



FCC RADIO TEST REPORT

FCC ID : TE7A9V6

Equipment : AC1900 Wireless MU-MIMO Gigabit Router

Brand Name : tp-link

Model Name : Archer A9

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 (floors 1-4), Central Science and Technology Park, Nanshan

Shenzhen, 518057 China

Standard : 47 CFR FCC Part 15.407

The product was received on Sep. 10, 2018, and testing was started from Sep. 27, 2018 and completed on Oct. 30, 2018. 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 report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

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

Approved by: Cliff Chang

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 Ver1.0

Page Number : 1 of 31

Issued Date : Nov. 23, 2018 Report Version : 01

Table of Contents

Histo	ory of this test report	3
Sum	mary of Test Result	4
1	General Description	5
1.1	Information	5
1.2	Testing Applied Standards	8
1.3	Testing Location Information	8
1.4	Measurement Uncertainty	8
2	Test Configuration of EUT	9
2.1	Test Channel Mode	9
2.2	The Worst Case Measurement Configuration	11
2.3	EUT Operation during Test	12
2.4	Accessories	12
2.5	Support Equipment	13
2.6	Test Setup Diagram	14
3	Transmitter Test Result	18
3.1	AC Power-line Conducted Emissions	18
3.2	Emission Bandwidth	20
3.3	Maximum Conducted Output Power	21
3.4	Peak Power Spectral Density	23
3.5	Unwanted Emissions	26
4	Test Equipment and Calibration Data	30
Appe	endix A. Test Results of AC Power-line Conducted Emissions	
Appe	endix 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 Ver1.0 Page Number : 2 of 31

: Nov. 23, 2018 Issued Date

Report No.: FR890719AB

Report Version : 01

History of this test report

Report No.: FR890719AB

Report No.	Version	Description	Issued Date
FR890719AB	01	Initial issue of report	Nov. 23, 2018

TEL: 886-3-656-9065 Page Number : 3 of 31
FAX: 886-3-656-9085 Issued Date : Nov. 23, 2018

Summary of Test Result

Report No.: FR890719AB

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
1.1.2	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 judgment of conformity in the report is based on the measurement results excluding the measurement uncertainty.

Comments and Explanations:

None

Reviewed by: Cliff Chang Report Producer: Vicky Huang

TEL: 886-3-656-9065 Page Number : 4 of 31
FAX: 886-3-656-9085 Issued Date : Nov. 23, 2018

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]
5725-5850		5755-5795	151-159 [2]
5150-5250	ac (VHT80)	5210	42 [1]
5725-5850		5775	155 [1]

Report No.: FR890719AB

Band	Band Mode		Nant
5.15-5.25GHz	802.11a	20	3TX
5.15-5.25GHz	802.11n HT20	20	3TX
5.15-5.25GHz	802.11n HT20-BF	20	3TX
5.15-5.25GHz	802.11ac VHT20	20	3TX
5.15-5.25GHz	802.11ac VHT20-BF	20	3TX
5.15-5.25GHz	802.11n HT40	40	3TX
5.15-5.25GHz	802.11n HT40-BF	40	3TX
5.15-5.25GHz	802.11ac VHT40	40	3TX
5.15-5.25GHz	802.11ac VHT40-BF	40	3TX
5.15-5.25GHz	802.11ac VHT80	80	3TX
5.15-5.25GHz	802.11ac VHT80-BF	80	3TX
5.725-5.85GHz	.725-5.85GHz 802.11a		3TX
5.725-5.85GHz	802.11n HT20	20	3TX
5.725-5.85GHz	802.11n HT20-BF	20	3TX
5.725-5.85GHz	802.11ac VHT20	20	3TX
5.725-5.85GHz	802.11ac VHT20-BF	20	3TX
5.725-5.85GHz	802.11n HT40	40	3TX
5.725-5.85GHz	802.11n HT40-BF	40	3TX
5.725-5.85GHz	802.11ac VHT40	40	3TX
5.725-5.85GHz	802.11ac VHT40-BF	40	3TX
5.725-5.85GHz	802.11ac VHT80	80	3TX
5.725-5.85GHz	802.11ac VHT80-BF	80	3TX

TEL: 886-3-656-9065 Page Number : 5 of 31
FAX: 886-3-656-9085 Issued Date : Nov. 23, 2018

Note:

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

Report No.: FR890719AB

- BWch is the nominal channel bandwidth.
- Nss-Min is the minimum number of spatial streams.
- Nant is the number of outputs. e.g., 2(2,3) means have 2 outputs for port 2 and port 3. 2 means have 2 outputs for port 1 and port 2.

1.1.2 Antenna Information

							Gain (dBi)	
Ant.	Port	Brand	P/N	Antenna Type	Connector	2.4GHz	5GHz Band 1	5GHz Band 4
1	1	TP-LINK	3101501875	Dipole Antenna	I-PEX	2.24	3.87	3.64
2	2	TP-LINK	3101501879	Dipole Antenna	I-PEX	2.24	3.87	3.64
3	3	TP-LINK	3101501872	Dipole Antenna	I-PEX	2.24	3.87	3.64
4	4	TP-LINK	3101502150	PIFA Antenna	N/A	1.83	-	-

Note: The EUT has four antennas.

For 2.4GHz function:

For IEEE 802.11b/g/n mode (4TX/4RX)

Ant. 1 (port 1), Ant. 2 (port 2), Ant. 3 (port 3) and Ant. 4 (port 4) could transmit/receive simultaneously.

For 5GHz function:

For IEEE 802.11a/n/ac mode (3TX/3RX)

Ant. 1 (port 1), Ant. 2 (port 2) and Ant. 3 (port 3) could transmit/receive simultaneously.

TEL: 886-3-656-9065 Page Number : 6 of 31
FAX: 886-3-656-9085 Issued Date : Nov. 23, 2018

1.1.3 Mode Test Duty Cycle

Mode	DC	DCF(dB)	T(s)	VBW(Hz) ≥ 1/T
802.11a	0.966	0.15	2.029m	1k
802.11ac VHT20	0.904	0.438	4.48m	300
802.11ac VHT20-BF	0.901	0.453	1.755m	1k
802.11ac VHT40	0.807	0.931	2.18m	1k
802.11ac VHT40-BF	0.93	0.315	1.69m	1k
802.11ac VHT80	0.903	0.443	3.986m	300
802.11ac VHT80-BF	0.931	0.311	1.943m	1k

Report No.: FR890719AB

NI	-+
ıvı	OID:

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

1.1.4 EUT Operational Condition

EUT Power Type	From Power Adapter				
Beamforming Function		With beamforming for 802.11n/ac in 5GHz		Without beamforming	
Function		Outdoor P2M	\boxtimes	Indoor P2M	
		Fixed P2P		Client	
Test Software Version		QSPR V5.0-00140			

1.1.5 Table for EUT support function

Function	Support type
AP Router mode	Master
Bridge mode	Master + Slave

Note:

The EUT supports both AP Router and Bridge mode. Bridge mode selected as representative mode because it is equipped with the most complicated functions.

TEL: 886-3-656-9065 Page Number : 7 of 31
FAX: 886-3-656-9085 Issued Date : Nov. 23, 2018

1.2 Testing Applied Standards

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

Report No.: FR890719AB

- 47 CFR FCC Part 15
- ANSI C63.10-2013
- FCC KDB 789033 D02 v02r01
- FCC KDB 662911 D01 v02r01
- FCC KDB 412172 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	TH01-CB	DK Chang	25.3°C / 46%	Sep. 28, 2018~Oct. 20, 2018
Radiated	03CH01-CB	Cola Fan	22°C / 54%	Sep. 27, 2018~Oct. 23, 2018
AC Conduction	CO02-CB	Rick Yeh	25°C / 60%	Oct. 30, 2018

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)	3.2 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	3.6 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	3.7 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	3.5 dB	Confidence levels of 95%
Conducted Emission	1.7 dB	Confidence levels of 95%
Output Power Measurement	1.33 dB	Confidence levels of 95%
Power Density Measurement	1.27 dB	Confidence levels of 95%
Bandwidth Measurement	9.74 x10 ⁻⁸	Confidence levels of 95%

TEL: 886-3-656-9065 Page Number : 8 of 31
FAX: 886-3-656-9085 Issued Date : Nov. 23, 2018

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)_3TX	-
5180MHz	21
5200MHz	23
5240MHz	22.5
5745MHz	28
5785MHz	28
5825MHz	28
802.11ac VHT20_Nss1,(MCS0)_3TX	-
5180MHz	21.5
5200MHz	23.5
5240MHz	23.5
5745MHz	28
5785MHz	28
5825MHz	28
802.11ac VHT40_Nss1,(MCS0)_3TX	-
5190MHz	16.5
5230MHz	21.5
5755MHz	22
5795MHz	23
802.11ac VHT80_Nss1,(MCS0)_3TX	-
5210MHz	15
5775MHz	16.5
802.11ac VHT20-BF_Nss1,(MCS0)_3TX	-
5180MHz	25
5200MHz	26
5240MHz	26
5745MHz	26
5785MHz	26
5825MHz	26
802.11ac VHT40-BF_Nss1,(MCS0)_3TX	-
5190MHz	23
5230MHz	26
5755MHz	23
5795MHz	26
802.11ac VHT80-BF_Nss1,(MCS0)_3TX	-
5210MHz	23

Report No.: FR890719AB

TEL: 886-3-656-9065 Page Number : 9 of 31
FAX: 886-3-656-9085 Issued Date : Nov. 23, 2018

Mode	Power Setting
5775MHz	21

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 802.11ac VHT20 and VHT40.

 There are two functions of EUT, one is beamforming function, and the other is non-beamforming function for 802.11n/ac in 5GHz band. All test results were recorded in the report.

TEL: 886-3-656-9065 Page Number : 10 of 31 FAX: 886-3-656-9085 : Nov. 23, 2018 Issued Date

2.2 The Worst Case Measurement Configuration

The Worst Case Mode for Following Conformance Tests			
Tests Item	Tests Item AC power-line conducted emissions		
Condition AC power-line conducted measurement for line and neutral			
Operating Mode Normal Link			
1 Bridge mode 2.4G link AP + Adapter			
2 Bridge mode 5G link AP + Adapter			
For operating mode 1 is the worst case and it was record in this test report.			

Report No.: FR890719AB

The Worst Case Mode for Following Conformance Tests		
Tests Item	Emission Bandwidth Maximum Conducted Output Power Peak Power Spectral Density	
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	Normal Link		
1	EUT at Y axis-Bridge mode 2.4G link AP + Adapter		
2	EUT at Z axis-Bridge mode 2.4G link AP + Adapter		
Mode 2 has been evaluate follow this same test mode	ed to be the worst case between Mode 1~2, thus measurement for Mode 3 will e.		
3	EUT at Z axis-Bridge mode 5G link AP + Adapter		
For operating mode 2 is the worst case and it was record in this test report.			
Operating Mode > 1GHz CTX			
The EUT was performed at Y axis and Z axis position for Radiated emission above 1GHz test, and the wors case was found at Z axis. So the measurement will follow this same test configuration.			
1	EUT at Z axis		

 TEL: 886-3-656-9065
 Page Number
 : 11 of 31

 FAX: 886-3-656-9085
 Issued Date
 : Nov. 23, 2018

The Worst Case Mode for Following Conformance Tests			
Tests Item	Simultaneous Transmission Analysis - Radiated Emission Co-location		
Test Condition	Radiated measurement		
Operating Mode	Operating Mode Normal Link		
The EUT was performed at Y axis and Z axis position for Radiated emission test, and the worst case was found at Z axis. So the measurement will follow this same test configuration.			
1 EUT at Z axis-WLAN 2.4GHz+WLAN 5GHz			
Refer to Appendix F for Radiated Emission Co-location.			

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		
Refer to Sporton Test Report No.: FA890719 for Co-location RF Exposure Evaluation.		

2.3 EUT Operation during Test

For CTX Mode:

non-beamforming mode:

The EUT was programmed to be in continuously transmitting mode.

beamforming mode:

For Conducted Mode:

The EUT was programmed to be in continuously transmitting mode.

For Radiated Mode:

During the test, the following programs under WIN 7 were executed.

The program was executed as follows:

- 1. During the test, the EUT operation to normal function.
- 2. Executed command fixed test channel under telnet: v6.1.7601.
- 3. Executed "Lantest.exe" to link with the remote workstation to transmit and receive packet by RX Device and transmit duty cycle no less than 98%.

For Normal Link:

During the test, the EUT operation to normal function.

2.4 Accessories

Accessories				
Equipment Name Brand Name Model Name Rating				
Adapter	tp-link	T120150-2B1	Input:100-240V~50/60Hz, 0.6A Output:12V, 1.5A	

TEL: 886-3-656-9065 Page Number : 12 of 31
FAX: 886-3-656-9085 Issued Date : Nov. 23, 2018

2.5 Support Equipment

For Test Site No: CO02-CB

	Support Equipment					
No.	o. Equipment Brand Name Model Name FCC ID					
1	NB*4	DELL	E6430	N/A		
2	AP Router	ASUS	RP-N53	MSQ-RPN53		
3	Flash disk3.0	Transcend	JetFlash-700	N/A		

Report No.: FR890719AB

For Test Site No: 03CH01-CB (below 1GHz)

	Support Equipment					
No.	No. Equipment Brand Name Model Name FCC ID					
1	NB*4	DELL	E4300	N/A		
2	AP Route	NETGEAR	WNDR3300v2	PY309300116		
3	Flash disk3.0	Silicon Power	B06	N/A		

For Test Site No: 03CH01-CB (above 1GHz)

For non-beamforming mode

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

For beamforming mode

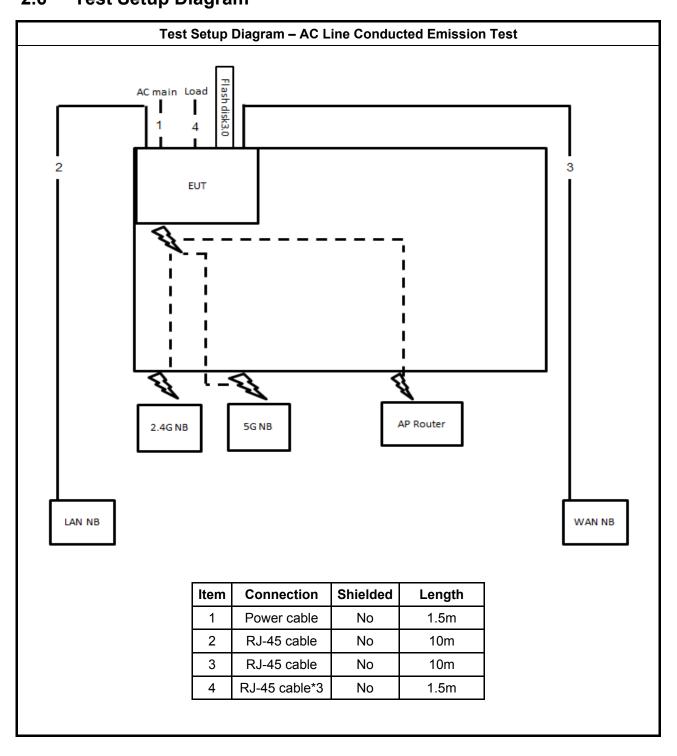
	Support Equipment			
No.	Equipment	Brand Name	Model Name	FCC ID
1	NB*2	DELL	E4300	N/A
2	RX Device (AC1900 Wireless MU-MIMO Gigabit Router)	tp-link	Archer A9	TE7A9V6

For Test Site No: TH01-CB

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

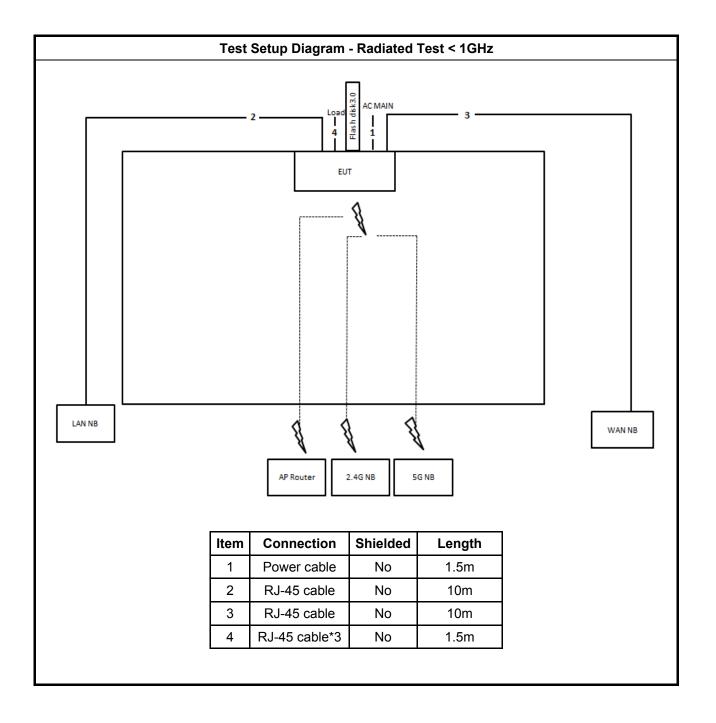
TEL: 886-3-656-9065 Page Number : 13 of 31
FAX: 886-3-656-9085 Issued Date : Nov. 23, 2018

2.6 Test Setup Diagram

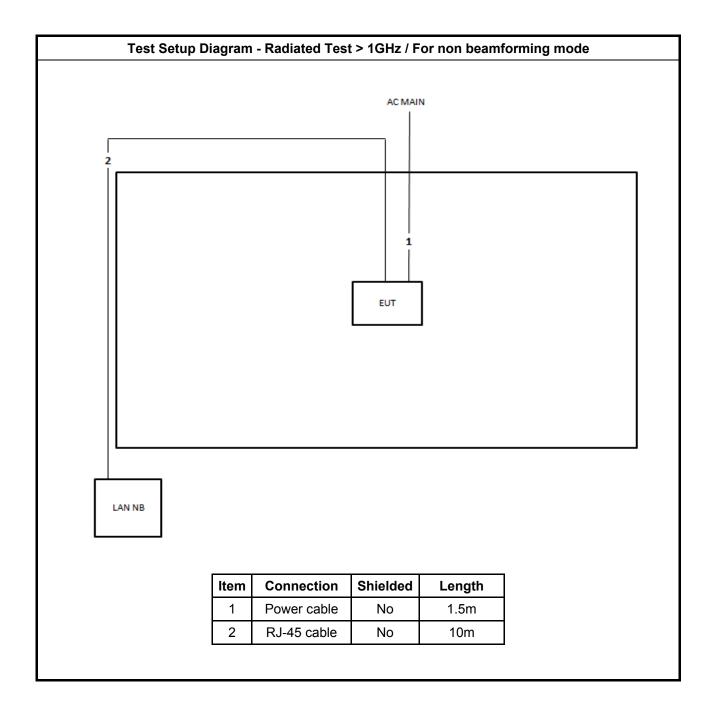


Report No.: FR890719AB

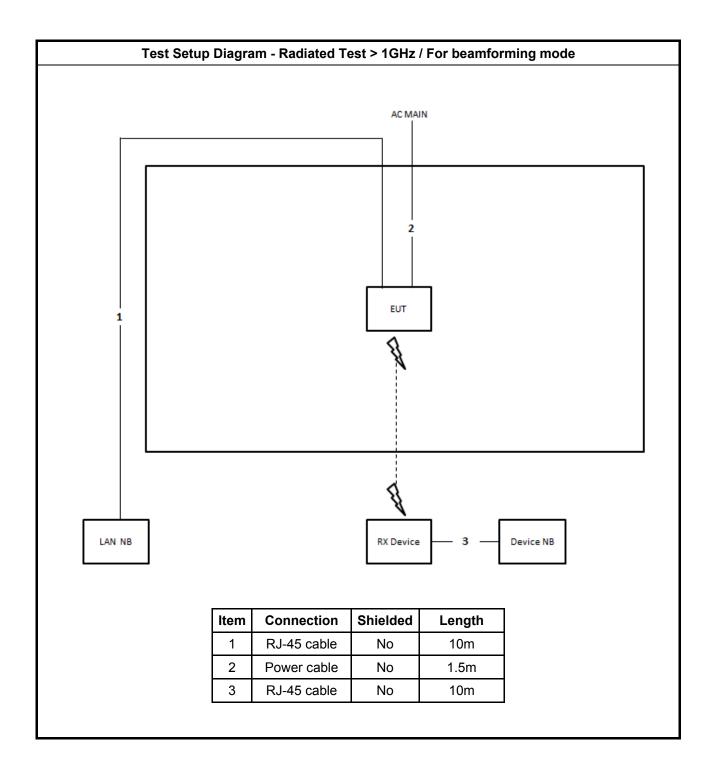
TEL: 886-3-656-9065 Page Number : 14 of 31
FAX: 886-3-656-9085 Issued Date : Nov. 23, 2018



TEL: 886-3-656-9065 Page Number : 15 of 31
FAX: 886-3-656-9085 Issued Date : Nov. 23, 2018



TEL: 886-3-656-9065 Page Number : 16 of 31
FAX: 886-3-656-9085 Issued Date : Nov. 23, 2018



TEL: 886-3-656-9065 Page Number : 17 of 31
FAX: 886-3-656-9085 Issued Date : Nov. 23, 2018

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 Frequency Emission (MHz) Quasi-Peak Average		
0.5-5	56	46
5-30	60	50
Note 1: * Decreases with the logarithm of the frequency.		

Report No.: FR890719AB

3.1.2 Measuring Instruments

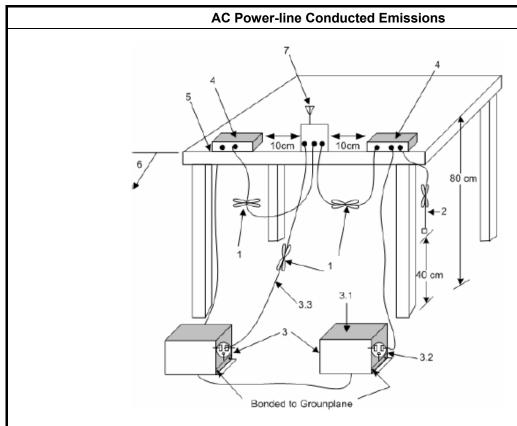
Refer a test equipment and calibration data table in this test report.

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 : 18 of 31
FAX: 886-3-656-9085 Issued Date : Nov. 23, 2018

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.: FR890719AB

- 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 Test Result of AC Power-line Conducted Emissions

Refer as Appendix A

TEL: 886-3-656-9065 Page Number: 19 of 31
FAX: 886-3-656-9085 Issued Date: Nov. 23, 2018

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.: FR890719AB

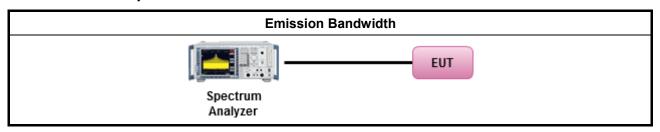
3.2.2 Measuring Instruments

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 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 : 20 of 31
FAX: 886-3-656-9085 Issued Date : Nov. 23, 2018

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 \leq 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-l	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. 		
	= maximum conducted output power in dBm, = the maximum transmitting antenna directional gain in dBi.		

Report No.: FR890719AB

TEL: 886-3-656-9065 Page Number : 21 of 31
FAX: 886-3-656-9085 Issued Date : Nov. 23, 2018

3.3.2 Measuring Instruments

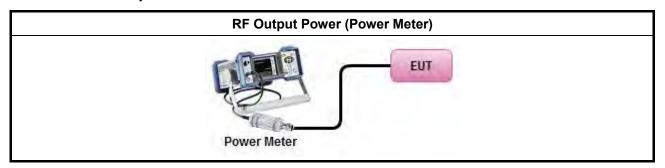
Refer a test equipment and calibration data table in this test report.

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} = P₁ + P₂ + + P_n (calculated in linear unit [mW] and transfer to log unit [dBm]) EIRP_{total} = P_{total} + DG 		

Report No.: FR890719AB

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 : 22 of 31
FAX: 886-3-656-9085 Issued Date : Nov. 23, 2018

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) \leq 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	PPSD = peak power spectral density that he same method as used to determine the conducted output power shall be used to determine the power spectral density. And power spectral density in dBm/MHz G_{TX} = the maximum transmitting antenna directional gain in dBi.		

Report No.: FR890719AB

TEL: 886-3-656-9065 Page Number : 23 of 31
FAX: 886-3-656-9085 Issued Date : Nov. 23, 2018

3.4.2 Measuring Instruments

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

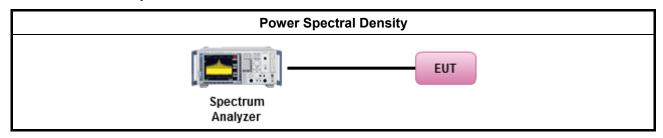
3.4.3 Test Procedures

		Test Method
•	outp func	power spectral density procedures that the same method as used to determine the conducted to power shall be used to determine the peak power spectral density and use the peak search on on the spectrum analyzer to find the peak of the spectrum. For the peak power spectral density be measured using below options:
		Refer as FCC KDB 789033, F)5) power spectral density can be measured using resolution bandwidths < 1 MHz provided that the results are integrated over 1 MHz bandwidth
	[duty	cycle ≥ 98% or external video / power trigger]
	\boxtimes	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
	\boxtimes	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	onducted 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 por 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 ther 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.: FR890719AB

TEL: 886-3-656-9065 Page Number : 24 of 31
FAX: 886-3-656-9085 Issued Date : Nov. 23, 2018

3.4.4 Test Setup



Report No.: FR890719AB

3.4.5 Test Result of Peak Power Spectral Density

Refer as Appendix D

TEL: 886-3-656-9065 Page Number : 25 of 31
FAX: 886-3-656-9085 Issued Date : Nov. 23, 2018

3.5 Unwanted Emissions

3.5.1 Transmitter Radiated 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.: FR890719AB

- 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	
	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 : 26 of 31
FAX: 886-3-656-9085 Issued Date : Nov. 23, 2018

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

Report No.: FR890719AB

3.5.2 Measuring Instruments

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

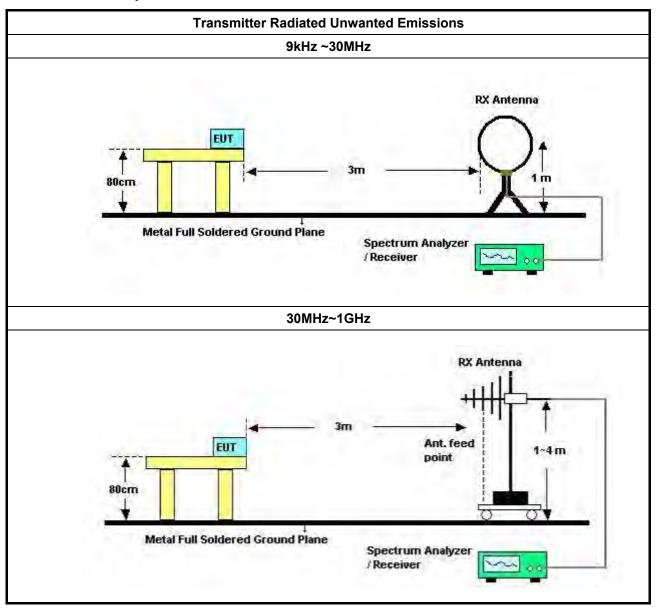
3.5.3 Test Procedures

Test Method

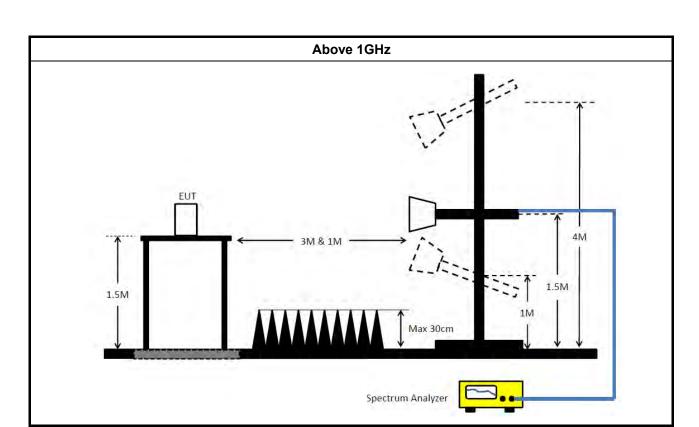
- Measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. Measurements shall not be performed at a distance greater than 30 m for frequencies above 30 MHz, 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 H)2) for unwanted emissions into non-restricted bands.
 - Refer as FCC KDB 789033, clause H)1) for unwanted emissions into restricted bands.
 - Refer as FCC KDB 789033, H)6) Method AD (Trace Averaging).
 - Refer as FCC KDB 789033, H)6) Method VB (Reduced VBW).
 - Refer as ANSI C63.10, clause 4.2.3.2.3 (Reduced VBW). VBW ≥ 1/T, where T is pulse time.
 - Refer as ANSI C63.10, clause 4.2.3.2.4 average value of pulsed emissions.
 - Refer as FCC KDB 789033, clause H)5) measurement procedure peak limit.
 - Refer as ANSI C63.10, clause 4.2.3.2.2 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 : 27 of 31
FAX: 886-3-656-9085 Issued Date : Nov. 23, 2018

3.5.4 Test Setup



TEL: 886-3-656-9065 Page Number : 28 of 31
FAX: 886-3-656-9085 Issued Date : Nov. 23, 2018



3.5.5 Transmitter Unwanted Emissions (Below 30MHz)

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 10 harmonic or 40 GHz, whichever is appropriate.

3.5.6 Test Result of Transmitter Unwanted Emissions

Refer as Appendix E

TEL: 886-3-656-9065 Page Number : 29 of 31 FAX: 886-3-656-9085 Issued Date : Nov. 23, 2018

4 Test Equipment and Calibration Data

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
LISN	Schwarzbeck	NSLK 8127	8127650	9kHz ~ 30MHz	Nov. 24, 2017	Nov. 23, 2018	Conduction (CO02-CB)
LISN	Schwarzbeck	NSLK 8127	8127478	9kHz ~ 30MHz	Nov. 13, 2017	Nov. 12, 2018	Conduction (CO02-CB)
EMI Receiver	Agilent	N9038A	MY52260140	9kHz ~ 8.4GHz	Jan. 17, 2018	Jan. 16, 2019	Conduction (CO02-CB)
COND Cable	Woken	Cable	2	0.15MHz ~ 30MHz	Nov. 10, 2017	Nov. 09, 2018	Conduction (CO02-CB)
Software	Audix	E3	6.120210n	-	N.C.R.	N.C.R.	Conduction (CO02-CB)
BILOG ANTENNA with 6dB Attenuator	TESEQ & EMCI	CBL6112D & N-6-06	37880 & AT-N0609	20MHz ~ 2GHz	Aug. 27, 2018	Aug. 26, 2019	Radiation (03CH01-CB)
Horn Antenna	EMCO	3115	00075790	750MHz ~ 18GHz	Nov. 20, 2017	Nov. 19, 2018	Radiation (03CH01-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Jun. 28, 2018	Jun. 27, 2019	Radiation (03CH01-CB)
Pre-Amplifier	EMCI	EMC330N	980332	20MHz ~ 3GHz	May 02, 2018	May 01, 2019	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02310	1GHz ~ 26.5GHz	Jan. 09, 2018	Jan. 08, 2019	Radiation (03CH01-CB)
Pre-Amplifier	MITEQ	TTA1840-35-H G	1864479	18GHz ~ 40GHz	Jul. 04, 2018 Jul. 03, 2019		Radiation (03CH01-CB)
Spectrum Analyzer	R&S	FSP40	100056	9kHz ~ 40GHz	Nov. 23, 2017	Nov. 22, 2018	Radiation (03CH01-CB)
EMI Test	R&S	ESCS	100354	9kHz ~ 2.75GHz	Dec. 08, 2017	Dec. 07, 2018	Radiation (03CH01-CB)
RF Cable-low	Woken	Low Cable-16+17	N/A	30 MHz ~ 1 GHz	Oct. 11, 2017	Oct. 10, 2018	Radiation (03CH01-CB)
RF Cable-low	Woken	Low Cable-16+17	N/A	30 MHz ~ 1 GHz	Oct. 08, 2018	Oct. 07, 2019	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-16	N/A	1 GHz ~ 18 GHz	Oct. 11, 2017	Oct. 10, 2018	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-16	N/A	1 GHz ~ 18 GHz	Oct. 08, 2018	Oct. 07, 2019	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-16+17	N/A	1 GHz ~ 18 GHz	Oct. 11, 2017	Oct. 10, 2018	Radiation (03CH01-CB)

Report No.: FR890719AB

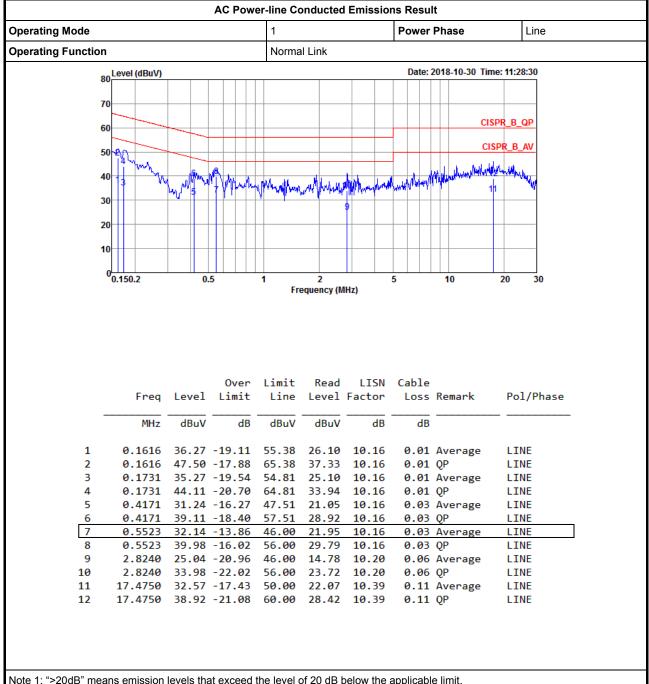
TEL: 886-3-656-9065 Page Number : 30 of 31
FAX: 886-3-656-9085 Issued Date : Nov. 23, 2018

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
RF Cable-high	Woken	High Cable-16+17	N/A	1 GHz ~ 18 GHz	Oct. 08, 2018	Oct. 07, 2019	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G#1	N/A	18GHz ~ 40 GHz	Jul. 27, 2018	Jul. 26, 2019	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G#2	N/A	18GHz ~ 40 GHz Jul. 27, 2018		Jul. 26, 2019	Radiation (03CH01-CB)
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	Mar. 16, 2018	Mar. 15, 2019	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSV40	100979	9kHz~40GHz	Dec. 21, 2017	Dec. 20, 2018	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-06	1 GHz – 26.5 GHz	Oct. 11, 2017	Oct. 10, 2018	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-06	1 GHz – 26.5 GHz	Oct. 08, 2018	Oct. 07, 2019	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-07	1 GHz –26.5 GHz	Oct. 11, 2017	Oct. 10, 2018	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-07	1 GHz –26.5 GHz	Oct. 08, 2018	Oct. 07, 2019	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-08	1 GHz –26.5 GHz	Oct. 11, 2017	Oct. 10, 2018	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-08	1 GHz –26.5 GHz	Oct. 08, 2018	Oct. 07, 2019	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-09	1 GHz –26.5 GHz	Oct. 11, 2017	Oct. 10, 2018	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-09	1 GHz –26.5 GHz	Oct. 08, 2018	Oct. 07, 2019	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-10	1 GHz –26.5 GHz	Oct. 11, 2017	Oct. 10, 2018	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-10	1 GHz –26.5 GHz	Oct. 08, 2018	Oct. 07, 2019	Conducted (TH01-CB)
Power Sensor	Agilent	U2021XA	MY54320014	50MHz~18GHz	Apr. 17, 2018	Apr. 16, 2019	Conducted (TH01-CB)

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

TEL: 886-3-656-9065 Page Number : 31 of 31
FAX: 886-3-656-9085 Issued Date : Nov. 23, 2018

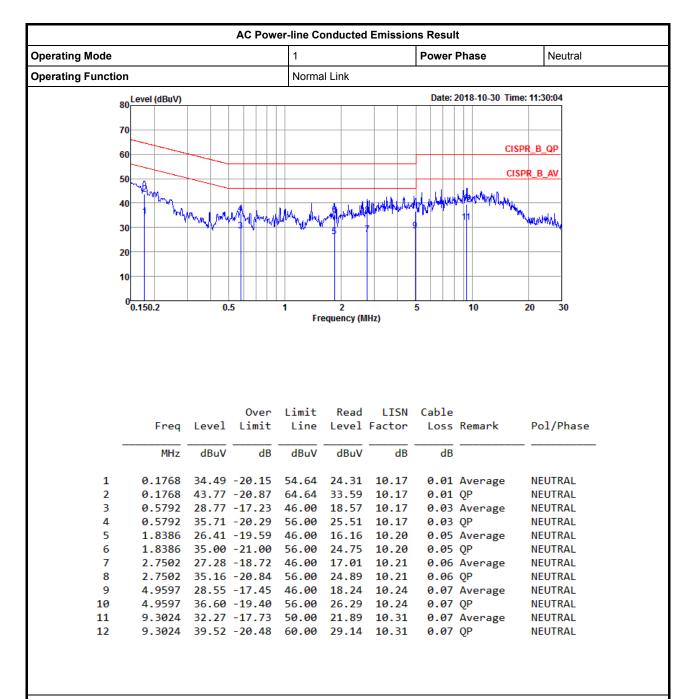
AC Power-line Conducted Emissions Result



Note 1: ">20dB" means emission levels that exceed the level of 20 dB below the applicable limit.

Note 2: "N/F" means Nothing Found emissions (No emissions were detected.)





Note 1: ">20dB" means emission levels that exceed the level of 20 dB below the applicable limit.

Note 2: "N/F" means Nothing Found emissions (No emissions were detected.)



Appendix B EBW Result

Summary

Mode	Max-N dB	Max-OBW	ITU-Code	Min-N dB	Min-OBW	
	(Hz)	(Hz)		(Hz)	(Hz)	
5.15-5.25GHz	-	-	-	-	-	
802.11a_Nss1,(6Mbps)_3TX	22.55M	16.517M	16M5D1D	19.75M	16.392M	
802.11ac VHT20_Nss1,(MCS0)_3TX	24.725M	17.725M	17M7D1D	20.7M	17.666M	
802.11ac VHT40_Nss1,(MCS0)_3TX	40.35M	36.232M	36M2D1D	39.8M	36.182M	
802.11ac VHT80_Nss1,(MCS0)_3TX	80.2M	75.762M	75M8D1D	79.9M	75.762M	
802.11ac VHT20-BF_Nss1,(MCS0)_3TX	20.775M	17.716M	17M7D1D	19.6M	17.291M	
802.11ac VHT40-BF_Nss1,(MCS0)_3TX	70.8M	36.282M	36M3D1D	38.55M	35.582M	
802.11ac VHT80-BF_Nss1,(MCS0)_3TX	80M	75.862M	75M9D1D	79.5M	75.562M	
5.725-5.85GHz	-	-	-	-	-	
802.11a_Nss1,(6Mbps)_3TX	16.35M	34.208M	34M2D1D	16.25M	32.984M	
802.11ac VHT20_Nss1,(MCS0)_3TX	17.6M	35.657M	35M7D1D	17.125M	33.583M	
802.11ac VHT40_Nss1,(MCS0)_3TX	36.15M	36.932M	36M9D1D	35.4M	36.232M	
802.11ac VHT80_Nss1,(MCS0)_3TX	76.3M	76.062M	76M1D1D	76.2M	75.862M	
802.11ac VHT20-BF_Nss1,(MCS0)_3TX	17.65M	17.741M	17M7D1D	15.325M	17.116M	
802.11ac VHT40-BF_Nss1,(MCS0)_3TX	35.9M	36.332M	36M3D1D	33.8M	35.082M	
802.11ac VHT80-BF_Nss1,(MCS0)_3TX	75.6M	76.462M	76M5D1D	73.3M	75.362M	

Max-N dB = Maximum 6dB down bandwidth for 5.725-5.85GHz band / Maximum 26dB down bandwidth for other band;
Max-OBW = Maximum 99% 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;

Page No. : 1 of 12



EBW Result Appendix B

Result

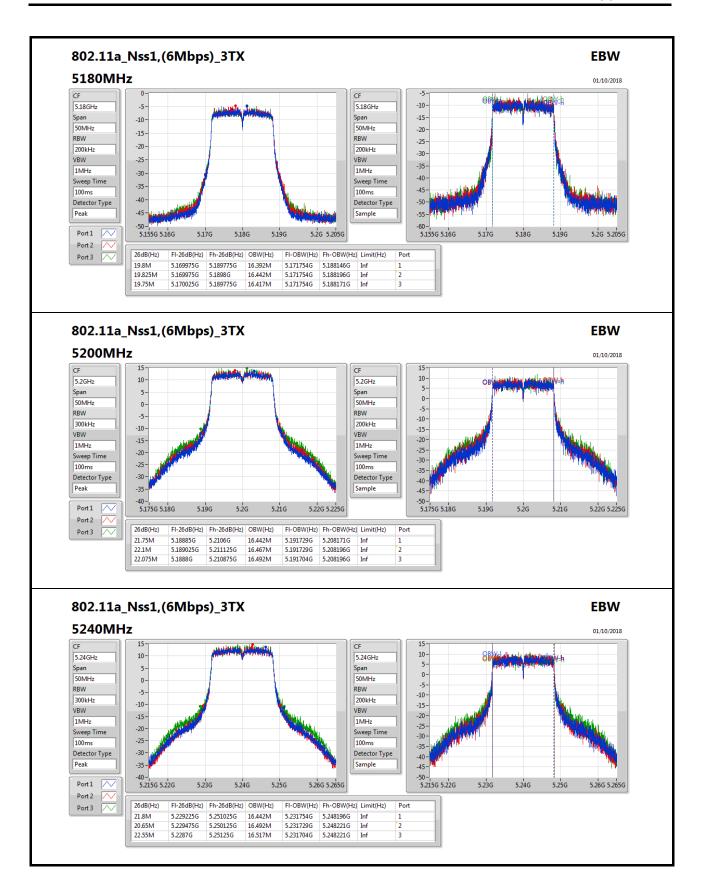
Mode	Result	Limit	Port 1-N dB	Port 1-OBW	Port 2-N dB	Port 2-OBW	Port 3-N dB	Port 3-OBW
		(Hz)	(Hz)	(Hz)	(Hz)	(Hz)	(Hz)	(Hz)
802.11a_Nss1,(6Mbps)_3TX	-	-	-	-	-	-	-	-
5180MHz	Pass	Inf	19.8M	16.392M	19.825M	16.442M	19.75M	16.417M
5200MHz	Pass	Inf	21.75M	16.442M	22.1M	16.467M	22.075M	16.492M
5240MHz	Pass	Inf	21.8M	16.442M	20.65M	16.492M	22.55M	16.517M
5745MHz	Pass	500k	16.325M	33.233M	16.325M	34.108M	16.275M	32.984M
5785MHz	Pass	500k	16.25M	33.408M	16.325M	33.983M	16.35M	33.208M
5825MHz	Pass	500k	16.275M	33.083M	16.3M	33.958M	16.325M	34.208M
802.11ac VHT20_Nss1,(MCS0)_3TX	-	-	-	-	-	-	-	-
5180MHz	Pass	Inf	20.85M	17.725M	20.7M	17.725M	20.975M	17.725M
5200MHz	Pass	Inf	23.275M	17.666M	23.55M	17.716M	24.725M	17.716M
5240MHz	Pass	Inf	22.525M	17.716M	23M	17.666M	24.275M	17.716M
5745MHz	Pass	500k	17.125M	34.158M	17.6M	35.457M	17.575M	33.958M
5785MHz	Pass	500k	17.25M	34.683M	17.425M	35.357M	17.55M	34.158M
5825MHz	Pass	500k	17.575M	33.583M	17.225M	34.583M	17.55M	35.657M
802.11ac VHT40_Nss1,(MCS0)_3TX	-	-	-	-	-	-	-	-
5190MHz	Pass	Inf	39.9M	36.232M	40.05M	36.182M	39.8M	36.182M
5230MHz	Pass	Inf	40.05M	36.182M	40.25M	36.182M	40.35M	36.182M
5755MHz	Pass	500k	36.15M	36.232M	36M	36.232M	35.7M	36.232M
5795MHz	Pass	500k	35.7M	36.532M	36.15M	36.782M	35.4M	36.932M
802.11ac VHT80_Nss1,(MCS0)_3TX	-	-	-	-	-	-	-	-
5210MHz	Pass	Inf	80.2M	75.762M	79.9M	75.762M	80M	75.762M
5775MHz	Pass	500k	76.3M	76.062M	76.3M	75.862M	76.2M	75.862M
802.11ac VHT20-BF_Nss1,(MCS0)_3TX	-	-	-	-	-	-	-	-
5180MHz	Pass	Inf	20.375M	17.641M	19.925M	17.566M	20.5M	17.591M
5200MHz	Pass	Inf	20.7M	17.716M	20.325M	17.516M	20.75M	17.666M
5240MHz	Pass	Inf	19.6M	17.291M	20.3M	17.566M	20.775M	17.691M
5745MHz	Pass	500k	17.65M	17.741M	16.825M	17.566M	17M	17.541M
5785MHz	Pass	500k	16.725M	17.666M	16.35M	17.491M	17.125M	17.666M
5825MHz	Pass	500k	16.475M	17.516M	15.325M	17.116M	17.55M	17.716M
802.11ac VHT40-BF_Nss1,(MCS0)_3TX	-	-	-	-	-	-	-	-
5190MHz	Pass	Inf	38.55M	35.582M	39.35M	36.282M	38.9M	36.132M
5230MHz	Pass	Inf	53.45M	35.932M	66.9M	35.932M	70.8M	35.982M
5755MHz	Pass	500k	35.05M	35.482M	35.75M	36.332M	35.5M	35.682M
5795MHz	Pass	500k	35.7M	35.882M	33.8M	35.082M	35.9M	36.232M
802.11ac VHT80-BF_Nss1,(MCS0)_3TX	-	-	-	-	-	-	-	-
5210MHz	Pass	Inf	79.9M	75.662M	79.5M	75.562M	80M	75.862M
5775MHz	Pass	500k	75M	75.362M	73.3M	75.562M	75.6M	76.462M

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;

Page No. : 2 of 12

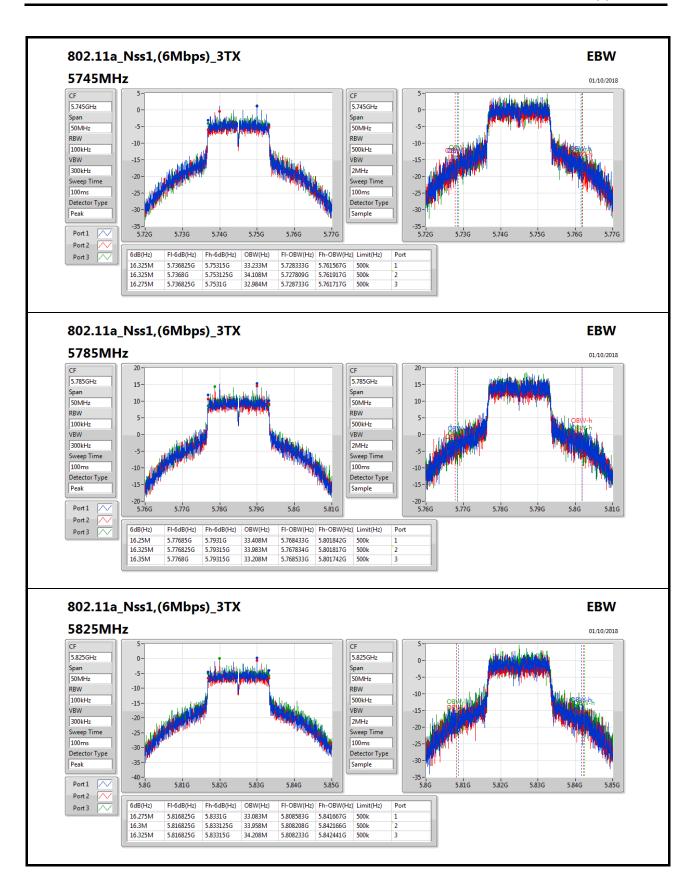


EBW Result Appendix B



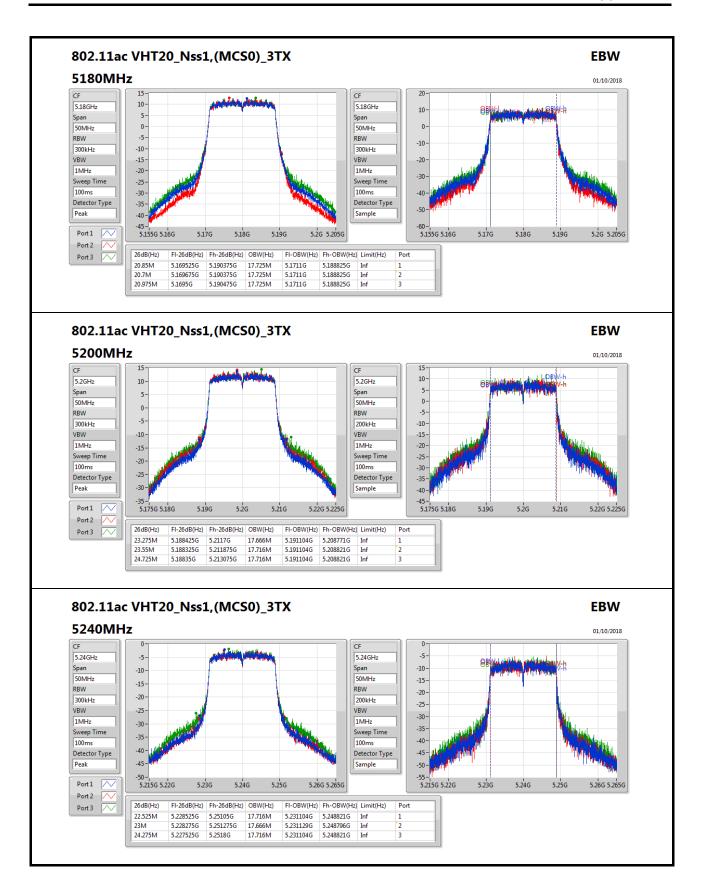
Page No. : 3 of 12





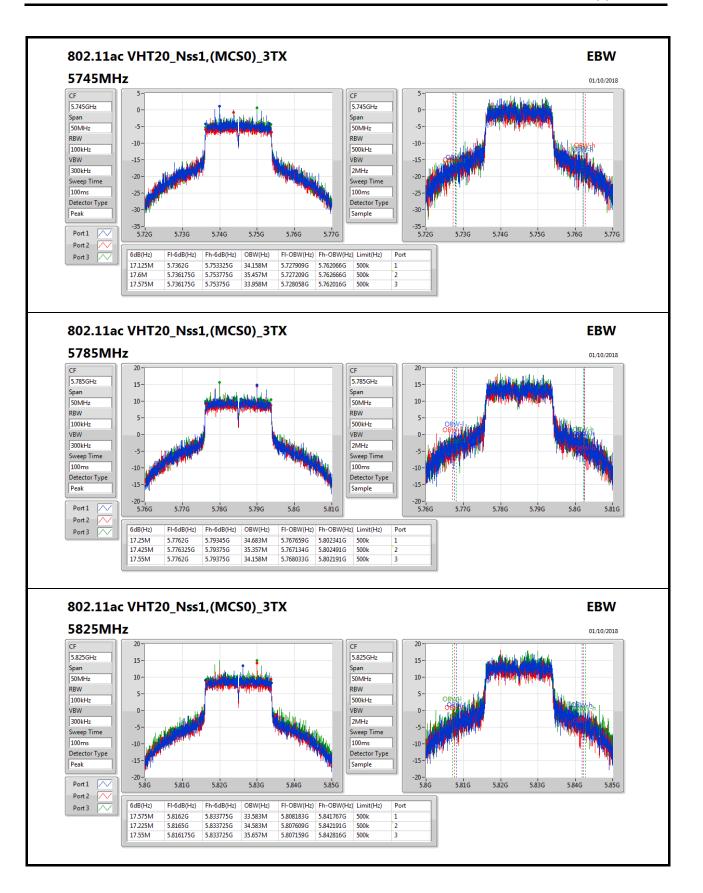
Page No. : 4 of 12





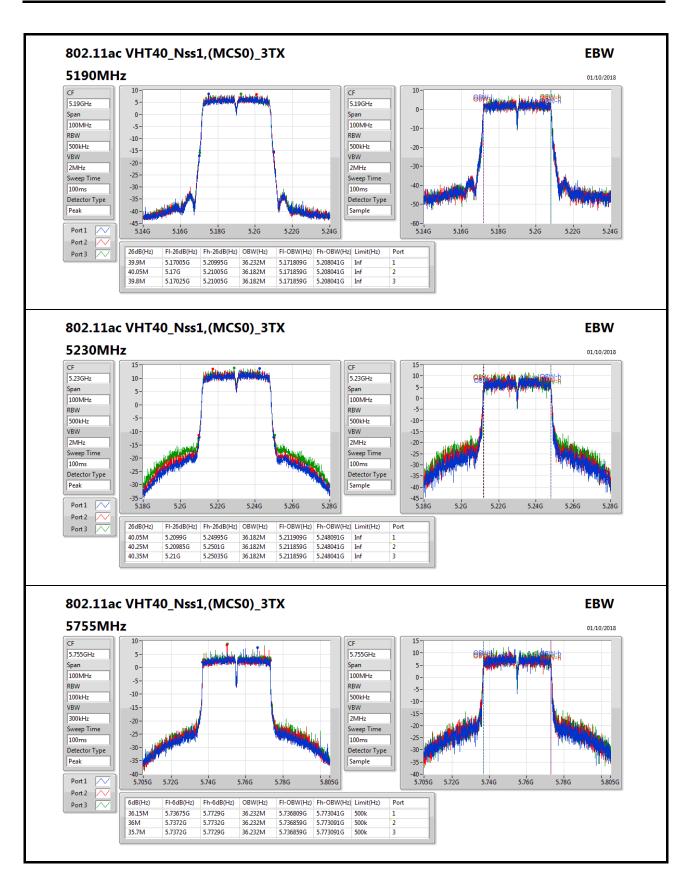
Page No. : 5 of 12





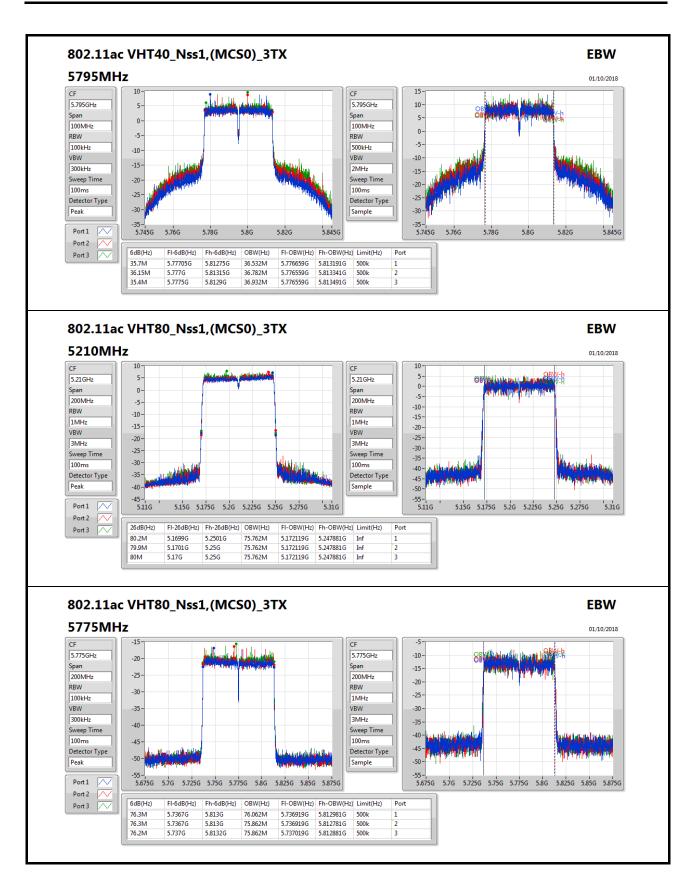
Page No. : 6 of 12



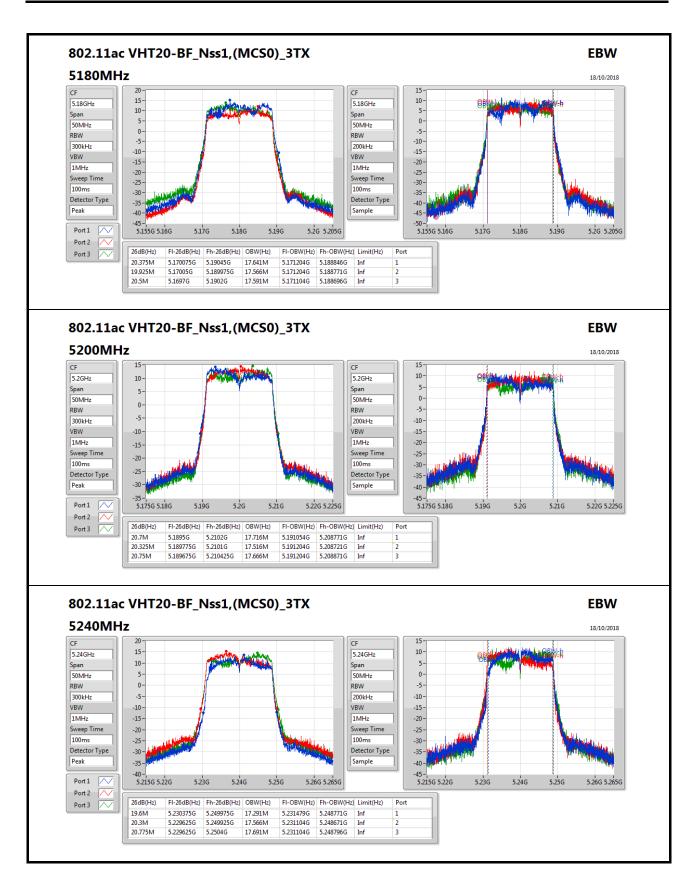


Page No. : 7 of 12

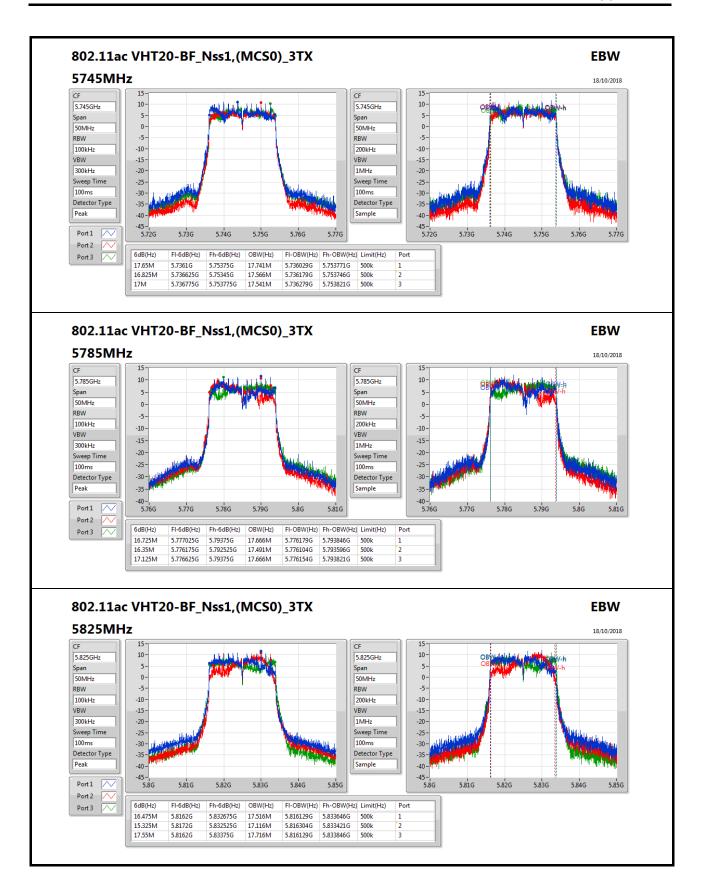






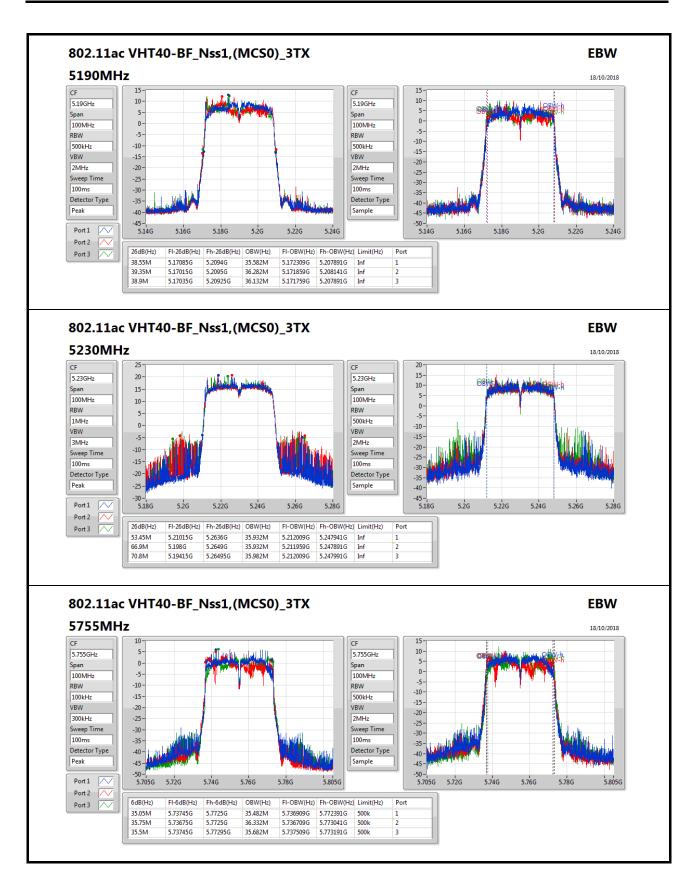


Page No. : 9 of 12



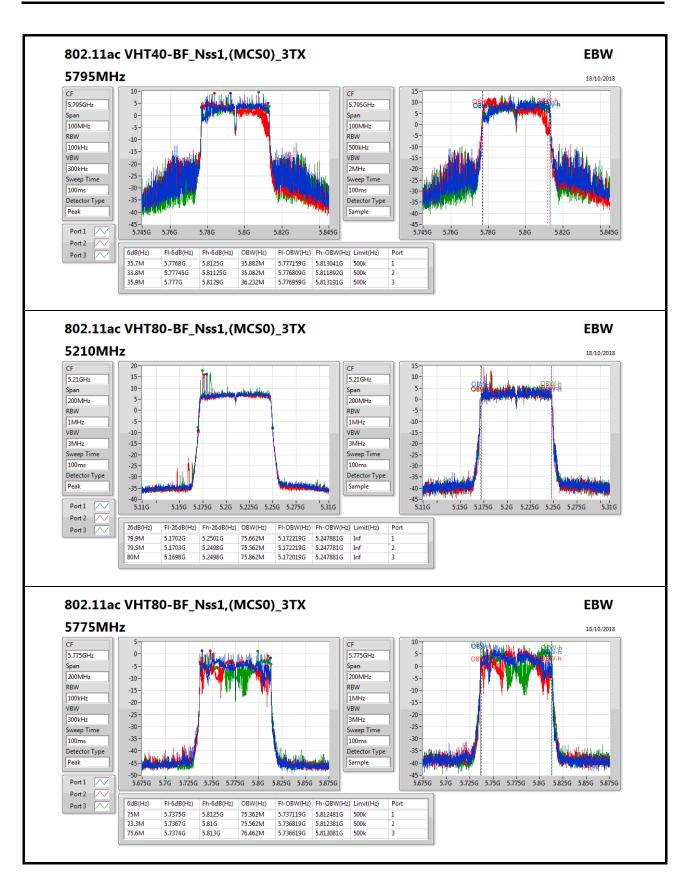
Page No. : 10 of 12





Page No. : 11 of 12





Page No. : 12 of 12



Power Result Appendix C

Summary

Mode	Total Power	Total Power
	(dBm)	(W)
5.15-5.25GHz	-	-
802.11a_Nss1,(6Mbps)_3TX	26.68	0.46559
802.11ac VHT20_Nss1,(MCS0)_3TX	26.90	0.48978
802.11ac VHT40_Nss1,(MCS0)_3TX	26.13	0.41020
802.11ac VHT80_Nss1,(MCS0)_3TX	19.46	0.08831
802.11ac VHT20-BF_Nss1,(MCS0)_3TX	26.91	0.49091
802.11ac VHT40-BF_Nss1,(MCS0)_3TX	26.76	0.47424
802.11ac VHT80-BF_Nss1,(MCS0)_3TX	22.14	0.16368
5.725-5.85GHz	-	-
802.11a_Nss1,(6Mbps)_3TX	29.89	0.97499
802.11ac VHT20_Nss1,(MCS0)_3TX	29.91	0.97949
802.11ac VHT40_Nss1,(MCS0)_3TX	27.27	0.53333
802.11ac VHT80_Nss1,(MCS0)_3TX	21.45	0.13964
802.11ac VHT20-BF_Nss1,(MCS0)_3TX	26.12	0.40926
802.11ac VHT40-BF_Nss1,(MCS0)_3TX	26.06	0.40365
802.11ac VHT80-BF_Nss1,(MCS0)_3TX	21.07	0.12794

Page No. : 1 of 2



Power Result Appendix C

Result

Mode	Result	DG	Port 1	Port 2	Port 3	Total Power	Power Limit	
		(dBi)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	
802.11a_Nss1,(6Mbps)_3TX	-	-	-	-	-	-	-	
5180MHz	Pass	3.87	19.75	20.01	19.80	24.63	30.00	
5200MHz	Pass	3.87	21.66	21.89	22.04	26.64	30.00	
5240MHz	Pass	3.87	21.80	21.78	22.15	26.68	30.00	
5745MHz	Pass	3.64	25.26	24.63	25.44	29.89	30.00	
5785MHz	Pass	3.64	24.68	24.03	24.88	29.32	30.00	
5825MHz	Pass	3.64	24.69	23.89	24.89	29.28	30.00	
802.11ac VHT20_Nss1,(MCS0)_3TX	-	-	-	-	-	-	-	
5180MHz	Pass	3.87	20.04	20.14	20.30	24.93	30.00	
5200MHz	Pass	3.87	21.73	21.93	22.10	26.69	30.00	
5240MHz	Pass	3.87	22.02	21.92	22.42	26.90	30.00	
5745MHz	Pass	3.64	25.29	24.63	25.45	29.91	30.00	
5785MHz	Pass	3.64	24.60	24.01	24.94	29.30	30.00	
5825MHz	Pass	3.64	24.44	23.65	24.86	29.12	30.00	
802.11ac VHT40_Nss1,(MCS0)_3TX	-	-	-	-	-	-	-	
5190MHz	Pass	3.87	16.33	16.52	16.64	21.27	30.00	
5230MHz	Pass	3.87	21.13	21.32	21.62	26.13	30.00	
5755MHz	Pass	3.64	21.41	21.27	21.84	26.28	30.00	
5795MHz	Pass	3.64	22.28	22.27	22.92	27.27	30.00	
802.11ac VHT80_Nss1,(MCS0)_3TX	-	-	-	-	-	-	-	
5210MHz	Pass	3.87	14.60	14.32	15.11	19.46	30.00	
5775MHz	Pass	3.64	16.67	16.85	16.52	21.45	30.00	
802.11ac VHT20-BF_Nss1,(MCS0)_3TX	-	-	-	-	-	-	-	
5180MHz	Pass	8.64	21.05	20.71	20.98	25.69	27.36	
5200MHz	Pass	8.64	21.72	22.26	21.43	26.59	27.36	
5240MHz	Pass	8.64	22.54	21.98	21.85	26.91	27.36	
5745MHz	Pass	8.41	21.60	21.23	21.02	26.06	27.59	
5785MHz	Pass	8.41	21.20	21.46	20.74	25.91	27.59	
5825MHz	Pass	8.41	21.67	21.14	21.21	26.12	27.59	
802.11ac VHT40-BF_Nss1,(MCS0)_3TX	-	-	-	-	-	-	-	
5190MHz	Pass	8.64	17.49	17.18	17.25	22.08	27.36	
5230MHz	Pass	8.64	22.21	21.97	21.76	26.76	27.36	
5755MHz	Pass	8.41	18.47	17.88	17.69	22.80	27.59	
5795MHz	Pass	8.41	21.69	21.13	21.01	26.06	27.59	
802.11ac VHT80-BF_Nss1,(MCS0)_3TX	-	-	-	-	-	-	-	
5210MHz	Pass	8.64	17.39	17.27	17.45	22.14	27.36	
5775MHz	Pass	8.41	16.49	16.14	16.27	21.07	27.59	

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



Summary

Mode	PD
	(dBm/RBW)
5.15-5.25GHz	-
802.11a_Nss1,(6Mbps)_3TX	14.16
802.11ac VHT20_Nss1,(MCS0)_3TX	14.01
802.11ac VHT40_Nss1,(MCS0)_3TX	10.34
802.11ac VHT80_Nss1,(MCS0)_3TX	0.44
802.11ac VHT20-BF_Nss1,(MCS0)_3TX	14.12
802.11ac VHT40-BF_Nss1,(MCS0)_3TX	10.61
802.11ac VHT80-BF_Nss1,(MCS0)_3TX	2.80
5.725-5.85GHz	-
802.11a_Nss1,(6Mbps)_3TX	15.26
802.11ac VHT20_Nss1,(MCS0)_3TX	14.63
802.11ac VHT40_Nss1,(MCS0)_3TX	9.92
802.11ac VHT80_Nss1,(MCS0)_3TX	0.47
802.11ac VHT20-BF_Nss1,(MCS0)_3TX	12.35
802.11ac VHT40-BF_Nss1,(MCS0)_3TX	8.79
802.11ac VHT80-BF_Nss1,(MCS0)_3TX	0.60

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

Page No. : 1 of 12



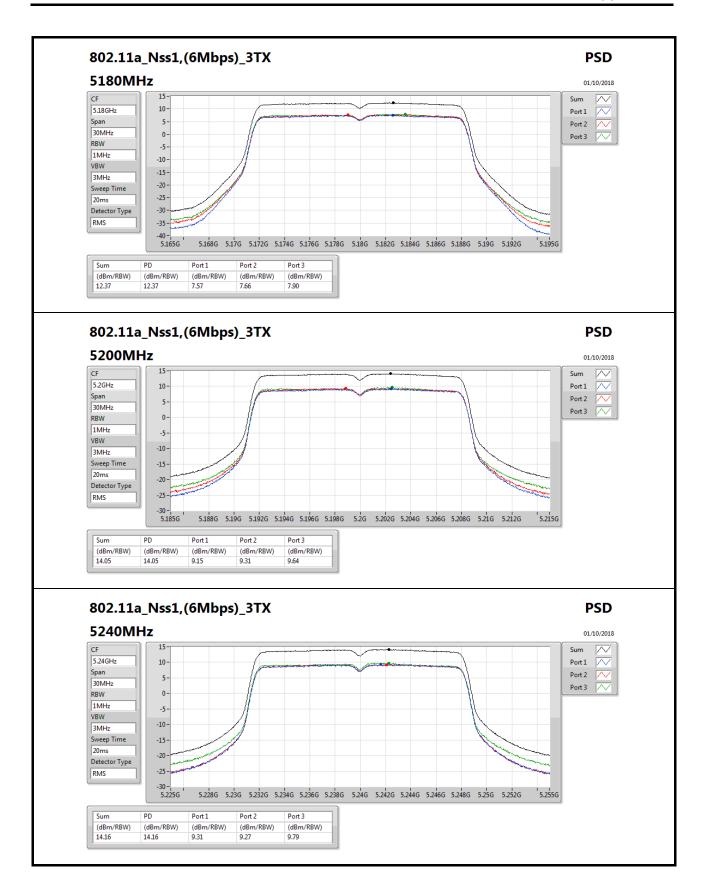
Appendix D **PSD** Result

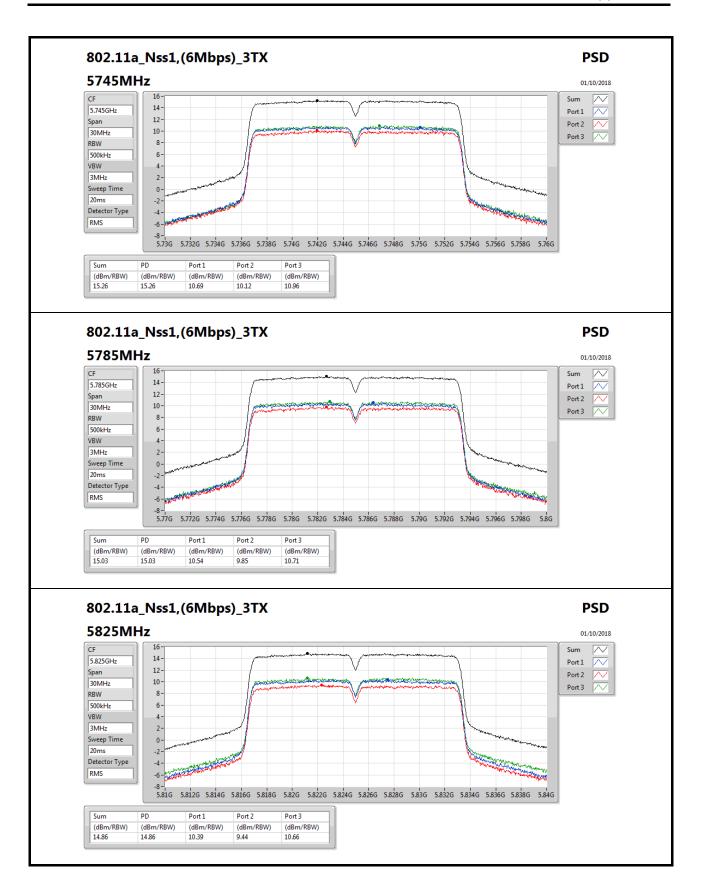
Result

Mode	Result	DG	Port 1	Port 2	Port 3	PD	PD Limit
		(dBi)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
802.11a_Nss1,(6Mbps)_3TX	-	-	-	-	-	-	-
5180MHz	Pass	8.64	7.57	7.66	7.90	12.37	14.36
5200MHz	Pass	8.64	9.15	9.31	9.64	14.05	14.36
5240MHz	Pass	8.64	9.31	9.27	9.79	14.16	14.36
5745MHz	Pass	8.41	10.69	10.12	10.96	15.26	27.59
5785MHz	Pass	8.41	10.54	9.85	10.71	15.03	27.59
5825MHz	Pass	8.41	10.39	9.44	10.66	14.86	27.59
802.11ac VHT20_Nss1,(MCS0)_3TX	-	-	-	-	-	-	-
5180MHz	Pass	8.64	7.08	7.09	7.36	11.78	14.36
5200MHz	Pass	8.64	9.05	9.16	9.47	13.86	14.36
5240MHz	Pass	8.64	9.17	9.06	9.83	14.01	14.36
5745MHz	Pass	8.41	10.24	9.47	10.31	14.63	27.59
5785MHz	Pass	8.41	9.91	9.14	10.07	14.31	27.59
5825MHz	Pass	8.41	9.77	8.97	10.15	14.26	27.59
802.11ac VHT40_Nss1,(MCS0)_3TX	-	-	-	-	-	-	-
5190MHz	Pass	8.64	0.35	0.57	0.73	5.23	14.36
5230MHz	Pass	8.64	5.38	5.47	6.03	10.34	14.36
5755MHz	Pass	8.41	4.12	4.12	4.50	8.94	27.59
5795MHz	Pass	8.41	4.94	5.14	5.63	9.92	27.59
802.11ac VHT80_Nss1,(MCS0)_3TX	-	-	-	-	-	-	-
5210MHz	Pass	8.64	-4.21	-4.27	-3.93	0.44	14.36
5775MHz	Pass	8.41	-4.08	-4.09	-4.05	0.47	27.59
802.11ac VHT20-BF_Nss1,(MCS0)_3TX	-	-	-	-	-	-	-
5180MHz	Pass	8.64	10.10	8.86	8.70	13.18	14.36
5200MHz	Pass	8.64	10.59	10.26	10.34	13.65	14.36
5240MHz	Pass	8.64	11.34	10.46	10.50	14.12	14.36
5745MHz	Pass	8.41	9.06	6.89	8.41	11.80	27.59
5785MHz	Pass	8.41	8.77	9.04	8.15	12.34	27.59
5825MHz	Pass	8.41	8.66	9.42	7.86	12.35	27.59
802.11ac VHT40-BF_Nss1,(MCS0)_3TX	-	-	-	-	-	-	-
5190MHz	Pass	8.64	2.92	2.60	3.39	6.28	14.36
5230MHz	Pass	8.64	6.21	5.74	6.35	10.61	14.36
5755MHz	Pass	8.41	2.77	2.55	2.18	5.91	27.59
5795MHz	Pass	8.41	5.06	5.66	5.58	8.79	27.59
802.11ac VHT80-BF_Nss1,(MCS0)_3TX	-	-	-	-	-	-	-
5210MHz	Pass	8.64	-1.75	-1.95	-1.58	2.80	14.36
5775MHz	Pass	8.41	-2.02	-1.48	-2.49	0.60	27.59

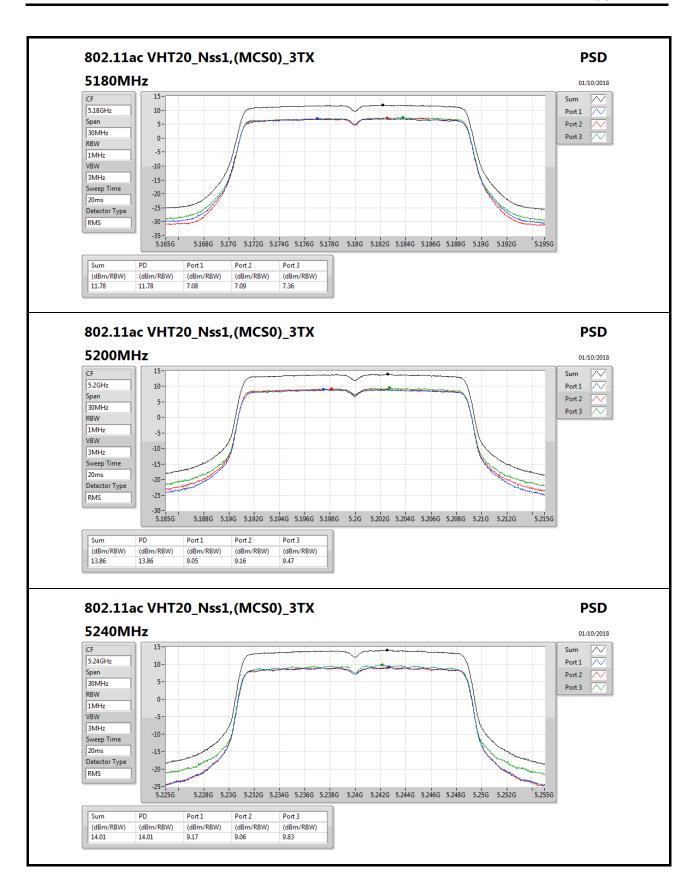
DG = Directional Gain; RBW = 500kHz for 5.725-5.85GHz band / 1MHz for other band;
PD = trace bin-by-bin of each transmits port summing can be performed maximum power density; Port X = Port Xpower density;

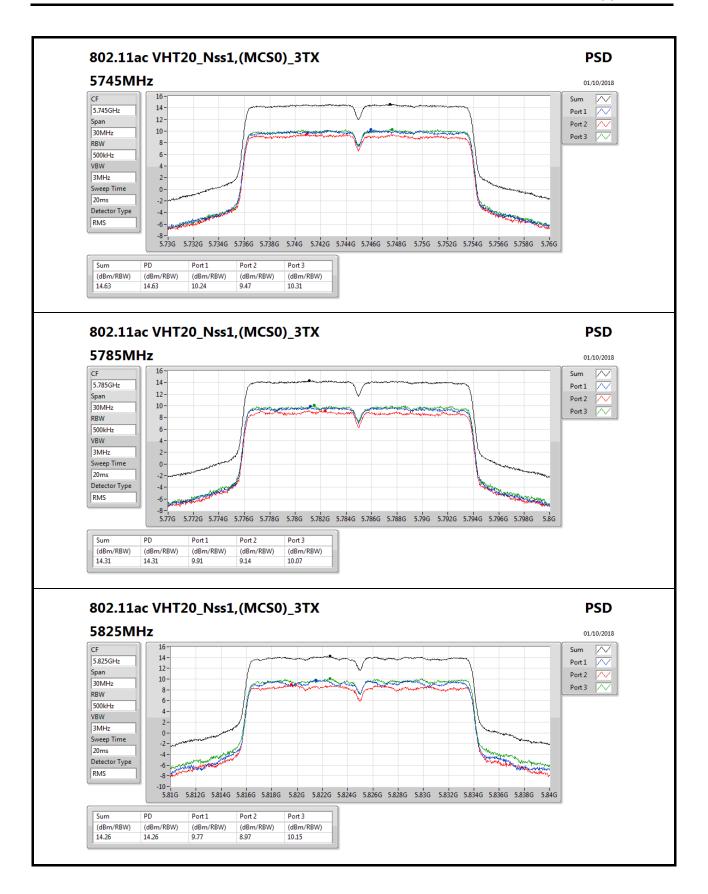
Page No. : 2 of 12

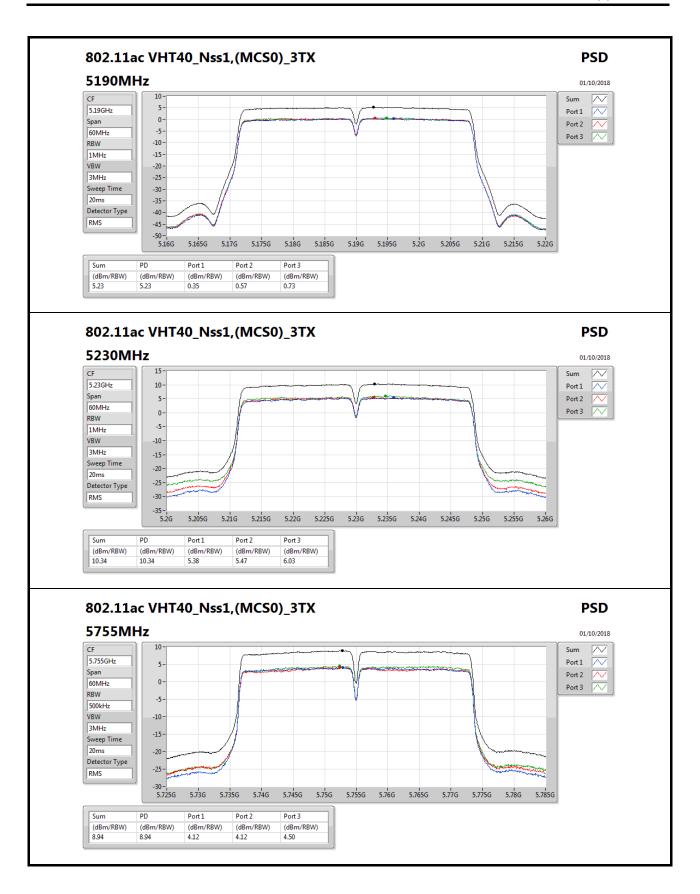


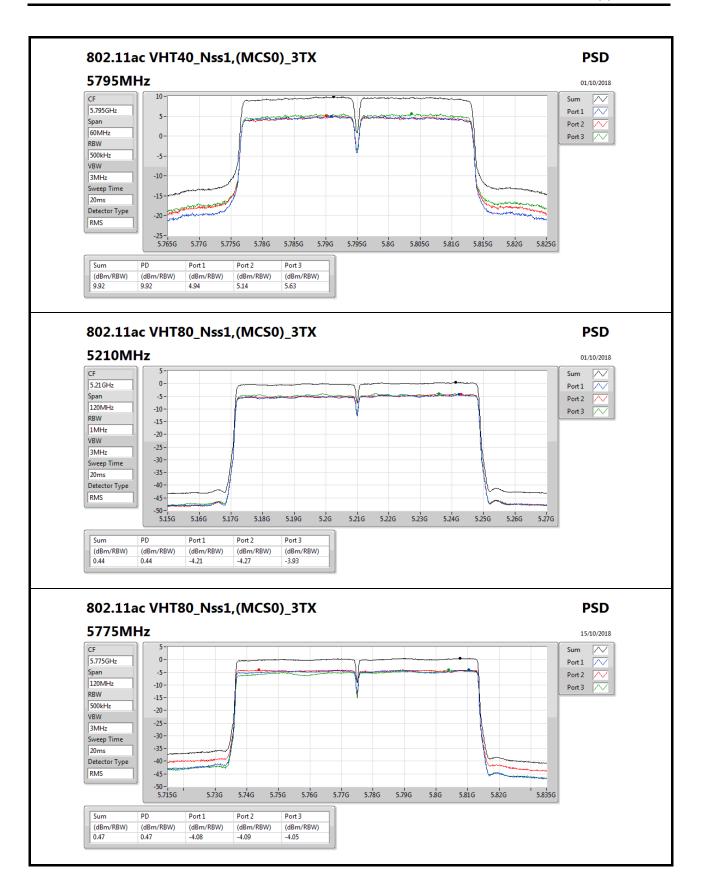


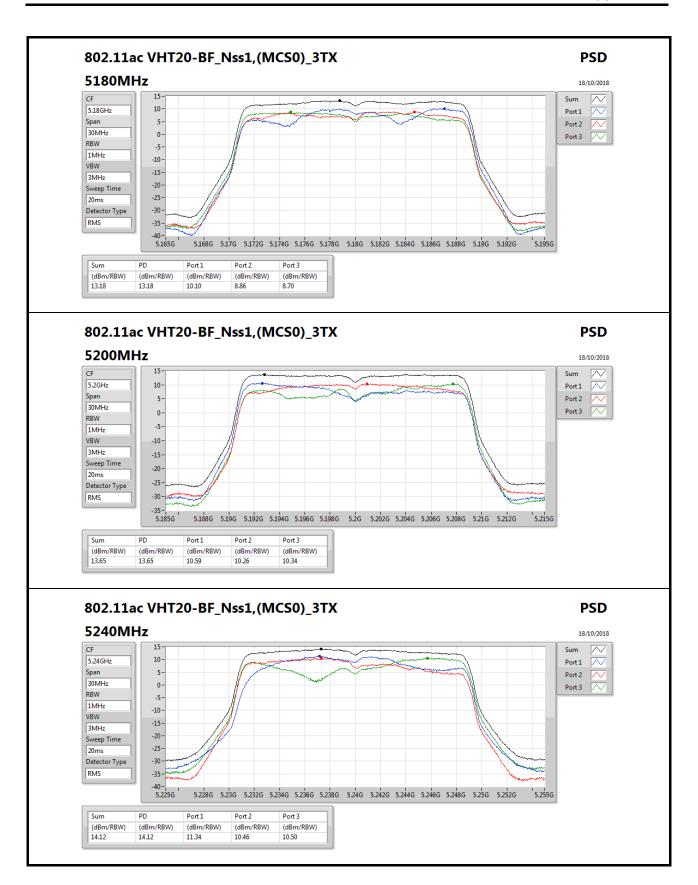


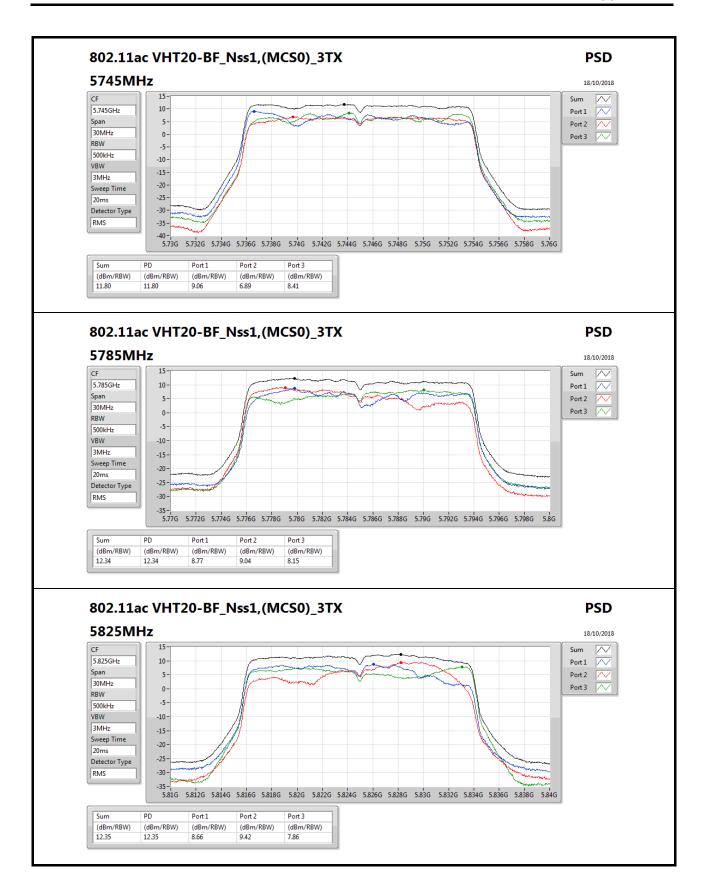


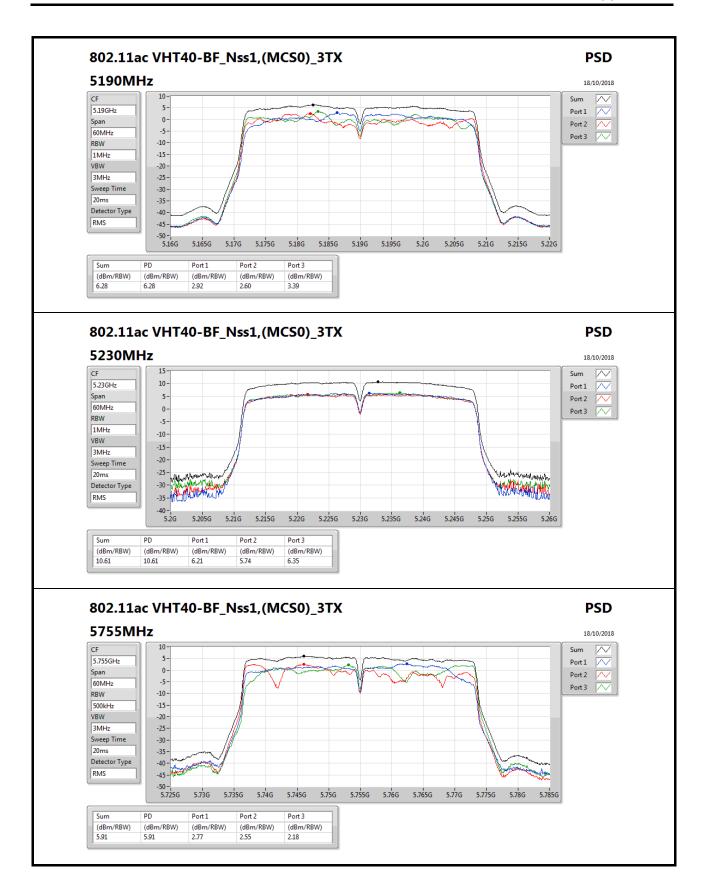




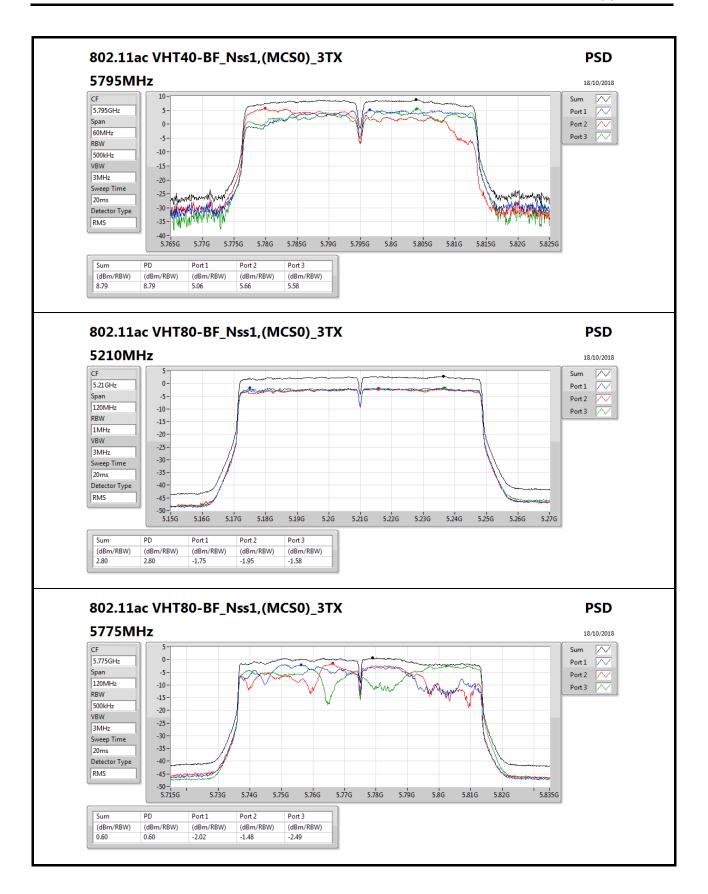




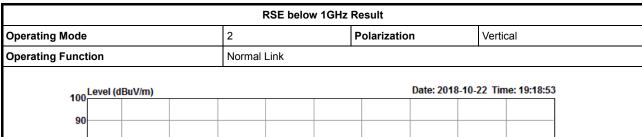


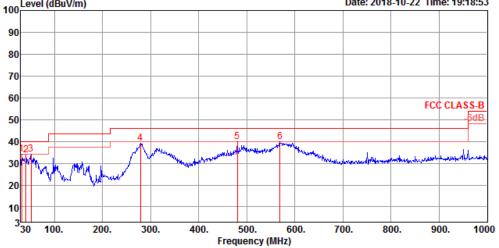


Page No. : 11 of 12





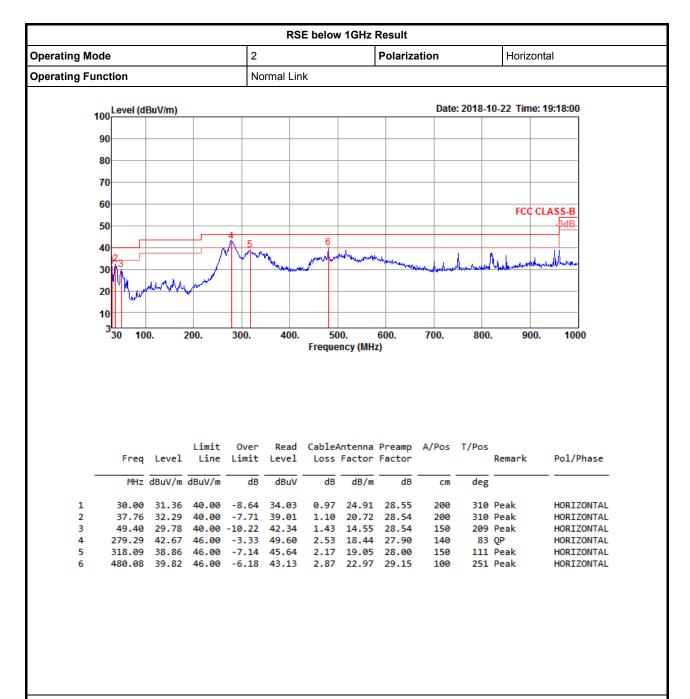




			Limit	0ver	Read	CableA	ntenna	Preamp	A/Pos	T/Pos		
	Freq	Level	Line	Limit	Level	Loss	Factor	Factor			Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	31.94	34.22	40.00	-5.78	37.93	0.99	23.84	28.54	300	177	Peak	VERTICAL
2	40.67	33.88	40.00	-6.12	42.17	1.19	19.06	28.54	300	2	Peak	VERTICAL
3	51.34	33.98	40.00	-6.02	47.28	1.40	13.84	28.54	100	138	Peak	VERTICAL
4	279.29	39.12	46.00	-6.88	46.05	2.53	18.44	27.90	200	221	Peak	VERTICAL
5	480.08	39.96	46.00	-6.04	43.27	2.87	22.97	29.15	200	218	Peak	VERTICAL
6	569.32	39.79	46.00	-6.21	42.38	2.40	24.37	29.36	125	142	Peak	VERTICAL

Note 1: ">20dB" means emission levels that exceed the level of 20 dB below the applicable limit. Note 2: "N/F" means Nothing Found emissions (No emissions were detected.)





Note 1: ">20dB" means emission levels that exceed the level of 20 dB below the applicable limit.

Note 2: "N/F" means Nothing Found emissions (No emissions were detected.)



RSE TX above 1GHz Result

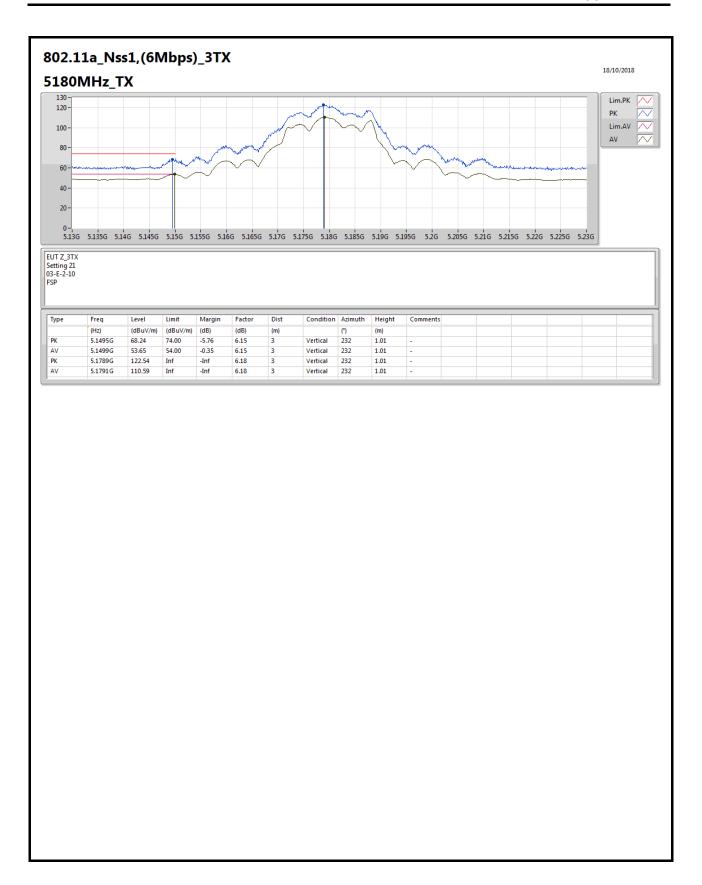
Appendix E.2

Page No. : 1 of 121

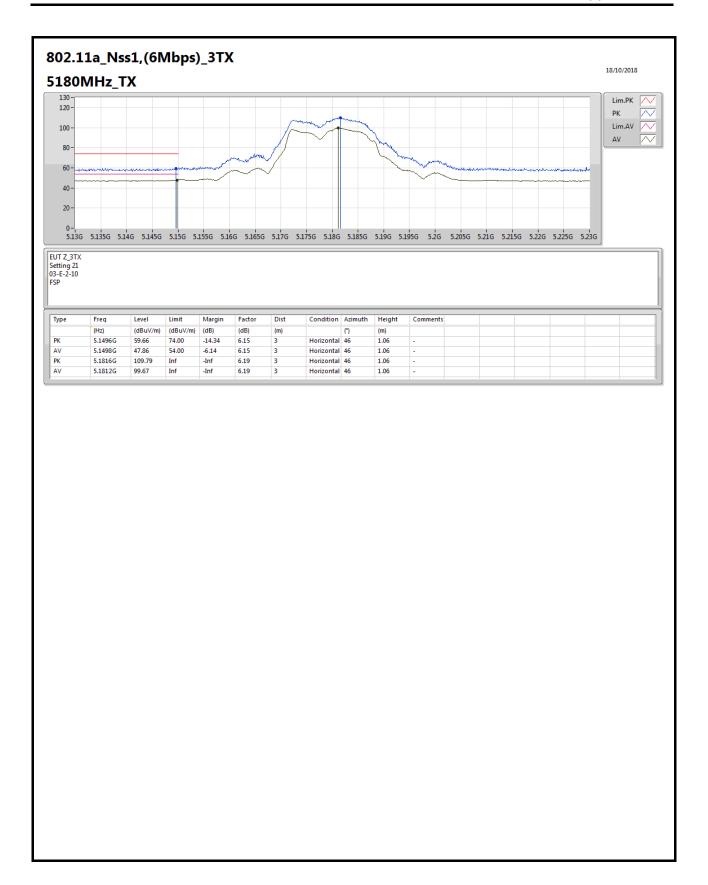
Summary

Mode	Result	Туре	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments
			(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
5.725-5.85GHz	-	-	-	-	-	-	-	-	-	-	-	-
802.11ac VHT40-BF_Nss1,(MCS0)_3TX	Pass	PK	5.926G	68.17	68.20	-0.03	7.33	3	Vertical	219	1.99	-

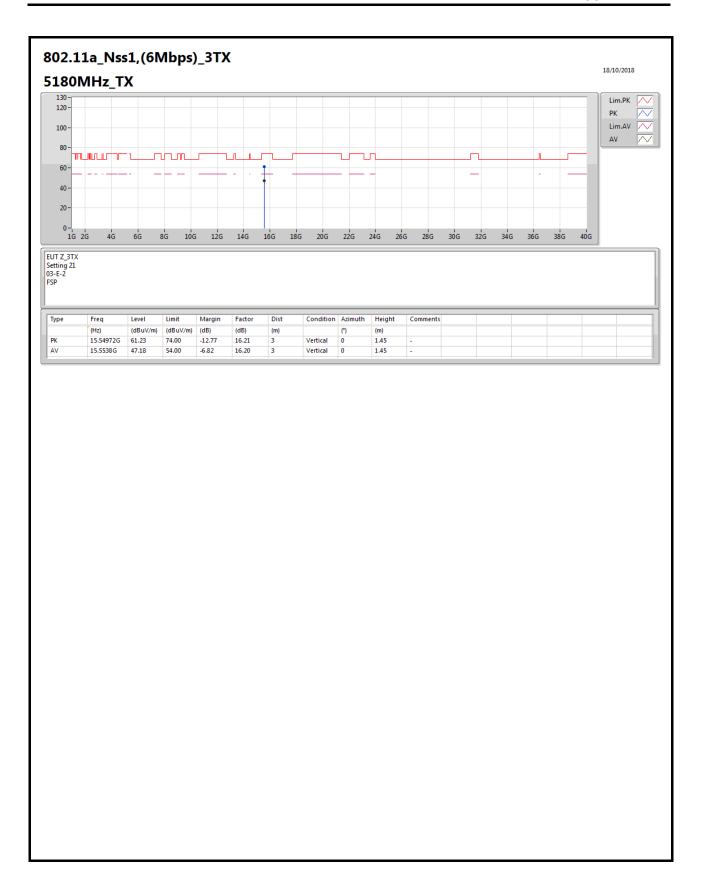
Page No. : 2 of 121



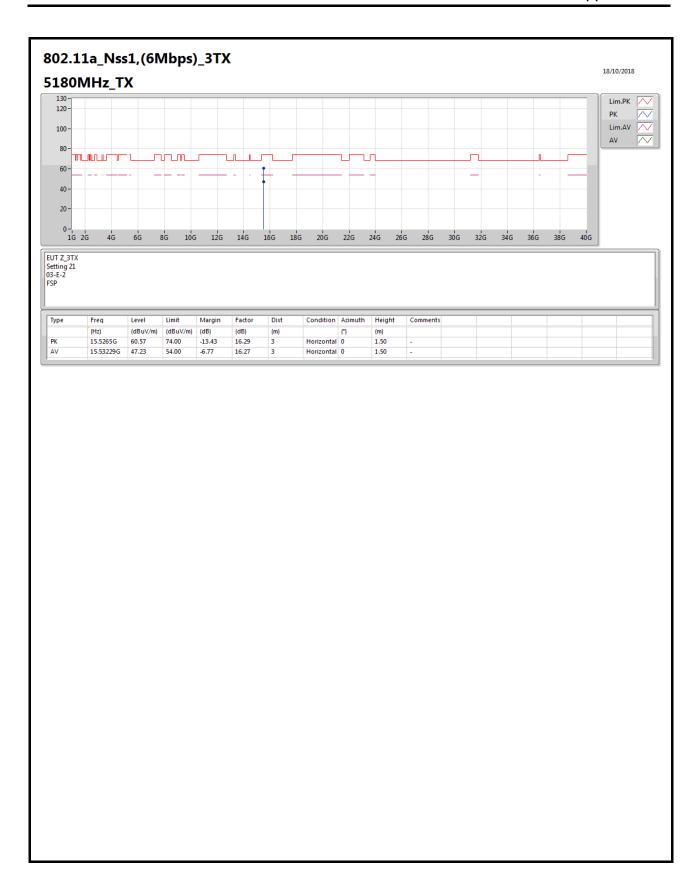
Page No. : 3 of 121



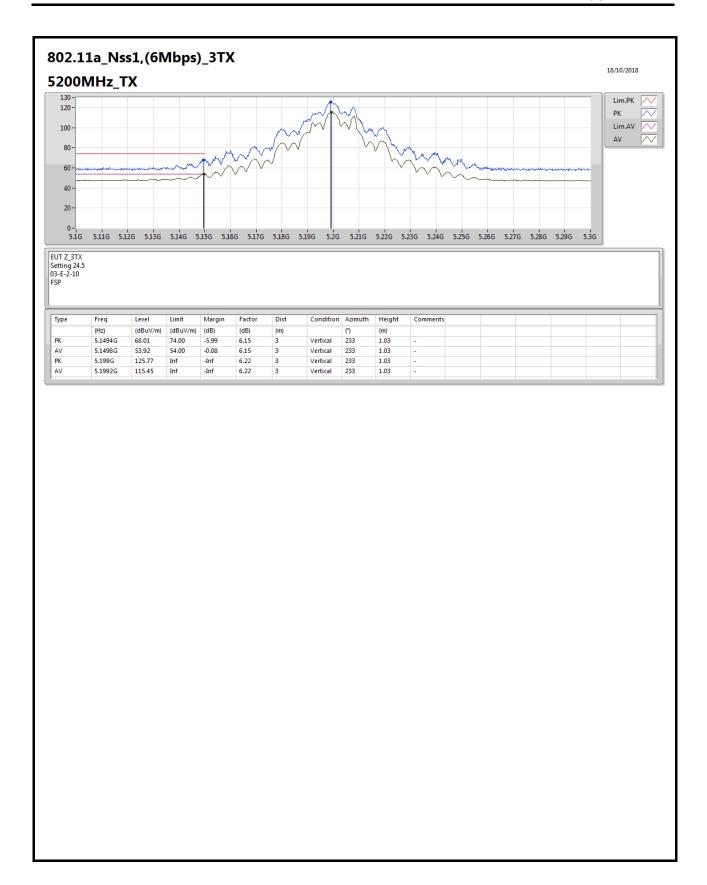
Page No. : 4 of 121



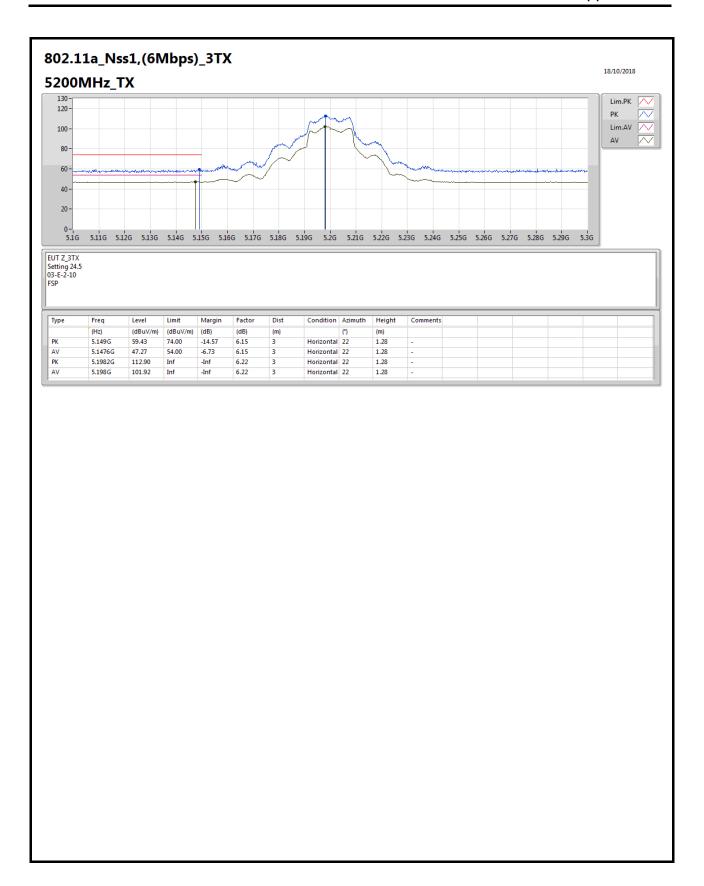
Page No. : 5 of 121



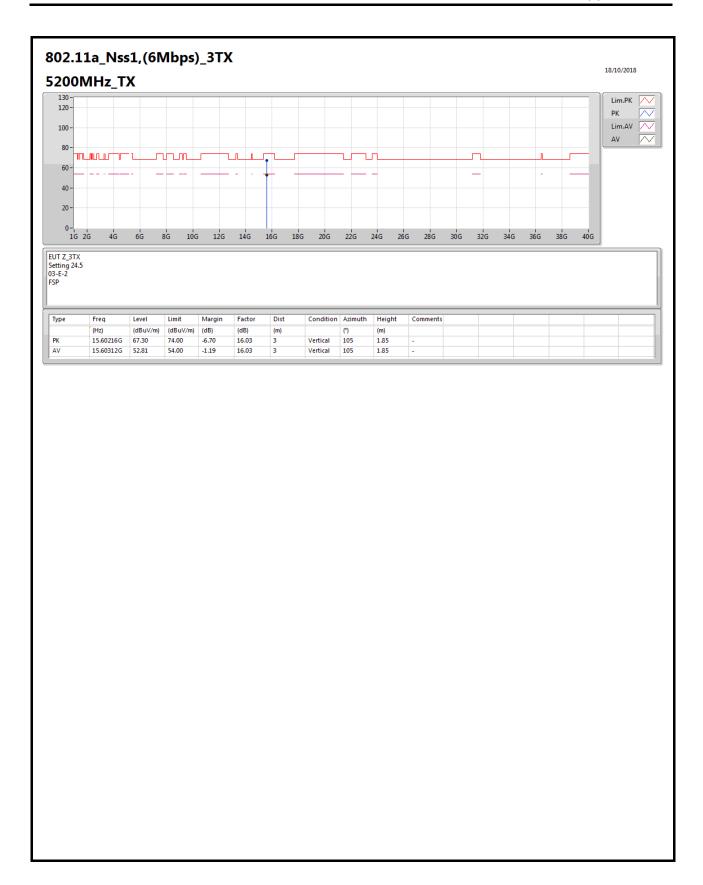
Page No. : 6 of 121



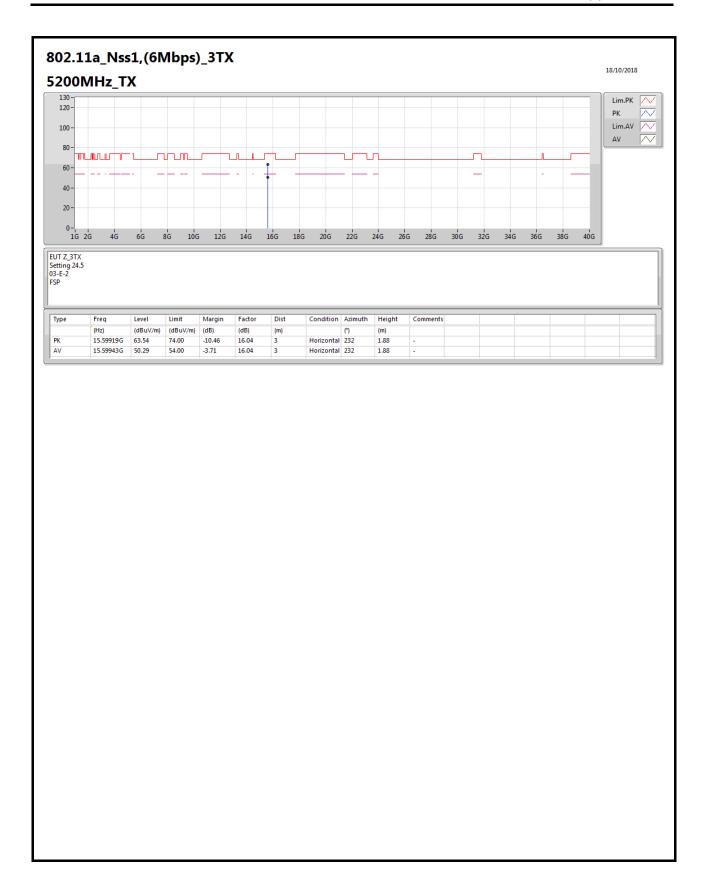
Page No. : 7 of 121



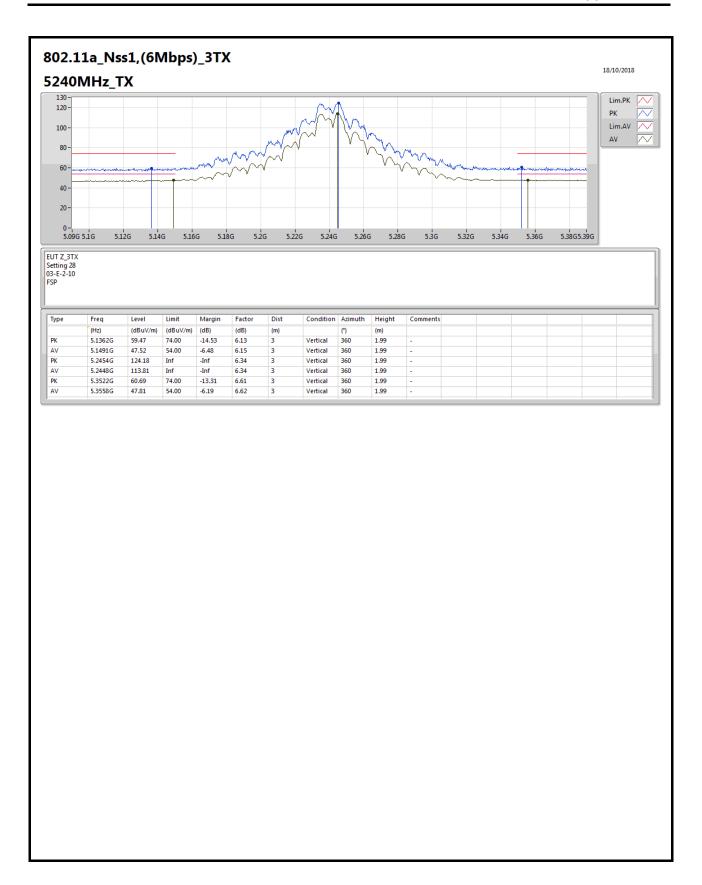
Page No. : 8 of 121



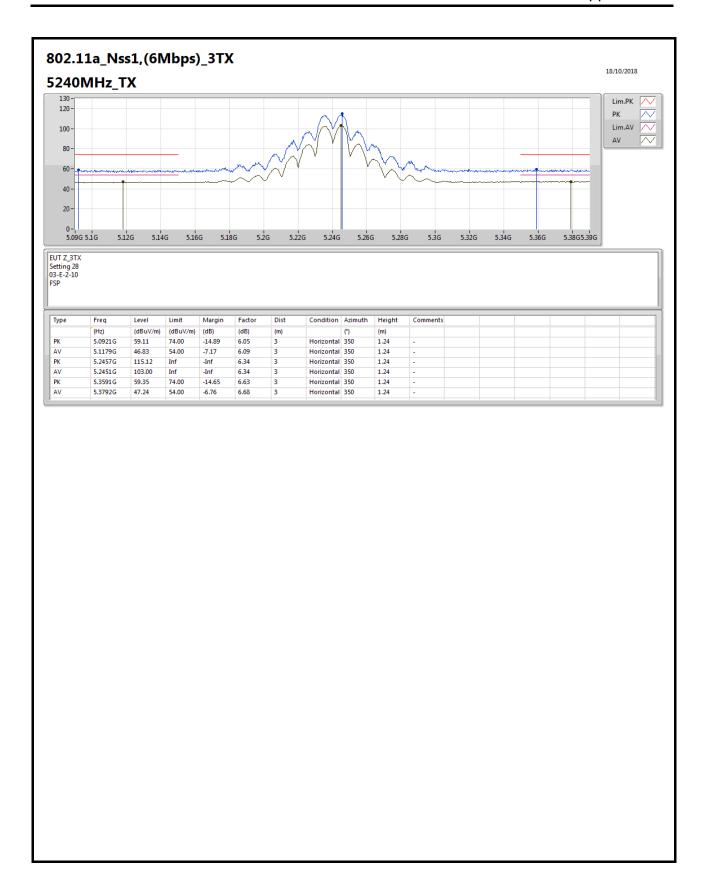
Page No. : 9 of 121



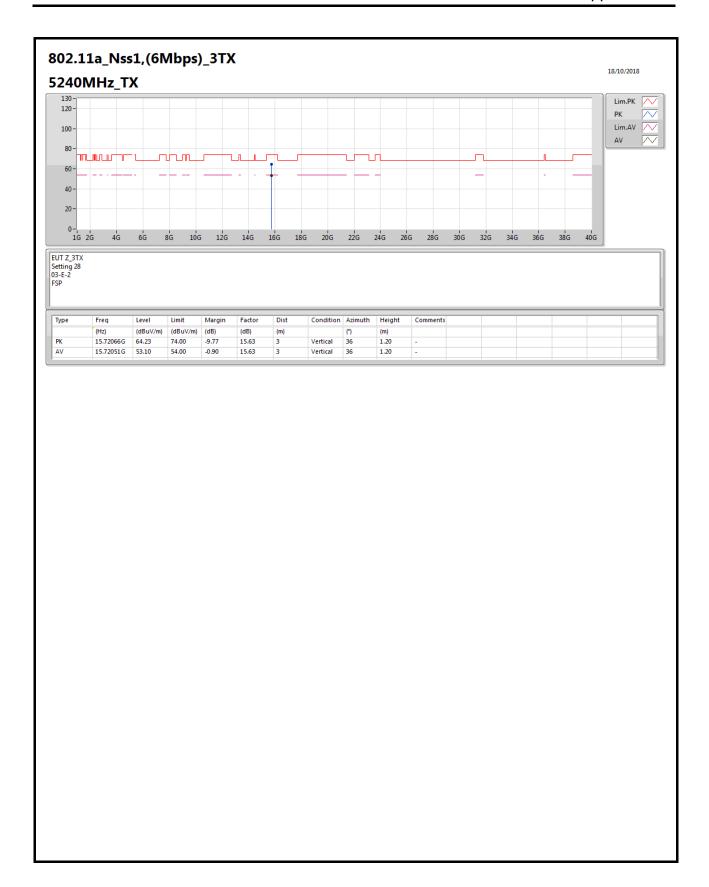
Page No. : 10 of 121



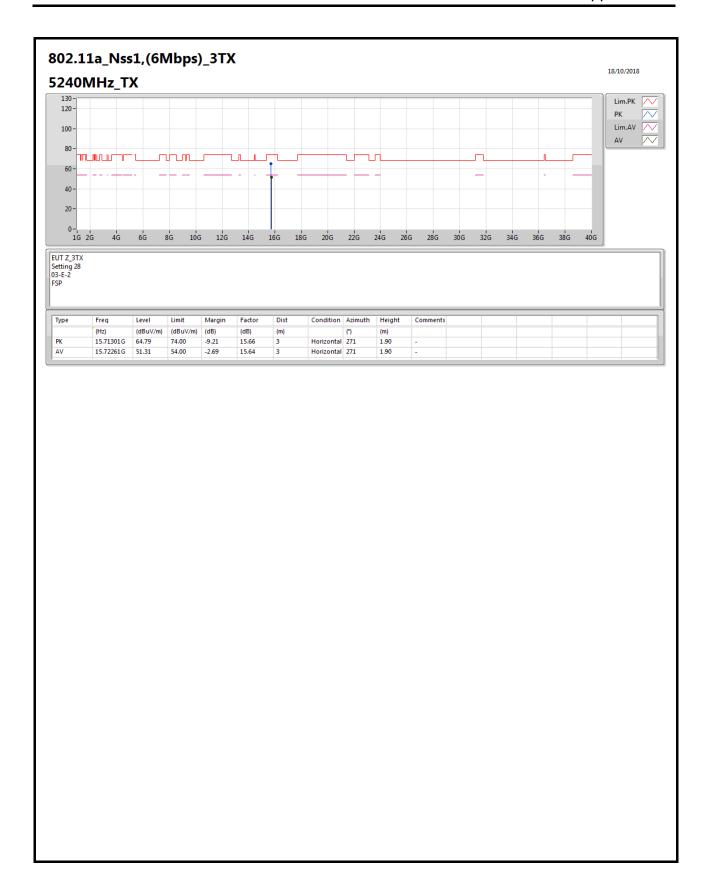
Page No. : 11 of 121



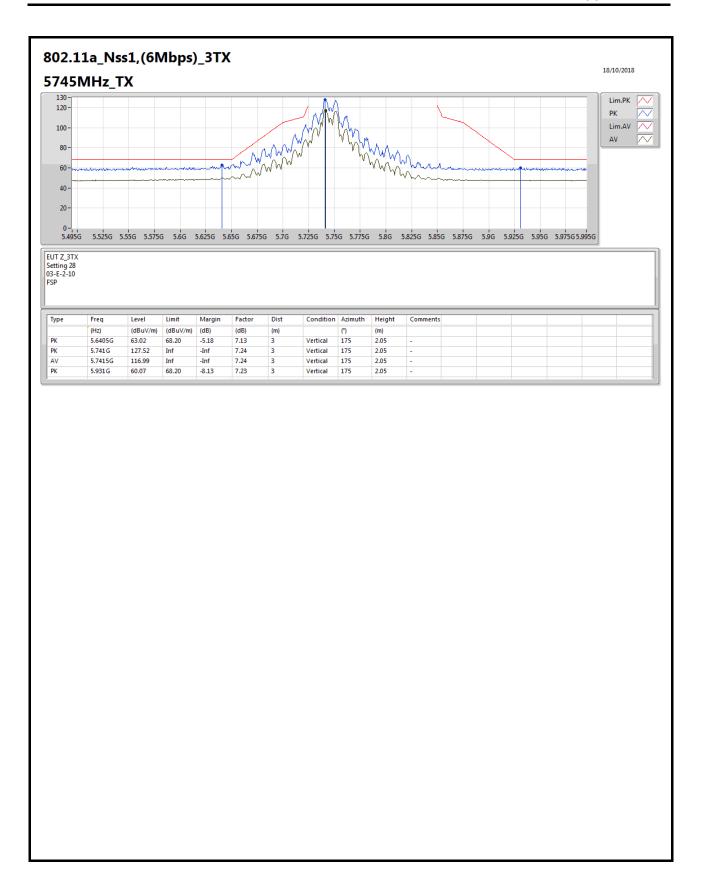
Page No. : 12 of 121



Page No. : 13 of 121

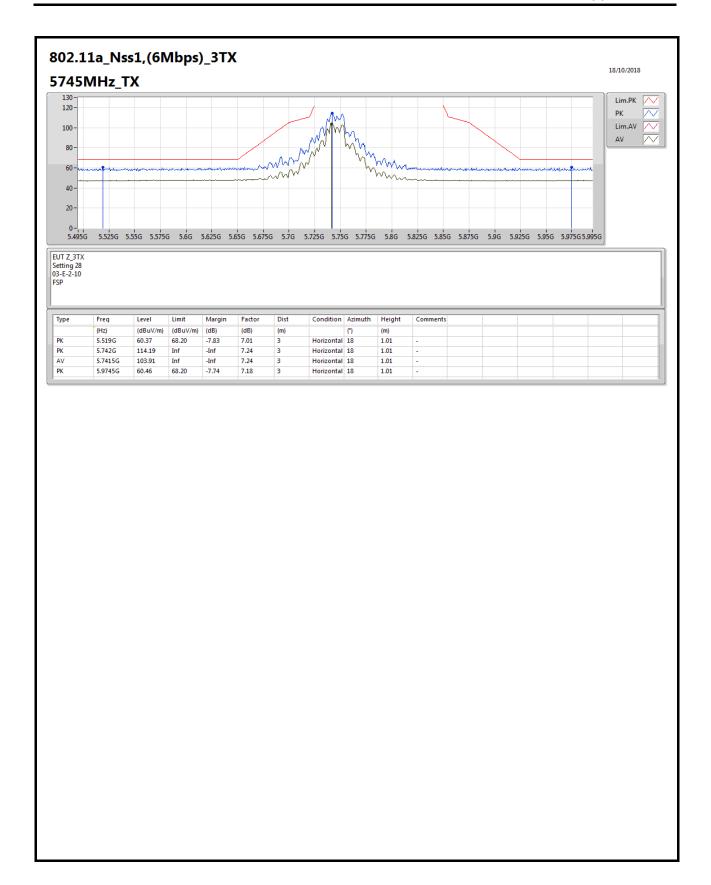


Page No. : 14 of 121

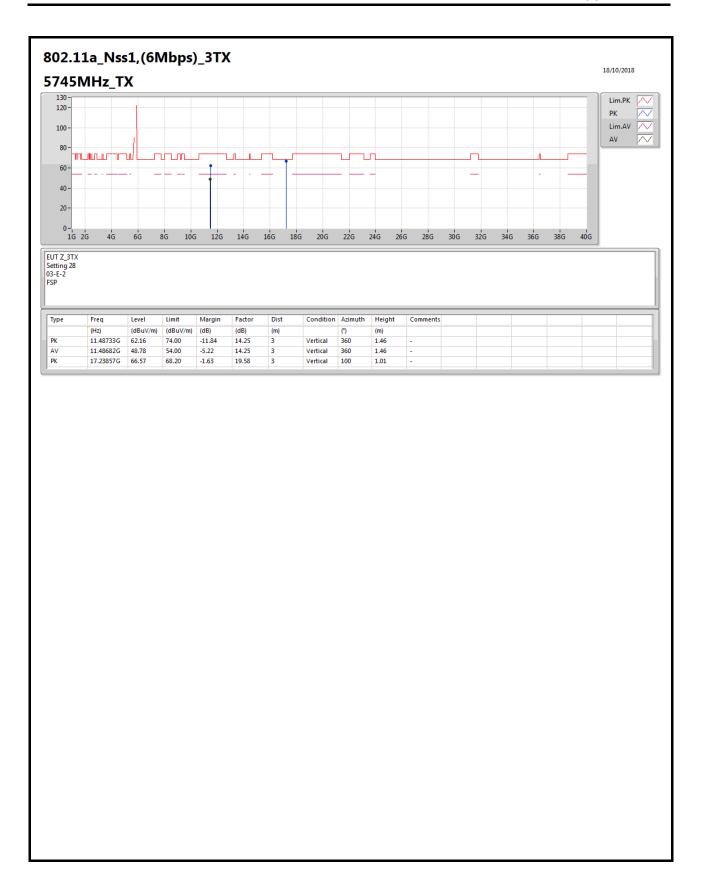


Page No. : 15 of 121

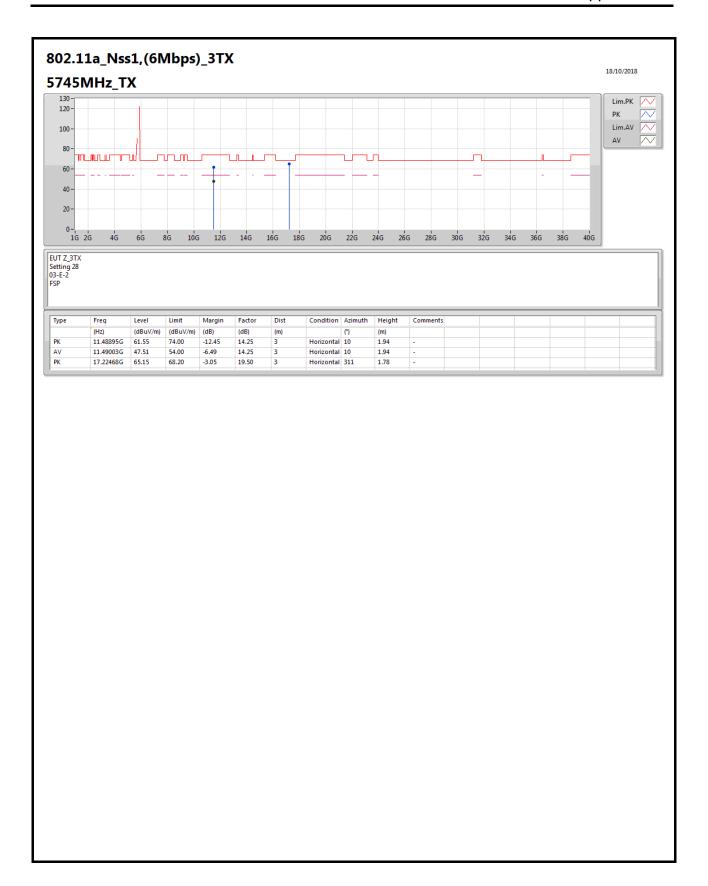




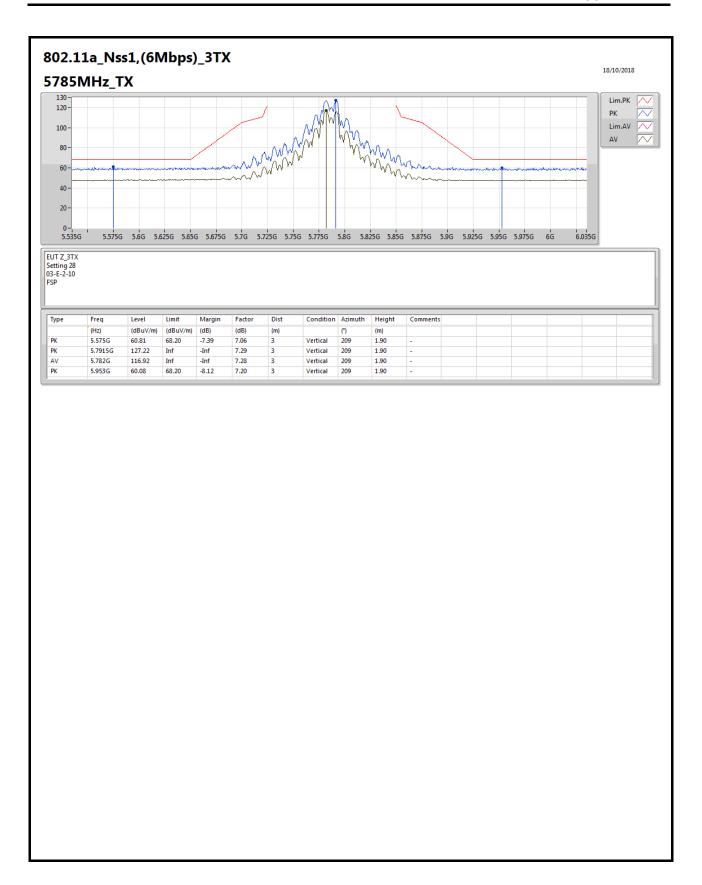
Page No. : 16 of 121



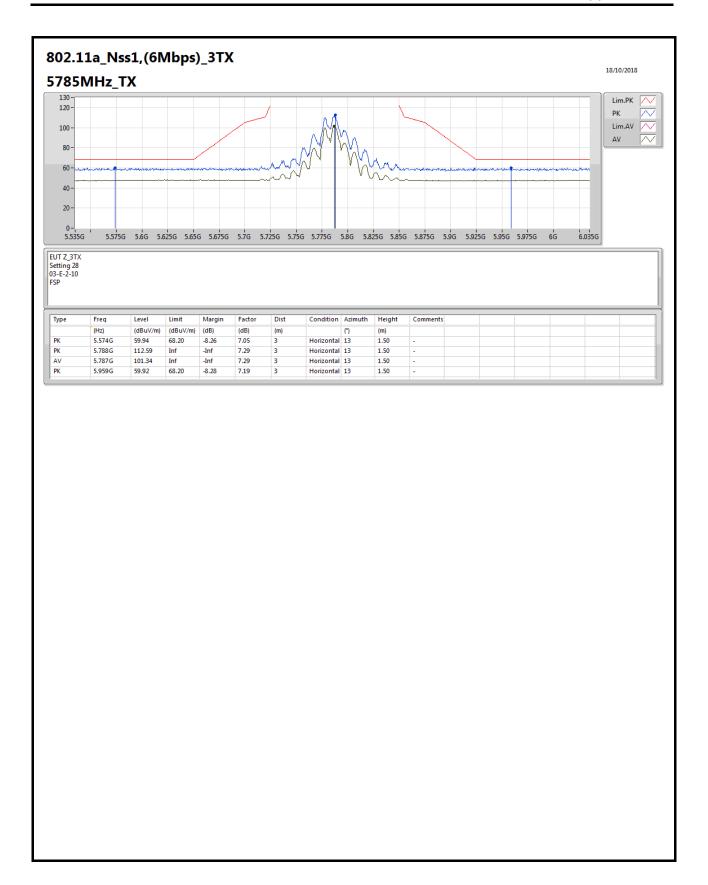
Page No. : 17 of 121



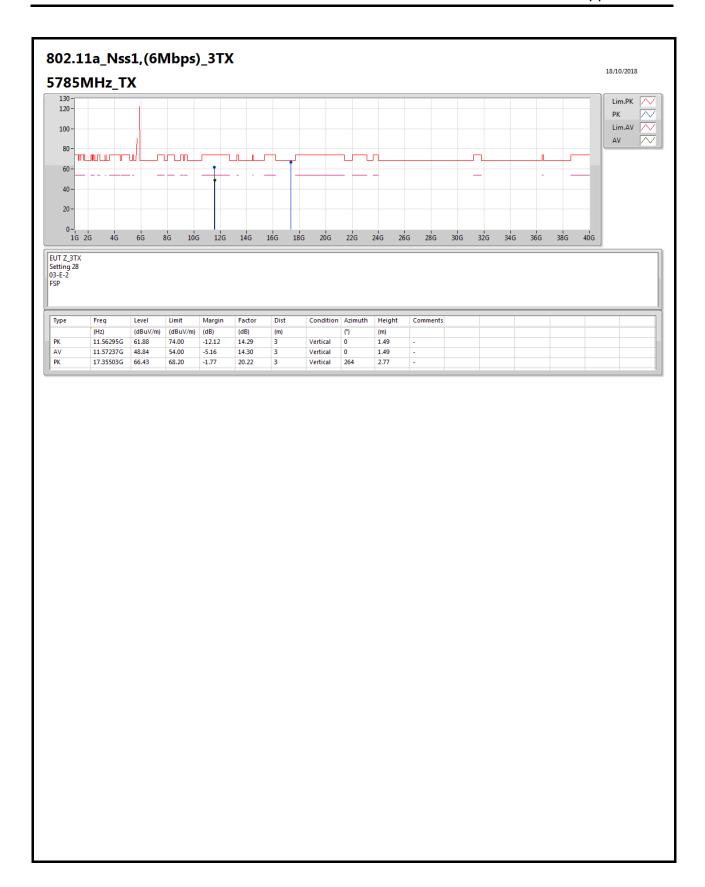
Page No. : 18 of 121



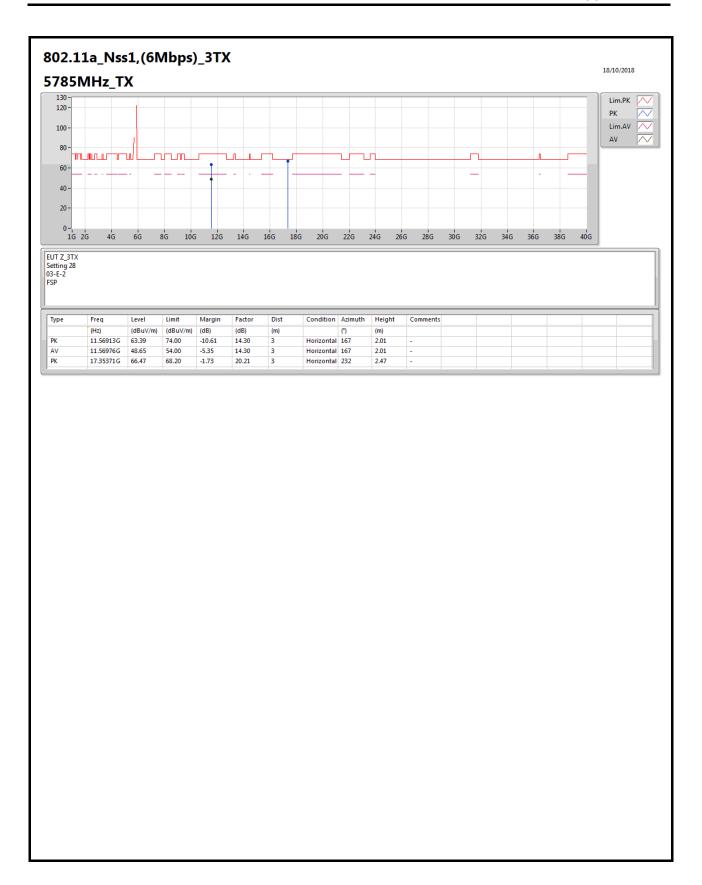
Page No. : 19 of 121



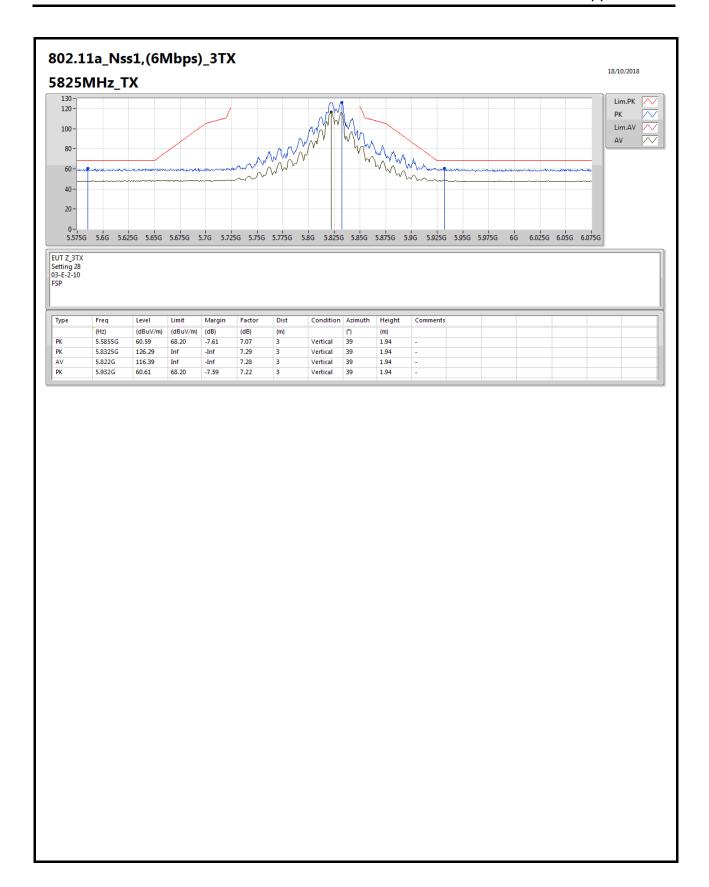
Page No. : 20 of 121



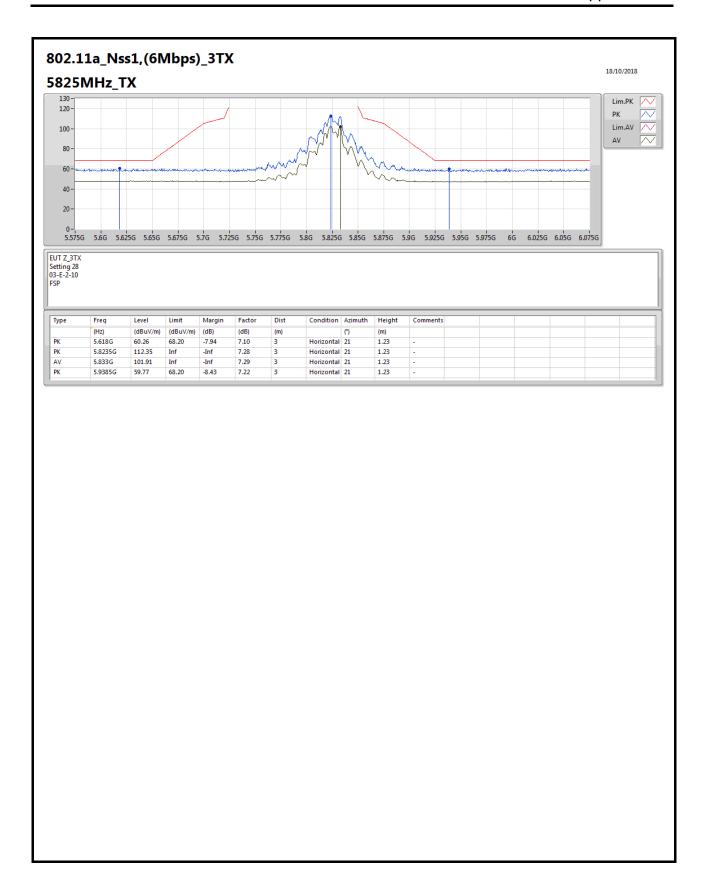
Page No. : 21 of 121



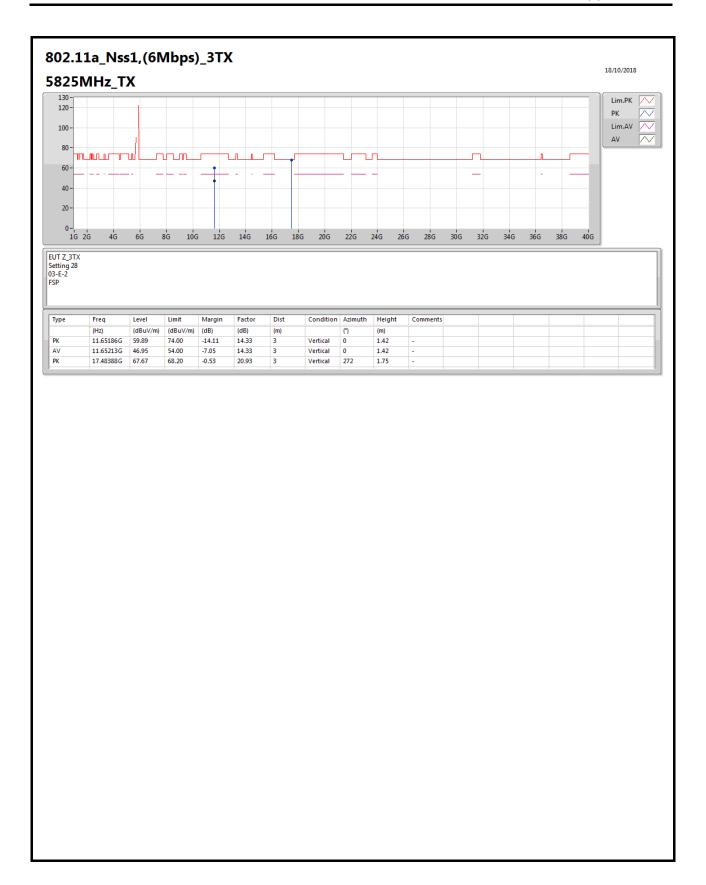
Page No. : 22 of 121



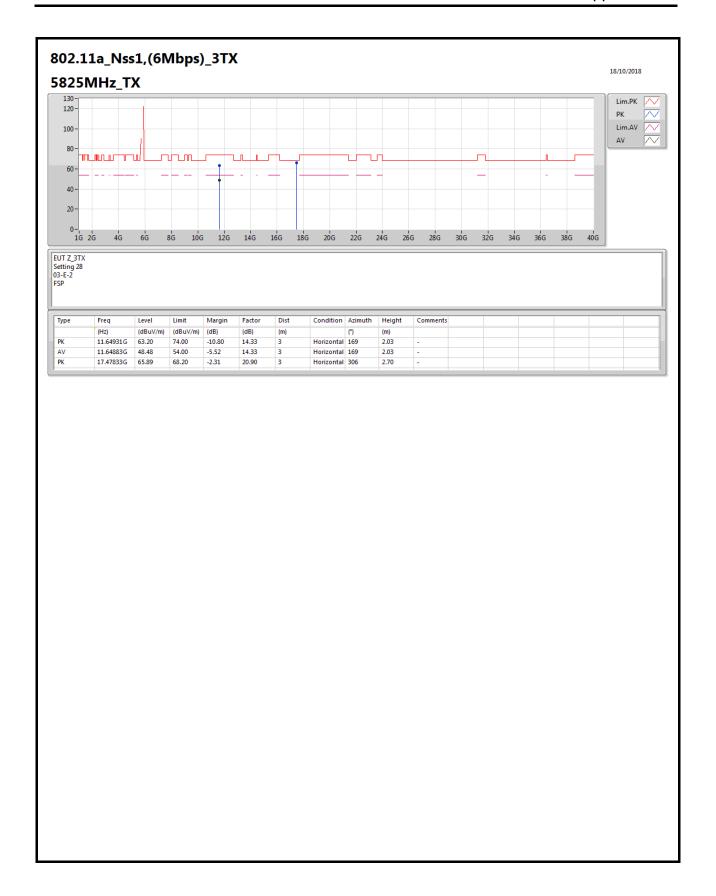
Page No. : 23 of 121



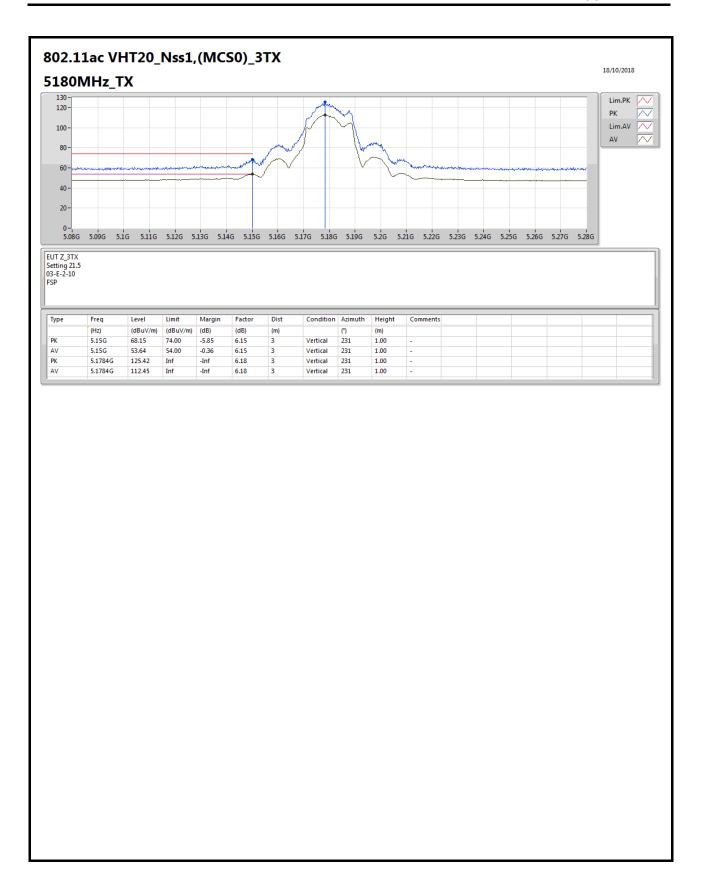
Page No. : 24 of 121



Page No. : 25 of 121

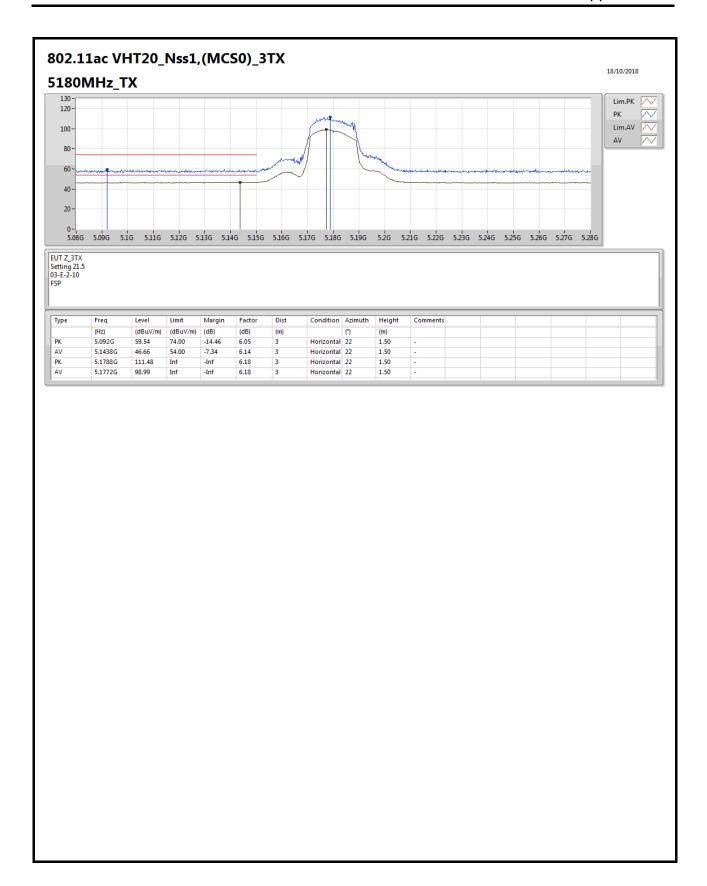


Page No. : 26 of 121

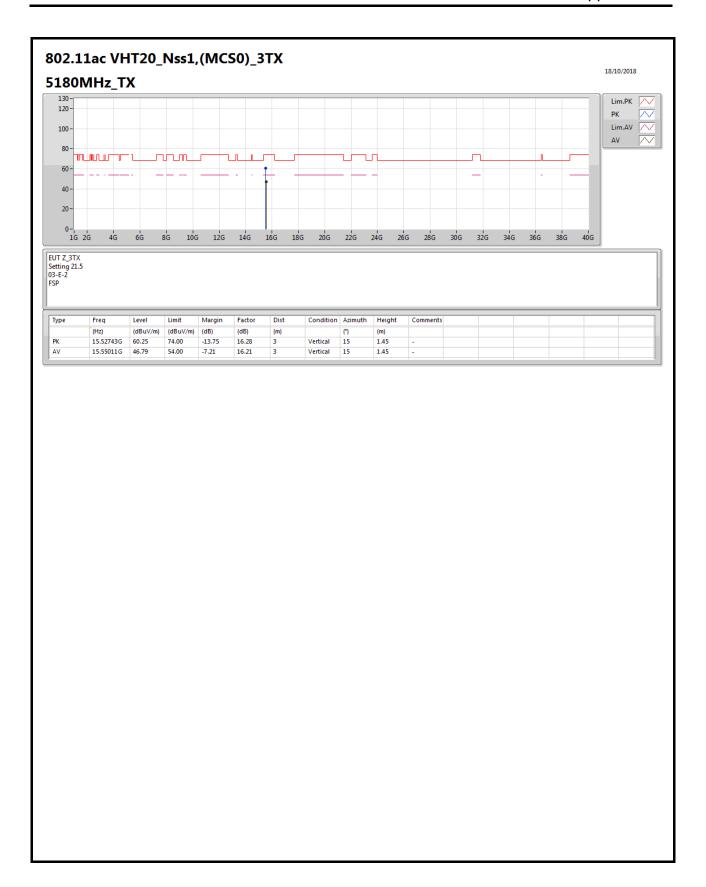


Page No. : 27 of 121

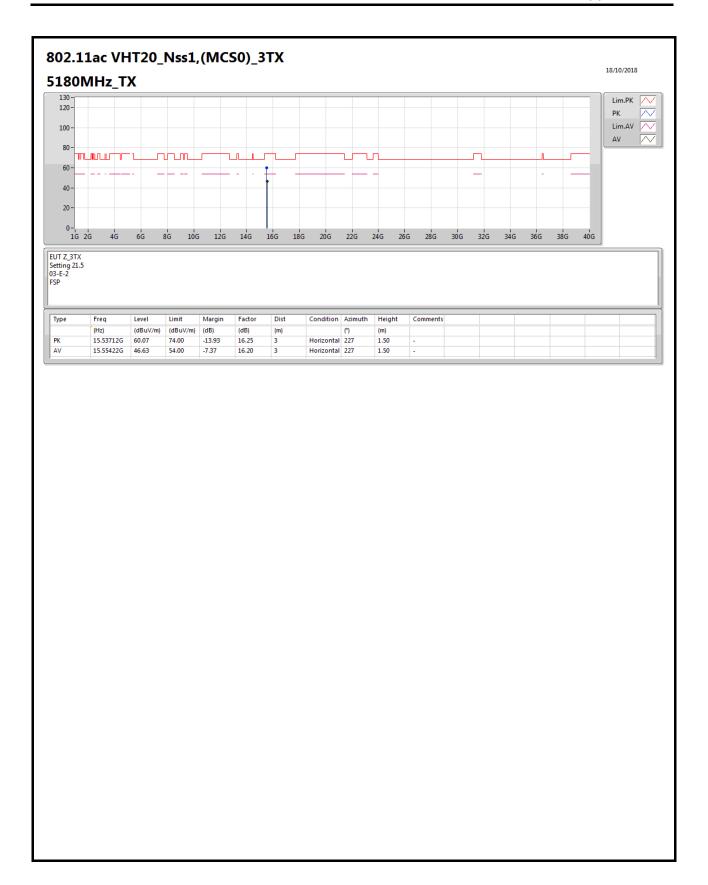




Page No. : 28 of 121

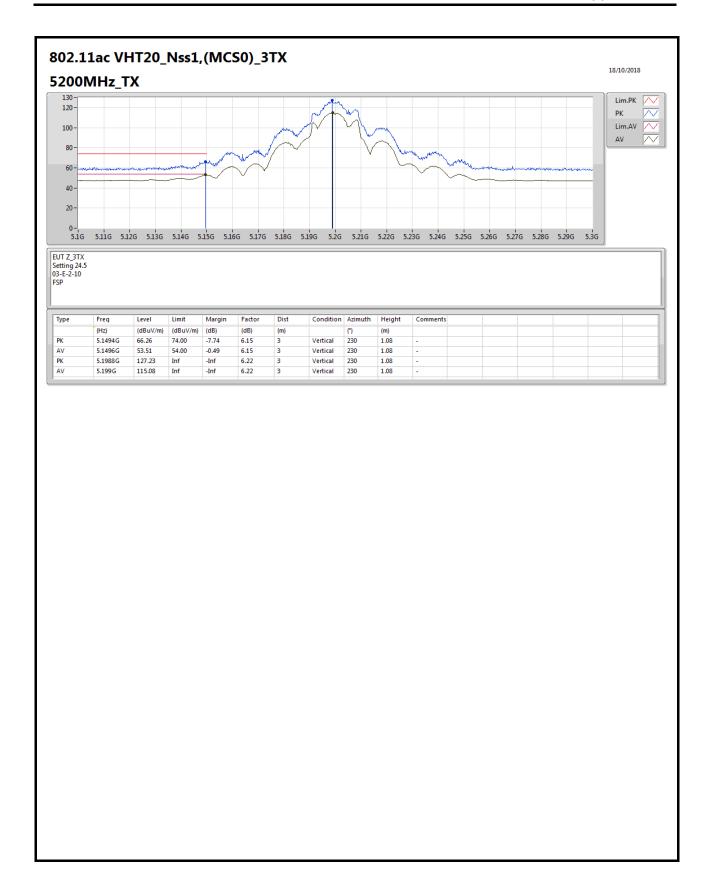


Page No. : 29 of 121



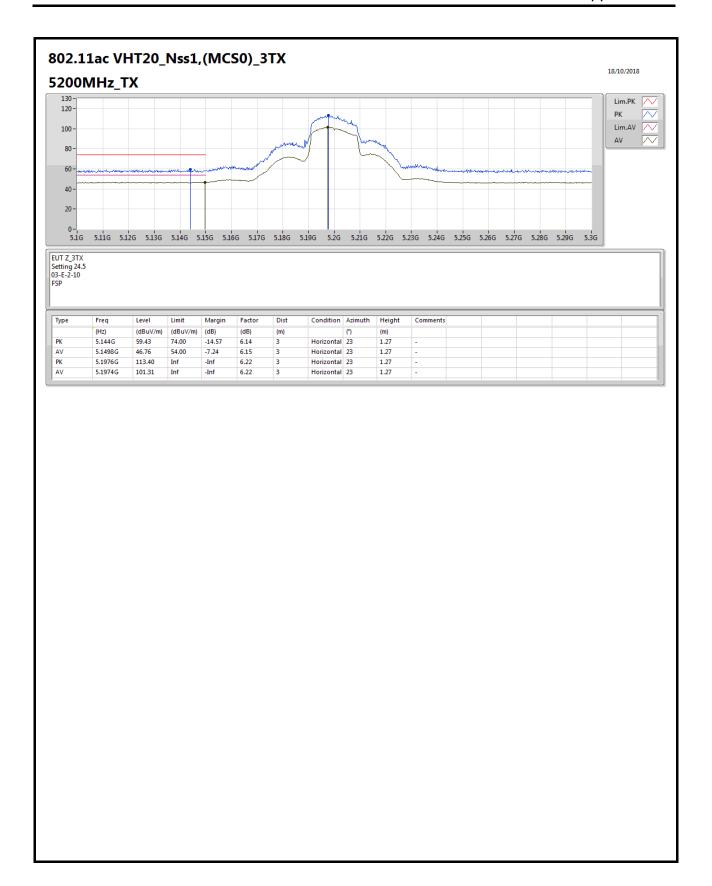
Page No. : 30 of 121



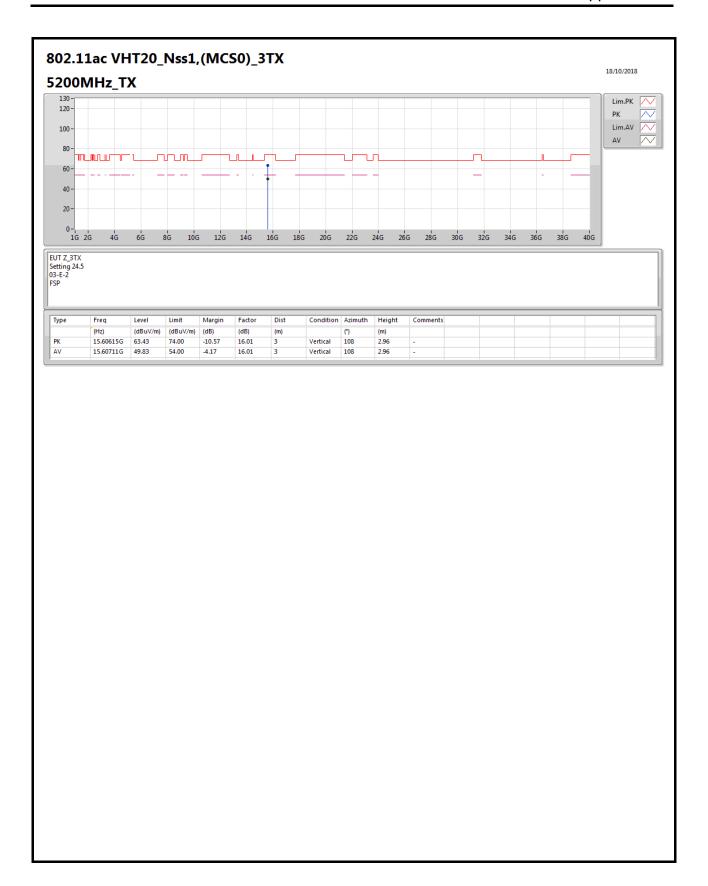


Page No. : 31 of 121

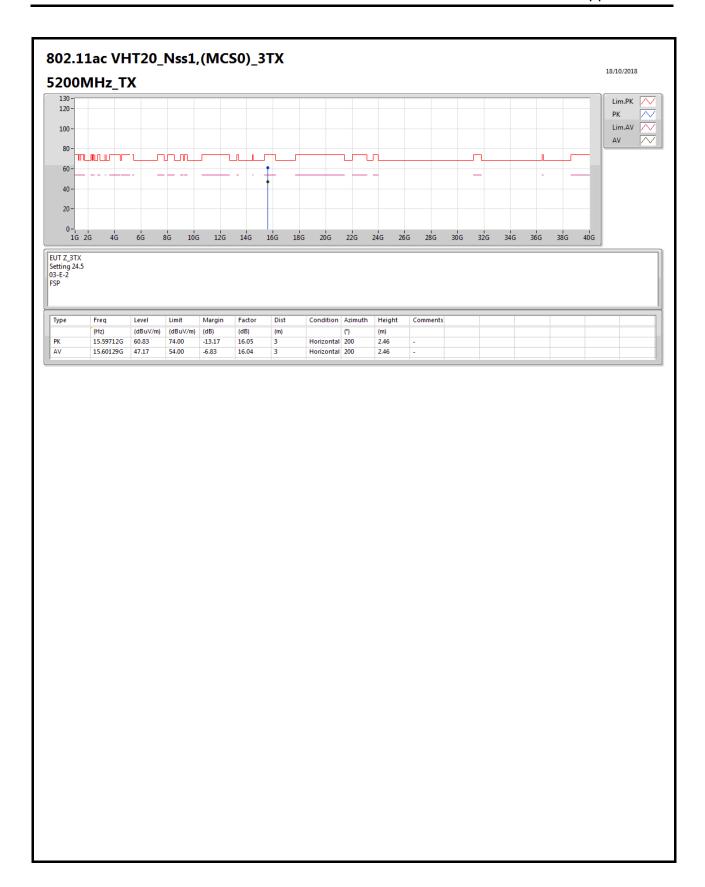




Page No. : 32 of 121



Page No. : 33 of 121

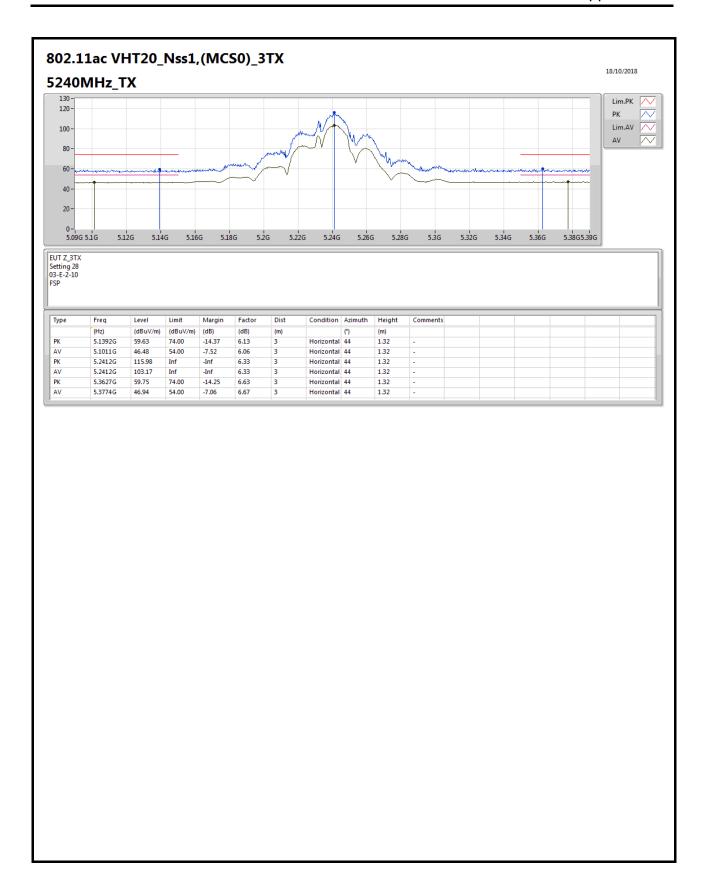


Page No. : 34 of 121

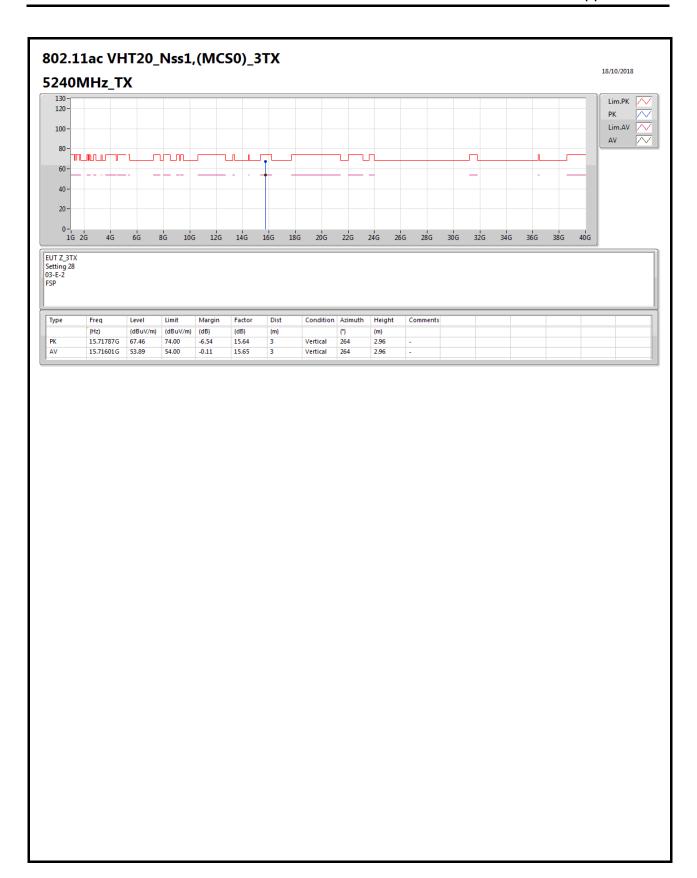
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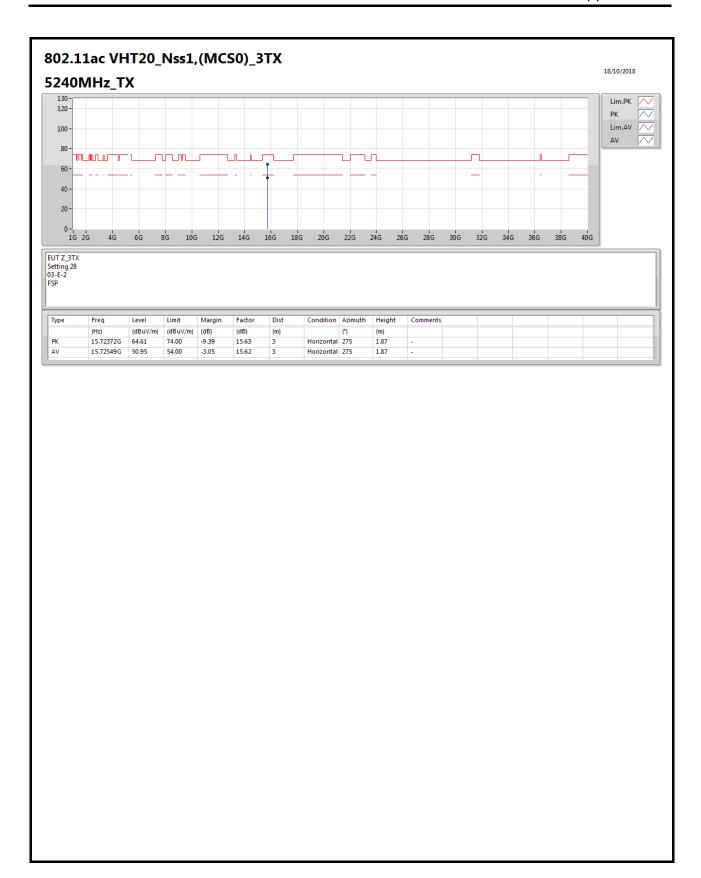
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0 - 5.090	G 5.1G 5.1	2G 5.14	G 5.16	G 5.18	G 5.20	G 5.22G	5.24G	5.26G	5.280	5.3G	5.32G	5.34G	5.36G	5.380	G5.39G	
T Z_3TX	K															
ting 28 -E-2-10																
0																
pe	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments						
K	(Hz) 5.1428G	(dBuV/m) 61.59	(dBuV/m) 74.00	(dB) -12.41	(dB) 6.14	(m) 3		(°) 116	(m) 1.02	-						
V	5.1428G 5.1434G	47.90	54.00	-6.10	6.14	3			1.02	-						
ζ.	5.2424G	126.16	Inf	-Inf	6.34	3			1.02	-						
V K	5.2421 G 5.3828 G	114.73 59.76	Inf 74.00	-Inf -14.24	6.34	3			1.02	-						
V	5.3516G	47.46	54.00	-6.54	6.61	3			1.02	-						

Page No. : 35 of 121



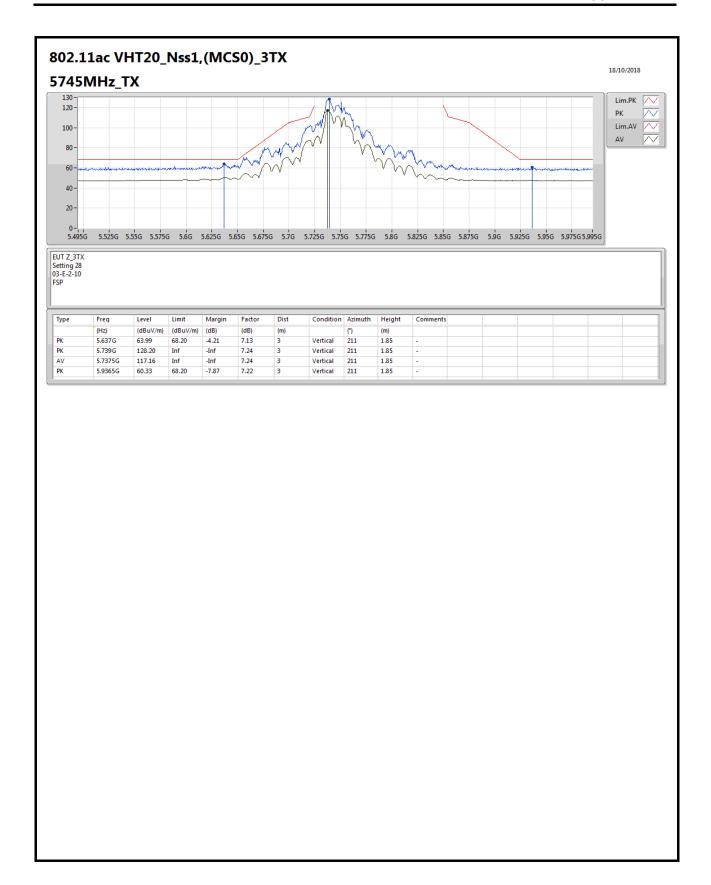
Page No. : 36 of 121



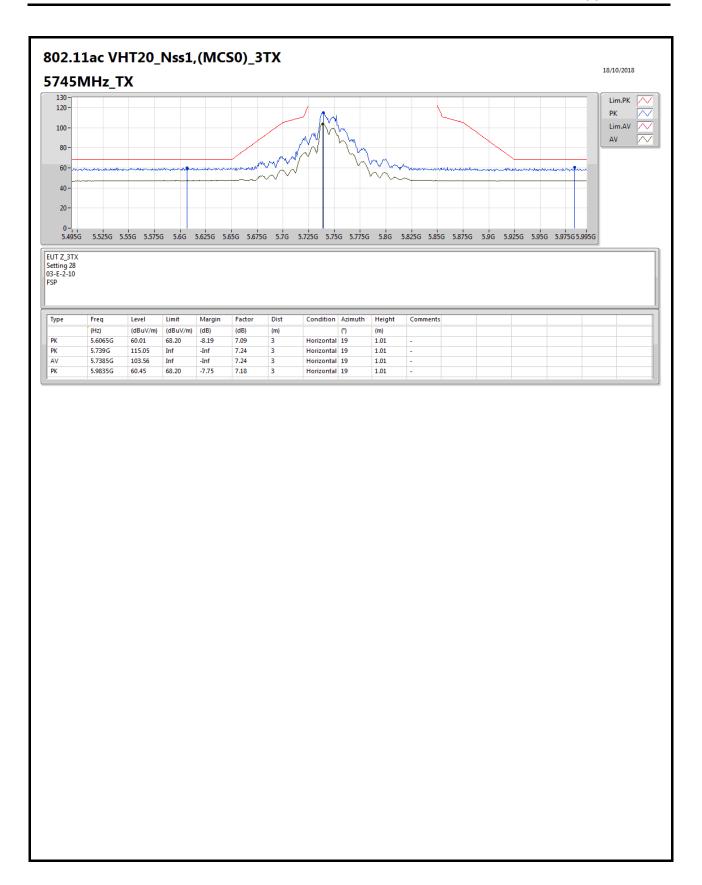


Page No. : 38 of 121

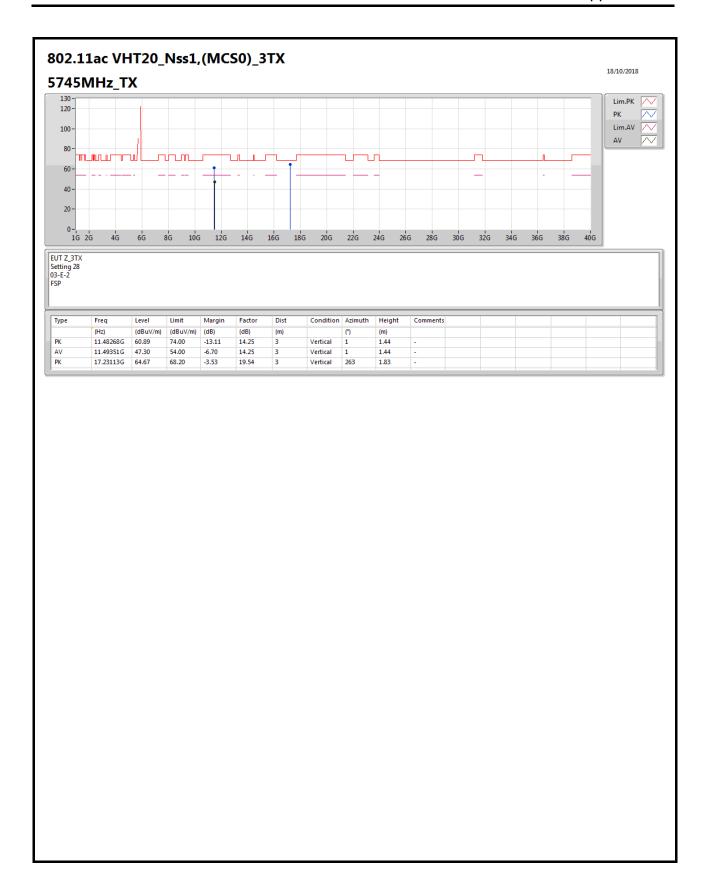




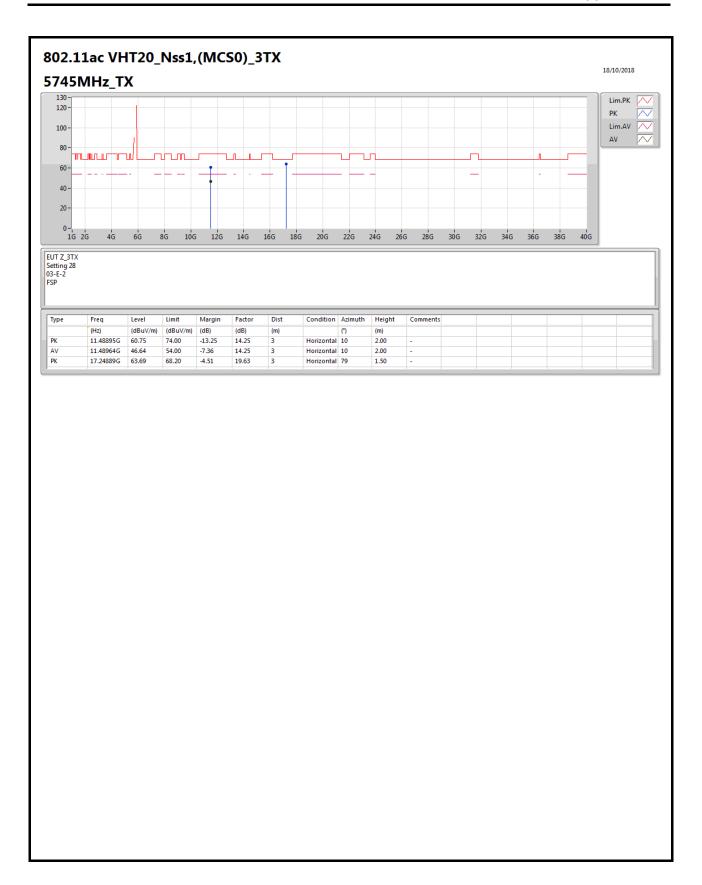
Page No. : 39 of 121



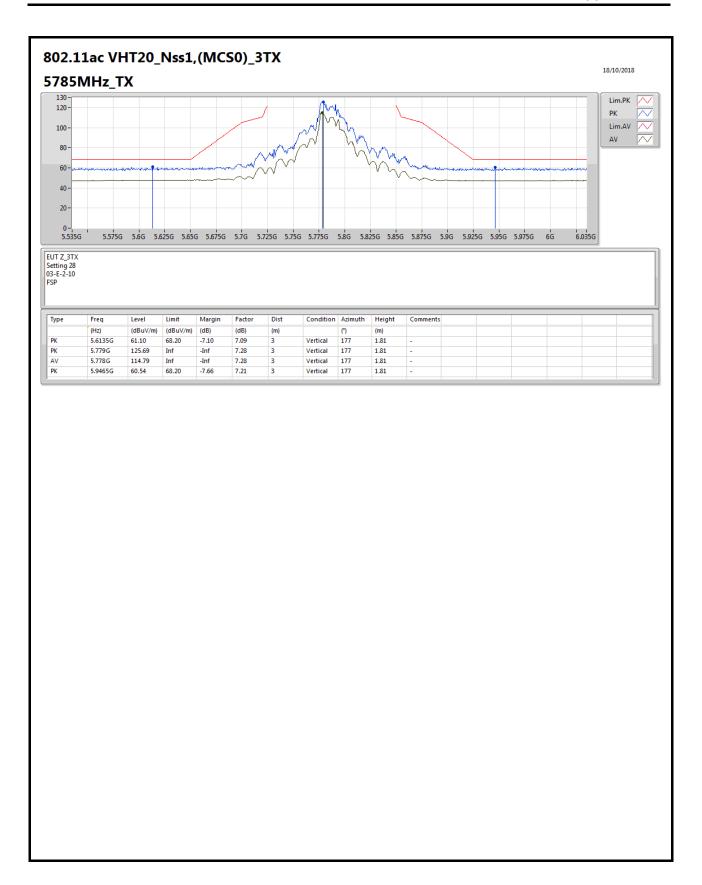
Page No. : 40 of 121



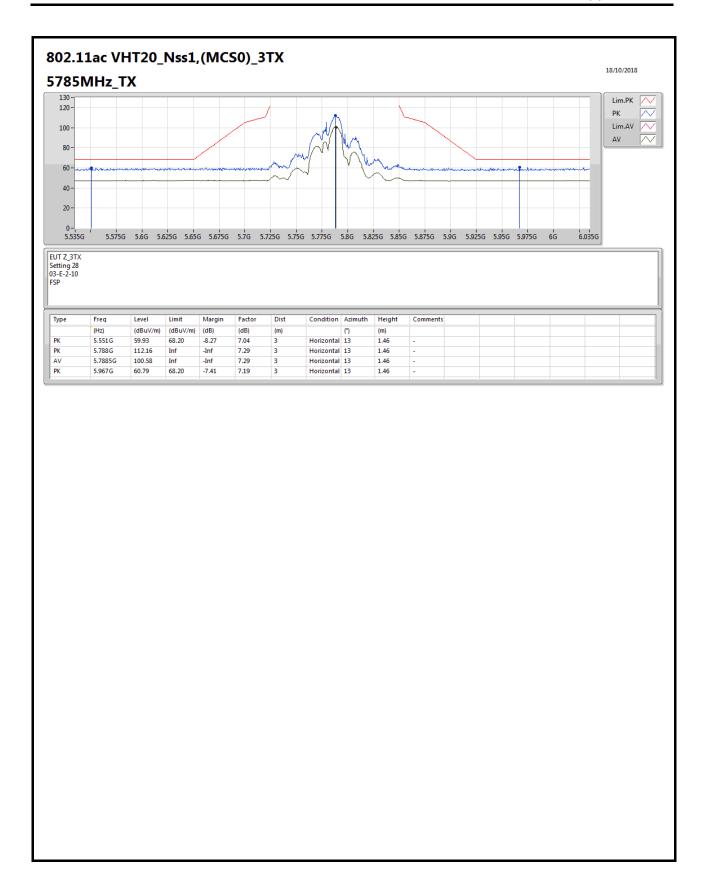
Page No. : 41 of 121



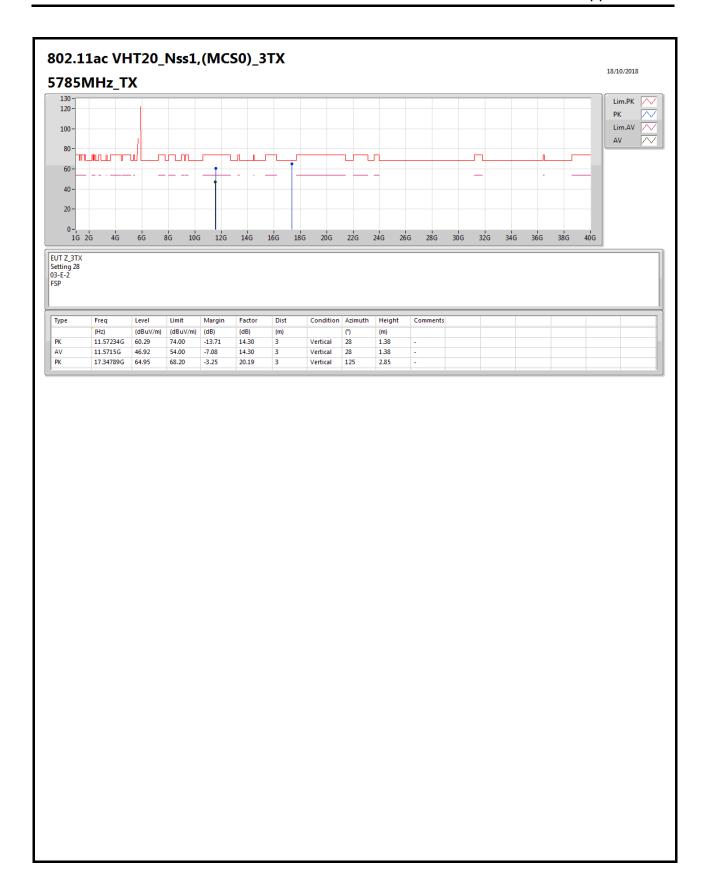
Page No. : 42 of 121



Page No. : 43 of 121

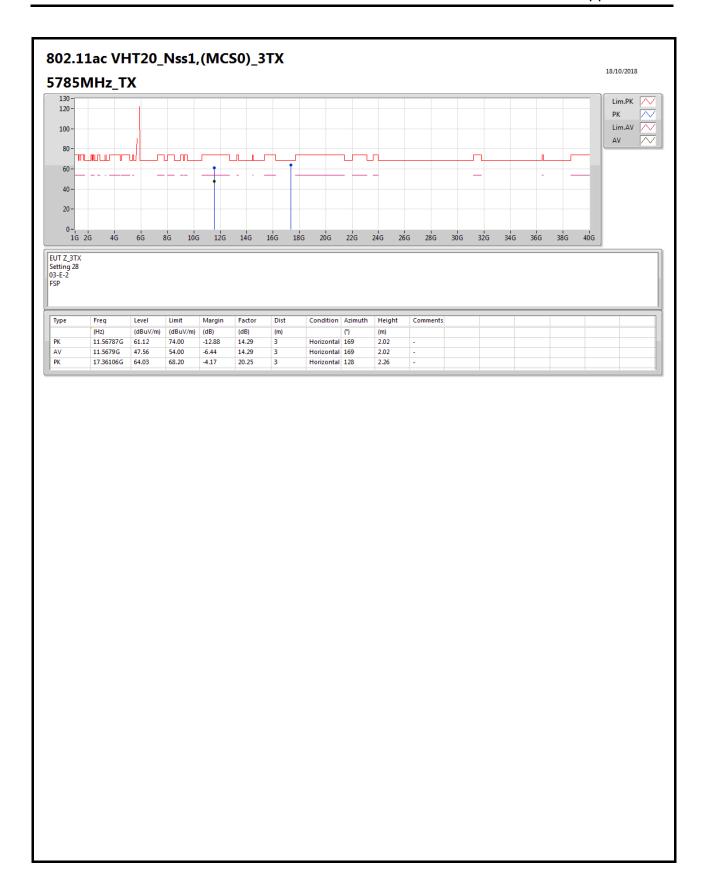


Page No. : 44 of 121

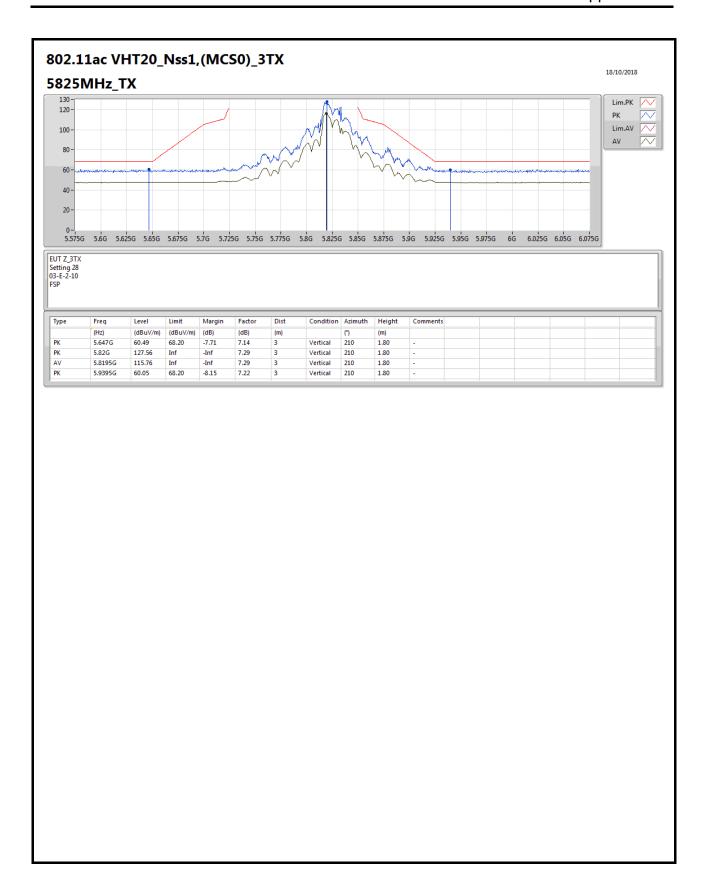


Page No. : 45 of 121

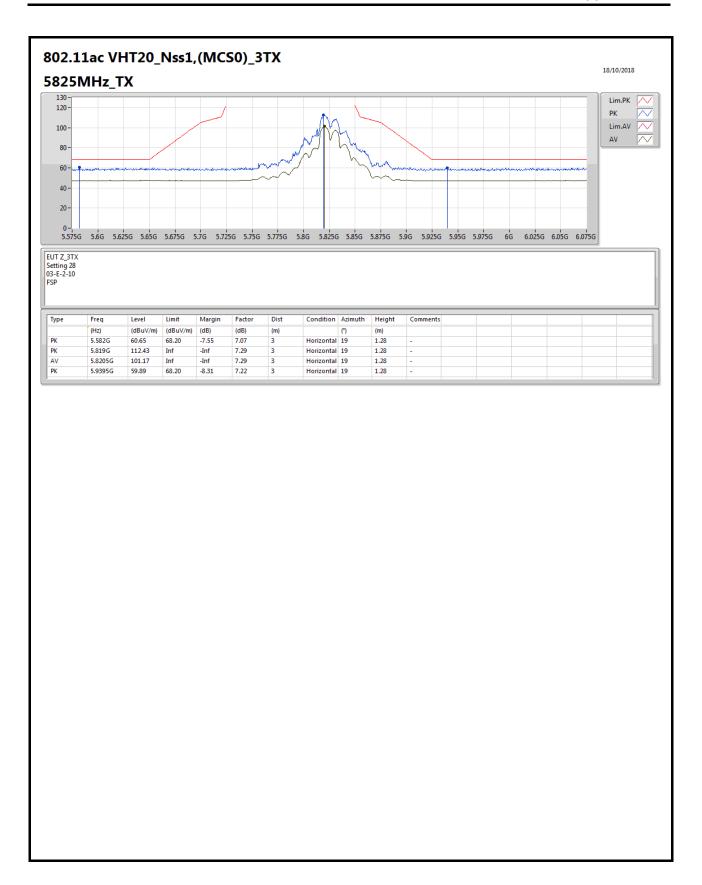




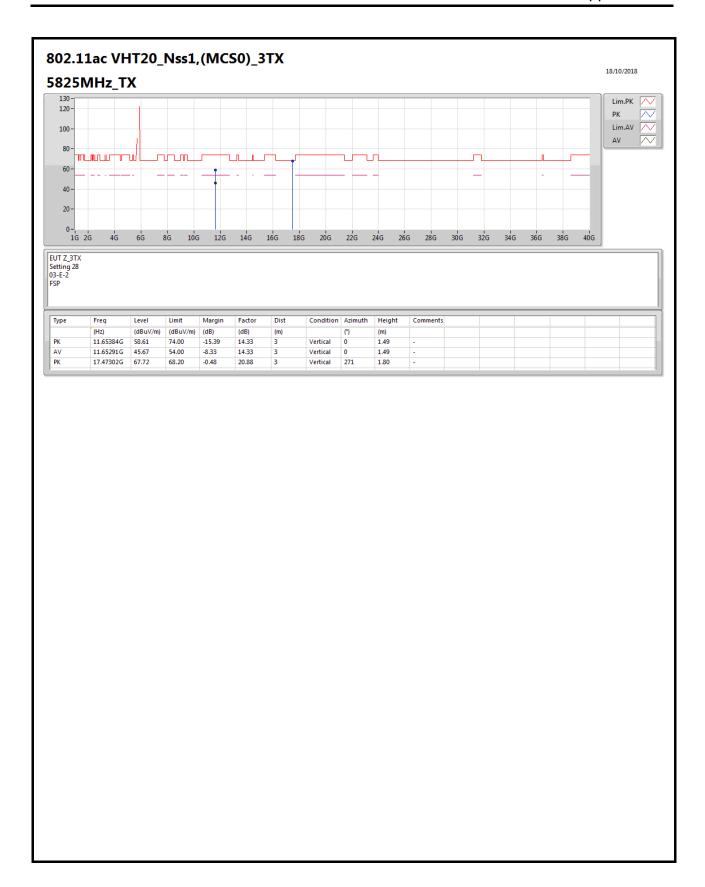
Page No. : 46 of 121



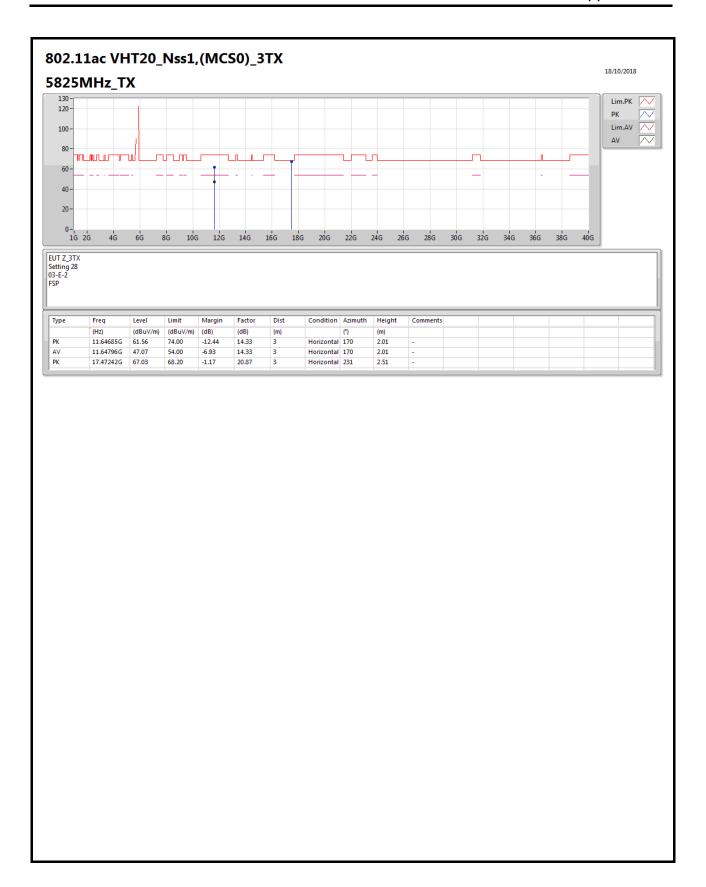
Page No. : 47 of 121



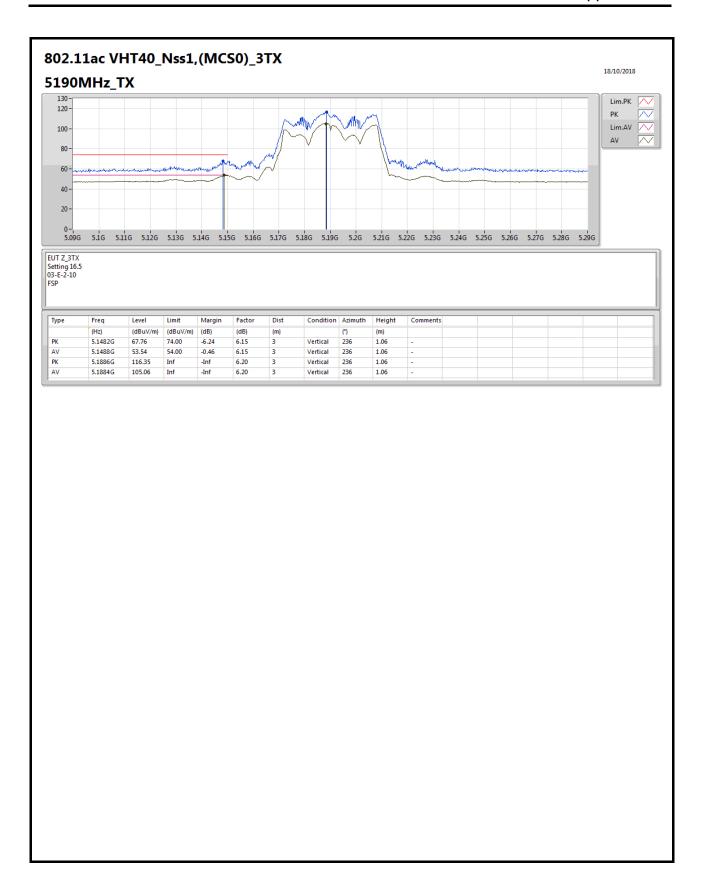
Page No. : 48 of 121



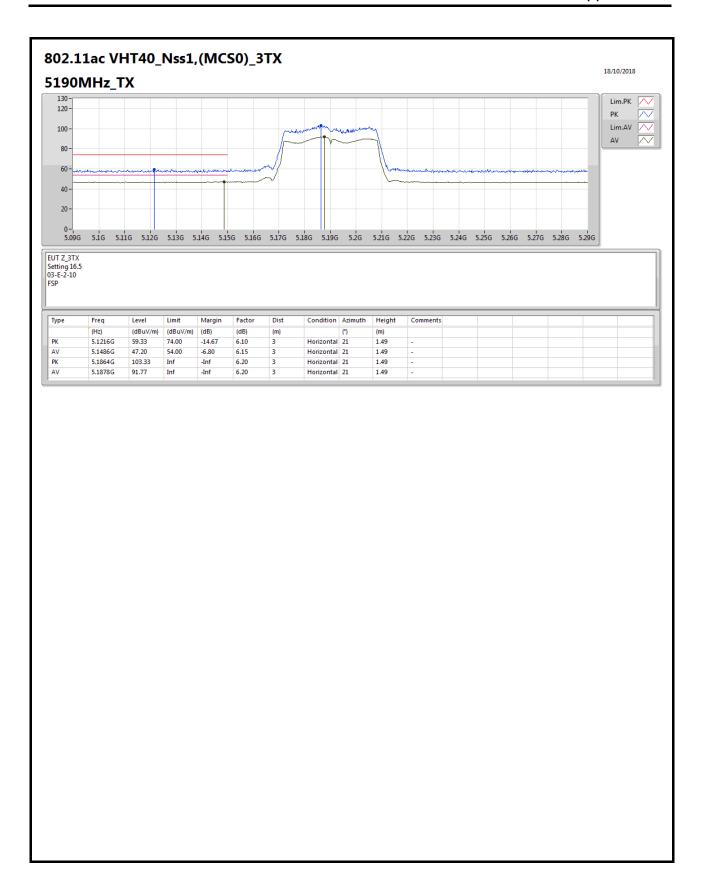
Page No. : 49 of 121



Page No. : 50 of 121

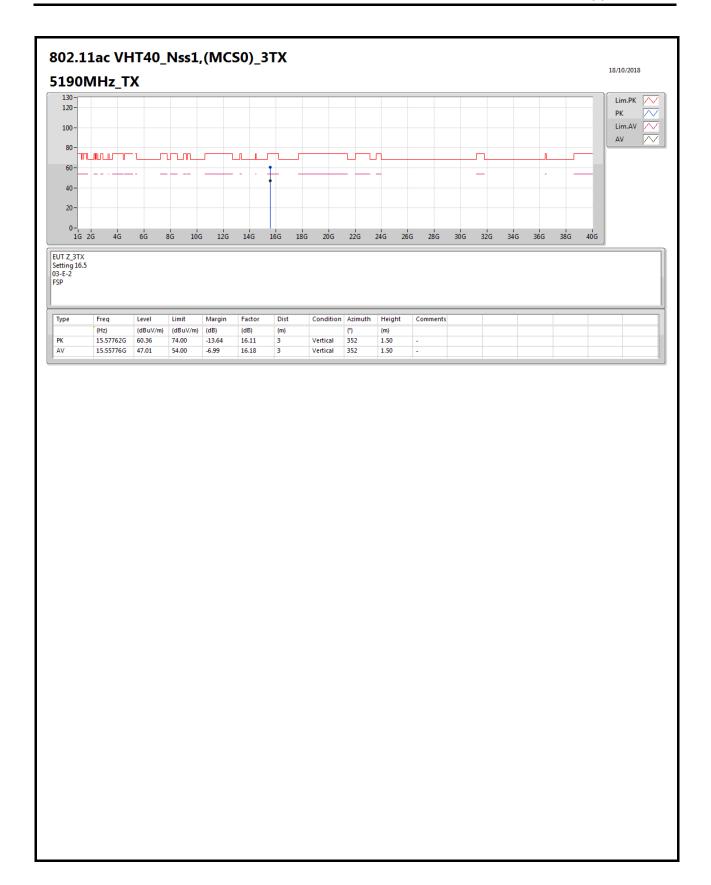


Page No. : 51 of 121

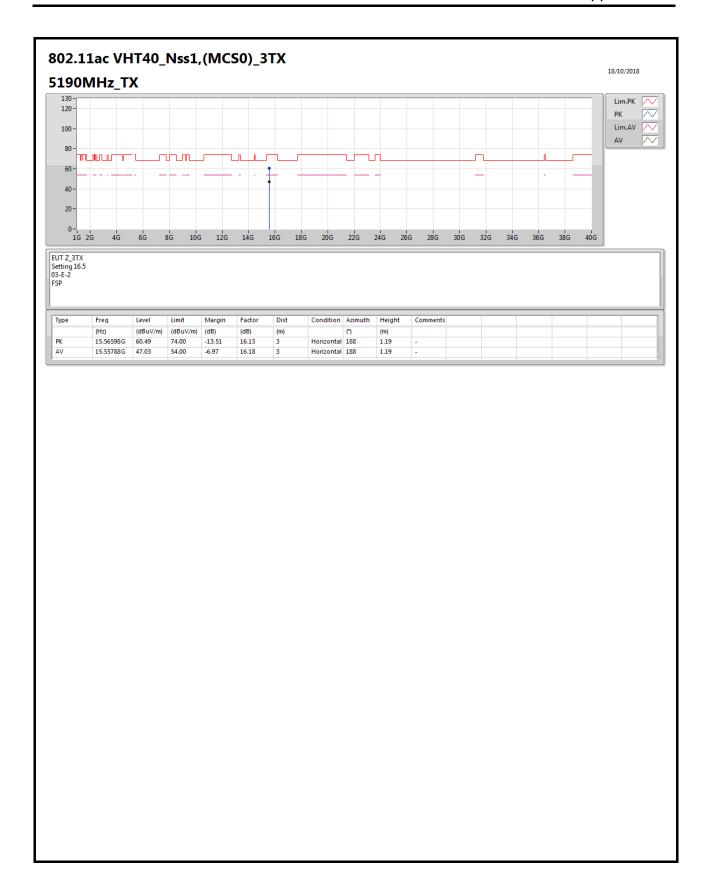


Page No. : 52 of 121



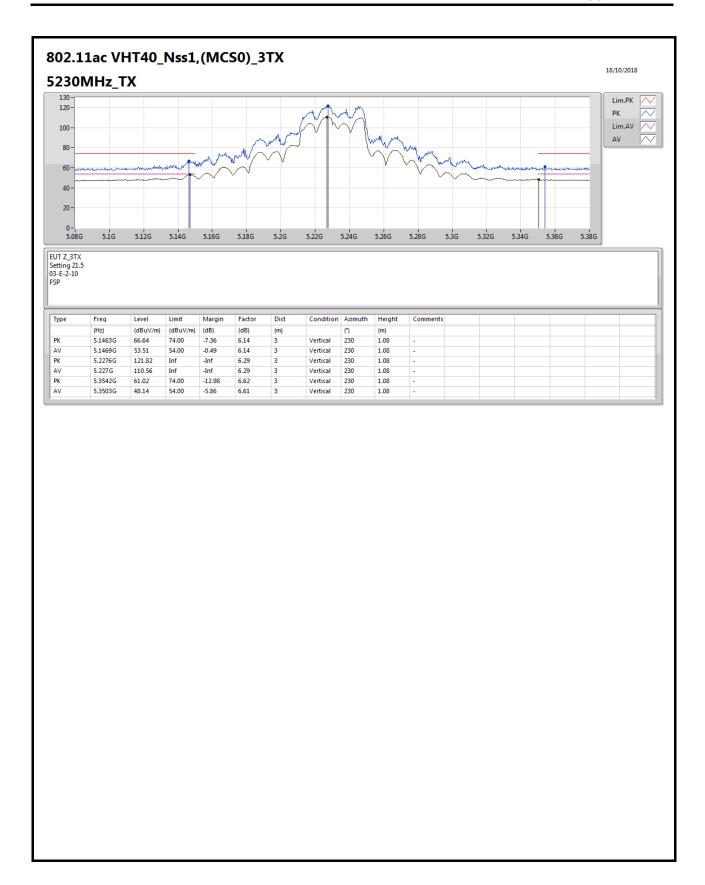


Page No. : 53 of 121



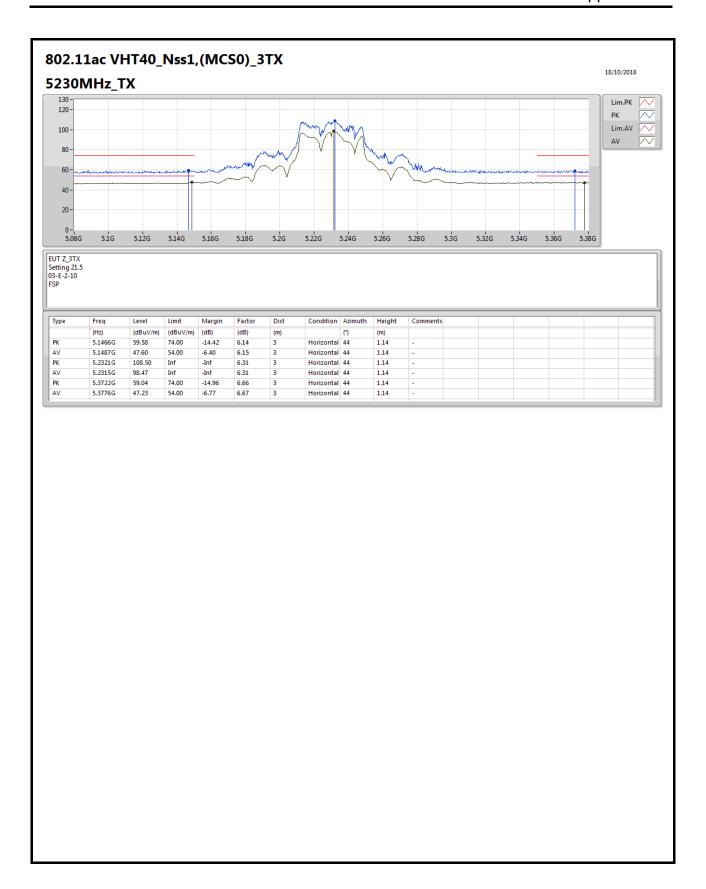
Page No. : 54 of 121



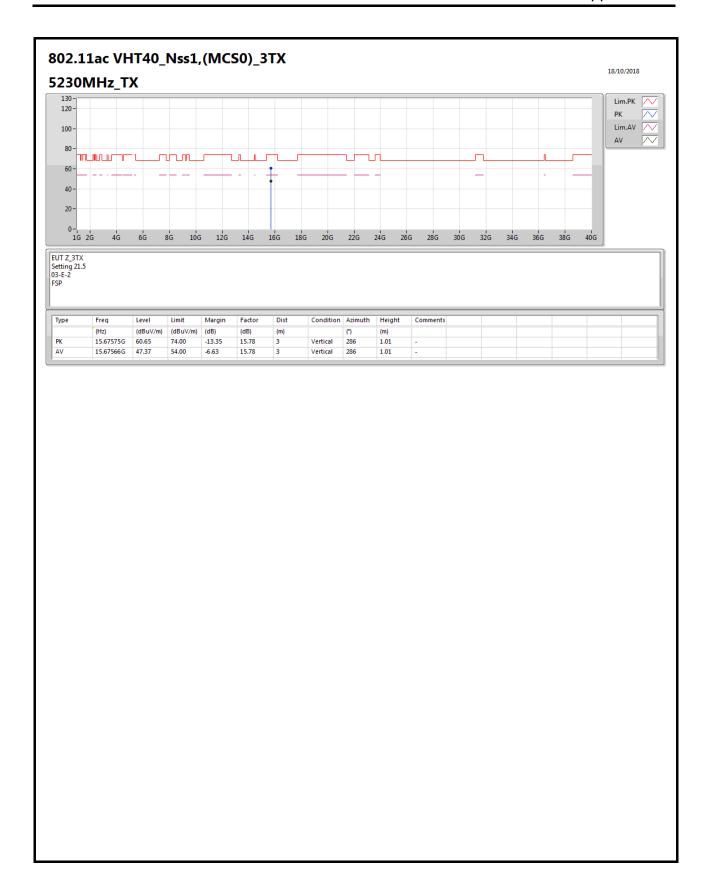


Page No. : 55 of 121



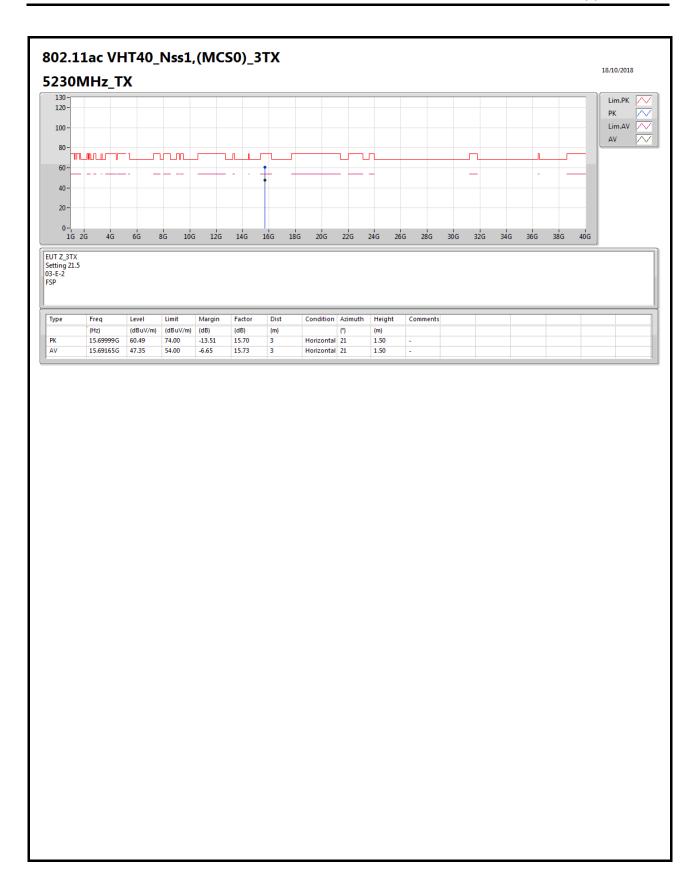


Page No. : 56 of 121



Page No. : 57 of 121



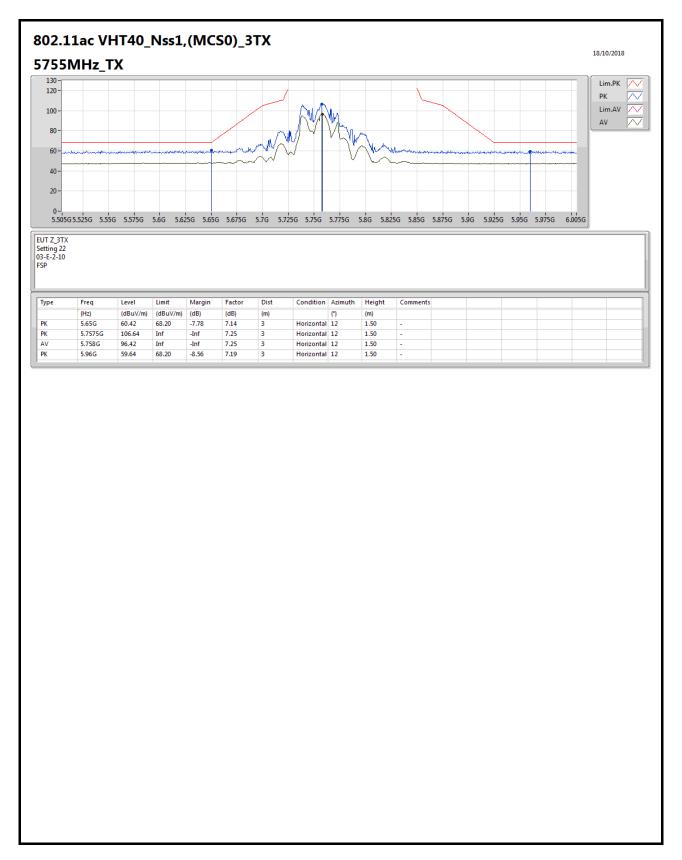


Page No. : 58 of 121

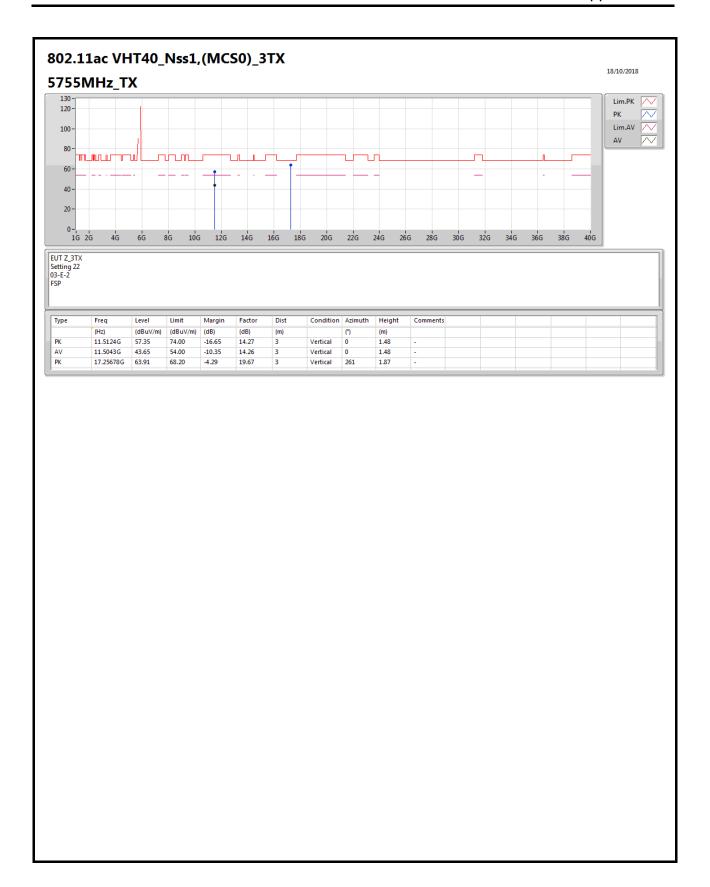
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JT Z_3TX tting 22 -E-2-10																
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ype	Freq (Hz)	Level	Limit (dRu)//m)	Margin	Factor	Dist	Condition		Height (m)	Comment	s					
ζ.	5.6495G	67.85	(dBuV/m) 68.20	-0.35	(dB) 7.14	(m) 3	Vertical	(°) 212	(m) 1.83	-						
(5.7475G	123.65	Inf	-Inf	7.25	3	Vertical	212	1.83	-						
V K	5.7475G 5.965G	111.97 60.32	Inf 68.20	-Inf -7.88	7.25 7.19	3	Vertical Vertical	212	1.83	-						

Page No. : 59 of 121

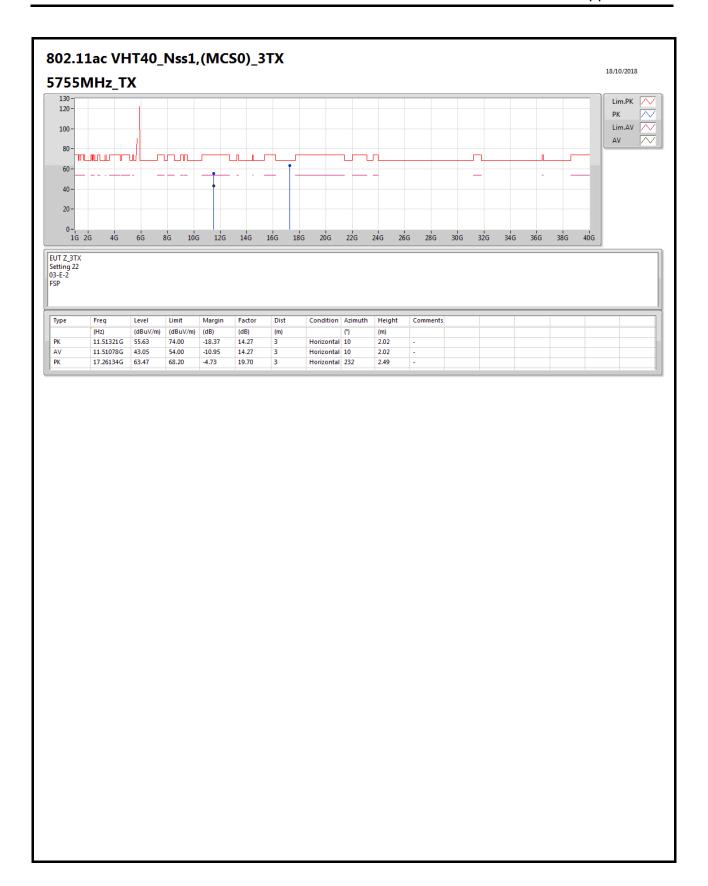


Page No. : 60 of 121



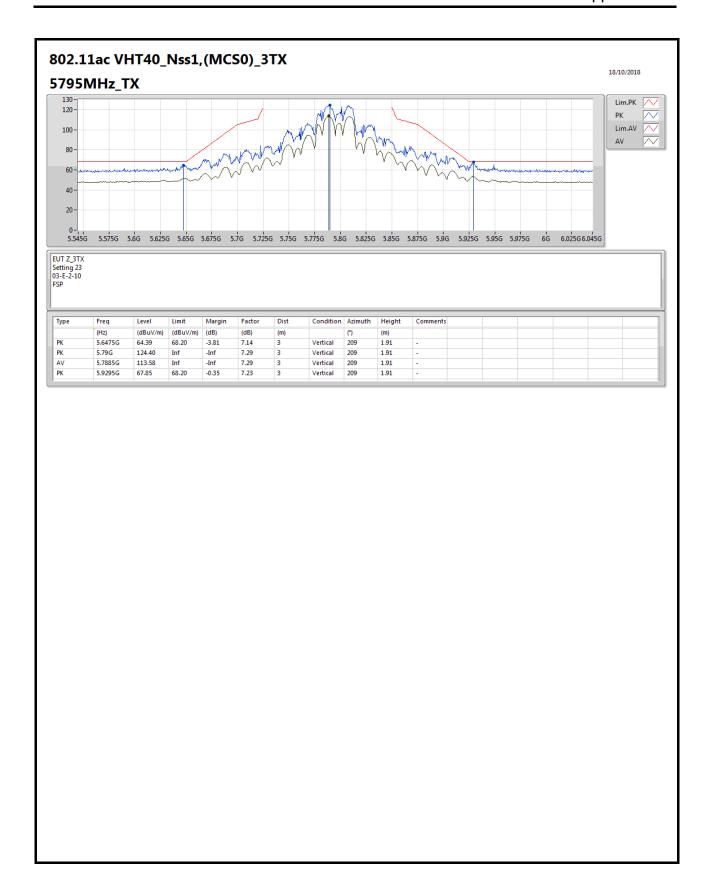
Page No. : 61 of 121



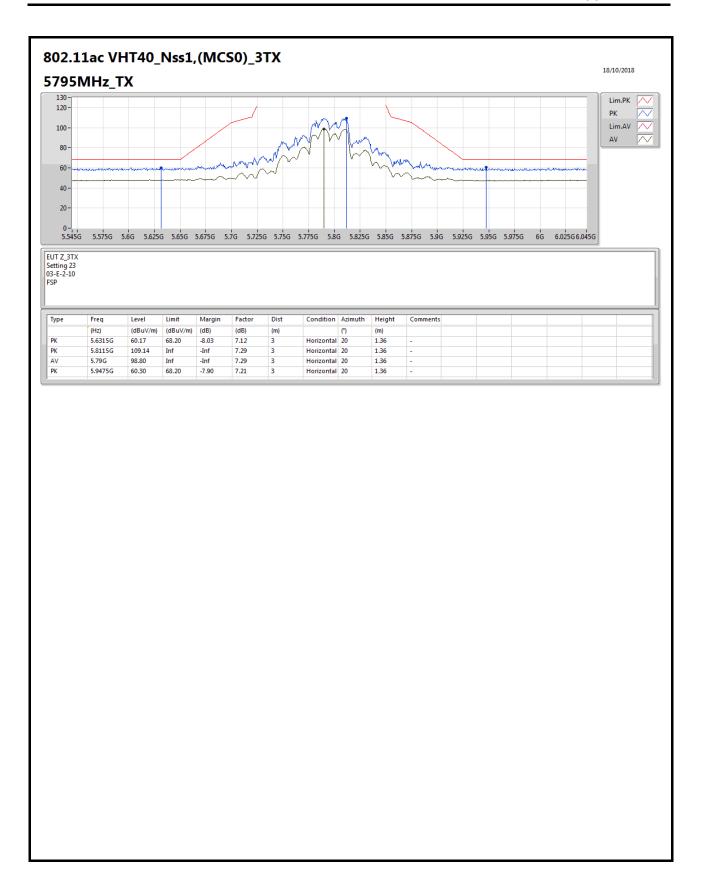


Page No. : 62 of 121

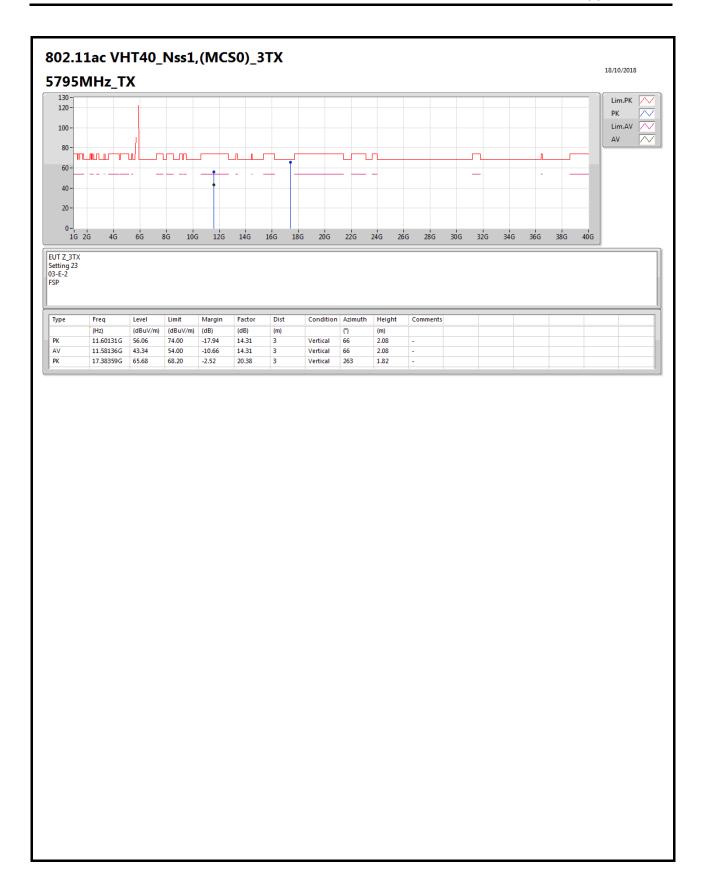




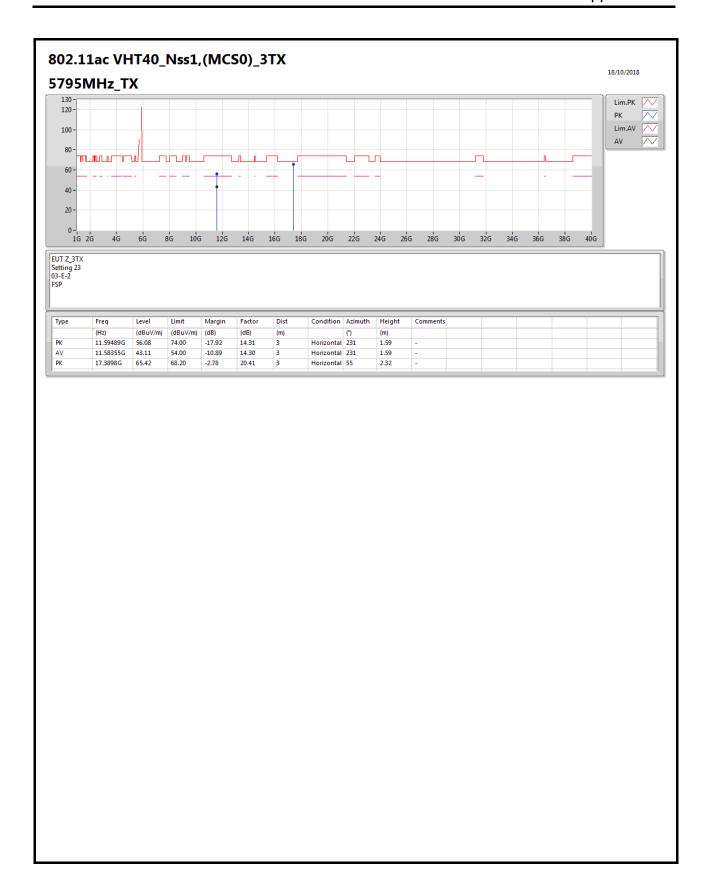
Page No. : 63 of 121



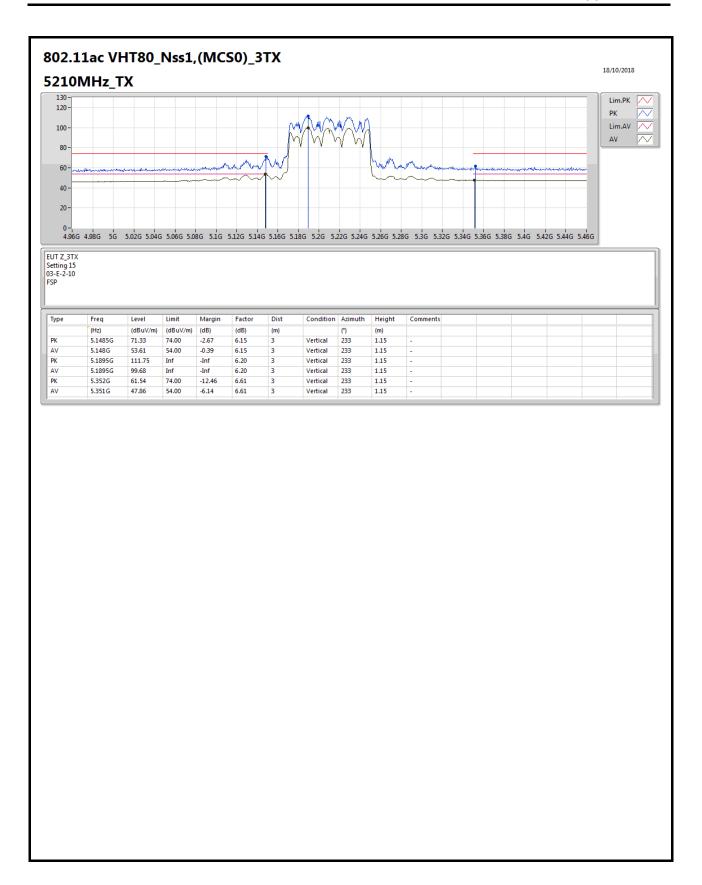
Page No. : 64 of 121



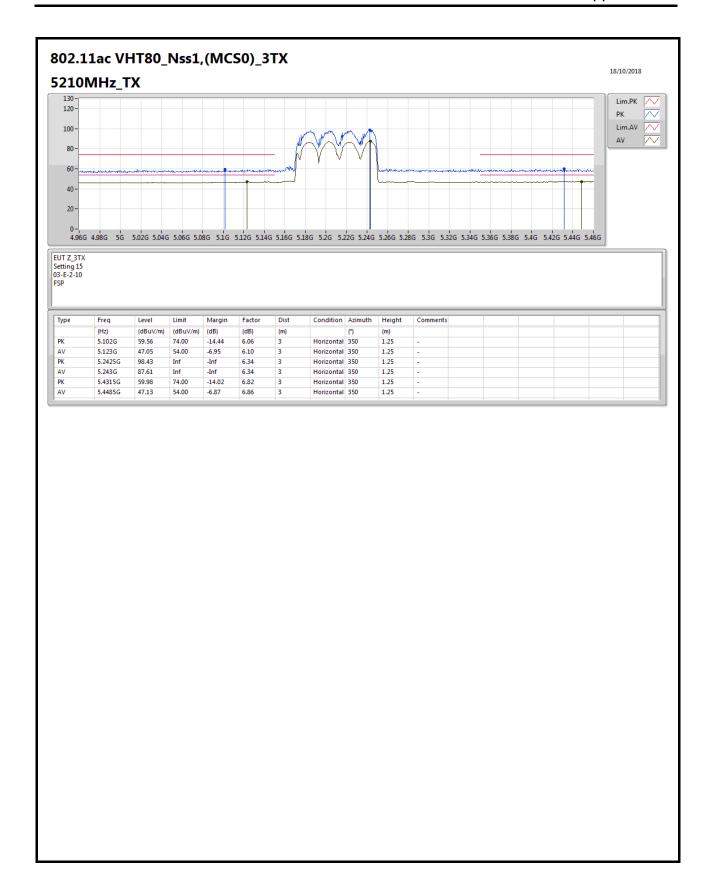
Page No. : 65 of 121



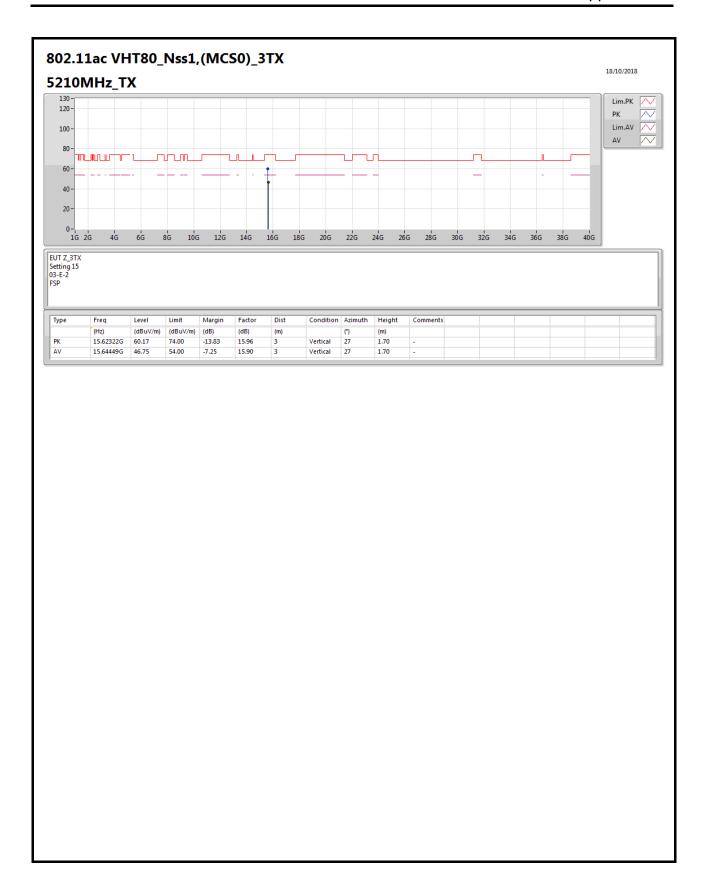
Page No. : 66 of 121



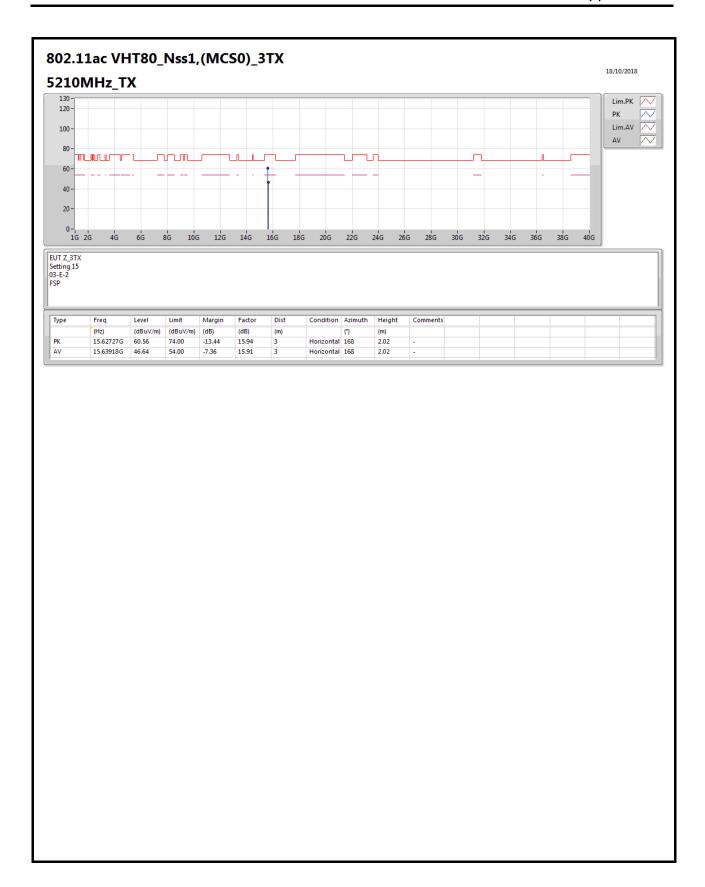
Page No. : 67 of 121



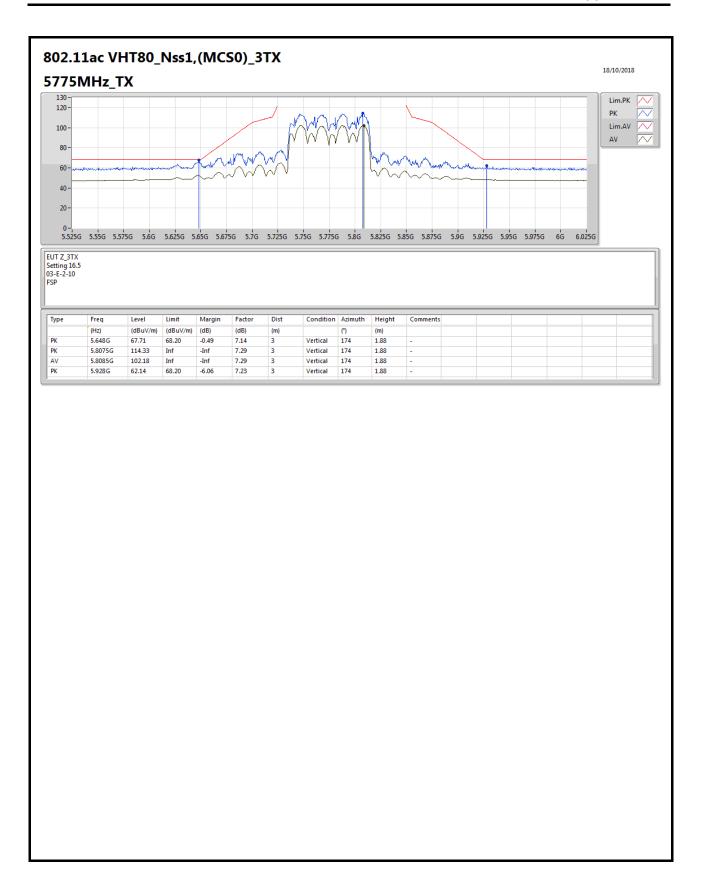
Page No. : 68 of 121



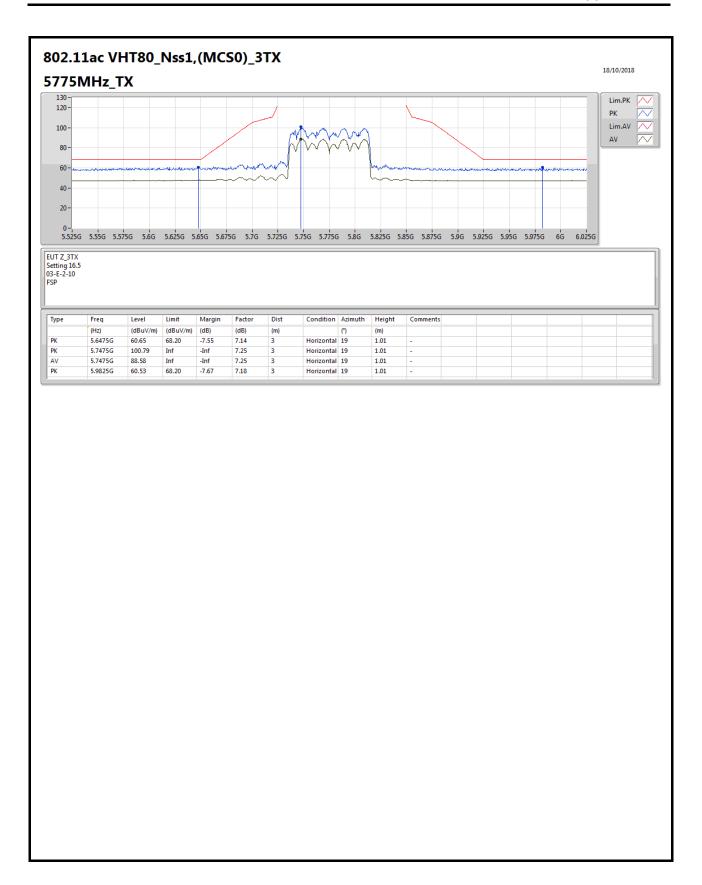
Page No. : 69 of 121



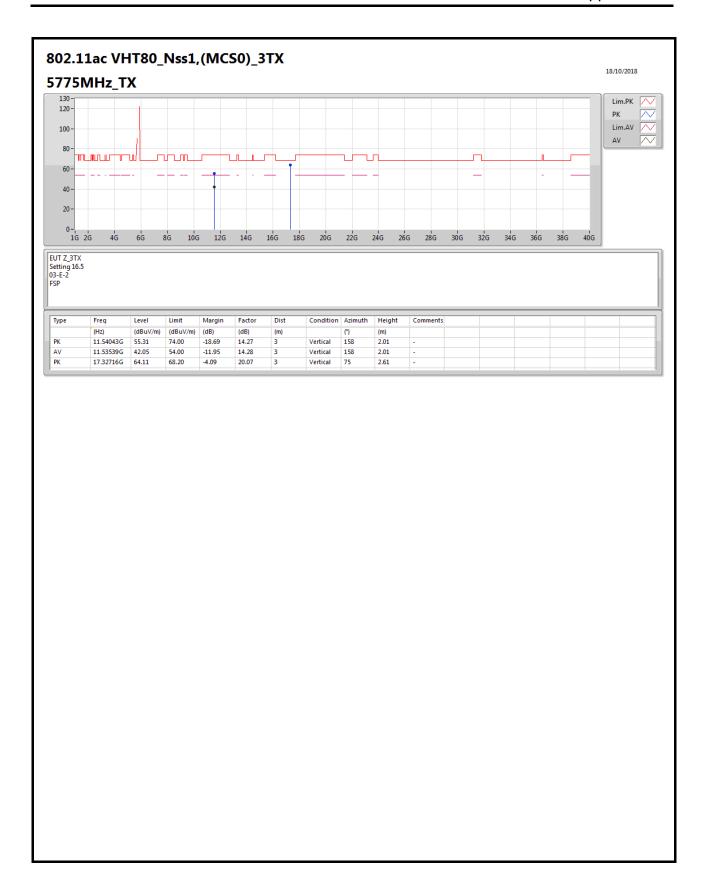
Page No. : 70 of 121



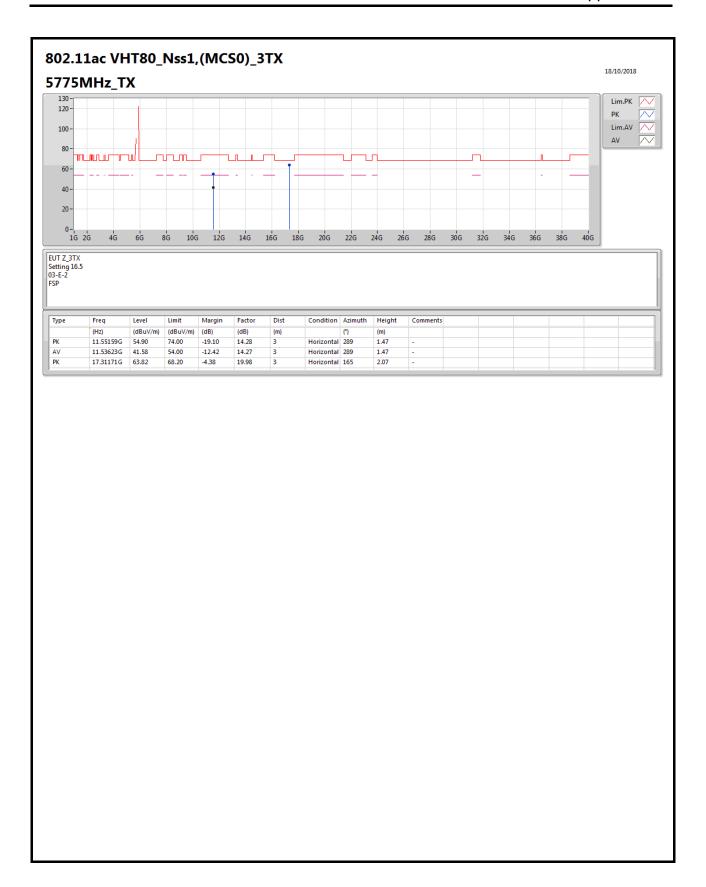
Page No. : 71 of 121



Page No. : 72 of 121

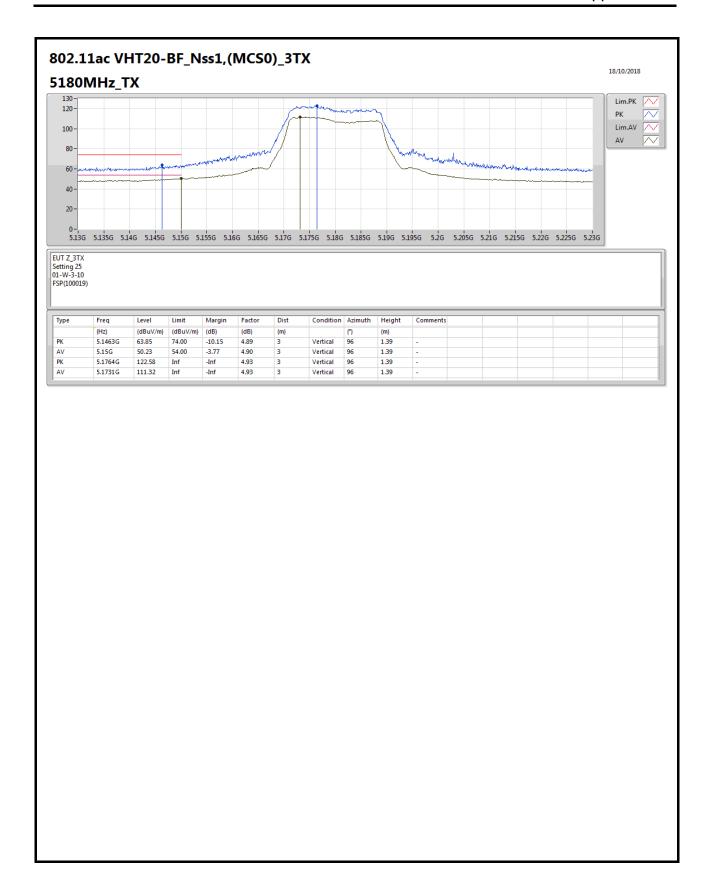


Page No. : 73 of 121



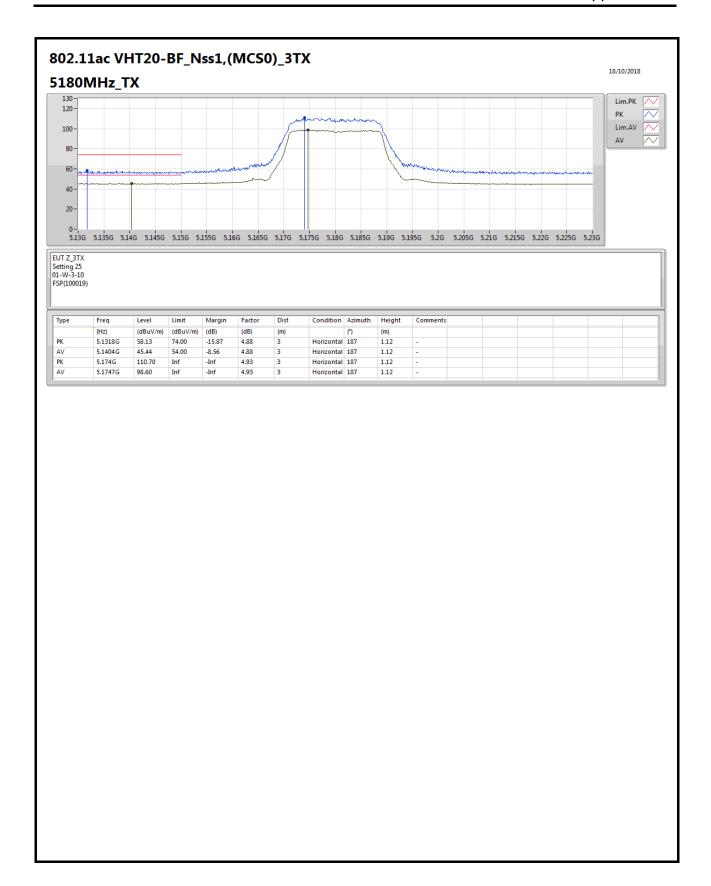
Page No. : 74 of 121





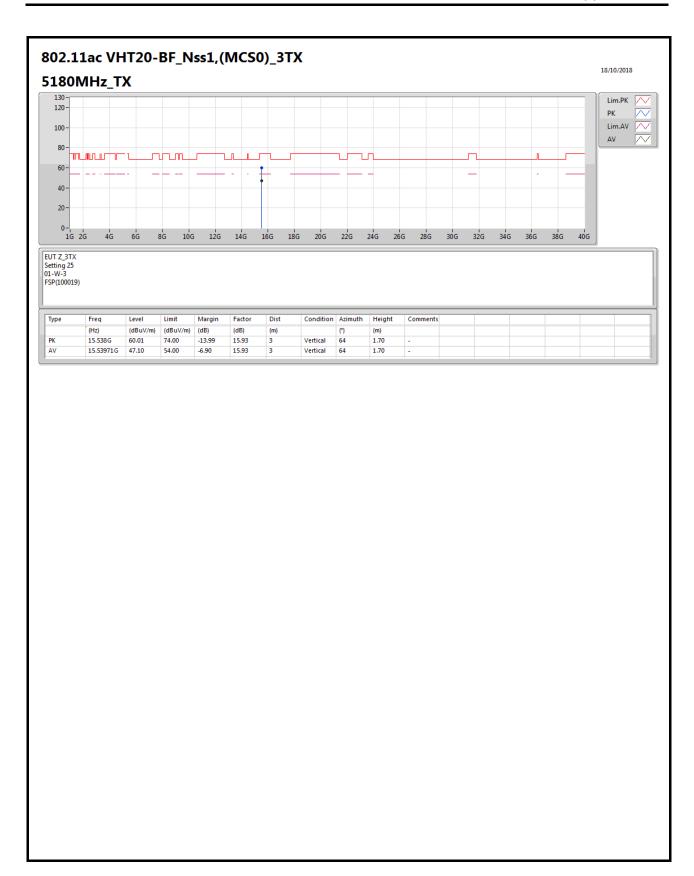
Page No. : 75 of 121



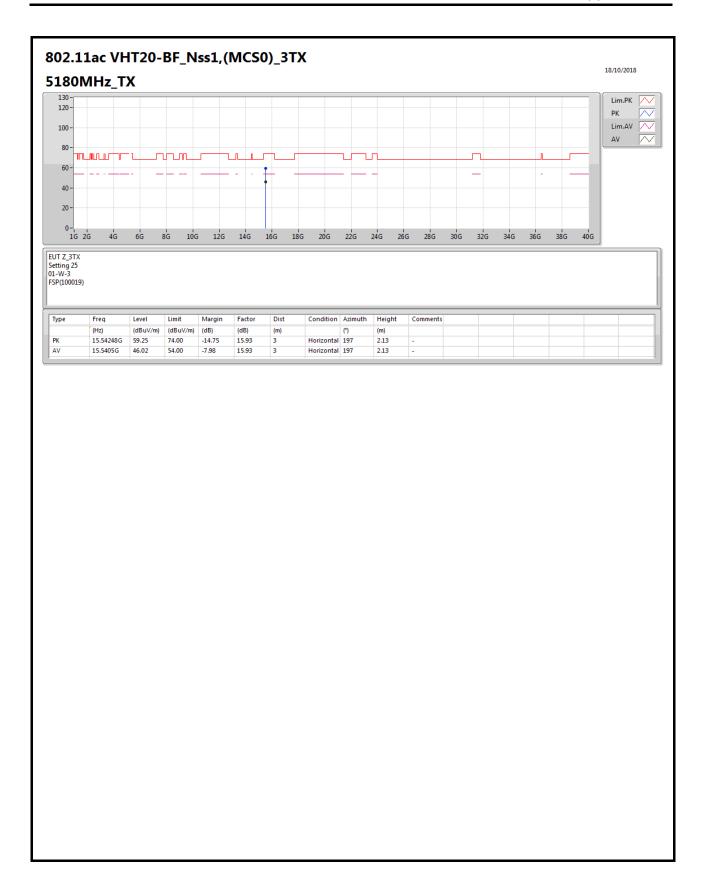


Page No. : 76 of 121



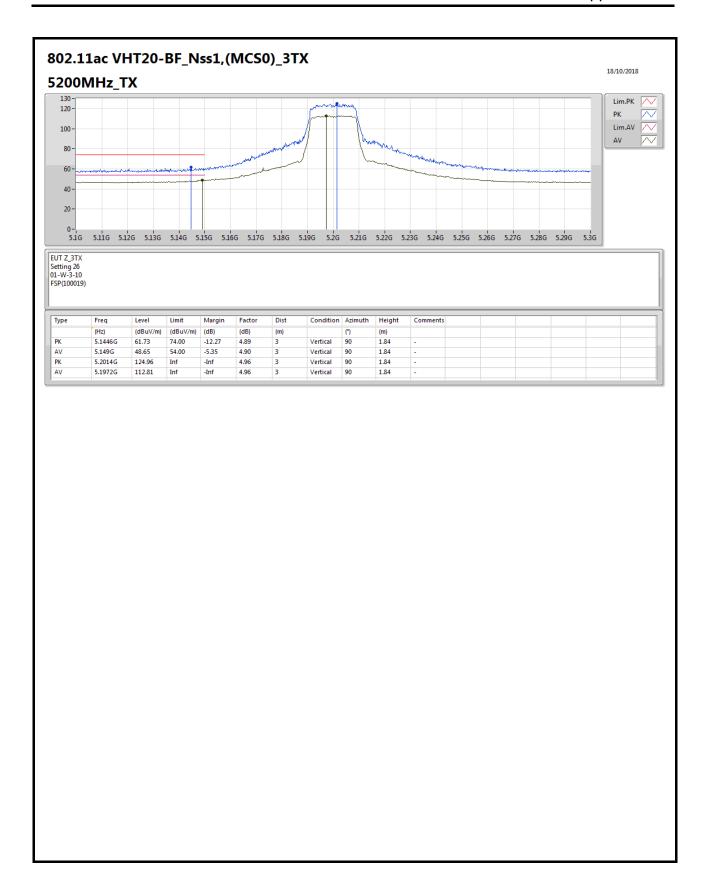


Page No. : 77 of 121



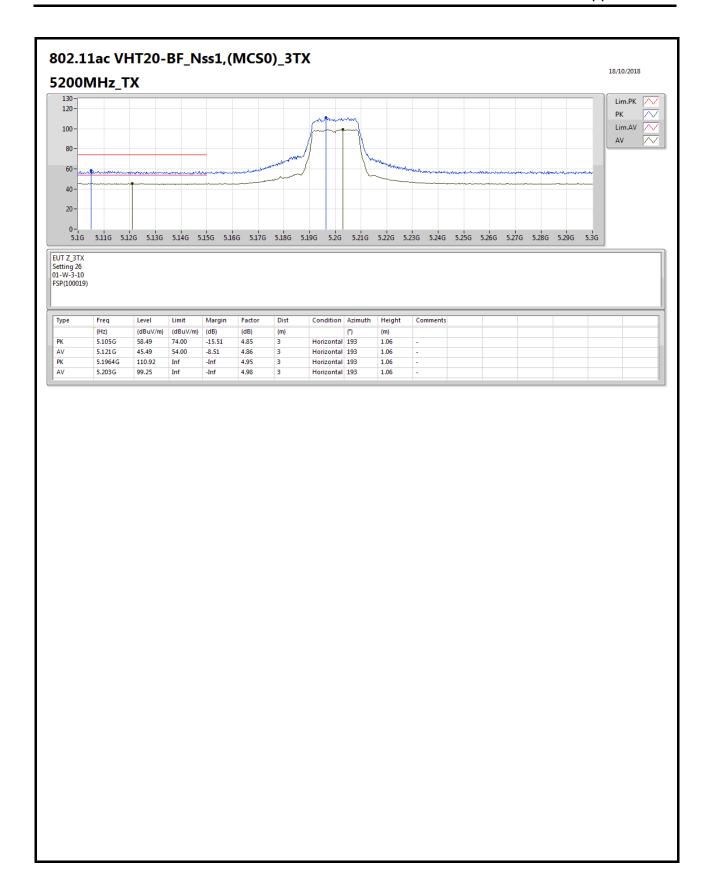
Page No. : 78 of 121





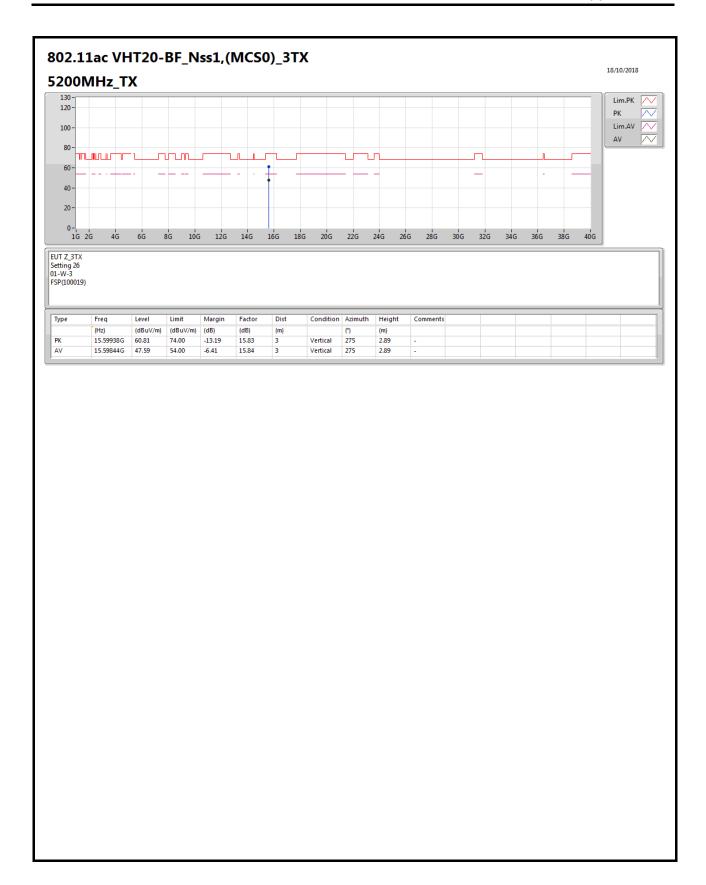
Page No. : 79 of 121



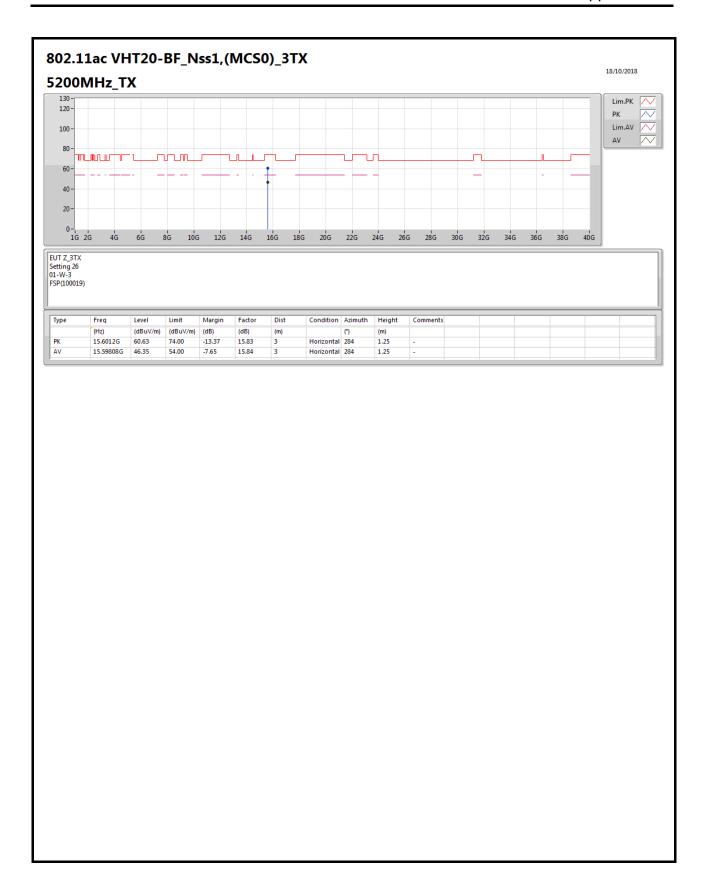


Page No. : 80 of 121



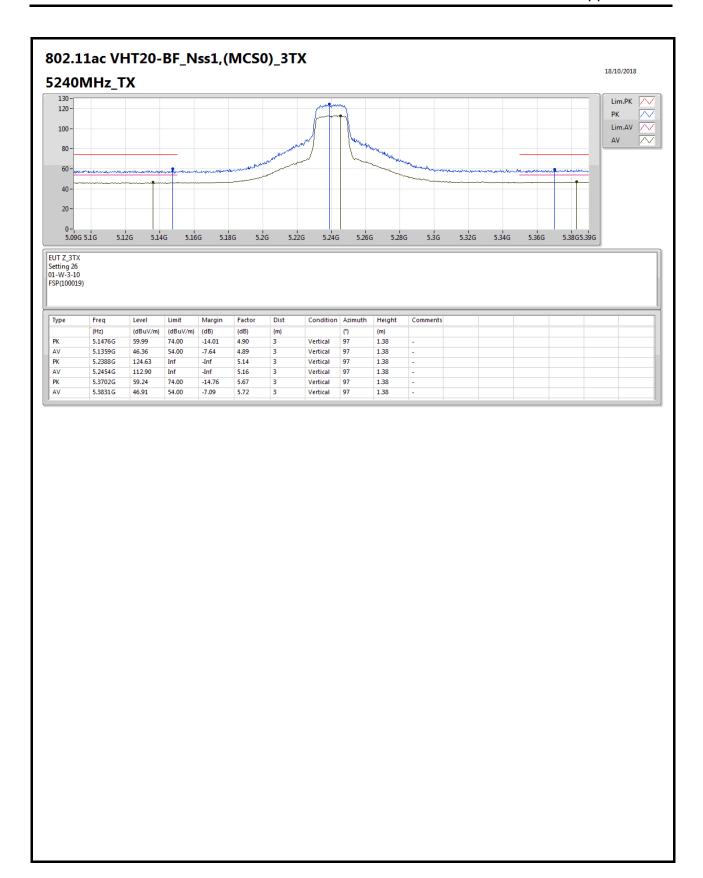


Page No. : 81 of 121



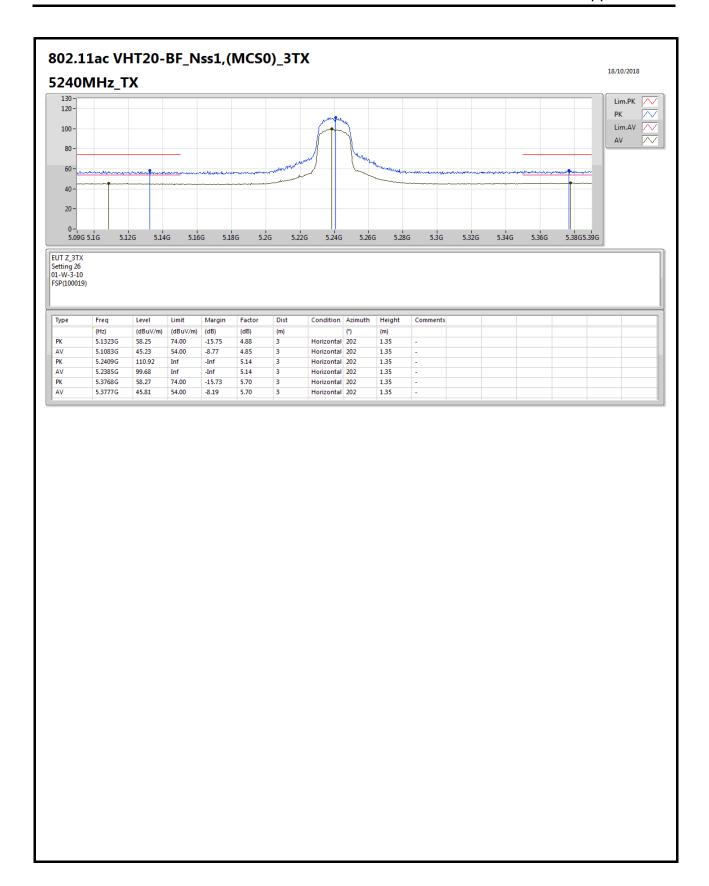
Page No. : 82 of 121



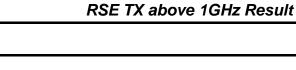


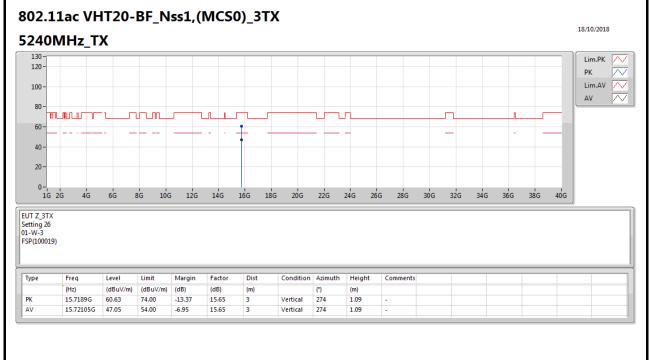
Page No. : 83 of 121





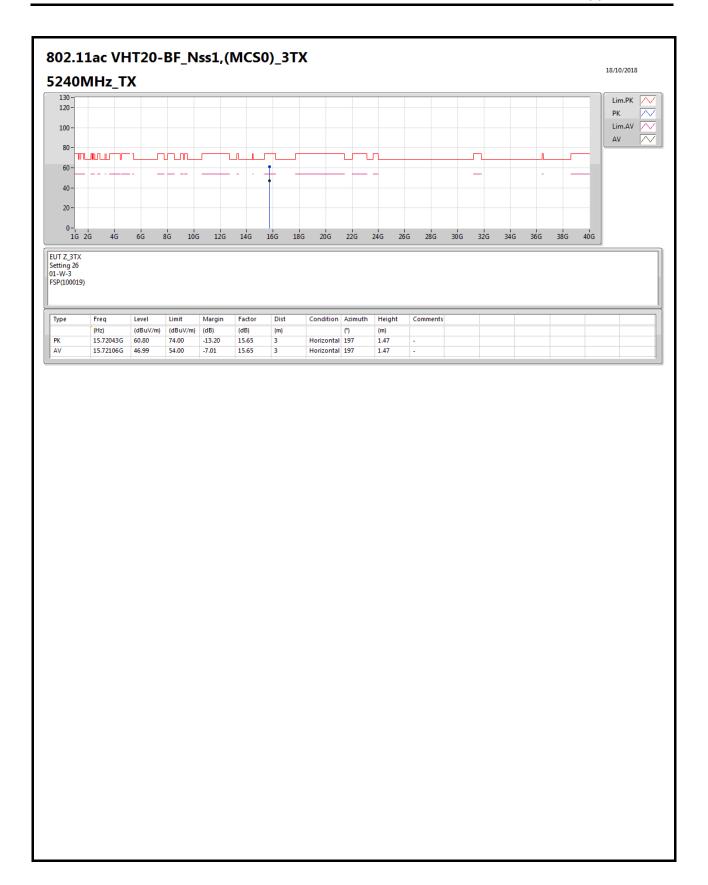
Page No. : 84 of 121





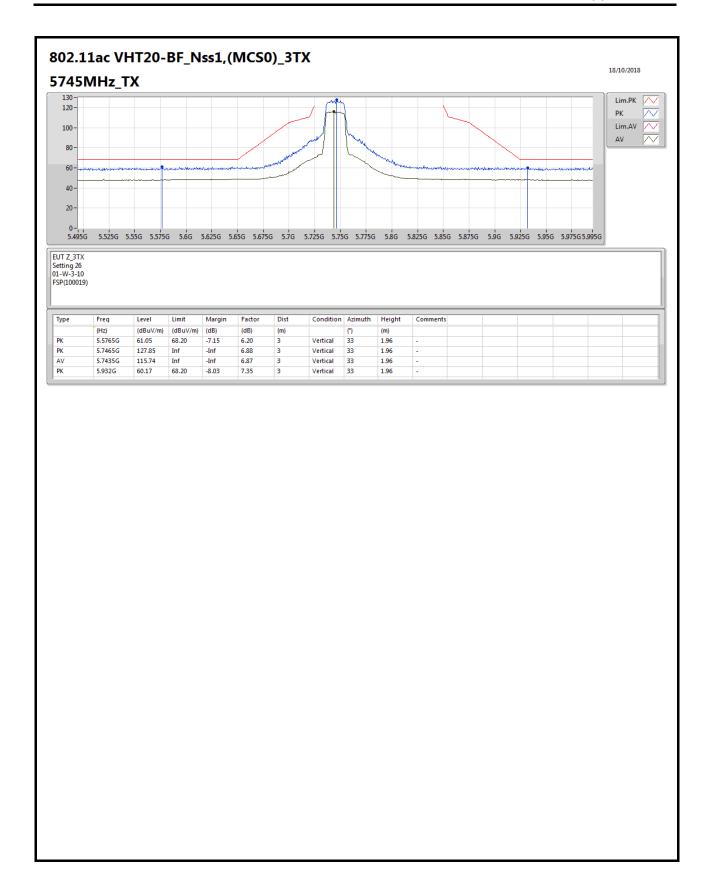
Page No. : 85 of 121





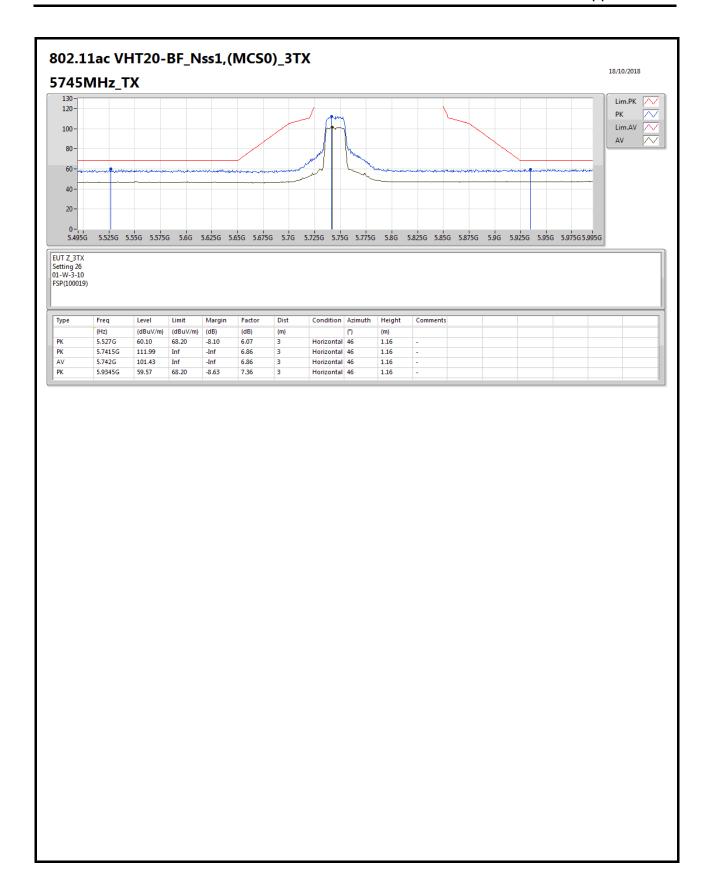
Page No. : 86 of 121



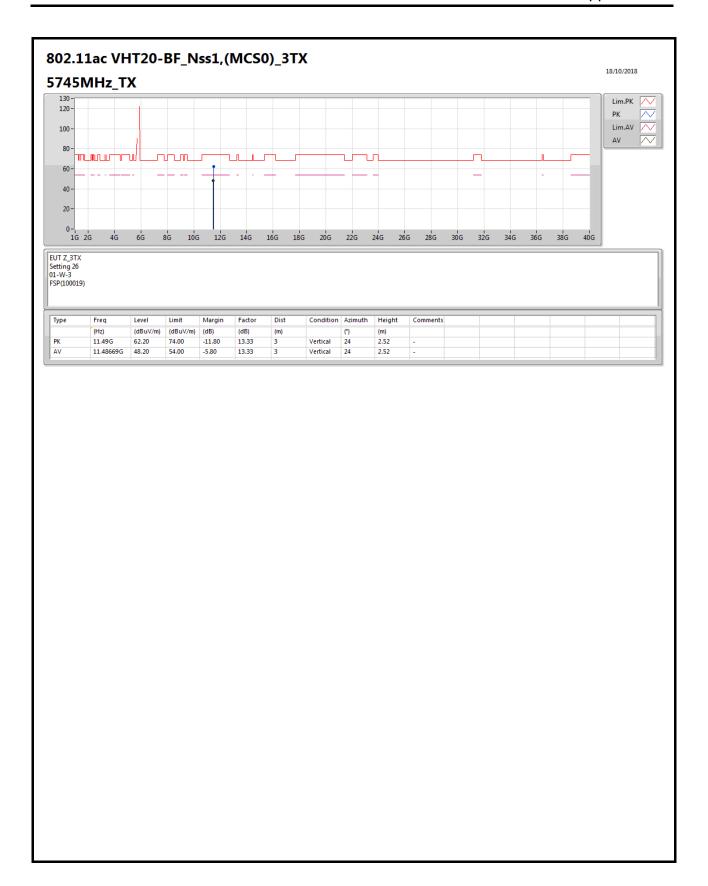


Page No. : 87 of 121

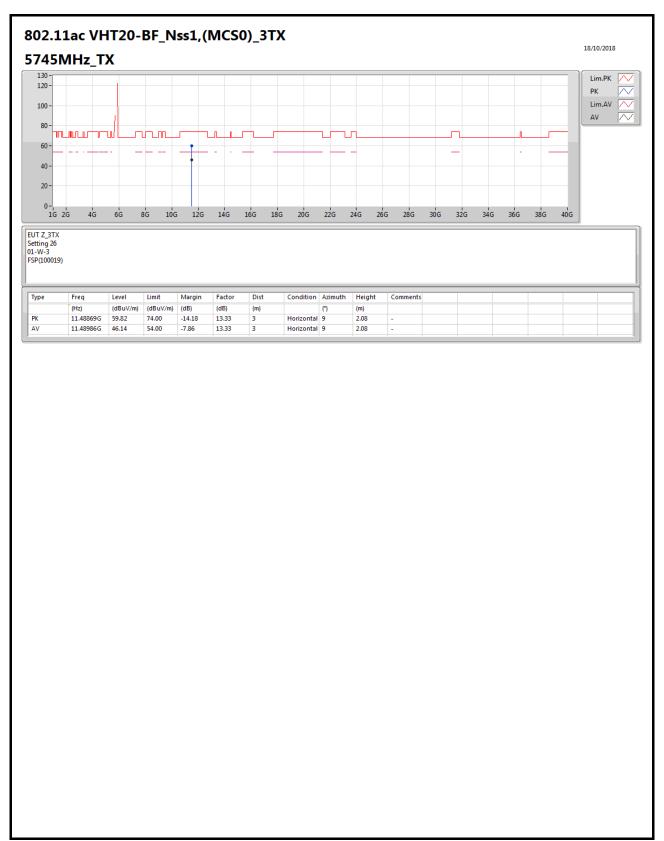




Page No. : 88 of 121

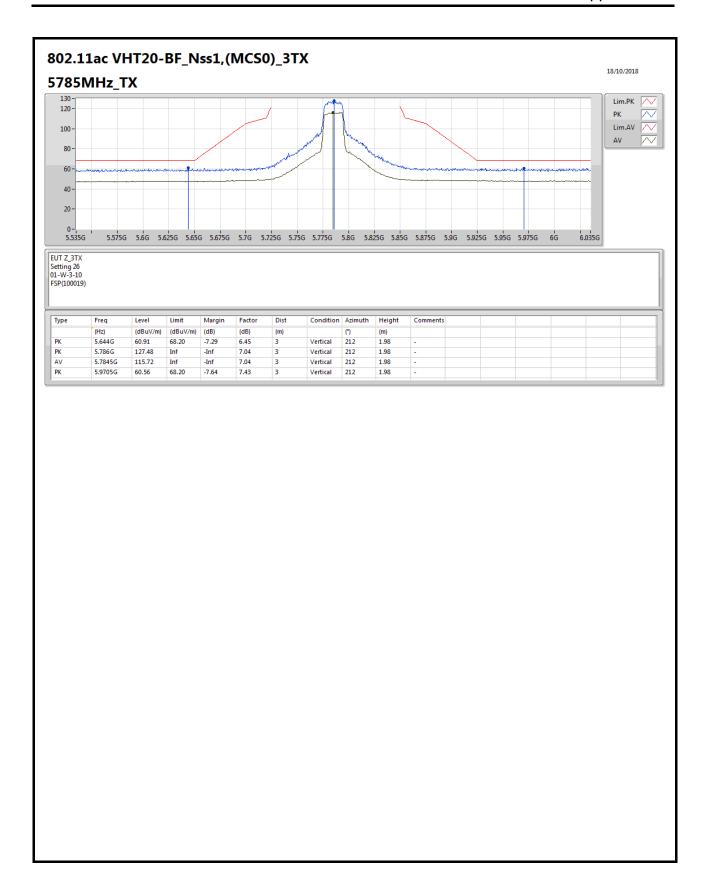


Page No. : 89 of 121



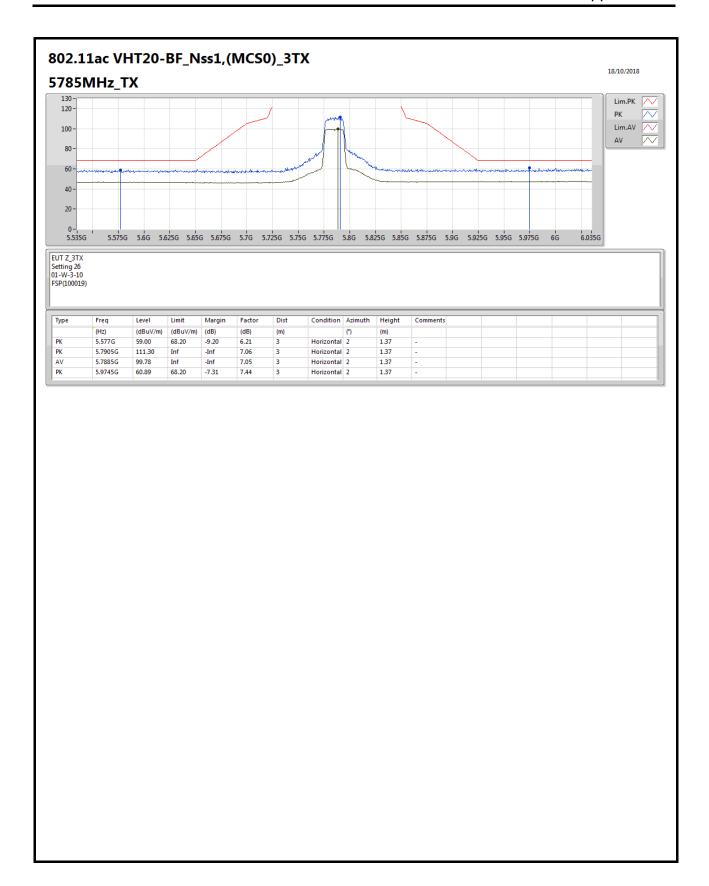
Page No. : 90 of 121



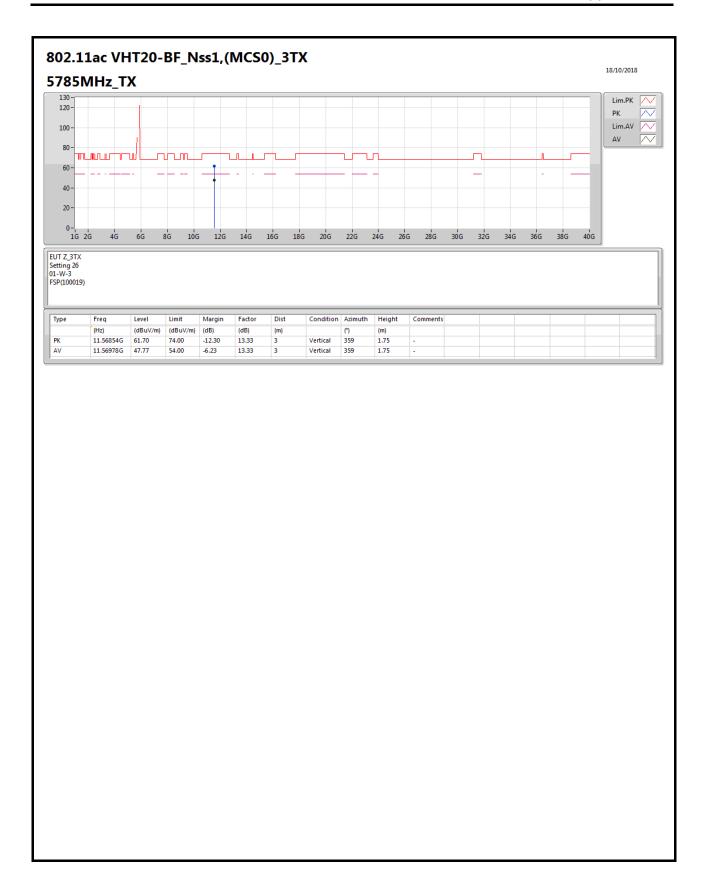


Page No. : 91 of 121

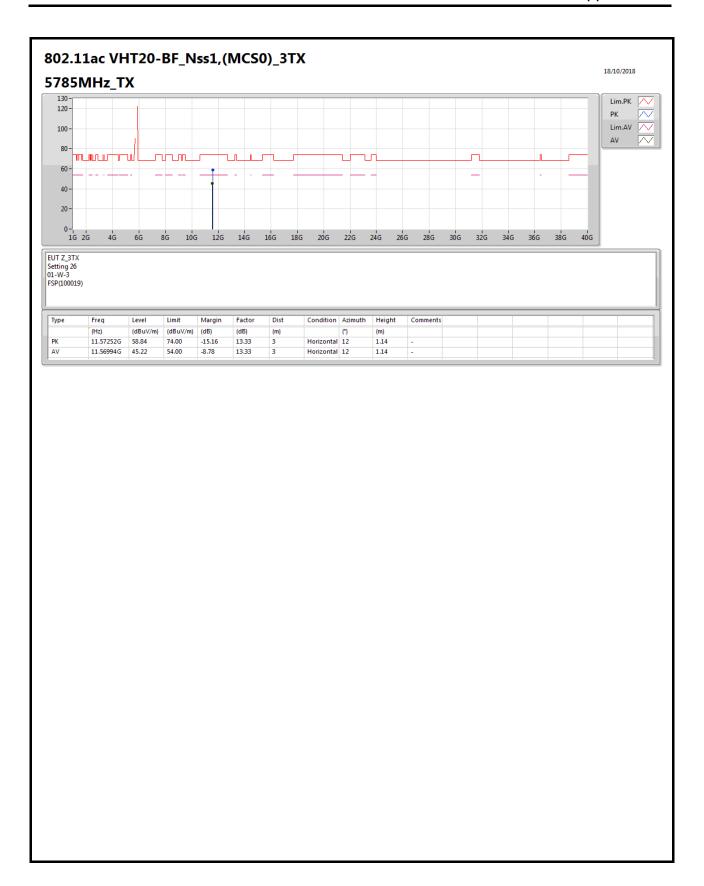




Page No. : 92 of 121

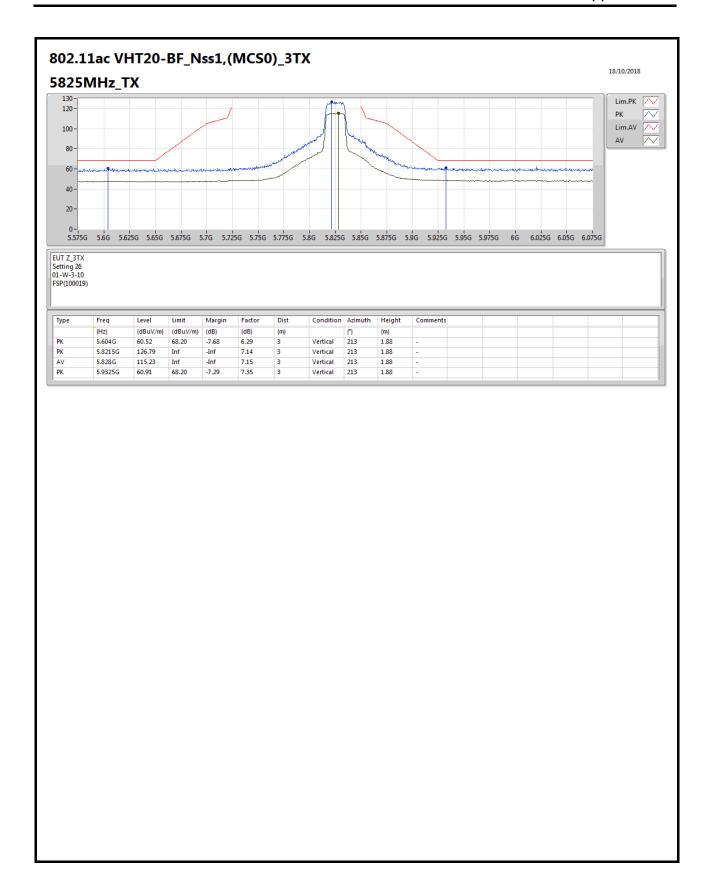


Page No. : 93 of 121

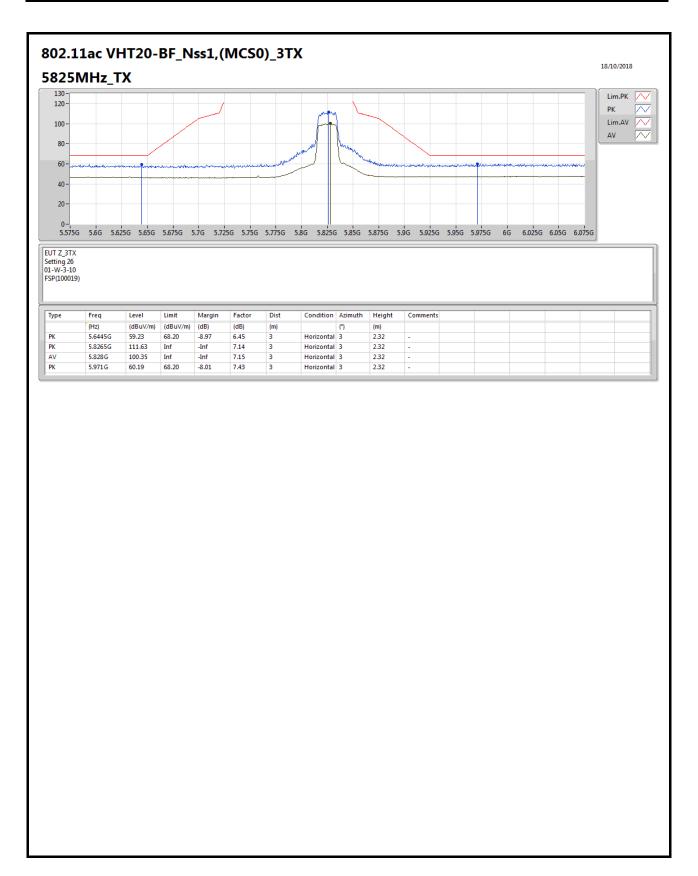


Page No. : 94 of 121

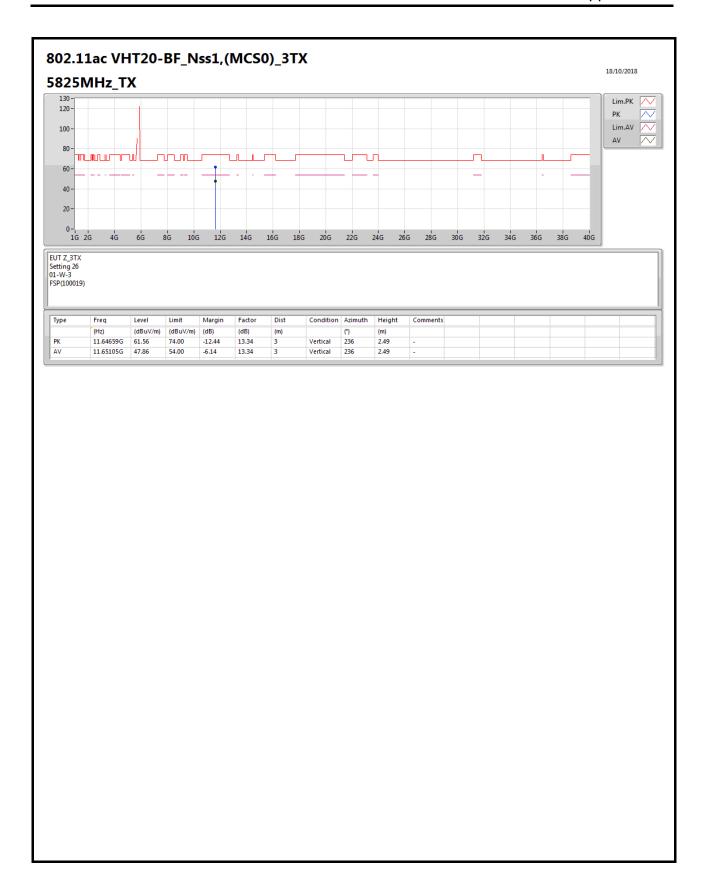




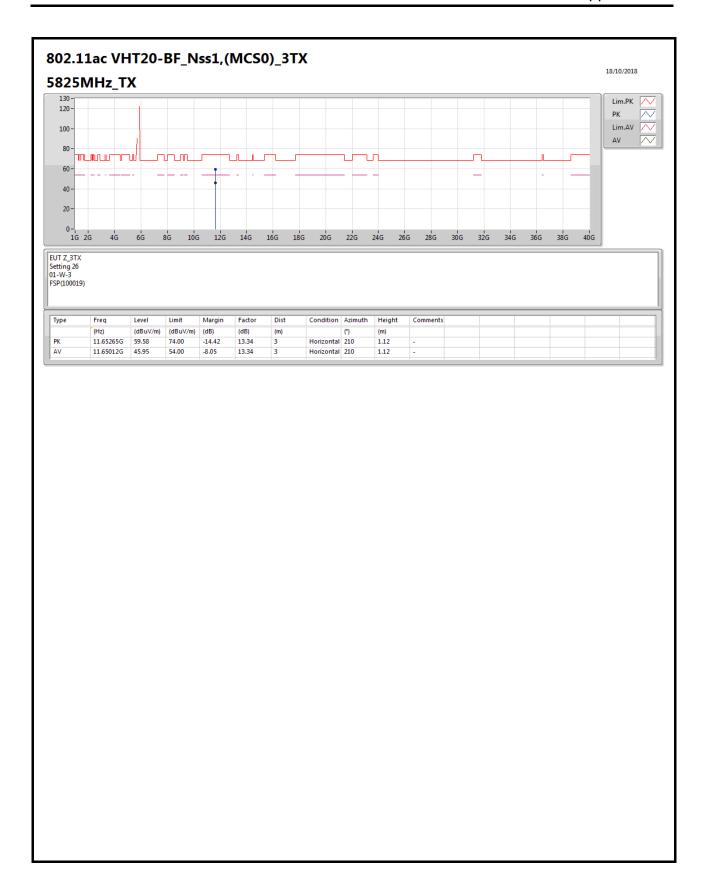
Page No. : 95 of 121



Page No. : 96 of 121

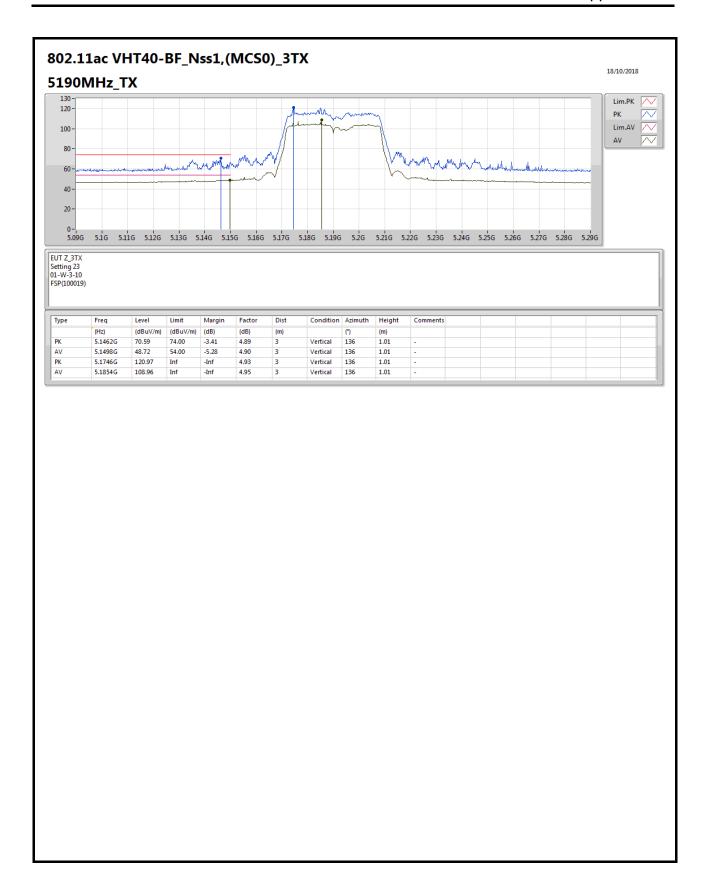


Page No. : 97 of 121



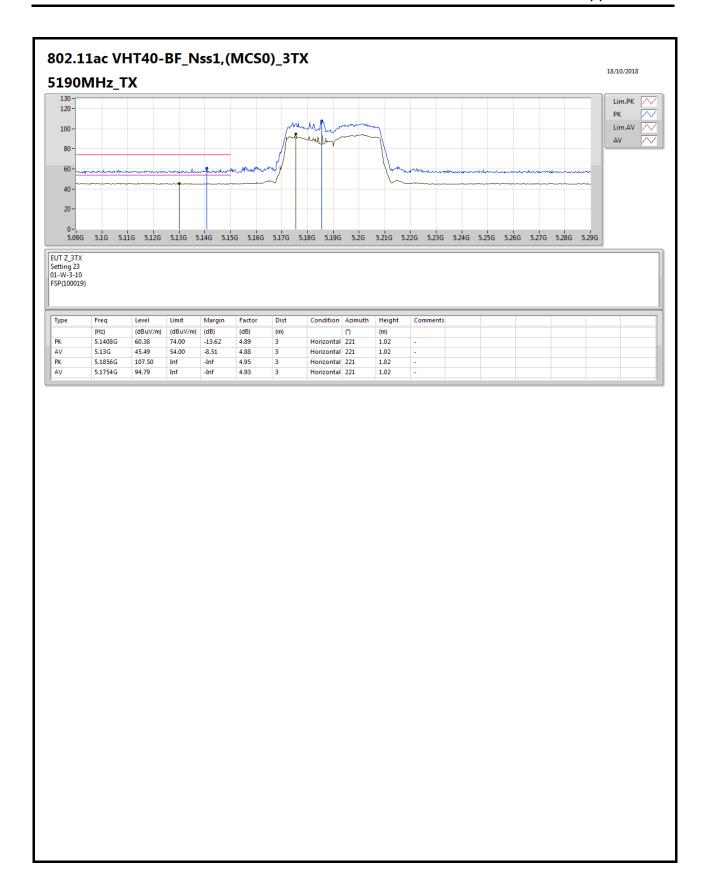
Page No. : 98 of 121





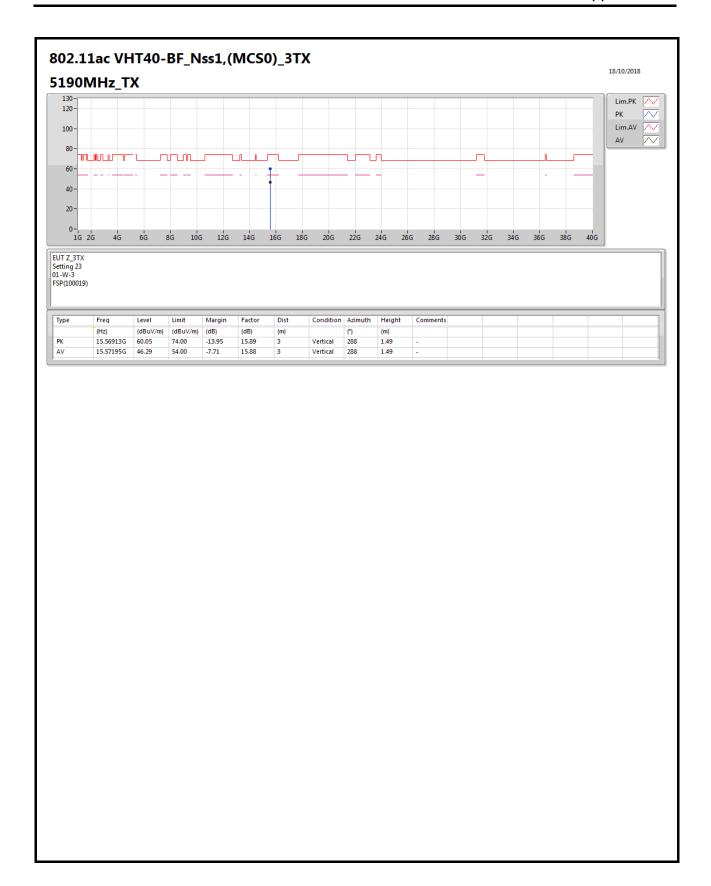
Page No. : 99 of 121





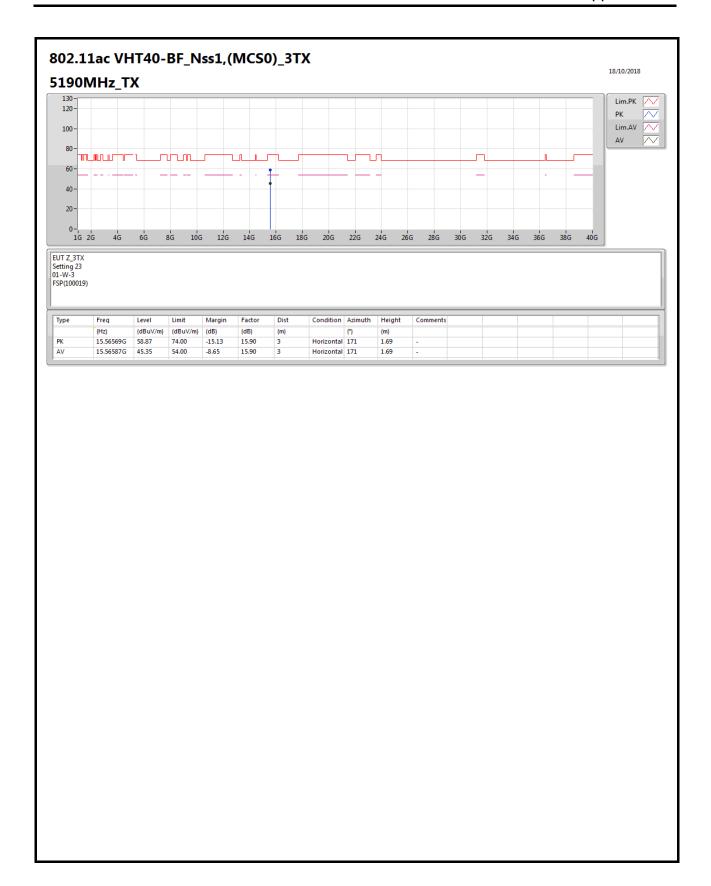
Page No. : 100 of 121





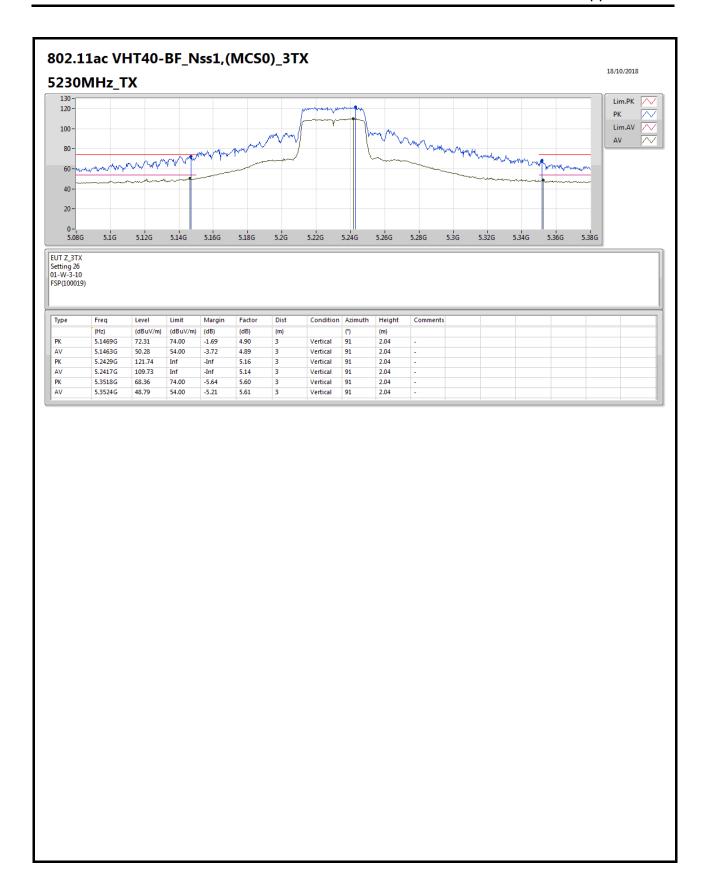
Page No. : 101 of 121





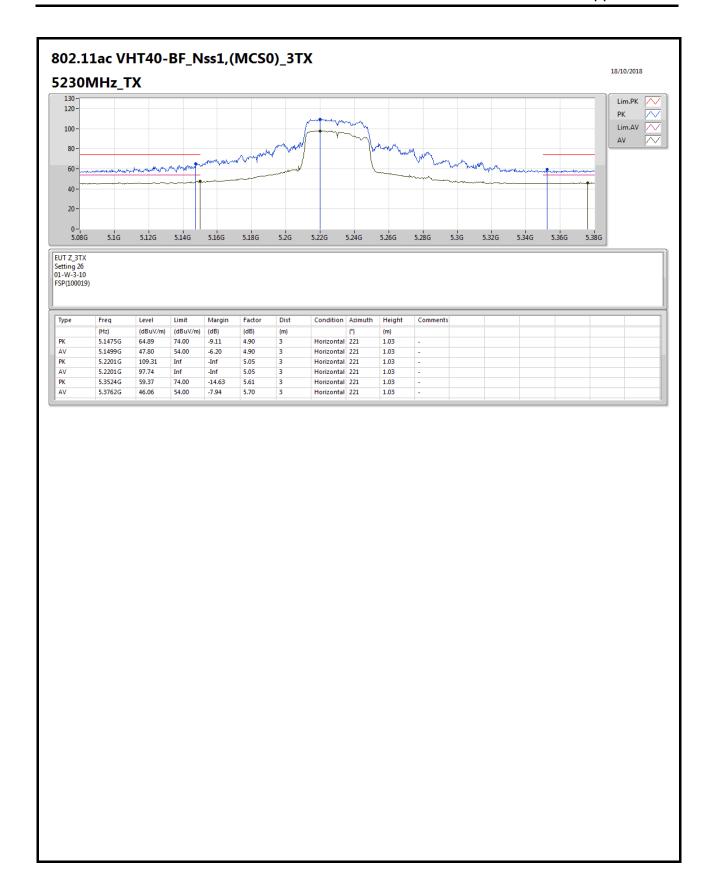
Page No. : 102 of 121



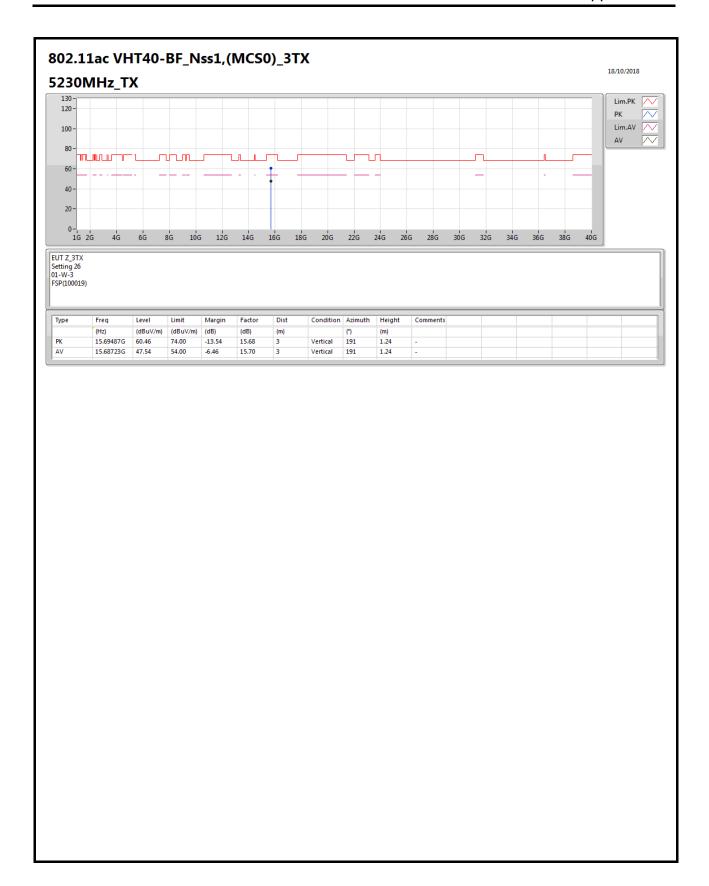


Page No. : 103 of 121

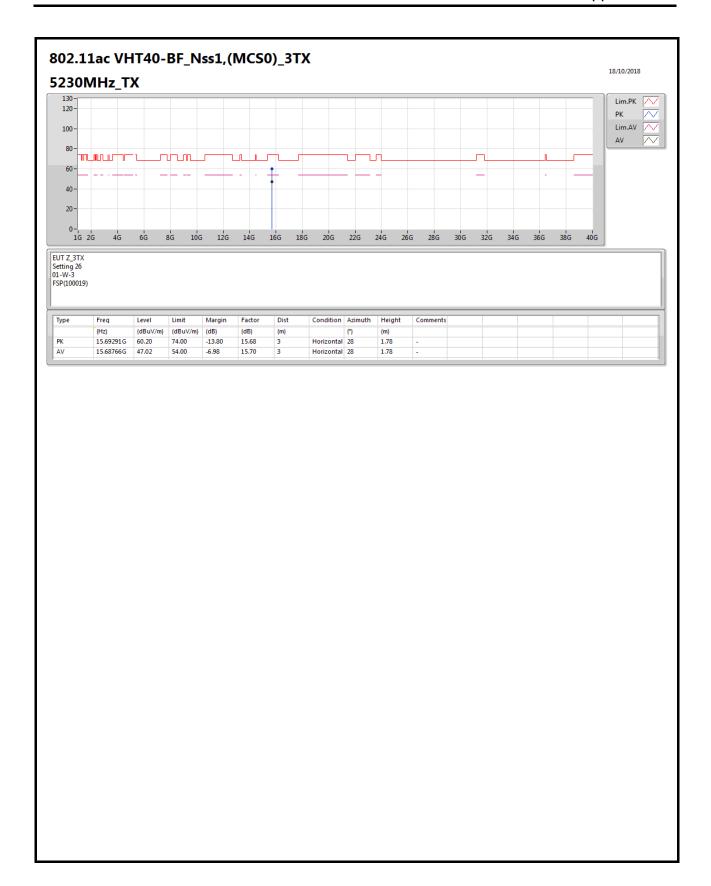




Page No. : 104 of 121

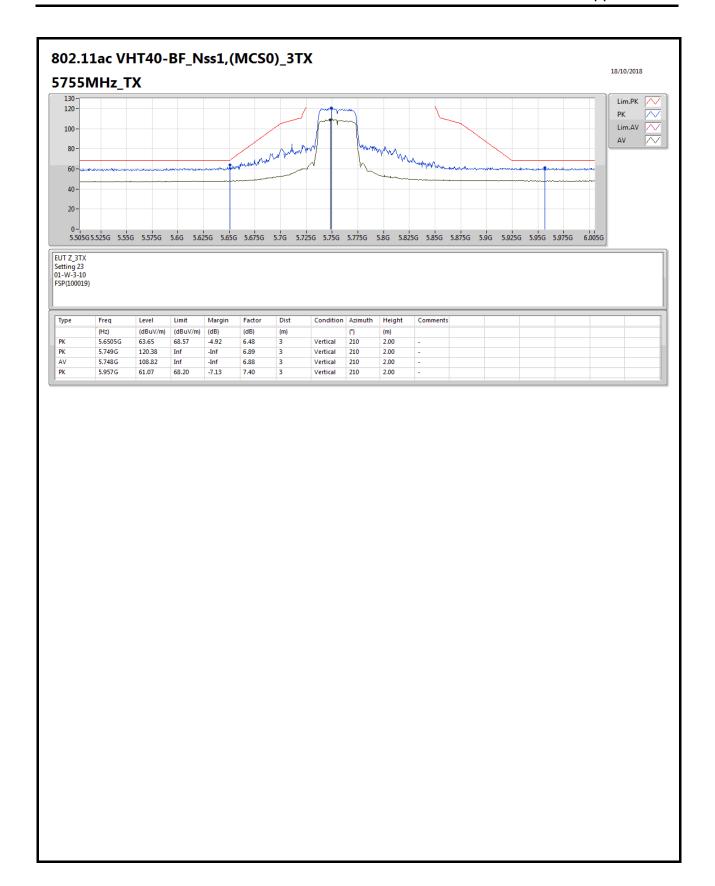


Page No. : 105 of 121



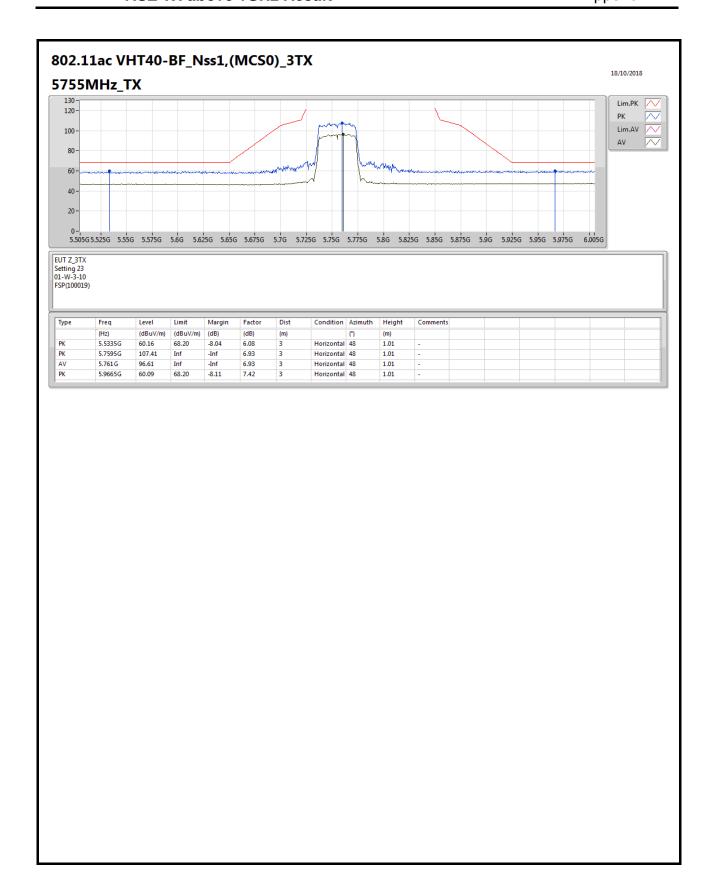
Page No. : 106 of 121





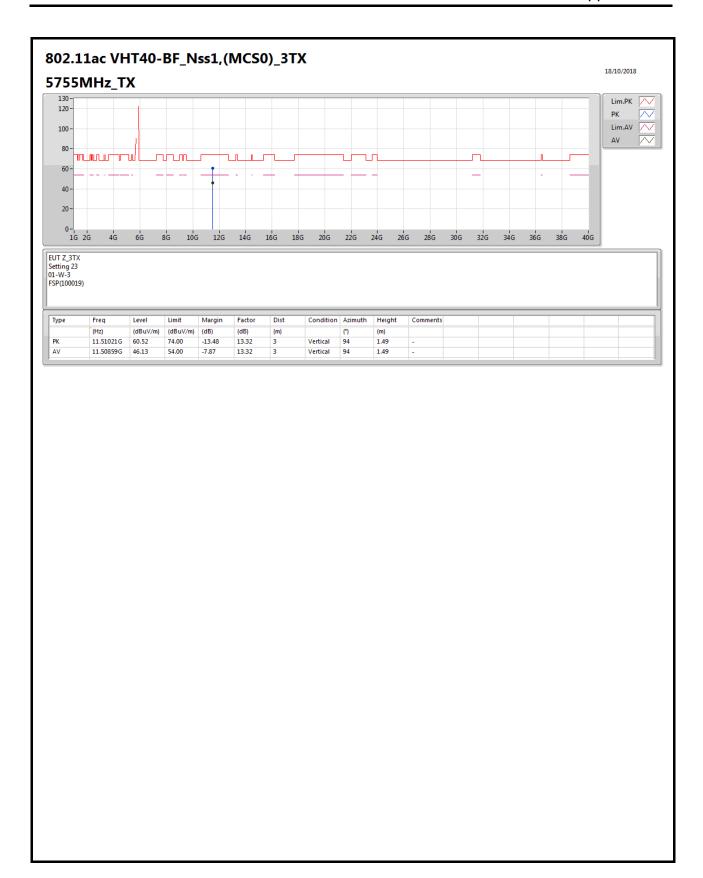
Page No. : 107 of 121





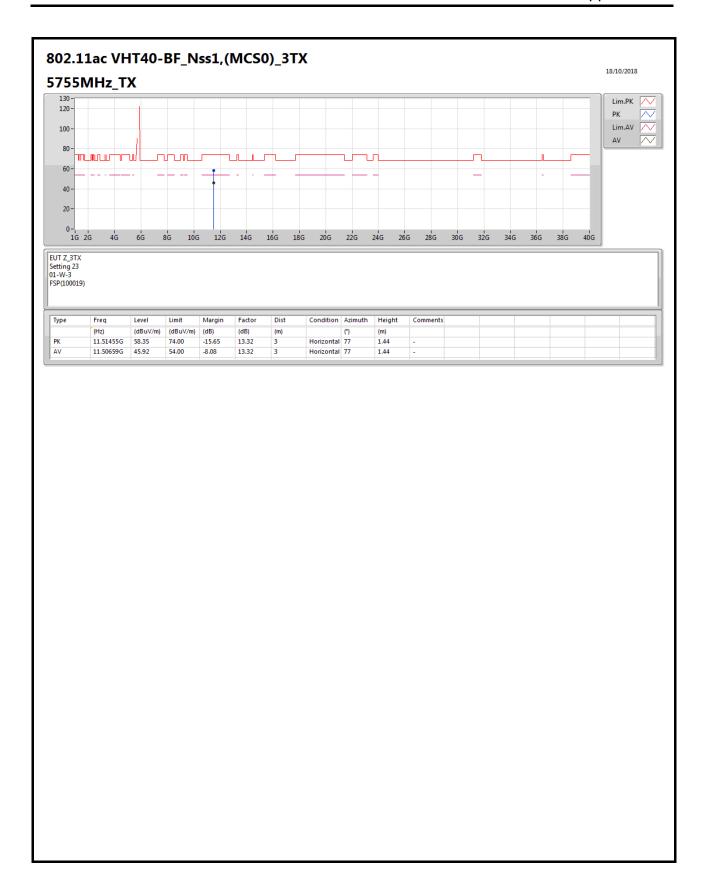
Page No. : 108 of 121





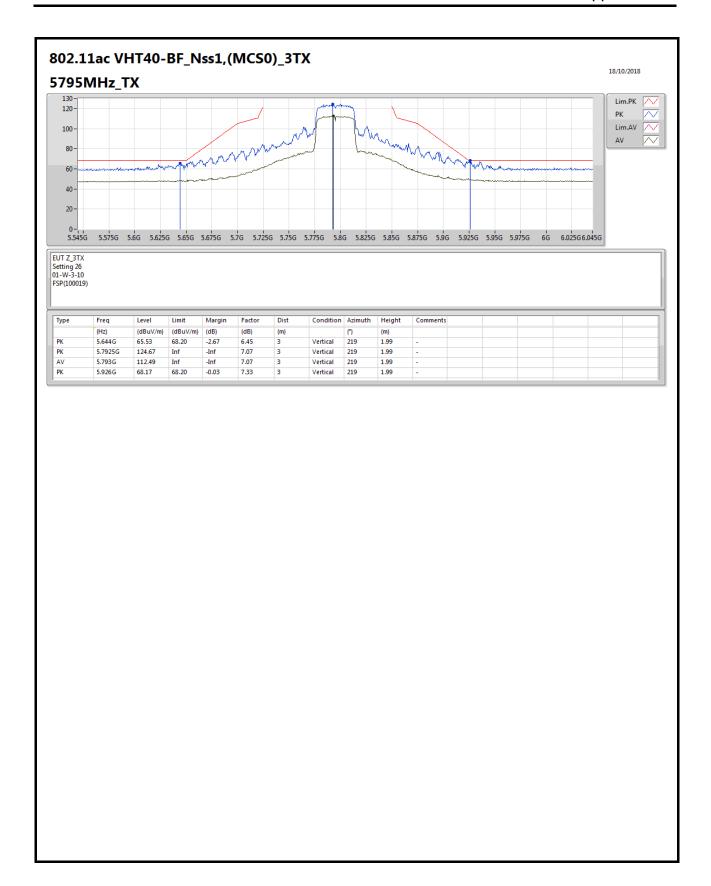
Page No. : 109 of 121





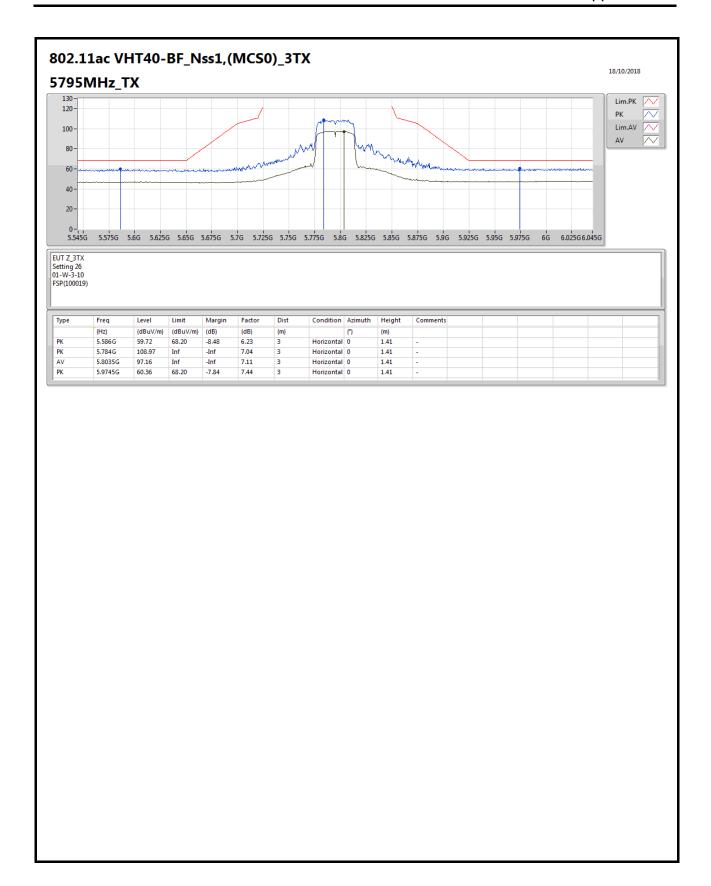
Page No. : 110 of 121



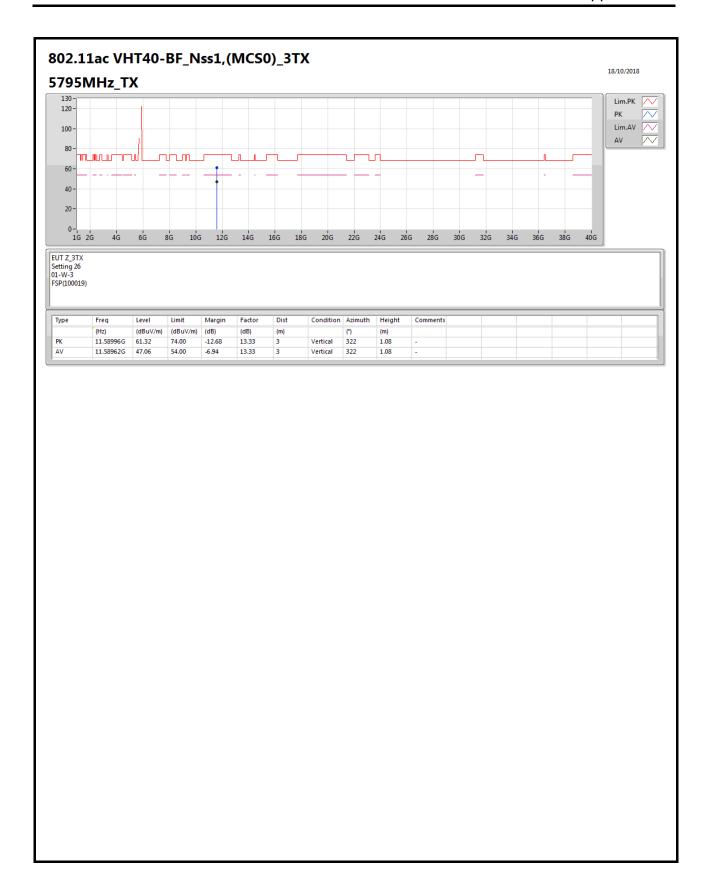


Page No. : 111 of 121

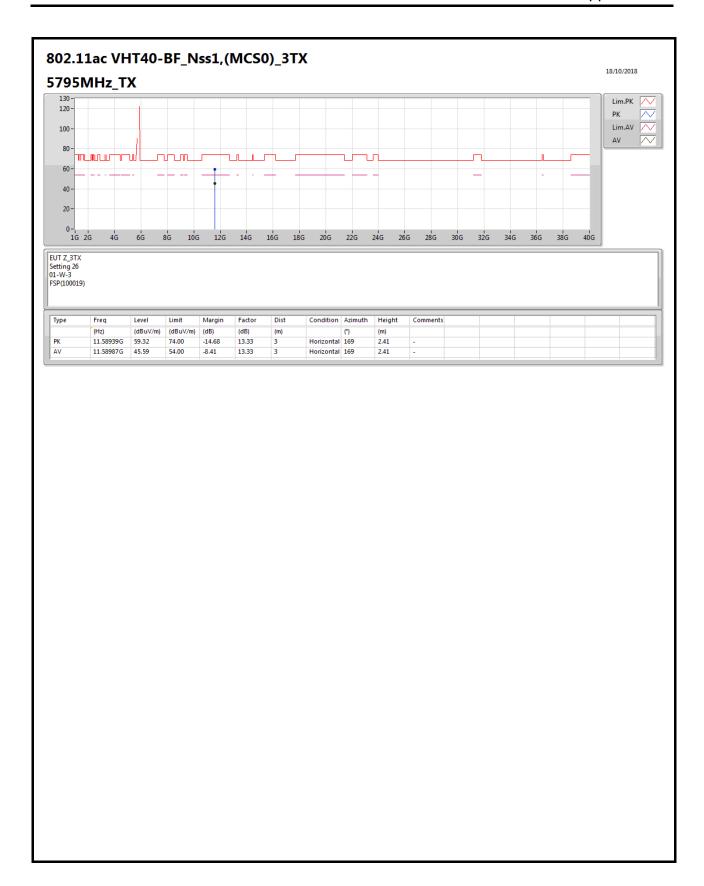




Page No. : 112 of 121

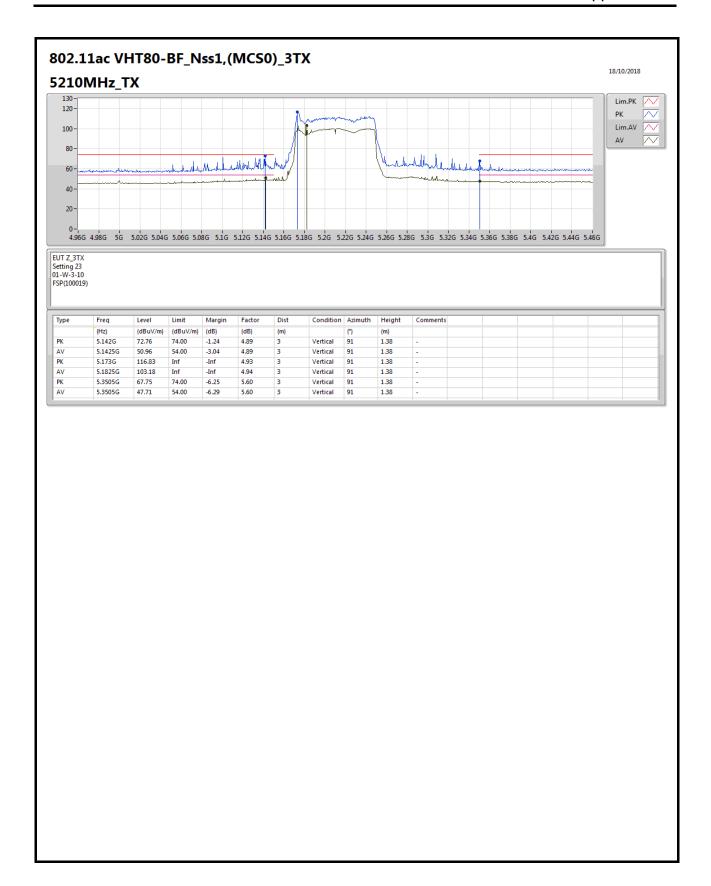


Page No. : 113 of 121



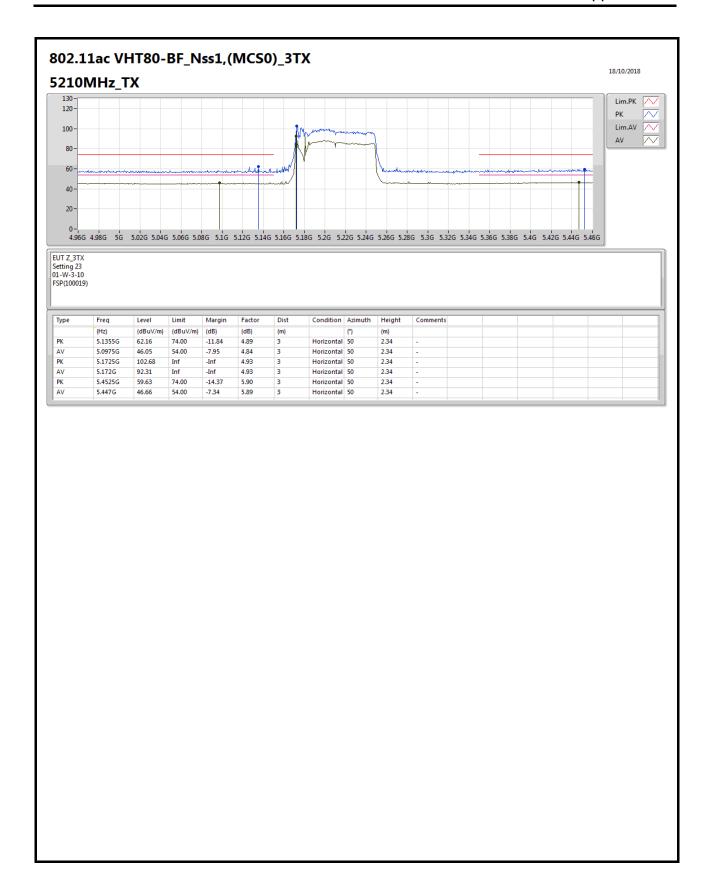
Page No. : 114 of 121





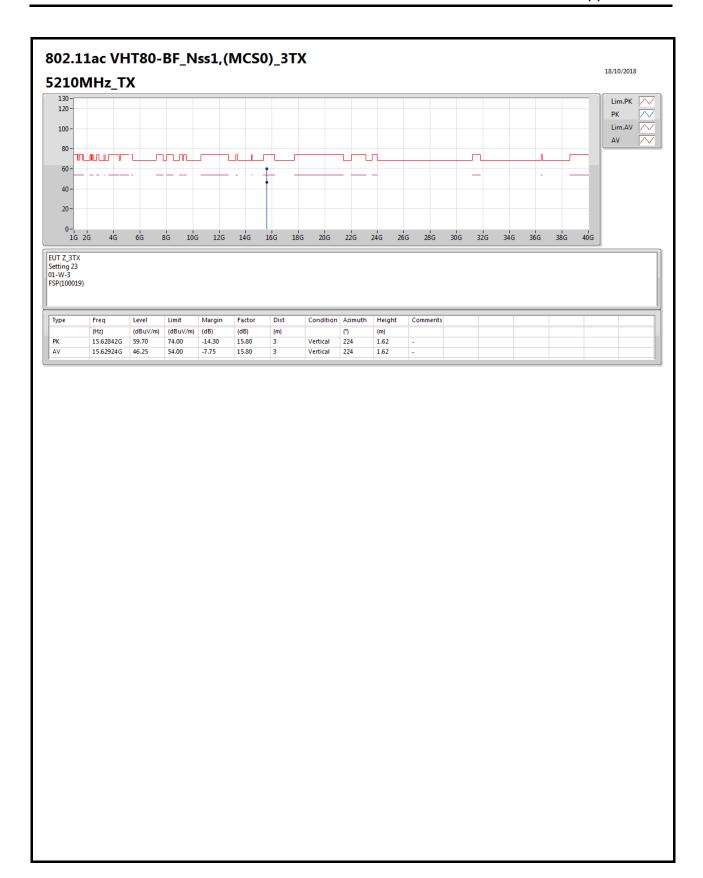
Page No. : 115 of 121



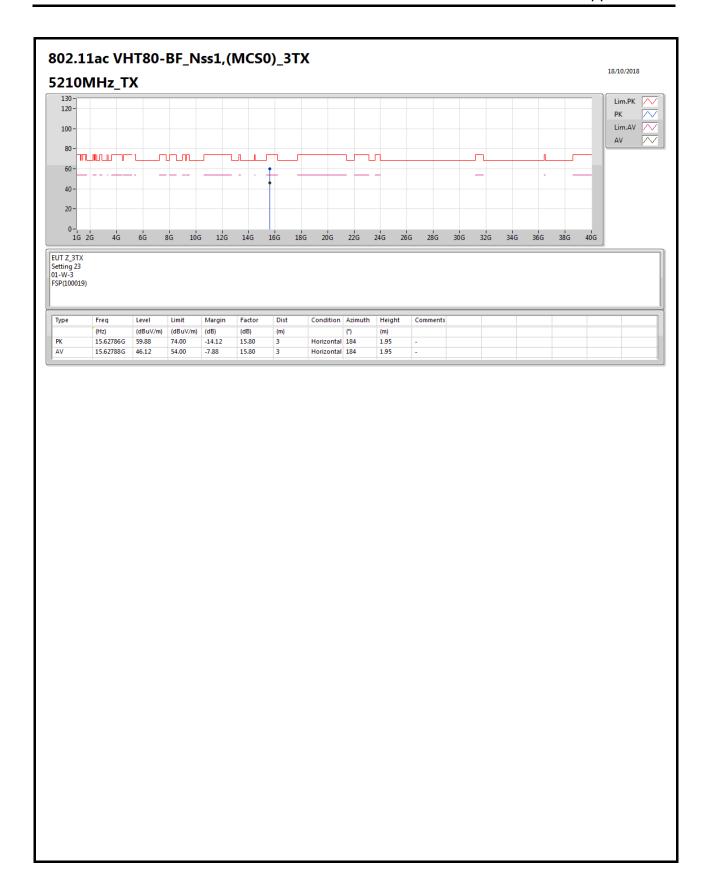


Page No. : 116 of 121



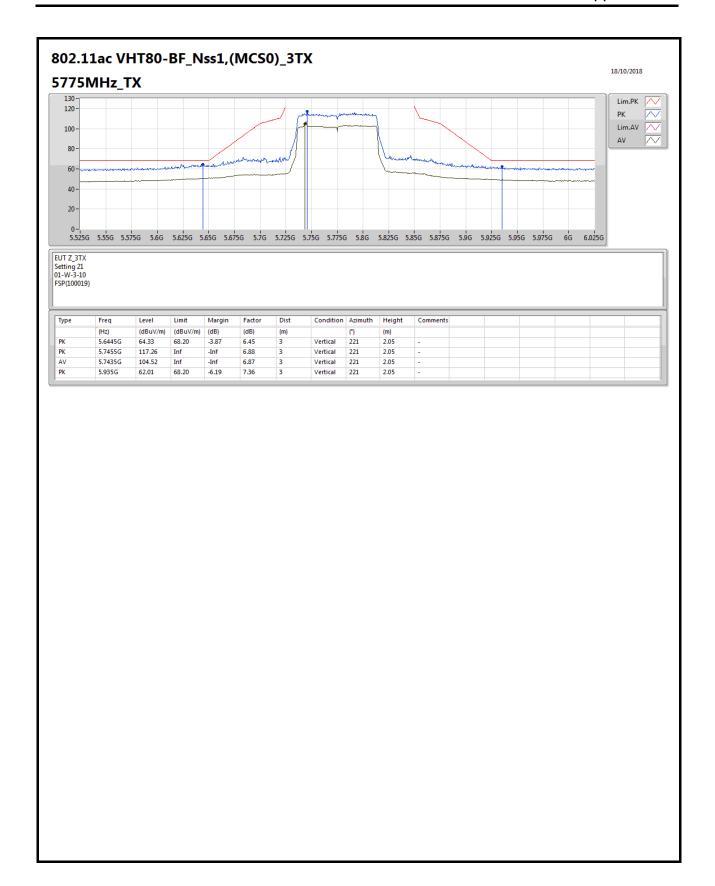


Page No. : 117 of 121



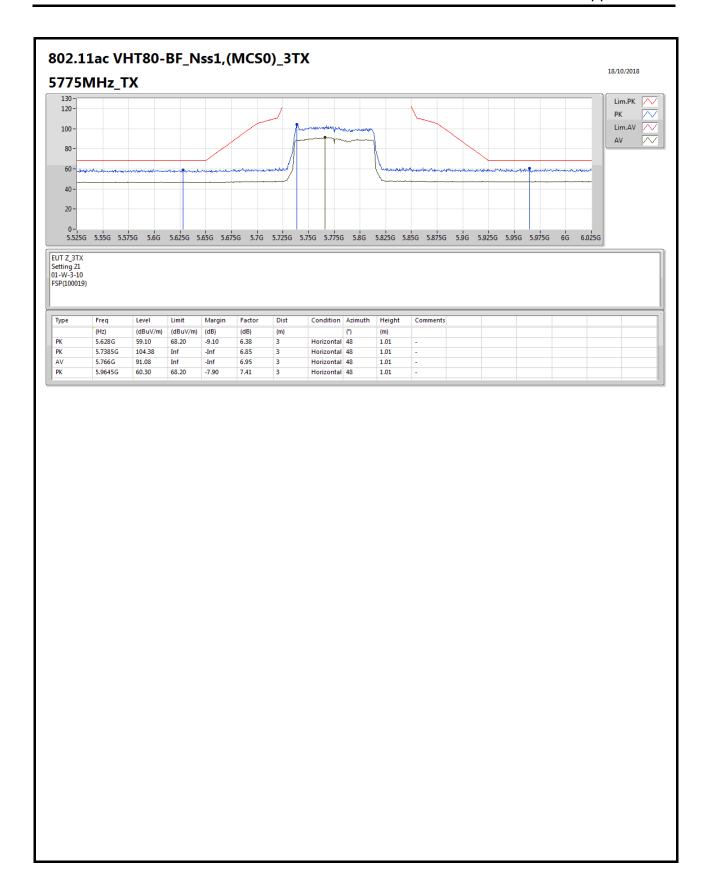
Page No. : 118 of 121





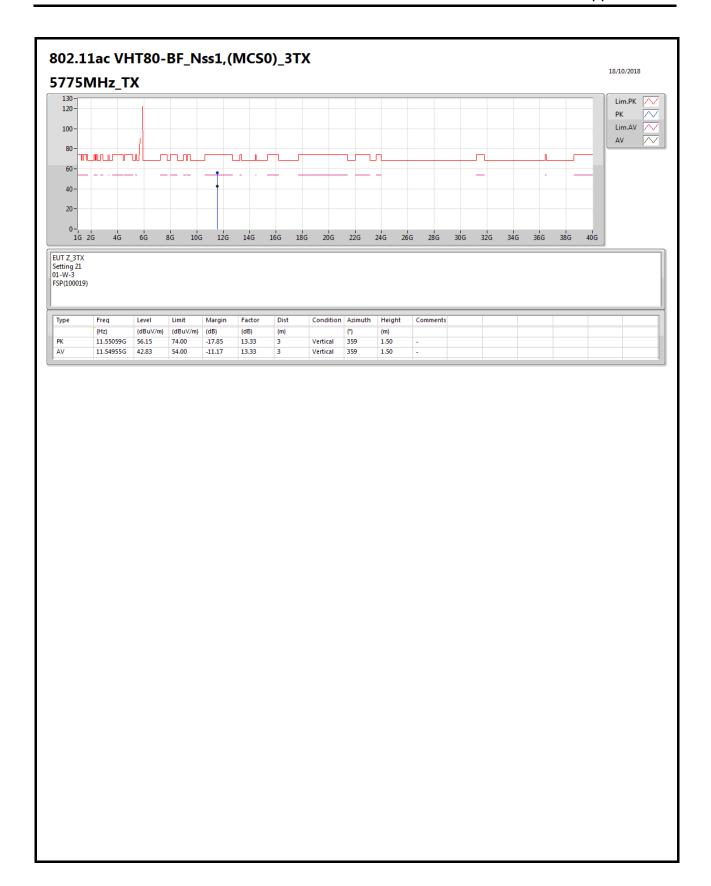
Page No. : 119 of 121





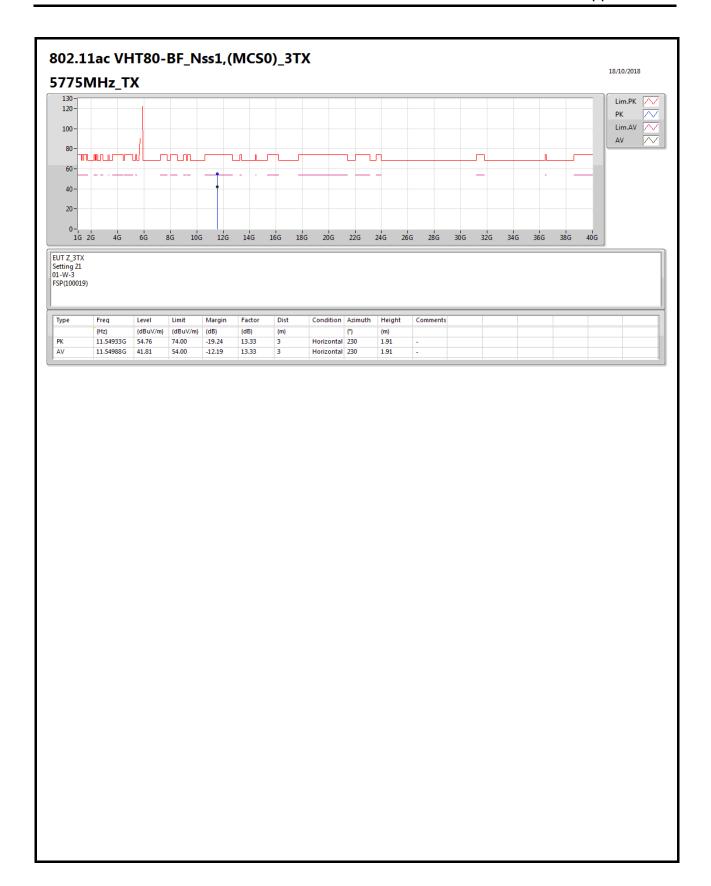
Page No. : 120 of 121



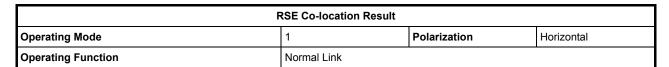


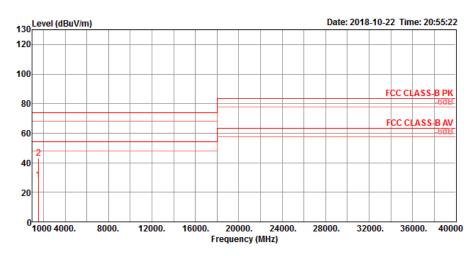
Page No. : 121 of 121





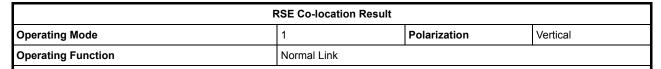


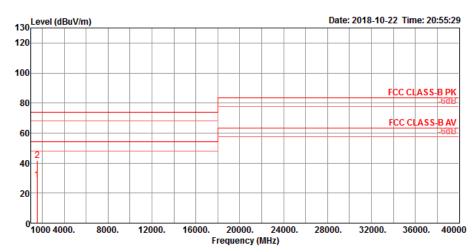


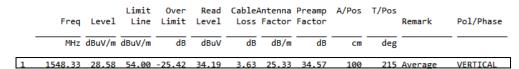


	Freq	Level		Limit						1/205		Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	1548.60	28.10	54.00	-25.90	33.71	3.63	25.33	34.57	102	155	Average	HORIZONTAL
2	1550.42	43.00	74.00	-31.00	48.60	3.64	25.33	34.57	102	155	Peak	HORIZONTAL









1548.33 28.58 54.00 -25.42 34.19 1549.22 41.64 74.00 -32.36 47.25 100 215 Average 3.63 25.33 34.57 100 215 Peak VERTICAL