



# FCC RADIO TEST REPORT

FCC ID : MSQI005D  
Equipment : ASUS Phone(Mobile Phone)  
Brand Name : ASUS  
Model Name : ASUS\_I005D  
ASUS\_I005DC  
Standard : FCC Part 15 Subpart C §15.247

The product was received on Nov. 02, 2020 and testing was started from Nov. 11, 2020 and completed on Dec. 30, 2020. We, SPORTON INTERNATIONAL INC., EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

*Louis Wu*

Approved by: Louis Wu

**SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory**  
No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)



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## Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.1	15.247(a)(2)	6dB Bandwidth	Pass	-
3.1	2.1049	99% Occupied Bandwidth	Reporting only	-
3.2	15.247(b)	Power Output Measurement	Pass	-
3.3	15.247(e)	Power Spectral Density	Pass	-
3.4	15.247(d)	Conducted Band Edges	Pass	-
		Conducted Spurious Emission	Pass	-
3.5	15.247(d)	Radiated Band Edges and Radiated Spurious Emission	Pass	Under limit 2.29 dB at 2483.530 MHz
3.6	15.207	AC Conducted Emission	Pass	Under limit 4.92 dB at 0.152 MHz
3.7	15.203 & 15.247(b)	Antenna Requirement	Pass	-

**Declaration of Conformity:**

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

**Comments and Explanations:**

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

**Reviewed by: Wii Chang**

**Report Producer: Cindy Liu**



# 1 General Description

## 1.1 Applicant

1. ASUSTeK COMPUTER INC.  
1F., No. 15, Lide Rd., Beitou Dist., Taipei City 112, Taiwan

## 1.2 Manufacturer

1. Guangdong Enok Communication Co., Ltd.  
No. 137, 139, Lixiang Road., Songmushan Village, Dalang Town, Dongguan City, Guangdong Province, China
2. PT. SAT NUSAPERSADA TBK  
JALAN PELITA VI. NO. 99, BATAM, 29443,INDONESIA

## 1.3 Product Feature of Equipment Under Test

GSM/WCDMA/LTE/5G NR, Bluetooth, Wi-Fi 2.4GHz 802.11b/g/n/ac/ax, Wi-Fi 5GHz 802.11a/n/ac/ax, NFC, and GNSS.

Product Specification subjective to this standard	
Sample 1	Model Name: ASUS_I005D
Sample 2	Model Name: ASUS_I005DC
Antenna Type	WWAN: PIFA Antenna WLAN <Ant. 4>: PIFA Antenna <Ant. 5>: PIFA Antenna <Ant. 6>: PIFA Antenna Bluetooth <Ant. 4>: PIFA Antenna <Ant. 5>: PIFA Antenna <Ant. 6>: PIFA Antenna GPS / Glonass / BDS / Galileo: PIFA Antenna NFC: Loop Antenna

Antenna information		
2400 MHz ~ 2483.5 MHz	Peak Gain (dBi)	Ant. 4: -0.5 dBi Ant. 5: -0.8 dBi Ant. 6: 2.7 dBi

**Remark:** The above EUT's information was declared by manufacturer. Please refer to Comments and Explanations in report summary.

Sample Information		
<b>Model Name</b>	<b>ASUS_I005D</b>	<b>ASUS_I005DC</b>
<b>SKU</b>	SKU1	SKU2
	UE2S3	UE2S2
<b>High-end or Entry level (Back cover CN or WW)</b>	High-end WW (Etching + Black) PMOLED	High-end CN (Etching + Black) Light guide plate
<b>PCB Manufacturer</b>	COMPEQ	COMPEQ
<b>Front Camera 24M (Brand/Model name)</b>	TRIPLEWIN/CASF0-000A	LUXVISIONS/0BFO01P3
<b>Rear CAM 64M+13M (Brand/Model name)</b>	PRIMAX/50-704JHASC8	PRIMAX/50-704JHASC8
<b>Rear CAM 8M (Brand/Model name)</b>	TSPRECISION/O5F9323 VERA1	TSPRECISION/O5F9323 VERA1
<b>BATT (Brand/Model name)</b>	SCUD/C21P2001	SCUD/C21P2001
<b>CPU (Brand/Model name)</b>	QUALCOMM/ SM-8350-1-MPSP1393-TR-00-0-AB	QUALCOMM/ SM-8350-1-MPSP1393-TR-00-0-AB
<b>DDR</b>	12G	12G
<b>Brand/Model name</b>	Micron/MT62F1536M64D8CH-031WT:A	Micron/MT62F1536M64D8CH-031WT:A
<b>UFS</b>	512G	256G
<b>Brand/Model name</b>	Micron/MTFC512GARATAM-WT	Samsung/KLUEG8UHDC-B0E1

## 1.4 Modification of EUT

No modifications are made to the EUT during all test items.



### 1.5 Testing Location

<b>Test Site</b>	SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory
<b>Test Site Location</b>	No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978
<b>Test Site No.</b>	<b>Sporton Site No.</b> TH05-HY, CO05-HY

**Note:** The test site complies with ANSI C63.4 2014 requirement.

<b>Test Site</b>	SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory
<b>Test Site Location</b>	No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-0868 FAX: +886-3-327-0855
<b>Test Site No.</b>	<b>Sporton Site No.</b> 03CH15-HY

**Note:** The test site complies with ANSI C63.4 2014 requirement.

FCC designation No.: TW1190 and TW0007

### 1.6 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ FCC Part 15 Subpart C §15.247
- ♦ FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v05r02
- ♦ FCC KDB 414788 D01 Radiated Test Site v01r01.
- ♦ FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
- ♦ ANSI C63.10-2013

**Remark:**

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. The TAF code is not including all the FCC KDB listed without accreditation.
3. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.



## 2 Test Configuration of Equipment Under Test

- a. The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conduction emission (150 kHz to 30 MHz), radiation emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (Normal Mode: X plane for Ant. 4 and Ant. 5; Camera Mode: Z plane for Ant. 6 and Ant. 5) were recorded in this report.
- b. AC power line Conducted Emission was tested under maximum output power.

### 2.1 Carrier Frequency and Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
2400-2483.5 MHz	1	2412	7	2442
	2	2417	8	2447
	3	2422	9	2452
	4	2427	10	2457
	5	2432	11	2462
	6	2437		

### 2.2 Test Mode

Final test modes are considering the modulation and worse data rates as below table.

#### MIMO Antenna

Modulation	Data Rate
802.11b	1 Mbps
802.11g (Covered by HE20)	6 Mbps
802.11n HT20 (Covered by HE20)	MCS0
802.11n HT40 (Covered by HE40)	MCS0
802.11ac VHT20 (Covered by HE20)	MCS0
802.11ac VHT40 (Covered by HE40)	MCS0
802.11ax HE20	MCS0
802.11ax HE40	MCS0

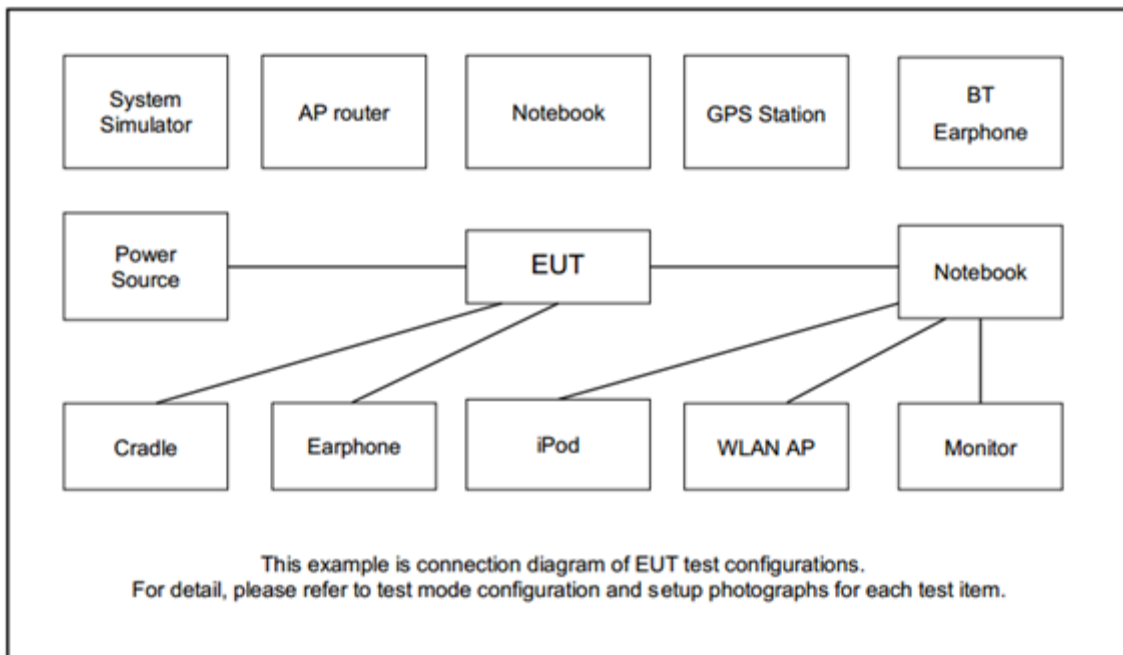


Test Cases	
<b>AC Conducted Emission</b>	Mode 1 : GSM850 Idle + Bluetooth Link + WLAN (2.4GHz) Link + Camera (Front) + NFC On + USB Cable (Bottom USB Port) (Charging from Adapter) + X mode + Aura sync + SIM 1 for Sample 1
<b>Remark:</b> For Radiated Test Cases, the tests were performed with Sample 1	

Ch. #	2400-2483.5 MHz		
	802.11b	802.11ax HE20	802.11ax HE40
Low	01	01	03
Middle	06	-	-
High	11	11	09

**Remark:** For radiation spurious emission, the final modulation and the worst data rate was reference the max RF conducted power.

### 2.3 Connection Diagram of Test System





## 2.4 Support Unit used in test configuration and system

Item	Equipment	Brand Name	Model Name	FCC ID	Data Cable	Power Cord
1.	System Simulator	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m
2.	Bluetooth Earphone	Sony Ericsson	MW600	PY700A2029	N/A	N/A
3.	WLAN AP	ASUS	RT-AC66U	MSQ-RTAC66U	ASUS	Unshielded, 1.8 m
4.	Notebook	DELL	Latitude E3400	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
5.	Earphone	ASUS	EA009B	N/A	N/A	N/A

## 2.5 EUT Operation Test Setup

The RF test items, utility “QRCT Ver.4.0.00175.0” was installed in Notebook which was programmed in order to make the EUT get into the engineering modes to provide channel selection, power level, data rate and the application type and for continuous transmitting signals.

## 2.6 Measurement Results Explanation Example

**For all conducted test items:**

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

Example:

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

*Offset = RF cable loss + attenuator factor.*

Following shows an offset computation example with cable loss 4.2 dB and 10dB attenuator.

$$\begin{aligned} \text{Offset(dB)} &= \text{RF cable loss(dB)} + \text{attenuator factor(dB)}. \\ &= 4.2 + 10 = 14.2 \text{ (dB)} \end{aligned}$$

### 3 Test Result

#### 3.1 6dB and 99% Bandwidth Measurement

##### 3.1.1 Limit of 6dB and 99% Bandwidth

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

##### 3.1.2 Measuring Instruments

See list of measuring equipment of this test report.

##### 3.1.3 Test Procedures

1. The testing follows the ANSI C63.10 Section 6.9.3 (OBW) and 11.8.1 (6dB BW).
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. Set the Video bandwidth (VBW) = 300 kHz. In order to make an accurate measurement. The 6 dB bandwidth must be greater than 500 kHz.
5. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) is set 1-5% of the emission bandwidth and set the Video bandwidth (VBW)  $\geq 3 * RBW$ .
6. Measure and record the results in the test report.

##### 3.1.4 Test Setup

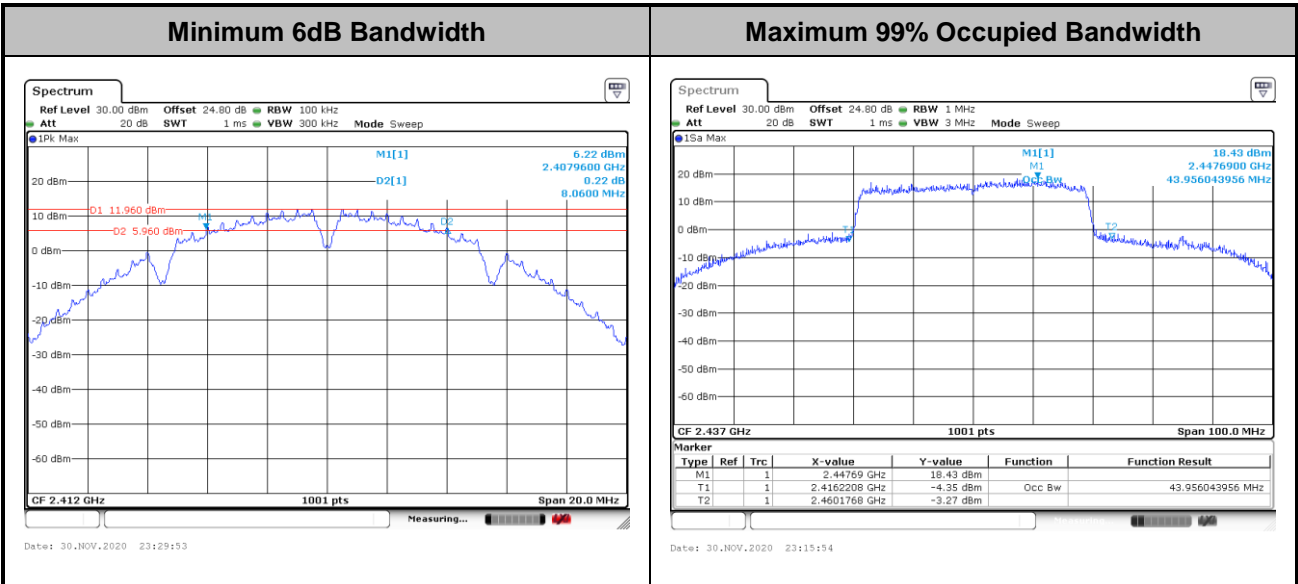




### 3.1.5 Test Result of 6dB and 99% Occupied Bandwidth

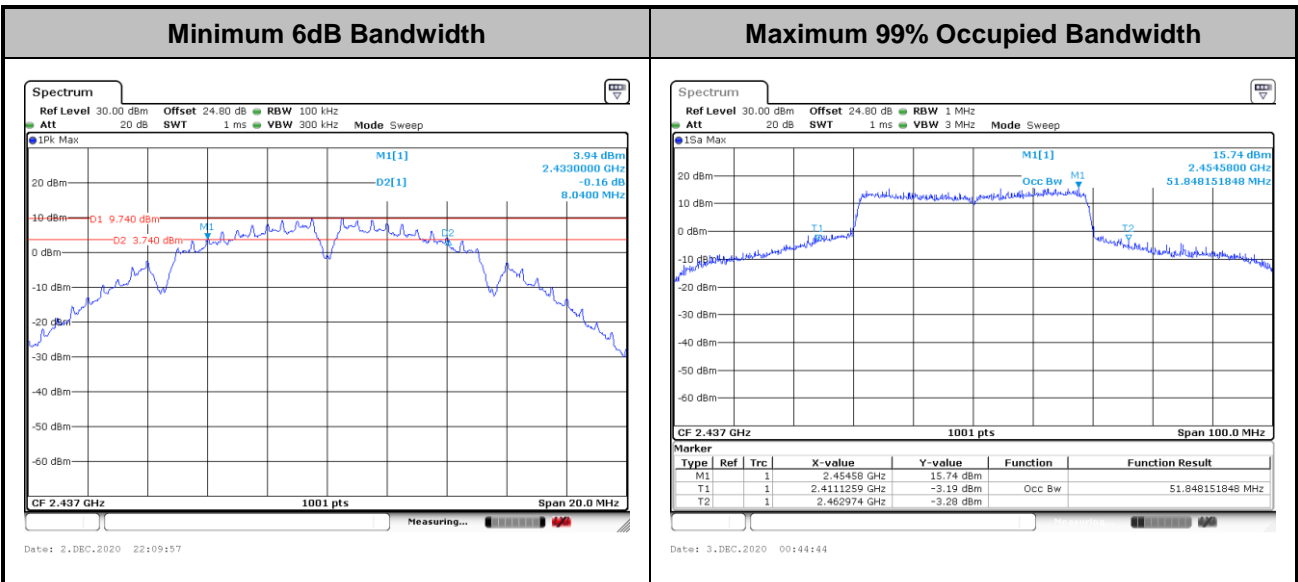
Please refer to Appendix A.

#### <Normal Mode>



Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

#### <Camera Mode>



Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

## 3.2 Output Power Measurement

### 3.2.1 Limit of Output Power

For systems using digital modulation in the 2400-2483.5MHz, the limit for output power is 30dBm. If transmitting antenna with directional gain greater than 6dBi is used, the peak output power from the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the antenna exceeds 6 dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

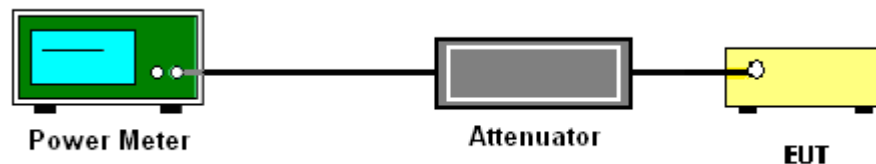
### 3.2.2 Measuring Instruments

See list of measuring equipment of this test report.

### 3.2.3 Test Procedures

1. For Average Power, the testing follows ANSI C63.10 Section 11.9.2.3.2 Method AVGPM-G
2. The RF output of EUT was connected to the power meter by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Measure the conducted output power and record the results in the test report.
5. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

### 3.2.4 Test Setup



### 3.2.5 Test Result of Average Output Power

Please refer to Appendix A.

### 3.3 Power Spectral Density Measurement

#### 3.3.1 Limit of Power Spectral Density

The peak power spectral density shall not be greater than 8dBm in any 3kHz band at any time interval of continuous transmission.

#### 3.3.2 Measuring Instruments

See list of measuring equipment of this test report.

#### 3.3.3 Test Procedures

1. The testing follows the ANSI C63.10 Section 11.10.2 Method PKPSD.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 3 kHz. Video bandwidth VBW = 10 kHz In order to make an accurate measurement, set the span to 1.5 times DTS Channel Bandwidth. (6dB BW)
5. Detector = peak, Sweep time = auto couple, Trace mode = max hold, Allow trace to fully stabilize. Use the peak marker function to determine the maximum power level.
6. Measure and record the results in the test report.
7. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

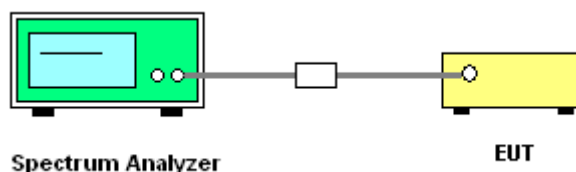
If measurements performed using method (2) plus  $10 \log (N)$  exceeds the emission limit, the test should choose method (1) before declaring that the device fails the emission limit.

Method (1): Measure and sum the spectra across the outputs.

The total final Power Spectral Density is from a device with 2 transmitter outputs. The spectrum measurements of the individual outputs are all performed with the same span and number of points, the spectrum value in the first spectral bin of output 1 is summed with that in the first spectral bin of output 2 to obtain the value for the first frequency bin of the summed spectrum.

Method (2): Measure and add  $10 \log (N)$  dB, where N is the number of outputs. (N=2)

#### 3.3.4 Test Setup

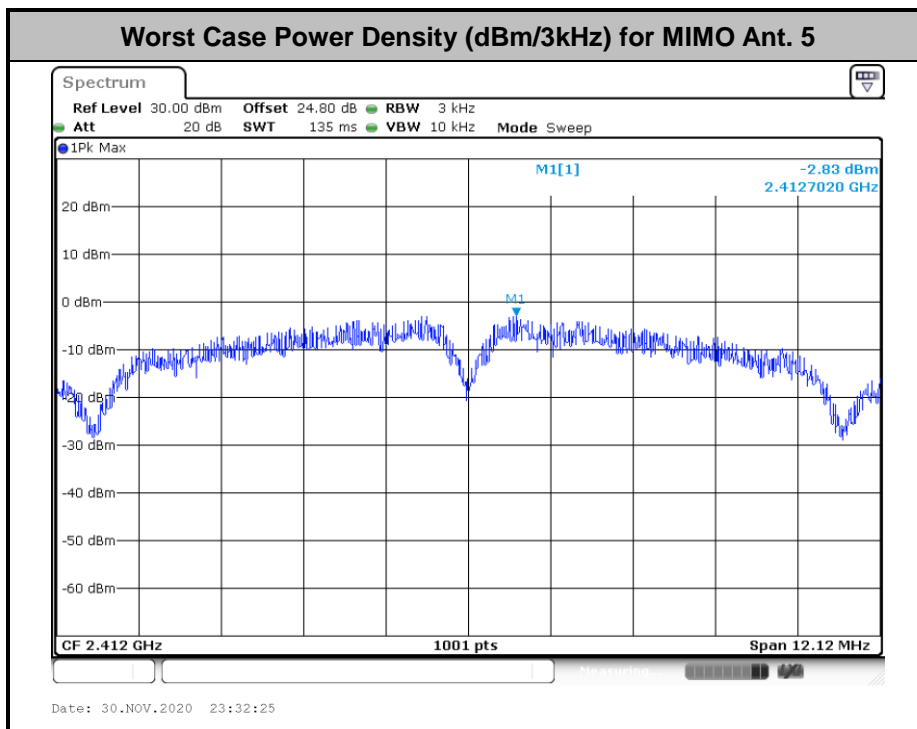
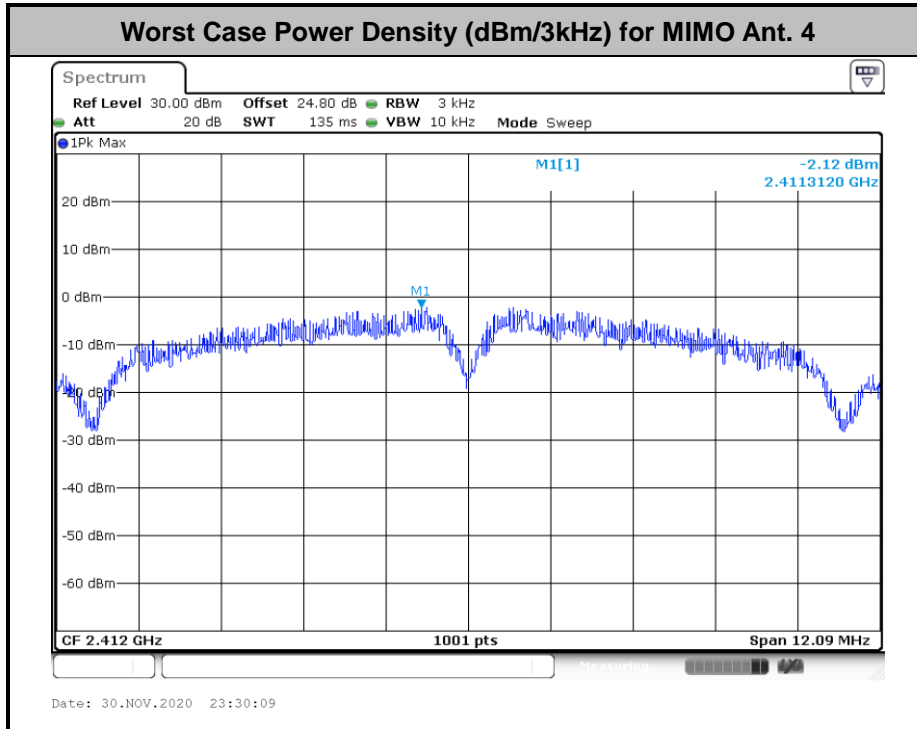




### 3.3.5 Test Result of Power Spectral Density

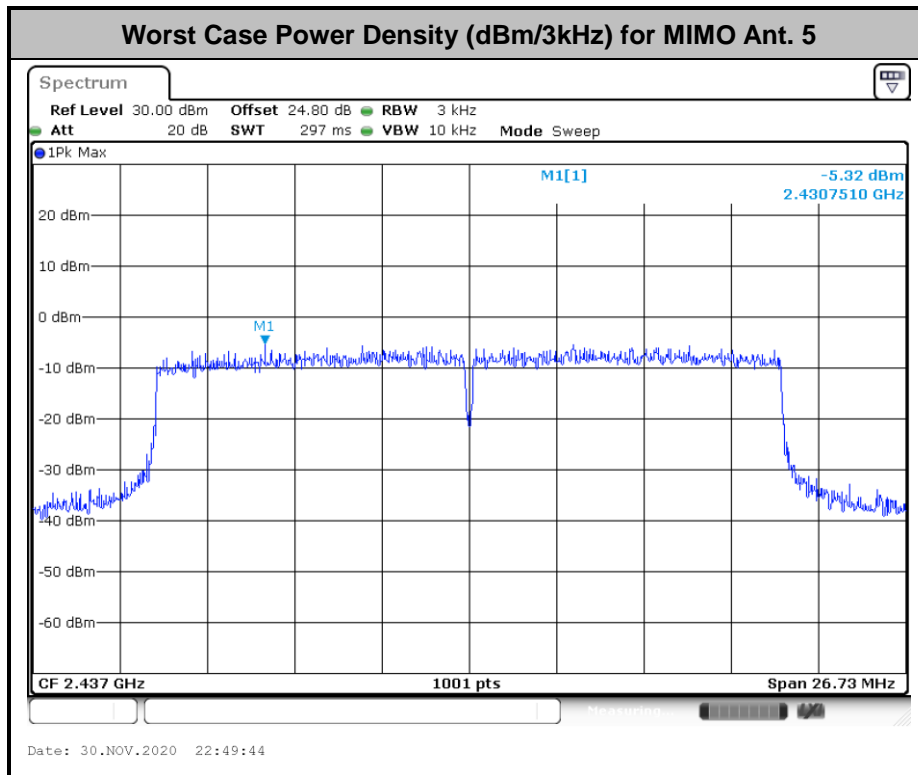
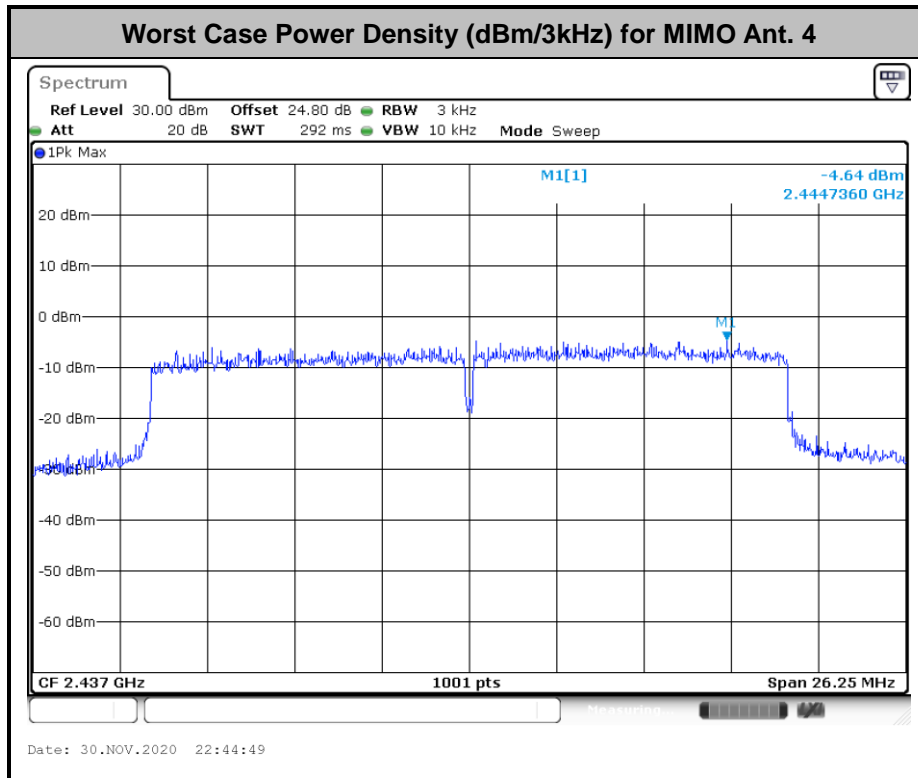
Please refer to Appendix A.

<Normal Mode>





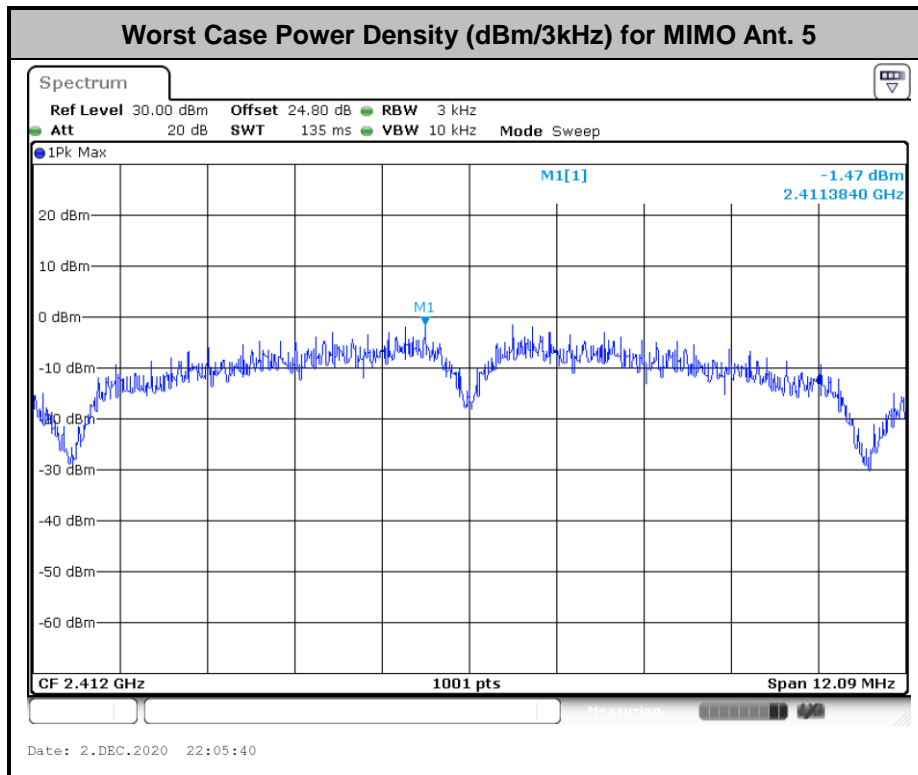
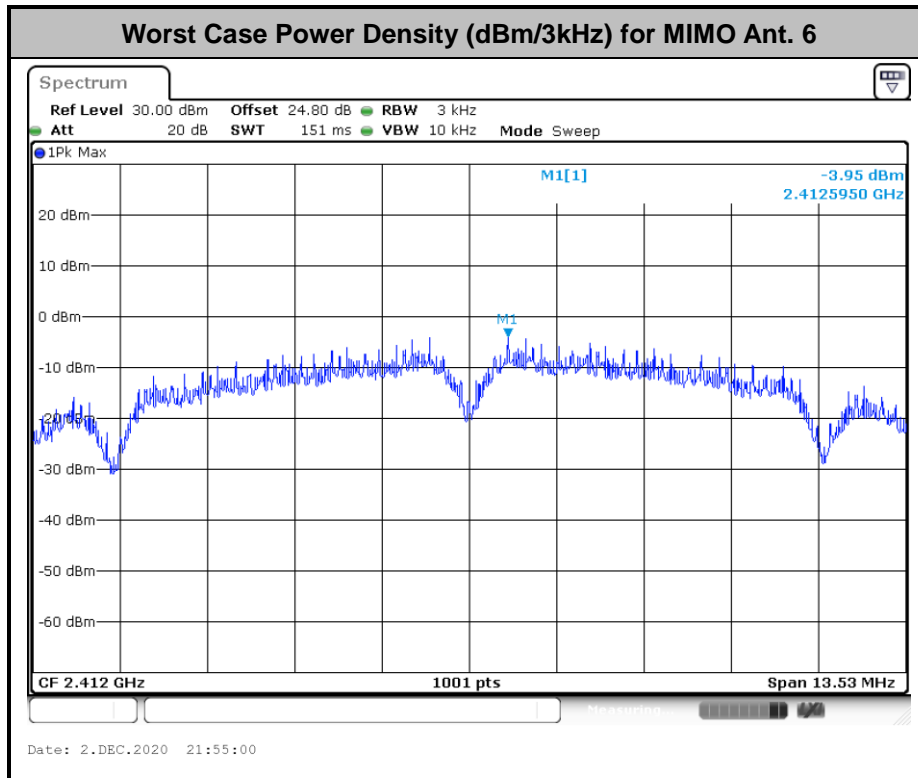
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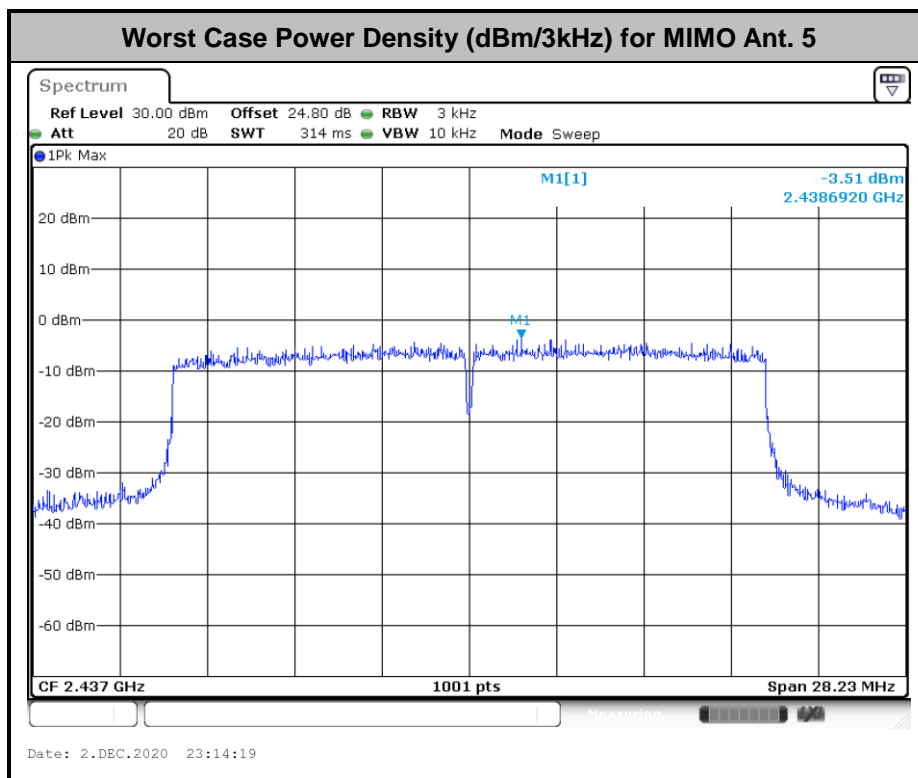
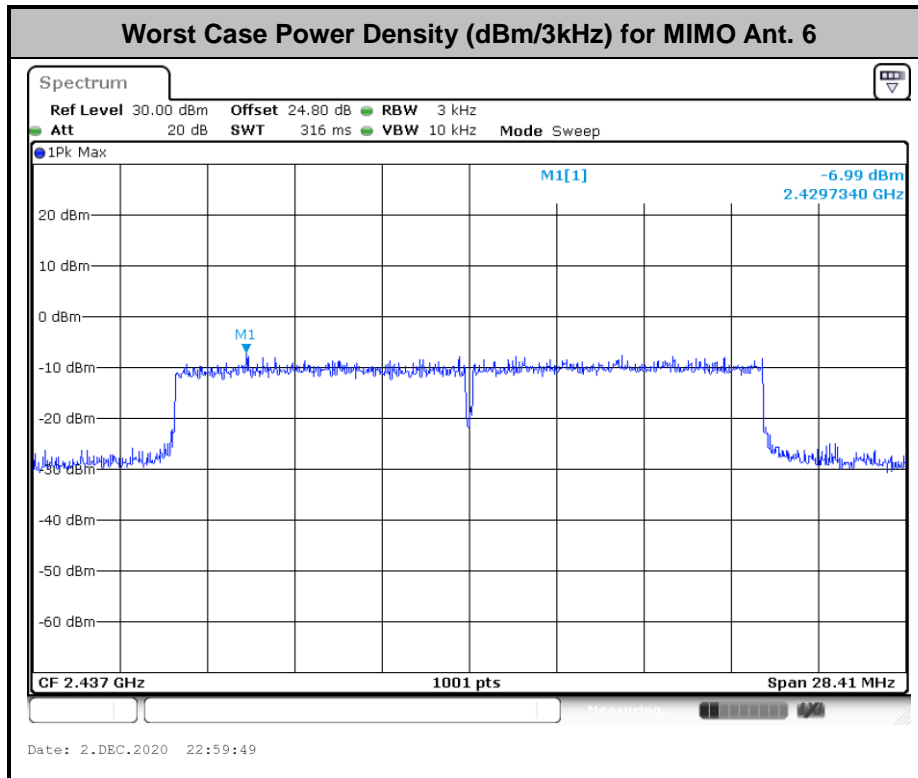


<Camera Mode>





<802.11ax Mode>



## 3.4 Conducted Band Edges and Spurious Emission Measurement

### 3.4.1 Limit of Conducted Band Edges and Spurious Emission Measurement

In any 100 kHz bandwidth outside of the authorized frequency band, the emissions which fall in the non-restricted bands shall be attenuated at least 20 dB / 30dB relative to the maximum PSD level in 100 kHz by RF conducted measurement.

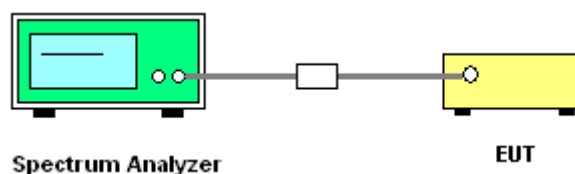
### 3.4.2 Measuring Instruments

See list of measuring equipment of this test report.

### 3.4.3 Test Procedures

1. The testing follows the ANSI C63.10 Section 11.11.3 Emission level measurement.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Set RBW = 100 kHz, VBW=300 kHz, Peak Detector. Unwanted Emissions measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when maximum peak conducted output power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB per 15.247(d).
5. Measure and record the results in the test report.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

### 3.4.4 Test Setup





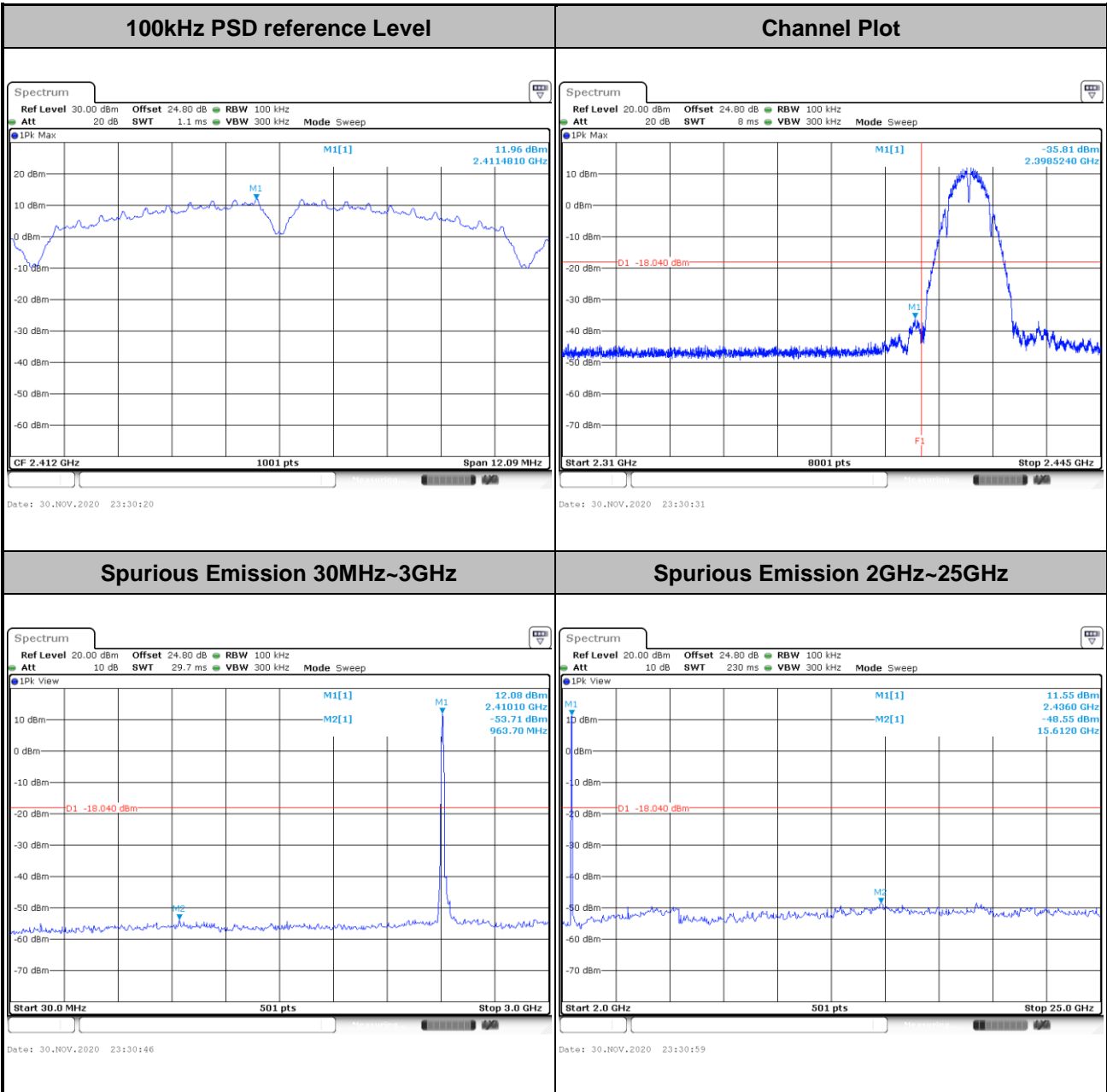
### 3.4.5 Test Result of Conducted Band Edges and Spurious Emission

Test Engineer : Derek Hsu	Temperature :	21~25°C
	Relative Humidity :	51~54%

<Normal Mode>

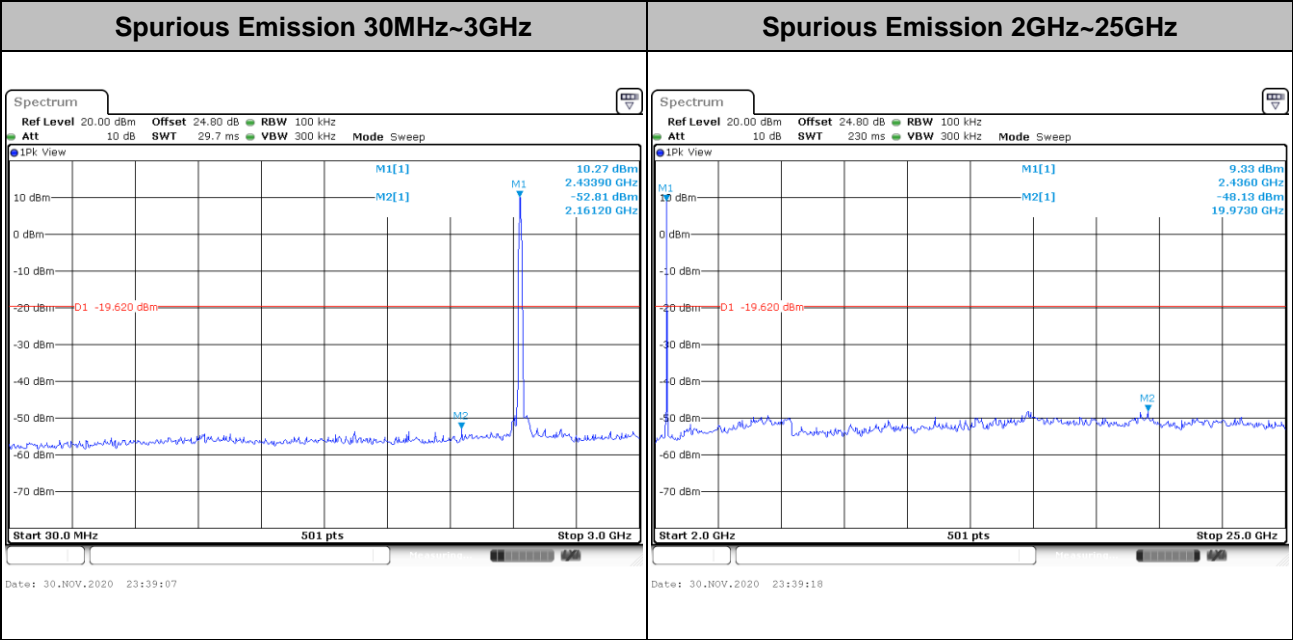
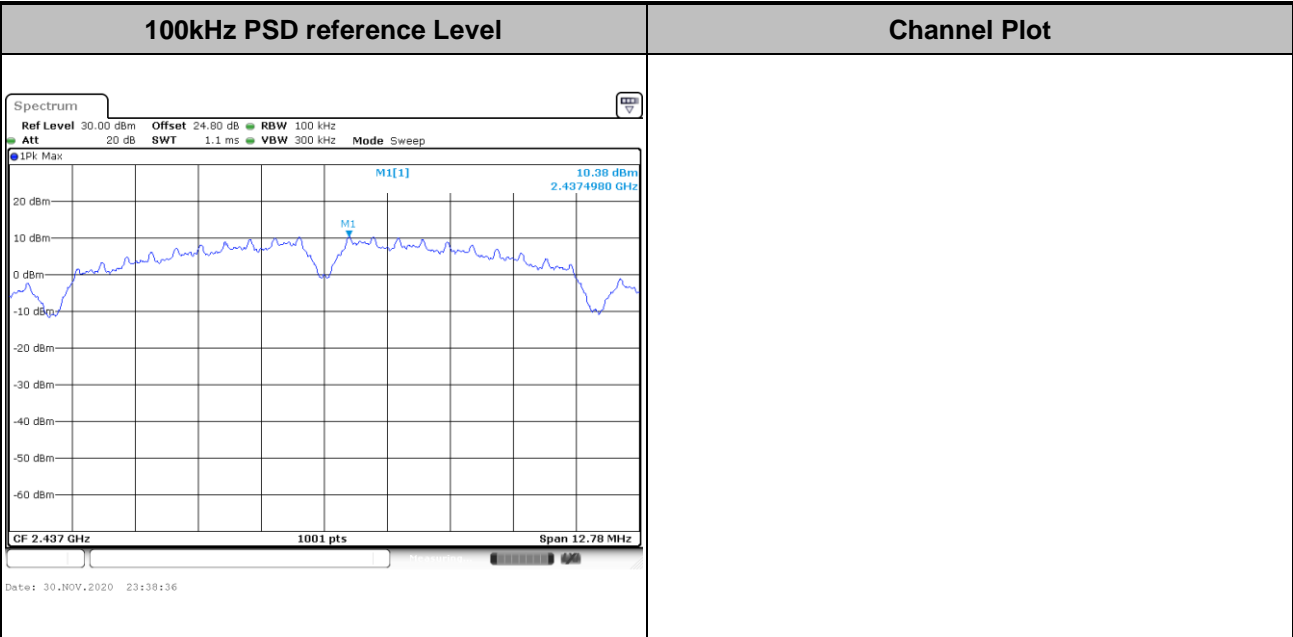
Number of TX = 2, Ant. 4 (Measured)

Test Mode :	802.11b	Test Channel :	01
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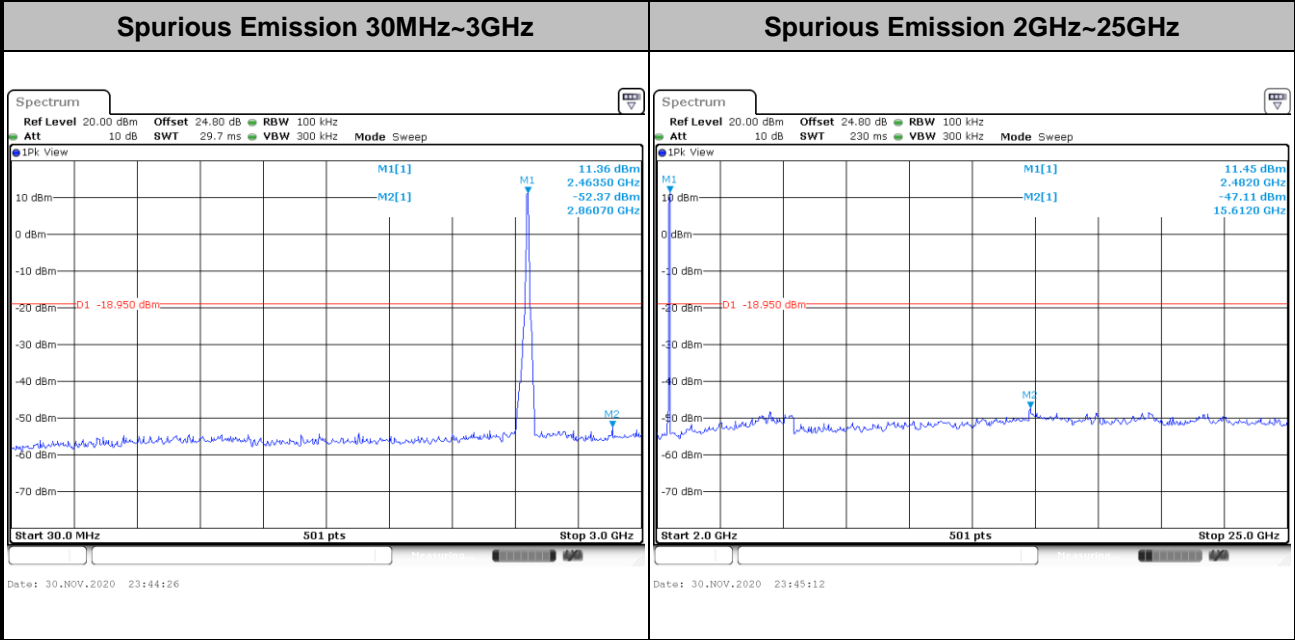
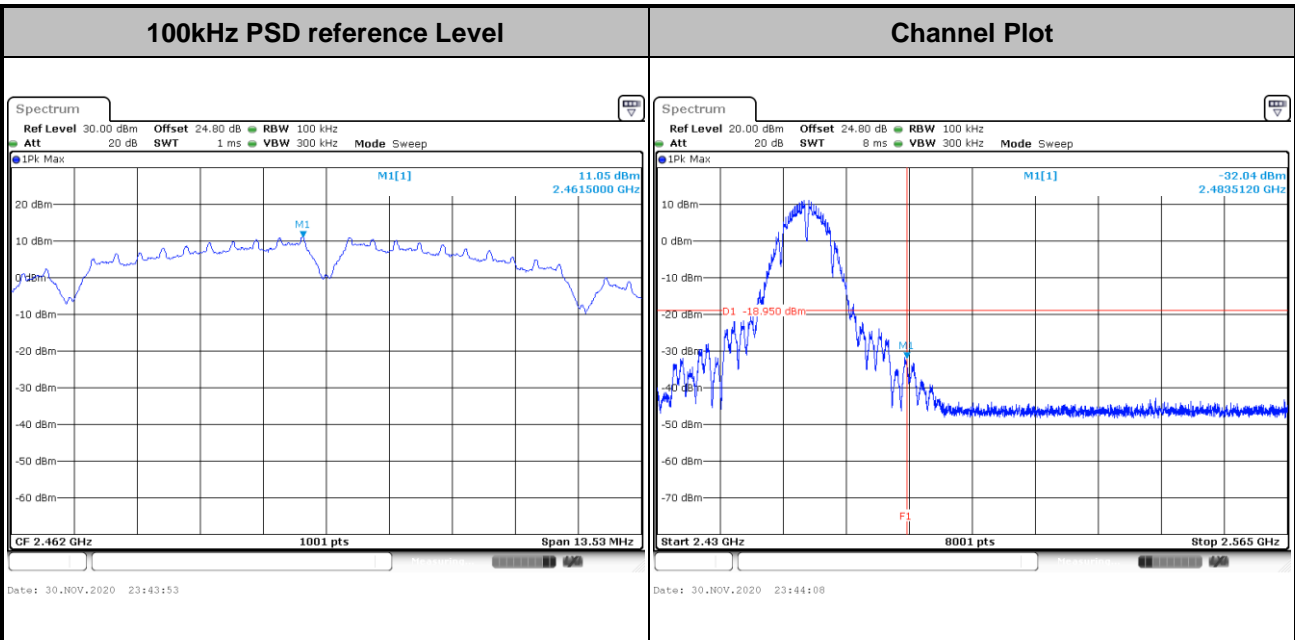


Test Mode :	802.11b	Test Channel :	06
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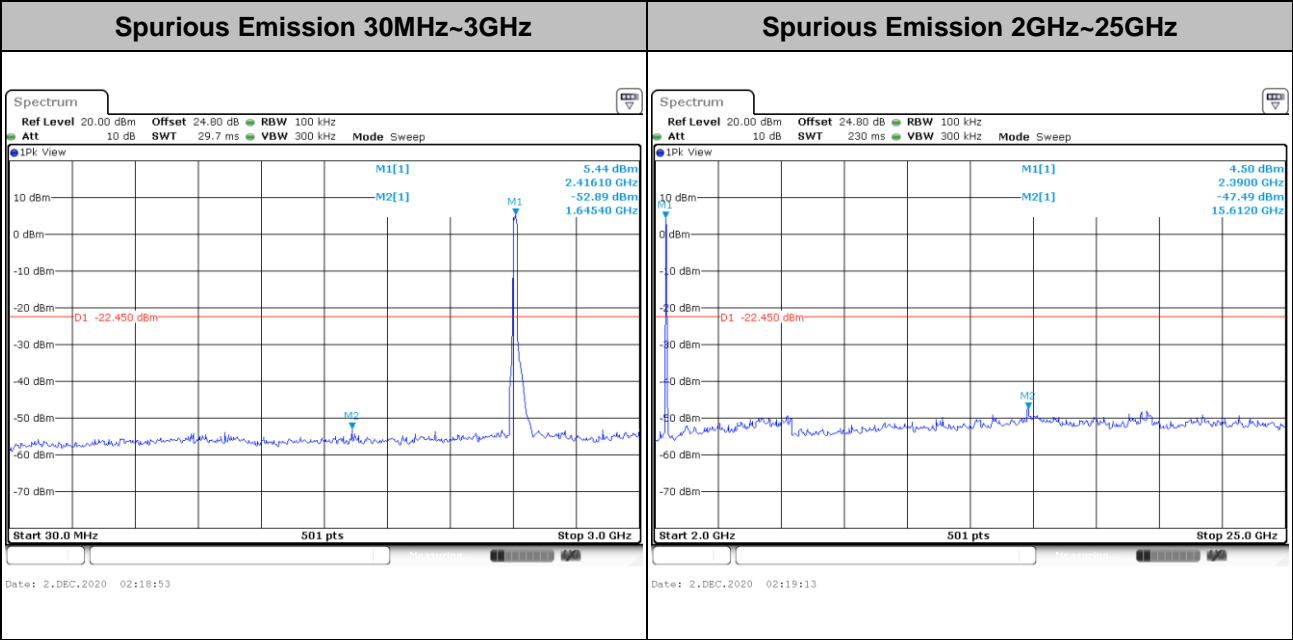
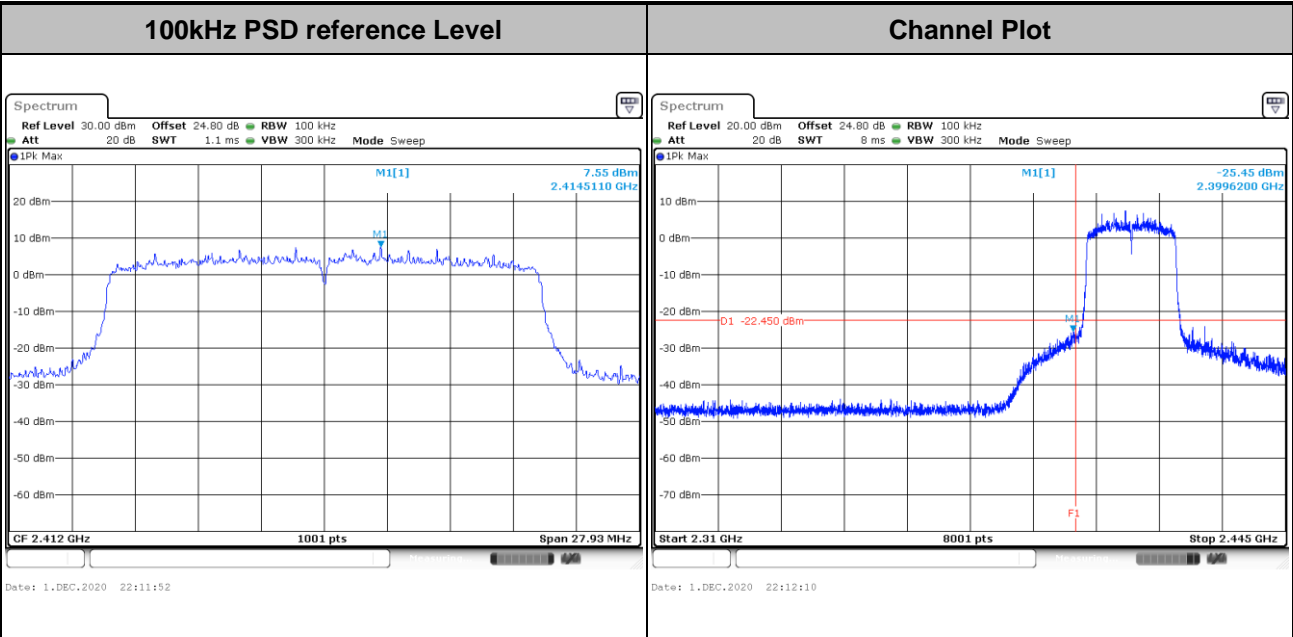


Test Mode :	802.11b	Test Channel :	11
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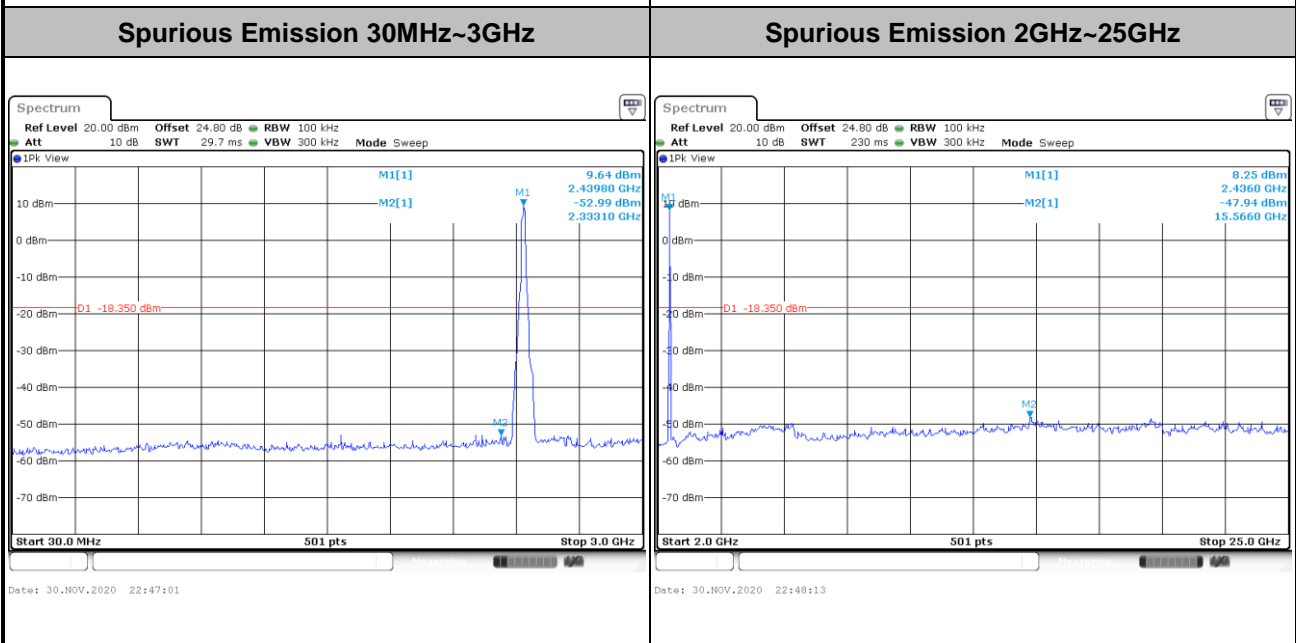
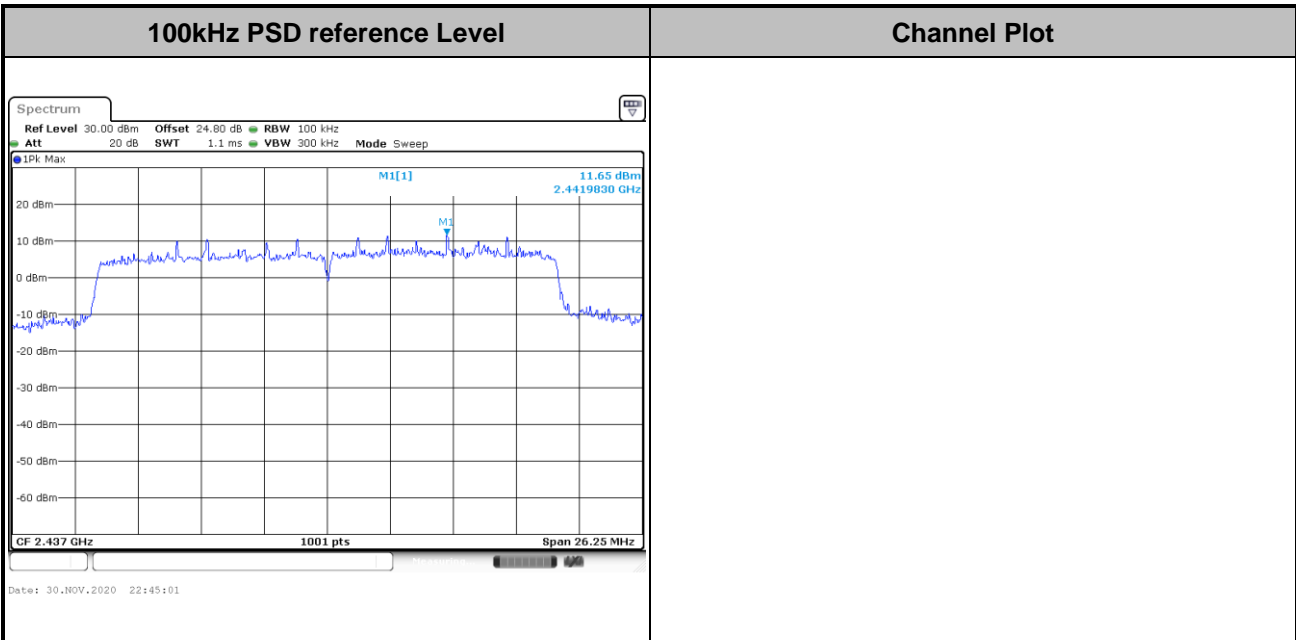


Test Mode : 802.11ax HE20 Full RU      Test Channel : 01





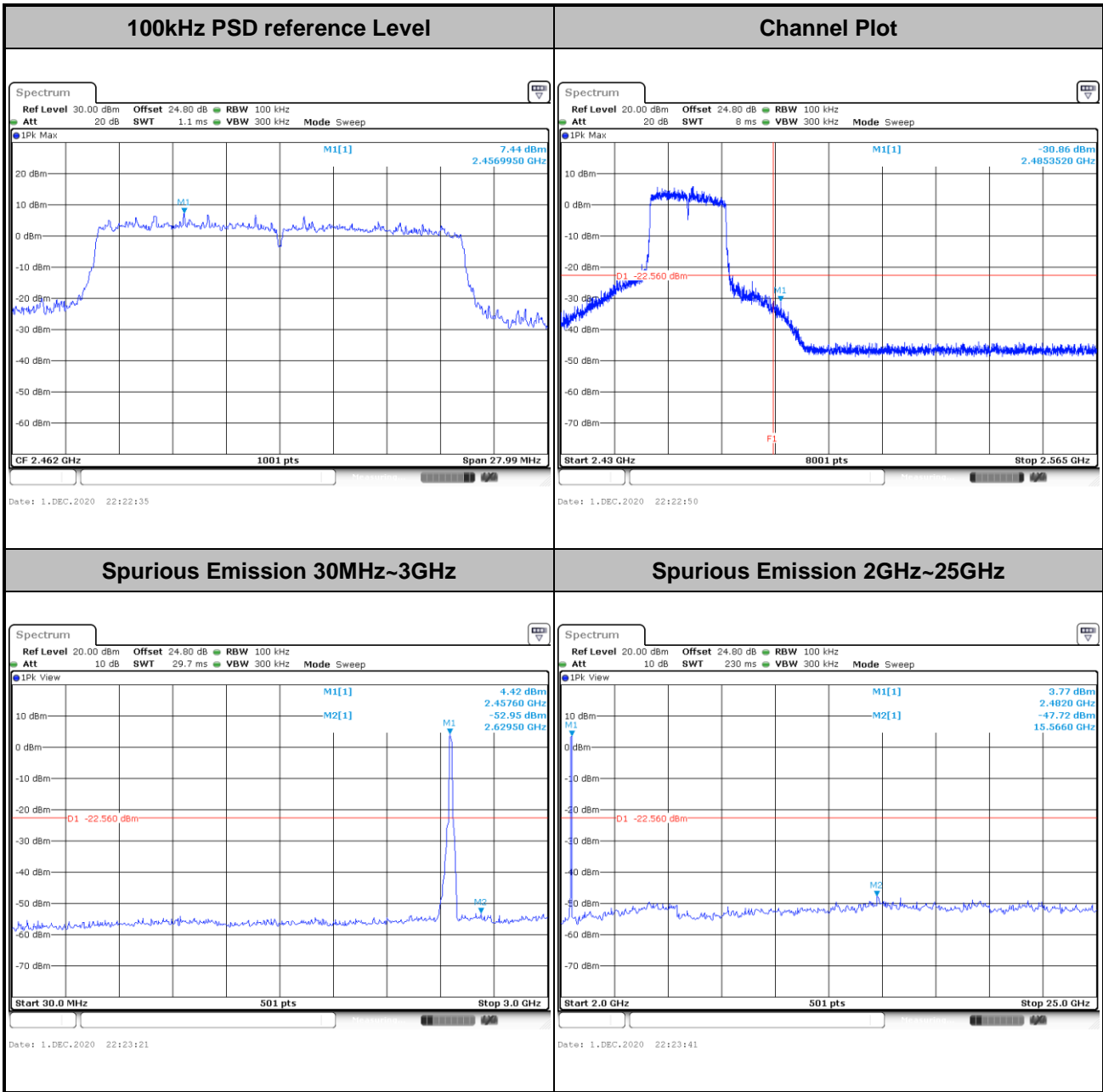
<b>Test Mode :</b>	802.11ax HE20 Full RU	<b>Test Channel :</b>	06
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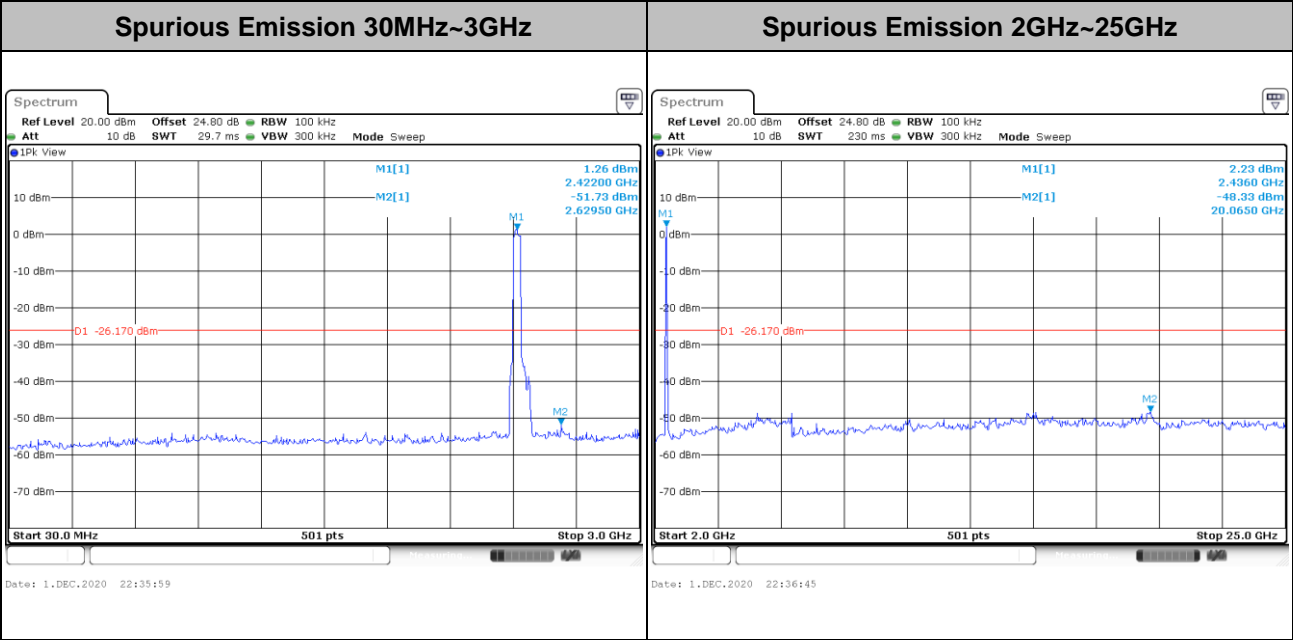
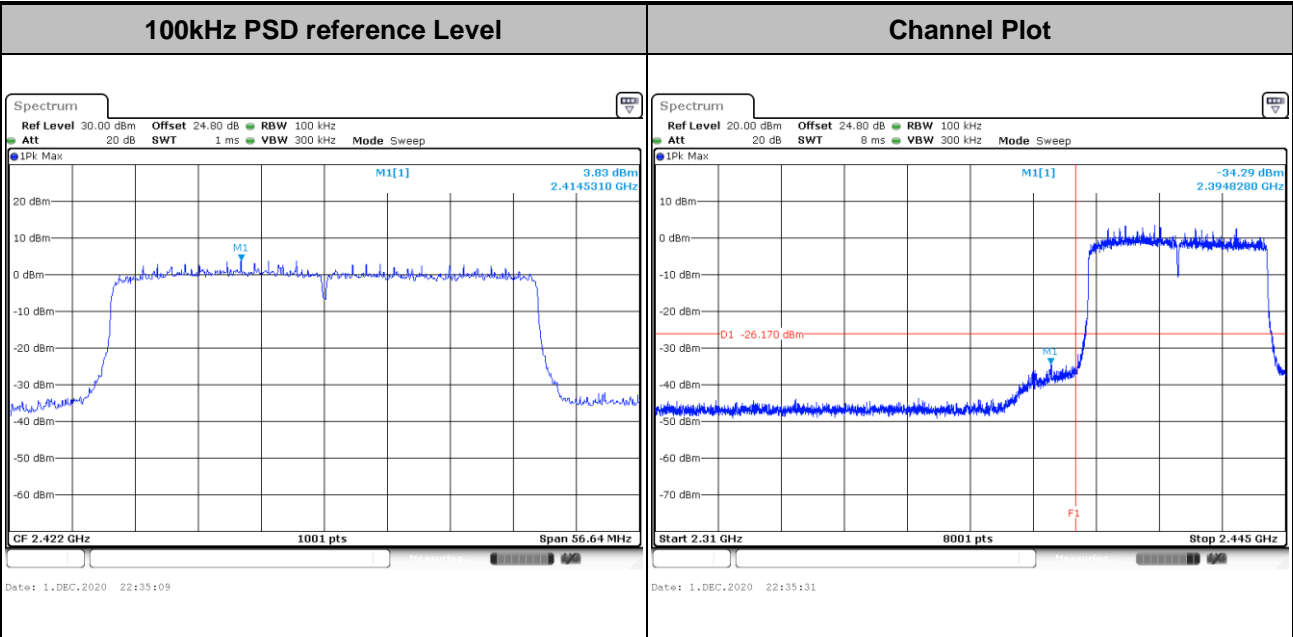


Test Mode :	802.11ax HE20 Full RU	Test Channel :	11
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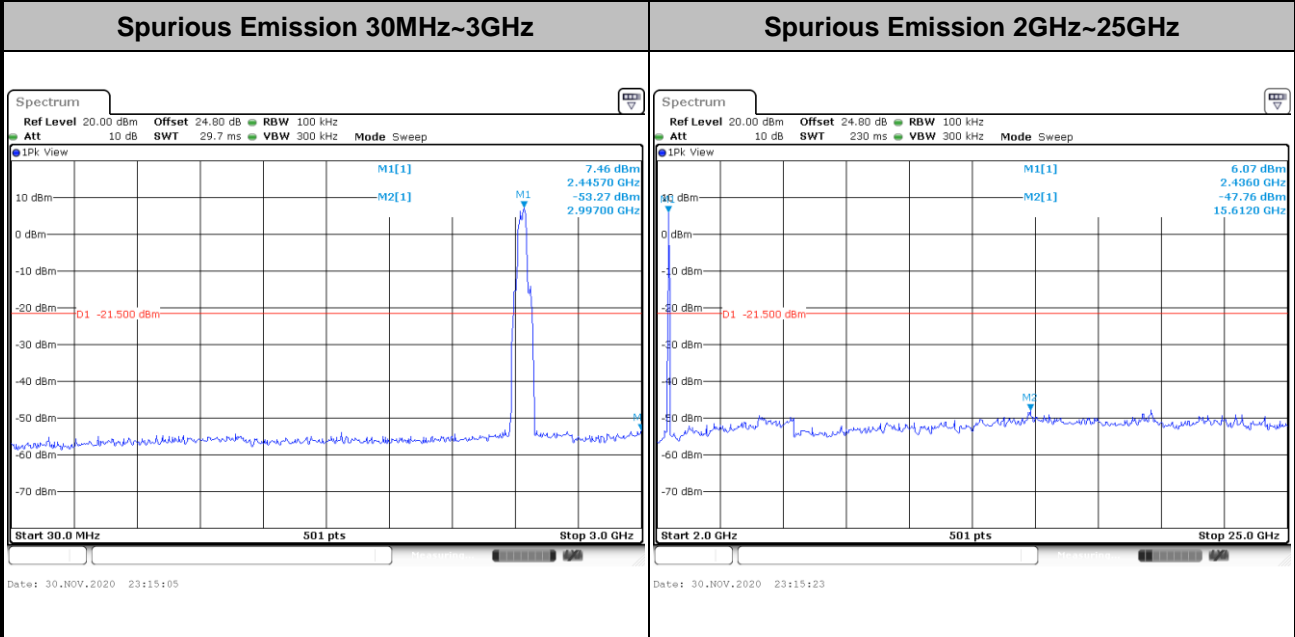
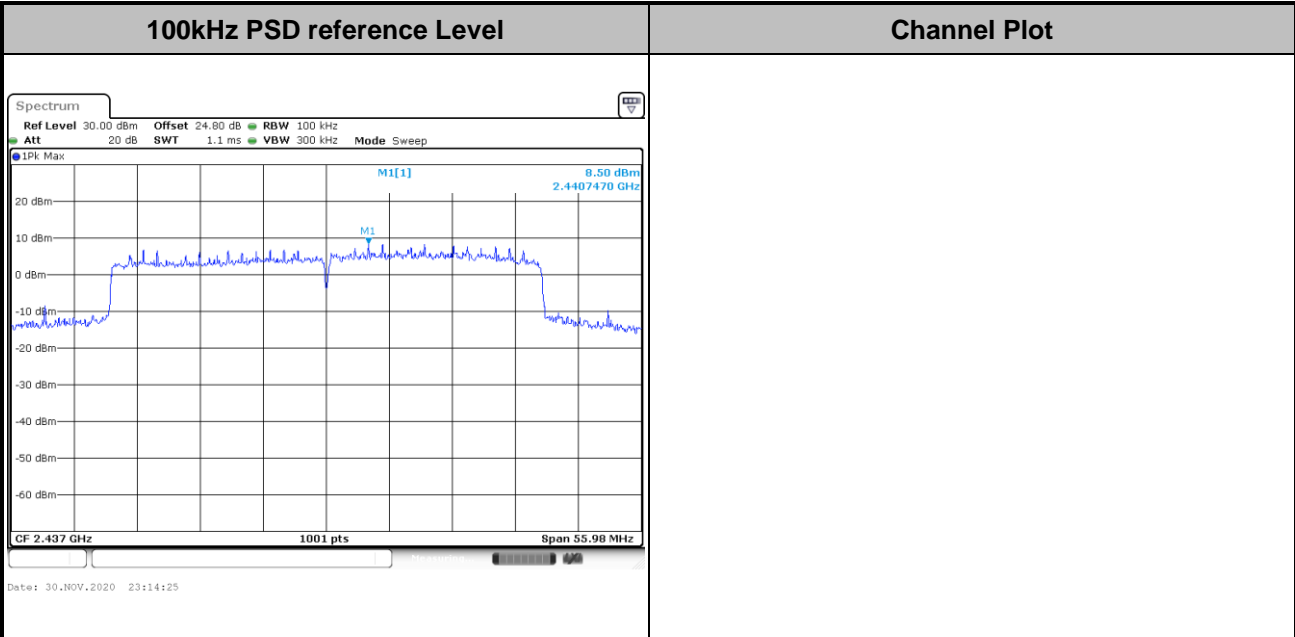


Test Mode : 802.11ax HE40 Full RU      Test Channel : 03



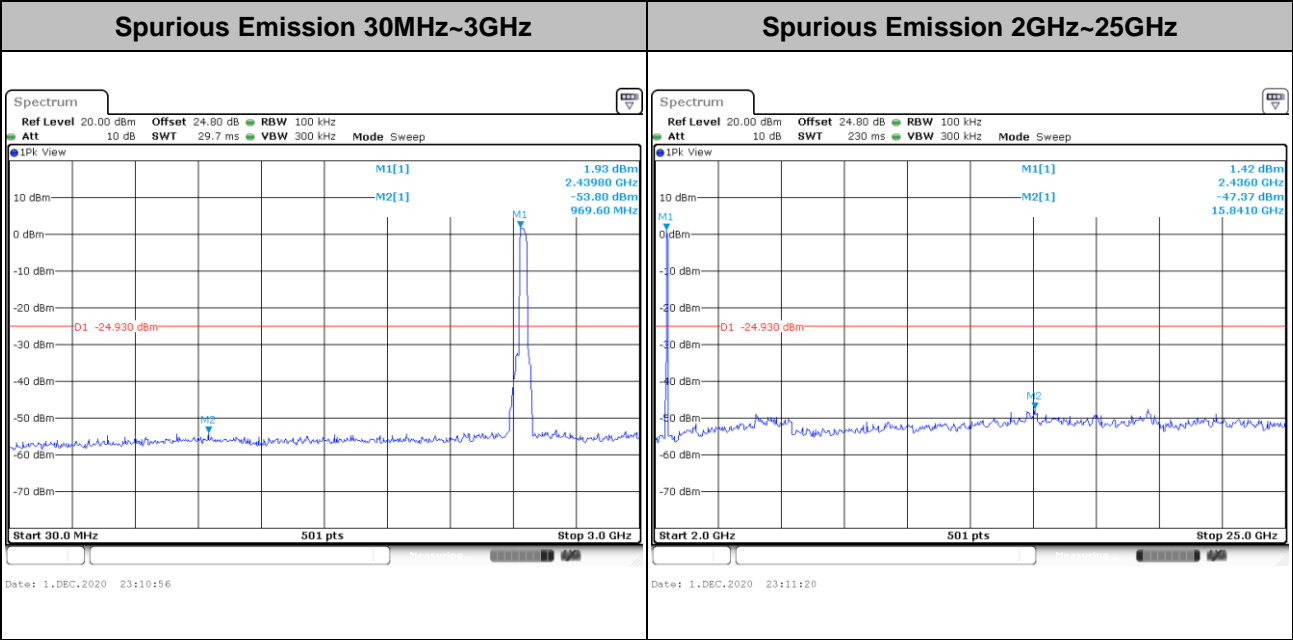
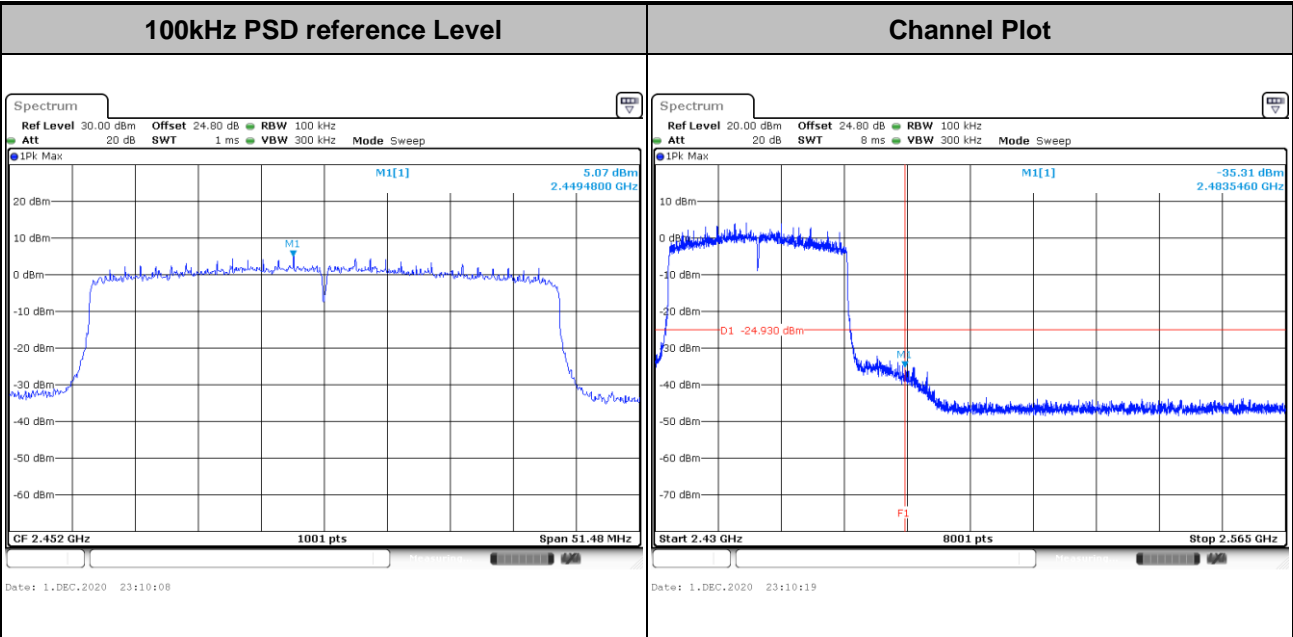


<b>Test Mode :</b>	802.11ax HE40 Full RU	<b>Test Channel :</b>	06
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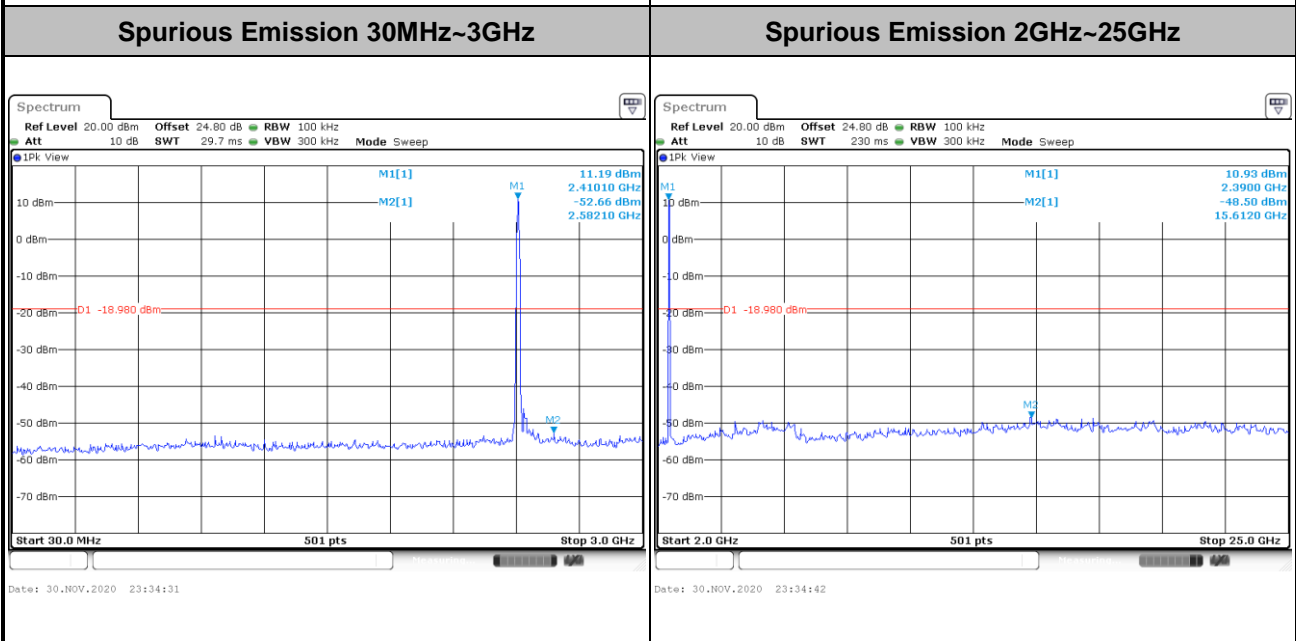
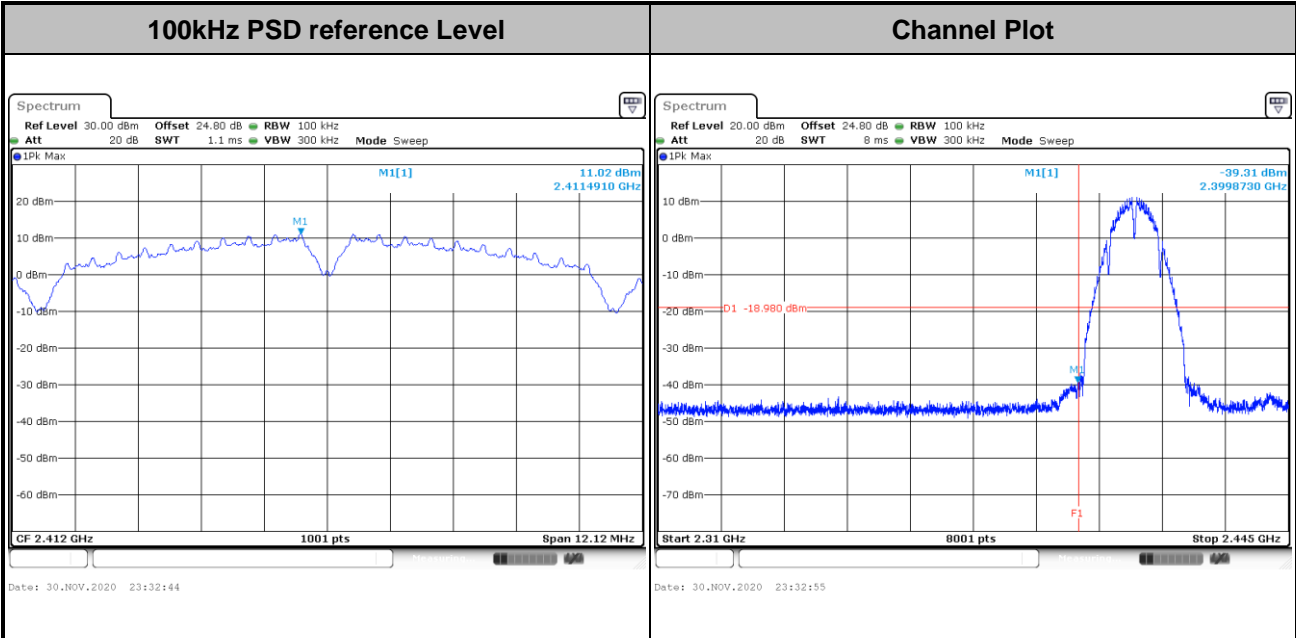
Test Mode : 802.11ax HE40 Full RU      Test Channel : 09





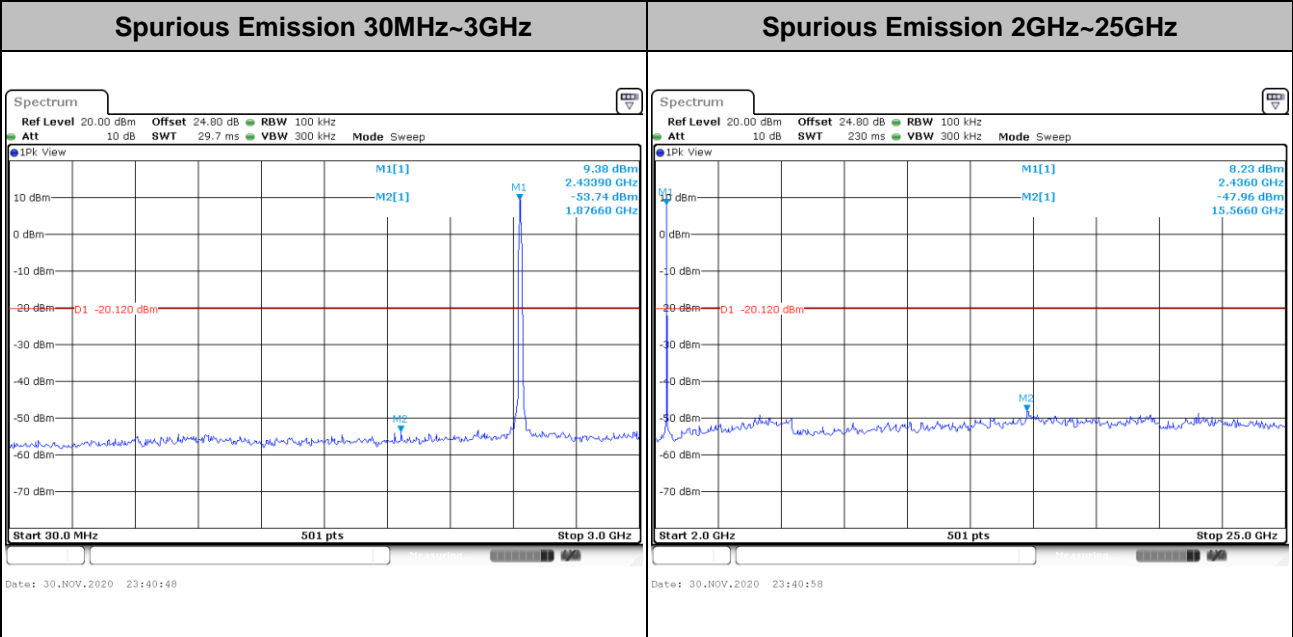
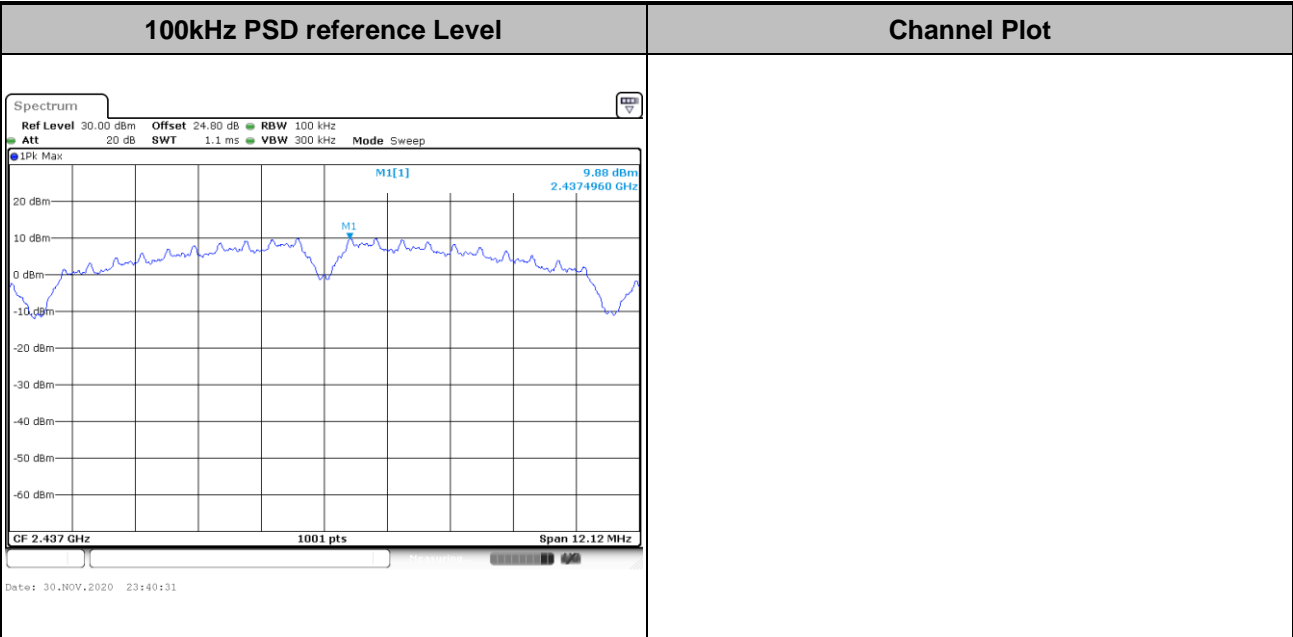
Number of TX = 2, Ant. 5 (Measured)

Test Mode :	802.11b	Test Channel :	01
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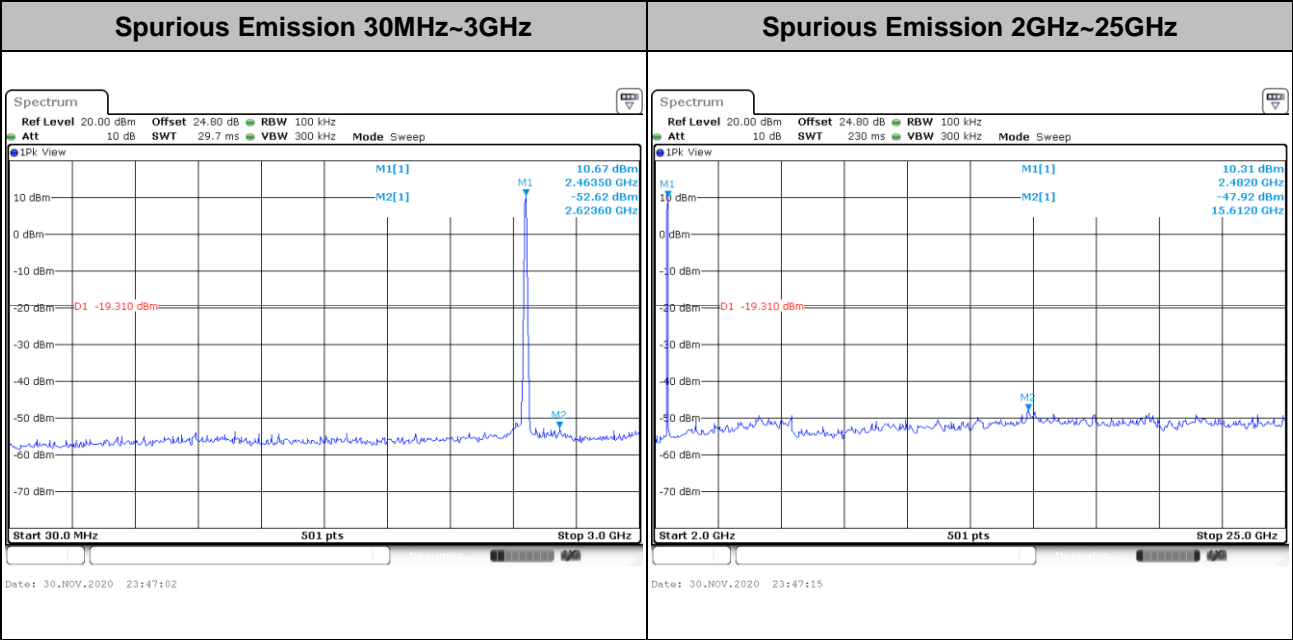
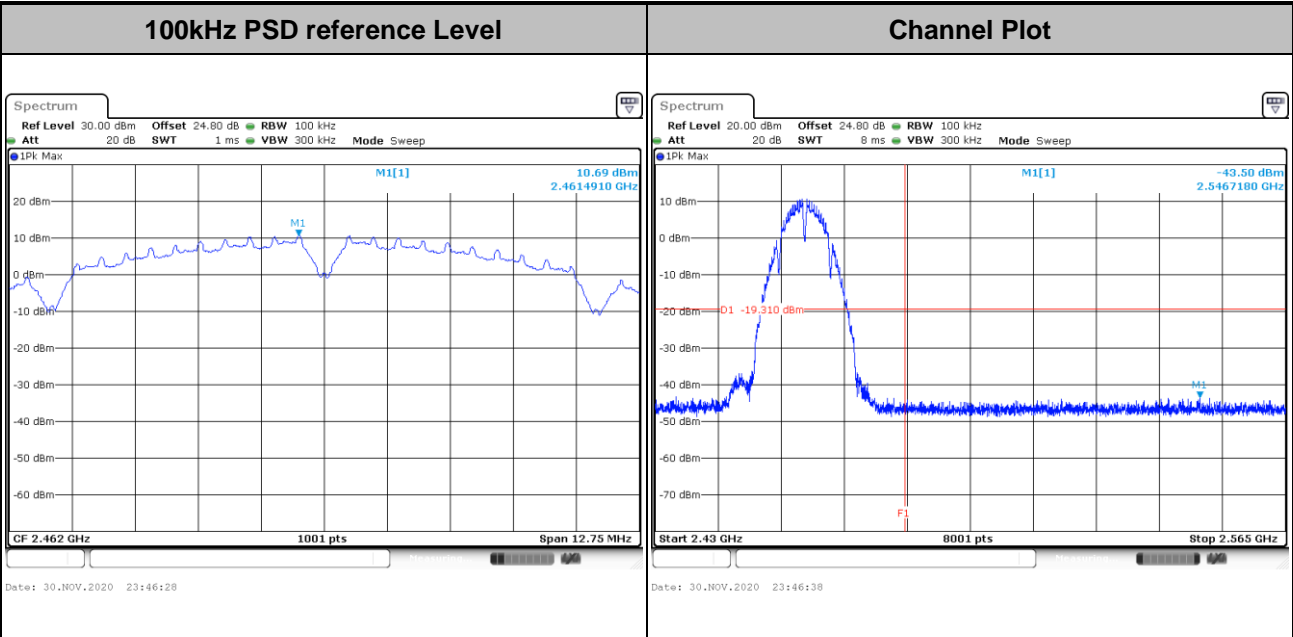


Test Mode :	802.11b	Test Channel :	06
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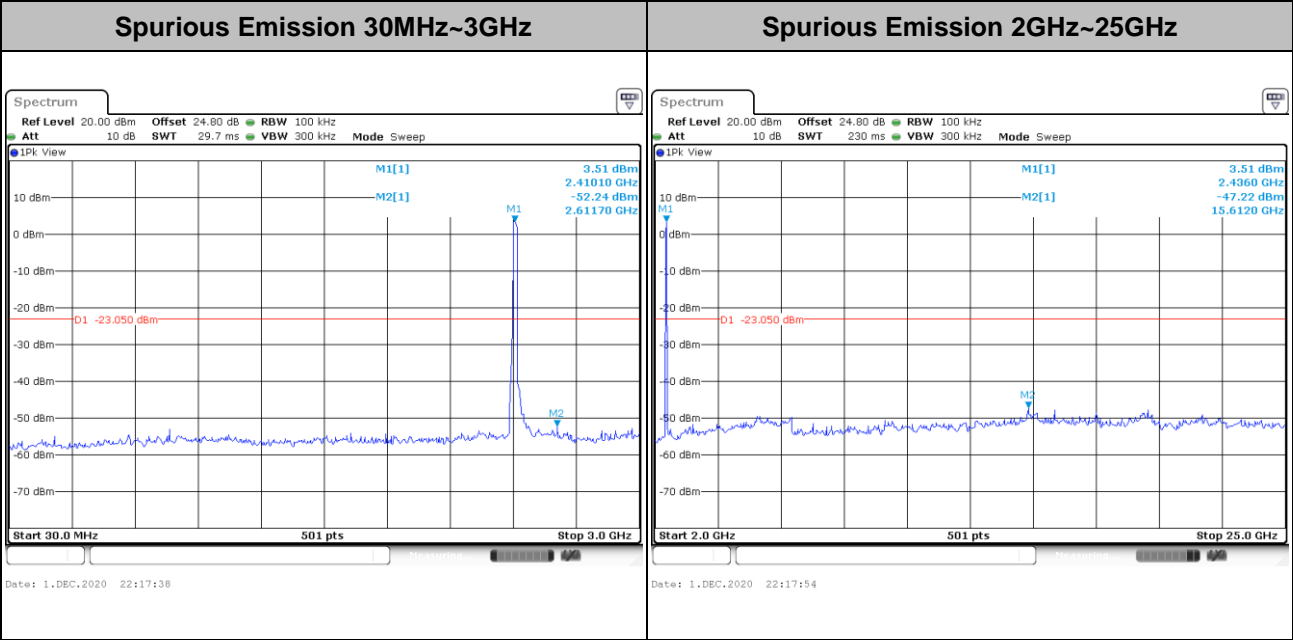
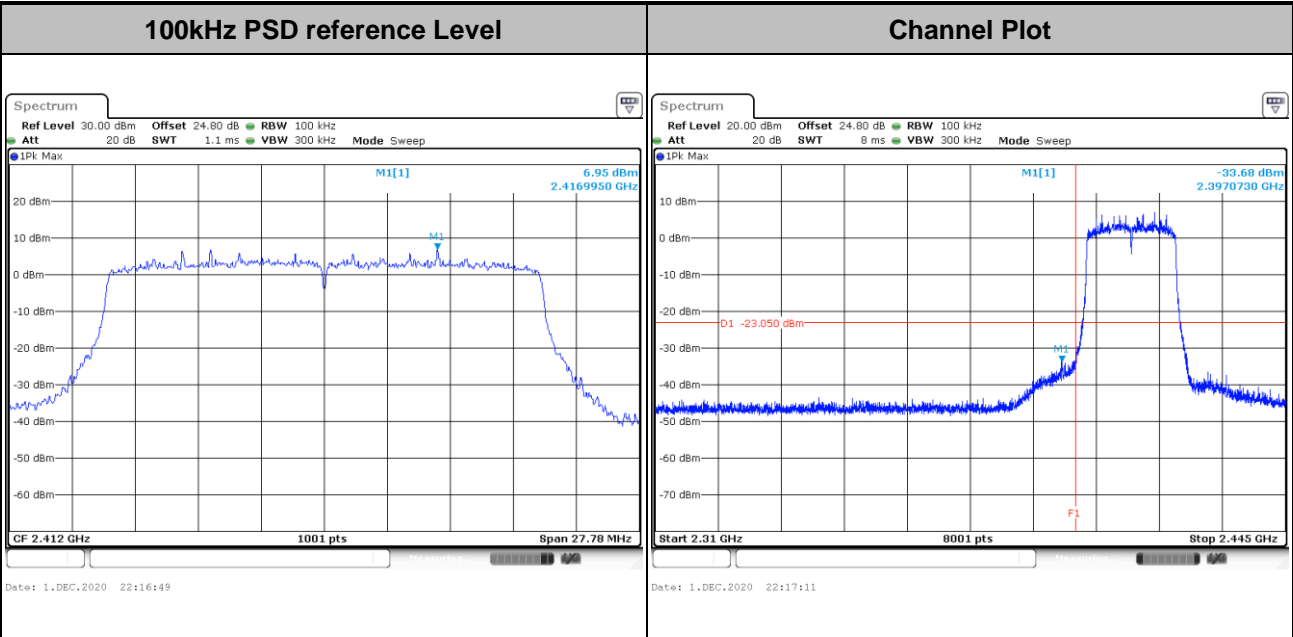


Test Mode :	802.11b	Test Channel :	11
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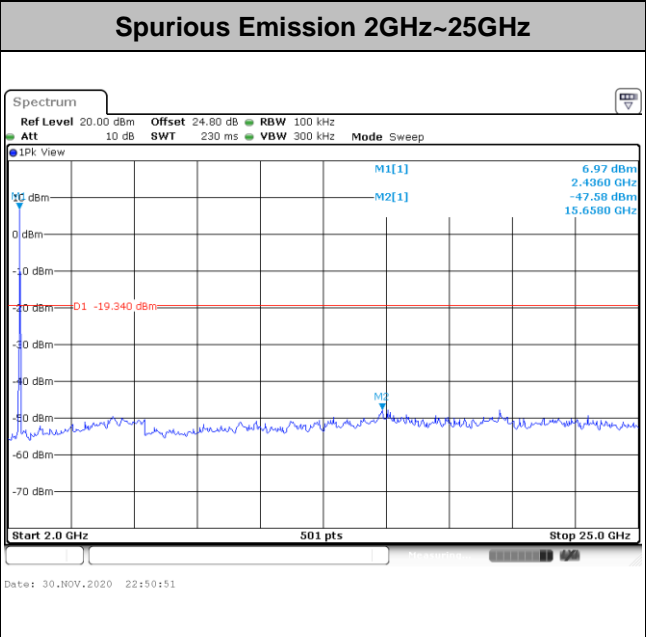
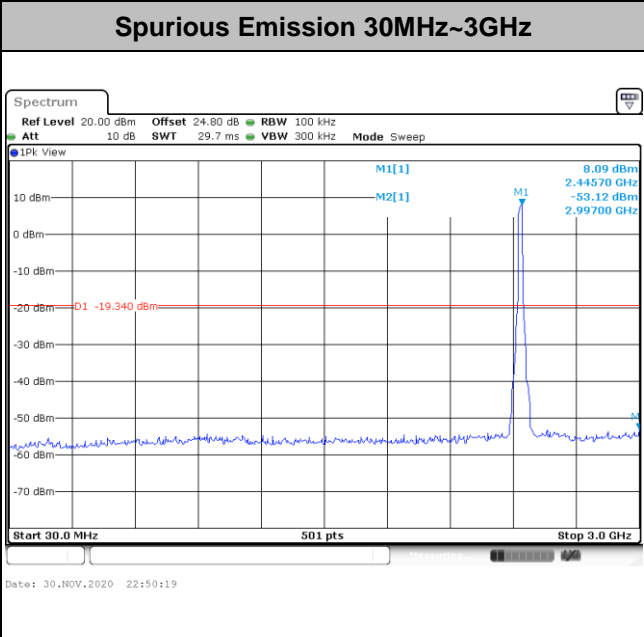
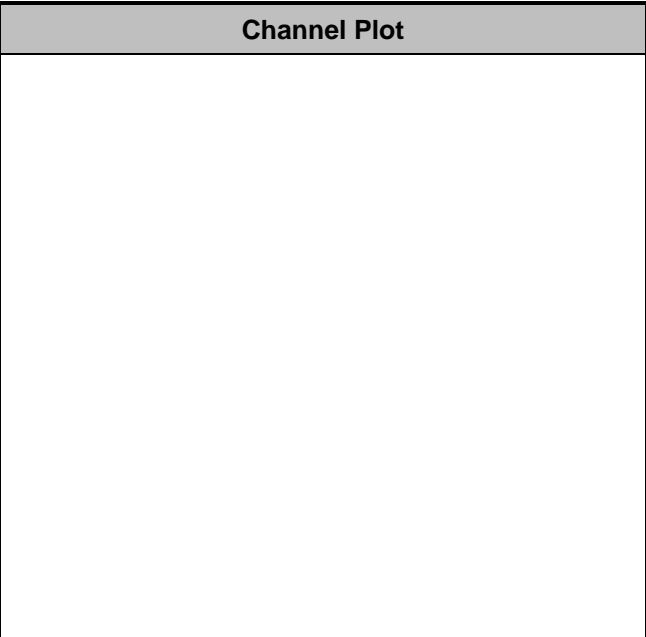
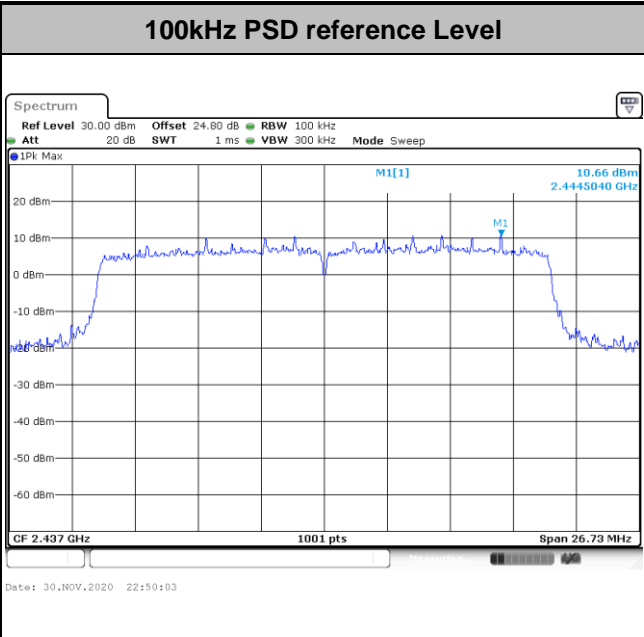
Test Mode :	802.11ax HE20 Full RU	Test Channel :	01
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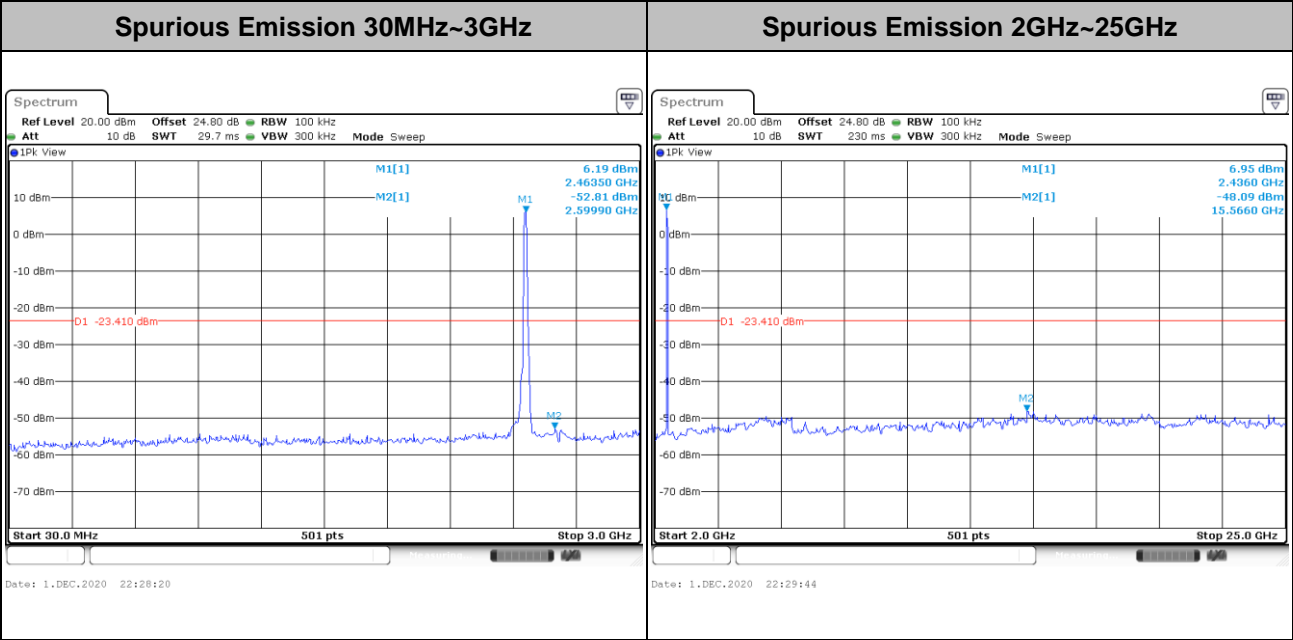
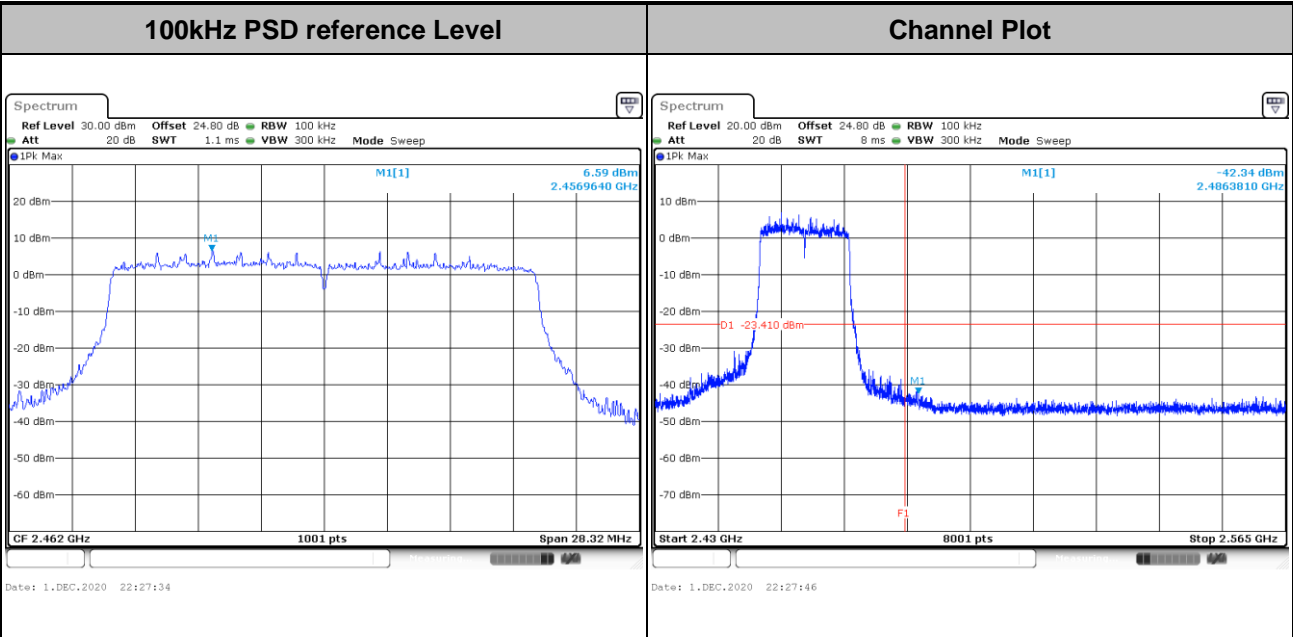


Test Mode :	802.11ax HE20 Full RU	Test Channel :	06
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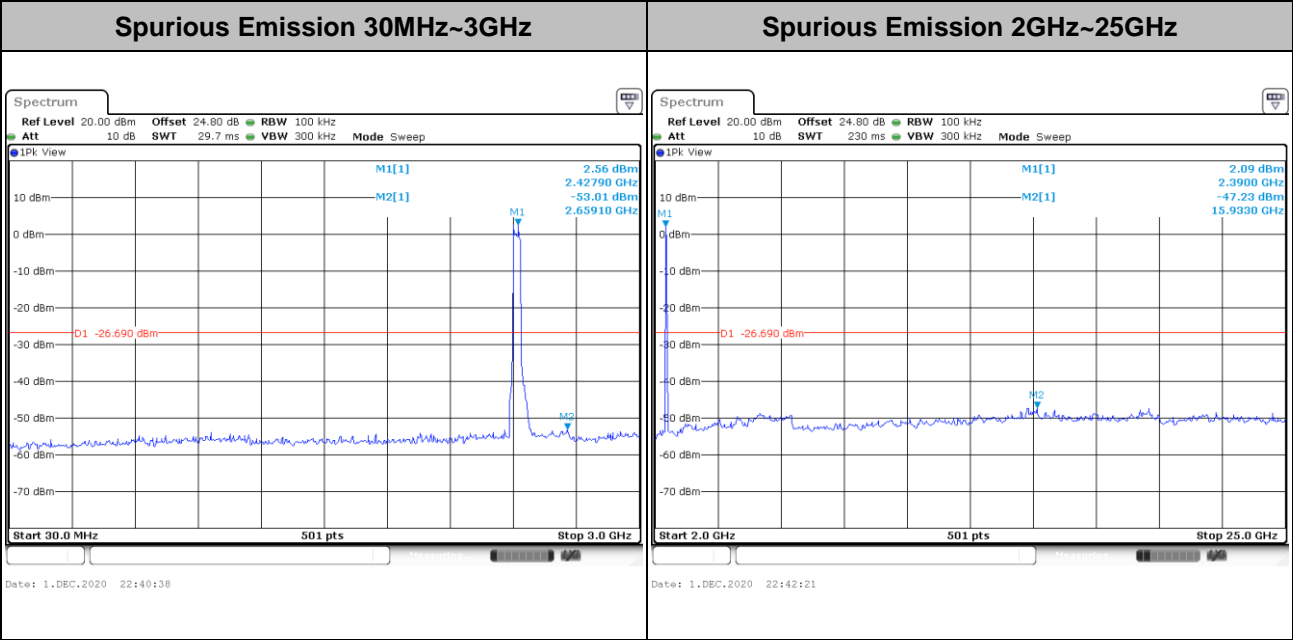
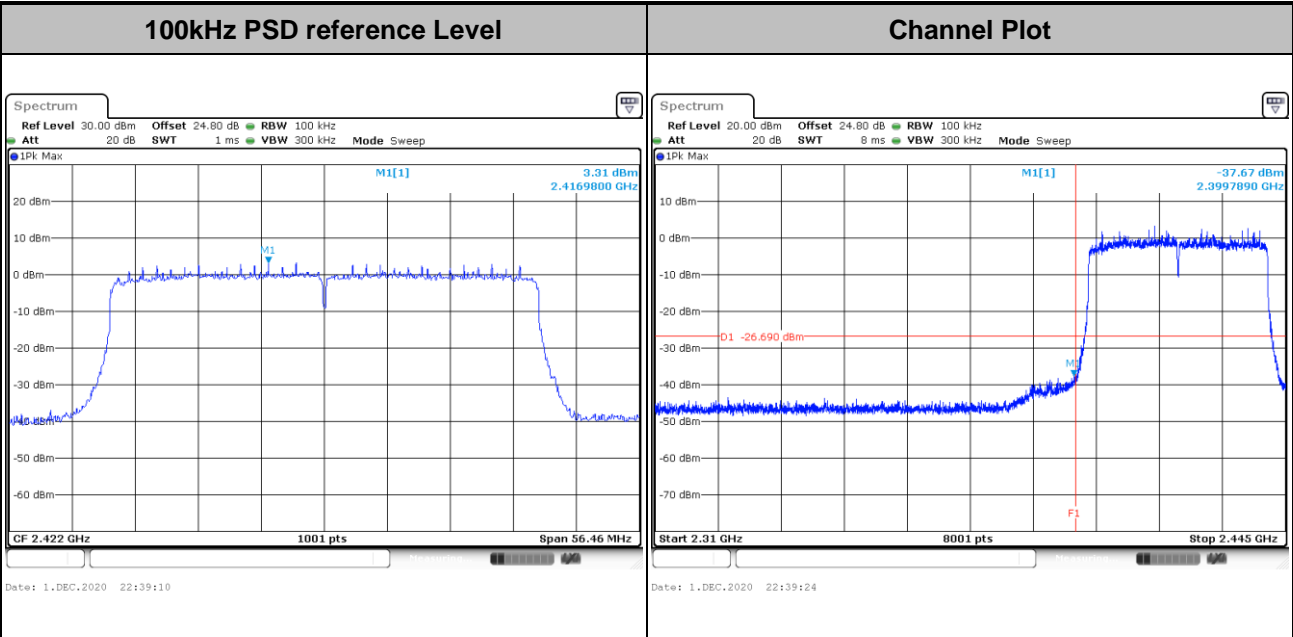


Test Mode :	802.11ax HE20 Full RU	Test Channel :	11
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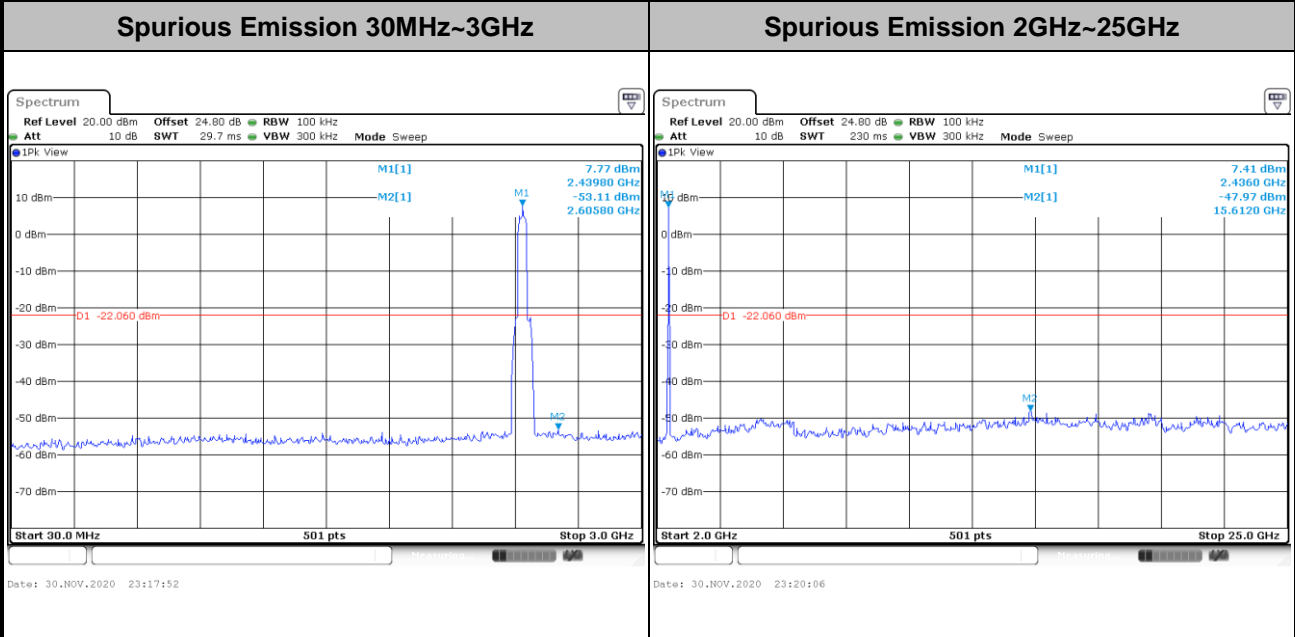
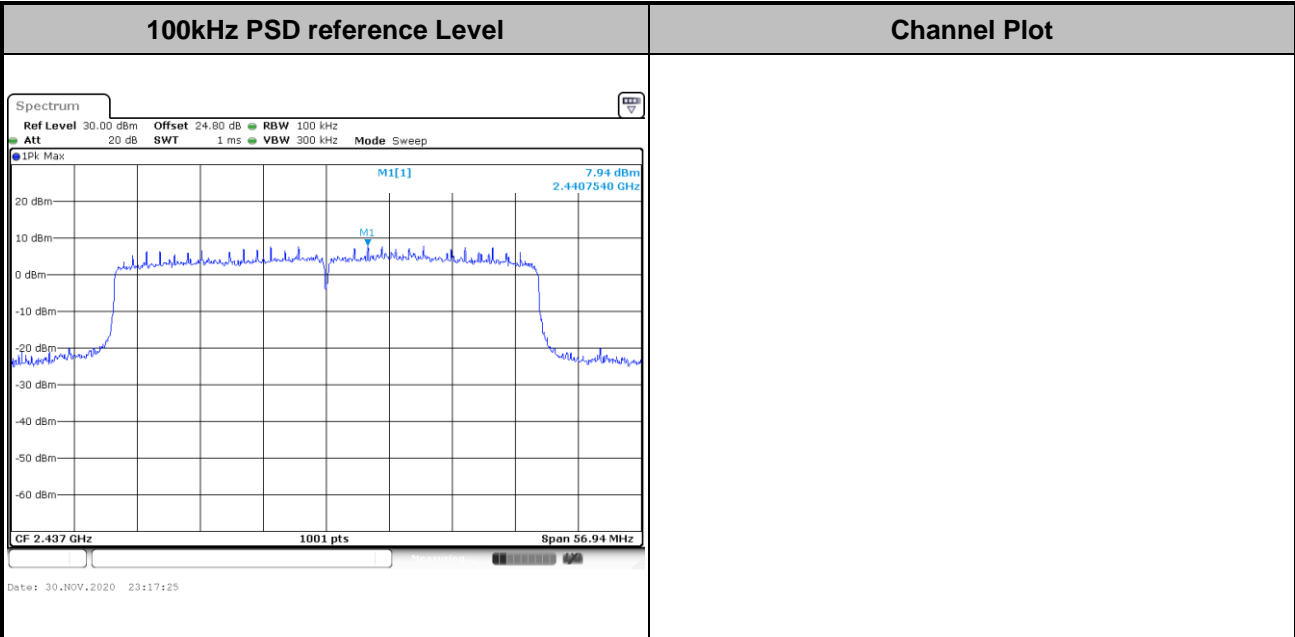


Test Mode : 802.11ax HE40 Full RU      Test Channel : 03



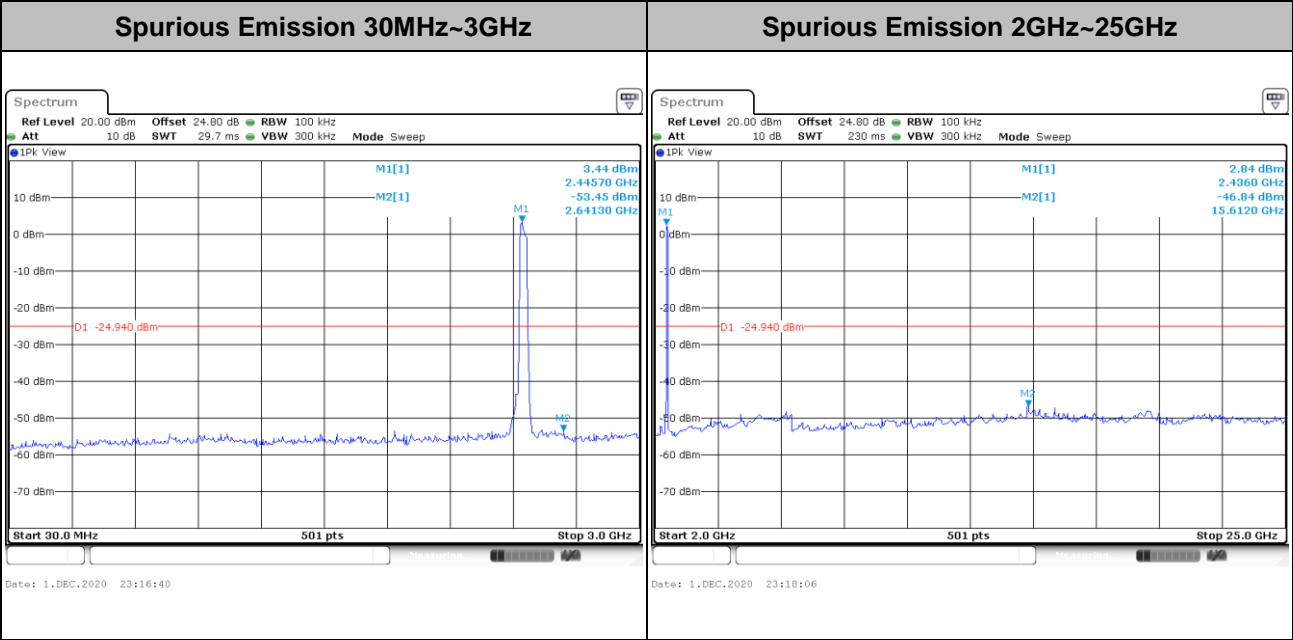
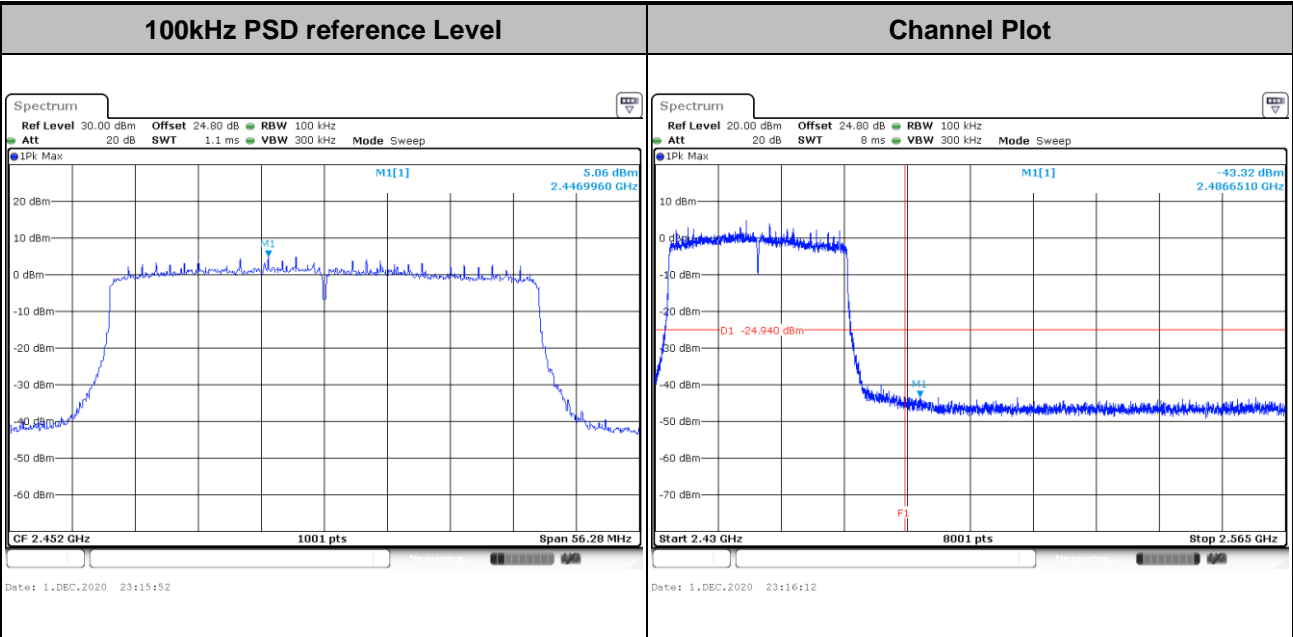


Test Mode :	802.11ax HE40 Full RU	Test Channel :	06
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Test Mode : 802.11ax HE40 Full RU      Test Channel : 09



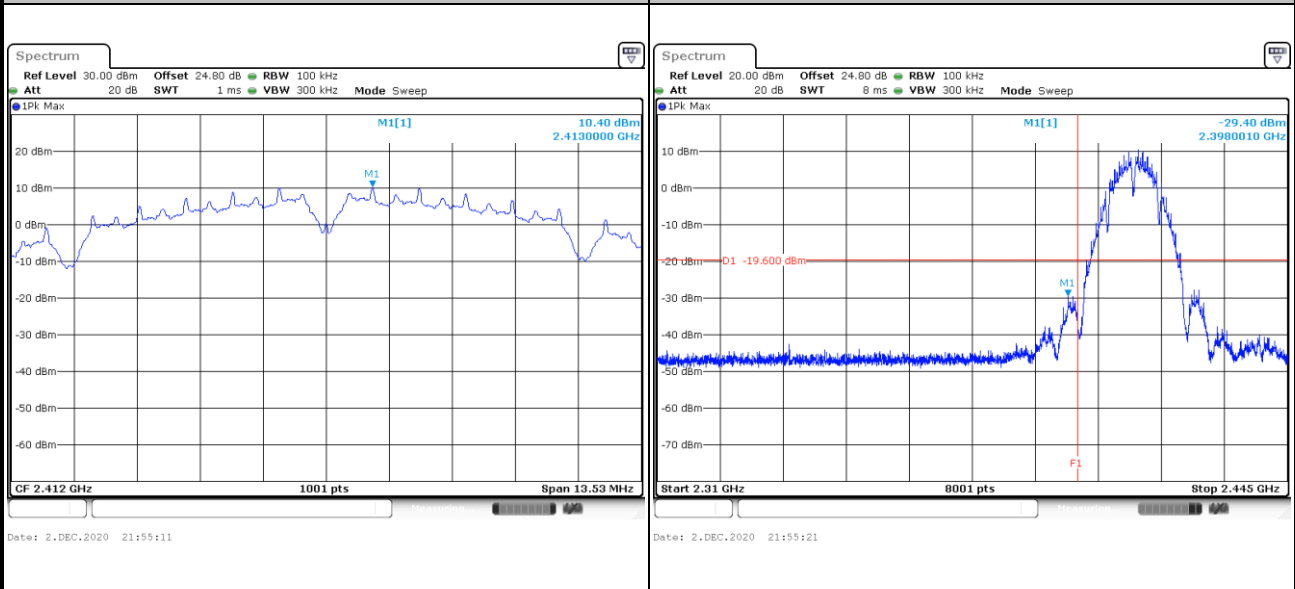


<Camera Mode>

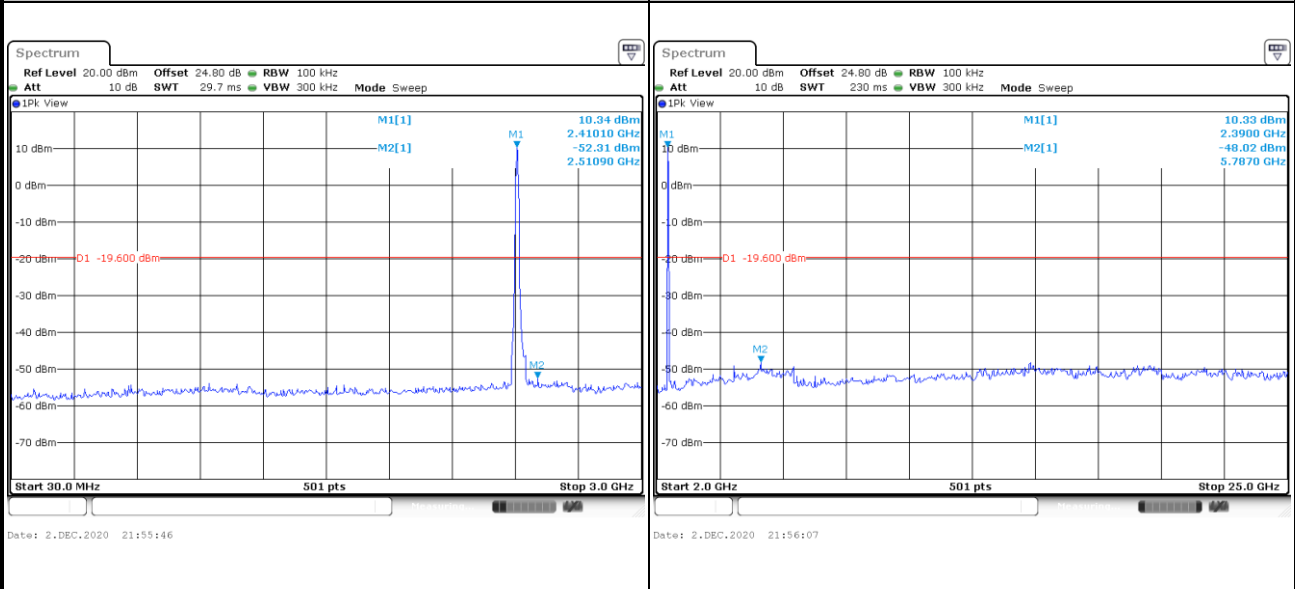
Number of TX = 2, Ant. 6 (Measured)

Test Mode :	802.11b	Test Channel :	01
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<b>100kHz PSD reference Level</b>	<b>Channel Plot</b>
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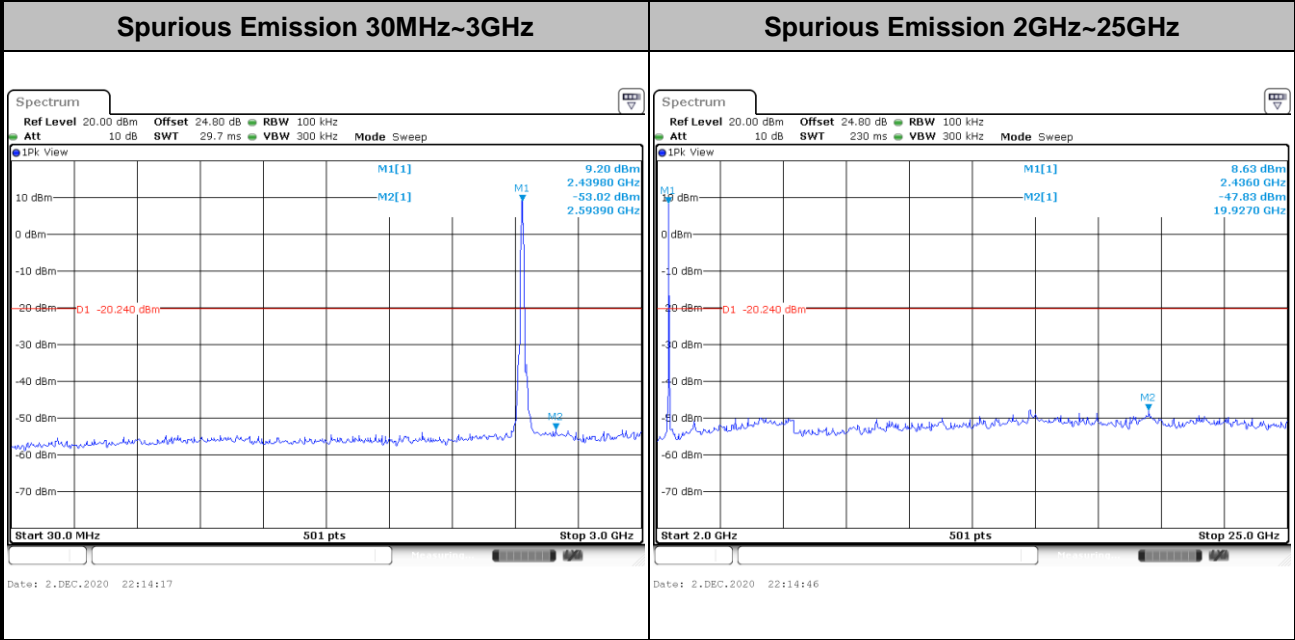
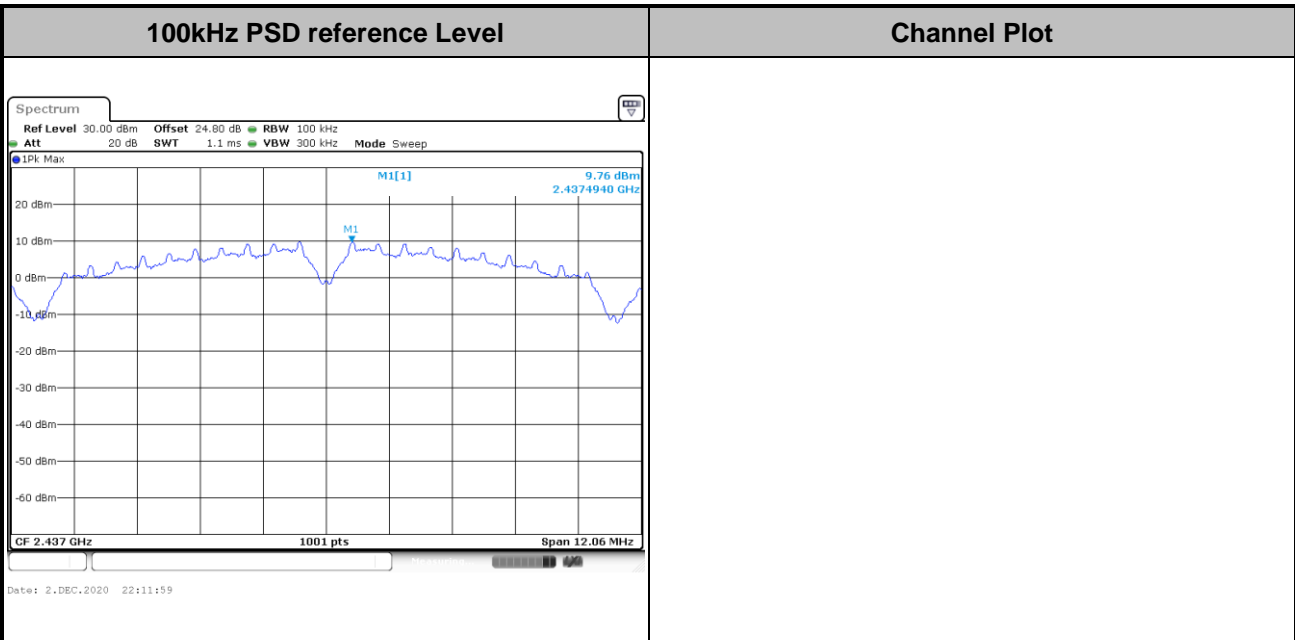


<b>Spurious Emission 30MHz~3GHz</b>	<b>Spurious Emission 2GHz~25GHz</b>
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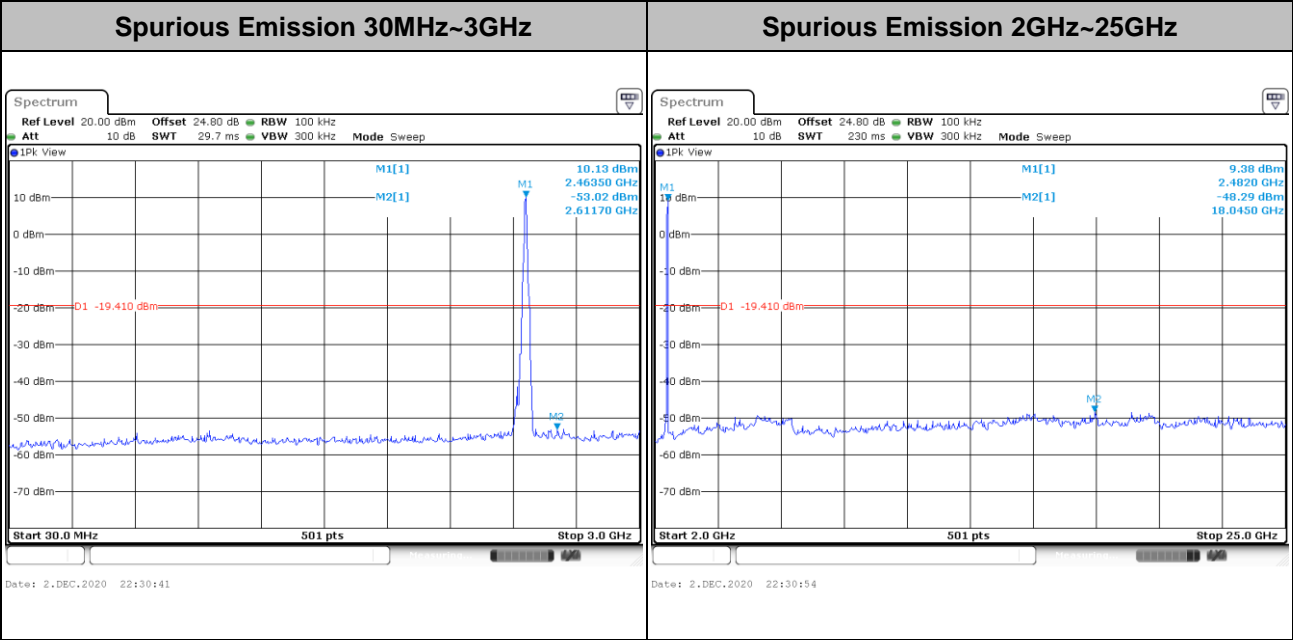
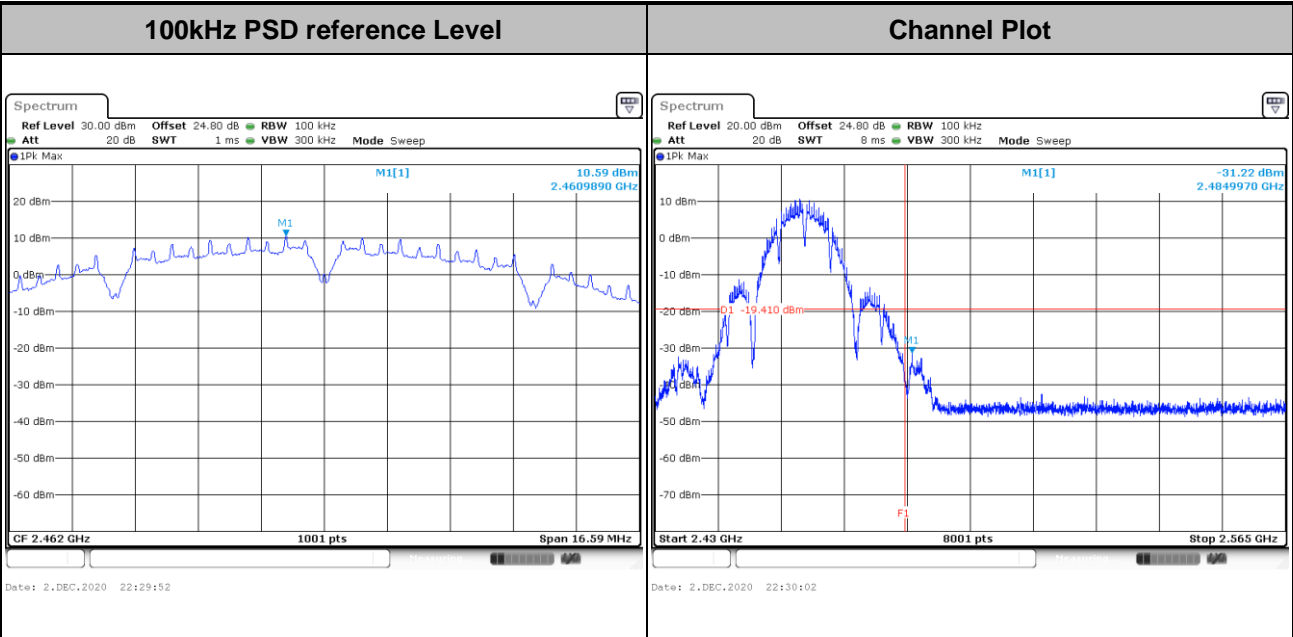


Test Mode :	802.11b	Test Channel :	06
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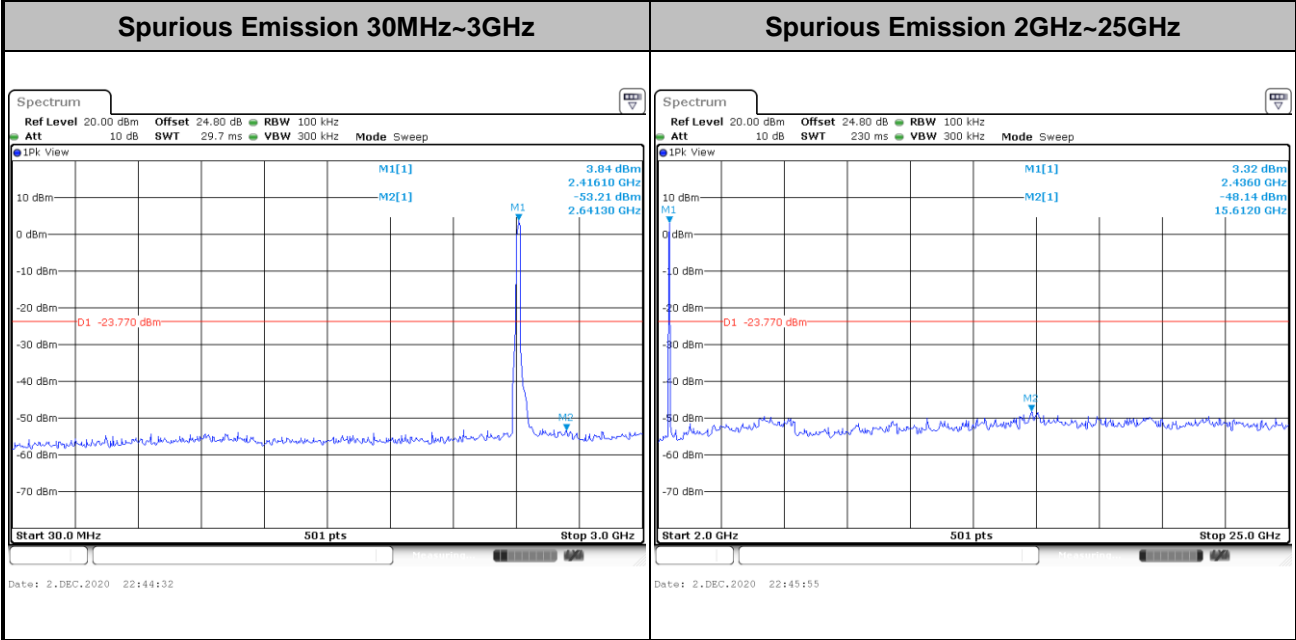
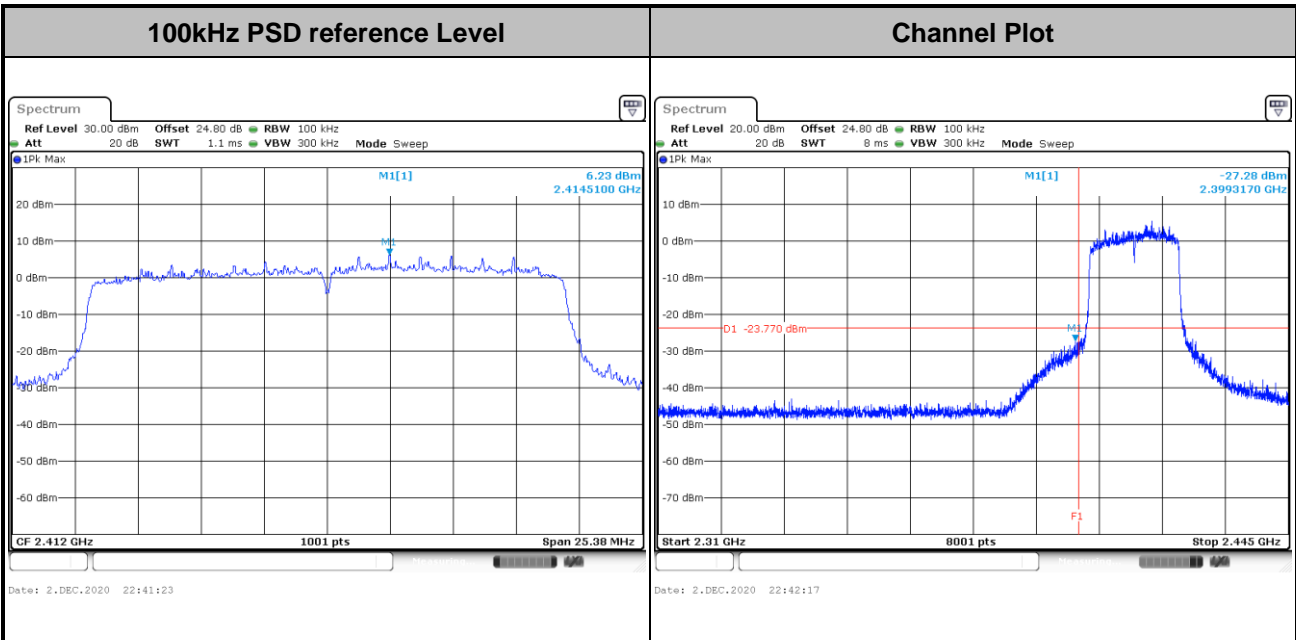
Test Mode :	802.11b	Test Channel :	11
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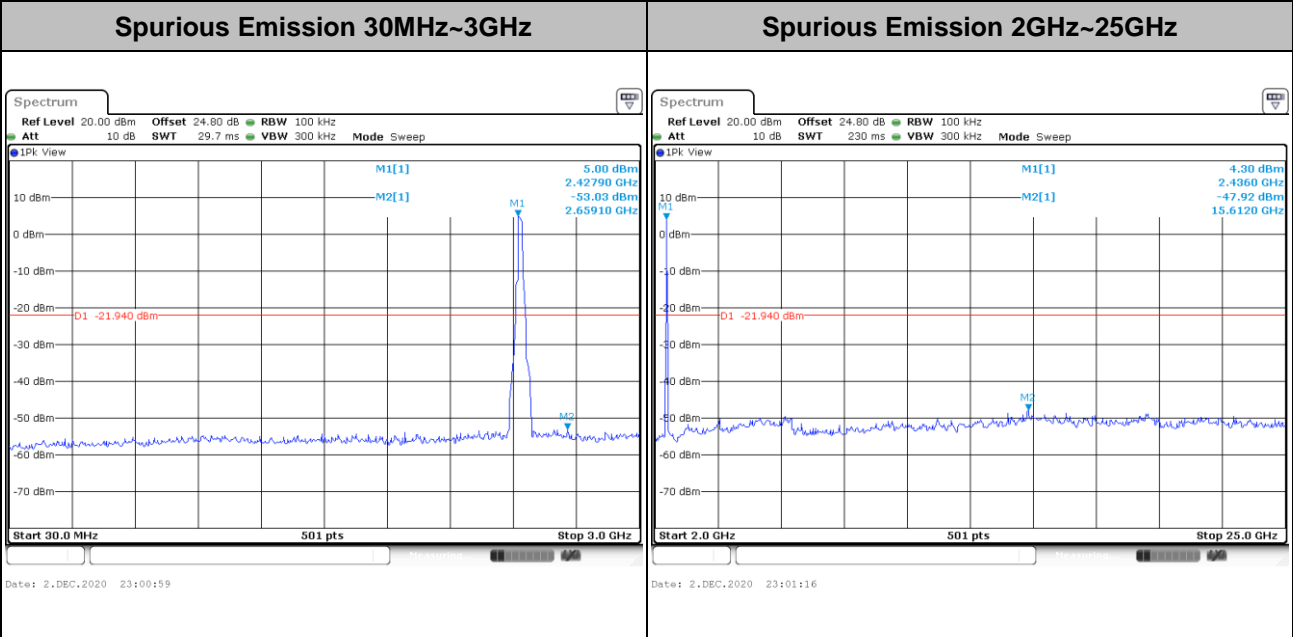
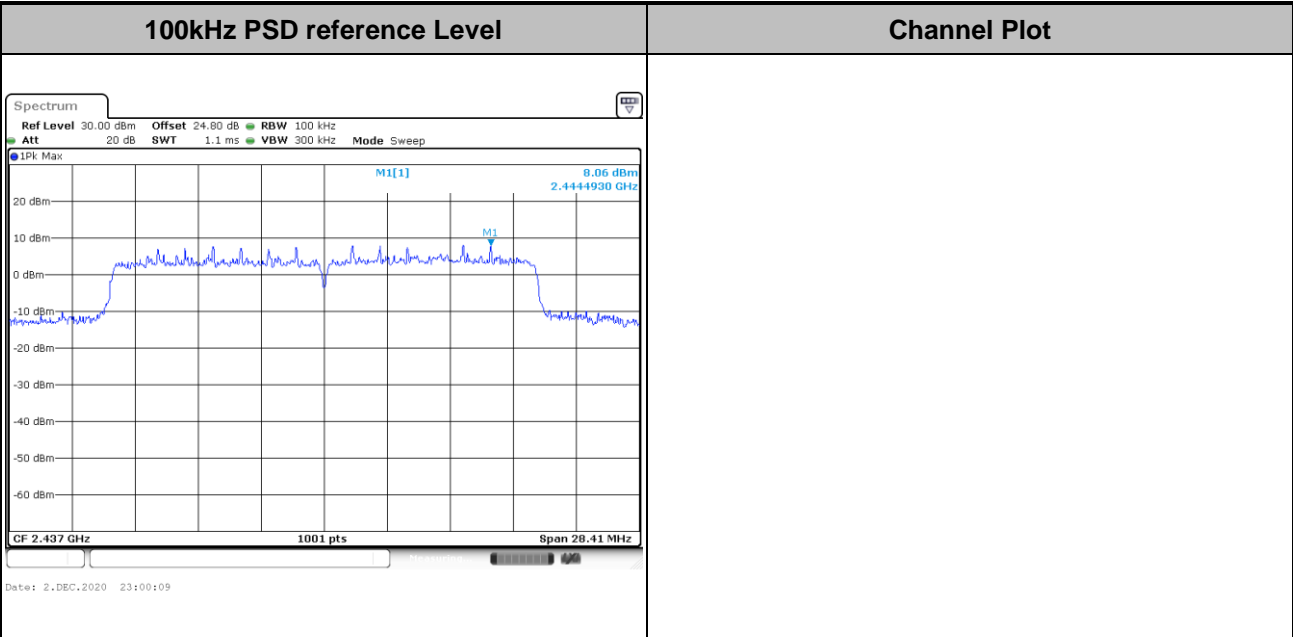


Test Mode : 802.11ax HE20 Full RU      Test Channel : 01



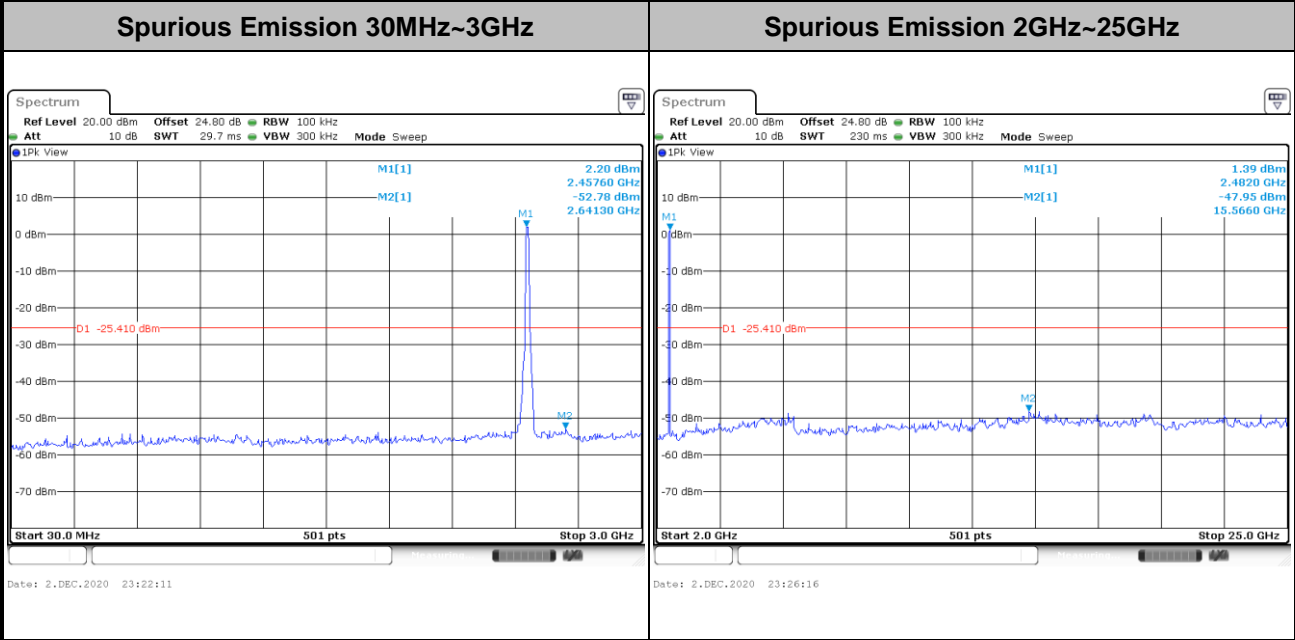
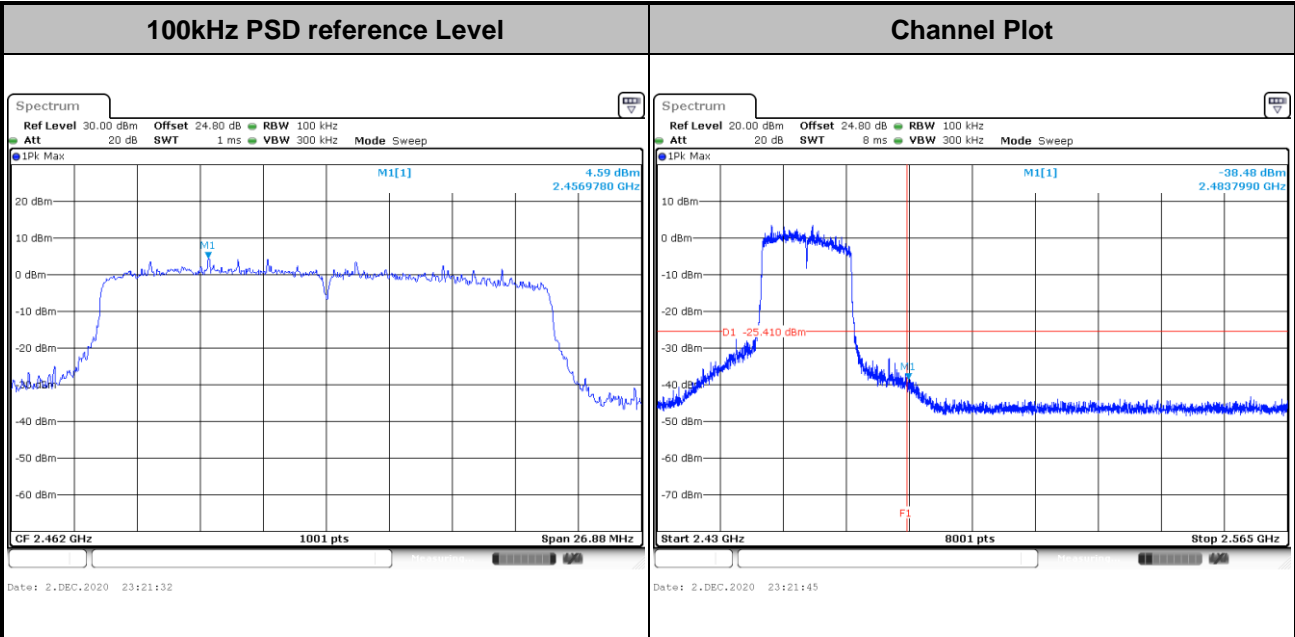


Test Mode :	802.11ax HE20 Full RU	Test Channel :	06
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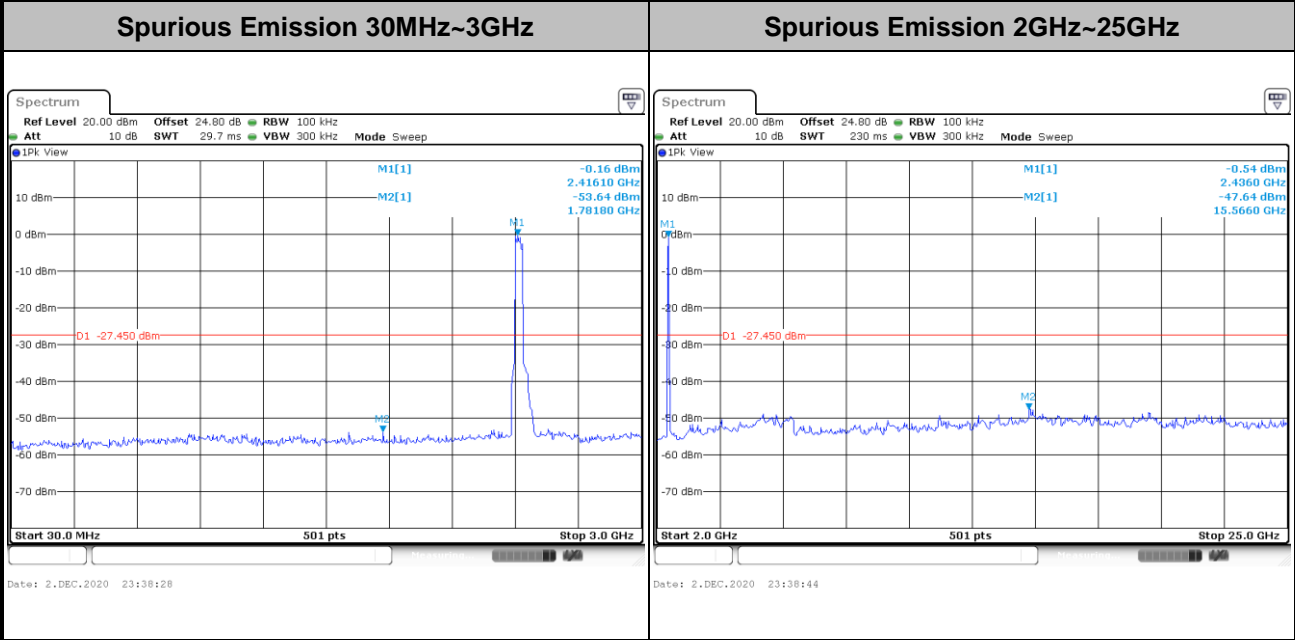
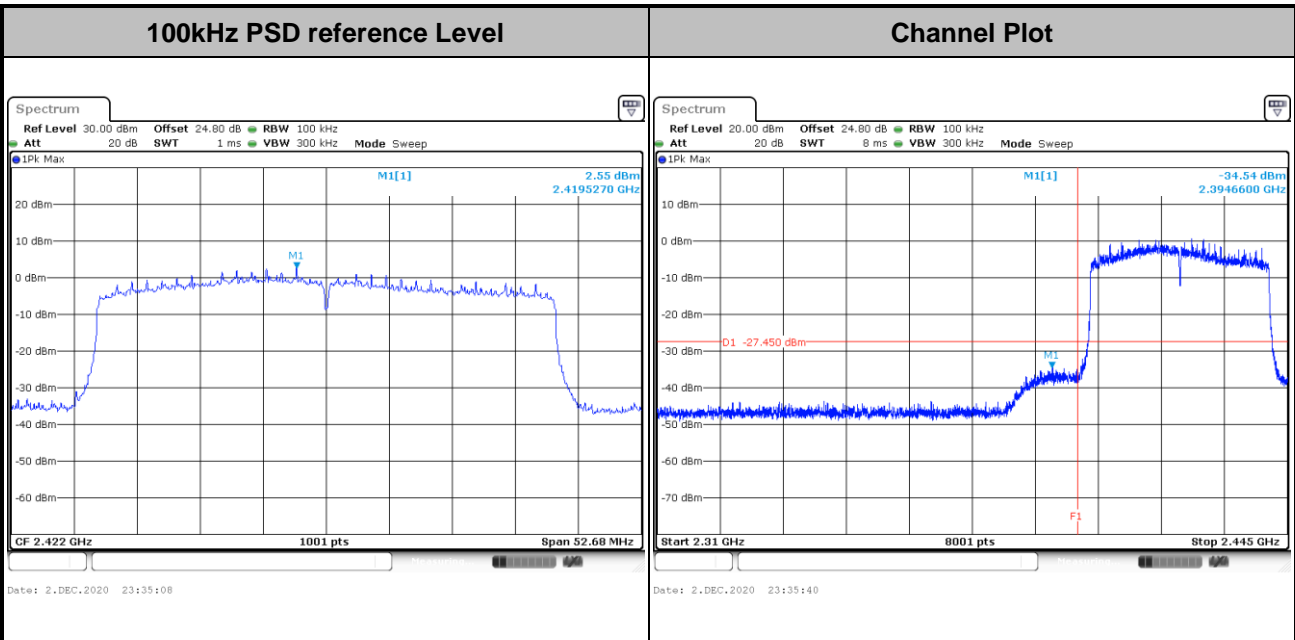


Test Mode :	802.11ax HE20 Full RU	Test Channel :	11
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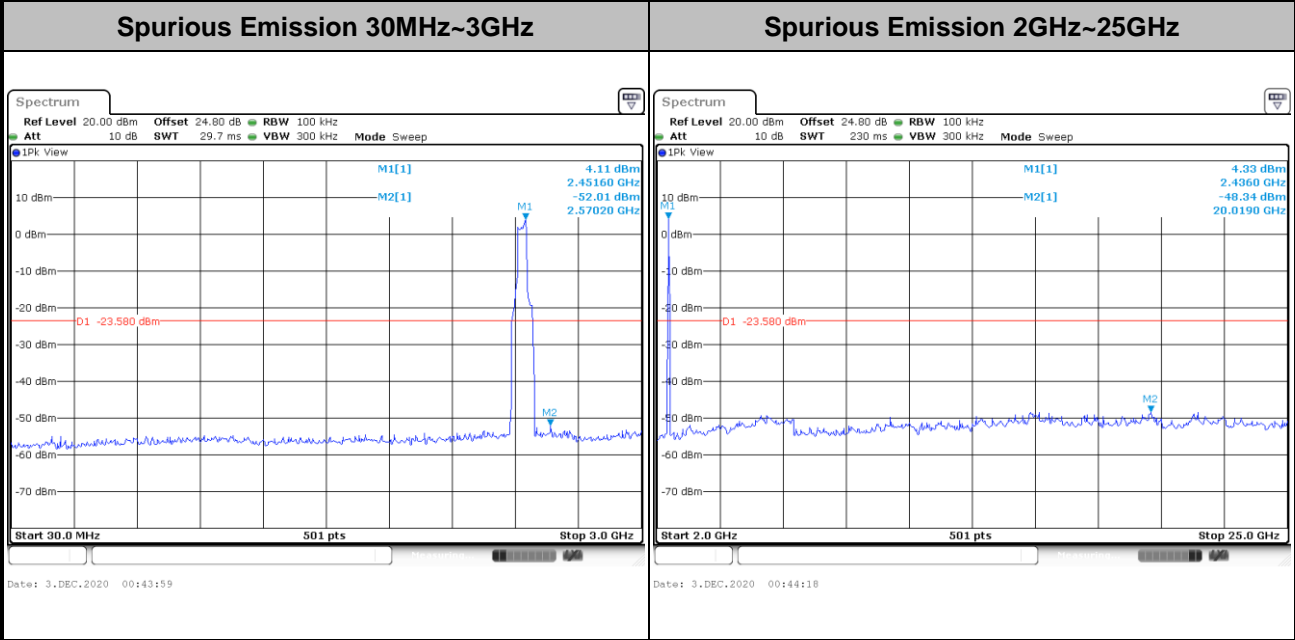
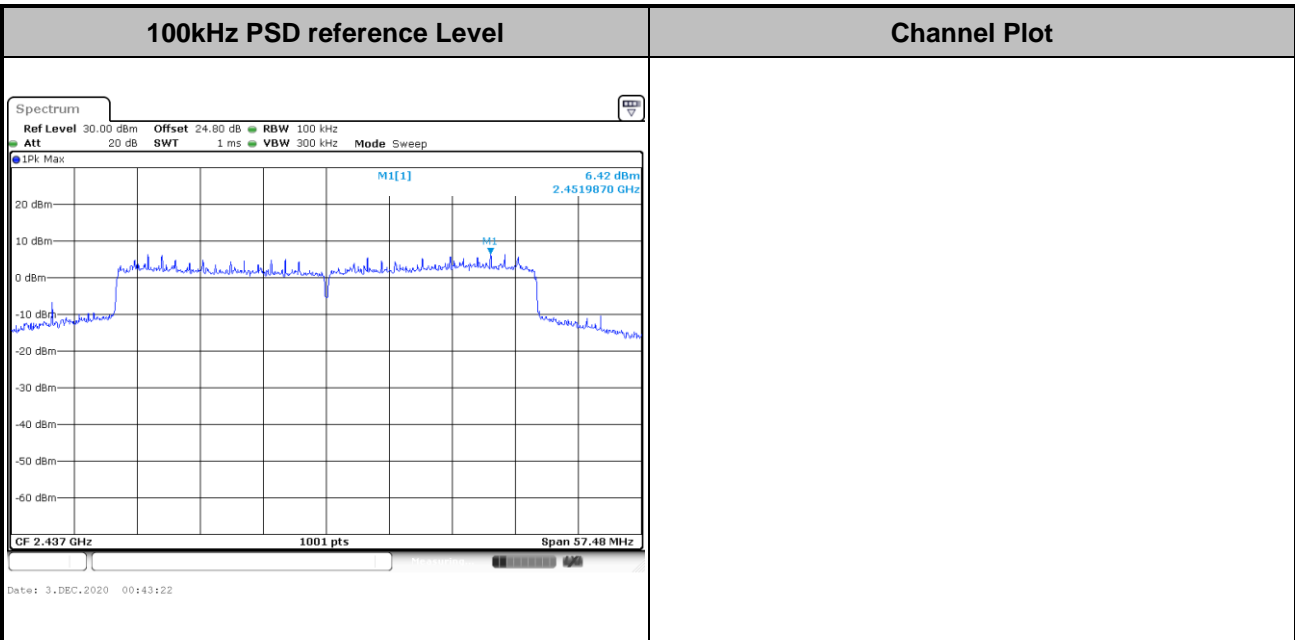


Test Mode : 802.11ax HE40 Full RU      Test Channel : 03



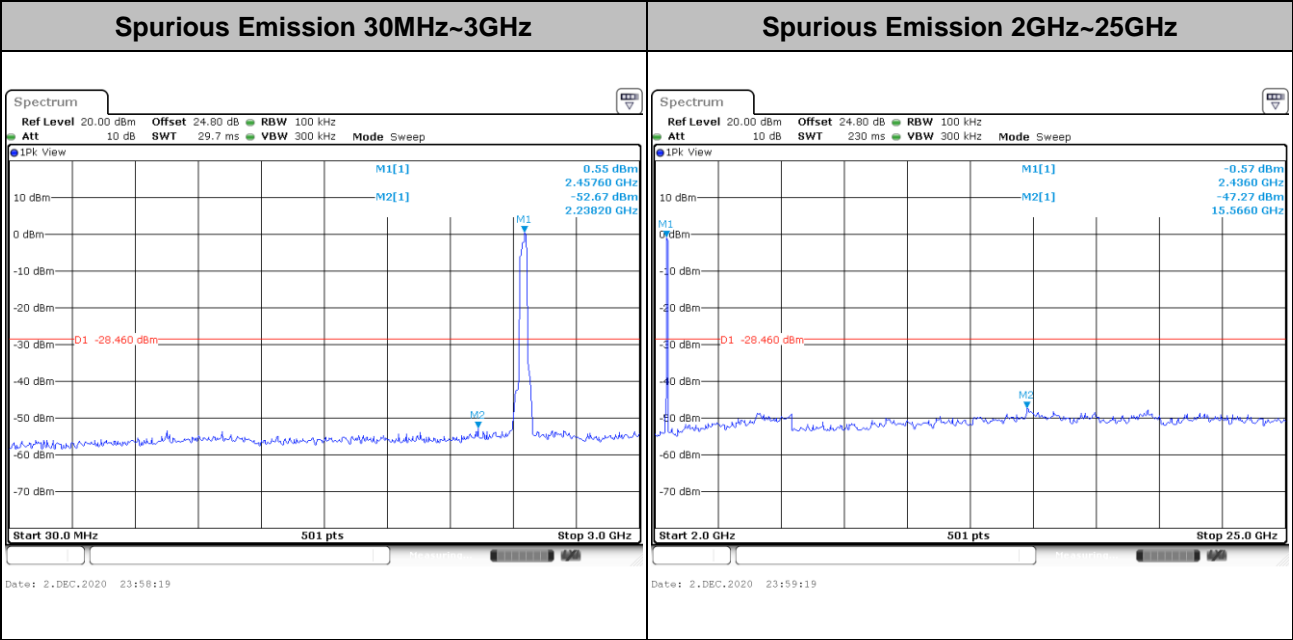
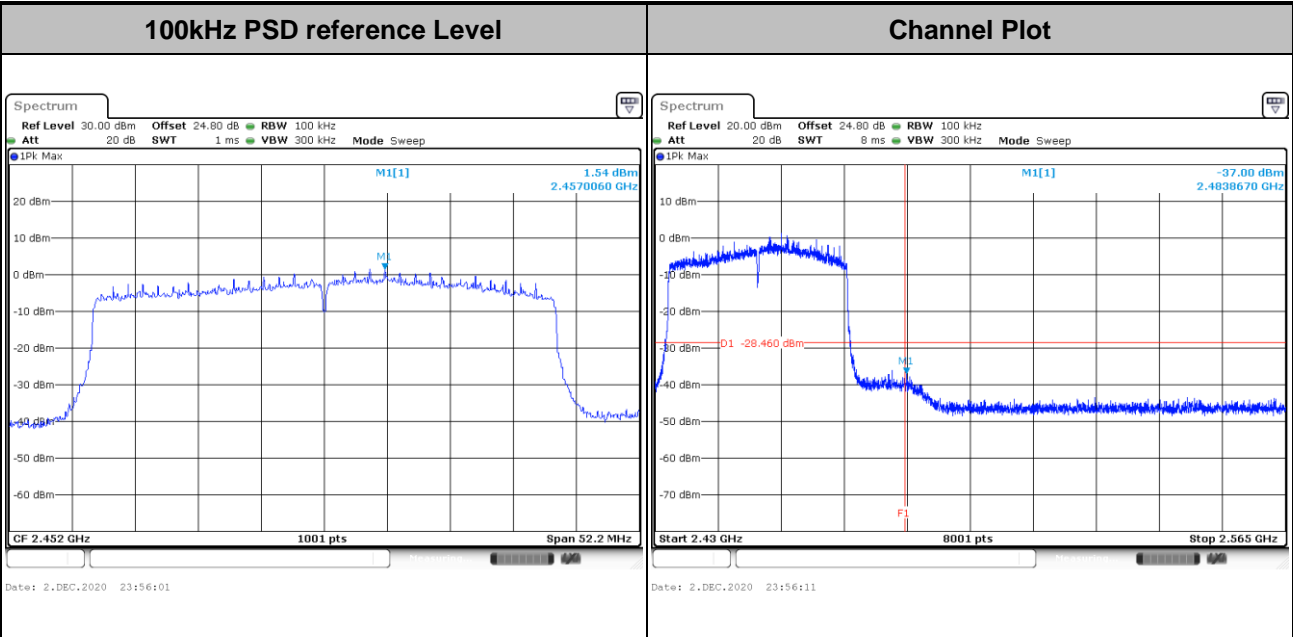


Test Mode :	802.11ax HE40 Full RU	Test Channel :	06
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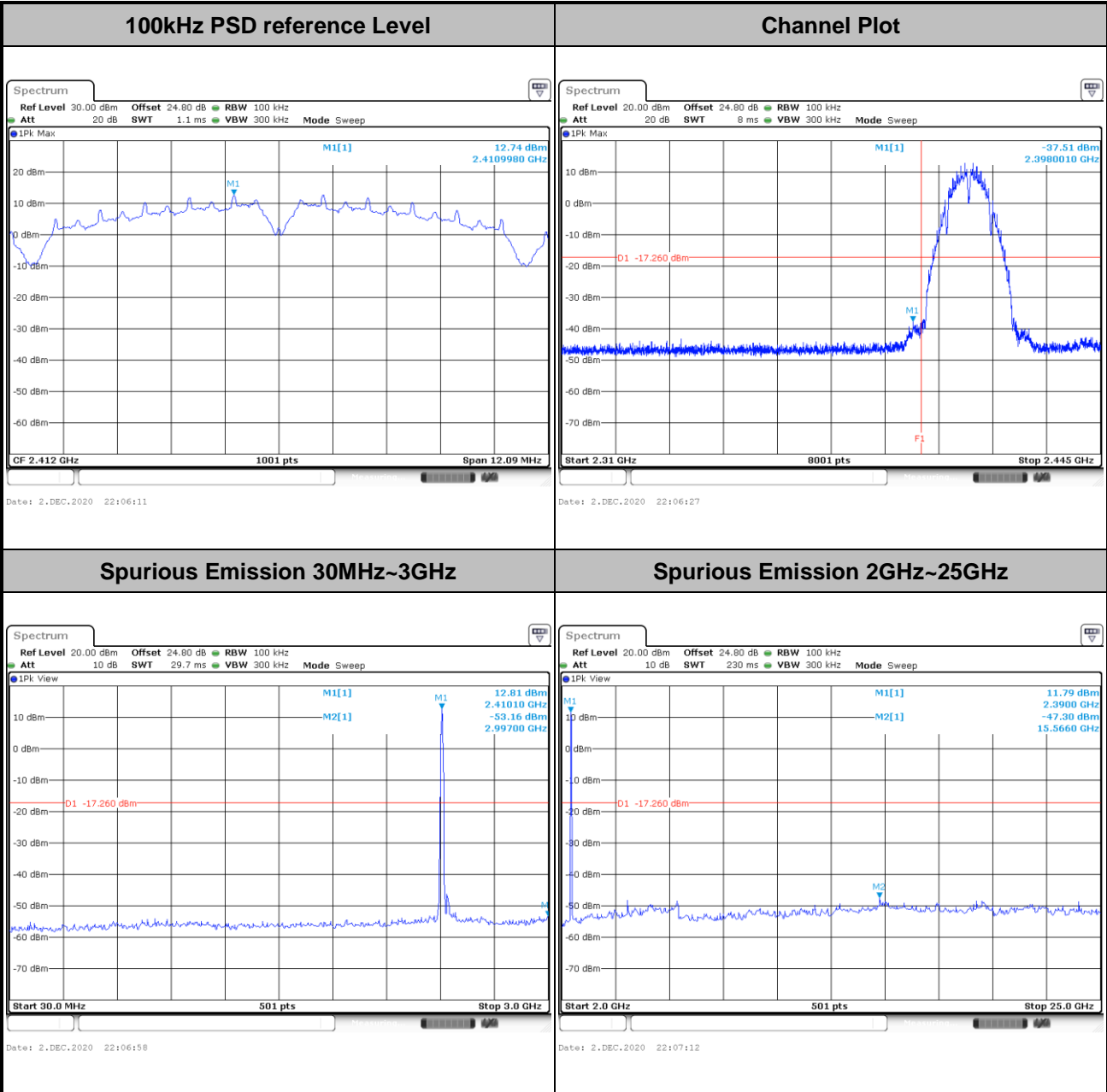
<b>Test Mode :</b> 802.11ax HE40 Full RU	<b>Test Channel :</b> 09
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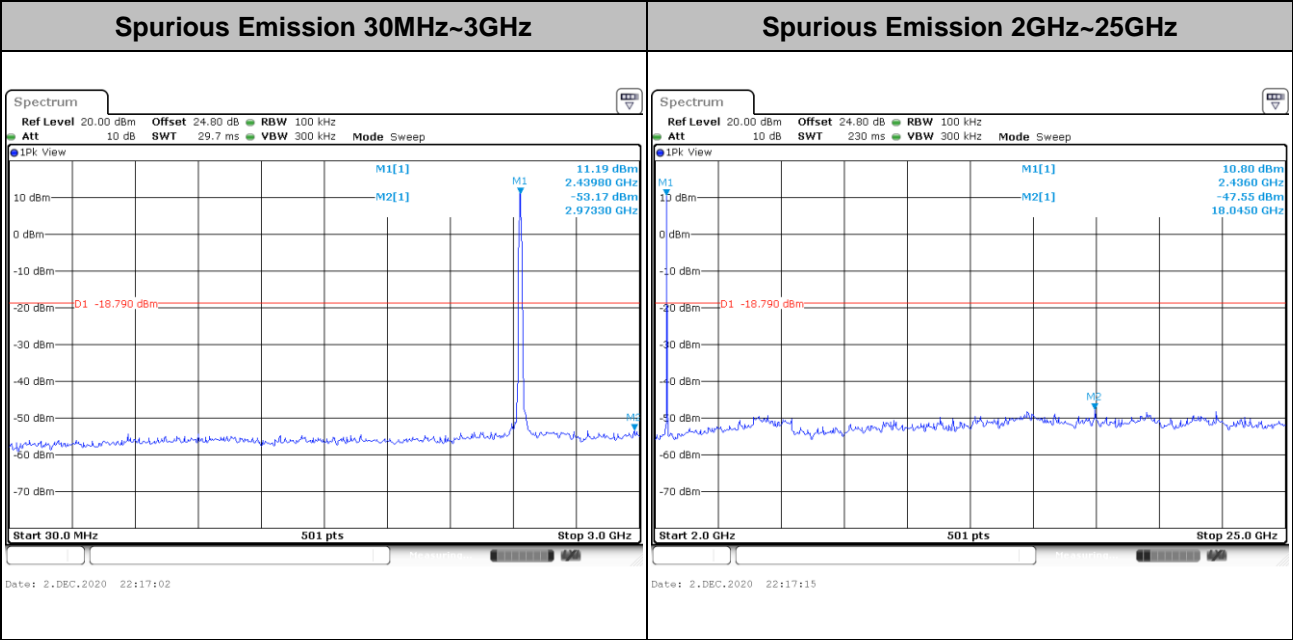
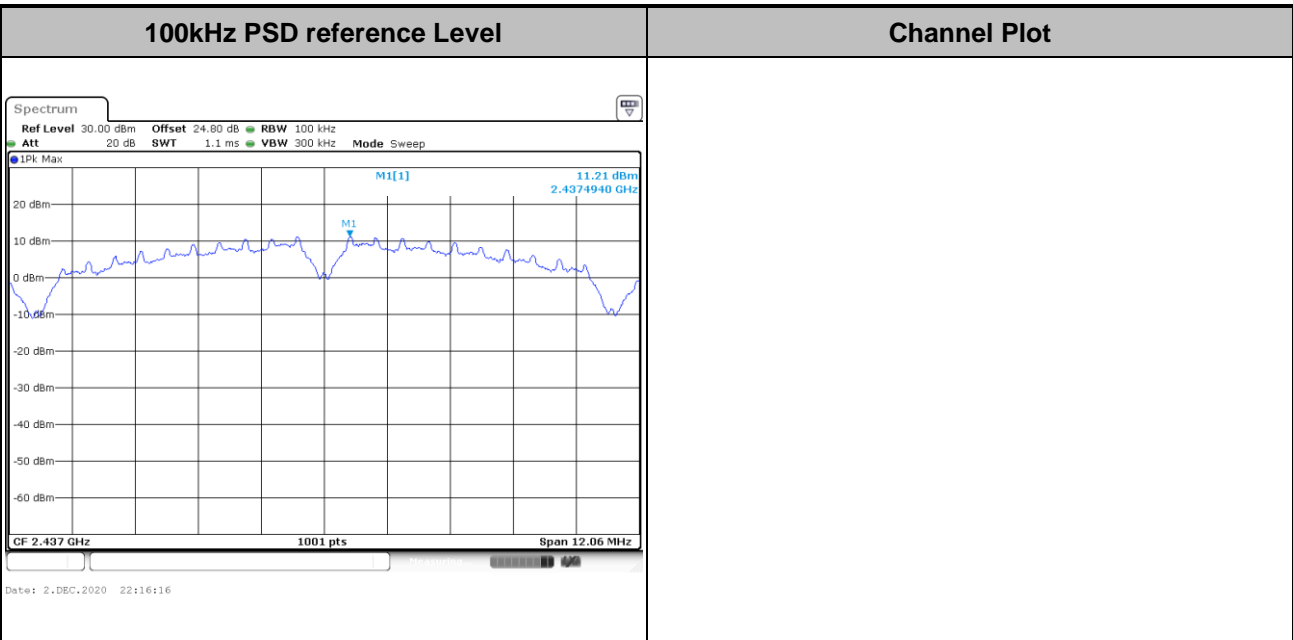
Number of TX = 2, Ant. 5 (Measured)

Test Mode :	802.11b	Test Channel :	01
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Test Mode :	802.11b	Test Channel :	06
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Test Mode :	802.11b	Test Channel :	11
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