

Report No.: FR672231-01AB



FCC RADIO TEST REPORT

FCC ID : TE7WPA8631PV3

Equipment : AV1300 Gigabit Passthrough Powerline ac Wi-Fi Extender

Brand Name : tp-link

Model Name : TL-WPA8631P

Applicant : TP-Link Technologies Co., Ltd.

Building 24 (floors 1,3,4,5) and 28 (floors1-4), Central

Science and Technology Park, Nanshan Shenzhen, 518057

China

Manufacturer : TP-Link Technologies Co., Ltd.

Building 24 (floors 1,3,4,5) and 28 (floors1-4), Central

Science and Technology Park, Nanshan Shenzhen, 518057

China

Standard : 47 CFR FCC Part 15.407

The product was received on Sep. 07, 2020, and testing was started from Sep. 16, 2020 and completed on Sep. 28, 2020. We, SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.10-2013 and shown compliance with the applicable technical standards.

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

Approved by: Sam Chen

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory

No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)

TEL: 886-3-656-9065

FAX: 886-3-656-9085

Report Template No.: CB-A12_1 Ver1.2

Page Number : 1 of 27

Issued Date : Oct. 22, 2020

Report Version : 01

Table of Contents

Histo	ory of this test report	3
Sumr	mary of Test Result	4
1	General Description	5
1.1	Information	5
1.2	Applicable Standards	7
1.3	Testing Location Information	7
1.4	Measurement Uncertainty	7
2	Test Configuration of EUT	8
2.1	Test Channel Mode	8
2.2	The Worst Case Measurement Configuration	9
2.3	EUT Operation during Test	10
2.4	Accessories	10
2.5	Support Equipment	10
2.6	Test Setup Diagram	11
3	Transmitter Test Result	13
3.1	AC Power-line Conducted Emissions	13
3.2	Emission Bandwidth	15
3.3	Maximum Conducted Output Power	16
3.4	Peak Power Spectral Density	18
3.5	Unwanted Emissions	21
4	Test Equipment and Calibration Data	25
_		

Appendix A. Test Results of AC Power-line Conducted Emissions

Appendix B. Test Results of Emission Bandwidth

Appendix C. Test Results of Maximum Conducted Output Power

Appendix D. Test Results of Peak Power Spectral Density

Appendix E. Test Results of Unwanted Emissions

Appendix F. Test Results of Radiated Emission Co-location

Appendix G. Test Photos

Photographs of EUT v01

TEL: 886-3-656-9065 FAX: 886-3-656-9085

Report Template No.: CB-A12_1 Ver1.2

Page Number : 2 of 27

: Oct. 22, 2020 Issued Date

Report Version : 01

Report No. : FR672231-01AB

History of this test report

Report No. : FR672231-01AB

Report No.	Version	Description	Issued Date
FR672231-01AB	01	Initial issue of report	Oct. 22, 2020

 TEL: 886-3-656-9065
 Page Number : 3 of 27

 FAX: 886-3-656-9085
 Issued Date : Oct. 22, 2020

Summary of Test Result

Report No.: FR672231-01AB

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
0	15.203	Antenna Requirement	PASS	-
3.1	15.207	AC Power-line Conducted Emissions	PASS	-
3.2	15.407(a)	Emission Bandwidth	PASS	-
3.3	15.407(a)	Maximum Conducted Output Power	PASS	-
3.4	15.407(a)	Peak Power Spectral Density	PASS	-
3.5	15.407(b)	Unwanted Emissions	PASS	-

Declaration of Conformity:

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

Comments and Explanations:

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

Reviewed by: Sam Chen

Report Producer: Sandy Chuang

TEL: 886-3-656-9065 Page Number : 4 of 27
FAX: 886-3-656-9085 Issued Date : Oct. 22, 2020

1 General Description

1.1 Information

1.1.1 RF General Information

Frequency Range (MHz)	IEEE Std. 802.11	Ch. Frequency (MHz)	Channel Number
5150-5250	a, n (HT20), ac (VHT20)	5180-5240	36-48 [4]
5725-5850		5745-5825	149-165 [5]
5150-5250	n (HT40), ac (VHT40)	5190-5230	38-46 [2]
5250-5350		5270-5310	54-62 [2]
5150-5250	ac (VHT80)	5210	42 [1]
5725-5850		5775	155 [1]

Report No.: FR672231-01AB

Band	Mode	BWch (MHz)	Nant
5.15-5.25GHz	802.11a	20	2TX
5.15-5.25GHz	802.11n HT20	20	2TX
5.15-5.25GHz	802.11ac VHT20	20	2TX
5.15-5.25GHz	802.11n HT40	40	2TX
5.15-5.25GHz	802.11ac VHT40	40	2TX
5.15-5.25GHz	802.11ac VHT80	80	2TX
5.725-5.85GHz	802.11a	20	2TX
5.725-5.85GHz	802.11n HT20	20	2TX
5.725-5.85GHz	802.11ac VHT20	20	2TX
5.725-5.85GHz	802.11n HT40	40	2TX
5.725-5.85GHz	802.11ac VHT40	40	2TX
5.725-5.85GHz	802.11ac VHT80	80	2TX

Note:

- 11a, HT20 and HT40 use a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM modulation.
- VHT20, VHT40, VHT80 use a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM, 256QAMmodulation.

BWch is the nominal channel bandwidth.

TEL: 886-3-656-9065 Page Number : 5 of 27
FAX: 886-3-656-9085 Issued Date : Oct. 22, 2020

1.1.2 Antenna Information

Ant.	Port	Brand	D/N	Antonna Tyna	Connector	Gain	(dBi)
Ant.		Біапа	P/N	Antenna Type	Connector	2.4GHz	5GHz
1	1	TP-Link	3101503165	Dipole Antenna	I-PEX	1.5	1.5
2	2	TP-Link	3101503166	Dipole Antenna	I-PEX	1.5	1.5

Report No.: FR672231-01AB

Note: The above information was declared by manufacturer.

For 2.4GHz function:

For IEEE 802.11b/g/n (2TX/2RX):

Port 1 and Port 2 can be used as transmitting/receiving antenna.

Port 1 and Port 2 could transmit/receive simultaneously.

For 5GHz function:

For IEEE 802.11a/n/ac (2TX/2RX):

Port 1 and Port 2 can be used as transmitting/receiving antenna.

Port 1 and Port 2 could transmit/receive simultaneously.

1.1.3 Mode Test Duty Cycle

Mode	DC	DCF(dB)	T(s)	VBW(Hz) ≥ 1/T
802.11a	0.958	0.19	1.398m	1k
802.11ac VHT20	0.765	1.16	2.107m	1k
802.11ac VHT40	0.674	1.71	3.964m	300
802.11ac VHT80	0.988	0.05	n/a (DC>=0.98)	n/a (DC>=0.98)

NI	ata.	٠
·V	UII ⊟	

- DC is Duty Cycle.
- DCF is Duty Cycle Factor.

1.1.4 EUT Operational Condition

EUT Power Type	From Internal power supply				
Beamforming Function	☐ With beamforming ☐ Without beamforming				
Function	☐ Outdoor P2M	\boxtimes	Indoor P2M		
runction	☐ Fixed P2P		Client		
Test Software Version	n QATool (Version 0.0.2.6)				

Note: The above information was declared by manufacturer.

1.1.5 EUT support function

The EUT supports AP/Master mode, only AP mode mode has been tested and recorded in this test report.

TEL: 886-3-656-9065 Page Number : 6 of 27
FAX: 886-3-656-9085 Issued Date : Oct. 22, 2020

1.2 Applicable Standards

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

Report No.: FR672231-01AB

- 47 CFR FCC Part 15
- ANSI C63.10-2013
- FCC KDB 789033 D02 v02r01

The following reference test guidance is not within the scope of accreditation of TAF.

- FCC KDB 662911 D01 v02r01
- FCC KDB 412172 D01 v01r01
- FCC KDB 414788 D01 v01r01

1.3 Testing Location Information

Testing Location							
	HWA YA ADD : No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)						
		TEL	:	886-3-327-3456 FAX : 886-3-327-0973			
\boxtimes	JHUBEI	ADD	:	No.8, Lane 724, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C.			
		TEL	:	886-3-656-9065 FAX : 886-3-656-9085			

Test Condition	Test Site No.	Test Engineer	Test Environment	Test Date
RF Conducted	TH02-CB	Caster Chang	22.5-23.8℃ / 52-57%	Sep. 18, 2020~ Sep. 28, 2020
Radiated <below 1ghz="" and="" co-location=""></below>	03CH03-CB	Paul Chen	22.6-23.9 °C / 51-53%	Sep. 16, 2020~ Sep. 18, 2020
Radiated <above 1ghz=""></above>	03CH02-CB 03CH04-CB	Paul Chen	24-25.8 °C / 53-57% 23.9-24.8 °C / 55-56%	Sep. 16, 2020~ Sep. 18, 2020
AC Conduction	CO01-CB	Wei Li	24~25°C / 56~59%	Sep. 16, 2020

Test site Designation No. TW0006 with FCC.

1.4 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2)

Test Items	Uncertainty	Remark
Conducted Emission (150kHz ~ 30MHz)	2.0 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	5.6 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	4.9 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	4.6 dB	Confidence levels of 95%
Conducted Emission	2.8 dB	Confidence levels of 95%
Output Power Measurement	1.4 dB	Confidence levels of 95%
Power Density Measurement	2.8 dB	Confidence levels of 95%
Bandwidth Measurement	0.39%	Confidence levels of 95%

TEL: 886-3-656-9065 Page Number : 7 of 27
FAX: 886-3-656-9085 Issued Date : Oct. 22, 2020

Test site registered number IC 4086D with Industry Canada.

2 Test Configuration of EUT

2.1 Test Channel Mode

Mode	Power Setting
802.11a_Nss1,(6Mbps)_2TX	-
5180MHz	27
5200MHz	2E
5240MHz	28
5745MHz	32
5785MHz	32
5825MHz	32
802.11ac VHT20_Nss1,(MCS0)_2TX	-
5180MHz	25
5200MHz	2E
5240MHz	27
5745MHz	32
5785MHz	32
5825MHz	32
802.11ac VHT40_Nss1,(MCS0)_2TX	-
5190MHz	1F
5230MHz	26
5755MHz	2A
5795MHz	2C
802.11ac VHT80_Nss1,(MCS0)_2TX	-
5210MHz	1D
5775MHz	26

Report No. : FR672231-01AB

Note

VHT20/VHT40 covers HT20/HT40, due to same modulation. The power setting for 802.11n HT20 and HT40 are the same or lower than VHT20 and VHT40.

TEL: 886-3-656-9065 Page Number : 8 of 27
FAX: 886-3-656-9085 Issued Date : Oct. 22, 2020

2.2 The Worst Case Measurement Configuration

The Worst Case Mode for Following Conformance Tests	
Tests Item AC power-line conducted emissions	
Condition AC power-line conducted measurement for line and neutral	
Operating Mode Normal Link	
1	The PLC function of EUT with Idle mode

Report No. : FR672231-01AB

The Worst Case Mode for Following Conformance Tests	
Tests Item	Emission Bandwidth Maximum Conducted Output Power Peak Power Spectral Density Unwanted Emissions
Test Condition	Conducted measurement at transmit chains

The Worst Case Mode for Following Conformance Tests		
Tests Item Unwanted Emissions		
Test Condition	Radiated measurement If EUT consist of multiple antenna assembly (multiple antenna are used in EUT regardless of spatial multiplexing MIMO configuration), the radiated test should be performed with highest antenna gain of each antenna type.	
Operating Mode < 1GHz	СТХ	
Y-axis generated the worst result for Emissions in Unwanted Emissions <above 1ghz="">, thus the measurement will follow this same test configuration.</above>		
1 2.4GHz: Place EUT in Y axis		
2	5GHz: Place EUT in Y axis	
For operating mode 2 is th	For operating mode 2 is the worst case and it was record in this test report.	
Operating Mode > 1GHz CTX		
The EUT can be placed in follow this same test configure.	n Y-axis and Z-axis. After evaluating, Y-axis was the worst case, so the test will guration.	
1	Place EUT in Y axis	

 TEL: 886-3-656-9065
 Page Number : 9 of 27

 FAX: 886-3-656-9085
 Issued Date : Oct. 22, 2020

The Worst Case Mode for Following Conformance Tests			
Tests Item Simultaneous Transmission Analysis - Radiated Emission Co-location			
Test Condition Radiated measurement			
Operating Mode Normal Link			
	Y-axis generated the worst result for Emissions in Unwanted Emissions <above 1ghz="">, thus the measurement will follow this same test configuration.</above>		
1 WLAN 2.4GHz + WLAN 5GHz in Y axis			
Refer to Appendix F for Radiated Emission Co-location.			

Report No.: FR672231-01AB

The Worst Case Mode for Following Conformance Tests	
Tests Item Simultaneous Transmission Analysis - Co-location RF Exposure Evaluation	
Operating Mode	
1 WLAN 2.4GHz + WLAN 5GHz in Y axis	
Refer to Sporton Test Report No.: FA672231-01 for Co-location RF Exposure Evaluation.	

2.3 EUT Operation during Test

For CTX Mode:

The EUT was programmed to be in continuously transmitting mode.

For Normal Link:

During the test, the EUT operation to normal function.

2.4 Accessories

N/A

2.5 Support Equipment

For AC Conduction:

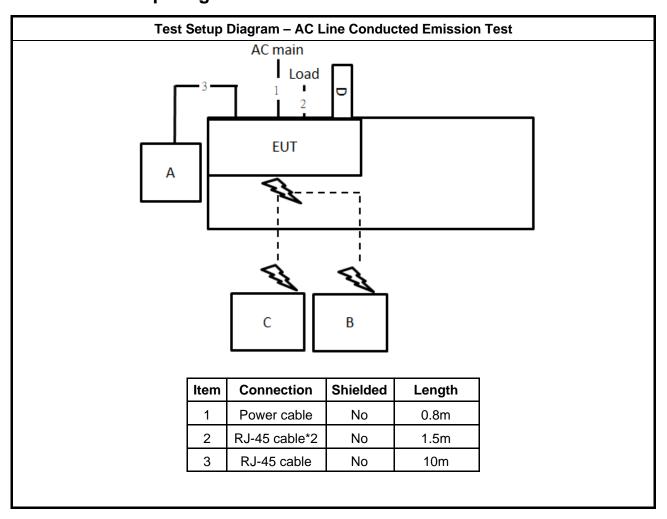
	Support Equipment				
No.	No. Equipment Brand Name Model Name FCC ID				
Α	LAN NB	DELL	E6430	N/A	
В	5G NB	DELL	E6430	N/A	
С	2.4G NB	DELL	E6430	N/A	
D	Lighting	Philips	N/A	N/A	

For Radiated and RF Conducted:

	Support Equipment				
No.	No. Equipment Brand Name Model Name FCC ID				
Α	NB	DELL	E4300	N/A	

TEL: 886-3-656-9065 Page Number : 10 of 27
FAX: 886-3-656-9085 Issued Date : Oct. 22, 2020

2.6 Test Setup Diagram

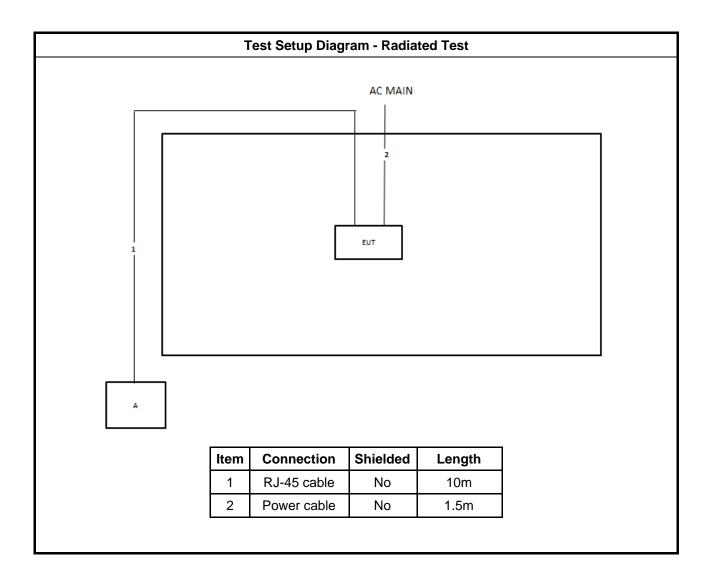


Report No. : FR672231-01AB

 TEL: 886-3-656-9065
 Page Number
 : 11 of 27

 FAX: 886-3-656-9085
 Issued Date
 : Oct. 22, 2020

Report No.: FR672231-01AB



 TEL: 886-3-656-9065
 Page Number
 : 12 of 27

 FAX: 886-3-656-9085
 Issued Date
 : Oct. 22, 2020

3 Transmitter Test Result

3.1 AC Power-line Conducted Emissions

3.1.1 AC Power-line Conducted Emissions Limit

AC Power-line Conducted Emissions Limit		Limit	
Frequency Emission (MHz) Quasi-Peak Average			
0.15-0.5	66 - 56 *	56 - 46 *	
0.5-5	56	46	
5-30	60	50	
Note 1: * Decreases with the logarithm of the frequency.			

Report No. : FR672231-01AB

3.1.2 Measuring Instruments

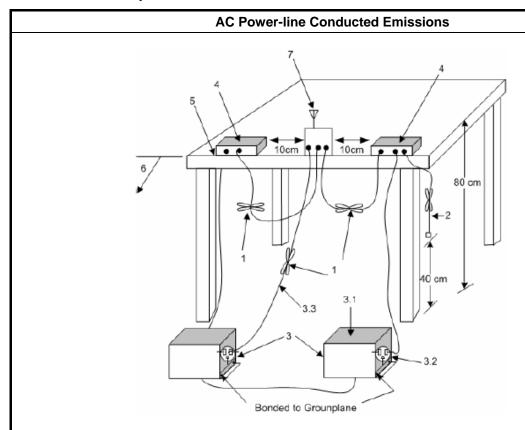
Refer a test equipment and calibration data table in this test report.

3.1.3 Test Procedures

Test Method
Refer as ANSI C63.10-2013, clause 6.2 for AC power-line conducted emissions.

TEL: 886-3-656-9065 Page Number : 13 of 27
FAX: 886-3-656-9085 Issued Date : Oct. 22, 2020

3.1.4 Test Setup



1—Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 cm to 40 cm long.

Report No.: FR672231-01AB

- 2—The I/O cables that are not connected to an accessory shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- 3—EUT connected to one LISN. Unused LISN measuring port connectors shall be terminated in 50 Ω loads. LISN may be placed on top of, or immediately beneath, reference ground plane.
- 3.1—All other equipment powered from additional LISN(s).
- 3.2—A multiple-outlet strip may be used for multiple power cords of non-EUT equipment.
- 3.3—LISN at least 80 cm from nearest part of EUT chassis.
- 4—Non-EUT components of EUT system being tested.
- 5—Rear of EUT, including peripherals, shall all be aligned and flush with edge of tabletop.
- 6—Edge of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the ground plane.
- 7—Antenna can be integral or detachable. If detachable, then the antenna shall be attached for this test.

3.1.5 Measurement Results Calculation

The measured Level is calculated using:

- a. Corrected Reading: LISN Factor (LISN) + Attenuator (AT/AUX) + Cable Loss (CL) + Read Level (Raw) = Level
- b. Margin = -Limit + Level

3.1.6 Test Result of AC Power-line Conducted Emissions

Refer as Appendix A

TEL: 886-3-656-9065 Page Number : 14 of 27
FAX: 886-3-656-9085 Issued Date : Oct. 22, 2020

3.2 Emission Bandwidth

3.2.1 Emission Bandwidth Limit

	Emission Bandwidth Limit		
UN	UNII Devices		
\boxtimes	For the 5.15-5.25 GHz band, N/A		
	For the 5.25-5.35 GHz band, the maximum conducted output power shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz.		
	For the 5.47-5.725 GHz band, the maximum conducted output power shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz.		
\boxtimes	For the 5.725-5.85 GHz band, 6 dB emission bandwidth ≥ 500kHz.		
LE-	LAN Devices		
	For the band 5.15-5.25 GHz, the maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz.		
	For the 5.25-5.35 GHz band, the maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz		
	For the 5.47-5.6 GHz band and 5.65-5.725 GHz band, the maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz		
	For the 5.725-5.85 GHz band, 6 dB emission bandwidth ≥ 500kHz.		

Report No. : FR672231-01AB

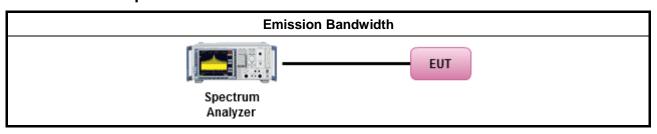
3.2.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.2.3 Test Procedures

	Test Method			
-	For the emission bandwidth shall be measured using one of the options below:			
	\boxtimes	Refer as FCC KDB 789033, clause C for EBW and clause D for OBW measurement.		
Refer as ANSI C63.10, clause 6.9.1 for occupied bandwidth testing.		Refer as ANSI C63.10, clause 6.9.1 for occupied bandwidth testing.		
		Refer as IC RSS-Gen, clause 4.6 for bandwidth testing.		

3.2.4 Test Setup



3.2.5 Test Result of Emission Bandwidth

Refer as Appendix B

TEL: 886-3-656-9065 Page Number : 15 of 27
FAX: 886-3-656-9085 Issued Date : Oct. 22, 2020

3.3 Maximum Conducted Output Power

3.3.1 Maximum Conducted Output Power Limit

	Maximum Conducted Output Power Limit
UNI	I Devices
\boxtimes	For the 5.15-5.25 GHz band:
	 Outdoor AP: the maximum conducted output power (P_{Out}) shall not exceed the lesser of 1 W. If G_{TX} > 6 dBi, then P_{Out} = 30 - (G_{TX} - 6). e.i.r.p. at any elevation angle above 30 degrees ≤ 125mW [21dBm]
	Indoor AP: the maximum conducted output power (P_{Out}) shall not exceed the lesser of 1 W. If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)$
	Point-to-point AP: the maximum conducted output power (P_{Out}) shall not exceed the lesser of 1 W If $G_{TX} > 23$ dBi, then $P_{Out} = 30 - (G_{TX} - 23)$.
	Mobile or Portable Client: the maximum conducted output power (P _{Out}) shall not exceed the lesser of 250 mW. If G _{TX} > 6 dBi, then P _{Out} = 24 - (G _{TX} - 6).
	For the 5.25-5.35 GHz band, the maximum conducted output power (P_{Out}) shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. If G_{TX} > 6 dBi, then P_{Out} = 24 – (G_{TX} – 6).
	For the 5.47-5.725 GHz band, the maximum conducted output power (P_{Out}) shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. If G_{TX} > 6 dBi, then P_{Out} = 24 – (G_{TX} – 6).
\boxtimes	For the 5.725-5.85 GHz band:
	Point-to-multipoint systems (P2M): the maximum conducted output power (P_{Out}) shall not exceed the lesser of 1 W. If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)$.
	 Point-to-point systems (P2P): the maximum conducted output power (P_{Out}) shall not exceed the lesser of 1 W.
LE-	LAN Devices
	For the 5.15-5.25 GHz band, the maximum e.i.r.p. shall not exceed 200 mW or $10 + 10 \log B$, dBm, whichever power is less. B is the 99% emission bandwidth in MHz.
	For the 5.25-5.35 GHz band, the maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz
	For the 5.47-5.6 GHz band and 5.65-5.725 GHz band, the maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz
	For the 5.725-5.85 GHz band:
	Point-to-multipoint systems (P2M): the maximum conducted output power (P_{Out}) shall not exceed the lesser of 1 W. If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)$.
	 Point-to-point systems (P2P): the maximum conducted output power (P_{Out}) shall not exceed the lesser of 1 W.
	t = maximum conducted output power in dBm, = the maximum transmitting antenna directional gain in dBi.

Report No. : FR672231-01AB

 TEL: 886-3-656-9065
 Page Number : 16 of 27

 FAX: 886-3-656-9085
 Issued Date : Oct. 22, 2020

3.3.2 Measuring Instruments

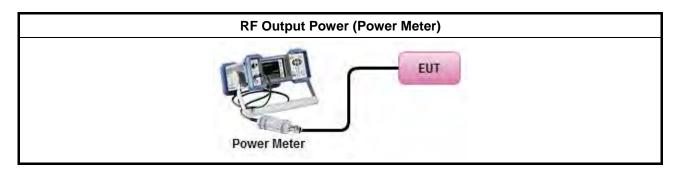
Refer a test equipment and calibration data table in this test report.

3.3.3 Test Procedures

	Test Method								
•	Maximum Conducted Output Power								
	Average over on/off periods with duty factor								
	Refer as FCC KDB 789033, clause E Method SA-2 (spectral trace averaging).								
	Refer as FCC KDB 789033, clause E Method SA-2 Alt. (RMS detection with slow sweep speed)								
	Wideband RF power meter and average over on/off periods with duty factor								
	Refer as FCC KDB 789033, clause E Method PM-G (using an RF average power meter).								
•	For conducted measurement.								
	If the EUT supports multiple transmit chains using options given below: Refer as FCC KDB 662911, In-band power measurements. Using the measure-and-sum approach, measured all transmit ports individually. Sum the power (in linear power units e.g., mW) of all ports for each individual sample and save them.								
	If multiple transmit chains, EIRP calculation could be following as methods: P _{total} = P ₁ + P ₂ + + P _n (calculated in linear unit [mW] and transfer to log unit [dBm]) EIRP _{total} = P _{total} + DG								

Report No. : FR672231-01AB

3.3.4 Test Setup



3.3.5 Test Result of Maximum Conducted Output Power

Refer as Appendix C

TEL: 886-3-656-9065 Page Number : 17 of 27
FAX: 886-3-656-9085 Issued Date : Oct. 22, 2020

3.4 Peak Power Spectral Density

3.4.1 Peak Power Spectral Density Limit

	Peak Power Spectral Density Limit
UNI	I Devices
\boxtimes	For the 5.15-5.25 GHz band:
	 Outdoor AP: the peak power spectral density (PPSD) shall not exceed the lesser of 17dBm/MHz. If G_{TX} > 6 dBi, then P_{Out} = 17 - (G_{TX} - 6).
	Indoor AP: the peak power spectral density (PPSD) shall not exceed the lesser of 17dBm/MHz. If G _{TX} > 6 dBi, then P _{Out} = 17 − (G _{TX} − 6).
	■ Point-to-point AP: the peak power spectral density (PPSD) shall not exceed the lesser of 17dBm/MHz. If $G_{TX} > 23$ dBi, then $P_{Out} = 17 - (G_{TX} - 23)$.
	Mobile or Portable Client: the peak power spectral density (PPSD) ≤ 11 dBm/MHz. If G _{TX} > 6 dBi, then PPSD= 11 - (G _{TX} - 6)
	For the 5.25-5.35 GHz band, the peak power spectral density (PPSD) \leq 11 dBm/MHz. If $G_{TX} > 6$ dBi, then PPSD= 11 – ($G_{TX} - 6$).
	For the 5.47-5.725 GHz band, the peak power spectral density (PPSD) \leq 11 dBm/MHz. If $G_{TX} > 6$ dBi, then PPSD= 11 – ($G_{TX} - 6$).
\boxtimes	For the 5.725-5.85 GHz band:
	Point-to-multipoint systems (P2M): the peak power spectral density (PPSD) ≤ 30 dBm/500kHz. If $G_{TX} > 6$ dBi, then PPSD= 30 – ($G_{TX} - 6$).
	Point-to-point systems (P2P): the peak power spectral density (PPSD) ≤ 30 dBm/500kHz.
LE-	LAN Devices
	For the 5.15-5.25 GHz band, the e.i.r.p. peak power spectral density (PPSD) ≤ 10 dBm/MHz.
	For the 5.25-5.35 GHz band, the peak power spectral density (PPSD) ≤ 11 dBm/MHz.
	 e.i.r.p. greater than 200 mW shall comply with the following e.i.r.p. at different elevations, where θ is the angle above the local horizontal plane (of the Earth) as shown below: -13 dBW/MHz for 0° ≤ θ < 8°; -13 − 0.716 (θ-8) dBW/MHz for 8° ≤ θ < 40° -35.9 − 1.22 (θ-40) dBW/MHz for 40° ≤ θ ≤ 45°; -42 dBW/MHz for θ > 45°
	For the 5.47-5.6 GHz band and 5.65-5.725 GHz band, the peak power spectral density (PPSD) \leq 11 dBm/MHz.
	For the 5.725-5.85 GHz band:
	Point-to-multipoint systems (P2M): the peak power spectral density (PPSD) ≤ 30 dBm/500kHz. If $G_{TX} > 6$ dBi, then PPSD= 30 – ($G_{TX} - 6$).
	 Point-to-point systems (P2P): the peak power spectral density (PPSD) ≤ 30 dBm/500kHz.
pow	SD = peak power spectral density that he same method as used to determine the conducted output ver shall be used to determine the power spectral density. And power spectral density in dBm/MHz = the maximum transmitting antenna directional gain in dBi.

Report No. : FR672231-01AB

 TEL: 886-3-656-9065
 Page Number : 18 of 27

 FAX: 886-3-656-9085
 Issued Date : Oct. 22, 2020

3.4.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

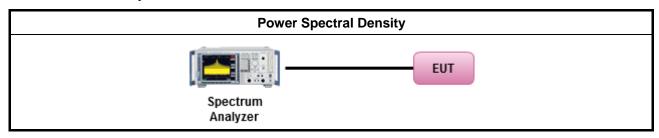
3.4.3 Test Procedures

		Test Method									
•	outp funct	ak power spectral density procedures that the same method as used to determine the conducted tput power shall be used to determine the peak power spectral density and use the peak search action on the spectrum analyzer to find the peak of the spectrum. For the peak power spectral density all be measured using below options:									
	Refer as FCC KDB 789033, F)5) power spectral density can be measured using resoluti bandwidths < 1 MHz provided that the results are integrated over 1 MHz bandwidth										
	[duty	cycle ≥ 98% or external video / power trigger]									
		Refer as FCC KDB 789033, clause E Method SA-1 (spectral trace averaging).									
		Refer as FCC KDB 789033, clause E Method SA-1 Alt. (RMS detection with slow sweep speed)									
	duty	cycle < 98% and average over on/off periods with duty factor									
		Refer as FCC KDB 789033, clause E Method SA-2 (spectral trace averaging).									
		Refer as FCC KDB 789033, clause E Method SA-2 Alt. (RMS detection with slow sweep speed)									
•	For	conducted measurement.									
	•	If the EUT supports multiple transmit chains using options given below:									
		Option 1: Measure and sum the spectra across the outputs. Refer as FCC KDB 662911, In-band power spectral density (PSD). Sample all transmit ports simultaneously using a spectrum analyzer for each transmit port. Where the trace bin-by-bin of each transmit port summing can be performed. (i.e., in the first spectral bin of output 1 is summed with that in the first spectral bin of output 2 and that from the first spectral bin of output 3, and so on up to the NTX output to obtain the value for the first frequency bin of the summed spectrum.). Add up the amplitude (power) values for the different transmit chains and use this as the new data trace.									
		Option 2: Measure and sum spectral maxima across the outputs. With this technique, spectra are measured at each output of the device at the required resolution bandwidth. The maximum value (peak) of each spectrum is determined. These maximum values are then summed mathematically in linear power units across the outputs. These operations shall be performed separately over frequency spans that have different out-of-band or spurious emission limits,									
		Option 3: Measure and add 10 log(N) dB, where N is the number of transmit chains. Refer as FCC KDB 662911, In-band power spectral density (PSD). Performed at each transmit chains and each transmit chains shall be compared with the limit have been reduced with 10 log(N). Or each transmit chains shall be add 10 log(N) to compared with the limit.									
	•	If multiple transmit chains, EIRP PPSD calculation could be following as methods: $ PPSD_{total} = PPSD_1 + PPSD_2 + + PPSD_n $ (calculated in linear unit [mW] and transfer to log unit [dBm]) $ EIRP_{total} = PPSD_{total} + DG $									

Report No. : FR672231-01AB

TEL: 886-3-656-9065 Page Number : 19 of 27
FAX: 886-3-656-9085 Issued Date : Oct. 22, 2020

3.4.4 Test Setup



Report No. : FR672231-01AB

3.4.5 Test Result of Peak Power Spectral Density

Refer as Appendix D

 TEL: 886-3-656-9065
 Page Number
 : 20 of 27

 FAX: 886-3-656-9085
 Issued Date
 : Oct. 22, 2020

3.5 Unwanted Emissions

3.5.1 Transmitter Unwanted Emissions Limit

Unwanted emissions below 1 GHz and restricted band emissions above 1GHz limit								
Frequency Range (MHz)	Field Strength (uV/m)	Field Strength (dBuV/m)	Measure Distance (m)					
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300					
0.490~1.705	24000/F(kHz)	33.8 - 23	30					
1.705~30.0	30	29	30					
30~88	100	40	3					
88~216	150	43.5	3					
216~960	200	46	3					
Above 960	500	54	3					

Report No.: FR672231-01AB

- Note 1: Test distance for frequencies at or above 30 MHz, measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).
- Note 2: Test distance for frequencies at below 30 MHz, measurements may be performed at a distance closer than the EUT limit distance; however, an attempt should be made to avoid making measurements in the near field. When performing measurements below 30 MHz at a closer distance than the limit distance, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two or more distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade). The test report shall specify the extrapolation method used to determine compliance of the EUT.
- Note 3: Using the distance of 1m during the test for above 18 GHz, and the test value to correct for the distance factor at 3m.

Un-restricted band emissions above 1GHz Limit							
Operating Band	Limit						
⊠ 5.15 - 5.25 GHz	e.i.r.p27 dBm [68.2 dBuV/m@3m]						
☐ 5.25 - 5.35 GHz	e.i.r.p27 dBm [68.2 dBuV/m@3m]						
☐ 5.47 - 5.725 GHz	e.i.r.p27 dBm [68.2 dBuV/m@3m]						
⊠ 5.725 - 5.85 GHz	all emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.						

Note 1: Measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of

TEL: 886-3-656-9065 Page Number : 21 of 27
FAX: 886-3-656-9085 Issued Date : Oct. 22, 2020

linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).

Report No.: FR672231-01AB

3.5.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.5.3 Test Procedures

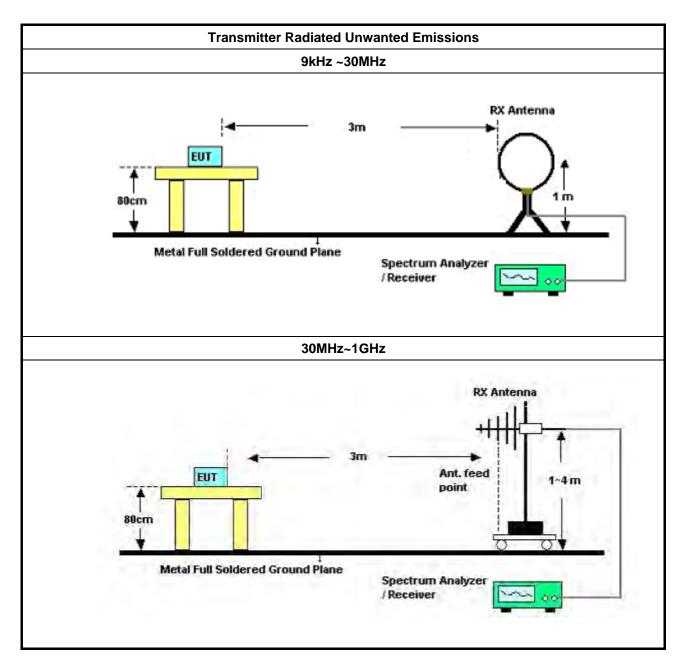
Test Method

- Measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. Measurements shall not be performed at a distance greater than 30 m for frequencies above 30 MHz, unless it can be further demonstrated that measurements at a distance of 30 m or less are impractical. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).
- The average emission levels shall be measured in [duty cycle ≥ 98 or duty factor].
- For the transmitter unwanted emissions shall be measured using following options below:
 - Refer as FCC KDB 789033, clause G)2) for unwanted emissions into non-restricted bands.
 - Refer as FCC KDB 789033, clause G)1) for unwanted emissions into restricted bands.
 - Refer as FCC KDB 789033, G)6) Method AD (Trace Averaging).
 - Refer as FCC KDB 789033, G)6) Method VB (Reduced VBW).
 - Refer as ANSI C63.10, clause 11.12.2.5.3 (Reduced VBW). VBW ≥ 1/T, where T is pulse time.
 - Refer as ANSI C63.10, clause 7.5 average value of pulsed emissions.
 - Refer as FCC KDB 789033, clause G)5) measurement procedure peak limit.
 - Refer as ANSI C63.10, clause 4.1.4.2.2 measurement procedure peak limit.
- For radiated measurement.
 - Refer as ANSI C63.10, clause 6.4 for radiated emissions below 30 MHz and test distance is 3m.
 - Refer as ANSI C63.10, clause 6.5 for radiated emissions 30 MHz to 1 GHz and test distance is 3m.
 - Refer as ANSI C63.10, clause 6.6 for radiated emissions above 1GHz.
- The any unwanted emissions level shall not exceed the fundamental emission level.
- All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

TEL: 886-3-656-9065 Page Number : 22 of 27
FAX: 886-3-656-9085 Issued Date : Oct. 22, 2020



3.5.4 Test Setup



Report No. : FR672231-01AB

 TEL: 886-3-656-9065
 Page Number
 : 23 of 27

 FAX: 886-3-656-9085
 Issued Date
 : Oct. 22, 2020

Above 1GHz EUT 4M 3M & 1M 1.5M Spectrum Analyzer

Report No.: FR672231-01AB

3.5.5 **Measurement Results Calculation**

The measured Level is calculated using:

Corrected Reading: Antenna factor (AF) + Cable loss (CL) + Read level (Raw) - Preamp factor (PA)(if applicable) = Level.

3.5.6 Transmitter Unwanted Emissions (Below 30MHz)

There is a comparison data of both open-field test site and alternative test site - semi-Anechoic chamber according to KDB414788 Radiated Test Site, and the result came out very similar.

All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

The radiated emissions were investigated from 9 kHz or the lowest frequency generated within the device, up to the 10th harmonic or 40 GHz, whichever is appropriate.

3.5.7 **Test Result of Transmitter Unwanted Emissions**

Refer as Appendix E

TEL: 886-3-656-9065 : 24 of 27 Page Number FAX: 886-3-656-9085 : Oct. 22, 2020 **Issued Date** : 01

4 Test Equipment and Calibration Data

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
EMI Receiver	Agilent	N9038A	My52260123	9kHz ~ 8.4GHz	Feb. 26, 2020	Feb. 25, 2021	Conduction (CO01-CB)
LISN	F.C.C.	FCC-LISN-50- 16-2	04083	150kHz ~ 100MHz	Dec. 25, 2019	Dec. 24, 2020	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127647	9kHz ~ 30MHz	Feb. 25, 2020	Feb. 24, 2021	Conduction (CO01-CB)
Pulse Limiter	Rohde&Schwa rz	ESH3-Z2	100430	9kHz ~ 30MHz	Jan. 31, 2020	Jan. 30, 2021	Conduction (CO01-CB)
COND Cable	Woken	Cable	Low cable-CO01	9kHz ~ 30MHz	May 20, 2020	May 19, 2021	Conduction (CO01-CB)
Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Conduction (CO01-CB)
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	Apr. 13, 2020	Apr. 12, 2021	Radiation (03CH03-CB)
Bilog Antenna with 6 dB attenuator	Schaffner	CBL6112B & N-6-06	2928 & AT-N0607	20MHz ~ 2GHz	Feb. 28, 2020	Feb. 27, 2021	Radiation (03CH03-CB)
Pre-Amplifier	Agilent	8447D	2944A10259	9kHz ~ 1.3GHz	Jan. 15, 2020	Jan. 14, 2021	Radiation (03CH03-CB)
Spectrum Analyzer	R&S	FSP40	100019	9kHz ~ 40GHz	Jun. 09, 2020	Jun. 08, 2021	Radiation (03CH03-CB)
EMI Test Receiver	R&S	ESCS	826547/017	9kHz ~ 2.75GHz	May 13, 2020	May 12, 2021	Radiation (03CH03-CB)
RF Cable-low	Woken	RG402	Low Cable-02+29	25MHz ~ 1GHz	Jul. 28, 2020	Jul. 27, 2021	Radiation (03CH03-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Jul. 21, 2020	Jul. 20, 2021	Radiation (03CH03-CB)
Pre-Amplifier	Agilent	8449B	3008A02097	1GHz ~ 26.5GHz	Jul. 03, 2020	Jun. 02, 2021	Radiation (03CH03-CB)
Pre-Amplifier	MITEQ	TTA1840-35-H G	1864479	18GHz ~ 40GHz	Jul. 08, 2020	Jul. 07, 2021	Radiation (03CH03-CB)
RF Cable-high	Woken	RG402	High Cable-20+29	1GHz ~ 18GHz	Jul. 28, 2020	Jul. 27, 2021	Radiation (03CH03-CB)
RF Cable-high	Woken	RG402	High Cable-29	1GHz ~ 18GHz	Jul. 28, 2020	Jul. 27, 2021	Radiation (03CH03-CB)
RF Cable-high	Woken	RG402	High Cable-40G#1	18GHz ~ 40 GHz	Jul. 16, 2020	Jul. 15, 2021	Radiation (03CH03-CB)
RF Cable-high	Woken	RG402	High Cable-40G#2	18GHz ~ 40 GHz	Jul. 16, 2020	Jul. 15, 2021	Radiation (03CH03-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Radiation (03CH03-CB)
Horn Antenna	EMCO	3115	9610-4976	1GHz ~ 18GHz	Apr. 21, 2020	Apr. 20, 2021	Radiation (03CH02-CB)

TEL: 886-3-656-9065 FAX: 886-3-656-9085

Report Template No.: CB-A12_1 Ver1.2

Page Number : 25 of 27
Issued Date : Oct. 22, 2020

Report No. : FR672231-01AB

Report Version : 01

Calibration Calibration Manufacturer Model No. Serial No. Characteristics Instrument Remark **Due Date** Date Radiation **BBHA 9170** BBHA9170252 15GHz ~ 40GHz Jul. 21, 2020 Jul. 20, 2021 Horn Antenna Schwarzbeck (03CH02-CB) Radiation Pre-Amplifier 83017A MY39501305 1GHz ~ 26.5GHz Jul. 13, 2020 Jul. 12, 2021 Agilent (03CH02-CB) TTA1840-35-H Radiation 18GHz ~ 40GHz Jul. 08, 2020 Pre-Amplifier MITFO 1864479 Jul. 07, 2021 (03CH02-CB) G Signal Radiation R&S FSV40 101904 9kHz ~ 40GHz May 12, 2020 May 11, 2021 Analyzer (03CH02-CB) Radiation High Cable Woken RG402 High Cable-18 1GHz ~ 18GHz Oct. 07, 2019 Oct. 06, 2020 (03CH02-CB) High Radiation 1GHz ~ 18GHz Oct. 07, 2019 Oct. 06, 2020 High Cable Woken RG402 Cable-18+19 (03CH02-CB) High Radiation RF Cable-high Woken RG402 18GHz ~ 40 GHz Jul. 16, 2020 Jul. 15, 2021 Cable-40G#1 (03CH02-CB) High Radiation 18GHz ~ 40 GHz Jul. 16, 2020 RF Cable-high Woken RG402 Jul. 15, 2021 Cable-40G#2 (03CH02-CB) Radiation **Test Software SPORTON** SENSE V5.10 N.C.R. N.C.R. (03CH02-CB) Radiation 00143147 750MHz~18GHz Oct. 22, 2019 Oct. 21, 2020 Horn Antenna ETS · Lindgren 3115 (03CH04-CB) Radiation Horn Antenna Schwarzbeck **BBHA 9170** BBHA9170252 15GHz ~ 40GHz Jul. 21, 2020 Jul. 20, 2021 (03CH04-CB) 0.5GHz ~ Radiation Pre-Amplifier Agilent 83017A MY53270063 Jul. 14, 2020 Jul. 13, 2021 26.5GHz (03CH04-CB) TTA1840-35-H Radiation Pre-Amplifier **MITEQ** 1864479 18GHz ~ 40GHz Jul. 08, 2020 Jul. 07, 2021 G (03CH04-CB) Spectrum Radiation FSP40 100142 9kHz~40GHz Dec. 17, 2020 R&S Dec. 18, 2019 (03CH04-CB Analyzer Radiation High Cable-21 RF Cable-high Woken RG402 1GHz - 18GHz Jul. 07, 2020 Jul. 06, 2021 (03CH04-CB) High Radiation RG402 1GHz - 18GHz Jan. 31, 2021 RF Cable-high Woken Feb. 01, 2020 Cable-21+22 (03CH04-CB) High Radiation RF Cable-high Woken RG402 18GHz ~ 40 GHz Jul. 16, 2020 Jul. 15, 2021 Cable-40G#1 (03CH04-CB) Radiation High RF Cable-high Woken RG402 18GHz ~ 40 GHz Jul. 16, 2020 Jul. 15, 2021 (03CH04-CB) Cable-40G#2 Radiation **SPORTON Test Software** SENSE V5.10 N.C.R. N.C.R. (03CH04-CB) Spectrum Conducted 101027 9kHz~40GHz Jul. 27, 2020 Jul. 26, 2021 R&S FSV40 (TH02-CB) analyzer Conducted Power Sensor Anritsu MA2411B 1531343 300MHz~40GHz Aug. 04, 2020 Aug. 03, 2021 (TH02-CB) Conducted Power Meter Anritsu ML2495A 1728001 300MHz~40GHz Aug. 04, 2020 Aug. 03, 2021 (TH02-CB) Conducted RF Cable-high Woken RG402 High Cable-01 1 GHz - 26.5 GHz Oct. 07, 2019 Oct. 06, 2020 (TH02-CB)

Report No.: FR672231-01AB

: 26 of 27 TEL: 886-3-656-9065 Page Number FAX: 886-3-656-9085 : Oct. 22, 2020 Issued Date : 01

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
RF Cable-high	Woken	RG402	High Cable-02	1 GHz – 26.5 GHz	Oct. 07, 2019	Oct. 06, 2020	Conducted (TH02-CB)
RF Cable-high	Woken	RG402	High Cable-3	1 GHz – 26.5 GHz	Oct. 07, 2019	Oct. 06, 2020	Conducted (TH02-CB)
RF Cable-high	Woken	RG402	High Cable-04	1 GHz – 26.5 GHz	Oct. 07, 2019	Oct. 06, 2020	Conducted (TH02-CB)
RF Cable-high	Woken	RG402	High Cable-05	1 GHz – 26.5 GHz	Oct. 07, 2019	Oct. 06, 2020	Conducted (TH02-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Conducted (TH02-CB)

Report No. : FR672231-01AB

Note: Calibration Interval of instruments listed above is one year. NCR means Non-Calibration required.

TEL: 886-3-656-9065 Page Number : 27 of 27
FAX: 886-3-656-9085 Issued Date : Oct. 22, 2020



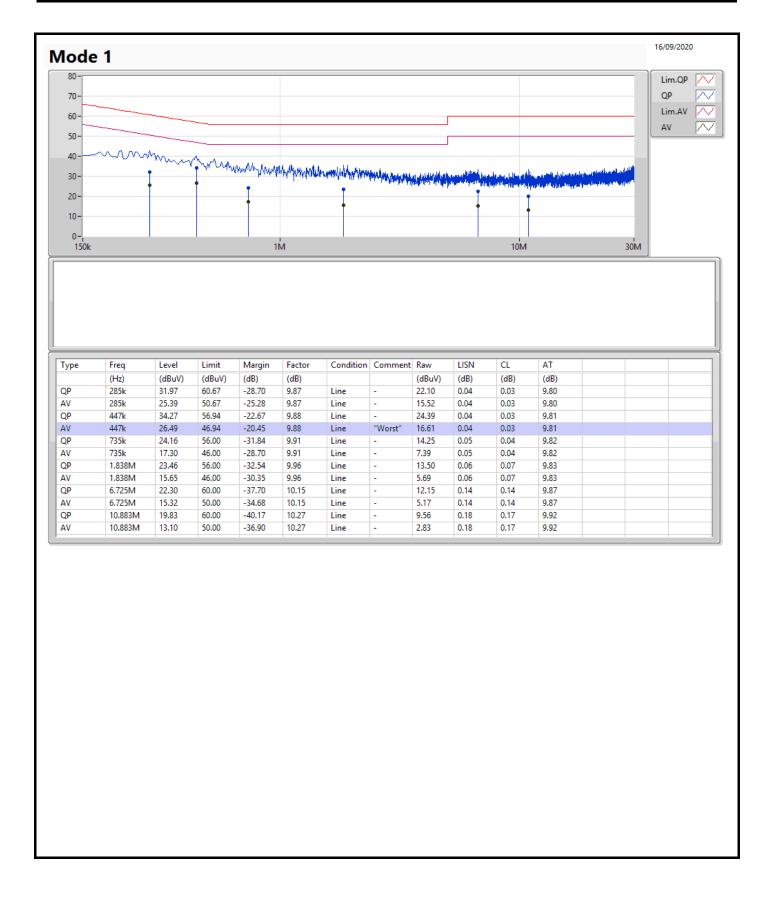
Conducted Emissions at Powerline

Appendix A

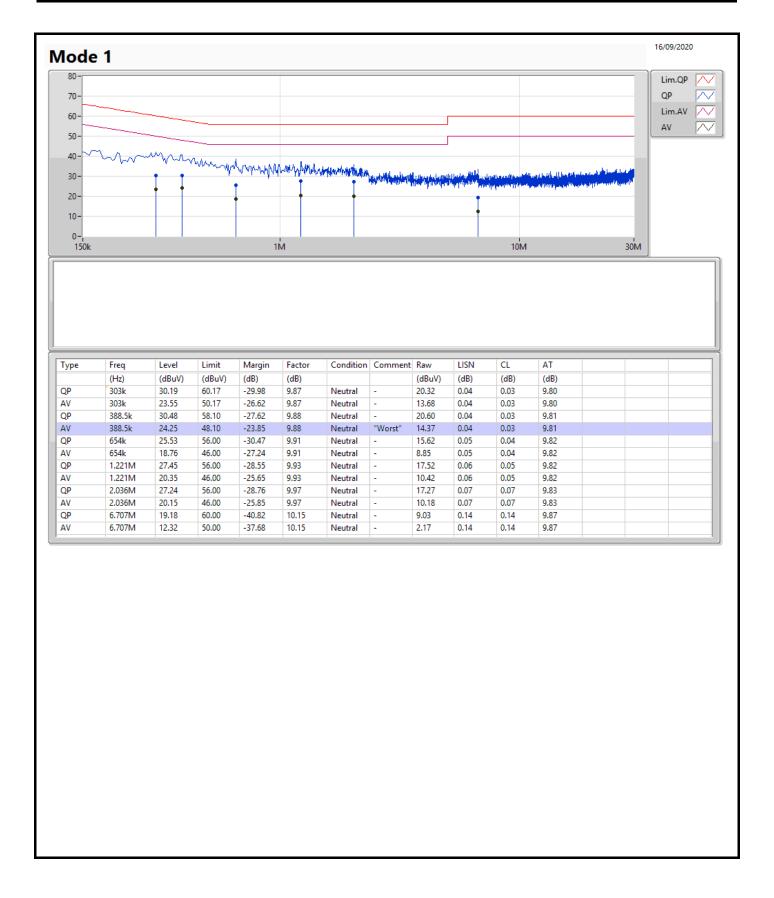
Summary

Mode	Result	Туре	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Condition
Mode 1	Pass	AV	447k	26.49	46.94	-20.45	Line











Summary

Mode	Mode Max-N dB		ITU-Code	Min-N dB	Min-OBW
	(Hz)	(Hz)		(Hz)	(Hz)
5.15-5.25GHz	-	-	-	-	-
802.11a_Nss1,(6Mbps)_2TX	43.29M	29.325M	29M3D7W	31.59M	18.141M
802.11ac VHT20_Nss1,(MCS0)_2TX	44.7M	30.735M	30M7D7W	27.03M	17.931M
802.11ac VHT40_Nss1,(MCS0)_2TX	71.28M	37.601M	37M6D7W	40.74M	36.042M
802.11ac VHT80_Nss1,(MCS0)_2TX	81.24M	75.322M	75M3D7W	80.76M	75.202M
5.725-5.85GHz	-	-	-	-	-
802.11a_Nss1,(6Mbps)_2TX	16.29M	35.592M	35M6D7W	15.3M	34.303M
802.11ac VHT20_Nss1,(MCS0)_2TX	17.55M	37.271M	37M3D7W	16.41M	36.192M
802.11ac VHT40_Nss1,(MCS0)_2TX	32.52M	68.546M	68M5D7W	29.94M	41.859M
802.11ac VHT80_Nss1,(MCS0)_2TX	74.16M	76.522M	76M5D7W	72.6M	76.162M

Max-N dB = Maximum 6dB down bandwidth for 5.725-5.85GHz band / Maximum 26dB down bandwidth for other band;

Max-OBW = Maximum99% occupied bandwidth;

Min-N dB = Minimum 6dB down bandwidth for 5.725-5.85GHz band / Maximum 26dB down bandwidth for other band;

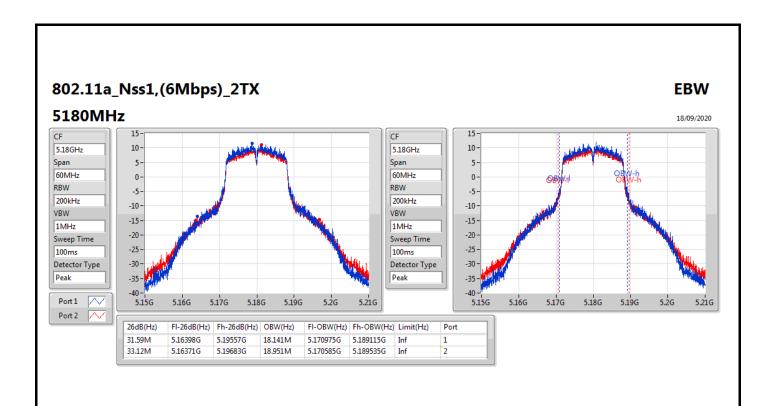
Min-OBW = Minimum 99% occupied bandwidth;

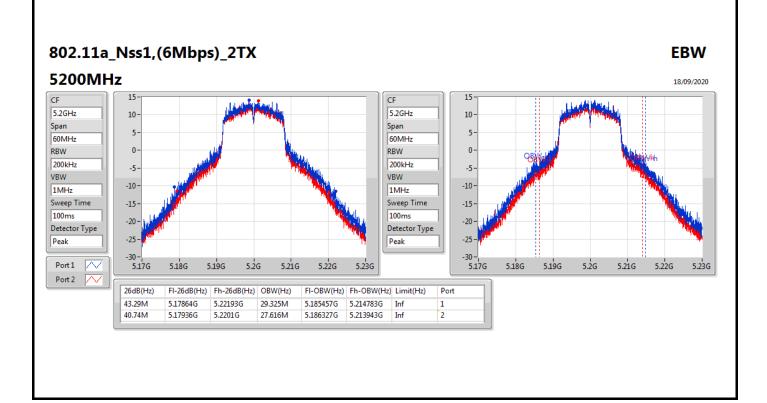


Result

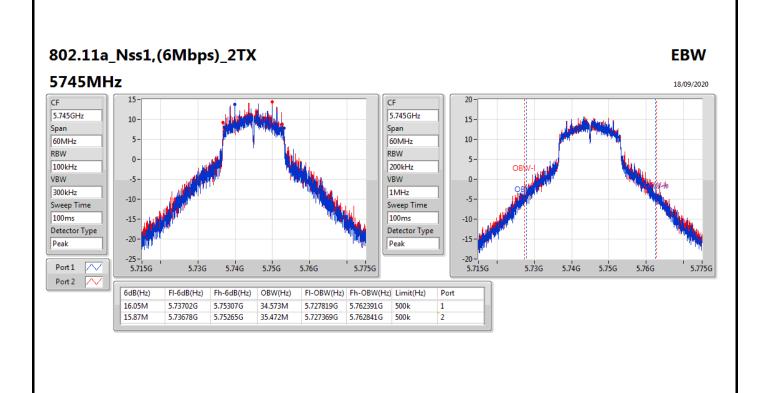
Mode	Result	Limit	Port 1-N dB	Port 1-OBW	Port 2-N dB	Port 2-OBW
		(Hz)	(Hz)	(Hz)	(Hz)	(Hz)
802.11a_Nss1,(6Mbps)_2TX	-	-	-	-	-	-
5180MHz	Pass	Inf	31.59M	18.141M	33.12M	18.951M
5200MHz	Pass	Inf	43.29M	29.325M	40.74M	27.616M
5240MHz	Pass	Inf	33.72M	19.22M	32.49M	19.28M
5745MHz	Pass	500k	16.05M	34.573M	15.87M	35.472M
5785MHz	Pass	500k	15.3M	34.423M	15.72M	35.292M
5825MHz	Pass	500k	15.87M	34.303M	16.29M	35.592M
802.11ac VHT20_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5180MHz	Pass	Inf	27.03M	17.931M	31.11M	18.201M
5200MHz	Pass	Inf	44.7M	30.735M	42.24M	29.325M
5240MHz	Pass	Inf	32.46M	18.741M	33.18M	18.831M
5745MHz	Pass	500k	17.25M	36.192M	17.25M	37.151M
5785MHz	Pass	500k	17.49M	36.492M	16.92M	36.762M
5825MHz	Pass	500k	16.41M	36.192M	17.55M	37.271M
802.11ac VHT40_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5190MHz	Pass	Inf	40.8M	36.222M	40.74M	36.042M
5230MHz	Pass	Inf	71.28M	37.601M	70.62M	36.822M
5755MHz	Pass	500k	30M	57.451M	32.52M	41.859M
5795MHz	Pass	500k	32.46M	68.546M	29.94M	53.673M
802.11ac VHT80_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5210MHz	Pass	Inf	81.24M	75.322M	80.76M	75.202M
5775MHz	Pass	500k	72.6M	76.522M	74.16M	76.162M

Port X-N dB = Port X 6dB down bandwidth for 5.725-5.85GHz band / 26dB down bandwidth for other band Port X-OBW = Port X 99% occupied bandwidth;

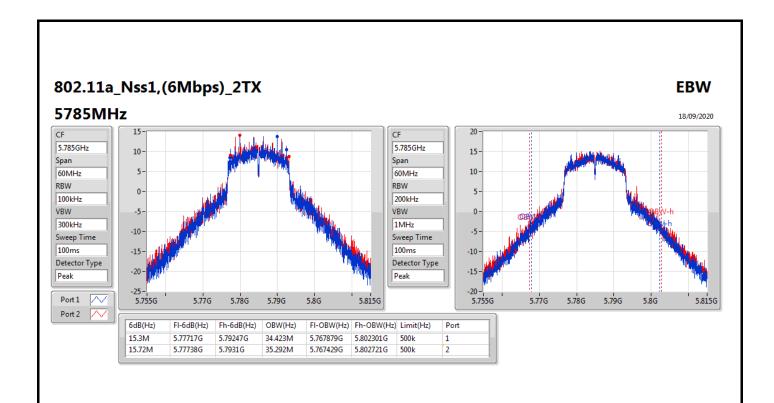


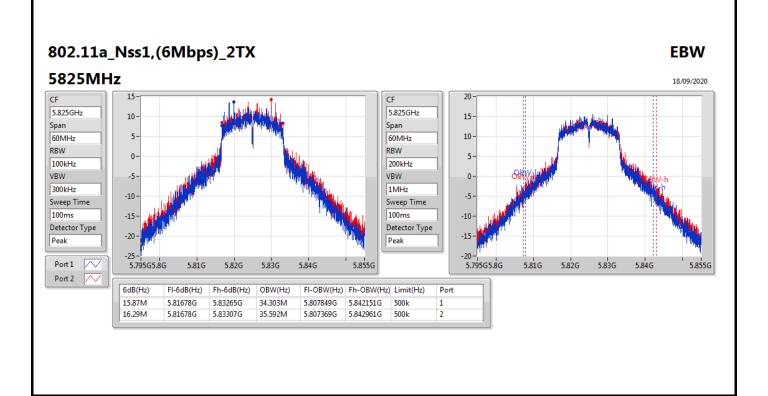


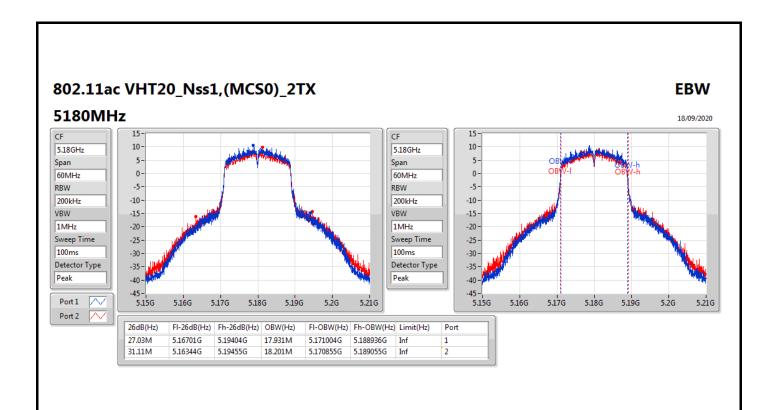


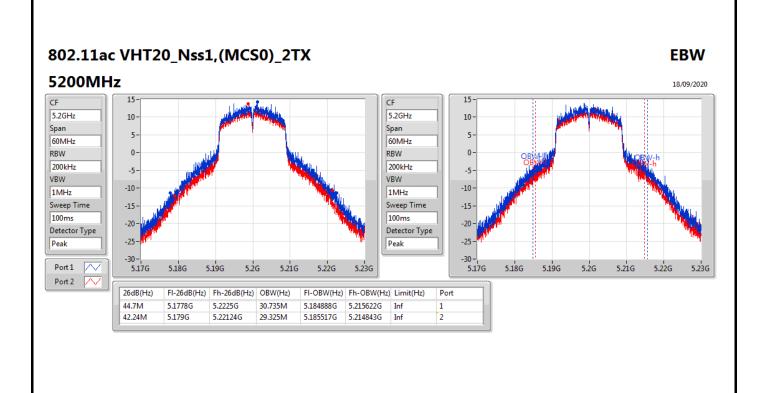


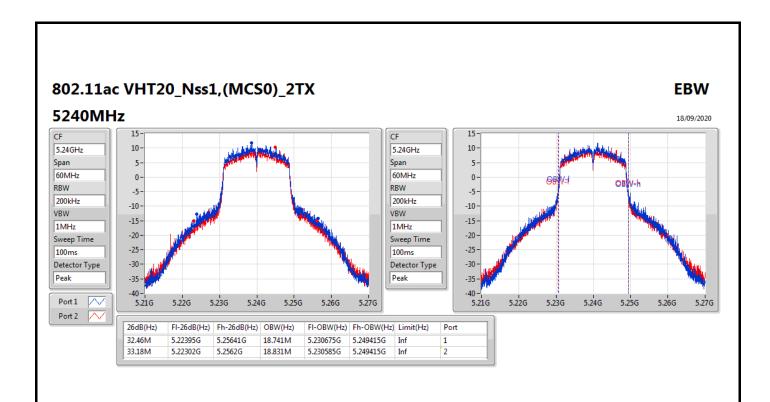
: 4 of 11

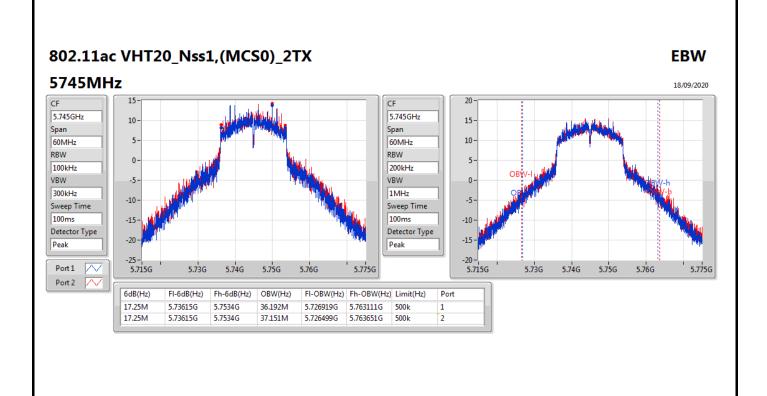


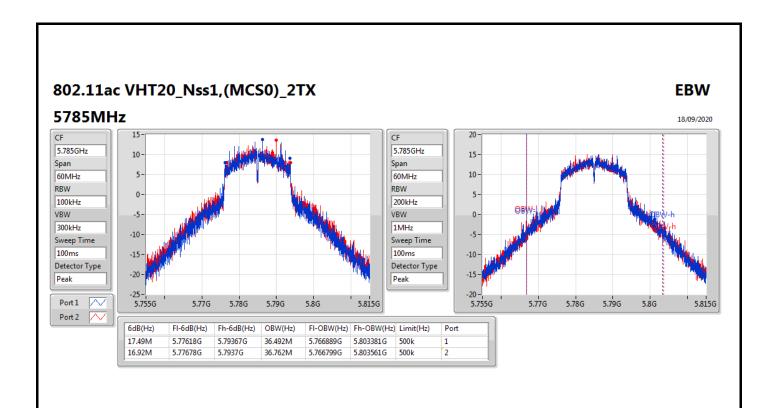


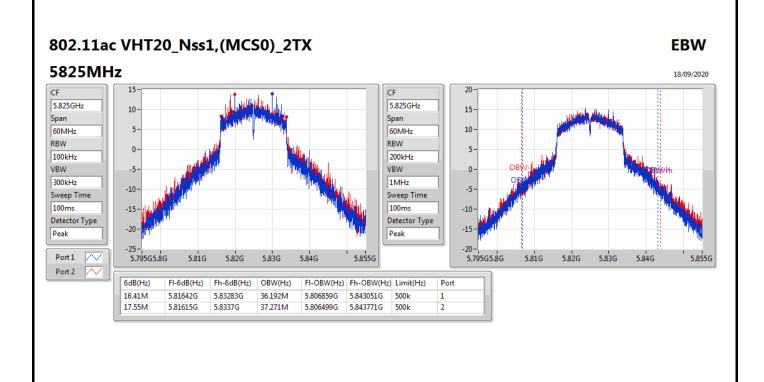


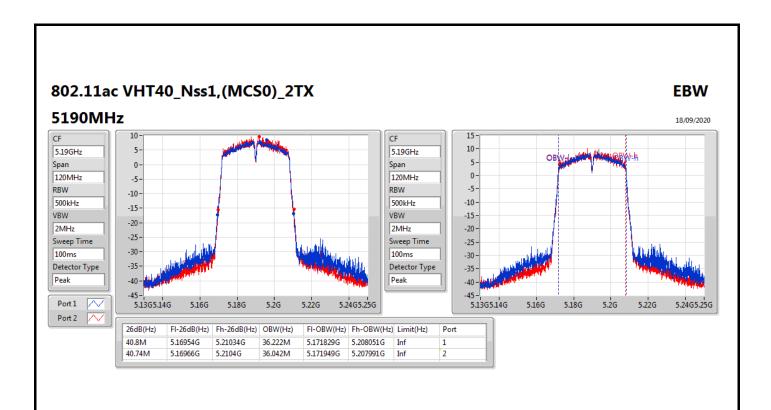


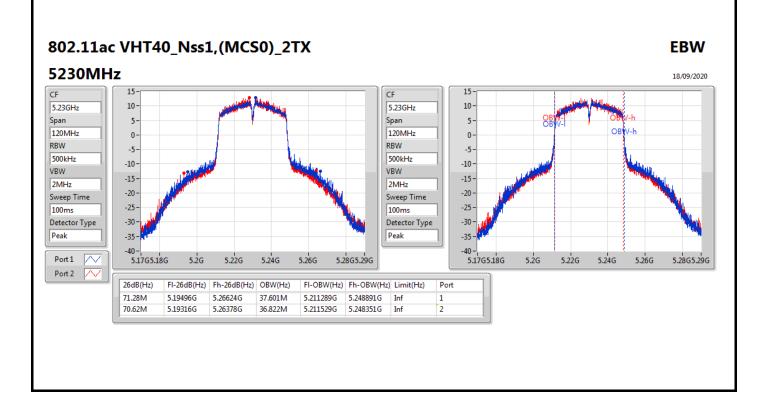


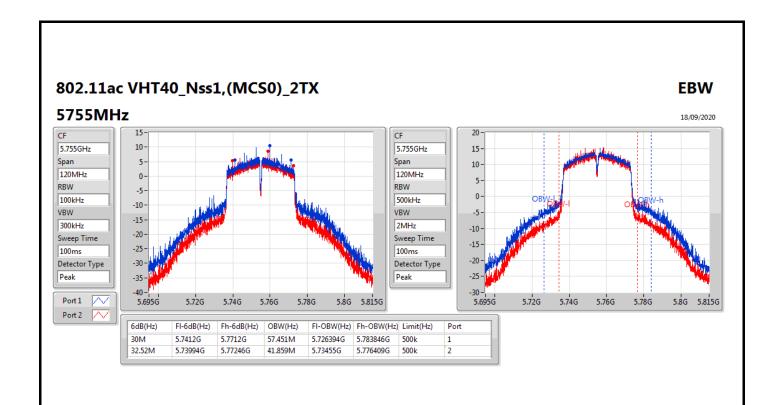


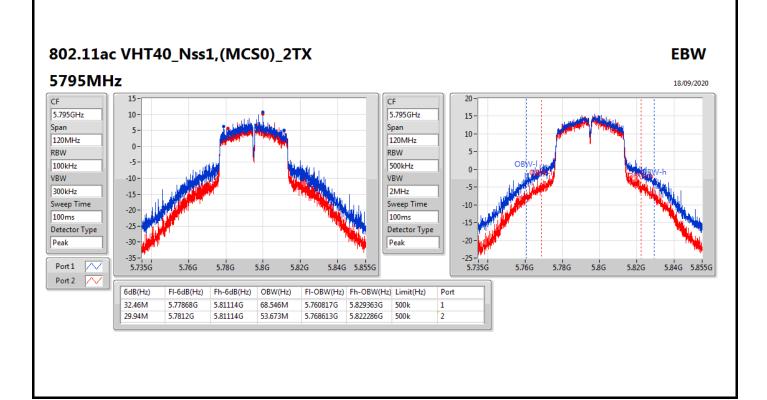


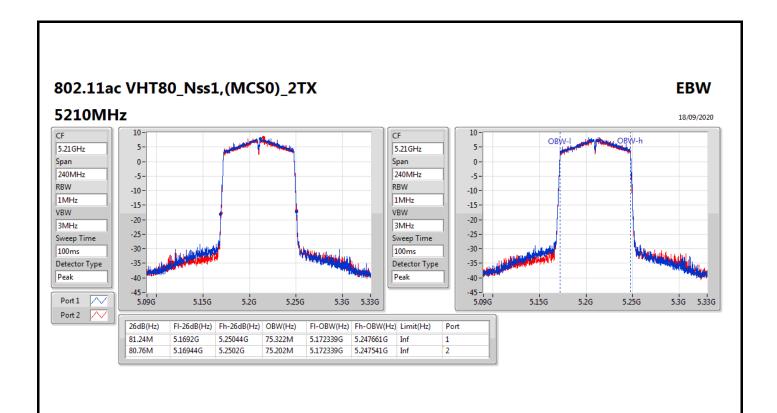


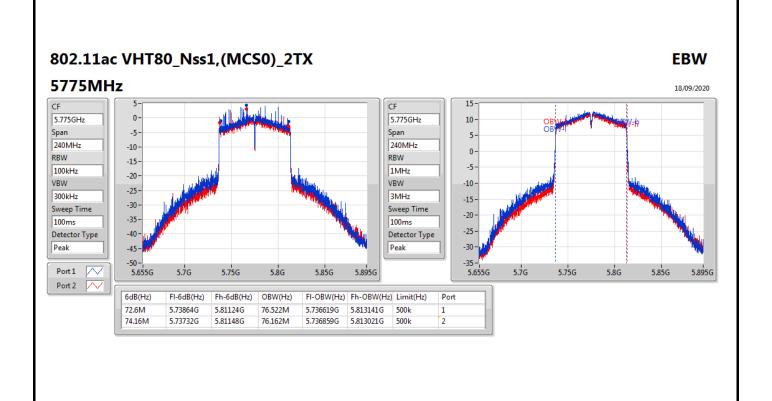
















Summary

Mode	Total Power	Total Power		
	(dBm)	(W)		
5.15-5.25GHz	-	-		
802.11a_Nss1,(6Mbps)_2TX	26.04	0.40179		
802.11ac VHT20_Nss1,(MCS0)_2TX	25.97	0.39537		
802.11ac VHT40_Nss1,(MCS0)_2TX	23.24	0.21086		
802.11ac VHT80_Nss1,(MCS0)_2TX	18.71	0.07430		
5.725-5.85GHz	-	-		
802.11a_Nss1,(6Mbps)_2TX	27.26	0.53211		
802.11ac VHT20_Nss1,(MCS0)_2TX	27.38	0.54702		
802.11ac VHT40_Nss1,(MCS0)_2TX	25.97	0.39537		
802.11ac VHT80_Nss1,(MCS0)_2TX	22.89	0.19454		



Result

Mode	Result	DG	Port 1	Port 2	Total Power	Power Limit	
		(dBi)	(dBm)	(dBm)	(dBm)	(dBm)	
802.11a_Nss1,(6Mbps)_2TX	-	-	-	-	-	-	
5180MHz	Pass	1.50	20.55	19.96	23.28	30.00	
5200MHz	Pass	1.50	23.29	22.76	26.04	30.00	
5240MHz	Pass	1.50	20.86	20.50	23.69	30.00	
5745MHz	Pass	1.50	24.09	24.38	27.25	30.00	
5785MHz	Pass	1.50	24.14	24.36	27.26	30.00	
5825MHz	Pass	1.50	24.05	24.35	27.21	30.00	
802.11ac VHT20_Nss1,(MCS0)_2TX	-	-	-	-	-	-	
5180MHz	Pass	1.50	19.43	18.86	22.16	30.00	
5200MHz	Pass	1.50	23.29	22.61	25.97	30.00	
5240MHz	Pass	1.50	20.49	19.85	23.19	30.00	
5745MHz	Pass	1.50	24.28	24.32	27.31	30.00	
5785MHz	Pass	1.50	24.34	24.40	27.38	30.00	
5825MHz	Pass	1.50	24.09	24.36	27.24	30.00	
802.11ac VHT40_Nss1,(MCS0)_2TX	-	-	-	-	-	-	
5190MHz	Pass	1.50	17.06	16.52	19.81	30.00	
5230MHz	Pass	1.50	20.59	19.83	23.24	30.00	
5755MHz	Pass	1.50	22.80	21.67	25.28	30.00	
5795MHz	Pass	1.50	23.53	22.30	25.97	30.00	
802.11ac VHT80_Nss1,(MCS0)_2TX	-	-	-	-	-	-	
5210MHz	Pass	1.50	15.84	15.55	18.71	30.00	
5775MHz	Pass	1.50	20.29	19.43	22.89	30.00	

DG = Directional Gain; **Port X** = Port X output power

Summary

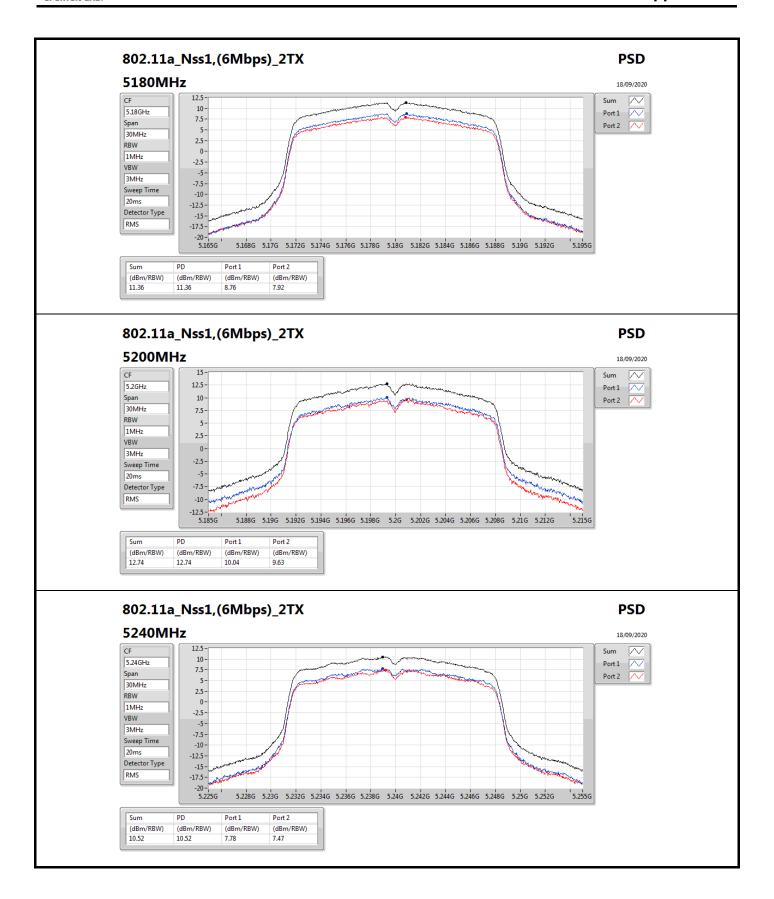
Mode	PD				
	(dBm/RBW)				
5.15-5.25GHz	-				
802.11a_Nss1,(6Mbps)_2TX	12.74				
802.11ac VHT20_Nss1,(MCS0)_2TX	13.47				
802.11ac VHT40_Nss1,(MCS0)_2TX	8.28				
802.11ac VHT80_Nss1,(MCS0)_2TX	-0.84				
5.725-5.85GHz	-				
802.11a_Nss1,(6Mbps)_2TX	12.51				
802.11ac VHT20_Nss1,(MCS0)_2TX	11.89				
802.11ac VHT40_Nss1,(MCS0)_2TX	8.90				
802.11ac VHT80_Nss1,(MCS0)_2TX	1.83				

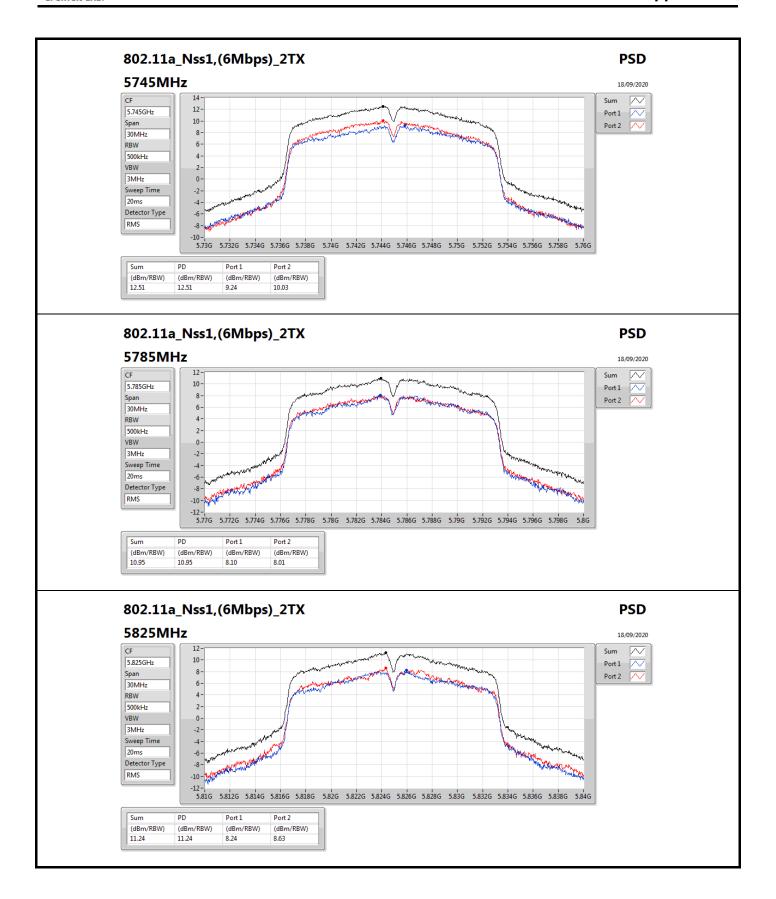
RBW = 500 kHz for 5.725-5.85GHz band / 1MHz for other band;

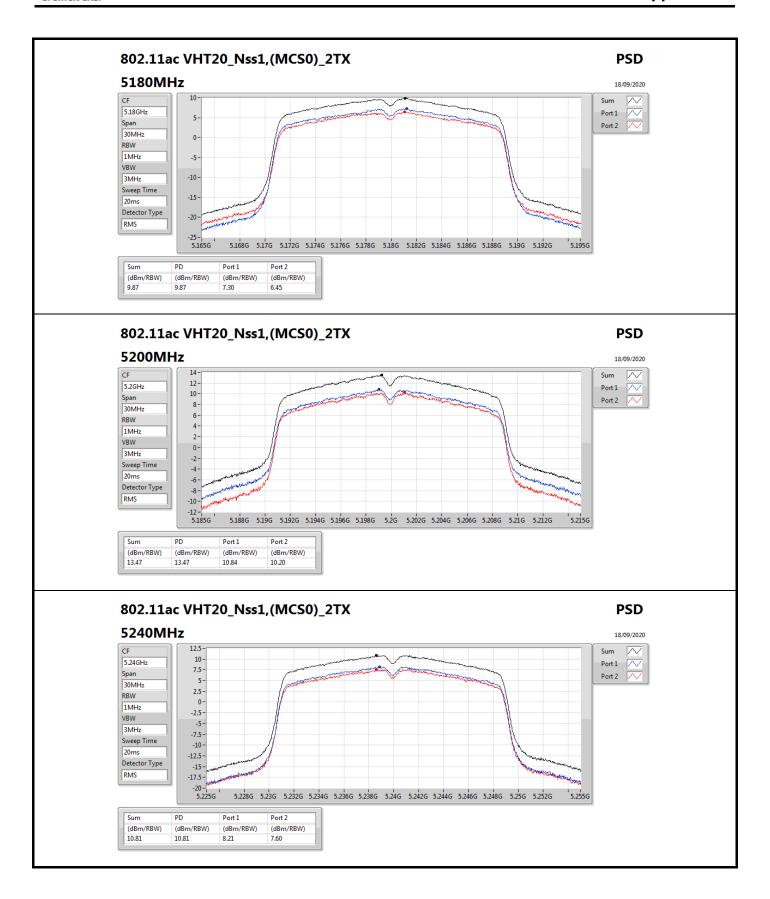
Result

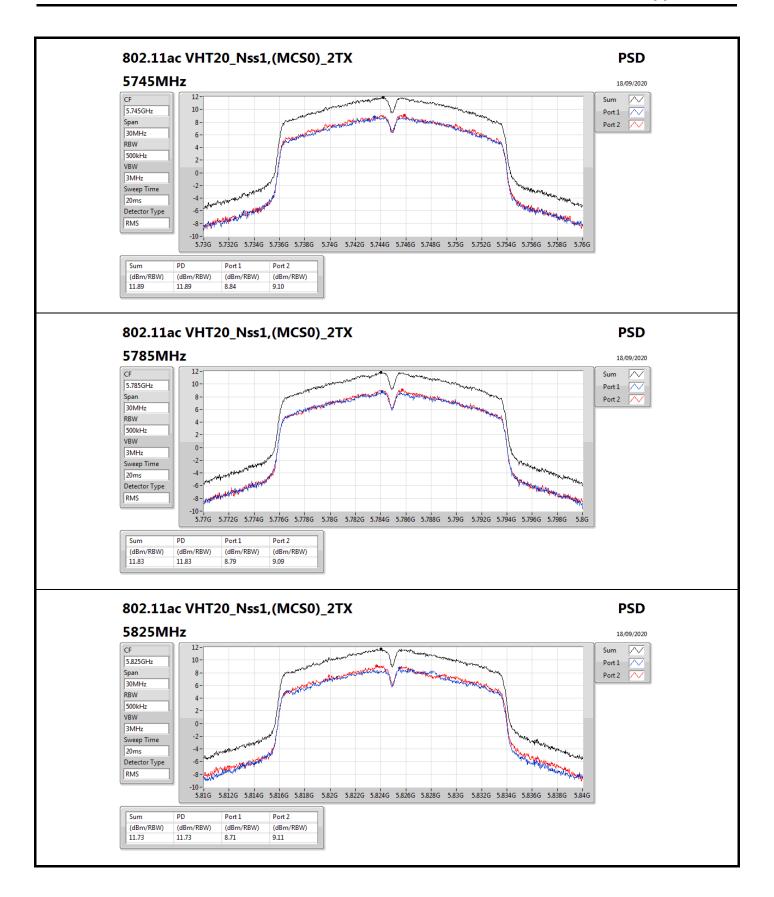
Mode	Result	DG	Port 1	Port 2	PD	PD Limit	
		(dBi)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	
802.11a_Nss1,(6Mbps)_2TX	-	-	-	-	-	-	
5180MHz	Pass	4.51	8.76	7.92	11.36	17.00	
5200MHz	Pass	4.51	10.04	9.63	12.74	17.00	
5240MHz	Pass	4.51	7.78	7.47	10.52	17.00	
5745MHz	Pass	4.51	9.24	10.03	12.51	30.00	
5785MHz	Pass	4.51	8.10	8.01	10.95	30.00	
5825MHz	Pass	4.51	8.24	8.63	11.24	30.00	
802.11ac VHT20_Nss1,(MCS0)_2TX	-	-	-	-	-	-	
5180MHz	Pass	4.51	7.30	6.45	9.87	17.00	
5200MHz	Pass	4.51	10.84	10.20	13.47	17.00	
5240MHz	Pass	4.51	8.21	7.60	10.81	17.00	
5745MHz	Pass	4.51	8.84	9.10	11.89	30.00	
5785MHz	Pass	4.51	8.79	9.09	11.83	30.00	
5825MHz	Pass	4.51	8.71	9.11	11.73	30.00	
802.11ac VHT40_Nss1,(MCS0)_2TX	-	-	-	-	-	-	
5190MHz	Pass	4.51	2.24	1.78	5.01	17.00	
5230MHz	Pass	4.51	5.73	4.96	8.28	17.00	
5755MHz	Pass	4.51	6.31	5.48	8.90	30.00	
5795MHz	Pass	4.51	5.97	4.45	8.23	30.00	
802.11ac VHT80_Nss1,(MCS0)_2TX	-	-	-	-	-	-	
5210MHz	Pass	4.51	-3.46	-4.04	-0.84	17.00	
5775MHz	Pass	4.51	-0.55	-1.62	1.83	30.00	

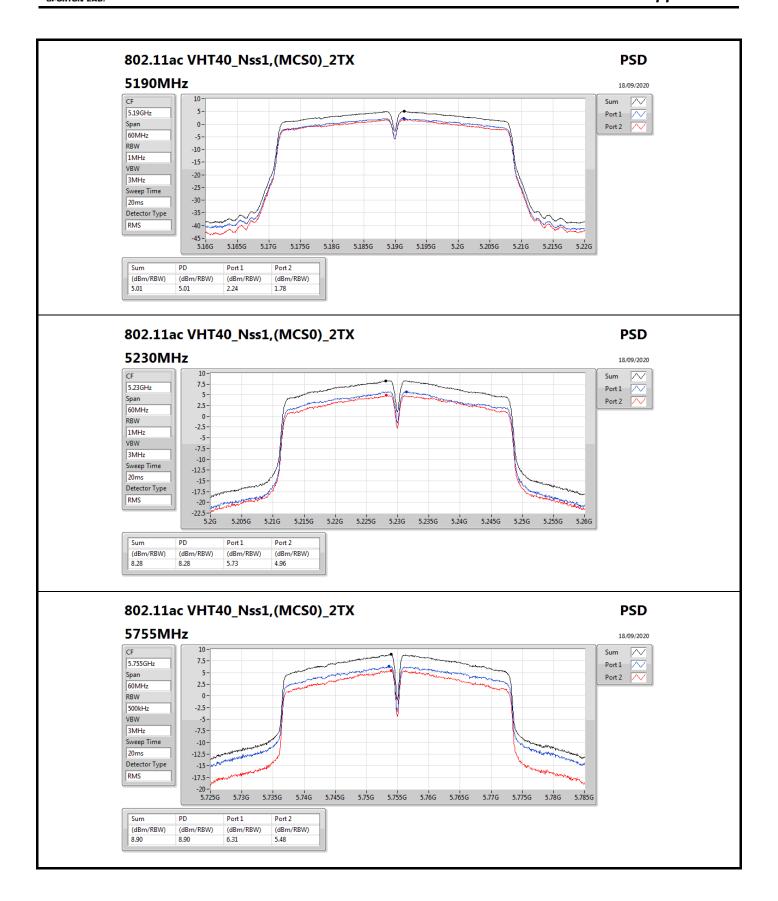
DG = Directional Gain; RBW = 500 kHz for 5.725-5.85GHz band / 1MHz for other band;
PD = trace bin-by-bin of each transmits port summing can be performed maximum power density; Port X = Port X power density;

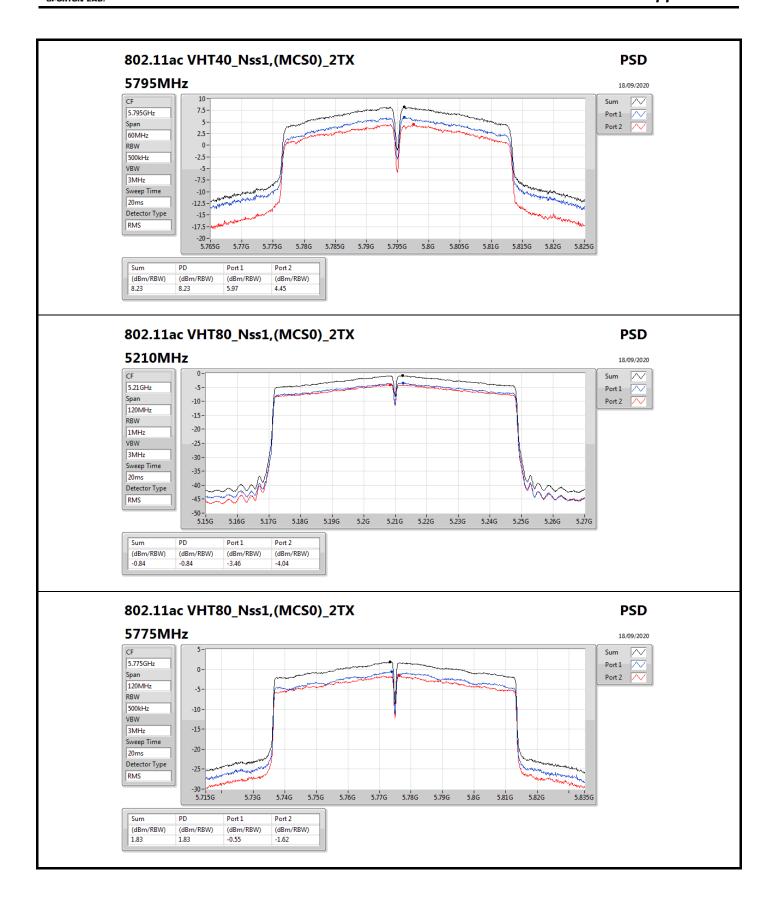














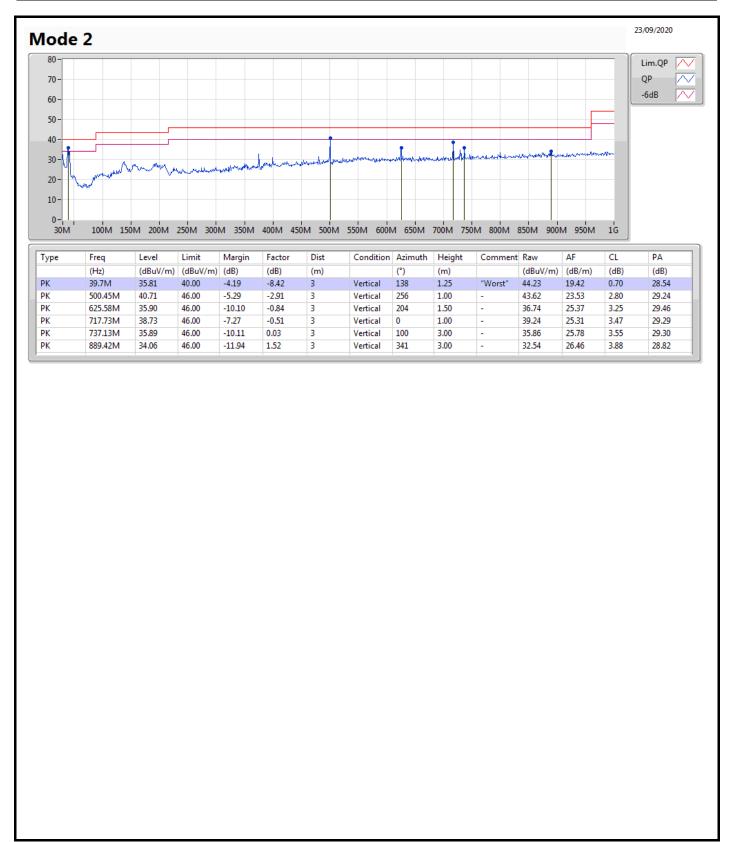
Radiated Emissions below 1GHz

Appendix E.1

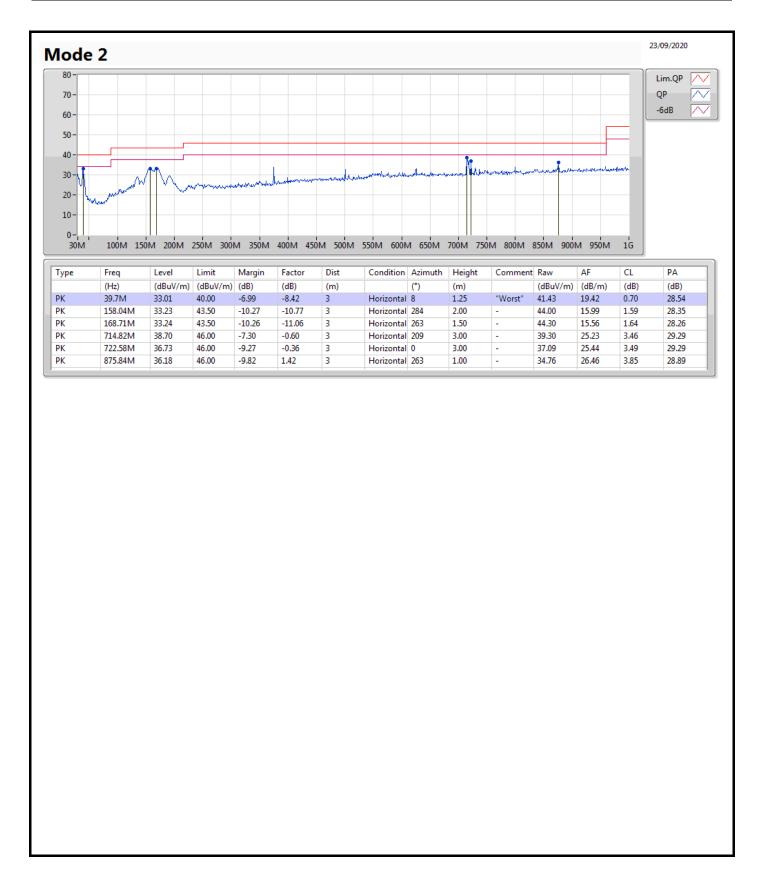
Summary

Mode	Result	Туре	Freq	Level	Limit	Margin	Condition
			(Hz)	(dBuV/m) (dBuV/m)		(dB)	
Mode 2	Pass	PK	39.7M	35.81	40.00	-4.19	Vertical











RSE TX above 1GHz

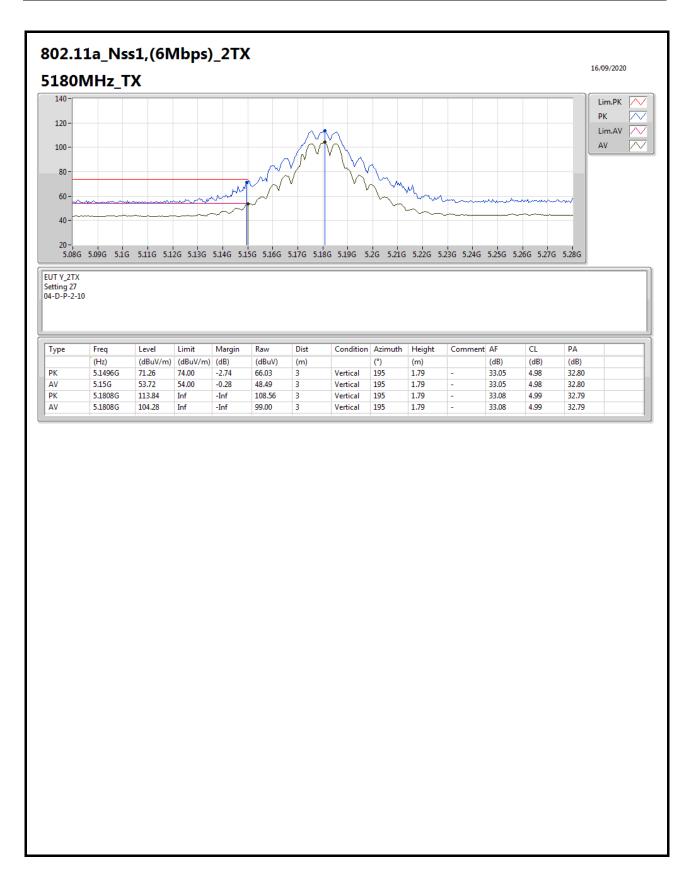
Appendix E.2

Page No. : 1 of 73

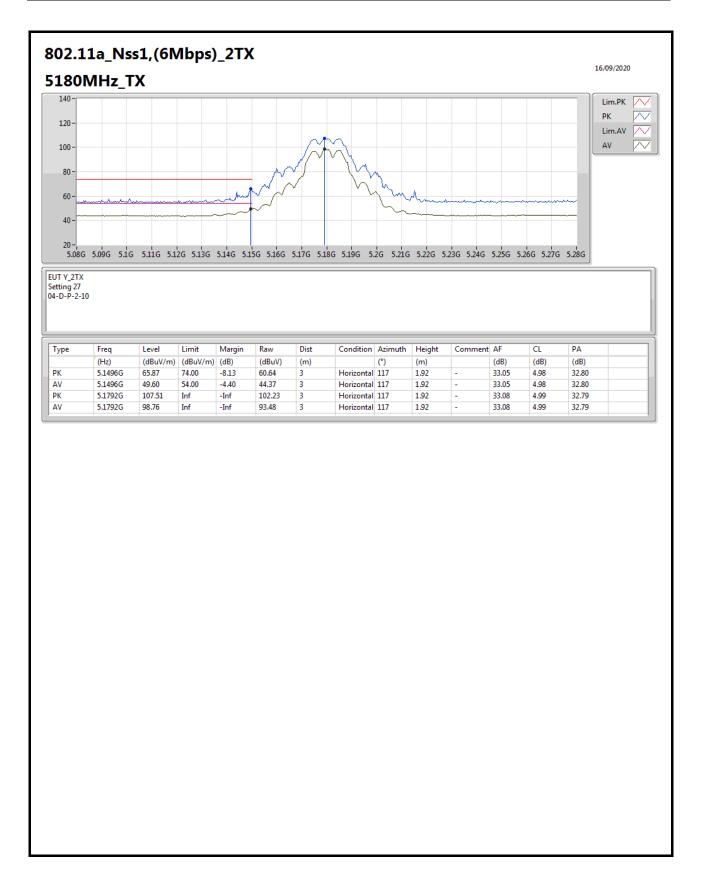
Summary

Mode	Result	Туре	Freq	Level	Limit	Margin	Dist	Condition	Azimuth	Height	Comments
			(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(m)		(°)	(m)	
5.15-5.25GHz	-	-	•	-	-	-	-	-	-	-	-
802.11ac VHT20_Nss1,(MCS0)_2TX	Pass	AV	5.1492G	53.97	54.00	-0.03	3	Vertical	309	2.62	-



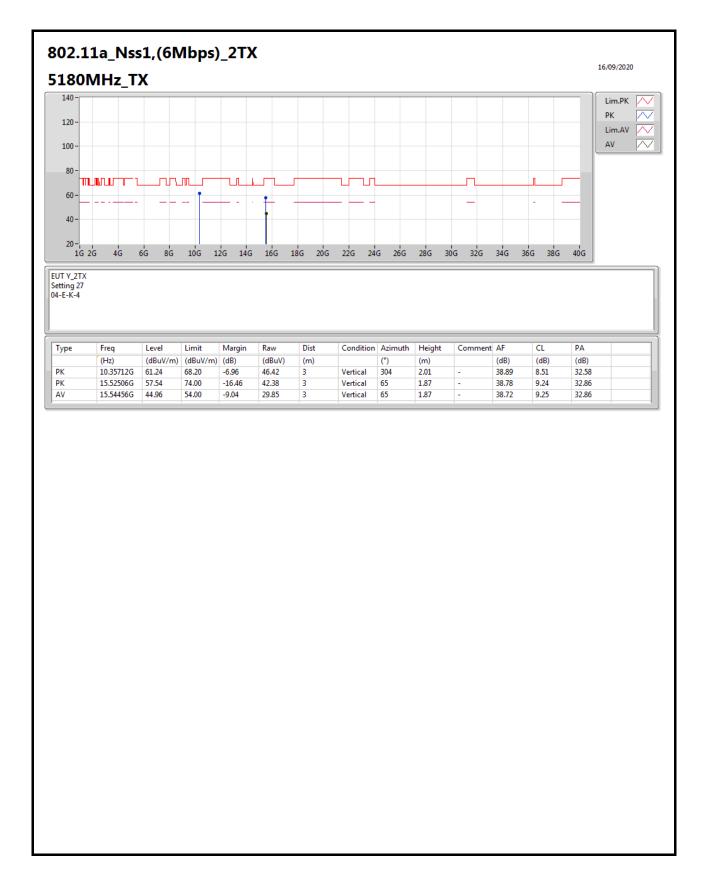




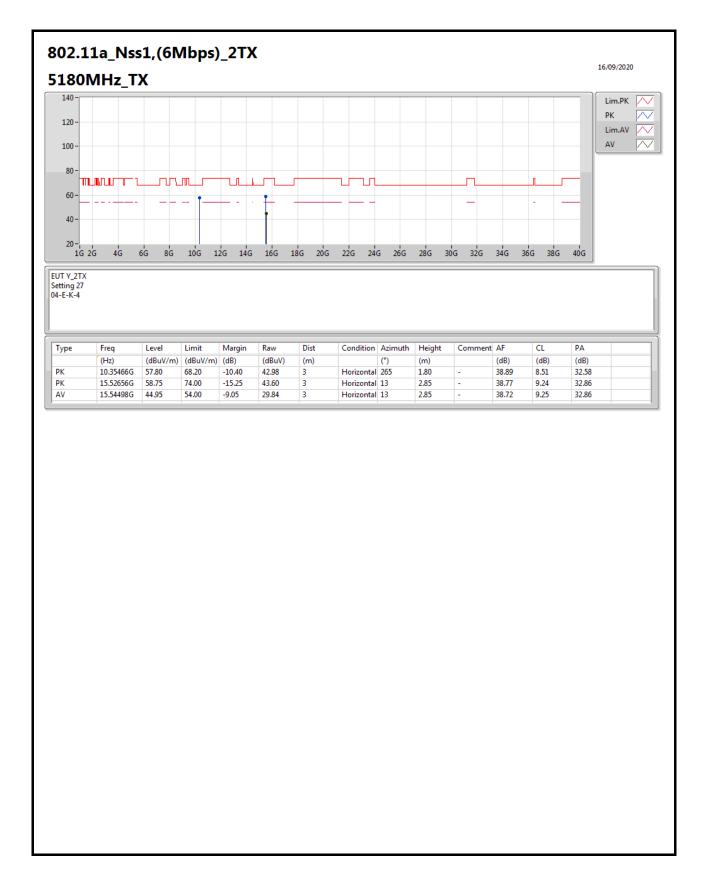


Page No. : 4 of 73



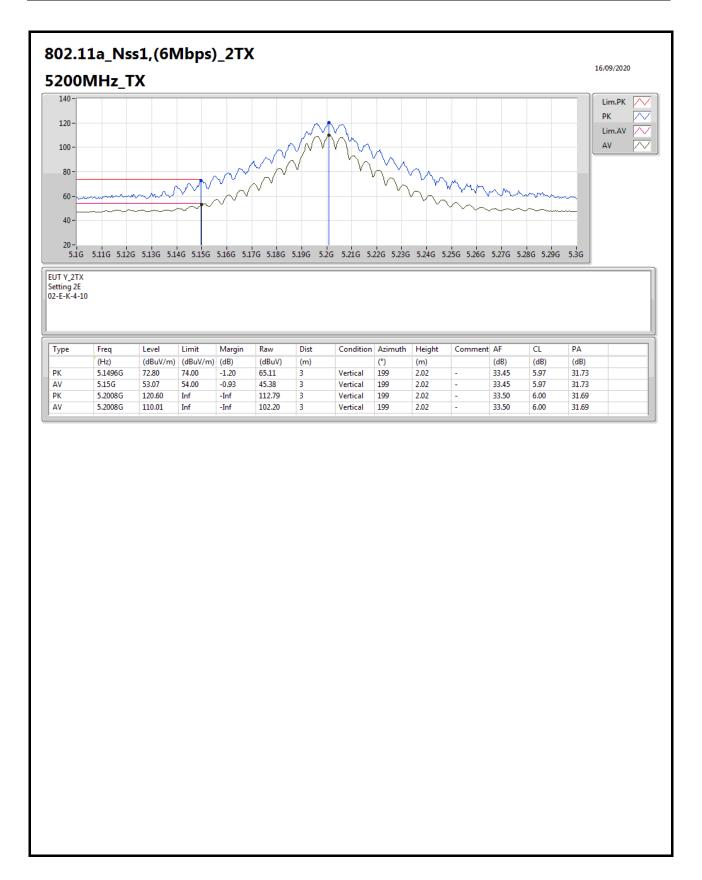




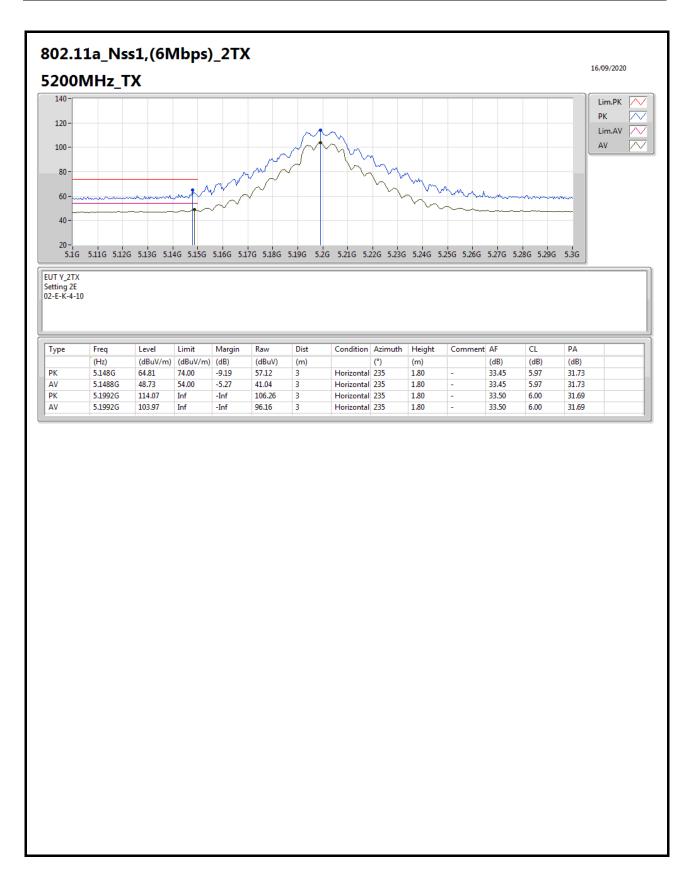


Page No. : 6 of 73

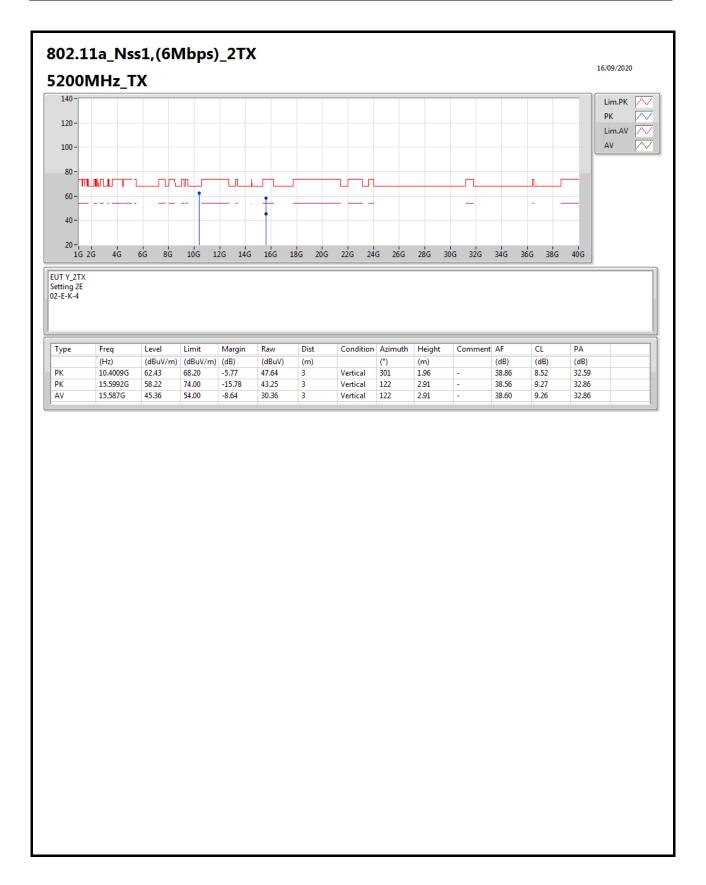




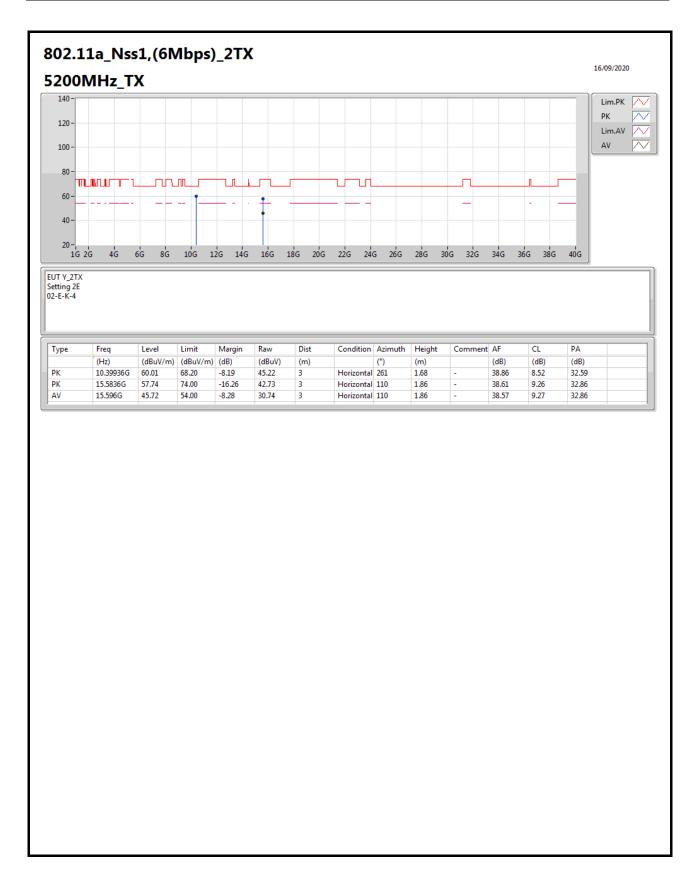




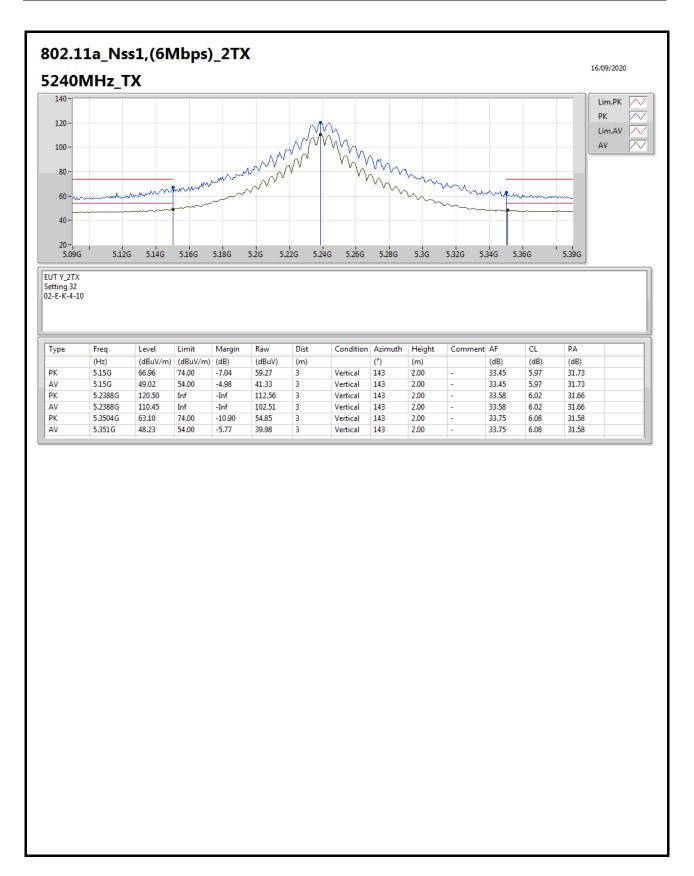




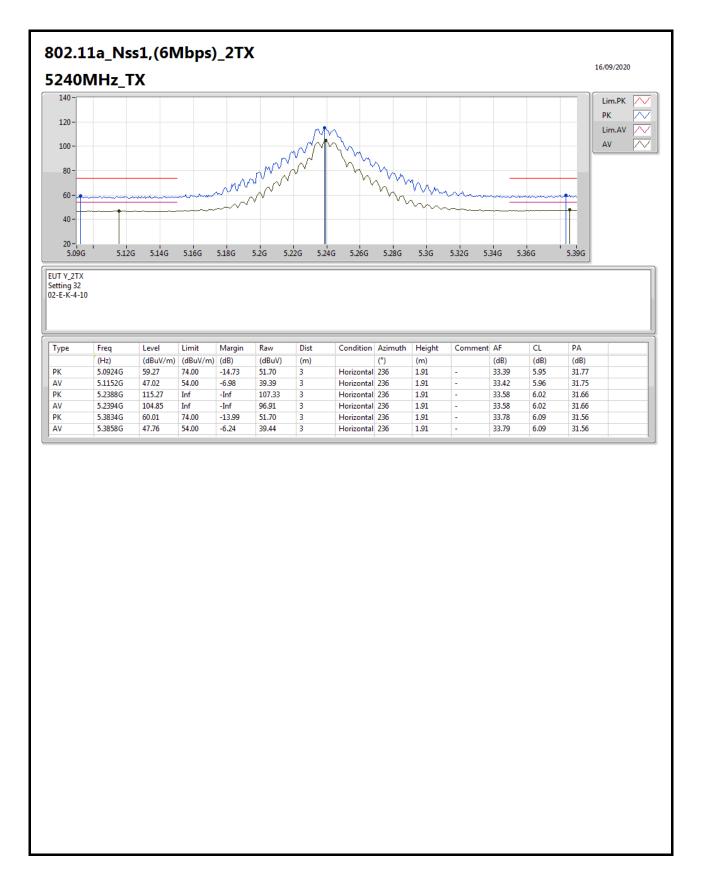




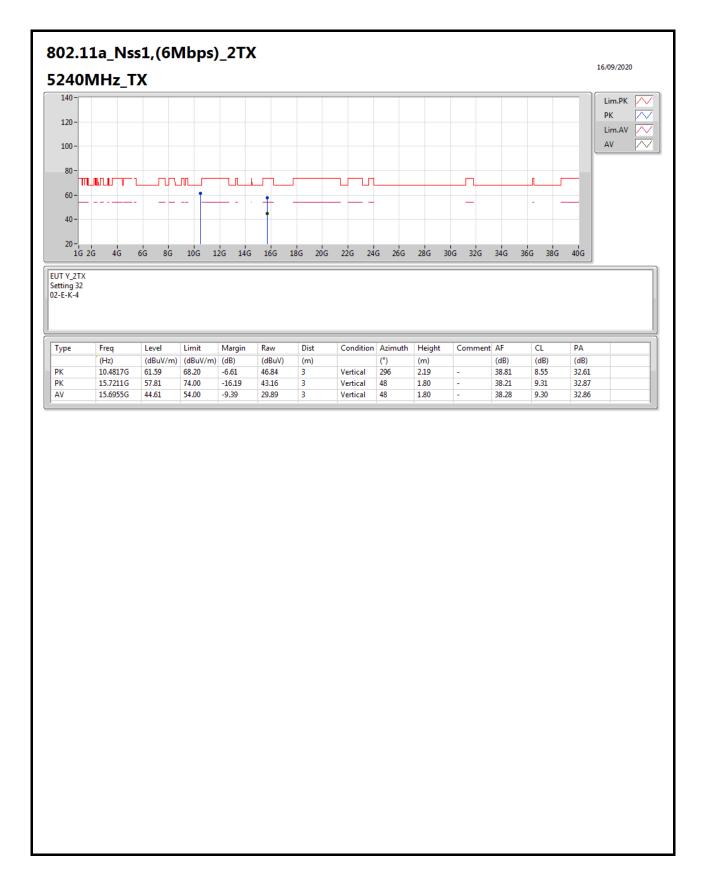




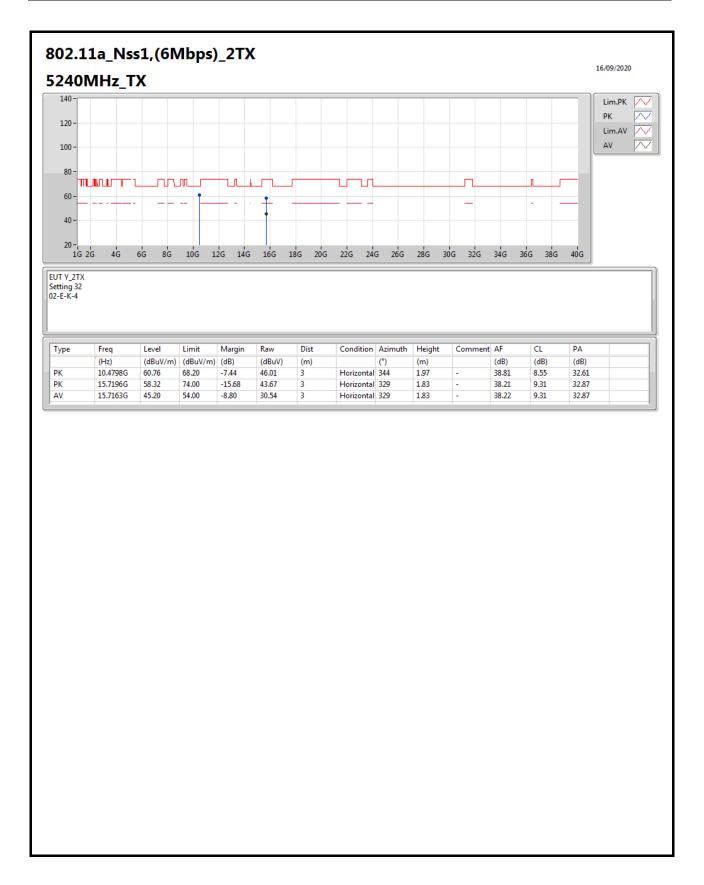




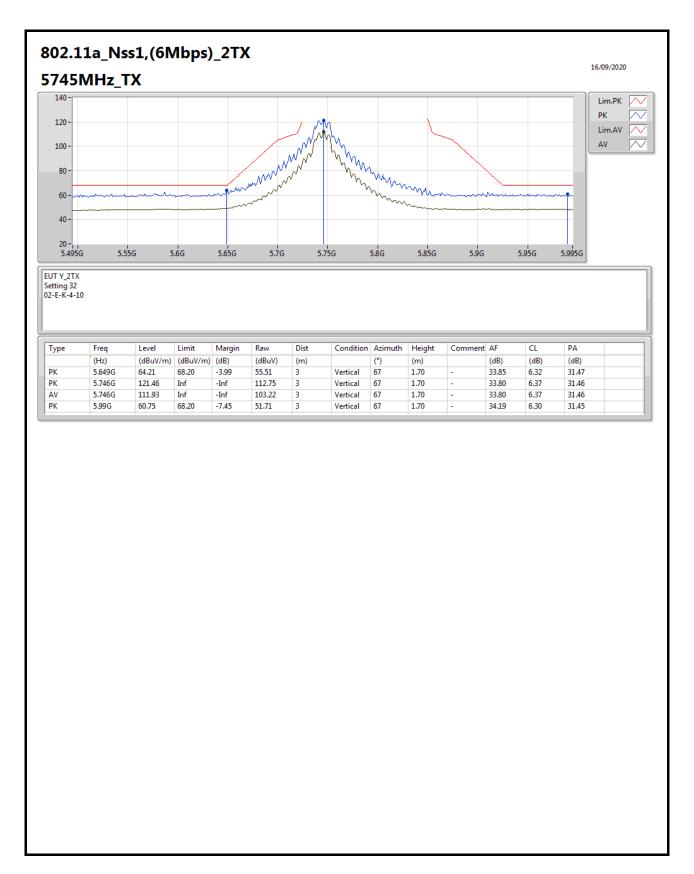




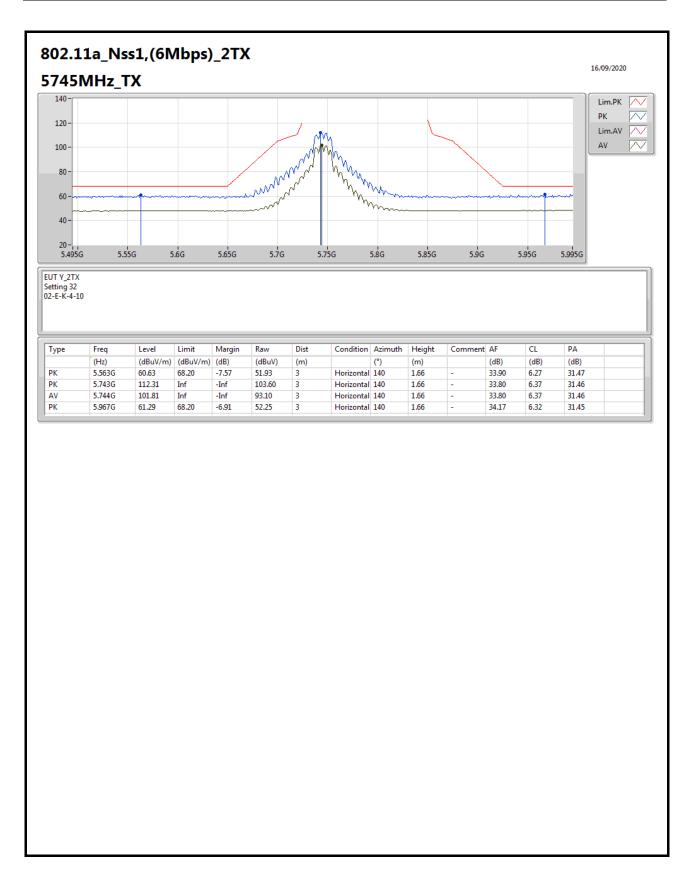






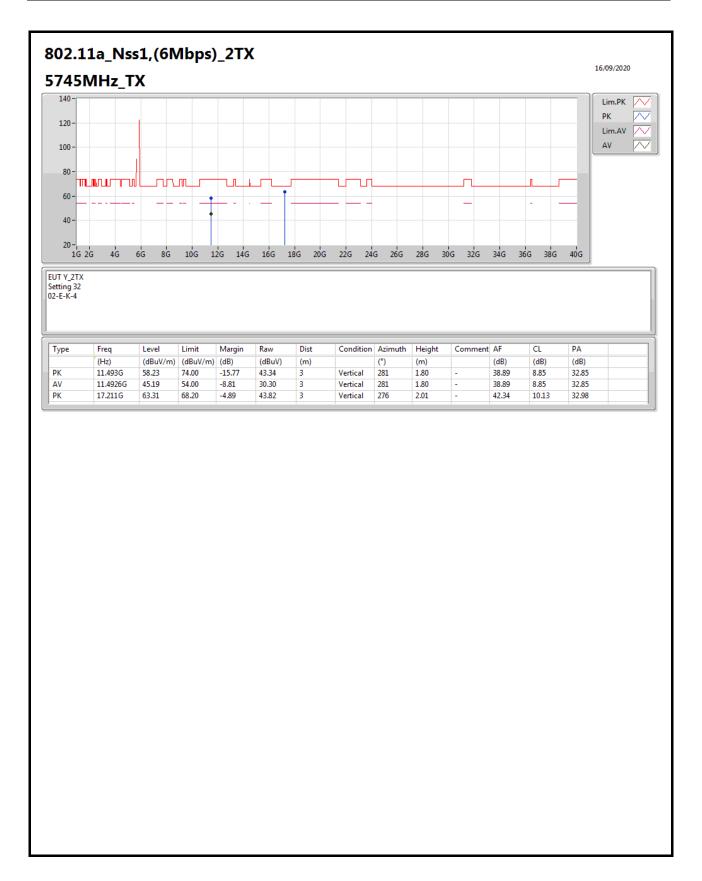






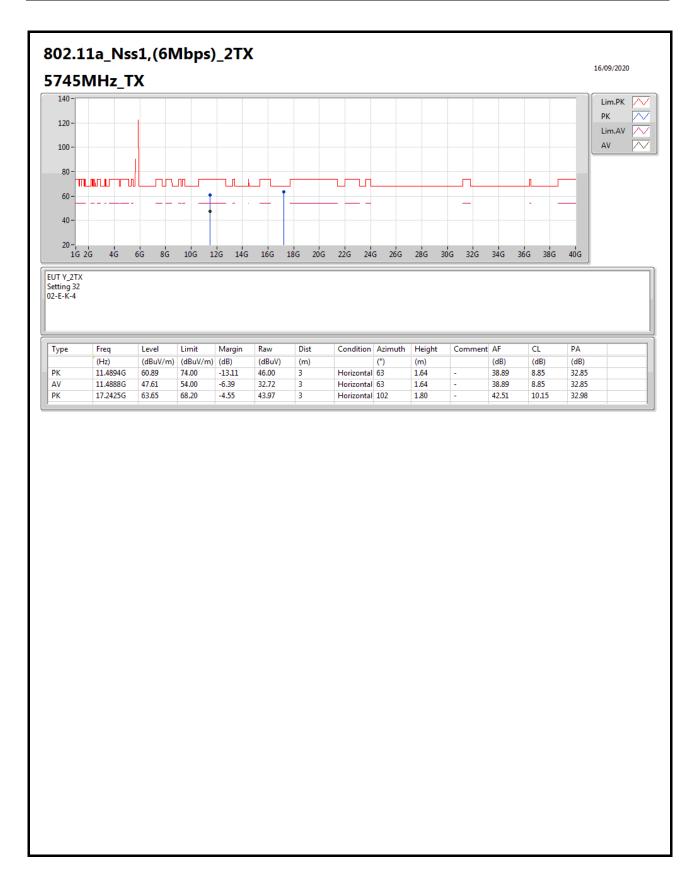
Page No. : 16 of 73



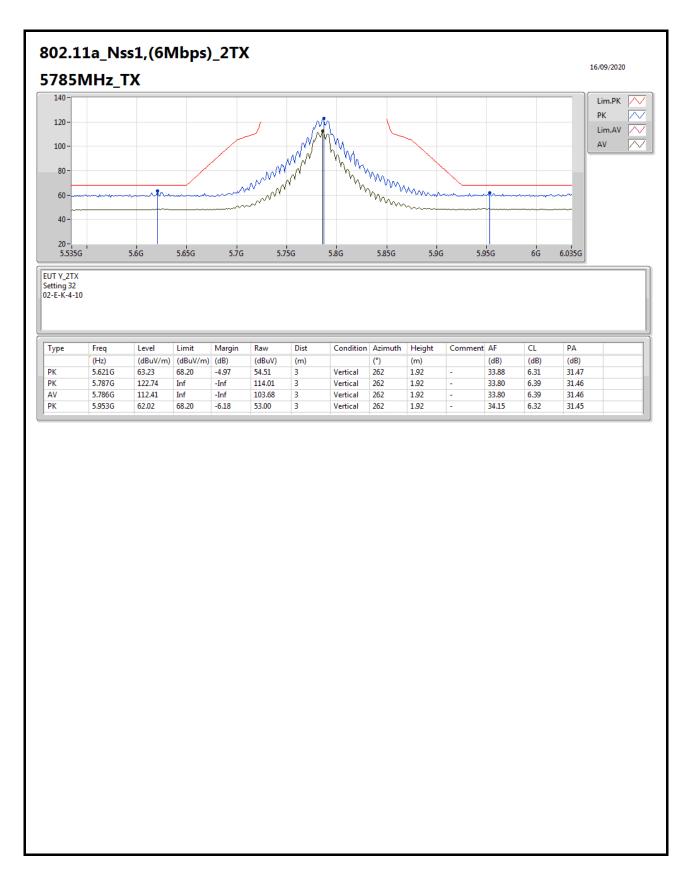


Page No. : 17 of 73



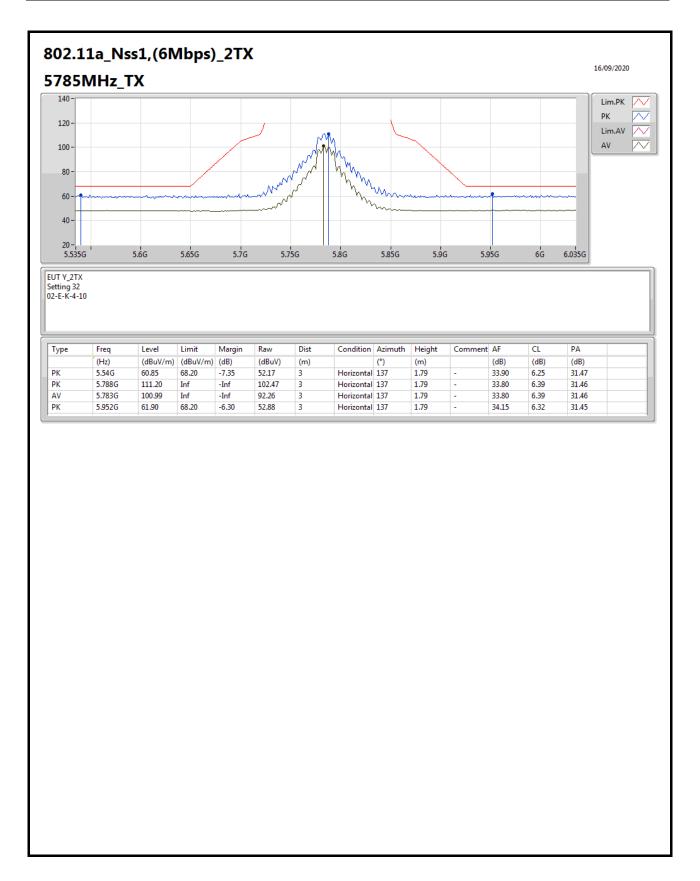




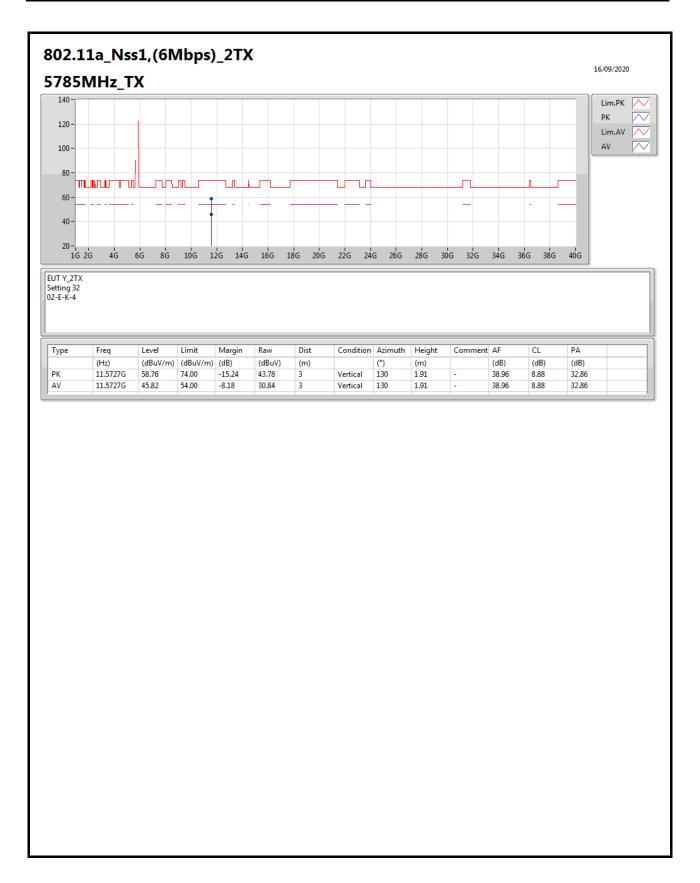


Page No. : 19 of 73

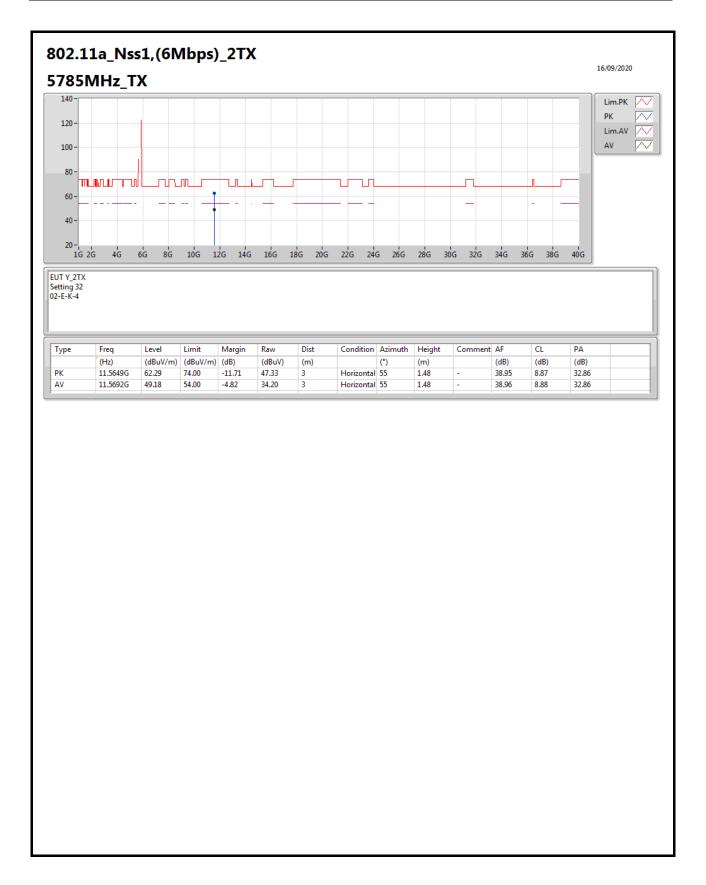




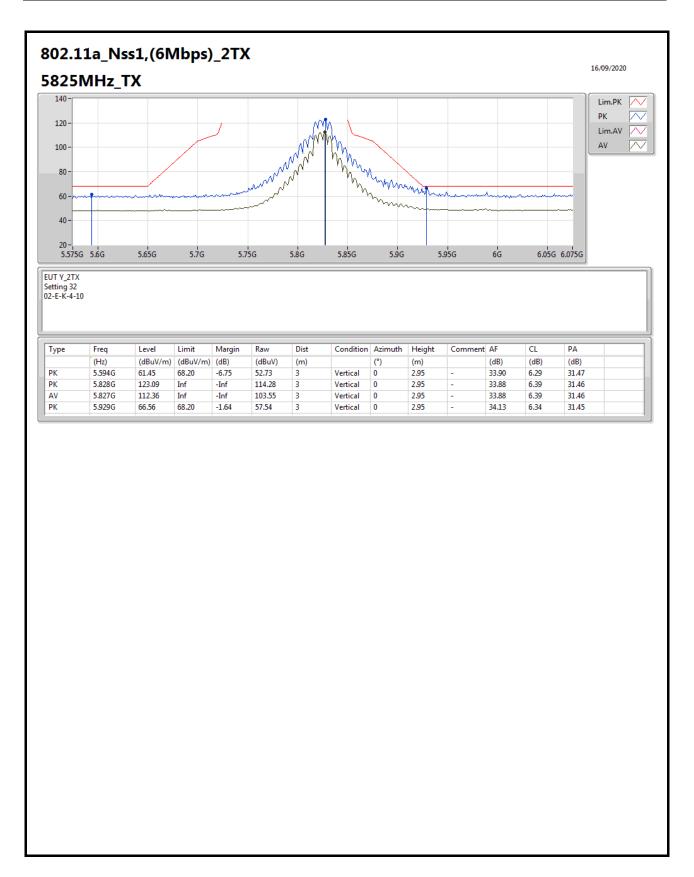






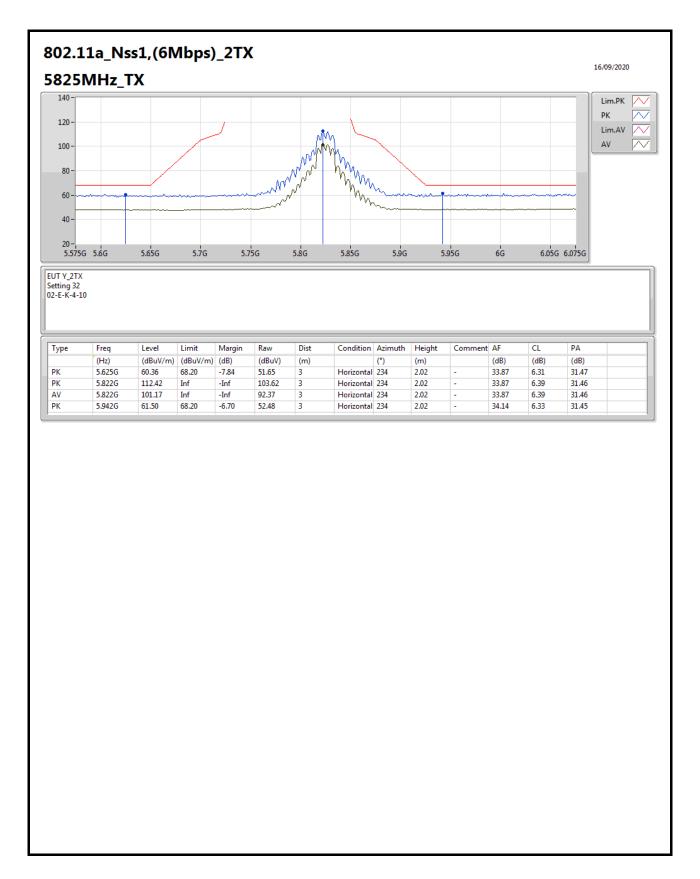




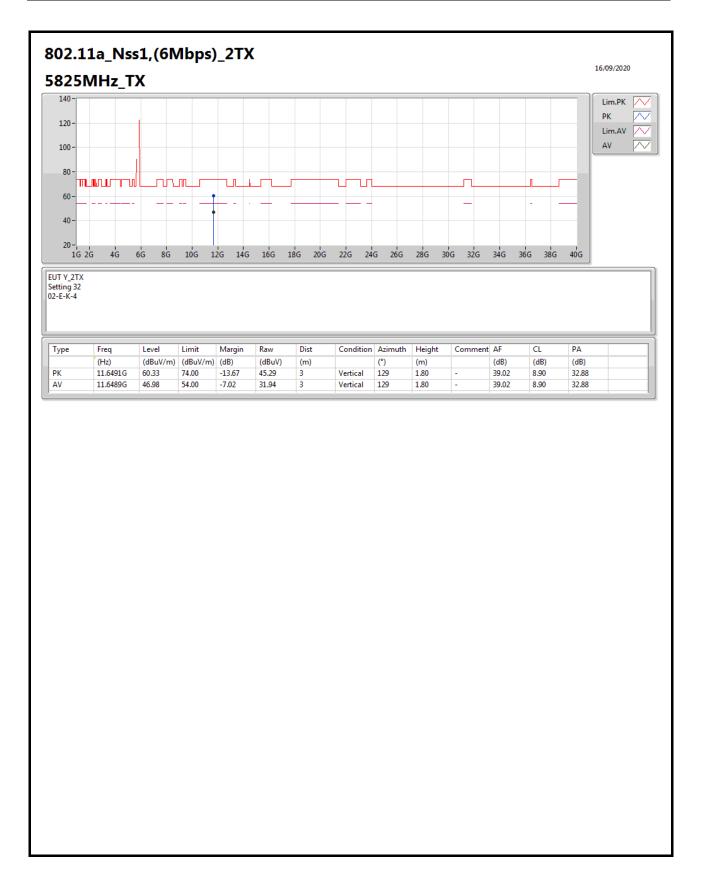


Page No. : 23 of 73

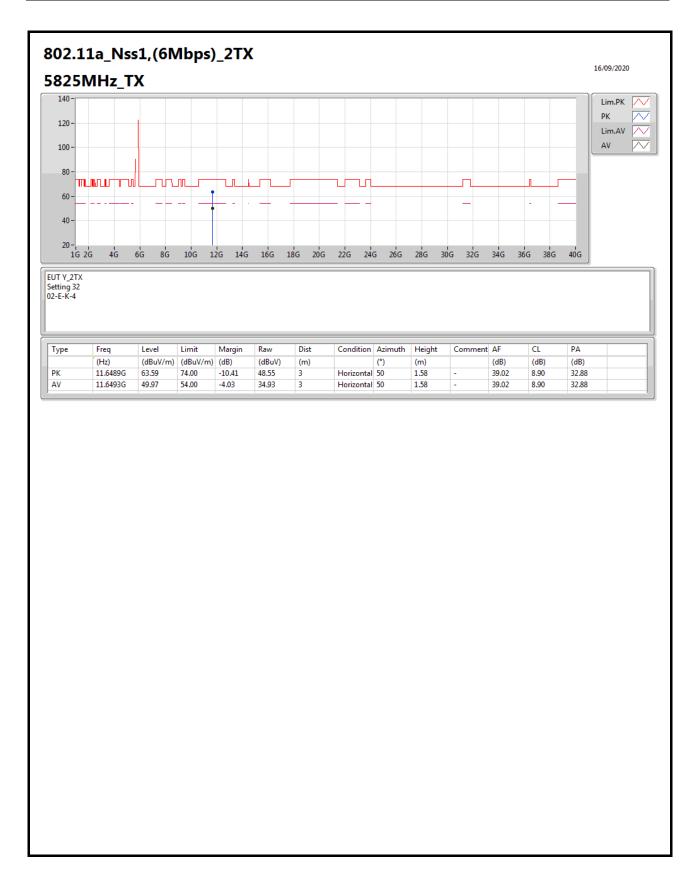




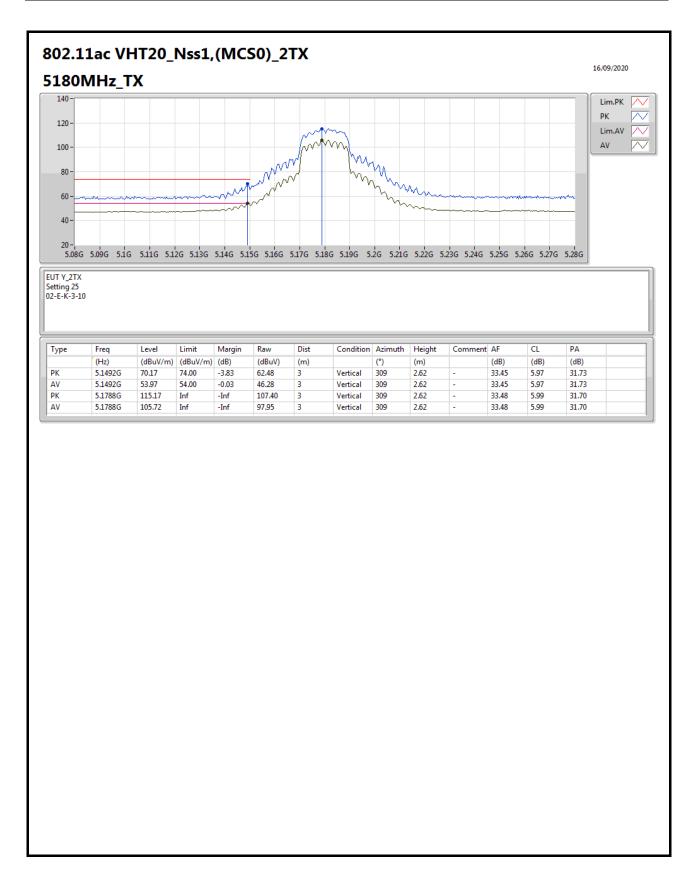




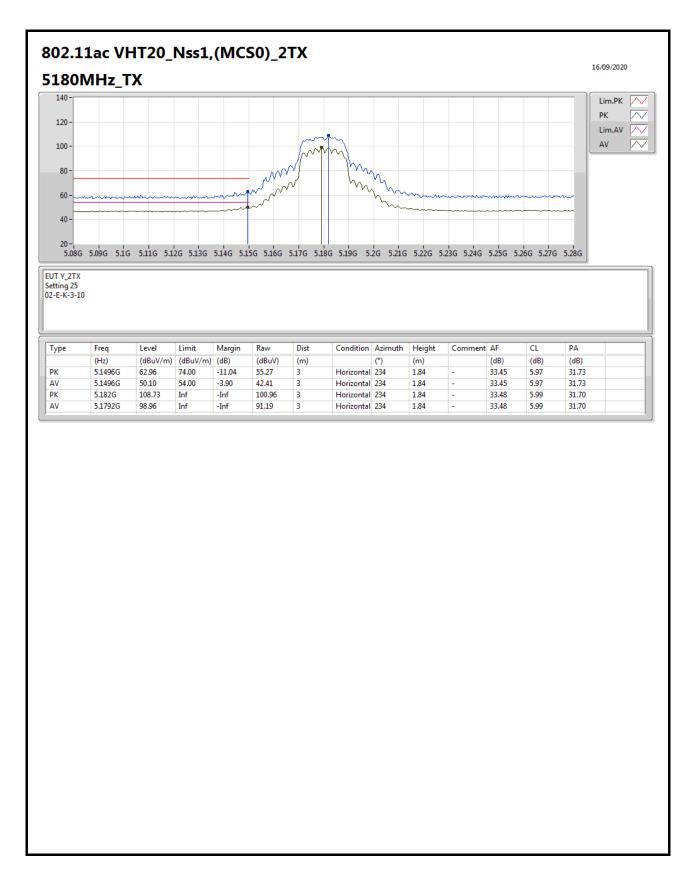




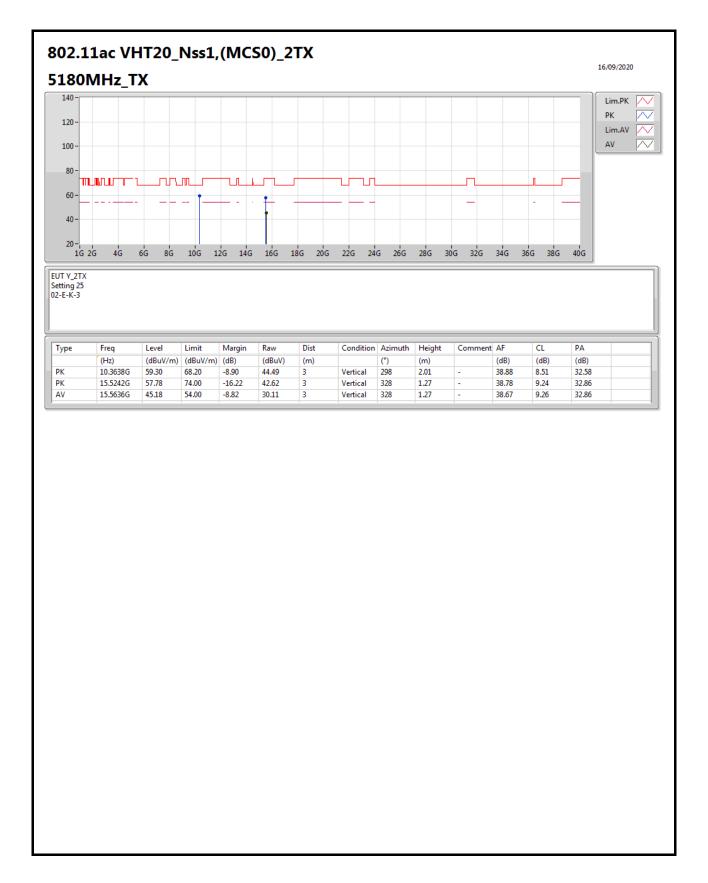




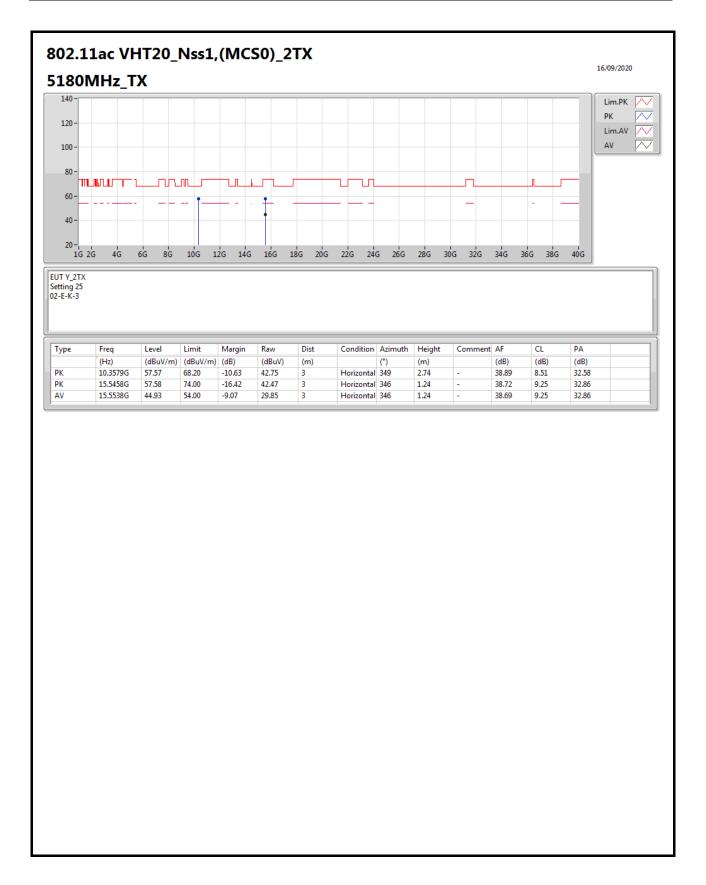




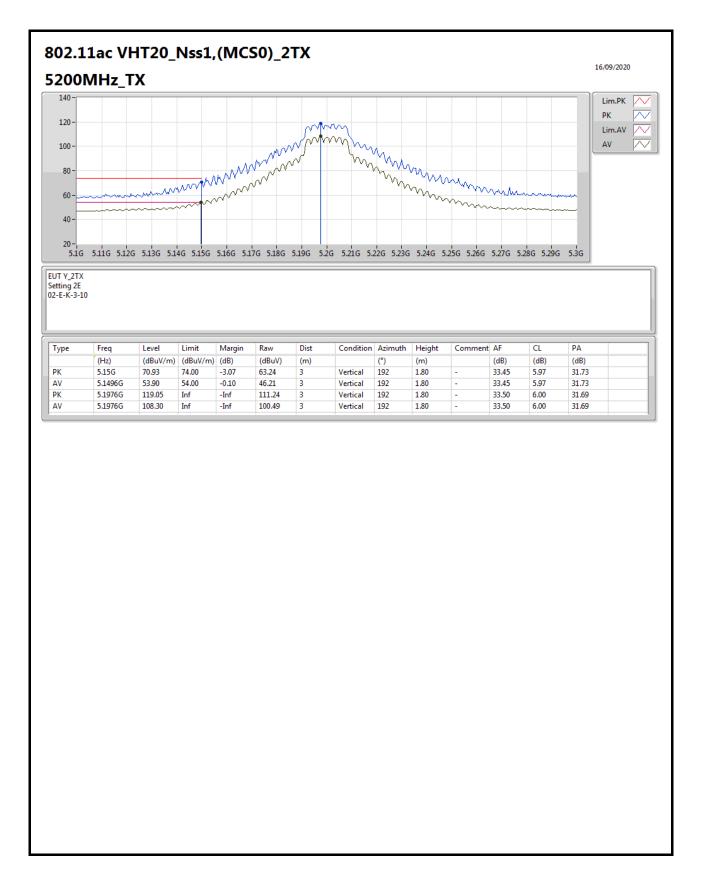




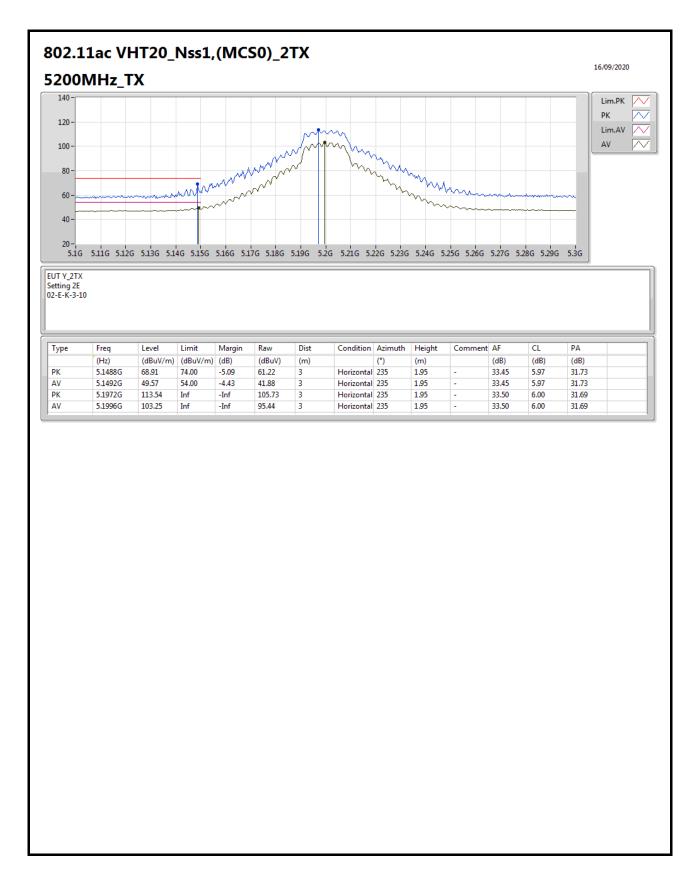




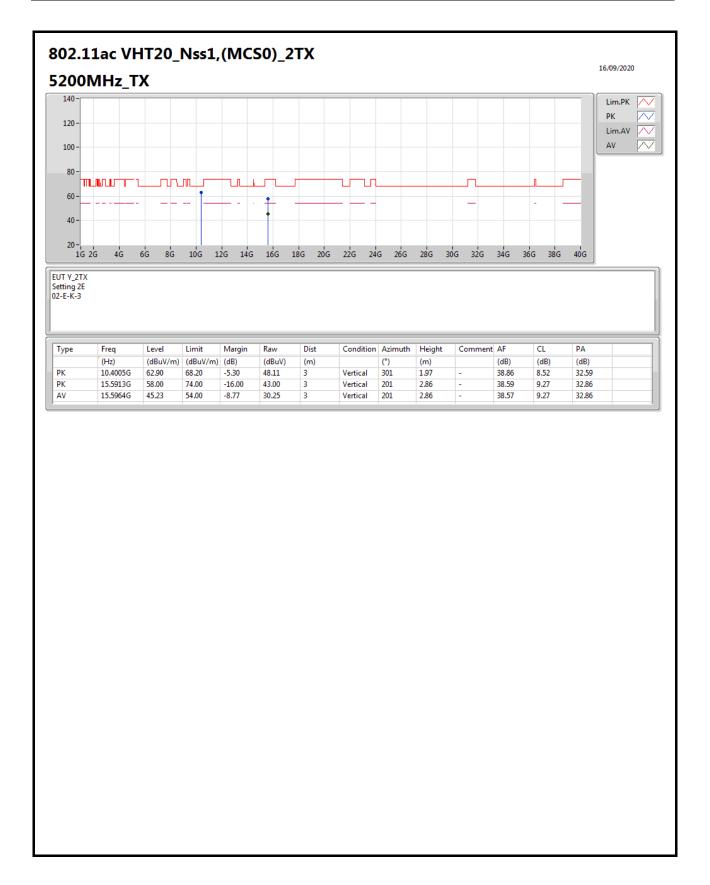




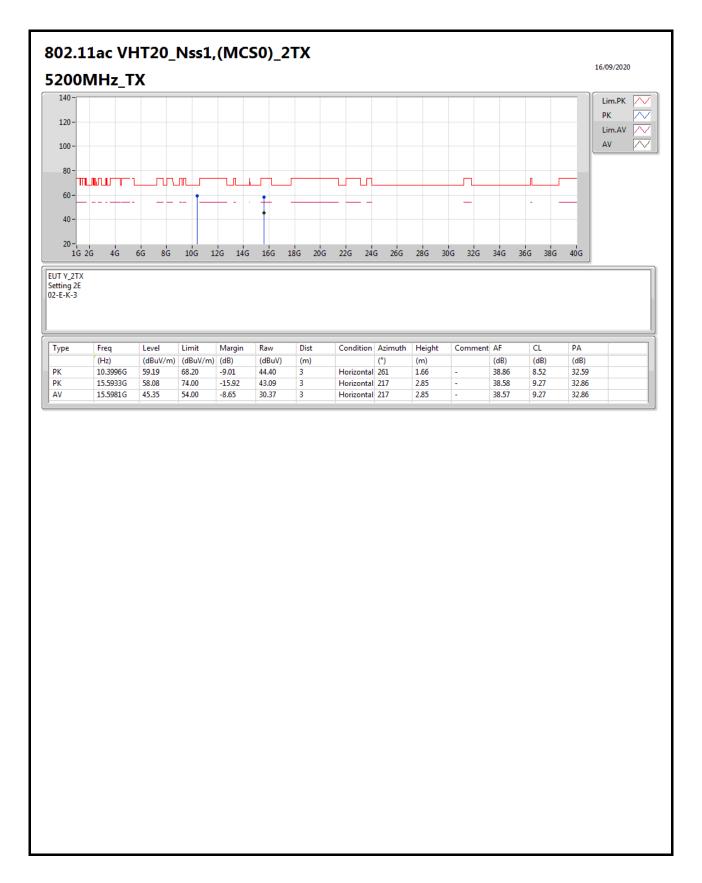




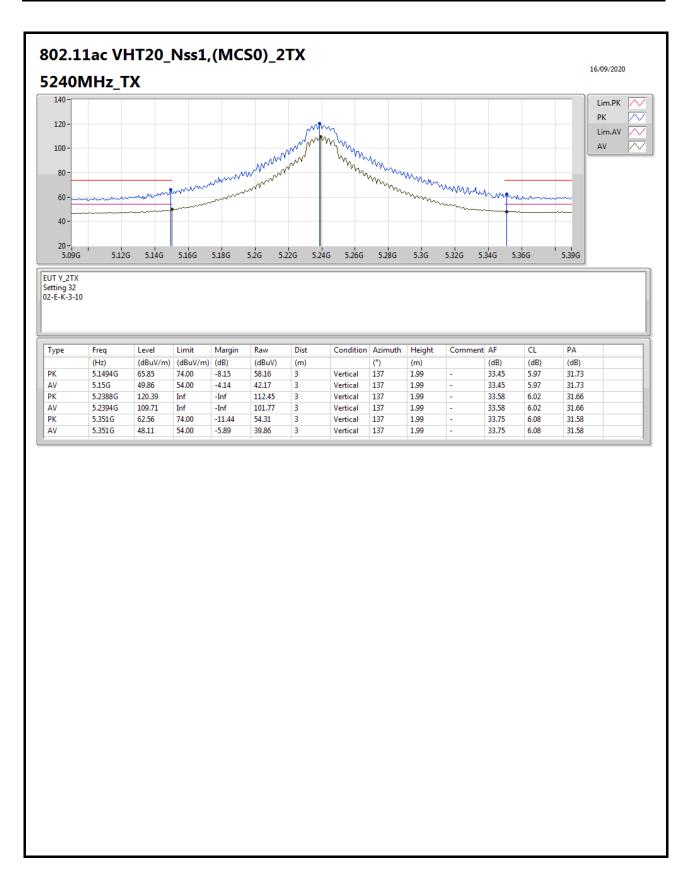




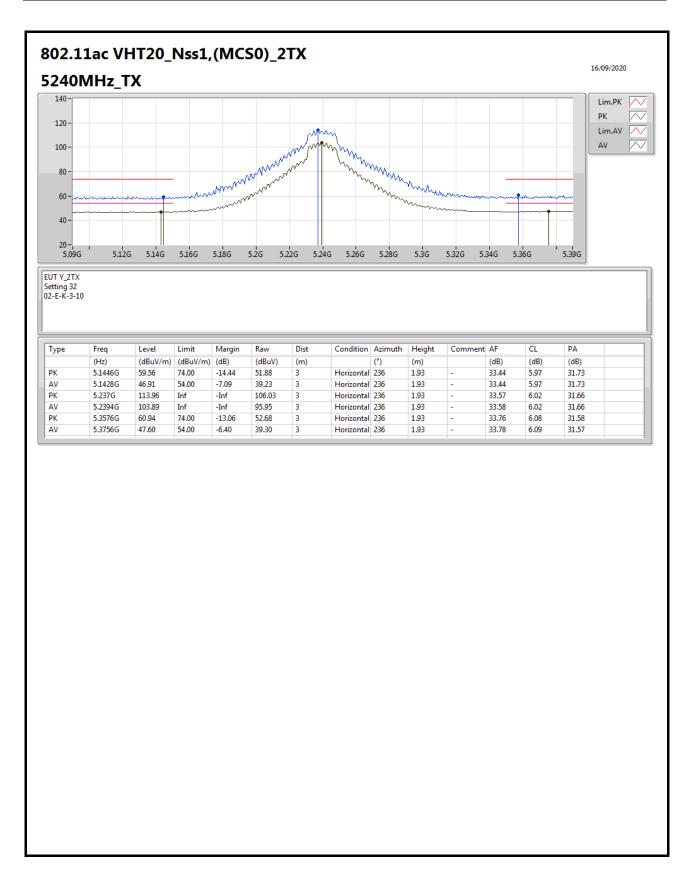




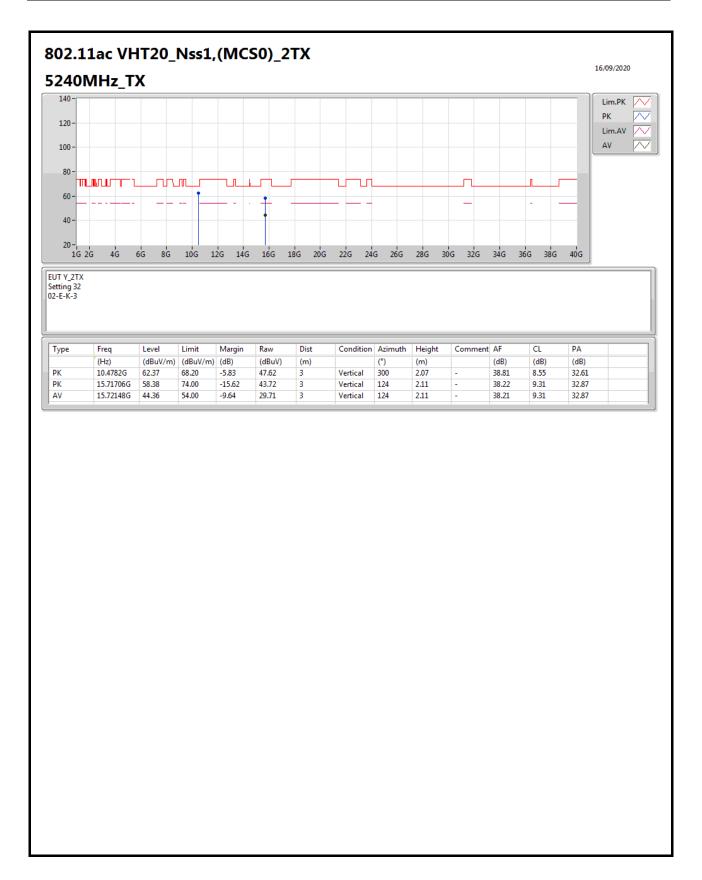




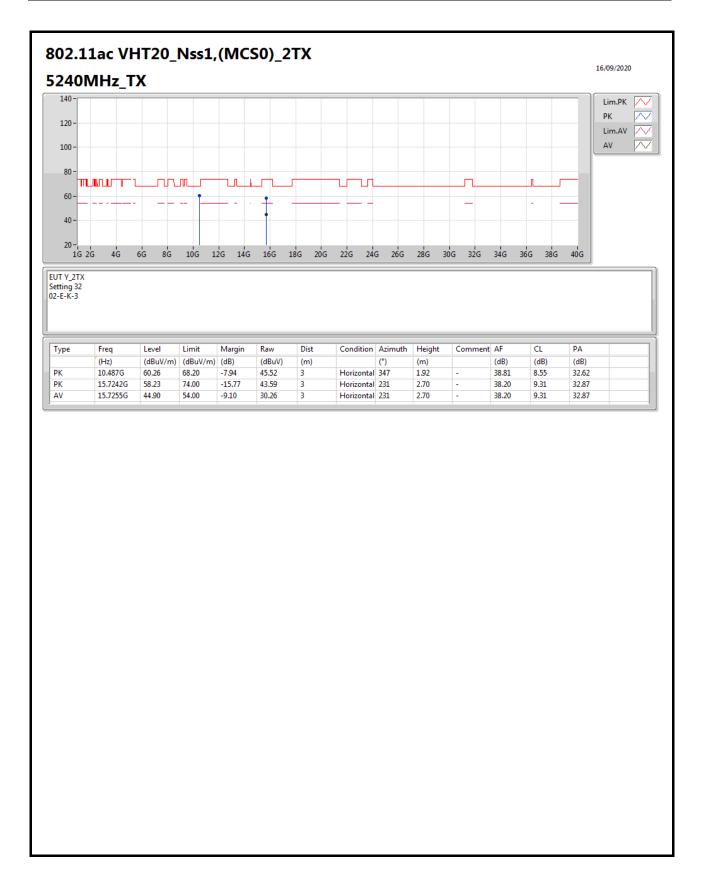




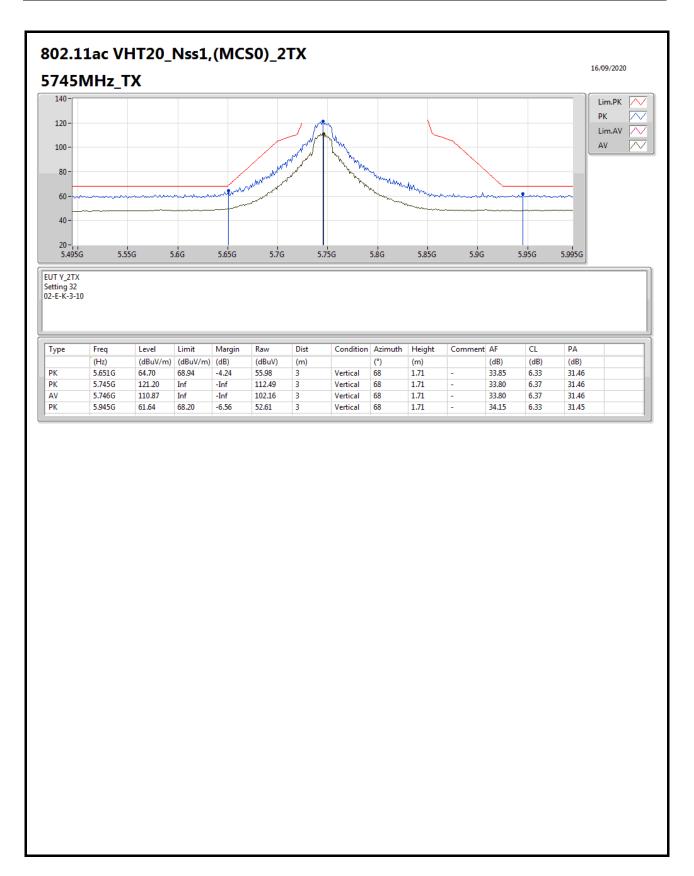




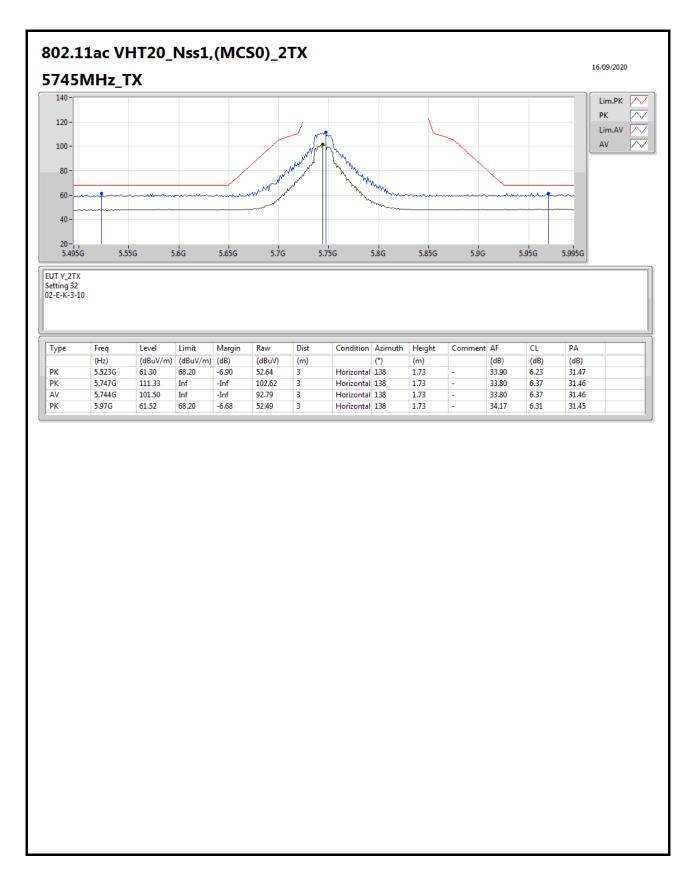




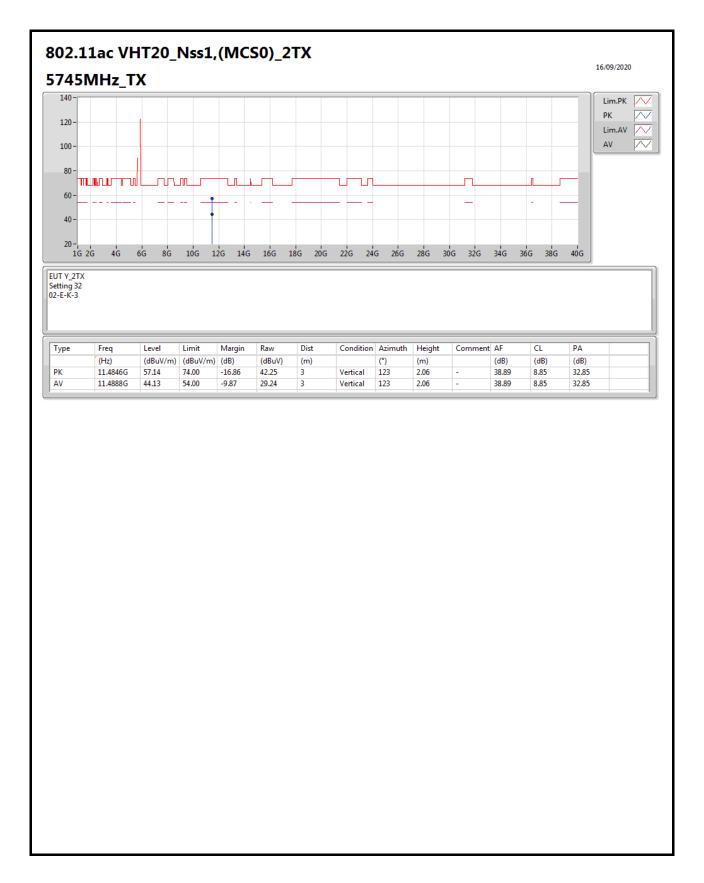




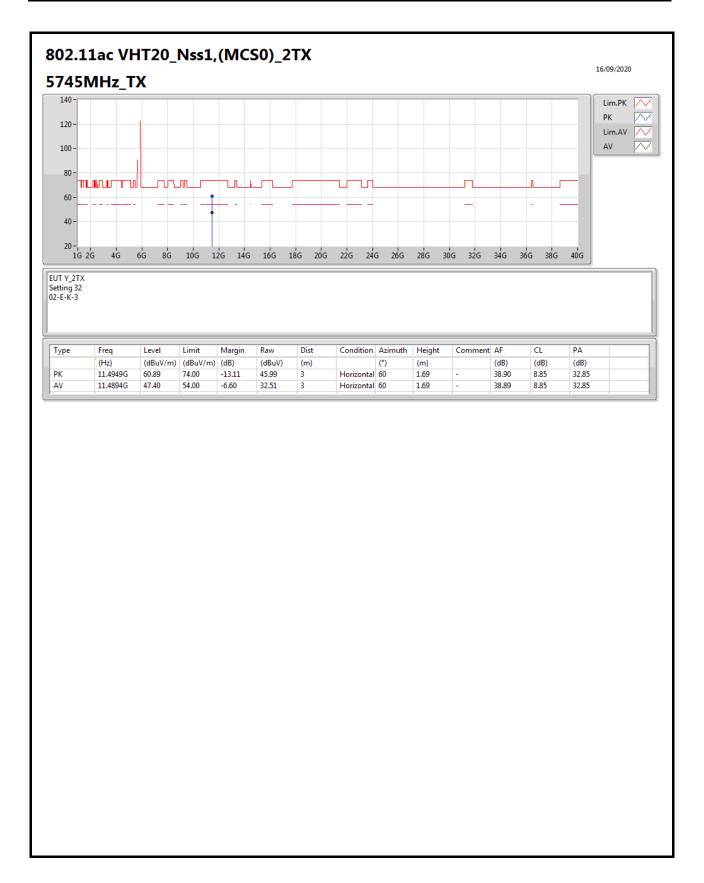




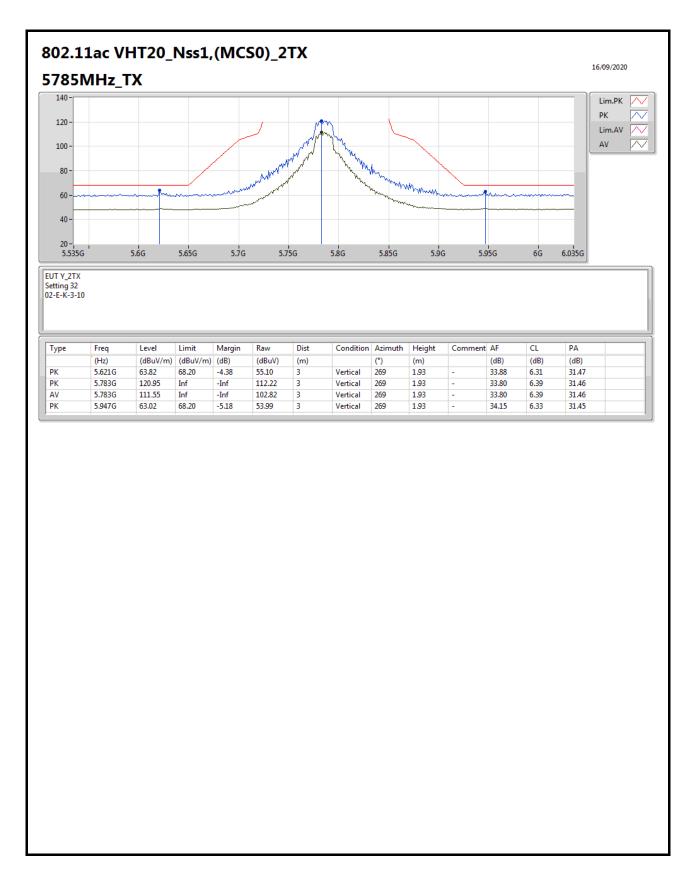




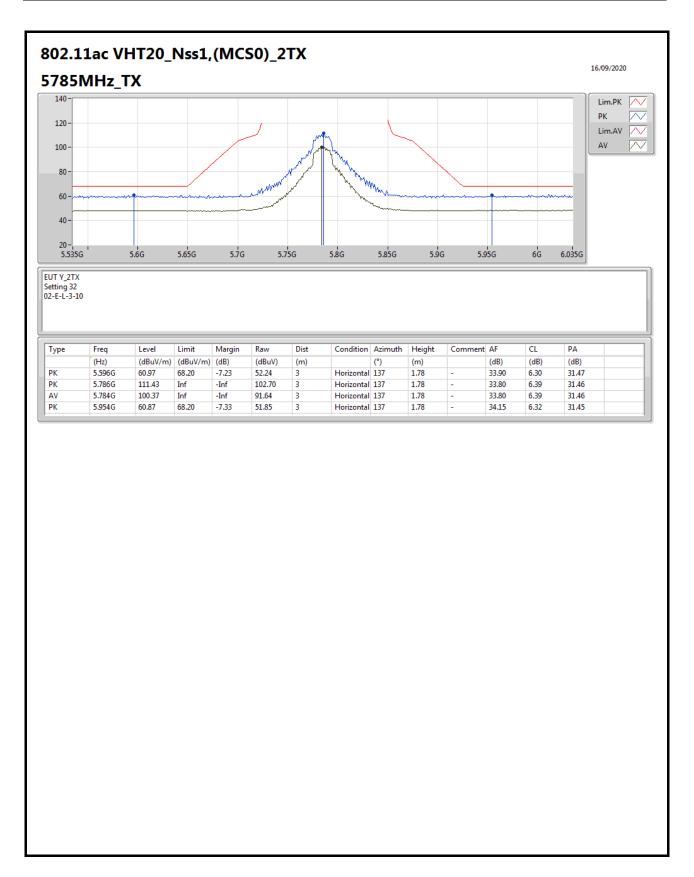






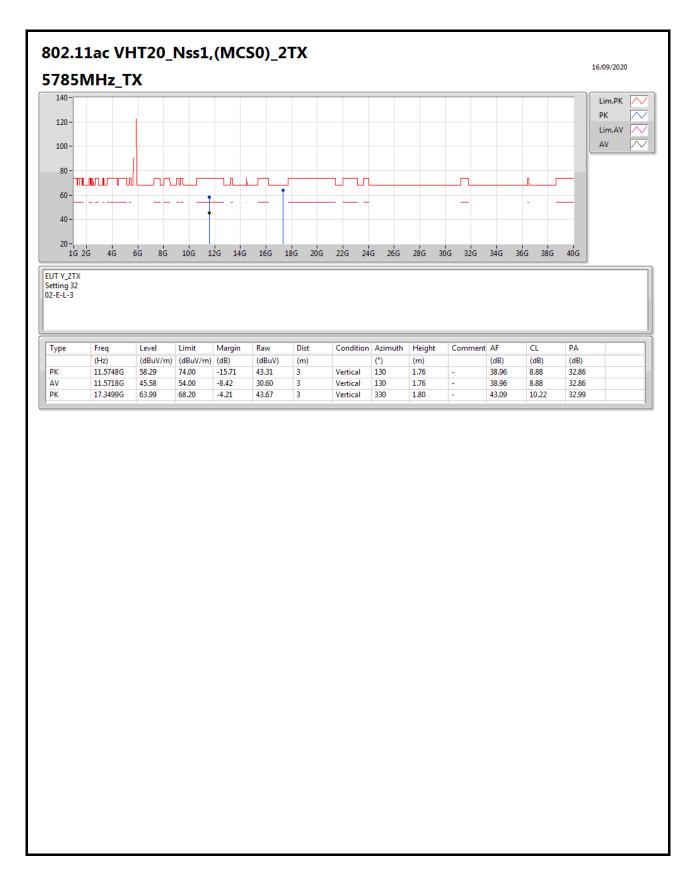






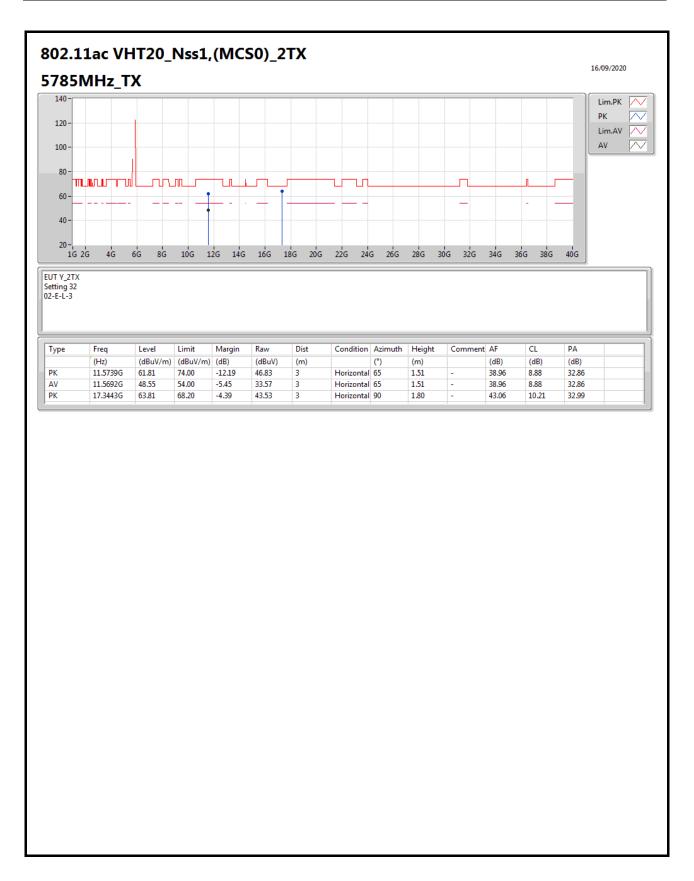
Page No. : 44 of 73



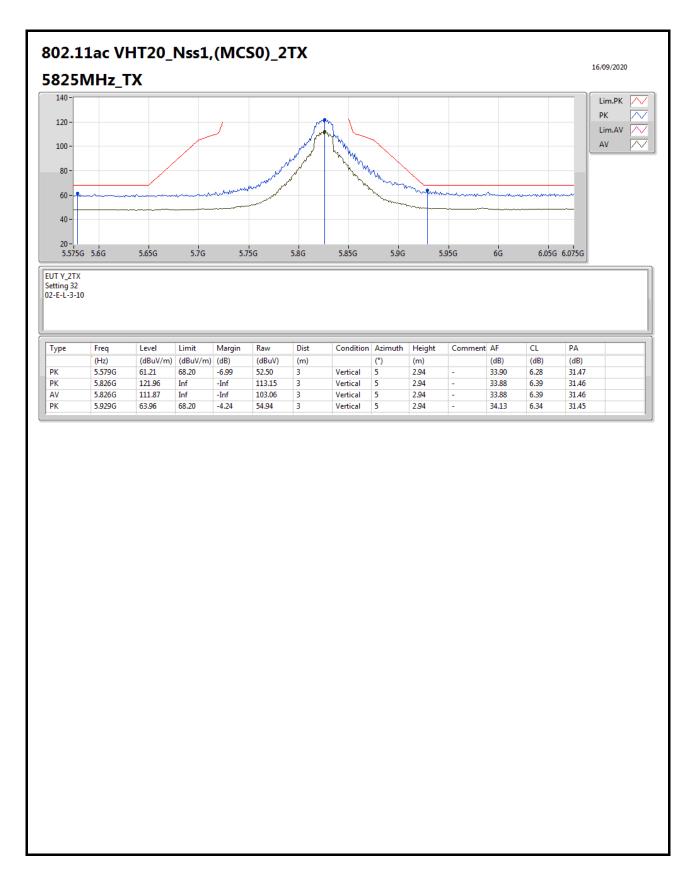


Page No. : 45 of 73

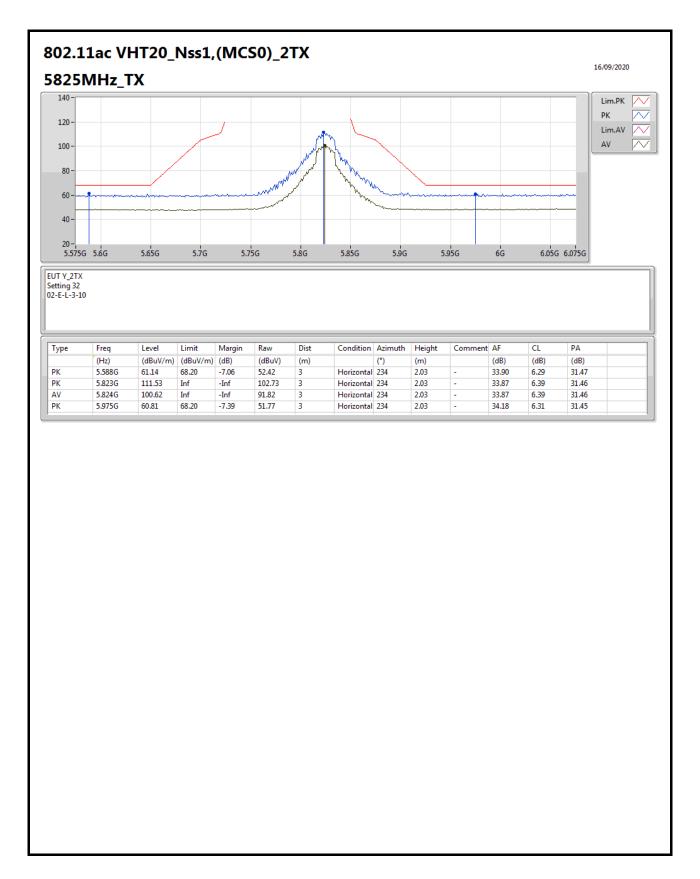




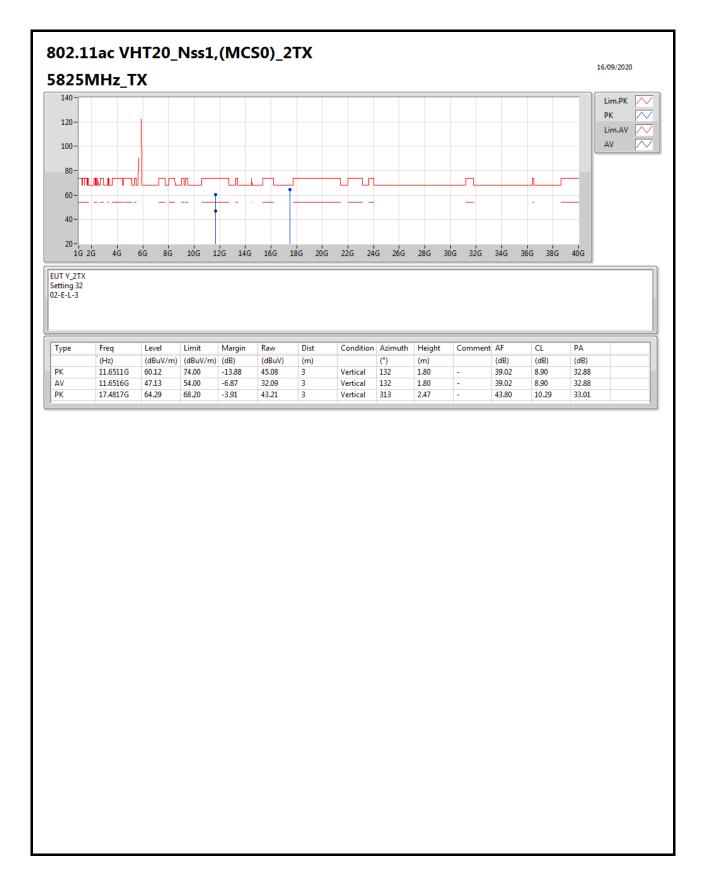




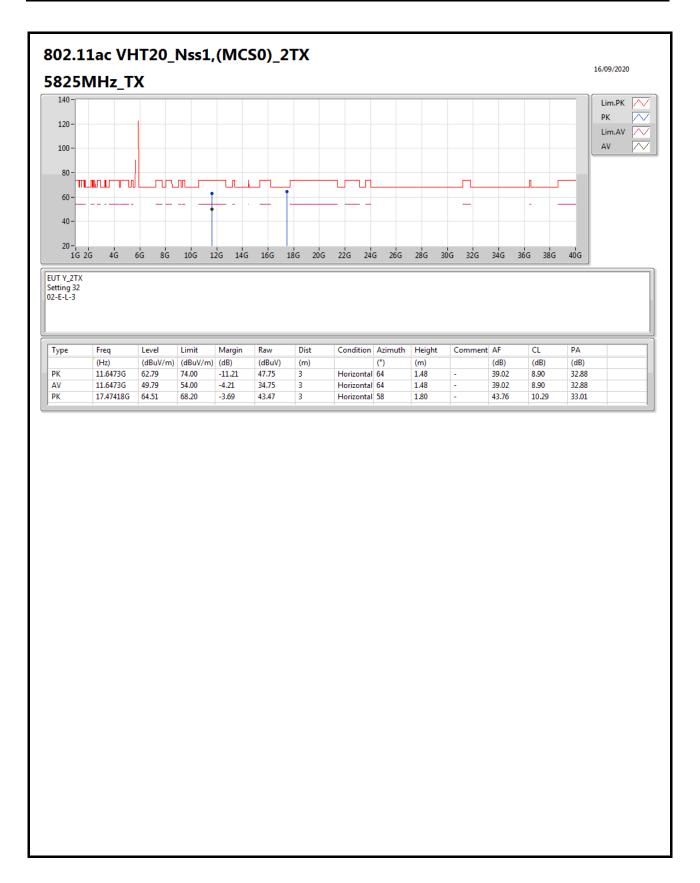






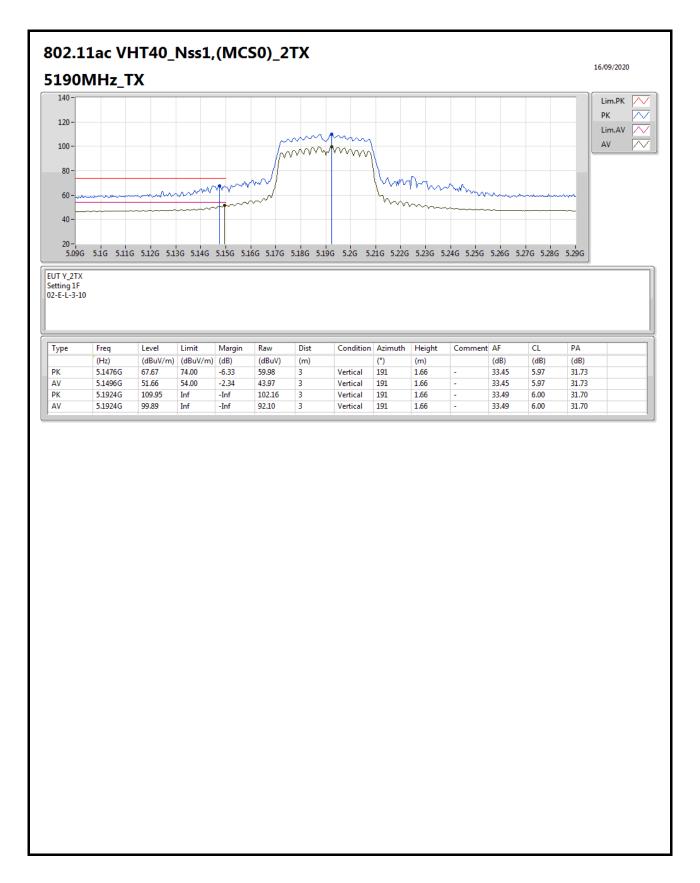






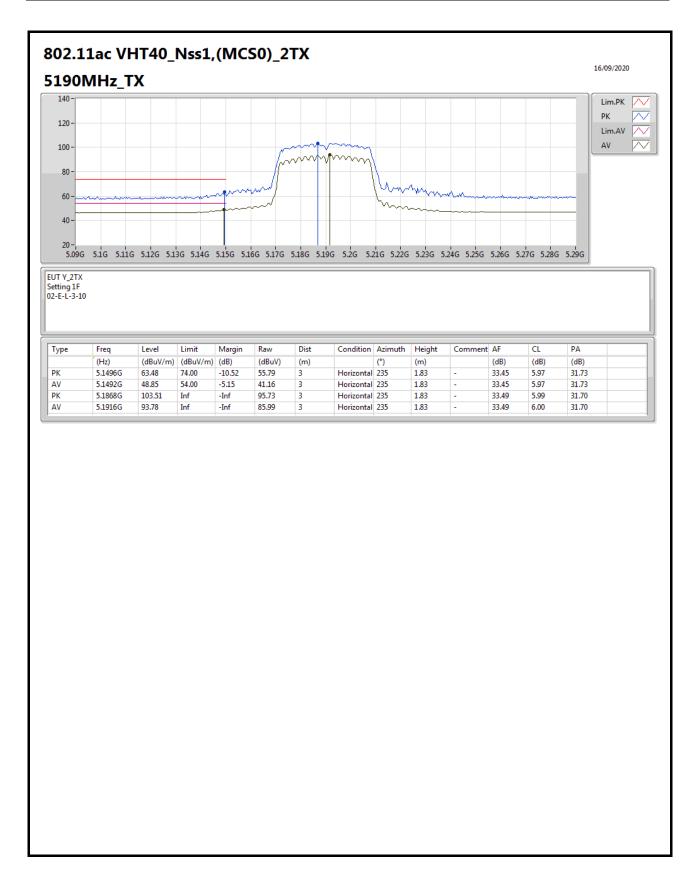
Page No. : 50 of 73





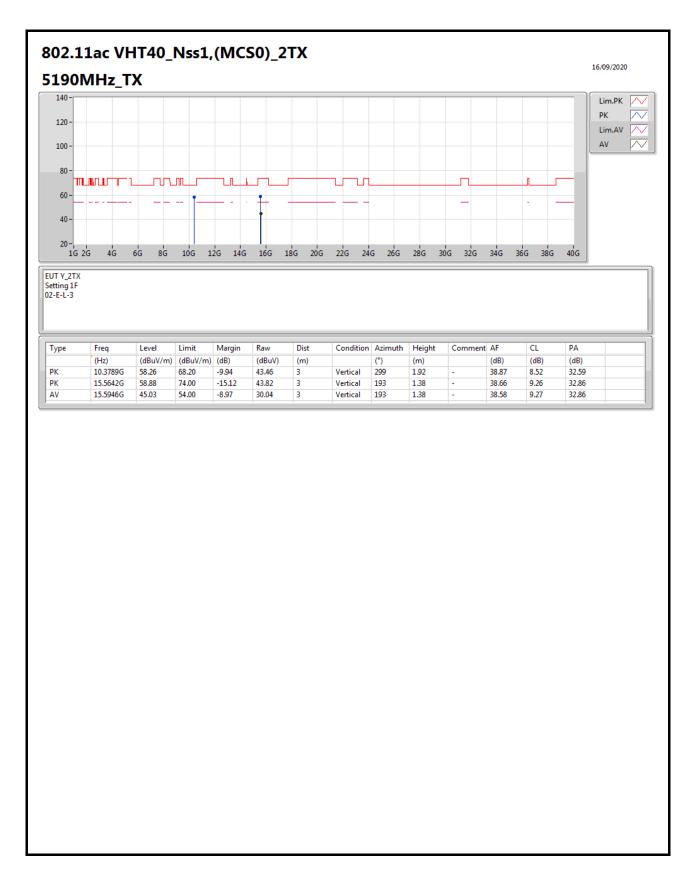
Page No. : 51 of 73





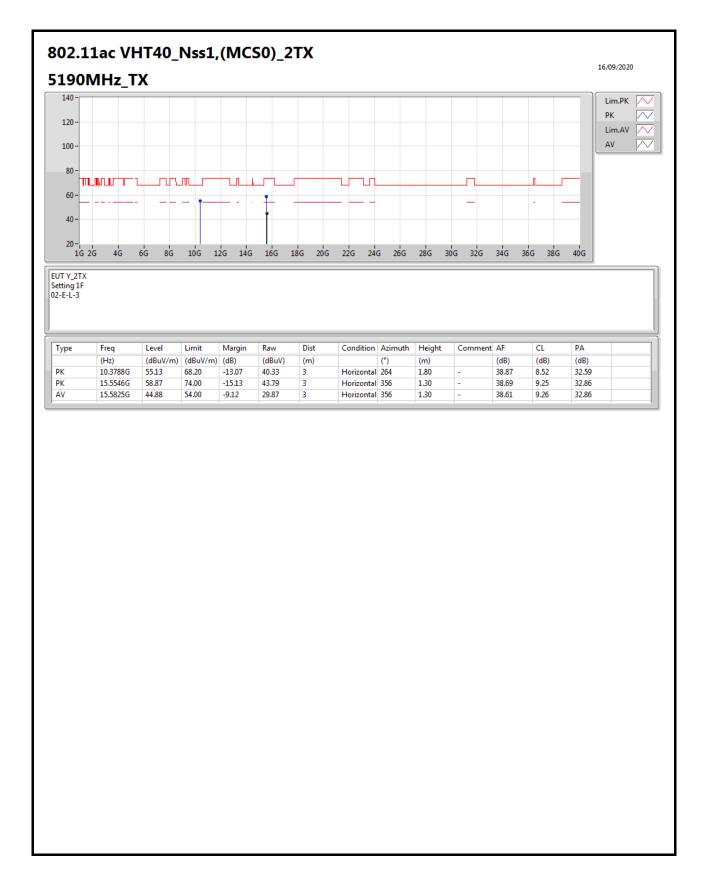
Page No. : 52 of 73



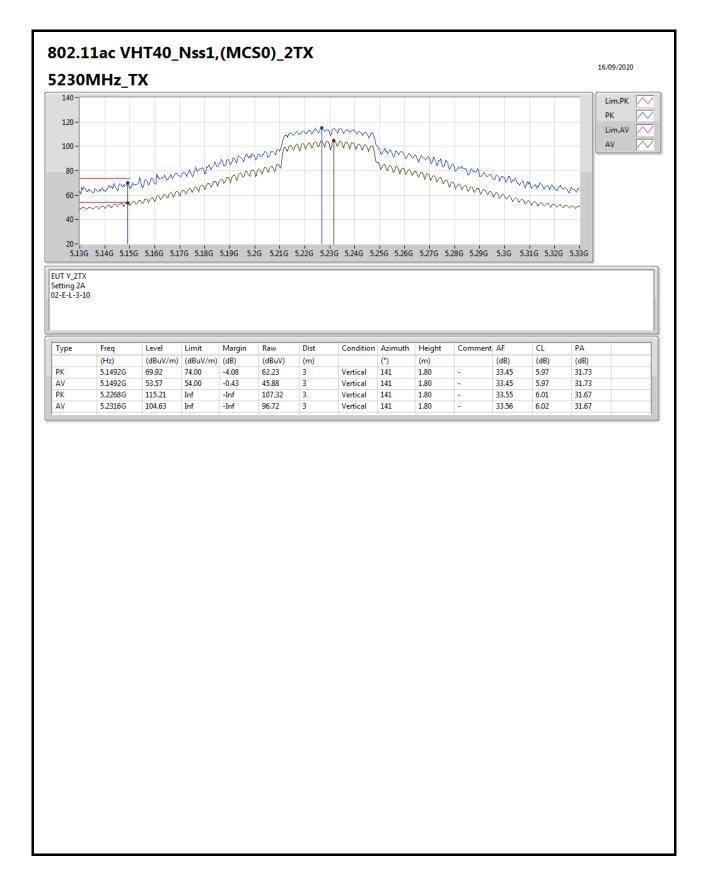


Page No. : 53 of 73



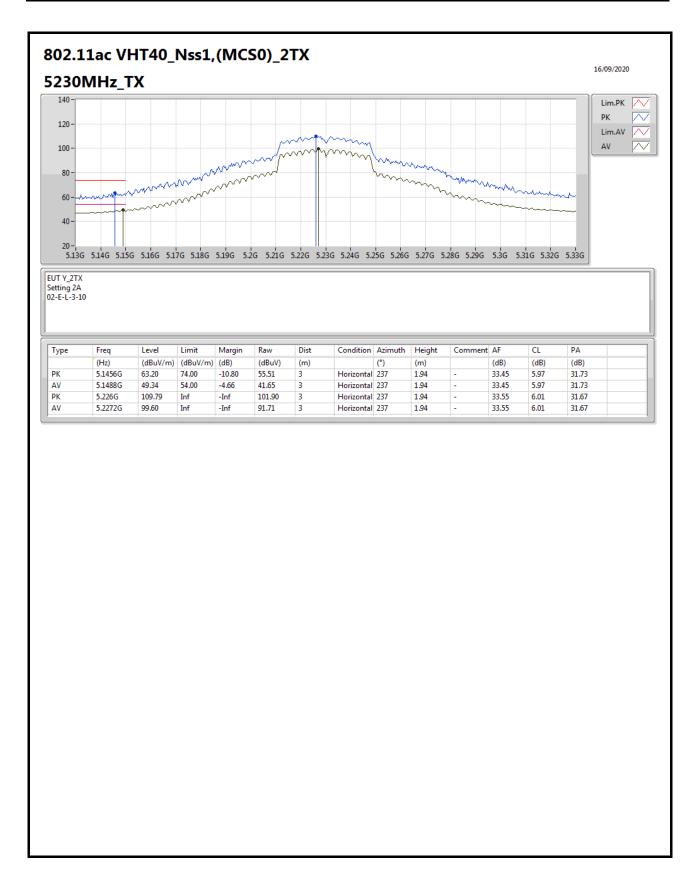




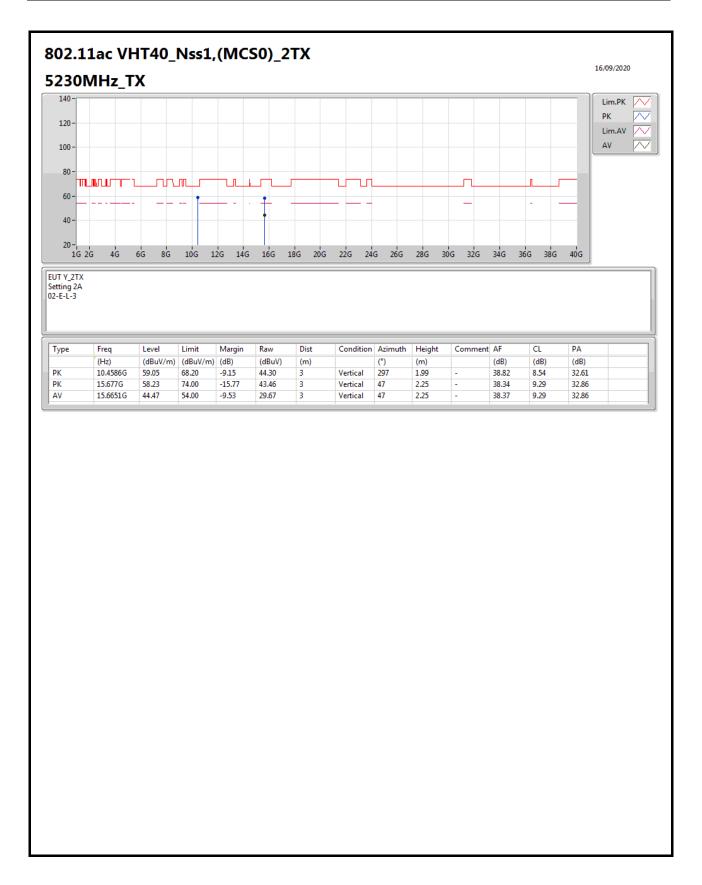


Page No. : 55 of 73

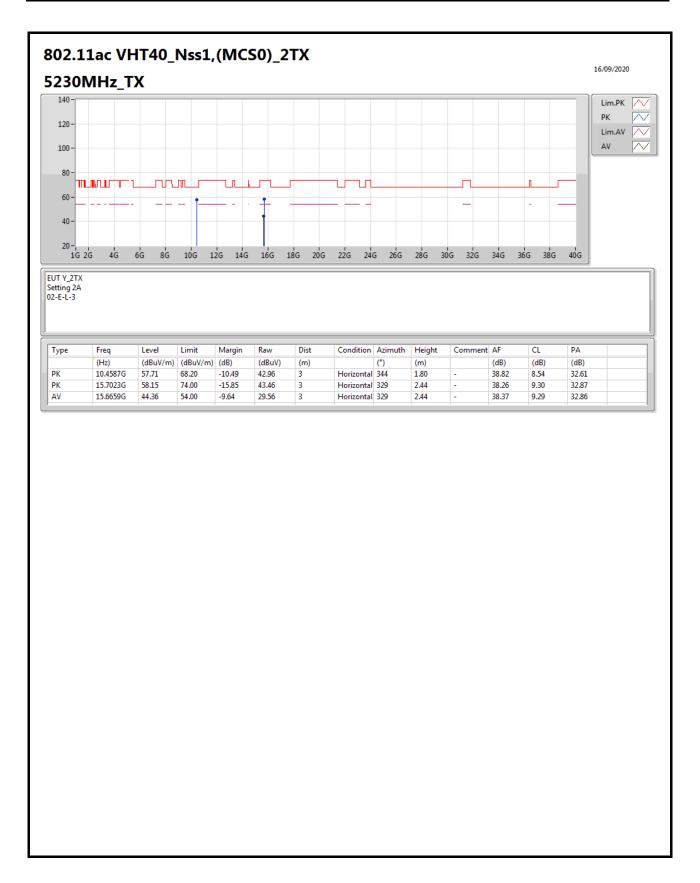






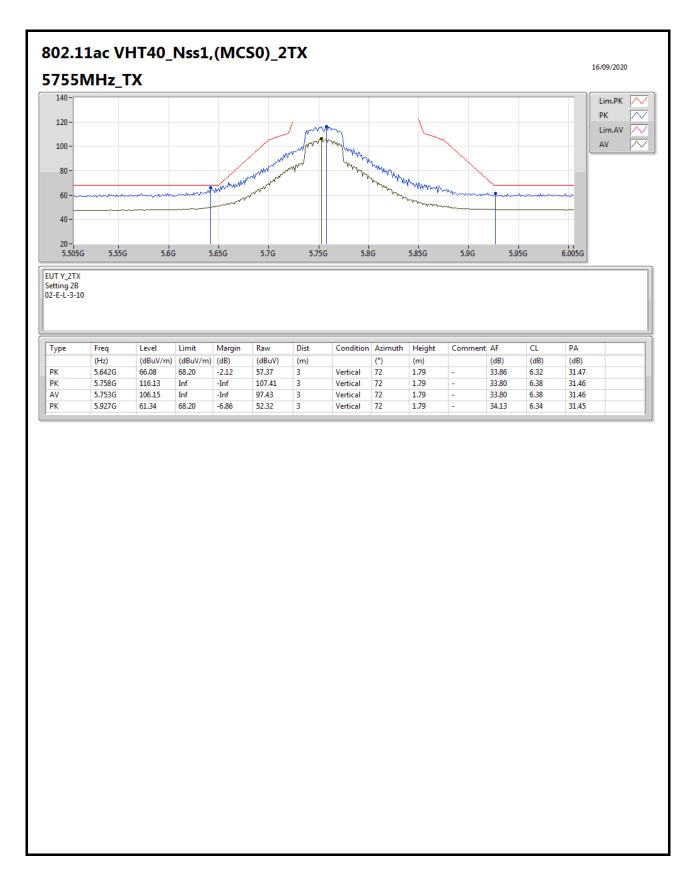






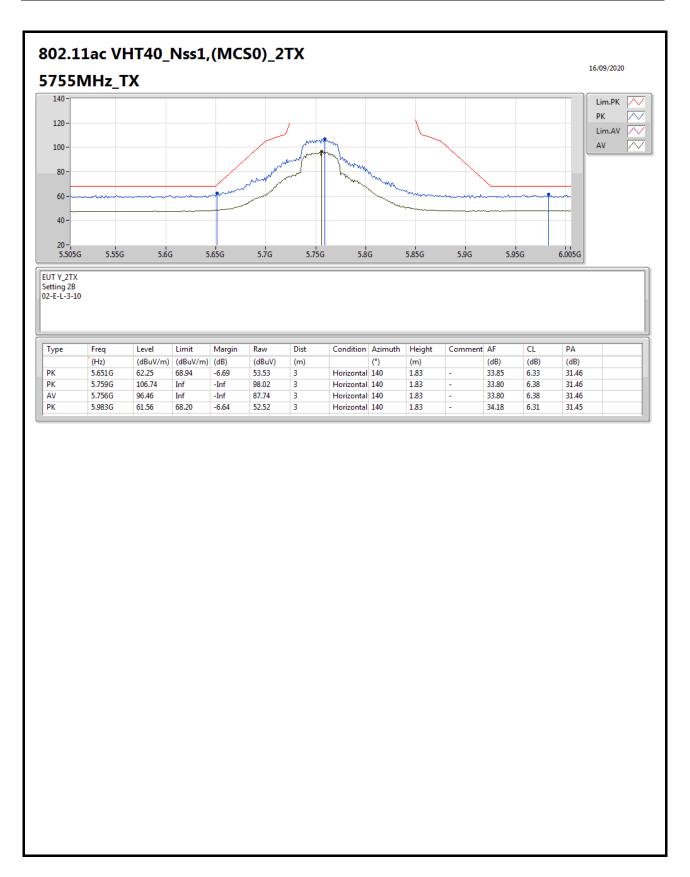
Page No. : 58 of 73



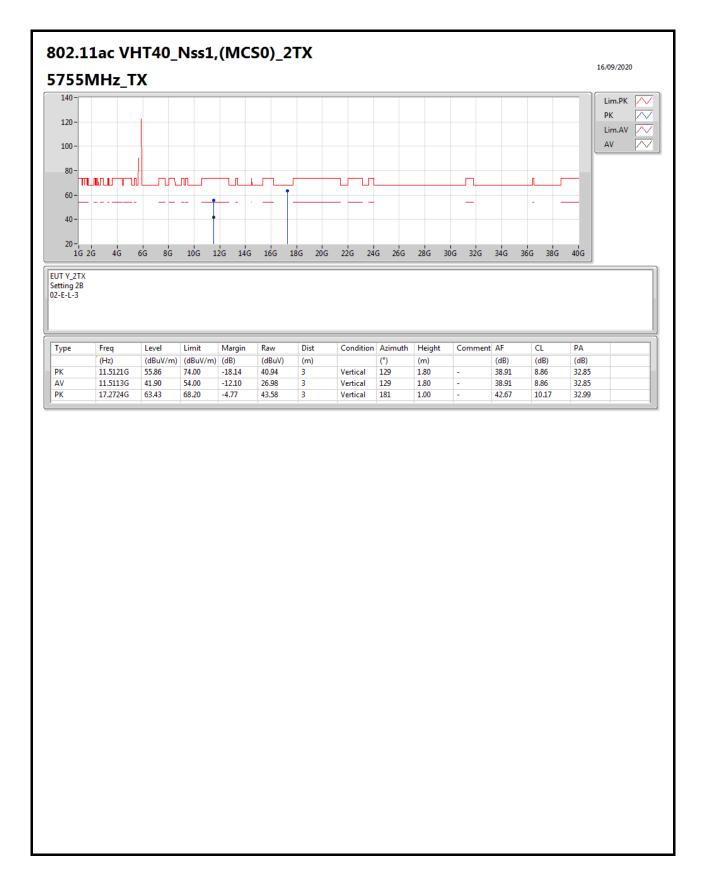


Page No. : 59 of 73

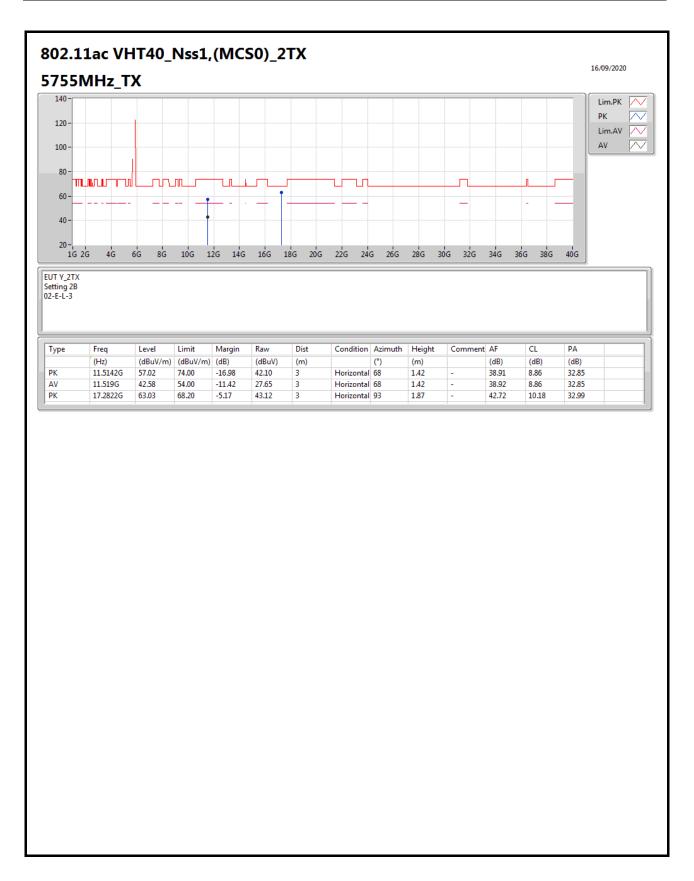




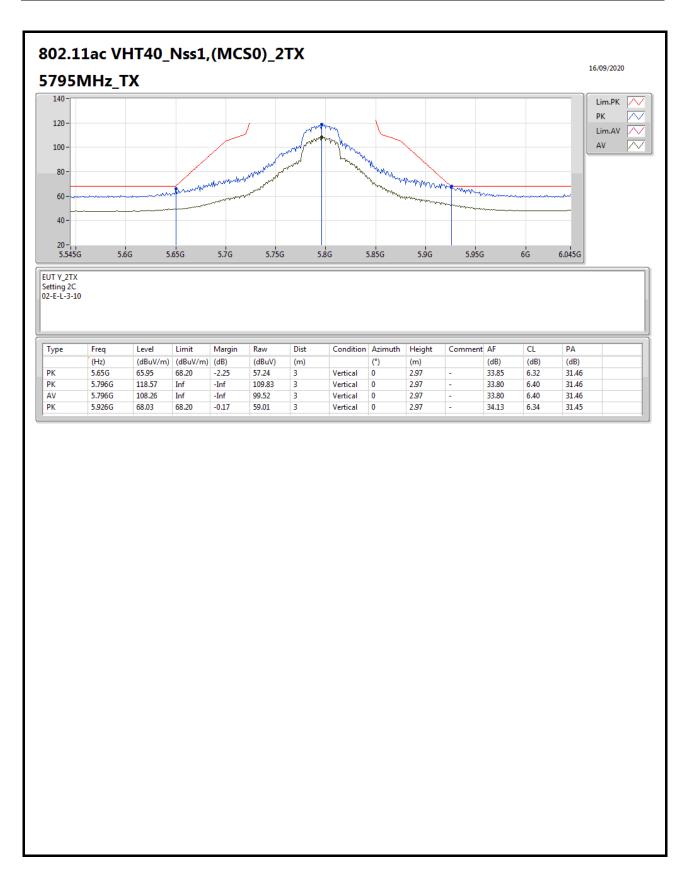




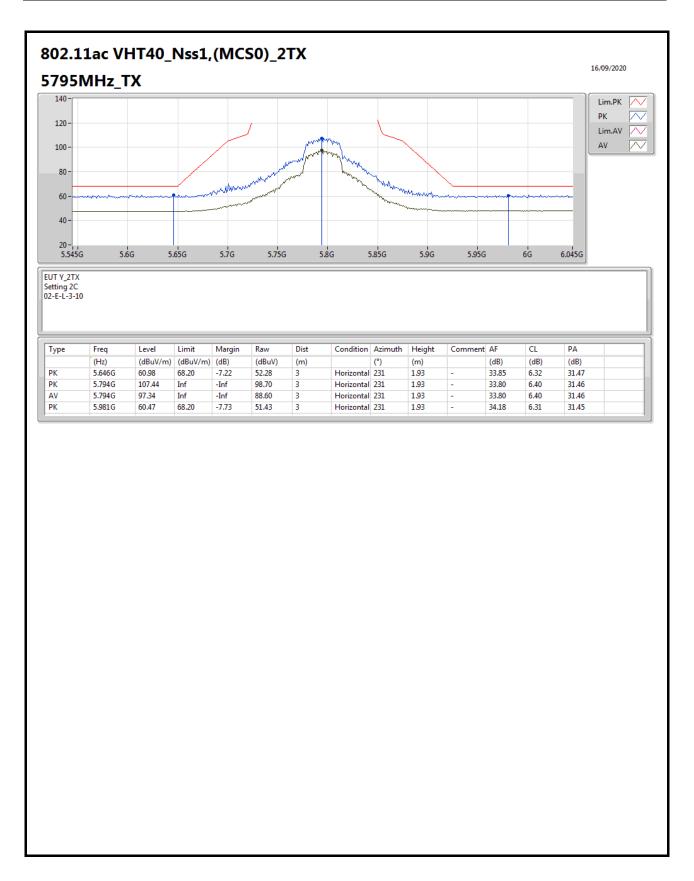




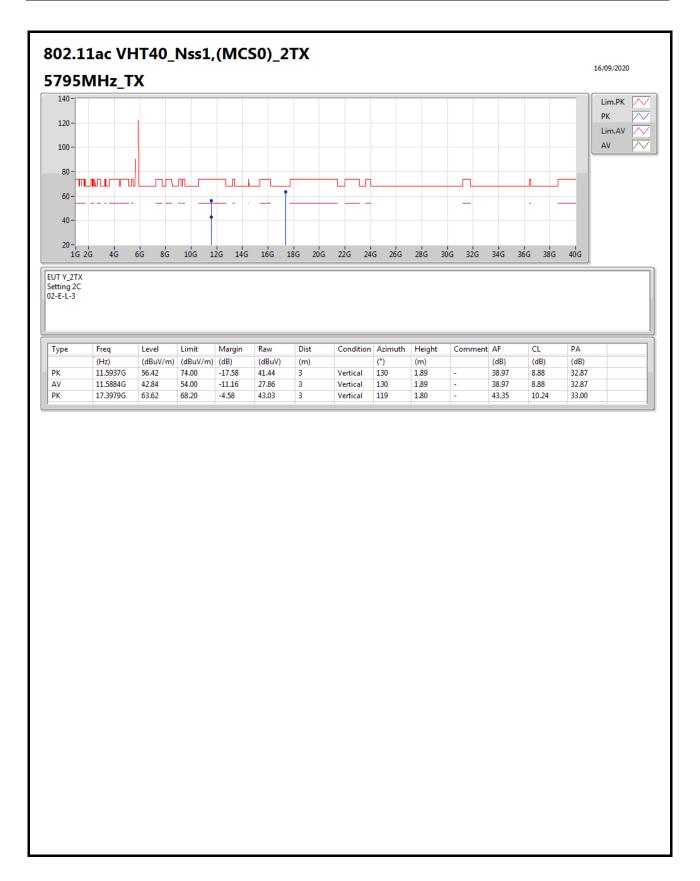




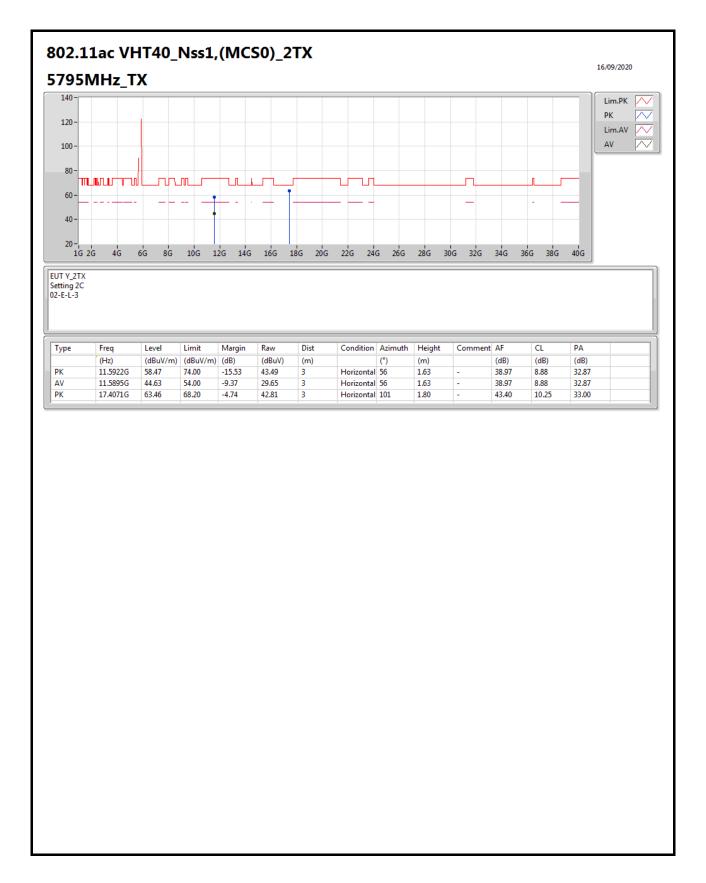




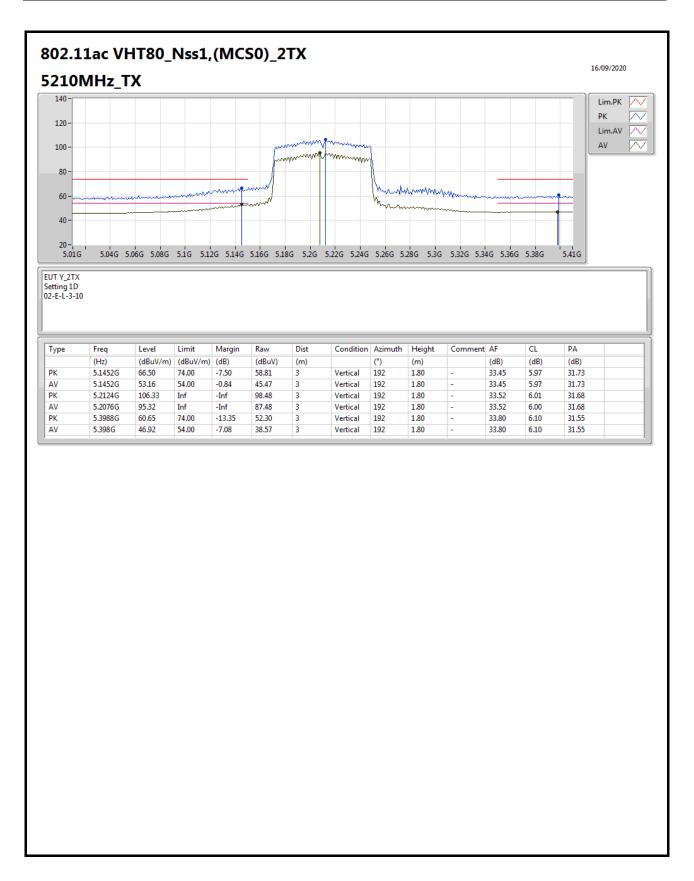




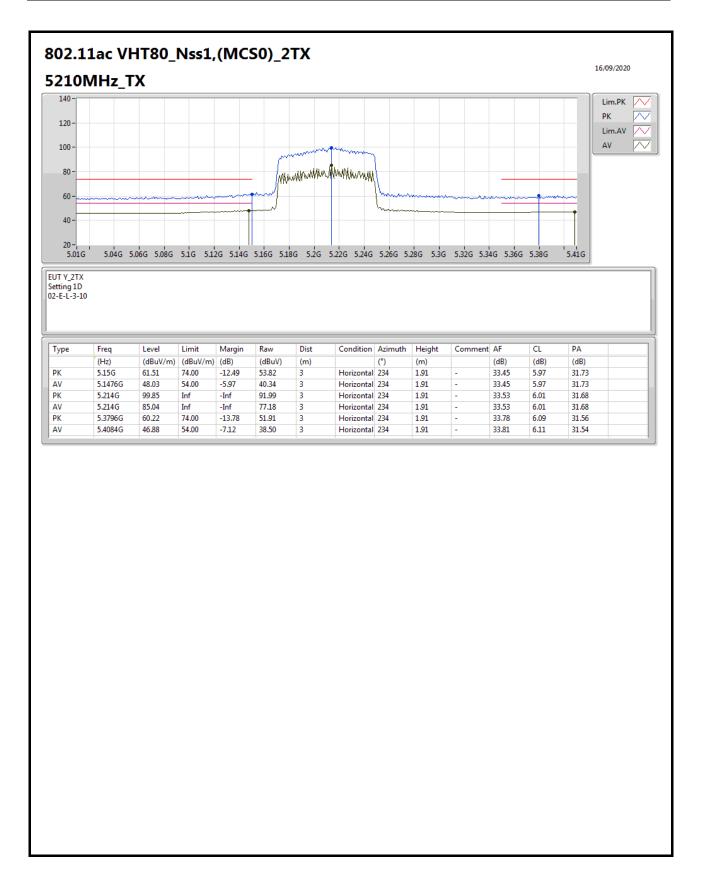




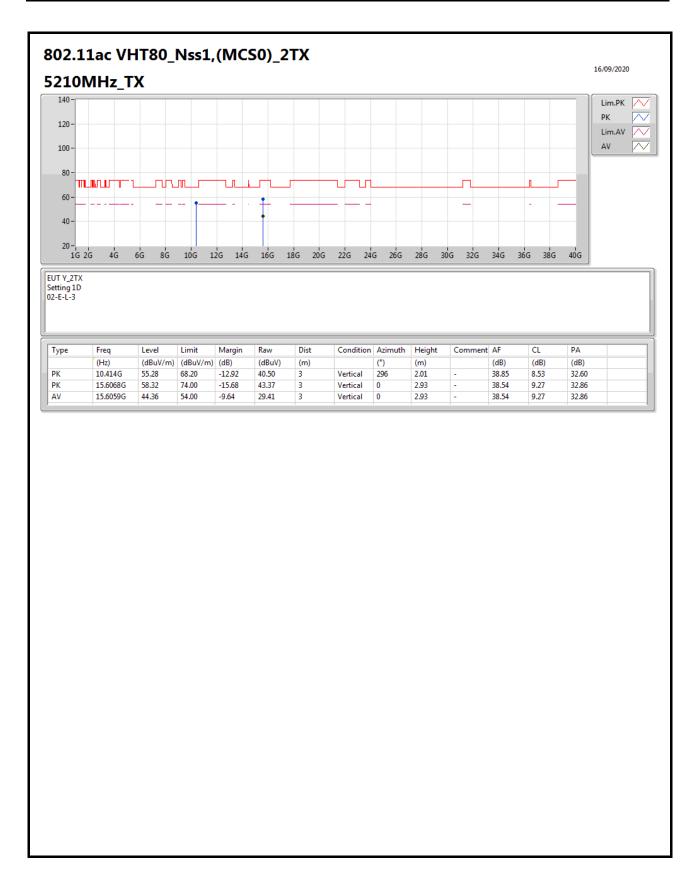




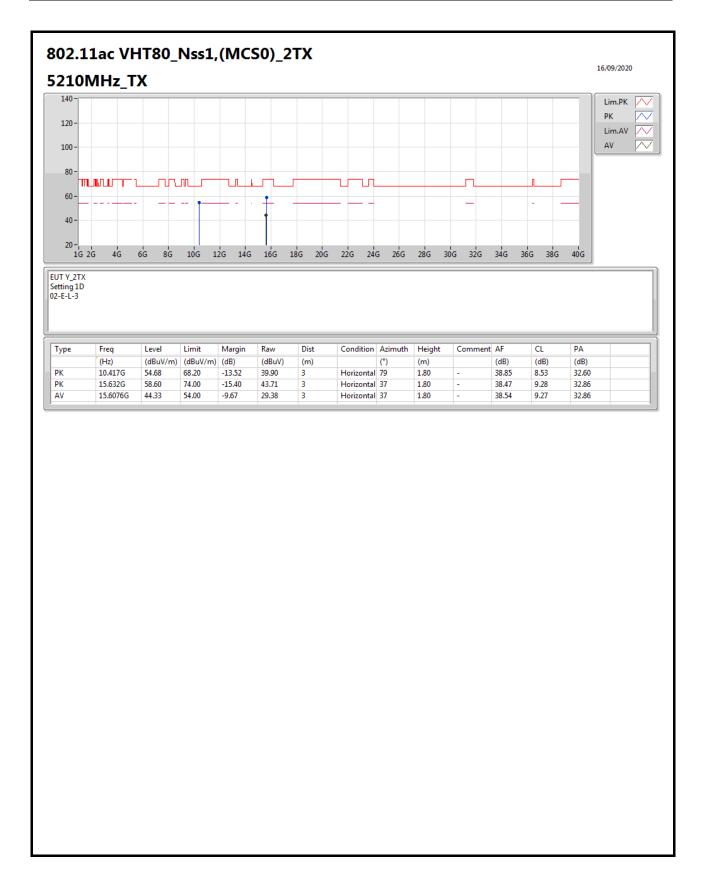




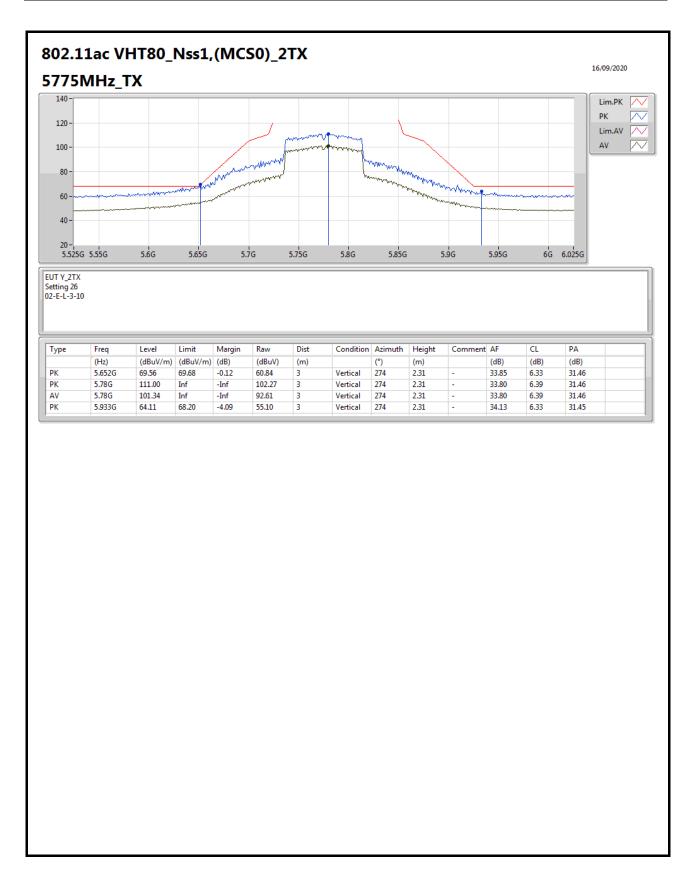




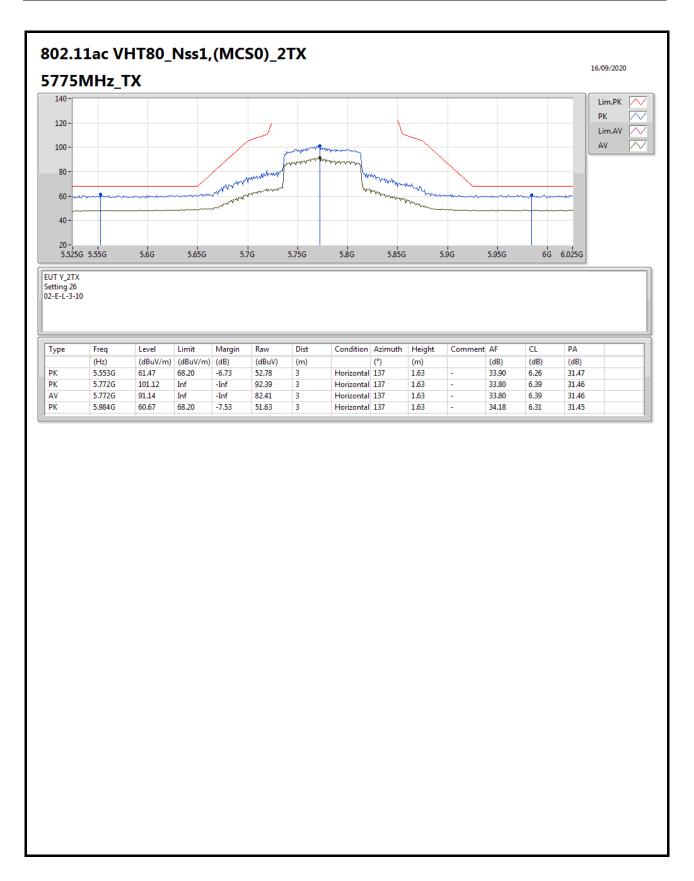




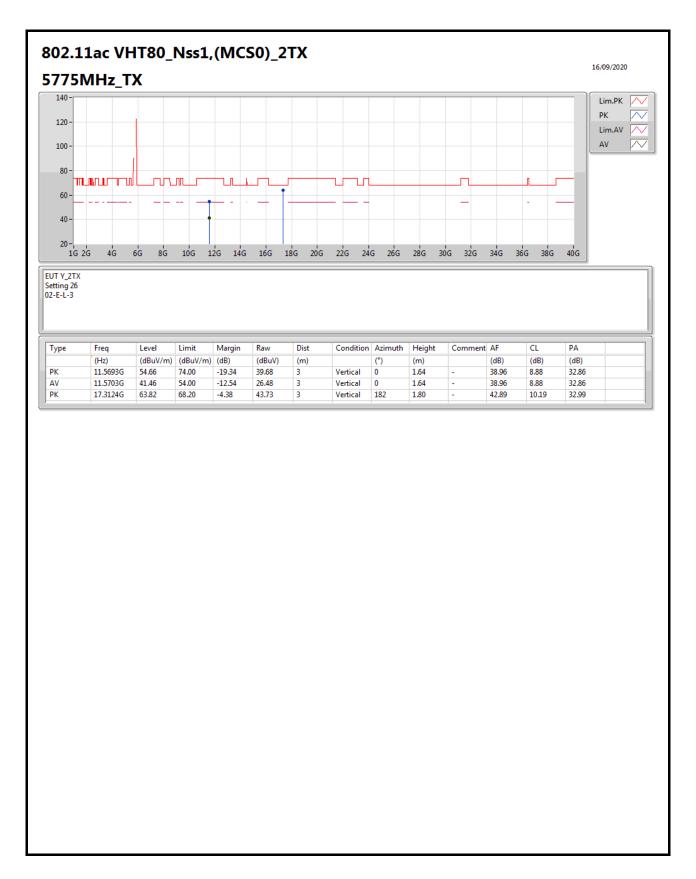






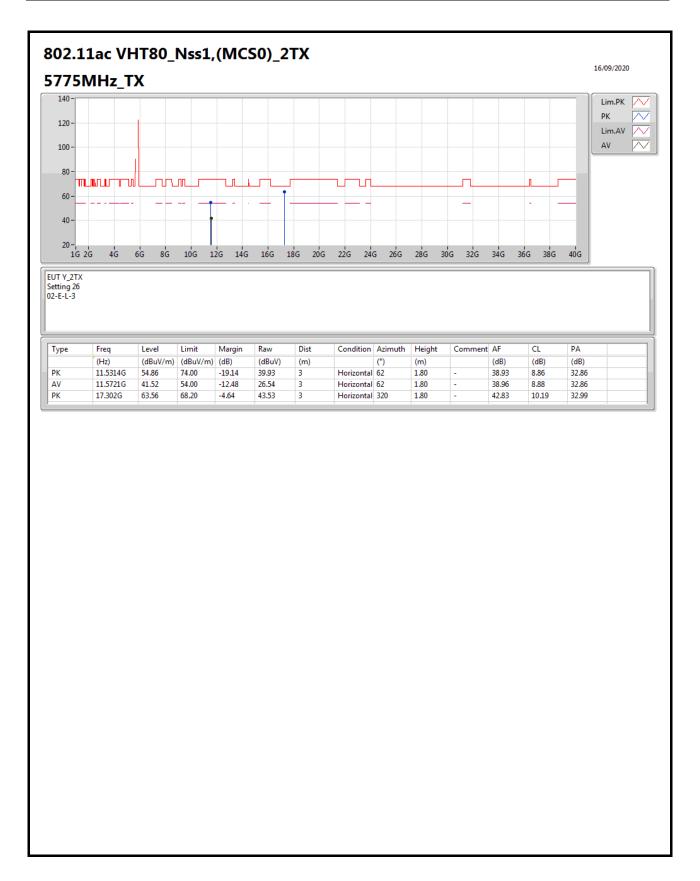






Page No. : 73 of 73







Radiated Emissions above 1GHz

Appendix F

Summary

Mode	Result	Туре	Freq	Level	Limit	Margin	Condition
			(Hz)	(dBuV/m)	(dBuV/m)	(dB)	
Mode 1	Pass	AV	1.79088G	40.33	54.00	-13.67	Vertical



