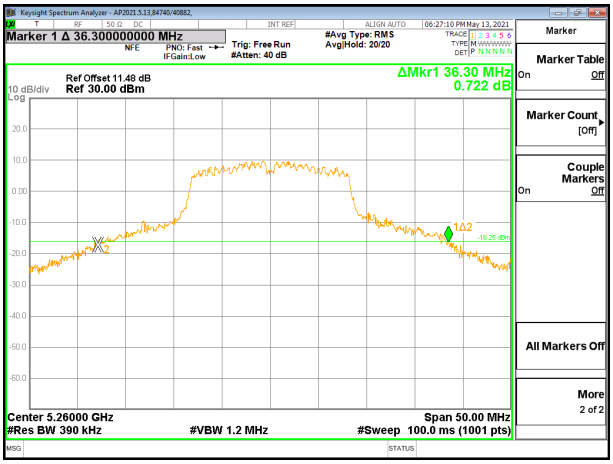
2TX Antenna 0 + Antenna 1 CDD MODE

Channel	Frequency (MHz)	26 dB Bandwidth Antenna 0 (MHz)	26 dB Bandwidth Antenna 1 (MHz)
Low	5260	33.30	36.30
Mid	5300	33.90	36.50
High	5320	27.75	26.55

LOW CHANNEL

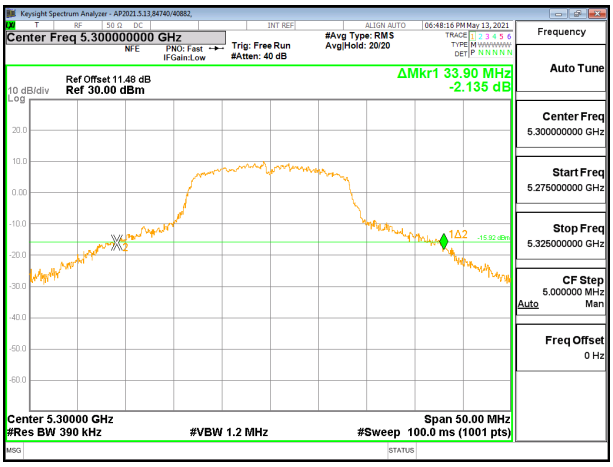


LOW CHANNEL ANTENNA 0

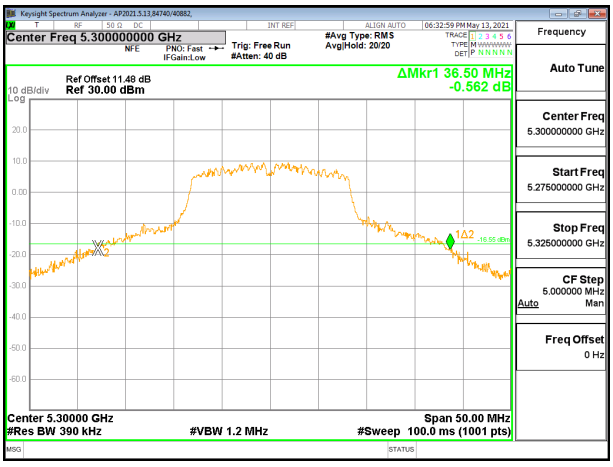


LOW CHANNEL ANTENNA 1

MID CHANNEL

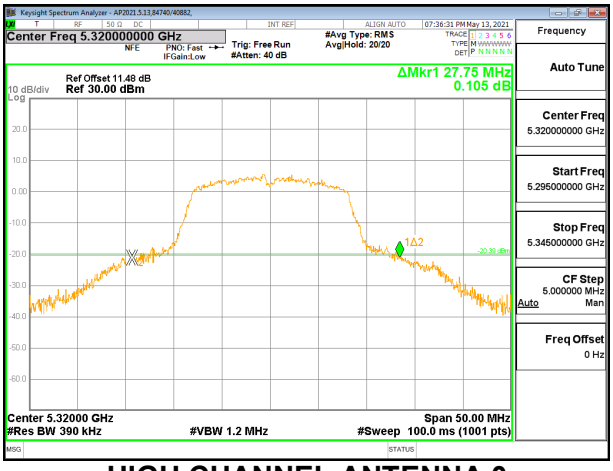


MID CHANNEL ANTENNA 0

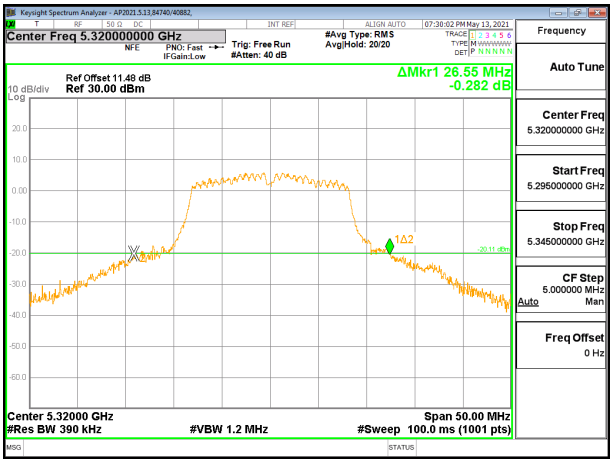


MID CHANNEL ANTENNA 1

HIGH CHANNEL



HIGH CHANNEL ANTENNA 0



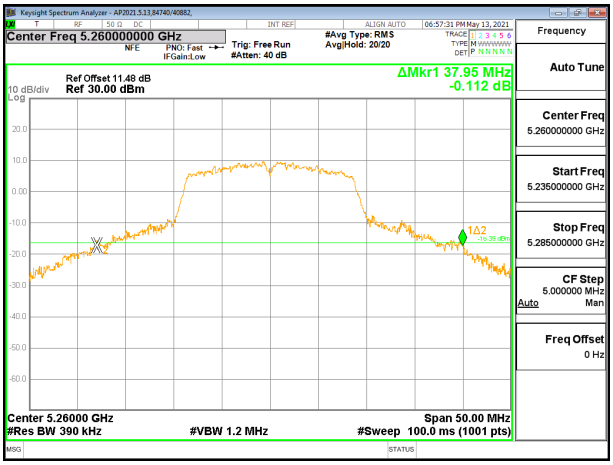
HIGH CHANNEL ANTENNA 1

9.2.4. 802.11n HT20 MODE IN THE 5.3 GHz BAND

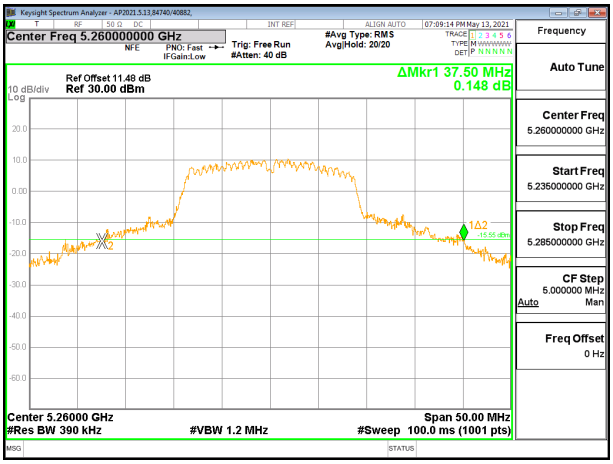
2TX Antenna 0 + Antenna 1 CDD MODE

Channel	Frequency (MHz)	26 dB Bandwidth Antenna 0 (MHz)	26 dB Bandwidth Antenna 1 (MHz)
Low	5260	37.95	37.50
Mid	5300	38.20	38.45
High	5320	31.65	31.95

LOW CHANNEL

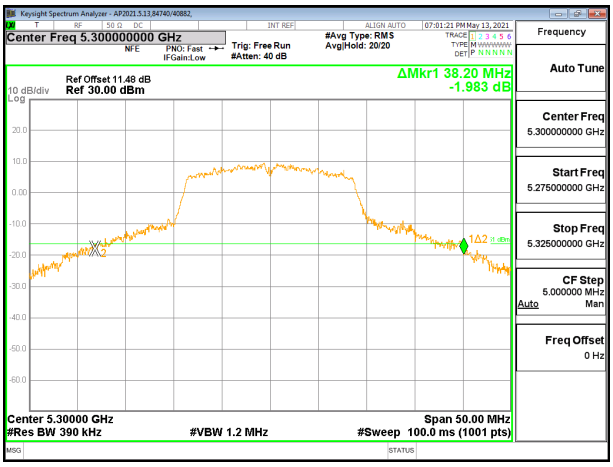


LOW CHANNEL ANTENNA 0

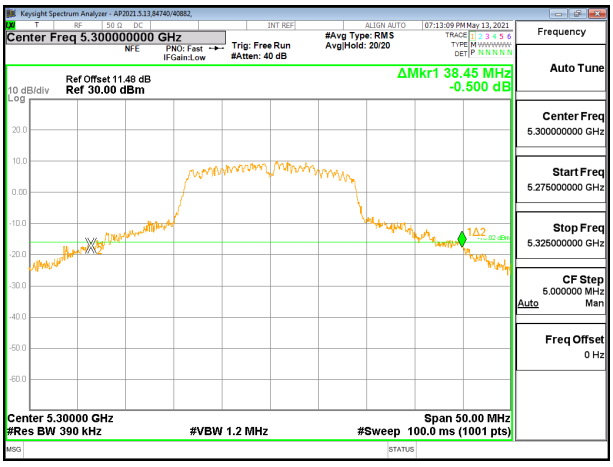


LOW CHANNEL ANTENNA 1

MID CHANNEL



MID CHANNEL ANTENNA 0



MID CHANNEL ANTENNA 1

HIGH CHANNEL

HIGH CHANNEL ANTENNA 0

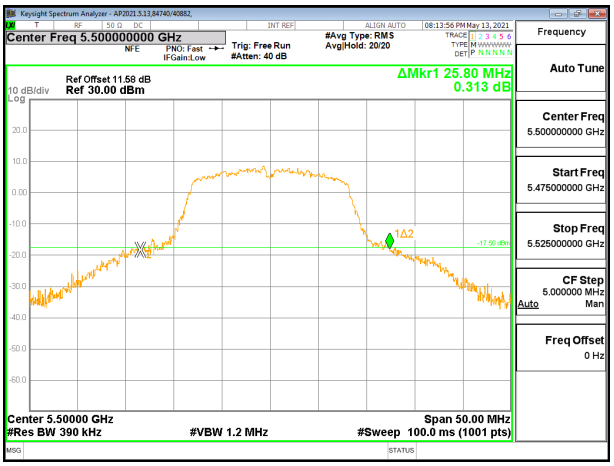
HIGH CHANNEL ANTENNA 1

9.2.5. 802.11a MODE IN THE 5.6 GHz BAND

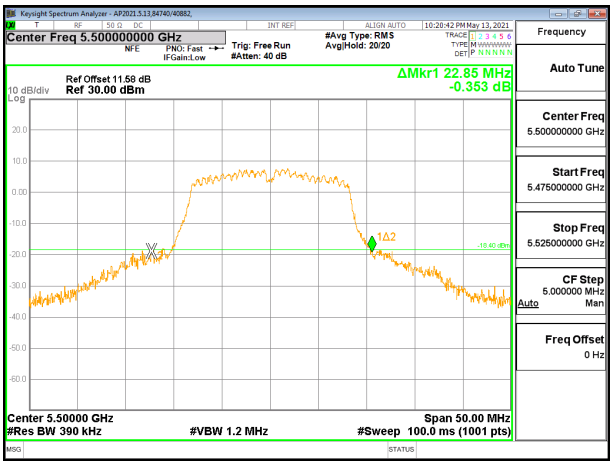
2TX Antenna 0 + Antenna 1 CDD MODE

Channel	Frequency (MHz)	26 dB Bandwidth Antenna 0 (MHz)	26 dB Bandwidth Antenna 1 (MHz)
Low	5500	25.80	22.85
Low	5520	41.25	35.35
Mid	5580	29.10	25.65
Mid	5660	42.50	36.65
High	5680	42.40	37.35
High	5700	23.15	20.00

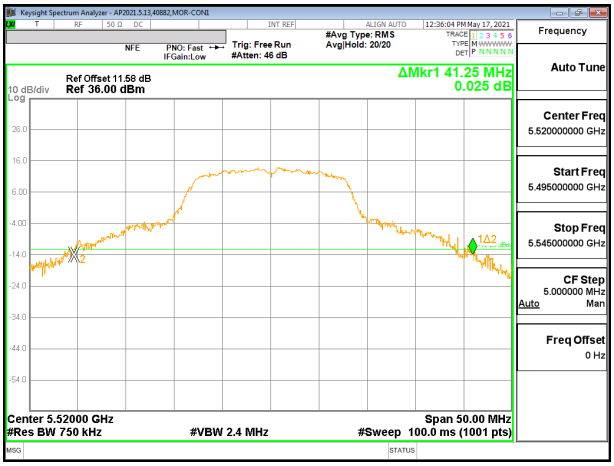
LOW CHANNEL



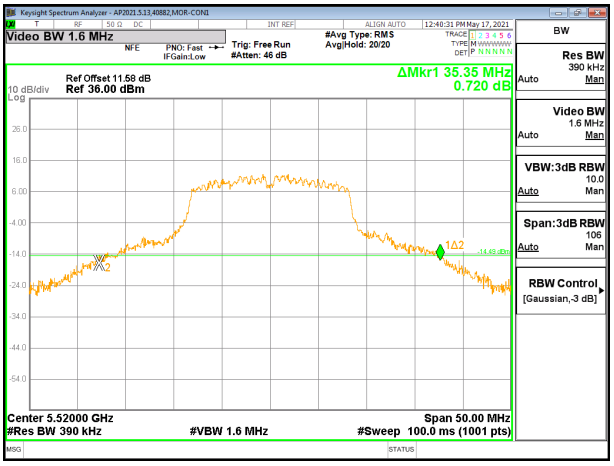
LOW CHANNEL (5500MHz) ANTENNA 0



LOW CHANNEL (5500MHz) ANTENNA 1

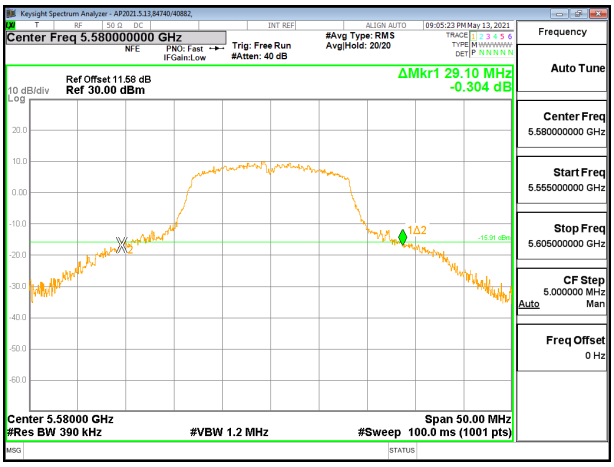


LOW CHANNEL (5520MHz) ANTENNA 0

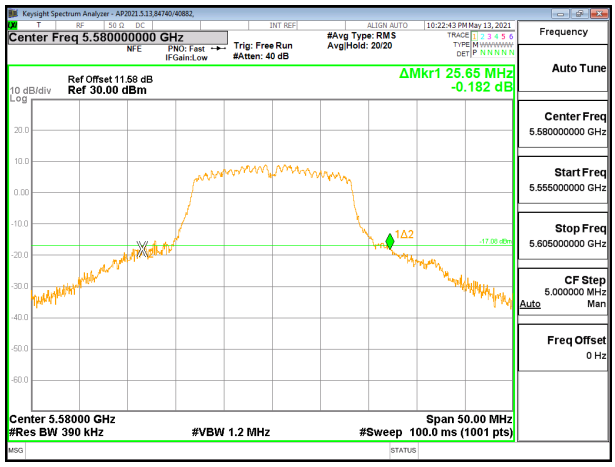


LOW CHANNEL (5520MHz) ANTENNA 1

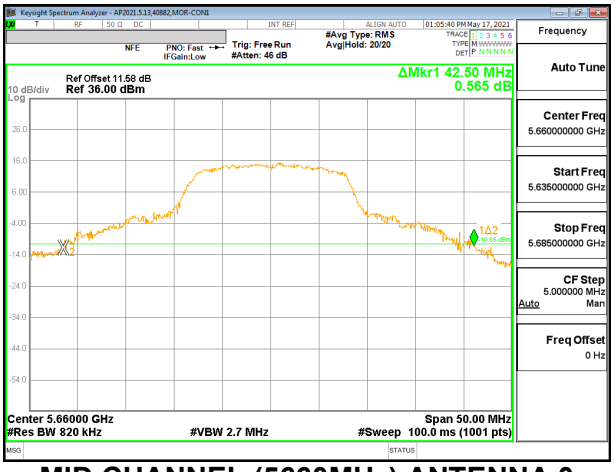
MID CHANNEL



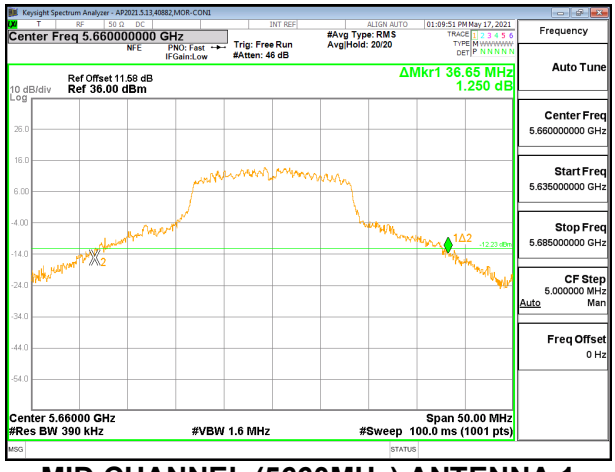
MID CHANNEL (5580MHz) ANTENNA 0



MID CHANNEL (5580MHz) ANTENNA 1

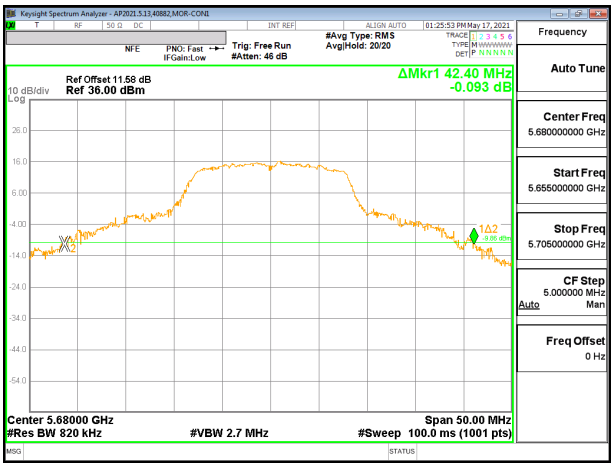


MID CHANNEL (5660MHz) ANTENNA 0

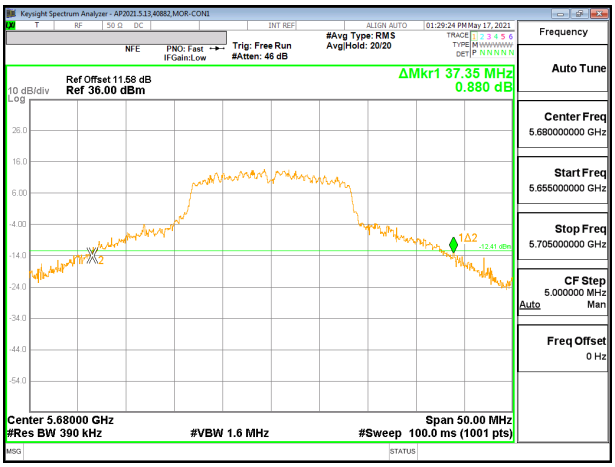


MID CHANNEL (5660MHz) ANTENNA 1

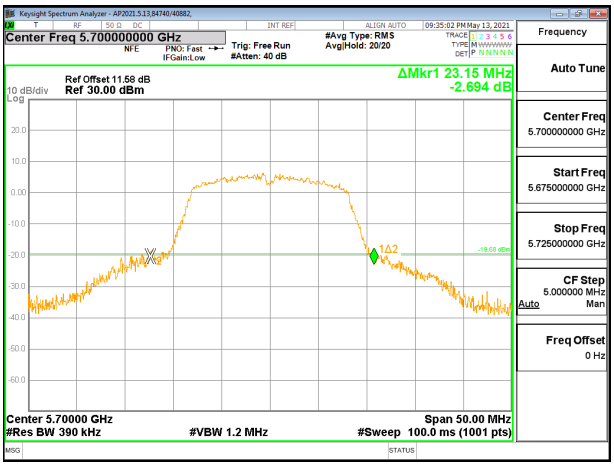
HIGH CHANNEL



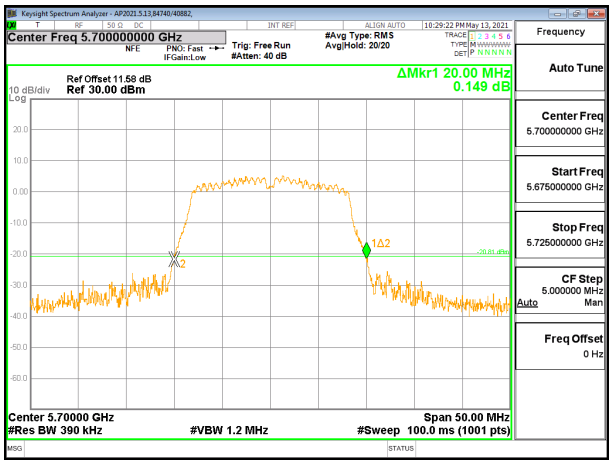
HIGH CHANNEL (5680MHz) ANTENNA 0



HIGH CHANNEL (5680MHz) ANTENNA 1



HIGH CHANNEL (5700MHz) ANTENNA 0



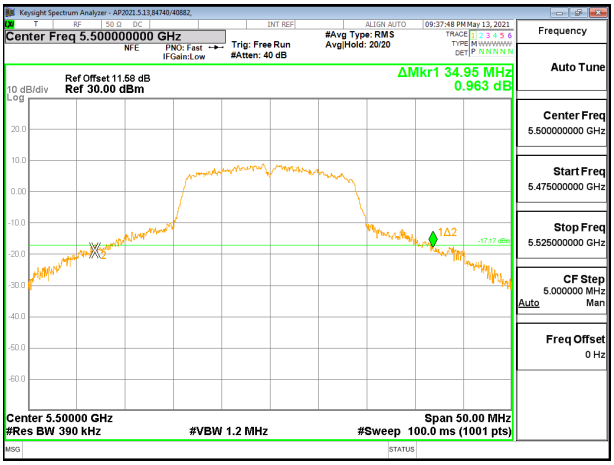
HIGH CHANNEL (5700MHz) ANTENNA 1

9.2.6. 802.11n HT20 MODE IN THE 5.6 GHz BAND

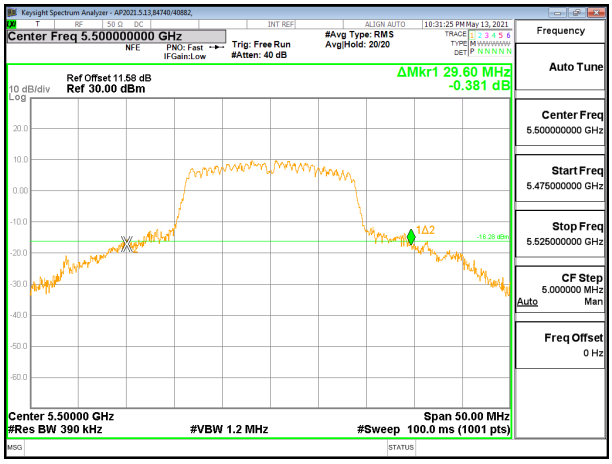
2TX Antenna 0 + Antenna 1 CDD MODE

Channel	Frequency (MHz)	26 dB Bandwidth Antenna 0 (MHz)	26 dB Bandwidth Antenna 1 (MHz)
Low	5500	34.95	29.60
Low	5520	47.15	41.95
Mid	5580	32.50	26.65
Mid	5680	48.00	46.20
High	5700	29.55	20.30

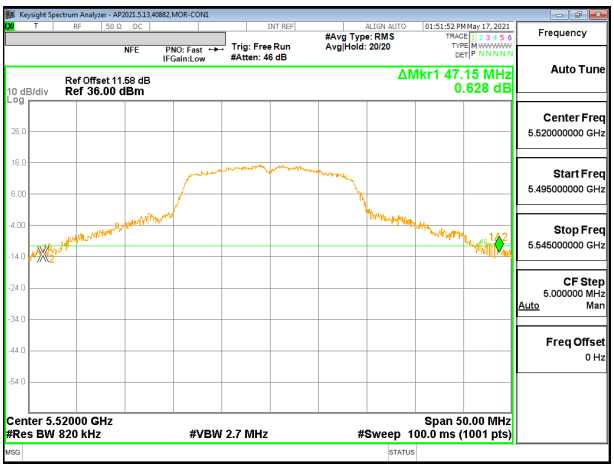
LOW CHANNEL



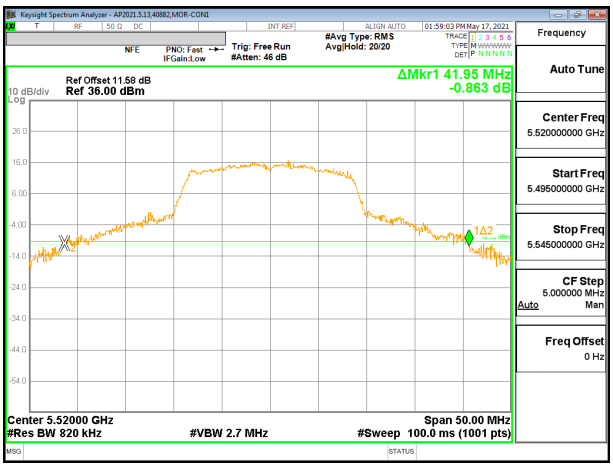
LOW CHANNEL (5500MHz) ANTENNA 0



LOW CHANNEL (5500MHz) ANTENNA 1

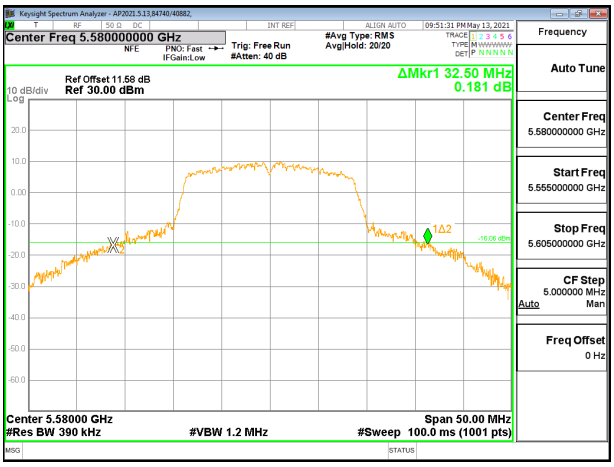


LOW CHANNEL (5520MHz) ANTENNA 0

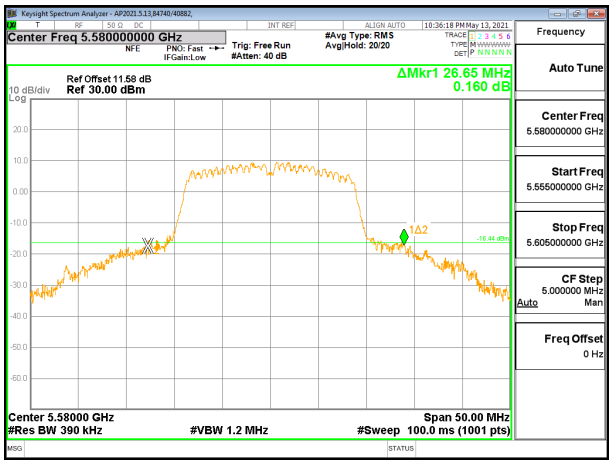


LOW CHANNEL (5520MHz) ANTENNA 1

MID CHANNEL

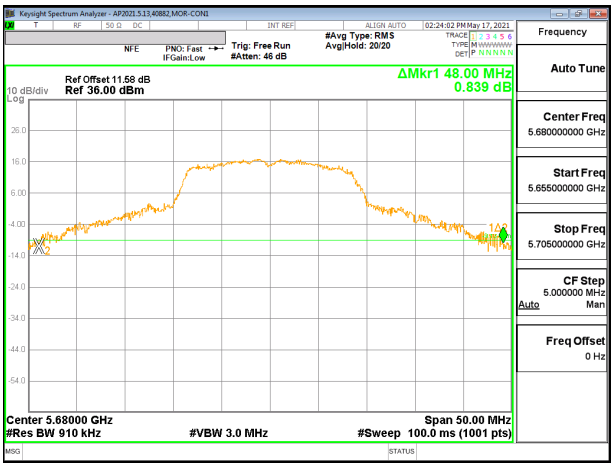


MID CHANNEL ANTENNA 0

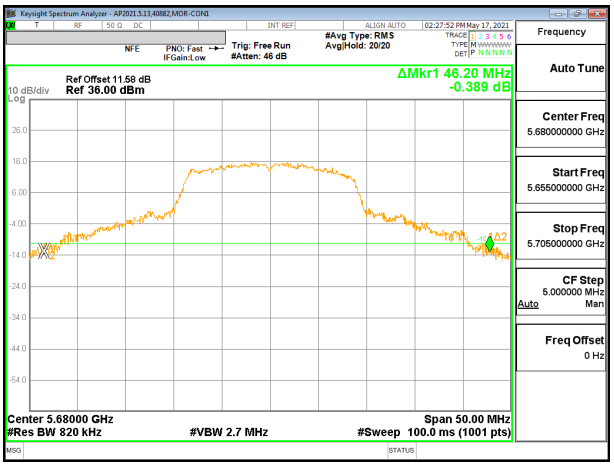


MID CHANNEL ANTENNA 1

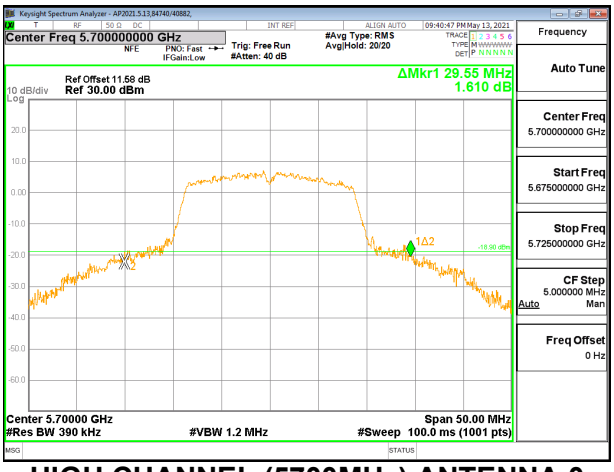
HIGH CHANNEL



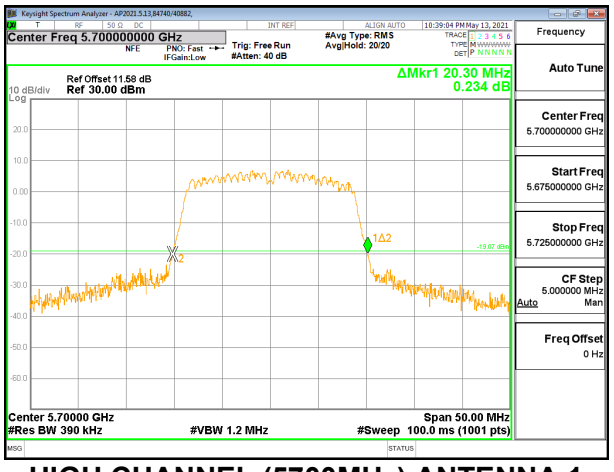
HIGH CHANNEL (5680MHz) ANTENNA 0



HIGH CHANNEL (5680MHz) ANTENNA 1



HIGH CHANNEL (5700MHz) ANTENNA 0



HIGH CHANNEL (5700MHz) ANTENNA 1

9.3. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

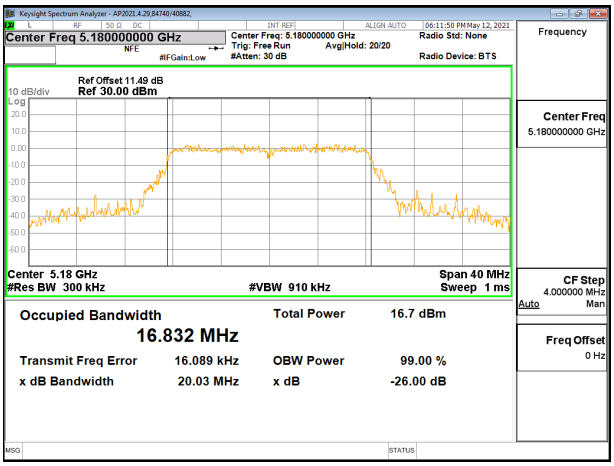
RESULTS

9.3.1. 802.11a MODE IN THE 5.2 GHz BAND

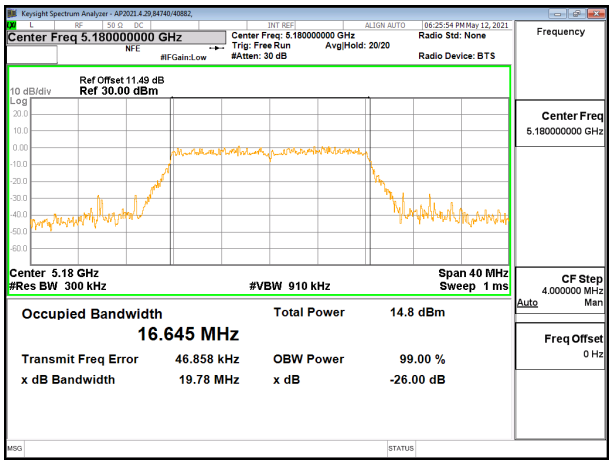
2TX Antenna 0 + Antenna 1 CDD MODE

Channel	Frequency (MHz)	99% Bandwidth Antenna 0 (MHz)	99% Bandwidth Antenna 1 (MHz)
Low	5180	16.832	16.645
Mid	5200	16.809	16.704
High	5240	16.823	16.636

LOW CHANNEL

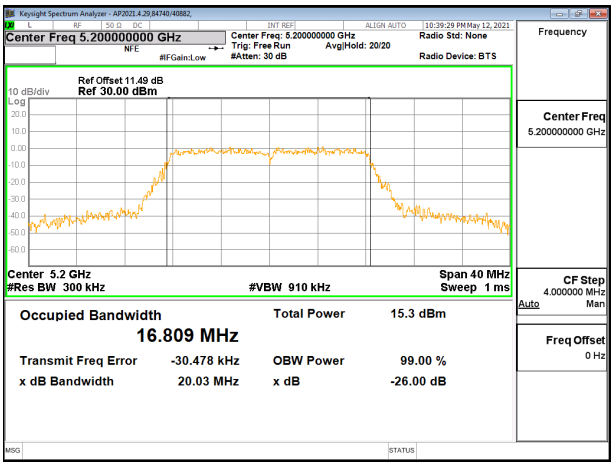


LOW CHANNEL ANTENNA 0

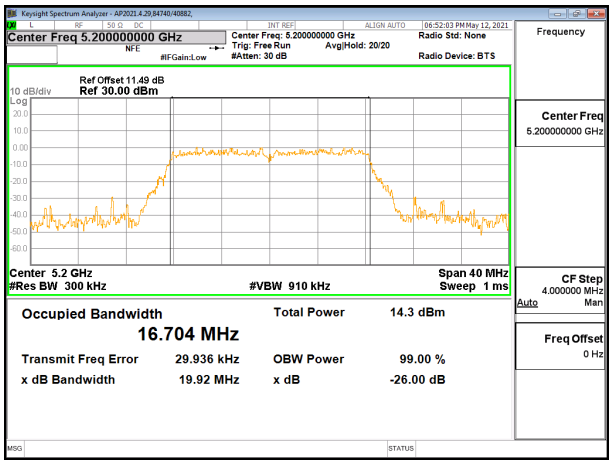


LOW CHANNEL ANTENNA 1

MID CHANNEL

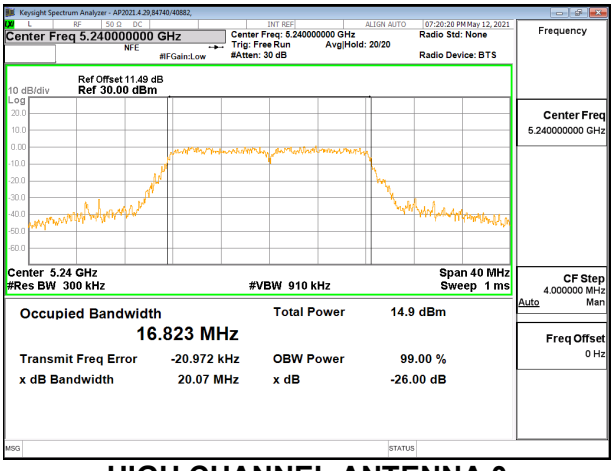


MID CHANNEL ANTENNA 0

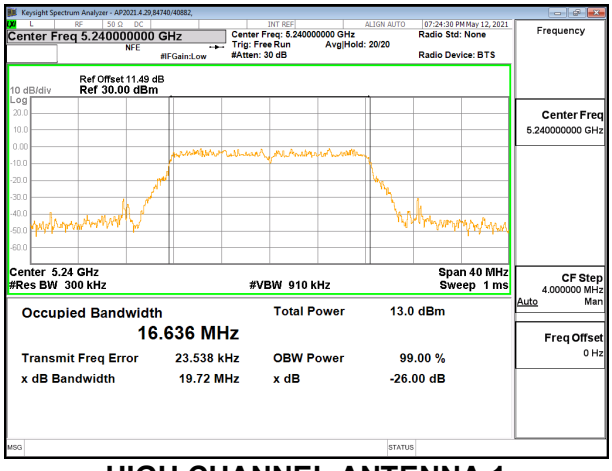


MID CHANNEL ANTENNA 1

HIGH CHANNEL



HIGH CHANNEL ANTENNA 0



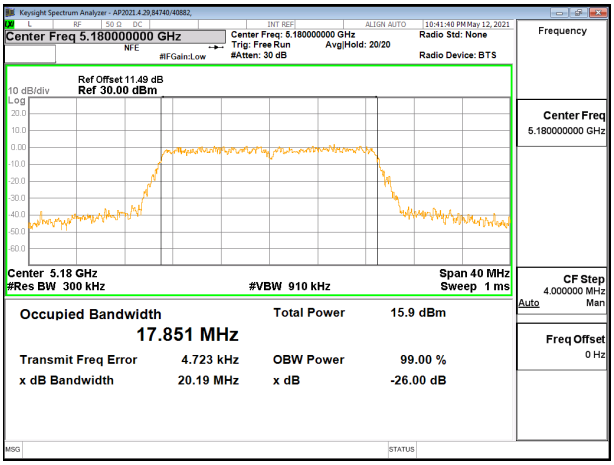
HIGH CHANNEL ANTENNA 1

9.3.2. 802.11n HT20 MODE IN THE 5.2 GHz BAND

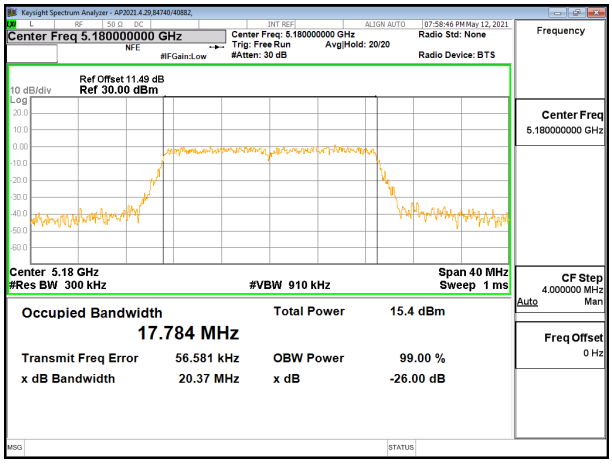
2TX Antenna 0 + Antenna 1 CDD MODE

Channel	Frequency (MHz)	99% Bandwidth Antenna 0 (MHz)	99% Bandwidth Antenna 1 (MHz)
Low	5180	17.851	17.784
Mid	5200	17.861	17.843
High	5240	17.827	17.801

LOW CHANNEL

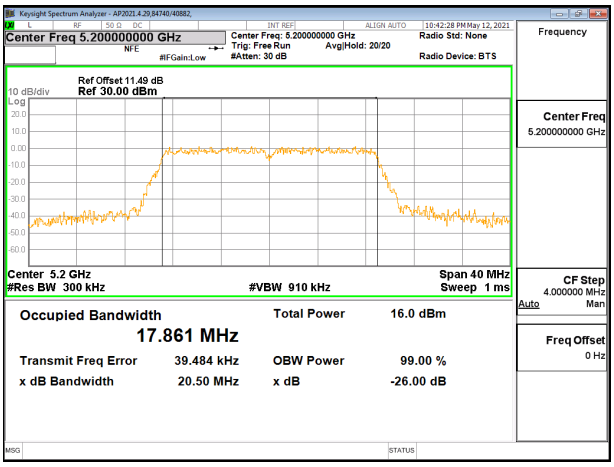


LOW CHANNEL ANTENNA 0

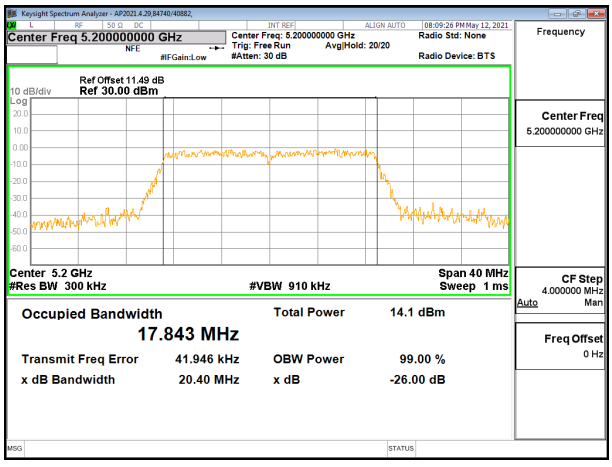


LOW CHANNEL ANTENNA 1

MID CHANNEL

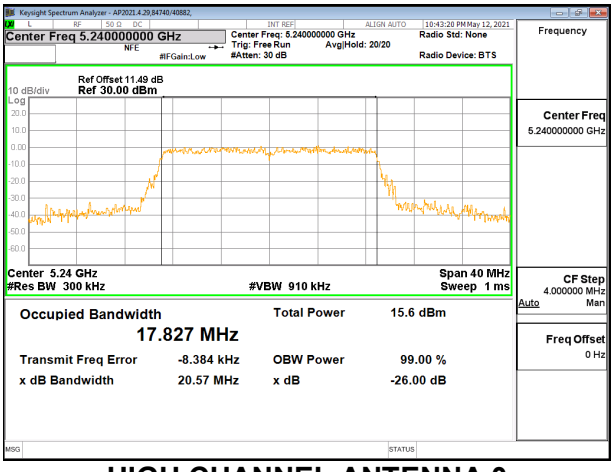


MID CHANNEL ANTENNA 0

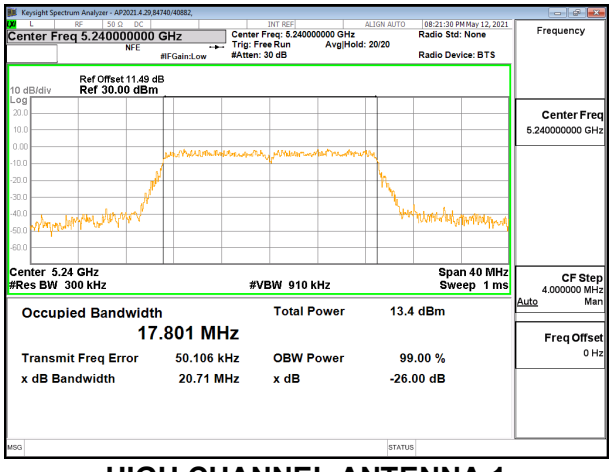


MID CHANNEL ANTENNA 1

HIGH CHANNEL



HIGH CHANNEL ANTENNA 0



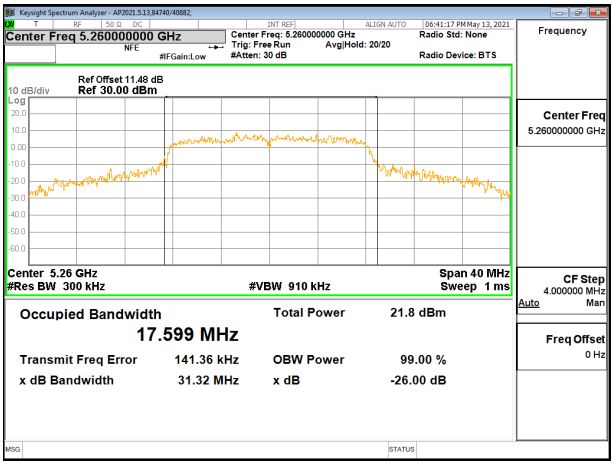
HIGH CHANNEL ANTENNA 1

9.3.3. 802.11a MODE IN THE 5.3 GHz BAND

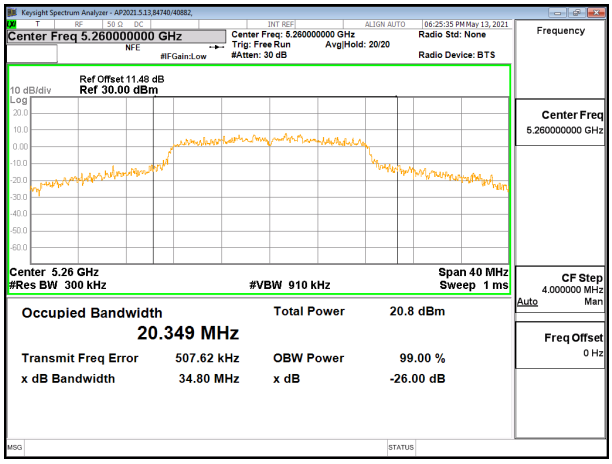
2TX Antenna 0 + Antenna 1 CDD MODE

Channel	Frequency (MHz)	99% Bandwidth Antenna 0 (MHz)	99% Bandwidth Antenna 1 (MHz)
Low	5260	17.599	20.349
Mid	5300	17.878	19.151
High	5320	16.722	16.591

LOW CHANNEL

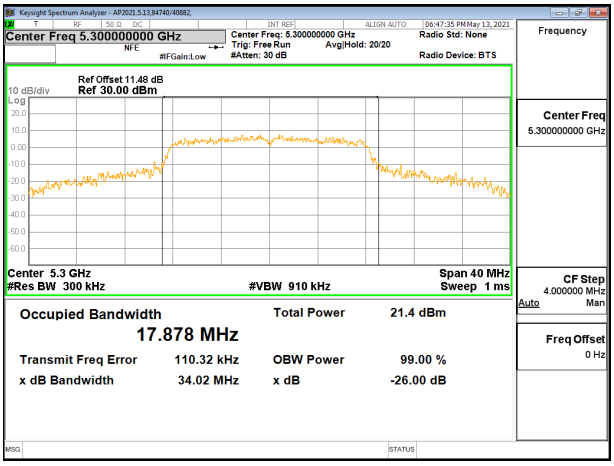


LOW CHANNEL ANTENNA 0

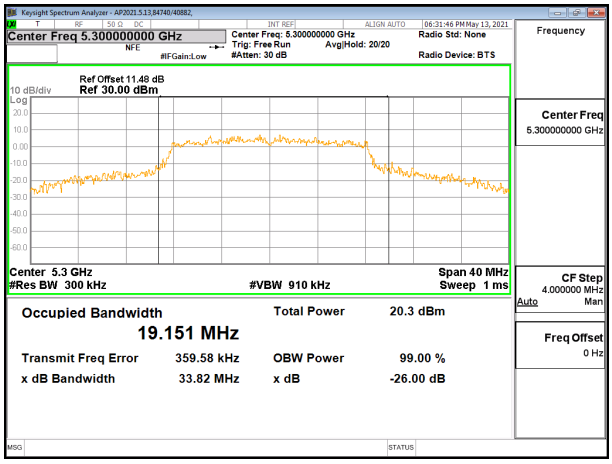


LOW CHANNEL ANTENNA 1

MID CHANNEL

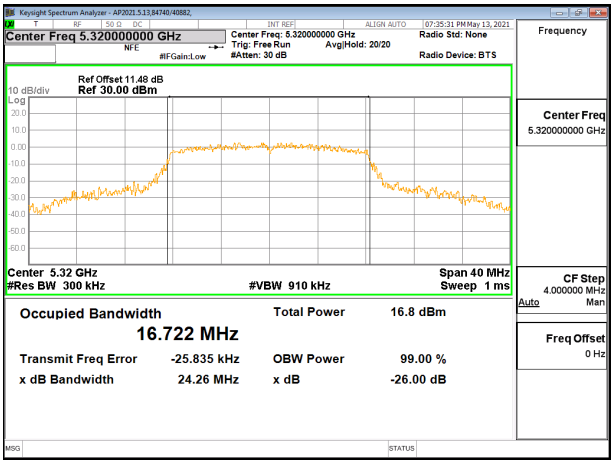


MID CHANNEL ANTENNA 0

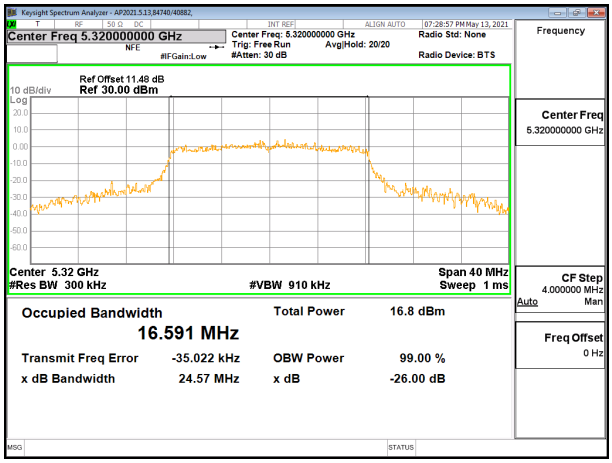


MID CHANNEL ANTENNA 1

HIGH CHANNEL



HIGH CHANNEL ANTENNA 0



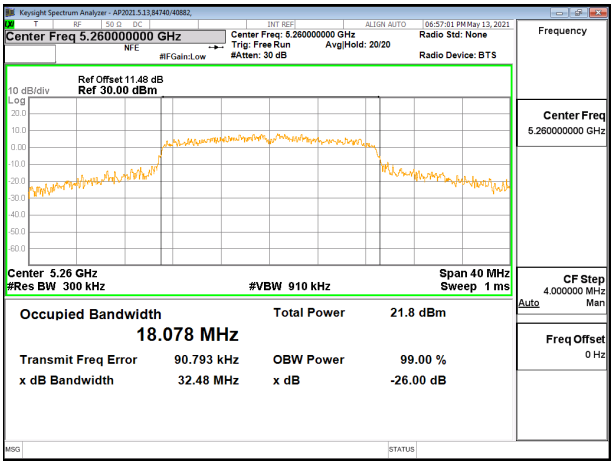
HIGH CHANNEL ANTENNA 1

9.3.4. 802.11n HT20 MODE IN THE 5.3 GHz BAND

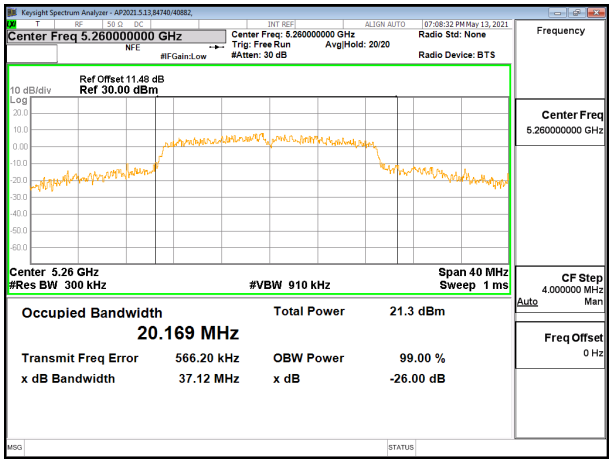
2TX Antenna 0 + Antenna 1 CDD MODE

Channel	Frequency (MHz)	99% Bandwidth Antenna 0 (MHz)	99% Bandwidth Antenna 1 (MHz)
Low	5260	18.078	20.169
Mid	5300	18.608	19.800
High	5320	17.815	17.751

LOW CHANNEL

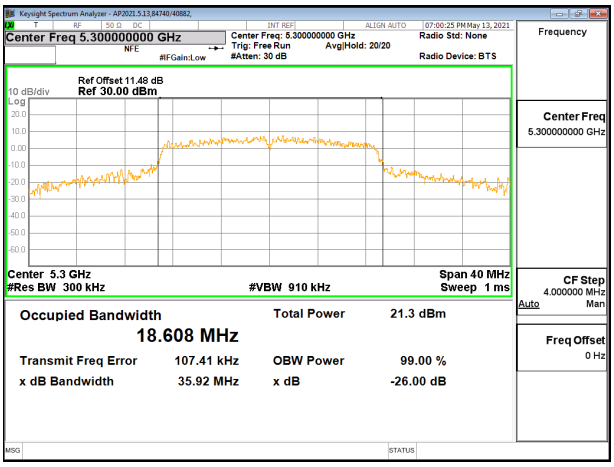


LOW CHANNEL ANTENNA 0

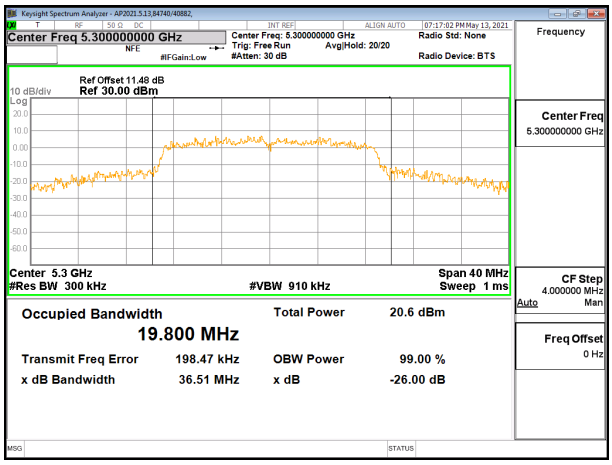


LOW CHANNEL ANTENNA 1

MID CHANNEL

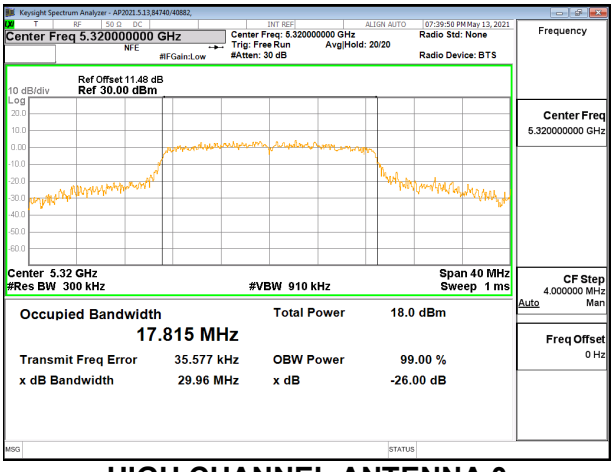


MID CHANNEL ANTENNA 0

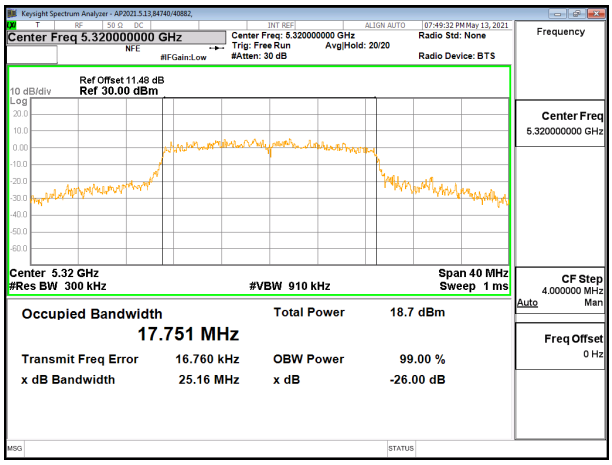


MID CHANNEL ANTENNA 1

HIGH CHANNEL



HIGH CHANNEL ANTENNA 0



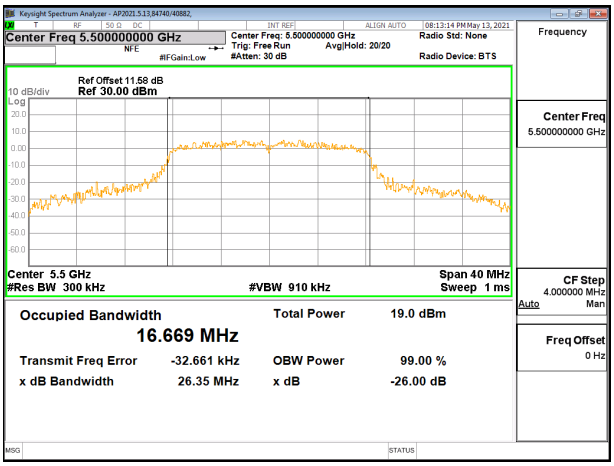
HIGH CHANNEL ANTENNA 1

9.3.5. 802.11a MODE IN THE 5.6 GHz BAND

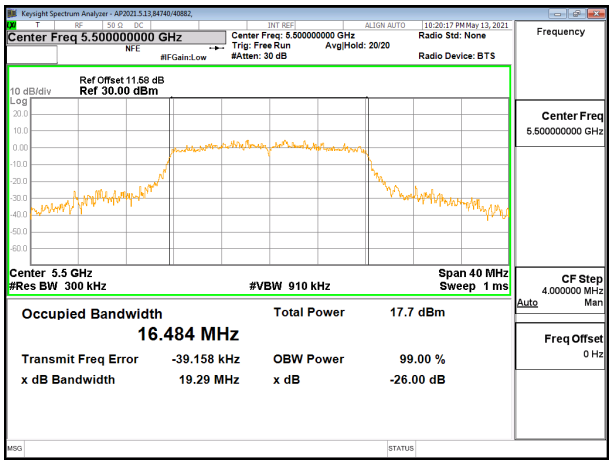
2TX Antenna 0 + Antenna 1 CDD MODE

Channel	Frequency (MHz)	99% Bandwidth Antenna 0 (MHz)	99% Bandwidth Antenna 1 (MHz)
Low	5500	16.669	16.484
Low	5520	22.458	18.564
Mid	5580	16.766	16.591
High	5680	24.148	21.573
High	5700	16.557	16.421

LOW CHANNEL

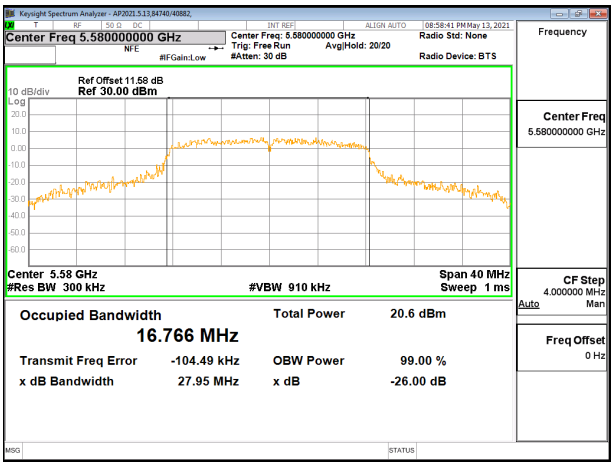


LOW CHANNEL ANTENNA 0

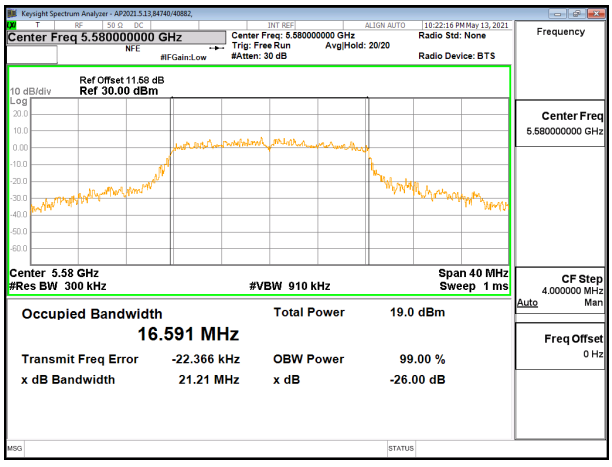


LOW CHANNEL ANTENNA 1

MID CHANNEL

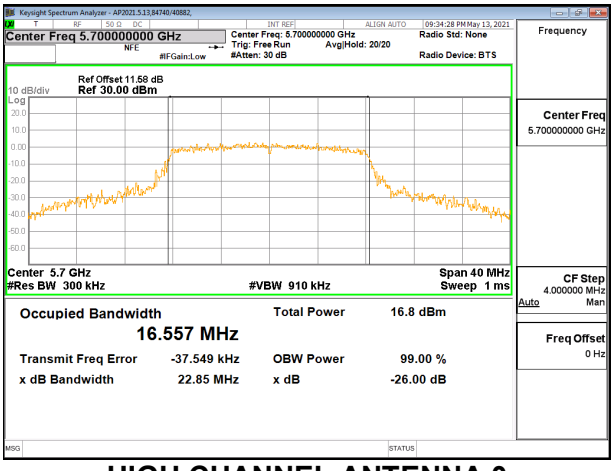


MID CHANNEL ANTENNA 0

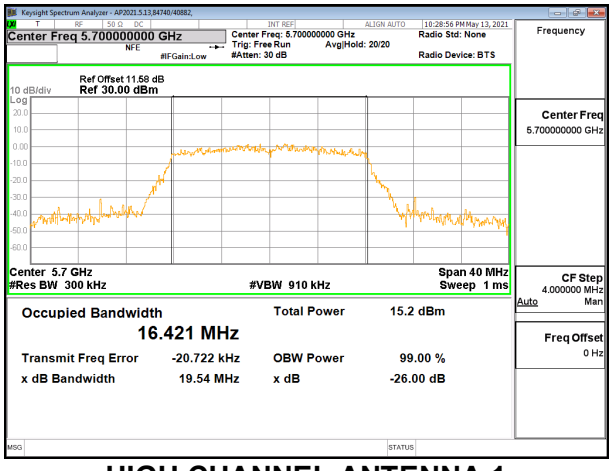


MID CHANNEL ANTENNA 1

HIGH CHANNEL



HIGH CHANNEL ANTENNA 0



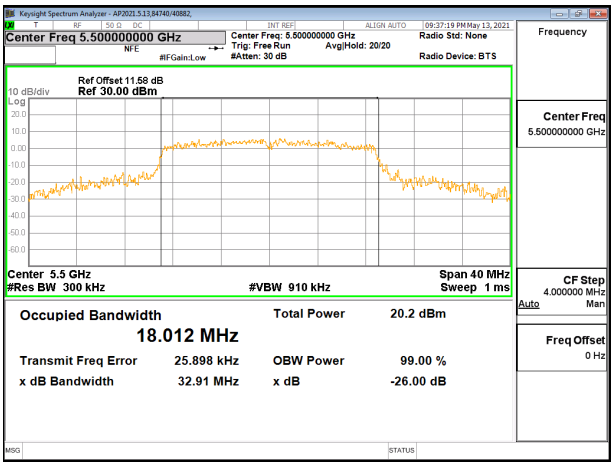
HIGH CHANNEL ANTENNA 1

9.3.6. 802.11n HT20 MODE IN THE 5.6 GHz BAND

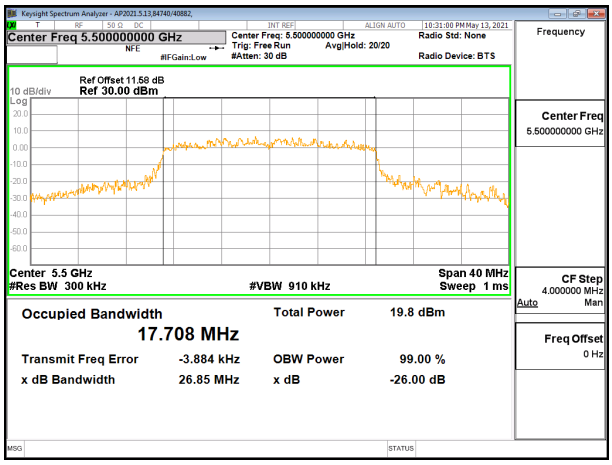
2TX Antenna 0 + Antenna 1 CDD MODE

Channel	Frequency (MHz)	99% Bandwidth Antenna 0 (MHz)	99% Bandwidth Antenna 1 (MHz)
Low	5500	18.012	17.708
Low	5520	22.825	20.848
Mid	5580	17.935	17.626
High	5680	24.521	23.165
High	5700	17.677	17.544

LOW CHANNEL

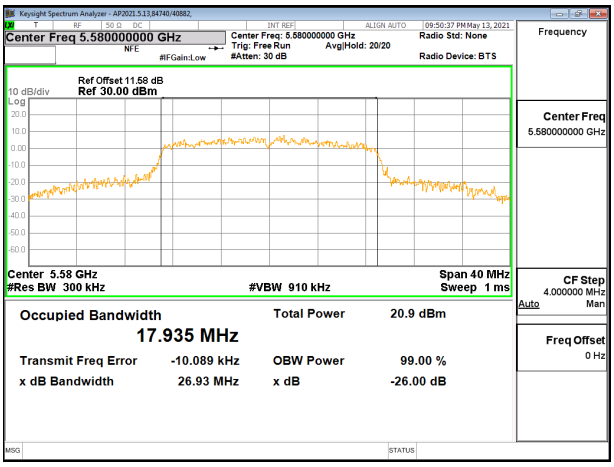


LOW CHANNEL ANTENNA 0

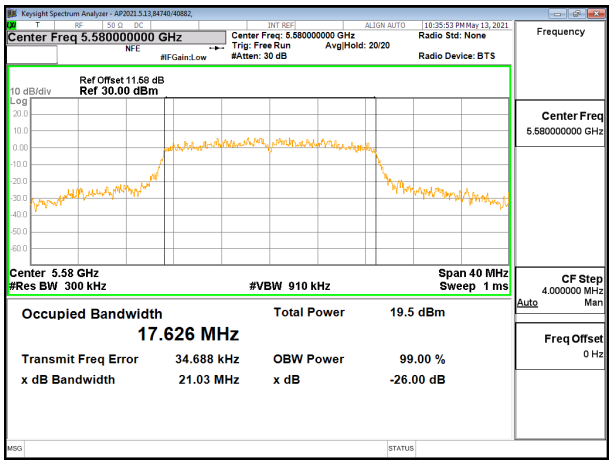


LOW CHANNEL ANTENNA 1

MID CHANNEL

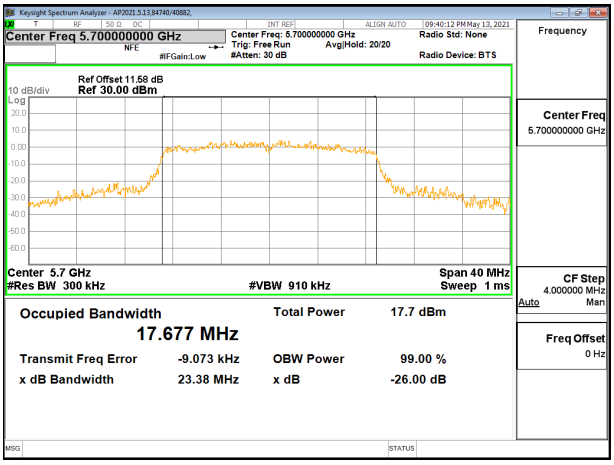


MID CHANNEL ANTENNA 0

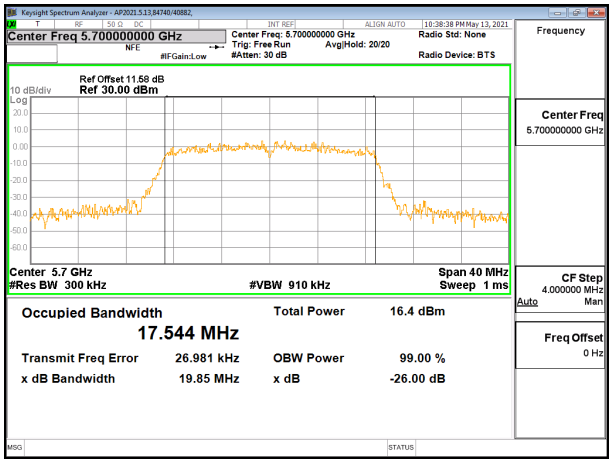


MID CHANNEL ANTENNA 1

HIGH CHANNEL



HIGH CHANNEL ANTENNA 0



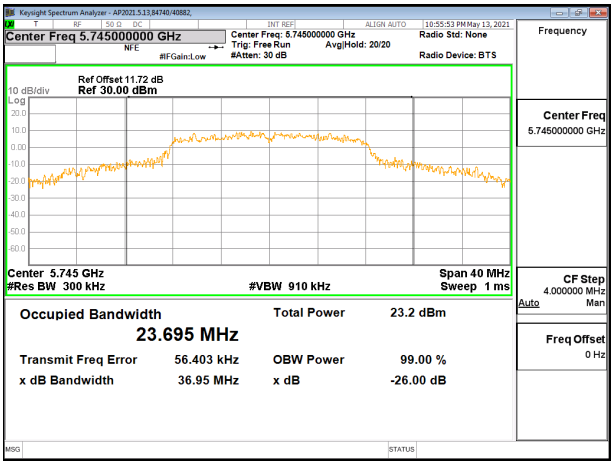
HIGH CHANNEL ANTENNA 1

9.3.7. 802.11a MODE IN THE 5.8 GHz BAND

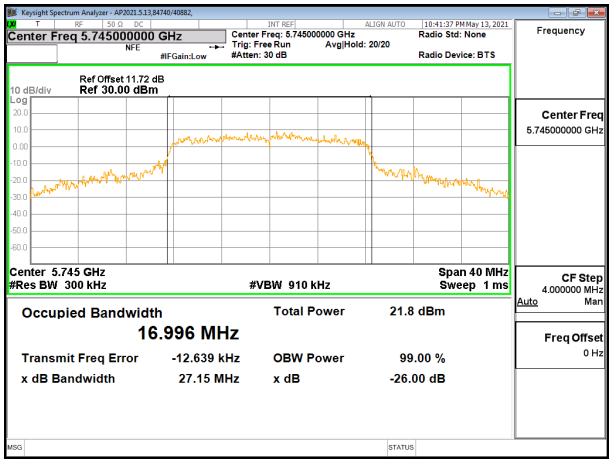
2TX Antenna 0 + Antenna 1 CDD MODE

Channel	Frequency (MHz)	99% Bandwidth Antenna 0 (MHz)	99% Bandwidth Antenna 1 (MHz)
Low	5745	23.695	16.996
Mid	5785	21.938	16.805
High	5825	23.094	16.858

LOW CHANNEL

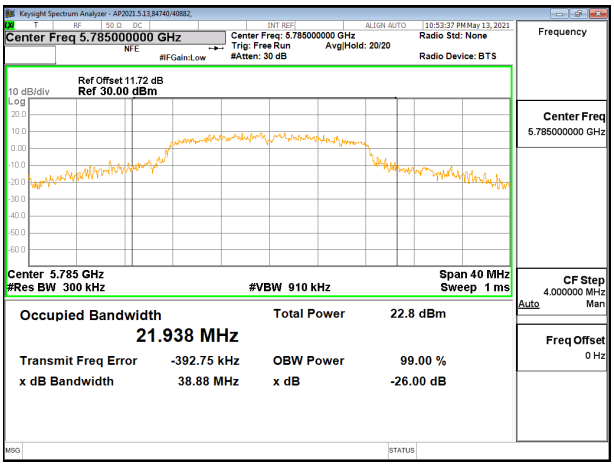


LOW CHANNEL ANTENNA 0

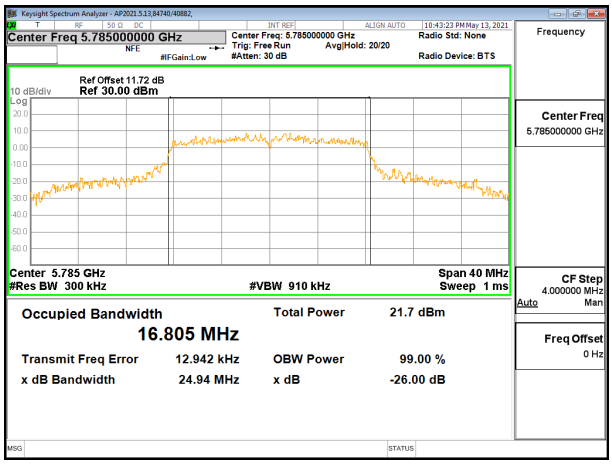


LOW CHANNEL ANTENNA 1

MID CHANNEL

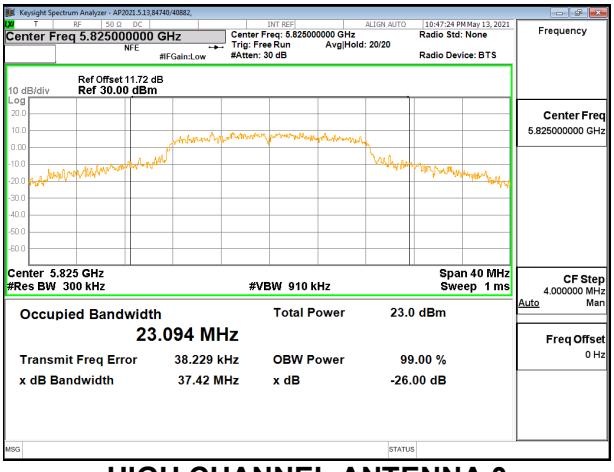


MID CHANNEL ANTENNA 0

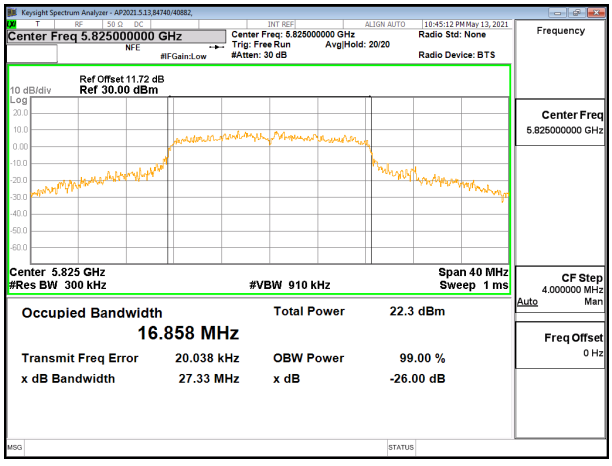


MID CHANNEL ANTENNA 1

HIGH CHANNEL



HIGH CHANNEL ANTENNA 0



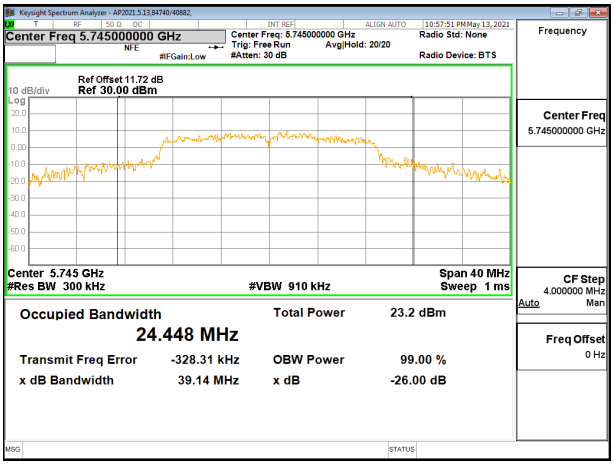
HIGH CHANNEL ANTENNA 1

9.3.8. 802.11n HT20 MODE IN THE 5.8 GHz BAND

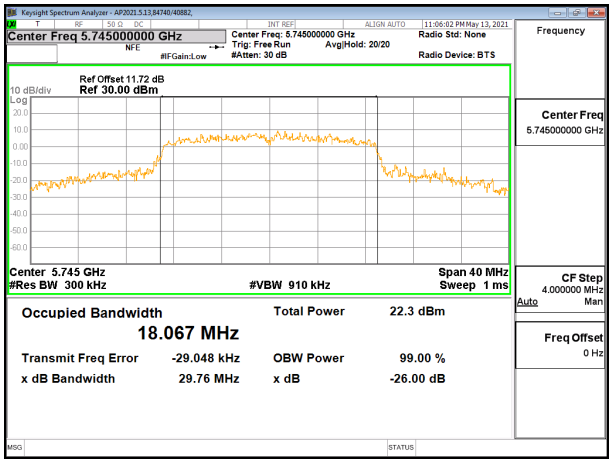
2TX Antenna 0 + Antenna 1 CDD MODE

Channel	Frequency (MHz)	99% Bandwidth Antenna 0 (MHz)	99% Bandwidth Antenna 1 (MHz)
Low	5745	24.448	18.067
Mid	5785	23.719	18.007
High	5825	23.419	17.952

LOW CHANNEL

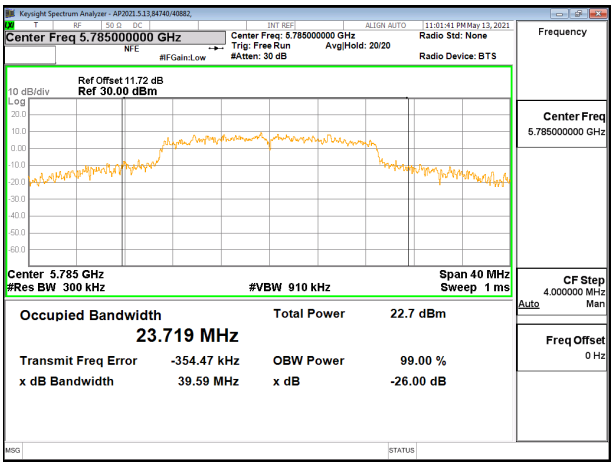


LOW CHANNEL ANTENNA 0

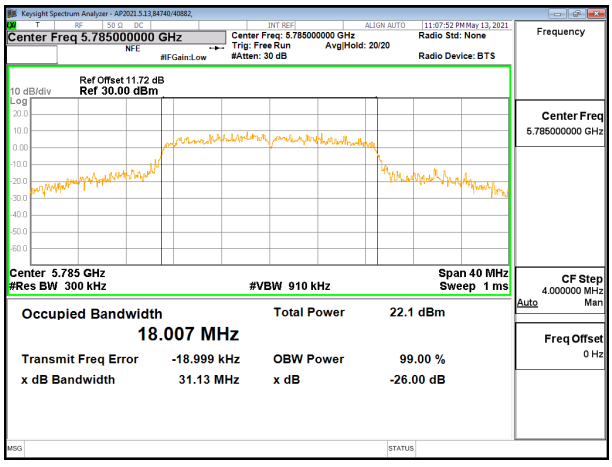


LOW CHANNEL ANTENNA 1

MID CHANNEL

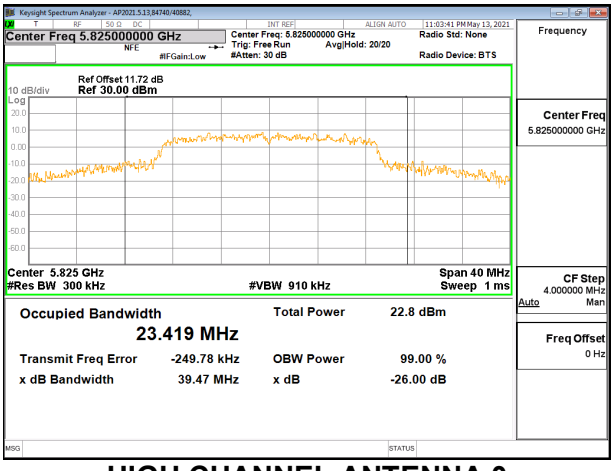


MID CHANNEL ANTENNA 0

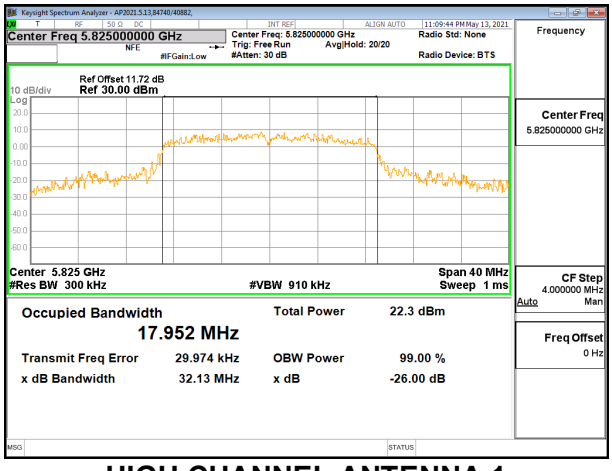


MID CHANNEL ANTENNA 1

HIGH CHANNEL



HIGH CHANNEL ANTENNA 0



HIGH CHANNEL ANTENNA 1

9.4. 6 dB BANDWIDTH

LIMITS

FCC §15.407 (e)

RSS-247 6.2.4.1

The minimum 6 dB bandwidth shall be at least 500 kHz.

RESULTS

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