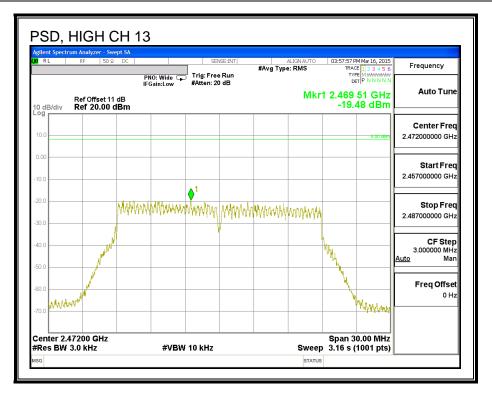


Page 121 of 380



Page 122 of 380

8.5.6. OUT-OF-BAND EMISSIONS

<u>LIMITS</u>

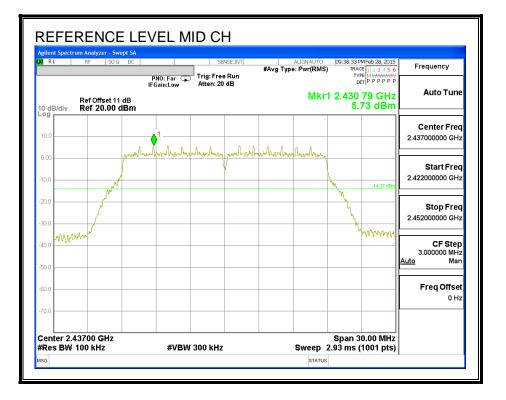
FCC §15.247 (d)

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator 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 the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required.

Page 123 of 380

RESULTS

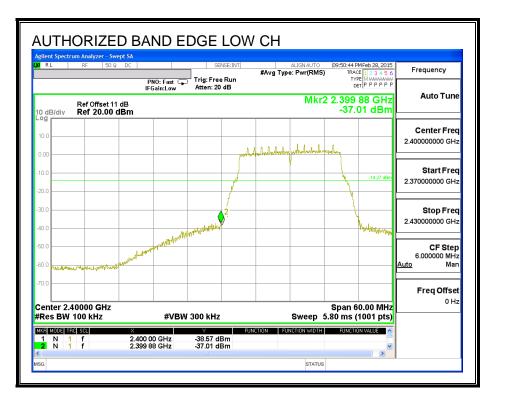
IN-BAND REFERENCE LEVEL



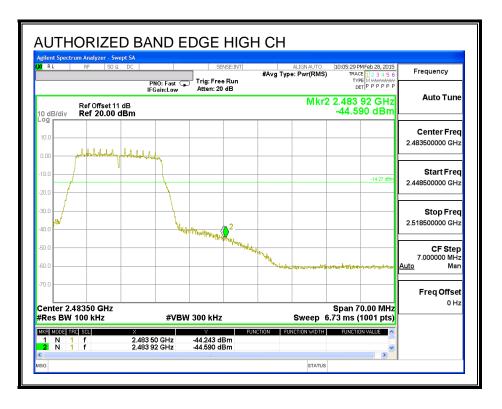
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Page 124 of 380

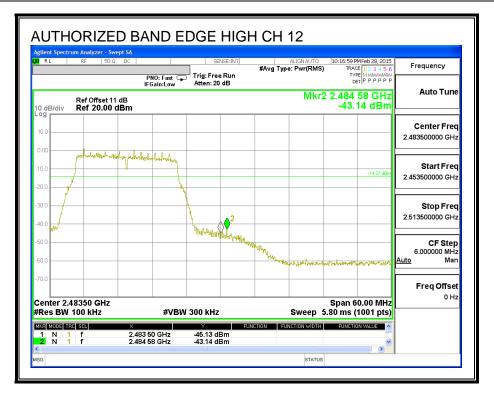
LOW CHANNEL BANDEDGE

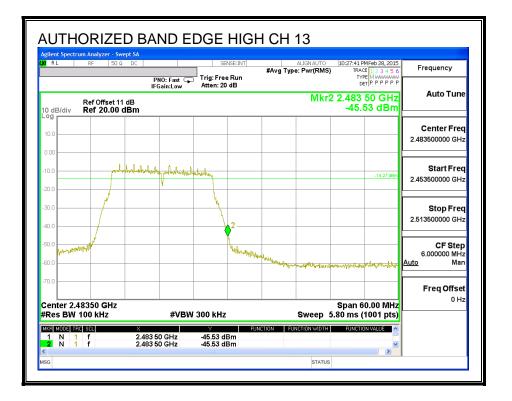


HIGH CHANNEL BANDEDGE



Page 125 of 380

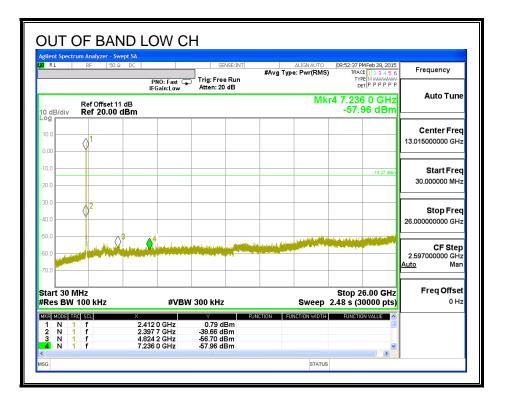


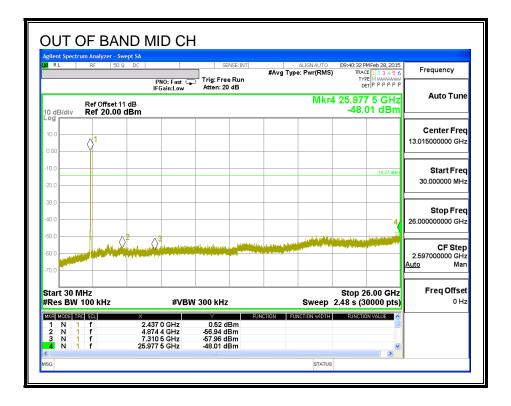


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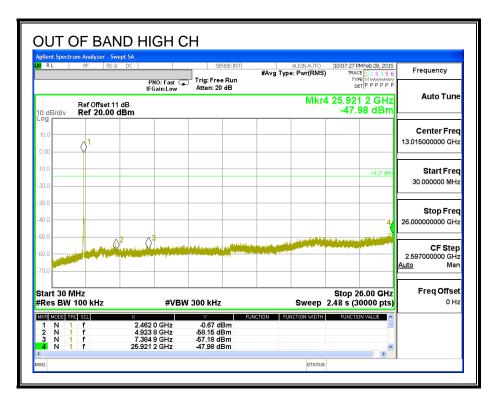
Page 126 of 380

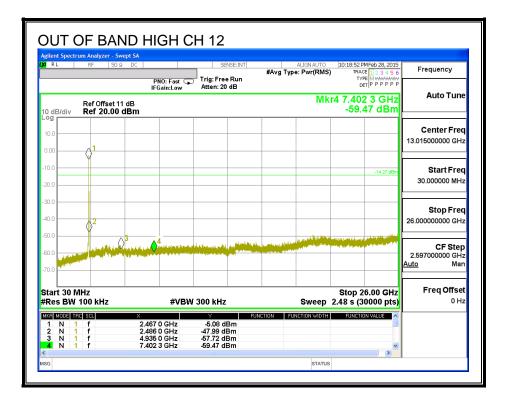
OUT-OF-BAND EMISSIONS





Page 127 of 380





Page 128 of 380

RL	RF 50 Ω	PI	IO: Fast ⊂ iain:Low				ALIGNAUTO Pwr(RMS) TRA	PM Feb 28, 2015 CE 1 2 3 4 5 6 /PE MWWWWW DET P P P P P P	Frequency
0 dB/div	Ref Offset 1' Ref 20.00						Mkr		7 8 GHz 62 dBm	Auto Tun
0.00										Center Free 13.015000000 GH
0.0	↓ 1 								-14.27 dBm	Start Fre 30.000000 MH
0.0										Stop Fre 26.00000000 GH
0.0		2 0			a la contra la contra a la contra a la contra a la contra da contra da contra da contra da contra da contra da	n (mailifering signifi) 				CF Ste 2.597000000 GH <u>Auto</u> Ma
tart 30 M Res BW 1			#VBV	N 300 kHz			Sweep		26.00 GHz 30000 pts)	Freq Offse 0 H
KR MODE TRO 1 N 1 2 N 1 3 N 1 4 N 1	f	× 2.472 4.942 7.416 25.627	3 GHz 1 GHz	-11.61 dE -58.19 dE -57.47 dE -47.62 dE	3m 3m 3m	ICTION FUN	ICTION WIDTH	FUNCT	ON VALUE	

Page 129 of 380

DATE: JUNE 17, 2015

8.6. 802.11n HT20 SISO MODE IN THE 2.4 GHz BAND (ANTENNA D)

8.6.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

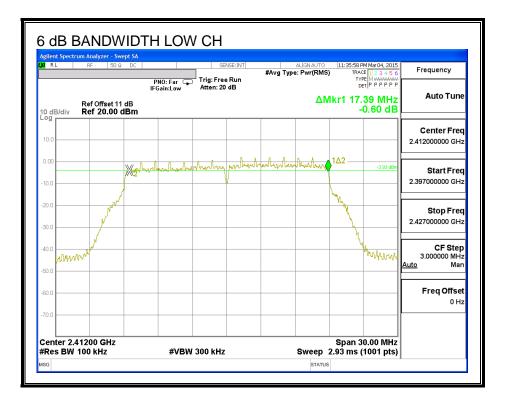
The minimum 6 dB bandwidth shall be at least 500 kHz.

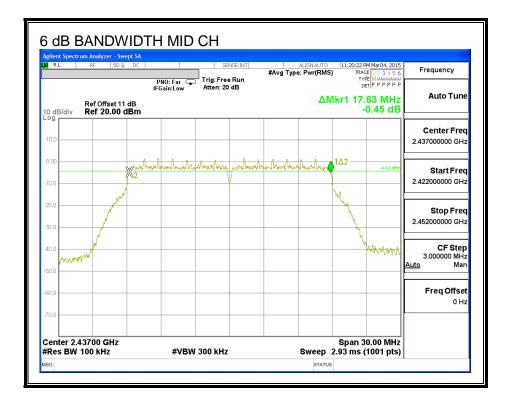
RESULTS

Channel	Frequency	6 dB Bandwidth	Minimum Limit
	(MHz)	(MHz)	(MHz)
Low	2412	17.390	0.5
Mid	2437	17.630	0.5
High	2462	17.610	0.5
High	2467	17.640	0.5
High	2472	17.340	0.5

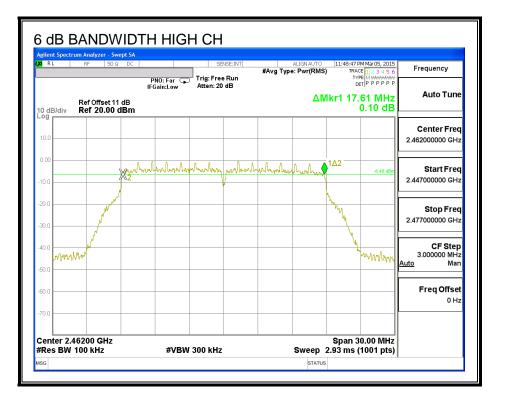
Page 130 of 380

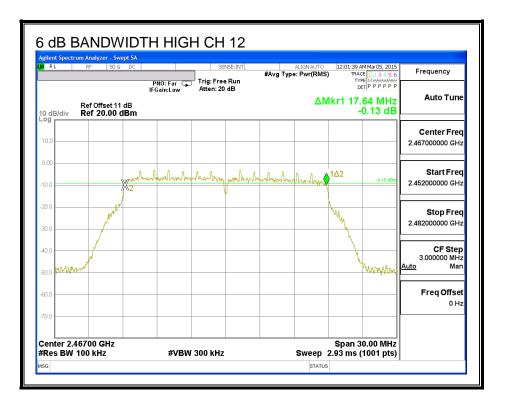
6 dB BANDWIDTH



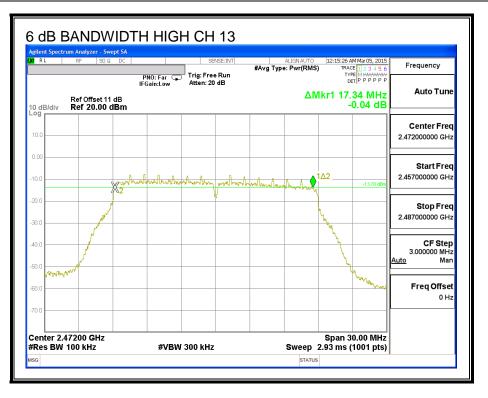


Page 131 of 380





Page 132 of 380



Page 133 of 380

8.6.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

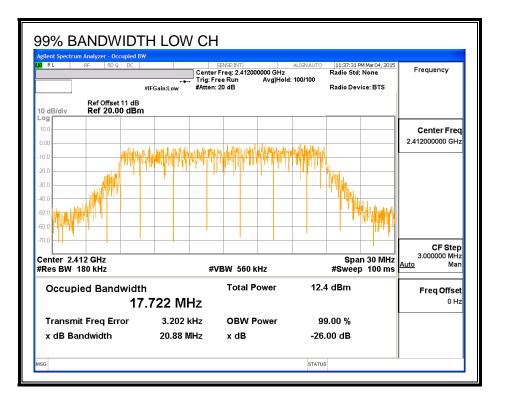
<u>RESULTS</u>

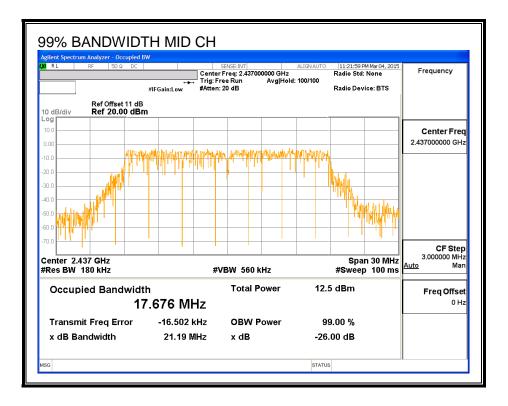
Channel	Frequency	99% Bandwidth
	(MHz)	(MHz)
Low	2412	17.722
Mid	2437	17.676
High	2462	17.713
High	2467	17.759
High	2472	17.630

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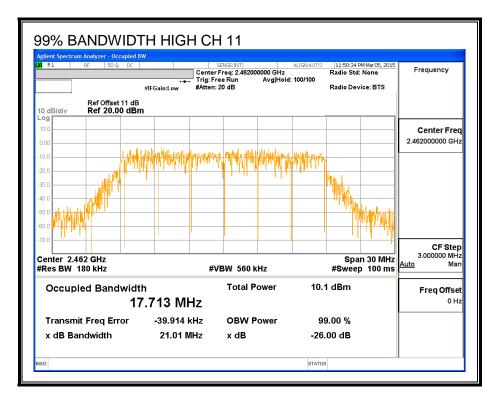
Page 134 of 380

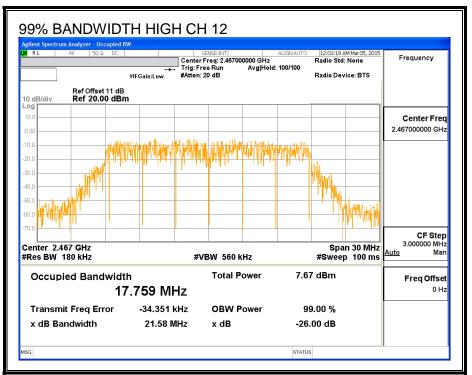
99% BANDWIDTH





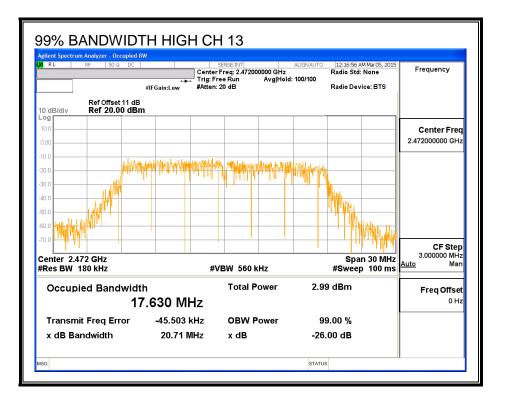
Page 135 of 380





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Page 136 of 380



Page 137 of 380

8.6.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency	Power
	(MHz)	(dBm)
Low	2412	12.41
Mid	2437	12.49
High	2462	10.48
High	2467	7.94
High	2472	2.98

Page 138 of 380

8.6.4. OUTPUT POWER

LIMITS

FCC §15.247

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt, based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

DIRECTIONAL ANTENNA GAIN

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

Page 139 of 380

<u>RESULTS</u>

Limits

Channel	Frequency	Directional	FCC	IC	IC	Max
		Gain	Power	Power	EIRP	Power
			Limit	Limit	Limit	
	(MHz)	(dBi)	(dBm)	(dBm)	(dBm)	(dBm)
Low	2412	2.50	30.00	30	36	30.00
Mid	2437	2.50	30.00	30	36	30.00
High	2462	2.50	30.00	30	36	30.00
High	2467	2.50	30.00	30	36	30.00
High	2472	2.50	30.00	30	36	30.00

Results

Channel	Frequency	Antenna D	Total	Power	Margin
		Meas	Corr'd	Limit	
		Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dB)
Low	2412	20.64	20.64	30.00	-9.36
Mid	2437	20.83	20.83	30.00	-9.17
High	2462	18.71	18.71	30.00	-11.29
High	2467	15.94	15.94	30.00	-14.06
High	2472	11.19	11.19	30.00	-18.81

DATE: JUNE 17, 2015

8.6.5. PSD

LIMITS

FCC §15.247

RESULTS

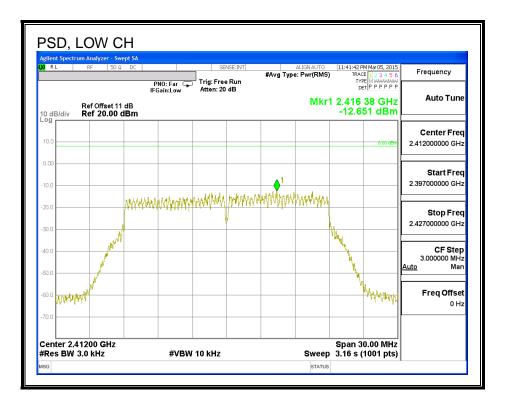
PSD Results

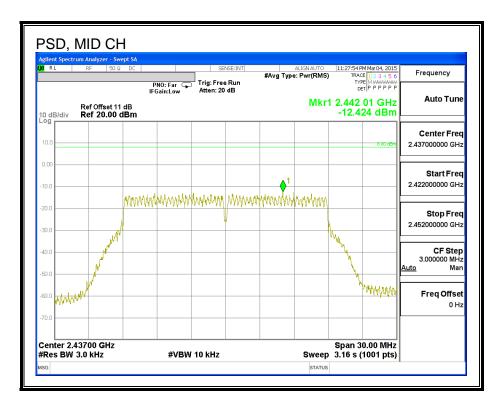
Channel	Frequency	Antenna D	Limit	Margin
		Meas		
	(MHz)	(dBm)	(dBm)	(dB)
Low	2412	-12.65	8.0	-20.7
Mid	2437	-12.42	8.0	-20.4
High	2462	-14.29	8.0	-22.3
High	2467	-17.32	8.0	-25.3
High	2472	-22.09	8.0	-30.1

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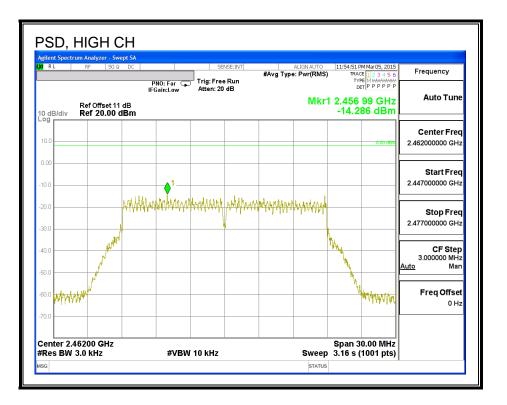
Page 141 of 380

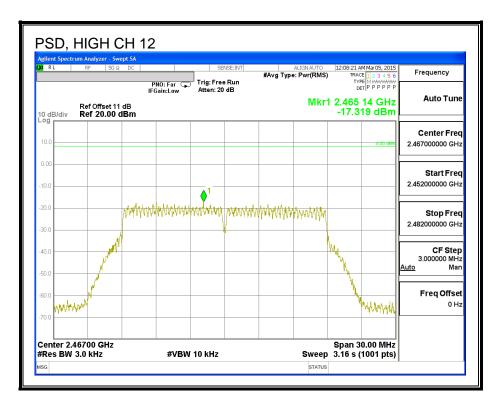
<u>PSD</u>



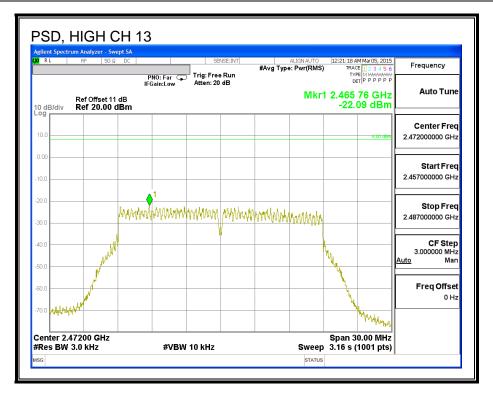


Page 142 of 380





Page 143 of 380



Page 144 of 380

8.6.6. OUT-OF-BAND EMISSIONS

<u>LIMITS</u>

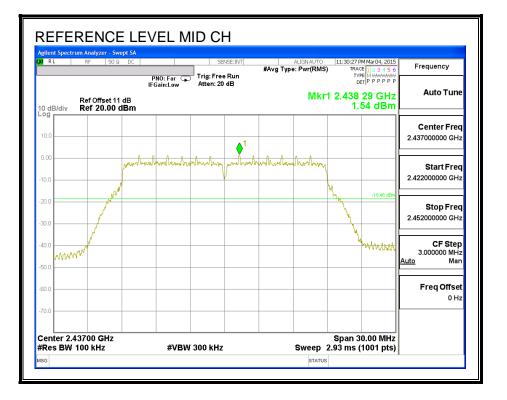
FCC §15.247 (d)

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator 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 the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required.

Page 145 of 380

RESULTS

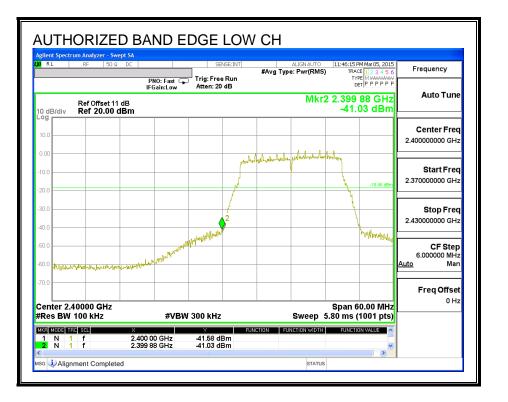
IN-BAND REFERENCE LEVEL



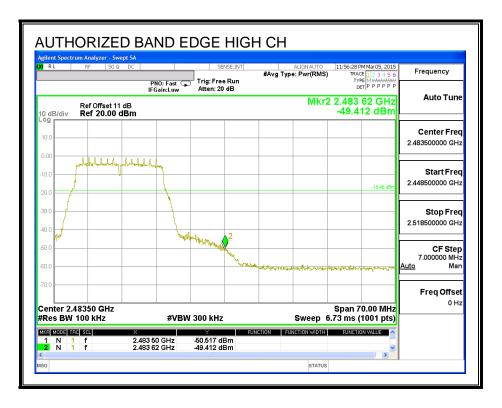
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Page 146 of 380

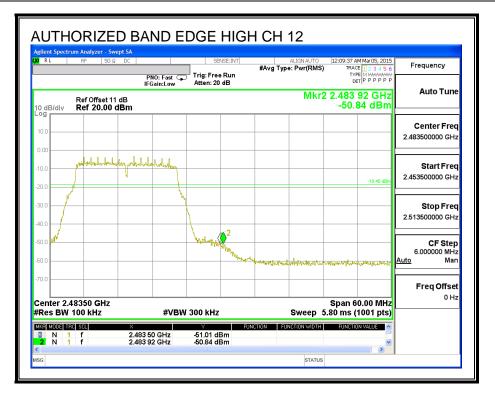
LOW CHANNEL BANDEDGE

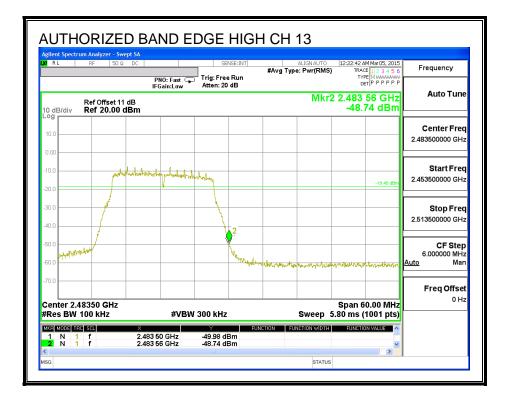


HIGH CHANNEL BANDEDGE



Page 147 of 380

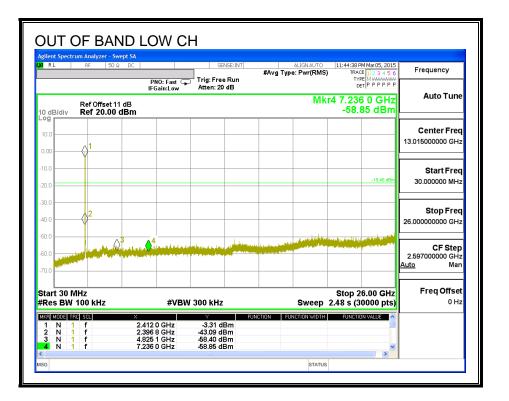


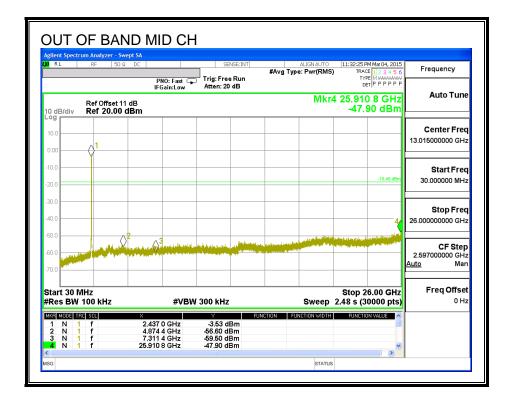


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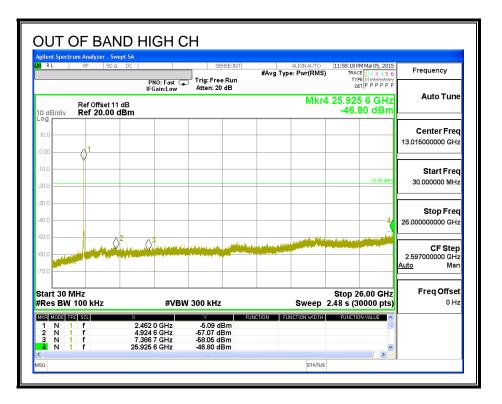
Page 148 of 380

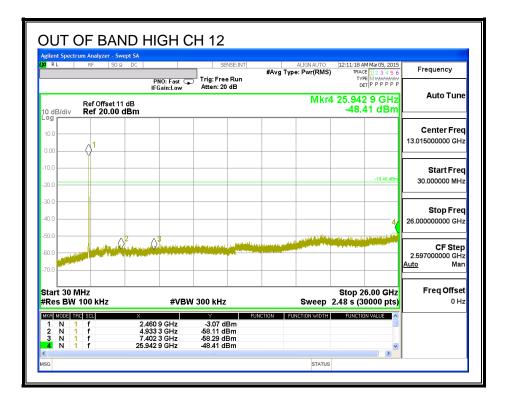
OUT-OF-BAND EMISSIONS





Page 149 of 380





Page 150 of 380

R L	rum Analyzer - 1 RF 50	Swept SA IΩ DC		SEN	SE:INT		ALIGNAUTO		AM Mar 05, 2015 CE 1 2 3 4 5 6	Frequency
			NO: Fast 🔾 Gain:Low	Trig: Free Atten: 20		wavg typ	2. F WI (RMS)	TY	ET P P P P P P	
0 dB/div	Ref Offset Ref 20.00						Mkr4		4 7 GHz 85 dBm	Auto Tune
^{og}										Center Free
0.00		_								13.015000000 GH:
10.0	¹									Start Free
20.0									-18.46 dBm	30.000000 MH
:0.0		_								04 E
10.0									4	Stop Fred 26.000000000 GH:
50.0		$()^2$	3		يد المتطالعة.	al dans a strand		ng Optimise		05.04-
50.0	We wanted				100 Martine		and the second second			CF Step 2.597000000 GH: Auto Mar
70.0										<u>Auto</u> Mar
tart 30 I									26.00 GHz	Freq Offse
Res BW	100 kHz	×	#VB\	N 300 kHz		CTION FUI	Sweep		10000 pts)	0 H:
1 N	1 f 1 f	2.472	0 GHz 8 GHz	-12.36 dB -57.62 dB	m	CHOIC FOR	ICHORWID H	HORU		
3 N	1 f 1 f		0 GHz	-58.85 dB -47.85 dB	m				~	

Page 151 of 380

8.7. 802.11n HT20 2TX CDD MODE IN THE 2.4 GHz BAND (ANTENNA B & A)

8.7.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

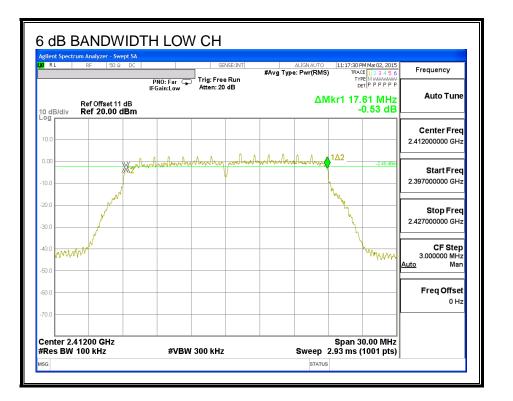
The minimum 6 dB bandwidth shall be at least 500 kHz.

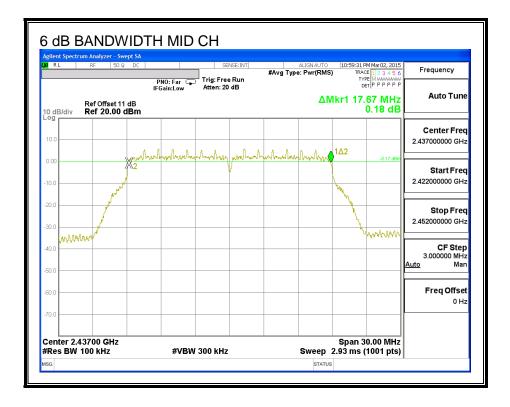
RESULTS

Channel	Frequency	6 dB BW	6 dB BW	Minimum
		Antenna B	Antenna A	Limit
	(MHz)	(MHz)	(MHz)	(MHz)
Low	2412	17.610	17.682	0.5
Mid	2437	17.670	17.682	0.5
High	2462	17.640	17.679	0.5
High	2467	17.640	17.630	0.5
High	2472	17.670	17.630	0.5

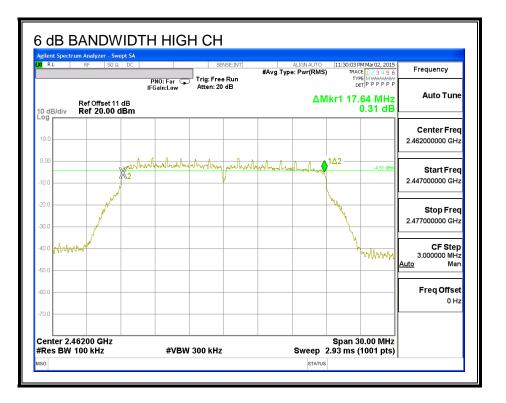
Page 152 of 380

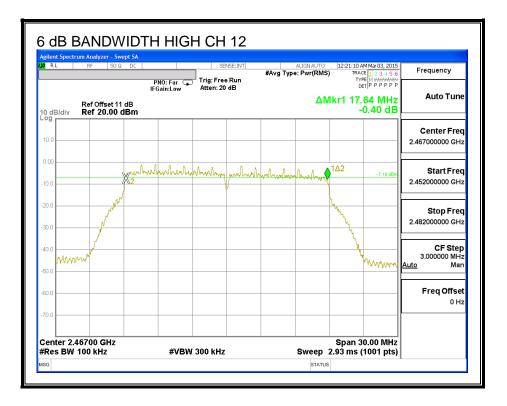
6 dB BANDWIDTH, ANTENNA B



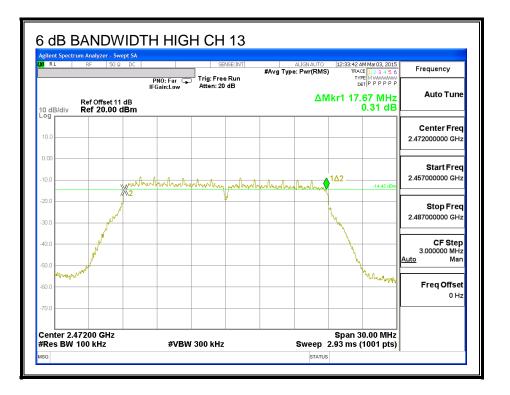


Page 153 of 380

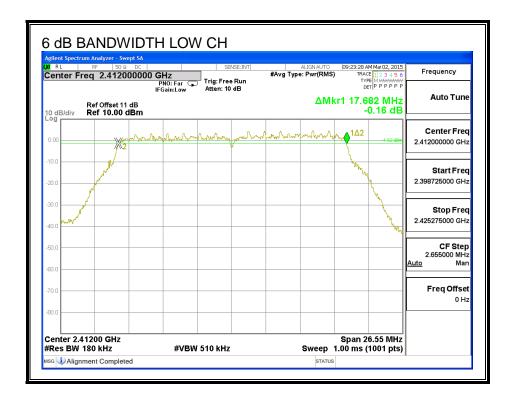




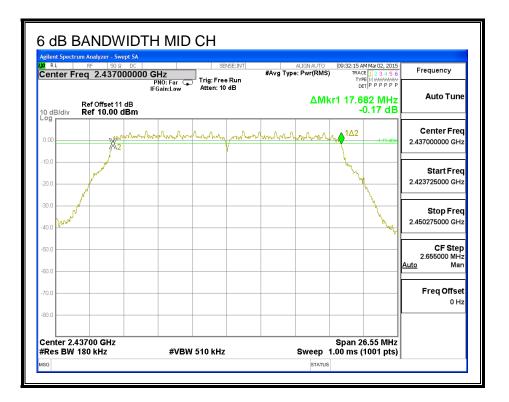
Page 154 of 380

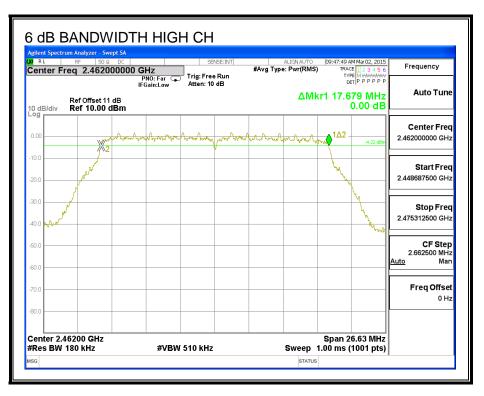


6 dB BANDWIDTH, ANTENNA A

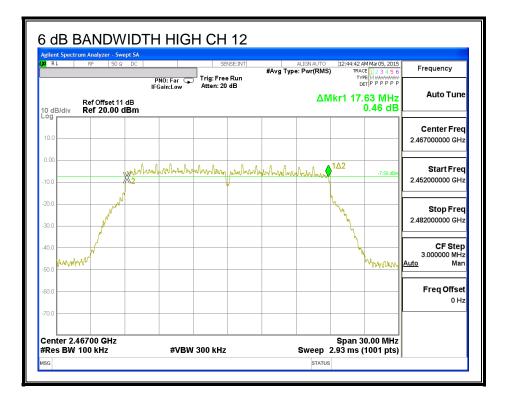


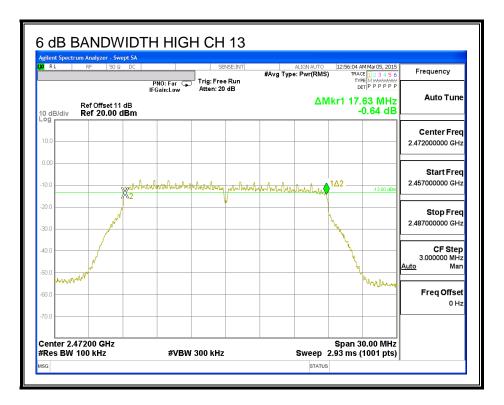
Page 155 of 380





Page 156 of 380





Page 157 of 380

8.7.2. 99% BANDWIDTH

LIMITS

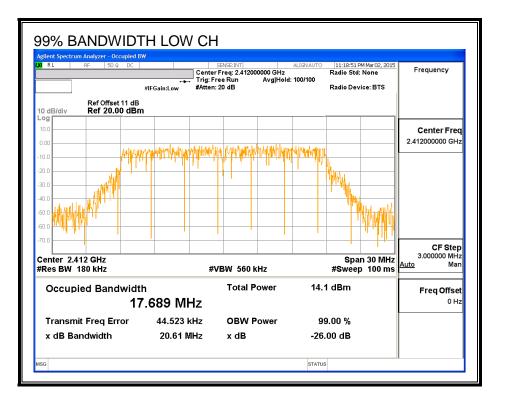
None; for reporting purposes only.

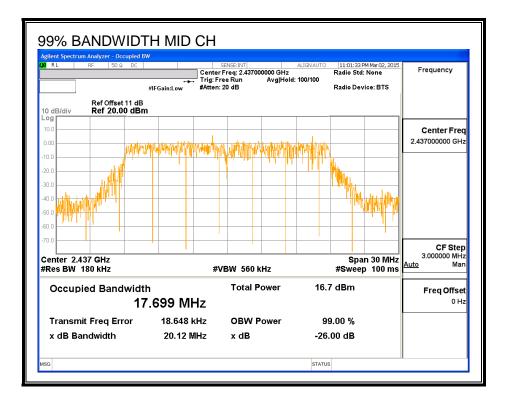
RESULTS

Channel	Frequency	99% Bandwidth (MHz)	99% Bandwidth (MHz)
	(MHz)	Antenna B	Antenna A
Low	2412	17.689	17.725
Mid	2437	17.699	17.680
High	2462	17.725	17.713
High	2467	17.633	17.720
High	2472	17.783	17.705

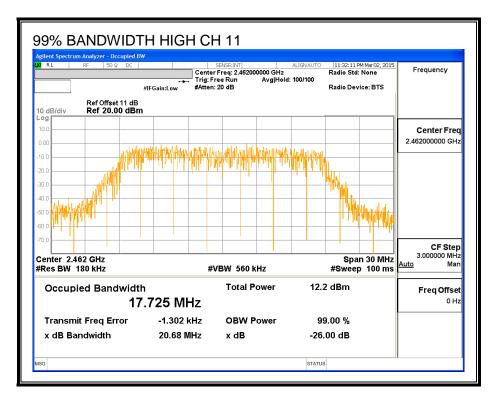
Page 158 of 380

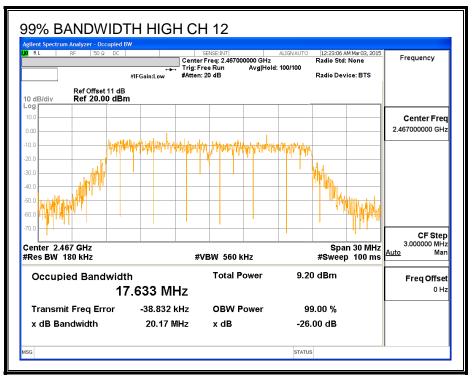
99% BANDWIDTH ANTENNA B





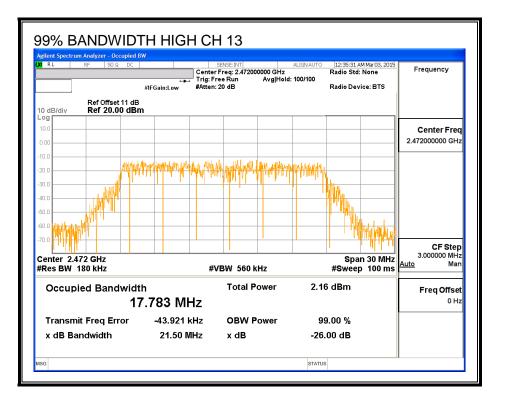
Page 159 of 380





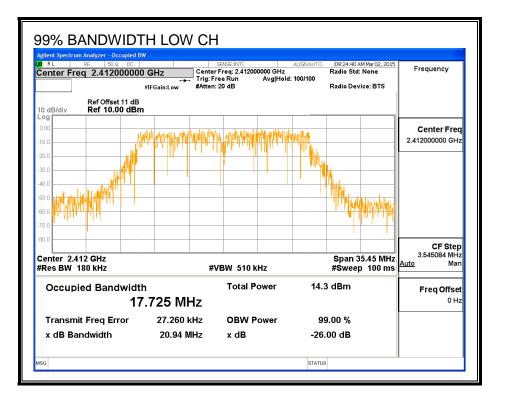
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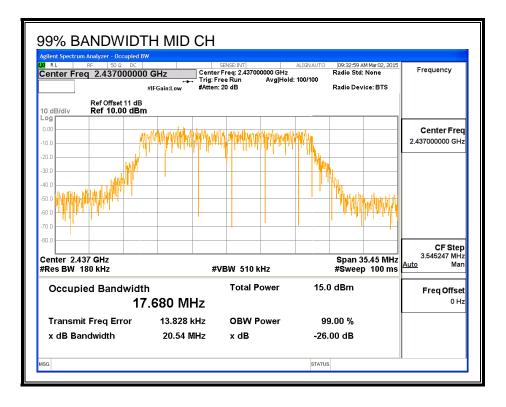
Page 160 of 380



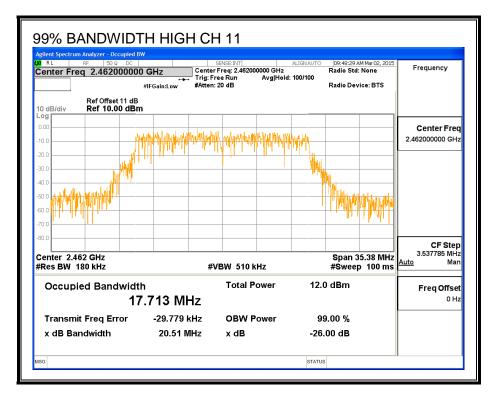
Page 161 of 380

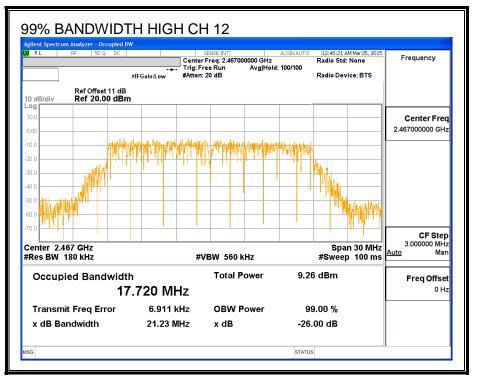
99% BANDWIDTH ANTENNA A





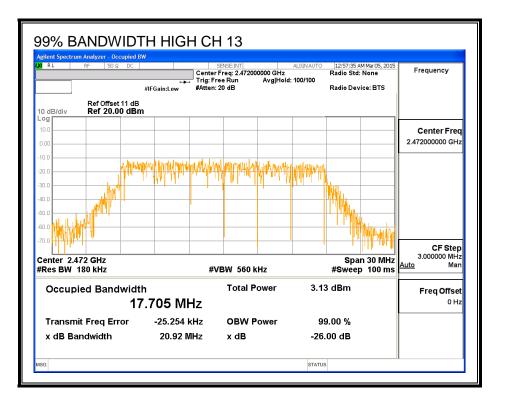
Page 162 of 380





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Page 163 of 380



Page 164 of 380

8.7.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency	Antenna B	Antenna A	Total
		Power	Power	Power
	(MHz)	(dBm)	(dBm)	(dBm)
Low	2412	13.97	13.88	16.94
Mid	2437	16.46	14.96	18.78
High	2462	11.92	11.99	14.97
High	2467	8.91	8.97	11.95
High	2472	2.94	2.99	5.98

Page 165 of 380

8.7.4. OUTPUT POWER

LIMITS

FCC §15.247

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt, based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

DIRECTIONAL ANTENNA GAIN

The TX chains are uncorrelated and the antenna gain is unequal among the chains. The directional gain is:

Antenna B	Antenna A	Uncorrelated Chains
Antenna	Antenna	Directional
Gain	Gain	Gain
(dBi)	(dBi)	(dBi)
-1.00	0.20	-0.36

Page 166 of 380

<u>RESULTS</u>

Limits

Channel	Frequency	Directional	FCC	IC	IC	Max
		Gain	Power	Power	EIRP	Power
			Limit	Limit	Limit	
	(MHz)	(dBi)	(dBm)	(dBm)	(dBm)	(dBm)
Low	2412	-0.36	30.00	30	36	30.00
Mid	2437	-0.36	30.00	30	36	30.00
High	2462	-0.36	30.00	30	36	30.00
High	2467	-0.36	30.00	30	36	30.00
High	2472	-0.36	30.00	30	36	30.00

Results

Channel	Frequency	Antenna B	Antenna A	Total	Power	Margi
						n
		Meas	Meas	Corr'd	Limit	
		Power	Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	2412	23.25	23.16	26.22	30.00	-3.78
Mid	2437	24.84	23.96	27.43	30.00	-2.57
High	2462	20.36	20.19	23.29	30.00	-6.71
High	2467	17.36	18.21	20.82	30.00	-9.18
High	2472	10.09	10.22	13.17	30.00	-16.83

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Page 167 of 380

8.7.5. PSD

LIMITS

FCC §15.247

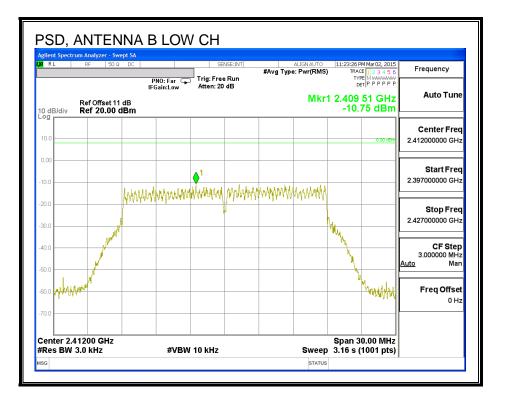
<u>RESULTS</u>

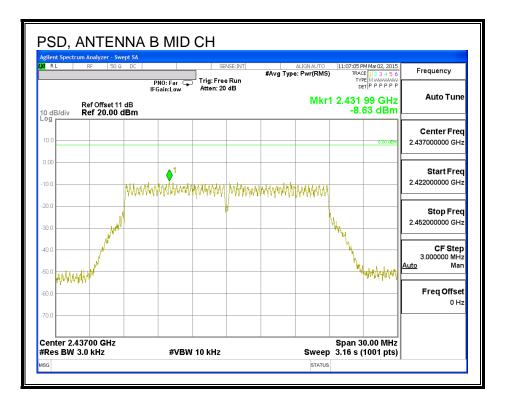
PSD Results

Channel	Frequency	Antenna B	Antenna A	Total	Limit	Margin
		Meas	Meas	PSD		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	2412	-10.75	-12.10	-8.36	8.0	-16.4
Mid	2437	-8.36	-11.71	-6.71	8.0	-14.7
High	2462	-13.24	-12.64	-9.92	8.0	-17.9
High	2467	-15.67	-16.11	-12.87	8.0	-20.9
High	2472	-22.90	-20.92	-18.79	8.0	-26.8

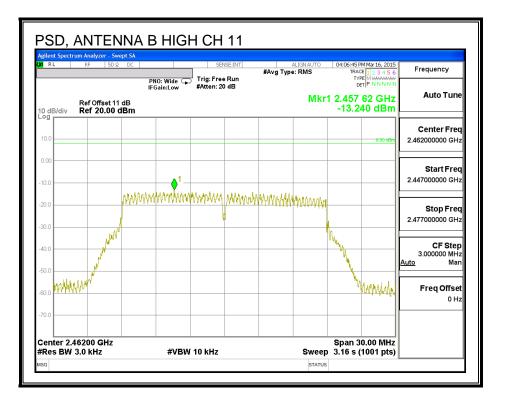
Page 168 of 380

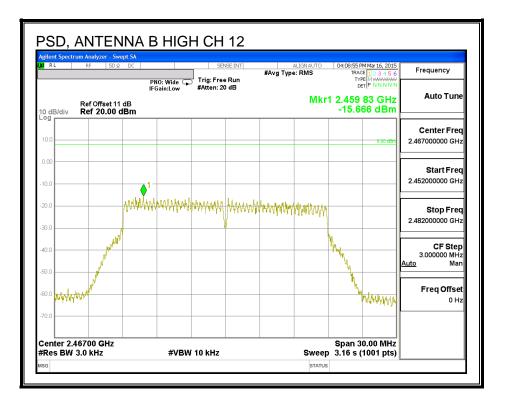
PSD, ANTENNA B



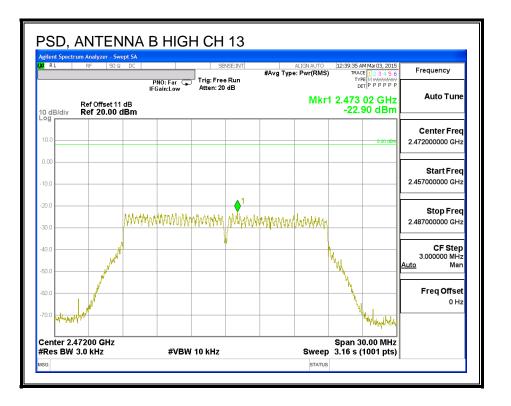


Page 169 of 380

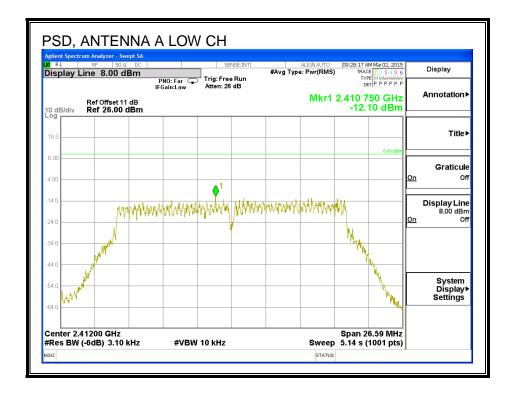




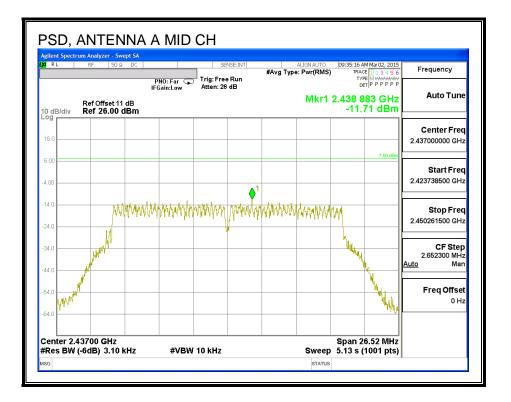
Page 170 of 380

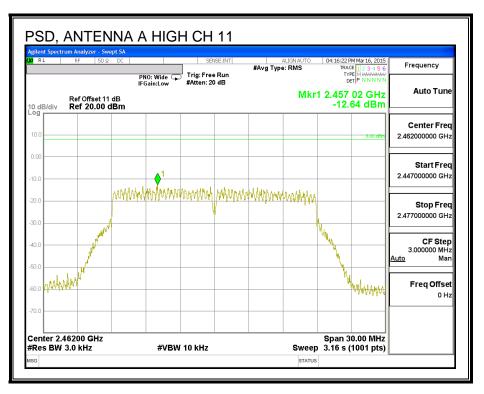


PSD, ANTENNA A

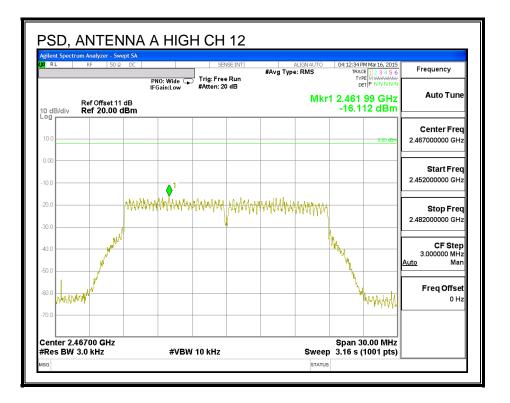


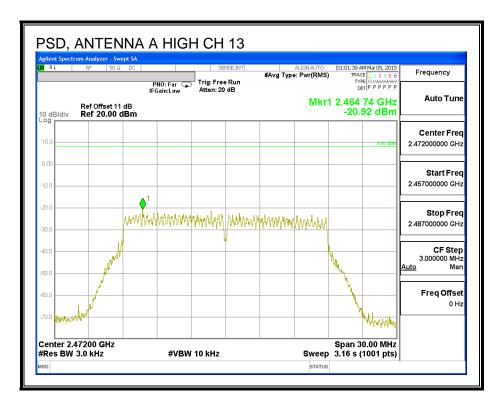
Page 171 of 380





Page 172 of 380





Page 173 of 380

8.7.6. OUT-OF-BAND EMISSIONS

LIMITS

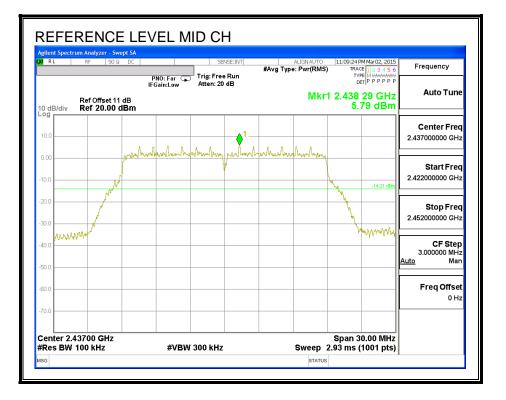
FCC §15.247 (d)

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator 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 the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required.

Page 174 of 380

RESULTS

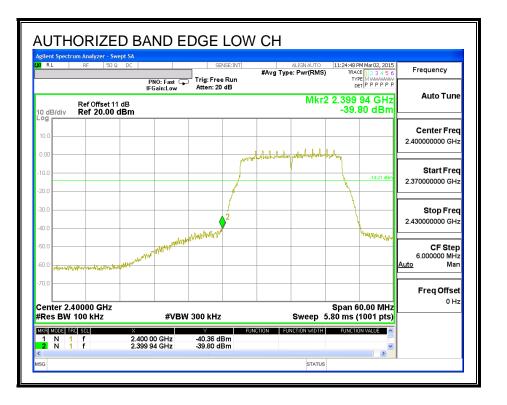
IN-BAND REFERENCE LEVEL, ANTENNA B



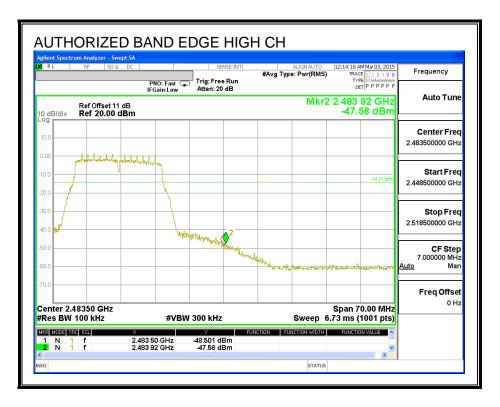
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Page 175 of 380

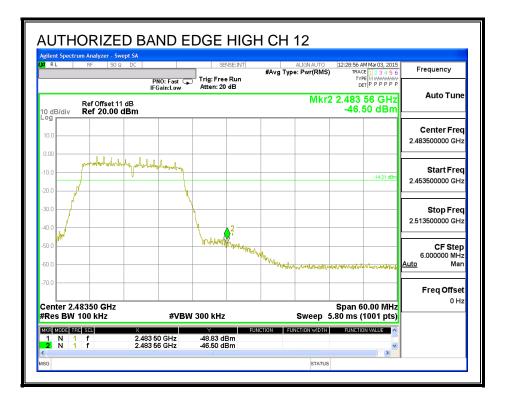
LOW CHANNEL BANDEDGE, ANTENNA B

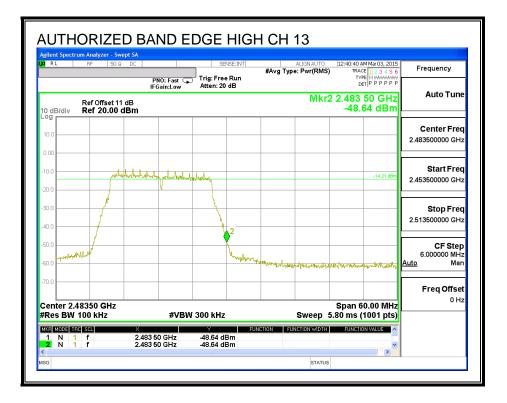


HIGH CHANNEL BANDEDGE, ANTENNA B



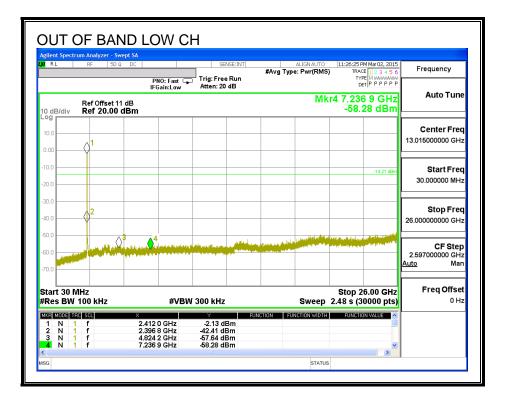
Page 176 of 380

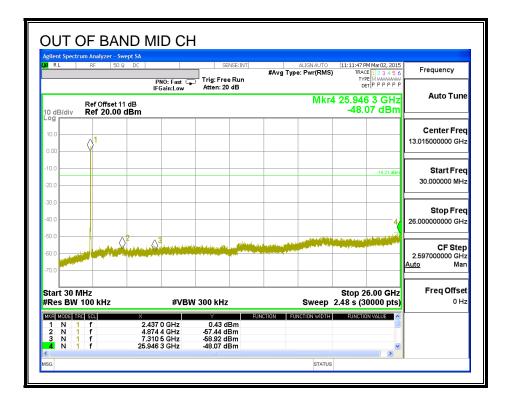




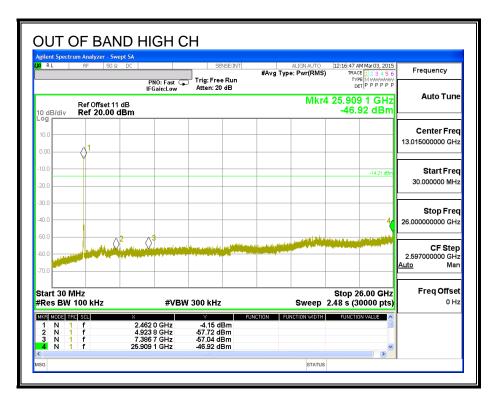
Page 177 of 380

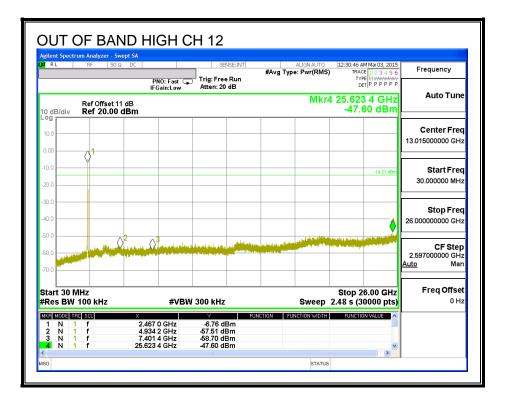
OUT-OF-BAND EMISSIONS, ANTENNA B



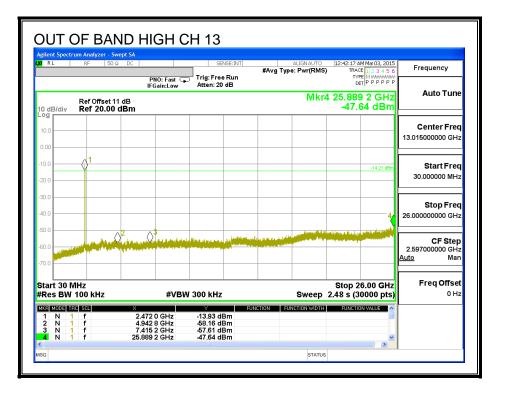


Page 178 of 380

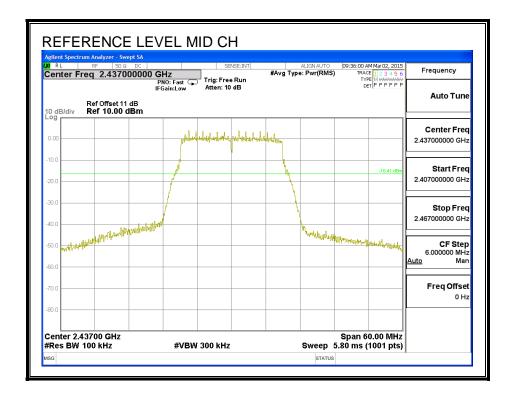




Page 179 of 380

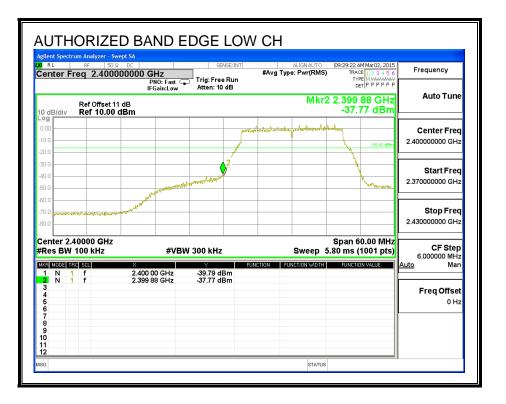


IN-BAND REFERENCE LEVEL, ANTENNA A

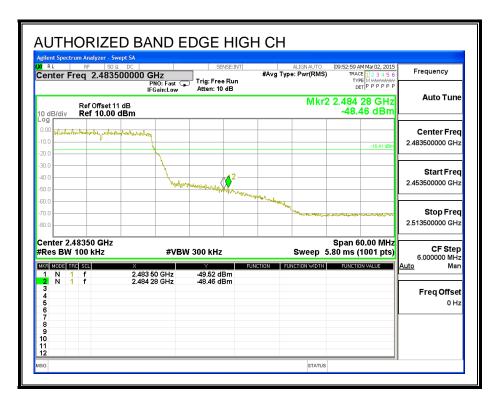


Page 180 of 380

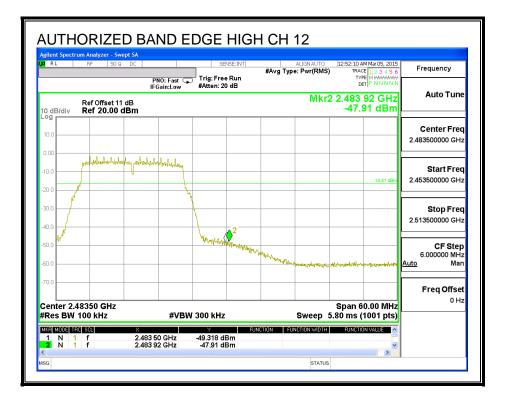
LOW CHANNEL BANDEDGE, ANTENNA A

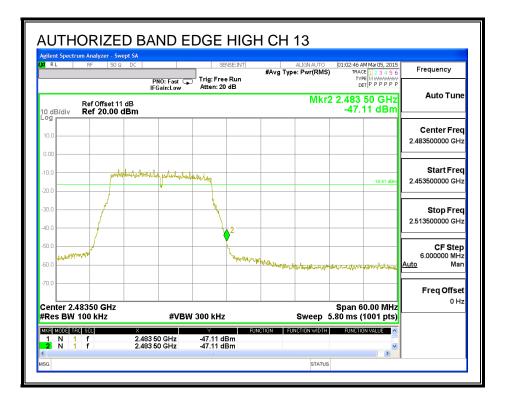


HIGH CHANNEL BANDEDGE, ANTENNA A



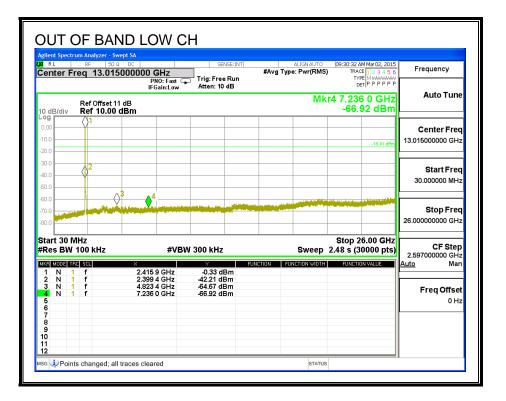
Page 181 of 380

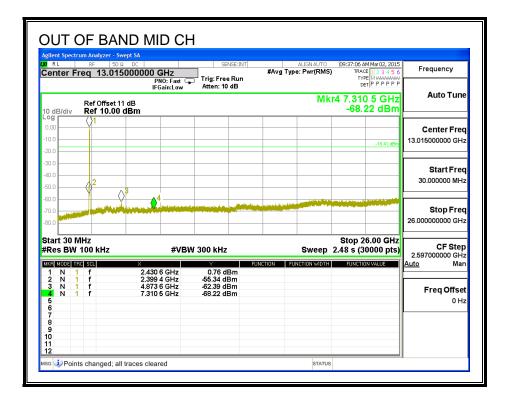




Page 182 of 380

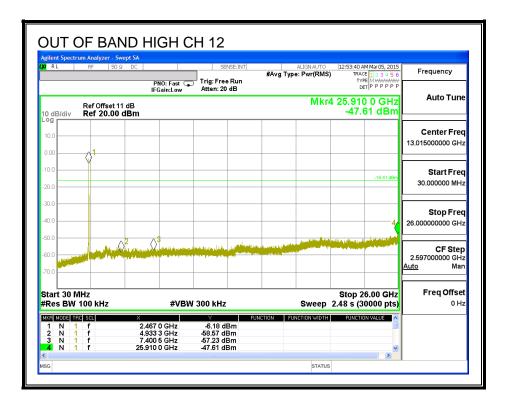
OUT-OF-BAND EMISSIONS, ANTENNA A



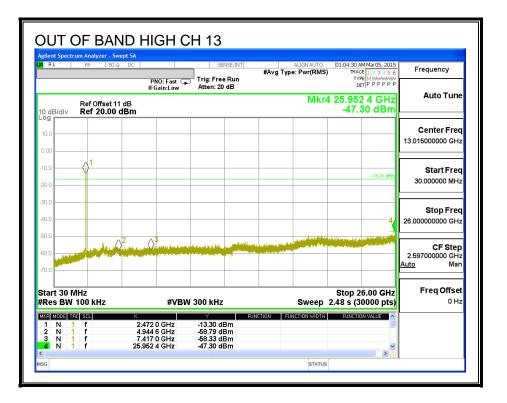


Page 183 of 380

	-		DC		SENSE:INT	#0	ALIGNAUTO pe: Pwr(RMS)		M Mar 02, 2015	Frequency
enter	Frec	13.0150	00000 GHz PNO: Fa IFGain:L		g:FreeRun en:10dB	#Avg iy	pe: Pwr(RMS)	TYP	E 1 2 3 4 5 6 E M W W W W W W T P P P P P P	
0 dB/di	v R	ef Offset 11 c ef 10.00 di	iB Bm				Mki		68 GHz 52 dBm	Auto Tune
og 0.00		°∕1								Center Free
20.0									-16.41 dBm	13.015000000 GH
10.0		~2								Start Free
50.0	(§² 3								30.000000 MH
'0.0 :0.0			Circu	et an aine à battern a						Stop Free 26.000000000 GH
tart 30 Res B			#	VBW 300	kHz		Sweep		6.00 GHz 0000 pts)	CF Stej 2.597000000 GH
Ke Mode 1 N	1	f	× 2.469 5 GH).96 dBm	FUNCTION F	UNCTION WIDTH	FUNCTIO	N VALUE	Auto Mai
2 N 3 N 4 N 5 6	1	f f f	2.486 0 GH 4.924 6 GH 7.385 8 GH	z -64	8.42 dBm 9.42 dBm 9.52 dBm					Freq Offse 0 H
7 8 9										



Page 184 of 380



Page 185 of 380

8.8. 802.11n HT20 2TX CDD MODE IN THE 2.4 GHz BAND (ANTENNA D & A)

8.8.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

The minimum 6 dB bandwidth shall be at least 500 kHz.

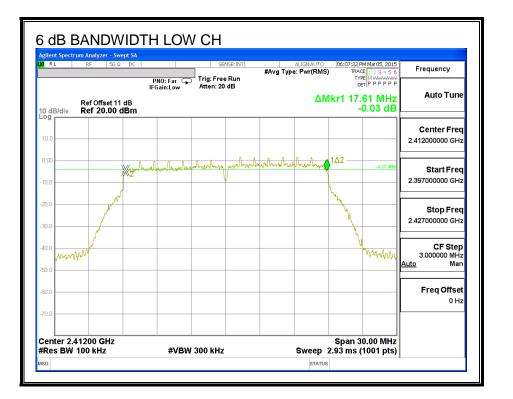
RESULTS

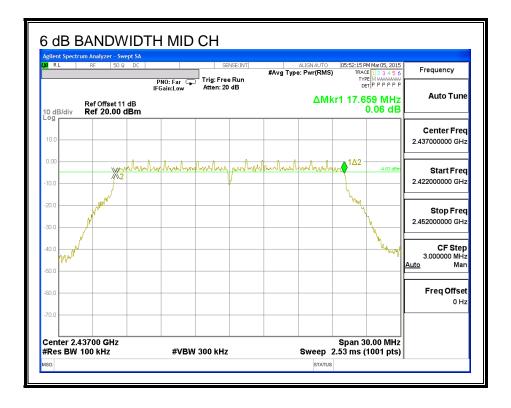
Channel	Frequency	6 dB BW	6 dB BW	Minimum
		Antenna D	Antenna A	Limit
	(MHz)	(MHz)	(MHz)	(MHz)
Low	2412	17.610	17.640	0.5
Mid	2437	17.659	17.670	0.5
High	2462	17.640	17.670	0.5
High	2467	17.640	17.670	0.5
High	2472	17.400	17.700	0.5

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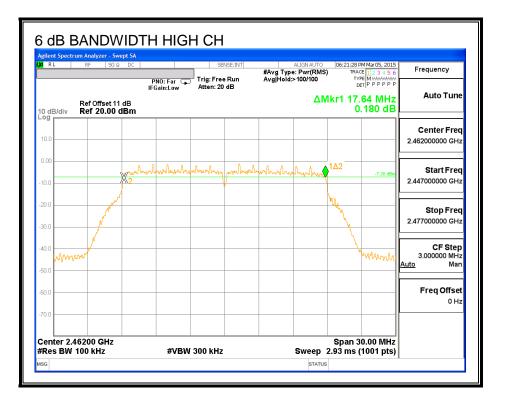
Page 186 of 380

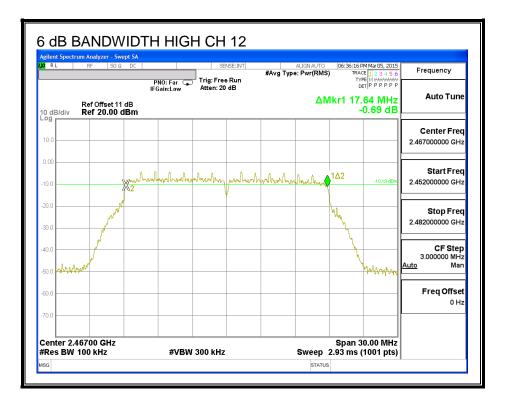
6 dB BANDWIDTH, ANTENNA D



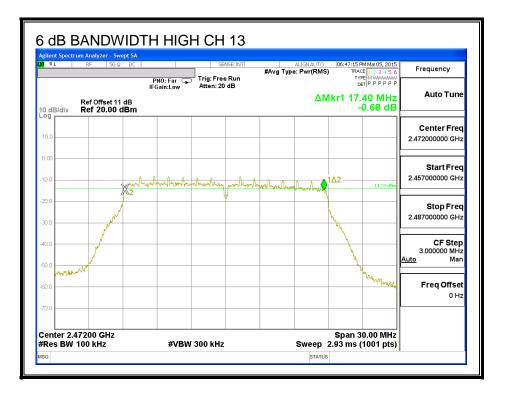


Page 187 of 380

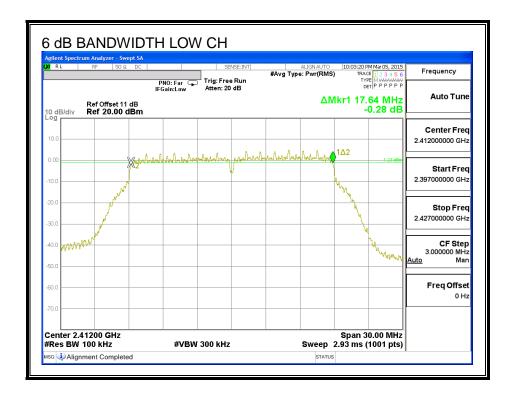




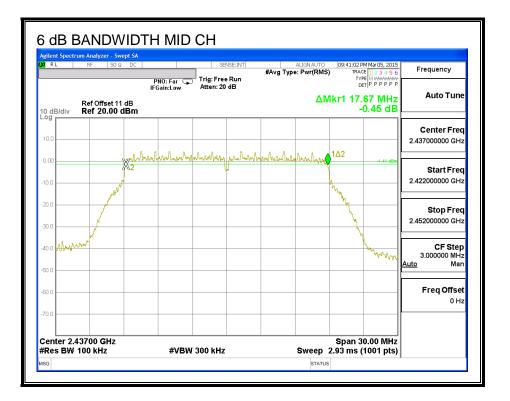
Page 188 of 380

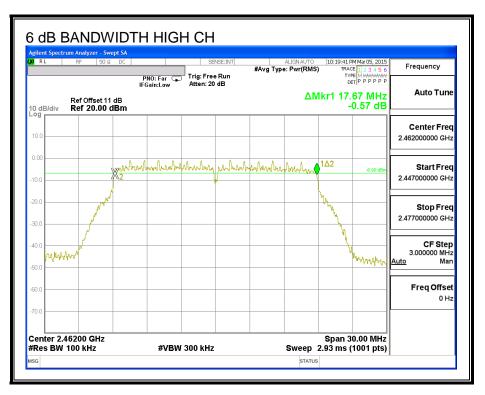


6 dB BANDWIDTH, ANTENNA A

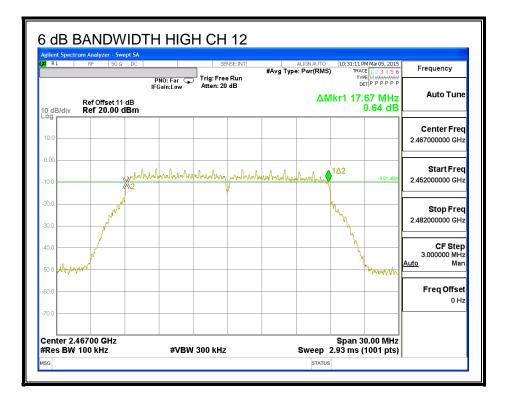


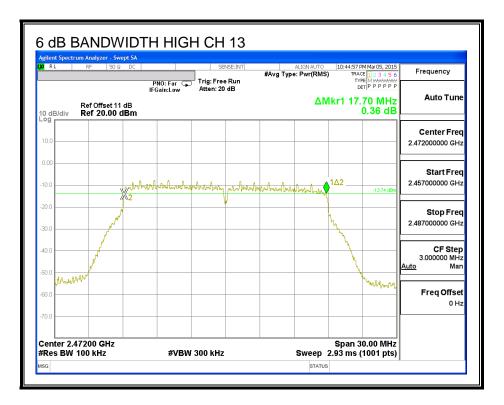
Page 189 of 380





Page 190 of 380





Page 191 of 380

8.8.2. 99% BANDWIDTH

LIMITS

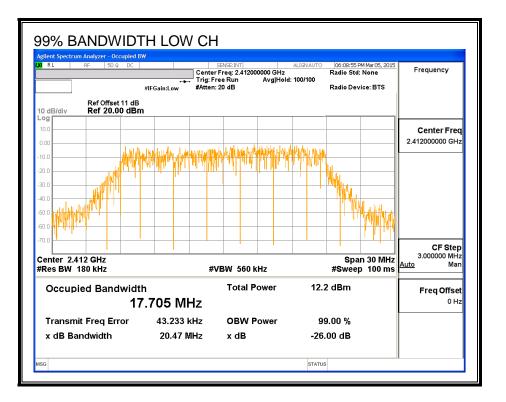
None; for reporting purposes only.

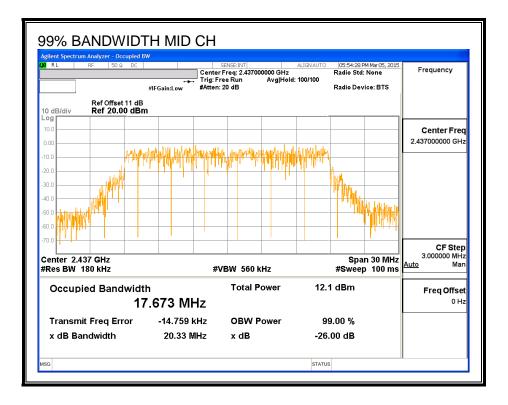
RESULTS

Channel	Frequency	99% Bandwidth (MHz)	99% Bandwidth (MHz)
	(MHz)	Antenna D	Antenna A
Low	2412	17.705	17.717
Mid	2437	17.673	17.819
High	2462	17.745	17.658
High	2467	17.642	17.721
High	2472	17.619	17.785

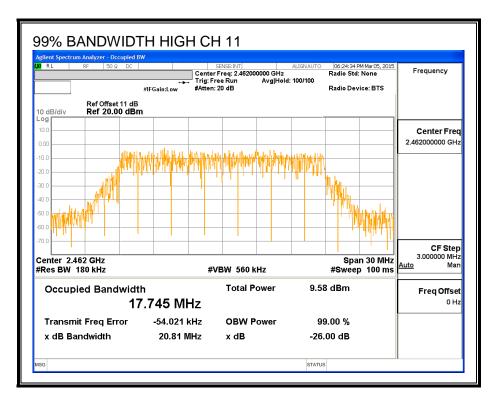
Page 192 of 380

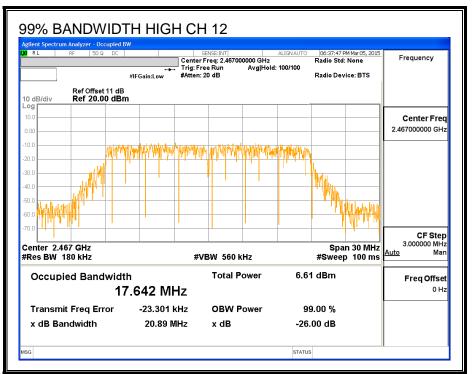
99% BANDWIDTH ANTENNA D





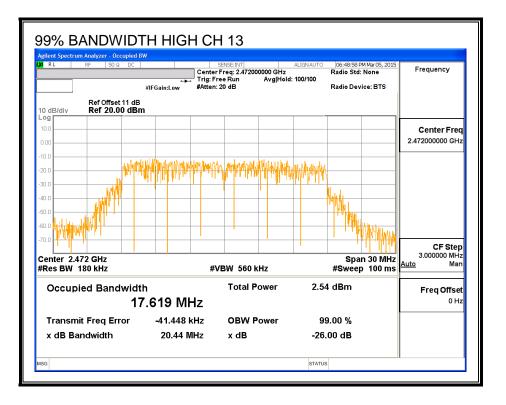
Page 193 of 380





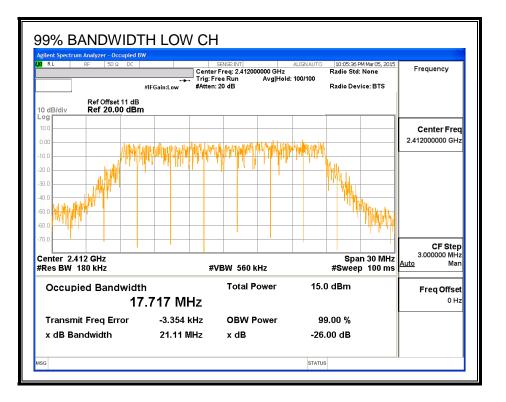
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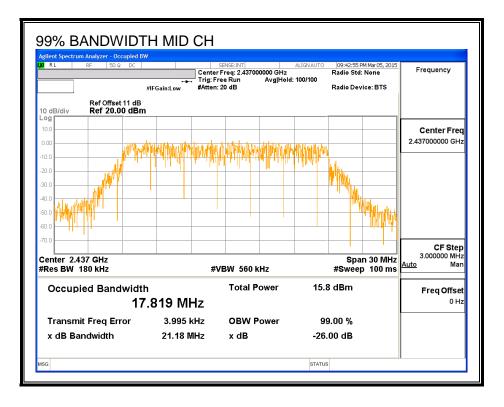
Page 194 of 380



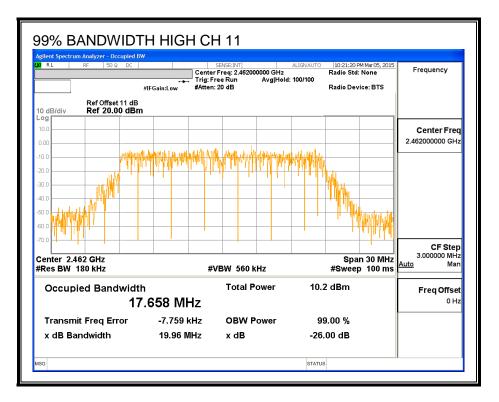
Page 195 of 380

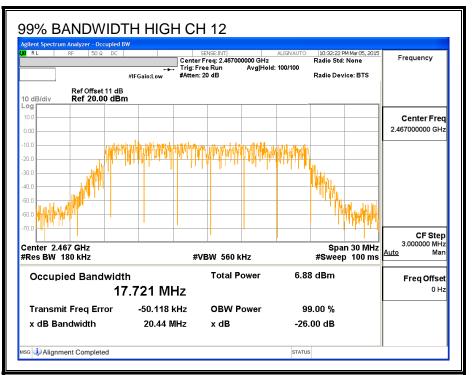
99% BANDWIDTH ANTENNA A





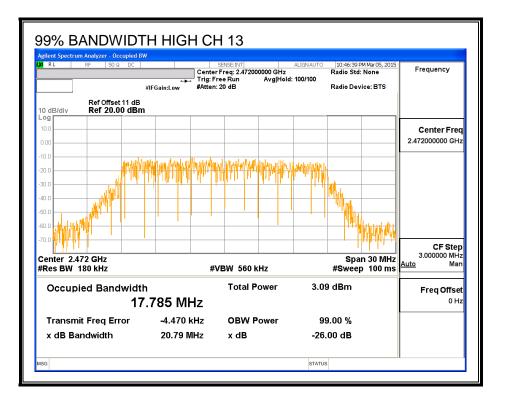
Page 196 of 380





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Page 197 of 380



Page 198 of 380

8.8.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency	Antenna D	Antenna A	Total	
		Power	Power	Power	
	(MHz)	(dBm)	(dBm)	(dBm)	
Low	2412	12.49	14.80	16.81	
Mid	2437	12.50	14.84	16.84	
High	2462	9.82	11.88	13.98	
High	2467	6.92	8.95	11.06	
High	2472	0.96	2.99	5.10	

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Page 199 of 380

8.8.4. OUTPUT POWER

LIMITS

FCC §15.247

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt, based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

DIRECTIONAL ANTENNA GAIN

The TX chains are uncorrelated and the antenna gain is unequal among the chains. The directional gain is:

Antenna D	Antenna A	Uncorrelated Chains		
Antenna	Antenna	Directional		
Gain	Gain	Gain		
(dBi)	(dBi)	(dBi)		
2.50	0.20	1.50		

Page 200 of 380

<u>RESULTS</u>

Limits

Channel	Frequency	Directional	FCC	IC	IC	Max
		Gain	Power	Power	EIRP	Power
			Limit	Limit	Limit	
	(MHz)	(dBi)	(dBm)	(dBm)	(dBm)	(dBm)
Low	2412	1.50	30.00	30	36	30.00
Mid	2437	1.50	30.00	30	36	30.00
High	2462	1.50	30.00	30	36	30.00
High	2467	1.50	30.00	30	36	30.00
High	2472	1.50	30.00	30	36	30.00

Results

Channel	Frequency	Antenna D	Antenna A	Total	Power	Margin
		Meas Power	Meas Power	Corr'd Power	Limit	
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	2412	20.49	24.40	25.88	30.00	-4.12
Mid	2437	20.52	24.74	26.13	30.00	-3.87
High	2462	17.82	21.16	22.81	30.00	-7.19
High	2467	14.92	18.17	19.85	30.00	-10.15
High	2472	8.56	12.57	14.02	30.00	-15.98

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Page 201 of 380

8.8.5. PSD

LIMITS

FCC §15.247

<u>RESULTS</u>

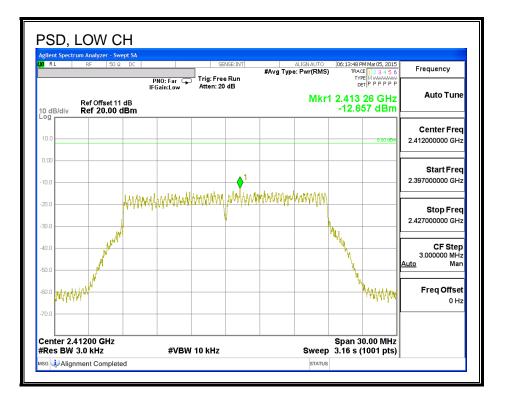
PSD Results

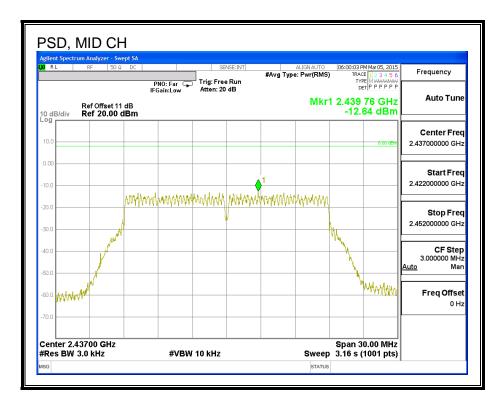
Channel	Frequency	Antenna D	Antenna A	Total	Limit	Margin
		Meas	Meas	PSD		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	2412	-12.66	-9.91	-8.06	8.0	-16.1
Mid	2437	-12.64	-9.68	-7.90	8.0	-15.9
High	2462	-16.22	-13.44	-11.60	8.0	-19.6
High	2467	-18.58	-16.72	-14.54	8.0	-22.5
High	2472	-22.30	-21.49	-18.87	8.0	-26.9

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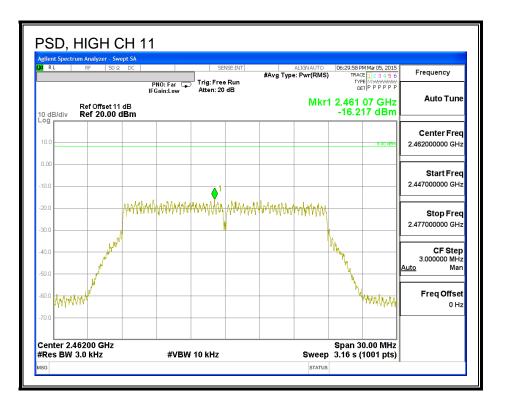
Page 202 of 380

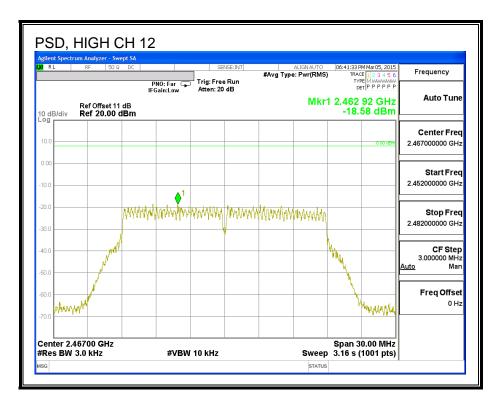
PSD, ANTENNA D



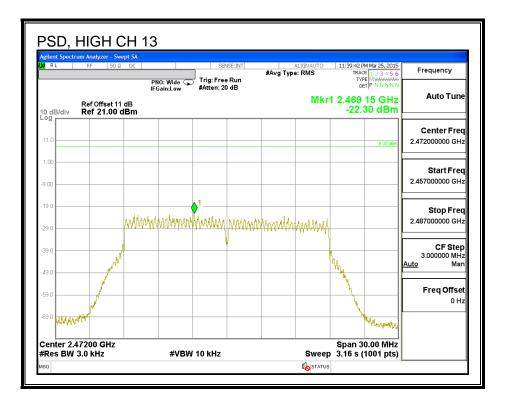


Page 203 of 380

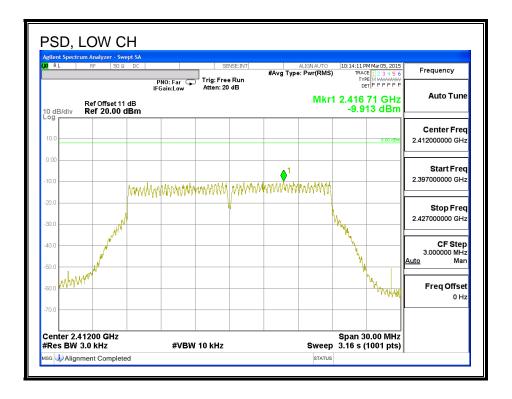




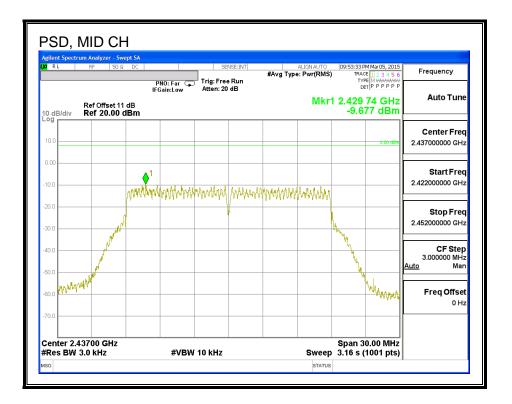
Page 204 of 380

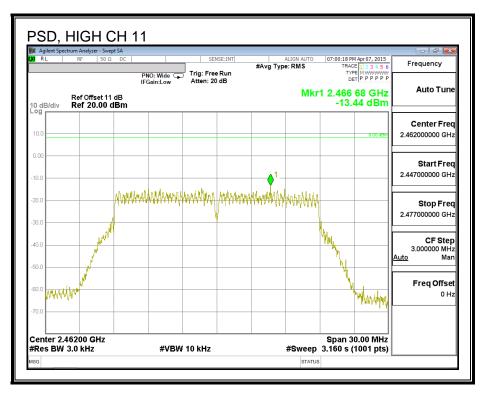


PSD, ANTENNA A

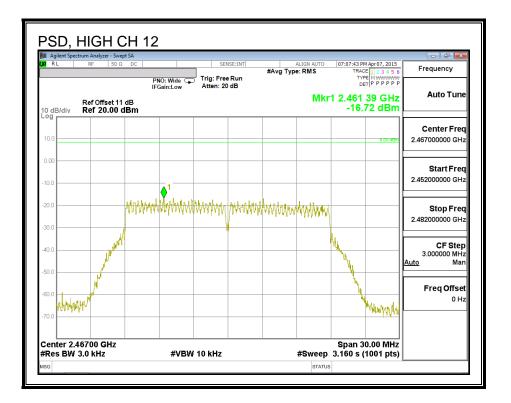


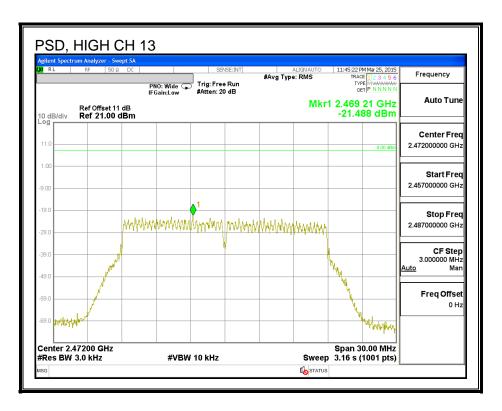
Page 205 of 380





Page 206 of 380





Page 207 of 380

8.8.6. OUT-OF-BAND EMISSIONS

LIMITS

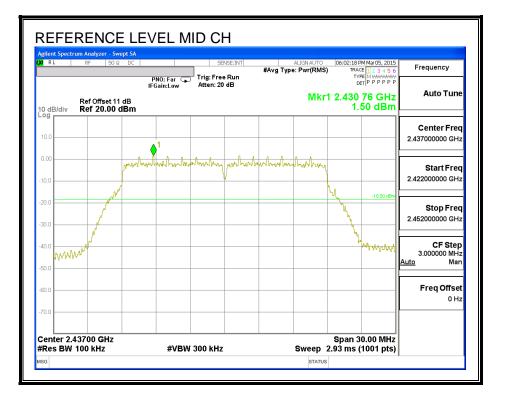
FCC §15.247 (d)

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator 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 the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required.

Page 208 of 380

RESULTS

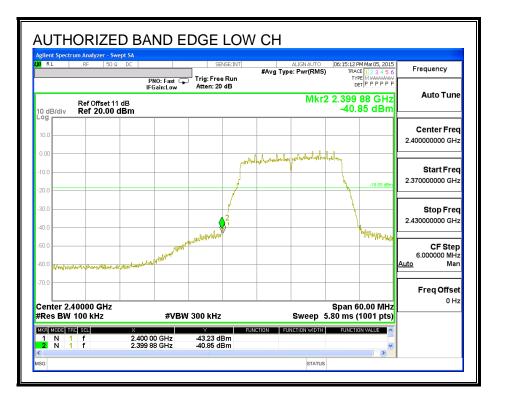
IN-BAND REFERENCE LEVEL, ANTENNA D



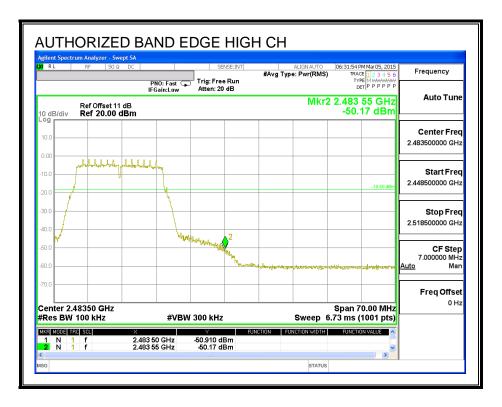
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Page 209 of 380

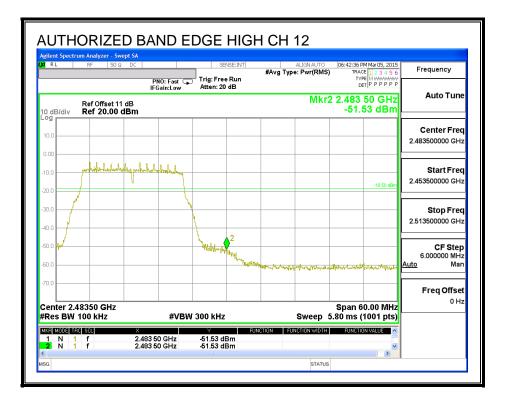
LOW CHANNEL BANDEDGE, ANTENNA D

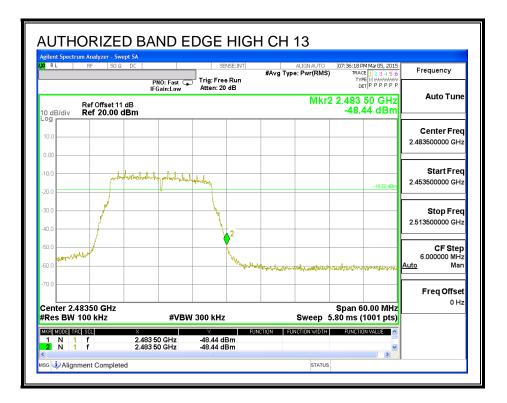


HIGH CHANNEL BANDEDGE, ANTENNA D



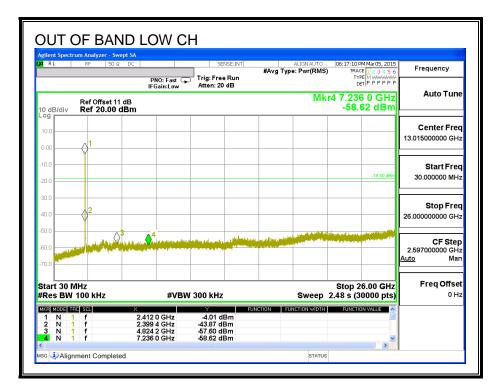
Page 210 of 380

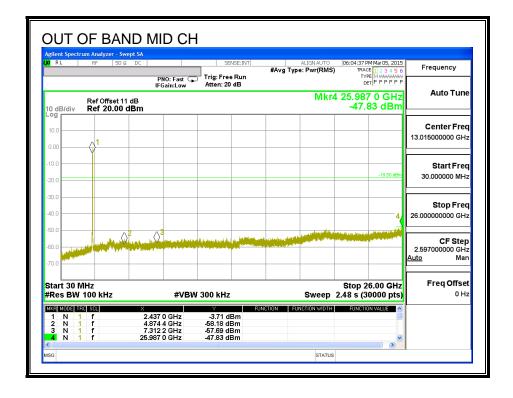




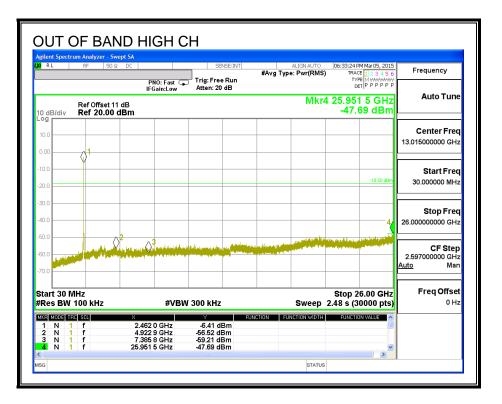
Page 211 of 380

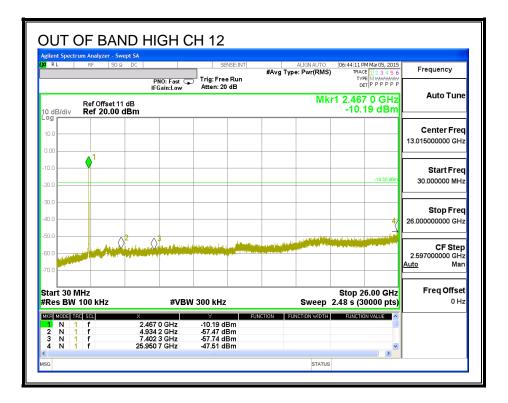
OUT-OF-BAND EMISSIONS, ANTENNA D



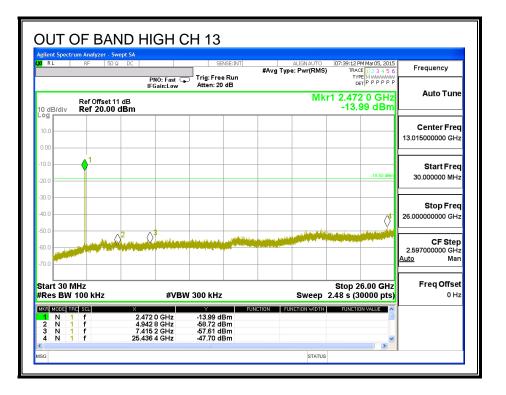


Page 212 of 380

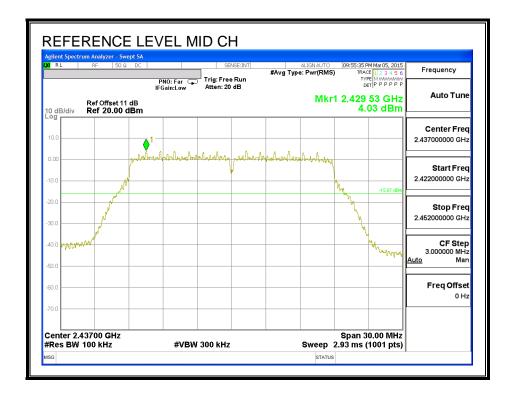




Page 213 of 380

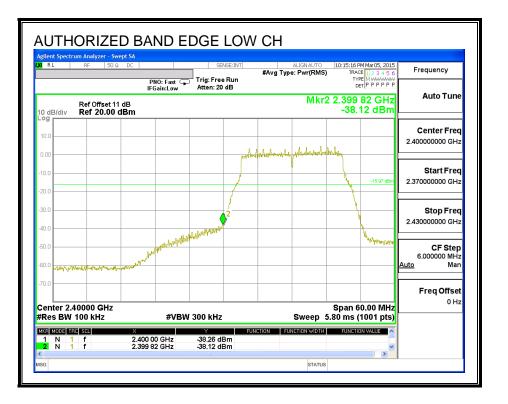


IN-BAND REFERENCE LEVEL, ANTENNA A

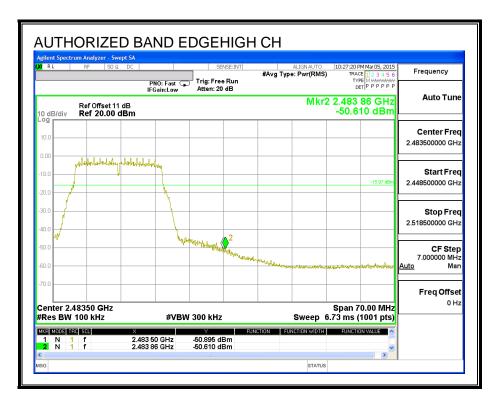


Page 214 of 380

LOW CHANNEL BANDEDGE, ANTENNA A



HIGH CHANNEL BANDEDGE, ANTENNA A



Page 215 of 380