

Vertical Polarization

SGS NA, San Diego Regulatory Lab

Customer / Model # - comma.ai / LightningHard SOM

Radiated Emissions

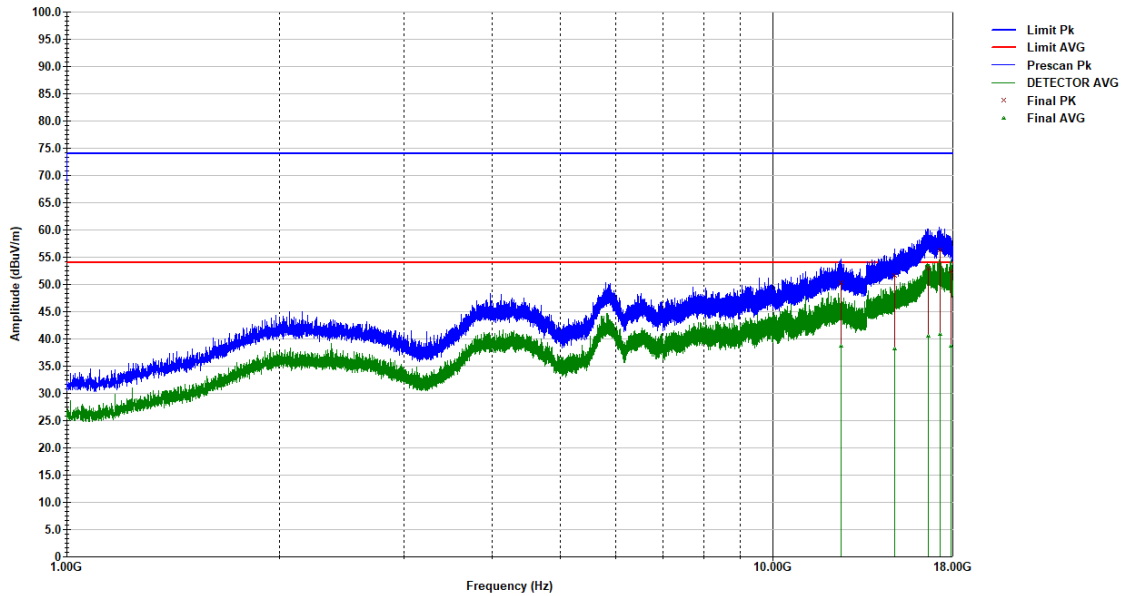
Test Mode - TX, 6GHz HPF

Operator - AG

Vertical AVG

Standard - FCC Class B

Comments - 5280MHz, 802.11ac20 VHT20, pwr 15, mcs 0



5280 15 mcs0 RE CISPR SW1A NC 3117 w lambda lna AVG 1G-18G 06Feb2024.til

Last Data Update 04:24:42 PM, Monday, March 18, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
12494.173	50.35	26.01	-23.65	74	150	192
14872.85065	51.6	28.16	-22.4	74	304	41
16610.90625	52.92	33.58	-21.08	74	351	81
17273.0194	56.36	32.59	-17.64	74	210	130
17911.6495	52.56	31.87	-21.44	74	155	20

Average

Freq. (MHz)	Final AVG (dBμV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
12494.173	38.78	0.15	26.01	-15.22	54	150	192
14872.85065	38.38	0.15	28.16	-15.62	54	304	41
16610.90625	40.68	0.15	33.58	-13.32	54	351	81
17273.0194	40.96	0.15	32.59	-13.04	54	210	130
17911.6495	38.74	0.15	31.87	-15.26	54	155	20

High Channel – 5320MHz - both chains transmitting Horizontal Polarization

SGS NA, San Diego Regulatory Lab

Customer / Model # - comma.ai / LightningHard SOM

Radiated Emissions

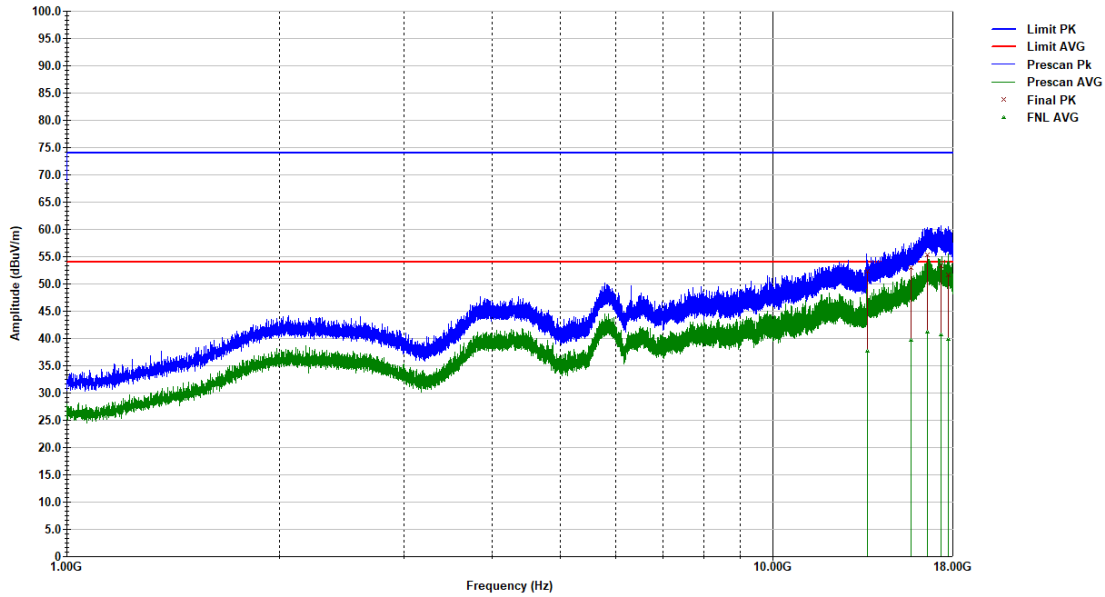
Test Mode - TX, 6GHz HPF

Horizontal AVG

Operator - AG

Standard - FCC Class B

Comments - 5320MHz, 802.11ac20 VHT20, pwr 15, mcs 0



5320 15 mcs0 RE CISPR SW1A NC 3117 w lambda lna AVG 1G-18G 06Feb2024.tif

Last Data Update 05:22:25 PM, Monday, March 18, 2024

Peak Data

Freq. (MHz)	Final PK (dBuV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBuV/m)	Ant. Height (cm)	Azimuth (deg.)
13604.04895	52.23	26.28	-21.77	74	194	48
15692.77282	53.01	30.09	-20.99	74	302	218
16559.19102	55.3	33.36	-18.7	74	310	-4
17311.37149	53.35	32.49	-20.65	74	334	114
17760.50219	51.6	31.87	-22.4	74	240	244

Average

Freq. (MHz)	Final AVG (dBuV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBuV/m)	Ant. Height (cm)	Azimuth (deg.)
13604.04895	37.86	0.15	26.28	-16.14	54	194	48
15692.77282	39.86	0.15	30.09	-14.14	54	302	218
16559.19102	41.28	0.15	33.36	-12.72	54	310	-4
17311.37149	40.74	0.15	32.49	-13.26	54	334	114
17760.50219	40.01	0.15	31.87	-13.99	54	240	244

Vertical Polarization

SGS NA, San Diego Regulatory Lab

Customer / Model # - comma.ai / LightningHard SOM

Radiated Emissions

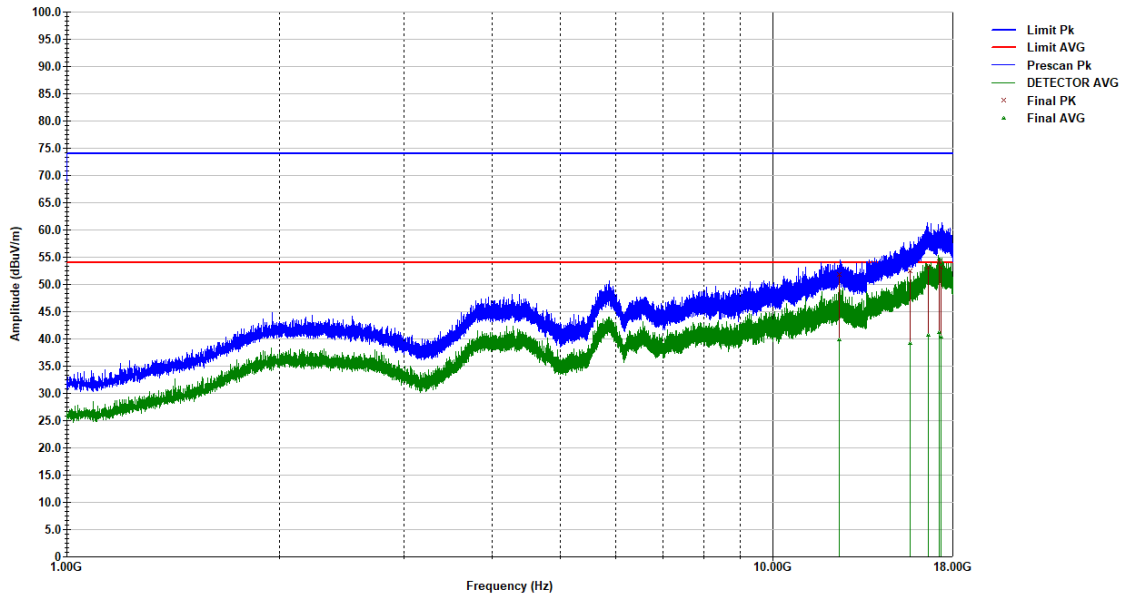
Test Mode - TX, 6GHz HPF

Operator - AG

Vertical AVG

Standard - FCC Class B

Comments - 5320MHz, 802.11ac20 VHT20, pwr 15, mcs 0



5320 15 mcs0 RE CISPR SW1A NC 3117 w lambda lna AVG 1G-18G 06Feb2024.til

Last Data Update 05:06:09 PM, Monday, March 18, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
12434.609	51.79	25.96	-22.21	74	241	374
15661.9771	52.46	30.03	-21.54	74	343	181
16610.1825	53.13	33.57	-20.87	74	187	51
17196.0215	54.21	32.81	-19.79	74	344	232
17346.5149	53.23	32.39	-20.77	74	265	192

Average

Freq. (MHz)	Final AVG (dBμV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
12434.609	39.98	0.15	25.96	-14.02	54	241	374
15661.9771	39.32	0.15	30.03	-14.68	54	343	181
16610.1825	40.77	0.15	33.57	-13.23	54	187	51
17196.0215	41.34	0.15	32.81	-12.66	54	344	232
17346.5149	40.53	0.15	32.39	-13.47	54	265	192

Upper band edge falling to restricted band Horizontal Polarization

SGS NA, San Diego Regulatory Lab

Model # - comma.ai

Radiated Emissions

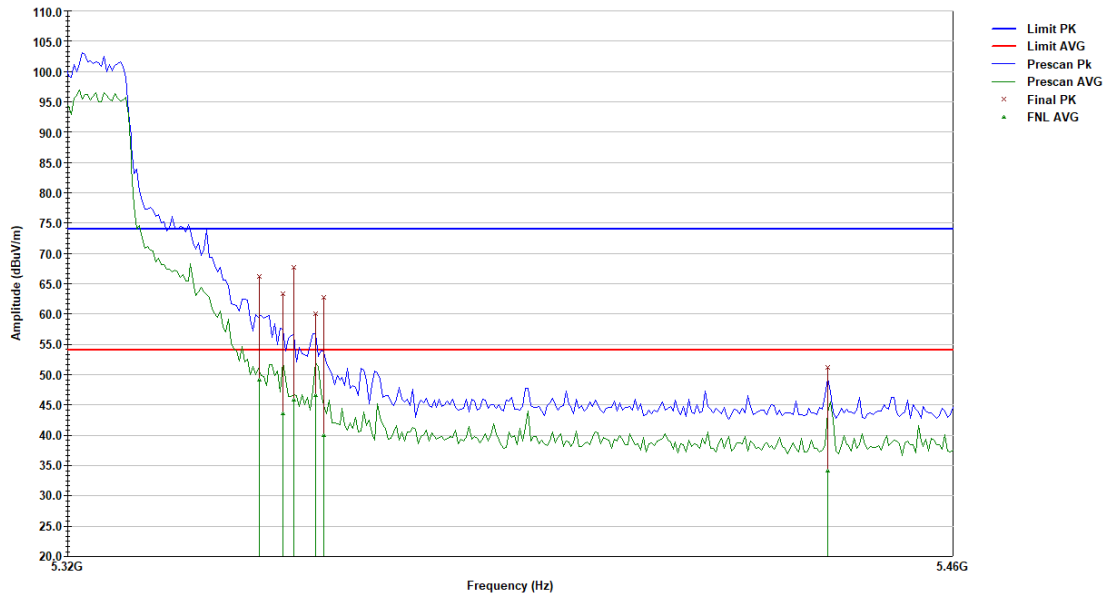
Test Mode - Tx mode, Upper Band-Edge

Horizontal AVG

Operator - AG

Standard - FCC Class B

Comments - 5320MHz, 802.11ac20 VHT20, pwr 15, mcs4



5320 15 mcs4 RE Upper Band-Edge.ttl

Last Data Update 12:46:43 PM, Thursday, May 23, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
5350.00001	66.2	7.62	-7.8	74	150	-10
5353.7	63.41	7.64	-10.59	74	248	351
5355.4	67.76	7.64	-6.24	74	263	348
5358.80001	60.02	7.66	-13.98	74	150	15
5360.075	62.79	7.66	-11.21	74	347	9
5439.97501	51.2	7.93	-22.8	74	400	342

Average

Freq. (MHz)	Final AVG (dBμV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
5350.00001	49.59	0.52	7.62	-4.41	54	150	-10
5353.7	44.03	0.52	7.64	-9.97	54	248	351
5355.4	46.26	0.52	7.64	-7.74	54	263	348
5358.80001	47.12	0.52	7.66	-6.88	54	150	15
5360.075	40.46	0.52	7.66	-13.54	54	347	9
5439.97501	34.56	0.52	7.93	-19.44	54	400	342

Vertical Polarization

SGS NA, San Diego Regulatory Lab

Model # - comma.ai

Radiated Emissions

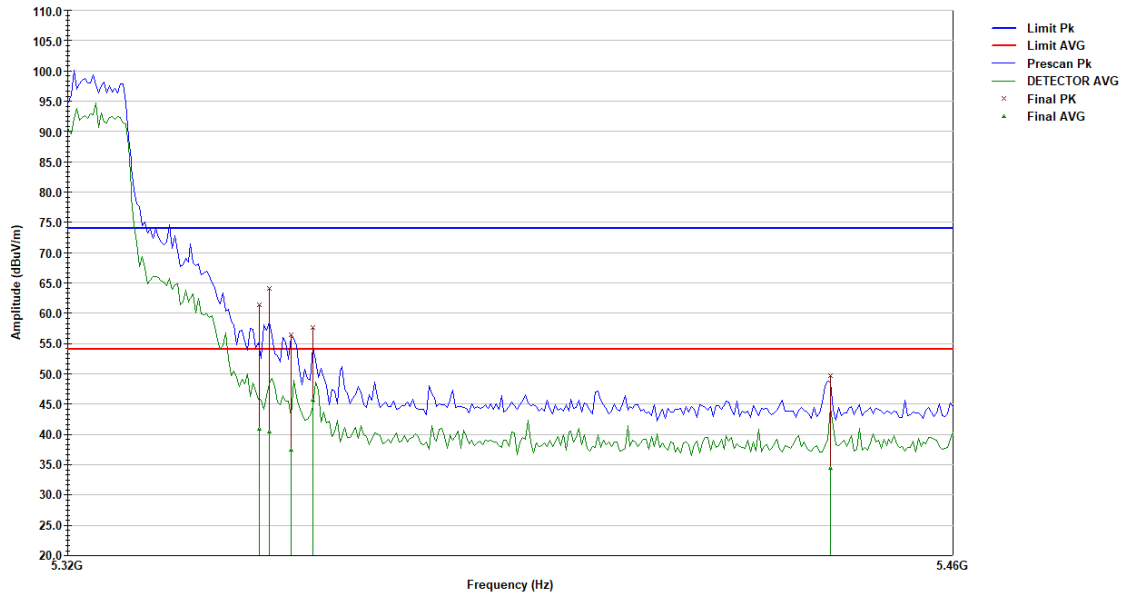
Test Mode - Tx mode, Upper Band-Edge

Vertical AVG

Operator - AG

Standard - FCC Class B

Comments - 5320MHz, 802.11ac20 VHT20, pwr 15, mcs4



5320 15 mcs4 RE Upper Band-Edge.ttl

Last Data Update 12:31:51 PM, Thursday, May 23, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
5350.00001	61.39	7.62	-12.61	74	365	265
5351.575	64.03	7.63	-9.97	74	373	261
5354.975	56.45	7.64	-17.55	74	380	48
5358.37501	57.64	7.66	-16.36	74	388	245
5440.4	49.69	7.93	-24.31	74	400	134

Average

Freq. (MHz)	Final AVG (dBμV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
5350.00001	41.36	0.52	7.62	-12.64	54	365	265
5351.575	40.92	0.52	7.63	-13.08	54	373	261
5354.975	37.91	0.52	7.64	-16.09	54	380	48
5358.37501	46.14	0.52	7.66	-7.86	54	388	245
5440.4	34.96	0.52	7.93	-19.56	54	400	134

UNII2a: 802.11ac40

30 to 1000 MHz Low Channel – 5270MHz - both chains transmitting Horizontal Polarization

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Horizontal QP

Customer / Model # - comma.ai / LightningHard SOM

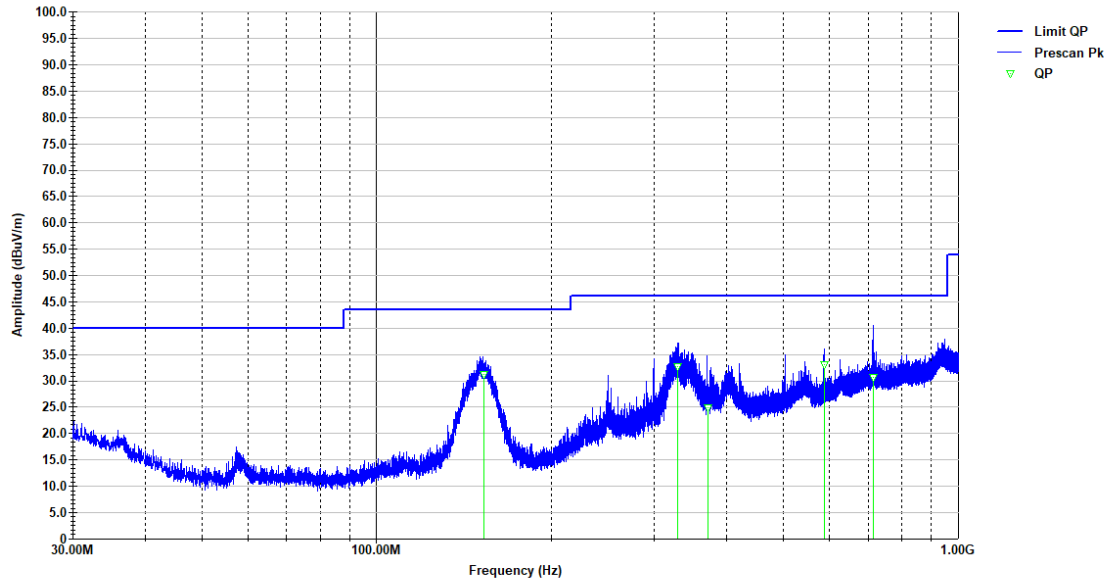
Serial # - N/A

Test Mode - TX99, ext. DC power supply

Operator - Alex C

Standard - FCC Class B

Comments - 5270MHz, 802.11ac40 VHT40, pwr 13, mcs0



5270 13 mcs0 FCC 15.407 RE 30M-1GHz.til

Last Data Update 11:27:53 AM, Friday, March 22, 2024

Quasi-Peak Data

Freq. (MHz)	Final QP (dBuV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBuV/m)	Ant. Height (cm)	Azimuth (deg.)
152.64193	31.21	-26.99	-12.31	43.52	200	345
329.662182	32.62	-22.66	-13.4	46.02	100	320
370.874836	24.89	-20.1	-21.13	46.02	100	324
587.980795	33.12	-14.74	-12.9	46.02	100	335
716.107187	30.72	-11.91	-15.3	46.02	100	202

Vertical Polarization

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Vertical QP

Customer / Model # - comma.ai / LightningHard SOM

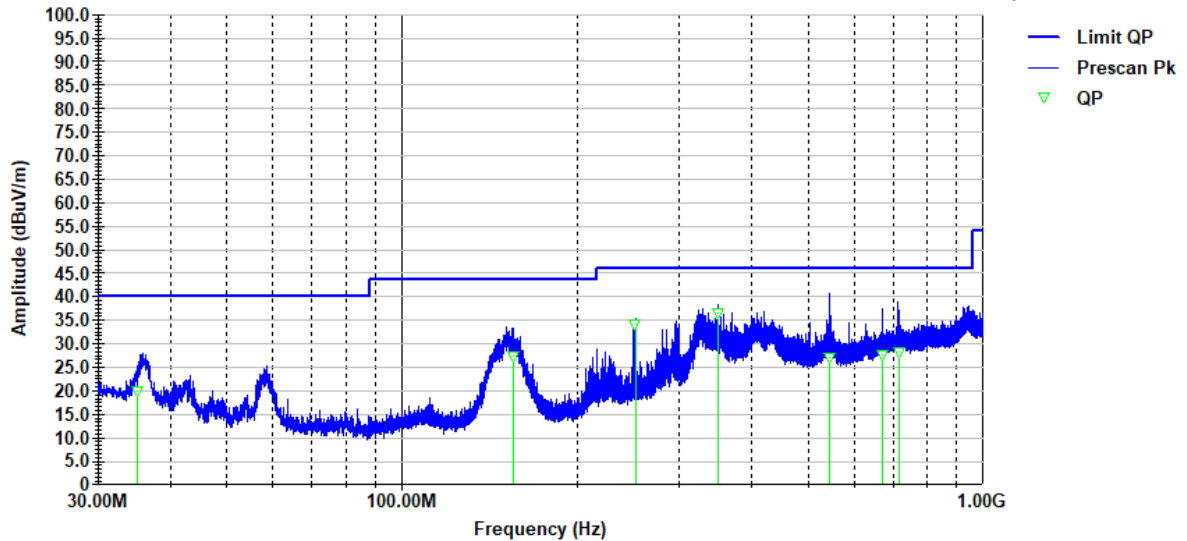
Serial # - N/A

Test Mode - TX99, ext. DC power supply

Operator - Alex C

Standard - FCC Class B

Comments - 5270MHz, 802.11ac40 VHT40, pwr 13, mcs0



5270 13 mcs0 FCC 15-407 RE 30M-1GHz.til

Last Data Update 11:14:48 AM, Friday, March 22, 2024

Quasi-Peak Data

Freq. (MHz)	Final QP (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
35.007831	20	-24.2	-20	40	100	354
155.744034	27.41	-26.27	-16.11	43.52	161	199
252.008756	34.08	-24.27	-11.94	46.02	114	343
349.998906	36.51	-21.02	-9.51	46.02	100	26
543.208135	27.08	-13.85	-18.94	46.02	154	200
671.622785	27.77	-12.58	-18.25	46.02	362	235

1 to 18 GHz Low Channel – 5270MHz - both chains transmitting Horizontal Polarization

SGS NA, San Diego Regulatory Lab

Customer / Model # - comma.ai / LightningHard SOM

Radiated Emissions

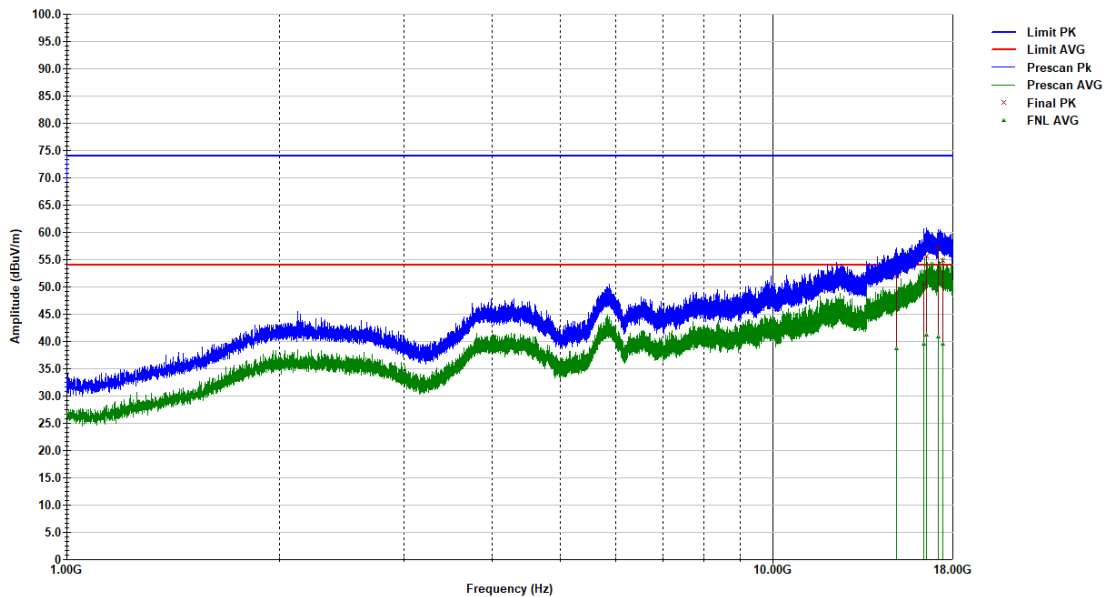
Test Mode - TX, 6GHz HPF

Horizontal AVG

Operator - AG

Standard - FCC Class B

Comments - 5270MHz, 802.11ac40 VHT40, pwr 13, mcs 0



5270 13 mcs0 RE CISPR SW1A NC 3117 w lambda lna AVG 1G-18G 06Feb2024.ttl

Last Data Update 06:06:18 PM, Monday, March 18, 2024

Peak Data

Freq. (MHz)	Final PK (dBuV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBuV/m)	Ant. Height (cm)	Azimuth (deg.)
14986.8096	51.96	28.44	-22.04	74	210	88
16380.07899	50.67	32.56	-23.33	74	368	327
16521.68653	55.62	33.2	-18.38	74	280	261
17184.80418	57.4	32.8	-16.6	74	194	355
17410.34198	54.86	32.24	-19.14	74	365	377

Average

Freq. (MHz)	Final AVG (dBuV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBuV/m)	Ant. Height (cm)	Azimuth (deg.)
14986.8096	38.86	0.28	28.44	-15.14	54	210	88
16380.07899	39.7	0.28	32.56	-14.3	54	368	327
16521.68653	41.4	0.28	33.2	-12.6	54	280	261
17184.80418	41.18	0.28	32.8	-12.82	54	194	355
17410.34198	39.71	0.28	32.24	-14.29	54	365	377

Vertical Polarization

SGS NA, San Diego Regulatory Lab

Customer / Model # - comma.ai / LightningHard SOM

Radiated Emissions

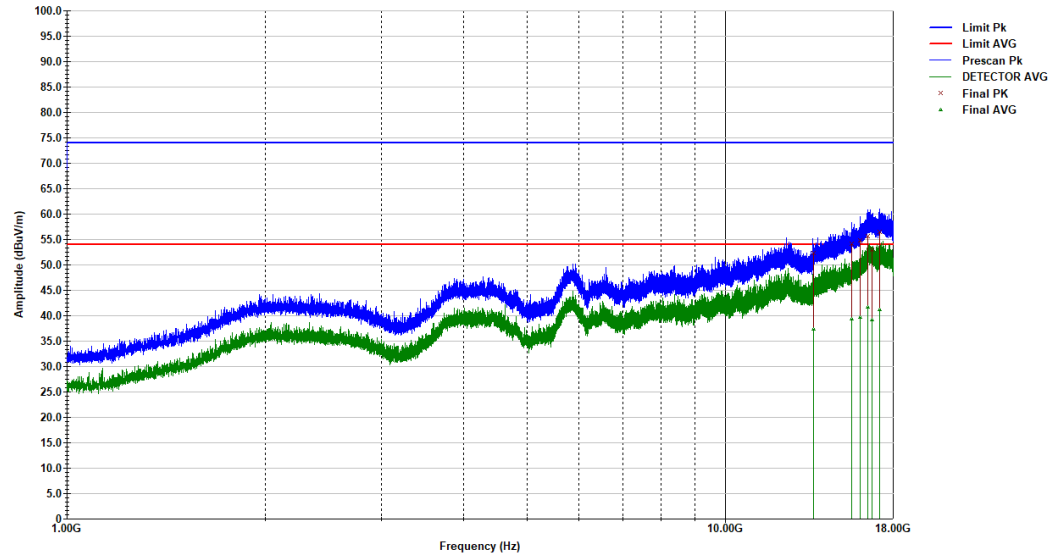
Test Mode - TX, 6GHz HPF

Operator - AG

Vertical AVG

Standard - FCC Class B

Comments - 5270MHz, 802.11ac40 VHT40, pwr 13, mcs 0



5270 13 mcs0 RE CISPR SW1A NC 3117 w lambda Ina AVG 1G-18G 06Feb2024.til

Last Data Update 05:51:43 PM, Monday, March 18, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
13611.49375	52.26	26.29	-21.74	74	280	71
15583.357	54.17	29.86	-19.83	74	225	-14
16048.69525	54.9	31.2	-19.1	74	400	245
16486.0566	55.62	33.04	-18.38	74	203	162
16694.10535	53.06	33.61	-20.94	74	202	251
17185.3329	56.43	32.8	-17.57	74	155	264

Average

Freq. (MHz)	Final AVG (dBμV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
13611.49375	37.55	0.28	26.29	-16.45	54	280	71
15583.357	39.63	0.28	29.86	-14.37	54	225	-14
16048.69525	40.01	0.28	31.2	-13.99	54	400	245
16486.0566	41.91	0.28	33.04	-12.09	54	203	162
16694.10535	39.49	0.28	33.61	-14.51	54	202	251
17185.3329	41.41	0.28	32.8	-12.59	54	155	264

High Channel – 5310MHz - both chains transmitting Horizontal Polarization

SGS NA, San Diego Regulatory Lab

Customer / Model # - comma.ai / LightningHard SOM

Radiated Emissions

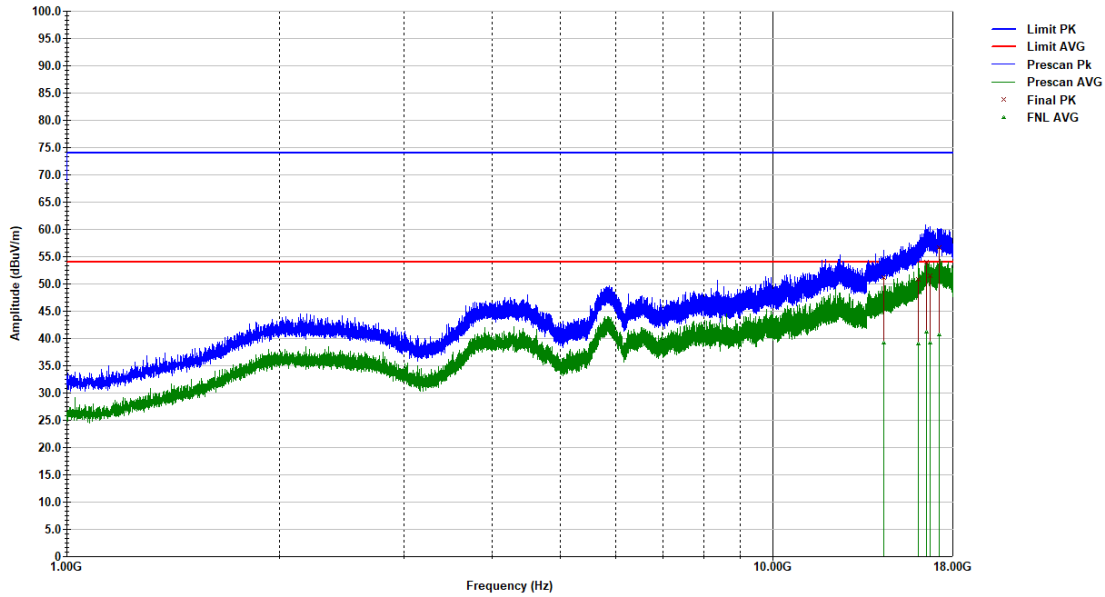
Test Mode - TX, 6GHz HPF

Horizontal AVG

Operator - AG

Standard - FCC Class B

Comments - 5310MHz, 802.11ac40 VHT40, pwr 13, mcs 0



5310 13 mcs0 RE CISPR SW1A NC 3117 w lambda lna AVG 1G-18G 06Feb2024.tif

Last Data Update 07:15:41 PM, Monday, March 18, 2024

Peak Data

Freq. (MHz)	Final PK (dBuV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBuV/m)	Ant. Height (cm)	Azimuth (deg.)
14370.04751	51.18	27.13	-22.82	74	360	187
16097.2446	50.77	31.35	-23.23	74	387	359
16499.85183	53.99	33.1	-20.01	74	326	380
16712.31579	51.52	33.6	-22.48	74	319	167
17245.10464	56.72	32.68	-17.28	74	248	84

Average

Freq. (MHz)	Final AVG (dBuV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBuV/m)	Ant. Height (cm)	Azimuth (deg.)
14370.04751	39.4	0.3	27.13	-14.6	54	360	187
16097.2446	39.22	0.3	31.35	-14.78	54	387	359
16499.85183	41.47	0.3	33.1	-12.53	54	326	380
16712.31579	39.39	0.3	33.6	-14.61	54	319	167
17245.10464	40.98	0.3	32.68	-13.02	54	248	84

Vertical Polarization

SGS NA, San Diego Regulatory Lab

Customer / Model # - comma.ai / LightningHard SOM

Radiated Emissions

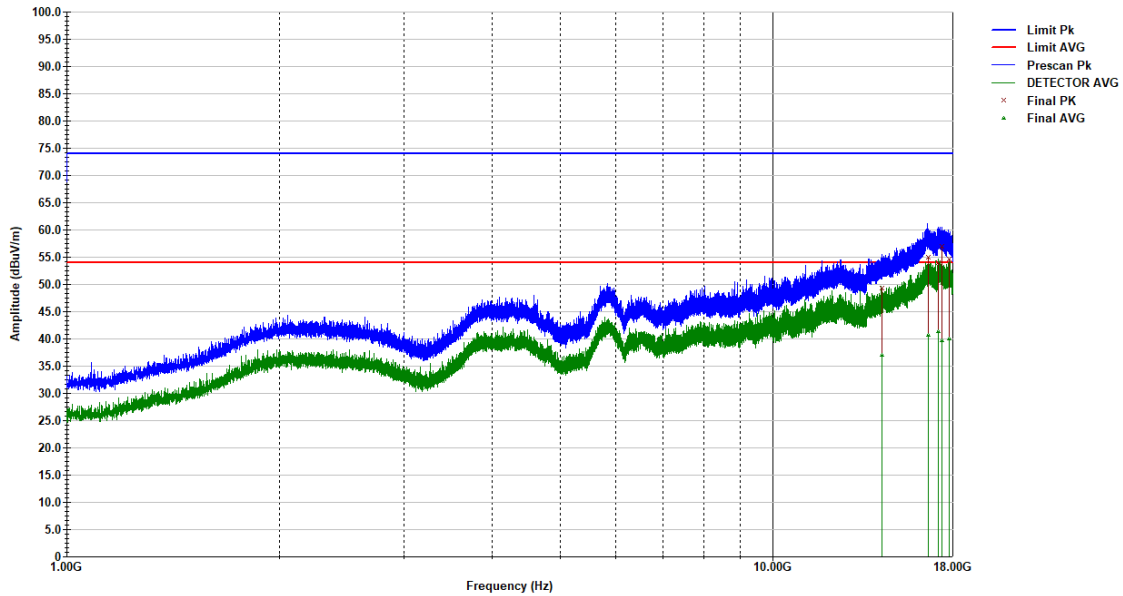
Test Mode - TX, 6GHz HPF

Operator - AG

Standard - FCC Class B

Vertical AVG

Comments - 5310MHz, 802.11ac40 VHT40, pwr 13, mcs 0



5310 13 mcs0 RE CISPR SW1A NC 3117 w lambda lna AVG 1G-18G 06Feb2024.til

Last Data Update 06:40:23 PM, Monday, March 18, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
14267.39385	49.25	27.07	-24.75	74	250	47
16608.2814	55.05	33.57	-18.95	74	150	364
17192.70515	53.99	32.81	-20.01	74	179	117
17396.16625	57.06	32.27	-16.94	74	319	9
17785.52025	54.69	31.84	-19.31	74	249	348

Average

Freq. (MHz)	Final AVG (dBμV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
14267.39385	37.23	0.3	27.07	-16.77	54	250	47
16608.2814	41.04	0.3	33.57	-12.96	54	150	364
17192.70515	41.66	0.3	32.81	-12.34	54	179	117
17396.16625	39.97	0.3	32.27	-14.03	54	319	9
17785.52025	40.26	0.3	31.84	-13.74	54	249	348

Upper band edge falling to restricted band Horizontal Polarization

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Horizontal AVG

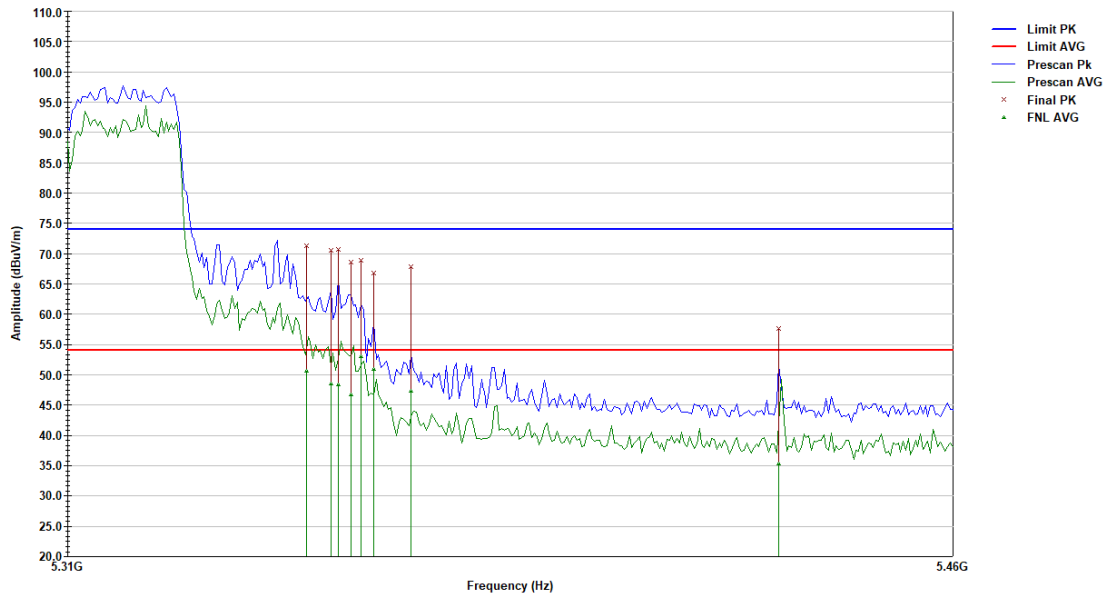
Model # - comma.ai

Test Mode - Tx mode, Upper Band-Edge

Operator - AG

Standard - FCC Class B

Comments - 5310MHz, 802.11ac40 VHT40, pwr 13, mcs1



5310 13 mcs1 RE Upper Band-Edge.ttl

Last Data Update 01:10:23 PM, Friday, May 24, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
5350.00001	71.28	7.62	-2.72	74	339	-14
5354.125	70.6	7.64	-3.4	74	263	346
5355.4	70.65	7.64	-3.35	74	270	-8
5357.525	68.52	7.65	-5.48	74	340	-20
5359.225	68.85	7.66	-5.15	74	271	-14
5361.35	66.73	7.67	-7.27	74	263	-20
5367.725	67.78	7.7	-6.22	74	271	-13
5430.2	57.62	7.93	-16.38	74	163	-14

Average

Freq. (MHz)	Final AVG (dBμV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
5350.00001	50.96	0.31	7.62	-3.04	54	339	-14
5354.125	48.83	0.31	7.64	-5.17	54	263	346
5355.4	48.61	0.31	7.64	-5.39	54	270	-8
5357.525	46.99	0.31	7.65	-7.01	54	340	-20
5359.225	53.28	0.31	7.66	-0.72	54	271	-14
5361.35	51.23	0.31	7.67	-2.77	54	263	-20
5367.725	47.66	0.31	7.7	-6.34	54	271	-13
5430.2	35.61	0.31	7.93	-18.39	54	163	-14

Vertical Polarization

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Vertical AVG

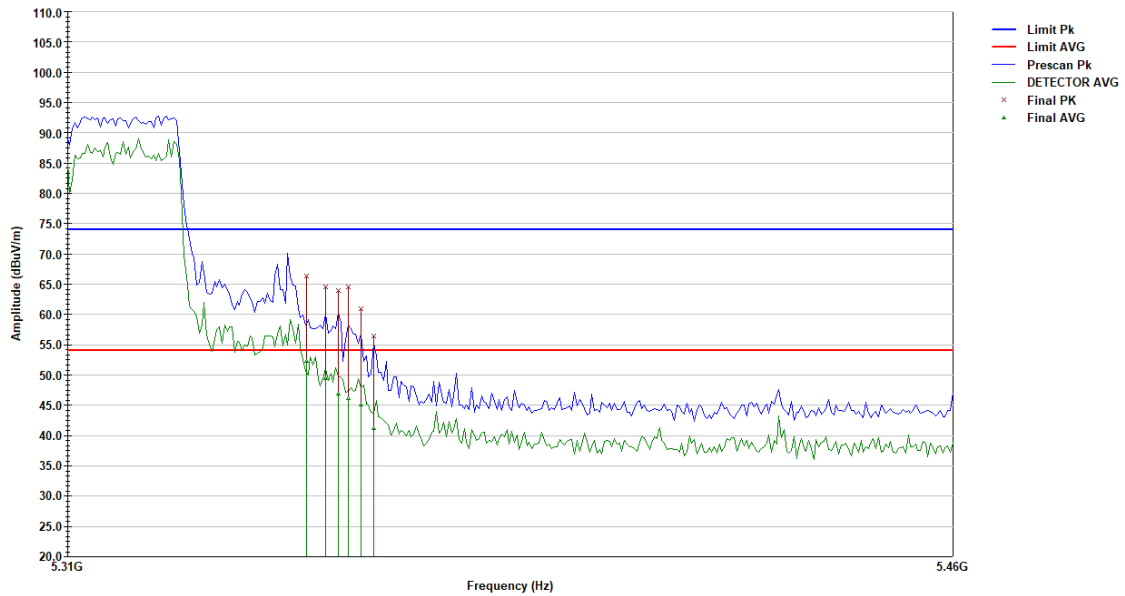
Model # - comma.ai

Test Mode - Tx mode, Upper Band-Edge

Operator - AG

Standard - FCC Class B

Comments - 5310MHz, 802.11ac40 VHT40, pwr 13, mcs1



5310 13 mcs1 RE Upper Band-Edge.ttl

Last Data Update 01:48:10 PM, Thursday, May 23, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
5350.00001	66.34	7.62	-7.66	74	357	264
5353.275	64.54	7.63	-9.46	74	400	74
5355.4	63.9	7.64	-10.1	74	380	50
5357.10001	64.54	7.65	-9.46	74	374	88
5359.225	60.94	7.66	-13.06	74	372	237
5361.35	56.44	7.67	-17.56	74	381	96

Average

Freq. (MHz)	Final AVG (dBμV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
5350.00001	52.61	0.31	7.62	-1.39	54	357	264
5353.275	49.64	0.31	7.63	-4.36	54	400	74
5355.4	47.1	0.31	7.64	-6.9	54	380	50
5357.10001	46.33	0.31	7.65	-7.67	54	374	88
5359.225	45.34	0.31	7.66	-8.66	54	372	237
5361.35	41.52	0.31	7.67	-12.48	54	381	96

UNII2a: 802.11ac80

30 to 1000 MHz
Mid Channel – 5290MHz - both chains transmitting
Horizontal Polarization

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Horizontal QP

Customer / Model # - comma.ai / LightningHard SOM

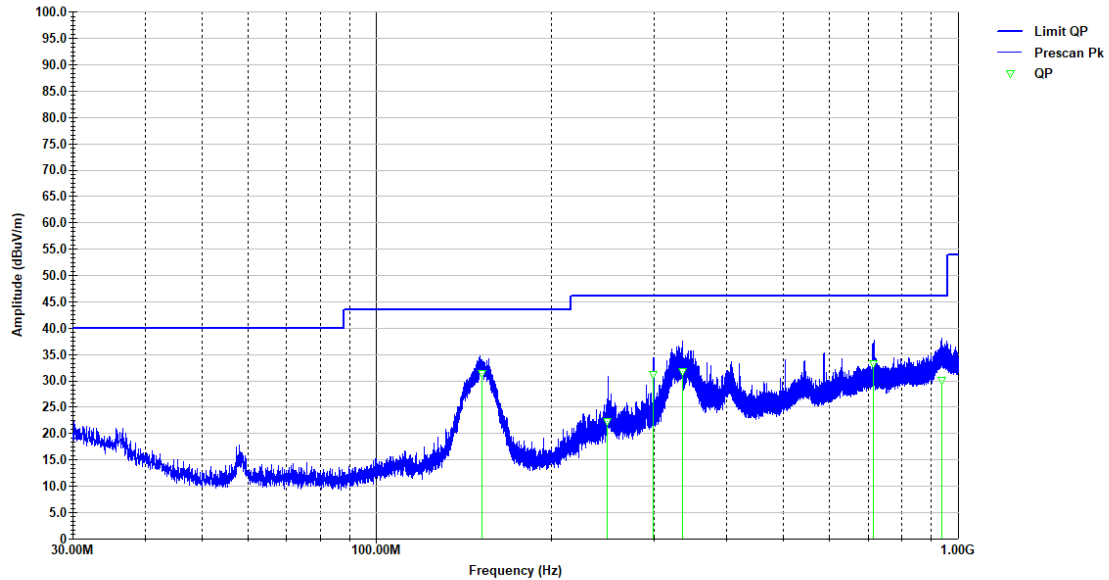
Serial # - N/A

Test Mode - TX99, ext. DC power supply

Operator - Alex C

Standard - FCC Class B

Comments - 5290MHz, 802.11ac80 VHT80, pwr 13, mcs0



5290 13 mcs0 FCC 15.407 RE 30M-1GHz.ttl

Last Data Update 12:15:59 PM, Friday, March 22, 2024

Quasi-Peak Data

Freq. (MHz)	Final QP (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
151.451175	31.48	-27.38	-12.04	43.52	185	335
249.111841	22.31	-24.48	-23.71	46.02	121	170
298.757166	31.27	-23.55	-14.75	46.02	100	318
336.256567	31.7	-22.19	-14.32	46.02	100	320
714.477348	33.22	-11.91	-12.8	46.02	100	312
939.247292	30.17	-8.31	-15.85	46.02	321	125

Vertical Polarization

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Vertical QP

Customer / Model # - comma.ai / LightningHard SOM

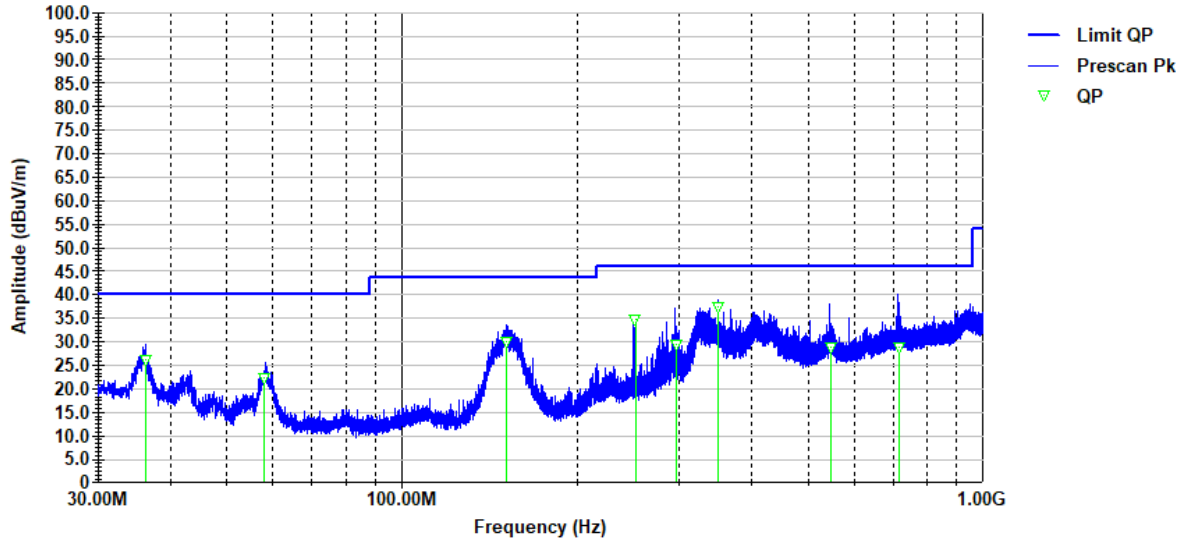
Serial # - N/A

Test Mode - TX99, ext. DC power supply

Operator - Alex C

Standard - FCC Class B

Comments - 5290MHz, 802.11ac80 VHT80, pwr 13, mcs0



5290 13 mcs0 FCC 15.407 RE 30M-1GHz.til

Last Data Update 11:59:54 AM, Friday, March 22, 2024

Quasi-Peak Data

Freq. (MHz)	Final QP (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
36.171088	26.13	-24.81	-13.87	40	138	52
58.049993	22.35	-30.48	-17.65	40	178	380
151.181868	29.99	-27.46	-13.53	43.52	155	230
251.978756	34.8	-24.28	-11.22	46.02	100	350
295.940623	29.34	-23.76	-16.68	46.02	100	338
349.998906	37.32	-21.02	-8.7	46.02	101	369
546.202214	28.78	-13.88	-17.24	46.02	101	338
714.970611	28.89	-11.92	-17.13	46.02	203	194

1 to 18 GHz Mid Channel – 5290MHz - both chains transmitting Horizontal Polarization

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Horizontal AVG

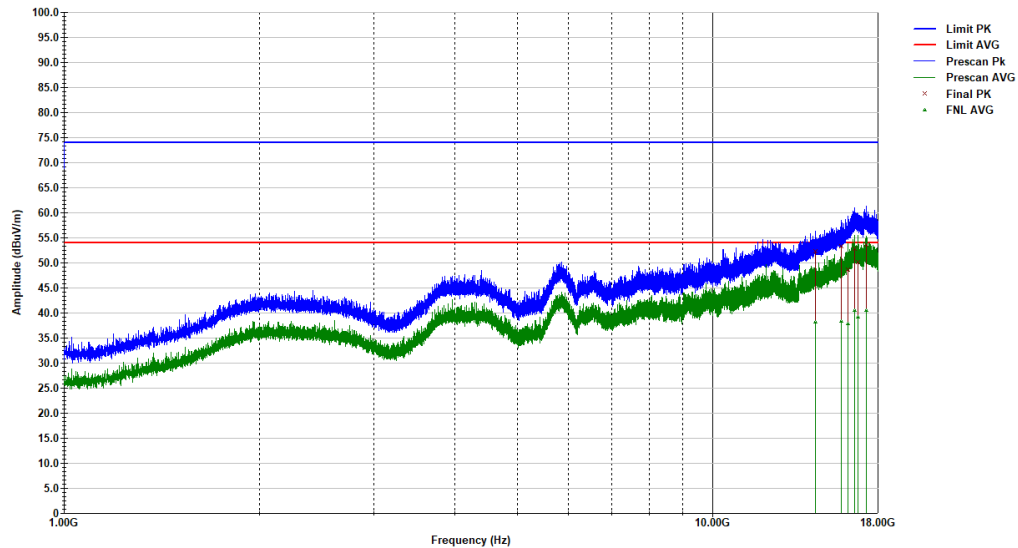
Customer / Model # - comma.ai / LightningHard SOM

Test Mode - TX, 6GHz HPF

Operator - AG

Standard - FCC Class B

Comments - 5290MHz, 802.11ac80 VHT80, pwr 13, mcs 0



5290 13 mcs0 RE CISPR SW1A NC 3117 w lambda lna AVG 1G-18G 06Feb2024.ttl

Last Data Update 07:58:04 PM, Monday, March 18, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
14430.45267	52.26	27.22	-21.74	74	264	13
15798.28479	53.4	30.33	-20.6	74	387	192
16198.36739	48.74	31.77	-25.26	74	241	85
16572.46613	52.78	33.41	-21.22	74	150	230
16771.38349	50.18	33.56	-23.82	74	334	302
17254.83827	53.67	32.65	-20.33	74	388	70

Average

Freq. (MHz)	Final AVG (dBμV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
14430.45267	38.78	0.57	27.22	-15.22	54	264	13
15798.28479	38.92	0.57	30.33	-15.08	54	387	192
16198.36739	38.44	0.57	31.77	-15.56	54	241	85
16572.46613	41.11	0.57	33.41	-12.89	54	150	230
16771.38349	39.75	0.57	33.56	-14.25	54	334	302
17254.83827	41.08	0.57	32.65	-12.92	54	388	70

Vertical Polarization

SGS NA, San Diego Regulatory Lab

Customer / Model # - comma.ai / LightningHard SOM

Radiated Emissions

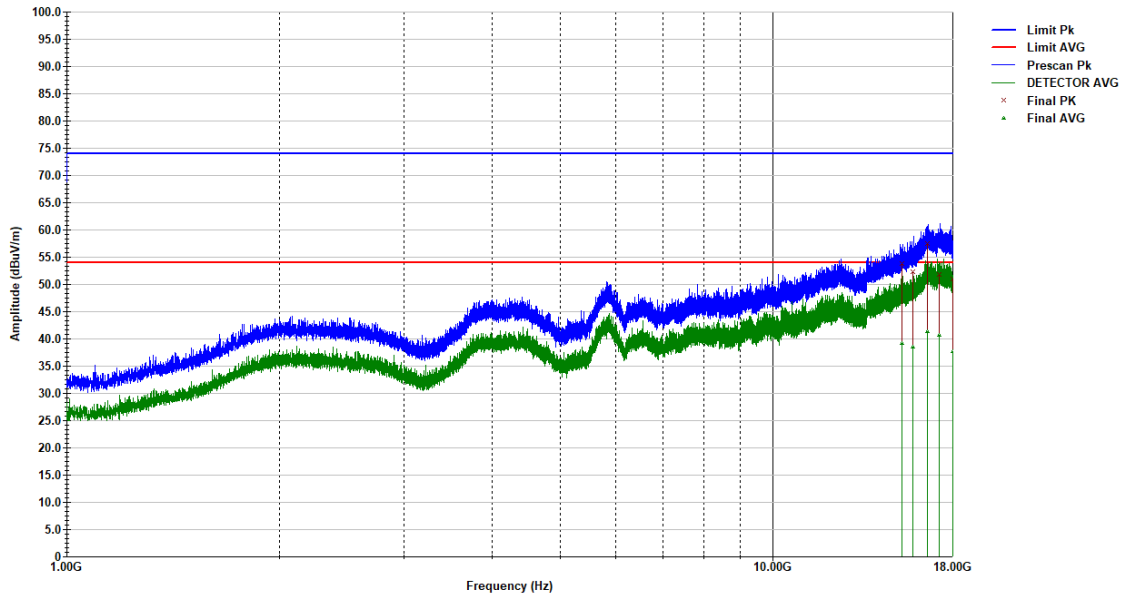
Test Mode - TX, 6GHz HPF

Operator - AG

Vertical AVG

Standard - FCC Class B

Comments - 5290MHz, 802.11ac80 VHT80, pwr 13, mcs 0



5290 13 mcs0 RE CISPR SW1A NC 3117 w lambda lna AVG 1G-18G 06Feb2024.til

Last Data Update 07:41:39 PM, Monday, March 18, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
15236.3904	53.86	28.96	-20.14	74	288	103
15810.4676	52.35	30.38	-21.65	74	257	233
16559.8821	57.47	33.36	-16.53	74	226	172
17224.69935	51.87	32.74	-22.13	74	150	353
17985.9515	51.01	30.91	-22.99	74	171	162

Average

Freq. (MHz)	Final AVG (dBμV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
15236.3904	39.69	0.57	28.96	-14.31	54	288	103
15810.4676	39.07	0.57	30.38	-14.93	54	257	233
16559.8821	41.86	0.57	33.36	-12.14	54	226	172
17224.69935	41.28	0.57	32.74	-12.72	54	150	353
17985.9515	38.21	0.57	30.91	-15.79	54	171	162

Upper band edge falling to restricted band Horizontal Polarization

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Horizontal AVG

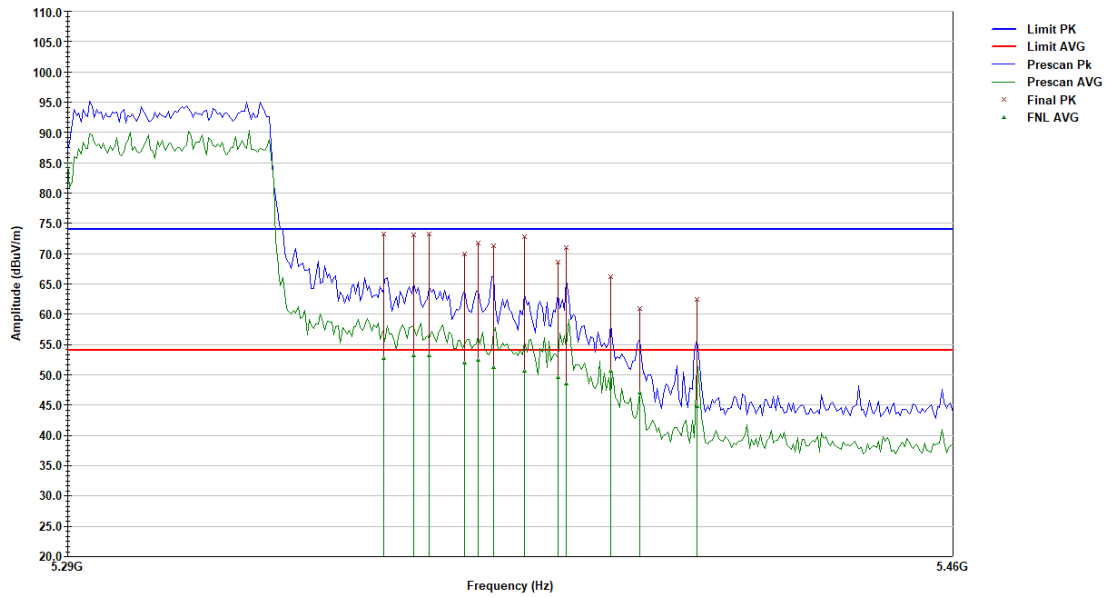
Model # - comma.ai

Test Mode - Tx mode, Upper Band-Edge

Operator - AG

Standard - FCC Class B

Comments - 5290MHz, 802.11ac80 VHT80, pwr 13, mcs0



5290 13 mcs0 RE Upper Band-Edge.ttl

Last Data Update 04:34:16 PM, Thursday, May 30, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
5350	73.27	7.62	-0.73	74	263	-20
5355.825	73.11	7.64	-0.89	74	340	346
5358.80001	73.28	7.66	-0.72	74	271	355
5365.6	70.02	7.69	-3.98	74	347	380
5368.15	71.8	7.7	-2.2	74	271	-8
5371.12501	71.28	7.71	-2.72	74	340	-20
5377.075	72.76	7.74	-1.24	74	340	367
5383.45	68.67	7.76	-5.33	74	340	15
5385.15	71.04	7.77	-2.96	74	263	342
5393.65	66.21	7.79	-7.79	74	270	359
5399.17501	60.87	7.81	-13.13	74	163	-11
5410.225	62.44	7.84	-11.56	74	270	-20

Average

Freq. (MHz)	Final AVG (dBµV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Ant. Height (cm)	Azimuth (deg.)
5350	53.32	0.57	7.62	-0.68	54	263	-20
5355.825	53.67	0.57	7.64	-0.33	54	340	346
5358.80001	53.66	0.57	7.66	-0.34	54	271	355
5365.6	52.58	0.57	7.69	-1.42	54	347	380
5368.15	53	0.57	7.7	-1	54	271	-8
5371.12501	51.79	0.57	7.71	-2.21	54	340	-20
5377.075	51.13	0.57	7.74	-2.87	54	340	367
5383.45	50.08	0.57	7.76	-3.92	54	340	15
5385.15	49.1	0.57	7.77	-4.9	54	263	342
5393.65	51.18	0.57	7.79	-2.82	54	270	359
5399.17501	47.52	0.57	7.81	-6.48	54	163	-11
5410.225	45.35	0.57	7.84	-8.65	54	270	-20

Vertical Polarization

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Vertical AVG

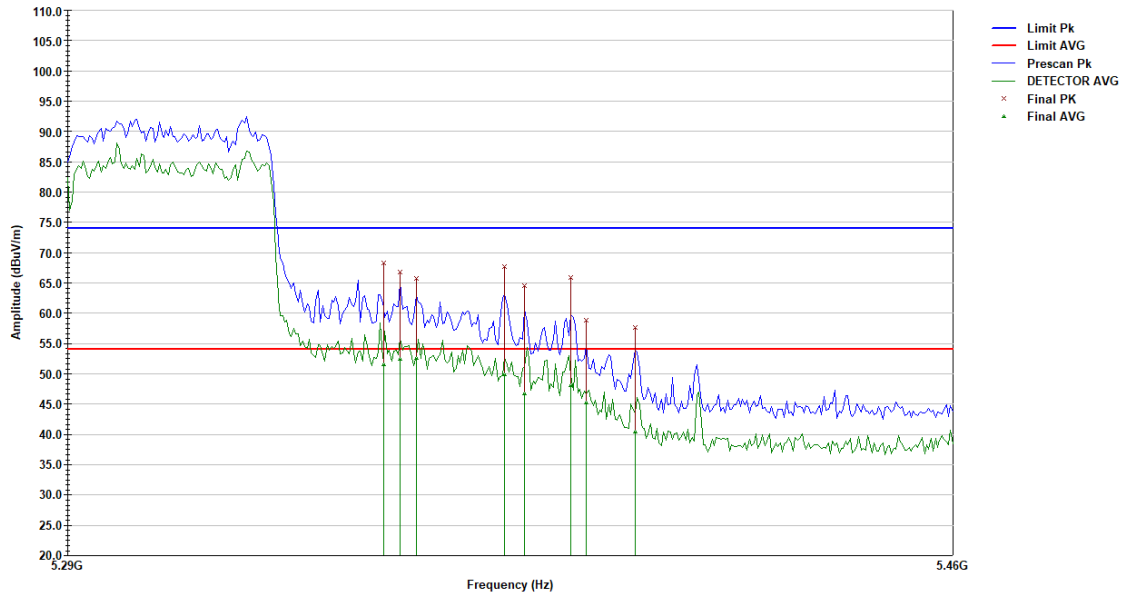
Model # - comma.ai

Test Mode - Tx mode, Upper Band-Edge

Operator - AG

Standard - FCC Class B

Comments - 5290MHz, 802.11ac80 VHT80, pwr 13, mcs0



5290 13 mcs0 RE Upper Band-Edge.til

Last Data Update 03:56:45 PM, Thursday, May 23, 2024

Peak Data

Freq. (MHz)	Final PK (dBuV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBuV/m)	Ant. Height (cm)	Azimuth (deg.)
5350	68.33	7.62	-5.67	74	381	51
5353.275	66.81	7.63	-7.19	74	400	66
5356.25	65.7	7.65	-8.3	74	400	84
5373.25	67.67	7.72	-6.33	74	335	110
5377.075	64.56	7.74	-9.44	74	400	35
5386.00001	65.93	7.77	-8.07	74	349	255
5388.975	58.85	7.78	-15.15	74	356	101
5398.32501	57.6	7.81	-16.4	74	400	281

Average

Freq. (MHz)	Final AVG (dBμV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
5350	52.06	0.57	7.62	-1.94	54	381	51
5353.275	52.97	0.57	7.63	-1.03	54	400	66
5356.25	53.19	0.57	7.65	-0.81	54	400	84
5373.25	50.39	0.57	7.72	-3.61	54	335	110
5377.075	47.23	0.57	7.74	-6.77	54	400	35
5386.00001	48.66	0.57	7.77	-5.34	54	349	255
5388.975	45.81	0.57	7.78	-8.19	54	356	101
5398.32501	40.89	0.57	7.81	-13.11	54	400	281

UNII2c: 802.11a NOHT

30 to 1000 MHz
Mid Channel – 5600MHz - both chains transmitting
Horizontal Polarization

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Horizontal QP

Customer / Model # - comma.ai / LightningHard SOM

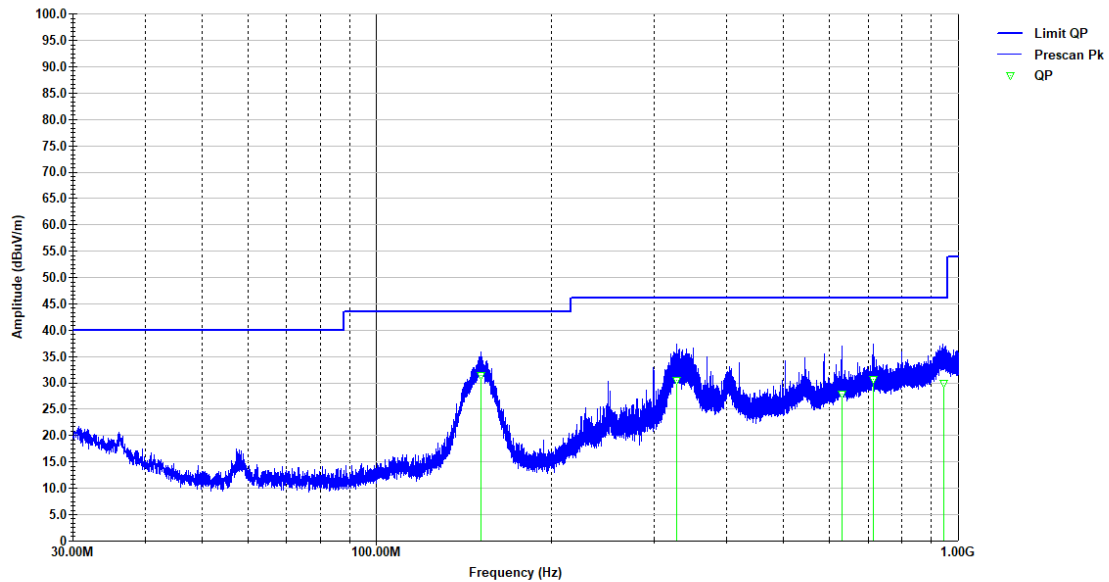
Serial # - N/A

Test Mode - TX99, ext. DC power supply

Operator - Alex C

Standard - FCC Class B

Comments - 5600MHz, 802.11a UNII2c NOHT, pwr 15, 9Mbps



5600 15 9 FCC 15.407 RE 30M-1GHz.ttl

Last Data Update 01:06:05 PM, Friday, March 22, 2024

Quasi-Peak Data

Freq. (MHz)	Final QP (dBuV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBuV/m)	Ant. Height (cm)	Azimuth (deg.)
151.098977	31.33	-27.49	-12.19	43.52	185	324
327.971189	30.43	-22.71	-15.59	46.02	100	-20
630.521019	27.78	-13.13	-18.24	46.02	100	259
716.244773	30.58	-11.91	-15.44	46.02	114	301
943.84373	29.94	-8.3	-16.08	46.02	130	26

Vertical Polarization

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Vertical QP

Customer / Model # - comma.ai / LightningHard SOM

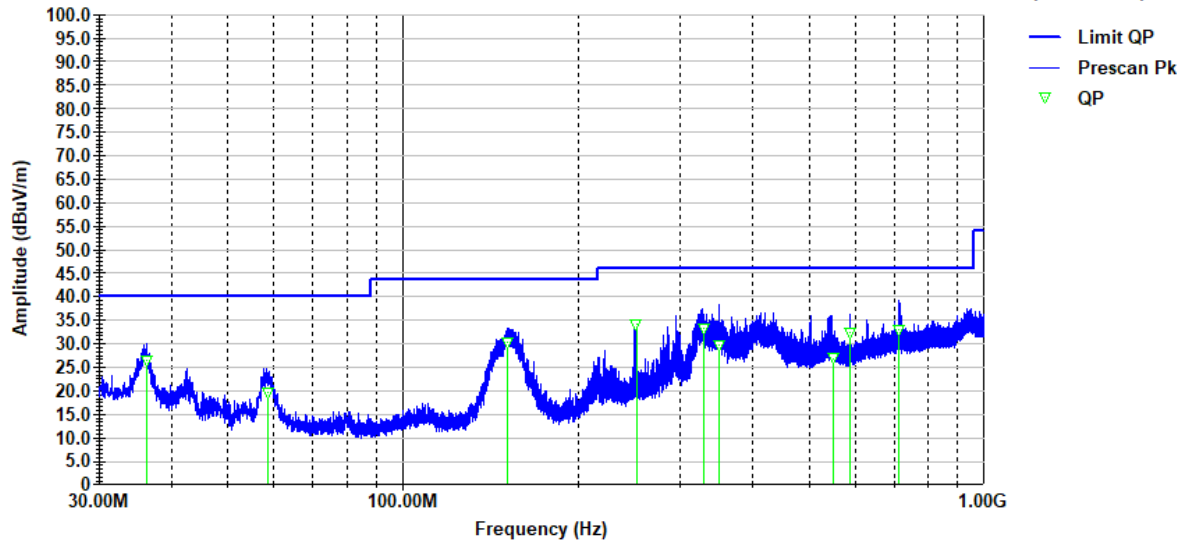
Serial # - N/A

Test Mode - TX99, ext. DC power supply

Operator - Alex C

Standard - FCC Class B

Comments - 5600MHz, 802.11a UNII2c NOHT, pwr 15, 9Mbps



5600 15 9 FCC 15-407 RE 30M-1GHz.til

Last Data Update 12:52:33 PM, Friday, March 22, 2024

Quasi-Peak Data

Freq. (MHz)	Final QP (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
36.218702	26.38	-24.84	-13.62	40	100	-20
58.505865	19.78	-30.46	-20.22	40	194	351
151.523434	30.21	-27.35	-13.31	43.52	178	222
251.984577	34.1	-24.28	-11.92	46.02	106	377
328.578475	33.16	-22.69	-12.86	46.02	187	52
349.038906	29.85	-21.09	-16.17	46.02	138	380
548.73192	26.9	-13.99	-19.12	46.02	106	220
587.926716	32.52	-14.74	-13.5	46.02	178	214
712.85166	32.89	-11.9	-13.13	46.02	100	194

1 to 18 GHz Low Channel – 5500MHz - both chains transmitting Horizontal Polarization

SGS NA, San Diego Regulatory Lab

Customer / Model # - comma.ai / LightningHard SOM

Radiated Emissions

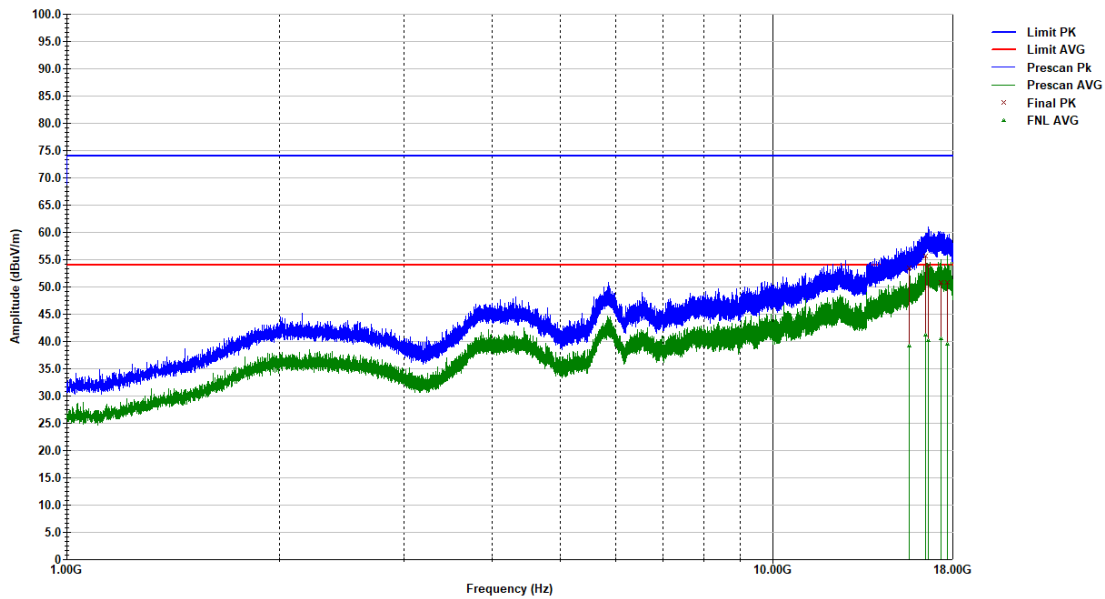
Test Mode - TX, 6GHz HPF

Horizontal AVG

Operator - AG

Standard - FCC Class B

Comments - 5500MHz, 802.11a NOHT, pwr 15, 18Mbps



5500 15 9 RE CISPR SW1A NC 3117 w lambda Ina AVG 1G-18G 06Feb2024.ttl

Last Data Update 08:44:12 PM, Monday, March 18, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
15594.46999	53.46	29.89	-20.54	74	380	338
16496.37544	55.73	33.09	-18.27	74	288	310
16595.9004	53.95	33.52	-20.05	74	280	313
17324.51766	50.73	32.45	-23.27	74	218	257
17685.80555	50.9	31.95	-23.1	74	400	74

Average

Freq. (MHz)	Final AVG (dBμV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
15594.46999	39.4	0.22	29.89	-14.6	54	380	338
16496.37544	41.34	0.22	33.09	-12.66	54	288	310
16595.9004	40.35	0.22	33.52	-13.65	54	280	313
17324.51766	40.68	0.22	32.45	-13.32	54	218	257
17685.80555	39.77	0.22	31.95	-14.23	54	400	74

Vertical Polarization

SGS NA, San Diego Regulatory Lab

Customer / Model # - comma.ai / LightningHard SOM

Radiated Emissions

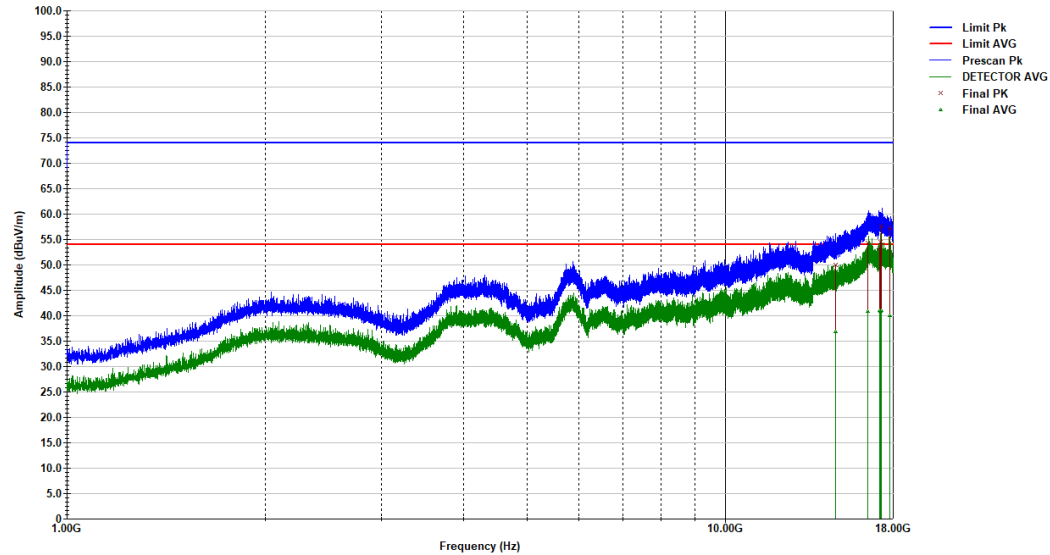
Test Mode - TX, 6GHz HPF

Operator - AG

Standard - FCC Class B

Comments - 5500MHz, 802.11a NOHT, pwr 15, 18Mbps

Vertical AVG



5500 15 9 RE CISPR SW1A NC 3117 w lambda lna AVG 1G-18G 06Feb2024.ttl

Last Data Update 08:27:56 PM, Monday, March 18, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
5444.65	49.83	7.93	-24.17	74	171	-10
5452.725	58.93	7.93	-15.07	74	400	1
5460.00001	59.95	7.93	-13.45	73.4	400	356
5462.07501	62.78	7.93	-5.22	68	400	366
5470.00001	65.99	7.93	-2.01	68	400	6

Average

Freq. (MHz)	Final AVG (dBμV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
5444.65	34.63	0.22	7.93	-19.37	54	171	-10
5452.725	38.68	0.22	7.93	-15.32	54	400	1
5460.00001	42.42	0.22	7.93	N/A	No AVG limit	400	356
5462.07501	49.57	0.22	7.93	N/A	No AVG limit	400	366
5470.00001	52.03	0.22	7.93	N/A	No AVG limit	400	6

Lower band edge falling to restricted band Horizontal Polarization

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Horizontal AVG

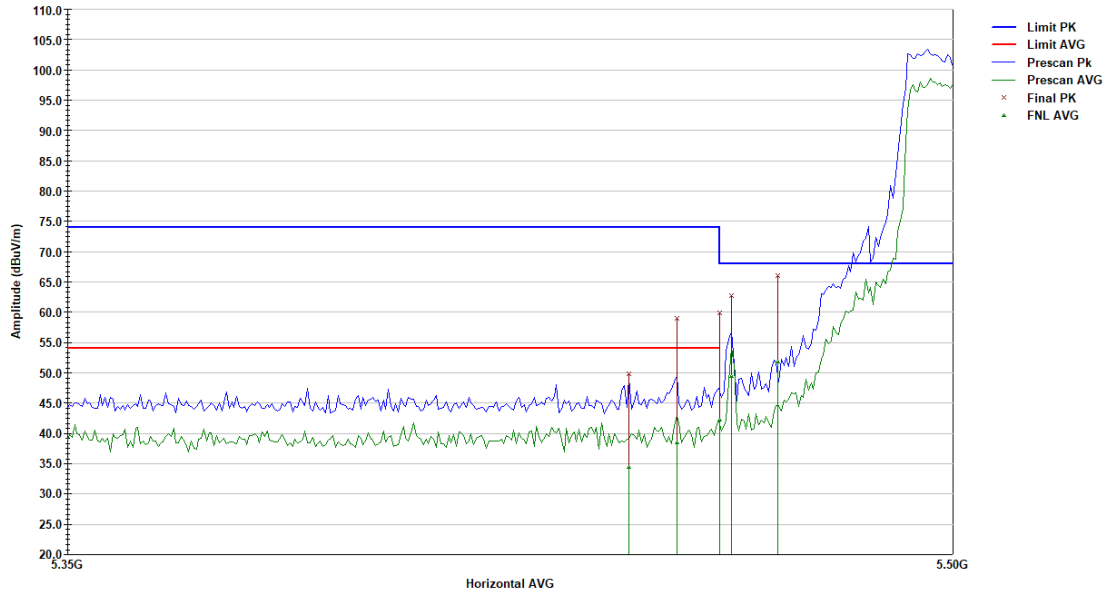
Model # - comma.ai

Test Mode - Tx mode, Lower Band-Edge

Operator - AG

Standard - FCC Class B

Comments - 5500MHz, 802.11a NOHT, pwr 15, 18Mbps



5500 15 18 RE Lower Band-Edge.ttl

Last Data Update 11:33:03 AM, Friday, May 24, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
5444.65	49.83	7.93	-24.17	74	171	-10
5452.725	58.93	7.93	-15.07	74	400	1
5460.00001	59.95	7.93	-13.45	73.4	400	356
5462.07501	62.78	7.93	-5.22	68	400	366
5470.00001	65.99	7.93	-2.01	68	400	6

Average

Freq. (MHz)	Final AVG (dBμV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
5444.65	33.29	0.11	7.75	-20.71	54	171	-10
5452.725	34.84	0.11	7.93	-19.16	54	400	1
5460.00001	37.82	0.11	7.93	-16.18	54	400	356
5462.07501	50.71	0.11	7.93	NAN	No AVG limit	400	366
5470.00001	47.09	0.11	7.93	NAN	No AVG limit	400	6

Vertical Polarization

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Vertical AVG

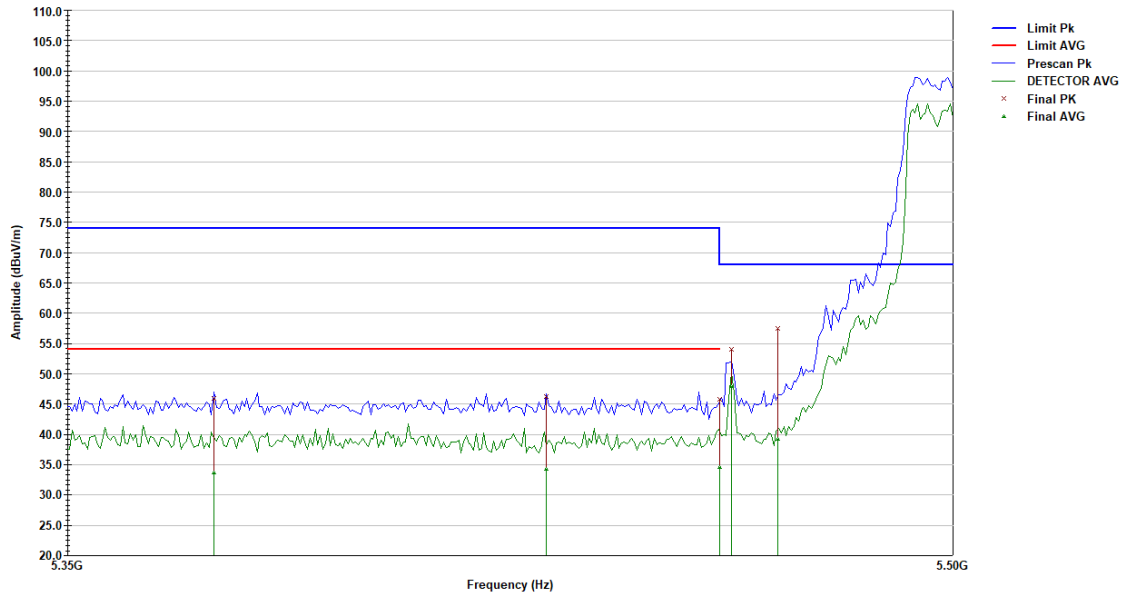
Model # - comma.ai

Test Mode - Tx mode, Lower Band-Edge

Operator - AG

Standard - FCC Class B

Comments - 5500MHz, 802.11a NOHT, pwr 15, 18Mbps



5500 15 18 RE Lower Band-Edge.ttl

Last Data Update 11:19:44 AM, Friday, May 24, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
5398.325	45.54	7.81	-28.46	74	150	313
5452.725	47.62	7.93	-26.38	74	311	103
5460.00001	47.46	7.93	-25.94	73.4	257	24
5462.075	54.07	7.93	-13.93	68	335	247
5470.00001	48.1	7.93	-19.9	68	150	141

Average

Freq. (MHz)	Final AVG (dBμV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
5398.325	34.26	0.11	7.81	-19.74	54	150	313
5452.725	34.94	0.11	7.93	-19.06	54	311	103
5460.00001	35.12	0.11	7.93	N/A	No AVG limit	257	24
5462.075	48.25	0.11	7.93	N/A	No AVG limit	335	247
5470.00001	34.83	0.11	7.93	N/A	No AVG limit	150	141

Mid Channel – 5600MHz - both chains transmitting Horizontal Polarization

SGS NA, San Diego Regulatory Lab

Customer / Model # - comma.ai / LightningHard SOM

Radiated Emissions

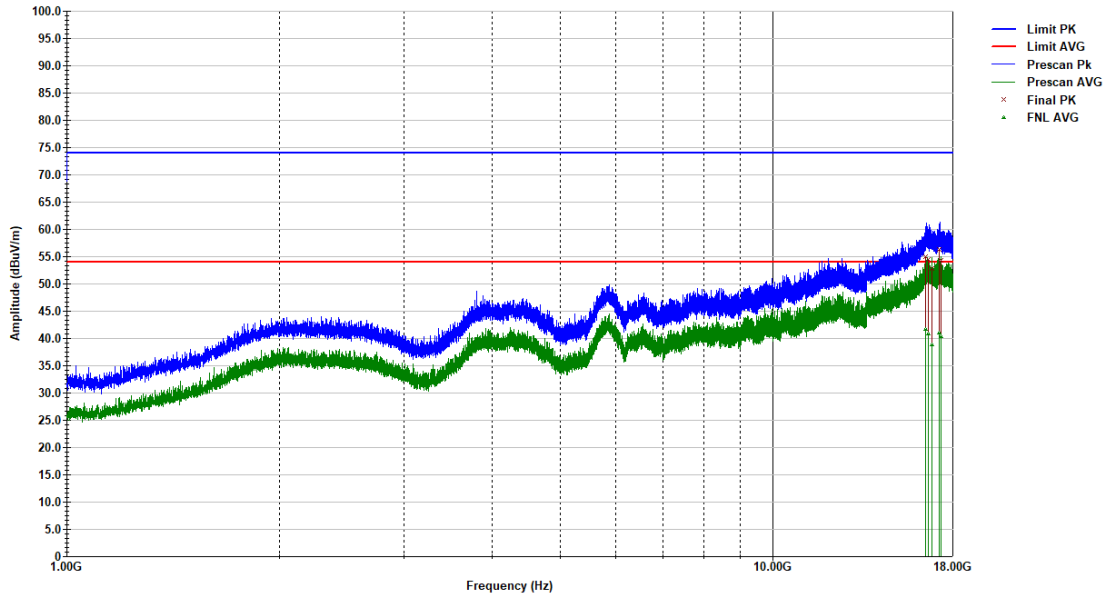
Test Mode - TX, 6GHz HPF

Horizontal AVG

Operator - AG

Standard - FCC Class B

Comments - 5600MHz, 802.11a NOHT, pwr 15, 9Mbps



5600 15 9 RE CISPR SW1A NC 3117 w lambda Ina AVG 1G-18G 06Feb2024.ttl

Last Data Update 09:21:29 PM, Monday, March 18, 2024

Peak Data

Freq. (MHz)	Final PK (dBuV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBuV/m)	Ant. Height (cm)	Azimuth (deg.)
16486.83246	54.93	33.04	-19.07	74	400	45
16598.18401	54.52	33.53	-19.48	74	349	-2
16810.66096	52.81	33.53	-21.19	74	295	69
17244.75506	56.24	32.68	-17.76	74	150	240
17344.5815	54.39	32.4	-19.61	74	400	201

Average

Freq. (MHz)	Final AVG (dBuV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBuV/m)	Ant. Height (cm)	Azimuth (deg.)
13604.04895	41.73	0.11	33.04	-12.27	54	400	45
15692.77282	40.9	0.11	33.53	-13.1	54	349	-2
16559.19102	38.9	0.11	33.53	-15.1	54	295	69
17311.37149	41.04	0.11	32.68	-12.96	54	150	240
17760.50219	40.47	0.11	32.4	-13.53	54	400	201

Vertical Polarization

SGS NA, San Diego Regulatory Lab

Customer / Model # - comma.ai / LightningHard SOM

Radiated Emissions

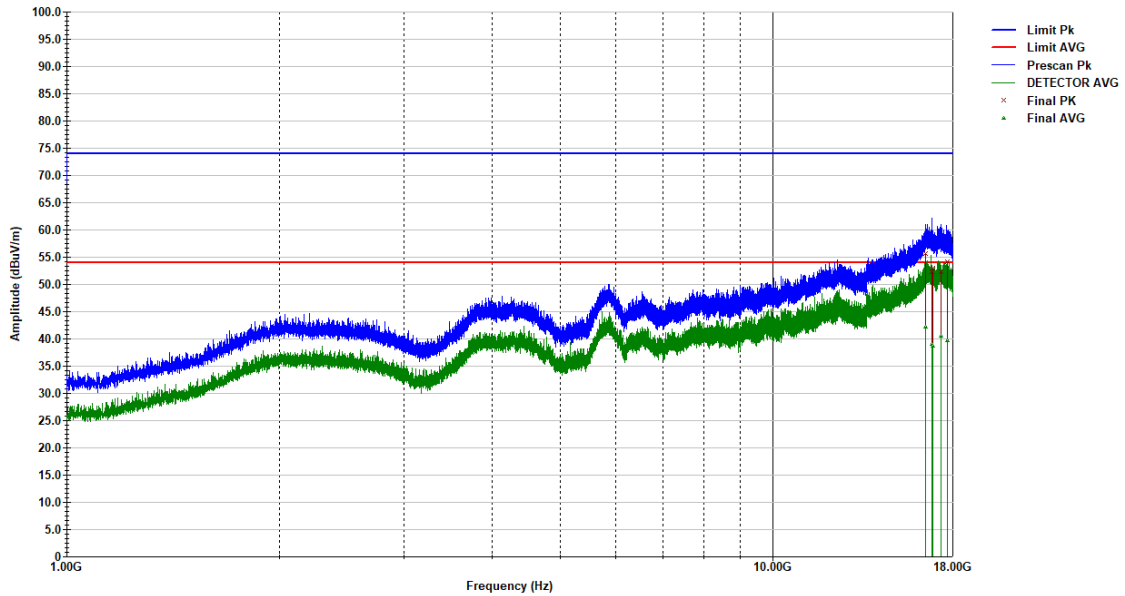
Test Mode - TX, 6GHz HPF

Operator - AG

Vertical AVG

Standard - FCC Class B

Comments - 5600MHz, 802.11a NOHT, pwr 15, 9Mbps



5600 15 9 RE CISPR SW1A NC 3117 w lambda Ina AVG 1G-18G 06Feb2024.ttl

Last Data Update 09:07:42 PM, Monday, March 18, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
16482.06265	55.72	33.02	-18.28	74	330	380
16833.2244	52.39	33.51	-21.61	74	226	-4
16847.3624	52.99	33.5	-21.01	74	233	276
17334.8924	52.32	32.42	-21.68	74	257	307
17696.86475	54.22	31.94	-19.78	74	328	380

Average

Freq. (MHz)	Final AVG (dBμV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
16482.06265	42.2	0.11	33.02	-11.8	54	330	380
16833.2244	39.06	0.11	33.51	-14.94	54	226	-4
16847.3624	38.73	0.11	33.5	-15.27	54	233	276
17334.8924	40.68	0.11	32.42	-13.32	54	257	307
17696.86475	39.86	0.11	31.94	-14.14	54	328	380

High Channel – 5700MHz - both chains transmitting Horizontal Polarization

SGS NA, San Diego Regulatory Lab

Customer / Model # - comma.ai / LightningHard SOM

Radiated Emissions

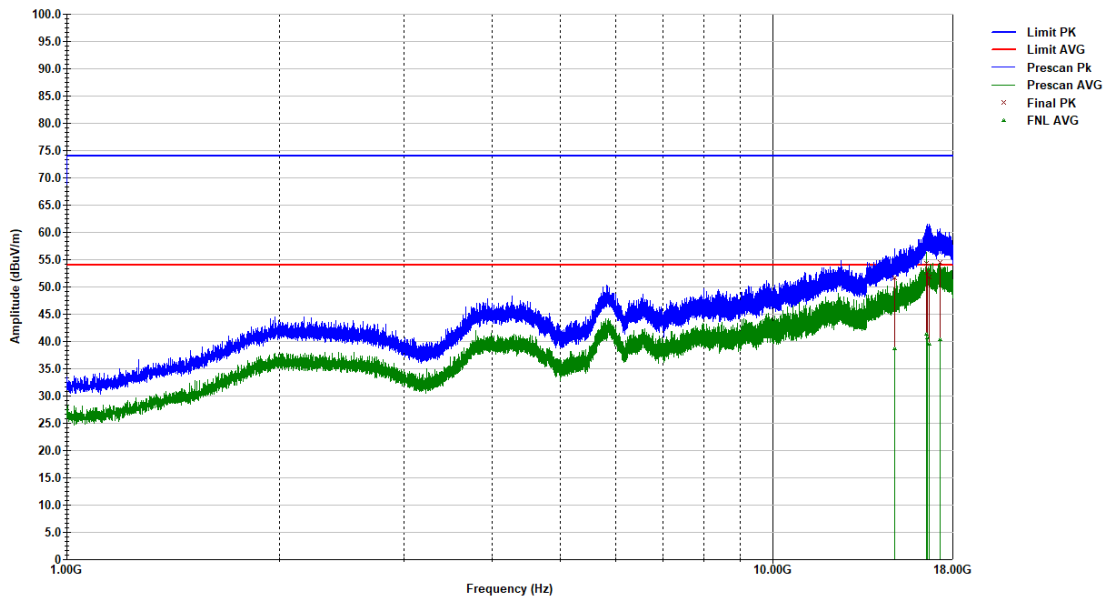
Test Mode - TX, 6GHz HPF

Horizontal AVG

Operator - AG

Standard - FCC Class B

Comments - 5700MHz, 802.11a NOHT, pwr 15, 9Mbps



5700 15 9 RE CISPR SW1A NC 3117 w lambda Ina AVG 1G-18G 06Feb2024.ttl

Last Data Update 10:10:58 PM, Monday, March 18, 2024

Peak Data

Freq. (MHz)	Final PK (dBuV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBuV/m)	Ant. Height (cm)	Azimuth (deg.)
14911.46467	51.67	28.25	-22.33	74	248	88
16511.32184	54.35	33.15	-19.65	74	233	346
16559.25398	52.73	33.36	-21.27	74	349	312
16670.96385	51.76	33.62	-22.24	74	311	115
17290.60488	54.5	32.54	-19.5	74	287	269

Average

Freq. (MHz)	Final AVG (dBuV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBuV/m)	Ant. Height (cm)	Azimuth (deg.)
14911.46467	38.83	0.11	28.25	-15.17	54	248	88
16511.32184	41.42	0.11	33.15	-12.58	54	233	346
16559.25398	40.78	0.11	33.36	-13.22	54	349	312
16670.96385	39.63	0.11	33.62	-14.37	54	311	115
17290.60488	40.39	0.11	32.54	-13.61	54	287	269

Vertical Polarization

SGS NA, San Diego Regulatory Lab

Customer / Model # - comma.ai / LightningHard SOM

Radiated Emissions

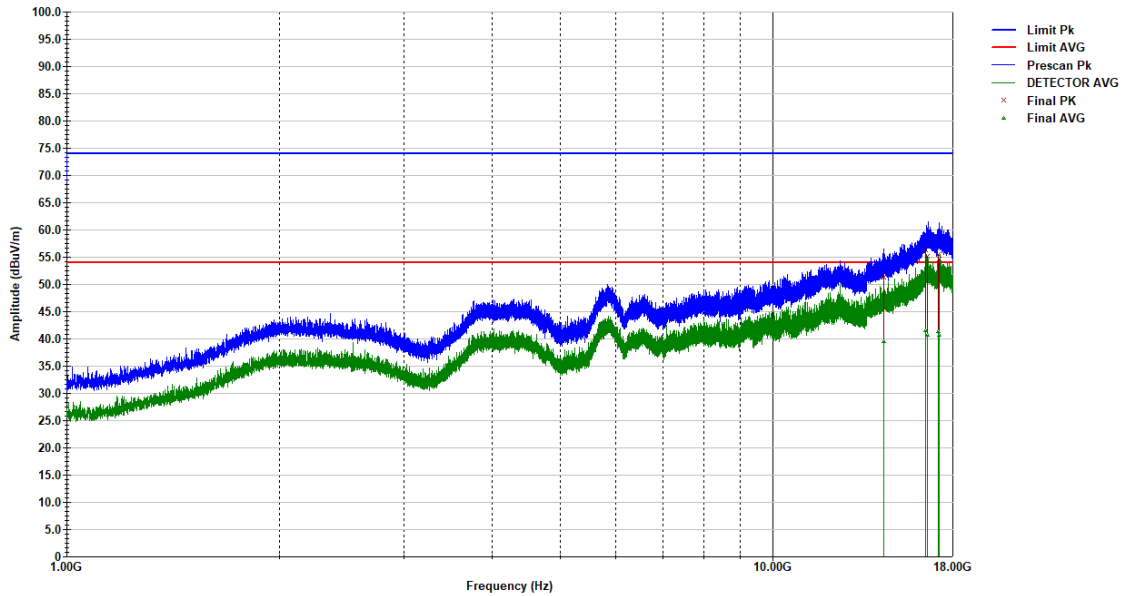
Test Mode - TX, 6GHz HPF

Operator - AG

Vertical AVG

Standard - FCC Class B

Comments - 5700MHz, 802.11a NOHT, pwr 15, 9Mbps



5700 15 9 RE CISPR SW1A NC 3117 w lambda Ina AVG 1G-18G 06Feb2024.ttl

Last Data Update 09:55:57 PM, Monday, March 18, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
14390.6344	51.26	27.14	-22.74	74	382	237
16473.84935	56.33	32.98	-17.67	74	171	355
16573.8585	55.21	33.42	-18.79	74	234	313
17167.26625	55.44	32.79	-18.56	74	297	108
17236.7455	54.71	32.7	-19.29	74	171	351

Average

Freq. (MHz)	Final AVG (dBμV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
14390.6344	39.54	0.11	27.14	-14.46	54	382	237
16473.84935	41.55	0.11	32.98	-12.45	54	171	355
16573.8585	40.79	0.11	33.42	-13.21	54	234	313
17167.26625	41.39	0.11	32.79	-12.61	54	297	108
17236.7455	40.8	0.11	32.7	-13.2	54	171	351

Upper band edge falling to restricted band Horizontal Polarization

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Horizontal AVG

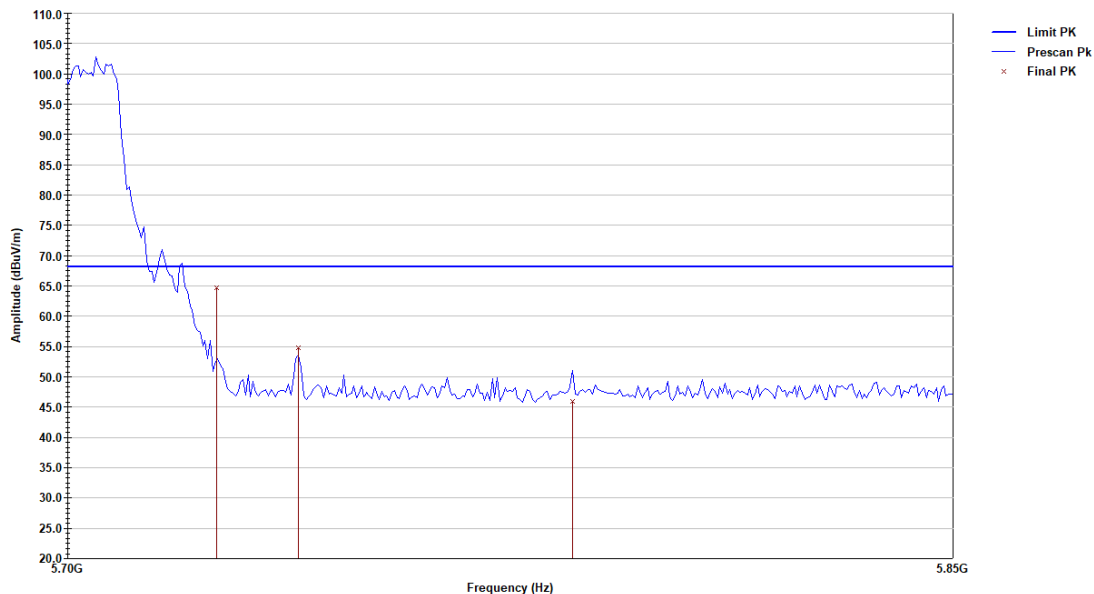
Model # - comma.ai

Test Mode - Tx mode, Upper Band-Edge

Operator - AG

Standard - FCC Class B

Comments - 5700MHz, 802.11a NOHT, pwr 15, 9Mbps



5700 15 9 RE Upper Band-Edge.til

Last Data Update 12:12:11 PM, Friday, May 24, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
5725.00001	64.67	9.15	-3.53	68.2	386	359
5738.75	54.78	9.15	-13.42	68.2	385	359
5785.07501	45.96	9.21	-22.24	68.2	248	122

No Average limit is defined for the upper band edge.

Vertical Polarization

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Vertical AVG

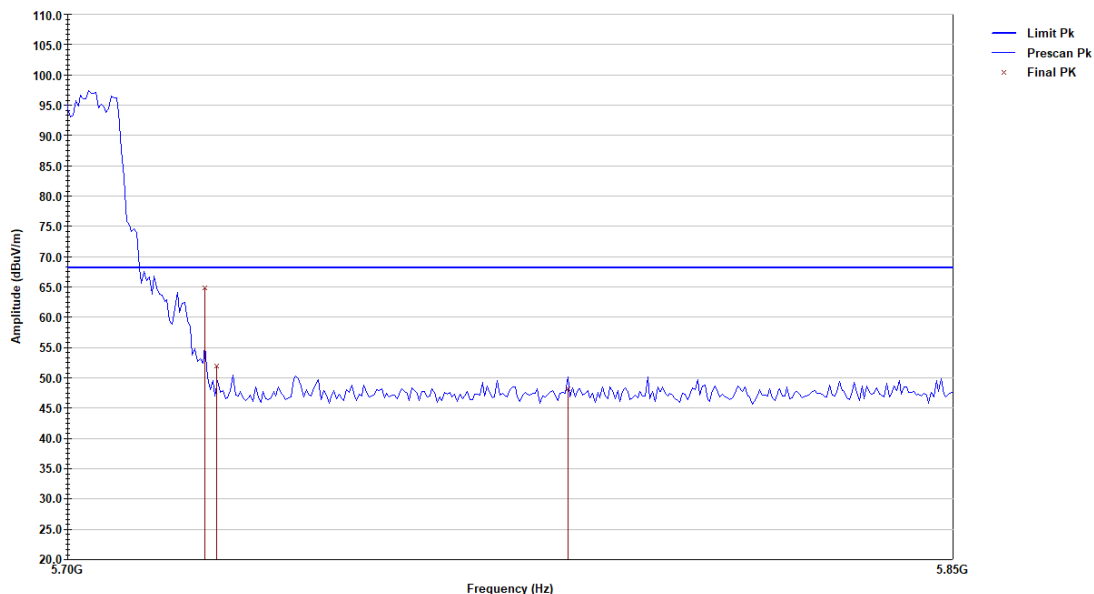
Model # - comma.ai

Test Mode - Tx mode, Upper Band-Edge

Operator - AG

Standard - FCC Class B

Comments - 5700MHz, 802.11a NOHT, pwr 15, 9Mbps



5700 15 9 RE Upper Band-Edge.til

Last Data Update 11:59:52 AM, Friday, May 24, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
5723.02501	64.9	9.15	-3.3	68.2	400	122
5725	52.01	9.15	-16.19	68.2	381	110
5784.22501	48.15	9.21	-20.05	68.2	240	286

No Average limit is defined for the upper band edge.

UNII2c: 802.11n20

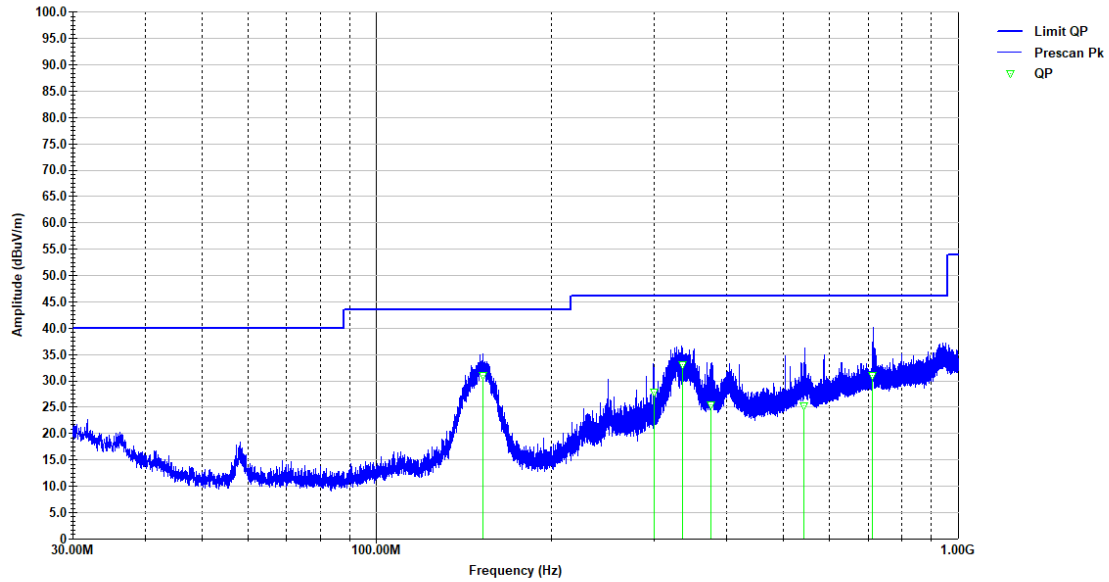
30 to 1000 MHz Mid Channel – 5600MHz - both chains transmitting Horizontal Polarization

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Horizontal QP

Customer / Model # - comma.ai / LightningHard SOM
Serial # - N/A
Test Mode - TX99, ext. DC power supply
Operator - Alex C
Standard - FCC Class B
Comments - 5600MHz, 802.11n20 UNII 2c HT20, pwr 13,
mcs0



5600 13 mcs0 FCC 15.407 RE 30M-1GHz.til

Last Data Update 02:11:50 PM, Friday, March 22, 2024

Quasi-Peak Data

Freq. (MHz)	Final QP (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
152.310642	31.09	-27.1	-12.43	43.52	208	342
299.693065	27.76	-23.5	-18.26	46.02	100	308
336.064902	33.13	-22.2	-12.89	46.02	265	316
375.954155	25.38	-20.14	-20.64	46.02	351	151
543.238135	25.24	-13.85	-20.78	46.02	248	86
713.369979	31.07	-11.9	-14.95	46.02	130	293

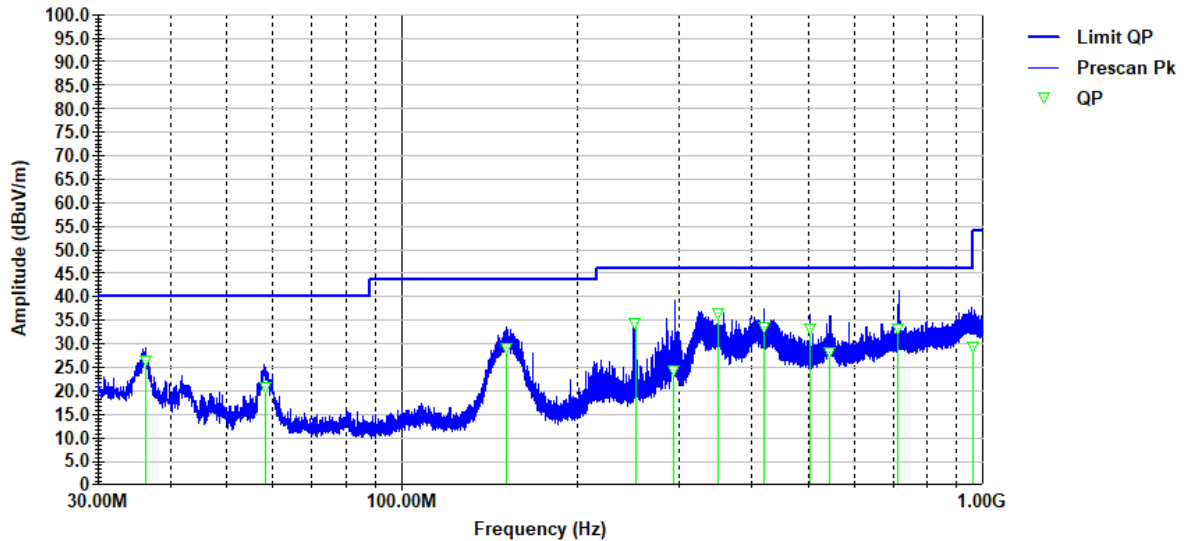
Vertical Polarization

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Vertical QP

Customer / Model # - comma.ai / LightningHard SOM
Serial # - N/A
Test Mode - TX99, ext. DC power supply
Operator - Alex C
Standard - FCC Class B
Comments - 5600MHz, 802.11n20 UNII 2c HT20, pwr 13, mcs0



5600 13 mcs0 FCC 15.407 RE 30M-1GHz.til

Last Data Update 01:55:13 PM, Friday, March 22, 2024

Quasi-Peak Data

Freq. (MHz)	Final QP (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
36.182831	26.55	-24.82	-13.45	40	146	18
58.250051	20.94	-30.47	-19.06	40	122	380
151.448522	29.18	-27.38	-14.34	43.52	100	219
252.014577	34.43	-24.27	-11.59	46.02	100	362
293.588286	24.5	-23.91	-21.52	46.02	101	319
350.02	36.56	-21.02	-9.46	46.02	131	366
419.946815	33.57	-18.22	-12.45	46.02	122	218
503.984726	33.41	-16.59	-12.61	46.02	100	-20
545.212214	28.22	-13.83	-17.8	46.02	106	188
713.466494	33.27	-11.9	-12.75	46.02	100	240
957.942106	29.38	-8.69	-16.64	46.02	130	80

1 to 18 GHz Low Channel – 5500MHz - both chains transmitting Horizontal Polarization

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Horizontal AVG

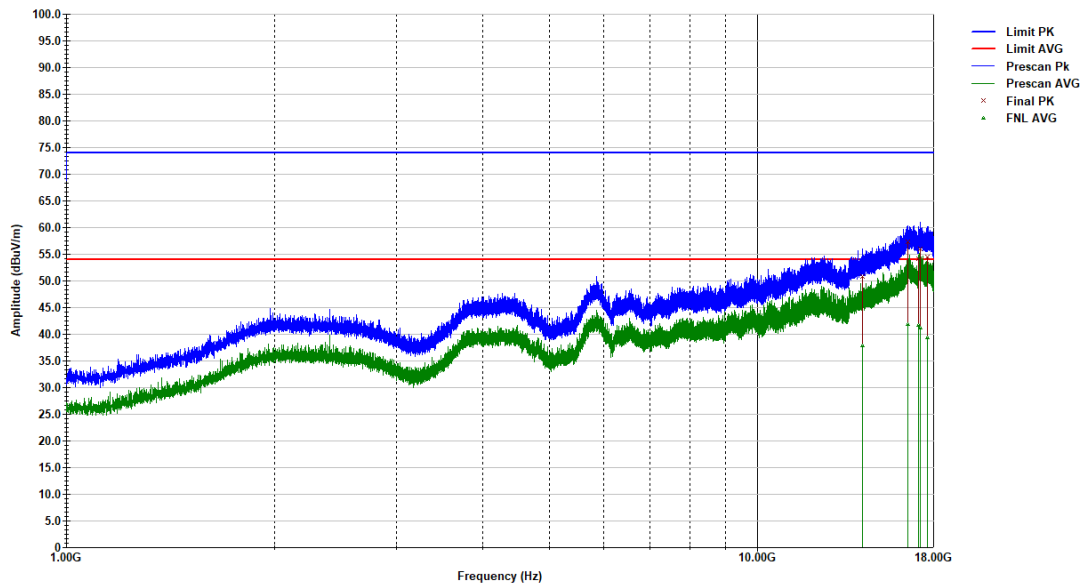
Customer / Model # - comma.ai / LightningHard SOM

Test Mode - TX, 6GHz HPF

Operator - AG

Standard - FCC Class B

Comments - 5500MHz, 802.11n20 HT20, pwr 13, mcs0



5500 13 mcs0 RE CISPR SW1A NC 3117 w lambda Ina AVG 1G-18G 06Feb2024.ttl

Last Data Update 04:13:21 PM, Tuesday, March 19, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
14205.27869	50.75	26.92	-23.25	74	302	239
16524.17141	57.24	33.21	-16.76	74	321	258
17108.81944	54.23	32.77	-19.77	74	240	232
17217.5393	56.03	32.76	-17.97	74	294	143
17656.69362	54.53	31.99	-19.47	74	150	143

Average

Freq. (MHz)	Final AVG (dBμV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
14205.27869	37.75	0	26.92	-16.25	54	302	239
16524.17141	41.8	0	33.21	-12.2	54	321	258
17108.81944	41.64	0	32.77	-12.36	54	240	232
17217.5393	41.11	0	32.76	-12.89	54	294	143
17656.69362	39.36	0	31.99	-14.64	54	150	143

Vertical Polarization

SGS NA, San Diego Regulatory Lab

Customer / Model # - comma.ai / LightningHard SOM

Radiated Emissions

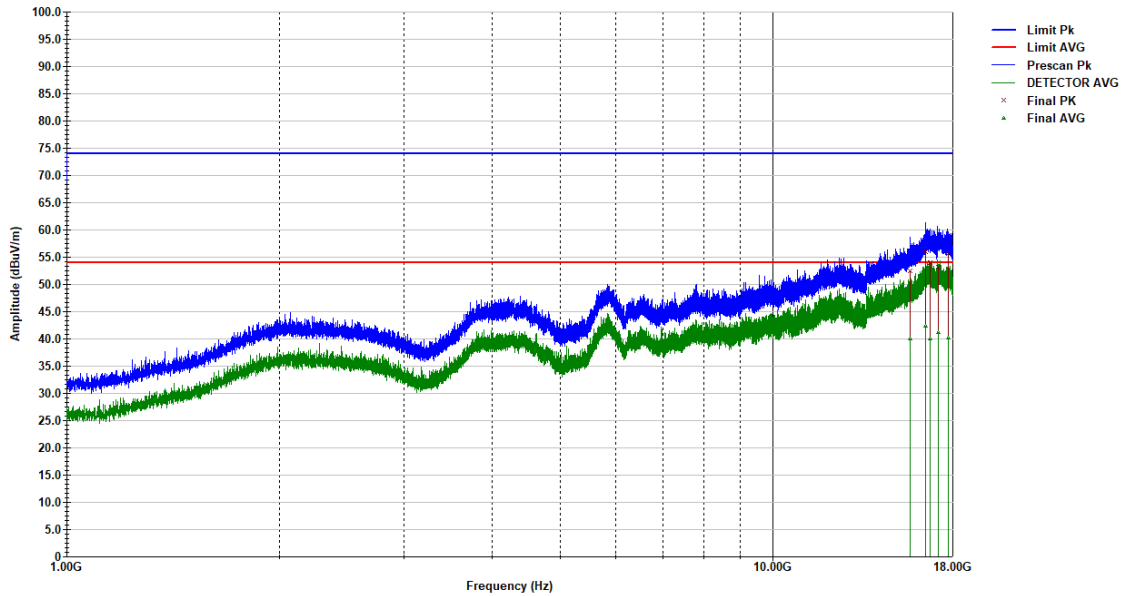
Test Mode - TX, 6GHz HPF

Operator - AG

Vertical AVG

Standard - FCC Class B

Comments - 5500MHz, 802.11n20 HT20, pwr 13, mcs0



5500 13 mcs0 RE CISPR SW1A NC 3117 w lambda lna AVG 1G-18G 06Feb2024.ttl

Last Data Update 03:56:36 PM, Tuesday, March 19, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
15672.70035	52.46	30.05	-21.54	74	249	148
16473.2056	56.03	32.98	-17.97	74	150	280
16724.7045	54.06	33.59	-19.94	74	304	97
17144.85075	53.13	32.79	-20.87	74	358	84
17747.98985	55.6	31.88	-18.4	74	241	283

Average

Freq. (MHz)	Final AVG (dBμV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
15672.70035	39.91	0	30.05	-14.09	54	249	148
16473.2056	42.4	0	32.98	-11.6	54	150	280
16724.7045	39.99	0	33.59	-14.01	54	304	97
17144.85075	41.2	0	32.79	-12.8	54	358	84
17747.98985	40.21	0	31.88	-13.79	54	241	283

Lower band edge falling to restricted band Horizontal Polarization

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Horizontal AVG

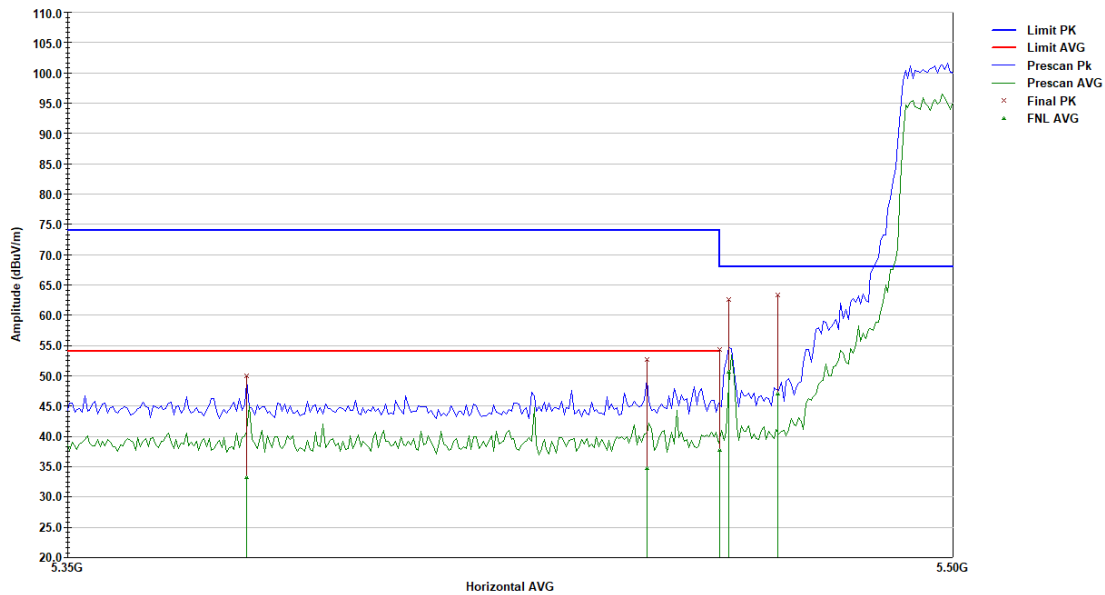
Model # - comma.ai

Test Mode - Tx mode, Lower Band-Edge

Operator - AG

Standard - FCC Class B

Comments - 5500MHz, 802.11n20 HT20, pwr 13, mcs3



5500 13 mcs3 RE Lower Band-Edge.ttl

Last Data Update 12:58:42 PM, Friday, May 24, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
5380.05	50	7.75	-24	74	334	-6
5447.62501	52.64	7.93	-21.36	74	247	340
5460	54.3	7.93	-19.7	74	163	370
5461.65	62.53	7.93	-5.47	68	325	5
5470	63.39	7.93	-4.61	68	400	-2

Average

Freq. (MHz)	Final AVG (dBμV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
5380.05	33.7	0.52	7.75	-20.3	54	334	-6
5447.62501	35.25	0.52	7.93	-18.75	54	247	340
5460	38.23	0.52	7.93	-15.77	54	163	370
5461.65	51.12	0.52	7.93	N/A	No AVG limit	325	5
5470	47.5	0.52	7.93	N/A	No AVG limit	400	-2

Vertical Polarization

SGS NA, San Diego Regulatory Lab

Model # - comma.ai

Radiated Emissions

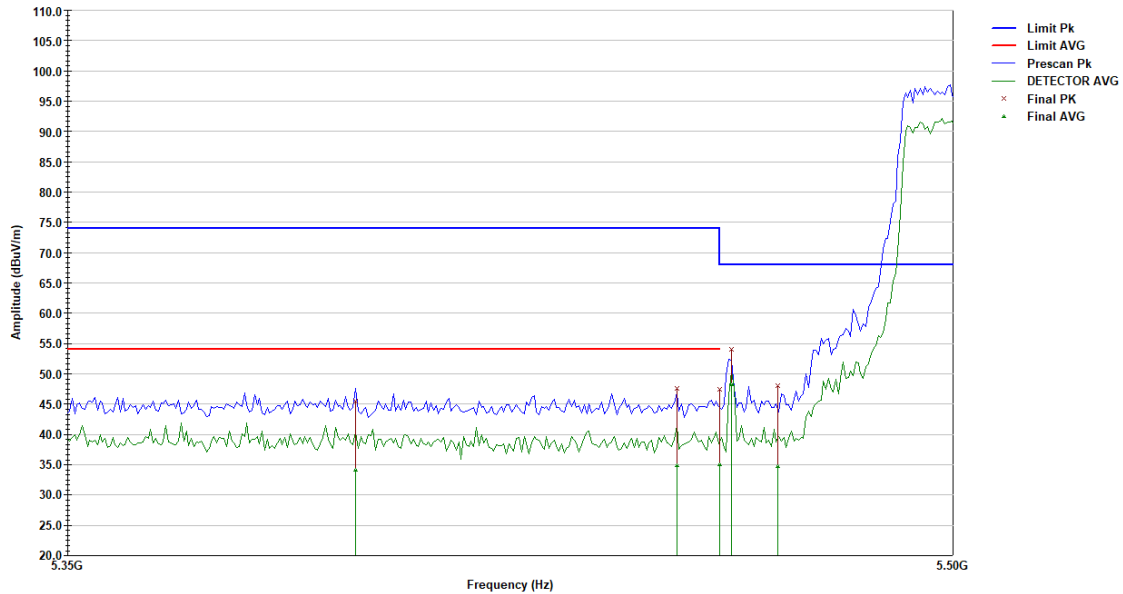
Test Mode - Tx mode, Lower Band-Edge

Operator - AG

Vertical AVG

Standard - FCC Class B

Comments - 5500MHz, 802.11n20 HT20, pwr 13, mcs3



5500 13 mcs3 RE Lower Band-Edge.ttl

Last Data Update 12:46:02 PM, Friday, May 24, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
5398.325	45.54	7.81	-28.46	74	150	313
5452.725	47.62	7.93	-26.38	74	311	103
5460.00001	47.46	7.93	-25.94	73.4	257	24
5462.075	54.07	7.93	-13.93	68	335	247
5470.00001	48.1	7.93	-19.9	68	150	141

Average

Freq. (MHz)	Final AVG (dBμV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
5398.325	34.67	0.52	7.81	-19.33	54	150	313
5452.725	35.35	0.52	7.93	-18.65	54	311	103
5460.00001	35.53	0.52	7.93	N/A	No AVG limit	257	24
5462.075	48.66	0.52	7.93	N/A	No AVG limit	335	247
5470.00001	35.24	0.52	7.93	N/A	No AVG limit	150	141

Mid Channel – 5600MHz - both chains transmitting Horizontal Polarization

SGS NA, San Diego Regulatory Lab

Customer / Model # - comma.ai / LightningHard SOM

Radiated Emissions

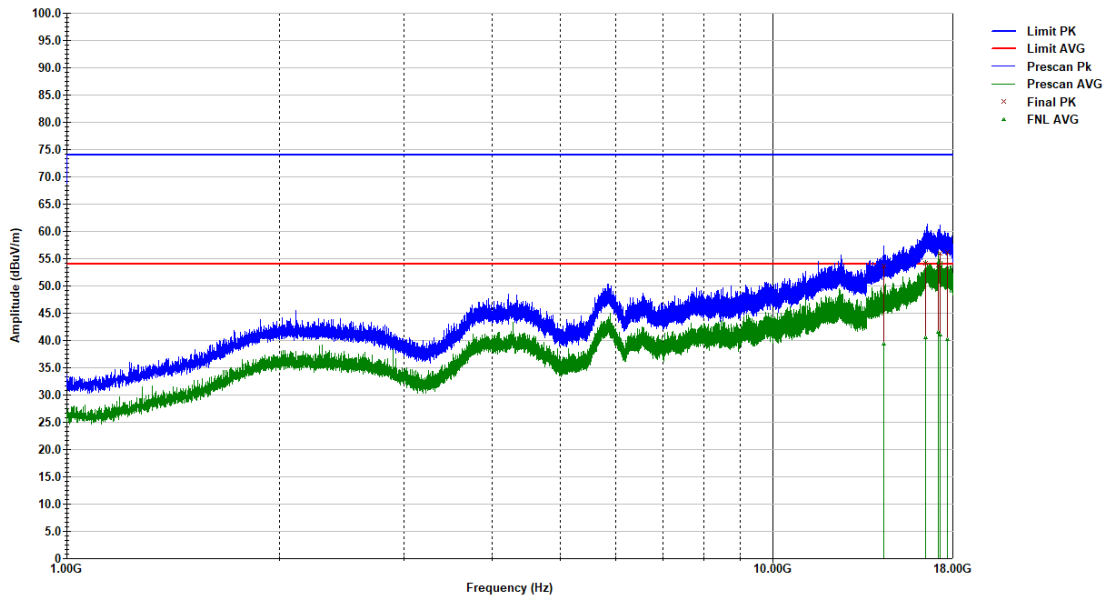
Test Mode - TX, 6GHz HPF

Horizontal AVG

Operator - AG

Standard - FCC Class B

Comments - 5600MHz, 802.11n20 HT20, pwr 13, mcs0



5600 13 mcs0 RE CISPR SW1A NC 3117 w lambda lna AVG 1G-18G 06Feb2024.ttl

Last Data Update 04:58:30 PM, Tuesday, March 19, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
14385.87434	53.63	27.14	-20.37	74	333	296
16446.80499	54.22	32.86	-19.78	74	224	144
17179.58204	53.84	32.8	-20.16	74	271	372
17248.374	56.05	32.67	-17.95	74	332	232
17708.8945	56.14	31.93	-17.86	74	363	142

Average

Freq. (MHz)	Final AVG (dBμV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
14385.87434	39.39	0	27.14	-14.61	54	333	296
16446.80499	40.42	0	32.86	-13.58	54	224	144
17179.58204	41.44	0	32.8	-12.56	54	271	372
17248.374	41.02	0	32.67	-12.98	54	332	232
17708.8945	40.13	0	31.93	-13.87	54	363	142

Vertical Polarization

SGS NA, San Diego Regulatory Lab

Customer / Model # - comma.ai / LightningHard SOM

Radiated Emissions

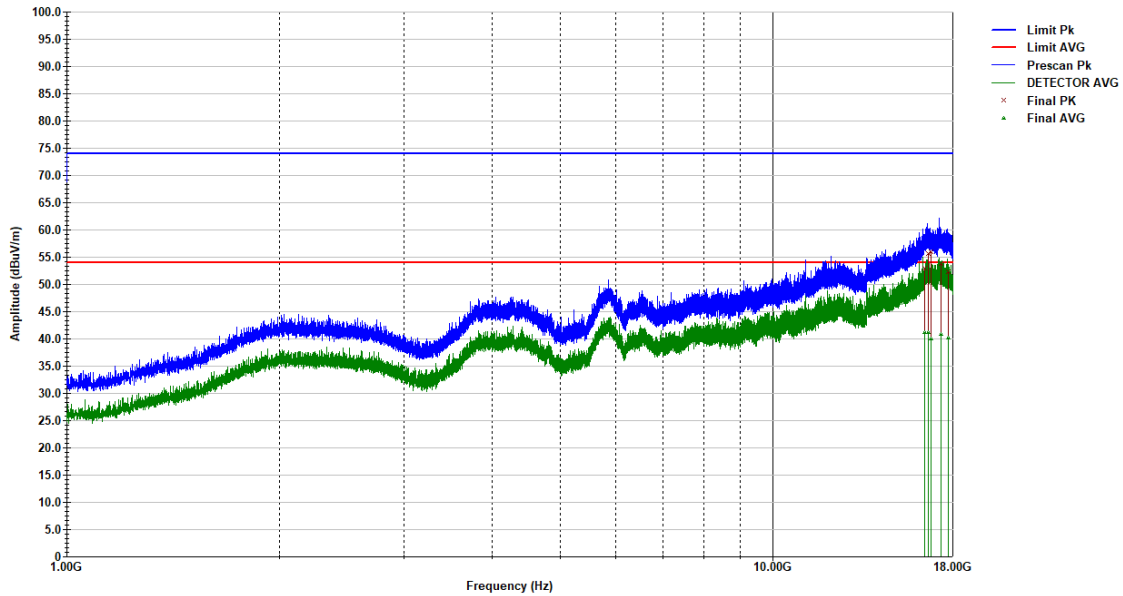
Test Mode - TX, 6GHz HPF

Operator - AG

Vertical AVG

Standard - FCC Class B

Comments - 5600MHz, 802.11n20 HT20, pwr 13, mcs0



5600 13 mcs0 RE CISPR SW1A NC 3117 w lambda lna AVG 1G-18G 06Feb2024.ttl

Last Data Update 04:45:09 PM, Tuesday, March 19, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
16397.2986	52.96	32.63	-21.04	74	372	358
16631.84225	55.61	33.63	-18.39	74	225	55
16759.391	56.06	33.57	-17.94	74	280	223
17297.5165	53.89	32.52	-20.11	74	210	144
17718.34925	52.3	31.92	-21.7	74	287	182

Average

Freq. (MHz)	Final AVG (dBμV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
16397.2986	41.22	0	32.63	-12.78	54	372	358
16631.84225	41.08	0	33.63	-12.92	54	225	55
16759.391	40.06	0	33.57	-13.94	54	280	223
17297.5165	40.81	0	32.52	-13.19	54	210	144
17718.34925	40.25	0	31.92	-13.75	54	287	182

High Channel – 5700MHz - both chains transmitting Horizontal Polarization

SGS NA, San Diego Regulatory Lab

Customer / Model # - comma.ai / LightningHard SOM

Radiated Emissions

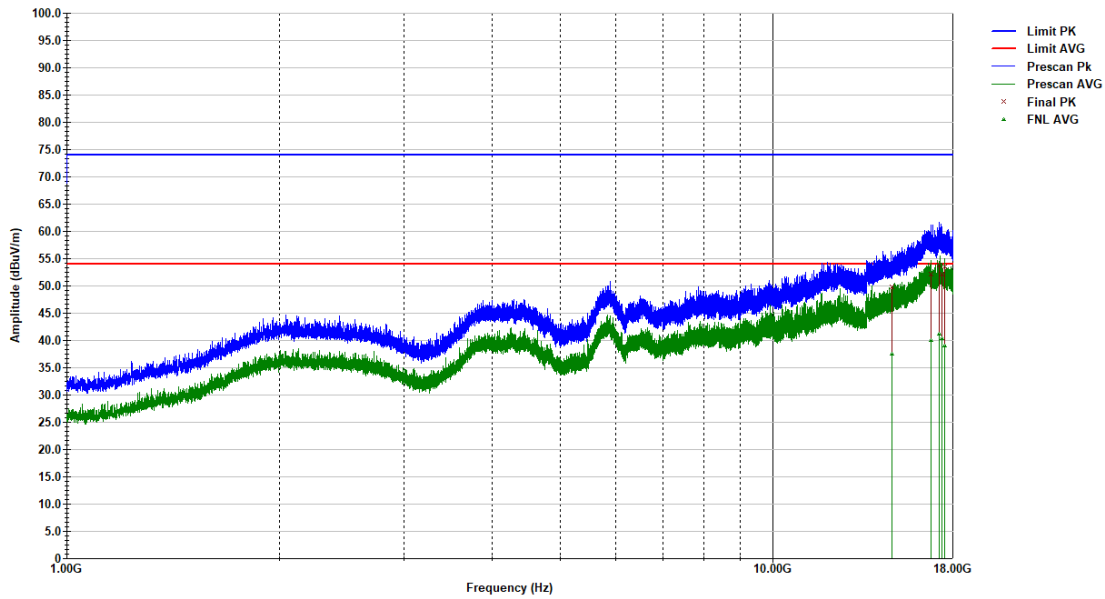
Test Mode - TX, 6GHz HPF

Horizontal AVG

Operator - AG

Standard - FCC Class B

Comments - 5700MHz, 802.11n20 HT20, pwr 13, mcs8



5700 13 mcs8 CISPR SW1A NC 3117 w lambda lna AVG 1G-18G 06Feb2024.ttl

Last Data Update 05:41:08 PM, Tuesday, March 19, 2024

Peak Data

Freq. (MHz)	Final PK (dBuV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBuV/m)	Ant. Height (cm)	Azimuth (deg.)
14736.81391	49.77	27.87	-24.23	74	271	255
16748.62475	52.16	33.58	-21.84	74	286	229
17224.09015	53.75	32.74	-20.25	74	255	95
17372.3145	52.12	32.33	-21.88	74	271	306
17511.8948	53.48	32.11	-20.52	74	400	121

Average

Freq. (MHz)	Final AVG (dBuV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBuV/m)	Ant. Height (cm)	Azimuth (deg.)
14736.81391	37.66	0.16	27.87	-16.34	54	271	255
16748.62475	40.15	0.16	33.58	-13.85	54	286	229
17224.09015	41.3	0.16	32.74	-12.7	54	255	95
17372.3145	40.55	0.16	32.33	-13.45	54	271	306
17511.8948	39.13	0.16	32.11	-14.87	54	400	121

Vertical Polarization

SGS NA, San Diego Regulatory Lab

Customer / Model # - comma.ai / LightningHard SOM

Radiated Emissions

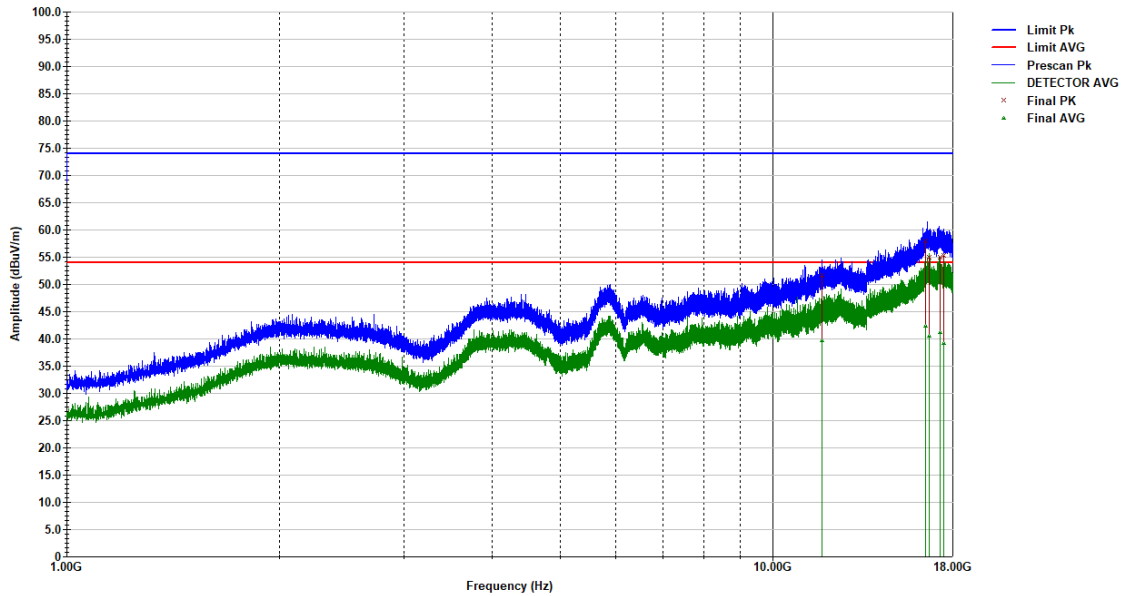
Test Mode - TX, 6GHz HPF

Operator - AG

Standard - FCC Class B

Comments - 5700MHz, 802.11n20 HT20, pwr 13, mcs8

Vertical AVG



5700 13 mcs8 CISPR SW1A NC 3117 w lambda Ina AVG 1G-18G 06Feb2024.ttl

Last Data Update 05:24:02 PM, Tuesday, March 19, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
11732.4715	51.58	24.69	-22.42	74	400	125
16483.33675	57.91	33.03	-16.09	74	210	287
16660.13525	54.95	33.62	-19.05	74	380	-7
17262.38035	55.03	32.63	-18.97	74	273	58
17454.54765	55.29	32.16	-18.71	74	272	310

Average

Freq. (MHz)	Final AVG (dBμV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
11732.4715	39.88	0.16	24.69	-14.12	54	400	125
16483.33675	42.44	0.16	33.03	-11.56	54	210	287
16660.13525	40.65	0.16	33.62	-13.35	54	380	-7
17262.38035	41.34	0.16	32.63	-12.66	54	273	58
17454.54765	39.41	0.16	32.16	-14.59	54	272	310

Upper band edge falling to restricted band Horizontal Polarization

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Horizontal AVG

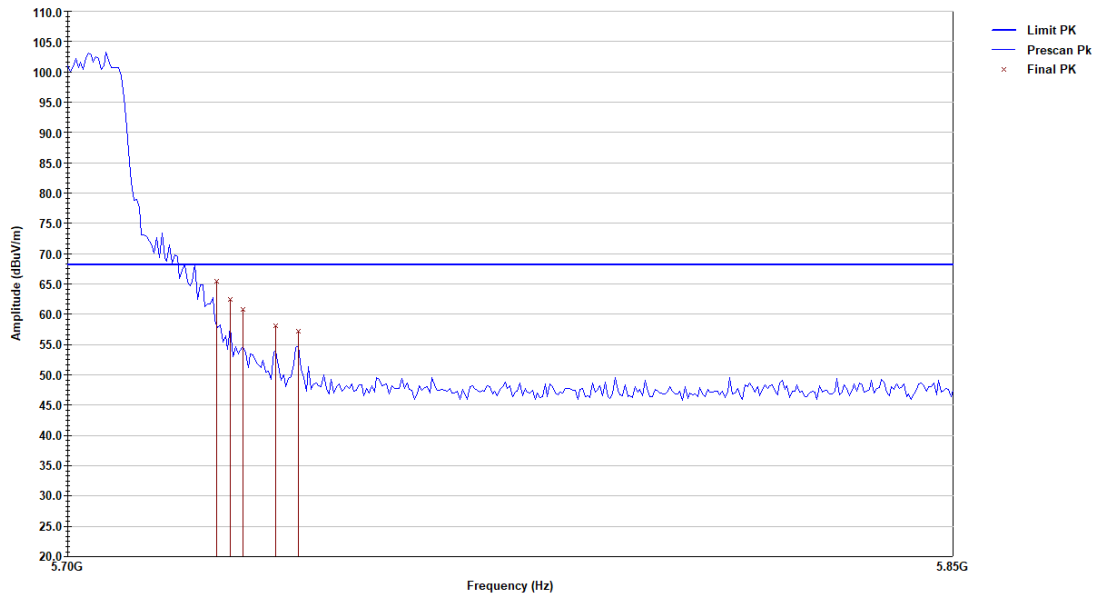
Model # - comma.ai

Test Mode - Tx mode, Upper Band-Edge

Operator - AG

Standard - FCC Class B

Comments - 5700MHz, 802.11n HT20, pwr 13, mcs2



5700 13 mcs2 RE Upper Band-Edge.ttl

Last Data Update 01:38:26 PM, Friday, May 24, 2024

Peak Data

Freq. (MHz)	Final PK (dBuV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBuV/m)	Ant. Height (cm)	Azimuth (deg.)
5725	65.44	9.15	-2.76	68.2	385	362
5727.275	62.5	9.15	-5.7	68.2	155	3
5729.4	60.75	9.15	-7.45	68.2	394	353
5734.92501	58.12	9.15	-10.08	68.2	400	5
5738.75	57.17	9.15	-11.03	68.2	400	-3

No Average limit is defined for the upper band edge.

Vertical Polarization

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Vertical AVG

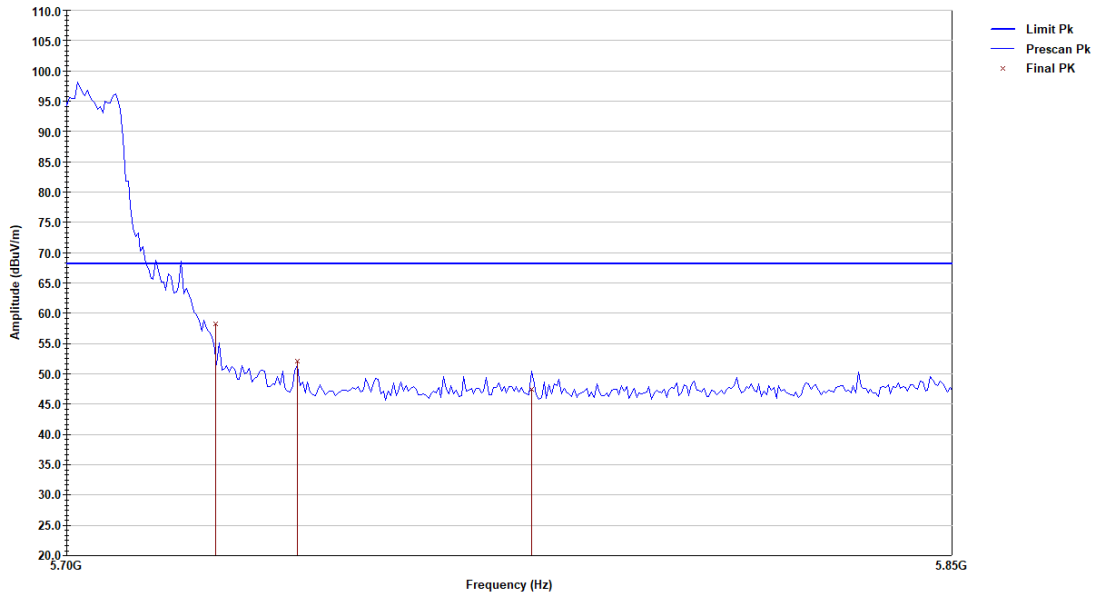
Model # - comma.ai

Test Mode - Tx mode, Upper Band-Edge

Operator - AG

Standard - FCC Class B

Comments - 5700MHz, 802.11n HT20, pwr 13, mcs2



5700 13 mcs2 RE Upper Band-Edge.til

Last Data Update 01:18:54 PM, Friday, May 24, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
5725	58.21	9.15	-9.99	68.2	296	239
5738.75	52.04	9.15	-16.16	68.2	373	264
5778.275	47.52	9.19	-20.68	68.2	365	-20

No Average limit is defined for the upper band edge.

UNII2c: 802.11n40

30 to 1000 MHz High Channel – 5590MHz - both chains transmitting Horizontal Polarization

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Horizontal QP

Customer / Model # - comma.ai / LightningHard SOM

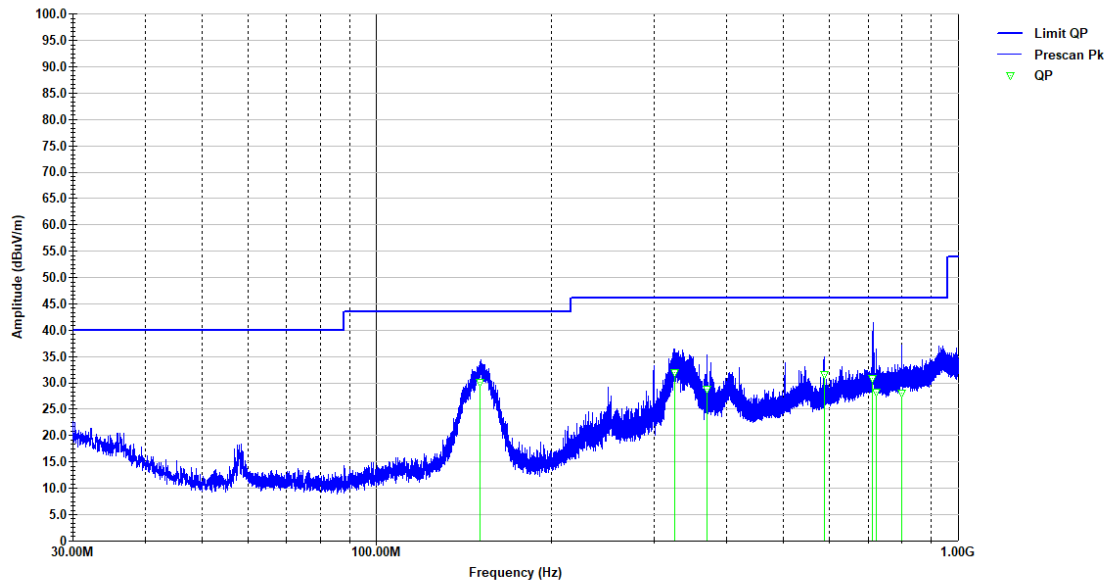
Serial # - N/A

Test Mode - TX99, ext. DC power supply

Operator - Alex C

Standard - FCC Class B

Comments - 5590MHz, 802.11n40 UNII2c HT40, pwr 13, mcs1



5590 13 mcs1 FCC 15.407 RE 30M-1GHz.ttl

Last Data Update 03:04:59 PM, Friday, March 22, 2024

Quasi-Peak Data

Freq. (MHz)	Final QP (dBuV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBuV/m)	Ant. Height (cm)	Azimuth (deg.)
150.30072	30.03	-27.73	-13.49	43.52	177	173
325.951066	31.92	-22.77	-14.1	46.02	106	329
369.723787	28.78	-20.1	-17.24	46.02	249	292
587.956716	31.63	-14.74	-14.39	46.02	217	319
712.81893	30.89	-11.9	-15.13	46.02	114	182
722.055218	28.25	-11.83	-17.77	46.02	106	40
799.454327	28.09	-11.37	-17.93	46.02	125	224

Vertical Polarization

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Vertical QP

Customer / Model # - comma.ai / LightningHard SOM

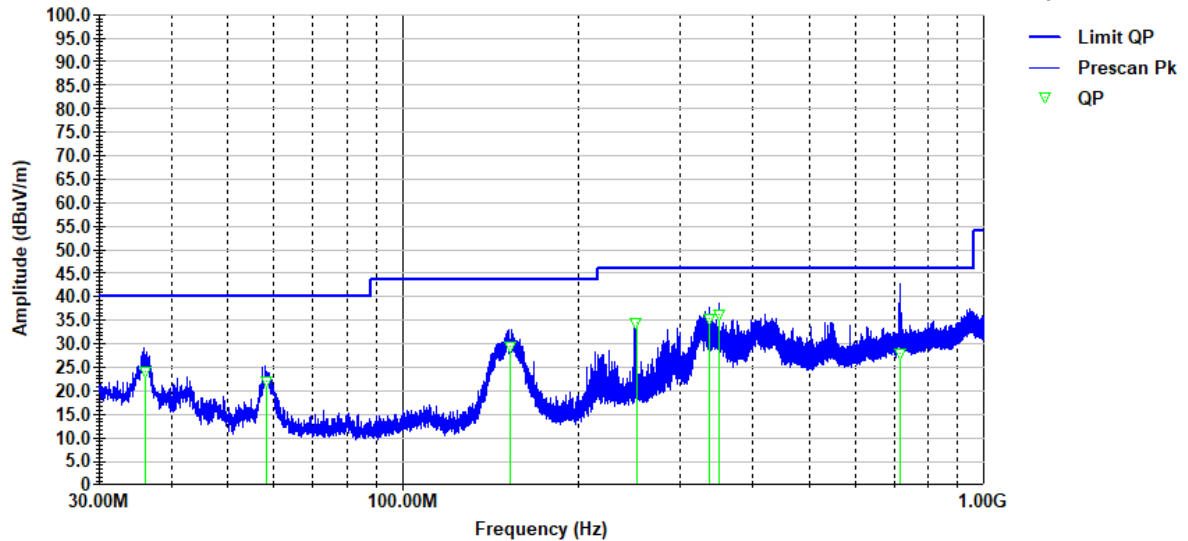
Serial # - N/A

Test Mode - TX99, ext. DC power supply

Operator - Alex C

Standard - FCC Class B

Comments - 5590MHz, 802.11n40 UNII2c HT40, pwr 13, mcs1



5590 13 mcs1 FCC 15.407 RE 30M-1GHz.til

Last Data Update 02:45:07 PM, Friday, March 22, 2024

Quasi-Peak Data

Freq. (MHz)	Final QP (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
35.9709	23.96	-24.68	-16.04	40	100	34
58.216963	22.01	-30.47	-17.99	40	162	372
152.846108	29.39	-26.92	-14.13	43.52	178	222
251.990498	34.58	-24.28	-11.44	46.02	100	362
336.004231	35.42	-22.21	-10.6	46.02	100	256
350.022985	36.29	-21.01	-9.73	46.02	100	369
716.26893	27.8	-11.91	-18.22	46.02	380	245

1 to 18 GHz Low Channel – 5510MHz - both chains transmitting Horizontal Polarization

SGS NA, San Diego Regulatory Lab

Customer / Model # - comma.ai / LightningHard SOM

Radiated Emissions

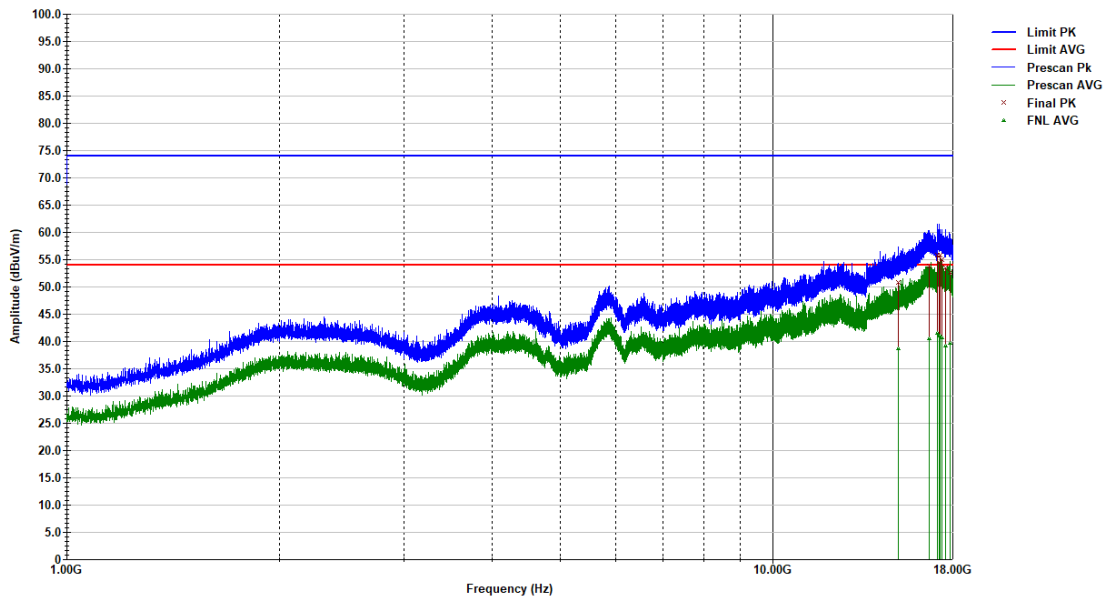
Test Mode - TX, 6GHz HPF

Horizontal AVG

Operator - AG

Standard - FCC Class B

Comments - 5510MHz, 802.11n40 HT40, pwr 13, mcs08



5510 13 mcs8 RE CISPR SW1A NC 3117 w lambda lna AVG 1G-18G 06Feb2024 - Copy.ttl

Last Data Update 06:36:16 PM, Tuesday, March 19, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
15073.96413	50.87	28.53	-23.13	74	186	68
16673.19024	53.88	33.62	-20.12	74	400	287
17104.56944	55.73	32.77	-18.27	74	150	219
17212.00994	54.53	32.77	-19.47	74	171	318
17291.40785	55.77	32.54	-18.23	74	378	225
17361.5179	54.94	32.36	-19.06	74	278	177
17566.08357	53.41	32.08	-20.59	74	186	276
17821.66946	52.71	31.87	-21.29	74	385	307

Average

Freq. (MHz)	Final AVG (dBμV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
15073.96413	39.03	0.3	28.53	-14.97	54	186	68
16673.19024	40.72	0.3	33.62	-13.28	54	400	287
17104.56944	41.79	0.3	32.77	-12.21	54	150	219
17212.00994	41.37	0.3	32.77	-12.63	54	171	318
17291.40785	41.31	0.3	32.54	-12.69	54	378	225
17361.5179	40.94	0.3	32.36	-13.06	54	278	177
17566.08357	39.49	0.3	32.08	-14.51	54	186	276
17821.66946	39.9	0.3	31.87	-14.1	54	385	307

Vertical Polarization

SGS NA, San Diego Regulatory Lab

Customer / Model # - comma.ai / LightningHard SOM

Radiated Emissions

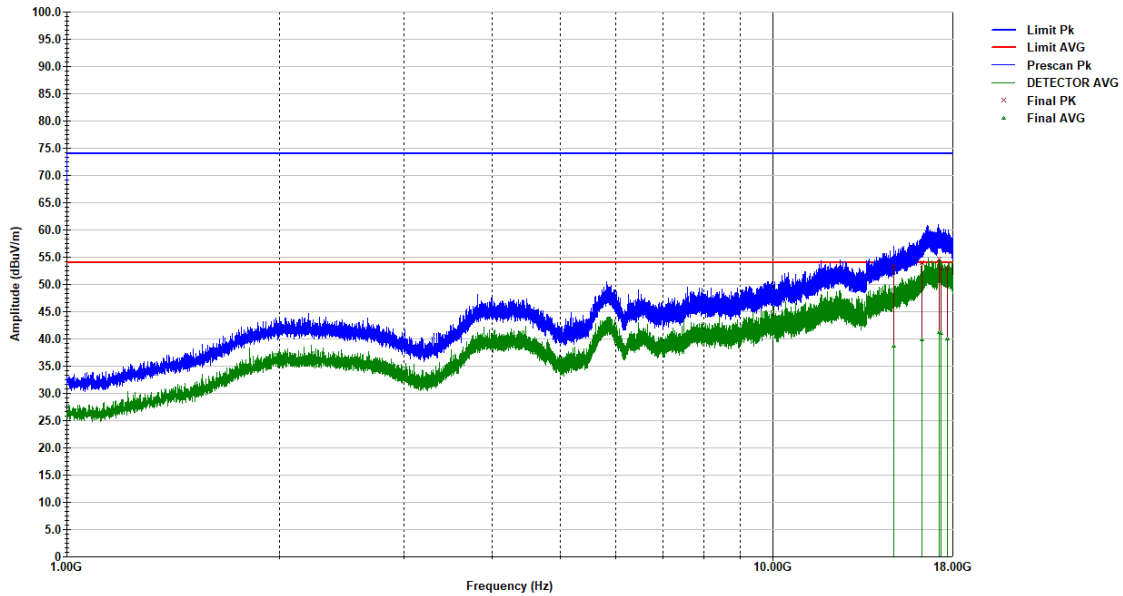
Test Mode - TX, 6GHz HPF

Operator - AG

Vertical AVG

Standard - FCC Class B

Comments - 5510MHz, 802.11n40 HT40, pwr 13, mcs08



5510 13 mcs8 RE CISPR SW1A NC 3117 w lambda lna AVG 1G-18G 06Feb2024 - Copy.ttl

Last Data Update 06:13:55 PM, Tuesday, March 19, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
14860.5731	53.3	28.14	-20.7	74	400	167
16298.505	54	32.2	-20	74	303	170
17231.00125	54.6	32.72	-19.4	74	150	297
17346.0296	52.93	32.4	-21.07	74	151	268
17684.6525	53.07	31.96	-20.93	74	280	64

Average

Freq. (MHz)	Final AVG (dBμV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
14860.5731	38.93	0.3	28.14	-15.07	54	400	167
16298.505	40.14	0.3	32.2	-13.86	54	303	170
17231.00125	41.51	0.3	32.72	-12.49	54	150	297
17346.0296	41.25	0.3	32.4	-12.75	54	151	268
17684.6525	40.31	0.3	31.96	-13.69	54	280	64

Lower band edge falling to restricted band Horizontal Polarization

SGS NA, San Diego Regulatory Lab

Model # - comma.ai

Radiated Emissions

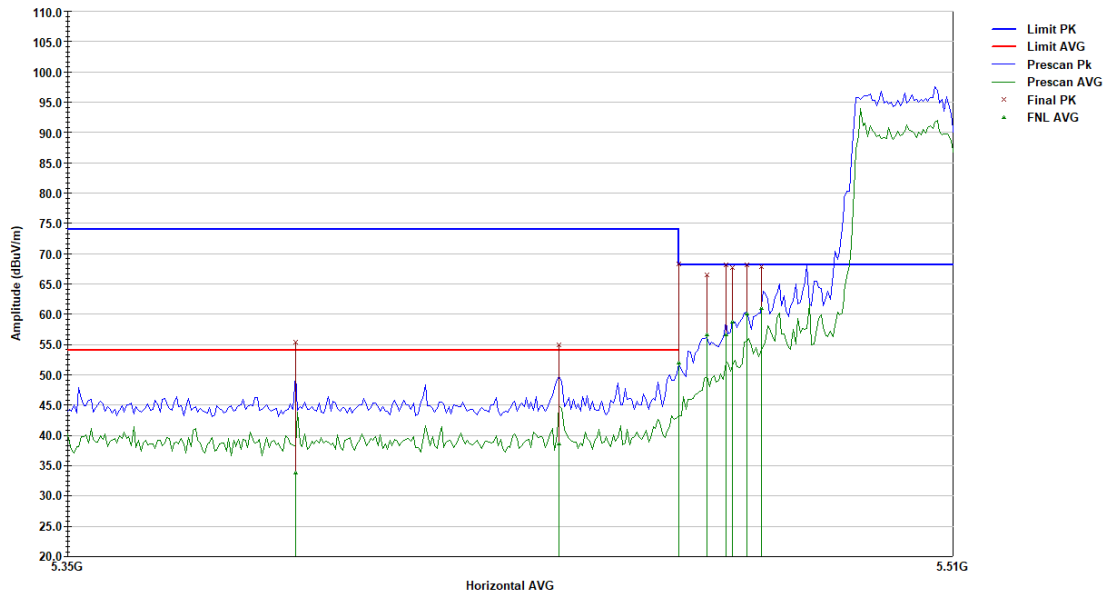
Test Mode - Tx mode, Lower Band-Edge

Horizontal AVG

Operator - AG

Standard - FCC Class B

Comments - 5510MHz, 802.11n40 HT40, pwr 13, mcs8



5510 13 mcs8 RE Lower Band-Edge.ttl

Last Data Update 03:12:11 PM, Friday, May 24, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
5390.675	55.37	7.78	-18.63	74	155	-17
5438.275	54.99	7.93	-19.01	74	163	345
5460.00001	68.23	7.93	-5.17	73.42	178	359
5465.05	66.46	7.93	-1.74	68.2	171	-8
5468.45	68.16	7.93	-0.04	68.2	186	-20
5469.72501	67.76	7.93	-0.44	68.2	179	-10
5472.27501	68.19	7.93	-0.01	68.2	171	342
5475	67.78	7.93	-0.42	68.2	178	352

Average

Freq. (MHz)	Final AVG (dBμV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
5390.675	34.16	0.3	7.78	-19.84	54	155	-17
5438.275	38.83	0.3	7.93	-15.17	54	163	345
5460.00001	52.23	0.3	7.93	N/A	No AVG limit	178	359
5465.05	56.87	0.3	7.93	N/A	No AVG limit	171	-8
5468.45	56.9	0.3	7.93	N/A	No AVG limit	186	-20
5469.72501	58.97	0.3	7.93	N/A	No AVG limit	179	-10
5472.27501	60.29	0.3	7.93	N/A	No AVG limit	171	342
5475	61.28	0.3	7.93	N/A	No AVG limit	178	352

Vertical Polarization

SGS NA, San Diego Regulatory Lab

Model # - comma.ai

Radiated Emissions

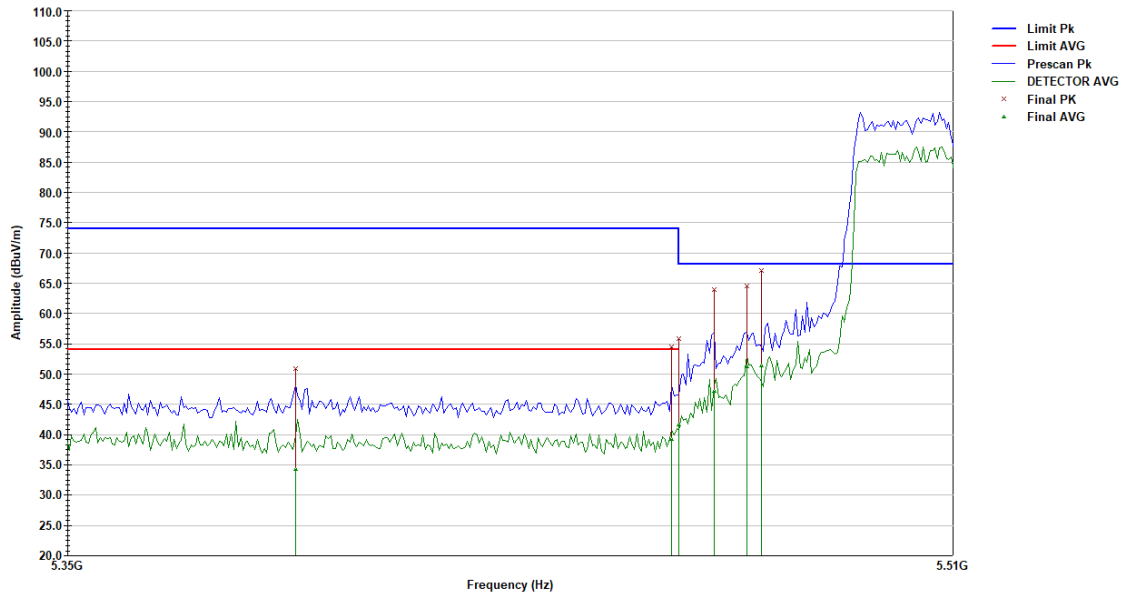
Test Mode - Tx mode, Lower Band-Edge

Vertical AVG

Operator - AG

Standard - FCC Class B

Comments - 5510MHz, 802.11n40 HT40, pwr 13, mcs8



5510 13 mcs8 RE Lower Band-Edge.ttl

Last Data Update 03:12:11 PM, Friday, May 24, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
5390.675	50.89	7.78	-23.11	74	249	118
5458.67501	54.46	7.93	-19.54	74	365	110
5460.00001	55.87	7.93	-17.53	73.42	373	65
5466.325	63.98	7.93	-4.02	68.2	400	91
5472.27501	64.58	7.93	-3.42	68.2	388	87
5475.00001	67.12	7.93	-0.88	68.2	400	44

Average

Freq. (MHz)	Final AVG (dBμV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
5390.675	34.53	0.3	7.78	-19.47	54	249	118
5458.67501	39.43	0.3	7.93	-14.57	54	365	110
5460.00001	41.89	0.3	7.93	N/A	No AVG limit	373	65
5466.325	47.46	0.3	7.93	N/A	No AVG limit	400	91
5472.27501	51.47	0.3	7.93	N/A	No AVG limit	388	87
5475.00001	51.58	0.3	7.93	N/A	No AVG limit	400	44

High Channel – 5590MHz - both chains transmitting Horizontal Polarization

SGS NA, San Diego Regulatory Lab

Customer / Model # - comma.ai / LightningHard SOM

Radiated Emissions

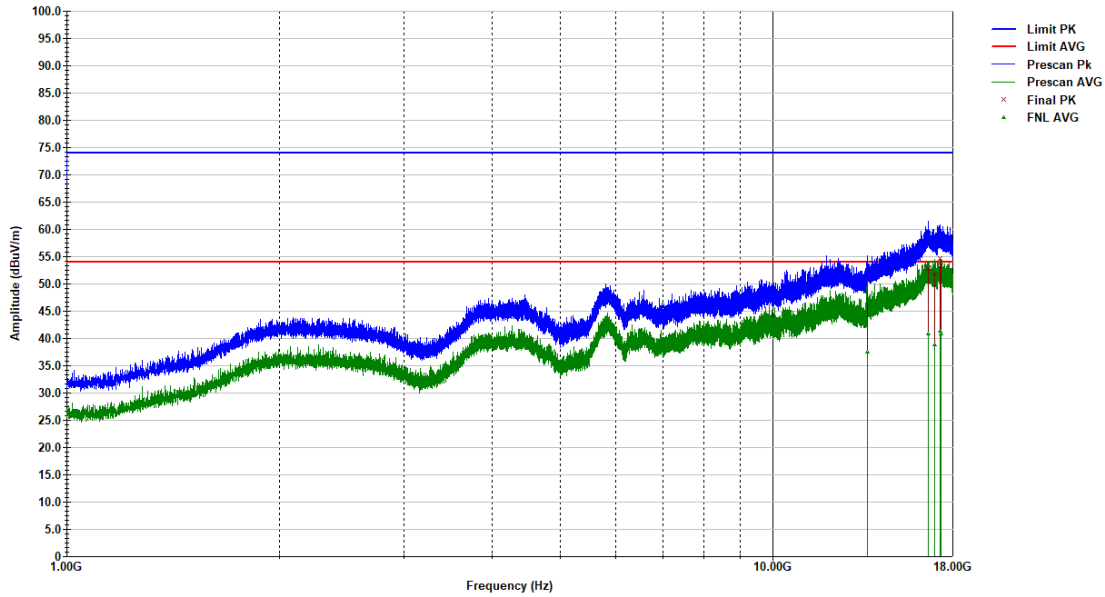
Test Mode - TX, 6GHz HPF

Horizontal AVG

Operator - AG

Standard - FCC Class B

Comments - 5590MHz, 802.11n40 HT40, pwr 13, mcs1



5590 13 mcs1 RE CISPR SW1A NC 3117 w lambda lna AVG 1G-18G 06Feb2024.ttl

Last Data Update 07:15:14 PM, Tuesday, March 19, 2024

Peak Data

Freq. (MHz)	Final PK (dBuV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBuV/m)	Ant. Height (cm)	Azimuth (deg.)
13608.46662	50.67	26.29	-23.33	74	332	-10
16634.35404	52.76	33.63	-21.24	74	363	302
16973.98489	51.87	33.2	-22.13	74	355	58
17260.33827	54.69	32.63	-19.31	74	163	299
17309.81277	53.37	32.49	-20.63	74	210	292

Average

Freq. (MHz)	Final AVG (dBuV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBuV/m)	Ant. Height (cm)	Azimuth (deg.)
13608.46662	37.85	0.31	26.29	-16.15	54	332	-10
16634.35404	41.1	0.31	33.63	-12.9	54	363	302
16973.98489	39.13	0.31	33.2	-14.87	54	355	58
17260.33827	41.61	0.31	32.63	-12.39	54	163	299
17309.81277	41.09	0.31	32.49	-12.91	54	210	292

Vertical Polarization

SGS NA, San Diego Regulatory Lab

Customer / Model # - comma.ai / LightningHard SOM

Radiated Emissions

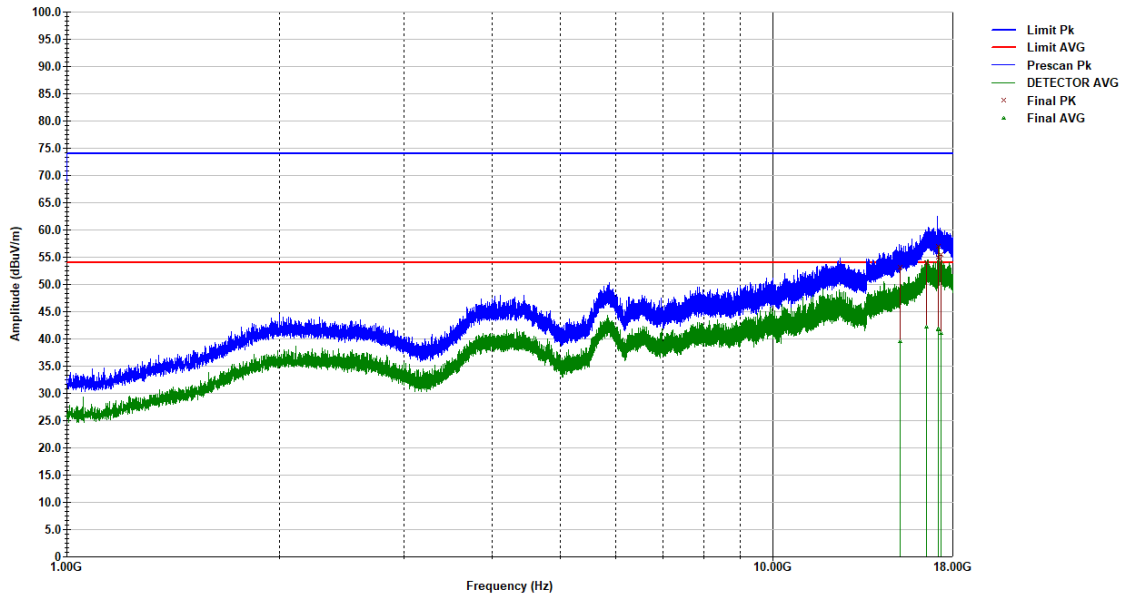
Test Mode - TX, 6GHz HPF

Operator - AG

Vertical AVG

Standard - FCC Class B

Comments - 5590MHz, 802.11n40 HT40, pwr 13, mcs1



5590 13 mcs1 RE CISPR SW1A NC 3117 w lambda lna AVG 1G-18G 06Feb2024.ttl

Last Data Update 07:02:00 PM, Tuesday, March 19, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
15162.48725	53.13	28.74	-20.87	74	357	62
16510.36585	53.98	33.15	-20.02	74	381	372
17159.67	57.07	32.79	-16.93	74	381	137
17174.00575	54.92	32.8	-19.08	74	150	28
17311.66915	55.46	32.49	-18.54	74	210	69

Average

Freq. (MHz)	Final AVG (dBμV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
15162.48725	39.78	0.31	28.74	-14.22	54	357	62
16510.36585	42.41	0.31	33.15	-11.59	54	381	372
17159.67	42.15	0.31	32.79	-11.85	54	381	137
17174.00575	42.02	0.31	32.8	-11.98	54	150	28
17311.66915	41.35	0.31	32.49	-12.65	54	210	69

Upper band edge falling to restricted band Horizontal Polarization

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Horizontal AVG

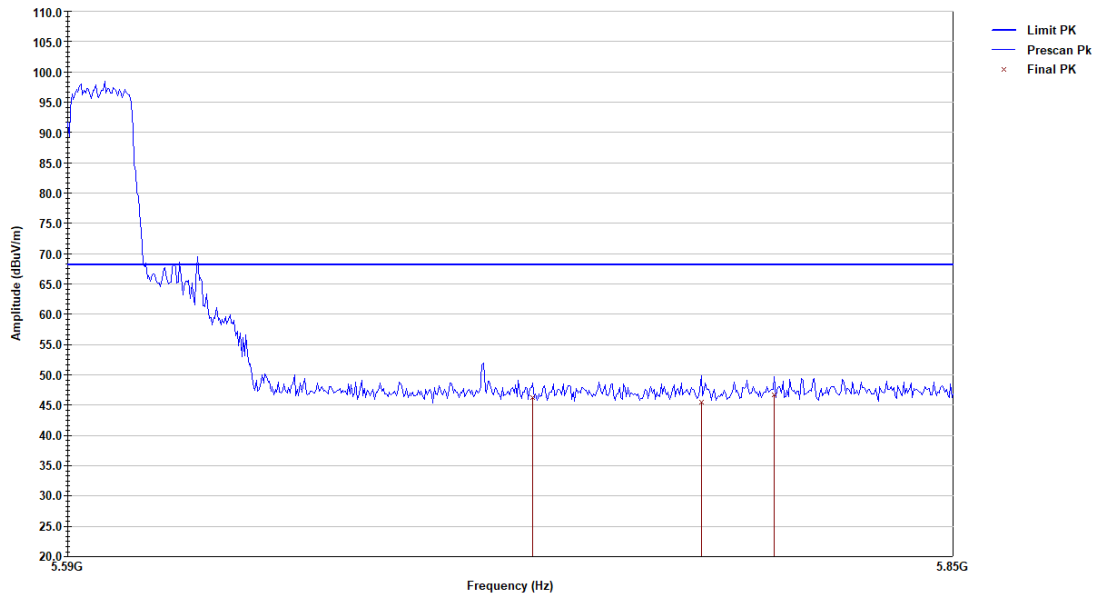
Model # - comma.ai

Test Mode - Tx mode, Upper Band-Edge

Operator - AG

Standard - FCC Class B

Comments - 5590MHz, 802.11n HT40, pwr 13, mcs1



5590 13 mcs1 RE Upper Band-Edge.ttl

Last Data Update 03:43:38 PM, Friday, May 24, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
5725	46.21	9.15	-21.99	68.2	294	248
5774.87501	45.56	9.17	-22.64	68.2	163	165
5796.55	46.69	9.26	-21.51	68.2	310	278

No Average limit is defined for the upper band edge.

Vertical Polarization

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Vertical AVG

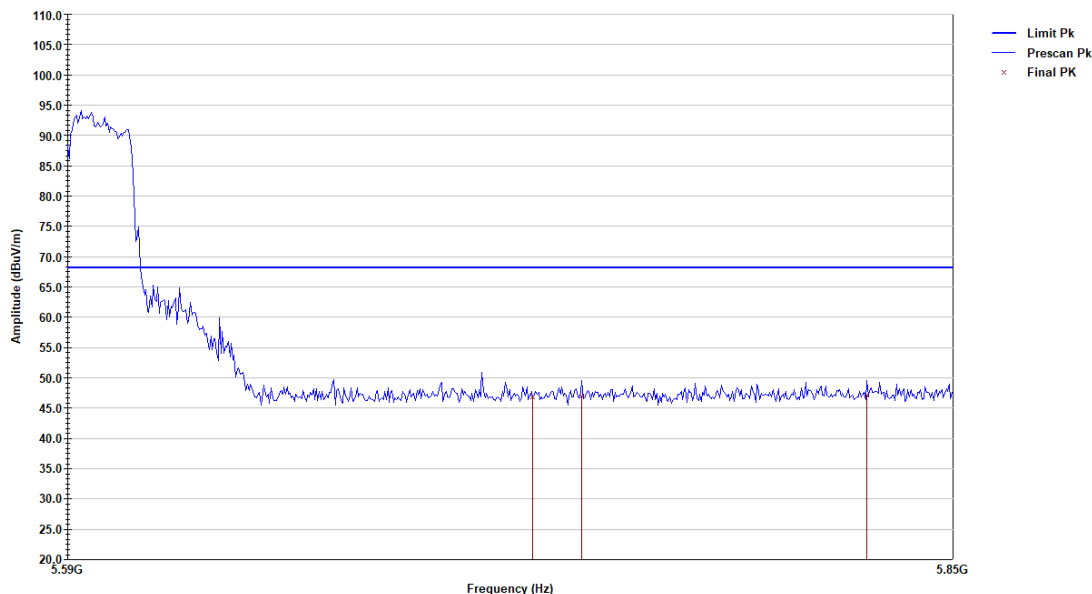
Model # - comma.ai

Test Mode - Tx mode, Upper Band-Edge

Operator - AG

Standard - FCC Class B

Comments - 5590MHz, 802.11n HT40, pwr 13, mcs1



5590 13 mcs1 RE Upper Band-Edge.til

Last Data Update 03:31:58 PM, Friday, May 24, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
5725	46.79	9.15	-21.41	68.2	272	-7
5739.6	47	9.15	-21.2	68.2	302	218
5824.175	47.16	9.37	-21.04	68.2	335	100

No Average limit is defined for the upper band edge.

UNII2c: 802.11ac20

30 to 1000 MHz Mid Channel – 5600MHz - both chains transmitting Horizontal Polarization

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Horizontal QP

Customer / Model # - comma.ai / LightningHard SOM

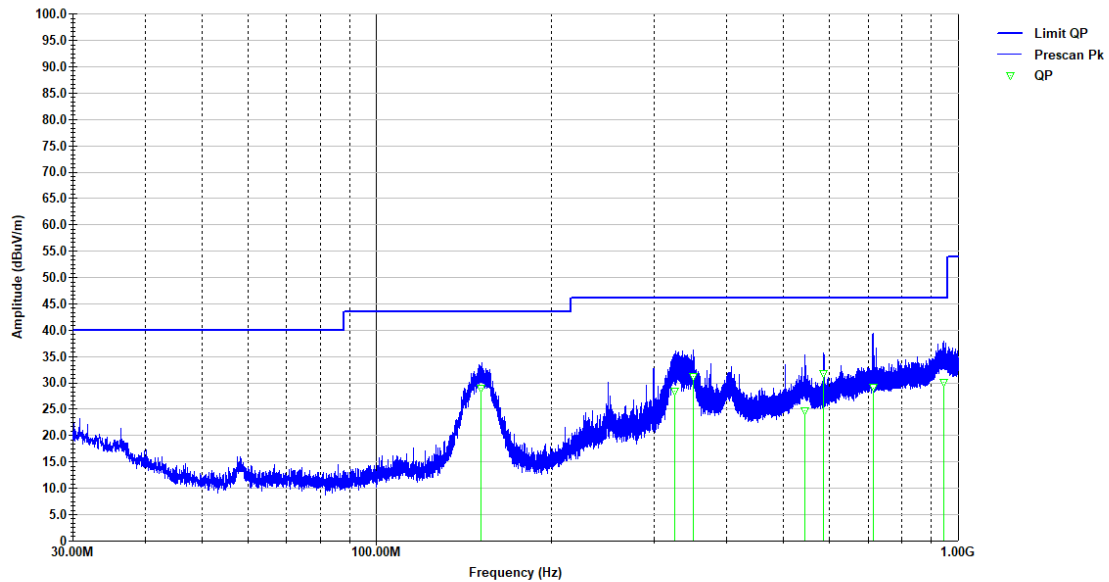
Serial # - N/A

Test Mode - TX99, ext. DC power supply

Operator - AG

Standard - FCC Class B

Comments - 5600MHz, 802.11ac20 UNII2c VHT20, pwr 13, mcs10



5600 13 mcs0 FCC 15.407 RE 30M-1GHz.ttl

Last Data Update 04:45:31 PM, Friday, March 22, 2024

Quasi-Peak Data

Freq. (MHz)	Final QP (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
151.28678	29.06	-27.43	-14.46	43.52	200	331
325.843247	28.4	-22.77	-17.62	46.02	100	316
350.034727	31.18	-21.01	-14.84	46.02	101	37
544.335699	24.62	-13.83	-21.4	46.02	209	255
587.913586	31.81	-14.74	-14.21	46.02	193	335
716.094751	29.07	-11.91	-16.95	46.02	153	289
945.760777	30.03	-8.31	-15.99	46.02	374	30

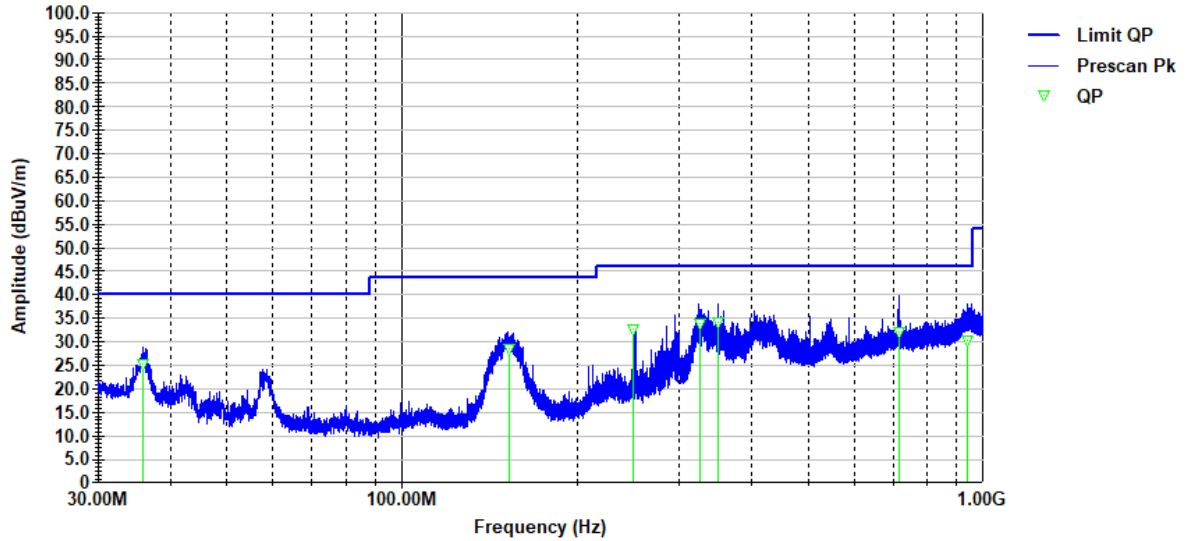
Vertical Polarization

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Vertical QP

Customer / Model # - comma.ai / LightningHard SOM
Serial # - N/A
Test Mode - TX99, ext. DC power supply
Operator - AG
Standard - FCC Class B
Comments - 5600MHz, 802.11ac20 UNII2c VHT20, pwr 13, mcs10



5600 13 mcs0 FCC 15.407 RE 30M-1GHz.til

Last Data Update 04:08:56 PM, Friday, March 22, 2024

Quasi-Peak Data

Freq. (MHz)	Final QP (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
35.826771	25.19	-24.61	-14.81	40	106	25
152.8389	28.64	-26.92	-14.88	43.52	154	204
250.00602	32.73	-24.47	-13.29	46.02	100	342
325.960827	33.72	-22.76	-12.3	46.02	154	35
349.962985	34.13	-21.02	-11.89	46.02	100	25
716.755445	32.22	-11.9	-13.8	46.02	100	204
936.799651	30.22	-8.33	-15.8	46.02	250	331

1 to 18 GHz Low Channel – 5500MHz - both chains transmitting Horizontal Polarization

SGS NA, San Diego Regulatory Lab

Customer / Model # - comma.ai / LightningHard SOM

Radiated Emissions

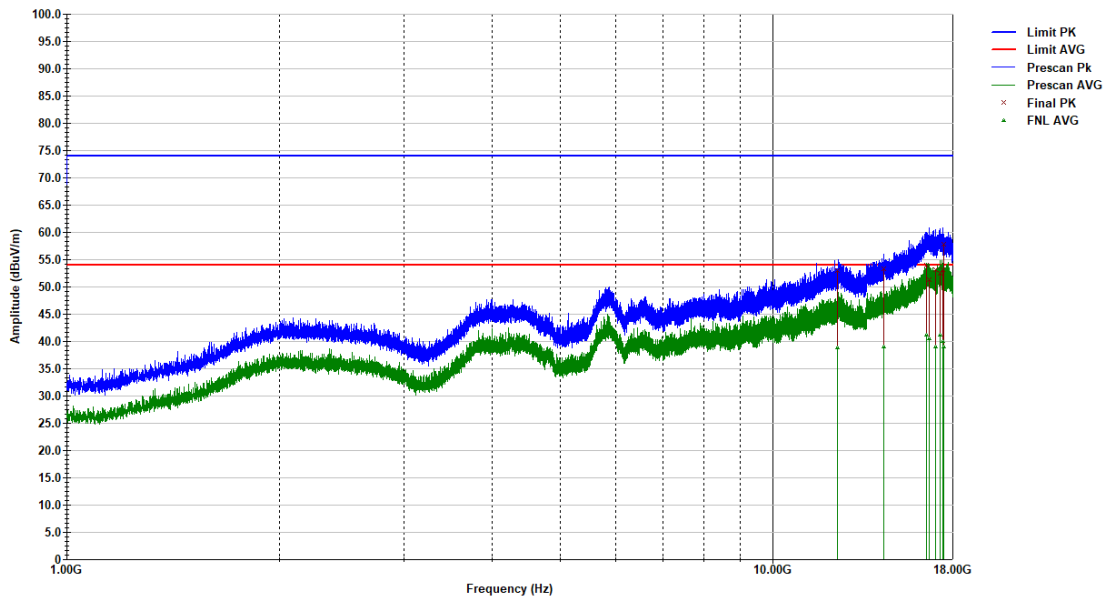
Test Mode - TX, 6GHz HPF

Horizontal AVG

Operator - AG

Standard - FCC Class B

Comments - 5500MHz, 802.11ac20 VHT20, pwr 13, mcs0



5500 13 mcs0 RE CISPR SW1A NC 3117 w lambda lna AVG 1G-18G 06Feb2024.ttl

Last Data Update 08:07:54 PM, Tuesday, March 19, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
12367.24329	53.02	25.91	-20.98	74	317	268
14365.13497	53.27	27.13	-20.73	74	225	106
16537.31546	54.01	33.26	-19.99	74	340	199
16644.07617	51.38	33.63	-22.62	74	171	69
17021.48875	53.21	33.04	-20.79	74	150	105
17274.91423	52.45	32.59	-21.55	74	279	306
17411.92431	53.2	32.23	-20.8	74	178	255
17495.60033	57.76	32.12	-16.24	74	317	129

Average

Freq. (MHz)	Final AVG (dBµV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Ant. Height (cm)	Azimuth (deg.)
12367.24329	39.02	0.16	25.91	-14.98	54	317	268
14365.13497	39.08	0.16	27.13	-14.92	54	225	106
16537.31546	41.41	0.16	33.26	-12.59	54	340	199
16644.07617	40.71	0.16	33.63	-13.29	54	171	69
17021.48875	39.21	0.16	33.04	-14.79	54	150	105
17274.91423	41.29	0.16	32.59	-12.71	54	279	306
17411.92431	40.08	0.16	32.23	-13.92	54	178	255
17495.60033	39.13	0.16	32.12	-14.87	54	317	129

Vertical Polarization

SGS NA, San Diego Regulatory Lab

Customer / Model # - comma.ai / LightningHard SOM

Radiated Emissions

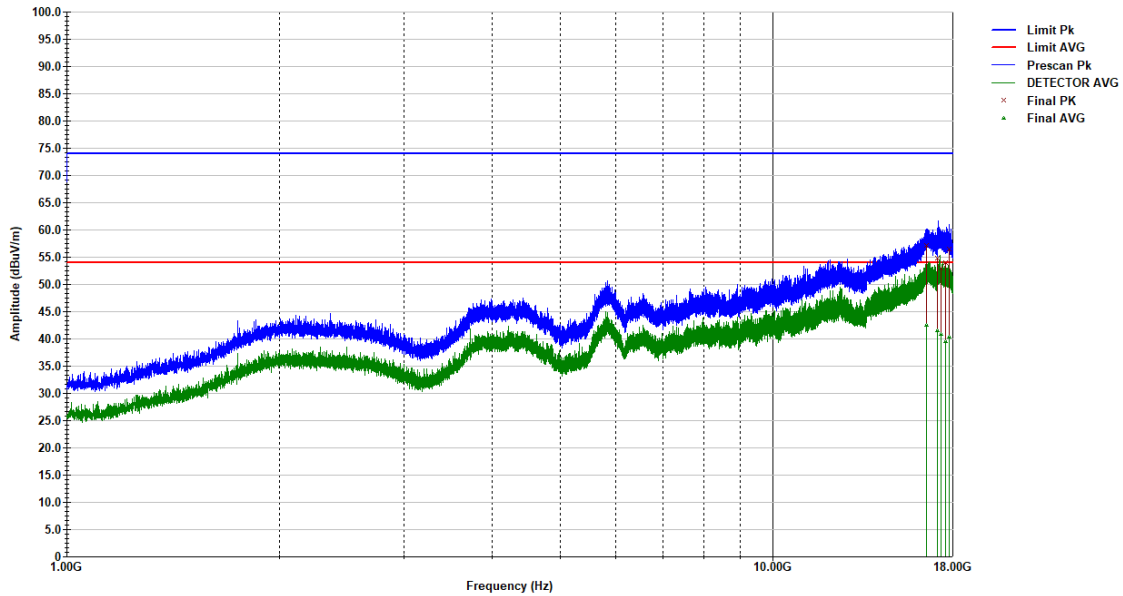
Test Mode - TX, 6GHz HPF

Operator - AG

Vertical AVG

Standard - FCC Class B

Comments - 5500MHz, 802.11ac20 VHT20, pwr 13, mcs0



5500 13 mcs0 RE CISPR SW1A NC 3117 w lambda lna AVG 1G-18G 06Feb2024.ttl

Last Data Update 07:47:09 PM, Tuesday, March 19, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
16497.1054	57.14	33.09	-16.86	74	381	159
17137.46825	54.87	32.78	-19.13	74	296	201
17323.29035	53.02	32.46	-20.98	74	218	263
17559.54025	54.01	32.08	-19.99	74	226	24
17778.169	56.52	31.85	-17.48	74	400	2

Average

Freq. (MHz)	Final AVG (dBμV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
16497.1054	42.63	0.16	33.09	-11.37	54	381	159
17137.46825	41.57	0.16	32.78	-12.43	54	296	201
17323.29035	41.03	0.16	32.46	-12.97	54	218	263
17559.54025	39.67	0.16	32.08	-14.33	54	226	24
17778.169	40.55	0.16	31.85	-13.45	54	400	2

Lower band edge falling to restricted band Horizontal Polarization

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Horizontal AVG

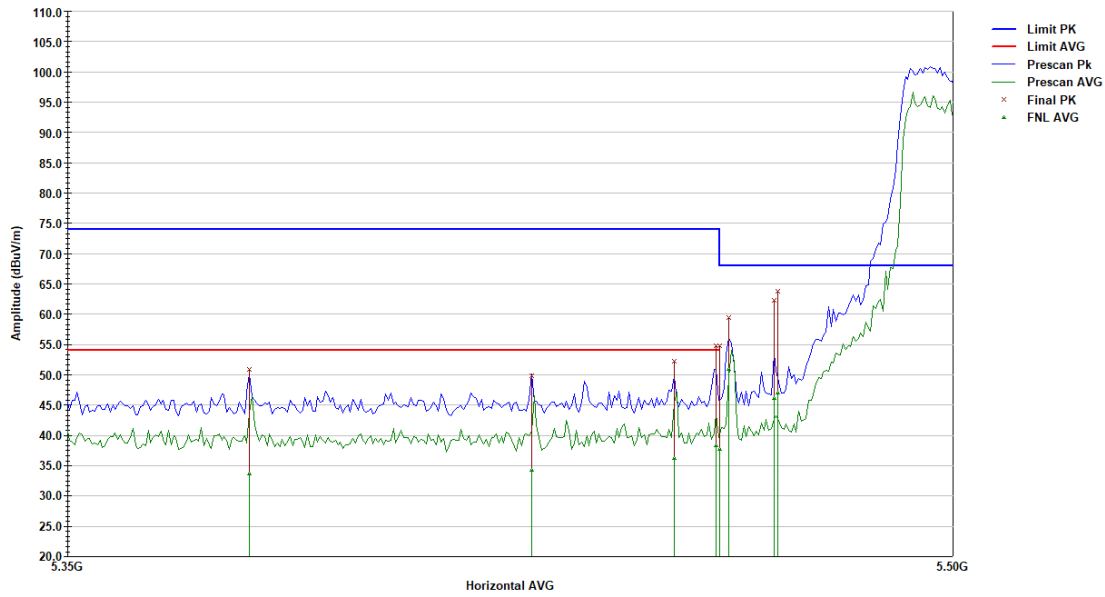
Model # - comma.ai

Test Mode - Tx mode, Lower Band-Edge

Operator - AG

Standard - FCC Class B

Comments - 5500MHz, 802.11ac20 VHT20, pwr 13, mcs3



5500 13 mcs3 RE Lower Band-Edge.ttl

Last Data Update 09:36:03 AM, Tuesday, May 28, 2024

Peak Data

Freq. (MHz)	Final PK (dBuV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBuV/m)	Ant. Height (cm)	Azimuth (deg.)
5380.475	50.83	7.75	-23.17	74	332	367
5428.07501	49.9	7.92	-24.1	74	155	344
5452.3	52.27	7.93	-21.73	74	150	344
5459.52501	54.8	7.93	-19.2	74	163	-9
5460.00001	54.79	7.93	-18.61	73.4	155	-20
5461.65	59.38	7.93	-8.62	68	163	343
5469.3	62.22	7.93	-5.78	68	155	351
5470.00001	63.79	7.93	-4.21	68	150	-10

Average

Freq. (MHz)	Final AVG (dBμV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
5380.475	34.2	0.52	7.75	-19.8	54	332	367
5428.07501	34.72	0.52	7.92	-19.28	54	155	344
5452.3	36.72	0.52	7.93	-17.28	54	150	344
5459.52501	38.75	0.52	7.93	-15.25	54	163	-9
5460.00001	38.22	0.52	7.93	N/A	No AVG limit	155	-20
5461.65	51.36	0.52	7.93	N/A	No AVG limit	163	343
5469.3	46.68	0.52	7.93	N/A	No AVG limit	155	351
5470.00001	47.49	0.52	7.93	N/A	No AVG limit	150	-10

Vertical Polarization

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Vertical AVG

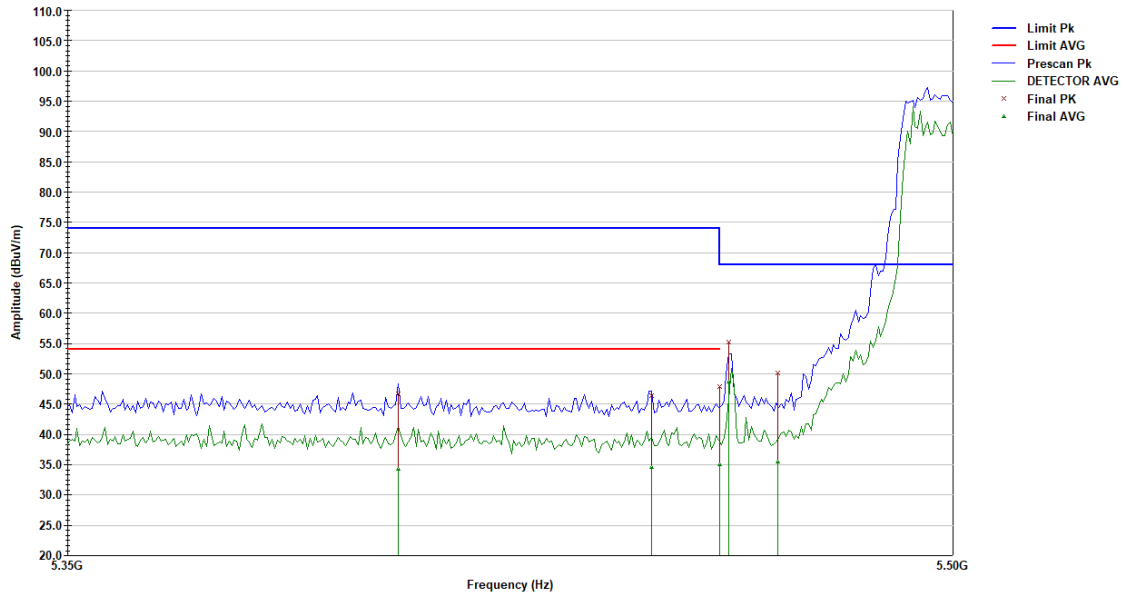
Model # - comma.ai

Test Mode - Tx mode, Lower Band-Edge

Operator - AG

Standard - FCC Class B

Comments - 5500MHz, 802.11ac20 VHT20, pwr 13, mcs3



5500 13 mcs3 RE Lower Band-Edge.ttl

Last Data Update 09:13:54 AM, Tuesday, May 28, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
5405.55001	46.76	7.83	-27.24	74	256	15
5448.475	46.44	7.93	-27.56	74	357	137
5460.00001	47.9	7.93	-25.5	73.4	210	81
5461.65	55.32	7.93	-12.68	68	388	273
5470	50.08	7.93	-17.92	68	400	35

Average

Freq. (MHz)	Final AVG (dBμV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
5405.55001	34.79	0.52	7.83	-19.21	54	256	15
5448.475	35.01	0.52	7.93	-18.99	54	357	137
5460.00001	35.49	0.52	7.93	N/A	No AVG limit	210	81
5461.65	49.17	0.52	7.93	N/A	No AVG limit	388	273
5470	35.96	0.52	7.93	N/A	No AVG limit	400	35

Mid Channel – 5600MHz - both chains transmitting Horizontal Polarization

SGS NA, San Diego Regulatory Lab

Customer / Model # - comma.ai / LightningHard SOM

Radiated Emissions

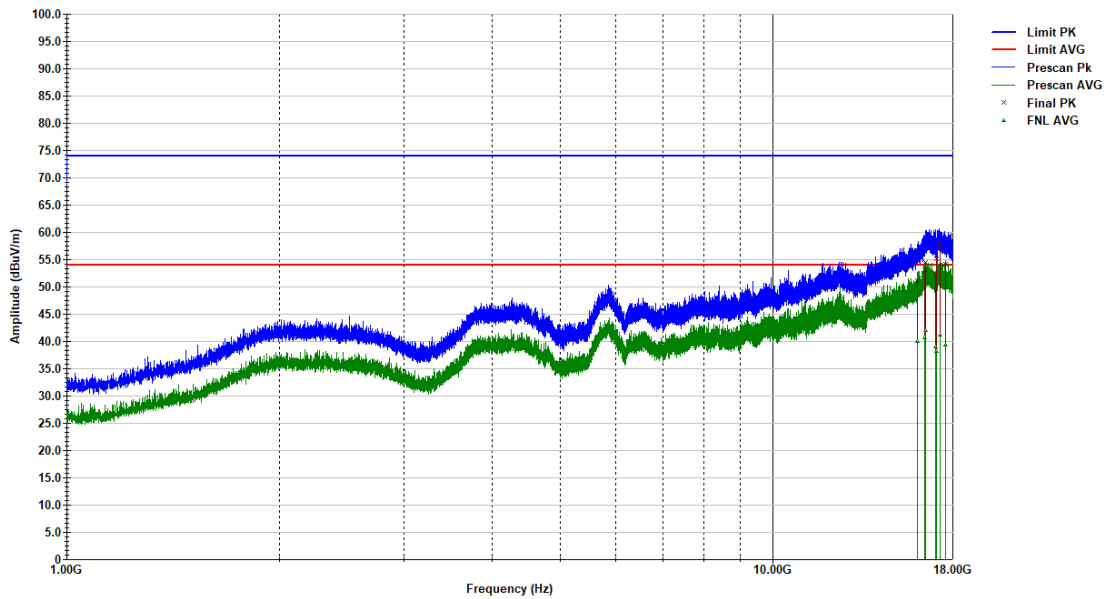
Test Mode - TX, 6GHz HPF

Horizontal AVG

Operator - AG

Standard - FCC Class B

Comments - 5600MHz, 802.11ac20 VHT20, pwr 13, mcs0



5600 13 mcs0 RE CISPR SW1A NC 3117 w lambda lna AVG 1G-18G 06Feb2024.ttl

Last Data Update 09:08:37 PM, Tuesday, March 19, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
16058.06858	51.08	31.23	-22.92	74	155	313
16435.1337	53.14	32.81	-20.86	74	248	-13
16470.12819	54.52	32.97	-19.48	74	150	83
17024.3457	52.3	33.03	-21.7	74	240	228
17085.42539	55.17	32.82	-18.83	74	400	307
17261.46508	57.99	32.63	-16.01	74	286	172
17581.26085	54.2	32.07	-19.8	74	310	253

Average

Freq. (MHz)	Final AVG (dBμV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
16058.06858	40.18	0.16	31.23	-13.82	54	155	313
16435.1337	40.87	0.16	32.81	-13.13	54	248	-13
16470.12819	42.08	0.16	32.97	-11.92	54	150	83
17024.3457	39.18	0.16	33.03	-14.82	54	240	228
17085.42539	38.25	0.16	32.82	-15.75	54	400	307
17261.46508	41.32	0.16	32.63	-12.68	54	286	172
17581.26085	39.48	0.16	32.07	-14.52	54	310	253

Vertical Polarization

SGS NA, San Diego Regulatory Lab

Customer / Model # - comma.ai / LightningHard SOM

Radiated Emissions

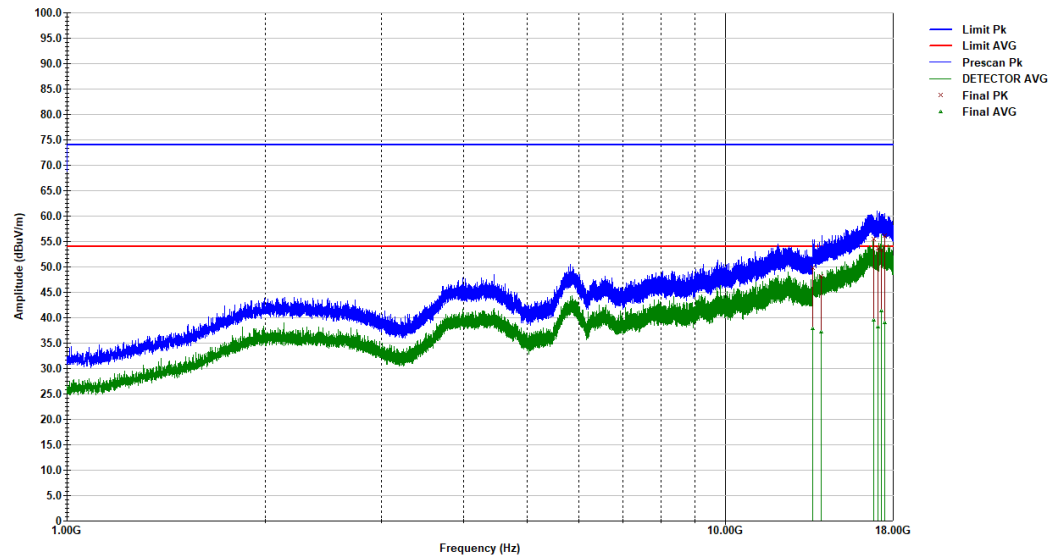
Test Mode - TX, 6GHz HPF

Operator - AG

Standard - FCC Class B

Comments - 5600MHz, 802.11ac20 VHT20, pwr 13, mcs0

Vertical AVG



5600 13 mcs0 RE CISPR SW1A NC 3117 w lambda Ina AVG 1G-18G 06Feb2024.ttl

Last Data Update 08:47:07 PM, Tuesday, March 19, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
13599.58259	49.85	26.28	-24.15	74	187	-20
14010.09985	48.11	26.65	-25.89	74	171	32
16796.09875	55.43	33.54	-18.57	74	202	-12
17049.68	53.63	32.94	-20.37	74	342	163
17249.107	53.3	32.66	-20.7	74	186	262
17461.62975	56.09	32.15	-17.91	74	264	-2

Average

Freq. (MHz)	Final AVG (dBμV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
13599.58259	37.94	0.16	26.28	-16.06	54	187	-20
14010.09985	37.29	0.16	26.65	-16.71	54	171	32
16796.09875	39.6	0.16	33.54	-14.4	54	202	-12
17049.68	38.4	0.16	32.94	-15.6	54	342	163
17249.107	41.42	0.16	32.66	-12.58	54	186	262
17461.62975	39.19	0.16	32.15	-14.81	54	264	-2

High Channel – 5700MHz - both chains transmitting Horizontal Polarization

SGS NA, San Diego Regulatory Lab

Customer / Model # - comma.ai / LightningHard SOM

Radiated Emissions

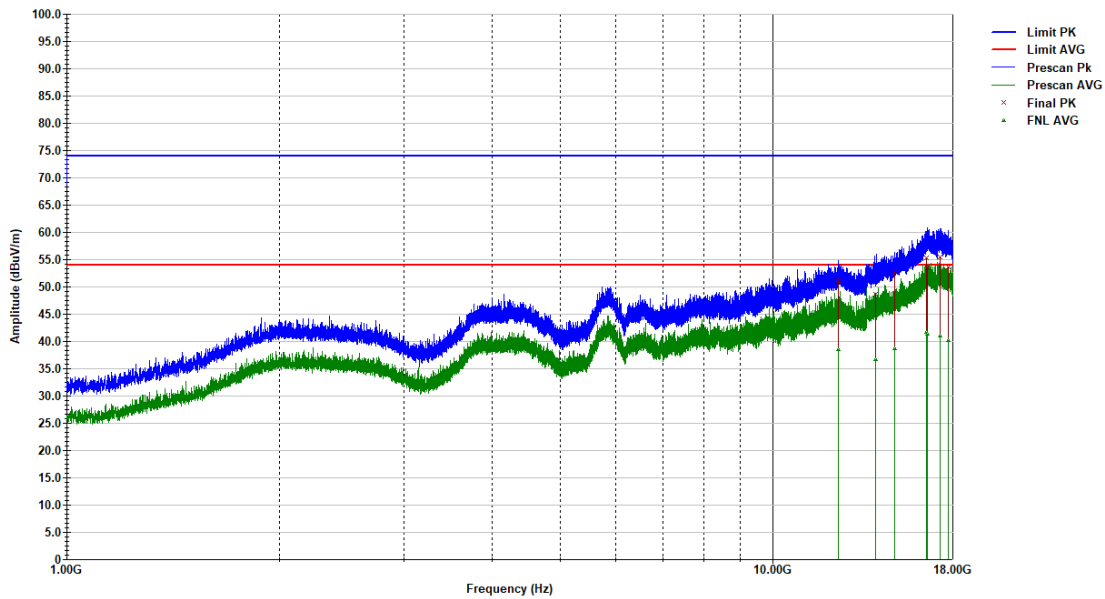
Test Mode - TX, 6GHz HPF

Horizontal AVG

Operator - AG

Standard - FCC Class B

Comments - 5700MHz, 802.11ac20 VHT20, pwr 13, mcs0



5700 13 mcs0 RE CISPR SW1A NC 3117 w lambda lna AVG 1G-18G 06Feb2024.ttl

Last Data Update 10:03:04 PM, Tuesday, March 19, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
12395.16969	51.16	25.92	-22.84	74	379	169
13973.21977	48.59	26.61	-25.41	74	225	150
14912.34573	52.88	28.26	-21.12	74	240	50
16497.54885	55.33	33.09	-18.67	74	240	129
16574.76485	53.47	33.42	-20.53	74	400	49
17246.60426	55.48	32.67	-18.52	74	386	207
17749.42623	53.62	31.88	-20.38	74	386	42

Average

Freq. (MHz)	Final AVG (dBμV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
12395.16969	38.58	0.16	25.92	-15.42	54	379	169
13973.21977	36.9	0.16	26.61	-17.1	54	225	150
14912.34573	38.82	0.16	28.26	-15.18	54	240	50
16497.54885	41.9	0.16	33.09	-12.1	54	240	129
16574.76485	41.43	0.16	33.42	-12.57	54	400	49
17246.60426	41.2	0.16	32.67	-12.8	54	386	207
17749.42623	40.28	0.16	31.88	-13.72	54	386	42

Vertical Polarization

SGS NA, San Diego Regulatory Lab

Customer / Model # - comma.ai / LightningHard SOM

Radiated Emissions

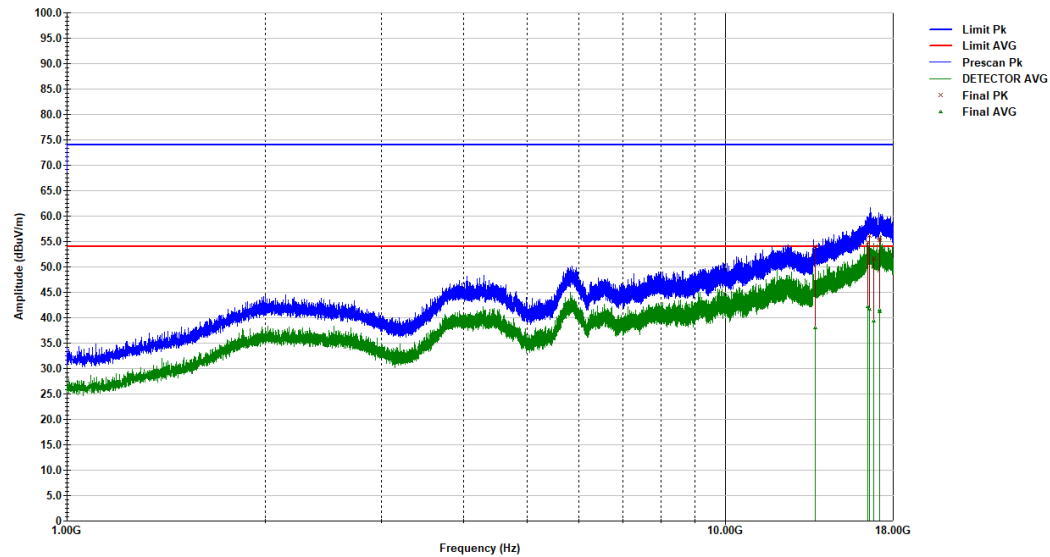
Test Mode - TX, 6GHz HPF

Operator - AG

Standard - FCC Class B

Comments - 5700MHz, 802.11ac20 VHT20, pwr 13, mcs0

Vertical AVG



5700 13 mcs0 RE CISPR SW1A NC 3117 w lambda Ina AVG 1G-18G 06Feb2024.ttl

Last Data Update 09:36:50 PM, Tuesday, March 19, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
13687.36335	53.94	26.37	-20.06	74	389	351
16470.40265	54.86	32.97	-19.14	74	150	-14
16560.9115	56.17	33.36	-17.83	74	264	295
16806.22125	51.71	33.53	-22.29	74	226	234
17149.12225	55.35	32.79	-18.65	74	362	92
17174.6495	55.71	32.8	-18.29	74	295	306

Average

Freq. (MHz)	Final AVG (dBμV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
13687.36335	38.08	0.16	26.37	-15.92	54	389	351
16470.40265	42.38	0.16	32.97	-11.62	54	150	-14
16560.9115	41.82	0.16	33.36	-12.18	54	264	295
16806.22125	39.52	0.16	33.53	-14.48	54	226	234
17149.12225	41.37	0.16	32.79	-12.63	54	362	92
17174.6495	41.63	0.16	32.8	-12.37	54	295	306

Upper band edge falling to restricted band Horizontal Polarization

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Horizontal AVG

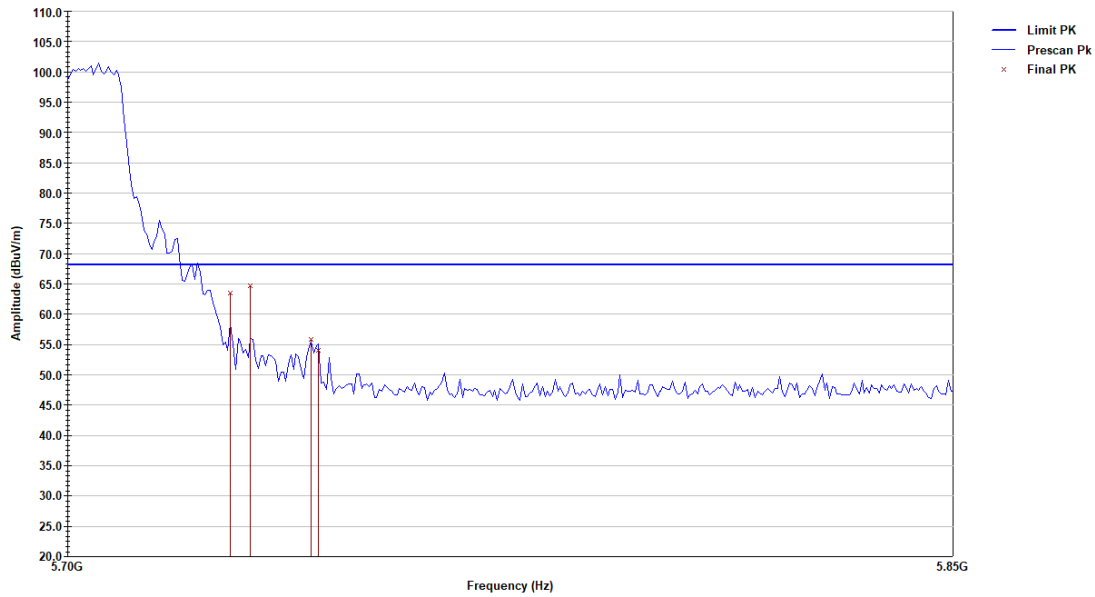
Model # - comma.ai

Test Mode - Tx mode, Upper Band-Edge

Operator - AG

Standard - FCC Class B

Comments - 5700MHz, 802.11ac20 VHT20, pwr 13, mcs1



5700 13 mcs1 RE Upper Band-Edge.ttl

Last Data Update 10:20:58 AM, Tuesday, May 28, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
5275	44.79	7.42	-23.41	68.2	386	317
5727.275	63.54	9.15	-4.66	68.2	386	13
5730.675	64.67	9.15	-3.53	68.2	324	358
5740.875	55.82	9.15	-12.38	68.2	325	370
5742.15	54.1	9.15	-14.1	68.2	386	370

No Average limit is defined for the upper band edge.

Vertical Polarization

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Vertical AVG

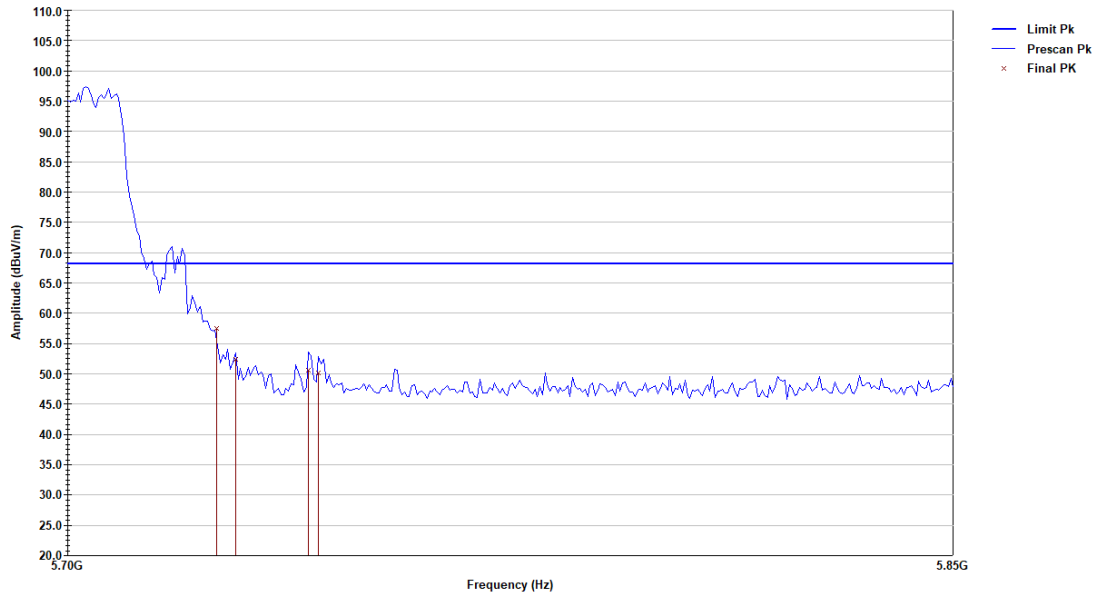
Model # - comma.ai

Test Mode - Tx mode, Upper Band-Edge

Operator - AG

Standard - FCC Class B

Comments - 5700MHz, 802.11ac20 VHT20, pwr 13, mcs1



5700 13 mcs1 RE Upper Band-Edge.til

Last Data Update 10:03:55 AM, Tuesday, May 28, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
5725	57.44	9.15	-10.76	68.2	358	247
5728.125	52.38	9.15	-15.82	68.2	389	261
5740.45	50.57	9.15	-17.63	68.2	335	272
5742.15	50.16	9.15	-18.04	68.2	210	380

No Average limit is defined for the upper band edge.

UNII2c: 802.11ac40

30 to 1000 MHz
Mid Channel – 5590MHz - both chains transmitting
Horizontal Polarization

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Horizontal QP

Customer / Model # - comma.ai / LightningHard SOM

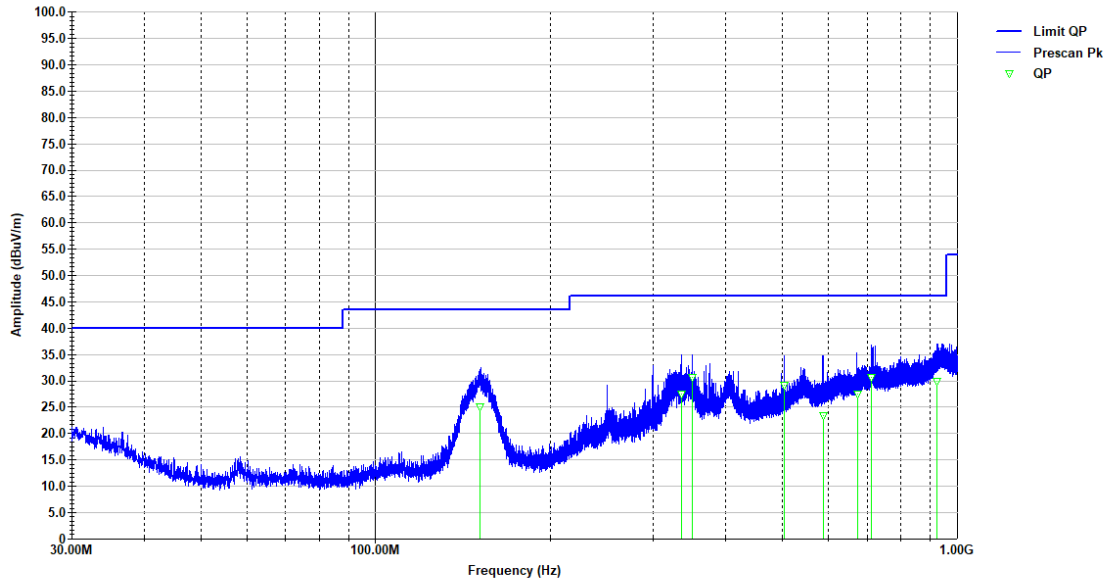
Serial # - N/A

Test Mode - TX99, ext. DC power supply

Operator - AG

Standard - FCC Class B

Comments - 5590MHz, 802.11ac40 UNII2c VHT40, pwr 13, mcs10



5590 13 mcs0 FCC 15.407 RE 30M-1GHz.til

Last Data Update 05:44:00 PM, Friday, March 22, 2024

Quasi-Peak Data

Freq. (MHz)	Final QP (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
151.084582	25.07	-27.5	-18.45	43.52	185	334
335.932389	27.56	-22.22	-18.46	46.02	129	45
349.992985	30.71	-21.02	-15.31	46.02	248	291
504.062983	29.18	-16.58	-16.84	46.02	100	285
589.156022	23.44	-14.69	-22.58	46.02	177	201
674.718706	27.51	-12.5	-18.51	46.02	100	263
713.145739	30.58	-11.9	-15.44	46.02	100	175
923.535331	29.88	-8.84	-16.14	46.02	122	44

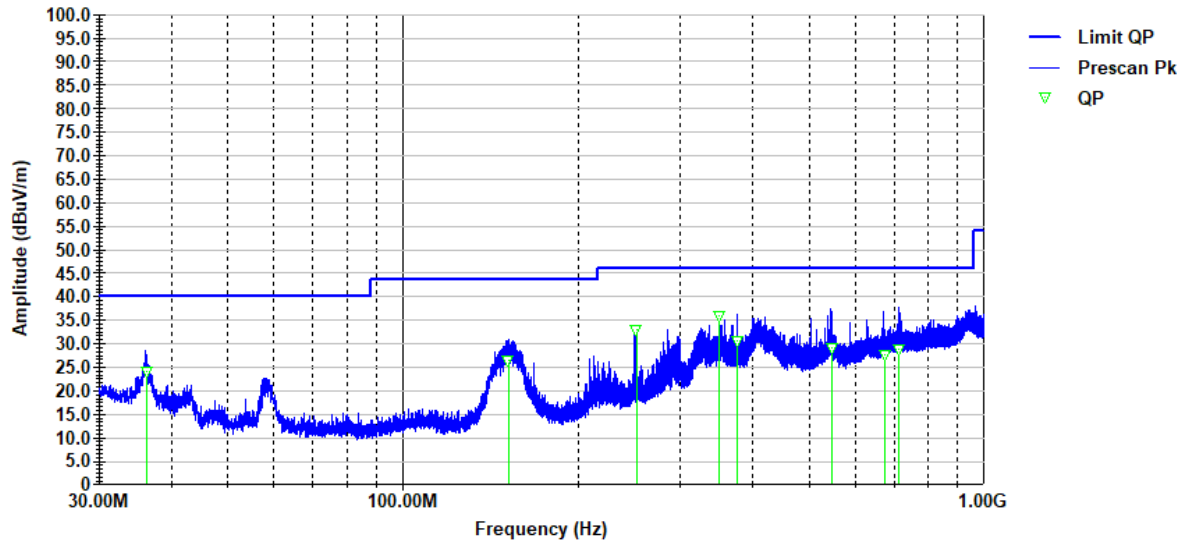
Vertical Polarization

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Vertical QP

Customer / Model # - comma.ai / LightningHard SOM
Serial # - N/A
Test Mode - TX99, ext. DC power supply
Operator - AG
Standard - FCC Class B
Comments - 5590MHz, 802.11ac40 UNII2c VHT40, pwr 13, mcs10



5590 13 mcs0 FCC 15.407 RE 30M-1GHz.til

Last Data Update 05:17:28 PM, Friday, March 22, 2024

Quasi-Peak Data

Freq. (MHz)	Final QP (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
36.194573	24	-24.82	-16	40	100	-20
151.680048	26.57	-27.3	-16.95	43.52	154	219
251.978756	33.08	-24.28	-12.94	46.02	100	362
349.998906	35.95	-21.02	-10.07	46.02	100	14
374.989005	30.53	-20.18	-15.49	46.02	118	380
545.985699	29.27	-13.87	-16.75	46.02	100	319
673.404527	27.55	-12.53	-18.47	46.02	361	75
711.814018	28.7	-11.88	-17.32	46.02	146	221

1 to 18 GHz Low Channel – 5510MHz - both chains transmitting Horizontal Polarization

SGS NA, San Diego Regulatory Lab

Customer / Model # - comma.ai / LightningHard SOM

Radiated Emissions

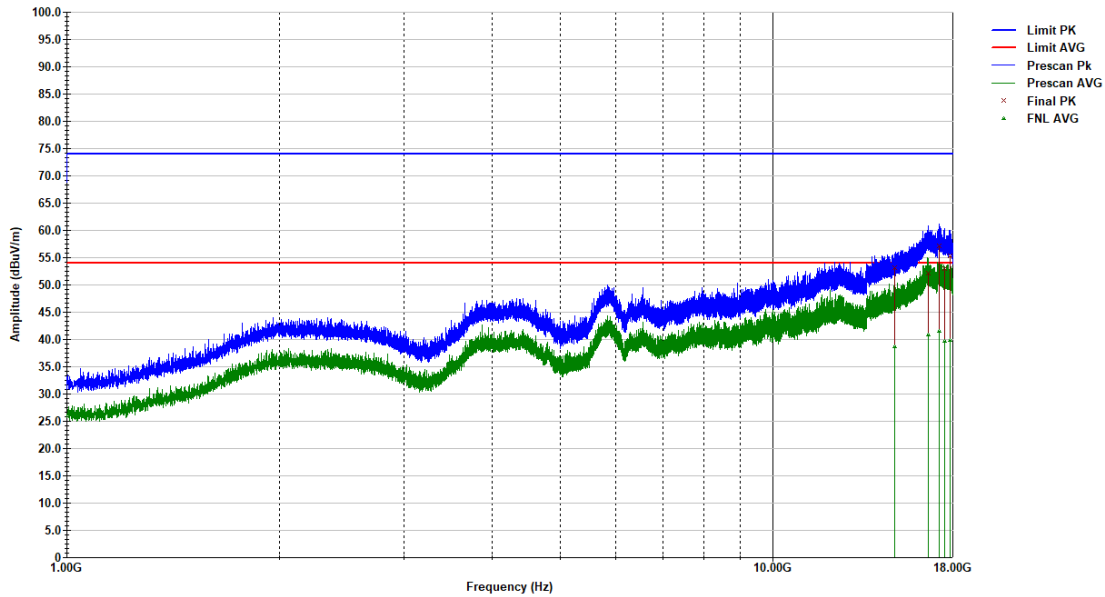
Test Mode - TX, 6GHz HPF

Horizontal AVG

Operator - AG

Standard - FCC Class B

Comments - 5510MHz, 802.11ac40 VHT40, pwr 13, mcs0



5510 13 mcs0 RE CISPR SW1A NC 3117 w lambda lna AVG 1G-18G 06Feb2024.ttl

Last Data Update 04:01:57 PM, Wednesday, March 20, 2024

Peak Data

Freq. (MHz)	Final PK (dBuV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBuV/m)	Ant. Height (cm)	Azimuth (deg.)
13604.04895	52.23	26.28	-21.77	74	194	48
15692.77282	53.01	30.09	-20.99	74	302	218
16559.19102	55.3	33.36	-18.7	74	310	-4
17311.37149	53.35	32.49	-20.65	74	334	114
17760.50219	51.6	31.87	-22.4	74	240	244

Average

Freq. (MHz)	Final AVG (dBuV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBuV/m)	Ant. Height (cm)	Azimuth (deg.)
13604.04895	37.86	0.15	26.28	-16.14	54	194	48
15692.77282	39.86	0.15	30.09	-14.14	54	302	218
16559.19102	41.28	0.15	33.36	-12.72	54	310	-4
17311.37149	40.74	0.15	32.49	-13.26	54	334	114
17760.50219	40.01	0.15	31.87	-13.99	54	240	244

Vertical Polarization

SGS NA, San Diego Regulatory Lab

Customer / Model # - comma.ai / LightningHard SOM

Radiated Emissions

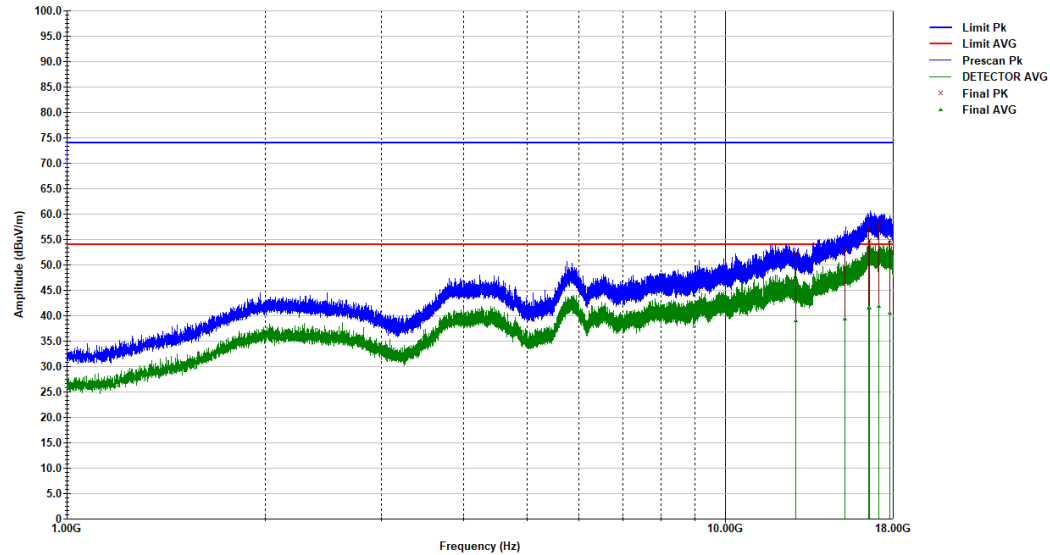
Test Mode - TX, 6GHz HPF

Operator - AG

Standard - FCC Class B

Comments - 5510MHz, 802.11ac40 VHT40, pwr 13, mcs0

Vertical AVG



5510 13 mcs0 RE CISPR SW1A NC 3117 w lambda Ina AVG 1G-18G 06Feb2024.ttl

Last Data Update 03:45:36 PM, Wednesday, March 20, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
12784.57585	52.39	26.23	-21.61	74	366	295
15198.5701	53.08	28.85	-20.92	74	187	242
16535.0044	57.23	33.25	-16.77	74	202	51
16572.8105	54.86	33.42	-19.14	74	218	202
17109.05825	57.95	32.77	-16.05	74	280	167
17799.1601	54.9	31.83	-19.1	74	350	103

Average

Freq. (MHz)	Final AVG (dBμV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
12784.57585	39.24	0.3	26.23	-14.76	54	366	295
15198.5701	39.63	0.3	28.85	-14.37	54	187	242
16535.0044	41.76	0.3	33.25	-12.24	54	202	51
16572.8105	41.74	0.3	33.42	-12.26	54	218	202
17109.05825	42.08	0.3	32.77	-11.92	54	280	167
17799.1601	40.75	0.3	31.83	-13.25	54	350	103

Lower band edge falling to restricted band Horizontal Polarization

SGS NA, San Diego Regulatory Lab

Model # - comma.ai

Radiated Emissions

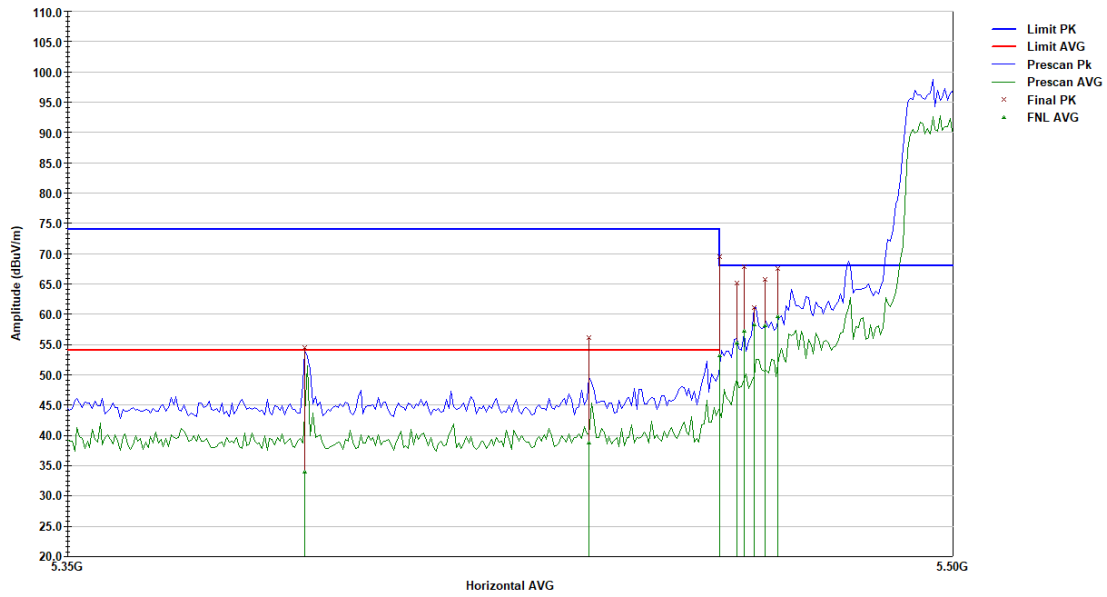
Test Mode - Tx mode, Lower Band-Edge

Horizontal AVG

Operator - AG

Standard - FCC Class B

Comments - 5510MHz, 802.11ac40 VH40, pwr 13, mcs0



5510 13 mcs0 RE Lower Band-Edge.ttl

Last Data Update 11:39:13 AM, Tuesday, May 28, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
5389.82501	54.52	7.78	-19.48	74	150	327
5437.85001	56.22	7.93	-17.78	74	150	0
5460.00001	69.51	7.93	-3.89	73.4	150	-10
5462.925	65.11	7.93	-2.89	68	150	-20
5464.20001	67.88	7.93	-0.12	68	150	347
5465.90001	61.09	7.93	-6.91	68	156	344
5467.82501	65.77	7.93	-2.23	68	171	-20
5470.00001	67.59	7.93	-0.41	68	163	347

Average

Freq. (MHz)	Final AVG (dBµV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Ant. Height (cm)	Azimuth (deg.)
5389.82501	34.21	0.3	7.78	-19.79	54	150	327
5437.85001	39.01	0.3	7.93	-14.99	54	150	0
5460.00001	53.5	0.3	7.93	N/A	No AVG limit	150	-10
5462.925	55.56	0.3	7.93	N/A	No AVG limit	150	-20
5464.20001	57.54	0.3	7.93	N/A	No AVG limit	150	347
5465.90001	58.46	0.3	7.93	N/A	No AVG limit	156	344
5467.82501	58.41	0.3	7.93	N/A	No AVG limit	171	-20
5470.00001	59.89	0.3	7.93	N/A	No AVG limit	163	347

Vertical Polarization

SGS NA, San Diego Regulatory Lab

Model # - comma.ai

Radiated Emissions

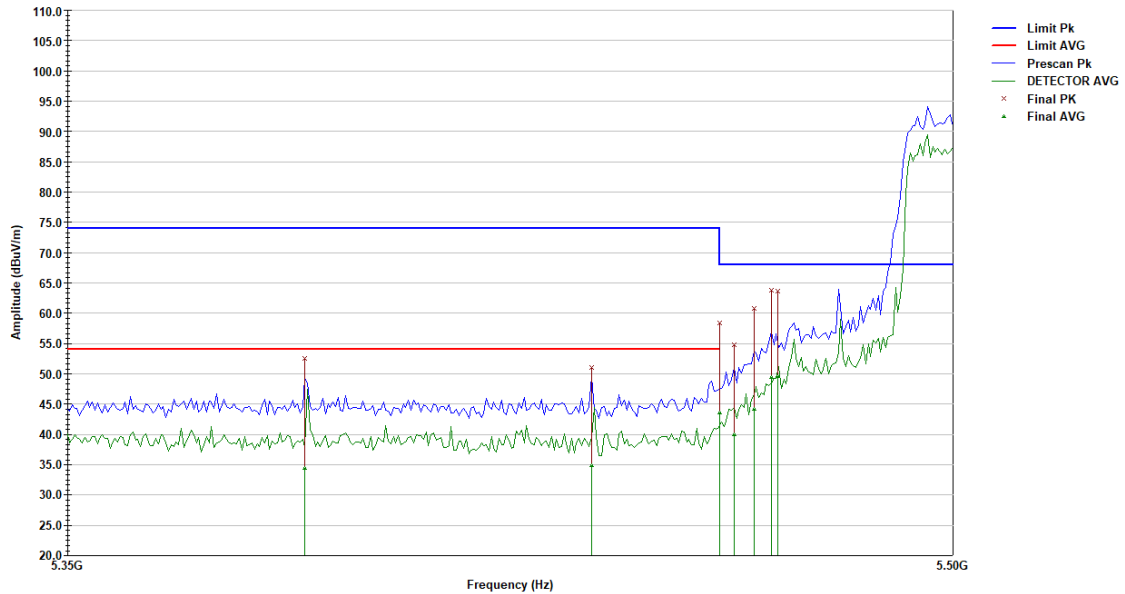
Test Mode - Tx mode, Lower Band-Edge

Vertical AVG

Operator - AG

Standard - FCC Class B

Comments - 5510MHz, 802.11ac40 VH40, pwr 13, mcs0



5510 13 mcs0 RE Lower Band-Edge.ttl

Last Data Update 10:54:32 AM, Tuesday, May 28, 2024

Peak Data

Freq. (MHz)	Final PK (dBuV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBuV/m)	Ant. Height (cm)	Azimuth (deg.)
5389.82501	52.58	7.78	-21.42	74	179	80
5438.275	51.07	7.93	-22.93	74	163	76
5460	58.38	7.93	-15.62	74	365	84
5462.5	54.76	7.93	-13.24	68	358	140
5465.9	60.81	7.93	-7.19	68	390	133
5468.87501	63.84	7.93	-4.16	68	373	249
5470.00001	63.64	7.93	-4.36	68	327	51

Average

Freq. (MHz)	Final AVG (dBμV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
5389.82501	34.67	0.3	7.78	-19.33	54	179	80
5438.275	35.21	0.3	7.93	-18.79	54	163	76
5460	43.9	0.3	7.93	-10.1	54	365	84
5462.5	40.31	0.3	7.93	N/A	No AVG limit	358	140
5465.9	44.51	0.3	7.93	N/A	No AVG limit	390	133
5468.87501	49.66	0.3	7.93	N/A	No AVG limit	373	249
5470.00001	49.82	0.3	7.93	N/A	No AVG limit	327	51

Mid Channel – 5590MHz - both chains transmitting Horizontal Polarization

SGS NA, San Diego Regulatory Lab

Customer / Model # - comma.ai / LightningHard SOM

Radiated Emissions

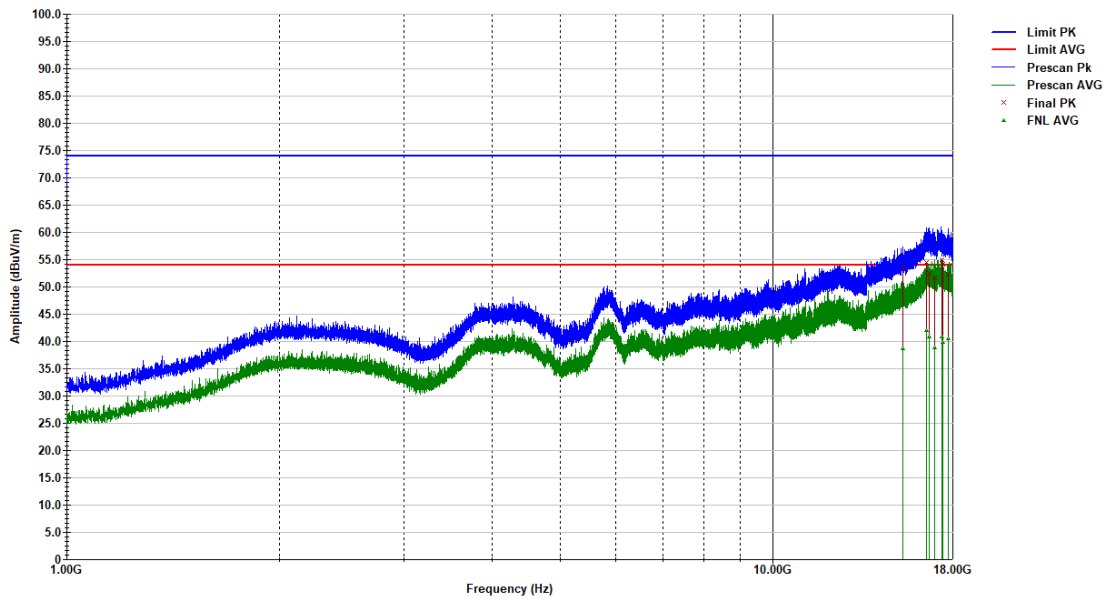
Test Mode - TX, 6GHz HPF

Horizontal AVG

Operator - AG

Standard - FCC Class B

Comments - 5590MHz, 802.11ac40 VHT40, pwr 13, mcs0



5590 13 mcs0 RE CISPR SW1A NC 3117 w lambda lna AVG 1G-18G 06Feb2024.ttl

Last Data Update 04:43:52 PM, Wednesday, March 20, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
15296.50193	53.62	29.14	-20.38	74	400	221
16512.14418	54.55	33.15	-19.45	74	209	296
16647.97235	52.51	33.63	-21.49	74	271	337
16969.96128	51.62	33.22	-22.38	74	309	359
17349.0702	55.01	32.39	-18.99	74	256	3
17436.93518	54.2	32.19	-19.8	74	400	351
17724.45622	52.4	31.91	-21.6	74	171	233

Average

Freq. (MHz)	Final AVG (dBμV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
15296.50193	38.87	0.28	29.14	-15.13	54	400	221
16512.14418	42.22	0.28	33.15	-11.78	54	209	296
16647.97235	41.04	0.28	33.63	-12.96	54	271	337
16969.96128	39.09	0.28	33.22	-14.91	54	309	359
17349.0702	41.09	0.28	32.39	-12.91	54	256	3
17436.93518	40.12	0.28	32.19	-13.88	54	400	351
17724.45622	40.83	0.28	31.91	-13.17	54	171	233

Vertical Polarization

SGS NA, San Diego Regulatory Lab

Customer / Model # - comma.ai / LightningHard SOM

Radiated Emissions

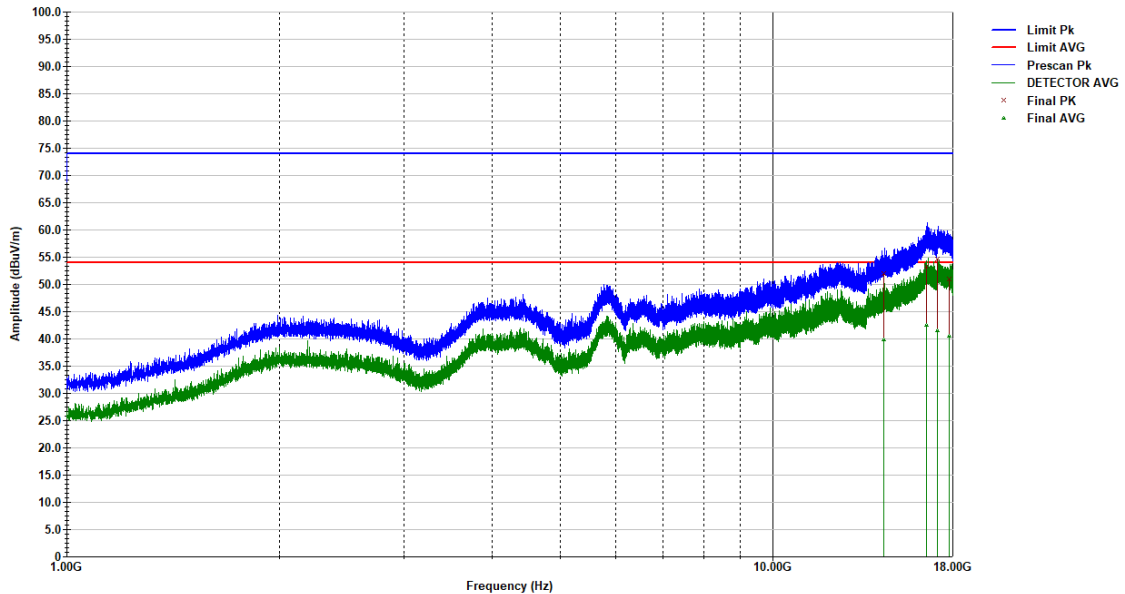
Test Mode - TX, 6GHz HPF

Operator - AG

Vertical AVG

Standard - FCC Class B

Comments - 5590MHz, 802.11ac40 VHT40, pwr 13, mcs0



5590 13 mcs0 RE CISPR SW1A NC 3117 w lambda lna AVG 1G-18G 06Feb2024.ttl

Last Data Update 04:23:57 PM, Wednesday, March 20, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
14377.92425	52.01	27.13	-21.99	74	400	304
16499.4645	53.34	33.1	-20.66	74	264	246
17136.98425	54.71	32.78	-19.29	74	400	169
17787.1554	50.95	31.84	-23.05	74	365	253

Average

Freq. (MHz)	Final AVG (dBμV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
14377.92425	40.04	0.28	27.13	-13.96	54	400	304
16499.4645	42.76	0.28	33.1	-11.24	54	264	246
17136.98425	41.74	0.28	32.78	-12.26	54	400	169
17787.1554	40.79	0.28	31.84	-13.21	54	365	253

High Channel – 5670MHz - both chains transmitting Horizontal Polarization

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Horizontal AVG

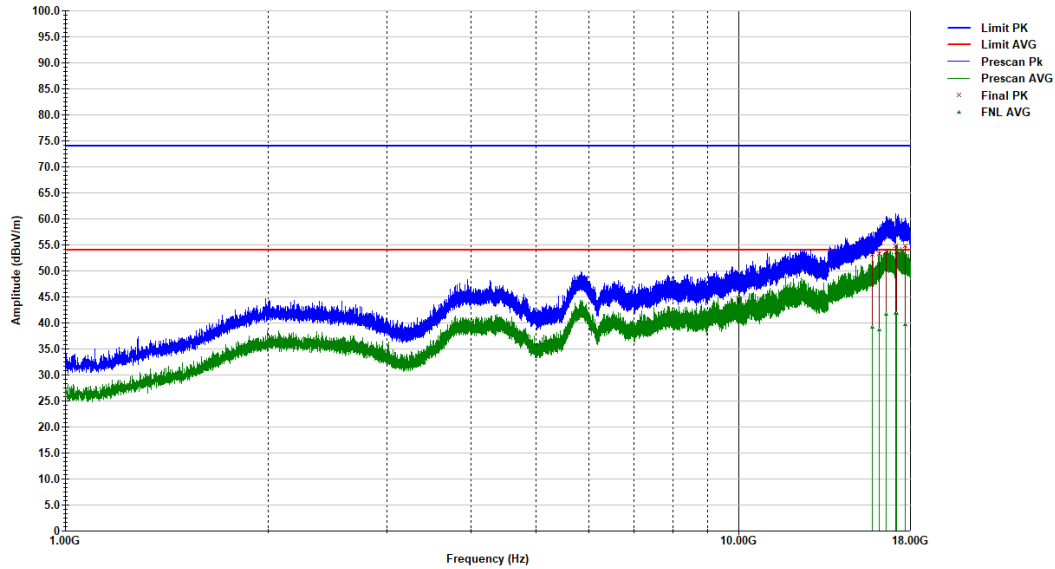
Customer / Model # - comma.ai / LightningHard SOM

Test Mode - TX, 6GHz HPF

Operator - AG

Standard - FCC Class B

Comments - 5670MHz, 802.11ac40 VHT40, pwr 13, mcs0



5670 13 mcs0 RE CISPR SW1A NC 3117 w lambda lna AVG 1G-18G 06Feb2024.til

Last Data Update 05:40:49 PM, Wednesday, March 20, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
15802.16884	53.22	30.34	-20.78	74	363	-6
16183.85865	53.23	31.71	-20.77	74	224	116
16548.59782	53.67	33.31	-20.33	74	232	-14
17108.19838	54.77	32.77	-19.23	74	385	79
17190.87227	53.58	32.8	-20.42	74	263	112
17661.89064	54.89	31.98	-19.11	74	224	242

Average

Freq. (MHz)	Final AVG (dBμV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
15802.16884	39.43	0.3	30.34	-14.57	54	363	-6
16183.85865	39	0.3	31.71	-15	54	224	116
16548.59782	42.03	0.3	33.31	-11.97	54	232	-14
17108.19838	42.07	0.3	32.77	-11.93	54	385	79
17190.87227	42.2	0.3	32.8	-11.8	54	263	112
17661.89064	39.97	0.3	31.98	-14.03	54	224	242

Vertical Polarization

SGS NA, San Diego Regulatory Lab

Customer / Model # - comma.ai / LightningHard SOM

Radiated Emissions

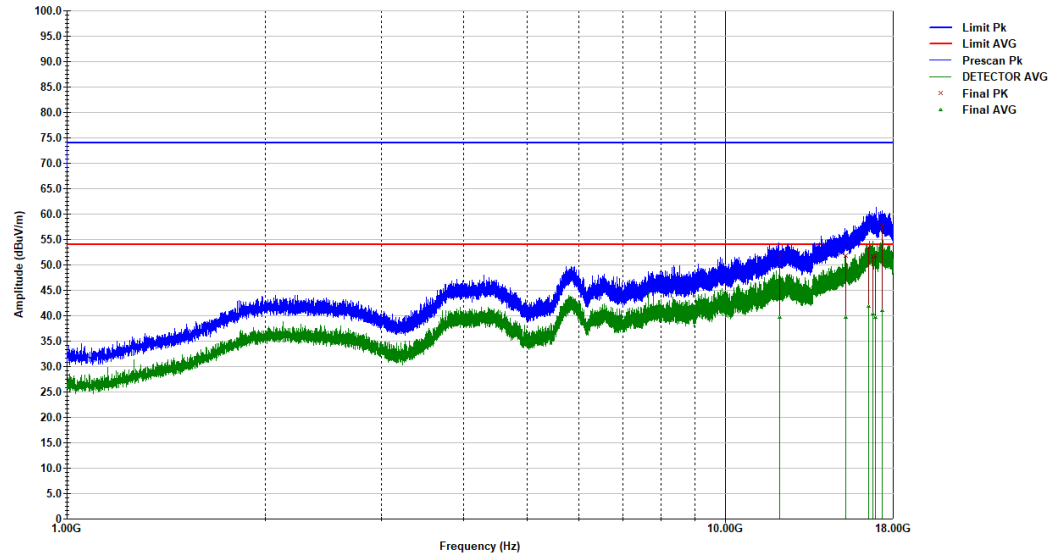
Test Mode - TX, 6GHz HPF

Operator - AG

Standard - FCC Class B

Comments - 5670MHz, 802.11ac40 VHT40, pwr 13, mcs0

Vertical AVG



5670 13 mcs0 RE CISPR SW1A NC 3117 w lambda Ina AVG 1G-18G 06Feb2024.ttl

Last Data Update 05:23:14 PM, Wednesday, March 20, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
12086.0564	52.08	25.42	-21.92	74	365	21
15228.39	51.75	28.94	-22.25	74	357	250
16524.71685	53.43	33.21	-20.57	74	256	306
16758.04	51.67	33.57	-22.33	74	233	157
16917.3794	51.9	33.39	-22.1	74	225	13
17306.58125	57.66	32.5	-16.34	74	342	81

Average

Freq. (MHz)	Final AVG (dBμV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
12086.0564	39.99	0.3	25.42	-14.01	54	365	21
15228.39	39.89	0.3	28.94	-14.11	54	357	250
16524.71685	42.16	0.3	33.21	-11.84	54	256	306
16758.04	40.56	0.3	33.57	-13.44	54	233	157
16917.3794	39.95	0.3	33.39	-14.05	54	225	13
17306.58125	41.27	0.3	32.5	-12.73	54	342	81

Upper band edge falling to restricted band Horizontal Polarization

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Horizontal AVG

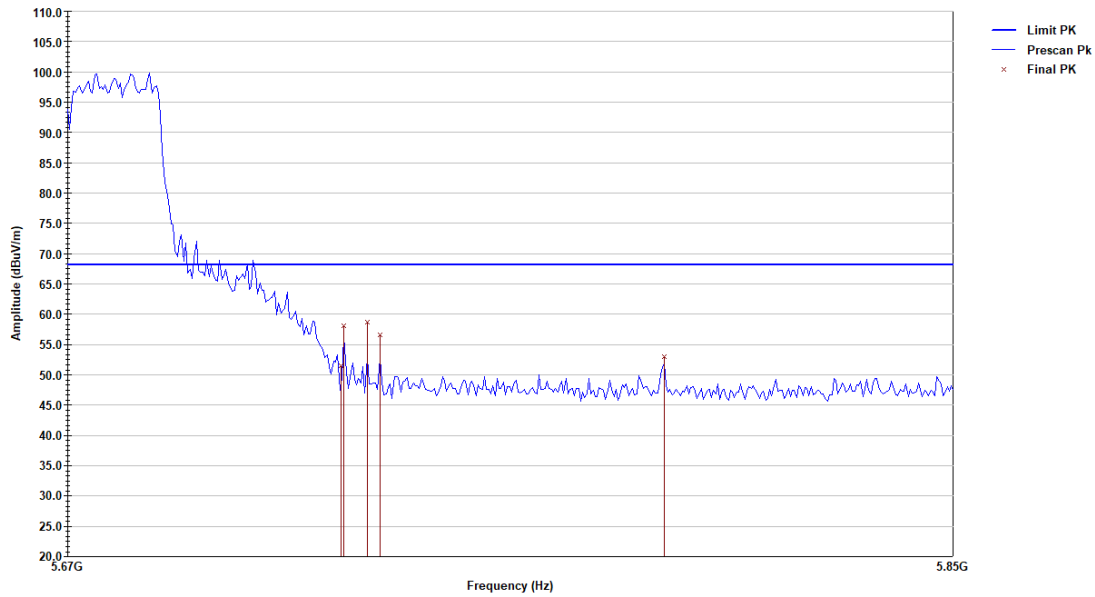
Model # - comma.ai

Test Mode - Tx mode, Upper Band-Edge

Operator - AG

Standard - FCC Class B

Comments - 5670MHz, 802.11ac40 VH40, pwr 13, mcs0



5670 13 mcs0 RE Upper Band-Edge.ttl

Last Data Update 06:45:19 PM, Thursday, May 30, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
5275.00001	45.36	7.42	-22.84	68.2	378	288
5275.575	44.87	7.43	-23.33	68.2	178	154
5730.25	58.71	9.15	-9.49	68.2	393	346
5732.8	56.59	9.15	-11.61	68.2	331	359
5790.6	53.07	9.23	-15.13	68.2	311	366

No Average limit is defined for the upper band edge.

Vertical Polarization

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Vertical AVG

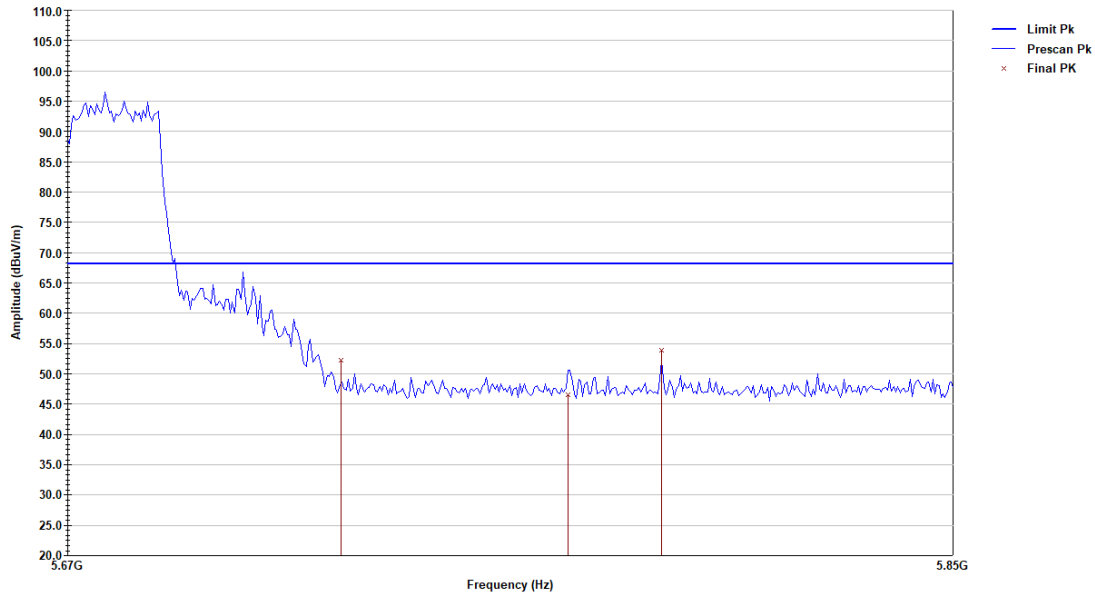
Model # - comma.ai

Test Mode - Tx mode, Upper Band-Edge

Operator - AG

Standard - FCC Class B

Comments - 5670MHz, 802.11ac40 VH40, pwr 13, mcs0



5670 13 mcs0 RE Upper Band-Edge.til

Last Data Update 12:00:44 PM, Tuesday, May 28, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
5725	52.24	9.15	-15.96	68.2	381	55
5771.05001	46.58	9.16	-21.62	68.2	365	80
5790.175	53.88	9.23	-14.32	68.2	389	84

o Average limit is defined for the upper band edge.

UNII2c: 802.11ac80

30 to 1000 MHz High Channel – 5610MHz - both chains transmitting Horizontal Polarization

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Horizontal QP

Customer / Model # - comma.ai / LightningHard SOM

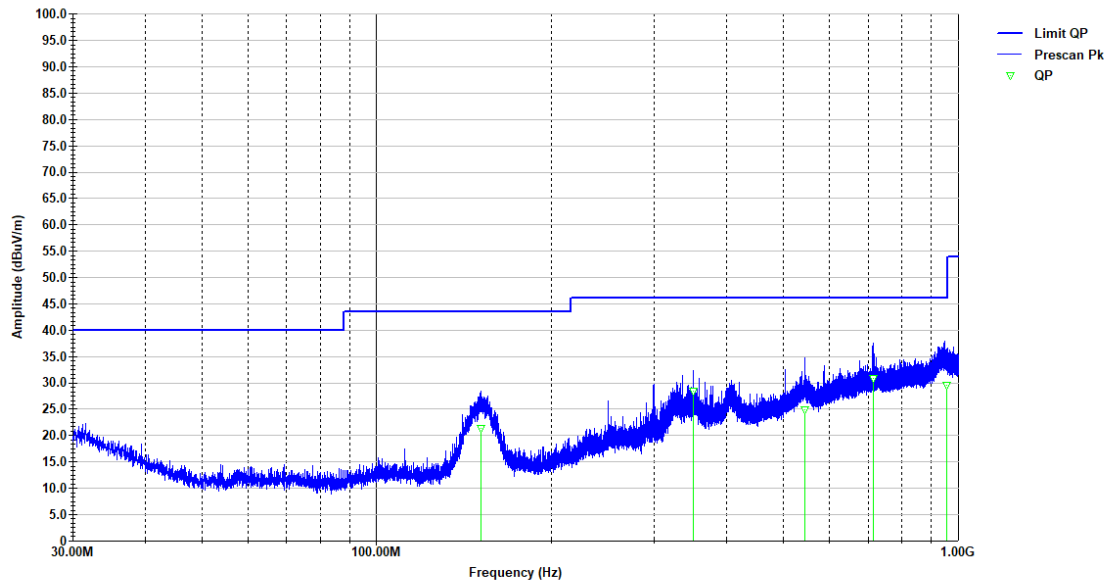
Serial # - N/A

Test Mode - TX99, ext. DC power supply

Operator - AG

Standard - FCC Class B

Comments - 5610MHz, 802.11ac80 UNII2c VHT80, pwr 13, mcs10



5610 13 mcs0 FCC 15.407 RE 30M-1GHz.ttl

Last Data Update 06:32:10 PM, Friday, March 22, 2024

Quasi-Peak Data

Freq. (MHz)	Final QP (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
150.859571	21.38	-27.56	-22.14	43.52	161	342
349.998906	28.35	-21.02	-17.67	46.02	106	377
544.689877	24.84	-13.83	-21.18	46.02	106	283
714.492415	30.83	-11.91	-15.19	46.02	100	320
954.449309	29.58	-8.55	-16.44	46.02	280	189

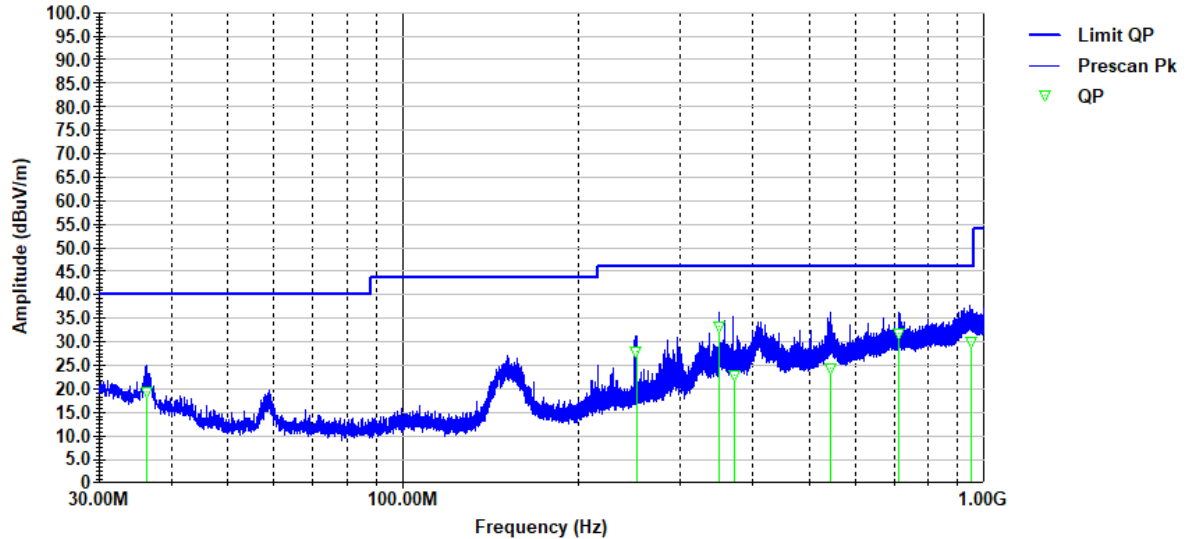
Vertical Polarization

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Vertical QP

Customer / Model # - comma.ai / LightningHard SOM
Serial # - N/A
Test Mode - TX99, ext. DC power supply
Operator - AG
Standard - FCC Class B
Comments - 5610MHz, 802.11ac80 UNII2c VHT80, pwr 13, mcs10



5610 13 mcs0 FCC 15.407 RE 30M-1GHz.til

Last Data Update 06:17:21 PM, Friday, March 22, 2024

Quasi-Peak Data

Freq. (MHz)	Final QP (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
36.188702	19.29	-24.82	-20.71	40	100	134
251.960498	27.94	-24.28	-18.08	46.02	114	380
349.998906	33.27	-21.02	-12.75	46.02	100	269
370.994836	22.96	-20.1	-23.06	46.02	154	350
543.91647	24.42	-13.84	-21.6	46.02	186	311
713.842254	31.64	-11.91	-14.38	46.02	100	195
949.07251	30.11	-8.36	-15.91	46.02	226	142

1 to 18 GHz Low Channel – 5530MHz - both chains transmitting Horizontal Polarization

SGS NA, San Diego Regulatory Lab

Customer / Model # - comma.ai / LightningHard SOM

Radiated Emissions

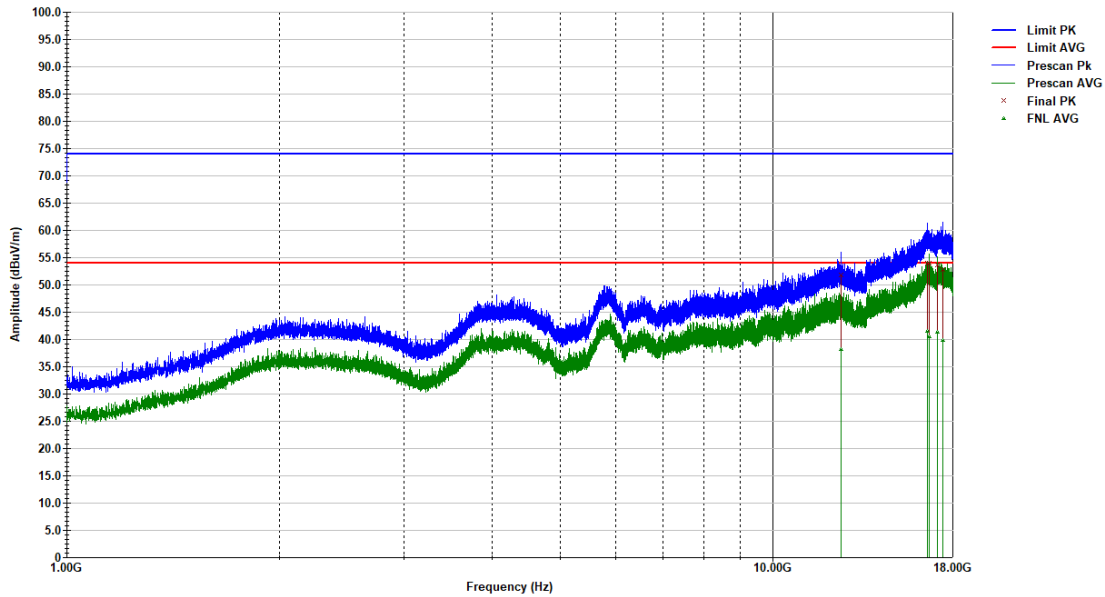
Test Mode - TX, 6GHz HPF

Horizontal AVG

Operator - AG

Standard - FCC Class B

Comments - 5530MHz, 802.11ac80 VHT80, pwr 13, mcs0



5530 13 mcs0 RE CISPR SW1A NC 3117 w lambda lna AVG 1G-18G 06Feb2024 - Copy.ttl

Last Data Update 06:26:21 PM, Wednesday, March 20, 2024

Peak Data

Freq. (MHz)	Final PK (dBuV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBuV/m)	Ant. Height (cm)	Azimuth (deg.)
12489.63294	51.84	26.01	-22.16	74	349	139
16554.59931	53.96	33.34	-20.04	74	256	283
16673.98109	54.02	33.62	-19.98	74	371	39
17128.33393	53.68	32.78	-20.32	74	150	242
17434.98178	52.89	32.19	-21.11	74	263	314

Average

Freq. (MHz)	Final AVG (dBuV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBuV/m)	Ant. Height (cm)	Azimuth (deg.)
12489.63294	38.78	0.57	26.01	-15.22	54	349	139
16554.59931	42.05	0.57	33.34	-11.95	54	256	283
16673.98109	41.03	0.57	33.62	-12.97	54	371	39
17128.33393	41.87	0.57	32.78	-12.13	54	150	242
17434.98178	40.47	0.57	32.19	-13.53	54	263	314

Vertical Polarization

SGS NA, San Diego Regulatory Lab

Customer / Model # - comma.ai / LightningHard SOM

Radiated Emissions

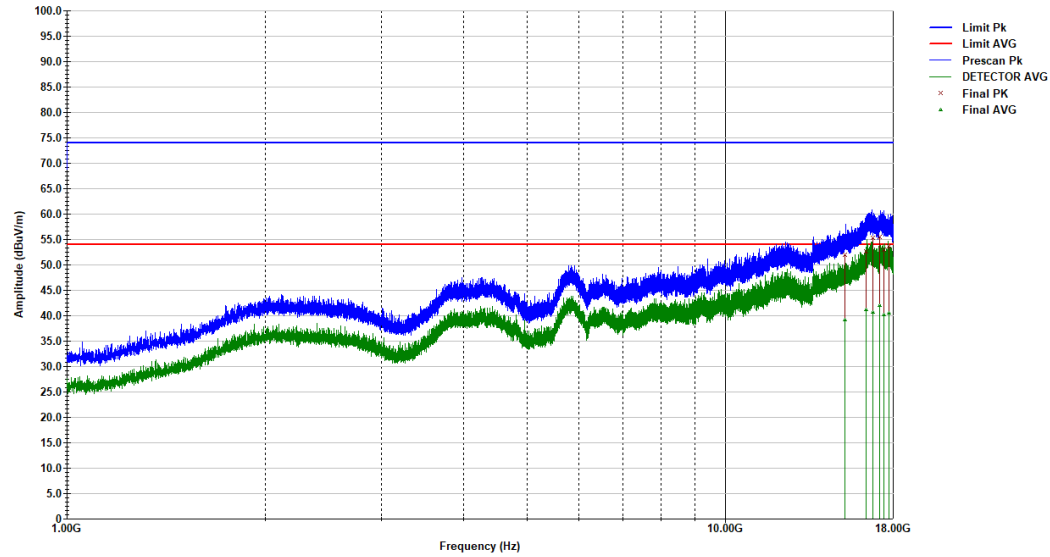
Test Mode - TX, 6GHz HPF

Operator - AG

Vertical AVG

Standard - FCC Class B

Comments - 5530MHz, 802.11ac80 VHT80, pwr 13, mcs0



5530 13 mcs0 RE CISPR SW1A NC 3117 w lambda Ina AVG 1G-18G 06Feb2024 - Copy.tif

Last Data Update 06:12:49 PM, Wednesday, March 20, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
15206.185	51.93	28.87	-22.07	74	150	167
16384.3785	52.71	32.58	-21.29	74	373	-20
16744.73675	55.32	33.58	-18.68	74	249	349
17173.314	55.49	32.8	-18.51	74	226	211
17434.8504	52.93	32.19	-21.07	74	265	358
17746.59925	53.71	31.89	-20.29	74	327	314

Average

Freq. (MHz)	Final AVG (dBμV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
15206.185	39.8	0.57	28.87	-14.2	54	150	167
16384.3785	41.73	0.57	32.58	-12.27	54	373	-20
16744.73675	41.21	0.57	33.58	-12.79	54	249	349
17173.314	42.51	0.57	32.8	-11.49	54	226	211
17434.8504	40.67	0.57	32.19	-13.33	54	265	358
17746.59925	41.02	0.57	31.89	-12.98	54	327	314

Lower band edge falling to restricted band Horizontal Polarization

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Horizontal AVG

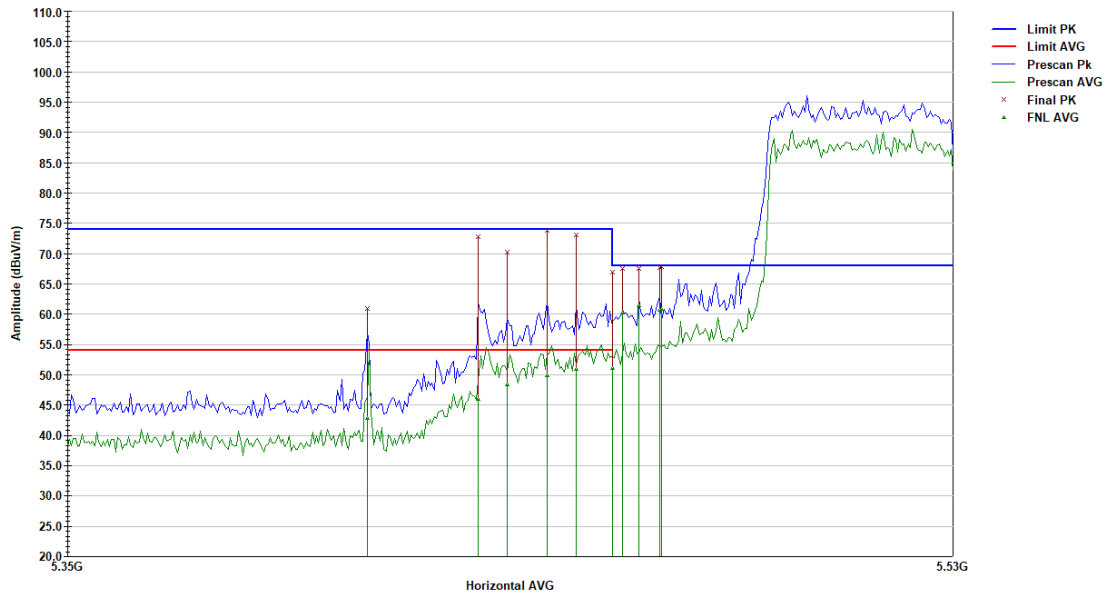
Model # - comma.ai

Test Mode - Tx mode, Lower Band-Edge

Operator - AG

Standard - FCC Class B

Comments - 5530MHz, 802.11ac80 VHT80, pwr 13, mcs0



5530 13 mcs0 RE Lower Band-Edge.ttl

Last Data Update 02:26:19 PM, Tuesday, May 28, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
4458.675	44.17	5.66	-29.83	74	186	286
5410.225	60.96	7.84	-13.04	74	171	-20
5432.75001	72.8	7.93	-1.2	74	400	1
5438.70001	70.23	7.93	-3.77	74	150	331
5446.775	73.81	7.93	-0.19	74	333	359
5452.725	73.04	7.93	-0.96	74	155	-12
5460	66.97	7.93	-7.03	74	155	345
5462.07501	67.53	7.93	-0.47	68	150	355
5465.47501	67.6	7.93	-0.4	68	163	-8
5469.72501	67.7	7.93	-0.3	68	150	346
5470	67.82	7.93	-0.18	68	150	352

Average

Freq. (MHz)	Final AVG (dBµV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Ant. Height (cm)	Azimuth (deg.)
4458.675	33.43	0.57	5.66	-20.57	54	186	286
5410.225	43.37	0.57	7.84	-10.63	54	171	-20
5432.75001	46.52	0.57	7.93	-7.48	54	400	1
5438.70001	48.93	0.57	7.93	-5.07	54	150	331
5446.775	50.45	0.57	7.93	-3.55	54	333	359
5452.725	51.52	0.57	7.93	-2.48	54	155	-12
5460	51.66	0.57	7.93	-2.34	54	155	345
5462.07501	60.77	0.57	7.93	N/A	No AVG limit	150	355
5465.47501	62.02	0.57	7.93	N/A	No AVG limit	163	-8
5469.72501	61.29	0.57	7.93	N/A	No AVG limit	150	346
5470	61.36	0.57	7.93	N/A	No AVG limit	150	352

Vertical Polarization

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Vertical AVG

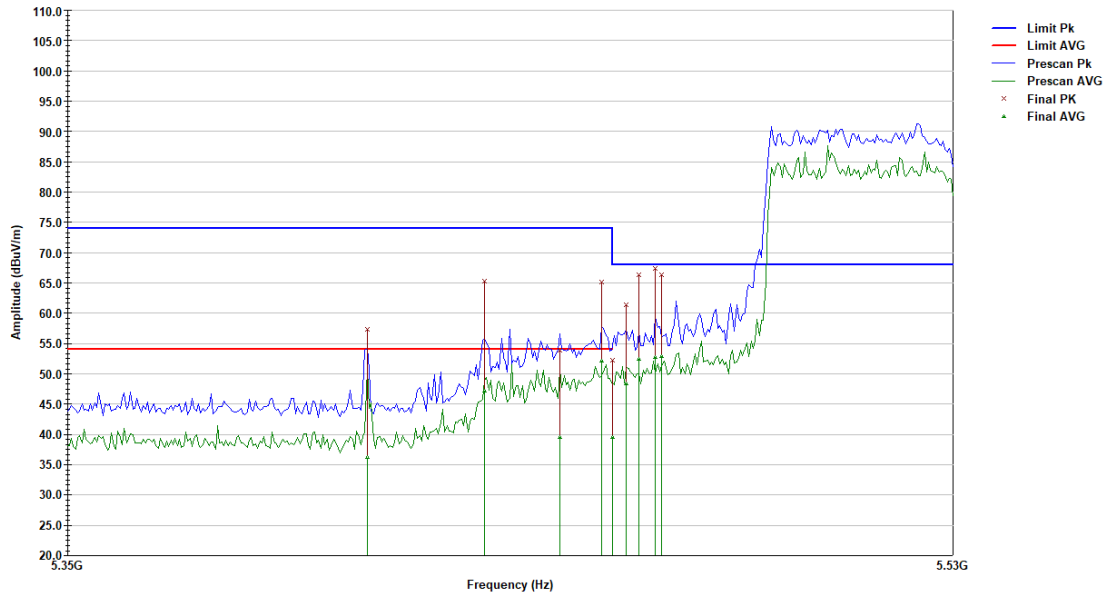
Model # - comma.ai

Test Mode - Tx mode, Lower Band-Edge

Operator - AG

Standard - FCC Class B

Comments - 5530MHz, 802.11ac80 VHT80, pwr 13, mcs0



5530 13 mcs0 RE Lower Band-Edge.ttl

Last Data Update 12:54:46 PM, Tuesday, May 28, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
5410.225	57.31	7.84	-16.69	74	289	77
5434.025	65.24	7.93	-8.76	74	390	76
5449.32501	53.82	7.93	-20.18	74	280	-20
5457.825	65.17	7.93	-8.83	74	400	91
5460.00001	52.3	7.93	-15.7	68	217	-20
5462.92501	61.45	7.93	-6.55	68	341	129
5465.47501	66.32	7.93	-1.68	68	400	87
5468.87501	67.39	7.93	-0.61	68	400	76
5470.00001	66.42	7.93	-1.58	68	388	76

Average

Freq. (MHz)	Final AVG (dBμV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
5410.225	36.69	0.57	7.84	-17.31	54	289	77
5434.025	47.7	0.57	7.93	-6.3	54	390	76
5449.32501	40.12	0.57	7.93	-13.88	54	280	-20
5457.825	52.61	0.57	7.93	-1.39	54	400	91
5460.00001	40.01	0.57	7.93	N/A	No AVG limit	217	-20
5462.92501	48.86	0.57	7.93	N/A	No AVG limit	341	129
5465.47501	52.94	0.57	7.93	N/A	No AVG limit	400	87
5468.87501	53.21	0.57	7.93	N/A	No AVG limit	400	76
5470.00001	53.41	0.57	7.93	N/A	No AVG limit	388	76

1 to 18 GHz High Channel – 5610MHz - both chains transmitting Horizontal Polarization

SGS NA, San Diego Regulatory Lab

Customer / Model # - comma.ai / LightningHard SOM

Radiated Emissions

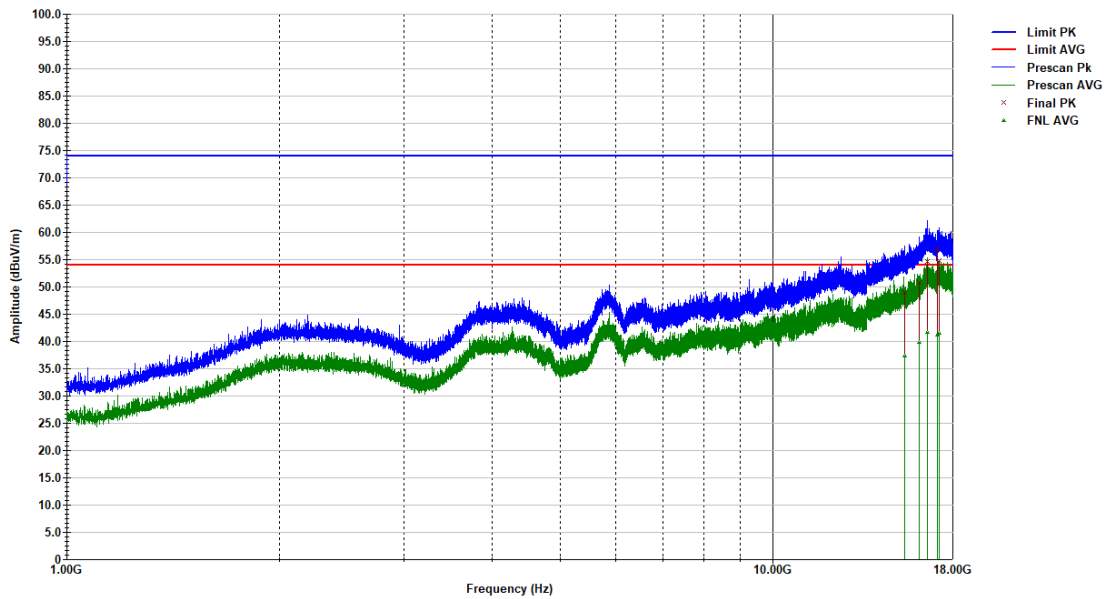
Test Mode - TX, 6GHz HPF

Horizontal AVG

Operator - AG

Standard - FCC Class B

Comments - 5610MHz, 802.11ac80 VHT80, pwr 13, mcs0



5610 13 mcs0 RE CISPR SW1A NC 3117 w lambda lna AVG 1G-18G 06Feb2024.ttl

Last Data Update 07:15:58 PM, Wednesday, March 20, 2024

Peak Data

Freq. (MHz)	Final PK (dBuV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBuV/m)	Ant. Height (cm)	Azimuth (deg.)
15387.03751	48.91	29.4	-25.09	74	294	195
16127.78457	50.86	31.48	-23.14	74	218	225
16558.27335	54.67	33.35	-19.33	74	286	-20
17130.95287	57	32.78	-17	74	186	101
17235.43548	54.8	32.7	-19.2	74	271	288

Average

Freq. (MHz)	Final AVG (dBuV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBuV/m)	Ant. Height (cm)	Azimuth (deg.)
15387.03751	37.85	0.57	29.4	-16.15	54	294	195
16127.78457	40.46	0.57	31.48	-13.54	54	218	225
16558.27335	42.27	0.57	33.35	-11.73	54	286	-20
17130.95287	41.73	0.57	32.78	-12.27	54	186	101
17235.43548	41.98	0.57	32.7	-12.02	54	271	288

Vertical Polarization

SGS NA, San Diego Regulatory Lab

Customer / Model # - comma.ai / LightningHard SOM

Radiated Emissions

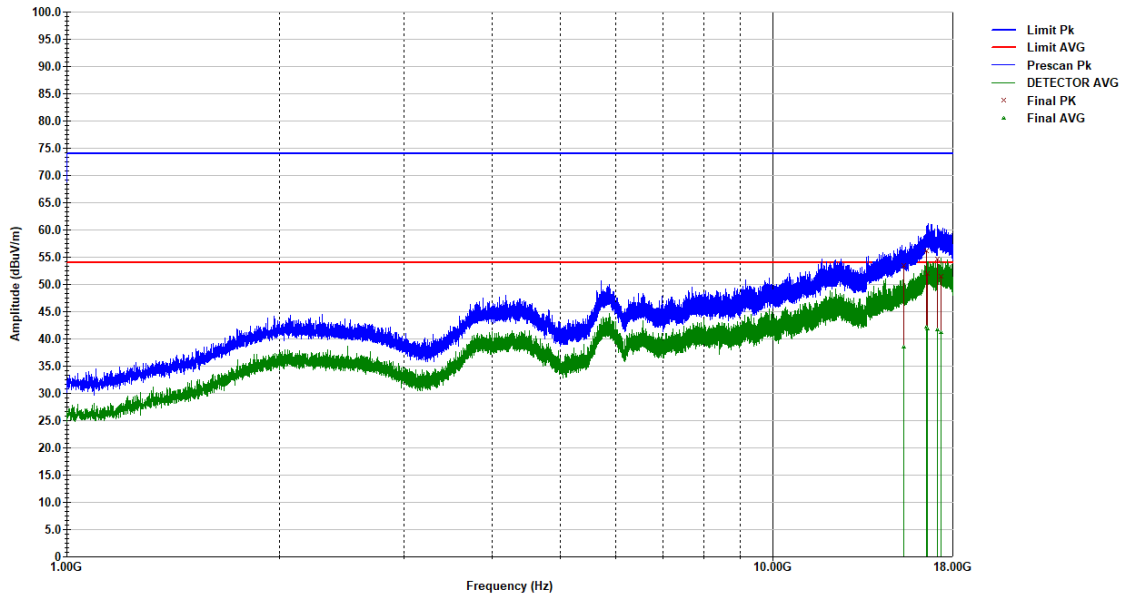
Test Mode - TX, 6GHz HPF

Operator - AG

Vertical AVG

Standard - FCC Class B

Comments - 5610MHz, 802.11ac80 VHT80, pwr 13, mcs0



5610 13 mcs0 RE CISPR SW1A NC 3117 w lambda lna AVG 1G-18G 06Feb2024.ttl

Last Data Update 06:55:40 PM, Wednesday, March 20, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
1534.80761	53.51	29.29	-20.49	74	311	314
16511.6555	56.08	33.15	-17.92	74	265	201
16547.5125	51.91	33.31	-22.09	74	186	3
17122.50525	54.72	32.78	-19.28	74	366	257
17297.2245	51.53	32.52	-22.47	74	365	313

Average

Freq. (MHz)	Final AVG (dBμV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
1534.80761	39.12	0.57	29.29	-14.88	54	311	314
16511.6555	42.75	0.57	33.15	-11.25	54	265	201
16547.5125	42.35	0.57	33.31	-11.65	54	186	3
17122.50525	42.19	0.57	32.78	-11.81	54	366	257
17297.2245	41.67	0.57	32.52	-12.33	54	365	313

Upper band edge falling to restricted band Horizontal Polarization

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Horizontal AVG

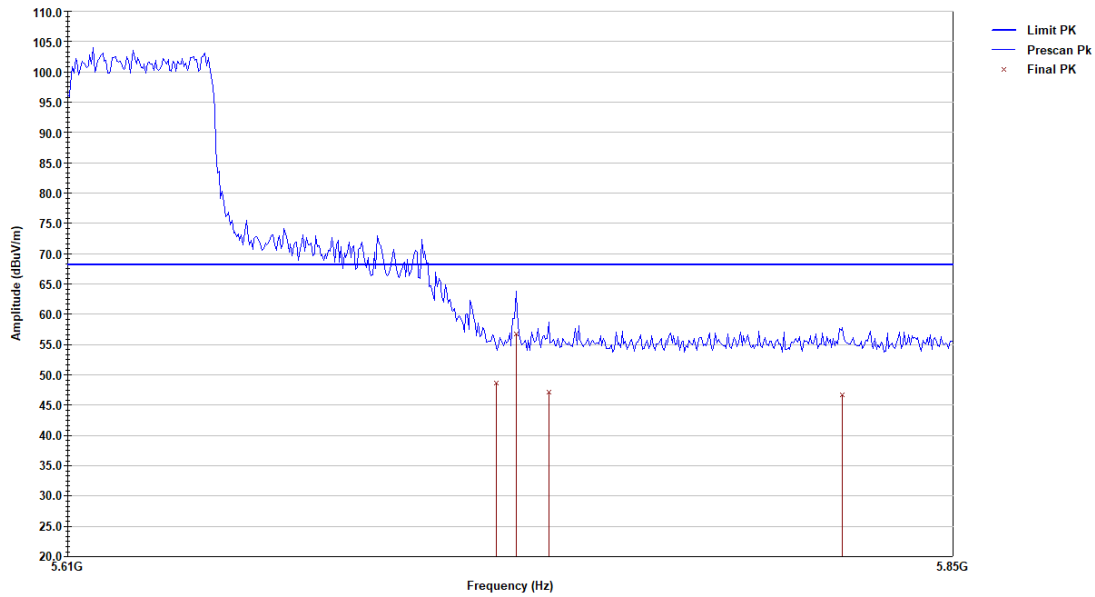
Model # - comma.ai

Test Mode - Tx mode, Upper Band-Edge

Operator - AG

Standard - FCC Class B

Comments - 5610MHz, 802.11ac80 VHT80, pwr 13, mcs0



5610 13 mcs0 RE Upper Band-Edge.ttl

Last Data Update 03:43:59 PM, Tuesday, May 28, 2024

Peak Data

Freq. (MHz)	Final PK (dBuV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBuV/m)	Ant. Height (cm)	Azimuth (deg.)
5725	48.63	9.15	-19.57	68.2	263	-3
5730.25	56.69	9.15	-11.51	68.2	400	335
5739.17501	47.14	9.15	-21.06	68.2	400	366
5819.5	46.75	9.34	-21.45	68.2	348	380

No Average limit is defined for the upper band edge.

Vertical Polarization

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Vertical AVG

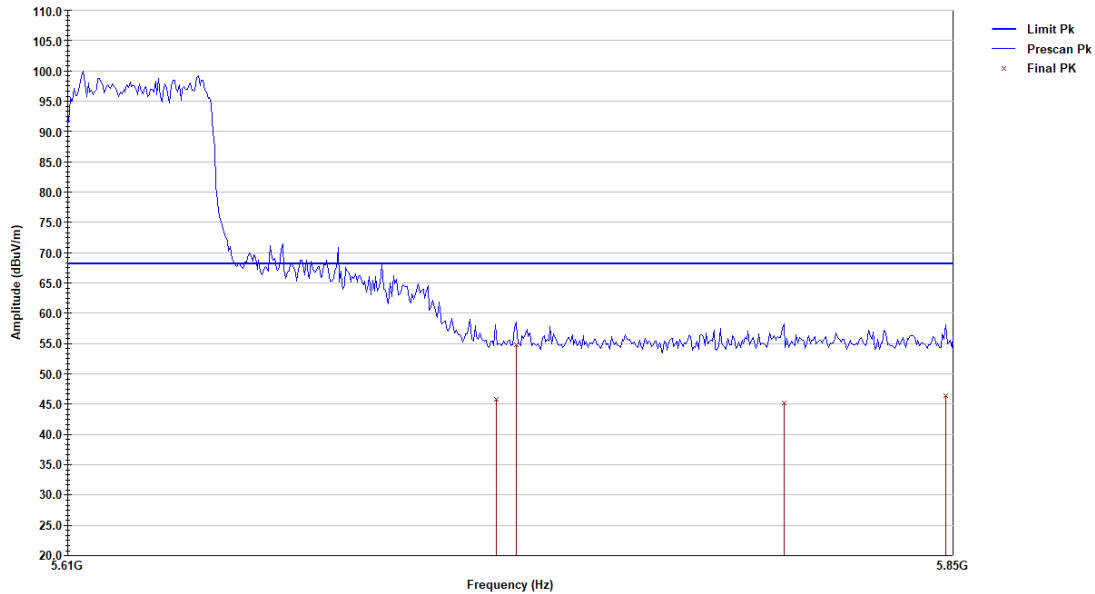
Model # - comma.ai

Test Mode - Tx mode, Upper Band-Edge

Operator - AG

Standard - FCC Class B

Comments - 5610MHz, 802.11ac80 VHT80, pwr 13, mcs0



5610 13 mcs0 RE Upper Band-Edge.til

Last Data Update 03:32:46 PM, Tuesday, May 28, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
5725.00001	45.77	9.15	-22.43	68.2	186	324
5730.25001	54.77	9.15	-13.43	68.2	400	67
5803.35001	45.25	9.28	-22.95	68.2	150	361
5847.975	46.42	9.54	-21.78	68.2	295	47

No Average limit is defined for the upper band edge.

UNII3: 802.11a NOHT

30 to 1000 MHz High Channel – 5825MHz - both chains transmitting Horizontal Polarization

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Horizontal QP

Customer / Model # - comma.ai / LightningHard SOM

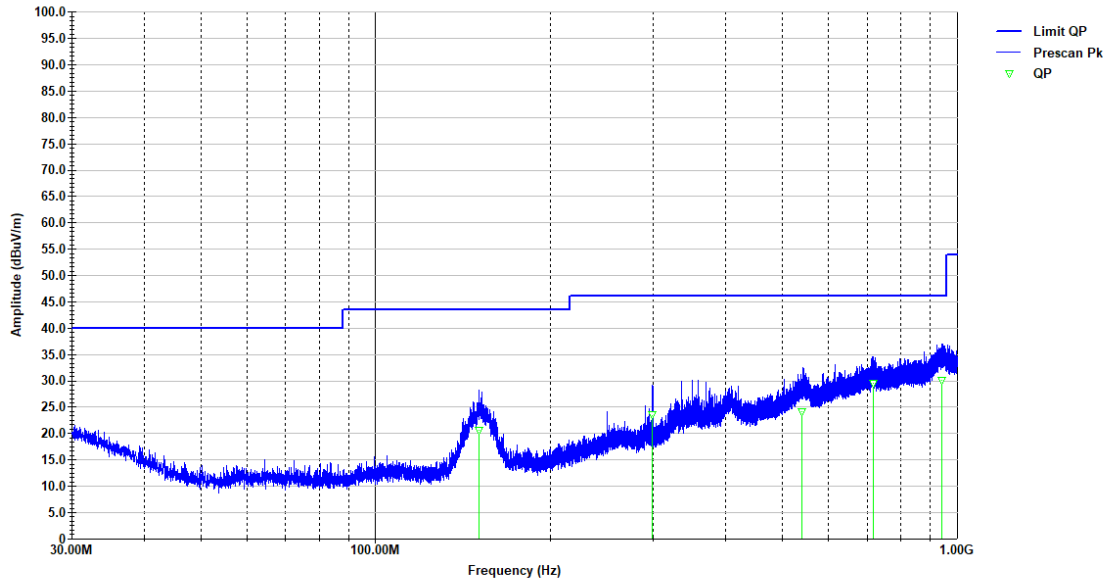
Serial # - N/A

Test Mode - TX99, ext. DC power supply

Operator - AG

Standard - FCC Class B

Comments - 5825MHz, 802.11a UNII3 NOHT, pwr 15, 6Mbps



5825 15 6 FCC 15.407 RE 30M-1GHz.ttl

Last Data Update 07:24:30 PM, Friday, March 22, 2024

Quasi-Peak Data

Freq. (MHz)	Final QP (dBuV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBuV/m)	Ant. Height (cm)	Azimuth (deg.)
150.460481	20.58	-27.68	-22.94	43.52	193	181
298.973065	23.49	-23.54	-22.53	46.02	100	332
541.10435	24.13	-13.89	-21.89	46.02	194	339
716.807565	29.59	-11.9	-16.43	46.02	100	312
941.91675	30.07	-8.3	-15.95	46.02	169	320

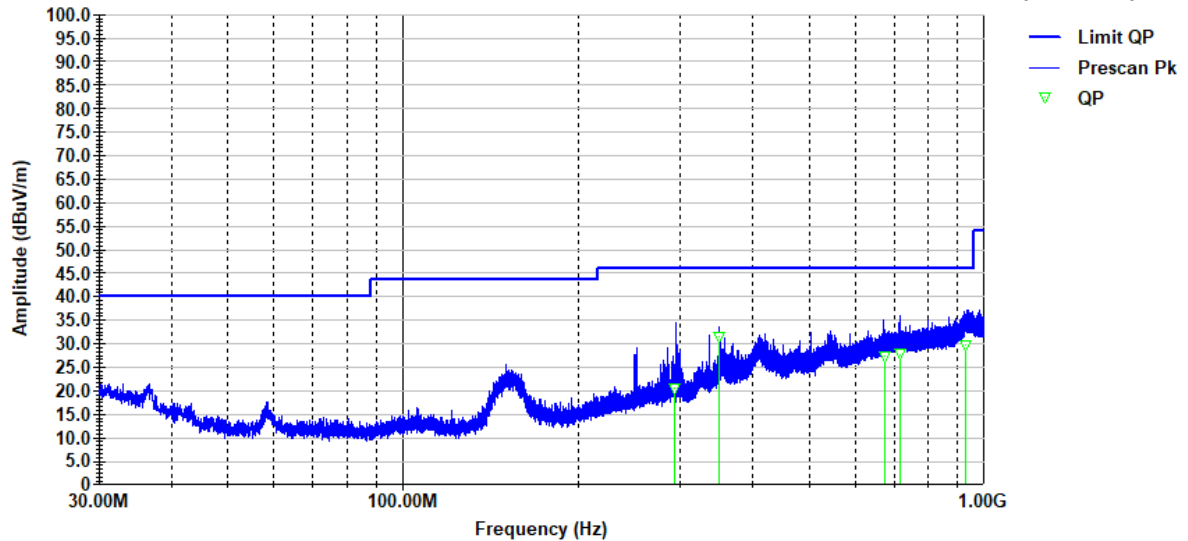
Vertical Polarization

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Vertical QP

Customer / Model # - comma.ai / LightningHard SOM
Serial # - N/A
Test Mode - TX99, ext. DC power supply
Operator - AG
Standard - FCC Class B
Comments - 5825MHz, 802.11a UNII3 NOHT, pwr 15, 6Mbps



5825 15 6 FCC 15-407 RE 30M-1GHz.til

Last Data Update 07:06:48 PM, Friday, March 22, 2024

Quasi-Peak Data

Freq. (MHz)	Final QP (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
293.666643	20.41	-23.91	-25.61	46.02	100	380
349.998906	31.4	-21.02	-14.62	46.02	100	249
673.122091	27.46	-12.54	-18.56	46.02	210	198
716.280672	27.79	-11.91	-18.23	46.02	250	230
930.544588	29.84	-8.49	-16.18	46.02	330	248

1 to 18 GHz Low Channel – 5745MHz - both chains transmitting Horizontal Polarization

SGS NA, San Diego Regulatory Lab

Customer / Model # - comma.ai / LightningHard SOM

Radiated Emissions

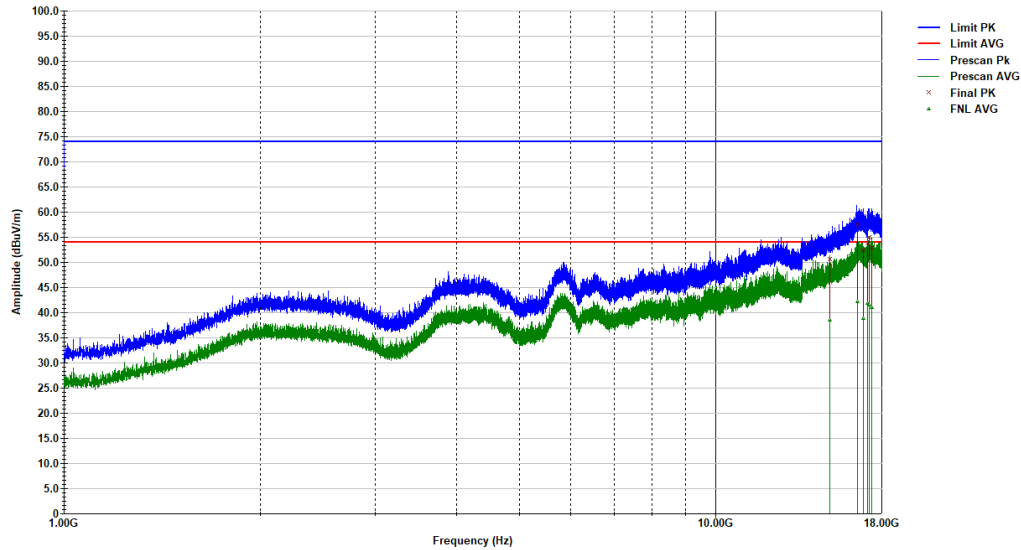
Test Mode - TX, 6GHz HPF

Horizontal AVG

Operator - AG

Standard - FCC Class B

Comments - 5745MHz, 802.11a NOHT, pwr 15, 6Mbps



5745 15 6 RE CISPR SW1A NC 3117 w lambda Ina AVG 1G-18G 06Feb2024.ttl

Last Data Update 08:10:32 PM, Wednesday, March 20, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
14973.04449	50.72	28.4	-23.28	74	155	102
16497.85183	57.55	33.09	-16.45	74	263	98
16860.02078	52.52	33.48	-21.48	74	377	313
17111.7471	53.82	32.77	-20.18	74	232	43
17198.43311	54.92	32.81	-19.08	74	209	313
17358.823	53.02	32.36	-20.98	74	400	258

Average

Freq. (MHz)	Final AVG (dBμV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
14973.04449	38.5	0	28.4	-15.5	54	155	102
16497.85183	42.14	0	33.09	-11.86	54	263	98
16860.02078	38.78	0	33.48	-15.22	54	377	313
17111.7471	41.81	0	32.77	-12.19	54	232	43
17198.43311	41.49	0	32.81	-12.51	54	209	313
17358.823	41.05	0	32.36	-12.95	54	400	258

Vertical Polarization

SGS NA, San Diego Regulatory Lab

Customer / Model # - comma.ai / LightningHard SOM

Radiated Emissions

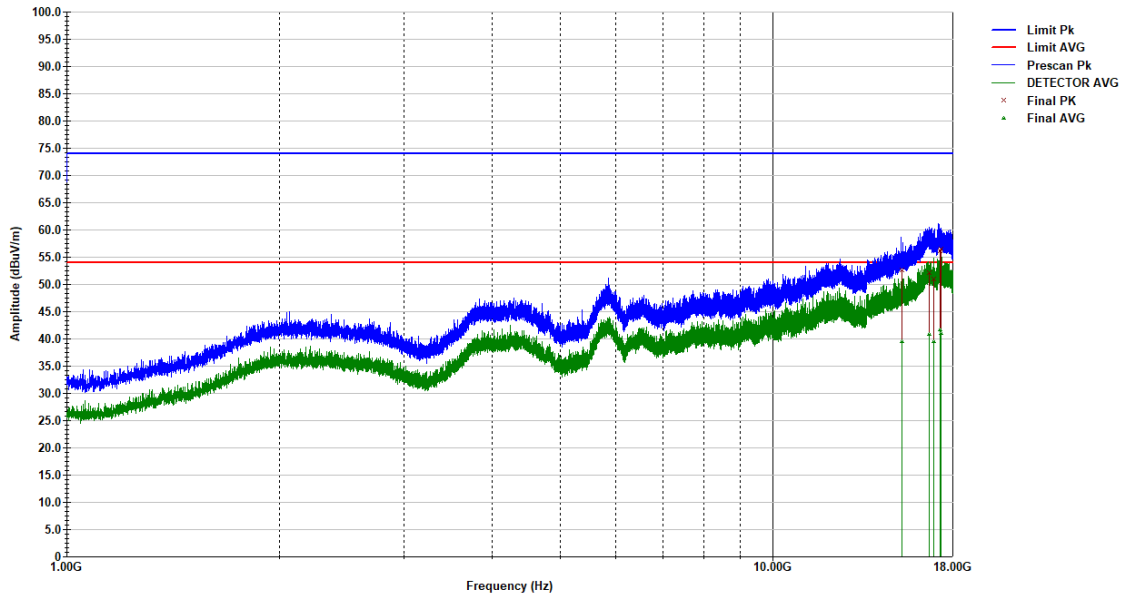
Test Mode - TX, 6GHz HPF

Operator - AG

Vertical AVG

Standard - FCC Class B

Comments - 5745MHz, 802.11a NOHT, pwr 15, 6Mbps



5745 15 6 RE CISPR SW1A NC 3117 w lambda Ina AVG 1G-18G 06Feb2024.ttl

Last Data Update 07:51:08 PM, Wednesday, March 20, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
15245.8419	52.66	28.99	-21.34	74	233	306
16674.03425	52.17	33.62	-21.83	74	194	193
16936.6984	50.91	33.33	-23.09	74	400	25
17261.7875	56.12	32.63	-17.88	74	357	-14
17309.03325	56.46	32.49	-17.54	74	202	5

Average

Freq. (MHz)	Final AVG (dBμV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
15245.8419	39.42	0	28.99	-14.58	54	233	306
16674.03425	40.88	0	33.62	-13.12	54	194	193
16936.6984	39.5	0	33.33	-14.5	54	400	25
17261.7875	41.72	0	32.63	-12.28	54	357	-14
17309.03325	40.93	0	32.49	-13.07	54	202	5

Lower band edge Horizontal Polarization

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Horizontal AVG

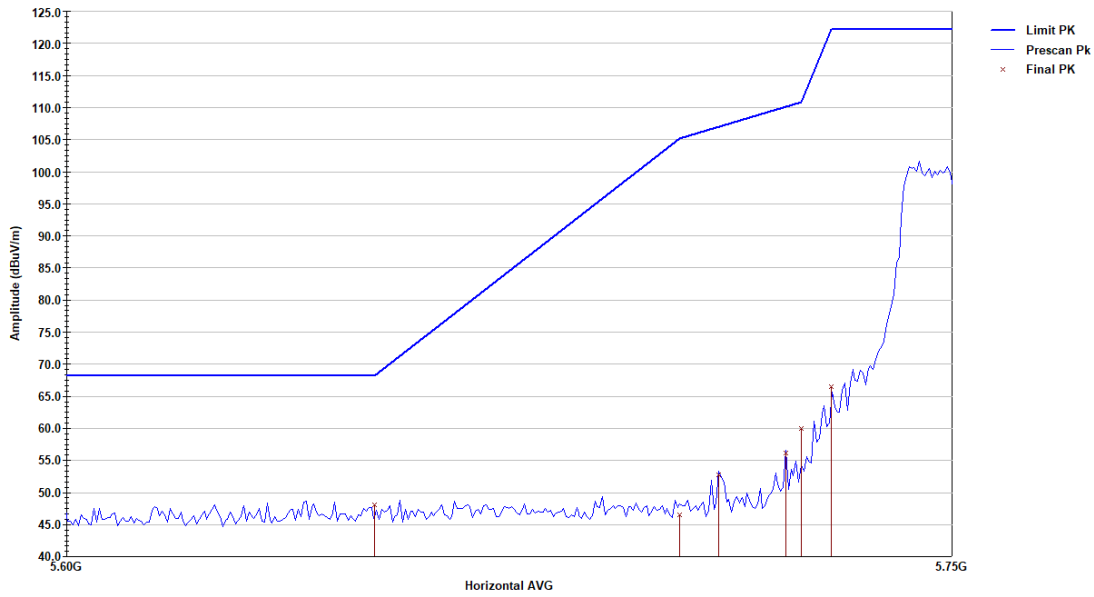
Model # - comma.ai

Test Mode - Tx mode, Lower Band-Edge

Operator - AG

Standard - FCC Class B

Comments - 5745MHz, 802.11a NOHT, pwr 15, 6Mbps



5745 15 6 RE Lower Band-Edge.ttl

Last Data Update 04:45:13 PM, Tuesday, May 28, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
5650.00001	48.08	8.92	-20.12	68.2	224	235
5700	46.45	9.12	-58.75	105.2	150	81
5706.45001	52.7	9.14	-54.3	107.01	150	-10
5717.50001	56.2	9.15	-53.9	110.1	386	-20
5720.00001	59.98	9.15	-50.82	110.8	155	342
5725	66.55	9.15	-55.65	122.2	324	-20

No Average limit is defined for the upper band edge.

Vertical Polarization

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Vertical AVG

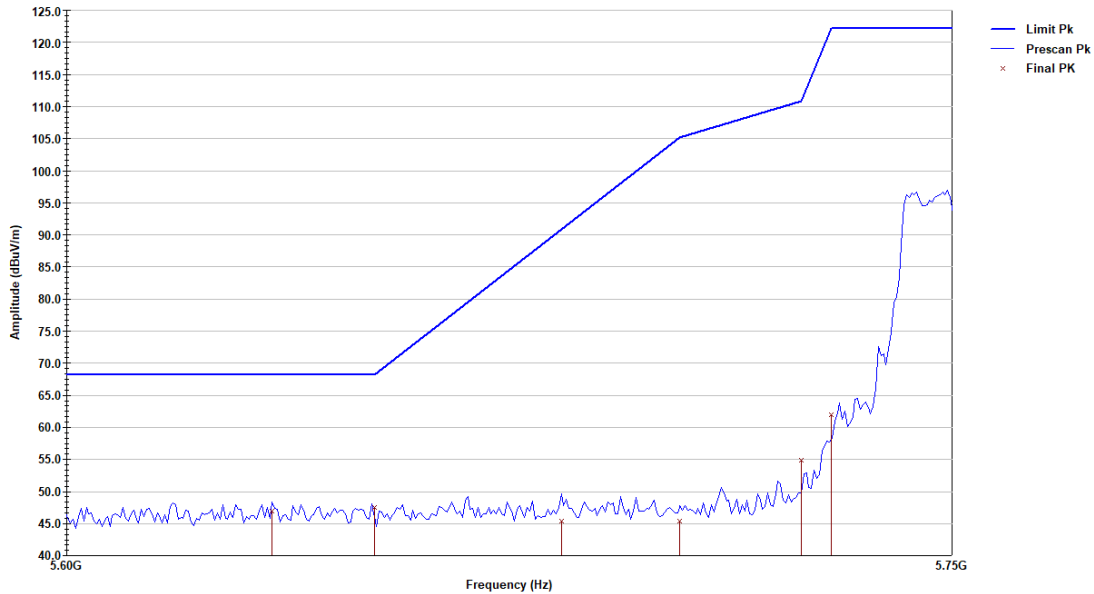
Model # - comma.ai

Test Mode - Tx mode, Lower Band-Edge

Operator - AG

Standard - FCC Class B

Comments - 5745MHz, 802.11a NOHT, pwr 15, 6Mbps



5745 15 6 RE Lower Band-Edge.til

Last Data Update 04:29:00 PM, Tuesday, May 28, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
5633.35001	46.9	8.71	-21.3	68.2	303	291
5650.00001	47.44	8.92	-20.76	68.2	342	65
5680.525	45.44	9.06	-45.35	90.79	272	230
5700.00001	45.42	9.12	-59.78	105.2	310	96
5720.00001	54.85	9.15	-55.95	110.8	380	110
5725	61.9	9.15	-60.3	122.2	187	106

No Average limit is defined for the upper band edge.

Mid Channel – 5785MHz - both chains transmitting Horizontal Polarization

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Horizontal AVG

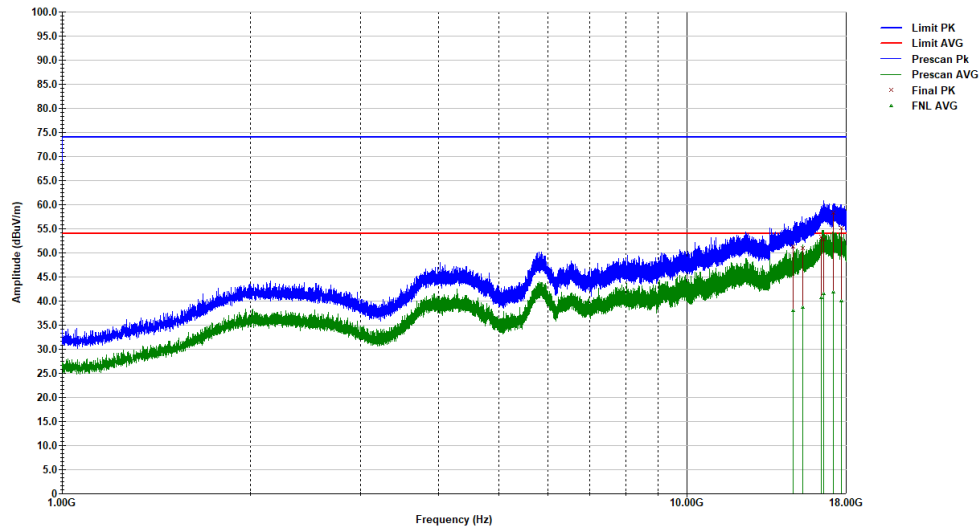
Customer / Model # - comma.ai / LightningHard SOM

Test Mode - TX, 6GHz HPF

Operator - AG

Standard - FCC Class B

Comments - 5785MHz, 802.11a NOHT, pwr 15, 6Mbps



5785 15 6 RE CISPR SW1A NC 3117 w lambda lna AVG 1G-18G 06Feb2024 - Copy.tif

Last Data Update 08:59:17 PM, Wednesday, March 20, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
14805.66822	51.32	28.01	-22.68	74	150	123
15336.95919	50.92	29.26	-23.08	74	379	1
16433.77987	53.26	32.8	-20.74	74	278	108
16546.30909	52.89	33.3	-21.11	74	363	282
17181.73609	58.28	32.8	-15.72	74	378	3
17686.405	55.13	31.95	-18.87	74	324	109

Average

Freq. (MHz)	Final AVG (dBμV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
14805.66822	38.04	0	28.01	-15.96	54	150	123
15336.95919	38.64	0	29.26	-15.36	54	379	1
16433.77987	40.74	0	32.8	-13.26	54	278	108
16546.30909	41.41	0	33.3	-12.59	54	363	282
17181.73609	41.9	0	32.8	-12.1	54	378	3
17686.405	40.02	0	31.95	-13.98	54	324	109

Vertical Polarization

SGS NA, San Diego Regulatory Lab

Customer / Model # - comma.ai / LightningHard SOM

Radiated Emissions

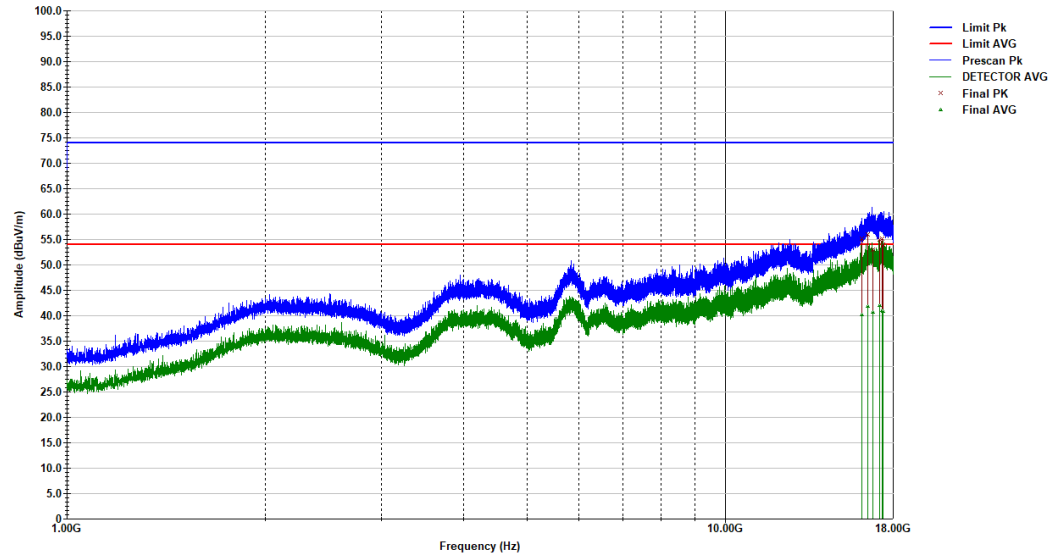
Test Mode - TX, 6GHz HPF

Operator - AG

Standard - FCC Class B

Comments - 5785MHz, 802.11a NOHT, pwr 15, 6Mbps

Vertical AVG



5785 15 6 RE CISPR SW1A NC 3117 w lambda lna AVG 1G-18G 06Feb2024 - Copy.tif

Last Data Update 08:39:46 PM, Wednesday, March 20, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
16123.8445	55.23	31.46	-18.77	74	303	171
16456.09625	55.98	32.9	-18.02	74	186	211
16758.7976	53.07	33.57	-20.93	74	342	20
17182.16475	55.07	32.8	-18.93	74	349	323
17335.3785	55.15	32.42	-18.85	74	303	284
17349.0091	53.92	32.39	-20.08	74	241	67

Average

Freq. (MHz)	Final AVG (dBμV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
16123.8445	40.13	0	31.46	-13.87	54	303	171
16456.09625	41.78	0	32.9	-12.22	54	186	211
16758.7976	40.59	0	33.57	-13.41	54	342	20
17182.16475	41.99	0	32.8	-12.01	54	349	323
17335.3785	41.02	0	32.42	-12.98	54	303	284
17349.0091	40.85	0	32.39	-13.15	54	241	67

High Channel – 5825MHz - both chains transmitting

Horizontal Polarization

SGS NA, San Diego Regulatory Lab

Customer / Model # - comma.ai / LightningHard SOM

Radiated Emissions

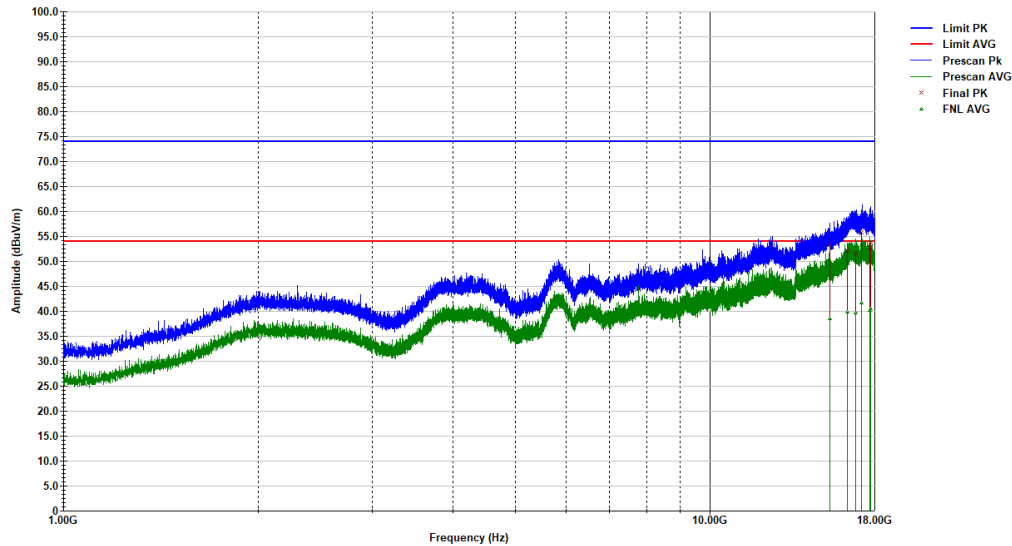
Test Mode - TX, 6GHz HPF

Horizontal AVG

Operator - AG

Standard - FCC Class B

Comments - 5825MHz, 802.11a NOHT, pwr 15, 6Mbps



5825 15 6 RE CISPR SW1A NC 3117 w lambda Ina AVG 1G-18G 06Feb2024.ttl

Last Data Update 10:15:49 PM, Wednesday, March 20, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
15320.91896	53.27	29.21	-20.73	74	374	351
16311.27341	52.2	32.25	-21.8	74	263	-20
16808.9467	51.64	33.53	-22.36	74	286	342
17167.36565	55.86	32.79	-18.14	74	216	-20
17685.03044	52.89	31.95	-21.11	74	202	120
17734.26069	53.87	31.9	-20.13	74	150	5

Average

Freq. (MHz)	Final AVG (dBμV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
15320.91896	38.5	0	29.21	-15.5	54	374	351
16311.27341	39.79	0	32.25	-14.21	54	263	-20
16808.9467	39.71	0	33.53	-14.29	54	286	342
17167.36565	41.59	0	32.79	-12.41	54	216	-20
17685.03044	40.13	0	31.95	-13.87	54	202	120
17734.26069	40.45	0	31.9	-13.55	54	150	5

Vertical Polarization

SGS NA, San Diego Regulatory Lab

Customer / Model # - comma.ai / LightningHard SOM

Radiated Emissions

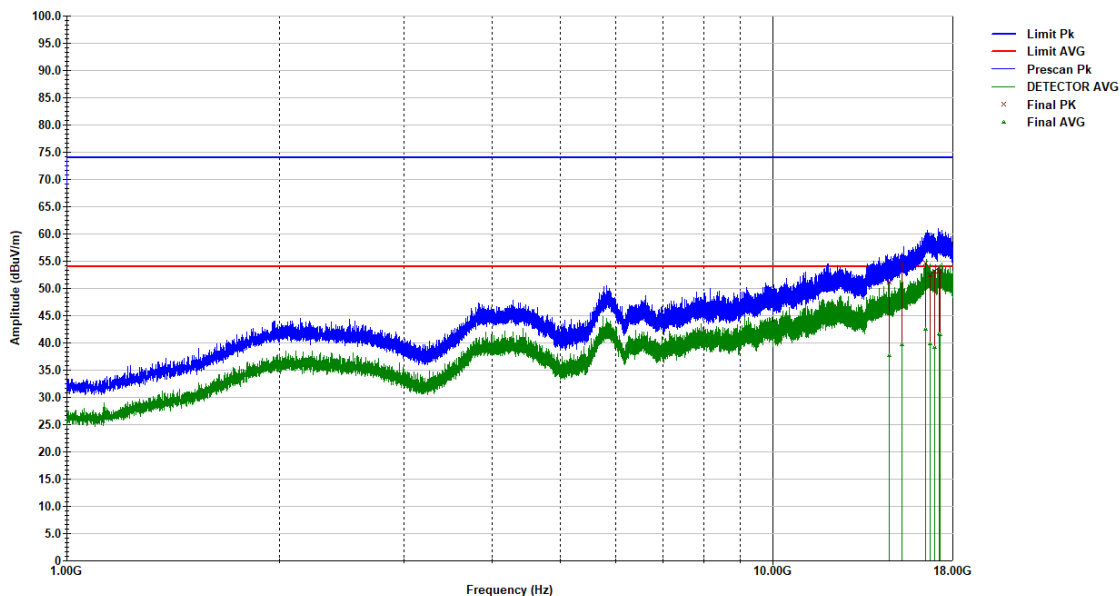
Test Mode - TX, 6GHz HPF

Operator - AG

Standard - FCC Class B

Comments - 5825MHz, 802.11a NOHT, pwr 15, 6Mbps

Vertical AVG



5825 15 6 RE CISPR SW1A NC 3117 w lambda Ina AVG 1G-18G 06Feb2024.ttl

Last Data Update 09:59:41 PM, Wednesday, March 20, 2024

Peak Data

Freq. (MHz)	Final PK (dB μ V/m)	Total Corr. (dB)	Margin (dB)	Limit (dB μ V/m)	Ant. Height (cm)	Azimuth (deg.)
14610.3274	51.11	27.63	-22.89	74	326	2
15238.72935	54.57	28.97	-19.43	74	150	189
16486.78035	54.68	33.04	-19.32	74	303	163
16736.1751	52.49	33.58	-21.51	74	210	313
16985.45965	53.23	33.17	-20.77	74	249	250
17196.6886	53.1	32.81	-20.9	74	280	374
17247.6886	53.27	32.67	-20.73	74	150	197

Average

Freq. (MHz)	Final AVG (dBμV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
14610.3274	37.72	0	27.63	-16.28	54	326	2
15238.72935	39.58	0	28.97	-14.42	54	150	189
16486.78035	42.56	0	33.04	-11.44	54	303	163
16736.1751	39.83	0	33.58	-14.17	54	210	313
16985.45965	39.09	0	33.17	-14.91	54	249	250
17196.6886	41.61	0	32.81	-12.39	54	280	374
17247.6886	41.42	0	32.67	-12.58	54	150	197

Upper band edge Horizontal Polarization

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Horizontal AVG

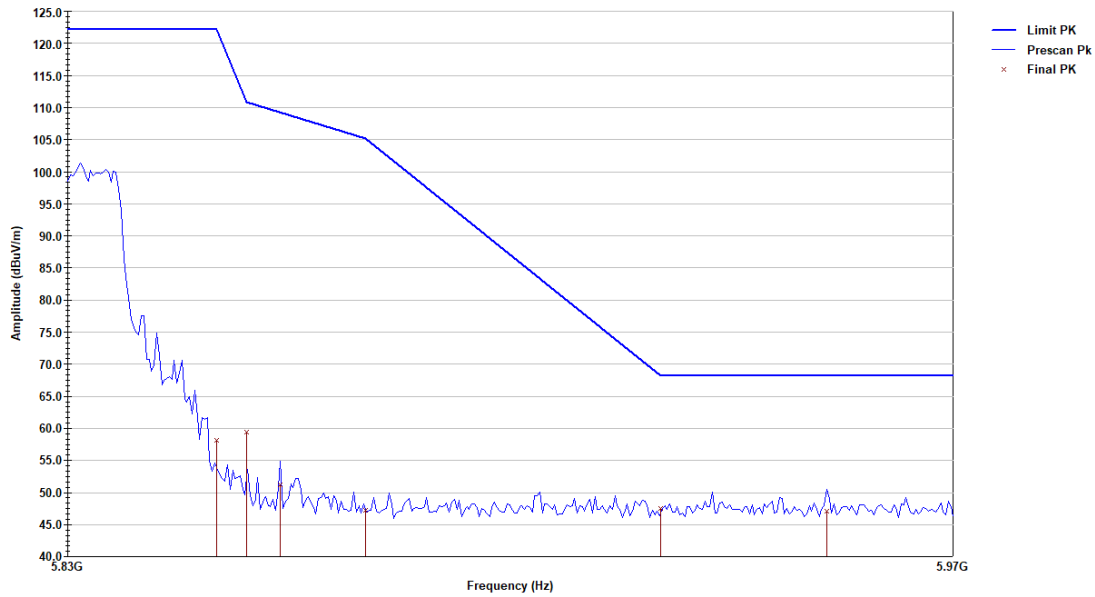
Model # - comma.ai

Test Mode - Tx mode, Upper Band-Edge

Operator - AG

Standard - FCC Class B

Comments - 5825MHz, 802.11a NOHT, pwr 15, 6Mbps



5825 15 6 RE Upper Band-Edge.til

Last Data Update 05:36:16 PM, Tuesday, May 28, 2024

Peak Data

Freq. (MHz)	Final PK (dBuV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBuV/m)	Ant. Height (cm)	Azimuth (deg.)
5850.00001	58.17	9.56	-64.03	122.2	378	25
5855	59.43	9.59	-51.37	110.8	379	-14
5860.72501	51.16	9.63	-58.04	109.2	379	16
5875.00001	47.26	9.73	-57.94	105.2	194	227
5925	47.46	9.97	-20.74	68.2	355	-12
5953.37501	47.06	10.03	-21.14	68.2	279	42

No Average limit is defined for the upper band edge.

Vertical Polarization

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Vertical AVG

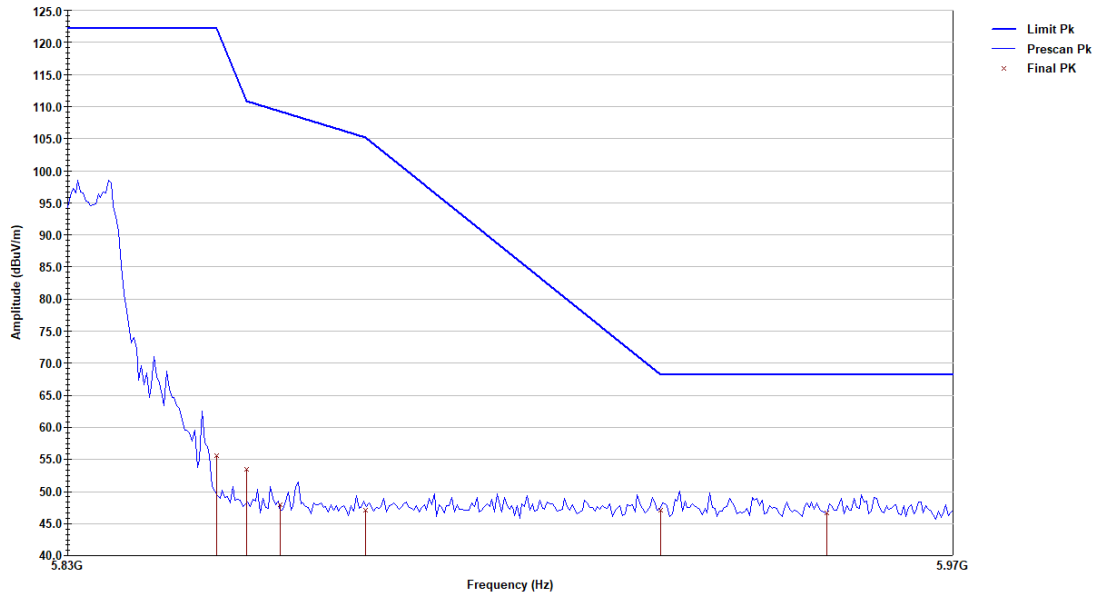
Model # - comma.ai

Test Mode - Tx mode, Upper Band-Edge

Operator - AG

Standard - FCC Class B

Comments - 5825MHz, 802.11a NOHT, pwr 15, 6Mbps



5825 15 6 RE Upper Band-Edge.tif

Last Data Update 05:18:41 PM, Tuesday, May 28, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
5850	55.63	9.56	-66.57	122.2	373	69
5855	53.43	9.59	-57.37	110.8	389	87
5860.72501	47.99	9.63	-61.2	109.2	225	24
5875	47.12	9.73	-58.08	105.2	265	312
5925	47.02	9.97	-21.18	68.2	312	28
5953.37501	46.71	10.03	-21.49	68.2	295	290

No Average limit is defined for the upper band edge.

UNII3: 802.11n20

30 to 1000 MHz Low Channel – 5745MHz - both chains transmitting Horizontal Polarization

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Horizontal QP

Customer / Model # - comma.ai / LightningHard SOM

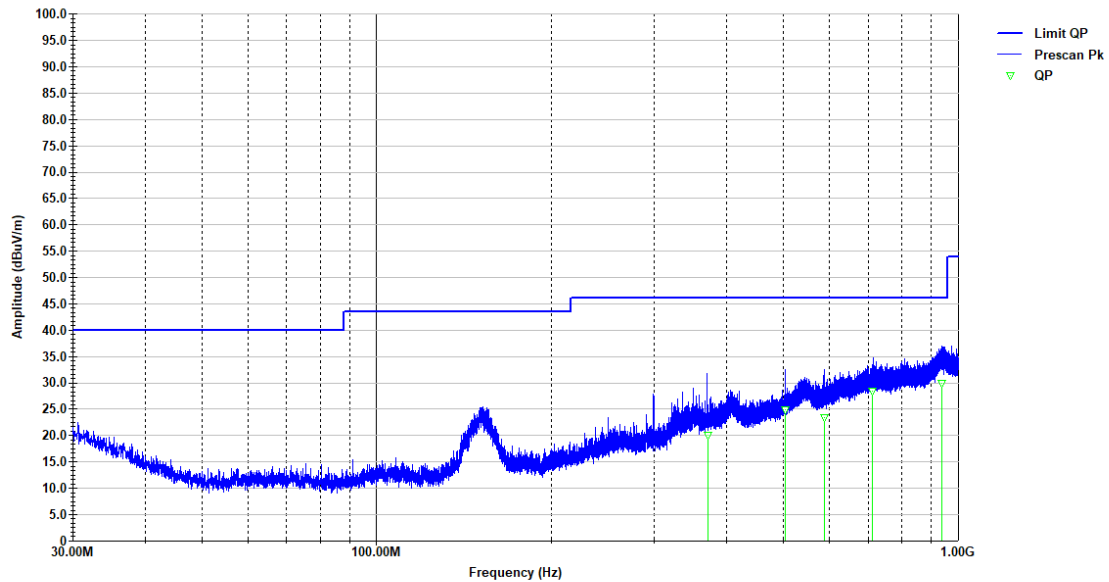
Serial # - N/A

Test Mode - TX99, ext. DC power supply

Operator - AG

Standard - FCC Class B

Comments - 5745MHz, 802.11n20 UNII3 HT20, pwr 15, mcs0



5745 15 mcs0 FCC 15.407 RE 30M-1GHz.til

Last Data Update 08:11:22 PM, Friday, March 22, 2024

Quasi-Peak Data

Freq. (MHz)	Final QP (dBuV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBuV/m)	Ant. Height (cm)	Azimuth (deg.)
371.169609	20.12	-20.11	-25.9	46.02	224	316
503.88229	24.94	-16.6	-21.08	46.02	352	297
589.319052	23.43	-14.68	-22.59	46.02	130	362
711.629979	28.34	-11.88	-17.68	46.02	114	183
937.76555	29.87	-8.32	-16.15	46.02	272	267

Vertical Polarization

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Vertical QP

Customer / Model # - comma.ai / LightningHard SOM

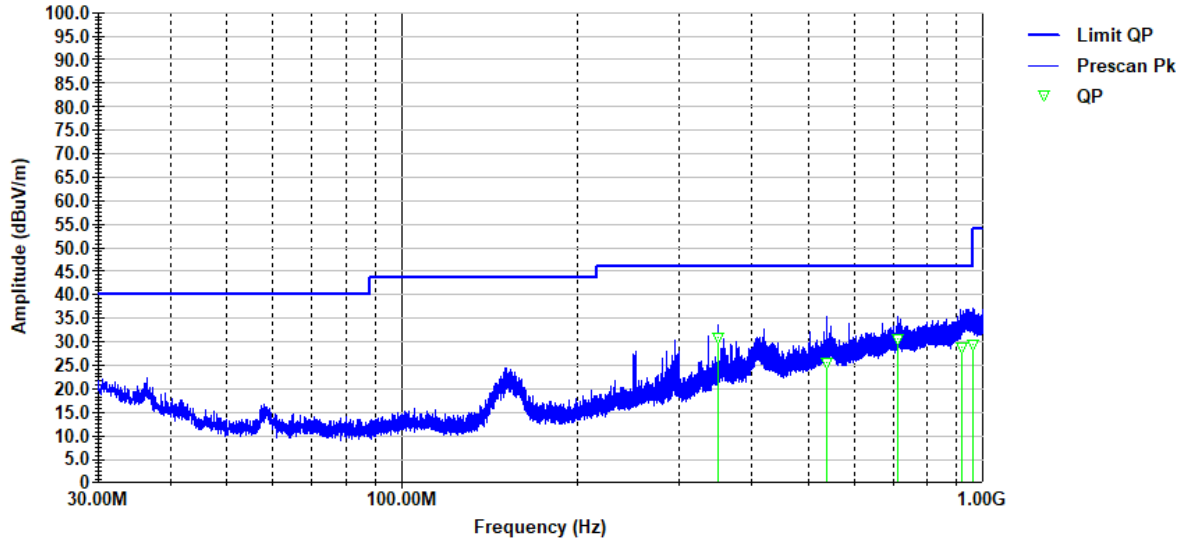
Serial # - N/A

Test Mode - TX99, ext. DC power supply

Operator - AG

Standard - FCC Class B

Comments - 5745MHz, 802.11n20 UNII3 HT20, pwr 15, mcs0



5745 15 mcs0 FCC 15-407 RE 30M-1GHz.til

Last Data Update 07:56:06 PM, Friday, March 22, 2024

Quasi-Peak Data

Freq. (MHz)	Final QP (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
349.992985	30.87	-21.02	-15.15	46.02	100	271
537.817767	25.64	-14.03	-20.38	46.02	114	319
713.284612	30.52	-11.9	-15.5	46.02	100	209
917.000068	28.93	-9.33	-17.09	46.02	179	122
961.16252	29.3	-8.82	-24.68	53.98	322	335

1 to 18 GHz Low Channel – 5745MHz - both chains transmitting Horizontal Polarization

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Horizontal AVG

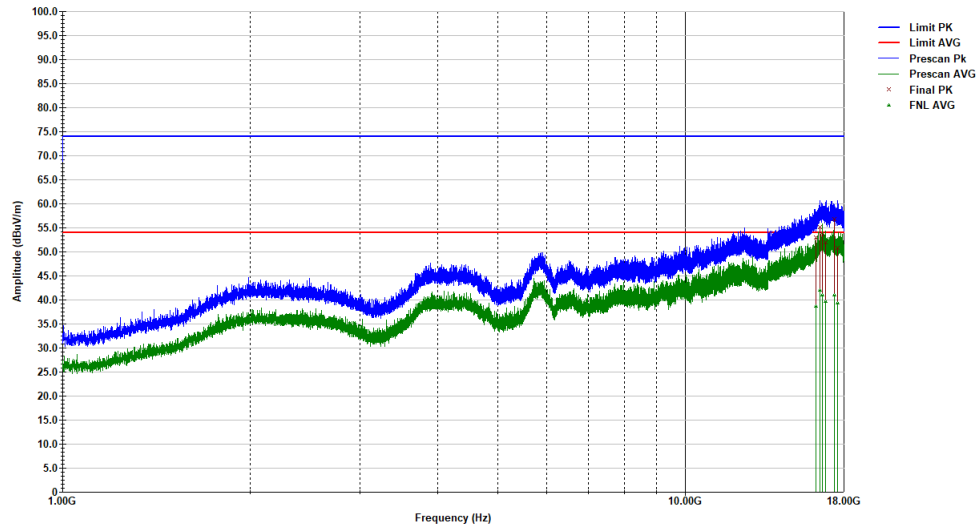
Customer / Model # - comma.ai / LightningHard SOM

Test Mode - TX, 6GHz HPF

Operator - AG

Standard - FCC Class B

Comments - 5745MHz, 802.11n20 HT20, pwr 15, mcs0



5745 15 mcs0 RE CISPR SW1A NC 3117 w lambda Ina AVG 1G-18G 06Feb2024.ttl

Last Data Update 11:01:21 PM, Wednesday, March 20, 2024

Peak Data

Freq. (MHz)	Final PK (dBuV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBuV/m)	Ant. Height (cm)	Azimuth (deg.)
16211.76569	53.03	31.83	-20.97	74	150	194
16473.66543	55.08	32.98	-18.92	74	240	-10
16624.45999	53.61	33.63	-20.39	74	218	275
16811.64585	52.06	33.53	-21.94	74	333	329
17349.32225	56.82	32.39	-17.18	74	309	288
17584.704	50.85	32.07	-23.15	74	163	266

Average

Freq. (MHz)	Final AVG (dBuV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBuV/m)	Ant. Height (cm)	Azimuth (deg.)
16211.76569	38.7	0	31.83	-15.3	54	150	194
16473.66543	41.95	0	32.98	-12.05	54	240	-10
16624.45999	40.96	0	33.63	-13.04	54	218	275
16811.64585	39.68	0	33.53	-14.32	54	333	329
17349.32225	40.91	0	32.39	-13.09	54	309	288
17584.704	39.33	0	32.07	-14.67	54	163	266

Vertical Polarization

SGS NA, San Diego Regulatory Lab

Customer / Model # - comma.ai / LightningHard SOM

Radiated Emissions

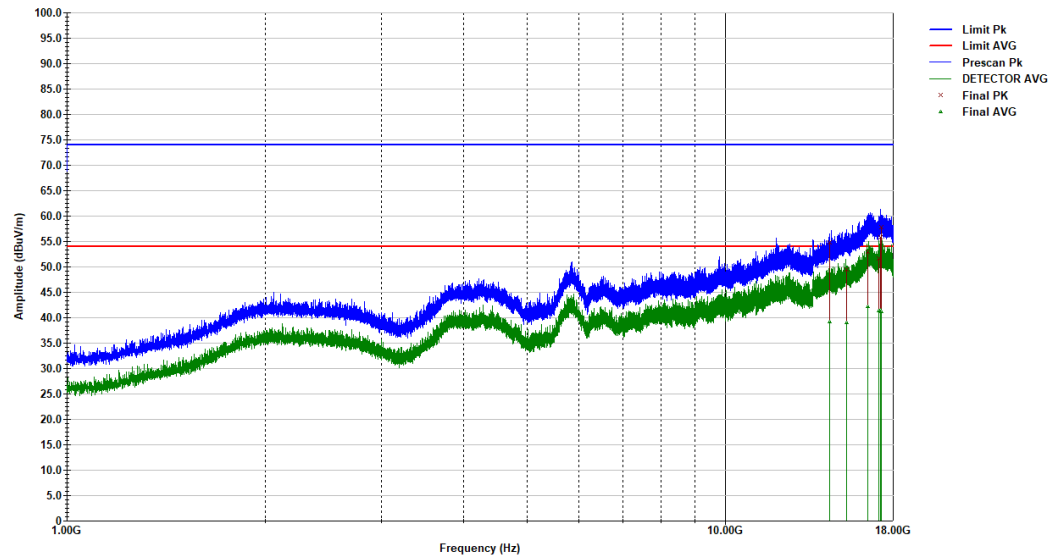
Test Mode - TX, 6GHz HPF

Operator - AG

Standard - FCC Class B

Comments - 5745MHz, 802.11n20 HT20, pwr 15, mcs0

Vertical AVG



5745 15 mcs0 RE CISPR SW1A NC 3117 w lambda lna AVG 1G-18G 06Feb2024.ttl

Last Data Update 10:44:02 PM, Wednesday, March 20, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
14410.49925	54.83	27.17	-19.17	74	187	294
15281.62125	49.54	29.1	-24.46	74	311	99
16473.75965	52.93	32.98	-21.07	74	295	283
17124.6975	51.65	32.78	-22.35	74	171	59
17224.0299	55.81	32.74	-18.19	74	319	156
17268.06735	57.83	32.61	-16.17	74	313	147

Average

Freq. (MHz)	Final AVG (dBμV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
14410.49925	39.21	0	27.17	-14.79	54	187	294
15281.62125	38.97	0	29.1	-15.03	54	311	99
16473.75965	42.19	0	32.98	-11.81	54	295	283
17124.6975	41.34	0	32.78	-12.66	54	171	59
17224.0299	41.48	0	32.74	-12.52	54	319	156
17268.06735	41.2	0	32.61	-12.8	54	313	147

Lower band edge Horizontal Polarization

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Horizontal AVG

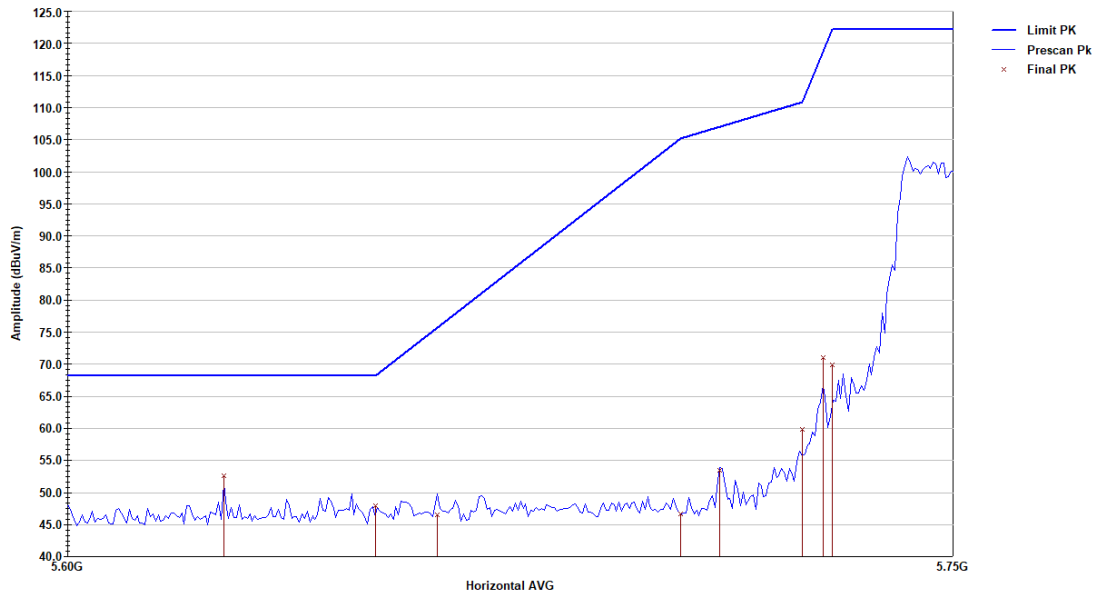
Model # - comma.ai

Test Mode - Tx mode, Lower Band-Edge

Operator - AG

Standard - FCC Class B

Comments - 5745MHz, 802.11n20 HT20, pwr 15, mcs0



5745 15 mcs0 RE Lower Band-Edge.ttl

Last Data Update 10:01:03 AM, Wednesday, May 29, 2024

Peak Data

Freq. (MHz)	Final PK (dBuV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBuV/m)	Ant. Height (cm)	Azimuth (deg.)
5625.275	52.55	8.61	-15.65	68.2	393	339
5650	47.94	8.92	-20.26	68.2	270	6
5660.12501	46.53	8.97	-29.16	75.69	354	-20
5700	46.7	9.12	-58.5	105.2	150	318
5706.45001	53.41	9.14	-53.59	107.01	386	359
5720.00001	59.79	9.15	-51.01	110.8	150	344
5723.45001	71.08	9.15	-47.59	118.67	324	-5
5725	69.92	9.15	-52.28	122.2	400	-3

No Average limit is defined for the upper band edge.

Vertical Polarization

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Vertical AVG

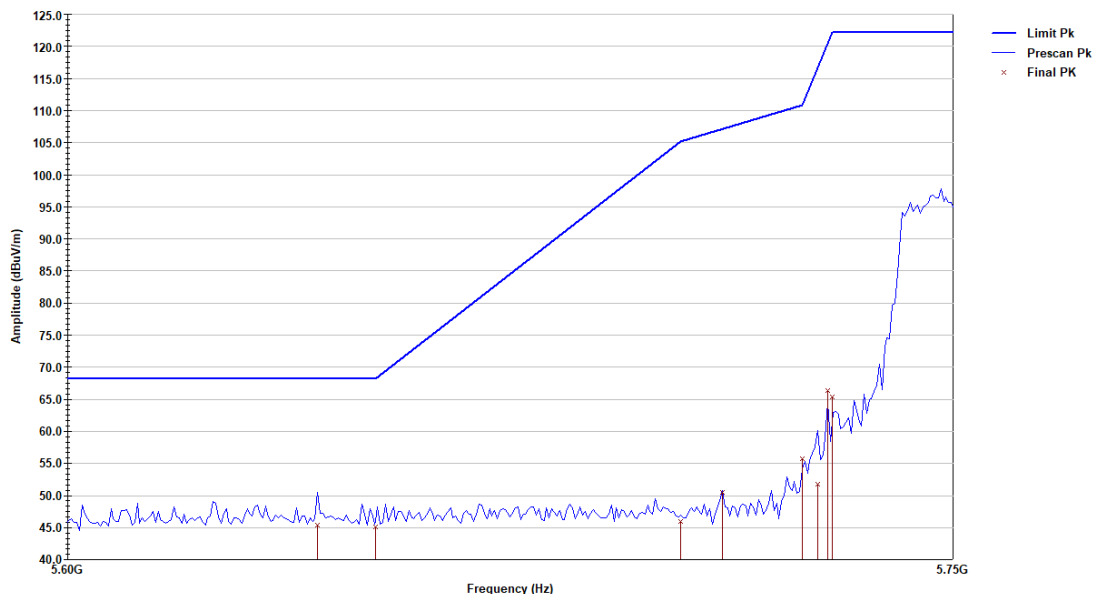
Model # - comma.ai

Test Mode - Tx mode, Lower Band-Edge

Operator - AG

Standard - FCC Class B

Comments - 5745MHz, 802.11n20 HT20, pwr 15, mcs0



5745 15 mcs0 RE Lower Band-Edge.ttl

Last Data Update 09:42:29 AM, Wednesday, May 29, 2024

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
5640.575	45.36	8.8	-22.84	68.2	295	380
5650.00001	45.15	8.92	-23.05	68.2	357	159
5700	46.01	9.12	-59.19	105.2	365	9
5706.87501	50.47	9.14	-56.65	107.13	373	231
5720.00001	55.75	9.15	-55.05	110.8	400	137
5722.60001	51.74	9.15	-64.99	116.73	171	-20
5724.3	66.39	9.15	-54.21	120.6	380	129
5725	65.39	9.15	-56.81	122.2	400	135

No Average limit is defined for the upper band edge.