DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.359	41.68	PK1	32	-33.3	40.38	-	-	74	-33.62	-	-	92	172	H
	* 2.359	30.09	AD1	32	-33.3	28.79	54	-25.21	-	-	-	-	92	172	H
2	* 5.079	40.33	PK1	34.2	-27.9	46.63	-	-	74	-27.37	-	-	137	153	H
	* 5.079	29.14	AD1	34.2	-27.9	35.44	54	-18.56	-	-	-	-	137	153	H
3	* 10.724	37.4	PK1	37.9	-24.6	50.7	-	-	74	-23.3	-	-	122	340	H
	* 10.723	25.36	AD1	37.9	-24.5	38.76	54	-15.24	-	-	-	-	122	340	H
4	* 4.686	41.4	PK1	34.2	-30.8	44.8	-	-	74	-29.2	-	-	230	337	V
	* 4.686	29.76	AD1	34.2	-30.8	33.16	54	-20.84	-	-	-	-	230	337	V
5	* 7.547	37.86	PK1	35.7	-27.2	46.36	-	-	74	-27.64	-	-	191	372	V
	* 7.547	26.67	AD1	35.7	-27.2	35.17	54	-18.83	-	-	-	-	191	372	V
6	* 9.082	37.87	PK1	36.3	-26.8	47.37	-	-	74	-26.63	-	-	64	165	V
	* 9.083	26.39	AD1	36.3	-26.8	35.89	54	-18.11	-	-	-	-	64	165	V

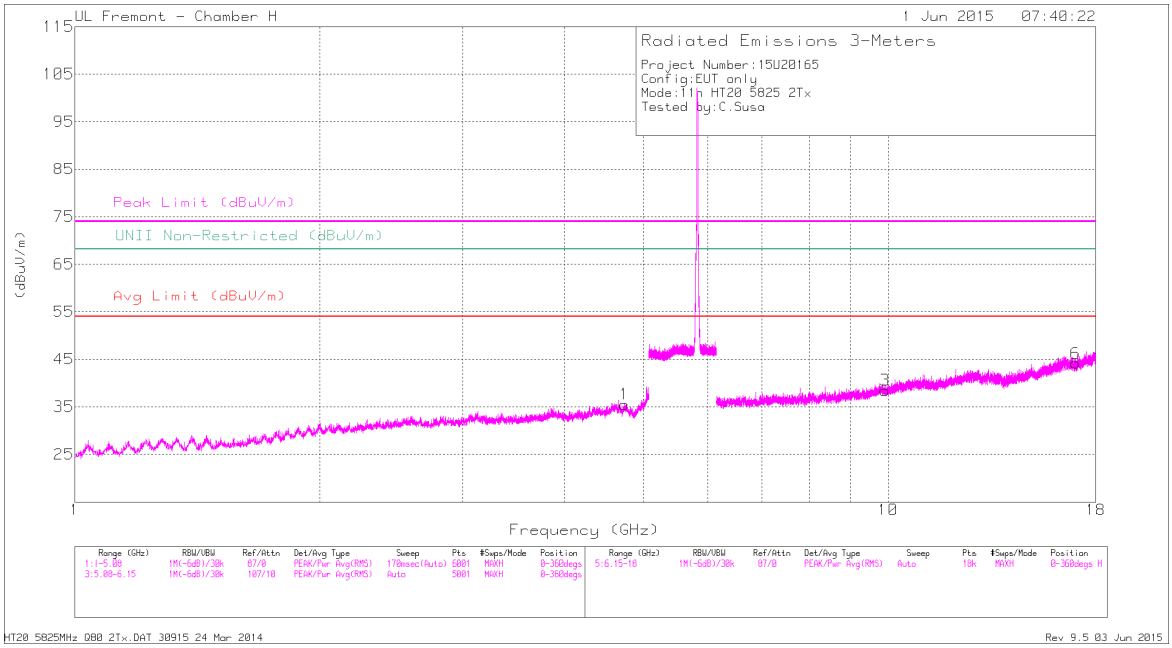
* - indicates frequency in CFR 47, Part 15 and Industry Canada RSS-Restricted Band.

PK1 - KDB789033 Method: Peak

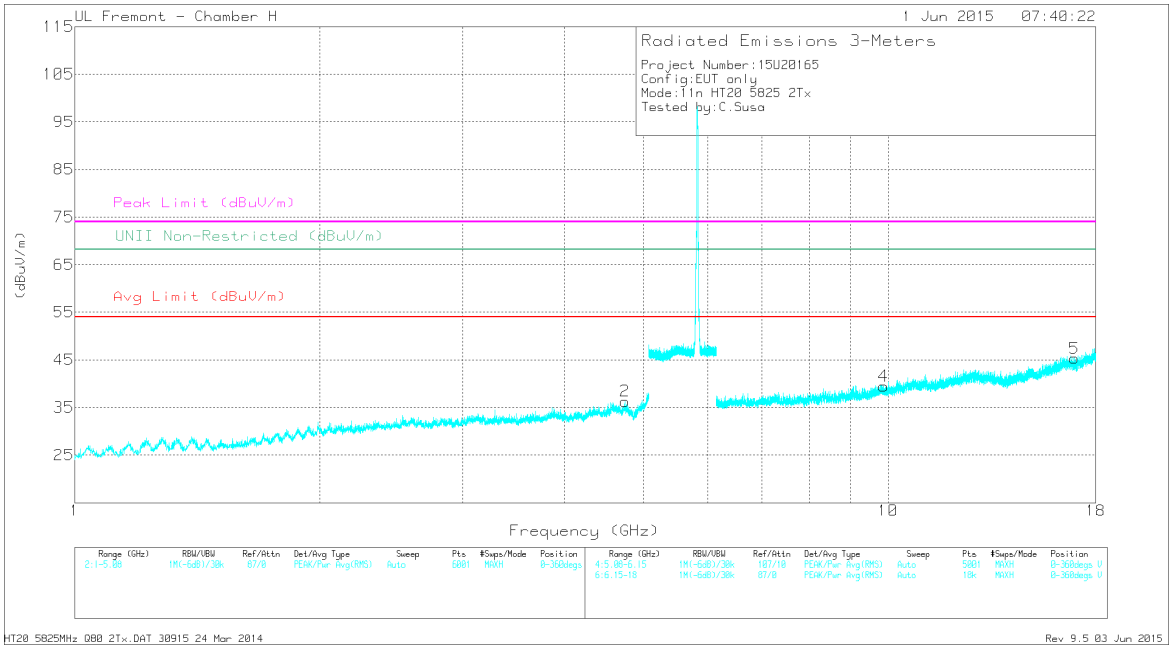
AD1 - KDB789033 Method: AD Primary Power Average

HIGH CHANNEL HARMONICS AND SPURIOUS EMISSIONS

HIGH CHANNEL HORIZONTAL PLOT



HIGH CHANNEL VERTICAL PLOT



DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4.746	41.08	PK3	34.2	-31.7	43.58	-	-	74	-30.42	-	-	185	228	H
	* 4.744	29.86	ADR	34.2	-31.7	32.36	54	-21.64	-	-	-	-	185	228	H
2	* 4.752	40.83	PK3	34.2	-31.8	43.23	-	-	74	-30.77	-	-	238	261	V
	* 4.749	29.67	ADR	34.2	-31.8	32.07	54	-21.93	-	-	-	-	238	261	V
4	9.877	36.62	PK3	36.9	-26.5	47.02	-	-	-	-	68.2	-21.18	166	282	V
3	9.915	36.4	PK3	36.9	-26.4	46.9	-	-	-	-	68.2	-21.3	149	234	H
5	16.946	35.02	PK3	41.7	-23.6	53.12	-	-	-	-	68.2	-15.08	360	101	V
6	17	35.74	PK3	41.7	-24	53.44	-	-	-	-	68.2	-14.76	208	173	H

* - indicates frequency in CFR15.205/IC8.10 Restricted Band

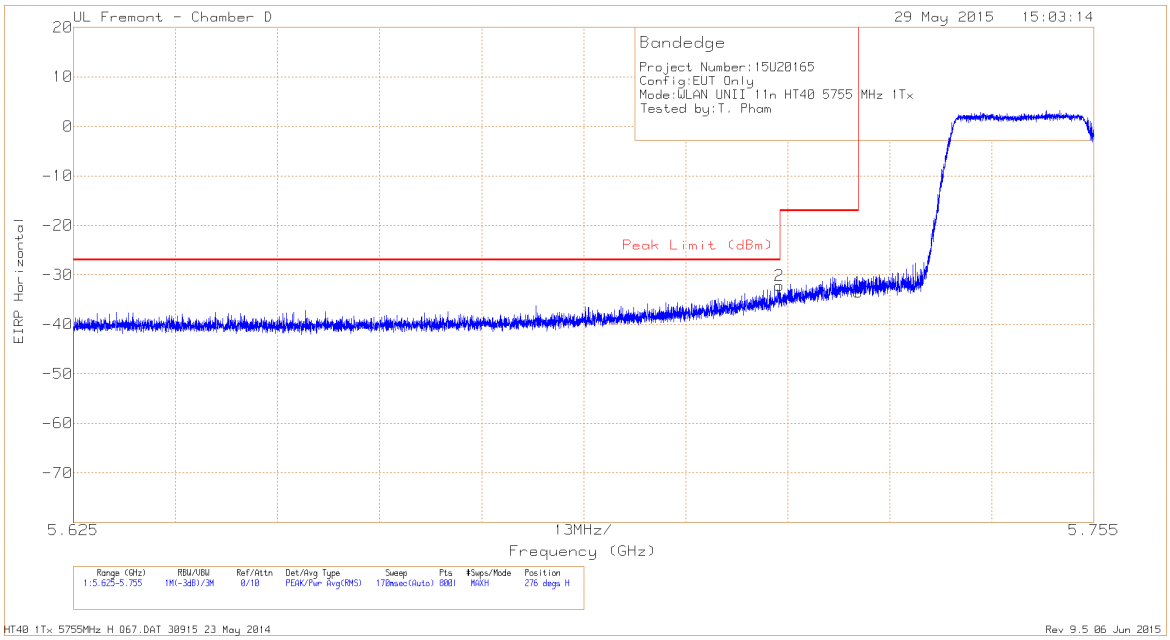
PK3 - U-NII: Maximum Peak

ADR - U-NII AD primary method, RMS average

11.22. 802.11n HT40 1Tx MODE IN THE 5.8 GHz BAND

RESTRICTED BANDEDGE, CHAIN 0 (LOW CHANNEL)

LOW CHANNEL HORIZONTAL PLOT



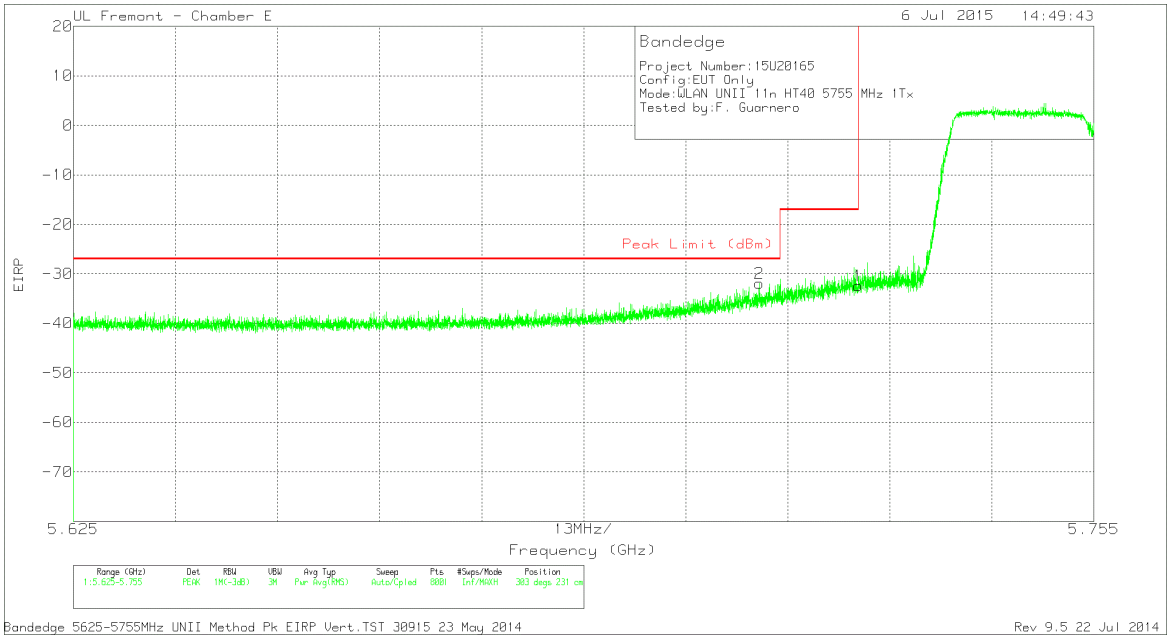
DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T346 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	5.715	-58.49	PK	34.7	-21	11.8	-32.99	-27	-5.99	276	230	H
1	5.725	-57.66	PK	34.7	-21	11.8	-32.16	-17	-15.16	276	230	H

* - indicates frequency in CFR15.205/IC8.10 Restricted Band

Pk - Peak detector

LOW CHANNEL VERTICAL PLOT

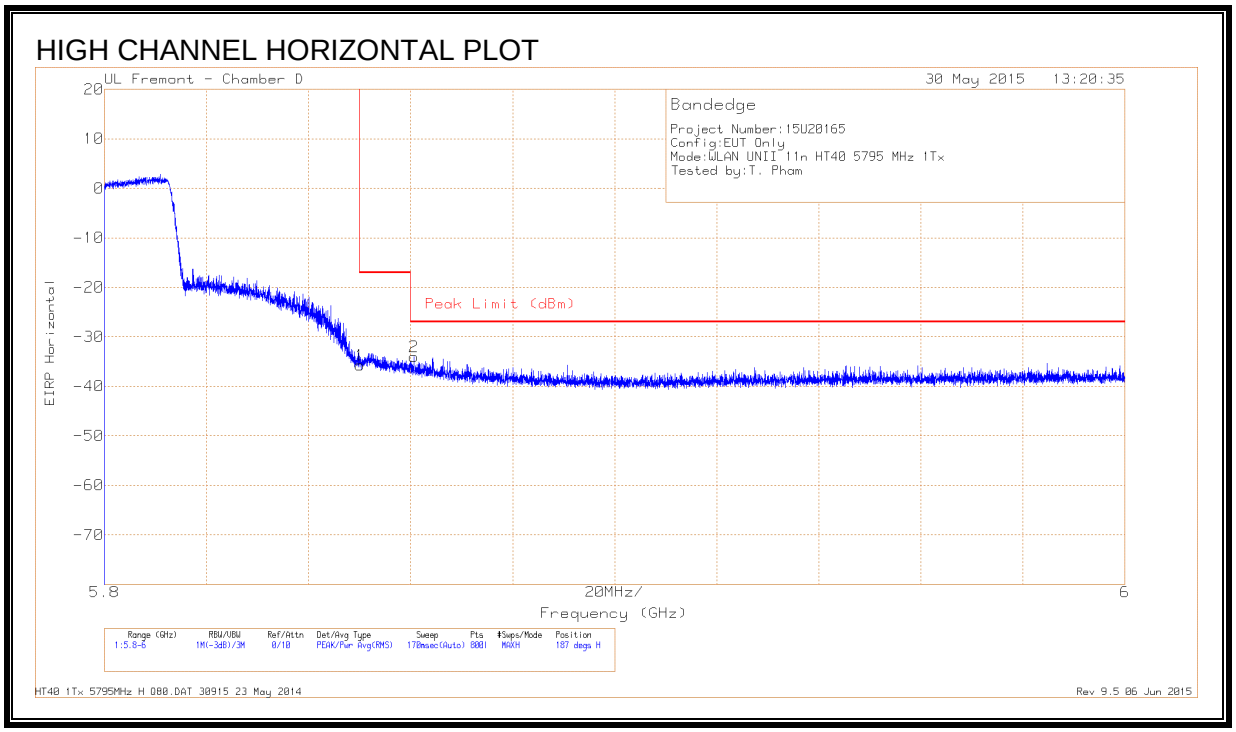


DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T346 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	5.712	-57.74	PK	34.7	-21	11.8	-32.24	-27	-5.24	303	231	V
1	5.725	-57.37	PK	34.7	-21	11.8	-31.87	-17	-14.87	303	231	V

PK - Peak detector

RESTRICTED BANDEDGE, CHAIN 0 (HIGH CHANNEL)

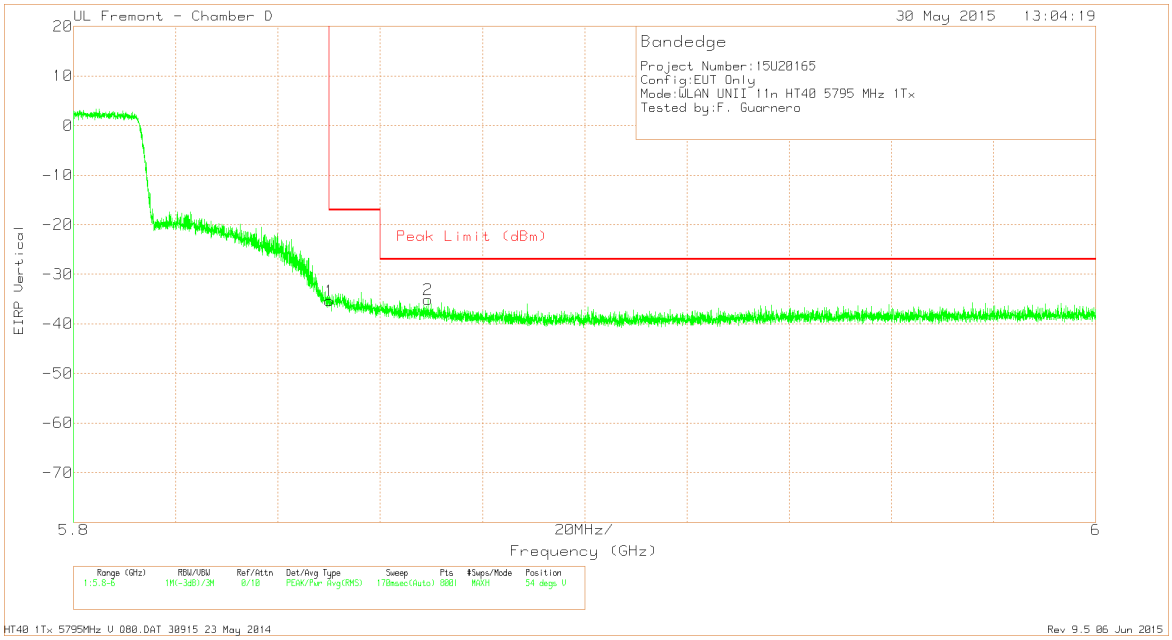


DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T346 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.85	-61.27	Pk	34.9	-21.2	11.8	-35.77	-17	-18.77	187	383	H
2	5.861	-59.38	Pk	34.9	-21.3	11.8	-33.98	-27	-6.98	187	383	H

Pk - Peak detector

HIGH CHANNEL VERTICAL PLOT



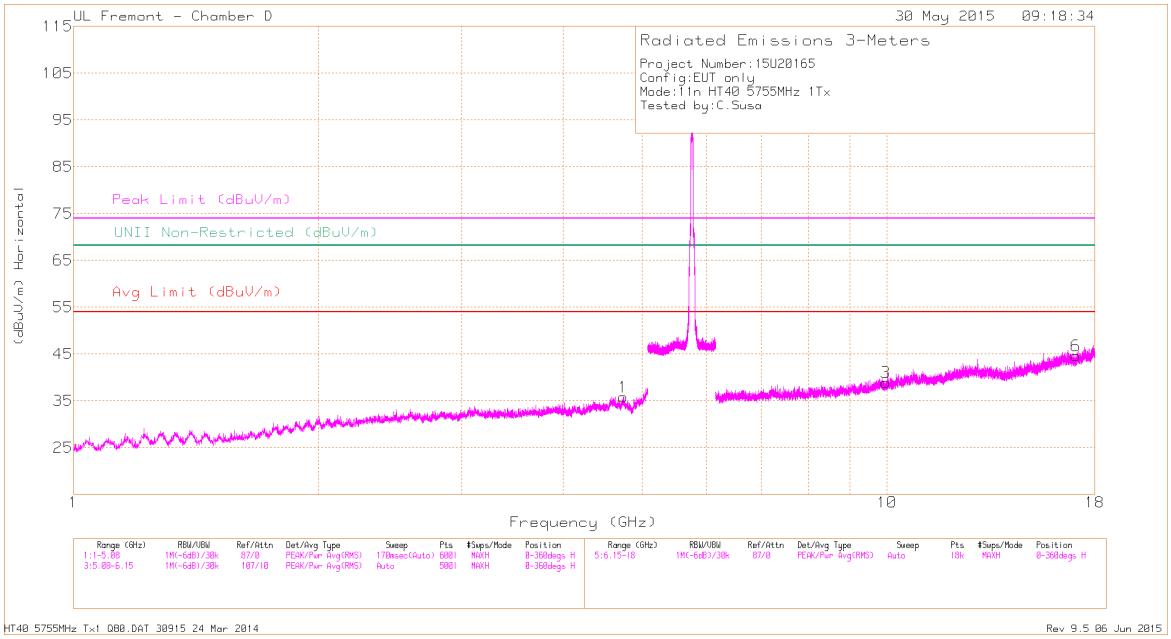
DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T346 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.85	-60.88	Pk	34.9	-21.2	11.8	-35.38	-17	-18.38	54	380	V
2	5.869	-60.53	Pk	34.9	-21.3	11.8	-35.13	-27	-8.13	54	380	V

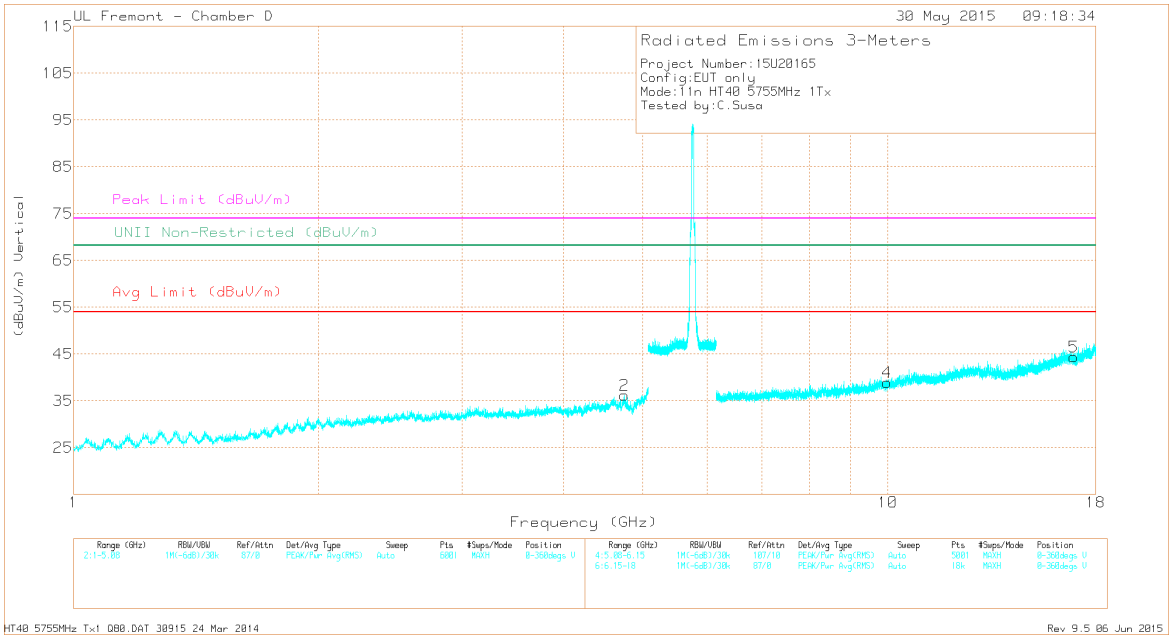
Pk - Peak detector

LOW CHANNEL HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL HORIZONTAL PLOT



LOW CHANNEL VERTICAL PLOT



DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4.739	40.82	PK3	34.2	-31.5	43.52	-	-	74	-30.48	68.2	-24.68	293	212	H
	* 4.735	29.67	ADR	34.2	-31.5	32.37	54	-21.63	-	-	-	-	293	212	H
2	* 4.745	41.44	PK3	34.2	-31.7	43.94	-	-	74	-30.06	68.2	-24.26	251	240	V
	* 4.745	29.91	ADR	34.2	-31.7	32.41	54	-21.59	-	-	-	-	251	240	V
3	9.956	36.91	PK3	36.9	-26.6	47.21	-	-	74	-26.79	68.2	-20.99	211	296	H
4	9.978	36.34	PK3	36.9	-26.2	47.04	-	-	74	-26.96	68.2	-21.16	97	225	V
5	16.911	34.5	PK3	41.7	-23.6	52.6	-	-	74	-21.4	68.2	-15.6	148	172	V
6	17.063	34.44	PK3	41.8	-23.6	52.64	-	-	74	-21.36	68.2	-15.56	311	314	H

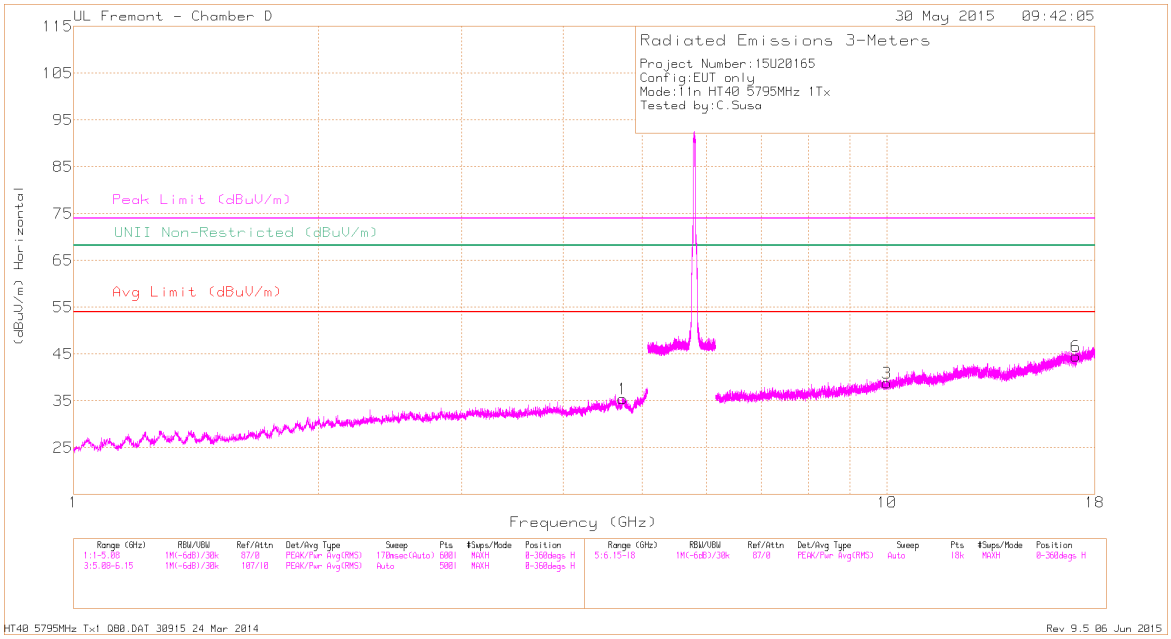
* - indicates frequency in CFR15.205/IC8.10 Restricted Band

PK3 - U-NII: Maximum Peak

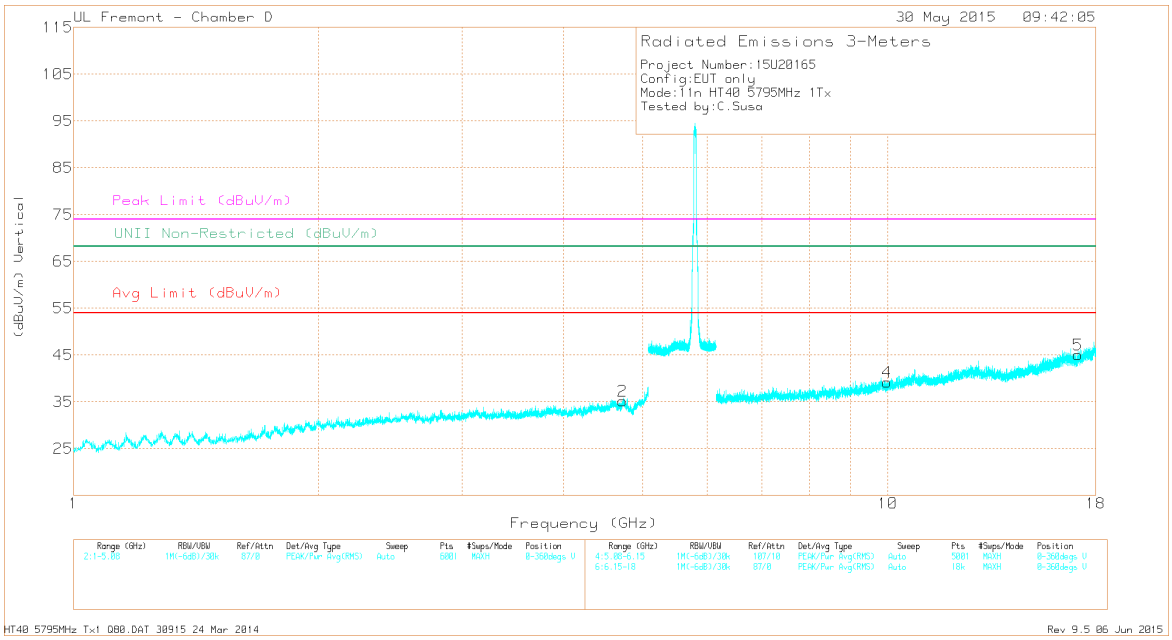
ADR - U-NII AD primary method, RMS average

HIGH CHANNEL HARMONICS AND SPURIOUS EMISSIONS

HIGH CHANNEL HORIZONTAL PLOT



HIGH CHANNEL VERTICAL PLOT



DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4.73	40.86	PK3	34.2	-31.5	43.56	-	-	74	-30.44	68.2	-24.64	175	242	H
	* 4.729	29.25	ADR	34.2	-31.5	31.95	54	-22.05	-	-	-	-	175	242	H
2	* 4.721	39.95	PK3	34.2	-31.4	42.75	-	-	74	-31.25	68.2	-25.45	215	304	V
	* 4.724	28.87	ADR	34.2	-31.4	31.67	54	-22.33	-	-	-	-	215	304	V
4	9.978	36.26	PK3	36.9	-26.2	46.96	-	-	74	-27.04	68.2	-21.24	104	219	V
3	9.994	36.19	PK3	36.9	-26.3	46.79	-	-	74	-27.21	68.2	-21.41	270	239	H
6	17.064	35.01	PK3	41.8	-23.6	53.21	-	-	74	-20.79	68.2	-14.99	317	300	H
5	17.119	35.01	PK3	41.8	-23.4	53.41	-	-	74	-20.59	68.2	-14.79	204	263	V

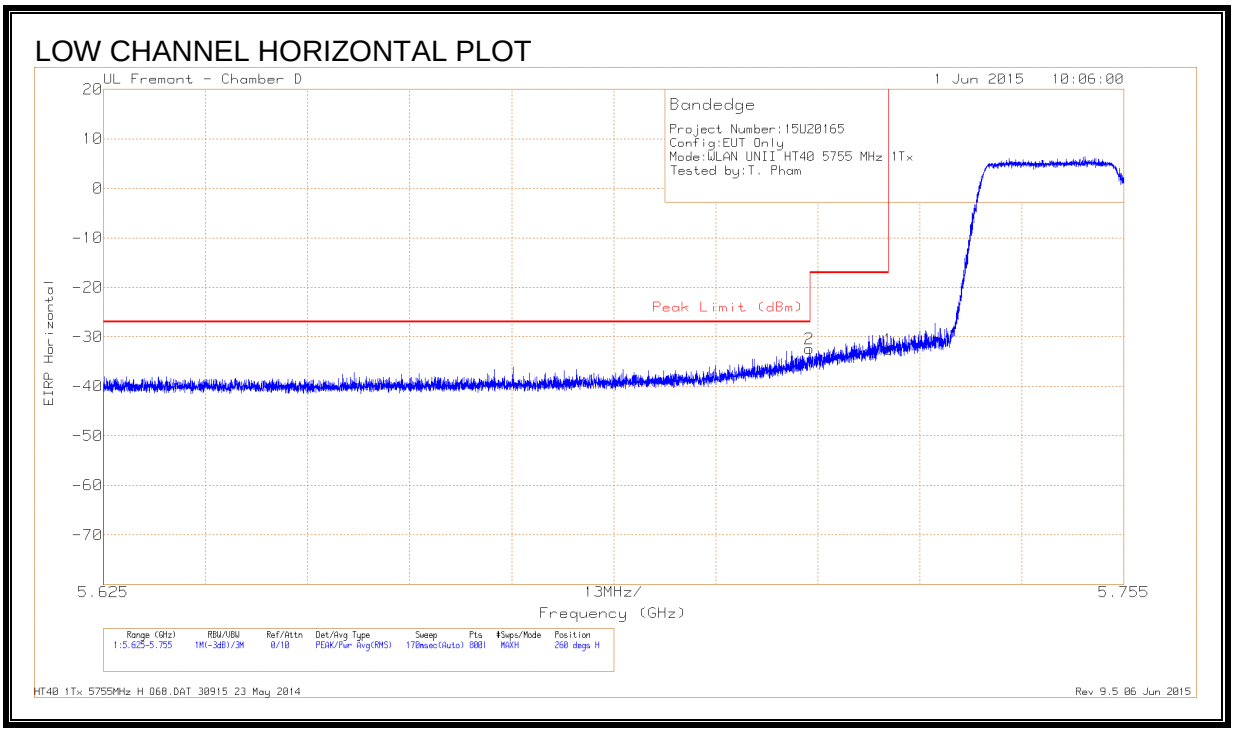
* - indicates frequency in CFR15.205/IC8.10 Restricted Band

PK3 - U-NII: Maximum Peak

ADR - U-NII AD primary method, RMS average

RESTRICTED BANDEDGE, CHAIN 1 (LOW CHANNEL)

LOW CHANNEL HORIZONTAL PLOT

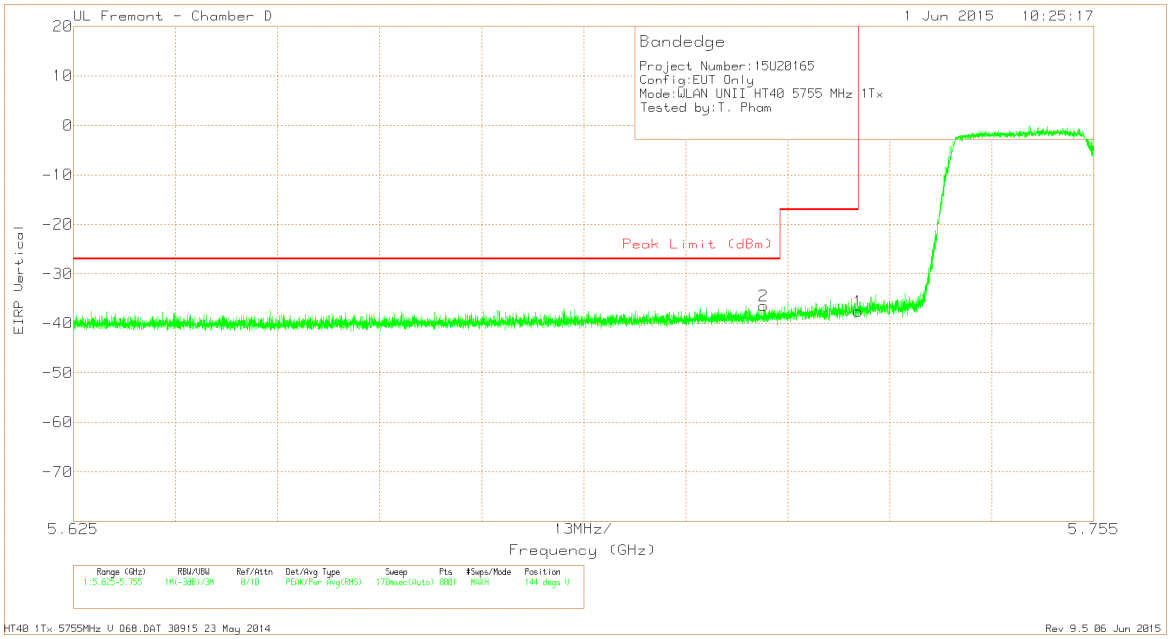


DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T346 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	5.715	-57.88	Pk	34.7	-21	11.8	-32.38	-27	-5.38	260	193	H
1	5.725	-58.01	Pk	34.7	-21	11.8	-32.51	-17	-15.51	260	193	H

Pk - Peak detector

LOW CHANNEL VERTICAL PLOT

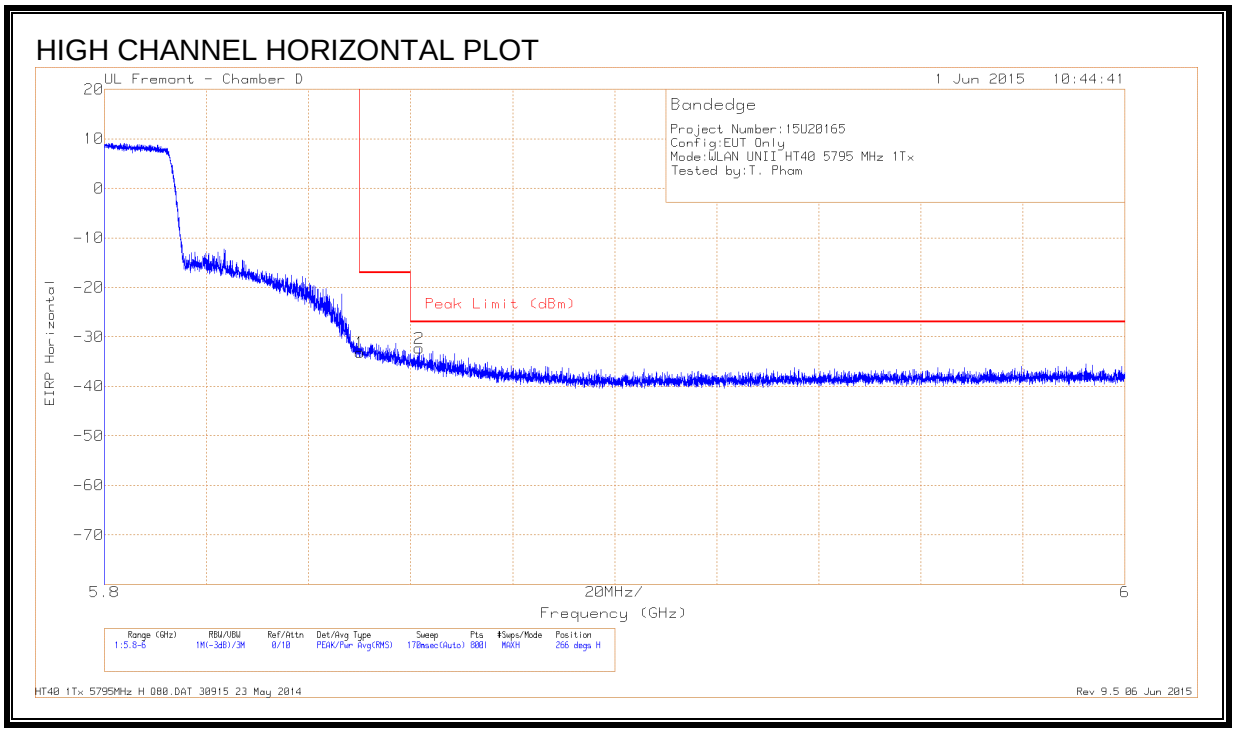


DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T346 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	5.713	-61.98	Pk	34.7	-21	11.8	-36.48	-27	-9.48	144	165	V
1	5.725	-63.05	Pk	34.7	-21	11.8	-37.55	-17	-20.55	144	165	V

Pk - Peak detector

RESTRICTED BANDEDGE, CHAIN 1 (HIGH CHANNEL)

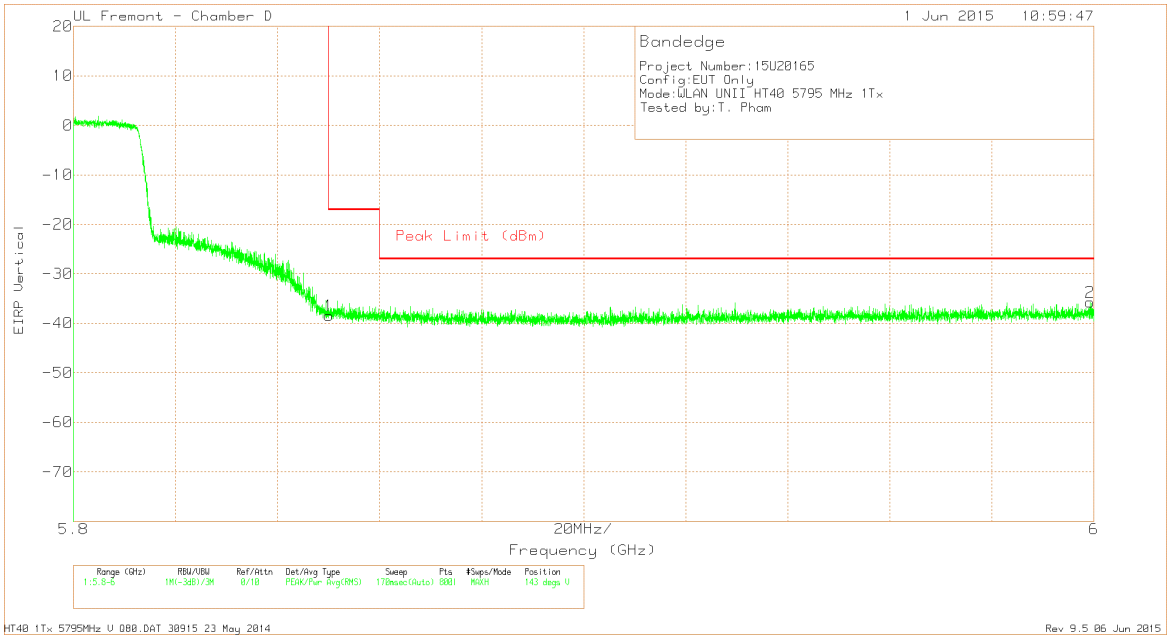


DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T346 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.85	-58.62	Pk	34.9	-21.2	11.8	-33.12	-17	-16.12	266	169	H
2	5.862	-57.7	Pk	34.9	-21.3	11.8	-32.3	-27	-5.3	266	169	H

Pk - Peak detector

HIGH CHANNEL VERTICAL PLOT



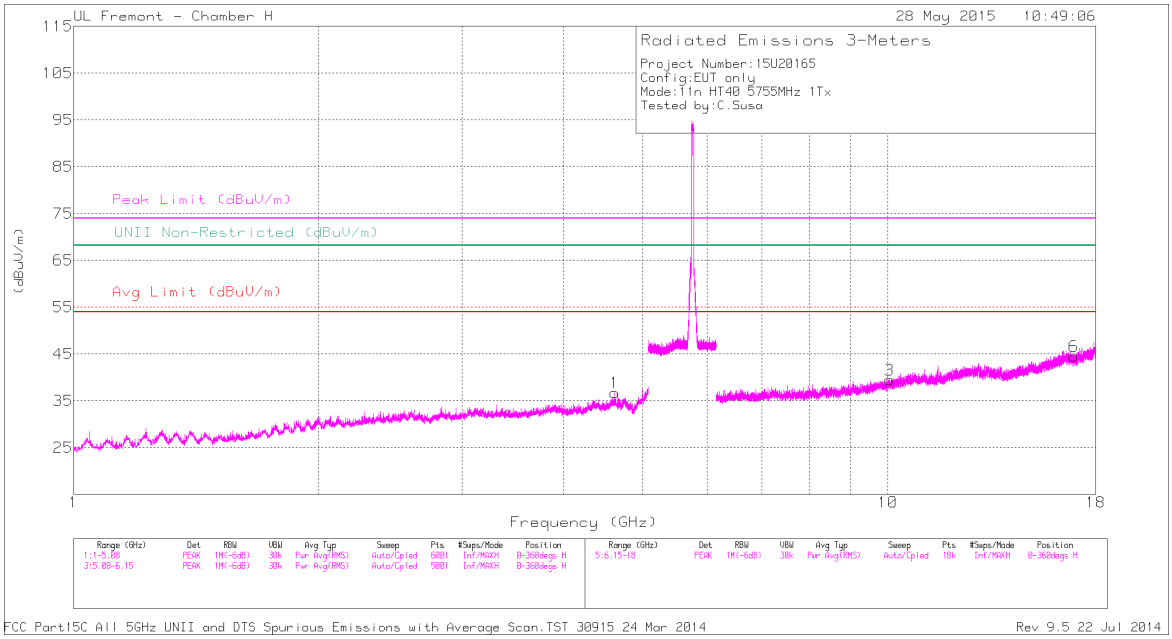
DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T346 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.85	-63.96	Pk	34.9	-21.2	11.8	-38.46	-17	-21.46	143	178	V
2	5.999	-61.8	Pk	35.1	-20.8	11.8	-35.7	-27	-8.7	143	178	V

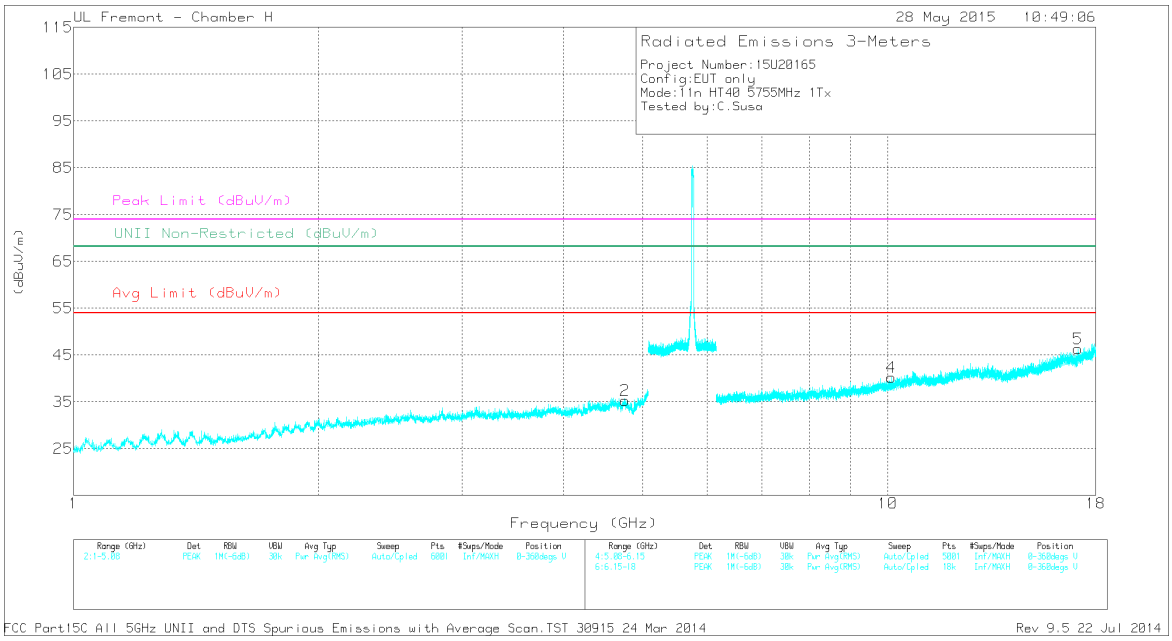
Pk - Peak detector

LOW CHANNEL HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL HORIZONTAL PLOT



LOW CHANNEL VERTICAL PLOT



DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4.615	40.84	PK1	34	-31.8	43.04	-	-	74	-30.96	-	-	149	220	H
	* 4.614	30.06	AD1	34	-31.7	32.36	54	-21.64	-	-	-	-	149	220	H
2	* 4.759	39.96	PK1	34.2	-31.8	42.36	-	-	74	-31.64	-	-	205	269	V
	* 4.757	29.33	AD1	34.2	-31.7	31.83	54	-22.17	-	-	-	-	205	269	V
3	10.037	35.67	PK1	37	-25.6	47.07	-	-	-	-	68.2	-21.13	303	231	H
4	10.101	36.33	PK1	37	-25.9	47.43	-	-	-	-	68.2	-20.77	174	323	V
5	17.115	34.55	PK1	41.8	-23.4	52.95	-	-	-	-	68.2	-15.25	65	239	V
6	16.916	33.62	PK1	41.7	-23.7	51.62	-	-	-	-	68.2	-16.58	260	132	H

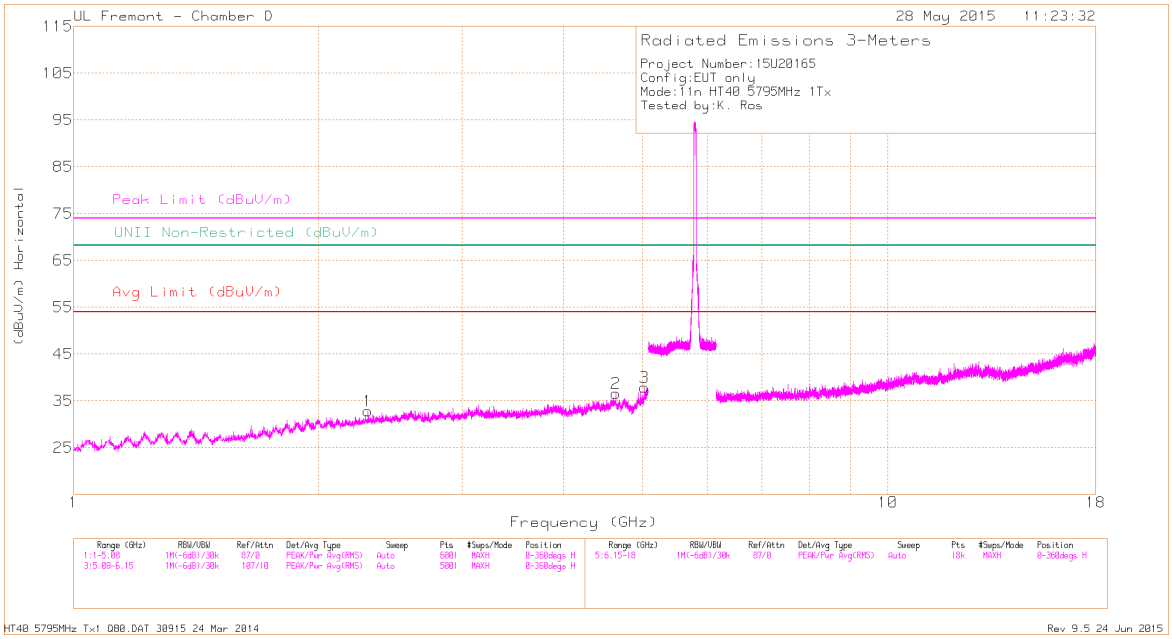
* - indicates frequency in CFR 47, Part 15 and Industry Canada RSS-Restricted Band.

PK1 - KDB789033 Method: Peak

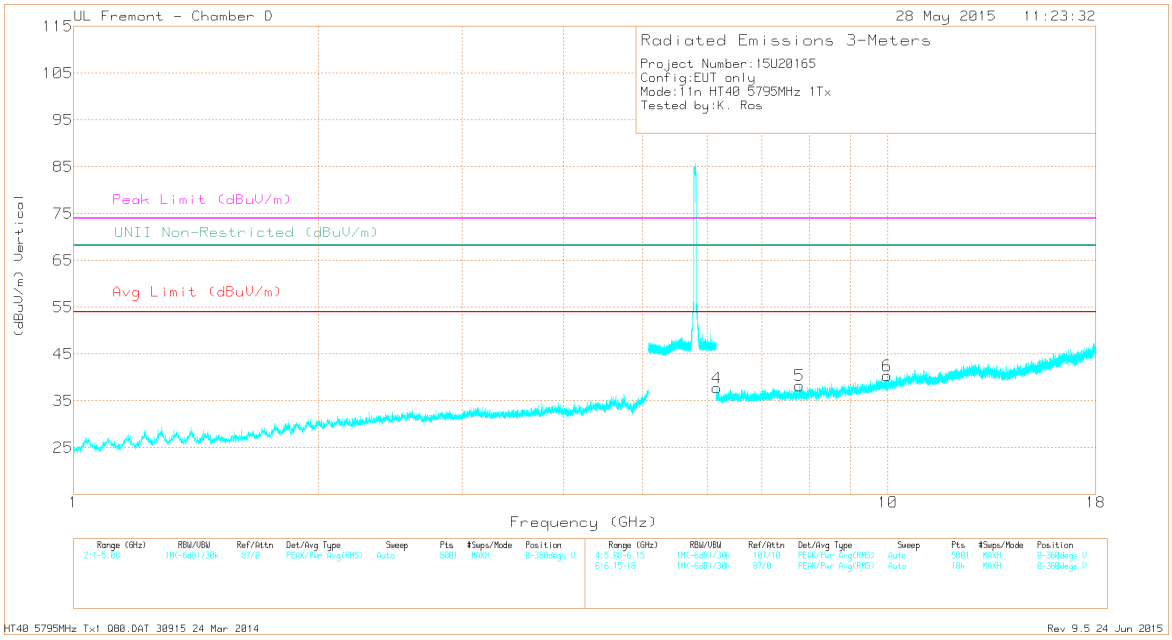
AD1 - KDB789033 Method: AD Primary Power Average

HIGH CHANNEL HARMONICS AND SPURIOUS EMISSIONS

HIGH CHANNEL HORIZONTAL PLOT



HIGH CHANNEL VERTICAL PLOT



DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.299	40.19	PK-U	31.8	-34	37.99	-	-	74	-36.01	-	-	149	255	H
	* 2.299	28.17	ADR	31.8	-34	25.97	54	-28.03	-	-	-	-	149	255	H
2	* 4.638	37.83	PK-U	34.1	-32.2	39.73	-	-	74	-34.27	-	-	205	110	H
	* 4.636	26.8	ADR	34.1	-32.1	28.8	54	-25.2	-	-	-	-	205	110	H
3	* 5.023	37.95	PK-U	34.3	-31.1	41.15	-	-	74	-32.85	-	-	194	197	H
	* 5.022	26.74	ADR	34.3	-31.2	29.84	54	-24.16	-	-	-	-	194	197	H
4	6.166	36.76	PK-U	35.4	-30.5	41.66	-	-	-	-	68.2	-26.54	281	274	V
5	7.795	35.86	PK-U	35.9	-28.7	43.06	-	-	-	-	68.2	-25.14	273	219	V
6	9.969	34.1	PK-U	36.9	-26.4	44.6	-	-	-	-	68.2	-23.6	179	250	V

* - indicates frequency in CFR15.205/IC8.10 Restricted Band

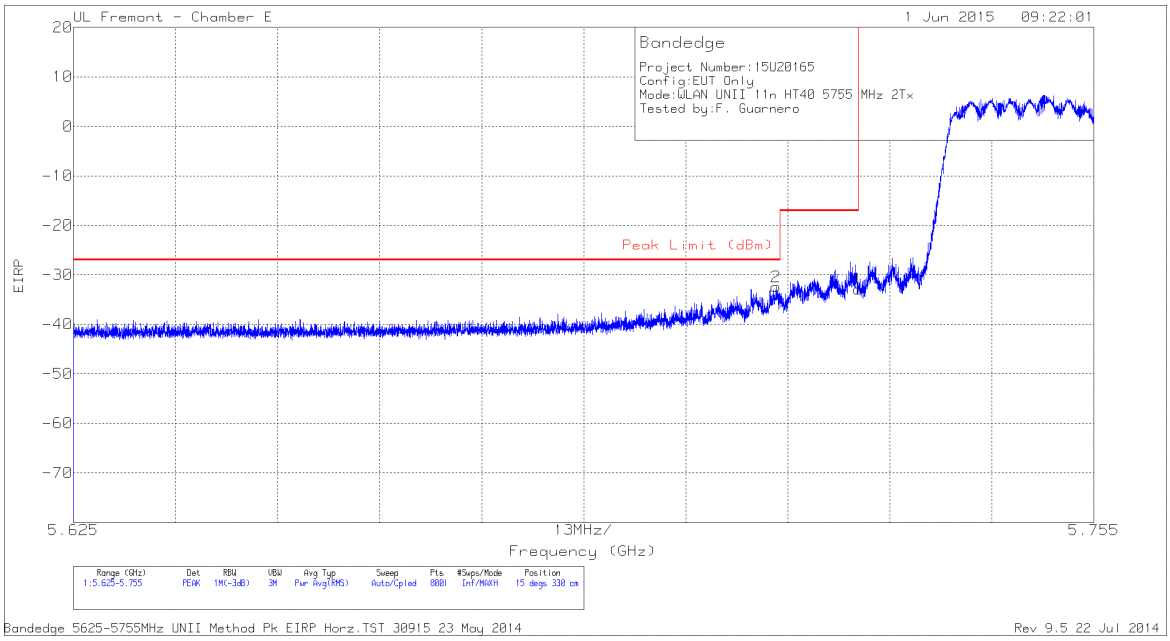
PK-U - U-NII: Maximum Peak

ADR - U-NII AD primary method, RMS average

11.23. 802.11n HT40 2Tx CDD MODE IN THE 5.8 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL)

LOW CHANNEL HORIZONTAL PLOT

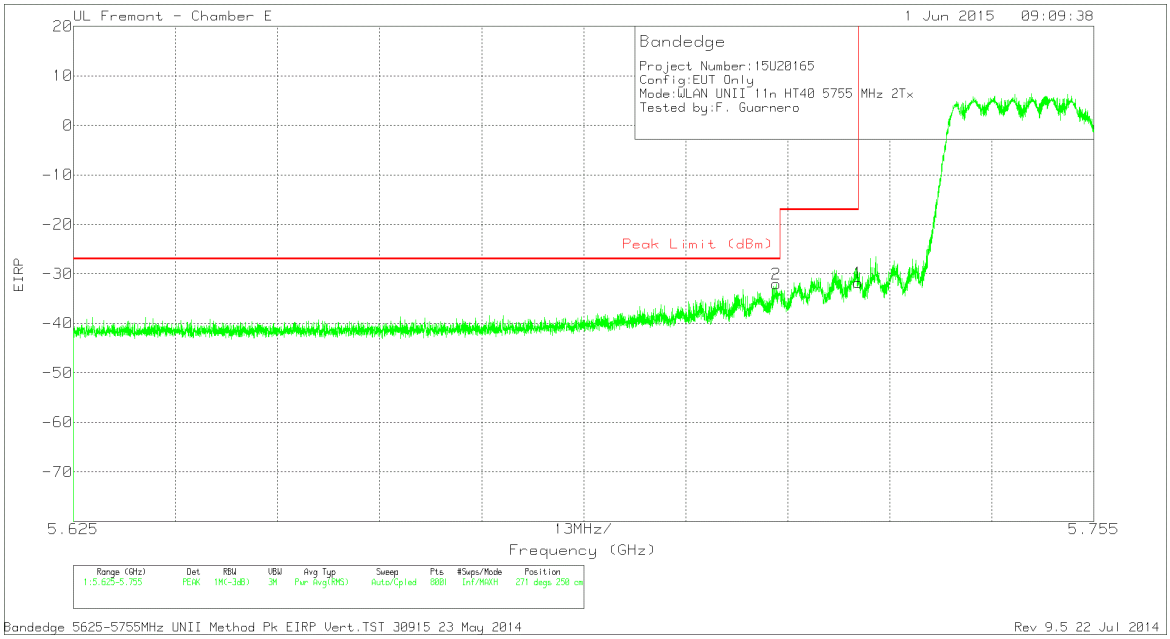


DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T346 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	5.715	-57.96	PK	34.7	-21	11.8	-32.46	-27	-5.46	15	330	H
1	5.725	-58.36	PK	34.7	-21	11.8	-32.86	-17	-15.86	15	330	H

PK - Peak detector

LOW CHANNEL VERTICAL PLOT



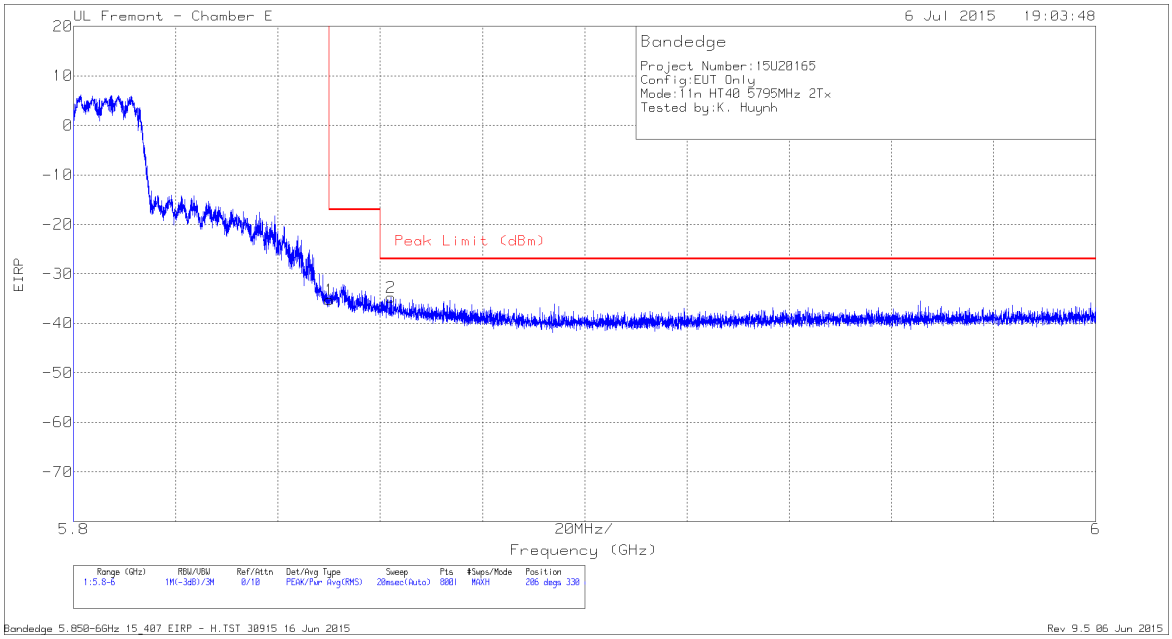
DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T346 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	5.715	-57.53	PK	34.7	-21	11.8	-32.03	-27	-5.03	271	250	V
1	5.725	-57.31	PK	34.7	-21	11.8	-31.81	-17	-14.81	271	250	V

PK - Peak detector

RESTRICTED BANDEDGE (HIGH CHANNEL)

HIGH CHANNEL HORIZONTAL PLOT

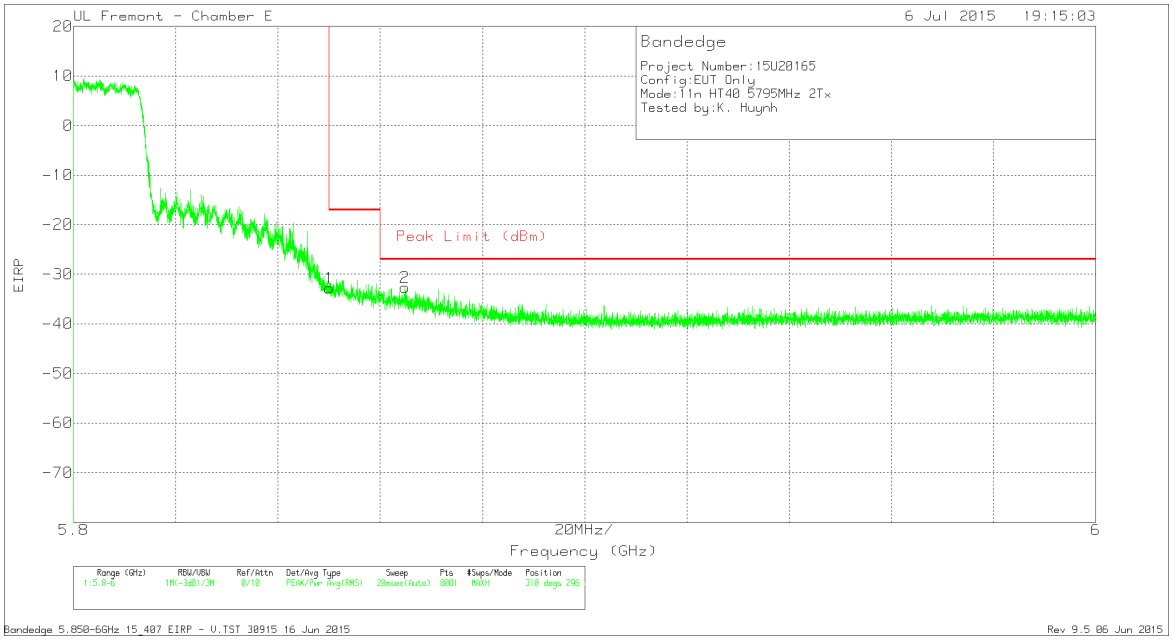


DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T346 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.85	-60.78	Pk	34.9	-21.2	11.8	-35.28	-17	-18.28	206	330	H
2	5.862	-60.13	Pk	34.9	-21.3	11.8	-34.73	-27	-7.73	206	330	H

Pk - Peak detector

HIGH CHANNEL VERTICAL PLOT



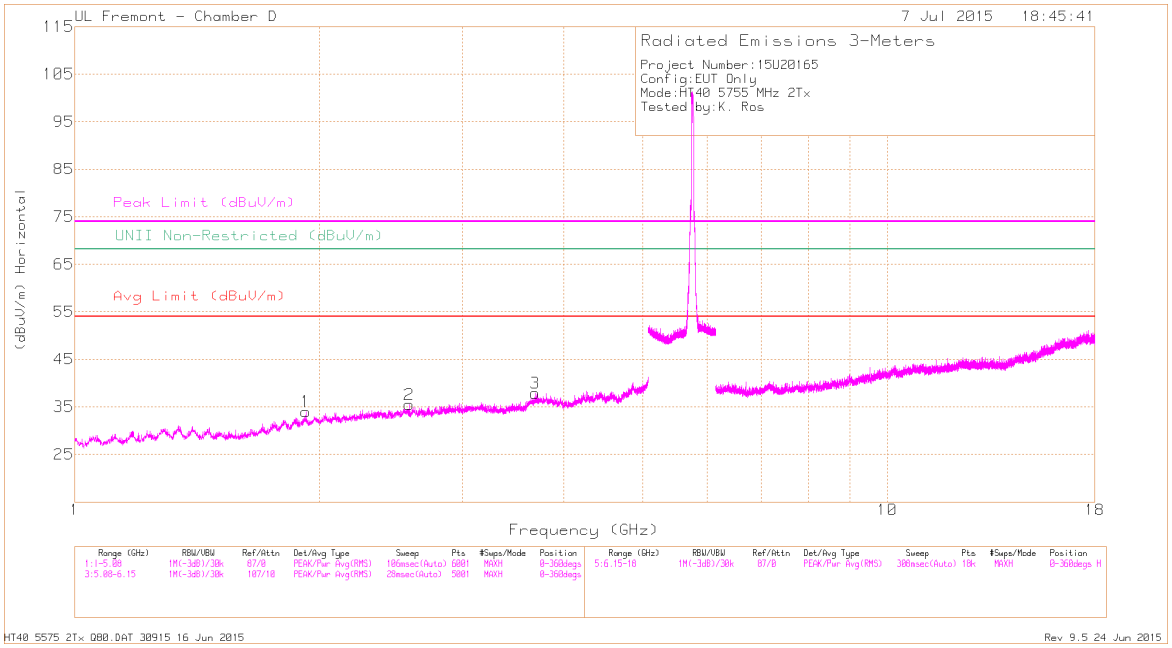
DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T346 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.85	-58.25	Pk	34.9	-21.2	11.8	-32.75	-17	-15.75	310	296	V
2	5.865	-58.18	Pk	34.9	-21.2	11.8	-32.68	-27	-5.68	310	296	V

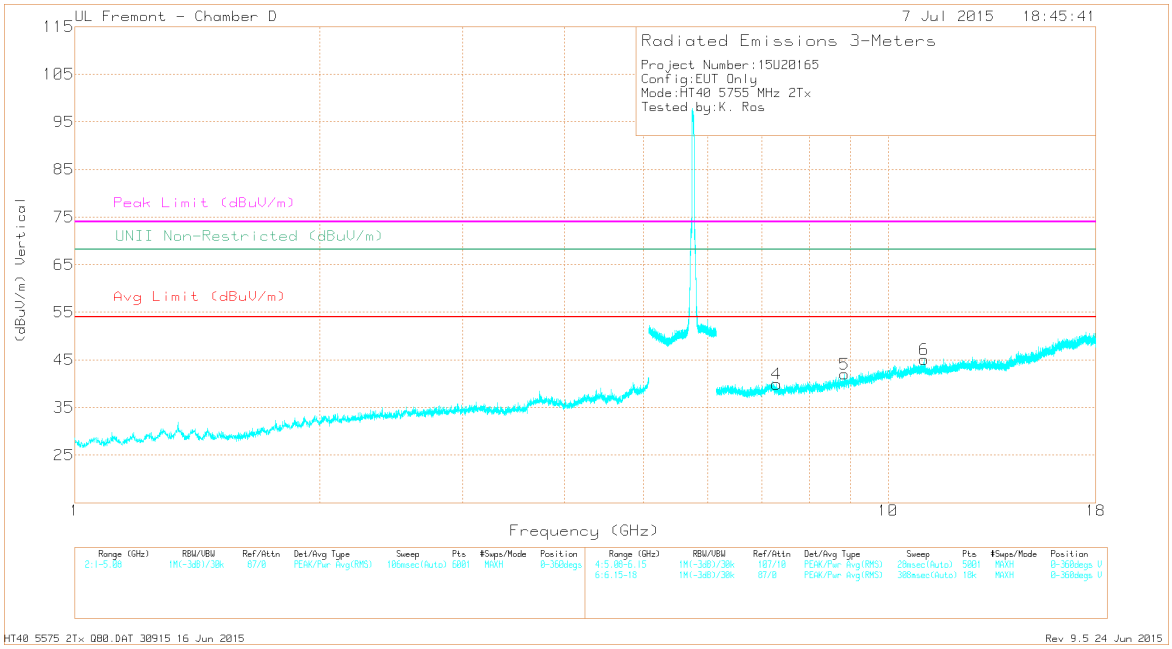
Pk - Peak detector

LOW CHANNEL HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL HORIZONTAL PLOT



LOW CHANNEL VERTICAL PLOT



DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	* 3.685	38.2	PK-U	33.2	-29.2	42.2	-	-	74	-31.8	-	-	312	201	H
	* 3.686	27.36	ADR	33.2	-29.2	31.36	54	-22.64	-	-	-	-	312	201	H
4	* 7.295	36.64	PK-U	35.5	-25.5	46.64	-	-	74	-27.36	-	-	160	218	V
	* 7.297	25.39	ADR	35.5	-25.5	35.39	54	-18.61	-	-	-	-	160	218	V
6	* 11.078	34.44	PK-U	38	-21.5	50.94	-	-	74	-23.06	-	-	112	156	V
	* 11.077	23.16	ADR	38	-21.5	39.66	54	-14.34	-	-	-	-	112	156	V
1	1.924	40.71	PK-U	30.8	-31.1	40.41	-	-	-	-	68.2	-27.79	319	121	H
2	2.581	39.01	PK-U	32.3	-29.7	41.61	-	-	-	-	68.2	-26.59	278	143	H
5	8.844	35.07	PK-U	36	-23.2	47.87	-	-	-	-	68.2	-20.33	179	135	V

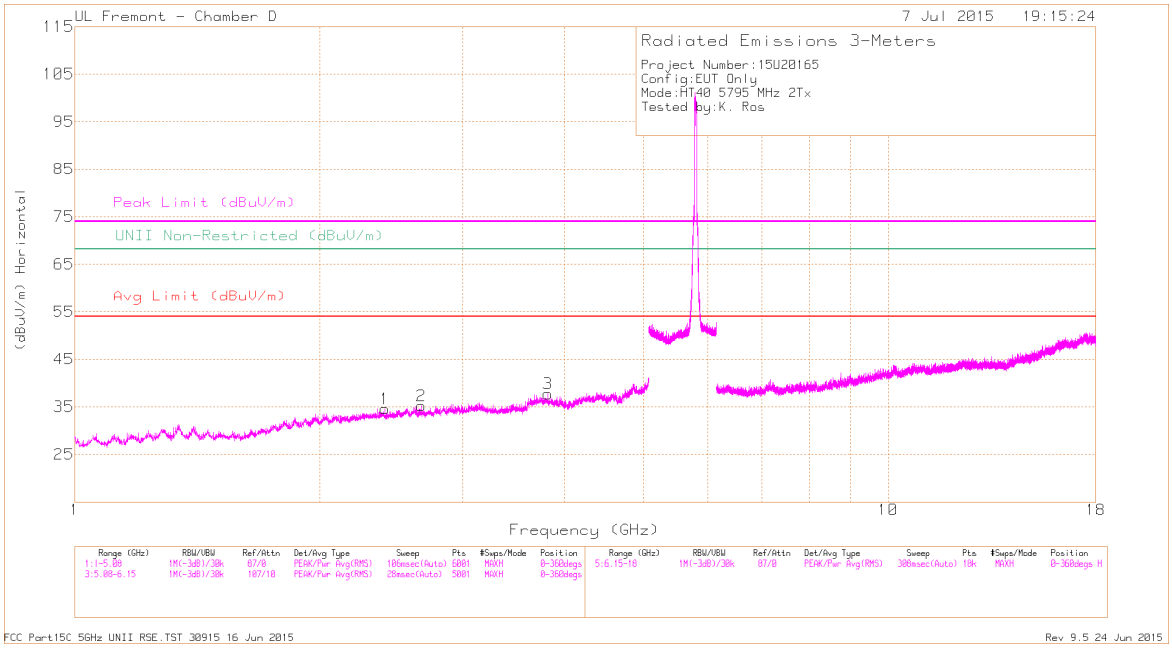
* - indicates frequency in CFR15.205/IC8.10 Restricted Band

PK-U - U-NII: Maximum Peak

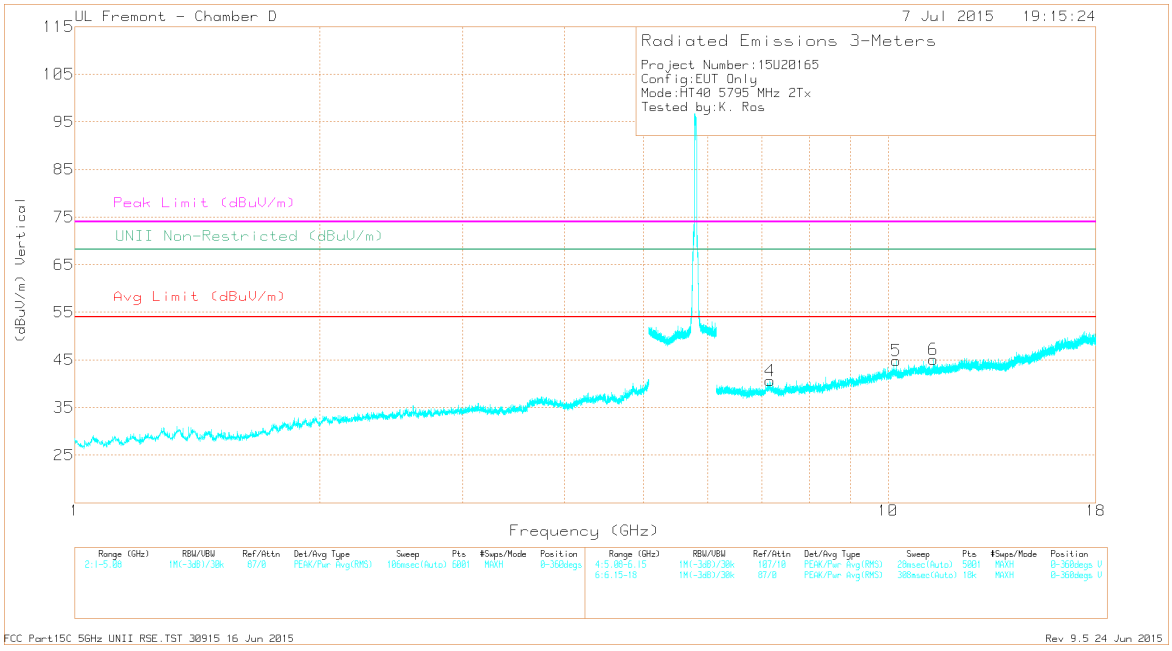
ADR - U-NII AD primary method, RMS average

HIGH CHANNEL HARMONICS AND SPURIOUS EMISSIONS

HIGH CHANNEL HORIZONTAL PLOT



HIGH CHANNEL VERTICAL PLOT



DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 2.667	39.7	PK-U	32.4	-30.6	41.5	-	-	74	-32.5	-	-	76	155	H
	* 2.667	28.45	ADR	32.4	-30.6	30.25	54	-23.75	-	-	-	-	76	155	H
3	* 3.816	38.86	PK-U	33.4	-28.7	43.56	-	-	74	-30.44	-	-	127	114	H
	* 3.814	27.25	ADR	33.4	-28.7	31.95	54	-22.05	-	-	-	-	127	114	H
6	* 11.372	34.46	PK-U	38	-21.6	50.86	-	-	74	-23.14	-	-	173	173	V
	* 11.373	23.18	ADR	38	-21.7	39.48	54	-14.52	-	-	-	-	173	173	V
1	2.406	39.5	PK-U	32.1	-30.6	41	-	-	-	-	68.2	-27.2	21	180	H
4	7.16	35.21	PK-U	35.5	-23.9	46.81	-	-	-	-	68.2	-21.39	191	197	V
5	10.233	33.94	PK-U	37.2	-20.9	50.24	-	-	-	-	68.2	-17.96	217	186	V

* - indicates frequency in CFR15.205/IC8.10 Restricted Band

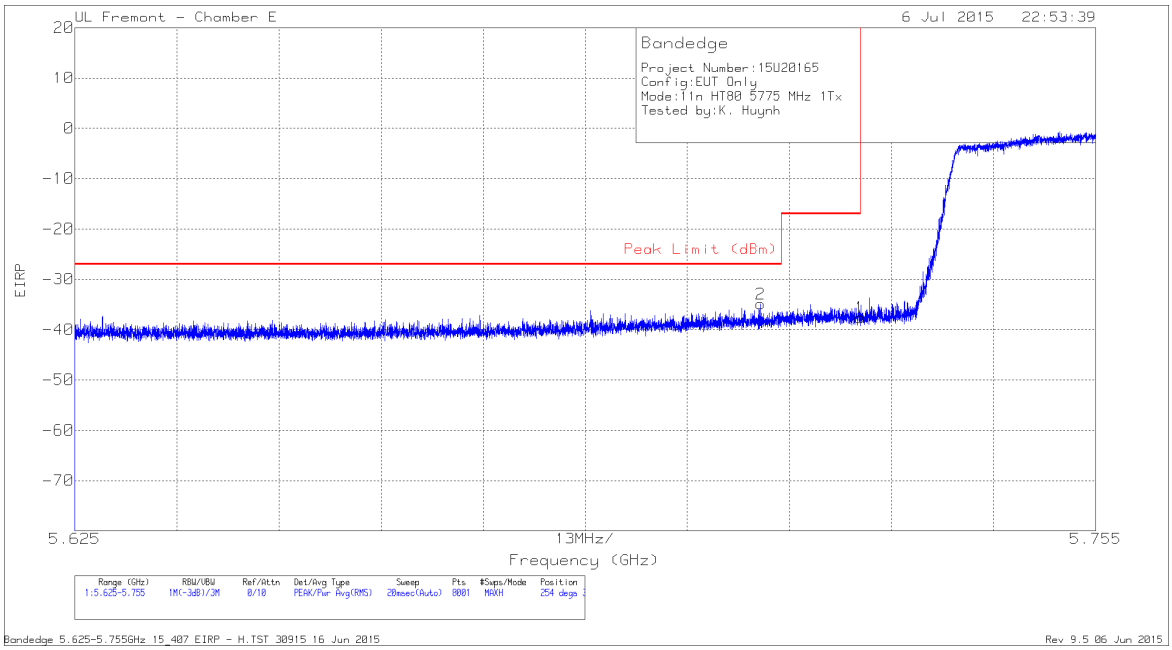
PK-U - U-NII: Maximum Peak

ADR - U-NII AD primary method, RMS average

11.24. 802.11ac 80Mhz 1Tx MODE IN THE 5.8 GHz BAND

RESTRICTED BANDEDGE, CHAIN 0 (LOW)

LOW CHANNEL HORIZONTAL PLOT

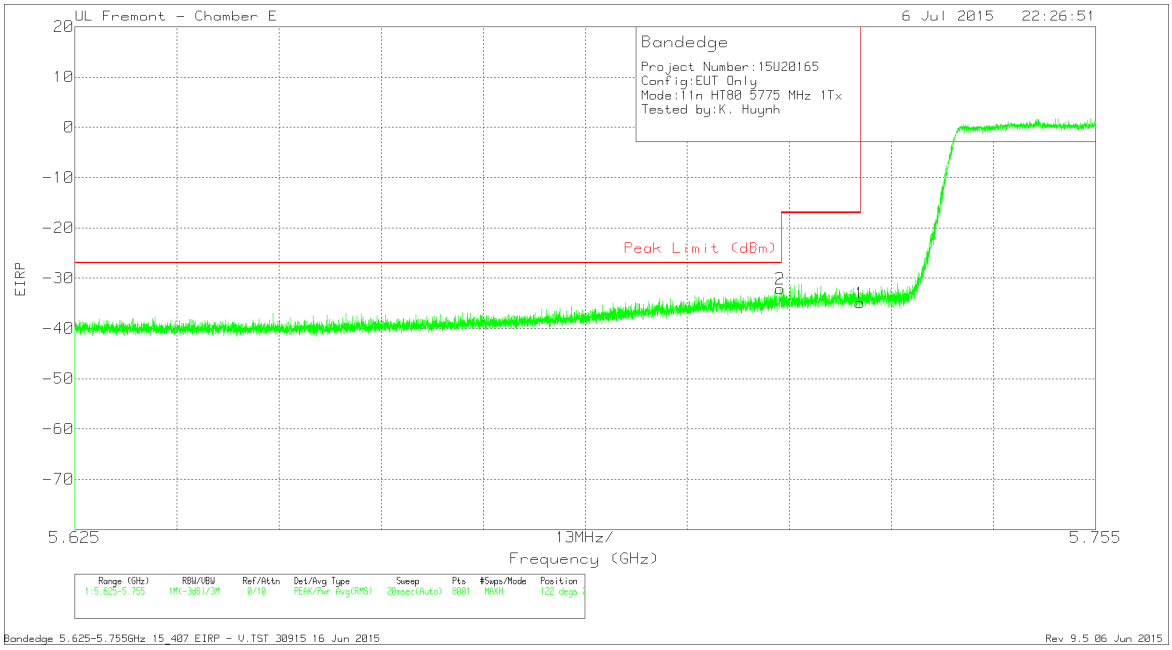


DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T346 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Conversion Factor (dB)	DC Corr (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	5.712	-60.42	Pk	34.7	-21	11.8	0	-34.92	-27	-7.92	254	339	H
1	5.725	-63.1	Pk	34.7	-21	11.8	0	-37.6	-17	-20.6	254	339	H

Pk - Peak detector

LOW CHANNEL VERTICAL PLOT

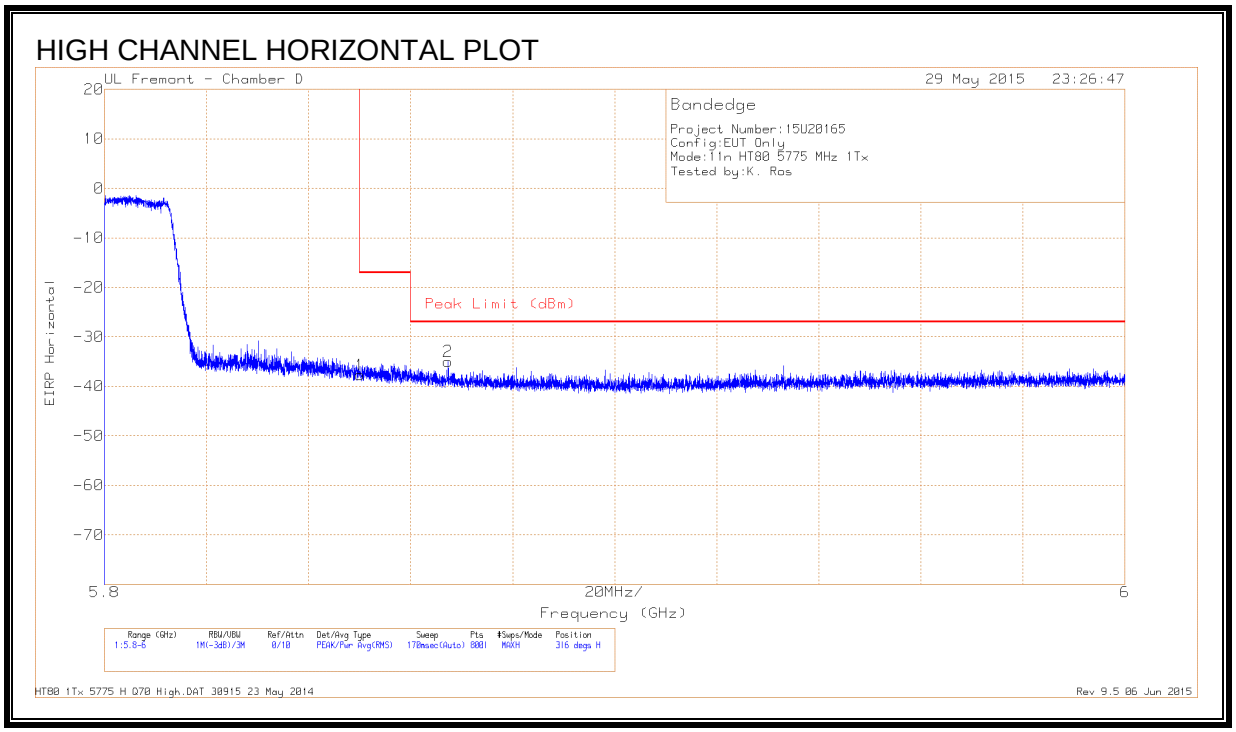


DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T346 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Conversion Factor (dB)	DC Corr (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	5.715	-57.63	Pk	34.7	-21	11.8	0	-32.13	-27	-5.13	122	248	V
1	5.725	-60.43	Pk	34.7	-21	11.8	0	-34.93	-17	-17.93	122	248	V

Pk - Peak detector

RESTRICTED BANDEDGE, CHAIN 0 (HIGH)

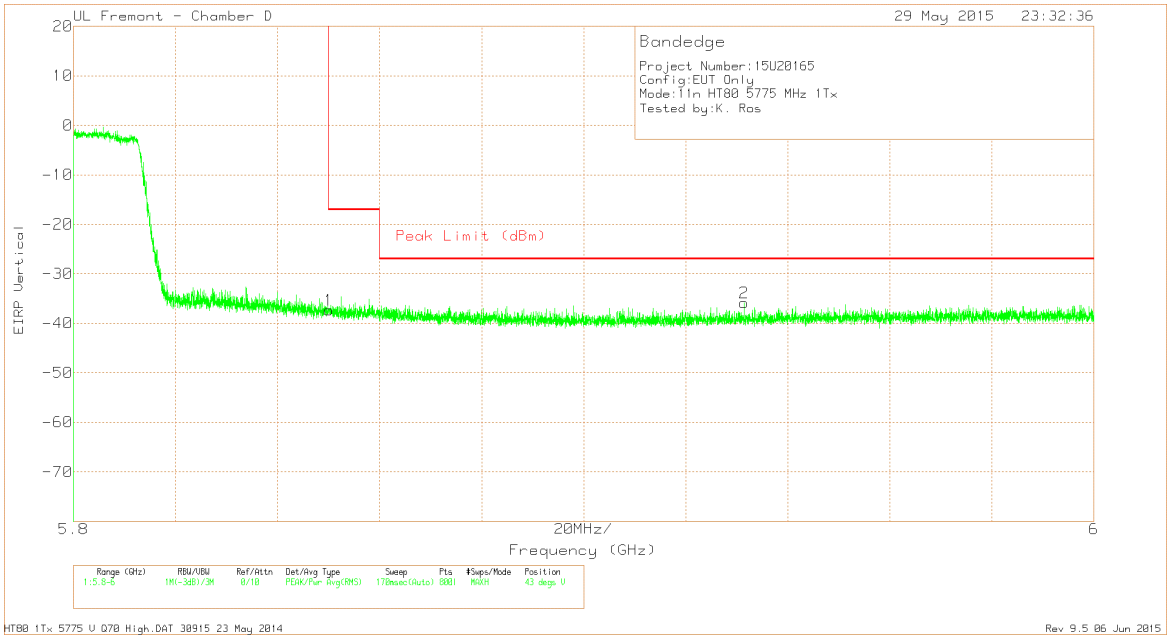


DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T346 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Conversion Factor (dB)	DC Corr (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.85	-63.15	Pk	34.9	-21.2	11.8	0	-37.65	-17	-20.65	316	317	H
2	5.867	-60.43	Pk	34.9	-21.2	11.8	0	-34.93	-27	-7.93	316	317	H

Pk - Peak detector

HIGH CHANNEL VERTICAL PLOT



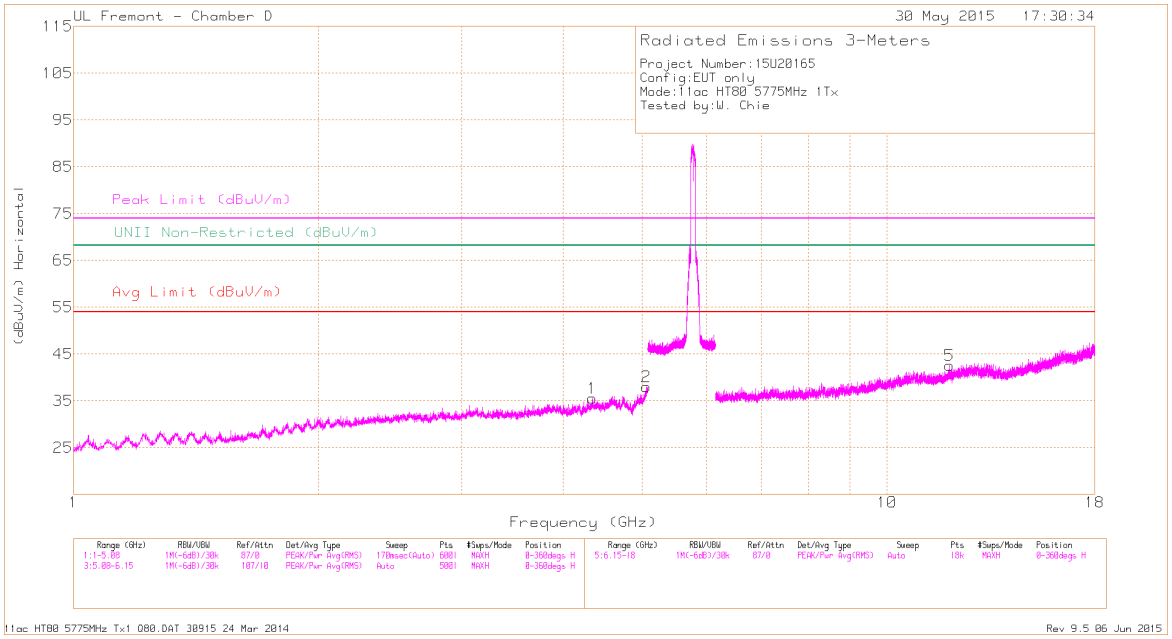
DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T346 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Conversion Factor (dB)	DC Corr (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.85	-62.82	Pk	34.9	-21.2	11.8	0	-37.32	-17	-20.32	43	294	V
2	5.931	-61.57	Pk	35	-21.1	11.8	0	-35.87	-27	-8.87	43	294	V

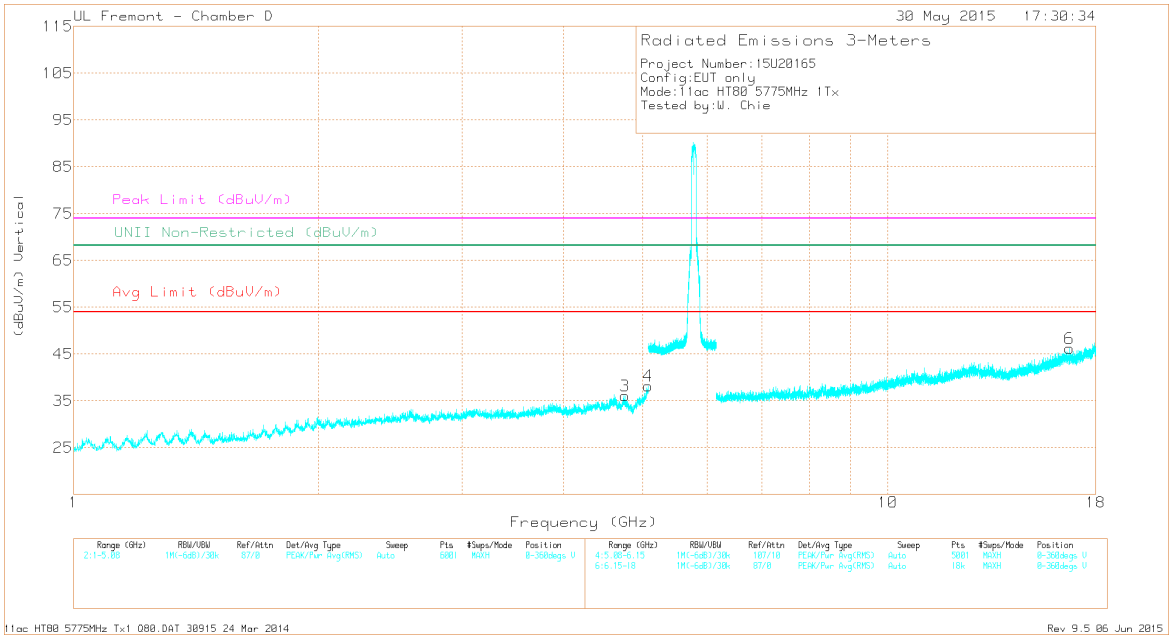
Pk - Peak detector

CHANNEL 155 HARMONICS AND SPURIOUS EMISSIONS

CHANNEL 155 HORIZONTAL PLOT



CHANNEL 155 VERTICAL PLOT



DATA

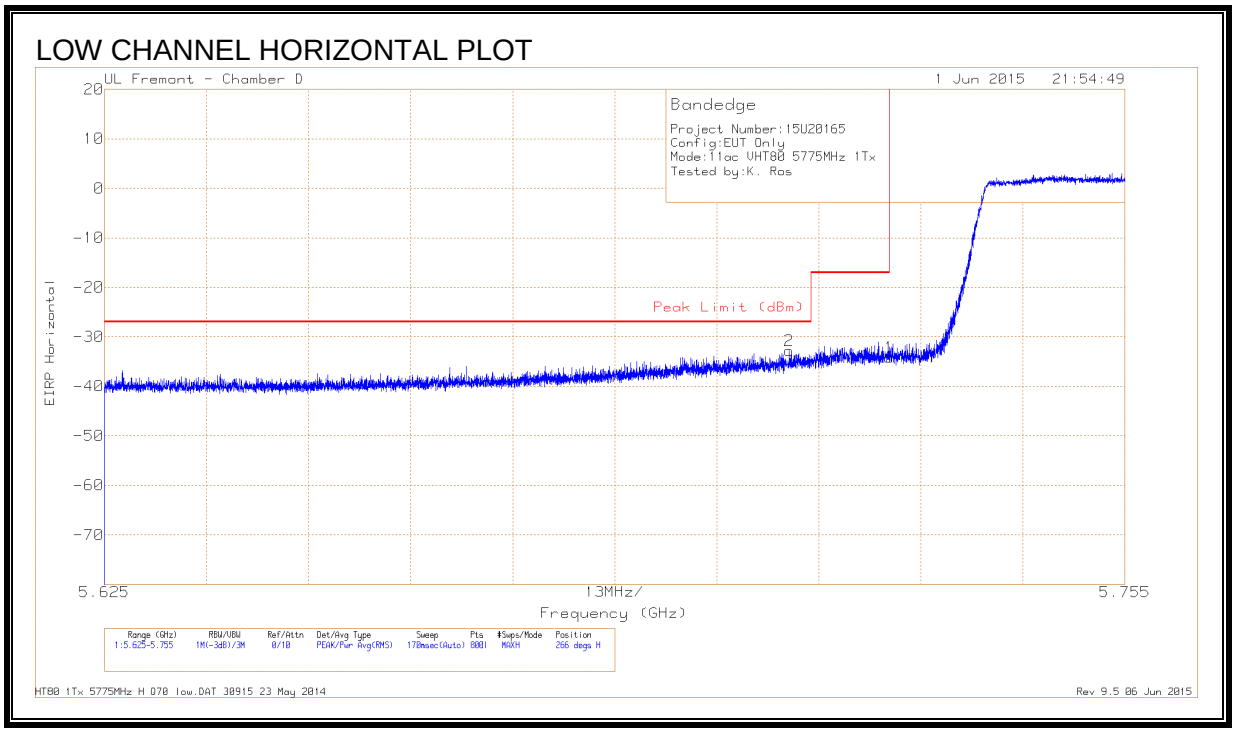
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4.345	40.46	PK3	33.6	-31.3	0	42.76	-	-	74	-31.24	68.2	-25.44	53	229	H
	* 4.343	29.04	ADR	33.6	-31.3	.21	31.55	54	-22.55	-	-	-	-	53	229	H
2	* 5.056	40.43	PK3	34.3	-29.4	0	45.33	-	-	74	-28.67	68.2	-22.87	261	369	H
	* 5.056	28.91	ADR	34.3	-29.4	.21	34.02	54	-19.98	-	-	-	-	261	369	H
3	* 4.753	41.24	PK3	34.2	-31.8	0	43.64	-	-	74	-30.36	68.2	-24.56	312	349	V
	* 4.755	29.5	ADR	34.2	-31.7	.21	32.21	54	-21.79	-	-	-	-	312	349	V
4	* 5.072	40.62	PK3	34.3	-28.7	0	46.22	-	-	74	-27.78	68.2	-21.98	180	291	V
	* 5.073	28.66	ADR	34.3	-28.6	.21	34.57	54	-19.43	-	-	-	-	180	291	V
5	* 11.934	35.83	PK3	38.6	-25.4	0	49.03	-	-	74	-24.97	68.2	-19.17	343	168	H
	* 11.938	24.51	ADR	38.6	-25.4	.21	37.92	54	-16.08	-	-	-	-	343	168	H
6	16.716	35.24	PK3	41.9	-24	0	53.14	-	-	74	-20.86	68.2	-15.06	232	202	V

* - indicates frequency in CFR15.205/IC8.10 Restricted Band

PK3 - U-NII: Maximum Peak

ADR - U-NII AD primary method, RMS average

RESTRICTED BANDEDGE, CHAIN 1 (LOW)

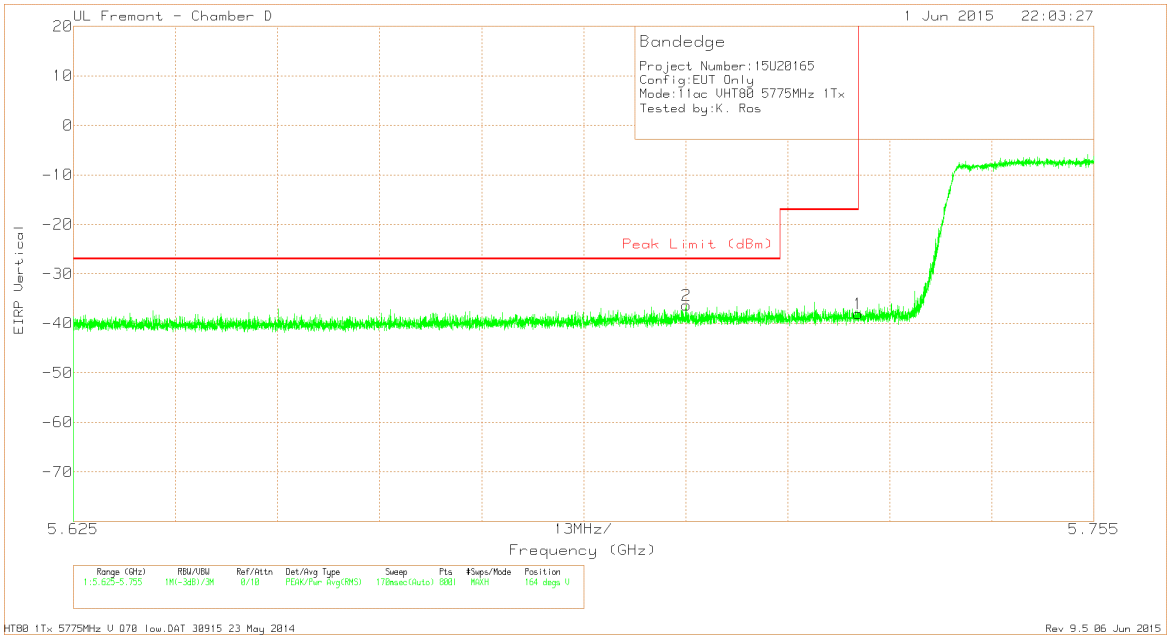


DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T346 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Conversion Factor (dB)	DC Corr (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	5.713	-58.09	Pk	34.7	-21	11.8	0	-32.59	-27	-5.59	266	255	H
1	5.725	-59.66	Pk	34.7	-21	11.8	0	-34.16	-17	-17.16	266	255	H

Pk - Peak detector

LOW CHANNEL VERTICAL PLOT



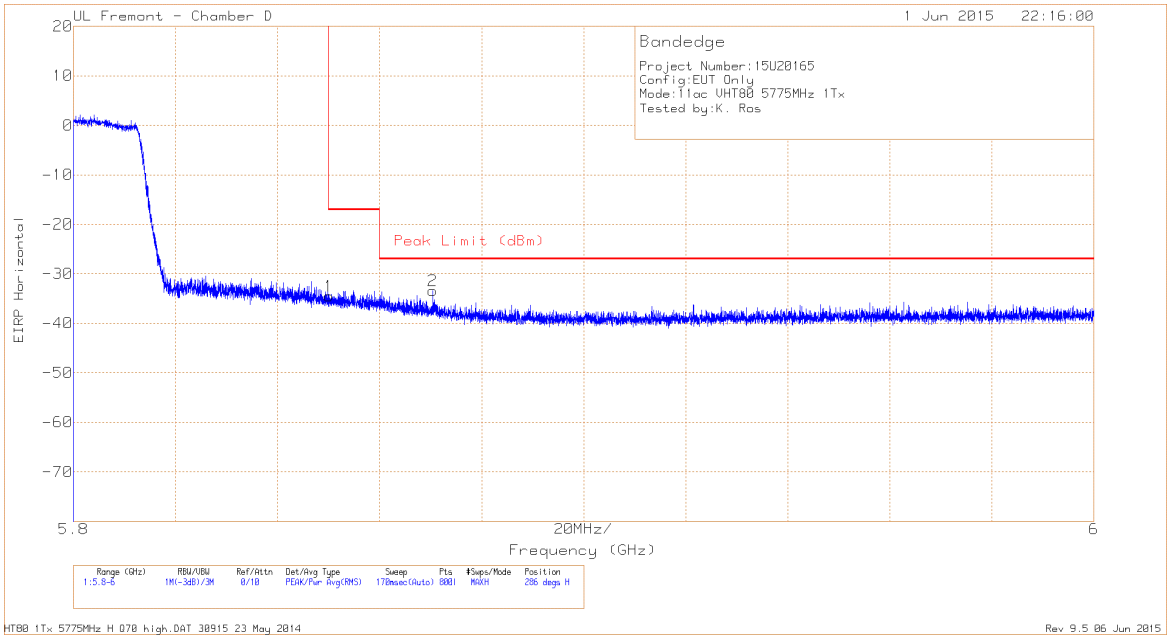
DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T346 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Conversion Factor (dB)	DC Corr (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	5.703	-61.76	Pk	34.7	-21.1	11.8	0	-36.36	-27	-9.36	164	255	V
1	5.725	-63.56	Pk	34.7	-21	11.8	0	-38.06	-17	-21.06	164	255	V

Pk - Peak detector

RESTRICTED BANDEDGE, CHAIN 1 (HIGH)

HIGH CHANNEL HORIZONTAL PLOT

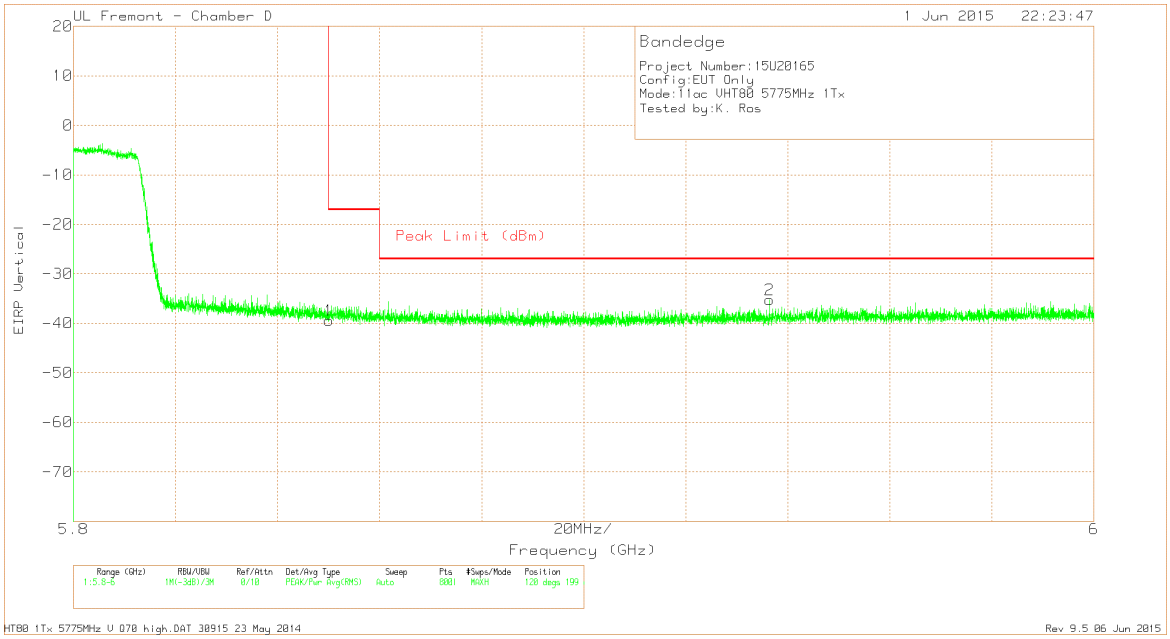


DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T346 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Conversion Factor (dB)	DC Corr (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.85	-60.05	Pk	34.9	-21.2	11.8	0	-34.55	-17	-17.55	286	182	H
2	5.87	-58.84	Pk	34.9	-21.3	11.8	0	-33.44	-27	-6.44	286	182	H

Pk - Peak detector

HIGH CHANNEL VERTICAL PLOT



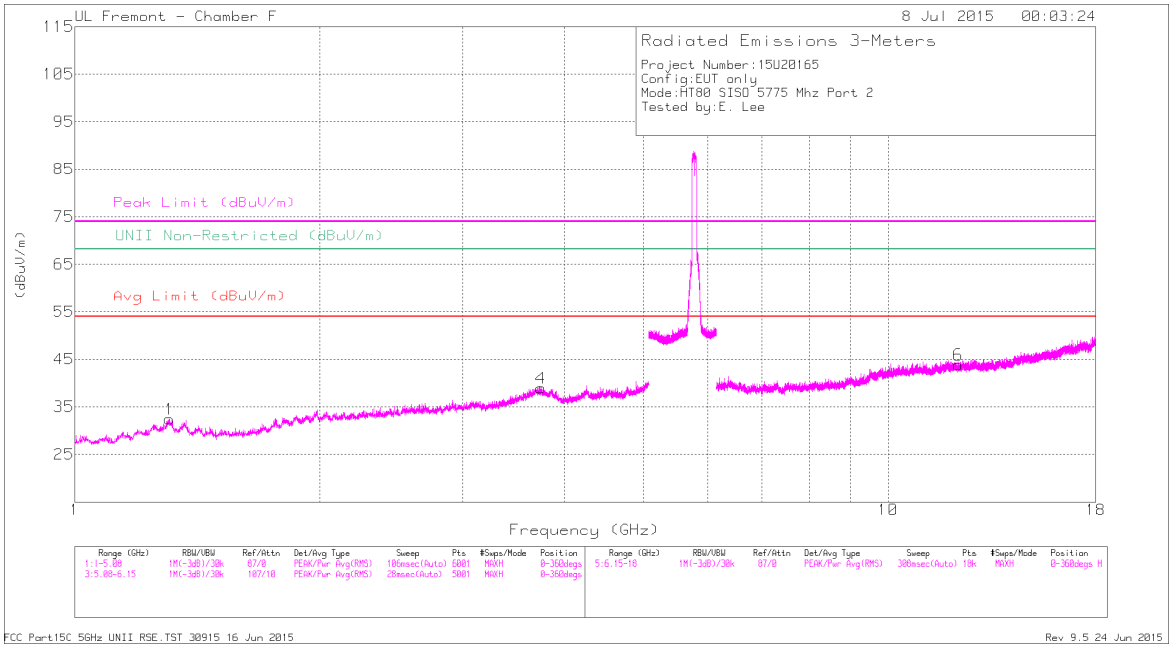
DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T346 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Conversion Factor (dB)	DC Corr (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.85	-64.87	Pk	34.9	-21.2	11.8	0	-39.37	-17	-22.37	120	199	V
2	5.936	-60.97	Pk	35	-21.1	11.8	0	-35.27	-27	-8.27	120	199	V

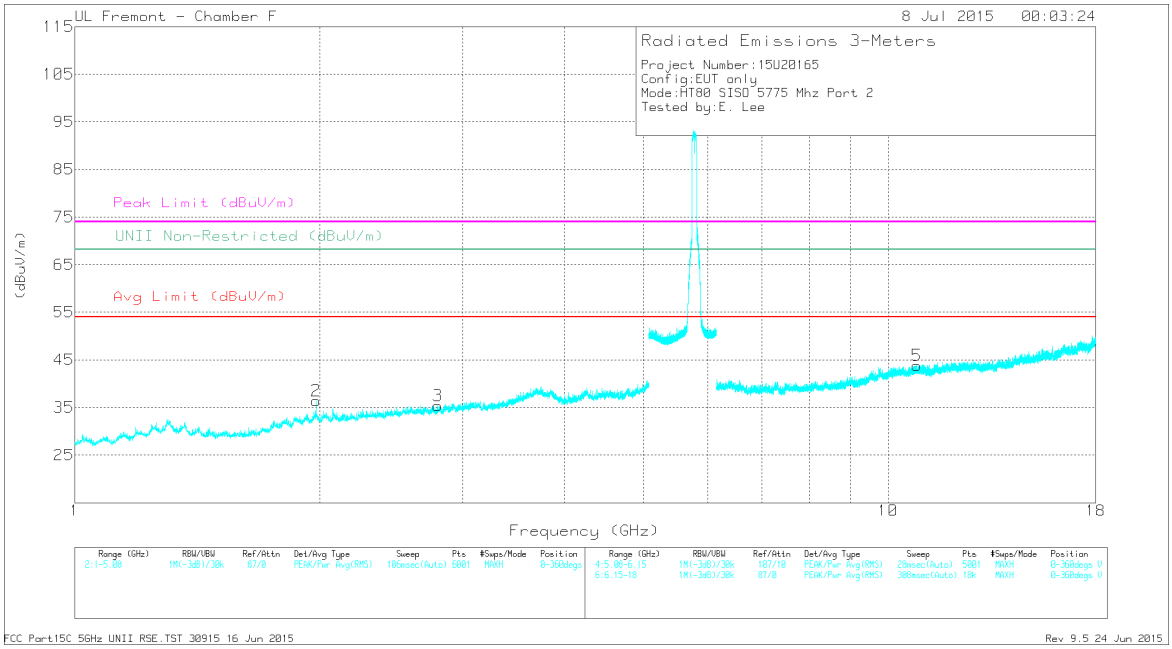
Pk - Peak detector

CHANNEL 155 HARMONICS AND SPURIOUS EMISSIONS

CHANNEL 155 HORIZONTAL PLOT



CHANNEL 155 VERTICAL PLOT



DATA

Markers	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T120 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.306	41.4	PK-U	30	-31.4	0	40	-	-	74	-34	-	-	343	104	H
	* 1.308	29.79	ADR	30	-31.4	.21	28.60	54	-25.40	-	-	-	-	343	104	H
4	* 3.742	38.7	PK-U	34.5	-29.3	0	43.9	-	-	74	-30.1	-	-	360	370	H
	* 3.743	27.7	ADR	34.4	-29.3	.21	33.01	54	-20.99	-	-	-	-	360	370	H
2	1.98	33.8	PK-U	31.5	-31	0	34.48	-	-	-	-	68.2	-33.72	360	370	V
3	* 2.798	42.32	PK-U	32.7	-30.1	0	44.92	-	-	74	-29.08	-	-	339	345	V
	* 2.798	28.32	ADR	32.7	-30.1	.21	31.13	54	-22.87	-	-	-	-	339	345	V
6	* 12.198	35.49	PK-U	39	-23.2	0	51.29	-	-	74	-22.71	-	-	360	327	H
	* 12.199	23.74	ADR	39	-23.2	.21	39.75	54	-14.25	-	-	-	-	360	327	H
5	* 10.85	33.71	PK-U	38.1	-21.8	0	50.01	-	-	74	-23.99	-	-	353	311	V
	* 10.85	22.89	ADR	38.1	-21.8	.21	39.40	54	-14.60	-	-	-	-	353	311	V

* - indicates frequency in CFR15.205/IC8.10 Restricted Band

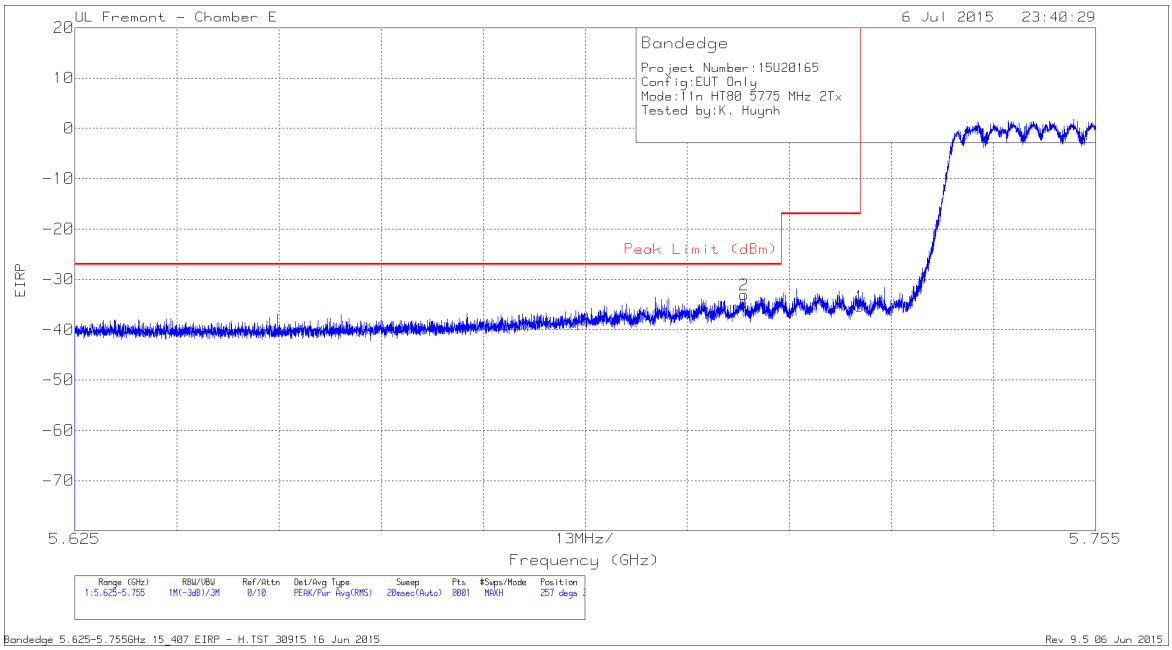
PK-U - U-NII: Maximum Peak

ADR - U-NII AD primary method, RMS average

11.25. 802.11ac 80Mhz 2Tx CDD MODE IN THE 5.8 GHz BAND

RESTRICTED BANDEDGE (LOW)

LOW CHANNEL HORIZONTAL PLOT

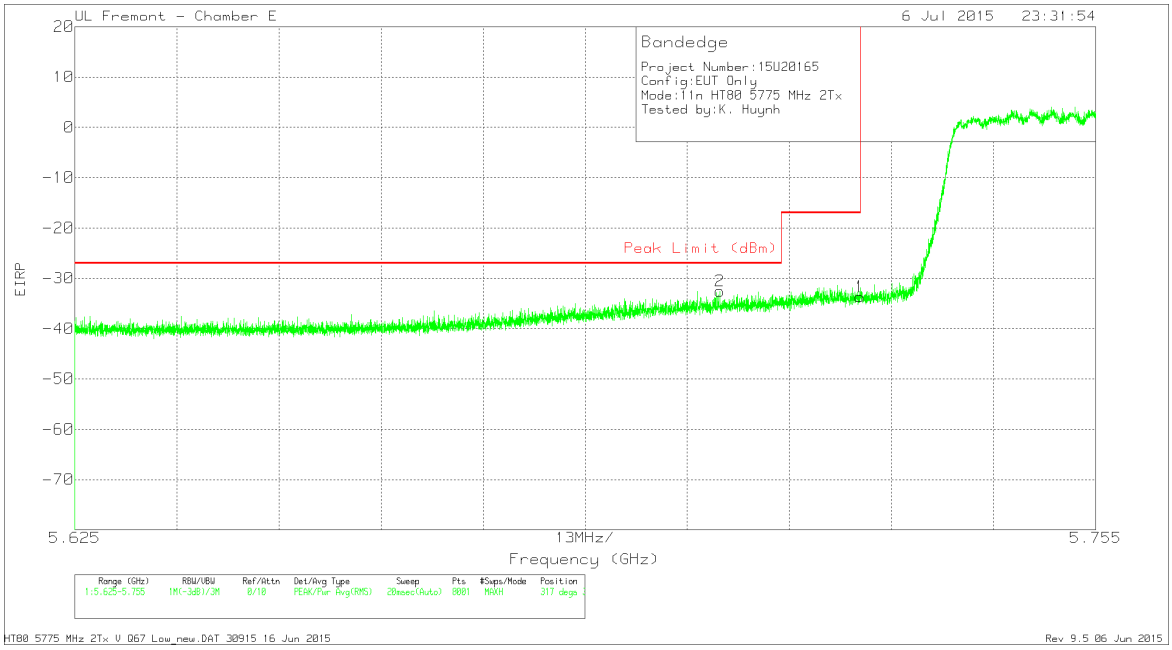


DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T346 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Conversion Factor (dB)	DC Corr (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	5.71	-58.59	Pk	34.7	-21	11.8	0	-33.09	-27	-6.09	257	373	H
1	5.725	-60.89	Pk	34.7	-21	11.8	0	-35.39	-17	-18.39	257	373	H

Pk - Peak detector

LOW CHANNEL VERTICAL PLOT



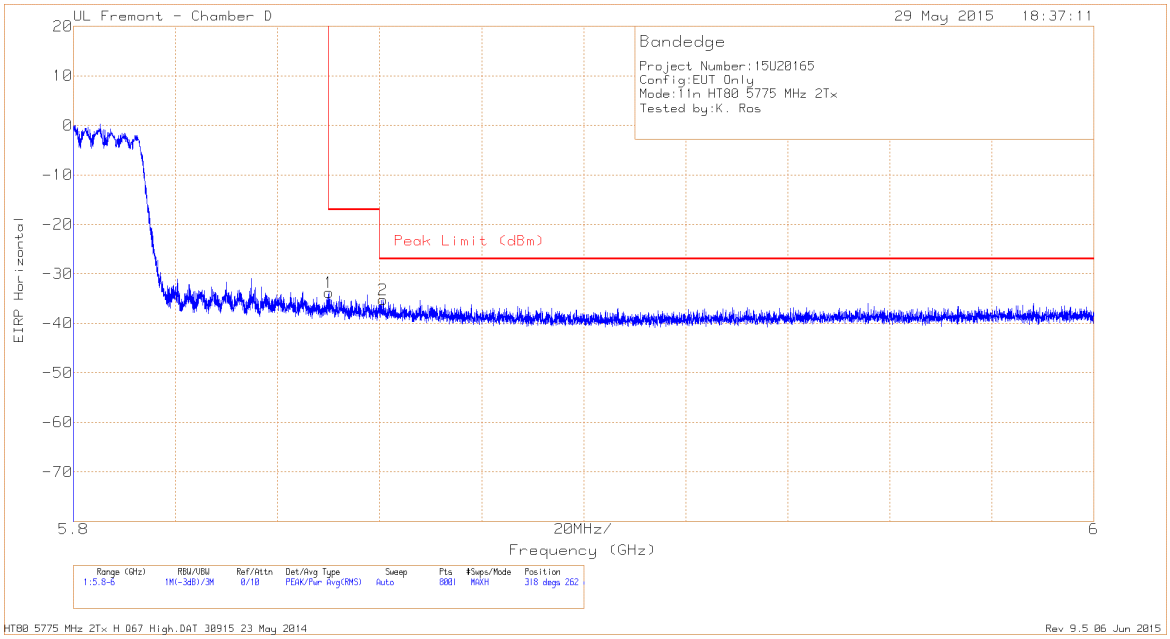
DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T346 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Conversion Factor (dB)	DC Corr (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	5.707	-58.03	Pk	34.7	-21	11.8	0	-32.53	-27	-5.53	317	306	V
1	5.725	-59.17	Pk	34.7	-21	11.8	0	-33.67	-17	-16.67	317	306	V

Pk - Peak detector

RESTRICTED BANDEDGE (HIGH)

HIGH CHANNEL HORIZONTAL PLOT

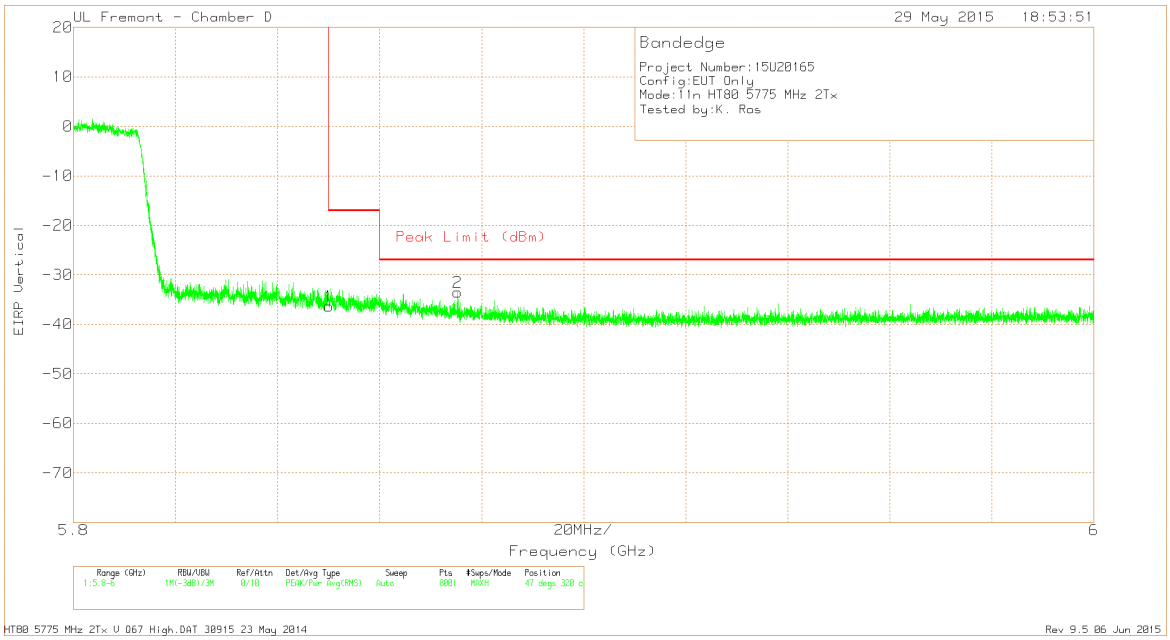


DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T346 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Conversion Factor (dB)	DC Corr (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.85	-59.3	Pk	34.9	-21.2	11.8	0	-33.8	-17	-16.8	318	262	H
2	5.861	-60.58	Pk	34.9	-21.3	11.8	0	-35.18	-27	-8.18	318	262	H

Pk - Peak detector

HIGH CHANNEL VERTICAL PLOT



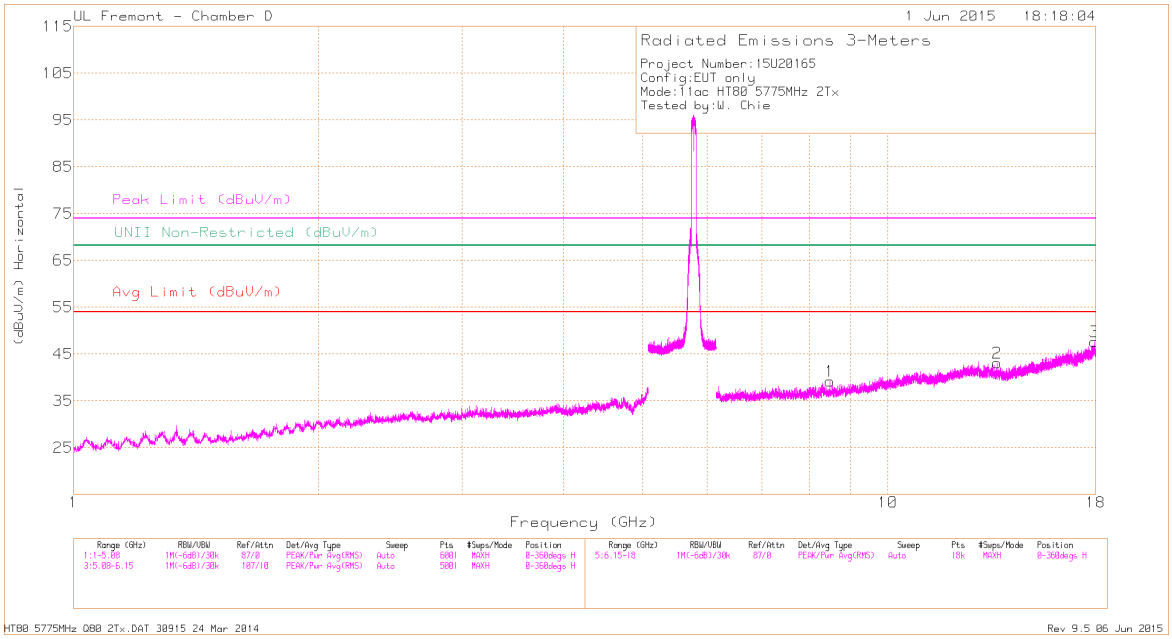
DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T346 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Conversion Factor (dB)	DC Corr (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.85	-61.82	Pk	34.9	-21.2	11.8	0	-36.32	-17	-19.32	47	320	V
2	5.875	-58.88	Pk	34.9	-21.3	11.8	0	-33.48	-27	-6.48	47	320	V

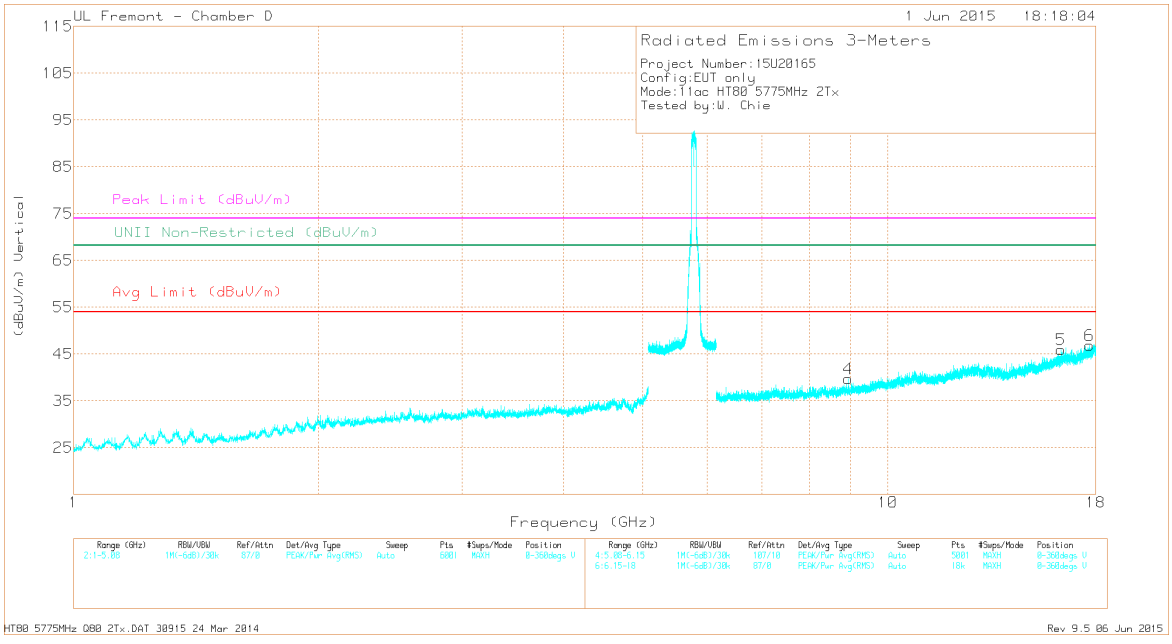
Pk - Peak detector

CHANNEL 155 HARMONICS AND SPURIOUS EMISSIONS

CHANNEL 155 HORIZONTAL PLOT



CHANNEL 155 VERTICAL PLOT



DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 8.485	38.8	PK3	35.9	-28.7	0	46	-	-	74	-28	68.2	-22.2	143	189	H
	* 8.484	27.01	ADR	35.9	-28.7	.22	34.43	54	-19.57	-	-	-	-	143	189	H
3	* 17.938	33.42	PK3	41.8	-20.8	0	54.42	-	-	74	-19.58	68.2	-13.78	115	299	H
	* 17.935	21.89	ADR	41.8	-20.7	.22	43.21	54	-10.79	-	-	-	-	115	299	H
6	* 17.704	34.64	PK3	42	-22.5	0	54.14	-	-	74	-19.86	68.2	-14.06	209	233	V
	* 17.704	23.19	ADR	42	-22.5	.22	42.91	54	-11.09	-	-	-	-	209	233	V
4	8.935	37.9	PK3	36.2	-28.1	0	46	-	-	74	-28	68.2	-22.2	179	248	V
2	13.624	37.36	PK3	39.2	-25.9	0	50.66	-	-	74	-23.34	68.2	-17.54	220	149	H
5	16.31	36.03	PK3	41.4	-23.7	0	53.73	-	-	74	-20.27	68.2	-14.47	146	224	V

* - indicates frequency in CFR15.205/IC8.10 Restricted Band

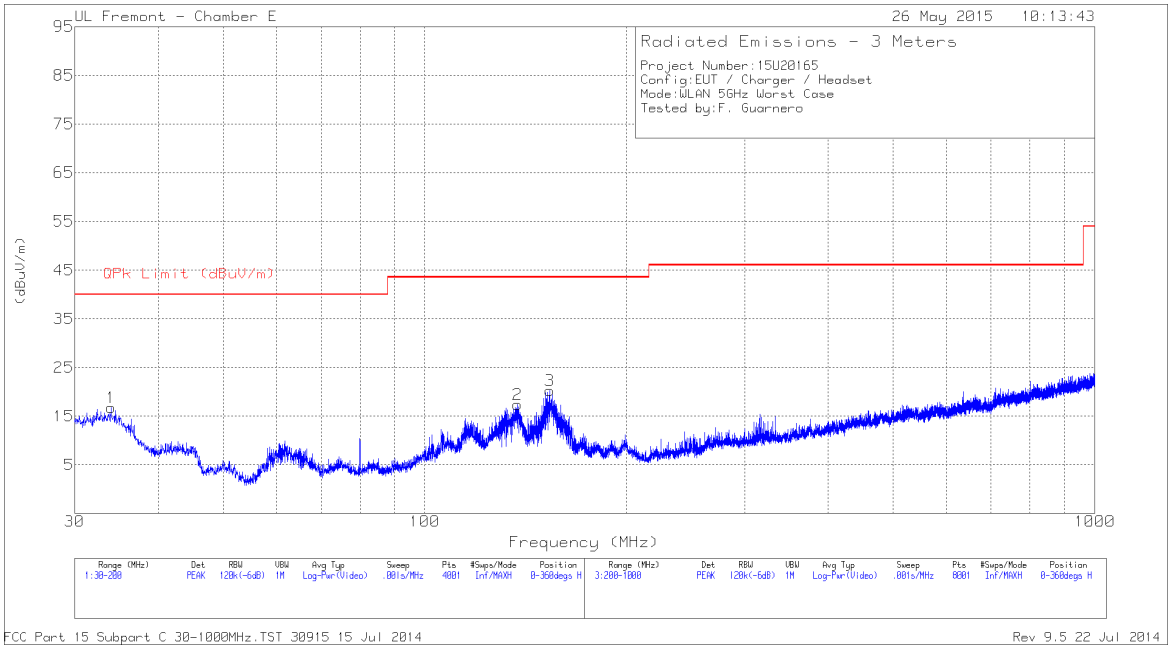
PK3 - U-NII: Maximum Peak

ADR - U-NII AD primary method, RMS average

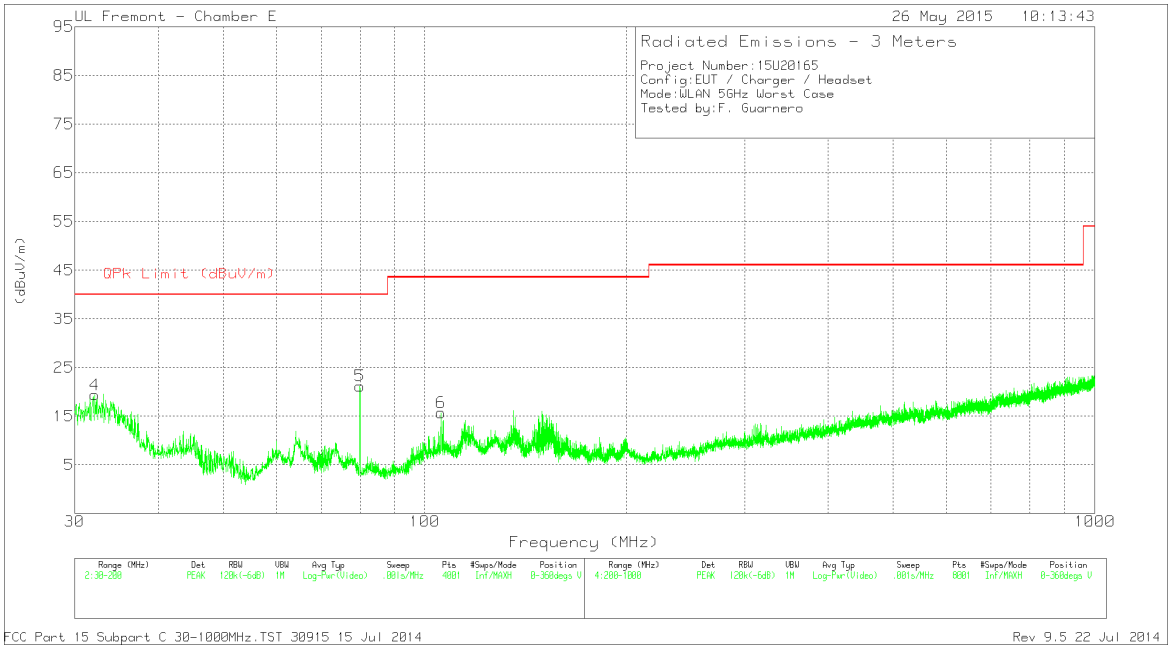
11.26. WORST-CASE BELOW 1 GHz

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL & VERTICAL)

HORIZONTAL PLOT



VERTICAL PLOT



HORIZONTAL AND VERTICAL DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T408 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 137.61	35.42	PK	13.1	-31.1	17.42	43.52	-26.1	0-360	201	H
4	32.1675	31.18	PK	20	-31.8	19.38	40	-20.62	0-360	100	V
1	33.995	29.98	PK	18.6	-31.8	16.78	40	-23.22	0-360	301	H
5	79.98	44.72	PK	8	-31.5	21.22	40	-18.78	0-360	100	V
6	105.735	35.53	PK	11.5	-31.3	15.73	43.52	-27.79	0-360	100	V
3	153.7175	39.07	PK	12.3	-31.1	20.27	43.52	-23.25	0-360	201	H

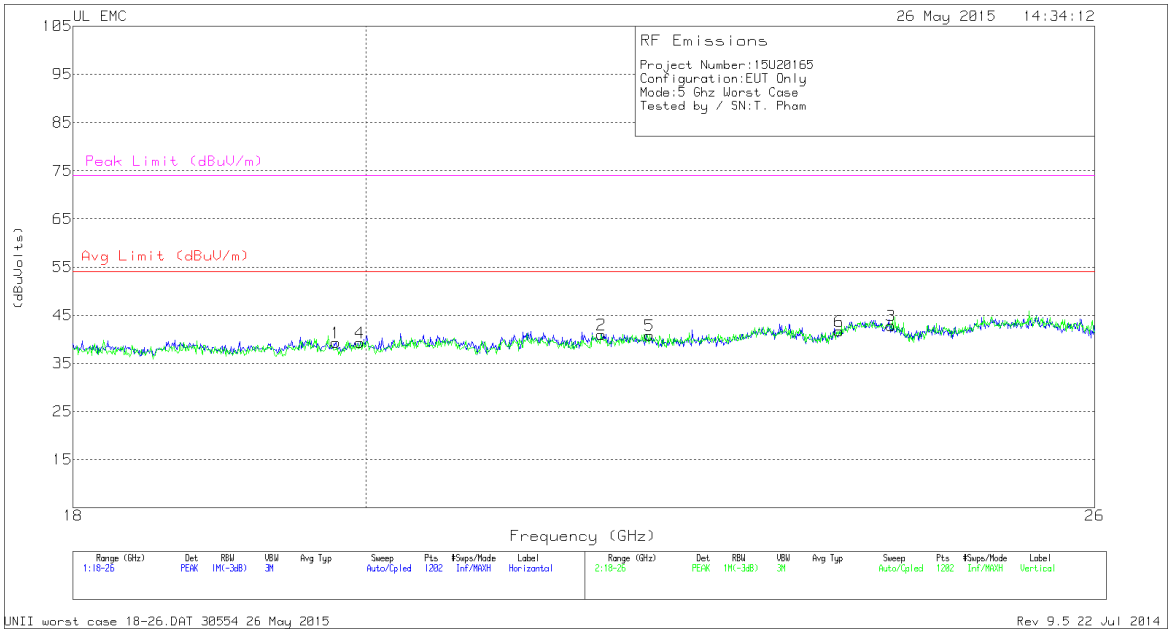
* - indicates frequency in CFR 47, Part 15 and Industry Canada RSS-Restricted Band.

PK - Peak detector

11.27. WORST-CASE ABOVE 18 GHz

SPURIOUS EMISSIONS 18000 TO 26000 MHz (WORST-CASE CONFIGURATION)

HORIZONTAL & VERTICAL PLOT



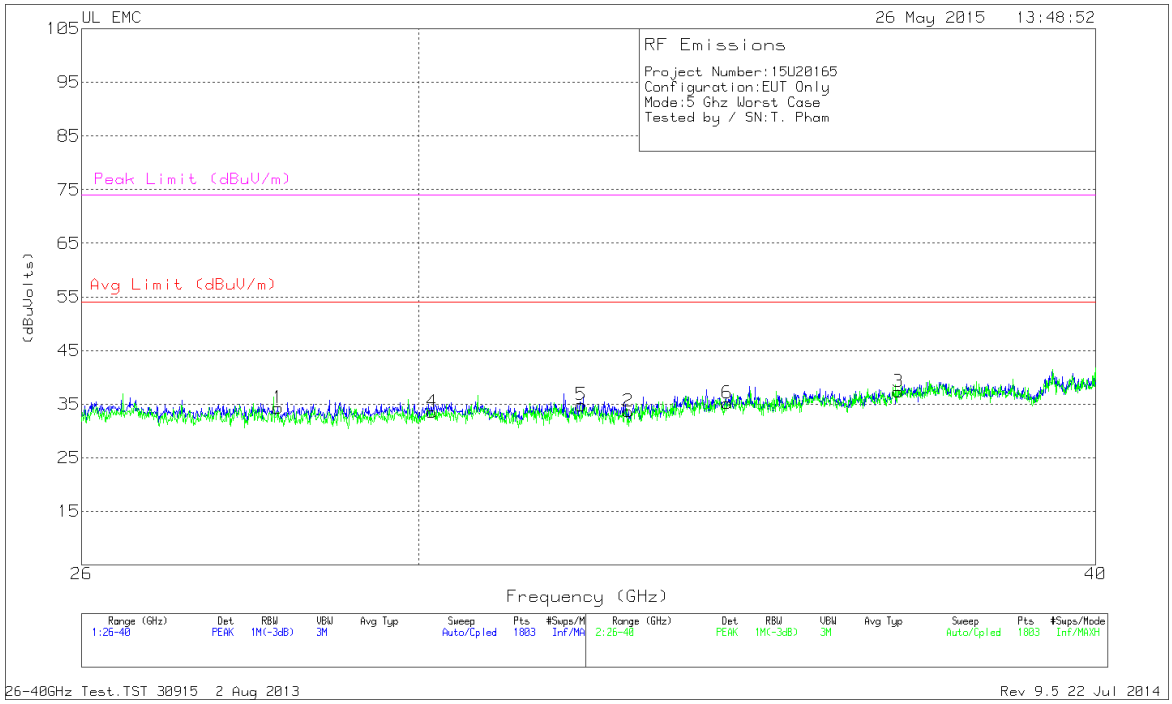
HORIZONTAL AND VERTICAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	T89 AF (dB/m)	Amp/Cbl (dB)	Dist Corr (dB)	Corrected Reading (dBuVolts)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)
1	19.785	40.53	PK	32.6	-24.3	-9.5	39.33	54	-14.66	74	-34.66
2	21.77	40.5	PK	33.3	-23.3	-9.5	41	54	-13	74	-33
3	24.162	41.83	PK	33.4	-22.9	-9.5	42.83	54	-11.16	74	-31.16
4	19.958	40.23	PK	33	-24.4	-9.5	39.33	54	-14.66	74	-34.66
5	22.15	40.73	PK	32.9	-23.3	-9.5	40.83	54	-13.16	74	-33.16
6	23.715	40.27	PK	33.7	-22.8	-9.5	41.66	54	-12.33	74	-32.33

PK - Peak detector

SPURIOUS EMISSIONS 26000 TO 40000 MHz (WORST-CASE CONFIGURATION)

HORIZONTAL & VERTICAL PLOT



HORIZONTAL AND VERTICAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	T90 AF (dB/m)	Amp/Cbl (dB)	Dist Corr (dB)	Corrected Reading (dBuVolts)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)
1	28.261	42.93	PK	35.9	-35	-9.5	34.33	54	-19.66	74	-39.66
2	32.798	44.57	PK	36.6	-38	-9.5	33.66	54	-20.33	74	-40.33
3	36.784	48.03	PK	37.1	-38.3	-9.5	37.33	54	-16.66	74	-36.66
4	30.172	43.3	PK	35.9	-36.2	-9.5	33.5	54	-20.5	74	-40.5
5	32.145	44.73	PK	36.4	-36.8	-9.5	34.83	54	-19.16	74	-39.16
6	34.204	44.47	PK	36.9	-36.7	-9.5	35.16	54	-18.83	74	-38.83

PK - Peak detector

12. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 8.8

Frequency of Emission (MHz)	Conducted Limit (dBµV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.10:2013.

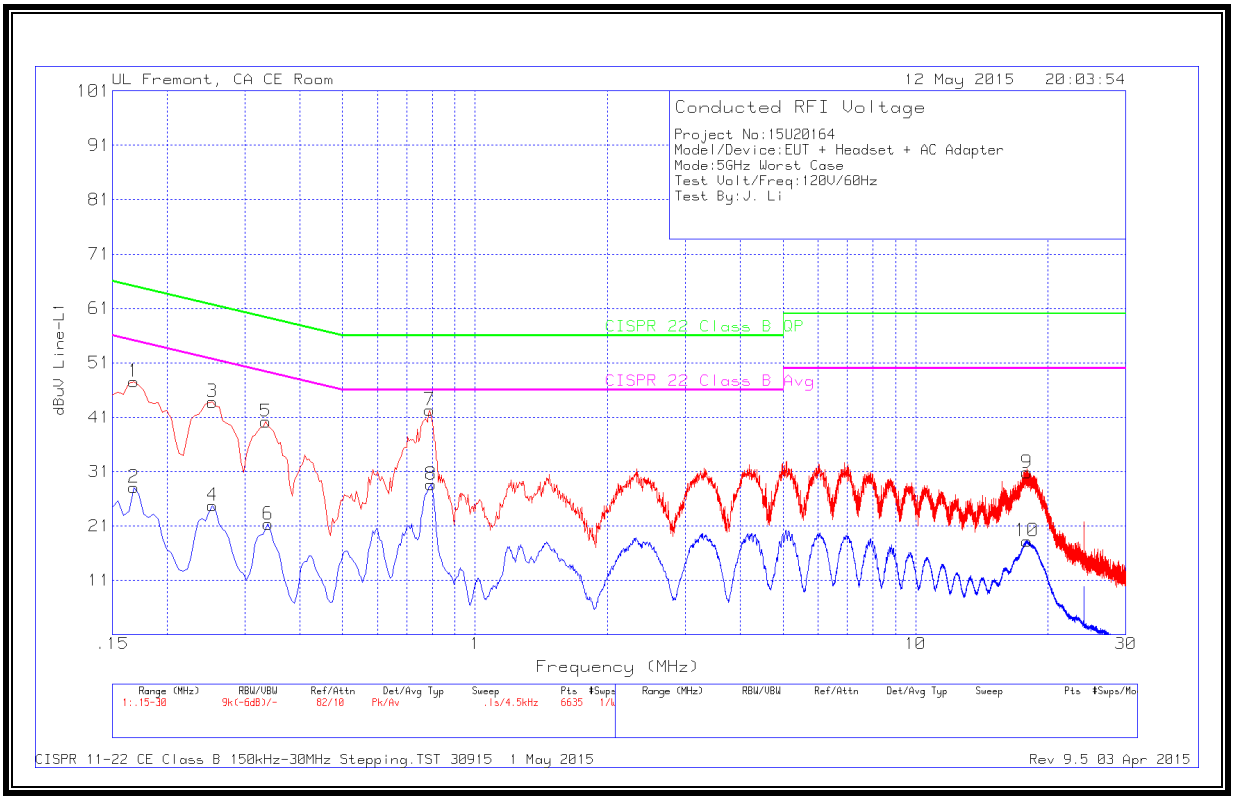
The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

Line conducted data is recorded for both NEUTRAL and HOT lines.

RESULTS

12.1. EUT POWERED BY AC ADAPTER

LINE 1 RESULTS



WORST EMISSIONS

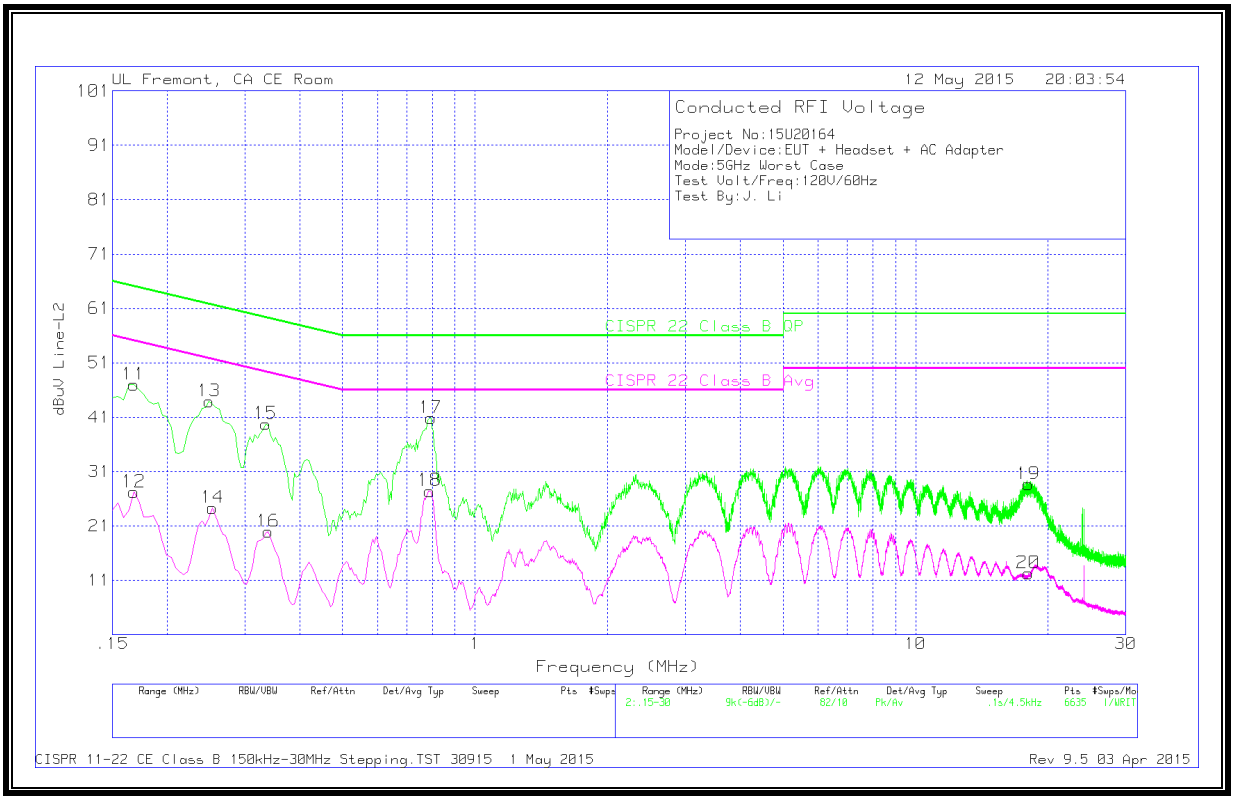
Range 1: Line-L1 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L1	LC Cables 1&3	Corrected Reading dBuV	CISPR 22 Class B QP	Margin (dB)	CISPR 22 Class B Avg	Margin (dB)
1	.168	46.35	Pk	1.2	0	47.55	65.06	-17.51	-	-
2	.168	26.89	Av	1.2	0	28.09	-	-	55.06	-26.97
3	.2535	43.12	Pk	.7	0	43.82	61.64	-17.82	-	-
4	.2535	24.05	Av	.7	0	24.75	-	-	51.64	-26.89
5	.3345	39.7	Pk	.5	0	40.2	59.34	-19.14	-	-
6	.339	20.83	Av	.5	0	21.33	-	-	49.23	-27.9
7	.789	42	Pk	.3	0	42.3	56	-13.7	-	-
8	.7935	28.32	Av	.3	0	28.62	-	-	46	-17.38
9	17.916	30.31	Pk	.3	.2	30.81	60	-29.19	-	-
10	17.907	17.72	Av	.3	.2	18.22	-	-	50	-31.78

Pk - Peak detector

Av - Average detection

LINE 2 RESULTS



WORST EMISSIONS

Range 2: Line-L2 .15 - 30MHz

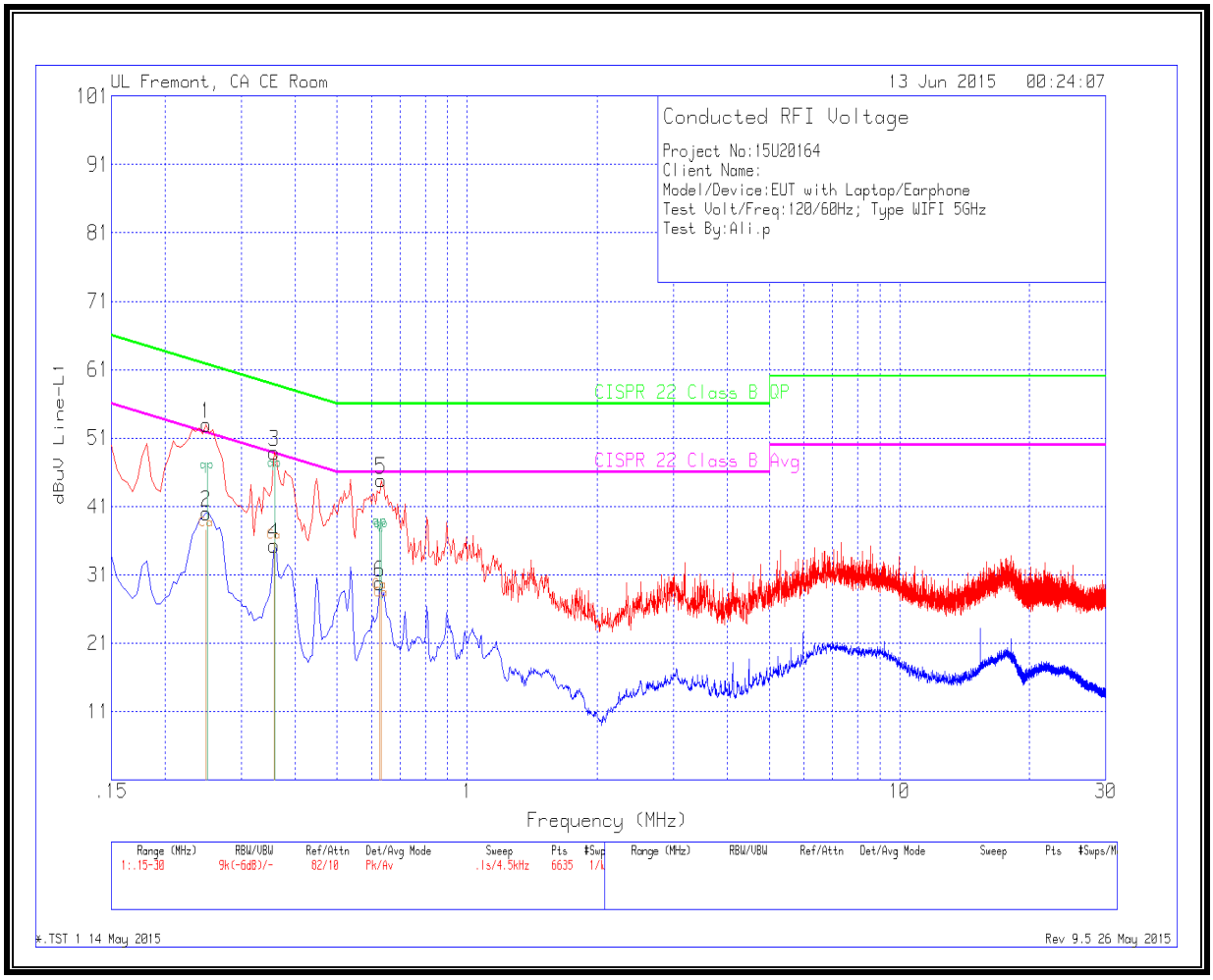
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L2	LC Cables 2&3	Corrected Reading dBuV	CISPR 22 Class B QP	Margin (dB)	CISPR 22 Class B Avg	Margin (dB)
11	.168	45.67	Pk	1.3	0	46.97	65.06	-18.09	-	-
12	.168	25.93	Av	1.3	0	27.23	-	-	55.06	-27.83
13	.249	43.2	Pk	.7	0	43.9	61.79	-17.89	-	-
14	.2535	23.63	Av	.7	0	24.33	-	-	51.64	-27.31
15	.3345	39.24	Pk	.5	0	39.74	59.34	-19.6	-	-
16	.339	19.44	Av	.5	0	19.94	-	-	49.23	-29.29
17	.7935	40.51	Pk	.3	0	40.81	56	-15.19	-	-
18	.789	27.13	Av	.3	0	27.43	-	-	46	-18.57
19	18.051	28.16	Pk	.3	.2	28.66	60	-31.34	-	-
20	18.0375	11.81	Av	.3	.2	12.31	-	-	50	-37.69

Pk - Peak detector

Av - Average detection

12.2. EUT POWERED BY HOST PC VIA USB CABLE

LINE 1 RESULTS



WORST EMISSIONS

Range 1: Line-L1 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L1	LC Cables 1&3	Corrected Reading dBuV	CISPR 22 Class B QP	Margin (dB)	CISPR 22 Class B Avg	Margin (dB)
1	.249	52.31	Pk	.7	0	53.01	61.79	-8.78		
2	.249	39.39	Av	.7	0	40.09	-	-	51.79	-11.7
3	.357	48.43	Pk	.5	0	48.93	58.8	-9.87		
4	.357	34.83	Av	.5	0	35.33	-	-	48.8	-13.47
5	.6315	44.57	Pk	.3	0	44.87	56	-11.13		
6	.627	29.52	Av	.3	0	29.82	-	-	46	-16.18

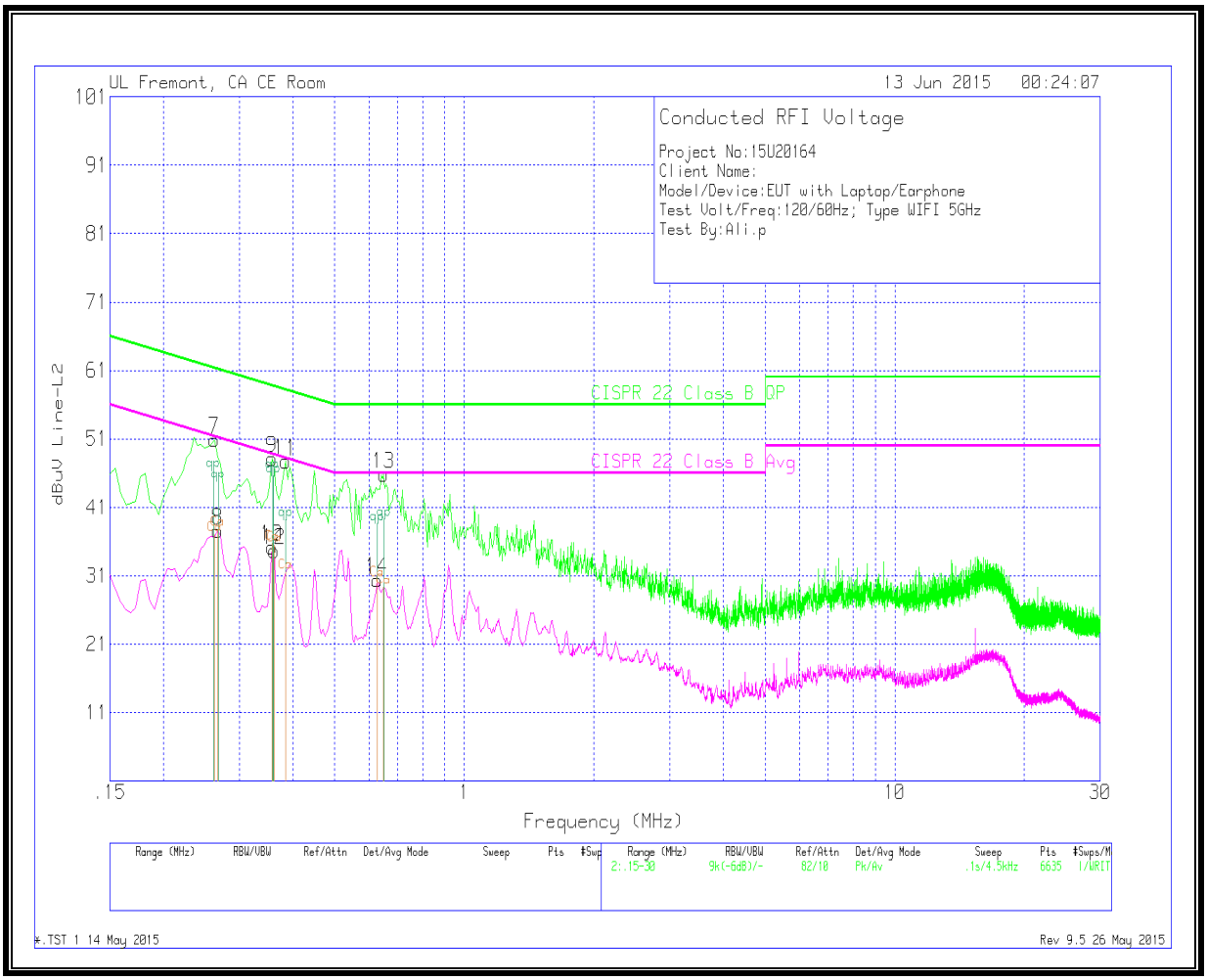
Pk - Peak detector

Av - Average detection

Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L1	LC Cables 1&3	Corrected Reading dBuV	CISPR 22 Class B QP	Margin (dB)	CISPR 22 Class B Avg	Margin (dB)
.25013	36.82	Ca	.7	0	37.52	-	-	51.75	-14.23
.35813	35.21	Ca	.5	0	35.71	-	-	48.77	-13.06
.63218	26.99	Ca	.3	0	27.29	-	-	46	-18.71

Ca - CISPR average detection

LINE 2 RESULTS



WORST EMISSIONS

Range 2: Line-L2 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L2	LC Cables 2&3	Corrected Reading dBuV	CISPR 22 Class B QP	Margin (dB)	CISPR 22 Class B Avg	Margin (dB)
7	.2625	50.19	Pk	.7	0	50.89	61.35	-10.46		
8	.267	36.88	Av	.7	0	37.58	-	-	51.21	-13.63
9	.357	47.64	Pk	.5	0	48.14	58.8	-10.66		
10	.357	34.69	Av	.5	0	35.19	-	-	48.8	-13.61
11	.384	47.22	Pk	.5	0	47.72	58.19	-10.47		
12	.3615	34.21	Av	.5	0	34.71	-	-	48.69	-13.98
13	.6495	45.52	Pk	.3	0	45.82	56	-10.18		
14	.627	30.08	Av	.3	0	30.38	-	-	46	-15.62

Pk - Peak detector

Av - Average detection

Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L2	LC Cables 2&3	Corrected Reading dBuV	CISPR 22 Class B QP	Margin (dB)	CISPR 22 Class B Avg	Margin (dB)
.26138	36.29	Ca	.7	0	36.99	-	-	51.39	-14.4
.35813	35.21	Ca	.5	0	35.71	-	-	48.77	-13.06
.38468	31.02	Ca	.5	0	31.52	-	-	48.18	-16.66
.65063	29	Ca	.3	0	29.3	-	-	46	-16.7

Ca - CISPR average detection

13. DYNAMIC FREQUENCY SELECTION

13.1. OVERVIEW

13.1.1. LIMITS

INDUSTRY CANADA

IC RSS-247 is closely harmonized with FCC Part 15 DFS rules. The deviations are as follows:

RSS-247 Issue 1

Note: For the band 5600–5650 MHz, no operation is permitted.

Until further notice, devices subject to this annex shall not be capable of transmitting in the band 5600–5650 MHz. This restriction is for the protection of Environment Canada weather radars operating in this band.

FCC

§15.407 (h), FCC KDB 905462 D02 “COMPLIANCE MEASUREMENT PROCEDURES FOR UNLICENSED-NATIONAL INFORMATION INFRASTRUCTURE DEVICES OPERATING IN THE 5250-5350 MHz AND 5470-5725 MHz BANDS INCORPORATING DYNAMIC FREQUENCY SELECTION” and KDB 905462 D03 “U-NII CLIENT DEVICES WITHOUT RADAR DETECTION CAPABILITY”.

Table 1: Applicability of DFS requirements prior to use of a channel

Requirement	Operational Mode		
	Master	Client (without radar detection)	Client (with radar detection)
Non-Occupancy Period	Yes	Not required	Yes
DFS Detection Threshold	Yes	Not required	Yes
Channel Availability Check Time	Yes	Not required	Not required
U-NII Detection Bandwidth	Yes	Not required	Yes

Table 2: Applicability of DFS requirements during normal operation

Requirement	Operational Mode		
	Master	Client **(without DFS)**	Client **(with DFS)**
DFS Detection Threshold	Yes	Not required	Yes
Channel Closing Transmission Time	Yes	Yes	Yes
Channel Move Time	Yes	Yes	Yes
U-NII Detection Bandwidth	Yes	Not required	Yes

Additional requirements for devices with multiple bandwidth modes	Master Device or Client with Radar DFS	Client (without DFS)
U-NII Detection Bandwidth and Statistical Performance Check	All BW modes must be tested	Not required
Channel Move Time and Channel Closing Transmission Time	Test using widest BW mode available	Test using the widest BW mode available for the link
All other tests	Any single BW mode	Not required
Note: Frequencies selected for statistical performance check (Section 7.8.4) should include several frequencies within the radar detection bandwidth and frequencies near the edge of the radar detection bandwidth. For 802.11 devices it is suggested to select frequencies in all 20 MHz channel blocks and a null frequency between the bonded 20 MHz channel blocks.		

Table 3: Interference Threshold values, Master or Client incorporating In-Service Monitoring

Maximum Transmit Power	Value (see notes)
E.I.R.P. ≥ 200 milliwatt	-64 dBm
E.I.R.P. < 200 milliwatt and power spectral density < 10 dBm/MHz	-62 dBm
E.I.R.P. < 200 milliwatt that do not meet power spectral density requirement	-64 dBm

Note 1: This is the level at the input of the receiver assuming a 0 dBi receive antenna
Note 2: Throughout these test procedures an additional 1 dB has been added to the amplitude of the test transmission waveforms to account for variations in measurement equipment. This will ensure that the test signal is at or above the detection threshold level to trigger a DFS response.
Note 3: E.I.R.P. is based on the highest antenna gain. For MIMO devices refer to KDB publication 662911 D01.

Table 4: DFS Response requirement values

Parameter	Value
Non-occupancy period	30 minutes
Channel Availability Check Time	60 seconds
Channel Move Time	10 seconds (See Note 1)
Channel Closing Transmission Time	200 milliseconds + approx. 60 milliseconds over remaining 10 second period. (See Notes 1 and 2)
U-NII Detection Bandwidth	Minimum 100% of the U-NII 99% transmission power bandwidth. (See Note 3)

Note 1: *Channel Move Time* and the *Channel Closing Transmission Time* should be performed with Radar Type 0. The measurement timing begins at the end of the Radar Type 0 burst.
Note 2: The *Channel Closing Transmission Time* is comprised of 200 milliseconds starting at the beginning of the *Channel Move Time* plus any additional intermittent control signals required to facilitate a *Channel* move (an aggregate of 60 milliseconds) during the remainder of the 10-second period. The aggregate duration of control signals will not count quiet periods in between transmissions.
Note 3: During the *U-NII Detection Bandwidth* detection test, radar type 0 should be used. For each frequency step the minimum percentage of detection is 90 percent. Measurements are performed with no data traffic.

Table 5 – Short Pulse Radar Test Waveforms

Radar Type	Pulse Width (usec)	PRI (usec)	Pulses	Minimum Percentage of Successful Detection	Minimum Trials
0	1	1428	18	See Note 1	See Note 1
1	1	Test A: 15 unique PRI values randomly selected from the list of 23 PRI values in table 5a	Roundup: {(1/360) x (19 x 10^6 PRI_{usec})}	60%	30
		Test B: 15 unique PRI values randomly selected within the range of 518-3066 usec. With a minimum increment of 1 usec, excluding PRI values selected in Test A			
2	1-5	150-230	23-29	60%	30
3	6-10	200-500	16-18	60%	30
4	11-20	200-500	12-16	60%	30
Aggregate (Radar Types 1-4)				80%	120

Note 1: Short Pulse Radar Type 0 should be used for the *Detection Bandwidth* test, *Channel Move Time*, and *Channel Closing Time* tests.

Table 6 – Long Pulse Radar Test Signal

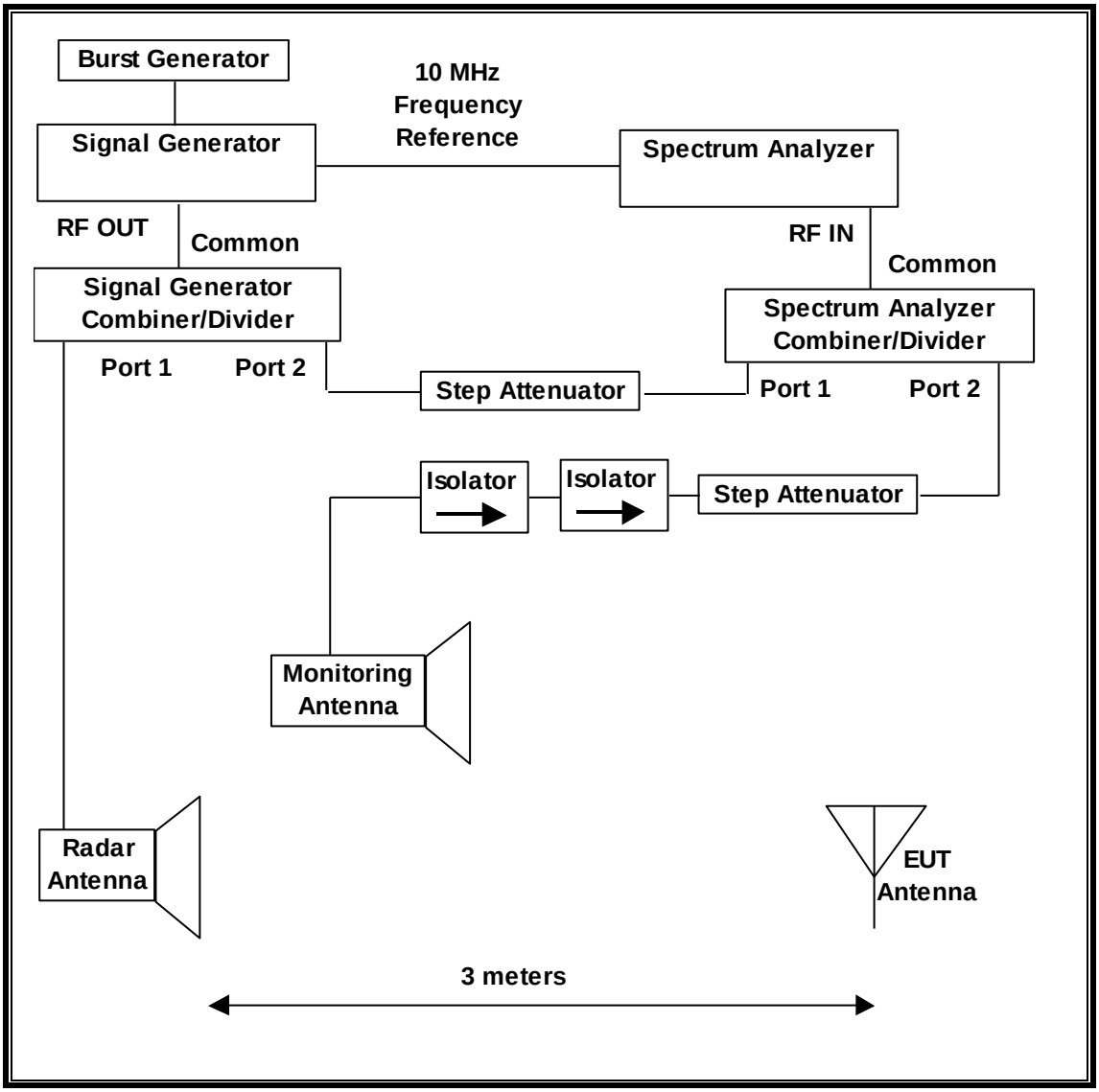
Radar Waveform Type	Pulse Width (µsec)	Chirp Width (MHz)	PRI (µsec)	Pulses per Burst	Number of Bursts	Minimum Percentage of Successful Detection	Minimum Trials
5	50-100	5-20	1000-2000	1-3	8-20	80%	30

Table 7 – Frequency Hopping Radar Test Signal

Radar Waveform Type	Pulse Width (µsec)	PRI (µsec)	Pulses per Hop	Hopping Rate (kHz)	Hopping Sequence Length (msec)	Minimum Percentage of Successful Detection	Minimum Trials
6	1	333	9	0.333	300	70%	30

13.1.2. TEST AND MEASUREMENT SYSTEM

RADIATED METHOD SYSTEM BLOCK DIAGRAM



SYSTEM OVERVIEW

The short pulse and long pulse signal generating system utilizes the NTIA software. The Vector Signal Generator has been validated by the NTIA. The hopping signal generating system utilizes the CCS simulated hopping method and system, which has been validated by the DoD, FCC and NTIA. The software selects waveform parameters from within the bounds of the signal type on a random basis using uniform distribution.

The short pulse types 2, 3 and 4, and the long pulse type 5 parameters are randomized at run-time.

The hopping type 6 pulse parameters are fixed while the hopping sequence is based on the August 2005 NTIA Hopping Frequency List. The initial starting point randomized at run-time and each subsequent starting point is incremented by 475. Each frequency in the 100-length segment is compared to the boundaries of the EUT Detection Bandwidth and the software creates a hopping burst pattern in accordance with Section 7.4.1.3 Method #2 Simulated Frequency Hopping Radar Waveform Generating Subsystem of KDB 905462 D02. The frequency of the signal generator is incremented in 1 MHz steps from F_L to F_H for each successive trial. This incremental sequence is repeated as required to generate a minimum of 30 total trials and to maintain a uniform frequency distribution over the entire Detection Bandwidth.

The signal monitoring equipment consists of a spectrum analyzer. The aggregate ON time is calculated by multiplying the number of bins above a threshold during a particular observation period by the dwell time per bin, with the analyzer set to peak detection and max hold.

SYSTEM CALIBRATION

A 50-ohm load is connected in place of the spectrum analyzer, and the spectrum analyzer is connected to a horn antenna via a coaxial cable, with the reference level offset set to (horn antenna gain – coaxial cable loss). The signal generator is set to CW mode. The amplitude of the signal generator is adjusted to yield a level of –64 dBm as measured on the spectrum analyzer.

Without changing any of the instrument settings, the spectrum analyzer is reconnected to the Common port of the Spectrum Analyzer Combiner/Divider. The Reference Level Offset of the spectrum analyzer is adjusted so that the displayed amplitude of the signal is –64 dBm.

The spectrum analyzer displays the level of the signal generator as received at the antenna ports of the Master Device. The interference detection threshold may be varied from the calibrated value of –64 dBm and the spectrum analyzer will still indicate the level as received by the Master Device.

ADJUSTMENT OF DISPLAYED TRAFFIC LEVEL

A link is established between the Master and Slave and the distance between the units is adjusted as needed to provide a suitable received level at the Master and Slave devices. The video test file is streamed to generate WLAN traffic. The monitoring antenna is adjusted so that the WLAN traffic level, as displayed on the spectrum analyzer, is at lower amplitude than the radar detection threshold.

TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized on the following dates for the DFS tests documented in this report:

MAY 07, 2015

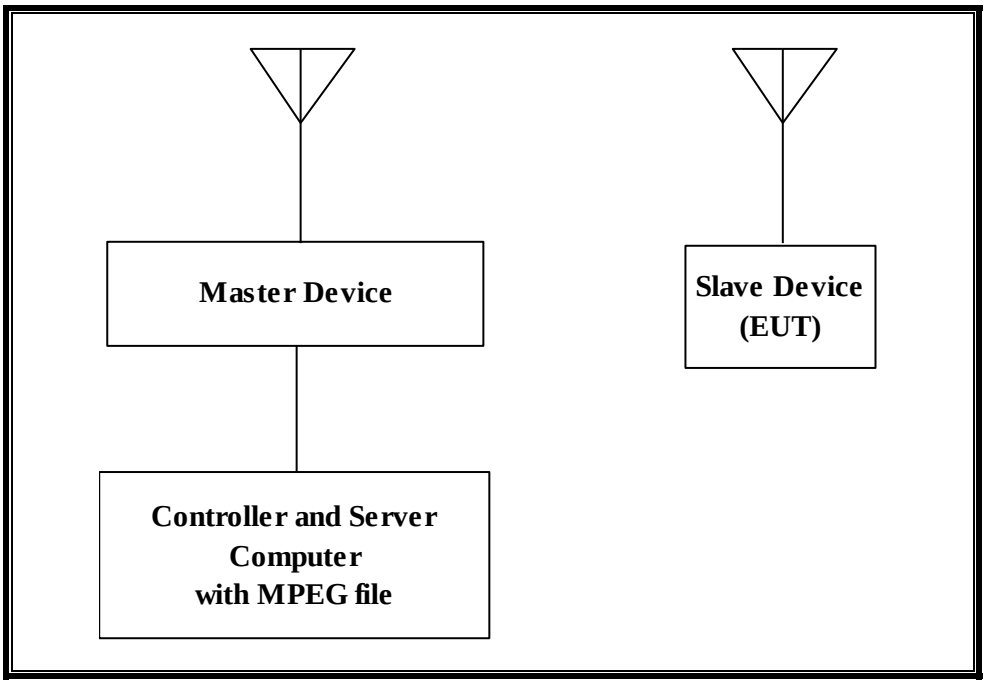
TEST EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Asset Number**	**Cal Due**
Spectrum Analyzer, 26.5 GHz	Agilent / HP	E4440A	C01178	09/05/15
Vector Signal Generator, 20GHz	Agilent / HP	E8267C	C01066	09/03/15

JUNE 11, 2015

TEST EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**Cal Due**
Spectrum Analyzer, PXA, 3Hz to 50GHz	Agilent	N9030A	MY52350671	06/25/15
Signal Generator, MXG X-Series RF Vector	Agilent	N5172B	MY51350337	02/17/16

13.1.3. SETUP OF EUT (CLIENT MODE)

RADIATED METHOD EUT TEST SETUP



SUPPORT EQUIPMENT

The following support equipment was utilized on the following dates for the DFS tests documented in this report:

MAY 07, 2015:

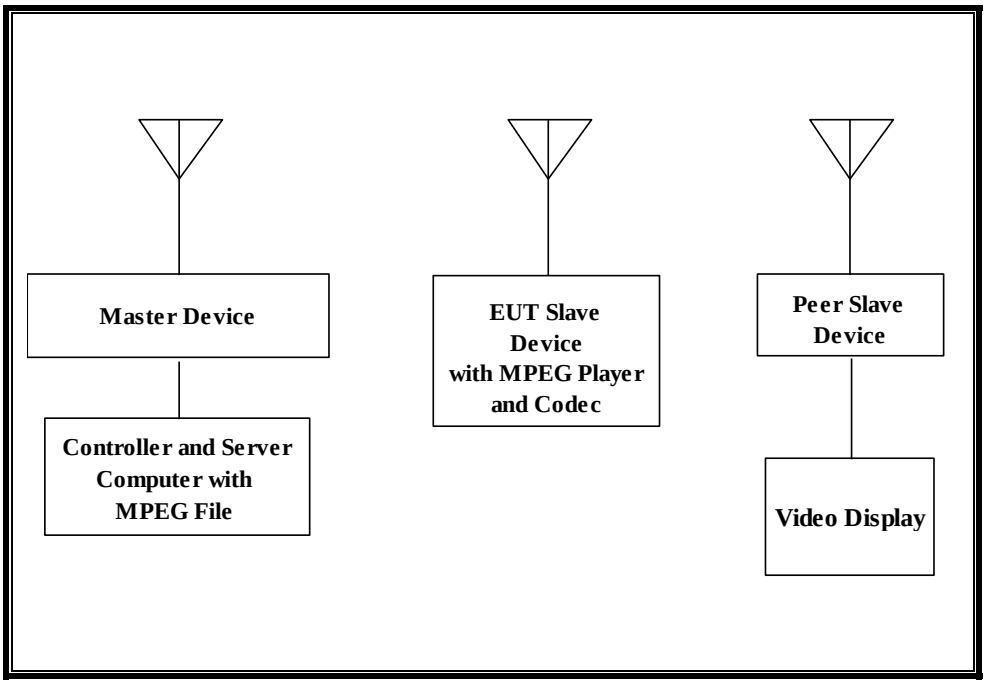
PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
802.11ac Dual Band Wireless Access Point (Master Device 1)	Cisco	AIR-CAP3702E-A-K9	FTX181570A6	LDK102087
P.O.E. Injector (AP)	Phihong	POE30U-560(G)	PHI170102N2	DoC
Notebook PC (Controller/Server)	Apple	A1181	W865101LWGK	DoC
AC Adapter (Controller/Server PC)	Delta Electronics	A1143	C0420640G9KDJ92BD	DoC

JUNE 11, 2015:

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
802.11a/b/g/n/ac Wireless Access (Master Device 2)	Apple	A1392	C86LCE5GFJ1R	BCGA1470
Notebook PC (Controller/Server)	Apple	A1181	W865101LWGK	DoC
AC Adapter (Controller/Server PC)	Delta Electronics	A1143	C0420640G9KDJ92BD	DoC

13.1.4. SETUP OF EUT (CLIENT-TO-CLIENT COMMUNICATIONS MODE)

RADIATED METHOD EUT TEST SETUP



SUPPORT EQUIPMENT

The following support equipment was utilized on the following dates for the DFS tests documented in this report:

MAY 07, 2015:

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
802.11ac Dual Band Wireless Access Point (Master Device 1)	Cisco	AIR-CAP3702E-A-K9	FTX181570A6	LDK102087
P.O.E. Injector (AP)	Phihong	POE30U-560(G)	PHI170102N2	DoC
Notebook PC (Controller/Server)	Apple	A1181	W865101LWGK	DoC
AC Adapter (Controller/Server PC)	Delta Electronics	A1143	C0420640G9KDJ92BD	DoC
Apple TV (Peer Slave Device)	Apple	A1469	5215	BCGA1469
Video Display	Samsung	LN19C350D1D	Z1MD3CLZ215180W	DoC

JUNE 11, 2015:

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
802.11a/b/g/n/ac Wireless Access (Master Device 2)	Apple	A1392	C86LCE5GFJ1R	BCGA1470
Notebook PC (Controller/Server)	Apple	A1181	W865101LWGK	DoC
AC Adapter (Controller/Server PC)	Delta Electronics	A1143	C0420640G9KDJ92BD	DoC
Apple TV (Peer Slave Device)	Apple	A1469	5215	BCGA1469
Video Display	Dell	U2410f	CN-0FJ525N-72872-1B5-AGAL	DoC

13.1.5. DESCRIPTION OF EUT

For FCC the EUT operates over the 5250-5350 MHz and 5470-5725 MHz ranges.

For IC the EUT operates over the 5250-5350 MHz and 5470-5725 MHz ranges, excluding the 5600-5650 MHz range.

The EUT is a Slave Device without Radar Detection.

The highest power level within these bands is 18.71 dBm EIRP in the 5250-5350 MHz band and 20.03 dBm EIRP in the 5470-5725 MHz band.

The only antenna assembly utilized with the EUT has a gain of -2.19 dBi in the 5250-5350 MHz band and –1.67 dBi in the 5470-5725 MHz band.

The rated output power of the Master Devices are > 23dBm (EIRP). Therefore the required interference threshold level is –64 dBm. After correction for procedural adjustments, the required radiated threshold at the antenna port is –64 + 1 = -63 dBm.

The calibrated radiated DFS Detection Threshold level is set to –64 dBm. The tested level is lower than the required level hence it provides a margin to the limit.

The EUT uses one transmitter/receiver chain connected to an antenna to perform radiated tests.

WLAN traffic is generated by streaming the video file TestFile.mp2 “6 ½ Magic Hours” from the Master to the Slave in full motion video mode using OPlayer Lite media player.

TPC is not required since the maximum EIRP is less than 500 mW (27 dBm).

The EUT utilizes the 802.11ac architecture. Three nominal channel bandwidths are implemented: 20 MHz, 40 MHz and 80 MHz.

In Client-to-Client Communications Mode the EUT utilizes the 802.11ac architecture between the EUT and the Master Device 2 where three nominal channel bandwidths are implemented: 20 MHz, 40 MHz and 80 MHz. However, 802.11a/n architecture is utilized between the EUT and the Peer Slave Device in Client-to Client Communications Mode where only two nominal channel bandwidths are implemented: 20 MHz and 40 MHz.

The software installed in the EUT is 9.0 (13A272).

UNIFORM CHANNEL SPREADING

This function is not applicable to Slave Devices.

OVERVIEW OF MASTER DEVICE 1 WITH RESPECT TO §15.407 (h) REQUIREMENTS

The Master Device is a Cisco Access Point, FCC ID: LDK102087. The minimum antenna gain for the Master Device is 6 dBi.

The rated output power of the Master unit is > 23dBm (EIRP). Therefore the required interference threshold level is –64 dBm. After correction for procedural adjustments, the required radiated threshold at the antenna port is –64 + 1 = -63 dBm.

The calibrated radiated DFS Detection Threshold level is set to –64 dBm. The tested level is lower than the required level hence it provides a margin to the limit.

The software installed in the access point is AP3G2-K9W7-M Version 15.2(4)JB4.

OVERVIEW OF MASTER DEVICE 2 WITH RESPECT TO §15.407 (h) REQUIREMENTS

The Master Device is an Apple, Inc. Access Point, FCC ID: BCGA1470. The minimum antenna gain for the Master Device is 1.4 dBi.

The rated output power of the Master unit is > 23dBm (EIRP). Therefore the required interference threshold level is –64 dBm. After correction for procedural adjustments, the required radiated threshold at the antenna port is –64 + 1 = -63 dBm.

The calibrated radiated DFS Detection Threshold level is set to –64 dBm. The tested level is lower than the required level hence it provides a margin to the limit.

The software installed in the access point is 7.7D3.

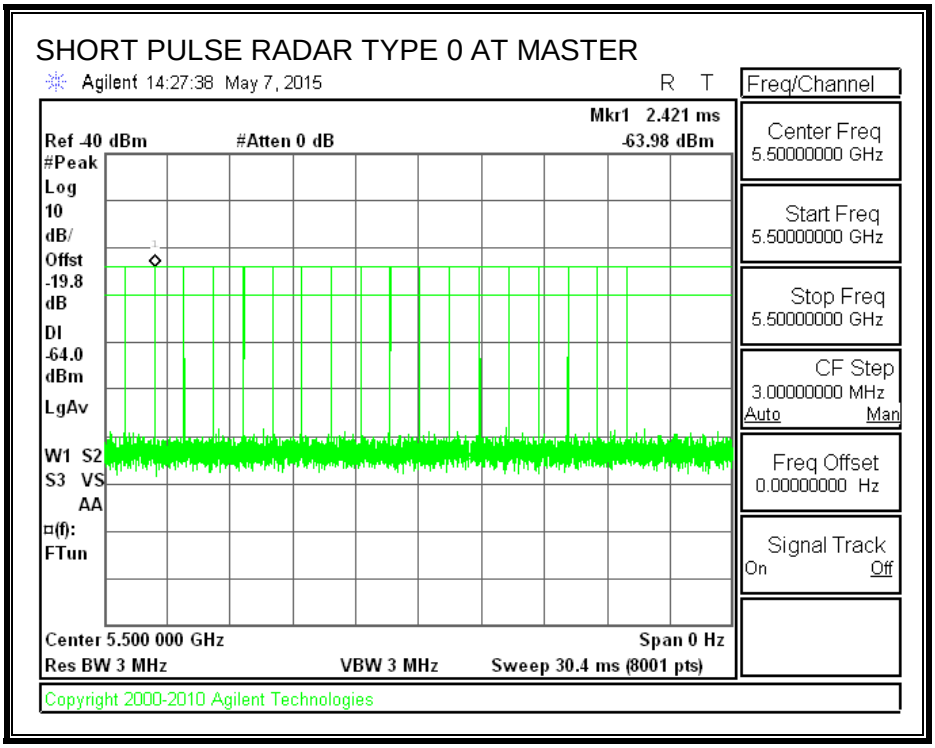
13.2. CLIENT MODE RESULTS FOR 20 MHz BANDWIDTH

13.2.1. TEST CHANNEL

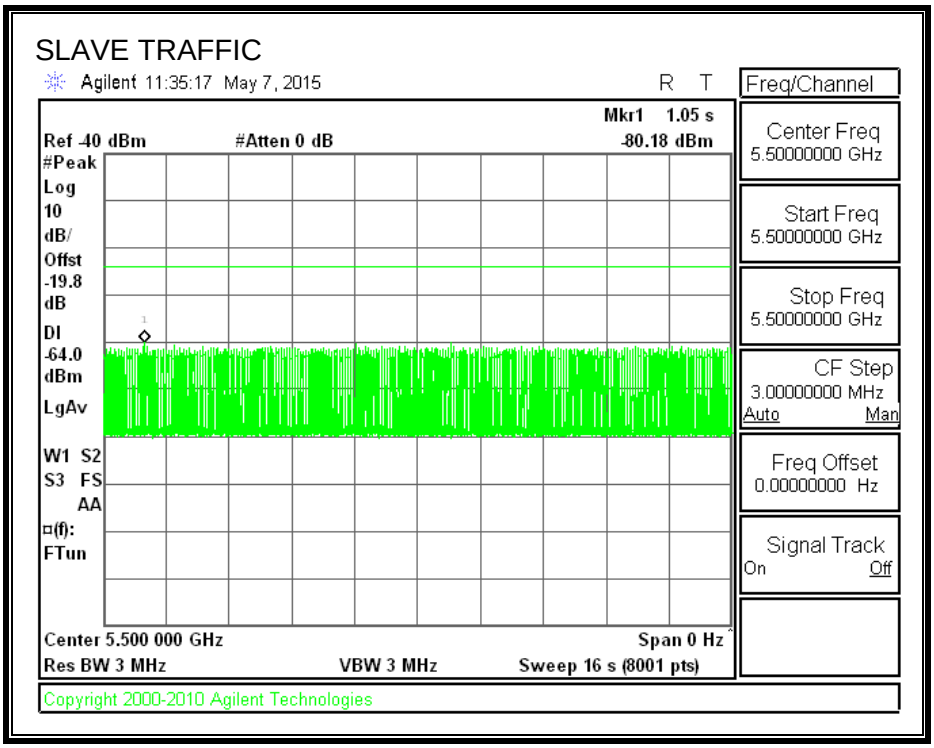
All tests were performed at a channel center frequency of 5500 MHz.

13.2.2. RADAR WAVEFORM AND TRAFFIC

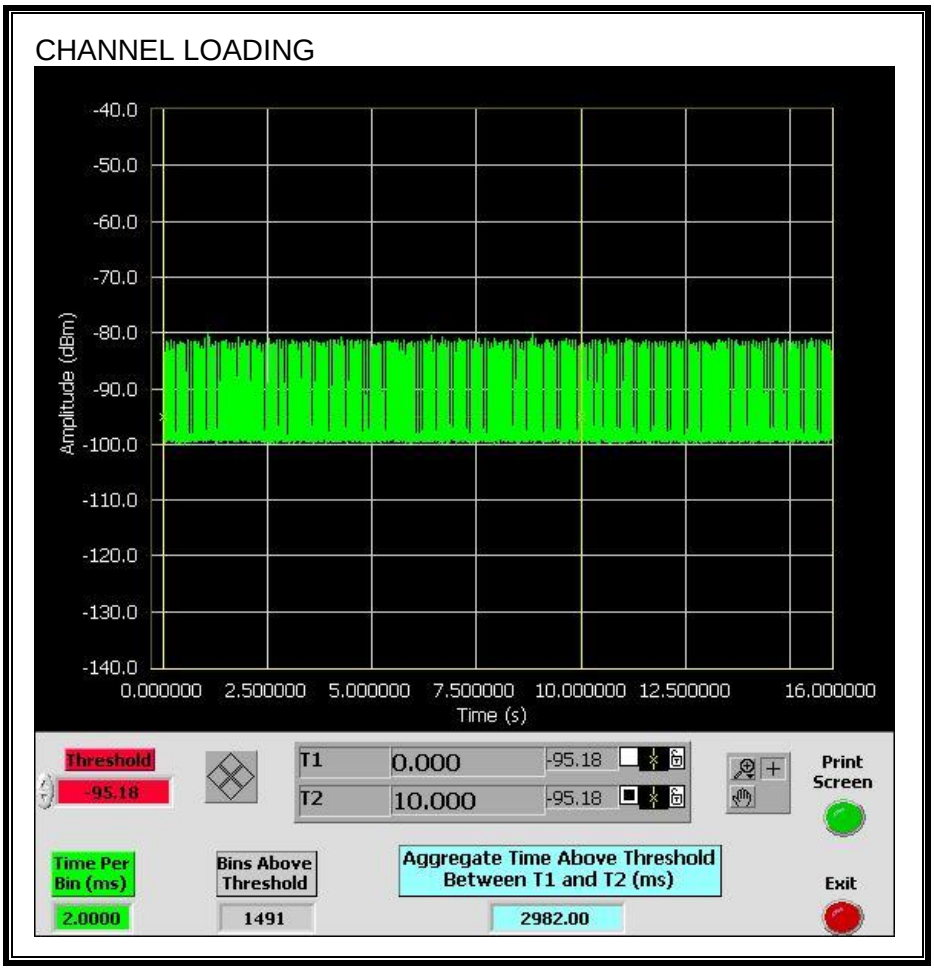
RADAR WAVEFORM



TRAFFIC



CHANNEL LOADING



The level of traffic loading on the channel by the EUT is 29.82%

13.2.3. OVERLAPPING CHANNEL TESTS

RESULTS

These tests are not applicable.

13.2.4. MOVE AND CLOSING TIME

REPORTING NOTES

The reference marker is set at the end of last radar pulse.

The delta marker is set at the end of the last WLAN transmission following the radar pulse. This delta is the channel move time.

The aggregate channel closing transmission time is calculated as follows:

Aggregate Transmission Time =
(Number of analyzer bins showing transmission) * (dwell time per bin)

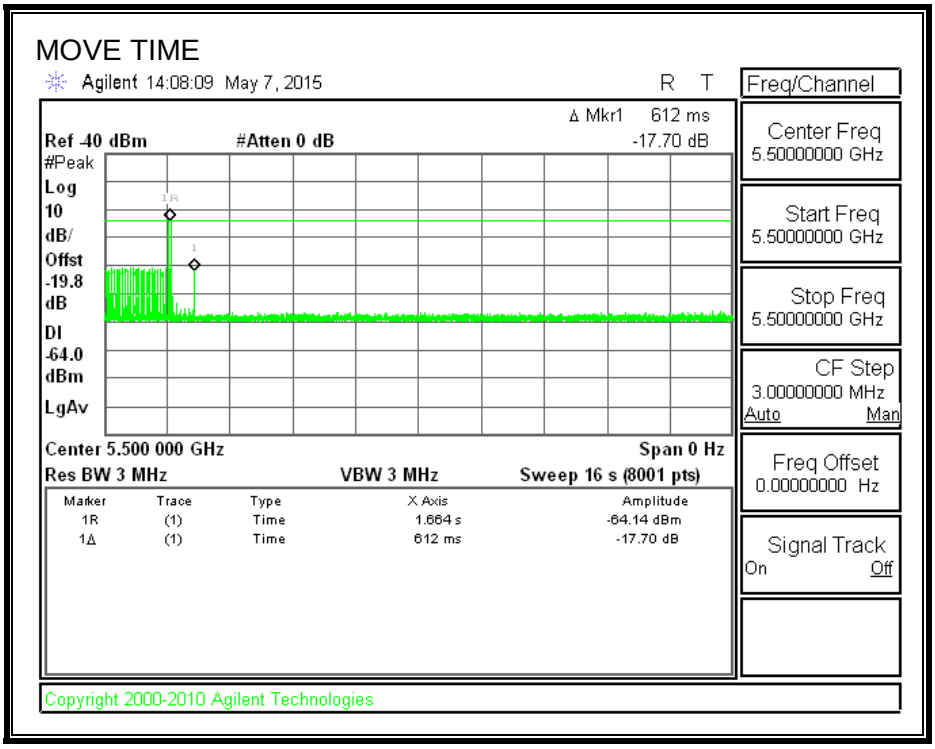
The observation period over which the aggregate time is calculated begins at (Reference Marker + 200 msec) and ends no earlier than (Reference Marker + 10 sec).

RESULTS

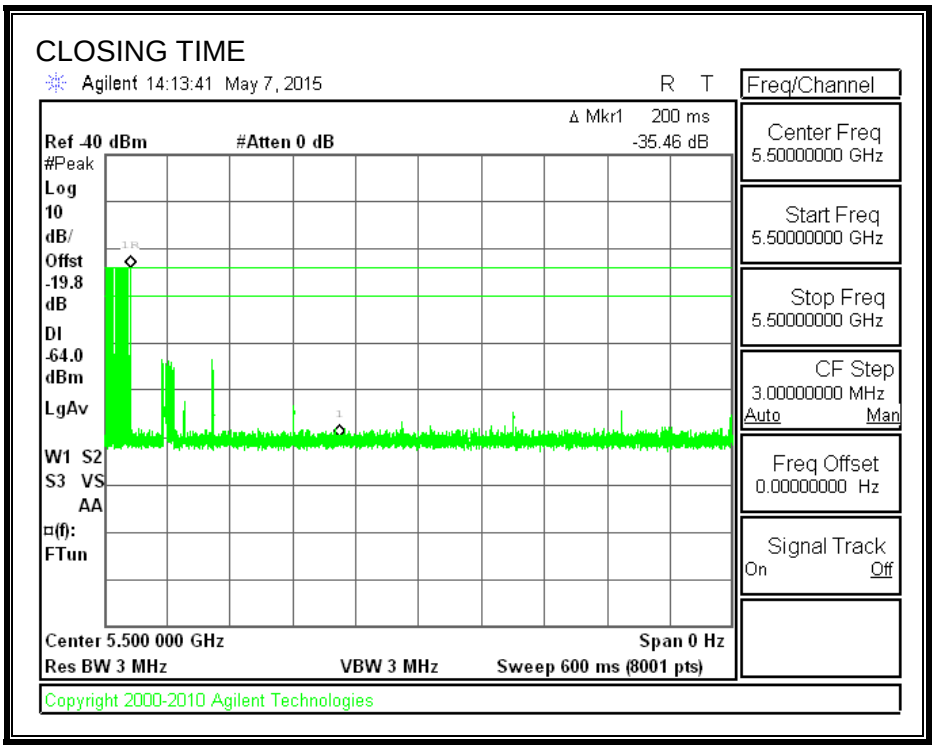
Channel Move Time (sec)	Limit (sec)
0.612	10

Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
4.0	60

MOVE TIME

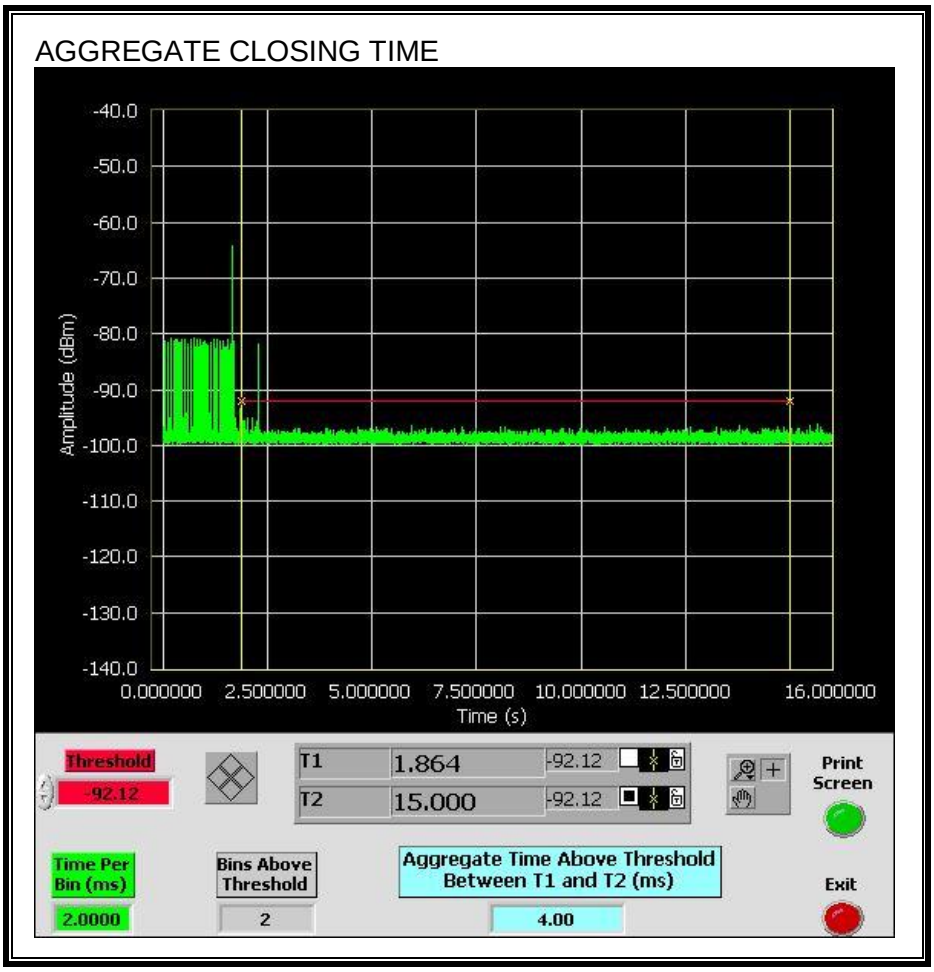


CHANNEL CLOSING TIME



AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

Only intermittent transmissions are observed during the aggregate monitoring period.



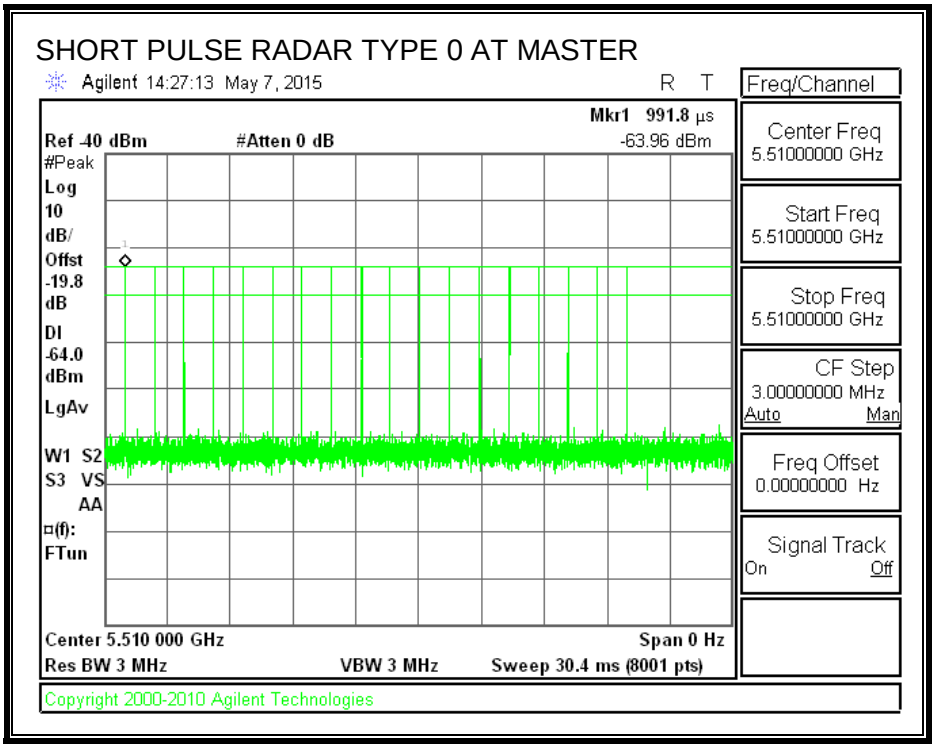
13.3. CLIENT MODE RESULTS FOR 40 MHz BANDWIDTH

13.3.1. TEST CHANNEL

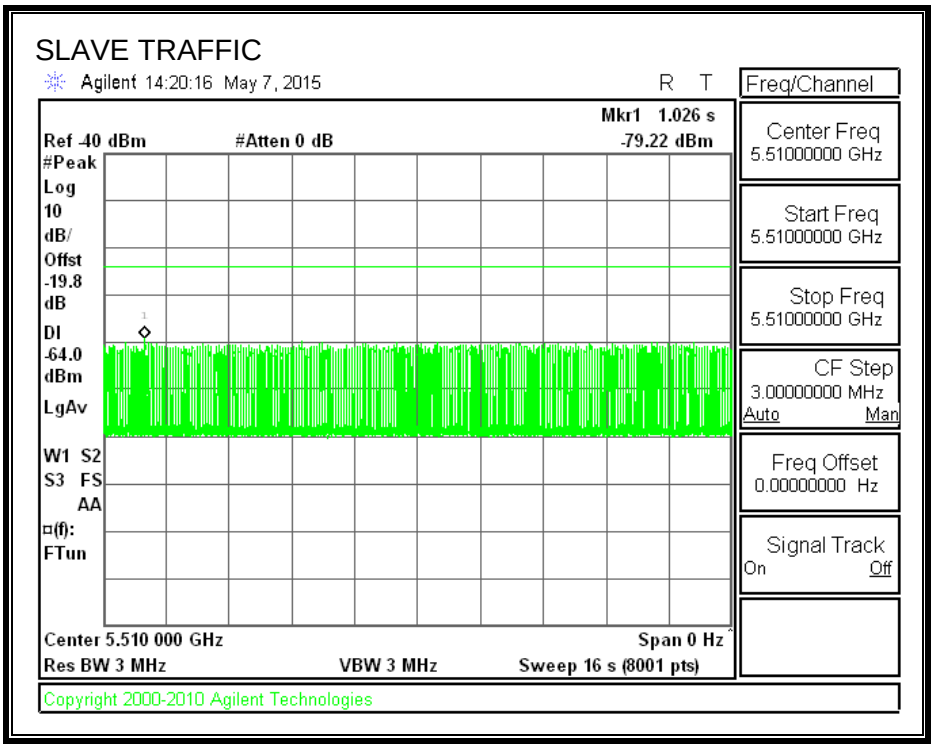
All tests were performed at a channel center frequency of 5510 MHz.

13.3.2. RADAR WAVEFORM AND TRAFFIC

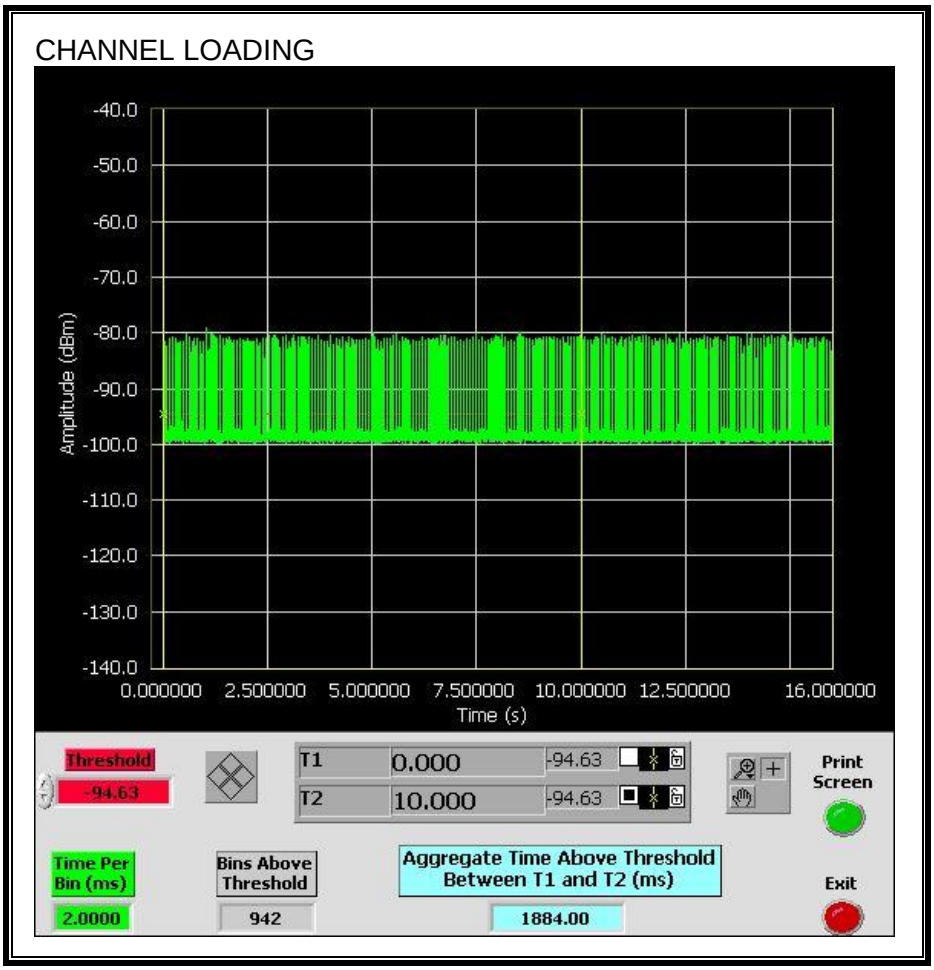
RADAR WAVEFORM



TRAFFIC



CHANNEL LOADING



The level of traffic loading on the channel by the EUT is 18.84%

13.3.3. OVERLAPPING CHANNEL TESTS

RESULTS

These tests are not applicable.

13.3.4. MOVE AND CLOSING TIME

REPORTING NOTES

The reference marker is set at the end of last radar pulse.

The delta marker is set at the end of the last WLAN transmission following the radar pulse. This delta is the channel move time.

The aggregate channel closing transmission time is calculated as follows:

Aggregate Transmission Time =
(Number of analyzer bins showing transmission) * (dwell time per bin)

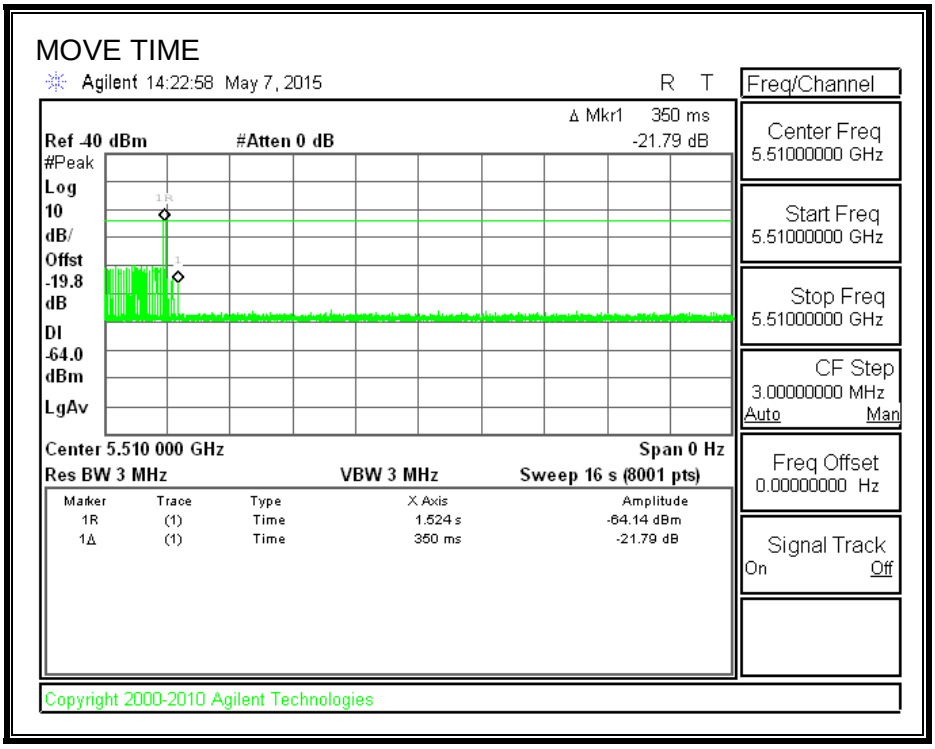
The observation period over which the aggregate time is calculated begins at (Reference Marker + 200 msec) and ends no earlier than (Reference Marker + 10 sec).

RESULTS

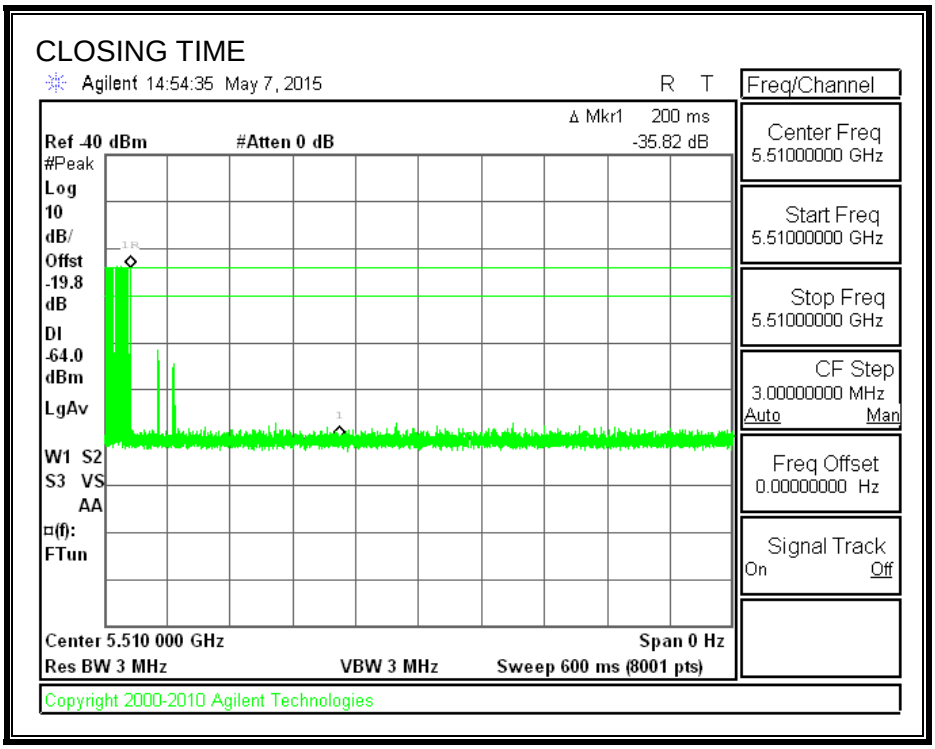
Channel Move Time (sec)	Limit (sec)
0.350	10

Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
4.0	60

MOVE TIME

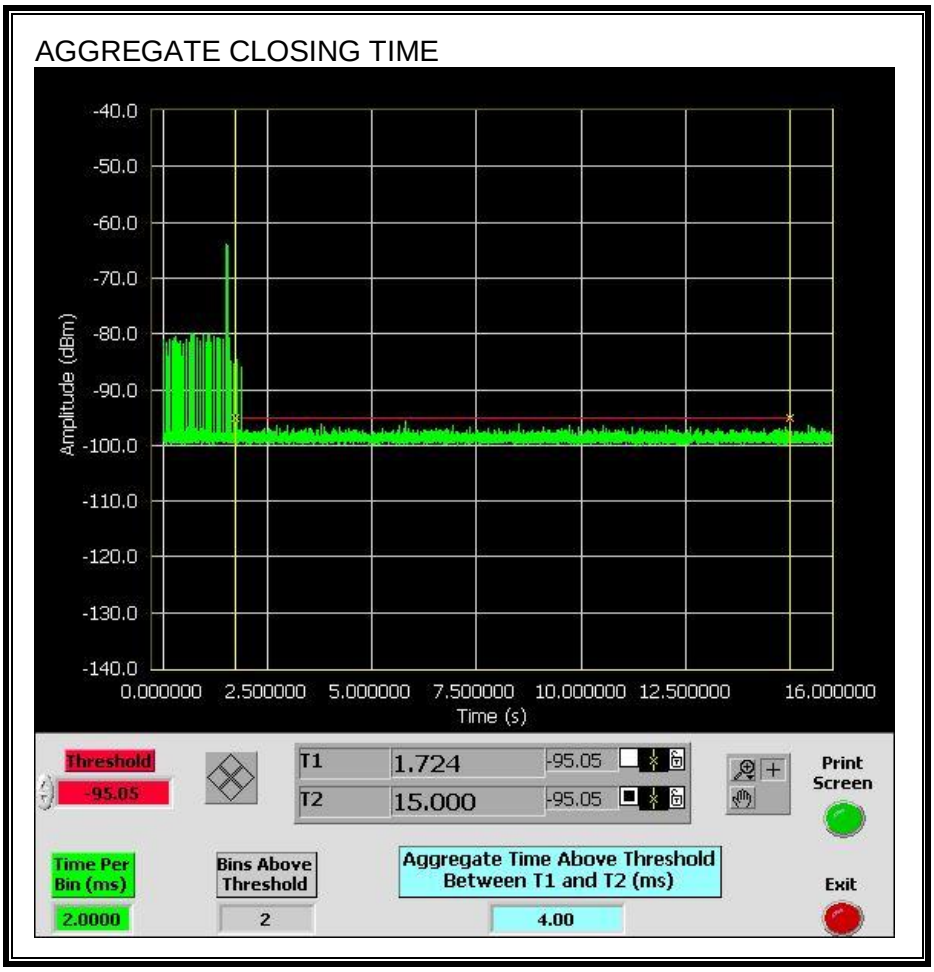


CHANNEL CLOSING TIME



AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

Only intermittent transmissions are observed during the aggregate monitoring period.



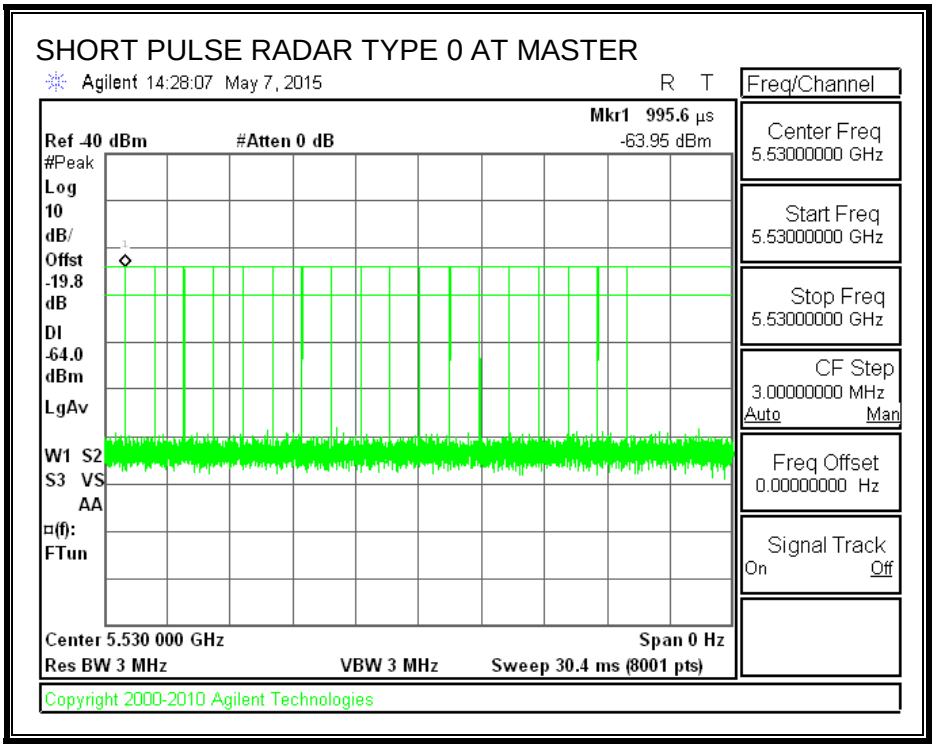
13.4. CLIENT MODE RESULTS FOR 80 MHz BANDWIDTH

13.4.1. TEST CHANNEL

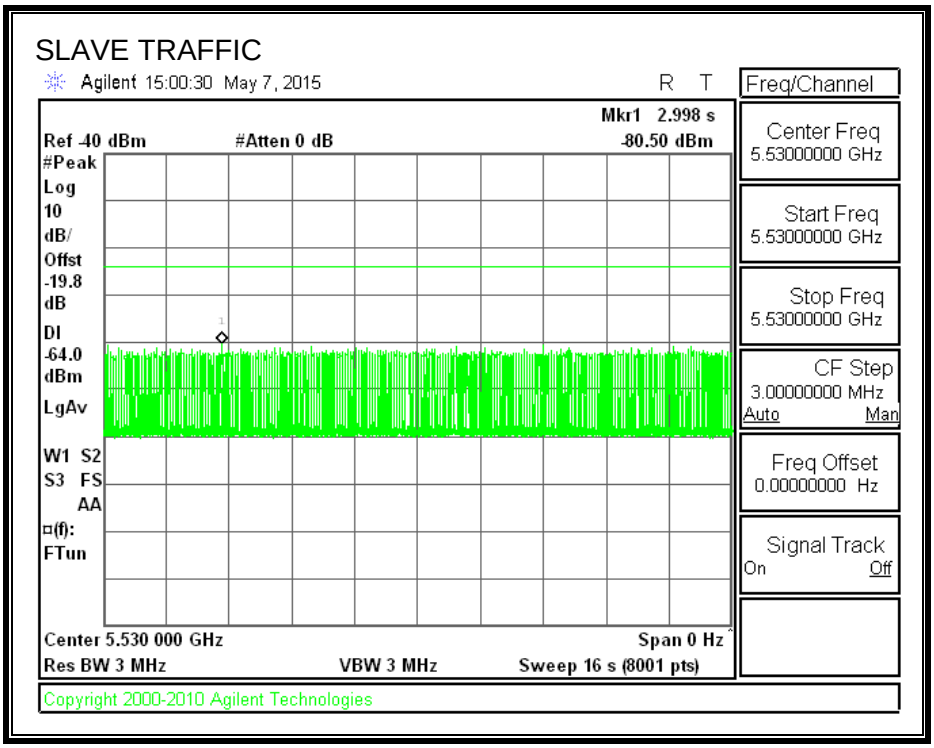
All tests were performed at a channel center frequency of 5530 MHz.

13.4.2. RADAR WAVEFORM AND TRAFFIC

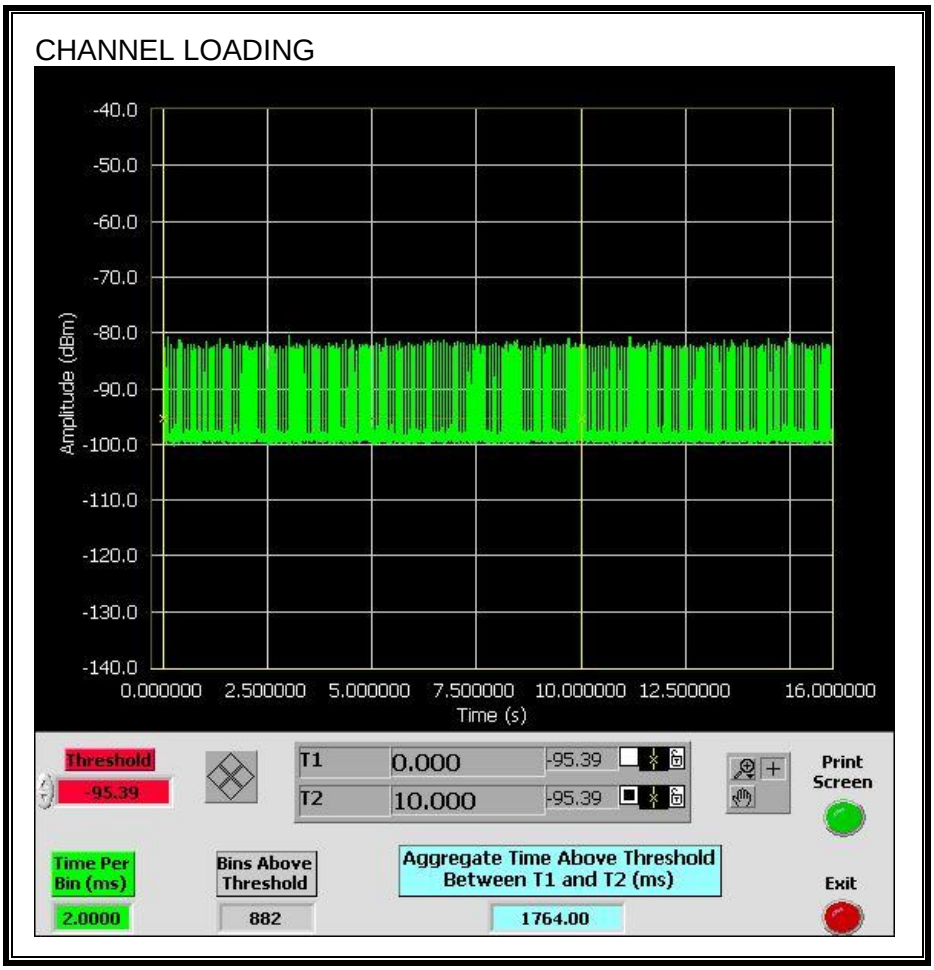
RADAR WAVEFORM



TRAFFIC



CHANNEL LOADING



The level of traffic loading on the channel by the EUT is 17.64%

13.4.3. OVERLAPPING CHANNEL TESTS

RESULTS

These tests are not applicable.

13.4.4. MOVE AND CLOSING TIME

REPORTING NOTES

The reference marker is set at the end of last radar pulse.

The delta marker is set at the end of the last WLAN transmission following the radar pulse. This delta is the channel move time.

The aggregate channel closing transmission time is calculated as follows:

Aggregate Transmission Time =
(Number of analyzer bins showing transmission) * (dwell time per bin)

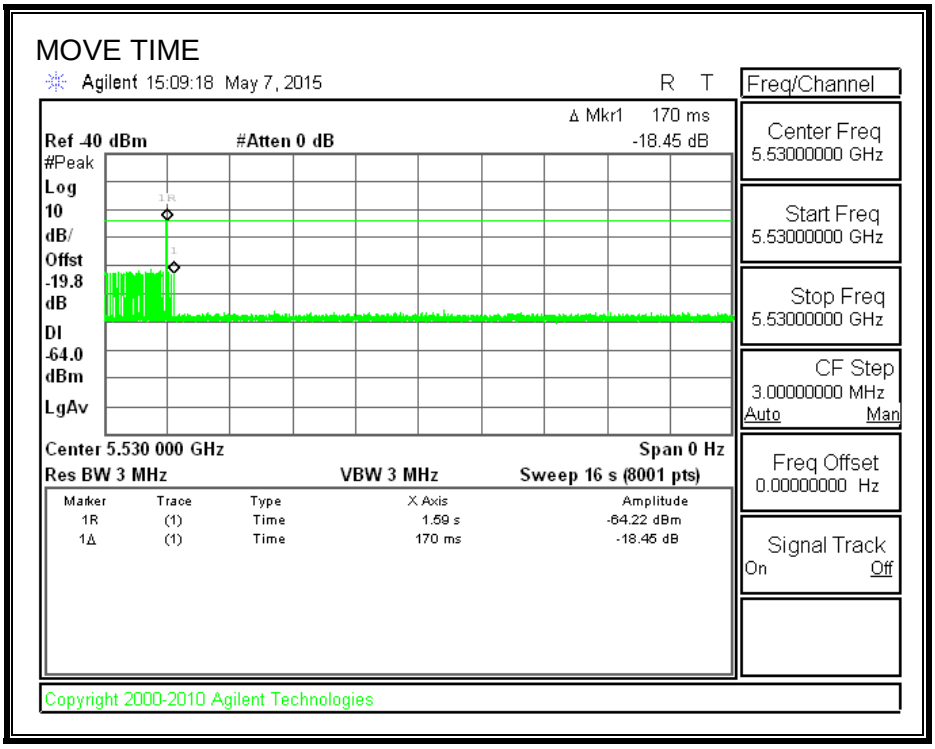
The observation period over which the aggregate time is calculated begins at (Reference Marker + 200 msec) and ends no earlier than (Reference Marker + 10 sec).

RESULTS

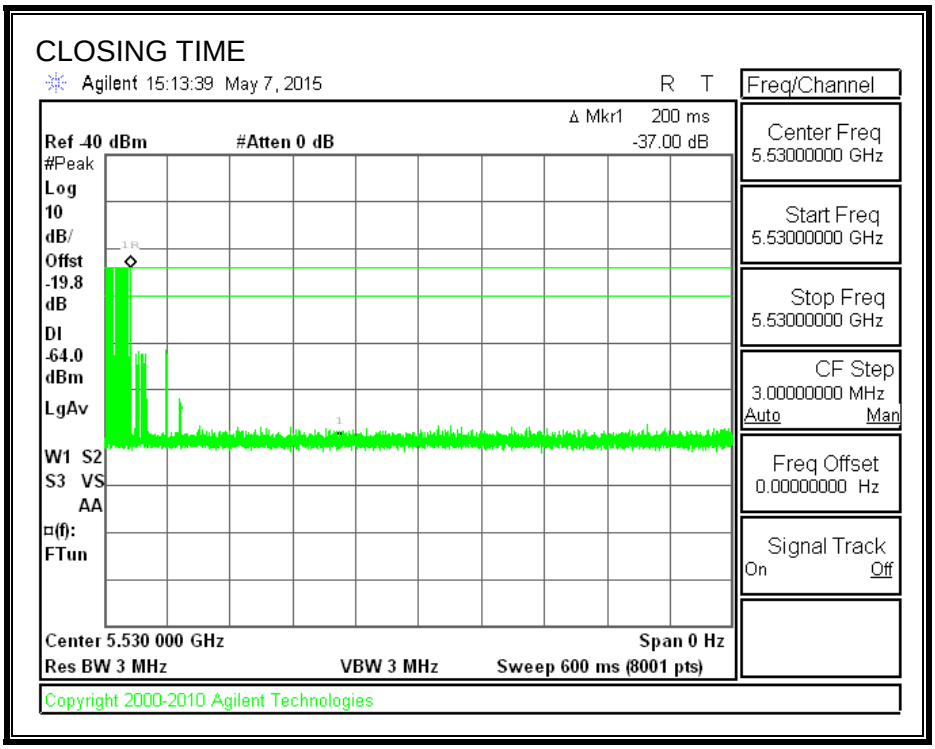
Channel Move Time (sec)	Limit (sec)
0.170	10

Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
0.0	60

MOVE TIME



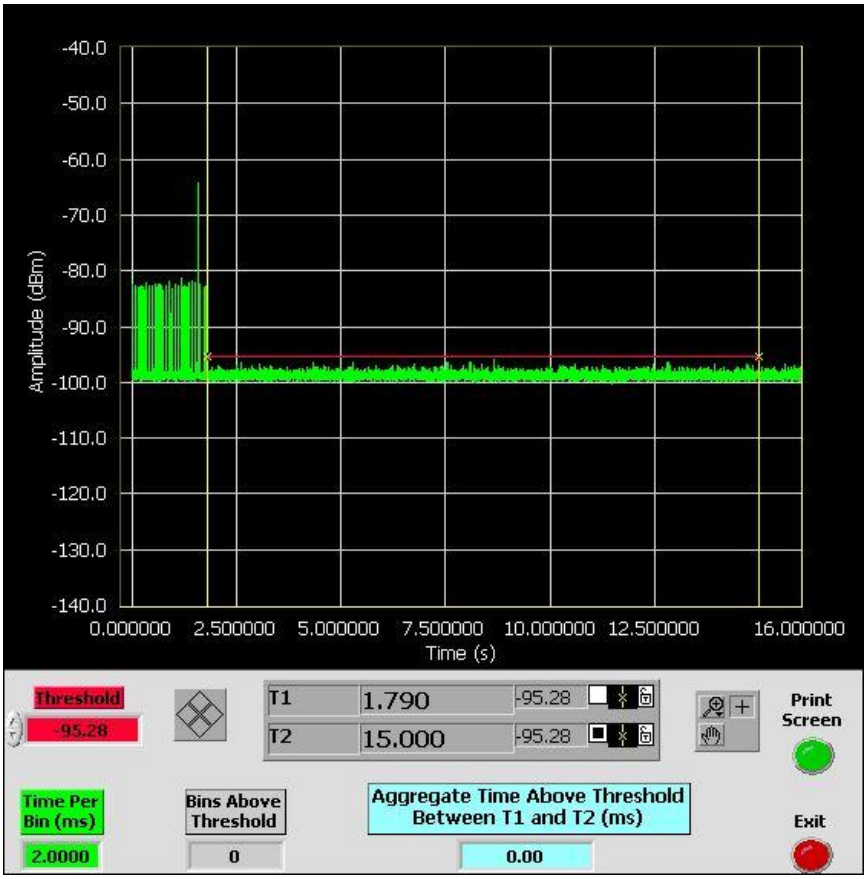
CHANNEL CLOSING TIME



AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

No transmissions are observed during the aggregate monitoring period.

AGGREGATE CLOSING TIME

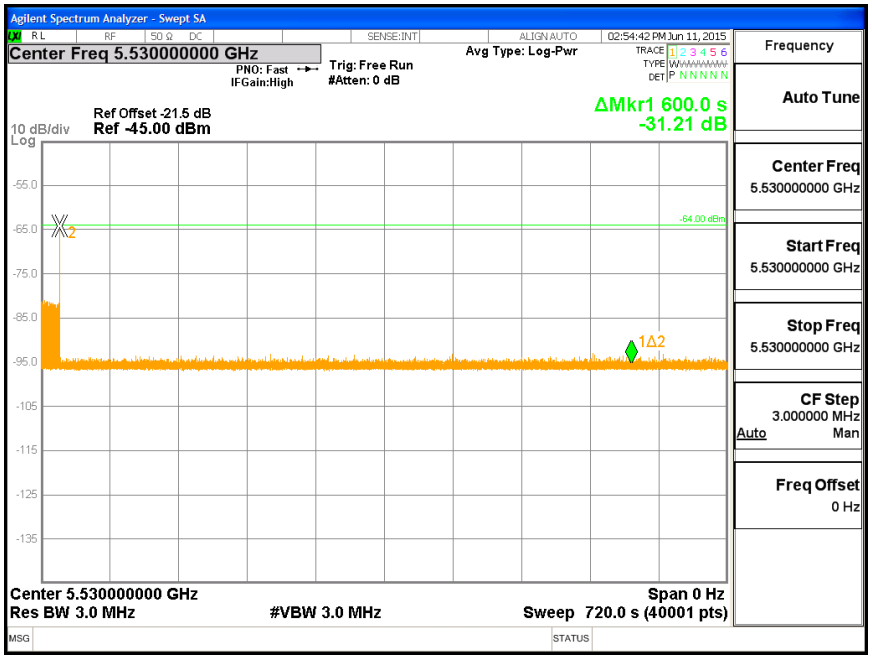


13.4.5. 10-MINUTE CLIENT TX MONITORING PERIOD

RESULTS

No EUT transmissions were observed on the test channel during the 10-minute observation time.

10-MINUTE CLIENT TX MONITORING PERIOD



13.5. CLIENT-TO-CLIENT COMMUNICATIONS MODE RESULTS FOR 20 MHz BANDWIDTH

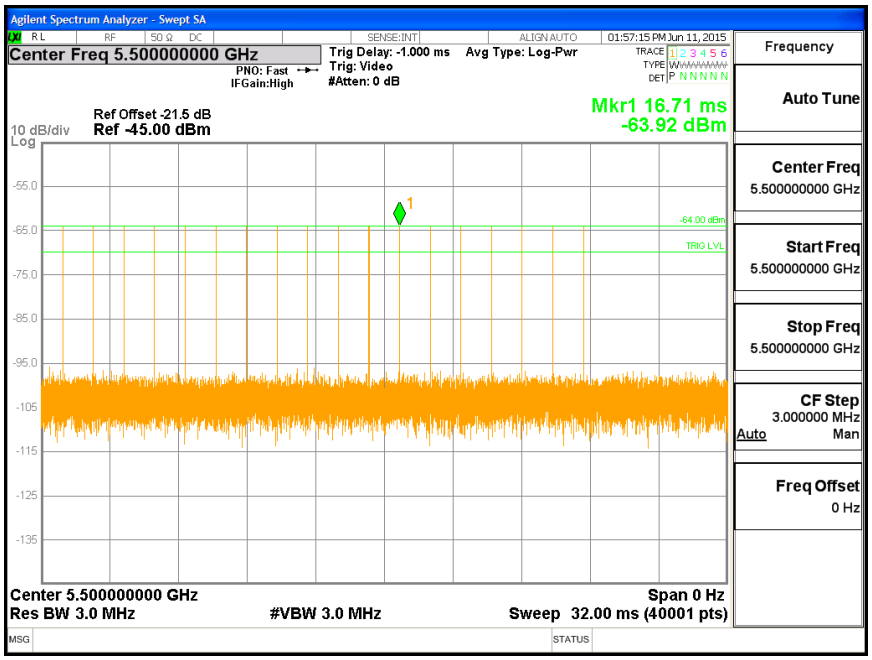
13.5.1. TEST CHANNEL

All tests were performed at a channel center frequency of 5500 MHz.

13.5.2. RADAR WAVEFORM AND TRAFFIC

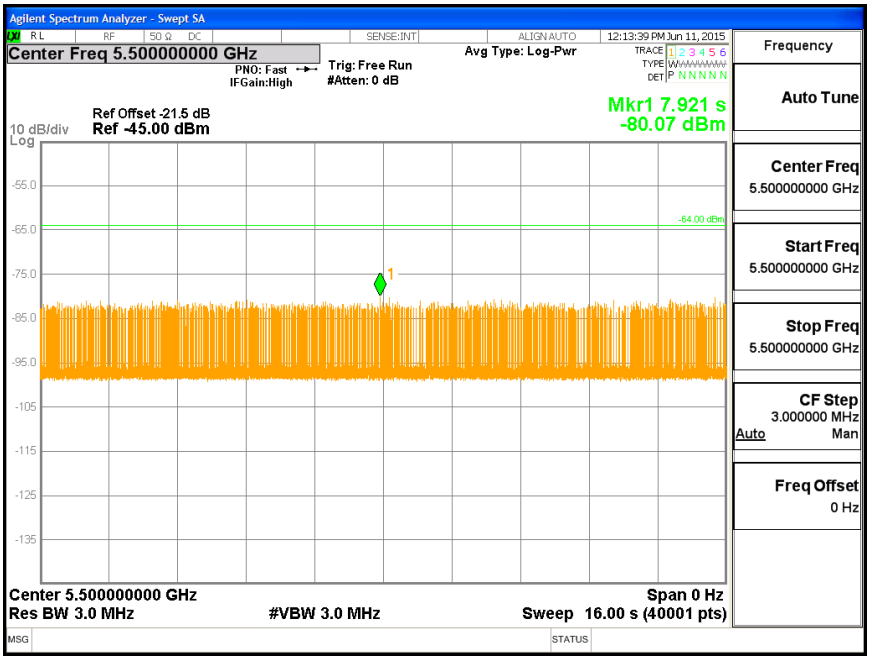
RADAR WAVEFORM

SHORT PULSE RADAR TYPE 0 AT MASTER

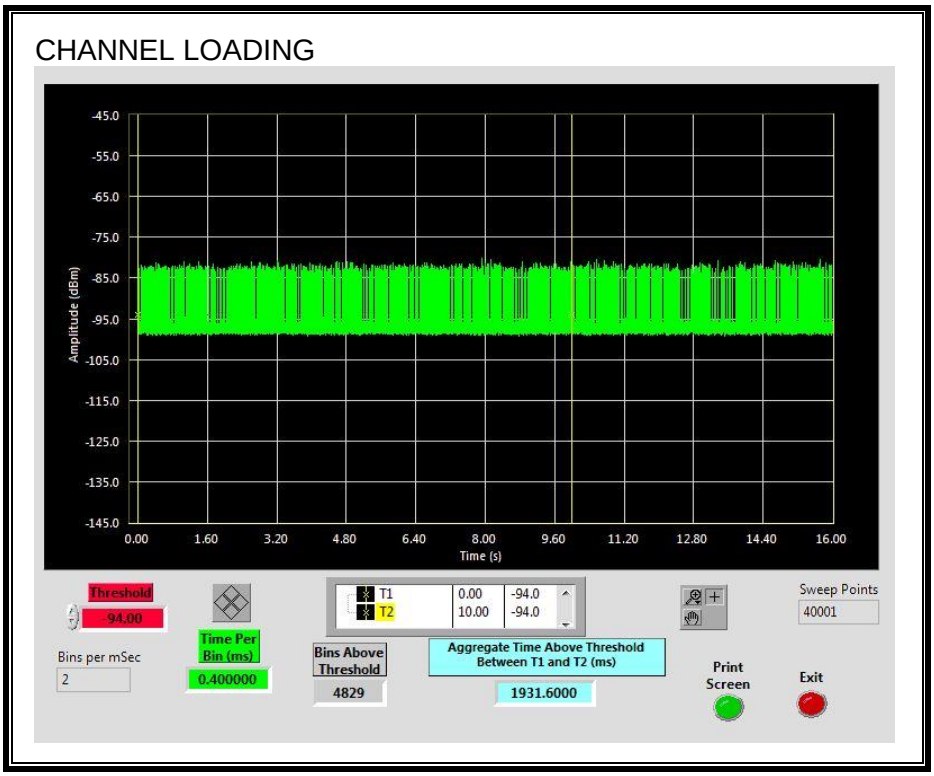


TRAFFIC

SLAVE TRAFFIC



CHANNEL LOADING



The level of traffic loading on the channel by the EUT is 19.31%

13.5.3. OVERLAPPING CHANNEL TESTS

RESULTS

These tests are not applicable.

13.5.4. MOVE AND CLOSING TIME

REPORTING NOTES

The reference marker is set at the end of last radar pulse.

The delta marker is set at the end of the last WLAN transmission following the radar pulse. This delta is the channel move time.

The aggregate channel closing transmission time is calculated as follows:

Aggregate Transmission Time =
(Number of analyzer bins showing transmission) * (dwell time per bin)

The observation period over which the aggregate time is calculated begins at (Reference Marker + 200 msec) and ends no earlier than (Reference Marker + 10 sec).

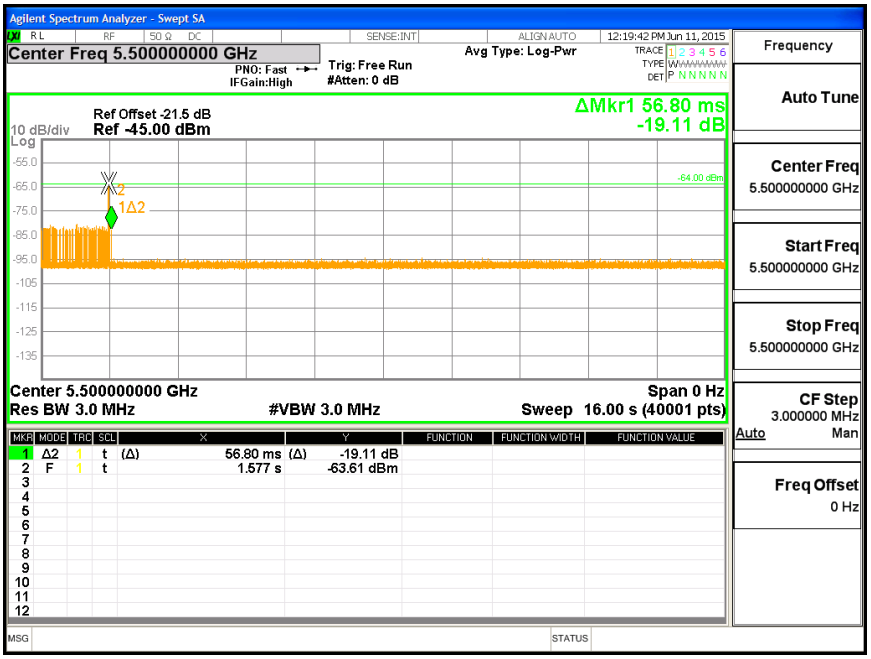
RESULTS

Channel Move Time (sec)	Limit (sec)
0.0568	10

Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
0.0	60

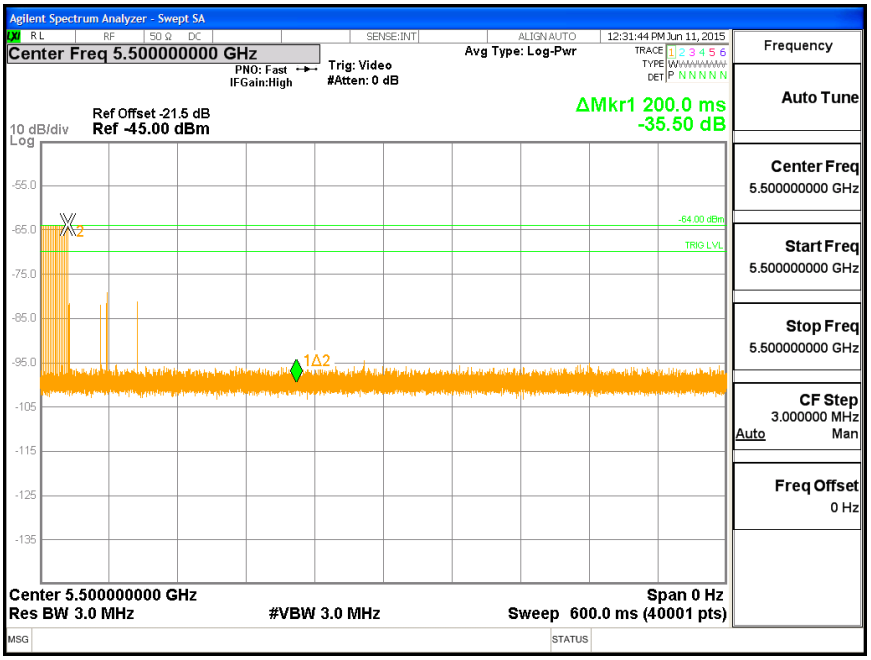
MOVE TIME

MOVE TIME



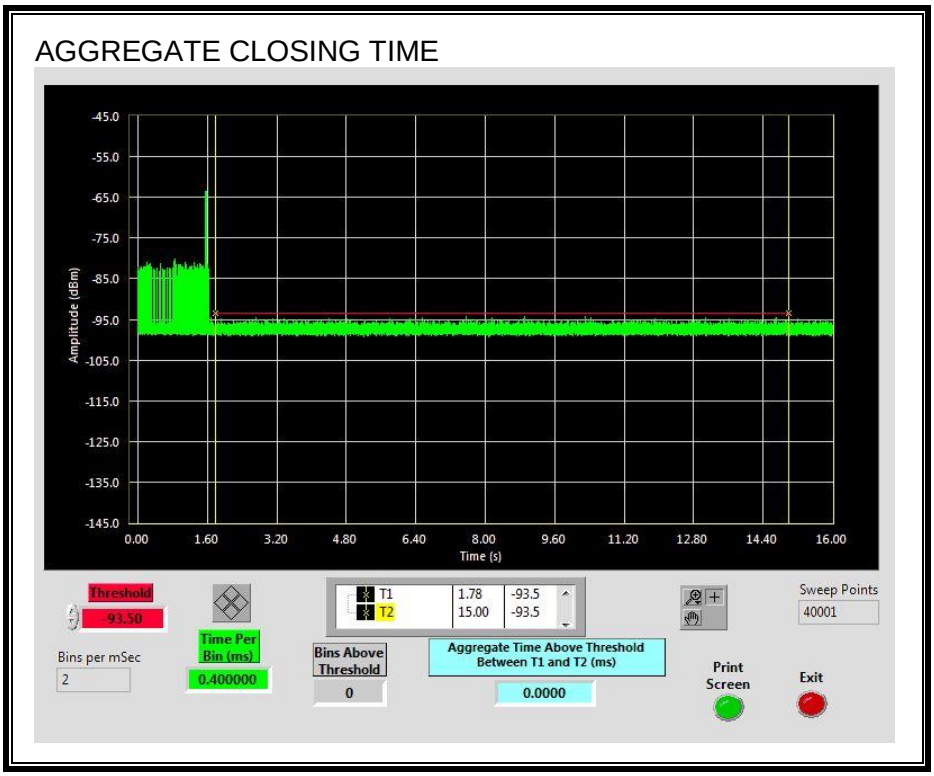
CHANNEL CLOSING TIME

CLOSING TIME



AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

No transmissions are observed during the aggregate monitoring period.



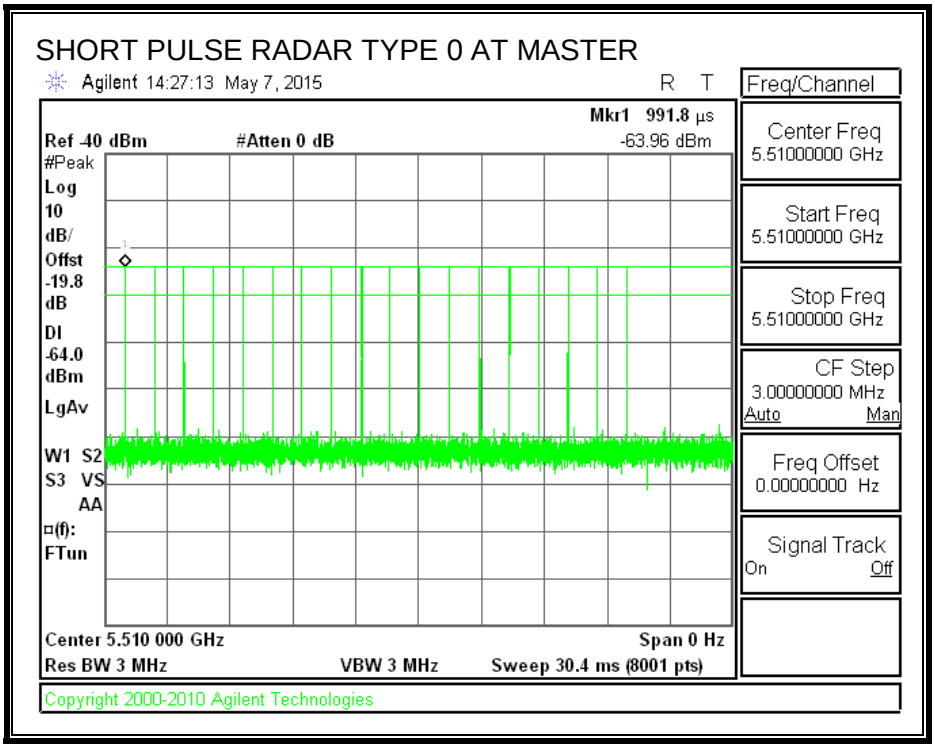
13.6. CLIENT-TO-CLIENT COMMUNICATIONS MODE RESULTS FOR 40 MHz BANDWIDTH

13.6.1. TEST CHANNEL

All tests were performed at a channel center frequency of 5510 MHz.

13.6.2. RADAR WAVEFORM AND TRAFFIC

RADAR WAVEFORM



TRAFFIC