

Report No.: FR082543AB



FCC RADIO TEST REPORT

FCC ID

: O2U-5541

Equipment

: Wireless Access Point

Brand Name

con

Model Name

: AP5541

Applicant

: COMPAL BROADBAND NETWORKS, INC.

13F-1, No.1, Taiyuan 1st St., Zhubei City, Hsinchu

County 30288, Taiwan, R.O.C.

Manufacturer

: COMPAL BROADBAND NETWORKS, INC.

13F-1, No.1, Taiyuan 1st St., Zhubei City, Hsinchu

County 30288, Taiwan, R.O.C.

Standard

: 47 CFR FCC Part 15.407

The product was received on Sep. 02, 2020, and testing was started from Sep. 08, 2020 and completed on Nov. 10, 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

: Dec. 31, 2020

Report Version : 01

Table of Contents

Histo	ory of this test report	3
Sumi	mary of Test Result	4
1	General Description	5
1.1	Information	
1.2	Applicable Standards	
1.3	Testing Location Information	
1.4	Measurement Uncertainty	
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	9
2.4	Accessories	10
2.5	Support Equipment	10
2.6	Test Setup Diagram	
3	Transmitter Test Result	14
3.1	AC Power-line Conducted Emissions	14
3.2	Emission Bandwidth	16
3.3	Maximum Conducted Output Power	17
3.4	Peak Power Spectral Density	19
3.5	Unwanted Emissions	22
4	Test Equipment and Calibration Data	26

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 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

: Dec. 31, 2020 Issued Date

Report Version : 01

Report No.: FR082543AB

History of this test report

Report No.: FR082543AB

Report No.	Version	Description	Issued Date
FR082543AB	01	Initial issue of report	Dec. 31, 2020

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

 FAX: 886-3-656-9085
 Issued Date : Dec. 31, 2020

Summary of Test Result

Report No.: FR082543AB

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 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: Vicky Huang

TEL: 886-3-656-9065 Page Number : 4 of 27
FAX: 886-3-656-9085 Issued Date : Dec. 31, 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]
5725-5850		5755-5795	151-159 [2]
5150-5250	ac (VHT80)	5210	42 [1]
5725-5850		5775	155 [1]

Report No.: FR082543AB

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, 256QAM modulation.
- BWch is the nominal channel bandwidth.

TEL: 886-3-656-9065 Page Number : 5 of 27
FAX: 886-3-656-9085 Issued Date : Dec. 31, 2020

1.1.2 Antenna Information

A n.4	Dort Brow	t Brand	and Model Name Ant	Antenna Type	Connector	Gain (dBi)		
Ant.	Port				Connector	2.4GHz	5GHz	
1	2	CBN	AP5541	PIFA Antenna	N/A	2.8	-	
2	1	CBN	AP5541	PIFA Antenna	N/A	3.7	-	
3	1	CBN	AP5541	PIFA Antenna	N/A	-	3.1	
4	2	CBN	AP5541	PIFA Antenna	N/A	-	3.5	

Report No.: FR082543AB

Note: The above information was declared by manufacturer.

<For WLAN 2.4GHz Function>

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

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

Port 1 and Port 2 could transmit/receive simultaneously.

<For WLAN 5GHz Function>

For IEEE 802.11a/n/ac mode (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	0.965	0.15	2.029m	1k
802.11ac VHT20	0.87	0.6	4.975m	300
802.11ac VHT40	0.805	0.94	2.418m	1k
802.11ac VHT80	0.804	0.95	3.329m	1k

Note:

- 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	\boxtimes	Without beamforming
Function		Outdoor P2M	\boxtimes	Indoor P2M
runction		Fixed P2P		Client
Test Software Version	QSPR V5.0-00186			
Test Sample Serial Number	For AC Conduction: 730293900038 For Radiated(below 1GHz): 730294900020 For RF Conducted and Radiated(above 1GHz): 1415541200003			

Note: The above information was declared by manufacturer.

TEL: 886-3-656-9065 Page Number : 6 of 27
FAX: 886-3-656-9085 Issued Date : Dec. 31, 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.: FR082543AB

- 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, Ln. 724, Bo'ai St., Zhubei 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	Nyle Chang	23-24.3°C / 51-54%	Sep. 11, 2020~ Nov. 10, 2020
Radiated (below 1GHz)	03CH01-CB	Stim Sung	24.3-24.9°C / 55-58%	Nov. 10, 2020
Radiated (above 1GHz)	03CH01-CB	JN Tu	24.3-24.9°C /55-58%	Sep. 08, 2020~ Oct. 30, 2020
AC Conduction	CO01-CB	Wei Li	23~24°C / 59~62%	Oct. 30, 2020

Test site Designation No. TW0006 with FCC

Test site registered number IC 4086D with Industry Canada.

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 (9kHz ~ 30MHz)	3.8 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	5.6 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	5.0 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	4.9 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	0.4%	Confidence levels of 95%

TEL: 886-3-656-9065 Page Number : 7 of 27
FAX: 886-3-656-9085 Issued Date : Dec. 31, 2020

2 Test Configuration of EUT

2.1 Test Channel Mode

Mode	Power Setting
802.11a_Nss1,(6Mbps)_2TX	-
5180MHz	18.5
5200MHz	23
5240MHz	18
5745MHz	15.5
5785MHz	23
5825MHz	23
802.11ac VHT20_Nss1,(MCS0)_2TX	-
5180MHz	20
5200MHz	23
5240MHz	18
5745MHz	15.5
5785MHz	23
5825MHz	23
802.11ac VHT40_Nss1,(MCS0)_2TX	-
5190MHz	16
5230MHz	18
5755MHz	15
5795MHz	23
802.11ac VHT80_Nss1,(MCS0)_2TX	-
5210MHz	15.5
5775MHz	20

Report No.: FR082543AB

TEL: 886-3-656-9065 Page Number : 8 of 27
FAX: 886-3-656-9085 Issued Date : Dec. 31, 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

Report No.: FR082543AB

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

Th	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	
Operating Mode > 1GHz	CTX	

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.: FA082543 for Co-location RF Exposure Evaluation.		

Note: The EUT can only be used at Z axis position.

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.

TEL: 886-3-656-9065 Page Number : 9 of 27
FAX: 886-3-656-9085 Issued Date : Dec. 31, 2020

2.4 Accessories

Accessories			
Equipment Name	Brand Name	Model Name	Rating
Adapter	APD	WB-18Q12FU	Input: 100-240V~,50-60Hz, 0.6A Max. Output:12V, 1.5A
Other			
RJ-45 cable, non-shielded 1.5m			

Report No.: FR082543AB

2.5 Support Equipment

For AC Conduction:

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

For Radiated (below 1GHz):

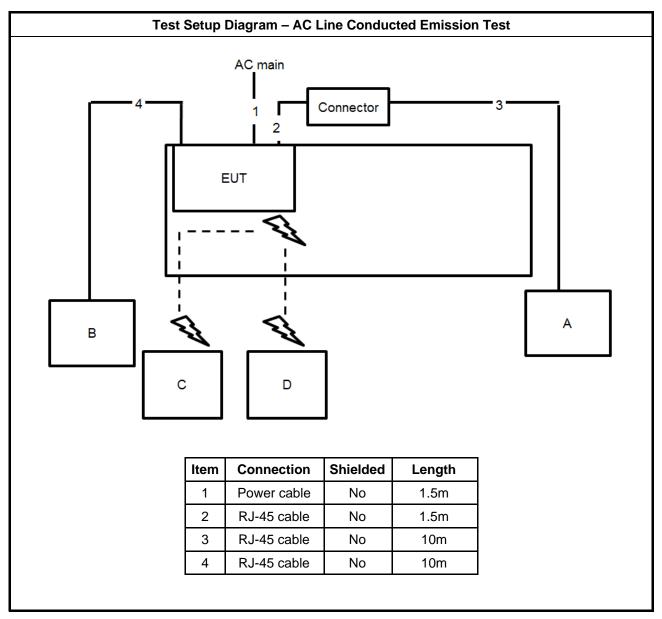
	Support Equipment				
No.	No. Equipment Brand Name Model Name FCC ID				
Α	LAN NB	DELL	E4300	N/A	
В	2.4G NB	DELL	E4300	N/A	
С	5G NB	DELL	E4300	N/A	
D	WLAN AP	Netgear	R7500	PY314300288	
Е	WAN NB	DELL	E4300	N/A	

For Radiated (above 1GHz) and RF Conducted:

Support Equipment				
No.	Io. 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 : Dec. 31, 2020

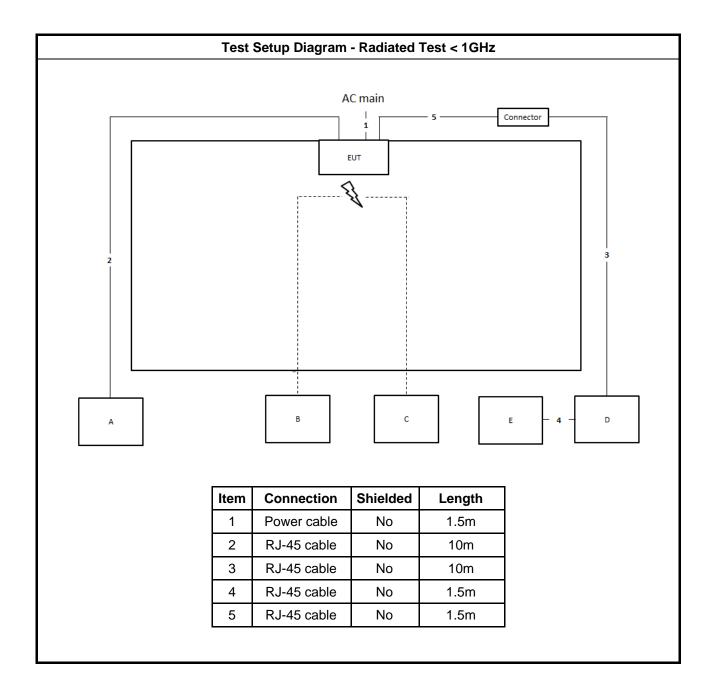
2.6 Test Setup Diagram



Report No.: FR082543AB

TEL: 886-3-656-9065 Page Number : 11 of 27
FAX: 886-3-656-9085 Issued Date : Dec. 31, 2020

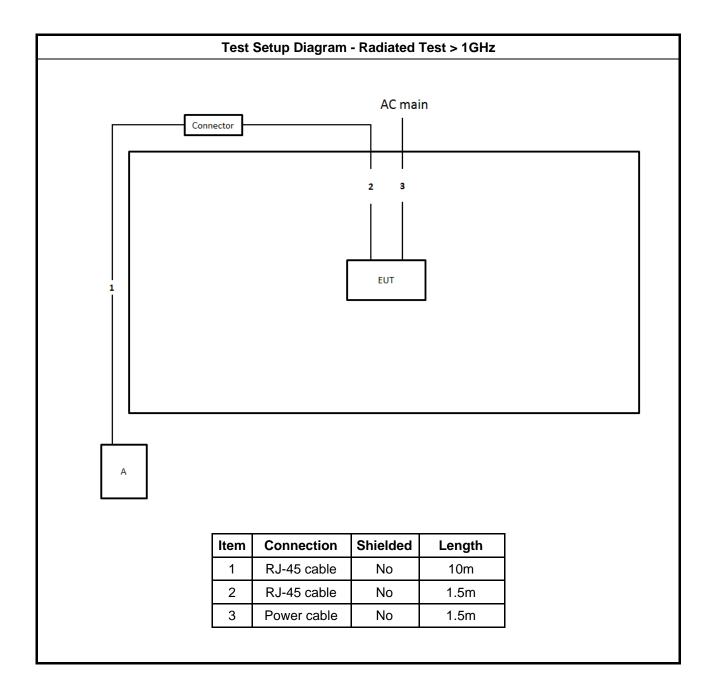
Report No.: FR082543AB



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

 FAX: 886-3-656-9085
 Issued Date : Dec. 31, 2020

Report No.: FR082543AB



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

 FAX: 886-3-656-9085
 Issued Date
 : Dec. 31, 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		
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.: FR082543AB

3.1.2 Measuring Instruments

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

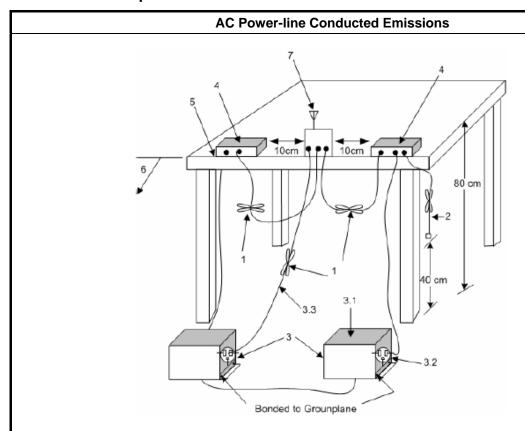
3.1.3 Test Procedures

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

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

 FAX: 886-3-656-9085
 Issued Date
 : Dec. 31, 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.: FR082543AB

- 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 : 15 of 27
FAX: 886-3-656-9085 Issued Date : Dec. 31, 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.: FR082543AB

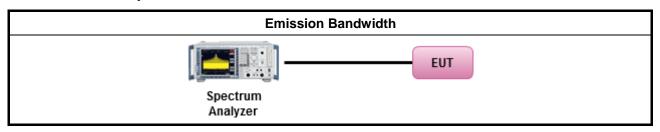
3.2.2 Measuring Instruments

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:		
		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 : 16 of 27
FAX: 886-3-656-9085 Issued Date : Dec. 31, 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.: FR082543AB

 TEL: 886-3-656-9065
 Page Number : 17 of 27

 FAX: 886-3-656-9085
 Issued Date : Dec. 31, 2020

3.3.2 Measuring Instruments

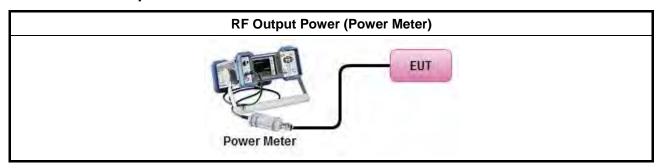
Refer a test equipment and calibration data table in this test report.

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

Report No.: FR082543AB

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 : 18 of 27
FAX: 886-3-656-9085 Issued Date : Dec. 31, 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.: FR082543AB

 TEL: 886-3-656-9065
 Page Number : 19 of 27

 FAX: 886-3-656-9085
 Issued Date : Dec. 31, 2020

3.4.2 Measuring Instruments

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

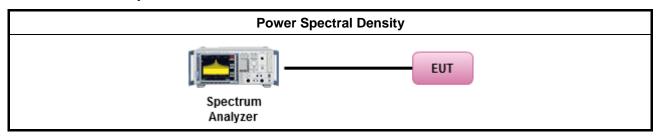
3.4.3 Test Procedures

		Test Method								
•	Peak power spectral density procedures that the same method as used to determine the conducted output power shall be used to determine the peak power spectral density and use the peak search function on the spectrum analyzer to find the peak of the spectrum. For the peak power spectral density shall be measured using below options:									
	Refer as FCC KDB 789033, F)5) power spectral density can be measured using resolutio 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								
	\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	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.: FR082543AB

TEL: 886-3-656-9065 Page Number : 20 of 27
FAX: 886-3-656-9085 Issued Date : Dec. 31, 2020

3.4.4 Test Setup



Report No.: FR082543AB

3.4.5 Test Result of Peak Power Spectral Density

Refer as Appendix D

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

 FAX: 886-3-656-9085
 Issued Date
 : Dec. 31, 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.: FR082543AB

- 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 : 22 of 27
FAX: 886-3-656-9085 Issued Date : Dec. 31, 2020

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

Report No.: FR082543AB

3.5.2 Measuring Instruments

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

3.5.3 Test Procedures

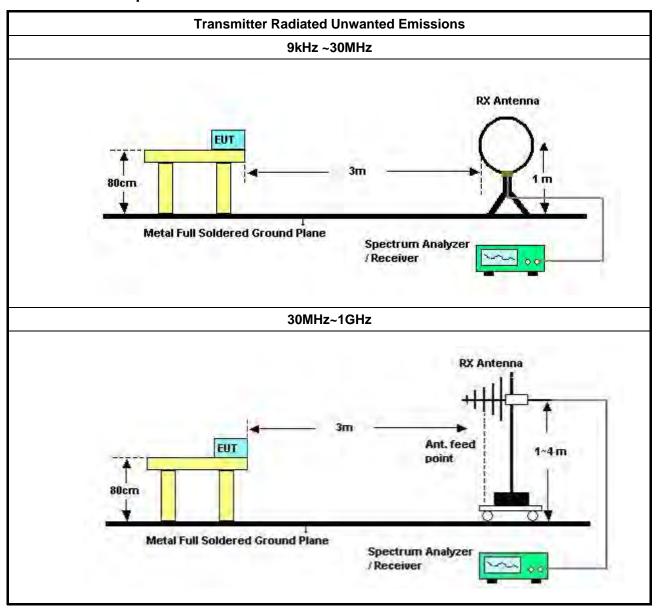
Test Method

- 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 : 23 of 27
FAX: 886-3-656-9085 Issued Date : Dec. 31, 2020

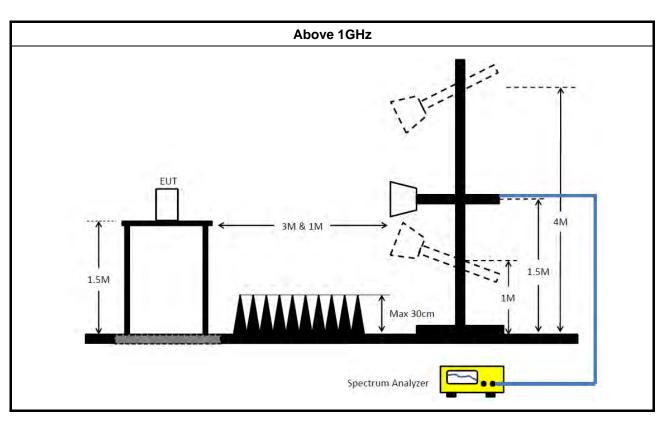
Report No.: FR082543AB

3.5.4 Test Setup



 TEL: 886-3-656-9065
 Page Number : 24 of 27

 FAX: 886-3-656-9085
 Issued Date : Dec. 31, 2020



Report No.: FR082543AB

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 Page Number : 25 of 27
FAX: 886-3-656-9085 Issued Date : Dec. 31, 2020

4 Test Equipment and Calibration Data

Instrument	Brand	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& Schwarz	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)
3m Semi Anechoic Chamber NSA	TDK	SAC-3M	03CH01-CB	30 MHz ~ 1 GHz	Jan. 28, 2020	Jan. 27, 2021	Radiation (03CH01-CB)
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	Apr. 13, 2020	Apr. 12, 2021	Radiation (03CH01-CB)
3m Semi Anechoic Chamber VSWR	TDK	SAC-3M	03CH01-CB	1GHz ~18GHz 3m	May 29, 2020	May 28, 2021	Radiation (03CH01-CB)
BILOG ANTENNA with 6dB Attenuator	TESEQ & EMCI	CBL6112D N-6-06	37880 & AT-N0609	20MHz ~ 2GHz	Feb. 28, 2020	Feb. 27, 2021	Radiation (03CH01-CB)
Horn Antenna	ETS-LINDGRE N	3115	00075790	750MHz ~ 18GHz	Nov. 04, 2019	Nov. 03, 2020	Radiation (03CH01-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Jul. 21, 2020	Jul. 20, 2021	Radiation (03CH01-CB)
Pre-Amplifier	EMCI	EMC330N	980332	20MHz ~ 3GHz	Jul. 03, 2020	Jun. 02, 2021	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02310	1GHz ~ 26.5GHz	Jan. 08, 2020	Jan. 07, 2021	Radiation (03CH01-CB)
Pre-Amplifier	MITEQ	TTA1840-35-H G	1864479	18GHz ~ 40GHz	Jul. 08, 2020	Jul. 07, 2021	Radiation (03CH01-CB)
Spectrum Analyzer	R&S	FSP40	100056	9kHz ~ 40GHz	Apr. 16, 2020	Apr. 15, 2021	Radiation (03CH01-CB)
EMI Test Receiver	R&S	ESCS	826547/017	9kHz ~ 2.75GHz	May 13, 2020	May 12, 2021	Radiation (03CH01-CB)
RF Cable-low	Woken	RG402	Low Cable-16+17	30 MHz ~ 1 GHz	Jul. 20, 2020	Jul. 19, 2021	Radiation (03CH01-CB)
RF Cable-high	Woken	RG402	High Cable-16	1 GHz ~ 18 GHz	Oct. 07, 2019	Oct. 06, 2020	Radiation (03CH01-CB)

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

Report Template No.: CB-A12_1 Ver1.2

Page Number : 26 of 27
Issued Date : Dec. 31, 2020

Report No.: FR082543AB

Report Version : 01

Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
RF Cable-high	Woken	RG402	High Cable-16	1 GHz ~ 18 GHz	Oct. 05, 2020	Oct. 04, 2021	Radiation (03CH01-CB)
RF Cable-high	Woken	RG402	High Cable-16+17	1 GHz ~ 18 GHz	Oct. 07, 2019	Oct. 06, 2020	Radiation (03CH01-CB)
RF Cable-high	Woken	RG402	High Cable-16+17	1 GHz ~ 18 GHz	Oct. 05, 2020	Oct. 04, 2021	Radiation (03CH01-CB)
RF Cable-high	Woken	RG402	High Cable-40G#1	18GHz ~ 40 GHz	Jul. 16, 2020	Jul. 15, 2021	Radiation (03CH01-CB)
RF Cable-high	Woken	RG402	High Cable-40G#2	18GHz ~ 40 GHz	Jul. 16, 2020	Jul. 15, 2021	Radiation (03CH01-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSV40	100979	9kHz~40GHz	May 05, 2020	May 04, 2021	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-06	1 GHz – 26.5 GHz	Oct. 07, 2019	Oct. 06, 2020	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-06	1 GHz – 26.5 GHz	Oct. 05, 2020	Oct. 04, 2021	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-07	1 GHz – 26.5 GHz	Oct. 07, 2019	Oct. 06, 2020	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-07	1 GHz – 26.5 GHz	Oct. 05, 2020	Oct. 04, 2021	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-08	1 GHz – 26.5 GHz	Oct. 07, 2019	Oct. 06, 2020	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-08	1 GHz – 26.5 GHz	Oct. 05, 2020	Oct. 04, 2021	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-09	1 GHz – 26.5 GHz	Oct. 07, 2019	Oct. 06, 2020	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-09	1 GHz – 26.5 GHz	Oct. 05, 2020	Oct. 04, 2021	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-10	1 GHz – 26.5 GHz	Oct. 07, 2019	Oct. 06, 2020	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-10	1 GHz – 26.5 GHz	Oct. 05, 2020	Oct. 04, 2021	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-28	1 GHz – 26.5 GHz	Nov. 18, 2019	Nov. 17, 2020	Conducted (TH01-CB)
Power Sensor	Agilent	E9327A	US40442088	50MHz~18GHz	Feb. 07, 2020	Feb. 06, 2021	Conducted (TH01-CB)
Power Meter	Agilent	E4416A	GB41291199	50MHz~18GHz	Feb. 07, 2020	Feb. 06, 2021	Conducted (TH01-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Conducted (TH01-CB)

Report No.: FR082543AB

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 : Dec. 31, 2020



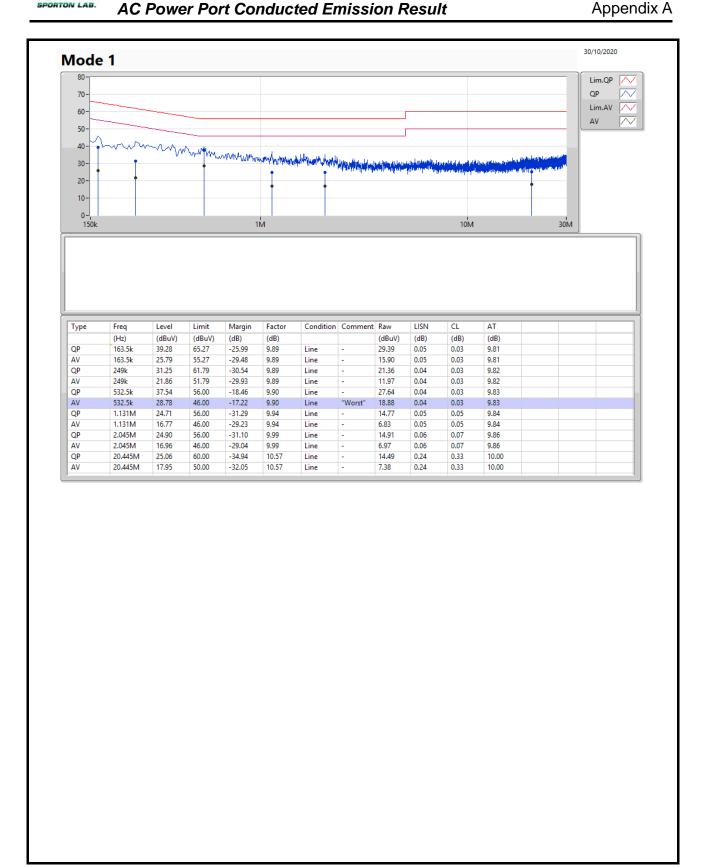
AC Power Port Conducted Emission Result

Appendix A

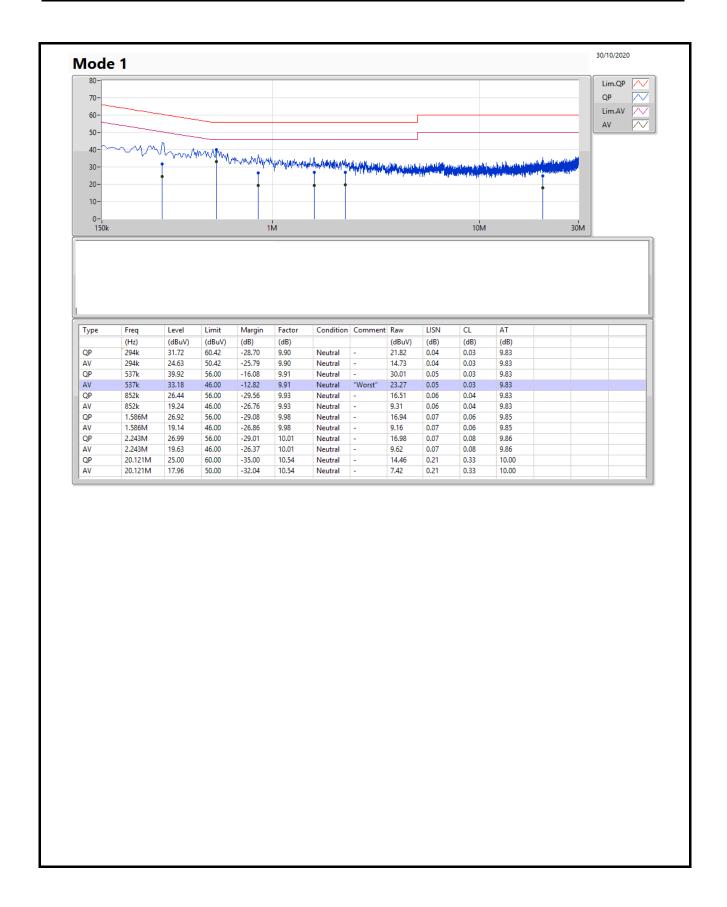
Summary

Mode	Result	Туре	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Condition
Mode 1	Pass	AV	537k	33.18	46.00	-12.82	Neutral











Appendix B **EBW**

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)_2TX	53.31M	35.802M	35M8D1D	27.69M	17.001M
802.11ac VHT20_Nss1,(MCS0)_2TX	54.69M	37.691M	37M7D1D	30.81M	18.111M
802.11ac VHT40_Nss1,(MCS0)_2TX	85.8M	38.501M	38M5D1D	46.5M	36.702M
802.11ac VHT80_Nss1,(MCS0)_2TX	102.72M	76.762M	76M8D1D	90.48M	76.402M
5.725-5.85GHz	-	-	-	-	-
802.11a_Nss1,(6Mbps)_2TX	16.32M	39.43M	39M4D1D	16.29M	16.732M
802.11ac VHT20_Nss1,(MCS0)_2TX	17.7M	41.679M	41M7D1D	17.55M	17.871M
802.11ac VHT40_Nss1,(MCS0)_2TX	36.36M	82.999M	83M0D1D	36.3M	36.762M
802.11ac VHT80_Nss1,(MCS0)_2TX	76.32M	103.148M	103MD1D	75.12M	96.312M

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;

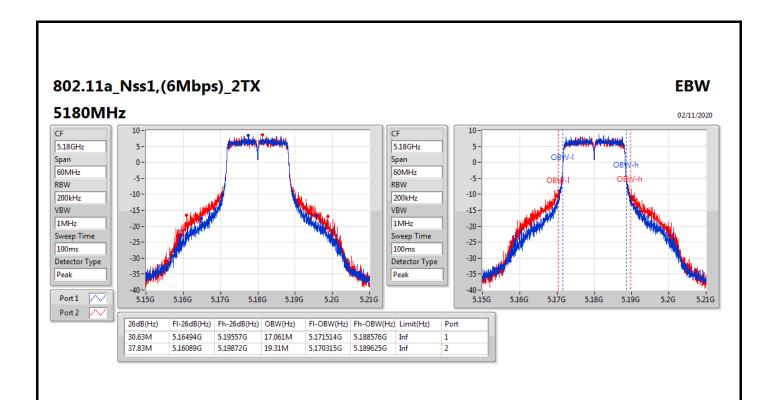
Min-OBW = Minimum 99% occupied bandwidth;

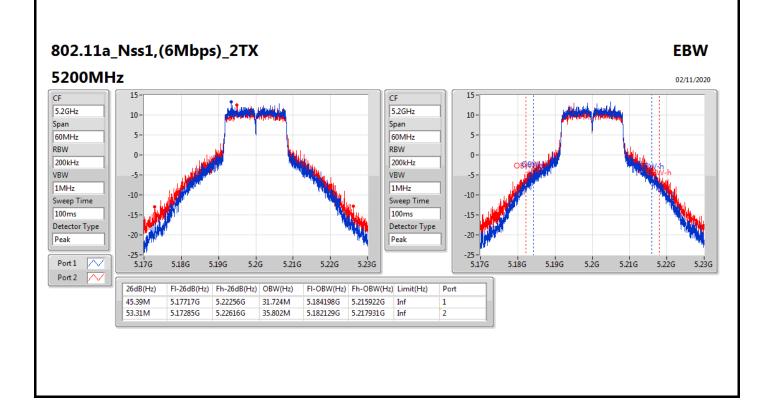


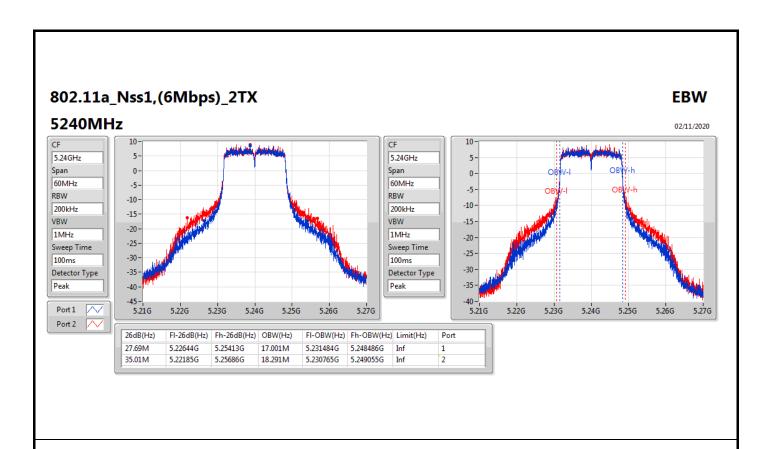
Result

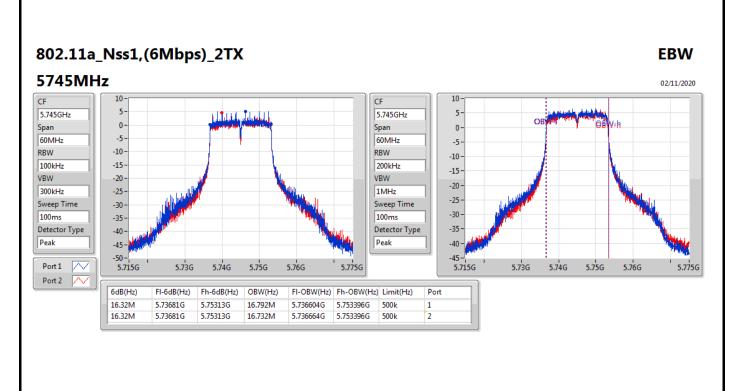
Mode	Result	Limit	Port 1-N dB	Port 1-OBW	Port 2-N dB	Port 2-OBW
		(Hz)	(Hz)	(Hz)	(Hz)	(Hz)
802.11a_Nss1,(6Mbps)_2TX	-	-	-	-	-	-
5180MHz	Pass	Inf	30.63M	17.061M	37.83M	19.31M
5200MHz	Pass	Inf	45.39M	31.724M	53.31M	35.802M
5240MHz	Pass	Inf	27.69M	17.001M	35.01M	18.291M
5745MHz	Pass	500k	16.32M	16.792M	16.32M	16.732M
5785MHz	Pass	500k	16.32M	38.171M	16.32M	39.43M
5825MHz	Pass	500k	16.29M	36.612M	16.32M	38.411M
802.11ac VHT20_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5180MHz	Pass	Inf	39.06M	20.24M	42.09M	26.177M
5200MHz	Pass	Inf	48.84M	33.973M	54.69M	37.691M
5240MHz	Pass	Inf	30.81M	18.111M	36.57M	19.31M
5745MHz	Pass	500k	17.55M	17.931M	17.58M	17.871M
5785MHz	Pass	500k	17.7M	40.48M	17.58M	41.679M
5825MHz	Pass	500k	17.55M	39.16M	17.58M	40.72M
802.11ac VHT40_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5190MHz	Pass	Inf	46.5M	36.702M	60.96M	36.942M
5230MHz	Pass	Inf	73.98M	37.121M	85.8M	38.501M
5755MHz	Pass	500k	36.3M	36.822M	36.36M	36.762M
5795MHz	Pass	500k	36.3M	81.559M	36.3M	82.999M
802.11ac VHT80_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5210MHz	Pass	Inf	90.48M	76.402M	102.72M	76.762M
5775MHz	Pass	500k	76.32M	103.148M	75.12M	96.312M

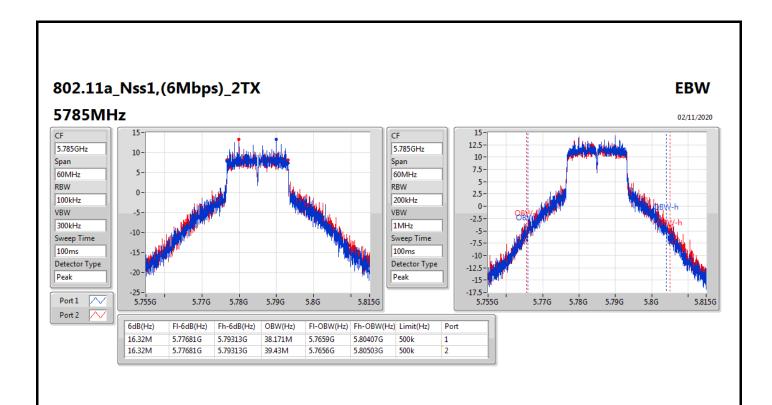
Port X-N dB = Port X 6dB down bandwidth for 5.725-5.85GHz band / 26dB down bandwidth for other band Port X-OBW = Port X 99% occupied bandwidth;

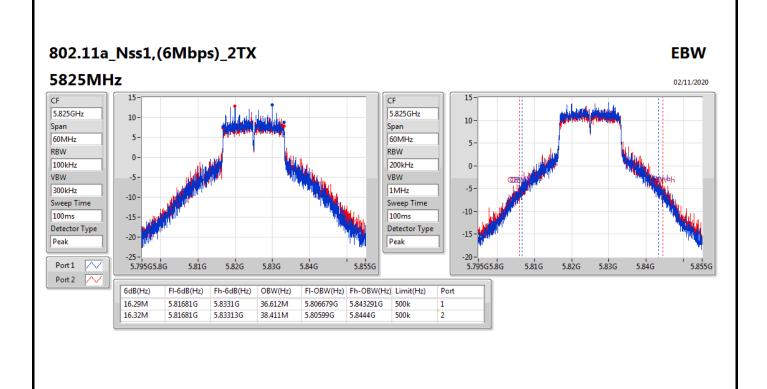


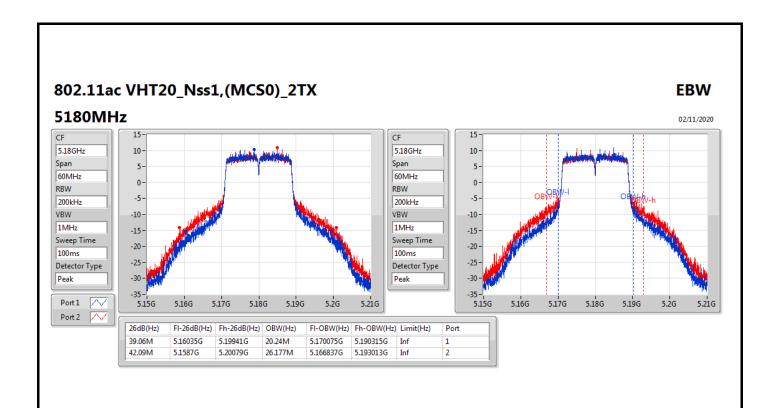


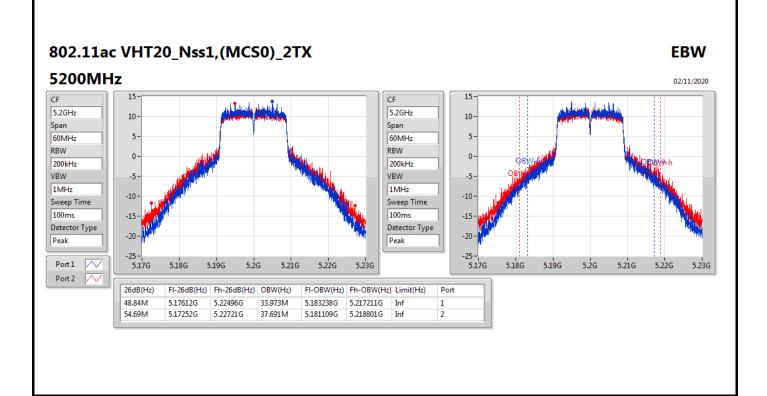


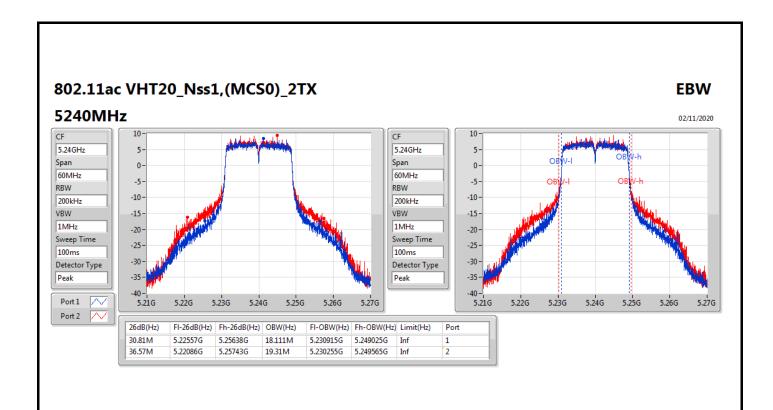


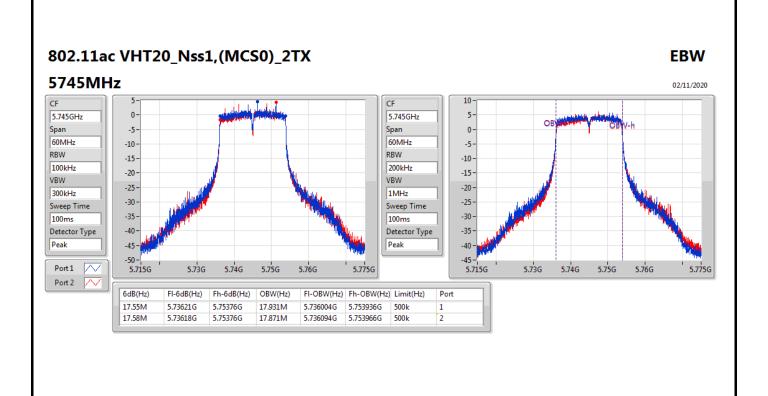


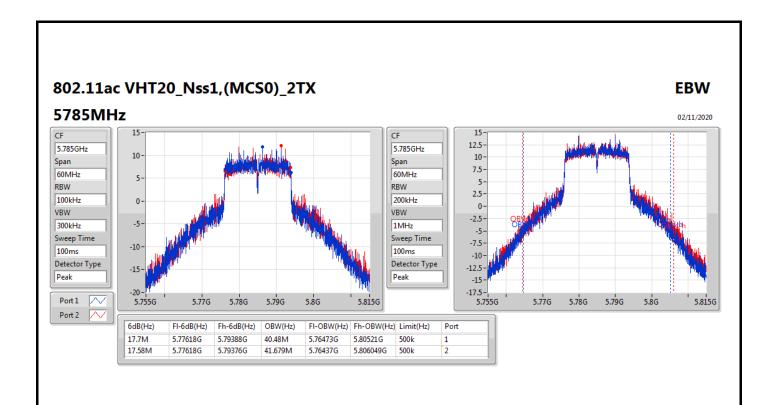


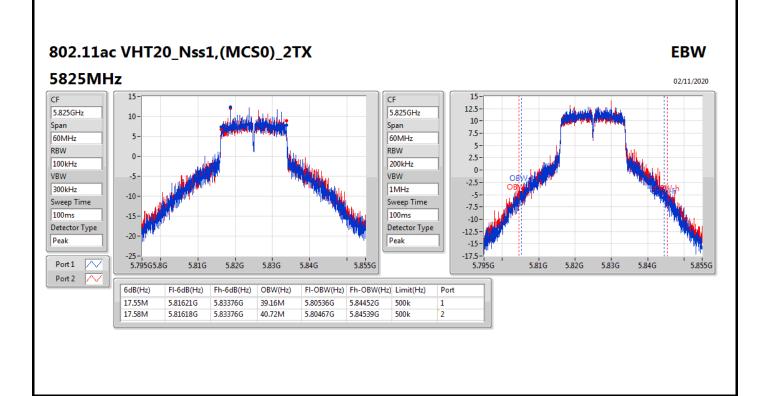


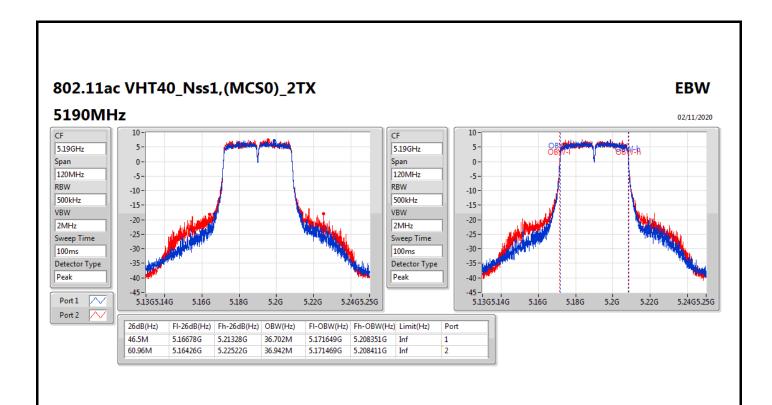


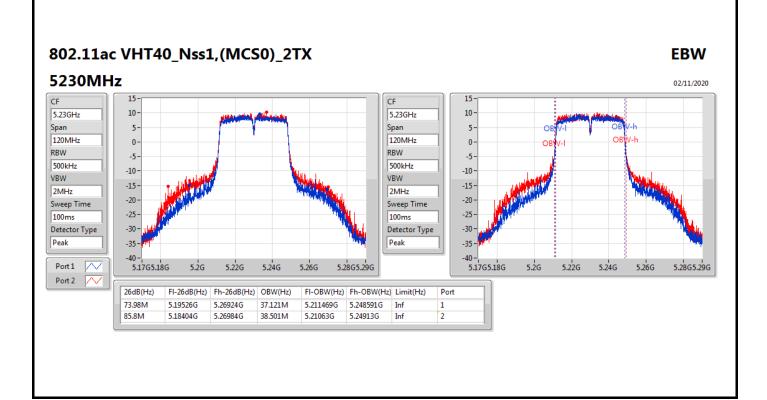


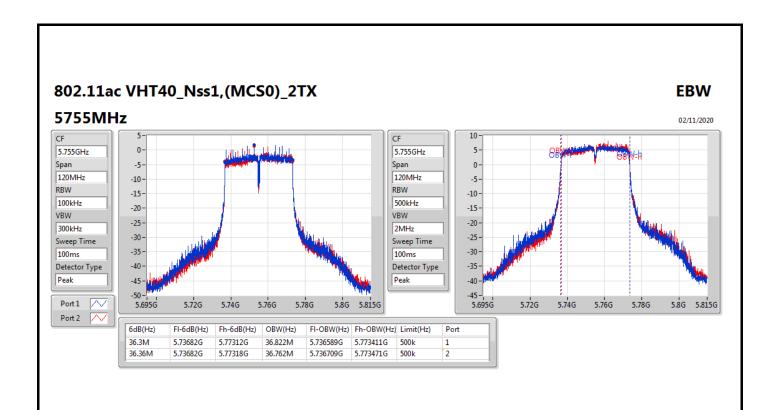


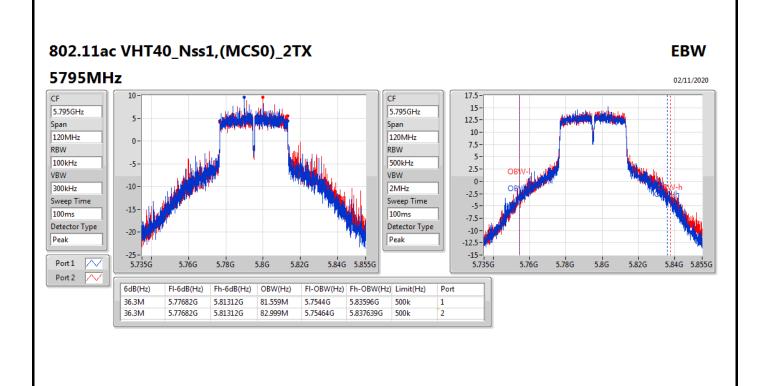


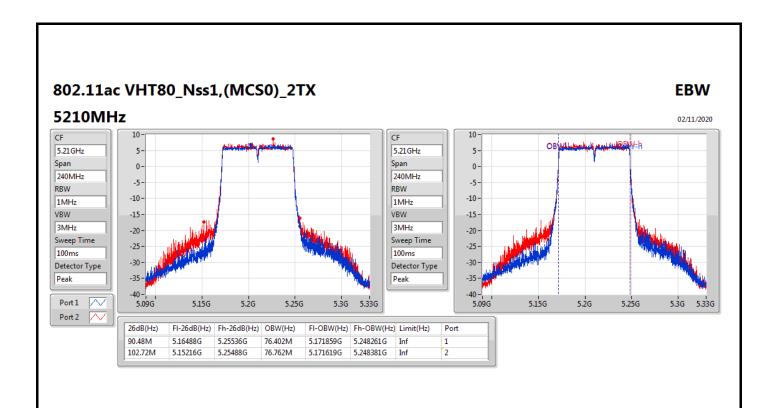


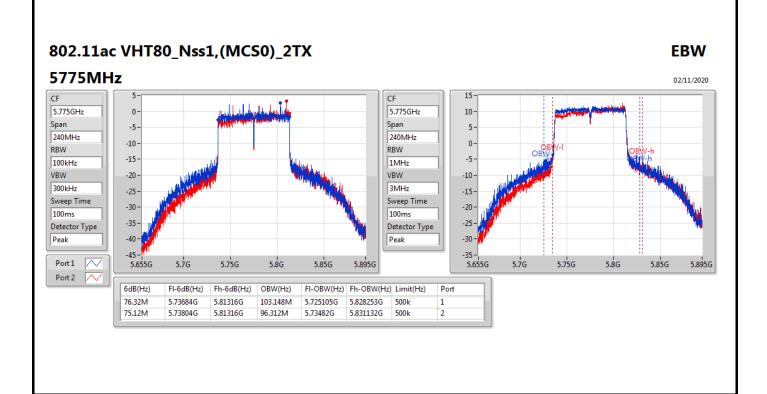














Average Power Appendix C

Mode	Total Power	Total Power				
	(dBm)	(W)				
5.15-5.25GHz	-	-				
802.11a_Nss1,(6Mbps)_2TX	25.72	0.37325				
802.11ac VHT20_Nss1,(MCS0)_2TX	25.84	0.38371				
802.11ac VHT40_Nss1,(MCS0)_2TX	22.00	0.15849				
802.11ac VHT80_Nss1,(MCS0)_2TX	19.07	0.08072				
5.725-5.85GHz	-	-				
802.11a_Nss1,(6Mbps)_2TX	26.21	0.41783				
802.11ac VHT20_Nss1,(MCS0)_2TX	26.32	0.42855				
802.11ac VHT40_Nss1,(MCS0)_2TX	26.35	0.43152				
802.11ac VHT80_Nss1,(MCS0)_2TX	23.23	0.21038				

Average Power Appendix C

Result

Mode	Result	DG	Port 1	Port 2	Total Power	Power Limit	
		(dBi)	(dBm)	(dBm)	(dBm)	(dBm)	
802.11a_Nss1,(6Mbps)_2TX	-	-	-	-	-	-	
5180MHz	Pass	3.50	18.89 22.93	18.96	21.94	30.00	
5200MHz	Pass	3.50		22.48	25.72	30.00	
5240MHz	Pass	3.50	18.82	19.12	21.98	30.00	
5745MHz	Pass	3.50	16.97	16.60	19.80	30.00	
5785MHz	Pass	3.50	23.23	23.17	26.21	30.00	
5825MHz	Pass	3.50	23.16	22.87	26.03	30.00	
802.11ac VHT20_Nss1,(MCS0)_2TX	-	-	-	-	23.29 25.84 22.04	-	
5180MHz	Pass	3.50	20.32	20.24 22.60 19.21		30.00 30.00 30.00	
5200MHz	Pass	3.50	23.04				
5240MHz	Pass	3.50	18.84				
5745MHz	Pass	3.50	17.08	16.67	19.89	30.00	
5785MHz	Pass	3.50	23.32	23.29	26.32	30.00	
5825MHz	Pass	3.50	23.14	22.97	26.07	30.00	
802.11ac VHT40_Nss1,(MCS0)_2TX	-	-	-	-	-	-	
5190MHz	Pass	3.50	16.31	16.71	19.52	30.00	
5230MHz	Pass	3.50	18.87	19.10	22.00	30.00	
5755MHz	Pass	3.50	16.41	16.14	19.29	30.00	
5795MHz	Pass	3.50	23.35	23.32	26.35	30.00	
802.11ac VHT80_Nss1,(MCS0)_2TX	-	-	-	-	-	-	
5210MHz	Pass	3.50	16.00	16.11	19.07	30.00	
5775MHz	Pass	3.50	20.50	19.92	23.23	30.00	

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



Mode	PD
	(dBm/RBW)
5.15-5.25GHz	·
802.11a_Nss1,(6Mbps)_2TX	12.31
802.11ac VHT20_Nss1,(MCS0)_2TX	12.49
802.11ac VHT40_Nss1,(MCS0)_2TX	5.85
802.11ac VHT80_Nss1,(MCS0)_2TX	-0.28
5.725-5.85GHz	-
802.11a_Nss1,(6Mbps)_2TX	11.45
802.11ac VHT20_Nss1,(MCS0)_2TX	11.47
802.11ac VHT40_Nss1,(MCS0)_2TX	8.37
802.11ac VHT80_Nss1,(MCS0)_2TX	2.68

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



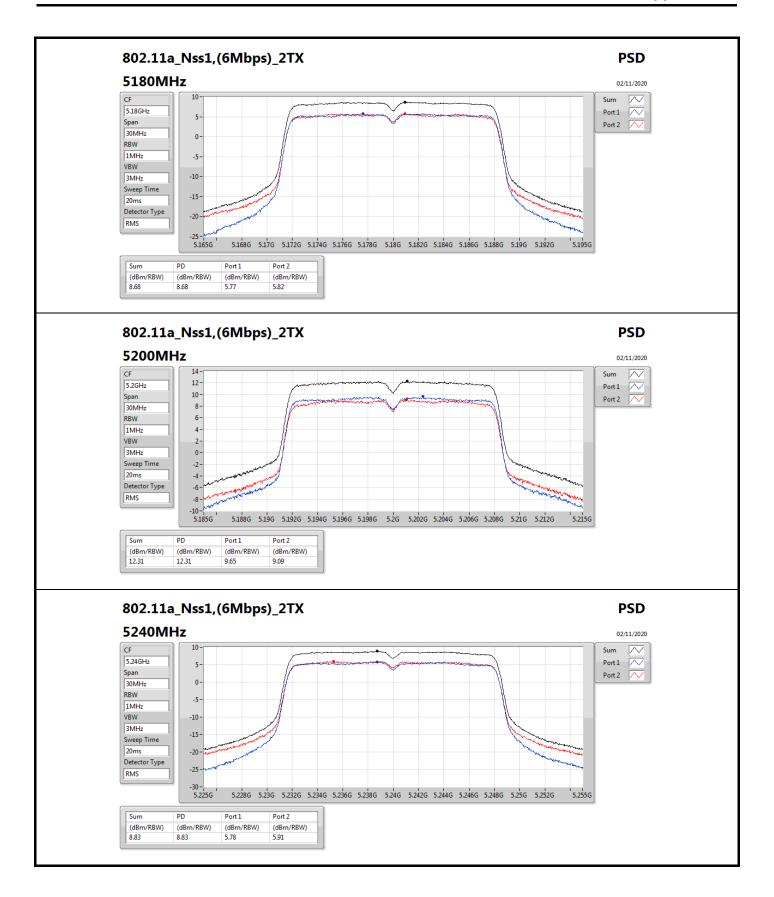
Appendix D **PSD**

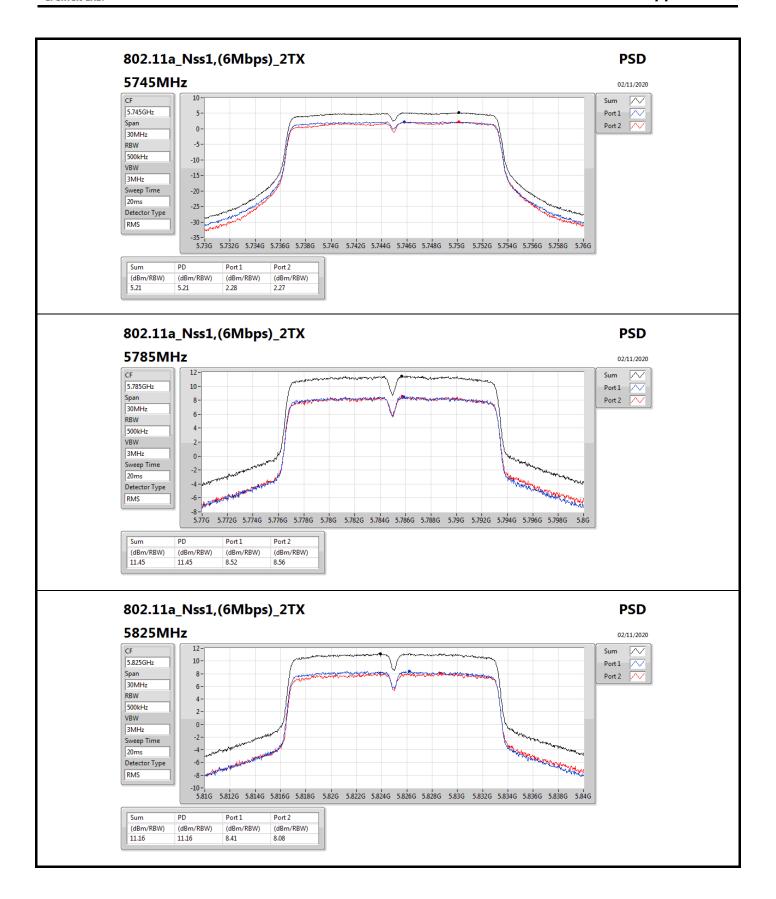
Result

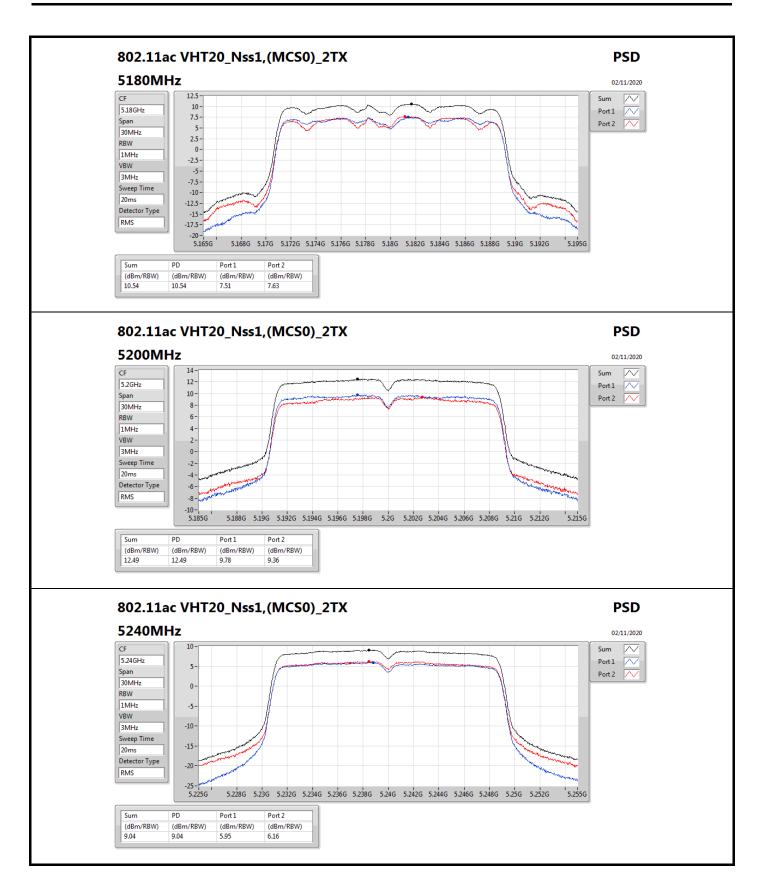
Mode	Result	DG	Port 1	Port 2	PD	PD Limit
		(dBi)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
802.11a_Nss1,(6Mbps)_2TX	-	-	-	-	-	-
5180MHz	Pass	6.31	5.77	5.82	8.68	16.69
5200MHz	Pass	6.31	9.65	9.09	12.31	16.69
5240MHz	Pass	6.31	5.78	5.91	8.83	16.69
5745MHz	Pass	6.31	2.28	2.27	5.21	29.69
5785MHz	Pass	6.31	8.52	8.56	11.45	29.69
5825MHz	Pass	6.31	8.41	8.08	11.16	29.69
802.11ac VHT20_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5180MHz	Pass	6.31	7.51	7.63	10.54	16.69
5200MHz	Pass	6.31	9.78	9.36	12.49	16.69
5240MHz	Pass	6.31	5.95	6.16	9.04	16.69
5745MHz	Pass	6.31	2.50	2.31	5.35	29.69
5785MHz	Pass	6.31	8.74	8.74	11.47	29.69
5825MHz	Pass	6.31	8.54	8.24	11.32	29.69
802.11ac VHT40_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5190MHz	Pass	6.31	0.43	0.57	3.45	16.69
5230MHz	Pass	6.31	2.90	3.02	5.85	16.69
5755MHz	Pass	6.31	-1.20	-1.13	1.77	29.69
5795MHz	Pass	6.31	5.44	5.51	8.37	29.69
802.11ac VHT80_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5210MHz	Pass	6.31	-3.10	-2.98	-0.28	16.69
5775MHz	Pass	6.31	-0.31	-0.09	2.68	29.69

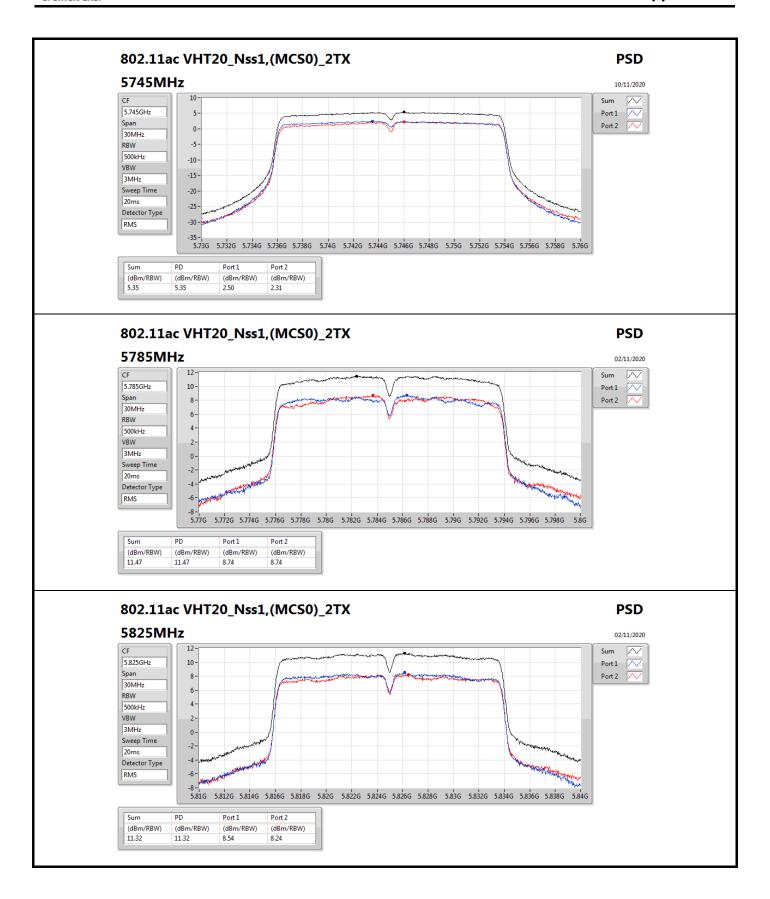
Page No. : 2 of 8

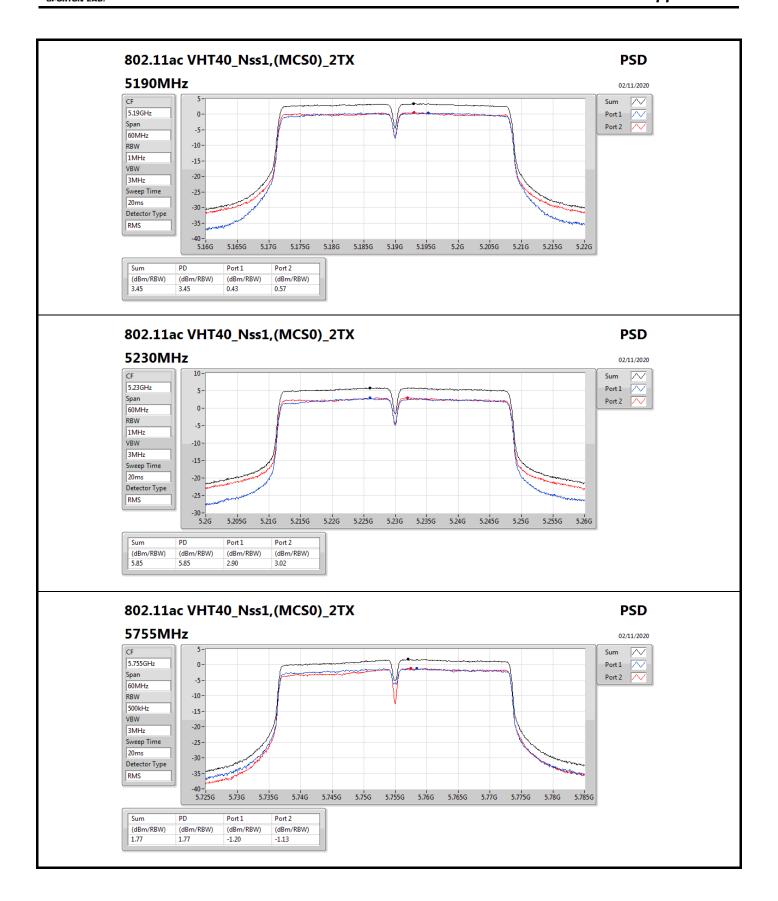
DG = Directional Gain; RBW = 500 kHz for 5.725-5.85GHz band / 1MHz for other band;
PD = trace bin-by-bin of each transmits port summing can be performed maximum power density; Port X = Port X power density;

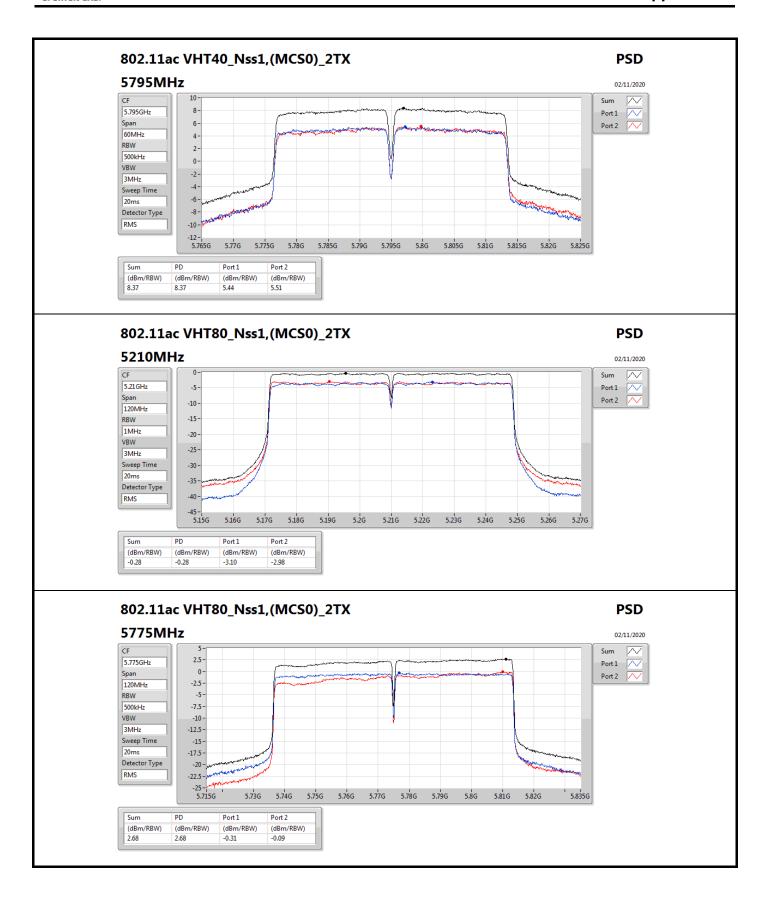












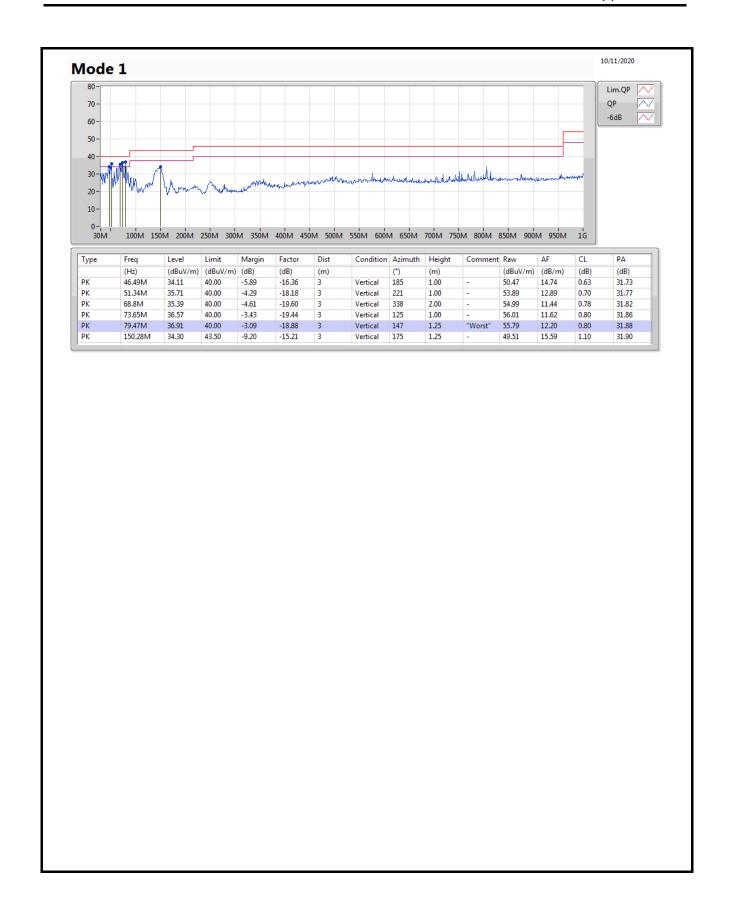


Radiated Emission below 1GHz Result

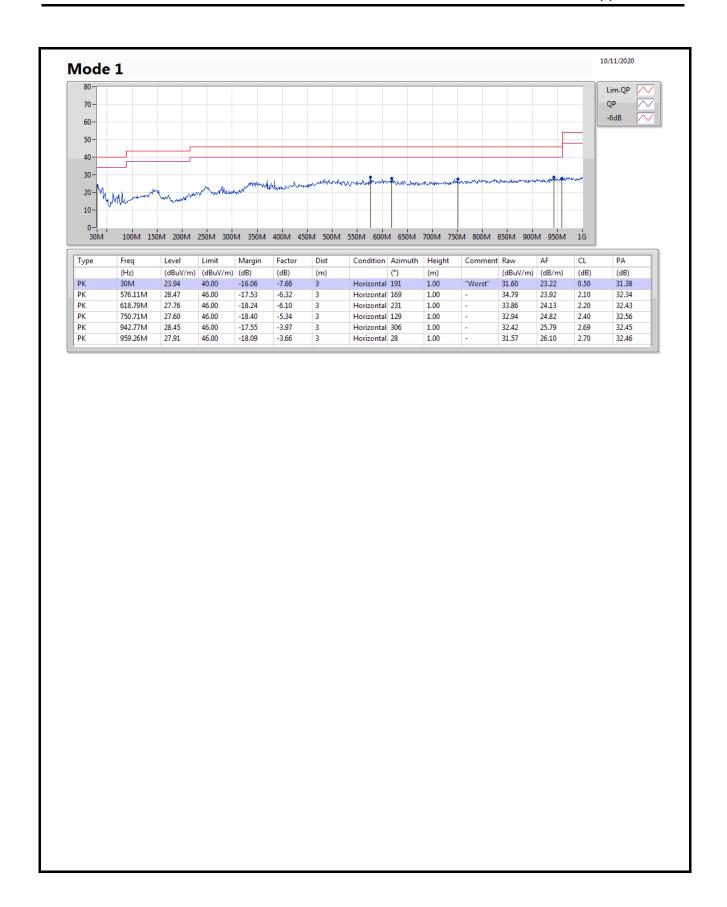
Appendix E.1

Mode	Result	Туре	Freq	Level	Limit	Margin	Condition
			(Hz)	(dBuV/m)	(dBuV/m)	(dB)	
Mode 1	Pass	PK	79.47M	36.91	40.00	-3.09	Vertical











RSE TX above 1GHz

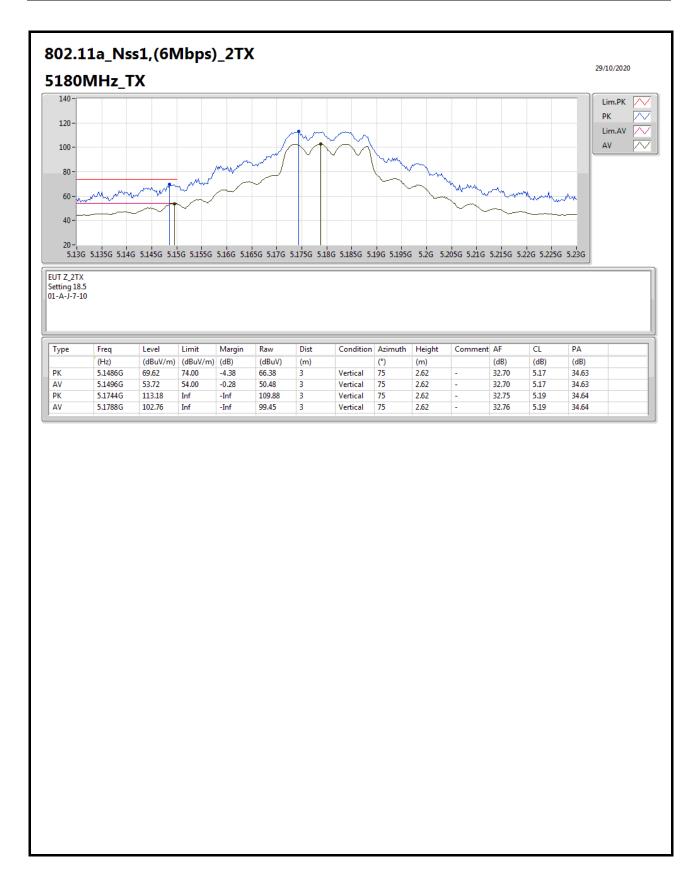
Appendix E.2

Page No. : 1 of 73

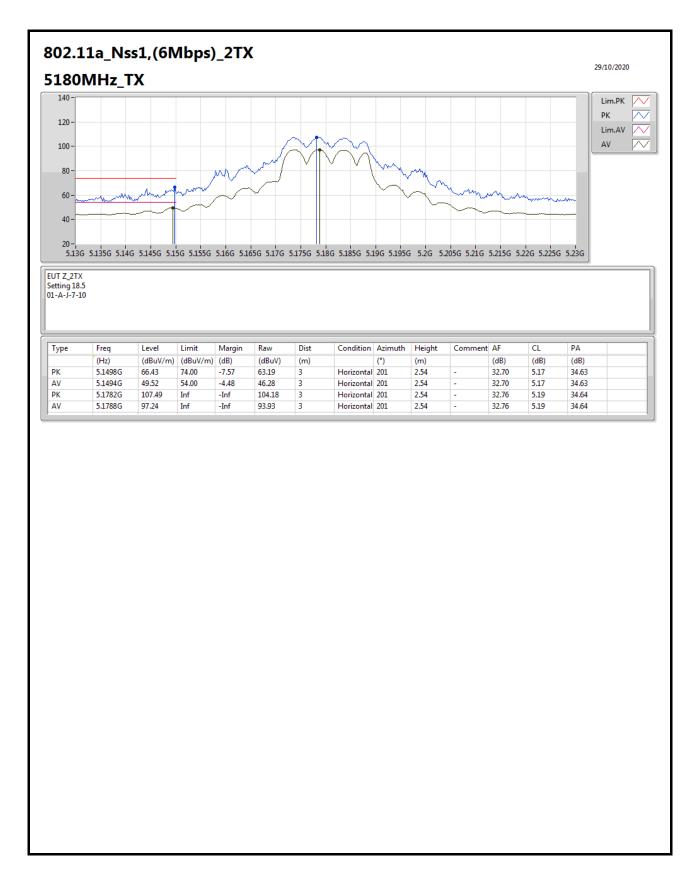
Mode	Result	Туре	Freq	Level	Limit	Margin	Dist	Condition	Azimuth	Height	Comments
			(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(m)		(°)	(m)	
5.15-5.25GHz	-	-	-	-	-	-	-	-	-	-	-
802.11ac VHT40_Nss1,(MCS0)_2TX	Pass	AV	5.148G	53.89	54.00	-0.11	3	Vertical	31	2.52	-

Page No. : 2 of 73

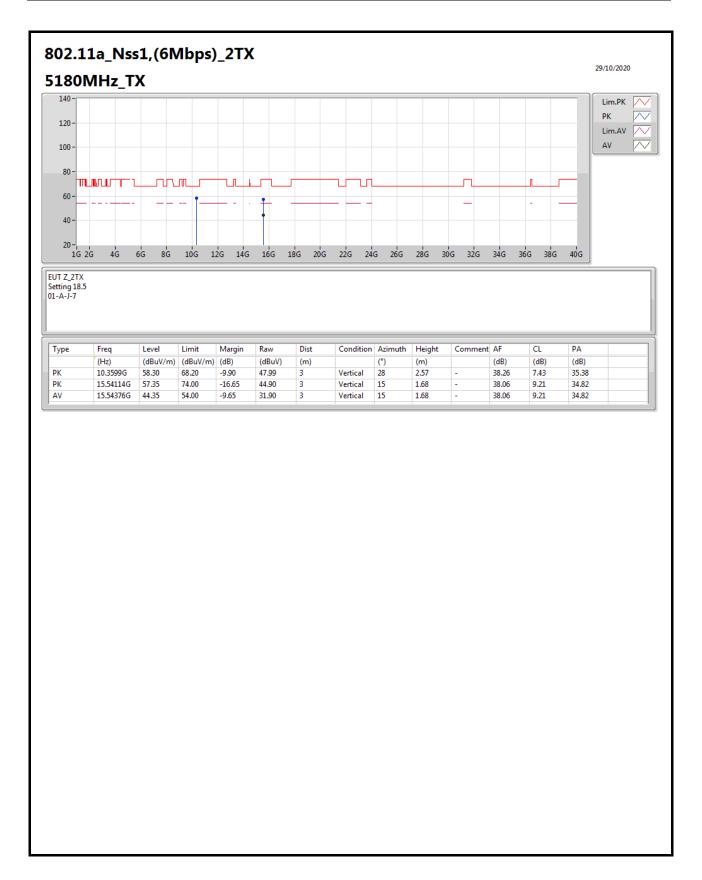




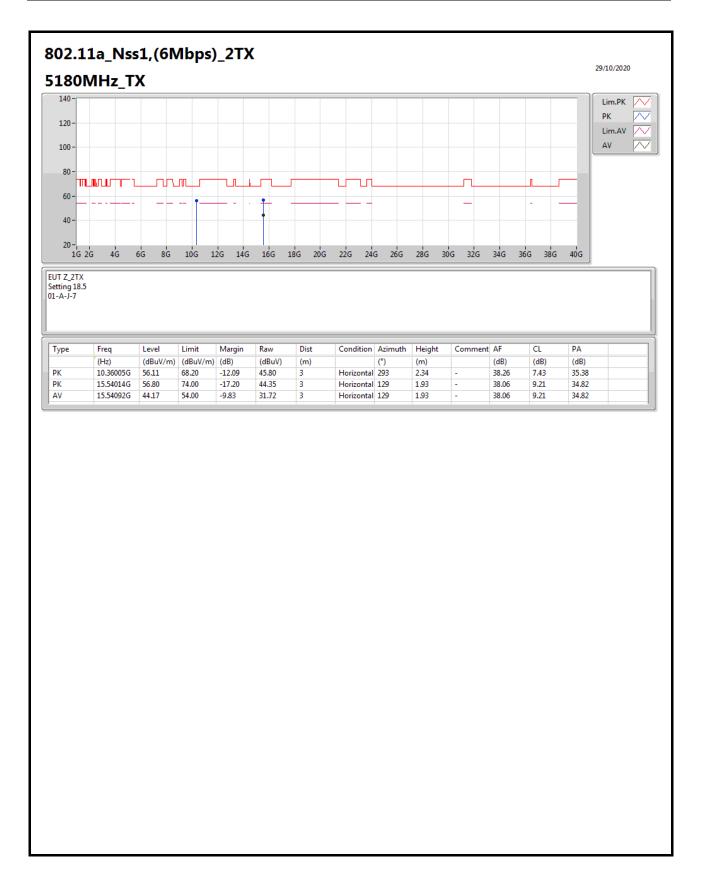




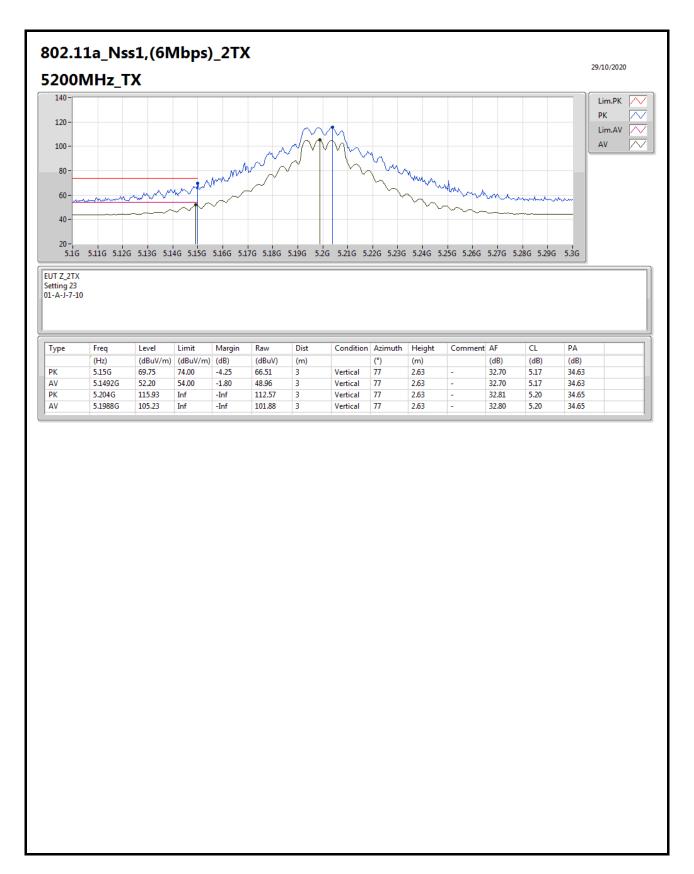




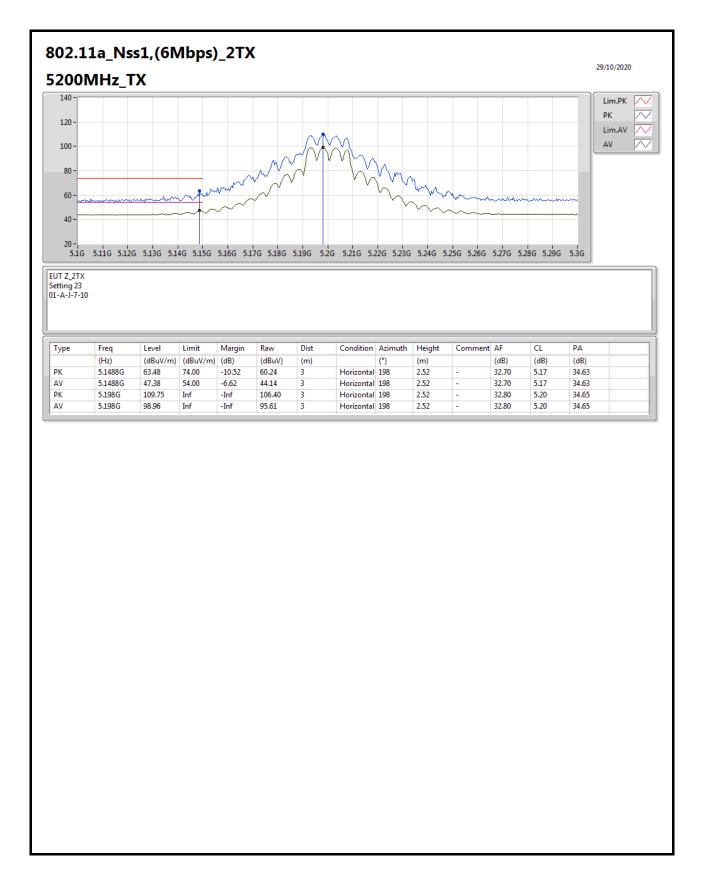




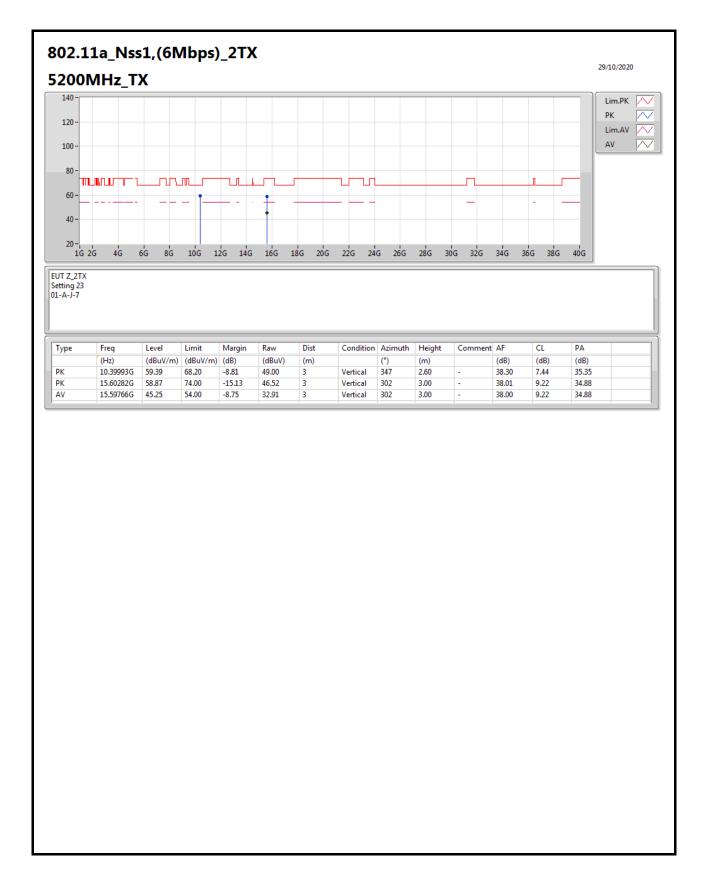




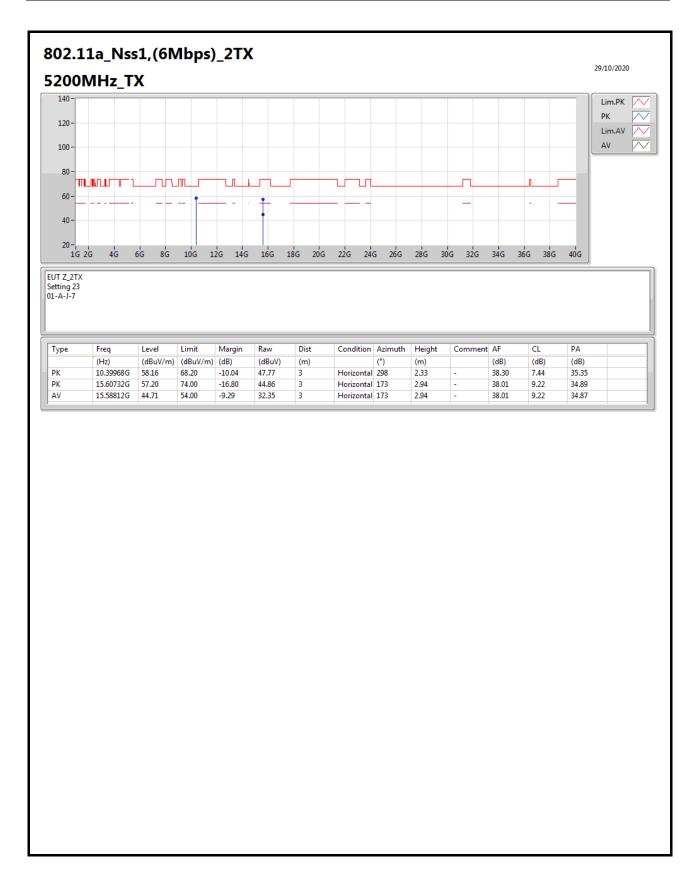




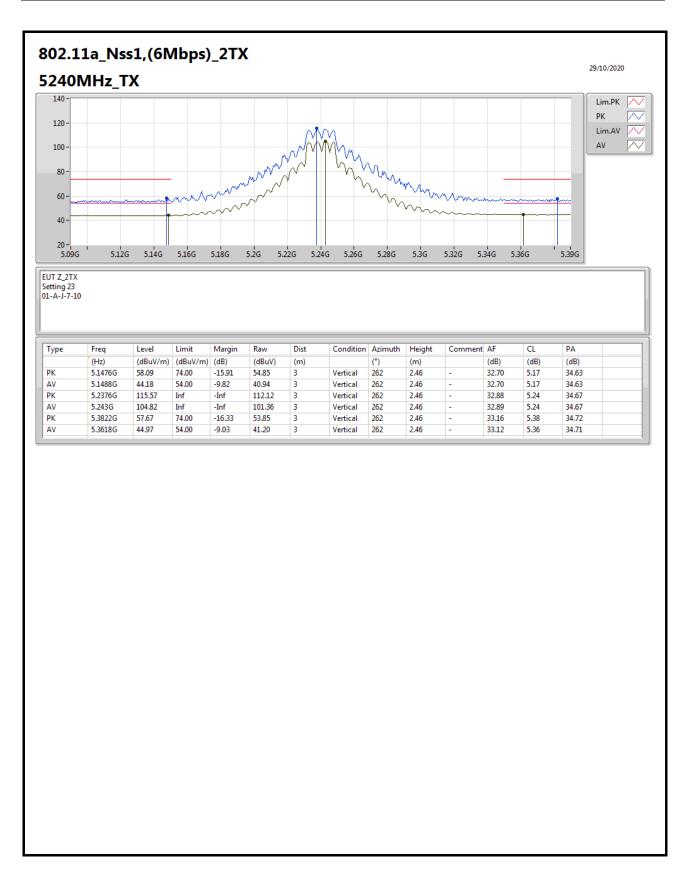




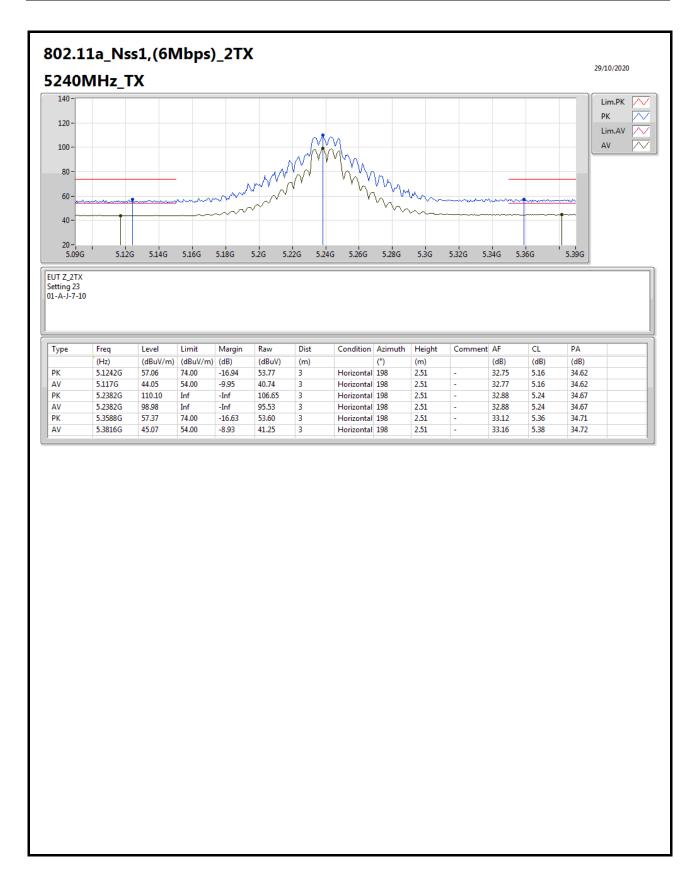




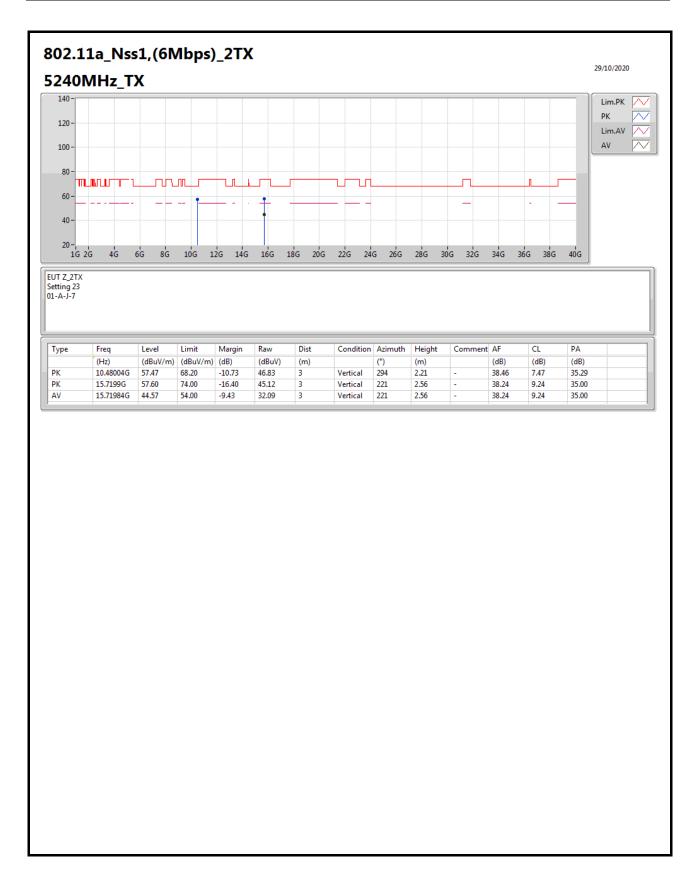




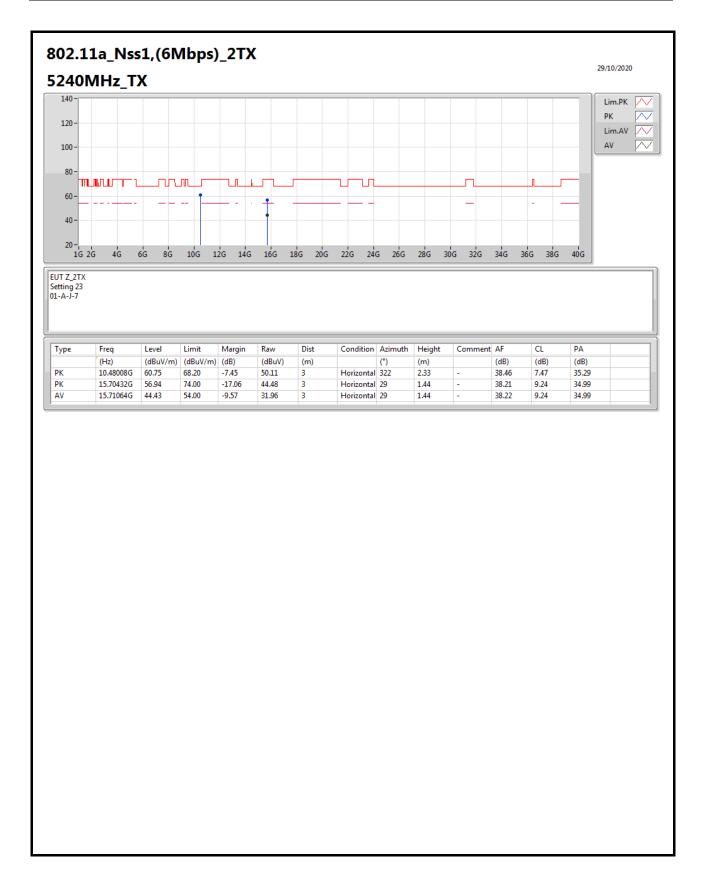




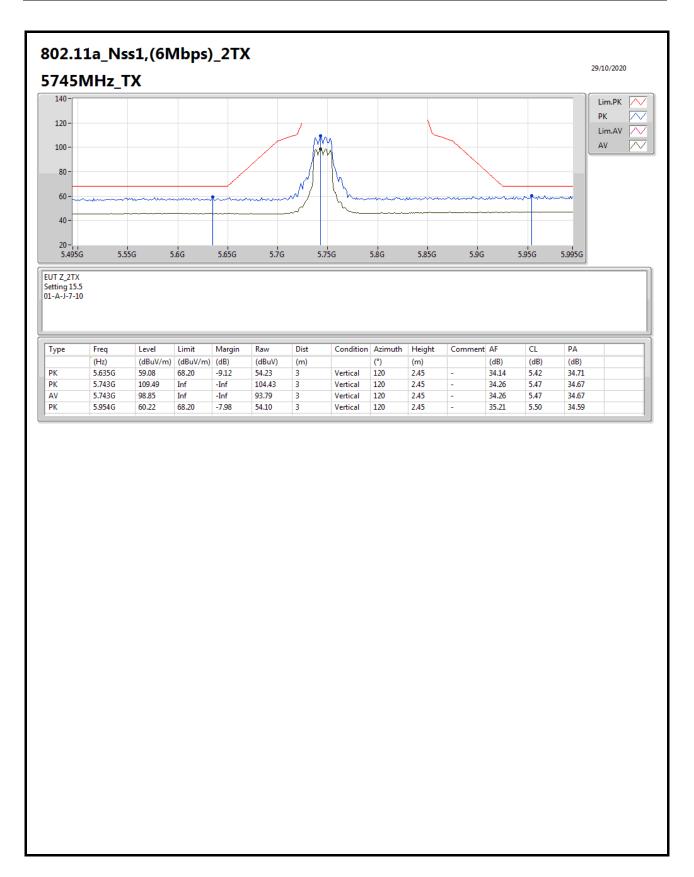






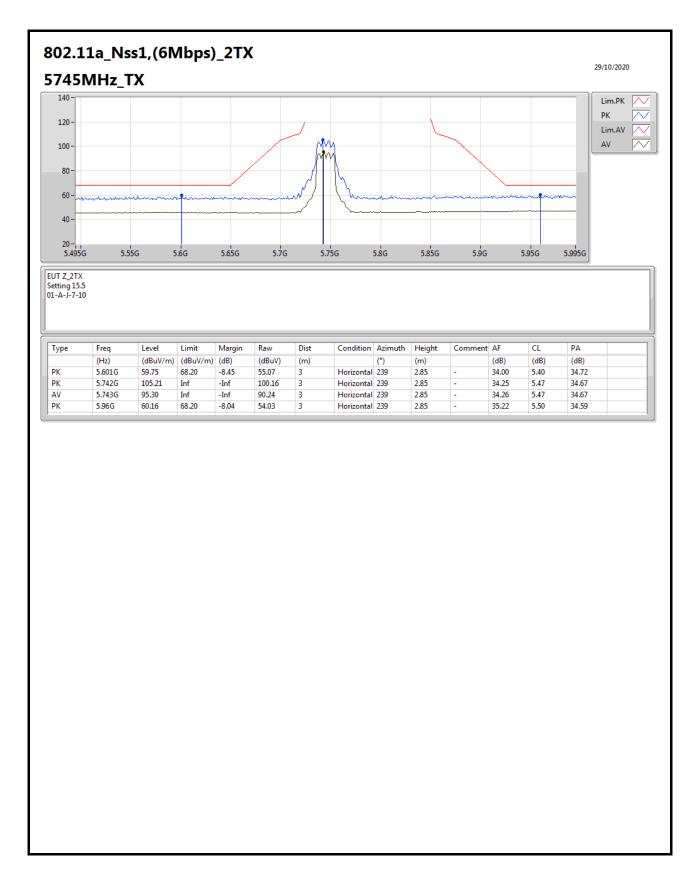






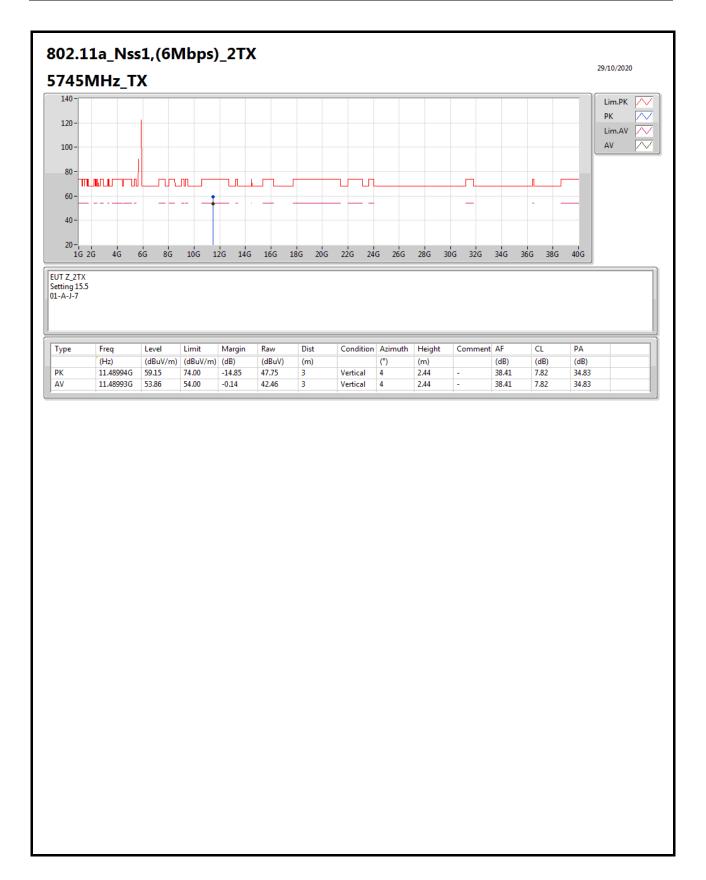
Page No. : 15 of 73



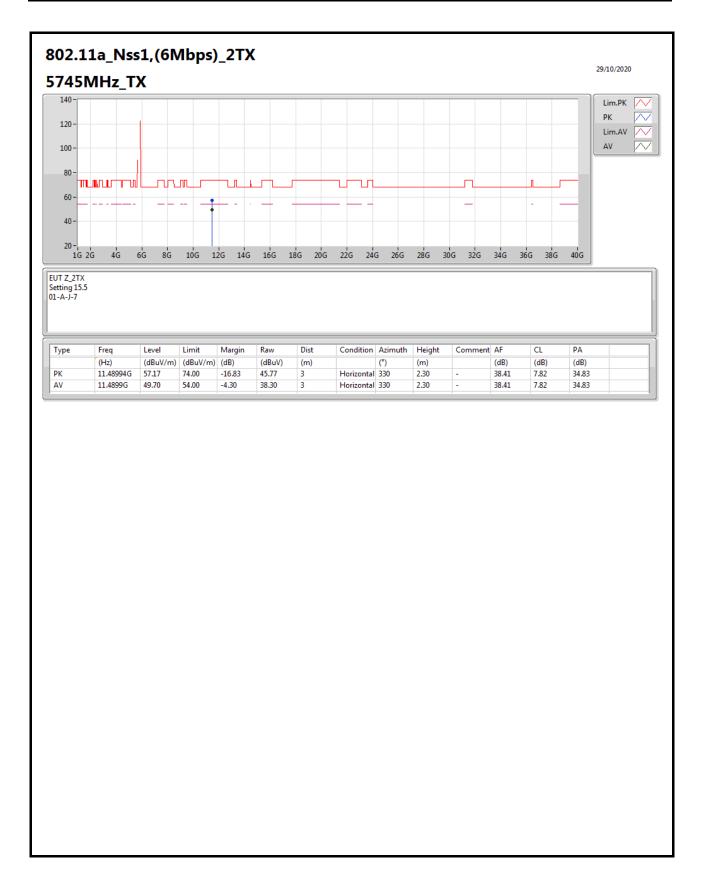


Page No. : 16 of 73

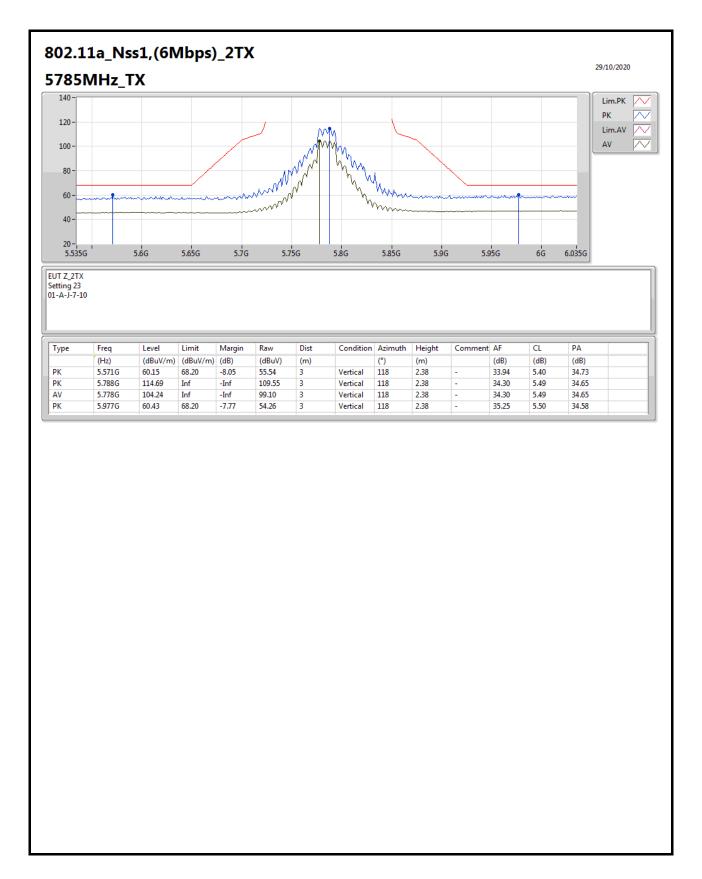




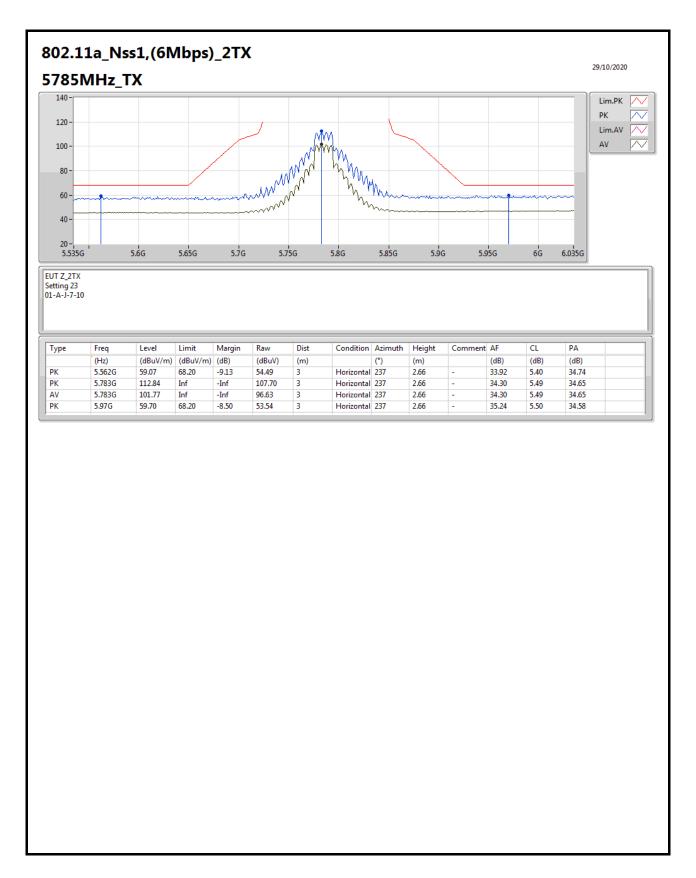




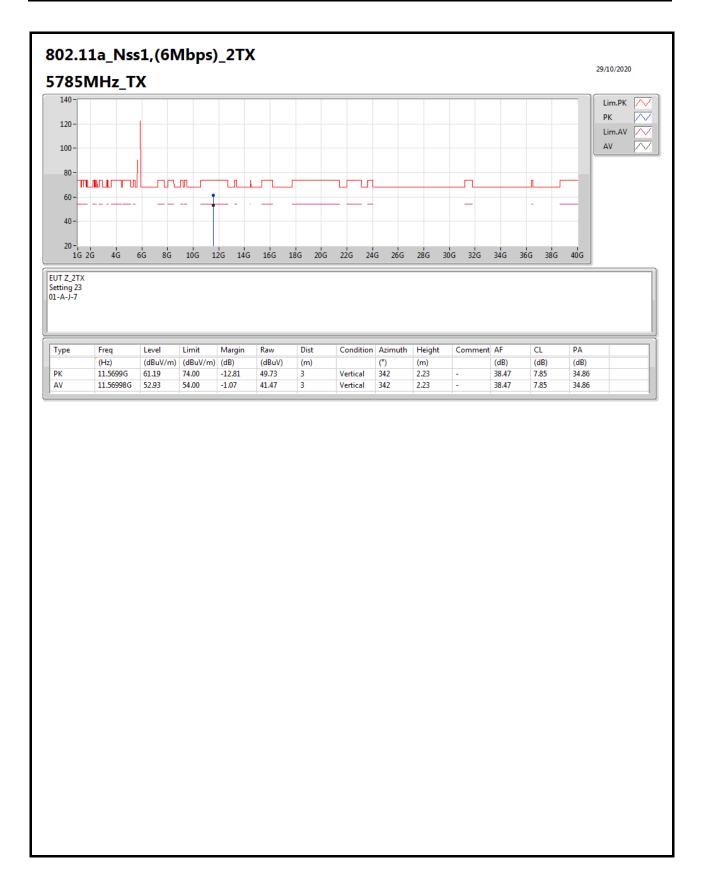




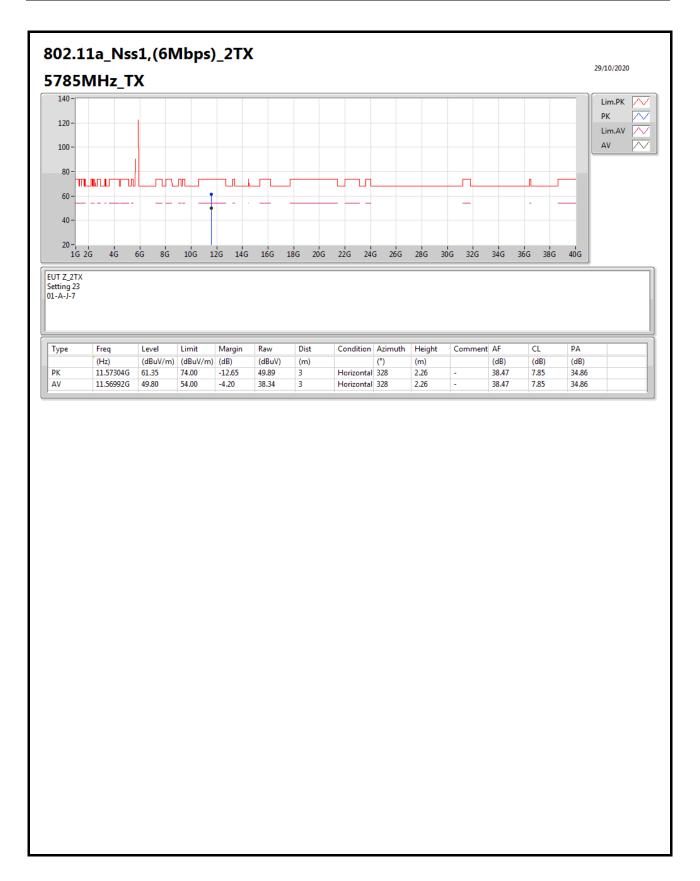




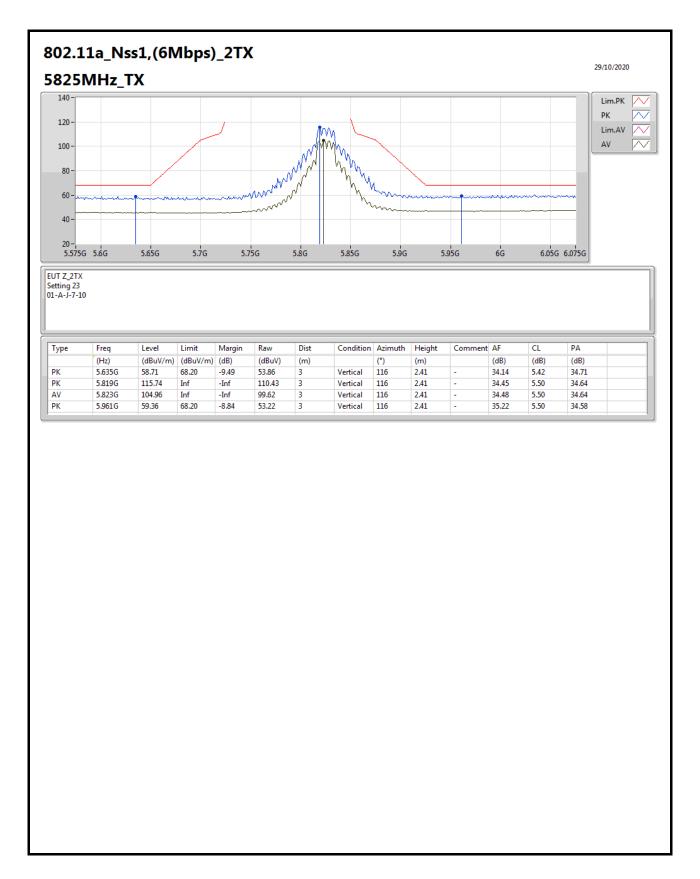




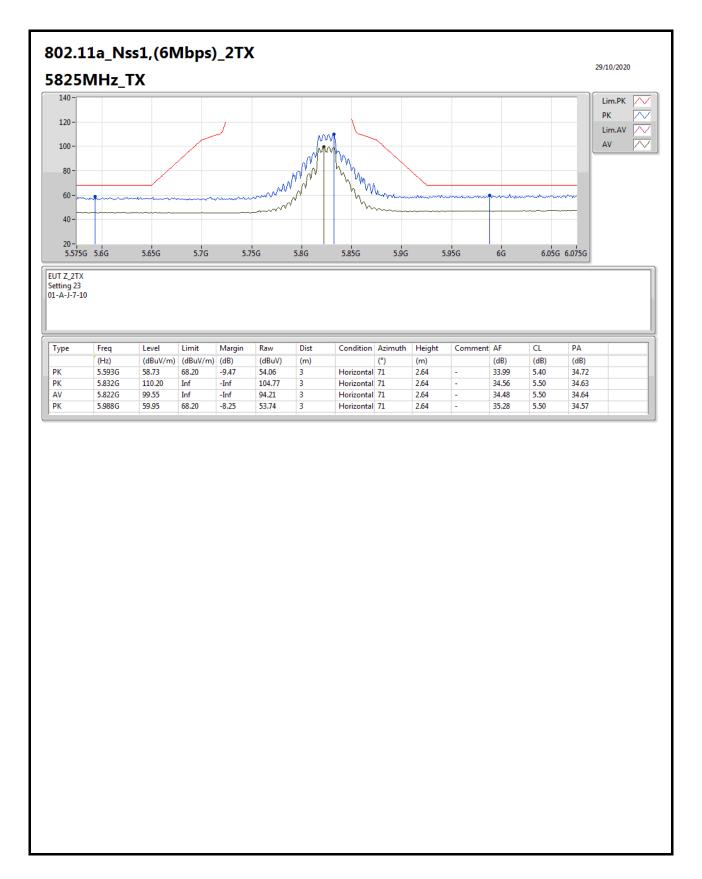




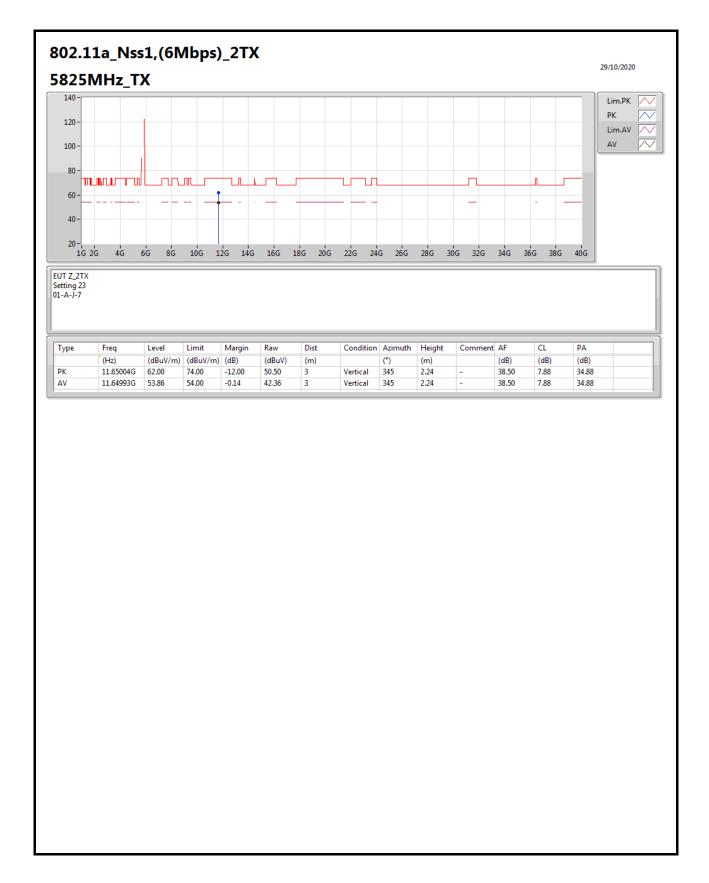






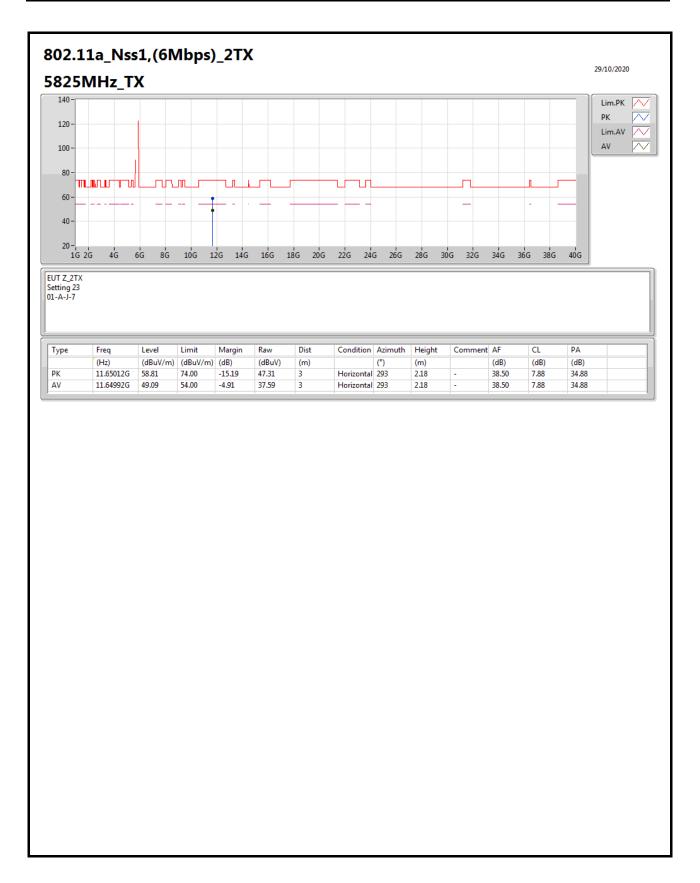






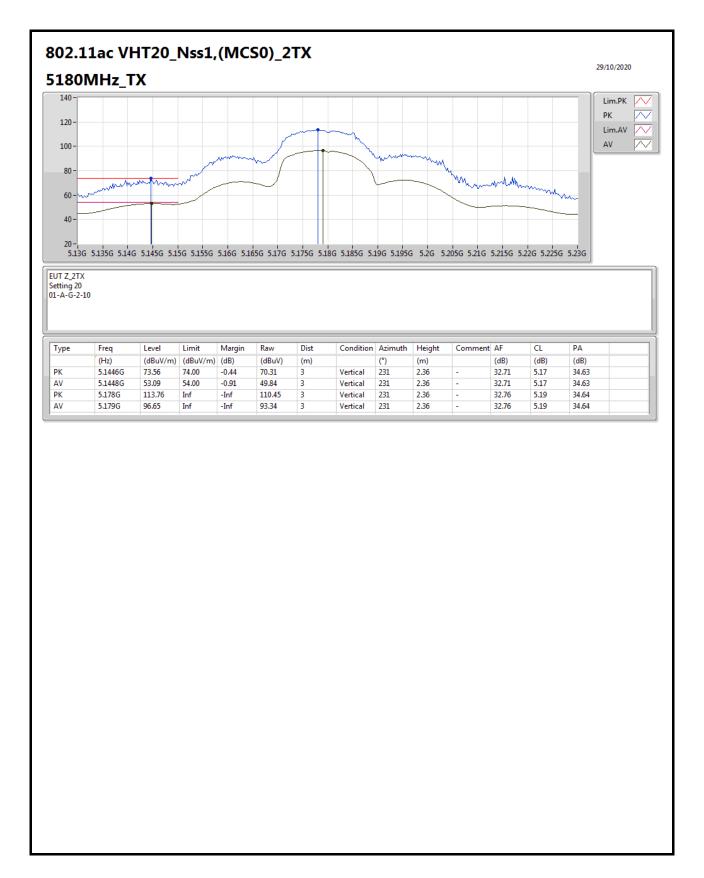
Page No. : 25 of 73



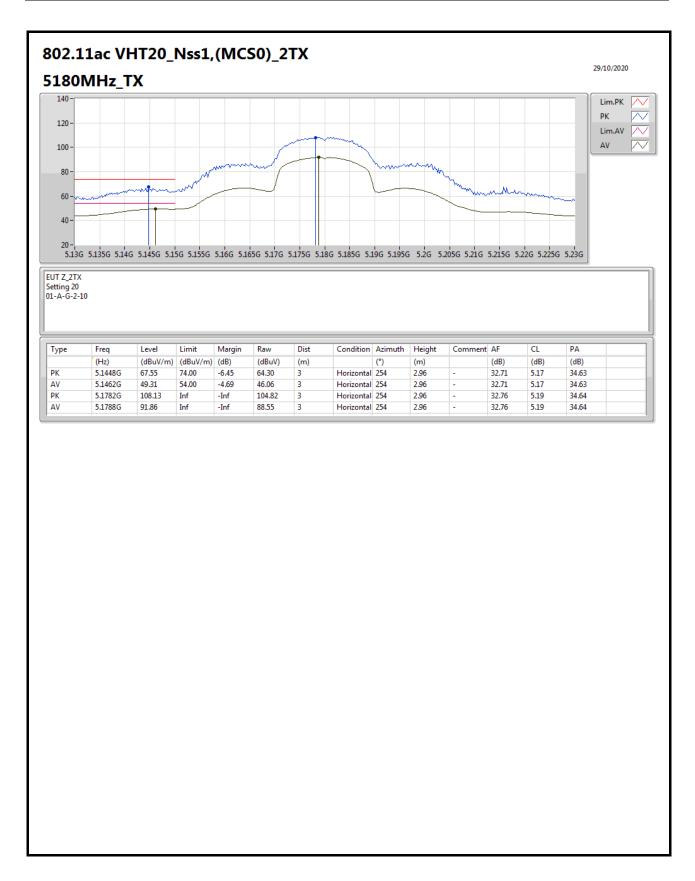


Page No. : 26 of 73

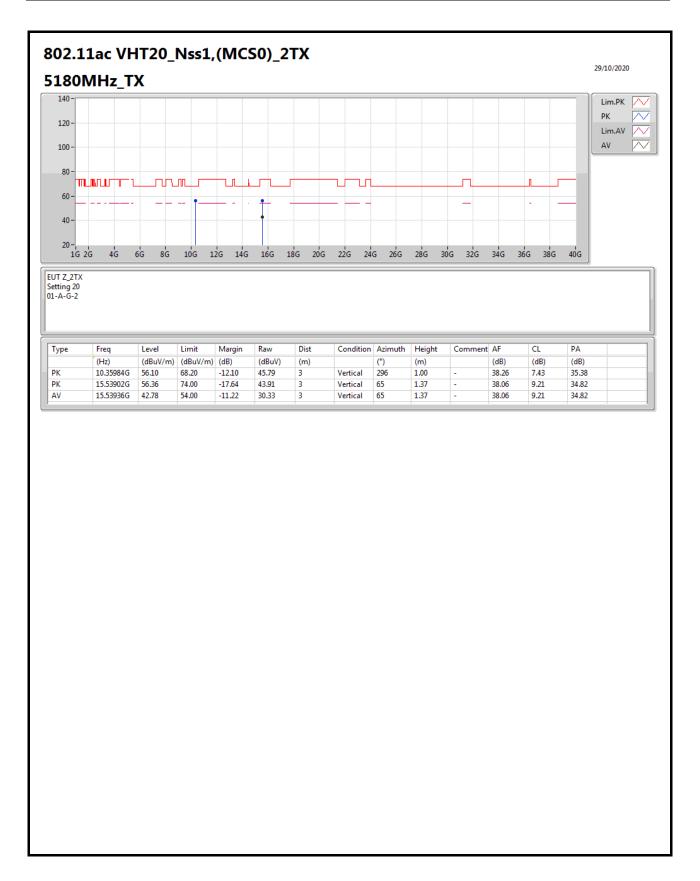




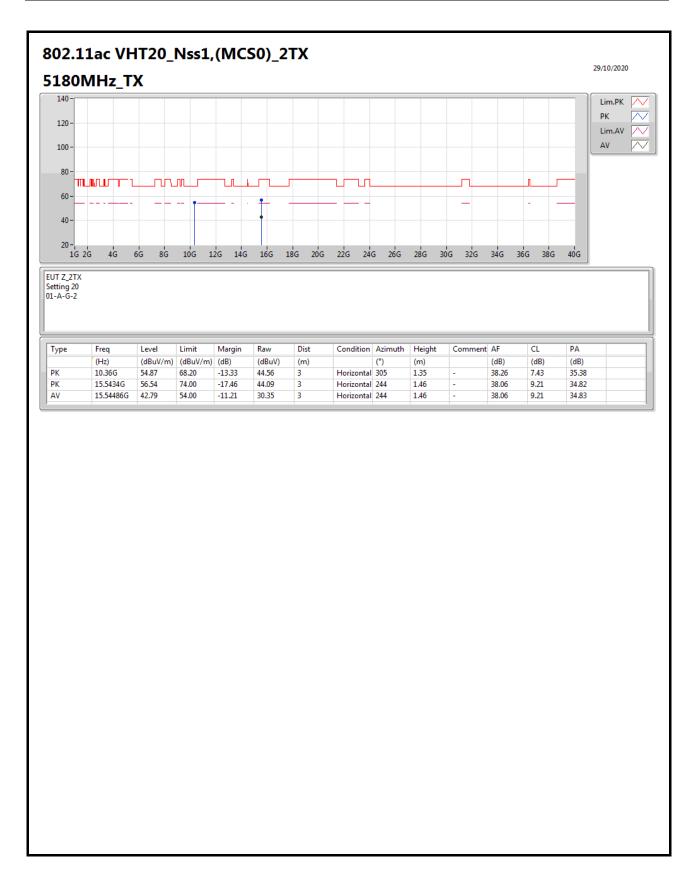




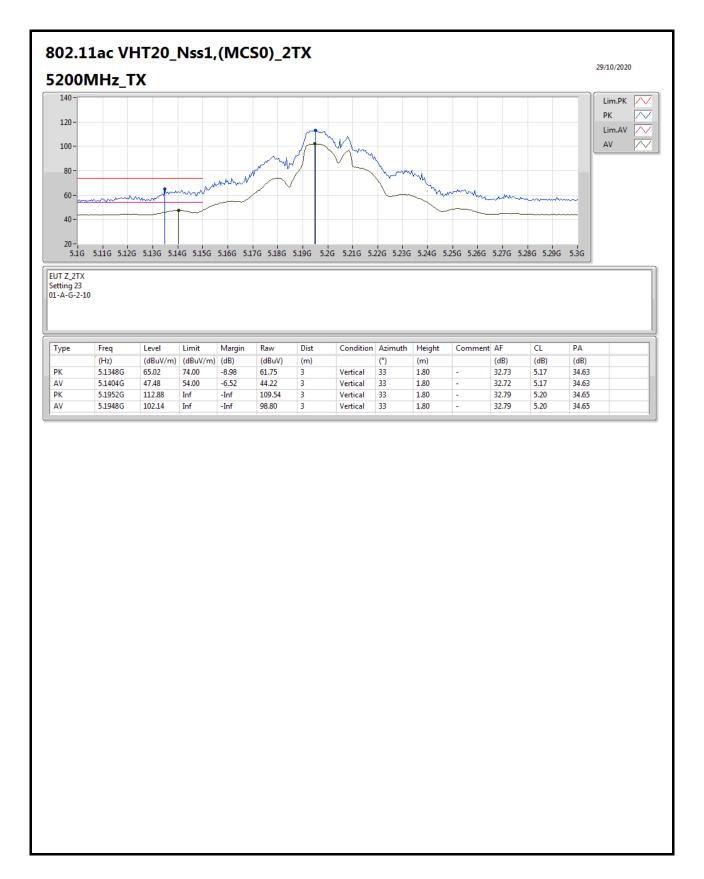




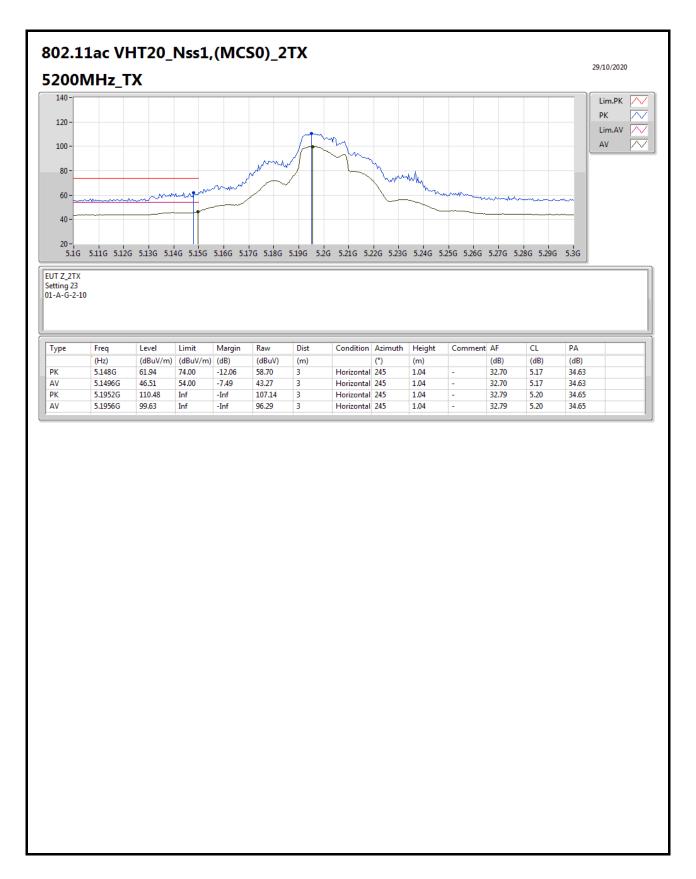




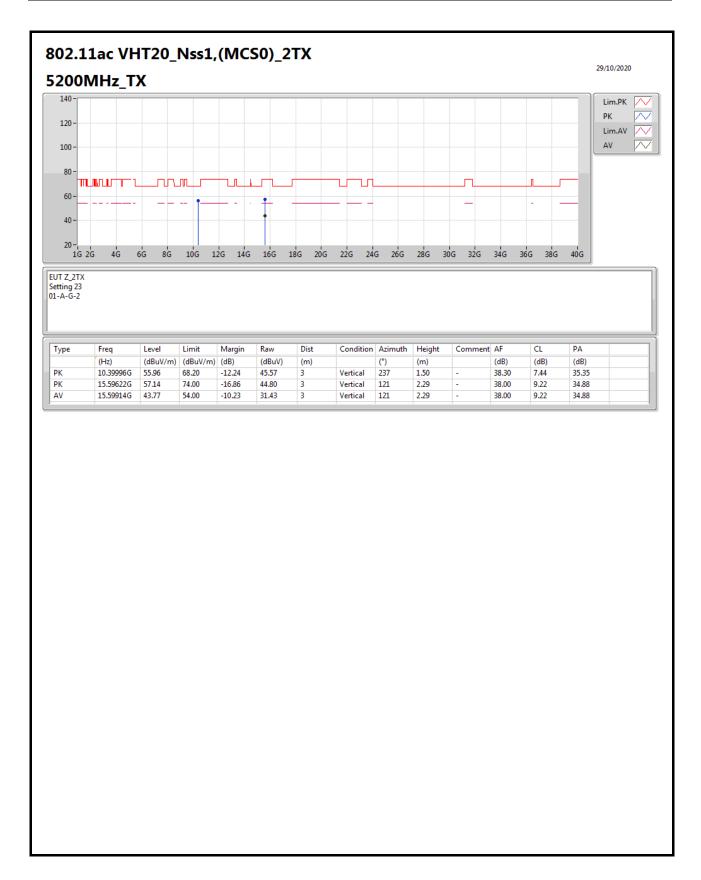




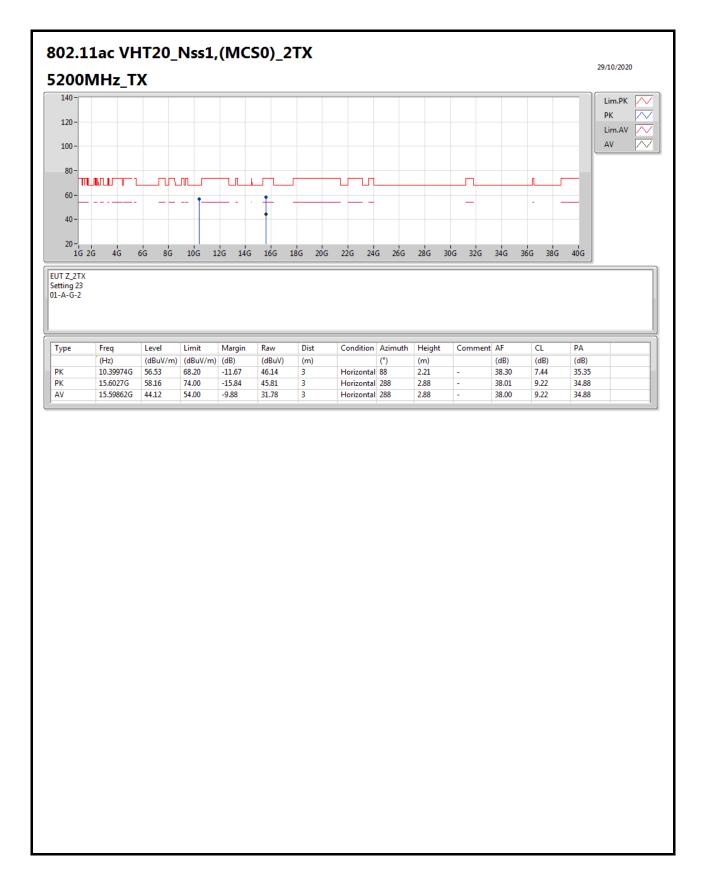




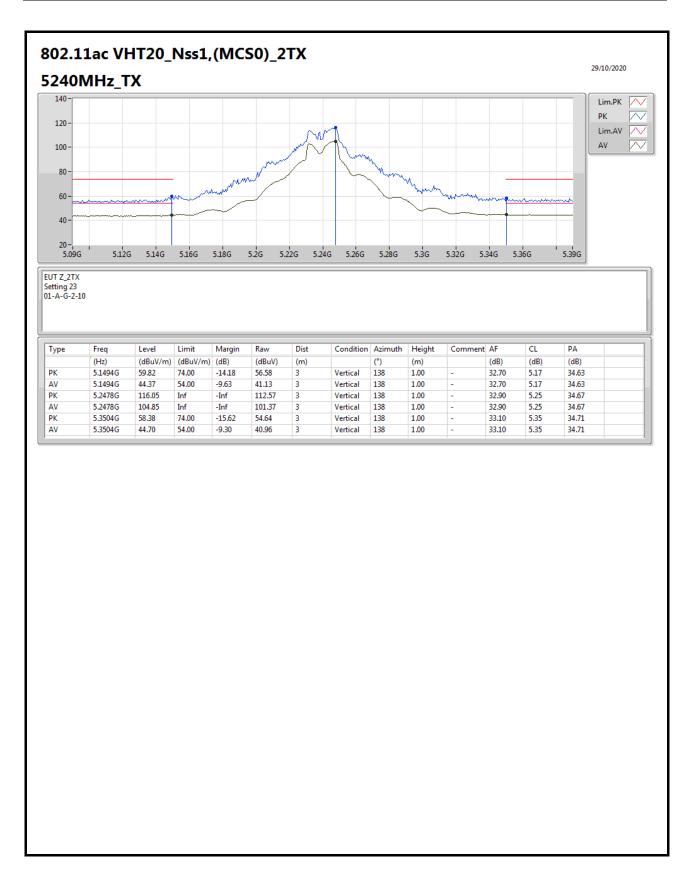




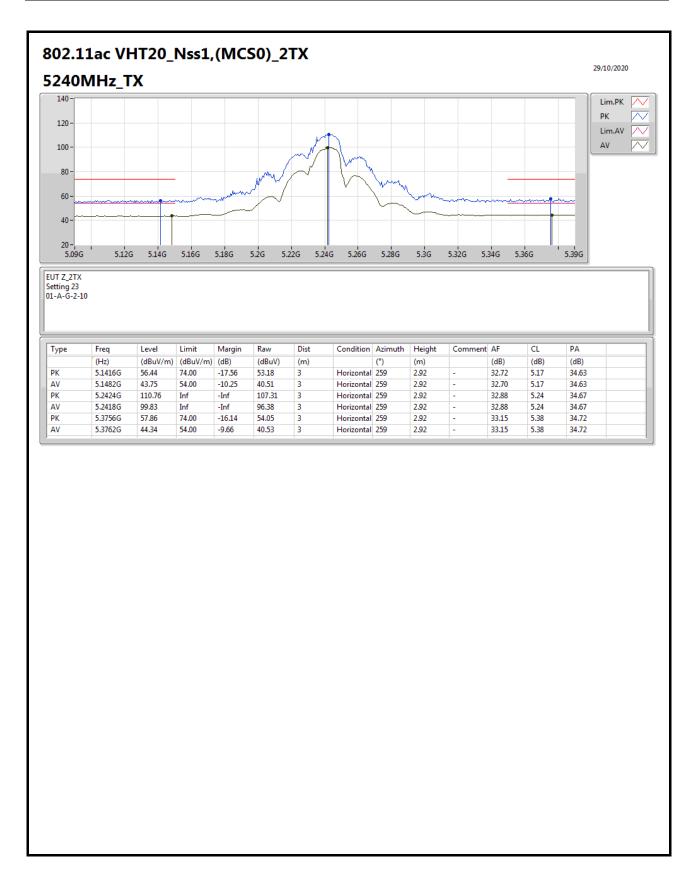




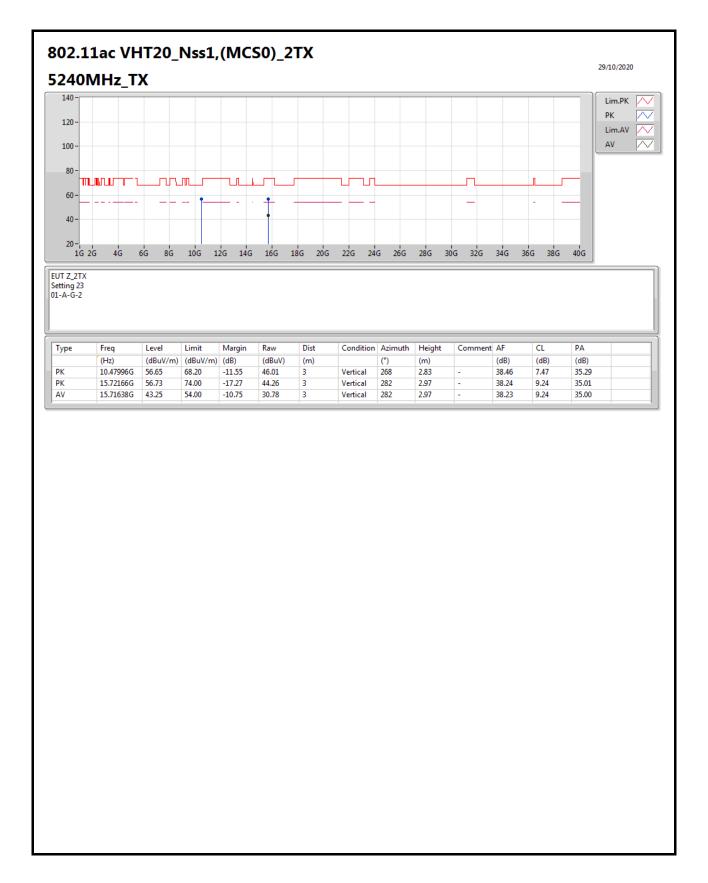




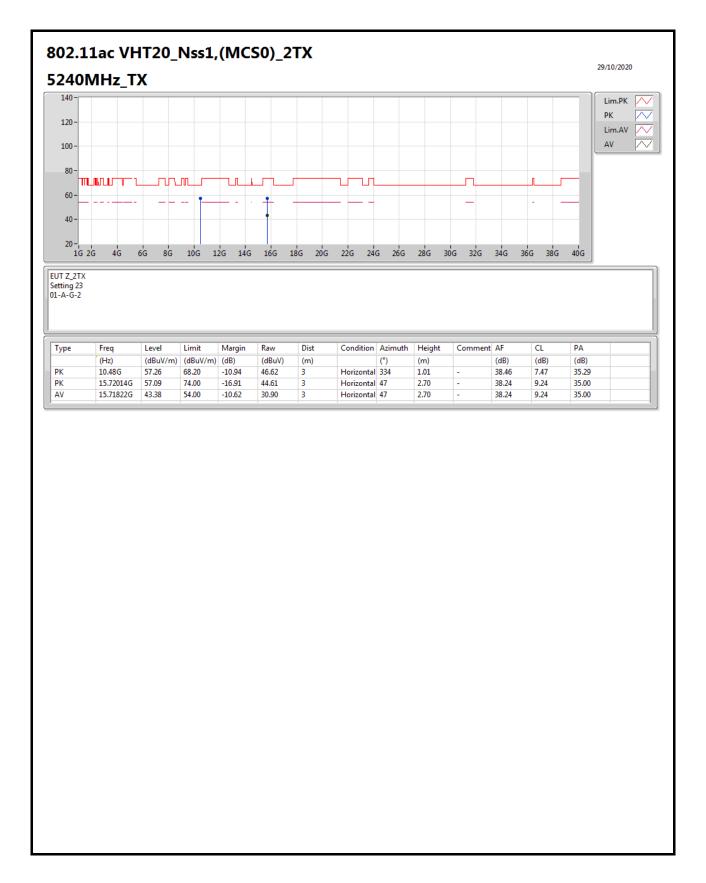




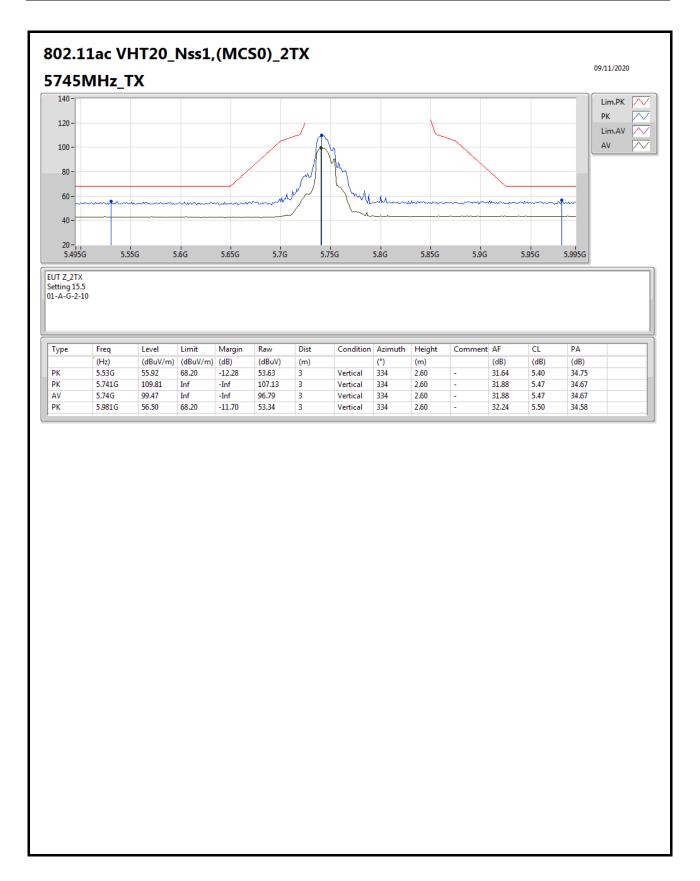




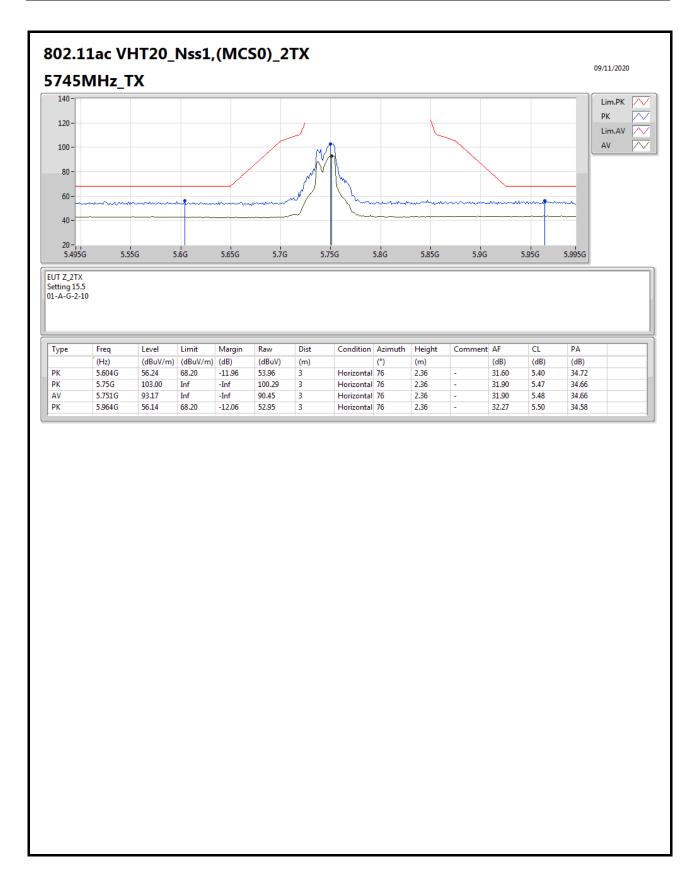




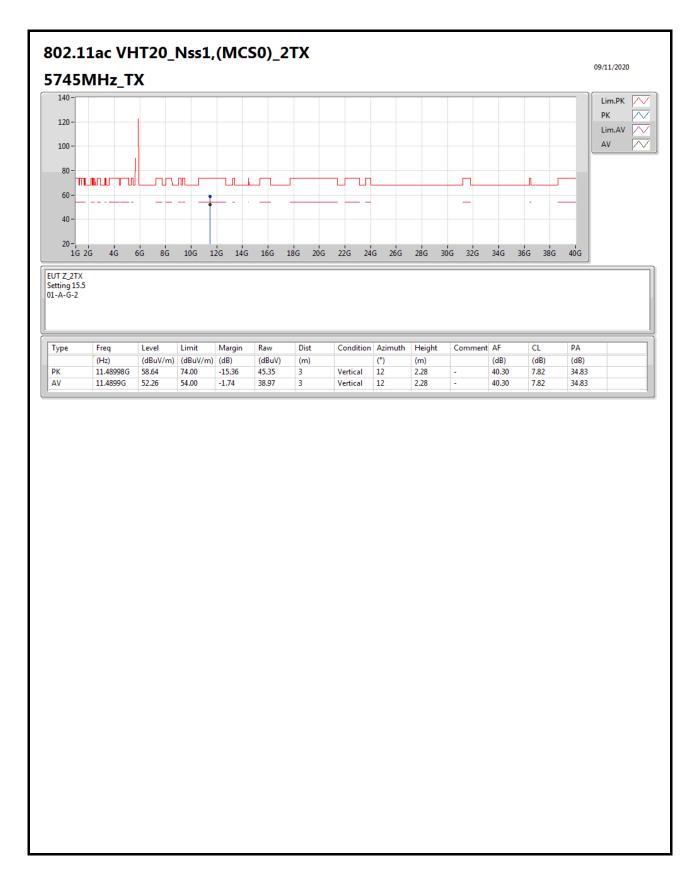




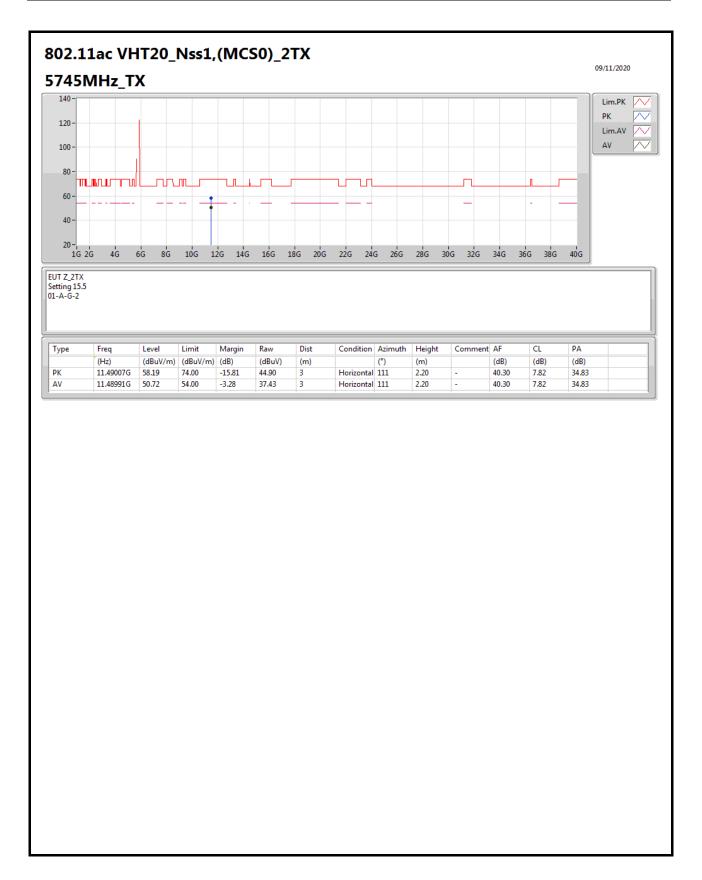




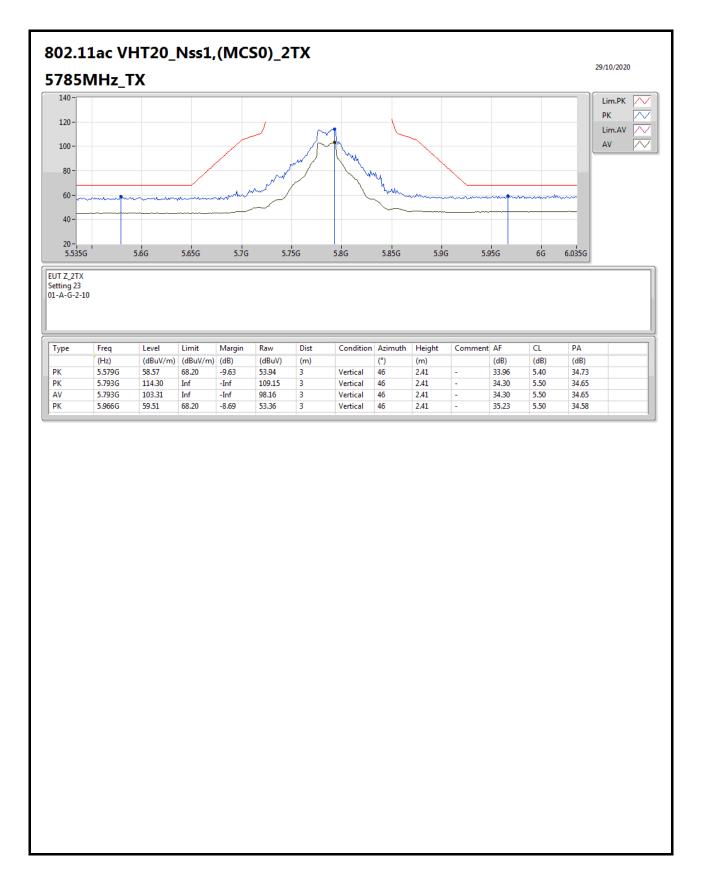




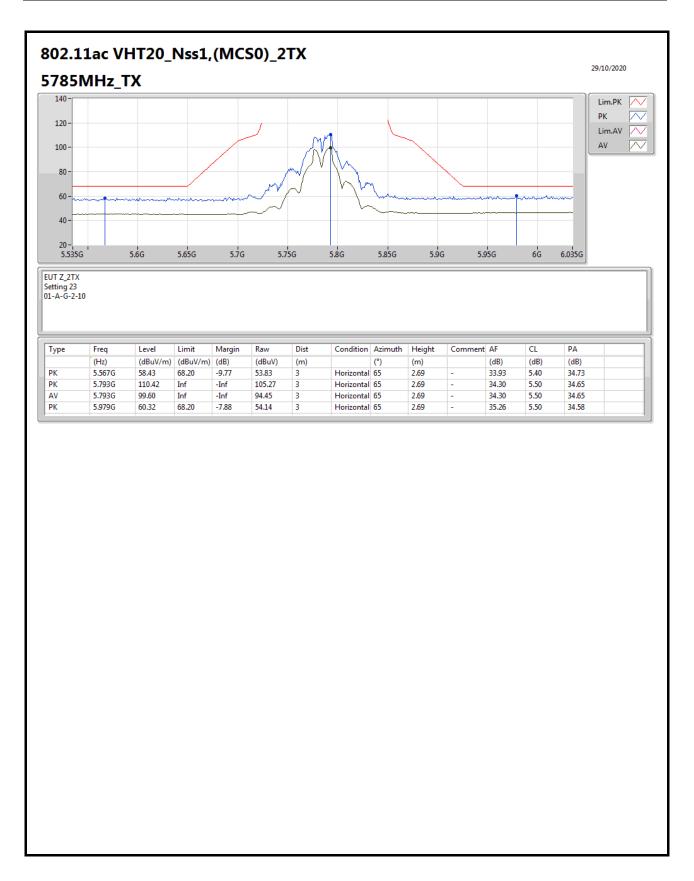




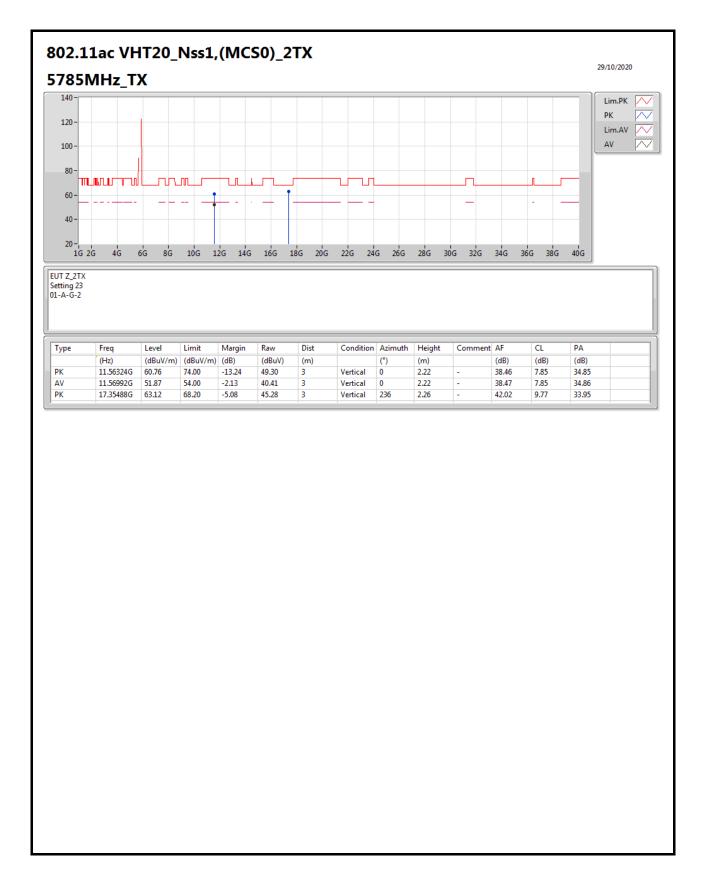




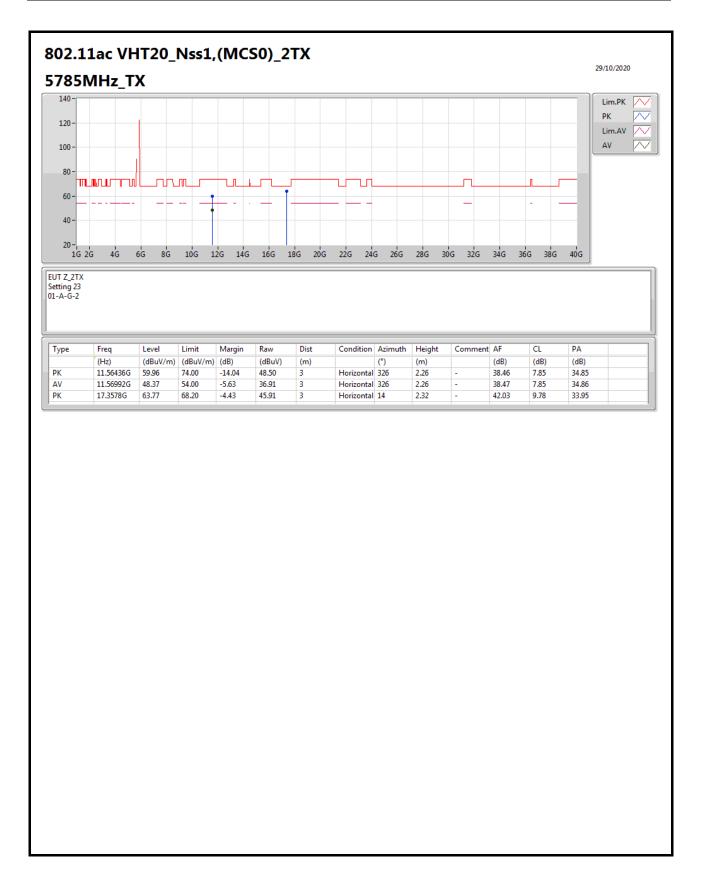




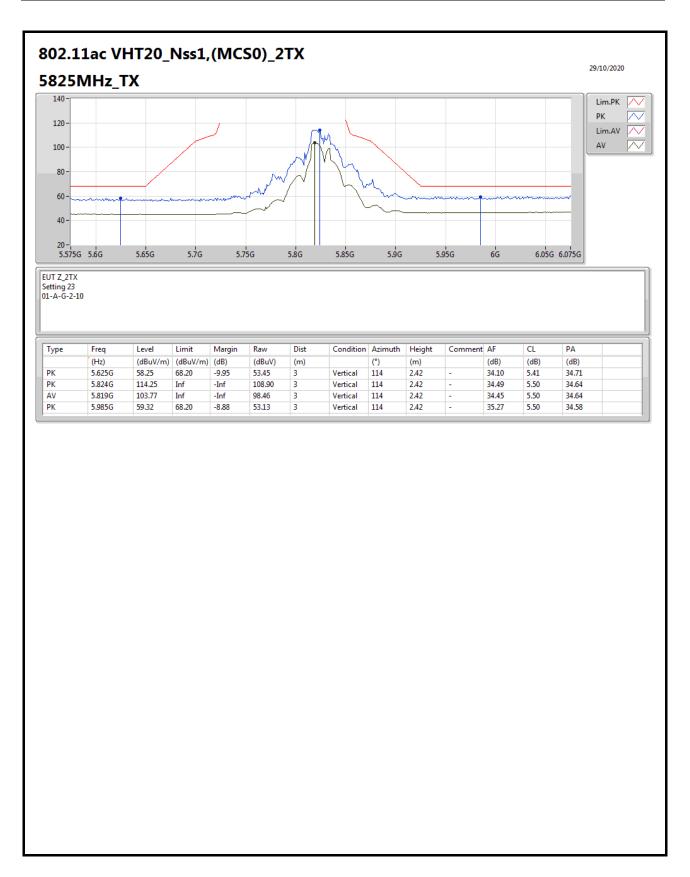






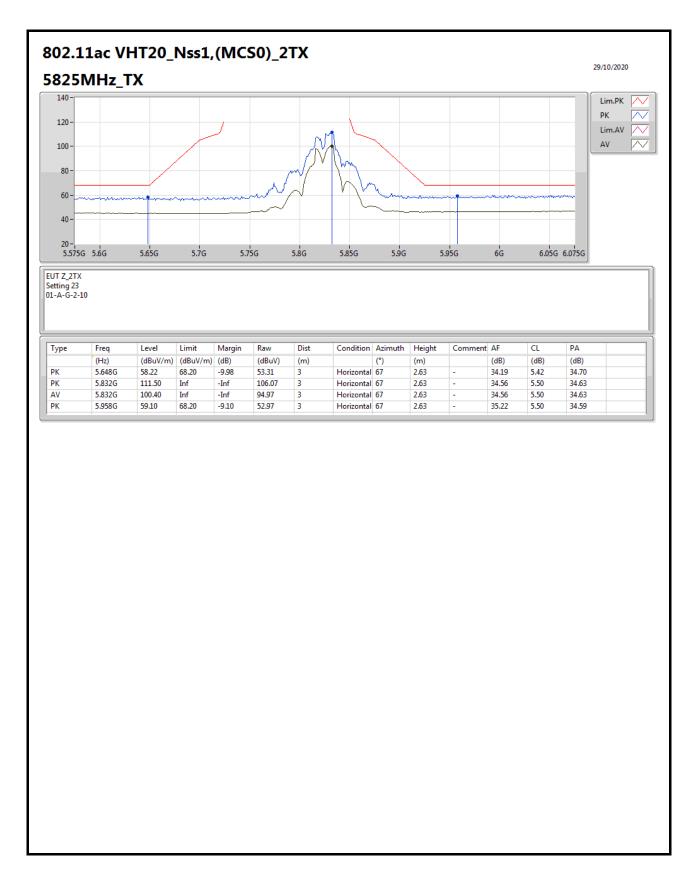




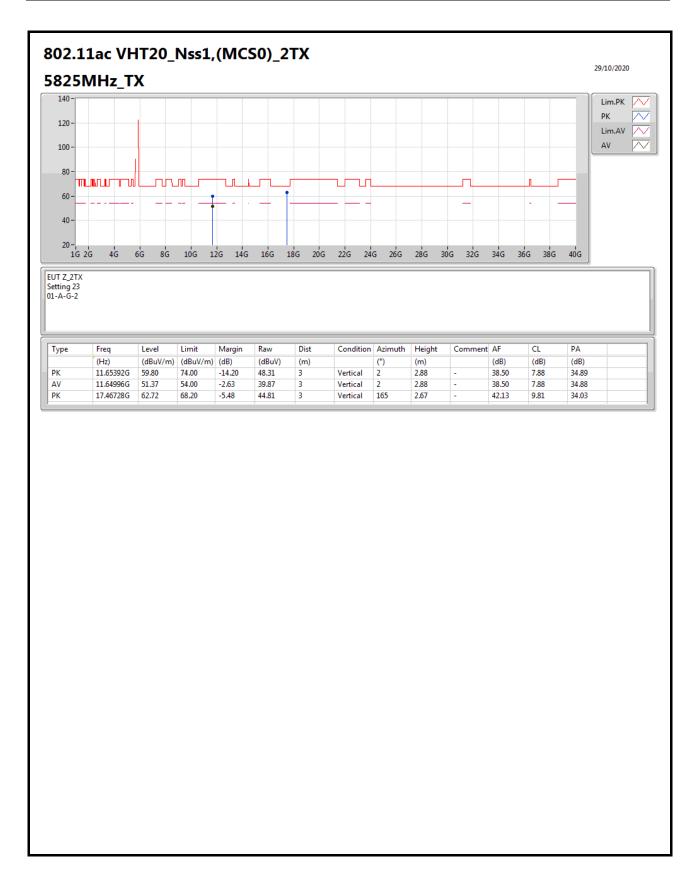


Page No. : 47 of 73

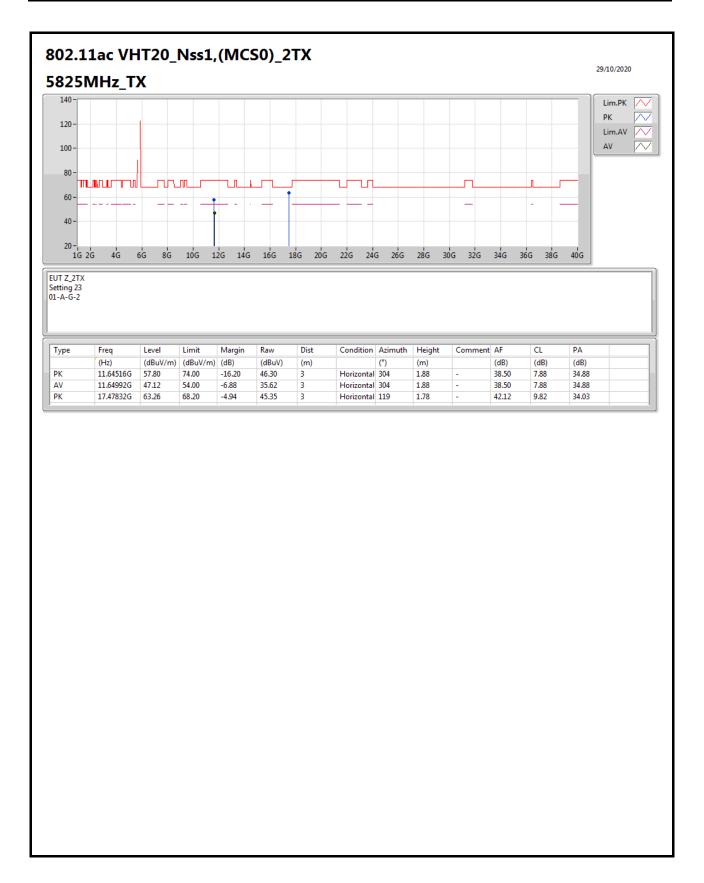




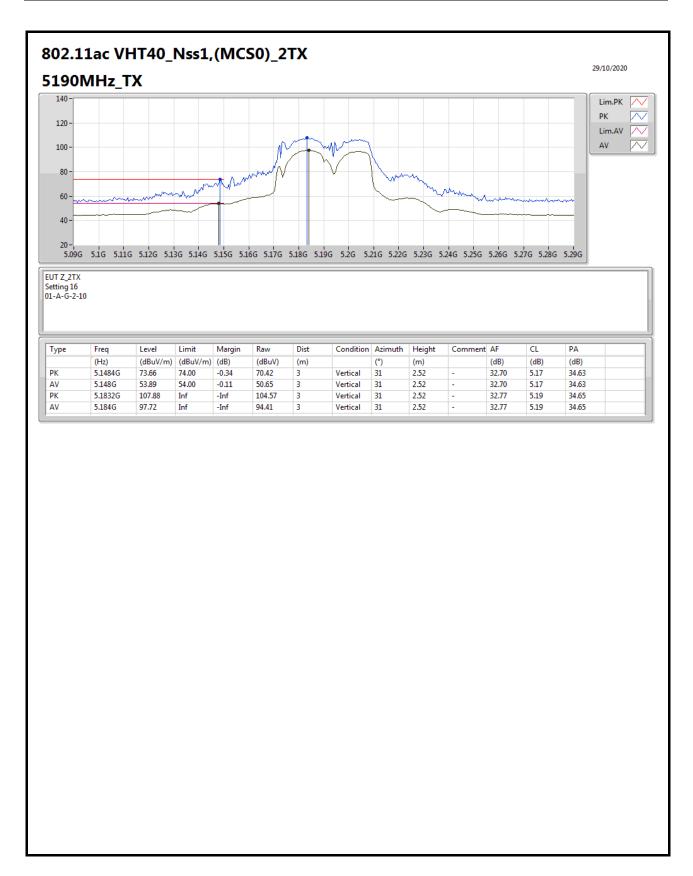




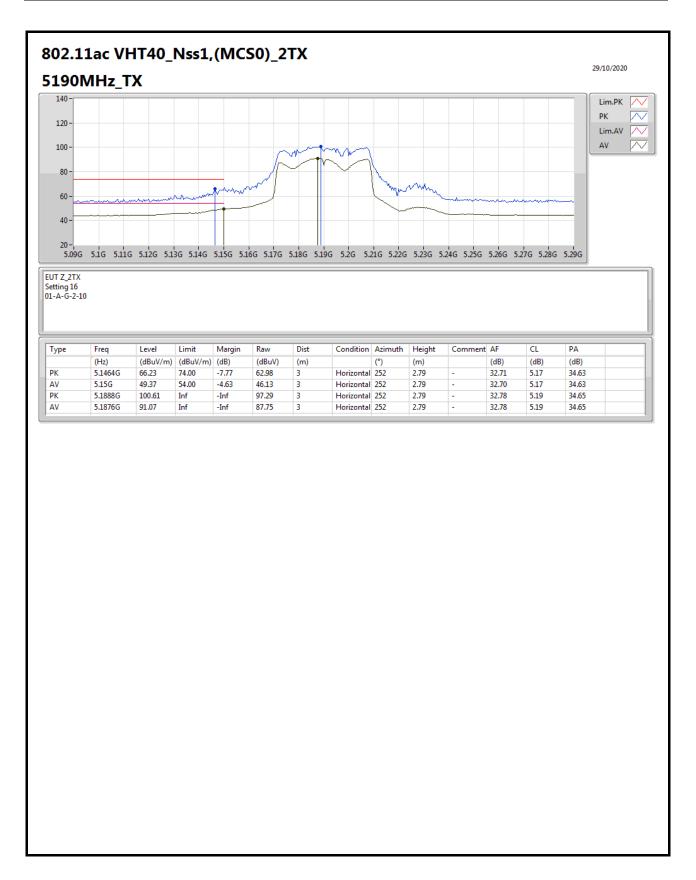




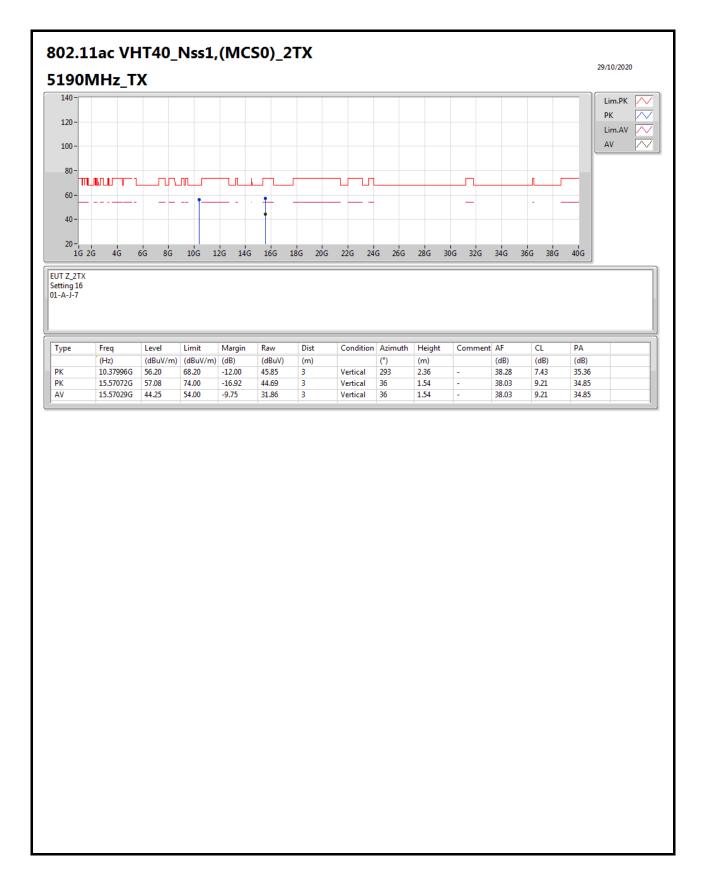






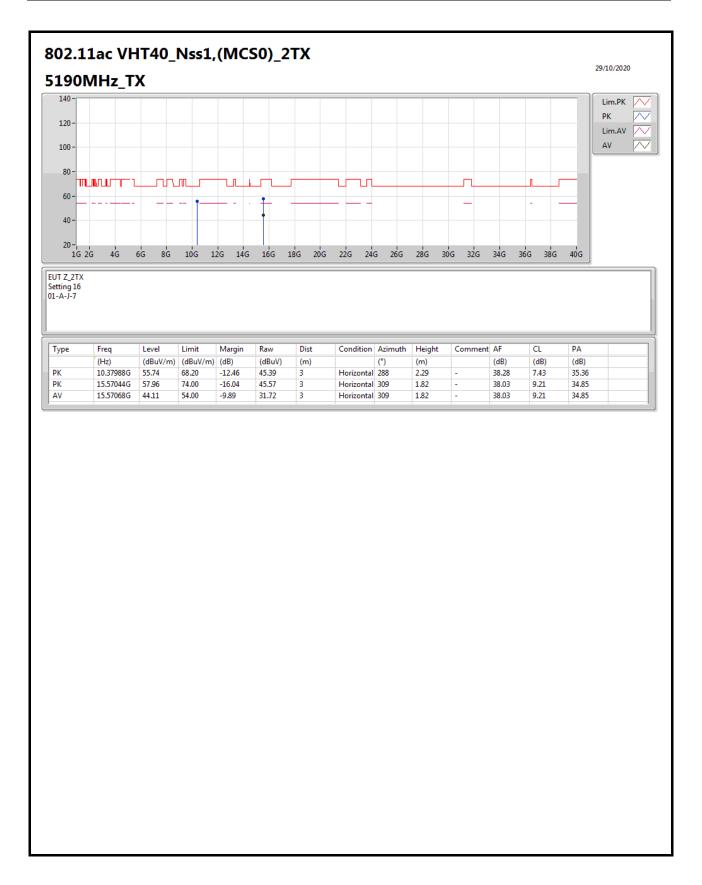




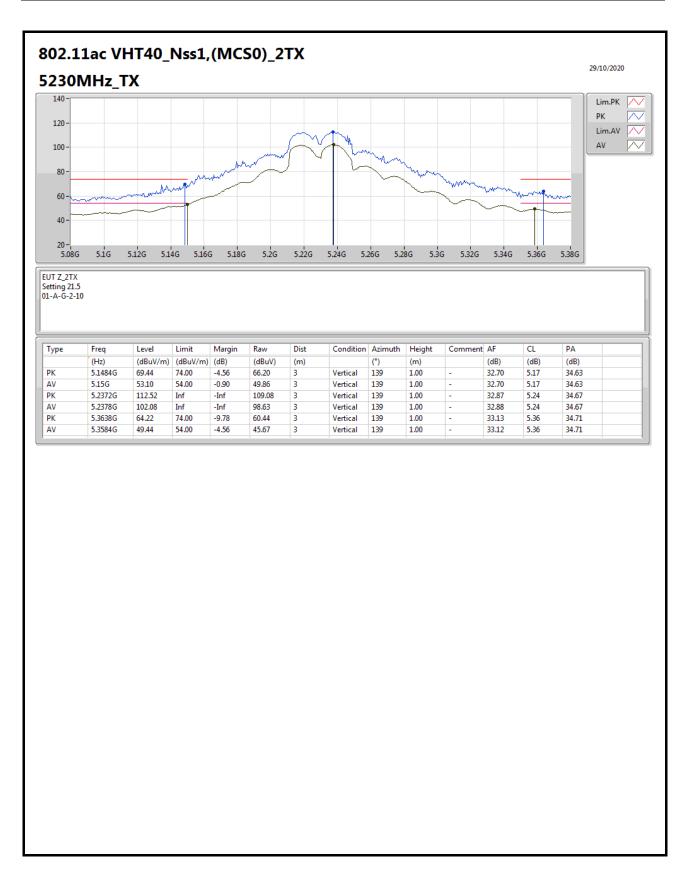


Page No. : 53 of 73

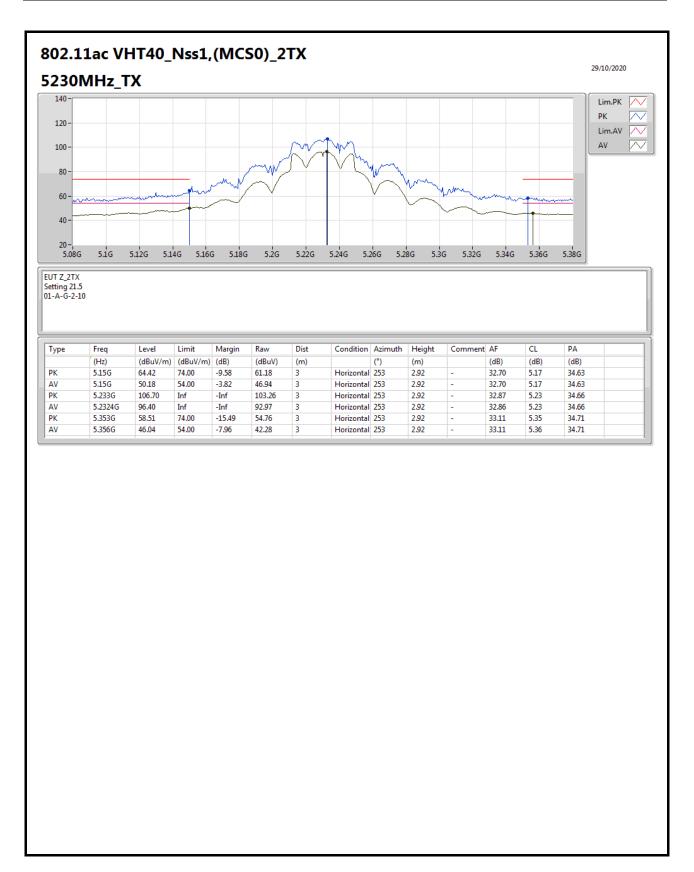




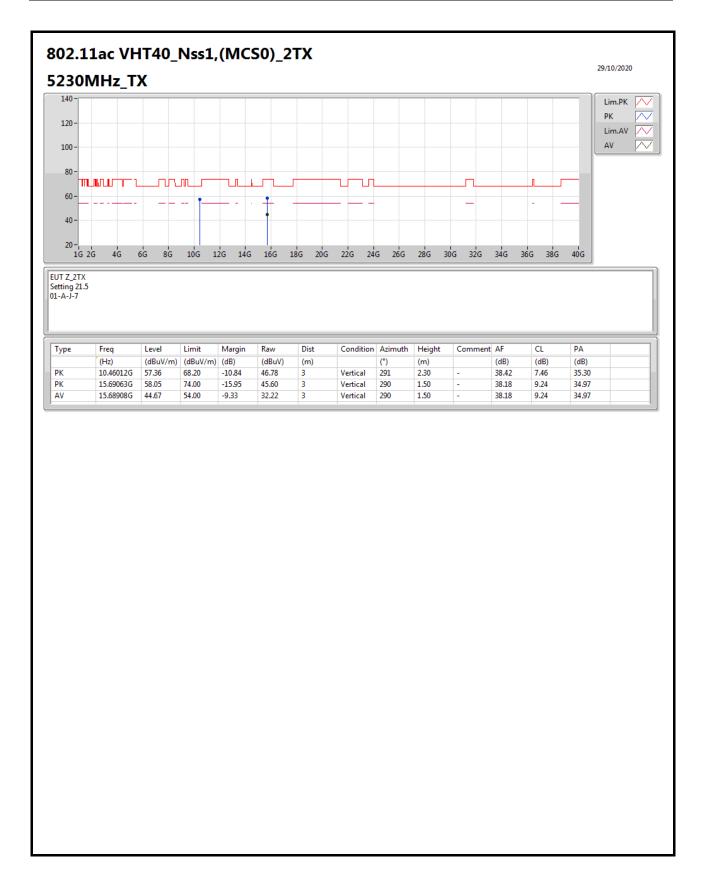




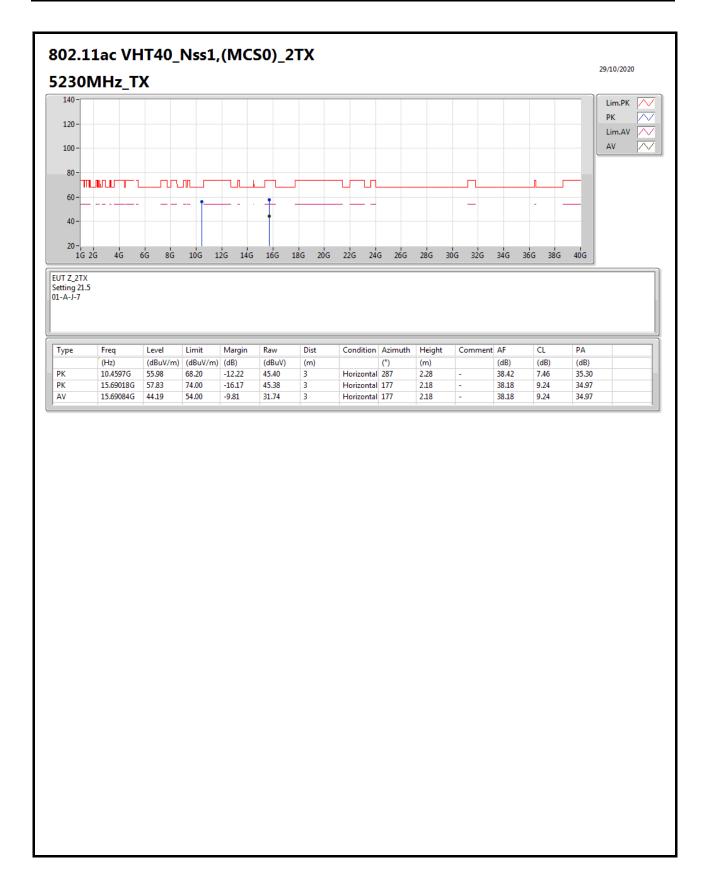




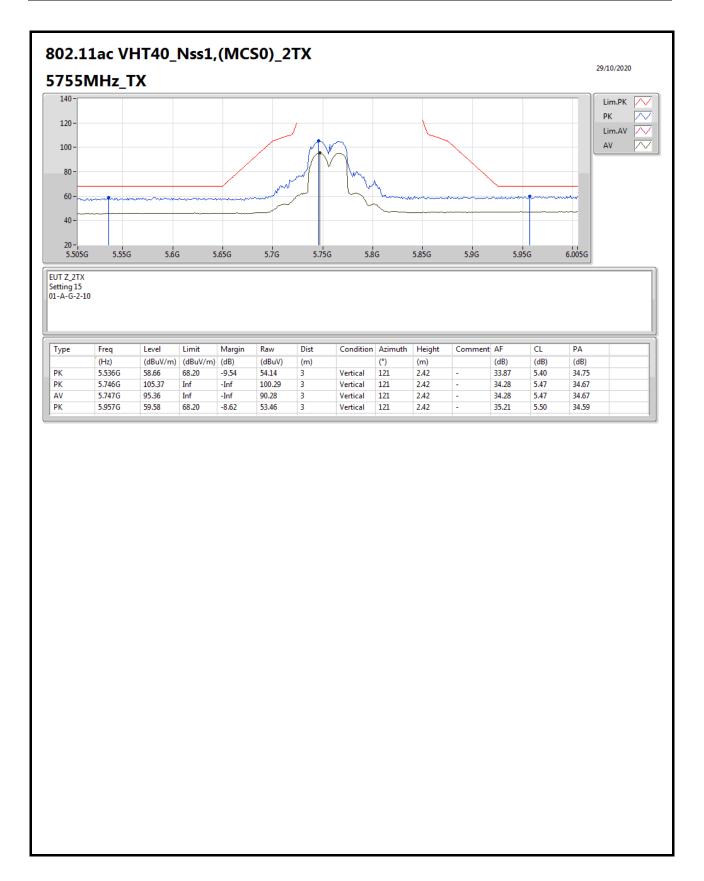




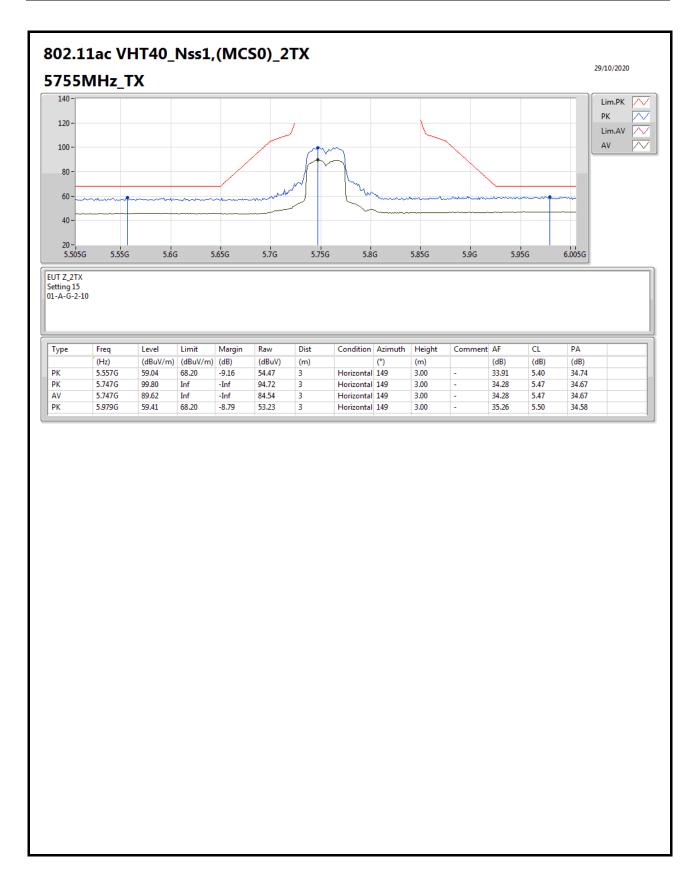




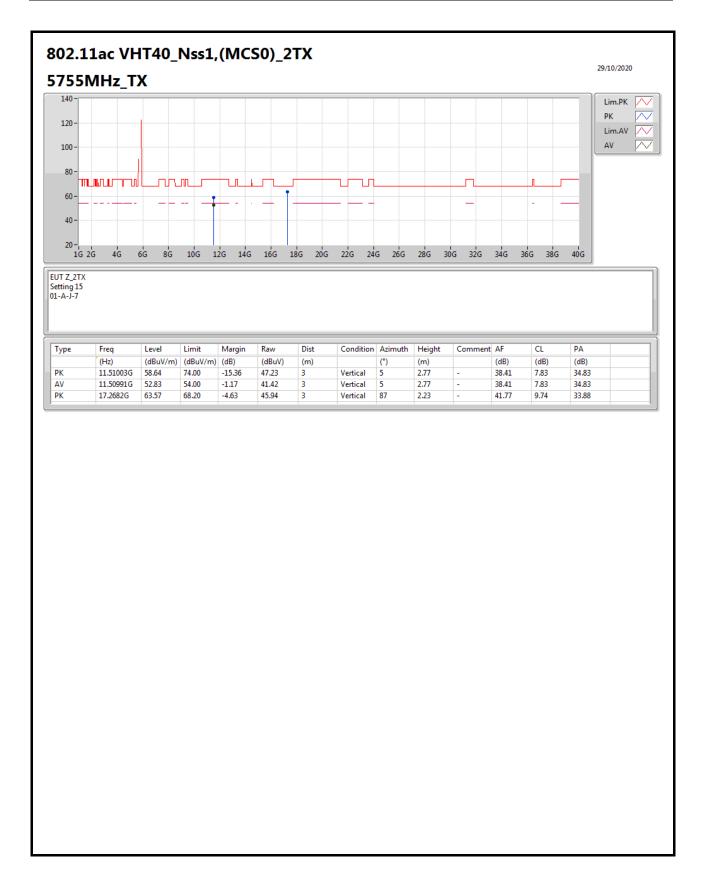




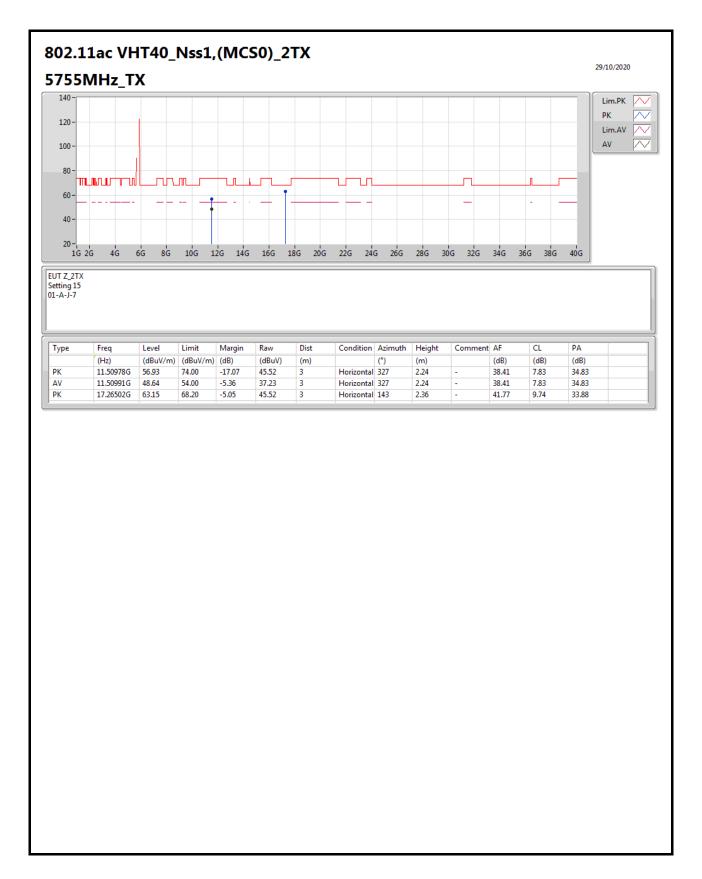






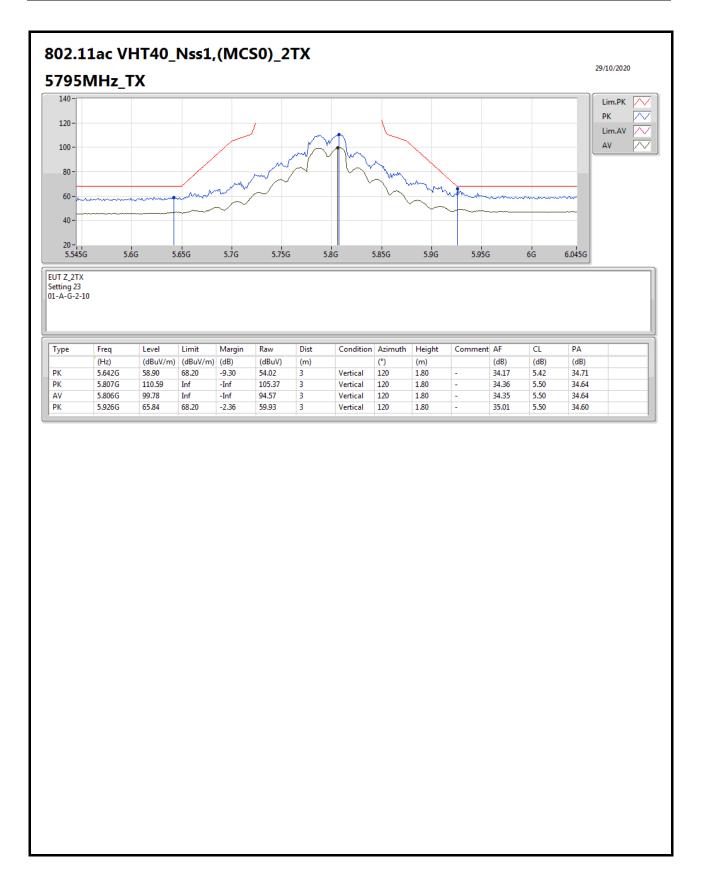




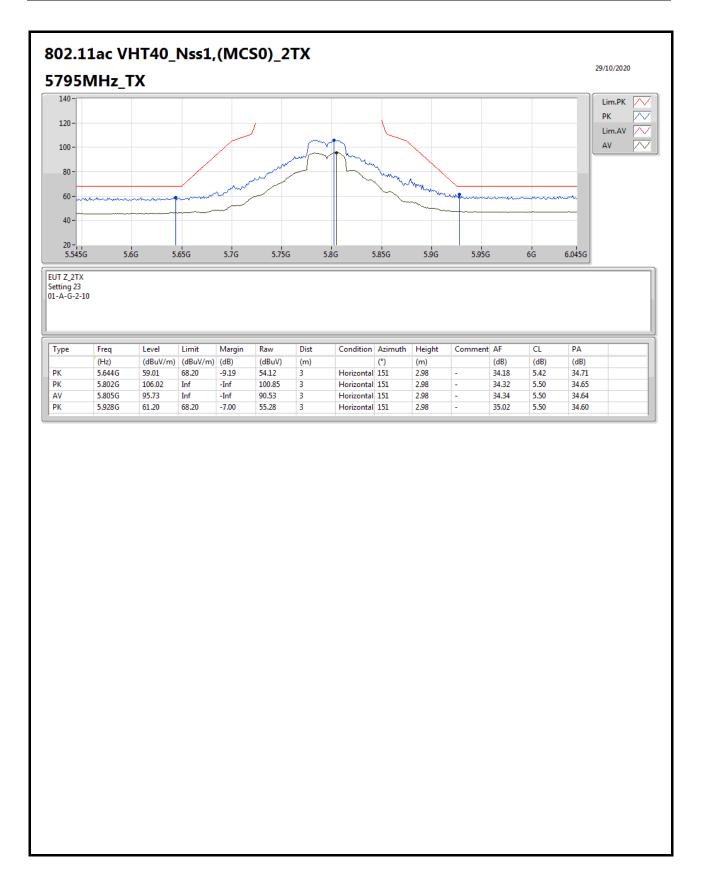


Page No. : 62 of 73

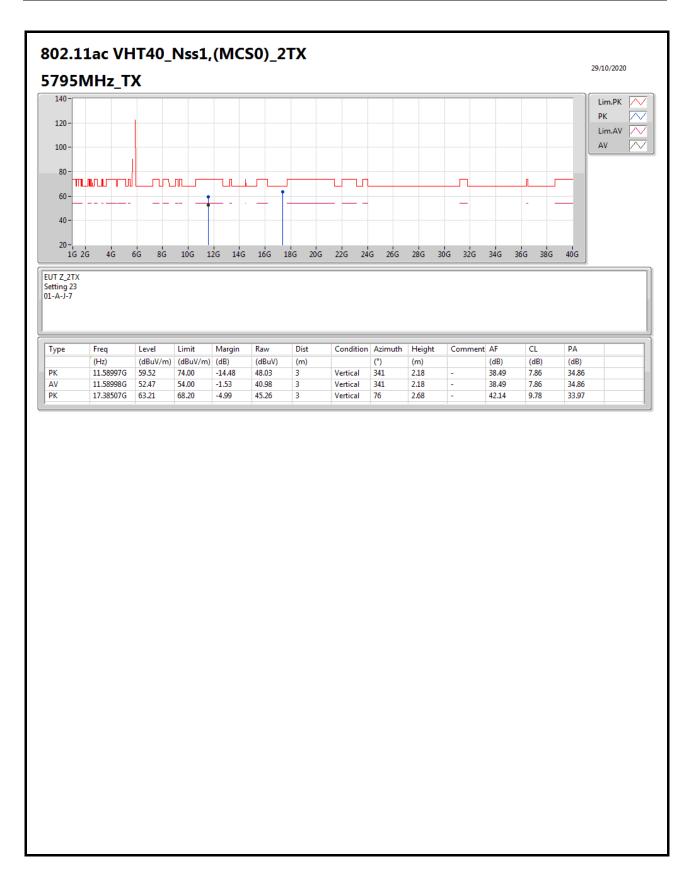




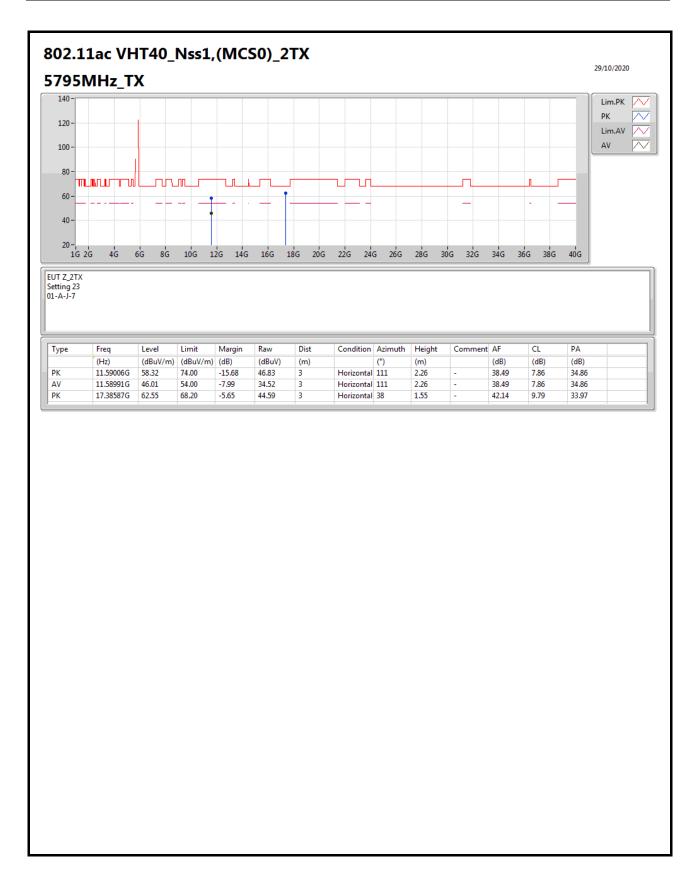




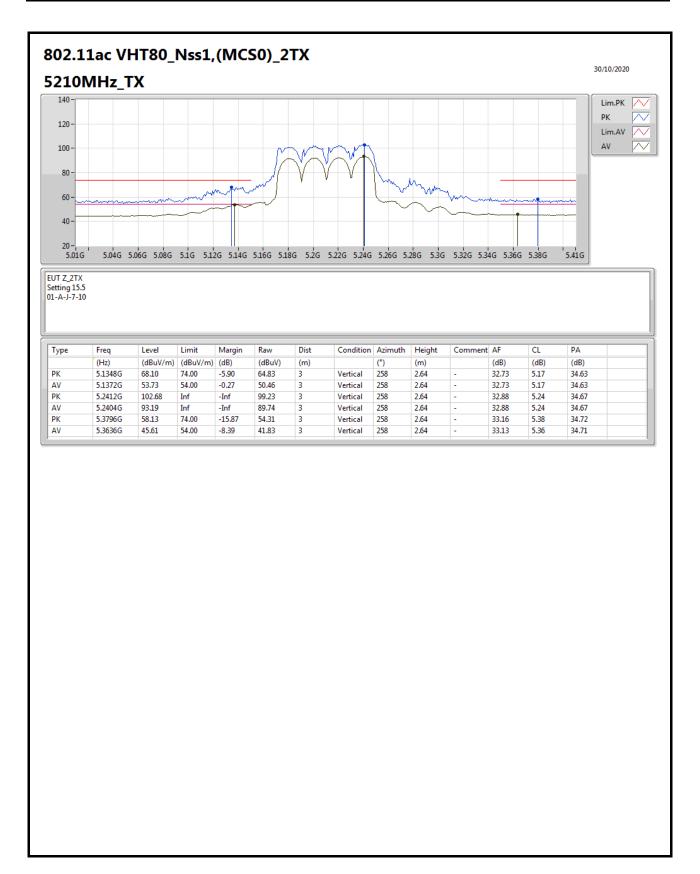




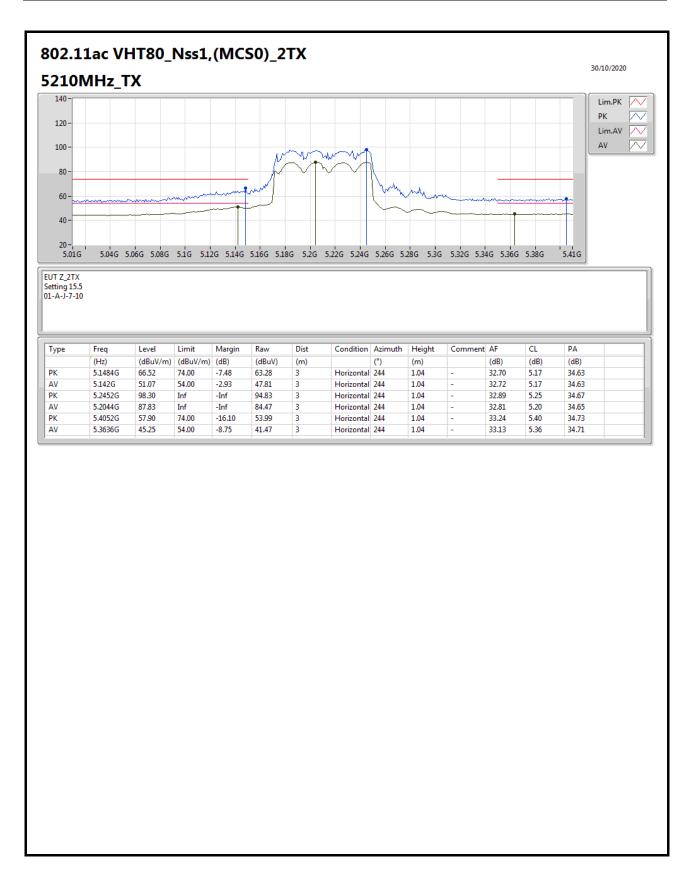






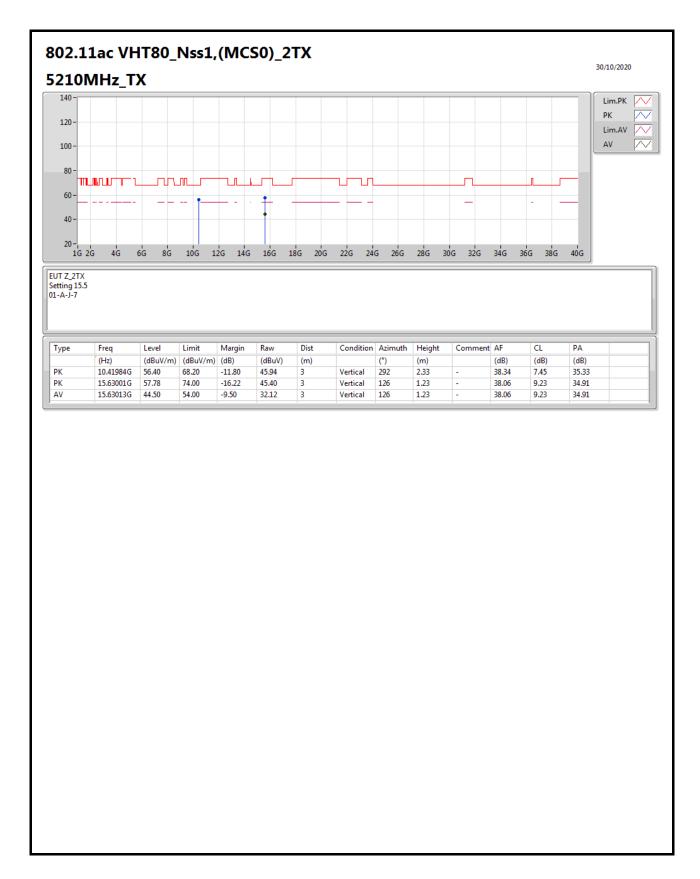




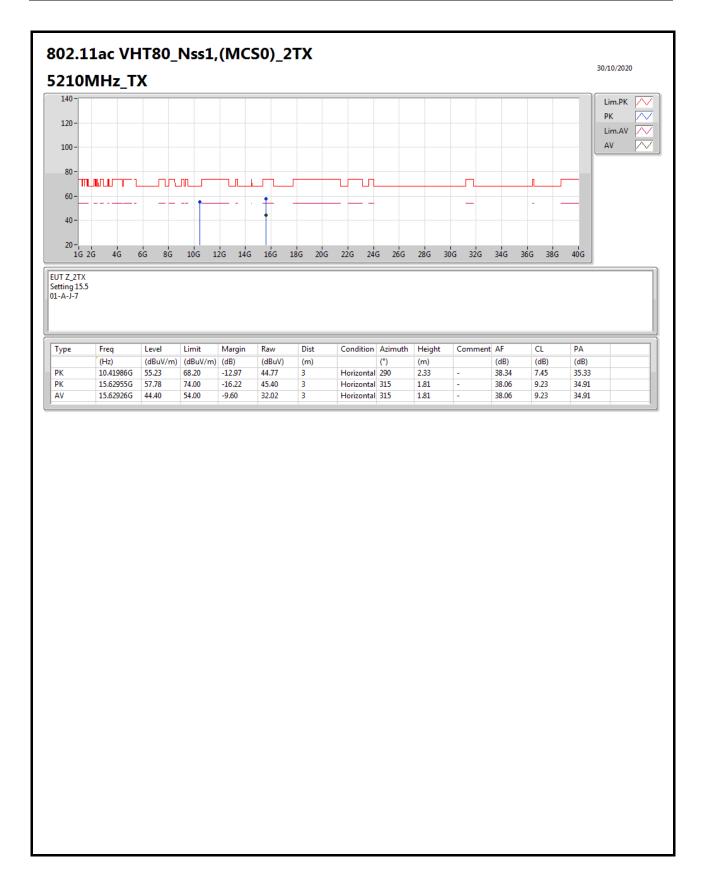


Page No. : 68 of 73









Page No. : 70 of 73



