



## 6.2 6dB BANDWIDTH MEASUREMENT

### 6.2.1 LIMITS

According to §15.407(e), Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

### 6.2.2 TEST INSTRUMENTS

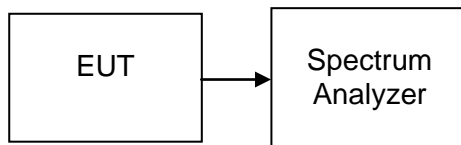
Name of Equipment	Manufacturer	Model	Serial Number	Last Calibration	Calibration Due
Spectrum Analyzer	Agilent	N9010A	MY52221469	02/21/2017	02/20/2018

### 6.2.3 TEST PROCEDURES (please refer to measurement standard)

#### 8.1 Option 2:

The automatic bandwidth measurement capability of an instrument may be employed using the X dB bandwidth mode with X set to 6 dB, if the functionality described above (i.e., RBW = 100 kHz, VBW  $\geq$  3 RBW, peak detector with maximum hold) is implemented by the instrumentation function. When using this capability, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be  $\geq$  6 dB.

### 6.2.4 TEST SETUP







## 6.2.5 TEST RESULTS

*No non-compliance noted*

### Test Data

Test mode: IEEE 802.11a mode / 5745 ~ 5825MHz

Channel	Frequency (MHz)	6dB Bandwidth(B) (MHz)			Limit (kHz)	Test Result
		Antenna 0	Antenna 1	Antenna 2		
Low	5745	16.37	16.37	16.36	>500	PASS
Mid	5785	16.44	16.38	16.34		PASS
High	5825	16.37	16.37	16.39		PASS

Test mode: IEEE 802.11n HT 20 MHz mode / 5745 ~ 5825MHz

Channel	Frequency (MHz)	6dB Bandwidth(B) (MHz)			Limit (kHz)	Test Result
		Antenna 0	Antenna 1	Antenna 2		
Low	5745	17.63	17.62	17.64	>500	PASS
Mid	5785	17.60	17.61	17.60		PASS
High	5825	17.65	17.65	17.54		PASS

Test mode: IEEE 802.11n HT 40 MHz mode / 5755 ~ 5795MHz

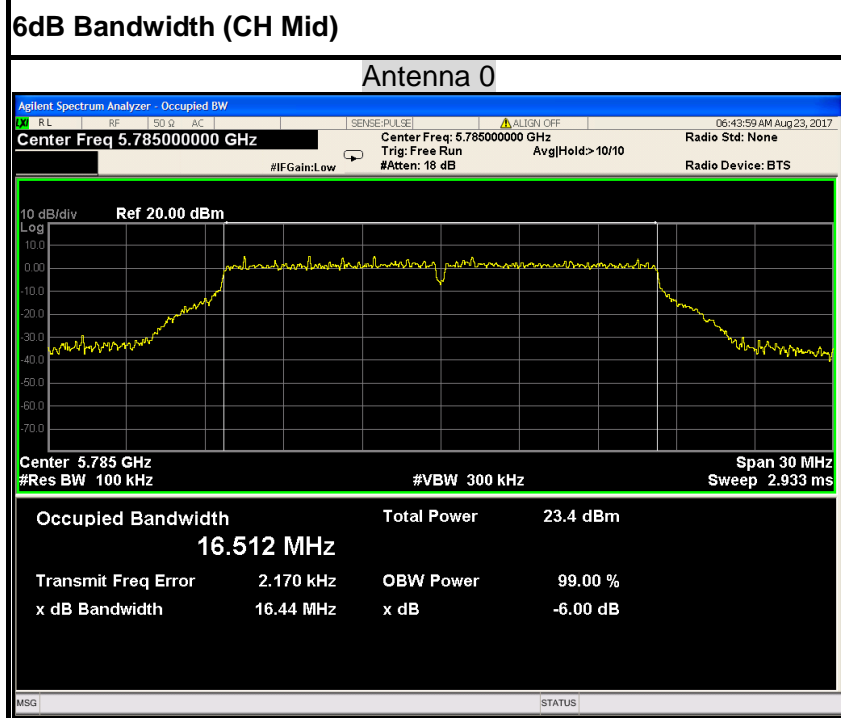
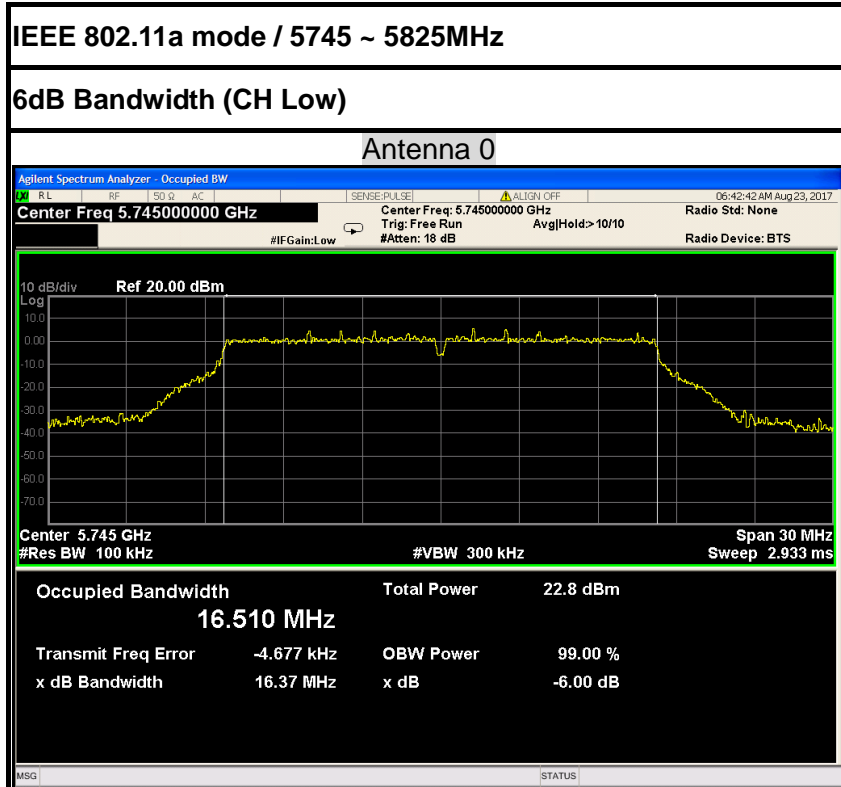
Channel	Frequency (MHz)	6dB Bandwidth(B) (MHz)			Limit (kHz)	Test Result
		Antenna 0	Antenna 1	Antenna 2		
Low	5755	36.07	36.38	36.37	>500	PASS
High	5795	36.37	36.12	36.12		PASS

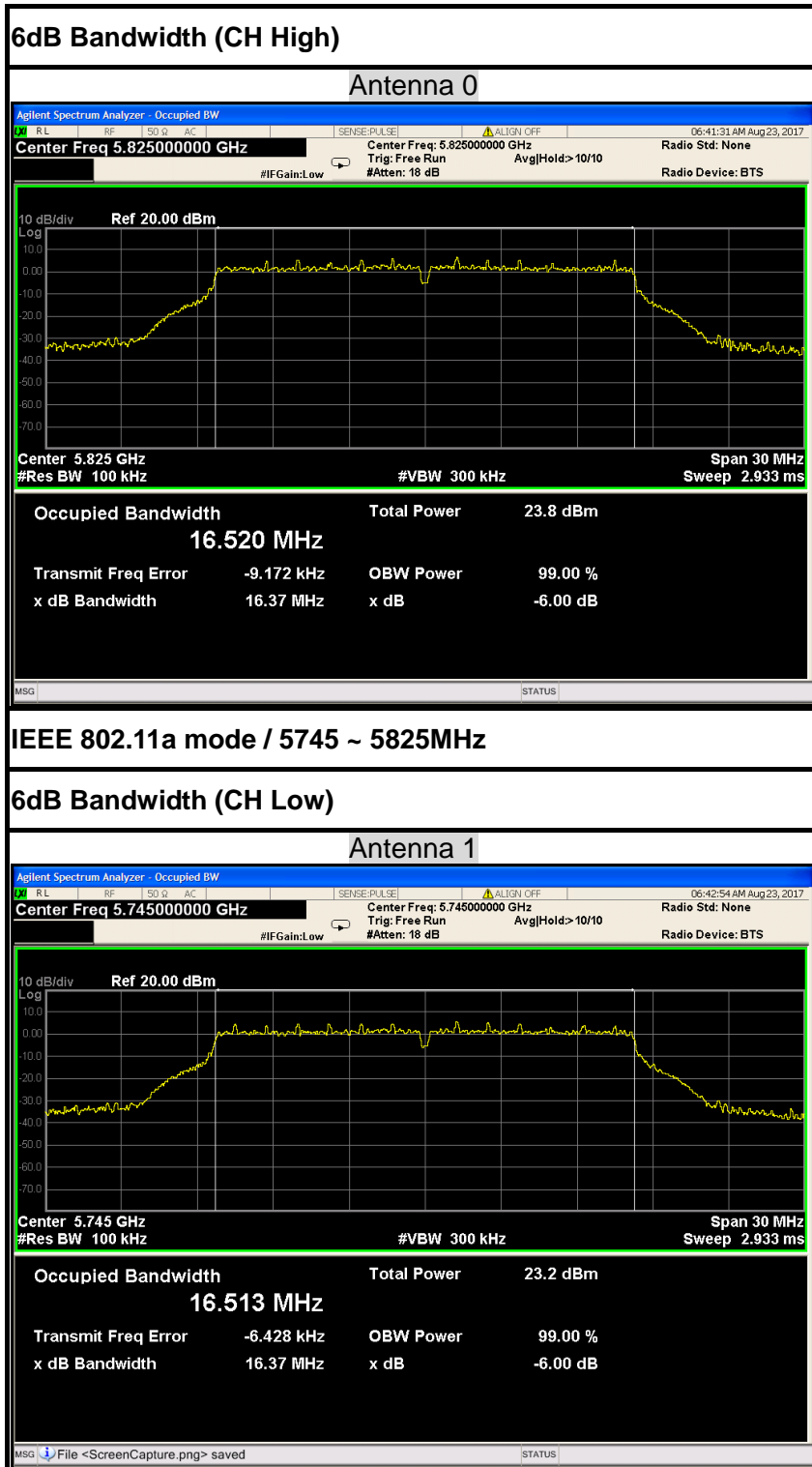
Test mode: IEEE 802.11ac 80 mode / 5775MHz

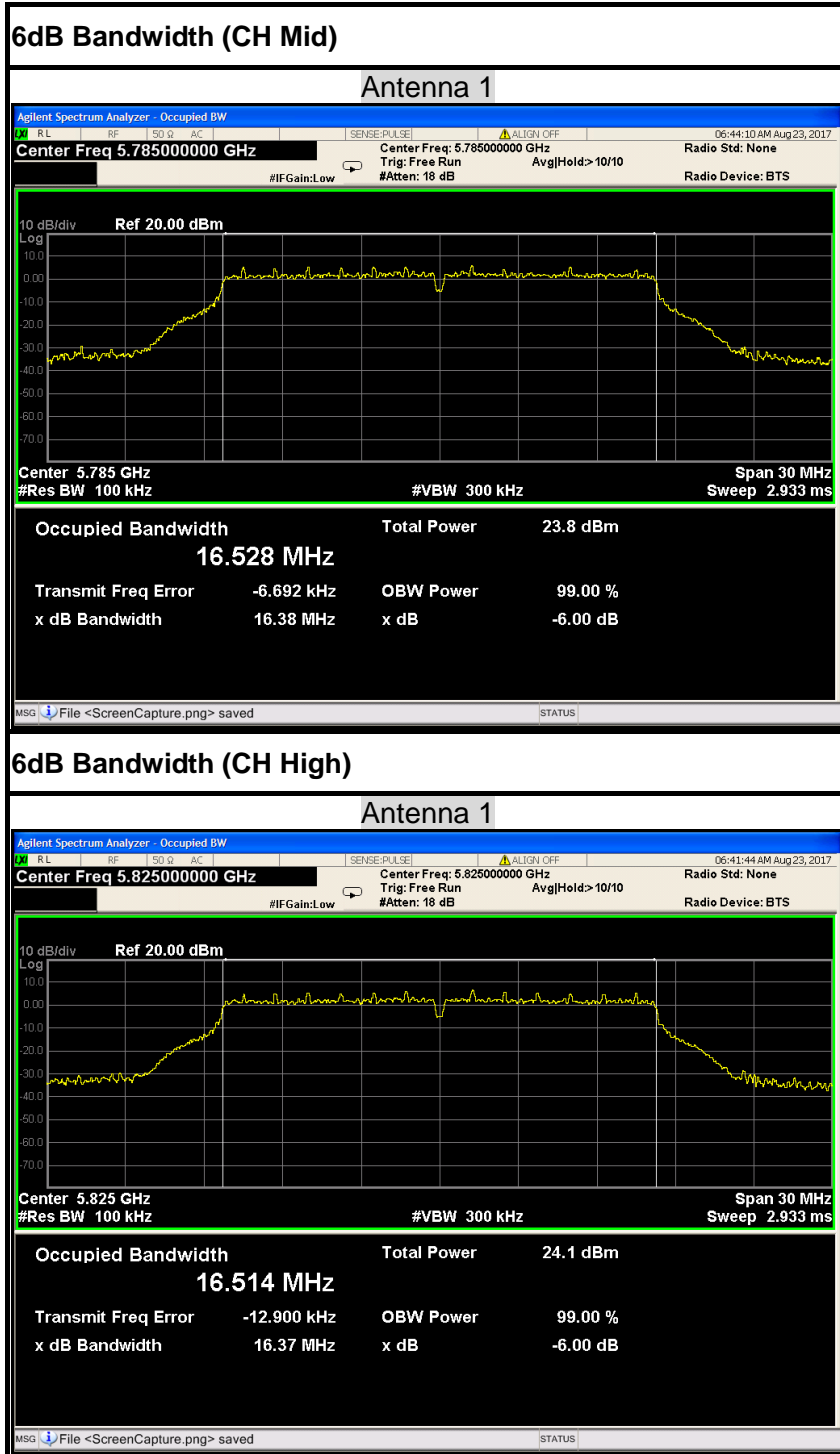
Channel	Frequency (MHz)	6dB Bandwidth(B) (MHz)			Limit (kHz)	Test Result
		Antenna 0	Antenna 1	Antenna 2		
	5775	75.62	75.33	75.62	>500	PASS

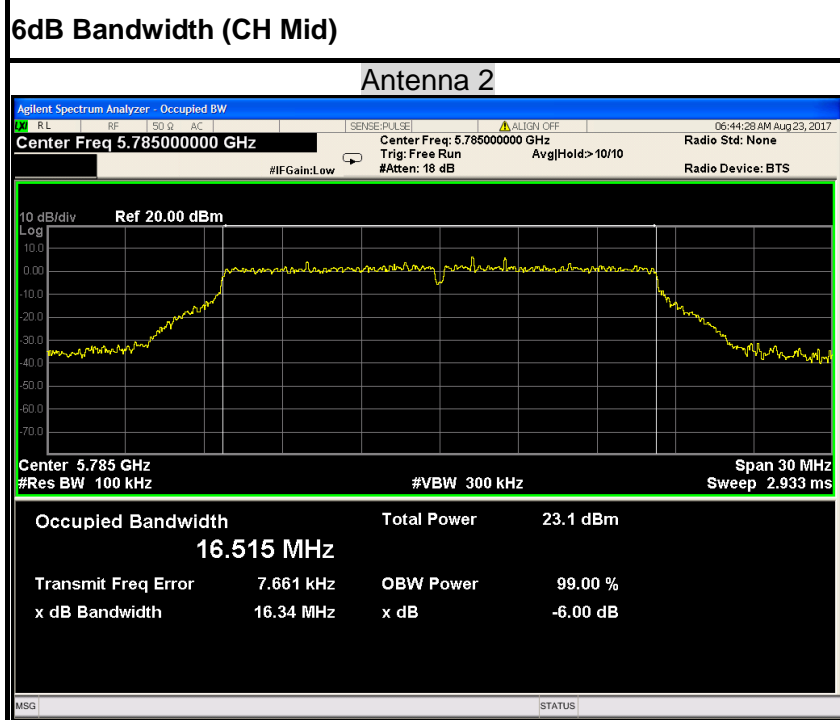
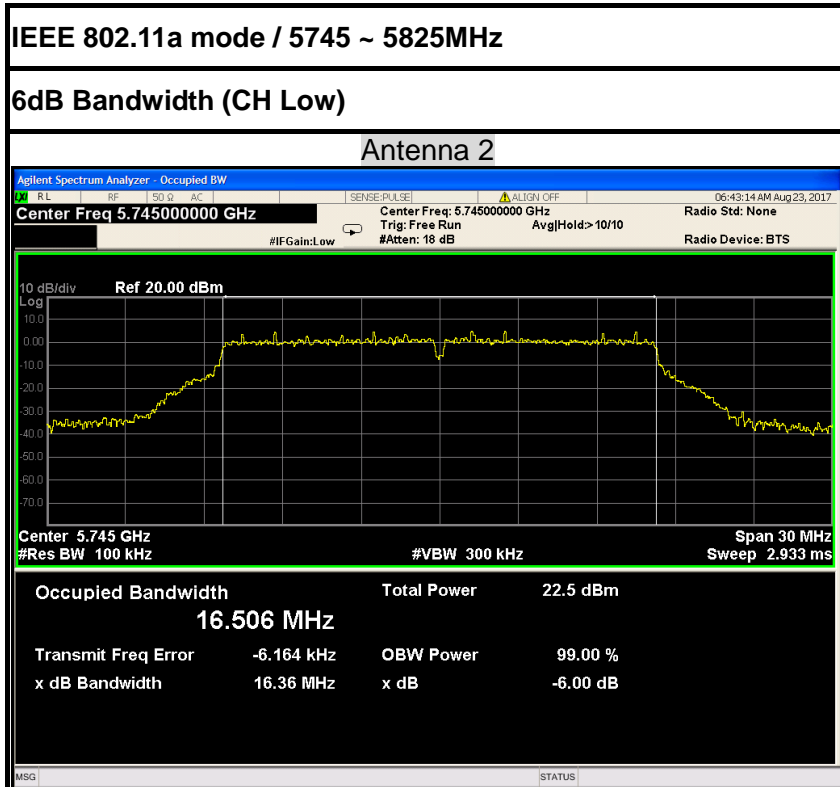


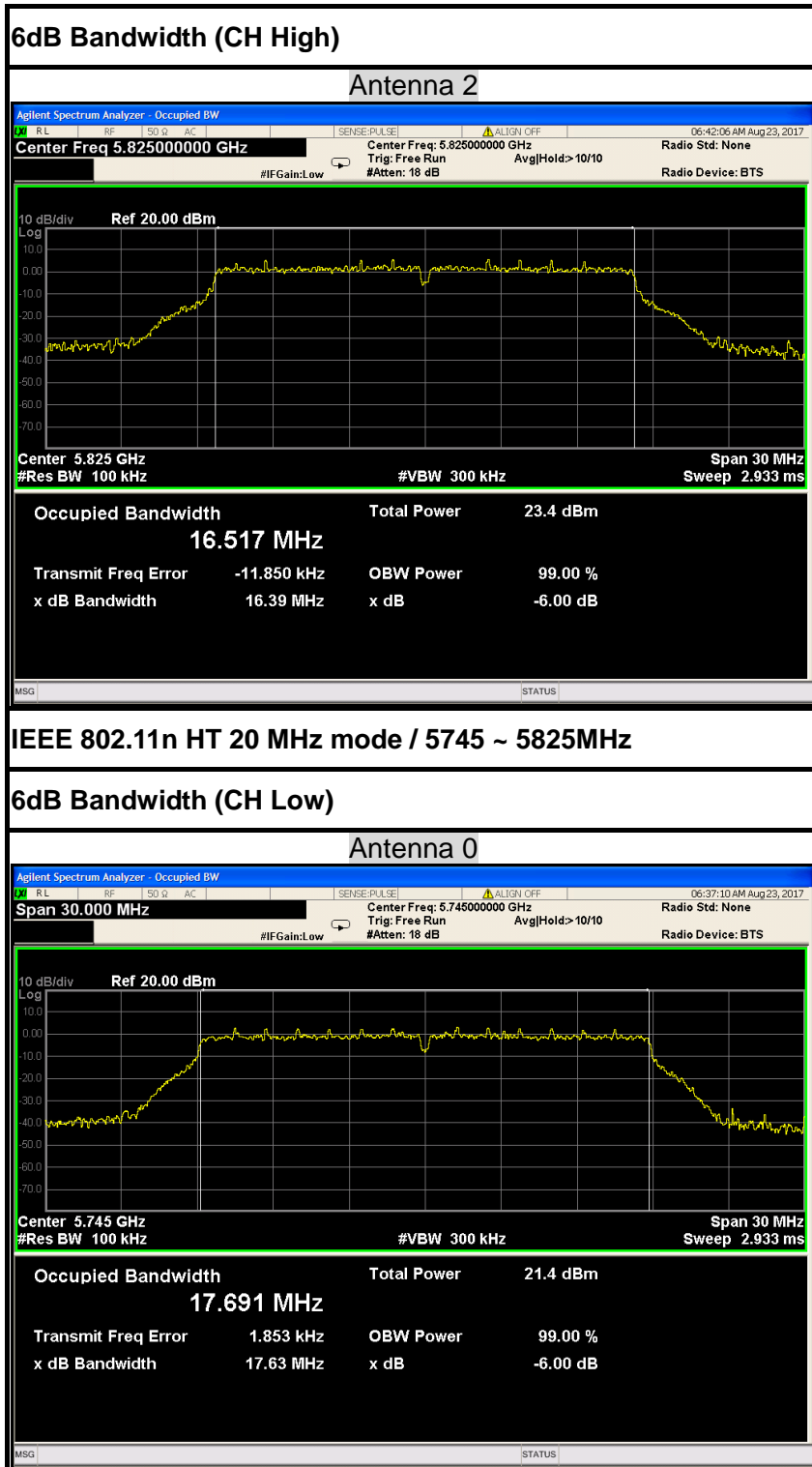
Test Plot

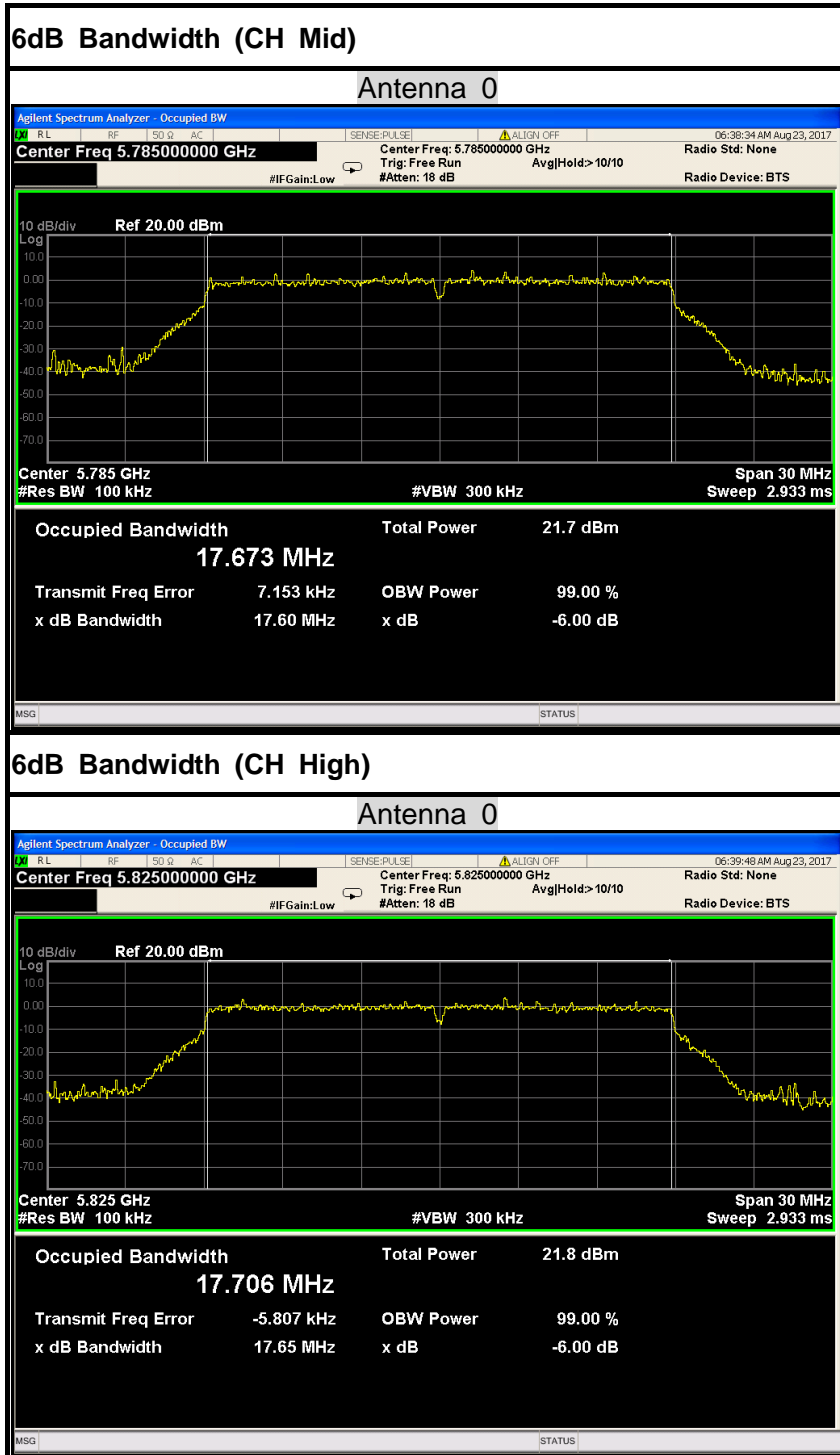


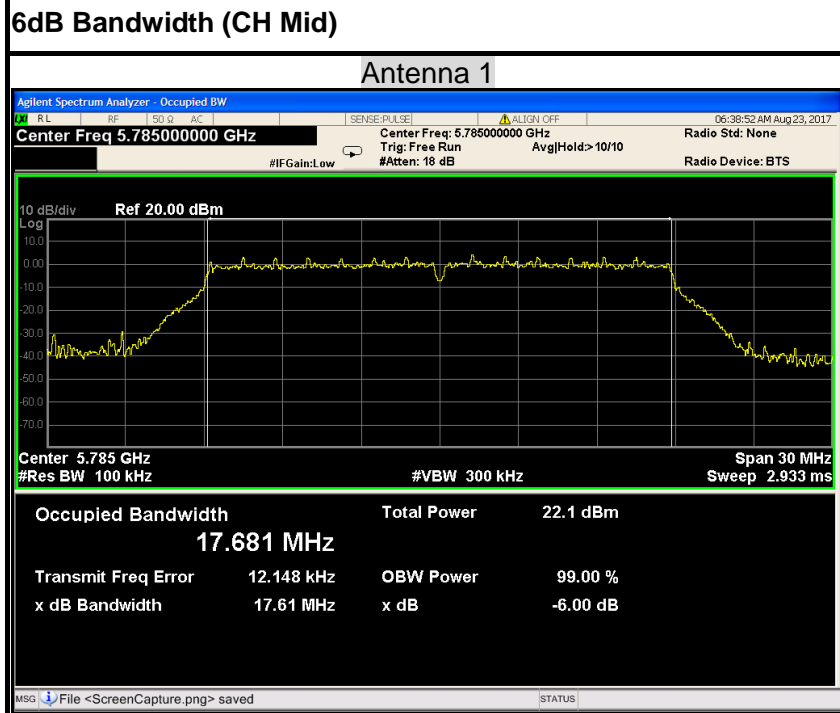
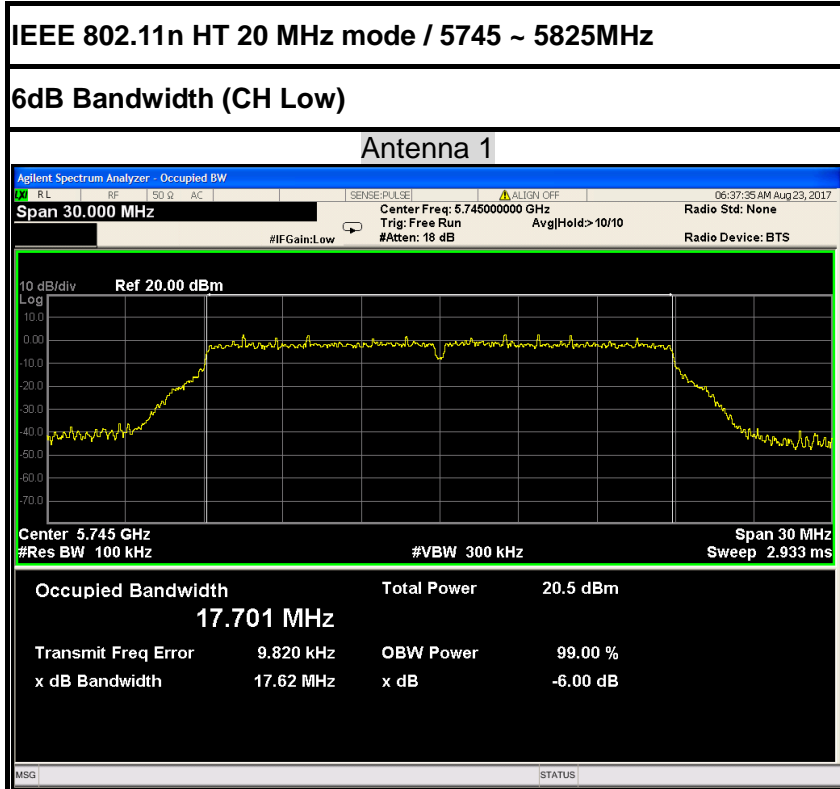




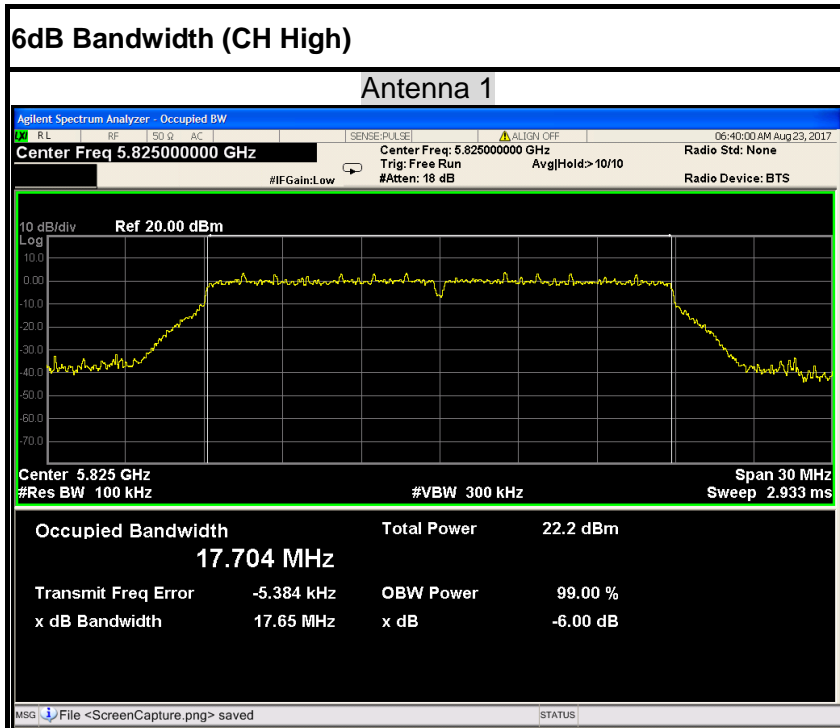




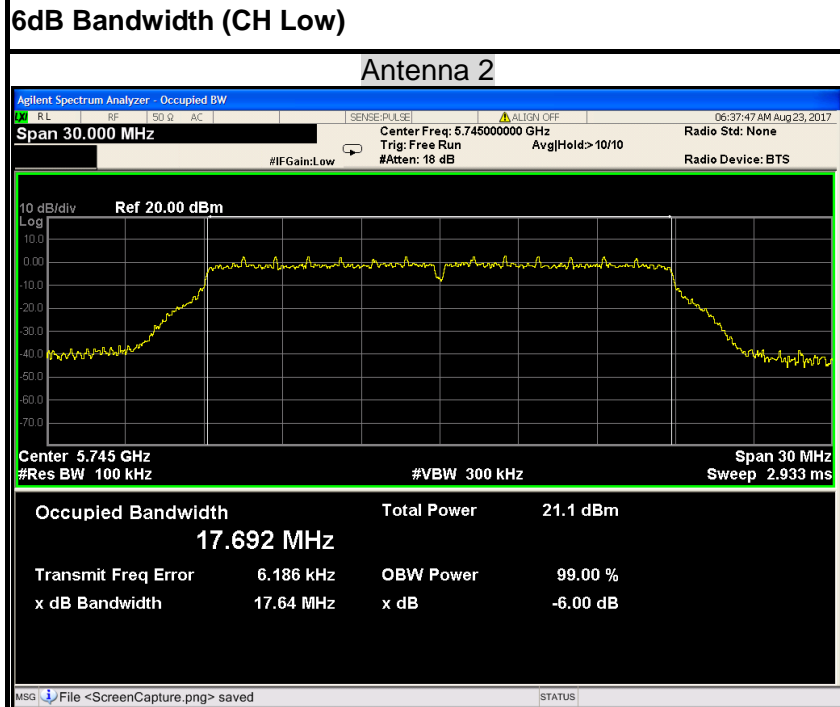




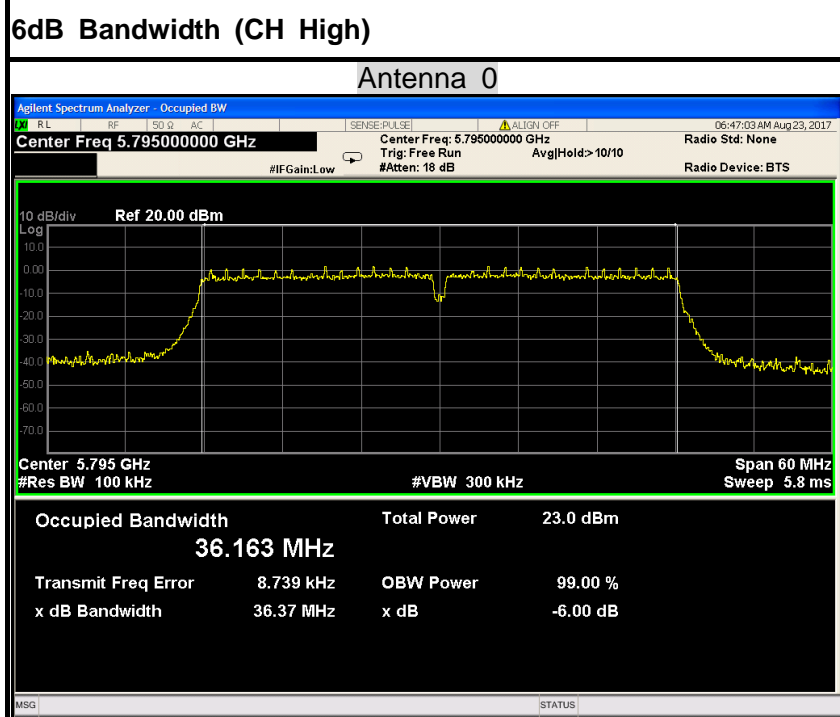
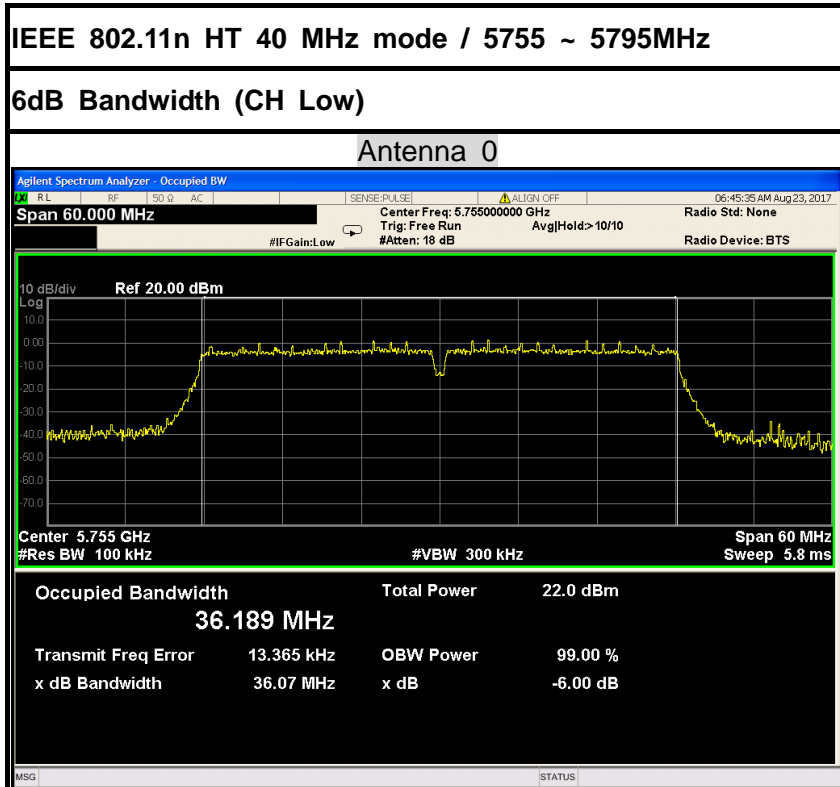


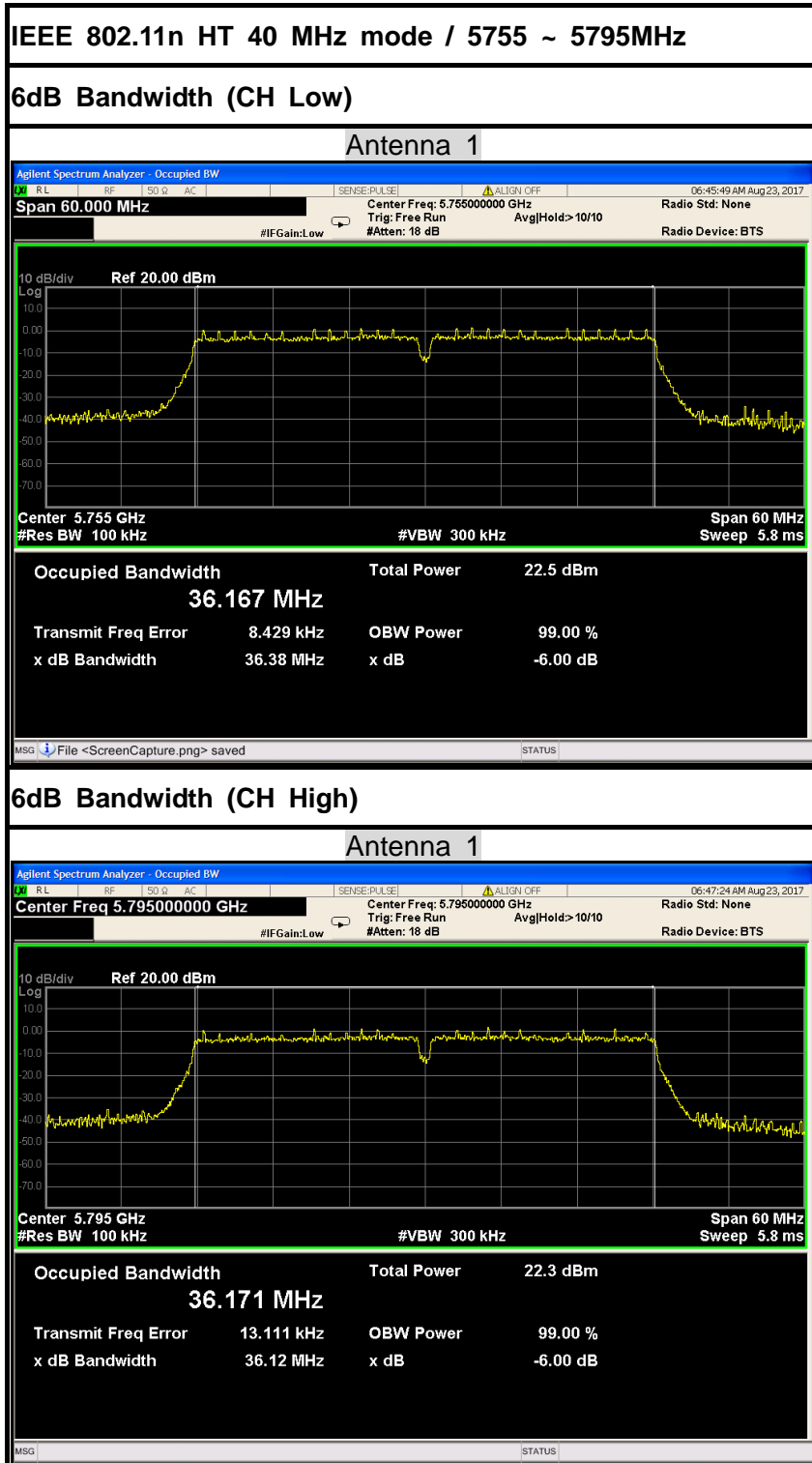


### IEEE 802.11n HT 20 MHz mode / 5745 ~ 5825MHz







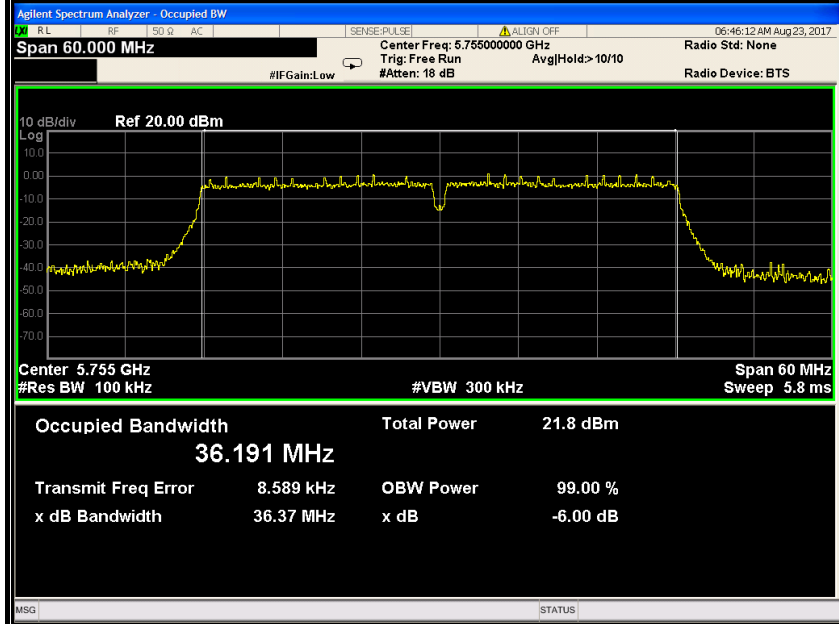




IEEE 802.11n HT 40 MHz mode / 5755 ~ 5795MHz

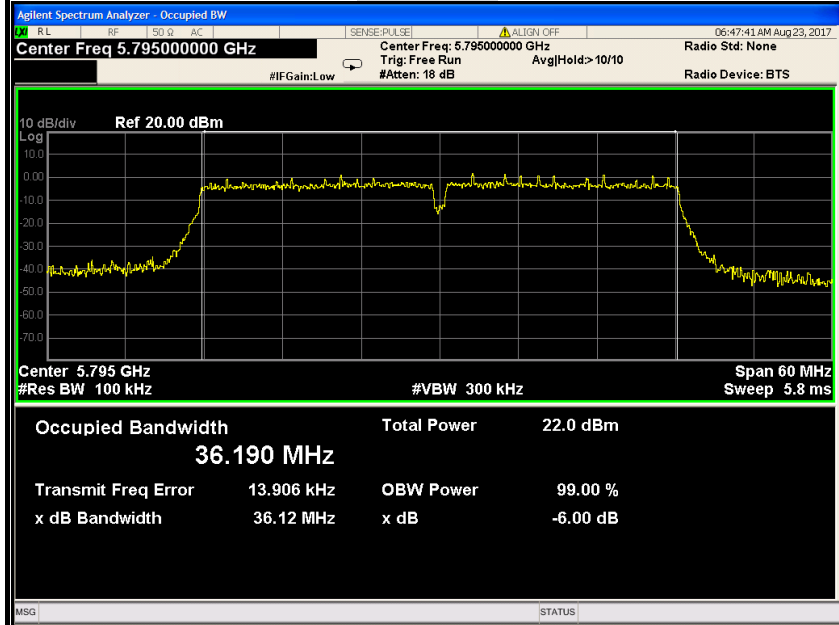
6dB Bandwidth (CH Low)

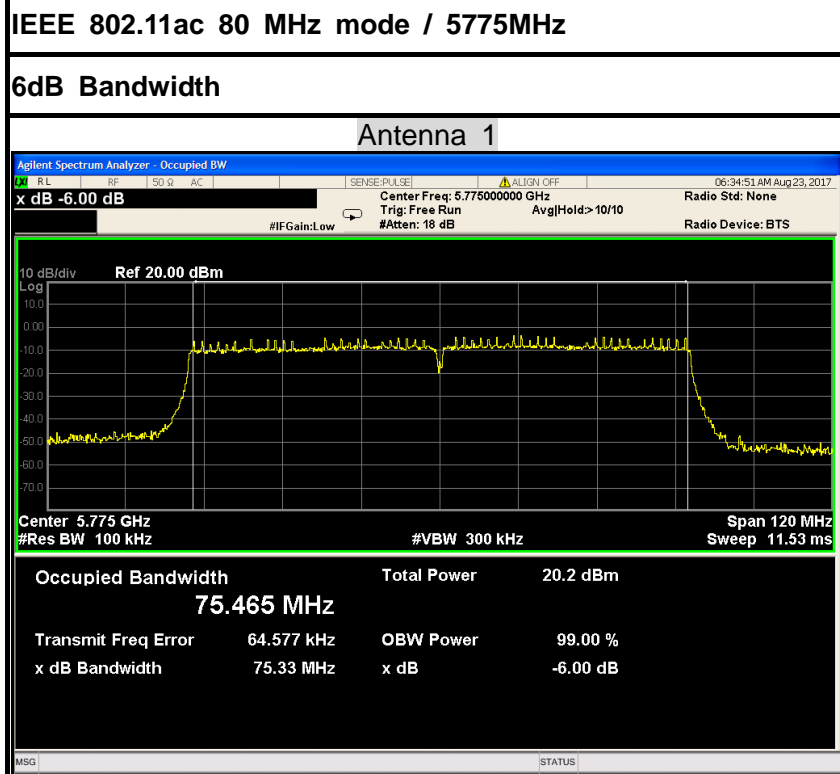
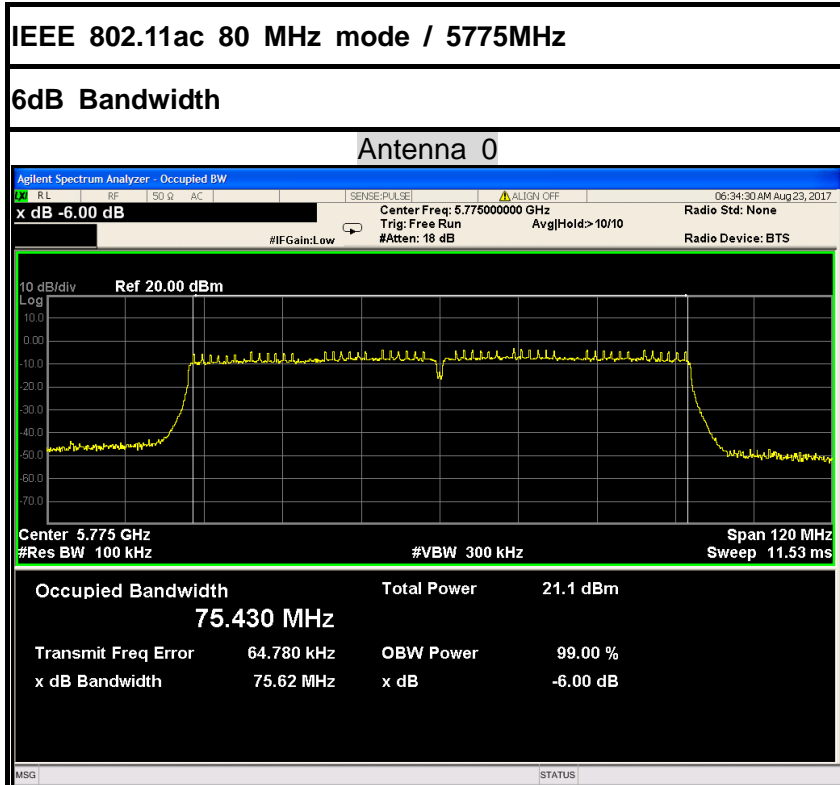
Antenna 2

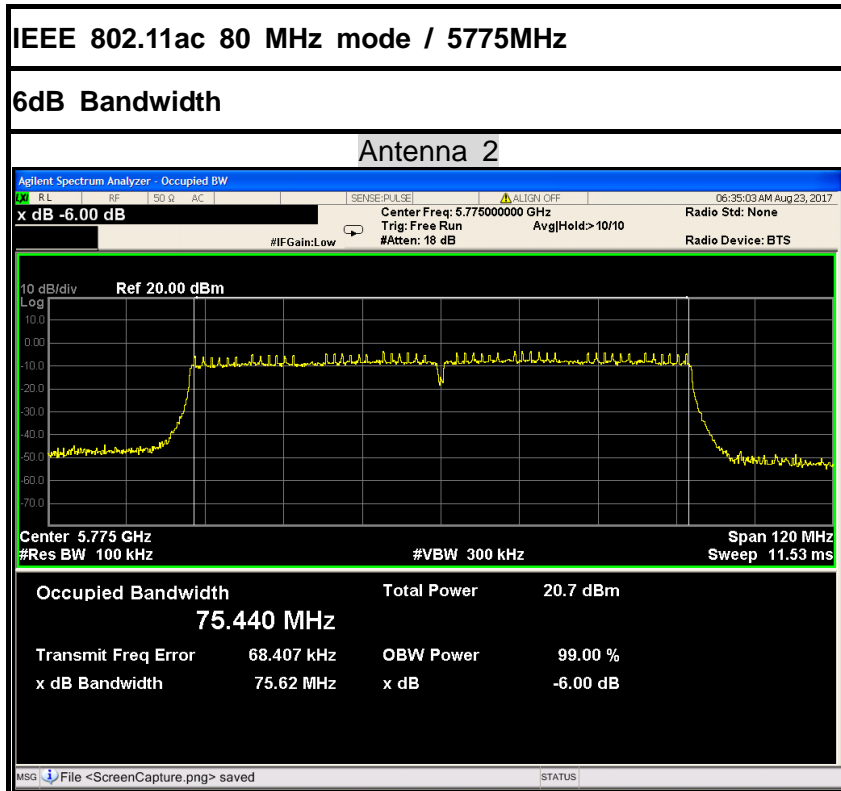


6dB Bandwidth (CH High)

Antenna 2









### 6.3 ANTENNA GAIN

#### MEASUREMENT

The antenna gain of the complete system is calculated by the difference of radiated power in EIRP and the conducted power of the module. For UNII devices, the IEEE 802.11a mode is used.

#### MEASUREMENT PARAMETERS

Measurement parameter	
Detector	Peak
Sweep time	Auto
Resolution bandwidth	3 MHz
Video bandwidth	3 MHz
Trace-Mode	Max hold

#### LIMITS

FCC	IC
Antenna Gain	
6 dBi	





## TEST RESULTS

### Antenna 0

#### IEEE 802.11a mode / 5180 ~ 5240MHz

T <sub>nom</sub>	V <sub>nom</sub>	Lowest channel 5180MHz	Highest channel 5240MHz
Conducted power [dBm] Measured with OFDM modulation		2.73	3.16
Radiated power [dBm] Measured with OFDM modulation		5.26	5.81
Gain [dBi] Calculated		2.53	2.65
Measurement uncertainty		± 1.5 dB (cond.) / ± 3 dB (rad.)	

#### IEEE 802.11a mode / 5260 ~ 5320MHz

T <sub>nom</sub>	V <sub>nom</sub>	Lowest channel 5260MHz	Highest channel 5320MHz
Conducted power [dBm] Measured with OFDM modulation		5.72	5.80
Radiated power [dBm] Measured with OFDM modulation		8.21	8.51
Gain [dBi] Calculated		2.49	2.71
Measurement uncertainty		± 1.5 dB (cond.) / ± 3 dB (rad.)	

#### IEEE 802.11a mode / 5500 ~ 5700MHz

T <sub>nom</sub>	V <sub>nom</sub>	Lowest channel 5500MHz	Highest channel 5700MHz
Conducted power [dBm] Measured with OFDM modulation		4.96	4.74
Radiated power [dBm] Measured with OFDM modulation		7.25	7.15
Gain [dBi] Calculated		2.29	2.41
Measurement uncertainty		± 1.5 dB (cond.) / ± 3 dB (rad.)	

#### IEEE 802.11a mode / 5745 ~ 5825MHz

T <sub>nom</sub>	V <sub>nom</sub>	Lowest channel 5745MHz	Highest channel 5825MHz
Conducted power [dBm] Measured with OFDM modulation		5.28	5.18
Radiated power [dBm] Measured with OFDM modulation		7.23	7.31
Gain [dBi] Calculated		1.95	2.13
Measurement uncertainty		± 1.5 dB (cond.) / ± 3 dB (rad.)	



**Antenna 1**

**IEEE 802.11a mode / 5180 ~ 5240MHz**

T <sub>nom</sub>	V <sub>nom</sub>	Lowest channel 5180MHz	Highest channel 5240MHz
Conducted power [dBm] Measured with OFDM modulation		2.90	3.04
Radiated power [dBm] Measured with OFDM modulation		5.15	5.26
Gain [dBi] Calculated		2.25	2.22
Measurement uncertainty		± 1.5 dB (cond.) / ± 3 dB (rad.)	

**IEEE 802.11a mode / 5260 ~ 5320MHz**

T <sub>nom</sub>	V <sub>nom</sub>	Lowest channel 5260MHz	Highest channel 5320MHz
Conducted power [dBm] Measured with OFDM modulation		5.77	5.55
Radiated power [dBm] Measured with OFDM modulation		7.42	7.18
Gain [dBi] Calculated		1.65	1.63
Measurement uncertainty		± 1.5 dB (cond.) / ± 3 dB (rad.)	

**IEEE 802.11a mode / 5500 ~ 5700MHz**

T <sub>nom</sub>	V <sub>nom</sub>	Lowest channel 5500MHz	Highest channel 5700MHz
Conducted power [dBm] Measured with OFDM modulation		4.79	4.77
Radiated power [dBm] Measured with OFDM modulation		6.19	7.26
Gain [dBi] Calculated		1.40	2.49
Measurement uncertainty		± 1.5 dB (cond.) / ± 3 dB (rad.)	

**IEEE 802.11a mode / 5745 ~ 5825MHz**

T <sub>nom</sub>	V <sub>nom</sub>	Lowest channel 5745MHz	Highest channel 5825MHz
Conducted power [dBm] Measured with OFDM modulation		5.34	5.16
Radiated power [dBm] Measured with OFDM modulation		7.15	7.26
Gain [dBi] Calculated		1.81	2.10
Measurement uncertainty		± 1.5 dB (cond.) / ± 3 dB (rad.)	

**Antenna 2****IEEE 802.11a mode / 5180 ~ 5240MHz**

T <sub>nom</sub>	V <sub>nom</sub>	Lowest channel 5180MHz	Highest channel 5240MHz
Conducted power [dBm] Measured with OFDM modulation		2.32	2.42
Radiated power [dBm] Measured with OFDM modulation		4.82	5.18
Gain [dBi] Calculated		2.50	2.76
Measurement uncertainty		± 1.5 dB (cond.) / ± 3 dB (rad.)	

**IEEE 802.11a mode / 5260 ~ 5320MHz**

T <sub>nom</sub>	V <sub>nom</sub>	Lowest channel 5260MHz	Highest channel 5320MHz
Conducted power [dBm] Measured with OFDM modulation		5.55	5.42
Radiated power [dBm] Measured with OFDM modulation		7.53	7.89
Gain [dBi] Calculated		1.98	2.47
Measurement uncertainty		± 1.5 dB (cond.) / ± 3 dB (rad.)	

**IEEE 802.11a mode / 5500 ~ 5700MHz**

T <sub>nom</sub>	V <sub>nom</sub>	Lowest channel 5500MHz	Highest channel 5700MHz
Conducted power [dBm] Measured with OFDM modulation		5.18	5.05
Radiated power [dBm] Measured with OFDM modulation		7.25	7.26
Gain [dBi] Calculated		2.07	2.21
Measurement uncertainty		± 1.5 dB (cond.) / ± 3 dB (rad.)	

**IEEE 802.11a mode / 5745 ~ 5825MHz**

T <sub>nom</sub>	V <sub>nom</sub>	Lowest channel 5745MHz	Highest channel 5825MHz
Conducted power [dBm] Measured with OFDM modulation		5.54	5.34
Radiated power [dBm] Measured with OFDM modulation		7.26	7.26
Gain [dBi] Calculated		1.72	1.92
Measurement uncertainty		± 1.5 dB (cond.) / ± 3 dB (rad.)	



## 6.4 OUTPUT POWER

### 6.4.1 LIMIT

#### According to §15.407(a)& FCC R&O FCC 14 - 30,

(1) For the band 5.15-5.25 GHz.

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(2) For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or  $11 \text{ dBm} + 10 \log B$ , where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.



(3) For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

*Note to paragraph (a)(3): The Commission strongly recommends that parties employing U-NII devices to provide critical communications services should determine if there are any nearby Government radar systems that could affect their operation.*



**Specified Limit of the Output Power**

**Test mode: IEEE 802.11a mode / 5260 ~ 5320MHz**

Channel	Frequency (MHz)	26 dB Bandwidth (B) (MHz) Antenna			10*Log(B) (dB) Antenna			11 + 10*Log(B) (dBm) Antenna			Maximum Conducted Output Power Limit (dBm) Antenna		
		0	1	2	0	1	2	0	1	2	0	1	2
Low	5260	21.47	21.47	21.19	13.32	13.32	13.26	24.32	24.32	24.26	24.00	24.00	24.00
Mid	5300	21.35	21.34	21.11	13.29	13.29	13.24	24.29	24.29	24.24	24.00	24.00	24.00
High	5320	21.46	21.17	21.13	13.32	13.26	13.25	24.32	24.26	24.25	24.00	24.00	24.00

**Test mode: IEEE 802.11a mode / 5500 ~ 5700MHz**

Channel	Frequency (MHz)	26 dB Bandwidth (B) (MHz) Antenna			10*Log(B) (dB) Antenna			11 + 10*Log(B) (dBm) Antenna			Maximum Conducted Output Power Limit (dBm) Antenna		
		0	1	2	0	1	2	0	1	2	0	1	2
Low	5500	21.01	21.20	21.19	13.22	13.26	13.26	24.22	24.26	24.26	24.00	24.00	24.00
Mid	5580	21.01	21.13	21.10	13.22	13.25	13.24	24.22	24.25	24.24	24.00	24.00	24.00
High	5700	21.41	21.29	21.40	13.31	13.28	13.30	24.31	24.28	24.30	24.00	24.00	24.00

**Test mode: IEEE 802.11n HT 20 MHz mode / 5260 ~ 5320MHz**

Channel	Frequency (MHz)	26 dB Bandwidth (B) (MHz) Antenna			10*Log(B) (dB) Antenna			11 + 10*Log(B) (dBm) Antenna			Maximum Conducted Output Power Limit (dBm) Antenna		
		0	1	2	0	1	2	0	1	2	0	1	2
Low	5260	21.33	21.23	21.33	13.29	13.27	13.29	24.29	24.27	24.29	24.00	24.00	24.00
Mid	5300	21.24	21.35	21.25	13.27	13.29	13.27	24.27	24.29	24.27	24.00	24.00	24.00
High	5320	21.33	20.98	21.36	13.29	13.22	13.30	24.29	24.22	24.30	24.00	24.00	24.00

**Test mode: IEEE 802.11n HT 20 MHz mode / 5500 ~ 5700MHz**

Channel	Frequency (MHz)	26 dB Bandwidth (B) (MHz) Antenna			10*Log(B) (dB) Antenna			11 + 10*Log(B) (dBm) Antenna			Maximum Conducted Output Power Limit (dBm) Antenna		
		0	1	2	0	1	2	0	1	2	0	1	2
Low	5500	21.24	21.26	21.23	13.27	13.28	13.27	24.27	24.28	24.27	24.00	24.00	24.00
Mid	5580	21.26	21.07	21.32	13.28	13.24	13.29	24.28	24.24	24.29	24.00	24.00	24.00
High	5700	21.39	21.46	21.45	13.30	13.32	13.31	24.30	24.32	24.31	24.00	24.00	24.00



**IEEE 802.11n HT 40 MHz mode / 5270 ~ 5310MHz**

Channel	Frequency (MHz)	26 dB Bandwidth (B) (MHz) Antenna			10*Log(B) (dB) Antenna			11 + 10*Log(B) (dBm) Antenna			Maximum Conducted Output Power Limit (dBm) Antenna		
		0	1	2	0	1	2	0	1	2	0	1	2
Low	5270	40.34	40.51	40.32	16.06	16.08	16.06	27.06	27.08	27.06	24.00	24.00	24.00
High	5310	40.25	40.63	40.32	16.05	16.09	16.06	27.05	27.09	27.06	24.00	24.00	24.00

**IEEE 802.11n HT 40 MHz mode / 5510 ~ 5670MHz**

Channel	Frequency (MHz)	26 dB Bandwidth (B) (MHz) Antenna			10*Log(B) (dB) Antenna			11 + 10*Log(B) (dBm) Antenna			Maximum Conducted Output Power Limit (dBm) Antenna		
		0	1	2	0	1	2	0	1	2	0	1	2
Low	5510	40.37	40.64	40.23	16.06	16.09	16.05	27.06	27.09	27.05	24.00	24.00	24.00
Mid	5550	40.25	40.65	40.65	16.05	16.09	16.09	27.05	27.09	27.09	24.00	24.00	24.00
High	5670	40.16	40.43	40.27	16.04	16.07	16.05	27.04	27.07	27.05	24.00	24.00	24.00

**IEEE 802.11ac 80 mode / 5290MHz**

Channel	Frequency (MHz)	26 dB Bandwidth (B) (MHz) Antenna			10*Log(B) (dB) Antenna			11 + 10*Log(B) (dBm) Antenna			Maximum Conducted Output Power Limit (dBm) Antenna		
		0	1	2	0	1	2	0	1	2	0	1	2
	5290	81.94	82.01	81.70	19.13	19.14	19.12	30.13	30.14	30.12	24.00	24.00	24.00

**IEEE 802.11ac 80 mode / 5530MHz**

Channel	Frequency (MHz)	26 dB Bandwidth (B) (MHz) Antenna			10*Log(B) (dB) Antenna			11 + 10*Log(B) (dBm) Antenna			Maximum Conducted Output Power Limit (dBm) Antenna		
		0	1	2	0	1	2	0	1	2	0	1	2
	5530	82.42	82.66	82.24	19.16	19.17	19.15	30.16	30.17	30.15	24.00	24.00	24.00

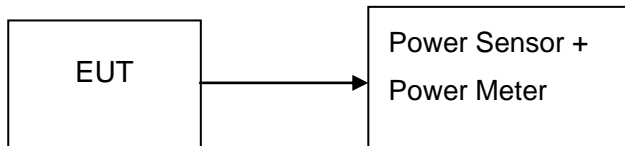


#### 6.4.2 MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Last Calibration	Calibration Due
Power Meter	Anritsu	ML2495A	1204003	02/21/2017	02/20/2018
Power Sensor	Anritsu	MA2411B	1126150	02/21/2017	02/20/2018

**Remark:** Each piece of equipment is scheduled for calibration once a year.

#### 6.4.3 TEST CONFIGURATIONS



#### 6.4.4 TEST PROCEDURE

The EUT was connected to a Power Meter through a 50Ω RF cable.

#### 6.4.5 TEST RESULTS

*No non-compliance noted*





**6.4.6 TEST DATA**

**IEEE 802.11a mode / 5180 ~ 5240MHz**

Channel	Frequency (MHz)	AVG Output Power (dBm)			AVG Output Power (W)			Limit (dBm)	Result
		Antenna 0	Antenna 1	Antenna 2	Antenna 0	Antenna 1	Antenna 2		
Low	5180	15.94	16.13	15.55	0.03926	0.04102	0.03589	30.00	PASS
Mid	5200	16.12	16.09	15.56	0.04093	0.04064	0.03597		PASS
High	5240	16.39	16.30	15.68	0.04355	0.04266	0.03698		PASS

**IEEE 802.11a mode / 5260~ 5320MHz**

Channel	Frequency (MHz)	AVG Output Power (dBm)			AVG Output Power (W)			Limit (dBm)	Result
		Antenna 0	Antenna 1	Antenna 2	Antenna 0	Antenna 1	Antenna 2		
Low	5260	19.04	19.09	18.81	0.08017	0.08110	0.07603	24.00	PASS
Mid	5300	19.18	18.91	18.54	0.08279	0.07780	0.07145		PASS
High	5320	19.12	18.81	18.67	0.08166	0.07603	0.07362		PASS

**IEEE 802.11a mode / 5500 ~ 5700MHz**

Channel	Frequency (MHz)	AVG Output Power (dBm)			AVG Output Power (W)			Limit (dBm)	Result
		Antenna 0	Antenna 1	Antenna 2	Antenna 0	Antenna 1	Antenna 2		
Low	5500	18.18	18.05	18.44	0.06577	0.06383	0.06982	24.00	PASS
Mid	5580	18.33	18.23	18.40	0.06808	0.06653	0.06918		PASS
High	5700	18.05	18.05	18.35	0.06383	0.06383	0.06839		PASS

**IEEE 802.11a mode / 5745 ~ 5825MHz**

Channel	Frequency (MHz)	AVG Output Power (dBm)			AVG Output Power (W)			Limit (dBm)	Result
		Antenna 0	Antenna 1	Antenna 2	Antenna 0	Antenna 1	Antenna 2		
Low	5745	18.55	18.61	18.74	0.07161	0.07261	0.07482	30.00	PASS
Mid	5785	18.42	18.39	18.74	0.06950	0.06902	0.07482		PASS
High	5825	18.38	18.42	18.65	0.06887	0.06950	0.07328		PASS



**IEEE 802.11n HT 20 MHz mode / 5180 ~ 5240MHz**

Channel	Frequency (MHz)	AVG Output Power (dBm)				AVG Output Power (W)	Limit (dBm)	Result
		Antenna 0	Antenna 1	Antenna 2	Total			
Low	5180	7.41	7.88	8.00	12.54	0.01796	28.23	PASS
Mid	5200	7.40	7.58	8.04	12.45	0.01759		PASS
High	5240	7.34	7.61	7.96	12.42	0.01744		PASS

**IEEE 802.11n HT 20 MHz mode / 5260~ 5320MHz**

Channel	Frequency (MHz)	AVG Output Power (dBm)				AVG Output Power (W)	Limit (dBm)	Result
		Antenna 0	Antenna 1	Antenna 2	Total			
Low	5260	12.61	12.84	16.66	19.23	0.08381	22.23	PASS
Mid	5300	12.46	12.43	16.60	19.08	0.08083		PASS
High	5320	12.42	12.41	16.55	19.03	0.08006		PASS

**IEEE 802.11n HT 20 MHz mode / 5500 ~ 5700MHz**

Channel	Frequency (MHz)	AVG Output Power (dBm)				AVG Output Power (W)	Limit (dBm)	Result
		Antenna 0	Antenna 1	Antenna 2	Total			
Low	5500	16.67	16.39	15.80	21.07	0.12802	22.23	PASS
Mid	5580	16.28	16.37	15.85	20.94	0.12427		PASS
High	5700	16.40	16.10	15.81	20.88	0.12250		PASS

**IEEE 802.11n HT 20 MHz mode / 5745 ~ 5825MHz**

Channel	Frequency (MHz)	AVG Output Power (dBm)				AVG Output Power (W)	Limit (dBm)	Result
		Antenna 0	Antenna 1	Antenna 2	Total			
Low	5745	16.58	16.55	16.35	21.27	0.13384	28.23	PASS
Mid	5785	16.60	16.48	16.14	21.18	0.13129		PASS
High	5825	16.33	16.33	16.25	21.07	0.12808		PASS



**IEEE 802.11n HT 40 MHz mode / 5190 ~ 5230MHz**

Channel	Frequency (MHz)	AVG Output Power (dBm)				AVG Output Power (W)	Limit (dBm)	Result
		Antenna 0	Antenna 1	Antenna 2	Total			
Low	5190	10.52	10.23	10.68	15.25	0.03351	28.23	PASS
High	5230	10.46	10.04	10.86	15.24	0.03340		PASS

**IEEE 802.11n HT 40 MHz mode / 5270 ~ 5310MHz**

Channel	Frequency (MHz)	AVG Output Power (dBm)				AVG Output Power (W)	Limit (dBm)	Result
		Antenna 0	Antenna 1	Antenna 2	Total			
Low	5270	13.83	14.14	15.96	19.52	0.08954	22.23	PASS
High	5310	14.03	13.94	15.94	19.51	0.08933		PASS

**IEEE 802.11n HT 40 MHz mode / 5510 ~ 5670MHz**

Channel	Frequency (MHz)	AVG Output Power (dBm)				AVG Output Power (W)	Limit (dBm)	Result
		Antenna 0	Antenna 1	Antenna 2	Total			
Low	5510	16.69	16.96	14.53	20.96	0.12470	22.23	PASS
Mid	5550	16.67	16.94	14.12	20.85	0.12171		PASS
High	5670	16.73	16.61	14.13	20.75	0.11879		PASS

**IEEE 802.11n HT 40 MHz mode / 5755 ~ 5795MHz**

Channel	Frequency (MHz)	AVG Output Power (dBm)				AVG Output Power (W)	Limit (dBm)	Result
		Antenna 0	Antenna 1	Antenna 2	Total			
Low	5775	16.74	16.64	14.18	20.77	0.11952	28.23	PASS
High	5795	16.77	16.75	14.12	20.82	0.12067		PASS



**IEEE 802.11ac 80 mode / 5210MHz**

Channel	Frequency (MHz)	AVG Output Power (dBm)				AVG Output Power (W)	Limit (dBm)	Result
		Antenna 0	Antenna 1	Antenna 2	Total			
	5210	13.10	13.23	13.05	17.90	0.06164	28.23	PASS

**IEEE 802.11ac 80 mode / 5290MHz**

Channel	Frequency (MHz)	AVG Output Power (dBm)				AVG Output Power (W)	Limit (dBm)	Result
		Antenna 0	Antenna 1	Antenna 2	Total			
	5290	15.62	15.54	14.01	19.89	0.09746	22.23	PASS

**IEEE 802.11ac 80 mode / 5530MHz**

Channel	Frequency (MHz)	AVG Output Power (dBm)				AVG Output Power (W)	Limit (dBm)	Result
		Antenna 0	Antenna 1	Antenna 2	Total			
	5530	16.42	16.45	14.22	20.59	0.11443	22.23	PASS

**IEEE 802.11ac 80 mode / 5775MHz**

Channel	Frequency (MHz)	AVG Output Power (dBm)				AVG Output Power (W)	Limit (dBm)	Result
		Antenna 0	Antenna 1	Antenna 2	Total			
	5775	16.36	16.72	14.15	20.65	0.11624	28.23	PASS



## 6.5 BAND EDGES MEASUREMENT

### 6.5.1 LIMIT

According to §15.407(b)

- (1) The provisions of Section 15.205 of this part apply to intentional radiators operating under this section.
- (2) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the upper and lower frequency block edges as the design of the equipment permits.

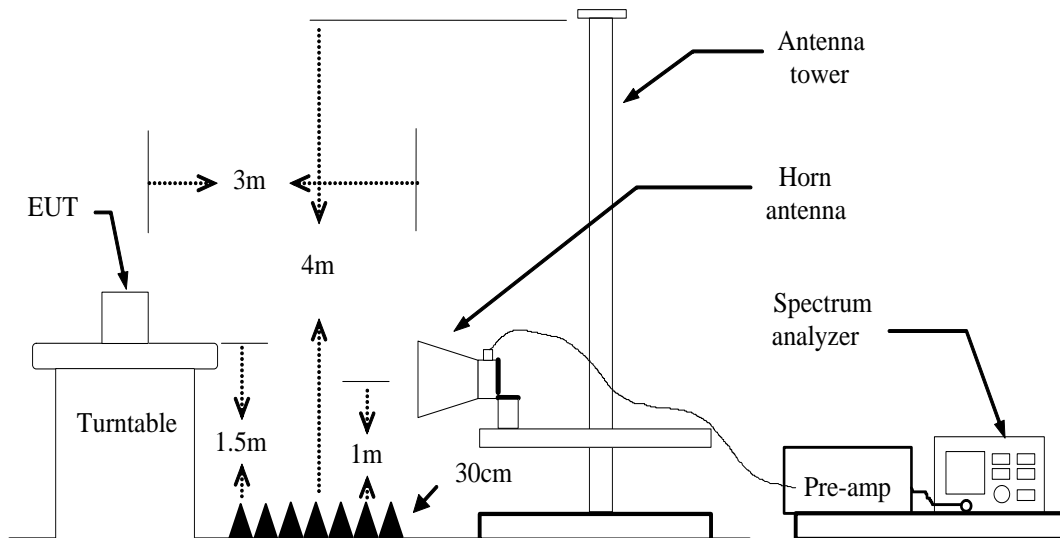
### 6.5.2 MEASUREMENT EQUIPMENT USED

Radiated Emission Test Site 966 (2)					
Name of Equipment	Manufacturer	Model Number	Serial Number	Last Calibration	Due Calibration
PSA Series Spectrum Analyzer	Agilent	N9010A	MY52221469	02/21/2017	02/20/2018
EMI TEST RECEIVER	ROHDE&SCHWARZ	ESCI	100783	02/21/2017	02/20/2018
Amplifier	EMEC	EM330	060661	03/18/2017	03/17/2018
High Noise Amplifier	Agilent	8449B	3008A01838	02/21/2017	02/20/2018
Loop Antenna	COM-POWER	AL-130	121044	09/25/2016	09/24/2017
Bilog Antenna	SCHAFFNER	CBL6143	5082	02/21/2017	02/20/2018
Horn Antenna	SCHWARZBECK	BBHA9120	D286	02/27/2017	02/27/2018
Board-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170-497	02/27/2017	02/27/2018
Turn Table	N/A	N/A	N/A	N.C.R	N.C.R
Antenna Tower	SUNOL	TLT2	N/A	N.C.R	N.C.R
Controller	Sunol Sciences	SC104V	022310-1	N.C.R	N.C.R
Controller	CT	N/A	N/A	N.C.R	N.C.R
Temp. / Humidity Meter	Anymetre	JR913	N/A	02/21/2017	02/20/2018
Test S/W	FARAD	LZ-RF / CCS-SZ-3A2			

- NOTE:**
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
  2. The FCC Site Registration number is 101879.
  3. N.C.R = No Calibration Required.



### 6.5.3 TEST CONFIGURATION



### 6.5.4 TEST PROCEDURE

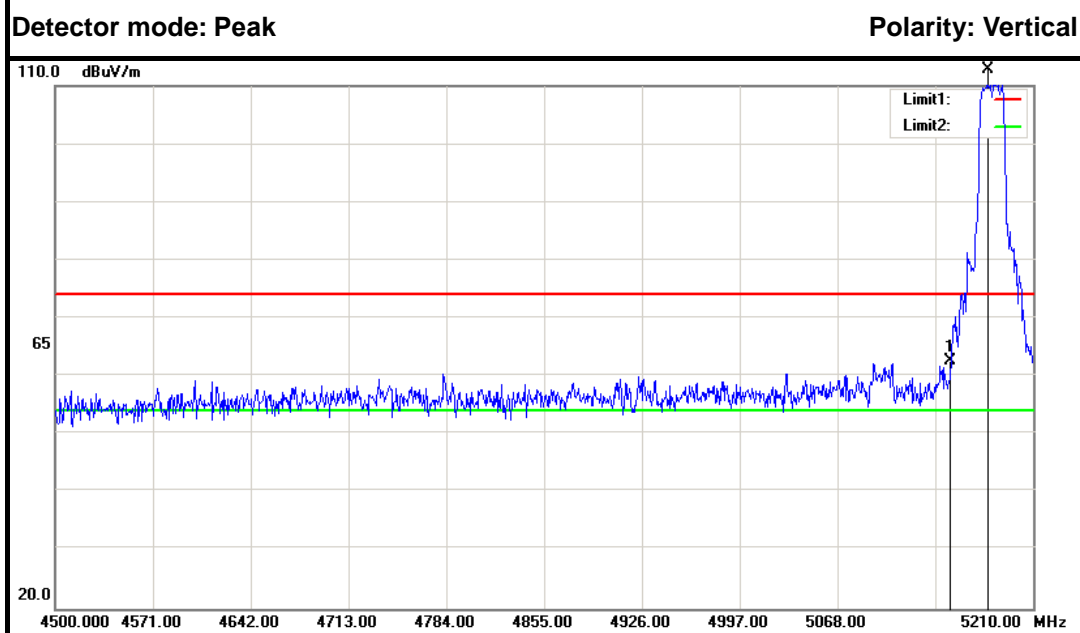
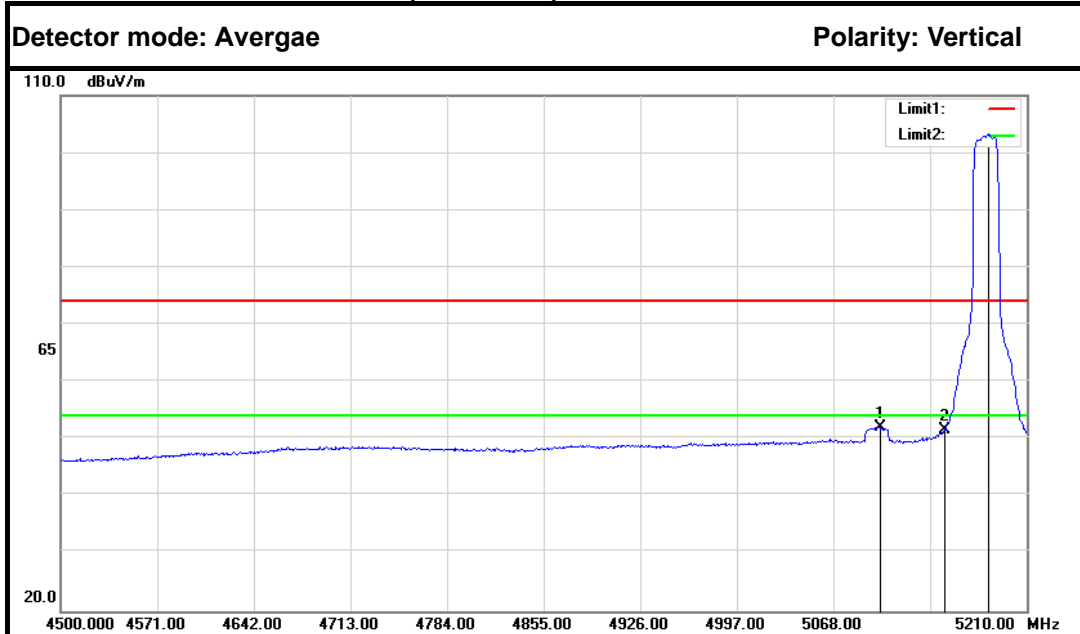
1. The EUT is placed on a turntable, which is 1.5m above the ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
4. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:
  - (a) PEAK: RBW=1 / VBW=3MHz / Sweep=AUTO
  - (b) AVERAGE: RBW=1MHz / VBW=1/T / Sweep=AUTO / Detector=Peak
5. Repeat the procedures until all the PEAK and AVERAGE versus POLARIZATION are measured.



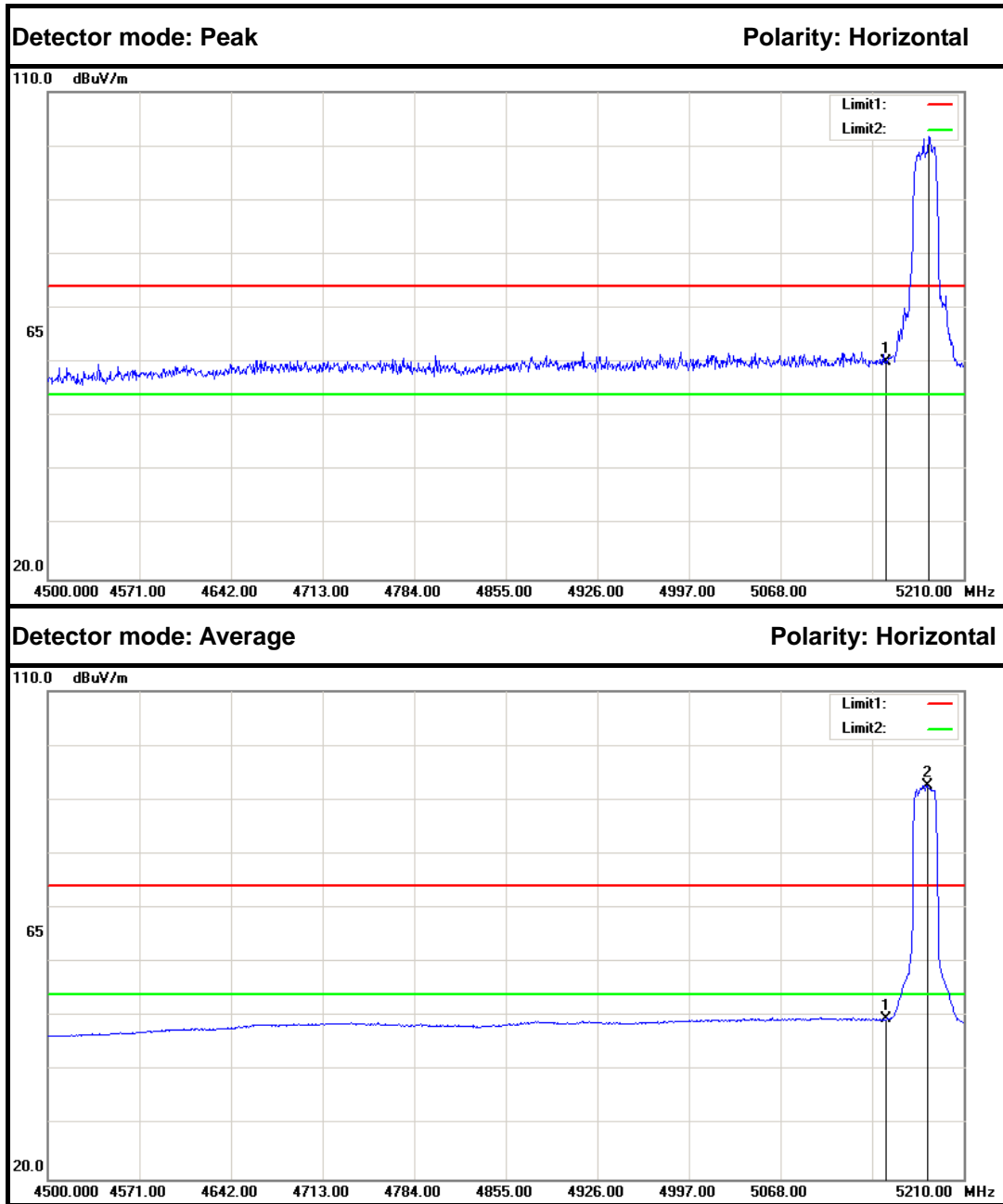
### 6.5.5 TEST RESULT

**Test Plot**

IEEE 802.11a mode / 5180MHz (Antenna 0)



No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	5102.080	46.94	5.16	52.10	54.00	-1.90	Average	Vertical
2	5150.000	46.40	5.25	51.65	54.00	-2.35	Average	Vertical
3	5182.310	97.97	5.30	103.27	---	---	Average	Vertical
1	5150.000	57.31	5.25	62.56	74.00	-11.44	Peak	Vertical
2	5177.340	107.69	5.30	112.99	---	---	Peak	Vertical

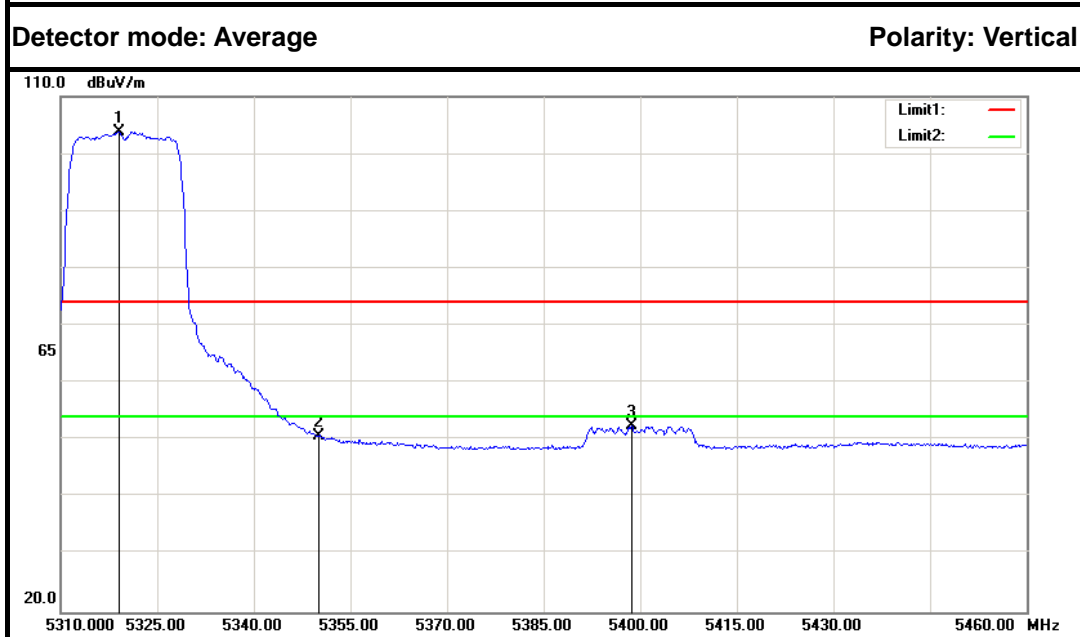
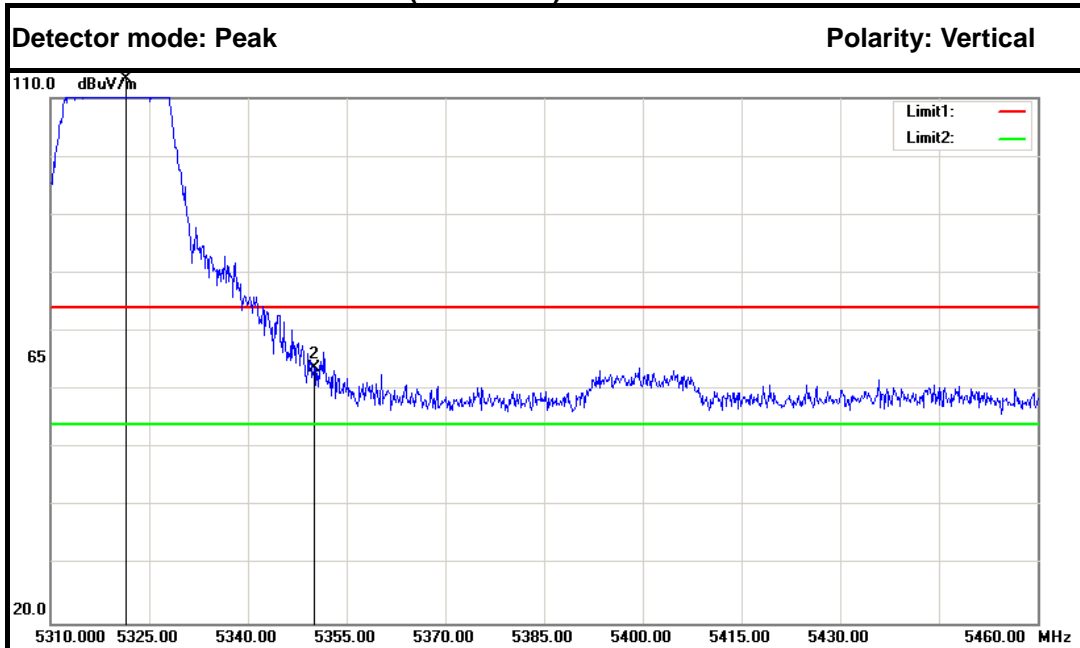


No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	5150.000	54.87	5.25	60.12	74.00	-13.88	Peak	Horizontal
2	5183.020	96.40	5.31	101.71	---	---	Peak	Horizontal
1	5150.000	44.24	5.25	49.49	54.00	-4.51	Average	Horizontal
2	5181.600	87.33	5.30	92.63	---	---	Average	Horizontal

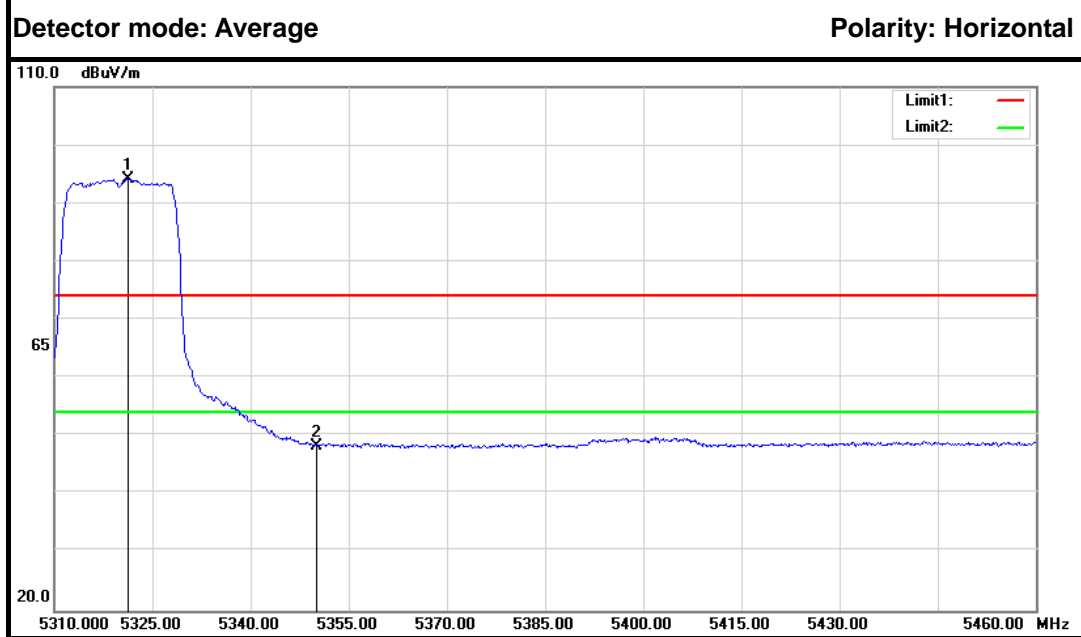
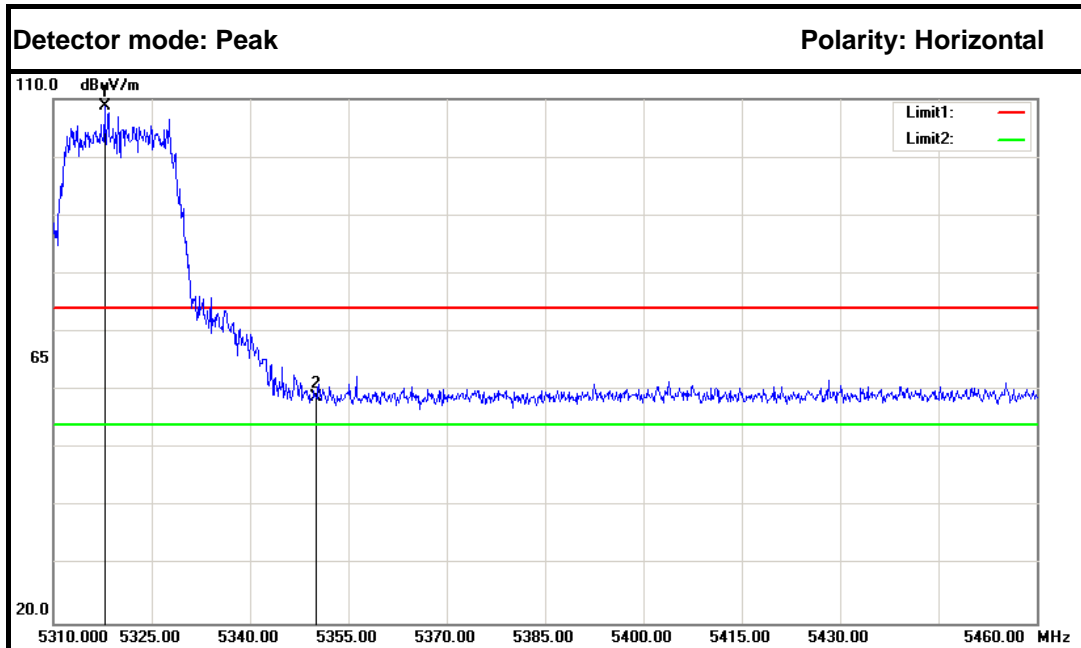




IEEE 802.11a mode / 5320MHz (Antenna 0)



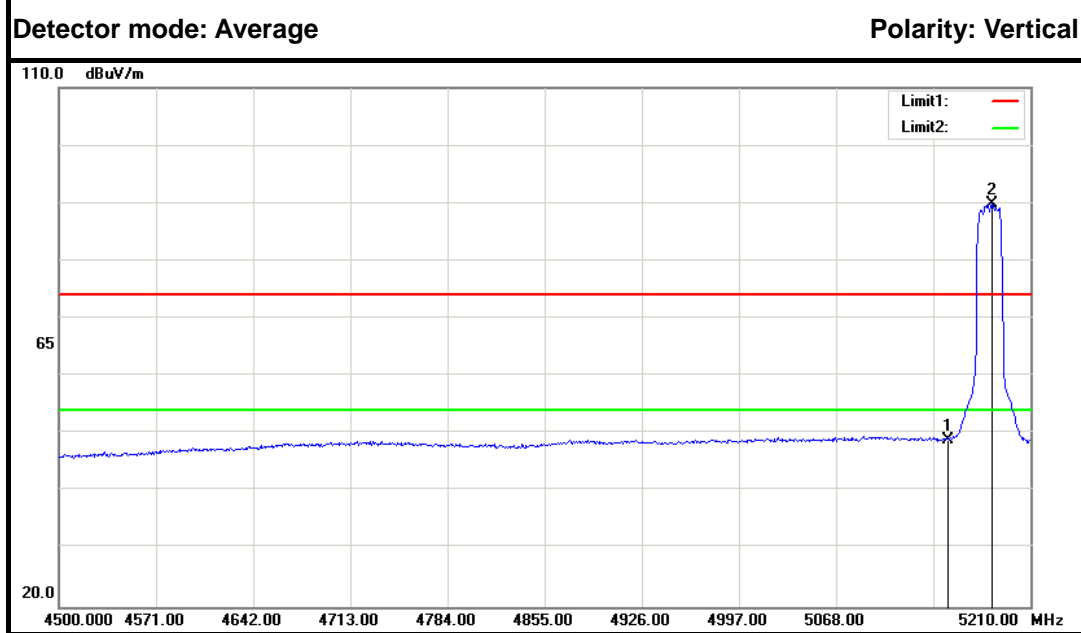
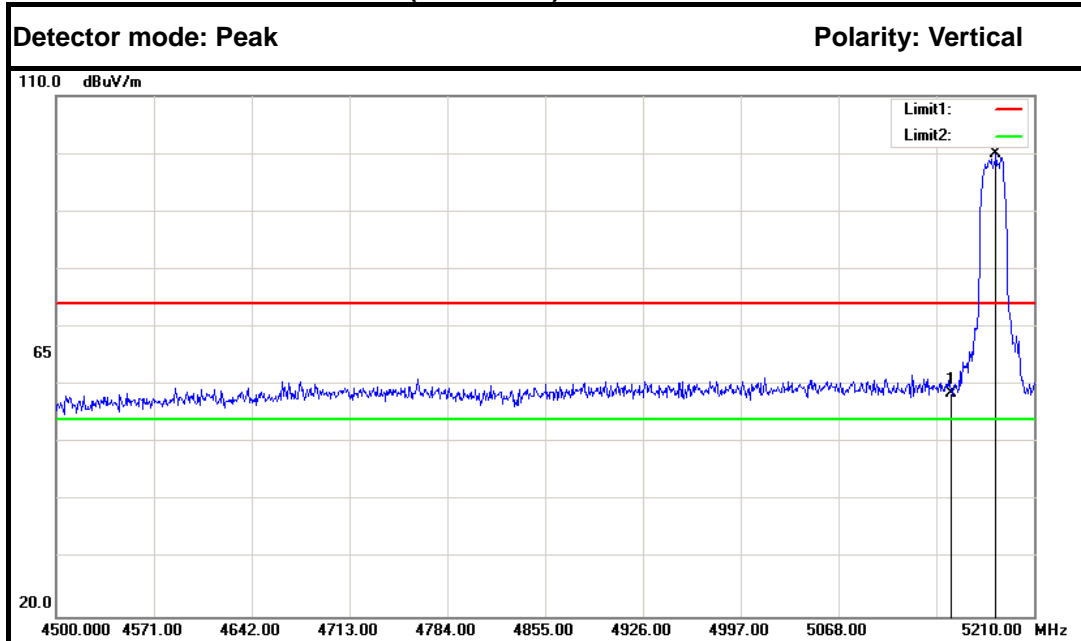
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	5321.400	107.83	5.55	113.38	---	---	Peak	Vertical
2	5350.000	58.27	5.60	63.87	74.00	-10.13	Peak	Vertical
1	5319.150	98.31	5.55	103.86	---	---	Average	Vertical
2	5350.000	45.11	5.60	50.71	54.00	-3.29	Average	Vertical
3	5398.650	46.79	5.69	52.48	54.00	-1.52	Average	Vertical



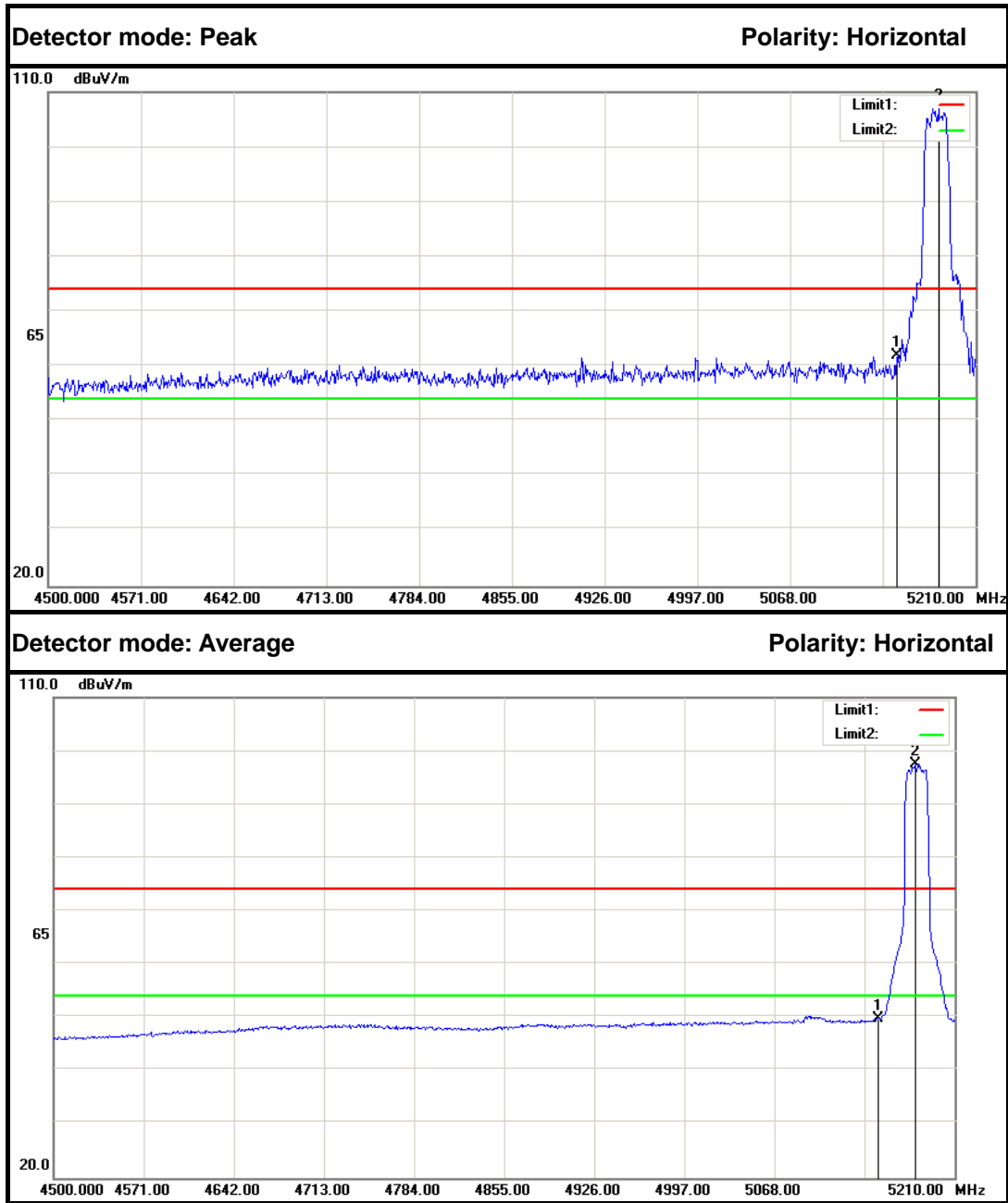
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	5317.800	103.10	5.55	108.65	---	---	Peak	Horizontal
2	5350.000	53.30	5.60	58.90	74.00	-15.10	Peak	Horizontal
1	5321.250	88.61	5.55	94.16	---	---	Average	Horizontal
2	5350.000	42.72	5.60	48.32	54.00	-5.68	Average	Horizontal



IEEE 802.11a mode / 5180MHz (Antenna 1)



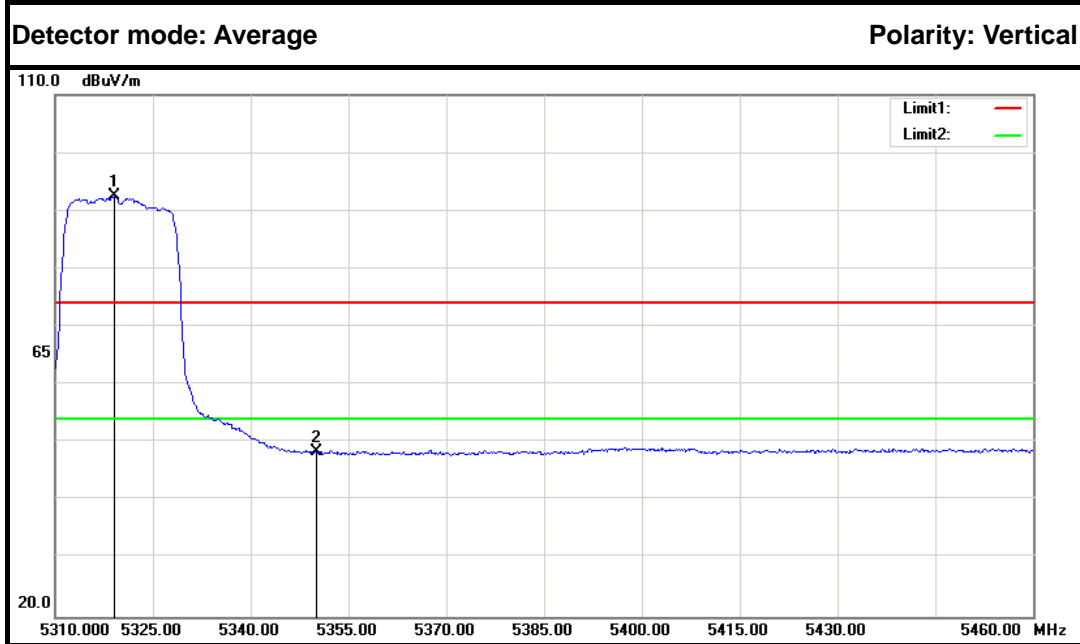
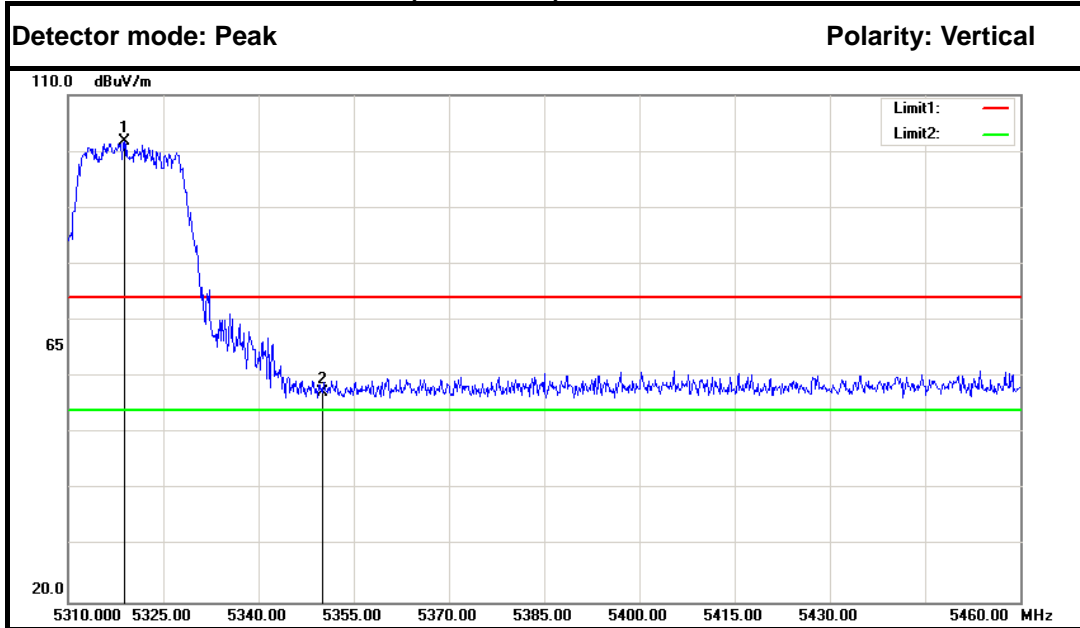
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	5150.000	53.40	5.25	58.65	74.00	-15.35	Peak	Vertical
2	5182.310	94.68	5.30	99.98	---	---	Peak	Vertical
1	5150.000	43.75	5.25	49.00	54.00	-5.00	Average	Vertical
2	5181.600	84.67	5.30	89.97	---	---	Average	Vertical



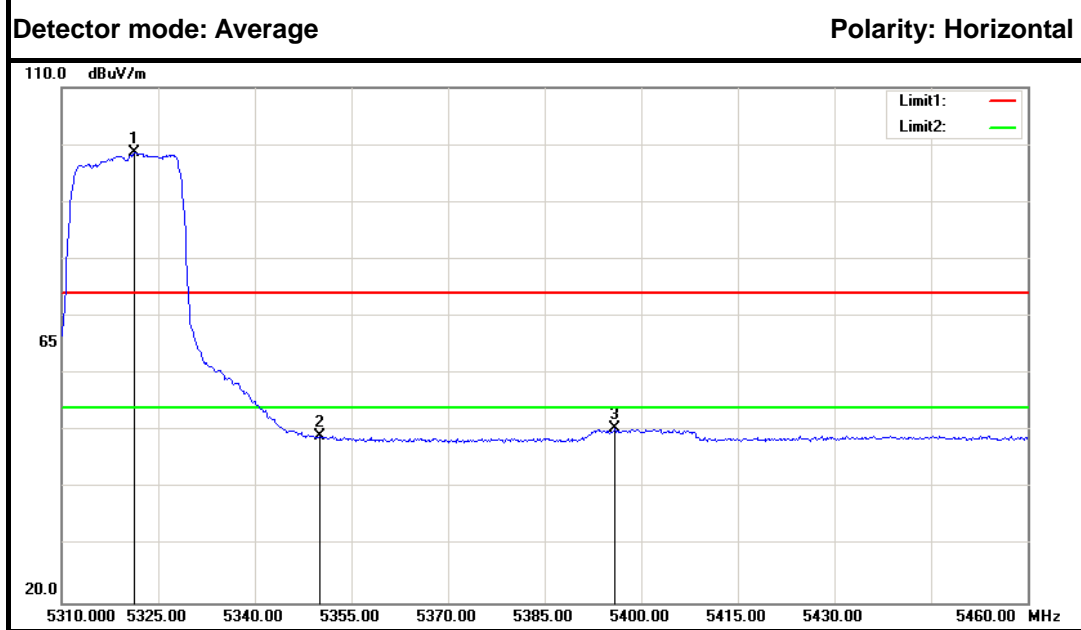
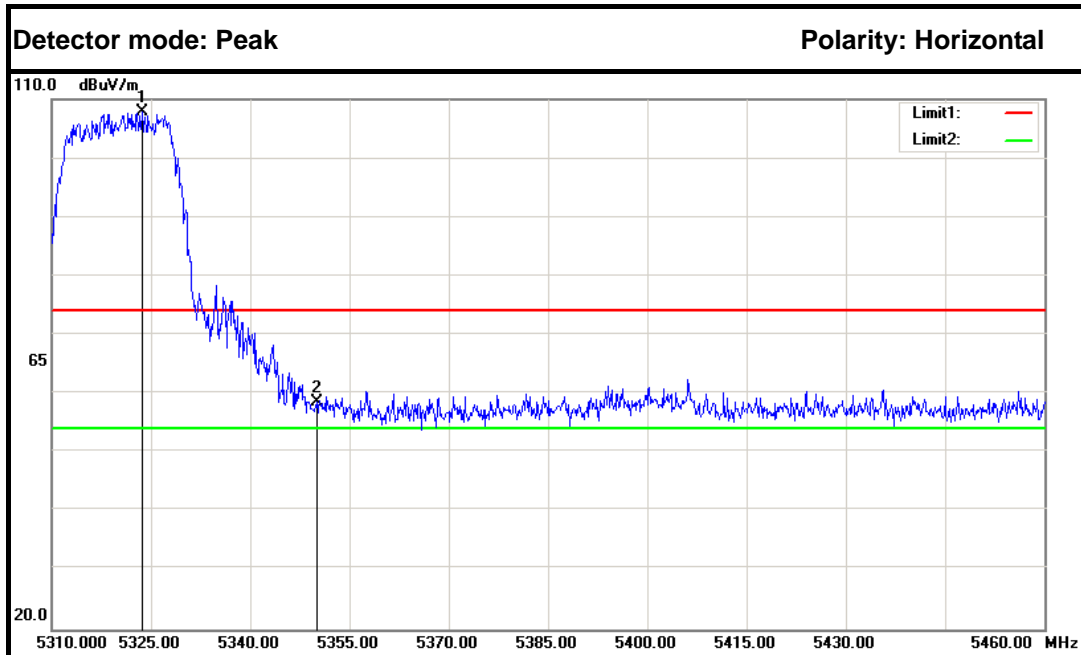
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	5150.000	56.61	5.25	61.86	74.00	-12.14	Peak	Horizontal
2	5181.600	101.70	5.30	107.00	---	---	Peak	Horizontal
1	5150.000	44.53	5.25	49.78	54.00	-4.22	Average	Horizontal
2	5179.470	92.21	5.30	97.51	---	---	Average	Horizontal



IEEE 802.11a mode / 5320MHz (Antenna 1)



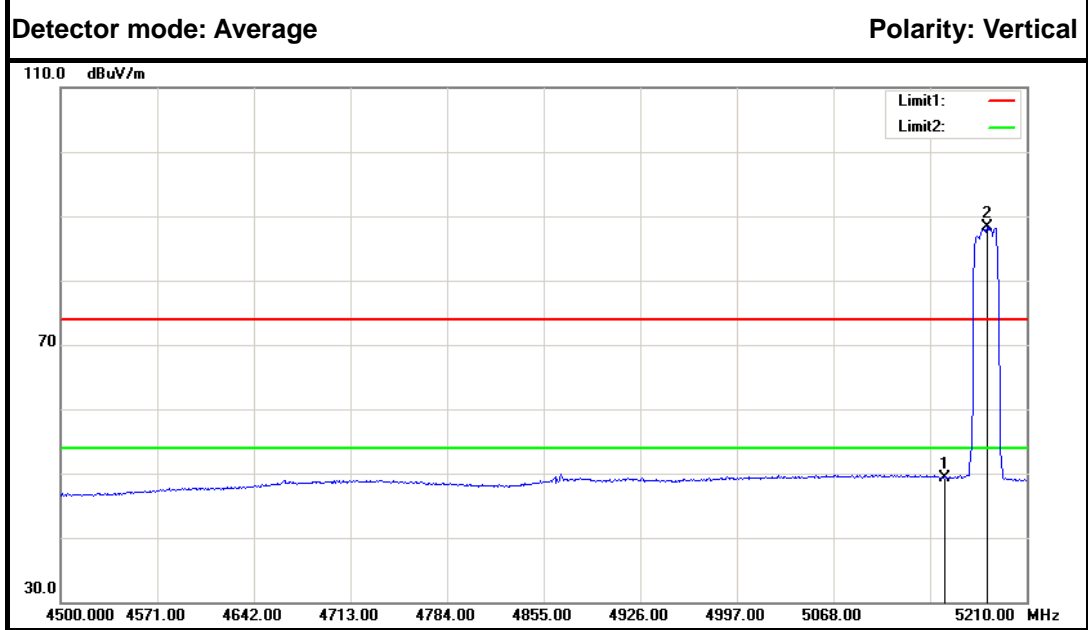
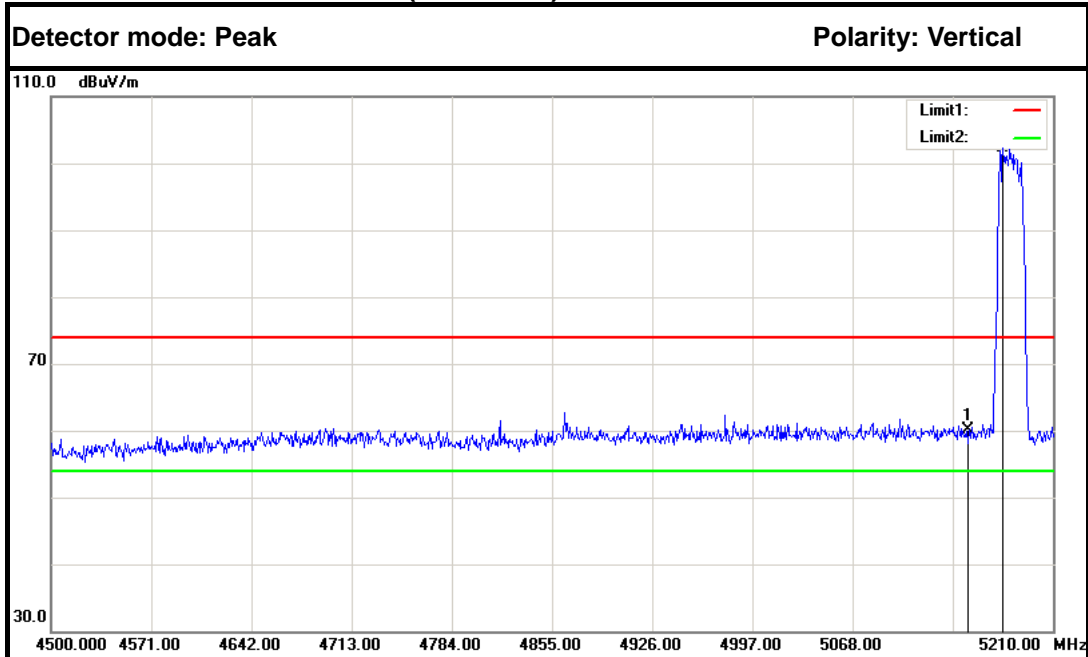
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	5318.850	96.26	5.55	101.81	---	---	Peak	Vertical
2	5350.000	51.60	5.60	57.20	74.00	-16.80	Peak	Vertical
1	5319.150	86.99	5.55	92.54	---	---	Average	Vertical
2	5350.000	42.76	5.60	48.36	54.00	-5.64	Average	Vertical



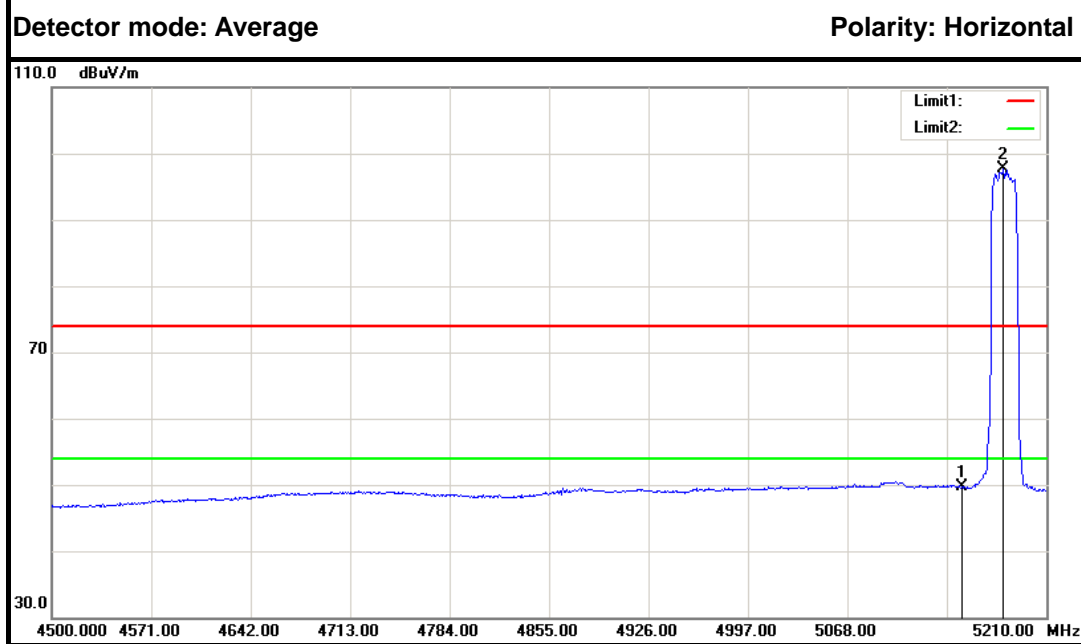
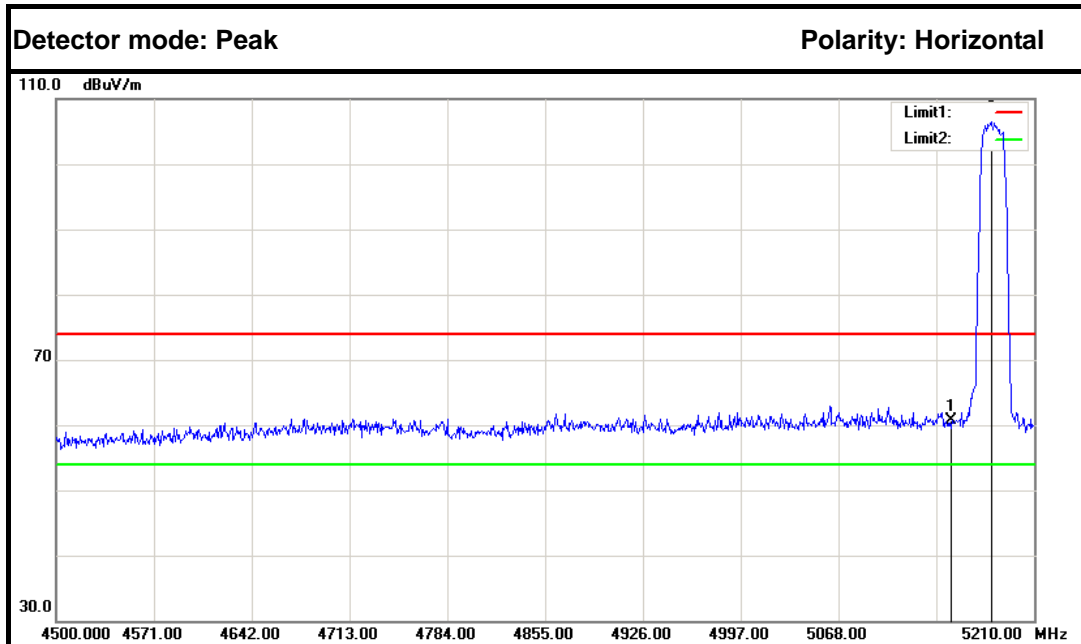
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	5323.650	102.27	5.56	107.83	---	---	Peak	Horizontal
2	5350.000	53.06	5.60	58.66	74.00	-15.34	Peak	Horizontal
1	5321.250	93.13	5.55	98.68	---	---	Average	Horizontal
2	5350.000	43.45	5.60	49.05	54.00	-4.95	Average	Horizontal
3	5395.950	44.77	5.68	50.45	54.00	-3.55	Average	Horizontal



IEEE 802.11a mode / 5180MHz (Antenna 2)



No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	5150.000	54.90	5.25	60.15	74.00	-13.85	Peak	Vertical
2	5174.500	96.98	5.29	102.27	---	---	Peak	Vertical
1	5150.000	44.06	5.25	49.31	54.00	-4.69	Average	Vertical
2	5180.890	82.96	5.30	88.26	---	---	Average	Vertical

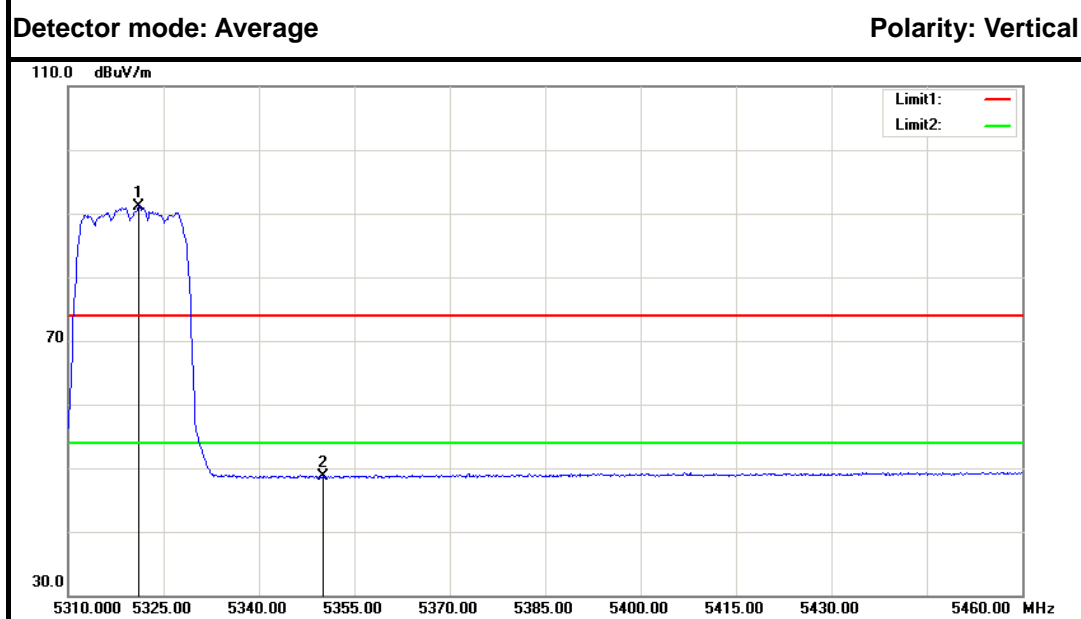
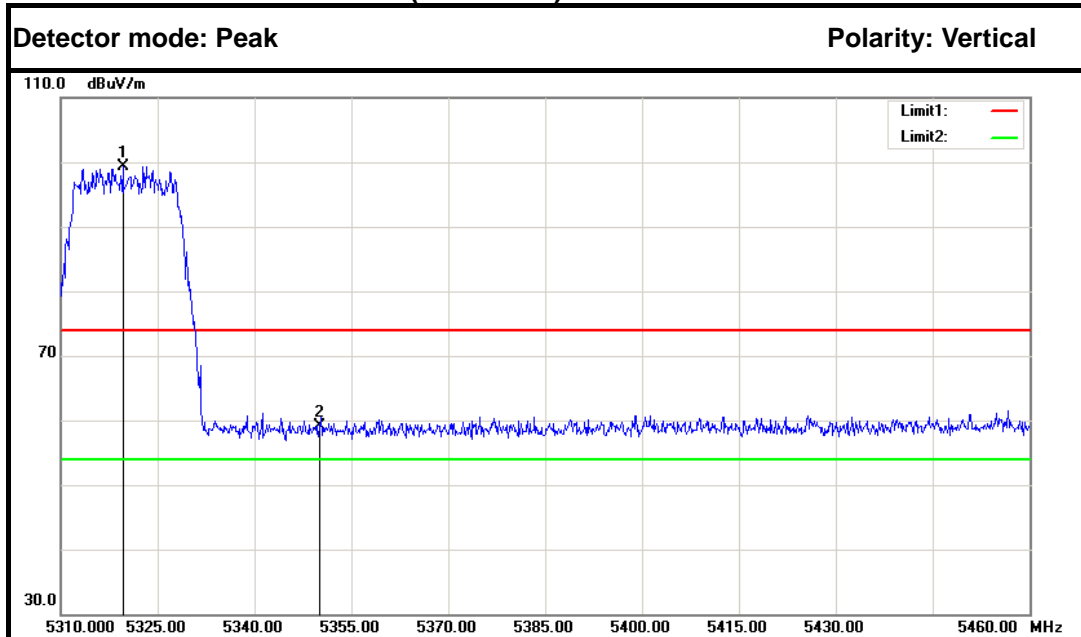


No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	5150.000	55.54	5.25	60.79	74.00	-13.21	Peak	Horizontal
2	5178.760	101.12	5.30	106.42	---	---	Peak	Horizontal
1	5150.000	44.43	5.25	49.68	54.00	-4.32	Average	Horizontal
2	5179.470	92.33	5.30	97.63	---	---	Average	Horizontal

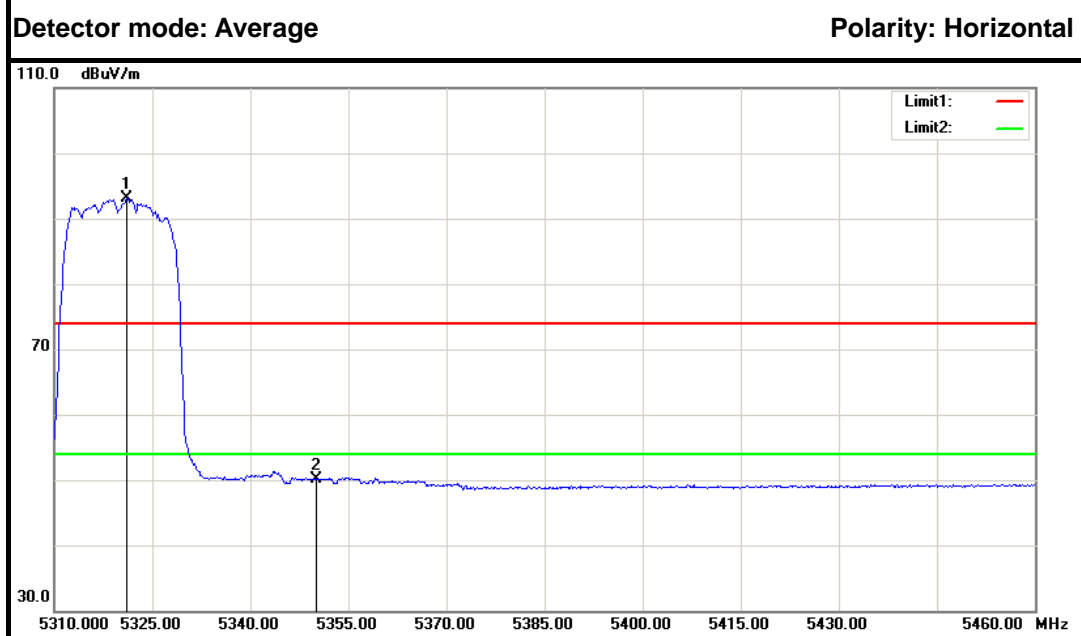
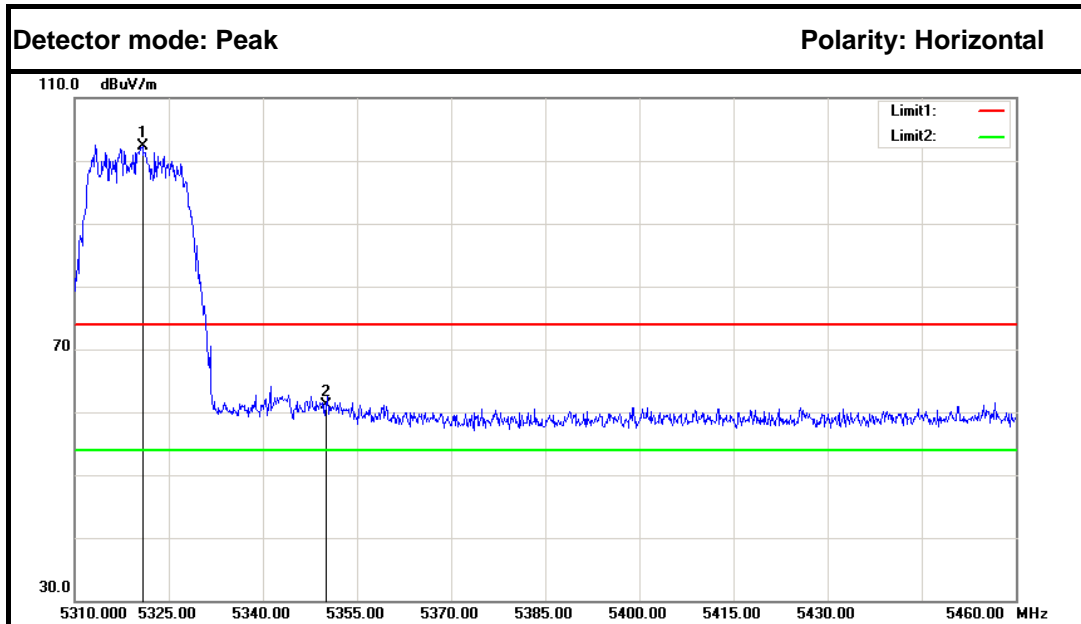




IEEE 802.11a mode / 5320MHz (Antenna 2)



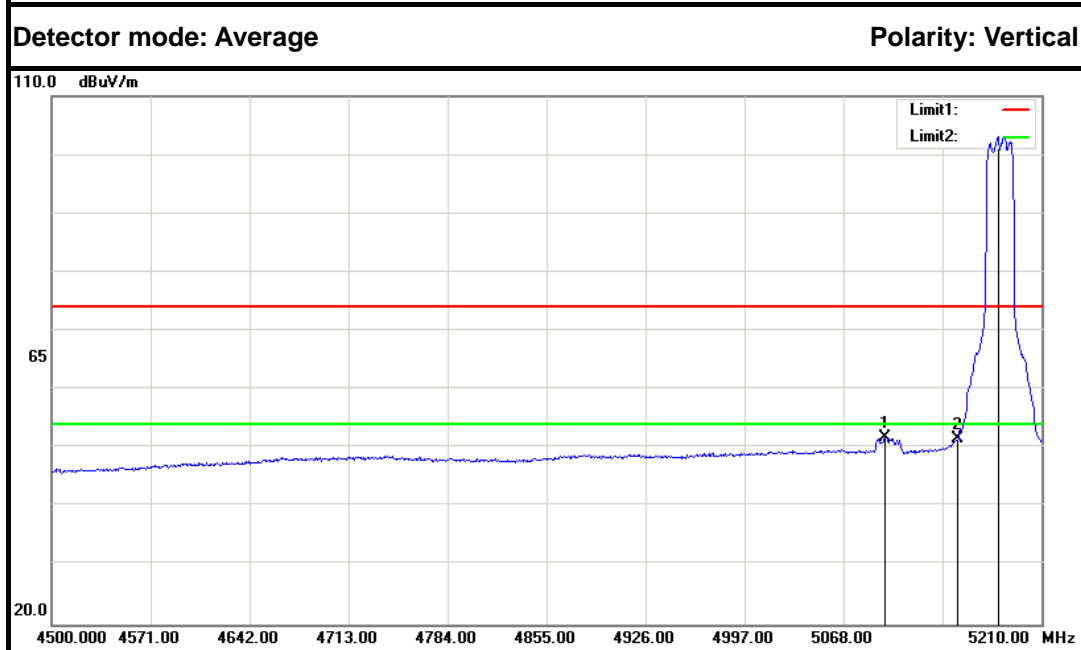
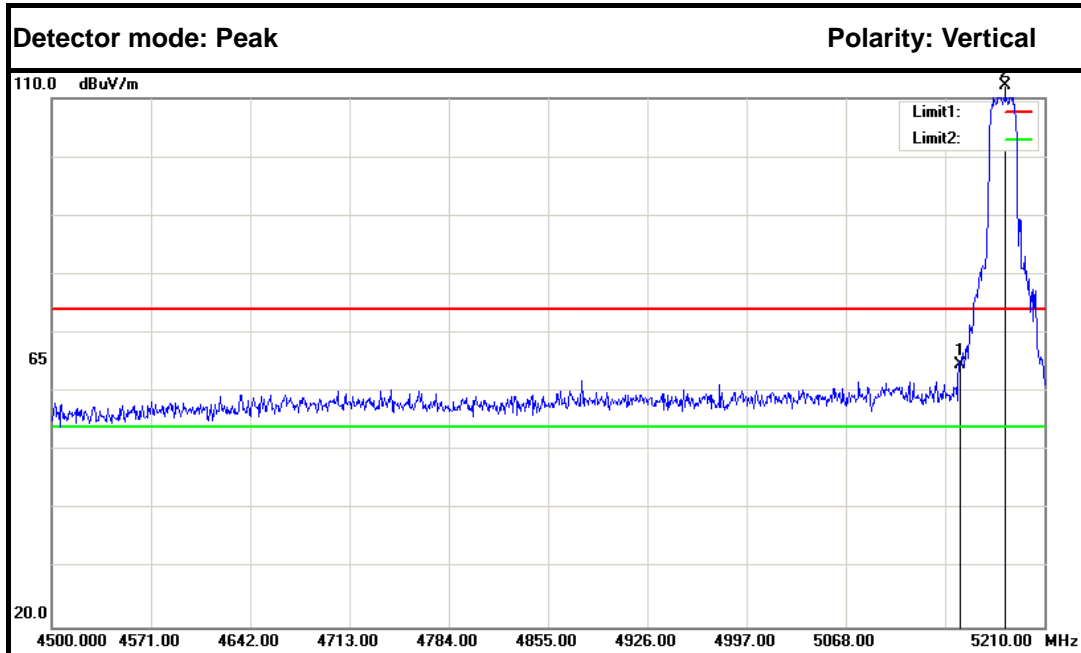
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	5319.600	93.82	5.55	99.37	---	---	Peak	Vertical
2	5350.000	53.54	5.60	59.14	74.00	-14.86	Peak	Vertical
1	5321.100	85.48	5.55	91.03	---	---	Average	Vertical
2	5350.000	43.04	5.60	48.64	54.00	-5.36	Average	Vertical



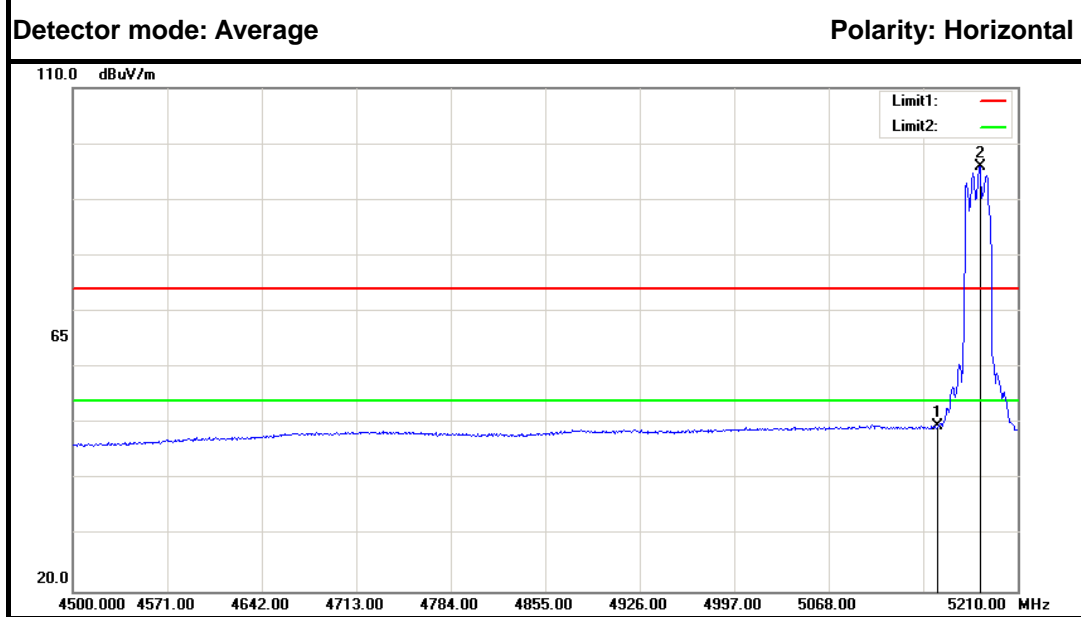
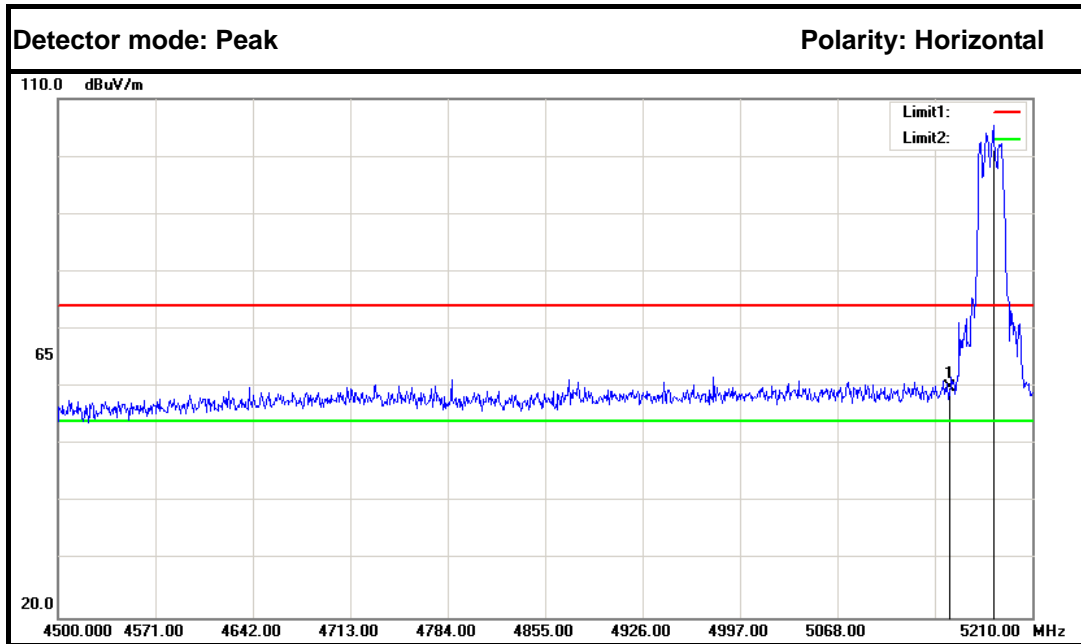
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	5320.800	96.75	5.55	102.30	---	---	Peak	Horizontal
2	5350.000	55.54	5.60	61.14	74.00	-12.86	Peak	Horizontal
1	5321.100	87.48	5.55	93.03	---	---	Average	Horizontal
2	5350.000	44.54	5.60	50.14	54.00	-3.86	Average	Horizontal



Combine with Antenna 0 and Antenna 1 and Antenna 2  
IEEE 802.11n HT 20 MHz mode / 5180 MHz



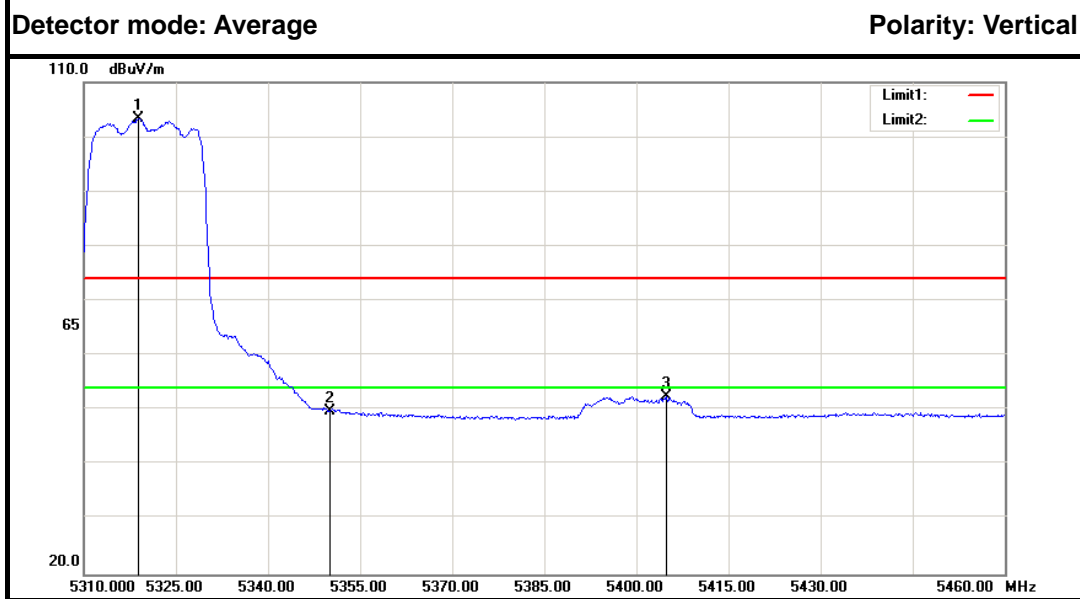
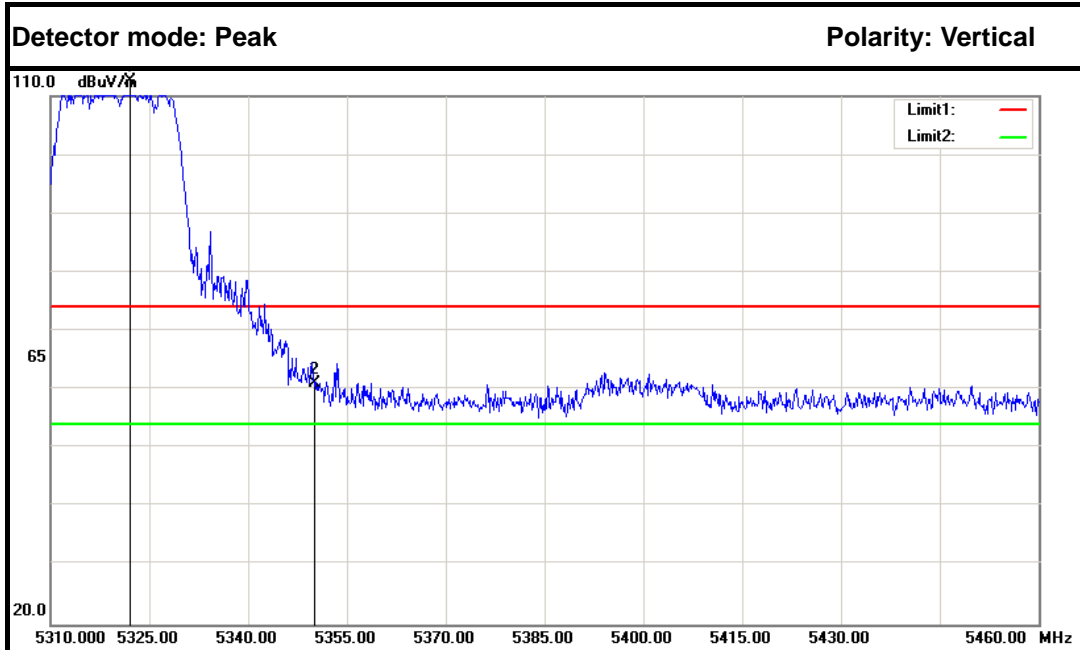
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	5150.000	59.47	5.25	64.72	74.00	-9.28	Peak	Vertical
2	5181.600	106.89	5.30	112.19	---	---	Peak	Vertical
1	5097.820	46.73	5.15	51.88	54.00	-2.12	Average	Vertical
2	5150.000	46.43	5.25	51.68	54.00	-2.32	Average	Vertical
3	5178.760	97.74	5.30	103.04	---	---	Average	Vertical



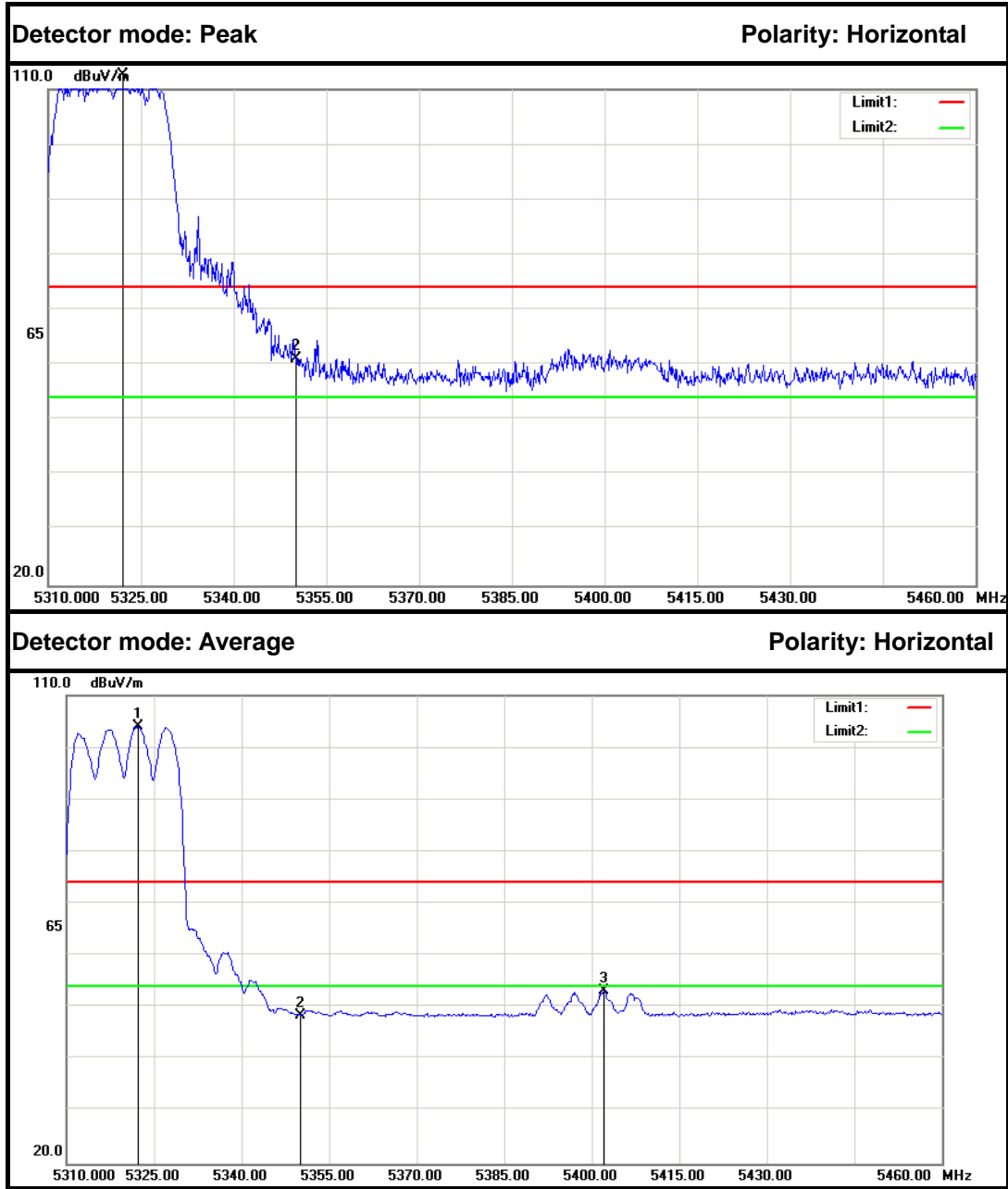
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	5150.000	54.78	5.25	60.03	74.00	-13.97	Peak	Horizontal
2	5181.600	99.99	5.30	105.29	---	---	Peak	Horizontal
1	5150.000	44.29	5.25	49.54	54.00	-4.46	Average	Horizontal
2	5181.600	90.59	5.30	95.89	---	---	Average	Horizontal



IEEE 802.11n HT 20 MHz mode / 5320 MHz



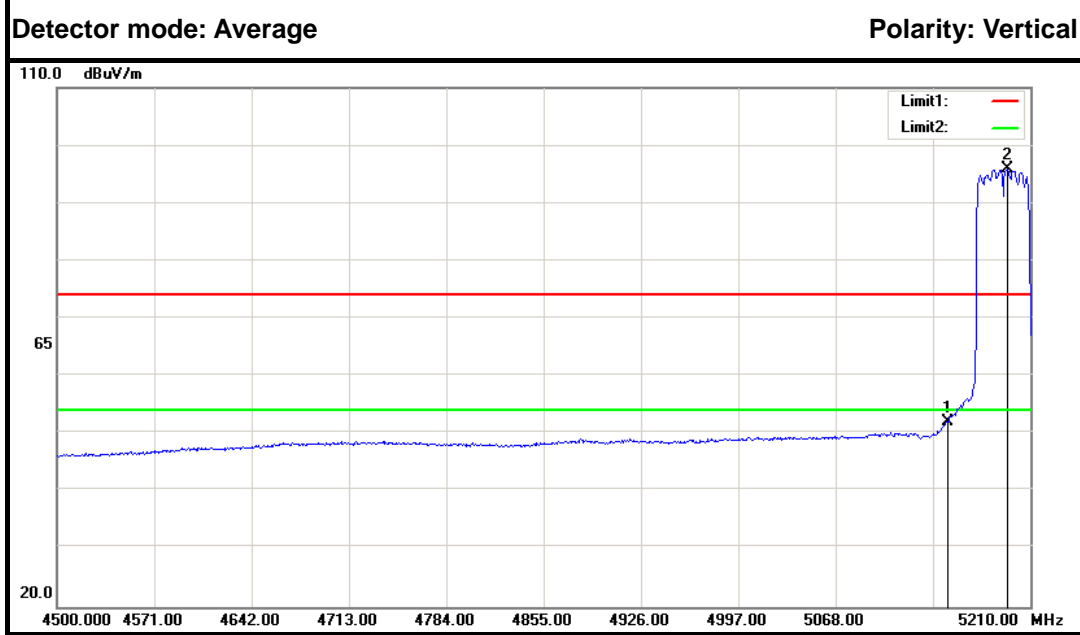
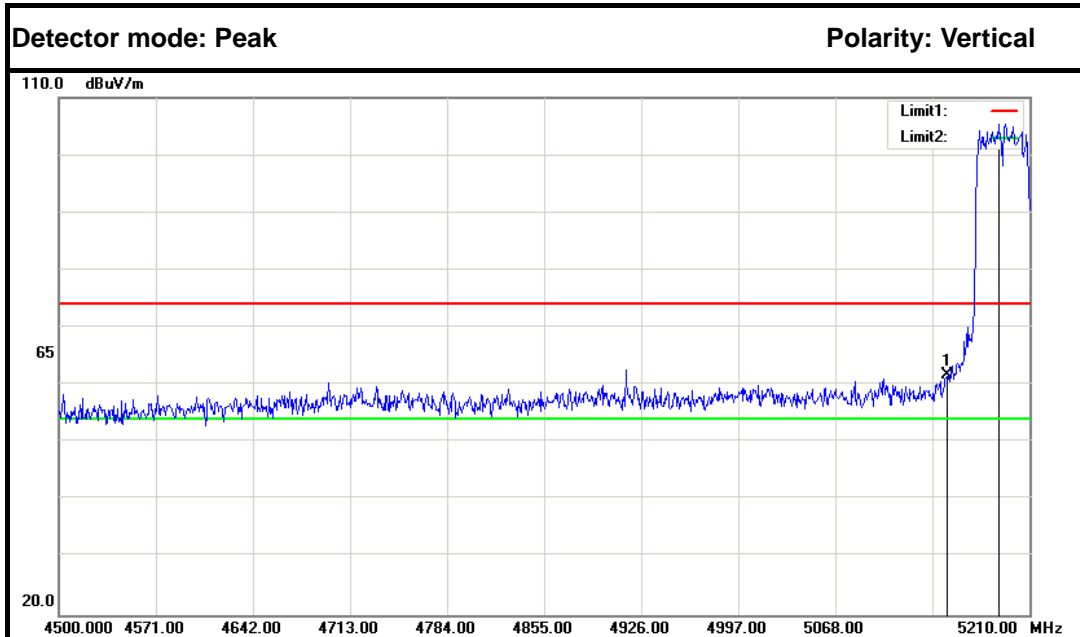
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	5322.150	107.28	5.55	112.83	---	---	Peak	Vertical
2	5350.000	55.37	5.60	60.97	74.00	-13.03	Peak	Vertical
1	5318.850	97.78	5.55	103.33	---	---	Average	Vertical
2	5350.000	44.24	5.60	49.84	54.00	-4.16	Average	Vertical
3	5404.800	46.73	5.70	52.43	54.00	-1.57	Average	Vertical



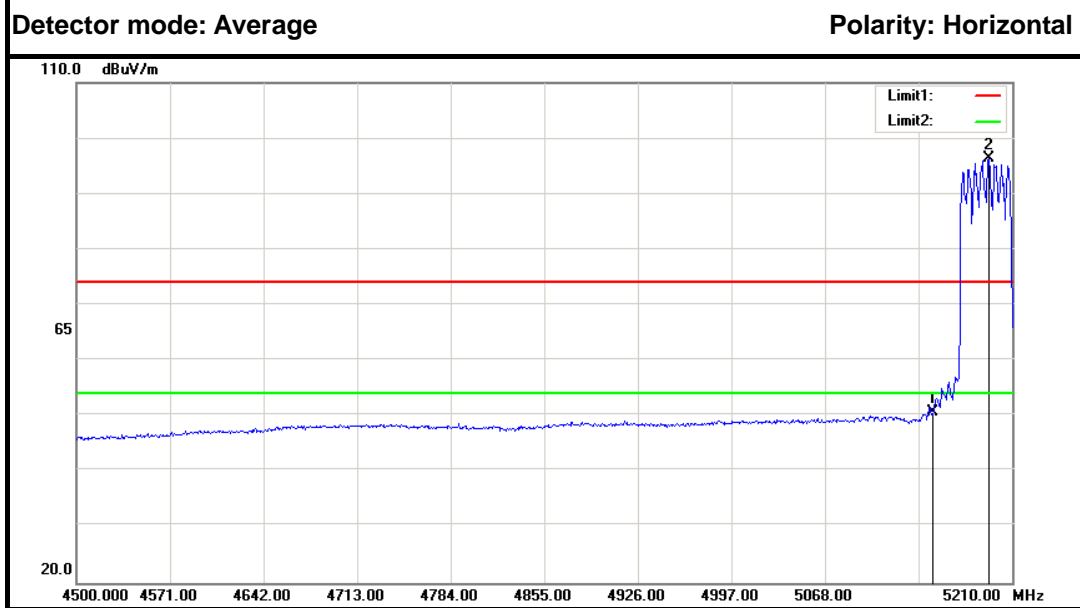
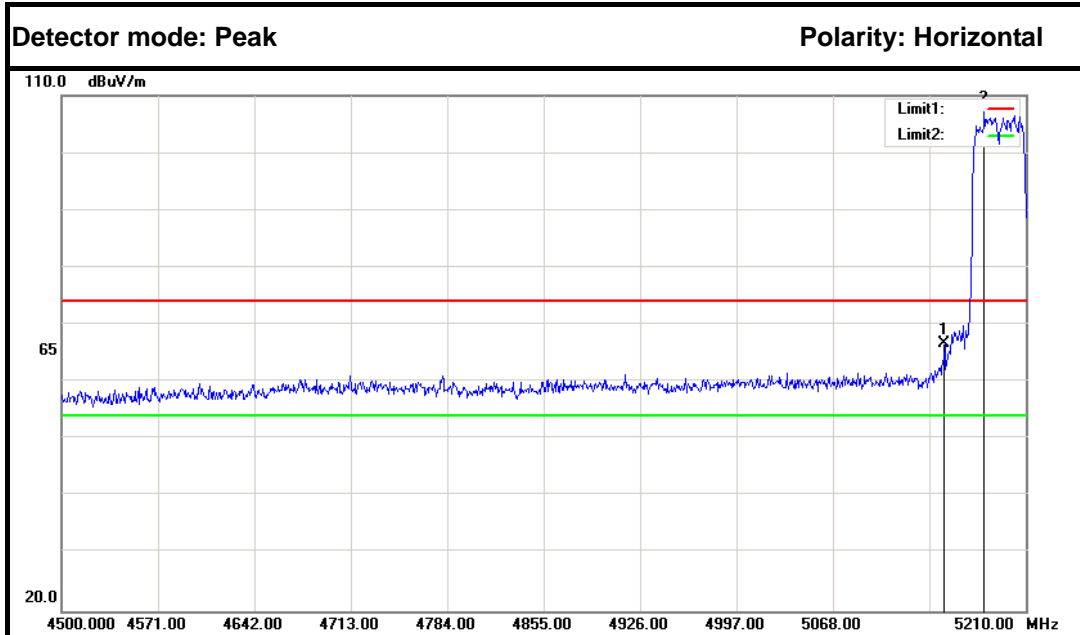
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	5322.150	107.28	5.55	112.83	---	---	Peak	Horizontal
2	5350.000	55.37	5.60	60.97	74.00	-13.03	Peak	Horizontal
1	5322.300	98.41	5.55	103.96	---	---	Average	Horizontal
2	5350.000	42.97	5.60	48.57	54.00	-5.43	Average	Horizontal
3	5402.100	47.49	5.70	53.19	54.00	-0.81	Average	Horizontal



IEEE 802.11n HT 40 MHz mode / 5190 MHz



No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	5150.000	56.40	5.25	61.65	74.00	-12.35	Peak	Vertical
2	5187.280	100.06	5.31	105.37	---	---	Peak	Vertical
1	5150.000	46.79	5.25	52.04	54.00	-1.96	Average	Vertical
2	5193.670	90.58	5.32	95.90	---	---	Average	Vertical

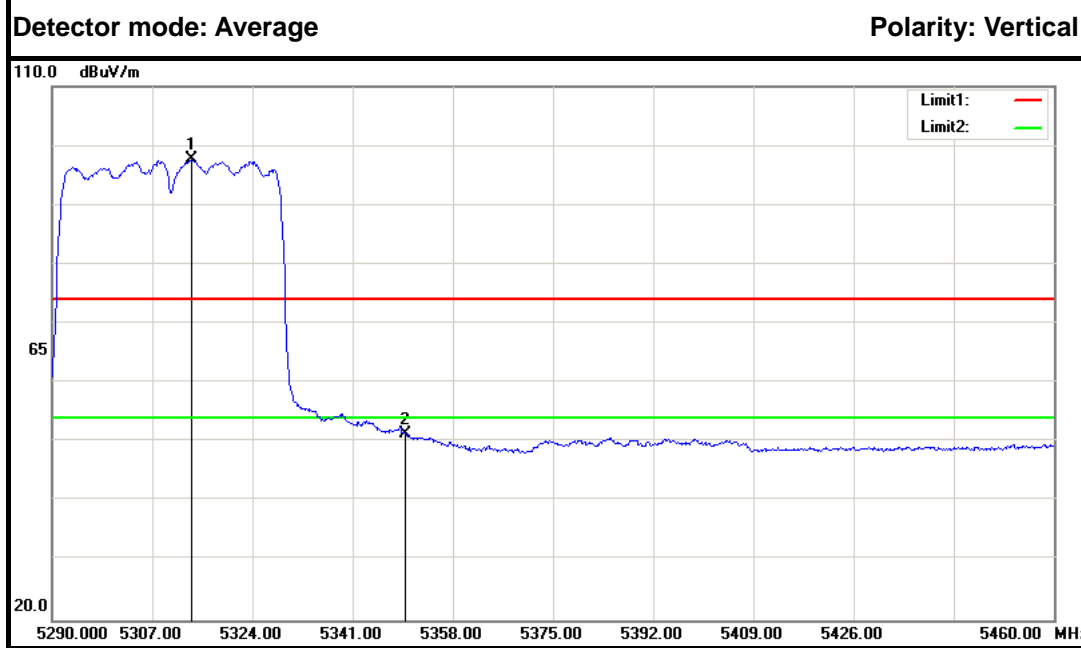
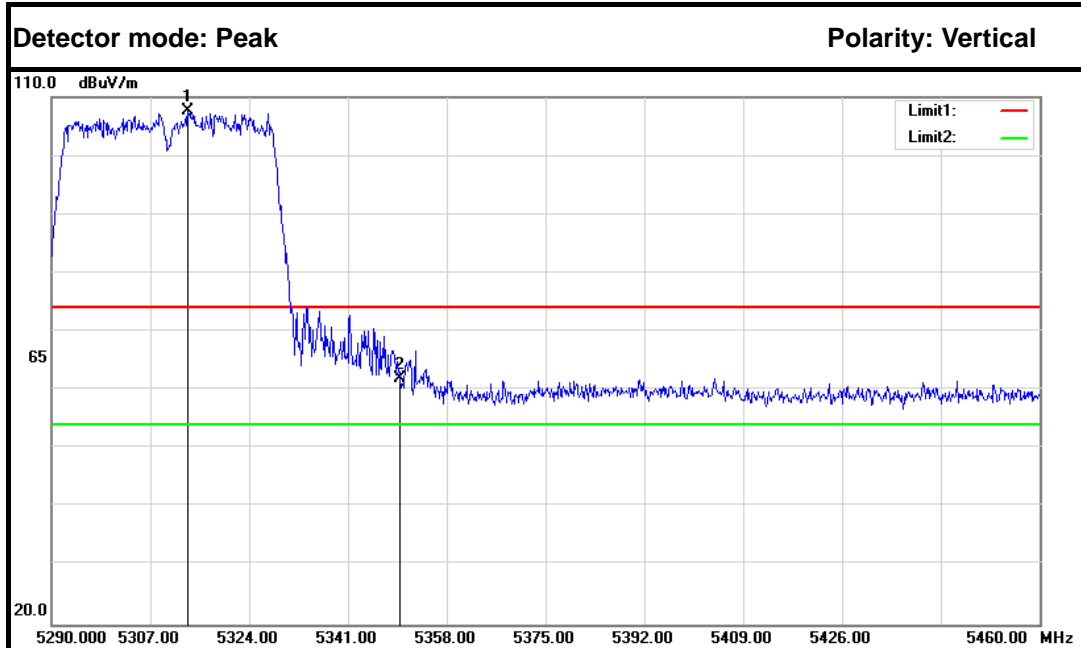


No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	5150.000	61.53	5.25	66.78	74.00	-7.22	Peak	Horizontal
2	5179.470	101.99	5.30	107.29	---	---	Peak	Horizontal
1	5150.000	45.45	5.25	50.70	54.00	-3.30	Average	Horizontal
2	5192.250	91.13	5.32	96.45	---	---	Average	Horizontal

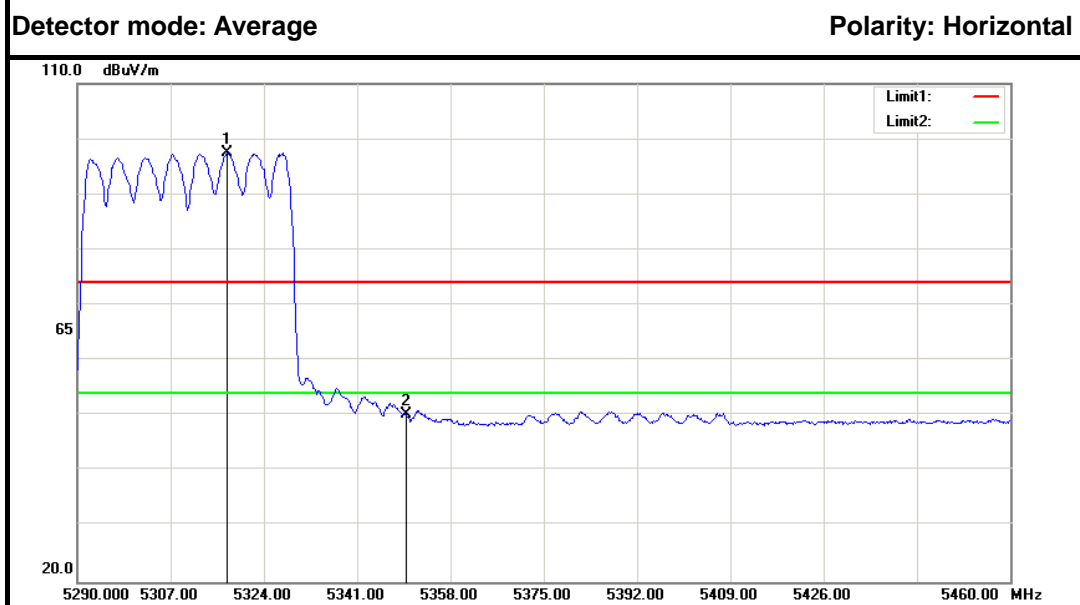
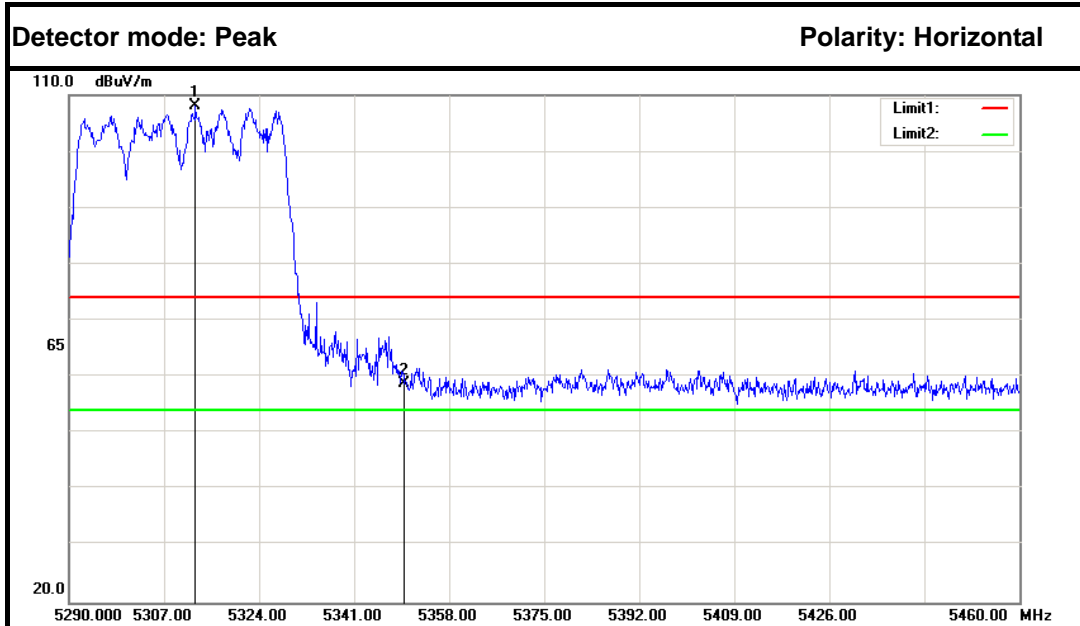




IEEE 802.11n HT 40 MHz mode / 5310 MHz



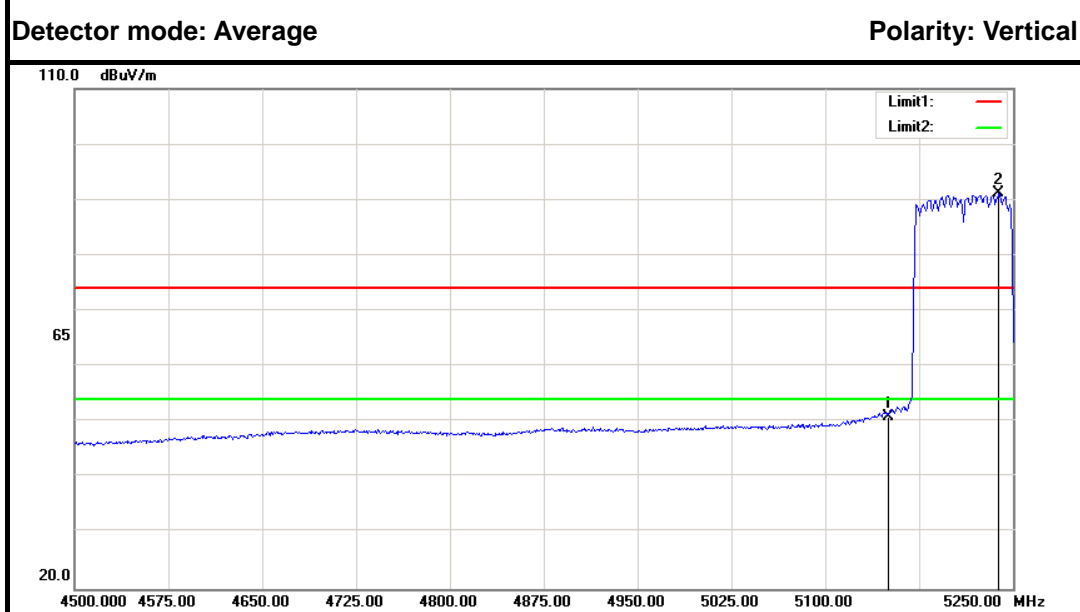
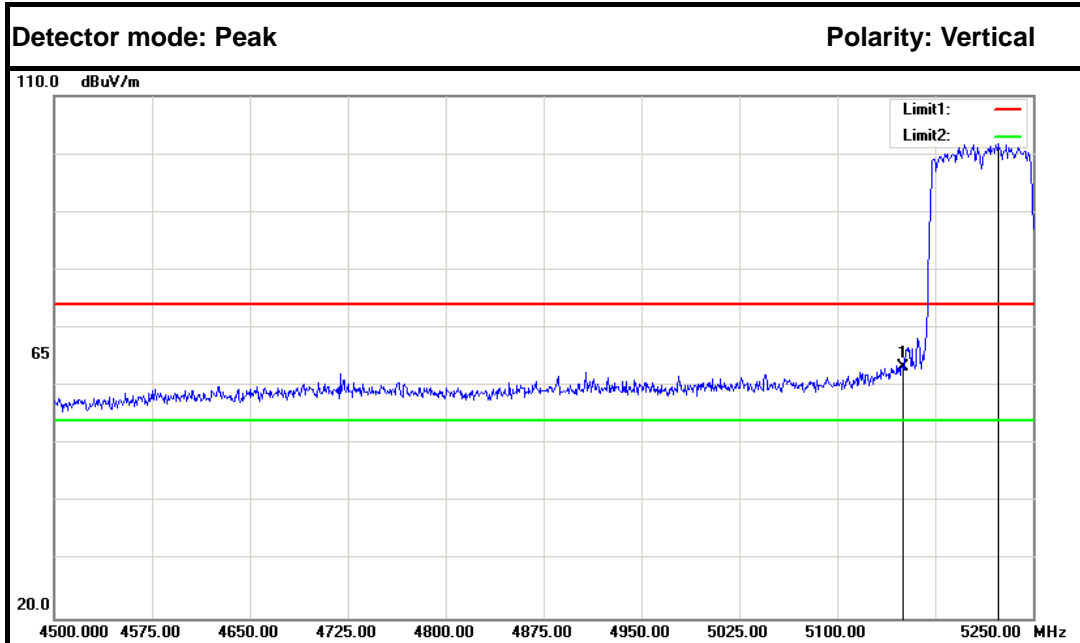
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	5313.460	102.13	5.54	107.67	---	---	Peak	Vertical
2	5350.000	56.27	5.60	61.87	74.00	-12.13	Peak	Vertical
1	5313.630	92.15	5.54	97.69	---	---	Average	Vertical
2	5350.000	45.81	5.60	51.41	54.00	-2.59	Average	Vertical



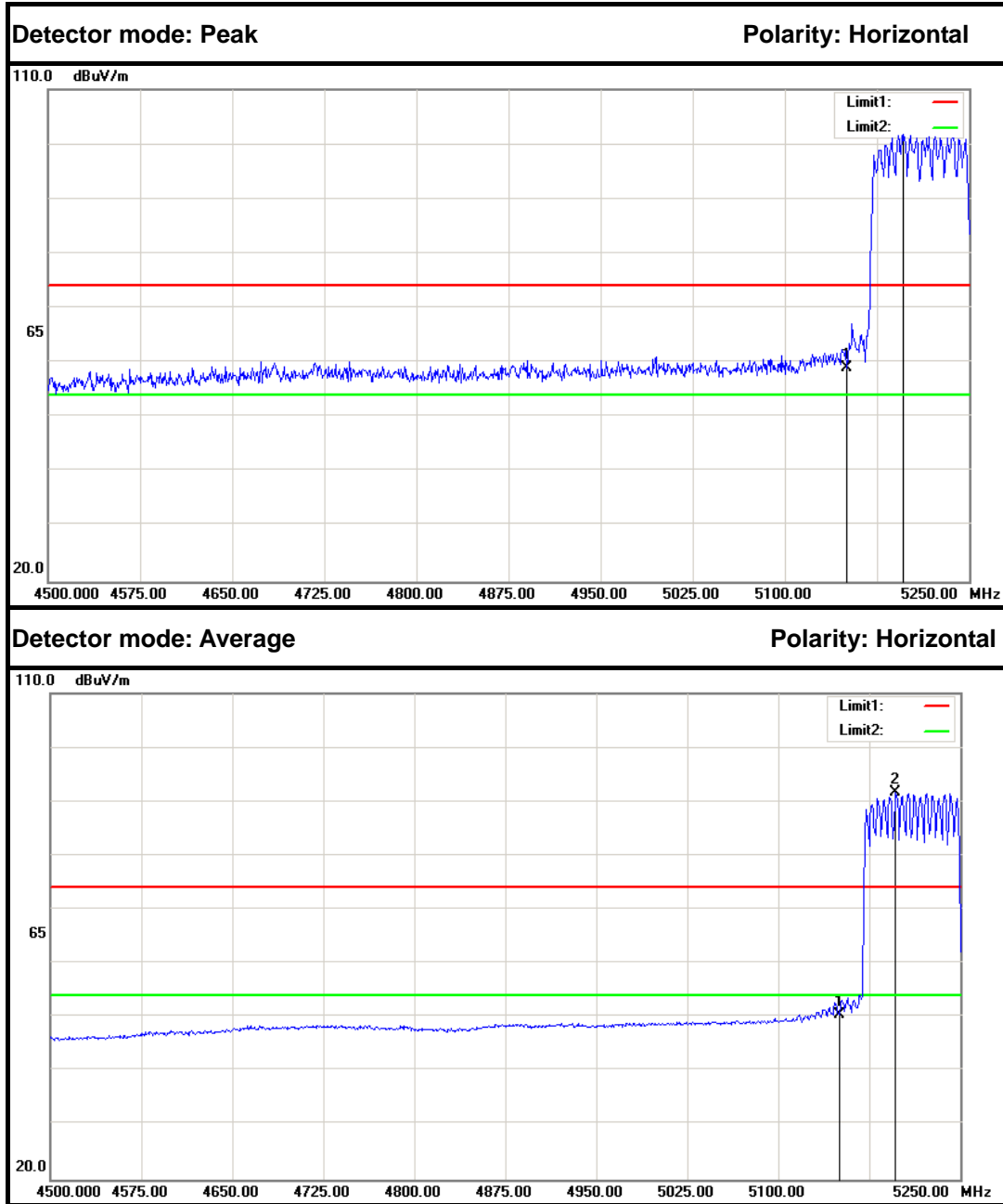
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	5312.610	102.53	5.54	108.07	---	---	Peak	Horizontal
2	5350.000	53.30	5.60	58.90	74.00	-15.10	Peak	Horizontal
1	5317.370	92.00	5.54	97.54	---	---	Average	Horizontal
2	5350.000	44.56	5.60	50.16	54.00	-3.84	Average	Horizontal



IEEE 802.11ac 80 mode / 5210 MHz



No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	5150.000	58.15	5.25	63.40	74.00	-10.60	Peak	Vertical
2	5223.000	96.42	5.38	101.80	---	---	Peak	Vertical
1	5150.000	45.80	5.25	51.05	54.00	-2.95	Average	Vertical
2	5238.750	85.71	5.40	91.11	---	---	Average	Vertical



No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	5150.000	53.85	5.25	59.10	74.00	-14.90	Peak	Horizontal
2	5196.000	96.42	5.33	101.75	---	---	Peak	Horizontal
1	5150.000	45.30	5.25	50.55	54.00	-3.45	Average	Horizontal
2	5196.750	86.29	5.33	91.62	---	---	Average	Horizontal