



# FCC RADIO TEST REPORT

**FCC ID** : UZ7MC330L  
**Equipment** : Mobile Computer  
**Brand Name** : Zebra  
**Model Name** : MC330L  
**Applicant** : Zebra Technologies Corporation  
1 Zebra Plaza, Holtsville, NY 11742  
**Manufacturer** : Zebra Technologies Corporation  
1 Zebra Plaza, Holtsville, NY 11742  
**Standard** : FCC Part 15 Subpart C §15.247

The product was received on Aug. 12, 2019 and testing was started from Aug. 16, 2019 and completed on Nov. 14, 2019. 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 report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

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.

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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## **History of this test report**



## 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 1.11 dB at 2484.110 MHz
3.6	15.207	AC Conducted Emission	Pass	Under limit 12.94 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: Lucy Wu**



## 1 General Description

### 1.1 Product Feature of Equipment Under Test

Product Feature	
<b>Equipment</b>	Mobile Computer
<b>Brand Name</b>	Zebra
<b>Model Name</b>	MC330L
<b>FCC ID</b>	UZ7MC930P
<b>EUT supports Radios application</b>	NFC WLAN 11a/b/g/n HT20/HT40 WLAN 11ac VHT20/VHT40/VHT80 Bluetooth BR/EDR/LE
<b>HW Version</b>	DV
<b>SW Version_Gun</b>	Android Version 9
<b>SW Version_Brick</b>	Android Version 9
<b>SW Version_Rotate</b>	Android Version 9
<b>FW Version_Gun</b>	Terminal Version: 02-11-08.00-PG-U00-PLT
<b>FW Version_Brick</b>	Terminal Version: 02-11-08.00-PG-U00-PLT
<b>FW Version_Rotate</b>	Terminal Version: 02-11-08.00-PG-U00-PLT
<b>MFD_Gun</b>	01AUG19
<b>MFD_Brick</b>	02AUG19
<b>MFD_Rotate</b>	27JUL19
<b>EUT Stage</b>	Identical Prototype

**Remark:** The above EUT's information was declared by manufacturer.



Specification of Accessories				
Adapter	Brand Name	Zebra	Part Number	PWR-WUA5V12W0US
U cable	Brand Name	Symbol	Model Name	CBL-MC33-USBCHG-01
MC32 1X battery (Inventus)	Brand Name	Symbol	Model Number	82-000011-01
MC32 2X battery (Inventus)	Brand Name	Symbol	Model Number	82-000012-02
MC32 2X battery (TWS)	Brand Name	Symbol	Model Number	82-000012-02
MC33 1X battery (Inventus)	Brand Name	Zebra	Model Number	BT-000338
MC33 2X battery (Inventus)	Brand Name	Zebra	Model Number	BT-000337
MC33 2X battery (TWS)	Brand Name	Zebra	Model Number	BT-000337A
MC33 7000mA 2X (Inventus)	Brand Name	Zebra	Model Number	BT-000375
Holster for MC3XXX Gun configuration	Brand Name	Zebra	Model Number	SG-MC3021212-01R
Rigid holster for MC3XXX Gun configuration	Brand Name	Zebra	Model Number	SG-MC33-RDHLST-01
Holster for MC3XXXX Brick configuration	Brand Name	Zebra	Model Number	11-69293-01R
Rigid holster for MC3XXX Brick configuration	Brand Name	Zebra	Model Number	SG-MC33-RDHLST-01
Lanyard for MC3XXX Brick Configuration	Brand Name	Zebra	Model Number	SG-MC33-LNYDB-01
Protective boot for MC3XXX straight shooter	Brand Name	Zebra	Model Number	SG-MC33-RBTG-01
Protective boot for MC3XXX Turret Cup of Rotate configuration	Brand Name	Zebra	Model Number	SG-MC33-RBTRT-01
Protective boot for MC3XXX Rotate configuration	Brand Name	Zebra	Model Number	SG-MC33-RBTRD-01



## &lt;Sample Information&gt;

Organization / Function / Group	SKU1	SKU2	SKU3	SKU4	SKU5
Phase	DV	DV	DV	DV	DV
<b>Configuration</b>					
Form Factor	Gun	Gun	Gun - Amazon	Gun China	Rotate
Scanner	SE965	SE4850 new 20-4850-IM001R	SE4770	SE4720	SE965
Keypad	Numeric (29Key)	Function Numeric (47Key)	AlphaNum (47Key)	Function Numeric (38Key)	Numeric (47Key)
Tier	Base	Base	Base	Base	Base
NFC	Yes	Yes	Yes	Yes	Yes
Camera	NA	NA	NA	NA	No
Audio Jack (NA)	NA	NA	NA	NA	No
Back Hsg	Gun 18D	Gun 18D	Gun 18D	Gun 18D	Rotate Head
Screen Protector	No	Yes	Yes	No	No
RFID Tag	Yes	Yes	Yes	Yes	No
Hand strap	No	Yes	Yes	No	No
USB Charge cable in box	No	No	No	Yes	No
Wal wart adaptor	No	No	No	Yes	No
PCB	Tripod	Tripod	Tripod	Tripod	Tripod
DRAM/eMMIC	4/32 GB MLC	4/32 GB MLC	4/32 GB MLC	4/16 GB MLC	4/32 GB MLC
DRAM/eMMC Mfr main source	Hynix/Hynix	Hynix/Hynix	Hynix/Hynix	Hynix/Hynix	Hynix/Hynix



Organization / Function / Group	SKU6	SKU7	SKU8	SKU9	SKU10
Phase	DV	DV	DV	DV	DV
<b>Configuration</b>					
<b>Form Factor</b>	Straight (S)	Straight (S)	Straight (S) China	Straight (L)	Straight(45)
<b>Scanner</b>	SE965	SE4770	SE4720	SE4850 new 20-4850-IM001R	SE4770
<b>Keypad</b>	AlphaNum (47Key)	Function Numeric (38Key)	Function Numeric (38Key)	Numeric (29Key)	Function Numeric (38Key)
<b>Tier</b>	Base + Camera	Base + Camera	Base	Base + Camera	Base + Camera
<b>NFC</b>	Yes	Yes	Yes	Yes	Yes
<b>Camera</b>	Yes	Yes	No	Yes	Yes
<b>Audio Jack (NA)</b>	No	No	No	No	No
<b>Back Hsg</b>	22 Deg ST	22 Deg ST	22 Deg ST	18 deg ST	45 deg ST
<b>Screen Protector</b>	No	No	No	Yes	Yes
<b>RFID Tag</b>	No	No	No	No	No
<b>Hand strap</b>	Yes	No	No	No	Yes
<b>USB Charge cable in box</b>	No	No	Yes	No	No
<b>Wal wart adaptor</b>	No	No	Yes	No	No
<b>PCB</b>	Tripod	Tripod	Tripod	Tripod	Tripod
<b>DRAM/eMMIC</b>	4/32 GB MLC	4/32 GB MLC	4/16 GB MLC	4/32 GB MLC	4/32 GB MLC
<b>DRAM/eMMC Mfr main source</b>	Hynix/Hynix	Hynix/Hynix	Hynix/Hynix	Hynix/Hynix	Hynix/Hynix



## 1.2 Product Specification of Equipment Under Test

Standards-related Product Specification	
<b>Tx/Rx Channel Frequency Range</b>	2412 MHz ~ 2462 MHz
<b>Maximum (Average) Output Power to antenna &lt;CDD Mode&gt;</b>	<b>&lt;Ant. 1&gt;</b> 802.11b : 19.00 dBm (0.0794 W) 802.11g : 18.80 dBm (0.0759 W) 802.11n HT20 : 18.70 dBm (0.0741 W) 802.11n HT40 : 15.40 dBm (0.0347 W) 802.11ac VHT20 : 18.60 dBm(0.0724 W) 802.11ac VHT40 : 15.30 dBm(0.0339 W) <b>&lt;Ant. 2&gt;</b> 802.11b : 18.90 dBm (0.0776 W) 802.11g : 18.80 dBm (0.0759 W) 802.11n HT20 : 18.80 dBm (0.0759 W) 802.11n HT40 : 17.10 dBm (0.0513 W) 802.11ac VHT20 : 18.70 dBm(0.0741 W) 802.11ac VHT40 : 17.00 dBm(0.0501 W) <b>&lt;MIMO Ant. 1 + 2&gt;</b> 802.11b : 23.81 dBm (0.2404 W) 802.11g : 23.11 dBm (0.2046 W) 802.11n HT20 : 23.01 dBm (0.2000 W) 802.11n HT40 : 18.51 dBm (0.0710 W) 802.11ac VHT20 : 22.86 dBm(0.1932 W) 802.11ac VHT40 : 18.46 dBm(0.0701 W)
<b>Maximum (Average) Output Power to antenna &lt;TXBF Mode&gt;</b>	<b>&lt;MIMO Ant. 1 + 2&gt;</b> 802.11ac VHT20 : 21.67 dBm(0.1469 W) 802.11ac VHT40 : 17.21 dBm(0.0526 W)
<b>99% Occupied Bandwidth &lt;CDD Mode&gt;</b>	<b>&lt;Ant. 1&gt;</b> 802.11b : 13.14MHz 802.11g : 16.98MHz 802.11n HT20 : 18.08MHz 802.11n HT40 : 36.76MHz <b>&lt;Ant. 2&gt;</b> 802.11b : 13.04MHz 802.11g : 17.23MHz 802.11n HT20 : 18.18MHz 802.11n HT40 : 36.76MHz <b>&lt;MIMO Ant. 1&gt;</b> 802.11b : 13.74MHz 802.11g : 18.13MHz 802.11n HT20 : 18.68MHz 802.11n HT40 : 36.66MHz <b>&lt;MIMO Ant. 2&gt;</b> 802.11b : 14.04MHz 802.11g : 19.88MHz 802.11n HT20 : 20.53MHz 802.11n HT40 : 36.66MHz



Standards-related Product Specification														
<b>99% Occupied Bandwidth &lt;TXBF Mode&gt;</b>	<b>&lt;MIMO Ant. 1&gt;</b> 802.11n VHT20 : 18.08MHz 802.11n VHT40 : 36.76MHz <b>&lt;MIMO Ant. 2&gt;</b> 802.11n VHT20 : 19.38MHz 802.11n VHT40 : 36.56MHz													
<b>Antenna Type / Gain</b>	<Ant. 1> : PIFA Antenna with gain 3.40 dBi <Ant. 2> : PIFA Antenna with gain 3.01 dBi													
<b>Type of Modulation</b>	802.11b : DSSS (DBPSK / DQPSK / CCK) 802.11a/g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) 802.11ac : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)													
<b>Antenna Function Description</b>	<table border="1"><thead><tr><th></th><th>Ant. 1</th><th>Ant. 2</th></tr></thead><tbody><tr><td>802.11 b/g/n/ac</td><td>V</td><td>V</td></tr><tr><td>802.11 b/g/n/ac MIMO</td><td>V</td><td>V</td></tr><tr><td>802.11 ac TXBF</td><td>V</td><td>V</td></tr></tbody></table>			Ant. 1	Ant. 2	802.11 b/g/n/ac	V	V	802.11 b/g/n/ac MIMO	V	V	802.11 ac TXBF	V	V
	Ant. 1	Ant. 2												
802.11 b/g/n/ac	V	V												
802.11 b/g/n/ac MIMO	V	V												
802.11 ac TXBF	V	V												

**Note:** MIMO Ant. 1+2 is a calculated result from sum of the power MIMO Ant. 1 and MIMO Ant. 2.

### 1.3 Modification of EUT

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



## 1.4 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. 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>
	03CH12-HY

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

FCC designation No.: TW1190 and TW0007

## 1.5 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. 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 (CDD Mode: Y plane for Ant. 1 and Ant. 2, Z plane for MIMO Ant. 1+2; TXBF Mode: Y plane) 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.

### Single Antenna

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

### MIMO Antenna

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

### <TXBF Mode>

Modulation	Data Rate
802.11ac VHT20	MCS0
802.11ac VHT40	MCS0

### Test Cases

AC Conducted Emission	Mode 1: WLAN (2.4GHz) Link + Bluetooth Link + Color bar + MC33 7000mA 2X (Inventus) + USB Data Link with Notebook (eMMC to Notebook) for SKU 5
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### Remark:

1. Data Linking with Notebook means data application transferred mode between EUT and Notebook.
2. For Radiated Test Cases, the tests were performed with MC33 2X battery (Inventus) and SKU 5.



## &lt;CDD Mode&gt;

&lt;Ant. 1&gt;

802.11b RF Avg Output Power (dBm)									
Power vs. Channel				Power vs Data Rate					
Channel	Frequency (MHz)	Data Rate (bps)		Channel	Data Rate (bps)				
		1M			2M	5.5M			
Duty Cycle (%)		100.00		CH 01	18.80	18.70			
CH 01	2412	19.00							
CH 06	2437	19.00							
CH 11	2462	18.90							

802.11g RF Avg Output Power (dBm)						
Power vs. Channel			Power vs Data Rate			
Channel	Frequency (MHz)	Data Rate (bps)	Channel	Data Rate (bps)		
				9Mbps	12Mbps	18Mbps
Duty Cycle (%)		94.86	CH 06	24Mbps	36Mbps	48Mbps
CH 06	2437	18.80		54Mbps		
CH 11	2462	16.40				

802.11n HT20 RF Avg Output Power (dBm)						
Power vs. Channel			Power vs Data Rate			
Channel	Frequency (MHz)	MCS Index	Channel	MCS Index		
				MCS 1	MCS 2	MCS 3
Duty Cycle (%)		95.47	CH 06	MCS 4	MCS 5	MCS 6
CH 01	2412	17.30		MCS 7		
CH 06	2437	18.70				
CH 11	2462	15.80				



802.11n HT40 RF Avg Output Power (dBm)										
Power vs. Channel			Power vs Data Rate							
Channel	Frequency (MHz)	MCS Index	Channel	MCS Index						
		MCS 0		MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7
Duty Cycle (%)	89.27	12.60	CH 06	15.00	15.00	14.90	15.00	15.10	15.00	15.00
CH 03	2422	12.60								
CH 06	2437	15.40								
CH 09	2452	13.50								

802.11ac VHT20 RF Avg Output Power (dBm)											
Power vs. Channel			Power vs Data Rate								
Channel	Frequency (MHz)	MCS Index	Channel	MCS Index							
		MCS 0		MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7	MCS 8
Duty Cycle (%)	95.31	17.20	CH 06	18.50	18.30	18.30	18.50	18.50	18.50	18.50	18.50
CH 01	2412	17.20									
CH 06	2437	18.60									
CH 11	2462	15.70									

802.11ac VHT40 RF Avg Output Power (dBm)												
Power vs. Channel			Power vs Data Rate									
Channel	Frequency (MHz)	MCS Index	Channel	MCS Index								
		MCS 0		MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7	MCS 8	MCS 9
Duty Cycle (%)	90.87	12.40	CH 06	14.90	14.90	14.80	14.90	15.00	14.90	14.90	15.20	15.10
CH 03	2422	12.40										
CH 06	2437	15.30										
CH 09	2452	13.40										



&lt;Ant. 2&gt;

802.11b RF Avg Output Power (dBm)									
Power vs. Channel				Power vs Data Rate					
Channel	Frequency (MHz)	Data Rate (bps)		Channel	Data Rate (bps)				
		1M			2M	5.5M			
Duty Cycle (%)		100.00		CH 06	18.60	18.60			
CH 01	2412	18.70							
CH 06	2437	18.90							
CH 11	2462	18.80							

802.11g RF Avg Output Power (dBm)							
Power vs. Channel			Power vs Data Rate				
Channel	Frequency (MHz)	Data Rate (bps)	Channel	Data Rate (bps)			
				9Mbps	12Mbps	18Mbps	24Mbps
Duty Cycle (%)		95.31	CH 06	36Mbps	48Mbps	54Mbps	
CH 06	2437	18.80		18.70	18.70	18.60	18.70
CH 11	2462	16.10		18.60	18.60	18.50	18.60

802.11n HT20 RF Avg Output Power (dBm)							
Power vs. Channel			Power vs Data Rate				
Channel	Frequency (MHz)	MCS Index	Channel	MCS Index			
		MCS 0		MCS 1	MCS 2	MCS 3	MCS 4
Duty Cycle (%)		95.47	CH 06	MCS 5	MCS 6	MCS 7	
CH 01	2412	17.40		18.70	18.30	18.30	18.70
CH 06	2437	18.80		18.50	18.50	18.50	18.50
CH 11	2462	14.30					



802.11n HT40 RF Avg Output Power (dBm)										
Power vs. Channel			Power vs Data Rate							
Channel	Frequency (MHz)	MCS Index	Channel	MCS Index						
		MCS 0		MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7
Duty Cycle (%)	89.50									
CH 03	2422	13.40	CH 06	16.70	16.80	16.70	16.70	16.70	16.60	16.60
CH 06	2437	17.10								
CH 09	2452	14.70								

802.11ac VHT20 RF Avg Output Power (dBm)											
Power vs. Channel			Power vs Data Rate								
Channel	Frequency (MHz)	MCS Index	Channel	MCS Index							
		MCS 0		MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7	MCS 8
Duty Cycle (%)	95.09										
CH 01	2412	17.30	CH 06	18.60	18.20	18.20	18.60	18.40	18.40	18.40	18.40
CH 06	2437	18.70									
CH 11	2462	14.20									

802.11ac VHT40 RF Avg Output Power (dBm)												
Power vs. Channel			Power vs Data Rate									
Channel	Frequency (MHz)	MCS Index	Channel	MCS Index								
		MCS 0		MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7	MCS 8	MCS 9
Duty Cycle (%)	91.26											
CH 03	2422	13.30	CH 06	16.60	16.70	16.60	16.60	16.50	16.50	16.50	16.60	16.60
CH 06	2437	17.00										
CH 09	2452	14.50										



## MIMO &lt;Ant. 1+2&gt;

802.11b RF Avg Output Power (dBm)						
Power vs. Channel				Power vs Data Rate		
Channel	Frequency (MHz)	Data Rate (bps)		Channel	Data Rate (bps)	
		1M			2M	5.5M
CH 01	2412	23.71		CH 06	23.61	23.77
CH 06	2437	23.81				
CH 11	2462	23.56				

802.11g RF Avg Output Power (dBm)							
Power vs. Channel			Power vs Data Rate				
Channel	Frequency (MHz)	Data Rate (bps)	Channel	Data Rate (bps)			
				9Mbps	12Mbps	18Mbps	24Mbps
CH 06	2437	23.11	CH 06	23.06	23.06	22.96	22.76
CH 11	2462	17.46		23.06	23.06	22.96	23.06

802.11n HT20 RF Avg Output Power (dBm)							
Power vs. Channel			Power vs Data Rate				
Channel	Frequency (MHz)	MCS Index	Channel	MCS Index			
				MCS1	MCS2	MCS3	MCS4
CH 01	2412	19.71	CH 06	22.91	22.81	22.76	22.91
CH 06	2437	23.01		22.91	22.96	22.91	22.91
CH 11	2462	18.31		22.91	22.91	22.91	22.91



802.11n HT40 RF Output Power (dBm)										
Power vs. Channel			Power vs Data Rate							
Channel	Frequency (MHz)	MCS Index	Channel	MCS Index						
		MCS0		MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 03	2422	14.82	CH 06	17.96	18.06	18.01	18.06	18.06	18.06	18.01
CH 06	2437	18.51		17.96	18.06	18.01	18.06	18.06	18.06	18.01
CH 09	2452	15.56								

802.11ac VHT20 RF Avg Output Power (dBm)											
Power vs. Channel			Power vs Data Rate								
Channel	Frequency (MHz)	MCS Index	Channel	MCS Index							
		MCS 0		MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7	MCS 8
CH 01	2412	19.46	CH 06	22.81	22.71	22.66	22.81	22.86	22.81	22.81	22.81
CH 06	2437	22.81		22.81	22.71	22.66	22.81	22.86	22.81	22.81	22.81
CH 11	2462	18.01									

802.11ac VHT40 RF Avg Output Power (dBm)												
Power vs. Channel			Power vs Data Rate									
Channel	Frequency (MHz)	MCS Index	Channel	MCS Index								
		MCS 0		MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7	MCS 8	MCS 9
CH 03	2422	14.51	CH 06	17.96	17.96	18.01	17.96	17.96	17.96	17.91	18.06	18.01
CH 06	2437	18.46		17.96	17.96	18.01	17.96	17.96	17.96	17.91	18.06	18.01
CH 09	2452	15.46										



&lt;TXBF Mode&gt;

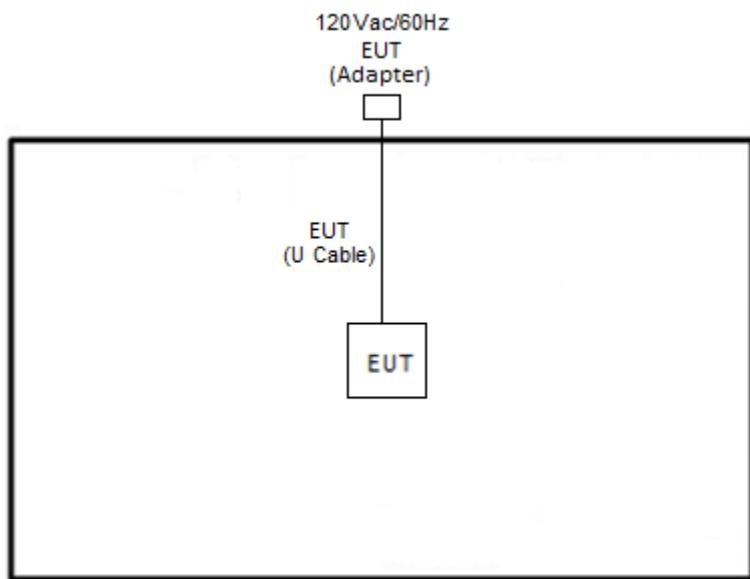
MIMO &lt;Ant. 1+2&gt;

802.11ac VHT20 RF Avg Output Power (dBm)											
Power vs. Channel			Power vs Data Rate								
Channel	Frequency (MHz)	MCS Index	Channel	MCS Index							
		MCS 0		MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7	MCS 8
CH 01	2412	19.42	CH 06	21.54	21.44	21.37	21.32	21.17	21.22	21.22	21.22
CH 06	2437	21.67									
CH 11	2462	15.22									

802.11ac VHT40 RF Avg Output Power (dBm)												
Power vs. Channel			Power vs Data Rate									
Channel	Frequency (MHz)	MCS Index	Channel	MCS Index								
		MCS 0		MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7	MCS 8	MCS 9
CH 03	2422	15.98	CH 06	17.08	16.97	16.91	16.84	16.69	16.74	16.74	16.74	16.74
CH 06	2437	17.21										
CH 09	2452	15.35										

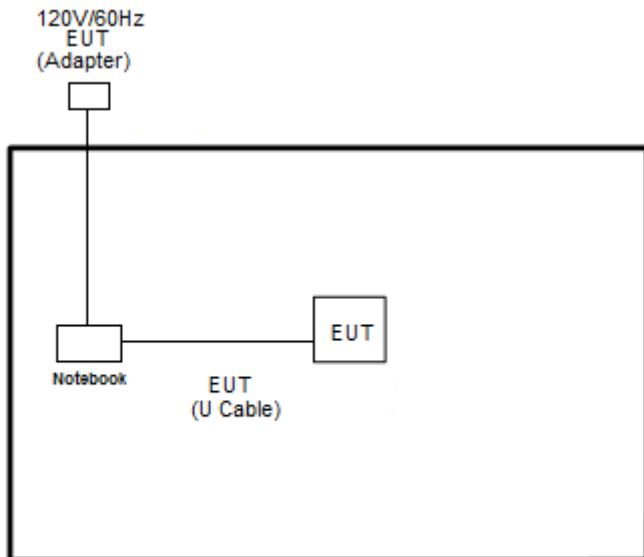
## 2.3 Connection Diagram of Test System

&lt;CDD Mode&gt;

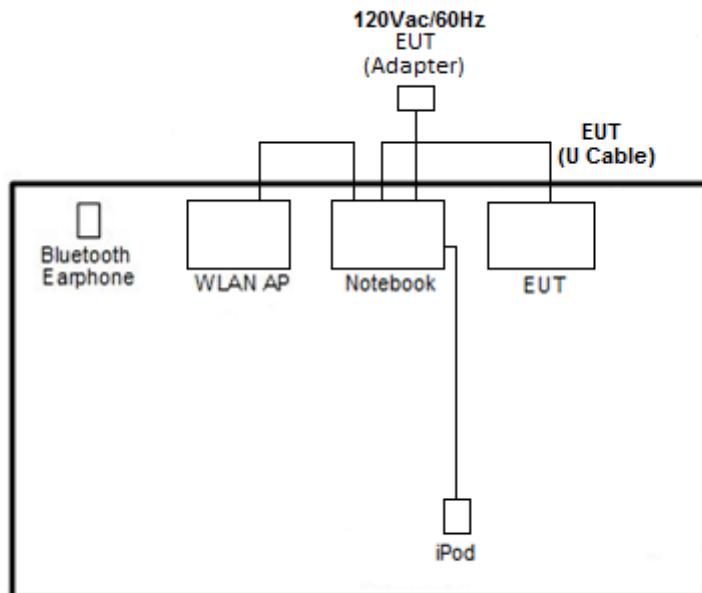




## &lt;TXBF Mode&gt;



## &lt;AC Conducted Emission Mode&gt;





## 2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Notebook	ASUS	P2430U	N/A	N/A	N/A
2.	Notebook	Lenovo	E330	N/A	N/A	N/A
3.	Notebook	DELL	Latitude E5570	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
4.	Bluetooth Earphone	Sony Ericsson	MW600	PY7DDA-2029	N/A	N/A
5.	WLAN AP	ASUS	RT-AC66U	MSQ-RTAC66U	N/A	Unshielded, 1.8 m
6.	iPod	Apple	A1285	FCC DoC	Shielded, 1.0 m	N/A
7.	SD Card	SanDisk	MicroSD HC	FCC DoC	N/A	N/A

## 2.5 EUT Operation Test Setup

The RF test items, utility “QRCT v3.0.298.0” 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.

For TXBF mode, the modulation modes and data rates manipulated by the command lines in the engineering program made the EUT link to another EUT by power under the normal operation.

## 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.

$$\text{Offset} = \text{RF cable loss} + \text{attenuator factor}.$$

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.

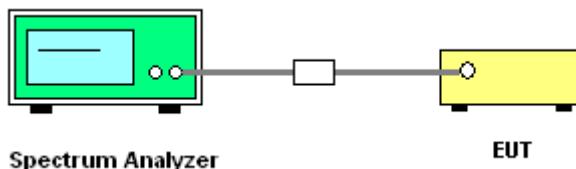
##### 3.1.2 Measuring Instruments

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)  $\geq 3 * \text{RBW}$ .
6. Measure and record the results in the test report.

##### 3.1.4 Test Setup



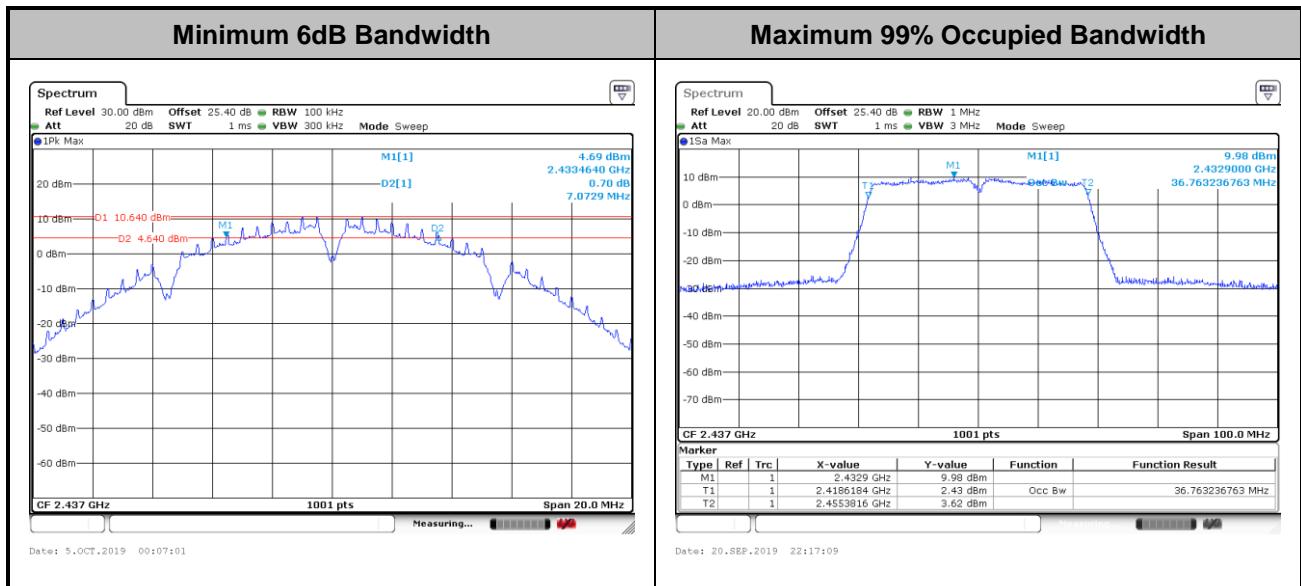


### 3.1.5 Test Result of 6dB and 99% Occupied Bandwidth

Test Engineer :	Kai Liao					Temperature :	21~25°C
				Relative Humidity :		51~54%	

<CDD Mode>

2.4GHz Band										
Mod.	Data Rate	N <sub>TX</sub>	CH.	Freq. (MHz)	99% Occupied BW (MHz)		6dB BW (MHz)		6dB BW Limit (MHz)	Pass/Fail
					Ant 1	Ant 2	Ant 1	Ant 2		
11b	1Mbps	1	1	2412	12.94	12.94	8.05	8.01	0.50	Pass
11b	1Mbps	1	6	2437	12.99	12.94	7.07	7.55	0.50	Pass
11b	1Mbps	1	11	2462	13.14	13.04	7.55	7.55	0.50	Pass
11g	6Mbps	1	1	2412	16.88	17.03	15.25	15.49	0.50	Pass
11g	6Mbps	1	6	2437	16.98	17.23	15.54	15.52	0.50	Pass
11g	6Mbps	1	11	2462	16.93	16.88	16.04	15.49	0.50	Pass
HT20	MCS0	1	1	2412	17.98	18.03	15.68	16.50	0.50	Pass
HT20	MCS0	1	6	2437	18.03	18.18	16.12	16.80	0.50	Pass
HT20	MCS0	1	11	2462	18.08	18.03	15.70	15.72	0.50	Pass
HT40	MCS0	1	3	2422	36.46	36.56	35.13	35.09	0.50	Pass
HT40	MCS0	1	6	2437	36.76	36.66	35.68	35.09	0.50	Pass
HT40	MCS0	1	9	2452	36.66	36.76	35.09	35.64	0.50	Pass
11b	1Mbps	2	1	2412	13.74	13.54	8.53	8.03	0.50	Pass
11b	1Mbps	2	6	2437	13.44	13.79	7.55	8.03	0.50	Pass
11b	1Mbps	2	11	2462	13.59	14.04	8.03	7.53	0.50	Pass
11g	6Mbps	2	1	2412	16.88	16.93	15.45	15.90	0.50	Pass
11g	6Mbps	2	6	2437	18.13	19.88	15.70	16.26	0.50	Pass
11g	6Mbps	2	11	2462	17.03	16.78	16.28	15.70	0.50	Pass
HT20	MCS0	2	1	2412	17.98	17.98	16.38	16.28	0.50	Pass
HT20	MCS0	2	6	2437	18.68	20.53	16.08	17.54	0.50	Pass
HT20	MCS0	2	11	2462	18.23	17.98	17.30	15.43	0.50	Pass
HT40	MCS0	2	3	2422	36.46	36.46	35.09	35.13	0.50	Pass
HT40	MCS0	2	6	2437	36.46	36.66	35.37	35.29	0.50	Pass
HT40	MCS0	2	9	2452	36.66	36.56	35.09	35.45	0.50	Pass

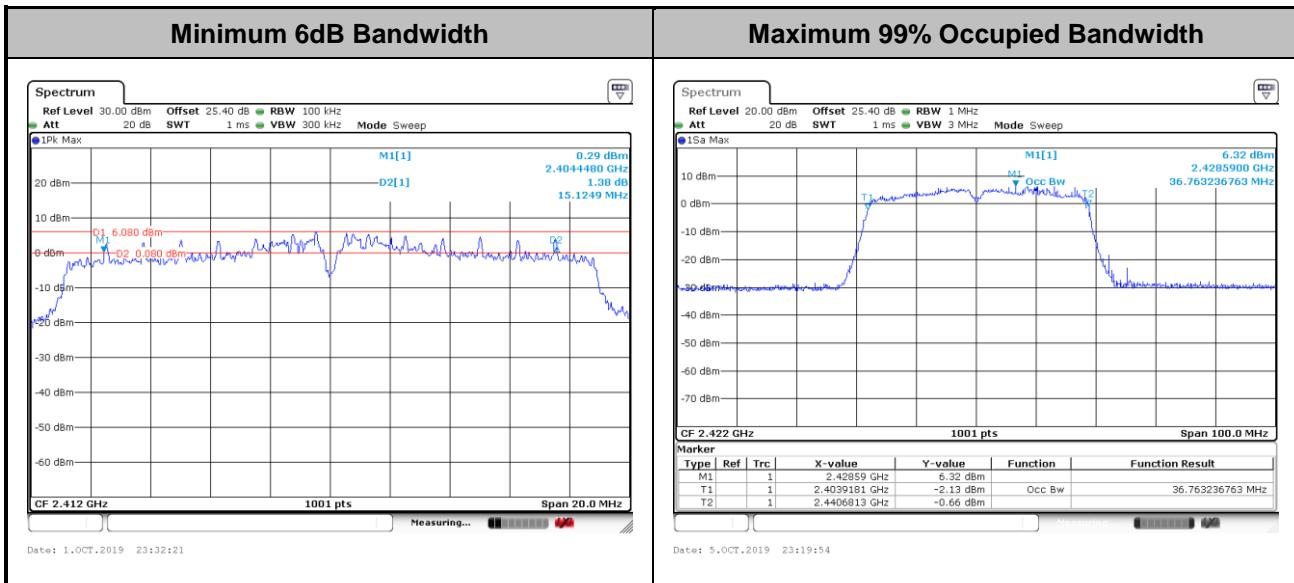


Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.



## &lt;TXBF Mode&gt;

2.4GHz Band										
Mod.	Data Rate	Ntx	CH.	Freq. (MHz)	99% Occupied BW (MHz)		6dB BW (MHz)		6dB BW Limit (MHz)	Pass/Fail
					Ant 1	Ant 2	Ant 1	Ant 2		
VHT20	MCS0	2	1	2412	17.88	18.68	15.13	17.54	0.50	Pass
VHT20	MCS0	2	6	2437	17.83	19.18	15.13	17.60	0.50	Pass
VHT20	MCS0	2	11	2462	18.08	19.38	15.13	17.58	0.50	Pass
VHT40	MCS0	2	3	2422	36.76	36.36	35.25	36.28	0.50	Pass
VHT40	MCS0	2	6	2437	36.56	36.46	35.05	36.28	0.50	Pass
VHT40	MCS0	2	9	2452	36.66	36.56	35.09	36.28	0.50	Pass





## 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 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.

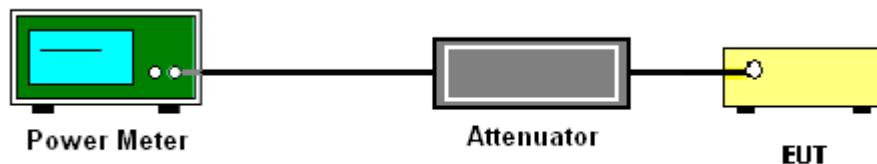
### 3.2.2 Measuring Instruments

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

Test Engineer :	Kai Liao				Temperature :	21~25°C	
					Relative Humidity :	51~54%	

## &lt;CDD Mode&gt;

Mod.	Data Rate	2.4GHz Band											Pass /Fail			
		NTX	CH.	Freq. (MHz)	Average Conducted Power (dBm)			Conducted Power Limit (dBm)		EIRP Power (dBm)		Power Limit (dBm)				
					Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2			
11b	1Mbps	1	1	2412	19.00	18.70		30.00	30.00	3.40	3.01	22.40	21.71	36.00	36.00	Pass
11b	1Mbps	1	6	2437	19.00	18.90		30.00	30.00	3.40	3.01	22.40	21.91	36.00	36.00	Pass
11b	1Mbps	1	11	2462	18.90	18.80		30.00	30.00	3.40	3.01	22.30	21.81	36.00	36.00	Pass
11g	6Mbps	1	1	2412	17.80	18.00		30.00	30.00	3.40	3.01	21.20	21.01	36.00	36.00	Pass
11g	6Mbps	1	6	2437	18.80	18.80		30.00	30.00	3.40	3.01	22.20	21.81	36.00	36.00	Pass
11g	6Mbps	1	11	2462	16.40	16.10		30.00	30.00	3.40	3.01	19.80	19.11	36.00	36.00	Pass
HT20	MCS0	1	1	2412	17.30	17.40		30.00	30.00	3.40	3.01	20.70	20.41	36.00	36.00	Pass
HT20	MCS0	1	6	2437	18.70	18.80		30.00	30.00	3.40	3.01	22.10	21.81	36.00	36.00	Pass
HT20	MCS0	1	11	2462	15.80	14.30		30.00	30.00	3.40	3.01	19.20	17.31	36.00	36.00	Pass
HT40	MCS0	1	3	2422	12.60	13.40		30.00	30.00	3.40	3.01	16.00	16.41	36.00	36.00	Pass
HT40	MCS0	1	6	2437	15.40	17.10		30.00	30.00	3.40	3.01	18.80	20.11	36.00	36.00	Pass
HT40	MCS0	1	9	2452	13.50	14.70		30.00	30.00	3.40	3.01	16.90	17.71	36.00	36.00	Pass
VHT20	MCS0	1	1	2412	17.20	17.30		30.00	30.00	3.40	3.01	20.60	20.31	36.00	36.00	Pass
VHT20	MCS0	1	6	2437	18.60	18.70		30.00	30.00	3.40	3.01	22.00	21.71	36.00	36.00	Pass
VHT20	MCS0	1	11	2462	15.70	14.20		30.00	30.00	3.40	3.01	19.10	17.21	36.00	36.00	Pass
VHT40	MCS0	1	3	2422	12.40	13.30		30.00	30.00	3.40	3.01	15.80	16.31	36.00	36.00	Pass
VHT40	MCS0	1	6	2437	15.30	17.00		30.00	30.00	3.40	3.01	18.70	20.01	36.00	36.00	Pass
VHT40	MCS0	1	9	2452	13.40	14.50		30.00	30.00	3.40	3.01	16.80	17.51	36.00	36.00	Pass



2.4GHz Band																
Mod.	Data Rate	N <sub>TX</sub>	CH.	Freq. (MHz)	Average Conducted Power (dBm)			Conducted Power Limit (dBm)		DG (dBi)		EIRP Power (dBm)		EIRP Power Limit (dBm)		Pass /Fail
					Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	
11b	1Mbps	2	1	2412	20.70	20.70	23.71	30.00	30.00	3.40	3.40	27.11	27.11	36.00	36.00	Pass
11b	1Mbps	2	6	2437	20.60	21.00	23.81	30.00	30.00	3.40	3.40	27.21	27.21	36.00	36.00	Pass
11b	1Mbps	2	11	2462	20.40	20.70	23.56	30.00	30.00	3.40	3.40	26.96	26.96	36.00	36.00	Pass
11g	6Mbps	2	1	2412	16.90	16.80	19.86	30.00	30.00	3.40	3.40	23.26	23.26	36.00	36.00	Pass
11g	6Mbps	2	6	2437	20.00	20.30	23.11	30.00	30.00	3.40	3.40	26.51	26.51	36.00	36.00	Pass
11g	6Mbps	2	11	2462	14.40	14.50	17.46	30.00	30.00	3.40	3.40	20.86	20.86	36.00	36.00	Pass
HT20	MCS0	2	1	2412	16.80	16.60	19.71	30.00	30.00	3.40	3.40	23.11	23.11	36.00	36.00	Pass
HT20	MCS0	2	6	2437	20.00	20.20	23.01	30.00	30.00	3.40	3.40	26.41	26.41	36.00	36.00	Pass
HT20	MCS0	2	11	2462	15.30	15.30	18.31	30.00	30.00	3.40	3.40	21.71	21.71	36.00	36.00	Pass
HT40	MCS0	2	3	2422	11.50	12.10	14.82	30.00	30.00	3.40	3.40	18.22	18.22	36.00	36.00	Pass
HT40	MCS0	2	6	2437	15.30	15.70	18.51	30.00	30.00	3.40	3.40	21.91	21.91	36.00	36.00	Pass
HT40	MCS0	2	9	2452	12.50	12.60	15.56	30.00	30.00	3.40	3.40	18.96	18.96	36.00	36.00	Pass
VHT20	MCS0	2	1	2412	16.50	16.40	19.46	30.00	30.00	3.40	3.40	22.86	22.86	36.00	36.00	Pass
VHT20	MCS0	2	6	2437	19.90	20.00	22.86	30.00	30.00	3.40	3.40	26.26	26.26	36.00	36.00	Pass
VHT20	MCS0	2	11	2462	14.80	15.20	18.01	30.00	30.00	3.40	3.40	21.41	21.41	36.00	36.00	Pass
VHT40	MCS0	2	3	2422	11.40	11.60	14.51	30.00	30.00	3.40	3.40	17.91	17.91	36.00	36.00	Pass
VHT40	MCS0	2	6	2437	15.40	15.50	18.46	30.00	30.00	3.40	3.40	21.86	21.86	36.00	36.00	Pass
VHT40	MCS0	2	9	2452	12.40	12.50	15.46	30.00	30.00	3.40	3.40	18.86	18.86	36.00	36.00	Pass



## &lt;TXBF Mode&gt;

2.4GHz Band															
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Average Conducted Power (dBm)			Conducted Power Limit (dBm)		DG (dBi)		EIRP Power (dBm)		EIRP Power Limit (dBm)	
					Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2
VHT20	MCS0	2	1	2412	15.60	17.10	19.42	29.78	29.78	6.22	6.22	25.64	25.64	36.00	Pass
VHT20	MCS0	2	6	2437	17.90	20.10	21.67	29.78	29.78	6.22	6.22	27.88	27.88	36.00	Pass
VHT20	MCS0	2	11	2462	11.40	12.90	15.22	29.78	29.78	6.22	6.22	21.44	21.44	36.00	Pass
VHT40	MCS0	2	3	2422	12.50	13.40	15.98	29.78	29.78	6.22	6.22	22.20	22.20	36.00	Pass
VHT40	MCS0	2	6	2437	13.50	15.60	17.21	29.78	29.78	6.22	6.22	23.43	23.43	36.00	Pass
VHT40	MCS0	2	9	2452	11.70	12.90	15.35	29.78	29.78	6.22	6.22	21.57	21.57	36.00	Pass



### 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.

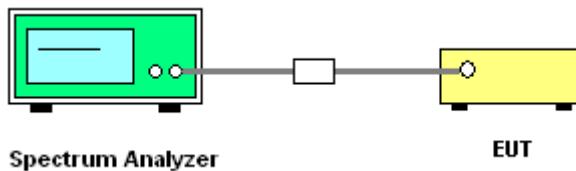
If measurements performed using method (2) plus  $10 \log (N)$  exceeds the emission limit, the test should choose method (1) before declaring that the device fails the emission limit.

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



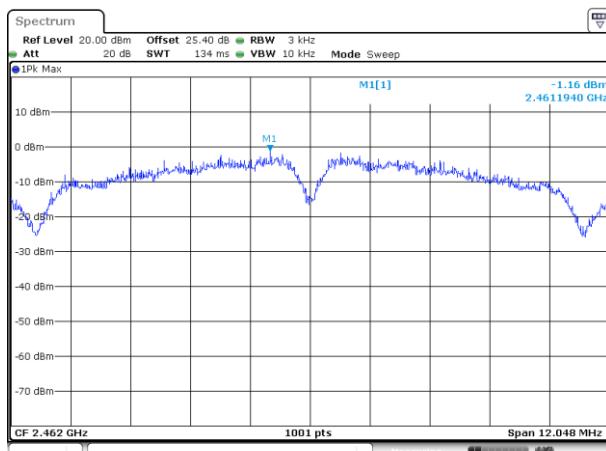


## 3.3.5 Test Result of Power Spectral Density

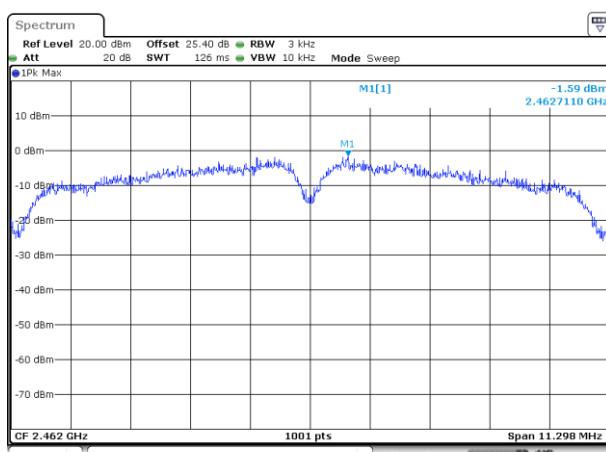
Test Engineer :	Kai Liao	Temperature :	21~25°C
		Relative Humidity :	51~54%

&lt;CDD Mode&gt;

2.4GHz Band												
Mod.	Data Rate	N <sub>TX</sub>	CH.	Freq. (MHz)	Peak PSD (dBm/3kHz)			DG (dBi)		Peak PSD Limit (dBm/3kHz)		Pass/Fail
					Ant 1	Ant 2	Worse + 3.01	Ant 1	Ant 2	Ant 1	Ant 2	
11b	1Mbps	1	1	2412	-3.08	-2.81	-	3.40	3.01	8.00	8.00	Pass
11b	1Mbps	1	6	2437	-2.38	-2.52	-	3.40	3.01	8.00	8.00	Pass
11b	1Mbps	1	11	2462	-2.87	-3.22	-	3.40	3.01	8.00	8.00	Pass
11g	6Mbps	1	1	2412	-6.28	-6.65	-	3.40	3.01	8.00	8.00	Pass
11g	6Mbps	1	6	2437	-8.39	-7.84	-	3.40	3.01	8.00	8.00	Pass
11g	6Mbps	1	11	2462	-7.94	-8.86	-	3.40	3.01	8.00	8.00	Pass
HT20	MCS0	1	1	2412	-6.92	-7.62	-	3.40	3.01	8.00	8.00	Pass
HT20	MCS0	1	6	2437	-7.79	-7.92	-	3.40	3.01	8.00	8.00	Pass
HT20	MCS0	1	11	2462	-9.41	-10.70	-	3.40	3.01	8.00	8.00	Pass
HT40	MCS0	1	3	2422	-15.23	-15.30	-	3.40	3.01	8.00	8.00	Pass
HT40	MCS0	1	6	2437	-12.66	-10.94	-	3.40	3.01	8.00	8.00	Pass
HT40	MCS0	1	9	2452	-14.03	-12.94	-	3.40	3.01	8.00	8.00	Pass
11b	1Mbps	2	1	2412	-1.37	-1.21	1.80	6.22		7.78		Pass
11b	1Mbps	2	6	2437	-1.51	-1.43	1.58	6.22		7.78		Pass
11b	1Mbps	2	11	2462	-1.16	-1.59	1.85	6.22		7.78		Pass
11g	6Mbps	2	1	2412	-6.54	-6.31	-3.30	6.22		7.78		Pass
11g	6Mbps	2	6	2437	-4.08	-3.91	-0.90	6.22		7.78		Pass
11g	6Mbps	2	11	2462	-9.65	-9.27	-6.26	6.22		7.78		Pass
HT20	MCS0	2	1	2412	-7.83	-7.93	-4.82	6.22		7.78		Pass
HT20	MCS0	2	6	2437	-4.73	-4.90	-1.72	6.22		7.78		Pass
HT20	MCS0	2	11	2462	-9.79	-9.27	-6.26	6.22		7.78		Pass
HT40	MCS0	2	3	2422	-17.02	-16.79	-13.78	6.22		7.78		Pass
HT40	MCS0	2	6	2437	-12.41	-12.89	-9.40	6.22		7.78		Pass
HT40	MCS0	2	9	2452	-15.40	-15.23	-12.22	6.22		7.78		Pass

**Worst Case Power Density (dBm/3kHz) for MIMO Ant. 1**

Date: 24.OCT.2019 00:54:08

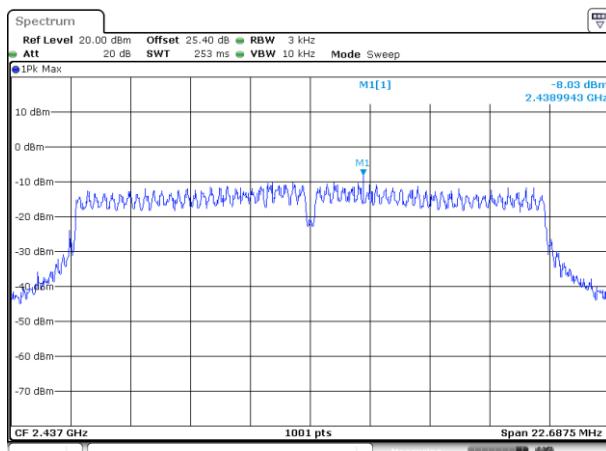
**Worst Case Power Density (dBm/3kHz) for MIMO Ant. 2**

Date: 24.OCT.2019 00:50:59

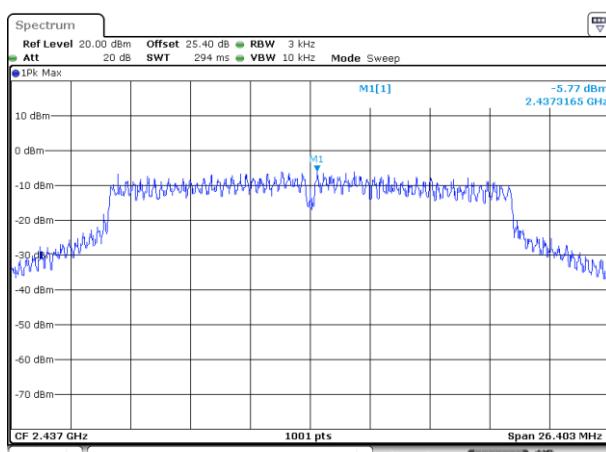


## &lt;TXBF Modes&gt;

2.4GHz Band												
Mod.	Data Rate	N <sub>Tx</sub>	CH.	Freq. (MHz)	Peak PSD (dBm/3kHz)			DG (dBi)		Peak PSD Limit (dBm/3kHz)		Pass/Fail
					Ant 1	Ant 2	Worse + 3.01	Ant 1	Ant 2	Ant 1	Ant 2	
VHT20	MCS0	2	1	2412	-8.32	-7.11	-4.10	6.22	6.22	7.78	7.78	Pass
VHT20	MCS0	2	6	2437	-8.03	-5.77	-2.76	6.22	6.22	7.78	7.78	Pass
VHT20	MCS0	2	11	2462	-12.32	-10.27	-7.26	6.22	6.22	7.78	7.78	Pass
VHT40	MCS0	2	3	2422	-16.40	-14.98	-11.97	6.22	6.22	7.78	7.78	Pass
VHT40	MCS0	2	6	2437	-15.26	-13.34	-10.33	6.22	6.22	7.78	7.78	Pass
VHT40	MCS0	2	9	2452	-17.07	-15.62	-12.61	6.22	6.22	7.78	7.78	Pass

**Worst Case Power Density (dBm/3kHz) for MIMO Ant. 1**

Date: 2.OCT.2019 00:31:06

**Worst Case Power Density (dBm/3kHz) for MIMO Ant. 2**

Date: 2.OCT.2019 00:42:26



## 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.

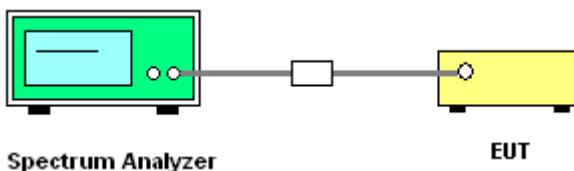
### 3.4.2 Measuring Instruments

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



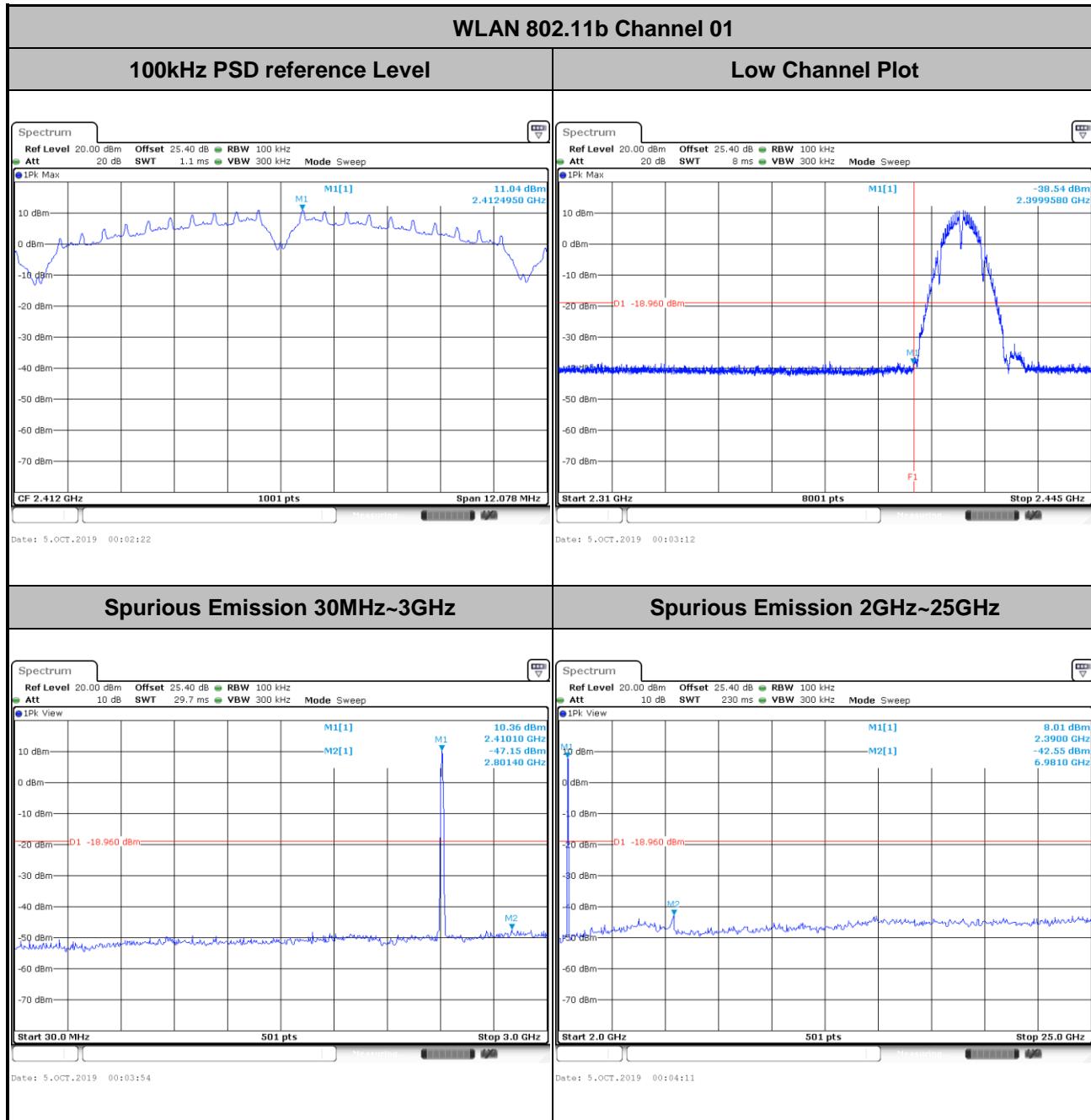


### 3.4.5 Test Result of Conducted Band Edges and Spurious Emission

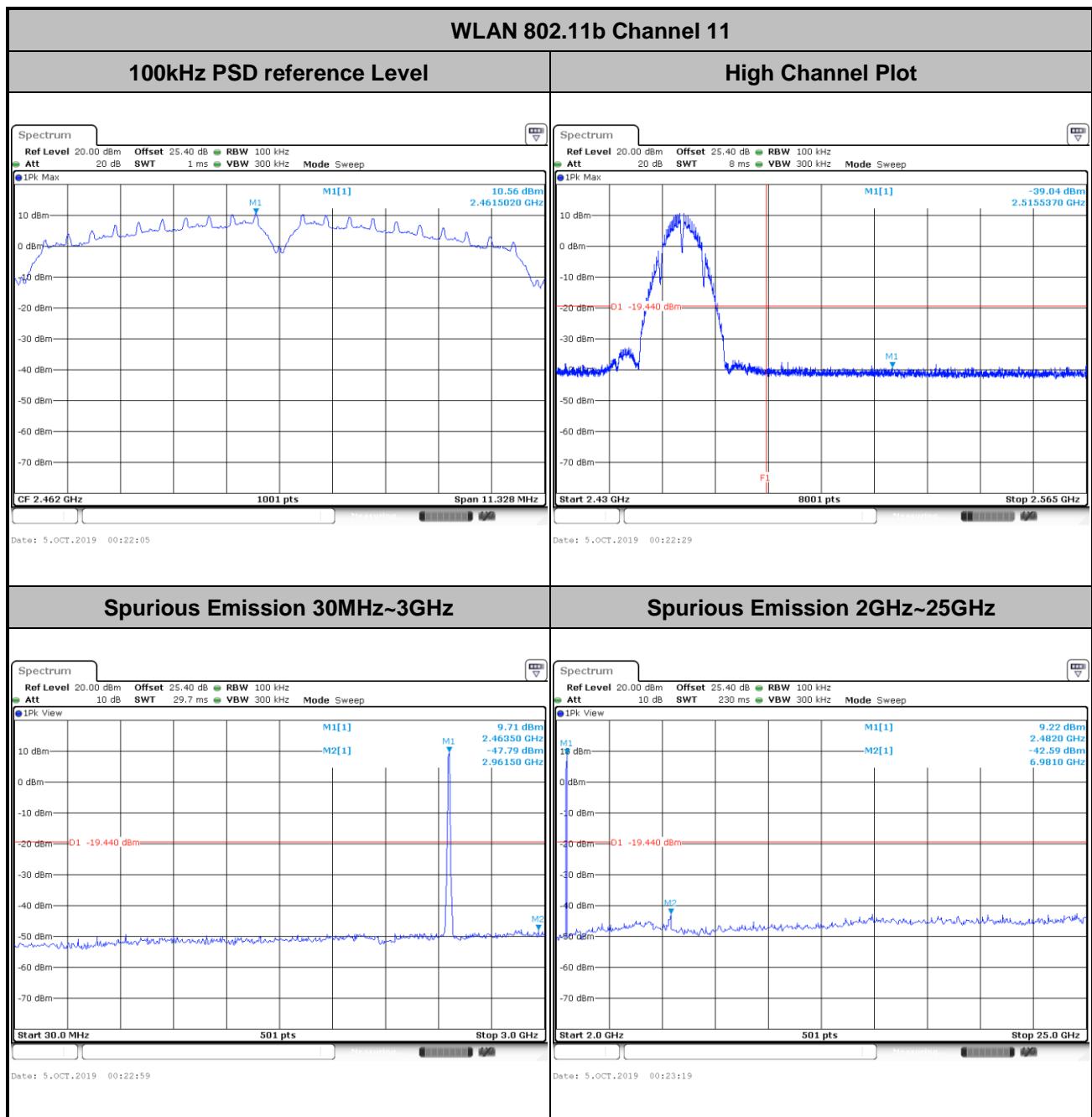
Test Engineer :	Kai Liao	Temperature :	21~25°C
		Relative Humidity :	51~54%

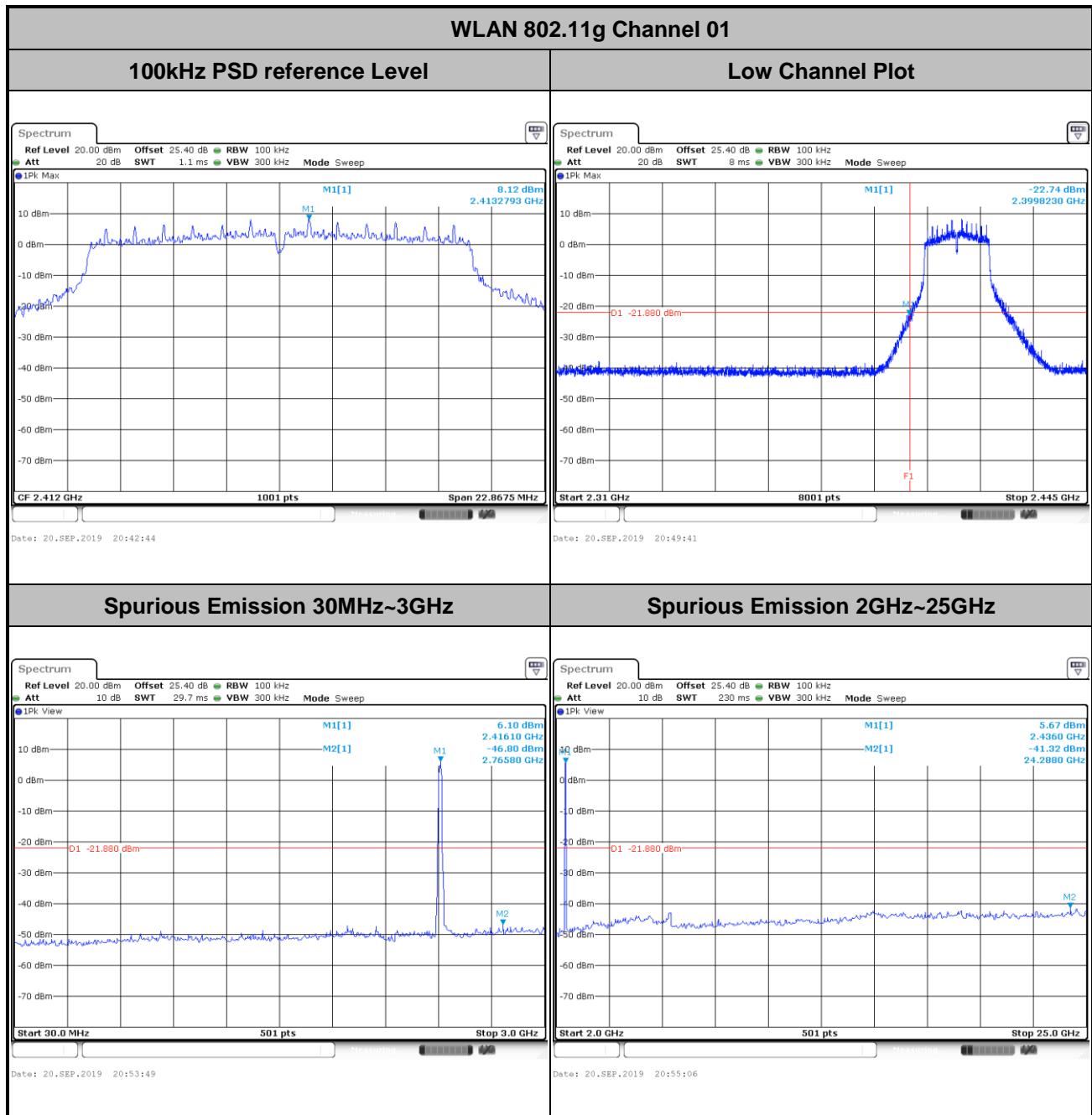
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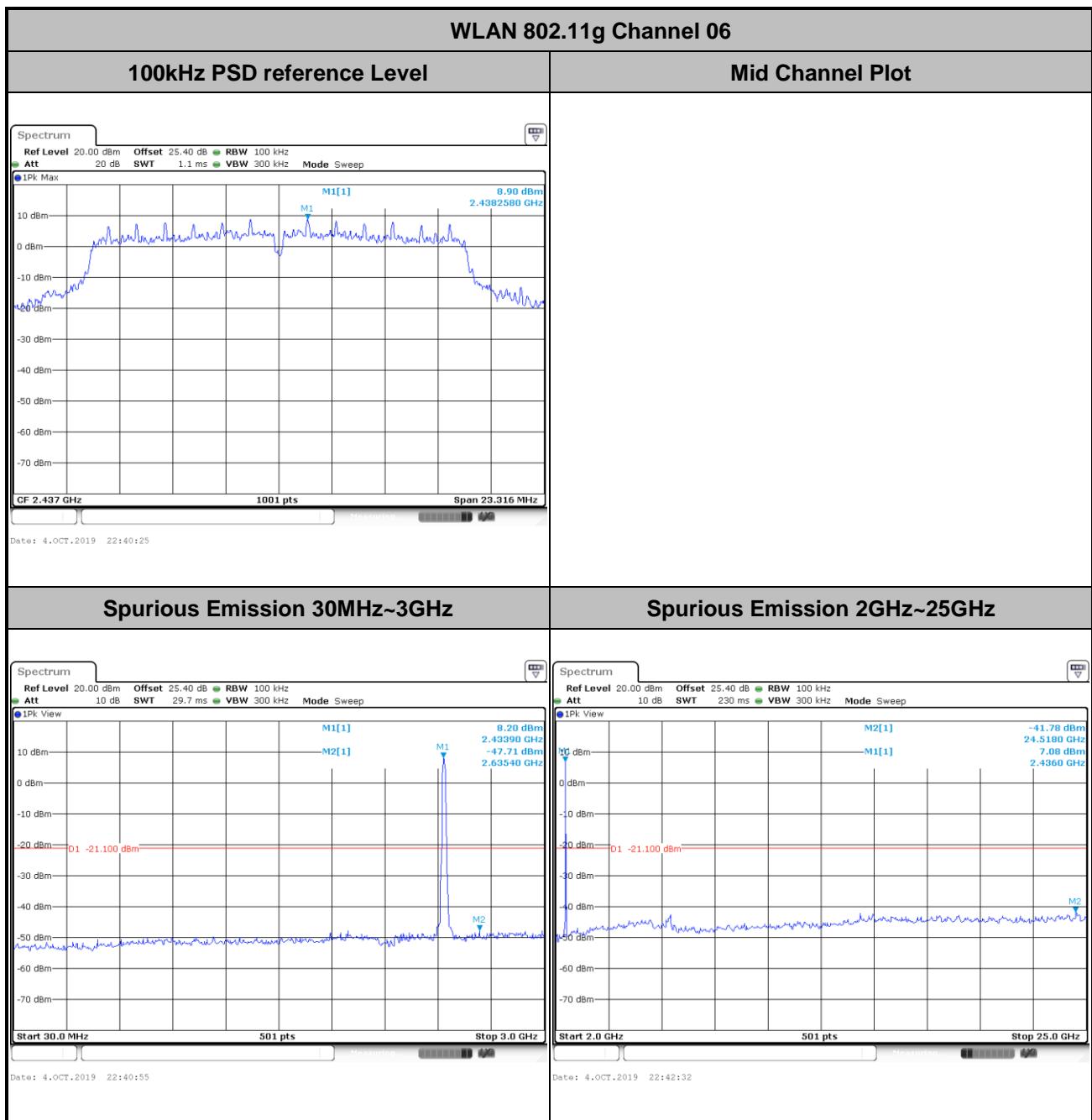
Number of TX = 1, Ant. 1 (Measured)

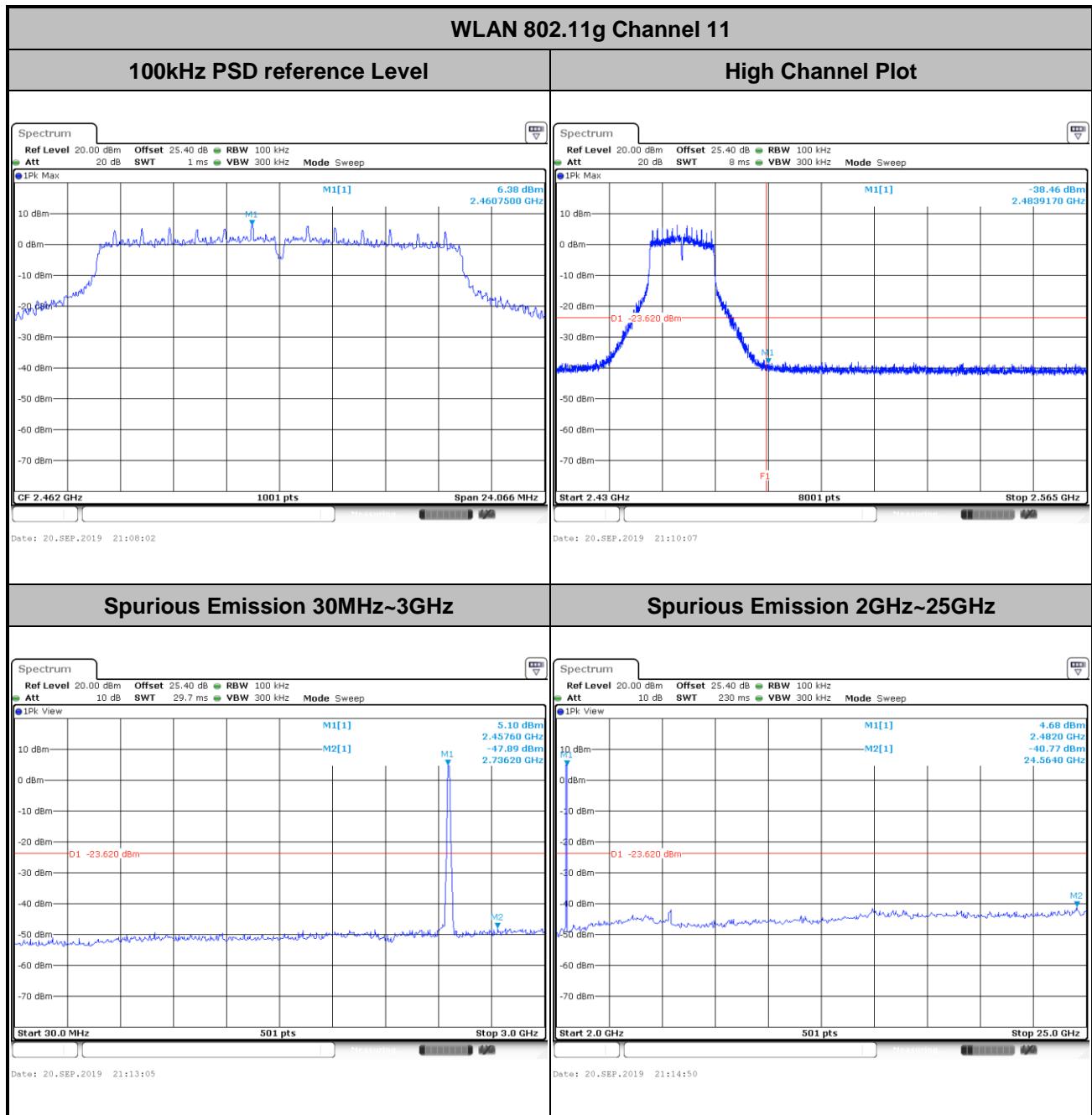


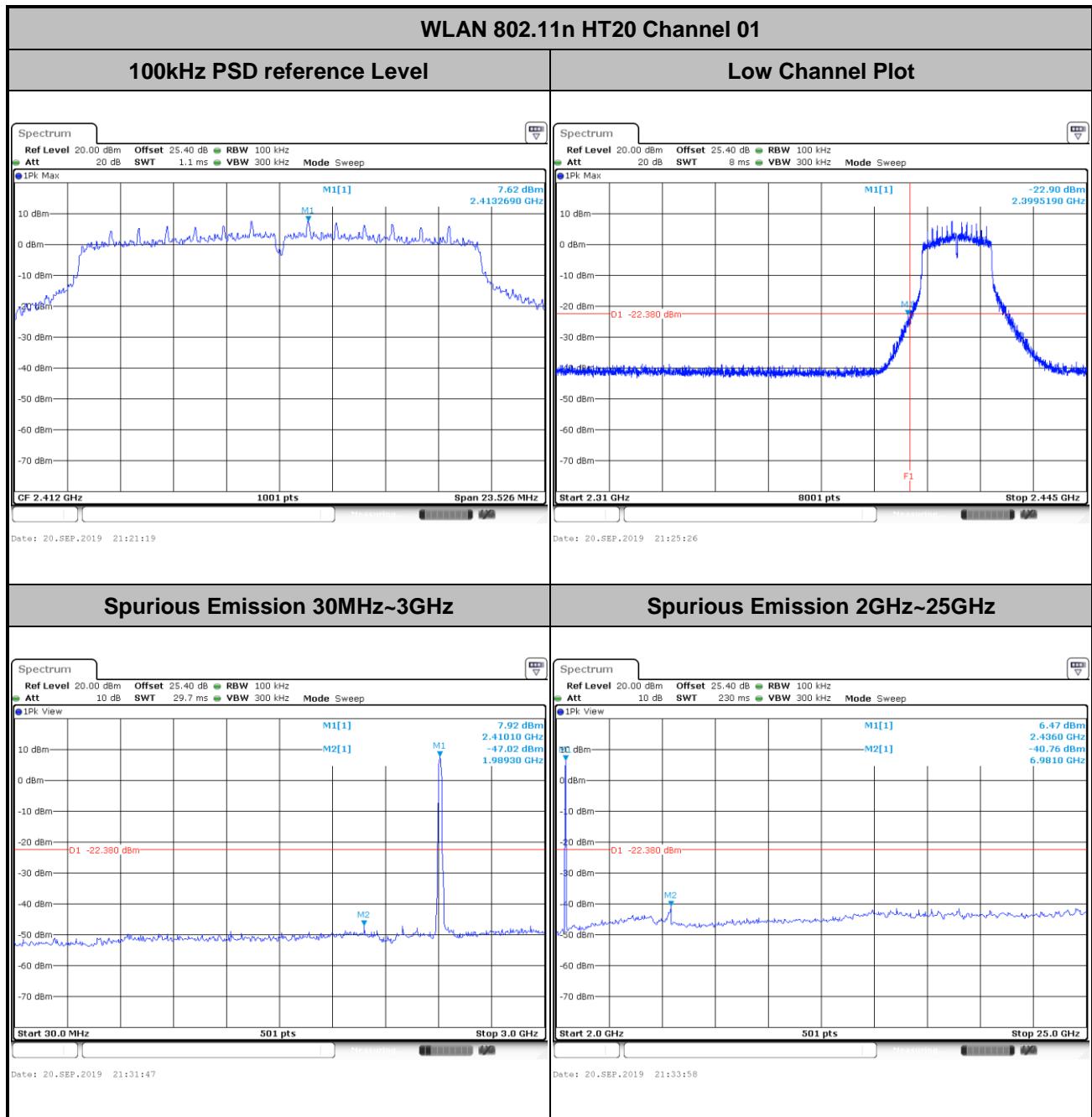


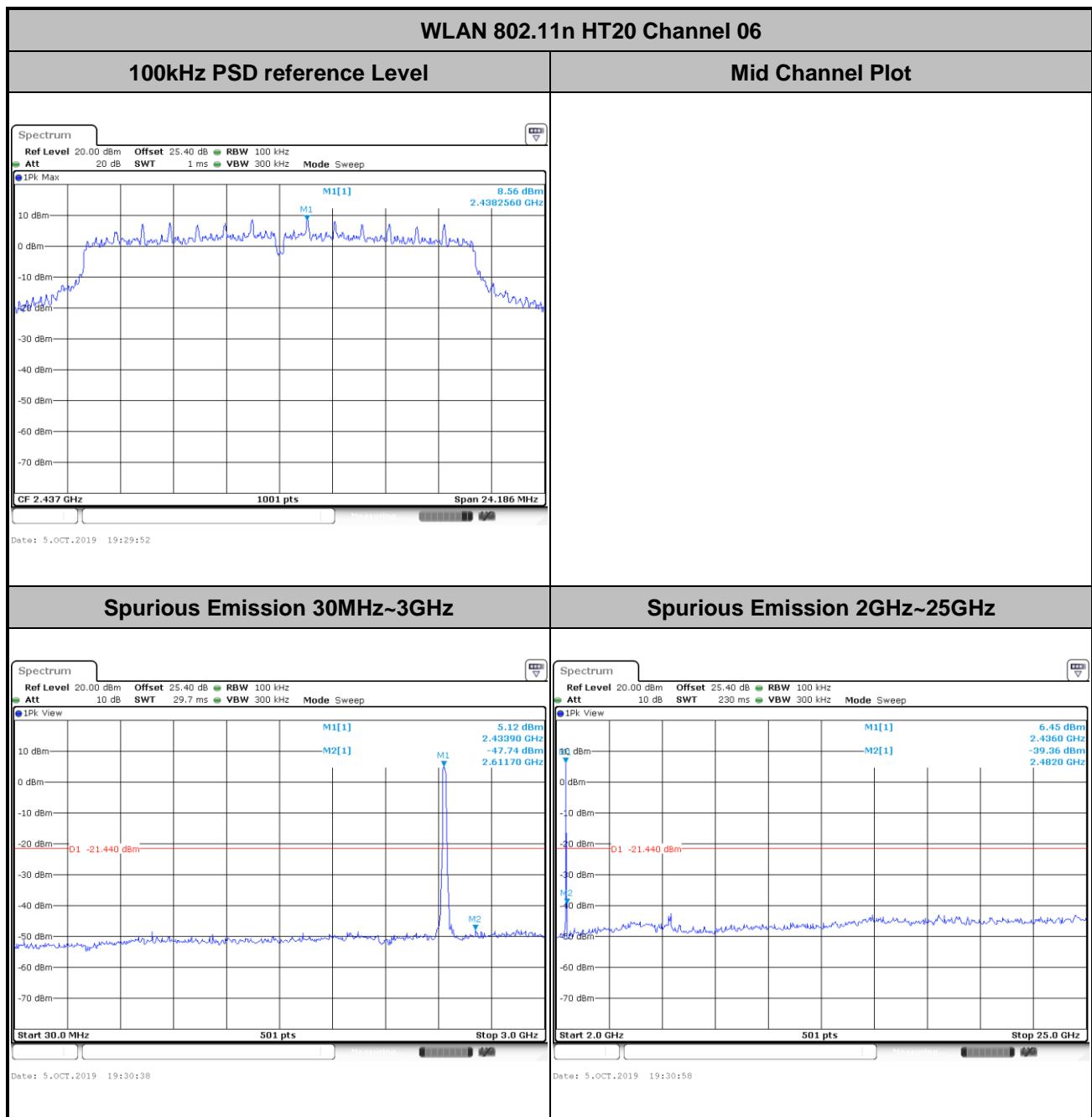


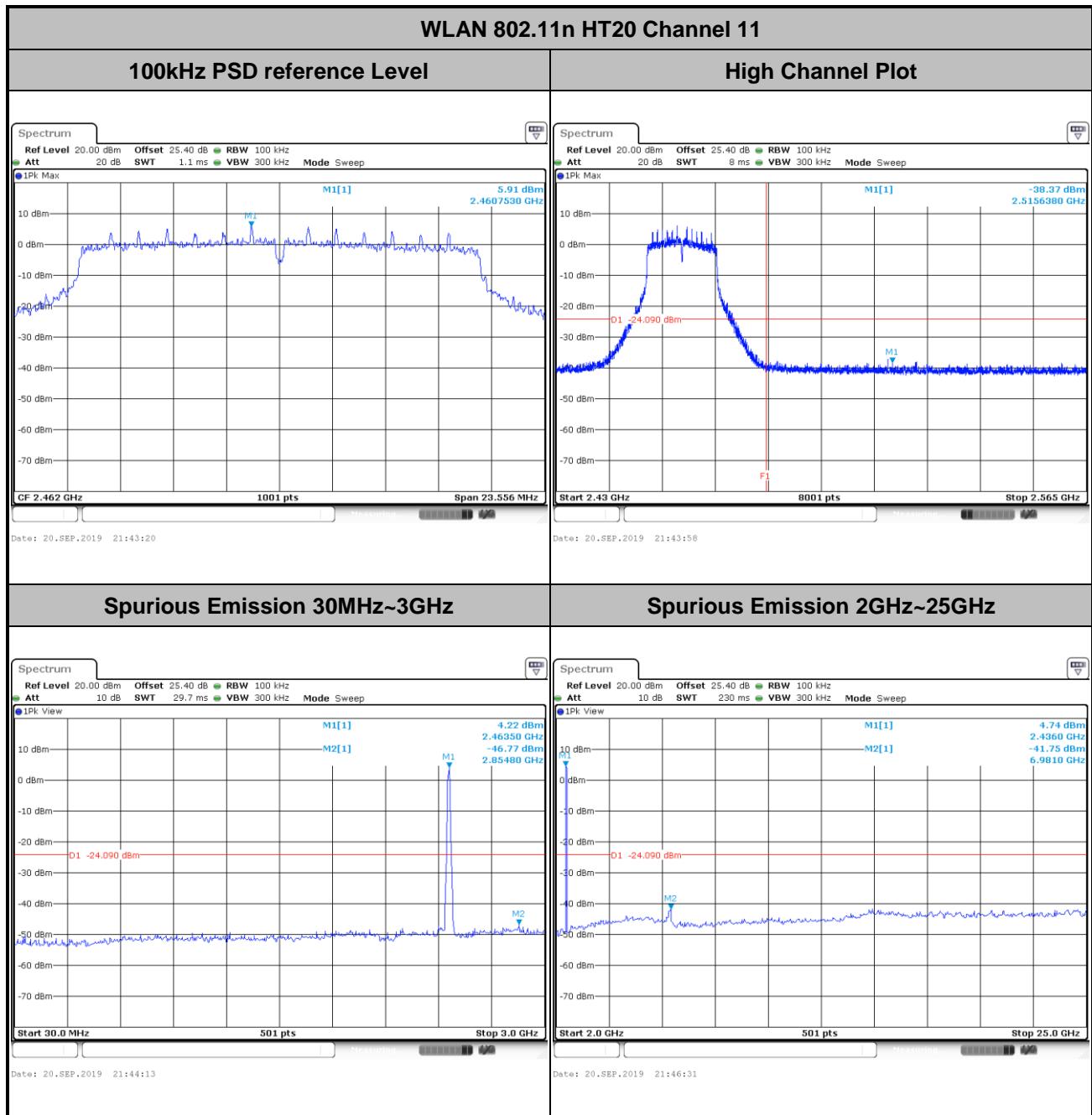


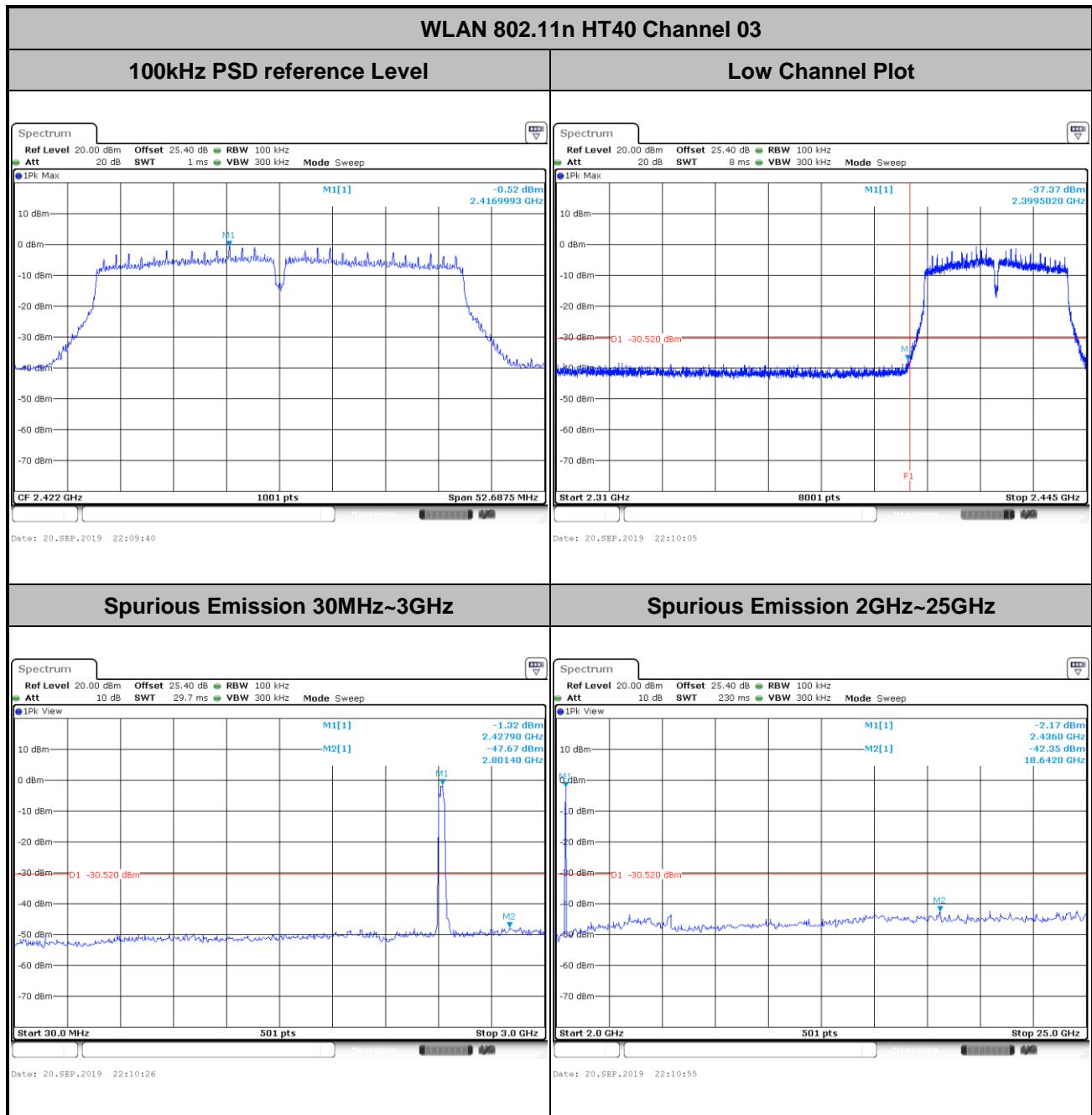


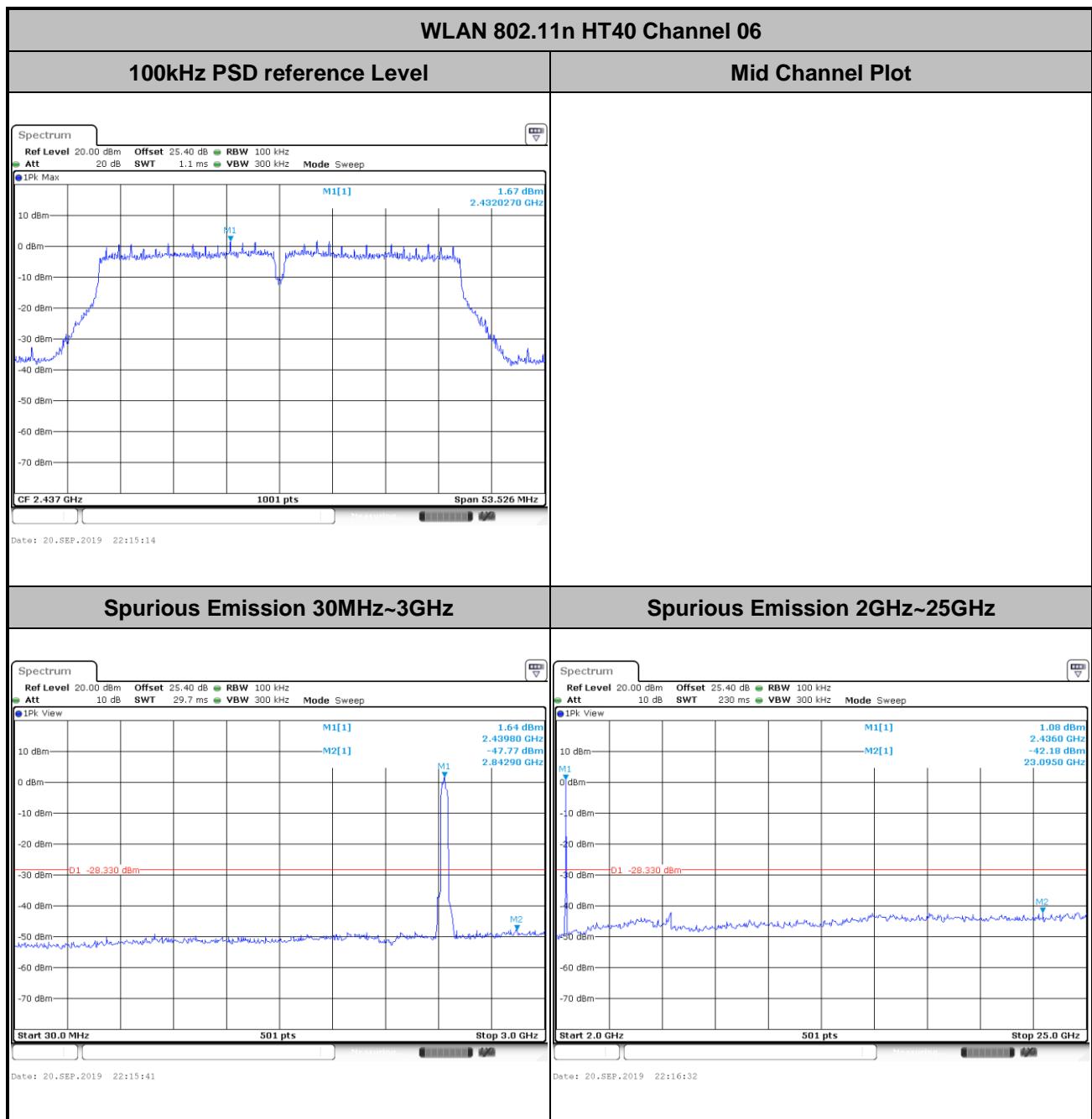


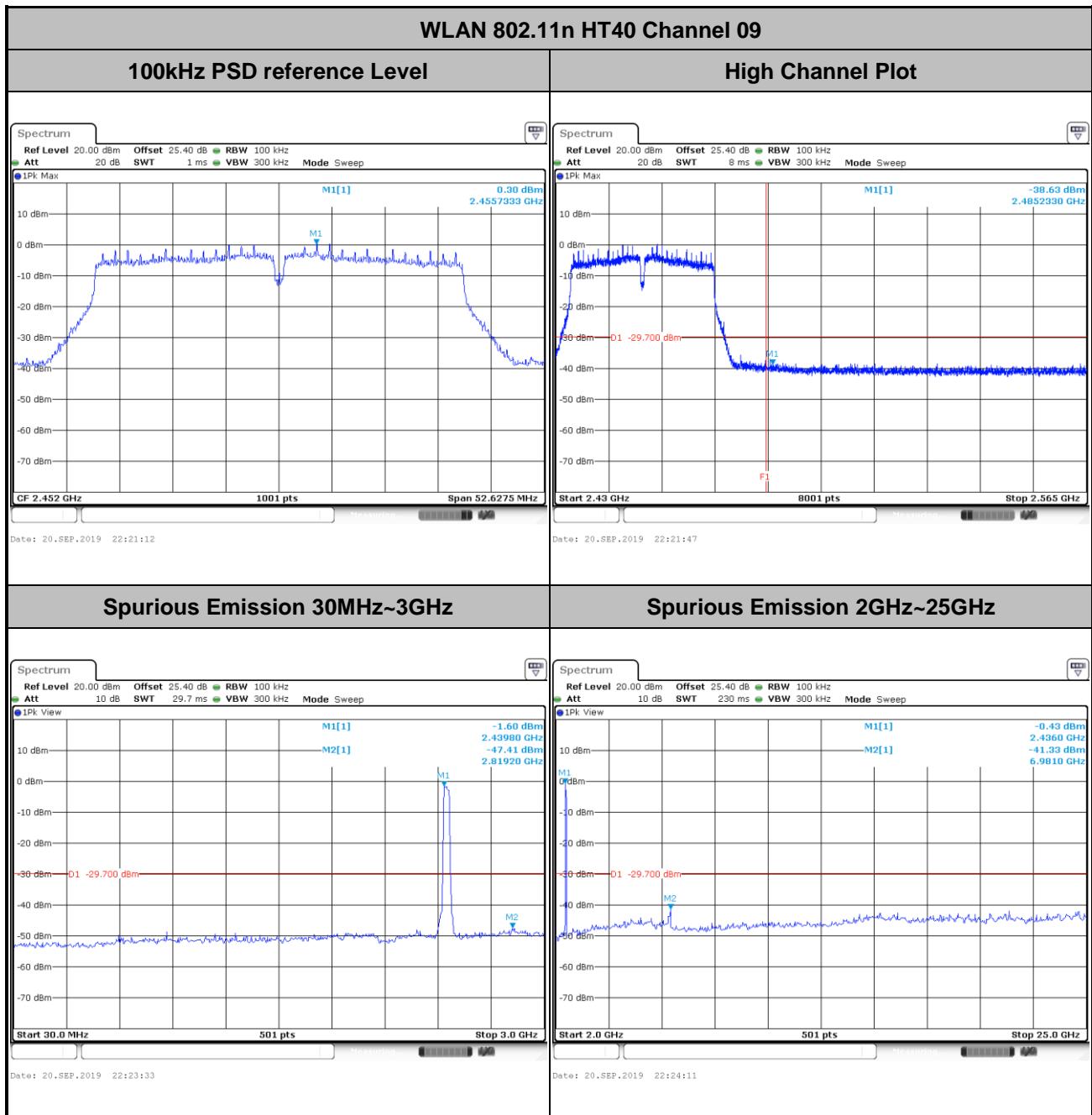






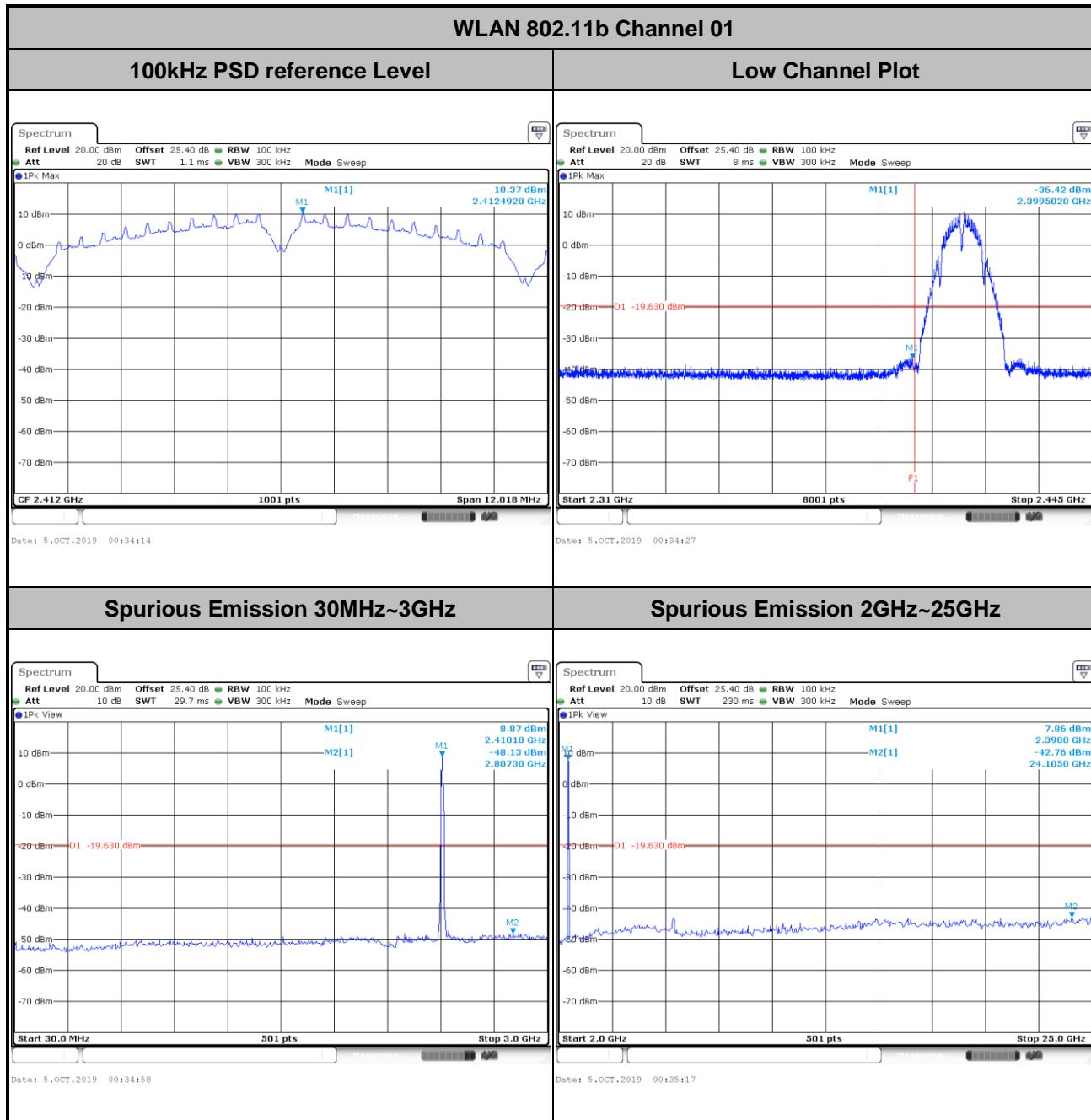


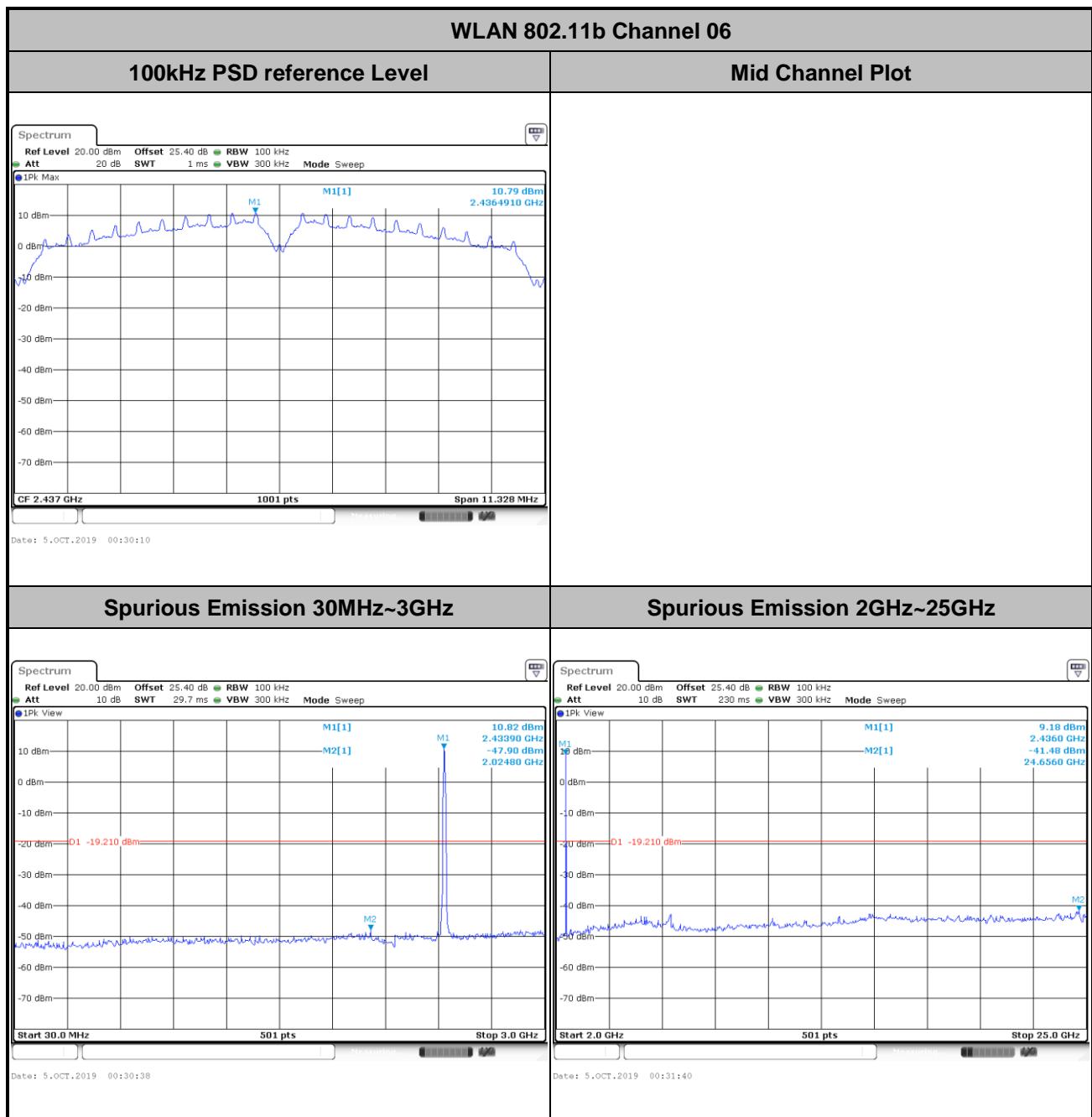


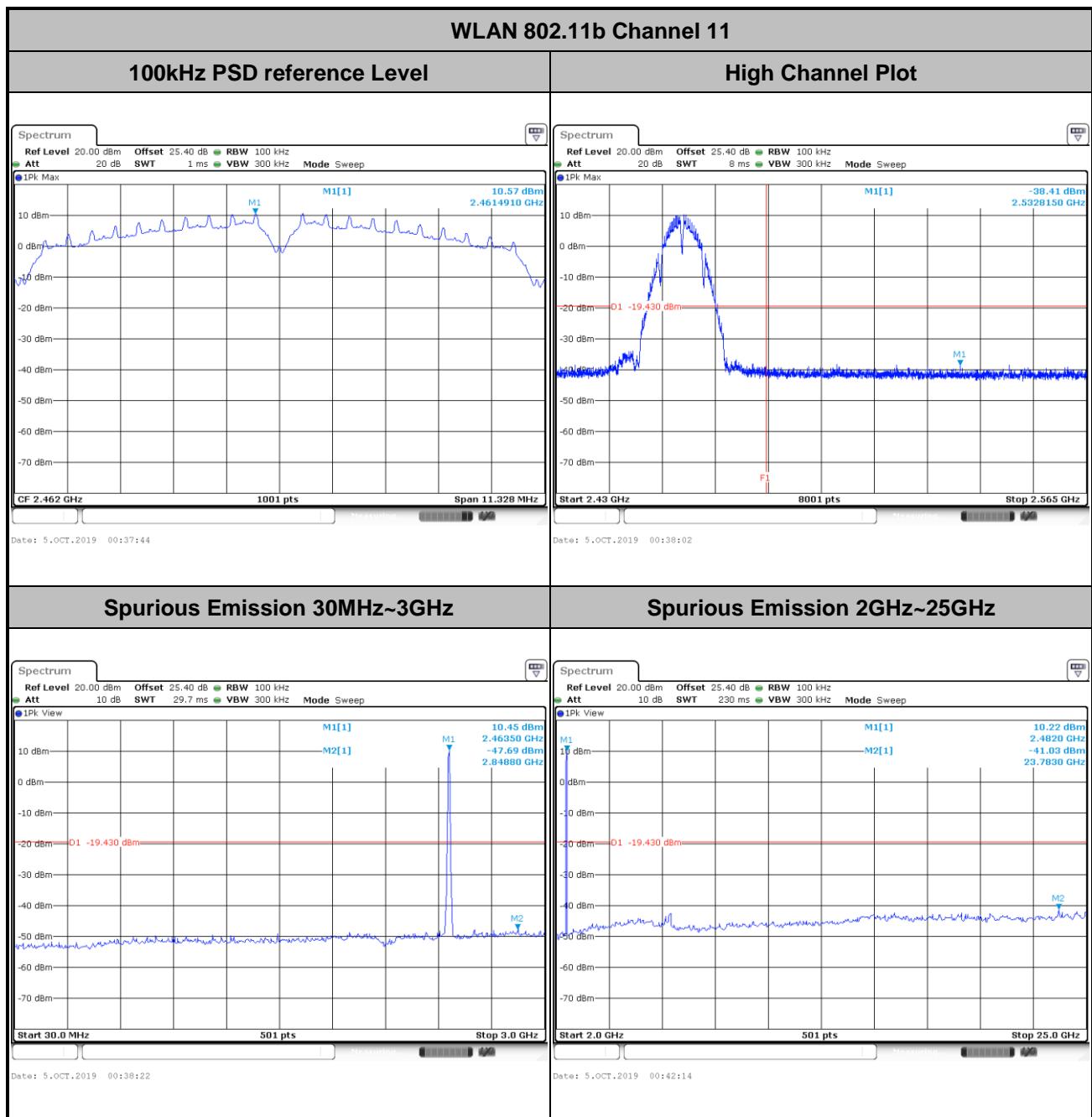


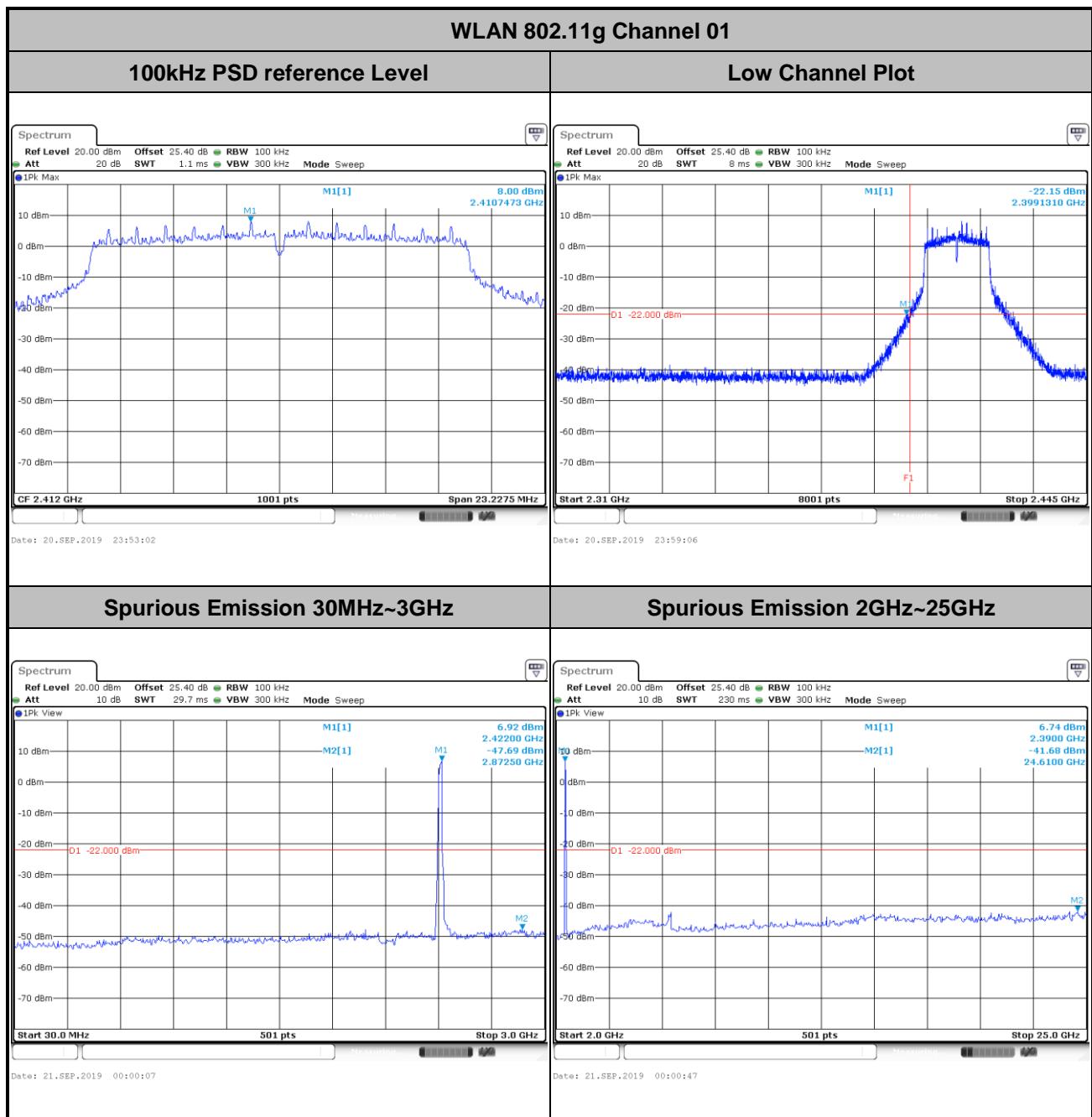


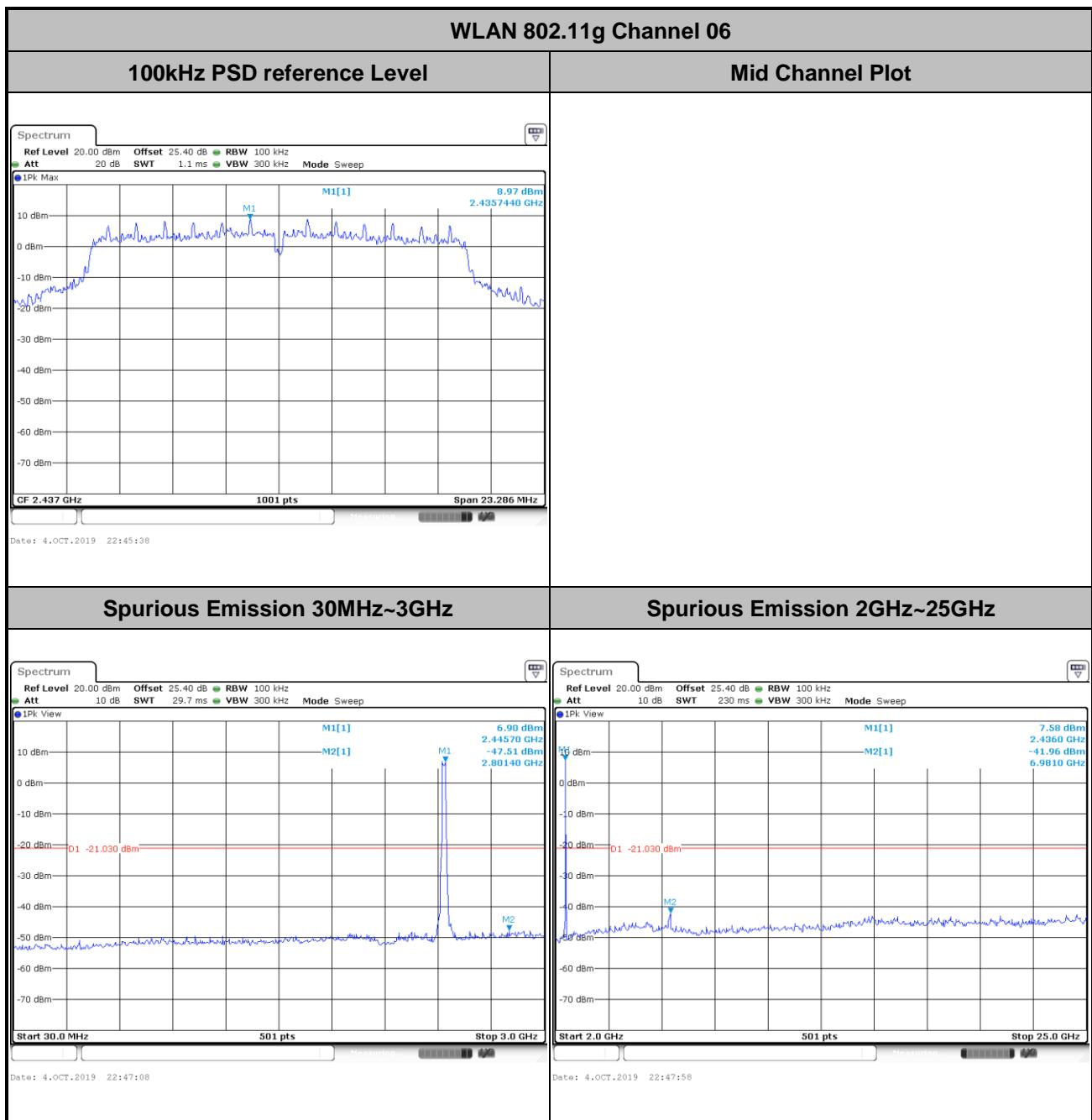
## Number of TX = 1, Ant. 2 (Measured)

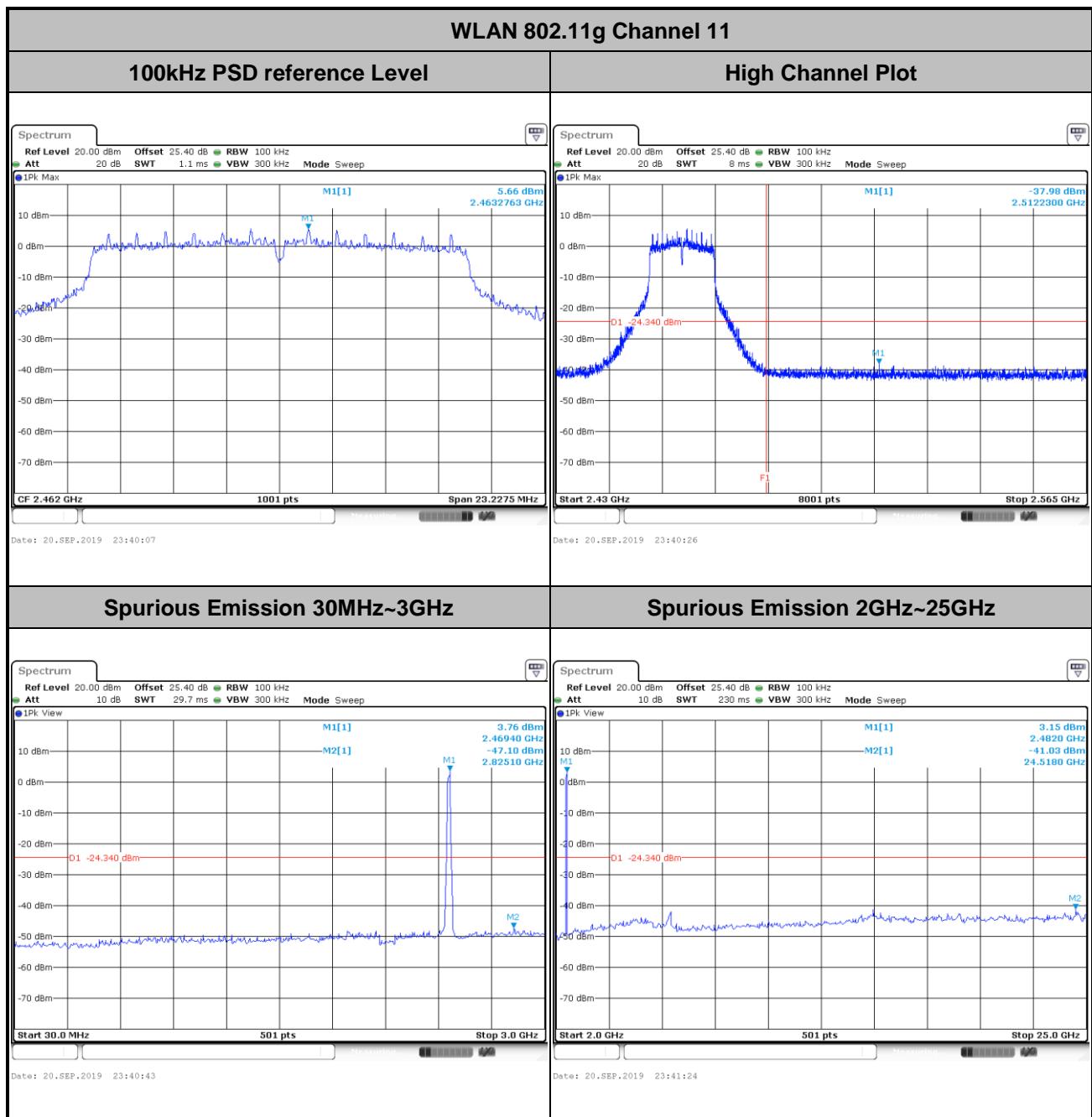


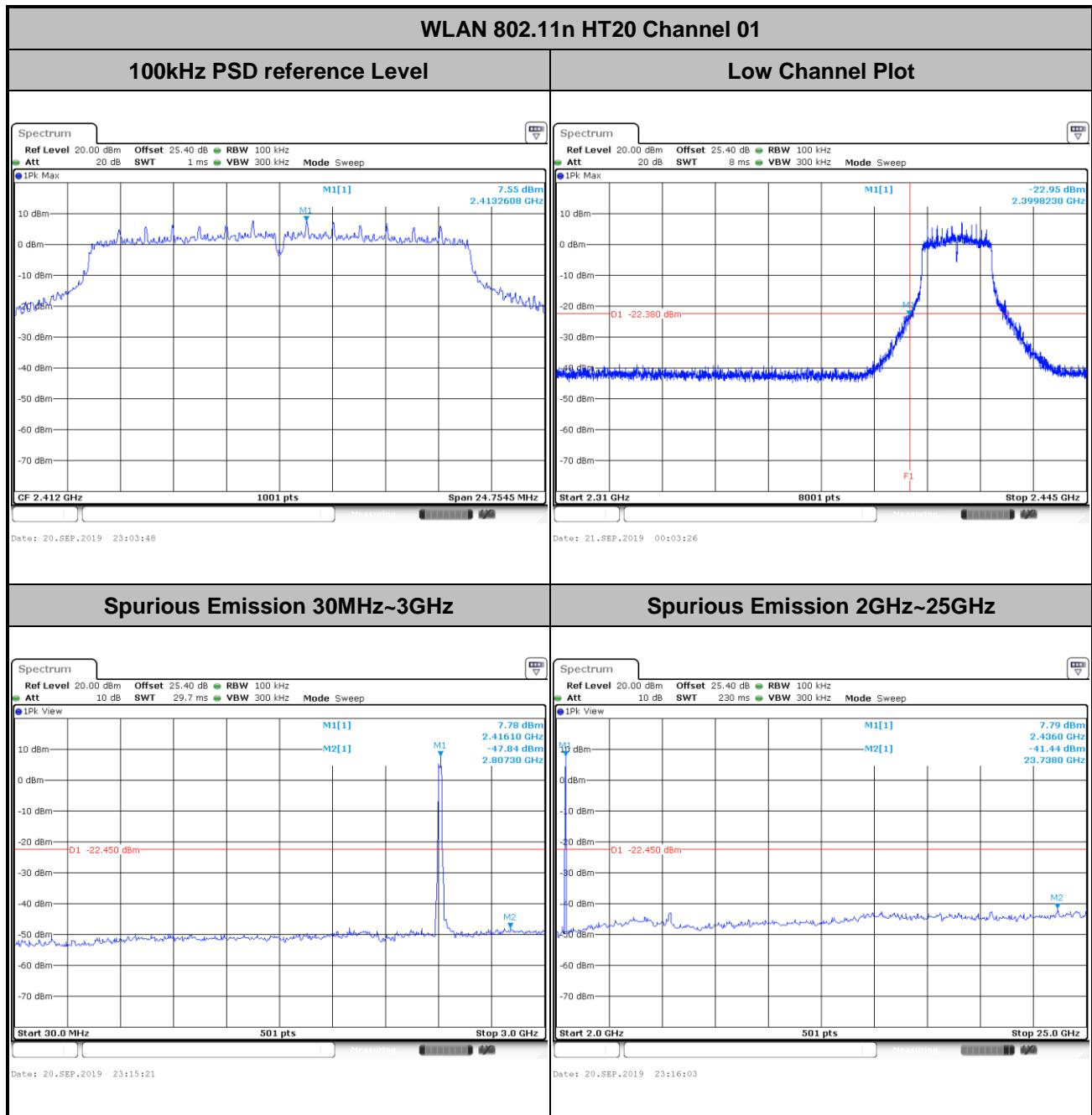


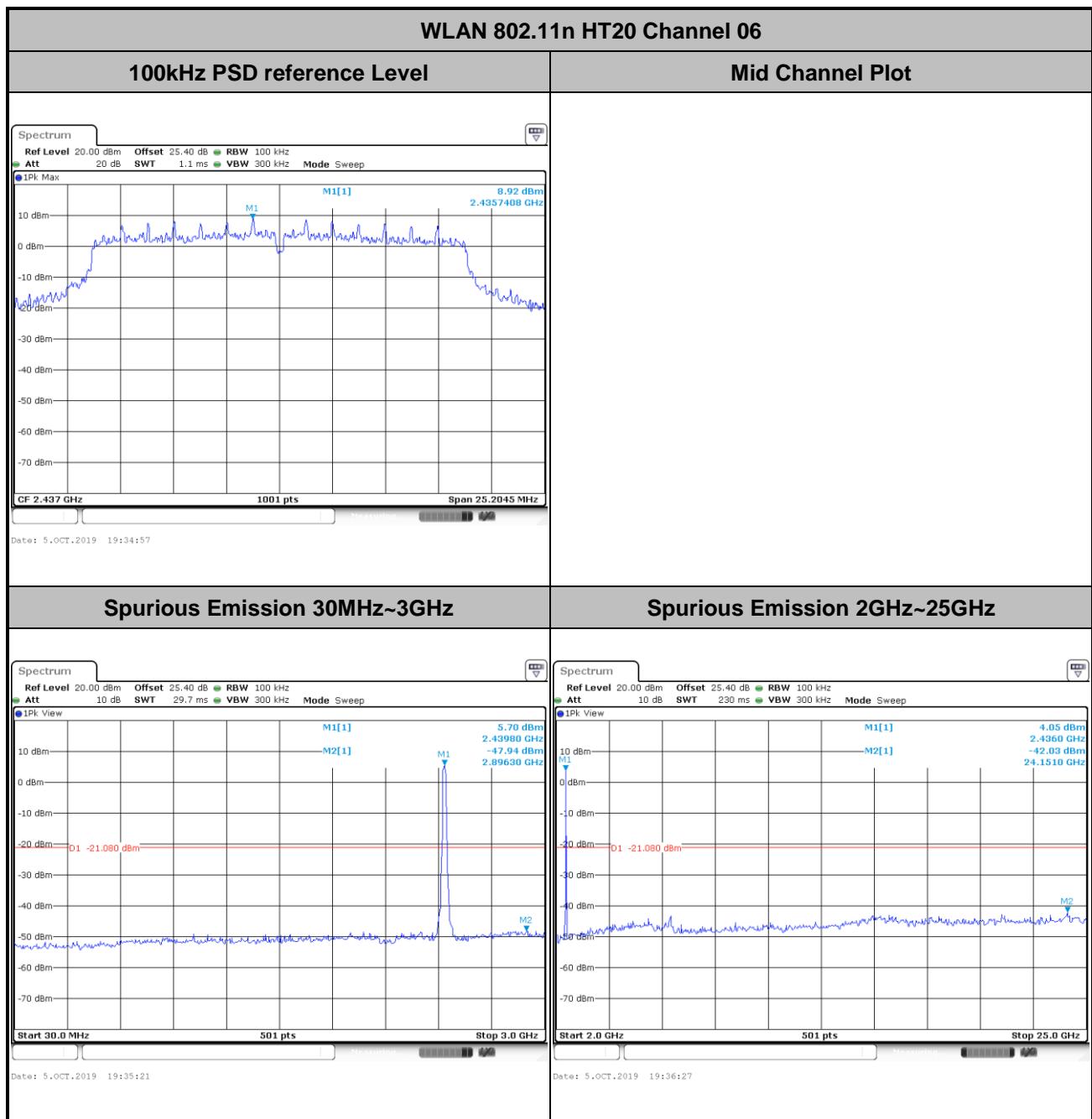


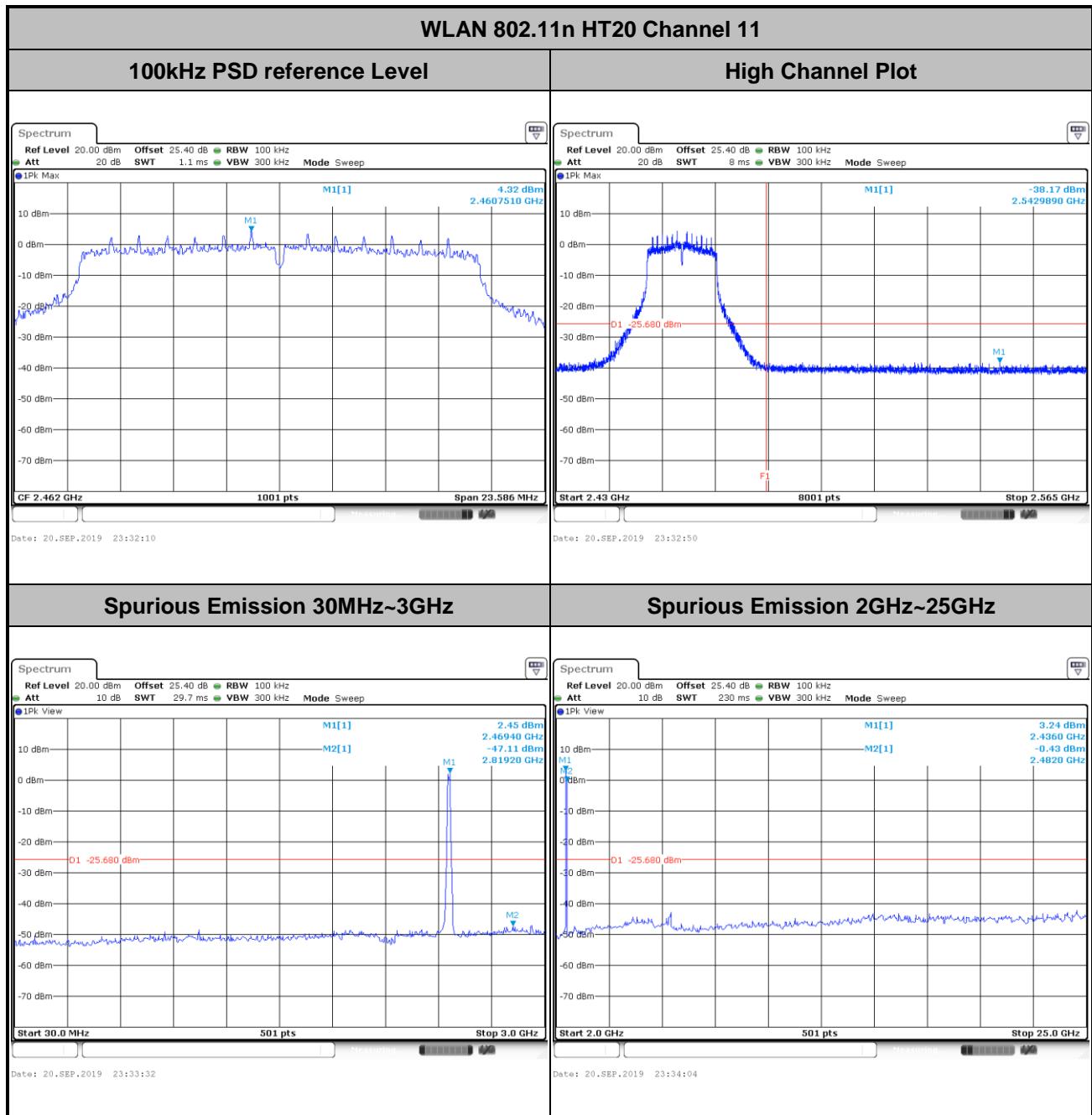


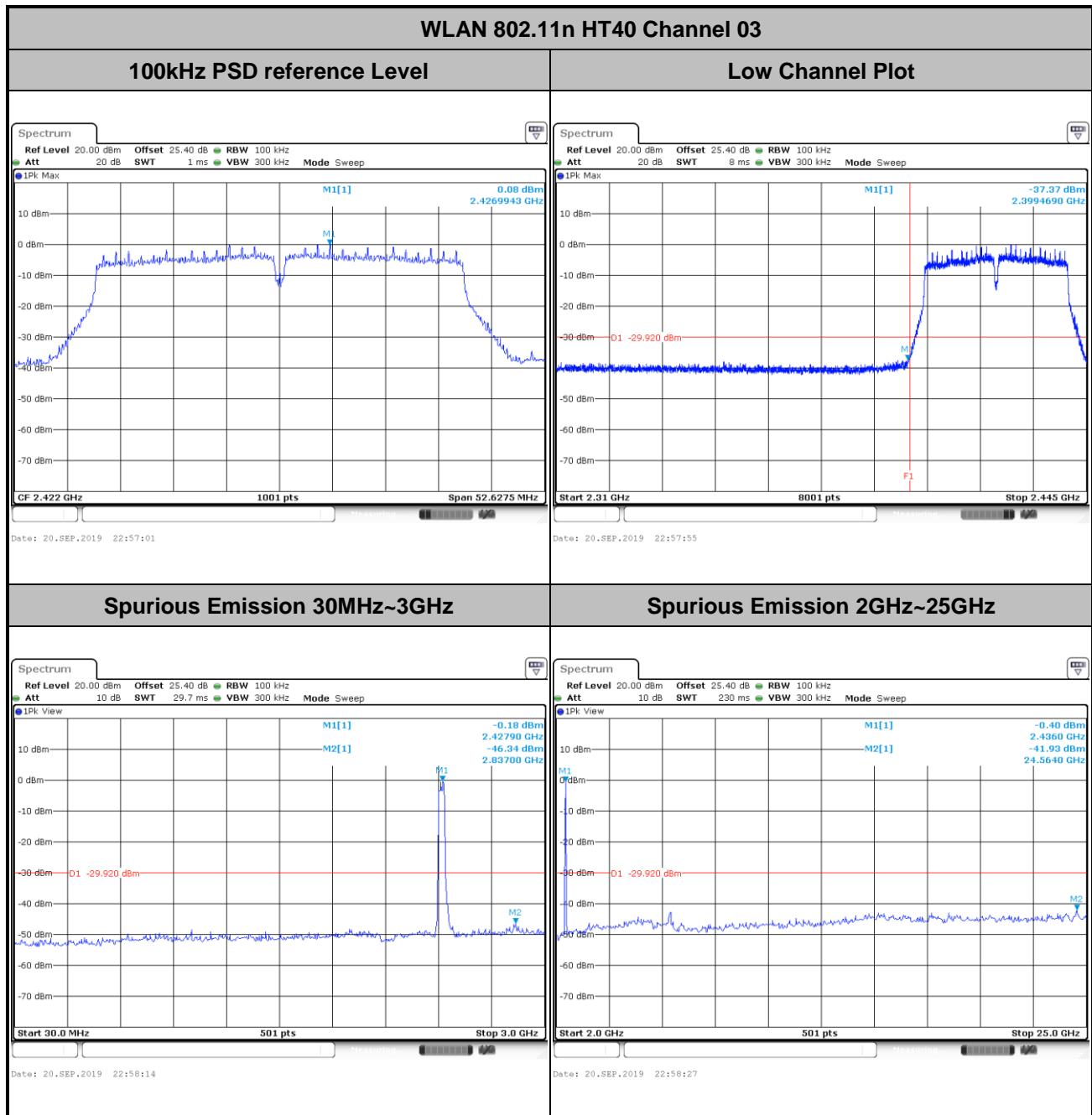


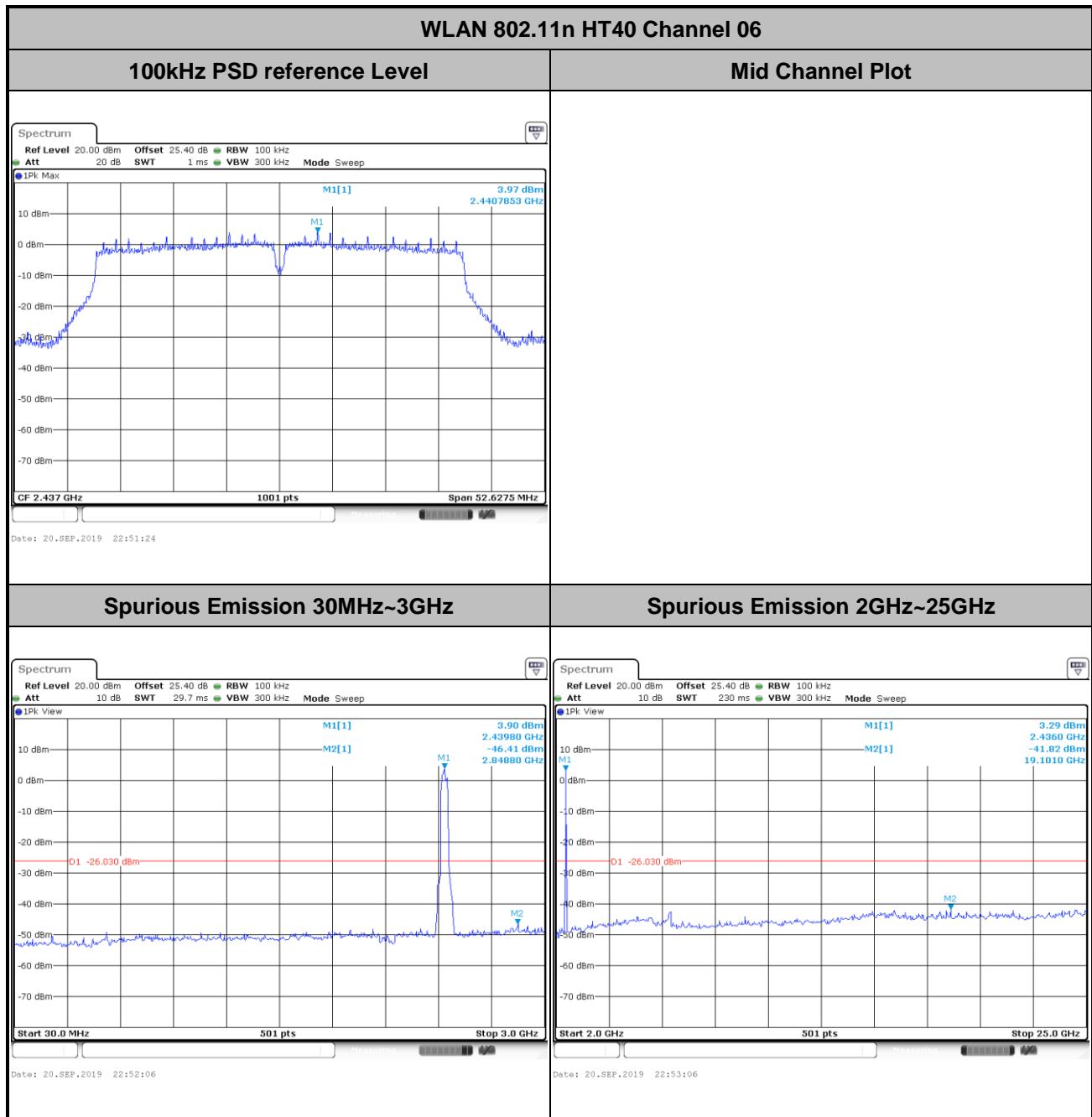


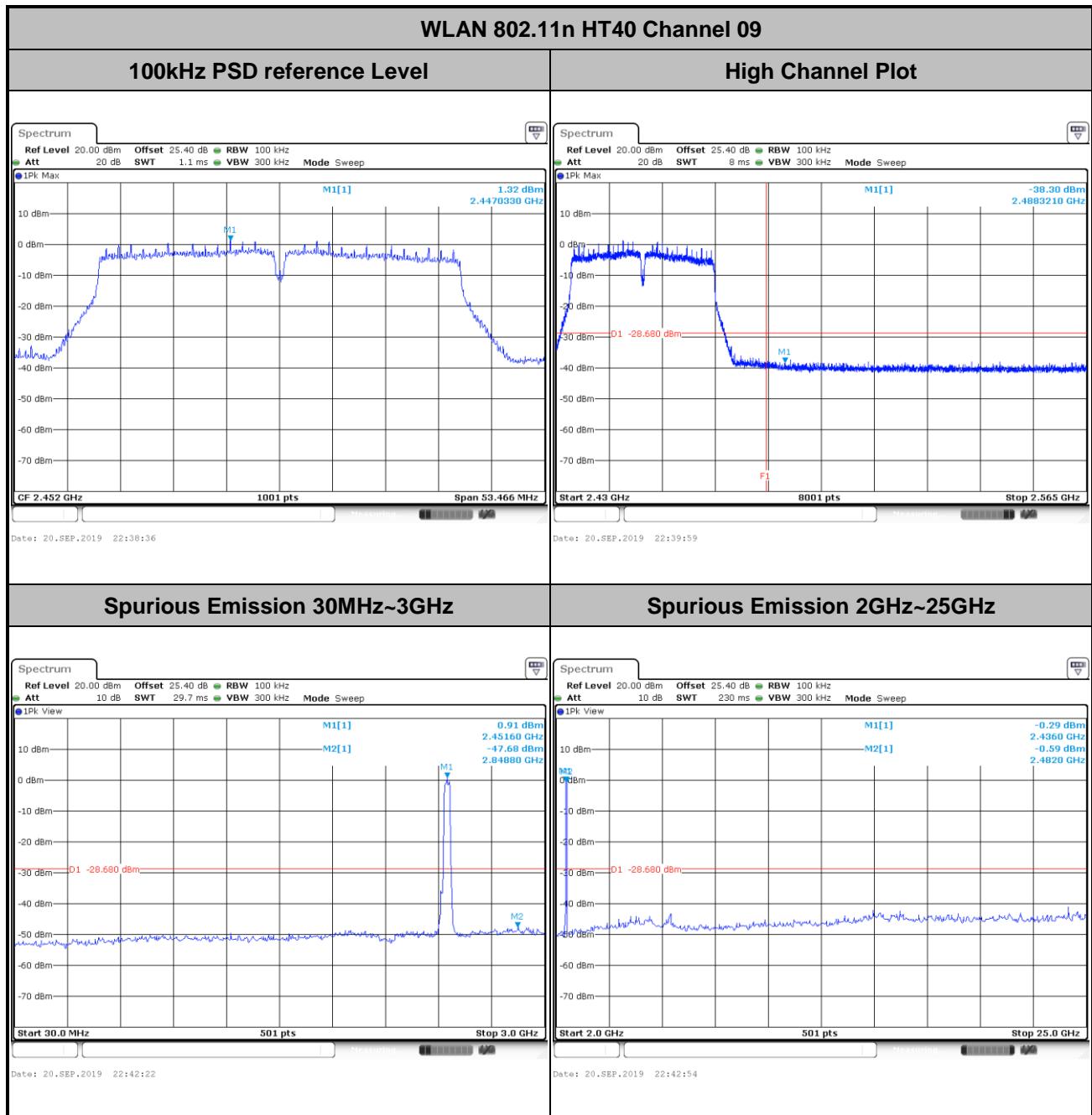














Number of TX = 2, Ant. 1 (Measured)

