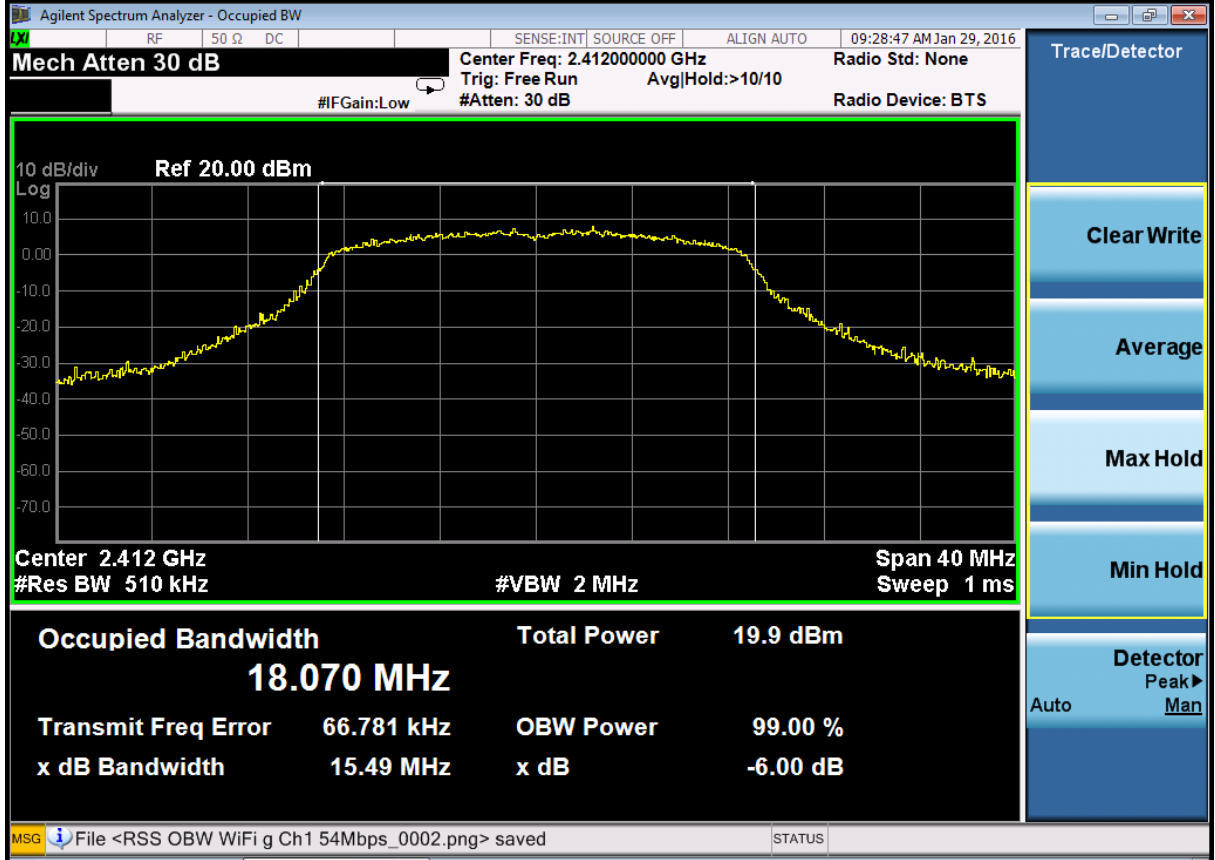
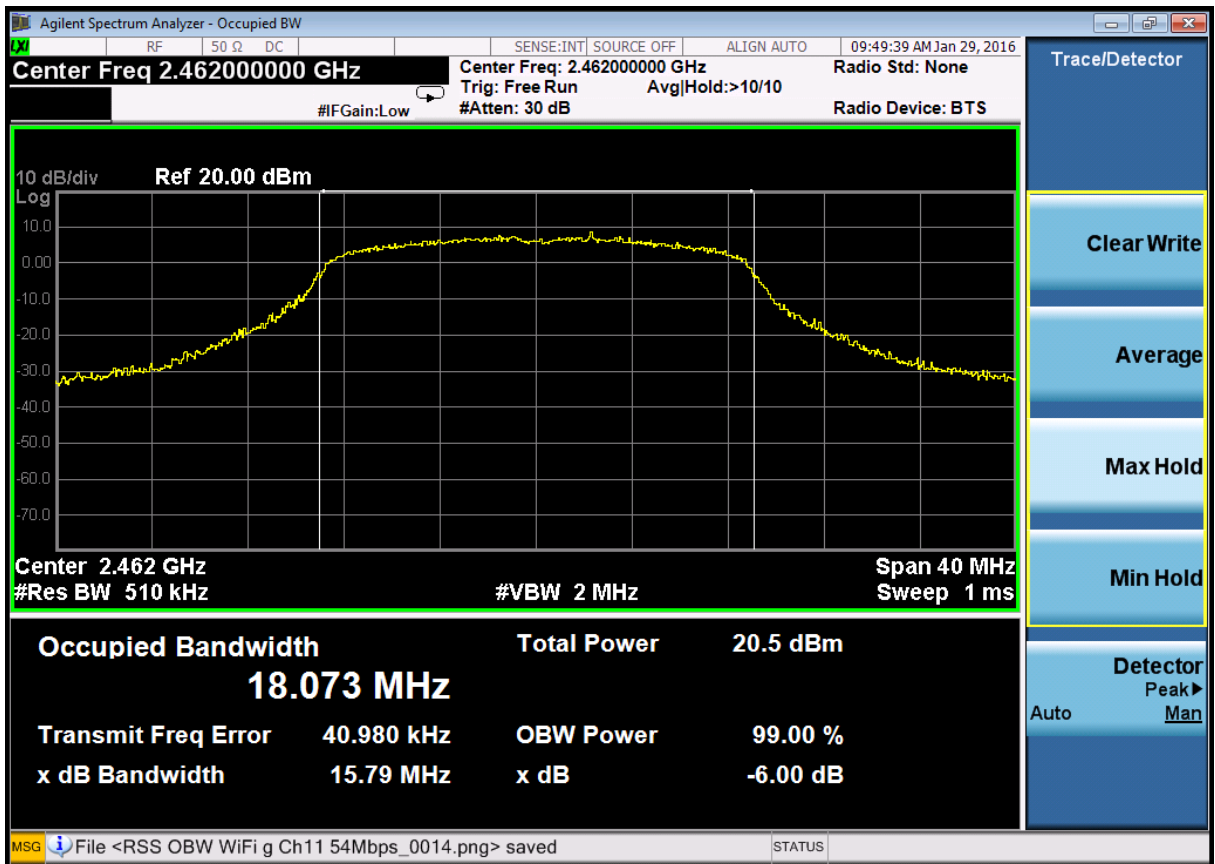
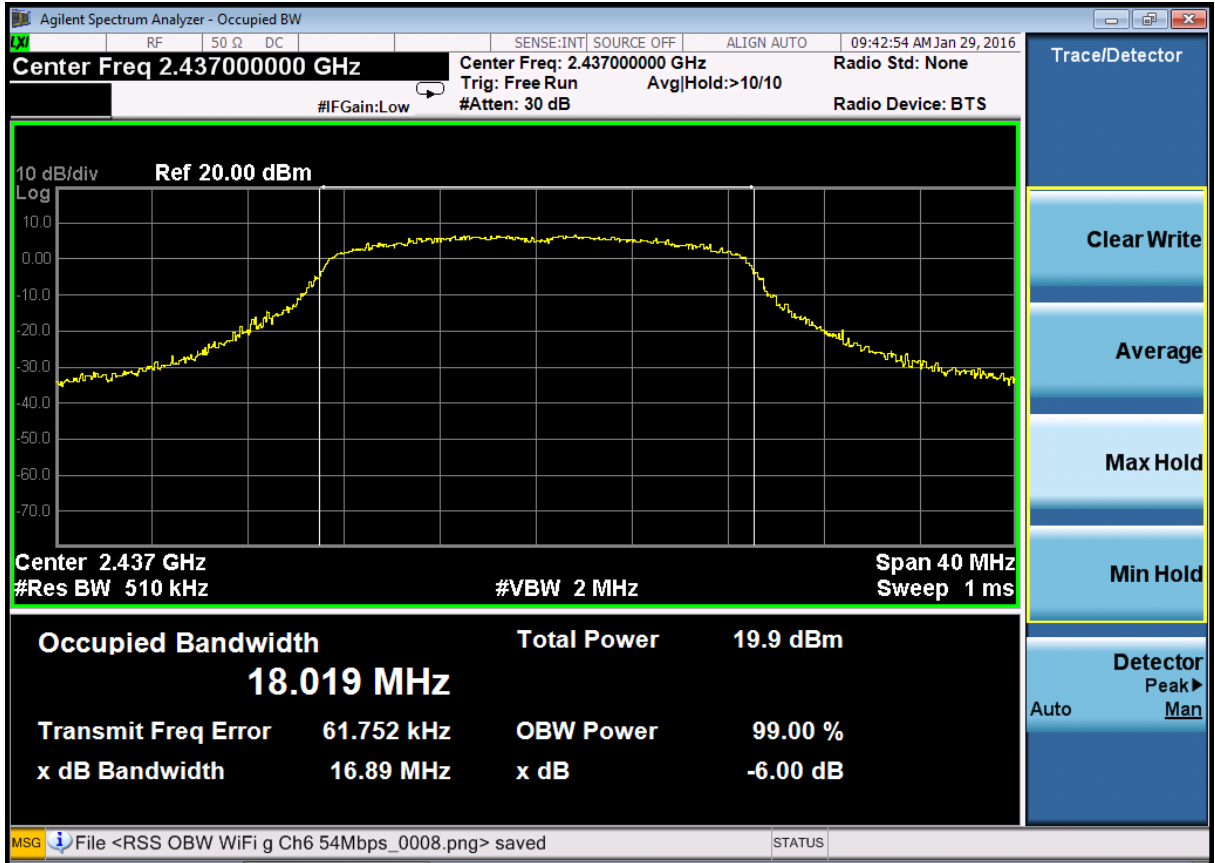


**RSS-247. Modulation: 802.11n; Data rate: MCS0; Power setting: Full**

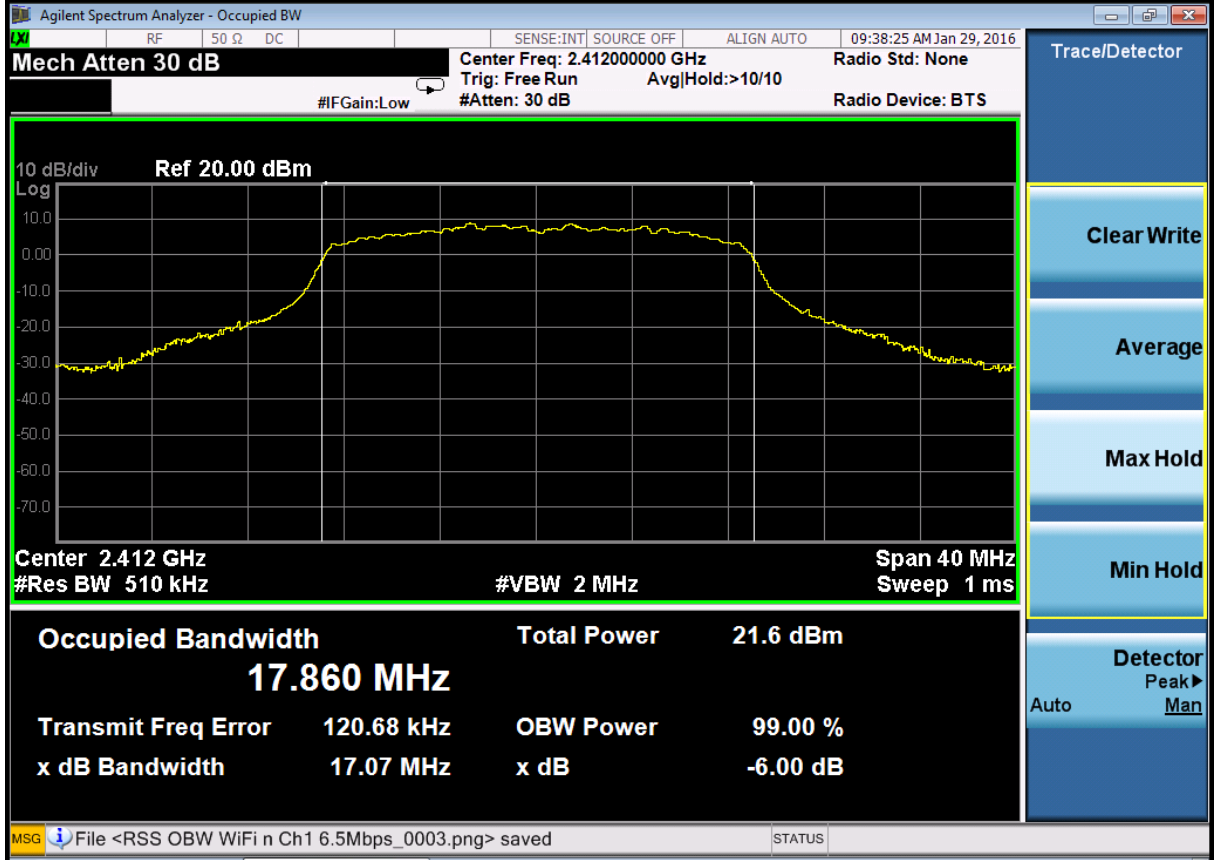
Channel Frequency (MHz)	99% Bandwidth (kHz)	6dB Bandwidth (kHz)	Result
2412	18070	15490	PASS
2437	18019	16890	PASS
2462	18073	15790	PASS

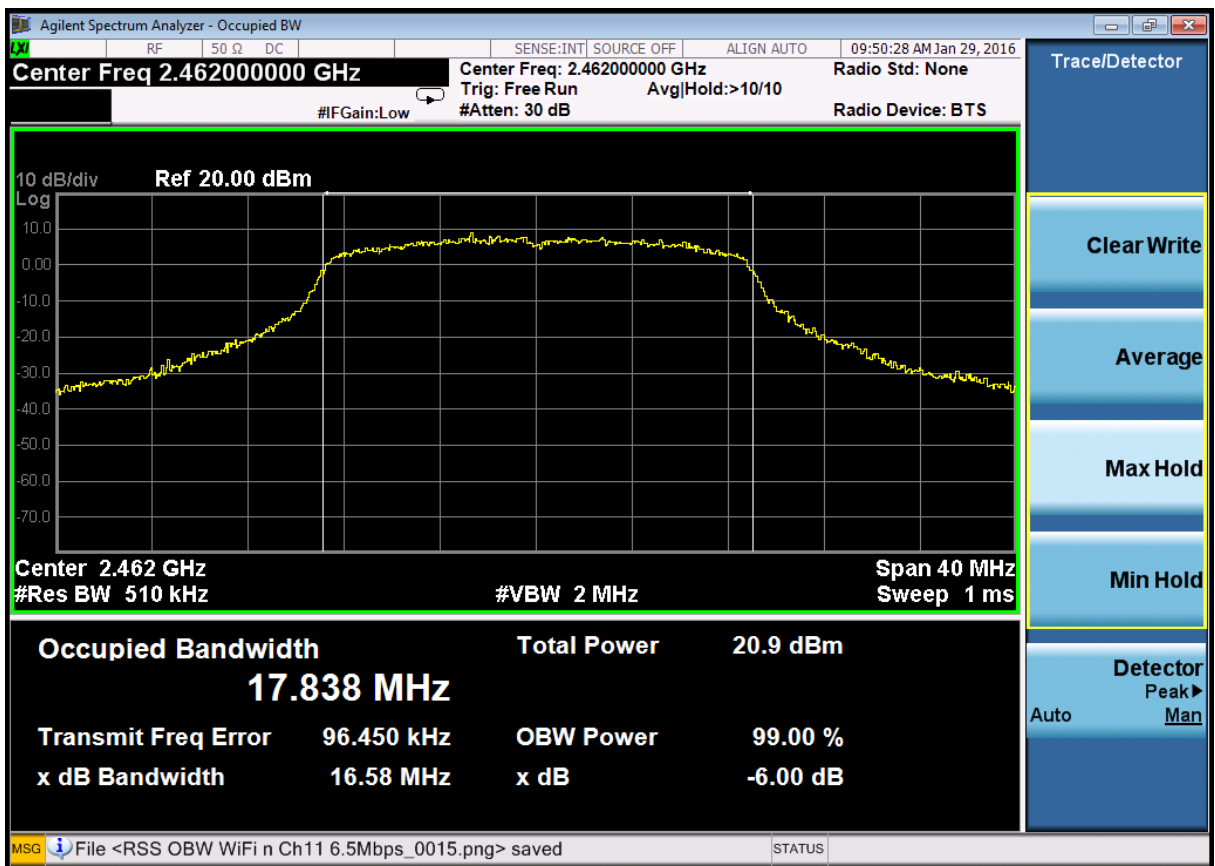
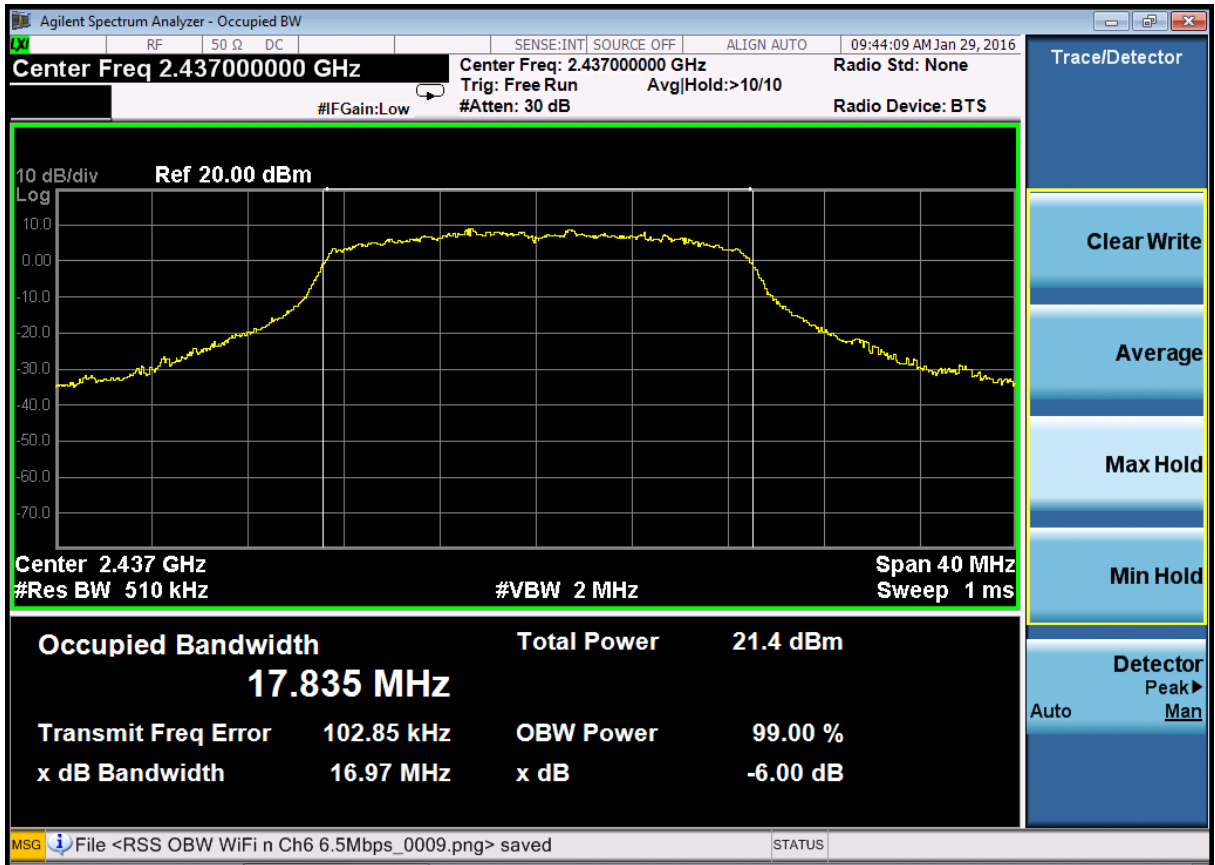




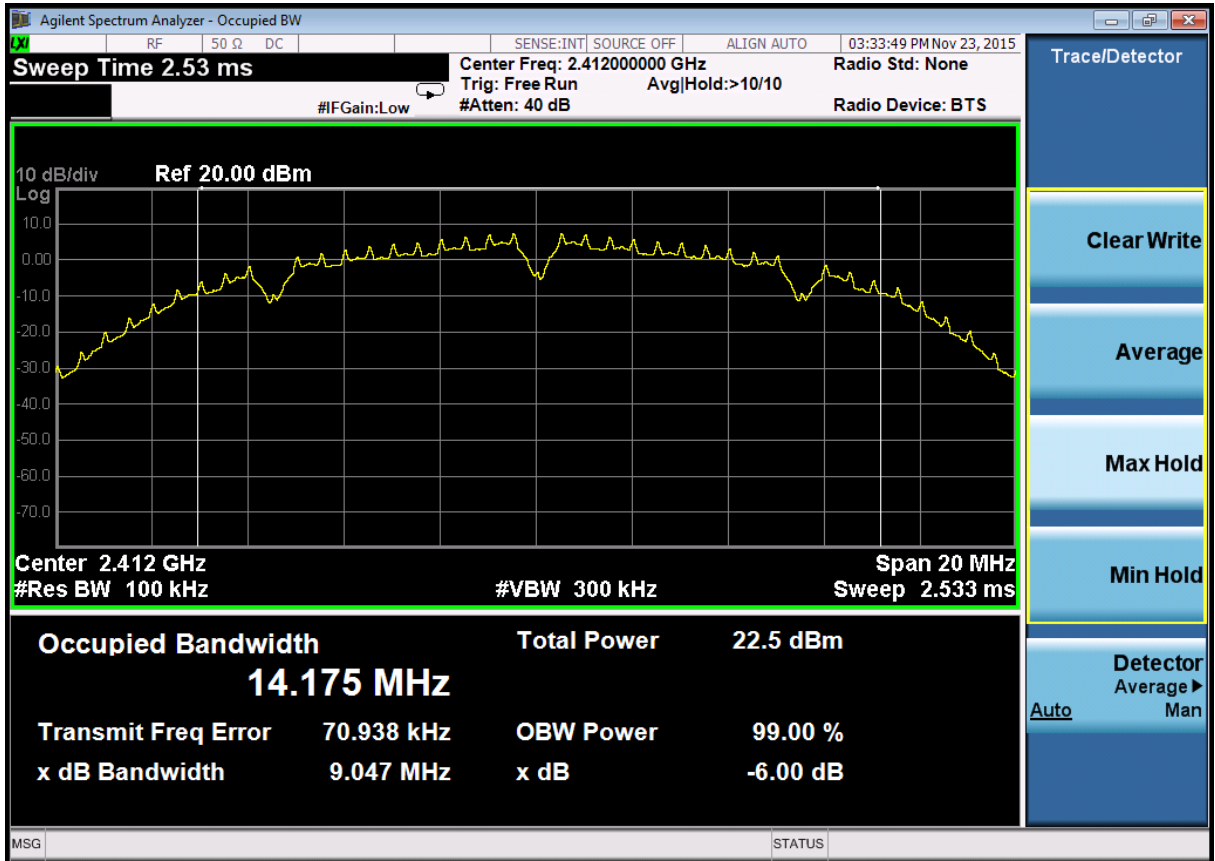
**RSS-247. Modulation: 802.11n; Data rate: MCS7; Power setting: Full**

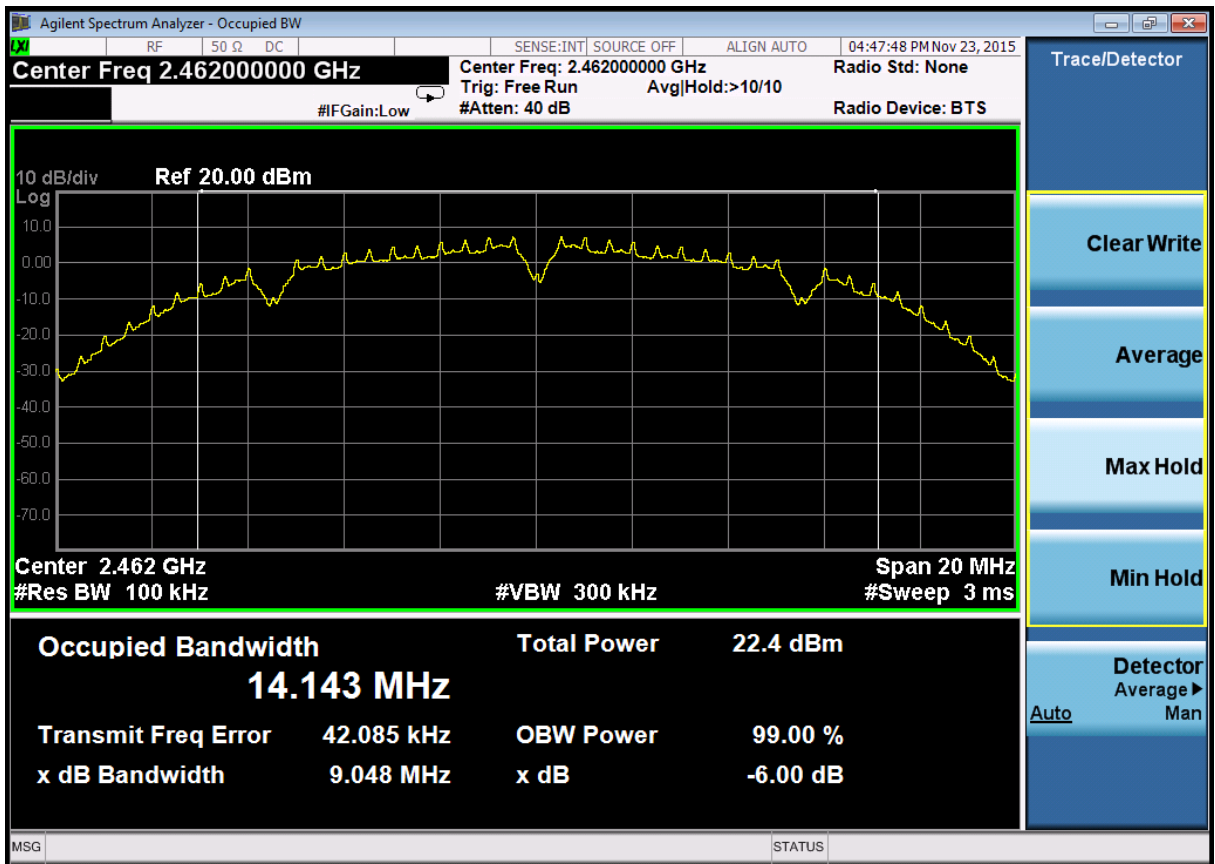
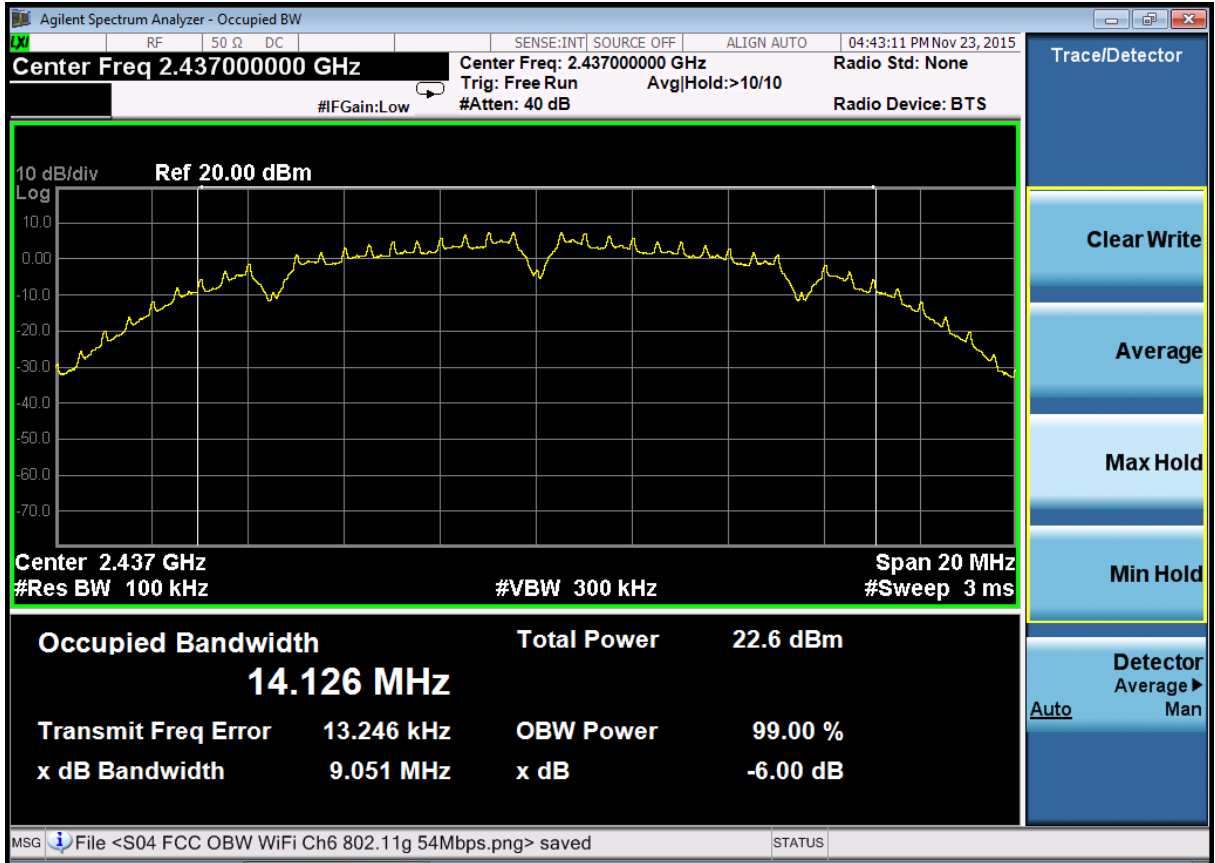
Channel Frequency (MHz)	99% Bandwidth (kHz)	6dB Bandwidth (kHz)	Result
2412	17860	17070	PASS
2437	17835	16970	PASS
2462	17838	16580	PASS



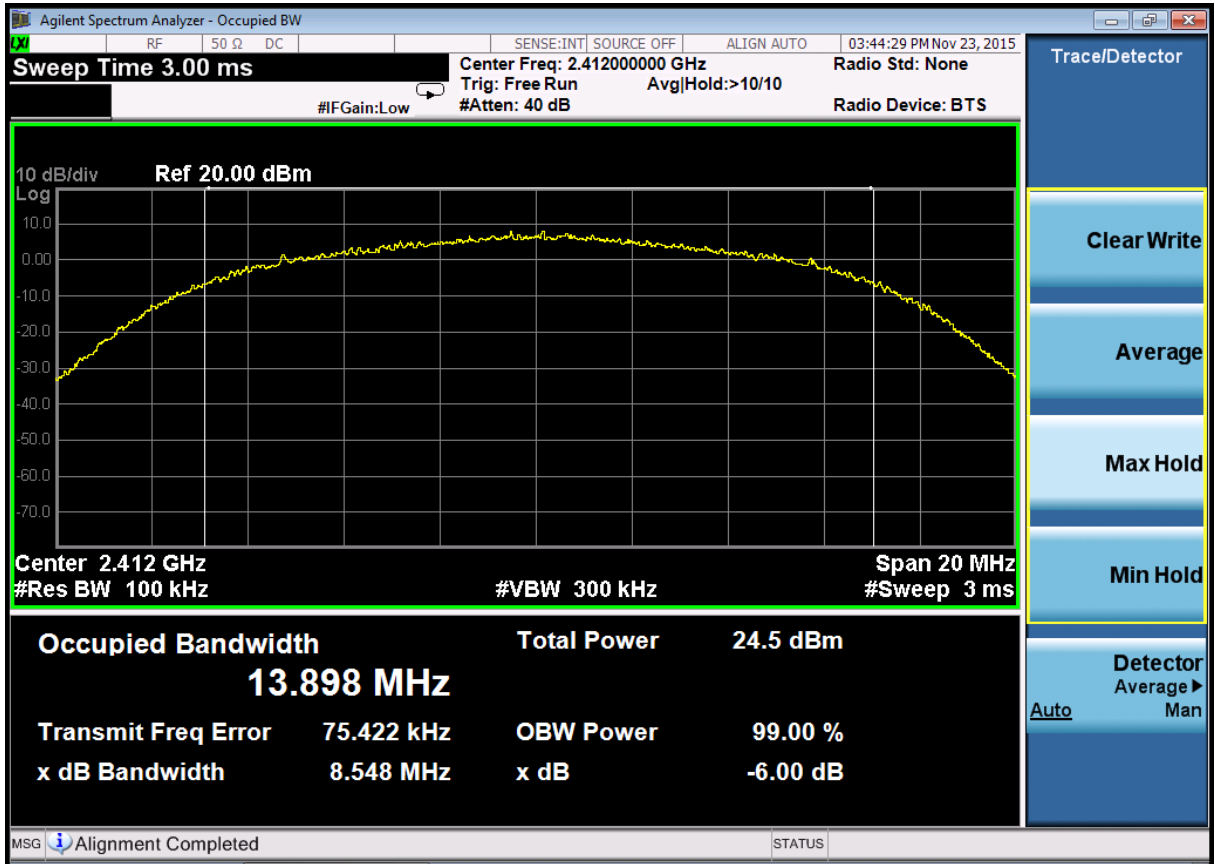


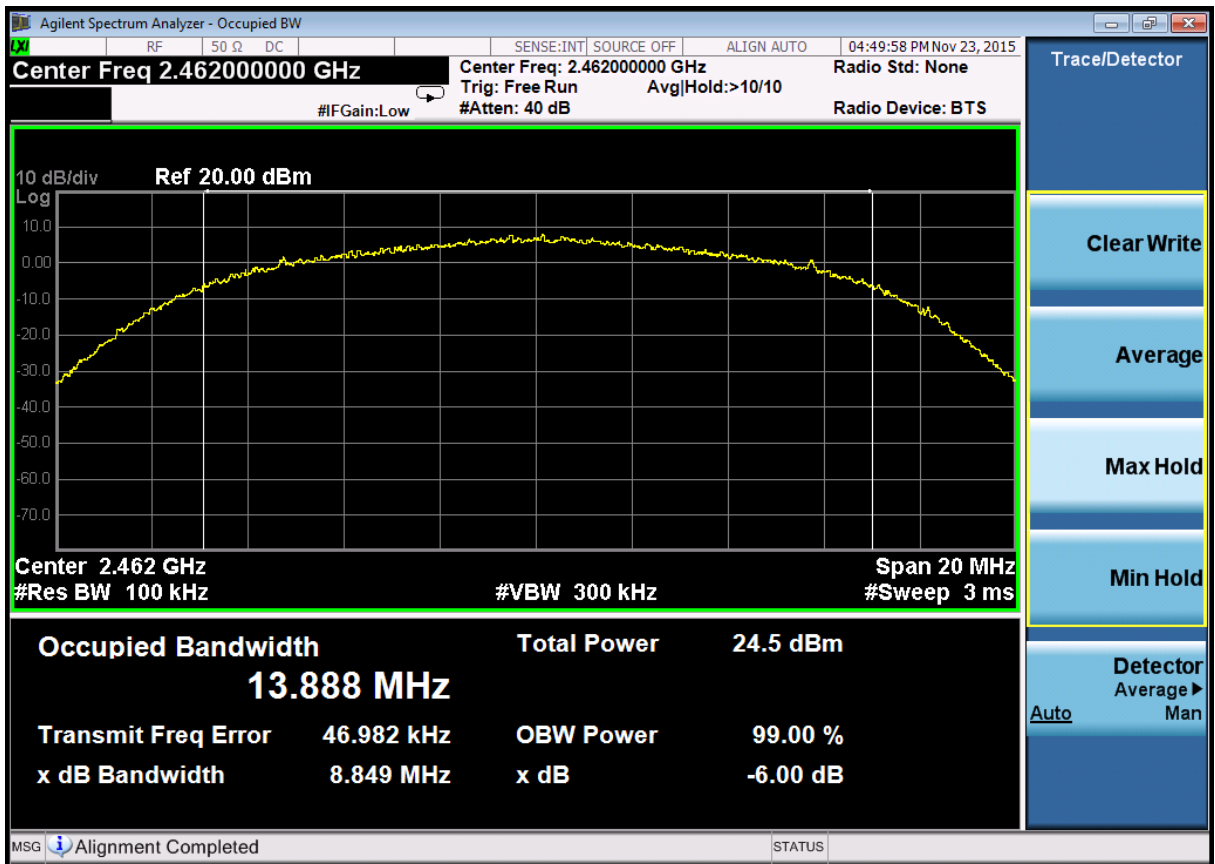
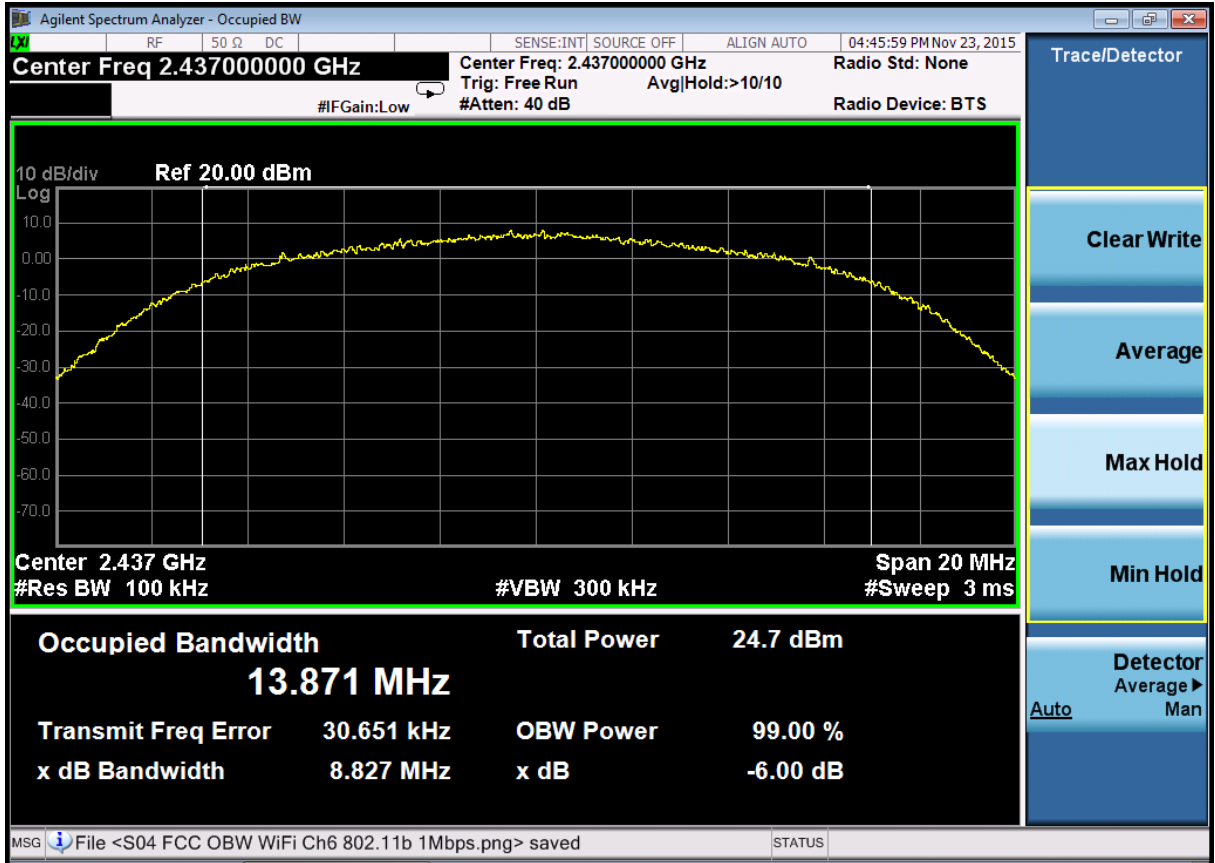
<b>FCC 15.247. Modulation: 802.11b; Data rate: 1 Mbps; Power setting: Full</b>			
<b>Channel Frequency (MHz)</b>	<b>99% Bandwidth (kHz)</b>	<b>6dB Bandwidth (kHz)</b>	<b>Result</b>
2412	14175	9047	PASS
2437	14126	9051	PASS
2462	14143	9048	PASS





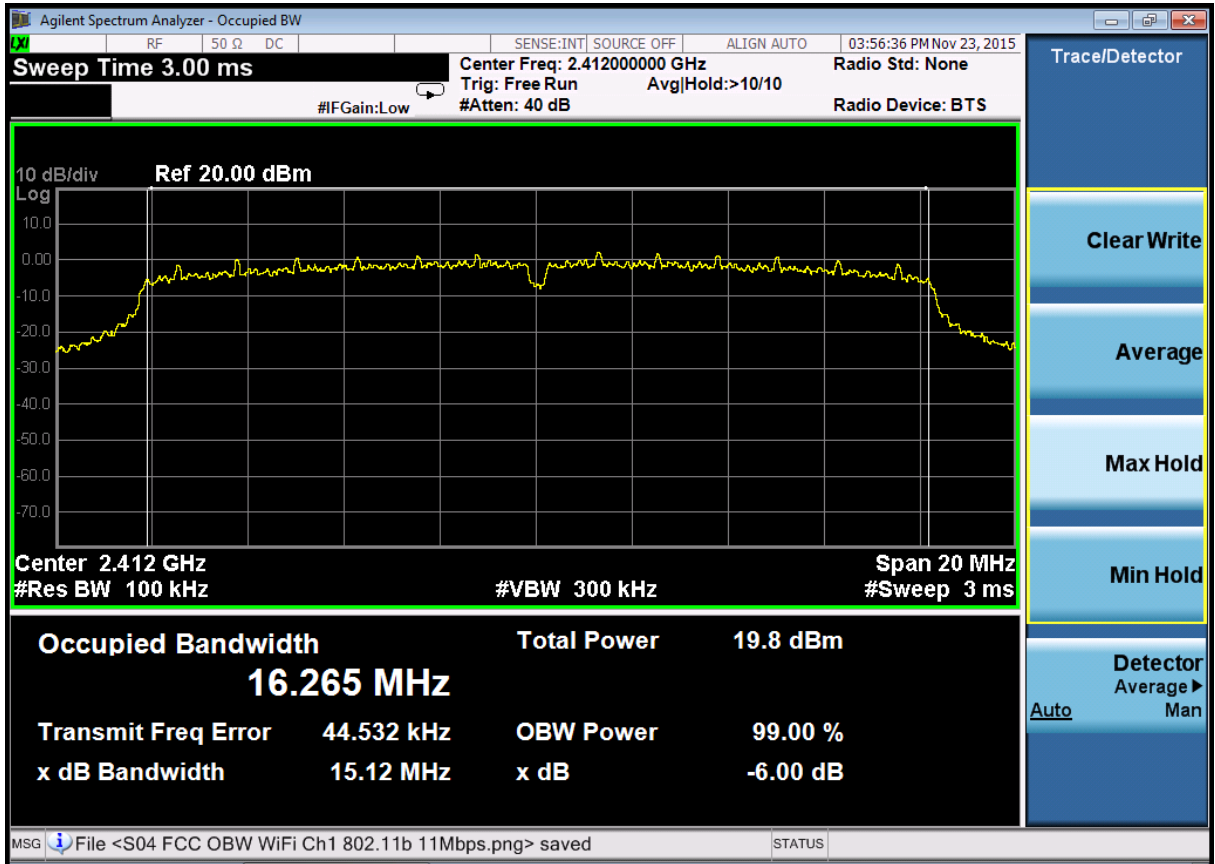
FCC 15.247. Modulation: 802.11b; Data rate: 11 Mbps; Power setting: Full			
Channel Frequency (MHz)	99% Bandwidth (kHz)	6dB Bandwidth (kHz)	Result
2412	13898	8548	PASS
2437	13871	8827	PASS
2462	13888	8849	PASS

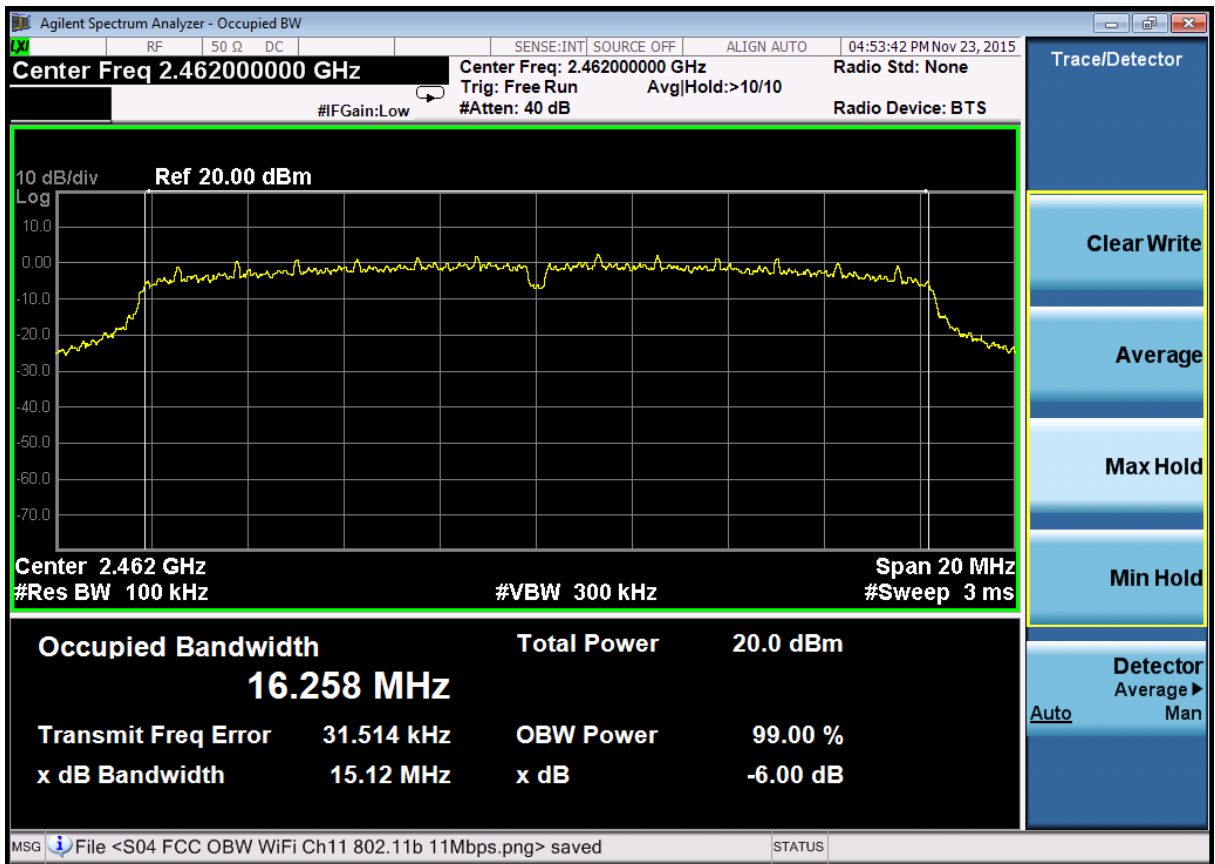
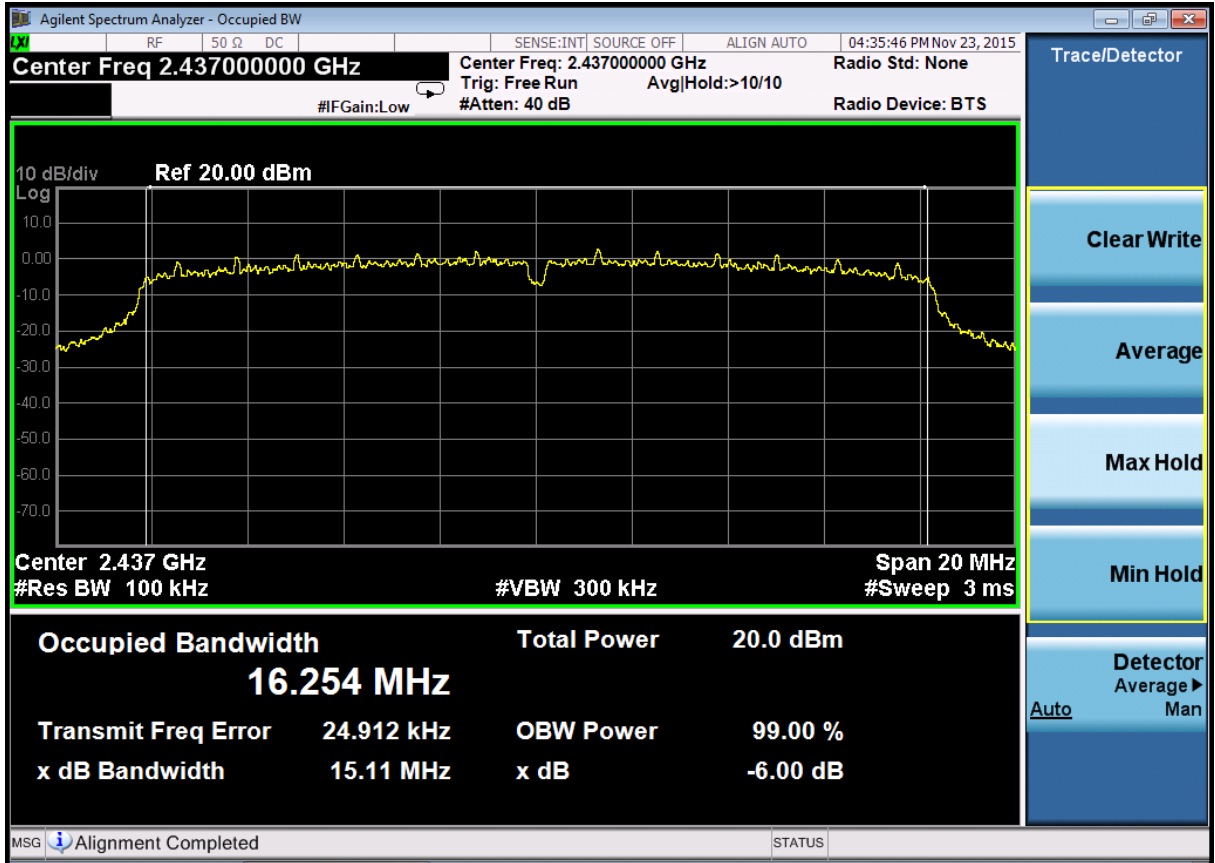




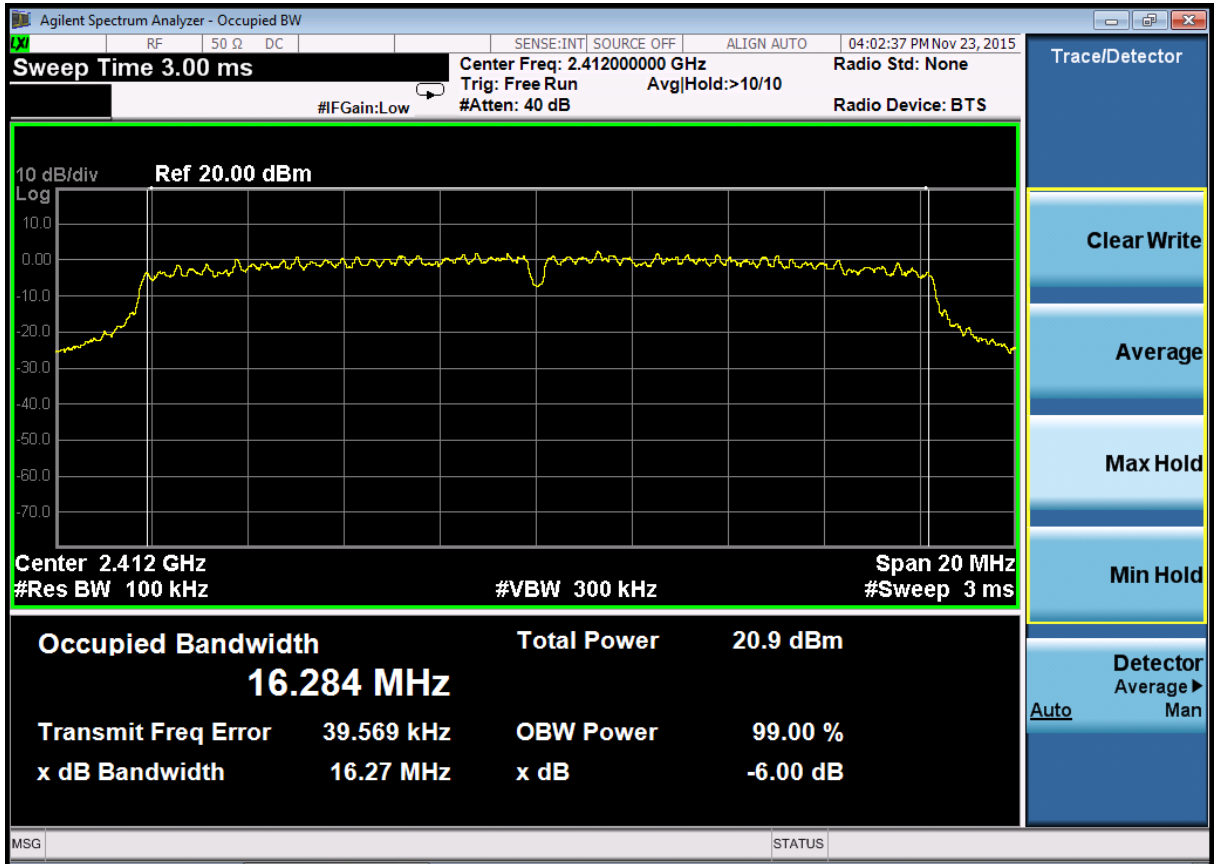


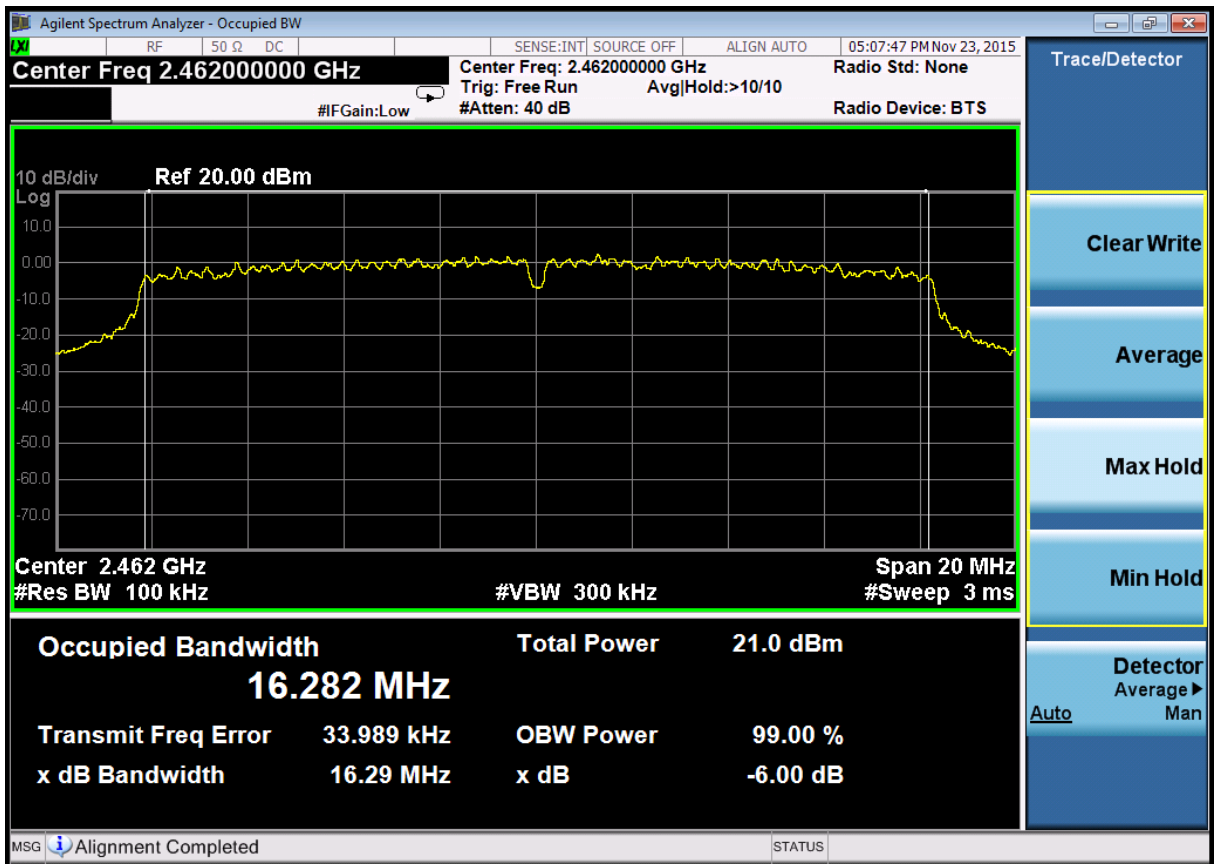
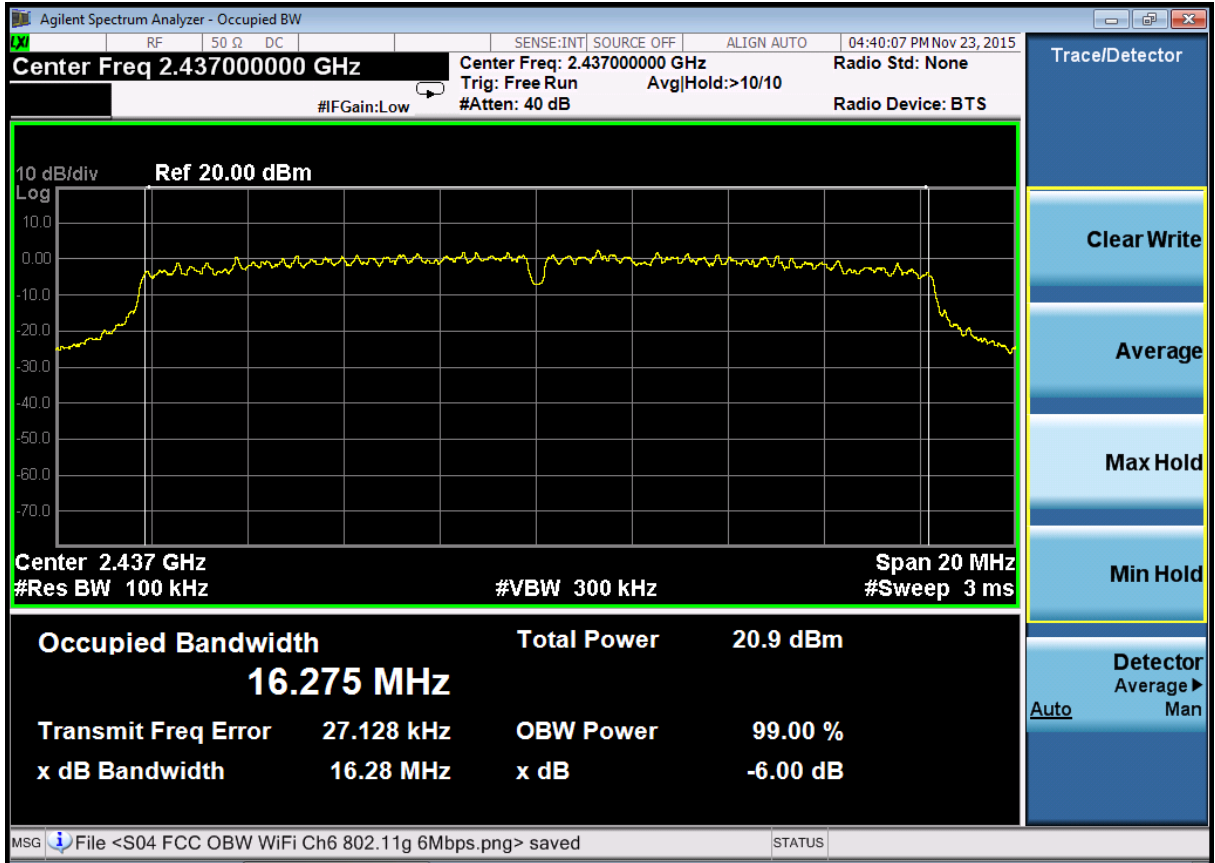
<b>FCC 15.247. Modulation: 802.11g; Data rate: 6 Mbps; Power setting: Full</b>			
<b>Channel Frequency (MHz)</b>	<b>99% Bandwidth (kHz)</b>	<b>6dB Bandwidth (kHz)</b>	<b>Result</b>
2412	16265	15120	PASS
2437	16254	15110	PASS
2462	16258	15120	PASS



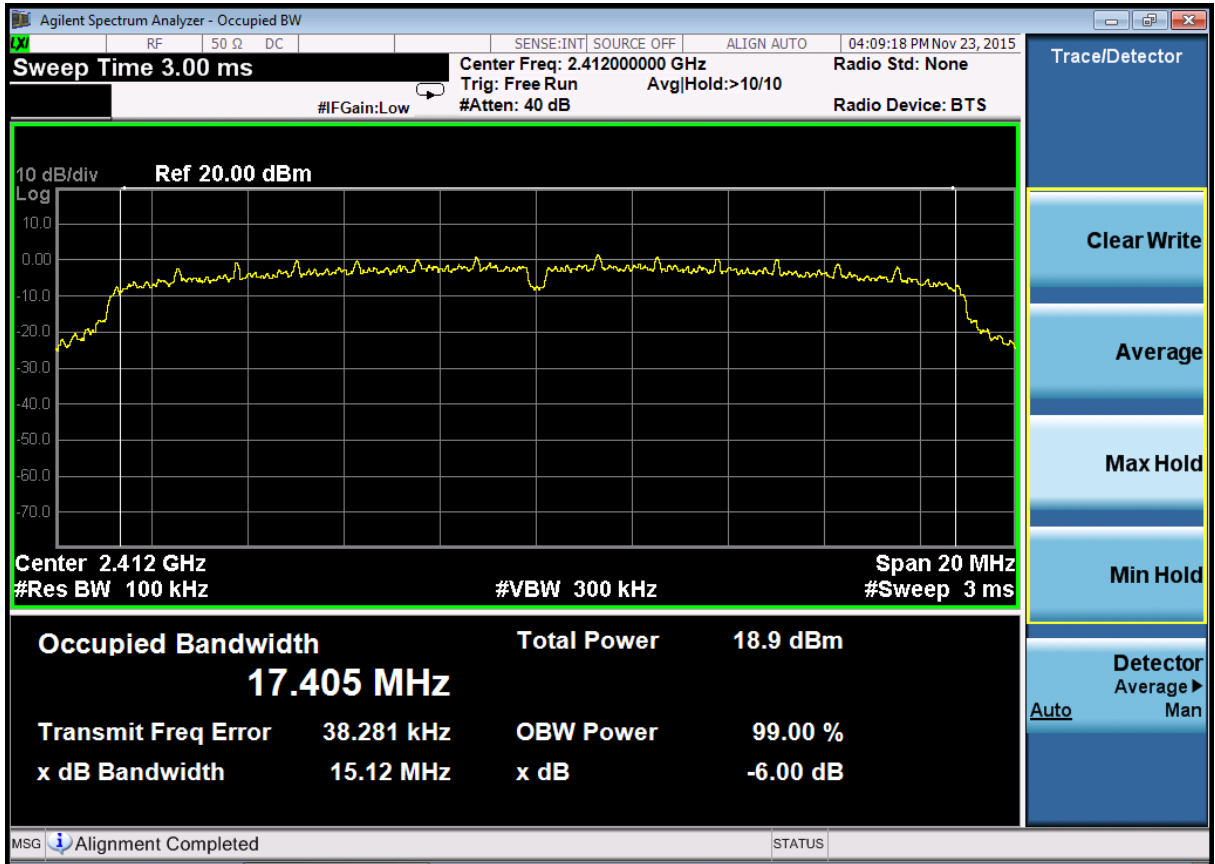


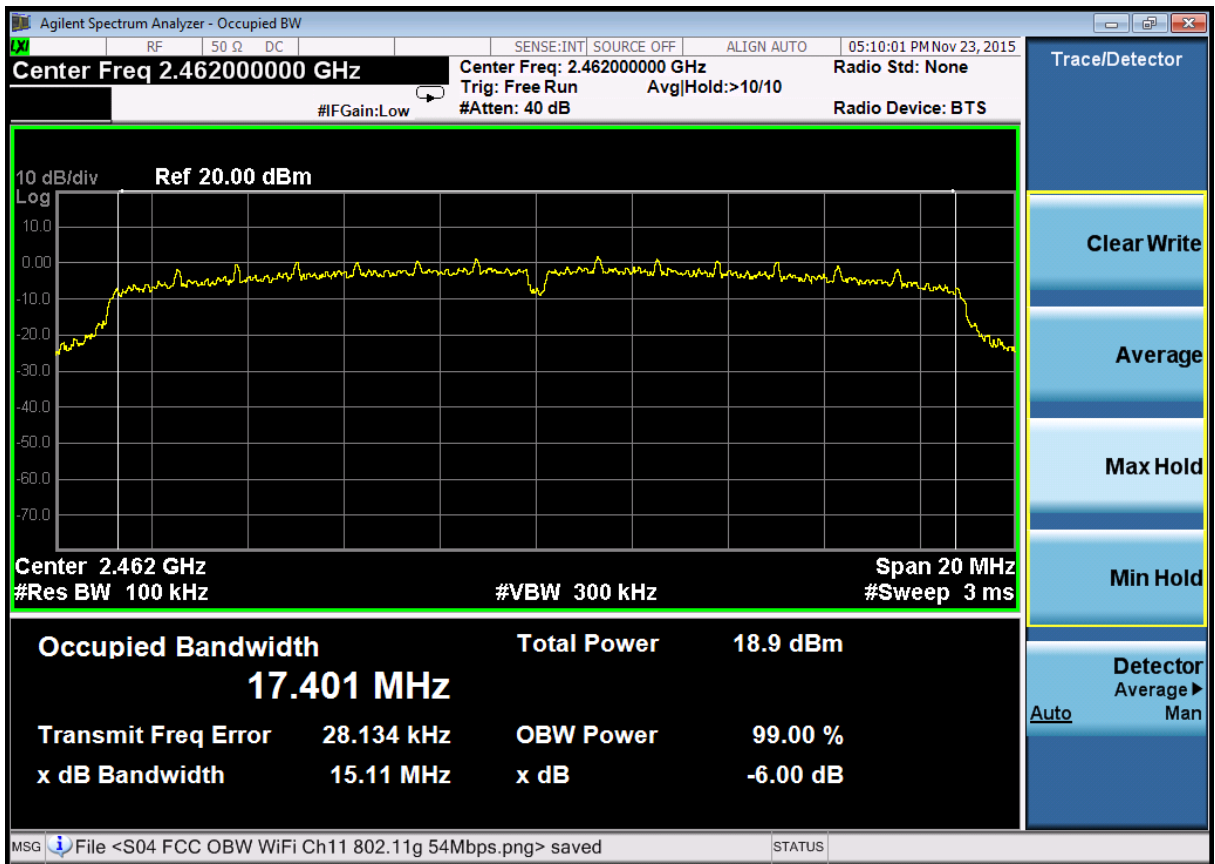
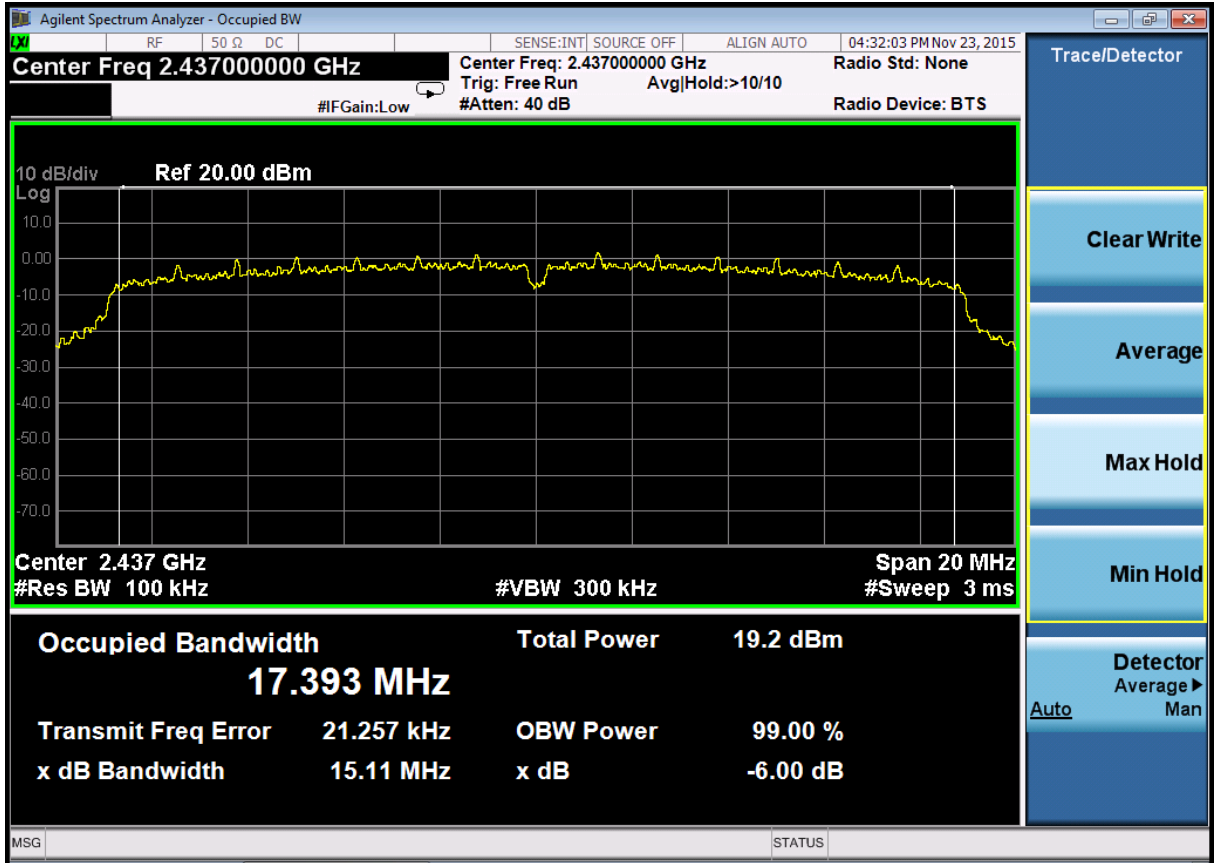
<b>FCC 15.247. Modulation: 802.11g; Data rate: 54 Mbps; Power setting: Full</b>			
<b>Channel Frequency (MHz)</b>	<b>99% Bandwidth (kHz)</b>	<b>6dB Bandwidth (kHz)</b>	<b>Result</b>
2412	16284	16270	PASS
2437	16275	16280	PASS
2462	16282	16290	PASS



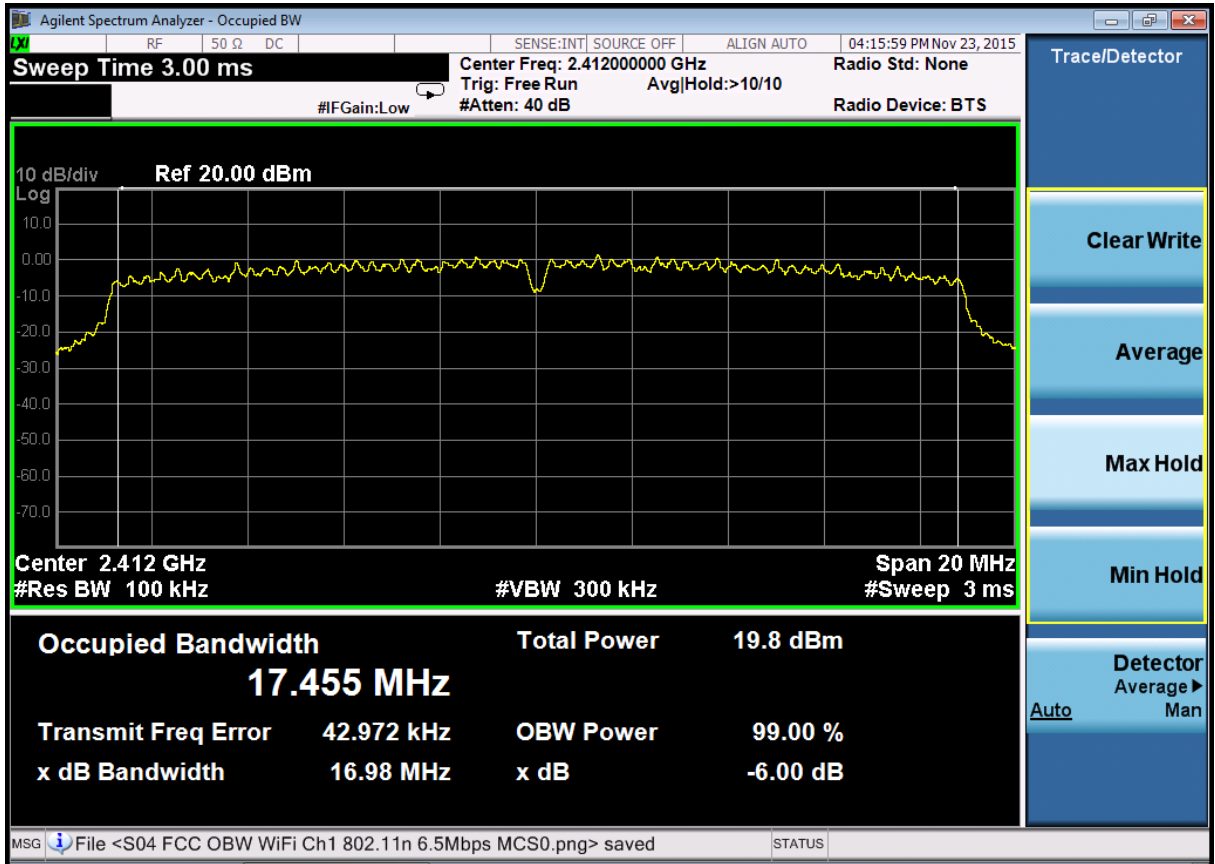


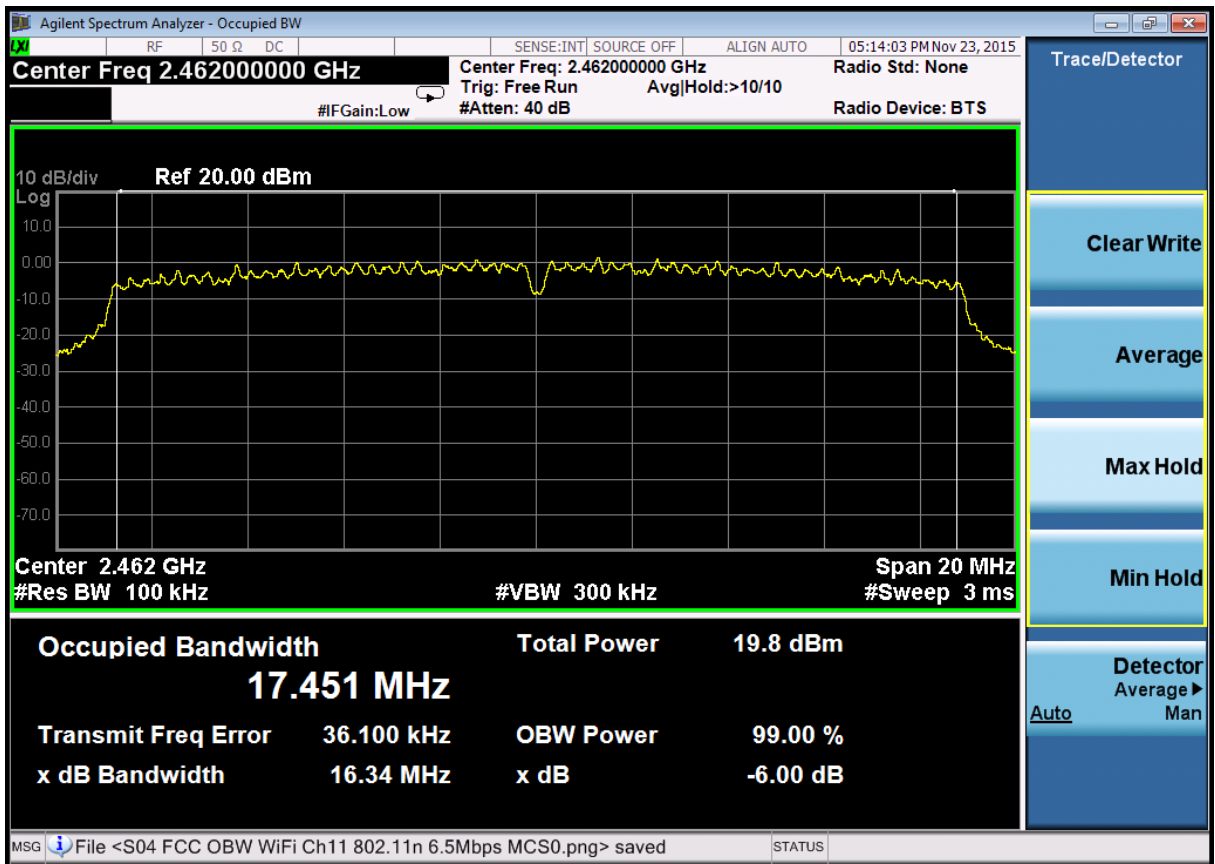
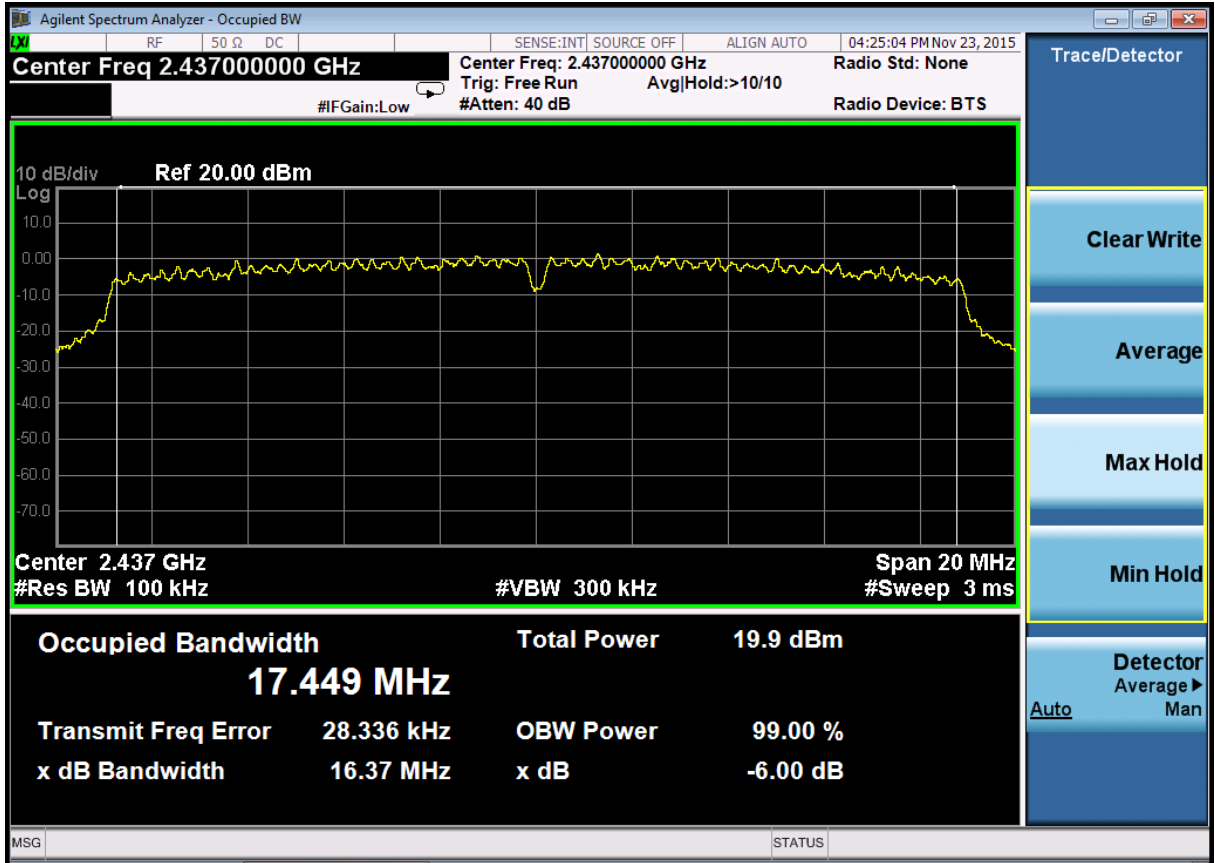
FCC 15.247. Modulation: 802.11n; Data rate: MCS0; Power setting: Full			
Channel Frequency (MHz)	99% Bandwidth (kHz)	6dB Bandwidth (kHz)	Result
2412	17405	15120	PASS
2437	17393	15110	PASS
2462	17401	15110	PASS





<b>FCC 15.247. Modulation: 802.11n; Data rate: MCS7; Power setting: Full</b>			
<b>Channel Frequency (MHz)</b>	<b>99% Bandwidth (kHz)</b>	<b>6dB Bandwidth (kHz)</b>	<b>Result</b>
2412	17455	16980	PASS
2437	17449	16370	PASS
2462	17451	16340	PASS







## 14 Maximum peak conducted output power

### 14.1 Definition

The maximum peak conducted output power is defined as the maximum power level measured with a peak detector using a filter with width and shape of which is sufficient to accept the signal bandwidth.

The maximum conducted output power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level.

### 14.2 Test Parameters

Test Location:	Element Hull
Test Chamber:	Lab 4
Test Standard and Clause:	ANSI C63.10-2013, Clause 11.9.1
EUT Channels / Frequencies Measured:	Low / Mid / High
EUT Channel Bandwidths:	20 MHz
Deviations From Standard:	None
Measurement BW:	Wideband
Spectrum Analyzer Video BW: (requirement at least 3x RBW)	N/A
Measurement Detector:	Peak
Voltage Extreme Environment Test Range:	Mains Power = 85 % and 115 % of Nominal (FCC only requirement); Battery Power = new battery.

### Environmental Conditions (Normal Environment)

Temperature: 22 °C	+15 °C to +35 °C (as declared)
Humidity: 32 % RH	20 % RH to 75 % RH (as declared)

### 14.3 Test Limit

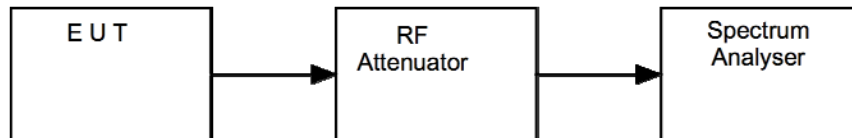
For systems employing digital modulation techniques operating in the bands 902 to 928 MHz, 2400 to 2483.5 MHz and 5725 to 5850 MHz, the maximum peak conducted output power shall not exceed 1 W.

#### 14.4 Test Method

With the EUT setup as per section 9 of this report and connected as per Figure iv, the resolution bandwidth of the spectrum analyser was increased above the EUT occupied bandwidth and the peak emission data noted.

The measurements were performed with EUT set at its maximum duty. All modulation schemes, data rates and power settings were used to observe the worst-case configuration in each bandwidth.

**Figure iv Test Setup**



#### 14.5 Test Equipment

Equipment Type	Manufacturer	Equipment Description	Element No	Due For Calibration	Calibration Interval (m)
RPR3006W	DARE	Power Meter	REF2083	17/11/2016	12

#### 14.6 Test Results

<b>Modulation: 802.11b; Data rate: 1 Mbps; Power setting: Full</b>				
Channel Frequency (MHz)	Analyzer Level (dBm)	Cable loss (dB)	Power (W)	Result
2412	19.1	0	0.0813	PASS
2437	19.2	0	0.0832	PASS
2462	19.1	0	0.0813	PASS

<b>Modulation: 802.11b; Data rate: 11 Mbps; Power setting: Full</b>				
Channel Frequency (MHz)	Analyzer Level (dBm)	Cable loss (dB)	Power (W)	Result
2412	19.2	0	0.0832	PASS
2437	19.3	0	0.0851	PASS
2462	19.2	0	0.0832	PASS

<b>Modulation: 802.11g; Data rate: 6 Mbps; Power setting: Full</b>				
<b>Channel Frequency (MHz)</b>	<b>Analyzer Level (dBm)</b>	<b>Cable loss (dB)</b>	<b>Power (W)</b>	<b>Result</b>
2412	21.2	0	0.1318	PASS
2437	21.3	0	0.1349	PASS
2462	21.4	0	0.1380	PASS

<b>Modulation: 802.11g; Data rate: 54 Mbps; Power setting: Full</b>				
<b>Channel Frequency (MHz)</b>	<b>Analyzer Level (dBm)</b>	<b>Cable loss (dB)</b>	<b>Power (W)</b>	<b>Result</b>
2412	20.6	0	0.1148	PASS
2437	20.7	0	0.1175	PASS
2462	20.5	0	0.1122	PASS

<b>Modulation: 802.11n; Data rate: MCS0; Power setting: Full</b>				
<b>Channel Frequency (MHz)</b>	<b>Analyzer Level (dBm)</b>	<b>Cable loss (dB)</b>	<b>Power (W)</b>	<b>Result</b>
2412	20.9	0	0.1230	PASS
2437	20.9	0	0.1230	PASS
2462	20.8	0	0.1202	PASS

<b>Modulation: 802.11n; Data rate: MCS7; Power setting: Full</b>				
<b>Channel Frequency (MHz)</b>	<b>Analyzer Level (dBm)</b>	<b>Cable loss (dB)</b>	<b>Power (W)</b>	<b>Result</b>
2412	19.8	0	0.0955	PASS
2437	19.6	0	0.0912	PASS
2462	19.7	0	0.0933	PASS

## 15 Out-of-band and conducted spurious emissions

### 15.1 Definition

#### *Out-of-band emission.*

Emission on a frequency or frequencies immediately outside the necessary bandwidth that results from the modulation process but excluding spurious emissions.

#### *Spurious emission.*

Emission on a frequency or frequencies that are outside the necessary bandwidth and the level of which may be reduced without affecting the corresponding transmission of information. Spurious emissions include harmonic emissions, parasitic emissions, intermodulation products, and frequency conversion products, but exclude out-of-band emissions.

### 15.2 Test Parameters

Test Location:	Element Hull
Test Chamber:	Lab 4
Test Standard and Clause:	ANSI C63.10-2013, Clause 11.11
EUT Channels / Frequencies Measured:	2412/2442/2462 MHz
EUT Channel Bandwidths:	20 MHz
Deviations From Standard:	None
Measurement BW:	100 kHz
Spectrum Analyzer Video BW: (requirement at least 3x RBW)	300 kHz
Measurement Detector:	Peak
Measurement Range:	9 kHz to 25 GHz

### Environmental Conditions (Normal Environment)

Temperature: 25 °C	+15 °C to +35 °C (as declared)
Humidity: 30 % RH	20 % RH to 75 % RH (as declared)
Supply: 110Vac	110V ac ±10 % (as declared)

### 15.3 Test Limit

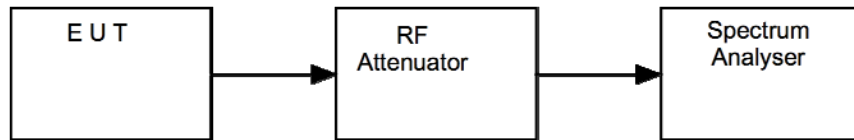
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in FCC 47CFR15.209(a) / RSS-Gen is not required.

### 15.4 Test Method

With the EUT setup as per section 9 of this report and connected as per Figure v, the emissions from the EUT were measured on a spectrum analyser.

The measurements were performed with EUT set at its maximum duty. All modulation schemes, data rates and power settings were used to observe the worst case configuration in each bandwidth.

**Figure v Test Setup**



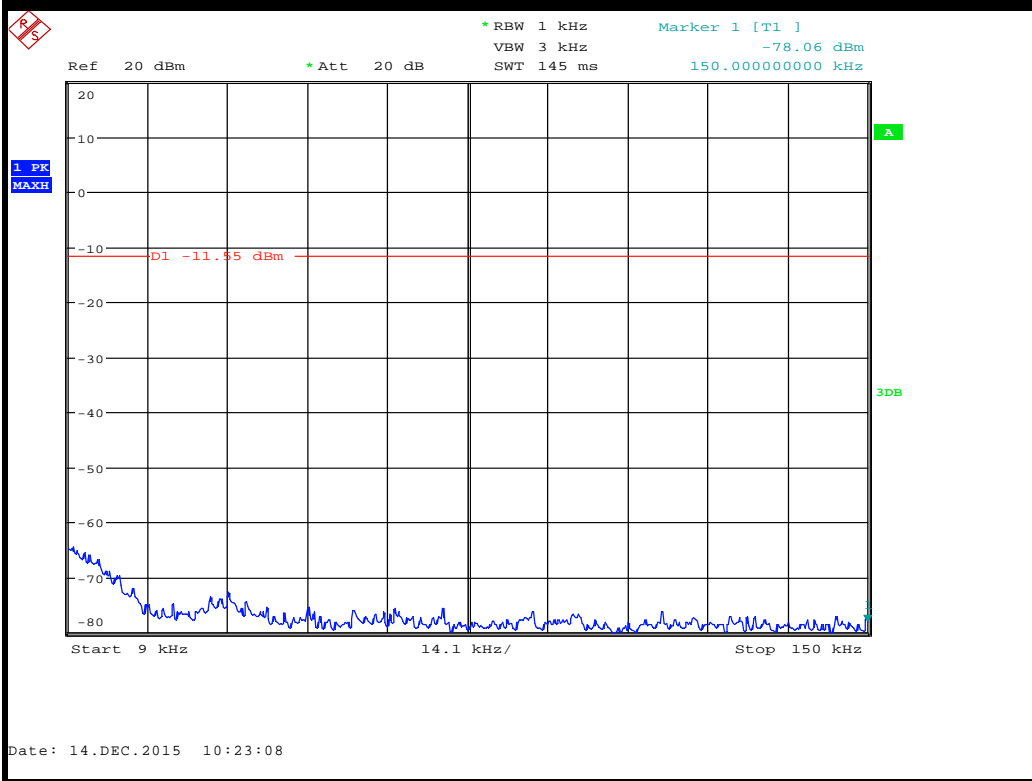
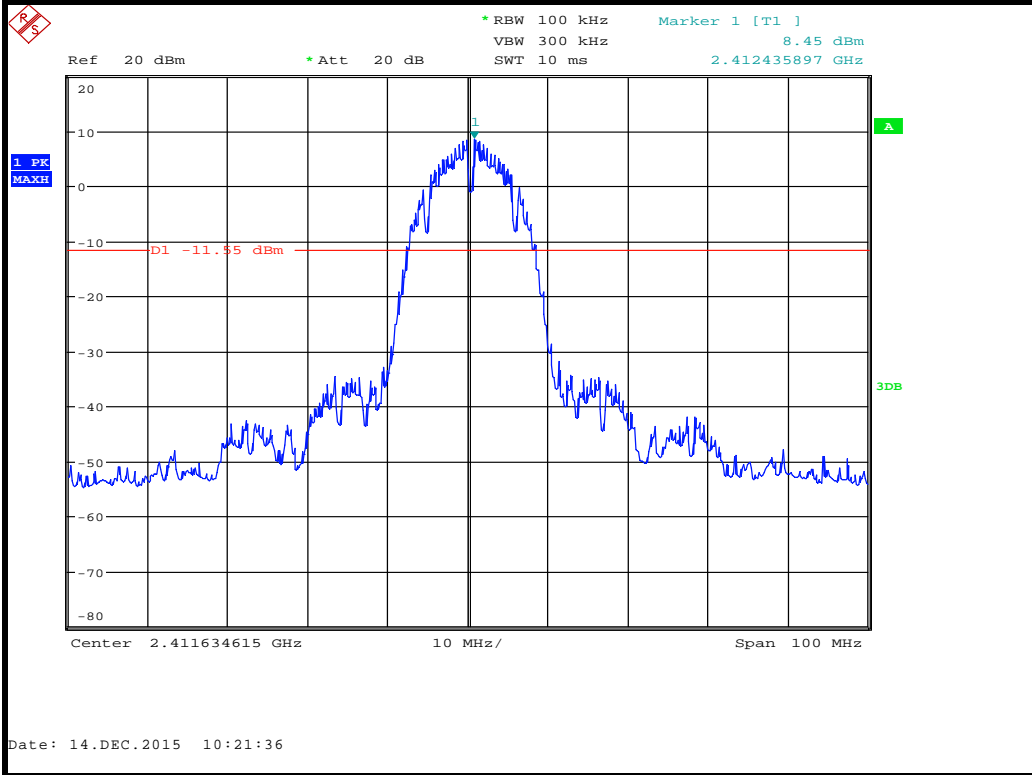
### 15.5 Test Equipment

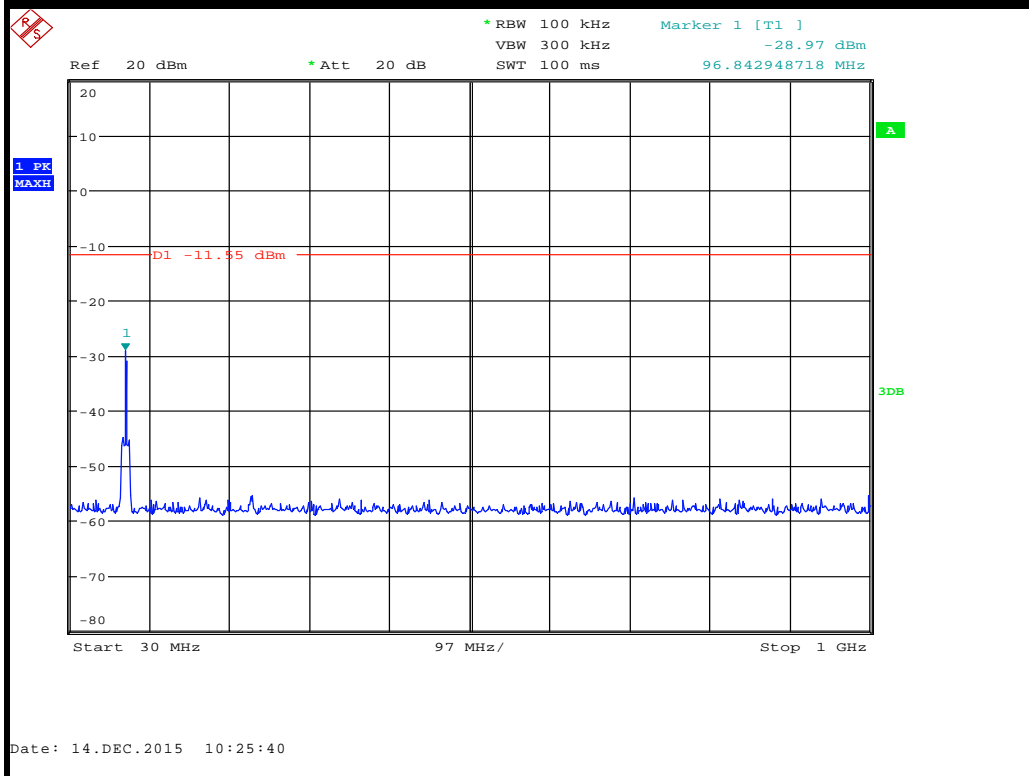
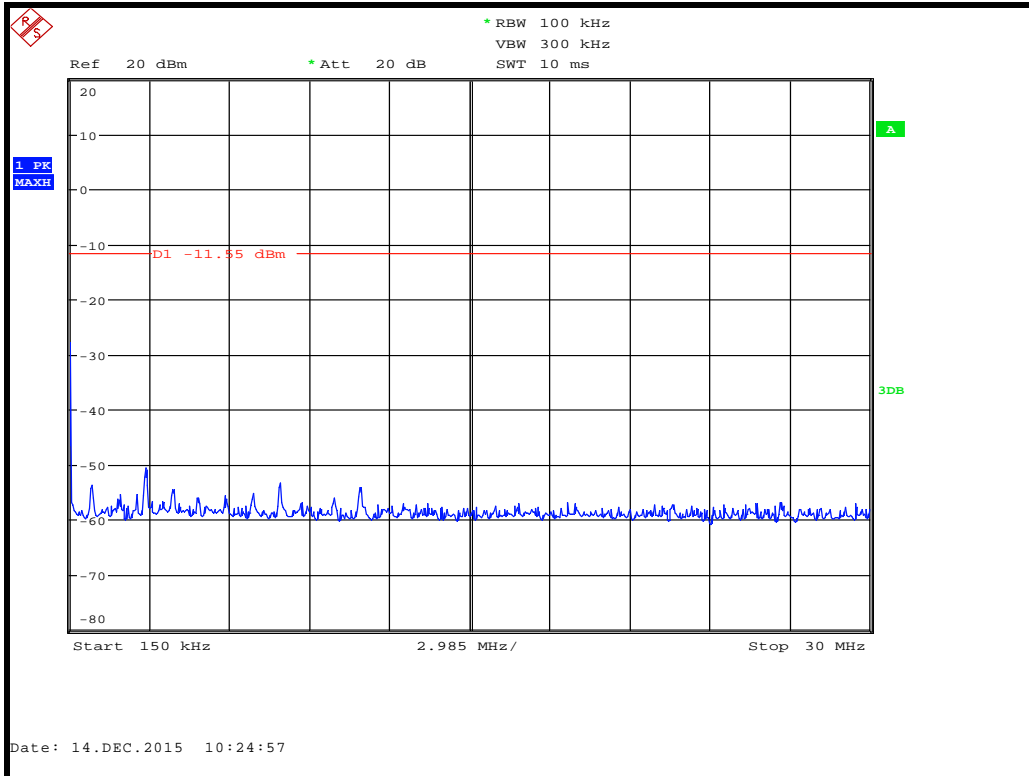
Equipment Type	Manufacturer	Equipment Description	Element No	Due For Calibration	Calibration Interval (m)
FSU26	R&S	Spectrum Analyser	U405	11/05/2016	12

**15.6 Test Results**

<i>Modulation: 802.11b; Data rate: 1Mbps; Power setting: Full</i>						
<i>Channel Frequency (MHz)</i>	<i>Emission Frequency (MHz)</i>	<i>Analyzer Level (dBm)</i>	<i>Emission Level (dBm)</i>	<i>Limit (dBm)</i>	<i>Margin (dB)</i>	<i>Result</i>
2412	96.843	-29.0	-29.0	-11.6	-17.4	PASS
2442	127.933	-29.2	-29.2	-11.5	-17.7	PASS
2462	146.587	-28.9	-28.9	-11.9	-17.0	PASS

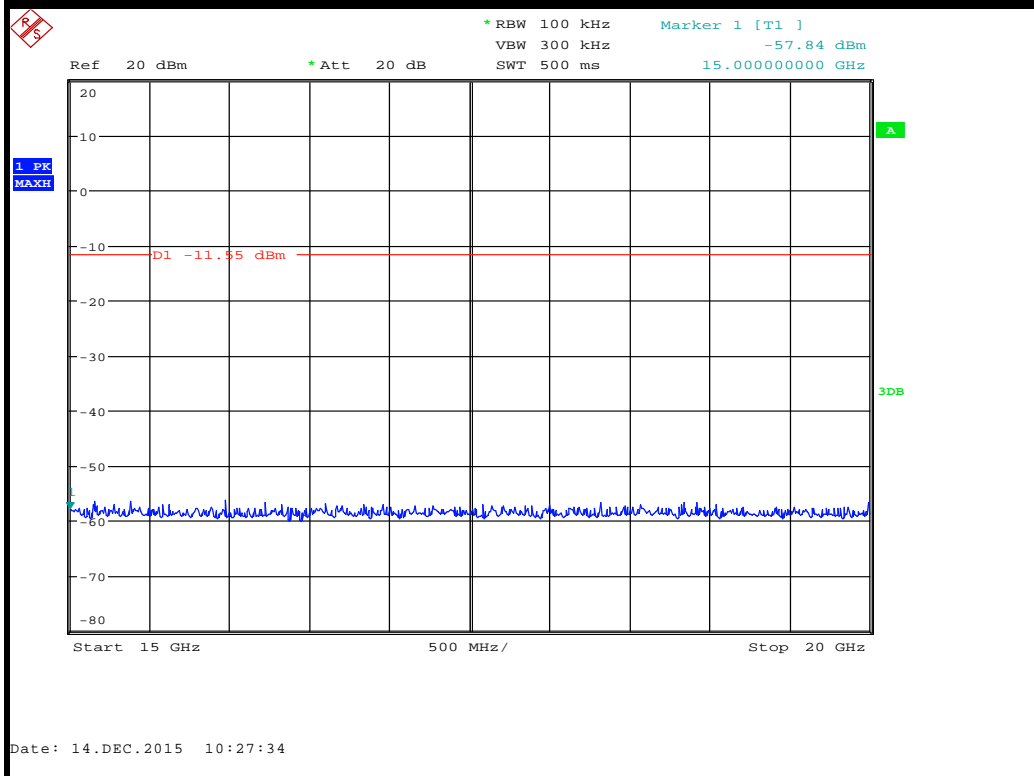
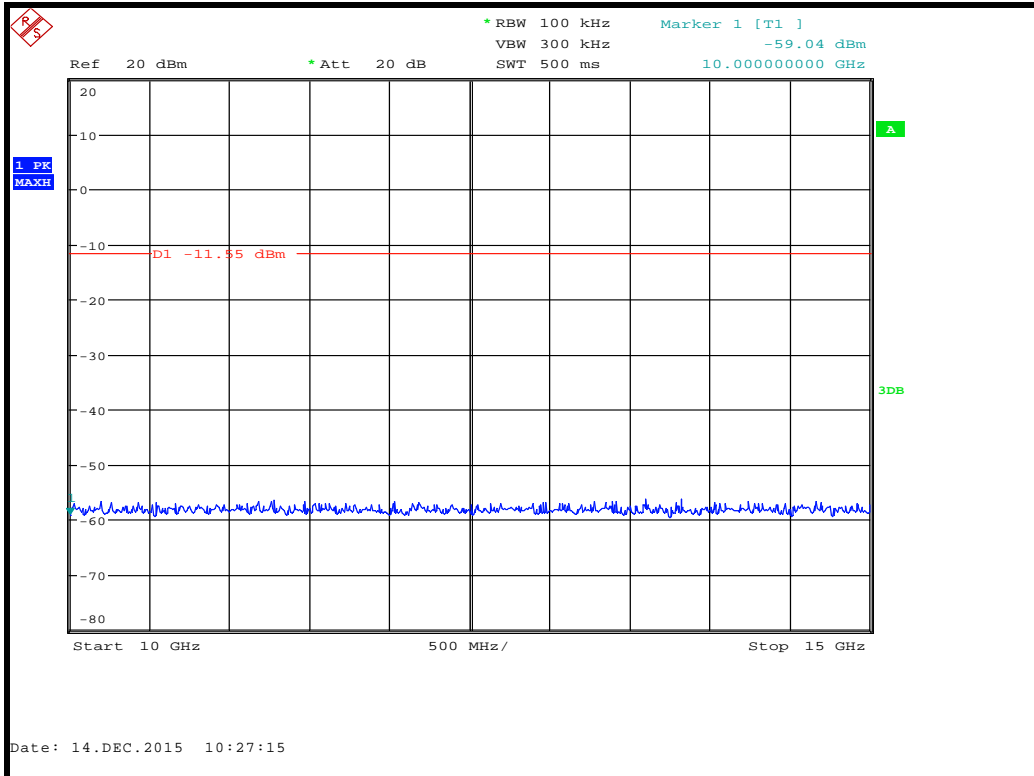
CH1

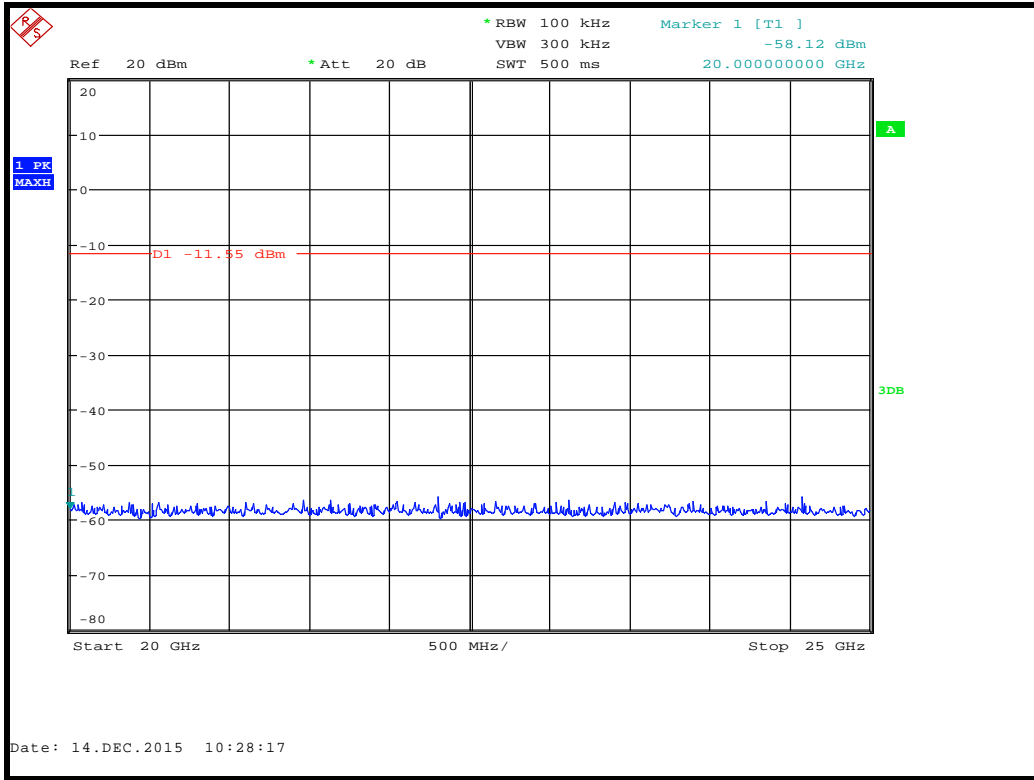




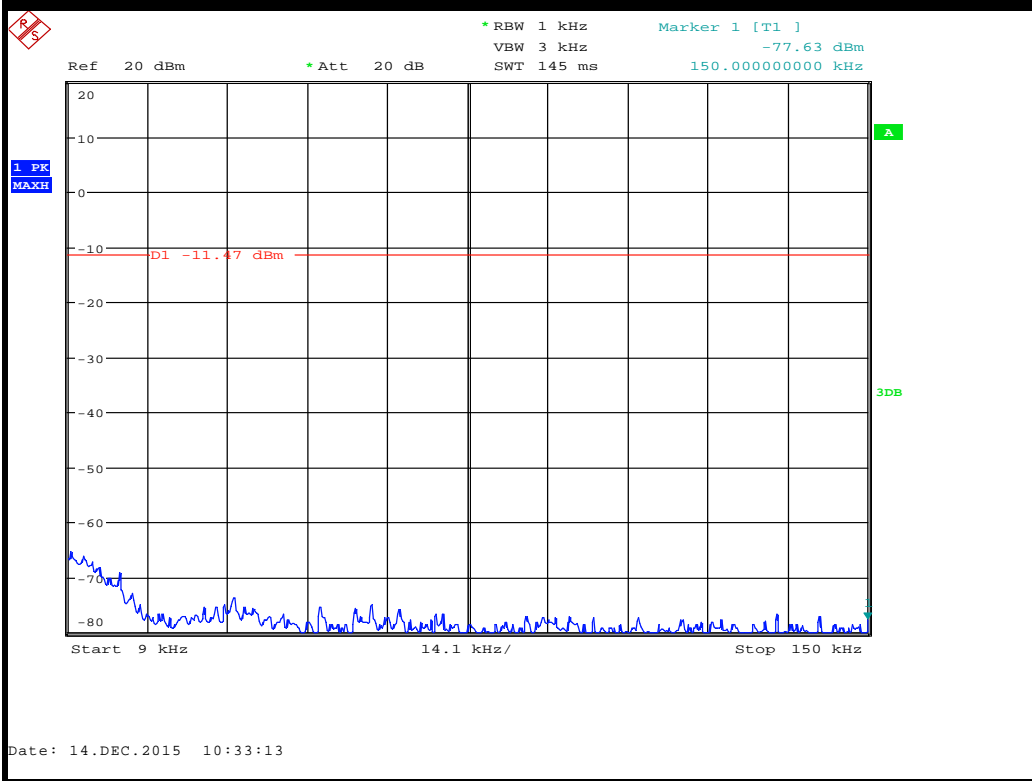
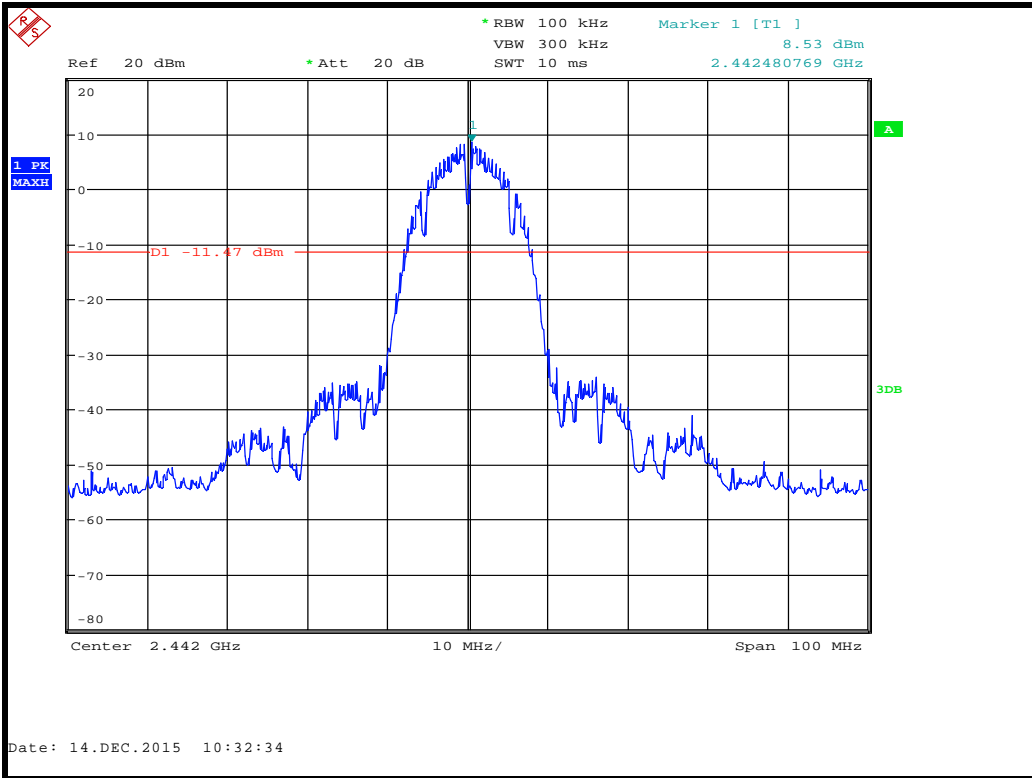


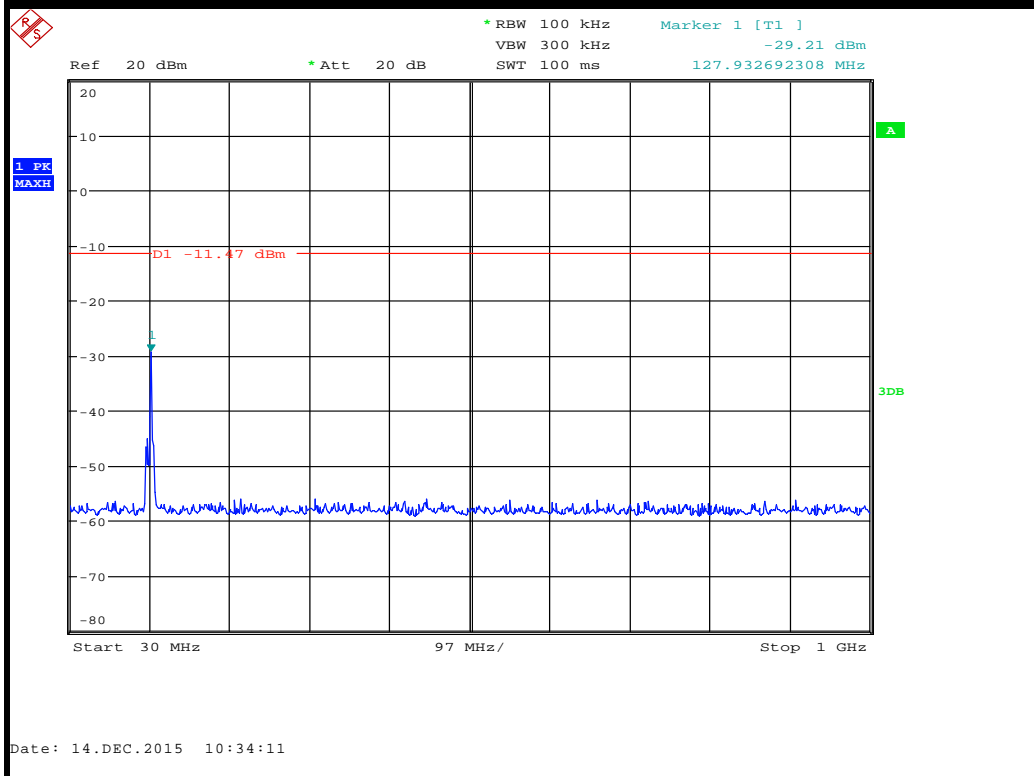
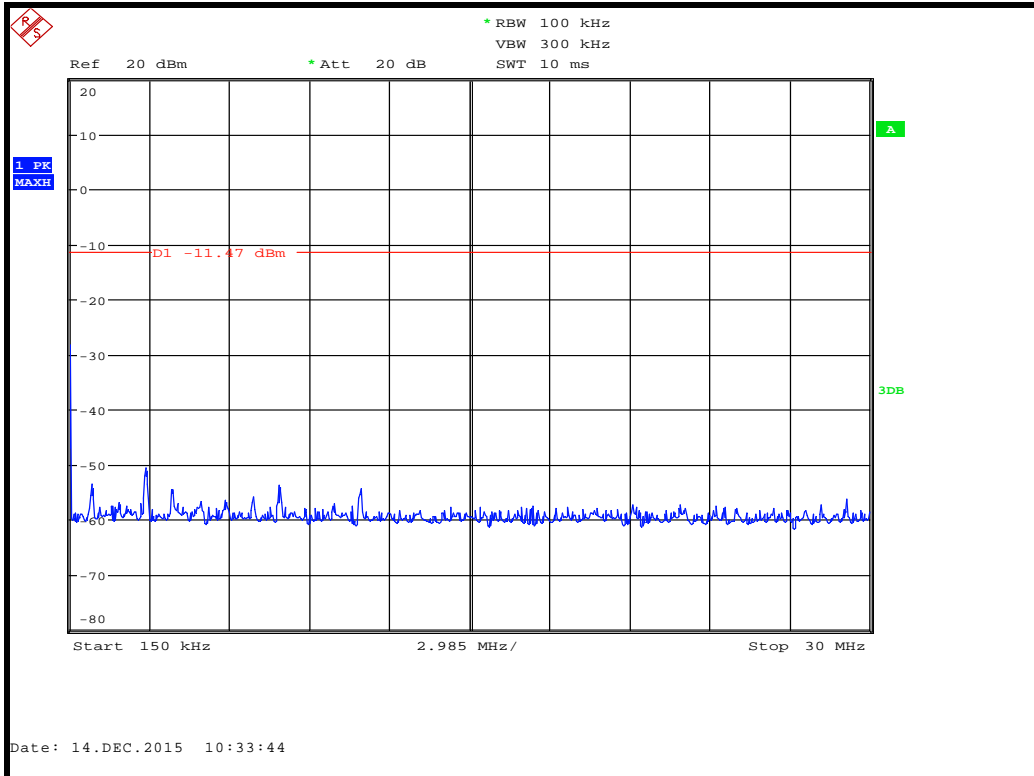


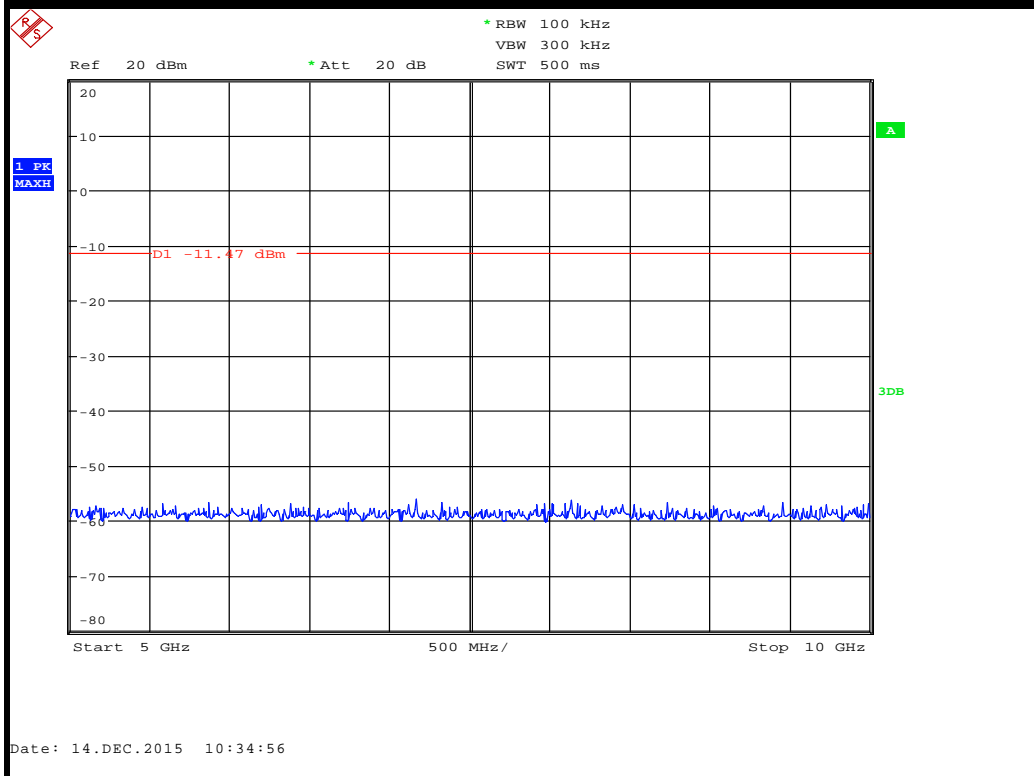
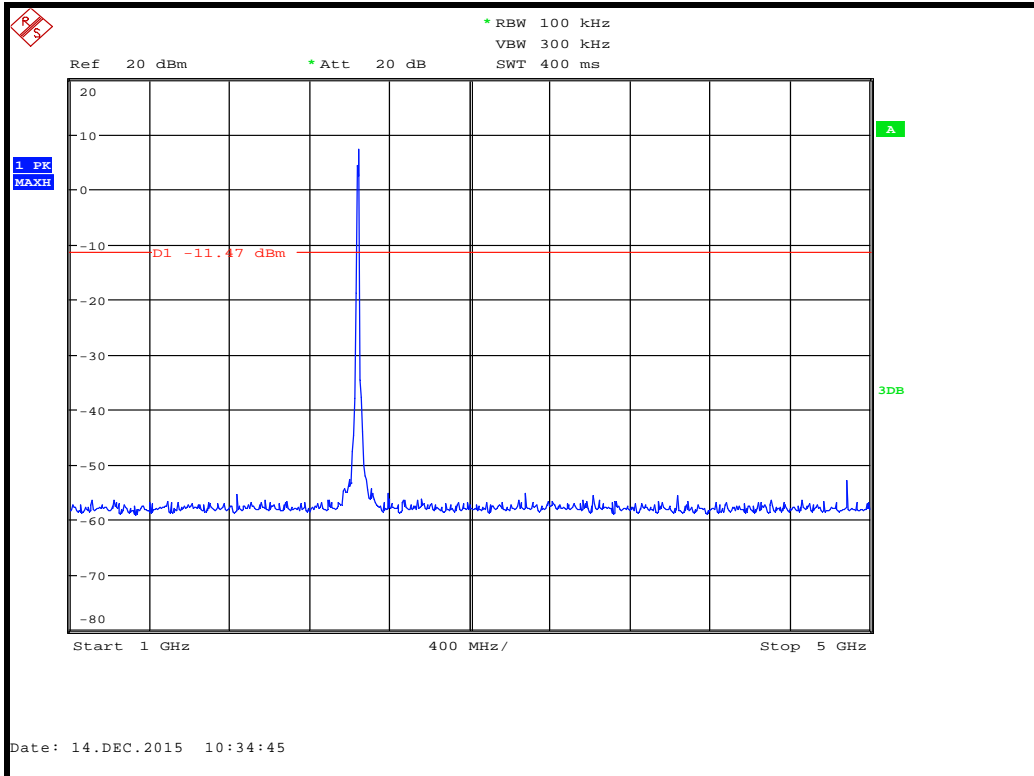




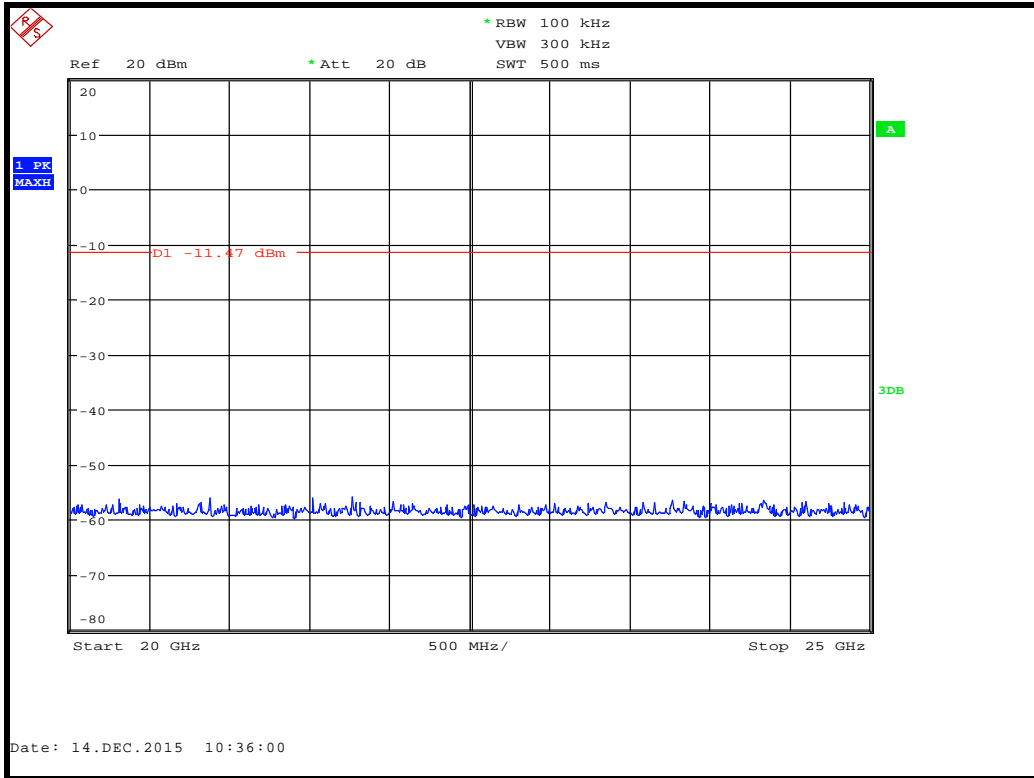
CH7





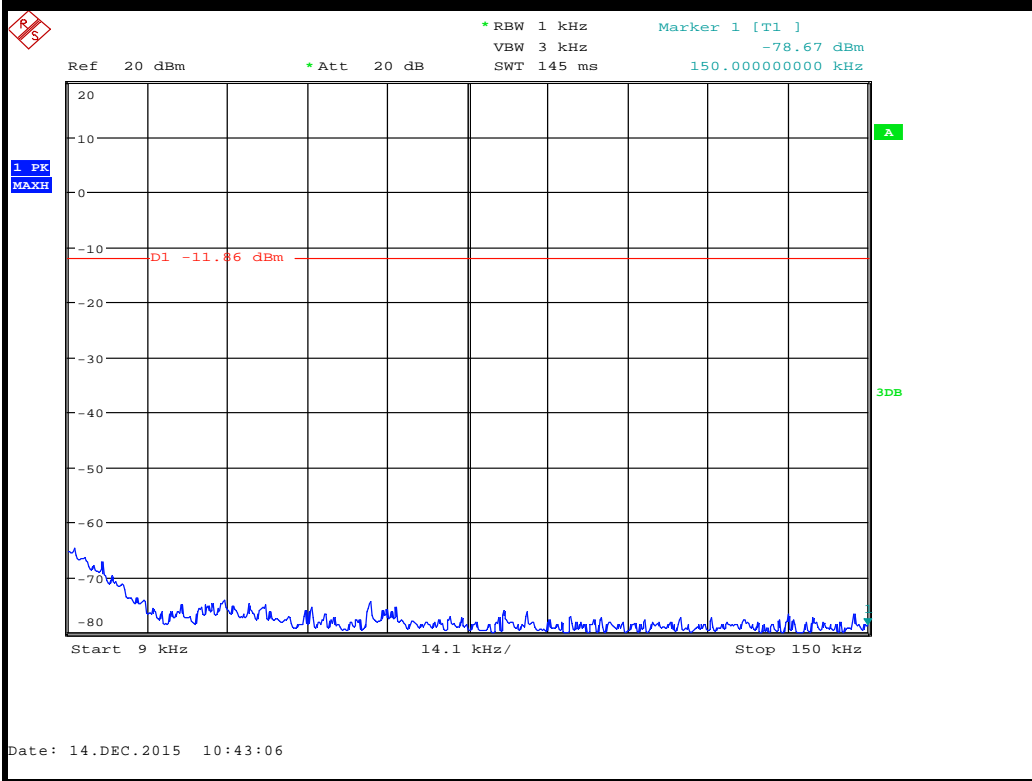
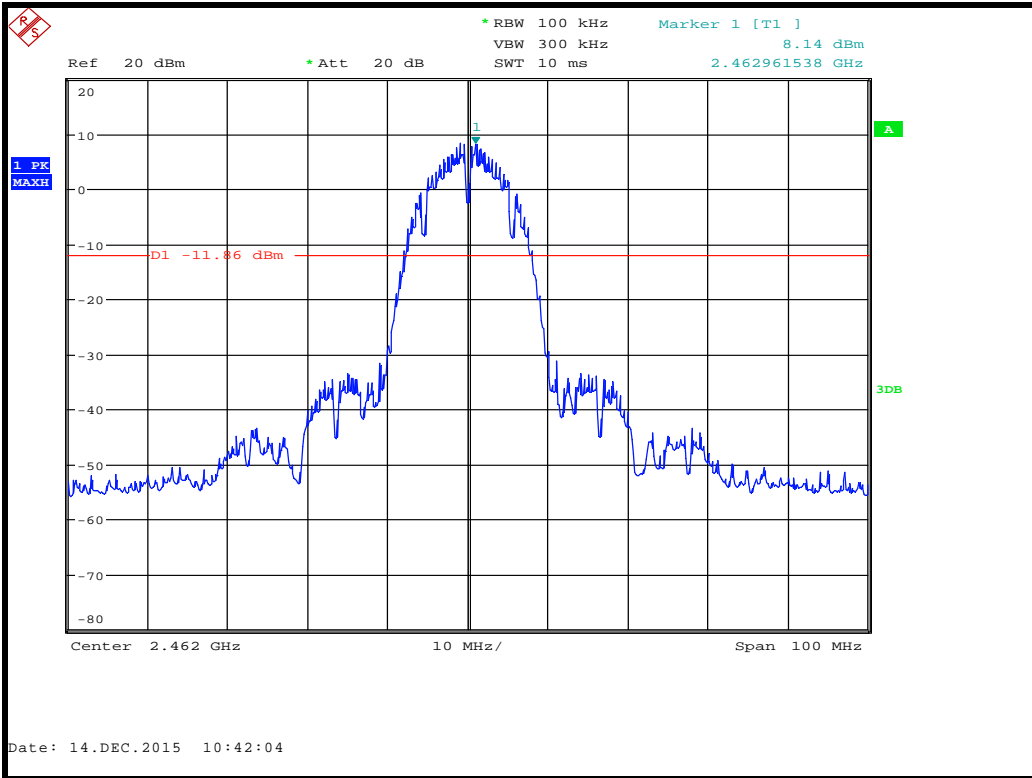


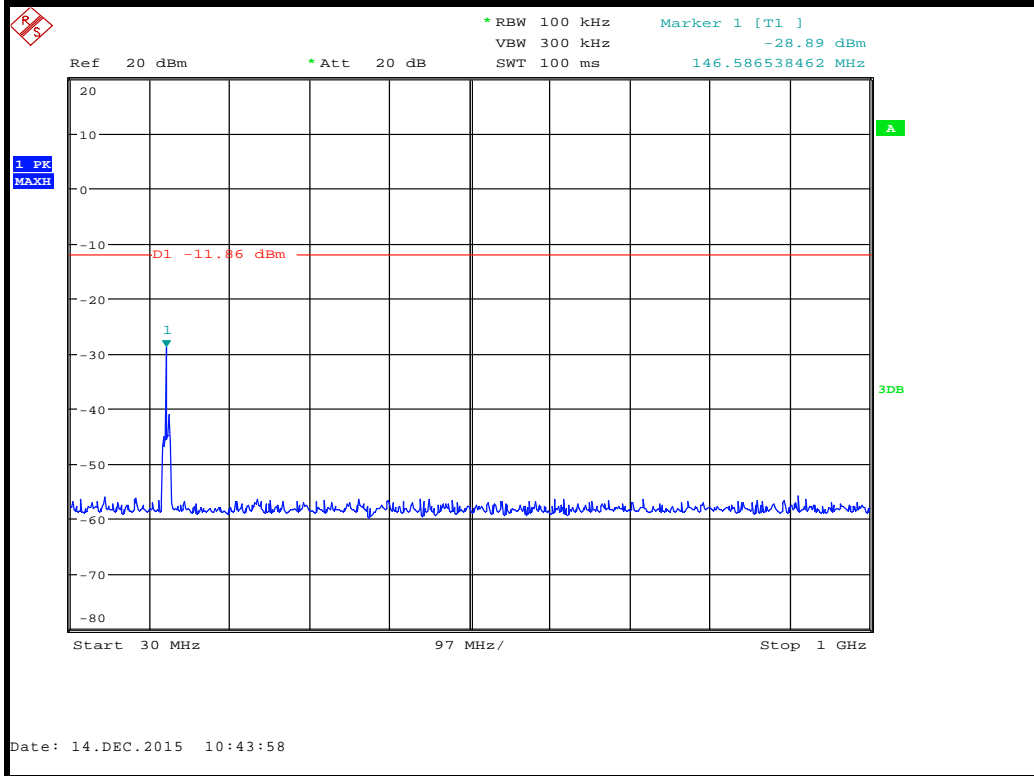
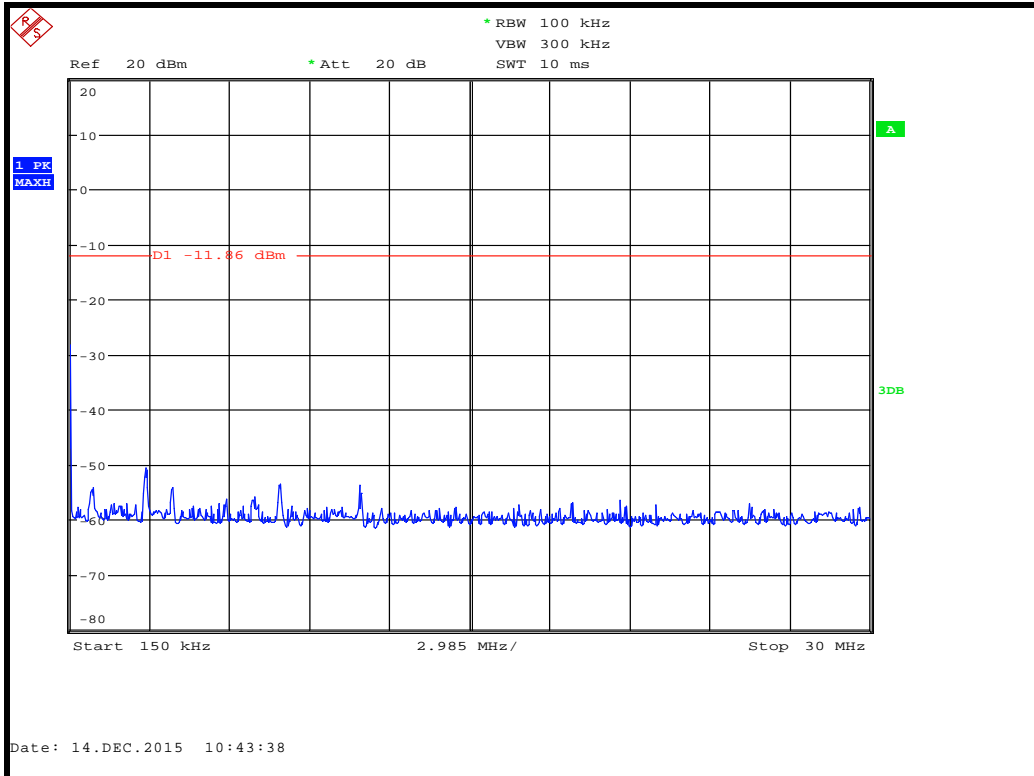


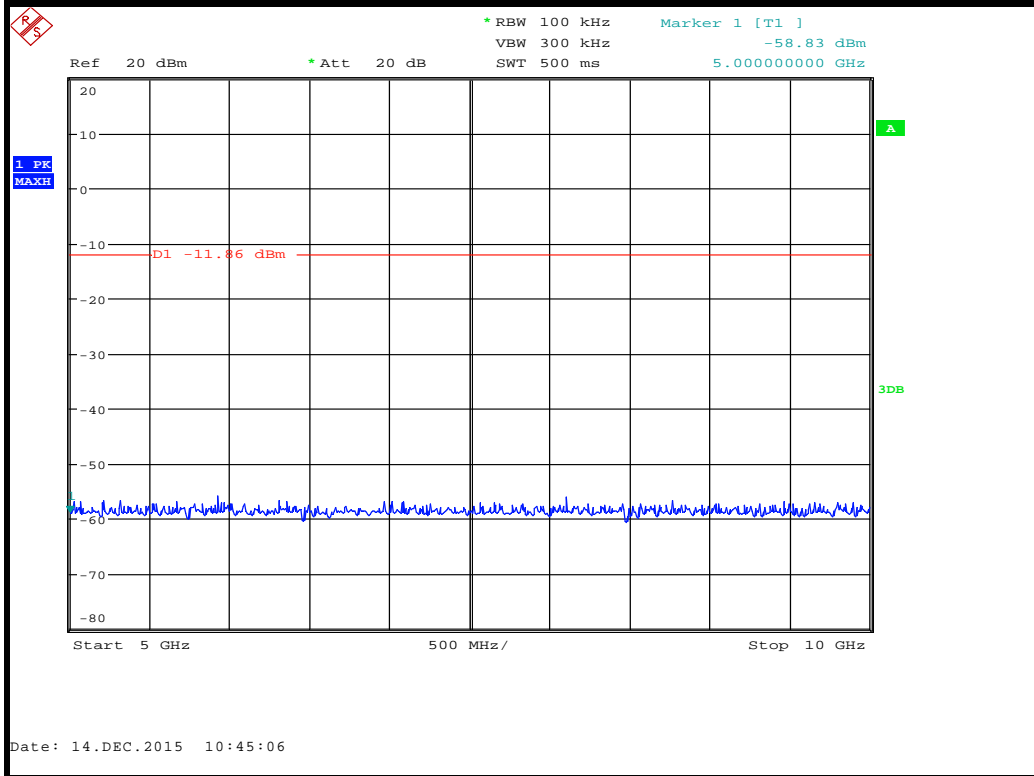
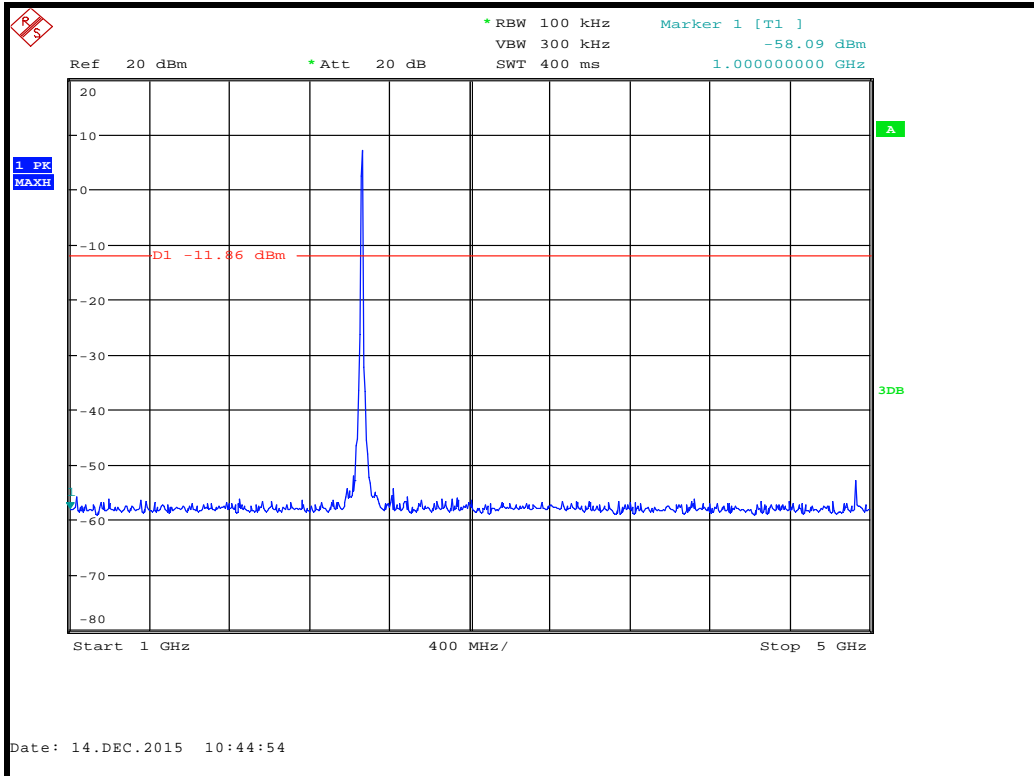


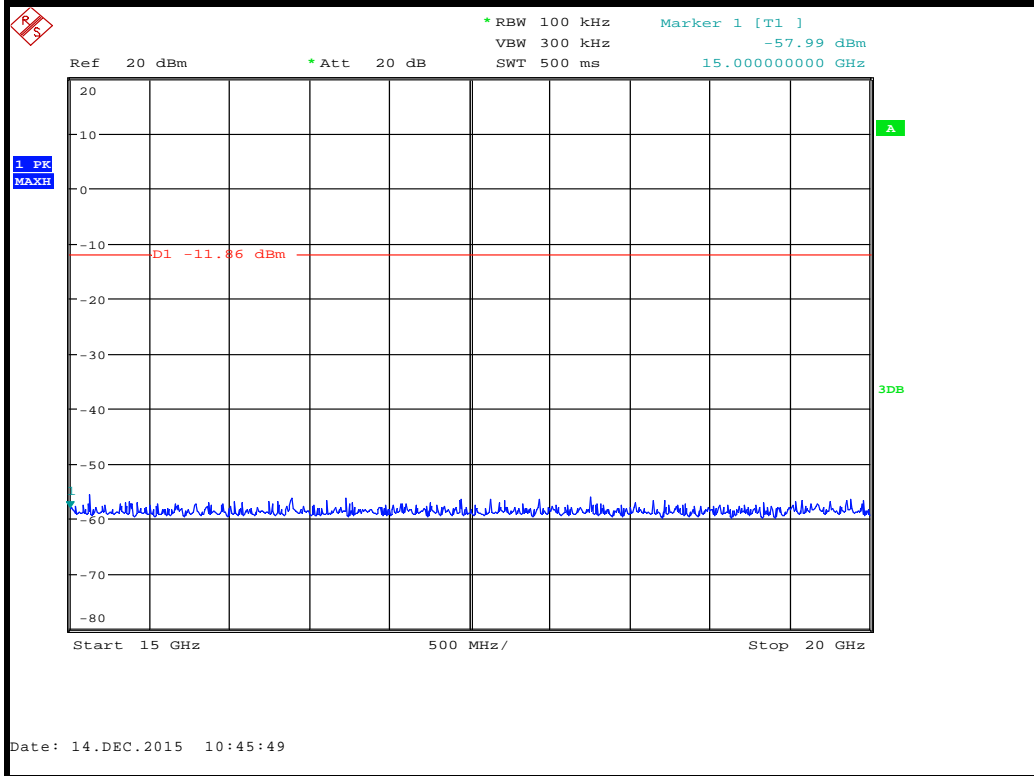
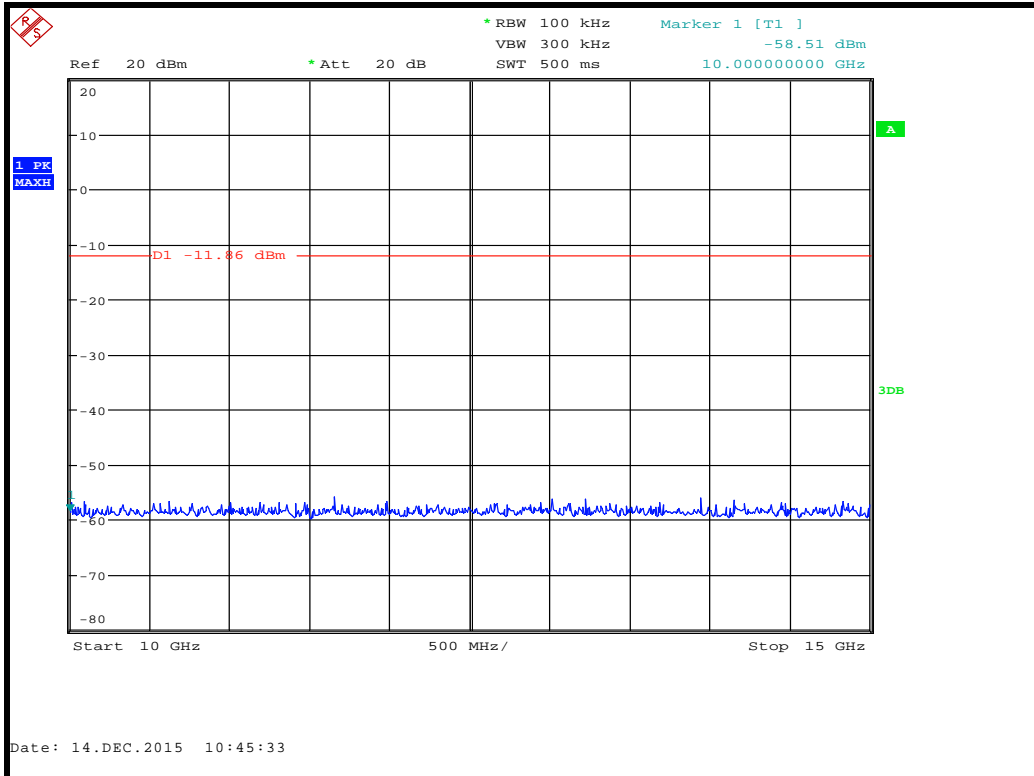


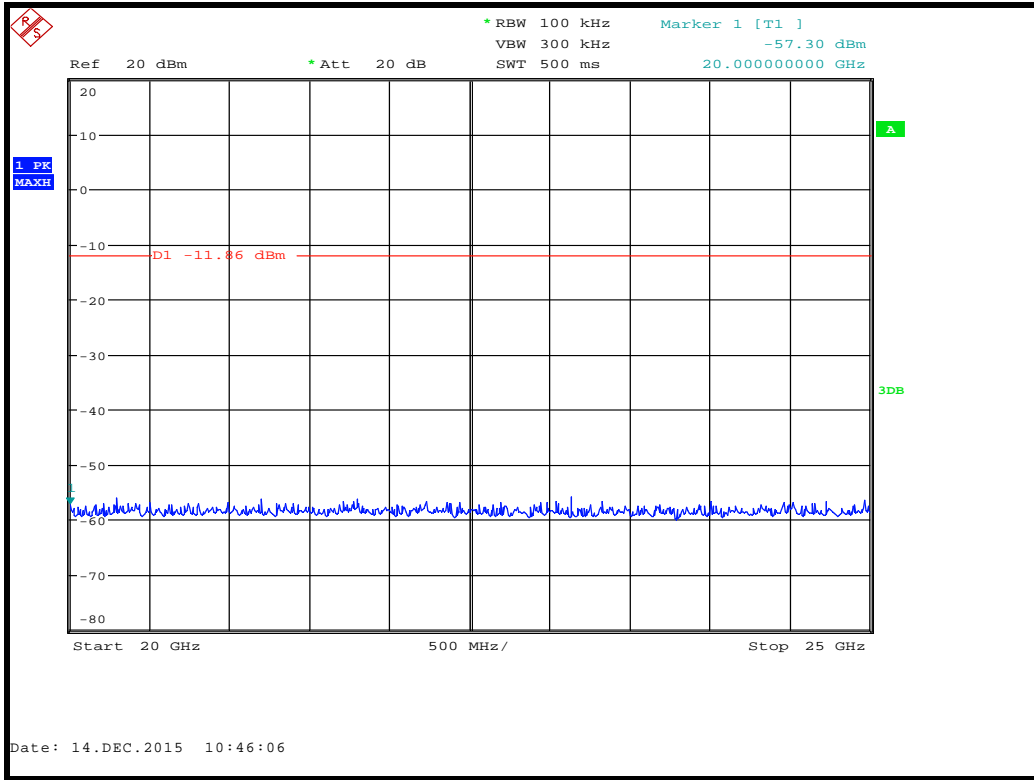
CH11





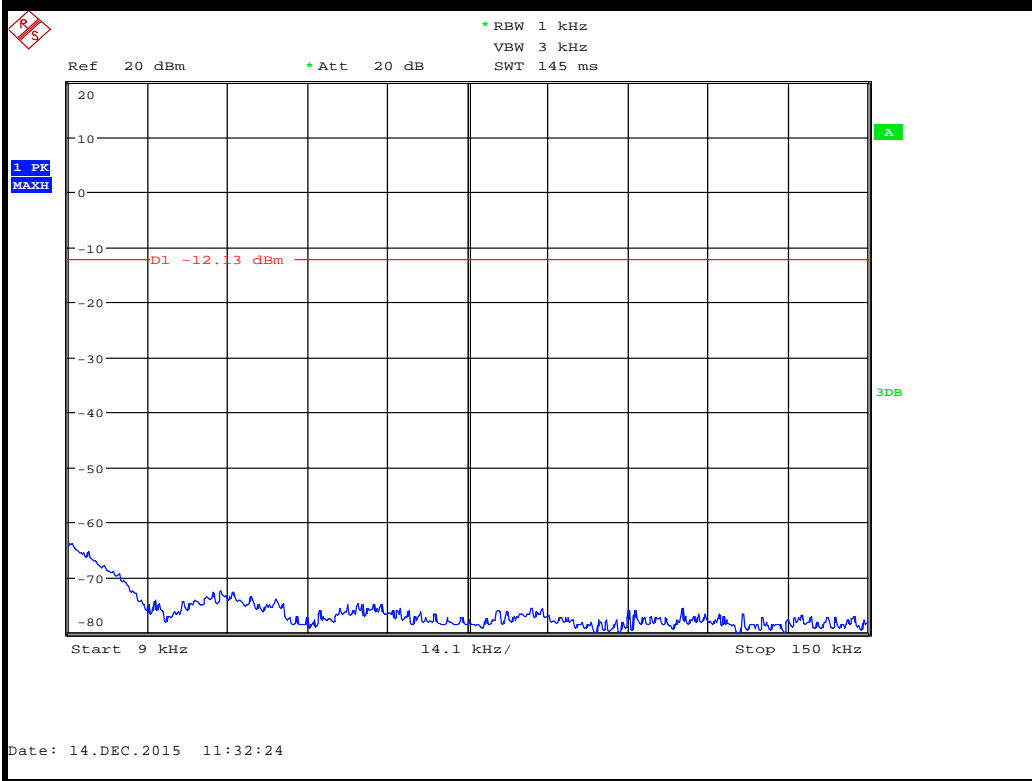
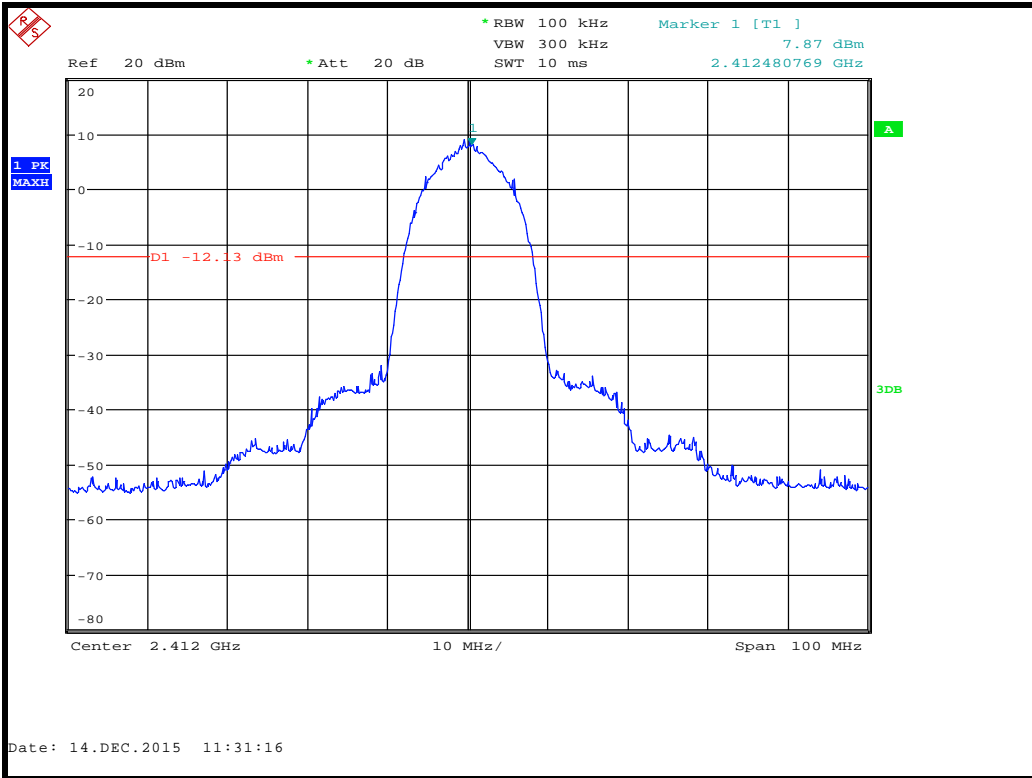


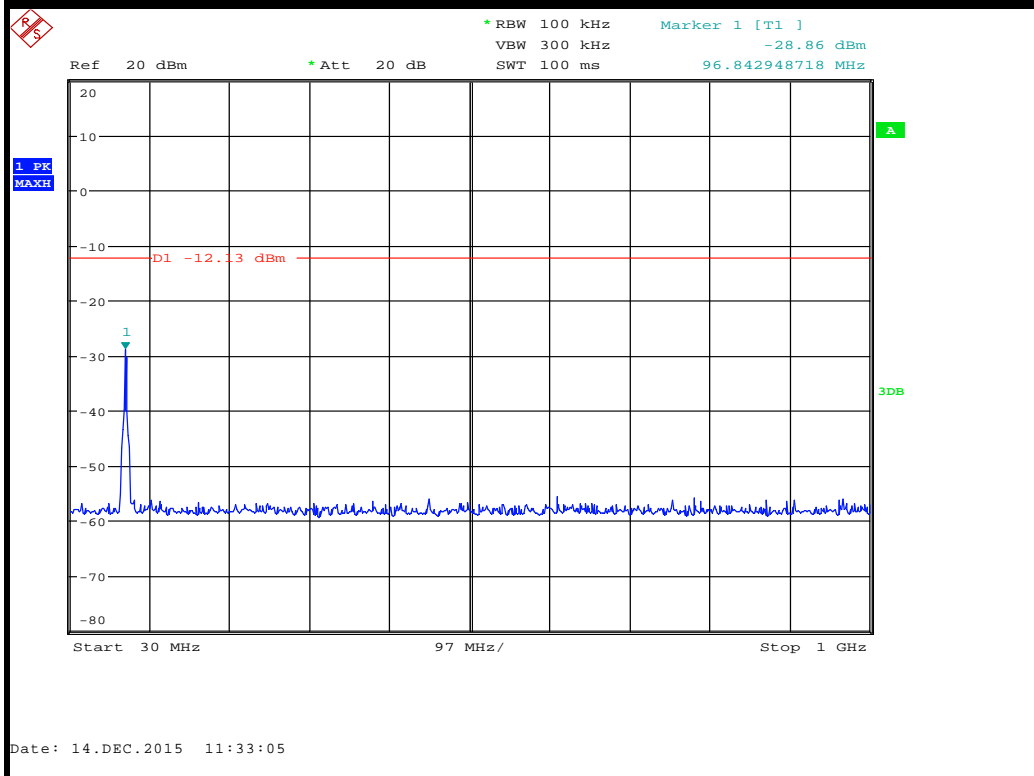
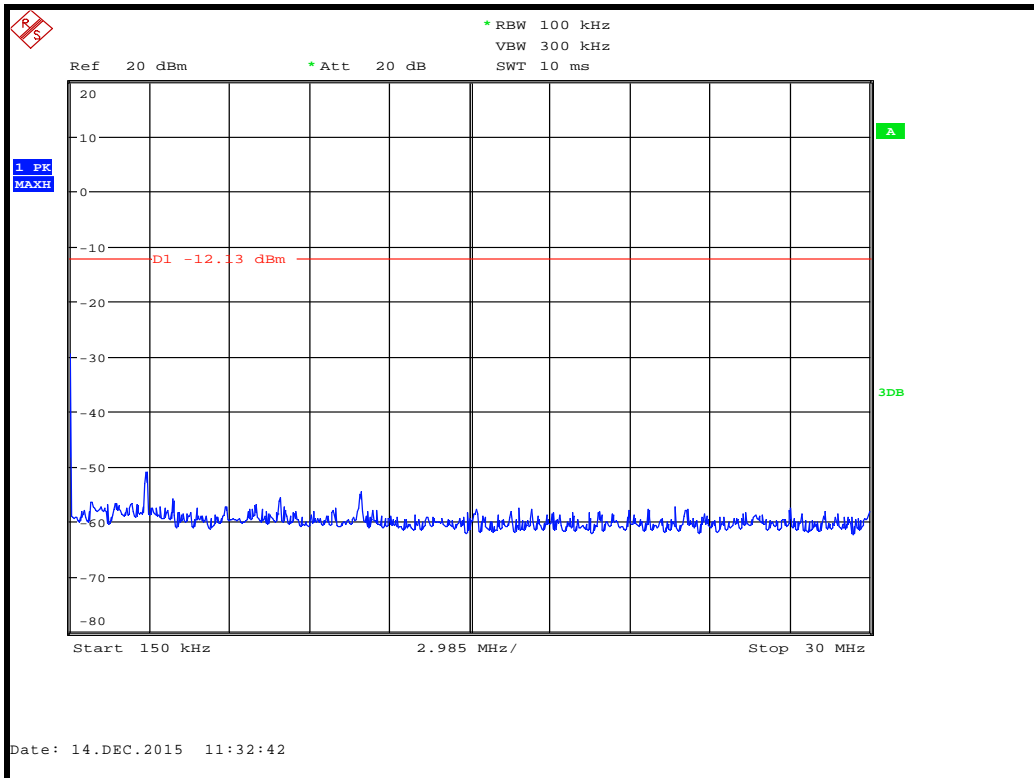




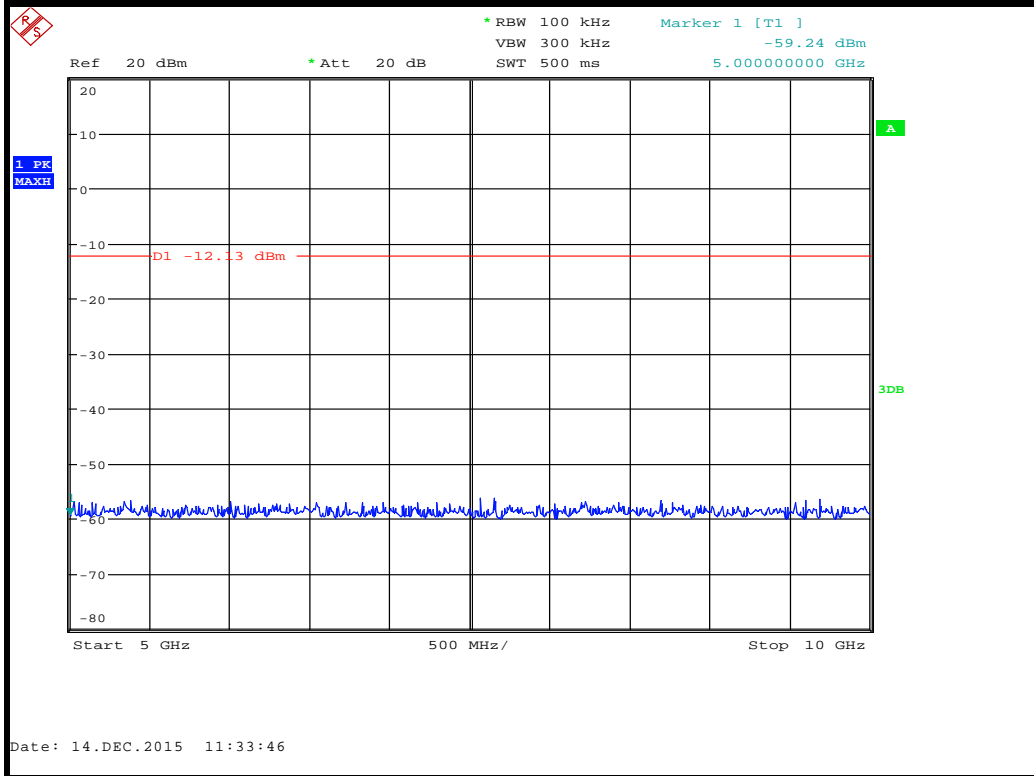
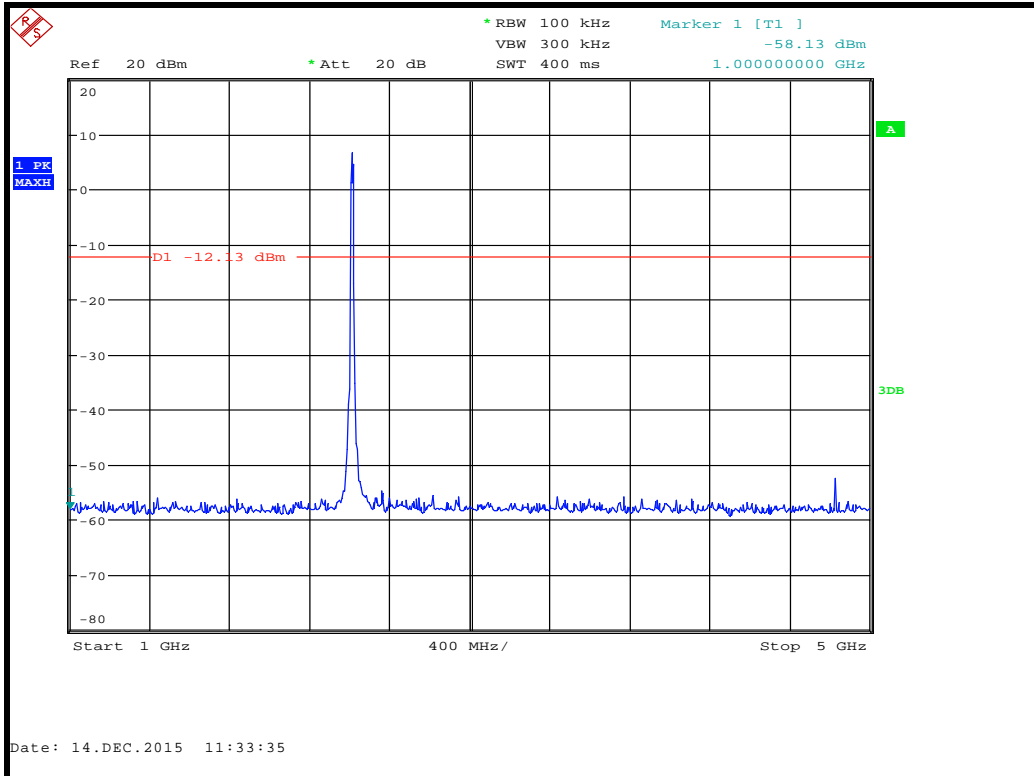
<b>Modulation: 802.11b; Data rate: 11Mbps; Power setting: Full</b>						
<b>Channel Frequency (MHz)</b>	<b>Emission Frequency (MHz)</b>	<b>Analyzer Level (dBm)</b>	<b>Emission Level (dBm)</b>	<b>Limit (dBm)</b>	<b>Margin (dB)</b>	<b>Result</b>
2412	96.843	-28.9	-28.9	-12.1	-16.8	PASS
2442	127.933	-28.9	-28.9	-11.8	-17.1	PASS
2462	146.587	-28.9	-28.9	-10.8	-18.1	PASS

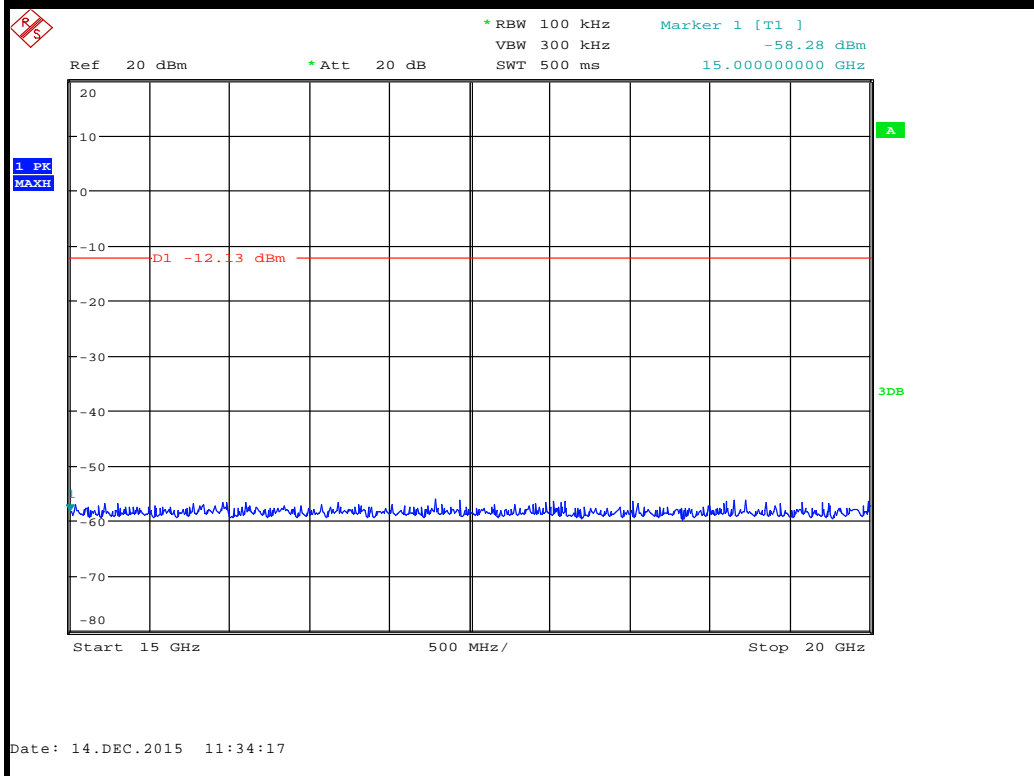
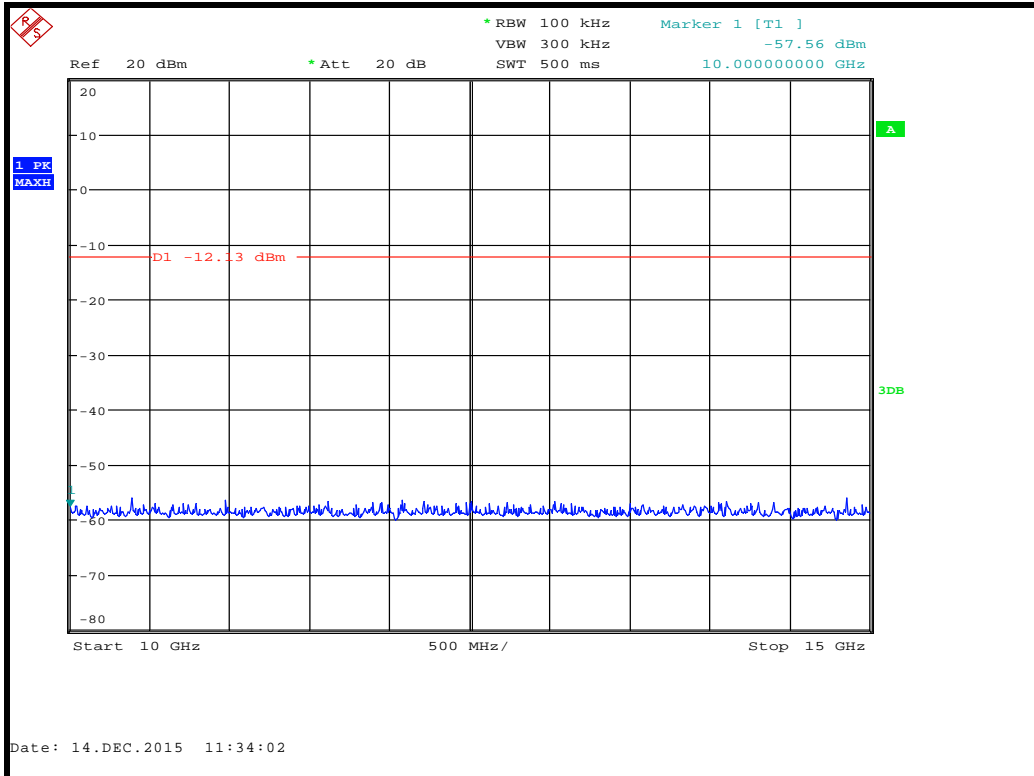
CH1

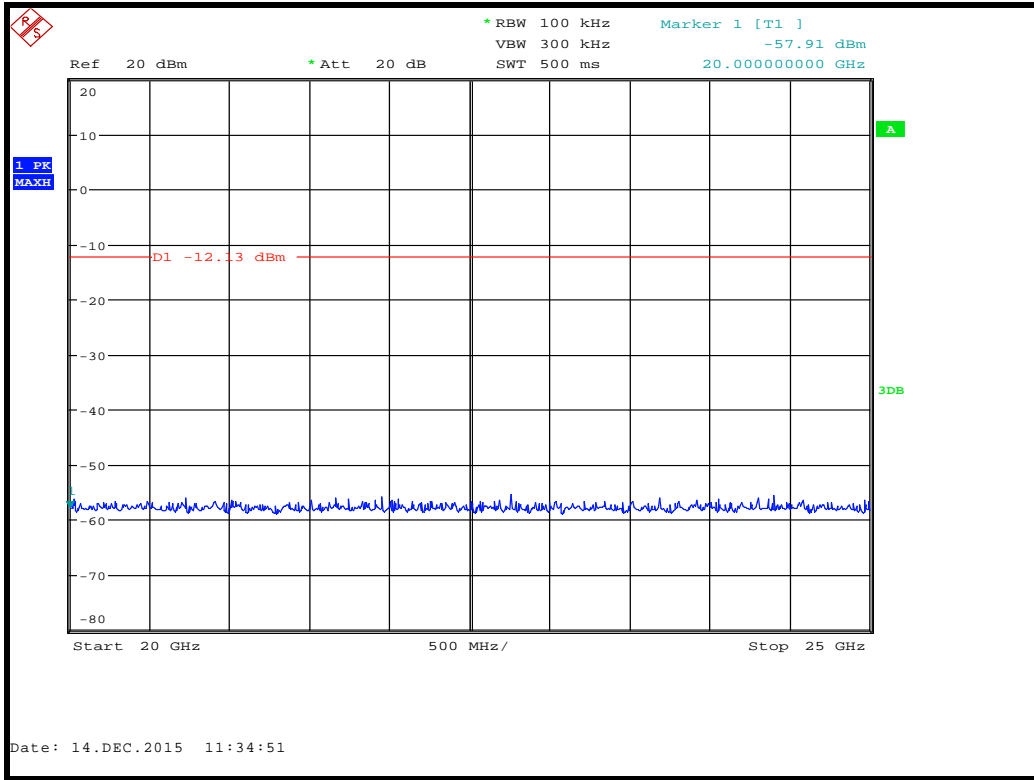




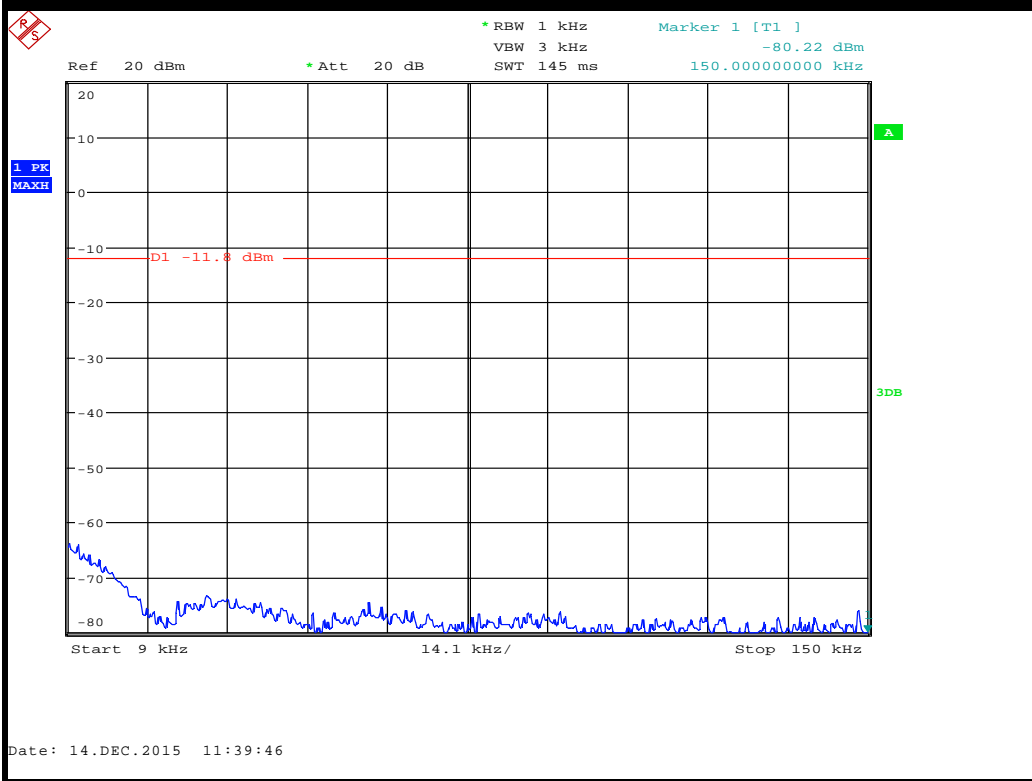
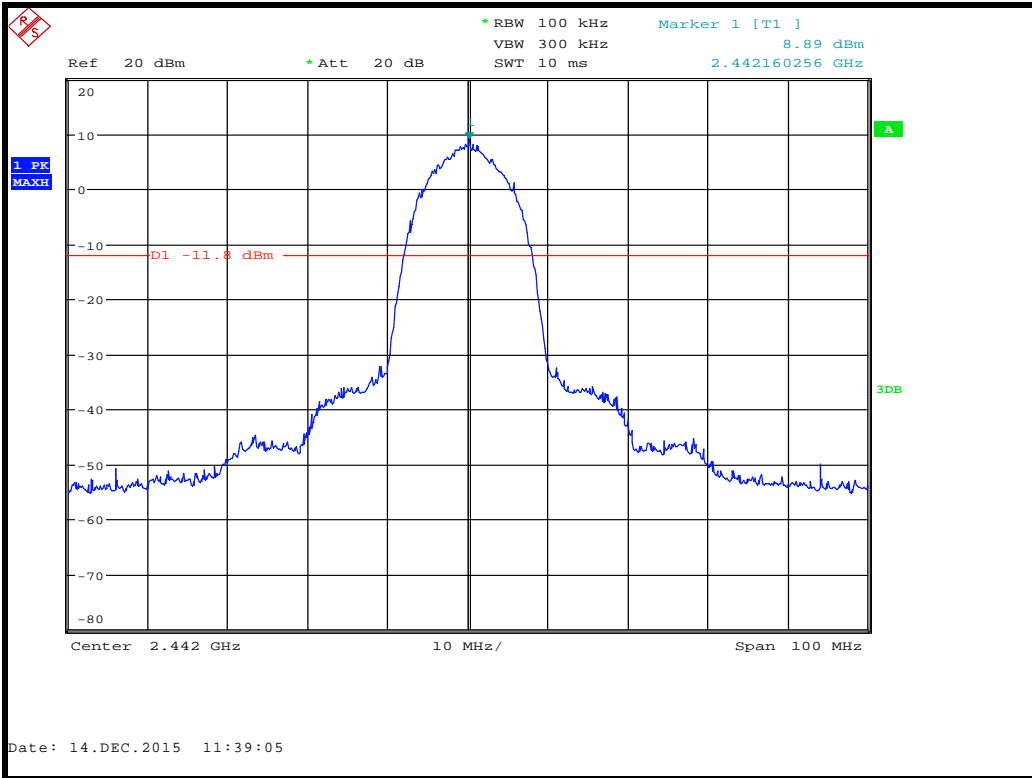


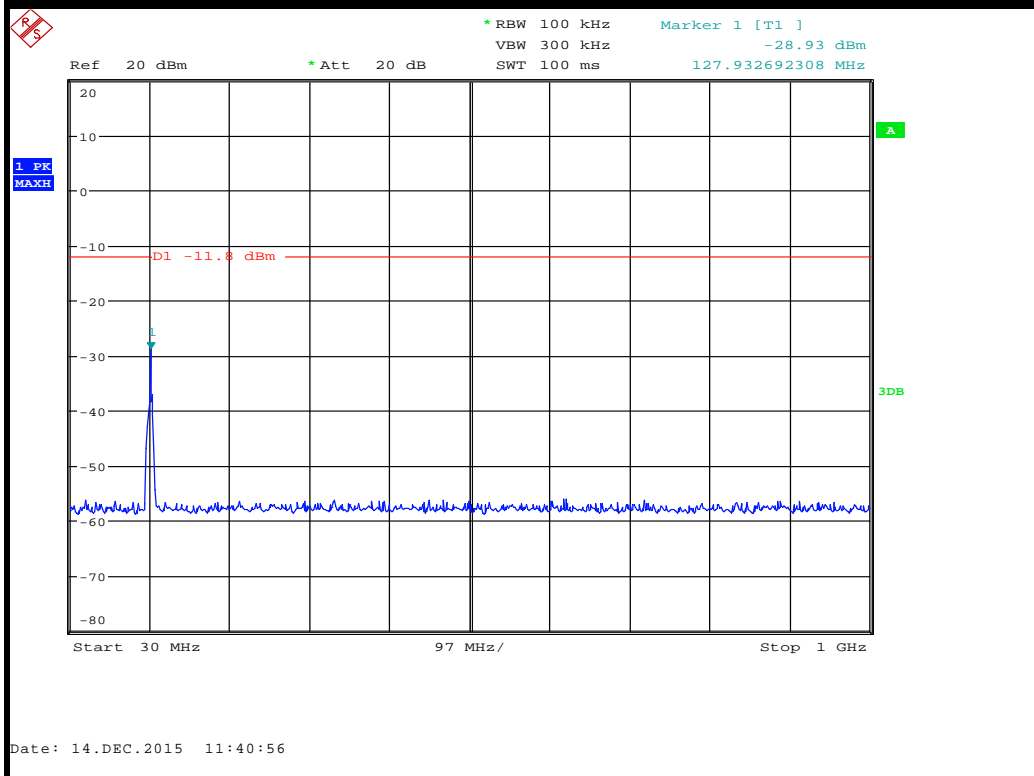
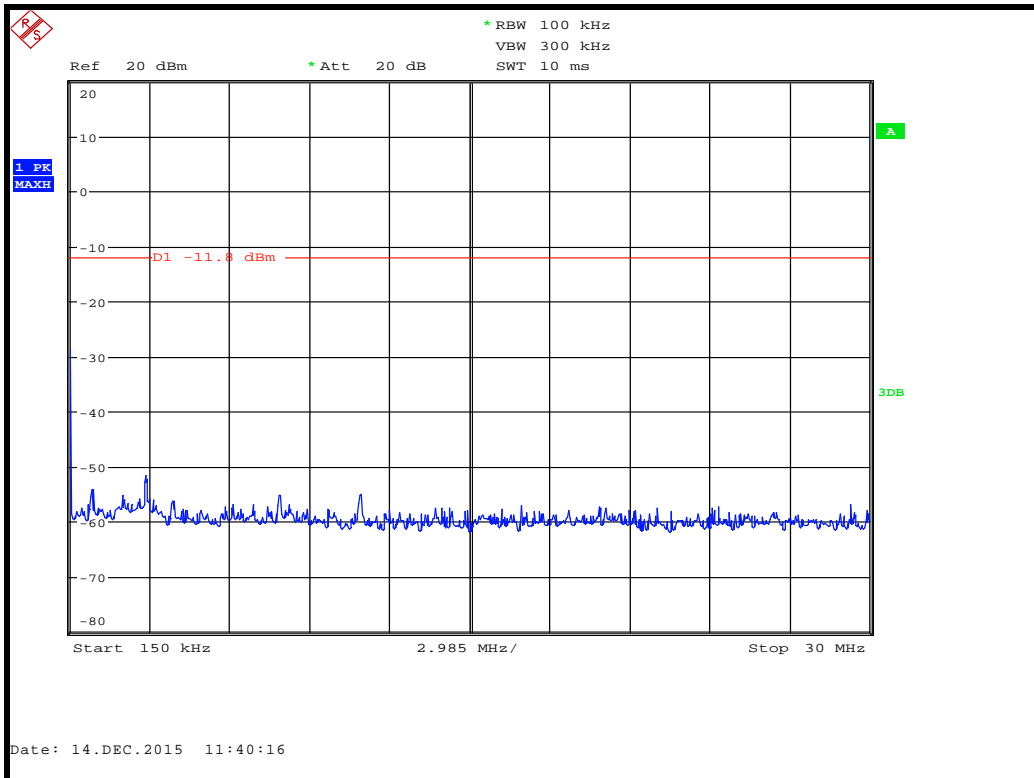


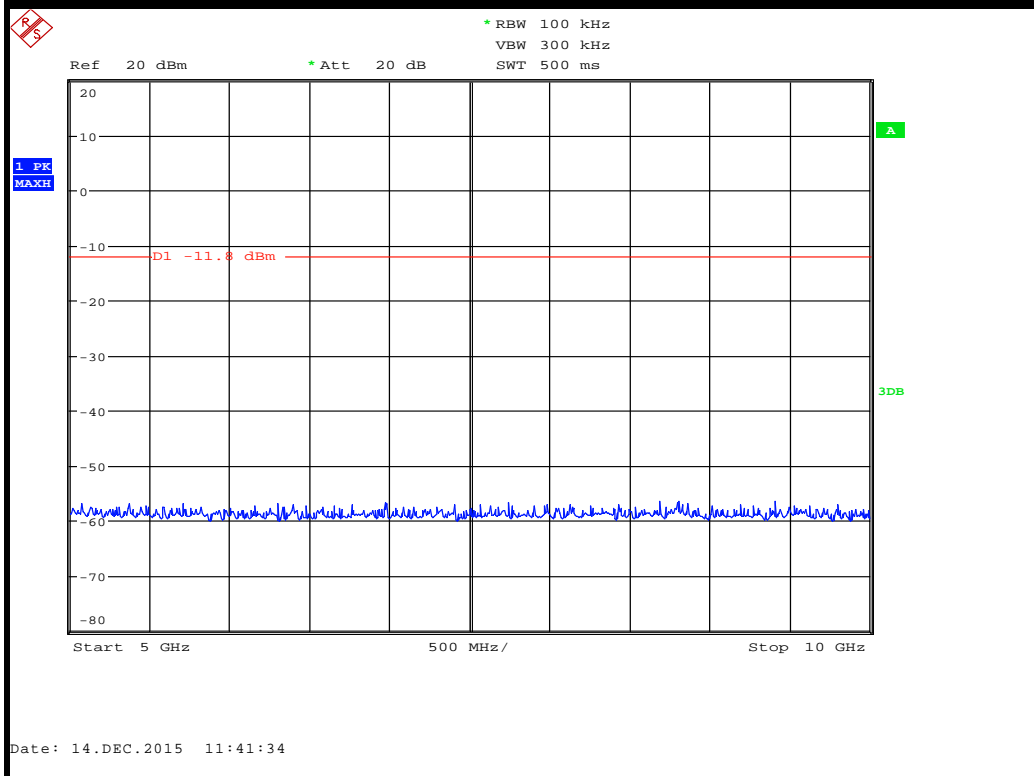
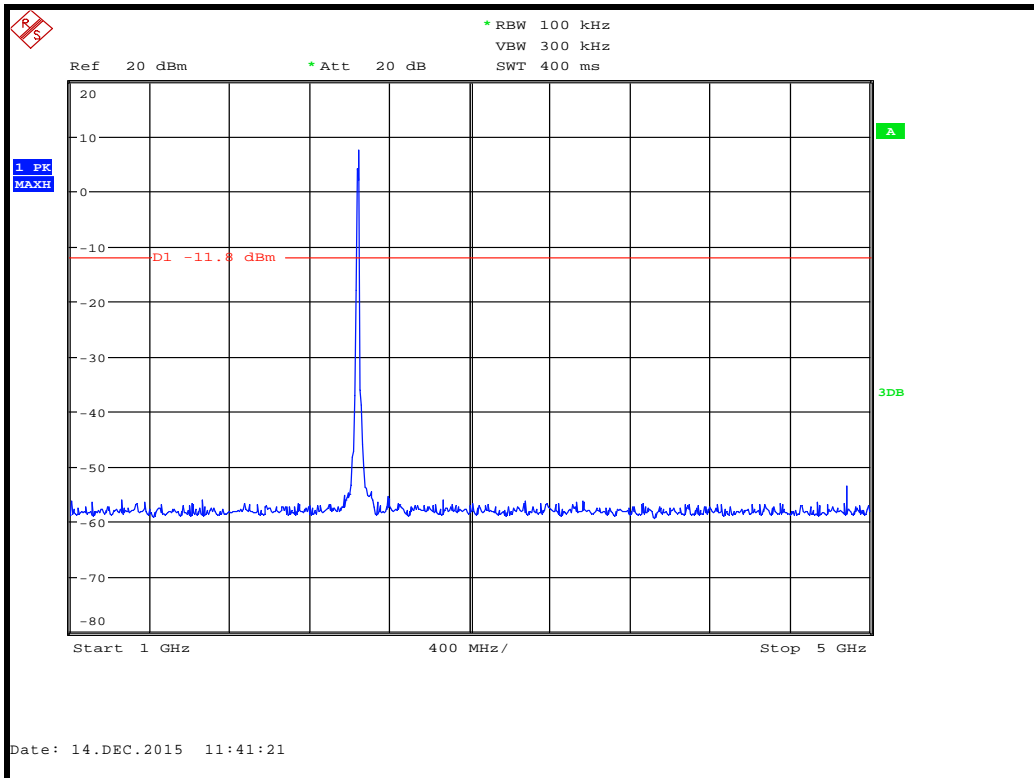


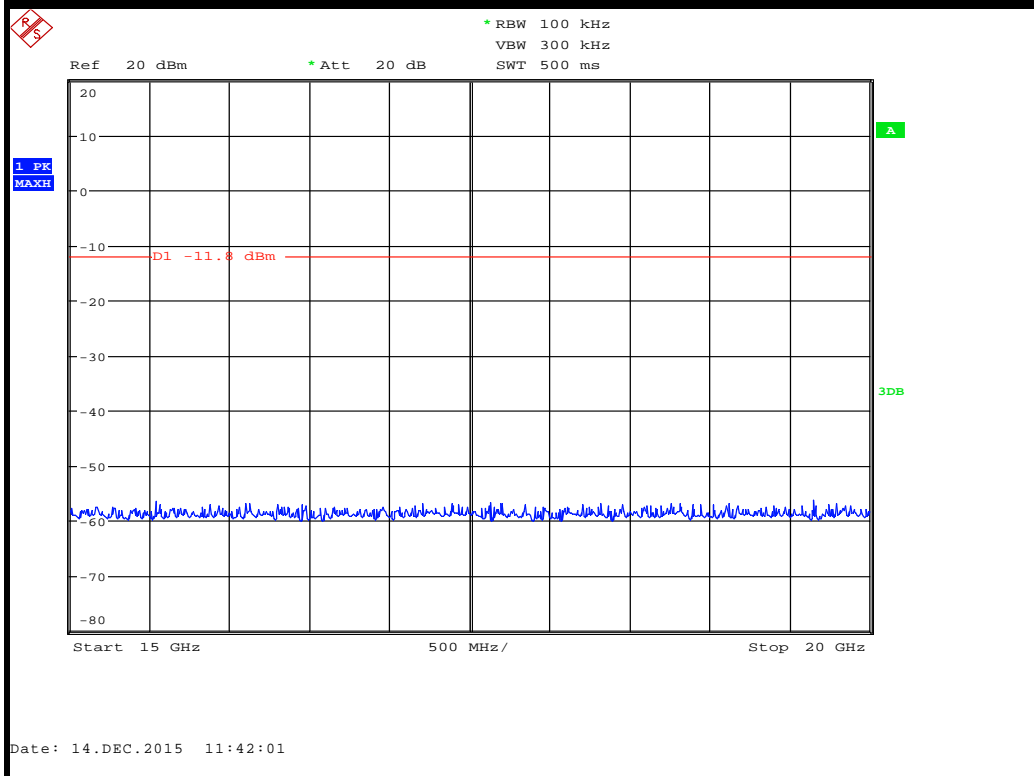
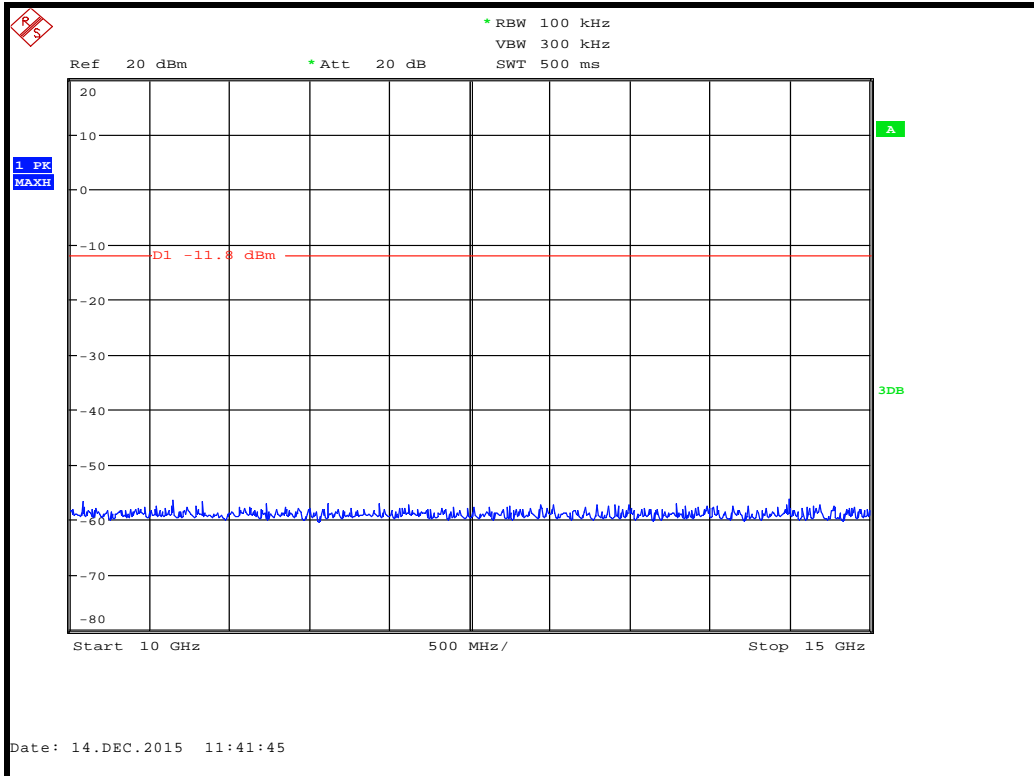


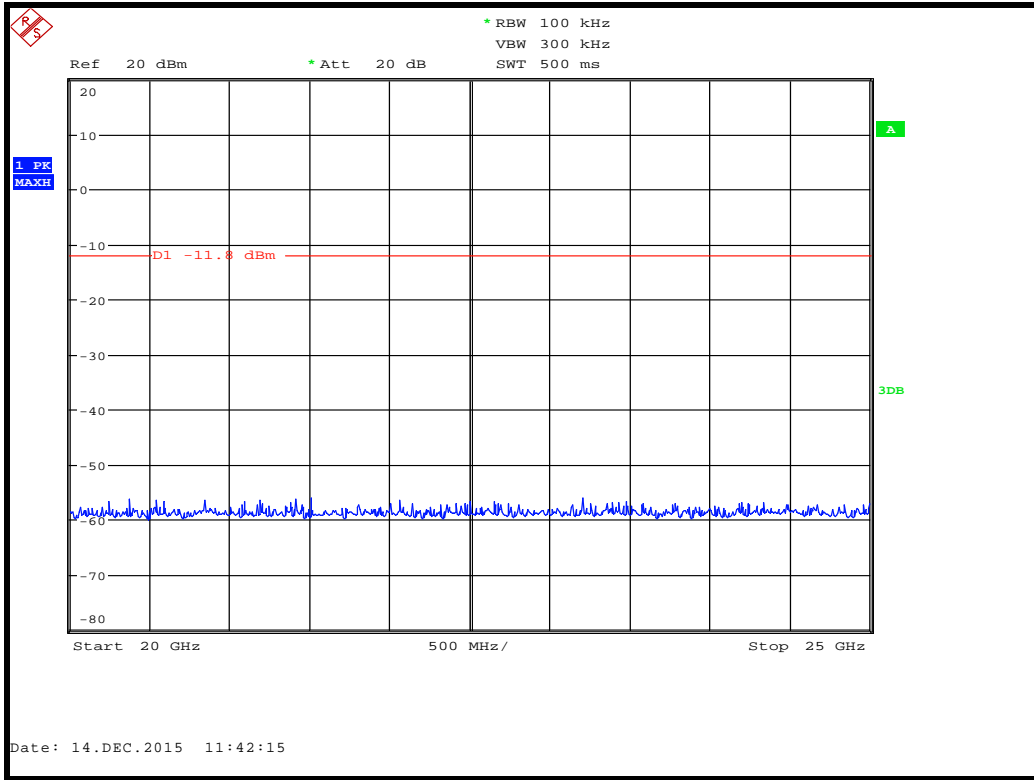
CH7





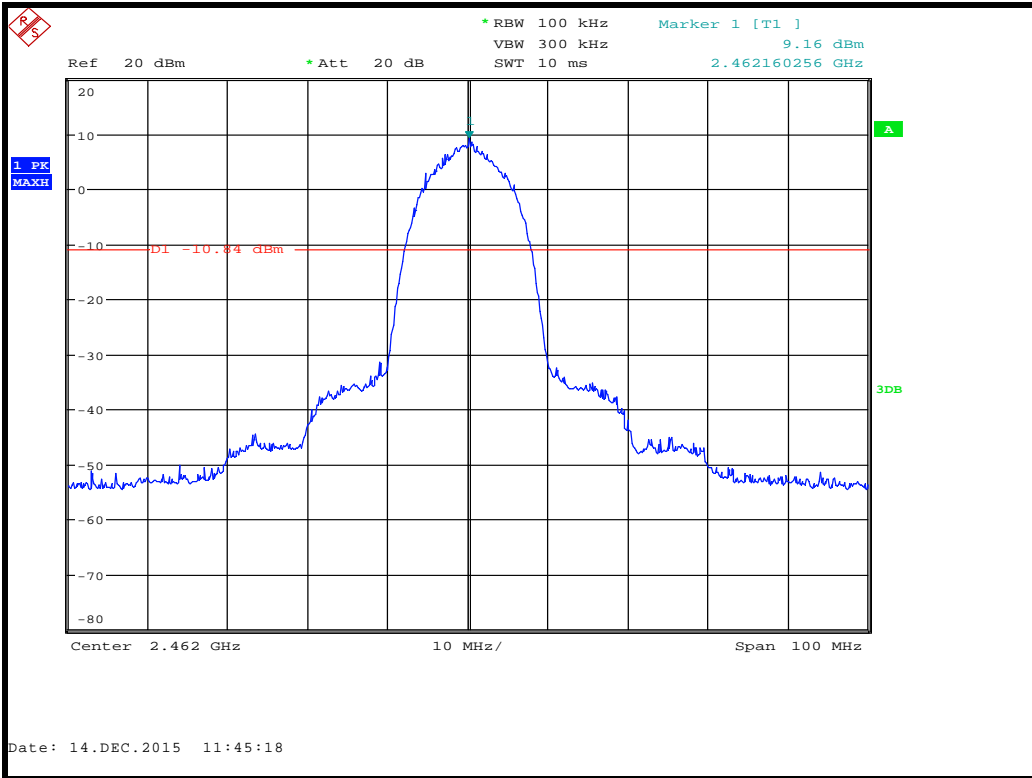


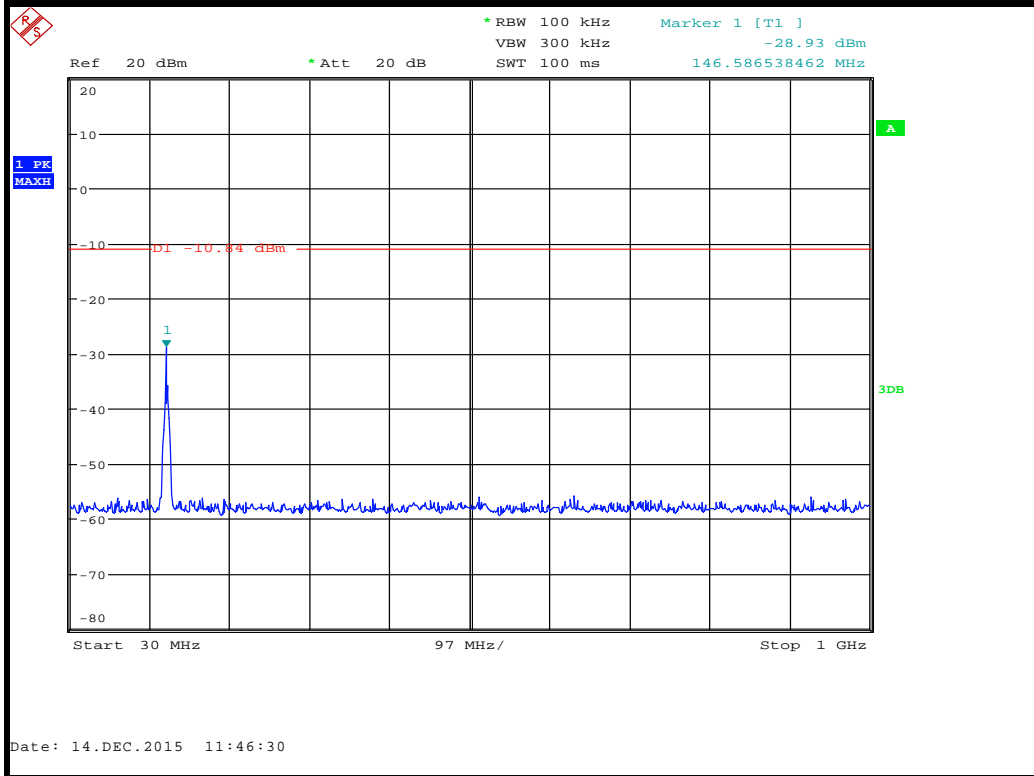
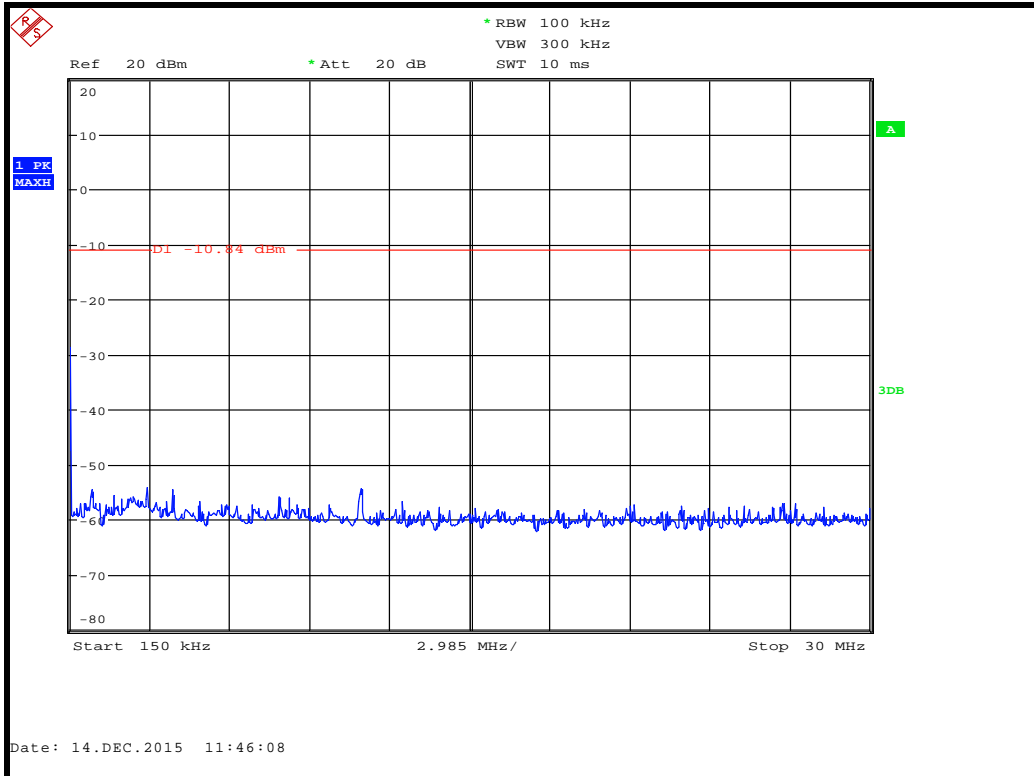


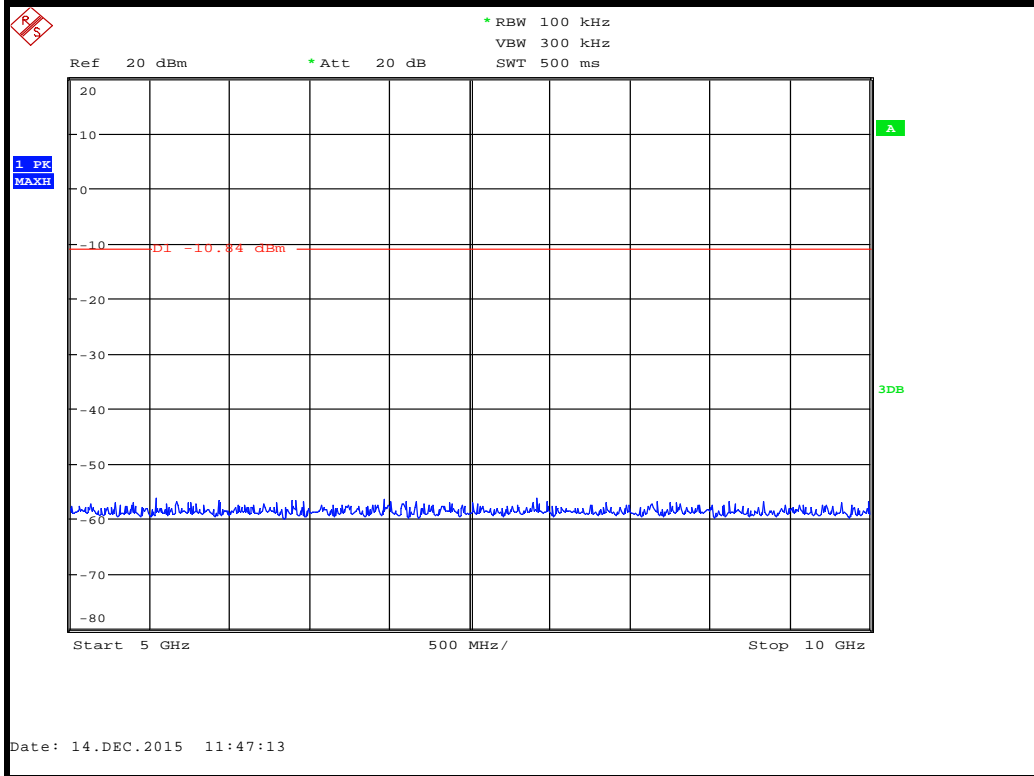
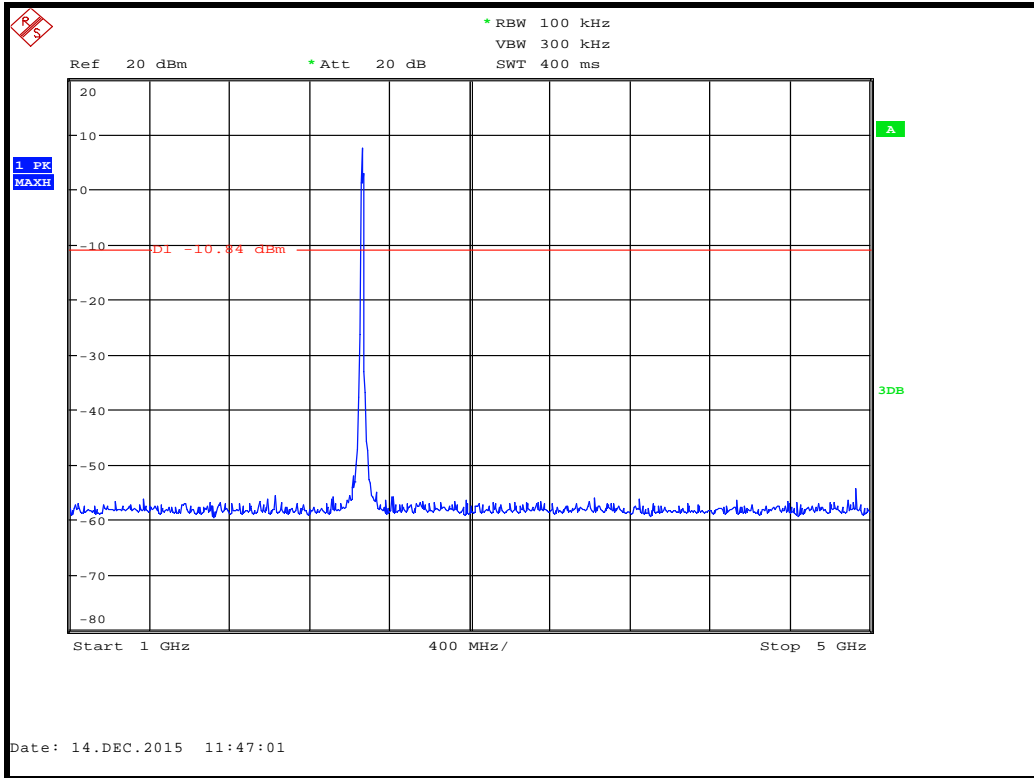


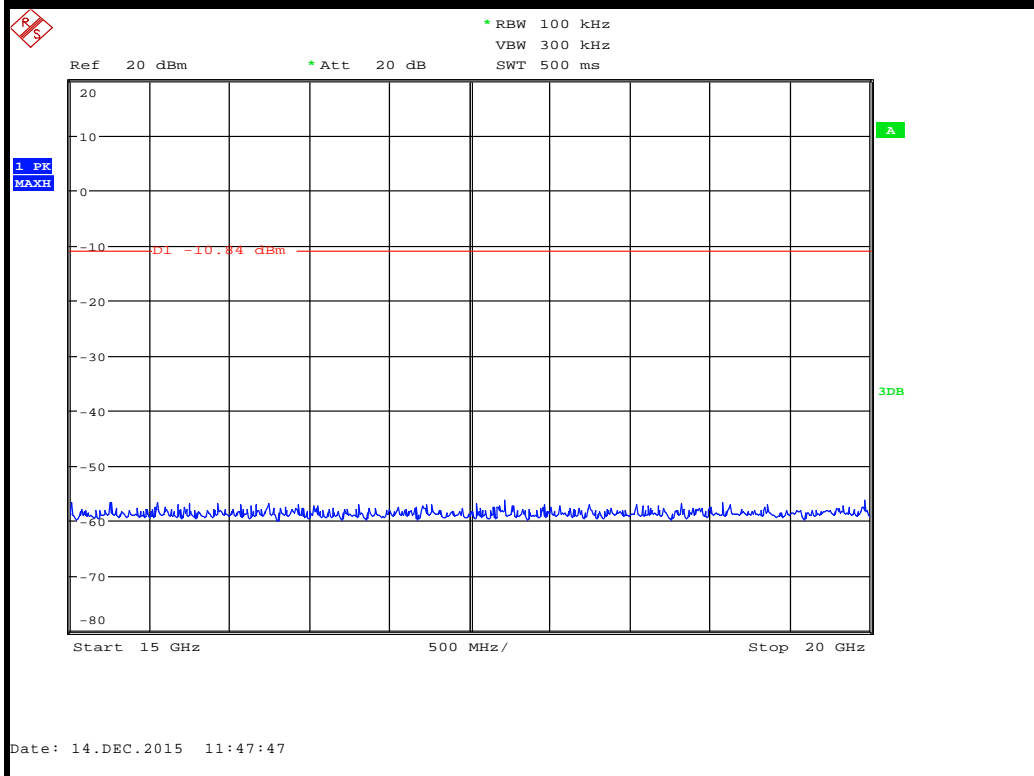
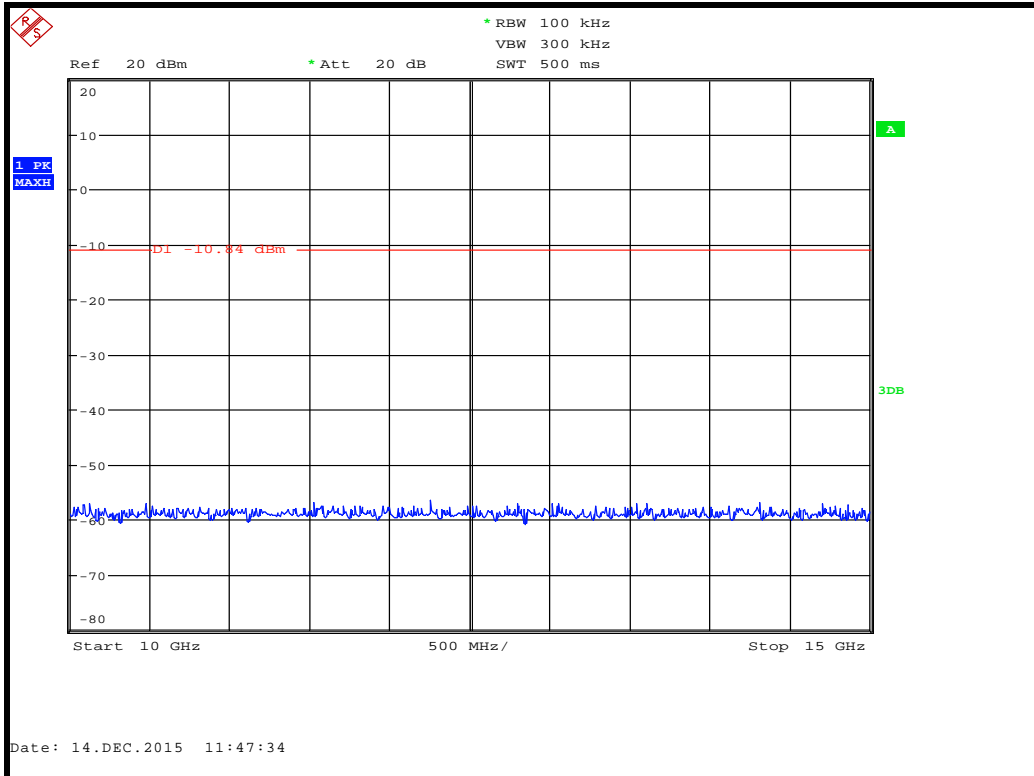


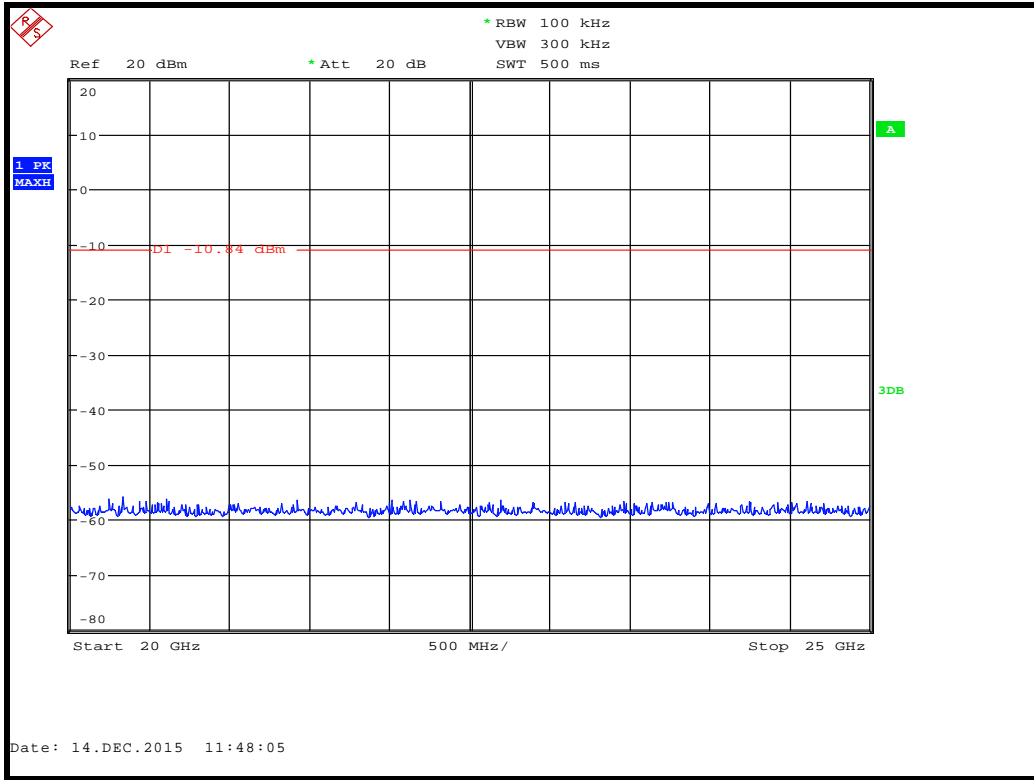
CH11





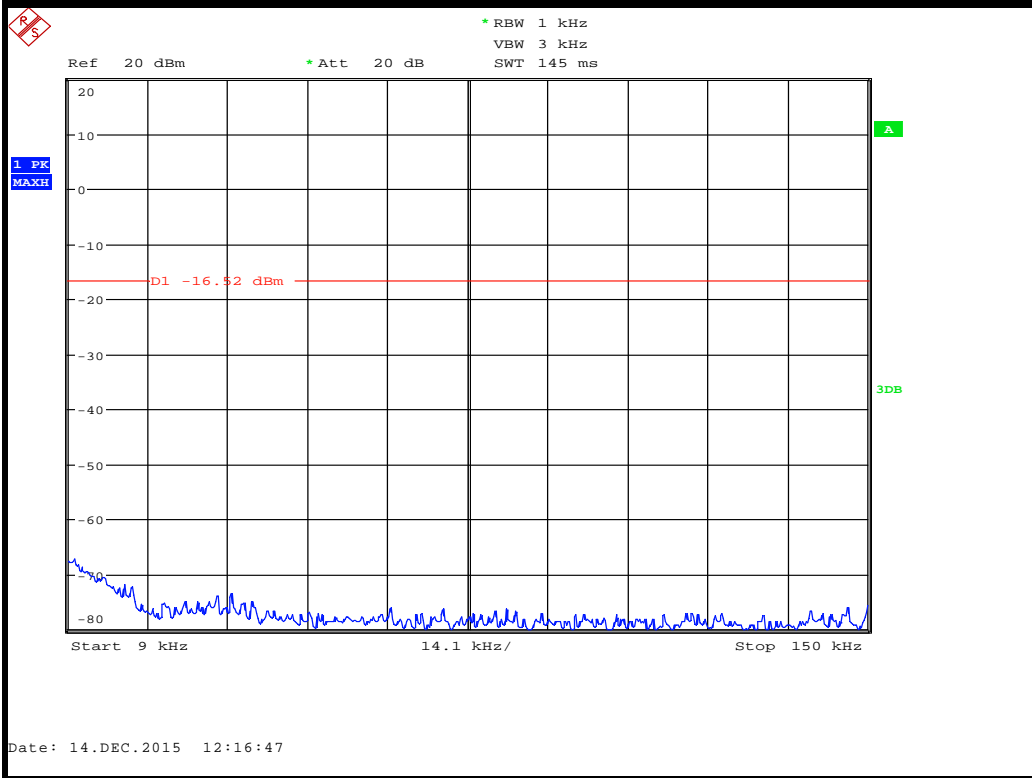
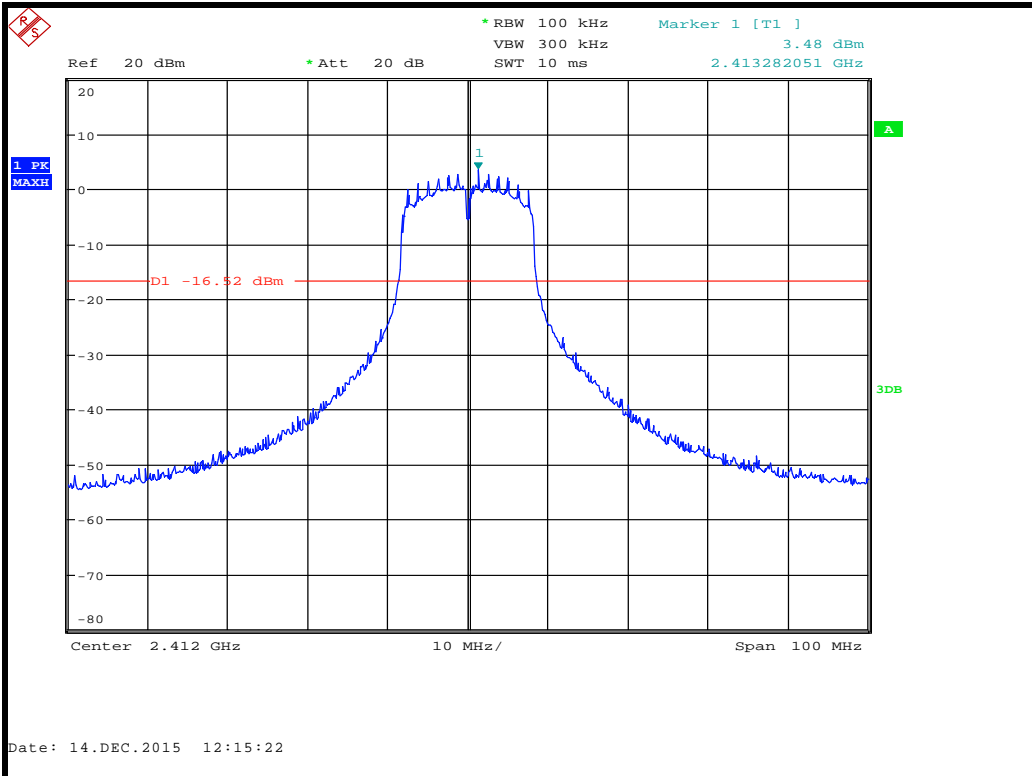


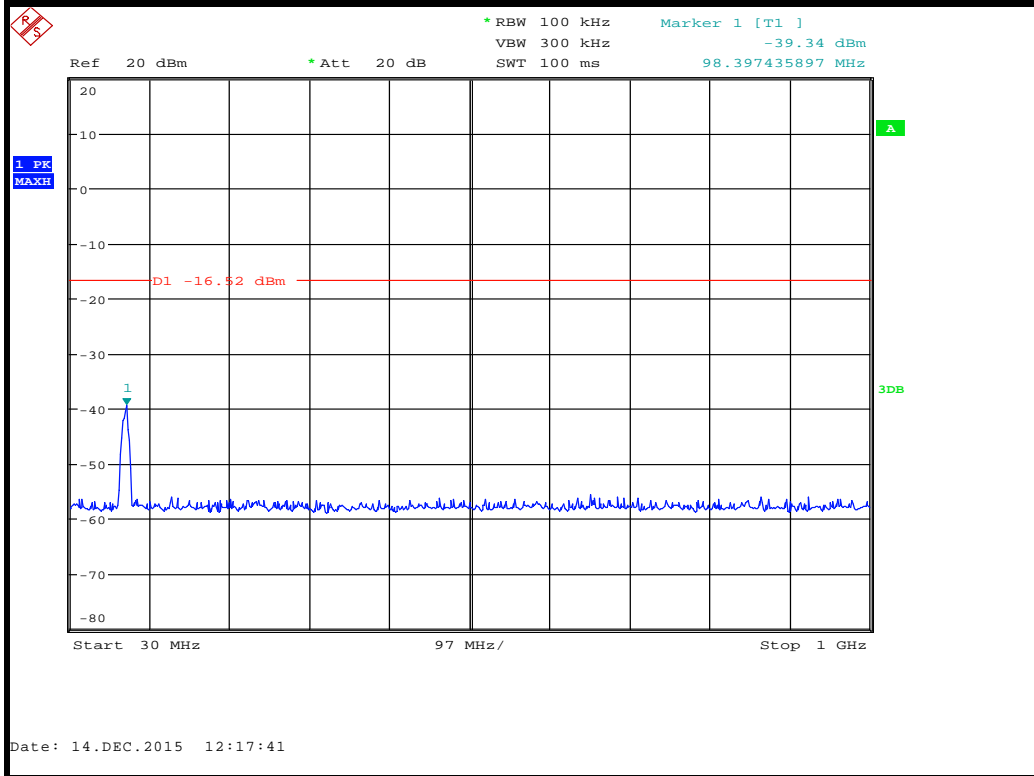
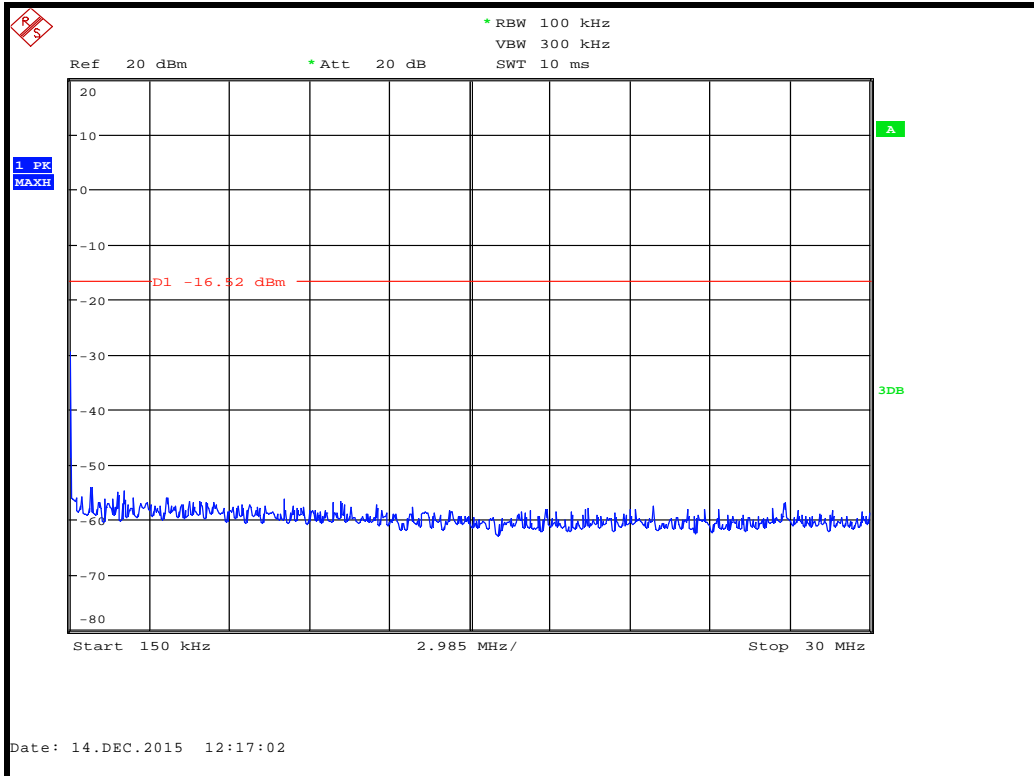




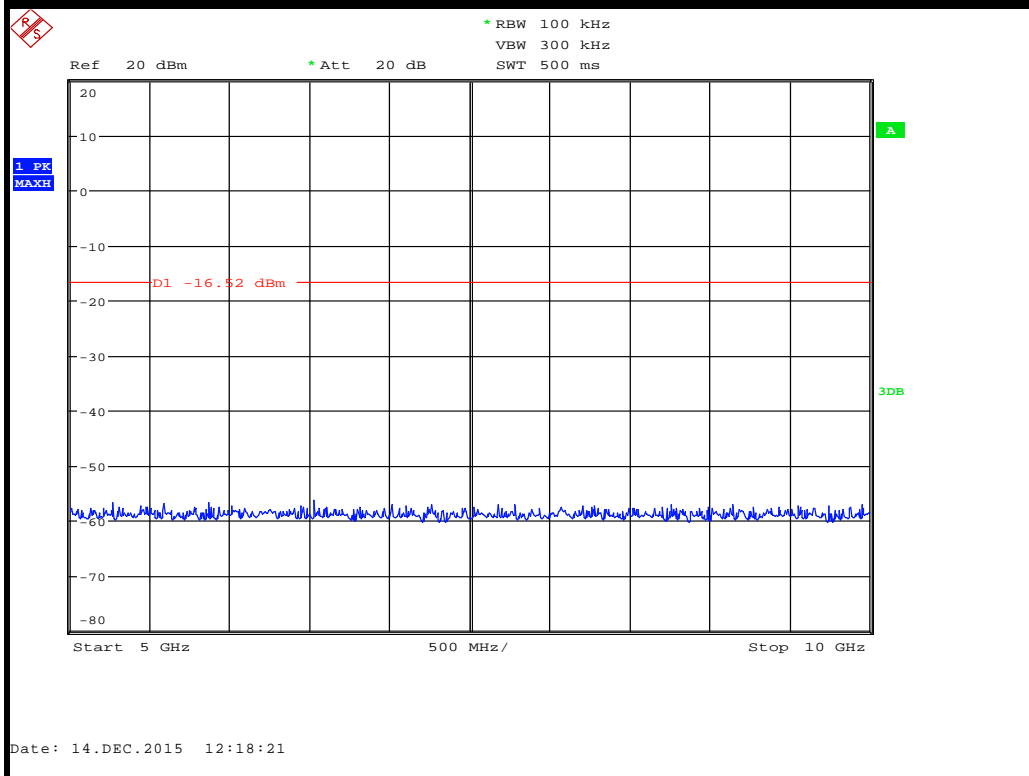
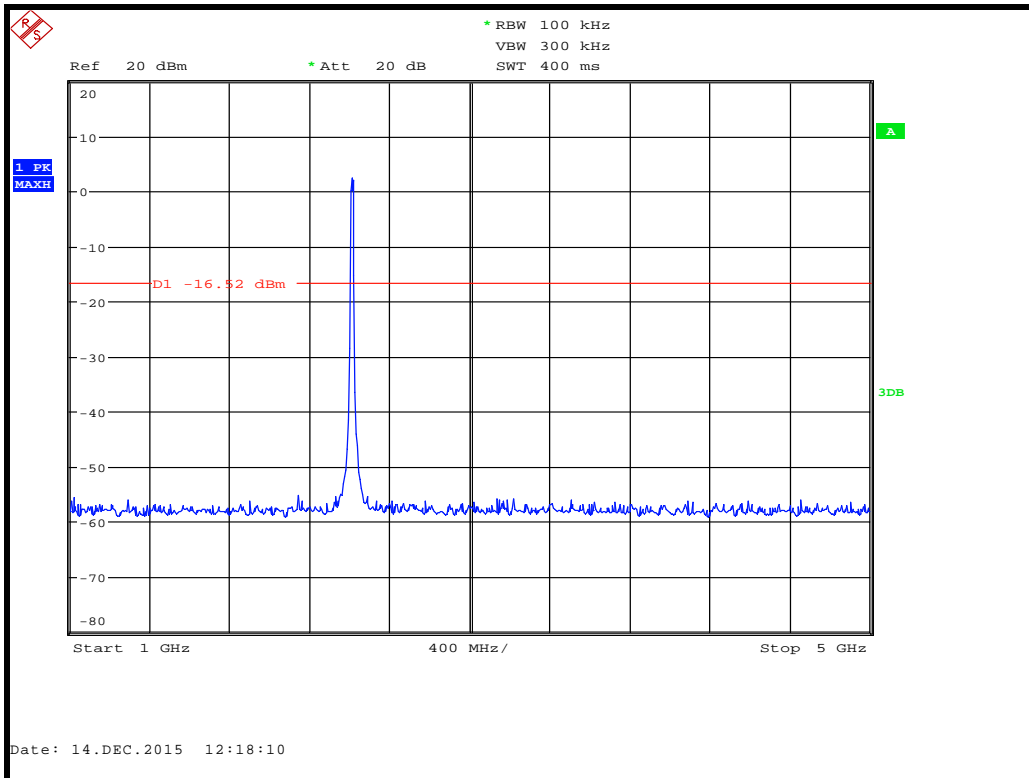
<b>Modulation: 802.11g; Data rate: 6Mbps; Power setting: Full</b>						
<b>Channel Frequency (MHz)</b>	<b>Emission Frequency (MHz)</b>	<b>Analyzer Level (dBm)</b>	<b>Emission Level (dBm)</b>	<b>Limit (dBm)</b>	<b>Margin (dB)</b>	<b>Result</b>
All emissions were a minimum of 20 dB below the test limit						

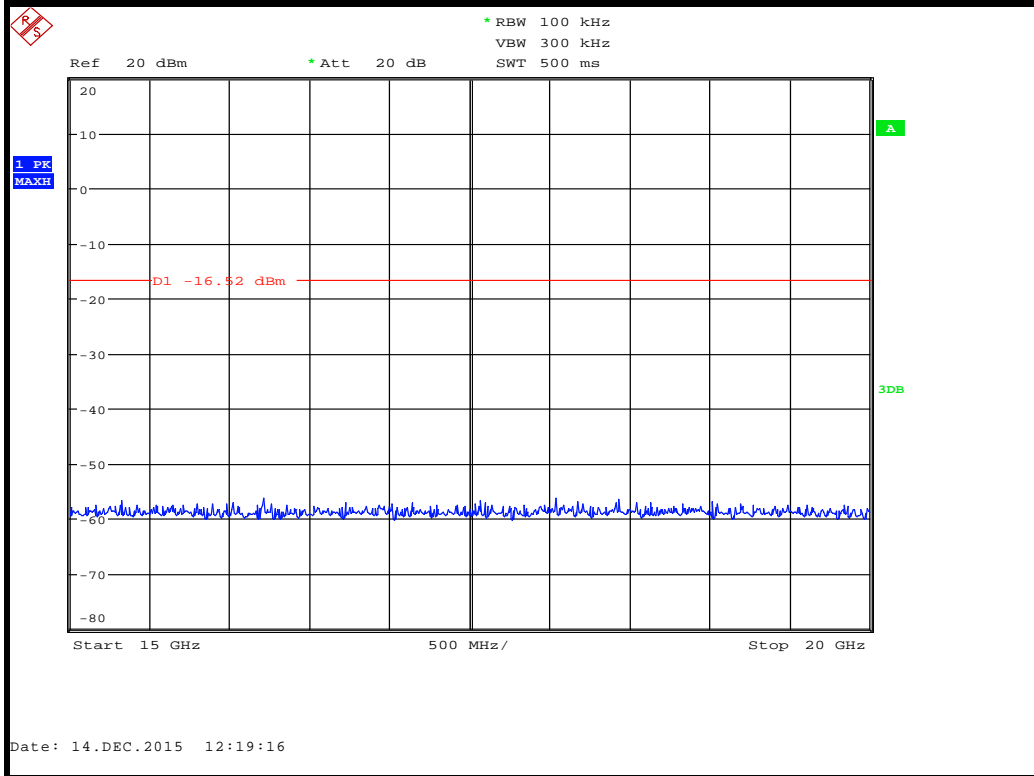
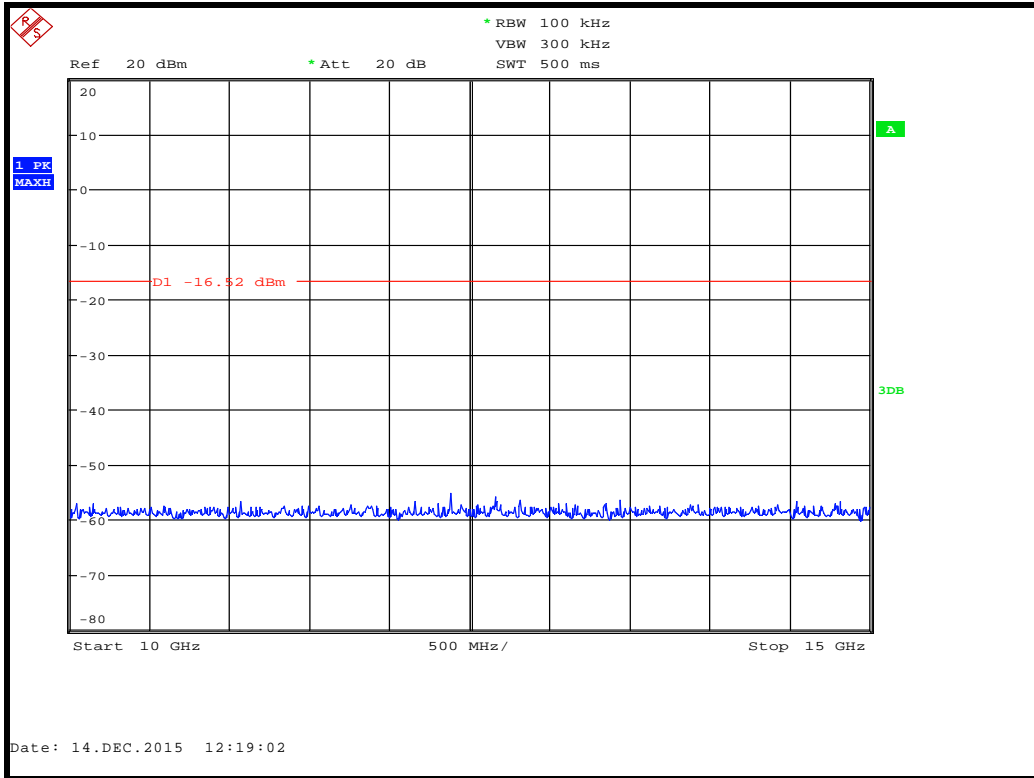
CH1

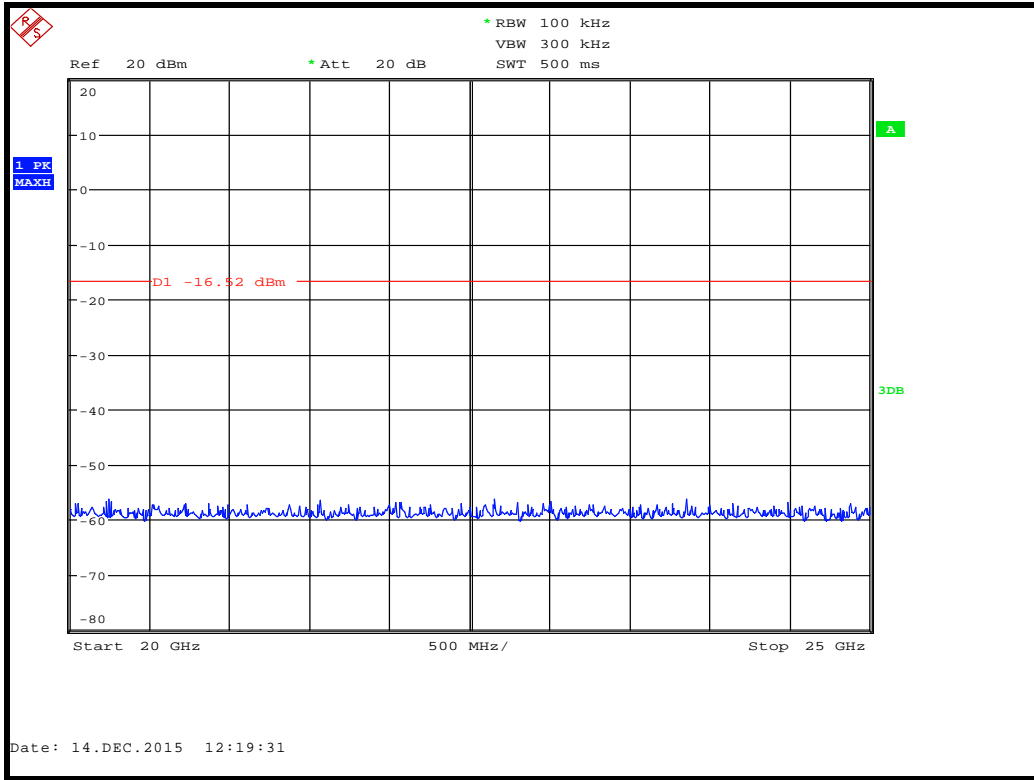




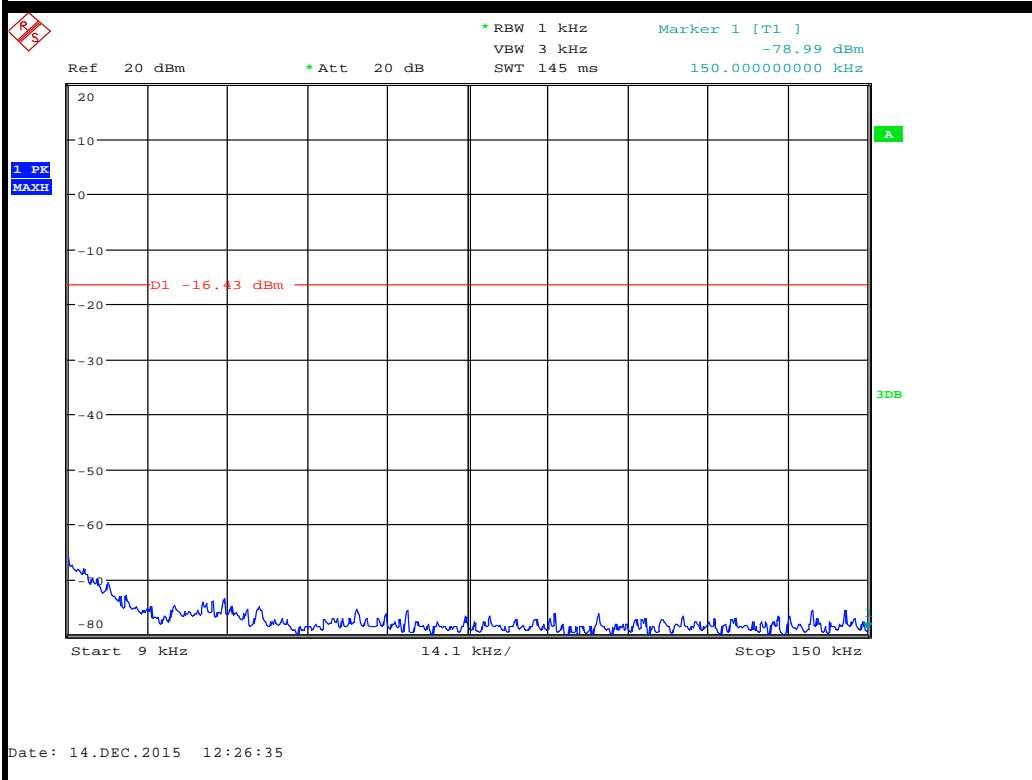
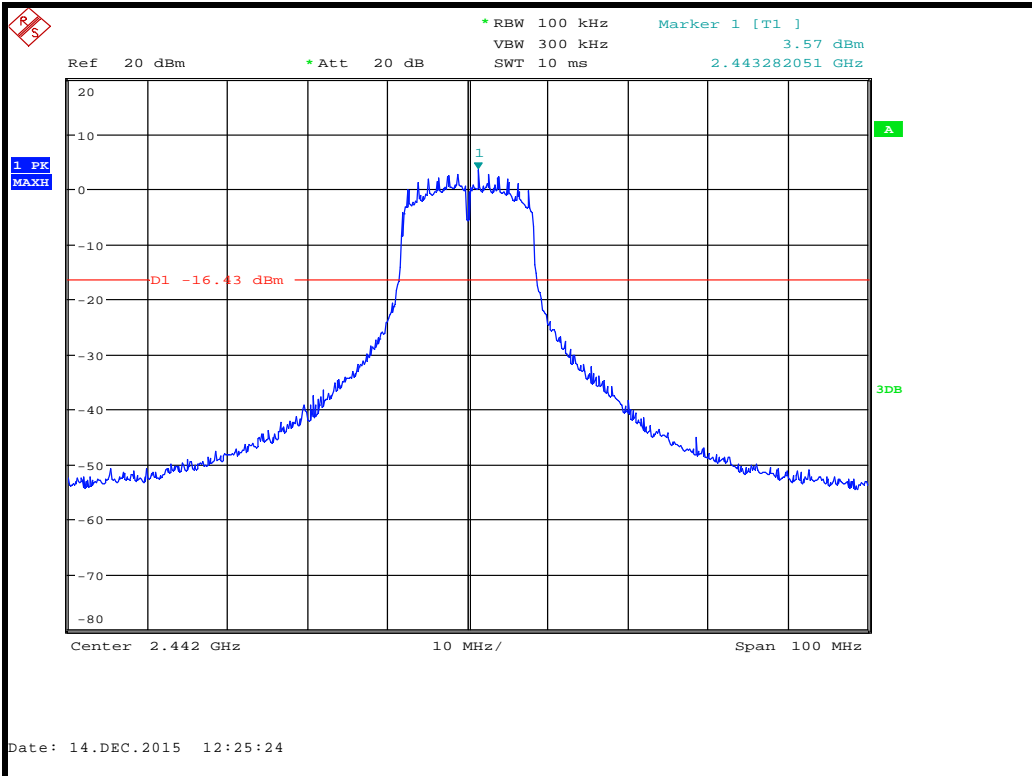


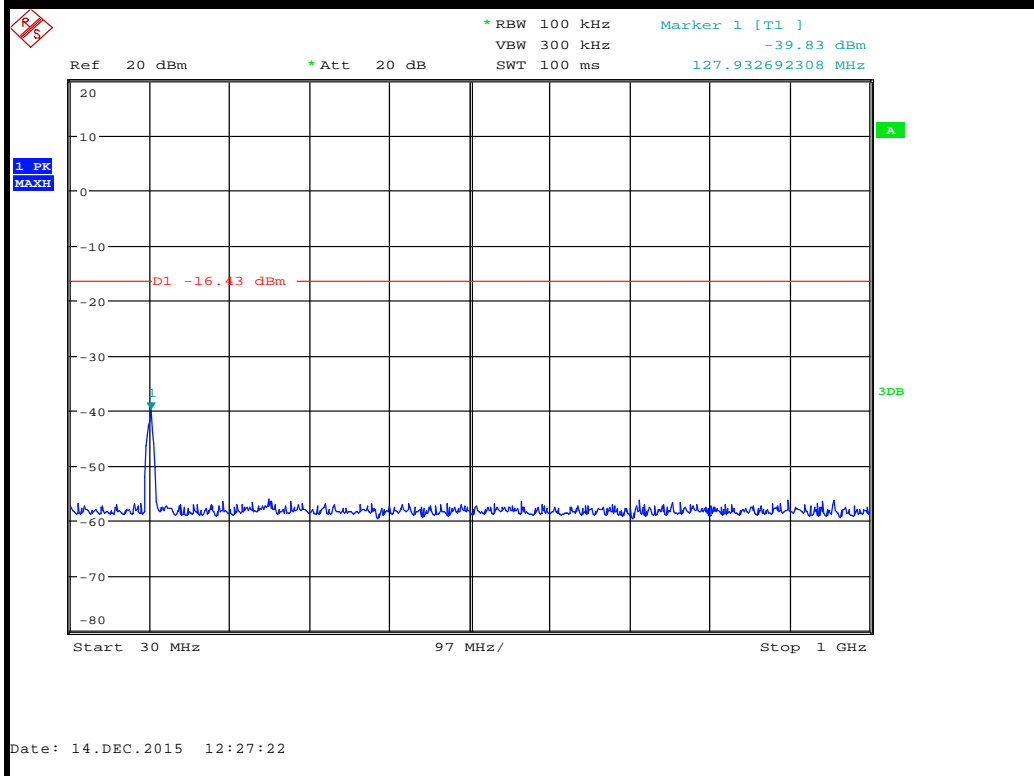
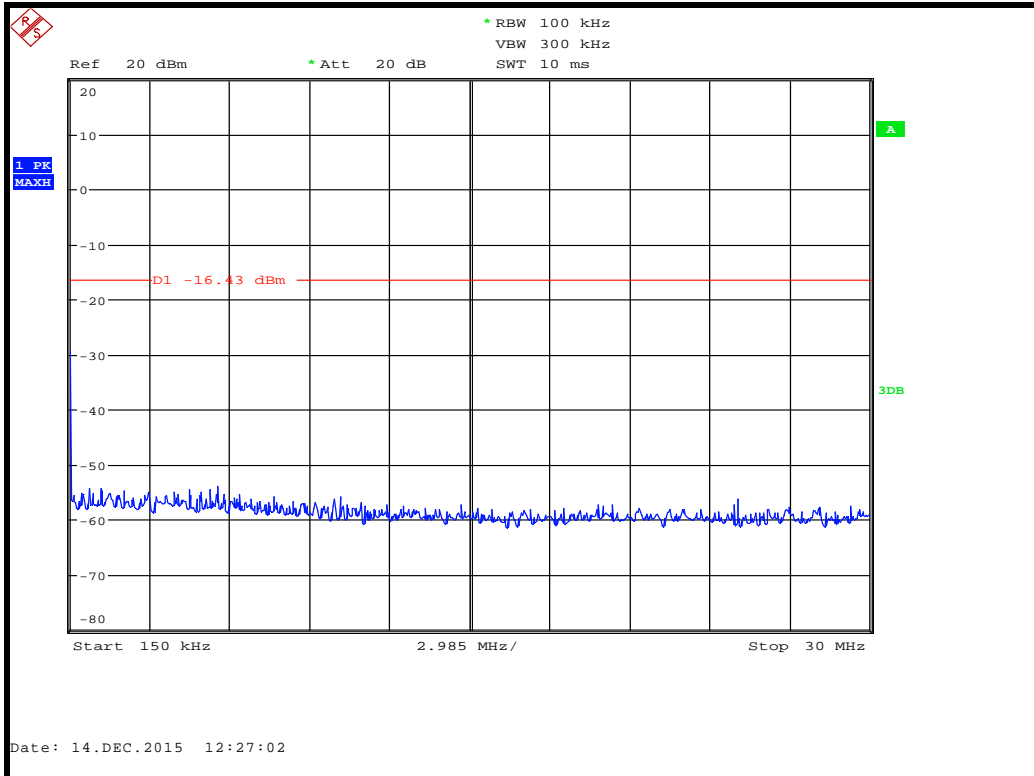


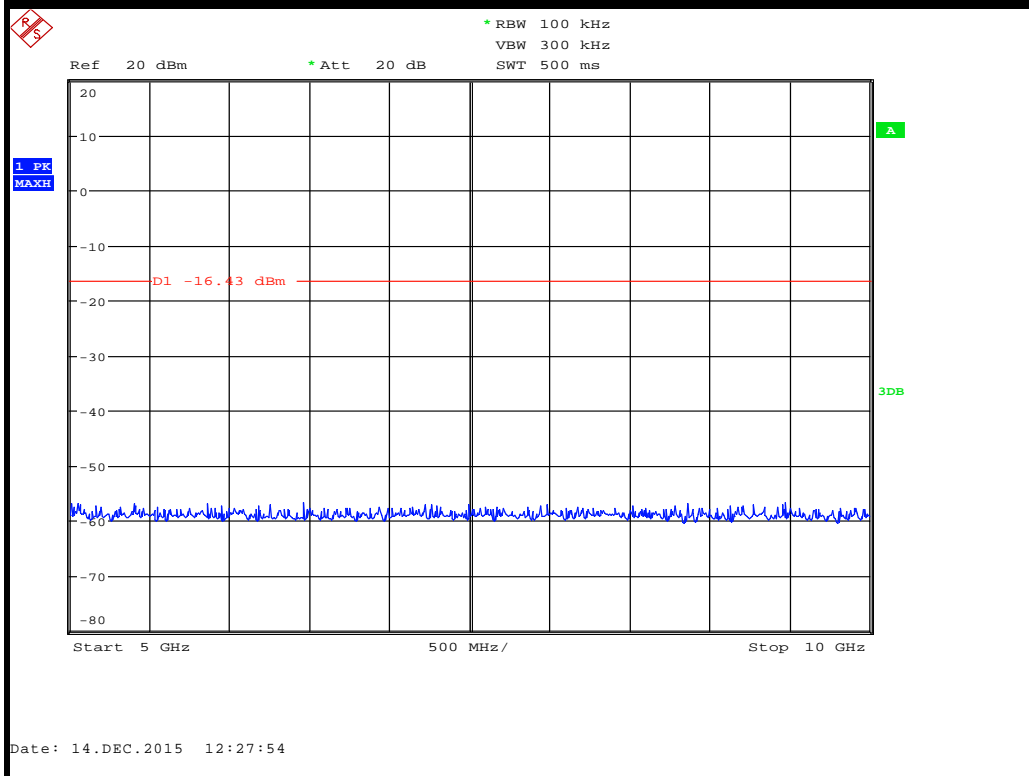
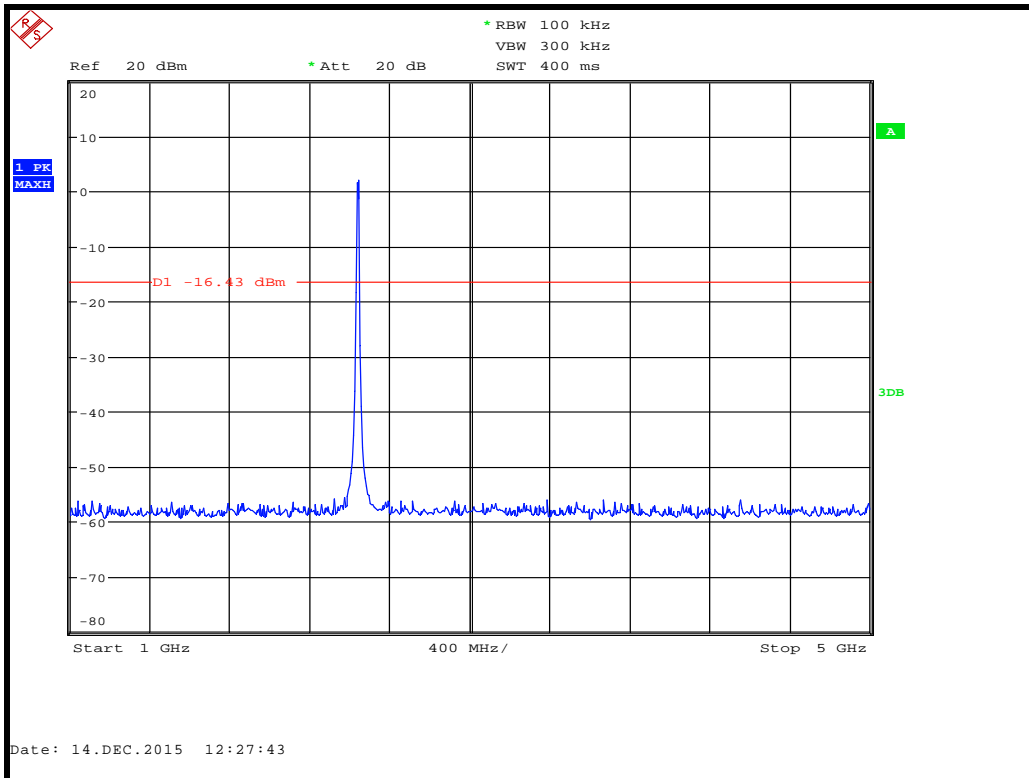


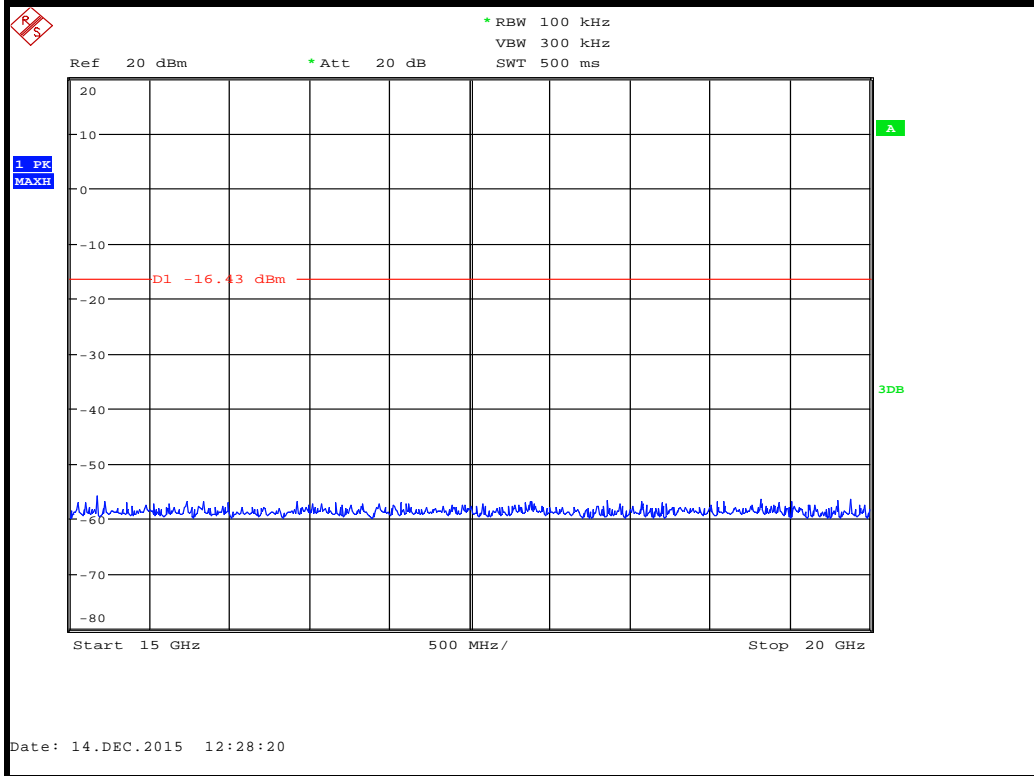
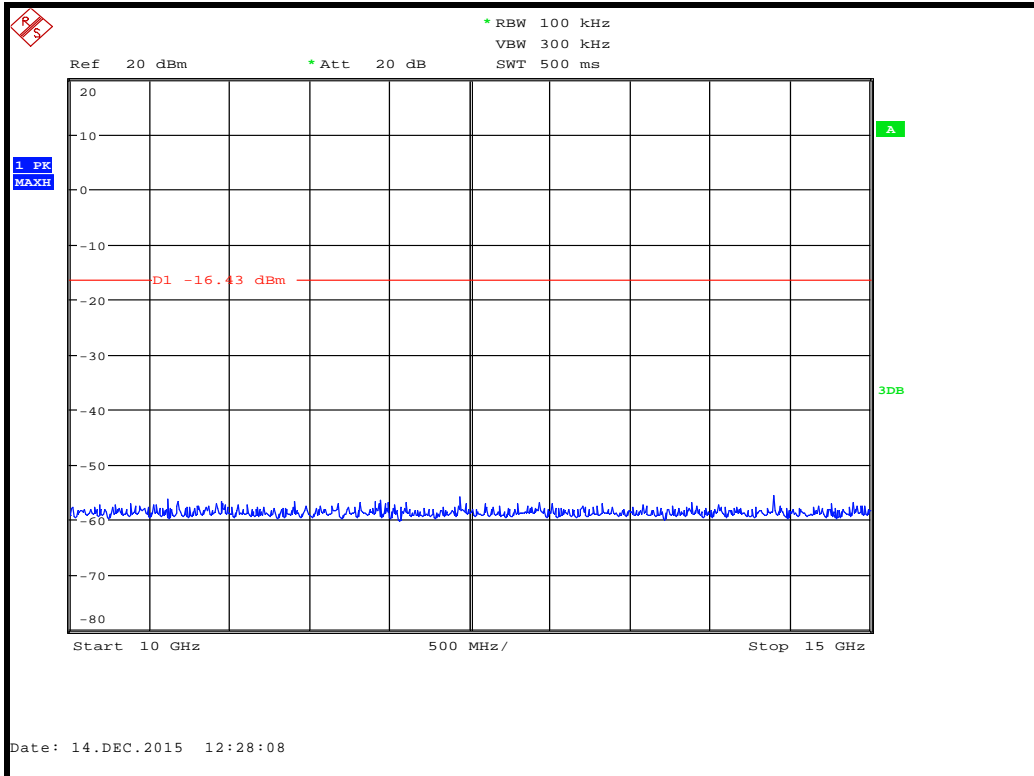


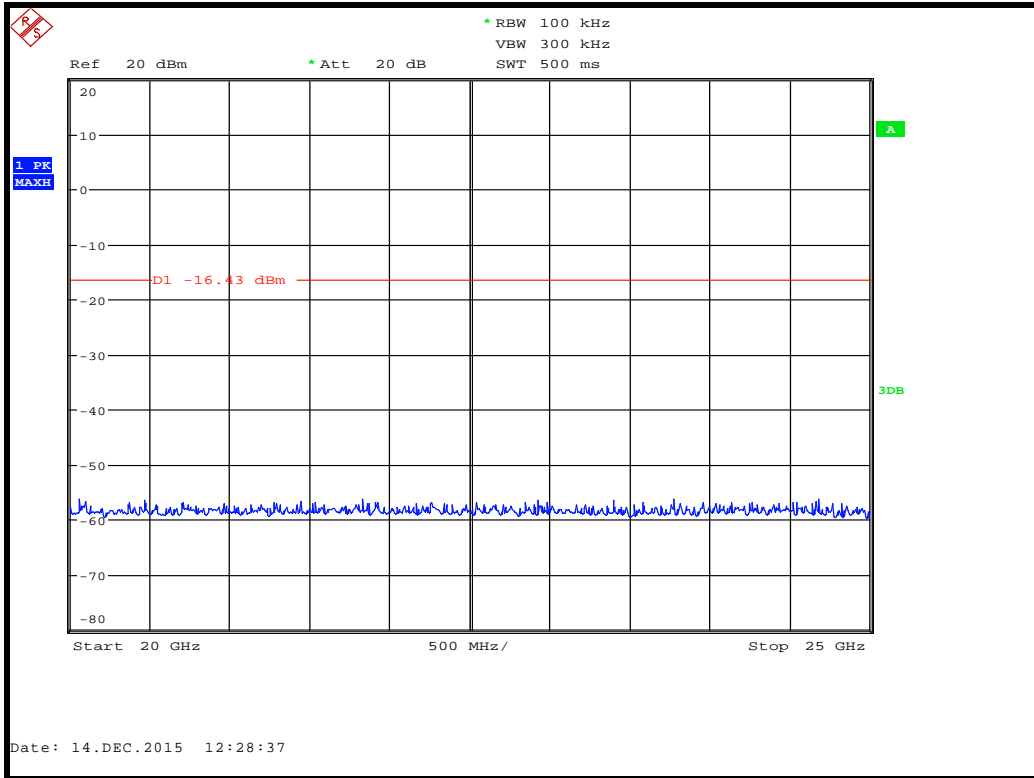
CH7





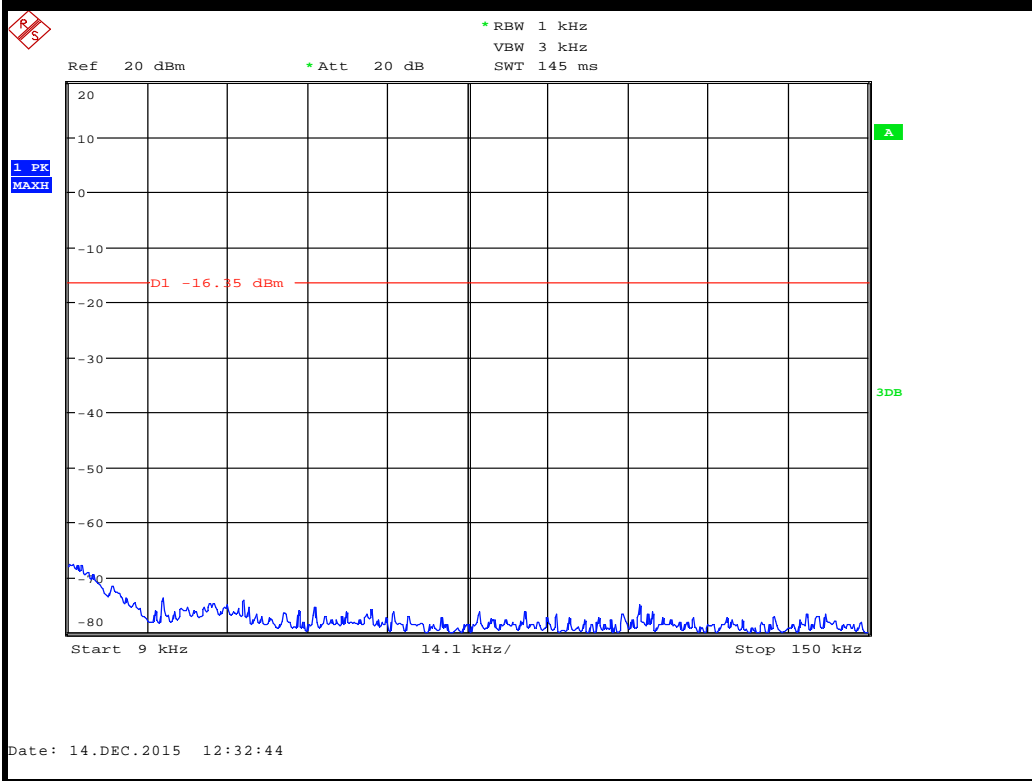
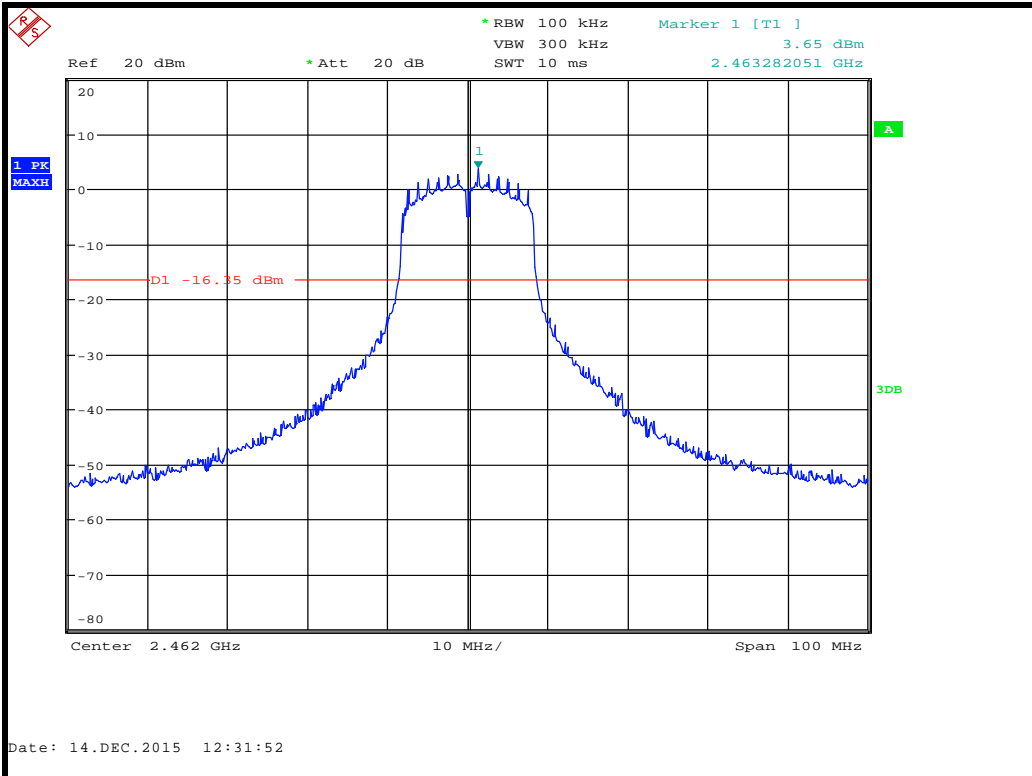


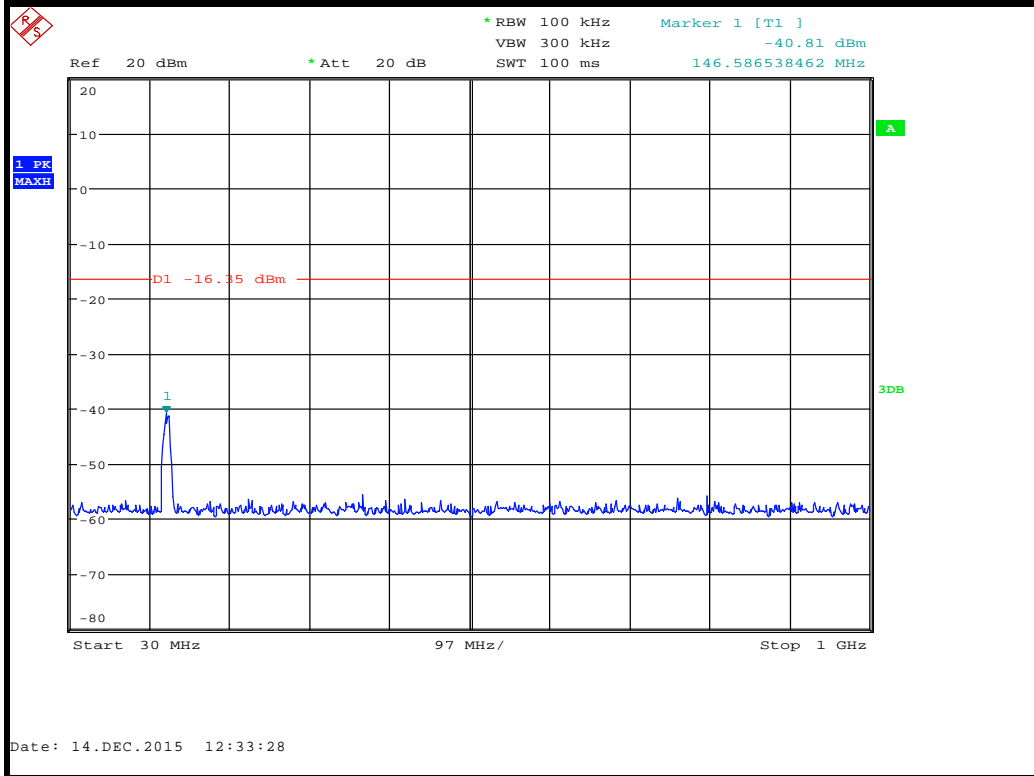
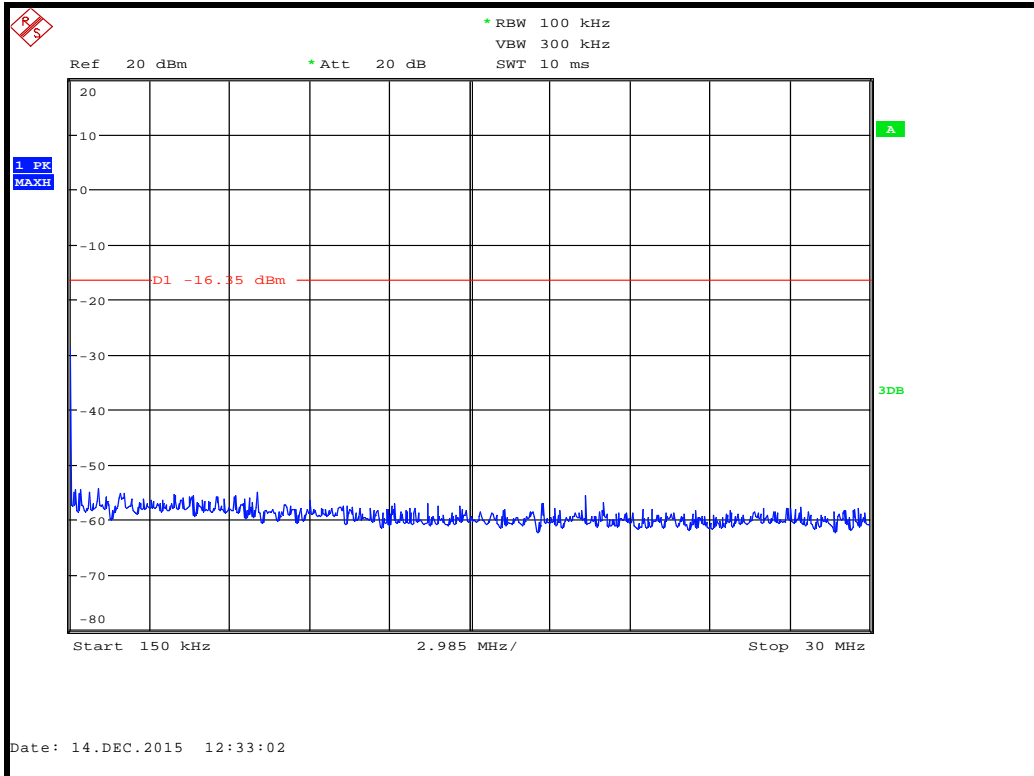


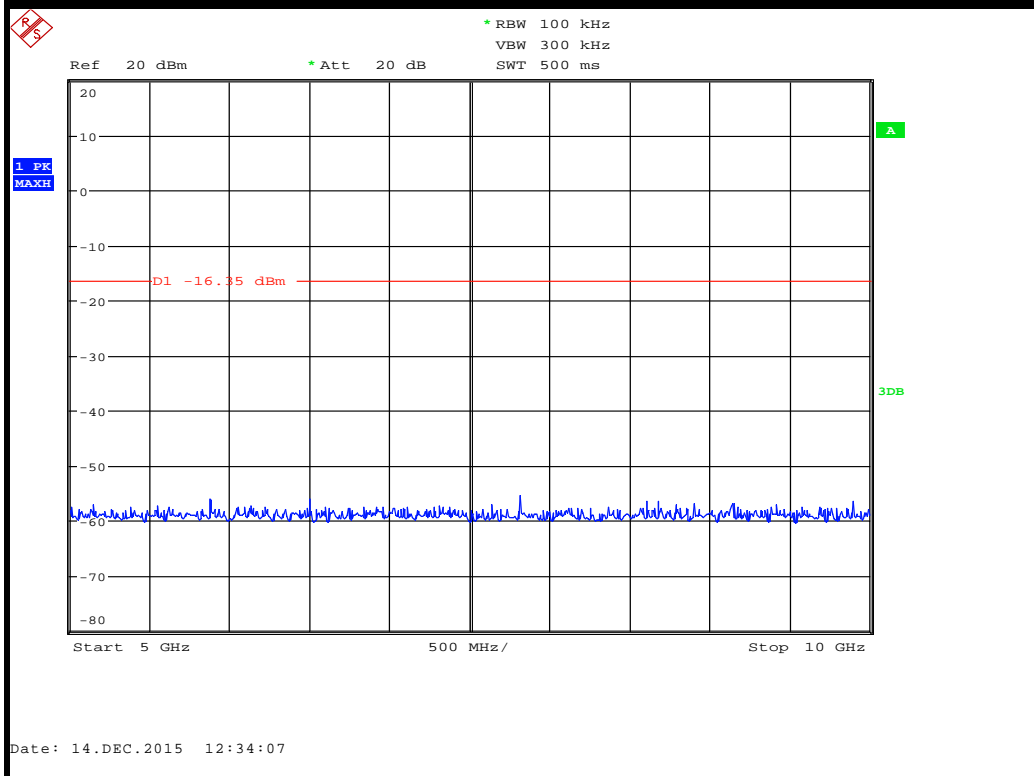
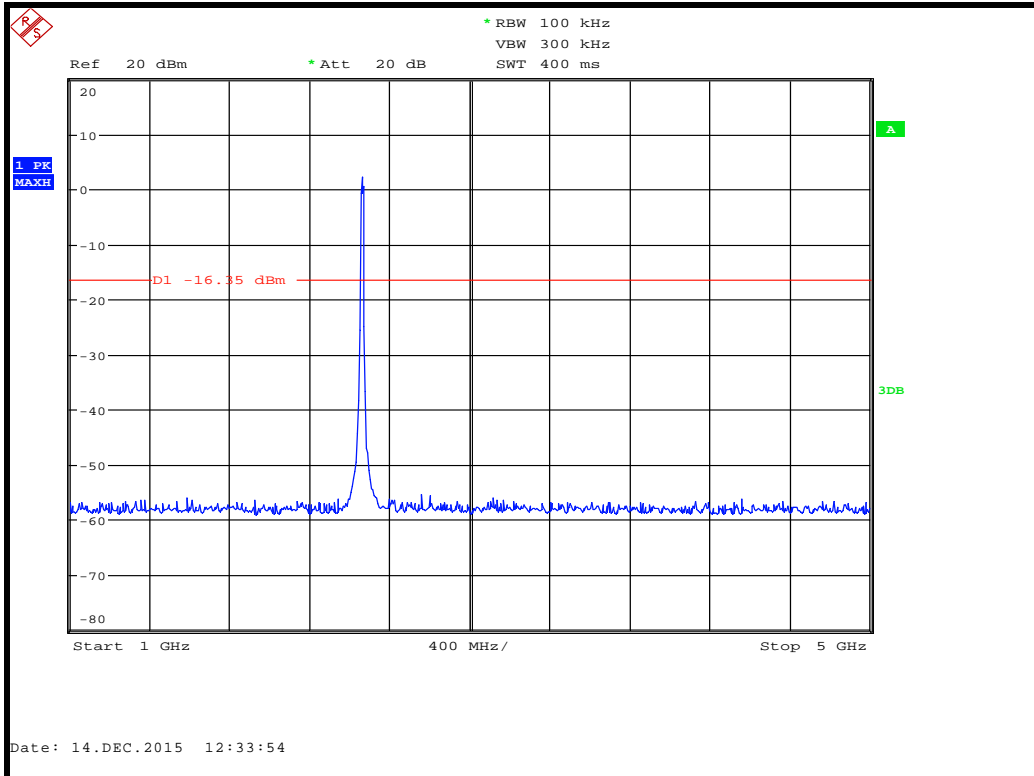


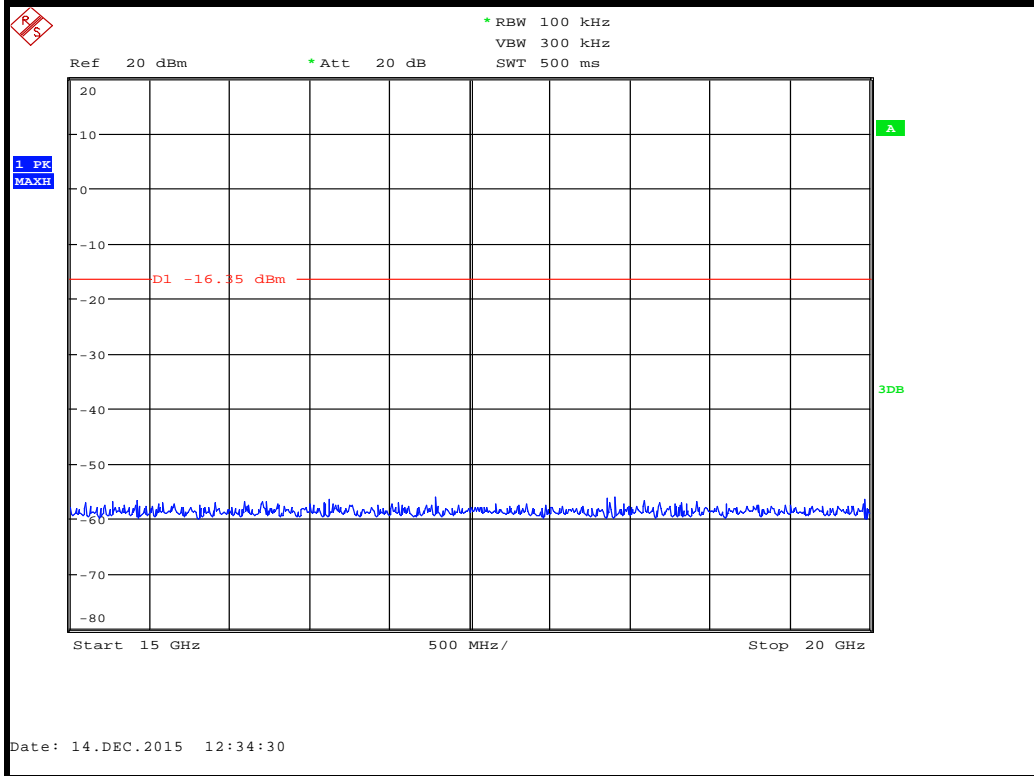
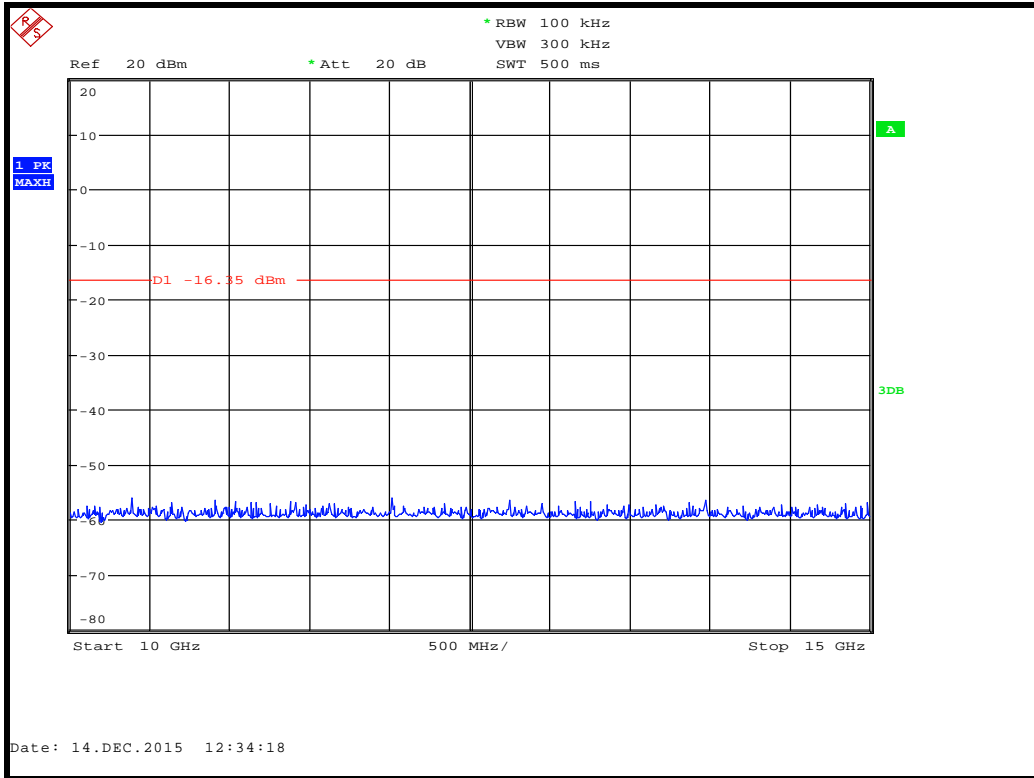


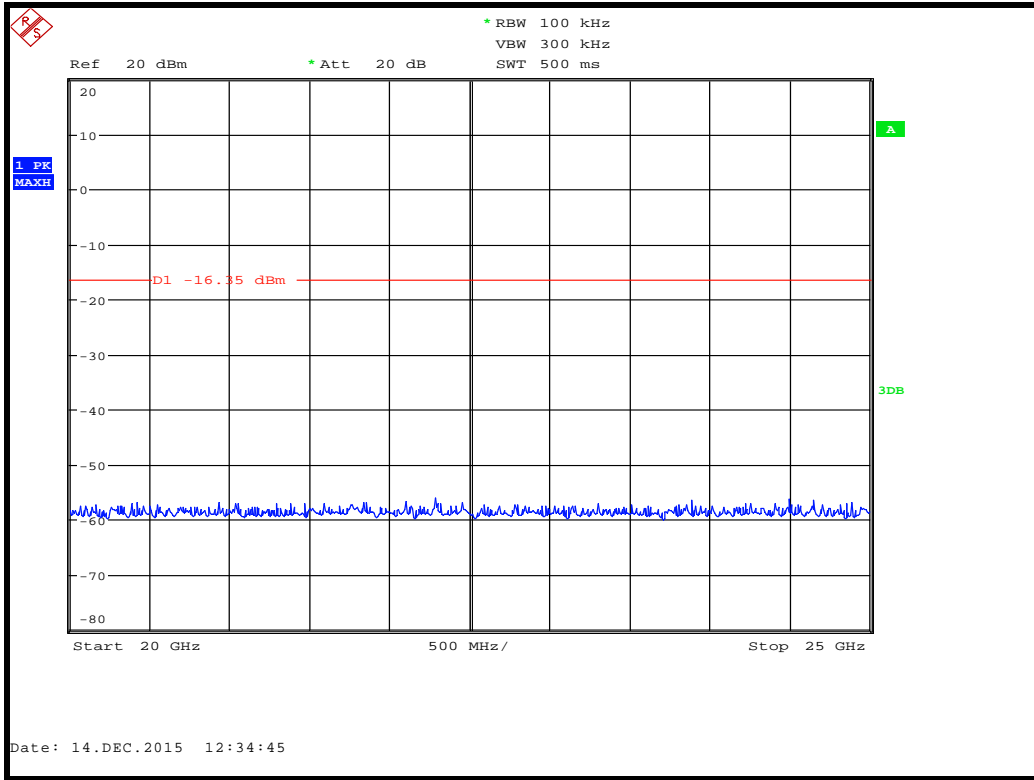
CH11





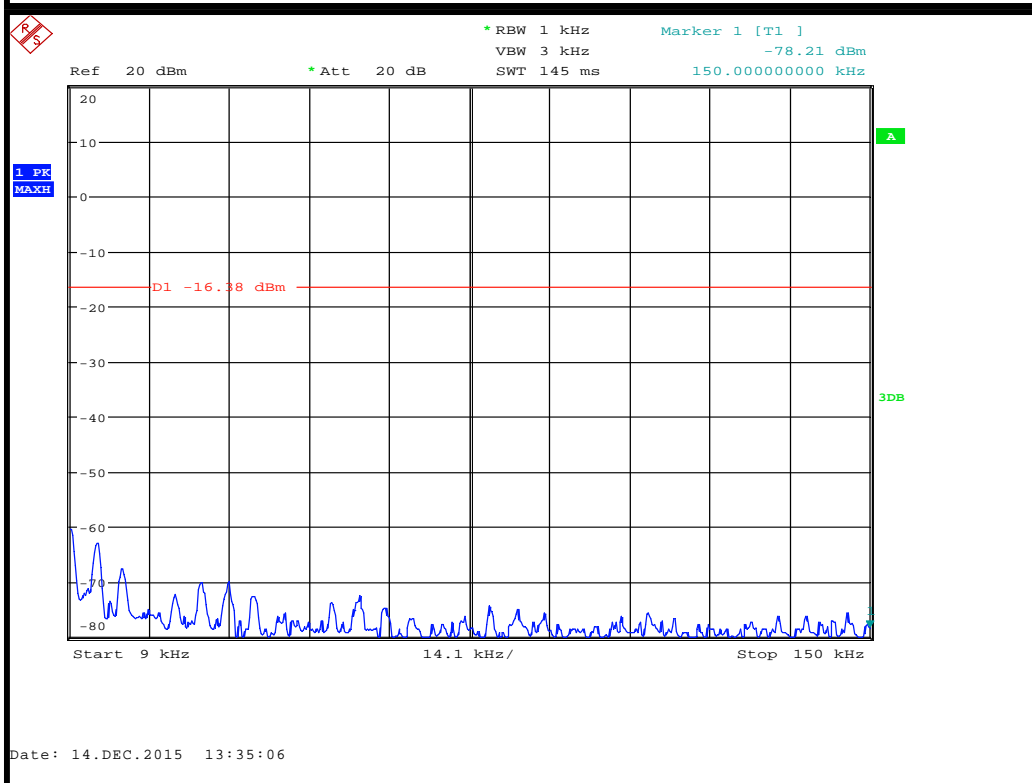
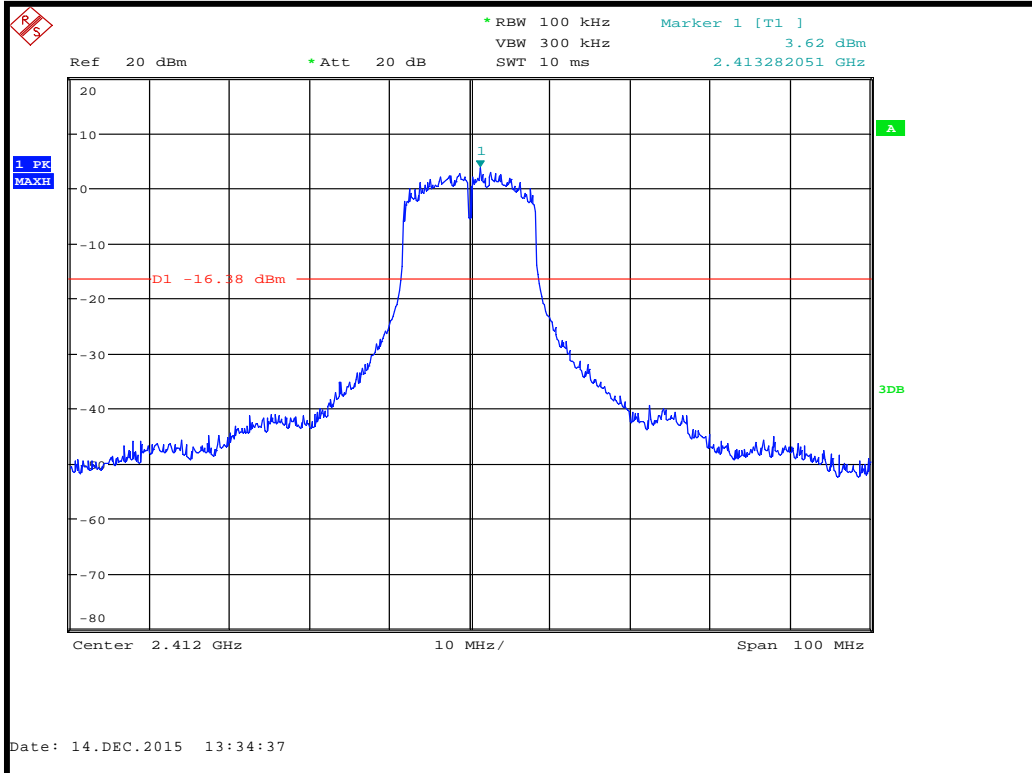


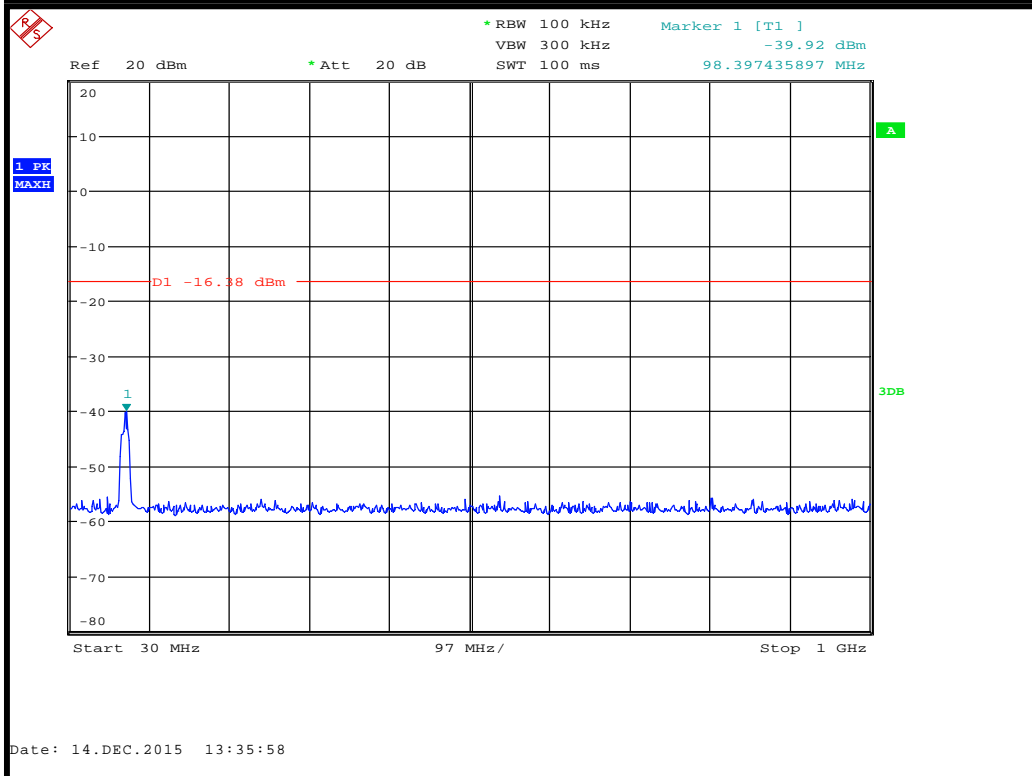
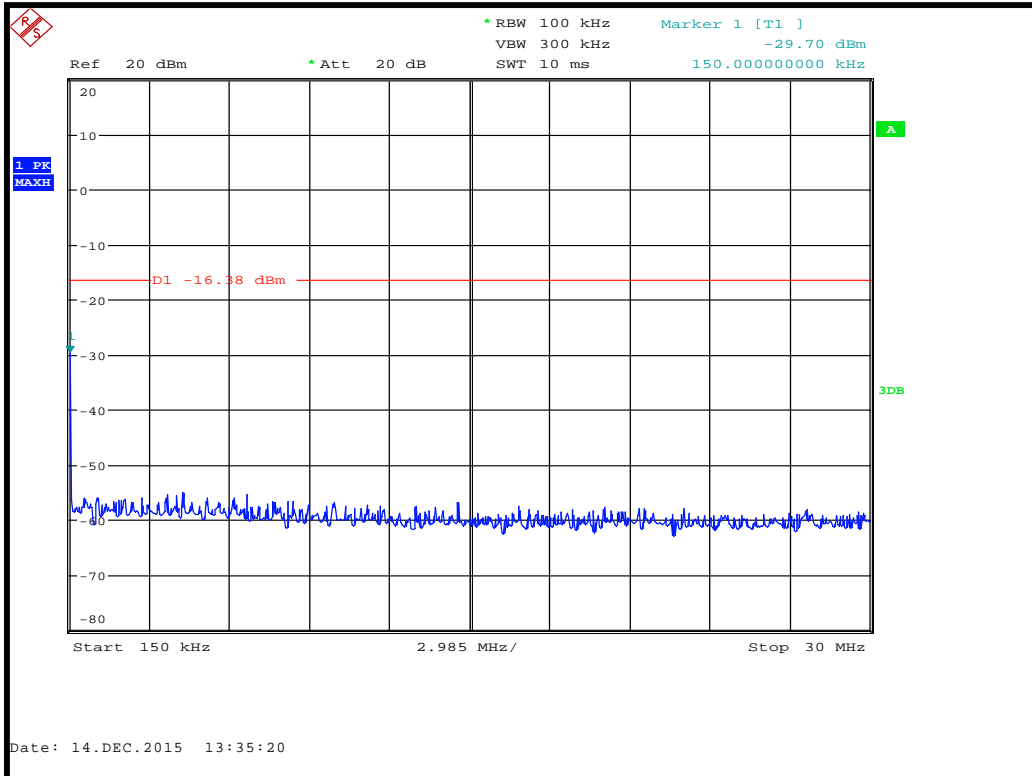




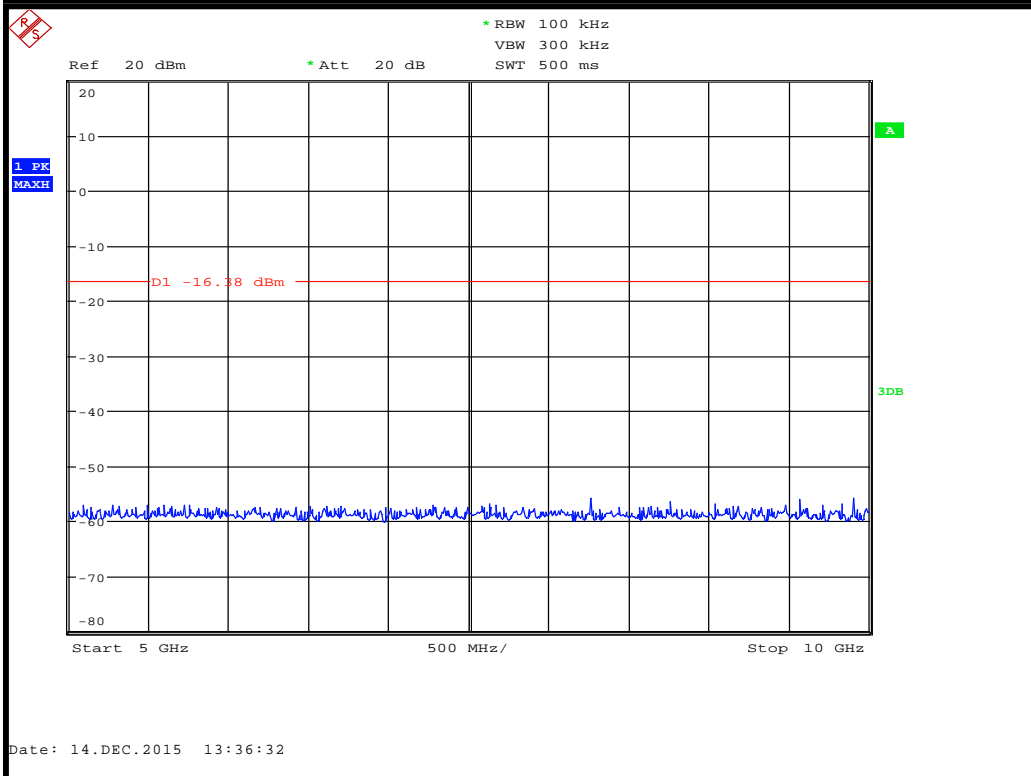
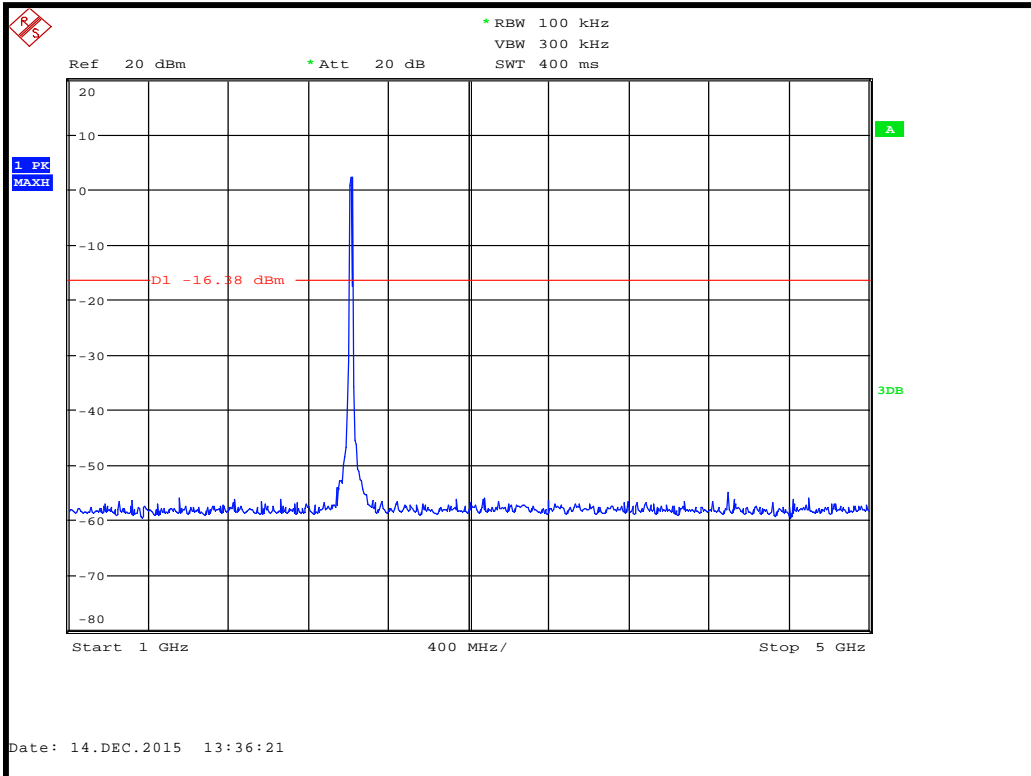
<b>Modulation: 802.11g; Data rate: 54Mbps; Power setting: Full</b>						
<b>Channel Frequency (MHz)</b>	<b>Emission Frequency (MHz)</b>	<b>Analyzer Level (dBm)</b>	<b>Emission Level (dBm)</b>	<b>Limit (dBm)</b>	<b>Margin (dB)</b>	<b>Result</b>
All emissions were a minimum of 20 dB below the test limit						

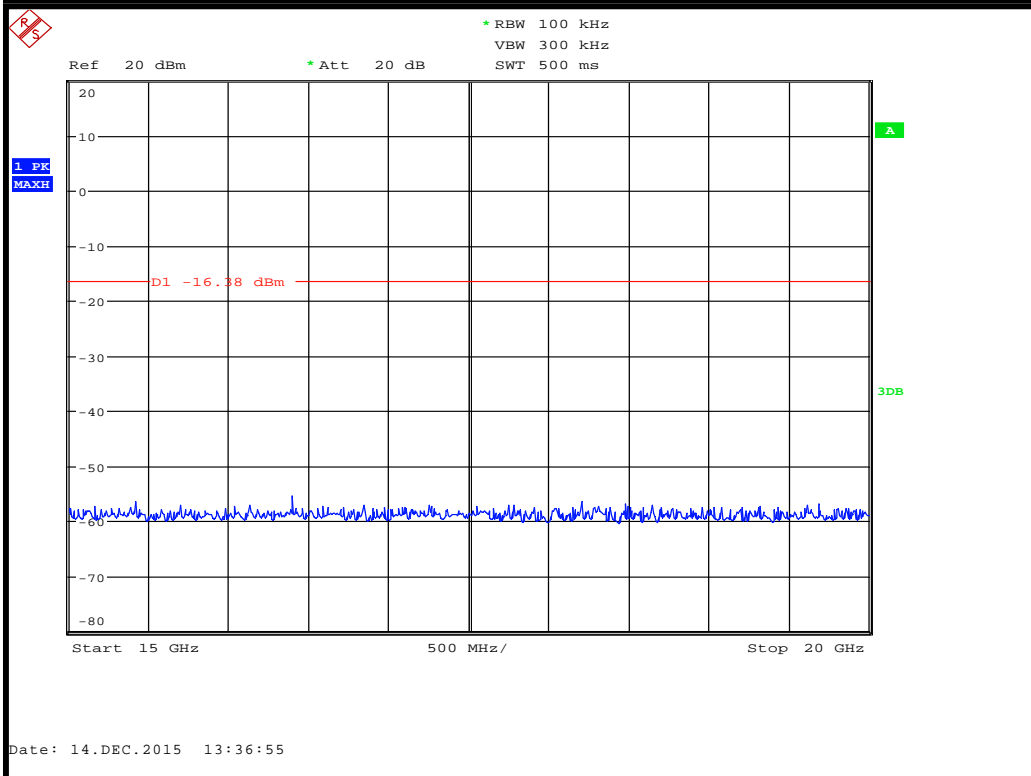
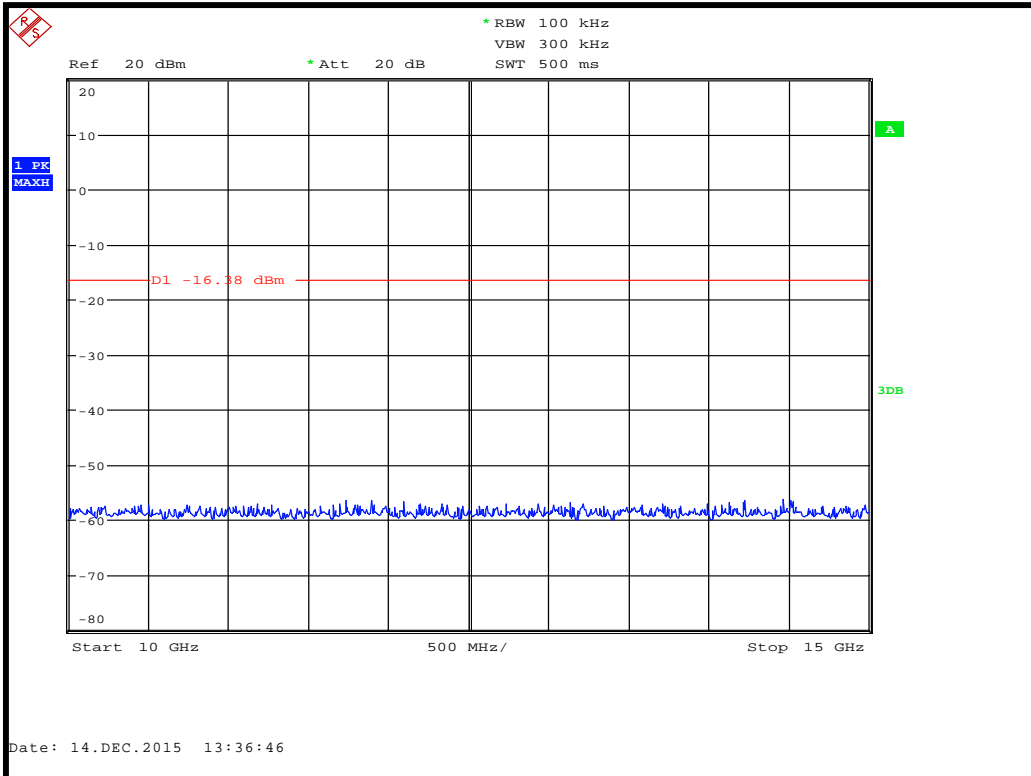
CH1

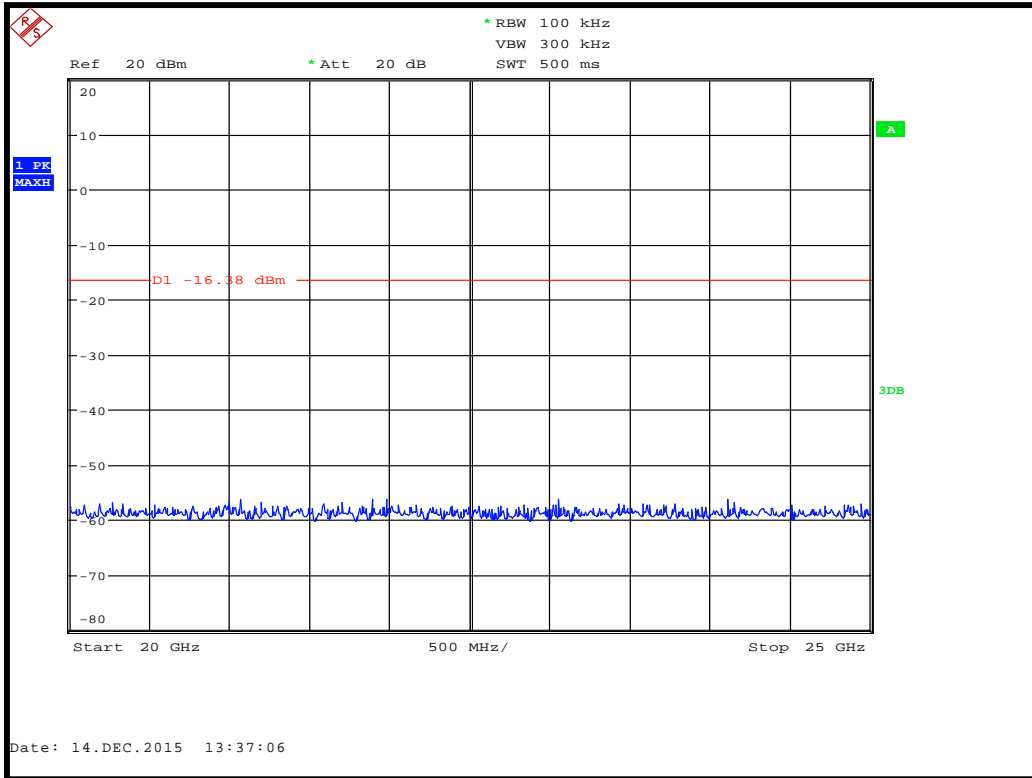




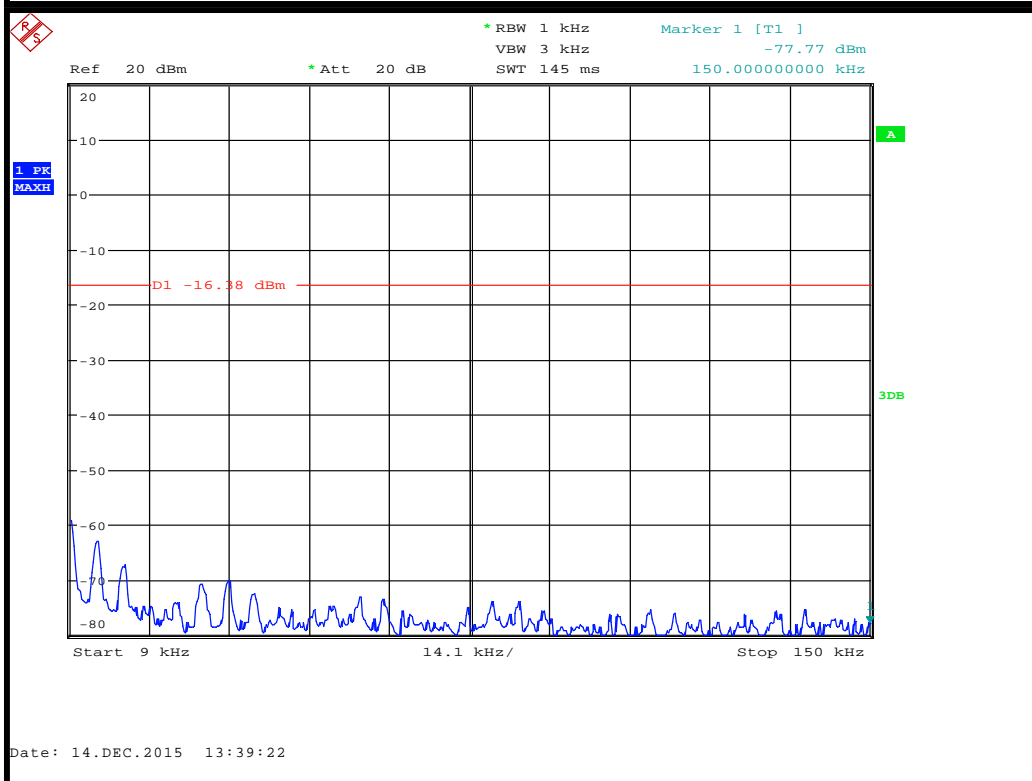
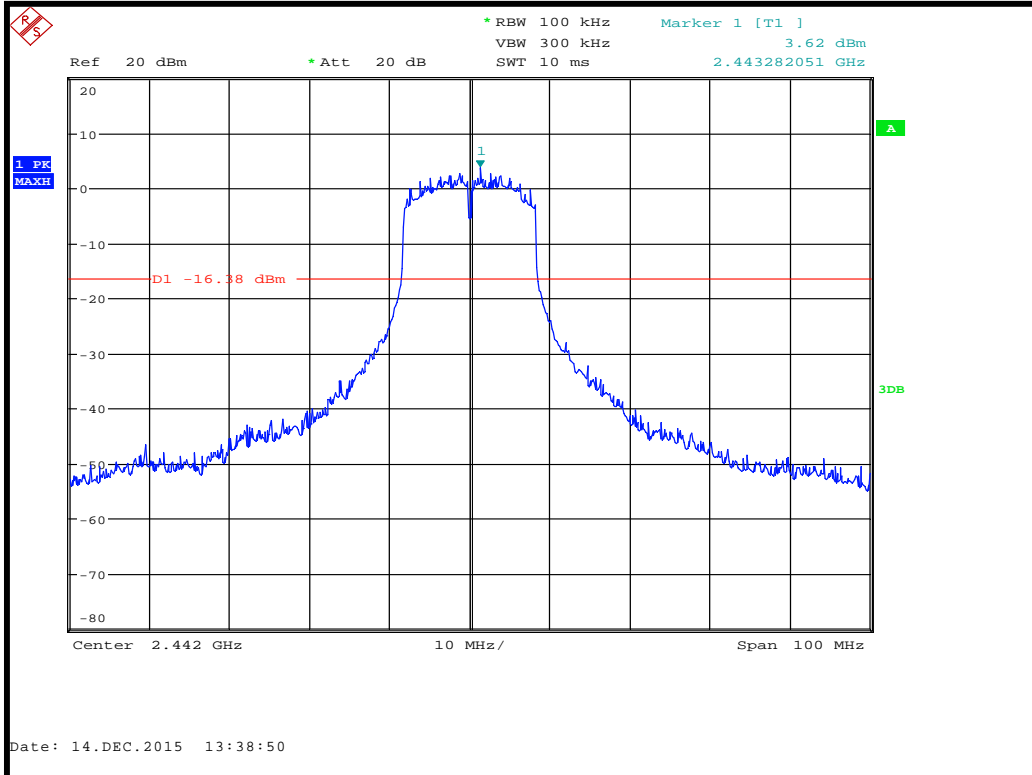


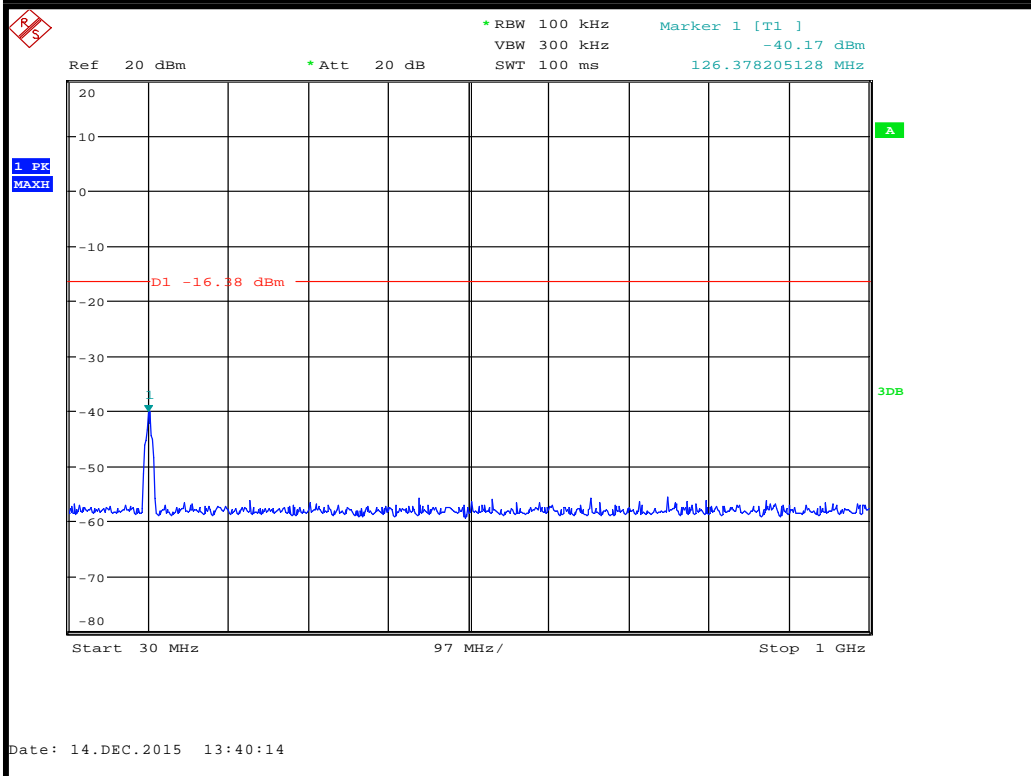
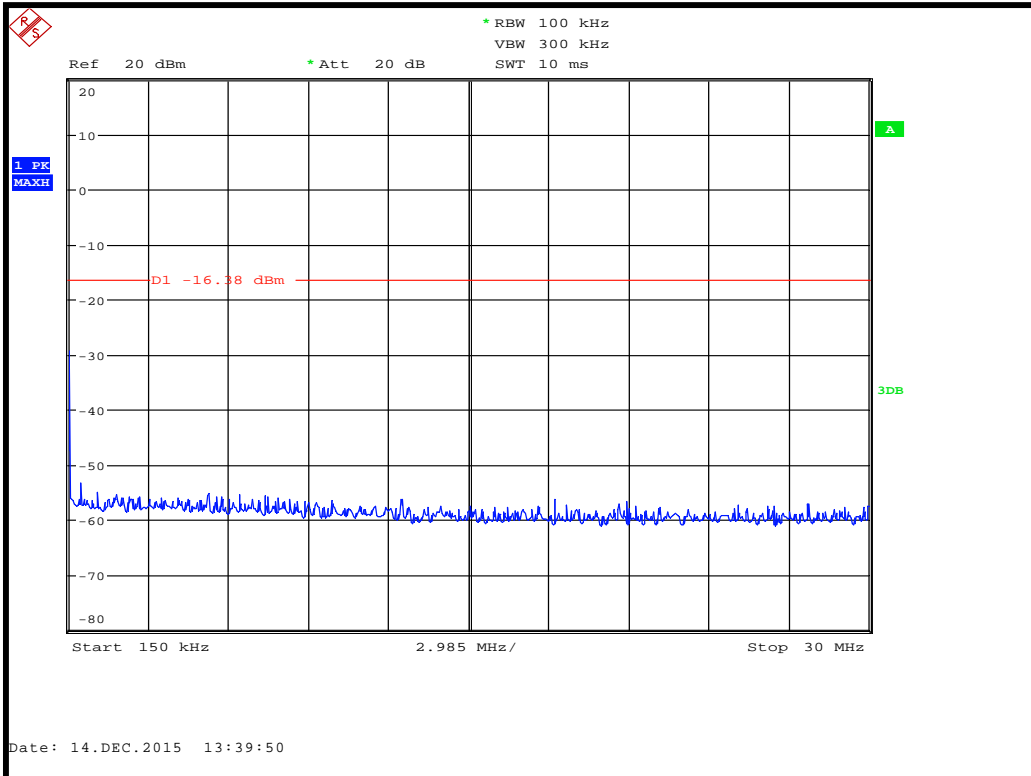


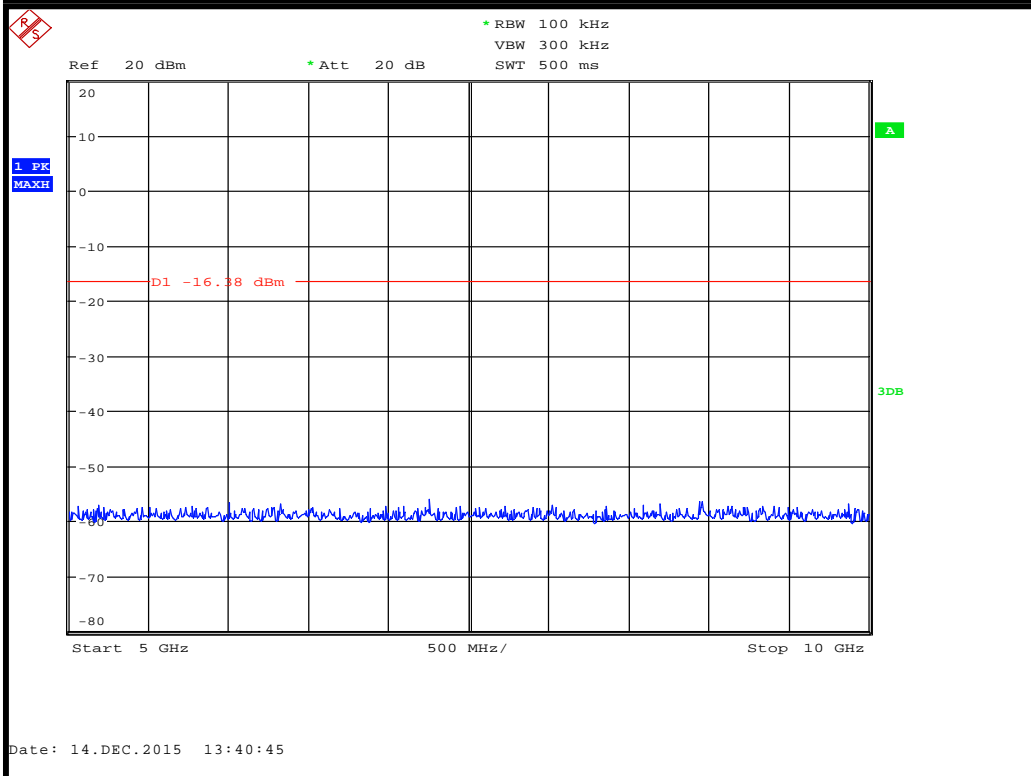
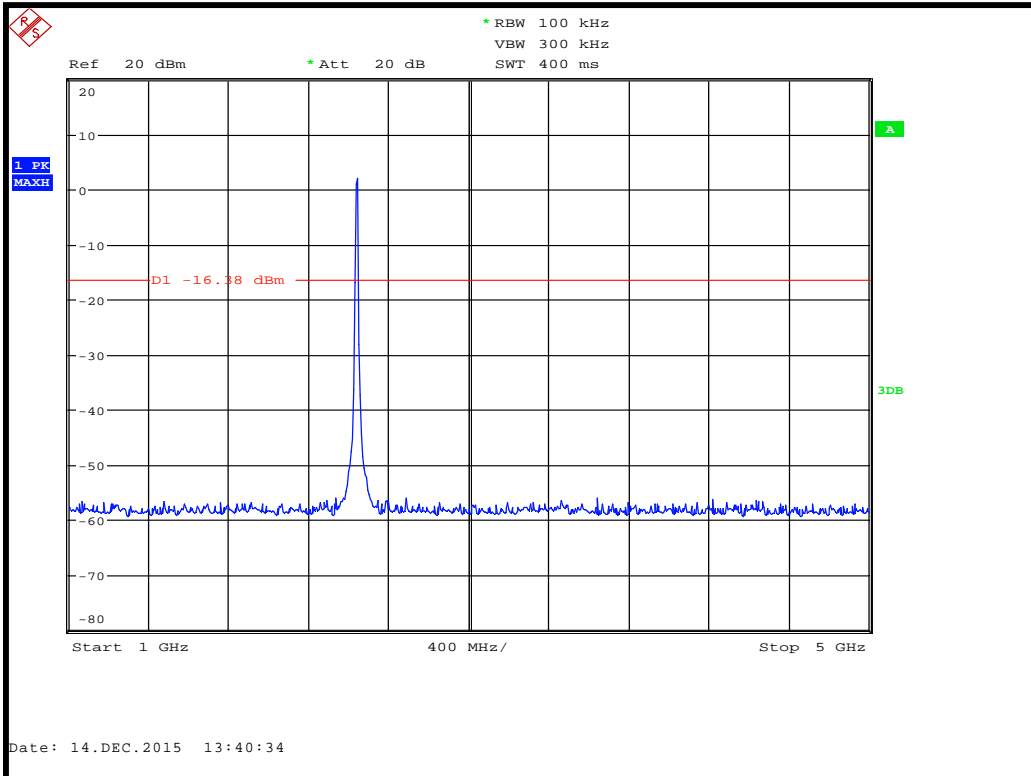


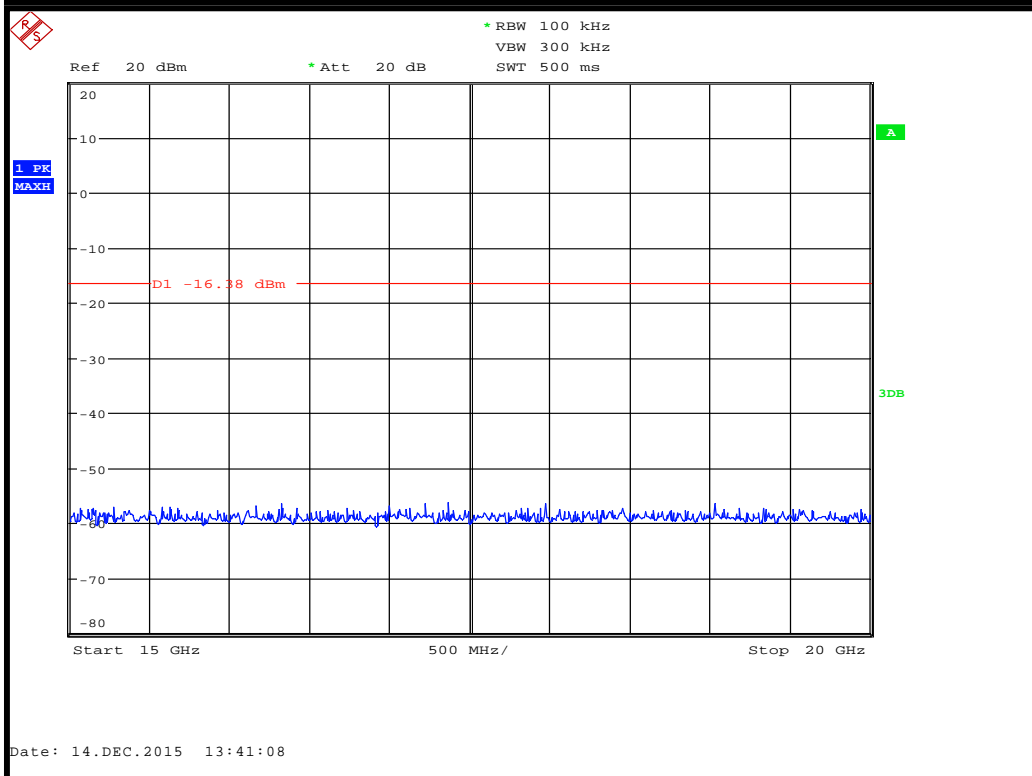
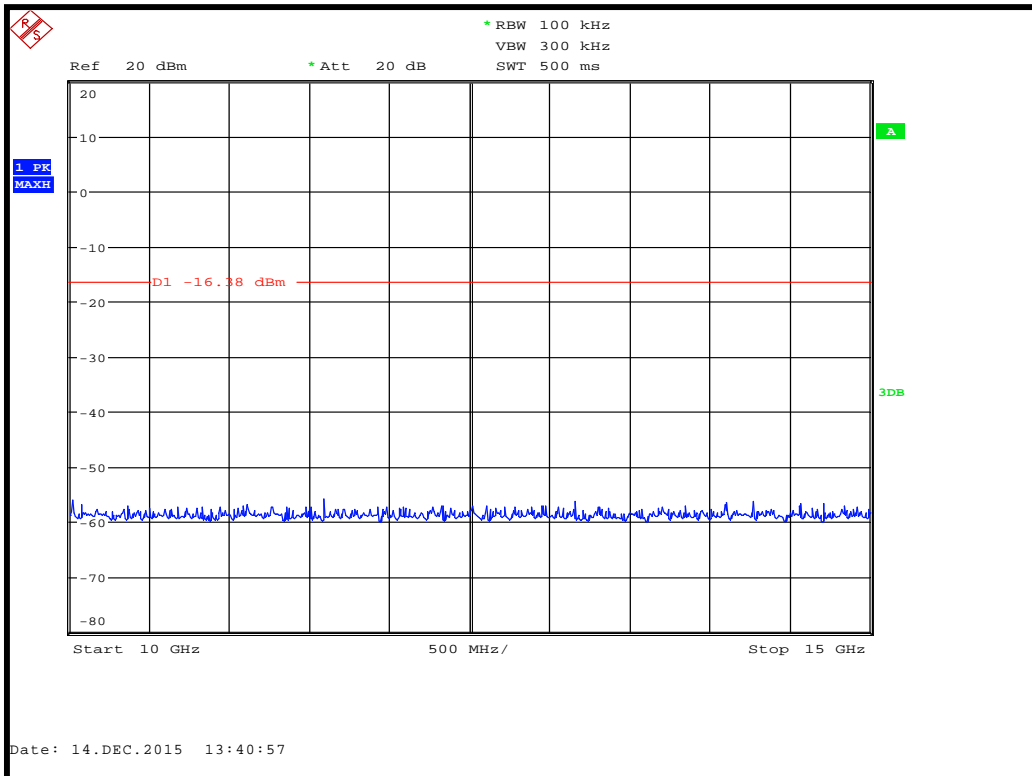


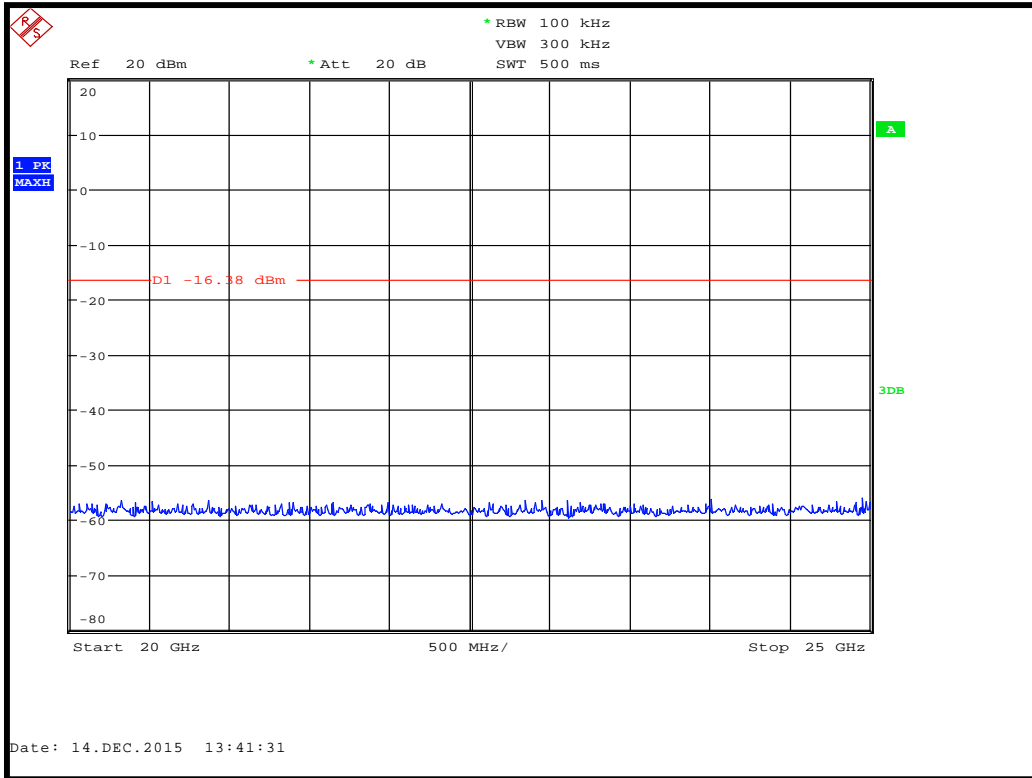
CH7





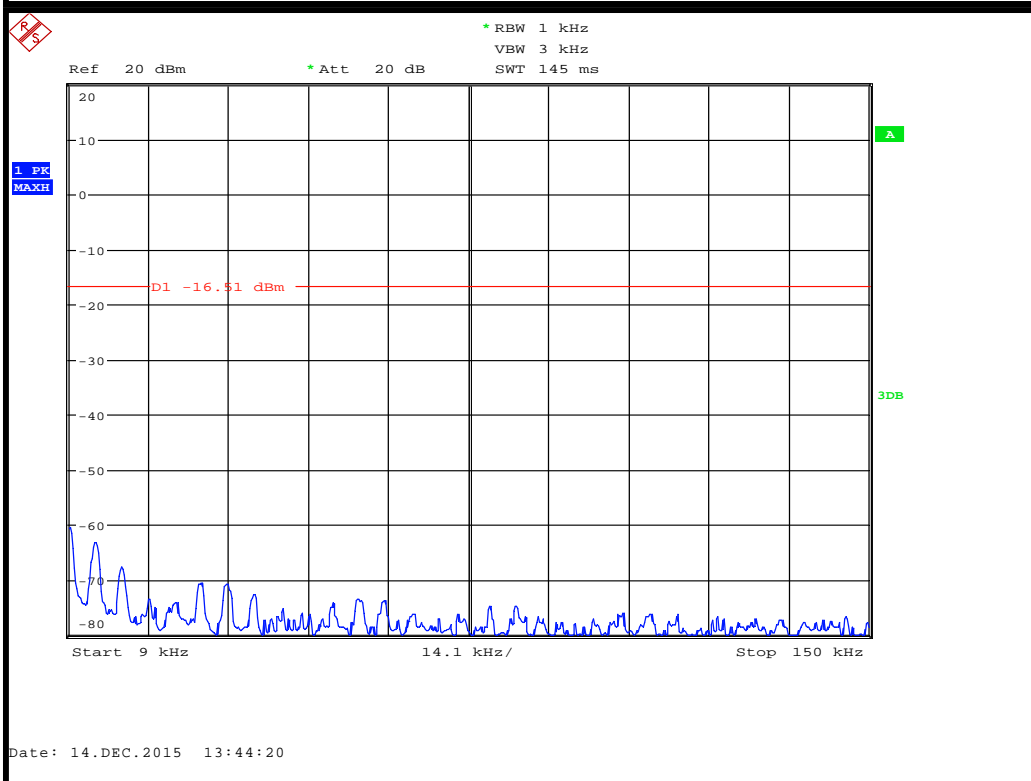
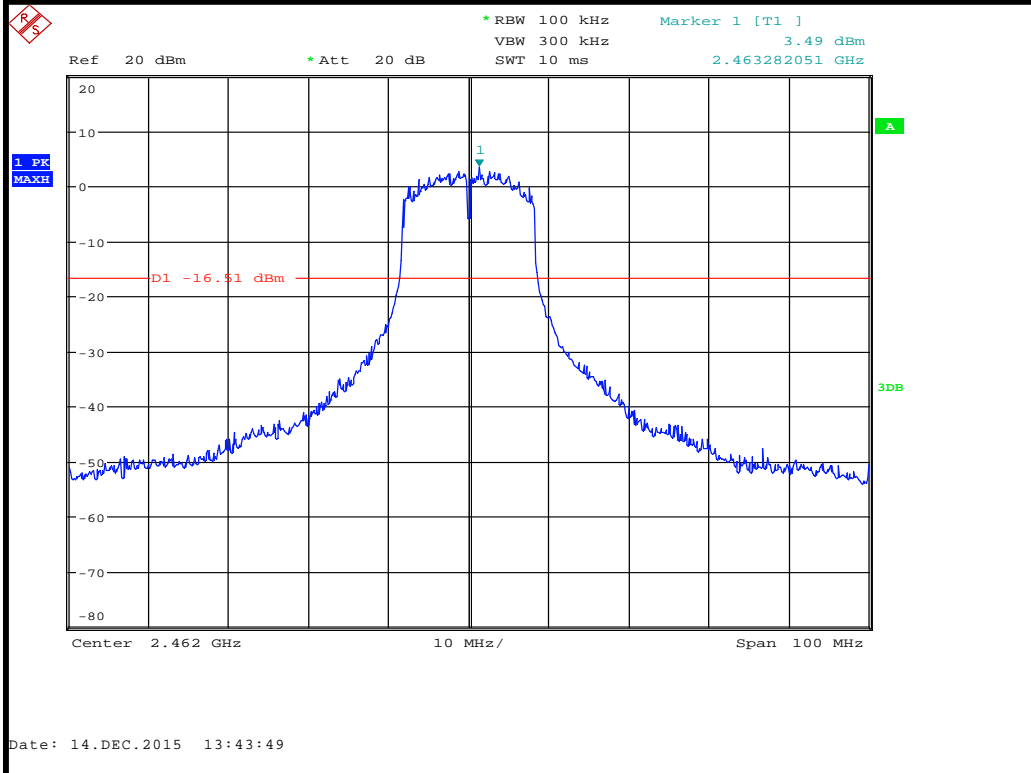


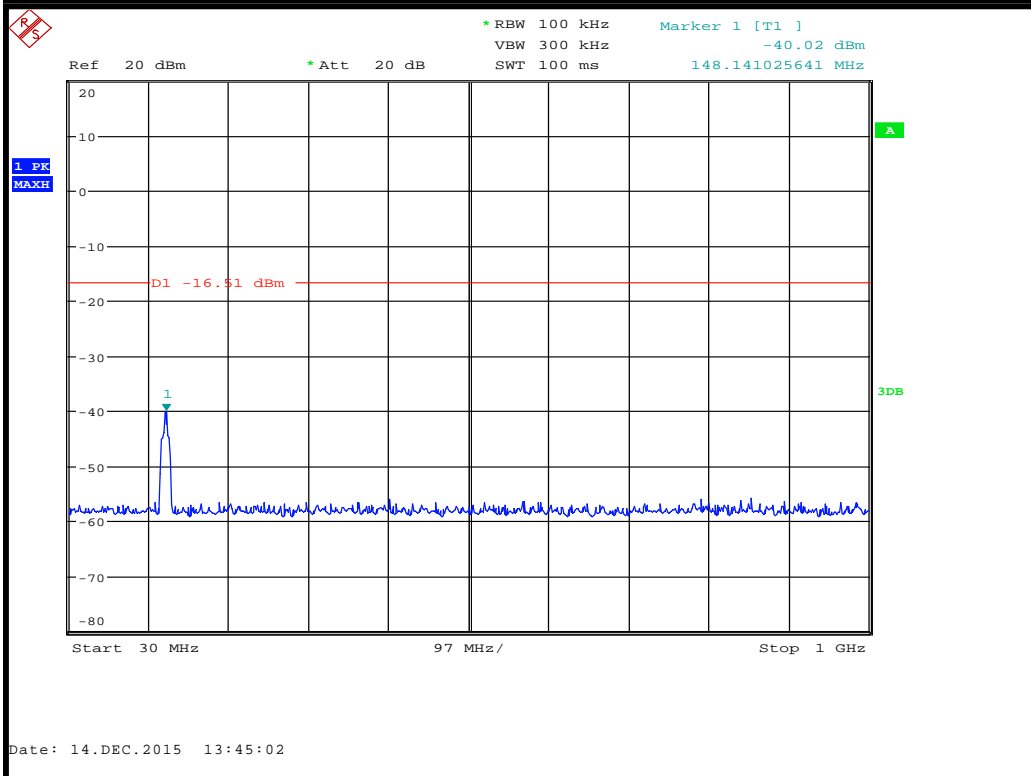
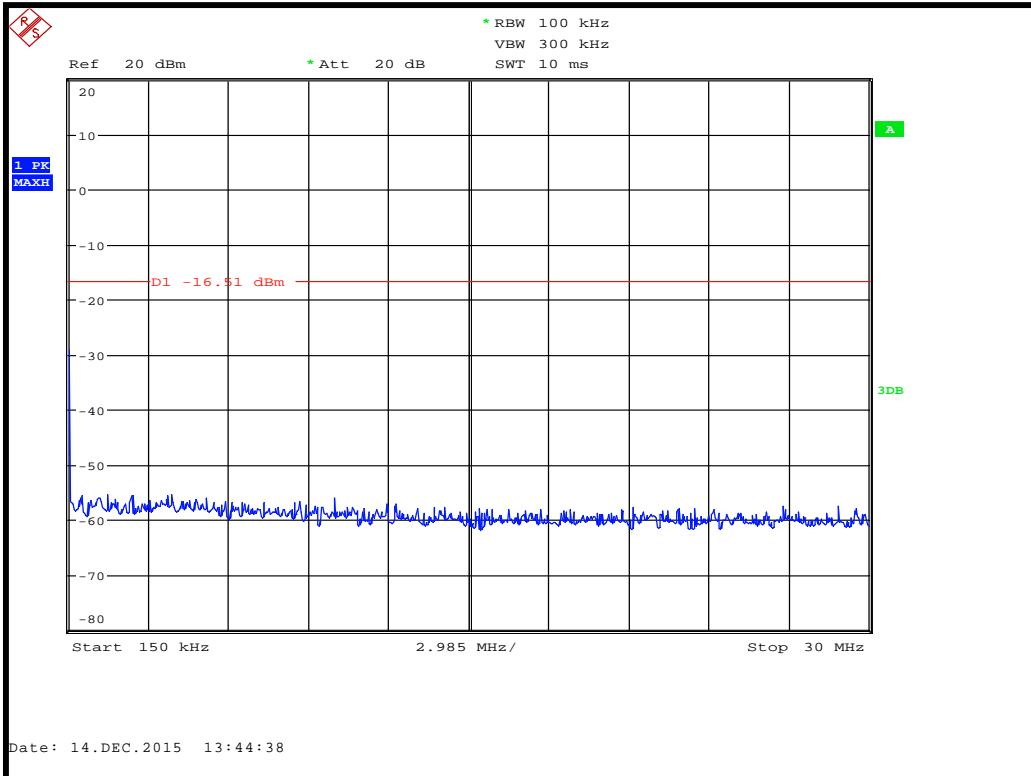


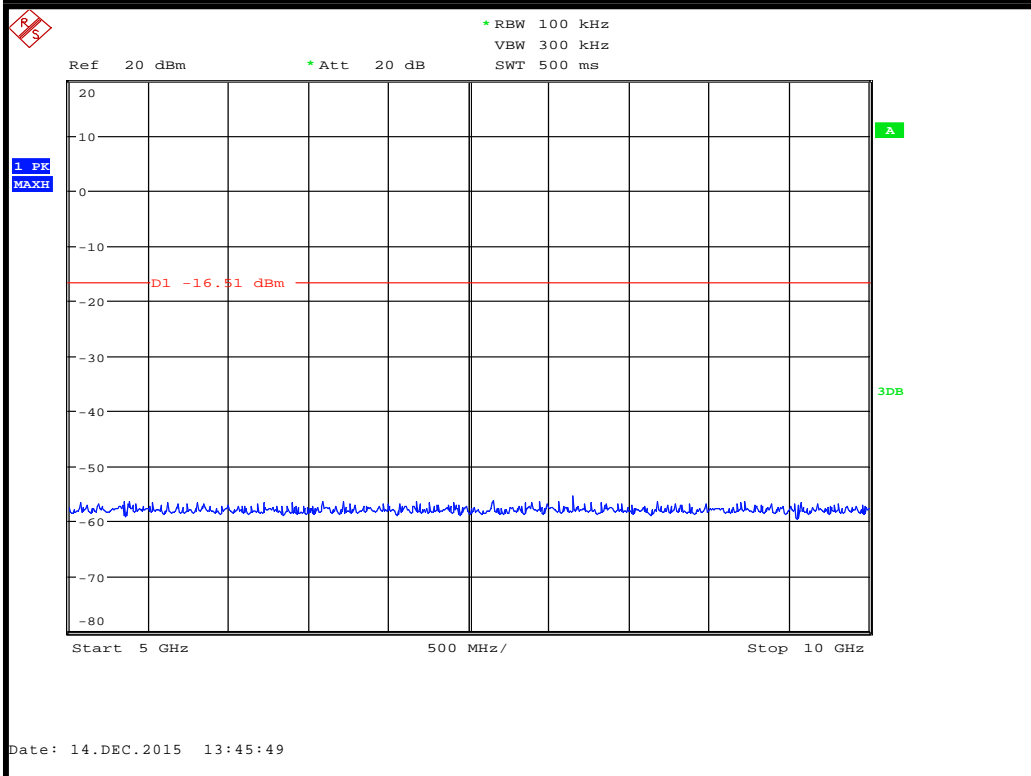
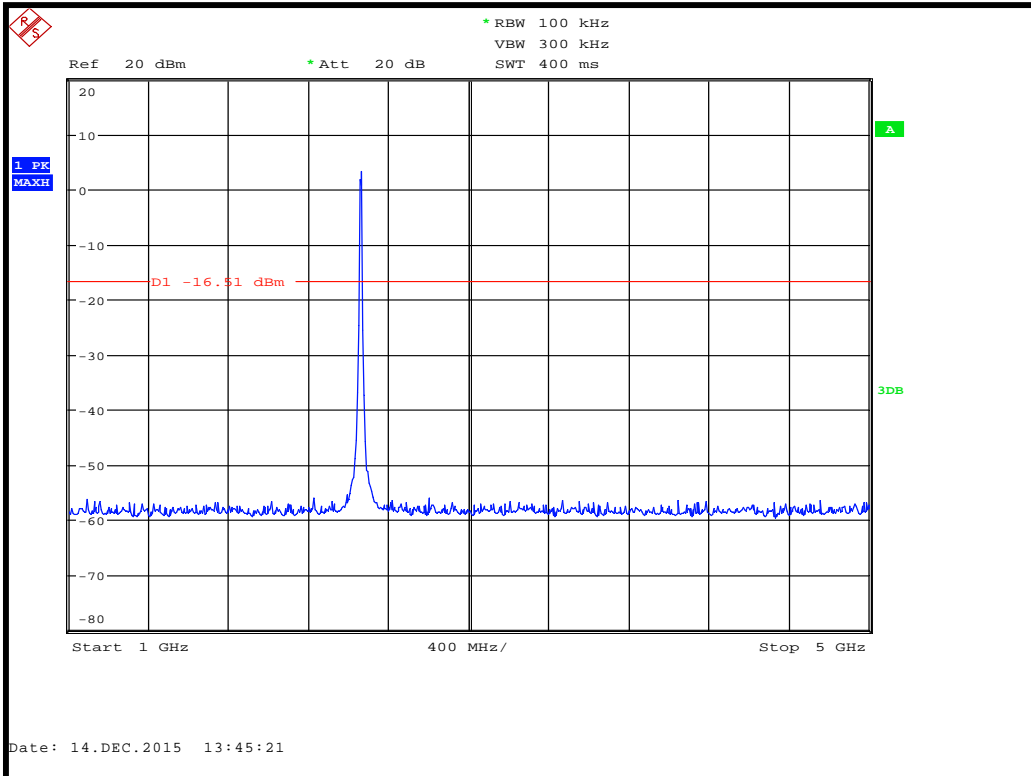


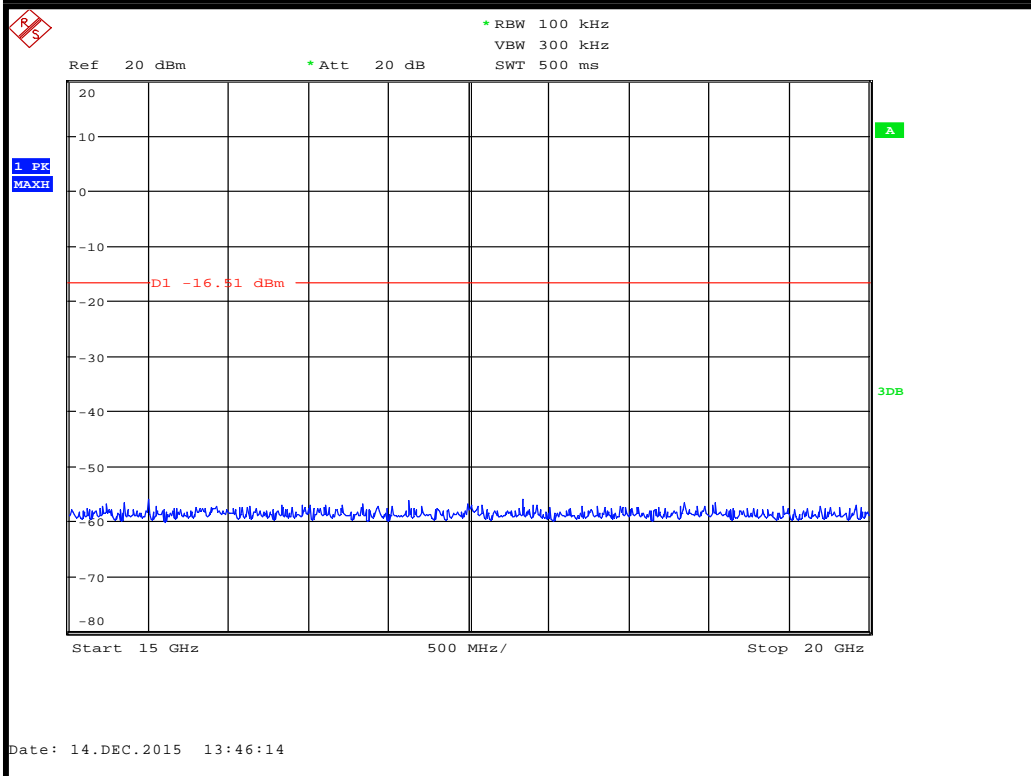
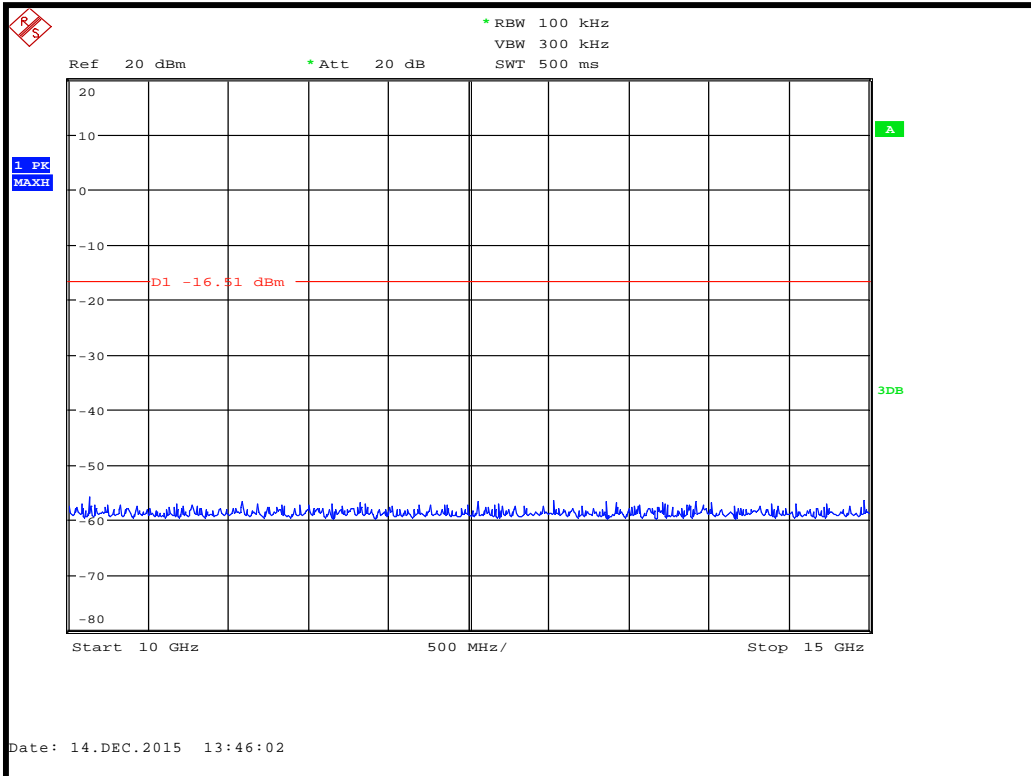


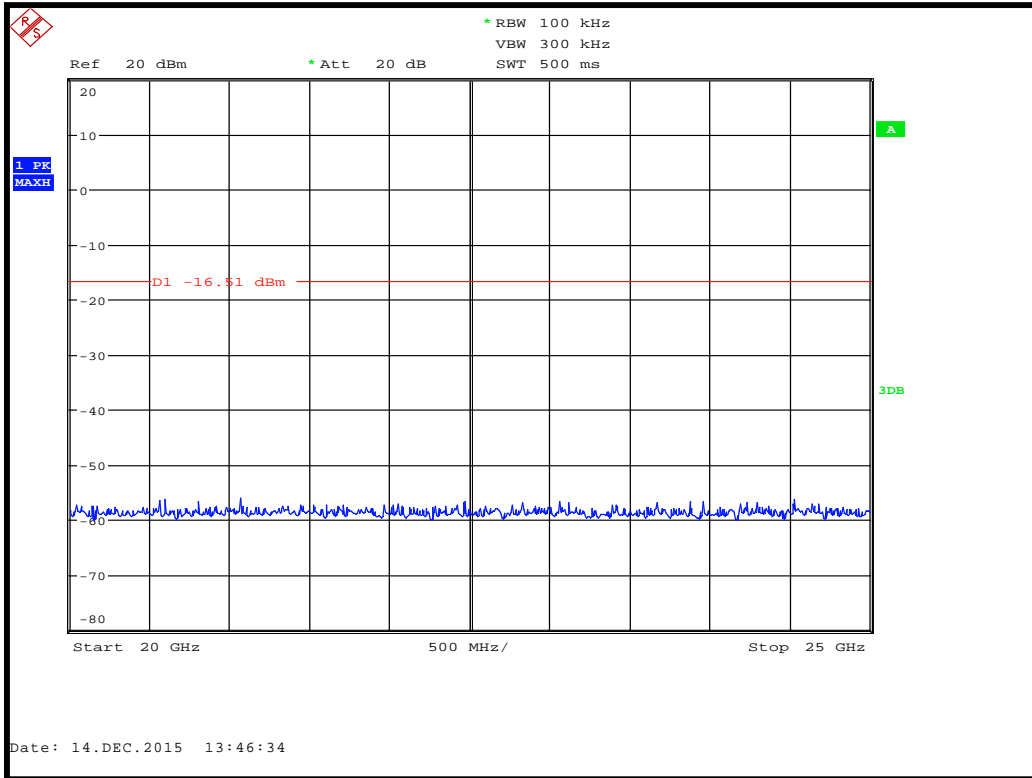
CH11





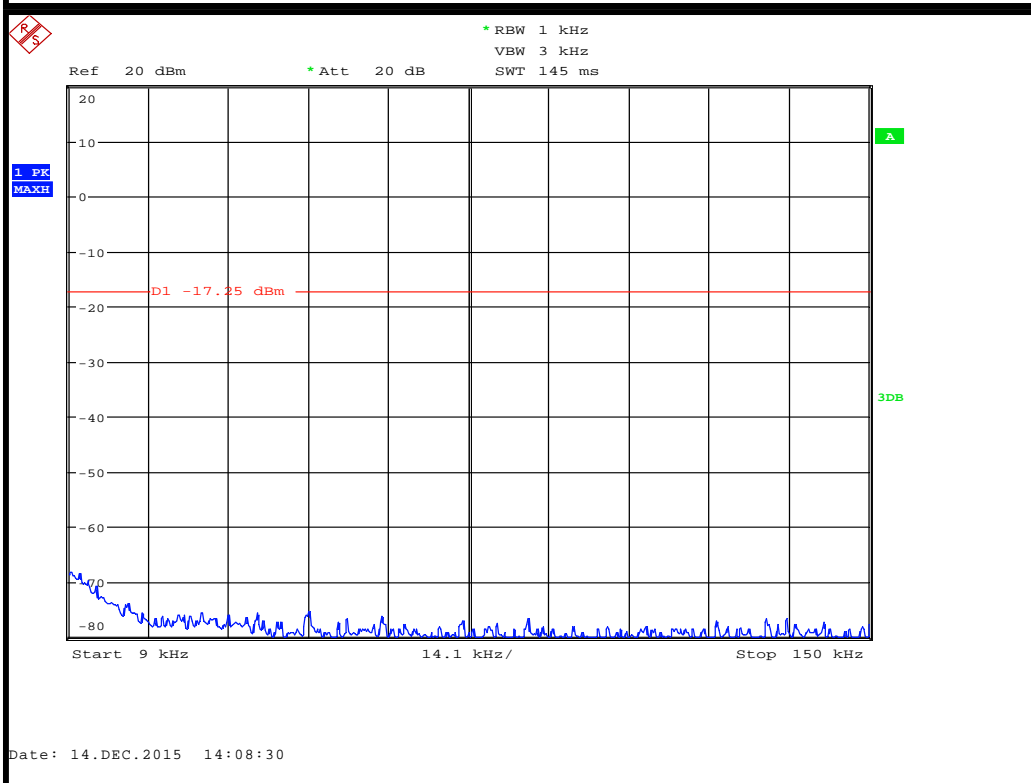
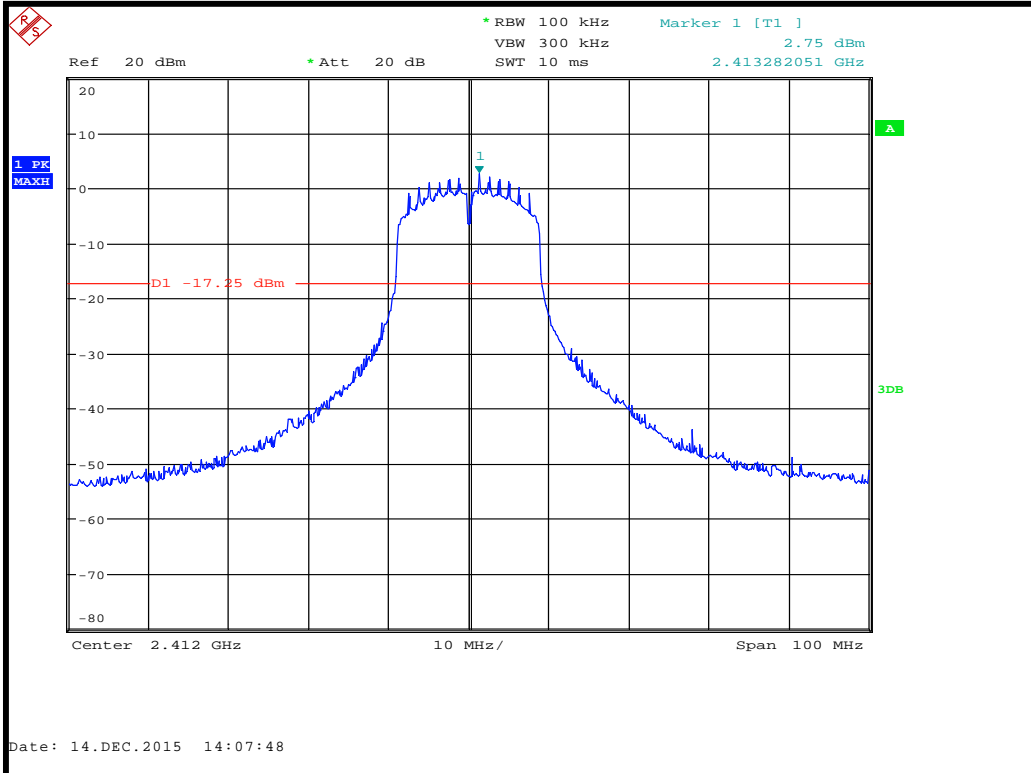


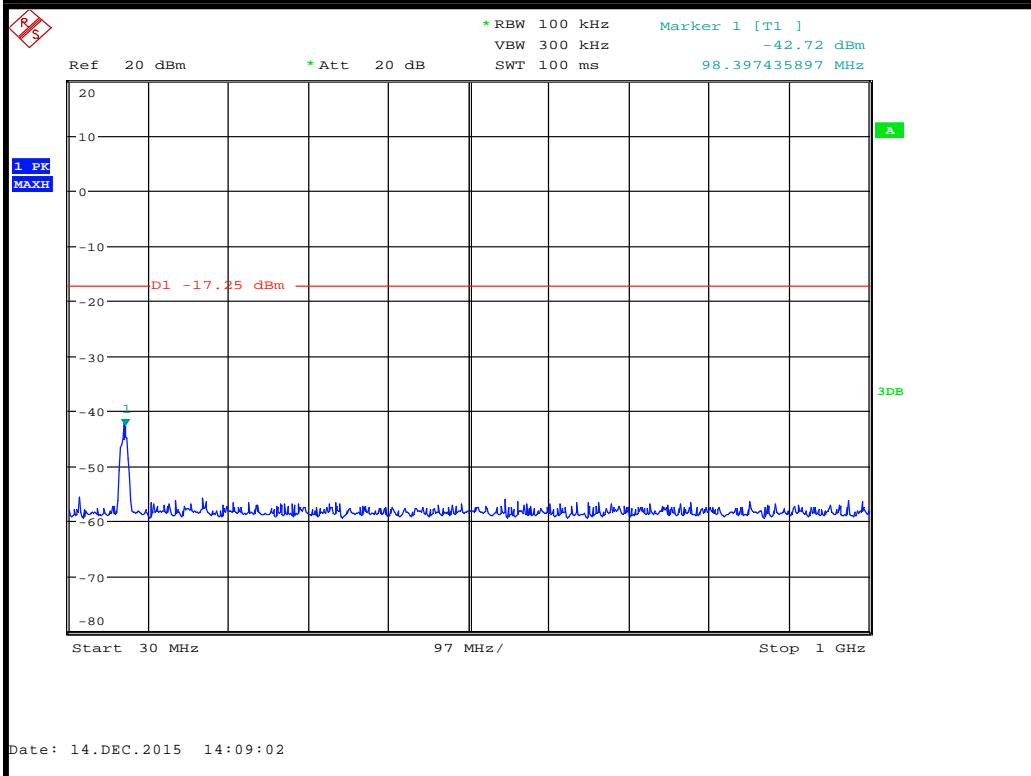
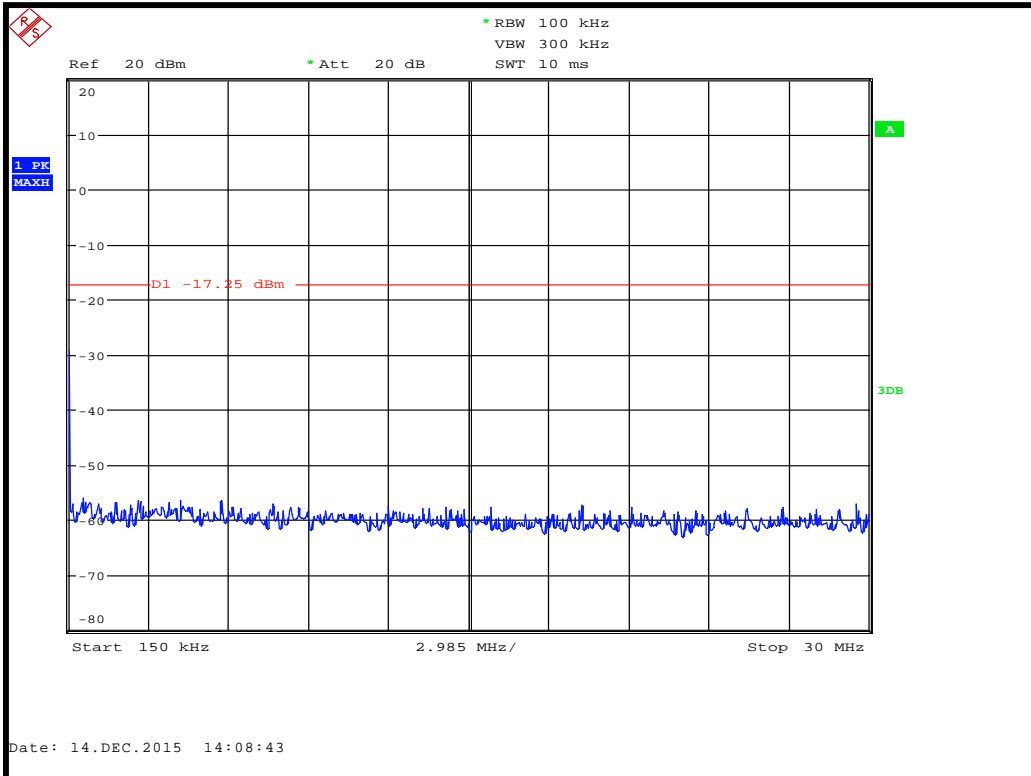




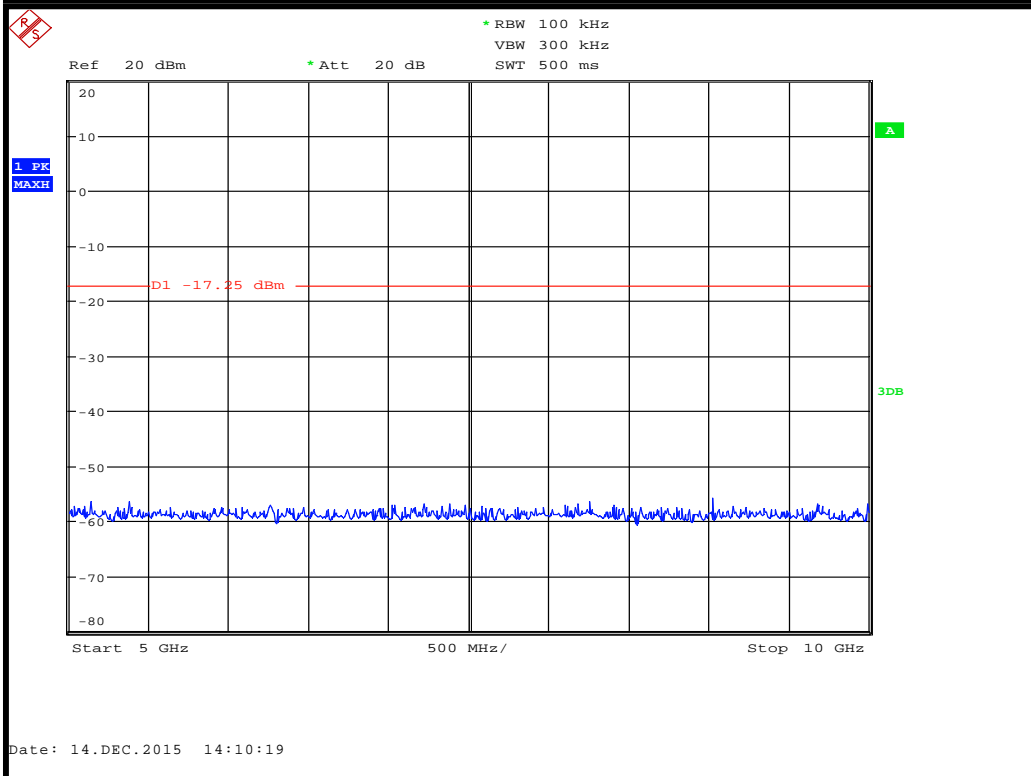
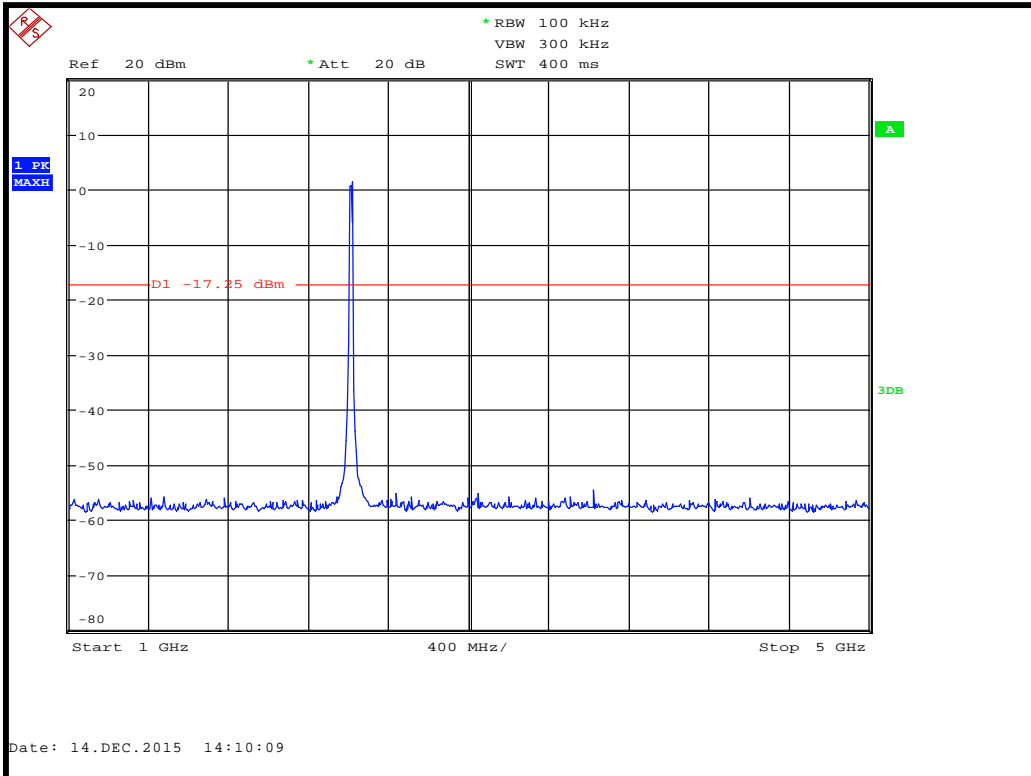
<b>Modulation: 802.11n; Data rate: 6.5Mbps (MCS0); Power setting: Full</b>						
<b>Channel Frequency (MHz)</b>	<b>Emission Frequency (MHz)</b>	<b>Analyzer Level (dBm)</b>	<b>Emission Level (dBm)</b>	<b>Limit (dBm)</b>	<b>Margin (dB)</b>	<b>Result</b>
All emissions were a minimum of 20 dB below the test limit						

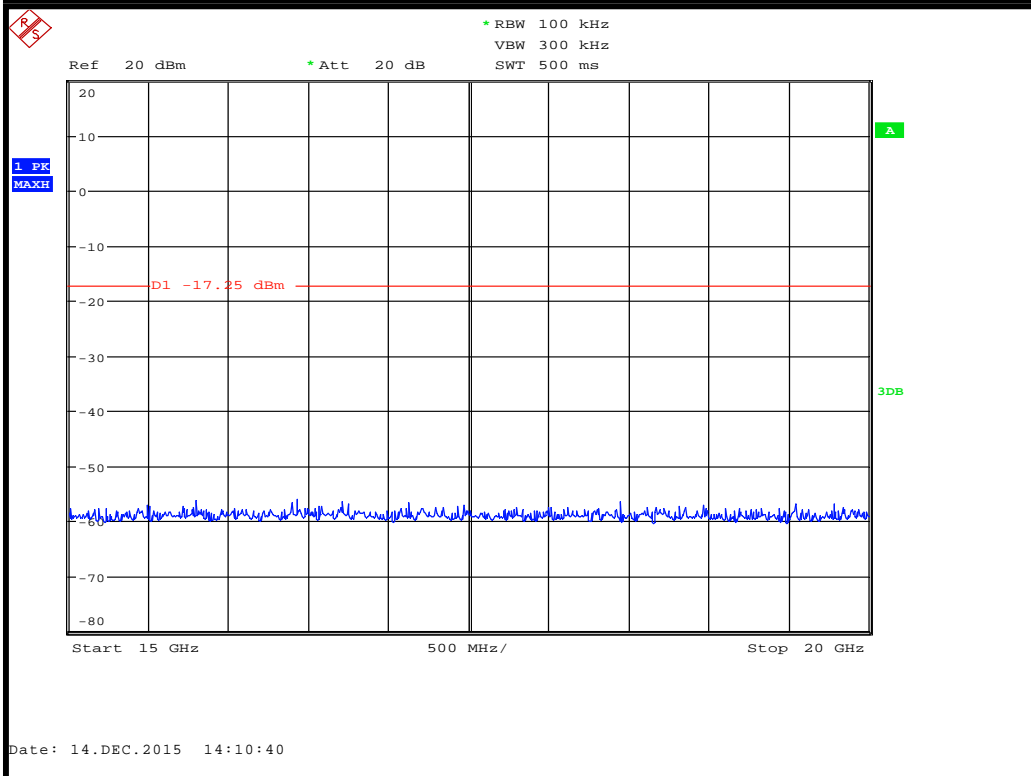
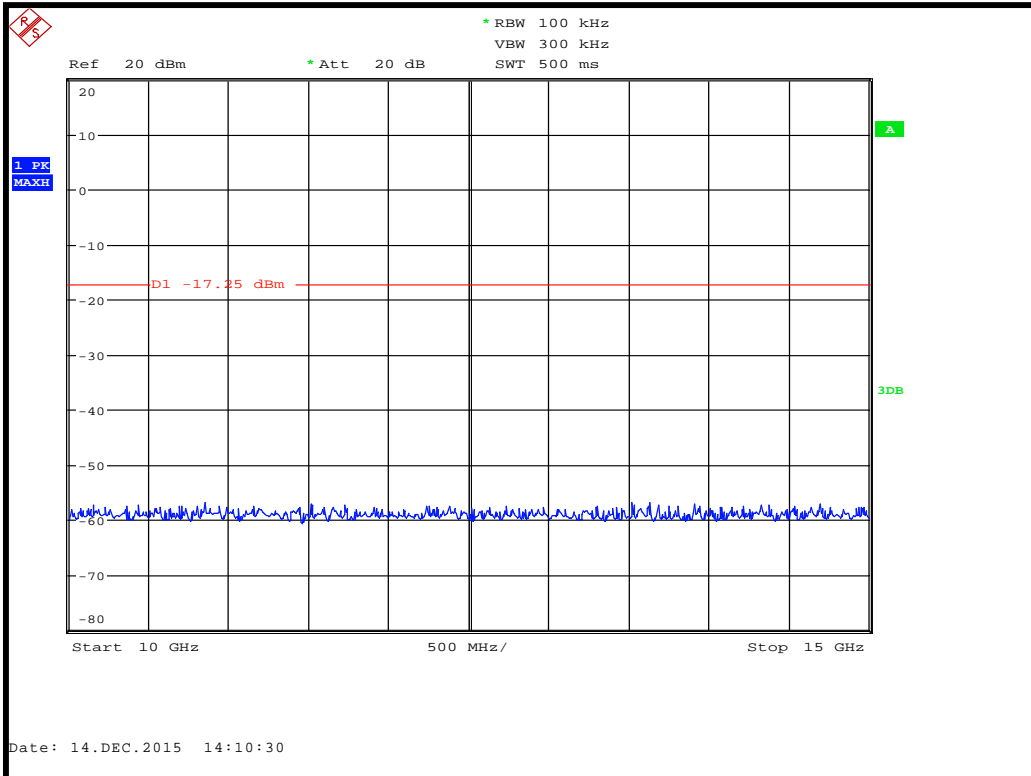
CH1

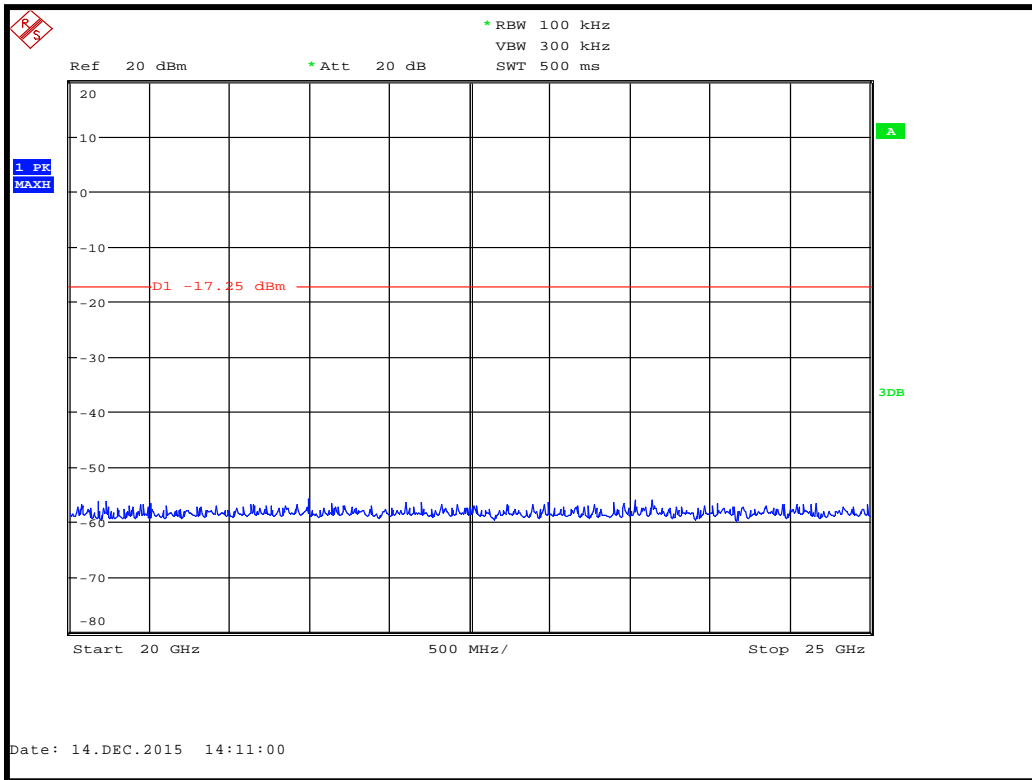




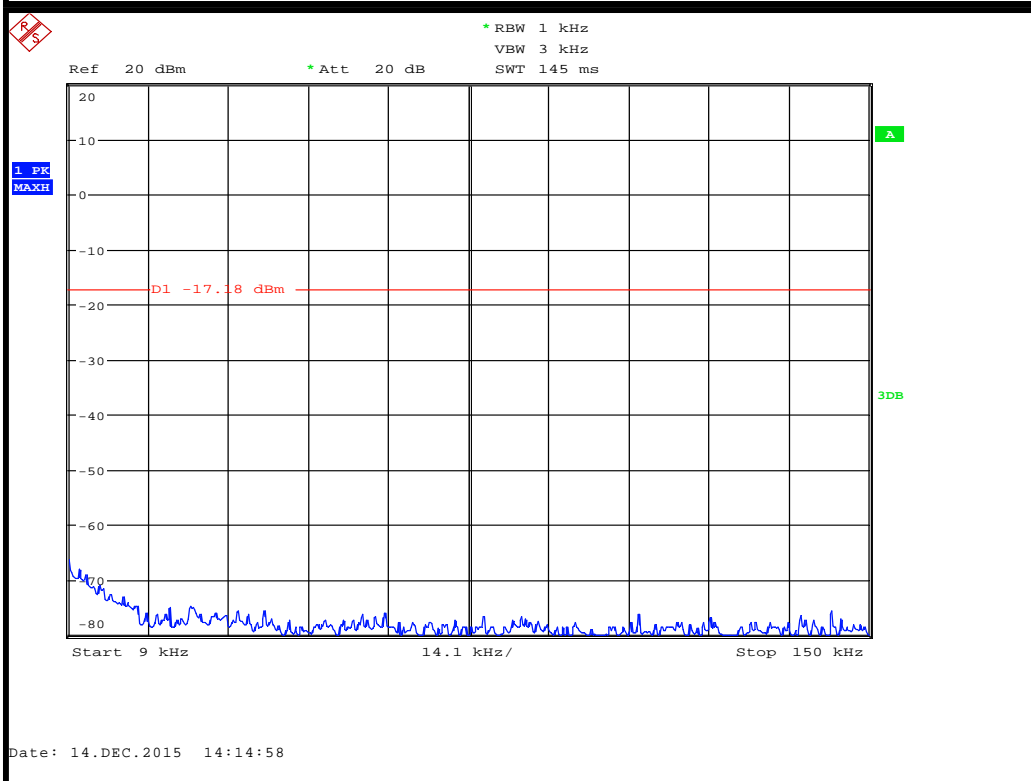
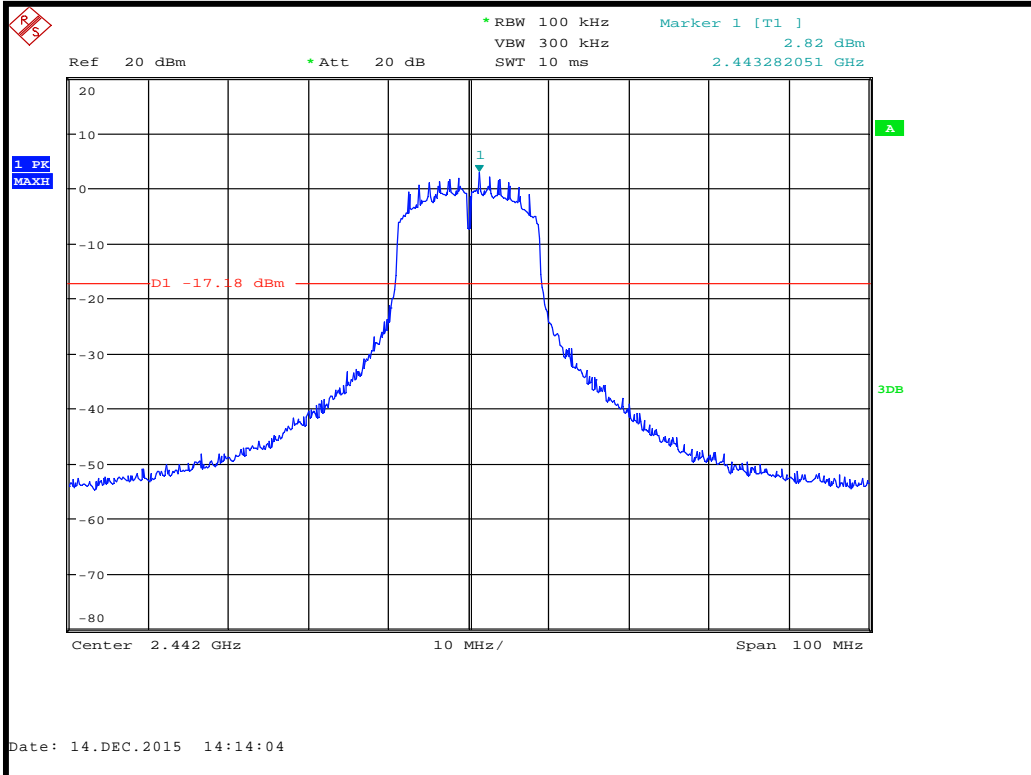


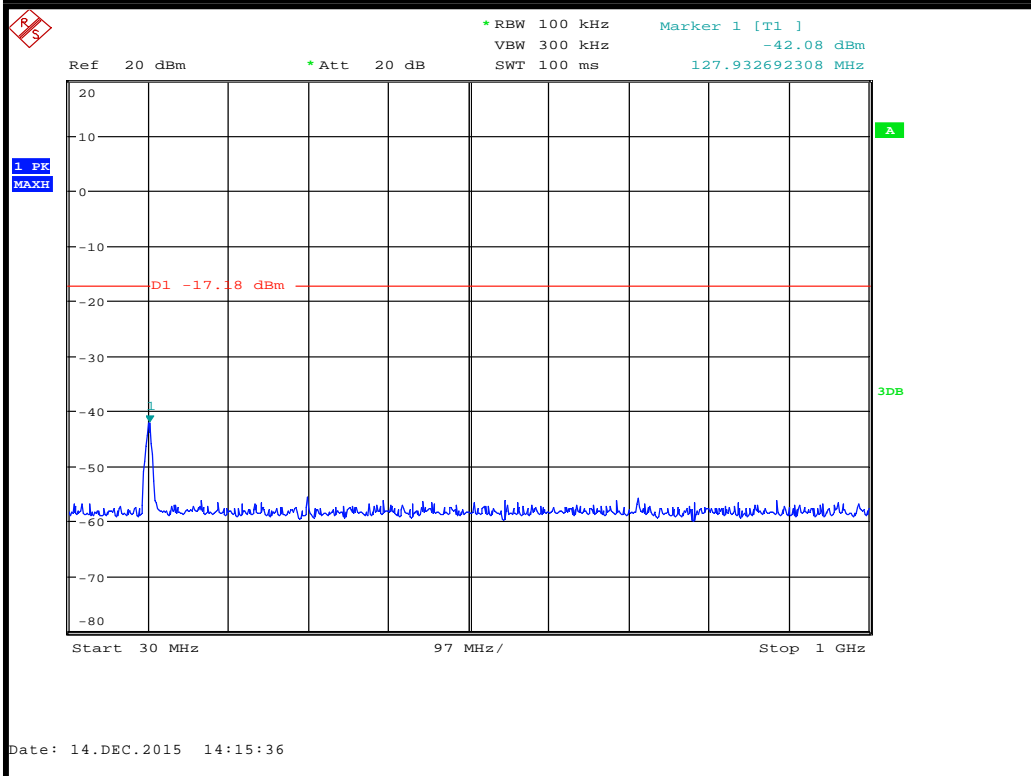
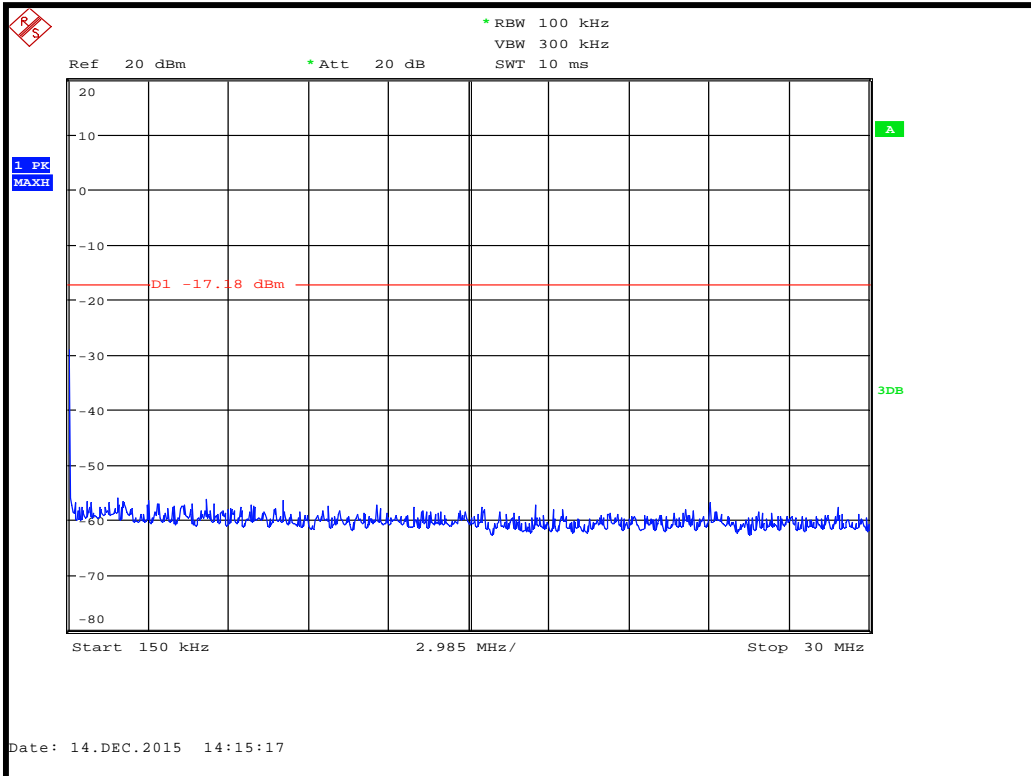


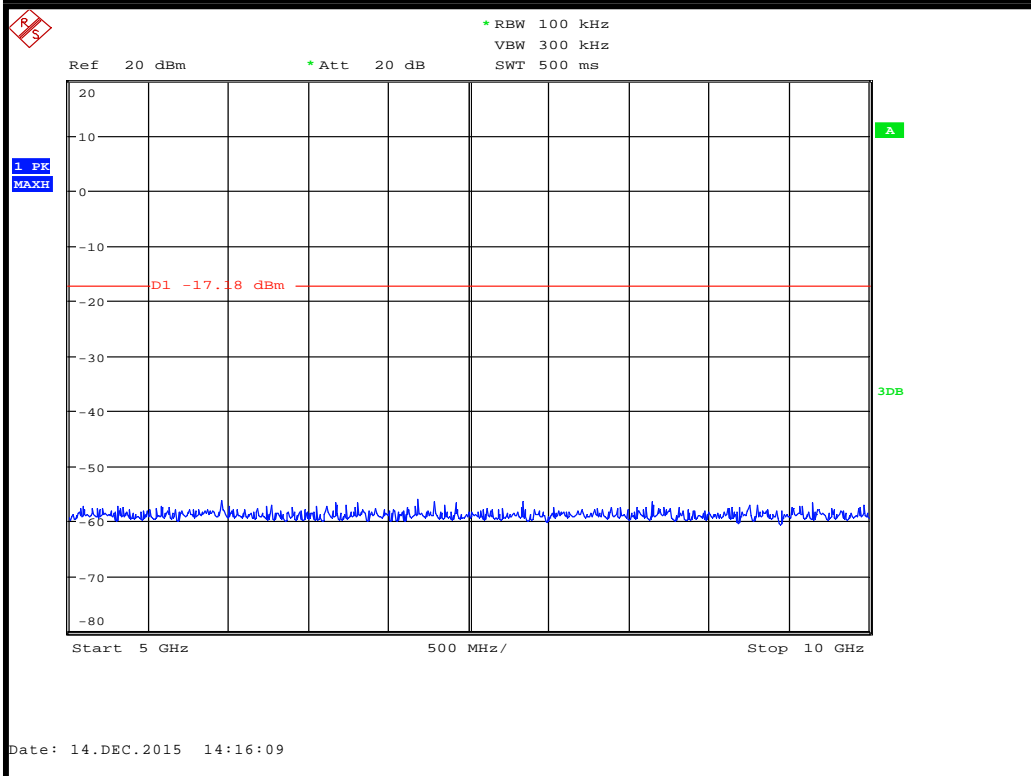
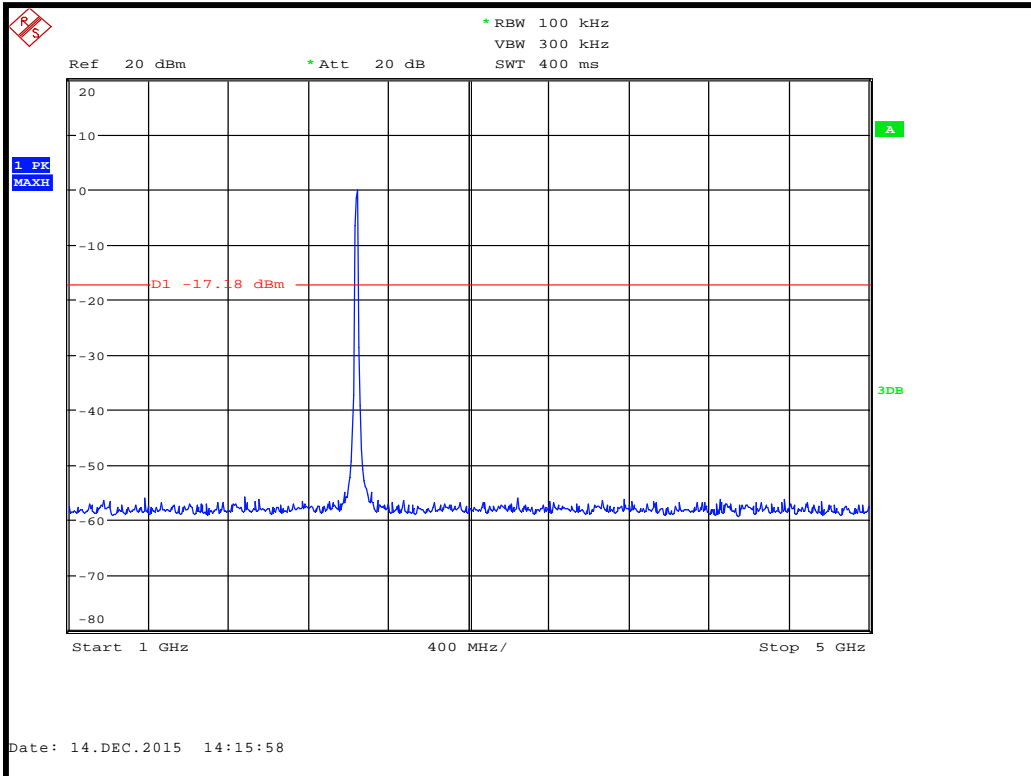


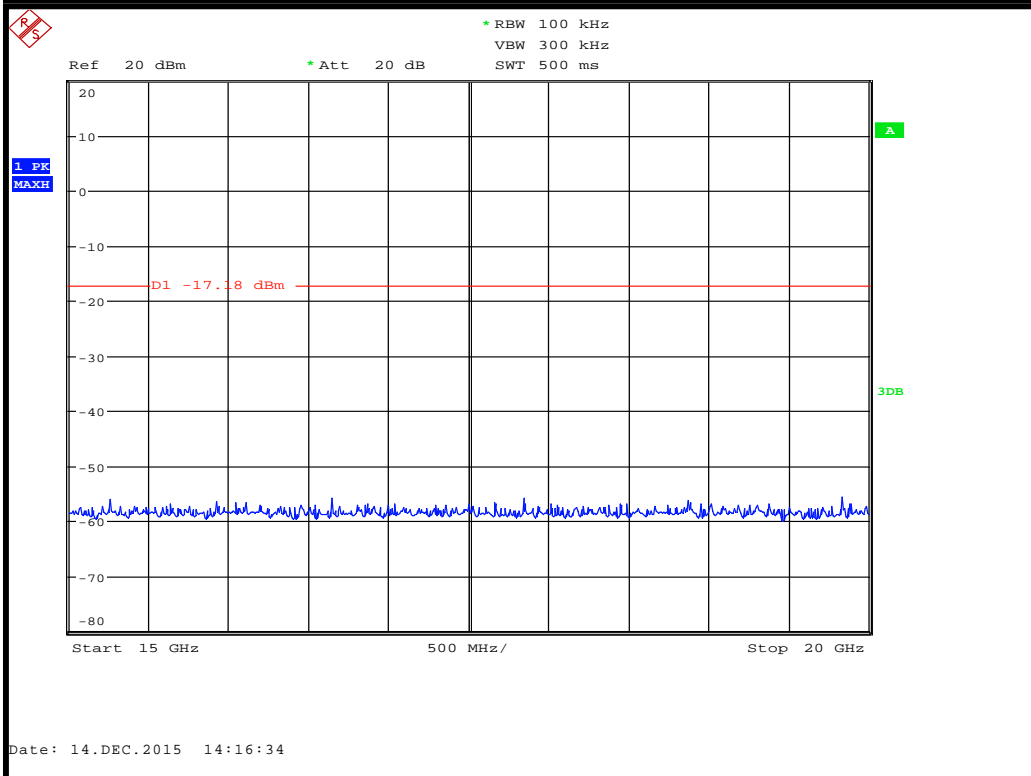
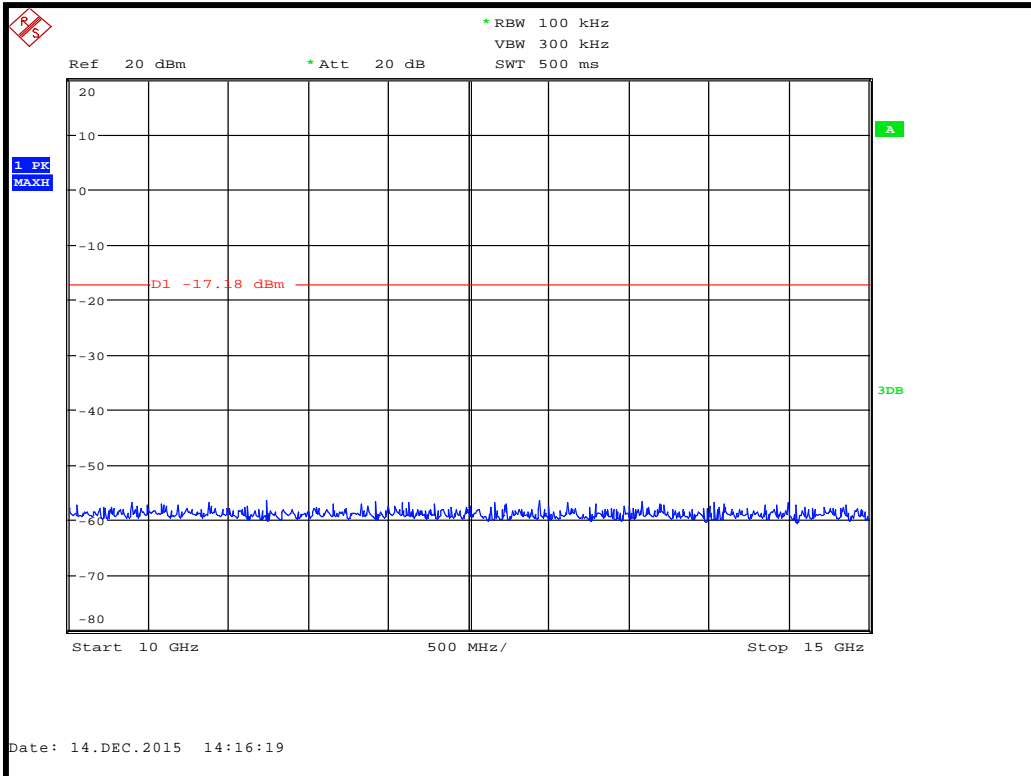


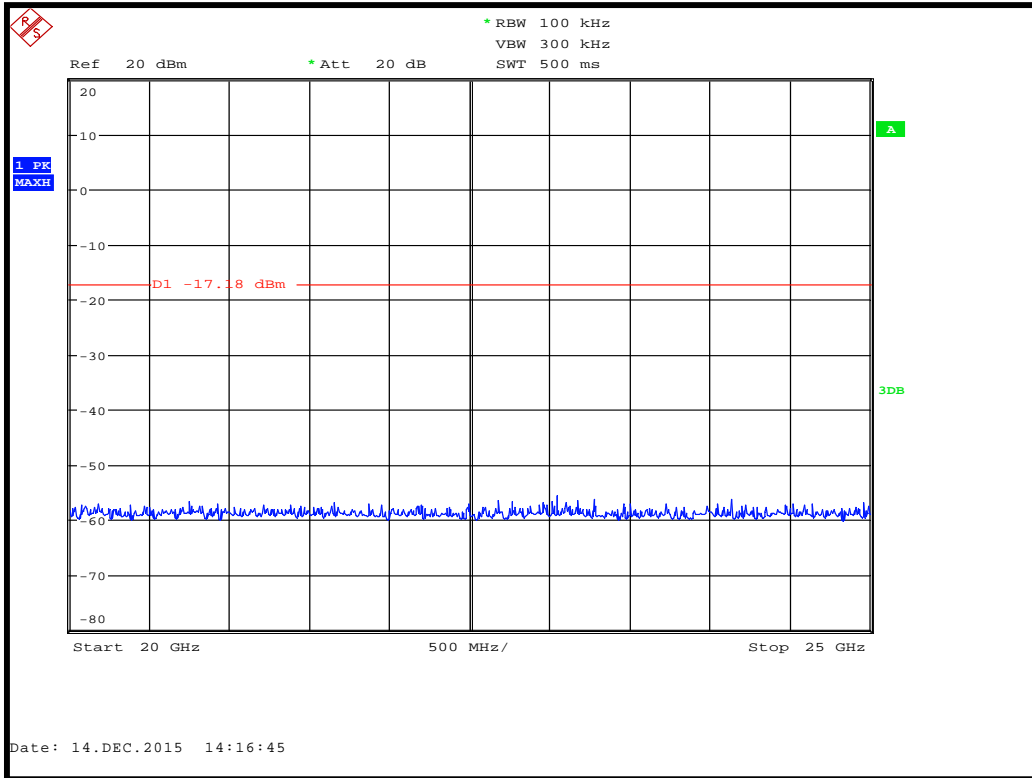
CH7





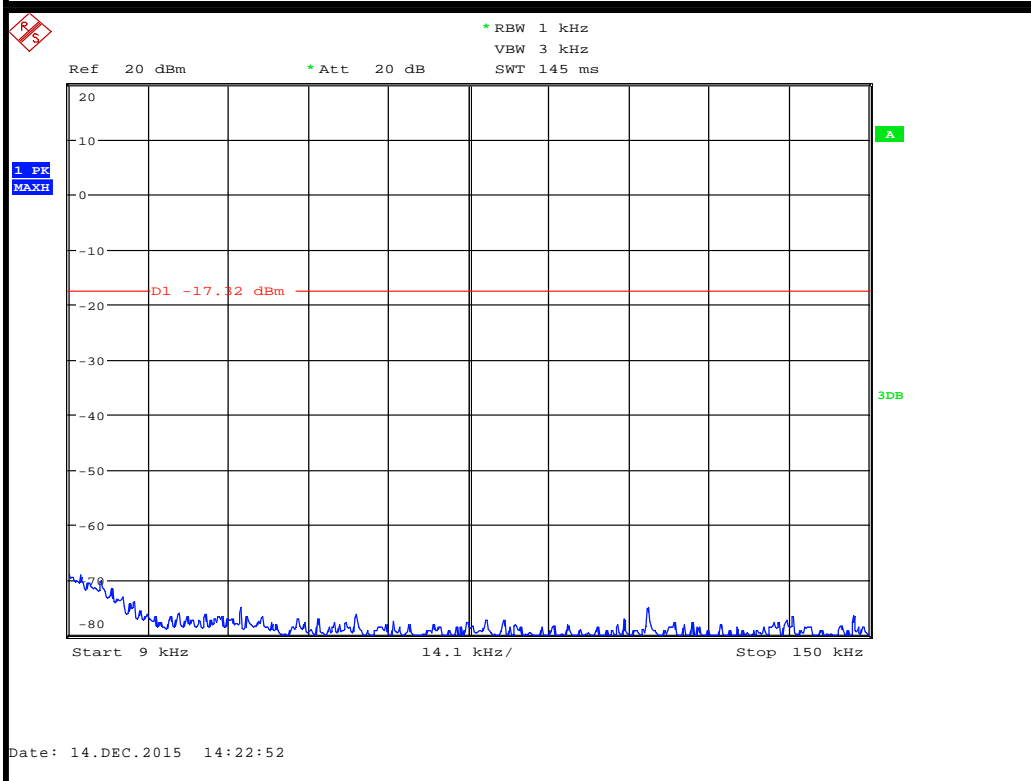
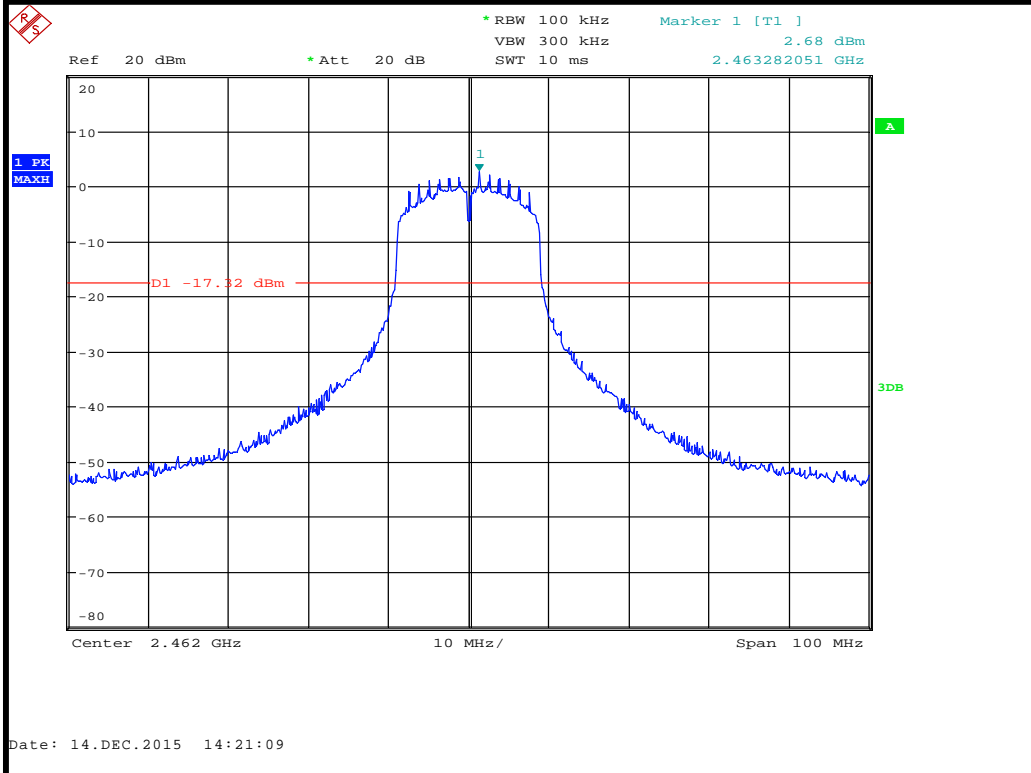


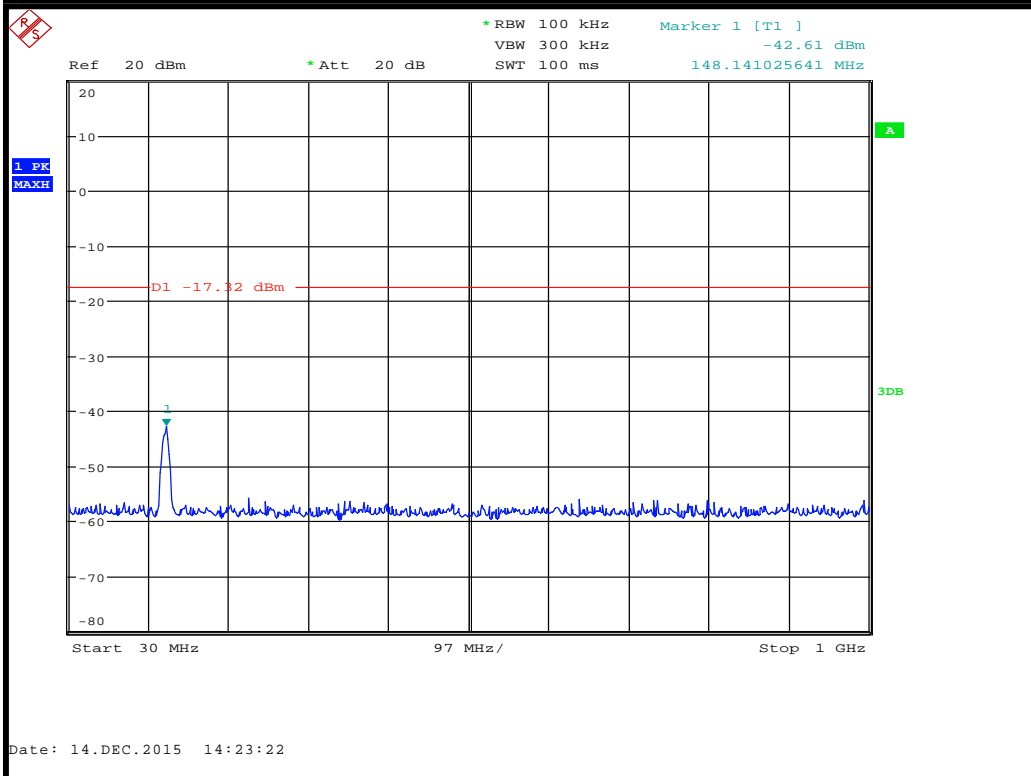
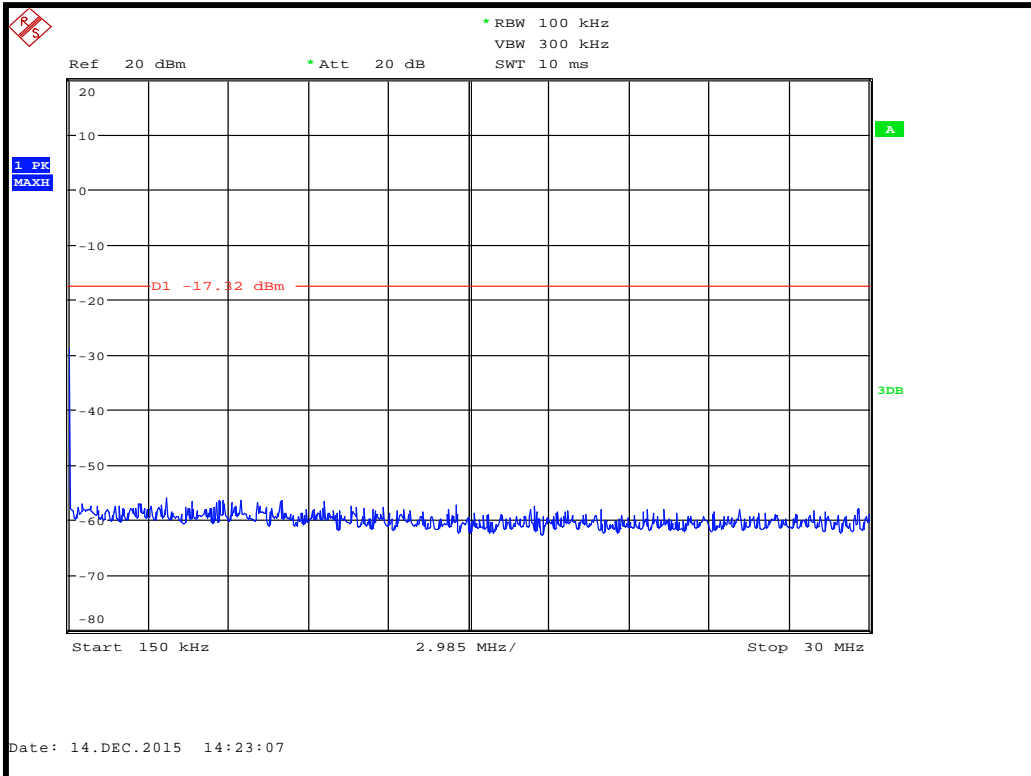


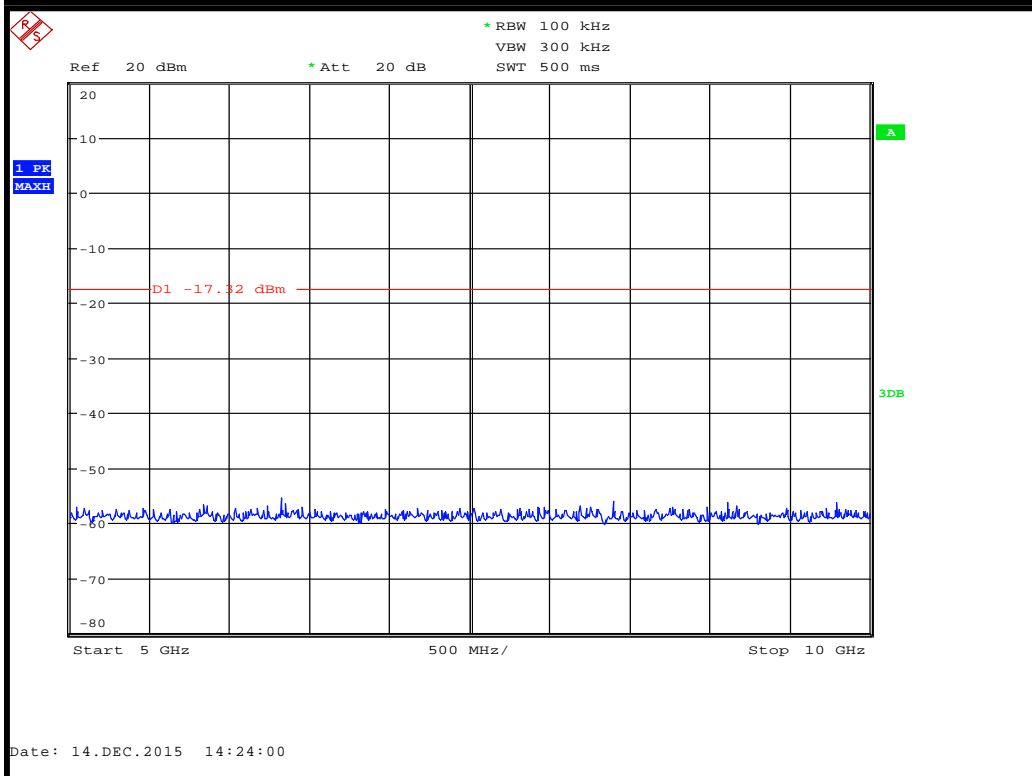
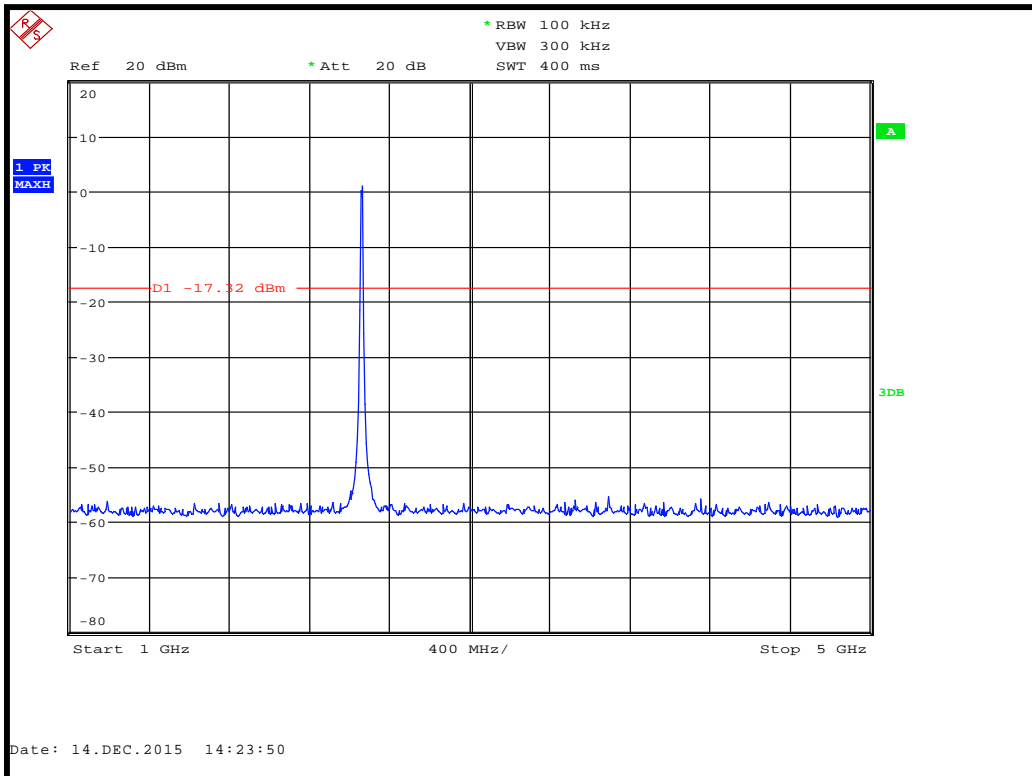


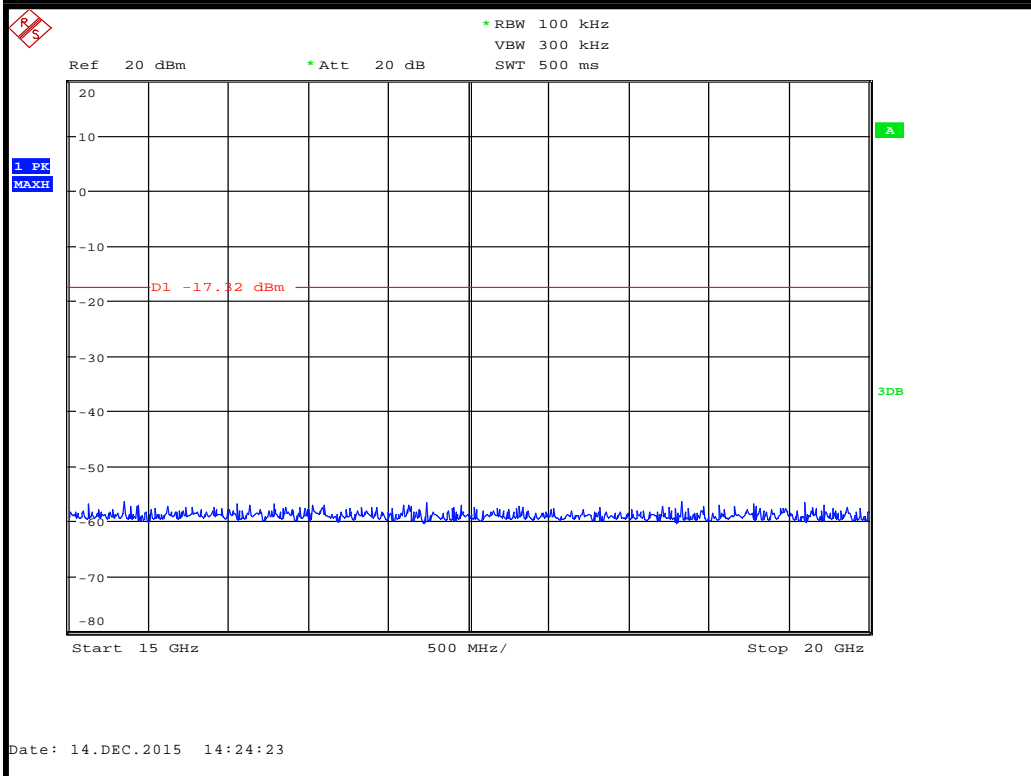
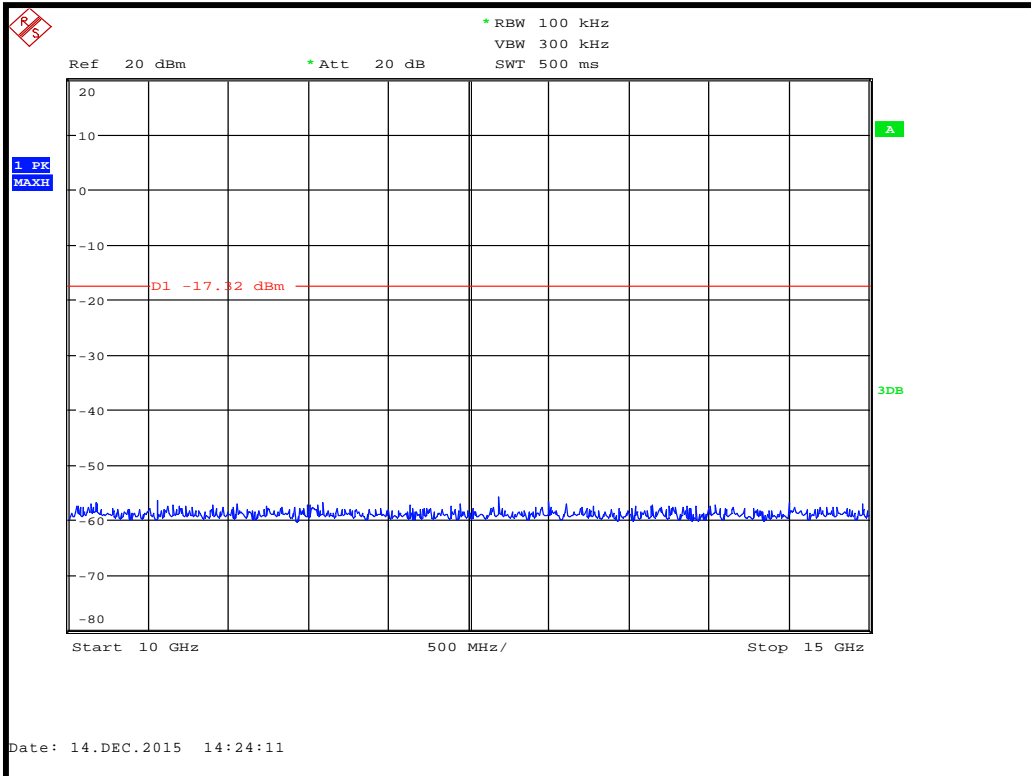


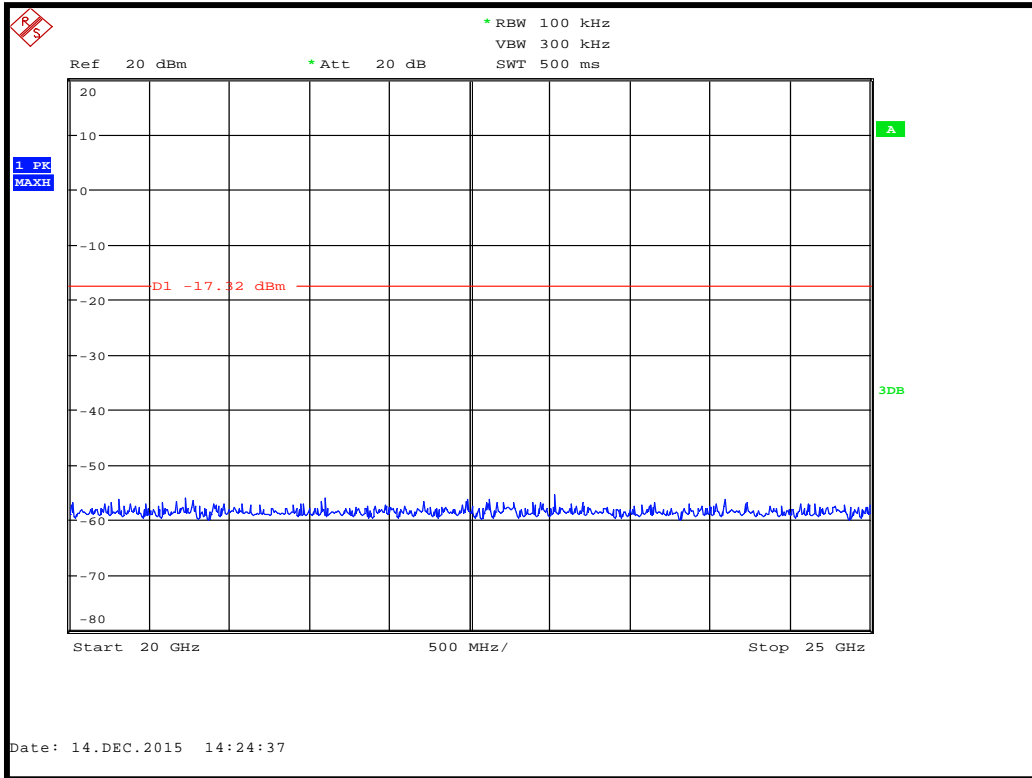
CH11





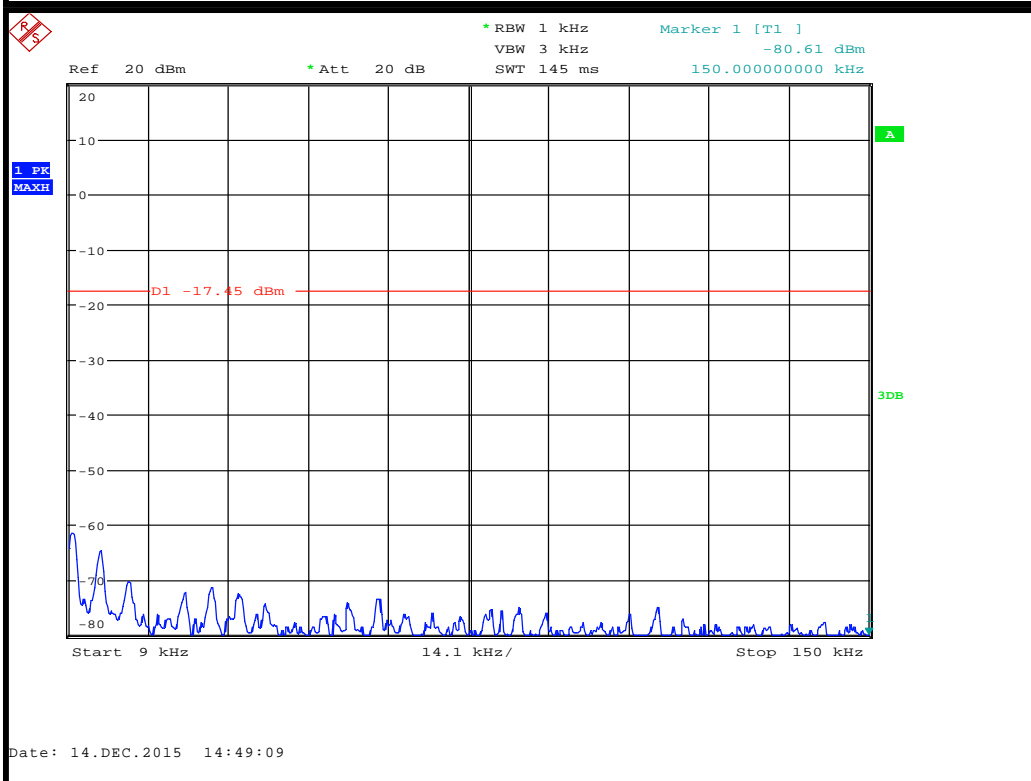
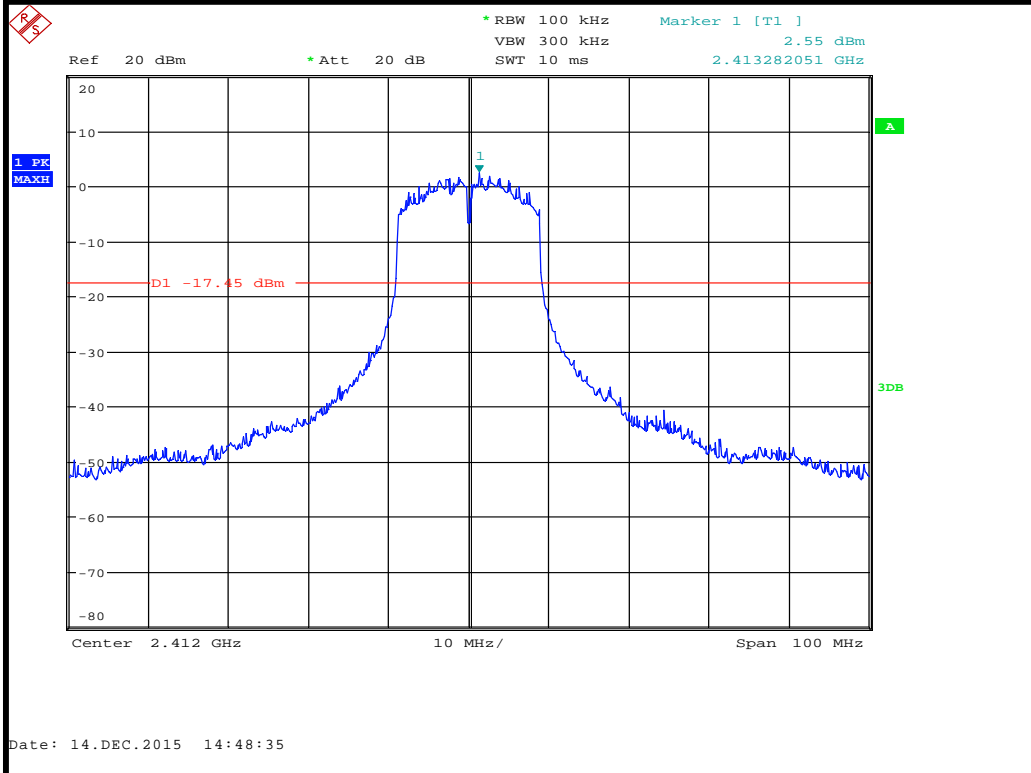


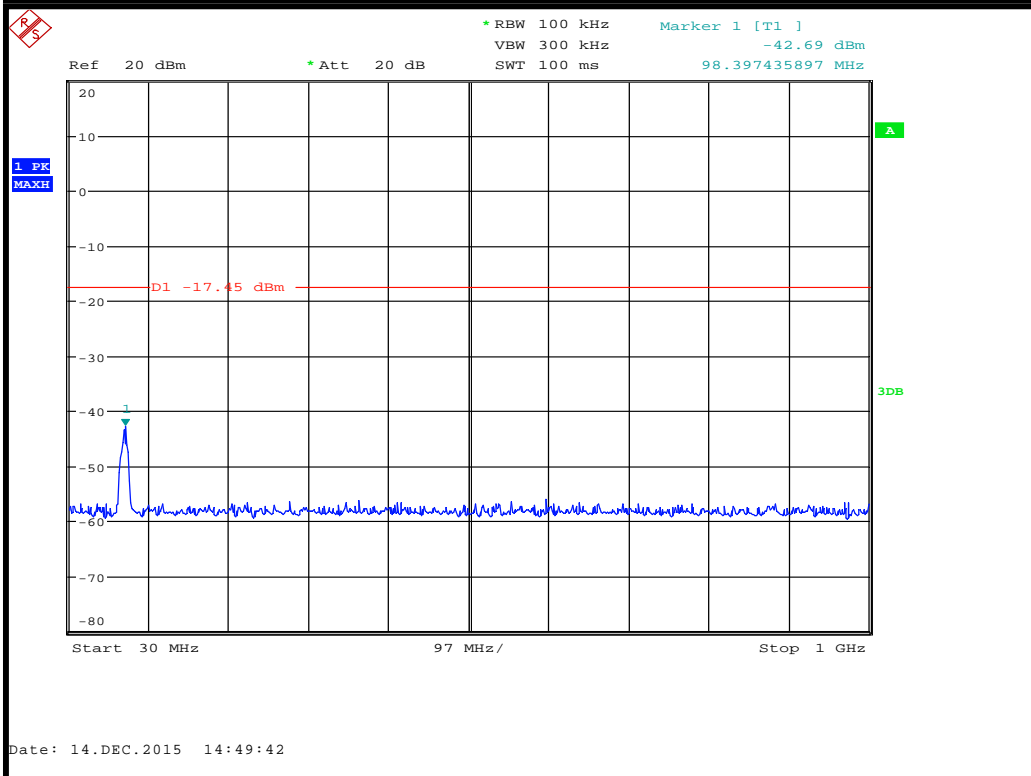
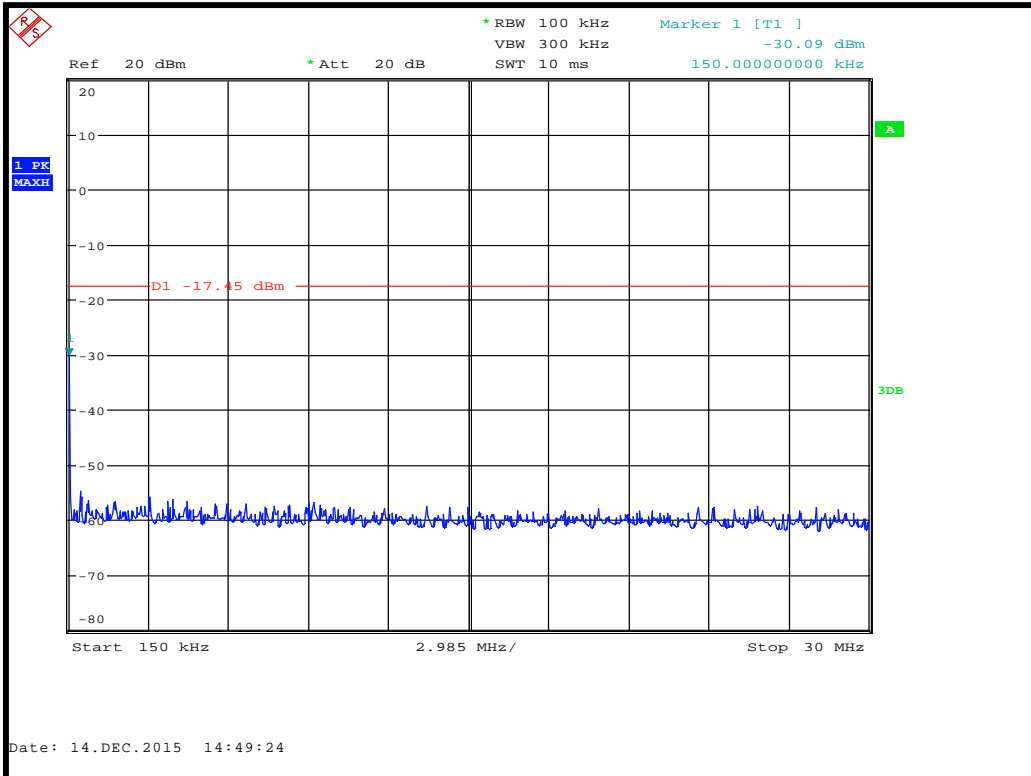




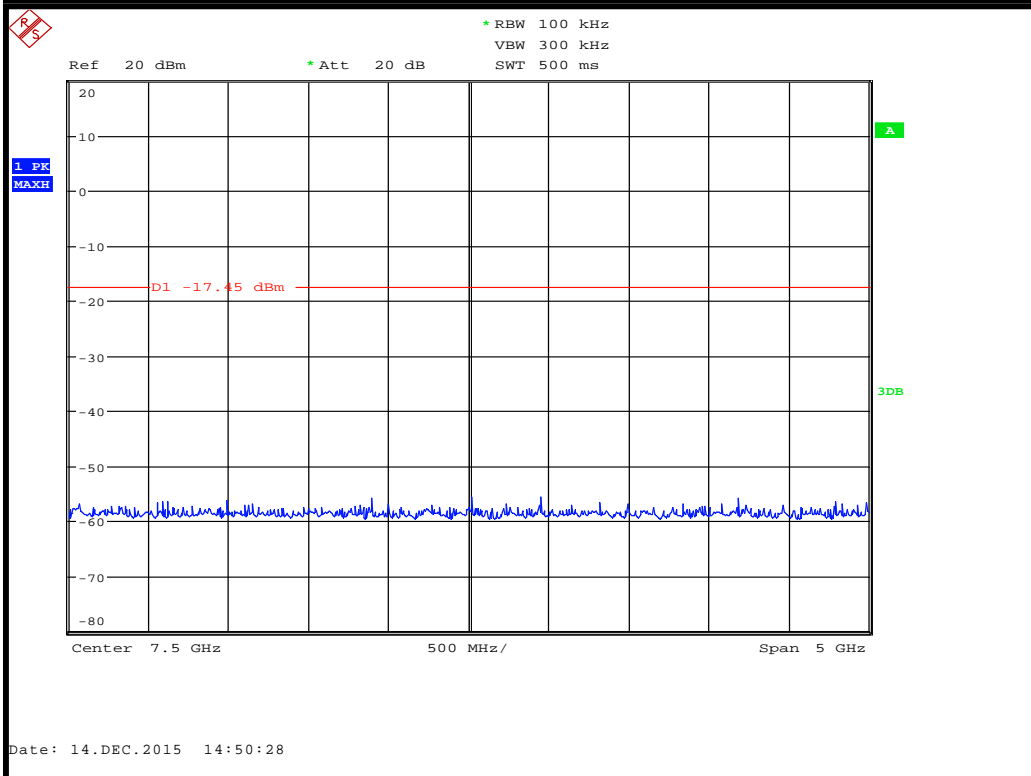
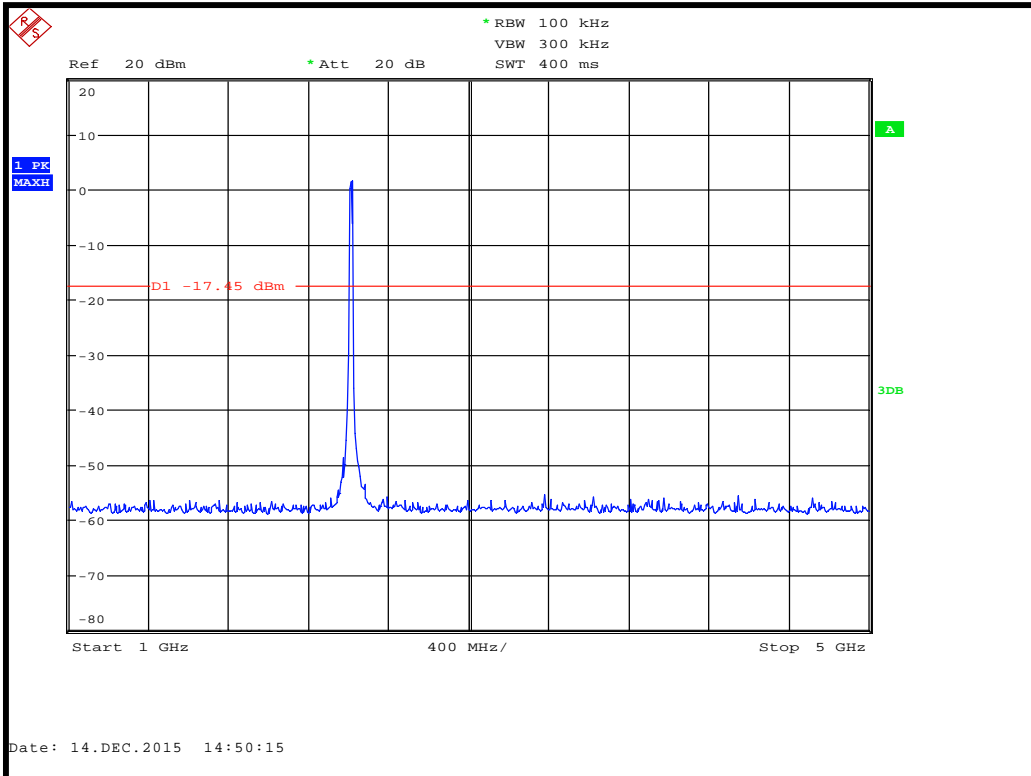
<b>Modulation: 802.11n; Data rate: 72.2 Mbps (MCS7); Power setting: Full</b>						
<b>Channel Frequency (MHz)</b>	<b>Emission Frequency (MHz)</b>	<b>Analyzer Level (dBm)</b>	<b>Emission Level (dBm)</b>	<b>Limit (dBm)</b>	<b>Margin (dB)</b>	<b>Result</b>
All emissions were a minimum of 20 dB below the test limit						

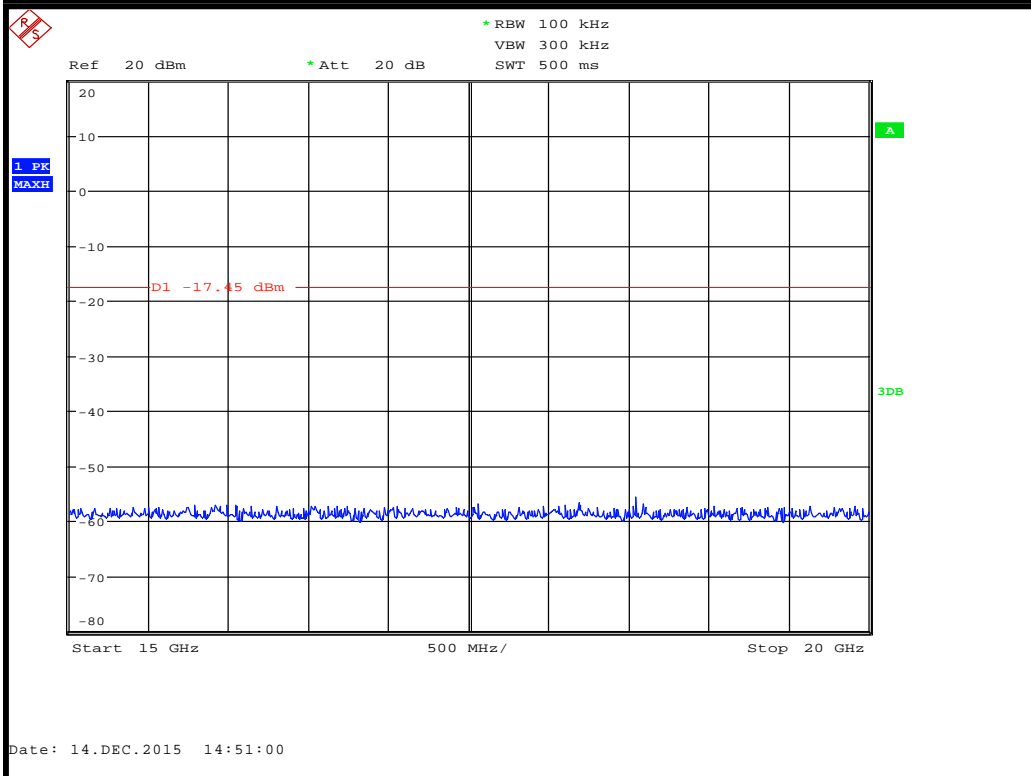
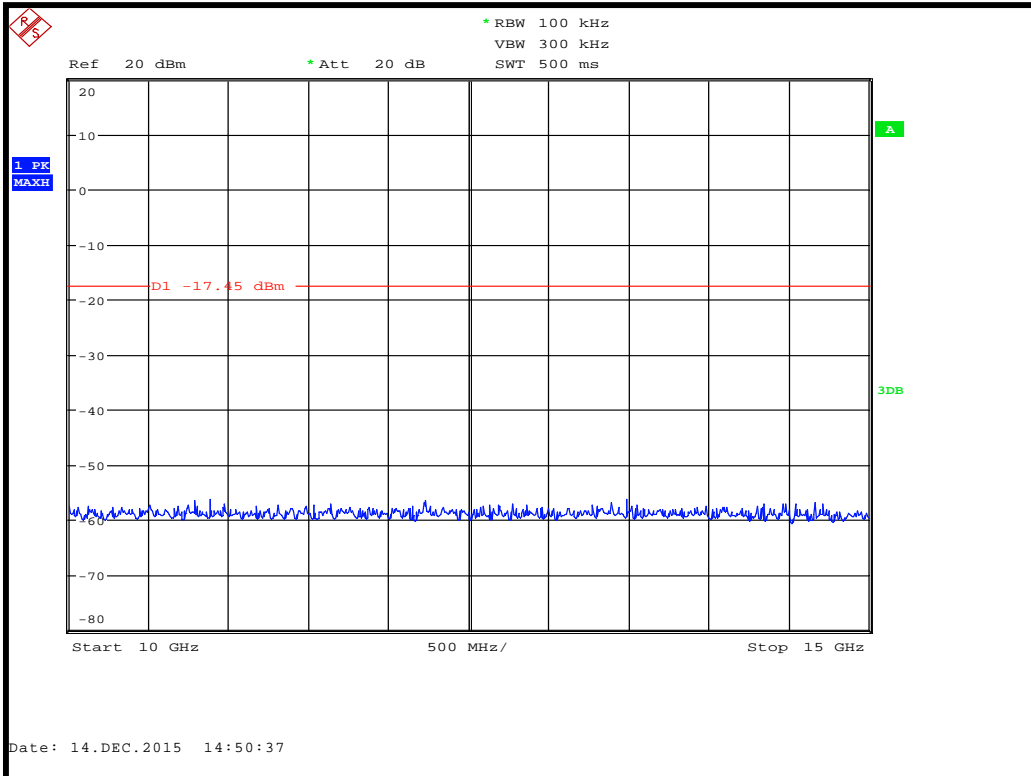
CH1

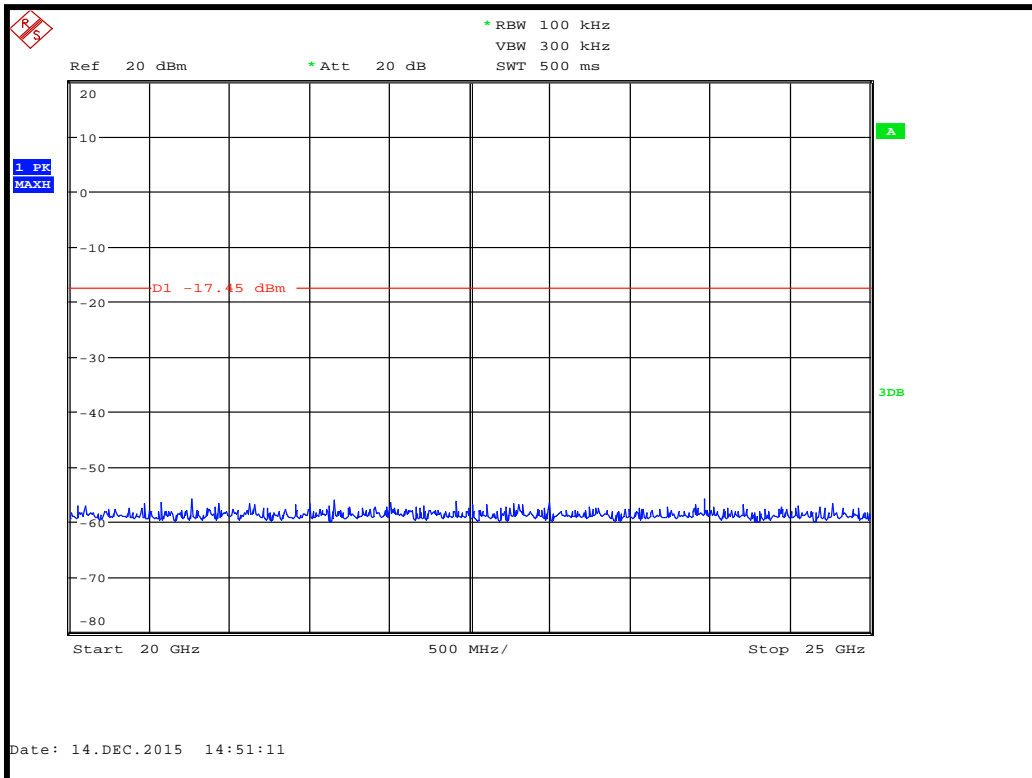




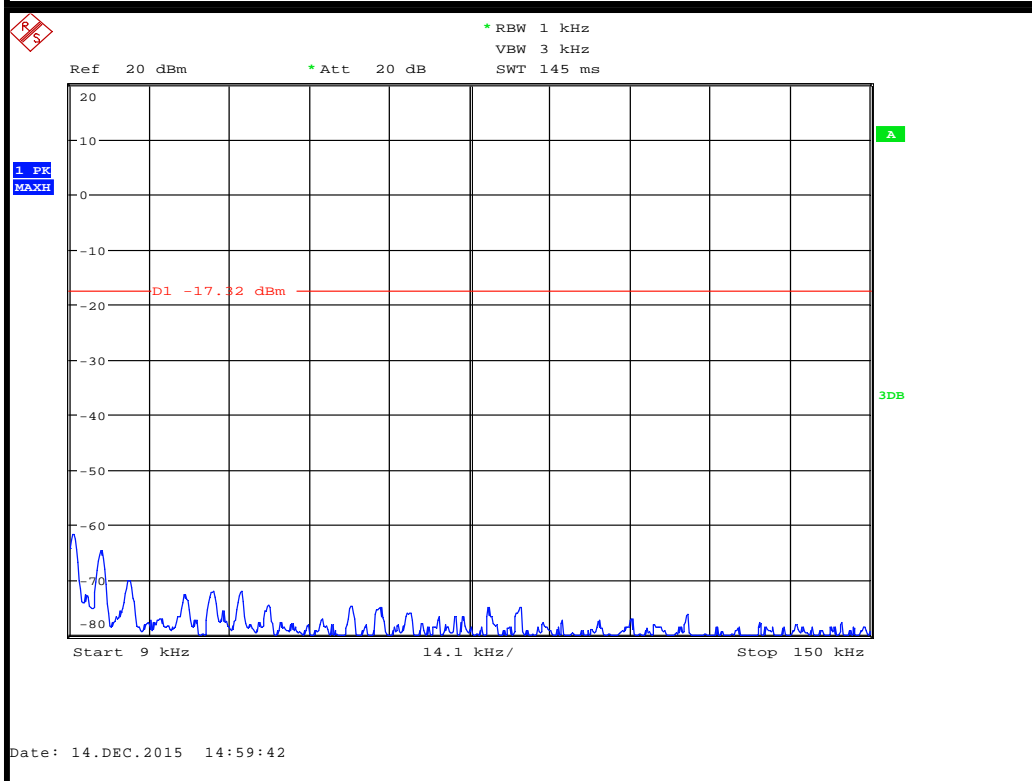
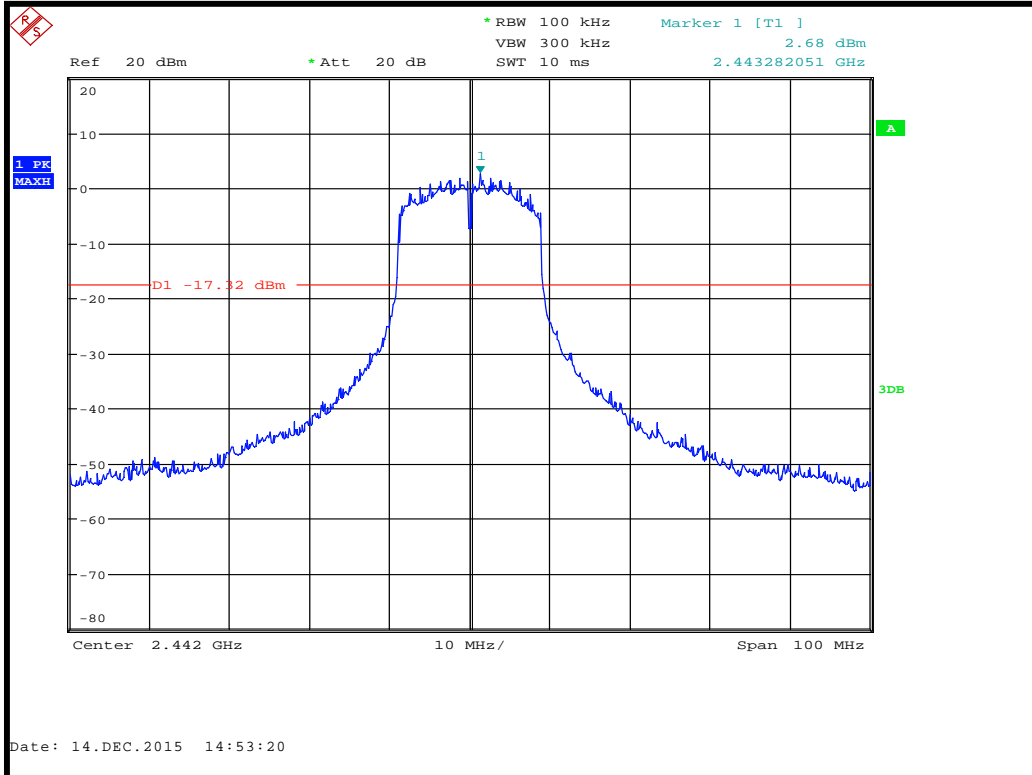


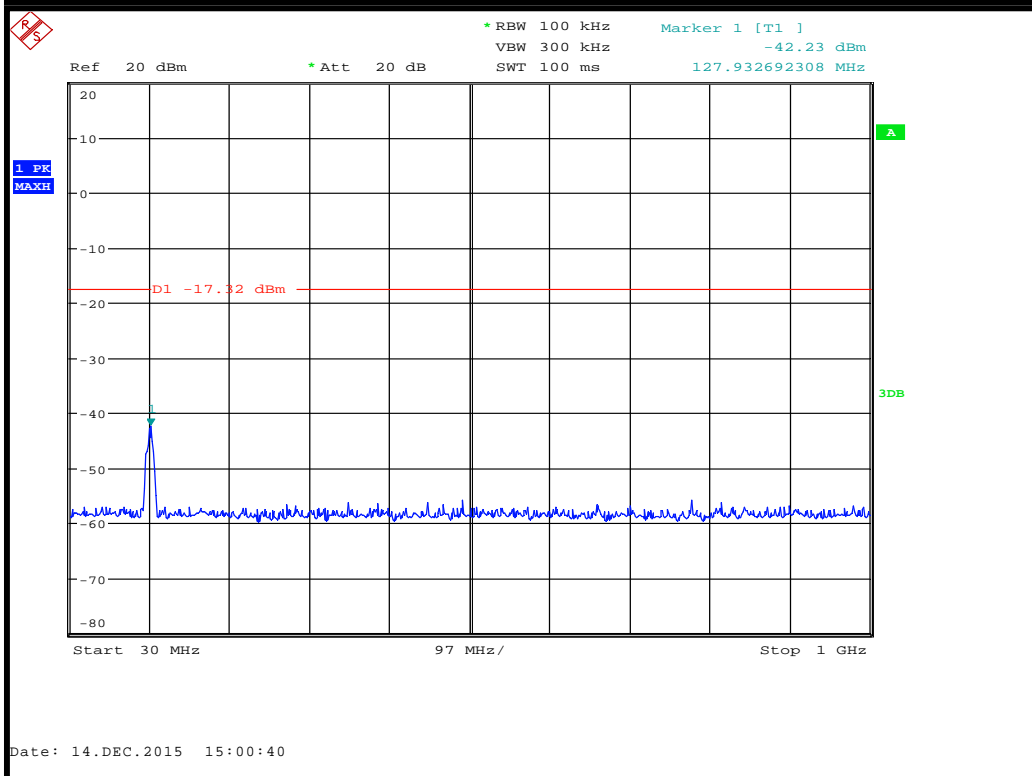
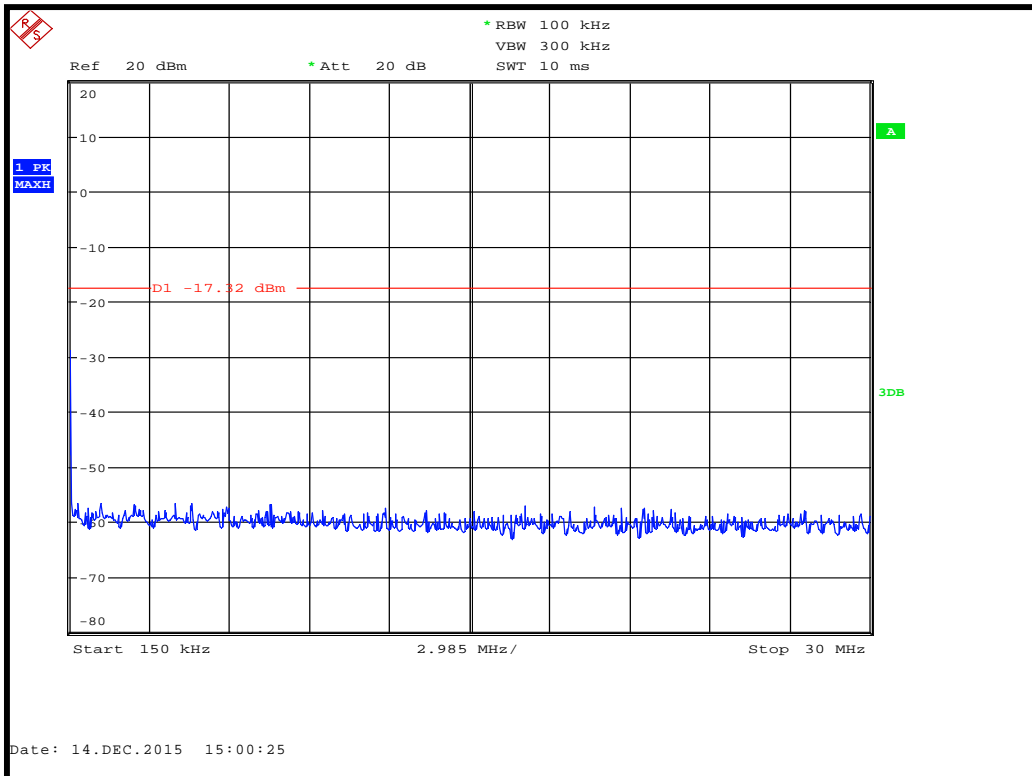


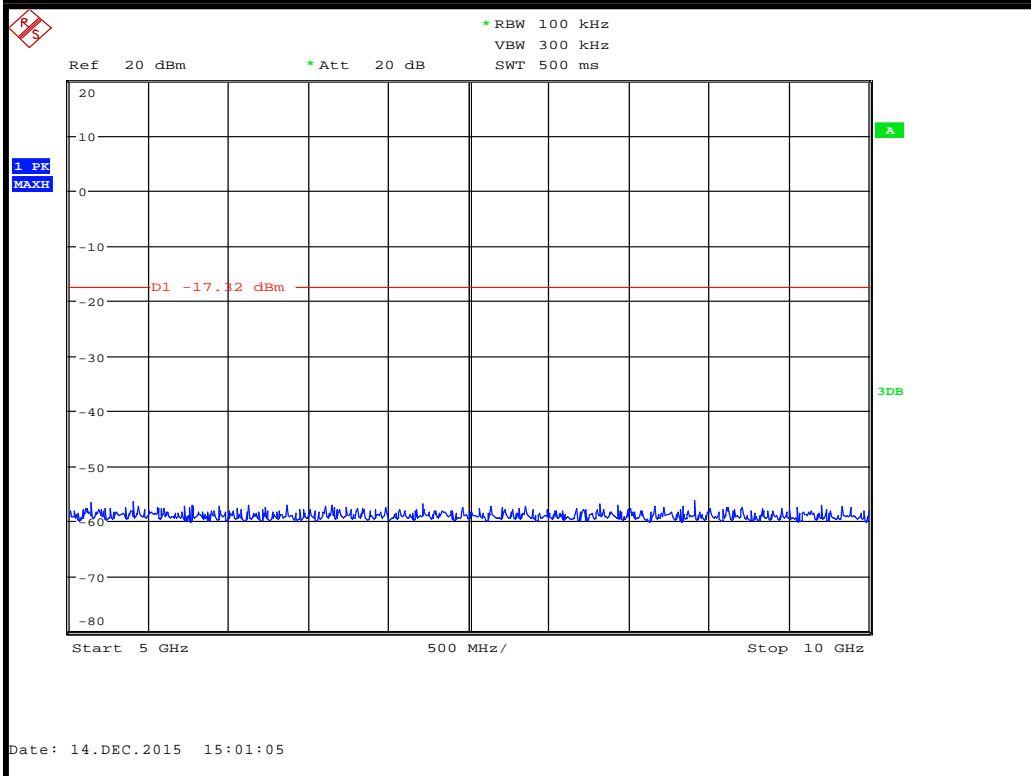
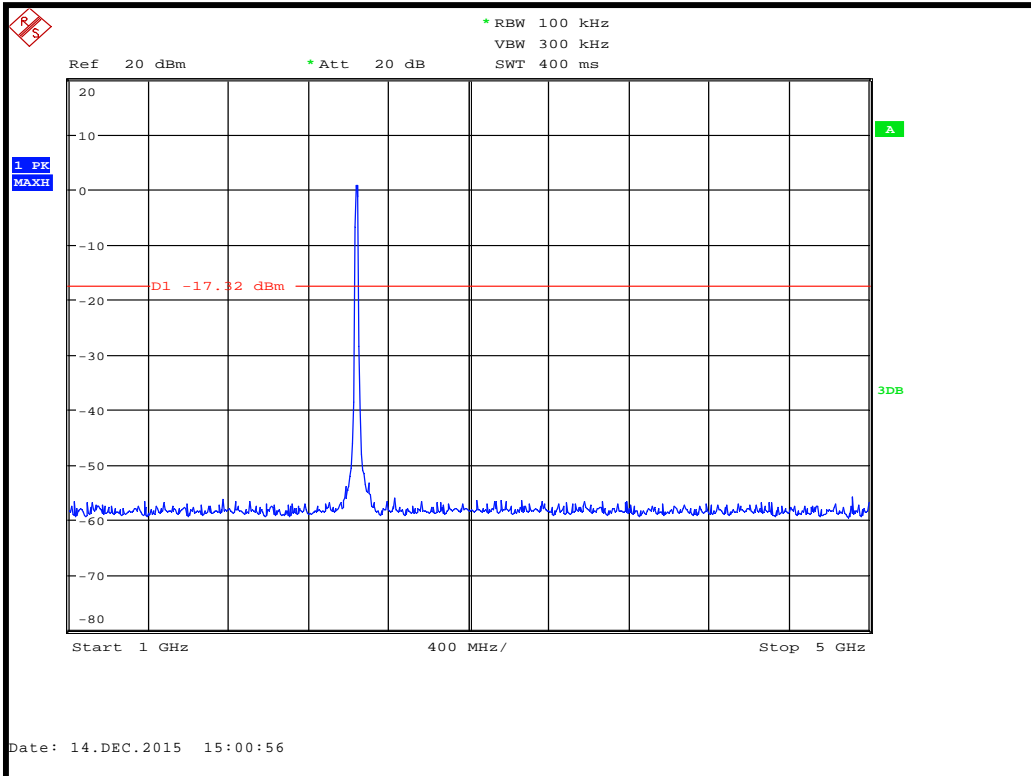


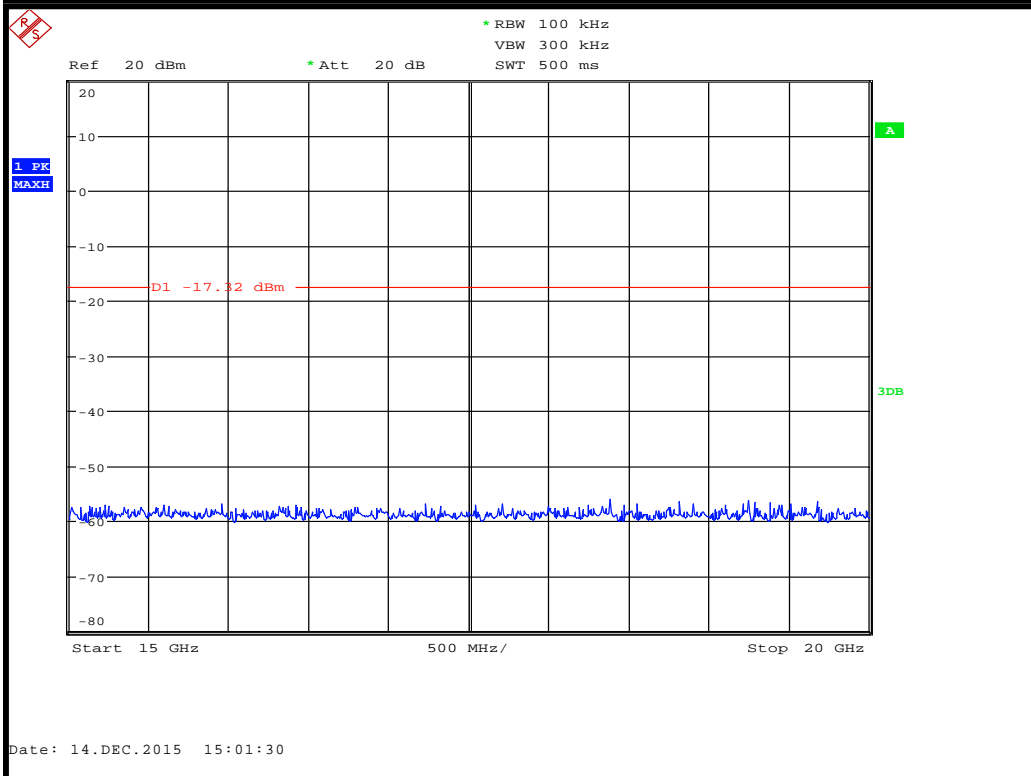
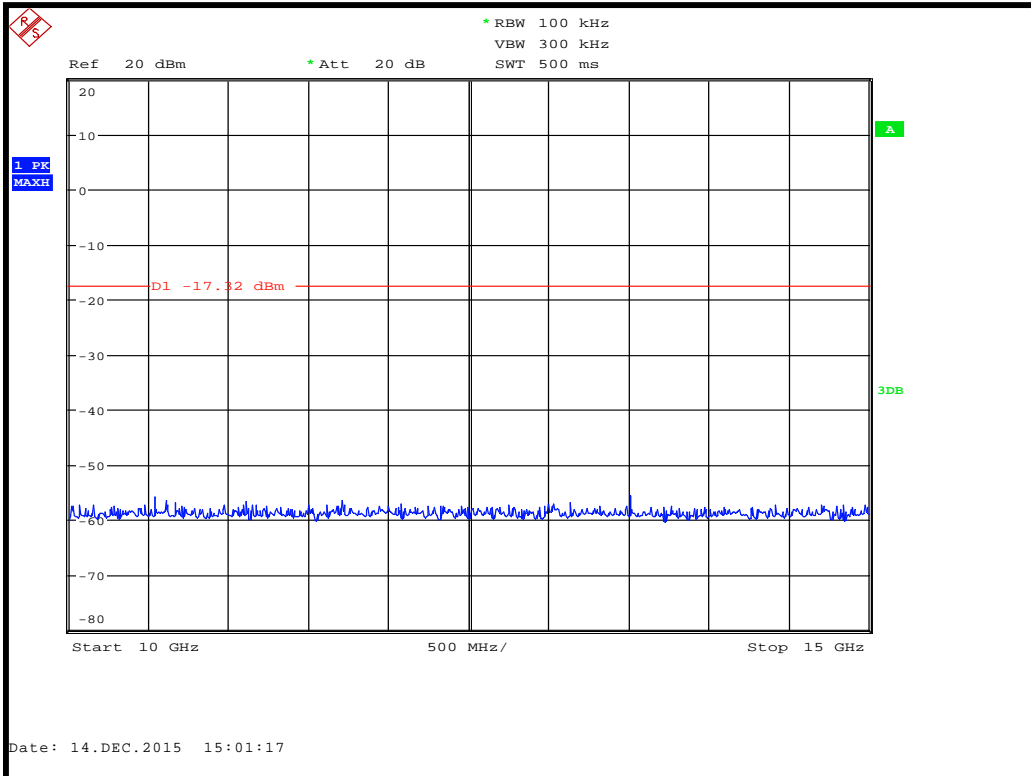


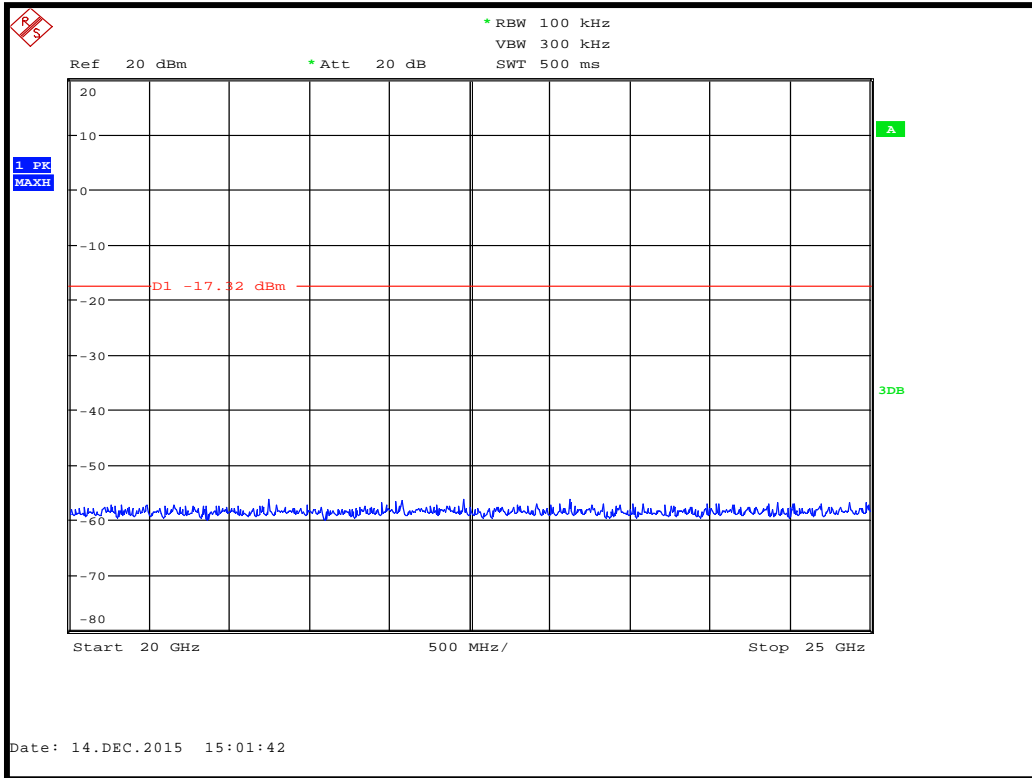
CH7





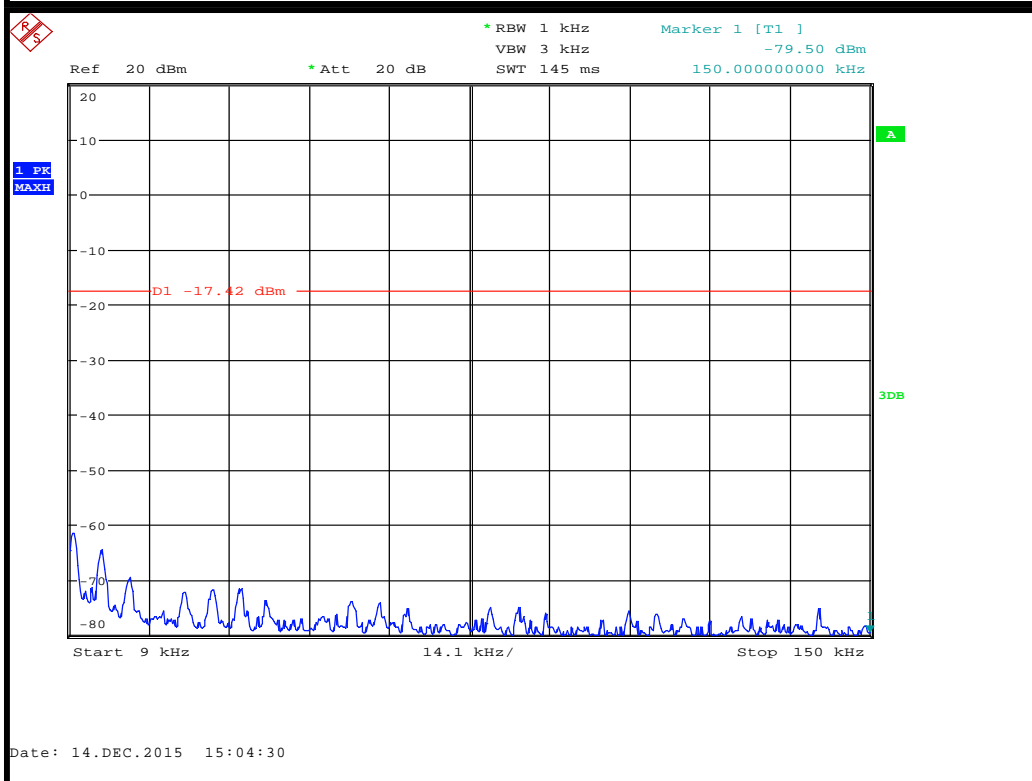
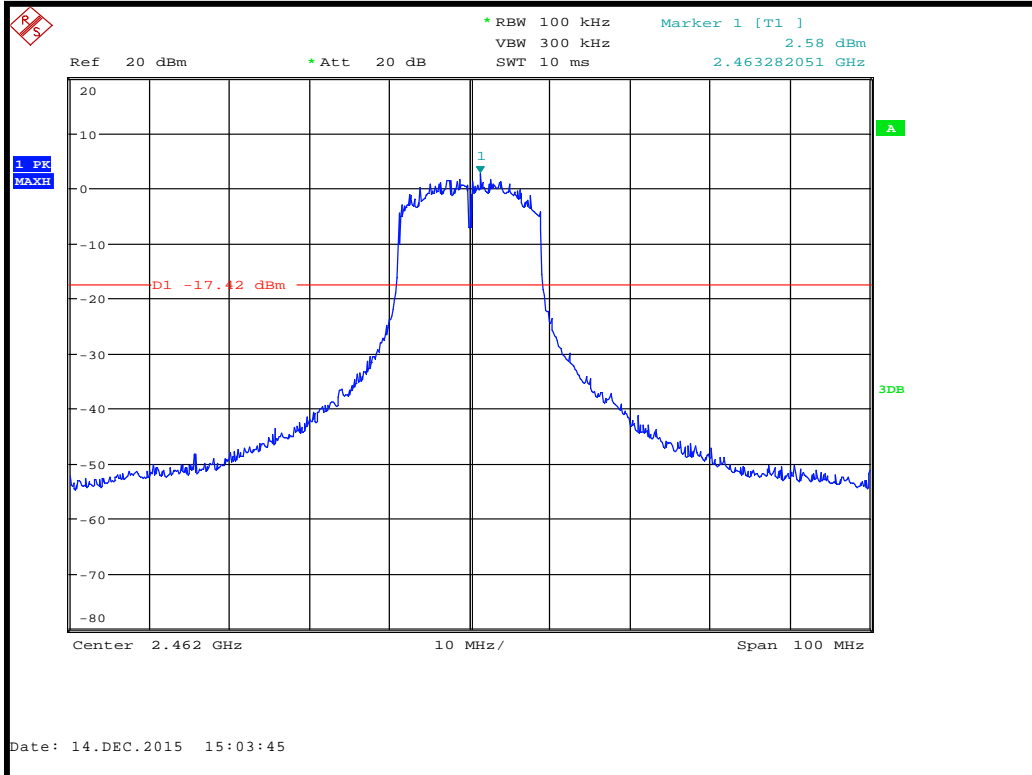


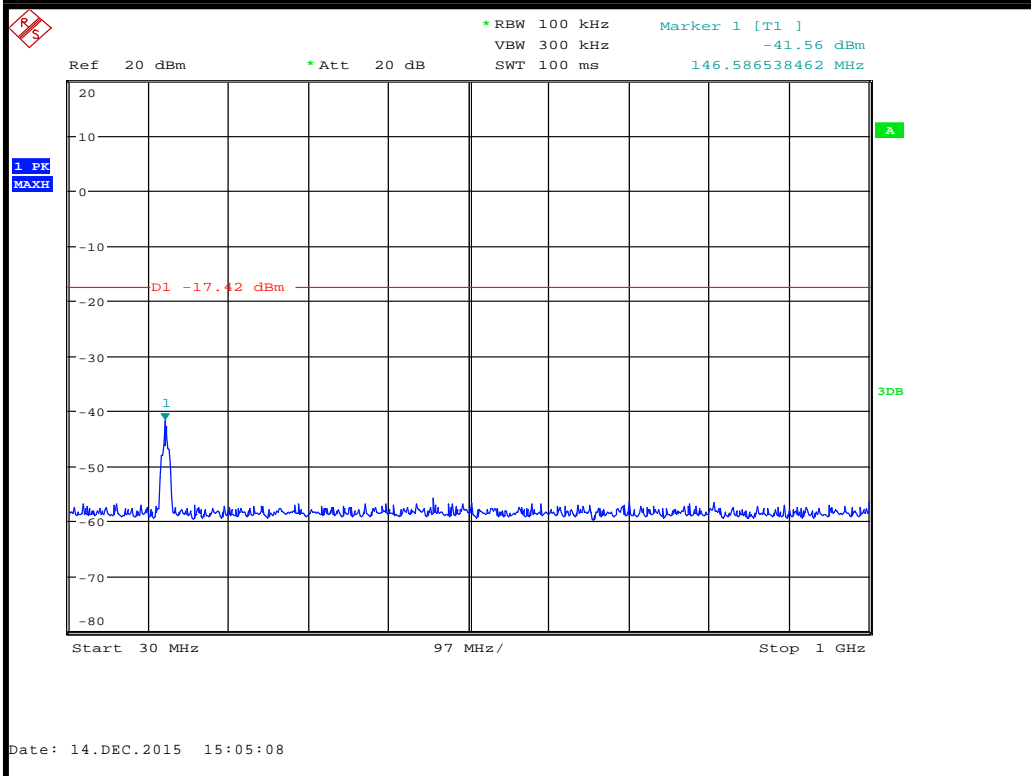
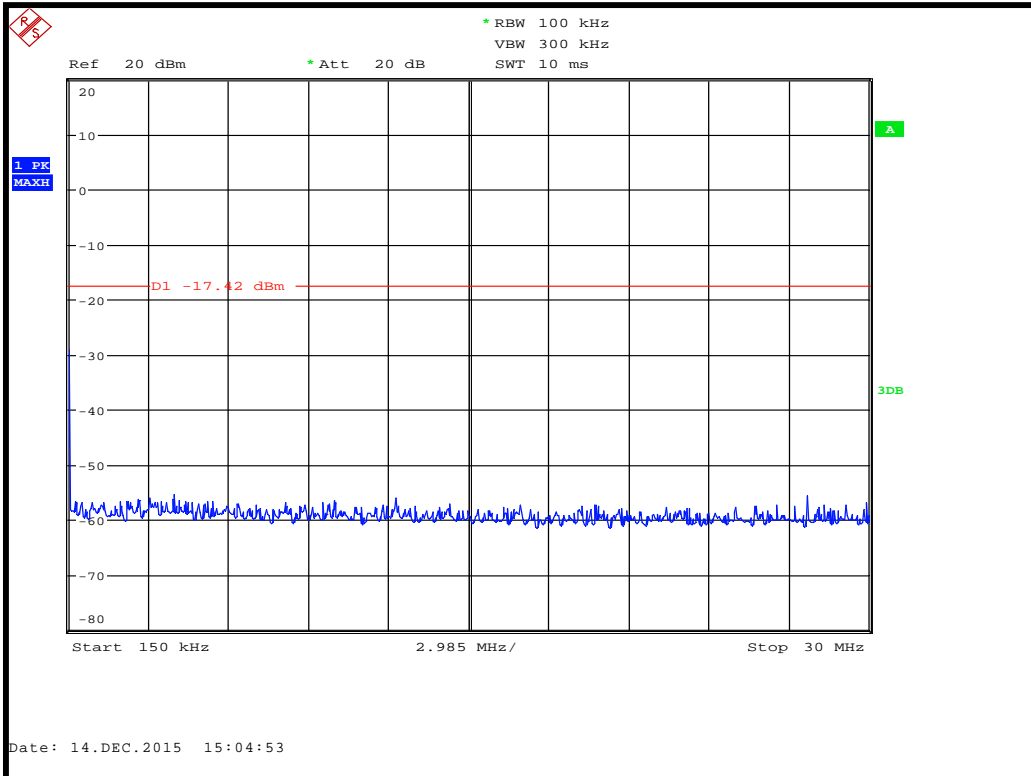


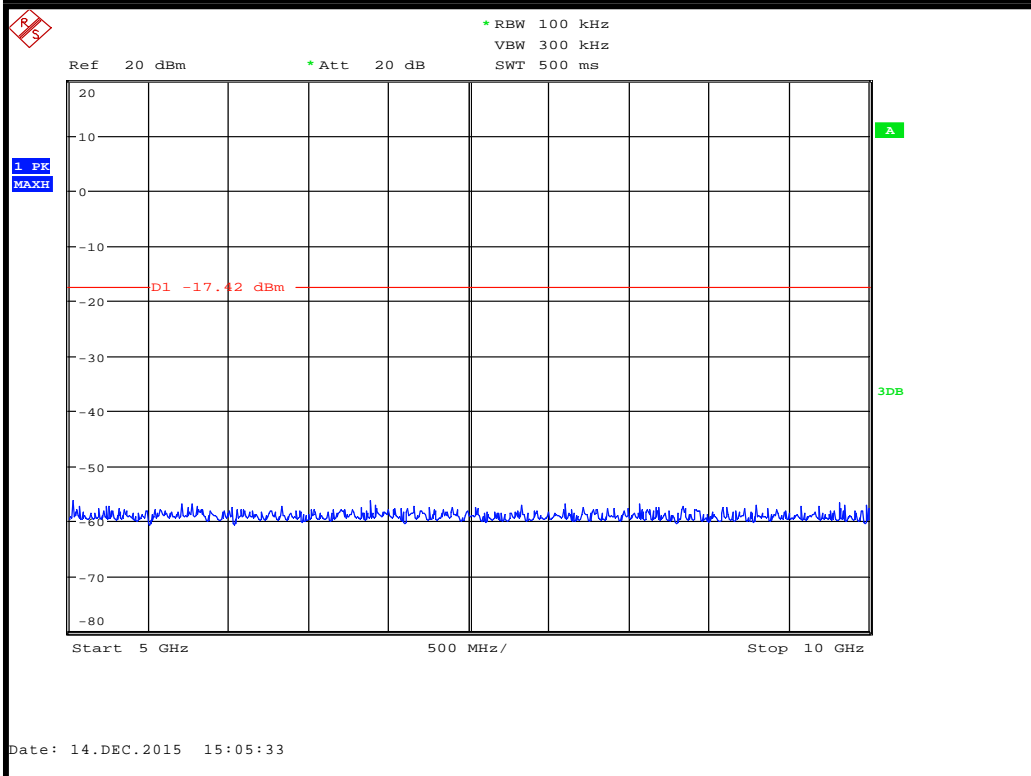
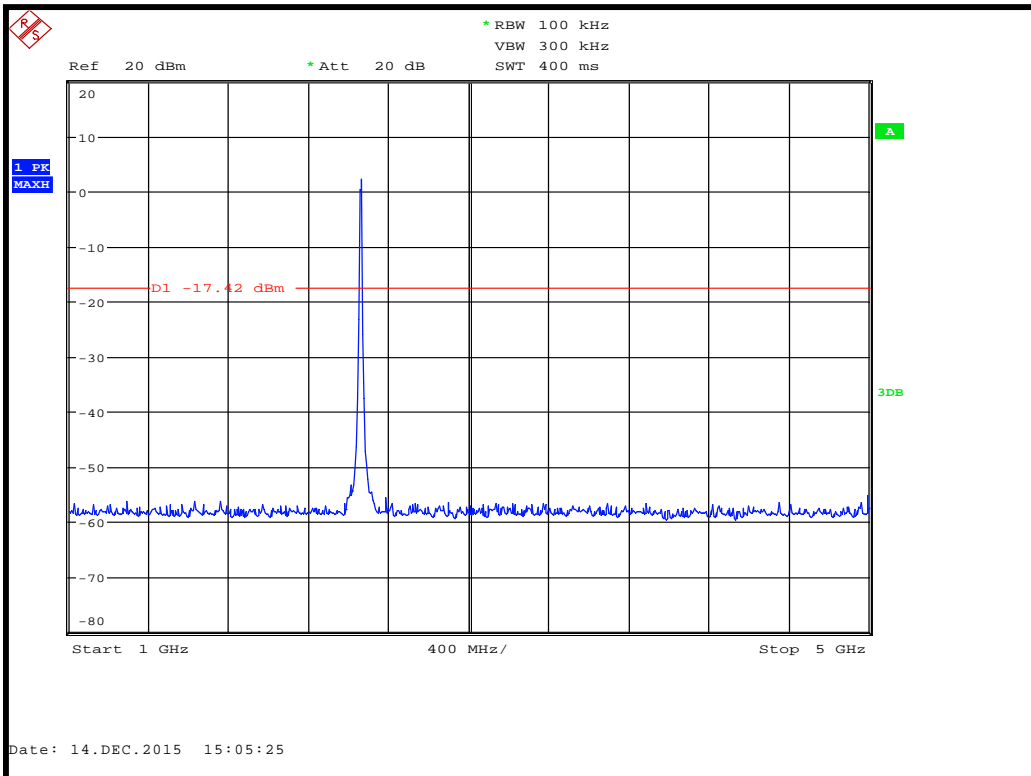


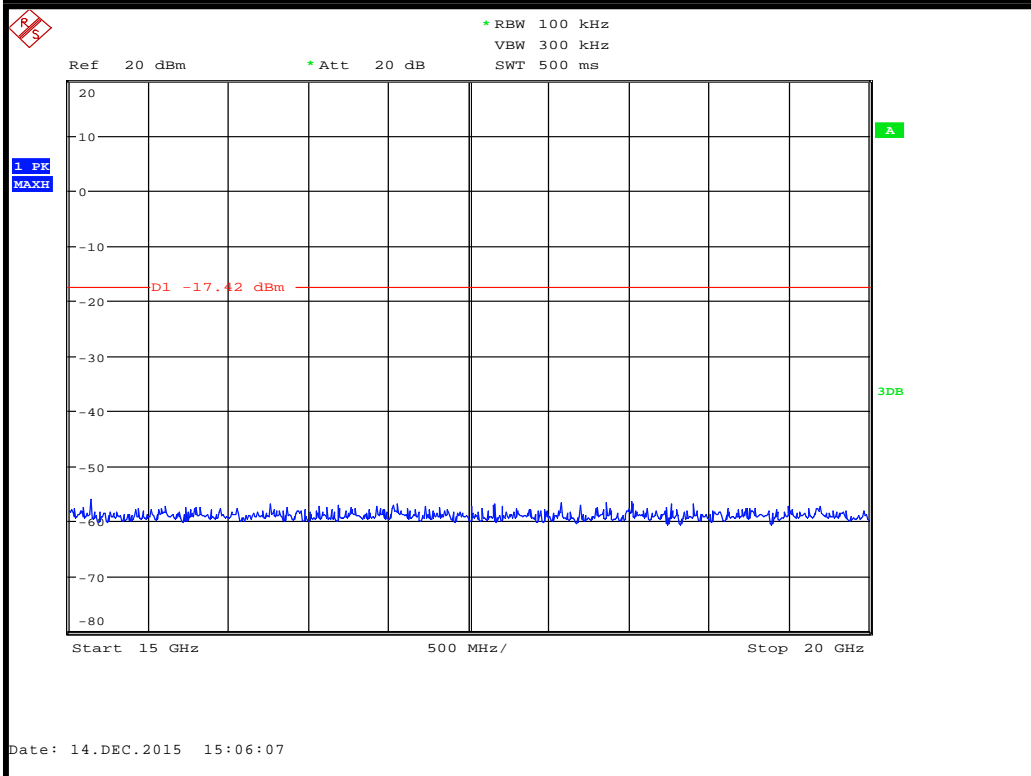
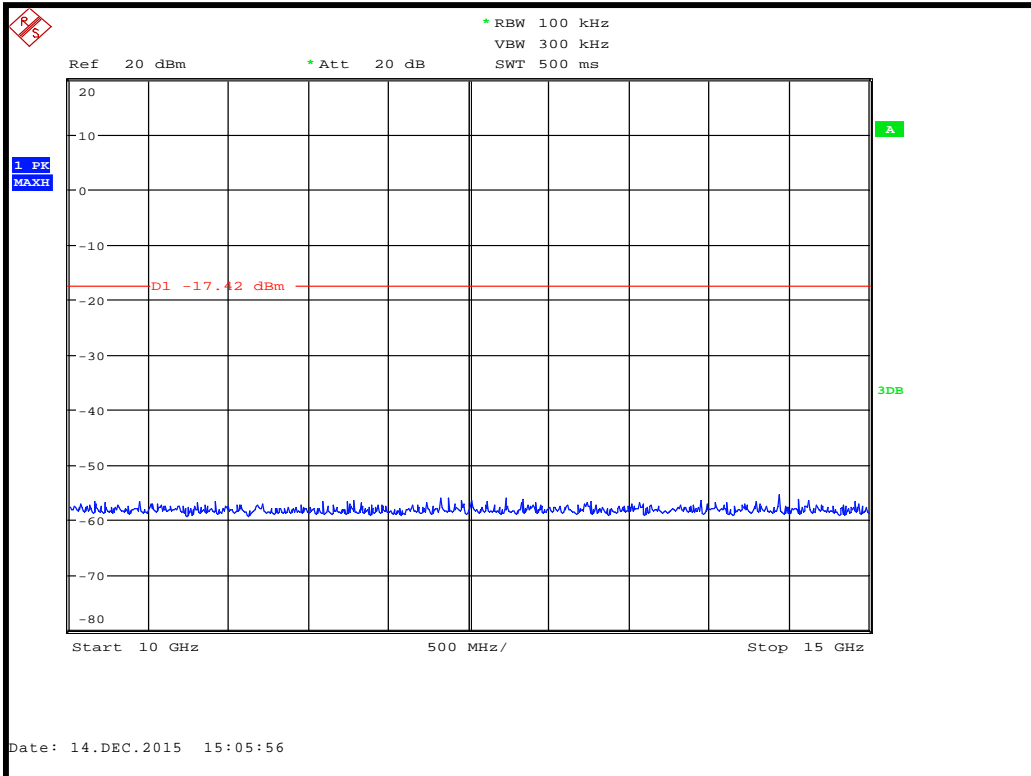


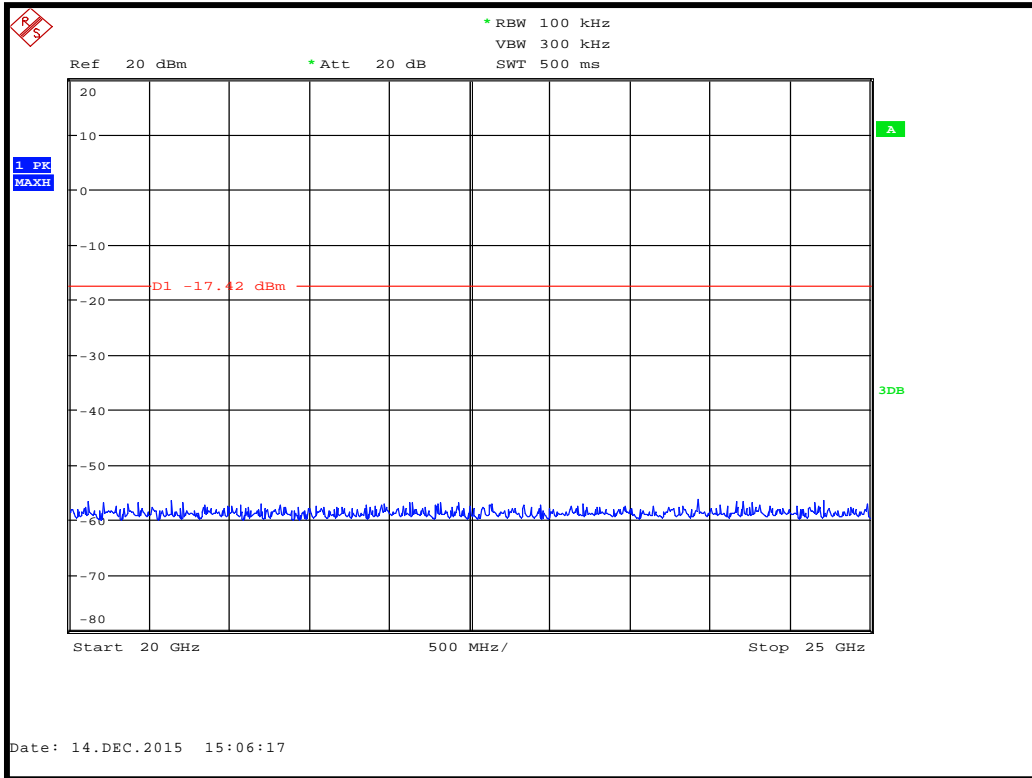
CH11











## 16 Power spectral density

### 16.1 Definition

The power per unit bandwidth.

### 16.2 Test Parameters

Test Location:	Element Hull
Test Chamber:	Lab 4
Test Standard and Clause:	ANSI C63.10-2013, Clause 11.10
EUT Channels / Frequencies Measured:	Low / Mid / High
EUT Channel Bandwidths:	20 MHz
Deviations From Standard:	None
Measurement BW:	3 kHz
Spectrum Analyzer Video BW: (requirement at least 3x RBW)	10 kHz
Measurement Span: (requirement 1.5 times Channel BW)	30 MHz
Measurement Detector:	Peak

### Environmental Conditions (Normal Environment)

Temperature: 22 °C	+15 °C to +35 °C (as declared)
Humidity: 32 % RH	20 % RH to 75 % RH (as declared)
Supply: 110V ac	110 V ac ±10% (as declared)

### 16.3 Test Limit

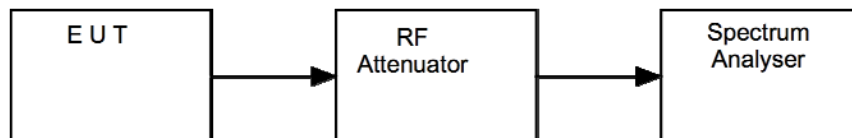
The transmitter power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

## 16.4 Test Method

With the EUT setup as per section 9 of this report and connected as per Figure vi, the peak emission of the EUT was measured on a spectrum analyser, with path losses taken into account.

The measurements were performed with EUT set at its maximum duty. All modulation schemes, data rates and power settings were used to observe the worst case configuration in each bandwidth.

**Figure vi Test Setup**



## 16.5 Test Equipment

Type of Equipment	Maker/Supplier	Model Number	Element Number	Calibration Due Date	Calibration Interval (m)
Spectrum Analyser	Agilent	N9030A	REF2167	13/10/2016	12

## 16.6 Test Results

<b>Modulation: 802.11b; Data rate: 1 Mbps; Power setting: Full</b>				
Channel Frequency (MHz)	Analyzer Level (dBm)	Cable loss (dB)	Power (dBm)	Result
2412	-5.53	0	-5.53	PASS
2437	-5.79	0	-5.79	PASS
2462	-4.77	0	-4.77	PASS

<b>Modulation: 802.11b; Data rate: 11 Mbps; Power setting: Full</b>				
Channel Frequency (MHz)	Analyzer Level (dBm)	Cable loss (dB)	Power (dBm)	Result
2412	-5.19	0	-5.19	PASS
2437	-5.93	0	-5.93	PASS
2462	-6.74	0	-6.74	PASS

<b>Modulation: 802.11g; Data rate: 6 Mbps; Power setting: Full</b>				
<b>Channel Frequency (MHz)</b>	<b>Analyzer Level (dBm)</b>	<b>Cable loss (dB)</b>	<b>Power (dBm)</b>	<b>Result</b>
2412	-11.08	0	-11.08	PASS
2437	-10.63	0	-10.63	PASS
2462	-10.73	0	-10.73	PASS

<b>Modulation: 802.11g; Data rate: 54 Mbps; Power setting: Full</b>				
<b>Channel Frequency (MHz)</b>	<b>Analyzer Level (dBm)</b>	<b>Cable loss (dB)</b>	<b>Power (dBm)</b>	<b>Result</b>
2412	-10.88	0	-10.88	PASS
2437	-10.09	0	-10.09	PASS
2462	-9.60	0	-9.60	PASS

<b>Modulation: 802.11n; Data rate: MCS0; Power setting: Full</b>				
<b>Channel Frequency (MHz)</b>	<b>Analyzer Level (dBm)</b>	<b>Cable loss (dB)</b>	<b>Power (dBm)</b>	<b>Result</b>
2412	-11.90	0	-11.90	PASS
2437	-10.43	0	-10.43	PASS
2462	-11.40	0	-11.40	PASS

<b>Modulation: 802.11n; Data rate: MCS7; Power setting: Full</b>				
<b>Channel Frequency (MHz)</b>	<b>Analyzer Level (dBm)</b>	<b>Cable loss (dB)</b>	<b>Power (dBm)</b>	<b>Result</b>
2412	-11.64	0	-11.64	PASS
2437	-11.75	0	-11.75	PASS
2462	-10.61	0	-10.61	PASS



## 17 Radiated emissions – unintentional radiation / receiver emissions

### 17.1 Definitions

#### *Receiver spurious emissions*

The radio frequency signals generated within the receiver, which may cause interference to other equipment. This includes the period during which the equipment is scanning or switching channels.

#### *Unintentional radiator*

A device that generates RF energy which is not intended to be radiated for reception by a radio receiver.

### 17.2 Test Parameters

Test Location:	Element Hull
Test Chamber:	Lab 16 / Lab 10
Test Standard and Clause:	ANSI C63.10-2013, Clause 6.5 and 6.6
EUT Channels / Frequencies Measured:	Low / Mid / High
EUT Channel Bandwidths:	20 MHz
Deviations From Standard:	None
Measurement BW:	30 MHz to 1 GHz: 120 kHz Above 1 GHz: 1 MHz
Measurement Detector:	Up to 1 GHz: quasi-peak Above 1 GHz: Peak

### Environmental Conditions (Normal Environment)

Temperature: 18 °C	+15 °C to +35 °C (as declared)
Humidity: 55 % RH	20 % RH to 75 % RH (as declared)
Supply: 110 V ac	110 V ac ±10 % (as declared)

### 17.3 Test Limit

Note:

Only radio communication receivers operating in stand-alone mode within the band 30 to 960 MHz, as well as scanner receivers, are subject to requirements, as described above. All other receivers are exempted from any certification, testing, labelling and reporting requirements.

However, all receivers in all frequency bands shall comply with the limits set forth in FCC 47CFR15B / IC RSS-Gen even in cases where testing, reporting and/or certification are not required.

### Receiver Radiated Limits

Frequency (MHz)	Field Strength ( $\mu\text{V/m}$ at 3 m)
30 to 88	100
88 to 216	150
216 to 960	200
Above 960	500

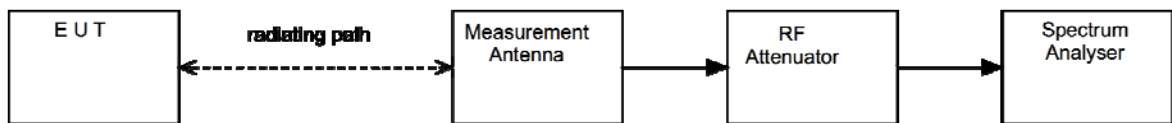
## 17.4 Test Method

With the EUT setup as per section 9 of this report and connected as per Figure viii, the emissions from the EUT were measured on a spectrum analyzer / EMI receiver. The EUT was rotated in three orthogonal planes and the measurement antenna height scanned (below 1 GHz, from 1 to 4 m; above 1 GHz as necessary) in order to maximise emissions.

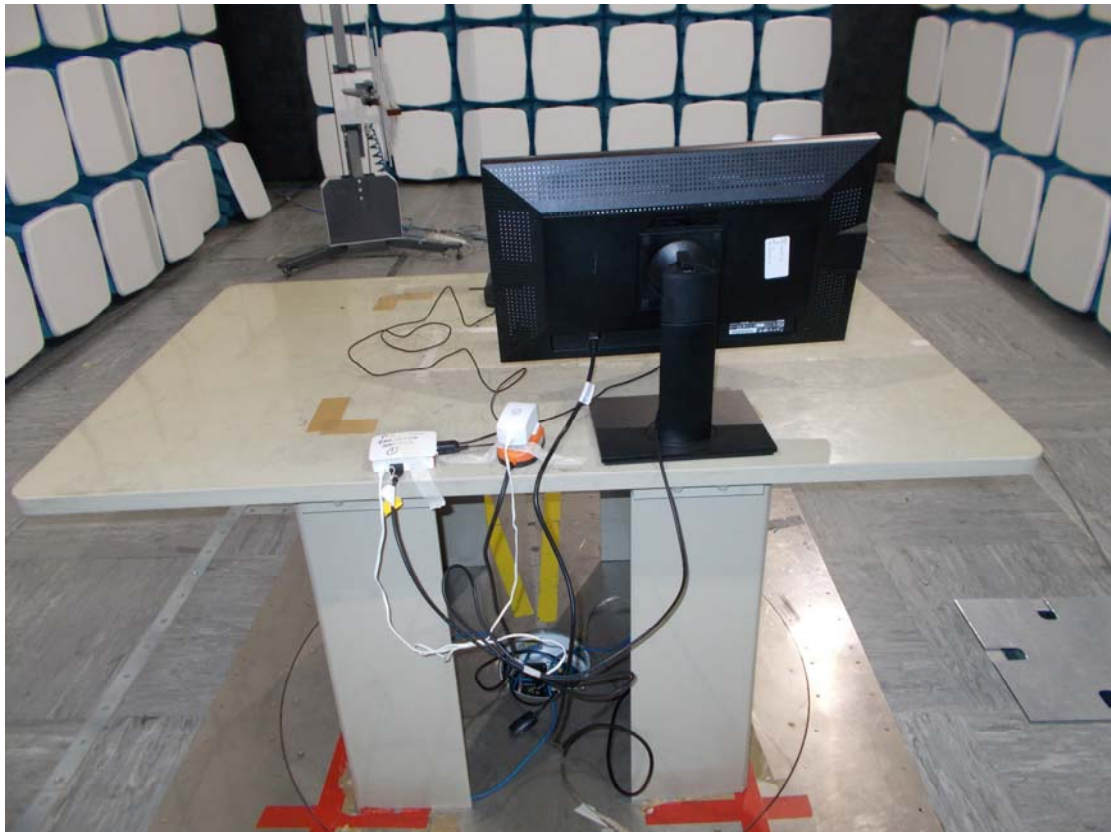
The measurements were performed with EUT set at its maximum duty. All modulation schemes, data rates and power settings were used to observe the worst-case configuration at each frequency.

Pre-scan plots are shown with a peak detector and 100 kHz RBW.

**Figure viii Test Setup**



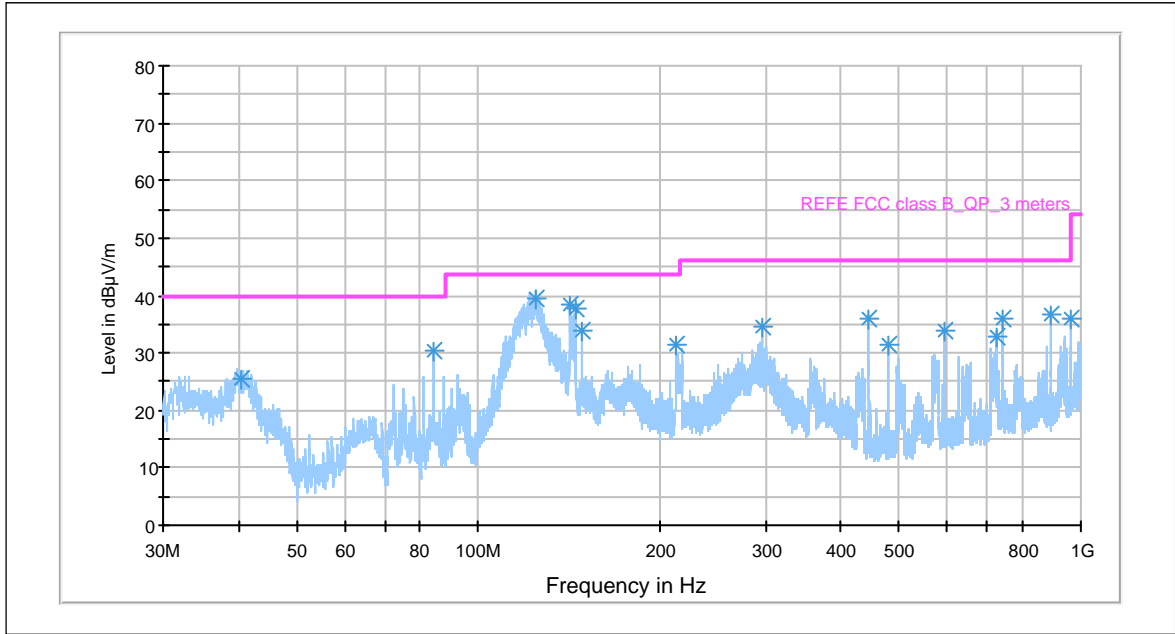
**Test Setup Photograph(s)**



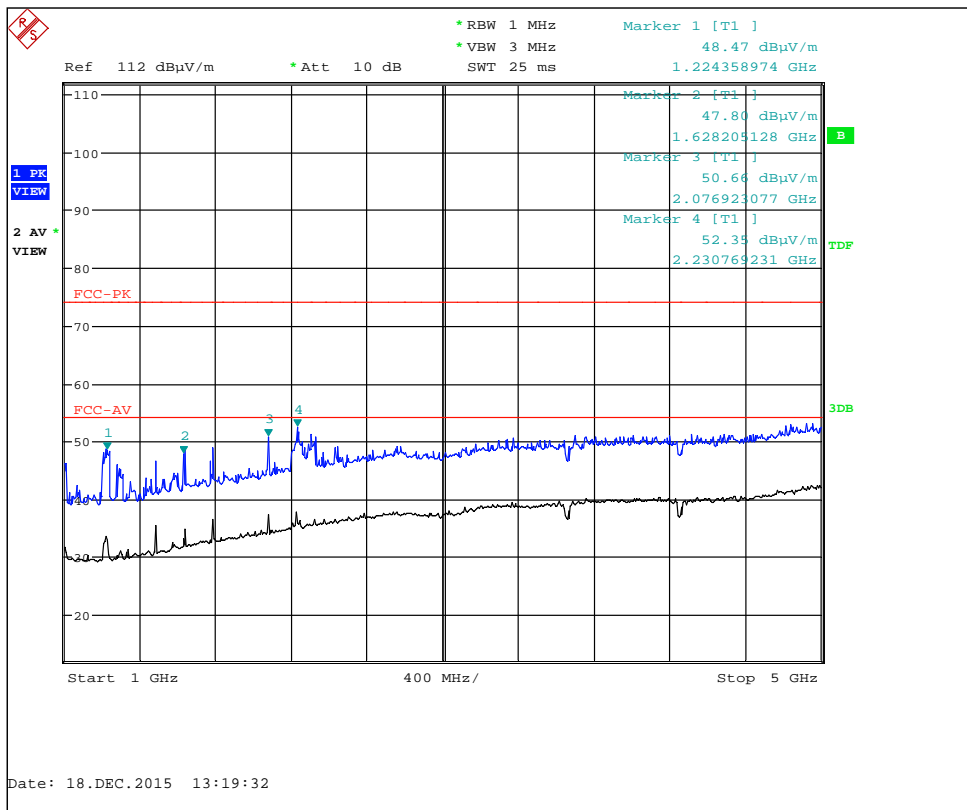
**17.5 Test Equipment**

<b>Equipment Type</b>	<b>Manufacturer</b>	<b>Equipment Description</b>	<b>Element No</b>	<b>Due For Calibration</b>	<b>Calibration Interval (m)</b>
ATS	Rainford	Ferrite Lined Chamber	REF886	21/07/2016	12
FSU46	R&S	Spectrum Analyser	REF910	28/05/2016	12
310	Sonoma	Pre-Amp (9kHz – 1GHz)	REF927	01/07/2016	12
8449B	Agilent	Pre-Amp (1 – 26.5GHz)	REF913	05/02/2016	12
3109	EMCO	Biconical Antenna	RFG095	09/05/2016	24
3146	EMCO	Log Periodic Antenna	RFG191	09/05/2016	24
3115	EMCO	Horn Antenna	RFG129	05/02/2016	24
	Q-Par	Horn Antenna	RFG629	30/09/2017	24

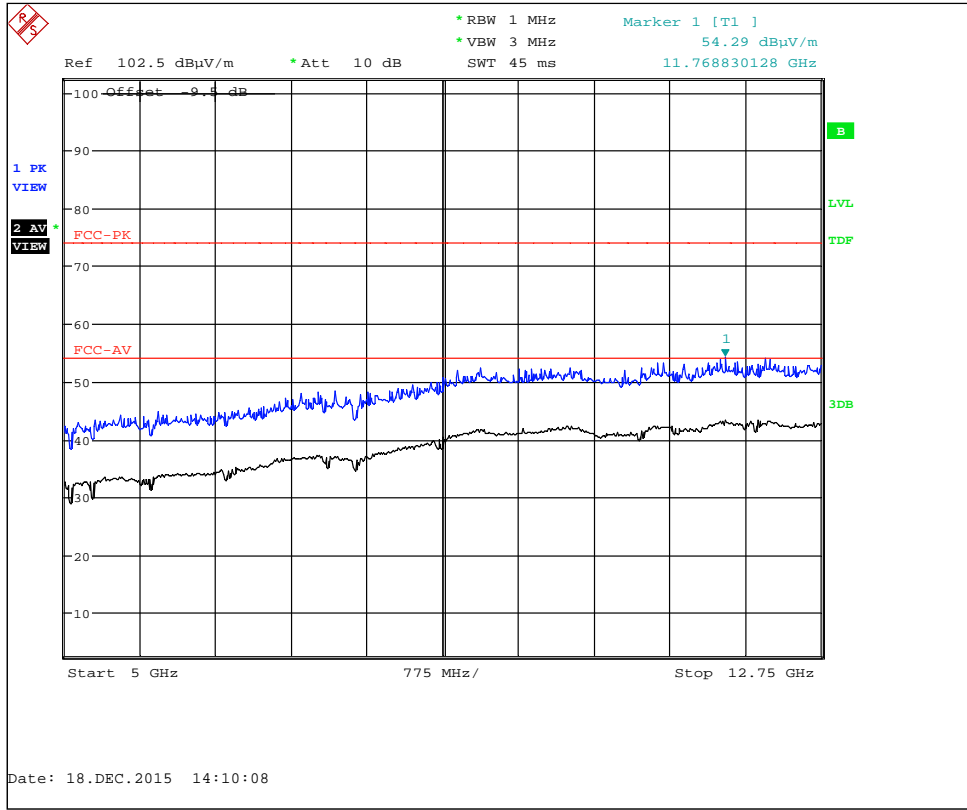
### 17.6 Test Results



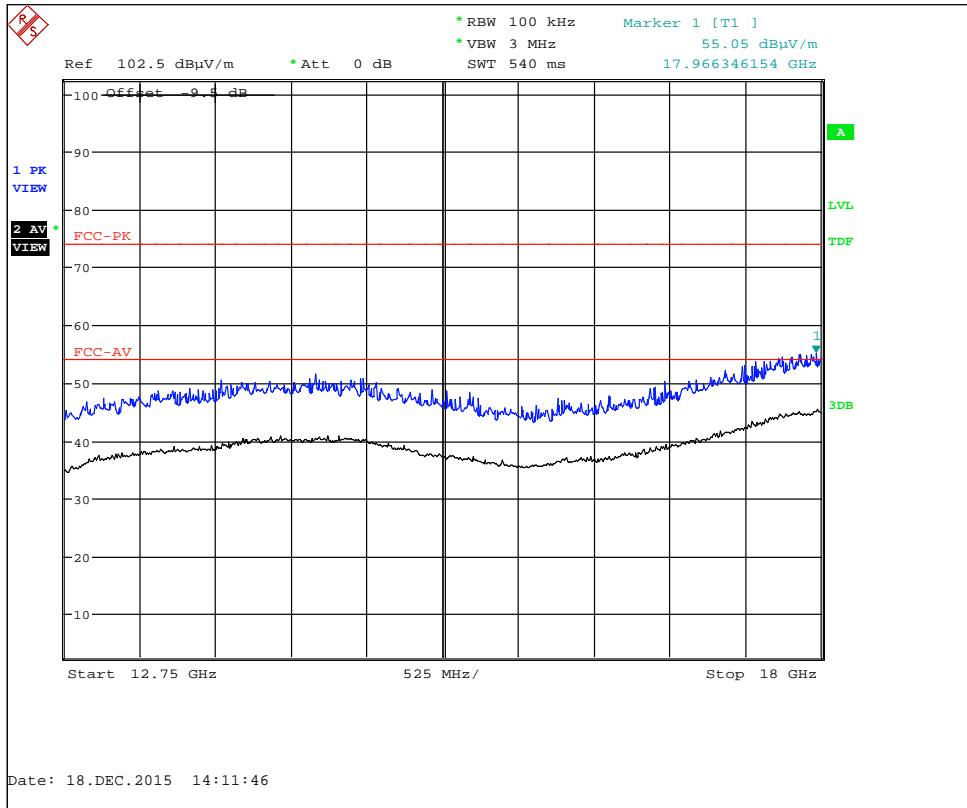
802.11 Channel 1 : 30 MHz to 1 GHz



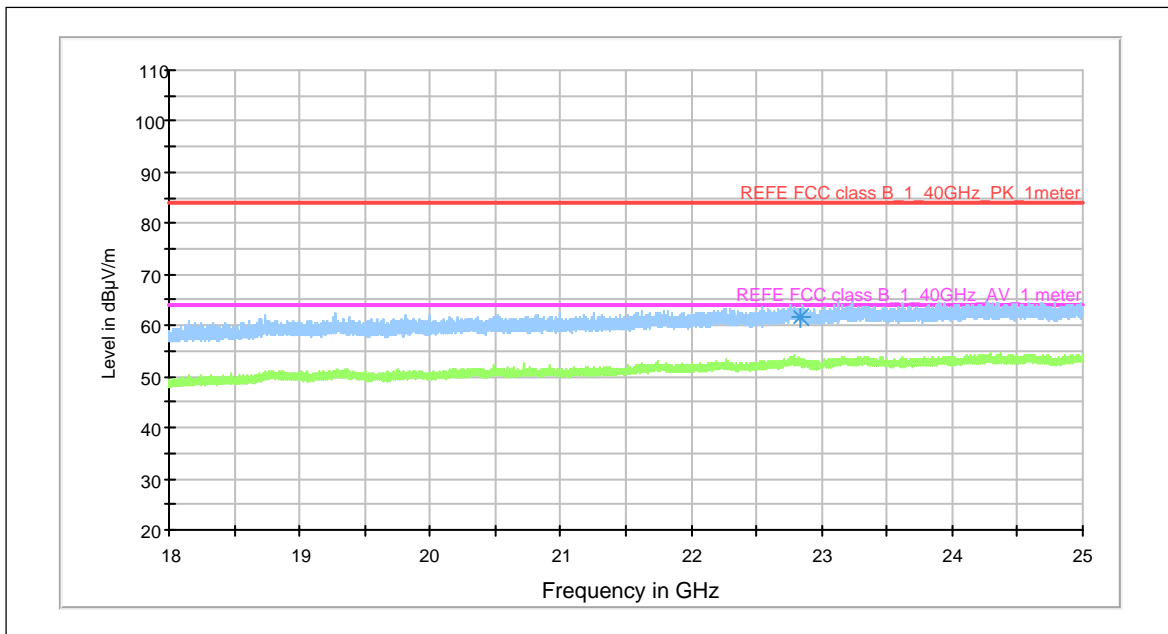
802.11 Channel 1 : 1 GHz to 5 GHz



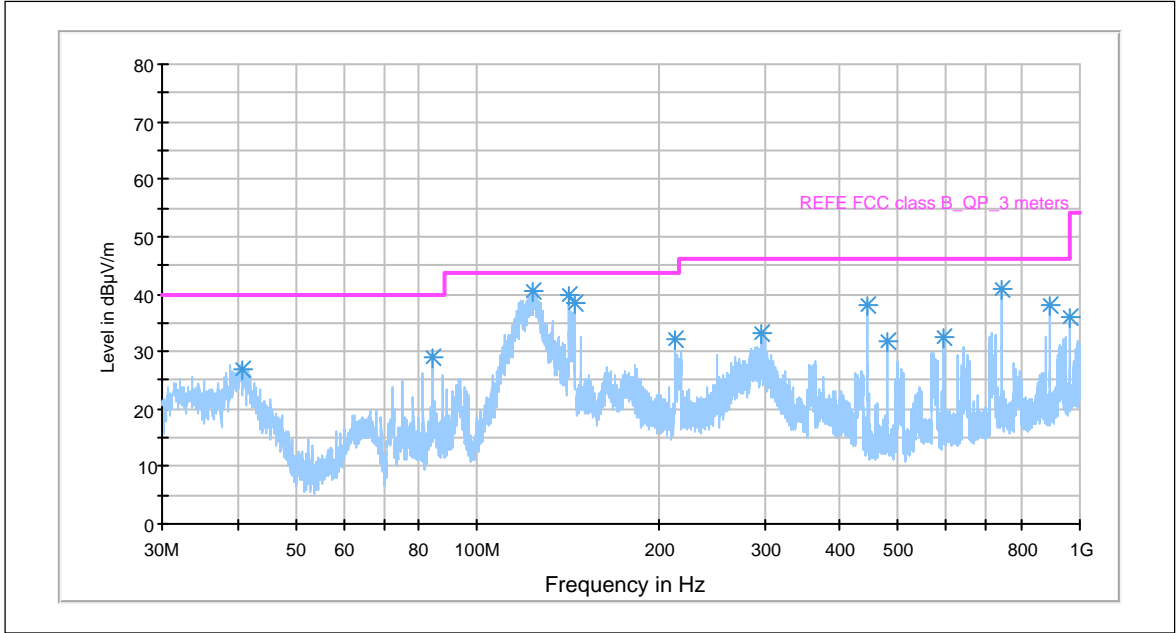
802.11 Channel 1 : 5 GHz to 12.75 GHz



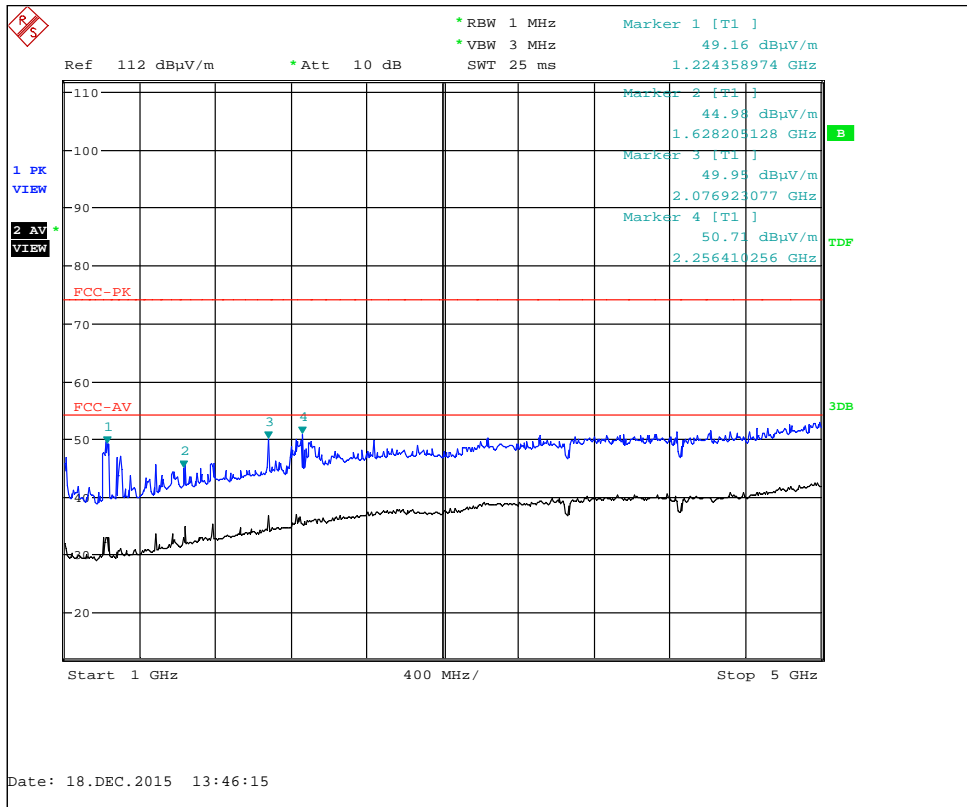
802.11 Channel 1 : 12.75 GHz to 18 GHz



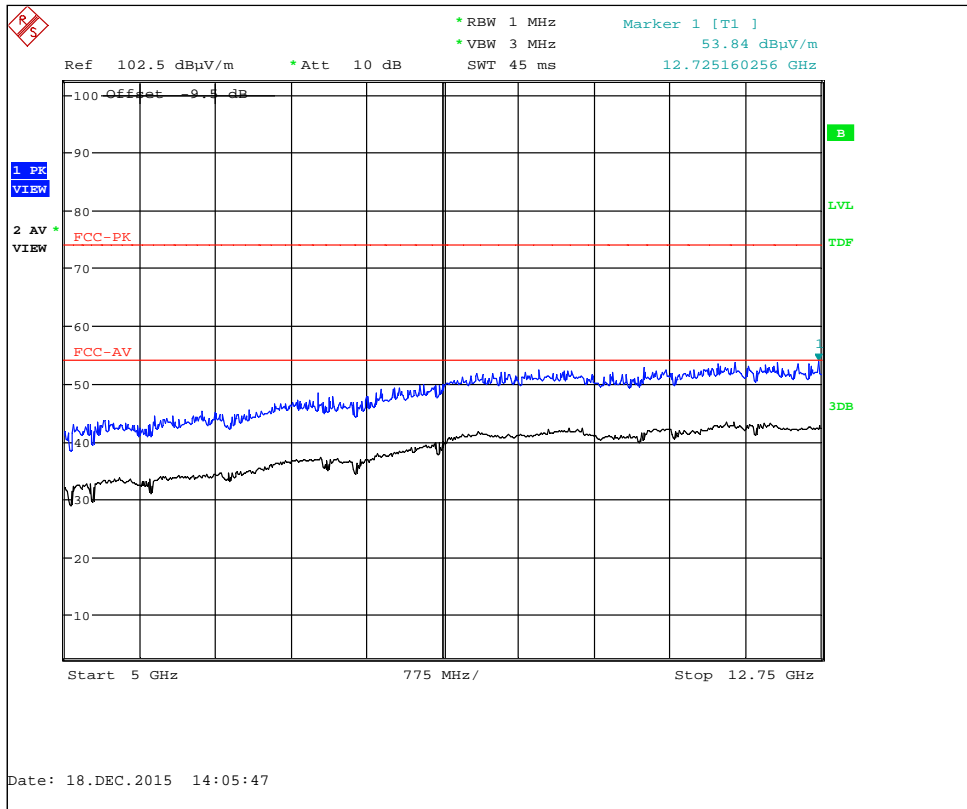
802.11 Channel 1 : 18 GHz to 25 GHz



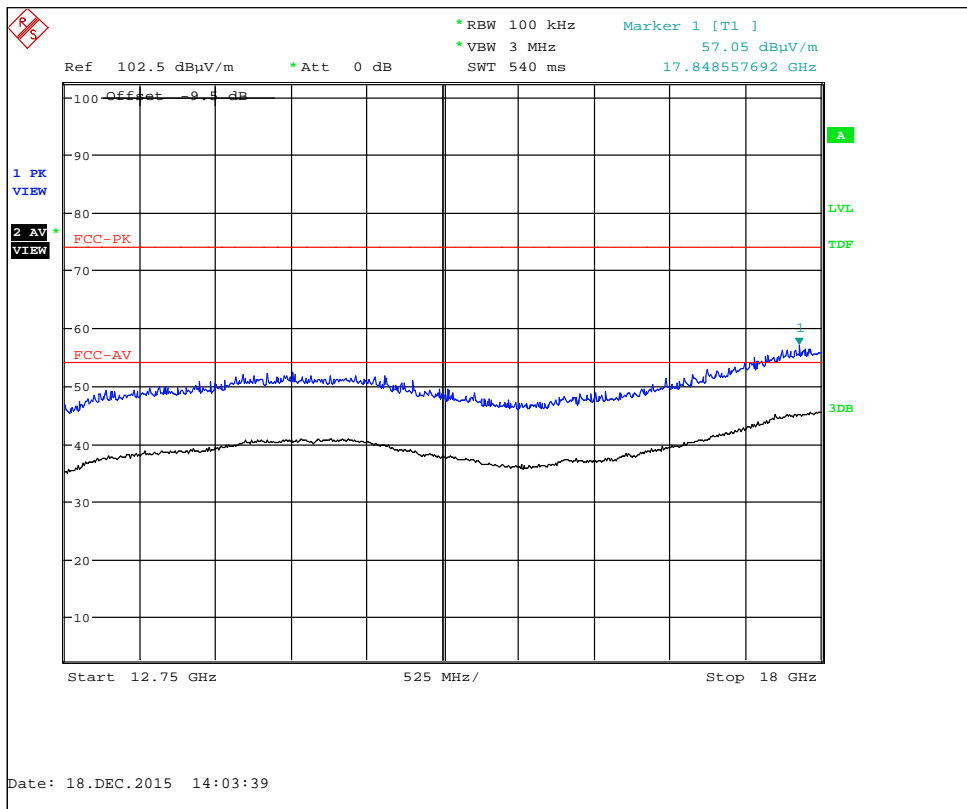
802.11 Channel 6 : 30 MHz to 1 GHz



802.11 Channel 6 : 1 GHz to 5 GHz

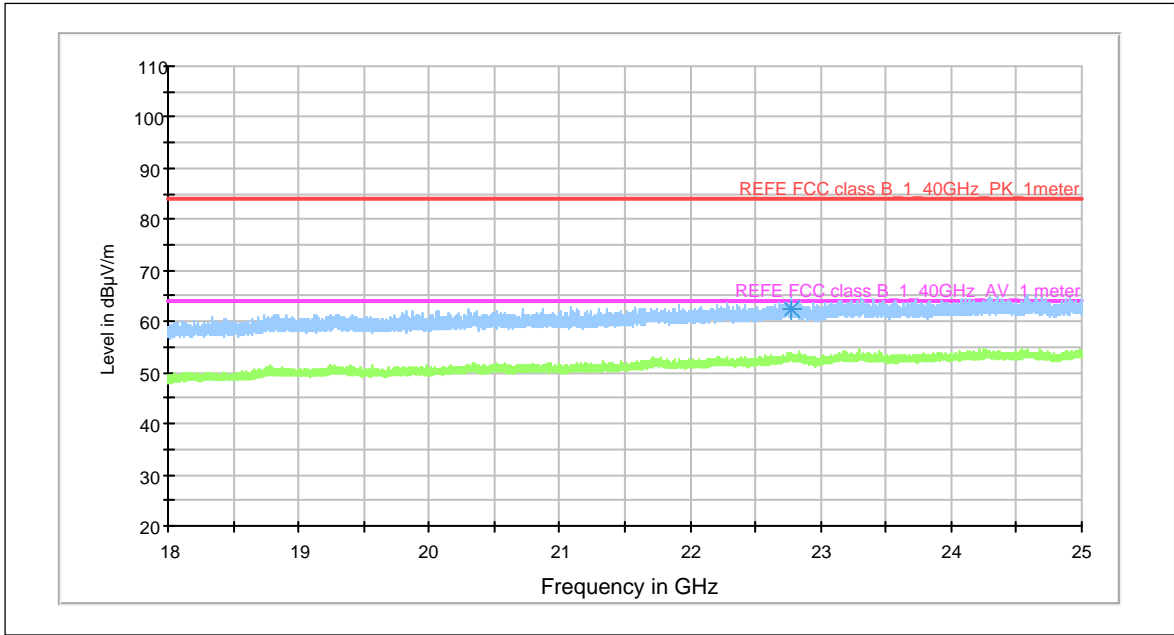


802.11 Channel 6 : 5 GHz to 12.75 GHz

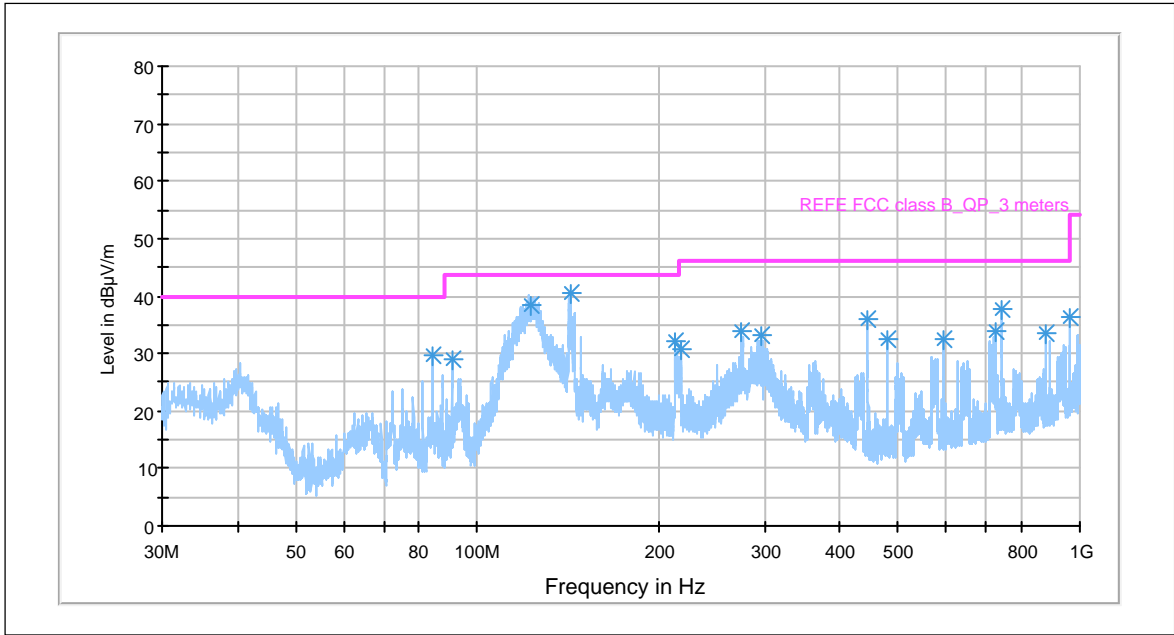


802.11 Channel 6 : 12.75 GHz to 18 GHz

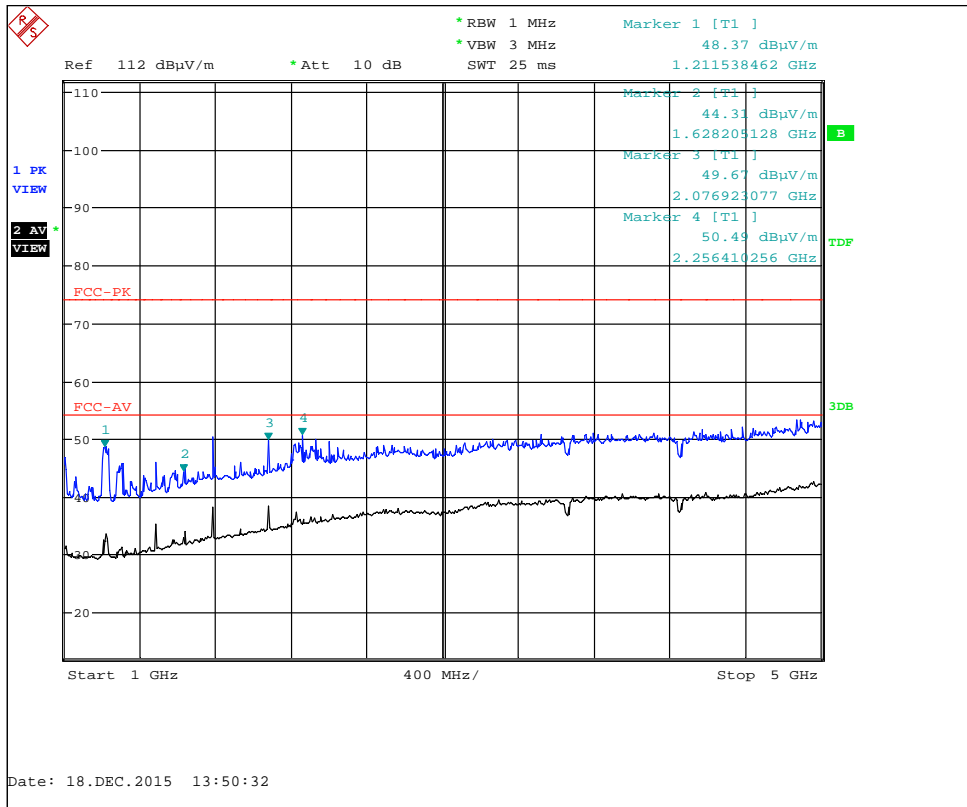




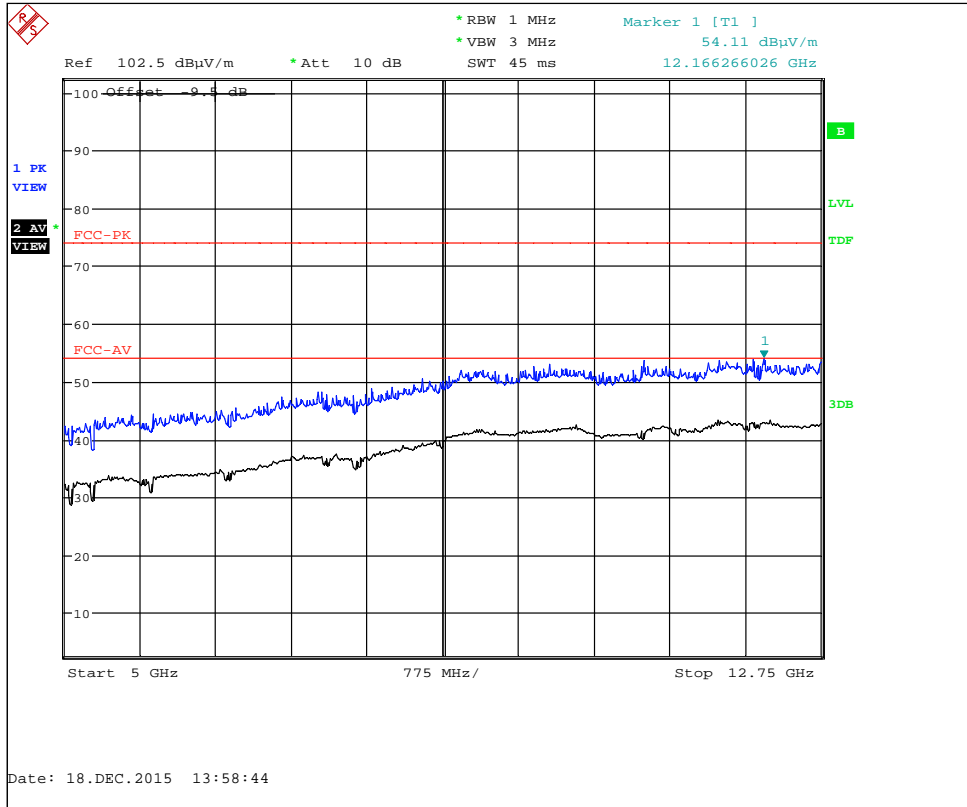
802.11 Channel 6 : 18 GHz to 25 GHz



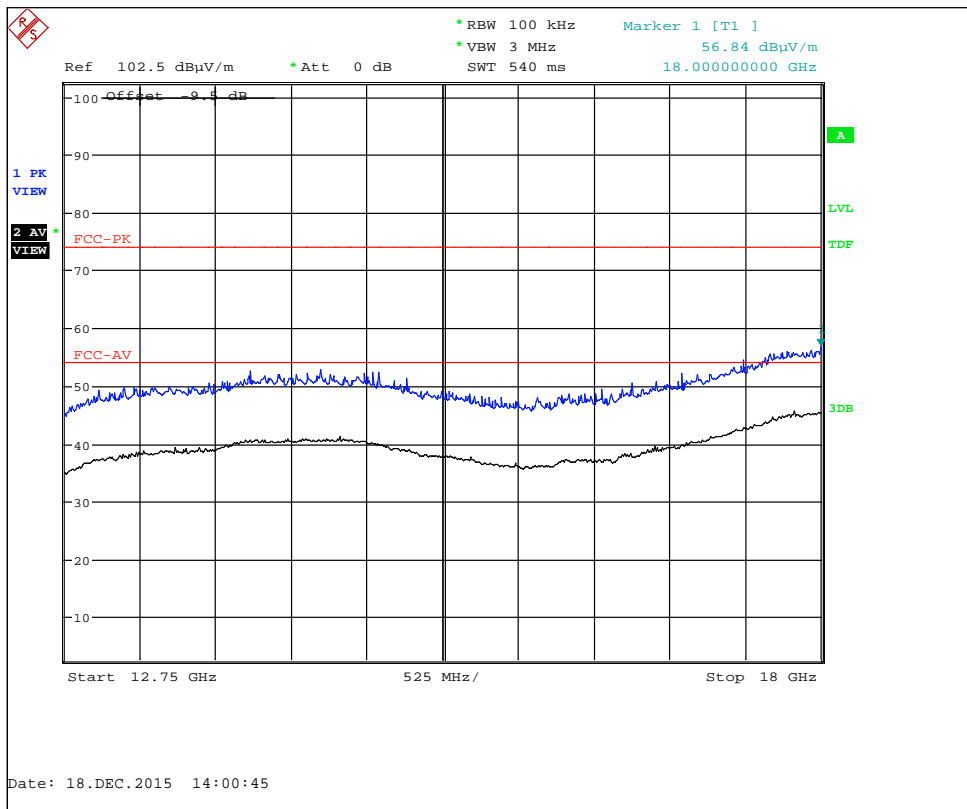
802.11 Channel 11 : 30 MHz to 1 GHz



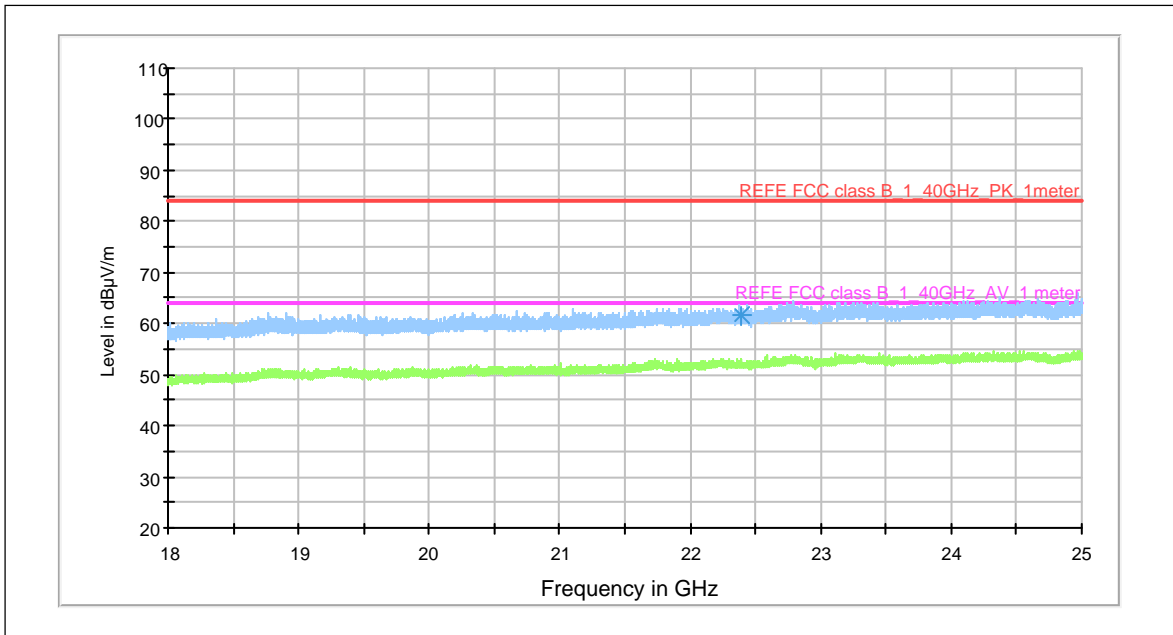
802.11 Channel 11 : 1 GHz to 5 GHz



802.11 Channel 11 : 5 GHz to 12.75 GHz



802.11 Channel 11 : 12.75 GHz to 18 GHz



802.11 Channel 11 : 18 GHz to 25 GHz

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
32.225520	21.1	15000.0	120.000	101.0	V	199.0	-12.9	18.9	40.0
40.910840	21.7	15000.0	120.000	110.0	V	207.0	-17.6	18.3	40.0
72.339693	31.6	15000.0	120.000	230.0	H	150.0	-23.8	8.4	40.0
84.410760	29.5	15000.0	120.000	154.0	V	270.0	-22.0	10.5	40.0
89.268613	24.8	15000.0	120.000	238.0	H	182.0	-21.4	18.7	43.5
90.754813	25.9	15000.0	120.000	340.0	V	281.0	-21.2	17.6	43.5
118.829507	29.9	15000.0	120.000	105.0	V	87.0	-18.5	13.6	43.5
125.015933	31.4	15000.0	120.000	100.0	V	103.0	-18.3	12.1	43.5
142.085467	28.6	15000.0	120.000	100.0	V	60.0	-18.4	14.9	43.5
145.143253	24.3	15000.0	120.000	140.0	V	47.0	-18.6	19.2	43.5
148.507120	34.3	15000.0	120.000	100.0	V	53.0	-18.8	9.2	43.5
213.634333	14.5	15000.0	120.000	100.0	V	250.0	-21.1	29.0	43.5
275.226867	28.8	15000.0	120.000	100.0	H	23.0	-17.1	17.2	46.0
290.639680	24.8	15000.0	120.000	216.0	V	6.0	-16.9	21.2	46.0
362.504960	25.5	15000.0	120.000	100.0	H	77.0	-15.3	20.5	46.0
445.515667	39.2	15000.0	120.000	100.0	H	161.0	-13.0	6.8	46.0
480.016293	32.9	15000.0	120.000	100.0	H	232.0	-12.1	13.1	46.0
569.472653	24.7	15000.0	120.000	197.0	H	61.0	-9.7	21.3	46.0
594.006413	34.5	15000.0	120.000	183.0	H	186.0	-10.0	11.5	46.0
625.004720	30.6	15000.0	120.000	100.0	V	220.0	-9.4	15.4	46.0
638.338733	27.2	15000.0	120.000	105.0	H	62.0	-9.3	18.8	46.0
711.513840	18.2	15000.0	120.000	100.0	H	180.0	-8.3	27.8	46.0
725.366213	16.6	15000.0	120.000	183.0	H	-1.0	-7.4	29.4	46.0
742.500627	37.0	15000.0	120.000	210.0	V	91.0	-6.9	9.0	46.0
874.989907	31.3	15000.0	120.000	216.0	H	122.0	-5.8	14.7	46.0
891.007213	37.5	15000.0	120.000	101.0	V	170.0	-5.7	8.5	46.0
959.994720	36.7	15000.0	120.000	107.0	H	149.0	-3.3	9.3	46.0

<i>High Power; Channel: 2412 MHz</i>									
Detector	Freq. (MHz)	Measured Emission (dBµV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Pre-amp Gain (dB)	Field Strength (dBµV/m)	Extrap'n Factor (dB)	Field Strength (µV/m)	Limit (µV/m)
Pk	1018.269	44.1	3.9	25.3	34.55	37.8	0	77.62	5000
Av	1018.269	34.8	3.9	25.3	34.55	28.5	0	26.61	500
Pk	1236.762	48.6	3.8	25.6	34.19	42.8	0	138.04	5000
Av	1236.762	33.5	3.8	25.6	34.19	27.7	0	24.27	500
Pk	1633.653	50.77	5.0	26.2	33.72	47.3	0	231.74	5000
Av	1633.653	45.32	5.0	26.2	33.72	41.9	0	124.45	500
Pk	2079.006	50.8	5.9	28.1	33.67	50.2	0	323.59	5000
Av	2079.006	40.2	5.9	28.1	33.67	39.6	0	95.50	500
Pk	2227.438	49.8	6.4	27.9	33.71	49.5	0	298.54	5000
Av	2227.438	35.25	6.4	27.9	33.71	35.0	0	56.23	500

<b>High Power; Channel: 2437 MHz</b>									
<b>Detector</b>	<b>Freq. (MHz)</b>	<b>Measured Emission (dB<math>\mu</math>V/m)</b>	<b>Cable Loss (dB)</b>	<b>Antenna Factor (dB/m)</b>	<b>Pre-amp Gain (dB)</b>	<b>Field Strength (dB<math>\mu</math>V/m)</b>	<b>Extrap'n Factor (dB)</b>	<b>Field Strength (<math>\mu</math>V/m)</b>	<b>Limit (<math>\mu</math>V/m)</b>
Pk	1018.269	45	3.9	25.3	34.55	38.7	0	86.10	5000
Av	1018.269	35.2	3.9	25.3	34.55	28.9	0	27.86	500
Pk	1236.769	47.6	3.8	25.6	34.19	41.8	0	123.03	5000
Av	1236.769	33.1	3.8	25.6	34.19	27.3	0	23.17	500
Pk	1633.648	49.8	5.0	26.2	33.72	46.3	0	206.54	5000
Av	1633.648	43.5	5.0	26.2	33.72	40.0	0	100.00	500
Pk	2079.002	49.4	5.9	28.1	33.67	48.8	0	275.42	5000
Av	2079.002	39.7	5.9	28.1	33.67	39.1	0	90.16	500
Pk	2227.421	50.2	6.4	27.9	33.71	49.9	0	312.61	5000
Av	2227.421	32.9	6.4	27.9	33.71	32.6	0	42.66	500

<b>High Power; Channel: 2462 MHz</b>									
<b>Detector</b>	<b>Freq. (MHz)</b>	<b>Measured Emission (dB<math>\mu</math>V/m)</b>	<b>Cable Loss (dB)</b>	<b>Antenna Factor (dB/m)</b>	<b>Pre-amp Gain (dB)</b>	<b>Field Strength (dB<math>\mu</math>V/m)</b>	<b>Extrap'n Factor (dB)</b>	<b>Field Strength (<math>\mu</math>V/m)</b>	<b>Limit (<math>\mu</math>V/m)</b>
Pk	1018.282	47.6	3.9	25.3	34.55	41.3	0	116.14	5000
Av	1018.282	35.2	3.9	25.3	34.55	28.9	0	27.86	500
Pk	1236.759	48.7	3.8	25.6	34.19	42.9	0	139.64	5000
Av	1236.759	33.4	3.8	25.6	34.19	27.6	0	23.99	500
Pk	1633.653	50.5	5	26.2	33.72	47.0	0	223.87	5000
Av	1633.653	44.8	5	26.2	33.72	41.3	0	116.14	500
Pk	2079.036	50.6	5.9	28.1	33.67	50.0	0	316.23	5000
Av	2079.036	41.3	5.9	28.1	33.67	40.7	0	108.39	500
Pk	2227.444	51.6	6.4	27.9	33.71	51.3	0	367.28	5000
Av	2227.444	33.3	6.4	27.9	33.71	33.0	0	44.67	500

## 18 Measurement Uncertainty

### Calculated Measurement Uncertainties

All statements of uncertainty are expanded standard uncertainty using a coverage factor of 1.96 to give a 95 % confidence:

#### [1] Radiated spurious emissions

Uncertainty in test result (30 MHz to 1 GHz) = **4.6 dB**

Uncertainty in test result (1 GHz to 18 GHz) = **4.7 dB**

#### [2] AC power line conducted emissions

Uncertainty in test result = **3.4 dB**

#### [3] Occupied bandwidth

Uncertainty in test result = **15.5 %**

#### [4] Conducted carrier power

Uncertainty in test result (Power Meter) = **1.08 dB**

#### [5] Conducted / radiated RF power out-of-band

Uncertainty in test result – up to 8.1 GHz = **3.31 dB**

Uncertainty in test result – 8.1 GHz to 15.3 GHz = **4.43 dB**

Uncertainty in test result (30 MHz to 1 GHz) = **4.6 dB**

Uncertainty in test result (1 GHz to 18 GHz) = **4.7 dB**

#### [6] Power spectral density

Uncertainty in test result (Spectrum Analyser) = **2.48 dB**

## 19 RF Exposure

### As per KDB 447498

47 CFR §§1.1307 and 2.1091

2.1091 Radio frequency radiation exposure evaluation: Portable devices.

For purposes of these requirements mobile devices are defined by the FCC as transmitters designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 centimetres is normally maintained between radiating structures and the body of the user or nearby persons. These devices are normally evaluated for exposure potential with relation to the MPE limits. As the 20cm separation specified under FCC rules may not be achievable under normal operation of the EUT, an RF exposure calculation is needed to show the minimum distance required to be less than 0.6mW/cm<sup>2</sup> power density limit, as required under FCC rules

### Prediction of MPE limit at a given distance

Equation from KDB 447498 D01

$$S = \frac{1.64 ERP}{4 \pi R^2} \quad \text{re - arranged} \quad R = \sqrt{\frac{1.64 ERP}{S 4 \pi}}$$

where:

S = power density

R = distance to the centre of radiation of the antenna

ERP = EUT Maximum power

Result:

Prediction Frequency (MHz)	Maximum ERP (mW)	Power density limit (S) (mW/cm <sup>2</sup> )	Distance (R) cm required to be less than 0.6mW/cm <sup>2</sup> (cm)
2462	118.89	0.6	5.1