



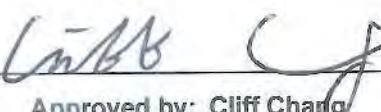
FCC RADIO TEST REPORT

FCC ID : 2ARF9CSG-W1
Equipment : Versa Wireless AP Module for Cloud Services
Gateway Appliances
Brand Name : VERSA NETWORKS
Model Name : CSG-W1
Applicant : Versa Networks
6001 America Center Dr, 4th floor, Suite 400, San
Jose, CA 95002, USA
Manufacturer : Wistron NeWeb Corporation
20 Park Avenue II, Hsinchu Science Park, Hsinchu
308 Taiwan
Standard : 47 CFR FCC Part 15.407

The product was received on Sep. 18, 2018, and testing was started from Sep. 19, 2018 and completed on Oct. 03, 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 variant report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.


Approved by: Cliff Chang

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory
No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)



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History of this test report



Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
1.1.2	15.203	Antenna Requirement	PASS	-
3.1	15.407(a)	Emission Bandwidth	PASS	-
3.2	15.407(a)	Maximum Conducted Output Power	PASS	-
3.3	15.407(a)	Peak Power Spectral Density	PASS	-
3.4	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



1 General Description

1.1 Information

1.1.1 RF General Information

Frequency Range (MHz)	IEEE Std. 802.11	Ch. Frequency (MHz)	Channel Number
5250-5350	a, n (HT20), ac (VHT20)	5260-5320	52-64 [4]
5470-5725		5500-5700	100-140 [11]
5250-5350	n (HT40), ac (VHT40)	5270-5310	54-62 [2]
5470-5725		5510-5670	102-134 [5]
5250-5350	ac (VHT80)	5290	58 [1]
5470-5725		5530-5610	106-122 [2]

Band	Mode	BWch (MHz)	Nant
5.25-5.35GHz	802.11a	20	2TX
5.25-5.35GHz	802.11n HT20	20	2TX
5.25-5.35GHz	802.11ac VHT20	20	2TX
5.25-5.35GHz	802.11n HT40	40	2TX
5.25-5.35GHz	802.11ac VHT40	40	2TX
5.25-5.35GHz	802.11ac VHT80	80	2TX
5.47-5.725GHz	802.11a	20	2TX
5.47-5.725GHz	802.11n HT20	20	2TX
5.47-5.725GHz	802.11ac VHT20	20	2TX
5.47-5.725GHz	802.11n HT40	40	2TX
5.47-5.725GHz	802.11ac VHT40	40	2TX
5.47-5.725GHz	802.11ac VHT80	80	2TX

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.
- 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

Ant.	Port	Brand	P/N	Antenna Type	Connector	cable color	Gain (dBi)
1	1	WIESON	GY121HT0330-016	Dipole Antenna	I-PEX	Gray	Note 1
2	2	WIESON	GY121HT0330-016	Dipole Antenna	I-PEX	Black	

Note 1:

Ant.	Port	Antenna Gain (dBi)		Cable Loss (dB)		True Gain (dBi)	
		2.4G	5G	2.4G	5G	2.4G	5G
1	1	3.10	4.55	0.75	1.61	2.35	2.94
2	2	3.10	4.55	1.00	1.78	2.10	2.77

Note 2: The above information was declared by manufacturer.

The EUT has two antennas.

2.4GHz Functions

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

Port 1 and Port 2 could transmit/receive simultaneously.

5GHz Functions

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

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	0.967	0.146	2.068m	1k
802.11ac VHT20	0.985	0.066	n/a (DC>=0.98)	n/a (DC>=0.98)
802.11ac VHT40	0.97	0.132	2.44m	1k
802.11ac VHT80	0.941	0.264	1.153m	1k

Note:

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

1.1.4 EUT Operational Condition

EUT Power Type	From host system		
Beamforming Function	<input type="checkbox"/>	With beamforming	<input checked="" type="checkbox"/> Without beamforming
Weather Band	<input checked="" type="checkbox"/>	With 5600~5650MHz	<input type="checkbox"/> Without 5600~5650MHz
Function	<input type="checkbox"/>	Outdoor P2M	<input checked="" type="checkbox"/> Indoor P2M
	<input type="checkbox"/>	Fixed P2P	<input type="checkbox"/> Client
TPC Function	<input checked="" type="checkbox"/>	With TPC	<input type="checkbox"/> Without TPC
Test Software Version	QCARCT v3.0.250.0		

Note: The above information was declared by manufacturer.



1.1.5 Table for EUT support function

Function	Support Type	Support Band
AP mode	Master	WLAN 2.4GHz/WLAN 5GHz Band 1~4
Mesh mode	Master	WLAN 2.4GHz/WLAN 5GHz Band 2~3

Note: The above information was declared by manufacturer.

1.1.6 Table for Class II Change

This product is an extension of original one reported under Sporton project number: FR891203-01AB

Below is the table for the change of the product with respect to the original one.

Modifications	Performance Checking
1. Adding 5GHz band 2 and band 3 (5250~5350 MHz, 5470~5725 MHz) for this device.	<ul style="list-style-type: none">1. Emission Bandwidth.2. Maximum Conducted Output Power.3. Peak Power Spectral Density.4. Unwanted Emissions Above 1GHz.
2. Adding mesh mode	It does not affect the test result.



1.2 Testing Applied Standards

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

- ♦ 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				
<input type="checkbox"/>	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		
<input checked="" type="checkbox"/>	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	Caster Chang	20°C / 50%	Sep. 21, 2018~Oct. 01, 218
Radiated	03CH01-CB	Stim Sung	22°C / 54%	Sep. 19, 2018~Oct. 03, 218

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
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%



2 Test Configuration of EUT

2.1 Test Channel Mode

Mode	Power Setting
802.11a_Nss1,(6Mbps)_2TX	-
5260MHz	21.5
5300MHz	21.5
5320MHz	18.5
5500MHz	18
5580MHz	21
5700MHz	16
802.11ac VHT20_Nss1,(MCS0)_2TX	-
5260MHz	21.5
5300MHz	21.5
5320MHz	20
5500MHz	19.5
5580MHz	21
5700MHz	16.5
802.11ac VHT40_Nss1,(MCS0)_2TX	-
5270MHz	20.5
5310MHz	16
5510MHz	15
5550MHz	20.5
5670MHz	17.5
802.11ac VHT80_Nss1,(MCS0)_2TX	-
5290MHz	16.5
5530MHz	16.5
5610MHz	19

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.



2.2 The Worst Case Measurement Configuration

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	CTX
The EUT was performed at X axis, Y axis and Z axis position. The worst case was found at Y axis, so it was selected to perform test and its test result was written in the report.	
1	Place EUT in Y axis

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.: FA891203-02 for Co-location RF Exposure Evaluation.	

Note : The Adapter below is for measurement only, would not be marketed.

The Adapter information as below:

Support Unit	Brand	Model Number
Adapter	I.T.E	F24W5-120200SPAU



2.3 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

2.4 Accessories

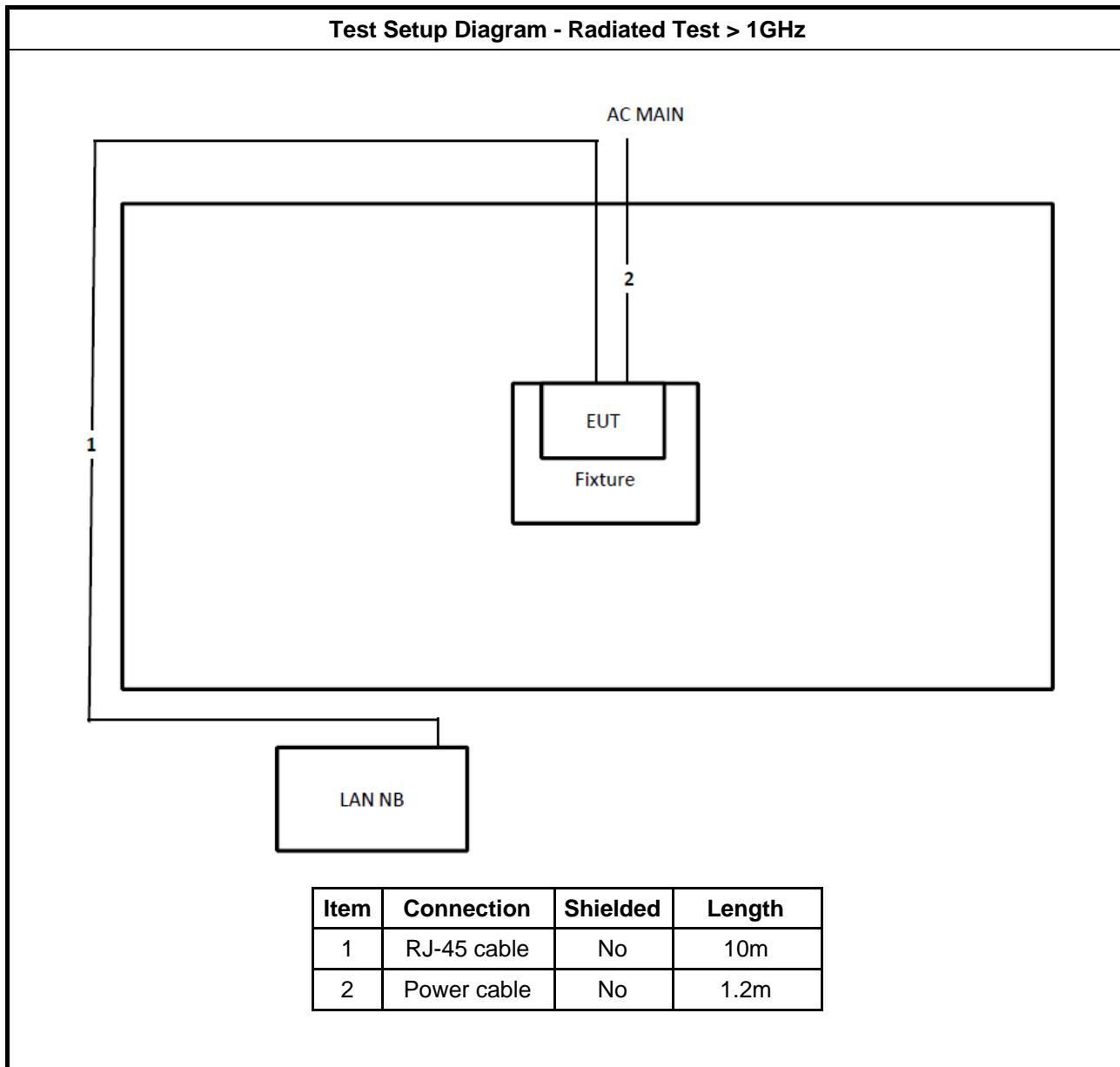
N/A

2.5 Support Equipment

Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID
1	NB	DELL	E4300	N/A
2	Fixture	WNC	48RAAAA2.SGA	N/A
3	Adapter	I.T.E	F24W5-120200SPAU	N/A



2.6 Test Setup Diagram





3 Transmitter Test Result

3.1 Emission Bandwidth

3.1.1 Emission Bandwidth Limit

Emission Bandwidth Limit	
UNII Devices	
<input type="checkbox"/>	For the 5.15-5.25 GHz band, N/A
<input checked="" type="checkbox"/>	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.
<input checked="" type="checkbox"/>	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.
<input type="checkbox"/>	For the 5.725-5.85 GHz band, 6 dB emission bandwidth \geq 500kHz.
LE-LAN Devices	
<input type="checkbox"/>	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.
<input type="checkbox"/>	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
<input type="checkbox"/>	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
<input type="checkbox"/>	For the 5.725-5.85 GHz band, 6 dB emission bandwidth \geq 500kHz.

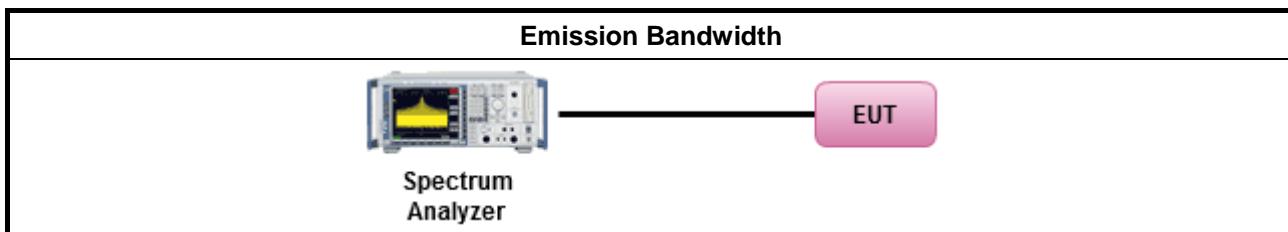
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

Test Method	
▪ For the emission bandwidth shall be measured using one of the options below:	
<input checked="" type="checkbox"/>	Refer as FCC KDB 789033, clause C for EBW and clause D for OBW measurement.
<input type="checkbox"/>	Refer as ANSI C63.10, clause 6.9.1 for occupied bandwidth testing.
<input type="checkbox"/>	Refer as IC RSS-Gen, clause 4.6 for bandwidth testing.

3.1.4 Test Setup





3.1.5 Test Result of Emission Bandwidth

Refer as Appendix A



3.2 Maximum Conducted Output Power

3.2.1 Maximum Conducted Output Power Limit

Maximum Conducted Output Power Limit	
UNII Devices	
<input type="checkbox"/> For the 5.15-5.25 GHz band:	<ul style="list-style-type: none">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 ≤ 125 mW [21 dBm]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 $P_{Out} = 24 - (G_{TX} - 6)$.
<input checked="" type="checkbox"/> 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 $P_{Out} = 24 - (G_{TX} - 6)$.	
<input checked="" type="checkbox"/> 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 $P_{Out} = 24 - (G_{TX} - 6)$.	
<input type="checkbox"/> For the 5.725-5.85 GHz band:	<ul style="list-style-type: none">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	
<input type="checkbox"/> 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.	
<input type="checkbox"/> 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	
<input type="checkbox"/> 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	
<input type="checkbox"/> For the 5.725-5.85 GHz band:	<ul style="list-style-type: none">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.
P_{Out} = maximum conducted output power in dBm, G_{TX} = the maximum transmitting antenna directional gain in dBi.	



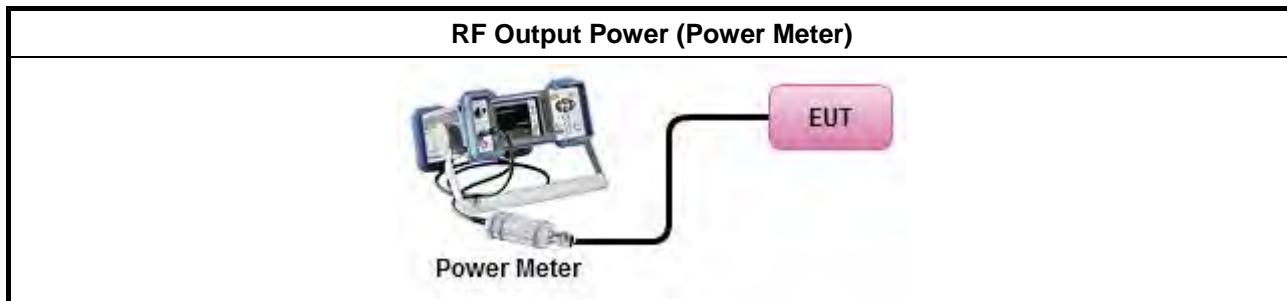
3.2.2 Measuring Instruments

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

3.2.3 Test Procedures

Test Method	
▪ Maximum Conducted Output Power	
	Average over on/off periods with duty factor
	<input type="checkbox"/> Refer as FCC KDB 789033, clause E Method SA-2 (spectral trace averaging).
	<input type="checkbox"/> 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
	<input checked="" type="checkbox"/> Refer as FCC KDB 789033, clause E Method PM-G (using an RF average power meter).
▪ For conducted measurement.	
	<ul style="list-style-type: none">▪ If the EUT supports multiple transmit chains using options given below: Refer as FCC KDB 662911, In-band power measurements. Using the measure-and-sum approach, measured all transmit ports individually. Sum the power (in linear power units e.g., mW) of all ports for each individual sample and save them.▪ If multiple transmit chains, EIRP calculation could be following as methods: $P_{total} = P_1 + P_2 + \dots + P_n$ (calculated in linear unit [mW] and transfer to log unit [dBm]) $EIRP_{total} = P_{total} + DG$

3.2.4 Test Setup



3.2.5 Test Result of Maximum Conducted Output Power

Refer as Appendix B



3.3 Peak Power Spectral Density

3.3.1 Peak Power Spectral Density Limit

Peak Power Spectral Density Limit	
UNII Devices	
<input type="checkbox"/> For the 5.15-5.25 GHz band:	<ul style="list-style-type: none">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 $PPSD = 11 - (G_{TX} - 6)$.
<input checked="" type="checkbox"/> For the 5.25-5.35 GHz band, the peak power spectral density (PPSD) ≤ 11 dBm/MHz. If $G_{TX} > 6$ dBi, then $PPSD = 11 - (G_{TX} - 6)$.	
<input checked="" type="checkbox"/> For the 5.47-5.725 GHz band, the peak power spectral density (PPSD) ≤ 11 dBm/MHz. If $G_{TX} > 6$ dBi, then $PPSD = 11 - (G_{TX} - 6)$.	
<input type="checkbox"/> For the 5.725-5.85 GHz band:	<ul style="list-style-type: none">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	
<input type="checkbox"/> For the 5.15-5.25 GHz band, the e.i.r.p. peak power spectral density (PPSD) ≤ 10 dBm/MHz.	
<input type="checkbox"/> For the 5.25-5.35 GHz band, the peak power spectral density (PPSD) ≤ 11 dBm/MHz.	
<input type="checkbox"/> For the 5.47-5.6 GHz band and 5.65-5.725 GHz band, the peak power spectral density (PPSD) ≤ 11 dBm/MHz.	<ul style="list-style-type: none">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 $0^\circ \leq \theta < 8^\circ$; -13 - 0.716 (θ-8) dBW/MHz for $8^\circ \leq \theta < 40^\circ$ -35.9 - 1.22 (θ-40) dBW/MHz for $40^\circ \leq \theta \leq 45^\circ$; -42 dBW/MHz for $\theta > 45^\circ$
<input type="checkbox"/> For the 5.725-5.85 GHz band:	<ul style="list-style-type: none">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.
PPSD = peak power spectral density that the 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.	



3.3.2 Measuring Instruments

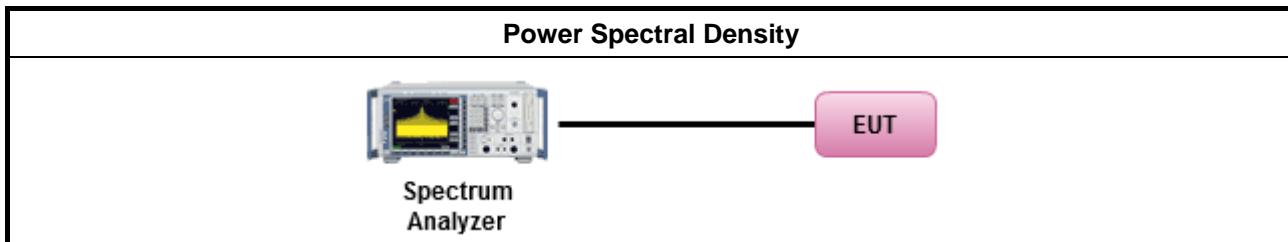
Refer a test equipment and calibration data table in this test report.

3.3.3 Test Procedures

Test Method	
<ul style="list-style-type: none">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:	
<p><input type="checkbox"/> Refer as FCC KDB 789033, F5) power spectral density can be measured using resolution bandwidths < 1 MHz provided that the results are integrated over 1 MHz bandwidth</p> <p>[duty cycle \geq 98% or external video / power trigger]</p> <p><input checked="" type="checkbox"/> Refer as FCC KDB 789033, clause E Method SA-1 (spectral trace averaging).</p> <p><input type="checkbox"/> Refer as FCC KDB 789033, clause E Method SA-1 Alt. (RMS detection with slow sweep speed)</p> <p>duty cycle $<$ 98% and average over on/off periods with duty factor</p> <p><input checked="" type="checkbox"/> Refer as FCC KDB 789033, clause E Method SA-2 (spectral trace averaging).</p> <p><input type="checkbox"/> Refer as FCC KDB 789033, clause E Method SA-2 Alt. (RMS detection with slow sweep speed)</p>	
<ul style="list-style-type: none">For conducted measurement.	
<ul style="list-style-type: none">If the EUT supports multiple transmit chains using options given below:	
	<p><input checked="" type="checkbox"/> 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.</p> <p><input type="checkbox"/> 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,</p> <p><input type="checkbox"/> 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.</p>
	<ul style="list-style-type: none">If multiple transmit chains, EIRP PPSD calculation could be following as methods: $PPSD_{total} = PPSD_1 + PPSD_2 + \dots + PPSD_n$ (calculated in linear unit [mW] and transfer to log unit [dBm]) $EIRP_{total} = PPSD_{total} + DG$



3.3.4 Test Setup



3.3.5 Test Result of Peak Power Spectral Density

Refer as Appendix C



3.4 Unwanted Emissions

3.4.1 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

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
<input type="checkbox"/> 5.15 - 5.25 GHz	e.i.r.p. -27 dBm [68.2 dBuV/m@3m]
<input checked="" type="checkbox"/> 5.25 - 5.35 GHz	e.i.r.p. -27 dBm [68.2 dBuV/m@3m]
<input checked="" type="checkbox"/> 5.47 - 5.725 GHz	e.i.r.p. -27 dBm [68.2 dBuV/m@3m]
<input type="checkbox"/> 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 linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).



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

3.4.2 Measuring Instruments

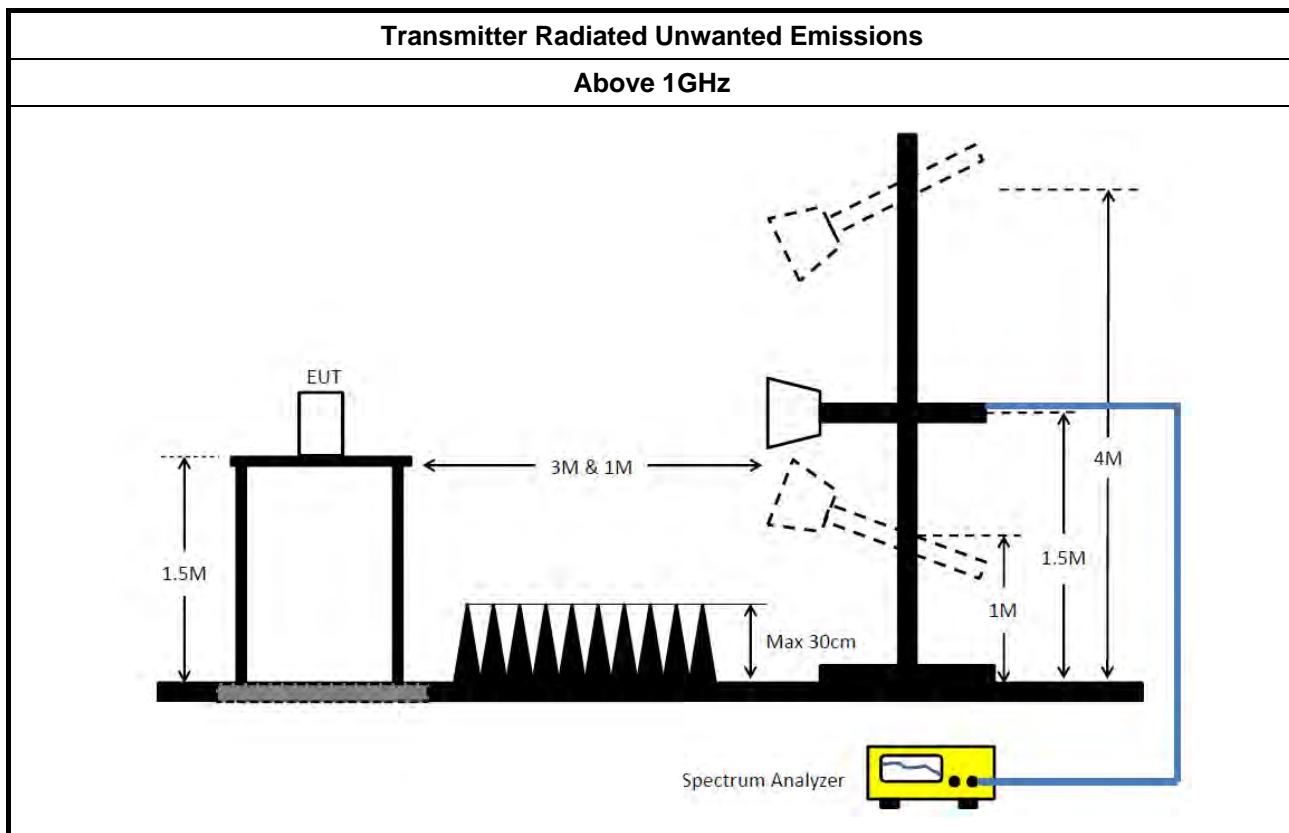
Refer a test equipment and calibration data table in this test report.

3.4.3 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 \geq 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.
	<input type="checkbox"/> Refer as FCC KDB 789033, H)6) Method AD (Trace Averaging).
	<input checked="" type="checkbox"/> Refer as FCC KDB 789033, H)6) Method VB (Reduced VBW).
	<input type="checkbox"/> Refer as ANSI C63.10, clause 4.2.3.2.3 (Reduced VBW). $VBW \geq 1/T$, where T is pulse time.
	<input type="checkbox"/> Refer as ANSI C63.10, clause 4.2.3.2.4 average value of pulsed emissions.
	<input checked="" type="checkbox"/> Refer as FCC KDB 789033, clause H)5) measurement procedure peak limit.
	<input type="checkbox"/> 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.	



3.4.4 Test Setup



3.4.5 Test Result of Transmitter Unwanted Emissions

Refer as Appendix D



4 Test Equipment and Calibration Data

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
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	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)
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+17	N/A	1 GHz ~ 18 GHz	Oct. 11, 2017	Oct. 10, 2018	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)
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-07	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. 11, 2017	Oct. 10, 2018	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-10	1 GHz ~26.5 GHz	Oct. 11, 2017	Oct. 10, 2018	Conducted (TH01-CB)
Power Sensor	Agilent	U2021XA	MY53410001	50MHz~18GHz	Nov. 20, 2017	Nov. 19, 2018	Conducted (TH01-CB)

Note: Calibration Interval of instruments listed above is one year.



EBW Result

Appendix A

Summary

Mode	Max-N dB (Hz)	Max-OBW (Hz)	ITU-Code	Min-N dB (Hz)	Min-OBW (Hz)
5.25-5.35GHz	-	-	-	-	-
802.11a_Nss1,(6Mbps)_2TX	39.625M	18.566M	18M6D1D	21.125M	16.417M
802.11ac VHT20_Nss1,(MCS0)_2TX	43.525M	18.891M	18M9D1D	29.9M	17.716M
802.11ac VHT40_Nss1,(MCS0)_2TX	80.1M	36.532M	36M5D1D	39.55M	35.932M
802.11ac VHT80_Nss1,(MCS0)_2TX	84.7M	75.762M	75M8D1D	84.4M	75.662M
5.47-5.725GHz	-	-	-	-	-
802.11a_Nss1,(6Mbps)_2TX	36.35M	17.141M	17M1D1D	18.975M	16.392M
802.11ac VHT20_Nss1,(MCS0)_2TX	40.025M	18.091M	18M1D1D	19.775M	17.616M
802.11ac VHT40_Nss1,(MCS0)_2TX	81.25M	36.832M	36M8D1D	39.65M	35.932M
802.11ac VHT80_Nss1,(MCS0)_2TX	85M	75.962M	76M0D1D	84.5M	75.662M

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;



EBW Result

Appendix A

Result

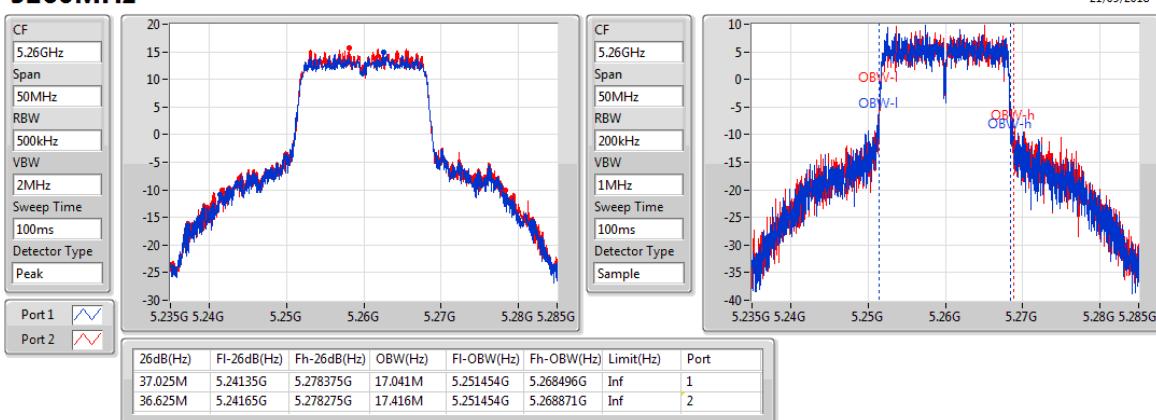
Mode	Result	Limit (Hz)	Port 1-N dB (Hz)	Port 1-OBW (Hz)	Port 2-N dB (Hz)	Port 2-OBW (Hz)
802.11a_Nss1,(6Mbps)_2TX	-	-	-	-	-	-
5260MHz	Pass	Inf	37.025M	17.041M	36.625M	17.416M
5300MHz	Pass	Inf	37.85M	17.566M	39.625M	18.566M
5320MHz	Pass	Inf	21.25M	16.417M	21.125M	16.442M
5500MHz	Pass	Inf	19.15M	16.417M	20.975M	16.442M
5580MHz	Pass	Inf	34.675M	16.667M	36.35M	17.141M
5700MHz	Pass	Inf	19.15M	16.417M	18.975M	16.392M
802.11ac VHT20_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5260MHz	Pass	Inf	42.675M	18.091M	42.45M	18.241M
5300MHz	Pass	Inf	42.675M	18.366M	43.525M	18.891M
5320MHz	Pass	Inf	29.9M	17.741M	33.15M	17.716M
5500MHz	Pass	Inf	22.175M	17.641M	29.675M	17.716M
5580MHz	Pass	Inf	36.425M	17.816M	40.025M	18.091M
5700MHz	Pass	Inf	19.775M	17.616M	19.85M	17.616M
802.11ac VHT40_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5270MHz	Pass	Inf	80.1M	36.532M	76.5M	36.432M
5310MHz	Pass	Inf	39.55M	35.982M	39.75M	35.932M
5510MHz	Pass	Inf	39.7M	35.932M	39.65M	35.982M
5550MHz	Pass	Inf	72.3M	36.282M	81.25M	36.832M
5670MHz	Pass	Inf	40.05M	35.932M	40.05M	35.982M
802.11ac VHT80_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5290MHz	Pass	Inf	84.4M	75.762M	84.7M	75.662M
5530MHz	Pass	Inf	84.8M	75.662M	84.7M	75.762M
5610MHz	Pass	Inf	85M	75.962M	84.5M	75.862M

Port X-N dB = Port X 6dB down bandwidth for 5.725-5.85GHz band / 26dB down bandwidth for other band

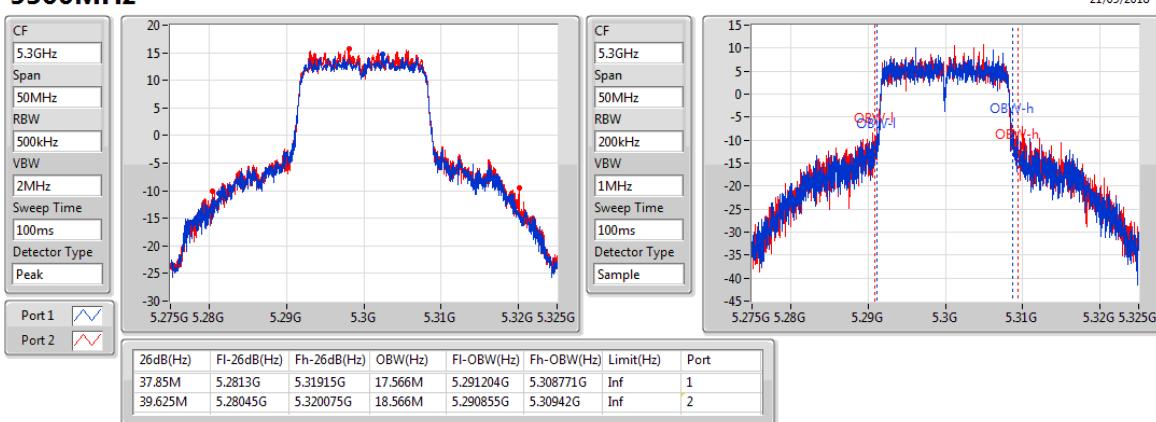
Port X-OBW = Port X 99% occupied bandwidth;

802.11a_Nss1,(6Mbps)_2TX
EBW
5260MHz

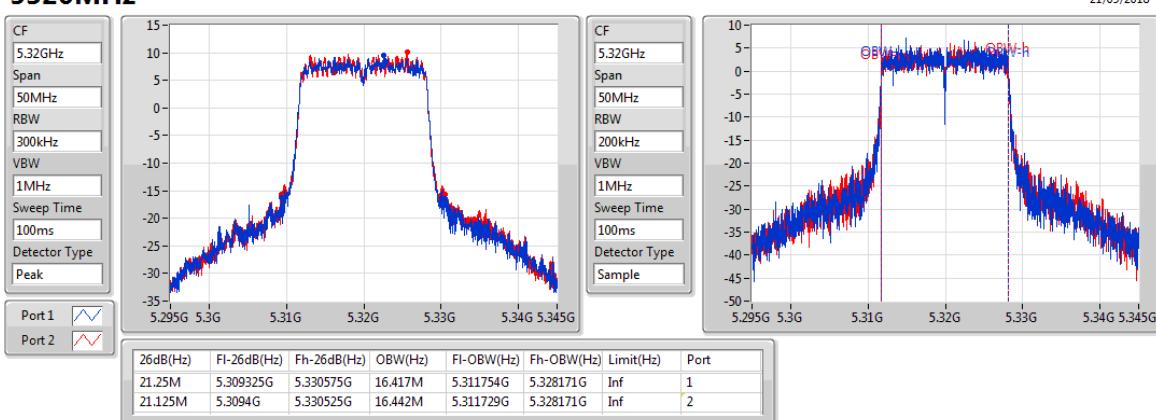
21/09/2018


802.11a_Nss1,(6Mbps)_2TX
EBW
5300MHz

21/09/2018

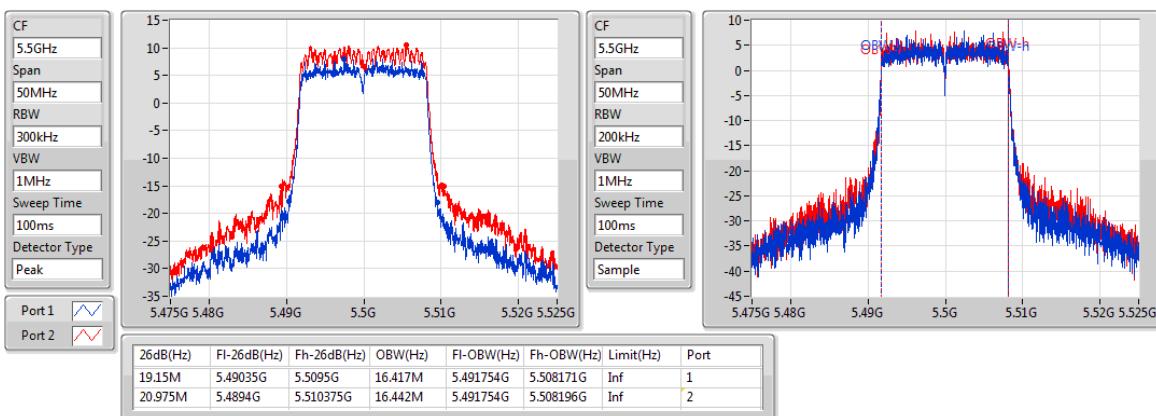

802.11a_Nss1,(6Mbps)_2TX
EBW
5320MHz

21/09/2018

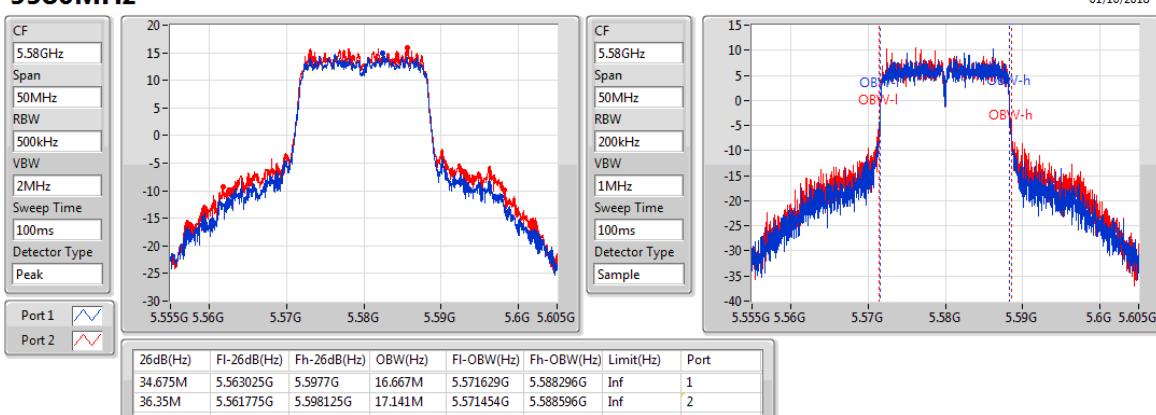


802.11a_Nss1,(6Mbps)_2TX
EBW
5500MHz

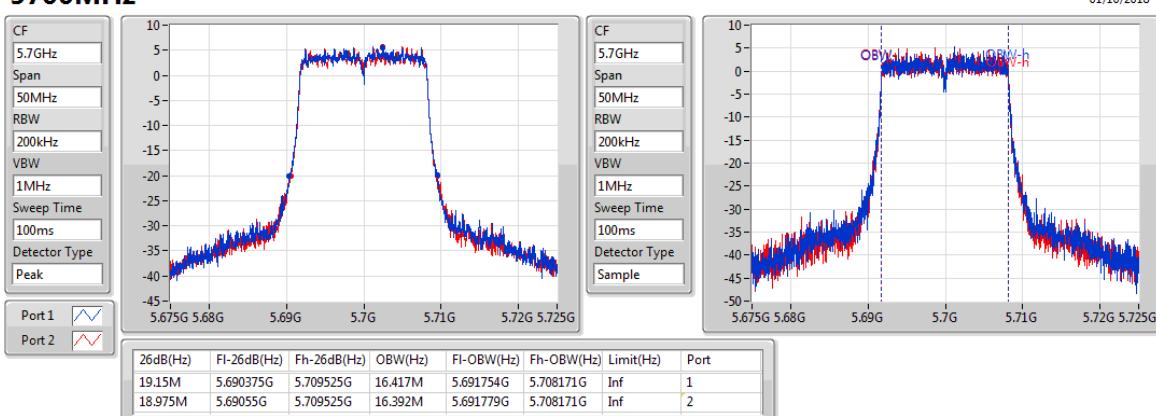
01/10/2018

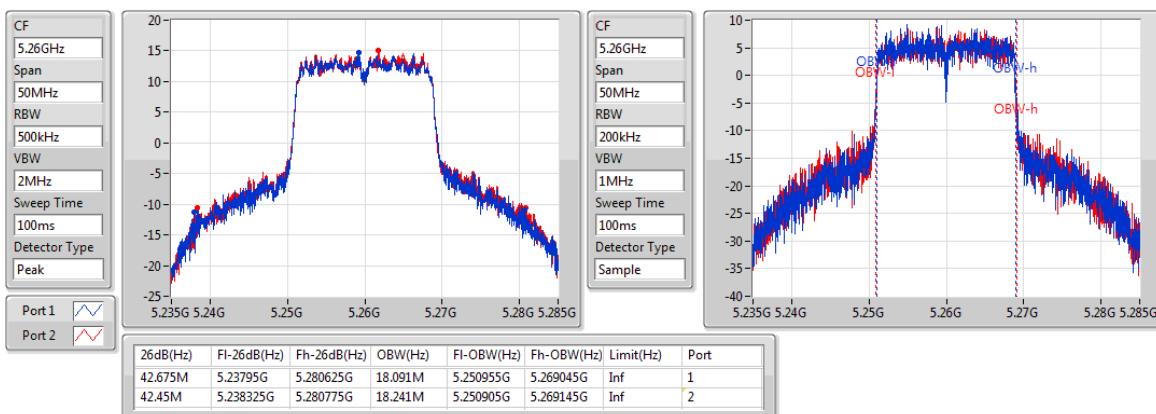
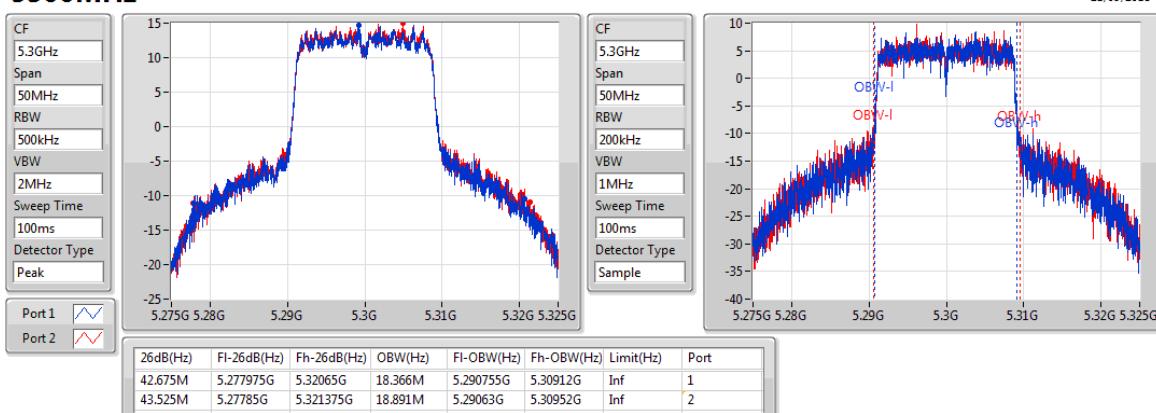
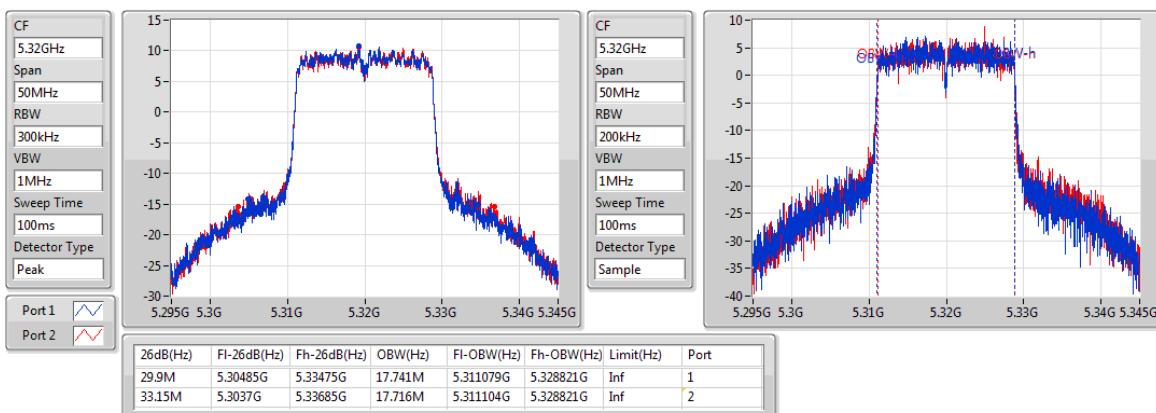

802.11a_Nss1,(6Mbps)_2TX
EBW
5580MHz

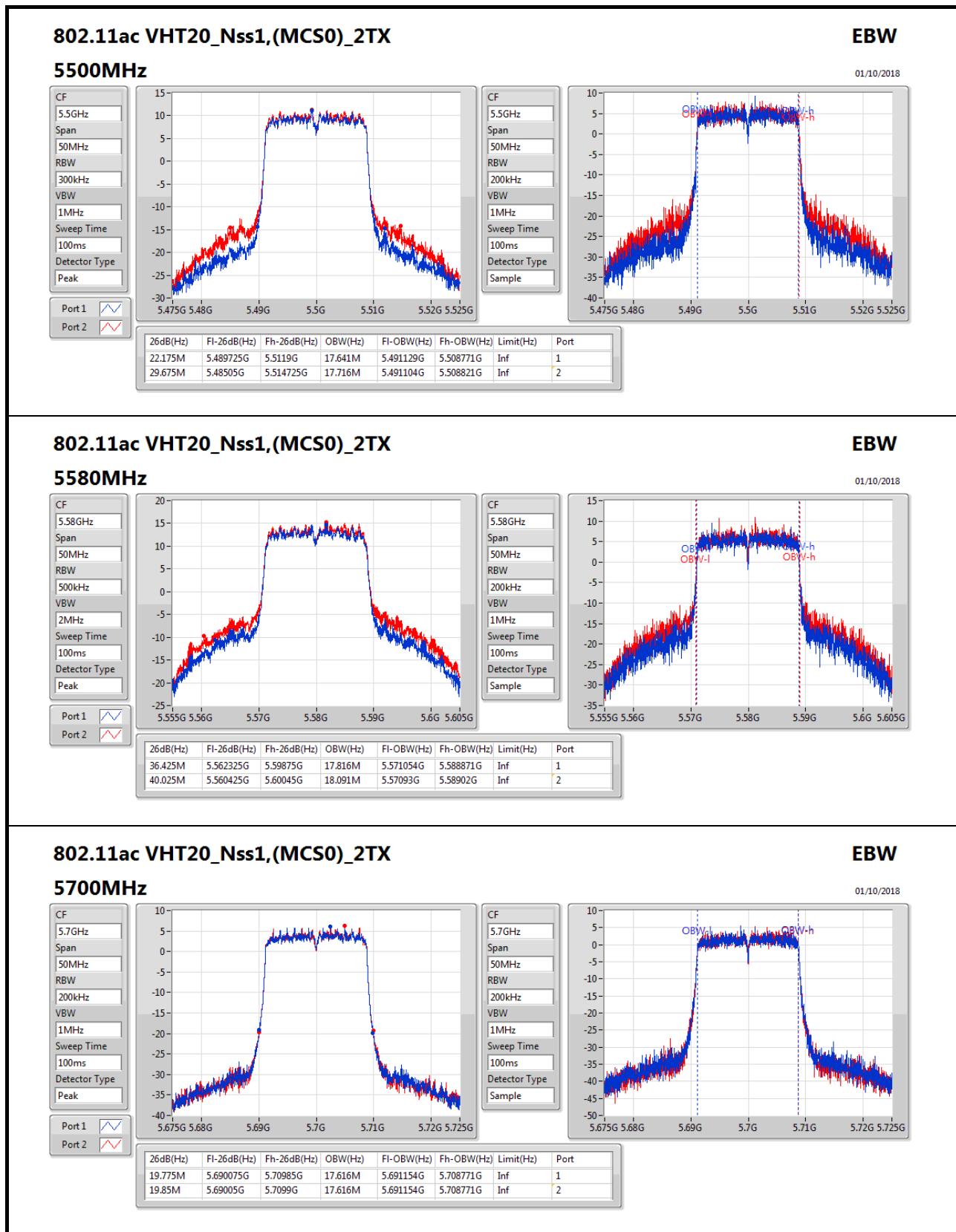
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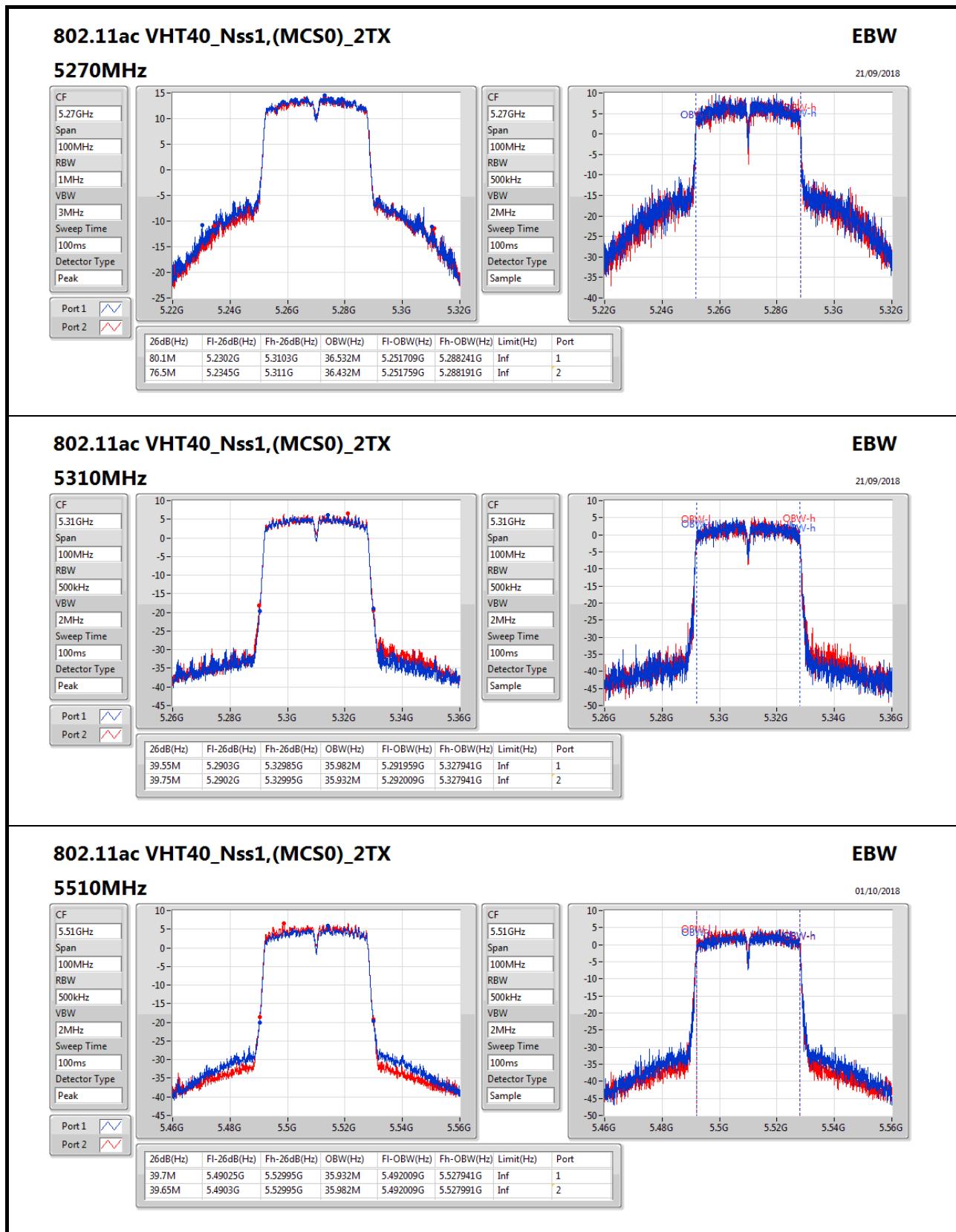

802.11a_Nss1,(6Mbps)_2TX
EBW
5700MHz

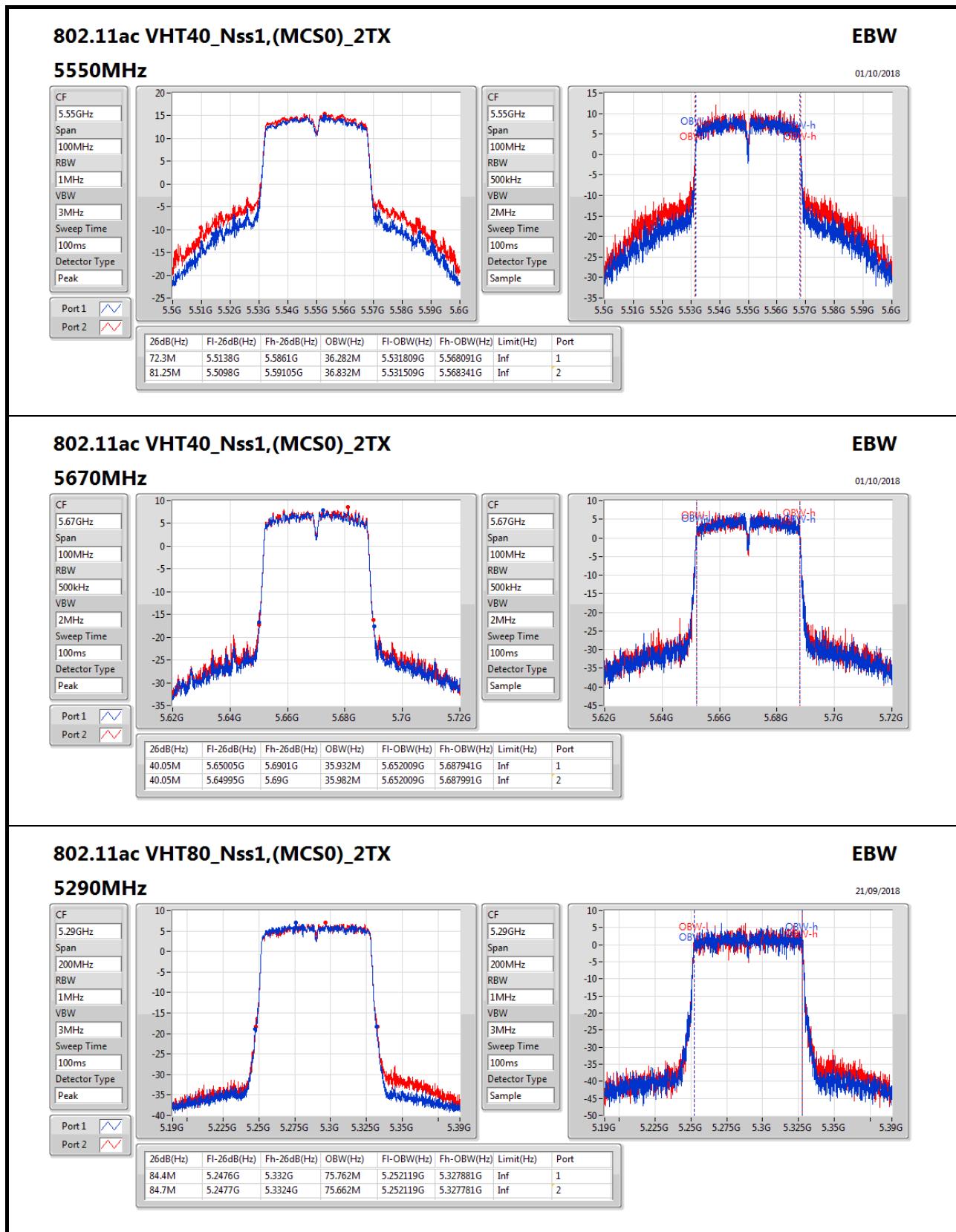
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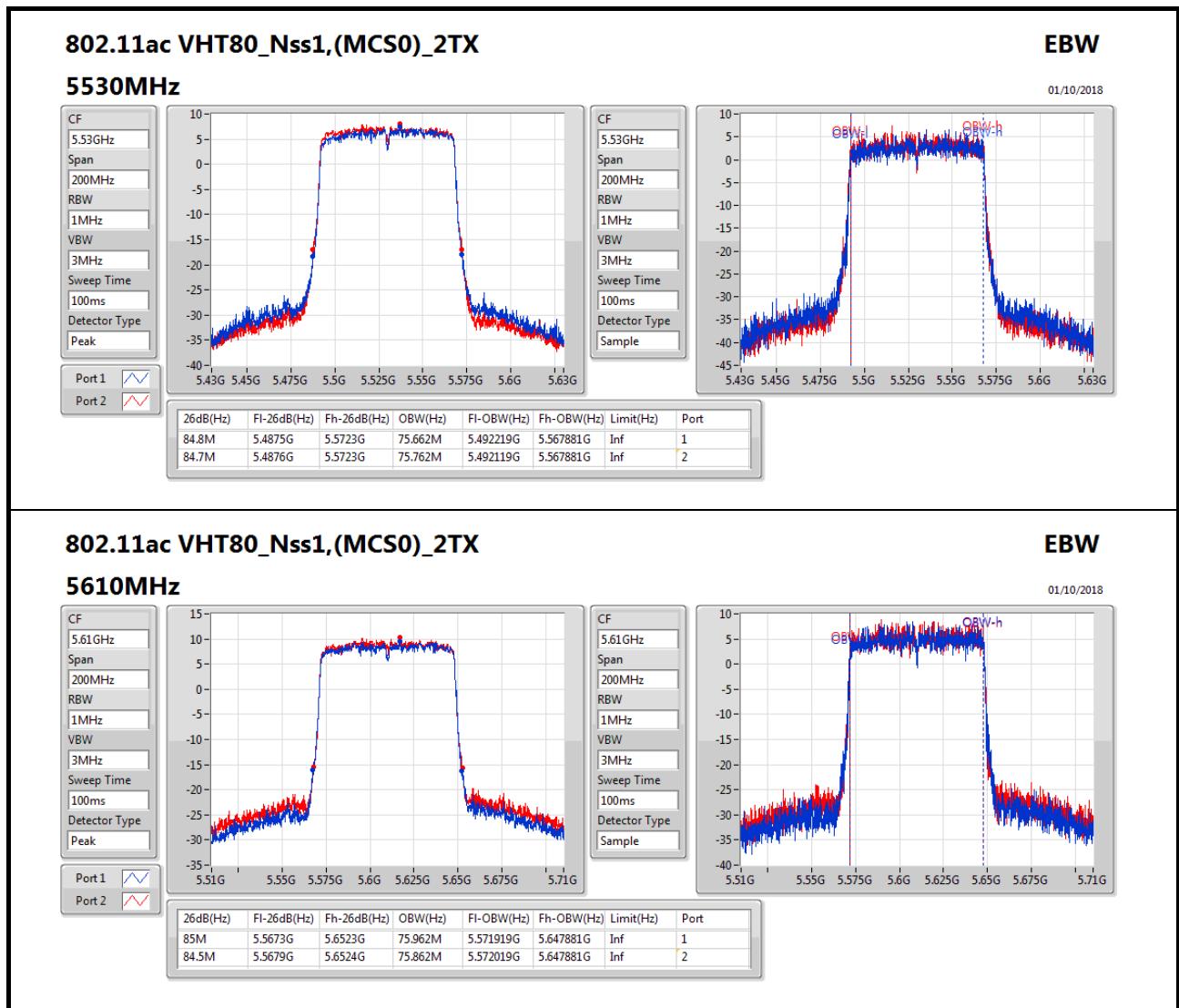


802.11ac VHT20_Nss1,(MCS0)_2TX
EBW
5260MHz

802.11ac VHT20_Nss1,(MCS0)_2TX
EBW
5300MHz

802.11ac VHT20_Nss1,(MCS0)_2TX
EBW
5320MHz












Power Result

Appendix B

Summary

Mode	Total Power (dBm)	Total Power (W)
5.25-5.35GHz	-	-
802.11a_Nss1,(6Mbps)_2TX	23.63	0.23067
802.11ac VHT20_Nss1,(MCS0)_2TX	23.68	0.23335
802.11ac VHT40_Nss1,(MCS0)_2TX	23.27	0.21232
802.11ac VHT80_Nss1,(MCS0)_2TX	18.86	0.07691
5.47-5.725GHz	-	-
802.11a_Nss1,(6Mbps)_2TX	23.85	0.24266
802.11ac VHT20_Nss1,(MCS0)_2TX	23.63	0.23067
802.11ac VHT40_Nss1,(MCS0)_2TX	23.74	0.23659
802.11ac VHT80_Nss1,(MCS0)_2TX	21.87	0.15382



Power Result

Appendix B

Result

Mode	Result	DG (dBi)	Port 1 (dBm)	Port 2 (dBm)	Total Power (dBm)	Power Limit (dBm)
802.11a_Nss1,(6Mbps)_2TX	-	-	-	-	-	-
5260MHz	Pass	2.94	20.58	20.66	23.63	23.98
5300MHz	Pass	2.94	20.55	20.67	23.62	23.98
5320MHz	Pass	2.94	18.05	18.10	21.09	23.98
5500MHz	Pass	2.94	18.34	18.71	21.54	23.82
5580MHz	Pass	2.94	20.66	21.02	23.85	23.98
5700MHz	Pass	2.94	16.07	16.11	19.10	23.78
802.11ac VHT20_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5260MHz	Pass	2.94	20.57	20.73	23.66	23.98
5300MHz	Pass	2.94	20.59	20.75	23.68	23.98
5320MHz	Pass	2.94	19.41	19.47	22.45	23.98
5500MHz	Pass	2.94	19.46	19.88	22.69	23.98
5580MHz	Pass	2.94	20.45	20.79	23.63	23.98
5700MHz	Pass	2.94	16.56	16.72	19.65	23.96
802.11ac VHT40_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5270MHz	Pass	2.94	20.36	20.15	23.27	23.98
5310MHz	Pass	2.94	15.97	16.01	19.00	23.98
5510MHz	Pass	2.94	15.32	15.63	18.49	23.98
5550MHz	Pass	2.94	20.56	20.89	23.74	23.98
5670MHz	Pass	2.94	17.68	17.88	20.79	23.98
802.11ac VHT80_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5290MHz	Pass	2.94	15.82	15.88	18.86	23.98
5530MHz	Pass	2.94	16.21	16.67	19.46	23.98
5610MHz	Pass	2.94	18.63	19.08	21.87	23.98

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

**Summary**

Mode	PD (dBm/RBW)
5.25-5.35GHz	-
802.11a_Nss1,(6Mbps)_2TX	10.64
802.11ac VHT20_Nss1,(MCS0)_2TX	10.35
802.11ac VHT40_Nss1,(MCS0)_2TX	7.30
802.11ac VHT80_Nss1,(MCS0)_2TX	-0.60
5.47-5.725GHz	-
802.11a_Nss1,(6Mbps)_2TX	10.77
802.11ac VHT20_Nss1,(MCS0)_2TX	10.43
802.11ac VHT40_Nss1,(MCS0)_2TX	7.75
802.11ac VHT80_Nss1,(MCS0)_2TX	2.76

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

**Result**

Mode	Result	DG (dBi)	Port 1 (dBm/RBW)	Port 2 (dBm/RBW)	PD (dBm/RBW)	PD Limit (dBm/RBW)
802.11a_Nss1,(6Mbps)_2TX	-	-	-	-	-	-
5260MHz	Pass	5.87	7.66	7.67	10.64	11.00
5300MHz	Pass	5.87	7.50	7.58	10.50	11.00
5320MHz	Pass	5.87	5.14	5.09	8.04	11.00
5500MHz	Pass	5.87	5.28	5.60	8.42	11.00
5580MHz	Pass	5.87	7.65	7.93	10.77	11.00
5700MHz	Pass	5.87	2.87	3.01	5.93	11.00
802.11ac VHT20_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5260MHz	Pass	5.87	7.29	7.46	10.35	11.00
5300MHz	Pass	5.87	7.19	7.43	10.27	11.00
5320MHz	Pass	5.87	6.07	6.08	9.05	11.00
5500MHz	Pass	5.87	6.32	6.75	9.52	11.00
5580MHz	Pass	5.87	7.24	7.72	10.43	11.00
5700MHz	Pass	5.87	3.32	3.55	6.39	11.00
802.11ac VHT40_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5270MHz	Pass	5.87	4.41	4.30	7.30	11.00
5310MHz	Pass	5.87	-0.22	-0.22	2.76	11.00
5510MHz	Pass	5.87	-0.85	-0.28	2.42	11.00
5550MHz	Pass	5.87	4.62	4.97	7.75	11.00
5670MHz	Pass	5.87	1.58	1.79	4.65	11.00
802.11ac VHT80_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5290MHz	Pass	5.87	-3.51	-3.66	-0.60	11.00
5530MHz	Pass	5.87	-2.79	-2.63	0.24	11.00
5610MHz	Pass	5.87	-0.43	0.09	2.76	11.00

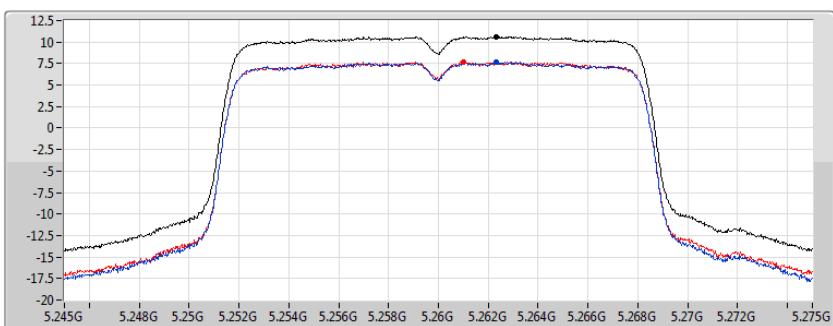
DG = Directional Gain; **RBW** = 500kHz for 5.725-5.85GHz band / 1MHz for other band;

PD = trace bin-by-bin of each transmits port summing can be performed maximum power density; **Port X** = Port Xpower density;

802.11a_Nss1,(6Mbps)_2TX
PSD
5260MHz

21/09/2018

CF
5.26GHz
Span
30MHz
RBW
1MHz
VBW
3MHz
Sweep Time
20ms
Detector Type
RMS



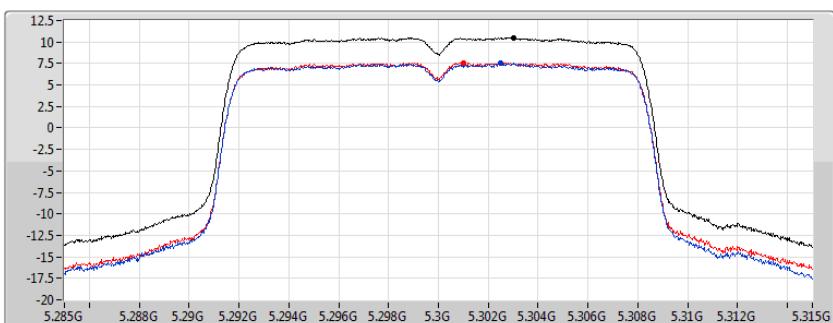
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Port 1	<input type="checkbox"/>
Port 2	<input type="checkbox"/>

Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
10.64	10.64	7.66	7.67

802.11a_Nss1,(6Mbps)_2TX
PSD
5300MHz

21/09/2018

CF
5.3GHz
Span
30MHz
RBW
1MHz
VBW
3MHz
Sweep Time
20ms
Detector Type
RMS



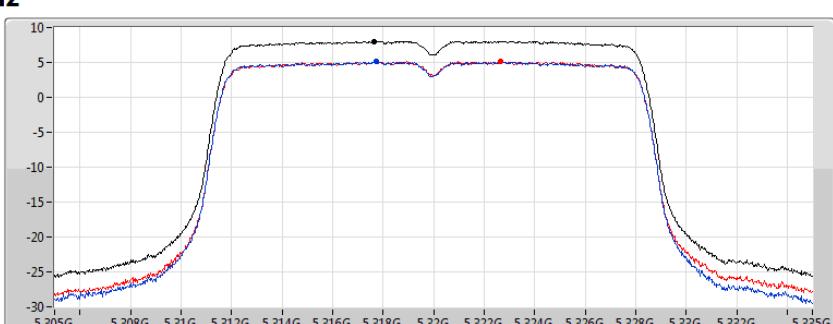
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Port 1	<input type="checkbox"/>
Port 2	<input type="checkbox"/>

Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
10.50	10.50	7.50	7.58

802.11a_Nss1,(6Mbps)_2TX
PSD
5320MHz

21/09/2018

CF
5.32GHz
Span
30MHz
RBW
1MHz
VBW
3MHz
Sweep Time
20ms
Detector Type
RMS

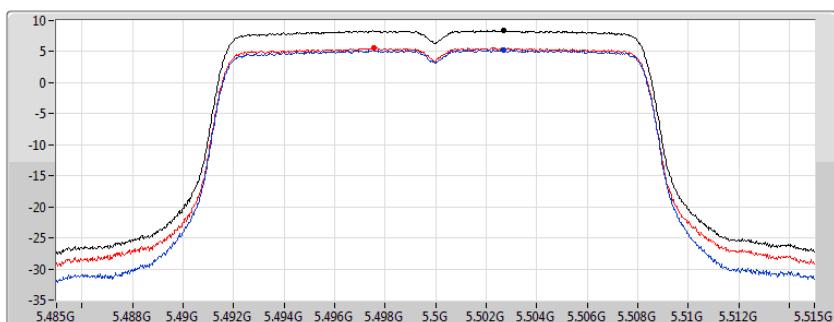


Sum	<input checked="" type="checkbox"/>
Port 1	<input type="checkbox"/>
Port 2	<input type="checkbox"/>

Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
8.04	8.04	5.14	5.09

802.11a_Nss1,(6Mbps)_2TX
5500MHz

CF
5.5GHz
Span
30MHz
RBW
1MHz
VBW
3MHz
Sweep Time
20ms
Detector Type
RMS


PSD

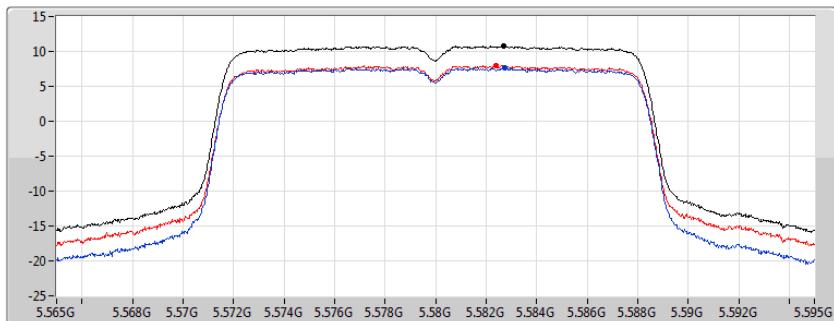
01/10/2018

Sum
Port 1
Port 2

Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
8.42	8.42	5.28	5.60

802.11a_Nss1,(6Mbps)_2TX
5580MHz

CF
5.58GHz
Span
30MHz
RBW
1MHz
VBW
3MHz
Sweep Time
20ms
Detector Type
RMS


PSD

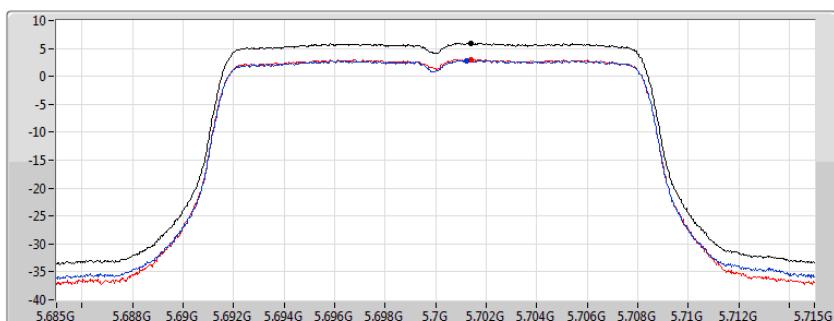
01/10/2018

Sum
Port 1
Port 2

Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
10.77	10.77	7.65	7.93

802.11a_Nss1,(6Mbps)_2TX
5700MHz

CF
5.7GHz
Span
30MHz
RBW
1MHz
VBW
3MHz
Sweep Time
20ms
Detector Type
RMS


PSD

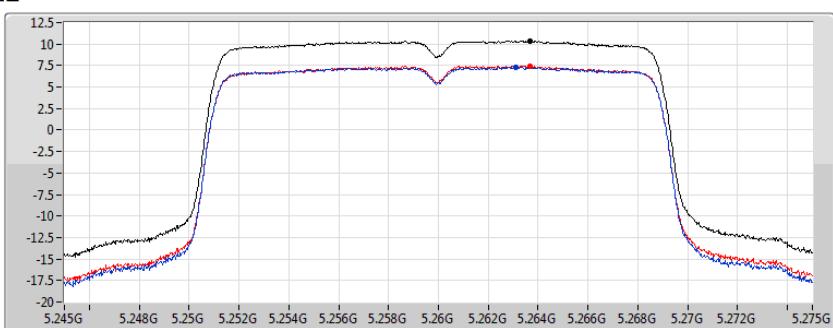
01/10/2018

Sum
Port 1
Port 2

Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
5.93	5.93	2.87	3.01

802.11ac VHT20_Nss1,(MCS0)_2TX
PSD
5260MHz

CF
5.26GHz
Span
30MHz
RBW
1MHz
VBW
3MHz
Sweep Time
20ms
Detector Type
RMS



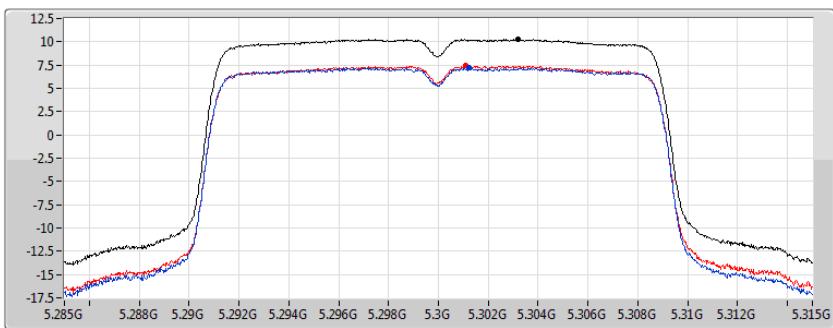
21/09/2018

Sum
Port 1
Port 2

Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
10.35	10.35	7.29	7.46

802.11ac VHT20_Nss1,(MCS0)_2TX
PSD
5300MHz

CF
5.3GHz
Span
30MHz
RBW
1MHz
VBW
3MHz
Sweep Time
20ms
Detector Type
RMS



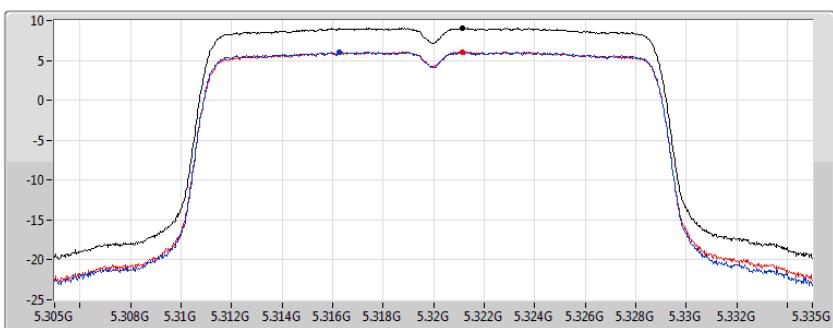
21/09/2018

Sum
Port 1
Port 2

Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
10.27	10.27	7.19	7.43

802.11ac VHT20_Nss1,(MCS0)_2TX
PSD
5320MHz

CF
5.32GHz
Span
30MHz
RBW
1MHz
VBW
3MHz
Sweep Time
20ms
Detector Type
RMS



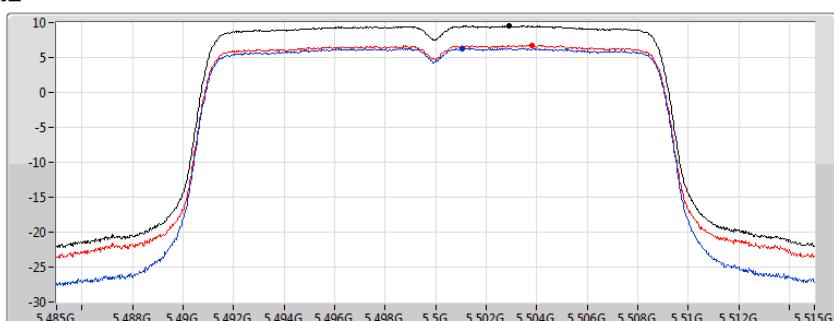
21/09/2018

Sum
Port 1
Port 2

Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
9.05	9.05	6.07	6.08

802.11ac VHT20_Nss1,(MCS0)_2TX
PSD
5500MHz

CF
5.5GHz
Span
30MHz
RBW
1MHz
VBW
3MHz
Sweep Time
20ms
Detector Type
RMS



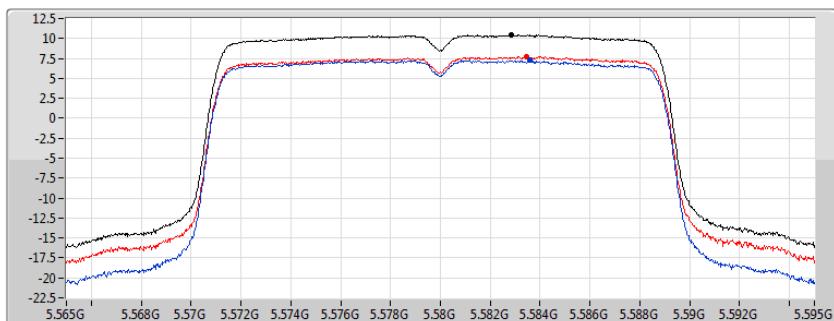
01/10/2018

Sum
Port 1
Port 2

Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
9.52	9.52	6.32	6.75

802.11ac VHT20_Nss1,(MCS0)_2TX
PSD
5580MHz

CF
5.58GHz
Span
30MHz
RBW
1MHz
VBW
3MHz
Sweep Time
20ms
Detector Type
RMS



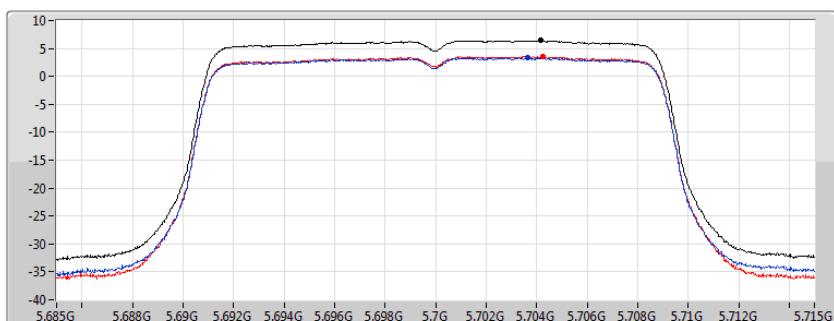
01/10/2018

Sum
Port 1
Port 2

Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
10.43	10.43	7.24	7.72

802.11ac VHT20_Nss1,(MCS0)_2TX
PSD
5700MHz

CF
5.7GHz
Span
30MHz
RBW
1MHz
VBW
3MHz
Sweep Time
20ms
Detector Type
RMS



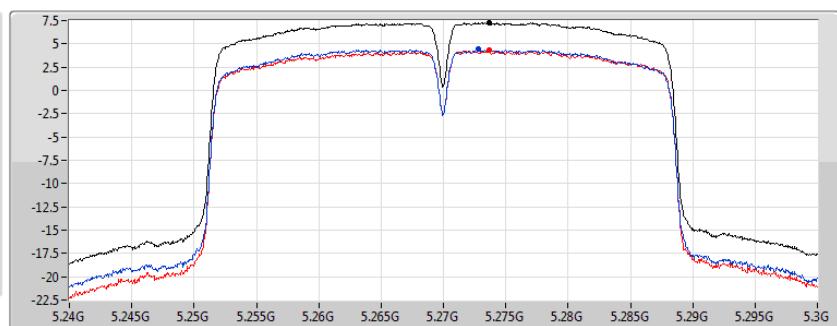
01/10/2018

Sum
Port 1
Port 2

Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
6.39	6.39	3.32	3.55

802.11ac VHT40_Nss1,(MCS0)_2TX
PSD
5270MHz

CF
5.27GHz
Span
60MHz
RBW
1MHz
VBW
3MHz
Sweep Time
20ms
Detector Type
RMS

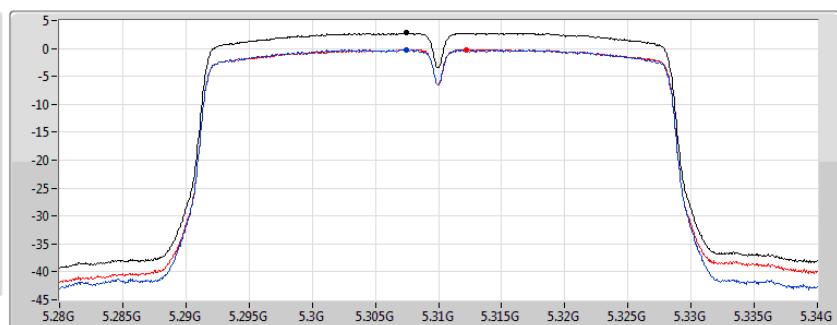


21/09/2018

Sum
Port 1
Port 2

802.11ac VHT40_Nss1,(MCS0)_2TX
PSD
5310MHz

CF
5.31GHz
Span
60MHz
RBW
1MHz
VBW
3MHz
Sweep Time
20ms
Detector Type
RMS

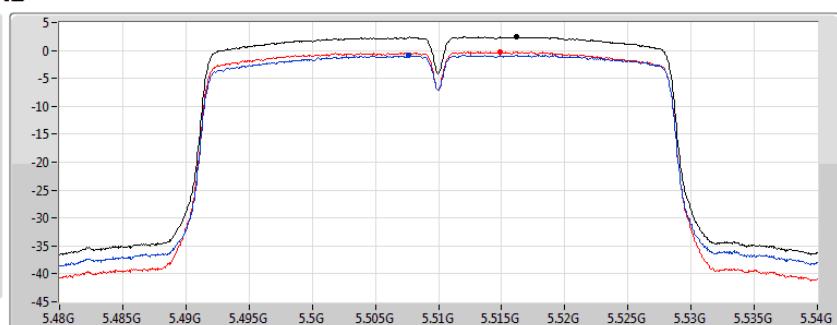


21/09/2018

Sum
Port 1
Port 2

802.11ac VHT40_Nss1,(MCS0)_2TX
PSD
5510MHz

CF
5.51GHz
Span
60MHz
RBW
1MHz
VBW
3MHz
Sweep Time
20ms
Detector Type
RMS



01/10/2018

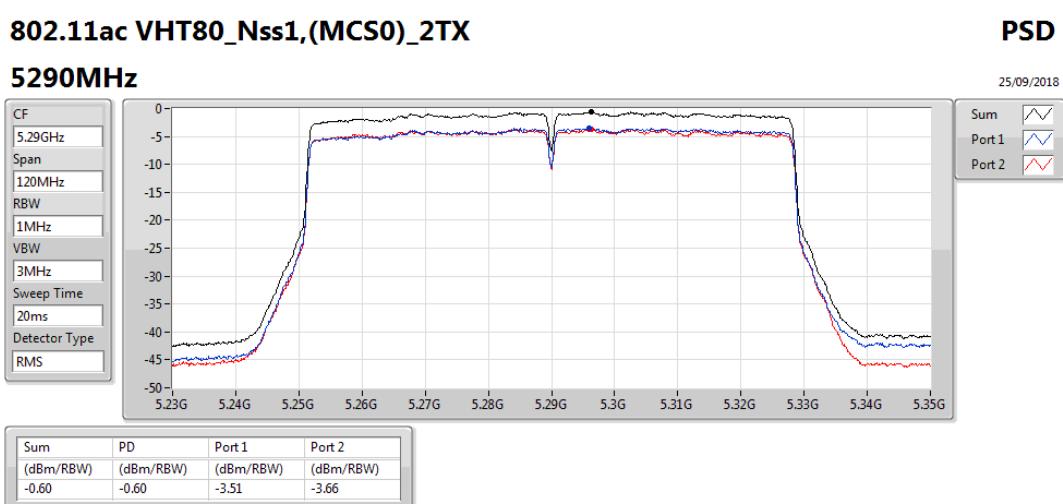
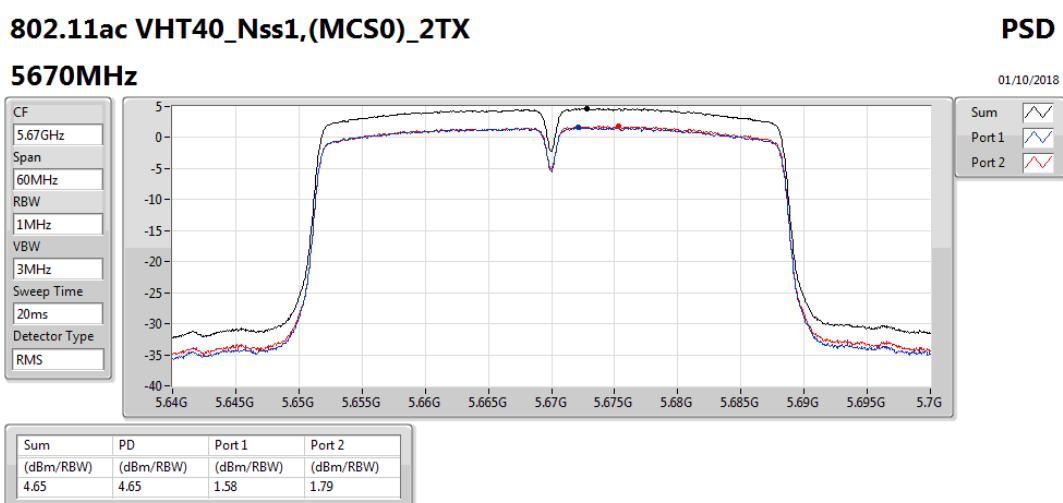
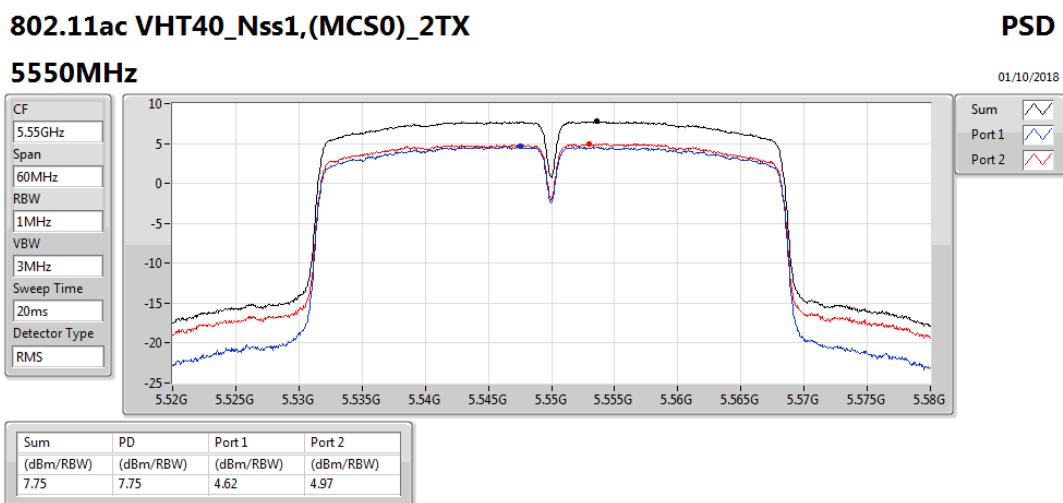
Sum
Port 1
Port 2

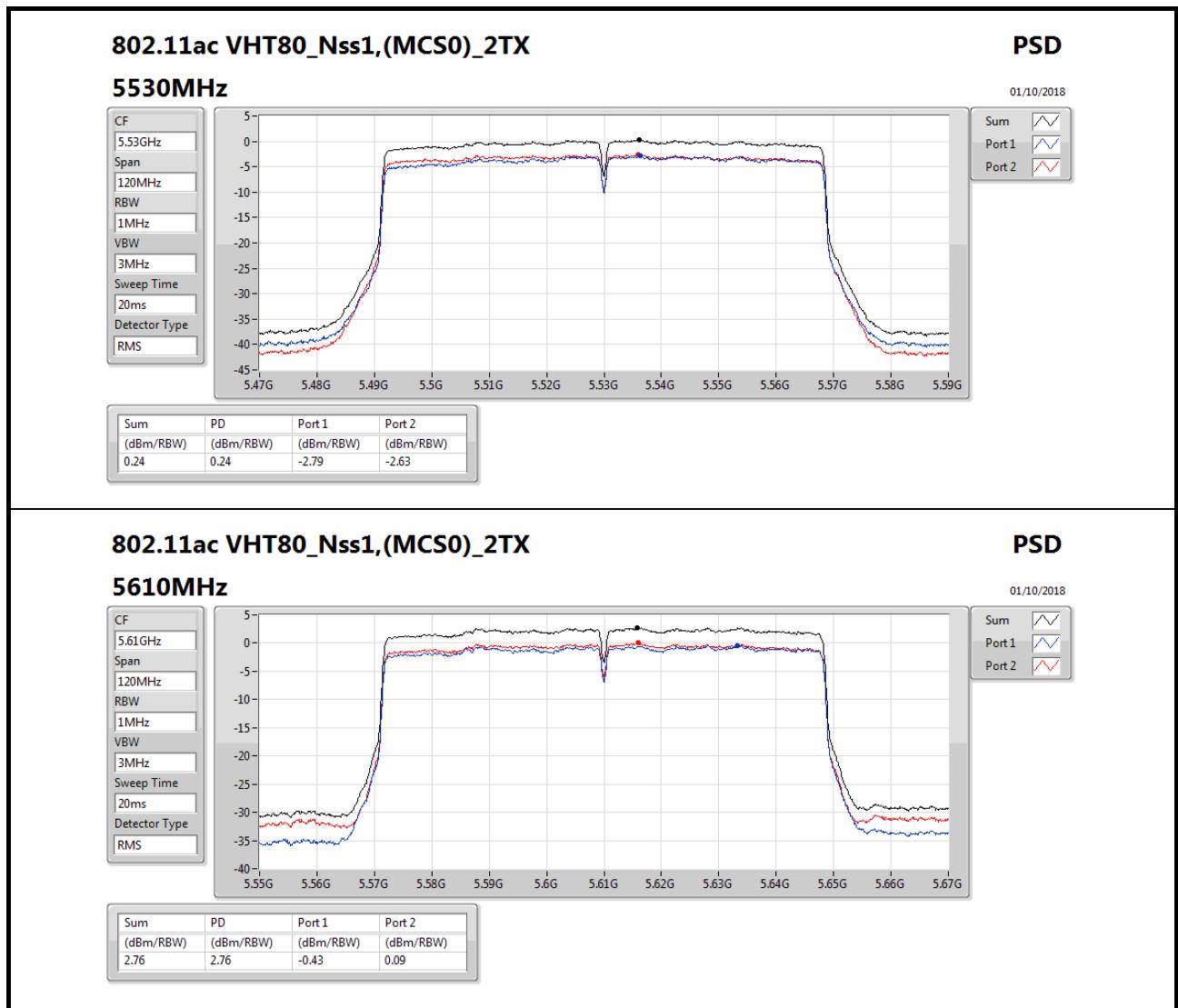
Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
2.42	2.42	-0.85	-0.28



PSD Result

Appendix C







SPORTON LAB.

RSE TX above 1GHz Result

Appendix D

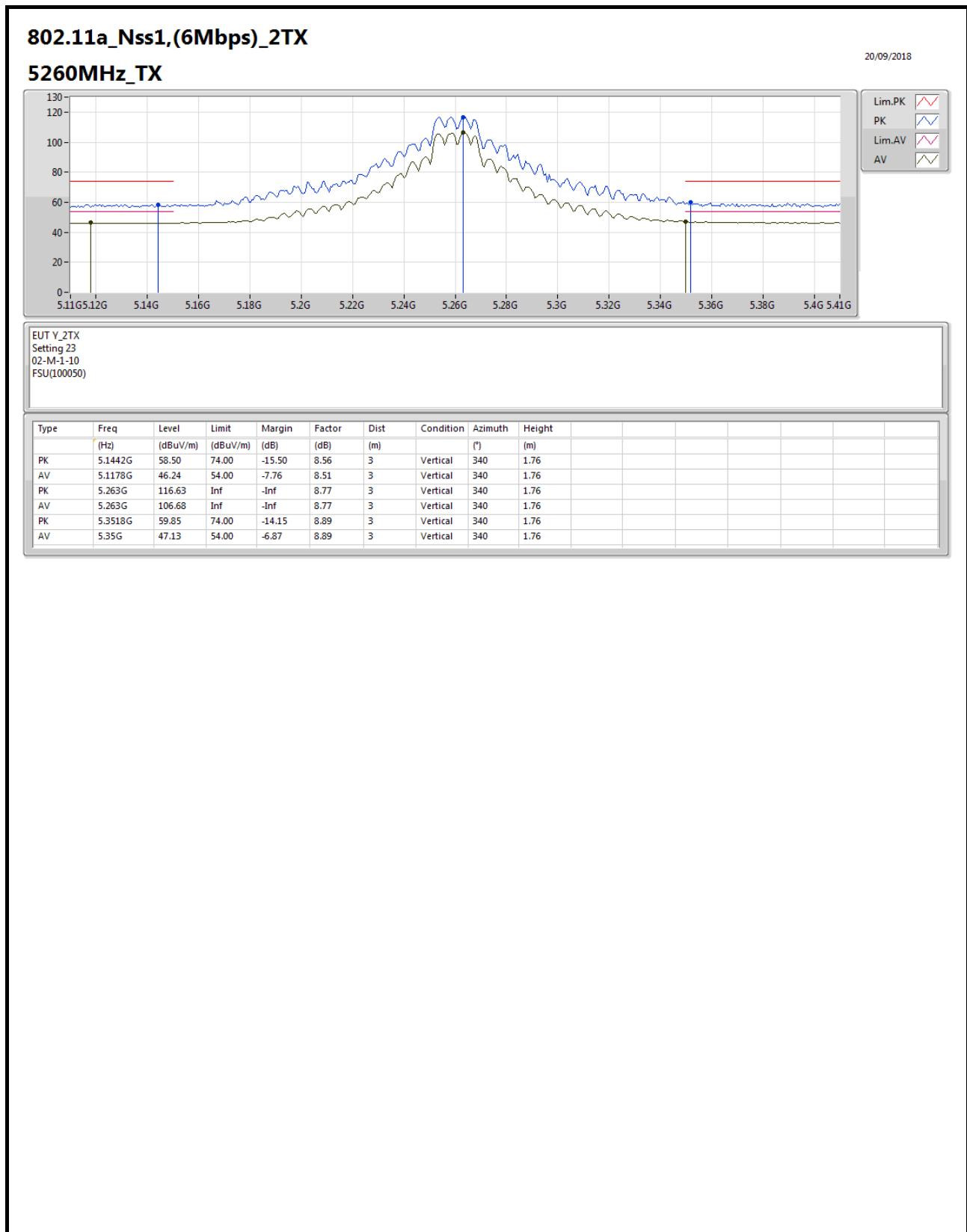
Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
5.25-5.35GHz	-	-	-	-	-	-	-	-	-	-	-	-
802.11ac VHT20_Nss1_(MCS0)_2TX	Pass	AV	5.35G	53.95	54.00	-0.05	8.89	3	Vertical	296	2.16	-



RSE TX above 1GHz Result

Appendix D





RSE TX above 1GHz Result

Appendix D





RSE TX above 1GHz Result

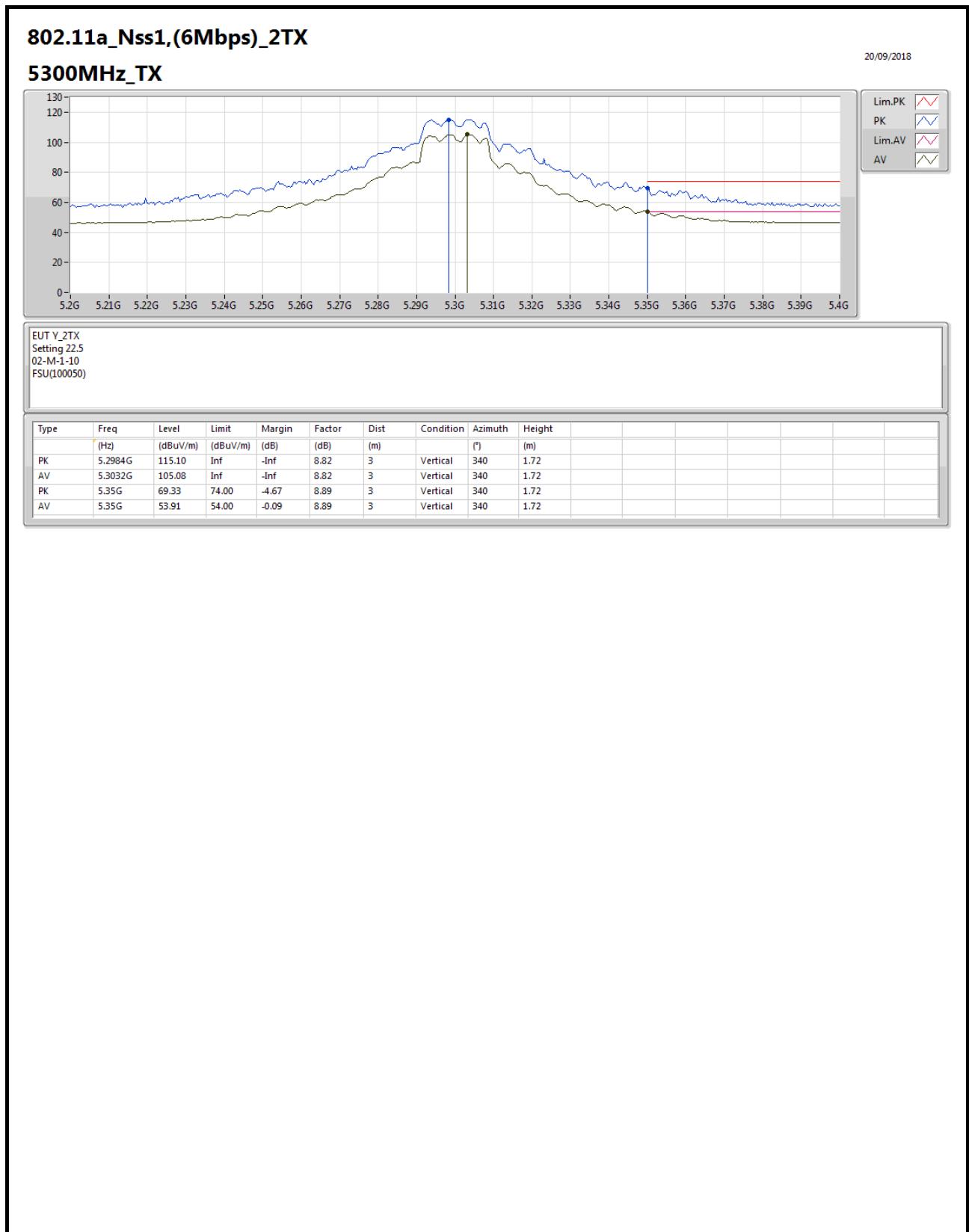
Appendix D





RSE TX above 1GHz Result

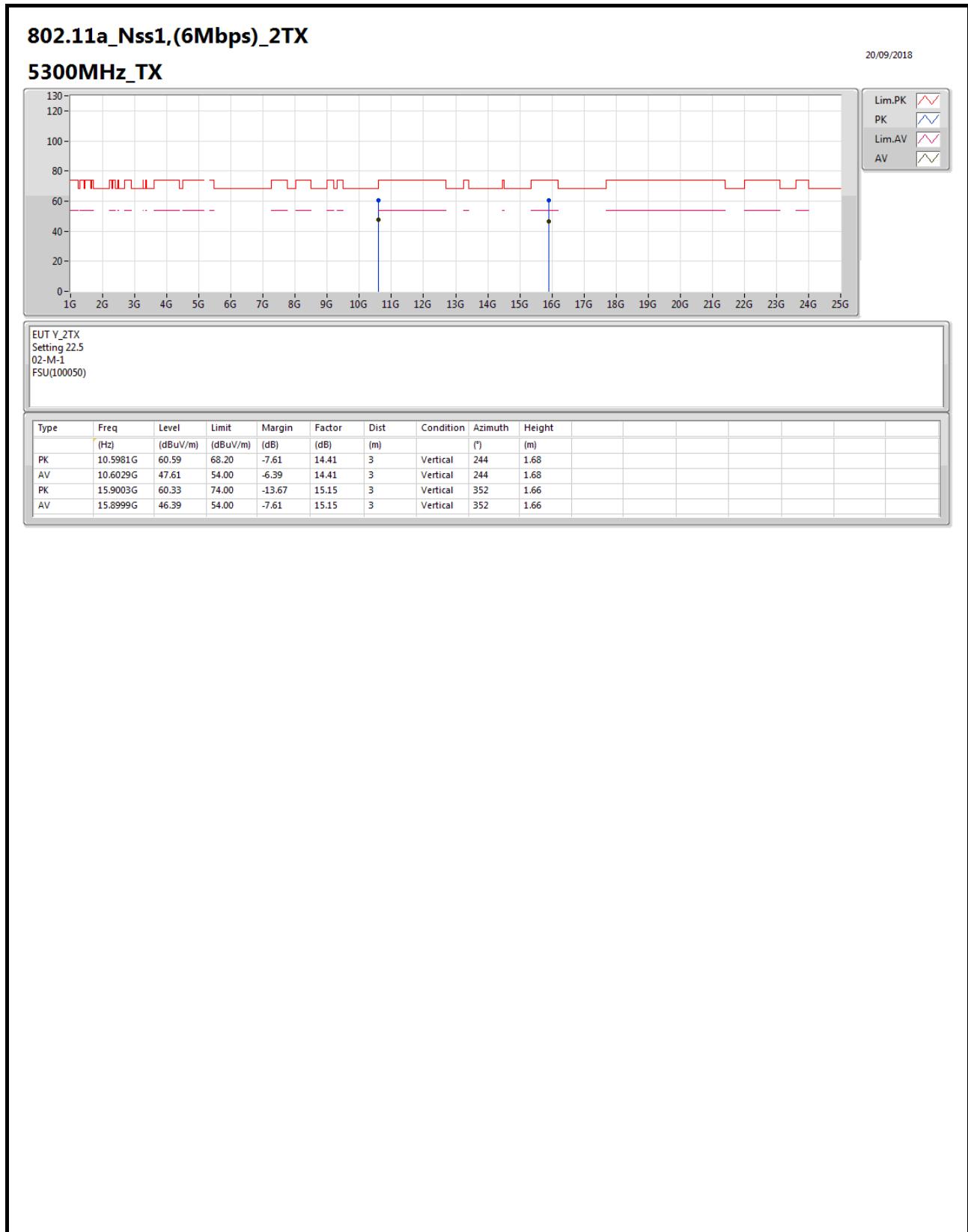
Appendix D





RSE TX above 1GHz Result

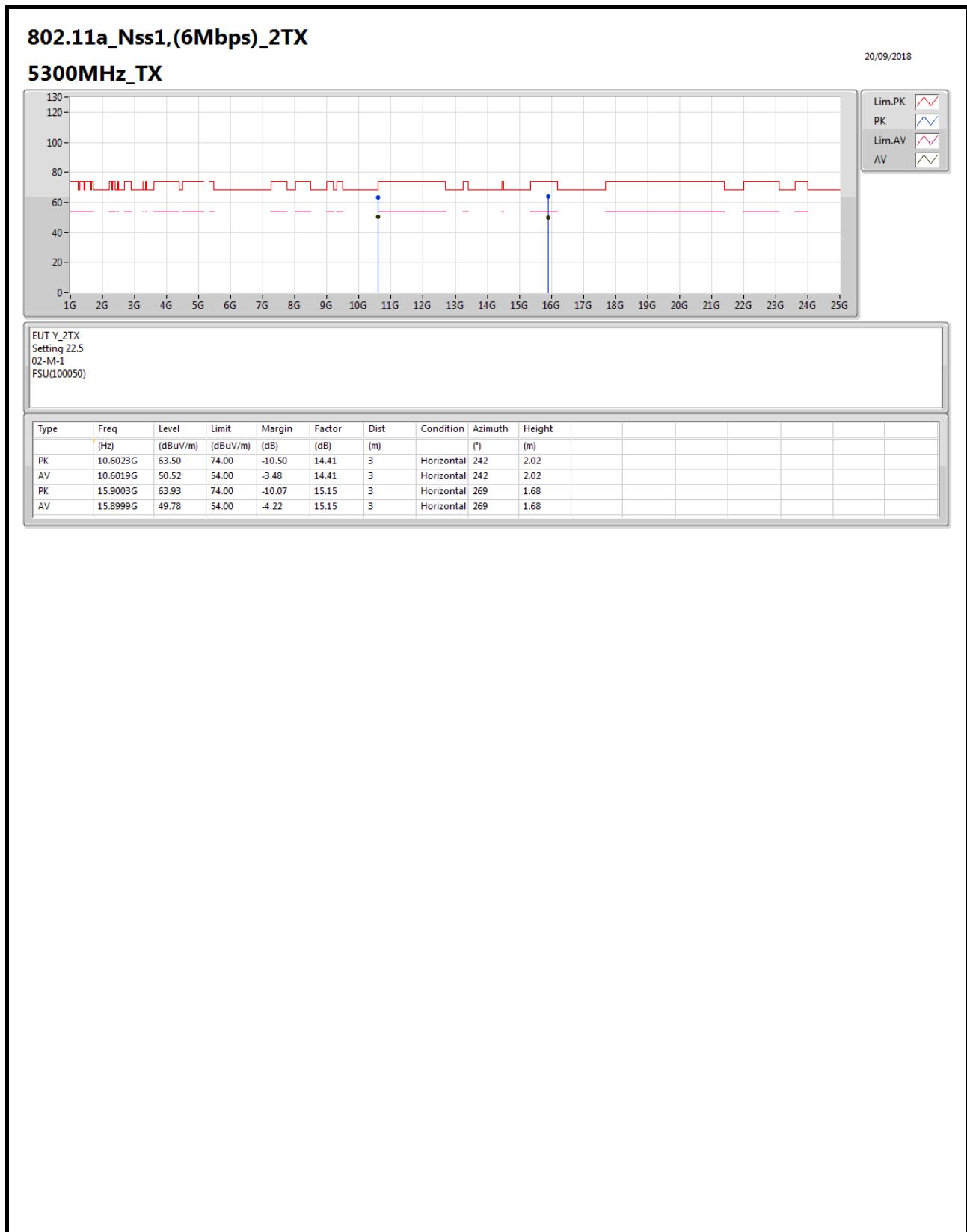
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RSE TX above 1GHz Result

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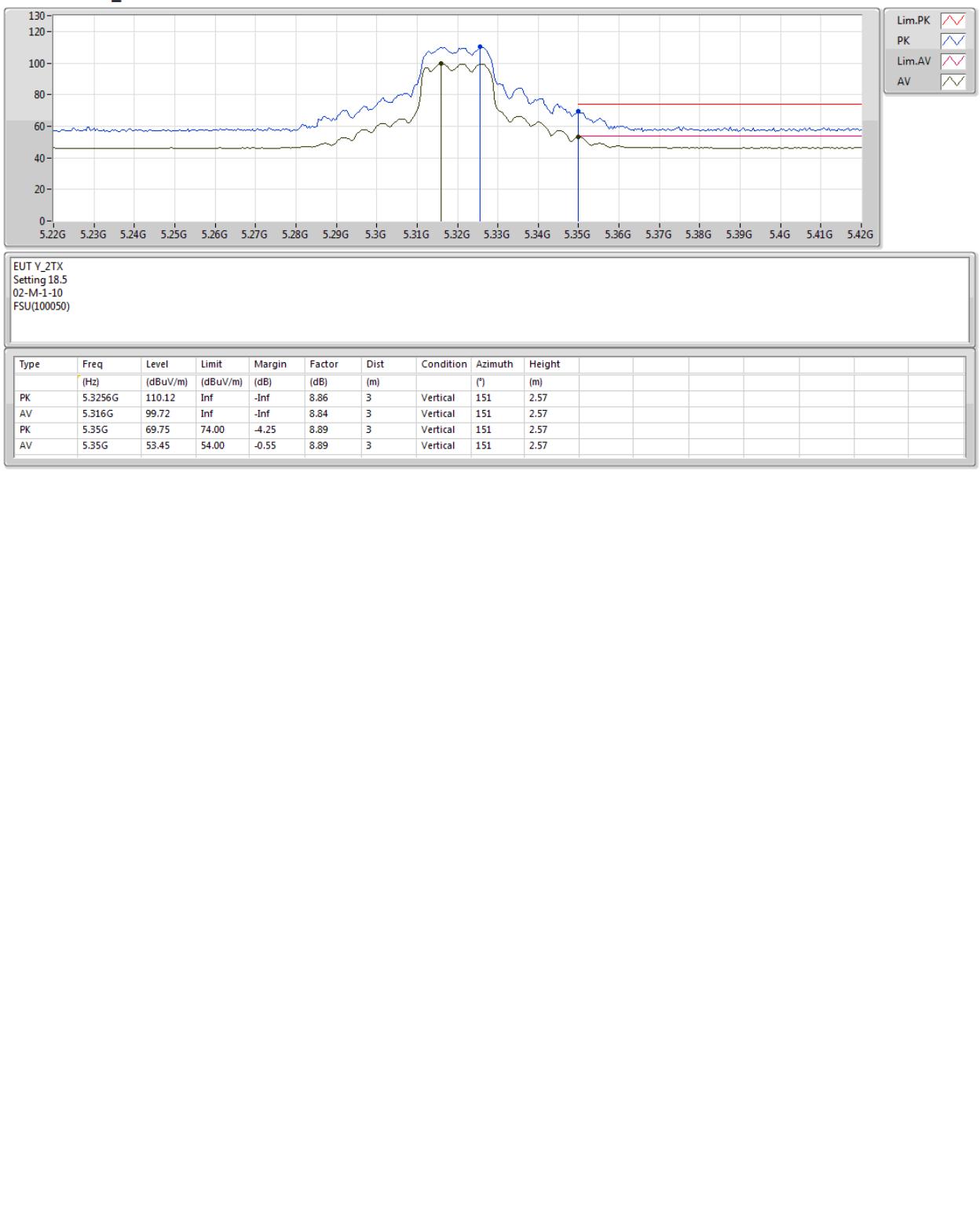
RSE TX above 1GHz Result

Appendix D

802.11a_Nss1,(6Mbps)_2TX

20/09/2018

5320MHz_TX





RSE TX above 1GHz Result

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RSE TX above 1GHz Result

Appendix D





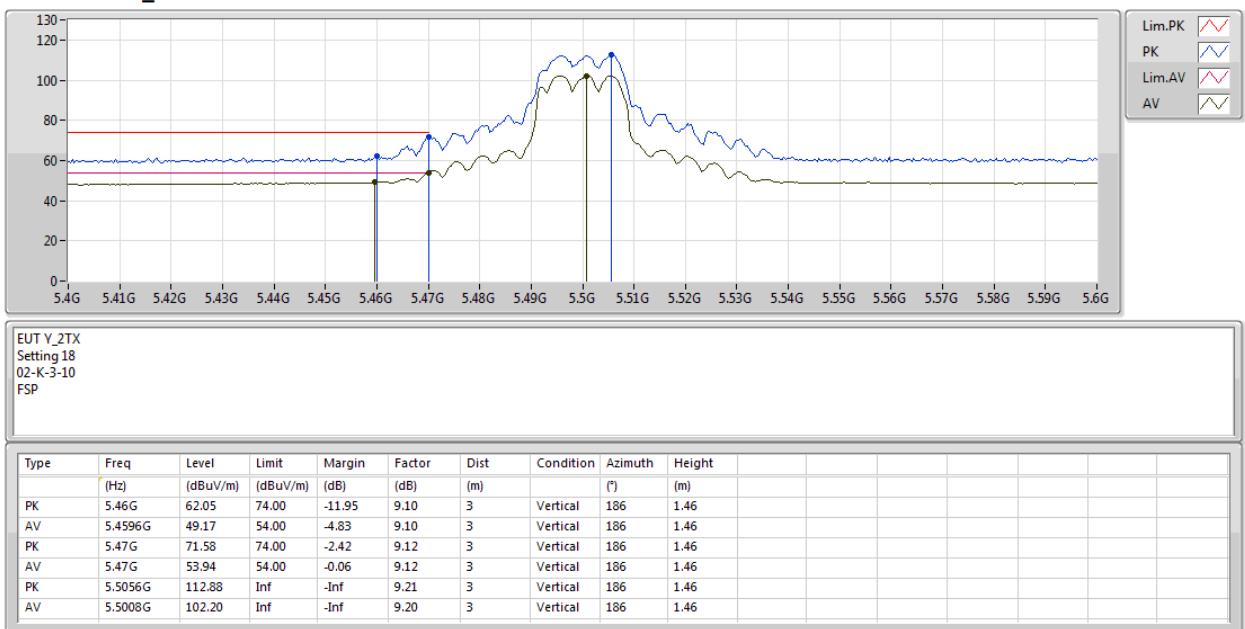
RSE TX above 1GHz Result

Appendix D

802.11a_Nss1,(6Mbps)_2TX

28/09/2018

5500MHz_TX





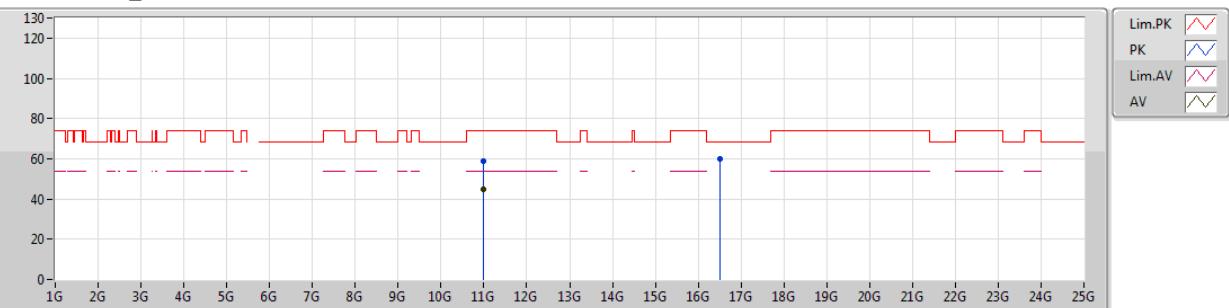
RSE TX above 1GHz Result

Appendix D

802.11a_Nss1,(6Mbps)_2TX

28/09/2018

5500MHz_TX



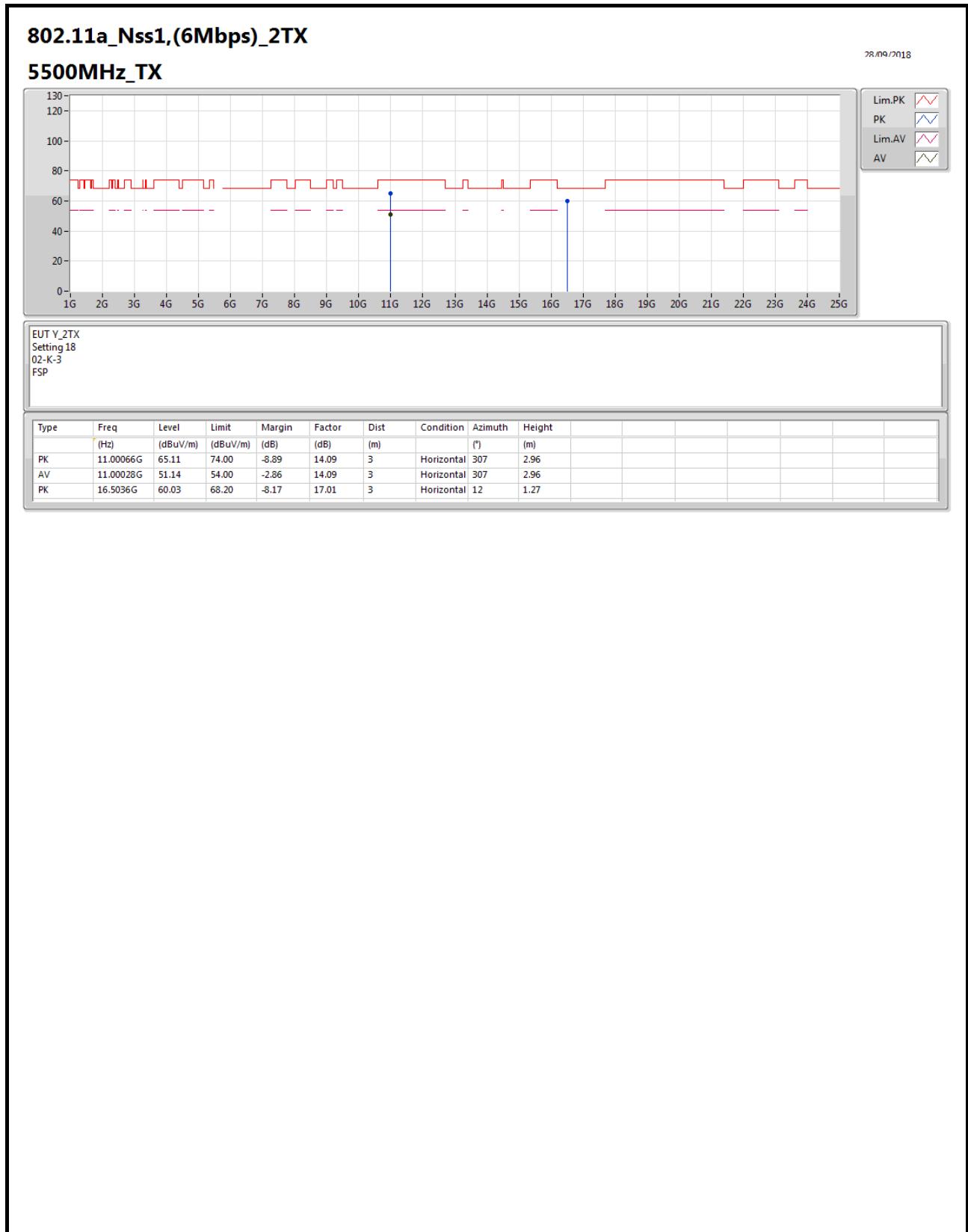
EUT Y_2TX
Setting 18
02-K-3
FSP

Type	Freq (Hz)	Level (dB _{UV} /m)	Limit (dB _{UV} /m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)											
PK	11.00062G	58.73	74.00	-15.27	14.09	3	Vertical	21	2.25											
AV	11.00008G	45.05	54.00	-8.95	14.09	3	Vertical	21	2.25											
PK	16.49708G	60.13	68.20	-8.07	16.99	3	Vertical	18	1.50											



RSE TX above 1GHz Result

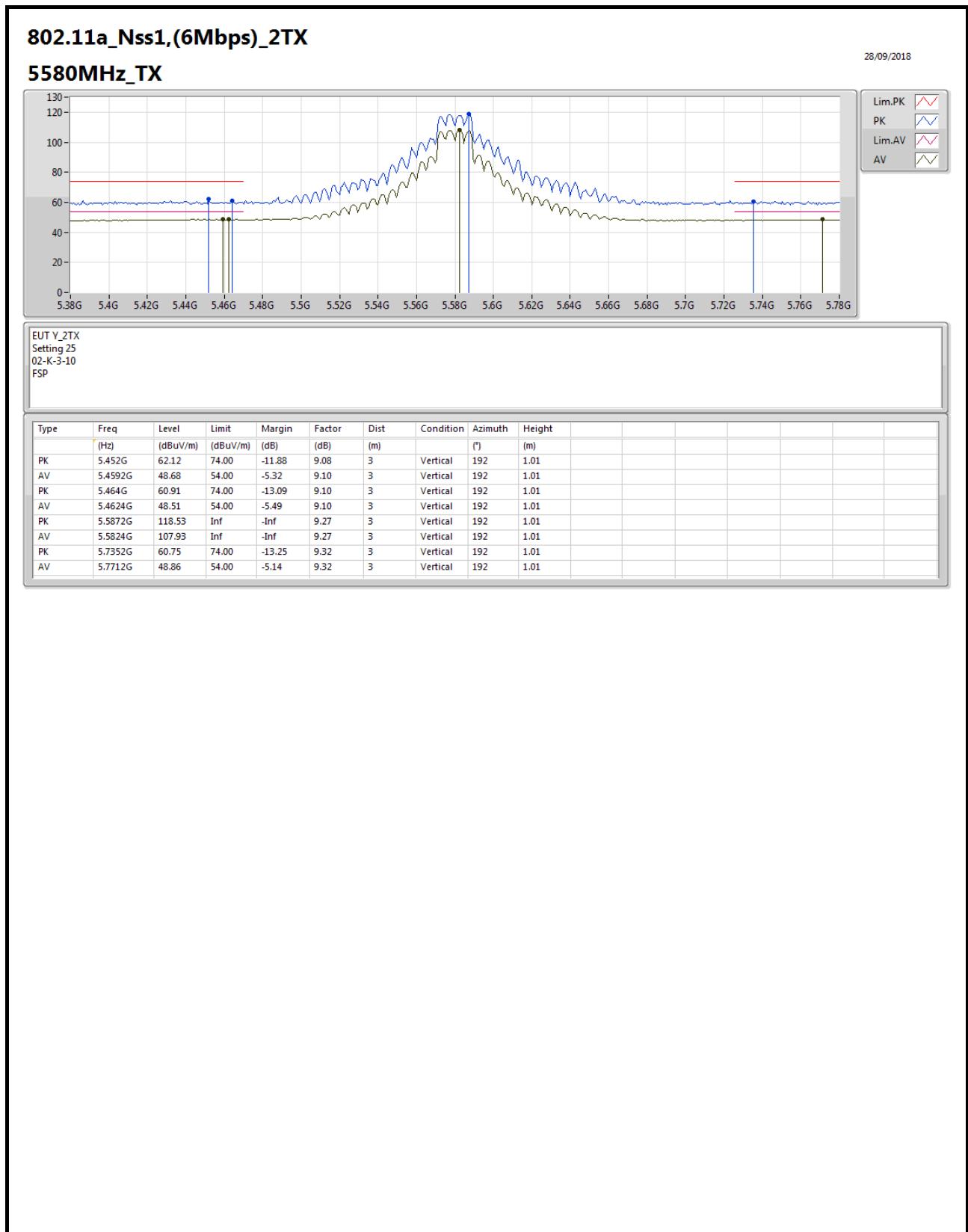
Appendix D





RSE TX above 1GHz Result

Appendix D





RSE TX above 1GHz Result

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RSE TX above 1GHz Result

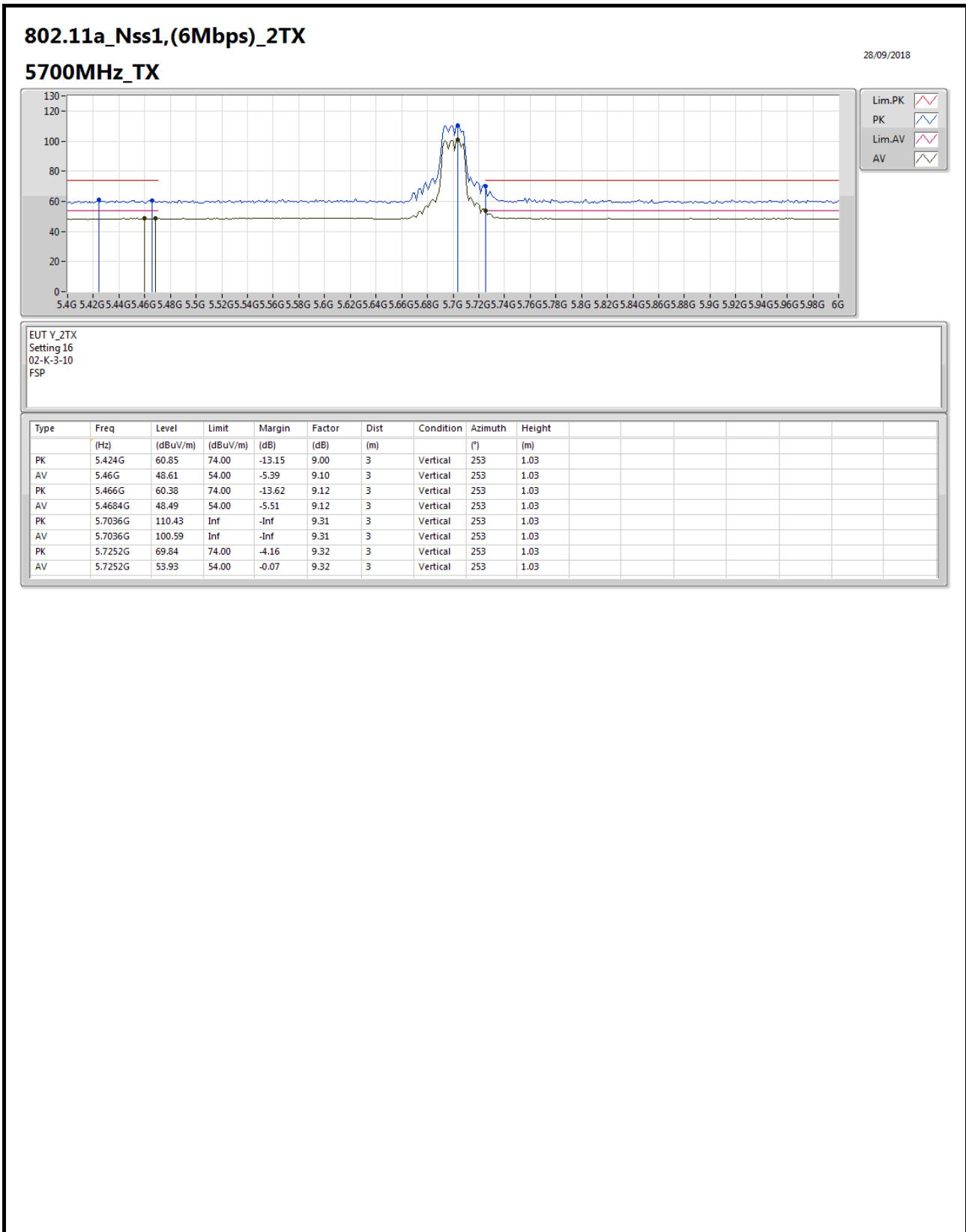
Appendix D





RSE TX above 1GHz Result

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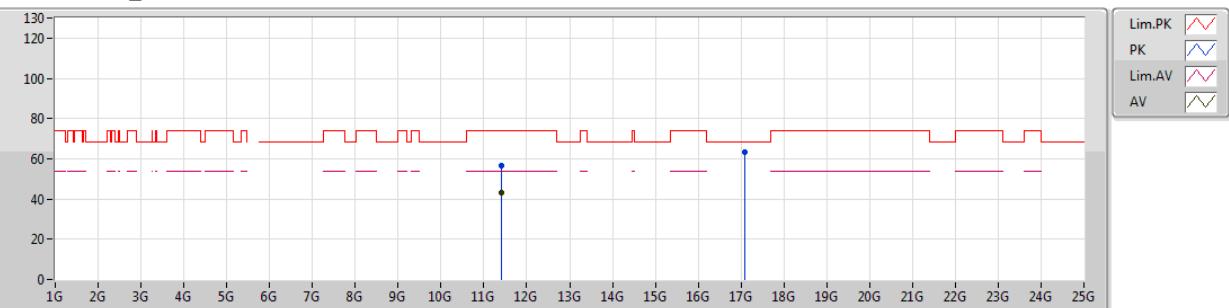
RSE TX above 1GHz Result

Appendix D

802.11a_Nss1,(6Mbps)_2TX

28/09/2018

5700MHz_TX



EUT Y_2TX
Setting 16
02-K-3
FSP

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)										
PK	11.40064G	56.61	74.00	-17.39	14.55	3	Vertical	295	1.16										
AV	11.40008G	43.09	54.00	-10.91	14.55	3	Vertical	295	1.16										
PK	17.09594G	63.21	68.20	-4.99	19.67	3	Vertical	284	2.08										



RSE TX above 1GHz Result

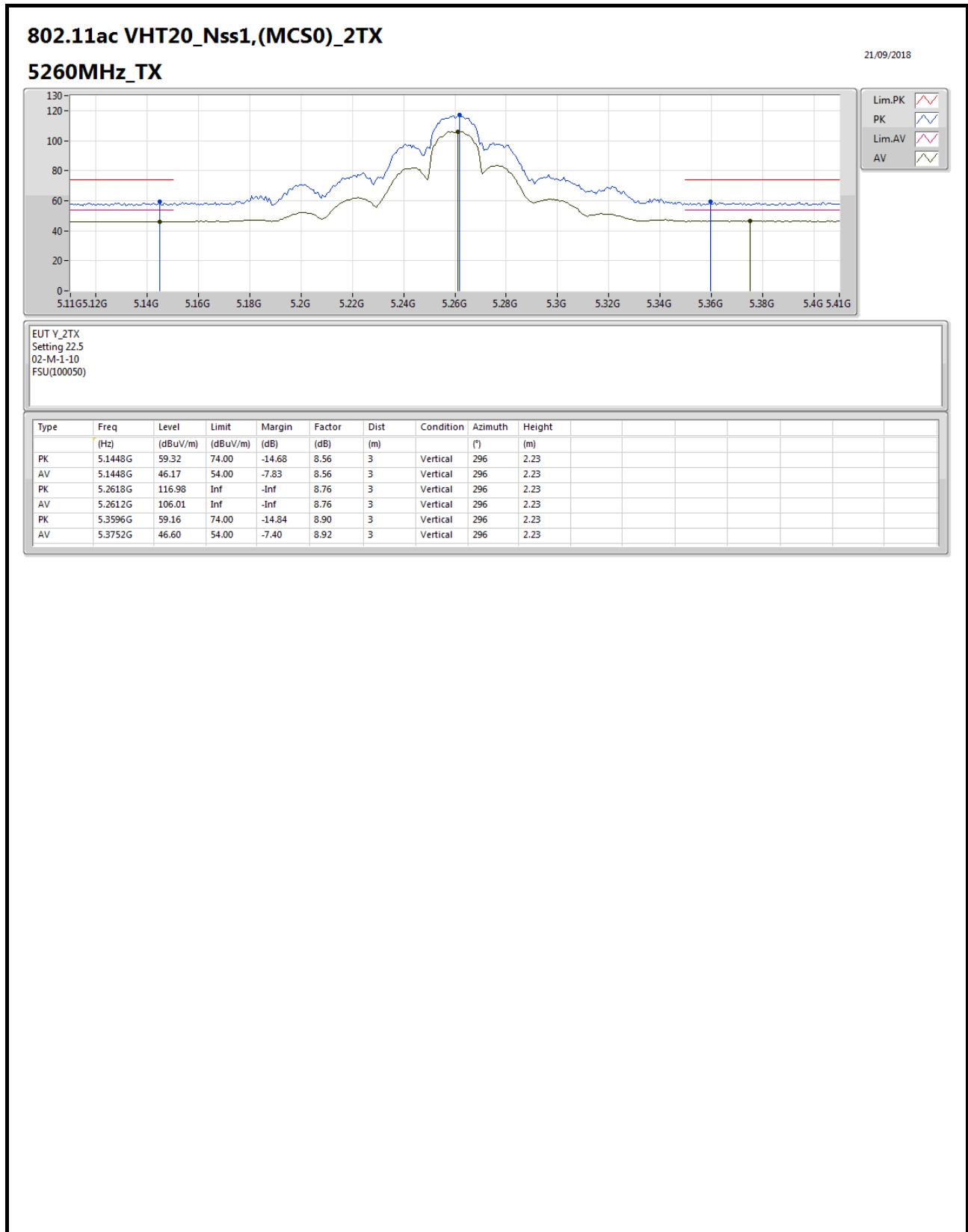
Appendix D





RSE TX above 1GHz Result

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RSE TX above 1GHz Result

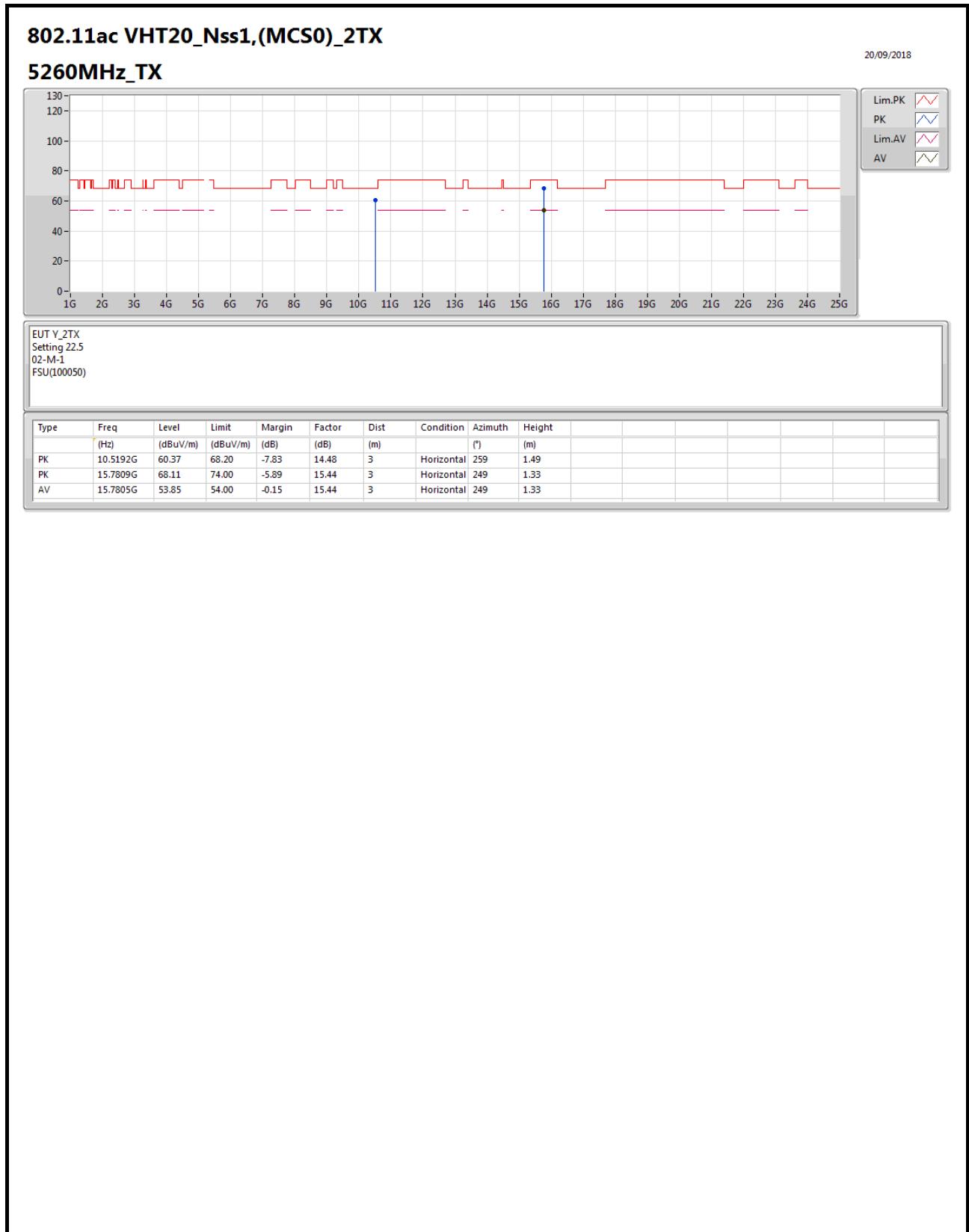
Appendix D





RSE TX above 1GHz Result

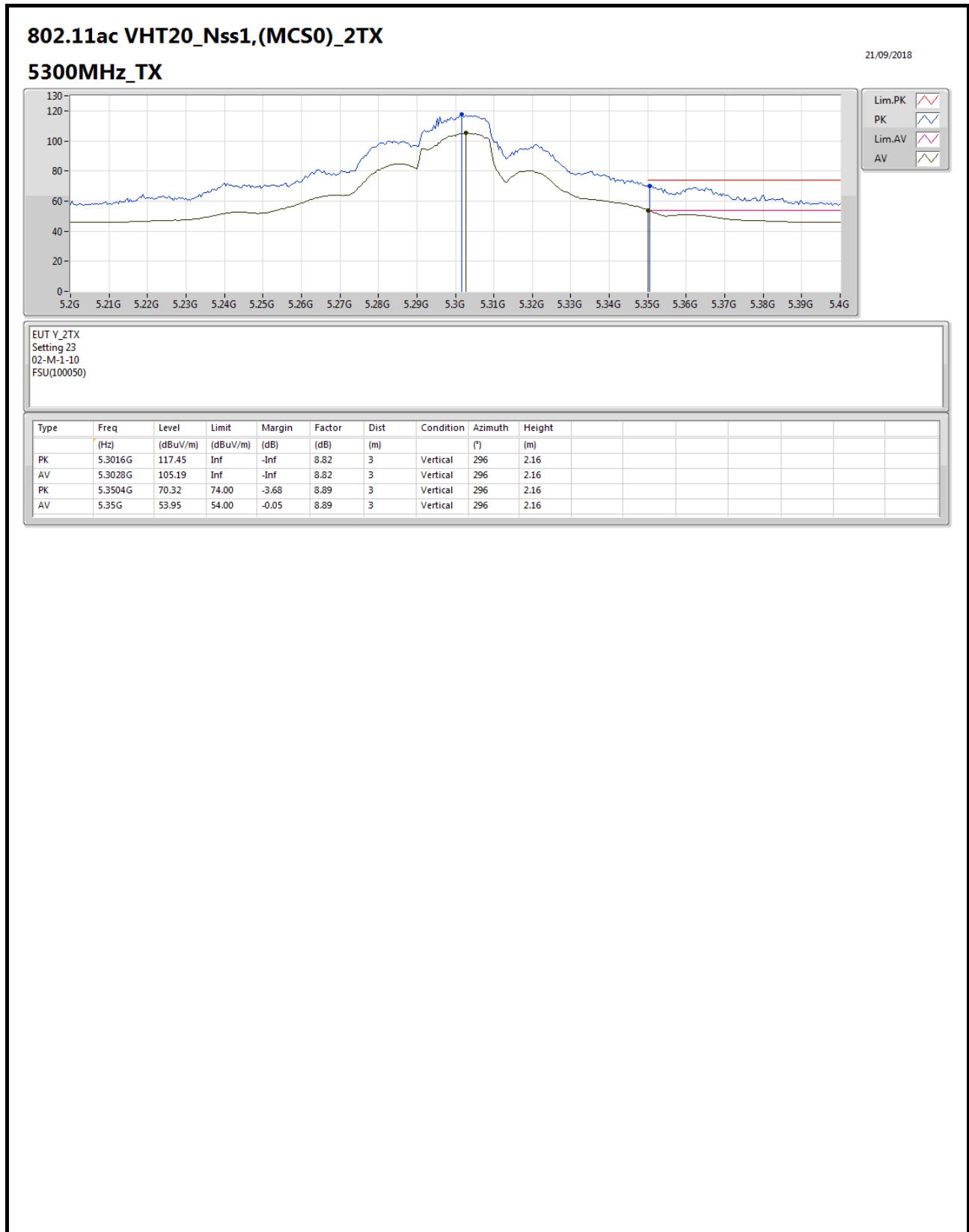
Appendix D





RSE TX above 1GHz Result

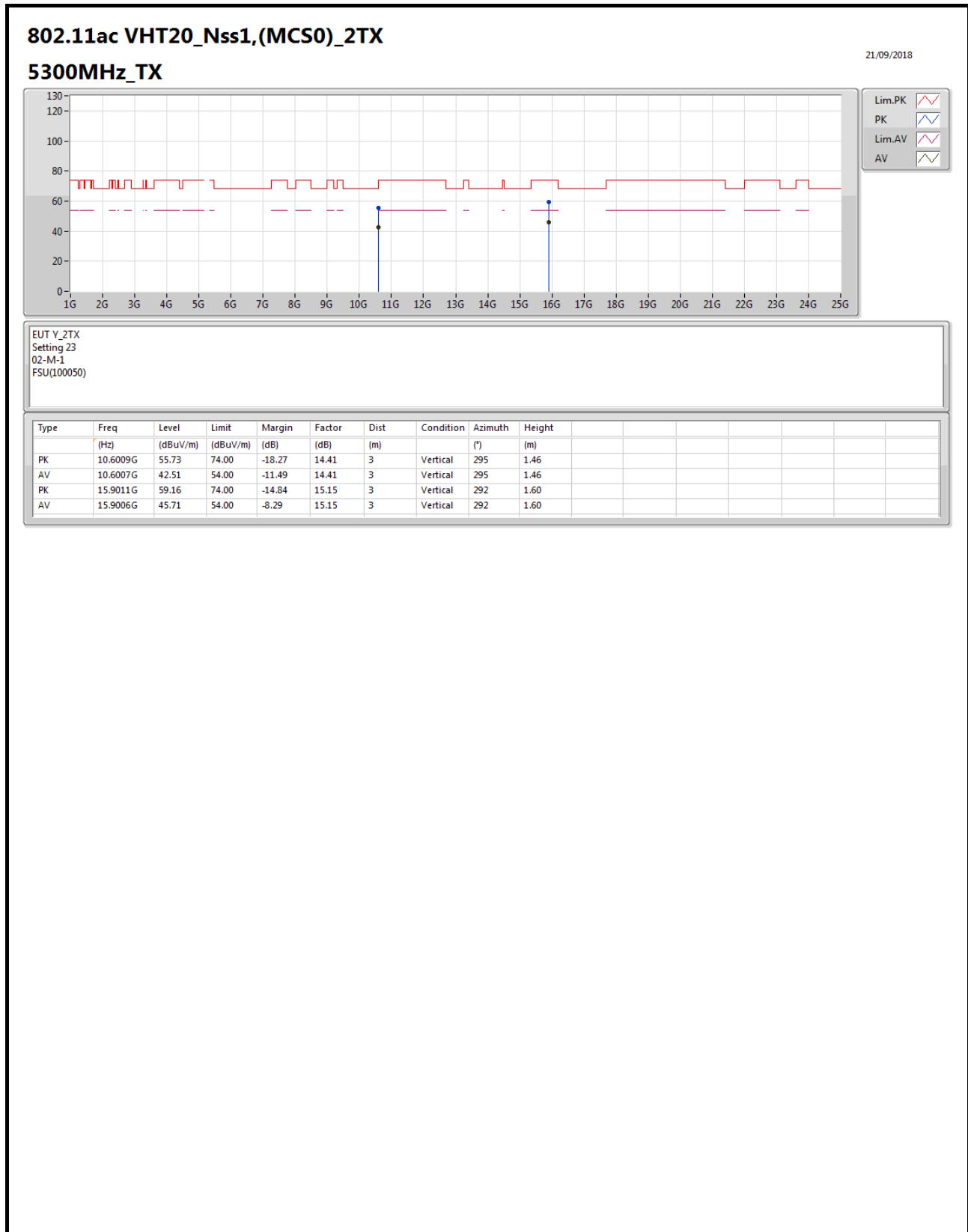
Appendix D





RSE TX above 1GHz Result

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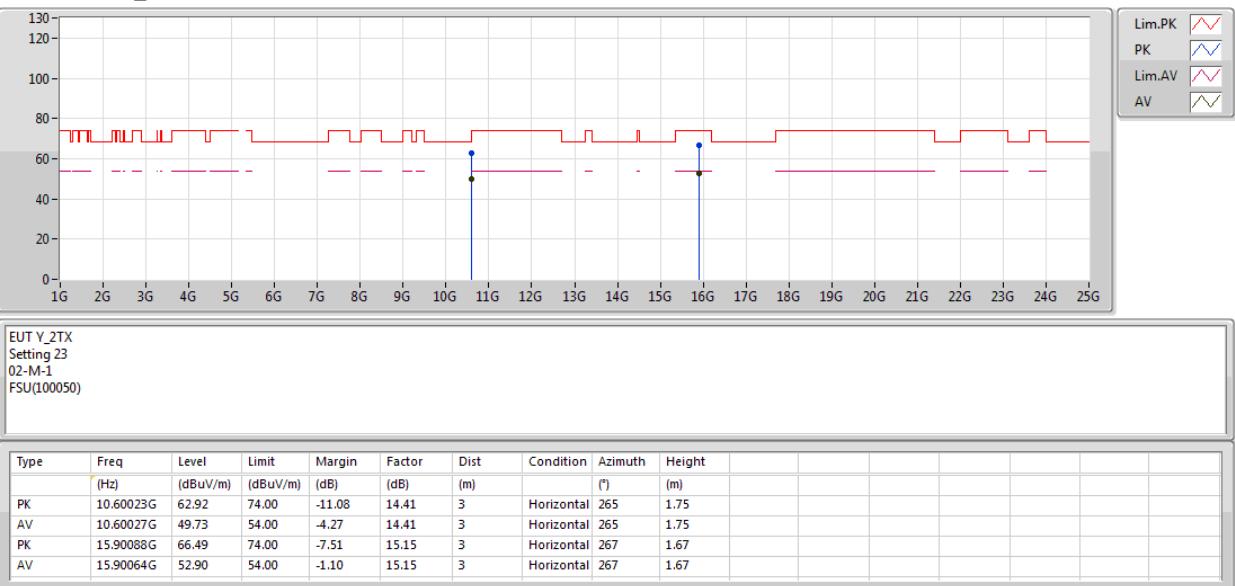
RSE TX above 1GHz Result

Appendix D

802.11ac VHT20_Nss1,(MCS0)_2TX

21/09/2018

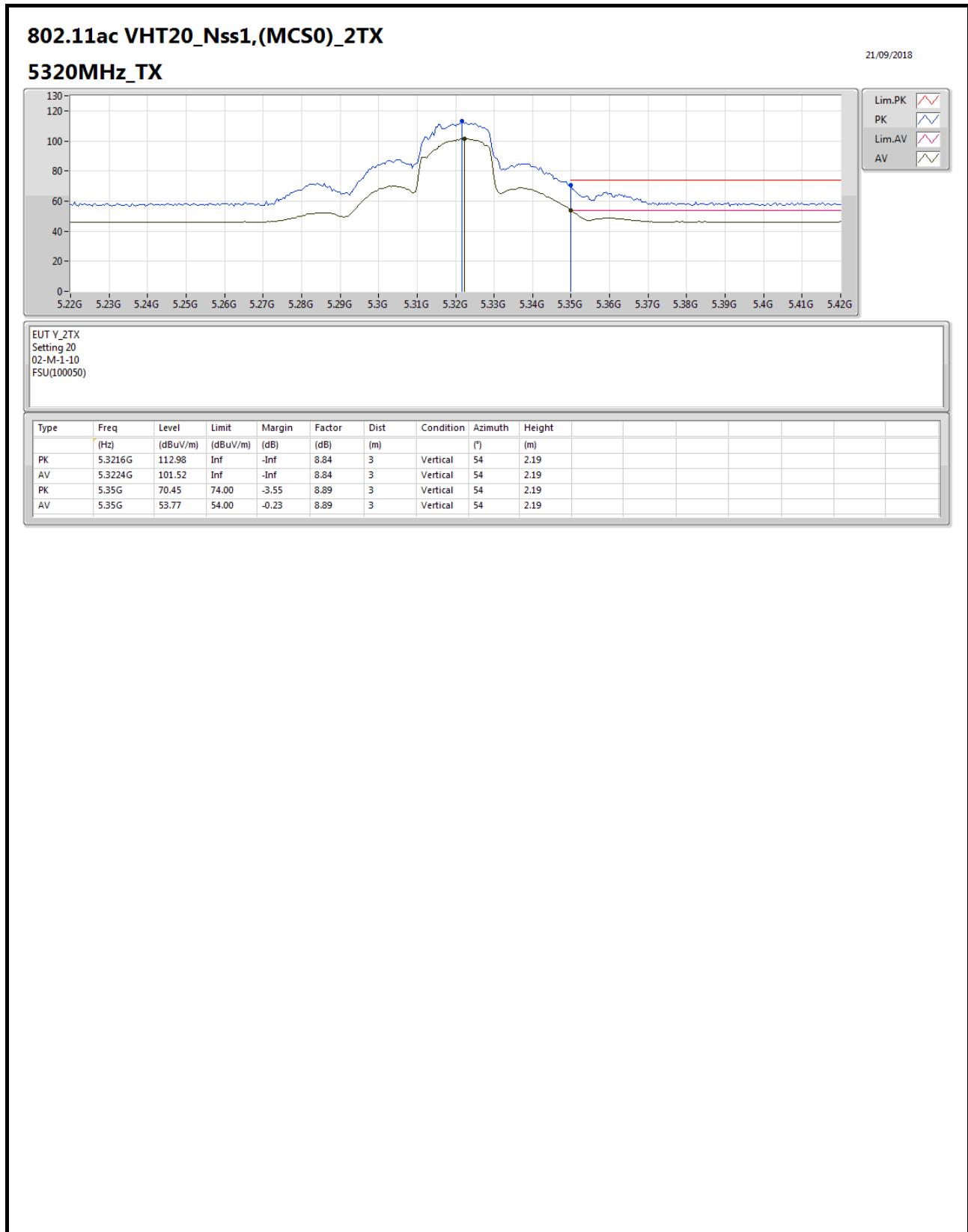
5300MHz_TX





RSE TX above 1GHz Result

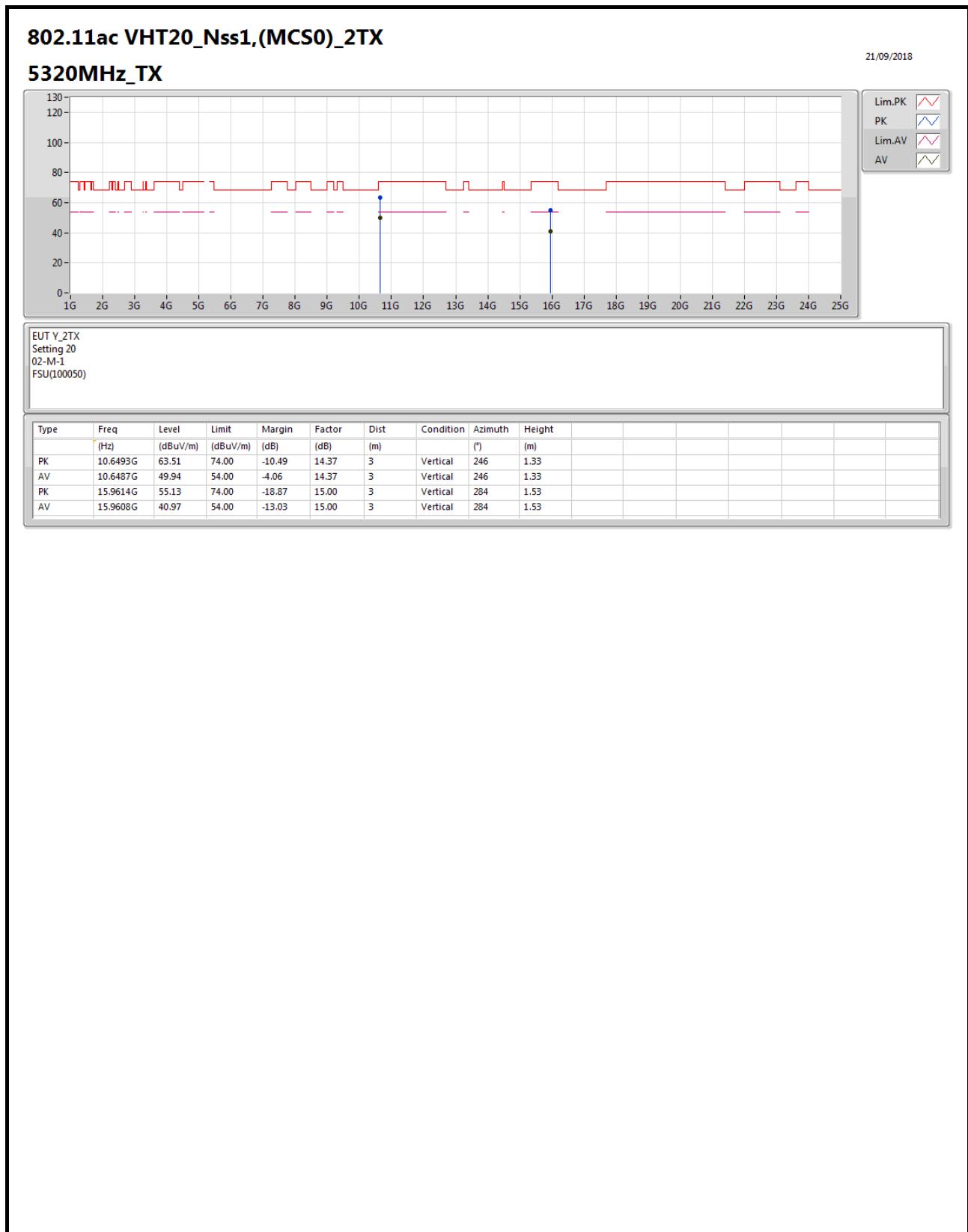
Appendix D





RSE TX above 1GHz Result

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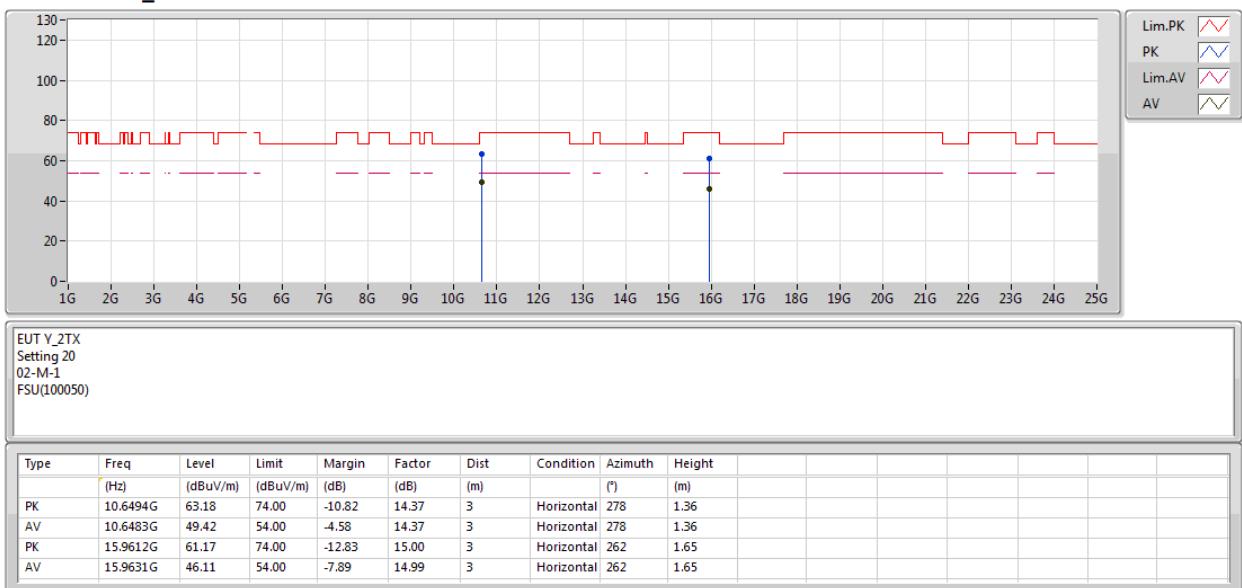
RSE TX above 1GHz Result

Appendix D

802.11ac VHT20_Nss1,(MCS0)_2TX

21/09/2018

5320MHz_TX





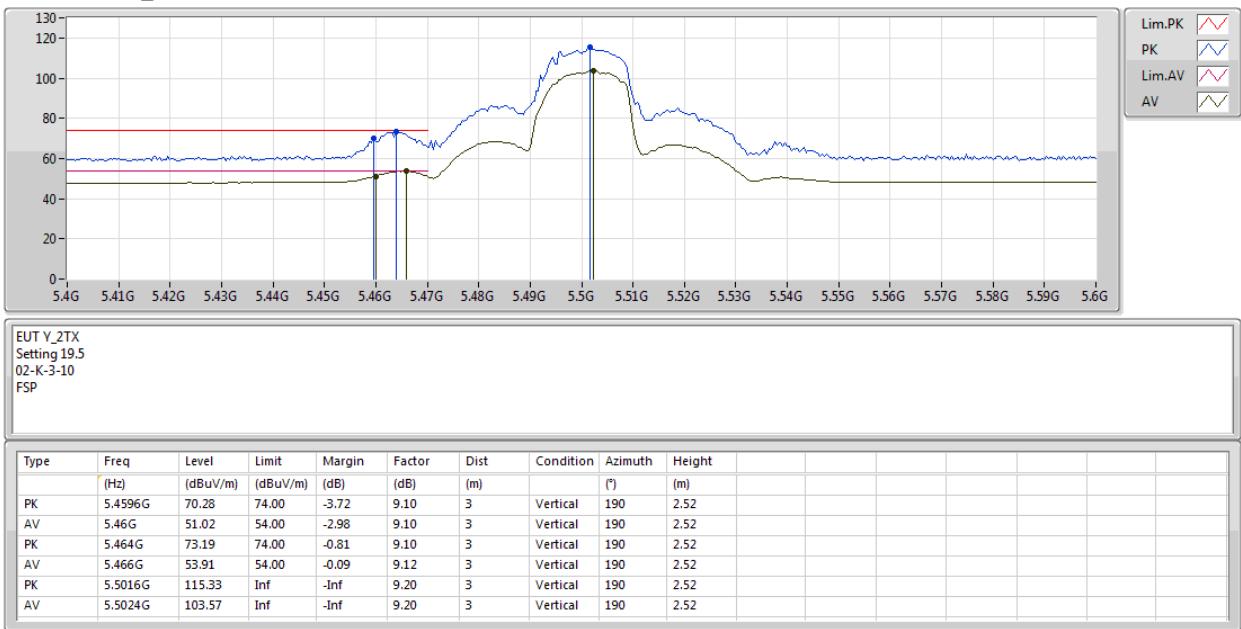
RSE TX above 1GHz Result

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802.11ac VHT20_Nss1,(MCS0)_2TX

28/09/2018

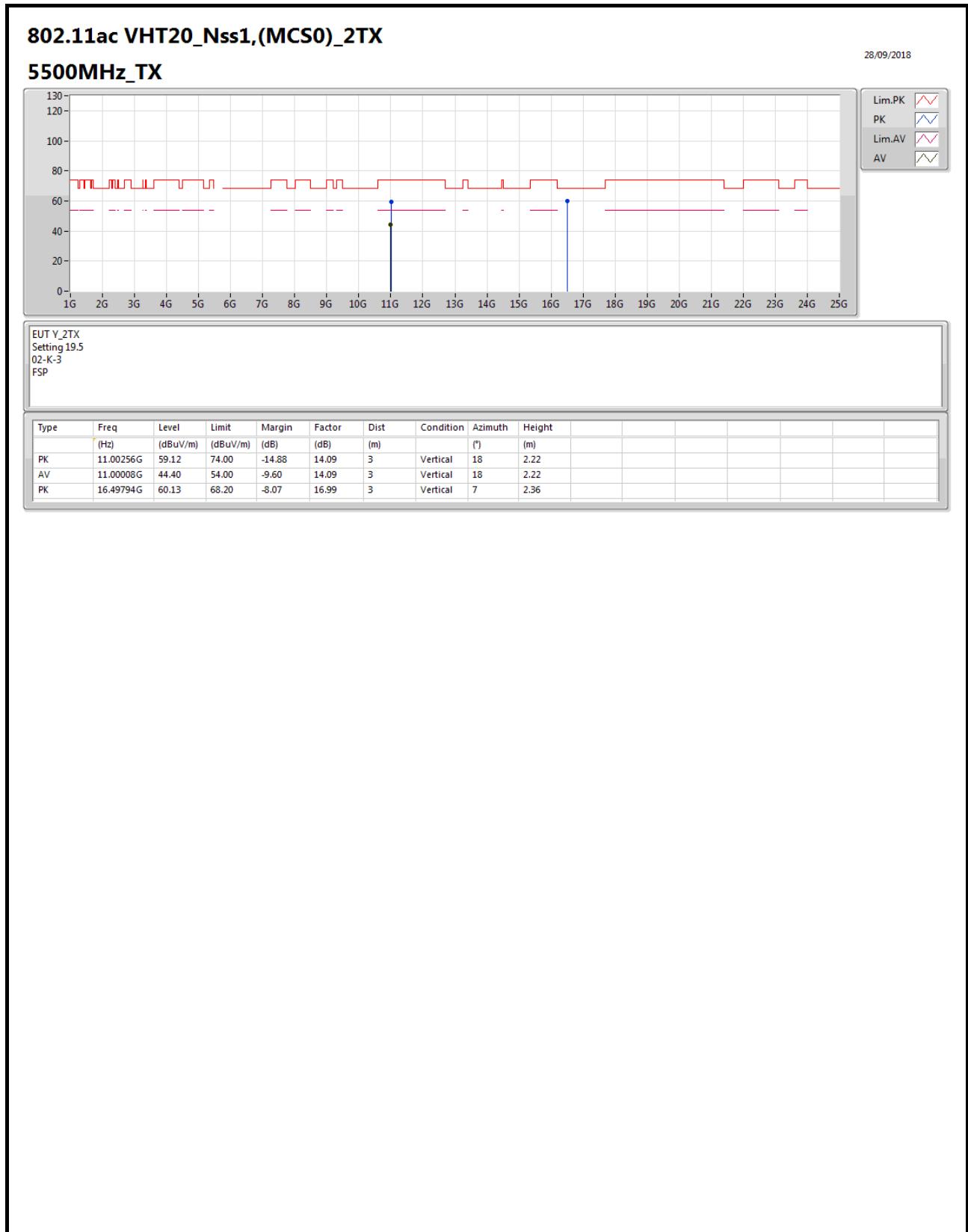
5500MHz_TX





RSE TX above 1GHz Result

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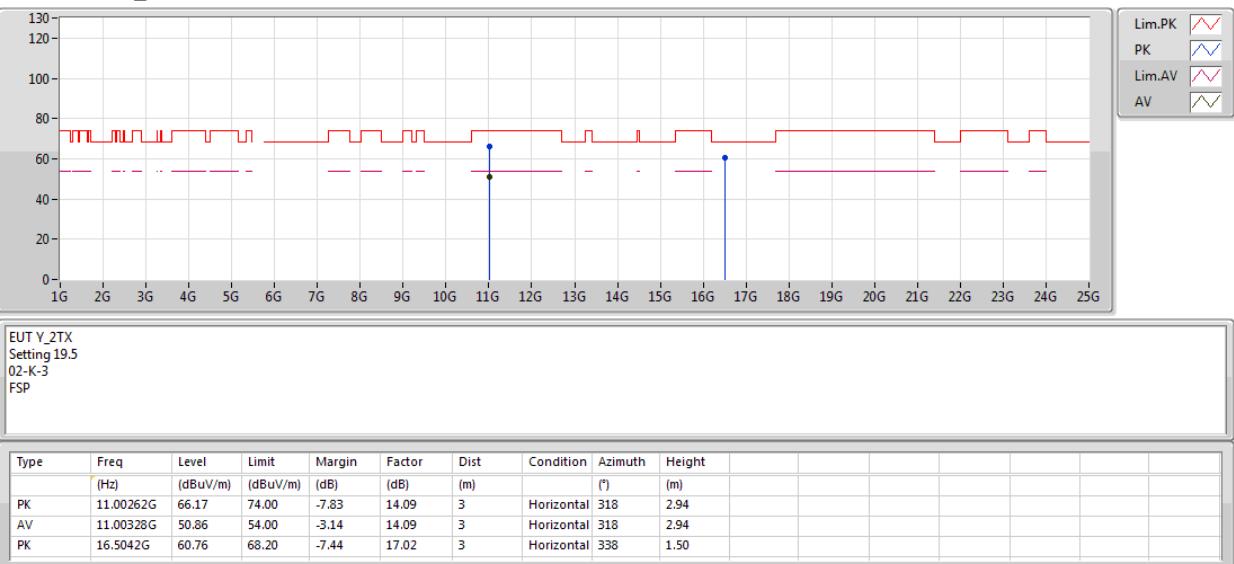
RSE TX above 1GHz Result

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802.11ac VHT20_Nss1,(MCS0)_2TX

28/09/2018

5500MHz_TX





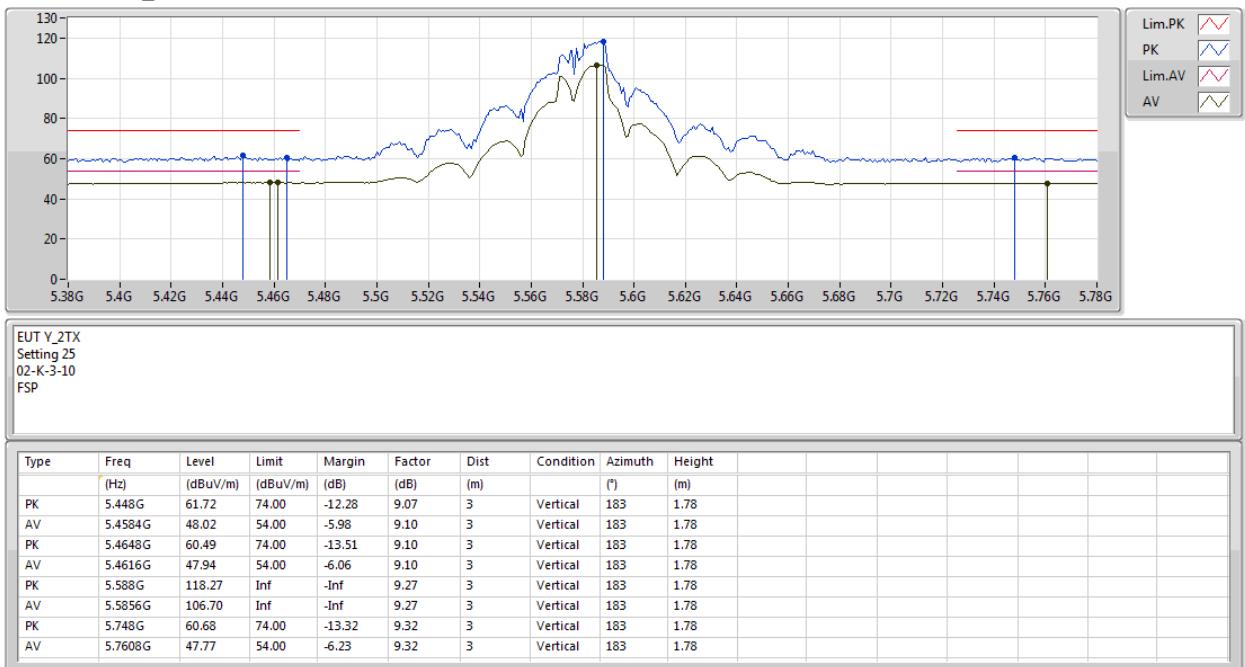
RSE TX above 1GHz Result

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802.11ac VHT20_Nss1,(MCS0)_2TX

28/09/2018

5580MHz_TX





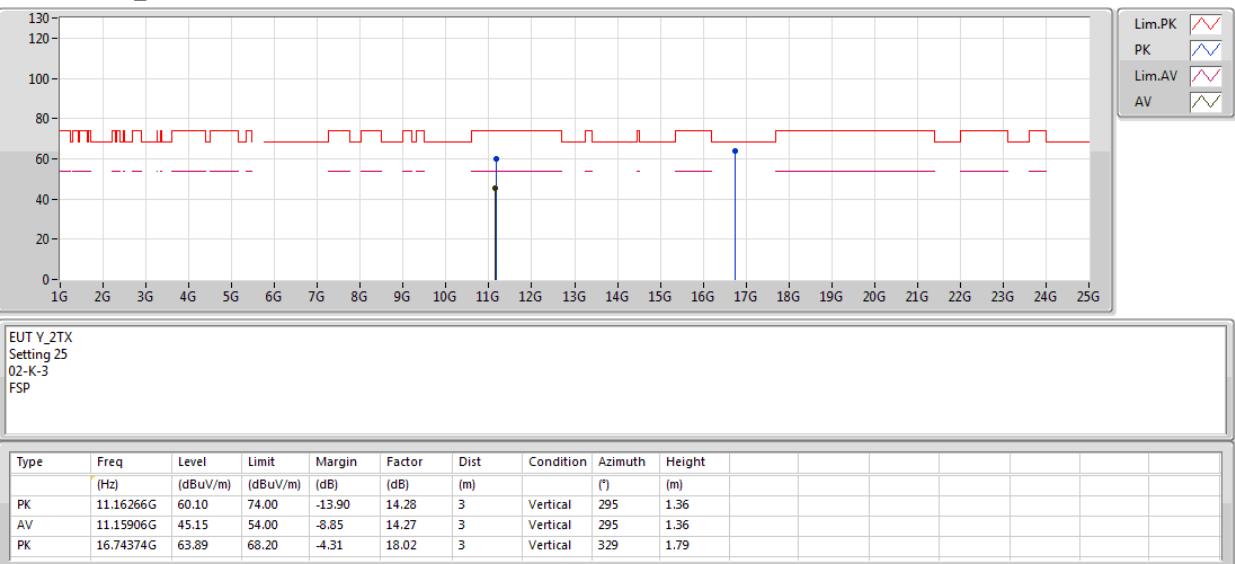
RSE TX above 1GHz Result

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802.11ac VHT20_Nss1,(MCS0)_2TX

28/09/2018

5580MHz_TX





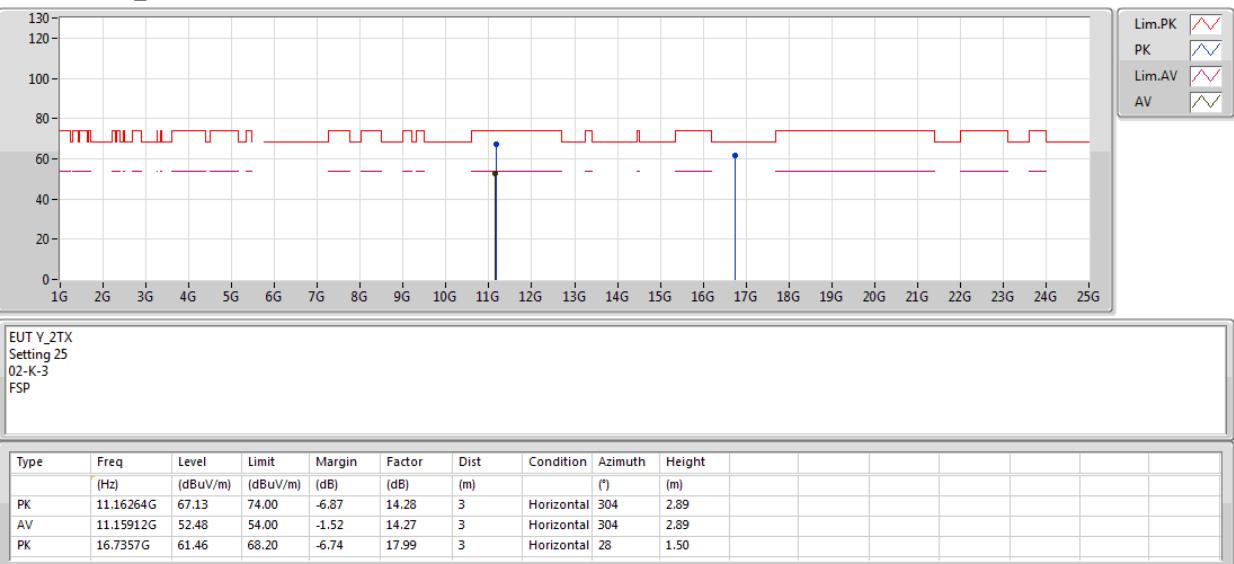
RSE TX above 1GHz Result

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802.11ac VHT20_Nss1,(MCS0)_2TX

28/09/2018

5580MHz_TX





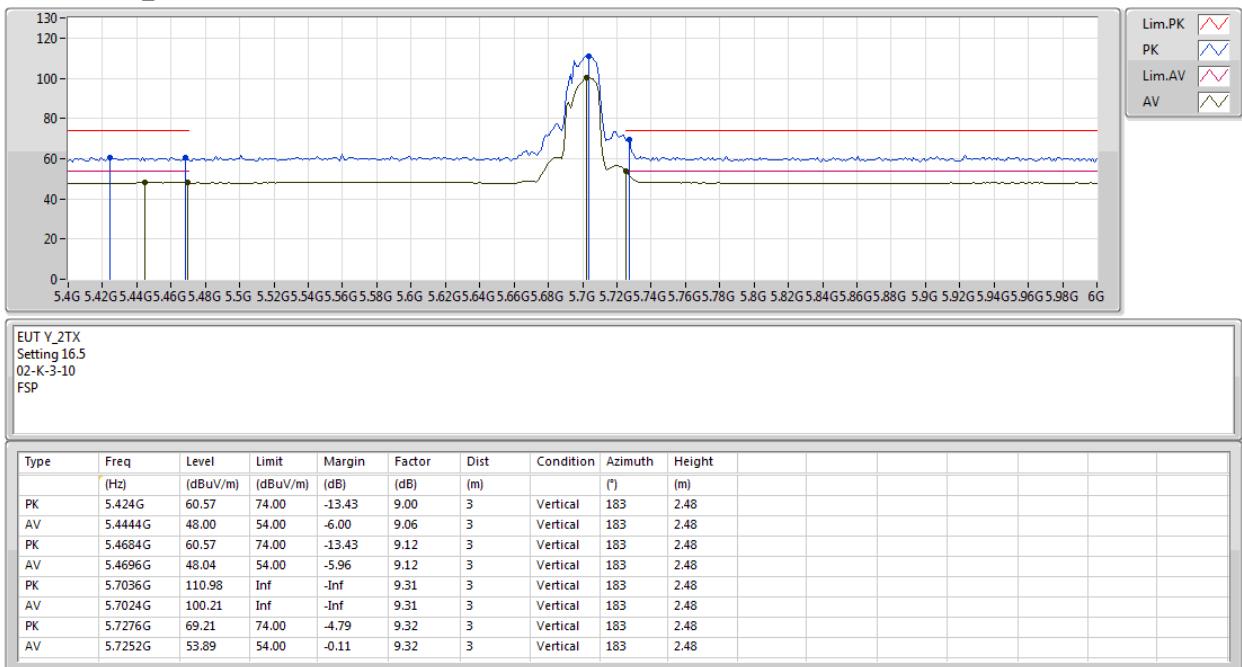
RSE TX above 1GHz Result

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802.11ac VHT20_Nss1,(MCS0)_2TX

28/09/2018

5700MHz_TX





RSE TX above 1GHz Result

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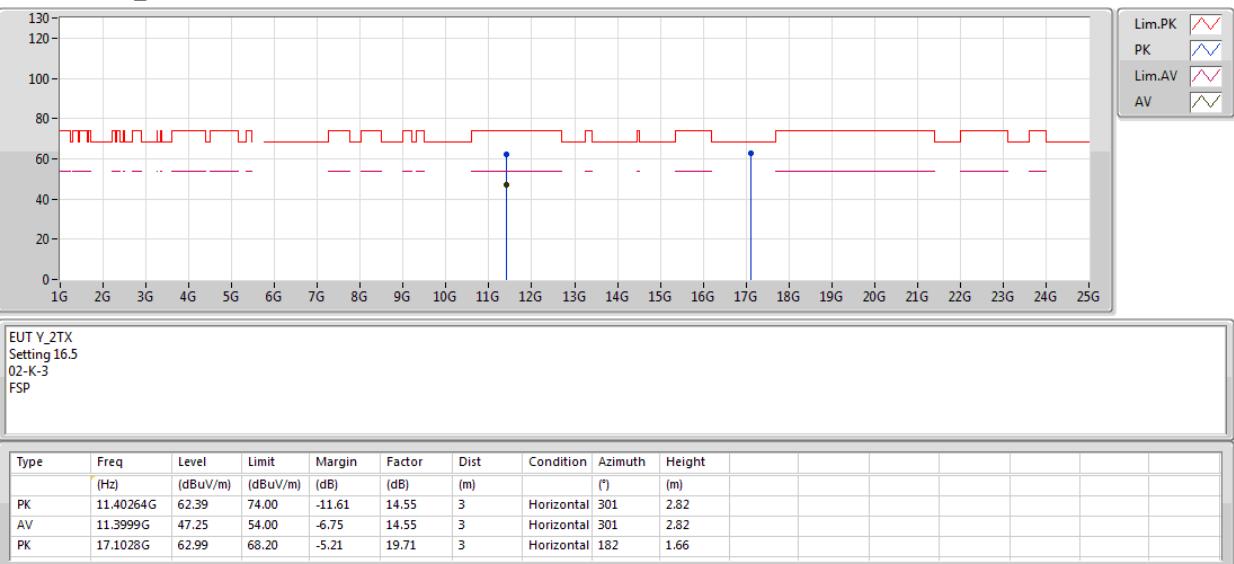
RSE TX above 1GHz Result

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802.11ac VHT20_Nss1,(MCS0)_2TX

28/09/2018

5700MHz_TX



802.11ac VHT40_Nss1,(MCS0)_2TX

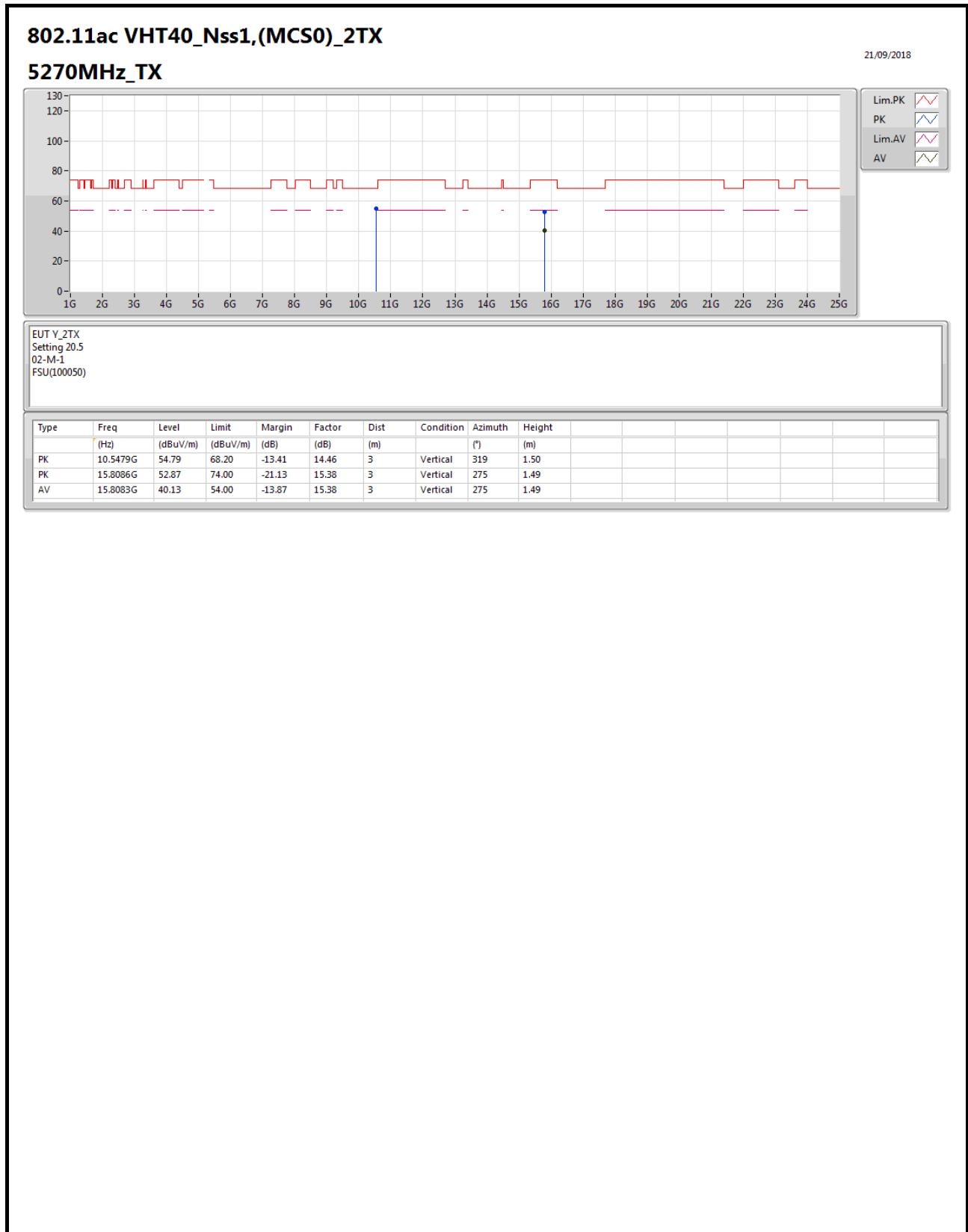
21/09/2018

5270MHz_TX




RSE TX above 1GHz Result

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RSE TX above 1GHz Result

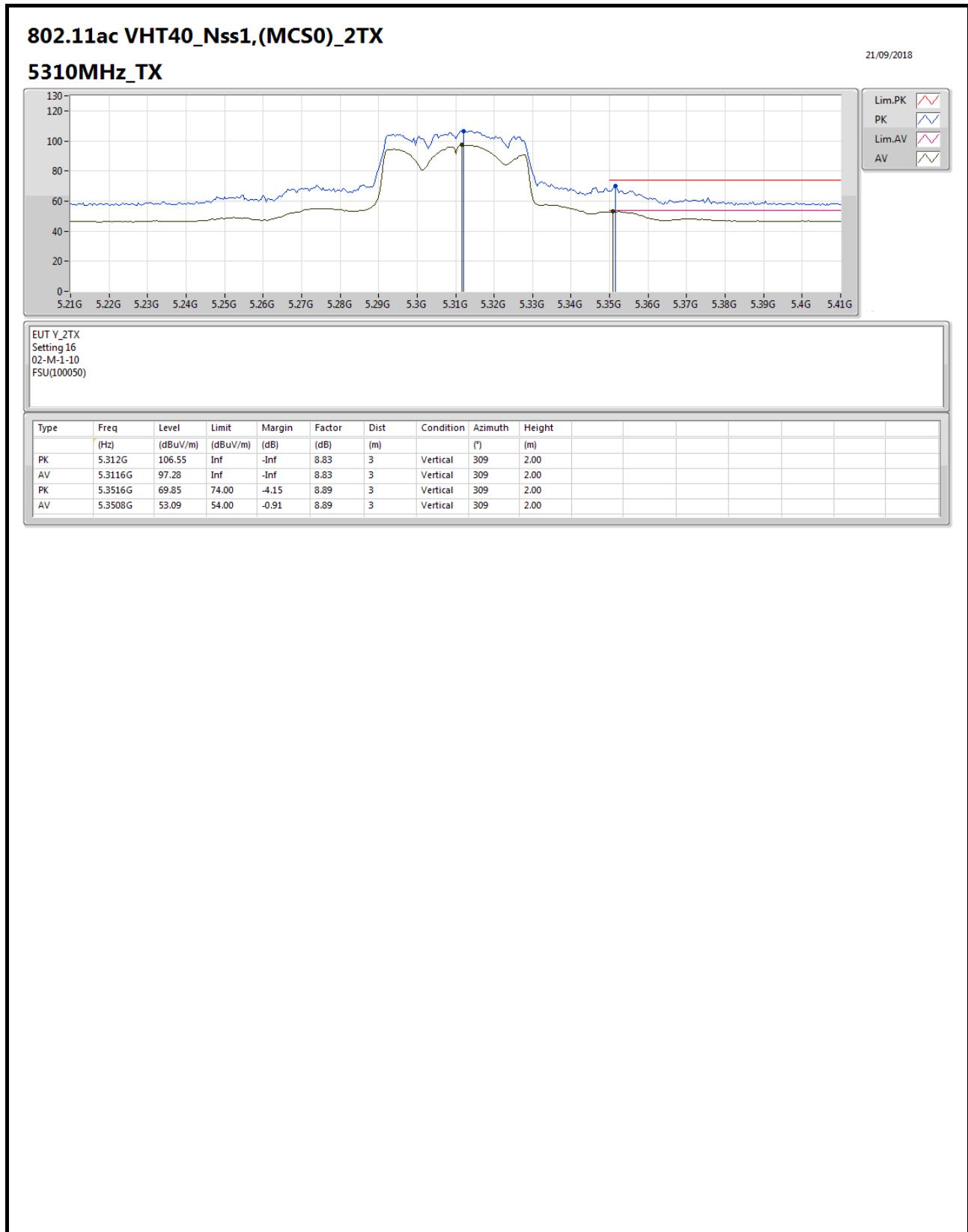
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RSE TX above 1GHz Result

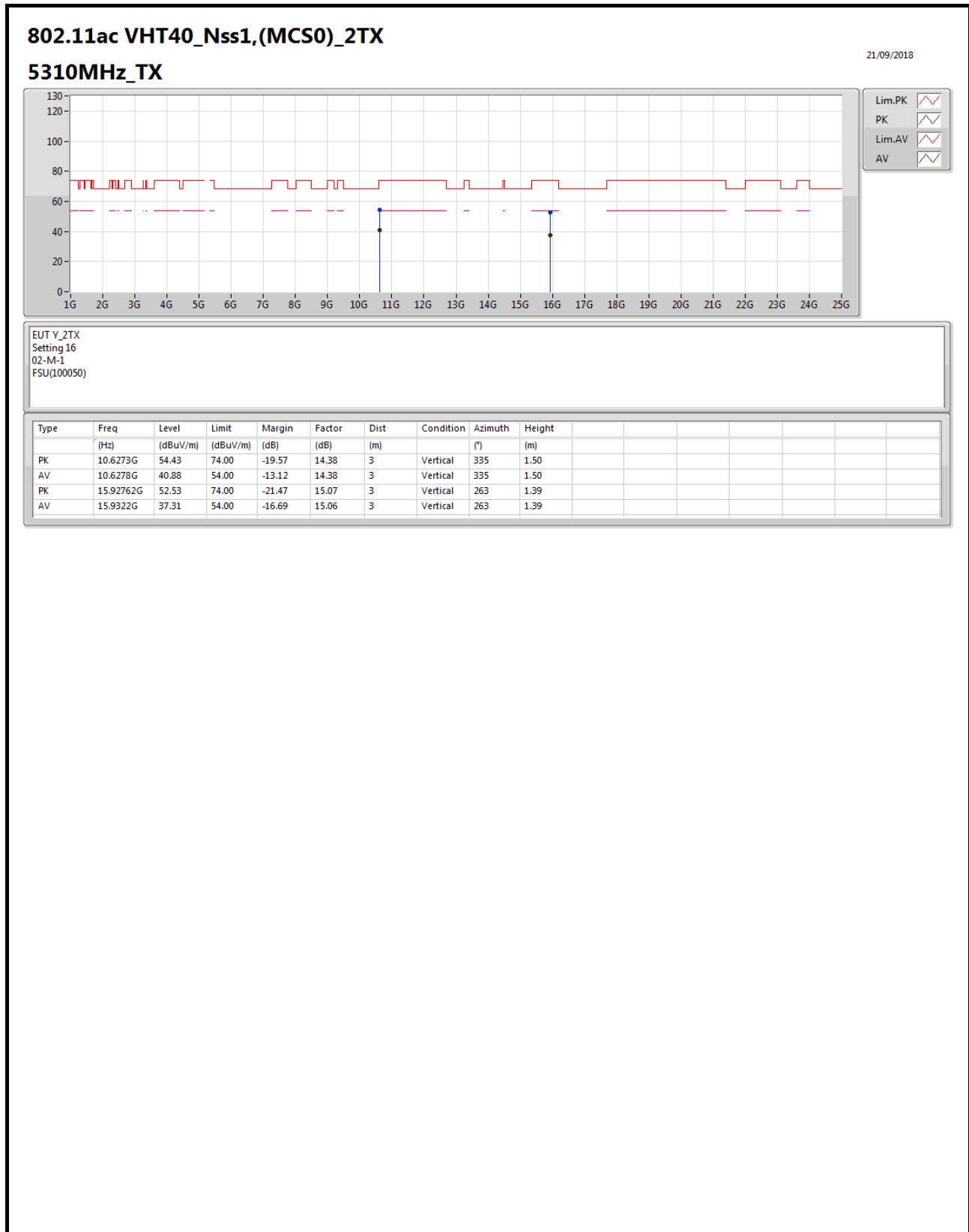
Appendix D





RSE TX above 1GHz Result

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RSE TX above 1GHz Result

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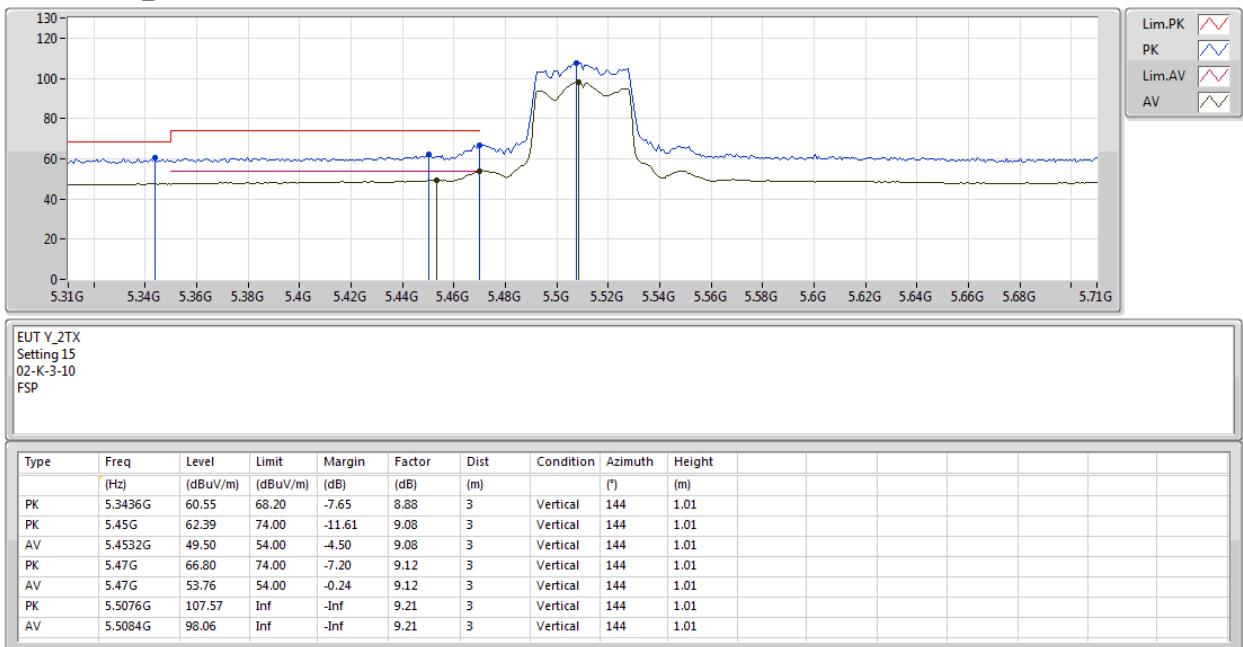
RSE TX above 1GHz Result

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802.11ac VHT40_Nss1,(MCS0)_2TX

28/09/2018

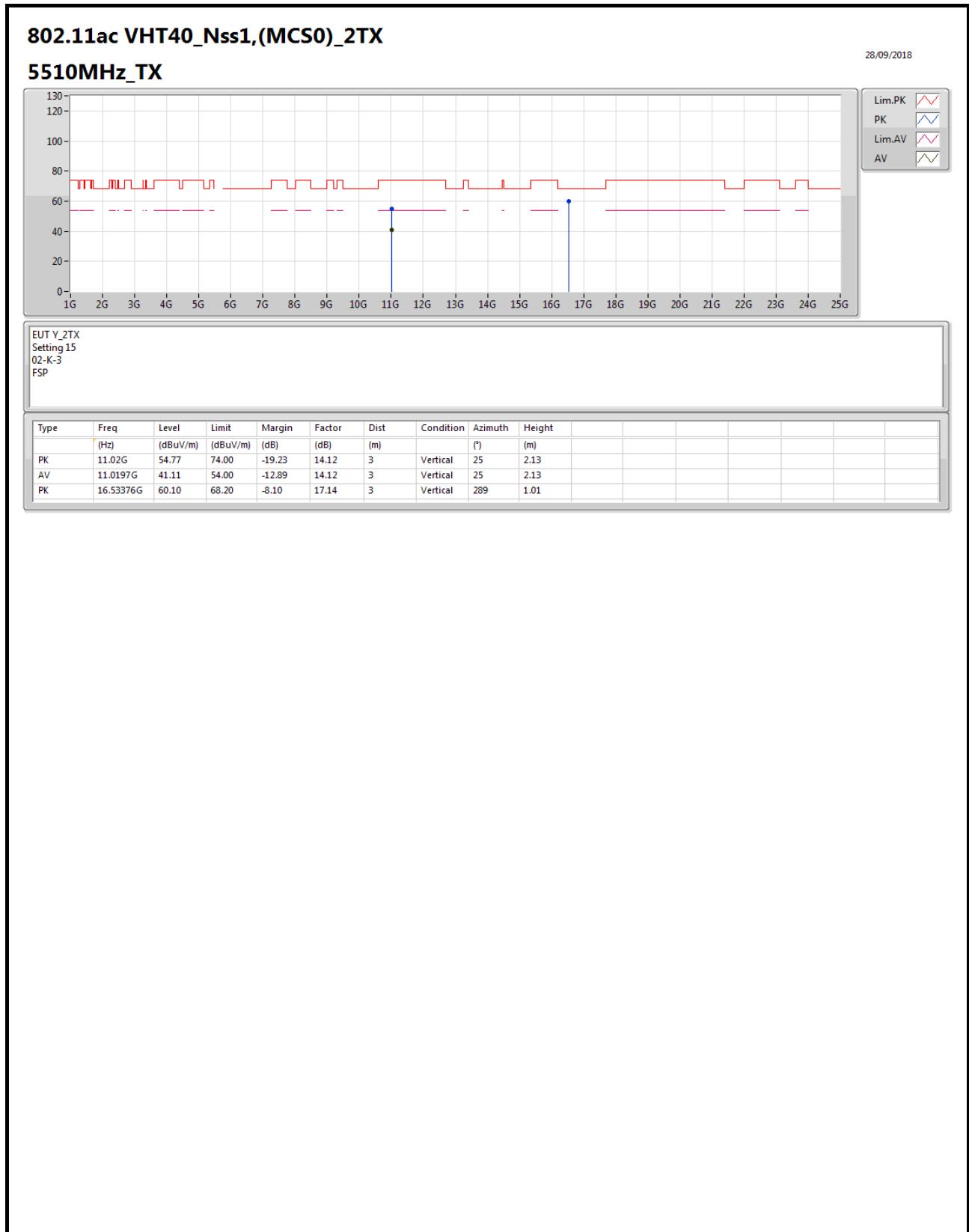
5510MHz_TX





RSE TX above 1GHz Result

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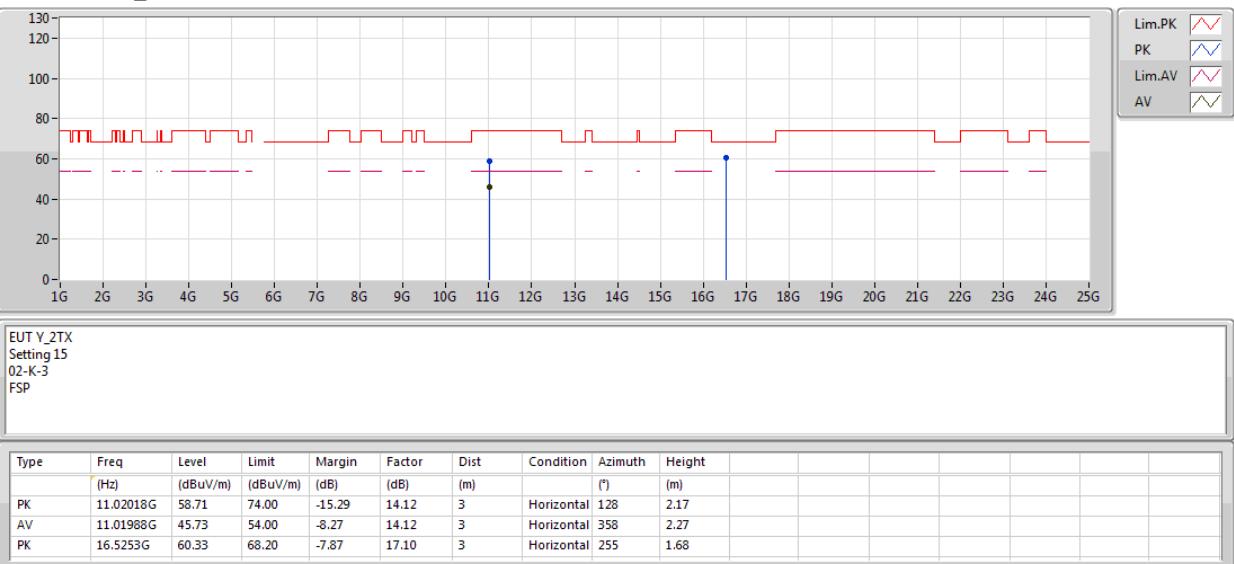
RSE TX above 1GHz Result

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802.11ac VHT40_Nss1,(MCS0)_2TX

28/09/2018

5510MHz_TX





RSE TX above 1GHz Result

Appendix D

802.11ac VHT40_Nss1,(MCS0)_2TX

28/09/2018

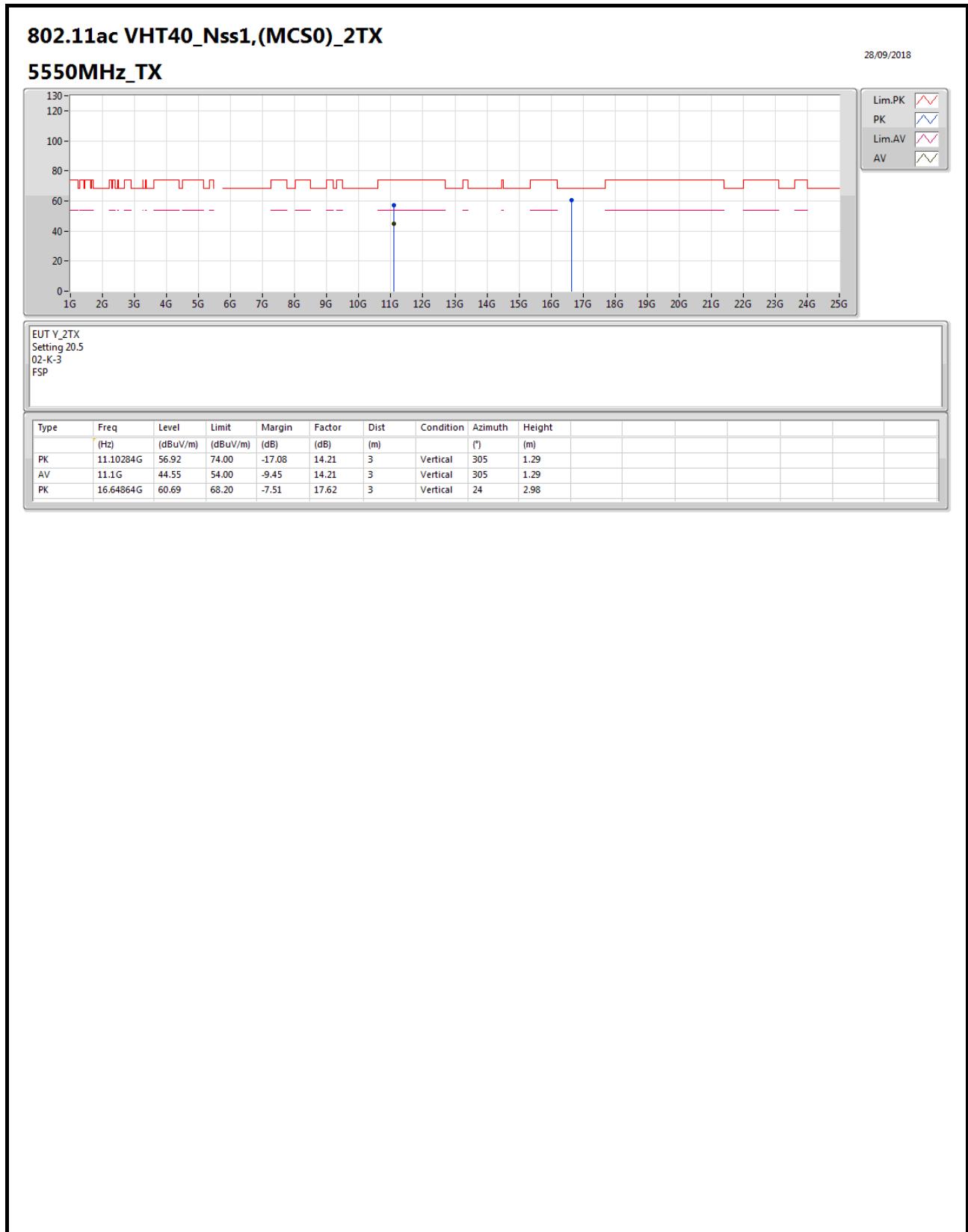
5550MHz_TX





RSE TX above 1GHz Result

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RSE TX above 1GHz Result

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802.11ac VHT40_Nss1,(MCS0)_2TX

28/09/2018

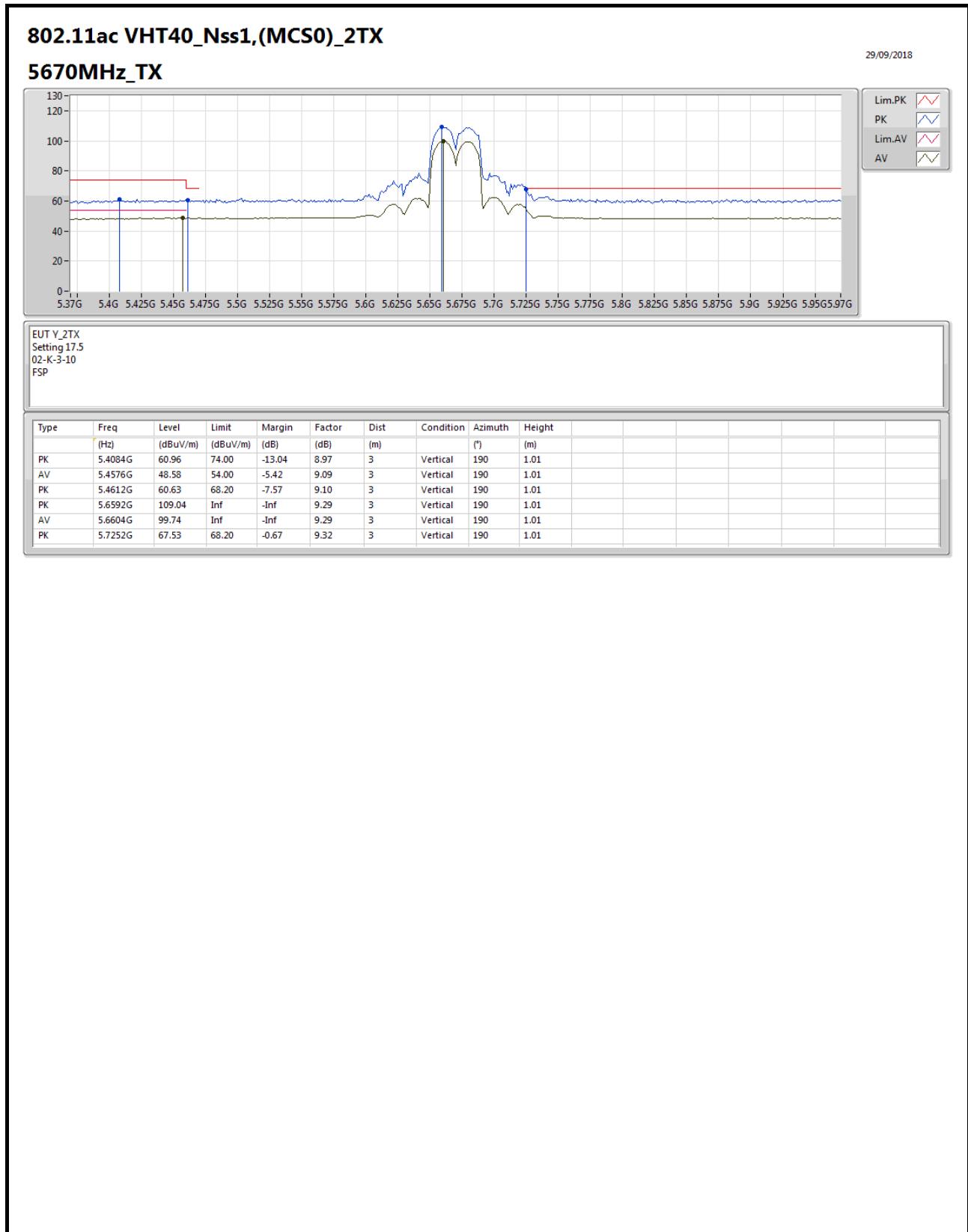
5550MHz_TX





RSE TX above 1GHz Result

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RSE TX above 1GHz Result

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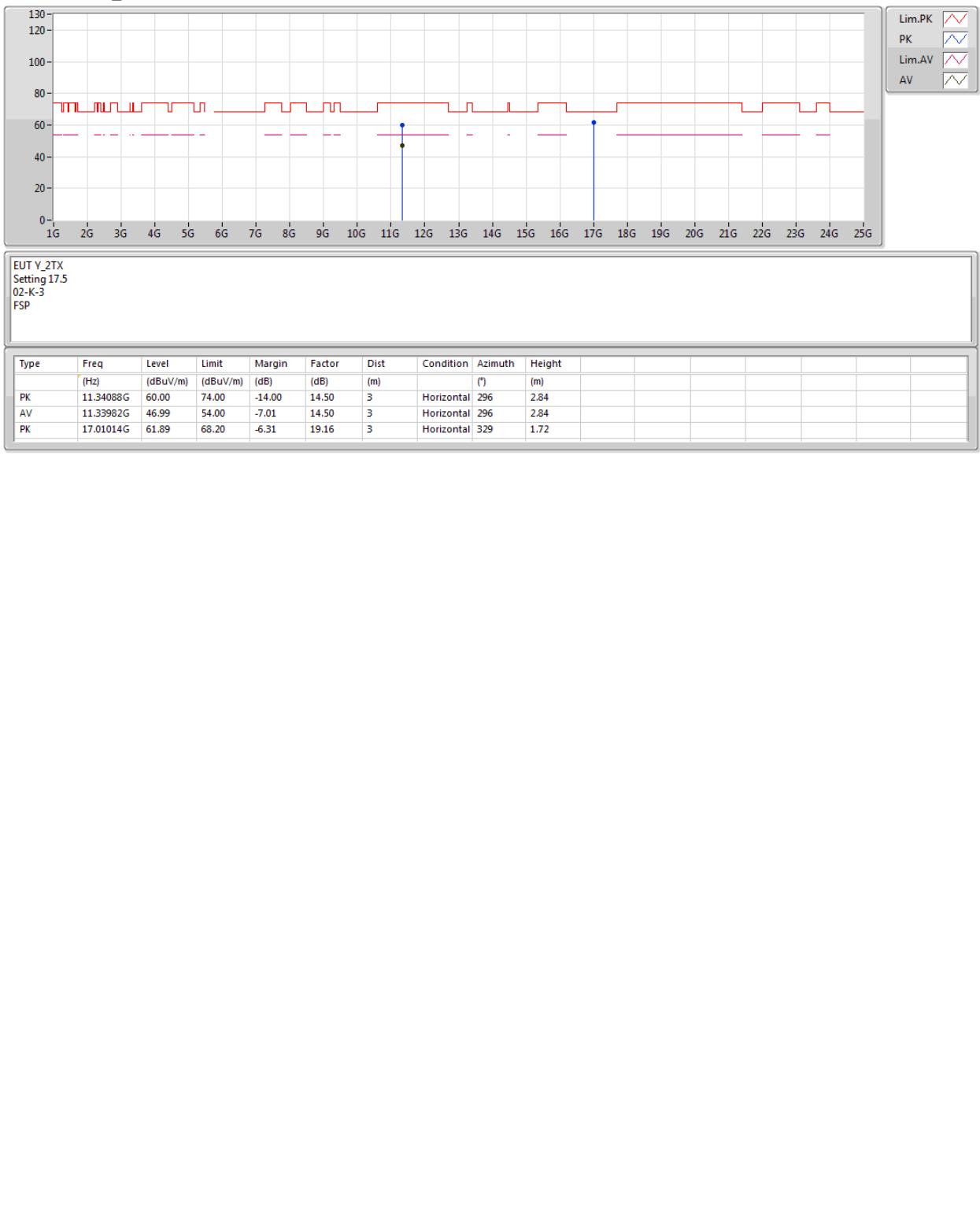
RSE TX above 1GHz Result

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802.11ac VHT40_Nss1,(MCS0)_2TX

29/09/2018

5670MHz_TX





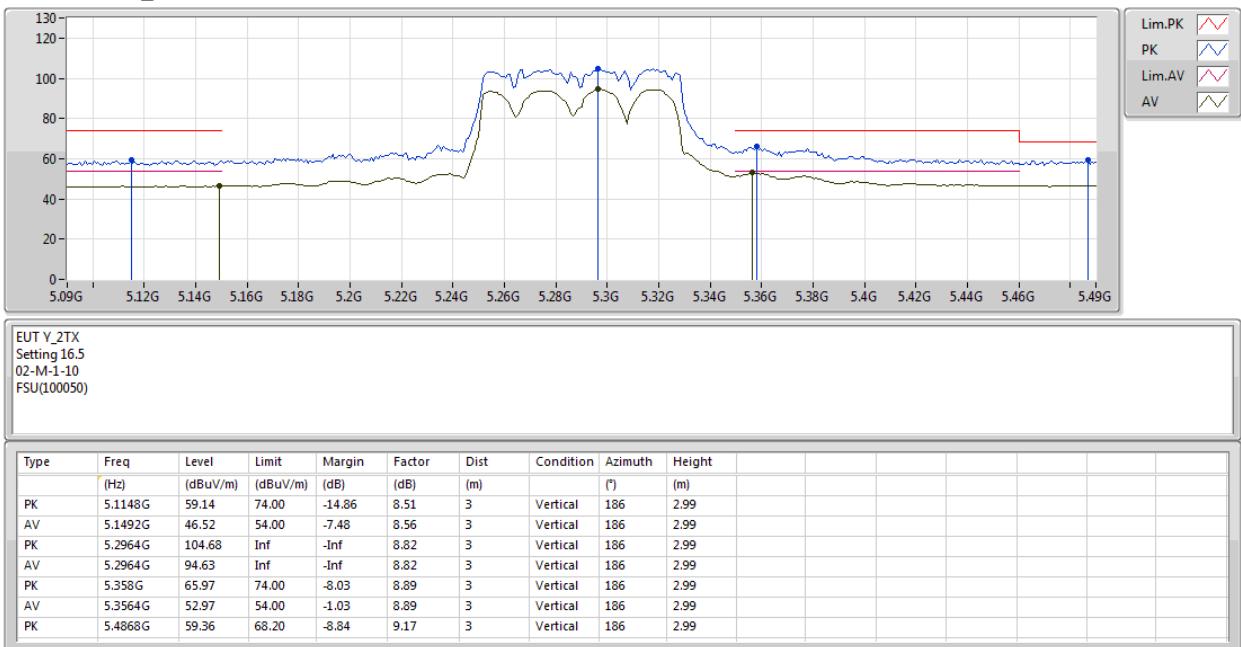
RSE TX above 1GHz Result

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802.11ac VHT80_Nss1,(MCS0)_2TX

21/09/2018

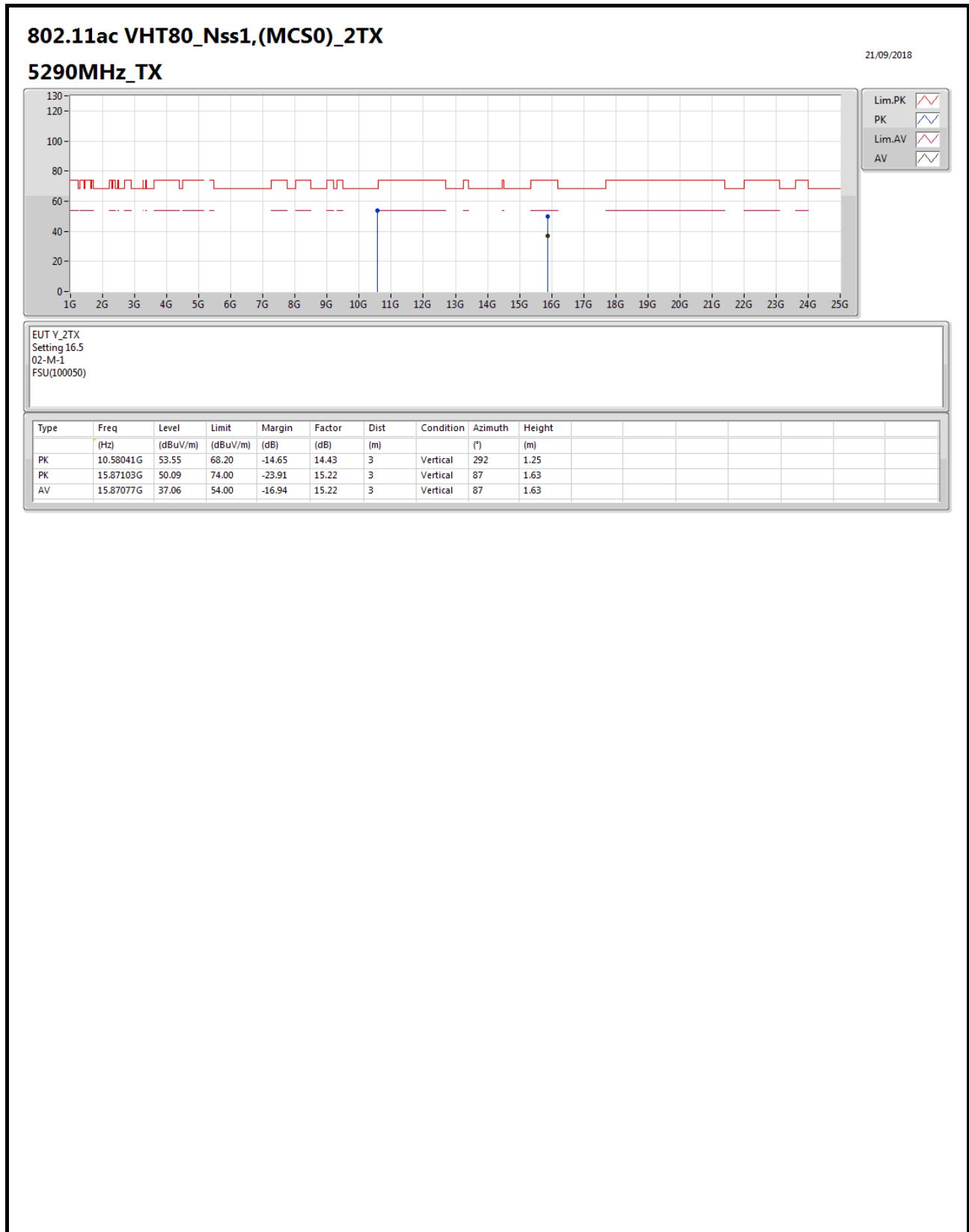
5290MHz_TX





RSE TX above 1GHz Result

Appendix D





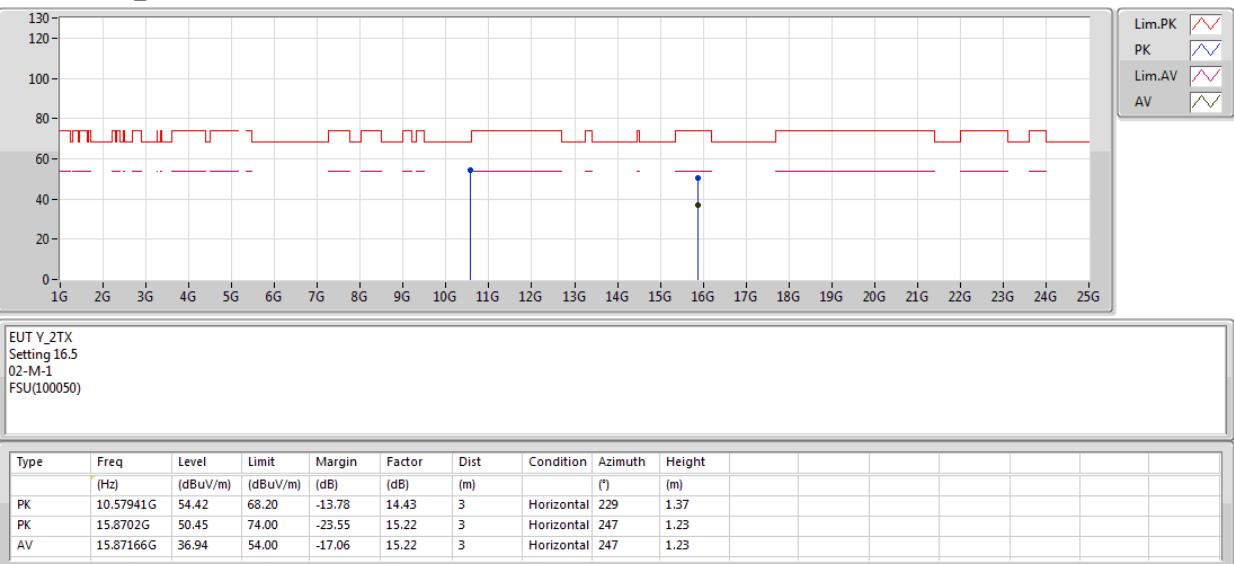
RSE TX above 1GHz Result

Appendix D

802.11ac VHT80_Nss1,(MCS0)_2TX

21/09/2018

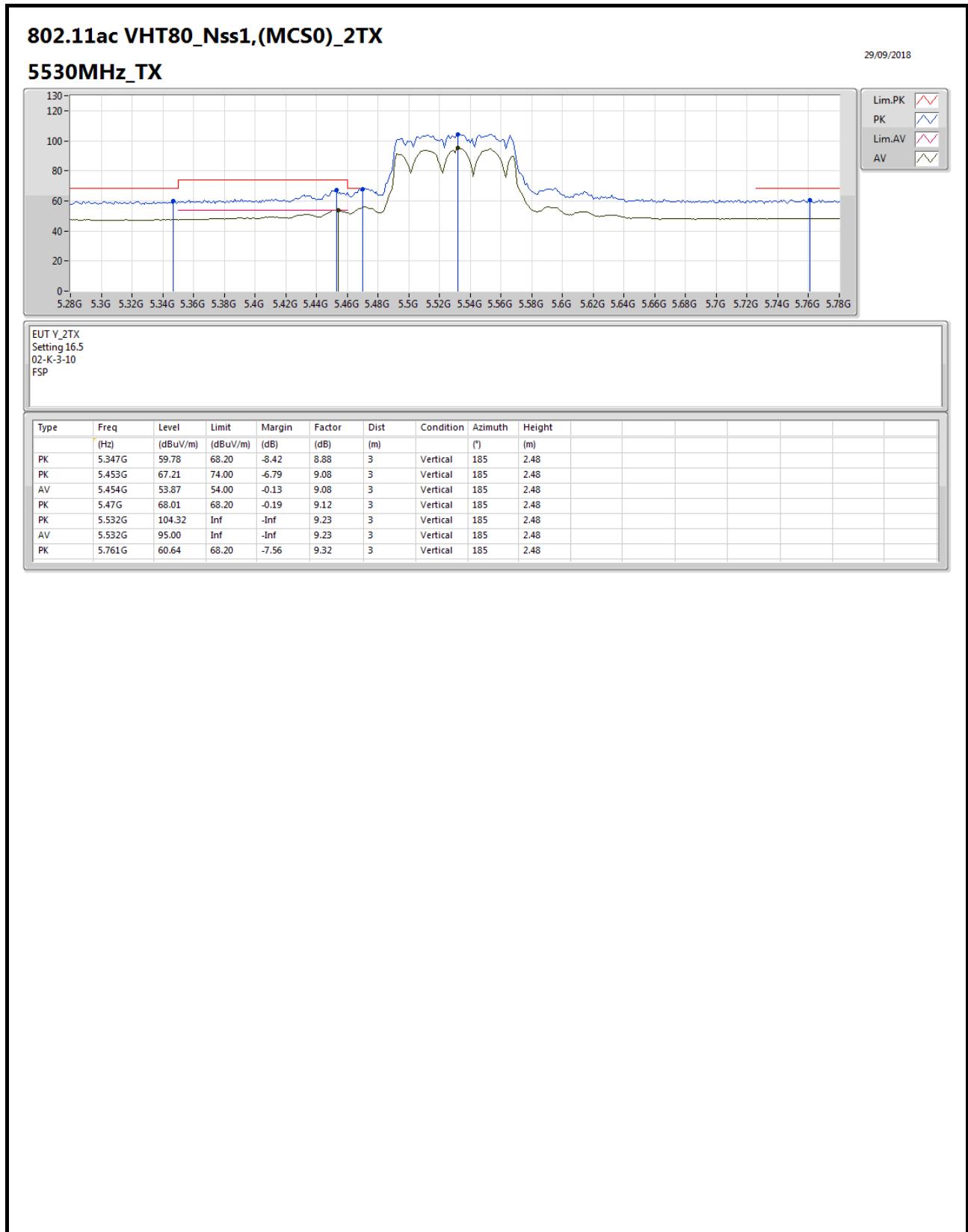
5290MHz_TX





RSE TX above 1GHz Result

Appendix D





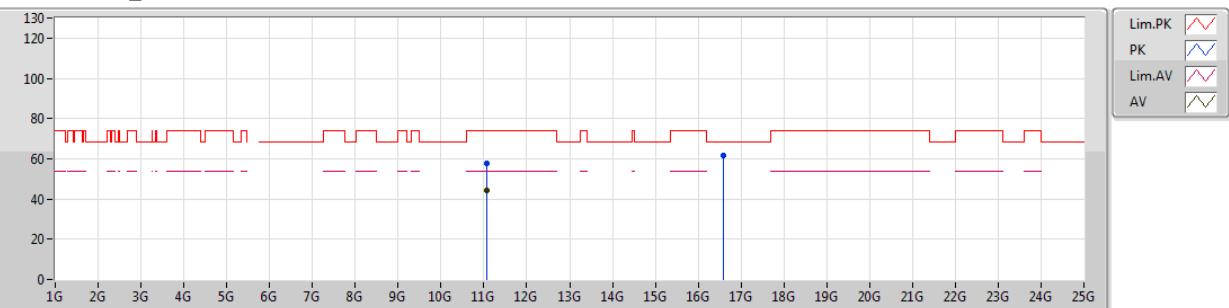
RSE TX above 1GHz Result

Appendix D



802.11ac VHT80_Nss1,(MCS0)_2TX

29/09/2018

5530MHz_TX


EUT Y_2TX
Setting 16.5
02-K-3
FSP

Type	Freq (Hz)	Level (dB _{UV} /m)	Limit (dB _{UV} /m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)									
PK	11.0598G	57.67	74.00	-16.33	14.16	3	Horizontal	312	2.96									
AV	11.0598G	44.15	54.00	-9.85	14.16	3	Horizontal	312	2.96									
PK	16.59382G	61.52	68.20	-6.68	17.40	3	Horizontal	322	2.99									



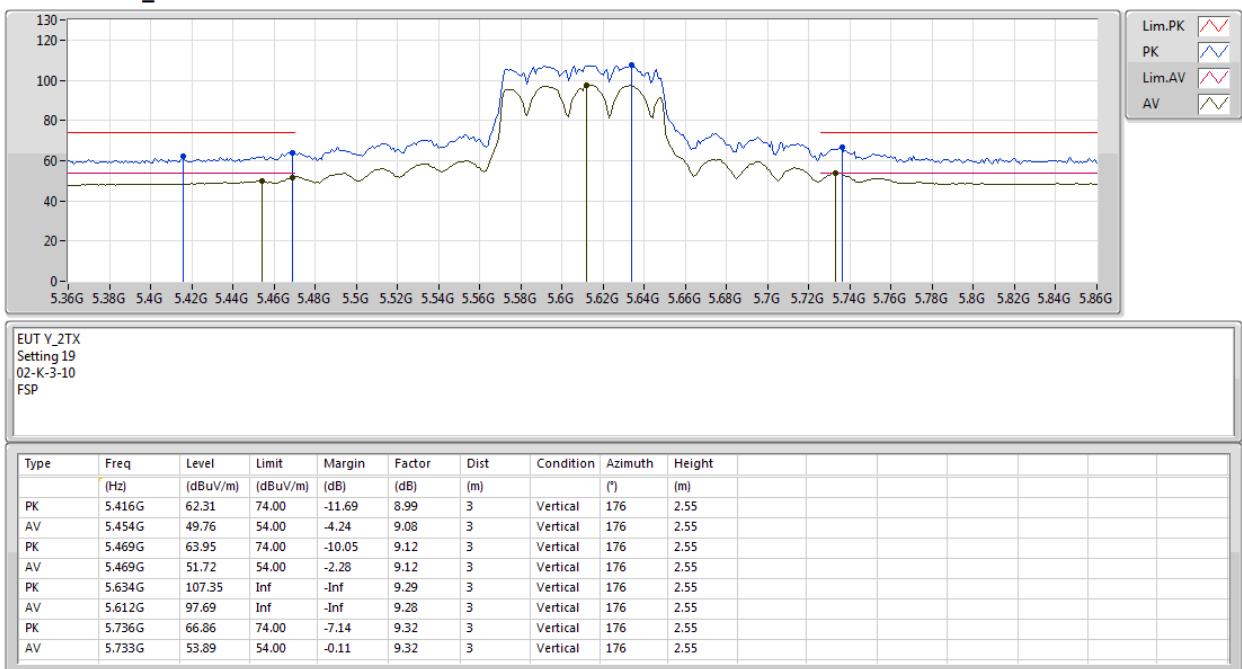
RSE TX above 1GHz Result

Appendix D

802.11ac VHT80_Nss1,(MCS0)_2TX

29/09/2018

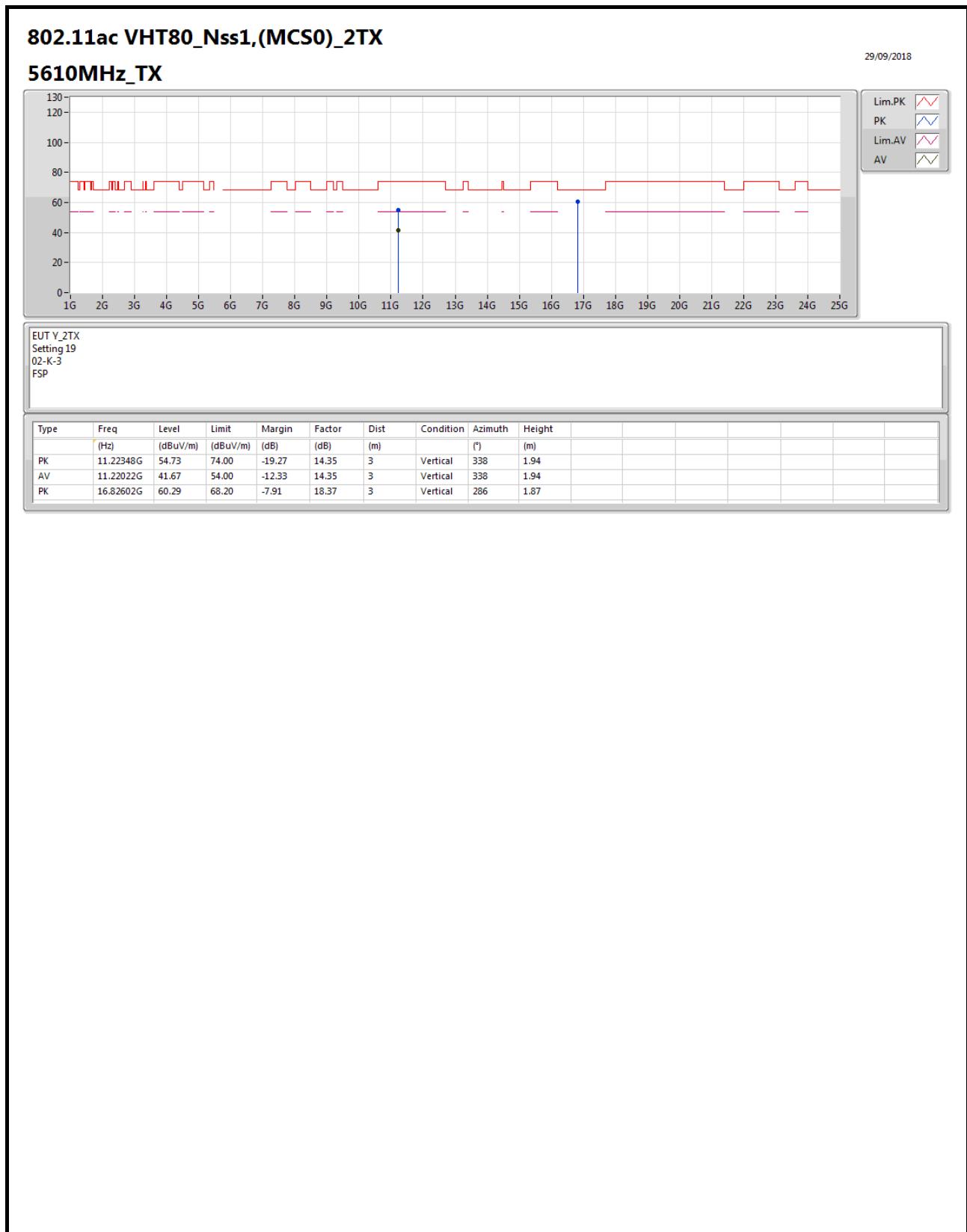
5610MHz_TX





RSE TX above 1GHz Result

Appendix D





RSE TX above 1GHz Result

Appendix D

802.11ac VHT80_Nss1,(MCS0)_2TX

29/09/2018

5610MHz_TX

