

FCC Test Report

Equipment : 802.11 b/g/n RTL8723DE Combo module
Brand Name : REALTEK
Model No. : RTL8723DE
FCC ID : TX2-RTL8723DE
Standard : 47 CFR FCC Part 15.247
Operating Band : 2400 MHz – 2483.5 MHz
Function : ☒ Point-to-multipoint; ☐ Point-to-point
Applicant : Realtek Semiconductor Corp.
No. 2, Innovation Road II, Hsinchu Science Park,
Hsinchu 300, Taiwan
Manufacturer : Realtek Semiconductor Corp.
No. 2, Innovation Road II, Hsinchu Science Park,
Hsinchu 300, Taiwan

The product sample received on Nov. 01, 2016 and completely tested on Nov. 29, 2016. We, SPORTON, 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., the test report shall not be reproduced except in full.

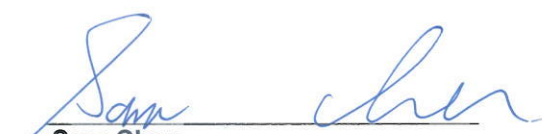

Sam Chen
SPORTON INTERNATIONAL INC.

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Summary of Test Result

Conformance Test Specifications				
Report Clause	Ref. Std. Clause	Description	Limit	Result
1.1.2	15.203	Antenna Requirement	FCC 15.203	Complied
3.1	15.207	AC Power-line Conducted Emissions	FCC 15.207	Complied
3.2	15.247(d)	Emissions in Non-restricted Frequency Bands	Non-Restricted Bands: > 30 dBc	Complied
3.3	15.247(d)	Emissions in Restricted Frequency Bands	Restricted Bands: FCC 15.209	Complied



1 General Description

1.1 Information

1.1.1 RF General Information

Frequency Range (MHz)	IEEE Std. 802.11	Ch. Frequency (MHz)	Channel Number
2400-2483.5	b, g, n (HT20)	2412-2472	1-13 [13]
2400-2483.5	n (HT40)	2422-2462	3-11 [9]

Band	Mode	BWch (MHz)	Nant
2.4G	11b	20	1
2.4G	11g	20	1
2.4G	11n	20	1
2.4G	11n	40	1

Note:

- 2.4G is the 2.4GHz Band (2.4-2.4835GHz).
- 11b mode uses a combination of DSSS-DBPSK, DQPSK, CCK modulation.
- 11g, HT20 and HT40 use a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM 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.	Brand	P/N	Antenna Type	Connector	Gain (dBi)
1	LYNwave	ALA110-222050-300011	PIFA Antenna	I-PEX MHF4	3.5
2	PSA	RFDPA171320EMLB301	Dipole Antenna	I-PEX MHF4	3.14

Note1: The EUT has two antennas.

Note2: Chain 1 can connect to Ant. 1 or Ant. 2.

For WLAN 802.11b/g/n (1TX, 1RX) mode:

Chain 1 can be used as transmitting/receiving antenna.

For Bluetooth mode:

Chain 1 can be used as transmitting/receiving antenna.

1.1.3 Mode Test Duty Cycle

Mode	DC	T(s)	VBW(Hz) $\geq 1/T$
11b	1	n/a (DC $\geq$ 0.98)	n/a (DC $\geq$ 0.98)
11g	0.981	n/a (DC $\geq$ 0.98)	n/a (DC $\geq$ 0.98)
HT20	0.981	n/a (DC $\geq$ 0.98)	n/a (DC $\geq$ 0.98)
HT40	0.997	n/a (DC $\geq$ 0.98)	n/a (DC $\geq$ 0.98)

1.1.4 EUT Operational Condition

EUT Power Type	From host system		
Beamforming Function	☐ With beamforming	☒ Without beamforming	

1.1.5 Table for Class II Change

This product is an extension of original one reported under Sporton project number: FR5D1601AA

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

Modifications	Performance Checking
Adding an one-connector type module (fixed to CON1) for A+E key type	1. AC Power-line Conducted Emissions 2. Emissions in Non-restricted Frequency Bands 3. Emissions in Restricted Frequency Bands

Note: The above test items will be based on original output power to re-test.

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 558074 D01 v03r05
- ♦ FCC KDB 662911 D01 v02r01
- ♦ FCC KDB 412172 D01 v01

1.3 Testing Location Information

Testing Location				
☐	HWA YA	ADD : No. 52, Hwa Ya 1st Rd., Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.	TEL : 886-3-327-3456	FAX : 886-3-318-0055
☒	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
AC Conduction	CO01-CB	Ryo Fan & Kane Liu	22°C / 52%	Nov. 17, 2016
Radiated	03CH01-CB	Welson Chen & Paul Chen	22°C / 54%	Nov. 22, 2016 ~ Nov. 29, 2016
RF Conducted	TH01-CB	Welson Chen & Paul Chen	22°C / 54%	Nov. 22, 2016 ~ Nov. 29, 2016

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)	3.2 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	3.6 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	3.7 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	3.5 dB	Confidence levels of 95%
Conducted Emission	1.7 dB	Confidence levels of 95%

2 Test Configuration of EUT

2.1 Test Channel Mode

Band	Mode	BWch (MHz)	Nss-Min	Nant	Ch. (MHz)	Range	Power Setting
2.4G	11b	20	1	1	2412	L	37
2.4G	11b	20	1	1	2437	M	36
2.4G	11b	20	1	1	2462	H	35
2.4G	11b	20	1	1	2467	H	36
2.4G	11b	20	1	1	2472	H	21
2.4G	11g	20	1	1	2412	L	43
2.4G	11g	20	1	1	2437	M	45
2.4G	11g	20	1	1	2462	H	39
2.4G	11g	20	1	1	2467	H	39
2.4G	11g	20	1	1	2472	H	29
2.4G	HT20	20	1,(M0)	1	2412	L	41
2.4G	HT20	20	1,(M0)	1	2437	M	46
2.4G	HT20	20	1,(M0)	1	2462	H	39
2.4G	HT20	20	1,(M0)	1	2467	H	37
2.4G	HT20	20	1,(M0)	1	2472	H	28
2.4G	HT40	40	1,(M0)	1	2422	L	41
2.4G	HT40	40	1,(M0)	1	2437	M	40
2.4G	HT40	40	1,(M0)	1	2452	H	40
2.4G	HT40	40	1,(M0)	1	2457	H	38
2.4G	HT40	40	1,(M0)	1	2462	H	36

Note:

- ♦ Test range channel consist of L (Low Ch.), M (Middle Ch.), H (High Ch.), S (Single Ch.) and C (Straddle Band Ch.).

2.2 The Worst Case Measurement Configuration

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

The Worst Case Mode for Following Conformance Tests	
Tests Item	Emissions in Non-restricted Frequency Bands
Test Condition	Conducted measurement at transmit chains
Operating Mode	Note
1	EUT + Ant. 1

The Worst Case Mode for Following Conformance Tests	
Tests Item	Emissions in Restricted Frequency Bands
Test Condition	Radiated measurement If EUT consist of multiple antenna assembly (multiple antenna are used in EUT regardless of spatial multiplexing MIMO configuration), the radiated test should be performed with highest antenna gain of each antenna type.
Operating Mode < 1GHz	Normal Link
1	EUT in Z axis + Ant. 1
2	EUT in Z axis + Ant. 2
For operating mode 1 is the worst case and it was record in this test report.	
Operating Mode > 1GHz	CTX The EUT was performed at X axis, Y axis and Z axis position for Radiated emission above 1GHz test, and the worst case was found at Z axis. So the measurement will follow this same test configuration.
1	EUT in Z axis + Ant. 1
2	EUT in Z axis + Ant. 2

The Worst Case Mode for Following Conformance Tests	
Tests Item	Simultaneous Transmission Analysis
Test Condition	Radiated measurement
Operating Mode	Normal Link
1	EUT in X axis + Ant. 1
2	EUT in Y axis + Ant. 1
3	EUT in Z axis + Ant. 1
Mode 3 has been evaluated to be the worst case among Mode 1~3, thus measurement for Mode 4 will follow this same test mode.	
4	EUT in Z axis + Ant. 2
For operating Mode 3 is the worst case, so it was selected to record in this test report	
Refer to Sporton Test.: Appendix D for Radiated Emission Co-location.	

Note: For Conducted measurement Test: only the higher gain antenna “Ant. 1” was selected to perform the test and recorded in this report.

2.3 EUT Operation during Test

For CTX Mode:

The EUT was programmed to be in continuously transmitting mode.

For Normal Link:

During the test, the EUT operation to normal function.

2.4 Accessories

N/A

2.5 Support Equipment

For Test Site No: CO01-CB

Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID
1	AP Router	Planex	GW-AP54SGX	KA220030603014-1
2	NB	DELL	E6430	DoC
3	NB	DELL	E6430	DoC
4	Test fixture*2	Realtek	Ameba adapter	N/A
5	Device	REALTEK	RTL8723DE	TX2-RTL8723DE
6	Earphone	SHYARO CHI	MIC-04	DoC
7	Mouse	Logitech	M-U0026	DoC

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

Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID
1	NB	DELL	E4300	DoC
2	NB	DELL	E4300	DoC
3	WLAN AP	Netgear	R7500	PY314300288
4	Test fixture*2	Realtek	Ameba adapter	NA
5	Device	REALTEK	RTL8723DE	TX2-RTL8723DE
6	Mouse	Logitech	M-U0026	DoC
7	Earphone	SHYARO CHI	MIC-04	DoC

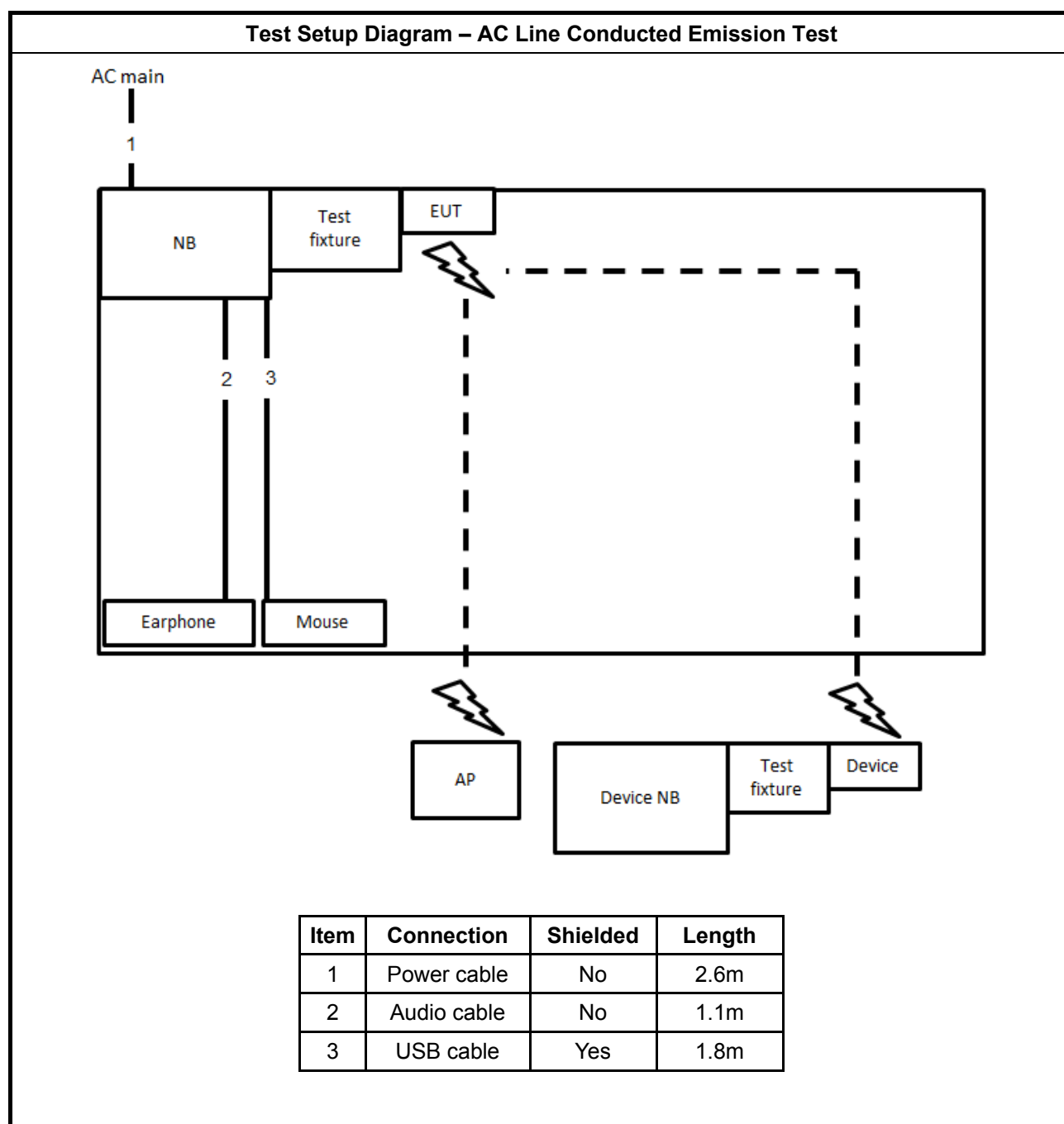
For Test Site No: 03CH01-CB (above 1GHz)

Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID
1	NB	DELL	E4300	DoC
2	Test fixture	Realtek	Ameba adapter	N/A

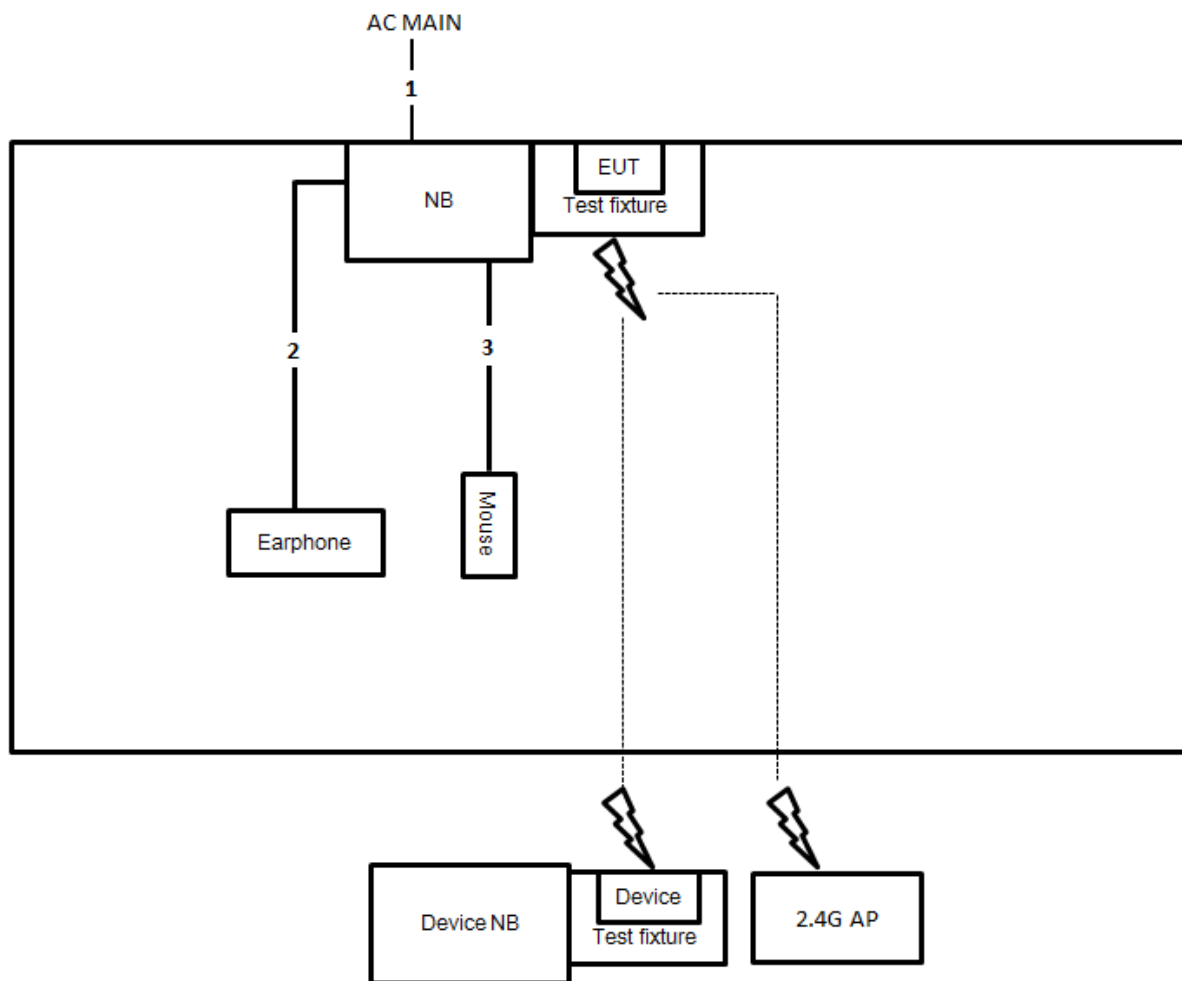
For Test Site No: TH01-CB

Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID
1	NB	DELL	E4300	DoC
2	Test fixture	Realtek	Ameba adapter	N/A

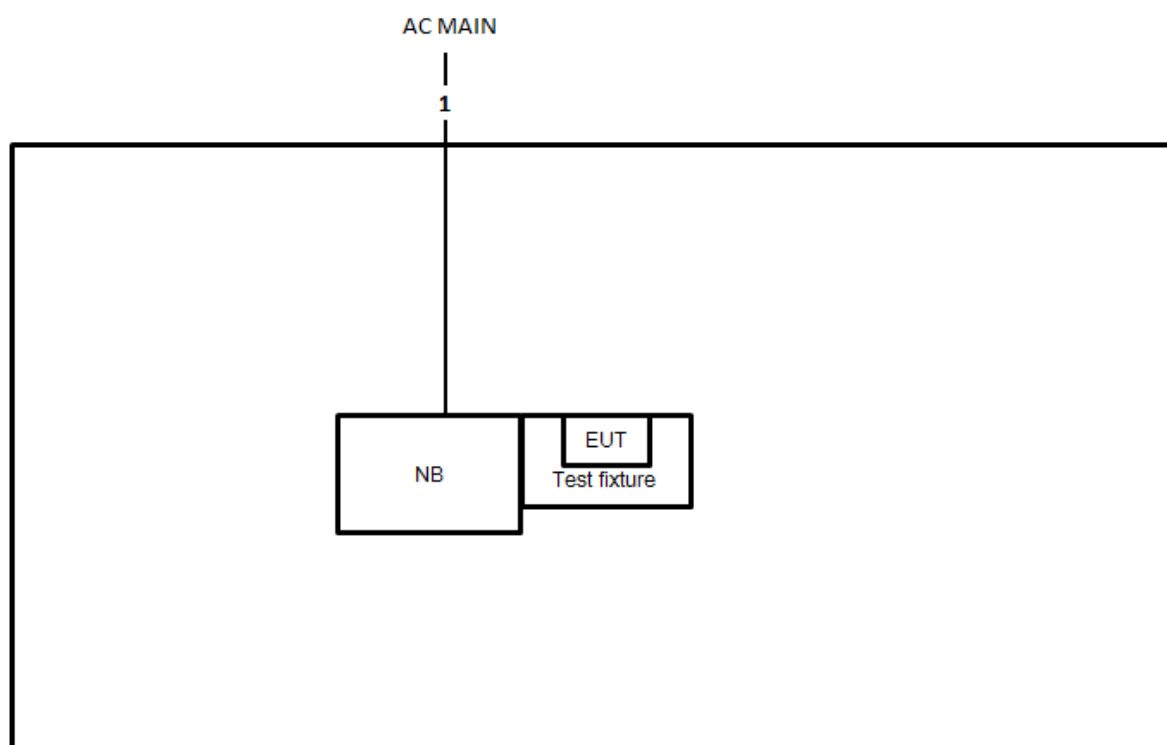
2.6 Test Setup Diagram



Test Setup Diagram - Radiated Test < 1GHz



Item	Connection	Shielded	Length
1	Power cable	No	2.6m
2	Audio cable	No	1.8m
3	USB cable	Yes	1.8m

Test Setup Diagram - Radiated Test > 1GHz


Item	Connection	Shielded	Length
1	Power cable	No	2.6m

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.

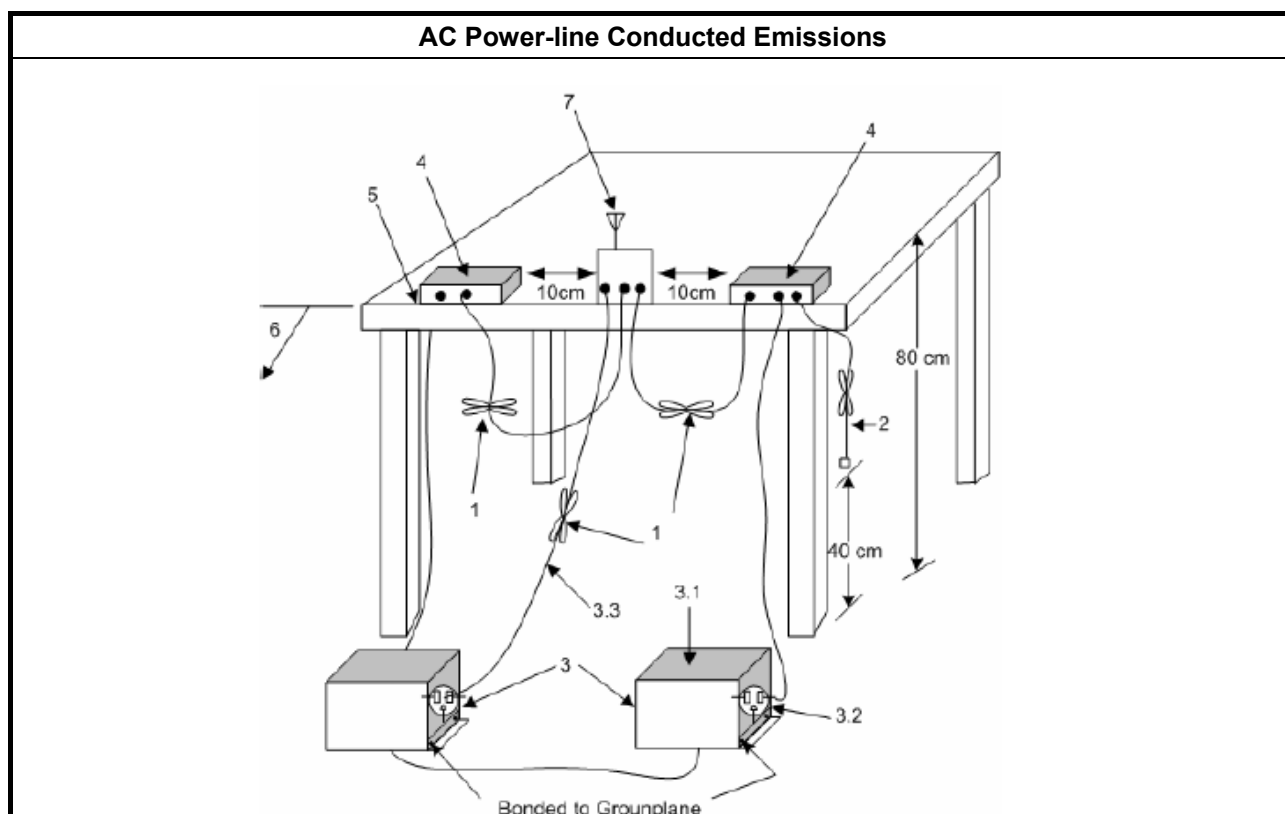
3.1.2 Measuring Instruments

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.

3.1.4 Test Setup





3.1.5 Test Result of AC Power-line Conducted Emissions

Refer as Appendix A

3.2 Emissions in Non-restricted Frequency Bands

3.2.1 Emissions in Non-restricted Frequency Bands Limit

Un-restricted Band Emissions Limit	
RF output power procedure	Limit (dB)
Peak output power procedure	20
Average output power procedure	30
Note 1: If the peak output power procedure is used to measure the fundamental emission power to demonstrate compliance to requirements, then the peak conducted output power measured within any 100 kHz outside the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum measured in-band peak PSD level. Note 2: If the average output power procedure is used to measure the fundamental emission power to demonstrate compliance to requirements, then the power in any 100 kHz outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum measured in-band average PSD level.	

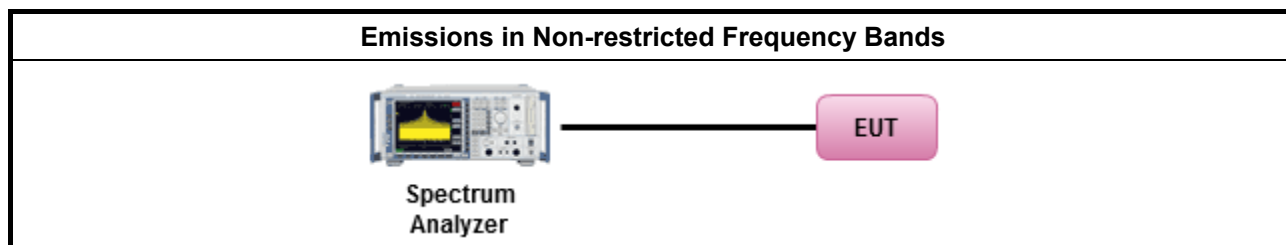
3.2.2 Measuring Instruments

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

3.2.3 Test Procedures

Test Method
Refer as FCC KDB 558074, clause 11 for unwanted emissions into non-restricted bands.

3.2.4 Test Setup





3.2.5 Test Result of Emissions in Non-restricted Frequency Bands

Refer as Appendix B

3.3 Emissions in Restricted Frequency Bands

3.3.1 Emissions in Restricted Frequency Bands Limit

Restricted Band Emissions 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.

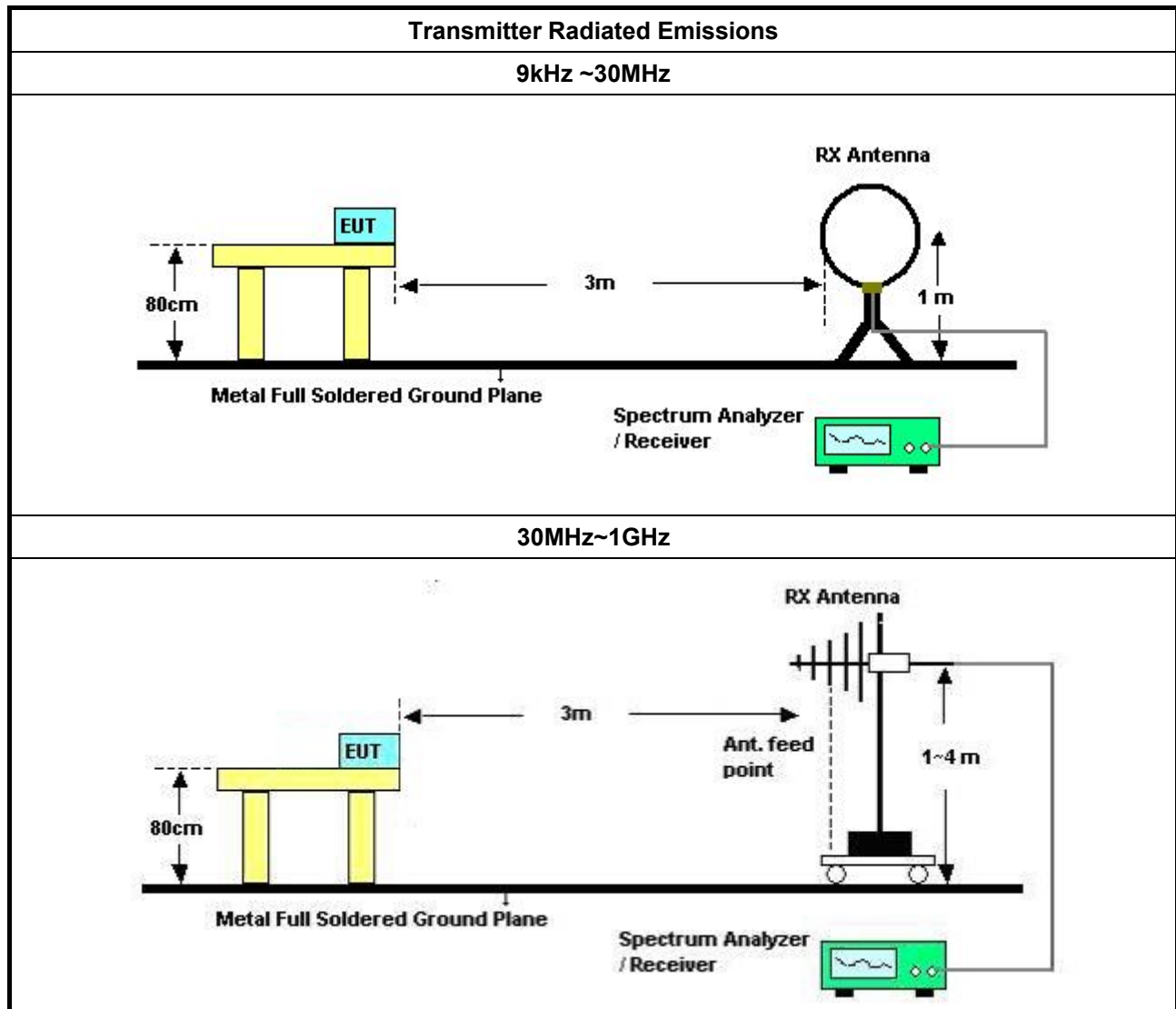
3.3.2 Measuring Instruments

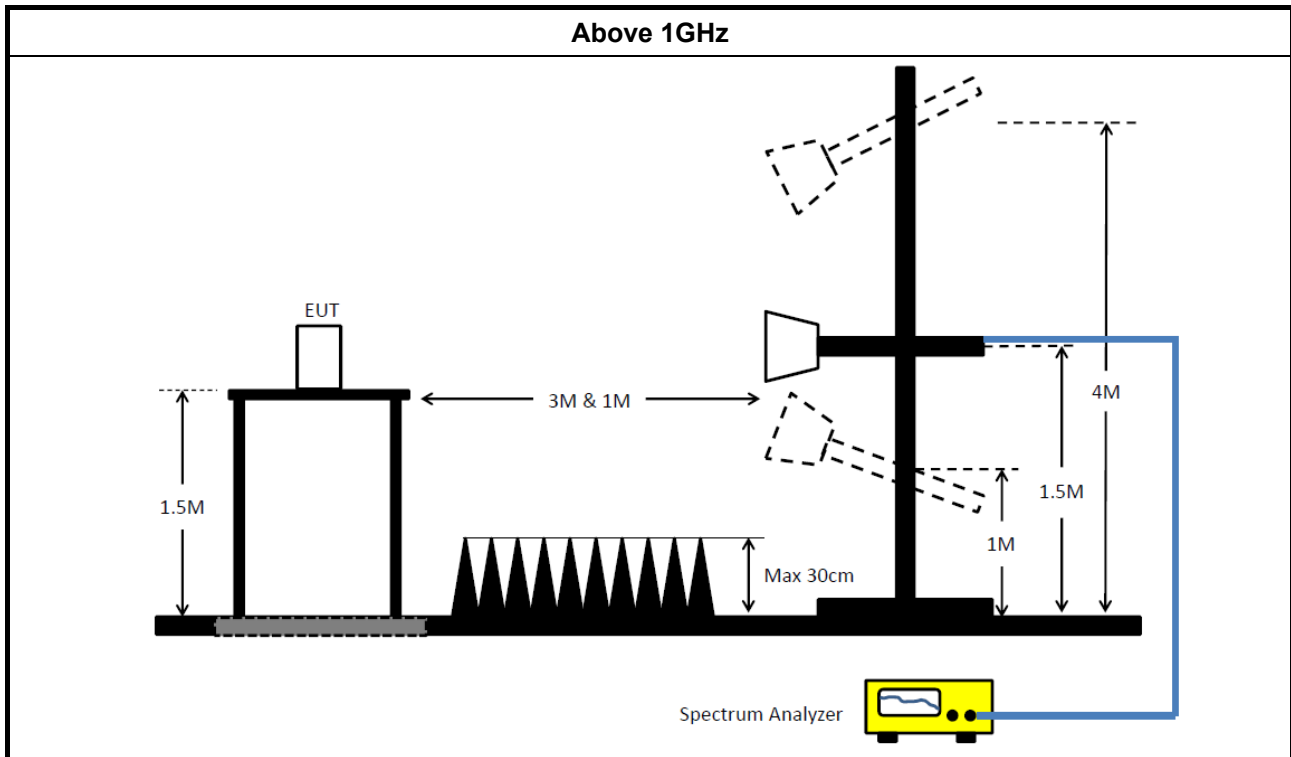
Refer a test equipment and calibration data table in this test report.

3.3.3 Test Procedures

Test Method	
The average emission levels shall be measured in [duty cycle ≥ 98 or duty factor].	
Refer as ANSI C63.10, clause 6.9.2.2 band-edge testing shall be performed at the lowest frequency channel and highest frequency channel within the allowed operating band.	
For the transmitter unwanted emissions shall be measured using following options below:	
	Refer as FCC KDB 558074, clause 12 for unwanted emissions into restricted bands.
	☐ Refer as FCC KDB 558074, clause 12.2.5.1 Option 1 (trace averaging for duty cycle $\geq 98\%$)
	☐ Refer as FCC KDB 558074, clause 12.2.5.2 Option 2 (trace averaging + duty factor).
	☒ Refer as FCC KDB 558074, clause 12.2.5.3 Option 3 (Reduced VBW $\geq 1/T$).
	☐ Refer as ANSI C63.10, clause 4.2.3.2.3 (Reduced VBW). VBW $\geq 1/T$, where T is pulse time.
	☐ Refer as ANSI C63.10, clause 4.2.3.2.4 average value of pulsed emissions.
	☒ Refer as FCC KDB 558074, clause 12.2.4 measurement procedure peak limit.
For the transmitter band-edge emissions shall be measured using following options below:	
	Refer as FCC KDB 558074 clause 13.1, When the performing peak or average radiated measurements, emissions within 2 MHz of the authorized band edge may be measured using the marker-delta method described below.
	Refer as FCC KDB 558074, clause 13.2 (ANSI C63.10, clause 6.9.3) for marker-delta method for band-edge measurements.
	Refer as FCC KDB 558074, clause 13.3 for narrower resolution bandwidth (100kHz) using the band power and summing the spectral levels (i.e., 1 MHz).
For conducted and cabinet radiation measurement, refer as FCC KDB 558074, clause 12.2.2.	
	For conducted unwanted emissions into restricted bands (absolute emission limits). Devices with multiple transmit chains using options given below: (1) Measure and sum the spectra across the outputs or (2) Measure and add $10 \log(N)$ dB
	For FCC KDB 662911 The methodology described here may overestimate array gain, thereby resulting in apparent failures to satisfy the out-of-band limits even if the device is actually compliant. In such cases, compliance may be demonstrated by performing radiated tests around the frequencies at which the apparent failures occurred.

3.3.4 Test Setup





3.3.5 Transmitter Radiated Unwanted Emissions (Below 30MHz)

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

3.3.6 Test Result of Transmitter Radiated Unwanted Emissions

Refer as Appendix C

4 Test Equipment and Calibration Data

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMI Receiver	Agilent	N9038A	My52260123	9kHz ~ 8.45GHz	Jan. 27, 2016	Conduction (CO01-CB)
LISN	F.C.C.	FCC-LISN-50-16-2	04083	150kHz ~ 100MHz	Dec. 08, 2015	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127647	9kHz ~ 30MHz	Dec. 23, 2015	Conduction (CO01-CB)
COND Cable	Woken	Cable	01	150kHz ~ 30MHz	May 24, 2016	Conduction (CO01-CB)
Software	Audix	E3	6.120210n	-	N.C.R.	Conduction (CO01-CB)
BILOG ANTENNA with 6dB Attenuator	TESEQ & EMCI	CBL6112D & N-6-06	37880 & AT-N0609	20MHz ~ 2GHz	Aug. 30, 2016	Radiation (03CH01-CB)
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	Mar. 16, 2016*	Radiation (03CH01-CB)
Horn Antenna	EMCO	3115	00075790	750MHz ~ 18GHz	Nov. 10, 2016	Radiation (03CH01-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Jul. 25, 2016	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8447D	2944A10991	0.1MHz ~ 1.3GHz	Mar. 15, 2016	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02310	1GHz ~ 26.5GHz	Jan. 18, 2016	Radiation (03CH01-CB)
Pre-Amplifier	MITEQ	TTA1840-35-HG	1864479	18GHz ~ 40GHz	Jun. 28, 2016	Radiation (03CH01-CB)
Spectrum Analyzer	R&S	FSP40	100056	9kHz ~ 40GHz	Nov. 21, 2016	Radiation (03CH01-CB)
EMI Test	R&S	ESCS	100355	9kHz ~ 2.75GHz	May 16, 2016	Radiation (03CH01-CB)
RF Cable-low	Woken	Low Cable-1	N/A	30 MHz ~ 1 GHz	Oct. 24, 2016	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-16	N/A	1 GHz ~ 18 GHz	Oct. 24, 2016	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-17	N/A	1 GHz ~ 18 GHz	Oct. 24, 2016	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G-1	N/A	18GHz ~ 40 GHz	Oct. 24, 2016	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G-2	N/A	18GHz ~ 40 GHz	Oct. 24, 2016	Radiation (03CH01-CB)
Test Software	Audix	E3	6.2009-I0-7	N/A	N/A	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSV40	100979	9kHz~40GHz	Dec. 09, 2015	Conducted (TH01-CB)
Temp. and Humidity Chamber	Ten Billion	TTH-D3SP	TBN-931011	-30~100 degree	Jun. 03, 2016	Conducted (TH01-CB)



Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
RF Cable-high	Woken	RG402	High Cable-6	1 GHz – 26.5 GHz	Oct. 24, 2016	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-7	1 GHz – 26.5 GHz	Oct. 24, 2016	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-8	1 GHz – 26.5 GHz	Oct. 24, 2016	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-9	1 GHz – 26.5 GHz	Oct. 24, 2016	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-10	1 GHz – 26.5 GHz	Oct. 24, 2016	Conducted (TH01-CB)
Power Sensor	Agilent	U2021XA	MY54320014	50MHz~18GHz	Apr. 20, 2016	Conducted (TH01-CB)

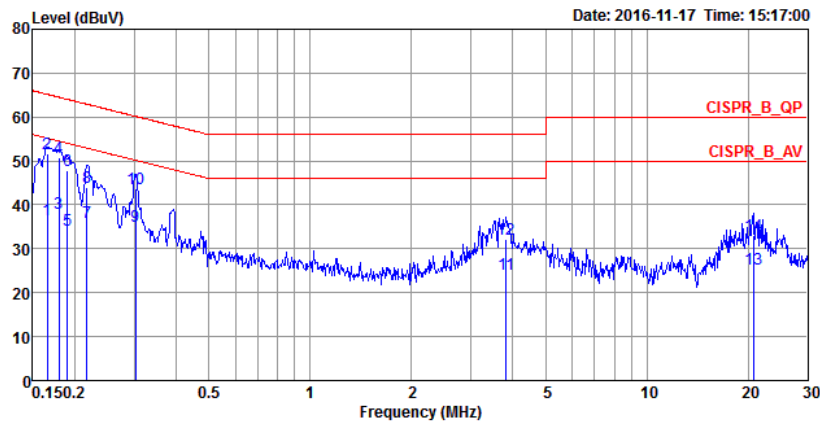
Note: Calibration Interval of instruments listed above is one year.

N.C.R. means Non-Calibration required.

*Calibration Interval of instruments listed above is two year.

AC Power-line Conducted Emissions Result

Operating Mode	1	Power Phase	Neutral
Operating Function	Normal Link		

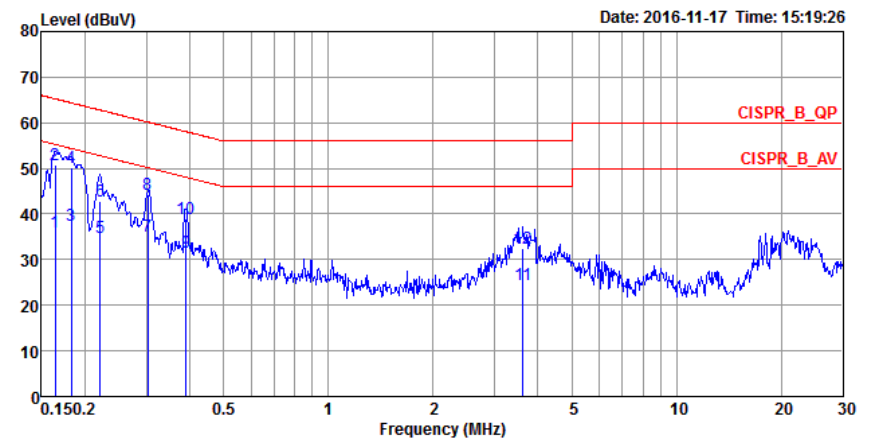


	Freq	Level	Over	Limit	Read	LISN	Cable	Pol/Phase	Remark
	MHz	dBuV	Limit	Line	Level	Factor	Loss		
			dB	dBuV	dBuV	dB	dB		
1	0.1659	36.60	-18.56	55.16	26.41	10.02	0.17	NEUTRAL	Average
2	0.1659	51.58	-13.58	65.16	41.39	10.02	0.17	NEUTRAL	QP
3	0.1796	38.00	-16.50	54.50	27.90	9.92	0.18	NEUTRAL	Average
4	0.1796	50.91	-13.59	64.50	40.81	9.92	0.18	NEUTRAL	QP
5	0.1904	34.36	-19.66	54.02	24.25	9.92	0.19	NEUTRAL	Average
6	0.1904	47.77	-16.25	64.02	37.66	9.92	0.19	NEUTRAL	QP
7	0.2174	36.11	-16.81	52.92	26.02	9.92	0.17	NEUTRAL	Average
8	0.2174	44.08	-18.84	62.92	33.99	9.92	0.17	NEUTRAL	QP
9	0.3035	35.04	-15.11	50.15	25.04	9.92	0.08	NEUTRAL	Average
10	0.3035	43.83	-16.32	60.15	33.83	9.92	0.08	NEUTRAL	QP
11	3.8196	24.08	-21.92	46.00	14.00	9.99	0.09	NEUTRAL	Average
12	3.8196	32.19	-23.81	56.00	22.11	9.99	0.09	NEUTRAL	QP
13	20.7038	25.36	-24.64	50.00	14.79	10.33	0.24	NEUTRAL	Average
14	20.7038	33.09	-26.91	60.00	22.52	10.33	0.24	NEUTRAL	QP

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

AC Power-line Conducted Emissions Result

Operating Mode	1	Power Phase	Line
Operating Function	Normal Link		



	Freq	Level	Over	Limit	Read	LISN	Cable	Pol/Phase	Remark
	MHz	dBuV	Limit	Line	Level	Factor	Loss		
			dB	dBuV	dBuV	dB	dB		
1	0.1641	35.94	-19.31	55.25	25.75	10.02	0.17	LINE	Average
2	0.1641	50.90	-14.35	65.25	40.71	10.02	0.17	LINE	QP
3	0.1825	37.53	-16.84	54.37	27.43	9.92	0.18	LINE	Average
4	0.1825	50.29	-14.08	64.37	40.19	9.92	0.18	LINE	QP
5	0.2208	34.85	-17.94	52.79	24.77	9.92	0.16	LINE	Average
6	0.2208	42.68	-20.11	62.79	32.60	9.92	0.16	LINE	QP
7	0.3035	35.08	-15.07	50.15	25.08	9.92	0.08	LINE	Average
8	0.3035	44.34	-15.81	60.15	34.34	9.92	0.08	LINE	QP
9	0.3893	31.54	-16.54	48.08	21.60	9.92	0.02	LINE	Average
10	0.3893	39.01	-19.07	58.08	29.07	9.92	0.02	LINE	QP
11	3.6225	24.51	-21.49	46.00	14.44	9.98	0.09	LINE	Average
12	3.6225	32.52	-23.48	56.00	22.45	9.98	0.09	LINE	QP

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



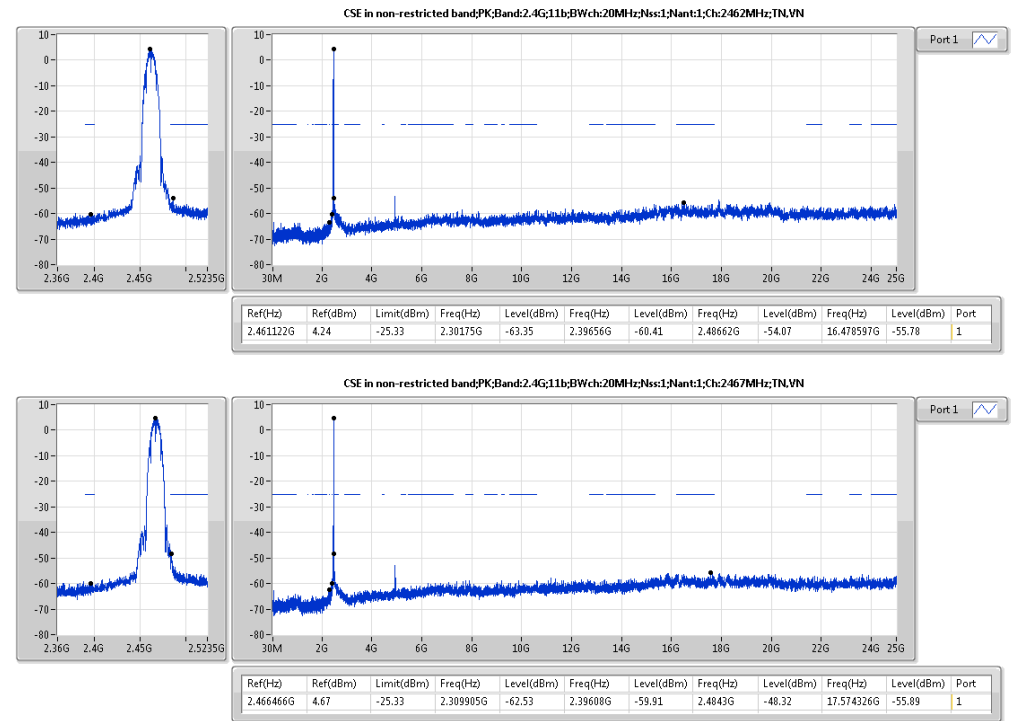
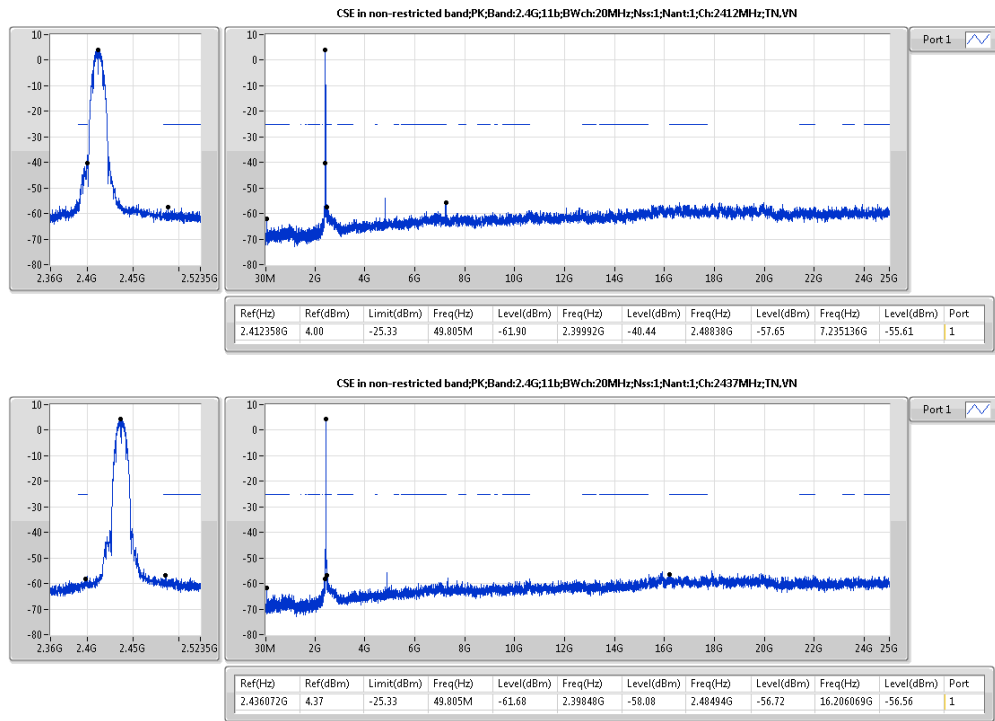
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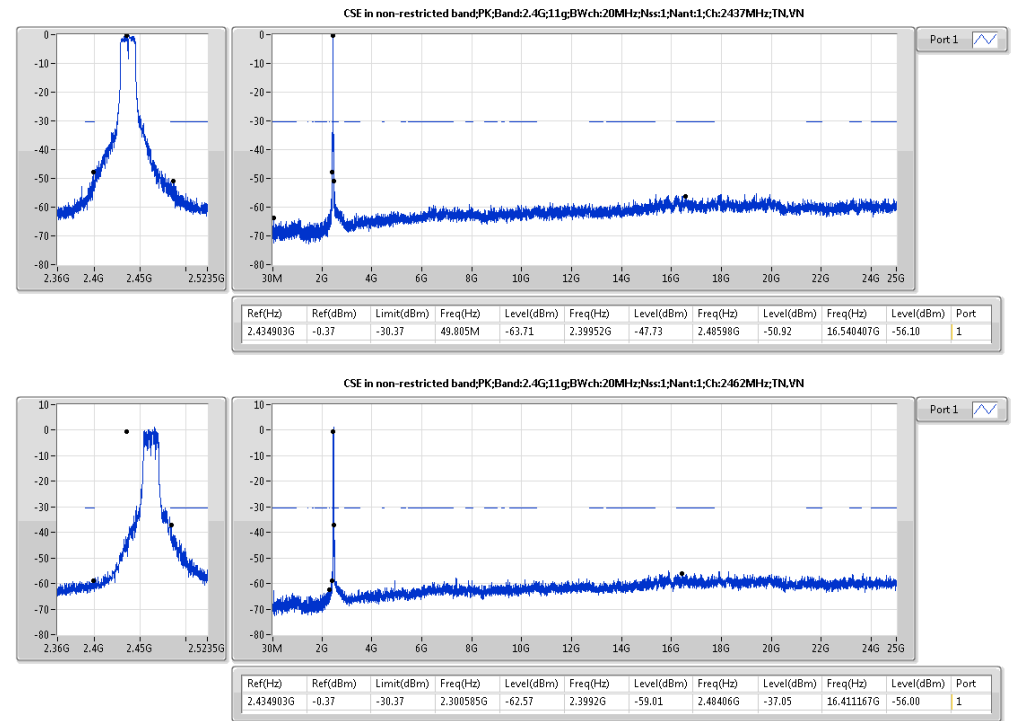
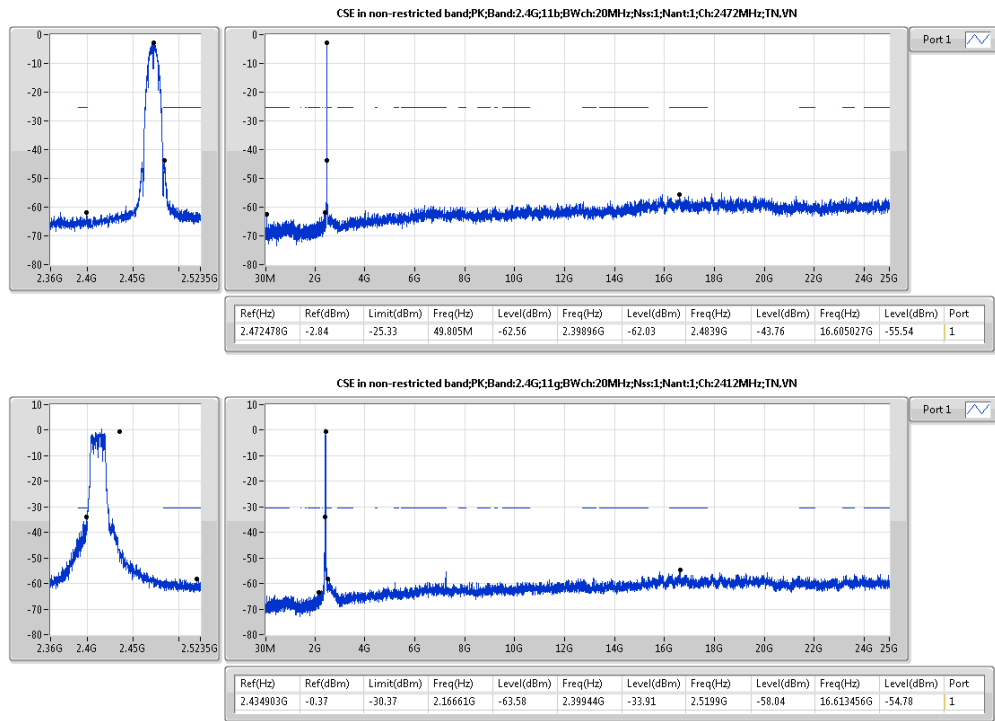
Mode	Result	Ref (Hz)	Ref (dBm)	Limit (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Port
2.4G;11g;Nss1;Ntx1;2467	Pass	2.434903G	-0.37	-30.37	2.307575G	-63.42	2.39288G	-59.23	2.48358G	-31.11	16.821364G	-55.85	1

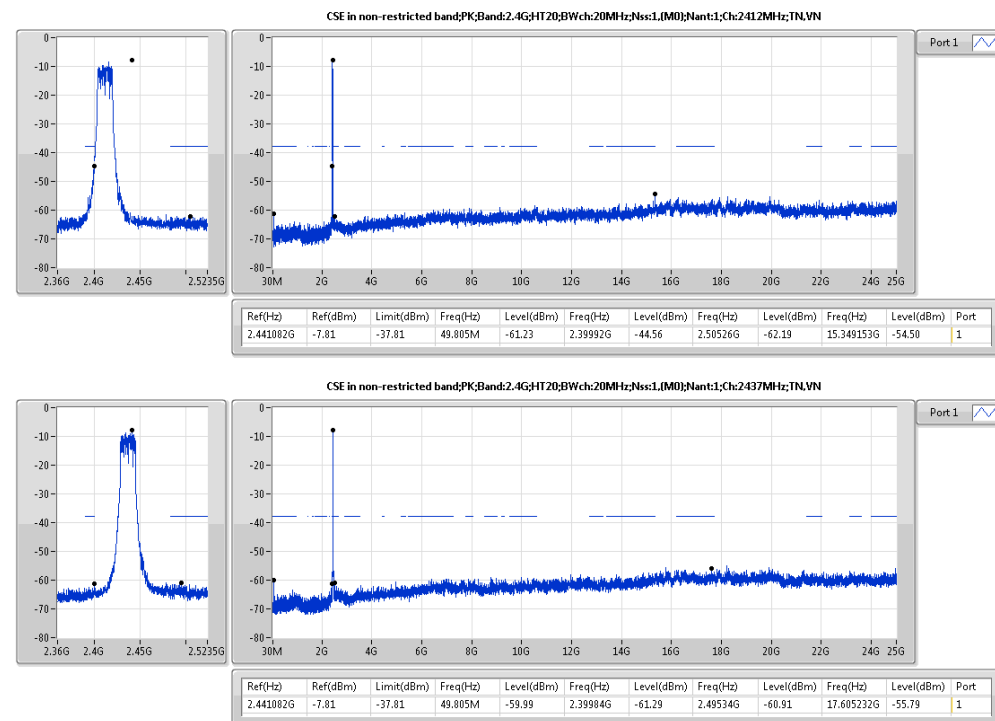
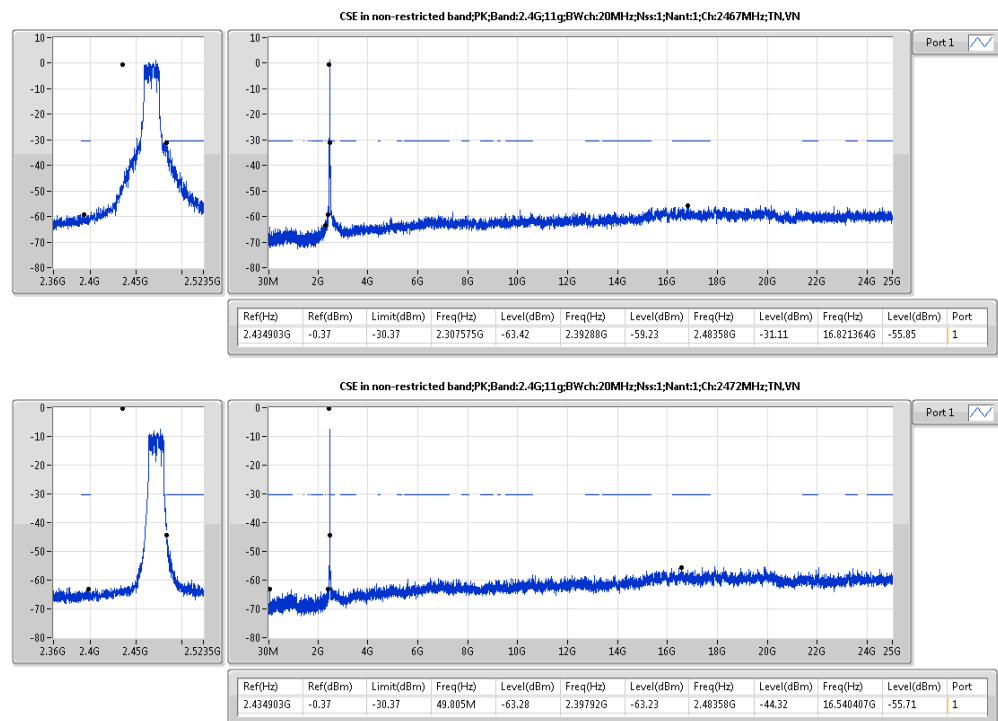


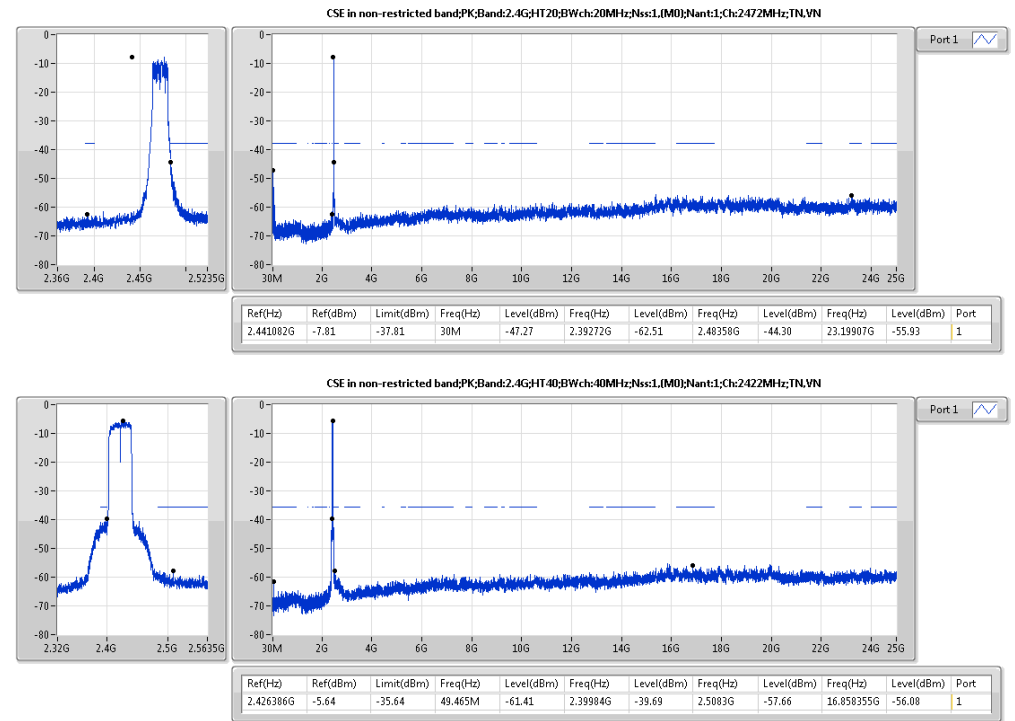
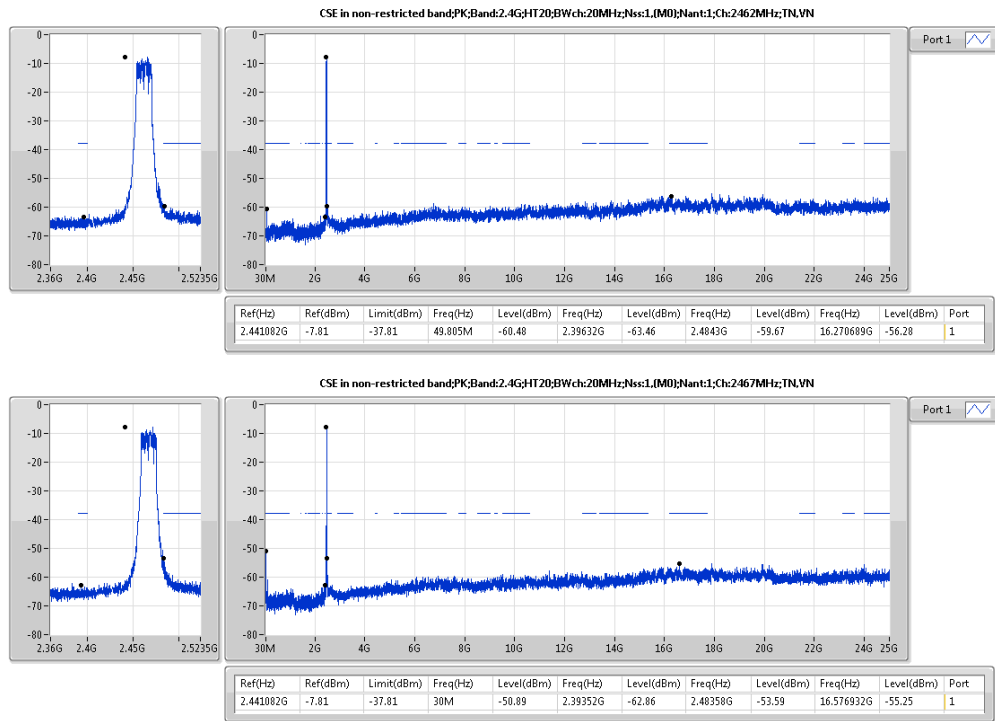
Result

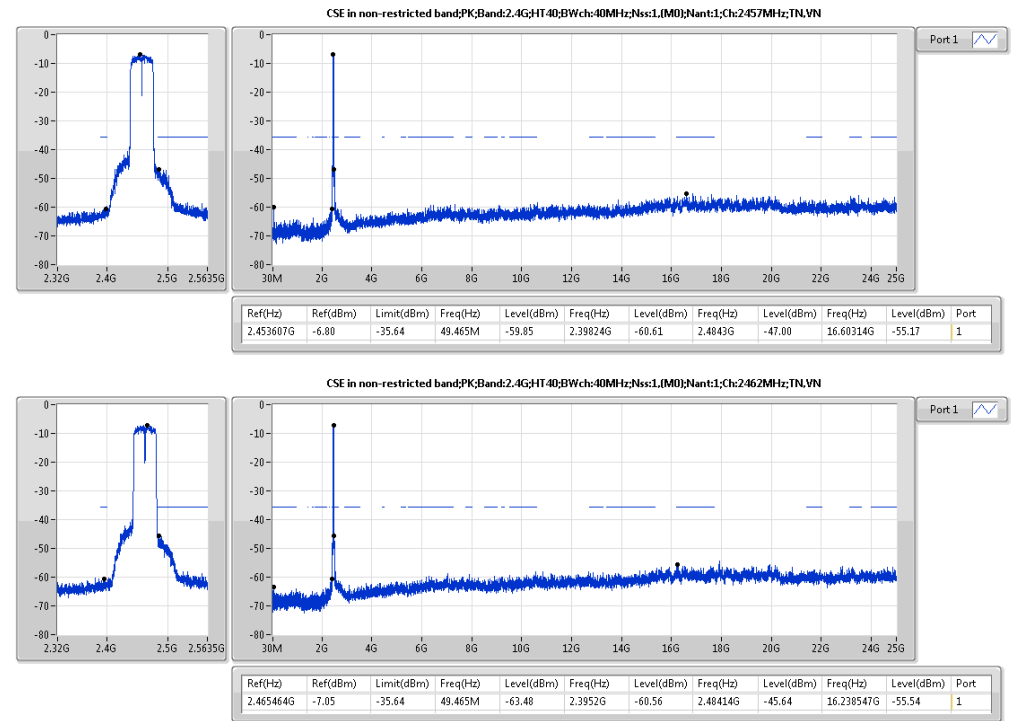
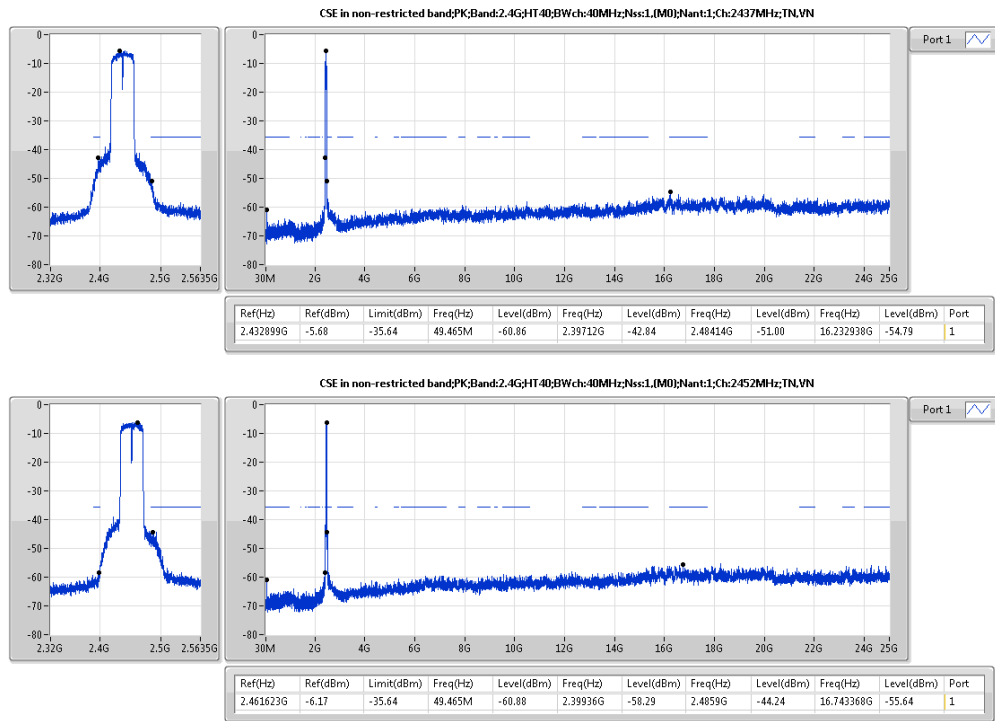
Mode	Result	Ref (Hz)	Ref (dBm)	Limit (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Port
2.4G;11b;Nss1;Ntx1;2412	Pass	2.412358G	4.67	-25.33	49.805M	-61.90	2.39992G	-40.44	2.48838G	-57.65	7.235136G	-55.61	1
2.4G;11b;Nss1;Ntx1;2437	Pass	2.436072G	4.67	-25.33	49.805M	-61.68	2.39848G	-58.08	2.48494G	-56.72	16.206069G	-56.56	1
2.4G;11b;Nss1;Ntx1;2462	Pass	2.461122G	4.67	-25.33	2.30175G	-63.35	2.39656G	-60.41	2.48662G	-54.07	16.478597G	-55.78	1
2.4G;11b;Nss1;Ntx1;2467	Pass	2.466466G	4.67	-25.33	2.309905G	-62.53	2.39608G	-59.91	2.4843G	-48.32	17.574326G	-55.89	1
2.4G;11b;Nss1;Ntx1;2472	Pass	2.472478G	4.67	-25.33	49.805M	-62.56	2.39896G	-62.03	2.4839G	-43.76	16.605027G	-55.54	1
2.4G;11g;Nss1;Ntx1;2412	Pass	2.434903G	-0.37	-30.37	2.16661G	-63.58	2.39944G	-33.91	2.5199G	-58.04	16.613456G	-54.78	1
2.4G;11g;Nss1;Ntx1;2437	Pass	2.434903G	-0.37	-30.37	49.805M	-63.71	2.39952G	-47.73	2.48598G	-50.92	16.540407G	-56.10	1
2.4G;11g;Nss1;Ntx1;2462	Pass	2.434903G	-0.37	-30.37	2.300585G	-62.57	2.3992G	-59.01	2.48406G	-37.05	16.411167G	-56.00	1
2.4G;11g;Nss1;Ntx1;2467	Pass	2.434903G	-0.37	-30.37	2.307575G	-63.42	2.39288G	-59.23	2.48358G	-31.11	16.821364G	-55.85	1
2.4G;11g;Nss1;Ntx1;2472	Pass	2.434903G	-0.37	-30.37	49.805M	-63.28	2.39792G	-63.23	2.48358G	-44.32	16.540407G	-55.71	1
2.4G;HT20;Nss1,(M0);Ntx1;2412	Pass	2.441082G	-7.81	-37.81	49.805M	-61.23	2.39992G	-44.56	2.50526G	-62.19	15.349153G	-54.50	1
2.4G;HT20;Nss1,(M0);Ntx1;2437	Pass	2.441082G	-7.81	-37.81	49.805M	-59.99	2.39984G	-61.29	2.49534G	-60.91	17.605232G	-55.79	1
2.4G;HT20;Nss1,(M0);Ntx1;2462	Pass	2.441082G	-7.81	-37.81	49.805M	-60.48	2.39632G	-63.46	2.4843G	-59.67	16.270689G	-56.28	1
2.4G;HT20;Nss1,(M0);Ntx1;2467	Pass	2.441082G	-7.81	-37.81	30M	-50.89	2.39352G	-62.86	2.48358G	-53.59	16.576932G	-55.25	1
2.4G;HT20;Nss1,(M0);Ntx1;2472	Pass	2.441082G	-7.81	-37.81	30M	-47.27	2.39272G	-62.51	2.48358G	-44.30	23.19907G	-55.93	1
2.4G;HT40;Nss1,(M0);Ntx1;2422	Pass	2.426386G	-5.64	-35.64	49.465M	-61.41	2.39984G	-39.69	2.5083G	-57.66	16.858355G	-56.08	1
2.4G;HT40;Nss1,(M0);Ntx1;2437	Pass	2.432899G	-5.64	-35.64	49.465M	-60.86	2.39712G	-42.84	2.48414G	-51.00	16.232938G	-54.79	1
2.4G;HT40;Nss1,(M0);Ntx1;2452	Pass	2.461623G	-5.64	-35.64	49.465M	-60.88	2.39936G	-58.29	2.4859G	-44.24	16.743368G	-55.64	1
2.4G;HT40;Nss1,(M0);Ntx1;2457	Pass	2.453607G	-5.64	-35.64	49.465M	-59.85	2.39824G	-60.61	2.4843G	-47.00	16.60314G	-55.17	1
2.4G;HT40;Nss1,(M0);Ntx1;2462	Pass	2.465464G	-5.64	-35.64	49.465M	-63.48	2.3952G	-60.56	2.48414G	-45.64	16.238547G	-55.54	1







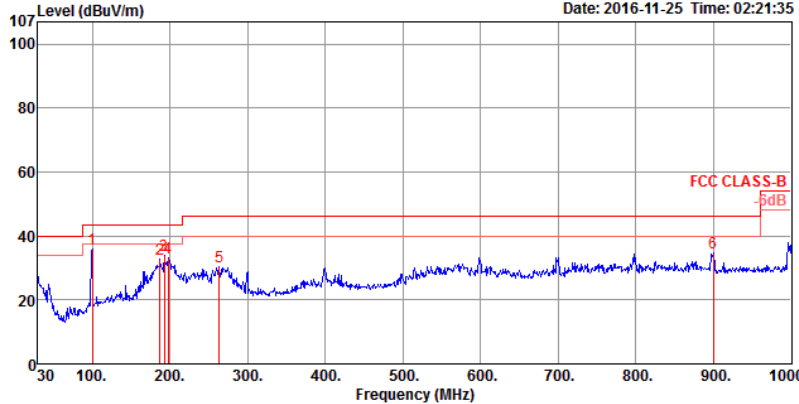


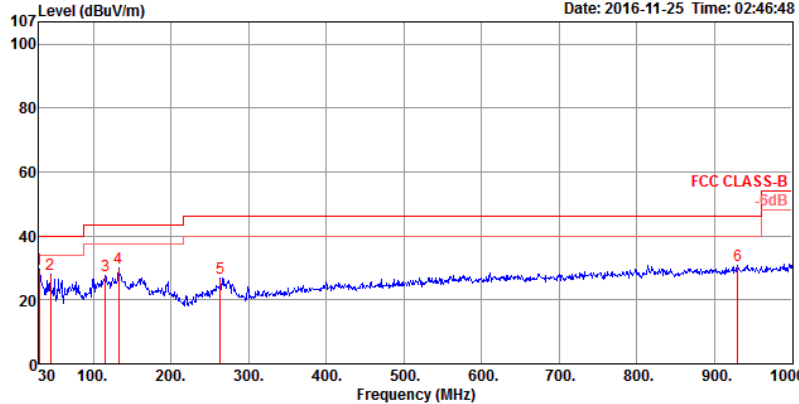




RSE below 1GHz Result

Appendix C.1

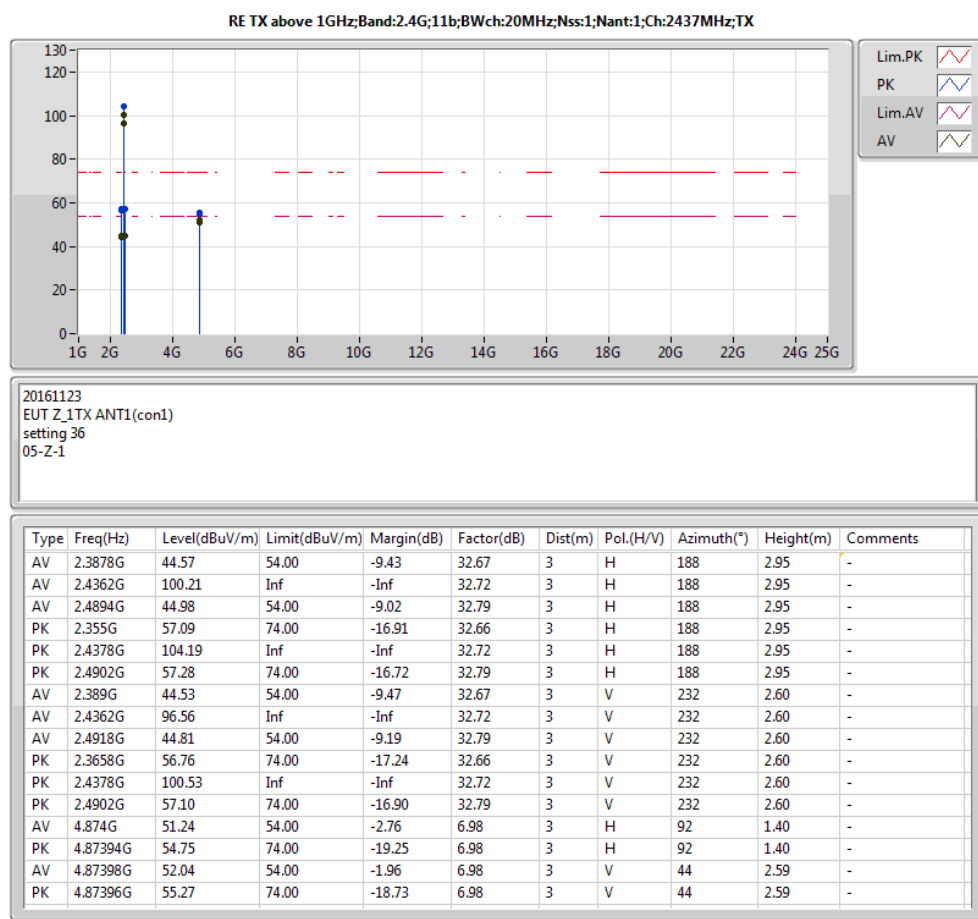
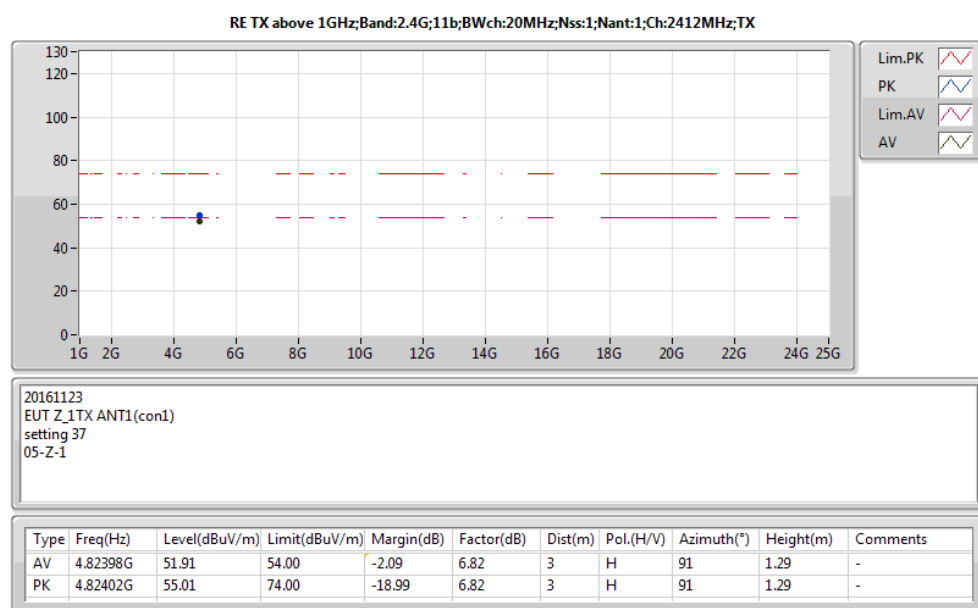
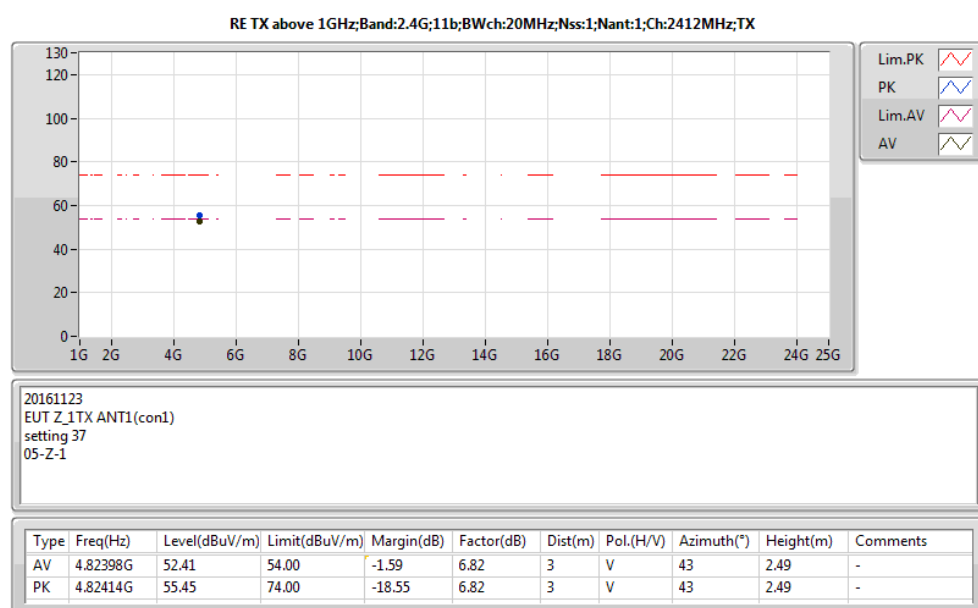
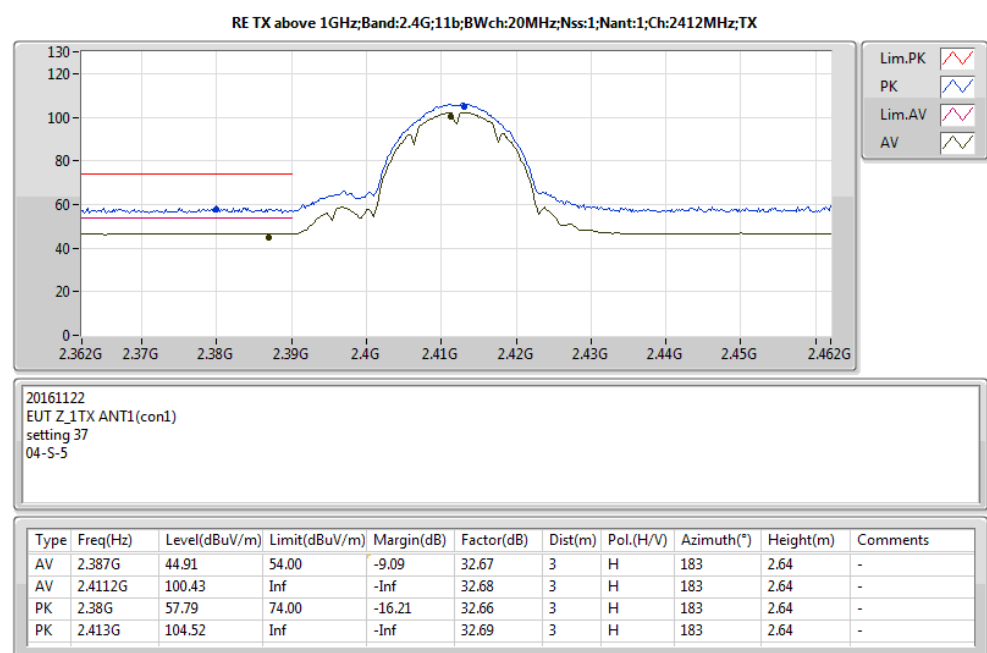
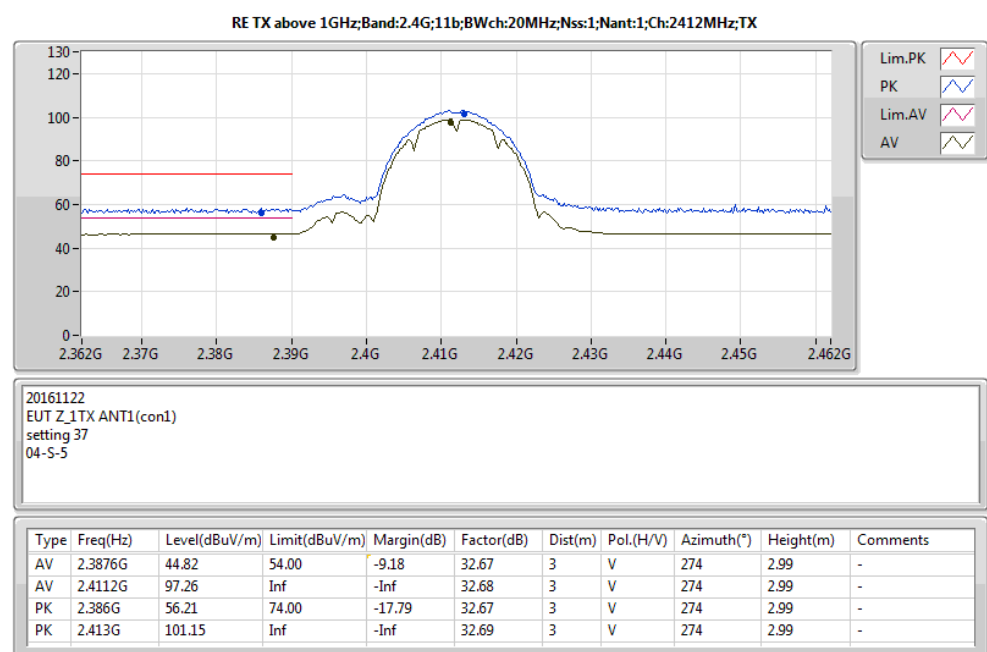
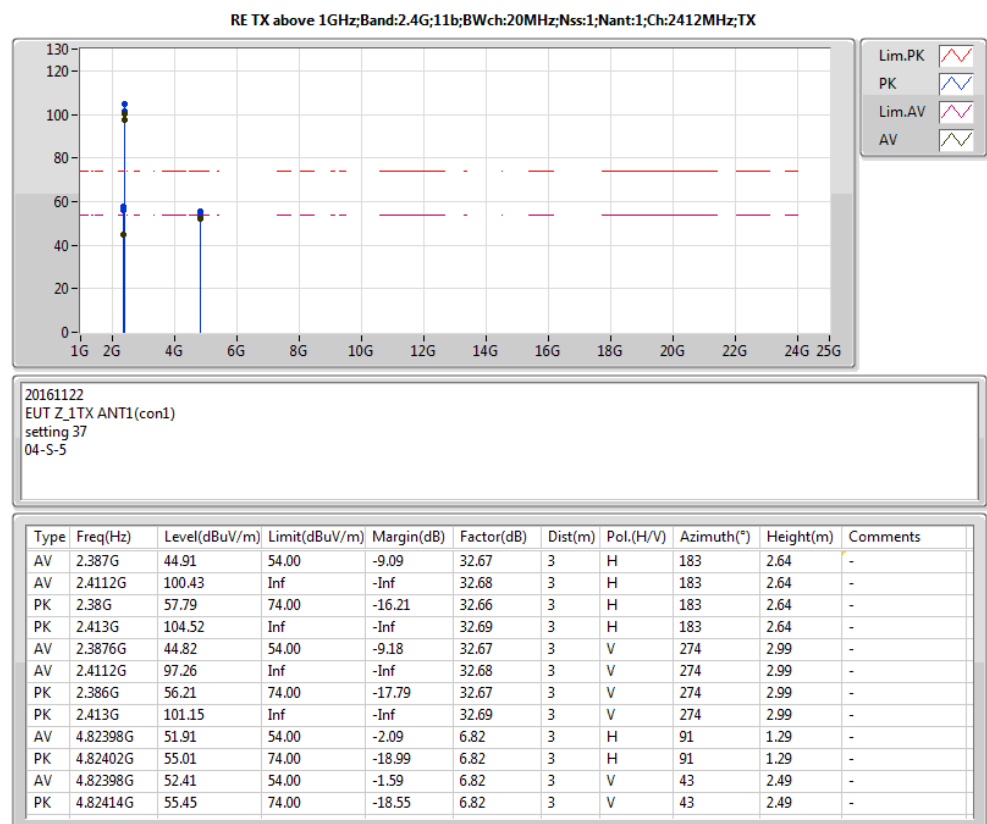
RSE below 1GHz Result																																																																																																											
Operating Mode	1				Polarization				Horizontal																																																																																																		
Operating Function	Normal Link																																																																																																										
Level (dBuV/m) Date: 2016-11-25 Time: 02:21:35  <table><thead><tr><th></th><th>Freq</th><th>Level</th><th>Limit</th><th>Over</th><th>Read</th><th>CableAntenna</th><th>Preamp</th><th>A/Pos</th><th>T/Pos</th><th>Remark</th><th>Pol/Phase</th></tr><tr><th></th><th>MHz</th><th>dBuV/m</th><th>dBuV/m</th><th>dB</th><th>dBuV</th><th>dB</th><th>dB/m</th><th>dB</th><th>cm</th><th>deg</th><th></th></tr></thead><tbody><tr><td>1</td><td>99.84</td><td>36.01</td><td>43.50</td><td>-7.49</td><td>50.00</td><td>0.87</td><td>17.00</td><td>31.86</td><td>200</td><td>168 Peak</td><td>HORIZONTAL</td></tr><tr><td>2</td><td>187.14</td><td>32.80</td><td>43.50</td><td>-10.70</td><td>48.24</td><td>1.09</td><td>15.43</td><td>31.96</td><td>200</td><td>5 Peak</td><td>HORIZONTAL</td></tr><tr><td>3</td><td>192.96</td><td>33.90</td><td>43.50</td><td>-9.60</td><td>49.09</td><td>1.11</td><td>15.67</td><td>31.97</td><td>200</td><td>0 Peak</td><td>HORIZONTAL</td></tr><tr><td>4</td><td>197.81</td><td>33.19</td><td>43.50</td><td>-10.31</td><td>48.01</td><td>1.12</td><td>16.04</td><td>31.98</td><td>200</td><td>188 Peak</td><td>HORIZONTAL</td></tr><tr><td>5</td><td>263.77</td><td>30.51</td><td>46.00</td><td>-15.49</td><td>41.77</td><td>1.28</td><td>19.45</td><td>31.99</td><td>125</td><td>196 Peak</td><td>HORIZONTAL</td></tr><tr><td>6</td><td>900.09</td><td>34.55</td><td>46.00</td><td>-11.45</td><td>37.30</td><td>2.40</td><td>27.30</td><td>32.45</td><td>100</td><td>263 Peak</td><td>HORIZONTAL</td></tr></tbody></table>													Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase		MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		1	99.84	36.01	43.50	-7.49	50.00	0.87	17.00	31.86	200	168 Peak	HORIZONTAL	2	187.14	32.80	43.50	-10.70	48.24	1.09	15.43	31.96	200	5 Peak	HORIZONTAL	3	192.96	33.90	43.50	-9.60	49.09	1.11	15.67	31.97	200	0 Peak	HORIZONTAL	4	197.81	33.19	43.50	-10.31	48.01	1.12	16.04	31.98	200	188 Peak	HORIZONTAL	5	263.77	30.51	46.00	-15.49	41.77	1.28	19.45	31.99	125	196 Peak	HORIZONTAL	6	900.09	34.55	46.00	-11.45	37.30	2.40	27.30	32.45	100	263 Peak	HORIZONTAL
	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase																																																																																																
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg																																																																																																	
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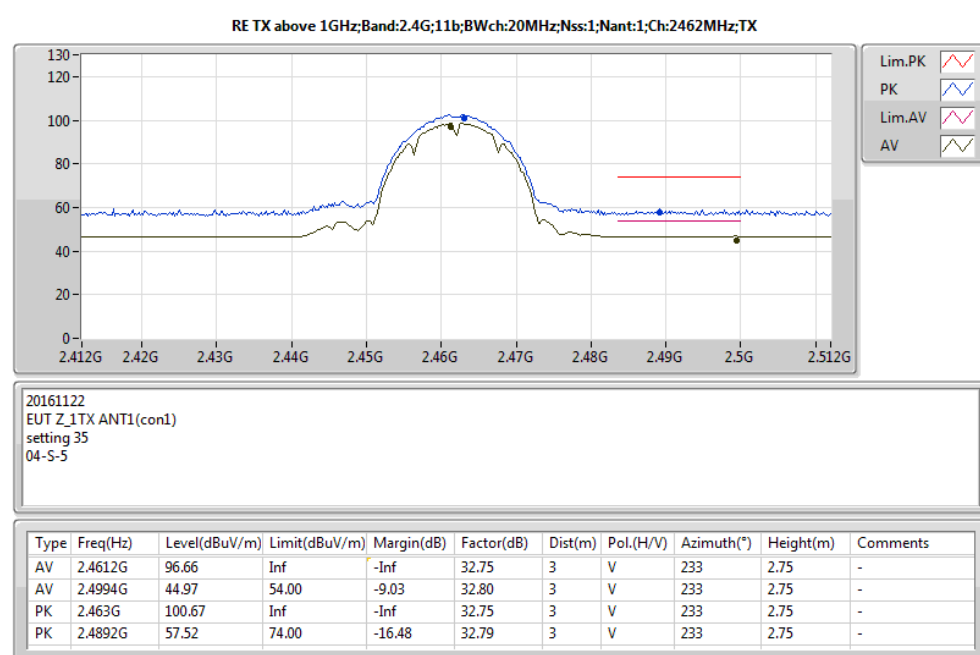
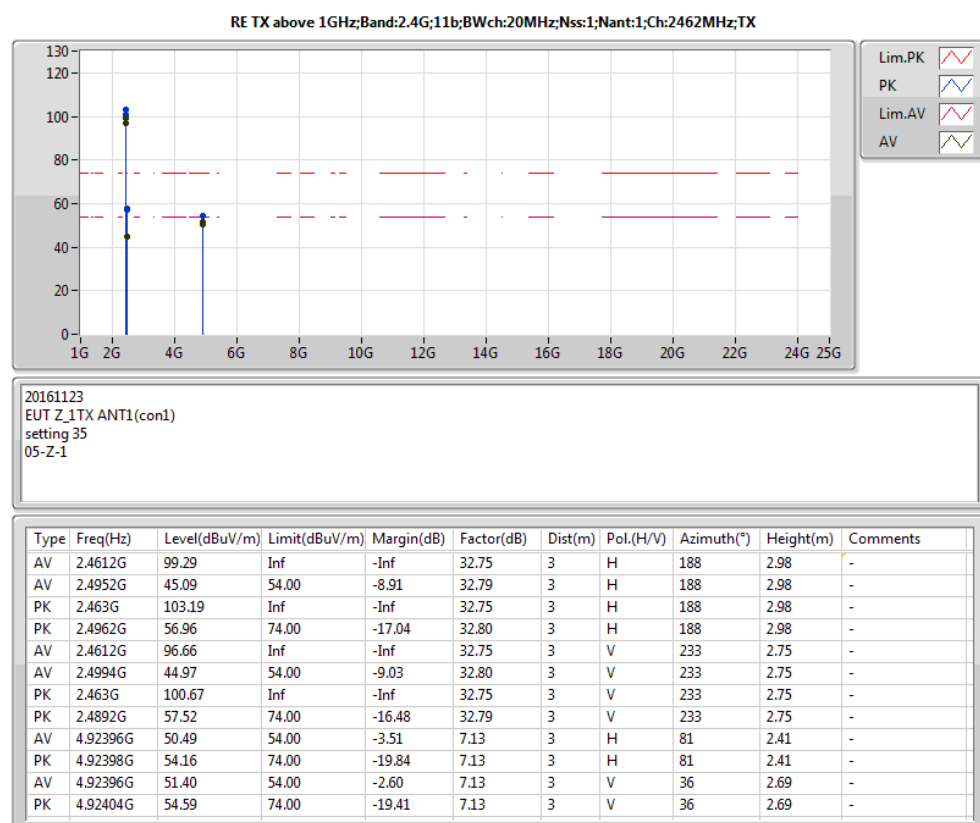
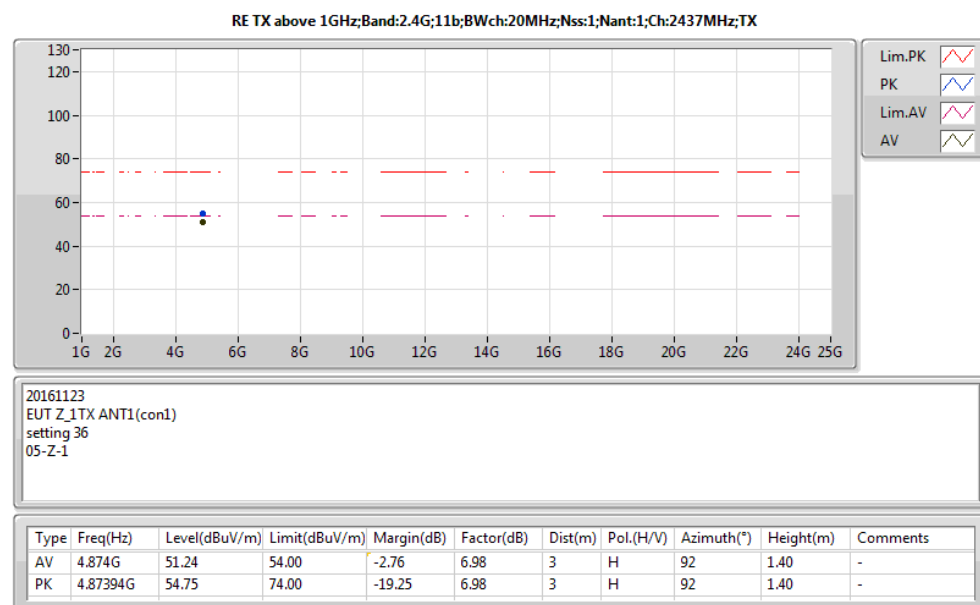
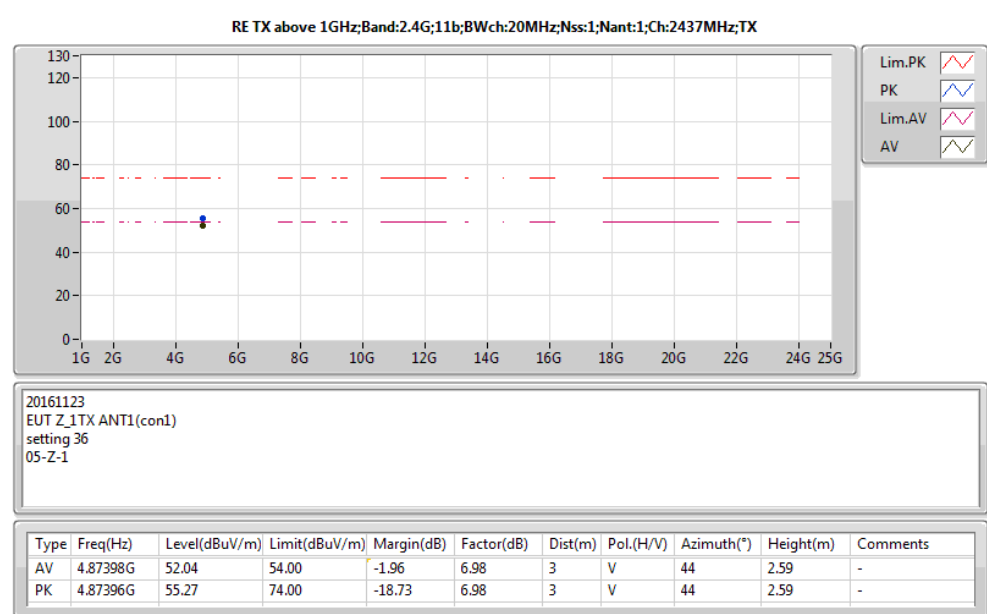
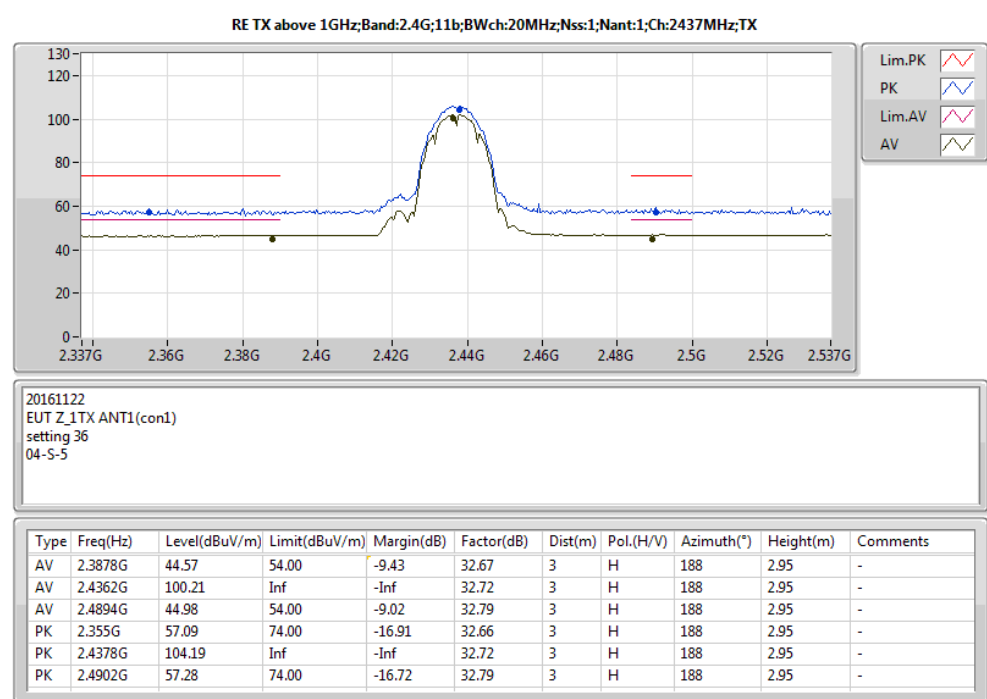
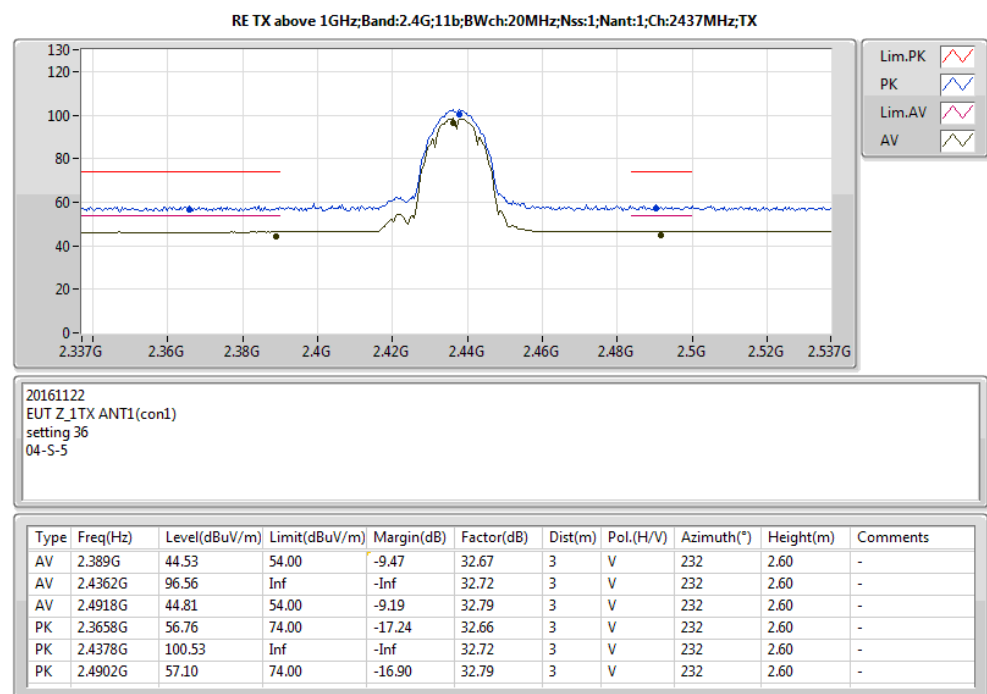
RSE below 1GHz Result																																																																																																											
Operating Mode	1				Power Phase				Vertical																																																																																																		
Operating Function	Normal Link																																																																																																										
Level (dBuV/m) Date: 2016-11-25 Time: 02:46:48  <table><tr><th></th><th>Freq</th><th>Level</th><th>Limit</th><th>Over</th><th>Read</th><th>CableAntenna</th><th>Preamp</th><th>A/Pos</th><th>T/Pos</th><th>Remark</th><th>Pol/Phase</th></tr><tr><th></th><th>MHz</th><th>dBuV/m</th><th>dBuV/m</th><th>dB</th><th>dBuV</th><th>dB</th><th>dB/m</th><th>dB</th><th>cm</th><th>deg</th><th></th></tr><tr><td>1</td><td>30.00</td><td>29.53</td><td>40.00</td><td>-10.47</td><td>34.87</td><td>0.53</td><td>25.60</td><td>31.47</td><td>150</td><td>2 Peak</td><td>VERTICAL</td></tr><tr><td>2</td><td>44.55</td><td>27.89</td><td>40.00</td><td>-12.11</td><td>41.84</td><td>0.60</td><td>17.15</td><td>31.70</td><td>125</td><td>306 Peak</td><td>VERTICAL</td></tr><tr><td>3</td><td>115.36</td><td>27.45</td><td>43.50</td><td>-16.05</td><td>40.10</td><td>0.87</td><td>18.36</td><td>31.88</td><td>100</td><td>6 Peak</td><td>VERTICAL</td></tr><tr><td>4</td><td>132.82</td><td>30.01</td><td>43.50</td><td>-13.49</td><td>42.78</td><td>0.91</td><td>18.20</td><td>31.88</td><td>100</td><td>2 Peak</td><td>VERTICAL</td></tr><tr><td>5</td><td>263.77</td><td>26.93</td><td>46.00</td><td>-19.07</td><td>38.19</td><td>1.28</td><td>19.45</td><td>31.99</td><td>200</td><td>315 Peak</td><td>VERTICAL</td></tr><tr><td>6</td><td>930.16</td><td>30.79</td><td>46.00</td><td>-15.21</td><td>33.32</td><td>2.42</td><td>27.51</td><td>32.46</td><td>125</td><td>99 Peak</td><td>VERTICAL</td></tr></table>													Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase		MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		1	30.00	29.53	40.00	-10.47	34.87	0.53	25.60	31.47	150	2 Peak	VERTICAL	2	44.55	27.89	40.00	-12.11	41.84	0.60	17.15	31.70	125	306 Peak	VERTICAL	3	115.36	27.45	43.50	-16.05	40.10	0.87	18.36	31.88	100	6 Peak	VERTICAL	4	132.82	30.01	43.50	-13.49	42.78	0.91	18.20	31.88	100	2 Peak	VERTICAL	5	263.77	26.93	46.00	-19.07	38.19	1.28	19.45	31.99	200	315 Peak	VERTICAL	6	930.16	30.79	46.00	-15.21	33.32	2.42	27.51	32.46	125	99 Peak	VERTICAL
	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase																																																																																																
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg																																																																																																	
1	30.00	29.53	40.00	-10.47	34.87	0.53	25.60	31.47	150	2 Peak	VERTICAL																																																																																																
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4	132.82	30.01	43.50	-13.49	42.78	0.91	18.20	31.88	100	2 Peak	VERTICAL																																																																																																
5	263.77	26.93	46.00	-19.07	38.19	1.28	19.45	31.99	200	315 Peak	VERTICAL																																																																																																
6	930.16	30.79	46.00	-15.21	33.32	2.42	27.51	32.46	125	99 Peak	VERTICAL																																																																																																
Note 1: ">20dB" means emission levels that exceed the level of 20 dB below the applicable limit. Note 2: "N/F" means Nothing Found emissions (No emissions were detected.)																																																																																																											

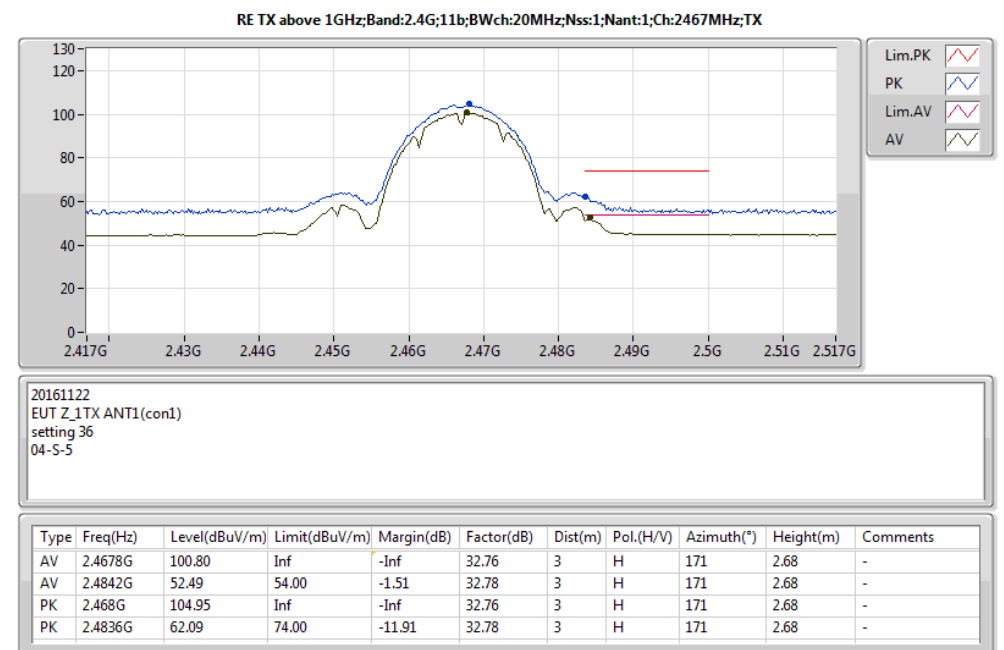
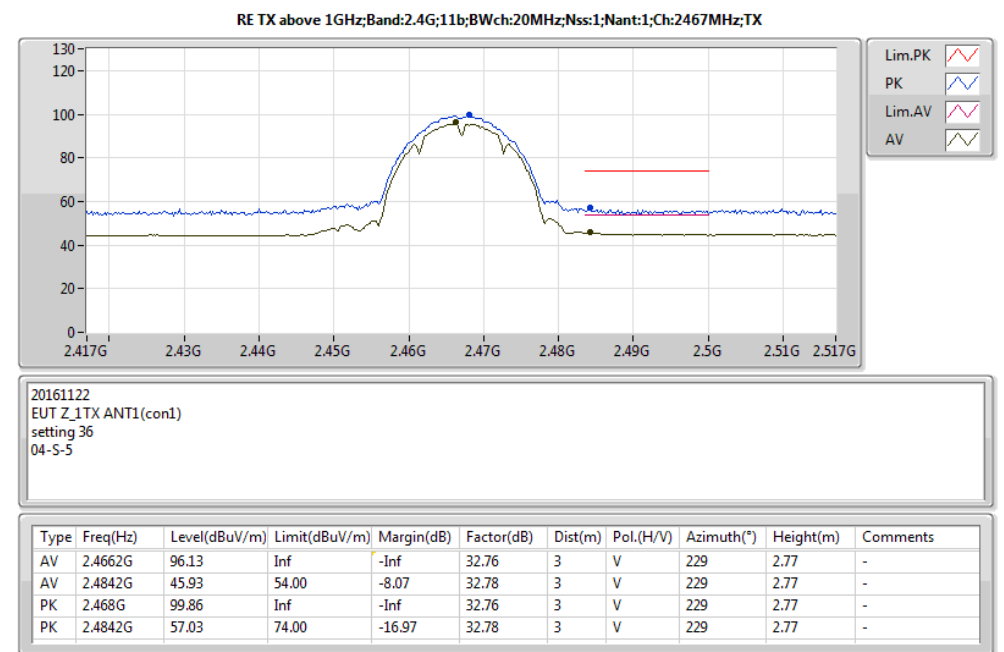
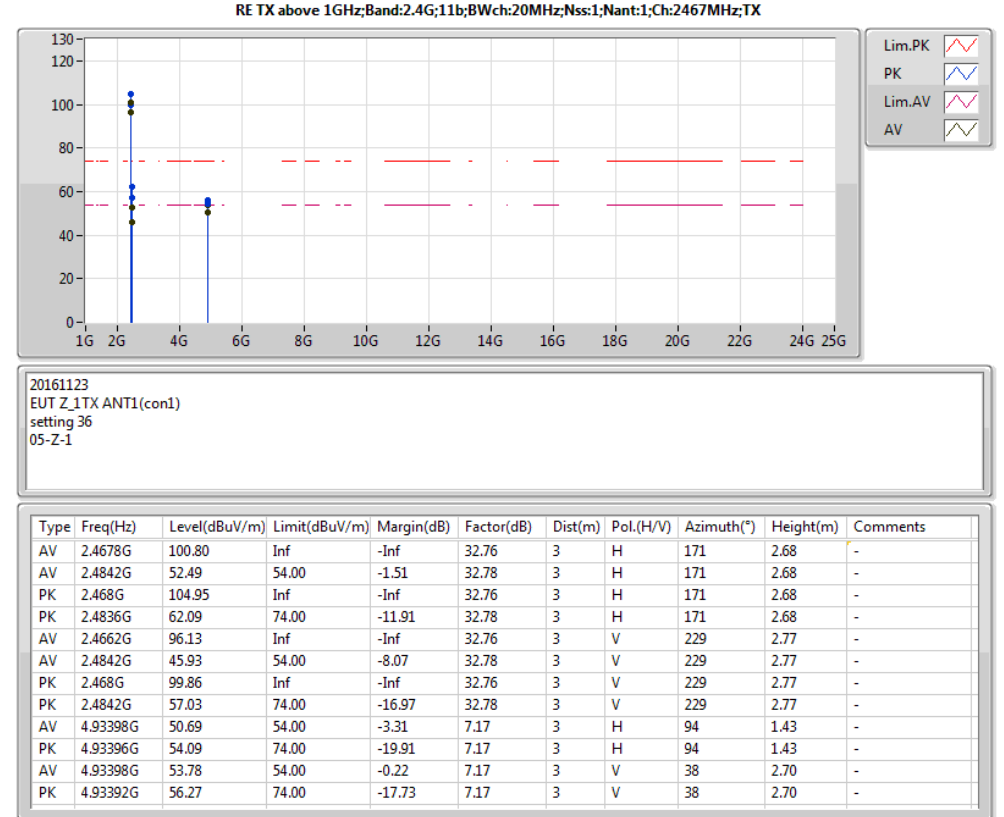
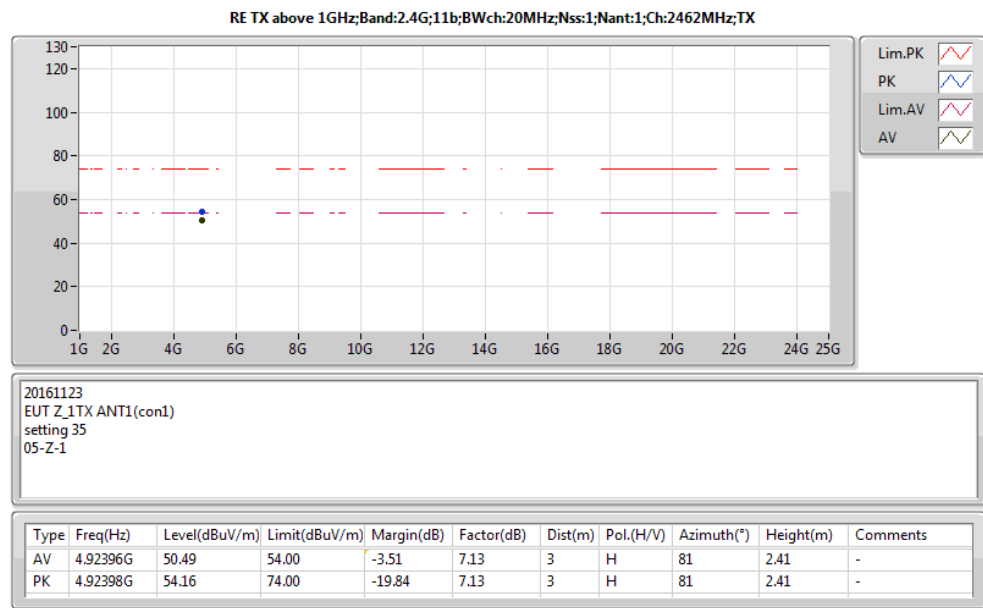
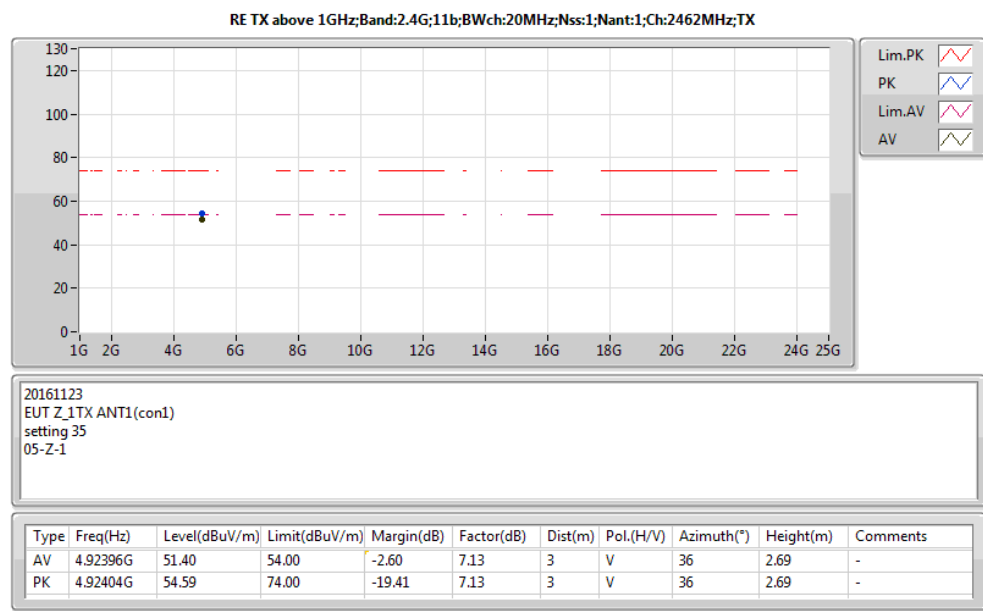
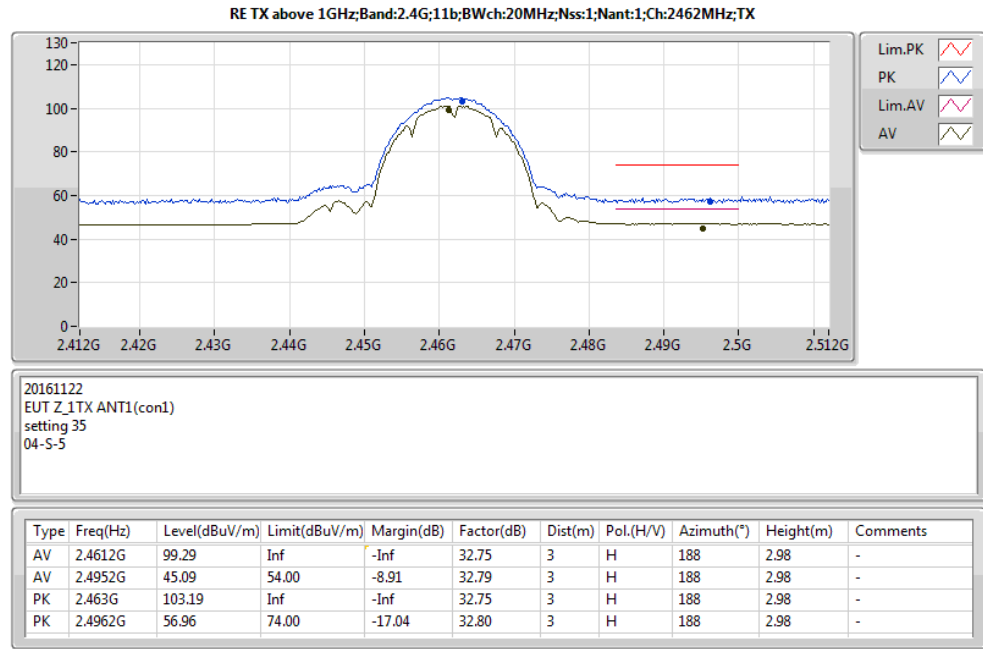


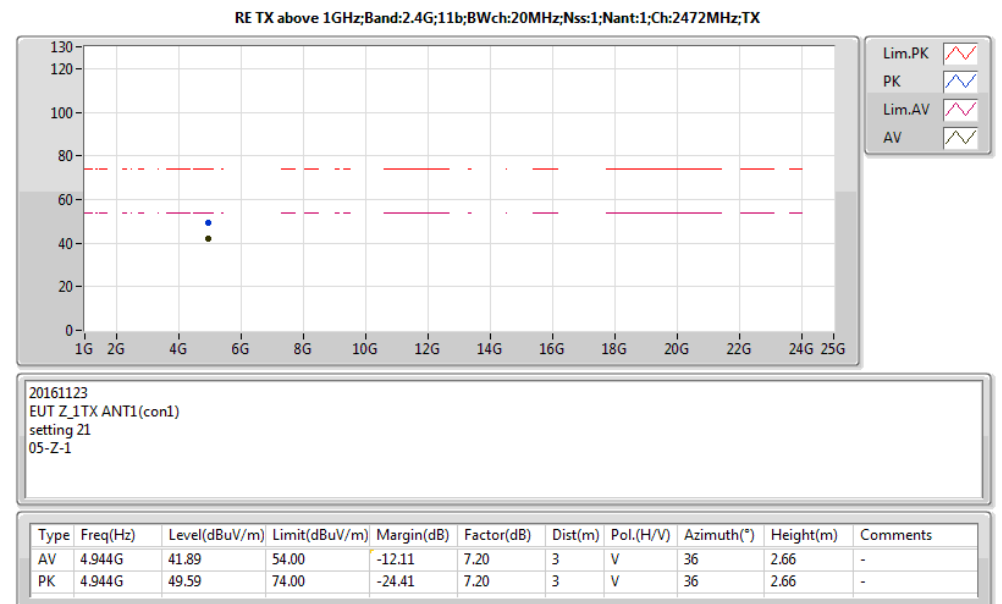
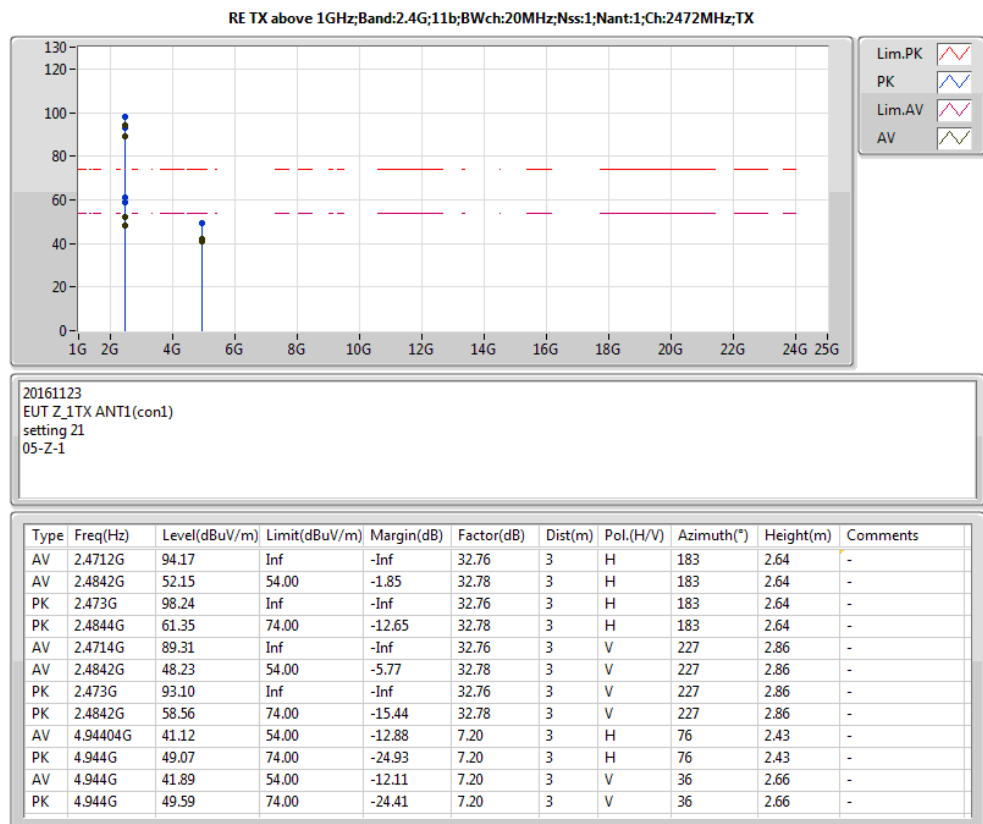
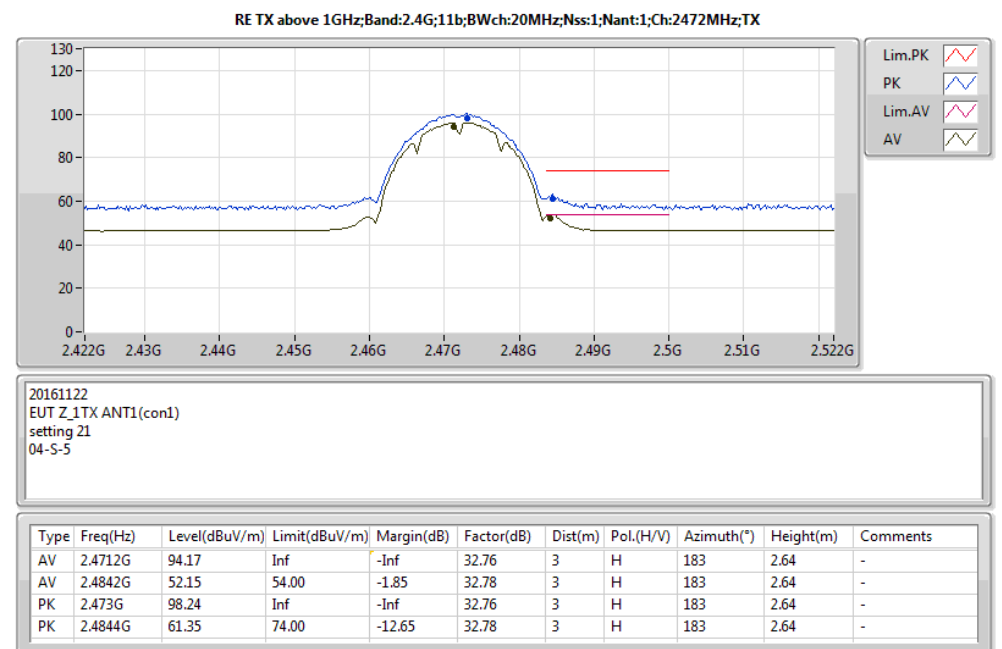
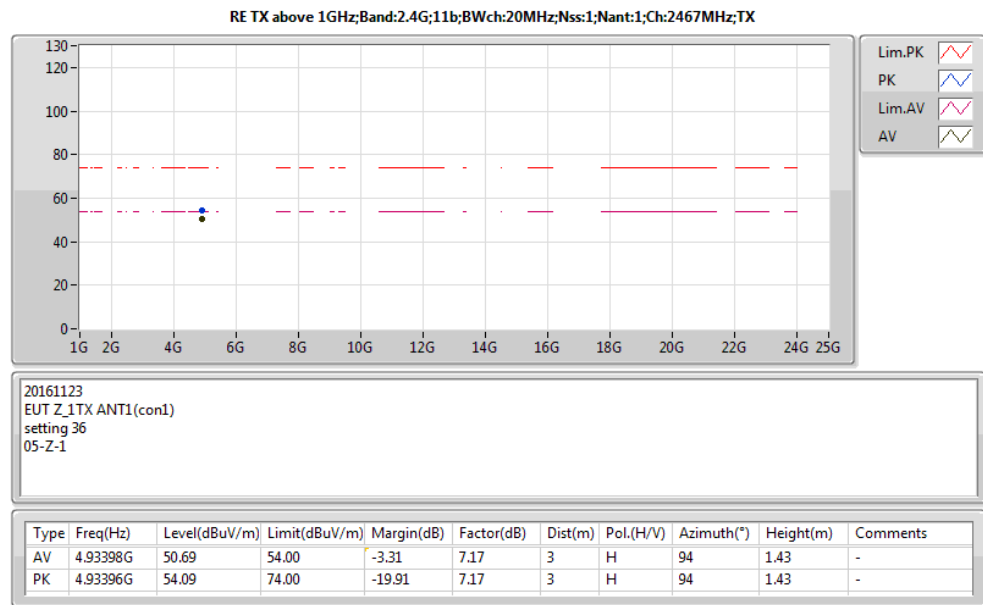
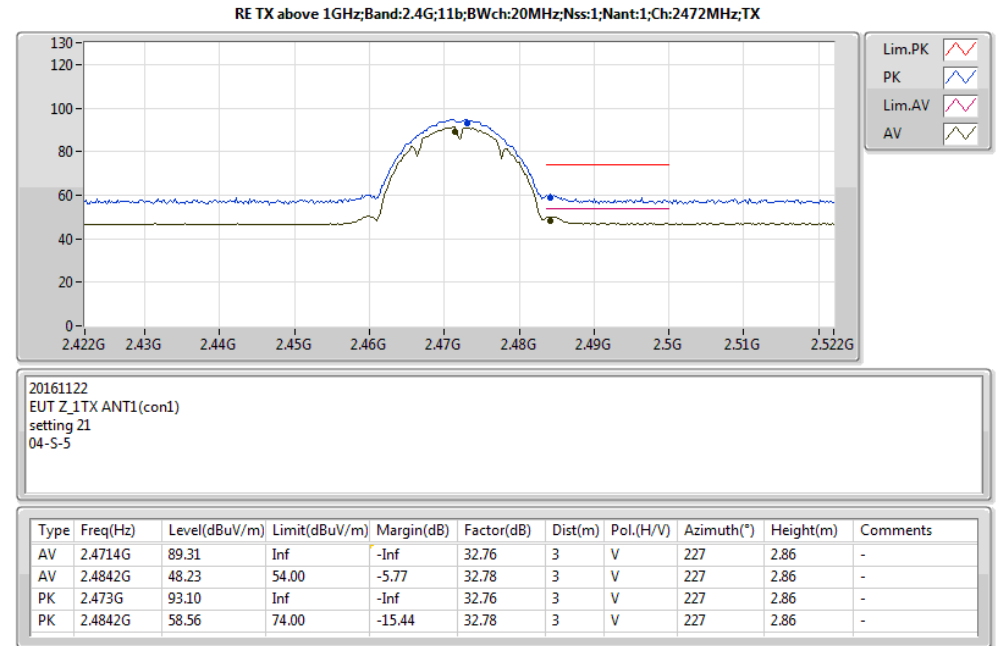
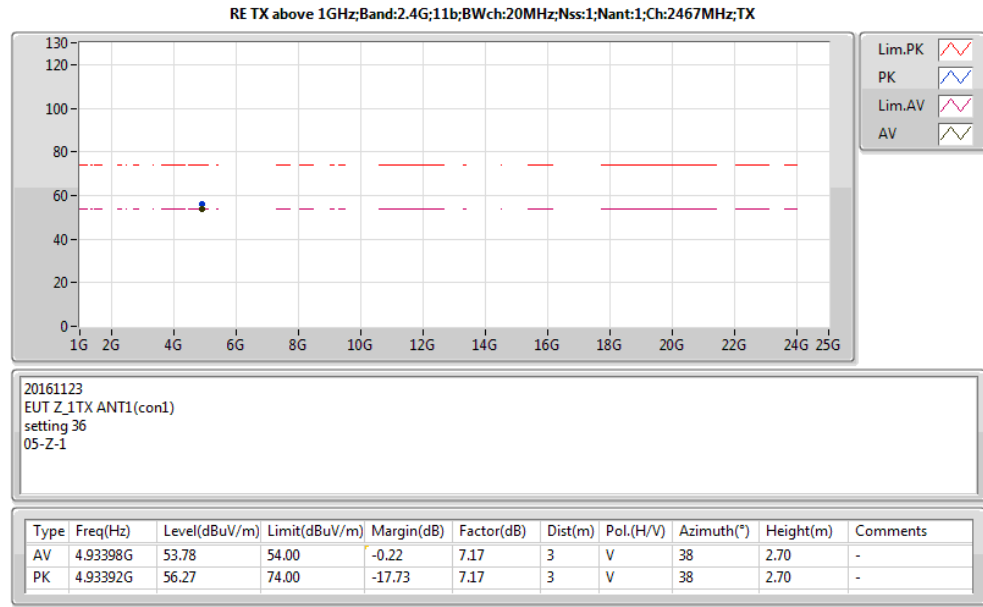
Summary

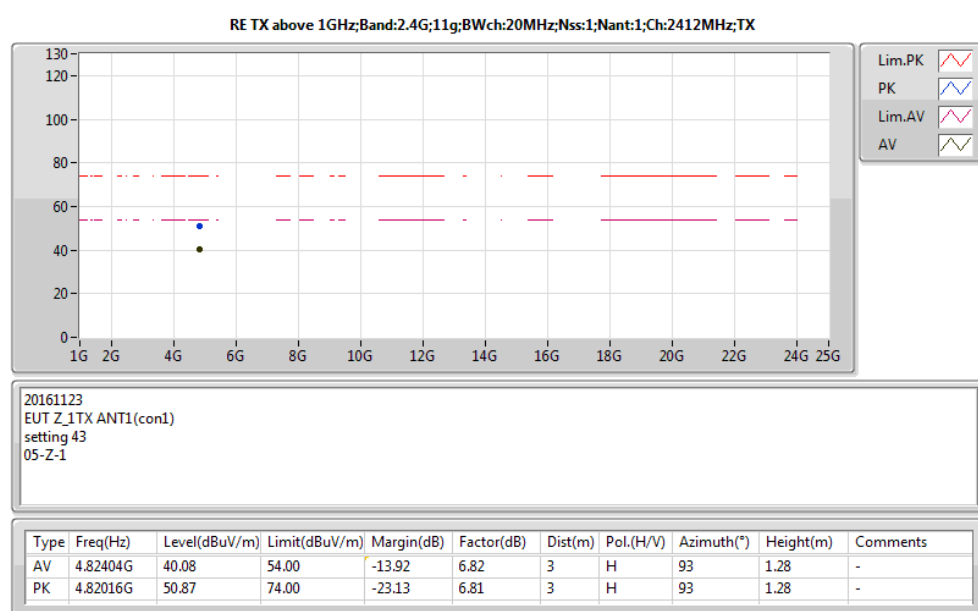
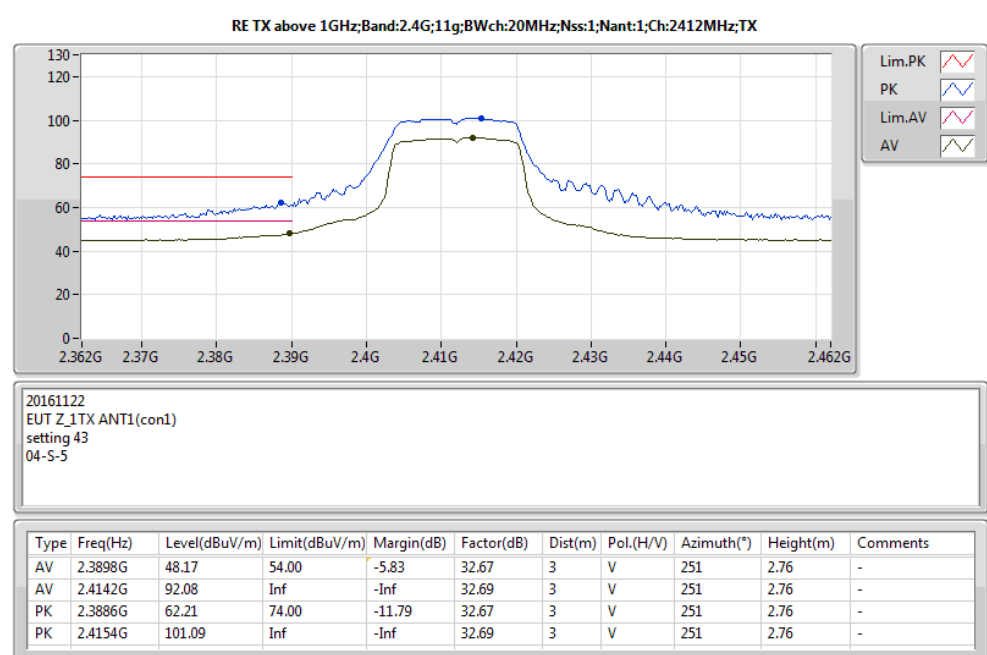
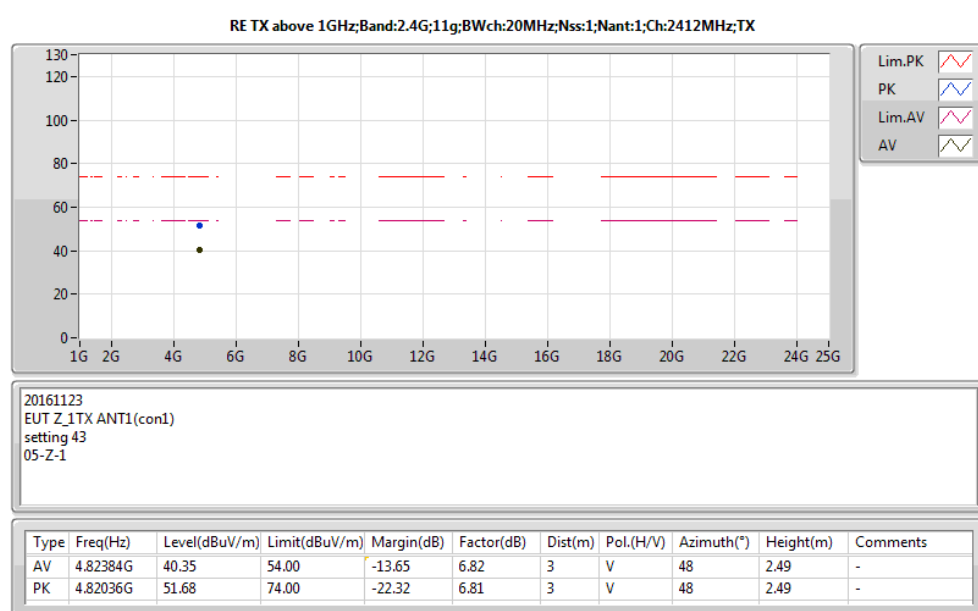
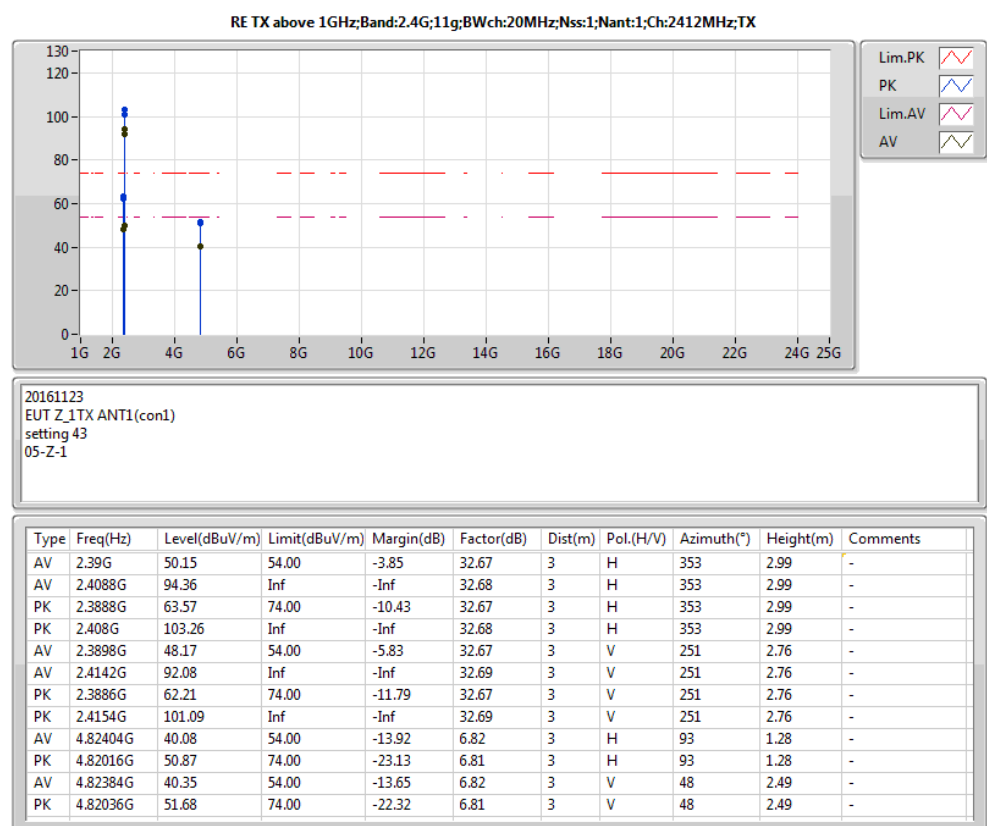
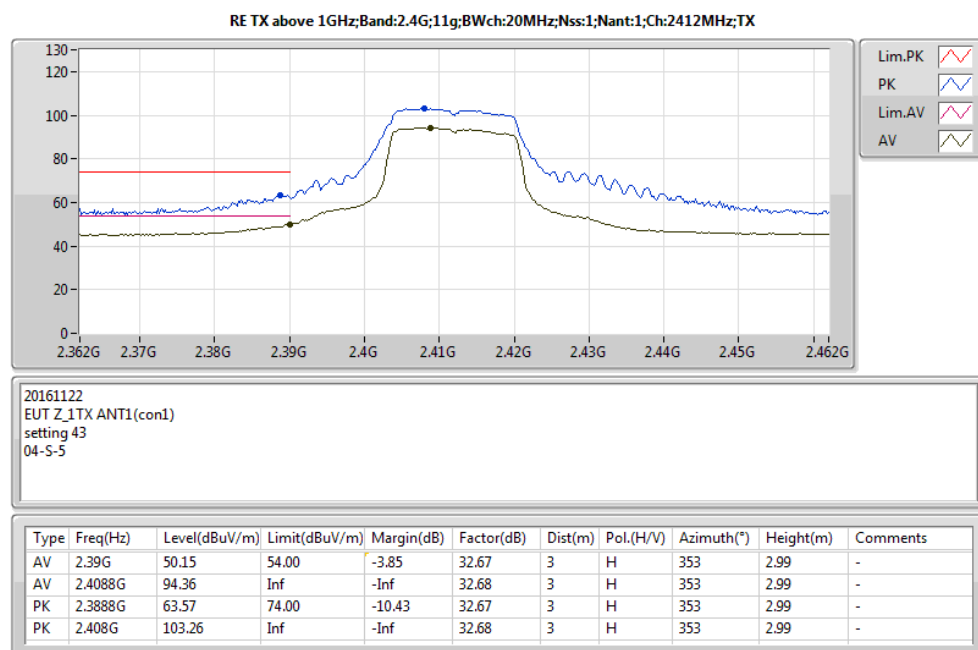
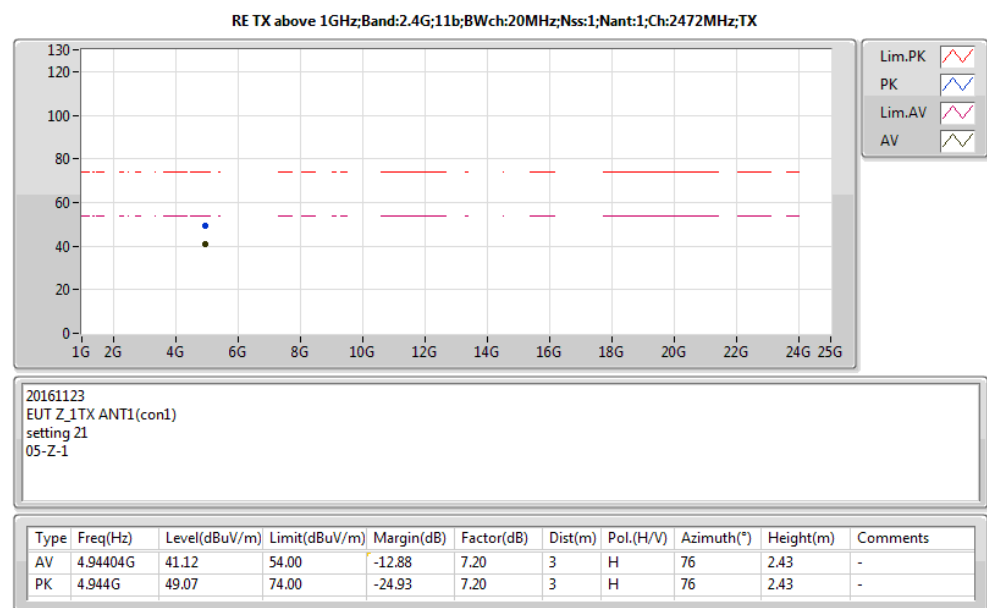
Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Pol. (H/V)	Azimuth (°)	Height (m)	Comments
2.4G;11b;Nss1;Ntx1;2467	Pass	AV	4.93398G	53.78	54.00	-0.22	7.17	3	V	38	2.70	-

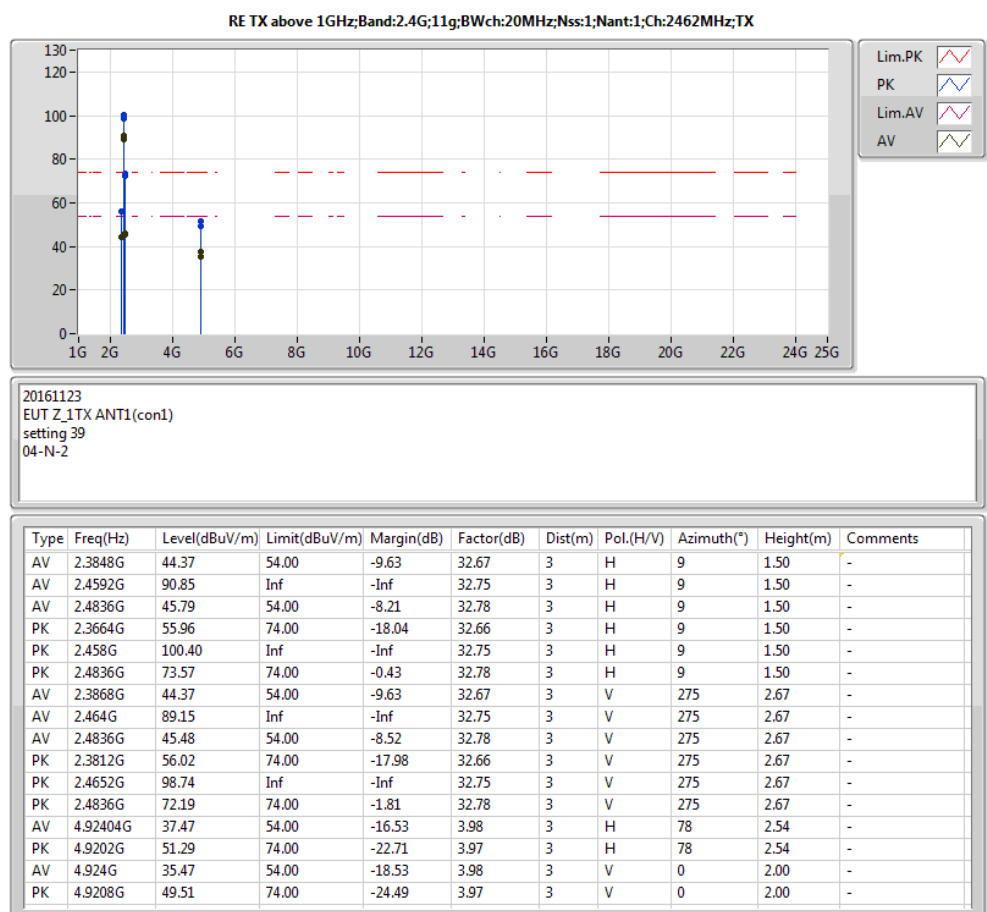
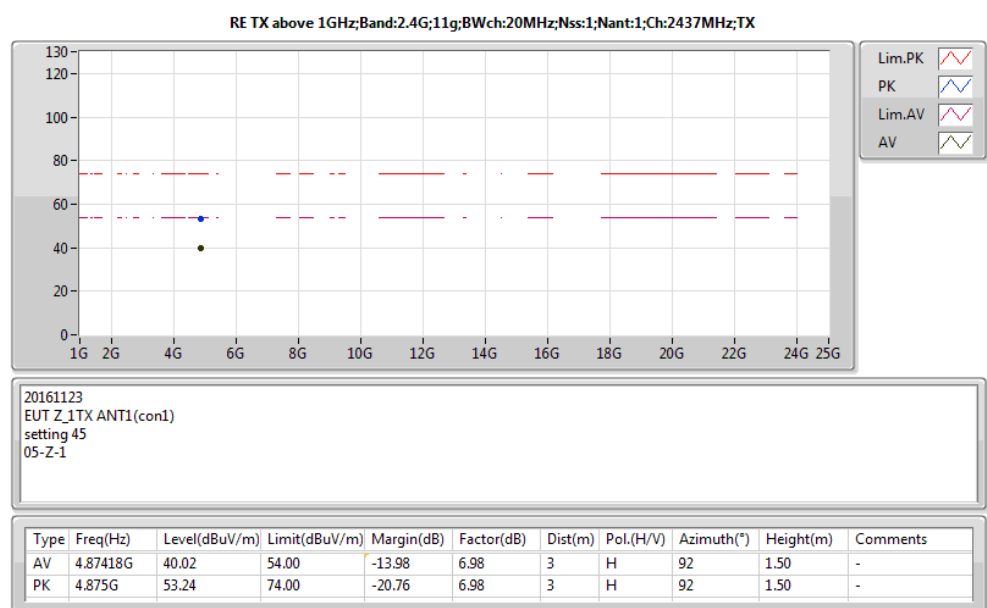
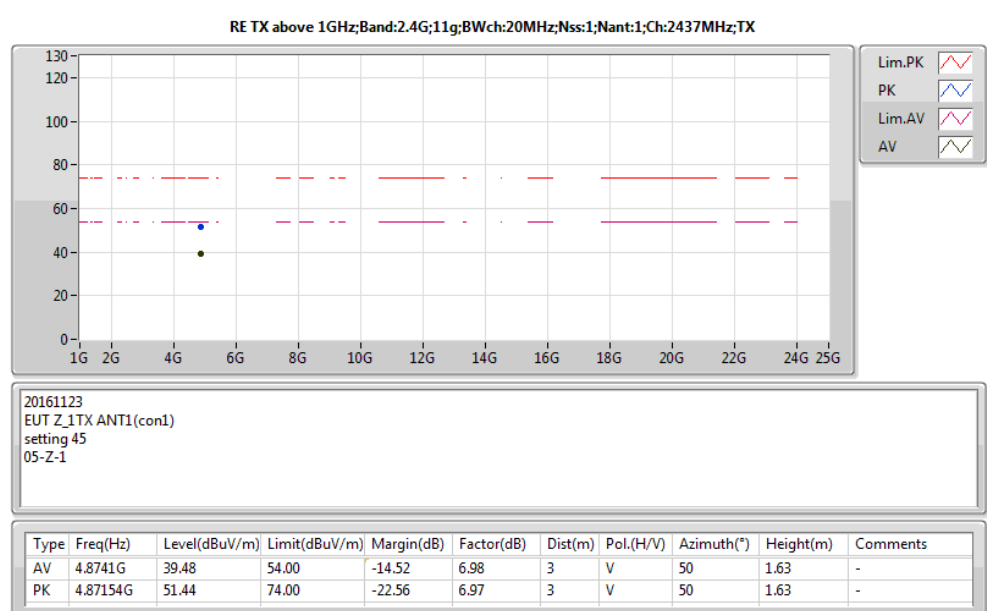
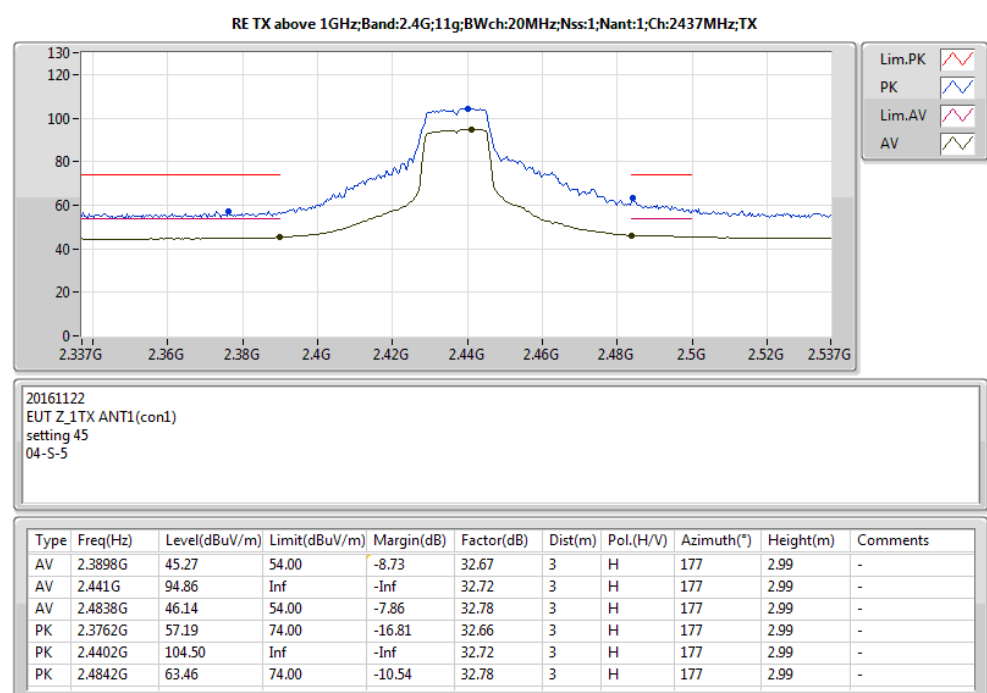
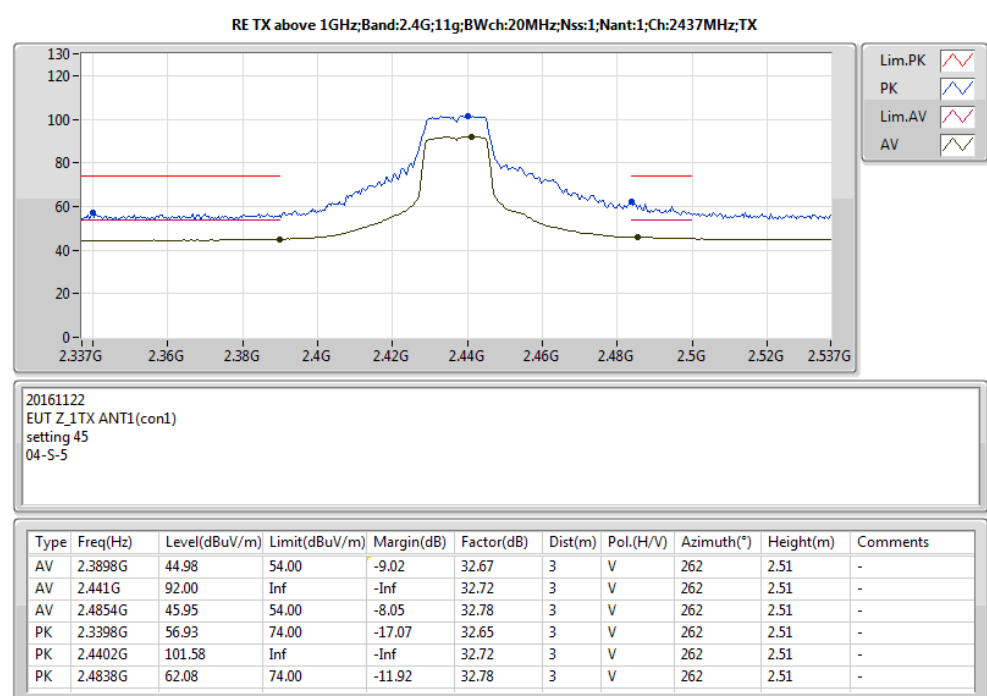
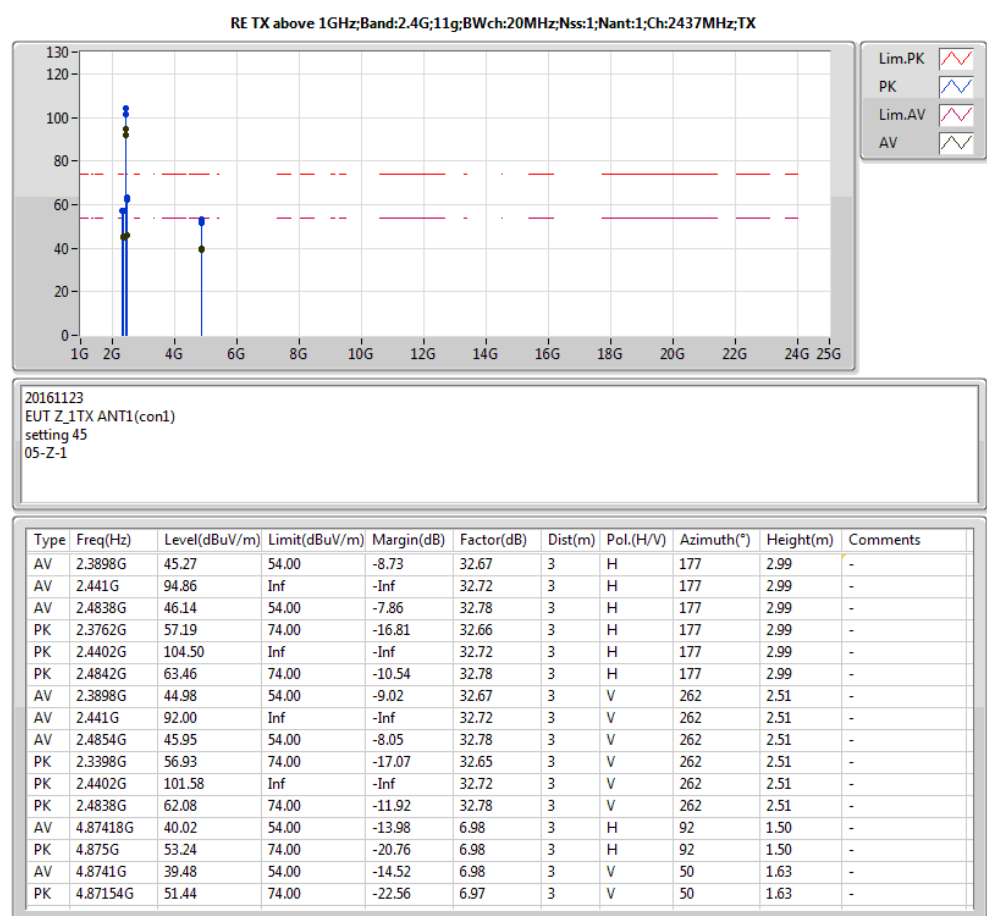


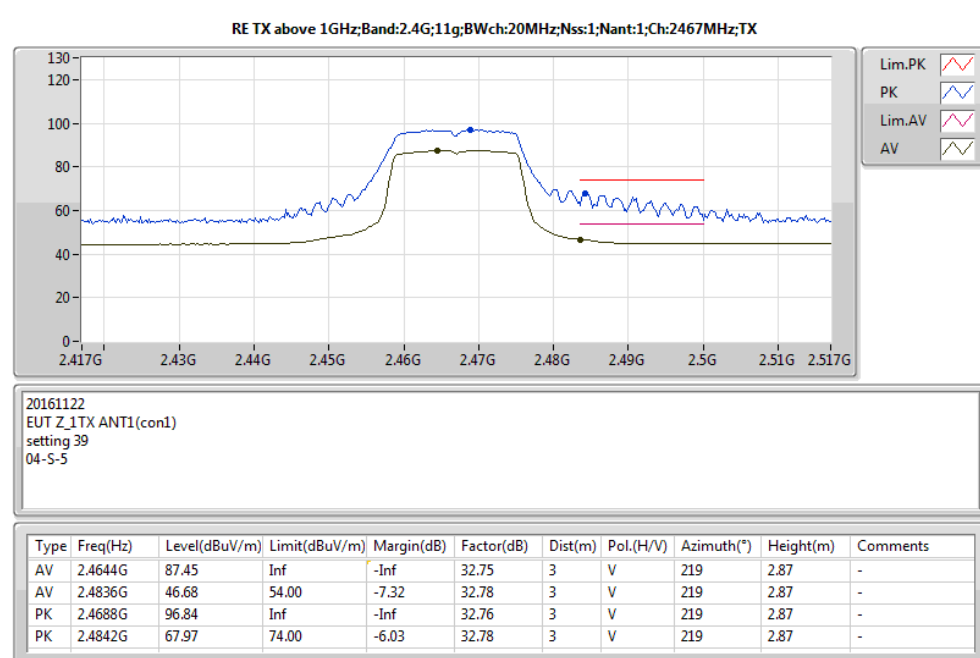
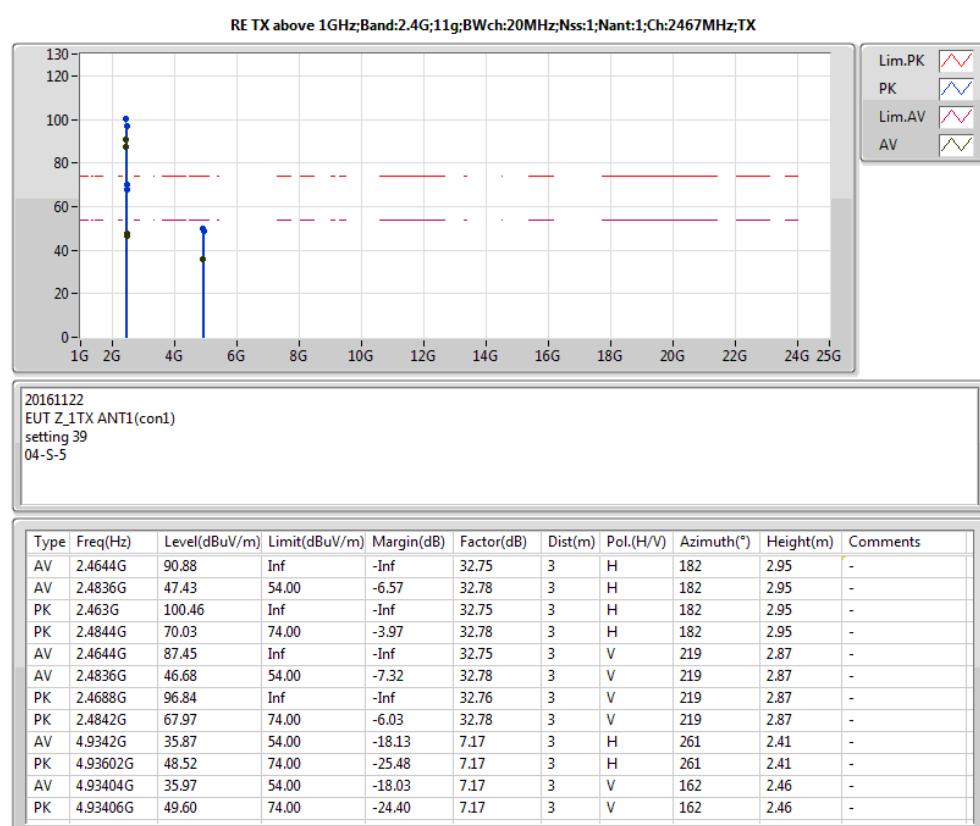
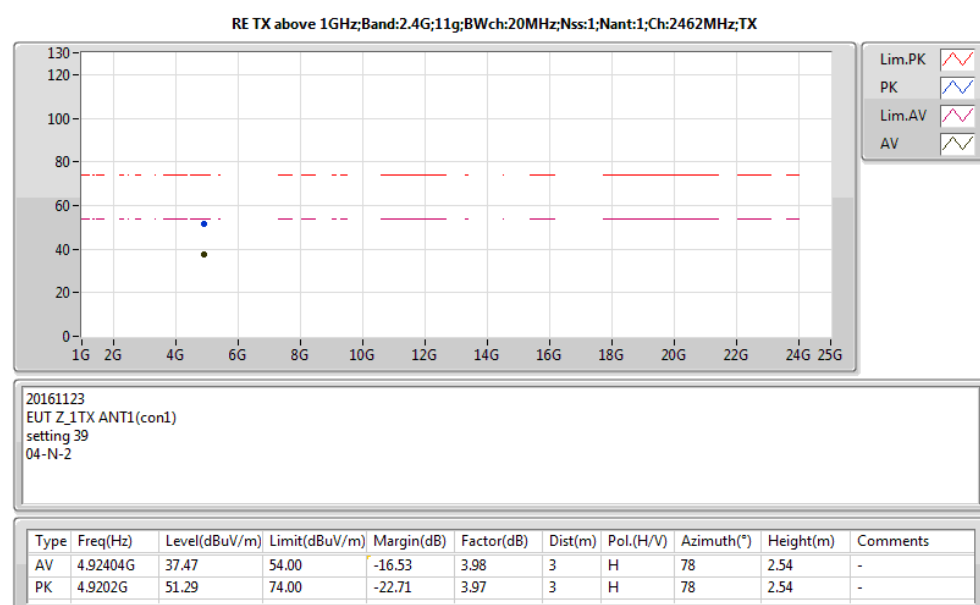
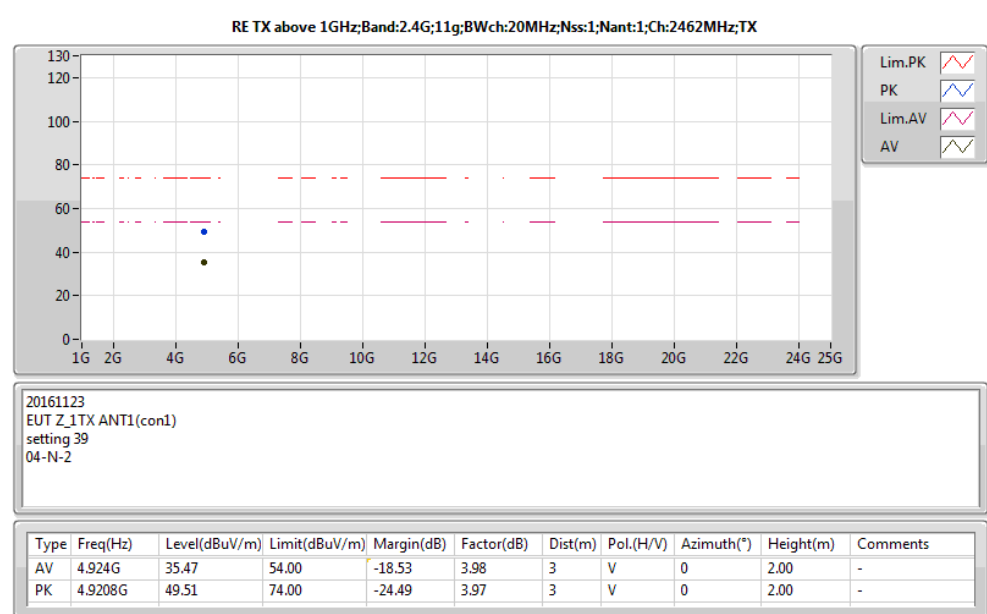
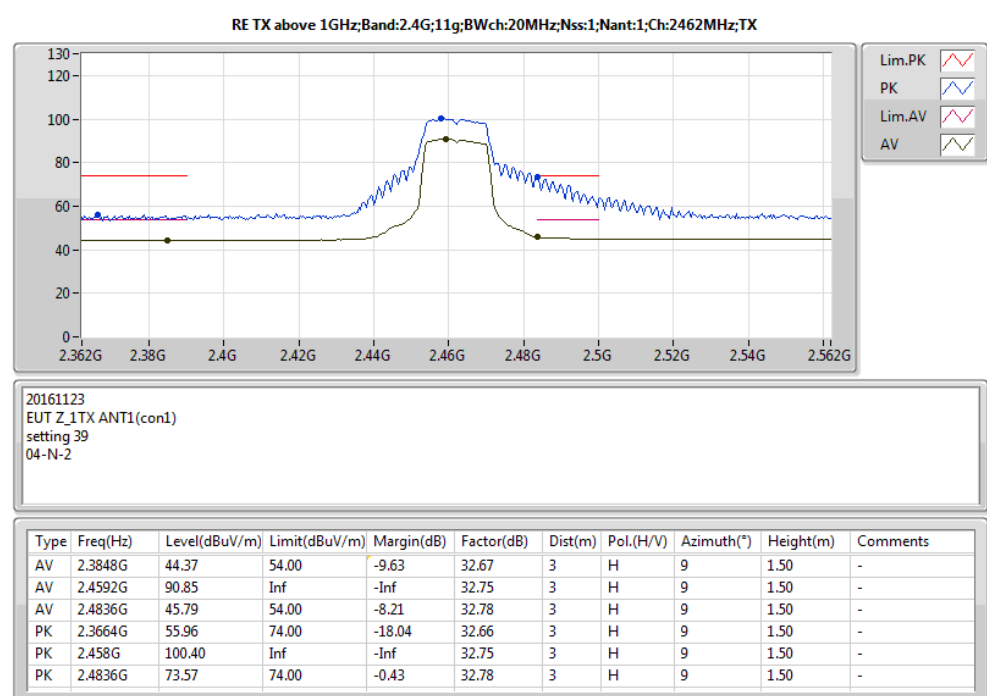
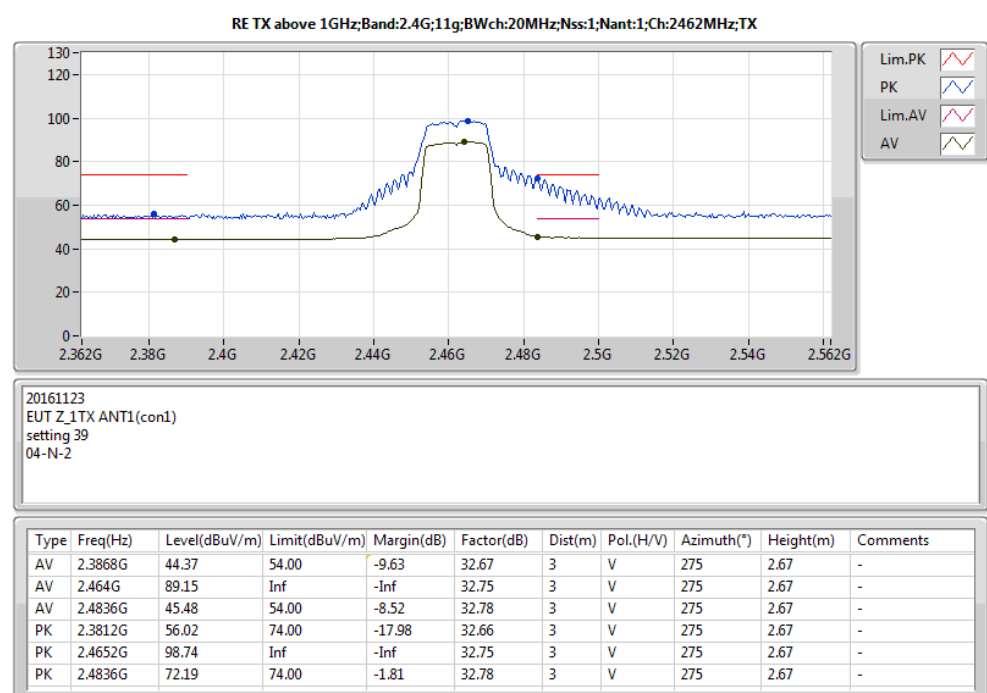


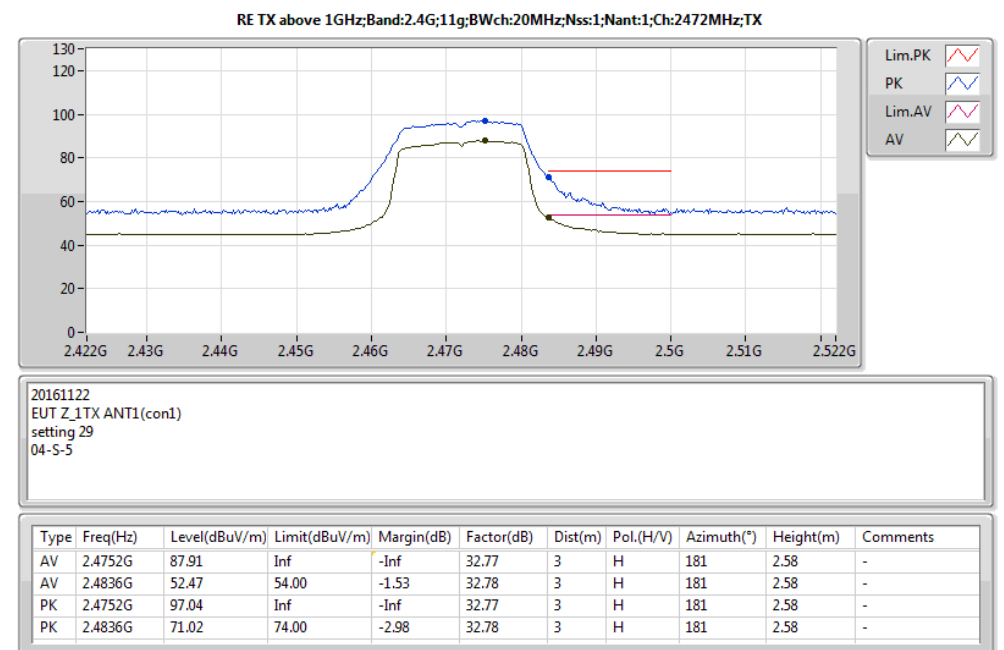
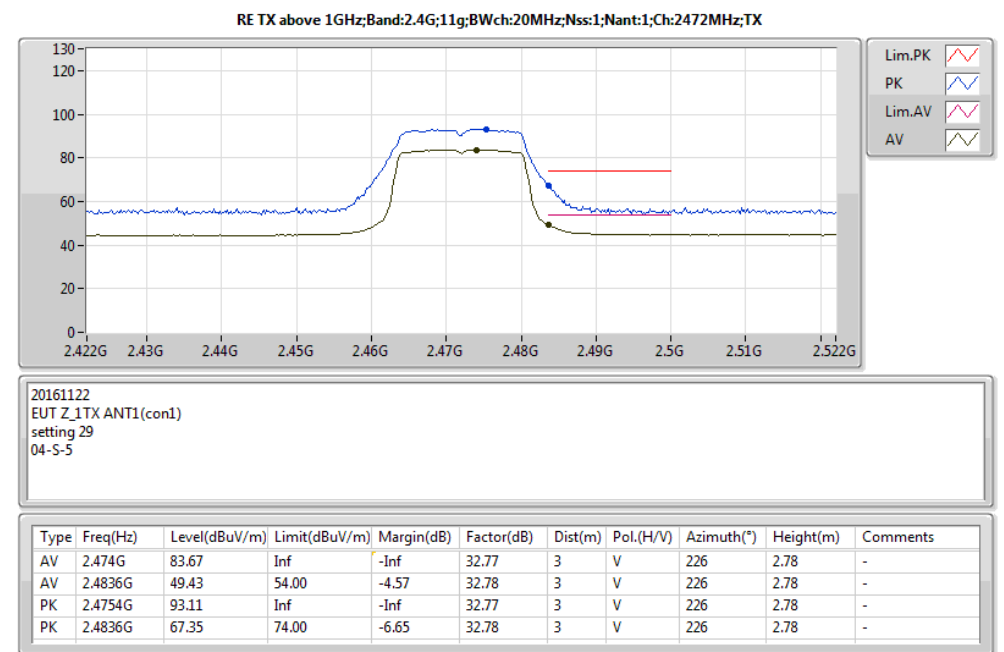
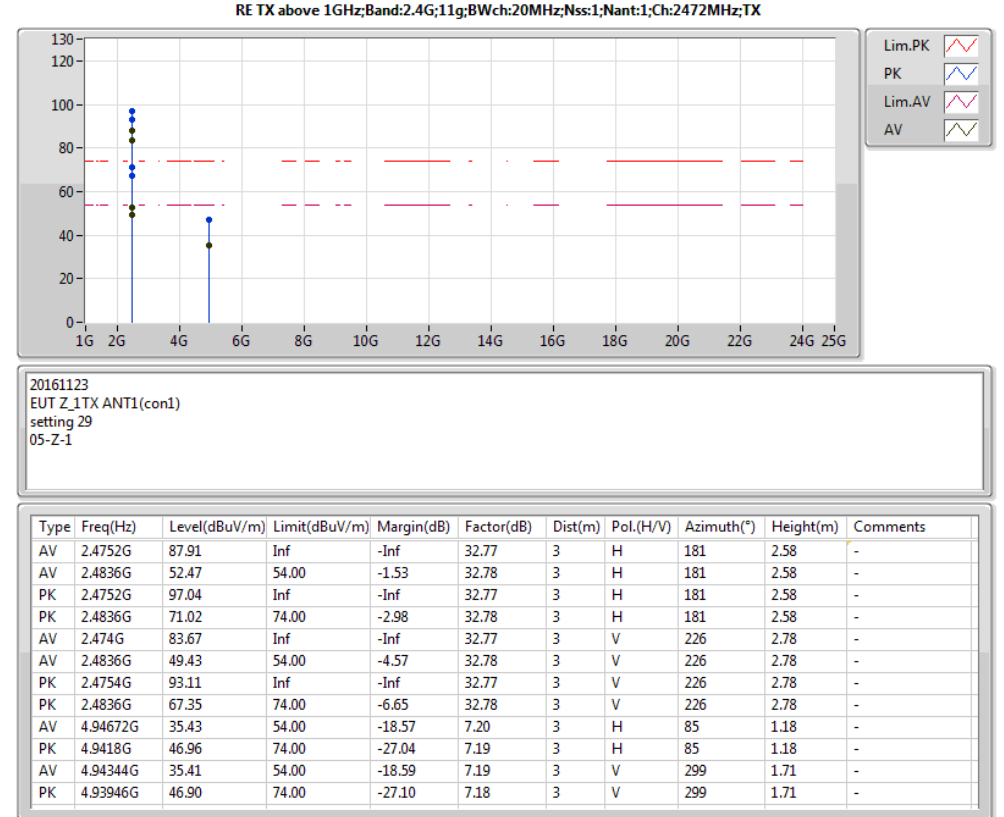
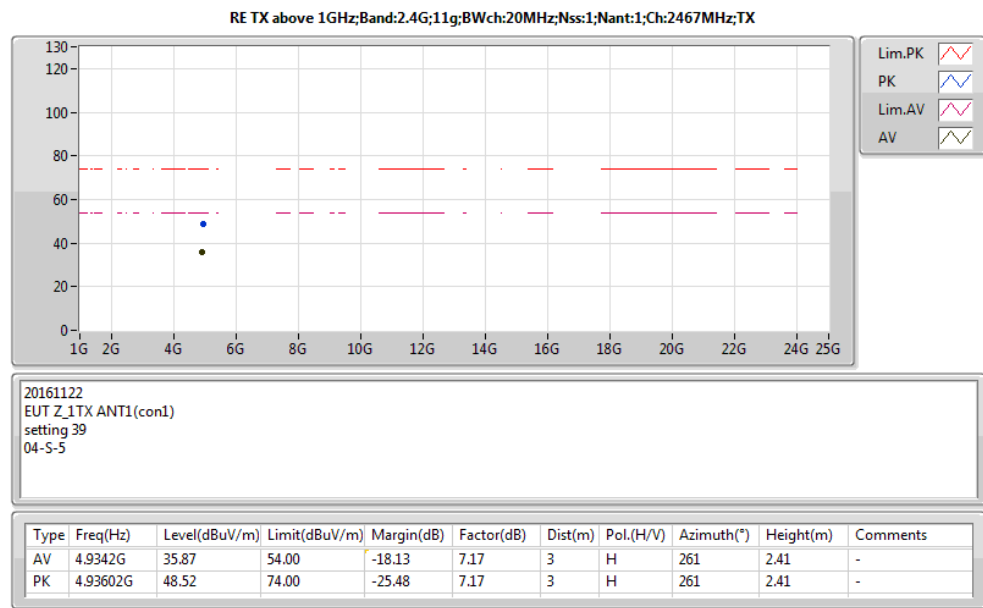
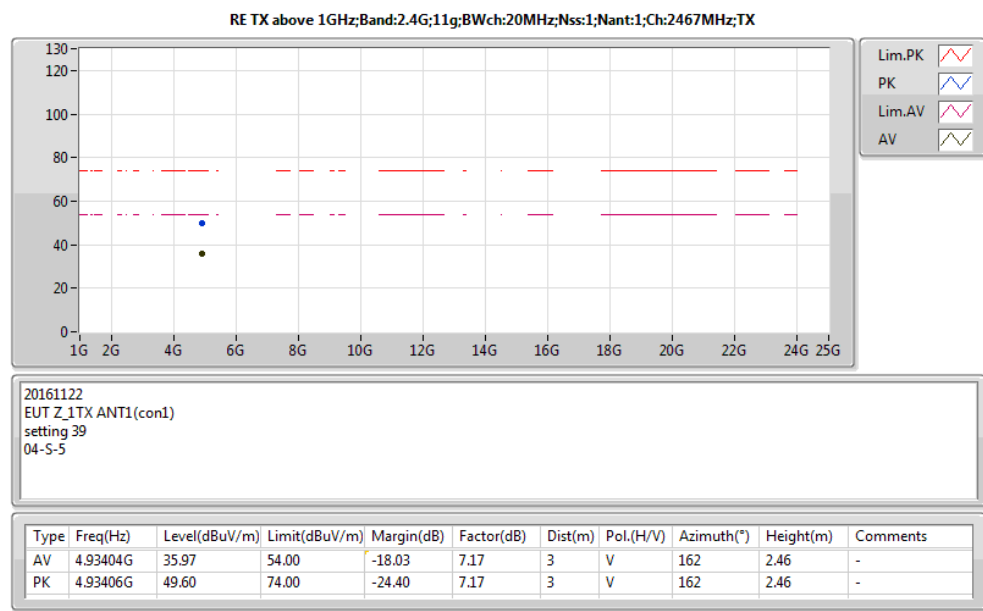
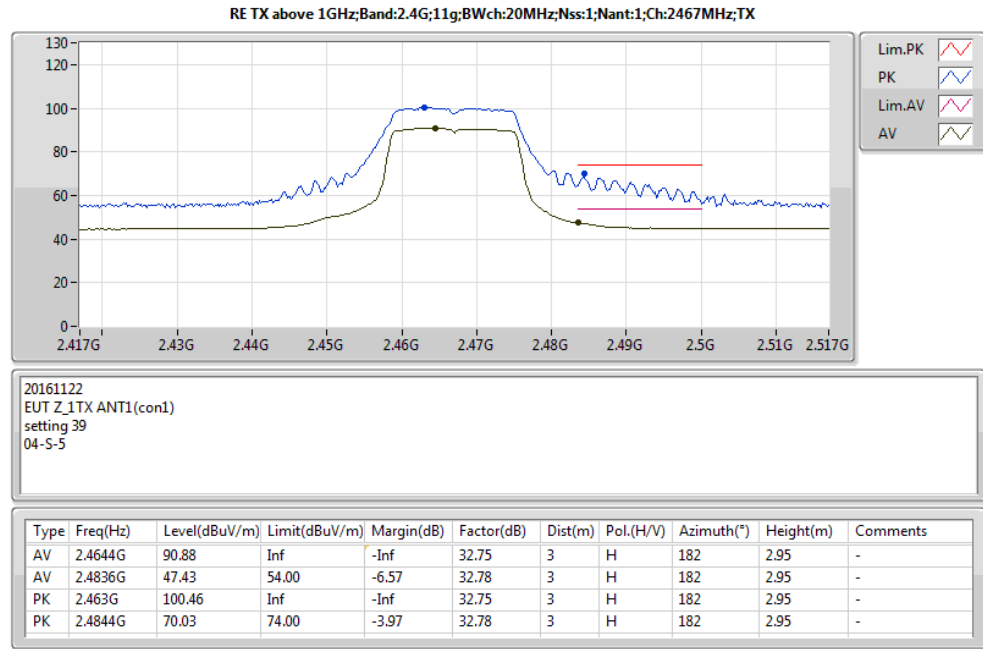


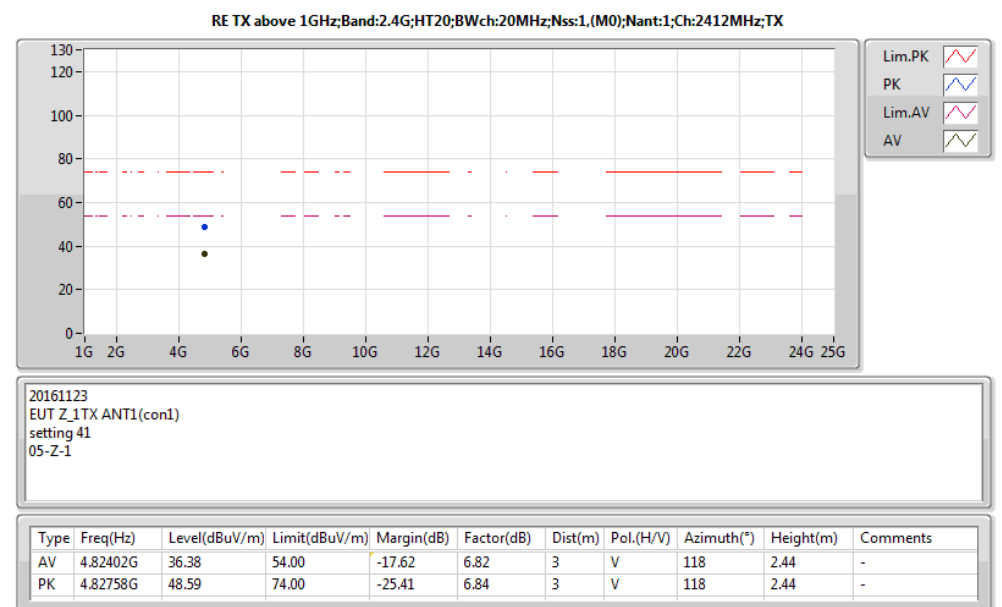
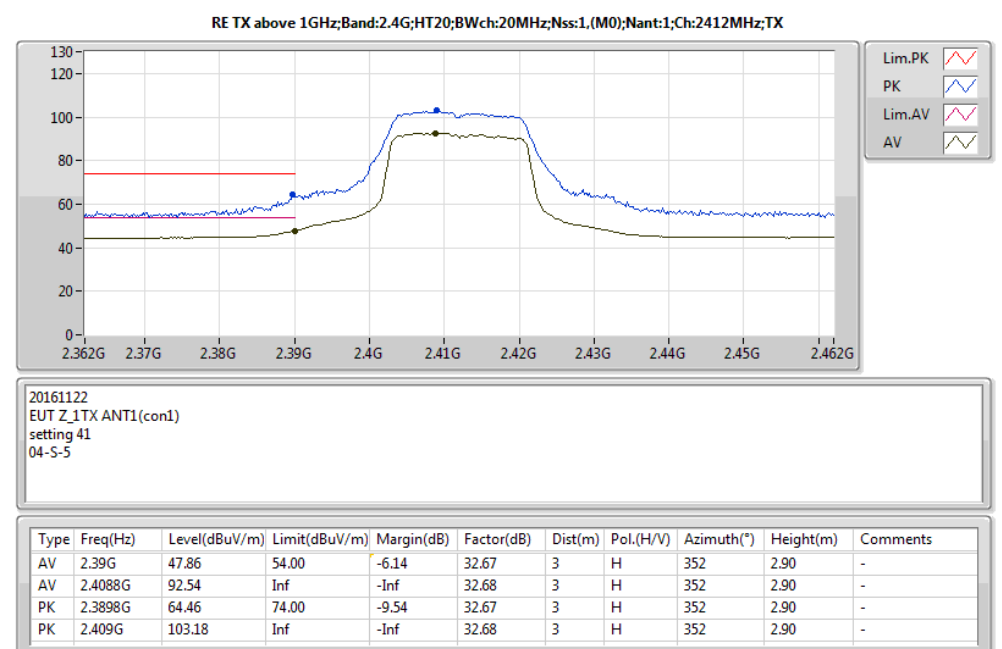
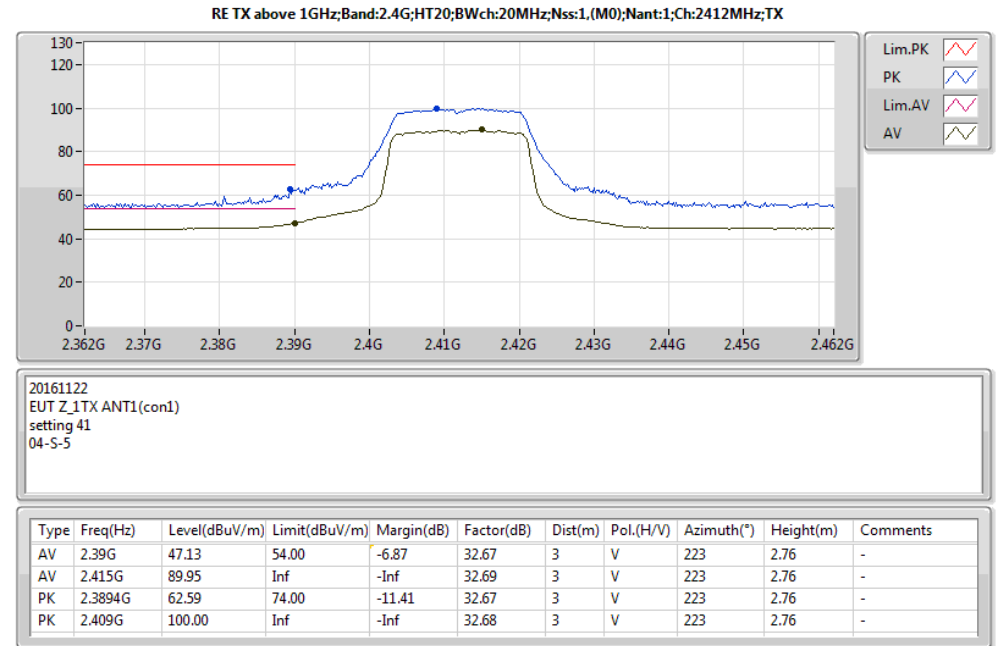
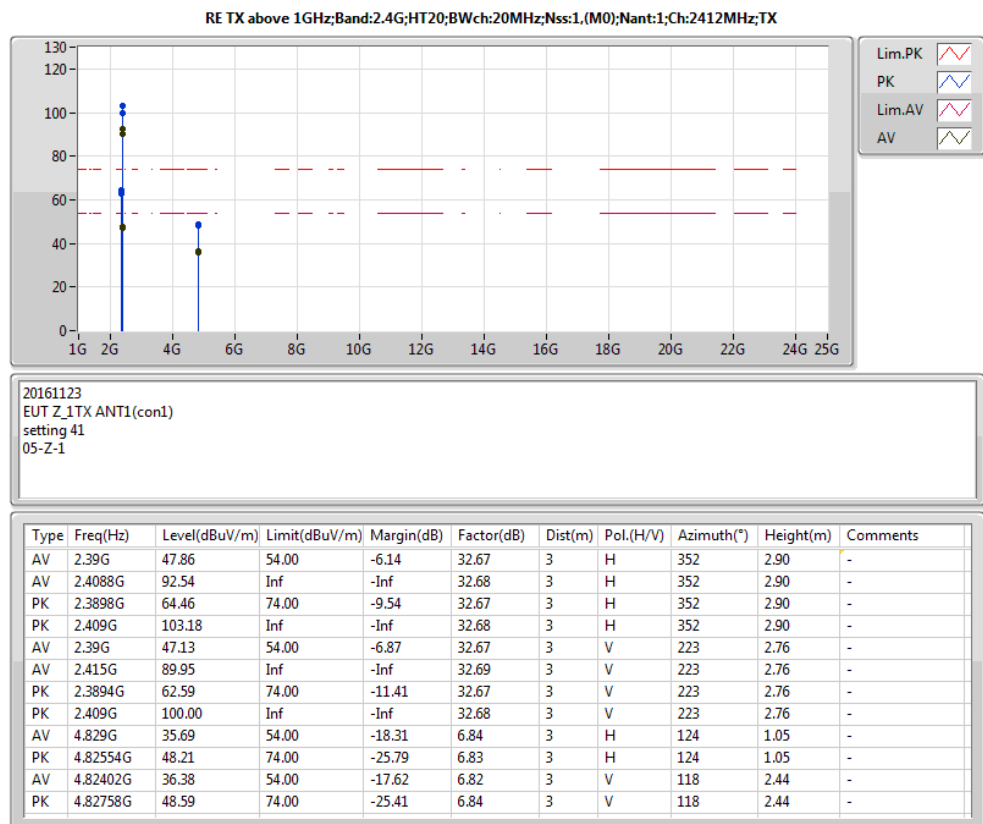
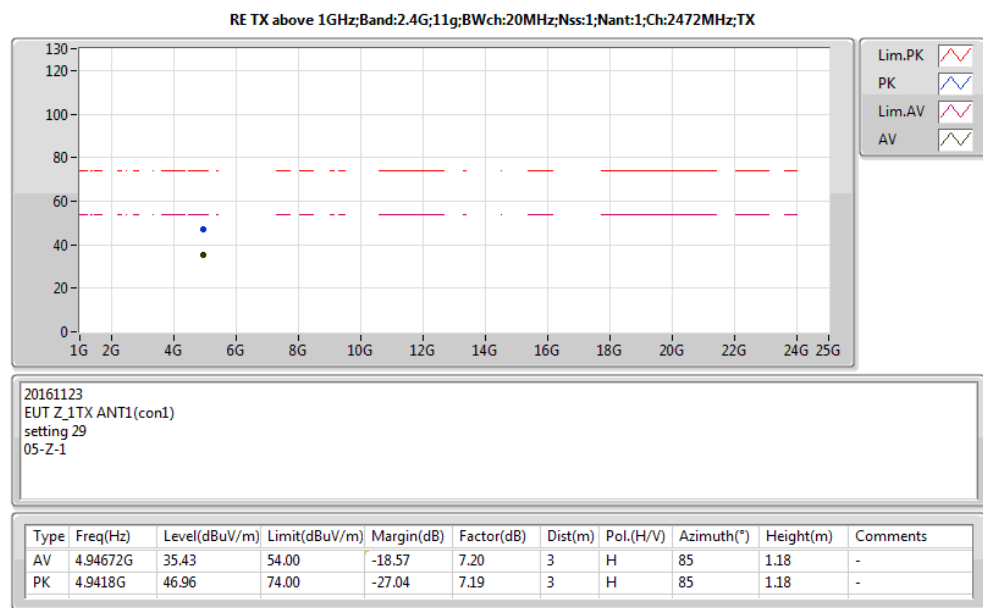
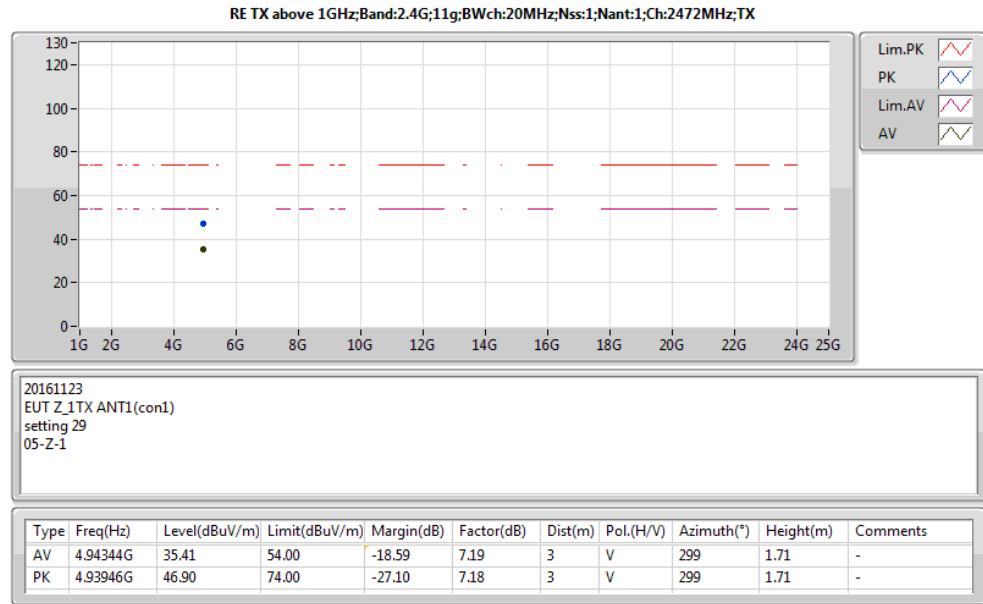


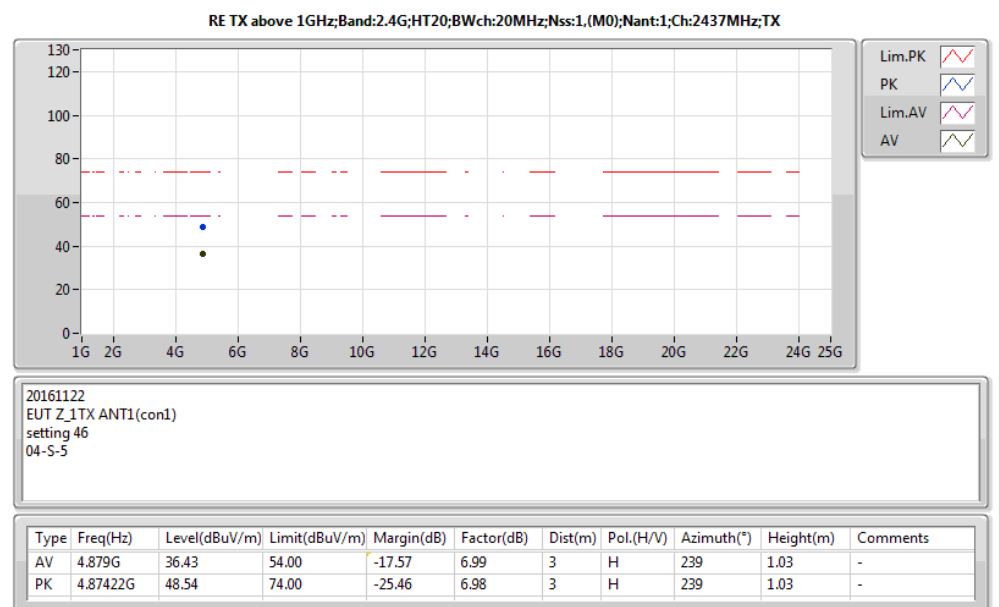
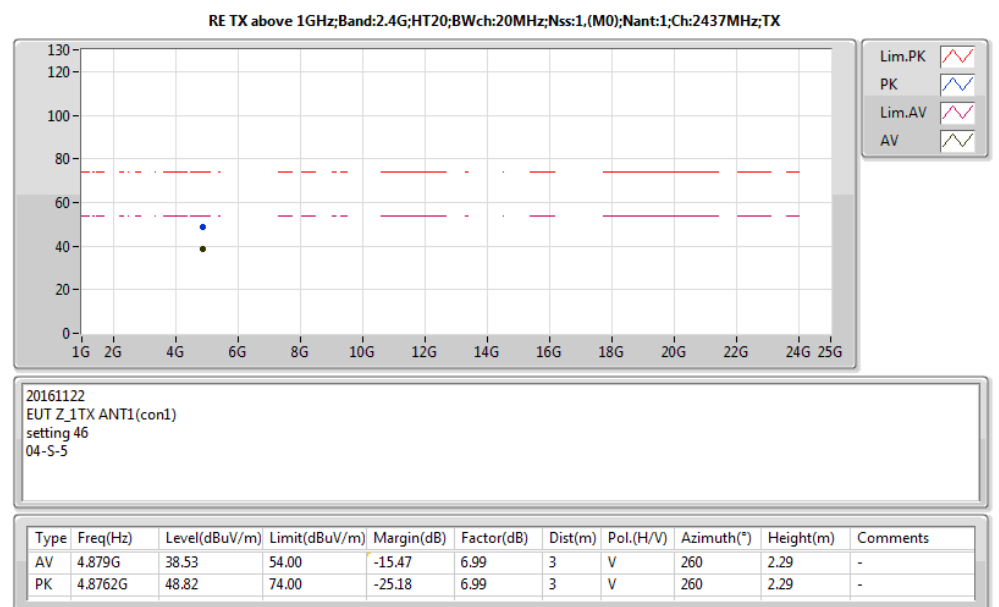
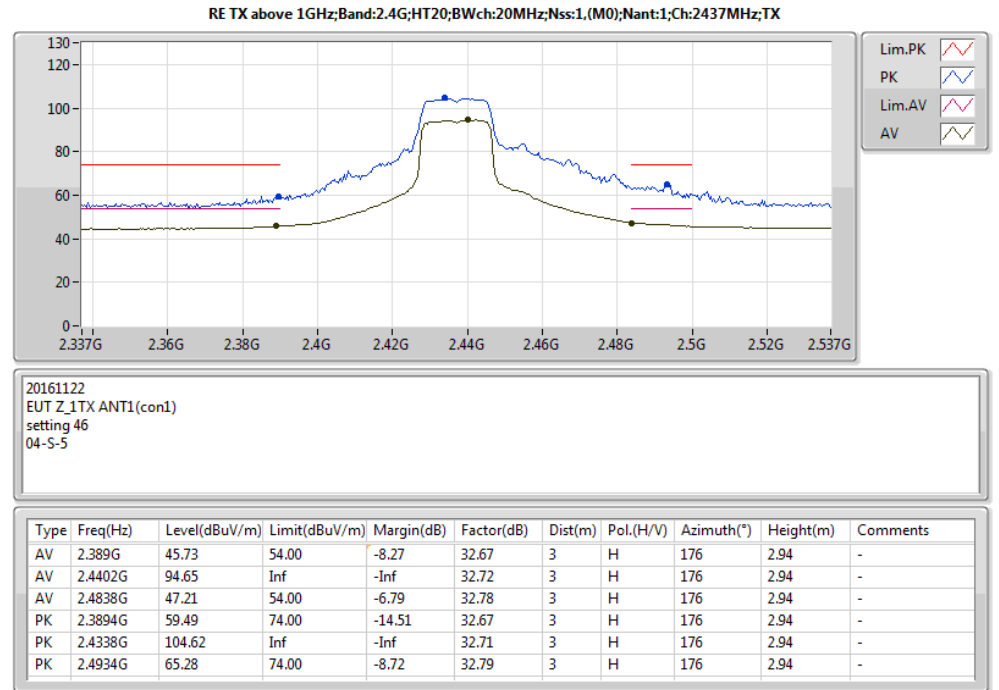
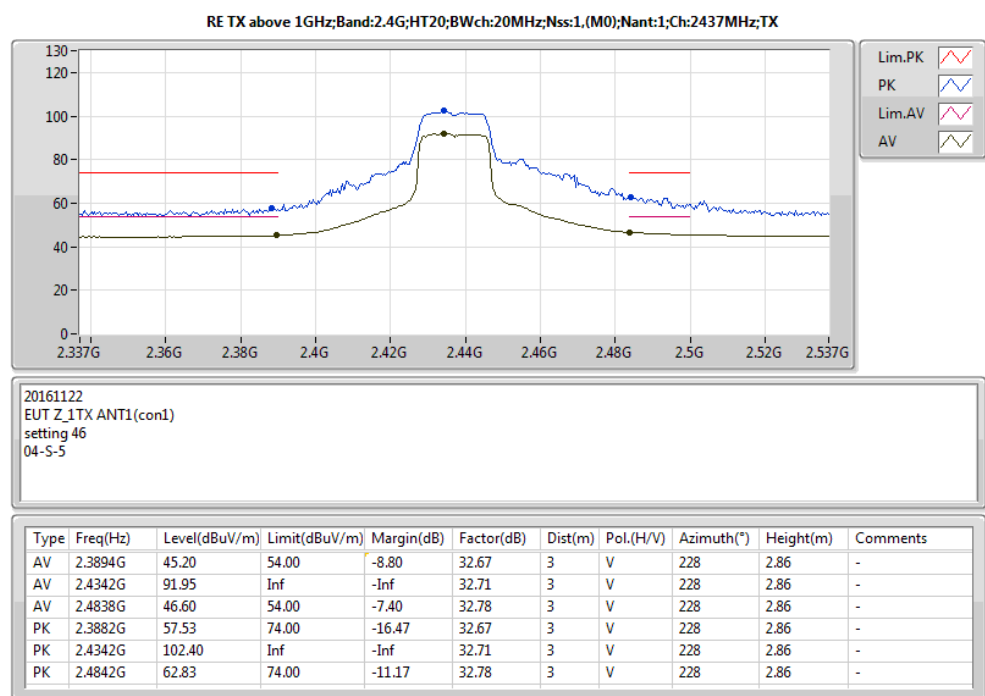
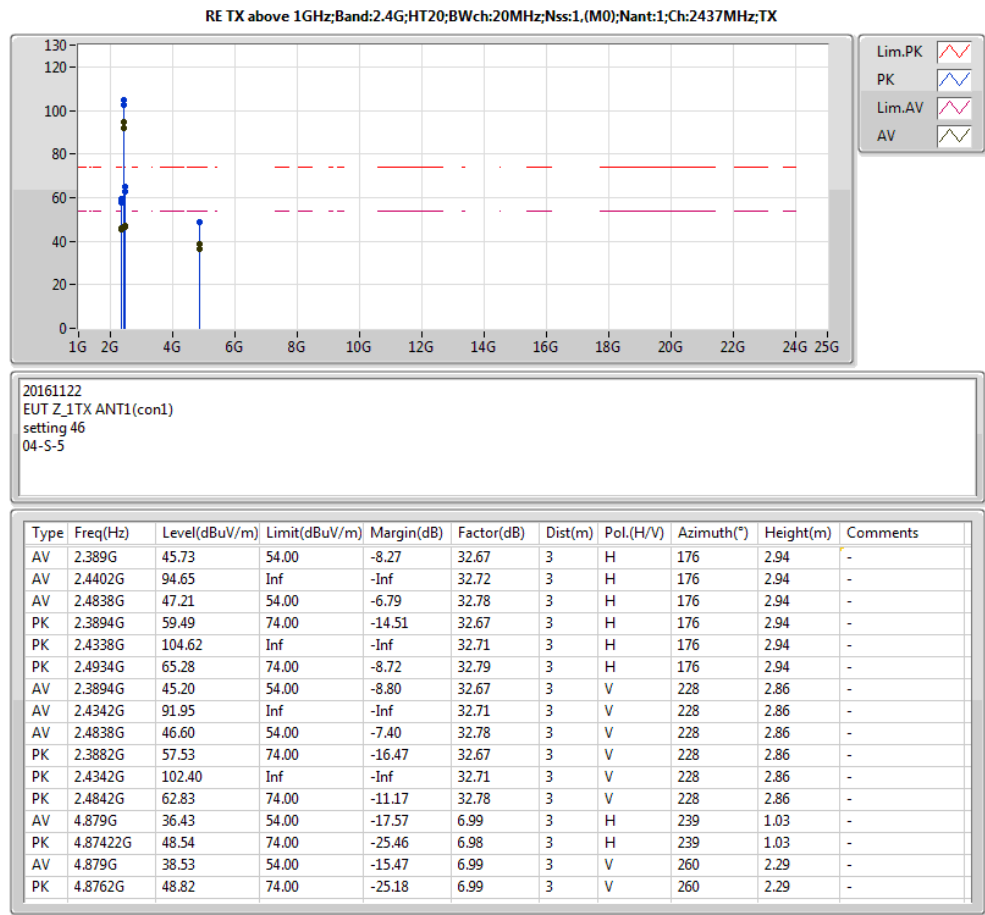
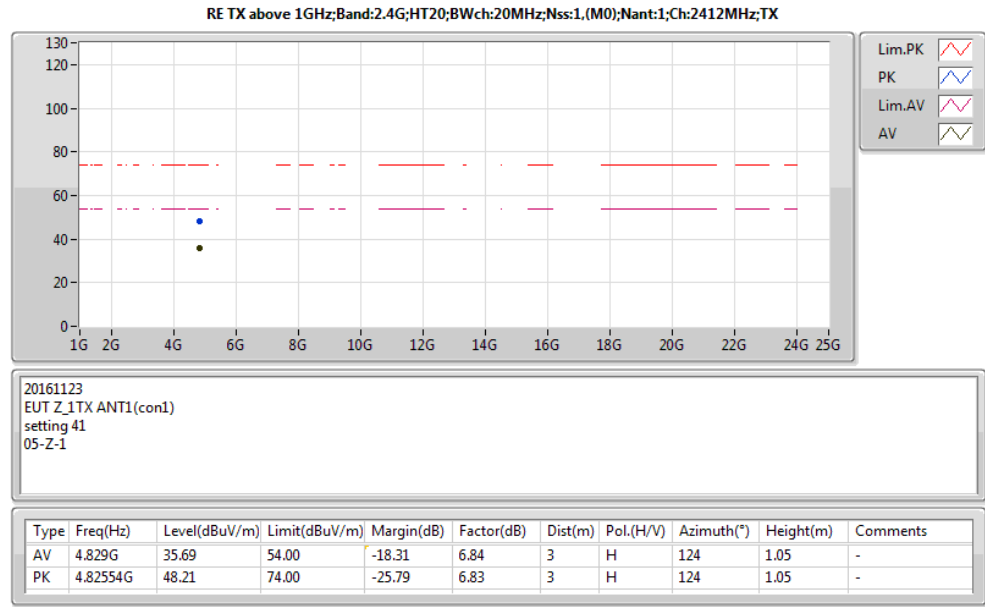


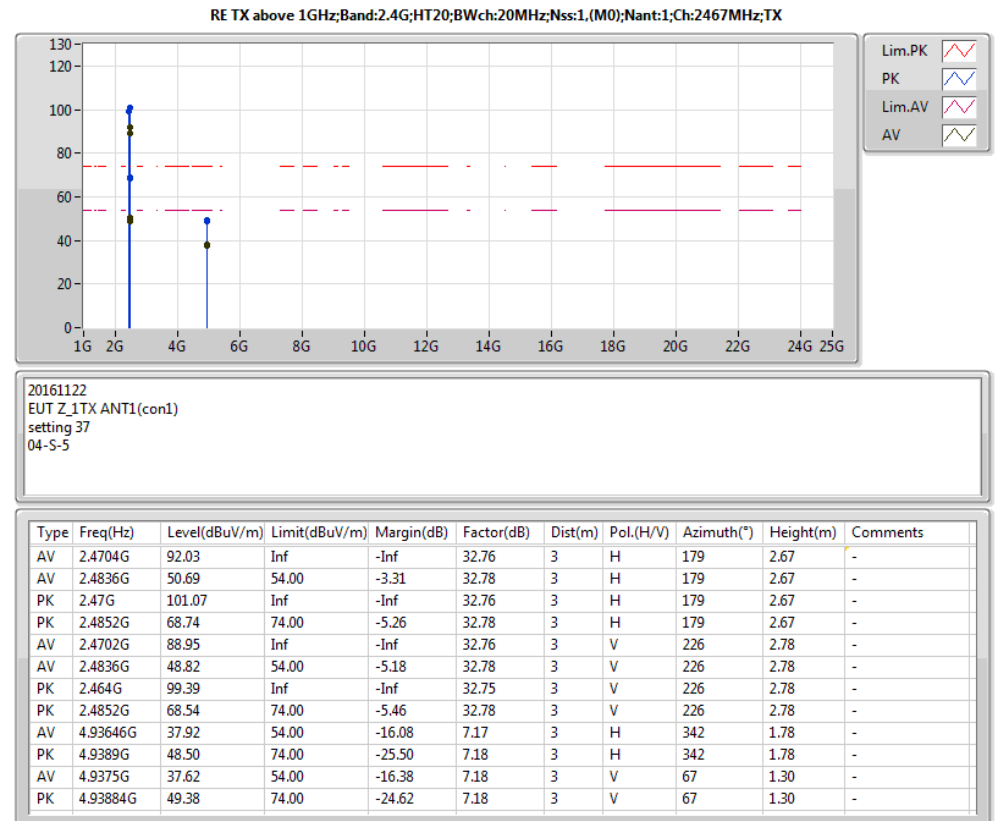
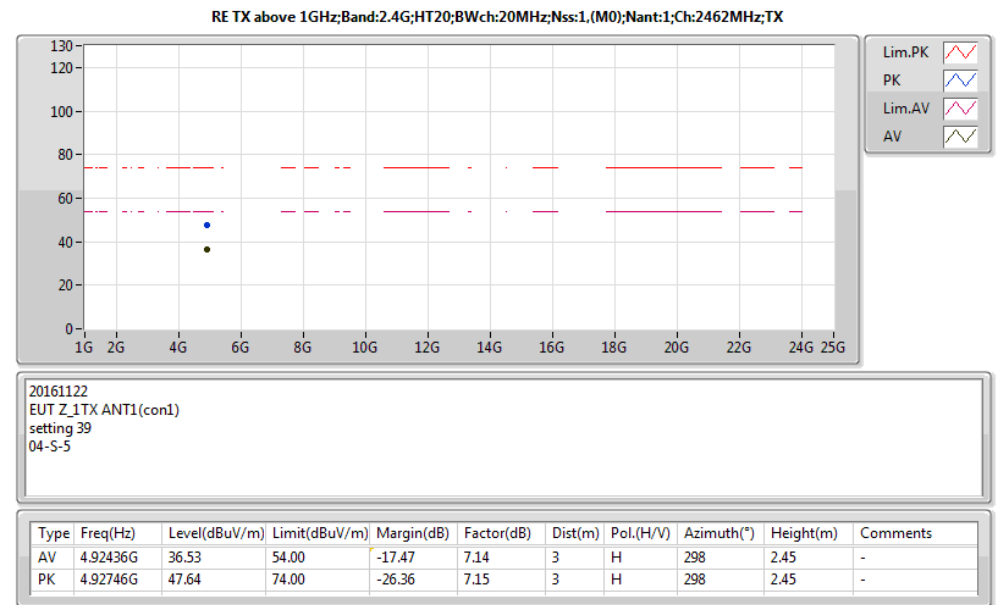
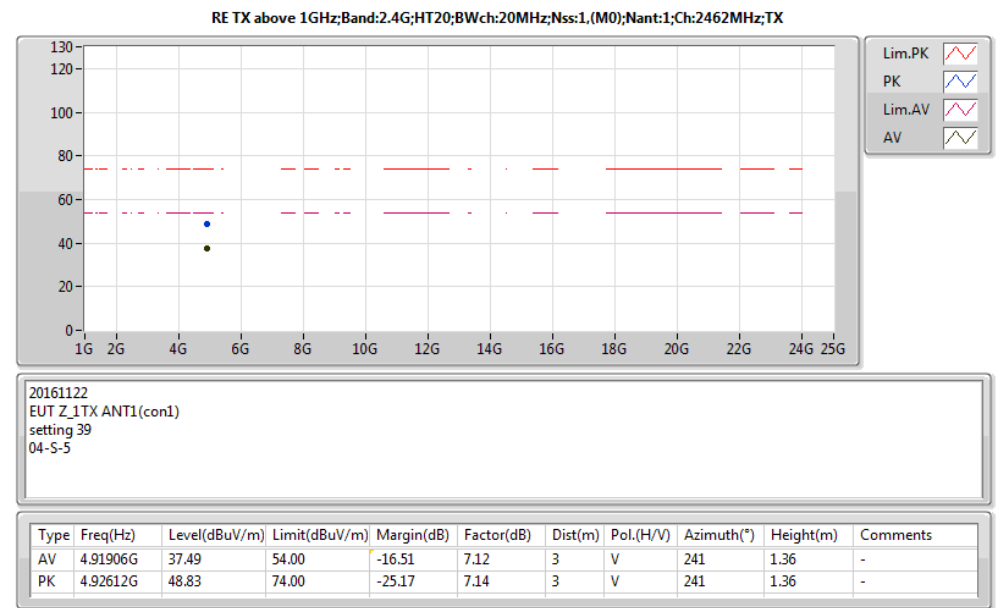
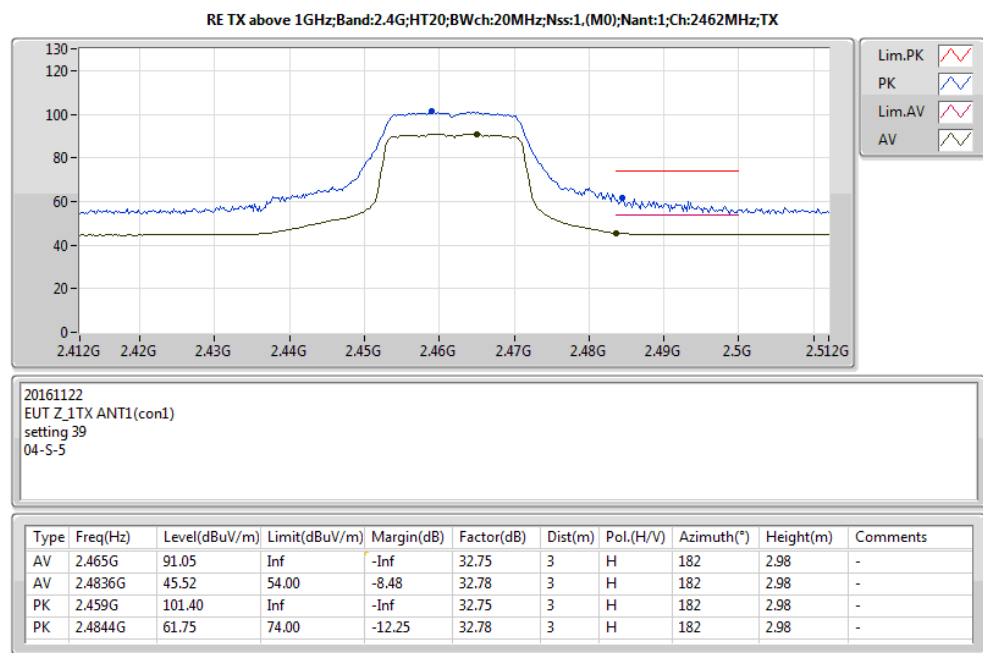
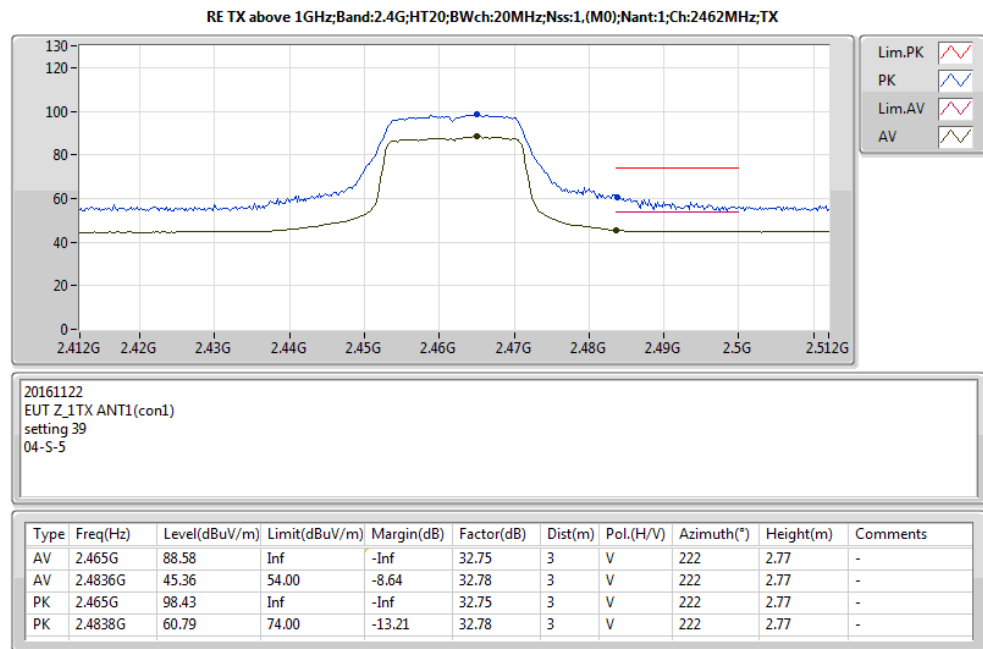
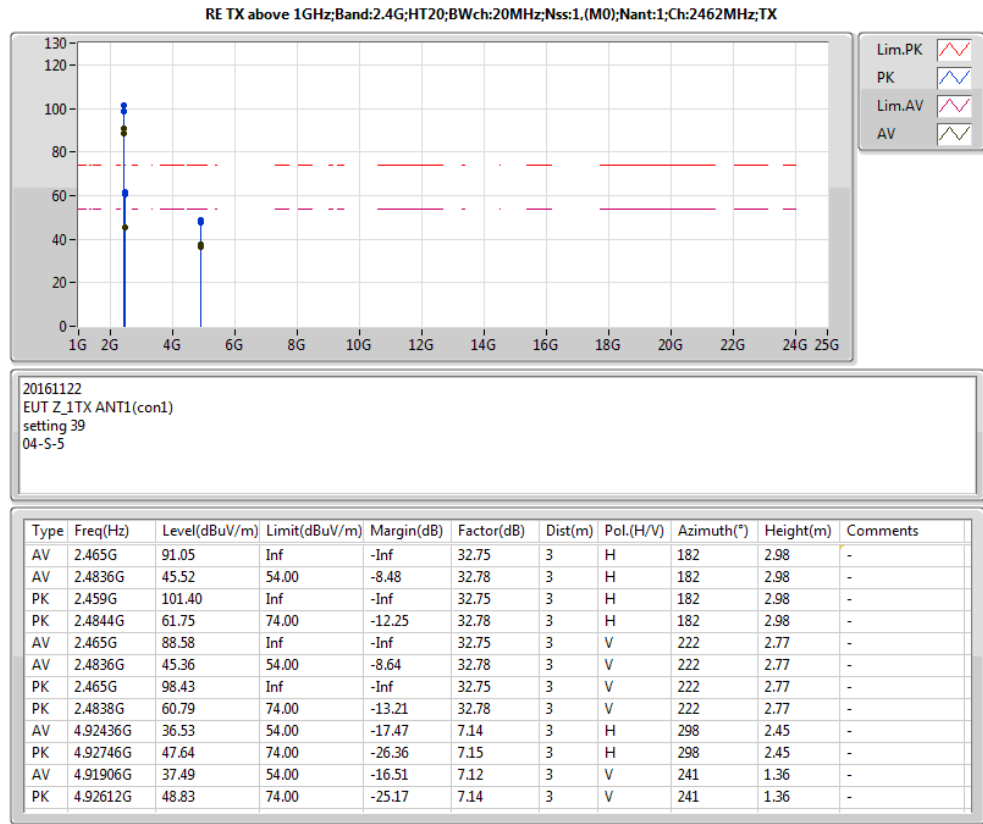


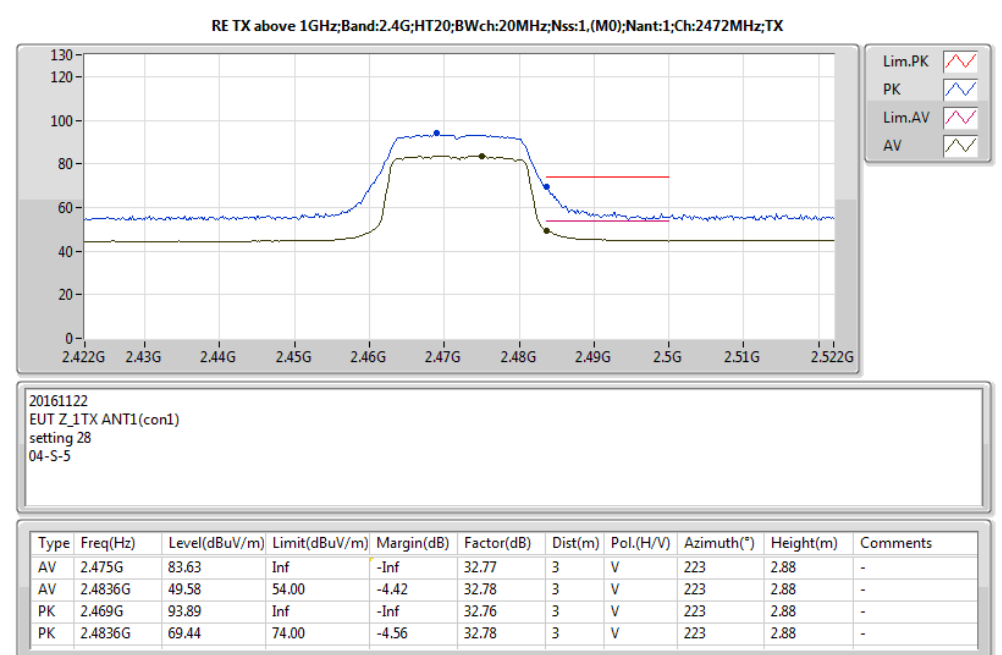
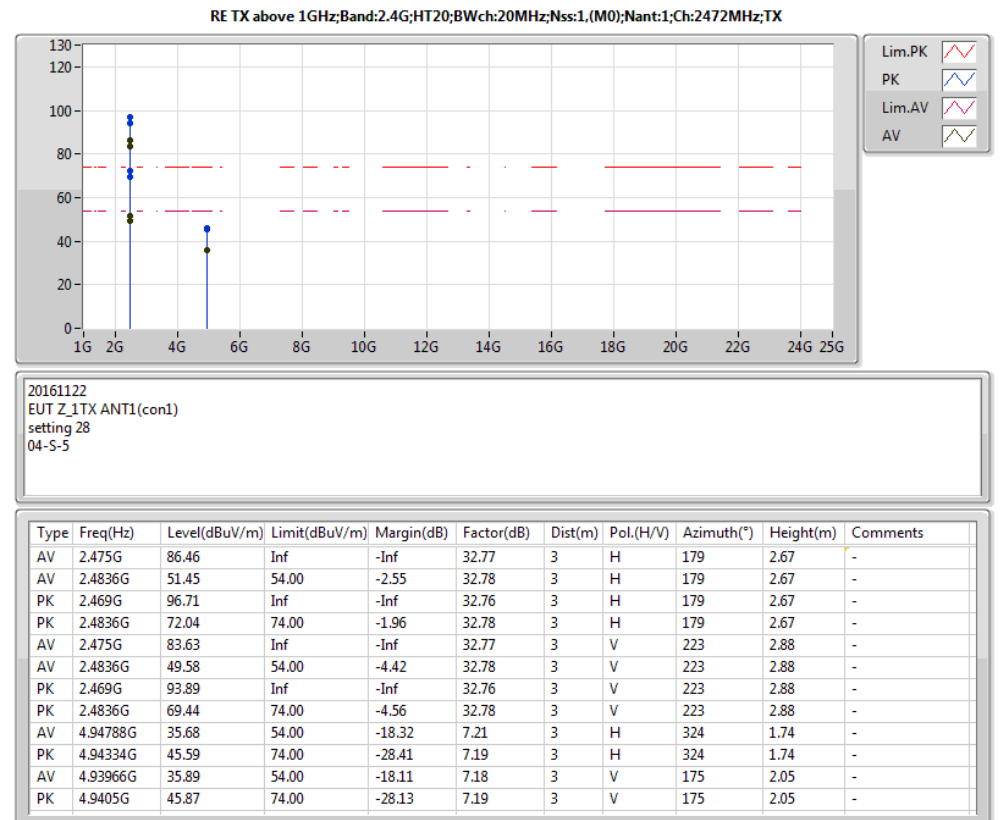
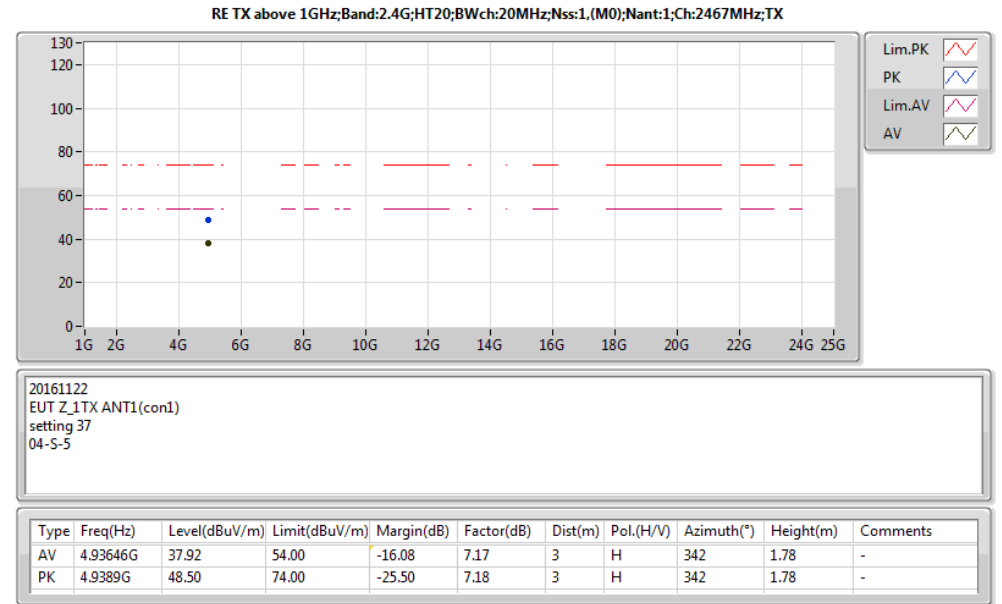
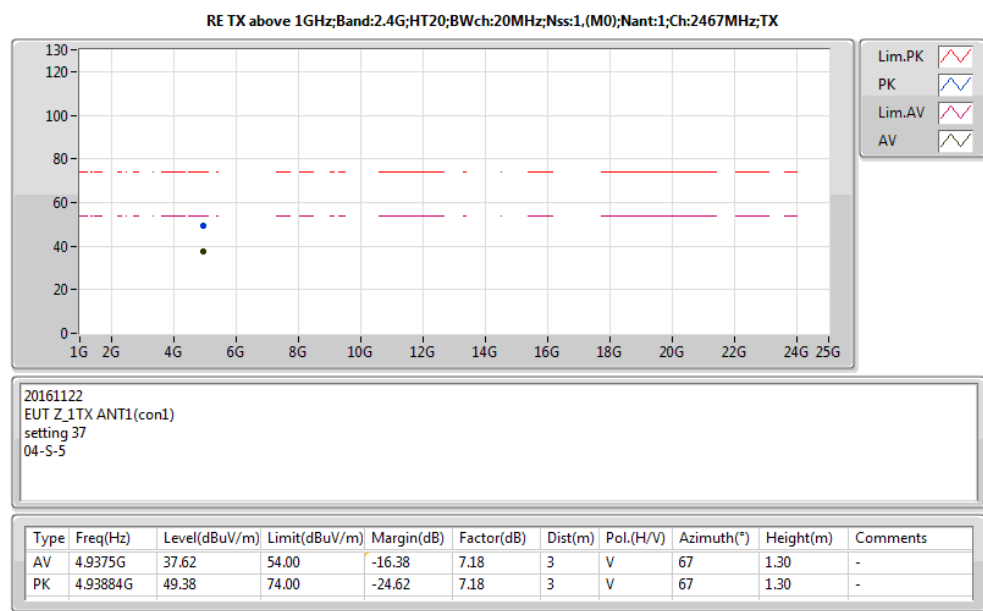
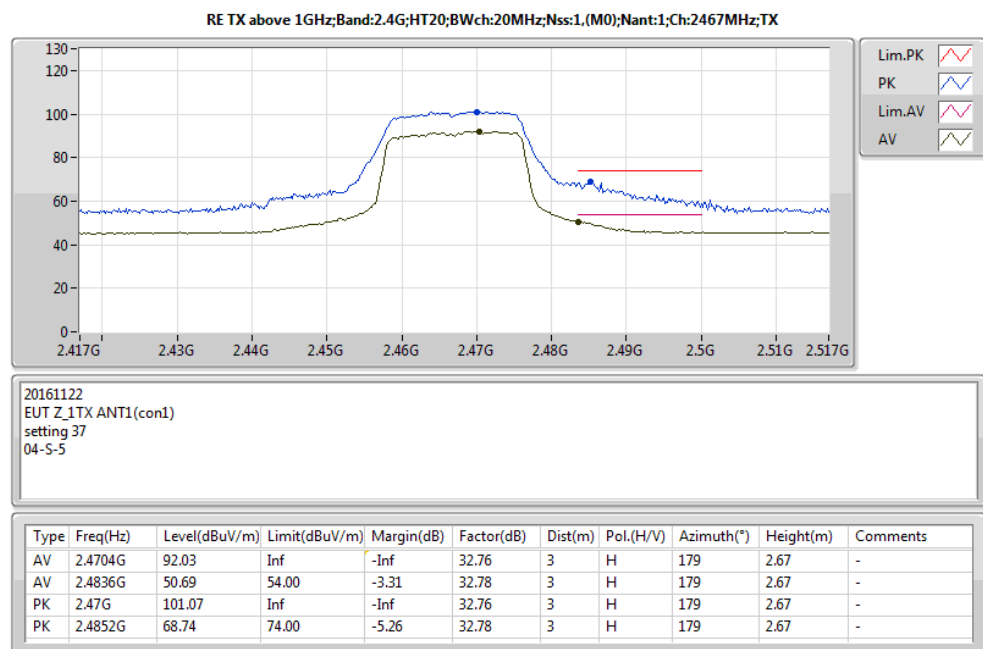
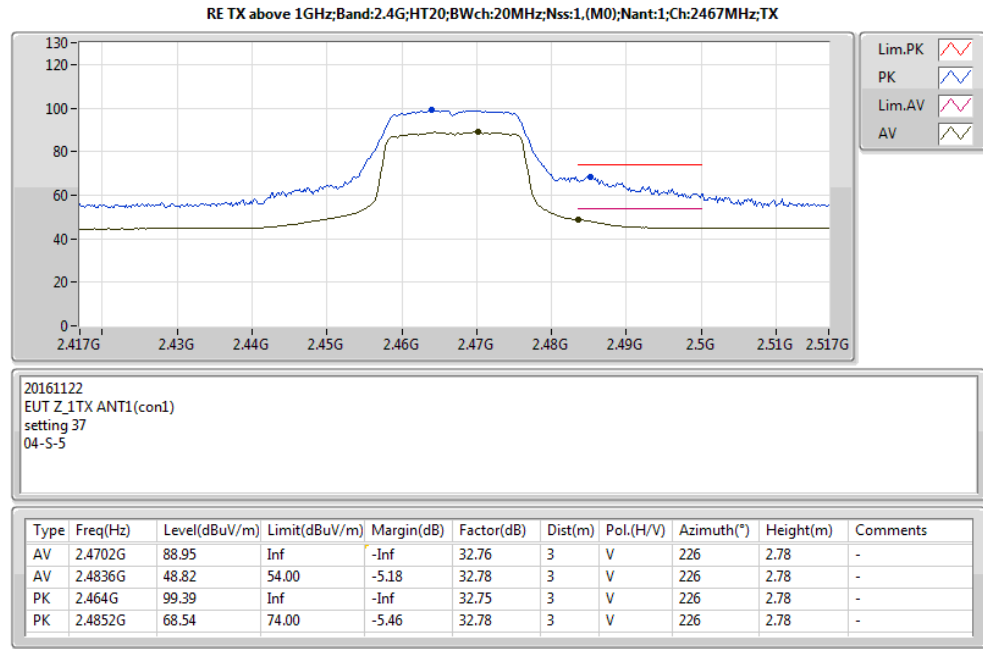


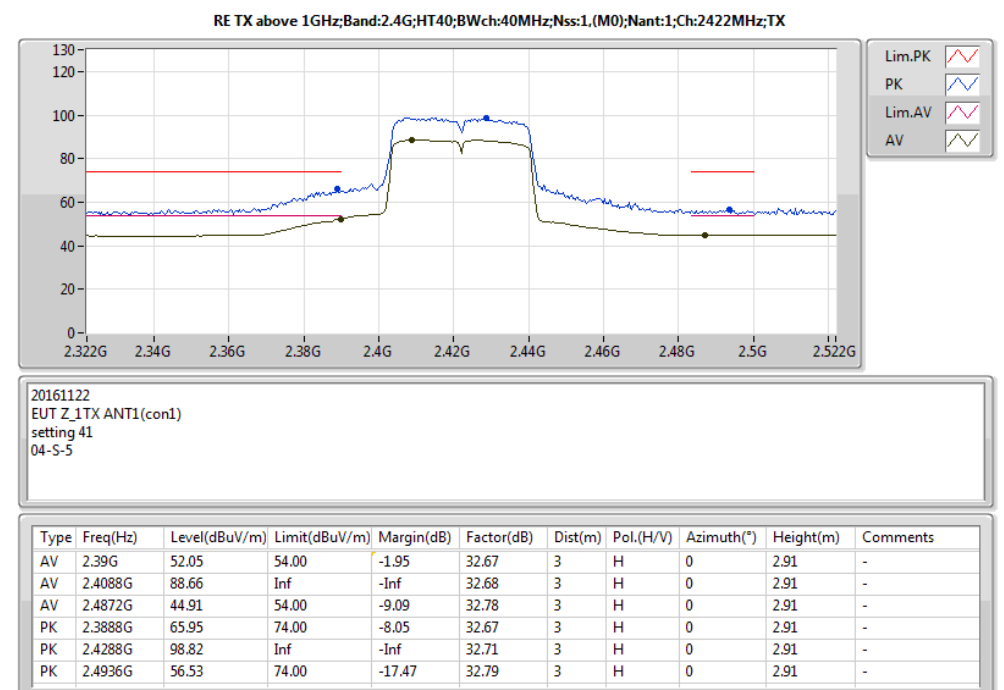
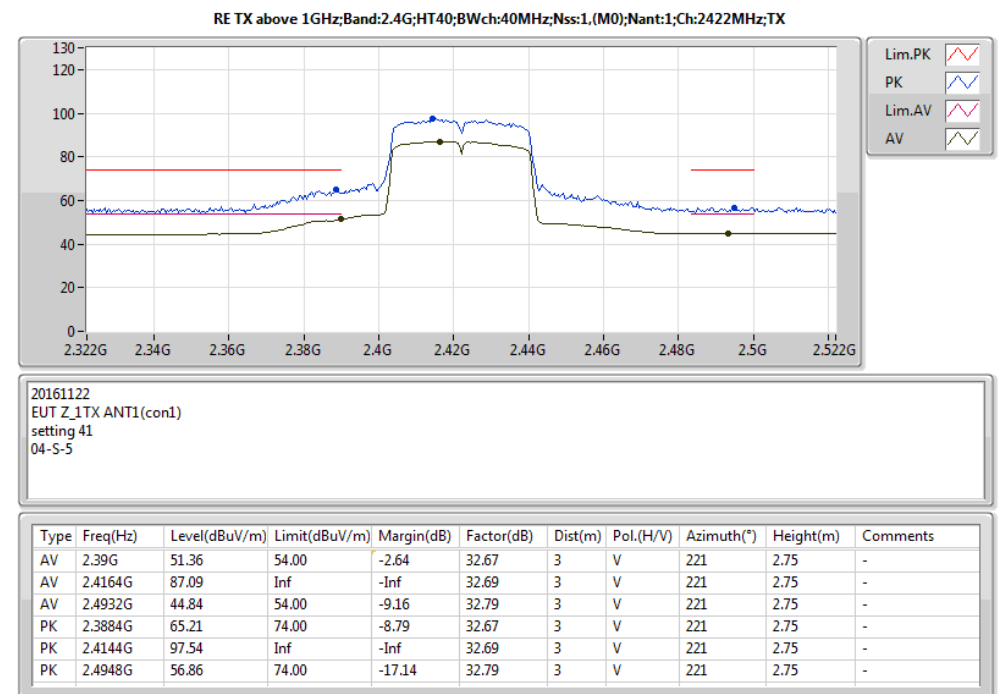
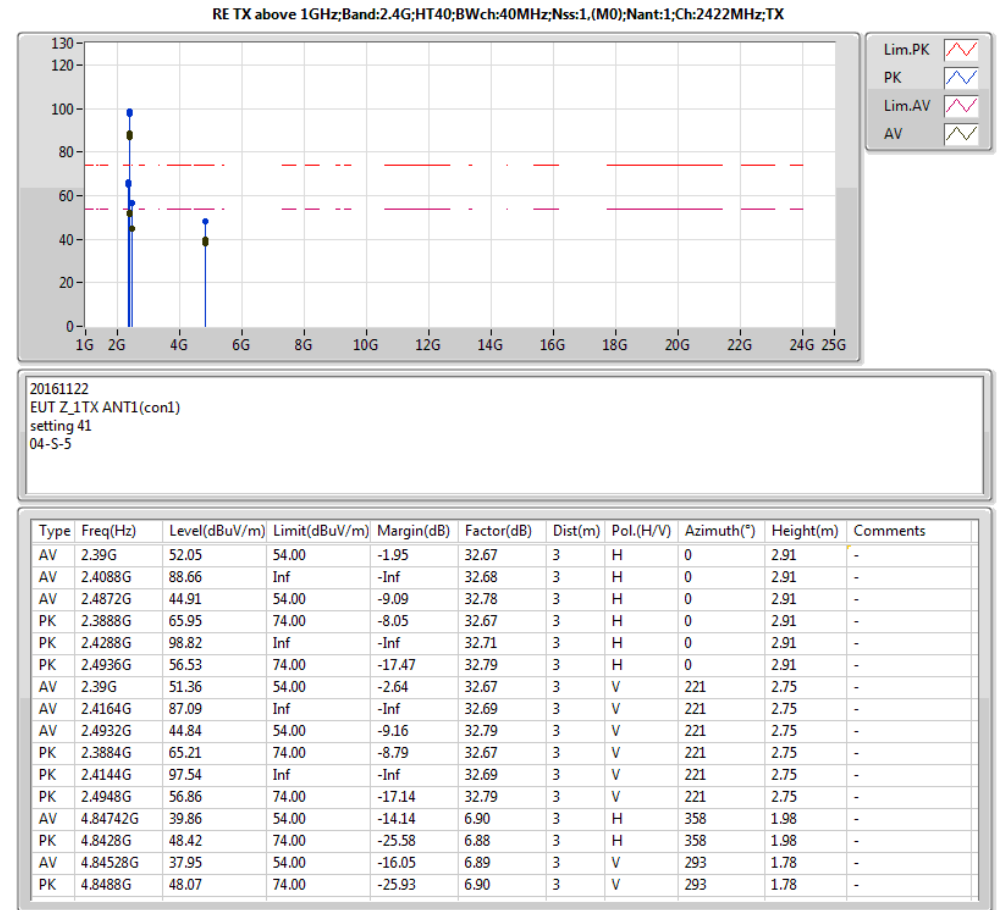
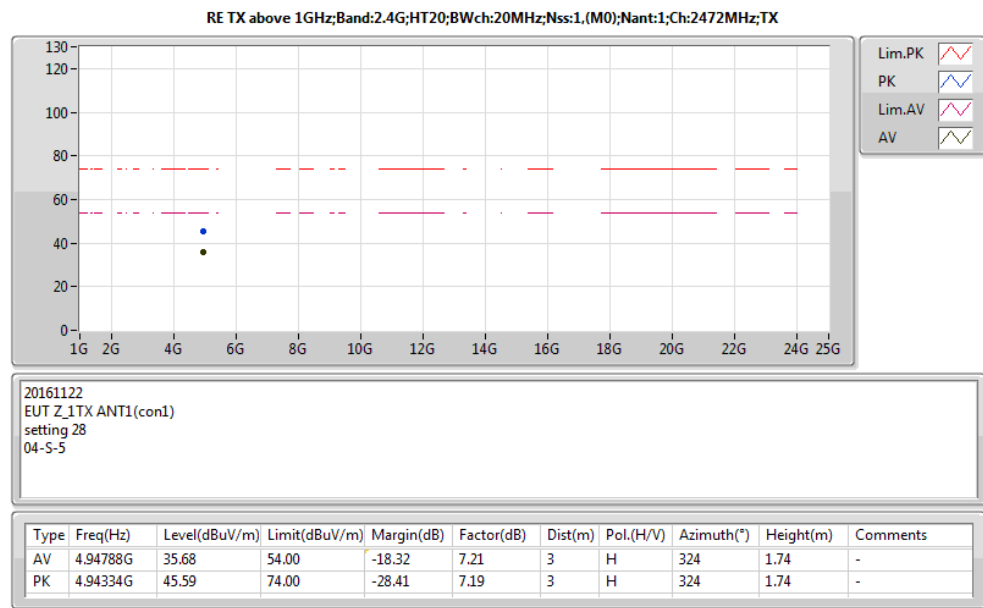
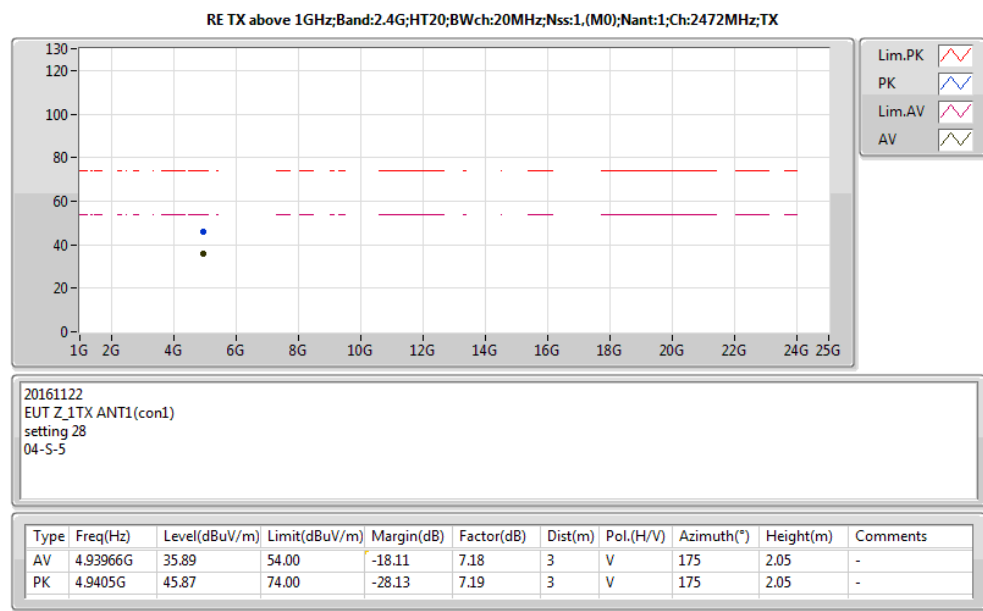
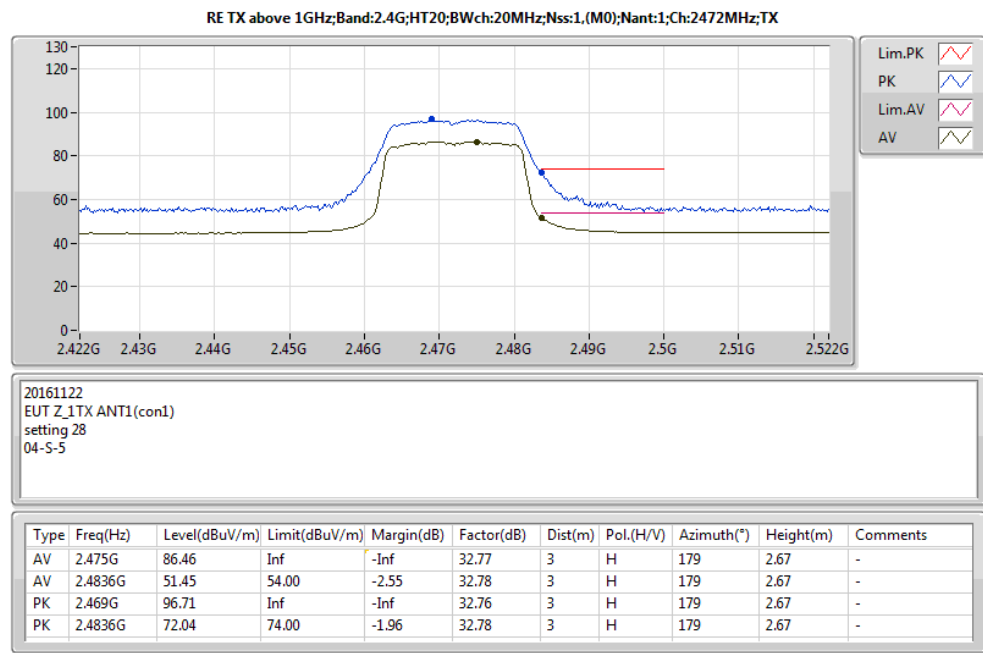


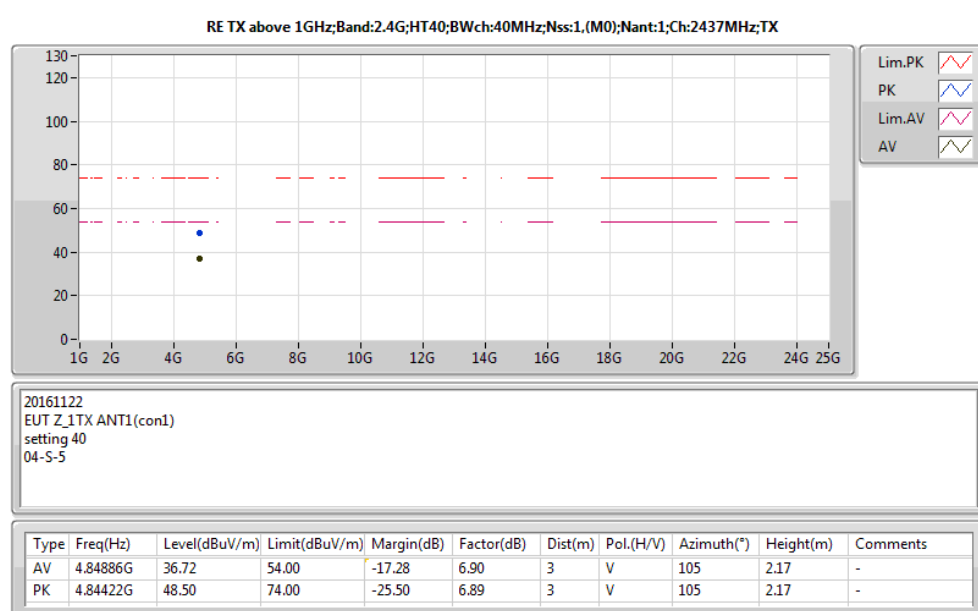
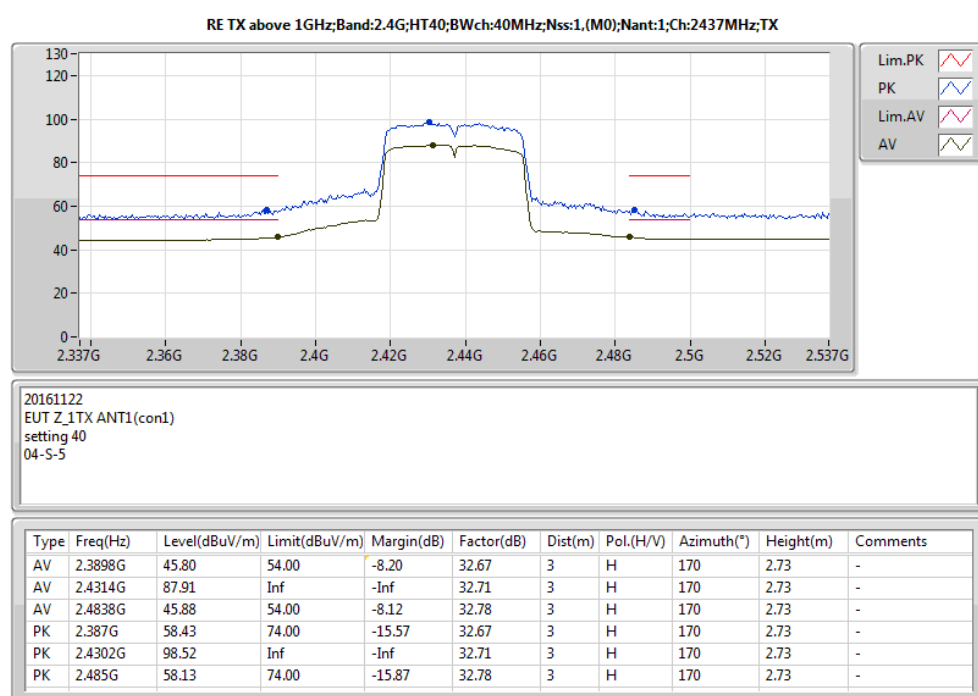
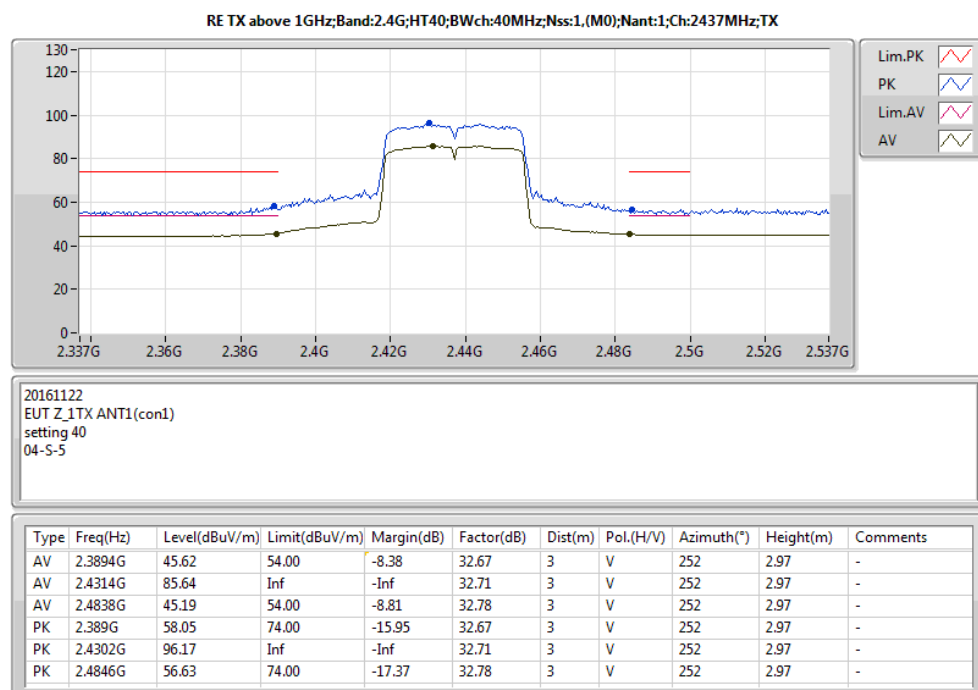
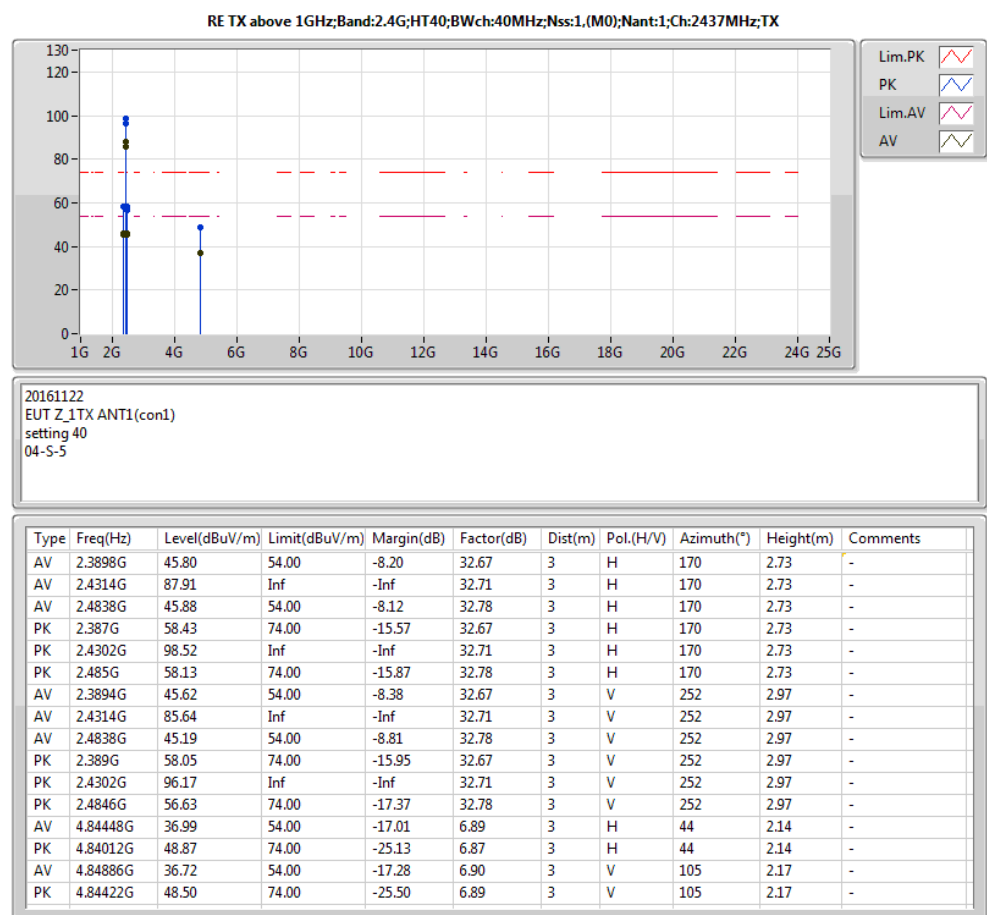
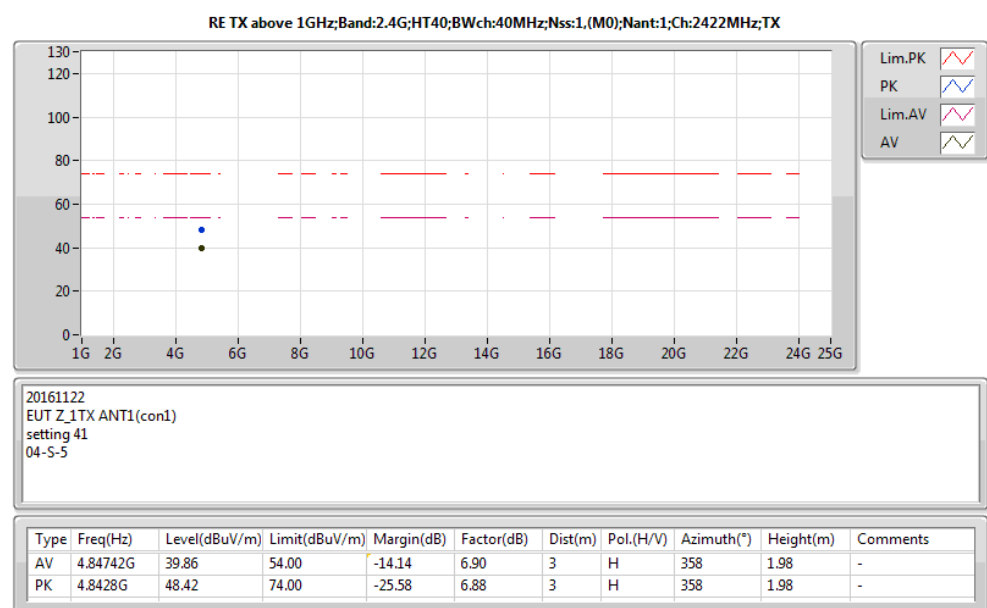
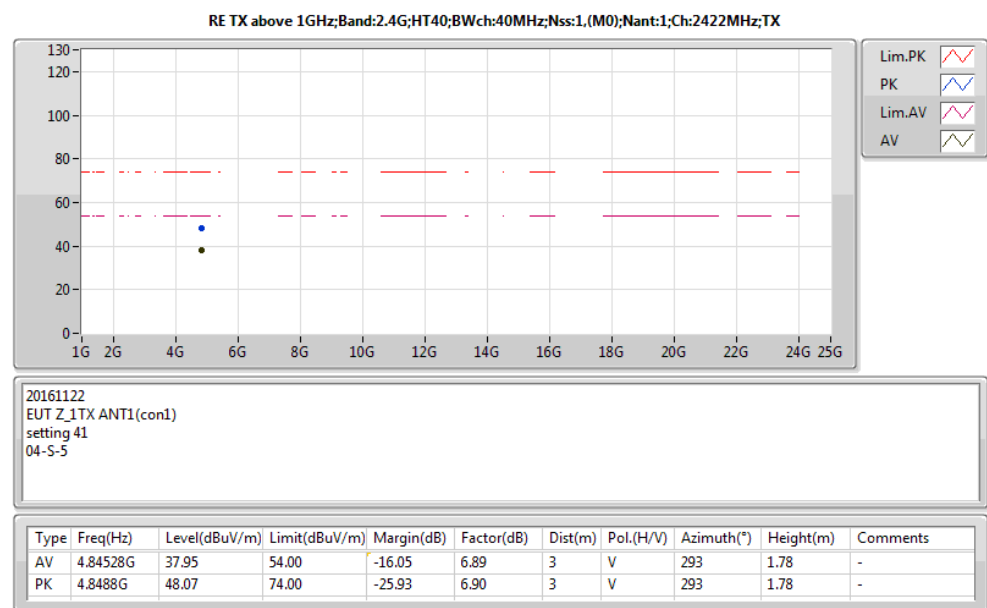


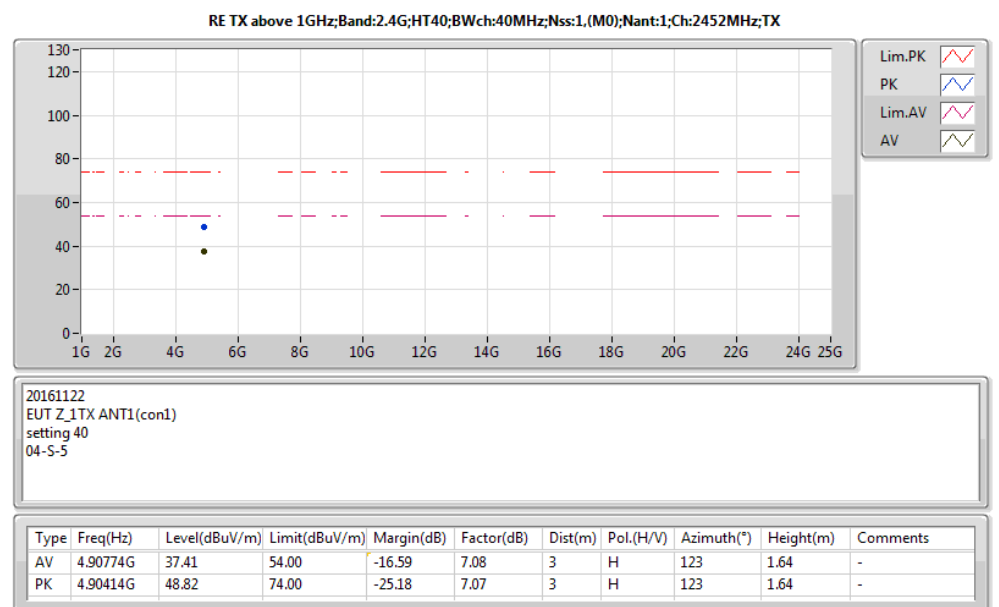
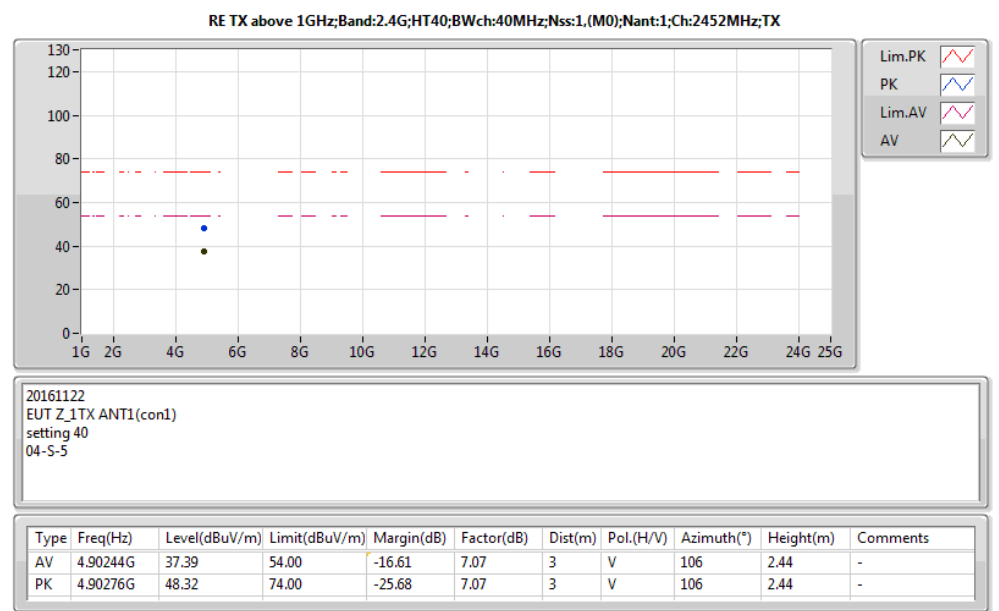
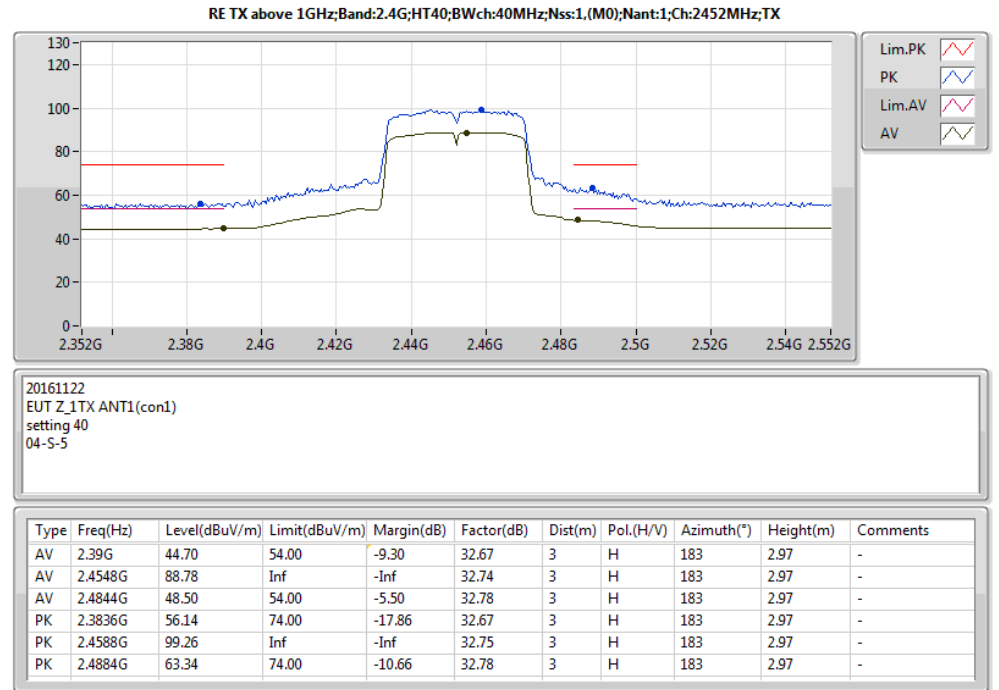
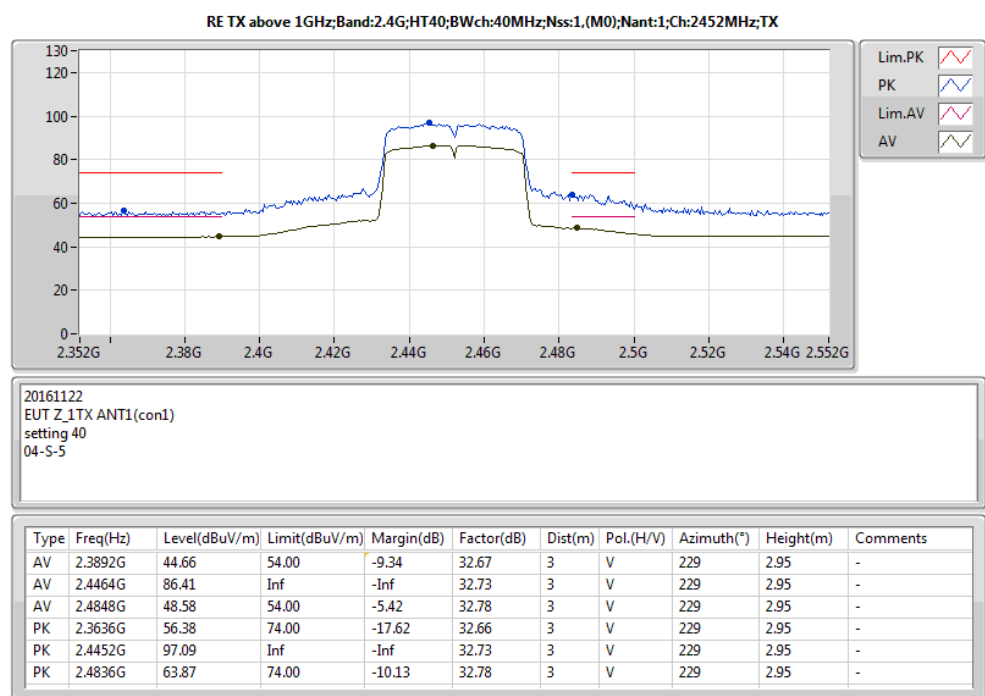
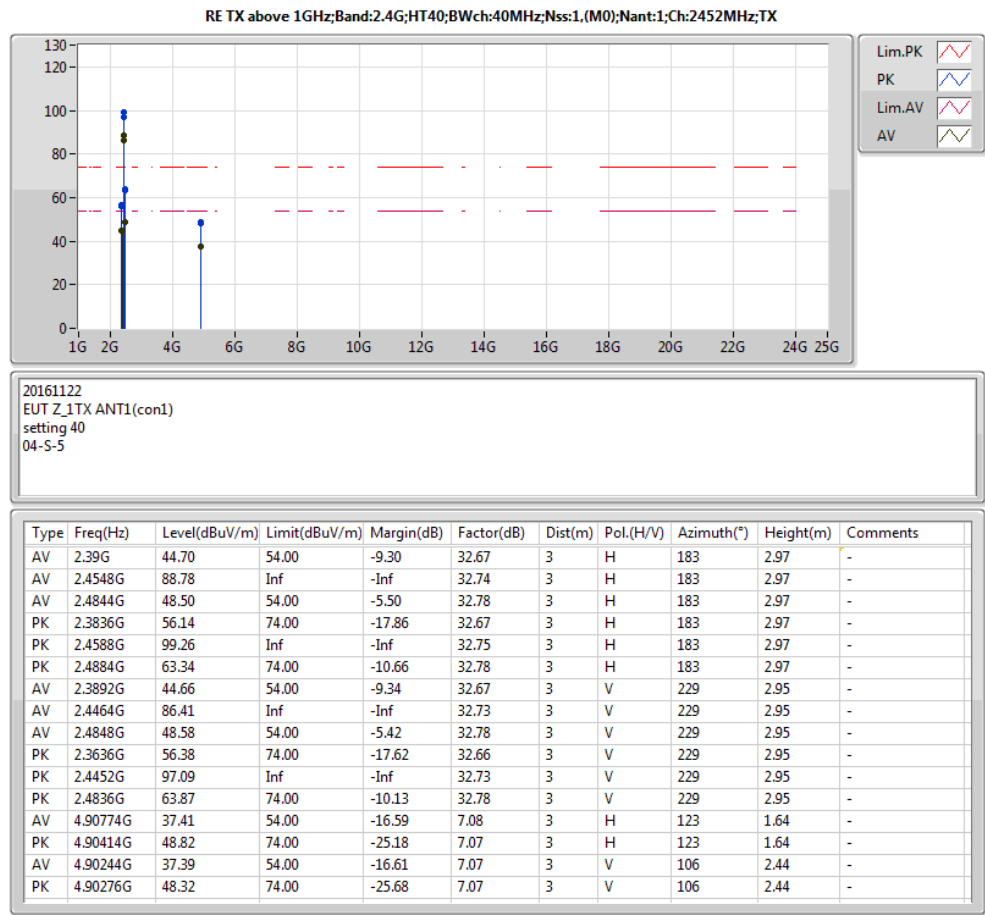
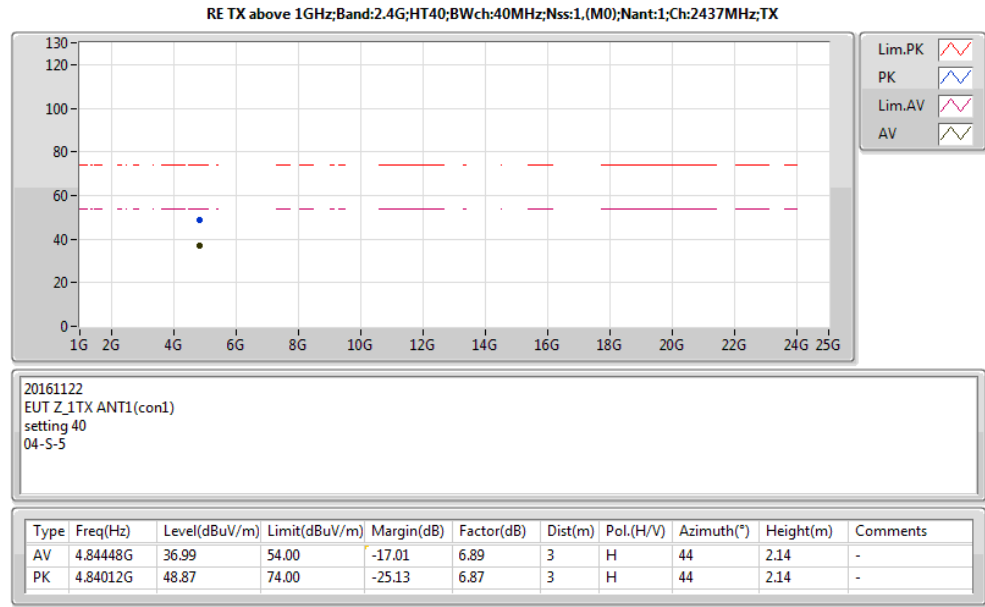


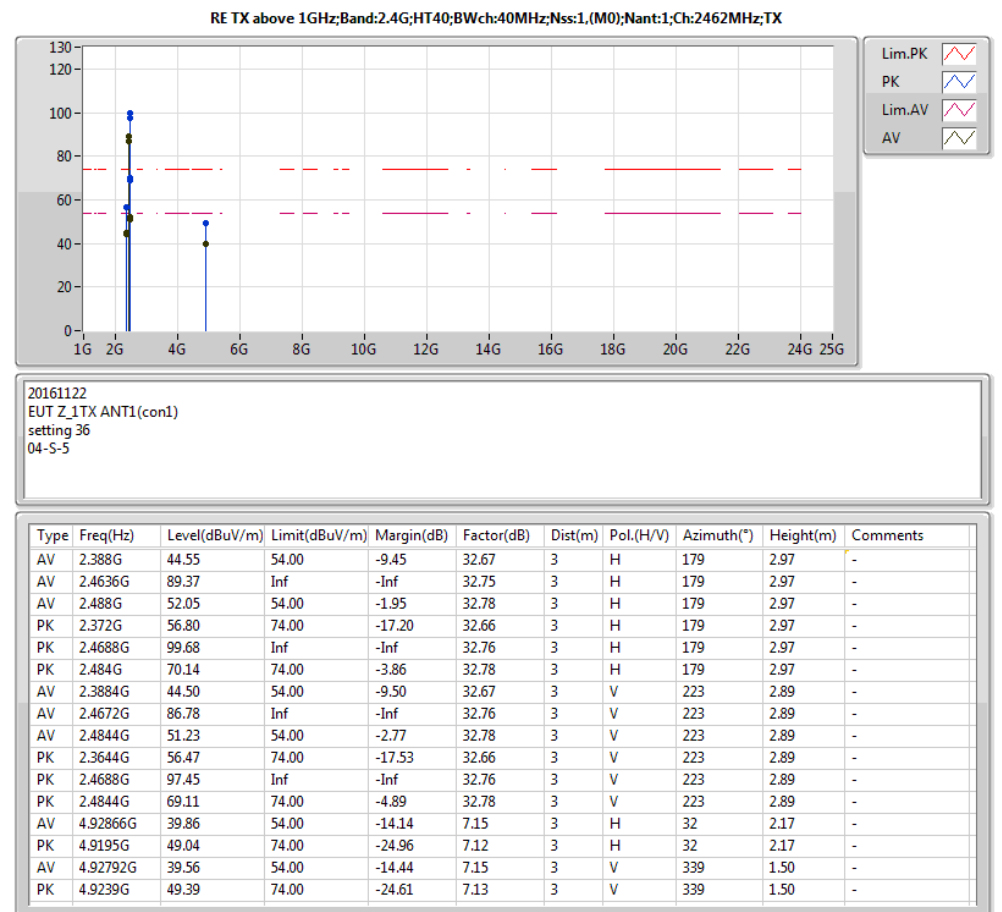
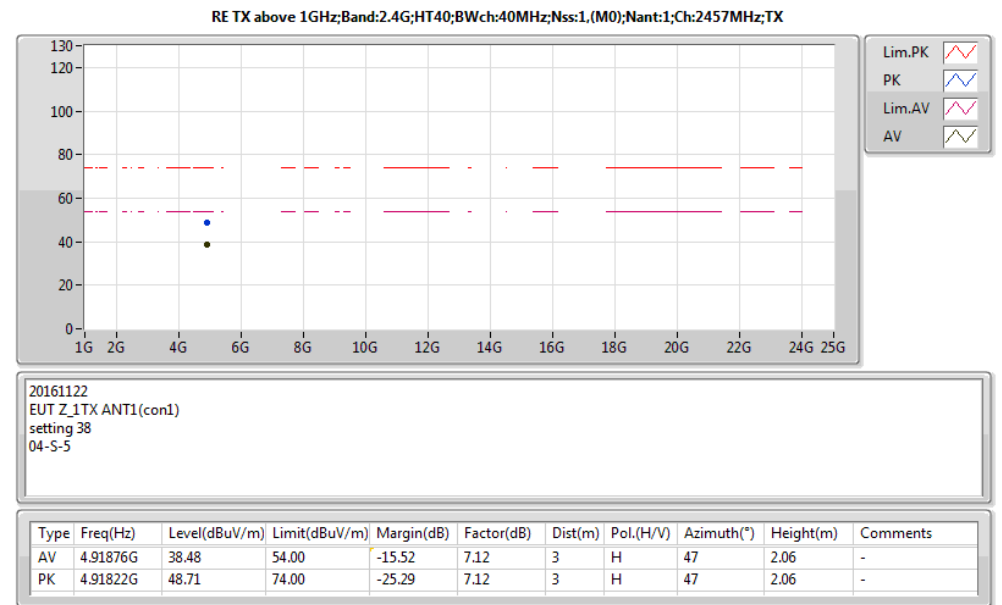
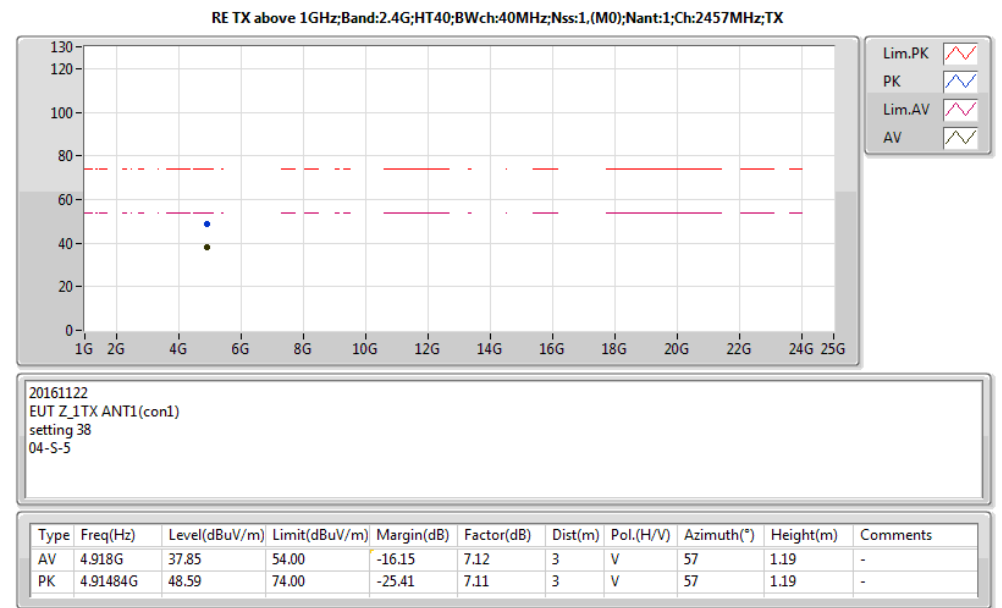
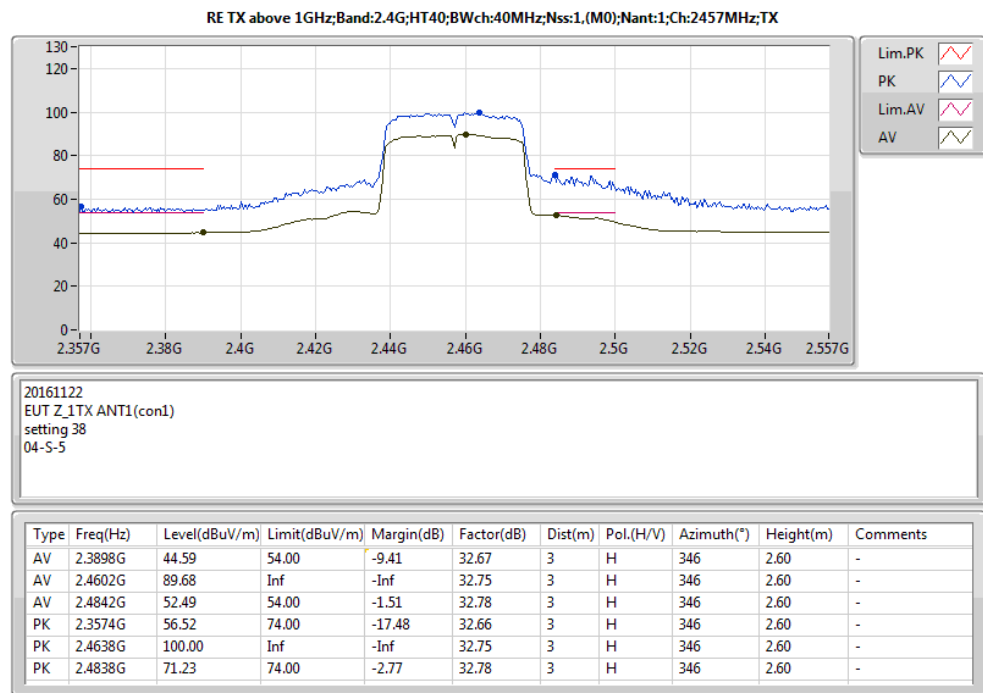
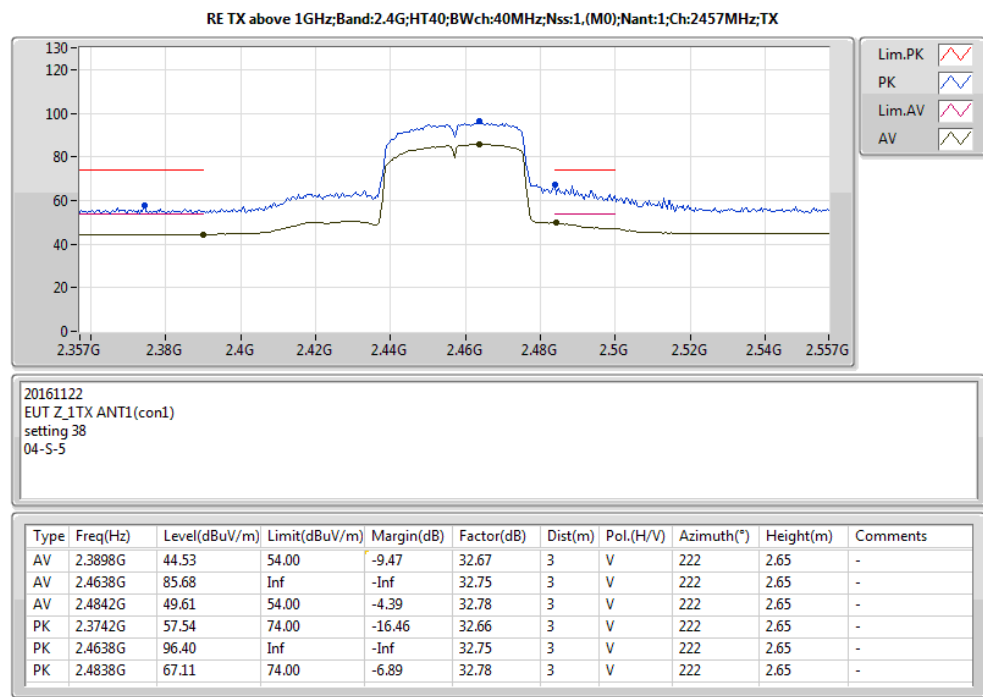
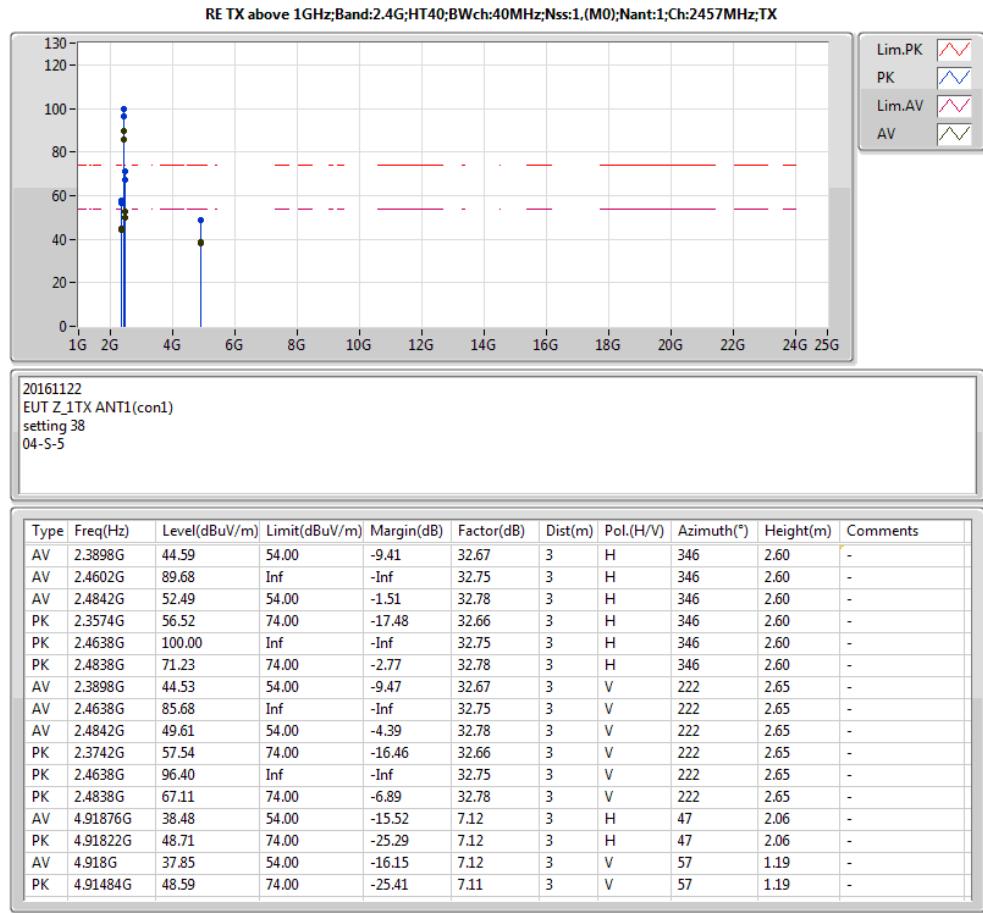


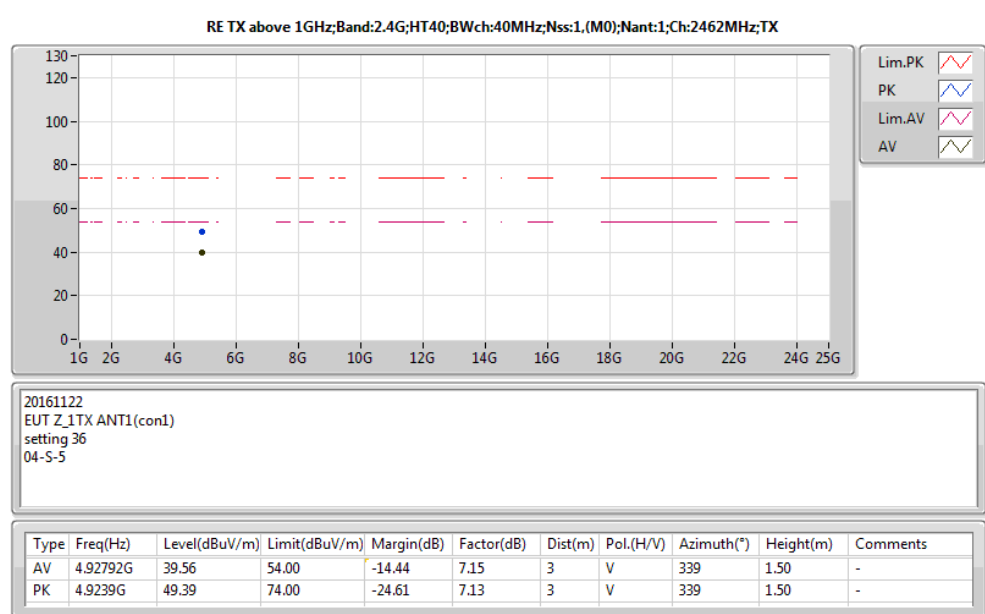
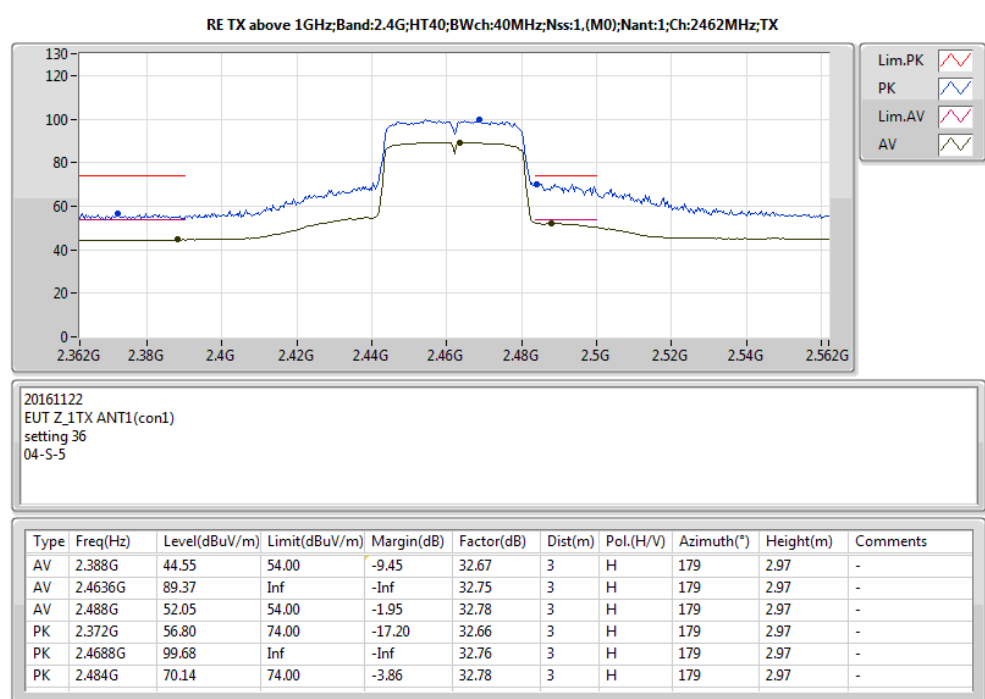
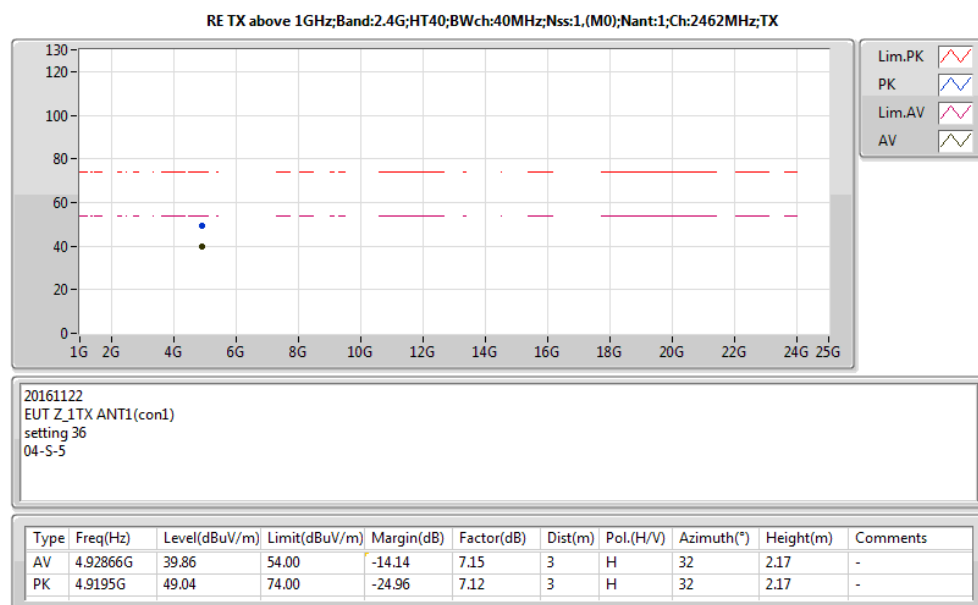
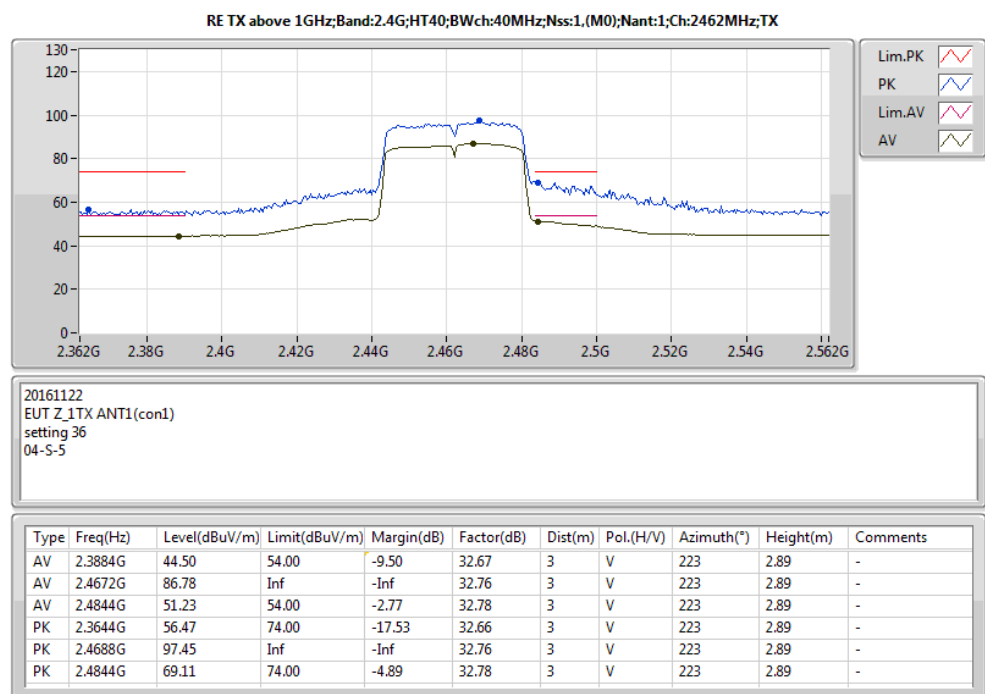














Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Pol. (H/V)	Azimuth (°)	Height (m)	Comments
2.4G;11b;Nss1;Ntx1;2412	Pass	AV	4.824G	53.98	54.00	-0.02	6.82	3	H	162	1.05	-

