



FCC RADIO TEST REPORT

FCC ID : UZ7VC8300
Equipment : Vehicle Computer
Brand Name : Zebra
Model Name : VC8300
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 Feb. 15, 2019 and testing was started from Apr. 04, 2019 and completed on Apr. 09, 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 variant 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: Jones Tsai

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 1.07 dB at 2390.000 MHz
-	15.207	AC Conducted Emission	Not Required	-
3.6	15.203 & 15.247(b)	Antenna Requirement	Pass	-

Remark:

1. Not required means after assessing, test items are not necessary to carry out.
2. This is a variant report by adding TXBF Mode. All the test cases were performed on original report which can be referred to Sporton Report Number FR8N0846C. Based on the original report, the test cases were verified.

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: Natasha Hsieh**



1 General Description

1.1 Product Feature of Equipment Under Test

Product Feature	
Equipment	Vehicle Computer
Brand Name	Zebra
Model Name	VC8300
FCC ID	UZ7VC8300
Sample 1	EUT with SKU 1
Sample 2	EUT with SKU 2
Sample 3	EUT with SKU 3
Sample 4	EUT with SKU 4
Sample 5	EUT with SKU 5
Sample 6	EUT with SKU 6
Sample 7	EUT with SKU 7
EUT supports Radios application	WLAN 11a/b/g/n HT20/HT40 WLAN 11ac VHT20/VHT40/VHT80 Bluetooth BR/EDR/LE
HW Version	EVT1
SW Version	Zebra/VC8300/VC8310:8.1.0/01-14-12-00-ON-U00-PRD/266: eng/release-keys
FW Version	01-14-12.00-ON-U00-PRD
MFD	03Nov18
EUT Stage	Identical Prototype

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

Specification of Accessories				
AC Adapter	Brand Name	Zebra	Model Name	FSP150-AAAN2-Z
Battery	Brand Name	Zebra	Model Name	BT000254A01
Car Charger	Brand Name	Zebra	Model Name	CA1210
RJ50/USB cable	Brand Name	Zebra	Model Name	CBA-U01-S07ZAR
Scanner	Brand Name	Zebra	Model Name	DS3508
Scanner	Brand Name	Zebra	Model Name	LS3408
Audio Speaker	Brand Name	Zebra	Model Name	M1000
Ferrite Core	Brand Name	Zebra	Model Name	M1000
Keyboard (ikey)	Brand Name	Zebra	Model Name	SLK-101-M-USB-3F
Keyboard (remote keyboard)	Brand Name	Zebra	Model Name	KYBD-QWH-VC80
External Antenna (Monopole)	Brand Name	Zebra	Model Name	AN2010
External Antenna (Monopole)	Brand Name	Zebra	Model Name	AN2020
External Antenna (Dipole)	Brand Name	Zebra	Model Name	AN2030
Power Pre-regulator	Brand Name	PSION	Model Name	PS1370



<Sample Information>

Model Name	VC80x 8"			VC80x 10"			
	SKU1	SKU2	SKU3	SKU4	SKU5	SKU6	SKU7
SKU Name	Warehouse 1	Warehouse 2	Freezer SK HYNIX eMMC & MICRON DRAM	Warehouse	Outdoor	Warehouse	Freezer
OS	Android O	Android O	Android O	Android O	Android O	Android O	Android O
Display	Tianma	Tianma	Tianma	AUO	Mitsubishi	AUO	AUO
DTB board / Fuxture	DTB 8" CTP (TCA8414)	DTB 8" CTP (TCA8414)	DTB 8" CTP (TCA8414)	DTB AUO CTP (TCA8414)	DTB MIT CTP (TCA8414)	DTB AUO RTP (TCA8414)	DTB AUO RTP (TCA8414)
TP Type (Gunze)	CTP 8"	CTP 8"	CTP 8" w/ Heater	CTP 10"	CTP 10"	RTP	RTP w/ Heater
KB printing	QWERTY	AZETY	QWERTY				
KB Board	NO	NO	NO	Yes	Yes	Yes	Yes
KB	Yes	Yes	Yes	NO	NO	NO	NO
MLB	SDA660	SDA660	SDA660	SDA660	SDA660	SDA660	SDA660
PWR Board	Yes	Yes	Yes	Yes	Yes	Yes	Yes
USB Board	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DB9 Board	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Battery Heater Board	Yes	Yes	Yes	Yes	Yes	Yes	Yes

1.2 Product Specification of Equipment Under Test

Standards-related Product Specification									
Tx/Rx Channel Frequency Range		2412 MHz ~ 2462 MHz							
Maximum (average) Output Power to antenna		<MIMO Chain 1 + 2> 802.11ac VHT20 : 21.76 dBm(0.1500 W) 802.11ac VHT40 : 15.76 dBm(0.0377 W)							
99% Occupied Bandwidth		<MIMO Chain. 1> 802.11ac VHT20 : 18.30MHz 802.11ac VHT40 : 37.10MHz <MIMO Chain. 2> 802.11ac VHT20 : 17.95MHz 802.11ac VHT40 : 36.90MHz							
Type of Modulation		802.11ac: OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)							
Antenna Function Description		<table border="1"> <tr> <td></td><td>Chain. 1</td><td>Chain 2</td></tr> <tr> <td>802.11 ac TXBF</td><td>V</td><td>V</td></tr> </table>			Chain. 1	Chain 2	802.11 ac TXBF	V	V
	Chain. 1	Chain 2							
802.11 ac TXBF	V	V							

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



Antenna No.	Chain No.	Model	Antenna Type	Antenna Gain (dBi) Exclude Cable loss	Internal Cable loss (dB)	External Cable loss (dB)	Antenna Gain (dBi) Include Cable loss	Frequency (GHz)		
1	Int. Chain 0	AN-000242-01	Patch	3.30	N/A	N/A	3.30	2.4~2.4835		
				4.53	N/A	N/A	4.53	5.15~5.85		
	Int. Chain 1			4.00	N/A	N/A	4.00	2.4~2.4835		
				4.79	N/A	N/A	4.79	5.15~5.85		
2	Ext. Chain 0	AN2010	Monopole	2	0.6	1.8	-0.4	2.4~2.4835		
				2	0.9	2.6	-1.5	5.15~5.85		
	Ext. Chain 1			2	0.6	1.8	-0.4	2.4~2.4835		
				2	0.9	2.6	-1.5	5.15~5.85		
3	Ext. Chain 0	AN2020	Monopole	5	0.6	1.8	2.6	2.4~2.4835		
	Ext. Chain 1			5	0.6	1.8	2.6	2.4~2.4835		
4	Ext. Chain 0	AN2030	Dipole	2	0.6	N/A	1.4	2.4~2.4835		
				3.7	0.9	N/A	2.8	5.15~5.85		
	Ext. Chain 1			2	0.6	N/A	1.4	2.4~2.4835		
				3.7	0.9	N/A	2.8	5.15~5.85		

1.3 Modification of EUT

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

1.4 Testing Location

Test Site	SPORTON INTERNATIONAL INC.
Test Site Location	No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978
Test Site No.	Sporton Site No.
	TH05-HY

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

Test Site	SPORTON INTERNATIONAL INC.
Test Site Location	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
Test Site No.	Sporton Site No.
	03CH11-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: All test items were verified and recorded according to the standards and without any deviation during the test.



2 Test Configuration of Equipment Under Test

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: 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 (X plane for Antenna 1; Y plane for Antenna 3; Vertical for Antenna 4) were recorded in this report.

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		



MIMO <Chain 1+2>

802.11ac VHT20 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	MCS 4	MCS 5	MCS 6	MCS 7	MCS 8
CH 01	2412	16.56	CH 06	21.66	21.61	21.56	21.61	21.61	21.66	21.61	21.61
CH 06	2437	21.76									
CH 11	2462	13.36									

802.11ac VHT40 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	MCS 4	MCS 5	MCS 6	MCS 7	MCS 8	MCS 9
CH 03	2422	13.82	CH 06	15.66	15.66	15.71	15.41	15.36	15.41	15.41	15.36	15.41
CH 06	2437	15.76										
CH 09	2452	8.86										

2.2 Test Mode

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

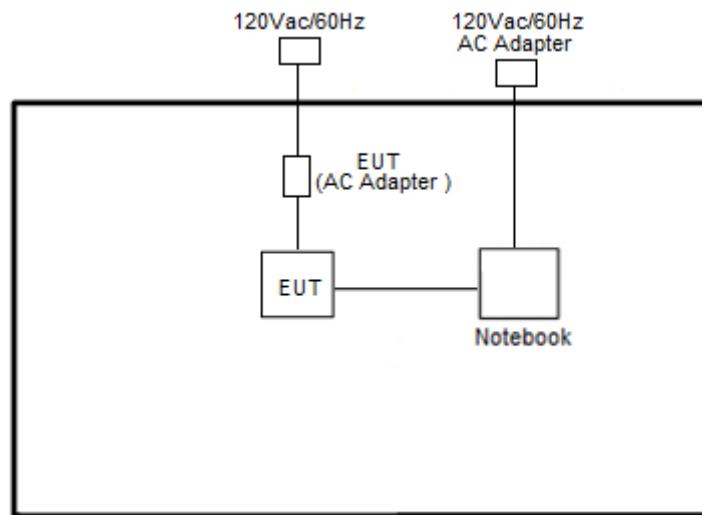
TXBF Mode

Modulation	Data Rate
802.11ac VHT20	MCS0
802.11ac VHT40	MCS0

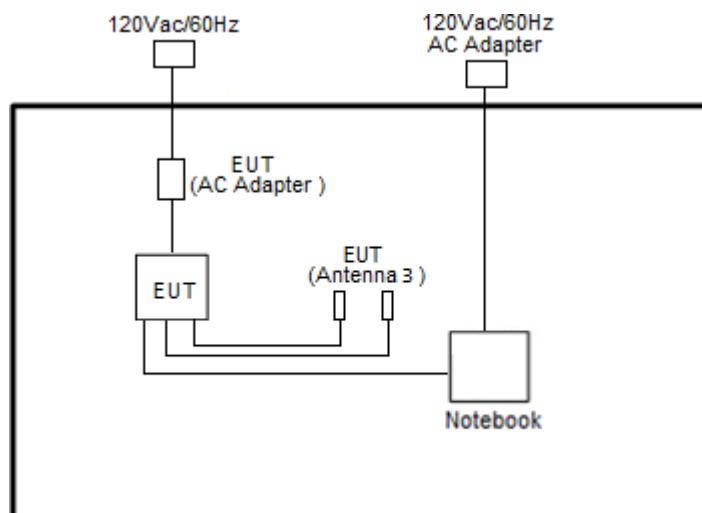
Remark: For Radiated Test Cases, the tests were performed with Sample 3, and each antenna (Ant. 1, Ant. 3, Ant. 4) was tested.

2.3 Connection Diagram of Test System

<EUT with Antenna 1>

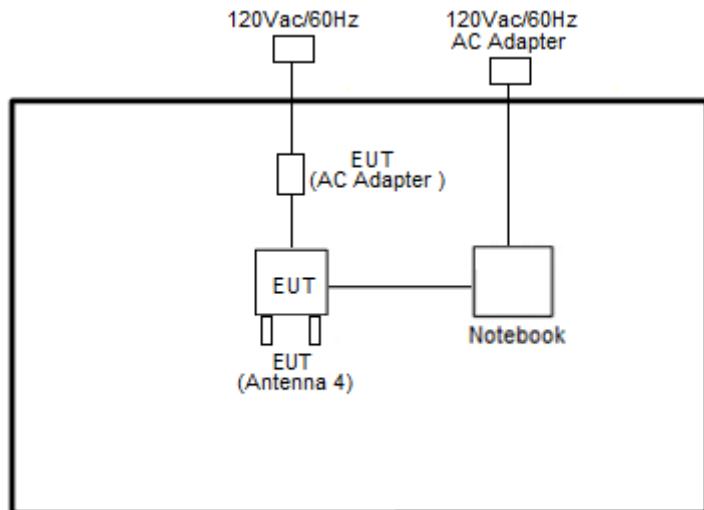


<EUT with Antenna 3>





<EUT with Antenna 4>



2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Notebook	Lenovo	G480	NoteBook-41	NA	unshilded 1.8m



2.5 EUT Operation Test Setup

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. The “ADB” software tool was used to enable the EUT to transmit signals continuously.

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.

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

$$= 4.2 + 10 = 14.2 \text{ (dB)}$$



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.

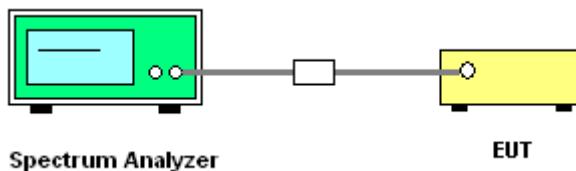
3.1.2 Measuring Instruments

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

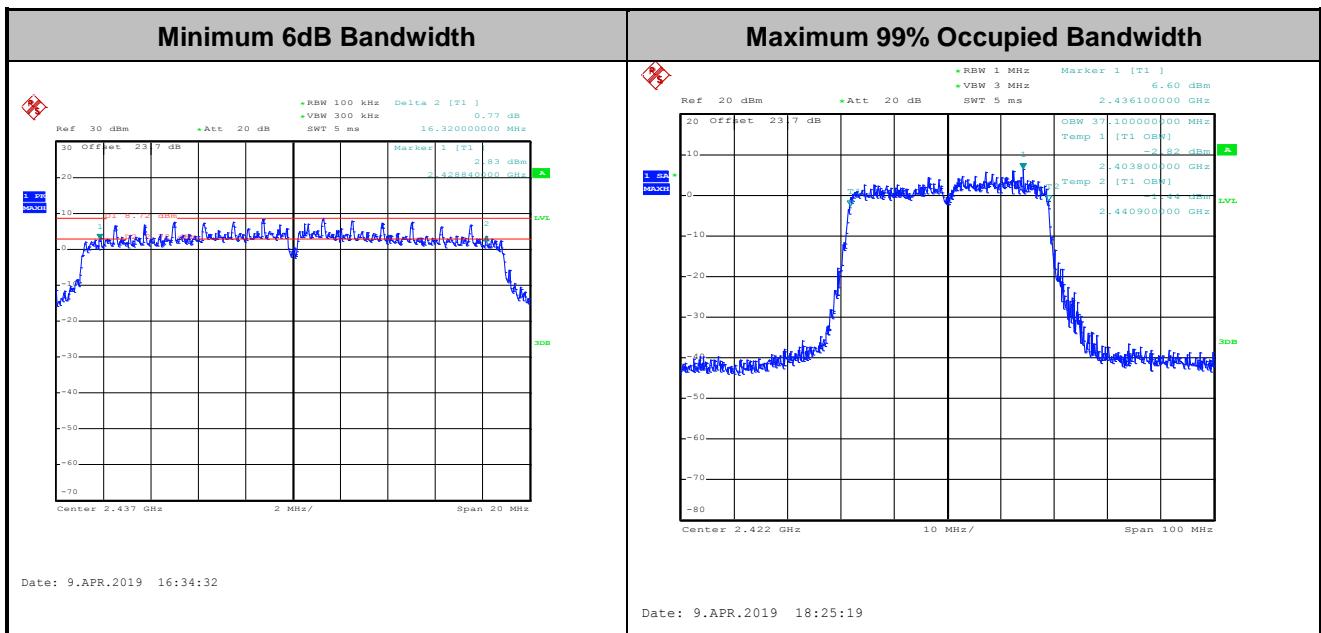




3.1.5 Test Result of 6dB and 99% Occupied Bandwidth

Test Engineer :	Richard Qiu	Temperature :	21~25°C
		Relative Humidity :	51~54%

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Occupied BW (MHz)		6dB BW (MHz)		6dB BW Limit (MHz)	Pass/Fail
					Chain 1	Chain 2	Chain 1	Chain 2		
					18.30	17.85	17.52	17.68	0.50	Pass
VHT20	MCS0	2	1	2412	17.95	17.95	17.72	16.32	0.50	Pass
VHT20	MCS0	2	6	2437	17.90	17.90	16.52	16.92	0.50	Pass
VHT40	MCS0	2	3	2422	37.10	36.40	35.68	35.70	0.50	Pass
VHT40	MCS0	2	6	2437	36.40	36.50	35.04	36.64	0.50	Pass
VHT40	MCS0	2	9	2452	36.50	36.90	36.32	36.36	0.50	Pass



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 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

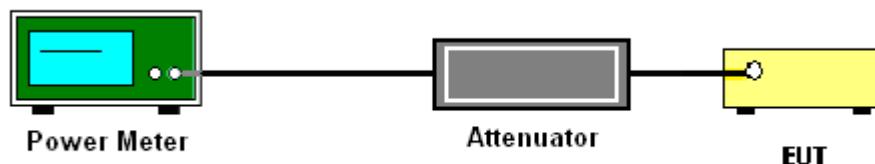
See list of measuring equipment of this test report.

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 :	Richard Qiu				Temperature :		21~25°C	
					Relative Humidity :			

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)		Pass /Fail
					Chain 1	Chain 2	SUM	Chain 1	Chain 2	Chain 1	Chain 2	Chain 1	Chain 2	Chain 1	Chain 2	
VHT20	MCS0	2	1	2412	13.70	13.40	16.56	27.99	27.99	8.01	8.01	24.57	24.57	36.00	36.00	Pass
VHT20	MCS0	2	6	2437	18.80	18.70	21.76	27.99	27.99	8.01	8.01	29.77	29.77	36.00	36.00	Pass
VHT20	MCS0	2	11	2462	10.40	10.30	13.36	27.99	27.99	8.01	8.01	21.37	21.37	36.00	36.00	Pass
VHT40	MCS0	2	3	2422	11.10	10.50	13.82	27.99	27.99	8.01	8.01	21.83	21.83	36.00	36.00	Pass
VHT40	MCS0	2	6	2437	12.90	12.60	15.76	27.99	27.99	8.01	8.01	23.77	23.77	36.00	36.00	Pass
VHT40	MCS0	2	9	2452	5.90	5.80	8.86	27.99	27.99	8.01	8.01	16.87	16.87	36.00	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.

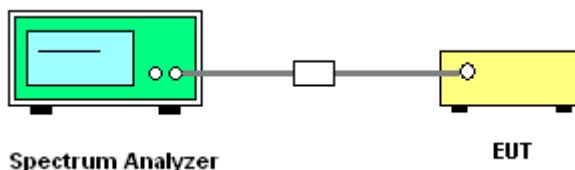
If measurements performed using method (2) plus $10 \log (N)$ exceeds the emission limit, the test should choose method (1) before declaring that the device fails the emission limit.

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)

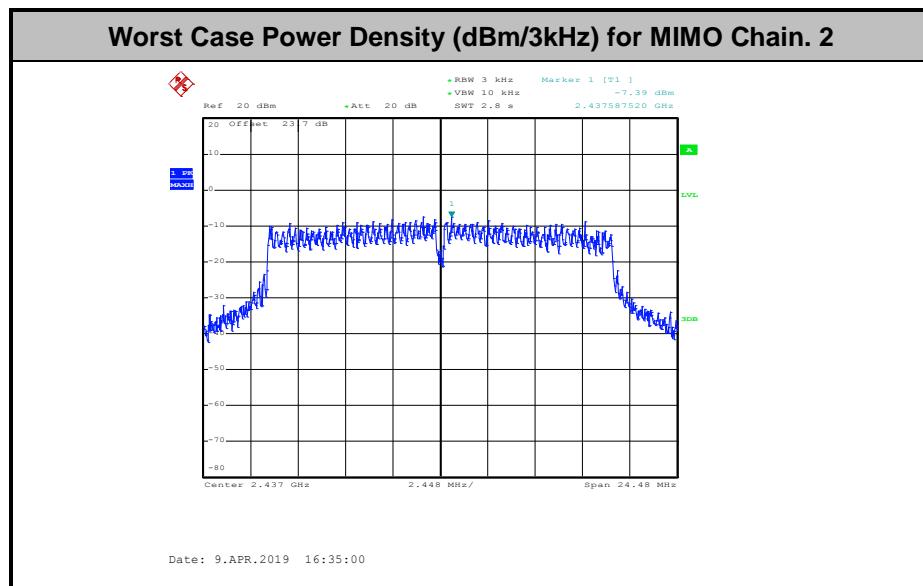
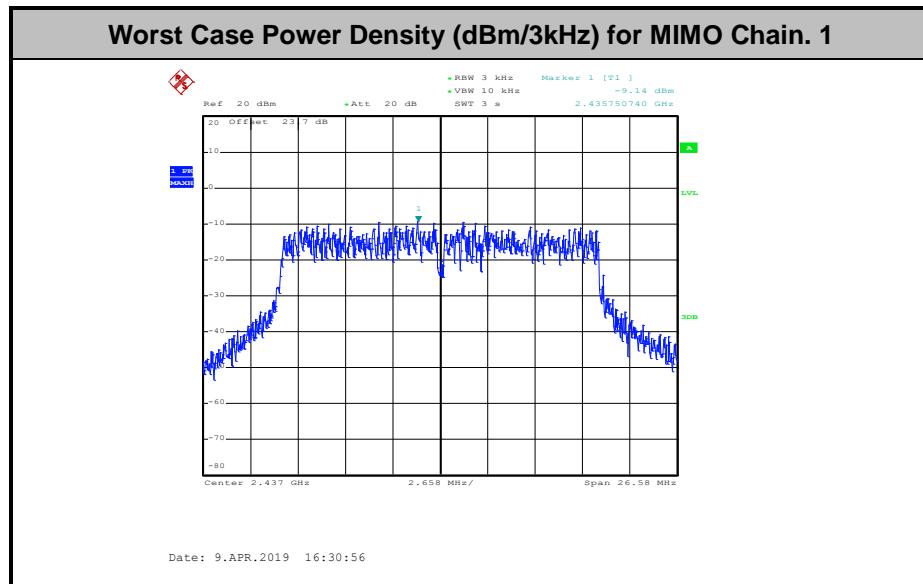
3.3.4 Test Setup





3.3.5 Test Result of Power Spectral Density

Test Engineer :	Richard Qiu	Temperature :	21~25°C
		Relative Humidity :	51~54%





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.

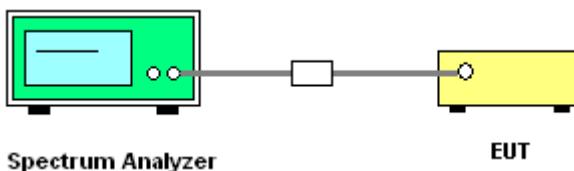
3.4.2 Measuring Instruments

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

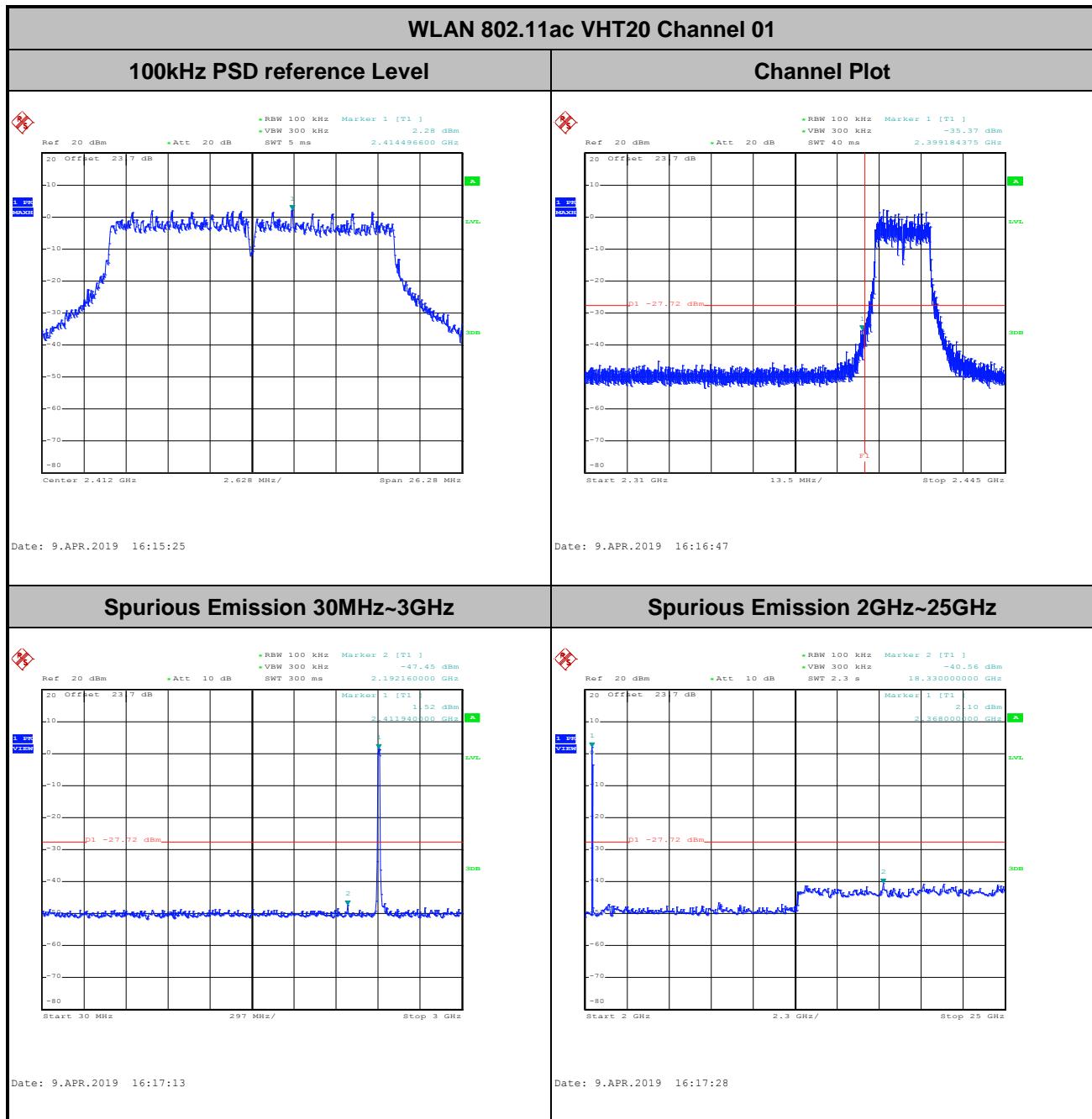


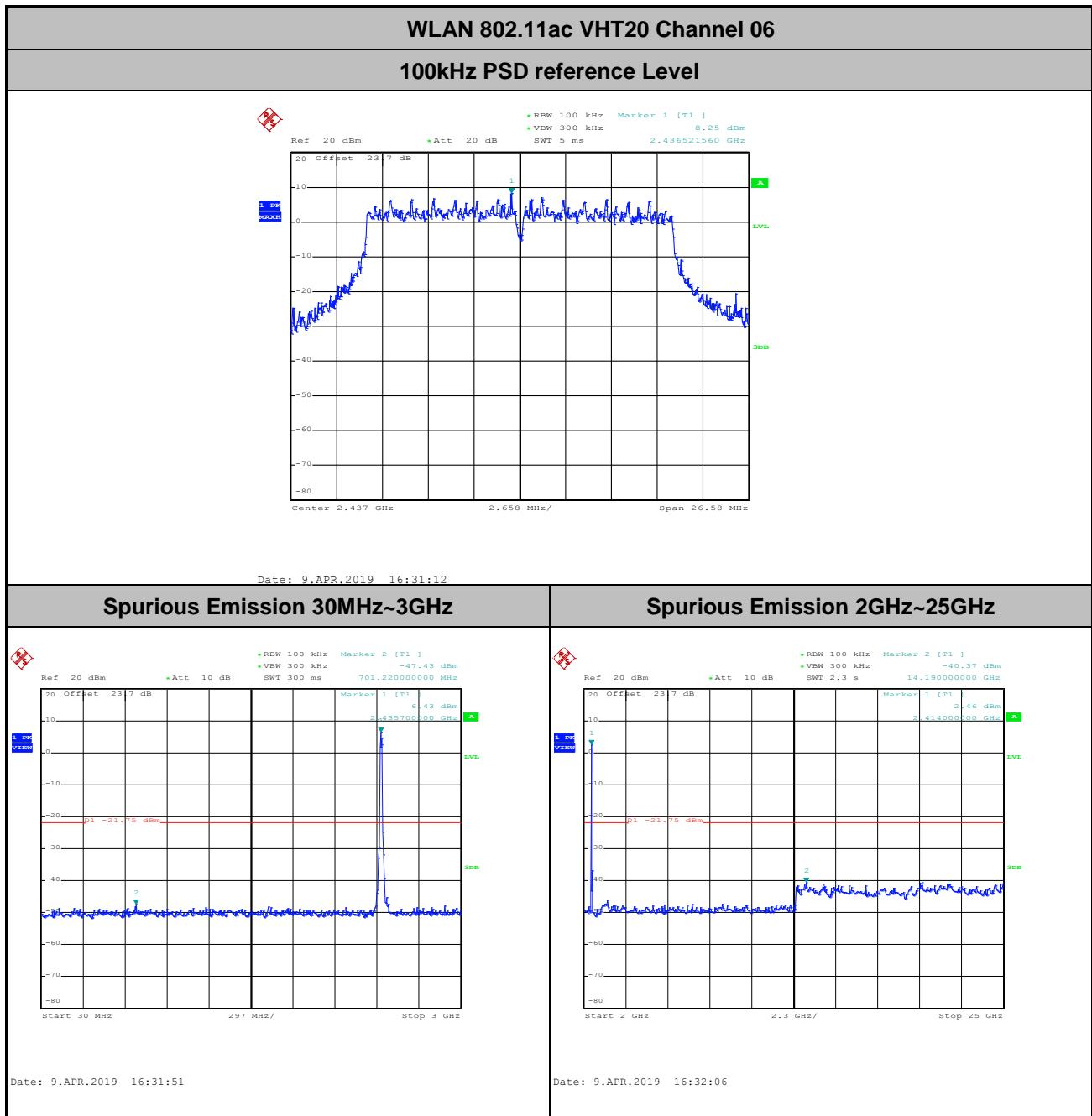


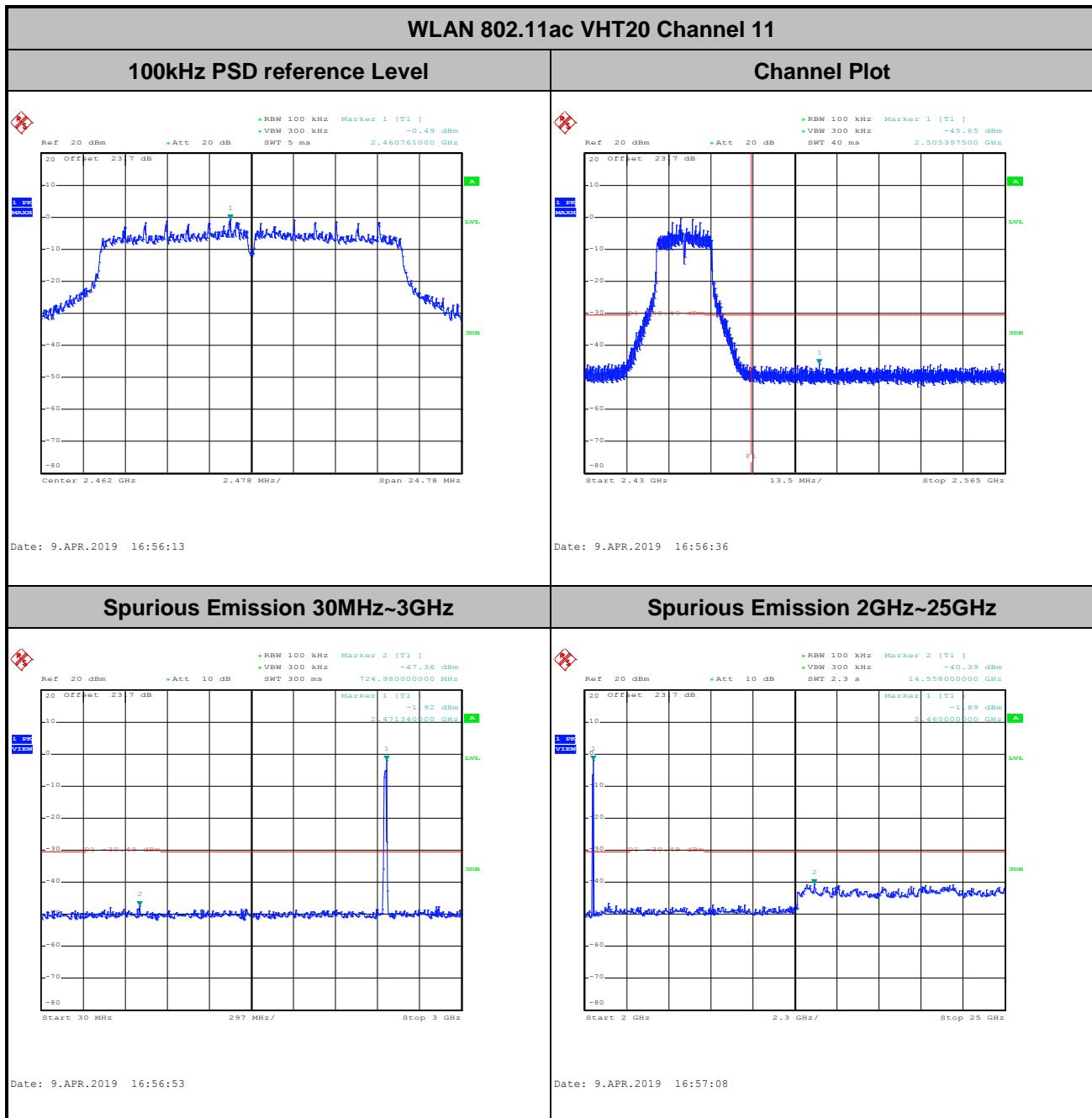
3.4.5 Test Result of Conducted Band Edges and Spurious Emission

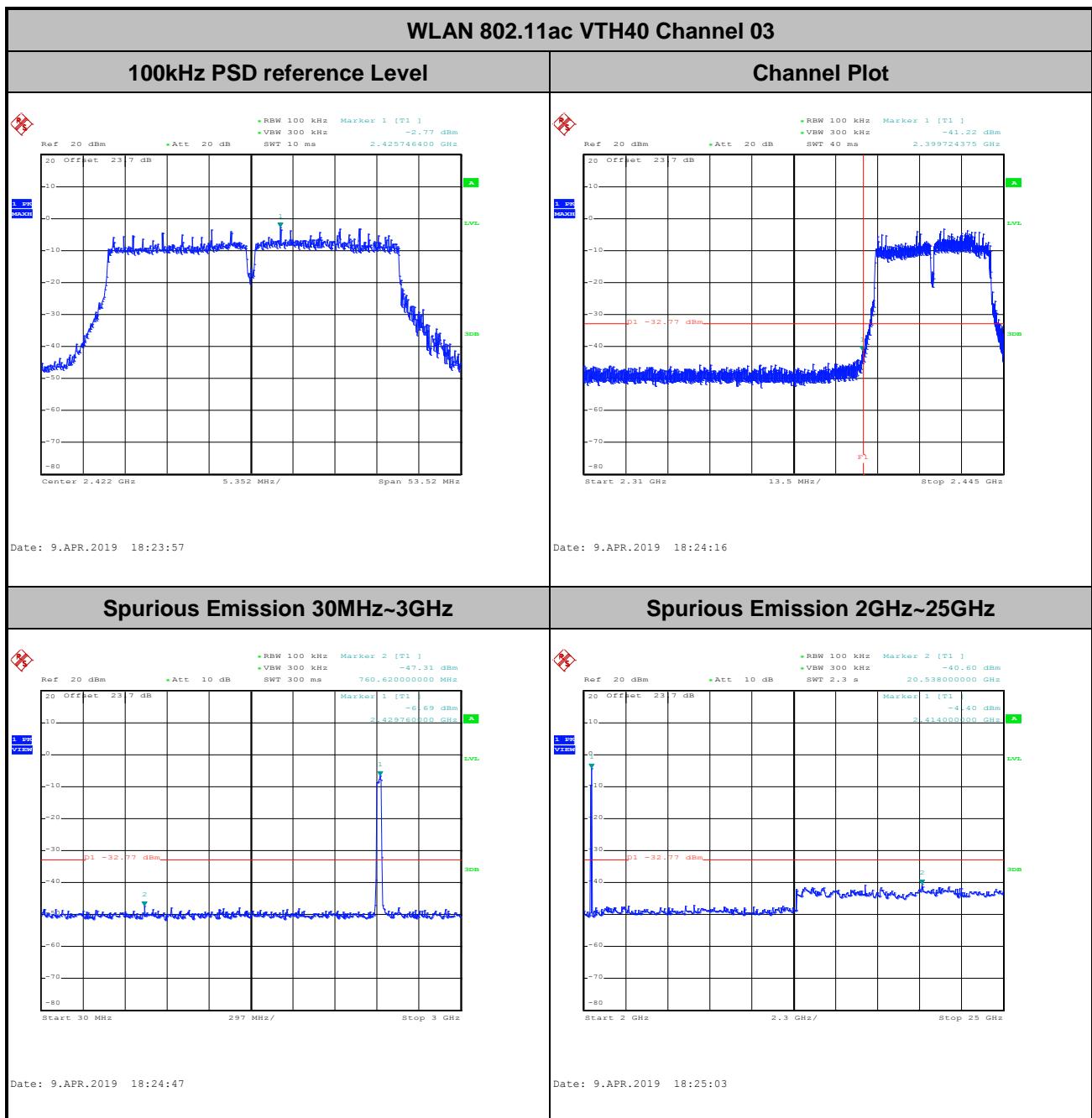
Test Engineer :	Richard Qiu	Temperature :	21~25°C
		Relative Humidity :	51~54%

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





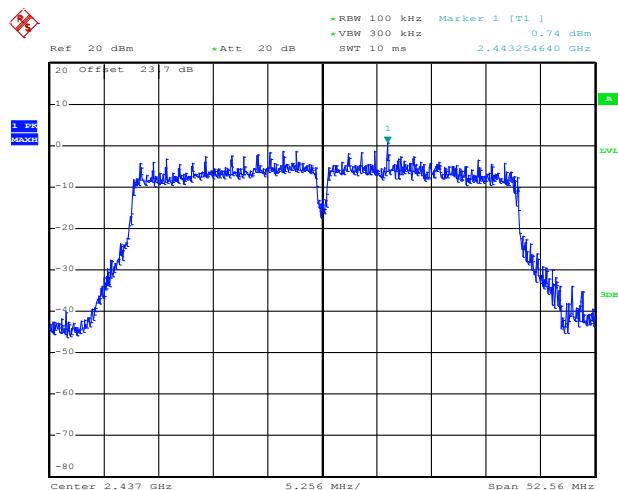






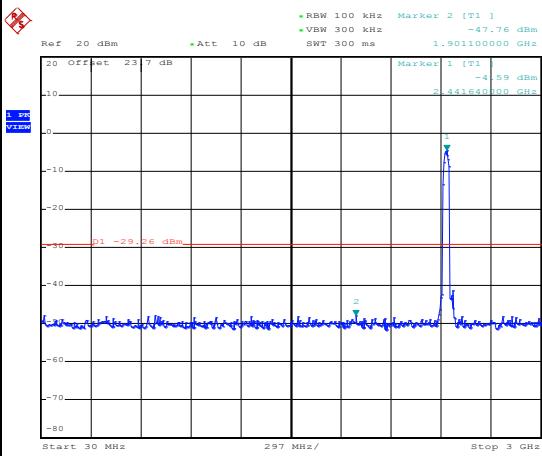
WLAN 802.11ac VTH40 Channel 06

100kHz PSD reference Level



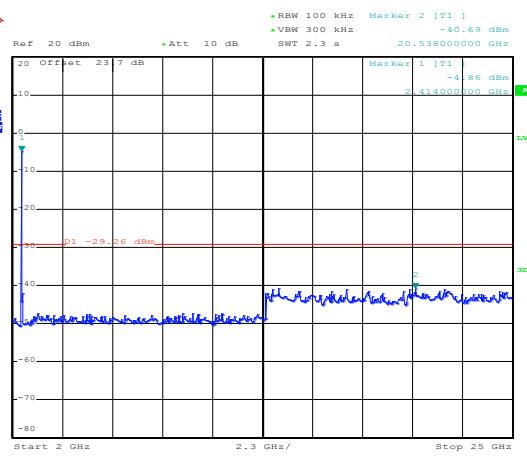
Date: 9.APR.2019 18:31:56

Spurious Emission 30MHz~3GHz

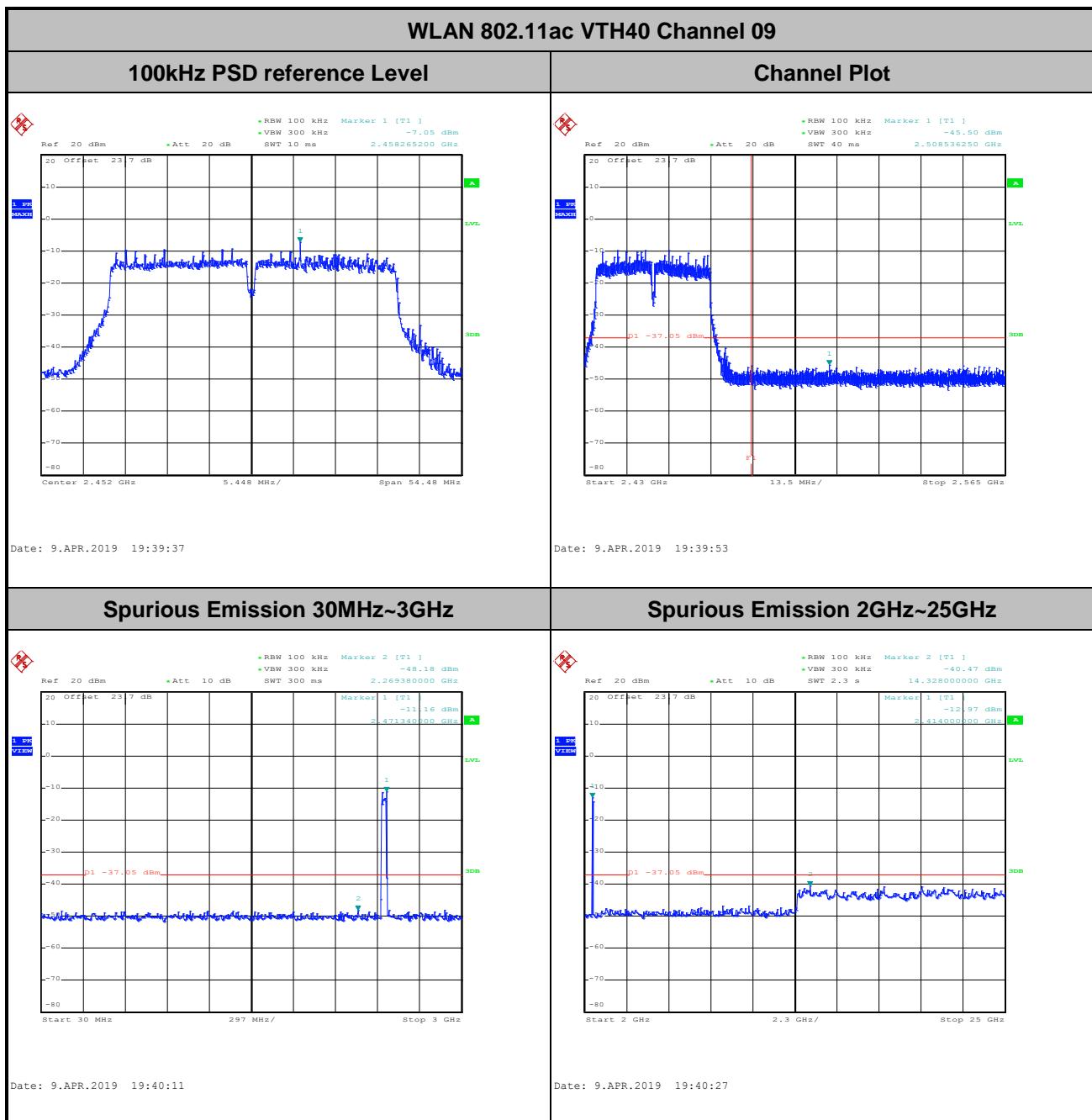


Date: 9.APR.2019 18:32:20

Spurious Emission 2GHz~25GHz

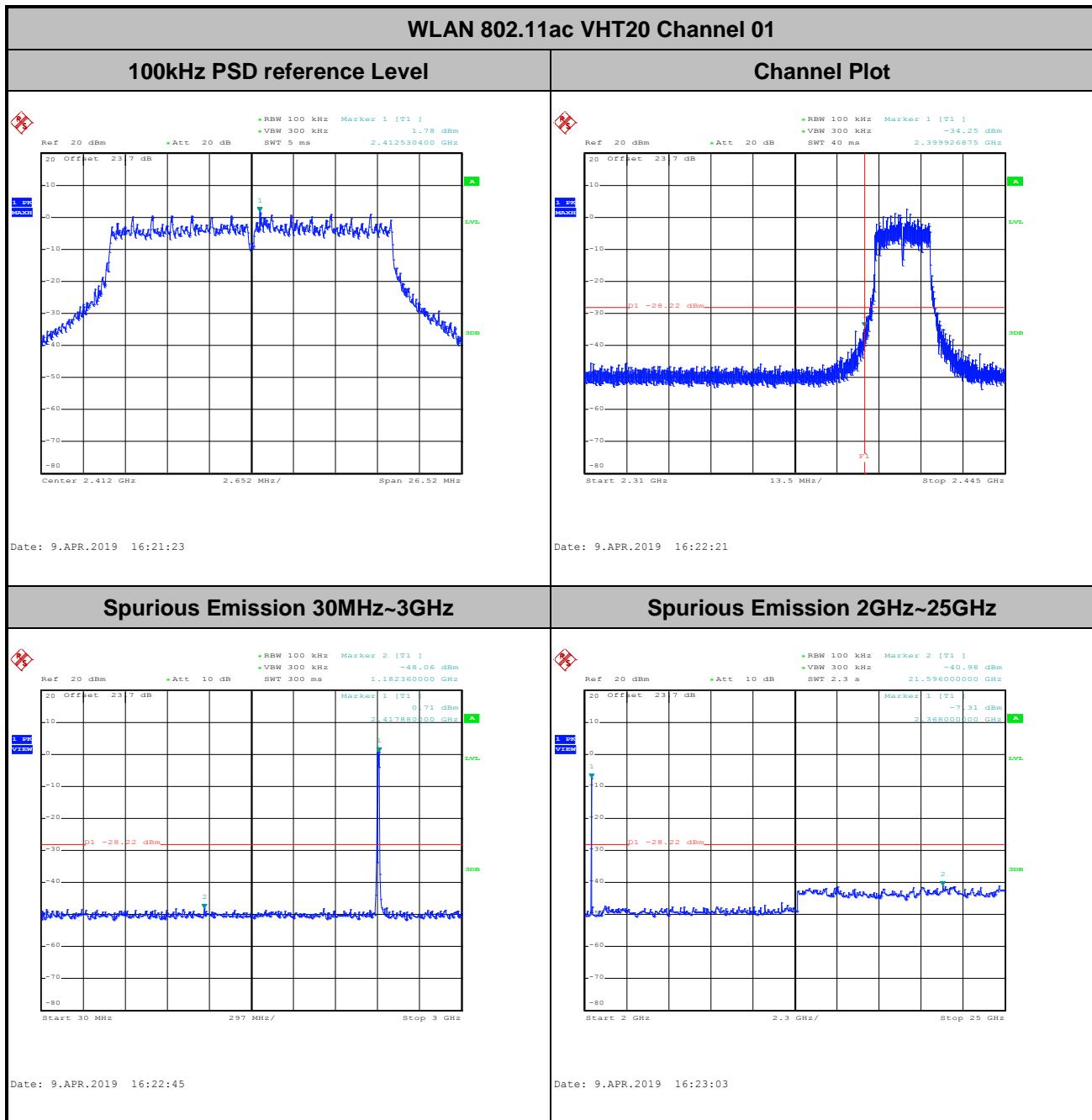


Date: 9.APR.2019 18:32:36





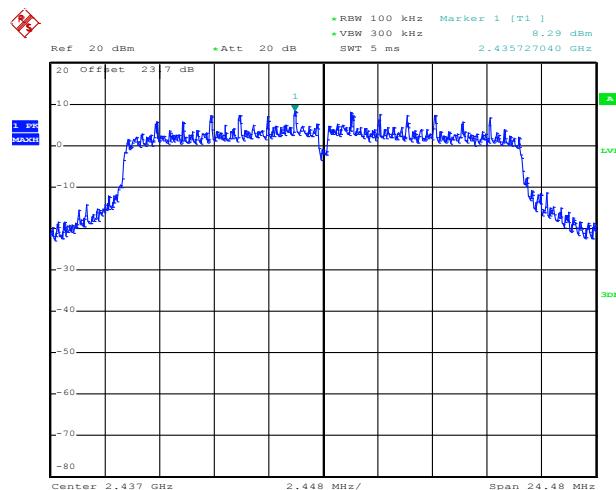
Number of TX = 2, Chain. 2 (Measured)





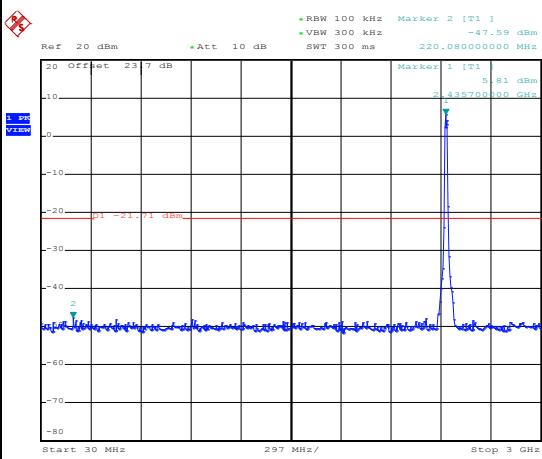
WLAN 802.11ac VHT20 Channel 06

100kHz PSD reference Level



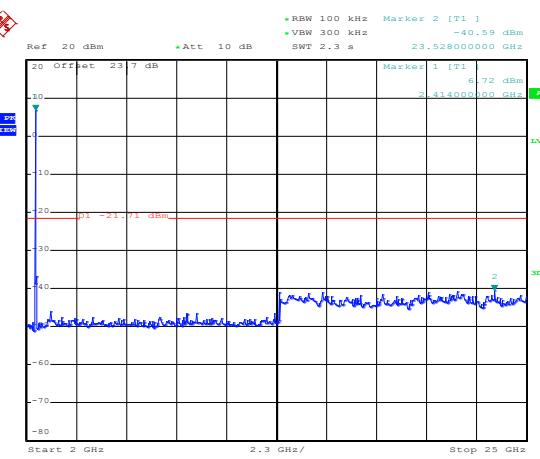
Date: 9.APR.2019 16:35:17

Spurious Emission 30MHz~3GHz

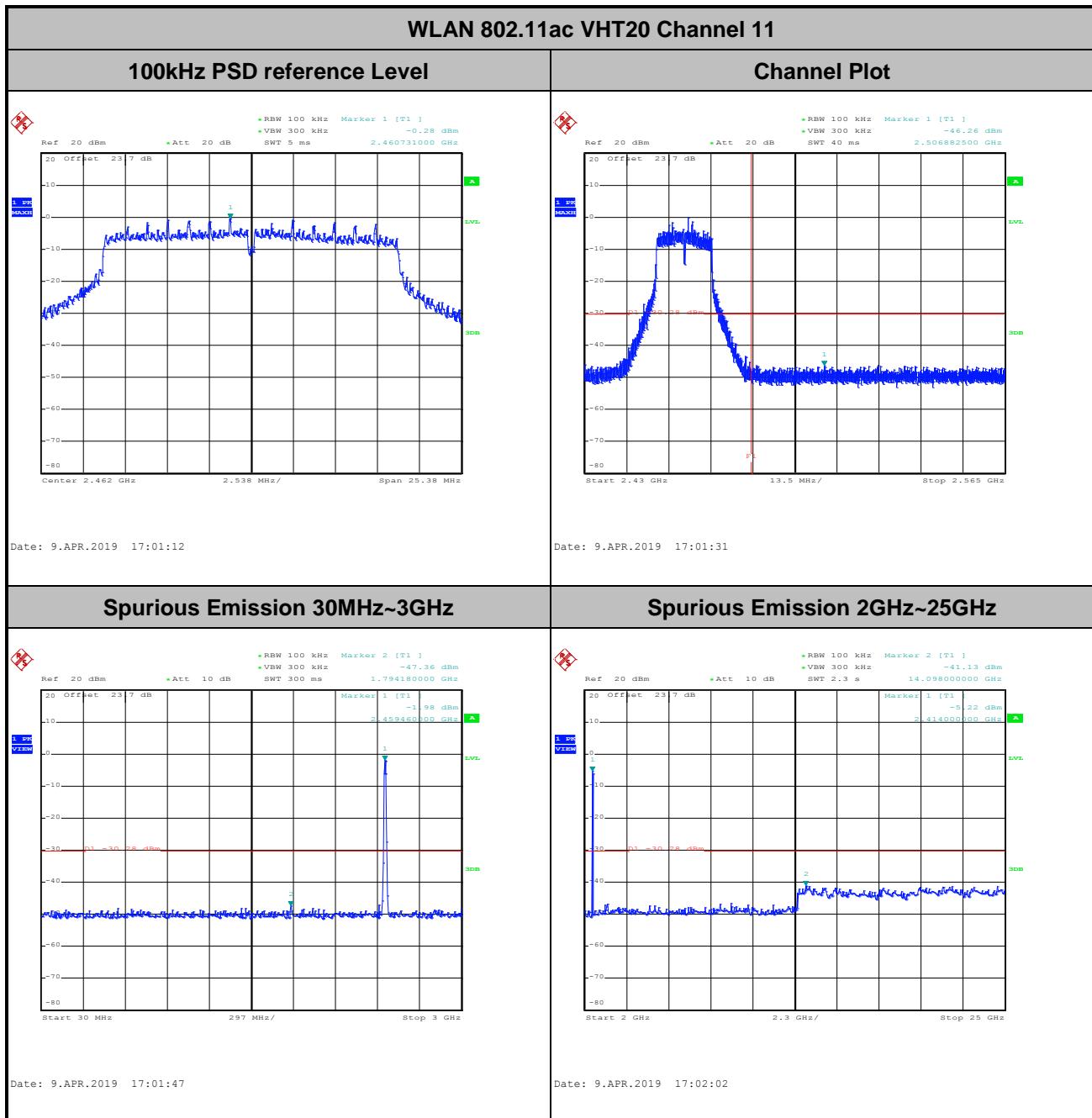


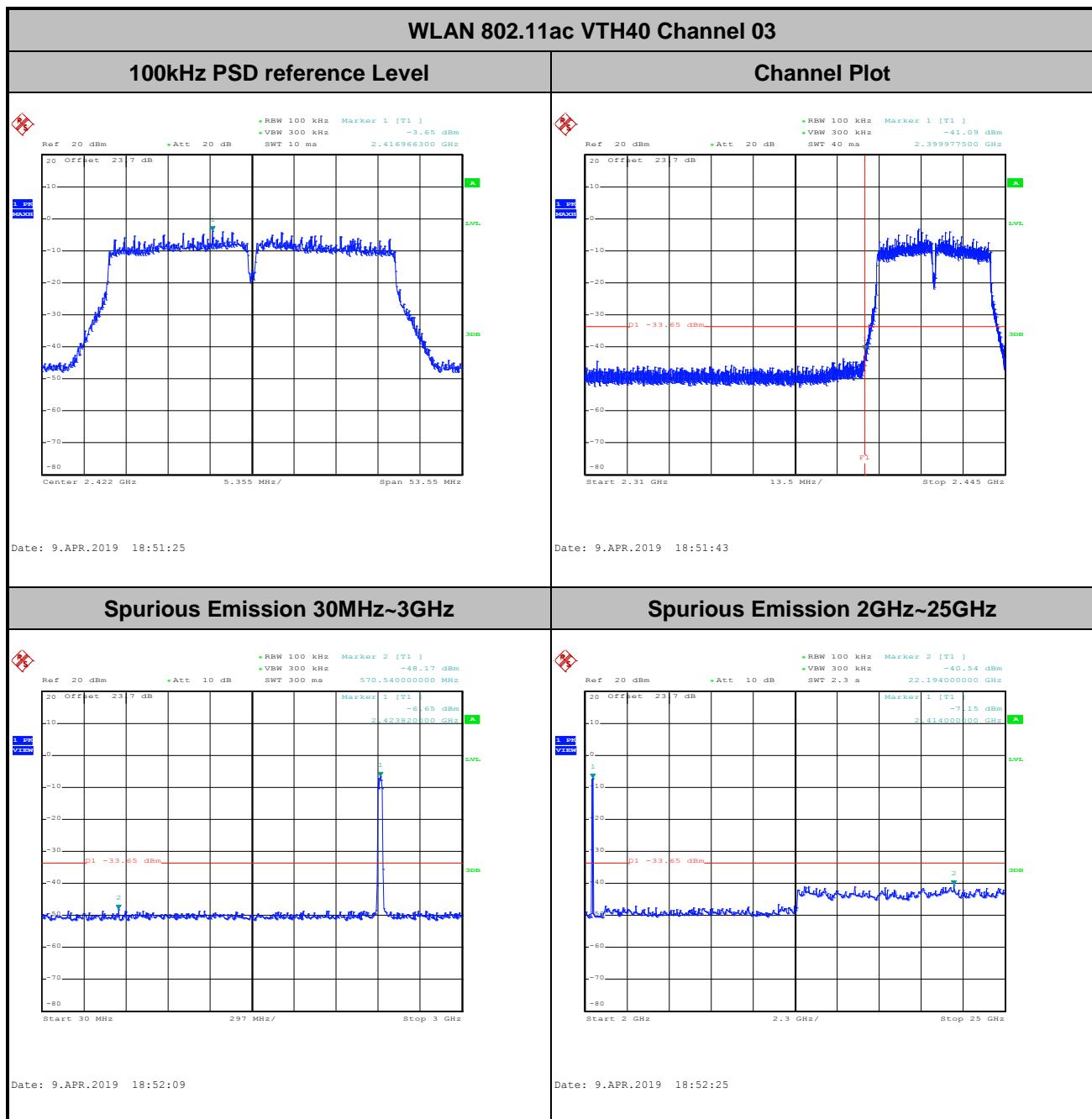
Date: 9.APR.2019 16:35:44

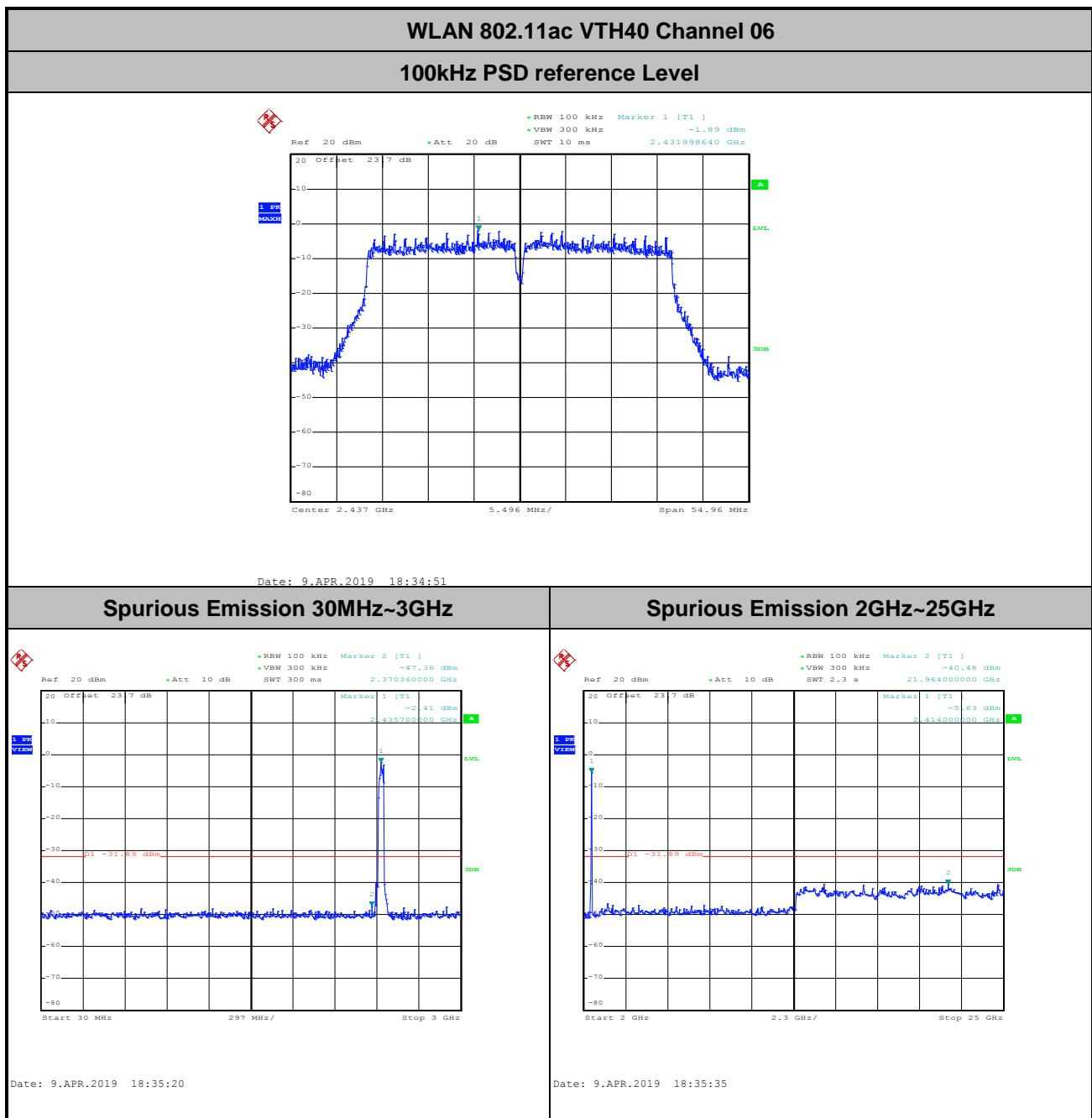
Spurious Emission 2GHz~25GHz

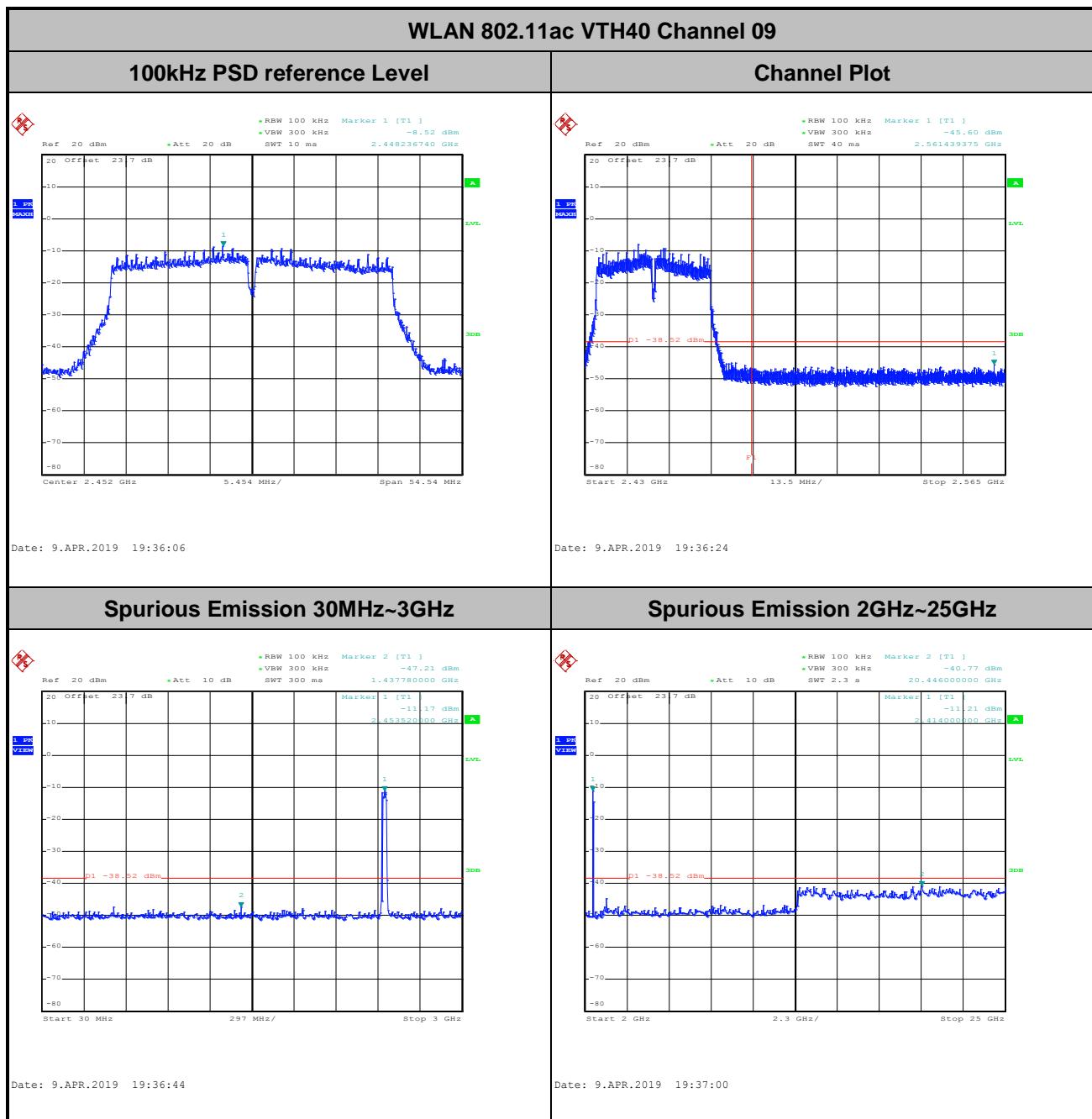


Date: 9.APR.2019 16:35:59











3.5 Radiated Band Edges and Spurious Emission Measurement

3.5.1 Limit of Radiated band edge and Spurious Emission Measurement

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. If the output power of this device was measured by spectrum analyzer, the attenuation under this paragraph shall be 30 dB instead of 20 dB. In addition, radiated emissions which fall in the restricted bands must also comply with the limits as below.

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

3.5.2 Measuring Instruments

See list of measuring equipment of this test report.

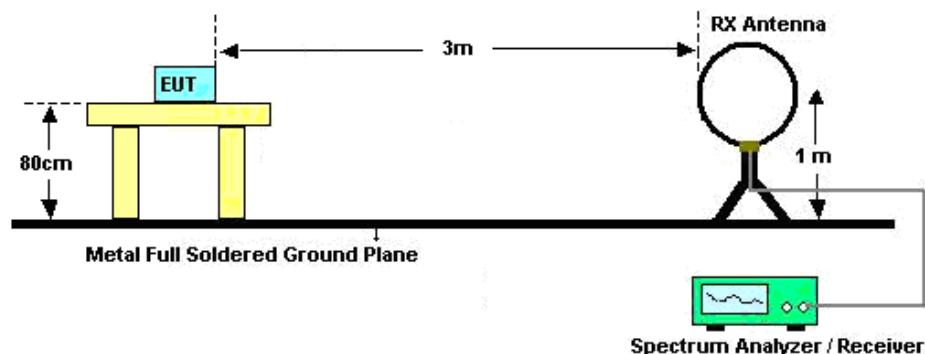


3.5.3 Test Procedures

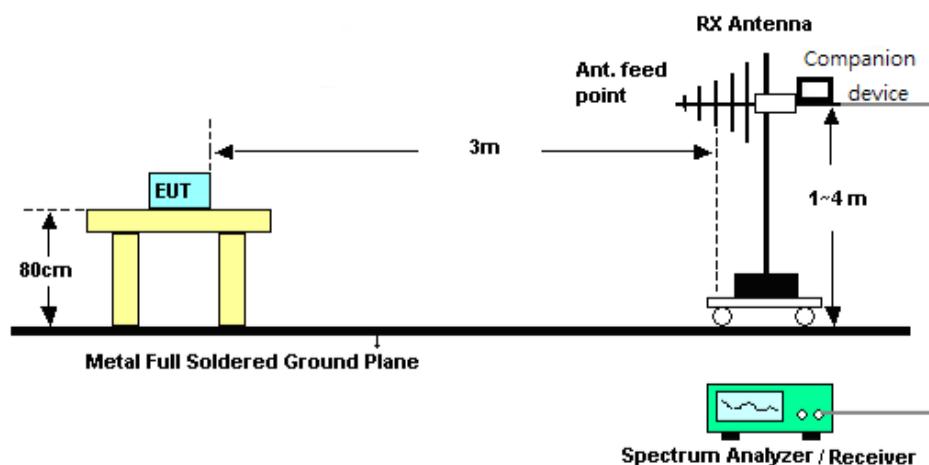
1. The testing follows the ANSI C63.10 Section 11.12.1 Radiated emission measurements
 2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
 3. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
 4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
 5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
 6. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
 7. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
 8. Use the following spectrum analyzer settings:
 - (1) Span shall wide enough to fully capture the emission being measured;
 - (2) Set RBW=100 kHz for $f < 1$ GHz; VBW \geq RBW; Sweep = auto; Detector function = peak;
Trace = max hold;
 - (3) Set RBW = 1 MHz, VBW= 3MHz for $f \geq 1$ GHz for peak measurement.
- For average measurement:
- VBW = 10 Hz, when duty cycle is no less than 98 percent.
 - VBW $\geq 1/T$, when duty cycle is less than 98 percent where T is 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.

3.5.4 Test Setup

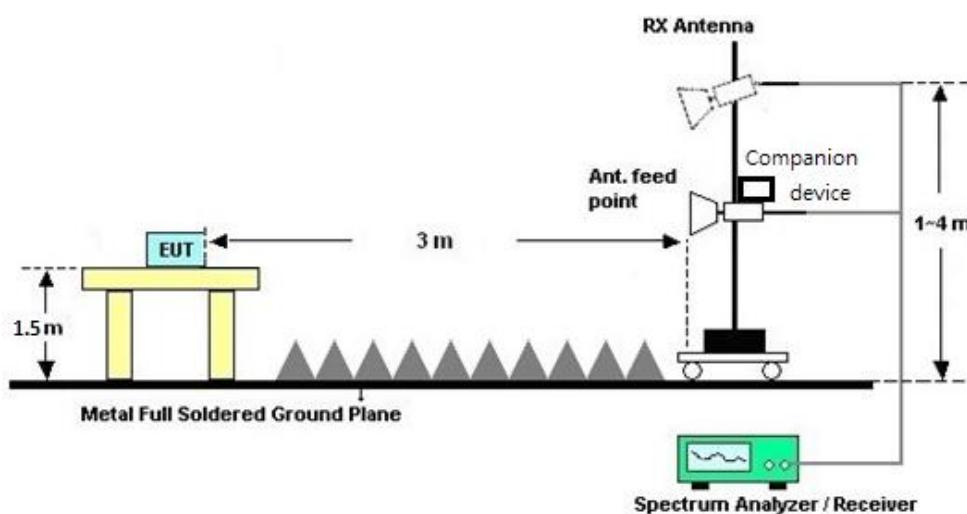
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz





3.5.5 Test Results of Radiated Spurious Emissions (9kHz ~ 30MHz)

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

There is a comparison data of both open-field test site and alternative test site - semi-Anechoic chamber according to 414788 D01 Radiated Test Site v01r01, and the result came out very similar.

3.5.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix A and B.

3.5.7 Test Result of Radiated Spurious Emission (30MHz ~ 10th Harmonic)

Please refer to Appendix A and B.



3.6 Antenna Requirements

3.6.1 Standard Applicable

If directional gain of transmitting Antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. The use of a permanently attached Antenna or of an Antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the rule.

3.6.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.6.3 Antenna Gain

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

For CDD transmissions, directional gain is calculated as

$$\text{DirectionalGain} = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$$

where

Each antenna is driven by no more than one spatial stream;

N_{SS} = the number of independent spatial streams of data;

N_{ANT} = the total number of antennas

$g_{j,k} = 10^{G_k / 20}$ if the k th antenna is being fed by spatial stream j , or zero if it is not;
 G_k is the gain in dBi of the k th antenna.

The EUT supports beamforming for 802.11ac modes.

The directional gain calculation is following F)2)e)ii) of KDB 662911 D01 v02r01.

The power and PSD limit should be modified if the directional gain of EUT is over 6 dBi,

The directional gain "DG" is calculated as following table.

			DG for Power	DG for PSD	Power Limit	PSD Limit
	Chain. 1 (dBi)	Chain. 2 (dBi)	Power (dBi)	PSD (dBi)	Reduction (dB)	Reduction (dB)
2.4 GHz	5.00	5.00	8.01	8.01	2.01	2.01

Power Limit Reduction = DG(Power) - 6dBi, (min = 0)

PSD Limit Reduction = DG(PSD) - 6dBi, (min = 0)



4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Power Sensor	DARE	RadiPower	15I00041S NO09	10MHz~6GHz	May 07, 2018	Apr. 09, 2019	May 06, 2019	Conducted (TH05-HY)
Spectrum Analyzer	Rohde & Schwarz	FSP40	100057	9kHz-40GHz	Nov. 21, 2018	Apr. 09, 2019	Nov. 20, 2019	Conducted (TH05-HY)
Spectrum Analyzer	Rohde & Schwarz	FSV 30	100895	9kHz~30GHz	Apr. 20, 2018	Apr. 09, 2019	Apr. 19, 2019	Conducted (TH05-HY)
Switch Box & RF Cable	EM	EMSW18	SW107090 3	N/A	Dec 19 2018	Apr. 09, 2019	Dec 18 2019	Conducted (TH05-HY)
Amplifier	MITEQ	TTA1840-35-HG	1871923	18GHz~40GHz, VSWR : 2.5:1 max	Jul. 16, 2018	Apr. 04, 2019~ Apr. 09, 2019	Jul. 15, 2019	Radiation (03CH11-HY)
Amplifier	SONOMA	310N	187312	9kHz~1GHz	Dec. 04, 2018	Apr. 04, 2019~ Apr. 09, 2019	Dec. 03, 2019	Radiation (03CH11-HY)
Bilog Antenna	TESEQ	CBL 6111D& N-6-06	35414&AT-N0602	30MHz~1GHz	Oct. 13, 2018	Apr. 04, 2019~ Apr. 09, 2019	Oct. 12, 2019	Radiation (03CH11-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-132 6	1GHz ~ 18GHz	Oct. 30, 2018	Apr. 04, 2019~ Apr. 09, 2019	Oct. 29, 2019	Radiation (03CH11-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100488	9 kHz~30 MHz	Jan. 07, 2019	Apr. 04, 2019~ Apr. 09, 2019	Jan. 06, 2020	Radiation (03CH11-HY)
Preamplifier	Keysight	83017A	MY532700 80	1GHz~26.5GHz	Nov. 14, 2018	Apr. 04, 2019~ Apr. 09, 2019	Nov. 13, 2020	Radiation (03CH11-HY)
Spectrum Analyzer	Keysight	N9010A	MY542004 86	10Hz ~ 44GHz	Oct. 19, 2018	Apr. 04, 2019~ Apr. 09, 2019	Oct. 18, 2019	Radiation (03CH11-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1~4m	N/A	Apr. 04, 2019~ Apr. 09, 2019	N/A	Radiation (03CH11-HY)
Turn Table	EMEC	TT 2000	N/A	0~360 Degree	N/A	Apr. 04, 2019~ Apr. 09, 2019	N/A	Radiation (03CH11-HY)
Preamplifier	Jet-Power	JPA0118-55-3 03	171000180 0054001	1GHz~18GHz	Apr. 16, 2018	Apr. 04, 2019~ Apr. 09, 2019	Apr. 15, 2019	Radiation (03CH11-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170 584	18GHz- 40GHz	Dec. 05, 2018	Apr. 04, 2019~ Apr. 09, 2019	Dec. 04, 2019	Radiation (03CH11-HY)
EMI Test Receiver	Keysight	N9038A(MXE)	MY554201 70	N/A	Mar. 08, 2019	Apr. 04, 2019~ Apr. 09, 2019	Mar. 07, 2020	Radiation (03CH11-HY)
Software	Audix	E3 6.2009-8-24	RK-00104 2	N/A	N/A	Apr. 04, 2019~ Apr. 09, 2019	N/A	Radiation (03CH11-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY9837/4 PE	9kHz-30MHz	Mar. 13, 2019	Apr. 04, 2019~ Apr. 09, 2019	Mar. 12, 2020	Radiation (03CH11-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	MY2859/2	30MHz-40GHz	Mar. 13, 2019	Apr. 04, 2019~ Apr. 09, 2019	Mar. 12, 2020	Radiation (03CH11-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY9837/4 PE	30M-18G	Mar. 13, 2019	Apr. 04, 2019~ Apr. 09, 2019	Mar. 12, 2020	Radiation (03CH11-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	MY4274/2	30MHz-40GHz	Mar. 13, 2019	Apr. 04, 2019~ Apr. 09, 2019	Mar. 12, 2020	Radiation (03CH11-HY)
Filter	Wainwright	WLK4-1000-1 530-8000-40SS	SN11	1G Low Pass	Sep. 16, 2018	Apr. 04, 2019~ Apr. 09, 2019	Sep. 17, 2019	Radiation (03CH11-HY)
Filter	Wainwright	WHKX12-270 0-3000-18000 -60SS	SN3	2.7G High Pass	Sep. 16, 2018	Apr. 04, 2019~ Apr. 09, 2019	Sep. 17, 2019	Radiation (03CH11-HY)



5 Uncertainty of Evaluation

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_{C(y)}$)	5.2
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Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_{C(y)}$)	5.5
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Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_{C(y)}$)	5.2
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Appendix A. Radiated Spurious Emission

Test Engineer :	Hao Xu, Ken Wu, and JC Liang	Temperature :	21~26°C
		Relative Humidity :	52~57%



<For Antenna 1>

<Chain 1+2>

2.4GHz 2400~2483.5MHz

WIFI 802.11ac VHT20 (Band Edge @ 3m)

WIFI	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
		(MHz)	(dB μ V/m)	(dB)	(dB μ V/m)	(dB μ V)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11ac VHT20 CH 01 2412MHz		2389.695	63.59	-10.41	74	53.14	27.44	16.64	33.63	145	360	P	H
		2390	52.93	-1.07	54	42.48	27.44	16.64	33.63	145	360	A	H
	*	2412	115.53	-	-	105.11	27.38	16.66	33.62	145	360	P	H
	*	2412	105.82	-	-	95.4	27.38	16.66	33.62	145	360	P	H
													H
													H
802.11ac VHT20 CH 06 2437MHz		2389.905	55.25	-18.75	74	44.8	27.44	16.64	33.63	100	120	P	V
		2389.905	45.9	-8.1	54	35.45	27.44	16.64	33.63	100	120	A	V
	*	2412	105.28	-	-	94.86	27.38	16.66	33.62	100	120	P	V
	*	2412	97.1	-	-	86.68	27.38	16.66	33.62	100	120	A	V
													V
													V
		2388.88	64.1	-9.9	74	53.65	27.44	16.64	33.63	109	352	P	H
		2389.68	47.92	-6.08	54	37.47	27.44	16.64	33.63	109	352	A	H
	*	2437	119.69	-	-	109.28	27.33	16.69	33.61	109	352	P	H
	*	2437	110.88	-	-	100.47	27.33	16.69	33.61	109	352	A	H
		2485.04	71.43	-2.57	74	60.99	27.3	16.74	33.6	109	352	P	H
		2484.32	52.29	-1.71	54	41.85	27.3	16.74	33.6	109	352	A	H
		2389.36	54.87	-19.13	74	44.42	27.44	16.64	33.63	115	120	P	V
		2390	43.39	-10.61	54	32.94	27.44	16.64	33.63	115	120	A	V
	*	2437	109.77	-	-	99.36	27.33	16.69	33.61	115	120	P	V
	*	2437	101.77	-	-	91.36	27.33	16.69	33.61	115	120	A	V
		2483.52	59.97	-14.03	74	49.53	27.3	16.74	33.6	115	120	P	V
		2484.24	44.05	-9.95	54	33.61	27.3	16.74	33.6	115	120	A	V



	*	2462	110.82	-	-	100.4	27.3	16.72	33.6	161	18	P	H
	*	2462	103.23	-	-	92.81	27.3	16.72	33.6	161	18	A	H
		2484.76	60.32	-13.68	74	49.88	27.3	16.74	33.6	161	18	P	H
		2483.52	50.76	-3.24	54	40.32	27.3	16.74	33.6	161	18	A	H
802.11ac													H
VHT20													H
CH 11	*	2462	103.93	-	-	93.51	27.3	16.72	33.6	100	57	P	V
2462MHz	*	2462	96.06	-	-	85.64	27.3	16.72	33.6	100	57	A	V
		2485.04	57.27	-16.73	74	46.83	27.3	16.74	33.6	100	57	P	V
		2483.56	44.63	-9.37	54	34.19	27.3	16.74	33.6	100	57	A	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz

WIFI 802.11ac VHT20 (Harmonic @ 3m)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dB μ V/m)	Over Limit (dB)	Limit Line (dB μ V/m)	Read Level (dB μ V)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT20 CH 01 2412MHz		4824	38.06	-35.94	74	54.97	31.1	10.56	58.57	100	0	P	H
													H
													H
													H
		4824	38.7	-35.3	74	55.61	31.1	10.56	58.57	100	0	P	V
													V
													V
													V
802.11ac VHT20 CH 06 2437MHz		4874	45.53	-28.47	74	62.42	31.05	10.61	58.55	100	0	P	H
		7311	42.46	-31.54	74	51.64	36.52	13.13	58.83	100	0	P	H
													H
													H
		4874	42.71	-31.29	74	59.6	31.05	10.61	58.55	100	0	P	V
		7311	42.71	-31.29	74	51.89	36.52	13.13	58.83	100	0	P	V
													V
													V
802.11ac VHT20 CH 11 2462MHz		4924	37.71	-36.29	74	54.45	31.14	10.65	58.53	100	0	P	H
		7386	42	-32	74	51.21	36.46	13.05	58.72	100	0	P	H
													H
													H
		4924	39.01	-34.99	74	55.75	31.14	10.65	58.53	100	0	P	V
		7386	41.44	-32.56	74	50.65	36.46	13.05	58.72	100	0	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz

WIFI 802.11ac VHT40 (Band Edge @ 3m)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dB μ V/m)	Over Limit (dB)	Limit Line (dB μ V/m)	Read Level (dB μ V)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT40 CH 03 2422MHz		2390	62.06	-11.94	74	51.61	27.44	16.64	33.63	113	15	P	H
		2389.68	52.7	-1.3	54	42.25	27.44	16.64	33.63	113	15	A	H
	*	2422	108.55	-	-	98.14	27.36	16.67	33.62	113	15	P	H
	*	2422	100.36	-	-	89.95	27.36	16.67	33.62	113	15	A	H
		2484.24	55.78	-18.22	74	45.34	27.3	16.74	33.6	113	15	P	H
		2484.64	44.14	-9.86	54	33.7	27.3	16.74	33.6	113	15	A	H
		2389.84	55.11	-18.89	74	44.66	27.44	16.64	33.63	100	120	P	V
		2390	49.17	-4.83	54	38.72	27.44	16.64	33.63	100	120	A	V
	*	2422	99.07	-	-	88.66	27.36	16.67	33.62	100	120	P	V
	*	2422	91.04	-	-	80.63	27.36	16.67	33.62	100	120	A	V
802.11ac VHT40 CH 06 2437MHz		2484.08	53.15	-20.85	74	42.71	27.3	16.74	33.6	100	120	P	V
		2483.84	43.43	-10.57	54	32.99	27.3	16.74	33.6	100	120	A	V
		2389.84	60.25	-13.75	74	49.8	27.44	16.64	33.63	115	16	P	H
		2389.84	50.37	-3.63	54	39.92	27.44	16.64	33.63	115	16	A	H
	*	2437	111.02	-	-	100.61	27.33	16.69	33.61	115	16	P	H
	*	2437	102.26	-	-	91.85	27.33	16.69	33.61	115	16	A	H
		2483.92	60.15	-13.85	74	49.71	27.3	16.74	33.6	115	16	P	H
		2483.68	51.94	-2.06	54	41.5	27.3	16.74	33.6	115	16	A	H
		2389.68	53.13	-20.87	74	42.68	27.44	16.64	33.63	100	121	P	V
		2389.52	44.38	-9.62	54	33.93	27.44	16.64	33.63	100	121	A	V
802.11ac VHT40 CH 06 2437MHz	*	2437	100.08	-	-	89.67	27.33	16.69	33.61	100	121	P	V
	*	2437	94.13	-	-	83.72	27.33	16.69	33.61	100	121	A	V
		2484.56	55.89	-18.11	74	45.45	27.3	16.74	33.6	100	121	P	V
		2483.68	44.52	-9.48	54	34.08	27.3	16.74	33.6	100	121	A	V



		2327.44	52.38	-21.62	74	41.77	27.69	16.57	33.65	110	17	P	H	
		2339.44	43.29	-10.71	54	32.72	27.64	16.58	33.65	110	17	A	H	
	*	2452	102.81	-	-	92.42	27.3	16.7	33.61	110	17	P	H	
	*	2452	95.16	-	-	84.77	27.3	16.7	33.61	110	17	A	H	
	802.11ac	2483.52	57.72	-16.28	74	47.28	27.3	16.74	33.6	110	17	P	H	
	VHT40	2483.84	52.2	-1.8	54	41.76	27.3	16.74	33.6	110	17	P	H	
	CH 09	2362	51.73	-22.27	74	41.21	27.55	16.61	33.64	112	118	P	V	
	2452MHz	2379.92	43.1	-10.9	54	32.62	27.48	16.63	33.63	112	118	A	V	
		*	2452	94.5	-	-	84.11	27.3	16.7	33.61	112	118	P	V
		*	2452	86.31	-	-	75.92	27.3	16.7	33.61	112	118	A	V
			2484.64	54.23	-19.77	74	43.79	27.3	16.74	33.6	112	118	P	V
			2484.16	44.68	-9.32	54	34.24	27.3	16.74	33.6	112	118	P	V
Remark		<ol style="list-style-type: none">1. No other spurious found.2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz

WIFI 802.11ac VHT40 (Harmonic @ 3m)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dB μ V/m)	Over Limit (dB)	Limit Line (dB μ V/m)	Read Level (dB μ V)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT40 CH 03 2422MHz		4844	38.08	-35.92	74	54.97	31.1	10.57	58.56	100	0	P	H
		7266	41.84	-32.16	74	51.08	36.43	13.2	58.87	100	0	P	H
													H
													H
		4844	38.6	-35.4	74	55.49	31.1	10.57	58.56	100	0	P	V
		7266	42.83	-31.17	74	52.07	36.43	13.2	58.87	100	0	P	V
													V
802.11ac VHT40 CH 06 2437MHz		4874	37.66	-36.34	74	54.55	31.05	10.61	58.55	100	0	P	H
		7311	42.24	-31.76	74	51.42	36.52	13.13	58.83	100	0	P	H
													H
													H
		4874	38.61	-35.39	74	55.5	31.05	10.61	58.55	100	0	P	V
		7311	41.66	-32.34	74	50.84	36.52	13.13	58.83	100	0	P	V
													V
802.11ac VHT40 CH 09 2452MHz		4904	38.3	-35.7	74	55.18	31.02	10.63	58.53	100	0	P	H
		7356	41.17	-32.83	74	50.28	36.58	13.08	58.77	100	0	P	H
													H
													H
		4904	38.63	-35.37	74	55.51	31.02	10.63	58.53	100	0	P	V
		7356	41.39	-32.61	74	50.5	36.58	13.08	58.77	100	0	P	V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Emission below 1GHz

2.4GHz WIFI 802.11ac VHT20 (LF)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		(MHz)	(dB μ V/m)	(dB)	(dB μ V/m)	(dB μ V)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2.4GHz 802.11ac VHT20 LF		55.22	25.94	-14.06	40	45.34	11.98	0.98	32.36	-	-	P	H
		139.61	28.34	-15.16	43.5	41.92	17.14	1.57	32.29	-	-	P	H
		208.48	28.42	-15.08	43.5	43.76	14.9	1.99	32.23	-	-	P	H
		430.61	34	-12	46	40.7	22.65	2.81	32.16	-	-	P	H
		624.61	32.23	-13.77	46	35.09	25.91	3.42	32.19	-	-	P	H
		958.29	34.14	-11.86	46	29.68	30.93	4.34	30.81	100	0	QP	H
													H
													H
													H
													H
													H
													H
													H
													H
													H
Remark	1.	No other spurious found.											
	2.	All results are PASS against limit line.											

**Note symbol**

*	Fundamental Frequency which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.
!	Test result is over limit line.
P/A	Peak or Average
H/V	Horizontal or Vertical



A calculation example for radiated spurious emission is shown as below:

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		(MHz)	(dB μ V/m)	(dB)	(dB μ V/m)	(dB μ V)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 01 2412MHz		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H

1. Path Loss(dB) = Cable loss(dB) + Filter loss(dB) + Attenuator loss(dB)

2. Level(dB μ V/m) =

Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dB μ V) - Preamp Factor(dB)

3. Over Limit(dB) = Level(dB μ V/m) – Limit Line(dB μ V/m)

For Peak Limit @ 2390MHz:

1. Level(dB μ V/m)

= Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dB μ V) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 54.51(dB μ V) – 35.86 (dB)

= 55.45 (dB μ V/m)

2. Over Limit(dB)

= Level(dB μ V/m) – Limit Line(dB μ V/m)

= 55.45(dB μ V/m) – 74(dB μ V/m)

= -18.55(dB)

For Average Limit @ 2390MHz:

1. Level(dB μ V/m)

= Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dB μ V) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 42.6(dB μ V) – 35.86 (dB)

= 43.54 (dB μ V/m)

2. Over Limit(dB)

= Level(dB μ V/m) – Limit Line(dB μ V/m)

= 43.54(dB μ V/m) – 54(dB μ V/m)

= -10.46(dB)

Both peak and average measured complies with the limit line, so test result is “PASS”.



<For Antenna 3>

<Chain 1+2>

2.4GHz 2400~2483.5MHz

WIFI 802.11ac VHT20 (Band Edge @ 3m)

WIFI	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
		(MHz)	(dB μ V/m)	(dB)	(dB μ V/m)	(dB μ V)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11ac VHT20 CH 01 2412MHz		2366.28	52.86	-21.14	74	42.36	27.53	16.61	33.64	100	21	P	H
		2350.215	42.47	-11.53	54	31.92	27.6	16.59	33.64	100	21	A	H
	*	2412	97.18	-	-	86.76	27.38	16.66	33.62	100	21	P	H
	*	2412	93.69	-	-	83.27	27.38	16.66	33.62	100	21	A	H
													H
													H
802.11ac VHT20 CH 06 2437MHz		2389.59	54.85	-19.15	74	44.4	27.44	16.64	33.63	119	155	P	V
		2389.8	44.18	-9.82	54	33.73	27.44	16.64	33.63	119	155	A	V
	*	2412	105.85	-	-	95.43	27.38	16.66	33.62	119	155	P	V
	*	2412	96.09	-	-	85.67	27.38	16.66	33.62	119	155	A	V
													V
													V
		2364.88	52.43	-21.57	74	41.92	27.54	16.61	33.64	100	18	P	H
		2384.4	42.59	-11.41	54	32.13	27.46	16.63	33.63	100	18	A	H
	*	2437	104.46	-	-	94.05	27.33	16.69	33.61	100	18	P	H
	*	2437	96.43	-	-	86.02	27.33	16.69	33.61	100	18	A	H



	*	2462	100.19	-	-	89.77	27.3	16.72	33.6	110	11	P	H
	*	2462	91.52	-	-	81.1	27.3	16.72	33.6	110	11	A	H
		2484.16	54.08	-19.92	74	43.64	27.3	16.74	33.6	110	11	P	H
		2483.72	43.02	-10.98	54	32.58	27.3	16.74	33.6	110	11	A	H
802.11ac													H
VHT20													H
CH 11	*	2462	107.98	-	-	97.56	27.3	16.72	33.6	100	156	P	V
2462MHz	*	2462	98.73	-	-	88.31	27.3	16.72	33.6	100	156	A	V
		2484.12	64.73	-9.27	74	54.29	27.3	16.74	33.6	100	156	P	V
		2483.92	48.34	-5.66	54	37.9	27.3	16.74	33.6	100	156	A	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz

WIFI 802.11ac VHT20 (Harmonic @ 3m)

WIFI	Note	Frequency (MHz)	Level (dB μ V/m)	Over Limit (dB)	Limit Line (dB μ V/m)	Read Level (dB μ V)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT20 CH 01 2412MHz		4824	37.61	-36.39	74	54.52	31.1	10.56	58.57	100	0	P	H
													H
													H
													H
		4824	38.81	-35.19	74	55.72	31.1	10.56	58.57	100	0	P	V
													V
													V
802.11ac VHT20 CH 06 2437MHz		4874	37.65	-36.35	74	54.54	31.05	10.61	58.55	100	0	P	H
		7311	42.71	-31.29	74	51.89	36.52	13.13	58.83	100	0	P	H
													H
													H
		4874	43.42	-30.58	74	60.31	31.05	10.61	58.55	100	0	P	V
		7311	42.69	-31.31	74	51.87	36.52	13.13	58.83	100	0	P	V
													V
802.11ac VHT20 CH 11 2462MHz		4924	38.33	-35.67	74	55.07	31.14	10.65	58.53	100	0	P	H
		7386	42.11	-31.89	74	51.32	36.46	13.05	58.72	100	0	P	H
													H
													H
		4924	39.03	-34.97	74	55.77	31.14	10.65	58.53	100	0	P	V
		7386	42.57	-31.43	74	51.78	36.46	13.05	58.72	100	0	P	V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz

WIFI 802.11ac VHT40 (Band Edge @ 3m)

WIFI	Note	Frequency (MHz)	Level (dB μ V/m)	Over Limit (dB)	Limit Line (dB μ V/m)	Read Level (dB μ V)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT40 CH 03 2422MHz		2389.68	53.76	-20.24	74	43.31	27.44	16.64	33.63	111	17	P	H
		2388.24	44.28	-9.72	54	33.82	27.45	16.64	33.63	111	17	A	H
	*	2422	96.99	-	-	86.58	27.36	16.67	33.62	111	17	P	H
	*	2422	90.11	-	-	79.7	27.36	16.67	33.62	111	17	A	H
		2486.48	54.72	-19.28	74	44.27	27.3	16.74	33.59	111	17	P	H
		2498.96	43.32	-10.68	54	32.86	27.3	16.75	33.59	111	17	A	H
		2389.52	62.05	-11.95	74	51.6	27.44	16.64	33.63	112	157	P	V
		2389.84	52.73	-1.27	54	42.28	27.44	16.64	33.63	112	157	A	V
	*	2422	103.02	-	-	92.61	27.36	16.67	33.62	112	157	P	V
	*	2422	95.29	-	-	84.88	27.36	16.67	33.62	112	157	A	V
802.11ac VHT40 CH 06 2437MHz		2485.84	56.83	-17.17	74	46.39	27.3	16.74	33.6	112	157	P	V
		2486.64	44.41	-9.59	54	33.96	27.3	16.74	33.59	112	157	A	V
		2390	53.38	-20.62	74	42.93	27.44	16.64	33.63	115	14	P	H
		2390	44.17	-9.83	54	33.72	27.44	16.64	33.63	115	14	A	H
	*	2437	100.46	-	-	90.05	27.33	16.69	33.61	115	14	P	H
	*	2437	92.65	-	-	82.24	27.33	16.69	33.61	115	14	A	H
		2483.68	53.48	-20.52	74	43.04	27.3	16.74	33.6	115	14	P	H
		2484.72	44.84	-9.16	54	34.4	27.3	16.74	33.6	115	14	A	H
		2389.68	62.17	-11.83	74	51.72	27.44	16.64	33.63	107	158	P	V
		2390	50.05	-3.95	54	39.6	27.44	16.64	33.63	107	158	A	V



FCC RADIO TEST REPORT

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		2380.08	52.7	-21.3	74	42.22	27.48	16.63	33.63	110	12	P	H
		2320.08	43.39	-10.61	54	32.76	27.72	16.56	33.65	110	12	A	H
	*	2452	94.95	-	-	84.56	27.3	16.7	33.61	110	12	P	H
	*	2452	88.55	-	-	78.16	27.3	16.7	33.61	110	12	A	H
802.11ac		2487.04	53.27	-20.73	74	42.82	27.3	16.74	33.59	110	12	P	H
VHT40		2484.32	43.93	-10.07	54	33.49	27.3	16.74	33.6	110	12	A	H
CH 09		2385.2	52.23	-21.77	74	41.77	27.46	16.63	33.63	100	157	P	V
2452MHz		2373.68	43.42	-10.58	54	32.93	27.51	16.62	33.64	100	157	A	V
	*	2452	101.45	-	-	91.06	27.3	16.7	33.61	100	157	P	V
	*	2452	92.84	-	-	82.45	27.3	16.7	33.61	100	157	A	V
		2484.4	60.24	-13.76	74	49.8	27.3	16.74	33.6	100	157	P	V
		2484.48	52.63	-1.37	54	42.19	27.3	16.74	33.6	100	157	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz

WIFI 802.11ac VHT40 (Harmonic @ 3m)

WIFI	Note	Frequency (MHz)	Level (dB μ V/m)	Over Limit (dB)	Limit Line (dB μ V/m)	Read Level (dB μ V)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT40 CH 03 2422MHz		4844	37.78	-36.22	74	54.67	31.1	10.57	58.56	100	0	P	H
		7266	42.21	-31.79	74	51.45	36.43	13.2	58.87	100	0	P	H
													H
													H
		4844	37.28	-36.72	74	54.17	31.1	10.57	58.56	100	0	P	V
		7266	42.42	-31.58	74	51.66	36.43	13.2	58.87	100	0	P	V
													V
802.11ac VHT40 CH 06 2437MHz		4874	37.09	-36.91	74	53.98	31.05	10.61	58.55	100	0	P	H
		7311	42.3	-31.7	74	51.48	36.52	13.13	58.83	100	0	P	H
													H
													H
		4874	37.34	-36.66	74	54.23	31.05	10.61	58.55	100	0	P	V
		7311	42.18	-31.82	74	51.36	36.52	13.13	58.83	100	0	P	V
													V
802.11ac VHT40 CH 09 2452MHz		4904	37.6	-36.4	74	54.48	31.02	10.63	58.53	100	0	P	H
		7356	42.02	-31.98	74	51.13	36.58	13.08	58.77	100	0	P	H
													H
													H
		4904	37.06	-36.94	74	53.94	31.02	10.63	58.53	100	0	P	V
		7356	41.38	-32.62	74	50.49	36.58	13.08	58.77	100	0	P	V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Emission below 1GHz

2.4GHz WIFI 802.11ac VHT40 (LF)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.	
2.4GHz 802.11ac VHT40 LF		30.97	23.68	-16.32	40	31.69	23.58	0.78	32.37	-	-	P	H	
		71.71	22.47	-17.53	40	41.48	12.19	1.15	32.35	-	-	P	H	
		120.21	25.66	-17.84	43.5	39.14	17.36	1.46	32.3	-	-	P	H	
		557.68	28.51	-17.49	46	31.59	25.88	3.23	32.19	-	-	P	H	
		624.61	34.44	-11.56	46	37.3	25.91	3.42	32.19	-	-	P	H	
		958.29	34.68	-11.32	46	30.22	30.93	4.34	30.81	100	0	P	H	
													H	
													H	
													H	
													H	
													H	
													H	
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													V	
													V	
													V	
													V	
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													V	
	Remark	1. No other spurious found. 2. All results are PASS against limit line.												

**Note symbol**

*	Fundamental Frequency which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.
!	Test result is over limit line.
P/A	Peak or Average
H/V	Horizontal or Vertical



A calculation example for radiated spurious emission is shown as below:

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		(MHz)	(dB μ V/m)	(dB)	(dB μ V/m)	(dB μ V)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A) (H/V)	
802.11b CH 01 2412MHz		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H

1. Path Loss(dB) = Cable loss(dB) + Filter loss(dB) + Attenuator loss(dB)

2. Level(dB μ V/m) =

Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dB μ V) - Preamp Factor(dB)

3. Over Limit(dB) = Level(dB μ V/m) – Limit Line(dB μ V/m)

For Peak Limit @ 2390MHz:

1. Level(dB μ V/m)

= Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dB μ V) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 54.51(dB μ V) – 35.86 (dB)

= 55.45 (dB μ V/m)

2. Over Limit(dB)

= Level(dB μ V/m) – Limit Line(dB μ V/m)

= 55.45(dB μ V/m) – 74(dB μ V/m)

= -18.55(dB)

For Average Limit @ 2390MHz:

1. Level(dB μ V/m)

= Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dB μ V) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 42.6(dB μ V) – 35.86 (dB)

= 43.54 (dB μ V/m)

2. Over Limit(dB)

= Level(dB μ V/m) – Limit Line(dB μ V/m)

= 43.54(dB μ V/m) – 54(dB μ V/m)

= -10.46(dB)

Both peak and average measured complies with the limit line, so test result is “PASS”.



<For Antenna 4>

<Chain 1+2>

2.4GHz 2400~2483.5MHz

WIFI 802.11ac VHT20 (Band Edge @ 3m)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
		(MHz)	(dB μ V/m)	(dB)	(dB μ V/m)	(dB μ V)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11ac VHT20	1+2	2386.755	52.76	-21.24	74	42.31	27.45	16.63	33.63	107	16	P	H
		2389.485	43.11	-10.89	54	32.66	27.44	16.64	33.63	107	16	A	H
	*	2412	98.93	-	-	88.51	27.38	16.66	33.62	107	16	P	H
	*	2412	95.49	-	-	85.07	27.38	16.66	33.62	107	16	A	H
													H
													H
CH 01 2412MHz	CH 01	2389.59	56.95	-17.05	74	46.5	27.44	16.64	33.63	150	40	P	V
		2389.905	45.88	-8.12	54	35.43	27.44	16.64	33.63	150	40	A	V
	*	2412	107.53	-	-	97.11	27.38	16.66	33.62	150	40	P	V
	*	2412	98.88	-	-	88.46	27.38	16.66	33.62	150	40	A	V
													V
													V
802.11ac VHT20	CH 06 2437MHz	2315.12	52.48	-21.52	74	41.85	27.74	16.55	33.66	100	343	P	H
		2328.72	42.61	-11.39	54	32	27.69	16.57	33.65	100	343	A	H
	*	2437	102.6	-	-	92.19	27.33	16.69	33.61	100	343	P	H
	*	2437	95.63	-	-	85.22	27.33	16.69	33.61	100	343	A	H
		2484.4	57.31	-16.69	74	46.87	27.3	16.74	33.6	100	343	P	H
		2485.2	43.17	-10.83	54	32.73	27.3	16.74	33.6	100	343	A	H
CH 06 2437MHz	CH 06	2389.36	56.4	-17.6	74	45.95	27.44	16.64	33.63	153	41	P	V
		2389.36	43.81	-10.19	54	33.36	27.44	16.64	33.63	153	41	A	V
	*	2437	113.07	-	-	102.66	27.33	16.69	33.61	153	41	P	V
	*	2437	104.49	-	-	94.08	27.33	16.69	33.61	153	41	A	V
		2483.84	62.9	-11.1	74	52.46	27.3	16.74	33.6	153	41	P	V
		2484.32	46.82	-7.18	54	36.38	27.3	16.74	33.6	153	41	A	V



802.11ac VHT20 CH 11 2462MHz	*	2462	96.32	-	-	85.9	27.3	16.72	33.6	116	340	P	H
	*	2462	92.3	-	-	81.88	27.3	16.72	33.6	116	340	A	H
		2486.68	54.29	-19.71	74	43.84	27.3	16.74	33.59	116	340	P	H
		2488.2	42.85	-11.15	54	32.4	27.3	16.74	33.59	116	340	A	H
													H
													H
	*	2462	105.64	-	-	95.22	27.3	16.72	33.6	164	34	P	V
	*	2462	101.57	-	-	91.15	27.3	16.72	33.6	164	34	A	V
		2487.16	60.93	-13.07	74	50.48	27.3	16.74	33.59	164	34	P	V
		2484.56	45.96	-8.04	54	35.52	27.3	16.74	33.6	164	34	A	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz

WIFI 802.11ac VHT20 (Harmonic @ 3m)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dB μ V/m)	Over Limit (dB)	Limit Line (dB μ V/m)	Read Level (dB μ V)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT20 CH 01 2412MHz		4824	38.71	-35.29	74	55.62	31.1	10.56	58.57	100	0	P	H
													H
													H
													H
		4824	37.99	-36.01	74	54.9	31.1	10.56	58.57	100	0	P	V
													V
													V
													V
802.11ac VHT20 CH 06 2437MHz		4874	37.38	-36.62	74	54.27	31.05	10.61	58.55	100	0	P	H
		7311	41.77	-32.23	74	50.95	36.52	13.13	58.83	100	0	P	H
													H
													H
		4874	41.42	-32.58	74	58.31	31.05	10.61	58.55	100	0	P	V
		7311	41.99	-32.01	74	51.17	36.52	13.13	58.83	100	0	P	V
													V
													V
802.11ac VHT20 CH 11 2462MHz		4924	38.6	-35.4	74	55.34	31.14	10.65	58.53	100	0	P	H
		7386	42.06	-31.94	74	51.27	36.46	13.05	58.72	100	0	P	H
													H
													H
		4924	38.83	-35.17	74	55.57	31.14	10.65	58.53	100	0	P	V
		7386	42.19	-31.81	74	51.4	36.46	13.05	58.72	100	0	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz

WIFI 802.11ac VHT40 (Band Edge @ 3m)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dB μ V/m)	Over Limit (dB)	Limit Line (dB μ V/m)	Read Level (dB μ V)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT40 CH 03 2422MHz		2321.68	52.29	-21.71	74	41.67	27.71	16.56	33.65	200	348	P	H
		2319.12	43.18	-10.82	54	32.56	27.72	16.56	33.66	200	348	A	H
	*	2422	91.57	-	-	81.16	27.36	16.67	33.62	200	348	P	H
	*	2422	83.96	-	-	73.55	27.36	16.67	33.62	200	348	A	H
		2487.28	52.31	-21.69	74	41.86	27.3	16.74	33.59	200	348	P	H
		2493.04	43.15	-10.85	54	32.69	27.3	16.75	33.59	200	348	P	H
		2389.52	54.66	-19.34	74	44.21	27.44	16.64	33.63	133	334	P	V
		2389.68	47.74	-6.26	54	37.29	27.44	16.64	33.63	133	334	A	V
	*	2422	102.58	-	-	92.17	27.36	16.67	33.62	133	334	P	V
	*	2422	91.89	-	-	81.48	27.36	16.67	33.62	133	334	P	V
802.11ac VHT40 CH 06 2437MHz		2484.64	55.9	-18.1	74	45.46	27.3	16.74	33.6	133	334	P	V
		2484.4	43.69	-10.31	54	33.25	27.3	16.74	33.6	133	334	A	V
		2357.04	52.66	-21.34	74	42.13	27.57	16.6	33.64	178	360	P	H
		2339.44	43.27	-10.73	54	32.7	27.64	16.58	33.65	178	336	P	H
	*	2437	95.25	-	-	84.84	27.33	16.69	33.61	178	360	P	H
	*	2437	88.37	-	-	77.96	27.33	16.69	33.61	178	360	A	H
		2499.44	52.63	-21.37	74	42.17	27.3	16.75	33.59	178	360	P	H
		2483.68	43.25	-10.75	54	32.81	27.3	16.74	33.6	178	360	P	H
		2389.36	54.27	-19.73	74	43.82	27.44	16.64	33.63	103	11	P	V
		2390	46.91	-7.09	54	36.46	27.44	16.64	33.63	103	11	A	V
802.11ac VHT40 CH 06 2437MHz	*	2437	103.49	-	-	93.08	27.33	16.69	33.61	100	333	P	V
	*	2437	95.51	-	-	85.1	27.33	16.69	33.61	100	333	A	V
		2484.56	58.76	-15.24	74	48.32	27.3	16.74	33.6	100	333	P	V
		2483.76	47.4	-6.6	54	36.96	27.3	16.74	33.6	100	333	P	V



FCC RADIO TEST REPORT

Report No. : FR8N0846-03

	2345.36	52.34	-21.66	74	41.78	27.62	16.59	33.65	116	360	P	H
	2342.16	43.21	-10.79	54	32.65	27.63	16.58	33.65	116	360	A	H
*	2452	88	-	-	77.61	27.3	16.7	33.61	116	360	P	H
*	2452	79.84	-	-	69.45	27.3	16.7	33.61	116	360	A	H
802.11ac	2483.84	53.07	-20.93	74	42.63	27.3	16.74	33.6	116	360	P	H
VHT40	2499.12	43.29	-10.71	54	32.83	27.3	16.75	33.59	116	360	A	H
CH 09	2380.08	52.17	-21.83	74	41.69	27.48	16.63	33.63	100	335	P	V
2452MHz	2314.32	43.05	-10.95	54	32.42	27.74	16.55	33.66	100	335	A	V
*	2452	96.71	-	-	86.32	27.3	16.7	33.61	100	335	P	V
*	2452	89.52	-	-	79.13	27.3	16.7	33.61	100	335	A	V
	2483.6	59.76	-14.24	74	49.32	27.3	16.74	33.6	100	335	P	V
	2484.64	47.09	-6.91	54	36.65	27.3	16.74	33.6	100	335	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.											



2.4GHz 2400~2483.5MHz

WIFI 802.11ac VHT40 (Harmonic @ 3m)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dB μ V/m)	Over Limit (dB)	Limit Line (dB μ V/m)	Read Level (dB μ V)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT40 CH 03 2422MHz		4844	39.39	-34.61	74	56.28	31.1	10.57	58.56	100	0	P	H
		7266	42.3	-31.7	74	51.54	36.43	13.2	58.87	100	0	P	H
													H
													H
		4844	38.33	-35.67	74	55.22	31.1	10.57	58.56	100	0	P	V
		7266	41.55	-32.45	74	50.79	36.43	13.2	58.87	100	0	P	V
													V
802.11ac VHT40 CH 06 2437MHz		4874	37.58	-36.42	74	54.47	31.05	10.61	58.55	100	0	P	H
		7311	41.84	-32.16	74	51.02	36.52	13.13	58.83	100	0	P	H
													H
													H
		4874	37.63	-36.37	74	54.52	31.05	10.61	58.55	100	0	P	V
		7311	42.68	-31.32	74	51.86	36.52	13.13	58.83	100	0	P	V
													V
802.11ac VHT40 CH 09 2452MHz		4904	37.52	-36.48	74	54.4	31.02	10.63	58.53	100	0	P	H
		7356	41.88	-32.12	74	50.99	36.58	13.08	58.77	100	0	P	H
													H
													H
		4904	37.43	-36.57	74	54.31	31.02	10.63	58.53	100	0	P	V
		7356	41.5	-32.5	74	50.61	36.58	13.08	58.77	100	0	P	V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Emission below 1GHz

2.4GHz WIFI 802.11ac VHT40 (LF)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		(MHz)	(dB μ V/m)	(dB)	(dB μ V/m)	(dB μ V)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2.4GHz 802.11ac VHT40 LF		30.97	22.71	-17.29	40	30.72	23.58	0.78	32.37	-	-	P	H
		60.07	22.6	-17.4	40	42.27	11.64	1.05	32.36	-	-	P	H
		147.37	23.67	-19.83	43.5	37.31	17	1.64	32.28	-	-	P	H
		624.61	32.2	-13.8	46	35.06	25.91	3.42	32.19	-	-	P	H
		864.2	31.97	-14.03	46	30.12	29.29	4.1	31.54	-	-	P	H
		959.26	33.94	-12.06	46	29.43	30.97	4.34	30.8	100	0	P	H
													H
													H
													H
													H
													H
													H
													H
													H
													H
Remark	1.	No other spurious found.											
	2.	All results are PASS against limit line.											

**Note symbol**

*	Fundamental Frequency which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.
!	Test result is over limit line.
P/A	Peak or Average
H/V	Horizontal or Vertical



A calculation example for radiated spurious emission is shown as below:

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		(MHz)	(dB μ V/m)	(dB)	(dB μ V/m)	(dB μ V)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 01 2412MHz		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H

1. Path Loss(dB) = Cable loss(dB) + Filter loss(dB) + Attenuator loss(dB)

2. Level(dB μ V/m) =

Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dB μ V) - Preamp Factor(dB)

3. Over Limit(dB) = Level(dB μ V/m) – Limit Line(dB μ V/m)

For Peak Limit @ 2390MHz:

1. Level(dB μ V/m)

= Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dB μ V) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 54.51(dB μ V) – 35.86 (dB)

= 55.45 (dB μ V/m)

2. Over Limit(dB)

= Level(dB μ V/m) – Limit Line(dB μ V/m)

= 55.45(dB μ V/m) – 74(dB μ V/m)

= -18.55(dB)

For Average Limit @ 2390MHz:

1. Level(dB μ V/m)

= Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dB μ V) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 42.6(dB μ V) – 35.86 (dB)

= 43.54 (dB μ V/m)

2. Over Limit(dB)

= Level(dB μ V/m) – Limit Line(dB μ V/m)

= 43.54(dB μ V/m) – 54(dB μ V/m)

= -10.46(dB)

Both peak and average measured complies with the limit line, so test result is “PASS”.



Appendix B. Radiated Spurious Emission Plots

Test Engineer :	Hao Xu, Ken Wu, and JC Liang	Temperature :	21~26°C
		Relative Humidity :	52~57%

Note symbol

-L	Low channel location
-R	High channel location

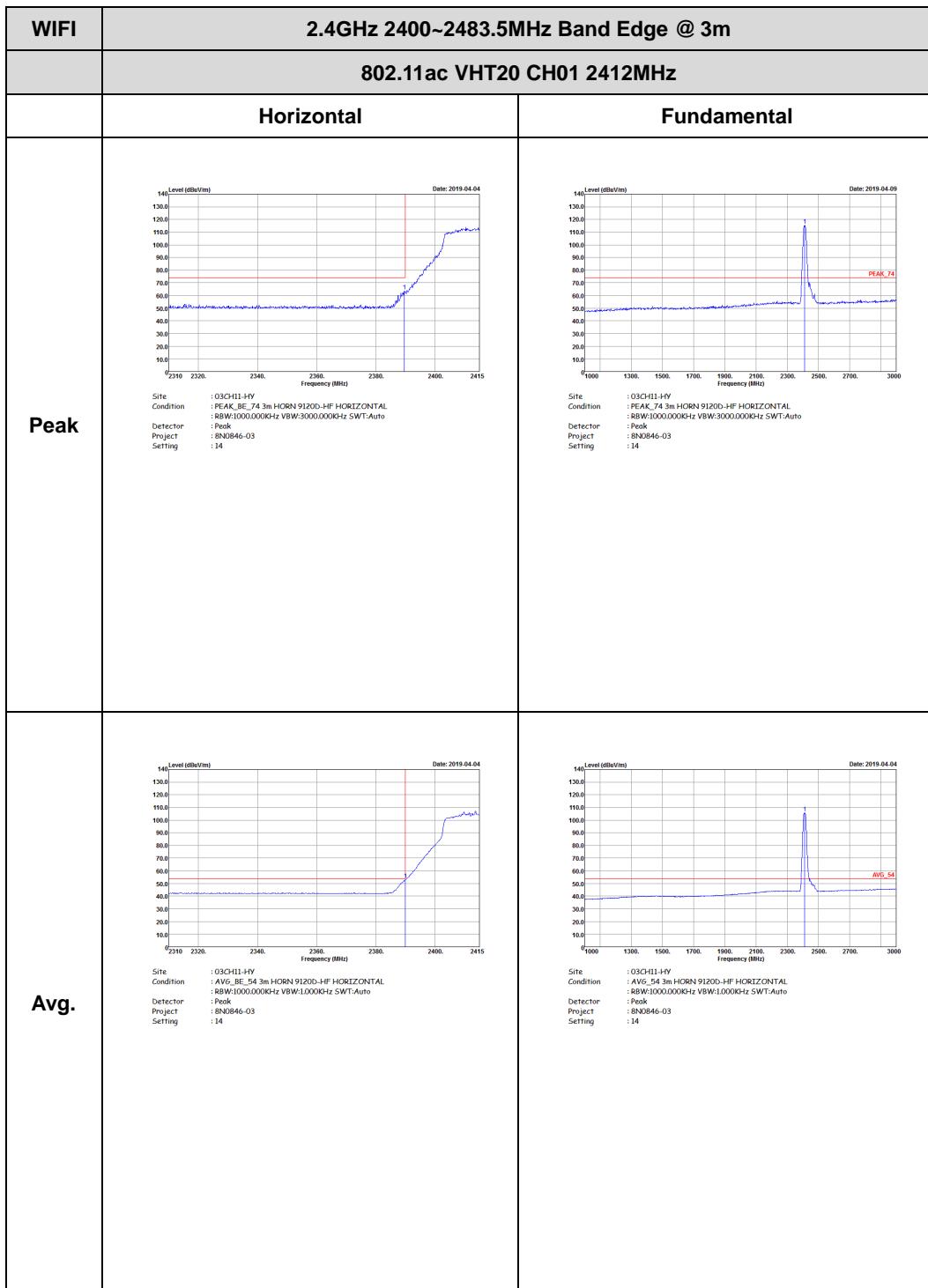


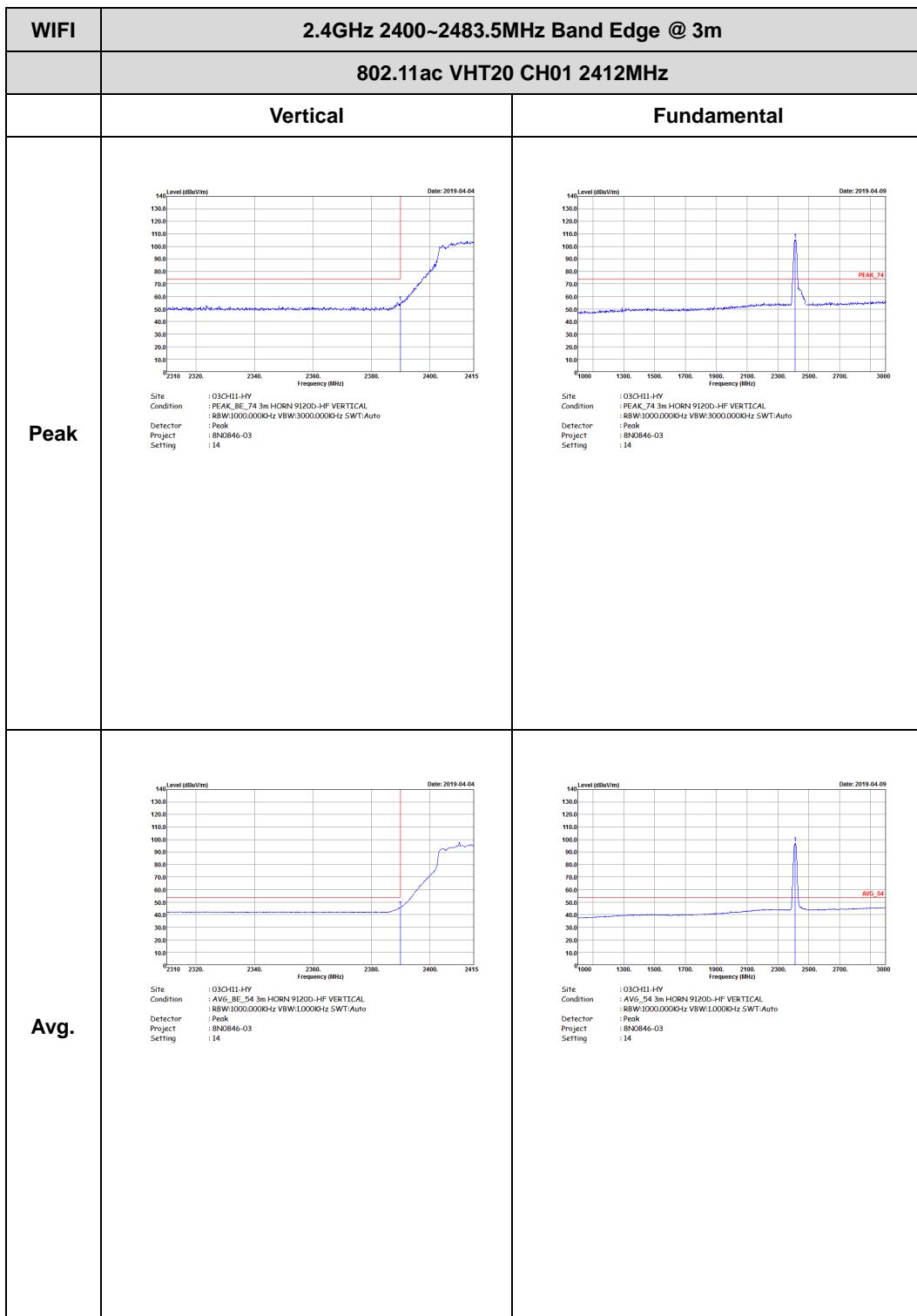
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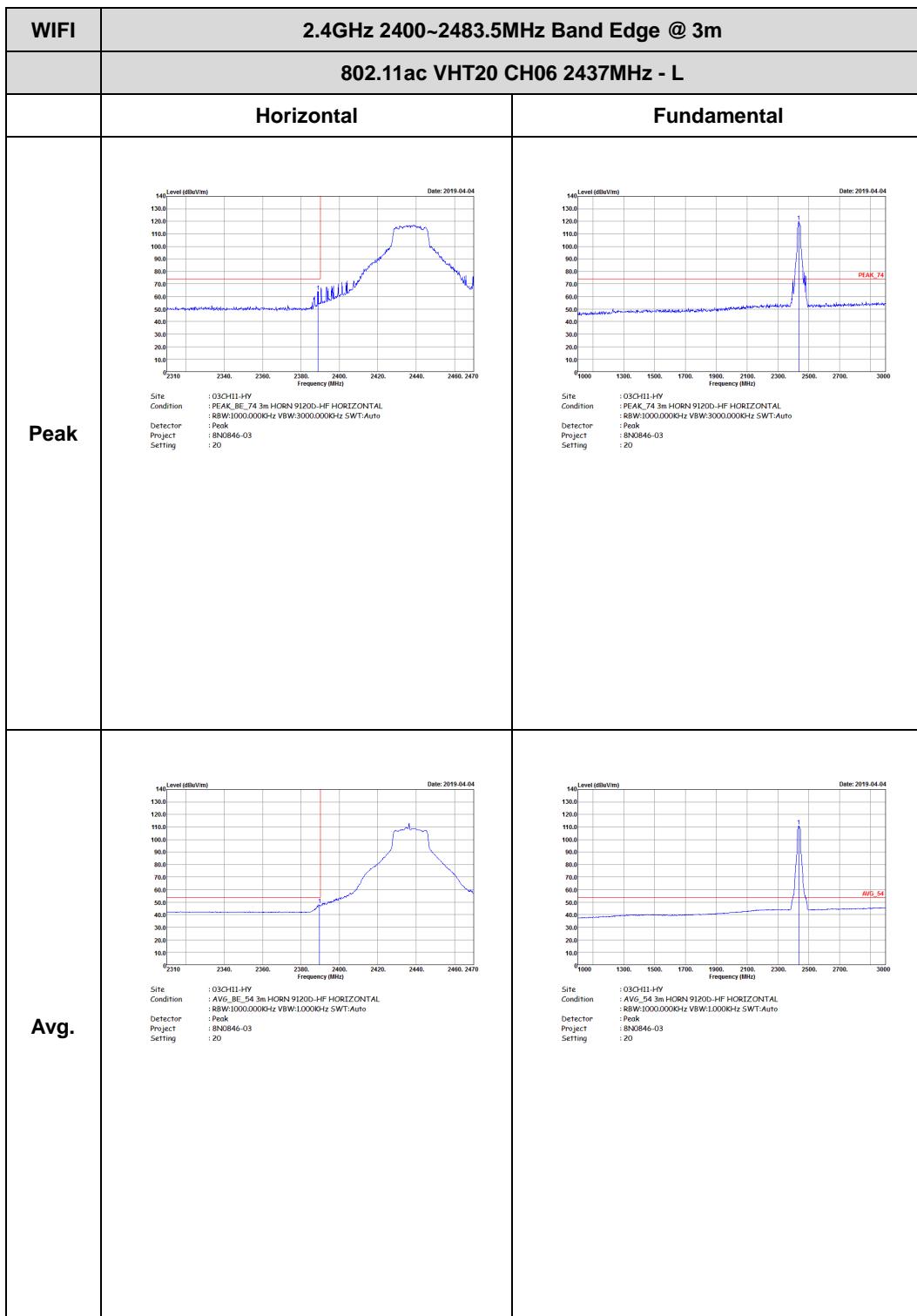
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2.4GHz 2400~2483.5MHz

WIFI 802.11ac VHT20 (Band Edge @ 3m)

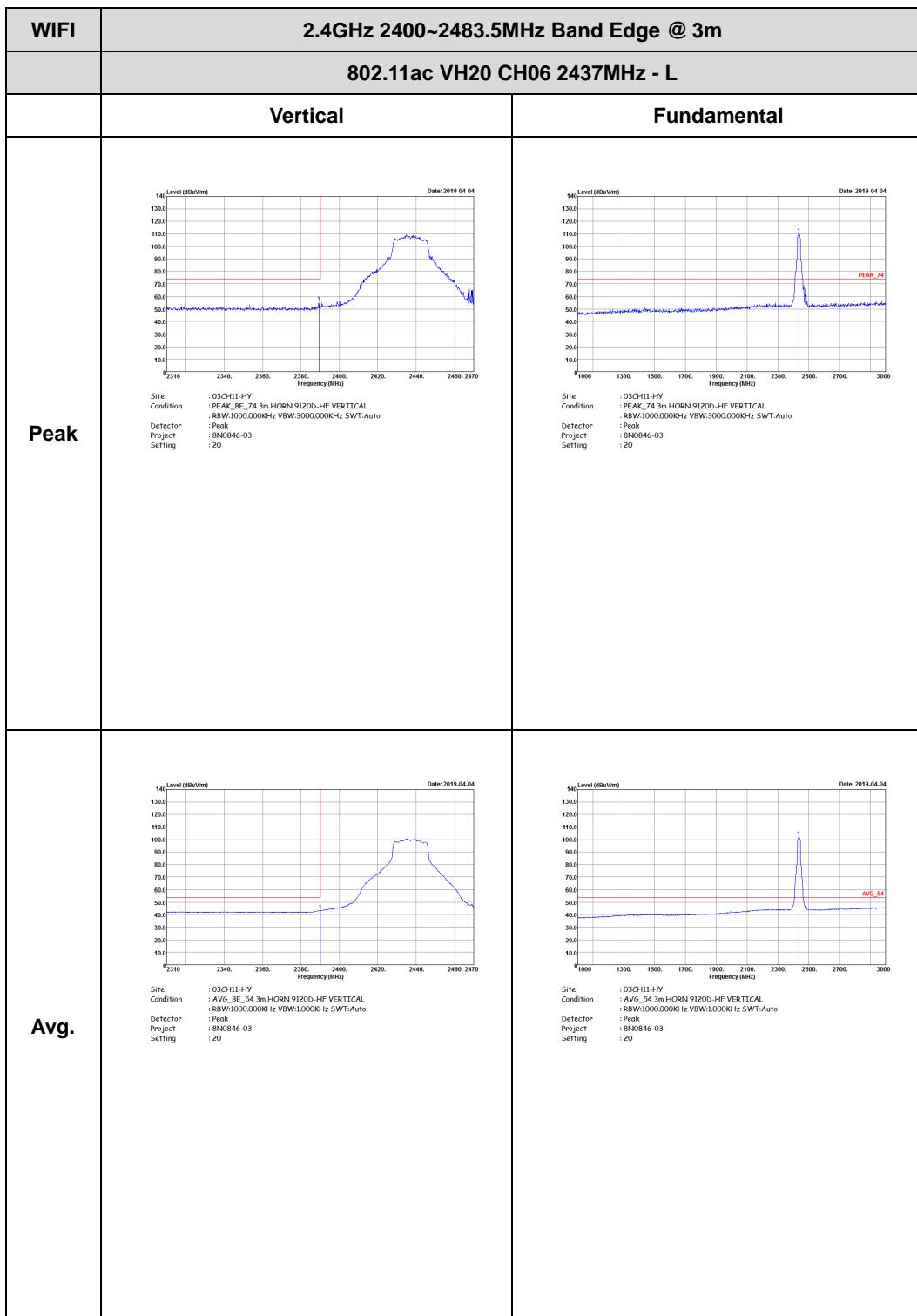






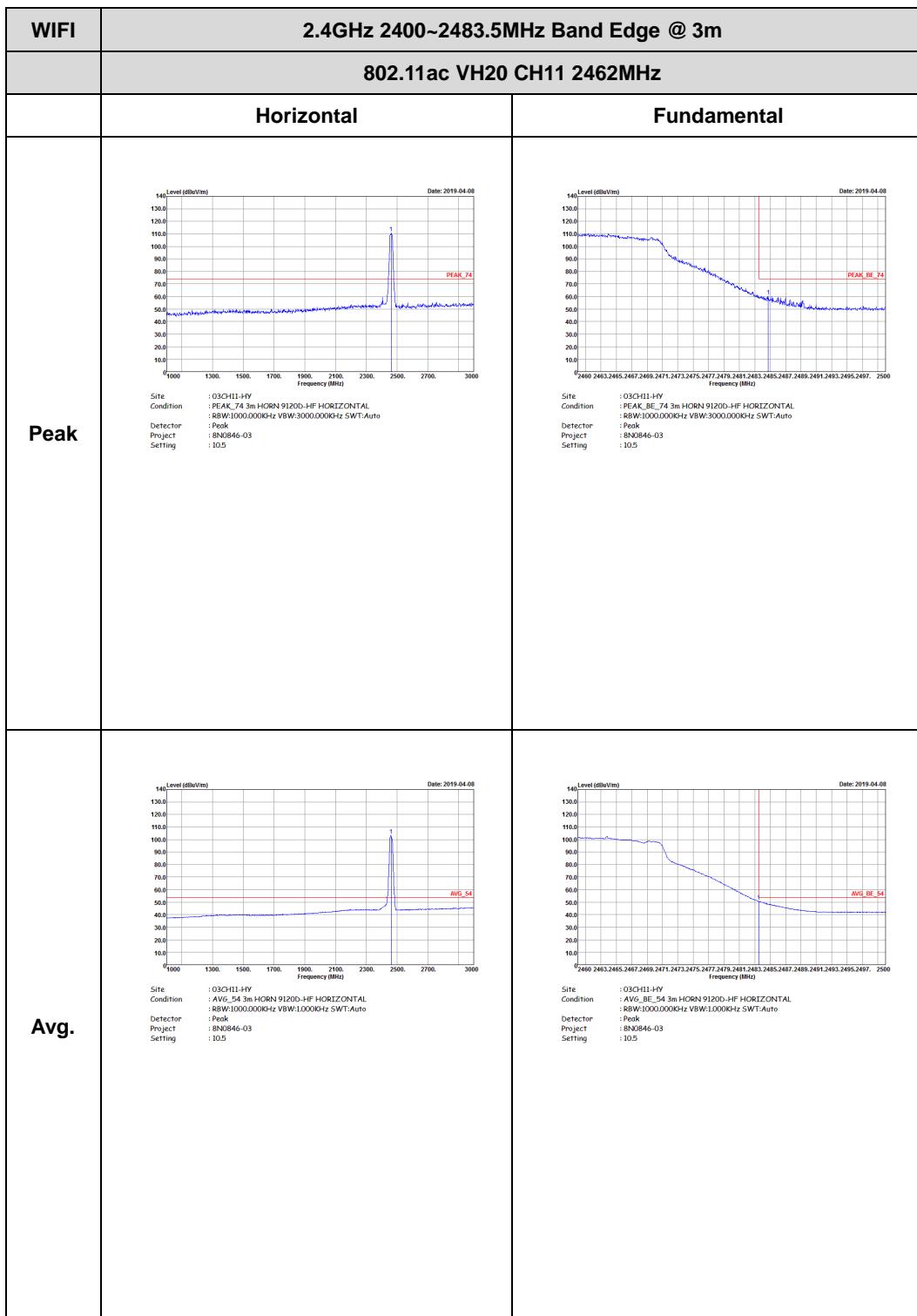


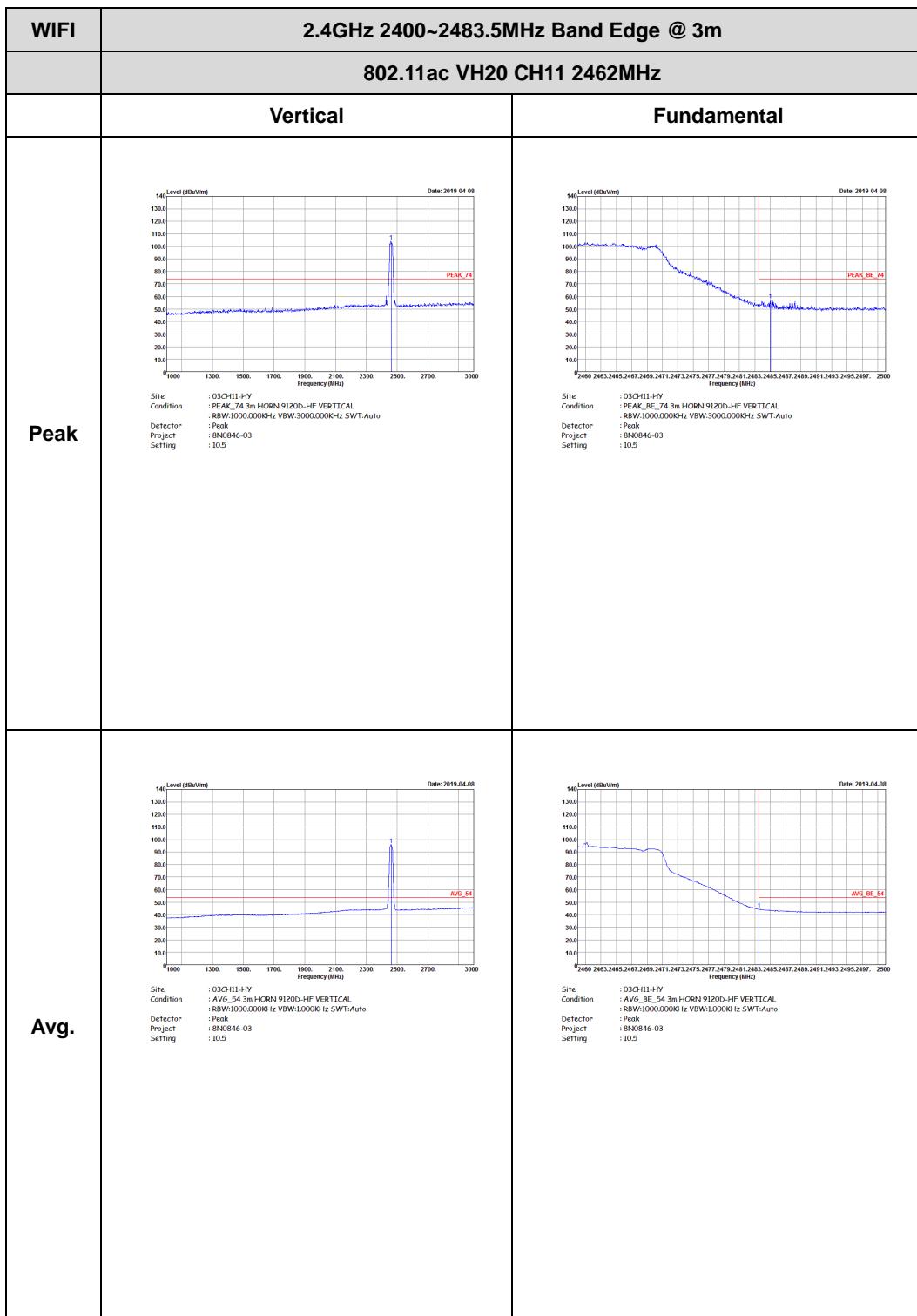
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
802.11ac VH20 CH06 2437MHz - R		
Horizontal		Fundamental
Peak	<p>Level (dBc/Vm)</p> <p>Frequency (MHz)</p> <p>Date: 2019-04-04</p> <p>Site : 03CH11-HV Condition : PEAK_BE_74 3m HORN 9120D-HF HORIZONTAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : 8N0846-03 Setting : 20</p>	Left blank
Avg.	<p>Level (dBc/Vm)</p> <p>Frequency (MHz)</p> <p>Date: 2019-04-04</p> <p>Site : 03CH11-HV Condition : AVG_BE_54 3m HORN 9120D-HF HORIZONTAL Detector : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Project : 8N0846-03 Setting : 20</p>	Left blank





WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
802.11ac VH20 CH06 2437MHz - R		
	Vertical	Fundamental
Peak	<p>Graph showing Level (dBc/Vm) vs Frequency (MHz) for Peak measurement. The graph shows a sharp peak around 2437 MHz. The x-axis ranges from 2420 to 2500 MHz, and the y-axis ranges from 0 to 140 dBc/Vm. A red vertical line marks the peak at approximately 2437 MHz.</p> <p>Date: 2019-04-04</p> <p>Site: 03CH11-HV Condition: PEAK_BE_74 3m HORN 9120D-HF VERTICAL Detector: R8W:1000.000KHz VBW:3000.000KHz SWT:Auto Project: 8N0846-03 Setting: 20</p>	Left blank
Avg.	<p>Graph showing Level (dBc/Vm) vs Frequency (MHz) for Average measurement. The graph shows a broad average level around 2437 MHz. The x-axis ranges from 2420 to 2500 MHz, and the y-axis ranges from 0 to 140 dBc/Vm. A red vertical line marks the average level at approximately 2437 MHz.</p> <p>Date: 2019-04-04</p> <p>Site: 03CH11-HV Condition: AVG_BE_54 3m HORN 9120D-HF VERTICAL Detector: R8W:1000.000KHz VBW:10000KHz SWT:Auto Project: 8N0846-03 Setting: 20</p>	Left blank







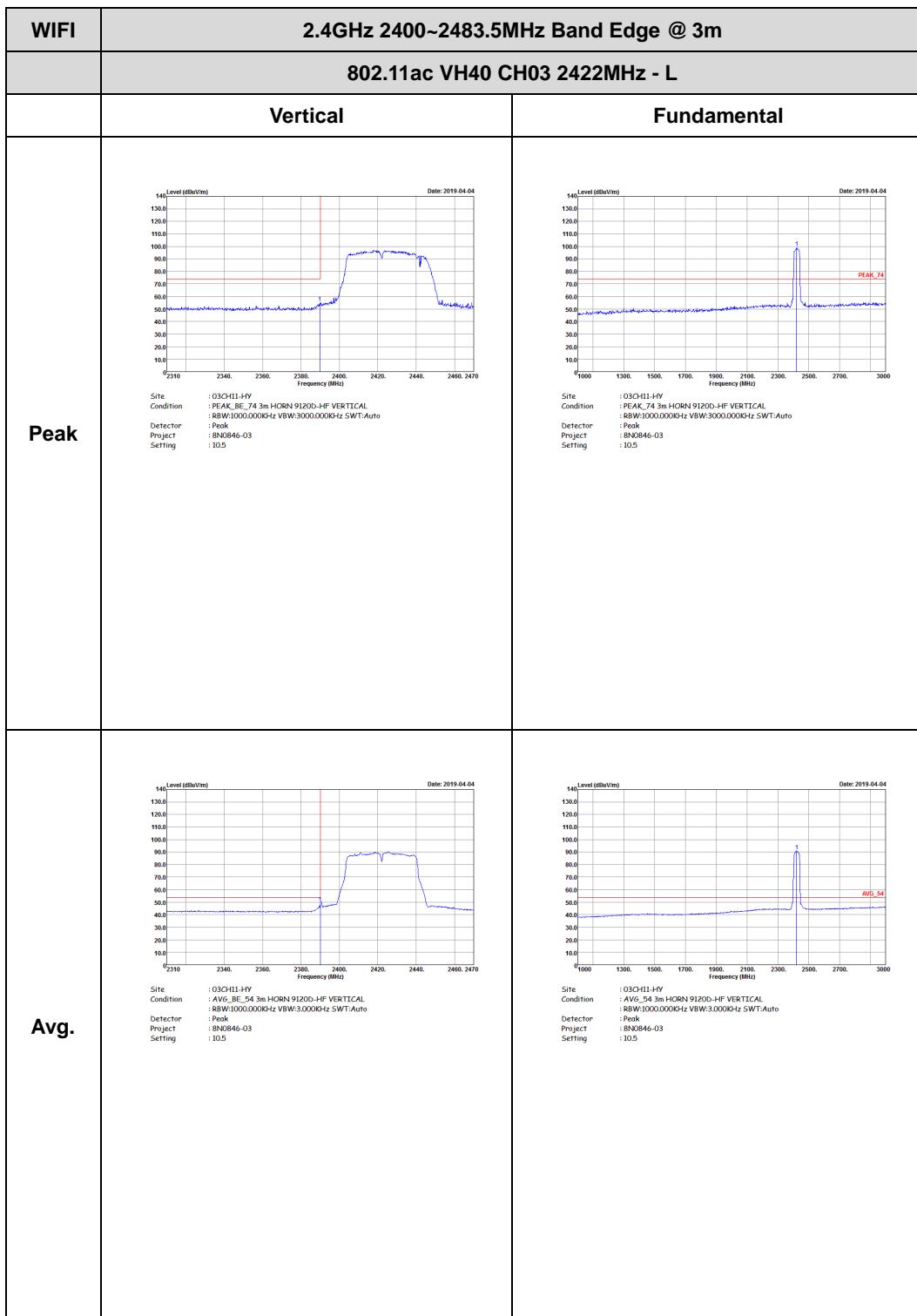
2.4GHz 2400~2483.5MHz

WIFI 802.11ac VHT40 (Band Edge @ 3m)

WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	802.11ac VH40 CH03 2422MHz - L	
	Horizontal	Fundamental
Peak	 Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 9120D-HF HORIZONTAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : 8N0846-03 Setting : 10.5	 Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120D-HF HORIZONTAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : 8N0846-03 Setting : 10.5
Avg.	 Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 9120D-HF HORIZONTAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : 8N0846-03 Setting : 10.5	 Site : 03CH11-HY Condition : AVG_54 3m HORN 9120D-HF HORIZONTAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : 8N0846-03 Setting : 10.5

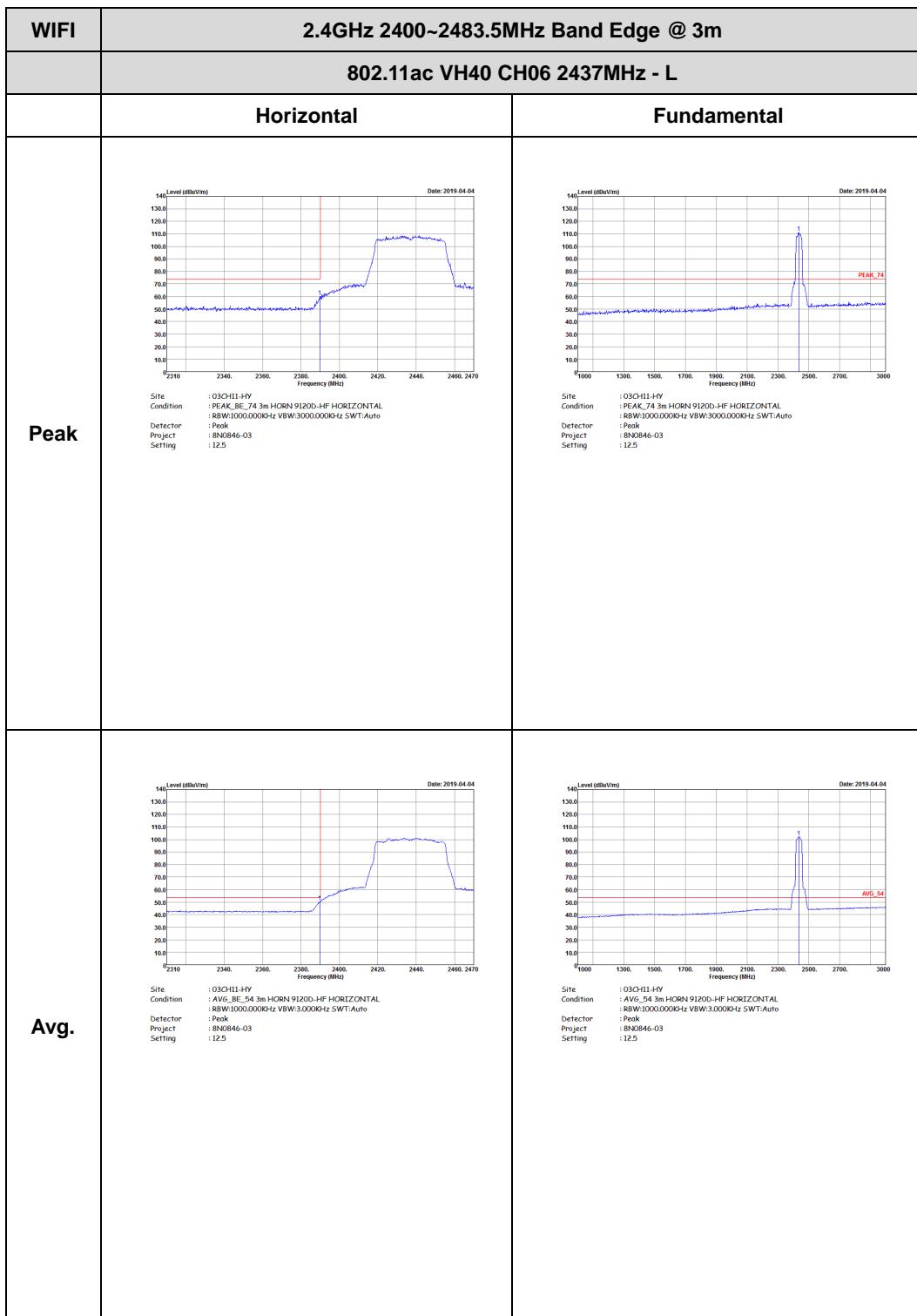


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
802.11ac VH40 CH03 2422MHz - R		
Horizontal		Fundamental
Peak	<p>Level (dBc/Vm)</p> <p>Frequency (MHz)</p> <p>Date: 2019-04-04</p> <p>PEAK_BE_74</p> <p>Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 8N0846-03 Setting : 10.5</p>	Left blank
Avg.	<p>Level (dBc/Vm)</p> <p>Frequency (MHz)</p> <p>Date: 2019-04-04</p> <p>AVG_BE_54</p> <p>Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:3.0000KHz SWT:Auto Detector : Peak Project : 8N0846-03 Setting : 10.5</p>	Left blank



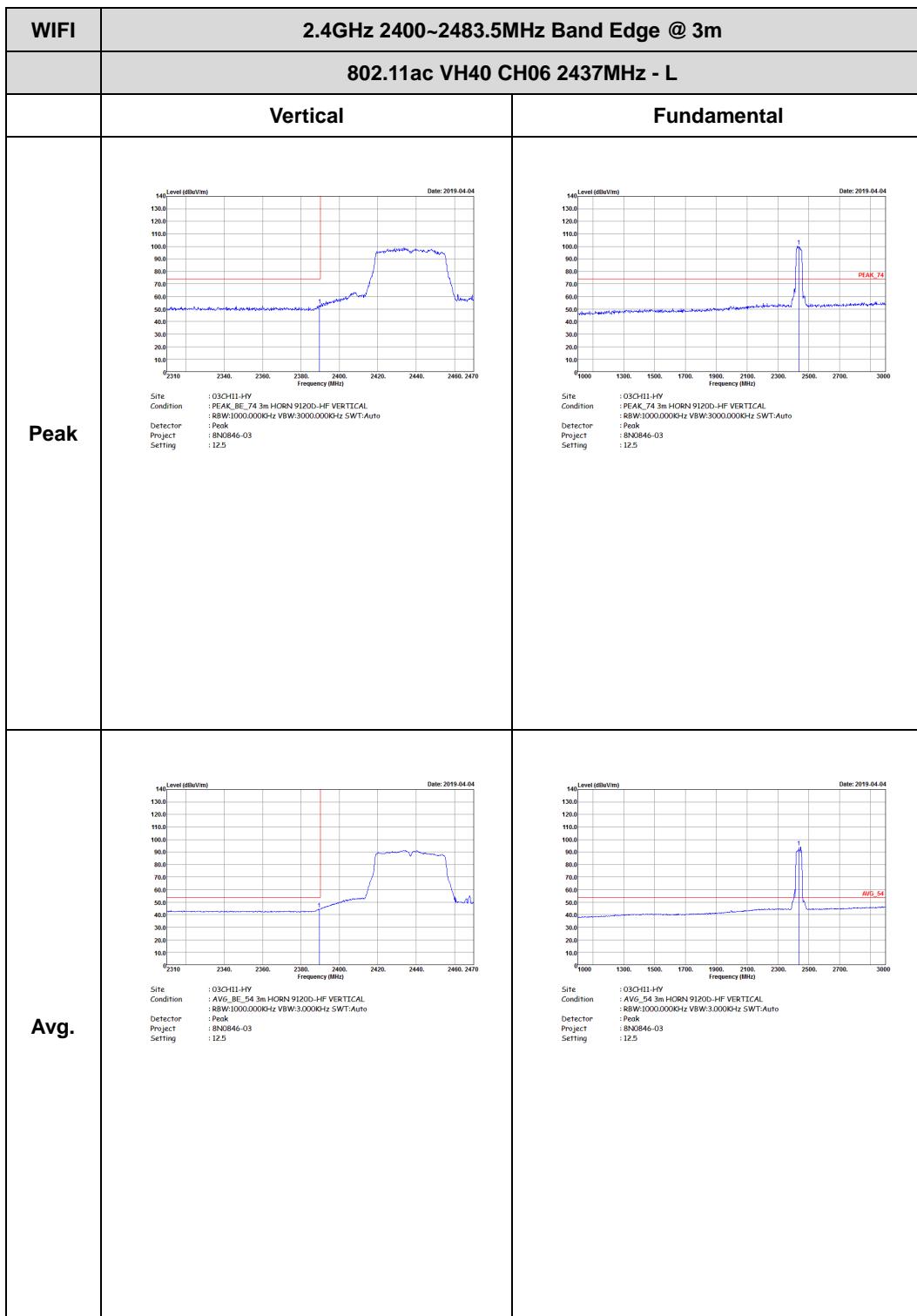


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
802.11ac VH40 CH03 2422MHz - R		
	Vertical	Fundamental
Peak	<p>Level (dBc/Vm)</p> <p>Frequency (MHz)</p> <p>Date: 2019-04-04</p> <p>PEAK_BE_74</p> <p>Site : 03CH11-HV Condition : PEAK_BE_74 3m HORN 91200-HF VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : 8N0846-03 Setting : 10.5</p>	Left blank
Avg.	<p>Level (dBc/Vm)</p> <p>Frequency (MHz)</p> <p>Date: 2019-04-04</p> <p>AVG_BE_54</p> <p>Site : 03CH11-HV Condition : AVG_BE_54 3m HORN 91200-HF VERTICAL Detector : RBW:1000.000KHz VBW:3.000KHz SWT:Auto Project : 8N0846-03 Setting : 10.5</p>	Left blank



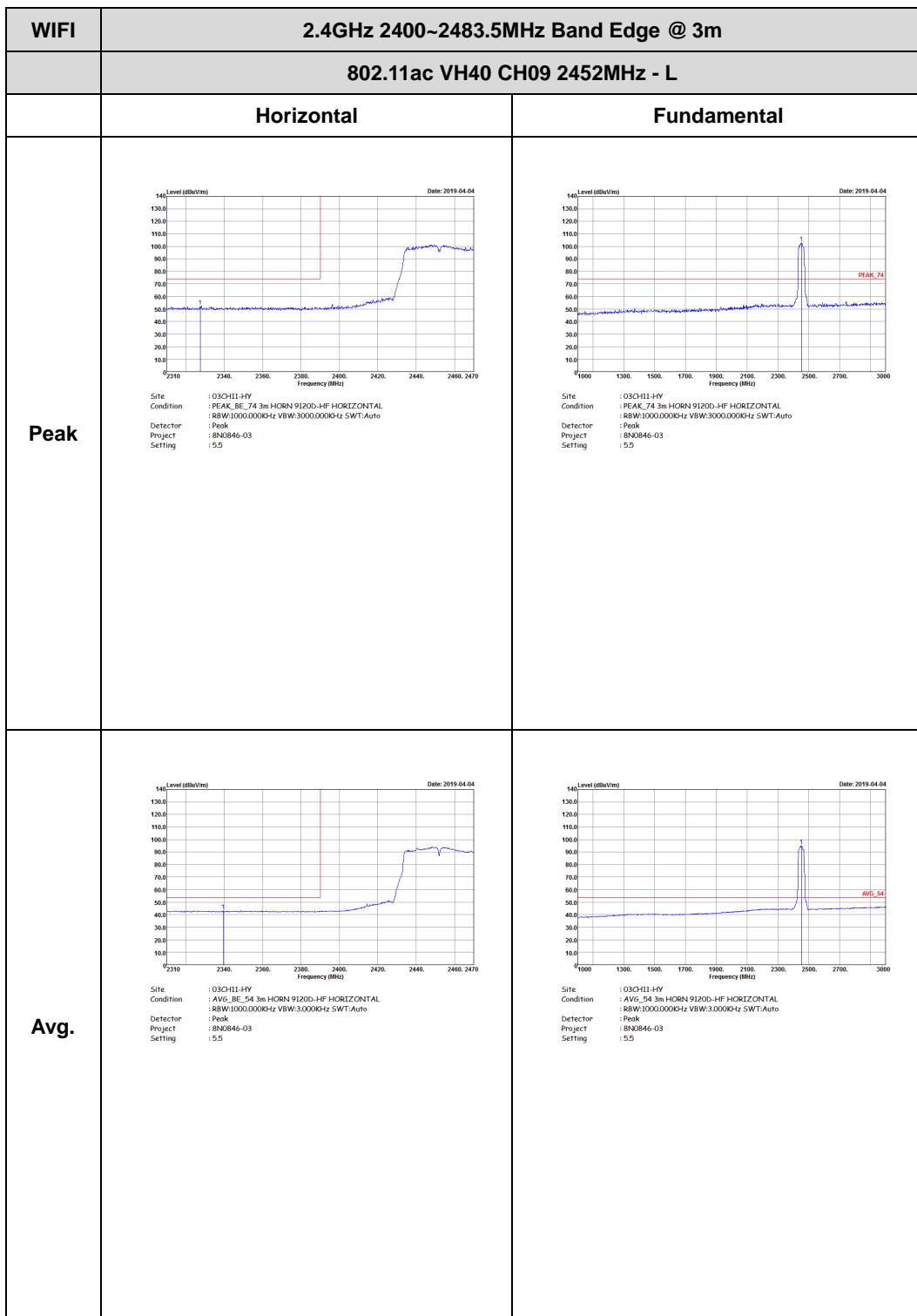


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
802.11ac VH40 CH06 2437MHz - R		
Horizontal		Fundamental
Peak	<p>Level (dBc/Vm)</p> <p>Frequency (MHz)</p> <p>Date: 2019-04-04</p> <p>PEAK_BE_74</p> <p>Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 8N0846-03 Setting : 12.5</p>	Left blank
Avg.	<p>Level (dBc/Vm)</p> <p>Frequency (MHz)</p> <p>Date: 2019-04-04</p> <p>AVG_BE_54</p> <p>Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:3.000KHz SWT:Auto Detector : Peak Project : 8N0846-03 Setting : 12.5</p>	Left blank



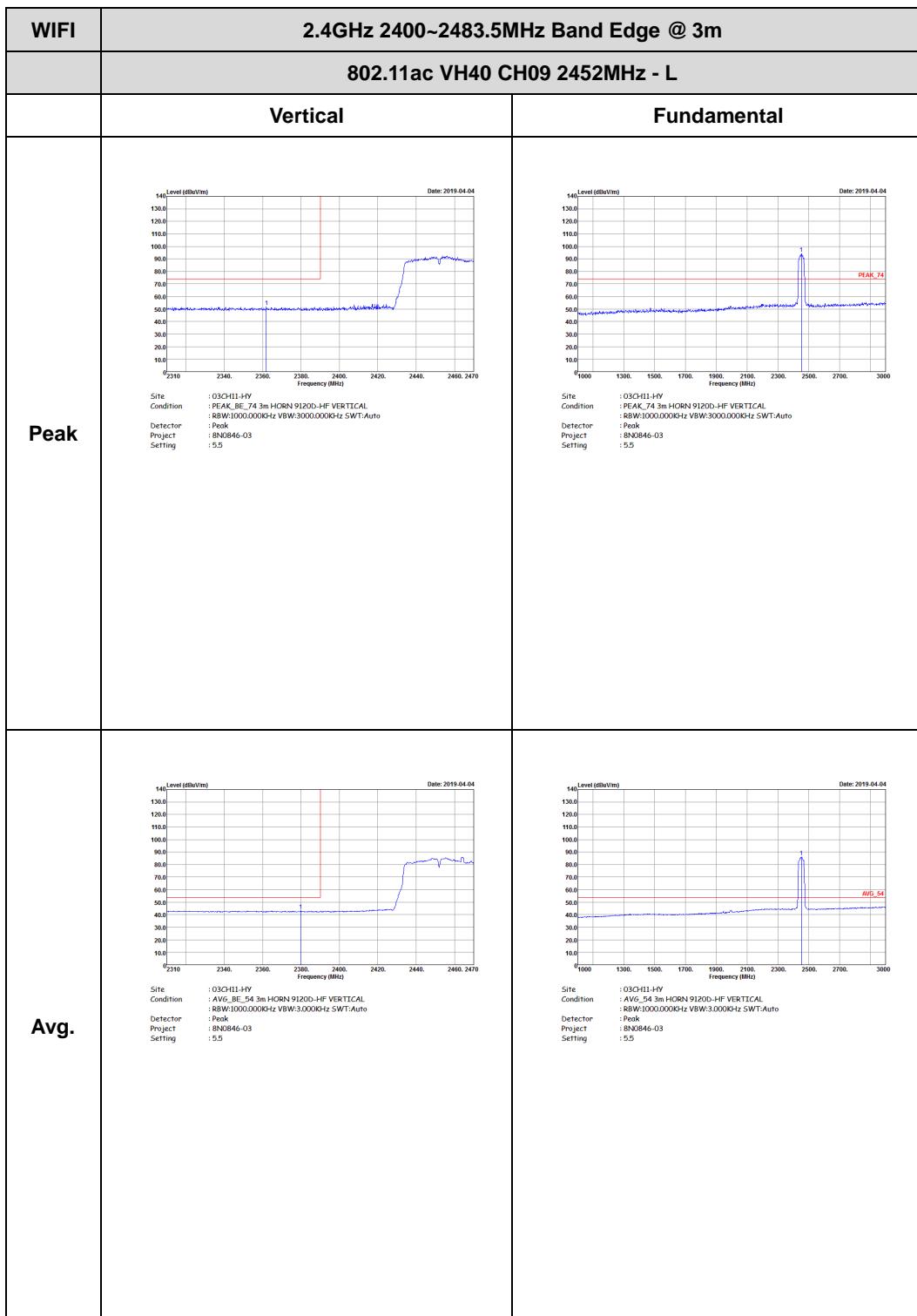


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
802.11ac VH40 CH06 2437MHz - R		
	Vertical	Fundamental
Peak	<p>Level (dBuV/m)</p> <p>Frequency (MHz)</p> <p>Date: 2019-04-04</p> <p>PEAK_BE_74</p> <p>Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 9120D-HF VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : 8N0846-03 Setting : 12.5</p>	Left blank
Avg.	<p>Level (dBuV/m)</p> <p>Frequency (MHz)</p> <p>Date: 2019-04-04</p> <p>Avg_BE_54</p> <p>Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 9120D-HF VERTICAL Detector : RBW:1000.000KHz VBW:3.000KHz SWT:Auto Project : 8N0846-03 Setting : 12.5</p>	Left blank





WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
802.11ac VH40 CH09 2452MHz - R		
Horizontal		Fundamental
Peak	<p>Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 9120D-HF HORIZONTAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : 8N0846-03 Setting : 5.5</p>	Left blank
Avg.	<p>Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 9120D-HF HORIZONTAL Detector : RBW:1000.000KHz VBW:3.000KHz SWT:Auto Project : 8N0846-03 Setting : 5.5</p>	Left blank



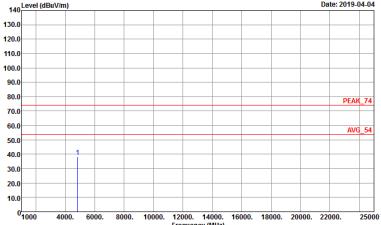
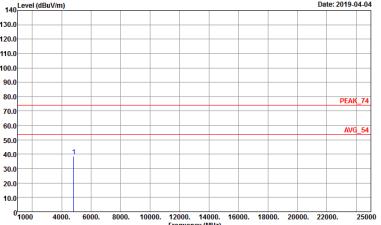


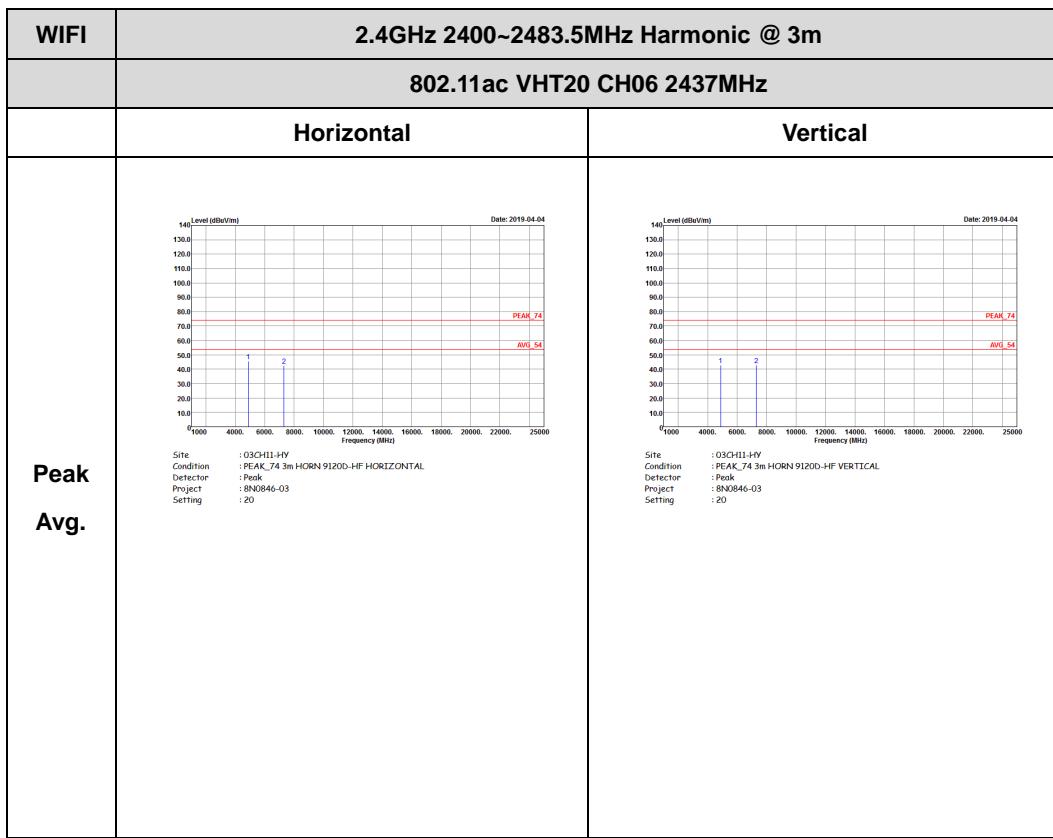
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
802.11ac VH40 CH09 2452MHz - R		
	Vertical	Fundamental
Peak	<p>Graph showing Level (dBc/Vm) vs Frequency (MHz) for Peak measurement. The graph shows a sharp peak around 2452MHz. The x-axis ranges from 2420 to 2500 MHz, and the y-axis ranges from 10.0 to 140.0 dBc/Vm. A red box highlights the peak at approximately 2452MHz.</p> <p>Date: 2019-04-04</p> <p>Site: 03CH11-HV Condition: PEAK_BE_74 3m HORN 9120D-HF VERTICAL Detector: R8W:1000.000KHz VBW:3000.000KHz SWT:Auto Project: 8N0846-03 Setting: 5.5</p>	Left blank
Avg.	<p>Graph showing Level (dBc/Vm) vs Frequency (MHz) for Average measurement. The graph shows a broad average level around 2452MHz. The x-axis ranges from 2420 to 2500 MHz, and the y-axis ranges from 10.0 to 140.0 dBc/Vm. A red box highlights the average level at approximately 2452MHz.</p> <p>Date: 2019-04-04</p> <p>Site: 03CH11-HV Condition: AVG_BE_54 3m HORN 9120D-HF VERTICAL Detector: R8W:1000.000KHz VBW:3.000KHz SWT:Auto Project: 8N0846-03 Setting: 5.5</p>	Left blank

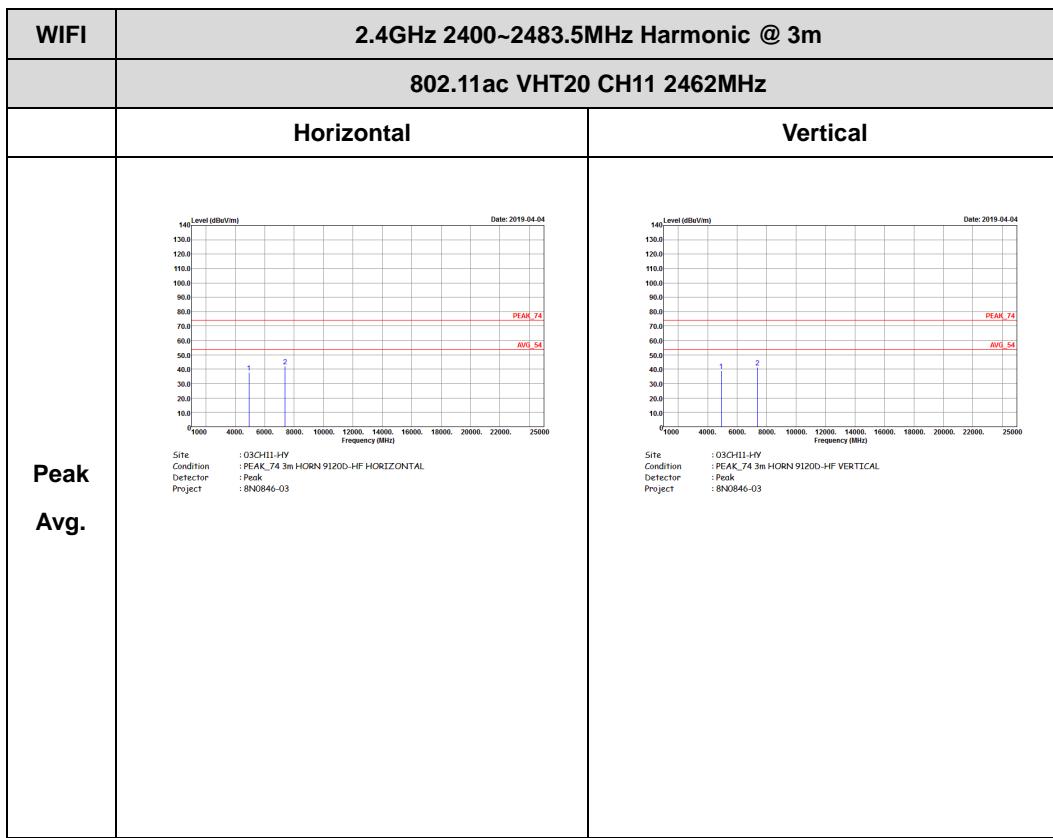


2.4GHz 2400~2483.5MHz

WIFI 802.11ac VHT20 (Harmonic @ 3m)

WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	802.11ac VHT20 CH01 2412MHz	
	Horizontal	Vertical
Peak	 <p>Site : 03CH11-H/V Condition : PEAK_74 3m HORN 9120D-HF HORIZONTAL Detector : Peak Project : 8N0846-03 Setting : 14</p>	 <p>Site : 03CH11-H/V Condition : PEAK_74 3m HORN 9120D-HF VERTICAL Detector : Peak Project : 8N0846-03 Setting : 14</p>
Avg.		

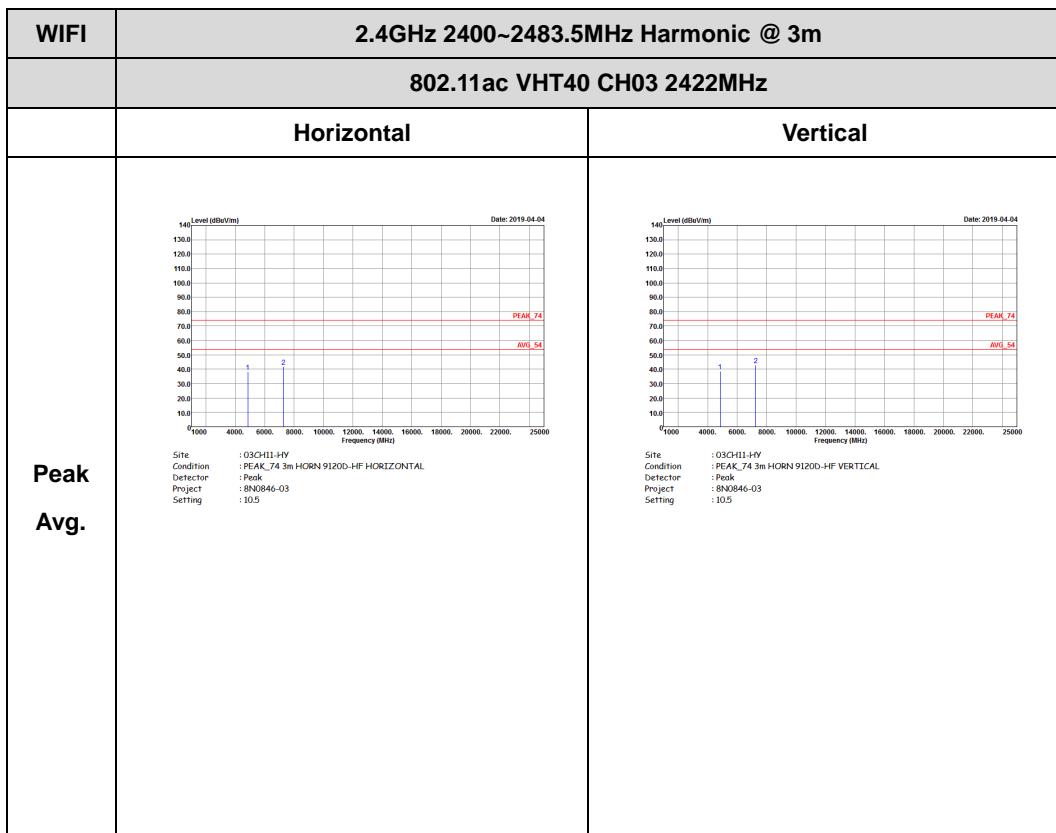


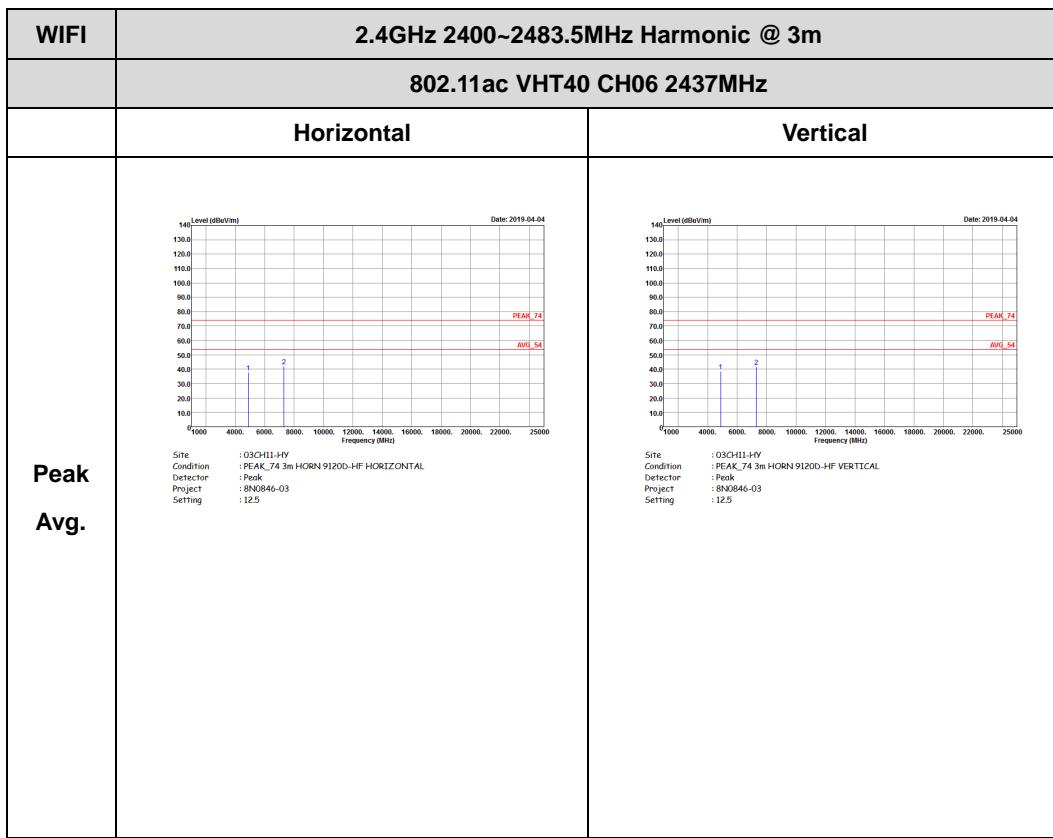


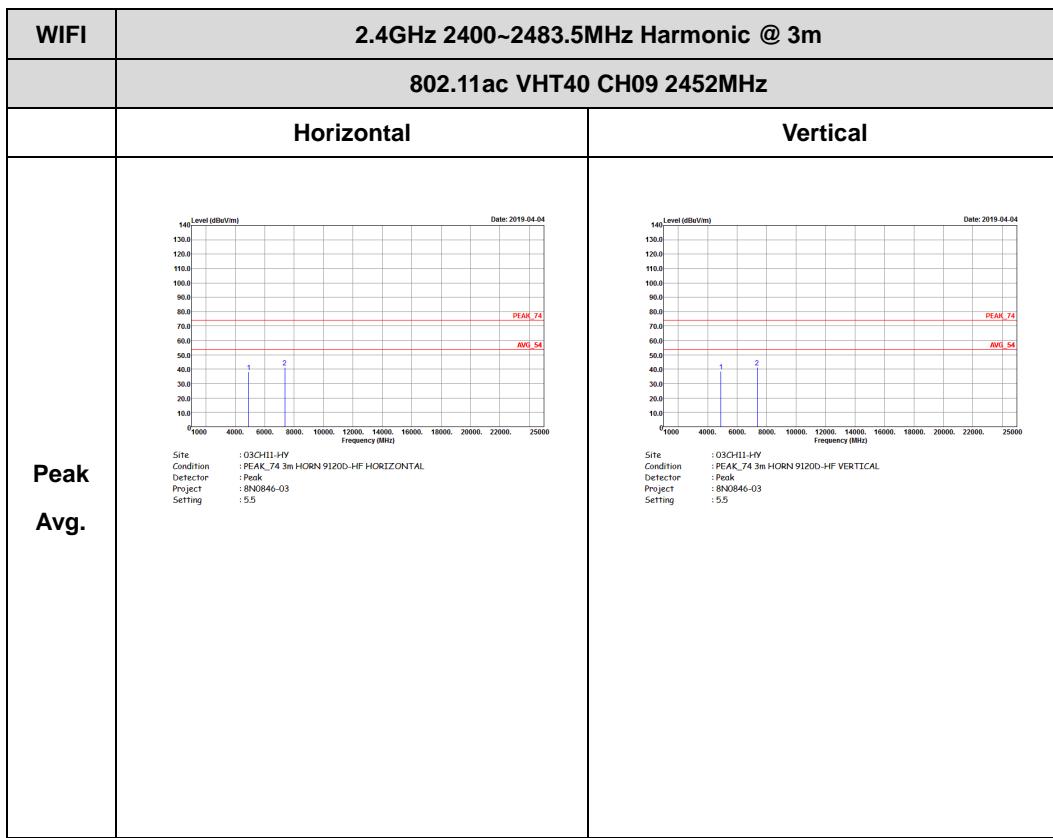


2.4GHz 2400~2483.5MHz

WIFI 802.11ac VHT40 (Harmonic @ 3m)





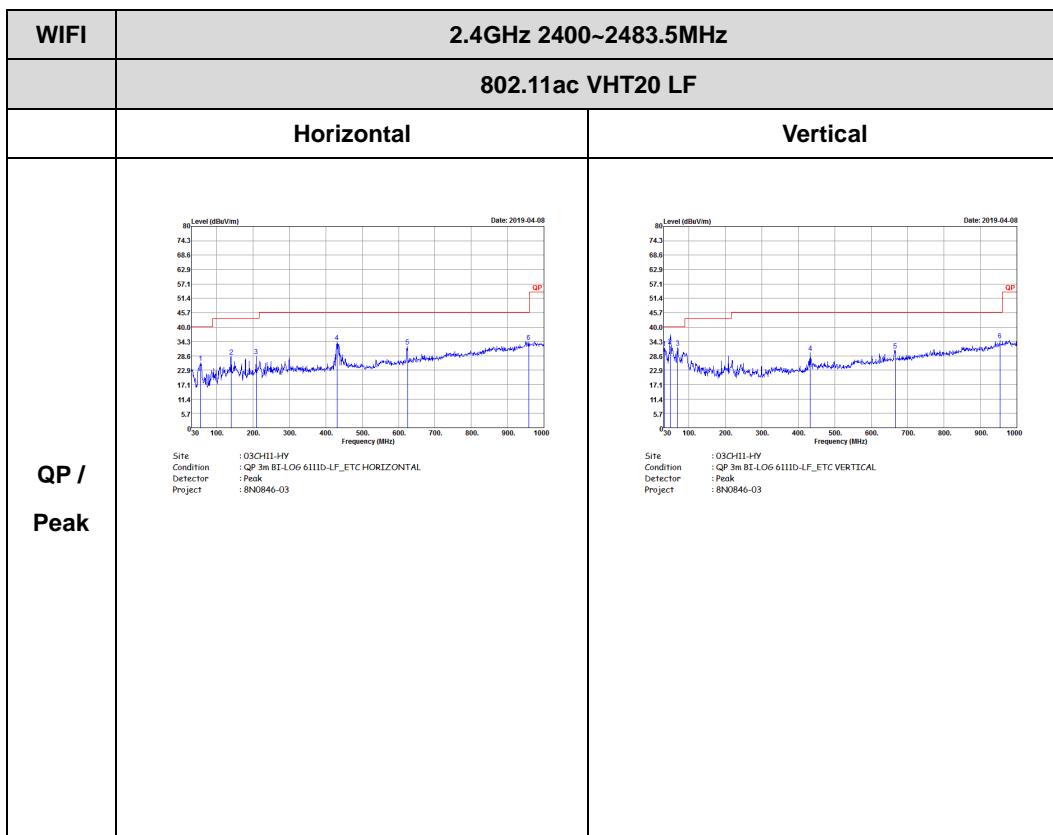




2.4GHz 2400~2483.5MHz

Emission below 1GHz

2.4GHz WIFI 802.11ac VHT20 (LF)



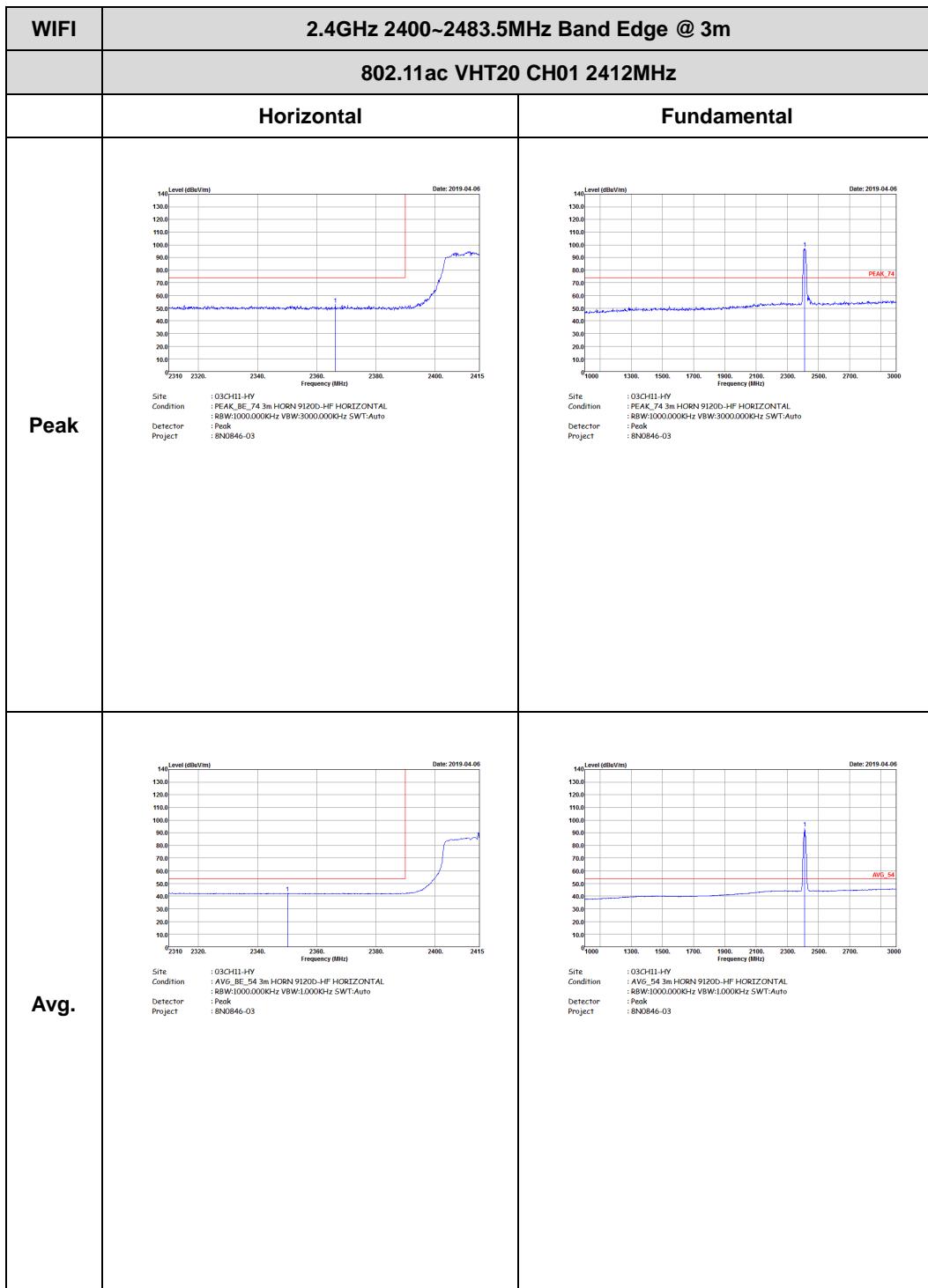


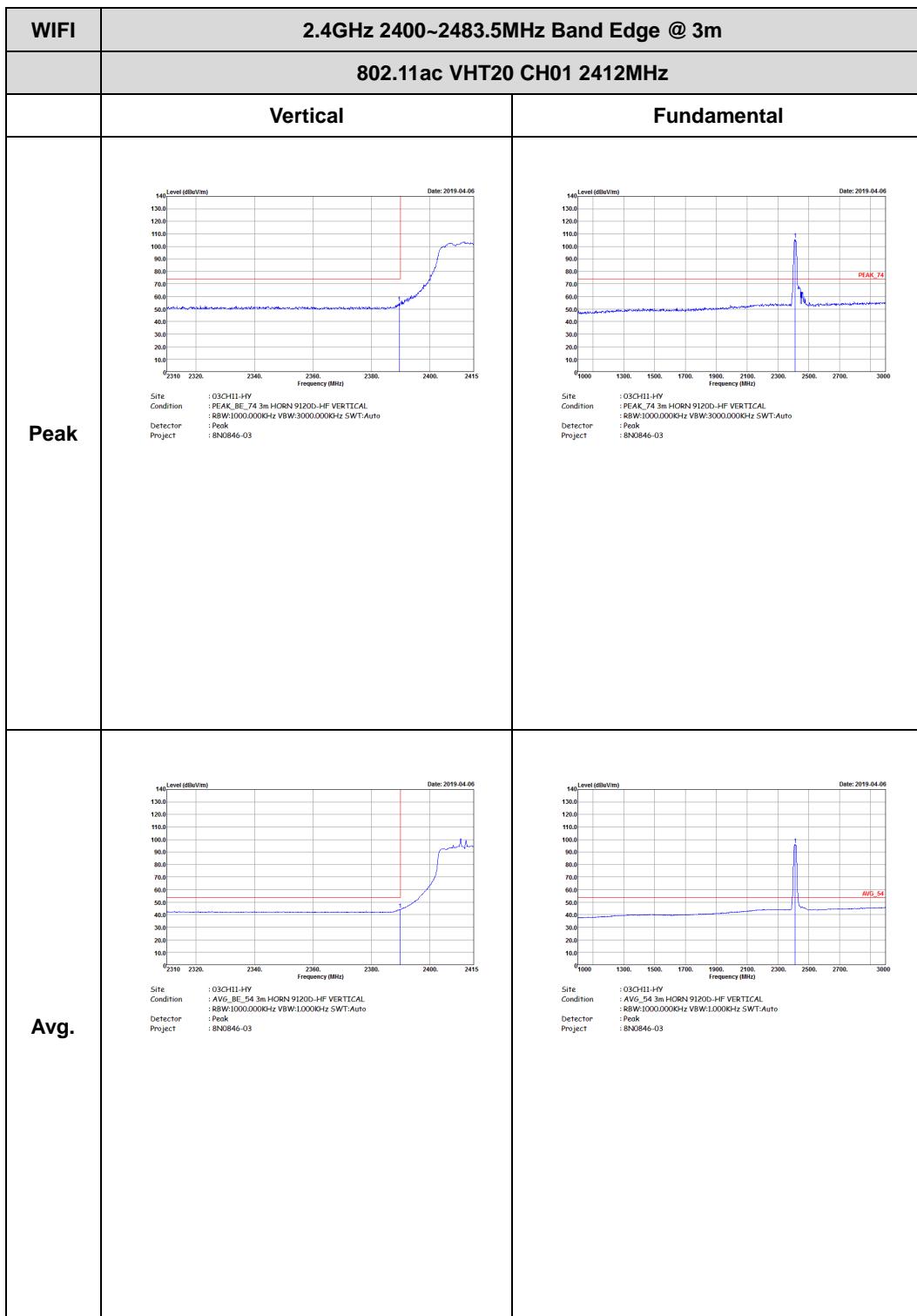
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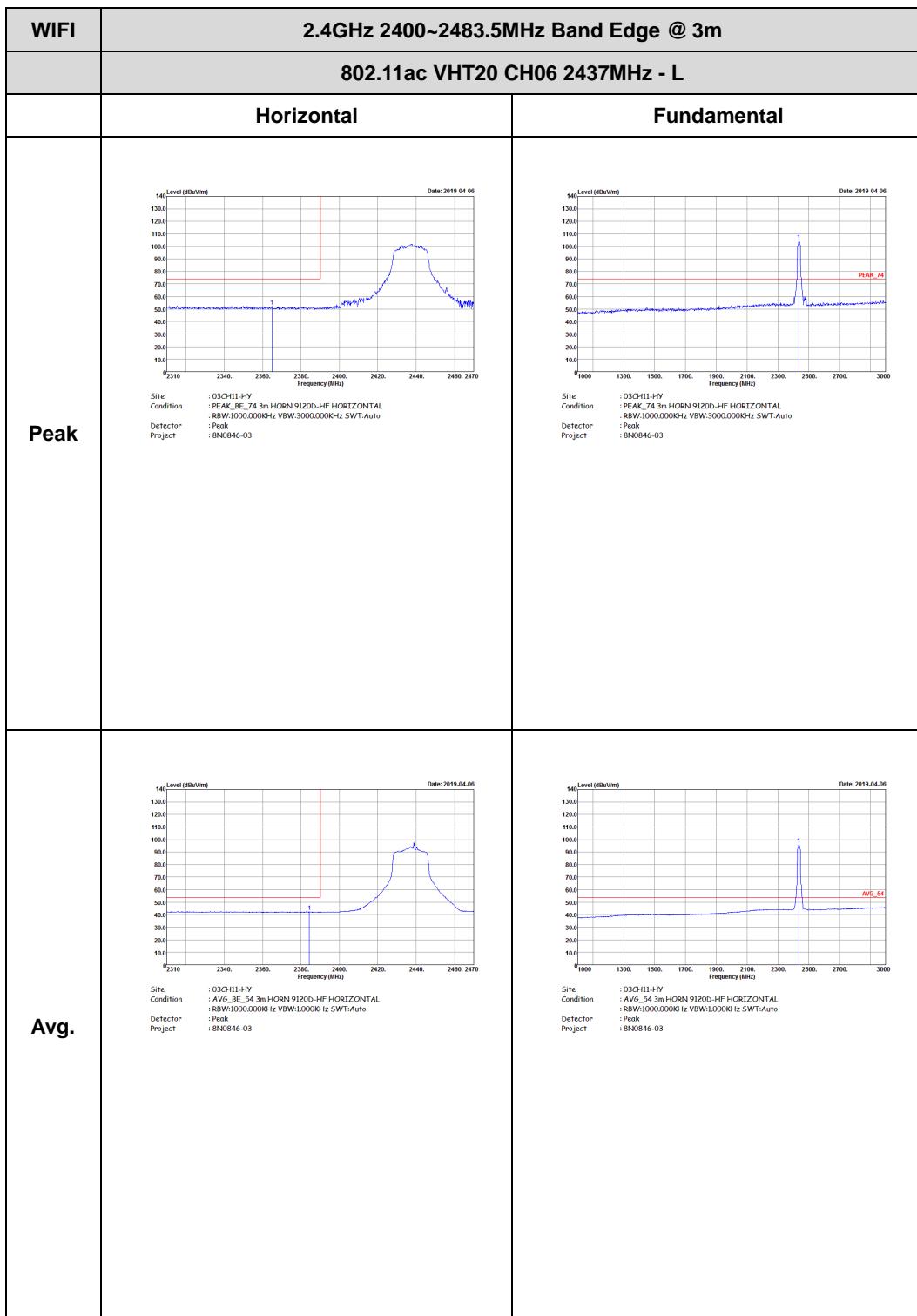
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2.4GHz 2400~2483.5MHz

WIFI 802.11ac VHT20 (Band Edge @ 3m)

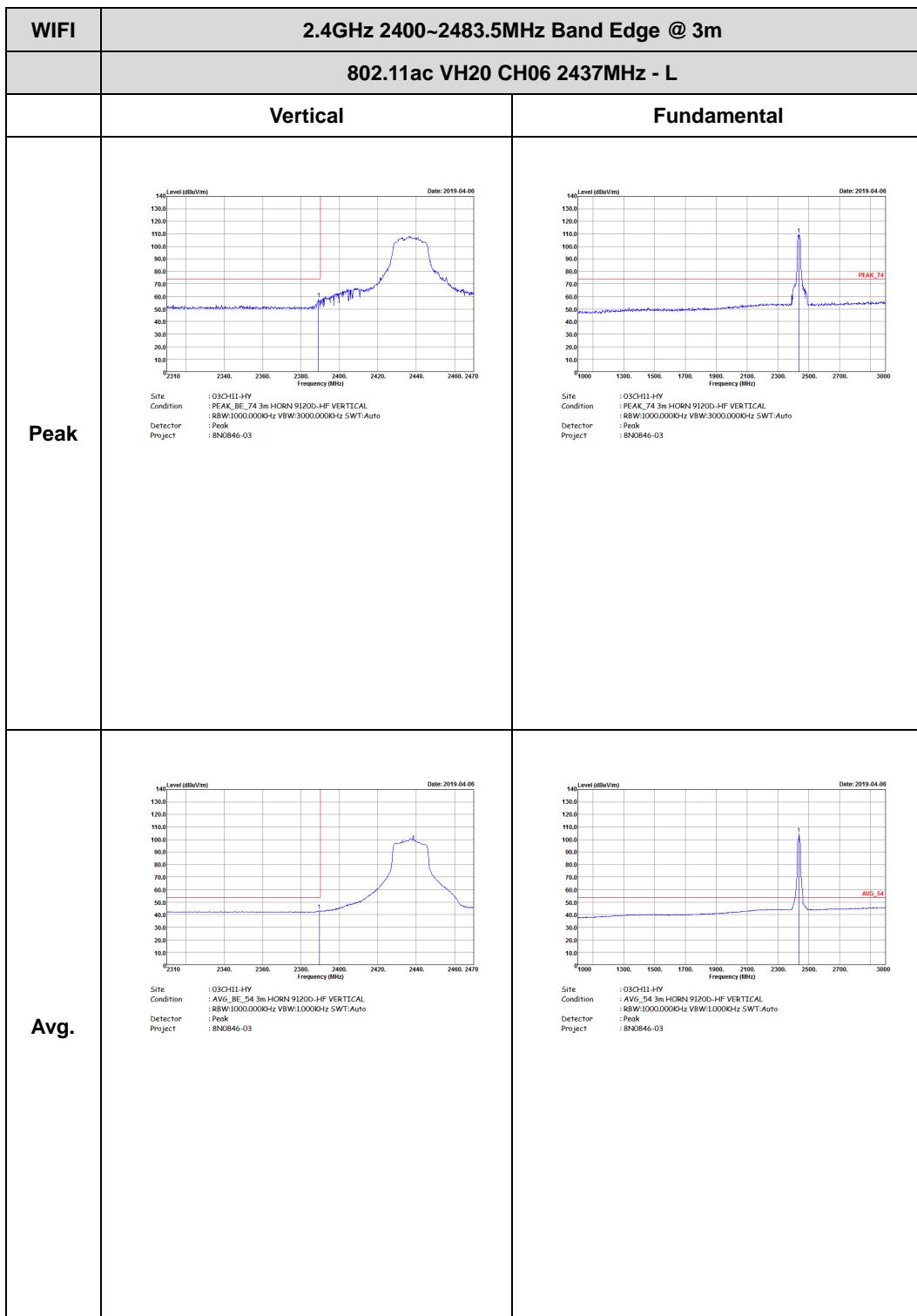






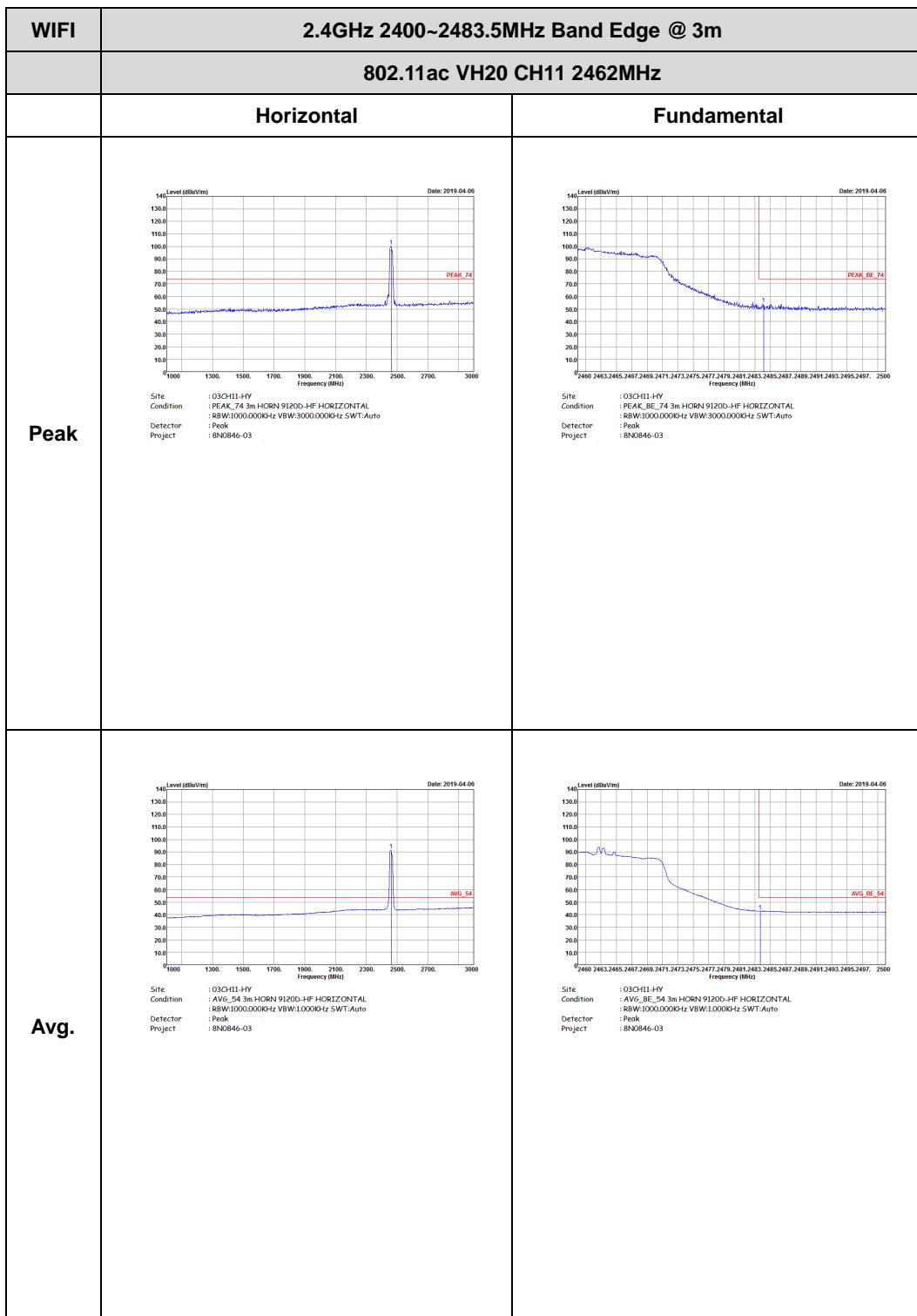


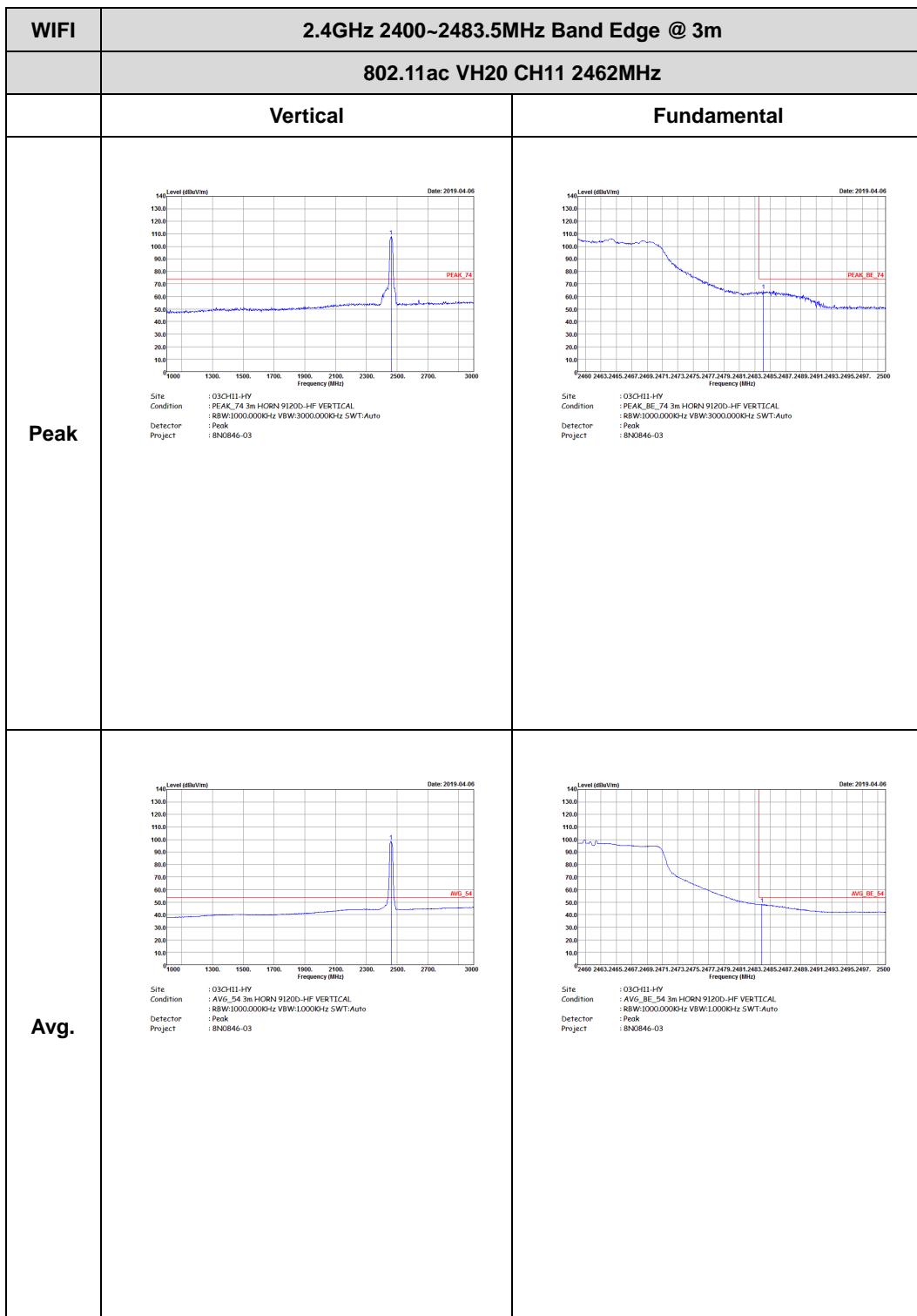
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
802.11ac VH20 CH06 2437MHz - R		
Horizontal		Fundamental
Peak	<p>Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 9120D-HF HORIZONTAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak Project : 8N0846-03</p>	Left blank
Avg.	<p>Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 9120D-HF HORIZONTAL Detector : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Project : Peak Project : 8N0846-03</p>	Left blank





	WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
		802.11ac VH20 CH06 2437MHz - R	
		Vertical	Fundamental
Peak		<p>Graph showing Level (dBc/Vm) vs Frequency (MHz) for Peak measurement. The graph shows a sharp peak around 2437 MHz. The x-axis ranges from 2420 to 2500 MHz, and the y-axis ranges from 0 to 140 dBc/Vm. A red box highlights the peak at approximately 2437 MHz, labeled "PEAK_BE_74".</p> <p>Date: 2019-04-06</p> <p>Site: 03CH11-HV Condition: PEAK_BE_74 3m HORN 9120D-HF VERTICAL Detector: RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project: 8N0846-03</p>	Left blank
Avg.		<p>Graph showing Level (dBc/Vm) vs Frequency (MHz) for Average measurement. The graph shows a broad average level around 2437 MHz. The x-axis ranges from 2420 to 2500 MHz, and the y-axis ranges from 0 to 140 dBc/Vm. A red box highlights the average level at approximately 2437 MHz, labeled "AVG_BE_54".</p> <p>Date: 2019-04-06</p> <p>Site: 03CH11-HV Condition: AVG_BE_54 3m HORN 9120D-HF VERTICAL Detector: RBW:1000.000KHz VBW:1000KHz SWT:Auto Project: 8N0846-03</p>	Left blank

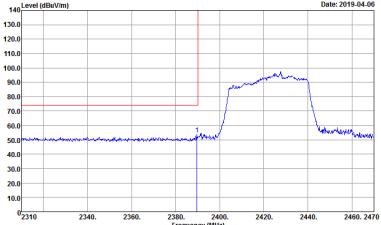
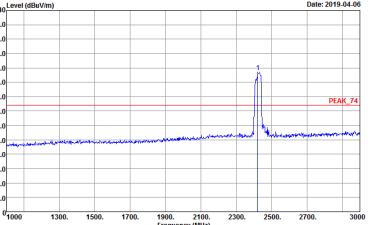
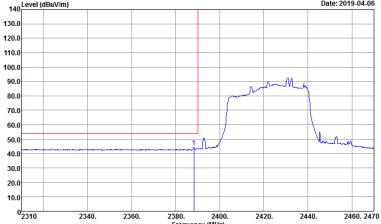
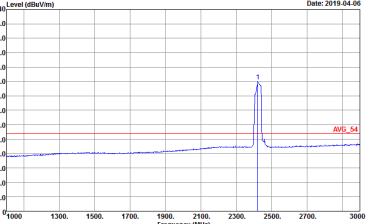






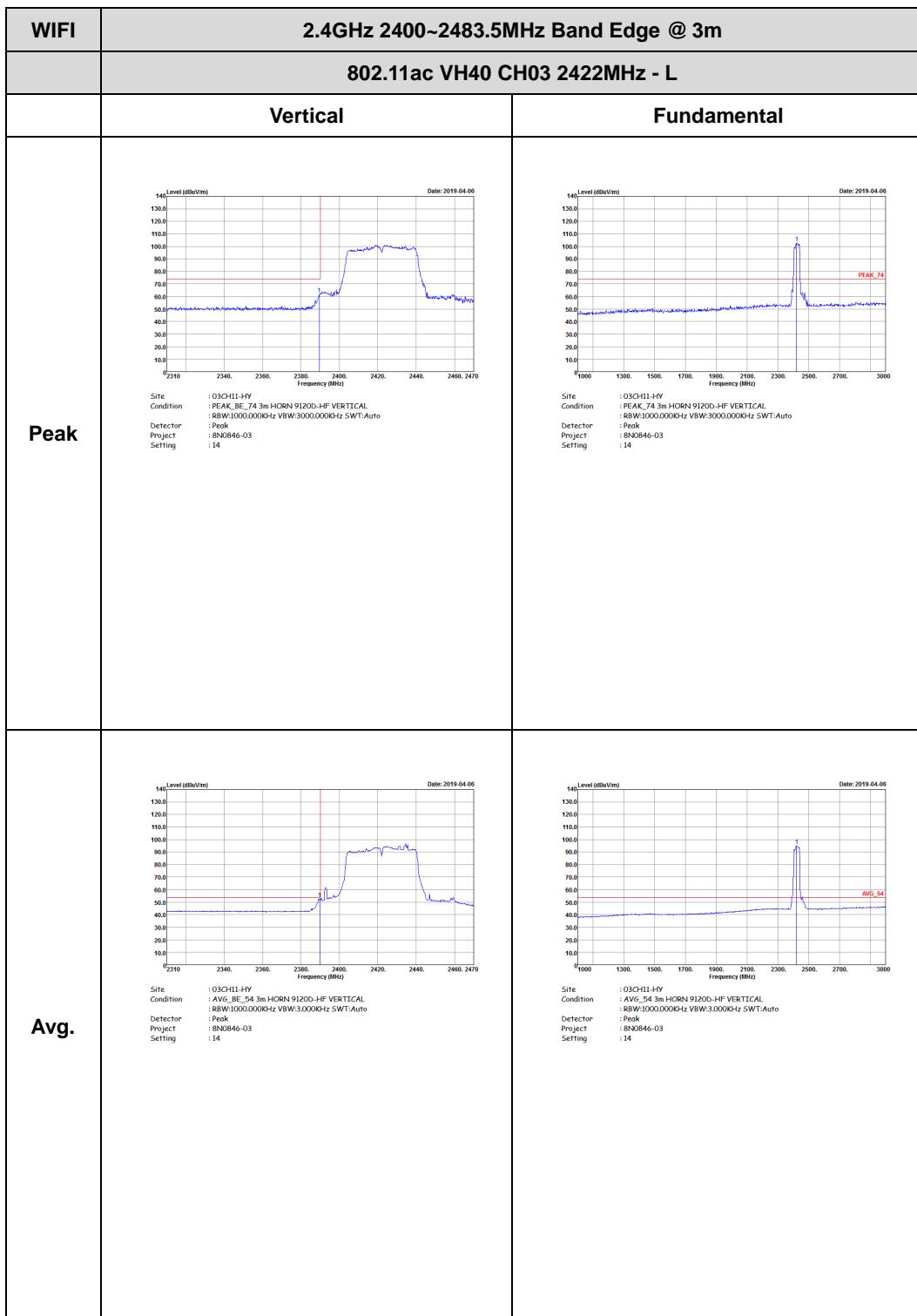
2.4GHz 2400~2483.5MHz

WIFI 802.11ac VHT40 (Band Edge @ 3m)

WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	802.11ac VH40 CH03 2422MHz - L	
	Horizontal	Fundamental
Peak	 Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto Detector : Peak Project : BN0846-03 Setting : 14	 Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto Detector : Peak Project : BN0846-03 Setting : 14
Avg.	 Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto Detector : Peak Project : BN0846-03 Setting : 14	 Site : 03CH11-HY Condition : AVG_54 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto Detector : Peak Project : BN0846-03 Setting : 14

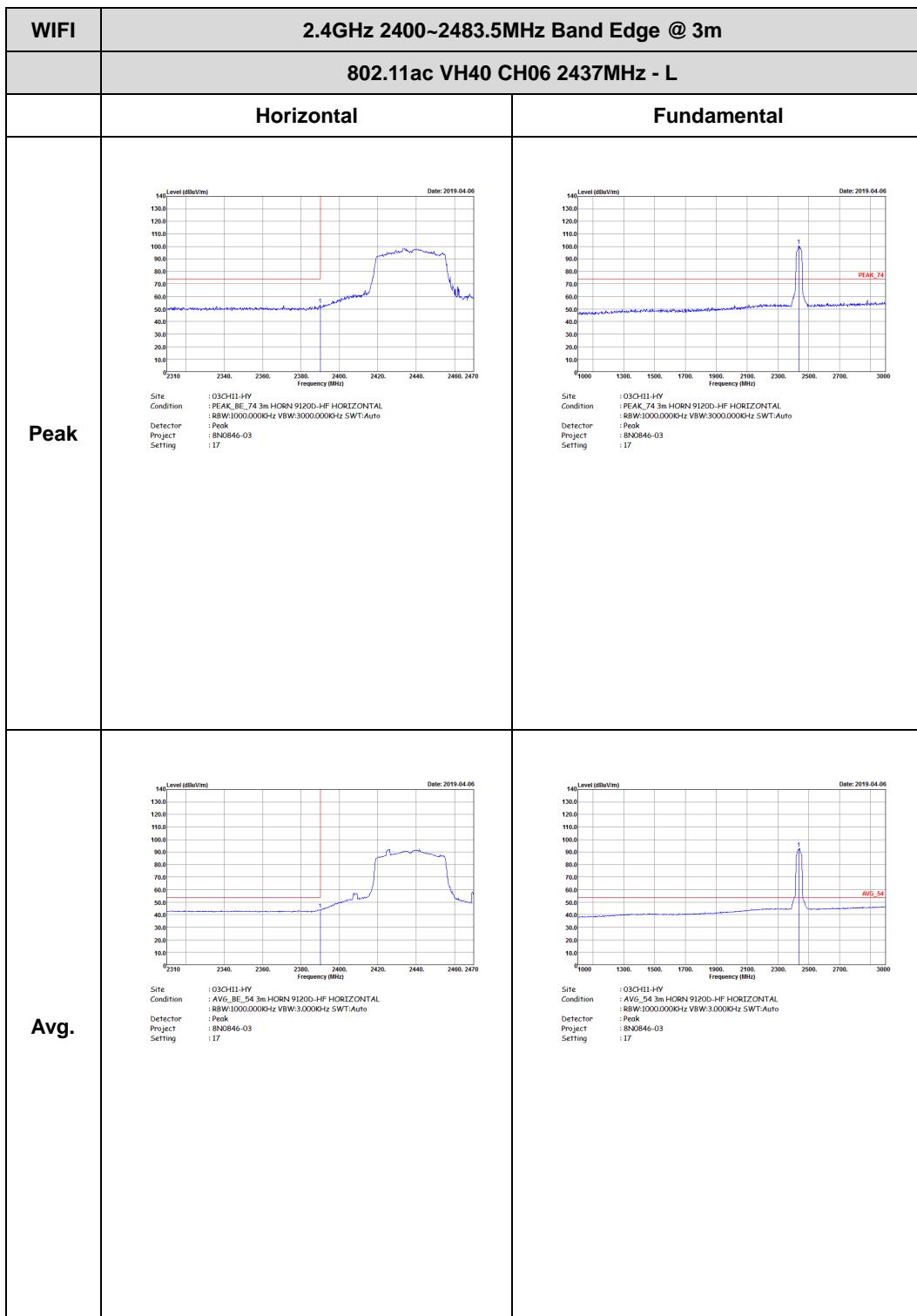


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
802.11ac VH40 CH03 2422MHz - R		
Horizontal		Fundamental
Peak	<p>Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 8N0846-03 Setting : 14</p>	Left blank
Avg.	<p>Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:3.000KHz SWT:Auto Detector : Peak Project : 8N0846-03 Setting : 14</p>	Left blank



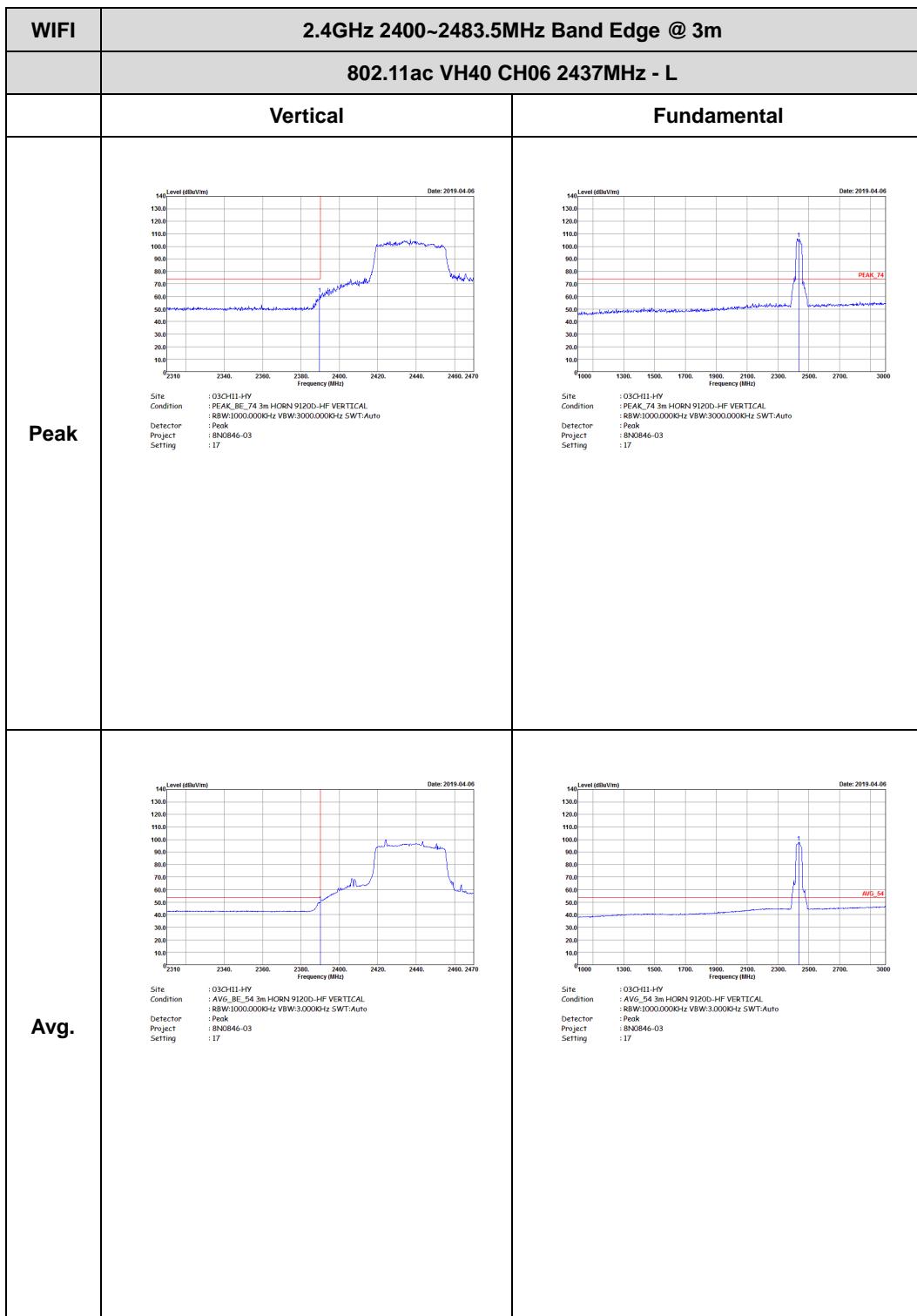


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
802.11ac VH40 CH03 2422MHz - R		
	Vertical	Fundamental
Peak	<p>Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 9120D-HF VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : 8N0846-03 Setting : 14</p>	Left blank
Avg.	<p>Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 9120D-HF VERTICAL Detector : RBW:1000.000KHz VBW:3.000KHz SWT:Auto Project : 8N0846-03 Setting : 14</p>	Left blank



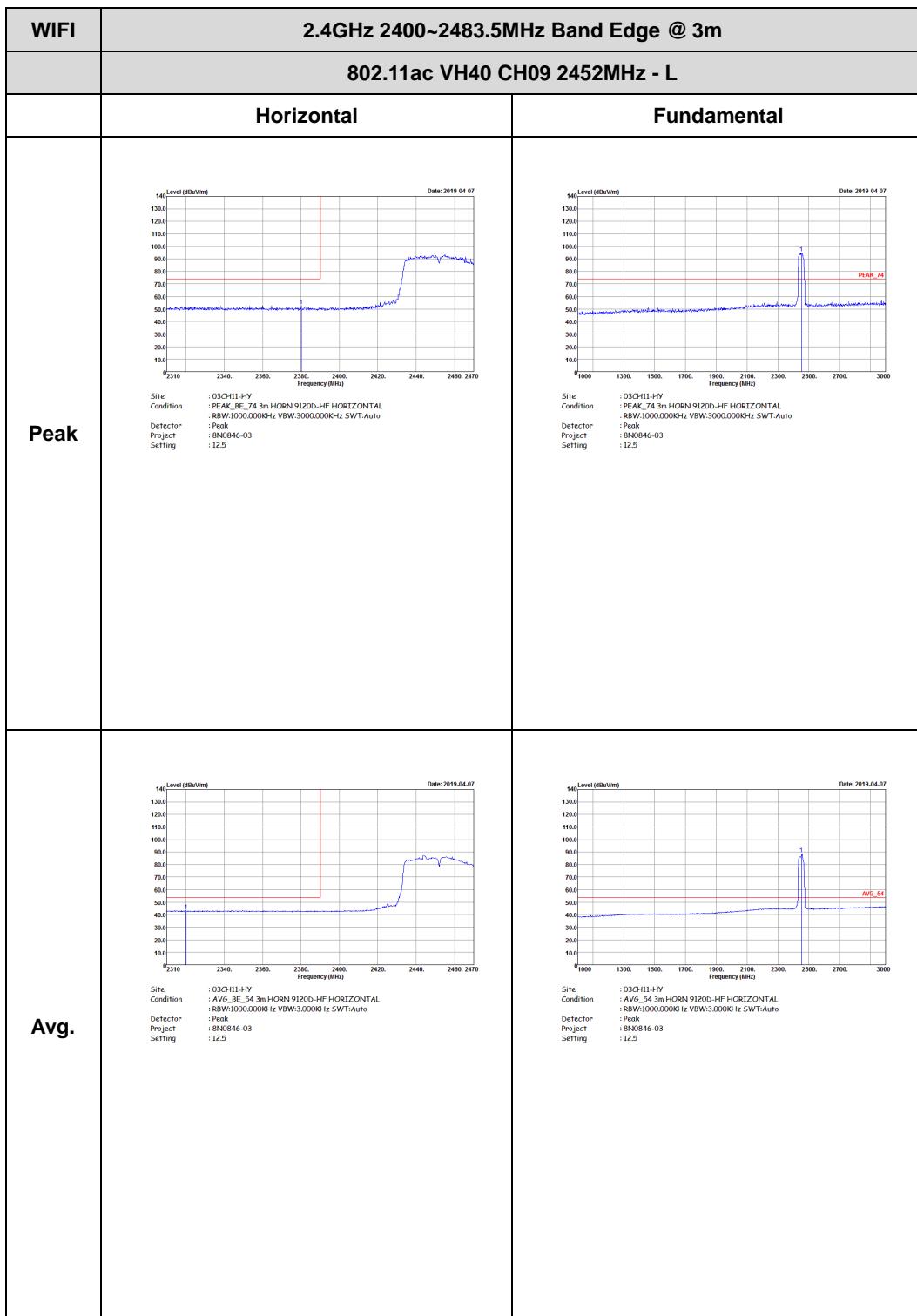


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
802.11ac VH40 CH06 2437MHz - R		
Horizontal		Fundamental
Peak	<p>Level (dBuV/m)</p> <p>Frequency (MHz)</p> <p>Date: 2019-04-06</p> <p>PEAK_BE_74</p> <p>Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 8N0846-03 Setting : 17</p>	Left blank
Avg.	<p>Level (dBuV/m)</p> <p>Frequency (MHz)</p> <p>Date: 2019-04-06</p> <p>AVG_BE_54</p> <p>Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:3.000KHz SWT:Auto Detector : Peak Project : 8N0846-03 Setting : 17</p>	Left blank



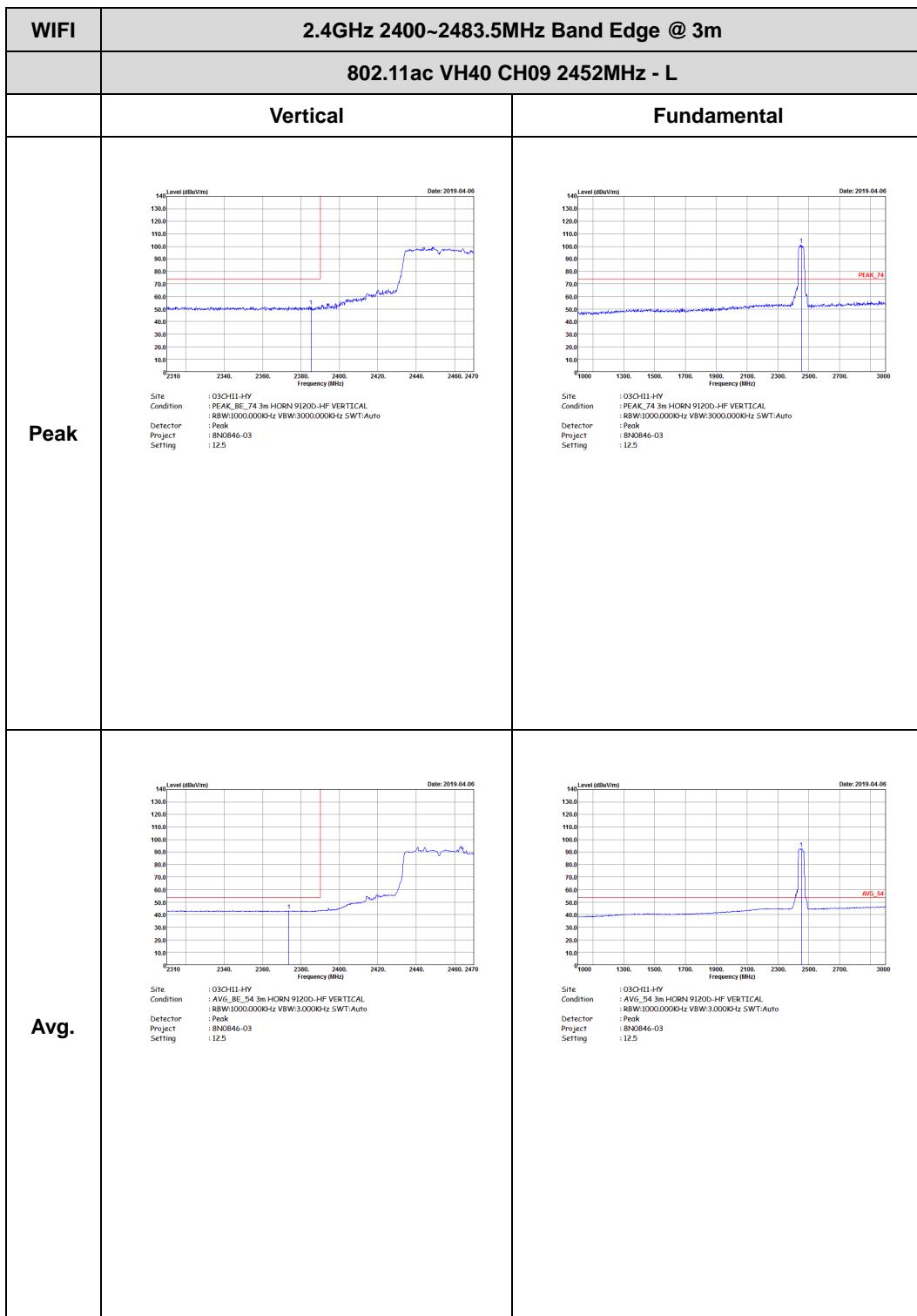


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
802.11ac VH40 CH06 2437MHz - R		
Vertical		Fundamental
Peak	<p>Level (dBuV/m)</p> <p>Frequency (MHz)</p> <p>Date: 2019-04-06</p> <p>PEAK_BE_74</p> <p>Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 9120D-HF VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : 8N0846-03 Setting : 17</p>	Left blank
Avg.	<p>Level (dBuV/m)</p> <p>Frequency (MHz)</p> <p>Date: 2019-04-06</p> <p>Avg_BE_54</p> <p>Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 9120D-HF VERTICAL Detector : RBW:1000.000KHz VBW:3.000KHz SWT:Auto Project : 8N0846-03 Setting : 17</p>	Left blank





WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	802.11ac VH40 CH09 2452MHz - R	
	Horizontal	Fundamental
Peak	<p>Level (dBc/Vm)</p> <p>Frequency (MHz)</p> <p>Date: 2019-04-07</p> <p>PEAK_BE_74</p> <p>Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 8N0846-03 Setting : 12.5</p>	Left blank
Avg.	<p>Level (dBc/Vm)</p> <p>Frequency (MHz)</p> <p>Date: 2019-04-07</p> <p>AVG_BE_54</p> <p>Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:3.000KHz SWT:Auto Detector : Peak Project : 8N0846-03 Setting : 12.5</p>	Left blank



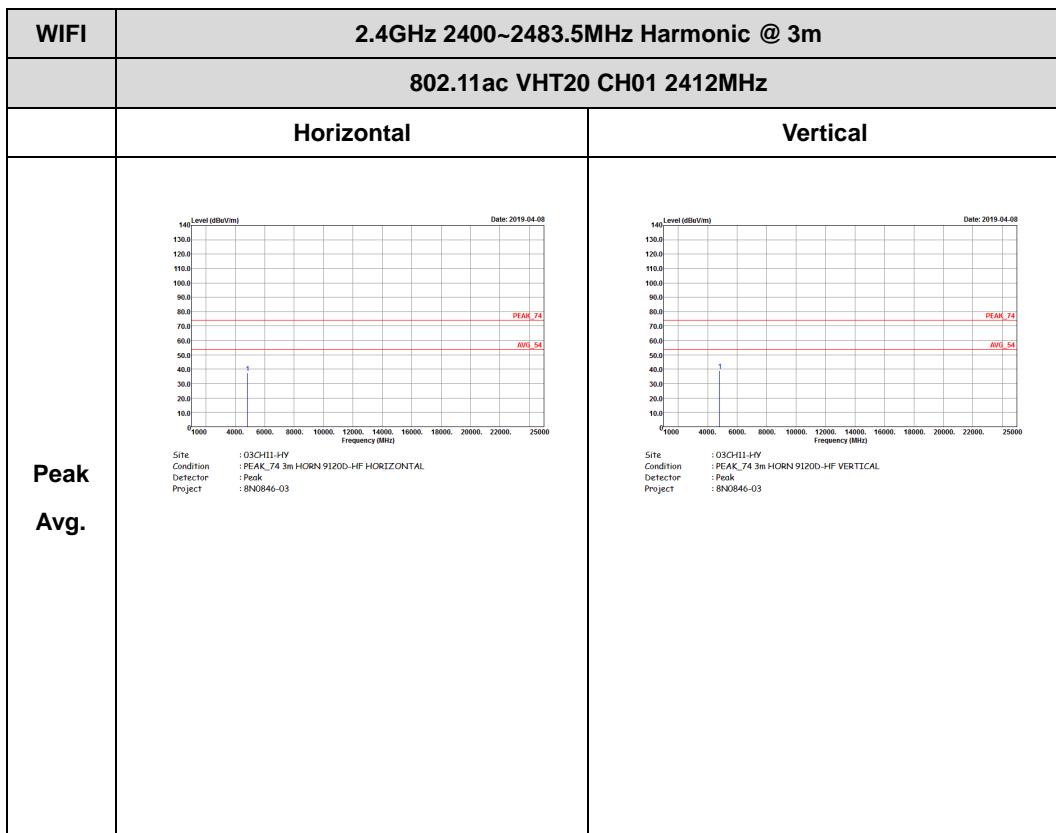


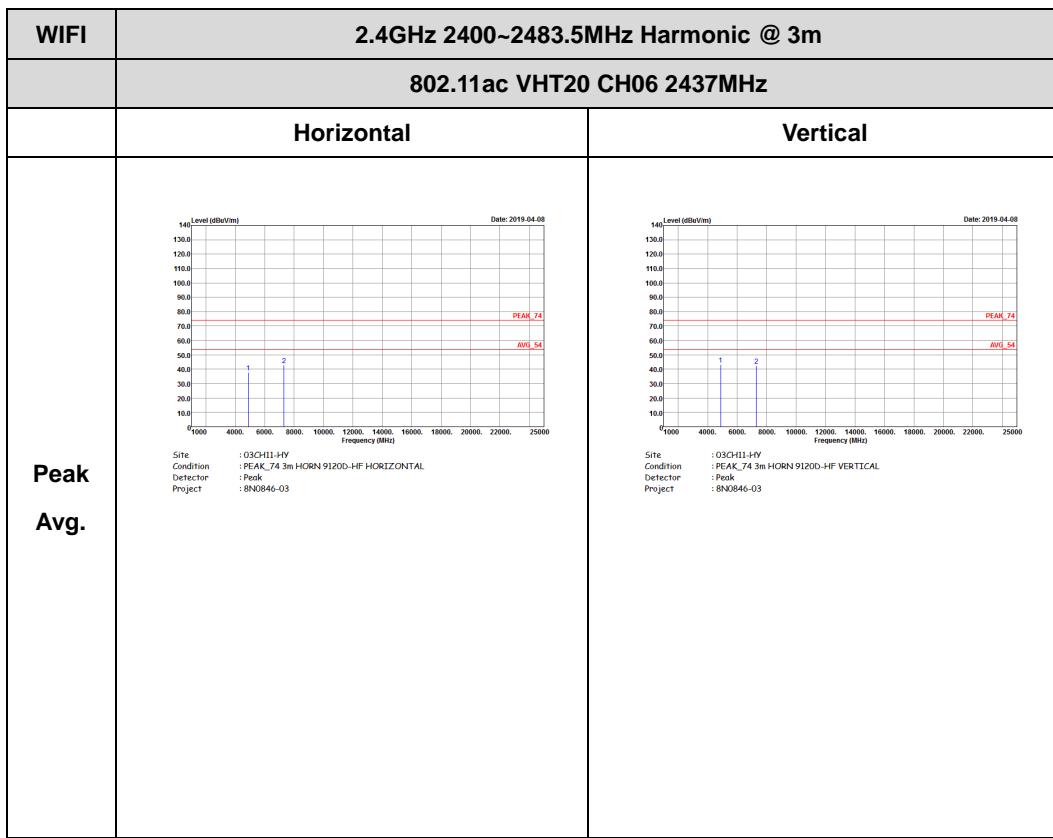
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
802.11ac VH40 CH09 2452MHz - R		
	Vertical	Fundamental
Peak	<p>Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 91200-HF VERTICAL Detector : R8W:1000.000KHz VBW:3000.000KHz SWT:Auto Project : 8N0846-03 Setting : 12.5</p>	Left blank
Avg.	<p>Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 91200-HF VERTICAL Detector : R8W:1000.000KHz VBW:3.000KHz SWT:Auto Project : 8N0846-03 Setting : 12.5</p>	Left blank

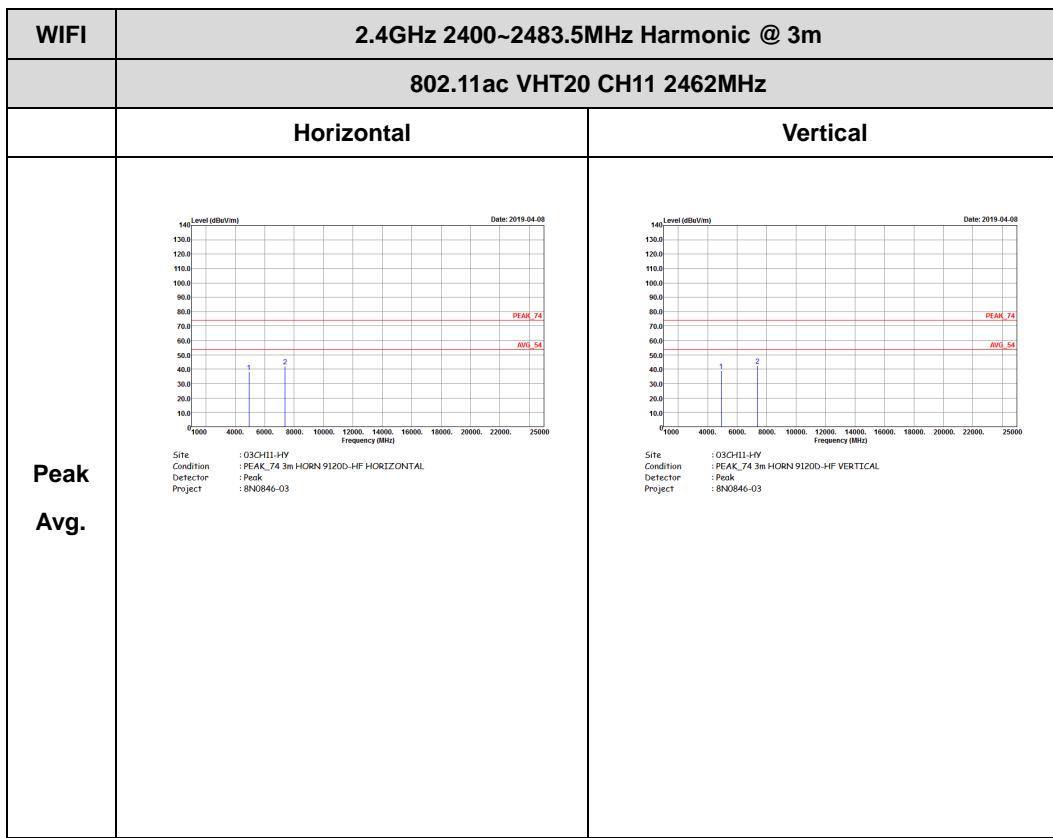


2.4GHz 2400~2483.5MHz

WIFI 802.11ac VHT20 (Harmonic @ 3m)



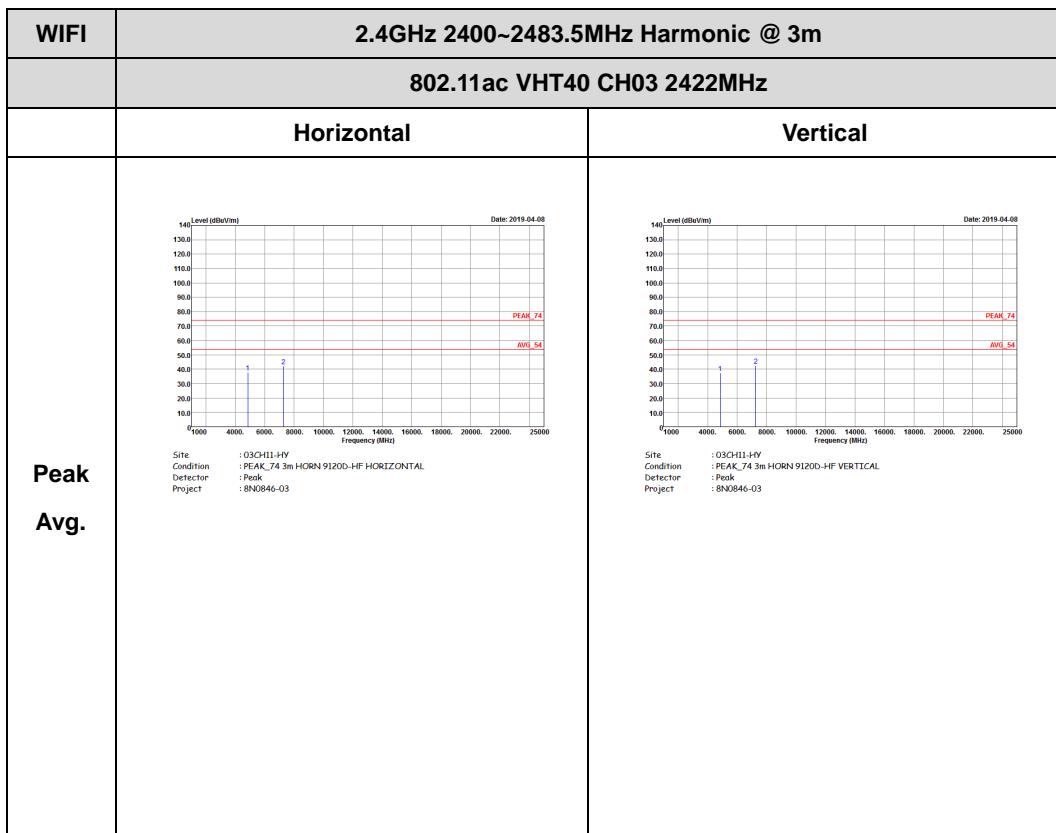


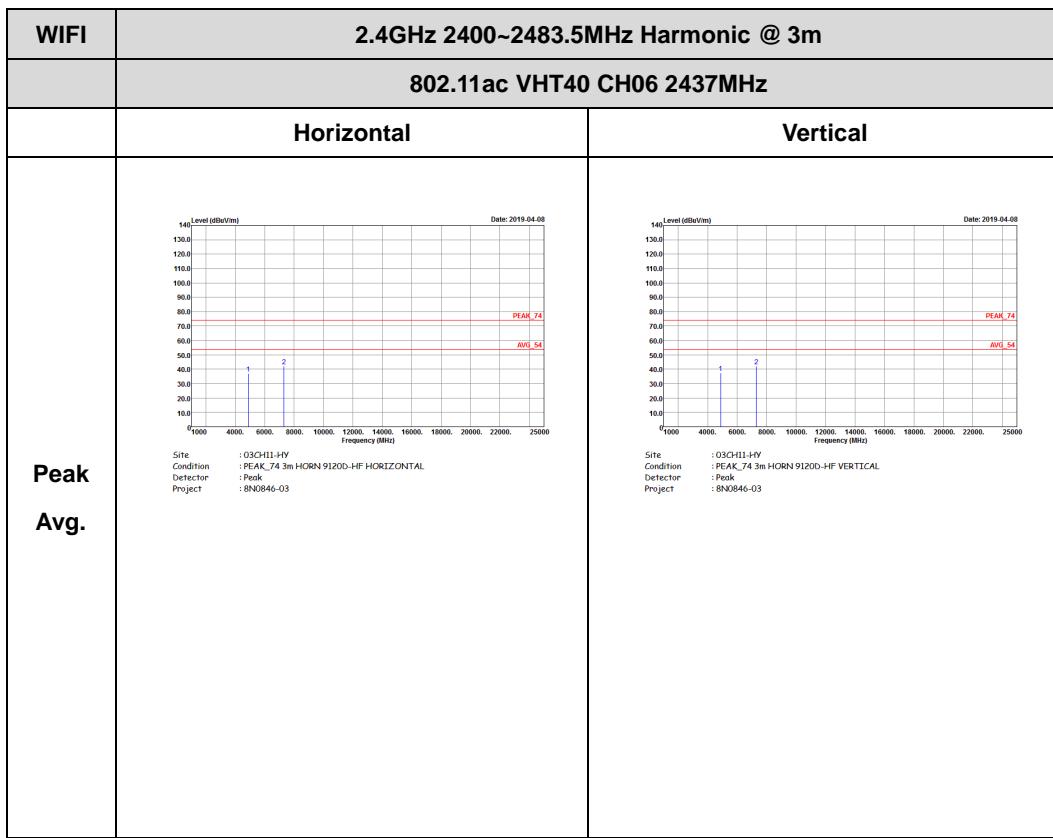


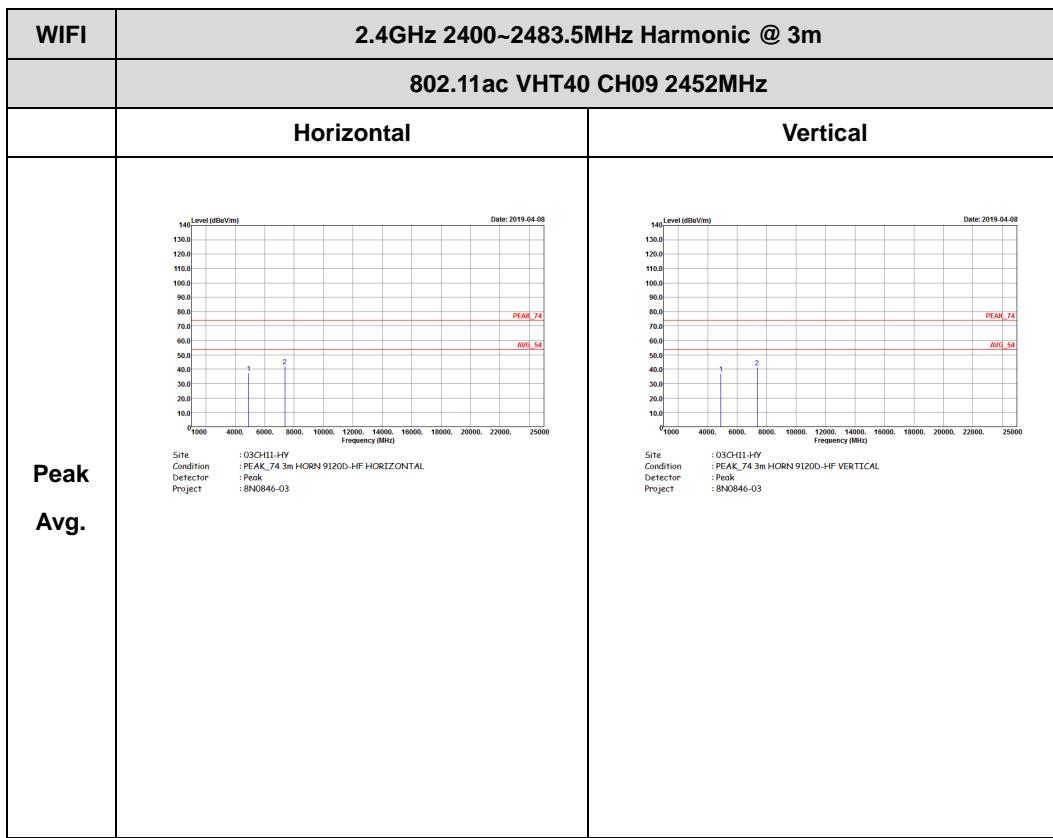


2.4GHz 2400~2483.5MHz

WIFI 802.11ac VHT40 (Harmonic @ 3m)





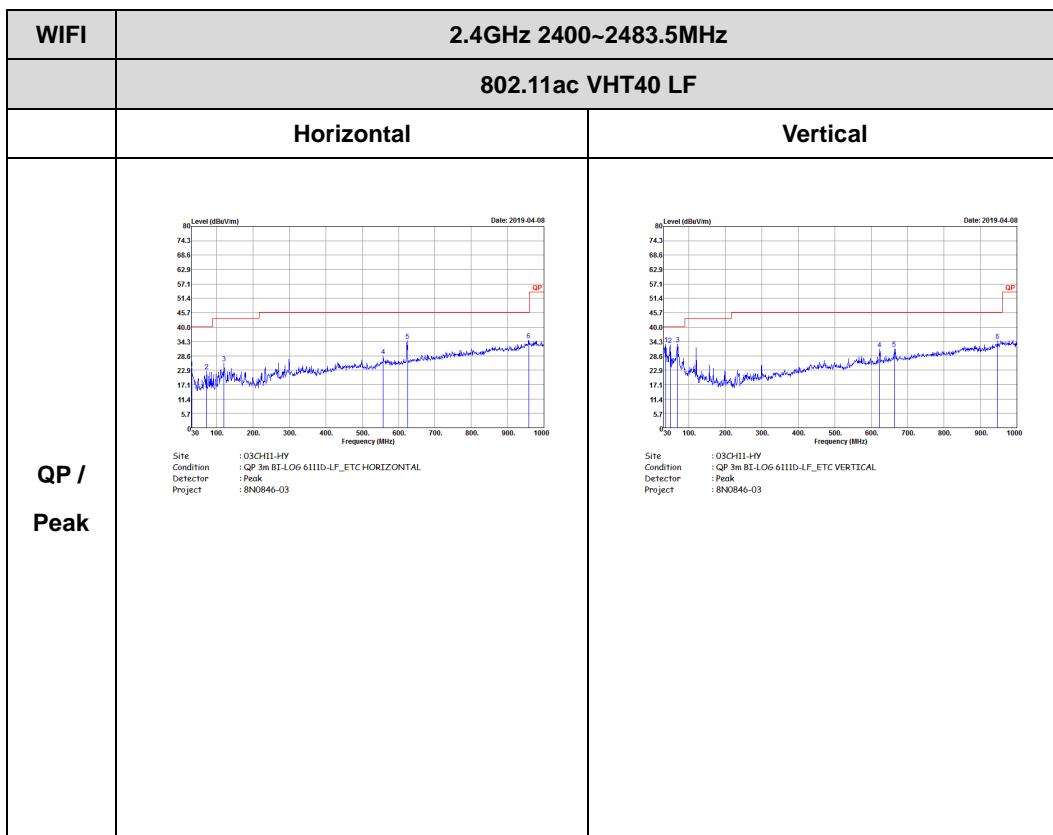




2.4GHz 2400~2483.5MHz

Emission below 1GHz

2.4GHz WIFI 802.11ac VHT40 (LF)



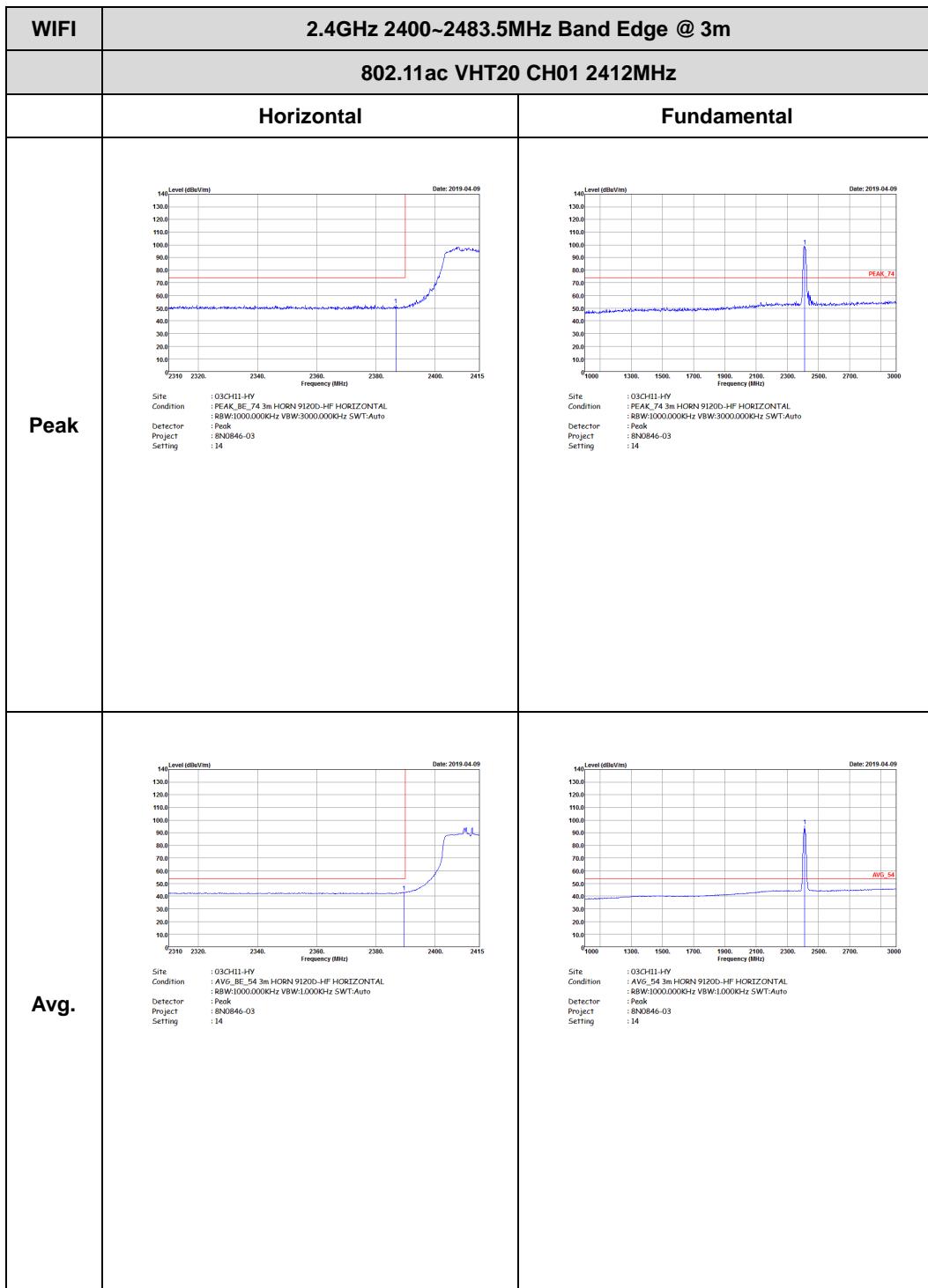


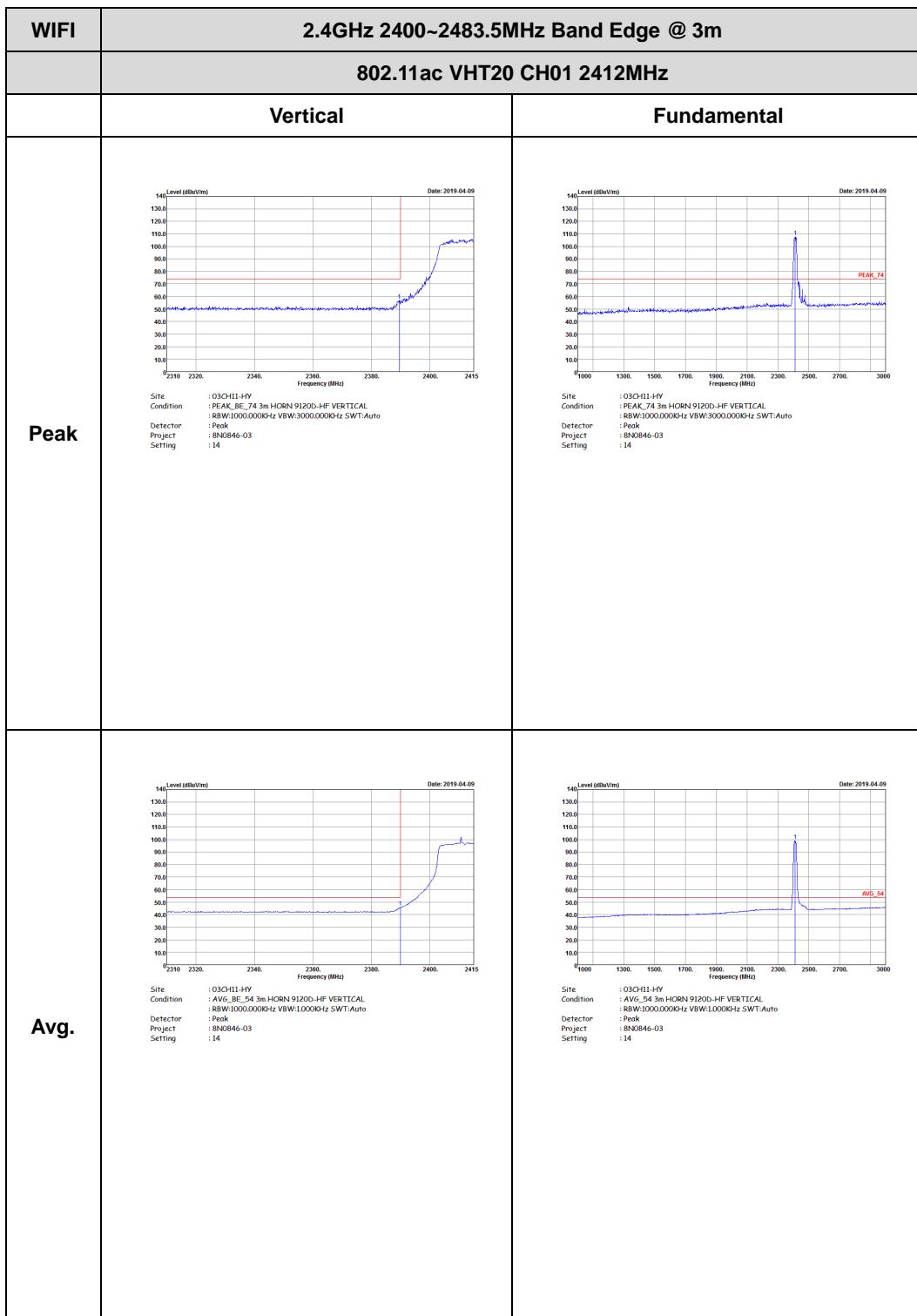
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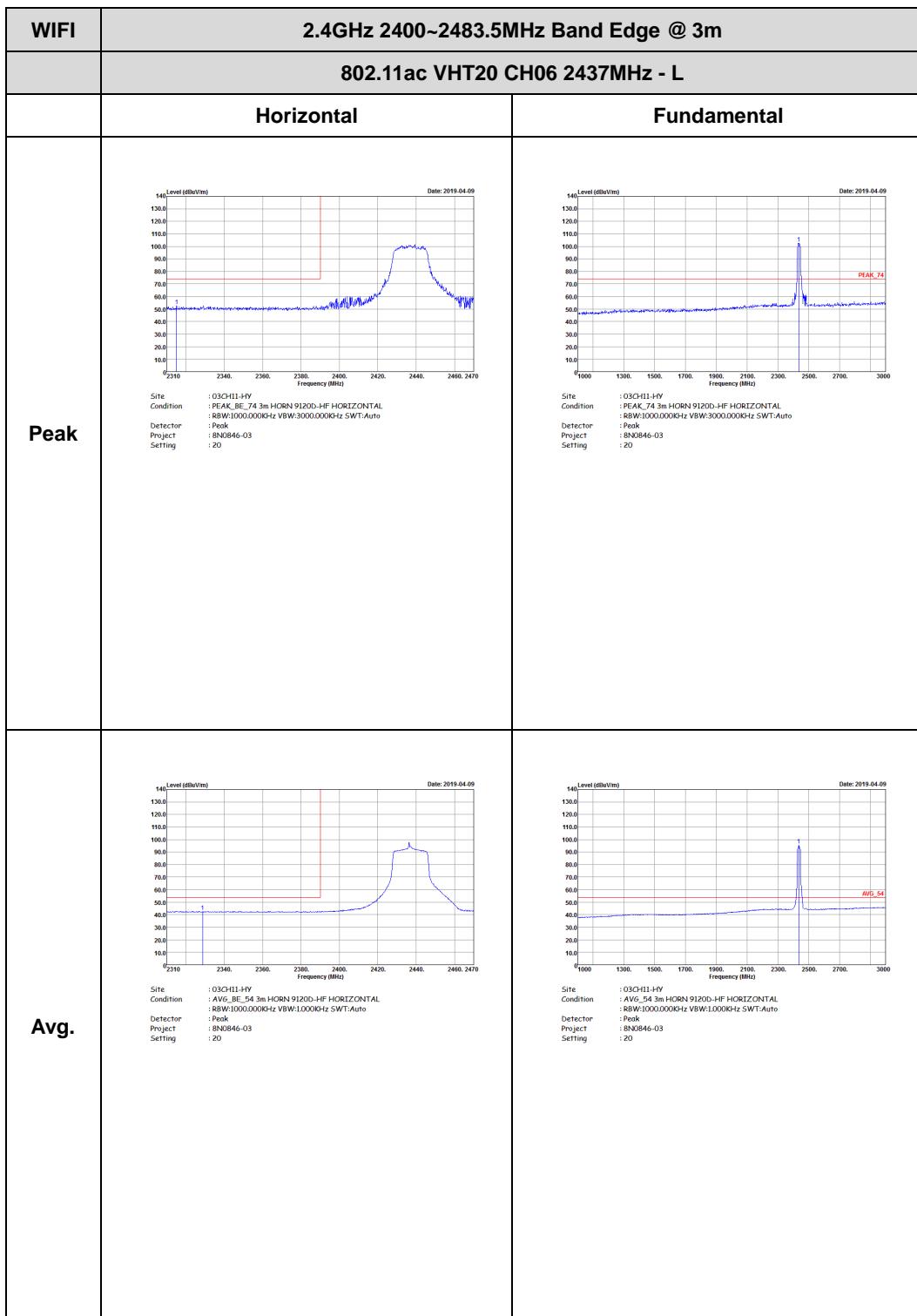
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2.4GHz 2400~2483.5MHz

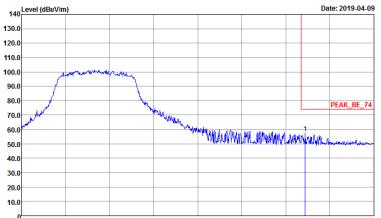
WIFI 802.11ac VHT20 (Band Edge @ 3m)

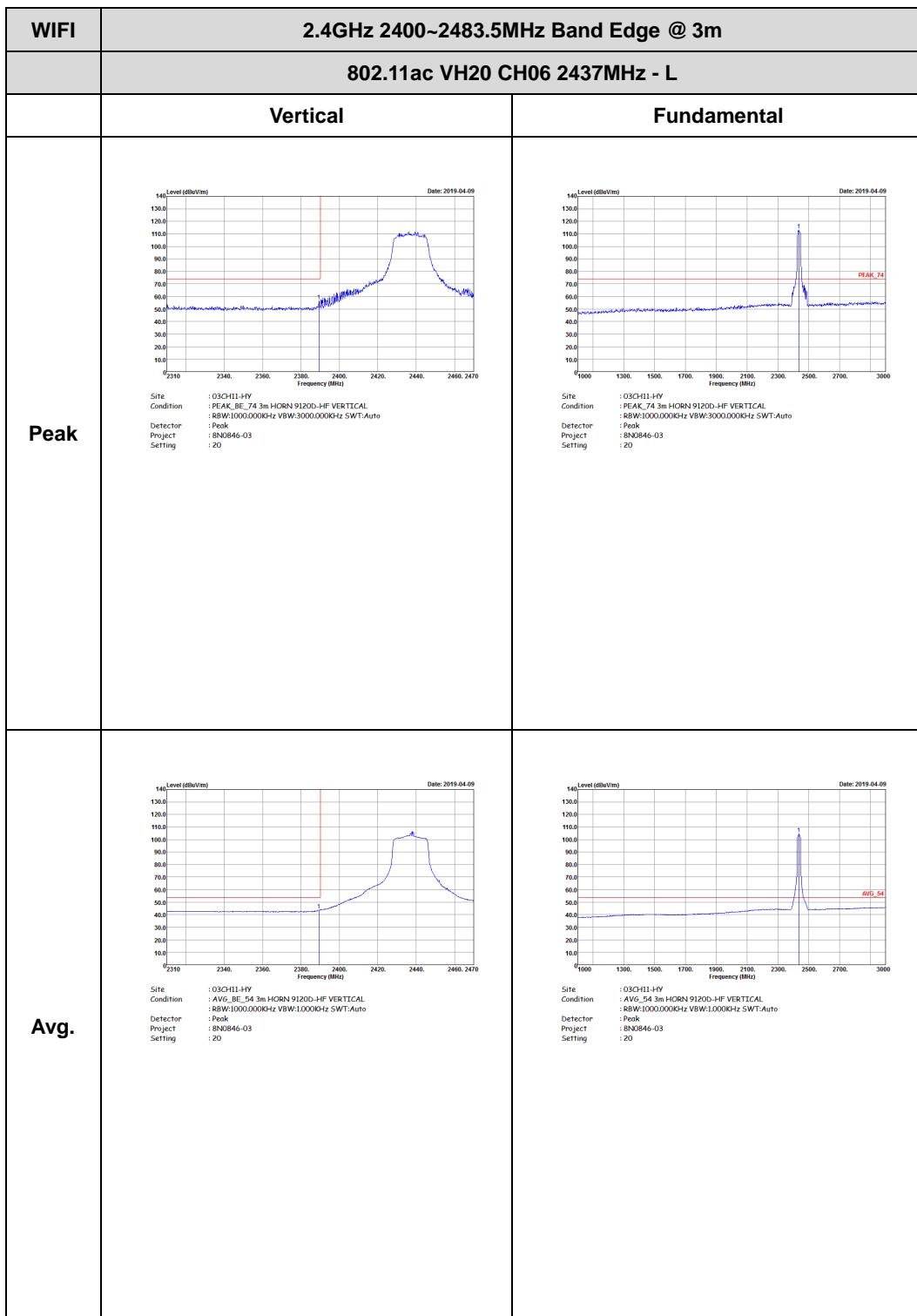






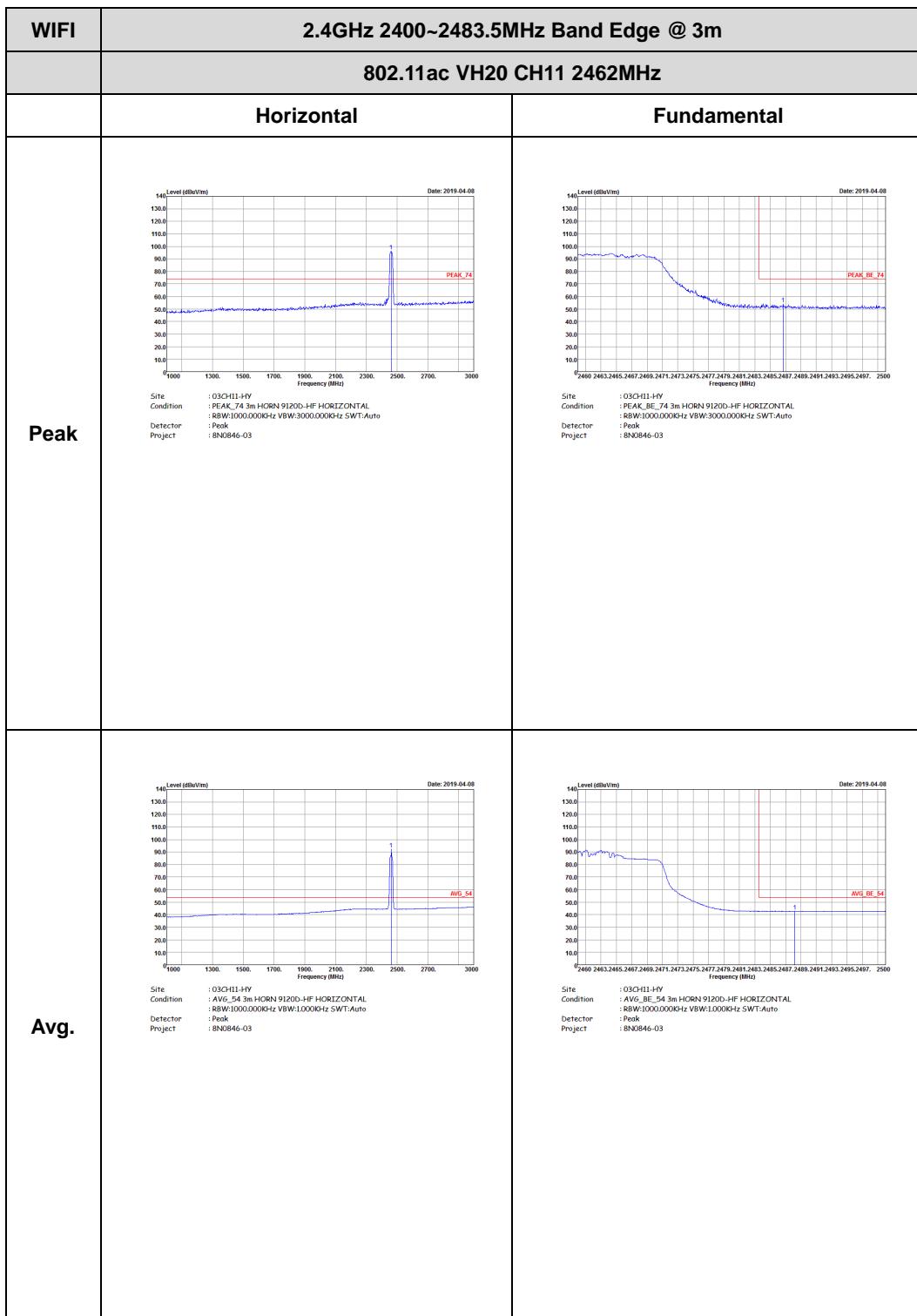


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
802.11ac VH20 CH06 2437MHz - R		
Horizontal		Fundamental
Peak	 <p>Level (dBc/Vm) vs Frequency (MHz) from 2420 to 2500. The graph shows a sharp peak labeled 'PEAK_BE_74' at approximately 2437MHz with a value around 100 dBc/Vm. The background noise level is around 50 dBc/Vm.</p> <p>Date: 2019-04-09</p> <p>Site: 03CH11-HY Condition: PEAK_BE_74 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector: Peak Project: 8N0846-03 Setting: 20</p>	Left blank
Avg.	 <p>Level (dBc/Vm) vs Frequency (MHz) from 2420 to 2500. The graph shows a broad average power envelope labeled 'AVG_BE_54' centered around 2437MHz with a value around 50 dBc/Vm. The background noise level is around 40 dBc/Vm.</p> <p>Date: 2019-04-09</p> <p>Site: 03CH11-HY Condition: AVG_BE_54 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector: Peak Project: 8N0846-03 Setting: 20</p>	Left blank





WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
802.11ac VH20 CH06 2437MHz - R		
	Vertical	Fundamental
Peak	<p>Graph showing Level (dBc/Vm) vs Frequency (MHz) for Peak measurement. The graph shows a sharp peak around 2437 MHz. The x-axis ranges from 2420 to 2500 MHz, and the y-axis ranges from 10.0 to 140.0 dBc/Vm. A red vertical line marks the peak at approximately 2437 MHz, labeled "PEAK_BE_74".</p> <p>Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 9120D-HF VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak Setting : 8N0846-03 Setting : 20</p>	Left blank
Avg.	<p>Graph showing Level (dBc/Vm) vs Frequency (MHz) for Average measurement. The graph shows a broad average level around 2437 MHz. The x-axis ranges from 2420 to 2500 MHz, and the y-axis ranges from 10.0 to 140.0 dBc/Vm. A red vertical line marks the average level at approximately 2437 MHz, labeled "AVG_BE_54".</p> <p>Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 9120D-HF VERTICAL Detector : RBW:1000.000KHz VBW:10000KHz SWT:Auto Project : Peak Setting : 8N0846-03 Setting : 20</p>	Left blank



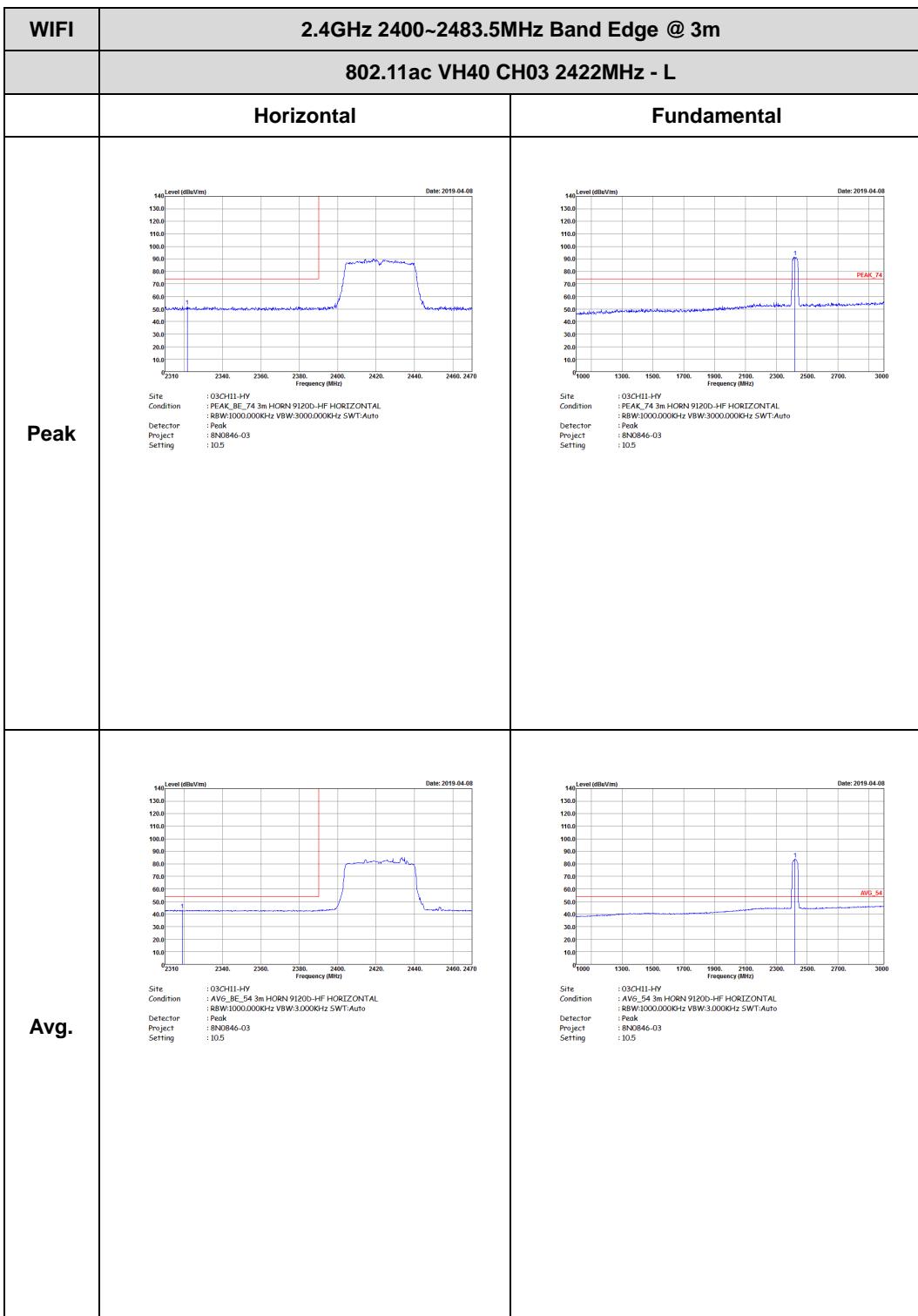


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	802.11ac VH20 CH11 2462MHz	
	Vertical	Fundamental
Peak	 Site : 03CH11-HV Condition : PEAK_74 3m HORN 9120D-HF VERTICAL : BW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 8N0846-03	 Site : 03CH11-HV Condition : PEAK_BE_74 3m HORN 9120D-HF VERTICAL : BW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 8N0846-03
Avg.	 Site : 03CH11-HV Condition : AVG_54 3m HORN 9120D-HF VERTICAL : BW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak Project : 8N0846-03	 Site : 03CH11-HV Condition : AVG_BE_54 3m HORN 9120D-HF VERTICAL : BW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak Project : 8N0846-03



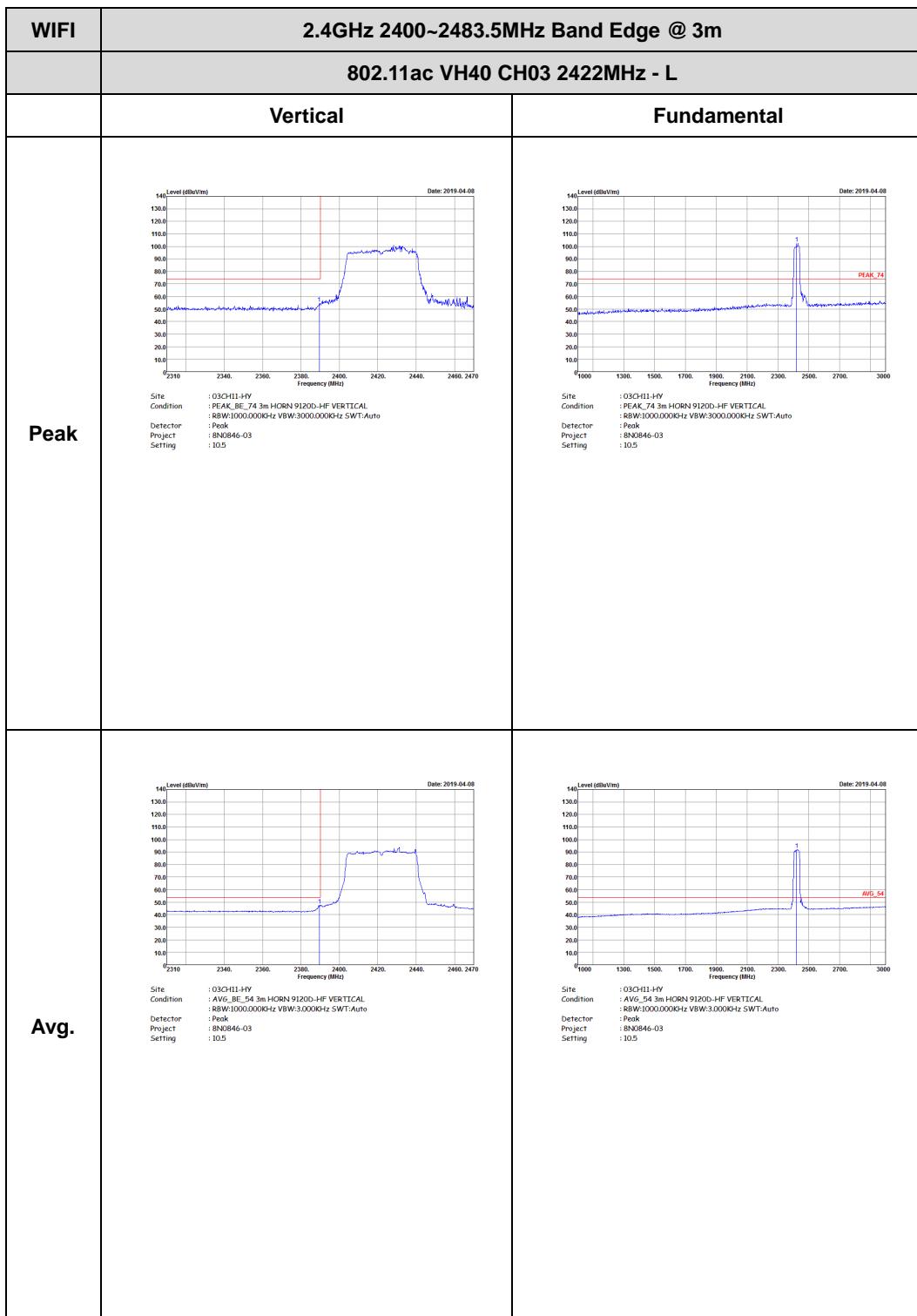
2.4GHz 2400~2483.5MHz

WIFI 802.11ac VHT40 (Band Edge @ 3m)



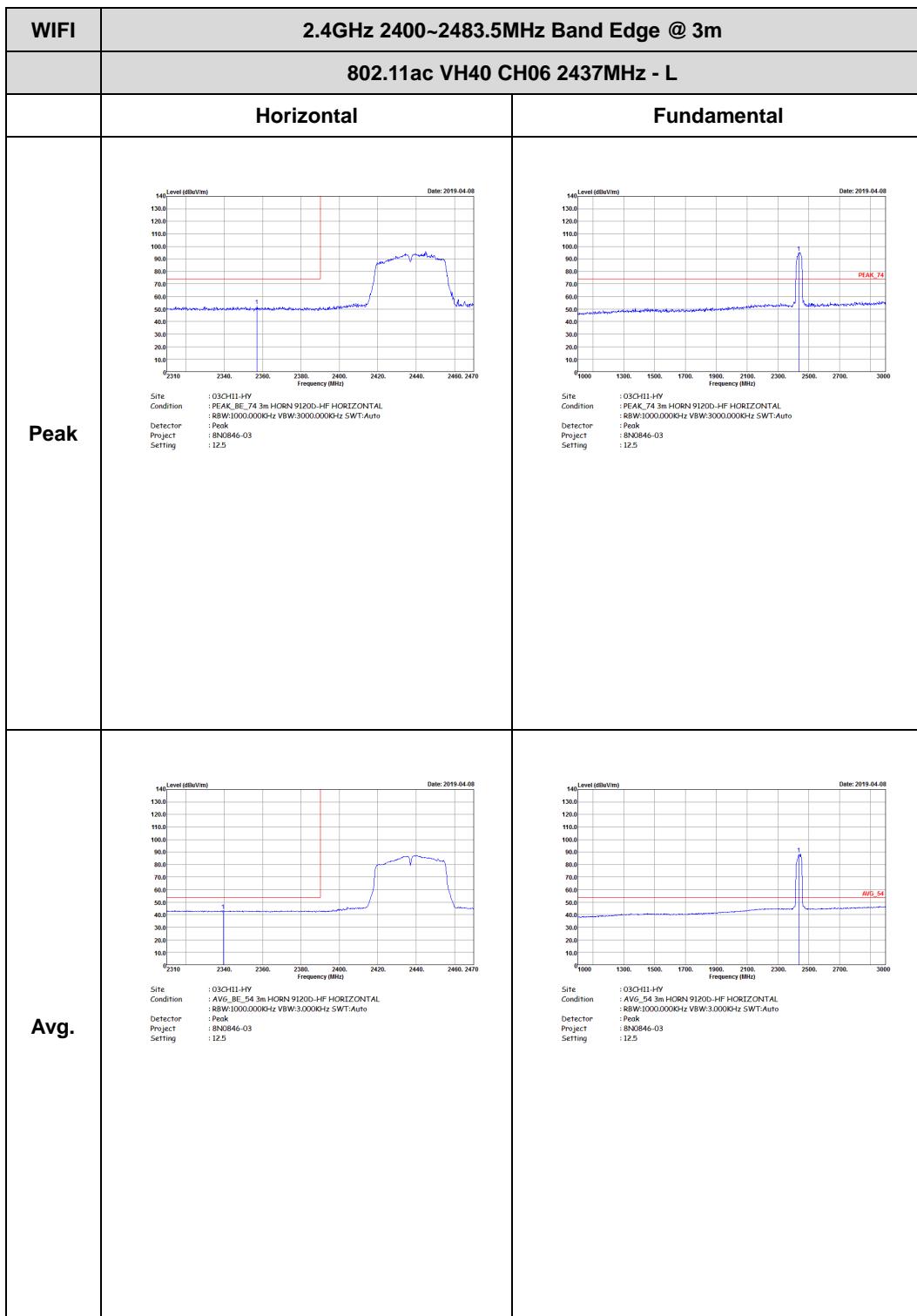


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
802.11ac VH40 CH03 2422MHz - R		
Horizontal		Fundamental
Peak	<p>Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 8N0846-03 Setting : 10.5</p>	Left blank
Avg.	<p>Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:3.000KHz SWT:Auto Detector : Peak Project : 8N0846-03 Setting : 10.5</p>	Left blank



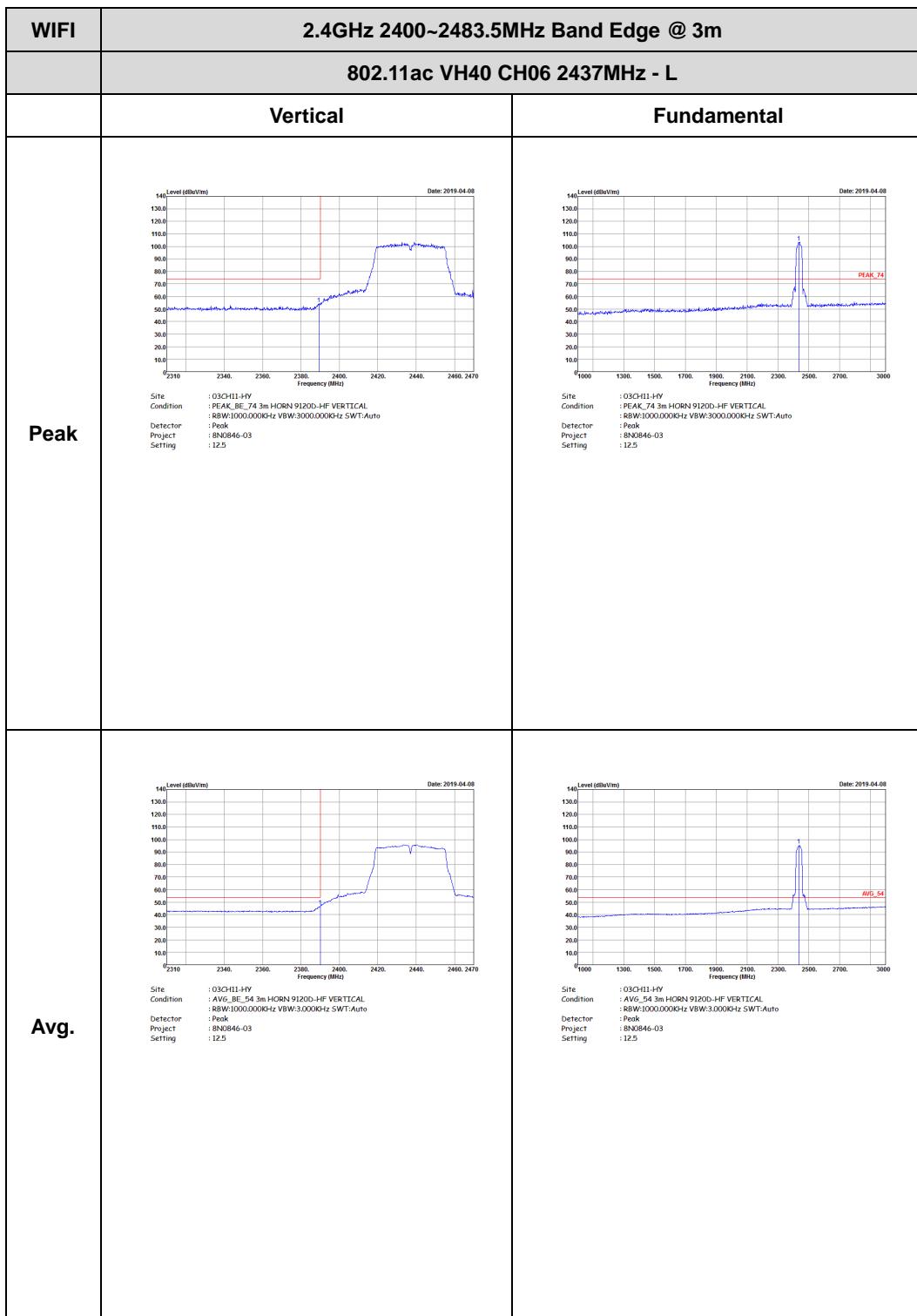


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
802.11ac VH40 CH03 2422MHz - R		
	Vertical	Fundamental
Peak	<p>Level (dBuV/m)</p> <p>Frequency (MHz)</p> <p>Date: 2019-04-08</p> <p>PEAK_BE_74</p> <p>Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 91200-HF VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : 8N0846-03 Setting : 10.5</p>	Left blank
Avg.	<p>Level (dBuV/m)</p> <p>Frequency (MHz)</p> <p>Date: 2019-04-08</p> <p>AVG_BE_54</p> <p>Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 91200-HF VERTICAL Detector : RBW:1000.000KHz VBW:3.000KHz SWT:Auto Project : 8N0846-03 Setting : 10.5</p>	Left blank



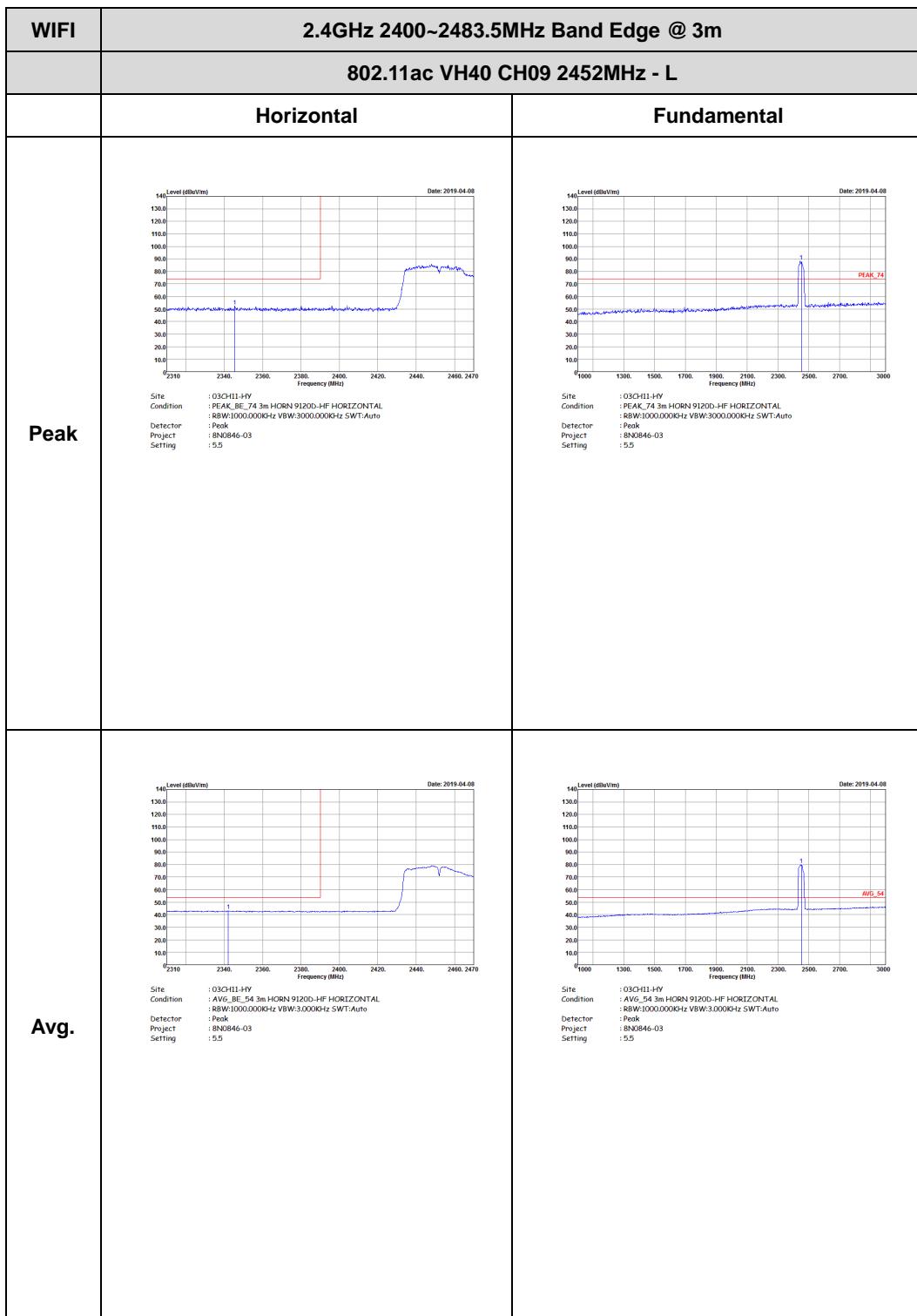


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
802.11ac VH40 CH06 2437MHz - R		
Horizontal		Fundamental
Peak	<p>Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 9120D-HF HORIZONTAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : 8N0846-03 Setting : 12.5</p>	Left blank
Avg.	<p>Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 9120D-HF HORIZONTAL Detector : RBW:1000.000KHz VBW:3.000KHz SWT:Auto Project : 8N0846-03 Setting : 12.5</p>	Left blank



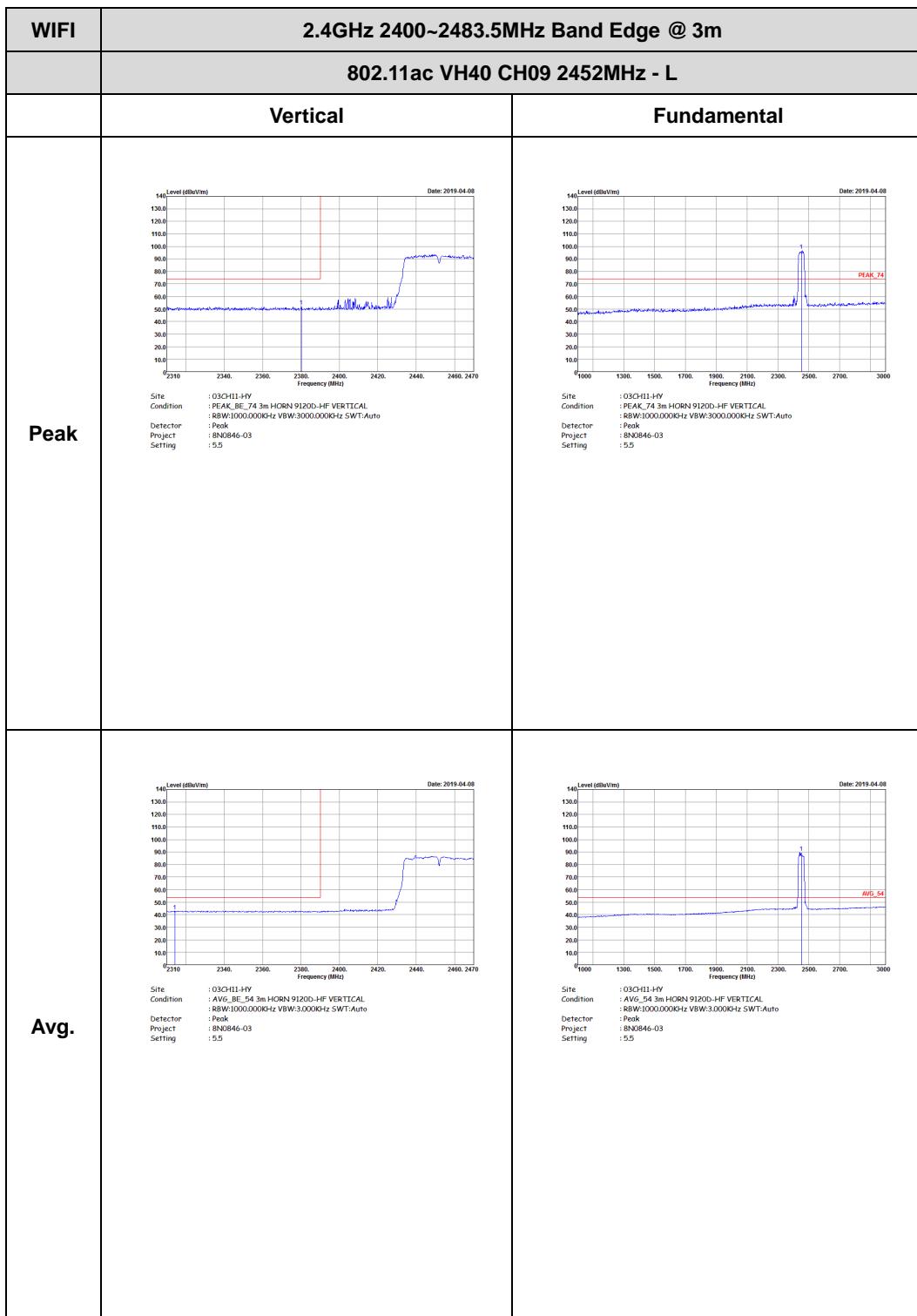


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
802.11ac VH40 CH06 2437MHz - R		
	Vertical	Fundamental
Peak	<p>Level (dBuV/m)</p> <p>Frequency (MHz)</p> <p>Date: 2019-04-08</p> <p>PEAK_BE_74</p> <p>Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 9120D-HF VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : 8N0846-03 Setting : 12.5</p>	Left blank
Avg.	<p>Level (dBuV/m)</p> <p>Frequency (MHz)</p> <p>Date: 2019-04-08</p> <p>AVG_BE_54</p> <p>Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 9120D-HF VERTICAL Detector : RBW:1000.000KHz VBW:3.000KHz SWT:Auto Project : 8N0846-03 Setting : 12.5</p>	Left blank





WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	802.11ac VH40 CH09 2452MHz - R	
	Horizontal	Fundamental
Peak	<p>Level (dBc/Vm)</p> <p>Frequency (MHz)</p> <p>Date: 2019-04-08</p> <p>PEAK_BE_74</p> <p>Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 8N0846-03 Setting : 5.5</p>	Left blank
Avg.	<p>Level (dBc/Vm)</p> <p>Frequency (MHz)</p> <p>Date: 2019-04-08</p> <p>Avg_BE_54</p> <p>Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:3.000KHz SWT:Auto Detector : Peak Project : 8N0846-03 Setting : 5.5</p>	Left blank



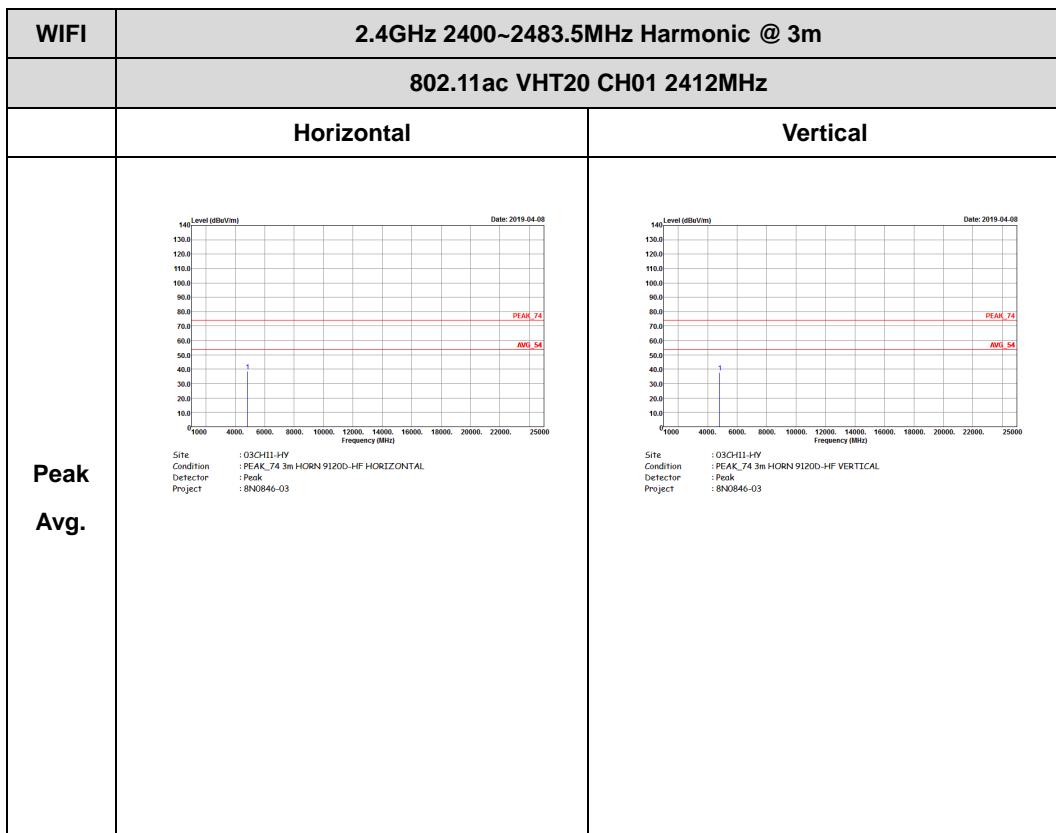


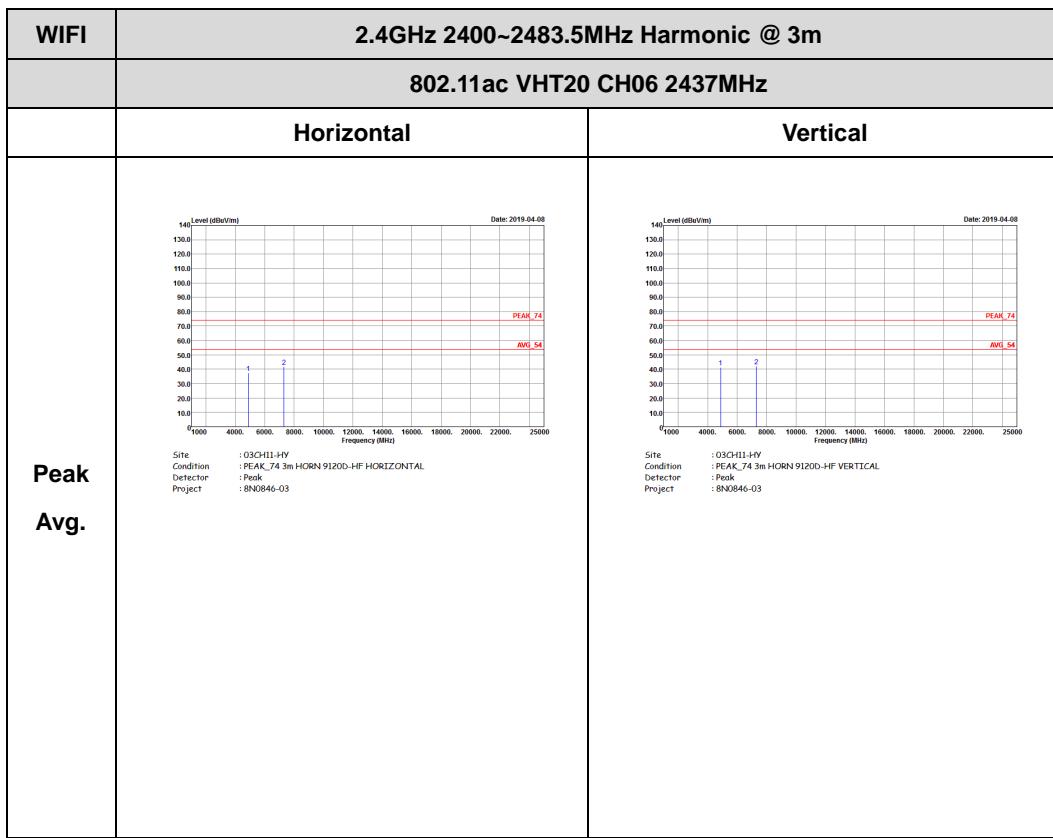
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
802.11ac VH40 CH09 2452MHz - R		
	Vertical	Fundamental
Peak	<p>Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 9120D-HF VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : 8N0846-03 Setting : 5.5</p>	Left blank
Avg.	<p>Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 9120D-HF VERTICAL Detector : AVG Project : 8N0846-03 Setting : 5.5</p>	Left blank

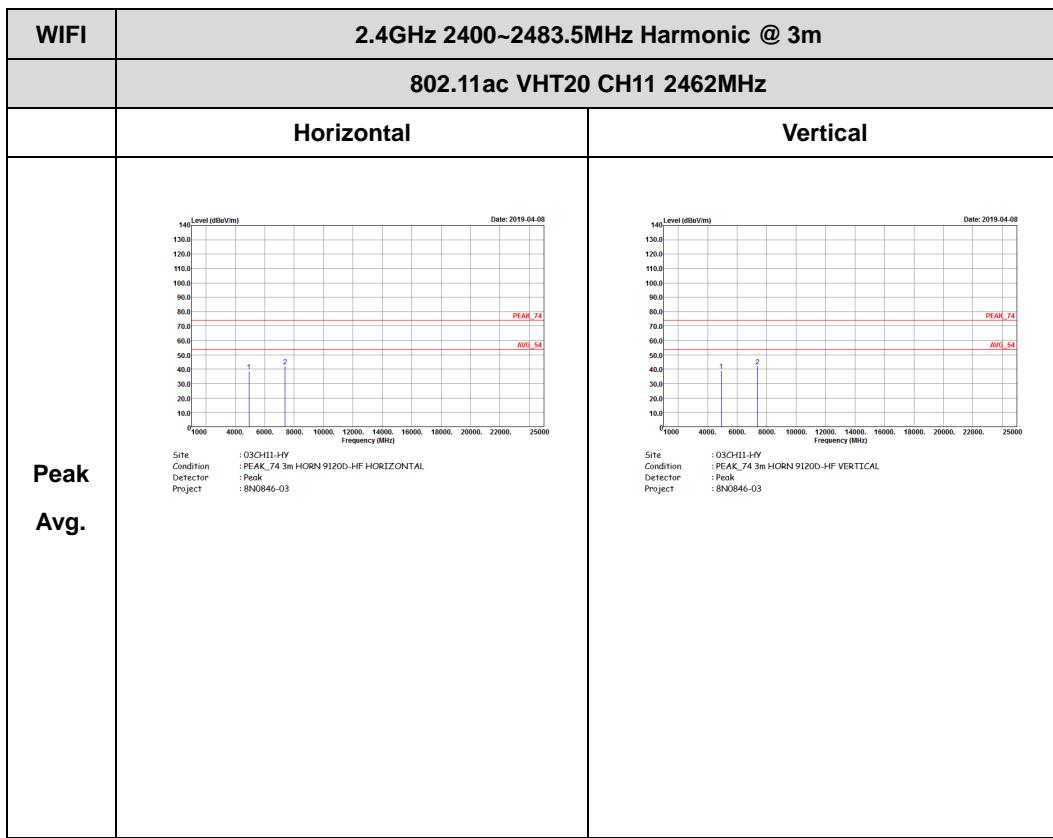


2.4GHz 2400~2483.5MHz

WIFI 802.11ac VHT20 (Harmonic @ 3m)



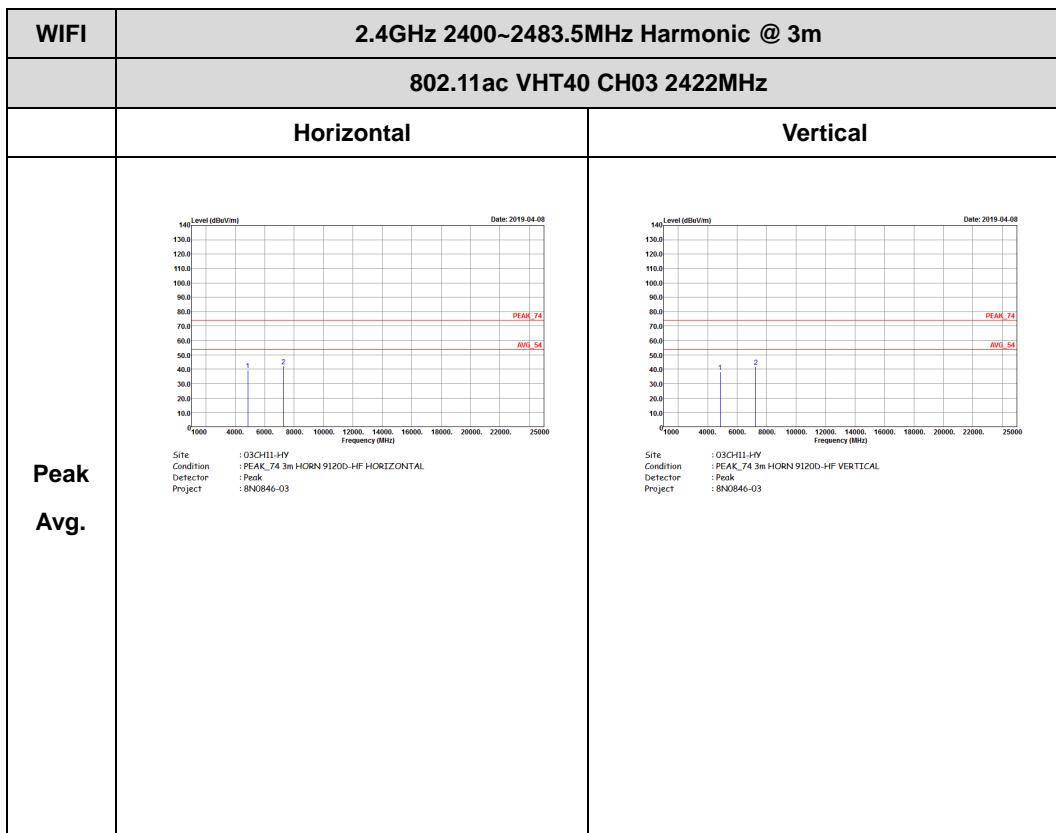


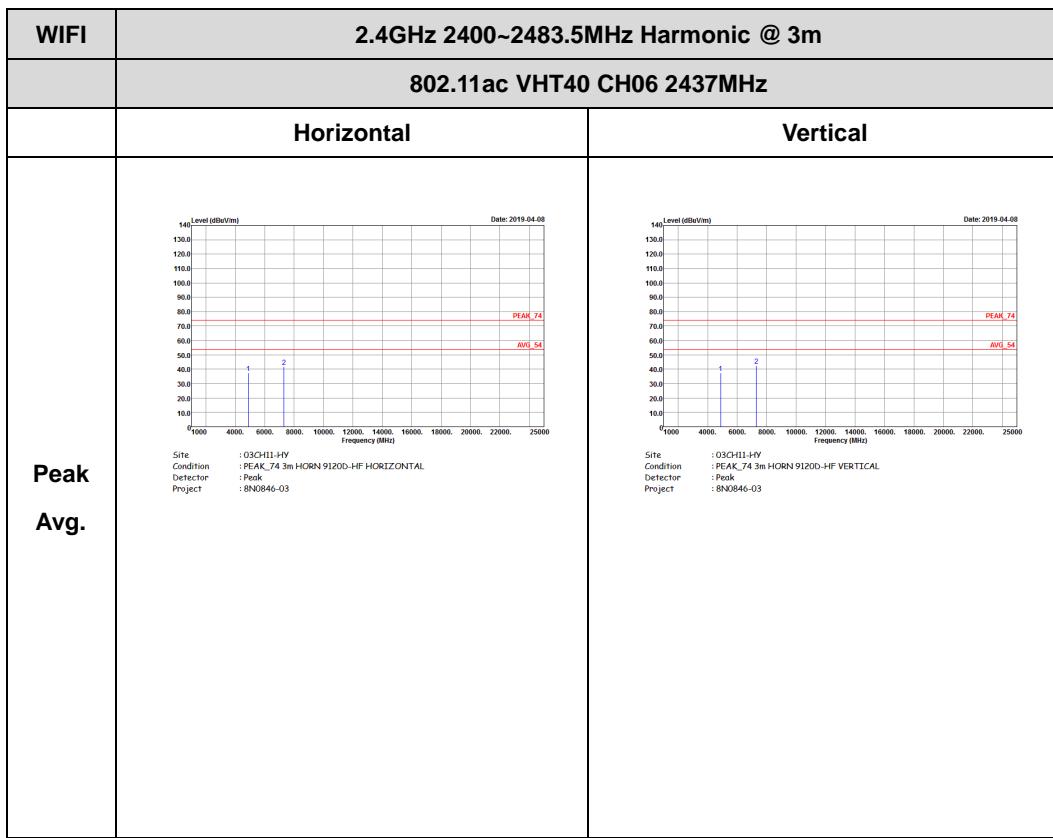


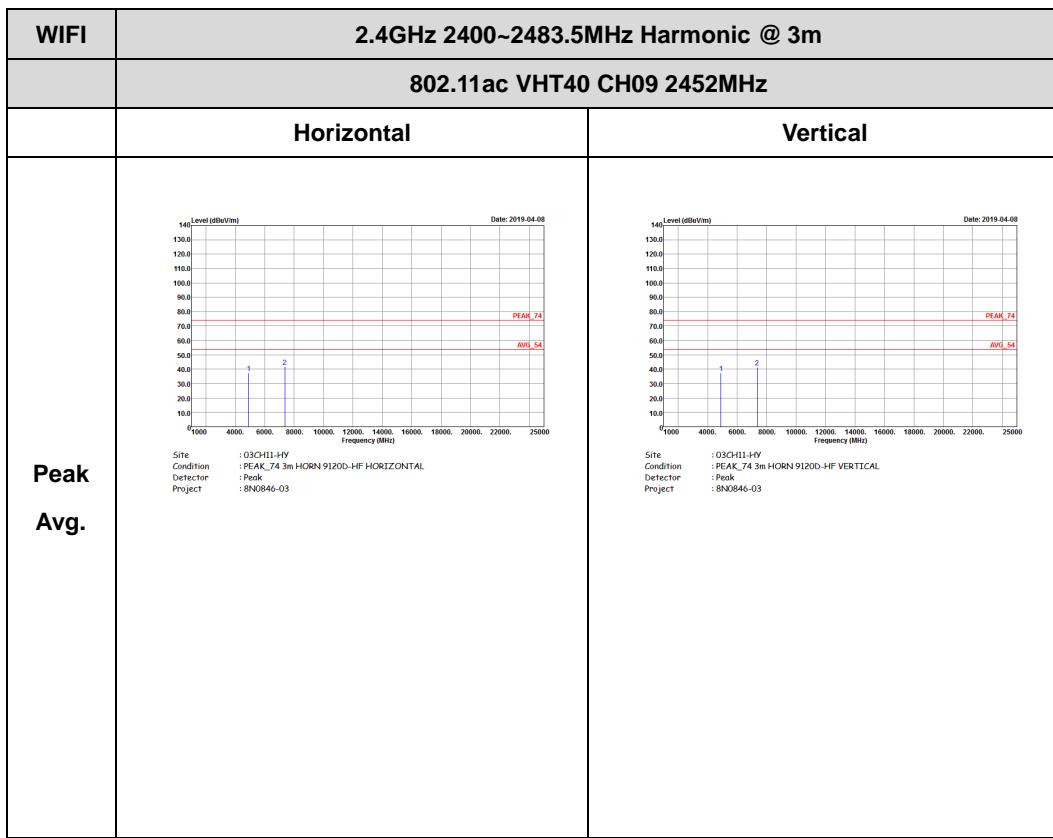


2.4GHz 2400~2483.5MHz

WIFI 802.11ac VHT40 (Harmonic @ 3m)









2.4GHz 2400~2483.5MHz

Emission below 1GHz

2.4GHz WIFI 802.11ac VHT40 (LF)

