

FCC Test Report

Product Name	InstaShow X Button, InstaShow S Button
Model No	WDC25THS, WDC30THS, WDC21THS, WDC30SETHS, WDC20+THS, WDC30+THS, WDC25PTHs, WDC31THS
FCC ID	JVPWDC30THS

Applicant	BenQ Corporation
Address	16 Jihu Road, 11492 Neihu, Taipei, TAIWAN

Date of Receipt	Sep. 09, 2021
Issued Date	Mar. 09, 2022
Report No.	2190334R-RFUSWL5V01-A
Report Version	V1.0



The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standard through the calibration report of the equipment and evaluated measurement uncertainty herein.

This report must not be used to claim product endorsement by TAF or any agency of the government.

The test report shall not be reproduced without the written approval of DEKRA Testing and Certification Co., Ltd.

Measurement uncertainties evaluated for each testing system and associated connections are given here to provide the system information for reference. Compliance determinations do not take into account measurement uncertainties for each testing system, but are based on the results of the compliance measurement.

Test Report

Issued Date: Mar. 09, 2022

Report No.: 2190334R-RFUSWL5V01-A



Product Name	InstaShow X Button, InstaShow S Button
Applicant	BenQ Corporation
Address	16 Jihu Road, 11492 Neihu, Taipei, TAIWAN
Manufacturer	Shuttle Inc.
Model No.	WDC25THS, WDC30THS, WDC21THS, WDC30SETHS, WDC20+THS, WDC30+THS, WDC25PTHs, WDC31THS
FCC ID.	JVPWDC30THS
EUT Rated Voltage	DC 5V Power by USB
EUT Test Voltage	AC 120V/60Hz
Trade Name	BenQ
Applicable Standard	FCC CFR Title 47 Part 15 Subpart E ANSI C63.4: 2014, ANSI C63.10: 2013 KDB Publication 789033
Test Result	Complied

Documented By : April Chen
(Senior Project Specialist / April Chen)

Tested By : Ivan Chuang
(Senior Engineer / Ivan Chuang)

Approved By : Alan Chen
(Senior Engineer / Alan Chen)

TABLE OF CONTENTS

Description	Page
1. GENERAL INFORMATION.....	6
1.1. EUT Description.....	6
1.2. Tested System Details.....	8
1.3. Configuration of tested System	8
1.4. EUT Exercise Software	8
1.5. Test Facility	9
1.6. List of Test Equipment	10
1.7. Uncertainty	11
2. Conducted Emission	12
2.1. Test Setup	12
2.2. Limits	12
2.3. Test Procedure	12
2.4. Test Result of Conducted Emission.....	13
3. Maximun conducted output power.....	14
3.1. Test Setup	14
3.2. Limits	15
3.3. Test Procedure	16
3.4. Test Result of Maximum conducted output power.....	17
4. Peak Power Spectral Density	22
4.1. Test Setup	22
4.2. Limits	22
4.3. Test Procedure	23
4.4. Test Result of Peak Power Spectral Density	24
5. Radiated Emission.....	28
5.1. Test Setup	28
5.2. Limits	29
5.3. Test Procedure	30
5.4. Test Result of Radiated Emission.....	32
6. Band Edge.....	42
6.1. Test Setup	42
6.2. Limits	43
6.3. Test Procedure	44
6.4. Test Result of Band Edge	45
7. Occupied Bandwidth.....	61
7.1. Test Setup	61

7.2.	Limits	61
7.3.	.Test Procedure	61
7.4.	Test Result of Occupied Bandwidth	62
8.	Duty Cycle.....	66
8.1.	Test Setup	66
8.2.	Test Procedure	66
8.3.	Test Result of Duty Cycle.....	67
9.	EMI Reduction Method During Compliance Testing	71

Appendix 1: EUT Test Photographs

Appendix 2: Product Photos-Please refer to the file: 2190334R-Product Photos

Revision History

Report No.	Version	Description	Issued Date
2190334R-RFUSWL5V01-A	V1.0	Initial issue of report.	Mar. 09, 2022

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	InstaShow X Button, InstaShow S Button
Trade Name	BenQ
FCC ID.	JVPWDC30THS
Model No.	WDC25THS, WDC30THS, WDC21THS, WDC30SETHS, WDC20+THS, WDC30+THS, WDC25PTHS, WDC31THS
Frequency Range	802.11a/n/ac-20MHz: 5180-5240MHz, 5745-5825MHz 802.11n/ac-40MHz: 5190-5230MHz, 5755-5795MHz 802.11ac-80MHz: 5210MHz, 5775MHz
Number of Channels	802.11a/n/ac-20MHz: 9; 802.11n/ac-40MHz: 4 802.11ac-80MHz: 2
Data Rate	802.11a: 6 - 54Mbps 802.11n: up to 300Mbps 802.11ac-80MHz: up to 866.7Mbps
Channel Control	Auto
Type of Modulation	802.11a/n/ac: OFDM, BPSK, QPSK, 16QAM, 64QAM, 256QAM
Antenna type	PIFA Antenna
Antenna Gain	Refer to the table "Antenna List"

Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	WGT	HHC30WIPB01+ C(43R-WDC301-0300) (Main) HHC30WIPB02+ B(43R-WDC301-0310)(Aux)	PIFA Antenna	2.28dBi for 5.15~5.25GHz 2.29dBi for 5.725~5.850GHz

Note: The antenna of EUT is conforming to FCC 15.203.

802.11a/n/ac-20MHz Center Working Frequency of Each Channel:

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 36:	5180 MHz	Channel 40:	5200 MHz	Channel 44:	5220 MHz	Channel 48:	5240 MHz
Channel 149:	5745 MHz	Channel 153:	5765 MHz	Channel 157:	5785 MHz	Channel 161:	5805 MHz
Channel 165:	5825 MHz						

802.11n/ac-40MHz Center Working Frequency of Each Channel:

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 38:	5190 MHz	Channel 46:	5230 MHz	Channel 151:	5755 MHz	Channel 159:	5795 MHz

802.11ac-80MHz Center Working Frequency of Each Channel:

Channel	Frequency	Channel	Frequency
Channel 42:	5210 MHz	Channel 155:	5775 MHz

Note:

1. This device is an InstaShow X Button, InstaShow S Button with a built-in WLAN (802.11a/n/ac) transceiver, this report for 5GHz WLAN.
2. The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.
3. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
4. Lowest and highest data rates are tested in each mode. Only worst case is shown in the report.
5. It's declared by manufacture about all models are electrically identical, different model names for marketing purpose. The identification of test sample is WDC30THS.
6. These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance of transmitter with Part 15 Subpart E for Unlicensed National Information Infrastructure devices.

Test Mode	Mode 1: Transmit (802.11a 6Mbps) Mode 2: Transmit (802.11ac-20BW 7.2Mbps) Mode 3: Transmit (802.11ac-40BW 15Mbps) Mode 4: Transmit (802.11ac-80BW 32.5Mbps)
-----------	--

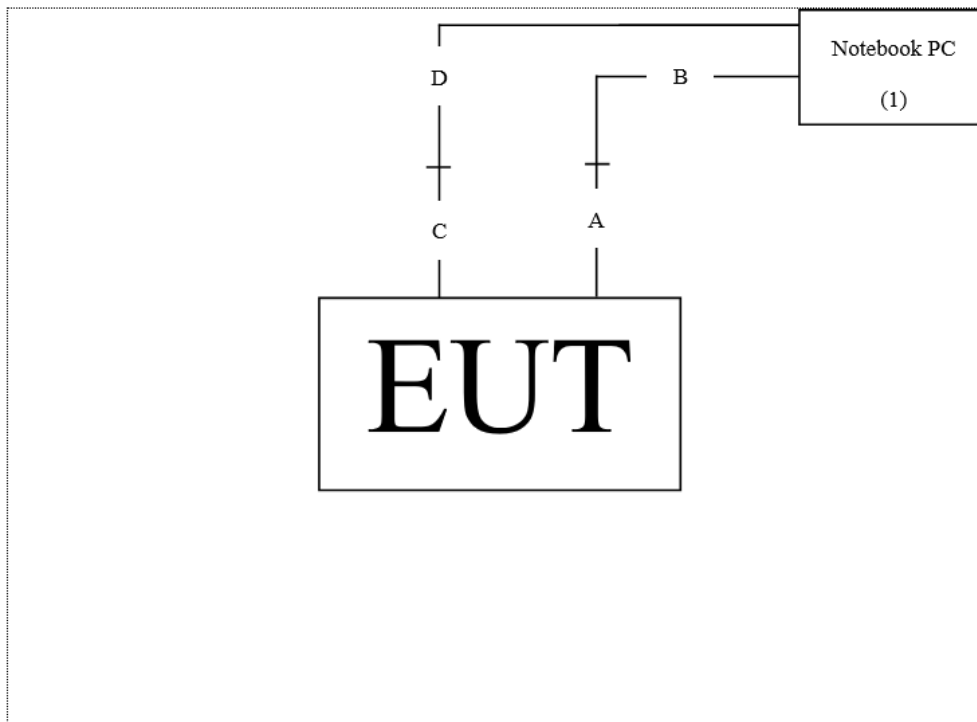
1.2. Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product	Manufacturer	Model No.	Serial No.	Power Cord
1 Notebook PC	DELL	Latitude E5440	74BTK32	N/A

Signal Cable Type	Signal cable Description
A USB Cable	Shielded, 0.2m
B USB Cable	Shielded, 1.8m
C HDMI Cable	Non-shielded, 0.1m
D HDMI Cable	Non-shielded, 1.8m

1.3. Configuration of tested System



1.4. EUT Exercise Software

1. Setup the EUT as shown in Section 1.4.
2. Execute software “wl Version 1.363.77.0” on the EUT.
3. Configure the test mode, the test channel, and the data rate.
4. Press “OK” to start the continuous Transmit.
5. Verify that the EUT works properly.

1.5. Test Facility

Ambient conditions in the laboratory:

Performed Item	Items	Required	Actual
Conducted Emission	Temperature (°C)	10~40 °C	25.0°C
	Humidity (%RH)	10~90 %	55.0%
Radiated Emission	Temperature (°C)	10~40 °C	22.0 °C
	Humidity (%RH)	10~90 %	61.0 %
Conductive	Temperature (°C)	10~40 °C	22.0 °C
	Humidity (%RH)	10~90 %	55.0 %

USA : FCC Registration Number: TW0033

Canada : IC Registration Number: 26930

Site Description : Accredited by TAF
Accredited Number: 3023

Test Laboratory : DEKRA Testing and Certification Co., Ltd
Address : No. 5-22, Ruishukeng Linkou District, New Taipei City,
24451, Taiwan

Performed Location : No. 26, Huaya 1st Rd., Guishan Dist., Taoyuan City
333411, Taiwan, R.O.C.

Phone number : +886-3-275-7255
Fax number : +866-3-327-8031
Email address : info.tw@dekra.com
Website : <http://www.dekra.com.tw>

1.6. List of Test Equipment

For Conduction measurements /SH1

	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due. Date
X	EMI Test Receiver	R&S	ESR7	101601	2021.06.19	2022.06.18
X	Two-Line V-Network	R&S	ENV216	101306	2021.04.08	2022.04.07
X	Two-Line V-Network	R&S	ENV216	101307	2021.05.04	2022.05.03
X	Coaxial Cable	DEKRA	RG400_BNC	RF001	2021.05.24	2022.05.23

Note:

1. All equipments are calibrated every one year.
2. The test instruments marked with "X" are used to measure the final test results.
3. Test Software version : DEKRA Testing System V2.0

For Conducted measurements /SH2

	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due. Date
X	Spectrum Analyzer	R&S	FSV30	103466	2020.12.28	2021.12.27
X	Peak Power Analyzer	KEYSIGHT	8900B	MY51000539	2021.06.07	2022.06.06
X	Power Sensor	KEYSIGHT	N1923A	MY59240002	2021.05.17	2022.05.16
X	Power Sensor	KEYSIGHT	N1923A	MY59240003	2021.05.17	2022.05.16

Note:

1. All equipments are calibrated every one year.
2. The test instruments marked with "X" are used to measure the final test results.
3. Test Software version : DEKRA Conduction Test System V9.0.5.

For Radiated measurements /966-1

	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due. Date
X	Loop Antenna	AMETEK	HLA6121	56736	2021.04.14	2022.04.13
X	Bi-Log Antenna	SCHWARZBECK	VULB9168	9168-678	2021.01.29	2022.01.28
X	Horn Antenna	ETS-Lindgren	3117	00203761	2020.11.23	2021.11.22
X	Horn Antenna	Com-Power	AH-840	101087	2021.06.18	2022.06.17
X	Pre-Amplifier	EMCI	EMC001330	980302	2021.07.26	2022.07.25
X	Pre-Amplifier	EMCI	EMC051835SE	980312	2021.02.24	2022.02.23
X	Pre-Amplifier	EMCI	EMC05820SE	980308	2021.09.23	2022.09.22
X	Pre-Amplifier	EMCI	EMC184045SE	980369	2021.04.27	2022.04.26
	Filter	MICRO TRONICS	BRM50702	G251	2021.09.16	2022.09.15
X	Filter	MICRO TRONICS	BRM50716	G188	2021.09.16	2022.09.15
X	EMI Test Receiver	R&S	ESR	102792	2020.12.15	2021.12.14
X	Spectrum Analyzer	R&S	FSV3044	101113	2021.02.04	2022.02.03
X	Mircoflex Cable	HUBER SUHNER	SUCOFLEX 102	MY3380/2	2021.08.30	2022.08.29
X	Coaxial Cable	SGH, EMCI, SUHNER	HA800, SGH18, SUCOFLEX 106, EMC106	HY2108-003C	2021.03.03	2022.03.02

Note:

1. All equipments are calibrated every one year.
2. The test instruments marked with "X" are used to measure the final test results.
3. Test Software version : AUDIX e3 V9

1.7. Uncertainty

Uncertainties have been calculated according to the DEKRA internal document, and is described in each test chapter of this report.

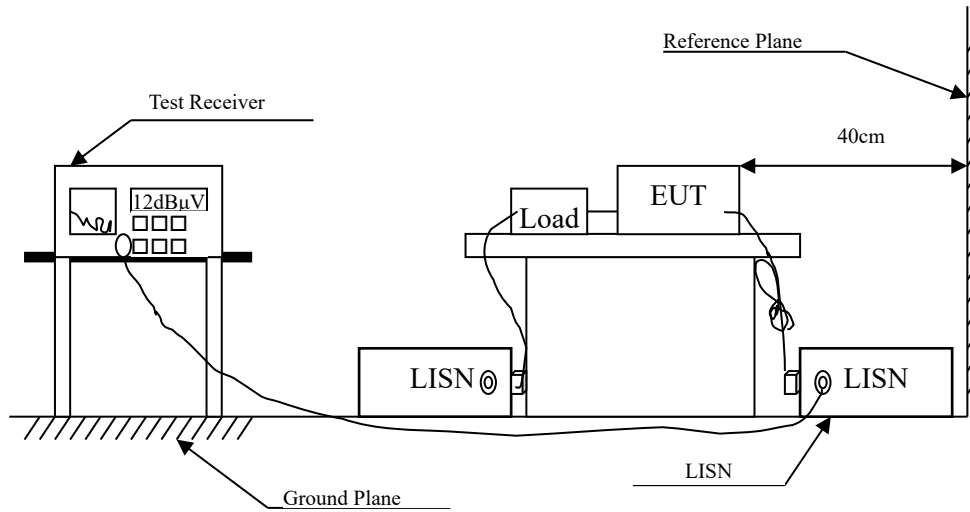
The reported expanded uncertainties are based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95%.

Measurement uncertainties evaluated for each testing system and associated connections are given here to provide the system information for reference. Compliance determinations do not take into account measurement uncertainties for each testing system, but are based on the results of the compliance measurement.

Test item	Uncertainty	
Conducted Emission	±3.42 dB	
Maximum conducted output power	Power Meter ±0.91 dB	Spectrum Analyzer ±2.53 dB
Peak Power Spectral Density	±2.53 dB	
Radiated Emission	Under 1GHz ±4.06 dB	Above 1GHz ±3.73 dB
Band Edge	Under 1GHz ±4.06 dB	Above 1GHz ±3.73 dB
Occupied Bandwidth	±682.83 Hz	
Duty Cycle	±2.31ms	

2. Conducted Emission

2.1. Test Setup



2.2. Limits

FCC Part 15 Subpart C Paragraph 15.207 (dB μ V) Limit		
Frequency MHz	Limits	
	QP	AV
0.15 - 0.50	66-56	56-46
0.50-5.0	56	46
5.0 - 30	60	50

Remarks : In the above table, the tighter limit applies at the band edges.

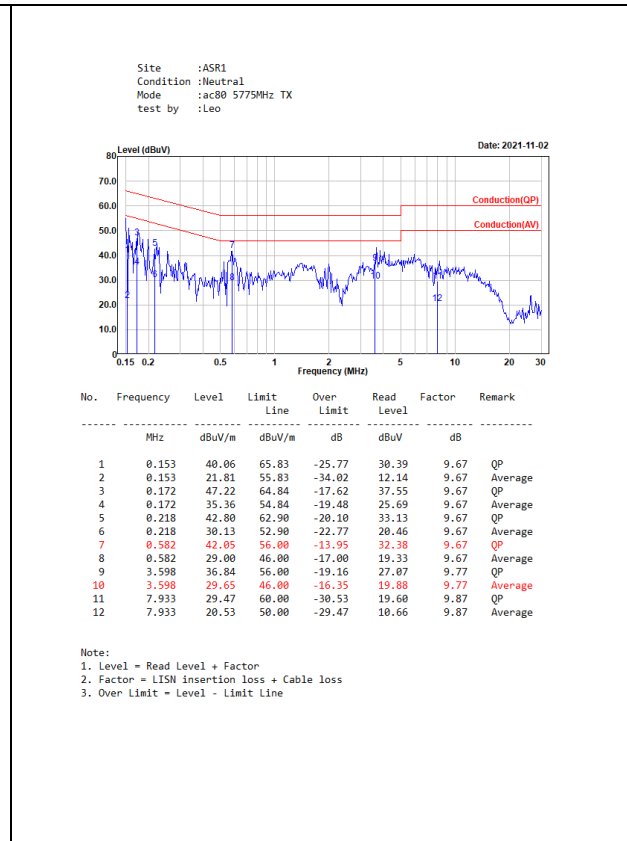
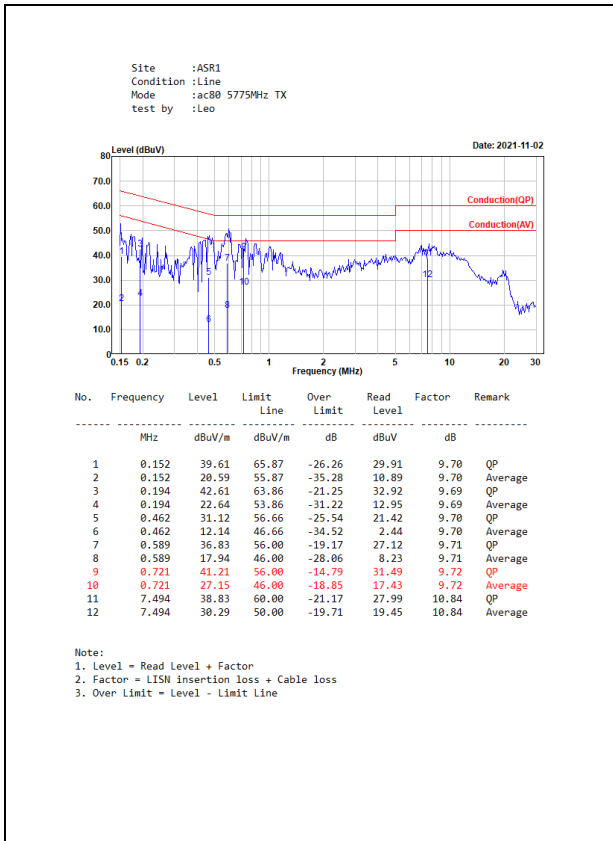
2.3. Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm /50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4:2014 on conducted measurement.

Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

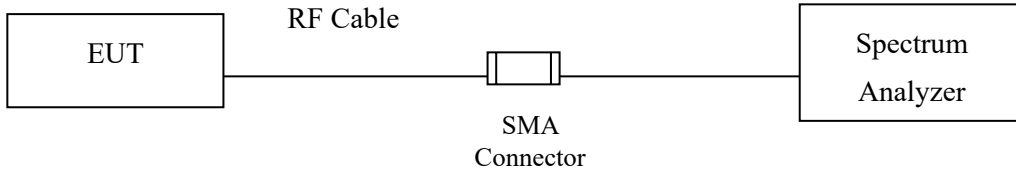
2.4. Test Result of Conducted Emission



3. Maximun conducted output power

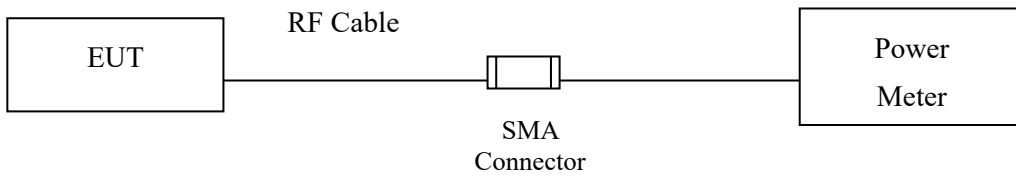
3.1. Test Setup

26dB Occupied Bandwidth

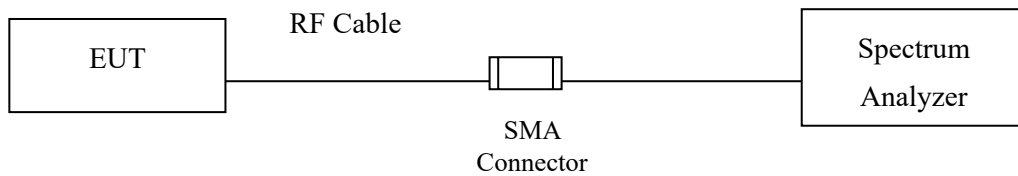


Conduction Power Measurement

Conduction Power Measurement (for 802.11an)



Conduction Power Measurement (for 802.11ac)



3.2. Limits

For the band 5.15-5.25 GHz,

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W, provided the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, if transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, if transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, where B is the 99% emission bandwidth in megahertz. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, if transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point UNII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

3.3. Test Procedure

As an alternative to FCC KDB-789033, the EUT maximum conducted output power was measured with an average power meter employing a video bandwidth greater than the 6dB BW of the emission under test. Maximum conducted output power was read directly from the meter across all data rates, and across three channels within each sub-band. Special care was used to make sure that the EUT was transmitting in continuous mode. This method exceeds the limitations of FCC KDB-789033, and provides more accurate measurements.

802.11an (BW \leq 40MHz) Maximum conducted output power using KDB 789033 section E)3)b) Method PM-G (Measurement using a gated RF average power meter)

Note: the power meter have a video bandwidth that is greater than or equal to the measurement bandwidth, (Anritsu/ MA2411B video bandwidth: 65MHz)

802.11ac (BW=80MHz) Maximum conducted output power using KDB 789033 section E)2)b) Method SA-1 (trace averaging with the EUT transmitting at full power throughout each sweep).

When transmitted signals consist of two or more non-contiguous spectrum segments (e.g., 80+80 MHz mode) or when a single spectrum segment of a transmission crosses the boundary between two adjacent U-NII bands, KDB 644545 D03 section D) procedure is used for measurements.

3.4. Test Result of Maximum conducted output power

Product : InstaShow X Button, InstaShow S Button
 Test Item : Maximum conducted output power
 Test Mode : Mode 1: Transmit (802.11a 6Mbps)
 Test Date : 2021/10/28

Chain A

Cable loss=1dB		Maximum Conducted Power Output (dBm)							
Channel No.	Frequency (MHz)	Data Rate (Mbps)							
		6	9	12	18	24	36	48	54
		Measurement Level (dBm)							
36	5180	13.65	--	--	--	--	--	--	--
44	5220	13.52	13.47	13.43	13.39	13.32	13.28	13.24	13.20
48	5240	13.64	--	--	--	--	--	--	--
149	5745	13.65	--	--	--	--	--	--	--
157	5785	13.72	13.68	13.62	13.57	13.52	13.48	13.44	13.40
165	5825	13.62	--	--	--	--	--	--	--

Note: Maximum conducted output power Value =Reading value on average power meter + cable loss

Chain B

Cable loss=1dB		Maximum Conducted Power Output (dBm)							
Channel No.	Frequency (MHz)	Data Rate (Mbps)							
		6	9	12	18	24	36	48	54
		Measurement Level (dBm)							
36	5180	13.75	--	--	--	--	--	--	--
44	5220	13.67	13.62	13.58	13.54	13.50	13.45	13.40	13.35
48	5240	13.73	--	--	--	--	--	--	--
149	5745	13.83	--	--	--	--	--	--	--
157	5785	13.89	13.85	13.80	13.75	13.70	13.65	13.60	13.56
165	5825	13.57	--	--	--	--	--	--	--

Note: Maximum conducted output power Value =Reading value on average power meter + cable loss

Maximum conducted output power Measurement:

Channel No	Frequency Range	26dB Bandwidth	Chain A Power	Chain B Power	Output Power	Duty factor	Output Power Limit	
	(MHz)	(MHz)	(dBm)	(dBm)	(dBm)	(dB)	(dBm)	dBm+10log(BW)
36	5180	--	13.65	13.75	16.71	--	24	--
44	5220	--	13.52	13.67	16.61	--	24	--
48	5240	--	13.64	13.73	16.70	--	24	--
149	5745	--	13.65	13.83	16.75	--	30	--
157	5785	--	13.72	13.89	16.82	--	30	--
165	5825	--	13.62	13.57	16.61	--	30	--

Product : InstaShow X Button, InstaShow S Button
 Test Item : Maximum conducted output power
 Test Mode : Mode 2: Transmit (802.11ac-20BW 7.2Mbps)
 Test Date : 2021/10/28

Chain A

Cable loss=1dB		Maximum Conducted Power Output (dBm)								
Channel No.	Frequency (MHz)	Data Rate (Mbps)								
		VHT0	VHT1	VHT2	VHT3	VHT4	VHT5	VHT6	VHT7	VHT8
		Measurement Level (dBm)								
36	5180	13.76	--	--	--	--	--	--	--	--
44	5220	13.91	13.87	13.78	13.73	13.64	13.61	13.58	13.55	13.47
48	5240	13.88	--	--	--	--	--	--	--	--
149	5745	13.84	--	--	--	--	--	--	--	--
157	5785	13.84	13.80	13.76	13.73	13.65	13.55	13.49	13.44	13.35
165	5825	13.92	--	--	--	--	--	--	--	--

Note: Maximum conducted output power Value =Reading value on average power meter + cable loss

Chain B

Cable loss=1dB		Maximum Conducted Power Output (dBm)								
Channel No.	Frequency (MHz)	Data Rate (Mbps)								
		VHT0	VHT1	VHT2	VHT3	VHT4	VHT5	VHT6	VHT7	VHT8
		Measurement Level (dBm)								
36	5180	13.66	--	--	--	--	--	--	--	--
44	5220	13.77	13.67	13.61	13.57	13.52	13.46	13.43	13.39	13.32
48	5240	13.81	--	--	--	--	--	--	--	--
149	5745	13.14	--	--	--	--	--	--	--	--
157	5785	13.31	13.28	13.20	13.15	13.07	12.97	12.92	12.85	12.79
165	5825	13.58	--	--	--	--	--	--	--	--

Note: Maximum conducted output power Value =Reading value on average power meter + cable loss

Maximum conducted output power Measurement:

Channel No	Frequency Range	26dB Bandwidth	Chain A Power	Chain B Power	Output Power	Duty factor	Output Power Limit	
	(MHz)	(MHz)	(dBm)	(dBm)	(dBm)	(dB)	(dBm)	dBm+10log(BW)
36	5180	--	13.76	13.66	16.72	--	24	--
44	5220	--	13.91	13.77	16.85	--	24	--
48	5240	--	13.88	13.81	16.86	--	24	--
149	5745	--	13.84	13.14	16.51	--	30	--
157	5785	--	13.84	13.31	16.59	--	30	--
165	5825	--	13.92	13.58	16.76	--	30	--

Product : InstaShow X Button, InstaShow S Button
 Test Item : Maximum conducted output power
 Test Mode : Mode 3: Transmit (802.11ac-40BW 15Mbps)
 Test Date : 2021/10/28

Chain A

Cable loss=1dB		Maximum Conducted Power Output (dBm)								
Channel No.	Frequency (MHz)	Data Rate (Mbps)								
		VHT0	VHT1	VHT2	VHT3	VHT4	VHT5	VHT6	VHT7	VHT8
		Measurement Level (dBm)								
38	5190	11.39	--	--	--	--	--	--	--	--
46	5230	13.82	13.74	13.64	13.55	13.48	13.43	13.37	13.27	13.18
151	5755	13.85	--	--	--	--	--	--	--	--
159	5795	13.95	13.87	13.83	13.77	13.67	13.63	13.59	13.52	13.44

Note: Maximum conducted output power Value =Reading value on average power meter + cable loss

Chain B

Cable loss=1dB		Maximum Conducted Power Output (dBm)								
Channel No.	Frequency (MHz)	Data Rate (Mbps)								
		VHT0	VHT1	VHT2	VHT3	VHT4	VHT5	VHT6	VHT7	VHT8
		Measurement Level (dBm)								
38	5190	11.23	--	--	--	--	--	--	--	--
46	5230	13.2	13.16	13.10	13.02	12.95	12.85	12.76	12.67	12.60
151	5755	13.26	--	--	--	--	--	--	--	--
159	5795	13.28	13.21	13.11	13.08	13.04	12.95	12.92	12.86	12.80

Note: Maximum conducted output power Value =Reading value on average power meter + cable loss

Maximum conducted output power Measurement:

Channel No	Frequency	26dB	Chain A	Chain B	Output	Duty factor	Output Power Limit	
	Range	Bandwidth	Power	Power	Power		(dBm)	dBm+10log(BW)
	(MHz)	(MHz)	(dBm)	(dBm)	(dBm)	(dB)		
38	5190	--	11.39	11.23	14.32	--	24	--
46	5230	--	13.82	13.20	16.53	--	24	--
151	5755	--	13.85	13.26	16.58	--	30	--
159	5795	--	13.95	13.28	16.64	--	30	--

Product : InstaShow X Button, InstaShow S Button
 Test Item : Maximum conducted output power
 Test Mode : Mode 4: Transmit (802.11ac-80BW 32.5Mbps)
 Test Date : 2021/10/28

ChainA

Cable loss=1dB		Maximum Conducted Power Output (dBm)									
Channel No	Frequency (MHz)	Data Rate (Mbps)									
		VTH0	VTH1	VTH2	VTH3	VTH4	VTH5	VTH6	VTH7	VTH8	VTH9
42	5210	9.51	9.48	9.44	9.38	9.31	9.27	9.24	9.18	9.14	9.10
155	5775	12.92	12.82	12.75	12.68	12.62	12.59	12.52	12.46	12.36	12.28

Note: Maximum conducted output power Value =Reading value on Spectrum Analyzer + cable loss

ChainB

Cable loss=1dB		Maximum Conducted Power Output (dBm)									
Channel No	Frequency (MHz)	Data Rate (Mbps)									
		VTH0	VTH1	VTH2	VTH3	VTH4	VTH5	VTH6	VTH7	VTH8	VTH9
42	5210	9.75	9.67	9.57	9.54	9.47	9.43	9.40	9.34	9.27	9.17
155	5775	12.92	12.82	12.75	12.68	12.62	12.59	12.52	12.46	12.36	12.28

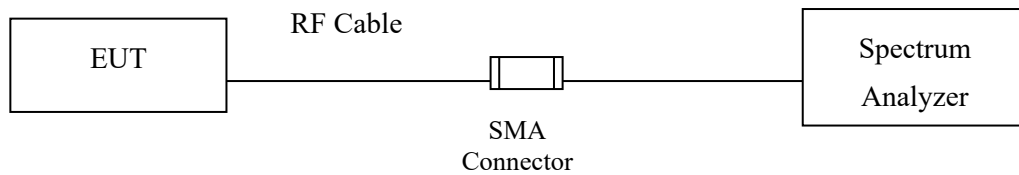
Note: Maximum conducted output power Value =Reading value on Spectrum Analyzer + cable loss

Maximum conducted output power Measurement

Channel No	Frequency Range	26dB Bandwidth	Chain A Power	Chain B Power	Output Power	Duty factor	Output Power Limit		Result
	(MHz)	(MHz)	(dBm)	(dBm)	(dBm)	(dB)	(dBm)	dBm+10log(BW)	
42	5210	--	9.51	9.75	12.64	--	24	--	Pass
155	5775	--	12.92	12.92	15.93	--	30	--	Pass

4. Peak Power Spectral Density

4.1. Test Setup



4.2. Limits

For the band 5.15-5.25 GHz,

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.+

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the band 5.725-5.85 GHz, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point UNII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

4.3. Test Procedure

The EUT was setup to ANSI C63.10, 2013; tested to UNII test procedure of FCC KDB-789033 for compliance to FCC 47CFR Subpart E requirements.

The Peak Power Spectral Density using KDB 789033 section F) procedure, Create an average power spectrum for the EUT operating mode being tested by following the instructions in section E)2) for measuring maximum conducted output power using a spectrum analyzer.

SA-1 method is selected to run the test.

For the band 5.725-5.85 GHz, Scale the observed power level to an equivalent value in 500 kHz by adjusting (increase) the measured power by a bandwidth correction factor (BWCF) where $BWCF = 10\log(500\text{ kHz}/100\text{ kHz}) = 6.98\text{ dB}$.

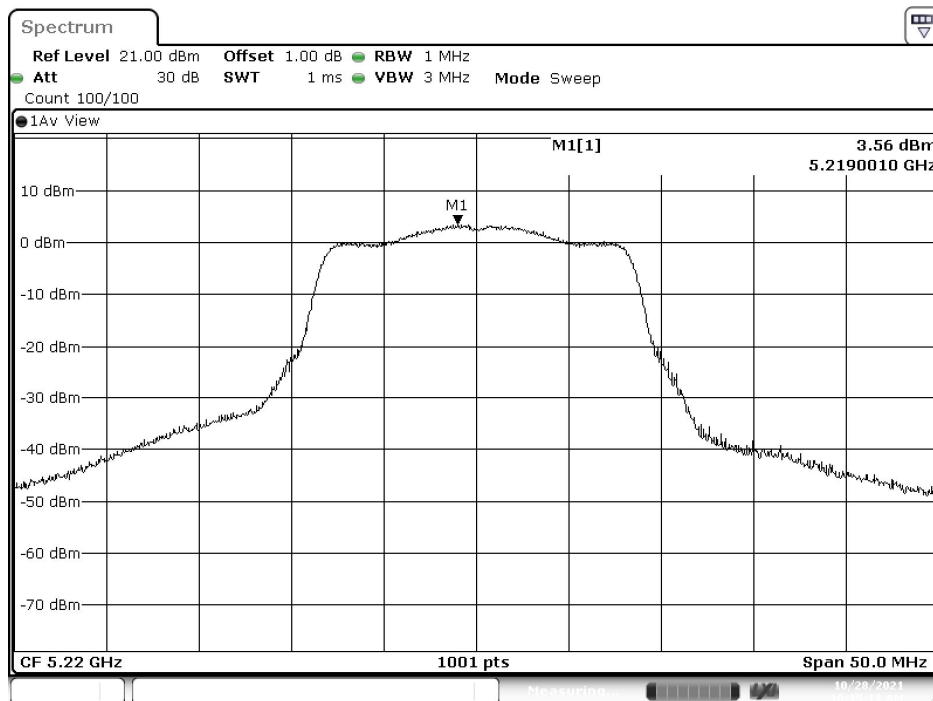
4.4. Test Result of Peak Power Spectral Density

Product : InstaShow X Button, InstaShow S Button
 Test Item : Peak Power Spectral Density
 Test Mode : Mode 1: Transmit (802.11a 6Mbps)
 Test Date : 2021/10/28

Channel Number	Frequency (MHz)	Data Rate (Mbps)	Chain (dBm)	PPSD/MHz (dBm)	10*log(2) (dB)	Duty factor (dB)	Total PPSD/MHz (dBm)	Limit (dBm)	Result
36	5180	6	A	2.72	3.01	0.31	6.04	11	Pass
			B	3.36	3.01	0.31	6.68	11	Pass
44	5220	6	A	3.37	3.01	0.31	6.69	11	Pass
			B	3.56	3.01	0.31	6.88	11	Pass
48	5240	6	A	3.22	3.01	0.31	6.54	11	Pass
			B	3.50	3.01	0.31	6.82	11	Pass

Channel Number	Frequency (MHz)	Data Rate (Mbps)	Chain (dBm)	PPSD (dBm)	BWCF (dB)	10*log(2) (dB)	Duty factor (dB)	Total PPSD (dBm)	Limit (dBm)	Result
149	5745	6	A	-4.24	6.98	3.01	0.31	6.06	<30	Pass
			B	-4.32	6.98	3.01	0.31	5.98		Pass
157	5785	6	A	-4.11	6.98	3.01	0.31	6.19	<30	Pass
			B	-4.72	6.98	3.01	0.31	5.58		Pass
165	5825	6	A	-4.40	6.98	3.01	0.31	5.90	<30	Pass
			B	-5.00	6.98	3.01	0.31	5.30		Pass

Channel 48



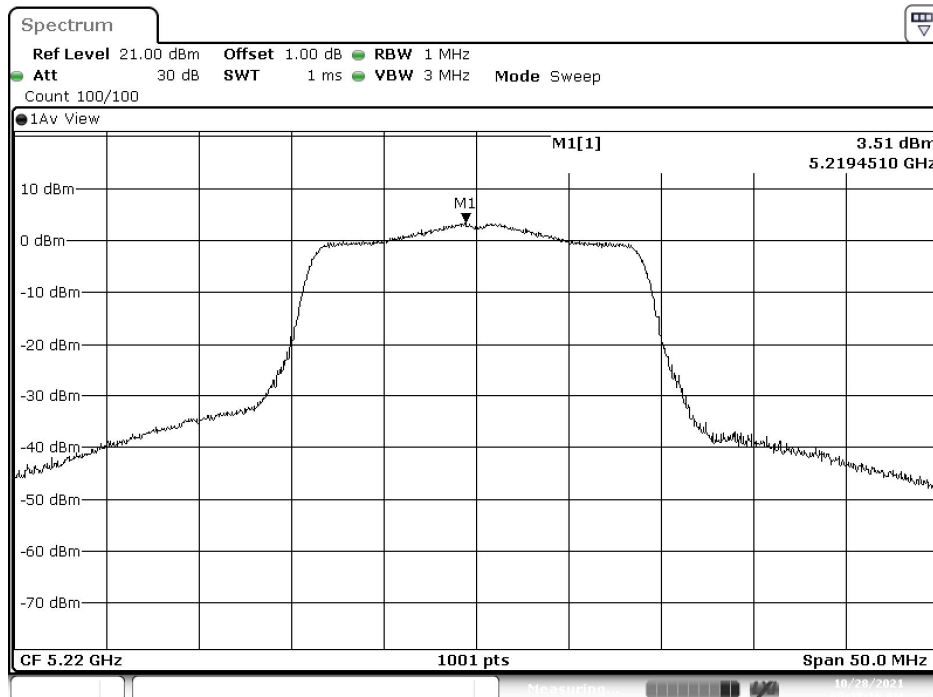
Date: 28.OCT.2021 10:15:12

Product : InstaShow X Button, InstaShow S Button
 Test Item : Peak Power Spectral Density
 Test Mode : Mode 2: Transmit (802.11ac-20BW 7.2Mbps)
 Test Date : 2021/10/28

Channel Number	Frequency (MHz)	Data Rata (Mbps)	Chain (dBm)	PPSD/MHz (dBm)	10*log(2) (dB)	Duty factor (dB)	Total PPSD/MHz (dBm)	Limit (dBm)	Result
36	5180	VHT0	A	3.08	3.01	0.33	6.42	11	Pass
			B	3.31	3.01	0.33	6.65	11	Pass
44	5220	VHT0	A	3.51	3.01	0.33	6.85	11	Pass
			B	3.28	3.01	0.33	6.62	11	Pass
48	5240	VHT0	A	3.16	3.01	0.33	6.50	11	Pass
			B	3.46	3.01	0.33	6.80	11	Pass

Channel Number	Frequency (MHz)	Data Rata (Mbps)	Chain (dBm)	PPSD (dBm)	BWCF (dB)	10*log(2) (dB)	Duty factor (dB)	Total PPSD (dBm)	Limit (dBm)	Result
149	5745	VHT0	A	-5.18	6.98	3.01	0.33	5.14	<30	Pass
			B	-5.13	6.98	3.01	0.33	5.19		Pass
157	5785	VHT0	A	-4.86	6.98	3.01	0.33	5.46	<30	Pass
			B	-5.13	6.98	3.01	0.33	5.19		Pass
165	5825	VHT0	A	-4.92	6.98	3.01	0.33	5.40	<30	Pass
			B	-5.51	6.98	3.01	0.33	4.81		Pass

Channel 36



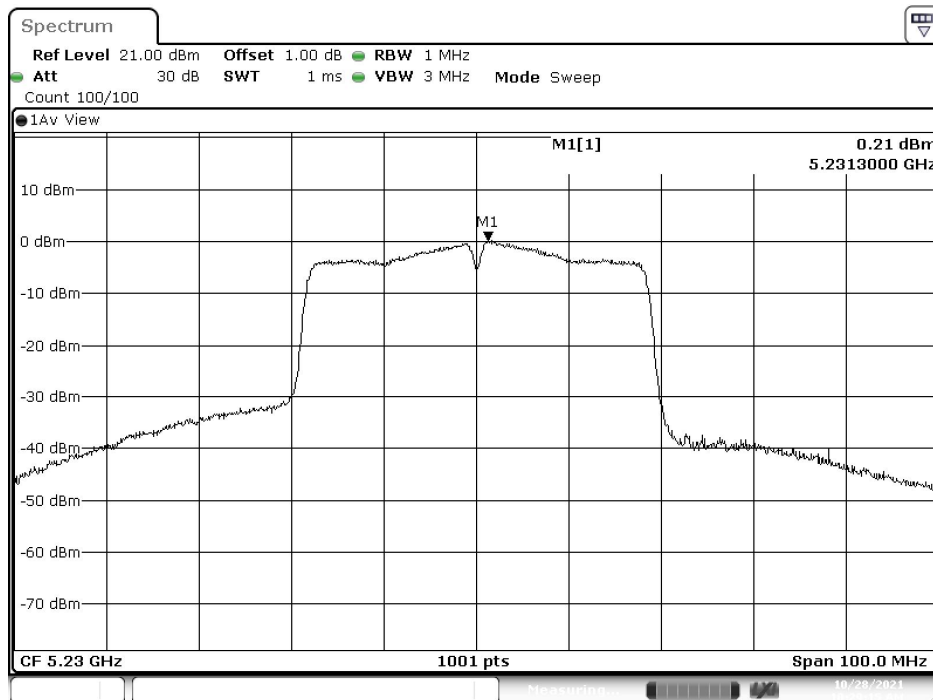
Date: 28.OCT.2021 09:48:16

Product : InstaShow X Button, InstaShow S Button
 Test Item : Peak Power Spectral Density
 Test Mode : Mode 3: Transmit (802.11ac-40BW 15Mbps)
 Test Date : 2021/10/28

Channel Number	Frequency (MHz)	Data Rata (Mbps)	Chain (dBm)	PPSD/MHz (dBm)	10*log(2) (dB)	Duty factor (dB)	Total PPSD/MHz (dBm)	Limit (dBm)	Result
38	5190	VHT0	A	-2.34	3.01	0.60	1.27	11	Pass
			B	-2.39	3.01	0.60	1.22	11	Pass
46	5230	VHT0	A	0.02	3.01	0.60	3.63	11	Pass
			B	0.21	3.01	0.60	3.82	11	Pass

Channel Number	Frequency (MHz)	Data Rata (Mbps)	Chain (dBm)	PPSD (dBm)	BWCF (dB)	10*log(2) (dB)	Duty factor (dB)	Total PPSD (dBm)	Limit (dBm)	Result
151	5755	VHT0	A	-8.26	6.98	3.01	0.60	2.33	<30	Pass
			B	-8.45	6.98	3.01	0.60	2.14		Pass
159	5795	VHT0	A	-8.76	6.98	3.01	0.60	1.83	<30	Pass
			B	-8.86	6.98	3.01	0.60	1.73		Pass

Channel 46



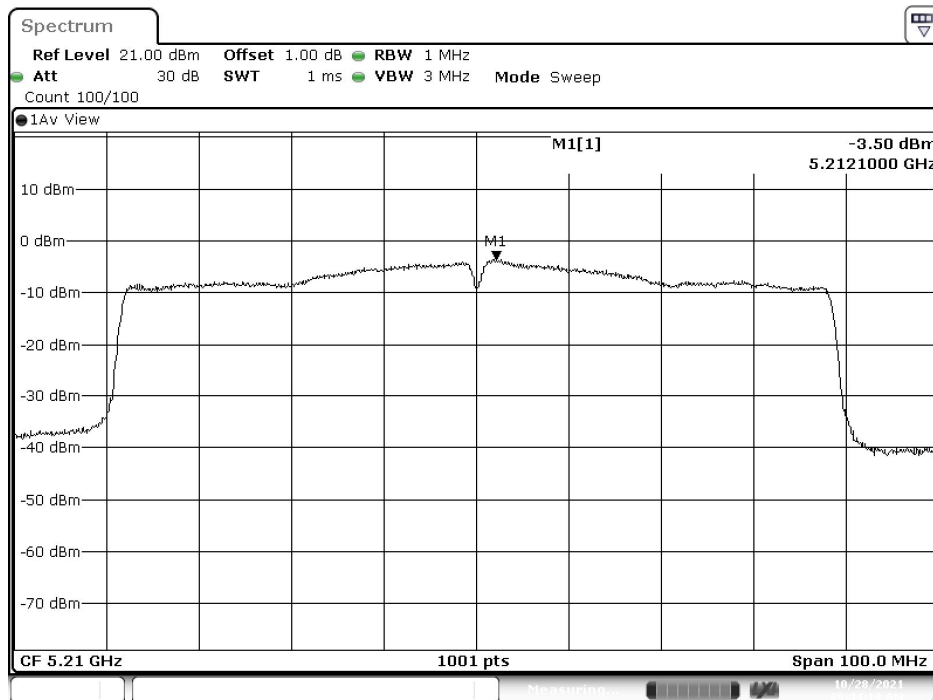
Date: 28.OCT.2021 10:29:15

Product : InstaShow X Button, InstaShow S Button
 Test Item : Peak Power Spectral Density
 Test Mode : Mode 4: Transmit (802.11ac-80BW 32.5Mbps)
 Test Date : 2021/10/28

Channel Number	Frequency (MHz)	Data Rate (Mbps)	Chain (dBm)	PPSD/MHz (dBm)	10*log(2) (dB)	Duty factor (dB)	Total PPSD/MHz (dBm)	Limit (dBm)	Result
42	5210	VHT0	A	-3.50	3.01	1.15	0.66	11	Pass
			B	-6.71	3.01	1.15	-2.55	11	Pass

Channel Number	Frequency (MHz)	Data Rate (Mbps)	Chain (dBm)	PPSD (dBm)	BWCF (dB)	10*log(2) (dB)	Duty factor (dB)	Total PPSD (dBm)	Limit (dBm)	Result
155	5775	VHT0	A	-11.73	6.98	3.01	1.15	-0.59	<11	Pass
			B	-12.12	6.98	3.01	1.15	-0.98		Pass

Channel 42

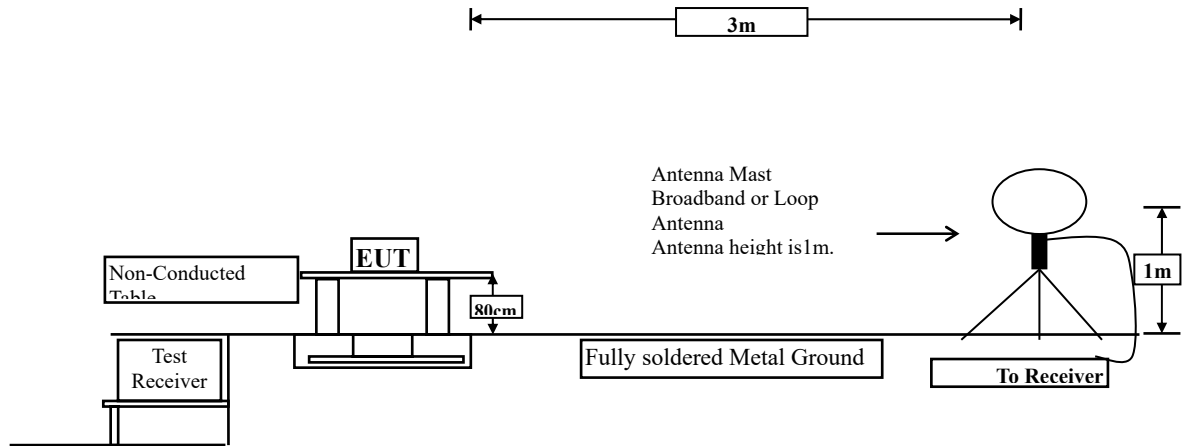


Date: 28.OCT.2021 09:44:19

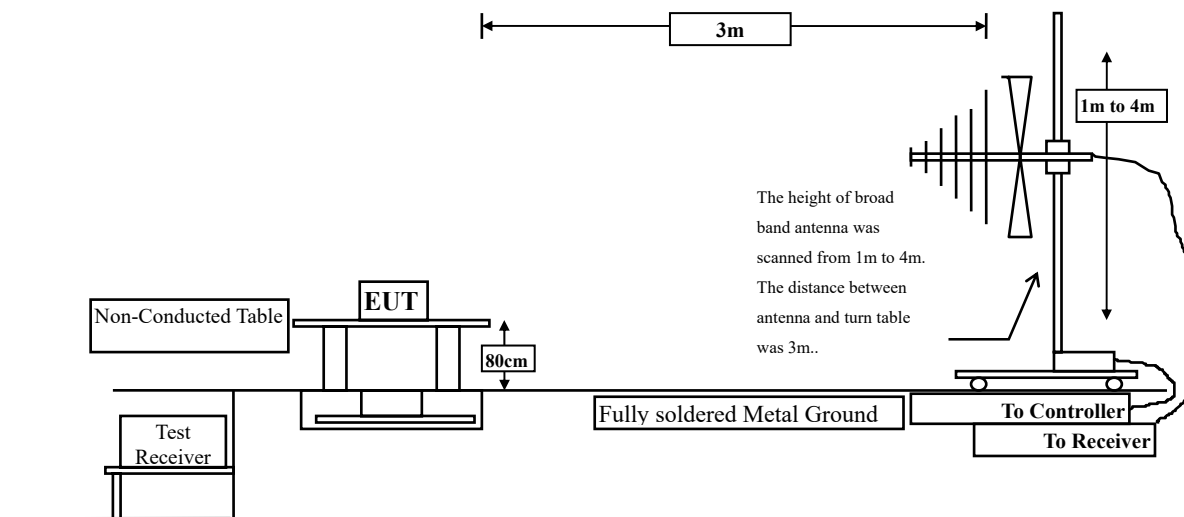
5. Radiated Emission

5.1. Test Setup

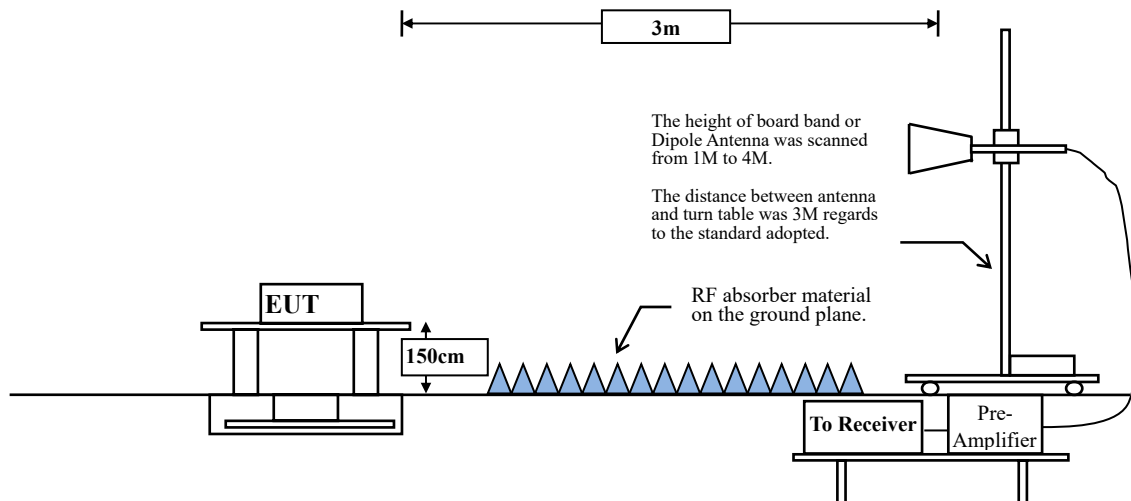
Radiated Emission Under 30MHz



Radiated Emission Below 1GHz



Radiated Emission Above 1GHz



5.2. Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

FCC Part 15 Subpart C Paragraph 15.209(a) Limits		
Frequency MHz	Field strength (microvolts/meter)	Measurement distance (meter)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Remarks: E field strength (dB μ V/m) = 20 log E field strength (uV/m)

- For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- For transmitters operating in the 5.725-5.85 GHz band:
All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.
- For transmitters operating within the 5.925-7.125 GHz band: Any emissions outside of the 5.925-7.125 GHz band must not exceed an e.i.r.p. of -27 dBm/MHz.

Based on ANSI C63.10-2013 Section 12.7.3 d) provides the conversion formula between field strength and EIRP, if distance is 3m, -27dBm is equivalent to 68.22dBuV/m.

5.3. Test Procedure

The EUT was setup according to ANSI C63.10, 2013 and tested according to FCC KDB-789033 test procedure for compliance to FCC 47CFR 15. 407 requirements.

Measuring the frequency range below 1GHz, the EUT is placed on a turn table which is 0.8 meter above ground, when measuring the frequency range above 1GHz, the EUT is placed on a turn table which is 1.5 meter above ground.

The turn table is rotated 360 degrees to determine the position of the maximum emission level.

The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned between 1 meter and 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10: 2013 on radiated measurement.

The resolution bandwidth below 30MHz setting on the field strength meter is 9kHz and 30MHz~1GHz is 120kHz and above 1GHz is 1MHz.

Radiated emission measurements below 30MHz are made using Loop Antenna and 30MHz~1GHz are made using broadband Bilog antenna and above 1GHz are made using Horn Antennas.

The measurement is divided into the Preliminary Measurement and the Final Measurement.

The suspected frequencies are searched for in Preliminary Measurement with the measurement antenna kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. The antenna is pointed at an angle towards the source of the emission, and the EUT is rotated in both height and polarization to maximize the measured emission. The emission is kept within the illumination area of the 3 dB bandwidth of the antenna. The measurement frequency range from 9kHz - 10th Harmonic of fundamental was investigated.

RBW and VBW Parameter setting:

According to KDB 789033 section II.G.5 Procedure for Unwanted Maximum Emissions Measurements above 1000 MHz.

RBW = 1MHz.

VBW \geq 3MHz.

According to KDB 789033 section II.G.6 Procedures for Average Unwanted Emissions Measurements above 1000 MHz.

RBW = 1MHz.

VBW = 10Hz, when duty cycle \geq 98 %

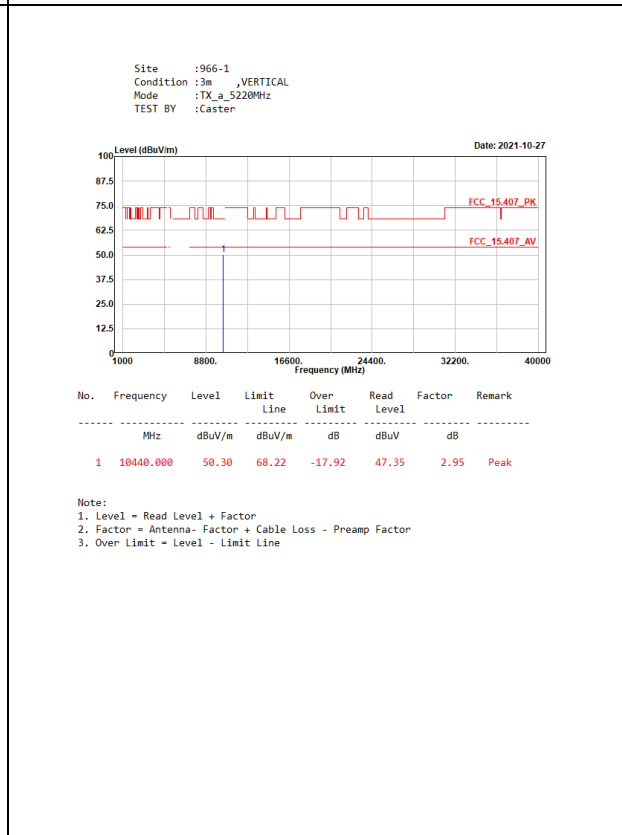
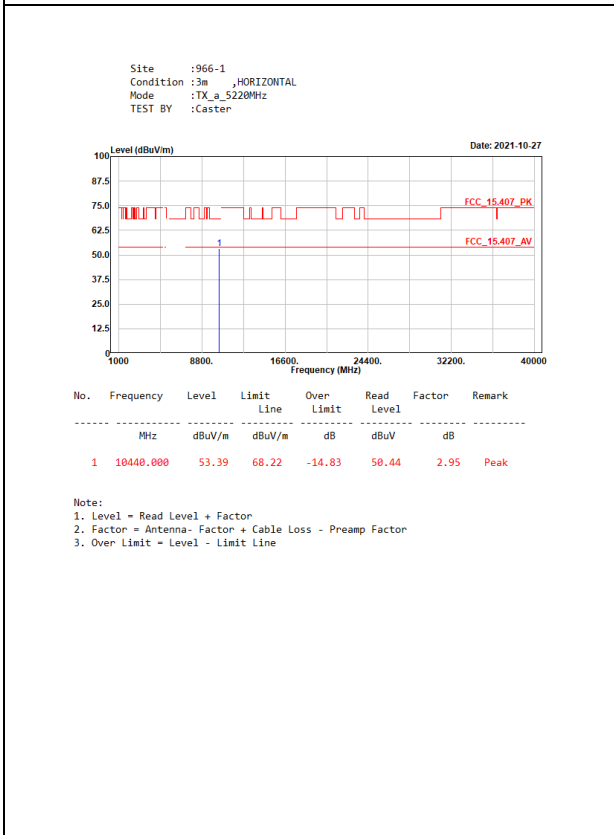
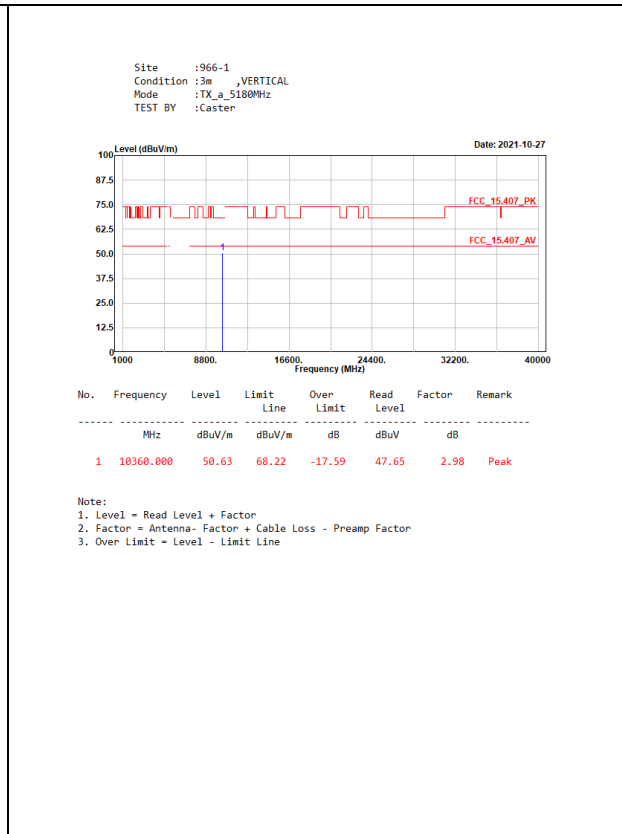
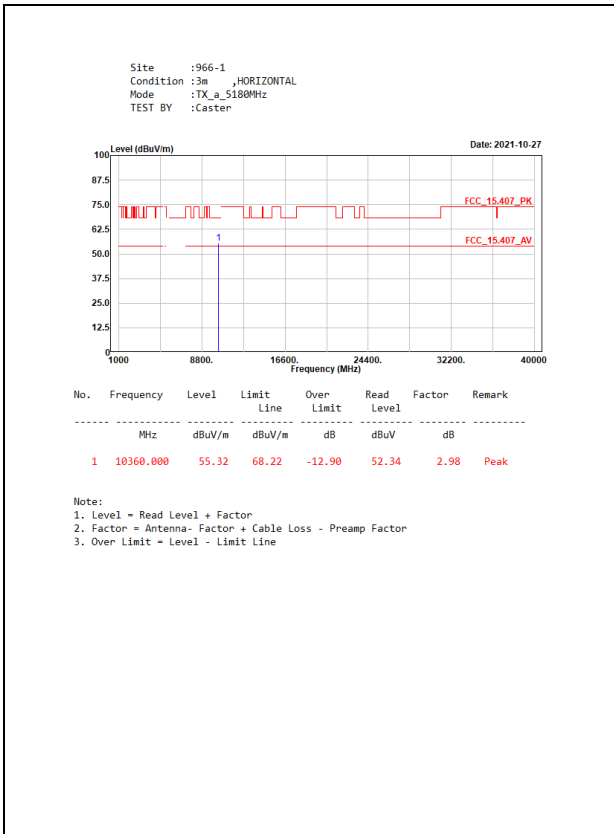
VBW \geq 1/T, when duty cycle < 98 %

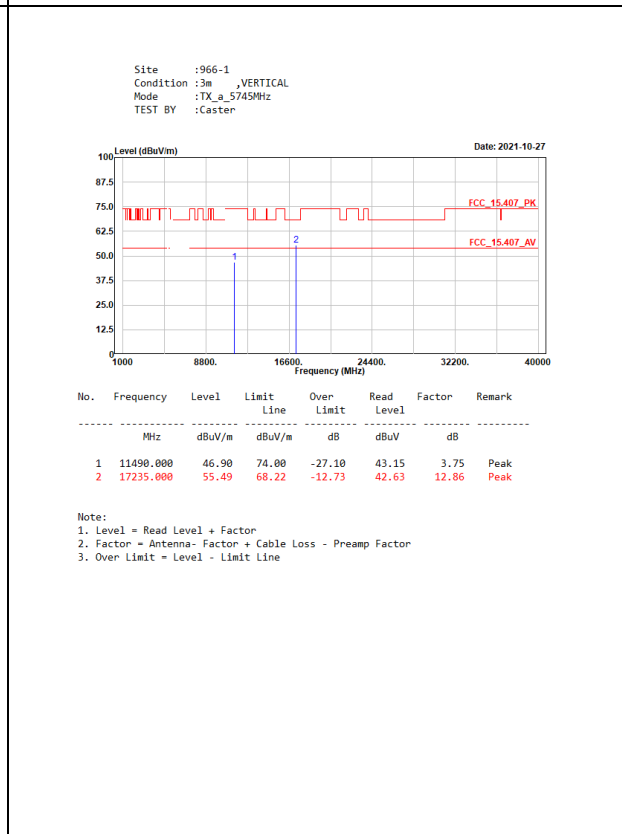
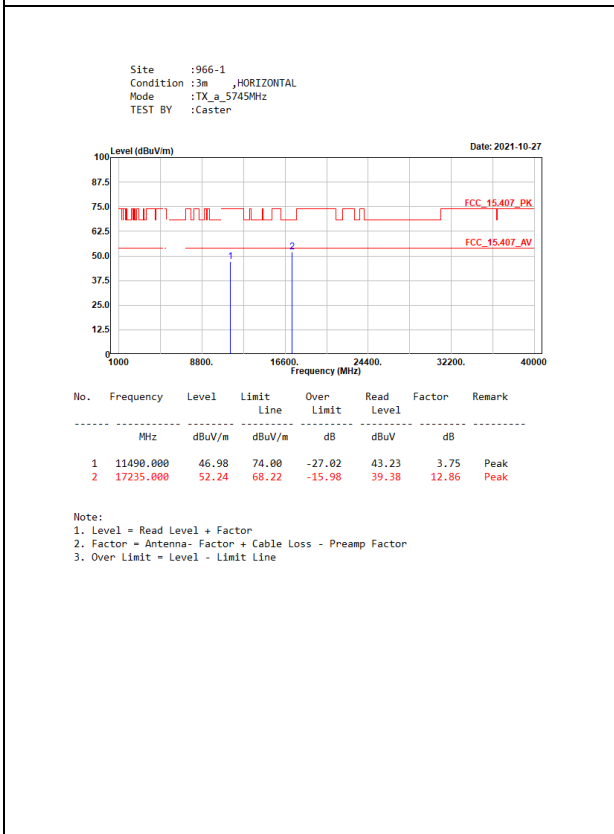
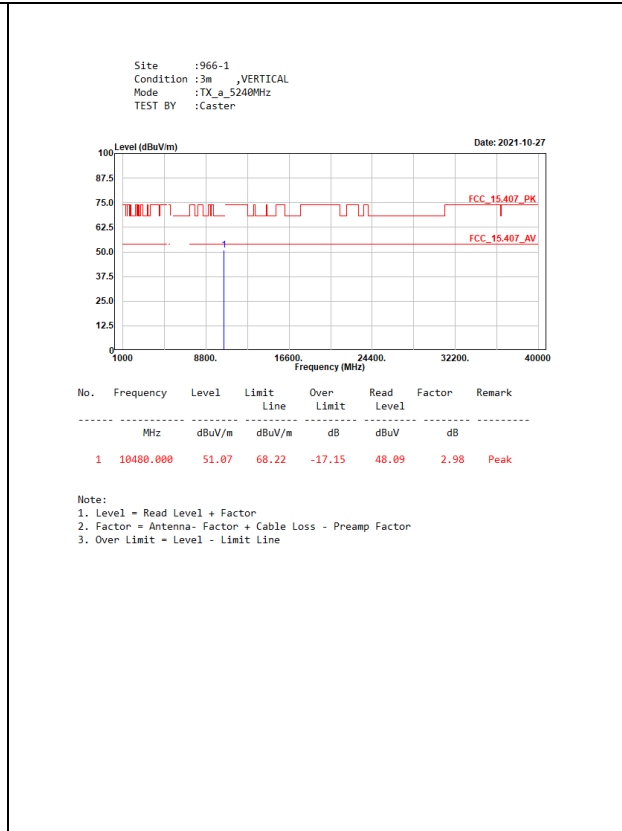
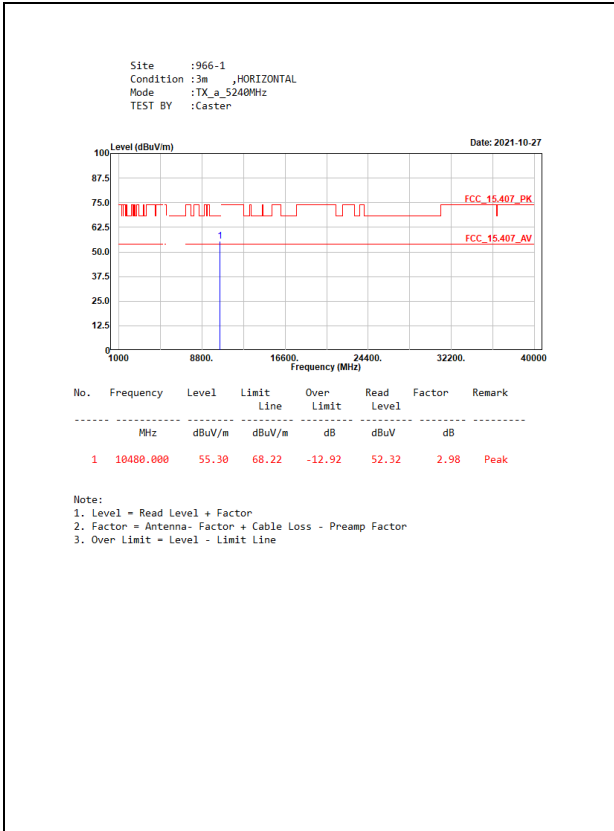
(T refers to the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.)

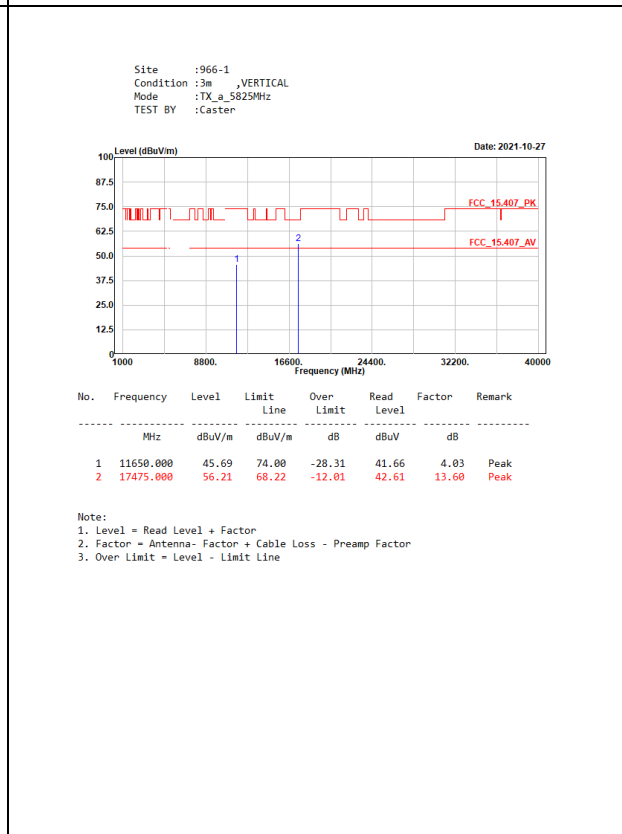
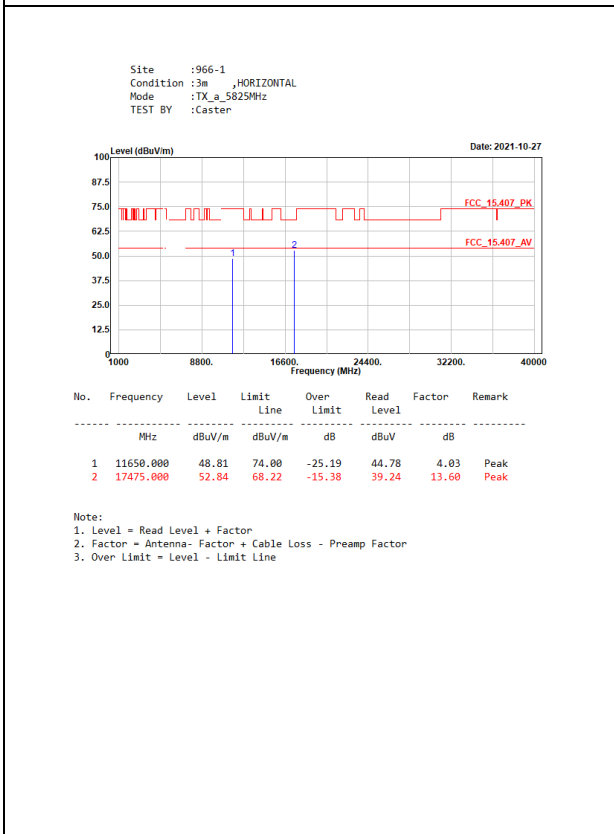
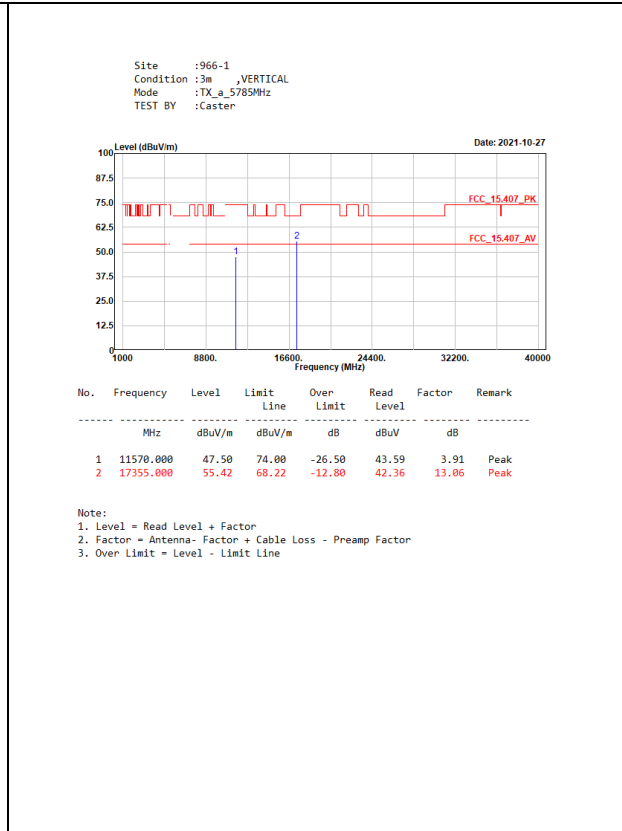
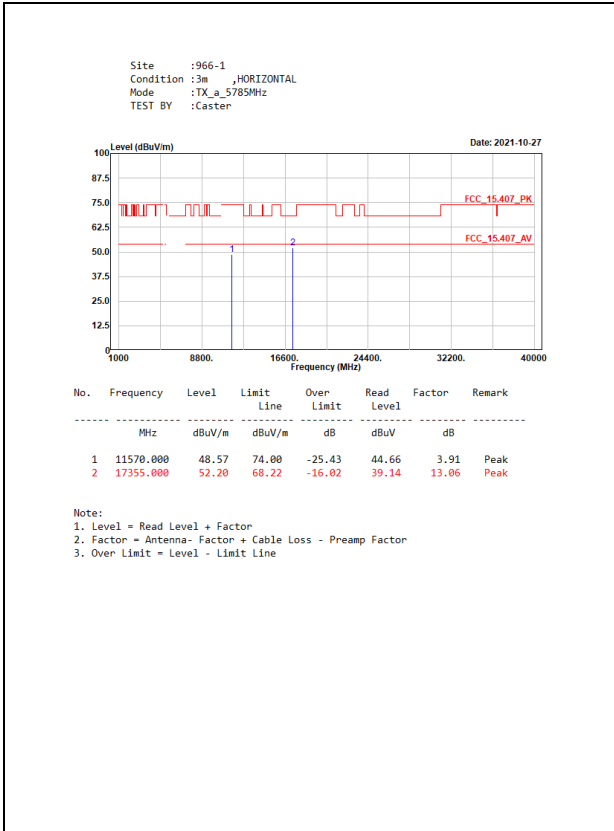
5GHz band	Duty Cycle (%)	T (ms)	1/T (Hz)	VBW (Hz)
802.11a	93.14	1.4250	702	1000
802.11n20	87.42	0.6950	1439	2000
802.11n40	78.02	0.3550	2817	3000
802.11ac20	76.74	0.3300	3030	5000
802.11ac40	92.73	1.3400	746	1000
802.11ac80	87.01	0.6700	1493	2000

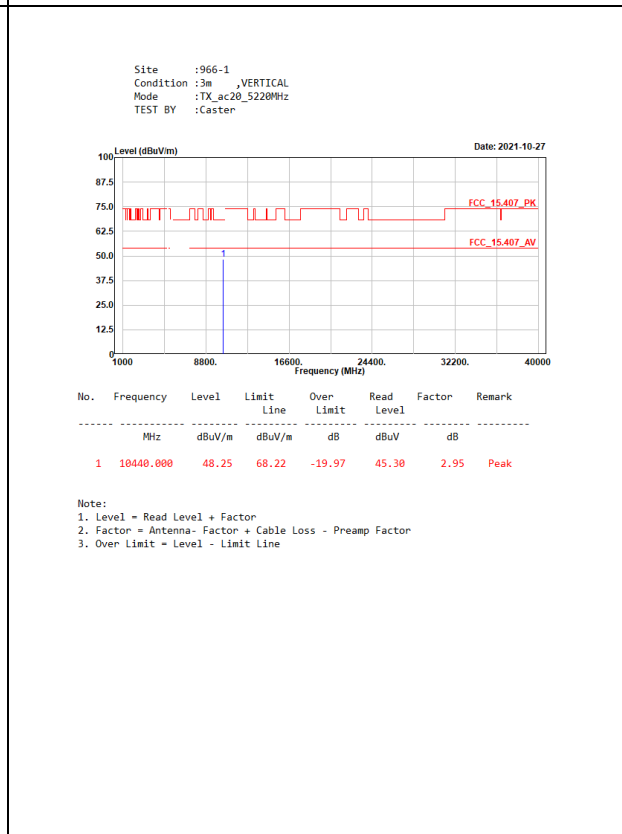
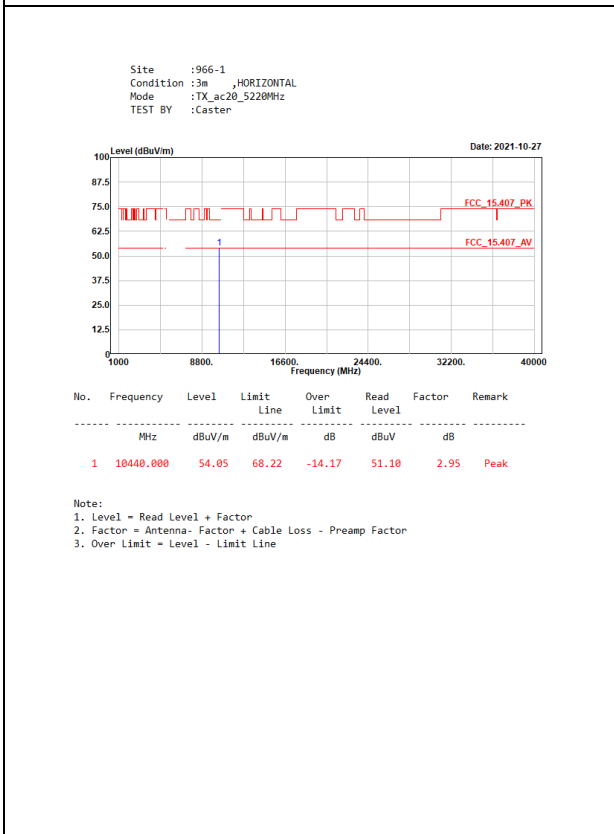
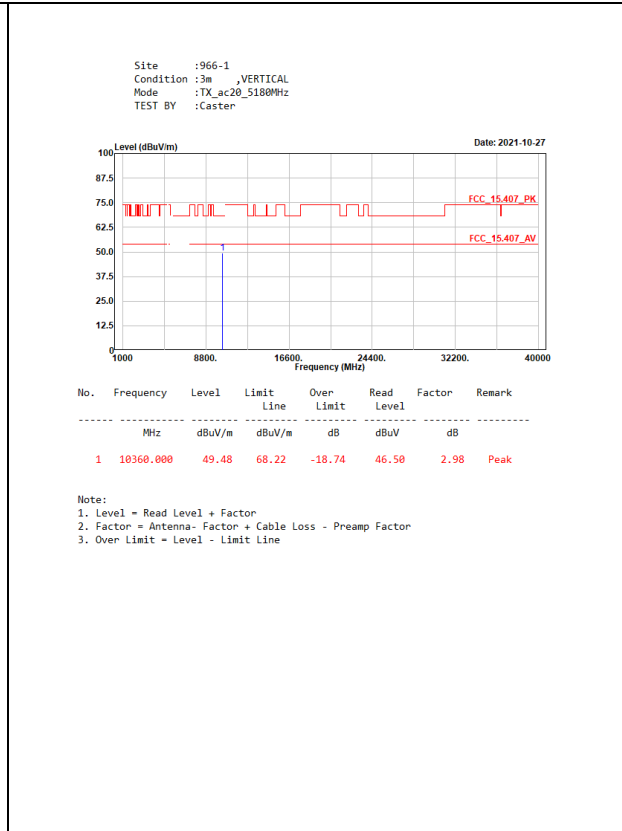
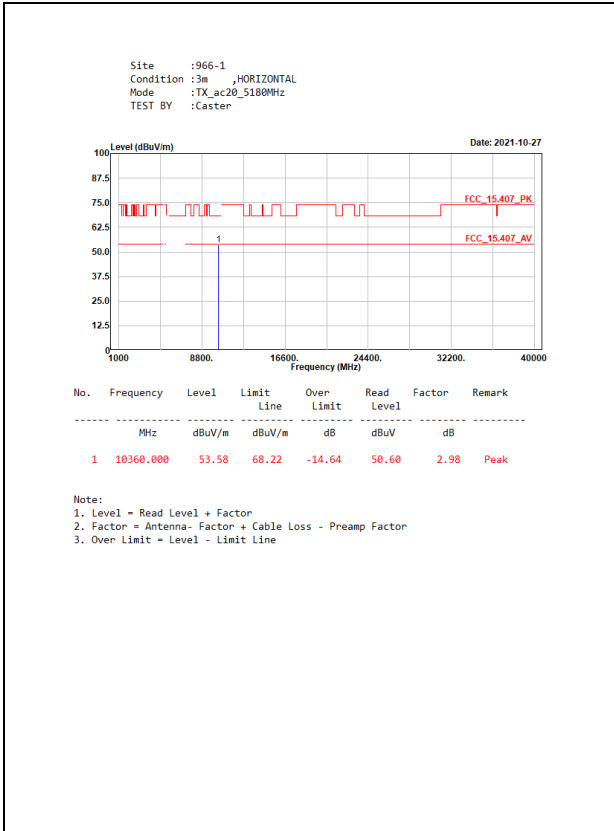
Note: Duty Cycle Refer to Section 8

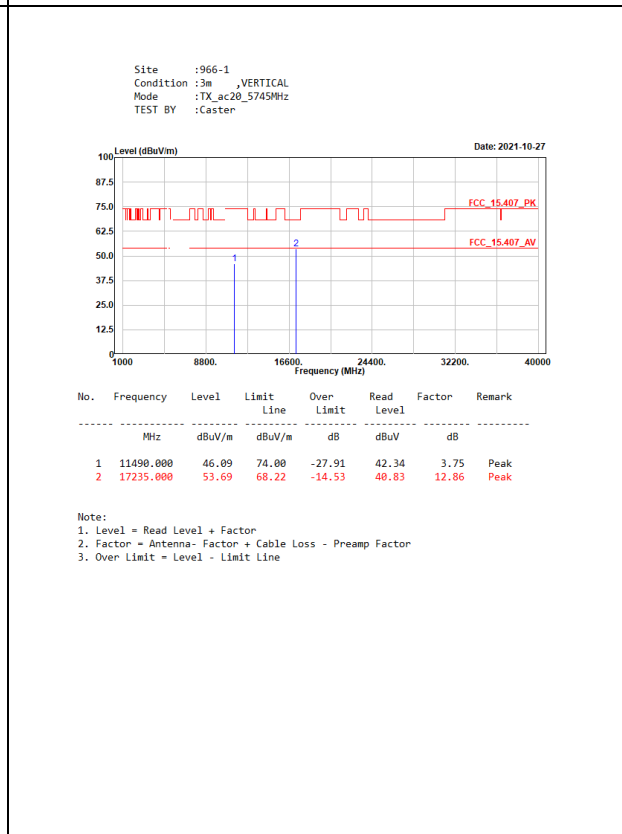
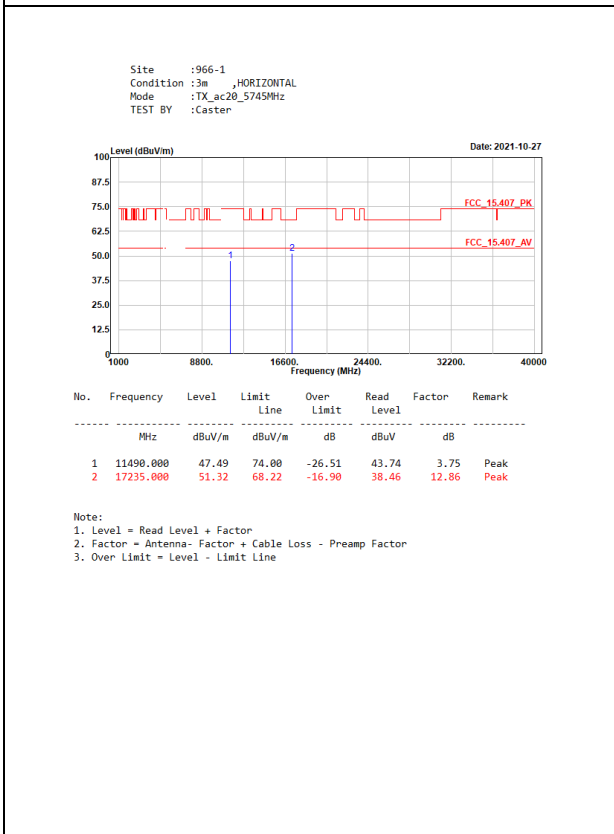
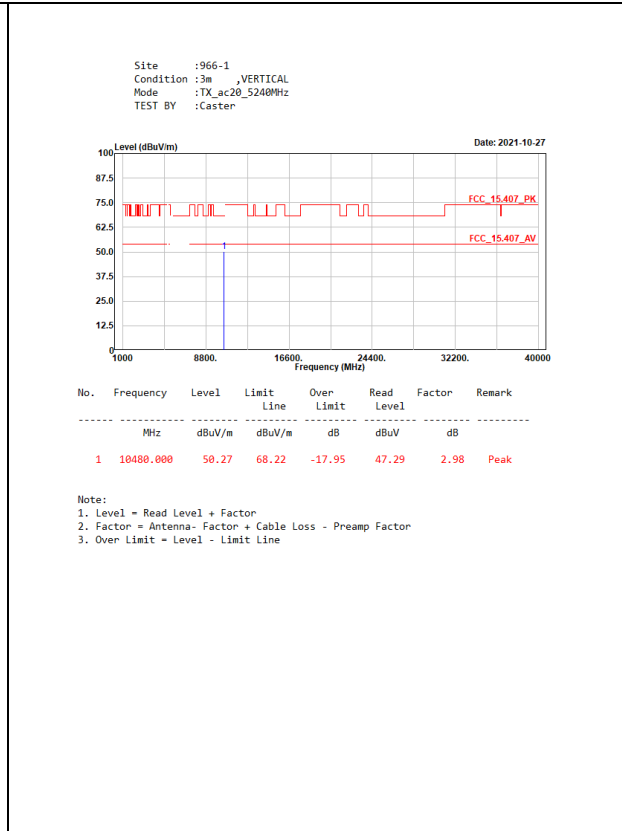
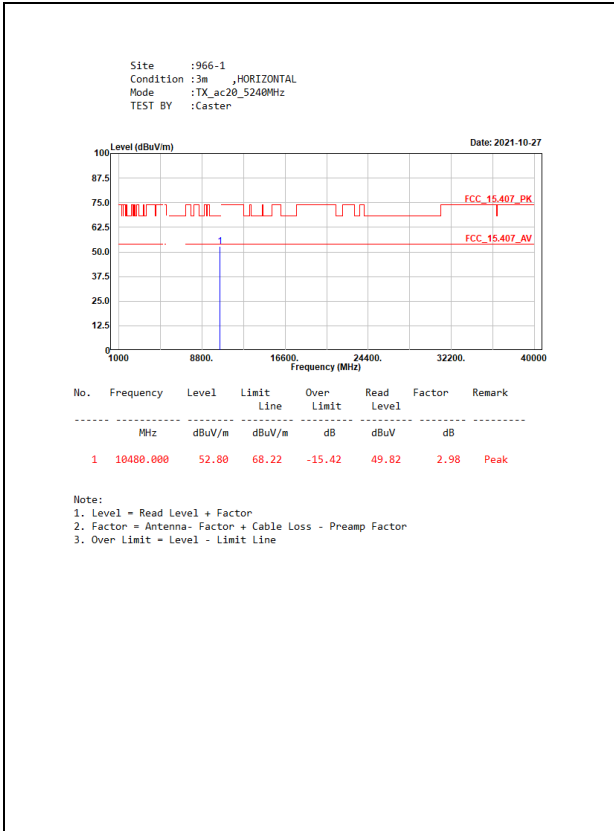
5.4. Test Result of Radiated Emission

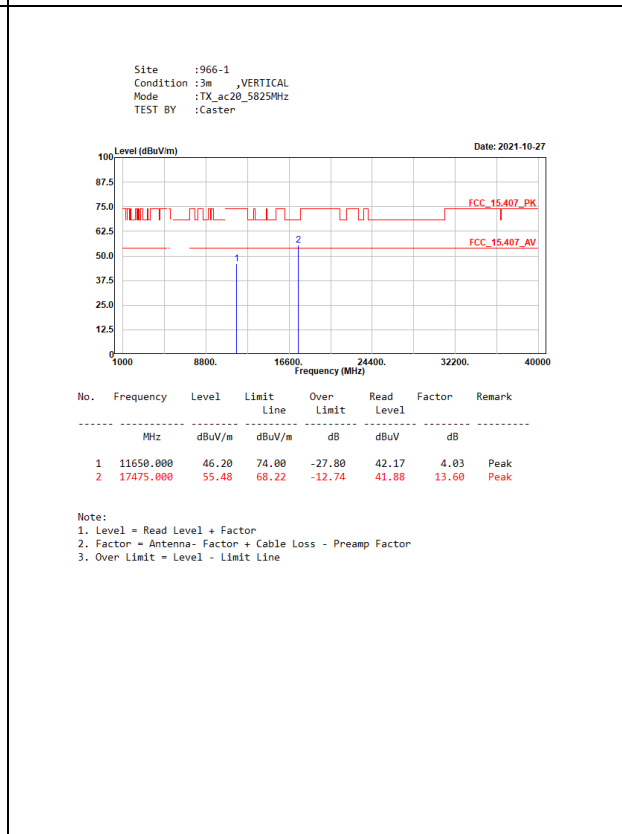
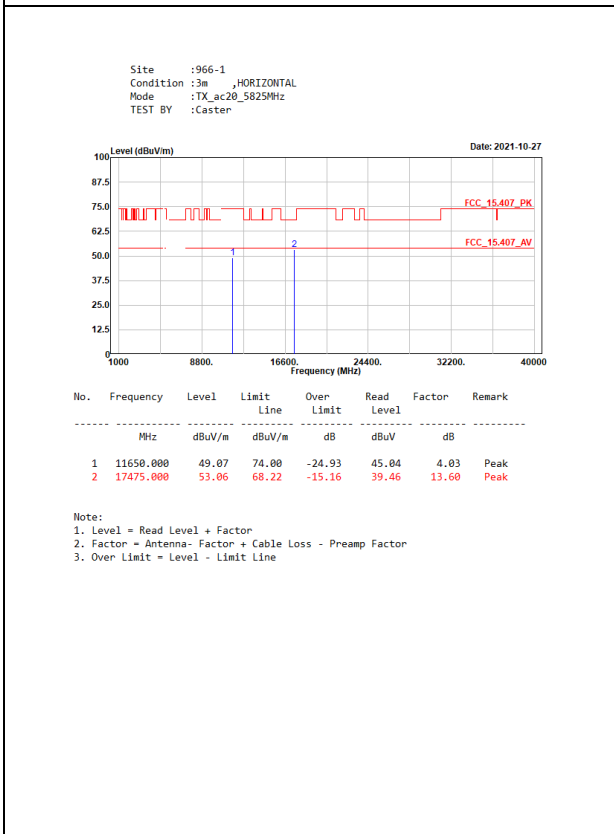
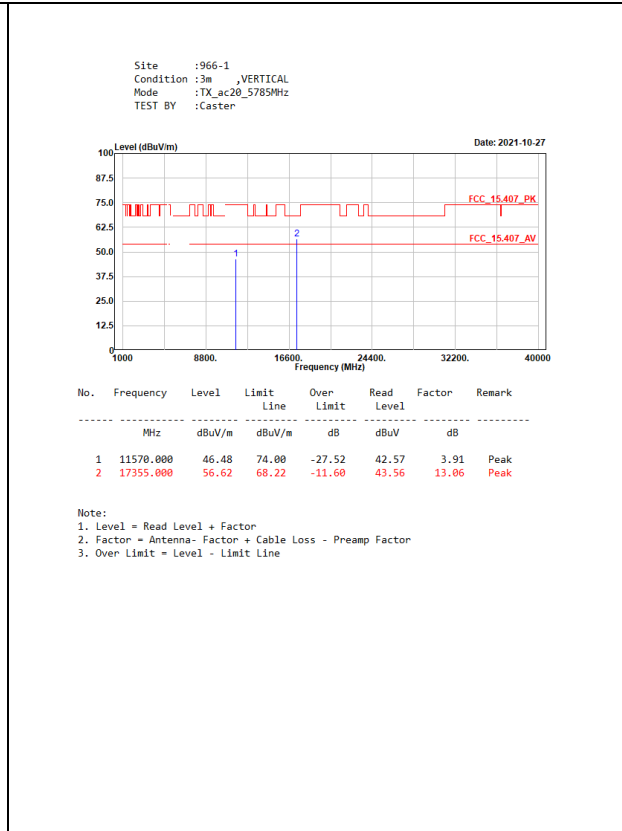
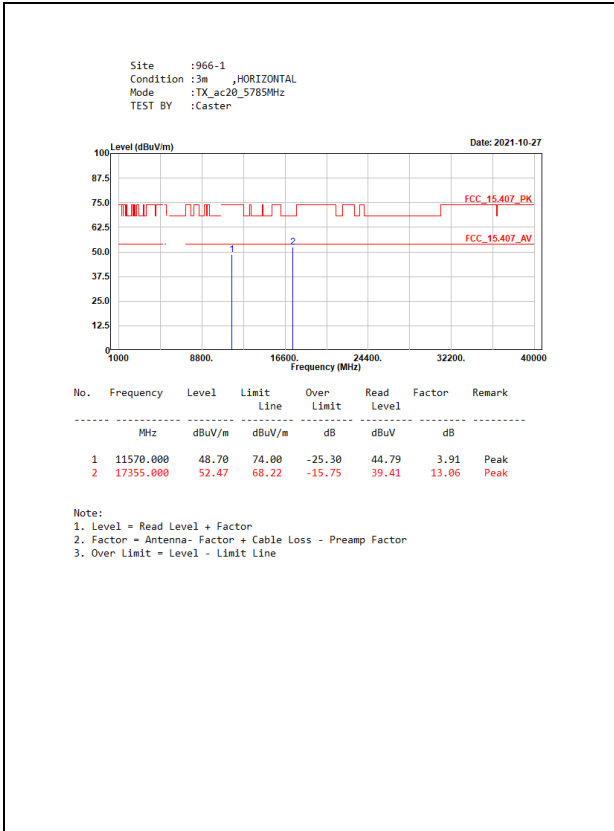


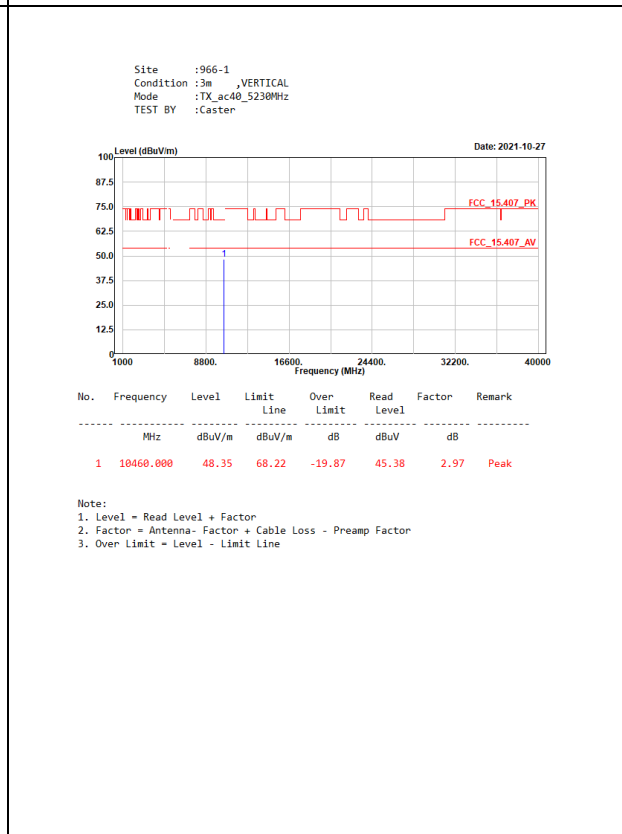
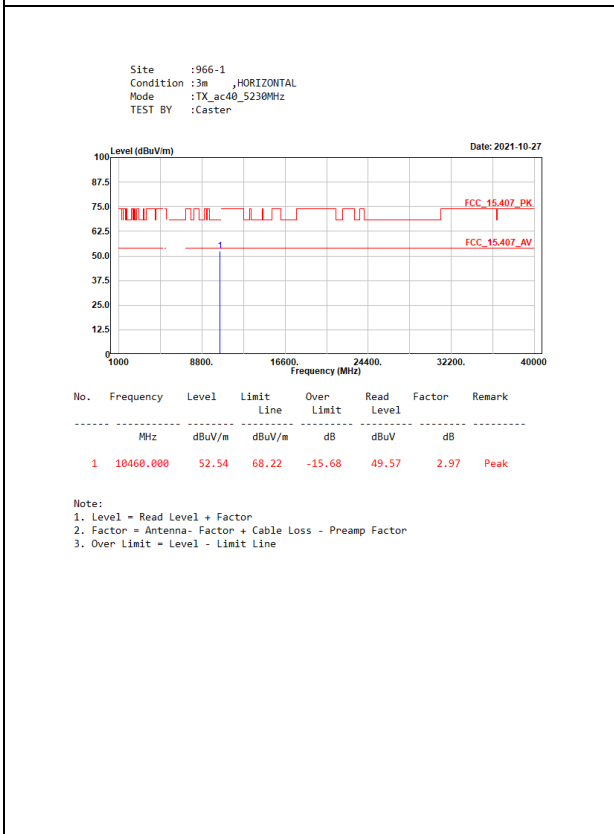
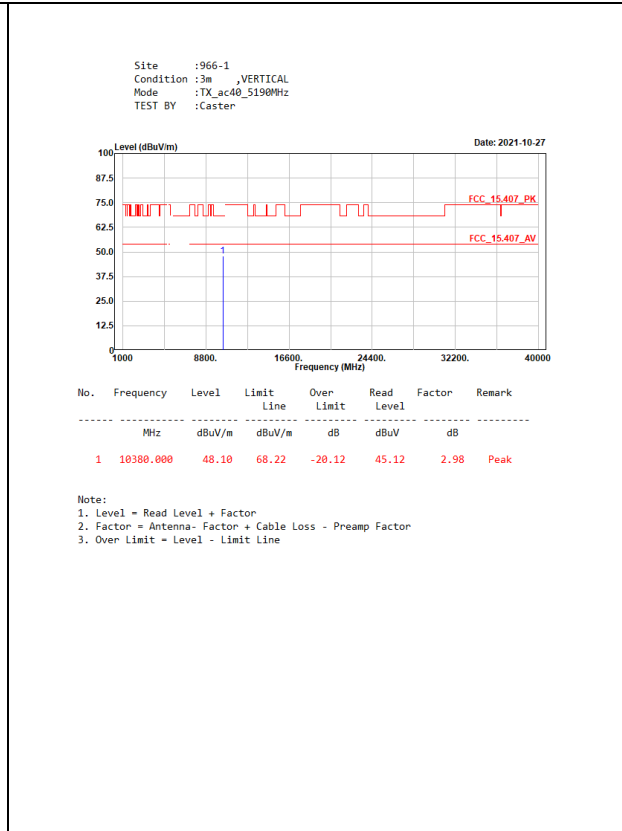
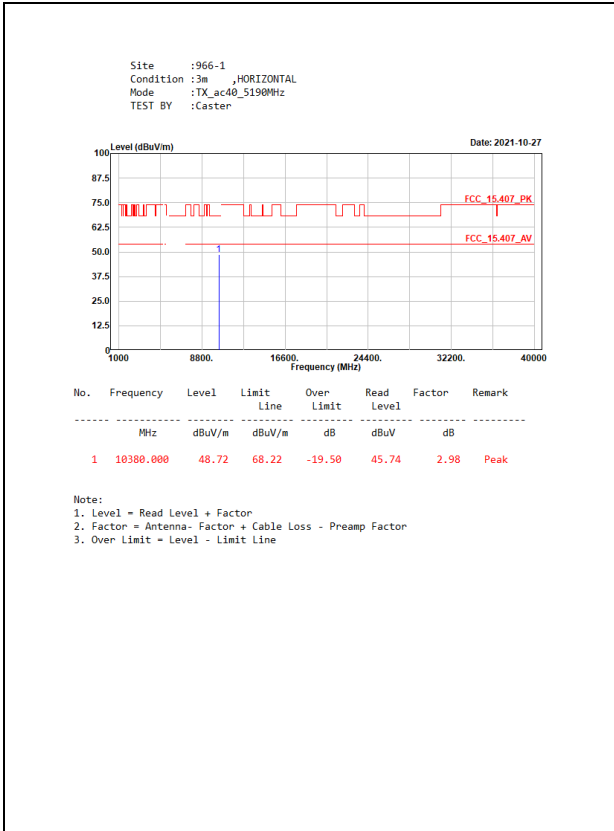


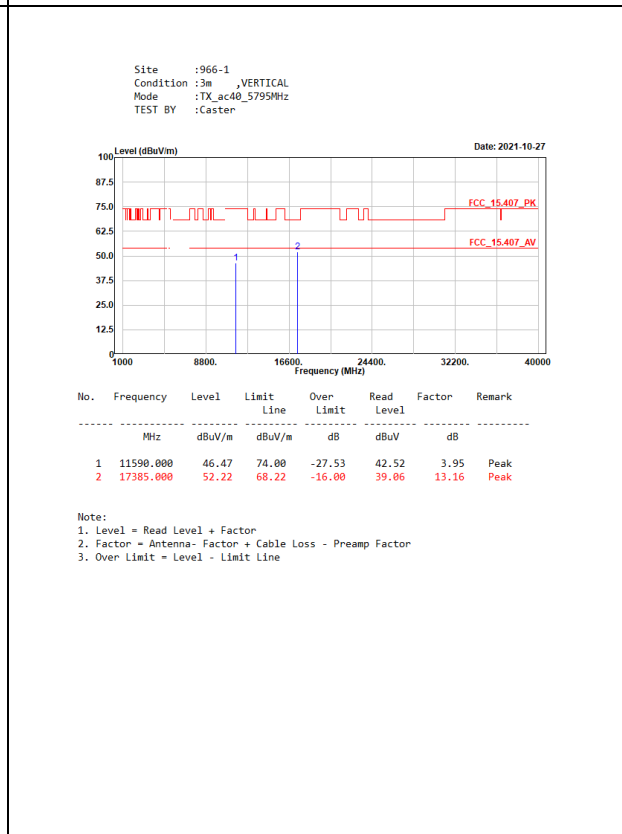
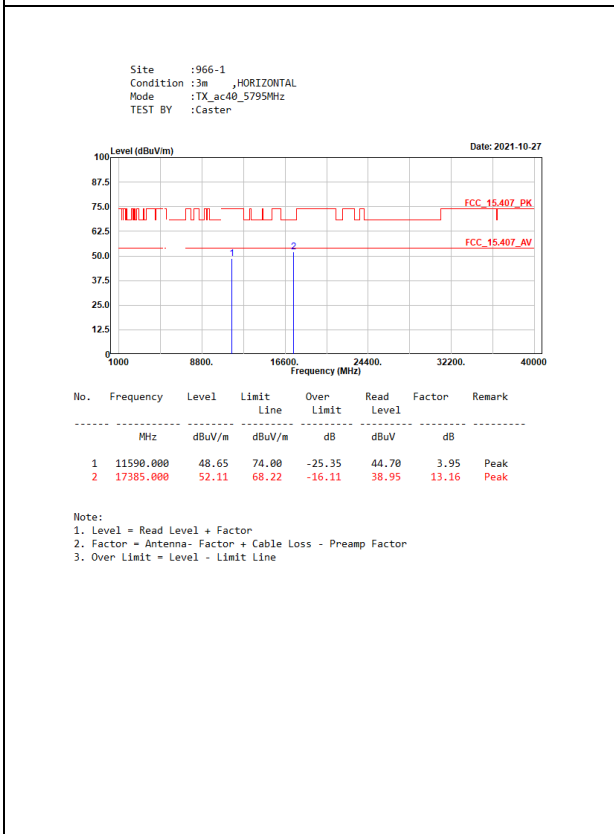
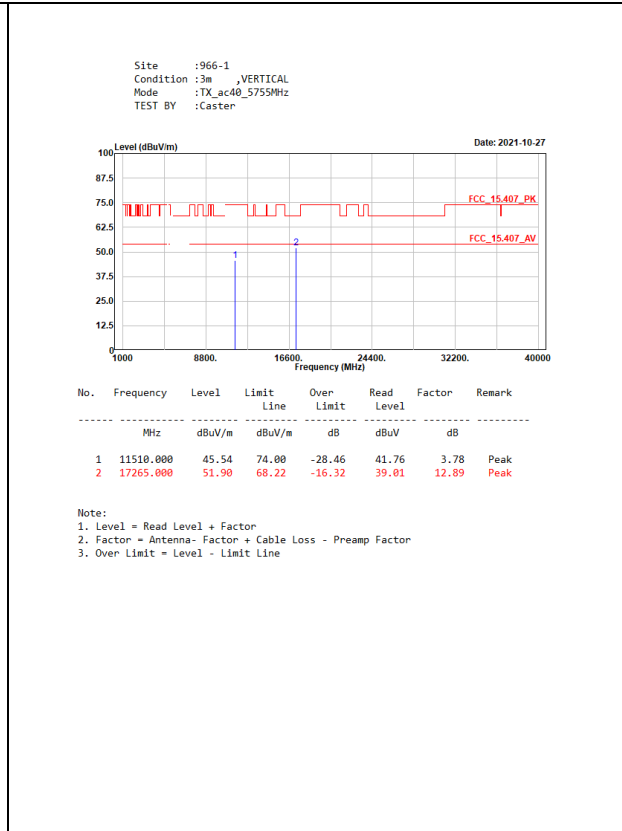
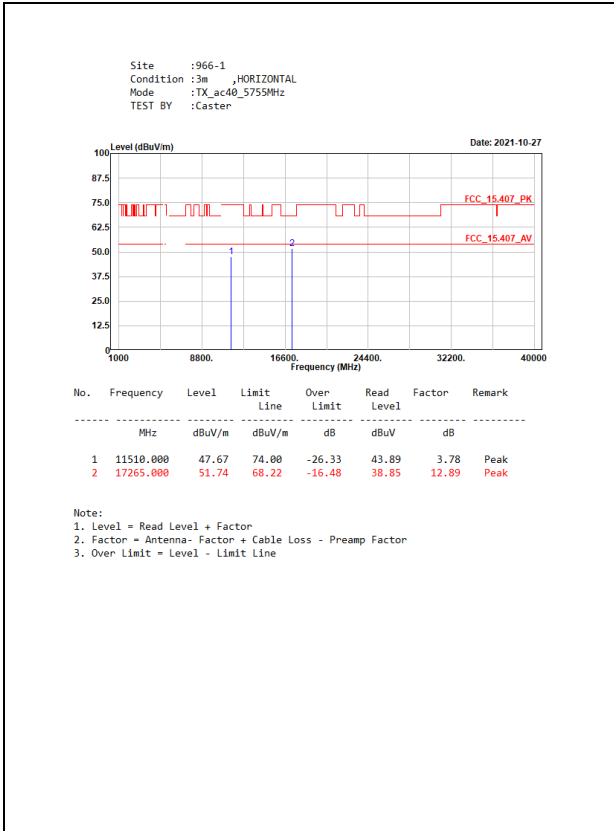


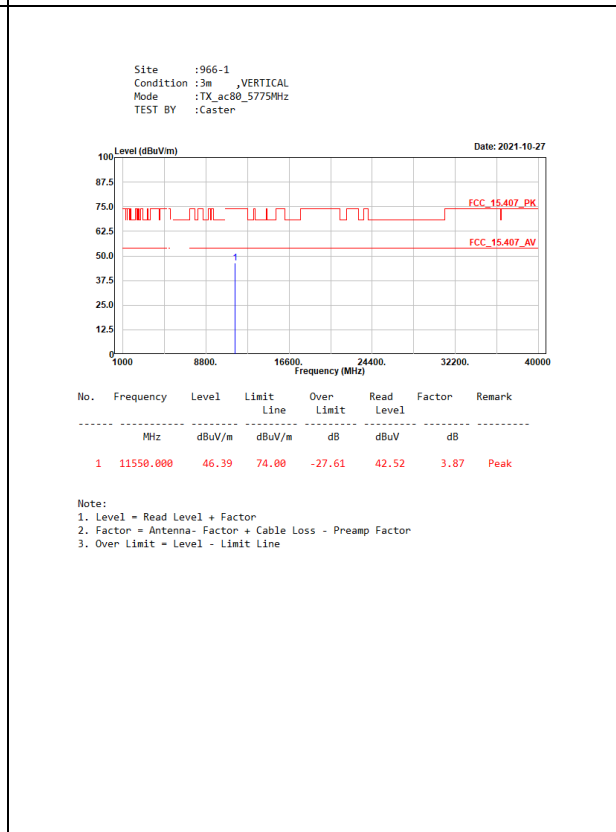
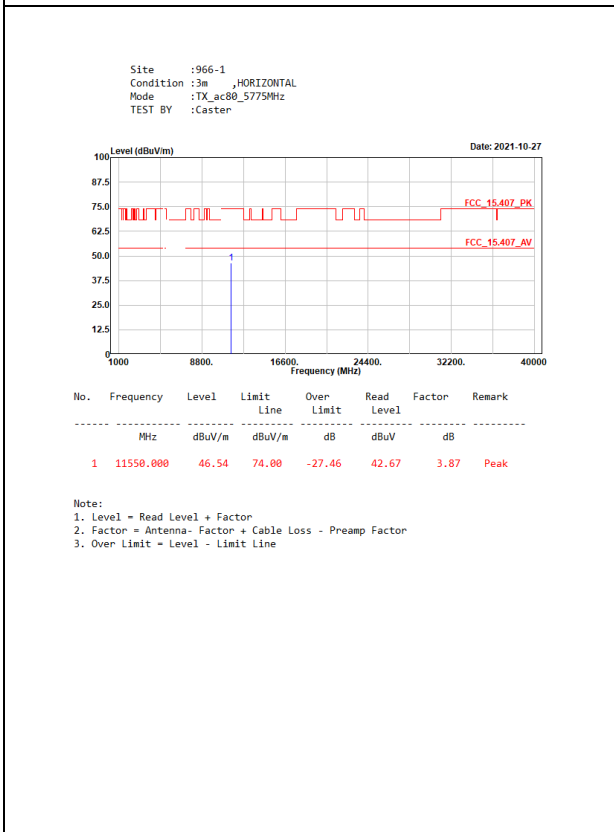
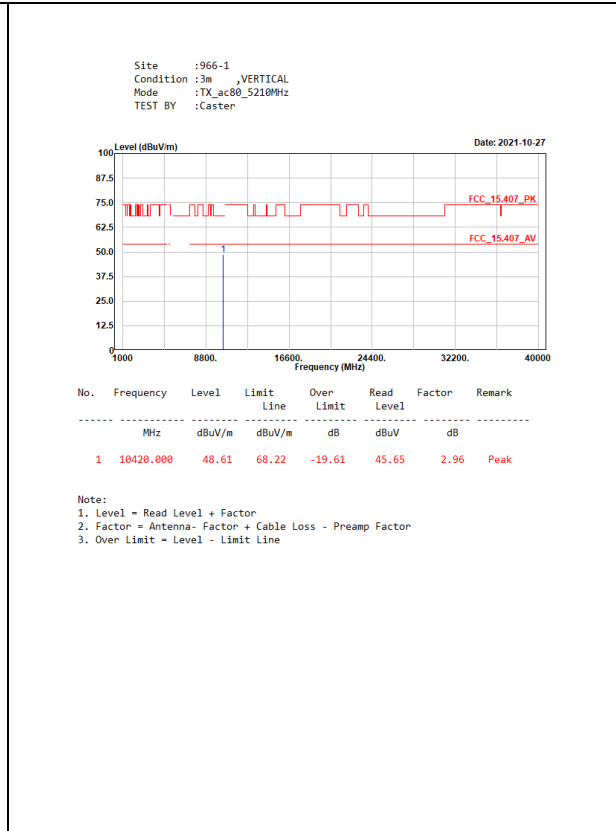
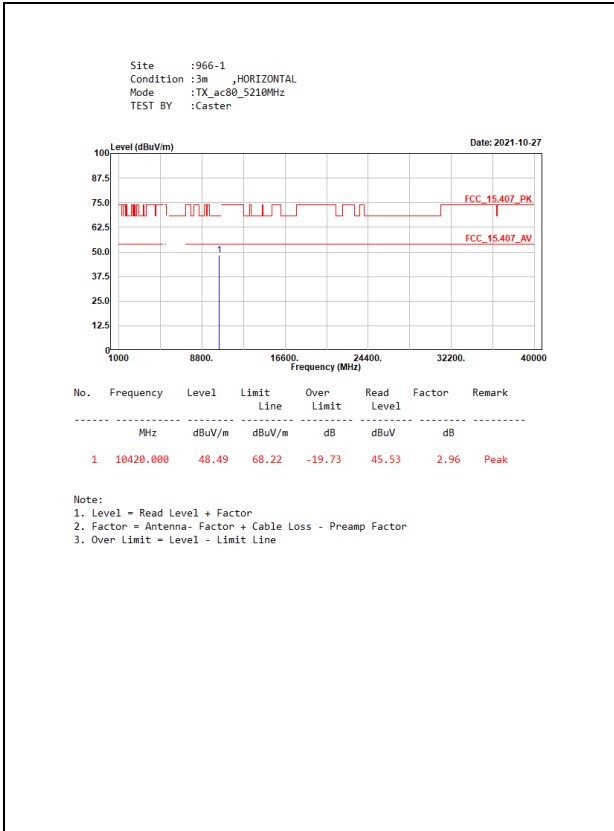


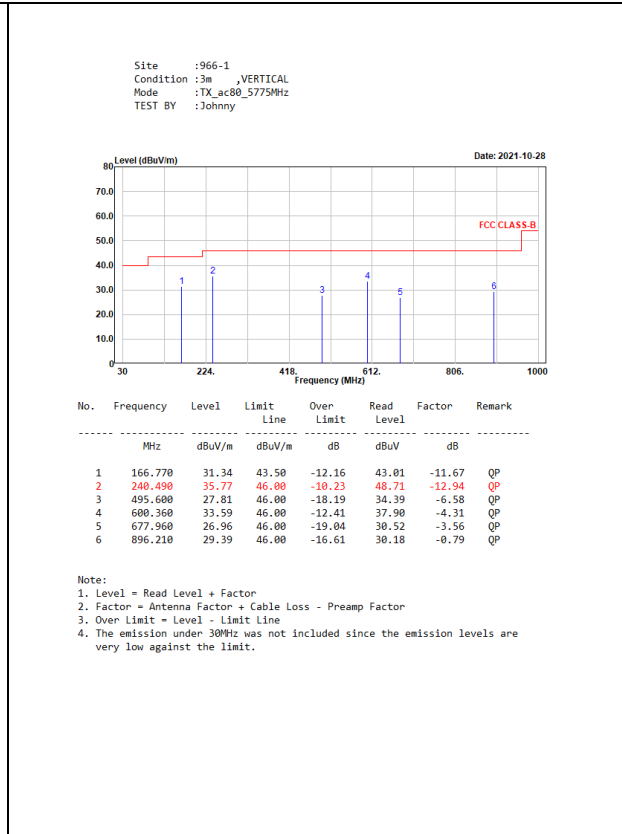
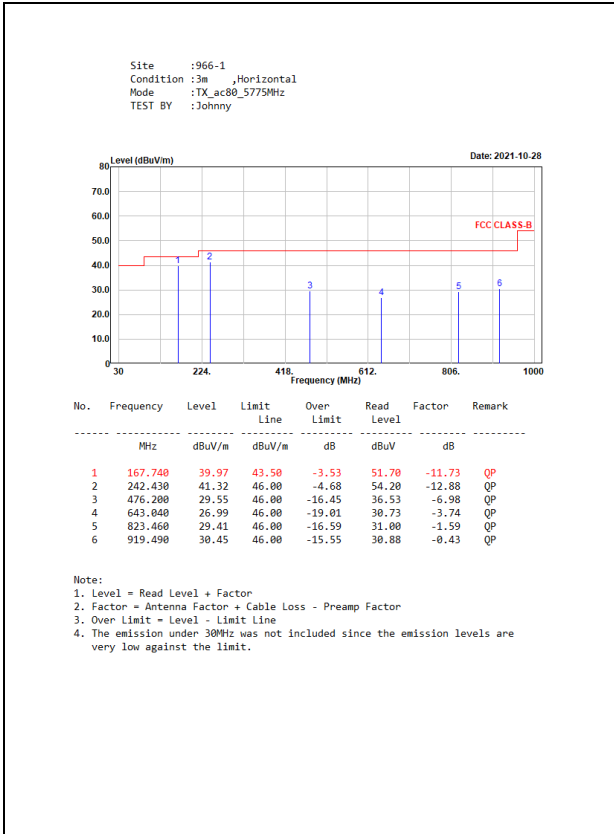








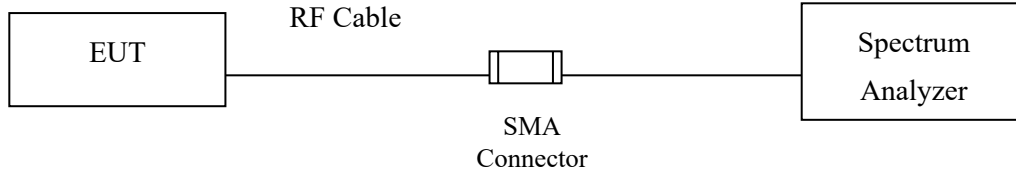




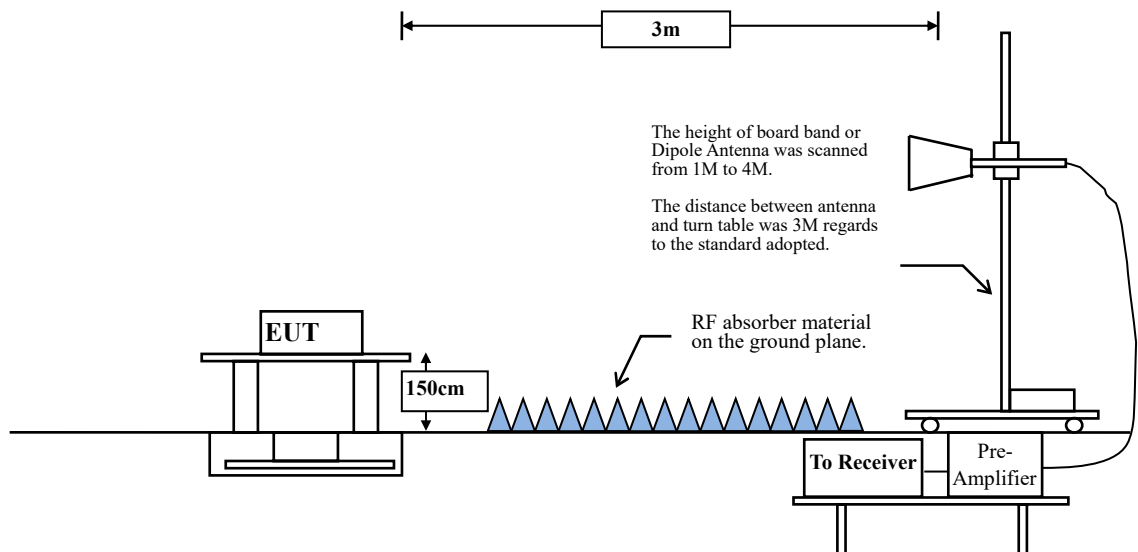
6. Band Edge

6.1. Test Setup

RF Conducted Measurement:



RF Radiated Measurement:



6.2. Limits

The provisions of Section 15.205 of this part apply to intentional radiators operating under this section. Radiated emissions which fall in the restricted bands, as defined in Section 15.205, must also comply with the radiated emission limits specified in Section 15.209:

FCC Part 15 Subpart C Paragraph 15.209 Limits		
Frequency MHz	uV/m @3m	dBµV/m@3m
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

- Remarks :
1. RF Voltage (dBµV) = 20 log RF Voltage (uV)
 2. In the Above Table, the tighter limit applies at the band edges.
 3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
- For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
 - For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
 - For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
 - For transmitters operating in the 5.725-5.85 GHz band:
All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.
 - For transmitters operating within the 5.925-7.125 GHz band: Any emissions outside of the 5.925-7.125 GHz band must not exceed an e.i.r.p. of -27 dBm/MHz.

Based on ANSI C63.10-2013 Section 12.7.3 d) provides the conversion formula between field strength and EIRP, if distance is 3m, -27dBm is equivalent to 68.22dBuV/m.

6.3. Test Procedure

The EUT is placed on a turn table which is 1.5 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.10:2013 on radiated measurement.

The bandwidth below 1GHz setting on the field strength meter is 120 kHz, above 1GHz are 1 MHz. The EUT was setup to ANSI C63.10, 2013; tested to UNII test procedure of FCC KDB-789033 for compliance to FCC 47CFR Subpart E requirements.

RBW and VBW Parameter setting:

According to KDB 789033 section II.G.5 Procedure for Unwanted Maximum Emissions Measurements above 1000 MHz.

RBW = 1MHz.

VBW \geq 3MHz.

According to KDB 789033 section II.G.6 Procedures for Average Unwanted Emissions Measurements above 1000 MHz.

RBW = 1MHz.

VBW = 10Hz, when duty cycle \geq 98 %

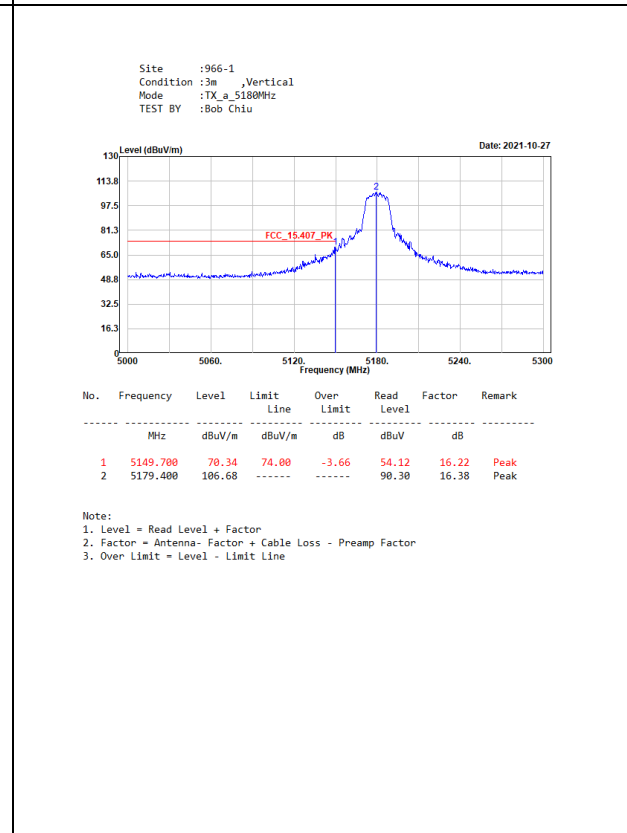
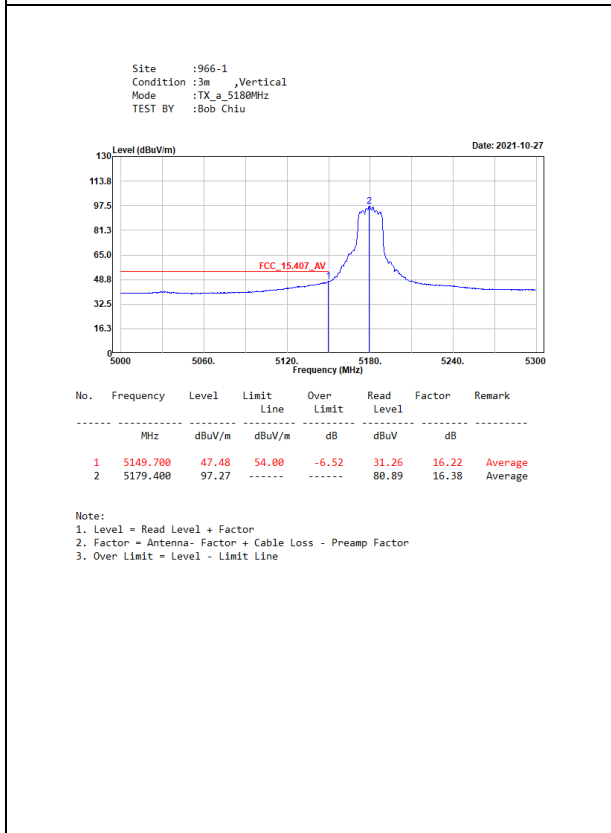
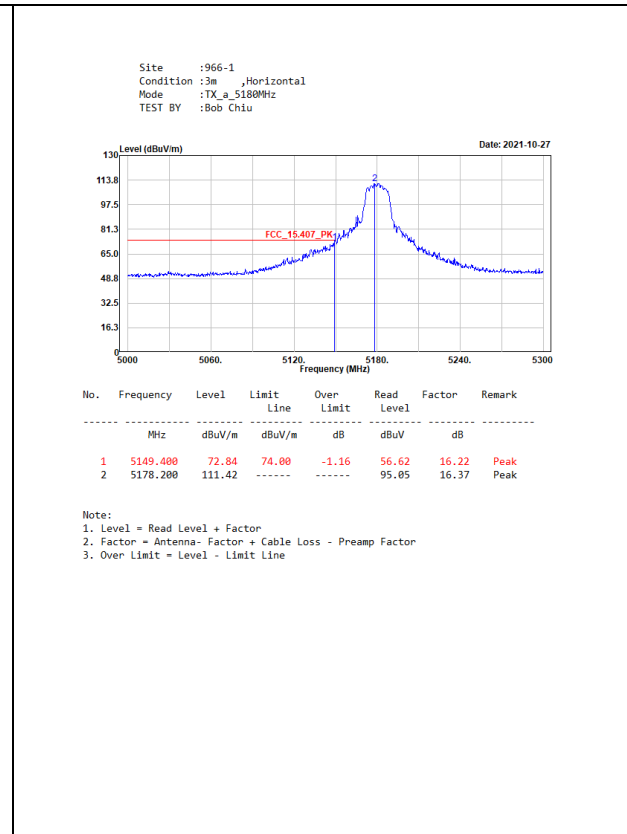
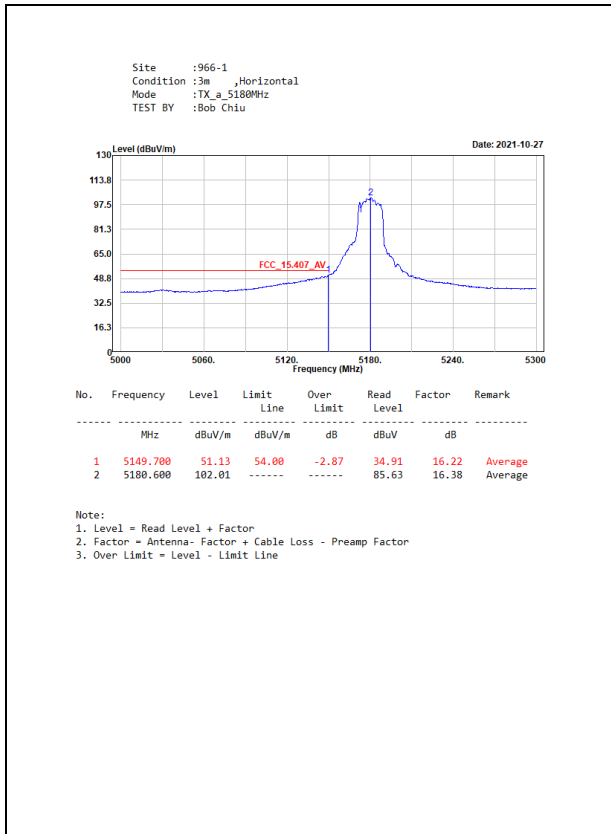
VBW \geq 1/T, when duty cycle < 98 %

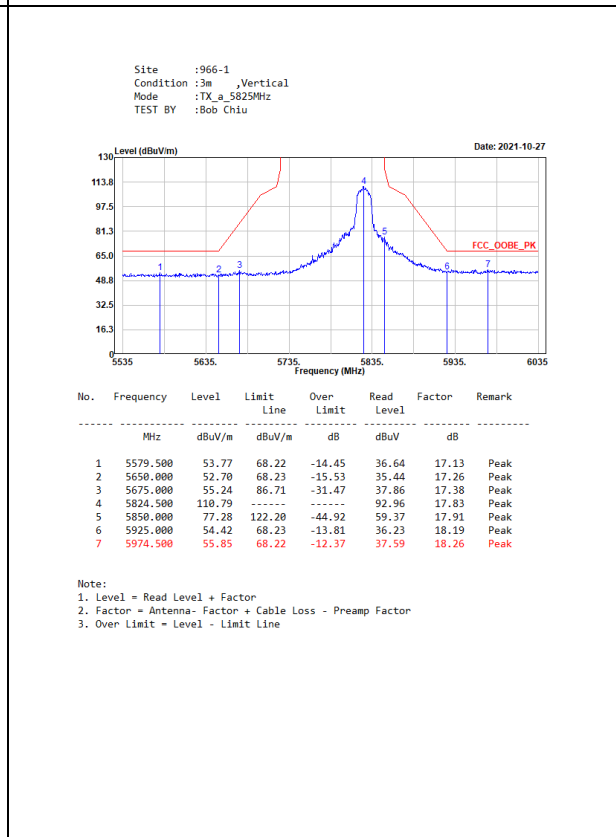
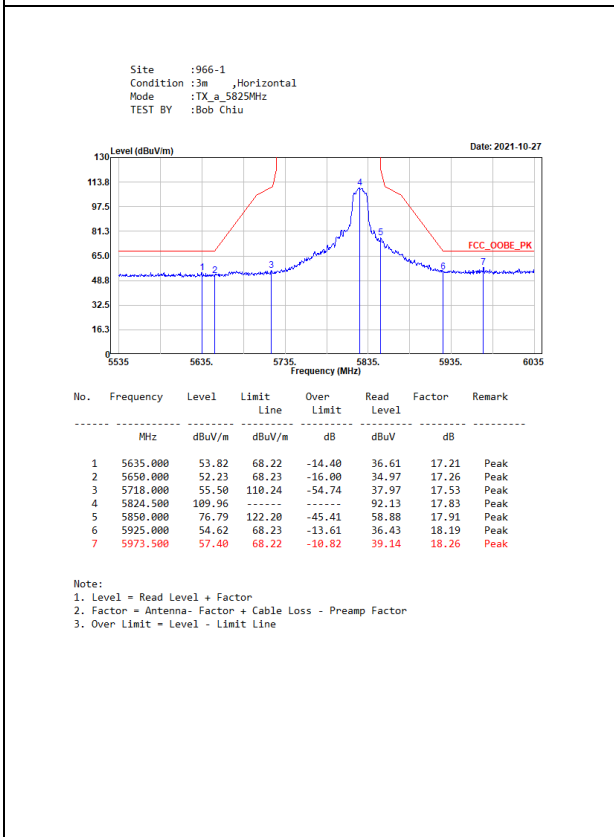
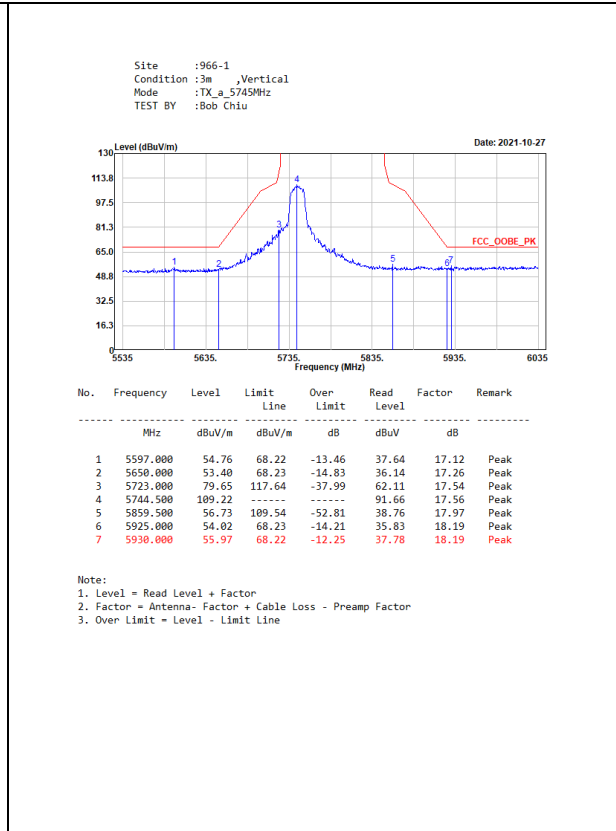
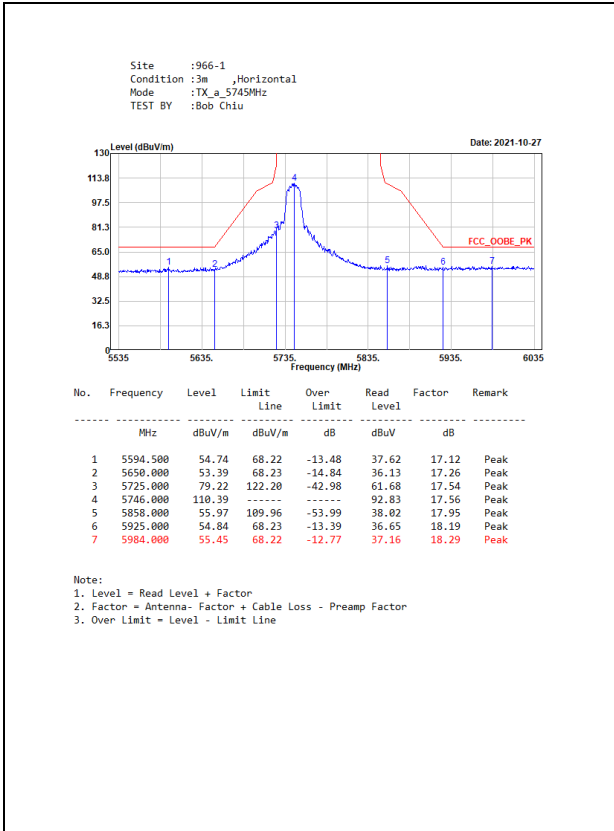
(T refers to the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.)

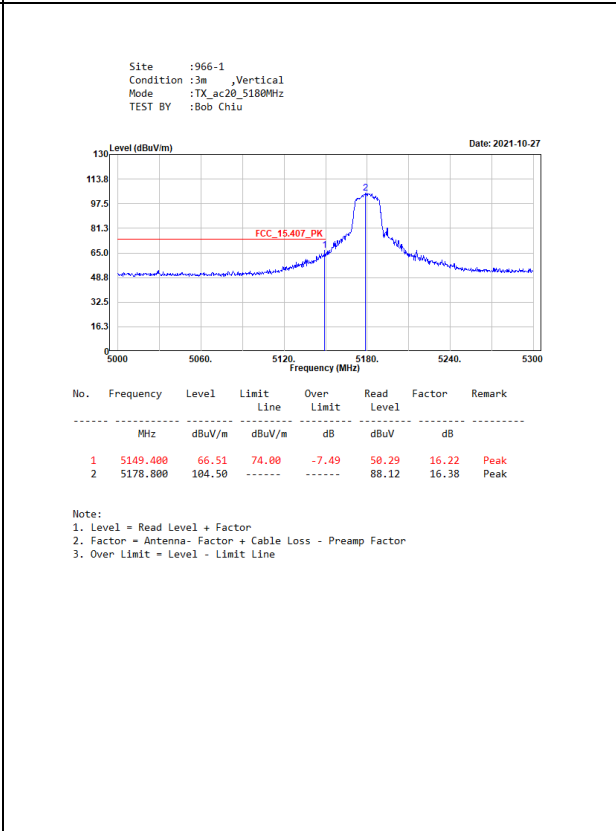
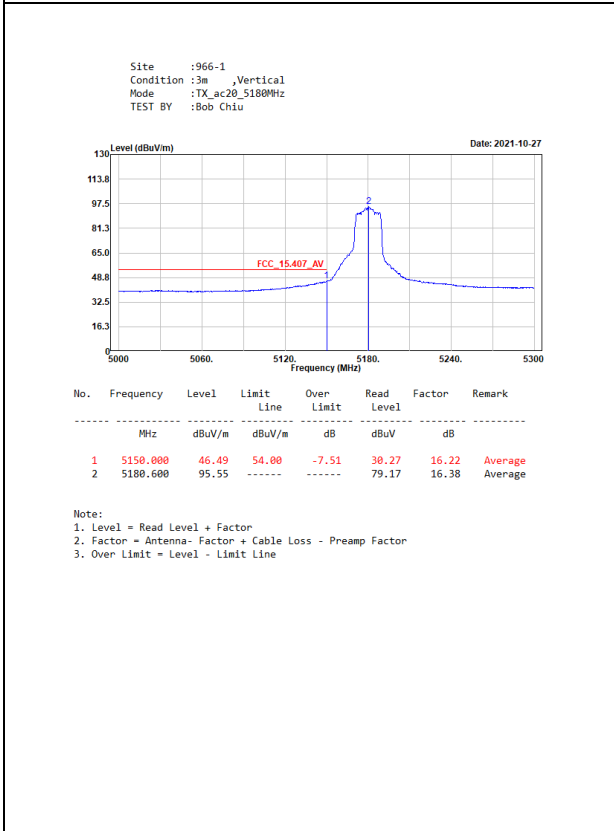
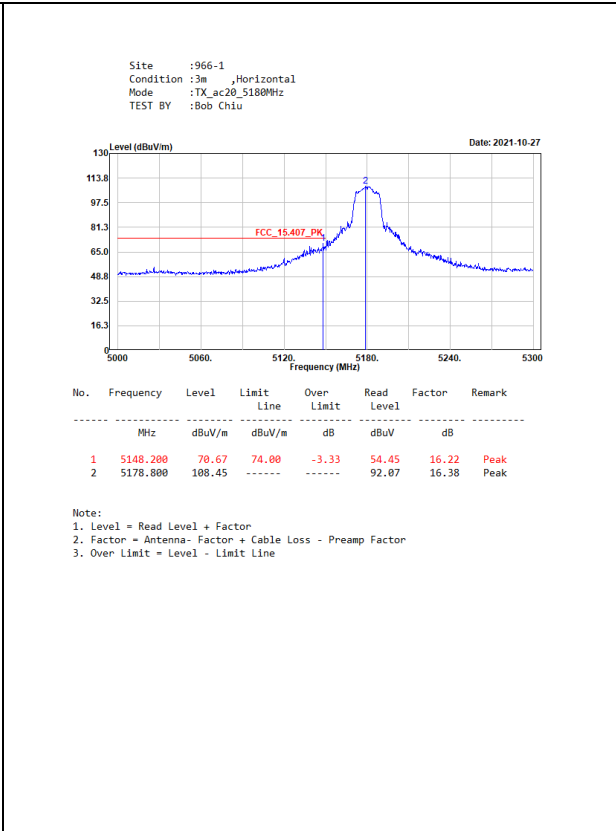
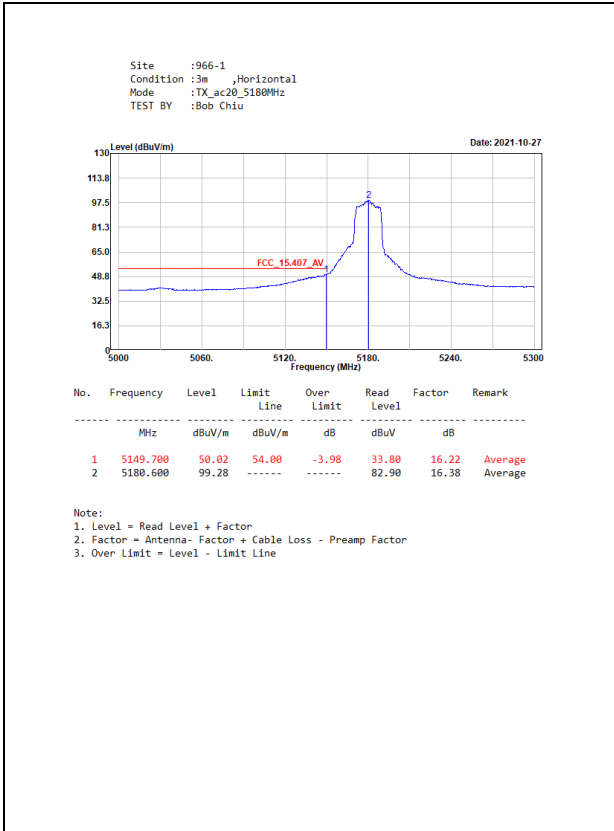
5GHz band	Duty Cycle (%)	T (ms)	1/T (Hz)	VBW (Hz)
802.11a	93.14	1.4250	702	1000
802.11n20	87.42	0.6950	1439	2000
802.11n40	78.02	0.3550	2817	3000
802.11ac20	76.74	0.3300	3030	5000
802.11ac40	92.73	1.3400	746	1000
802.11ac80	87.01	0.6700	1493	2000

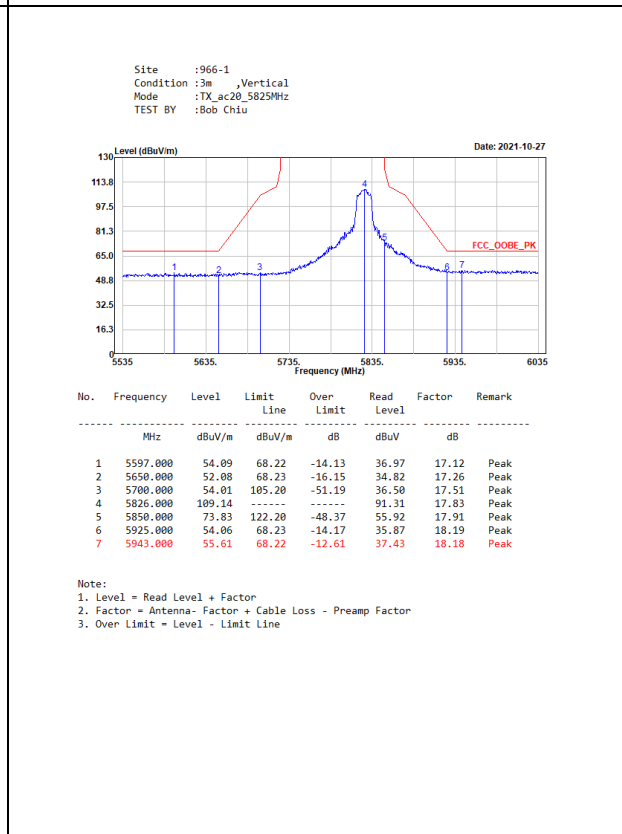
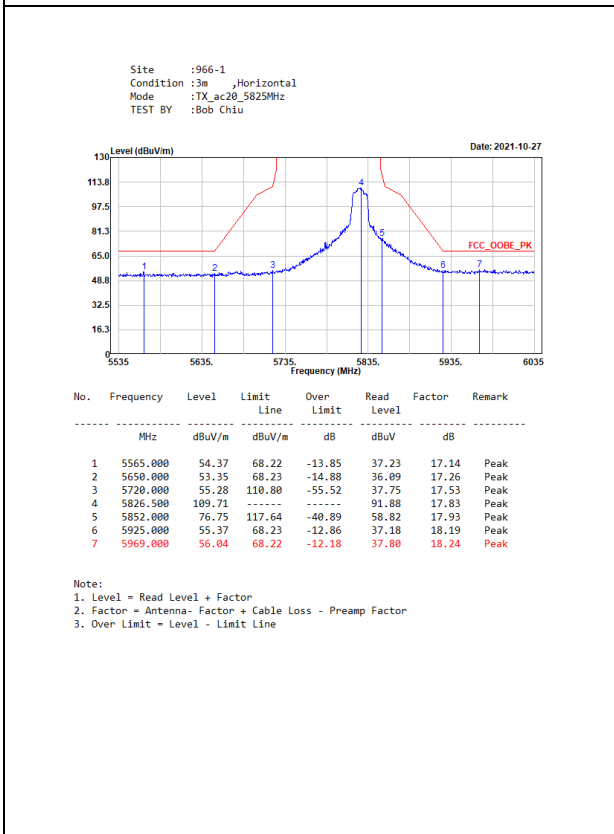
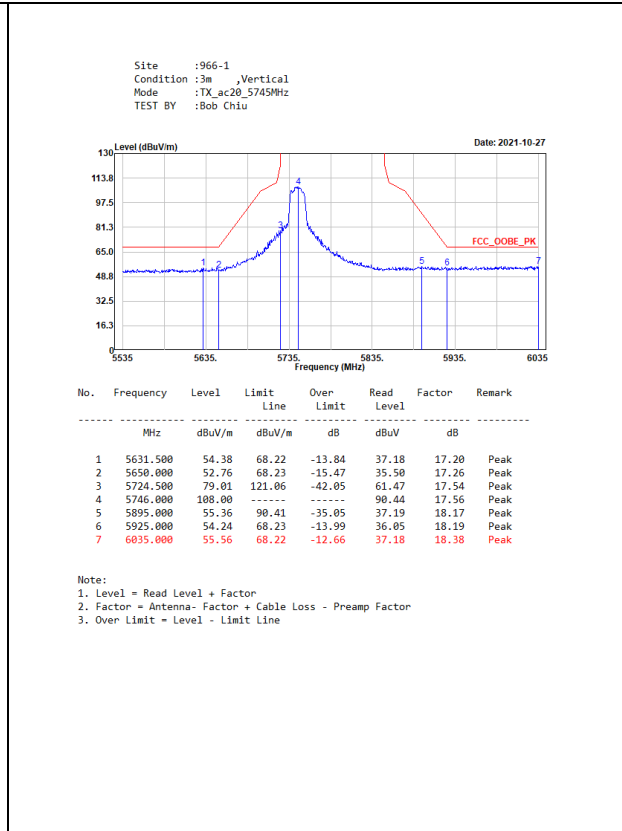
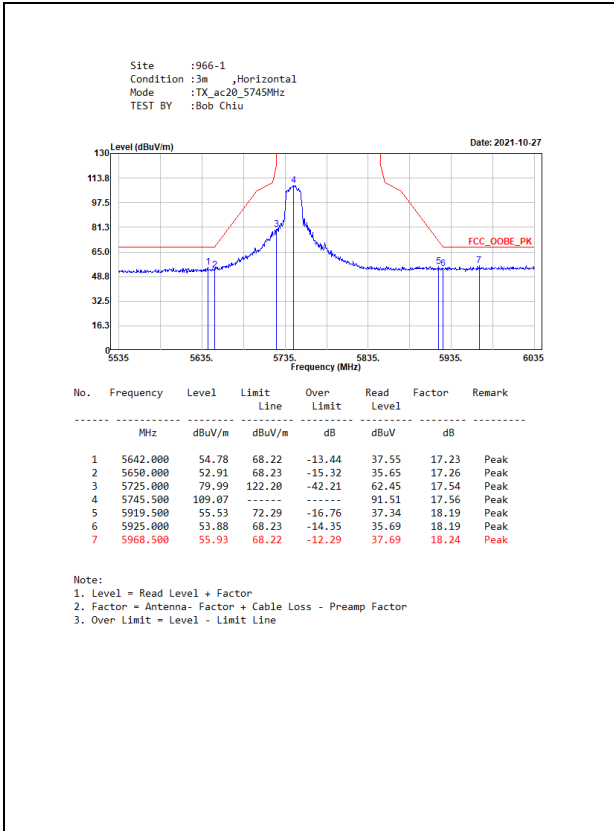
Note: Duty Cycle Refer to Section 8

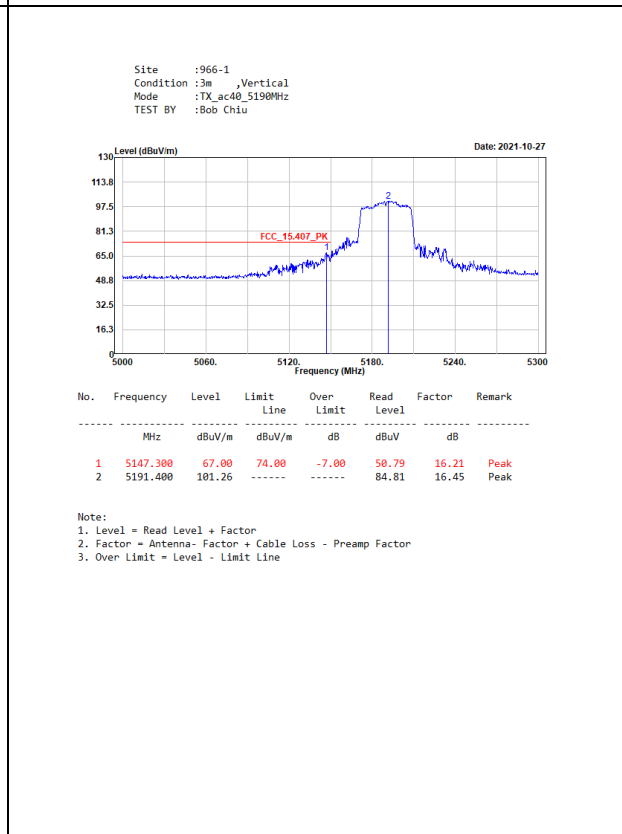
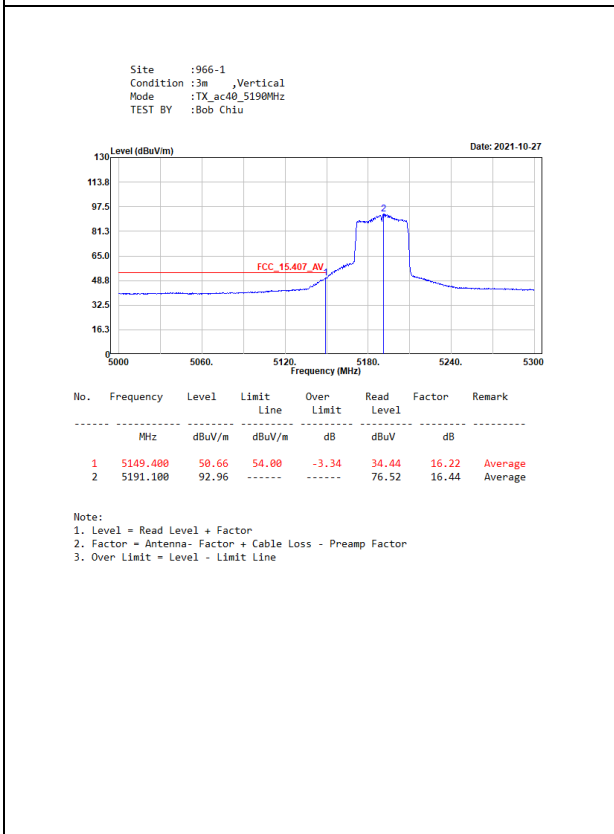
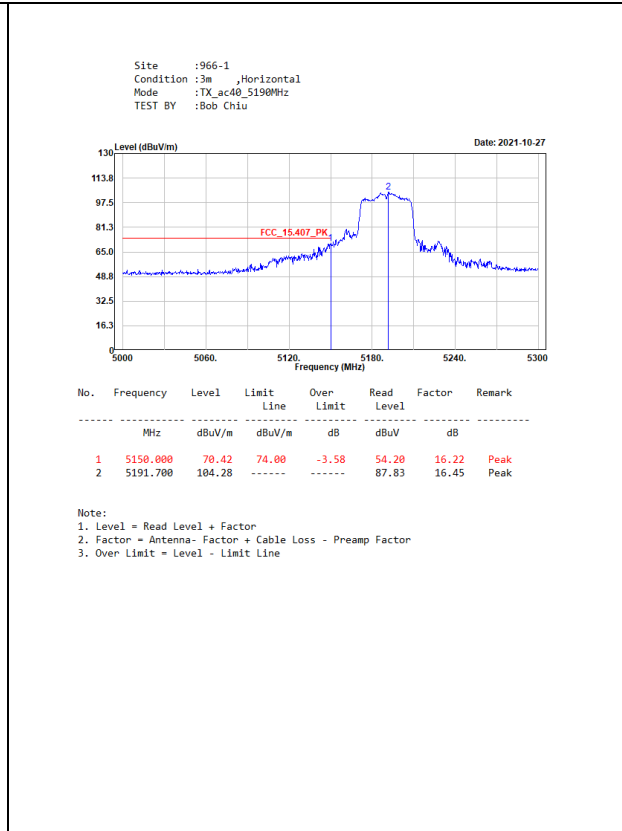
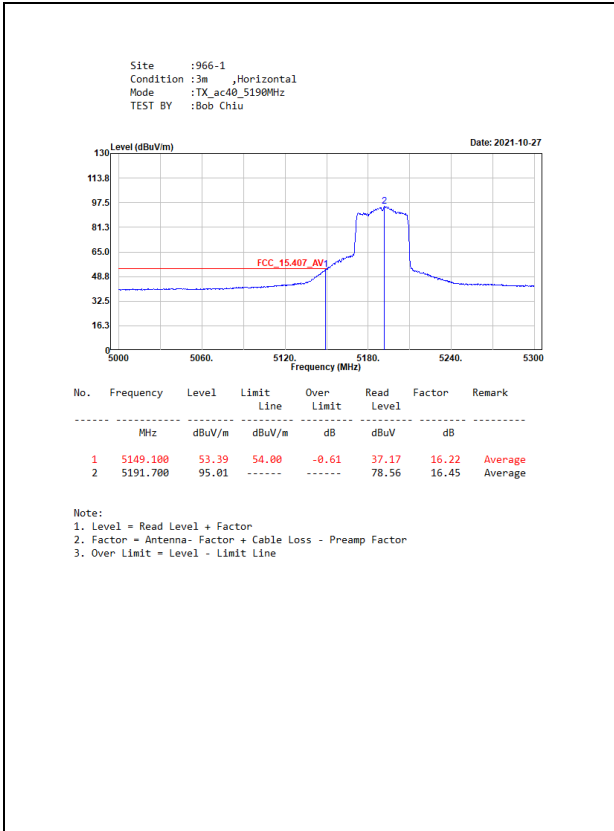
6.4. Test Result of Band Edge

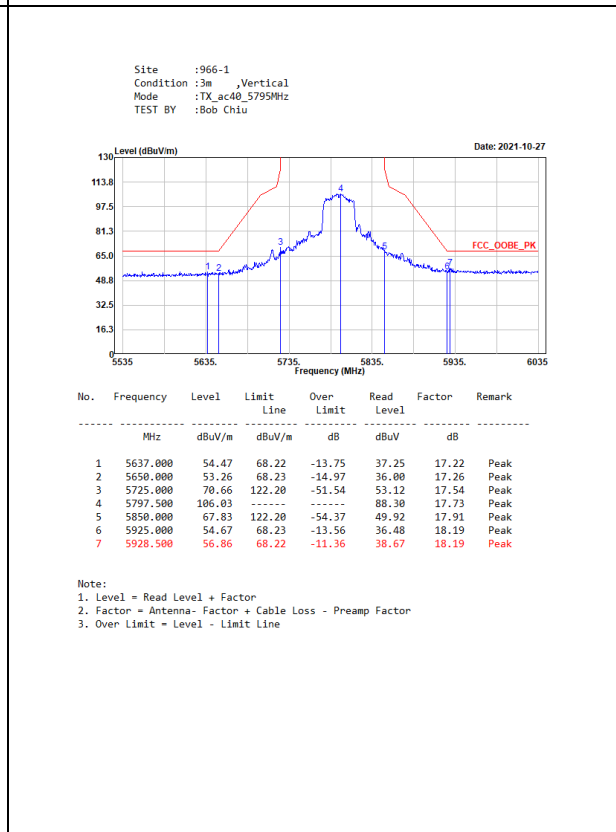
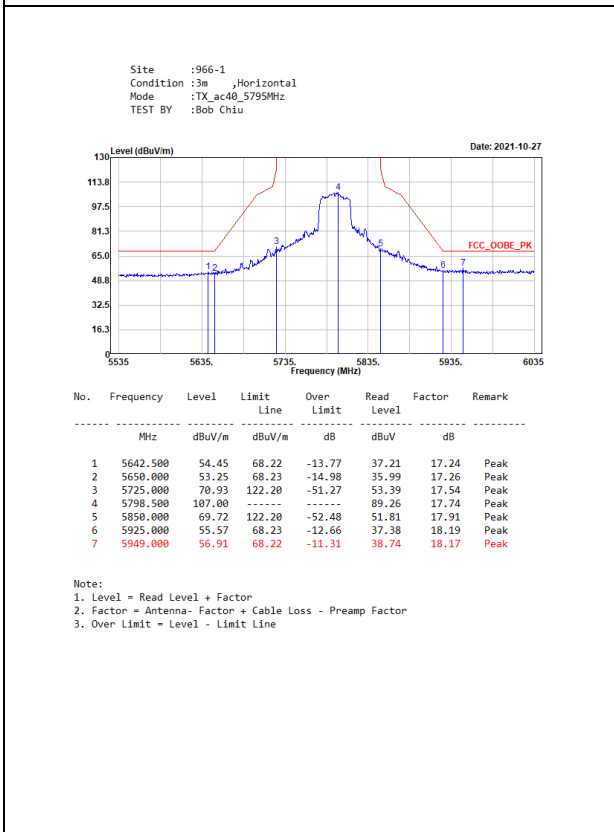
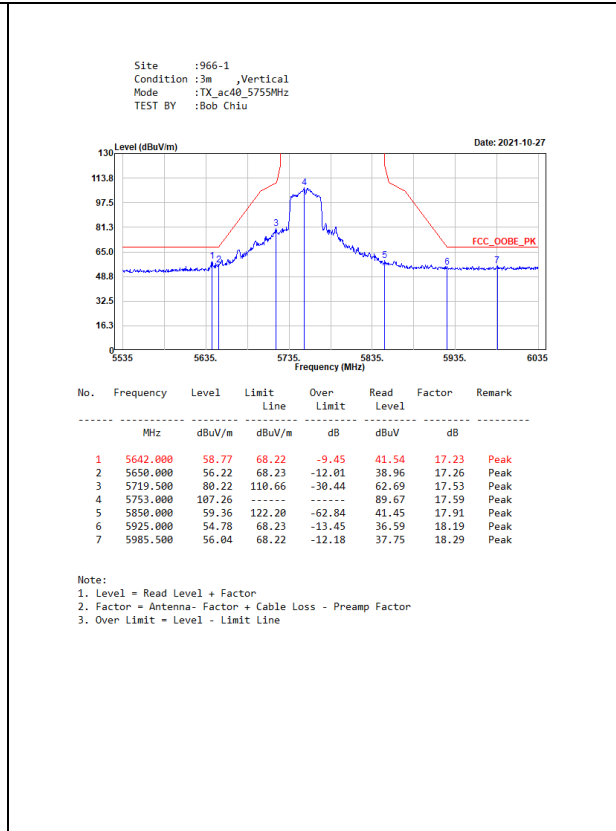
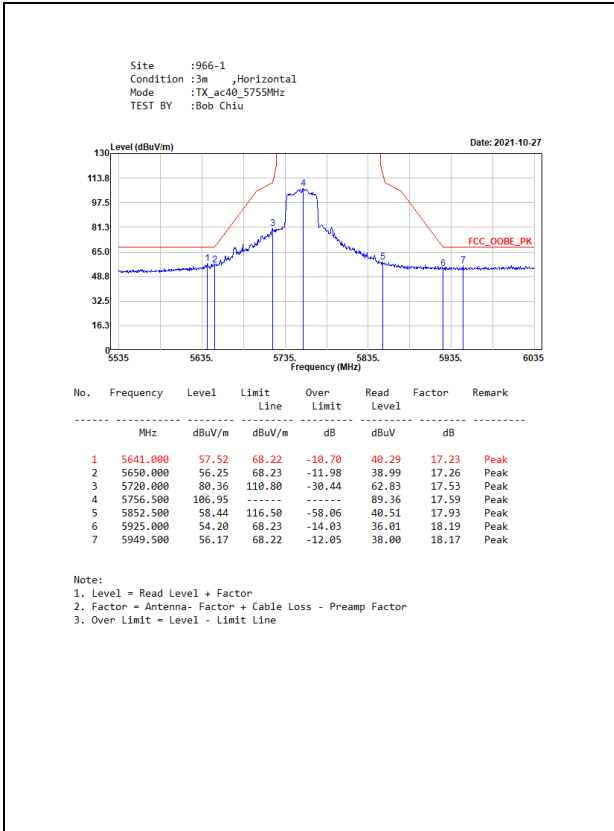


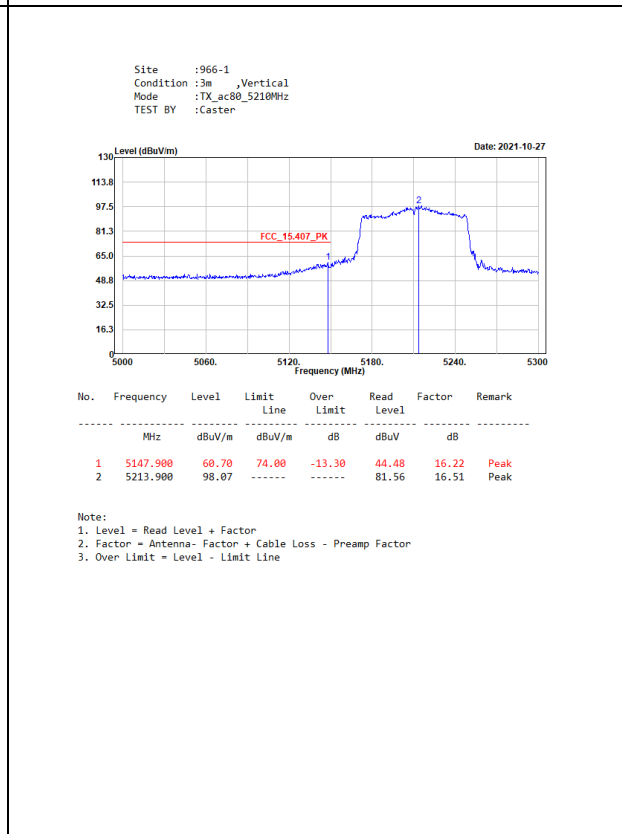
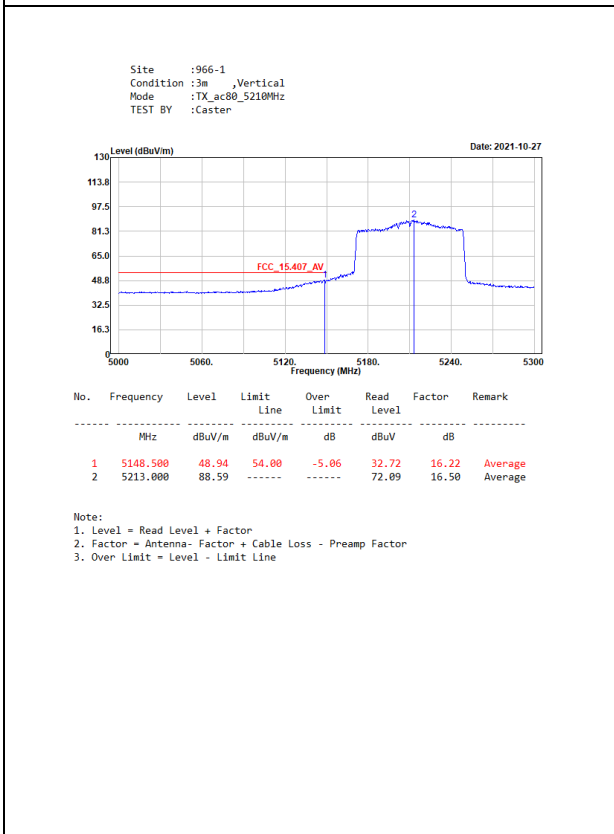
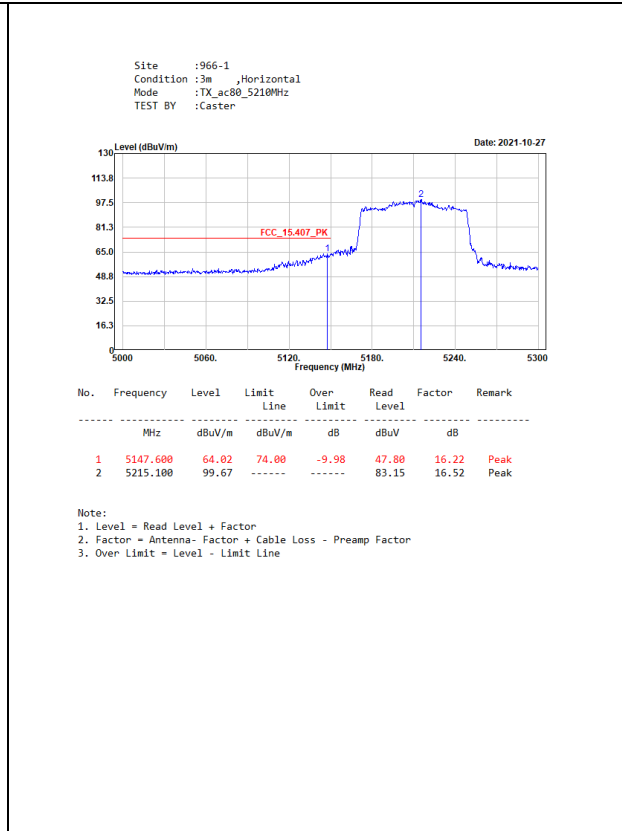
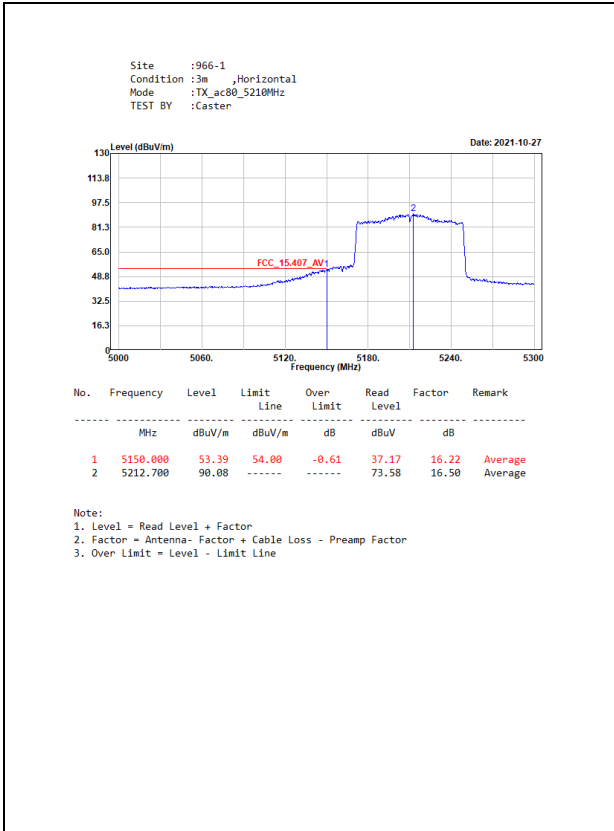


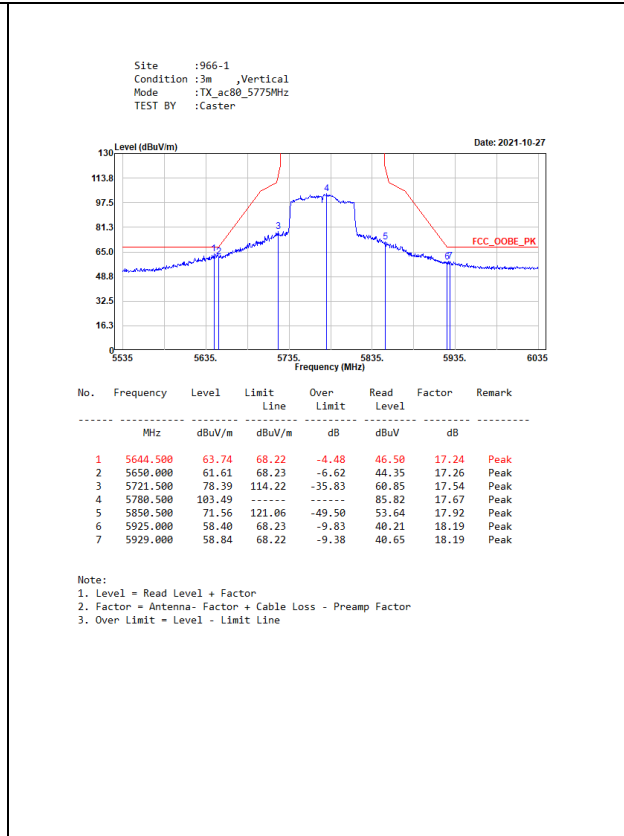
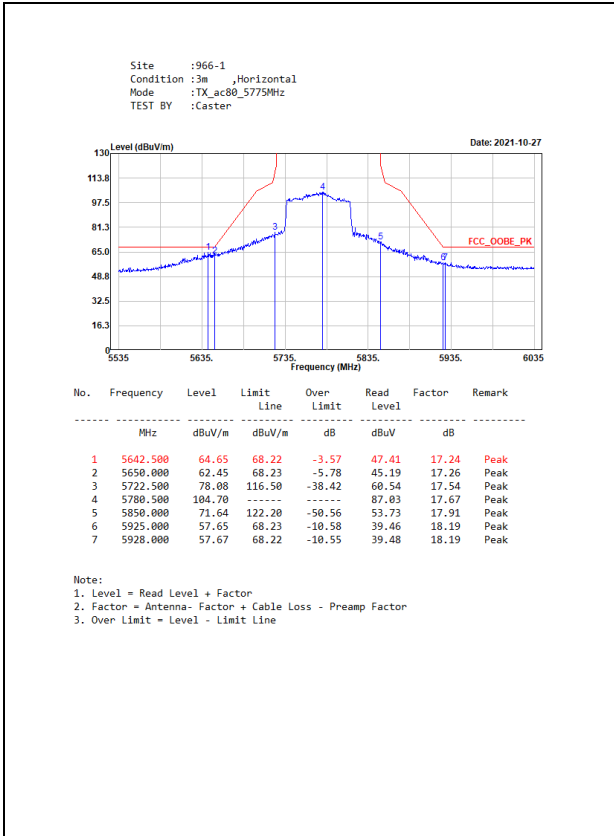












Product : InstaShow X Button, InstaShow S Button
Test Item : Band Edge Data
Test Mode : Mode 1: Transmit (802.11a 6Mbps)

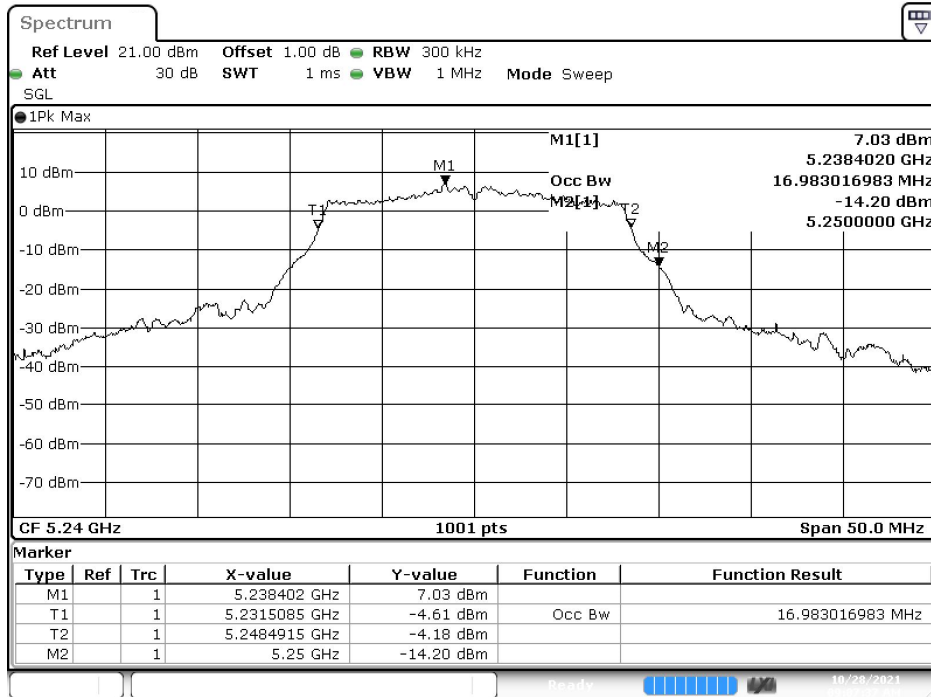
Chain A

Test Frequency (MHz)	Measurement Level (MHz)	Limit (MHz)	Result
5240	5248.54	<5250	PASS

Chain B

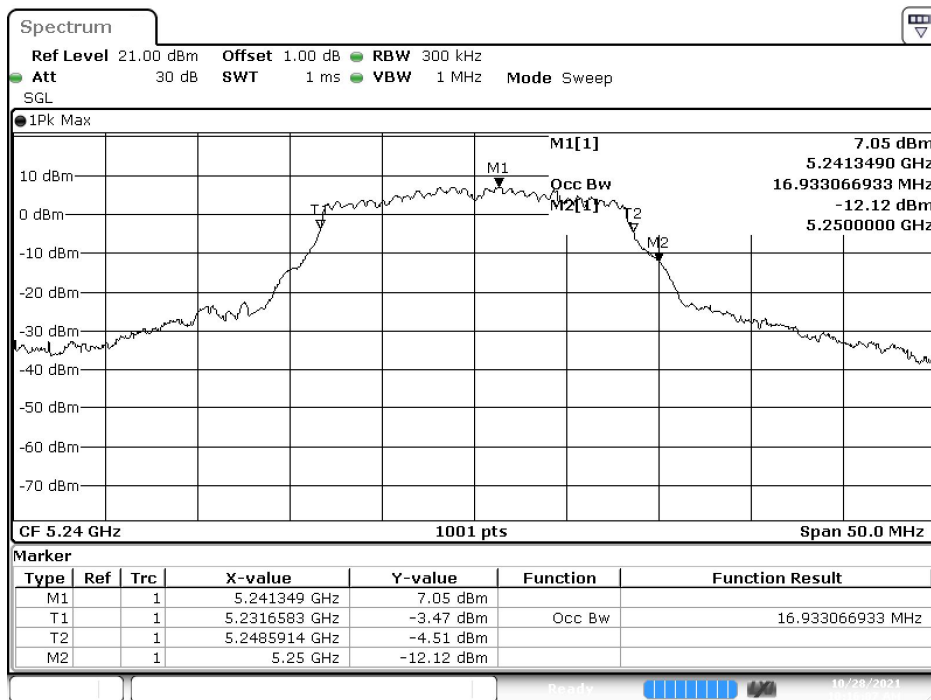
Test Frequency (MHz)	Measurement Level (MHz)	Limit (MHz)	Result
5240	5248.64	<5250	PASS

Chain A



Date: 28.OCT.2021 09:07:38

Chain B



Date: 28.OCT.2021 10:16:07

Product : InstaShow X Button, InstaShow S Button
Test Item : Band Edge Data
Test Mode : Mode 2: Transmit (802.11ac-20BW 7.2Mbps)

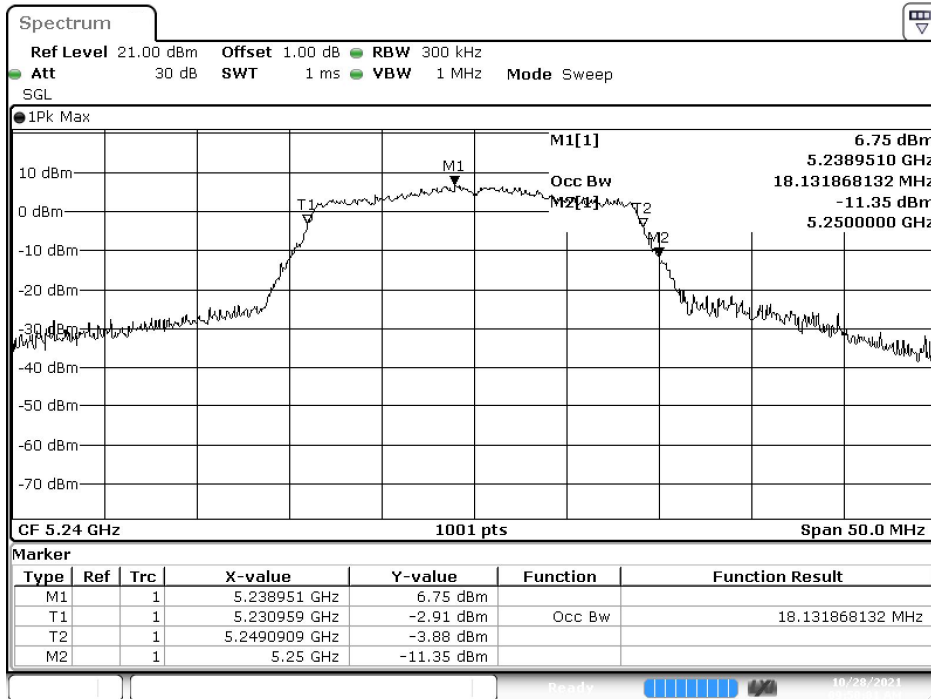
Chain A

Test Frequency (MHz)	Measurement Level (MHz)	Limit (MHz)	Result
5240	5249.04	<5250	PASS

Chain B

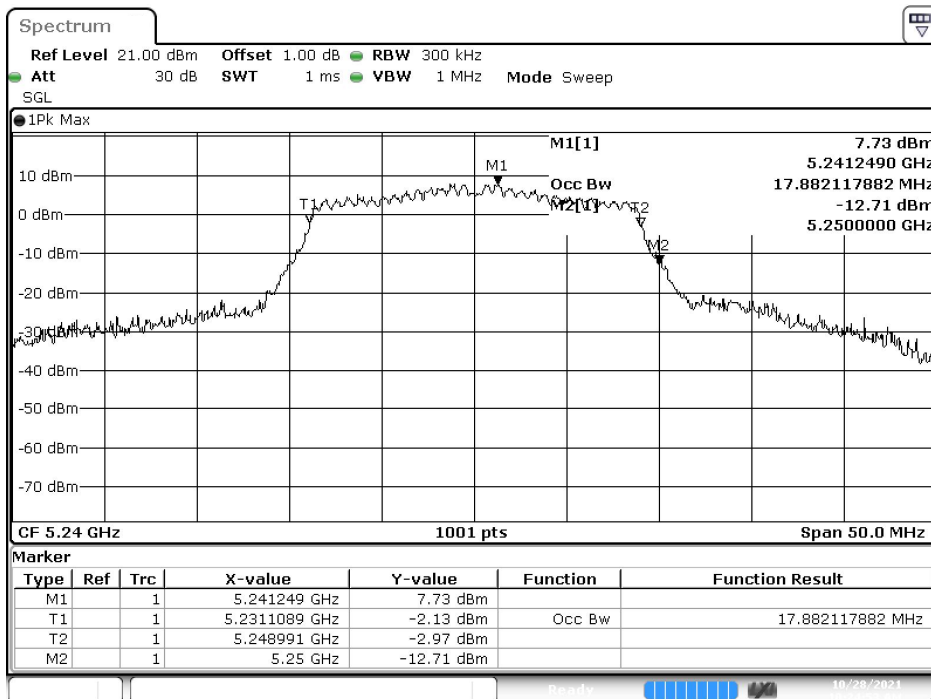
Test Frequency (MHz)	Measurement Level (MHz)	Limit (MHz)	Result
5240	5248.89	<5250	PASS

Chain A



Date: 28.OCT.2021 09:50:01

Chain B



Date: 28.OCT.2021 10:24:54

Product : InstaShow X Button, InstaShow S Button
Test Item : Band Edge Data
Test Mode : Mode 3: Transmit (802.11ac-40BW 15Mbps)

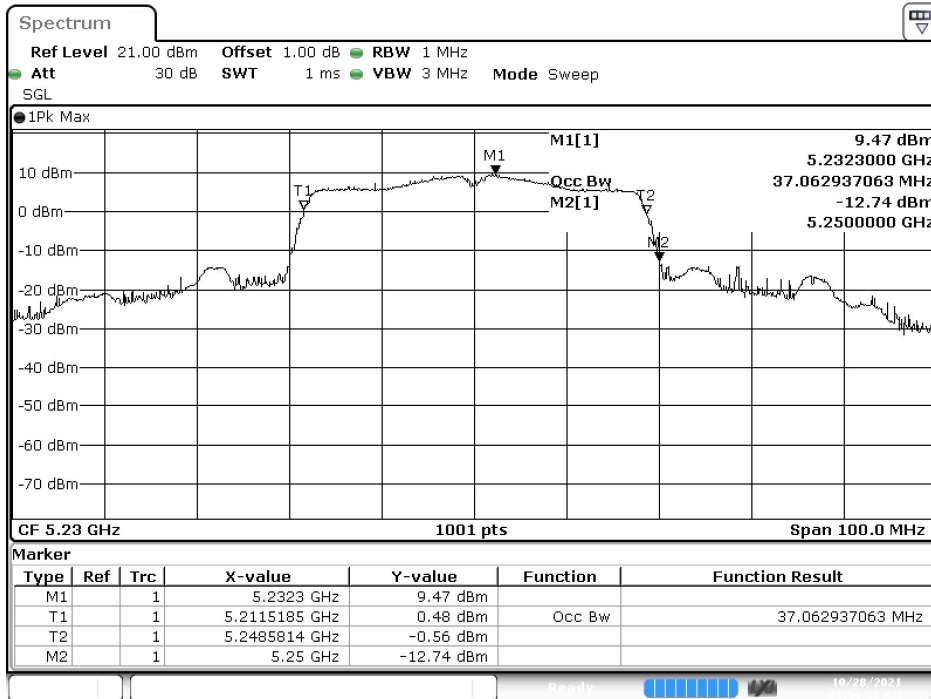
Chain A

Test Frequency (MHz)	Measurement Level (MHz)	Limit (MHz)	Result
5230	5248.38	<5250	PASS

Chain B

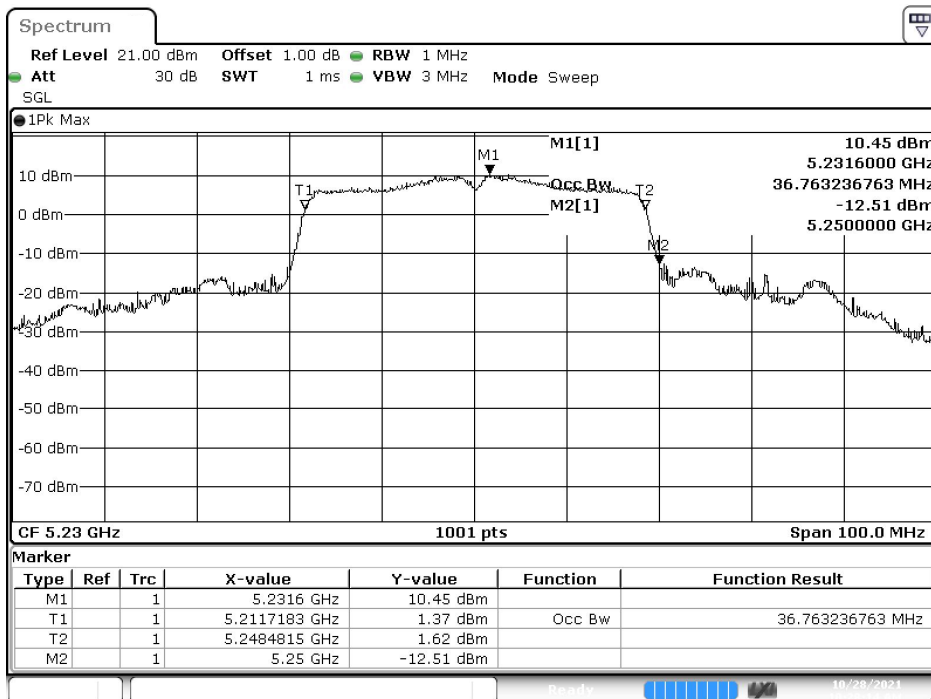
Test Frequency (MHz)	Measurement Level (MHz)	Limit (MHz)	Result
5230	5248.38	<5250	PASS

Chain A



Date: 28.OCT.2021 09:53:56

Chain B



Date: 28.OCT.2021 10:28:14

Product : InstaShow X Button, InstaShow S Button
Test Item : Band Edge Data
Test Mode : Mode 4: Transmit (802.11ac-80BW 32.5Mbps)

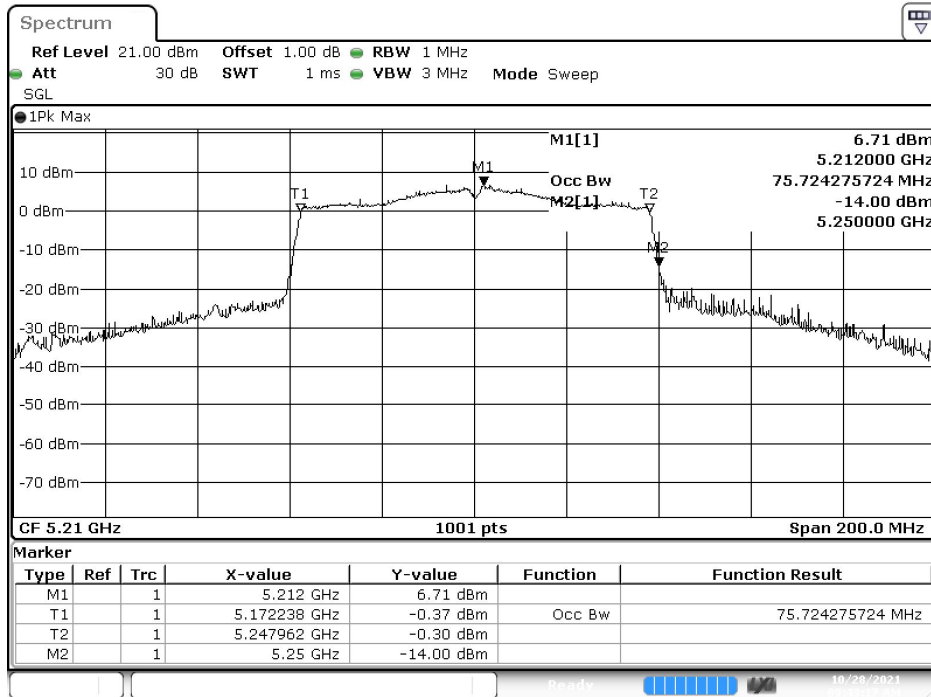
Chain A

Test Frequency (MHz)	Measurement Level (MHz)	Limit (MHz)	Result
5210	5247.96	<5250	PASS

Chain B

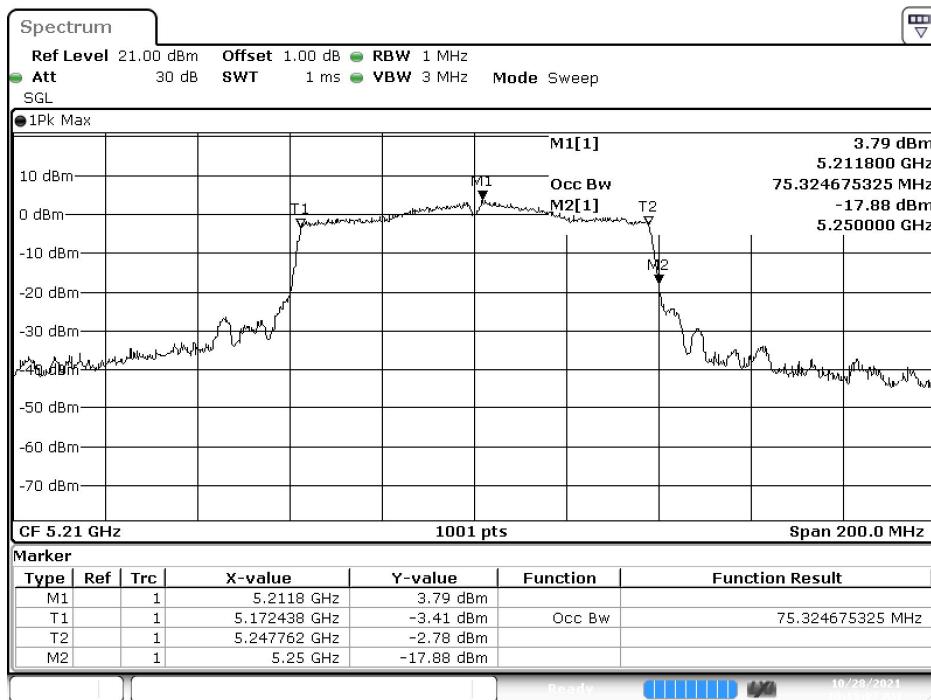
Test Frequency (MHz)	Measurement Level (MHz)	Limit (MHz)	Result
5210	5247.76	<5250	PASS

Chain A



Date: 28.OCT.2021 09:43:17

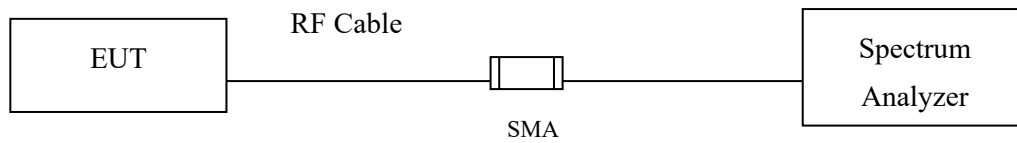
Chain B



Date: 28.OCT.2021 10:19:07

7. Occupied Bandwidth

7.1. Test Setup



7.2. Limits

For the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz

7.3. Test Procedure

The EUT was setup to ANSI C63.10, 2013; tested to UNII test procedure of FCC KDB-789033 for compliance to FCC 47CFR Subpart E requirements.

7.4. Test Result of Occupied Bandwidth

Product : InstaShow X Button, InstaShow S Button
 Test Item : Occupied Bandwidth Data
 Test Mode : Mode 1: Transmit (802.11a 6Mbps)
 Test Date : 2021/10/28

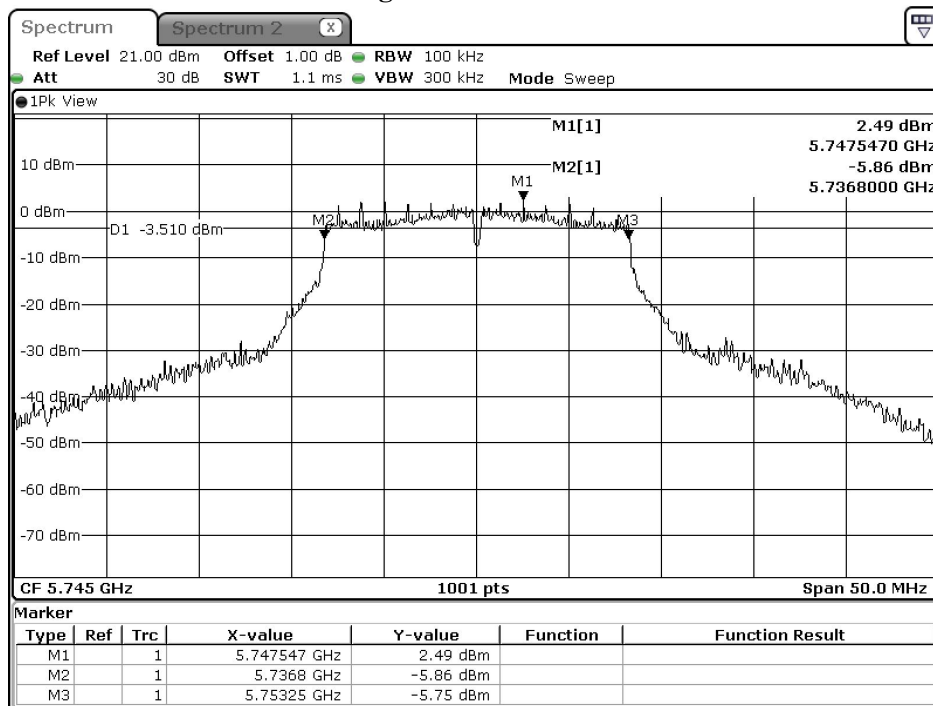
Chain A

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
149	5745	16400	>500	Pass
157	5785	16350	>500	Pass
165	5825	16450	>500	Pass

Chain B

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
149	5745	16200	>500	Pass
157	5785	16200	>500	Pass
165	5825	16450	>500	Pass

Figure Channel 149



Date: 27.OCT.2021 15:26:16

Product : InstaShow X Button, InstaShow S Button
 Test Item : Occupied Bandwidth Data
 Test Mode : Mode 2: Transmit (802.11ac-20BW 7.2Mbps)
 Test Date : 2021/10/28

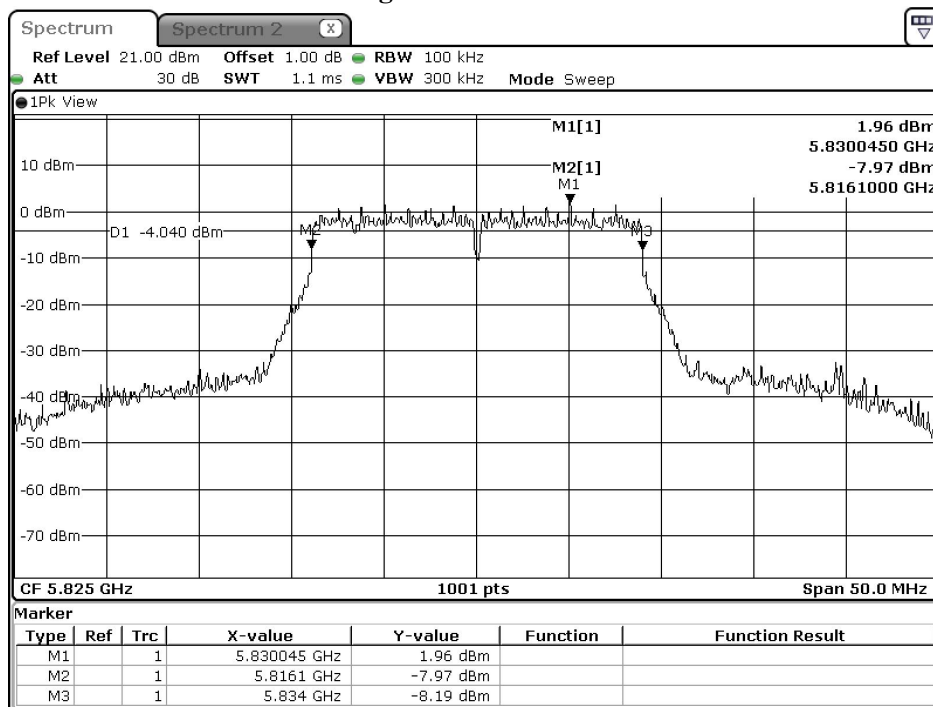
ChainA

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
149	5745	17650	>500	Pass
157	5785	17650	>500	Pass
165	5825	17650	>500	Pass

ChainB

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
149	5745	17650	>500	Pass
157	5785	17650	>500	Pass
165	5825	17650	>500	Pass

Figure Channel 165



Date: 27.OCT.2021 16:19:04

Product : InstaShow X Button, InstaShow S Button
 Test Item : Occupied Bandwidth Data
 Test Mode : Mode 3: Transmit (802.11ac-40BW 15Mbps)
 Test Date : 2021/10/28

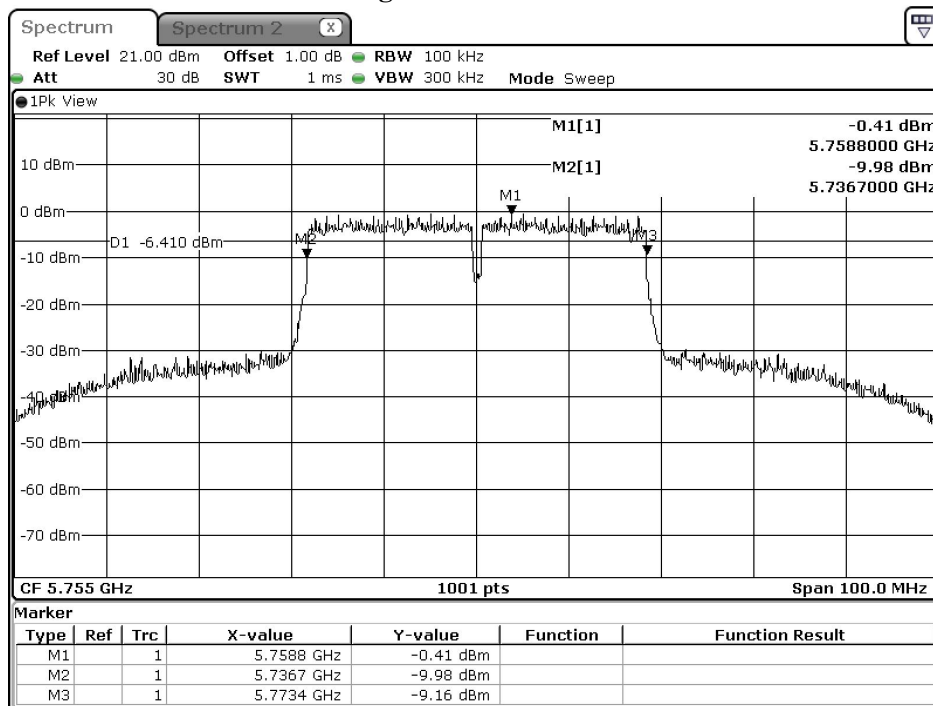
ChainA

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
151	5755	36200	>500	Pass
159	5795	36200	>500	Pass

ChainB

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
151	5755	36500	>500	Pass
159	5795	36100	>500	Pass

Figure Channel 151



Date: 27.OCT.2021 15:39:51

Product : InstaShow X Button, InstaShow S Button
 Test Item : Occupied Bandwidth Data
 Test Mode : Mode 4: Transmit (802.11ac-80BW 32.5Mbps)
 Test Date : 2021/10/28

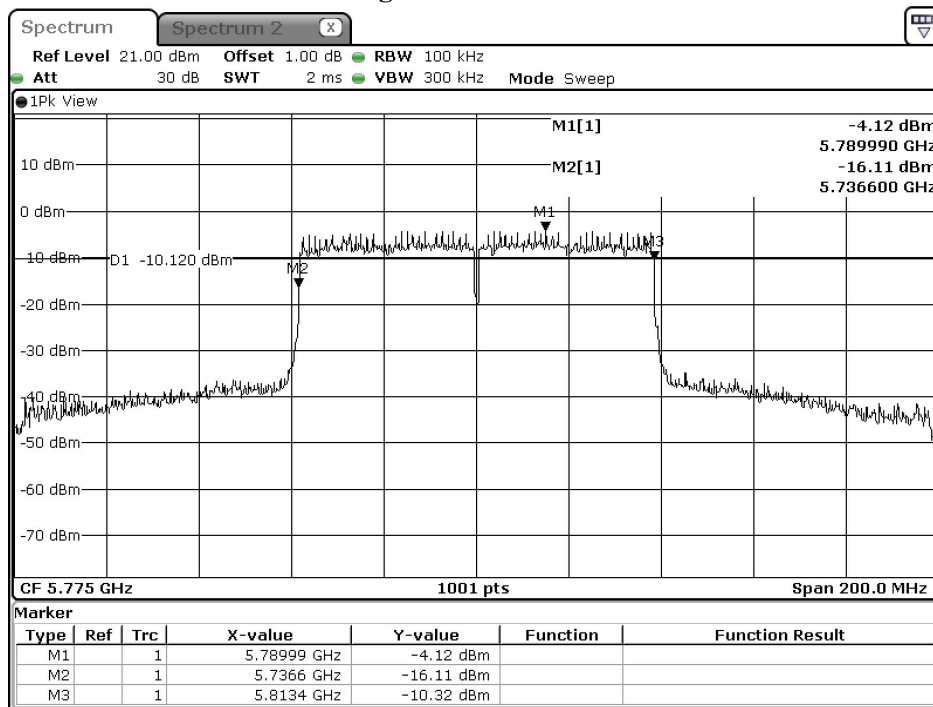
ChainA

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
155	5775	75800	>500	Pass

ChainB

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
155	5775	75800	>500	Pass

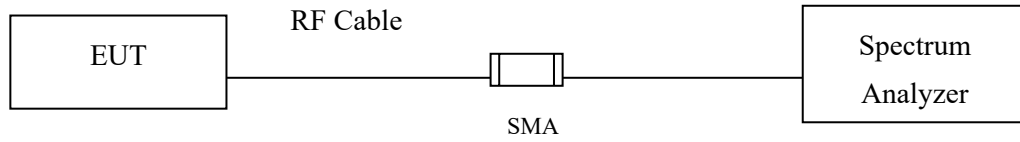
Figure Channel 155



Date: 27.OCT.2021 15:31:01

8. Duty Cycle

8.1. Test Setup



8.2. Test Procedure

The EUT was setup according to ANSI C63.10 2013; tested according to U-NII test procedure of KDB789033 for compliance to FCC 47CFR 15.407 requirements.

8.3. Test Result of Duty Cycle

Product : InstaShow X Button, InstaShow S Button
Test Item : Duty Cycle
Test Mode : Transmit

Duty Cycle Formula:

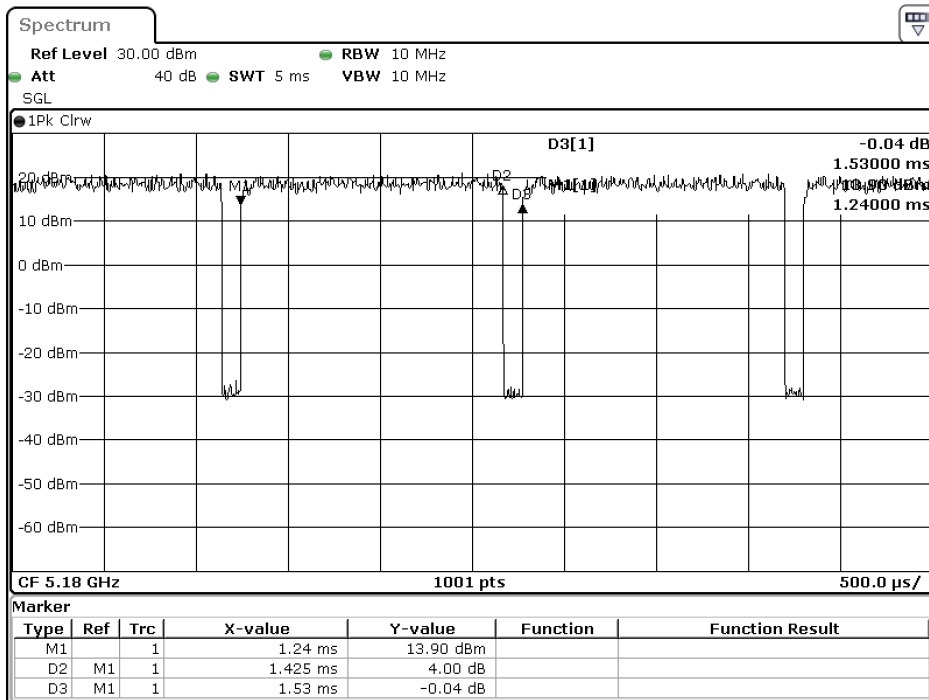
$\text{Duty Cycle} = \text{Ton} / (\text{Ton} + \text{Toff})$

$\text{Duty Factor} = 10 \text{ Log} (1/\text{Duty Cycle})$

Results:

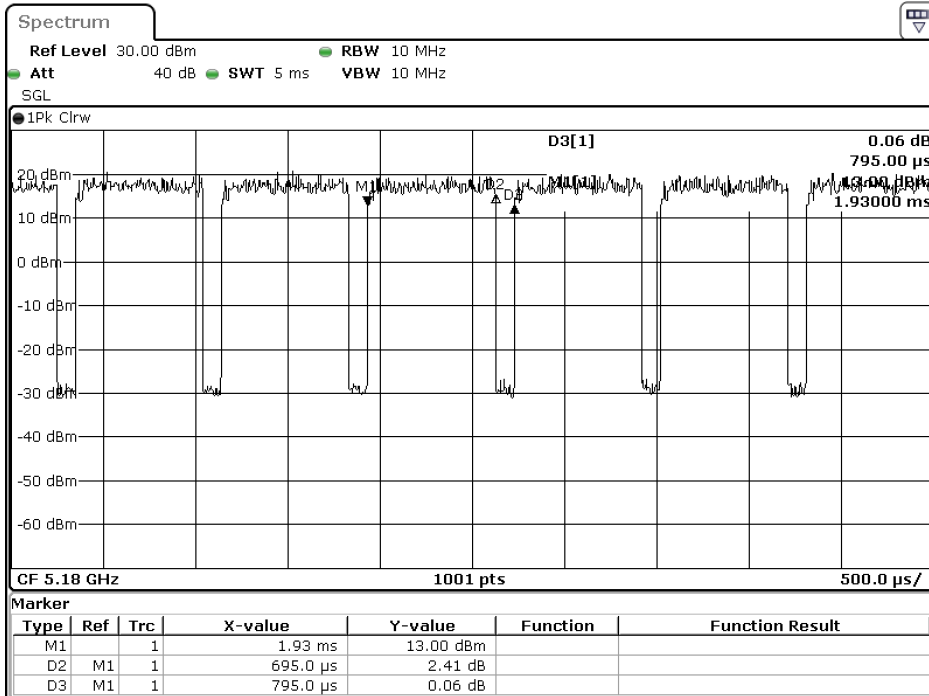
5GHz band	Ton (ms)	Ton + Toff (ms)	Duty Cycle (%)	Duty Factor (dB)
802.11a	1.4250	1.5300	93.14	0.31
802.11n20	0.6950	0.7950	87.42	0.58
802.11n40	0.3550	0.4550	78.02	1.08
802.11ac20	0.3300	0.4300	76.74	1.15
802.11ac40	1.3400	1.4450	92.73	0.33
802.11ac80	0.6700	0.7700	87.01	0.60

802.11a



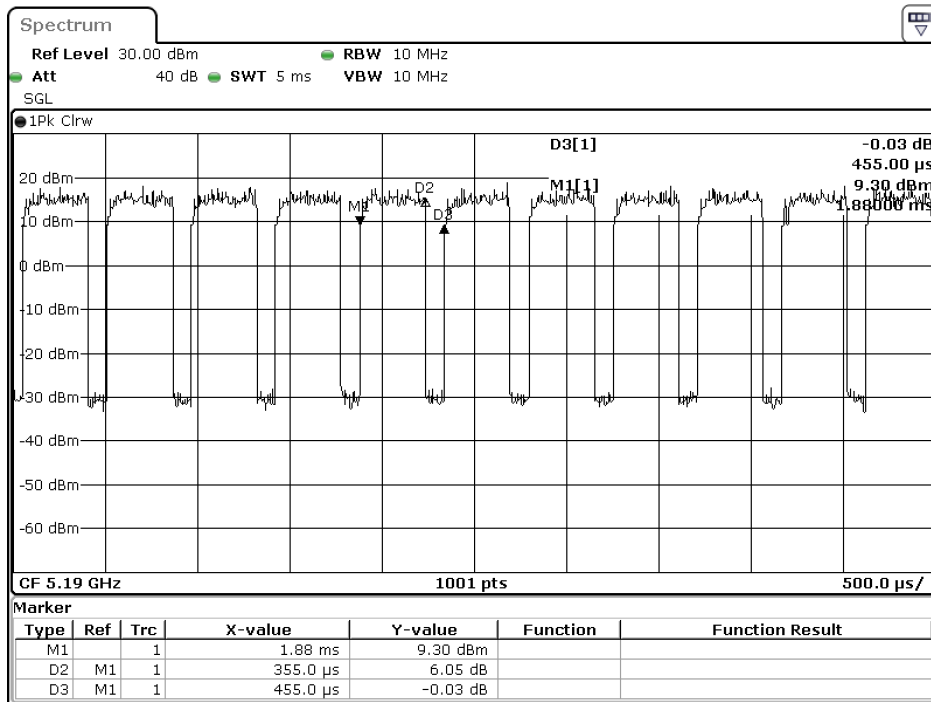
Date: 29.SEP.2021 15:39:50

802.11n20



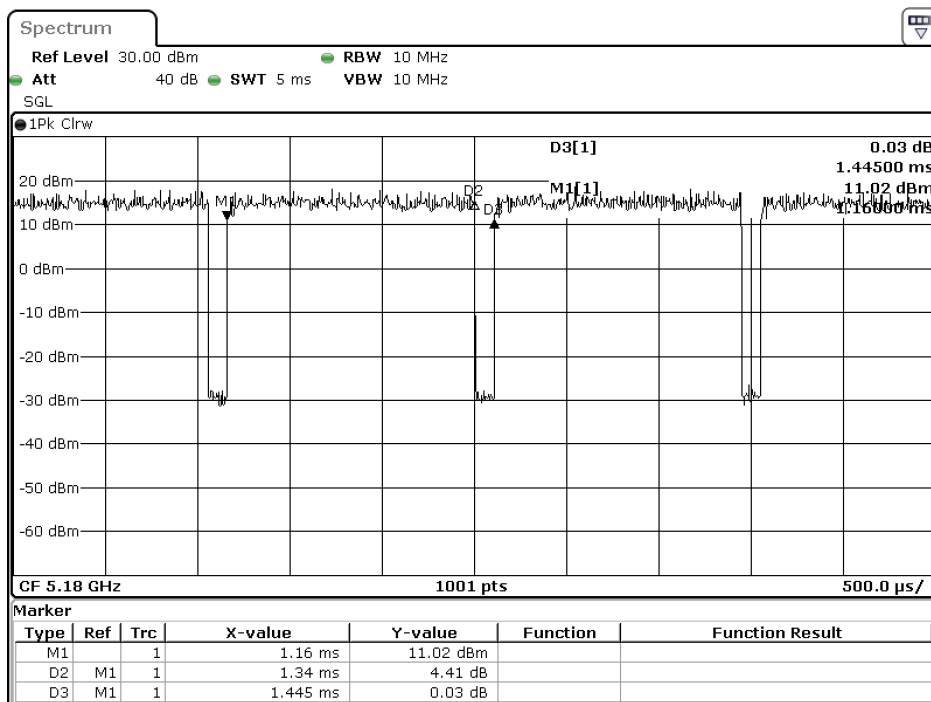
Date: 29.SEP.2021 15:44:31

802.11n40



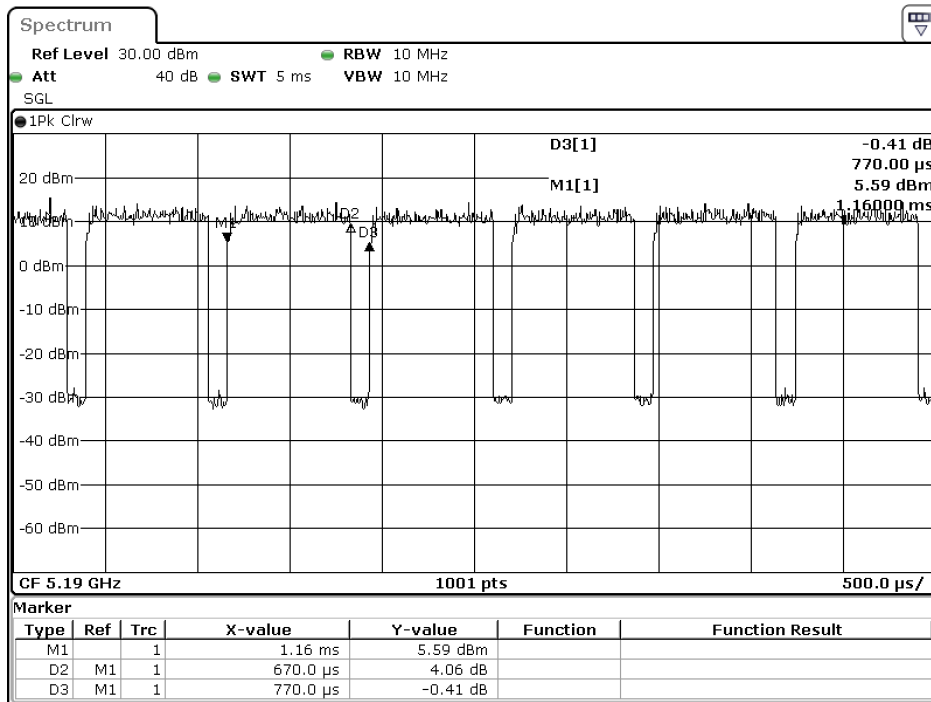
Date: 29.SEP.2021 15:45:30

802.11ac20



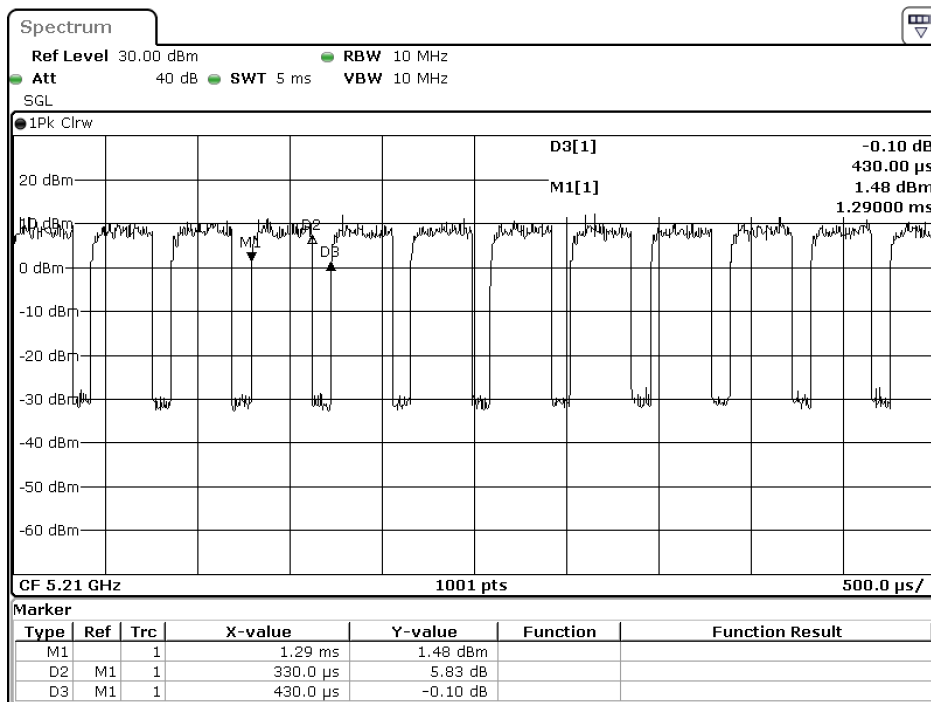
Date: 29.SEP.2021 15:47:32

802.11ac40



Date: 29.SEP.2021 15:49:10

802.11ac80



Date: 29.SEP.2021 15:50:50

9. EMI Reduction Method During Compliance Testing

No modification was made during testing.