RESTRICTED BANDEDGE, CHAIN 1 (HIGH) (FCC)

HIGH CHANNEL HORIZONTAL PLOT

DATA

| Mark er	Frequen cy (GHz)	Meter Readi ng (dBm)	Det	AF T712 (dB/m)	Amp/Cbl/Fltr /Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimu th (Degs)	Heig ht (cm)	Polari ty
1	5.85	-64.49	Pk	34.9	-17.3	11.8	-35.09	26.99	-62.08	47	380	H
2	5.959	-66.37	Pk	35	-17.2	11.8	-36.77	-27	-9.77	47	380	H

Pk - Peak detector
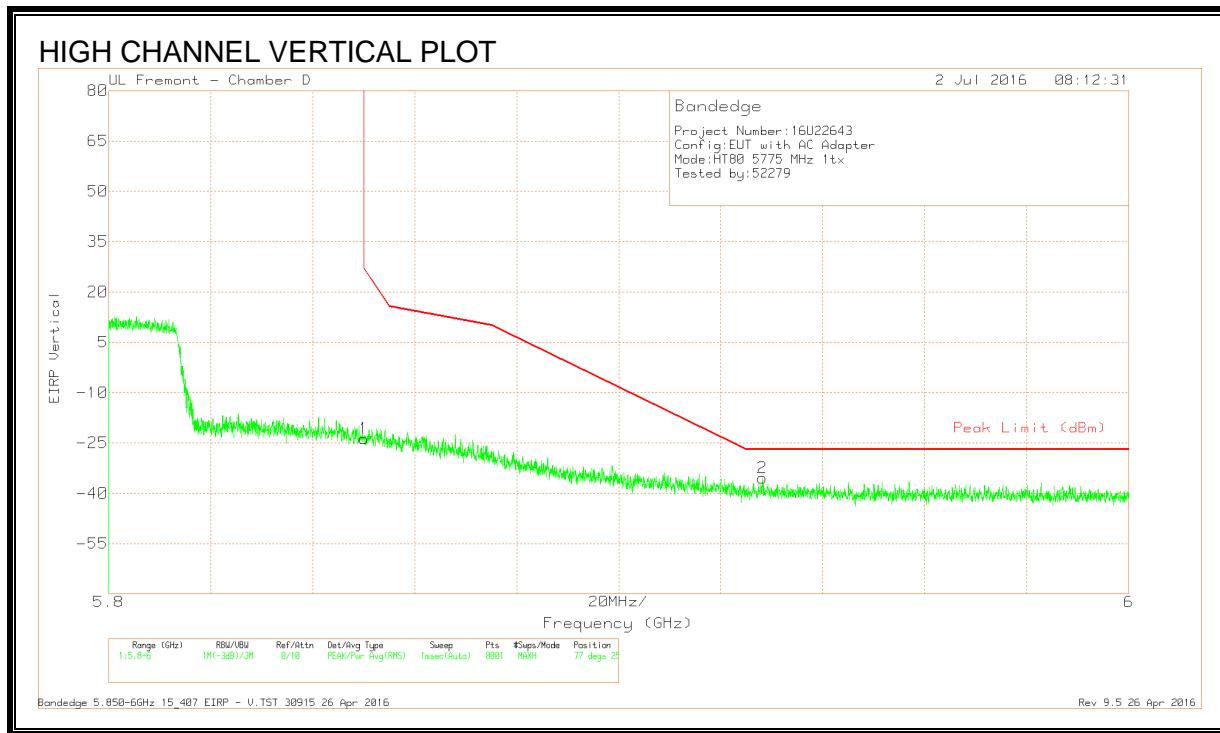
DATA

| Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T712 (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	-53.09	Pk	34.9	-17.3	11.8	-23.69	26.94	-50.63	77	256	V
2	5.928	-65.11	Pk	35	-17.1	11.8	-35.41	-27	-8.41	77	256	V

Pk - Peak detector

RESTRICTED BANDEDGE, CHAIN 1 (LOW CHANNEL) (IC)
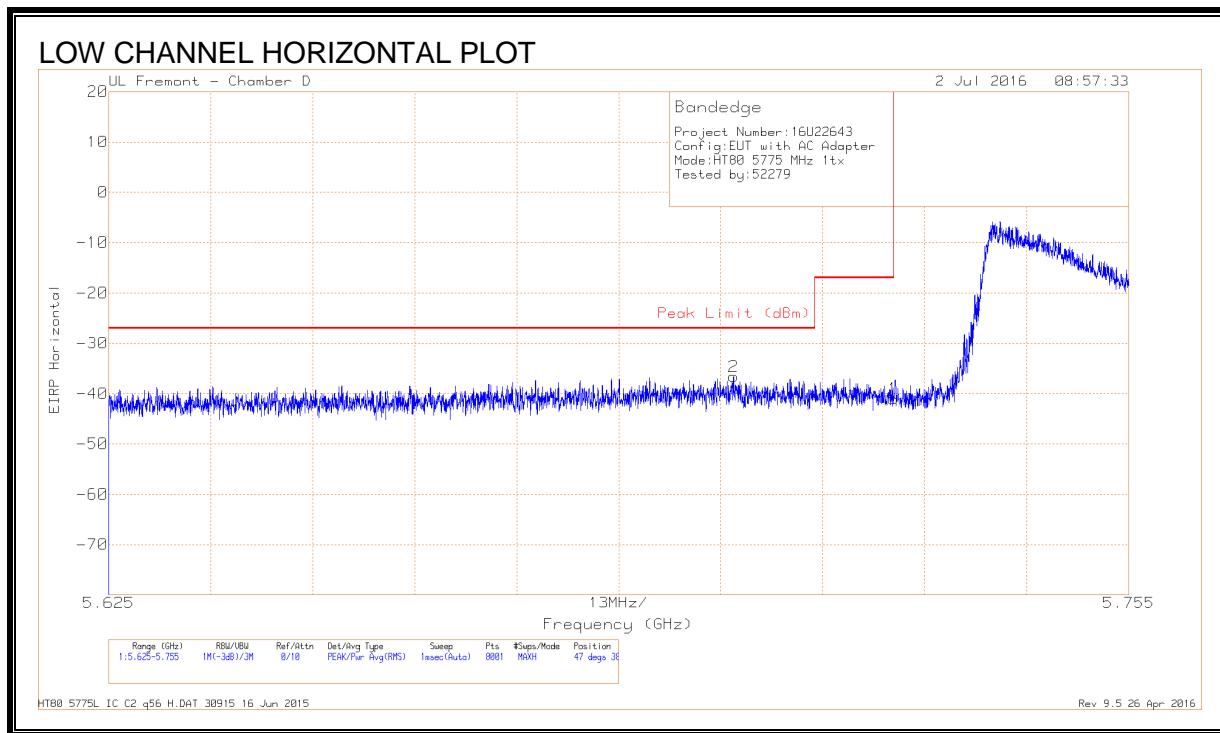
DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T712 (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	5.705	-66.01	Pk	34.8	-17.2	11.8	-36.61	-27	-9.61	47	380	H
1	5.725	-70.3	Pk	34.8	-17.3	11.8	-41	-17	-24	47	380	H

Pk - Peak detector
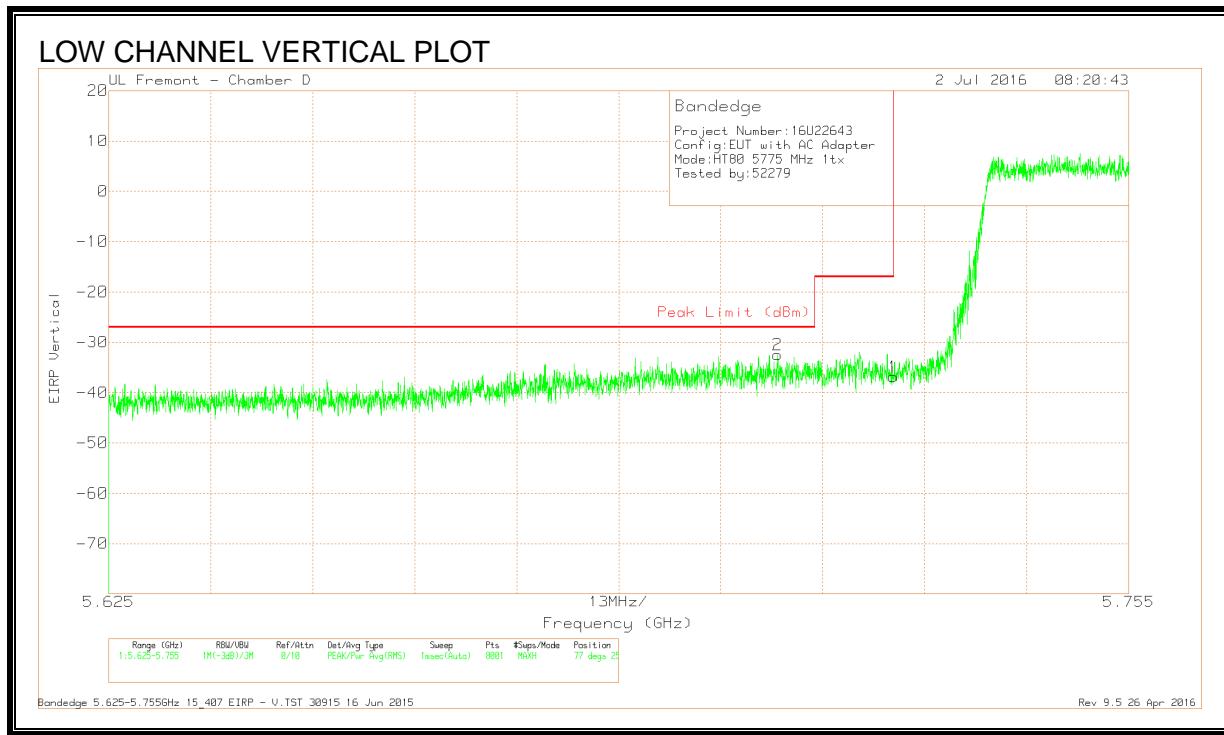
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LOW CHANNEL VERTICAL PLOT

UL Fremont - Chamber D   2 Jul 2016   08:20:43

Bandedge
Project Number:16U22643
Config:EUT with AC Adapter
Mode:AT80 5775 MHz 1tx
Tested by:52279

Peak Limit (dBm)

Range (GHz)	RBW/VBW	Ref/Attn	Det/Avg Type	Sweep	Pts	#Swps/Mode	Position
1:5.625-5.755	1M(-3dB)/3M	0/10	PEAK/Pwr Avg(RMS)	1msec(Auto)	8001	MAXH	77 degs 2V

Bandedge 5.625-5.755GHz 15_407 EIRP - V.TST 30915 16 Jun 2015   Rev 9.5 26 Apr 2016

DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T712 (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	5.71	-61.73	Pk	34.8	-17.3	11.8	-32.43	-27	-5.43	77	256	V
1	5.725	-66.15	Pk	34.8	-17.3	11.8	-36.85	-17	-19.85	77	256	V

Pk - Peak detector

RESTRICTED BANDEDGE, CHAIN 1 (HIGH CHANNEL) (IC)
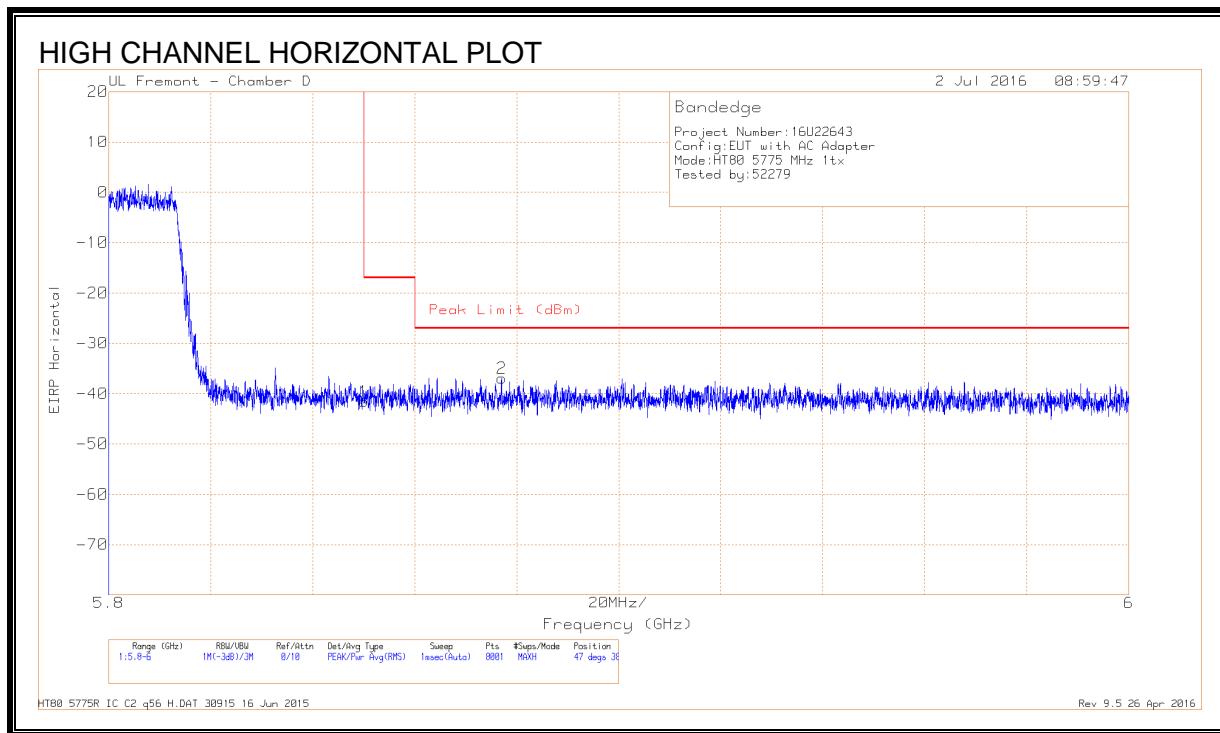
HIGH CHANNEL HORIZONTAL PLOT

UL Fremont — Chamber D   2 Jul 2016   08:59:47

Bandedge
Project Number:16U22643
Config:EUT with AC Adapter
Mode:HT80 5775 MHz 1tx
Tested by:52279

Peak Limit (dBm)

EIRP Horizontal

20MHz/
Frequency (GHz)

Range (GHz)	RBW/VBW	Ref/Attn	Det/Avg Type	Sweep	Pts	#Swps/Mode	Position
1:5.8-6	1M(-3dB)/3M	0/10	PEAK/Pwr Avg(RMS)	1msec(Auto)	0001	MAXH	47 degs J8

HT80 5775R IC C2 q56 H.DAT 30915 16 Jun 2015   Rev 9.5 26 Apr 2016

DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T712 (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	-70.95	Pk	34.9	-17.3	11.8	-41.55	-17	-24.55	47	380	H
2	5.877	-66.33	Pk	34.9	-17.3	11.8	-36.93	-27	-9.93	47	380	H

Pk - Peak detector
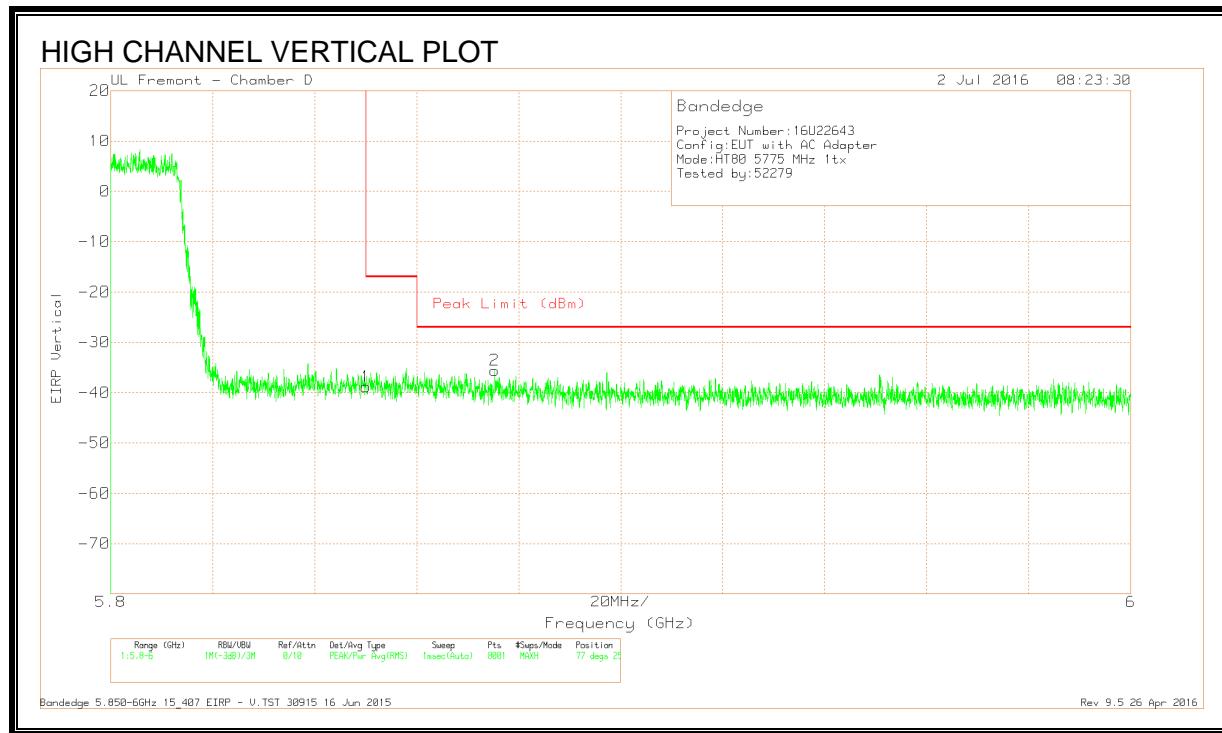
HIGH CHANNEL VERTICAL PLOT

DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T712 (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	-68.2	Pk	34.9	-17.3	11.8	-38.8	-17	-21.8	77	256	V
2	5.875	-64.96	Pk	34.9	-17.3	11.8	-35.56	-27	-8.56	77	256	V

Pk - Peak detector

CHANNEL 155 HARMONICS AND SPURIOUS EMISSIONS

CHANNEL 155 HORIZONTAL PLOT

CHANNEL 155 VERTICAL PLOT
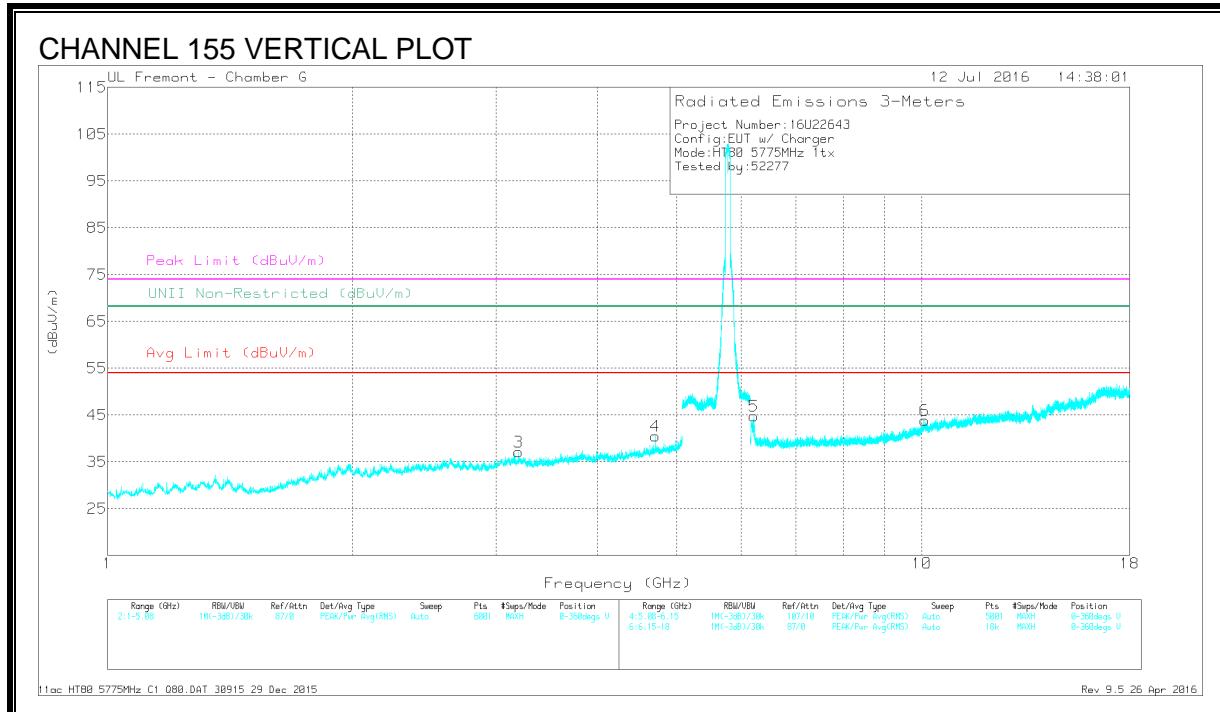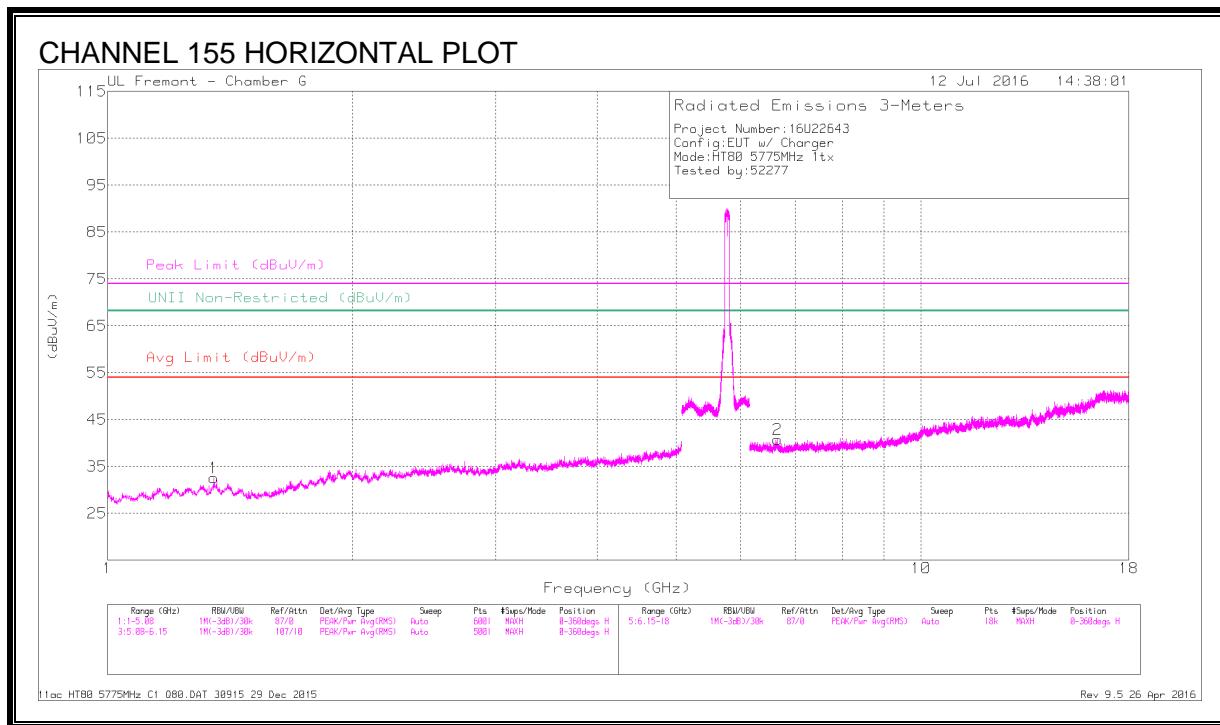
DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T711 (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	* 1.35	44.55	PK-U	29.2	-35	0	38.75	-	-	74	-35.25	-	-	300	123	H
	* 1.352	33.09	ADR	29.2	-35	.22	27.51	54	-26.49	-	-	-	-	300	123	H
4	* 4.704	41.53	PK-U	34	-29.3	0	46.23	-	-	74	-27.77	-	-	126	248	V
	* 4.707	30.82	ADR	34	-29.2	.22	35.84	54	-18.16	-	-	-	-	126	248	V
3	3.195	42.68	PK-U	33.6	-32	0	44.28	-	-	-	-	68.2	-23.92	338	181	V
5	6.216	43.97	PK-U	35.6	-28	0	51.57	-	-	-	-	68.2	-16.63	351	201	V
2	6.667	41.22	PK-U	35.6	-27.1	0	49.72	-	-	-	-	68.2	-18.48	351	101	H
6	10.079	37.99	PK-U	37.3	-23	0	52.29	-	-	-	-	68.2	-15.91	12	200	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK-U - U-NII: Maximum Peak

ADR - U-NII AD primary method, RMS average

9.59. 802.11ac VHT80 2Tx CDD MODE IN THE 5.8 GHz BAND
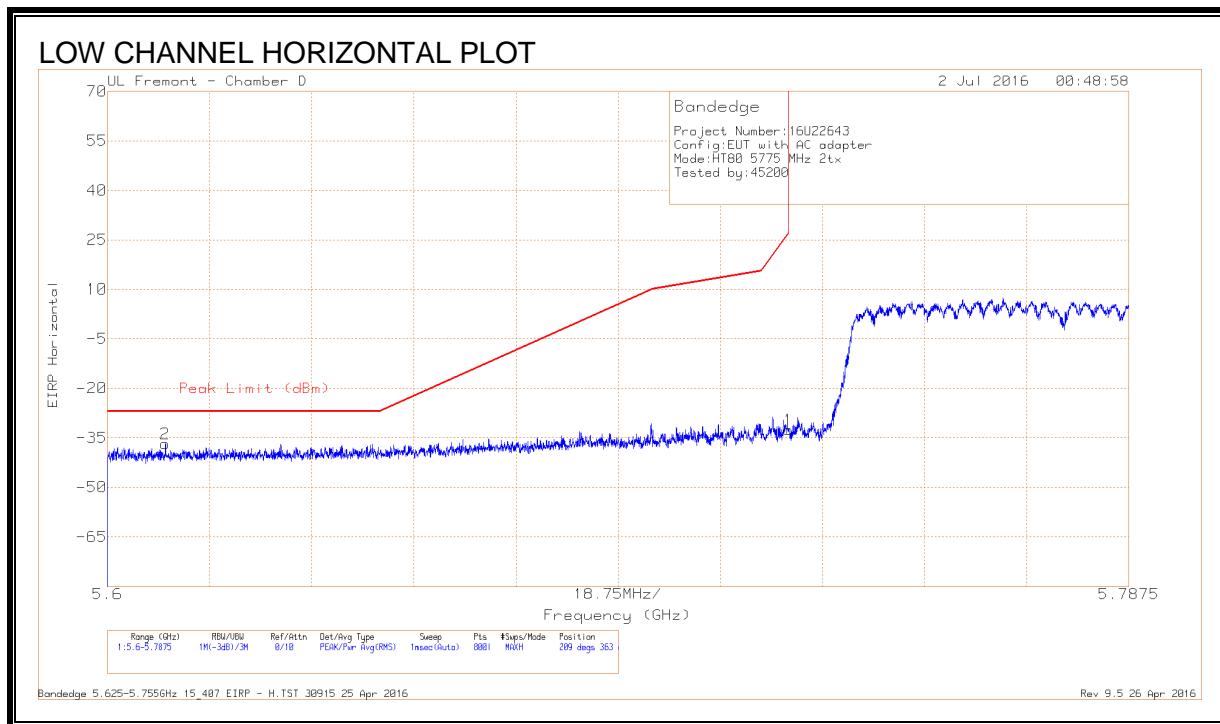
**RESTRICTED BANDEDGE (LOW) (FCC)**

DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T712 (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	5.611	-65.62	Pk	34.5	-17.5	11.8	-36.82	-27	-9.82	209	363	H
1	5.725	-61.83	Pk	34.8	-17.3	11.8	-32.53	26.99	-59.52	209	363	H

Pk - Peak detector
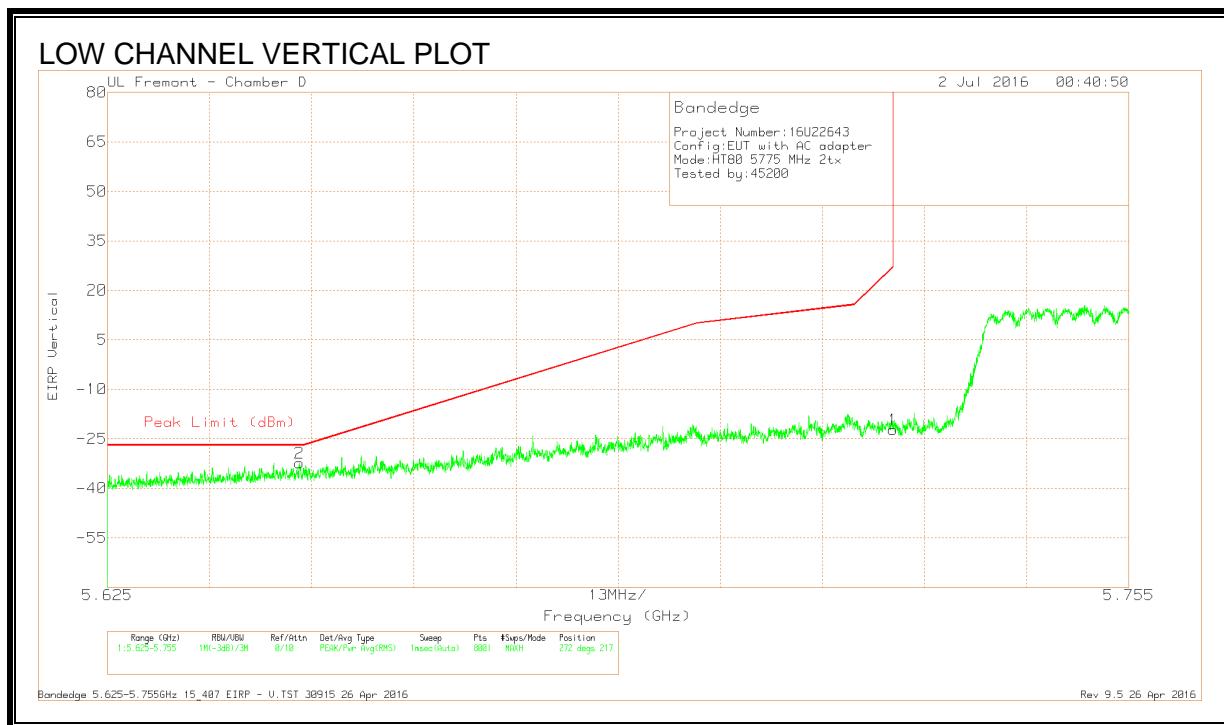
LOW CHANNEL VERTICAL PLOT

DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T712 (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	5.649	-61.47	Pk	34.6	-17.3	11.8	0	-32.37	-27	-5.37	272	217	V
1	5.725	-51.41	Pk	34.8	-17.3	11.8	0	-22.11	26.97	-49.08	272	217	V

Pk - Peak detector
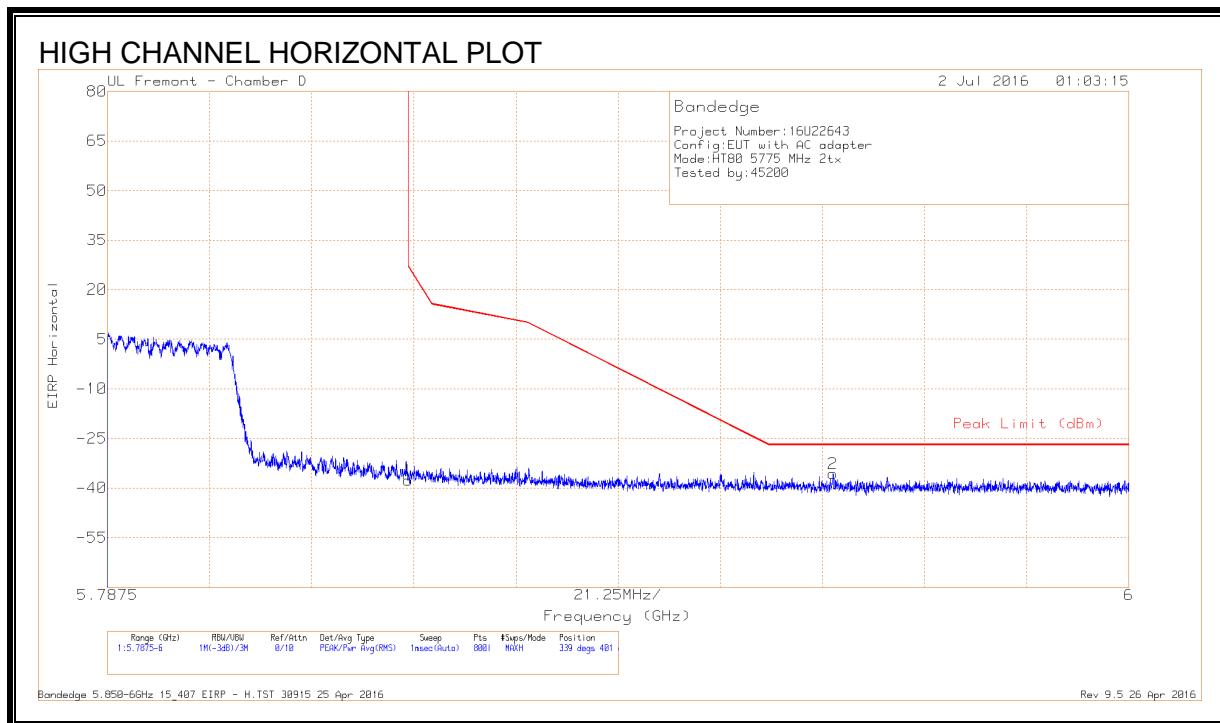
RESTRICTED BANDEDGE (HIGH) (FCC)

HIGH CHANNEL HORIZONTAL PLOT

DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T712 (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	-67.02	Pk	34.9	-17.3	11.8	-37.62	26.99	-64.61	339	401	H
2	5.938	-65.25	Pk	35	-17.2	11.8	-35.65	-27	-8.65	339	401	H

Pk - Peak detector
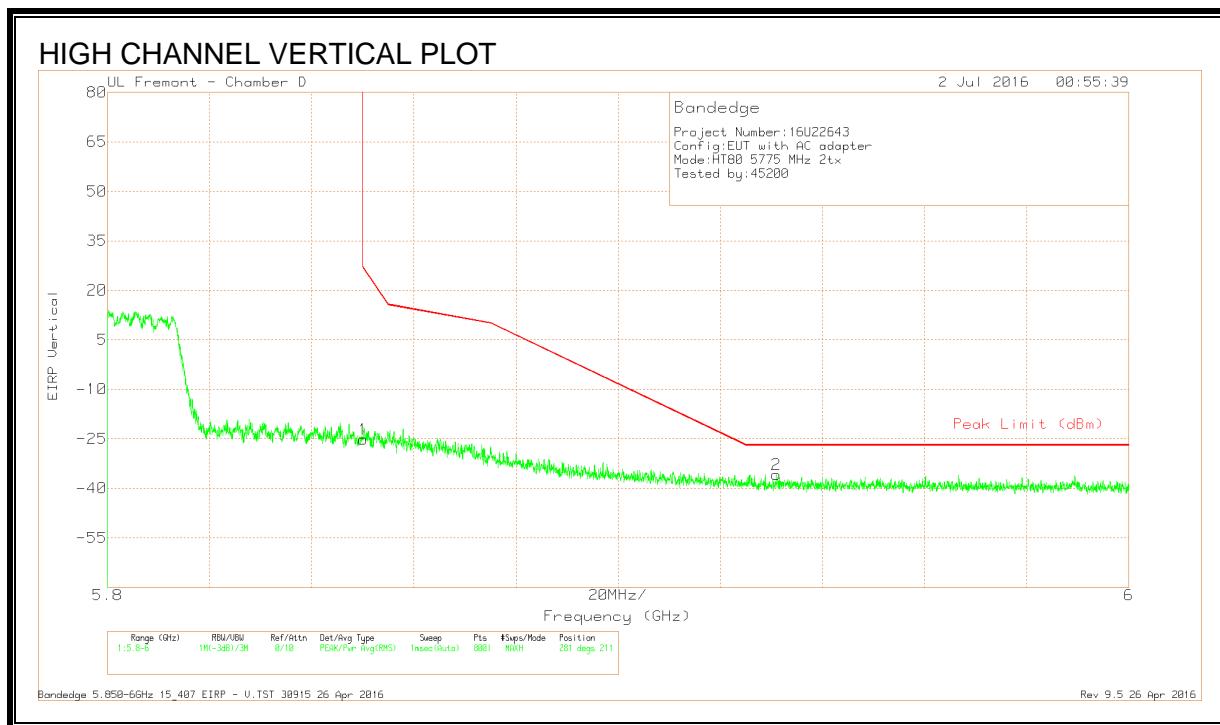
HIGH CHANNEL VERTICAL PLOT

DATA

| Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T712 (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	-54.5	Pk	34.9	-17.3	11.8	-25.1	26.94	-52.04	281	211	V
2	5.931	-65.53	Pk	35	-17.1	11.8	-35.83	-27	-8.83	281	211	V

Pk - Peak detector
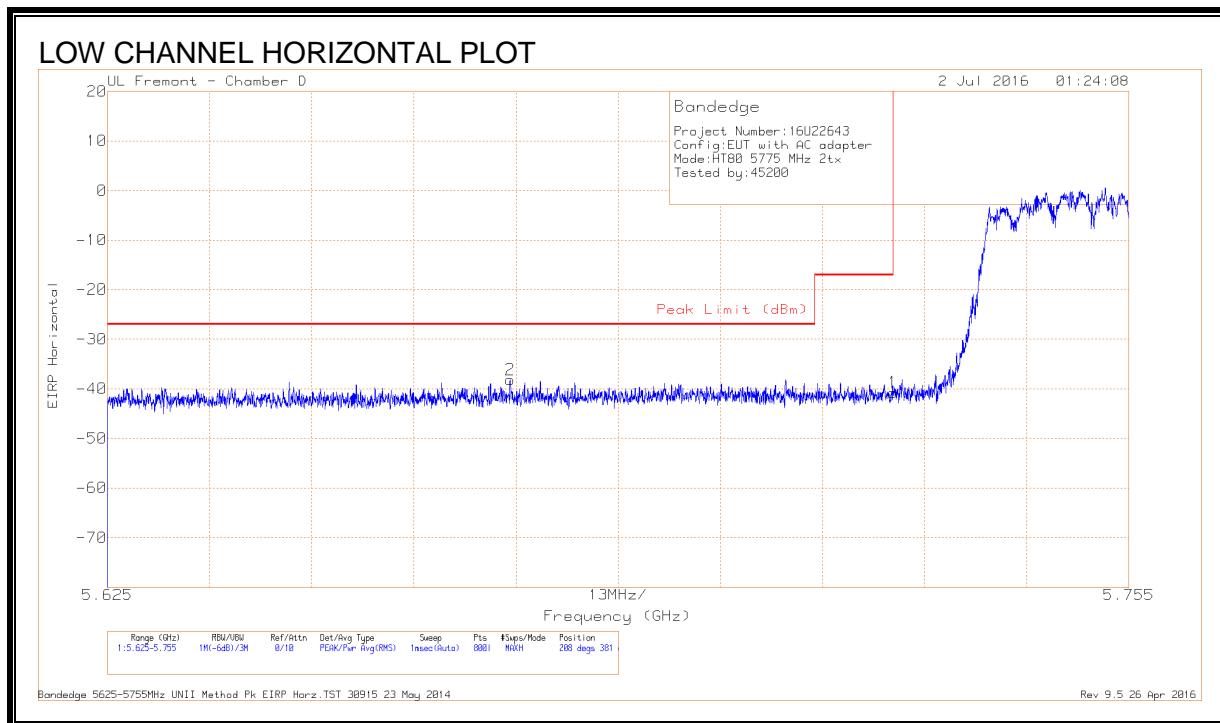
RESTRICTED BANDEDGE (LOW CHANNEL) (IC)

DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T712 (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	5.676	-67.42	Pk	34.7	-17.2	11.8	-38.12	-27	-11.12	208	381	H
1	5.725	-70	Pk	34.8	-17.3	11.8	-40.7	-17	-23.7	208	381	H

Pk - Peak detector
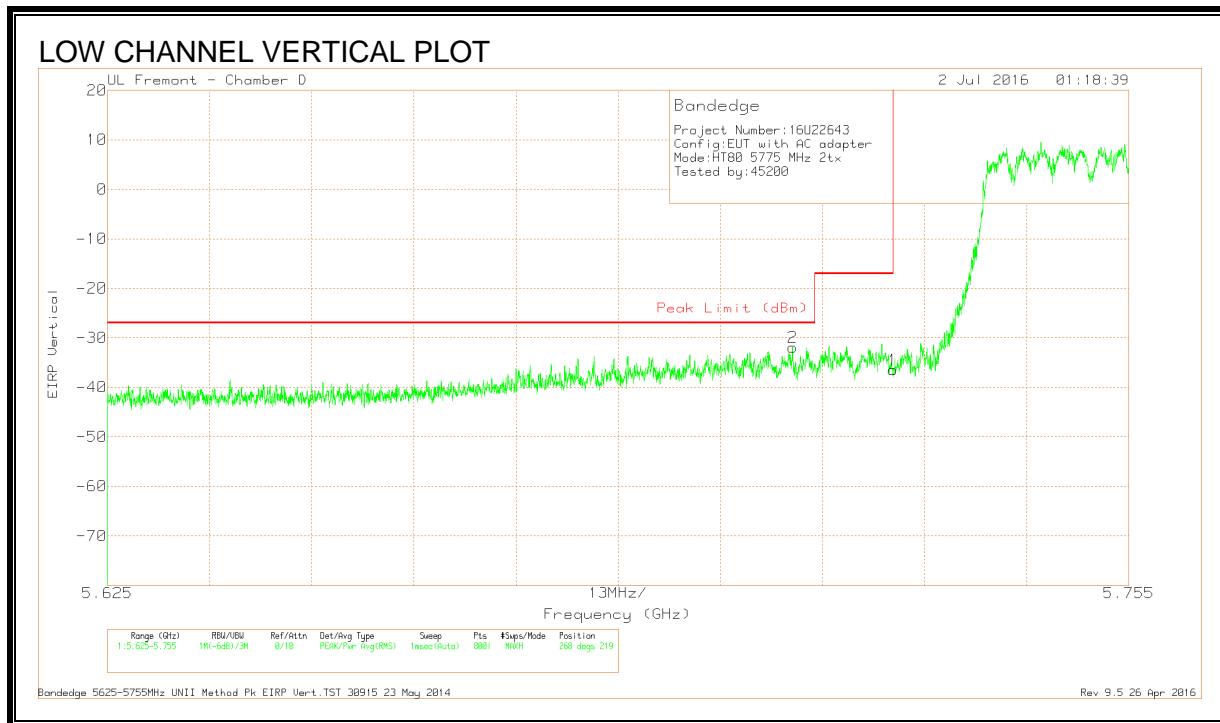
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## LOW CHANNEL VERTICAL PLOT


DATA

Mark er	Frequen cy (GHz)	Meter Readi ng (dBm)	Det	AF T712 (dB/m)	Amp/Cbl/Fltr /Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimu th (Degs)	Heig ht (cm)	Polari ty
2	5.712	-61.36	Pk	34.8	-17.2	11.8	-31.96	-27	-4.96	268	219	V
1	5.725	-65.77	Pk	34.8	-17.3	11.8	-36.47	-17	-19.47	268	219	V

Pk - Peak detector
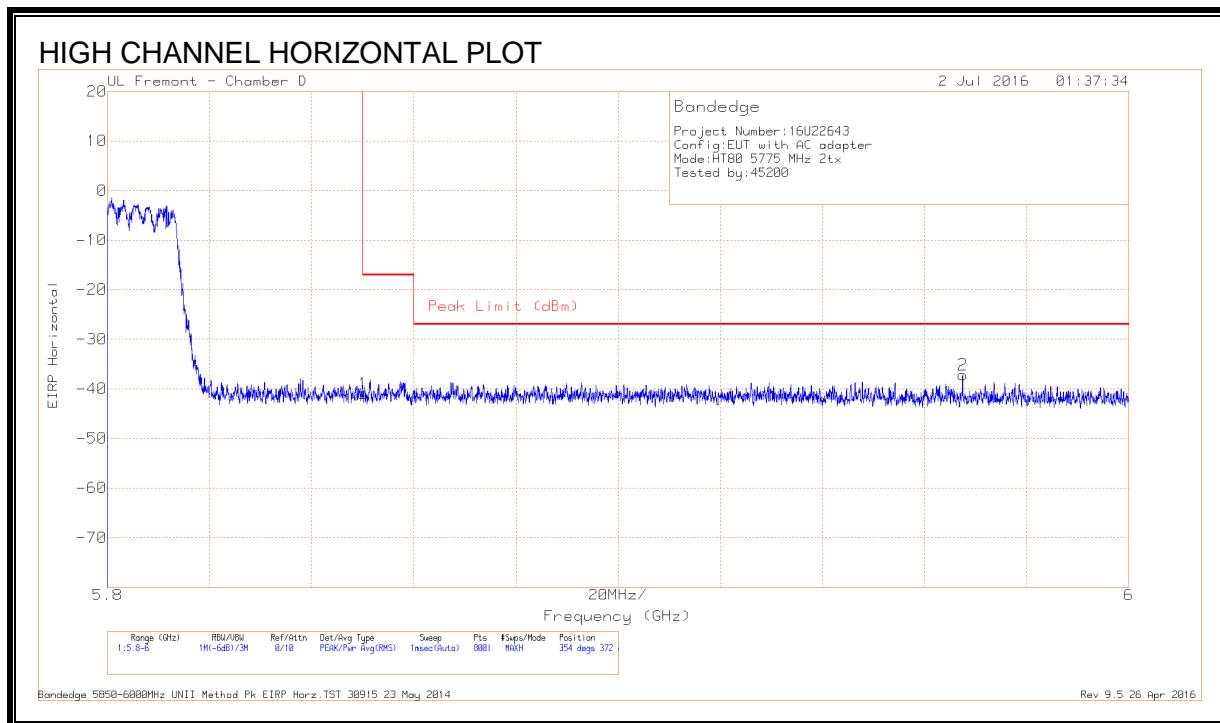
RESTRICTED BANDEDGE (HIGH CHANNEL) (IC)

DATA

Mark er	Frequen cy (GHz)	Meter Readi ng (dBm)	Det	AF T712 (dB/m)	Amp/Cbl/Fltr /Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimu th (Degs)	Heig ht (cm)	Polari ty
1	5.85	-70.34	Pk	34.9	-17.3	11.8	-40.94	-17	-23.94	354	372	H
2	5.967	-66.74	Pk	35	-17.2	11.8	-37.14	-27	-10.14	354	372	H

Pk - Peak detector
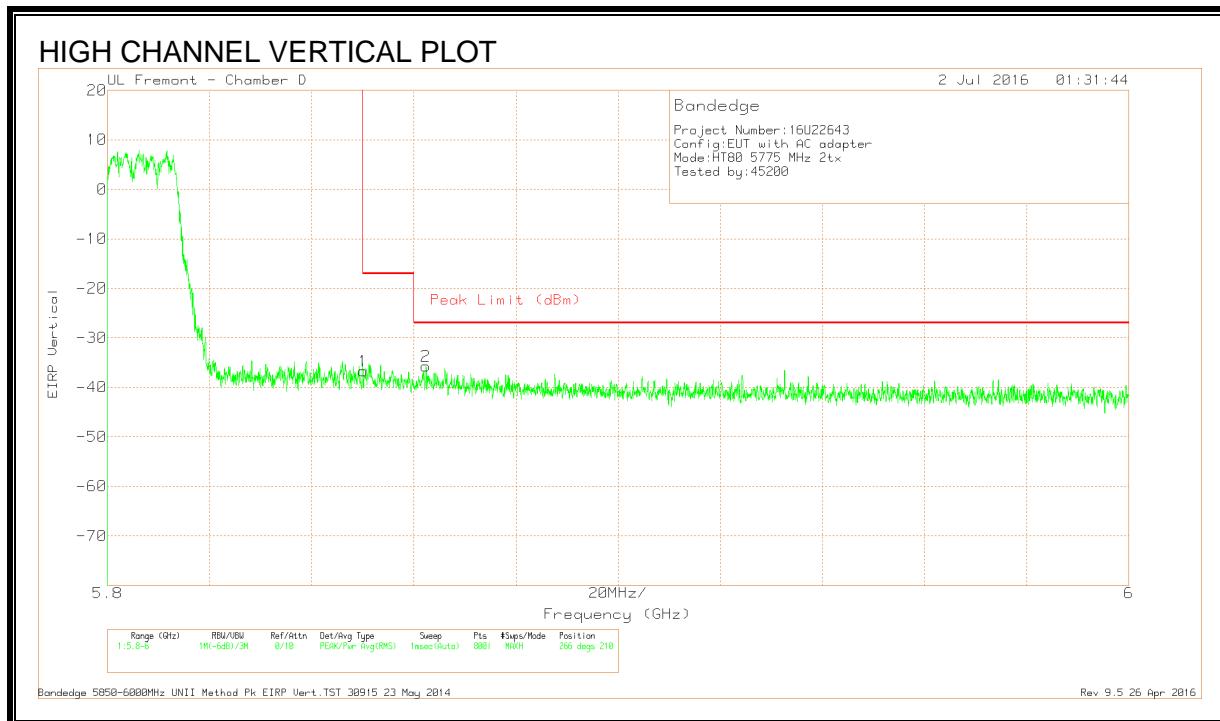
HIGH CHANNEL VERTICAL PLOT

DATA

Mark er	Frequen cy (GHz)	Meter Readi ng (dBm)	Det	AF T712 (dB/m)	Amp/Cbl/Fltr /Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimu th (Degs)	Heig ht (cm)	Polari ty
1	5.85	-66.16	Pk	34.9	-17.3	11.8	-36.76	-17	-19.76	266	210	V
2	5.862	-65.11	Pk	34.9	-17.3	11.8	-35.71	-27	-8.71	266	210	V

Pk - Peak detector
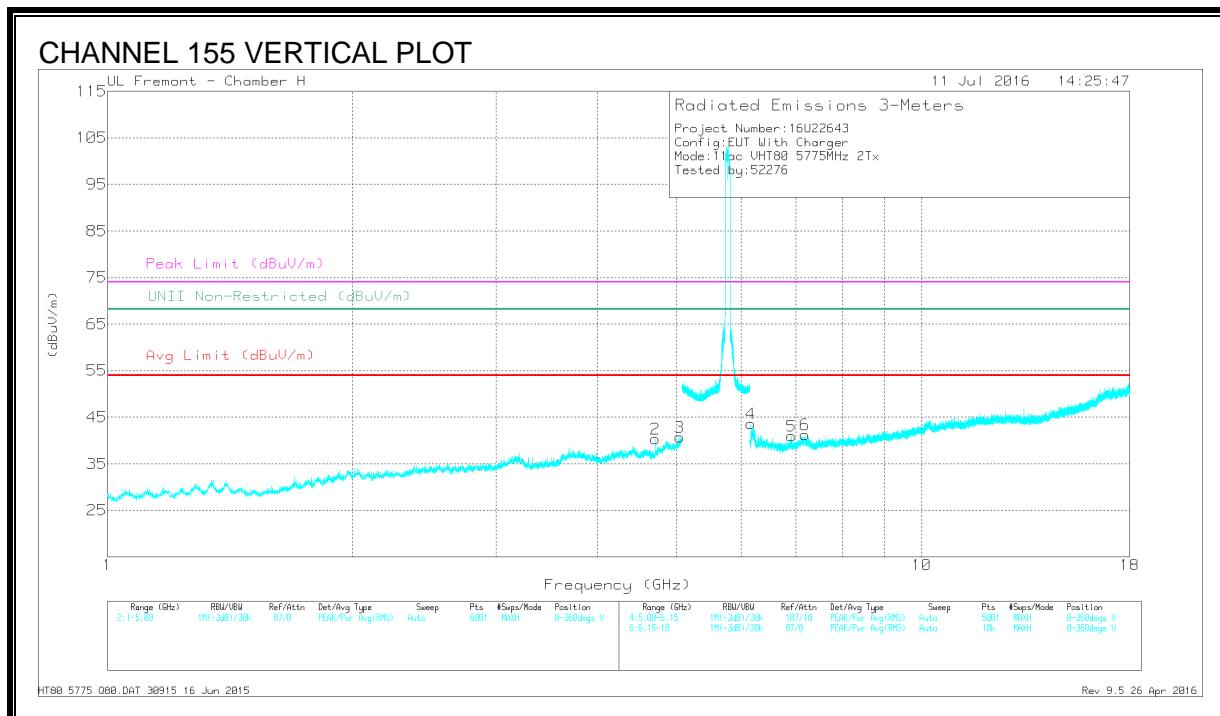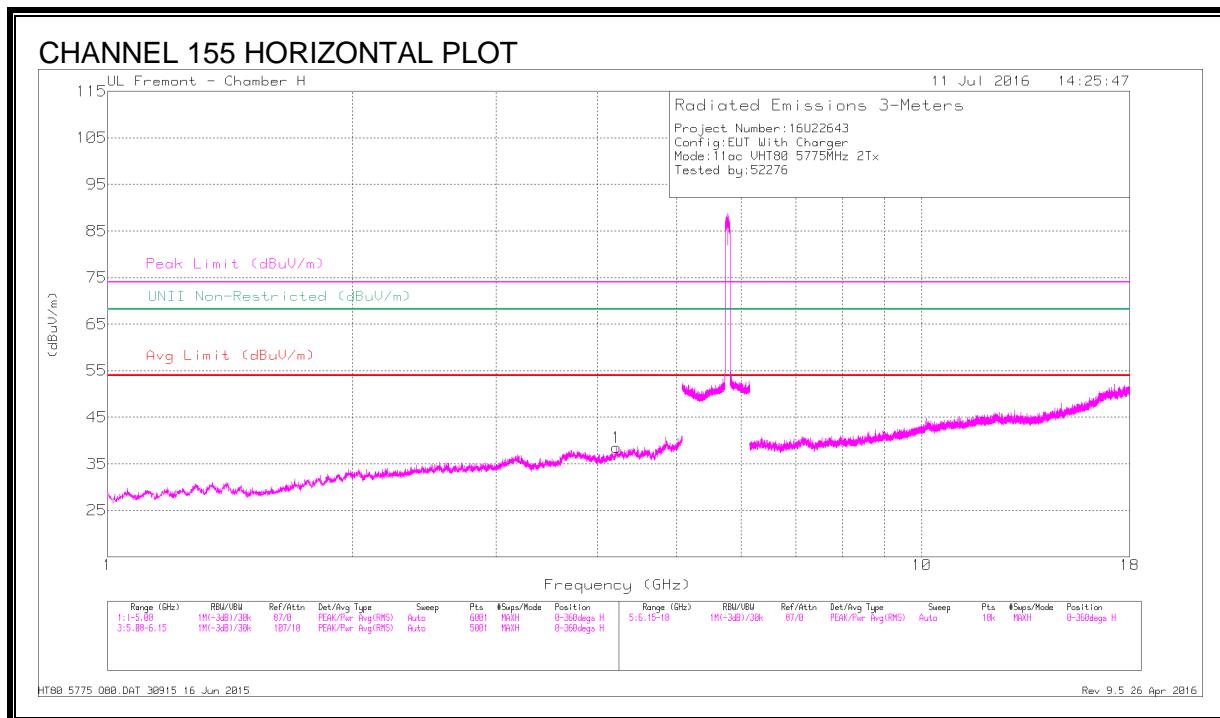
CHANNEL 155 HARMONICS AND SPURIOUS EMISSIONS

CHANNEL 155 HORIZONTAL PLOT

CHANNEL 155 VERTICAL PLOT

DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T712 (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	* 4.22	37.64	PK-U	33.5	-27.5	0	43.64	-	-	74	-30.36	-	-	360	101	H
	* 4.217	27.34	ADR	33.5	-27.6	.21	33.45	54	-20.55	-	-	-	-	360	101	H
2	* 4.706	38.27	PK-U	34	-27.9	0	44.37	-	-	74	-29.63	-	-	360	101	V
	* 4.706	27.91	ADR	34	-27.9	.21	34.22	54	-19.78	-	-	-	-	360	101	V
3	* 5.043	37.08	PK-U	34	-25.4	0	45.68	-	-	74	-28.32	-	-	360	101	V
	* 5.04	27.02	ADR	34	-25.4	.21	35.83	54	-18.17	-	-	-	-	360	101	V
4	6.153	36.24	PK-U	35.5	-26	0	45.74	-	-	-	-	68.2	-22.46	194	201	V
5	6.921	35.41	PK-U	35.7	-25.1	0	46.01	-	-	-	-	68.2	-22.19	360	101	V
6	7.188	35.01	PK-U	35.7	-23.4	0	47.31	-	-	-	-	68.2	-20.89	360	101	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK-U - U-NII: Maximum Peak

ADR - U-NII AD primary method, RMS average

9.60. 802.11ac VHT80 2Tx STBC MODE IN THE 5.8 GHz BAND
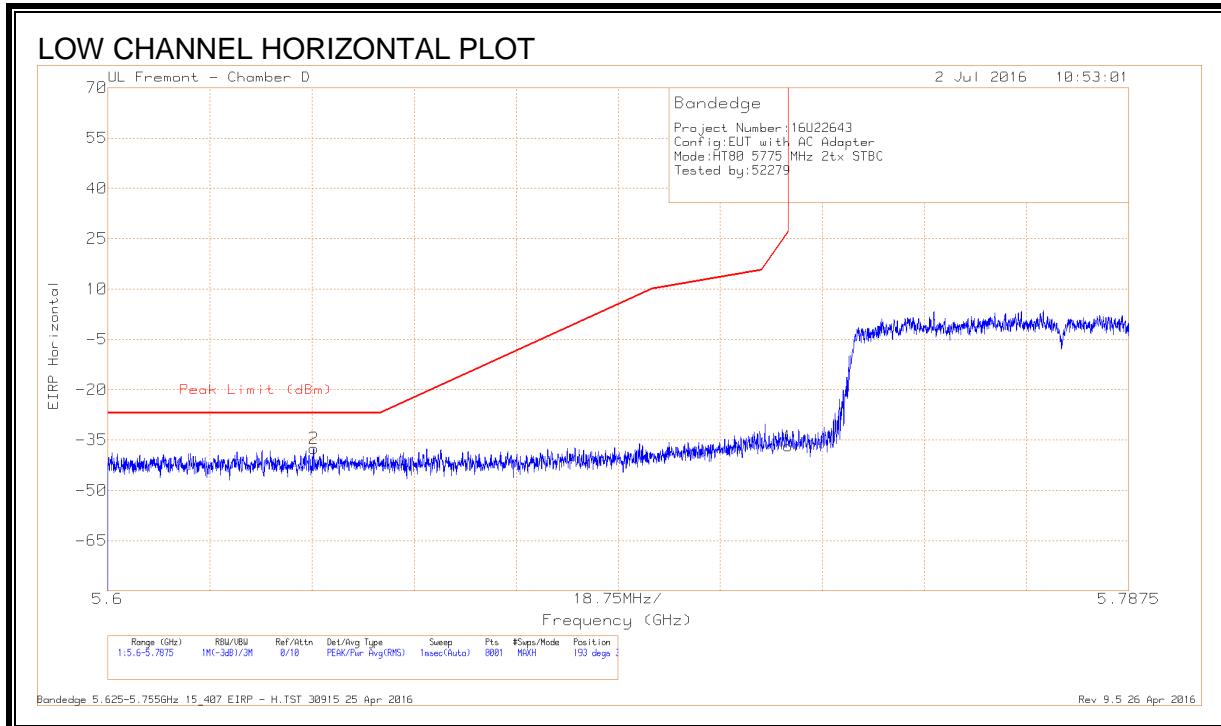
RESTRICTED BANDEDGE (LOW) (FCC)

LOW CHANNEL HORIZONTAL PLOT

DATA

Mark er	Frequen cy (GHz)	Meter Reading (dBm)	Det	AF T712 (dB/m)	Amp/Cbl/Flt r/Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimu th (Degs)	Heig ht (cm)	Polari ty
2	5.638	-66.5	Pk	34.6	-17.4	11.8	-37.5	-27	-10.5	193	318	H
1	5.725	-66.15	Pk	34.8	-17.3	11.8	-36.85	26.99	-63.84	193	318	H

Pk - Peak detector
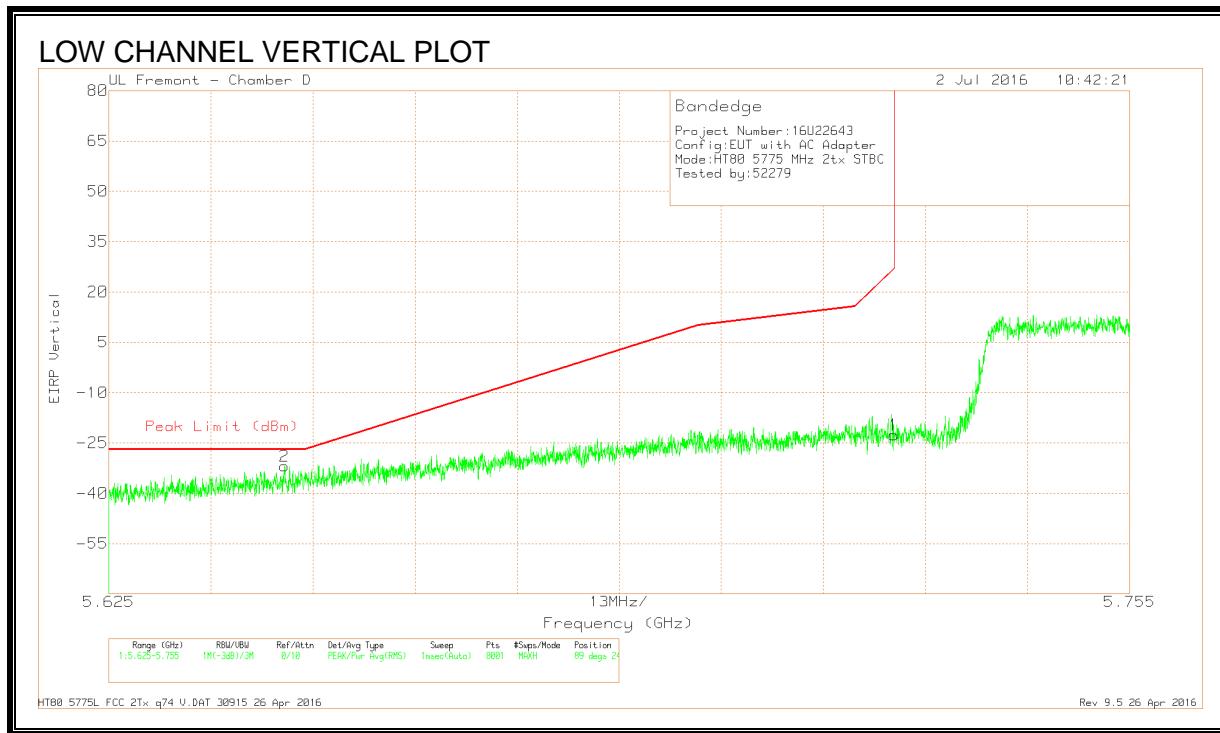
LOW CHANNEL VERTICAL PLOT

DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T712 (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	5.647	-60.97	Pk	34.6	-17.3	11.8	-31.87	-27	-4.87	89	247	V
1	5.725	-51.92	Pk	34.8	-17.3	11.8	-22.62	26.97	-49.59	89	247	V

Pk - Peak detector
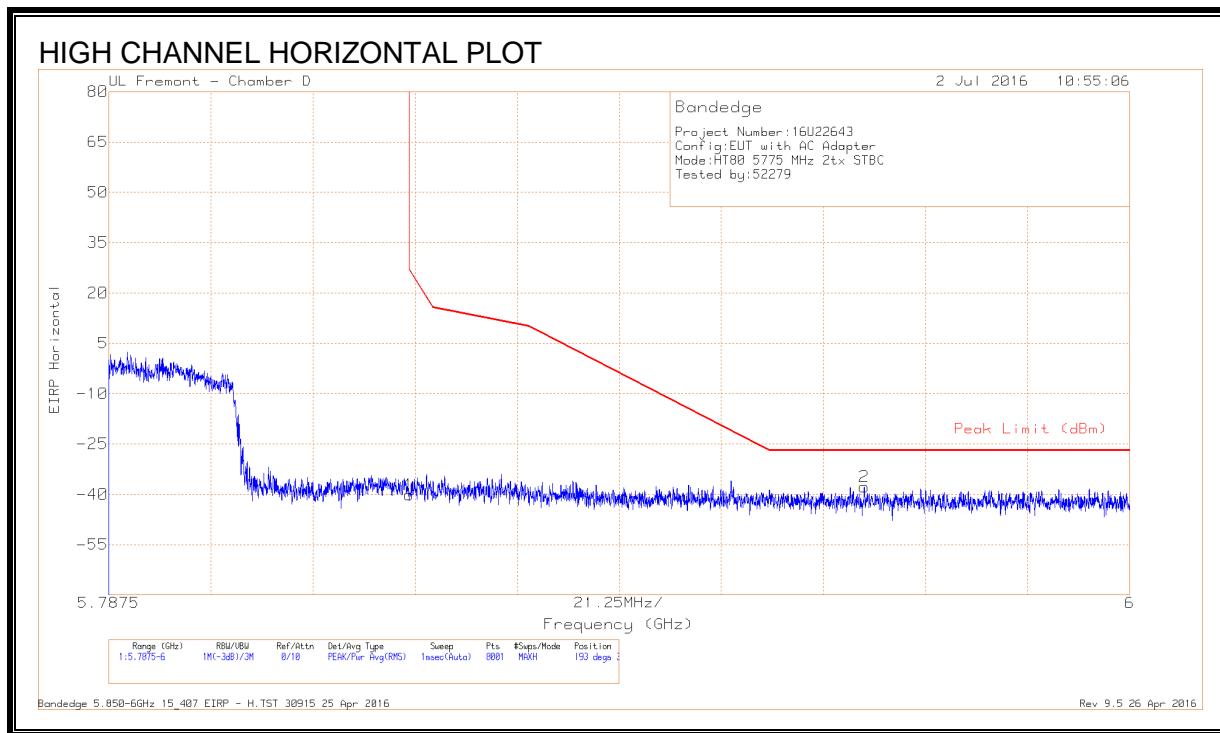
RESTRICTED BANDEDGE (HIGH) (FCC)

HIGH CHANNEL HORIZONTAL PLOT

DATA

Mark er	Frequen cy (GHz)	Meter Reading (dBm)	Det	AF T712 (dB/m)	Amp/Cbl/Flt r/Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimu th (Degs)	Heig ht (cm)	Polari ty
1	5.85	-69.52	Pk	34.9	-17.3	11.8	-40.12	26.99	-67.11	193	318	H
2	5.945	-67.37	Pk	35	-17.2	11.8	-37.77	-27	-10.77	193	318	H

Pk - Peak detector
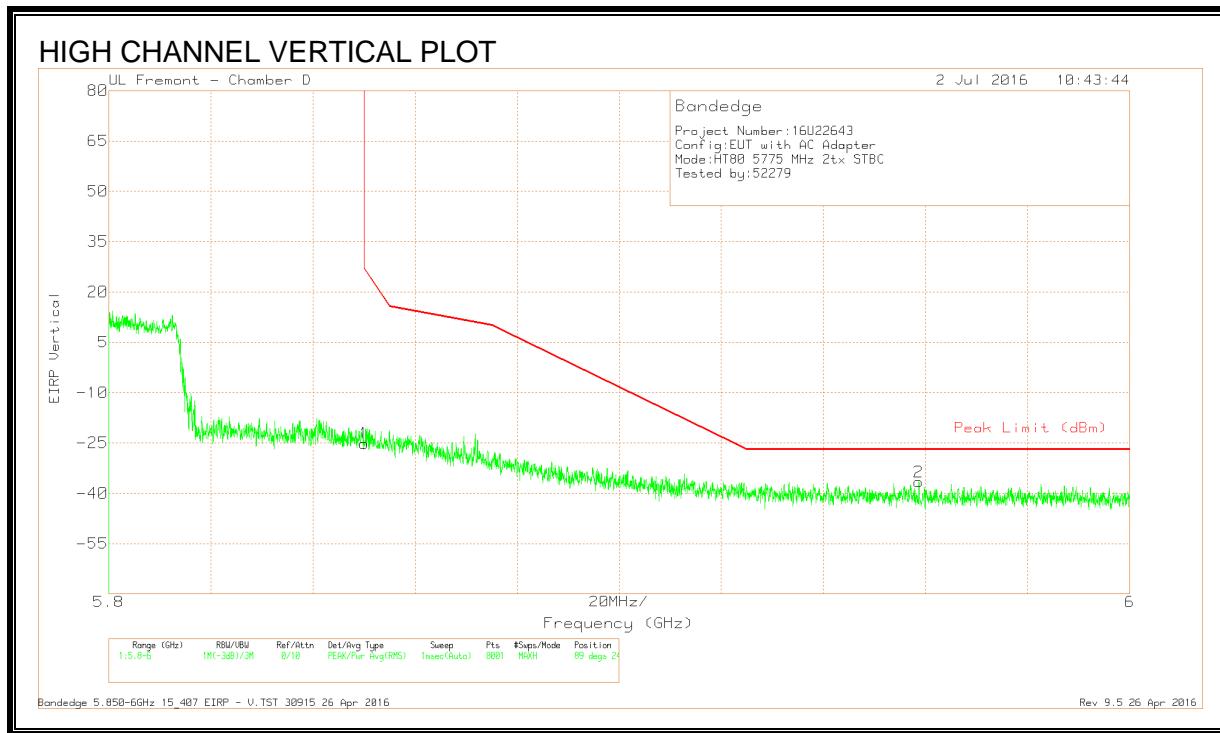
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HIGH CHANNEL VERTICAL PLOT

DATA

Mark er	Frequen cy (GHz)	Meter Reading (dBm)	Det	AF T712 (dB/m)	Amp/Cbl/Flt r/Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimu th (Degs)	Heig ht (cm)	Polari ty
1	5.85	-54.52	Pk	34.9	-17.3	11.8	-25.12	26.94	-52.06	89	247	V
2	5.959	-66.2	Pk	35	-17.2	11.8	-36.6	-27	-9.6	89	247	V

Pk - Peak detector
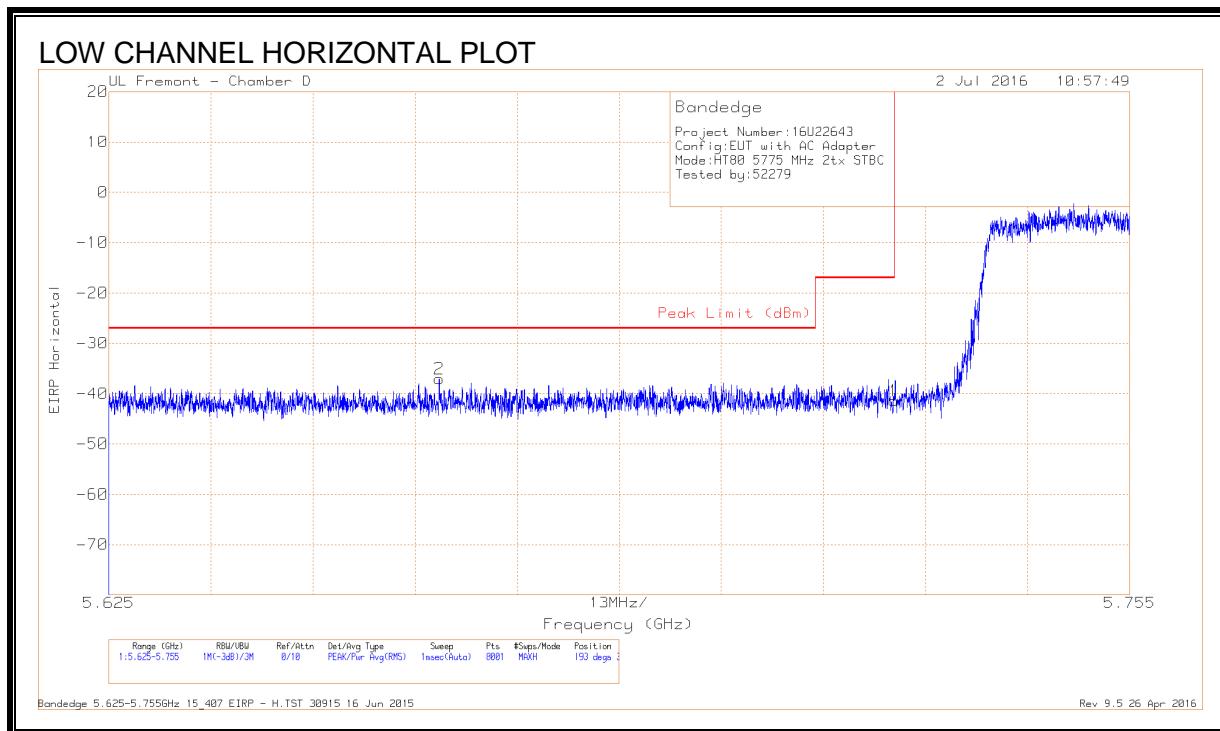
RESTRICTED BANDEDGE (LOW CHANNEL) (IC)


LOW CHANNEL HORIZONTAL PLOT

DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T712 (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	5.667	-66.43	Pk	34.7	-17.1	11.8	-37.03	-27	-10.03	193	318	H
1	5.725	-70.7	Pk	34.8	-17.3	11.8	-41.4	-17	-24.4	193	318	H

Pk - Peak detector
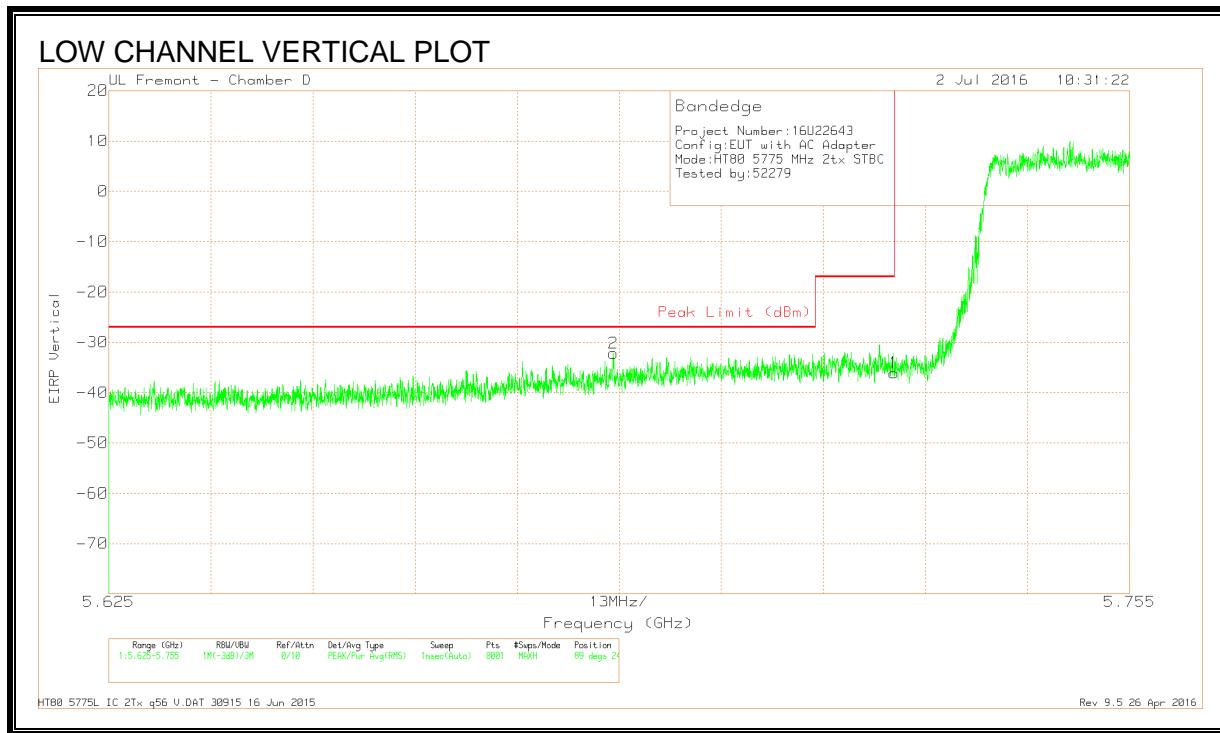
LOW CHANNEL VERTICAL PLOT

DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T712 (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	5.689	-61.46	Pk	34.7	-17.2	11.8	-32.16	-27	-5.16	89	247	V
1	5.725	-65.34	Pk	34.8	-17.3	11.8	-36.04	-17	-19.04	89	247	V

Pk - Peak detector
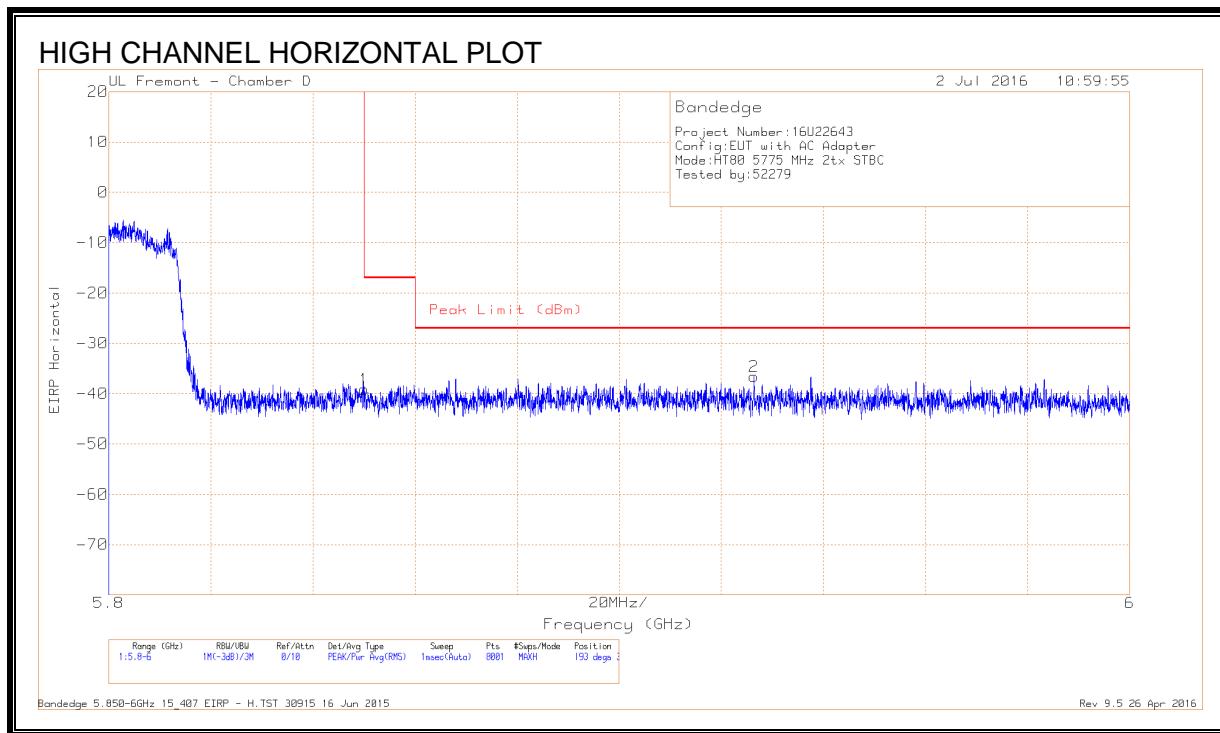
RESTRICTED BANDEDGE (HIGH CHANNEL) (IC)

HIGH CHANNEL HORIZONTAL PLOT

DATA

Mark er	Frequen cy (GHz)	Meter Readi ng (dBm)	Det	AF T712 (dB/m)	Amp/Cbl/Flt r/Pad (dB)	Conversion Factor (dB)	Correct ed Readin g EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimu th (Degs)	Heig ht (cm)	Polari ty
1	5.85	-68.57	Pk	34.9	-17.3	11.8	-39.17	-17	-22.17	193	318	H
2	5.926	-66.28	Pk	35	-17.1	11.8	-36.58	-27	-9.58	193	318	H

Pk - Peak detector
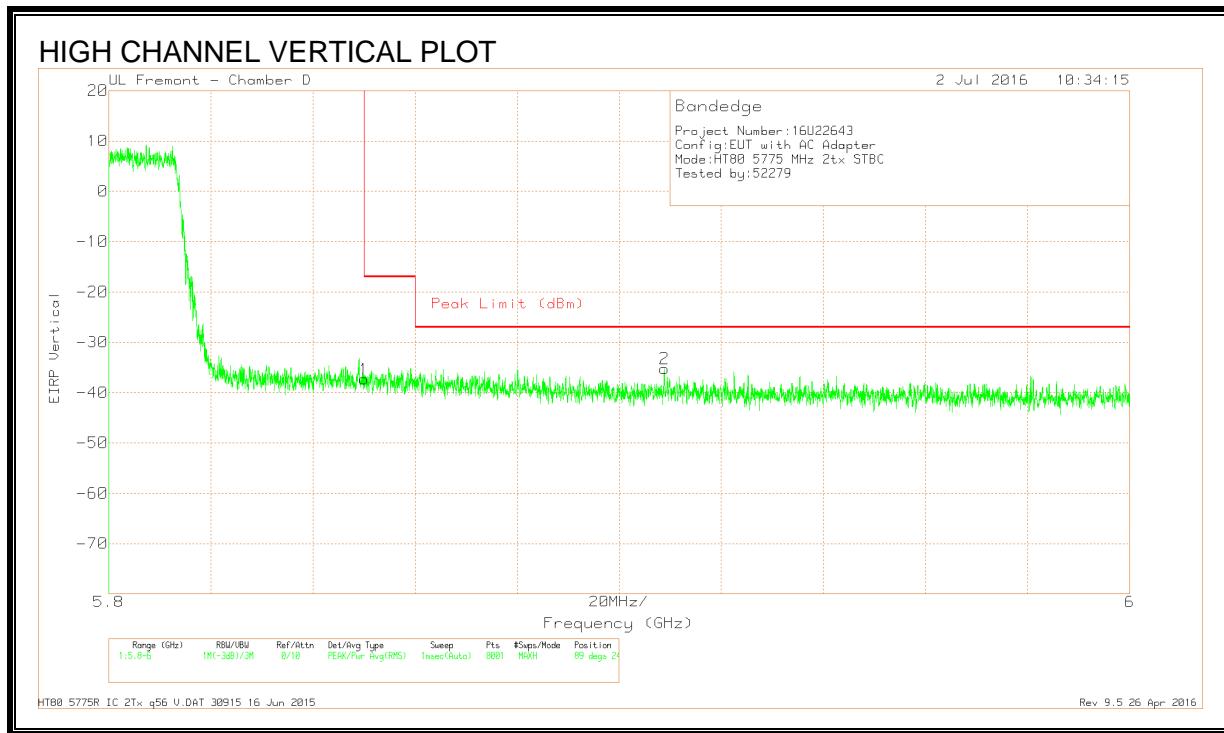
HIGH CHANNEL VERTICAL PLOT

DATA

Mark er	Frequen cy (GHz)	Meter Readi ng (dBm)	Det	AF T712 (dB/m)	Amp/Cbl/Flt r/Pad (dB)	Conversion Factor (dB)	Correct ed Readin g EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimu th (Degs)	Heig ht (cm)	Polari ty
1	5.85	-66.7	Pk	34.9	-17.3	11.8	-37.3	-17	-20.3	89	247	V
2	5.909	-64.82	Pk	35	-17.2	11.8	-35.22	-27	-8.22	89	247	V

Pk - Peak detector
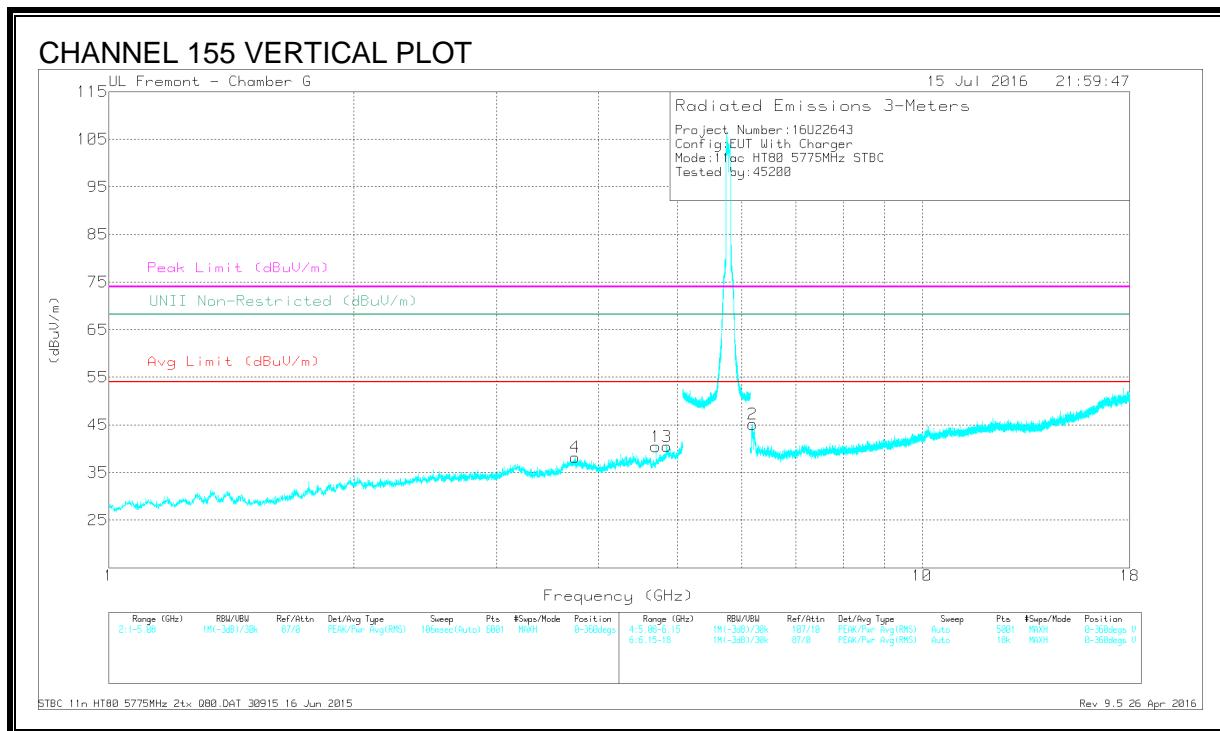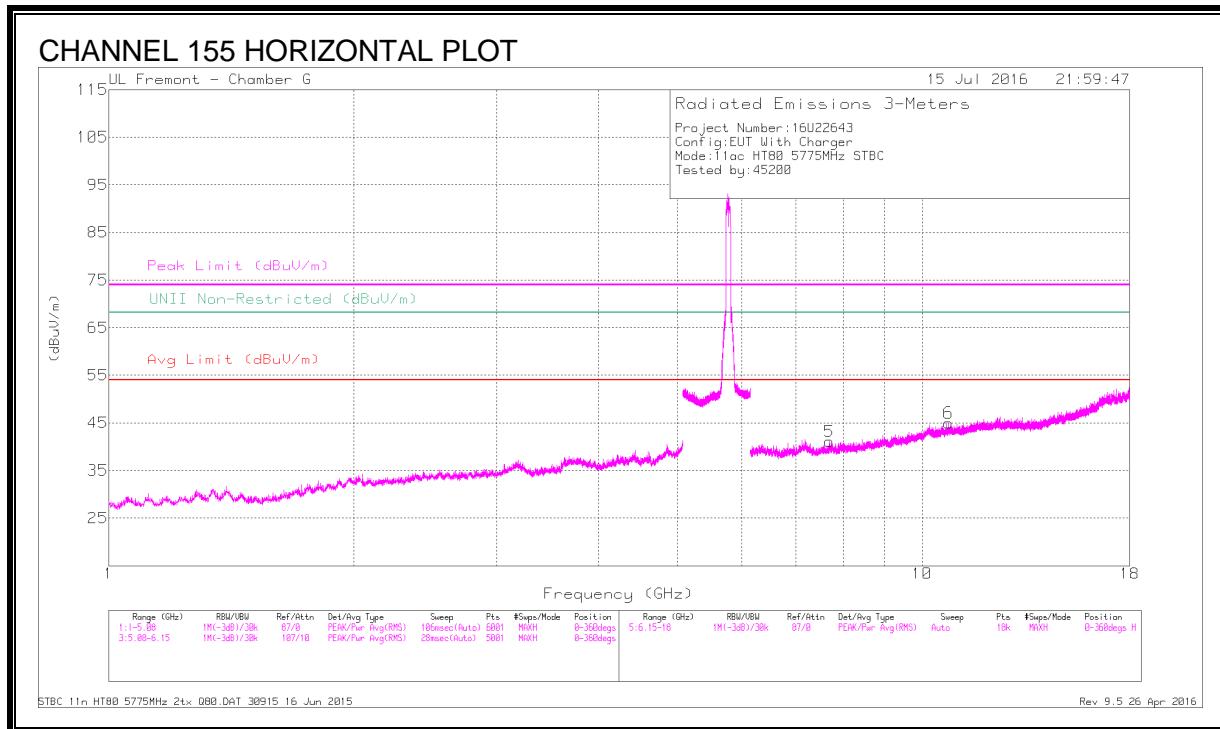
CHANNEL 155 HARMONICS AND SPURIOUS EMISSIONS

CHANNEL 155 HORIZONTAL PLOT

CHANNEL 155 VERTICAL PLOT

DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T712 (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	* 4.706	41.1	PK-U	34	-27.9	0	47.2	-	-	74	-26.8	-	-	266	295	V
	* 4.706	34.15	ADR	34	-27.9	.21	40.46	54	-13.54	-	-	-	-	266	295	V
4	* 3.746	39.05	PK-U	33.5	-28.8	0	43.75	-	-	74	-30.25	-	-	313	102	V
	* 3.747	27.36	ADR	33.5	-28.8	.21	32.27	54	-21.73	-	-	-	-	313	102	V
3	* 4.859	40.83	PK-U	34.1	-25.3	0	49.63	-	-	74	-24.37	-	-	301	130	V
	* 4.857	30.54	ADR	34.1	-25.3	.21	39.55	54	-14.45	-	-	-	-	301	130	V
5	* 7.693	35.38	PK-U	35.8	-24.4	0	46.78	-	-	74	-27.22	-	-	107	359	H
	* 7.691	24.87	ADR	35.8	-24.5	.21	36.38	54	-17.62	-	-	-	-	107	359	H
6	* 10.773	33.88	PK-U	37.9	-20.4	0	51.38	-	-	74	-22.62	-	-	18	377	H
	* 10.772	22.56	ADR	37.9	-20.4	.21	40.27	54	-13.73	-	-	-	-	18	377	H
2	6.192	41.47	PK-U	35.6	-26.2	0	50.87	-	-	-	-	68.2	-17.33	298	205	V

* - indicates frequency in CFR4 7 Pt 15 / IC RSS-Restricted Band

PK-U - U-NII: Maximum Peak

9.61.   802.11ac VHT80 2Tx BEAM FORMING MODE IN THE 5.8 GHz BAND
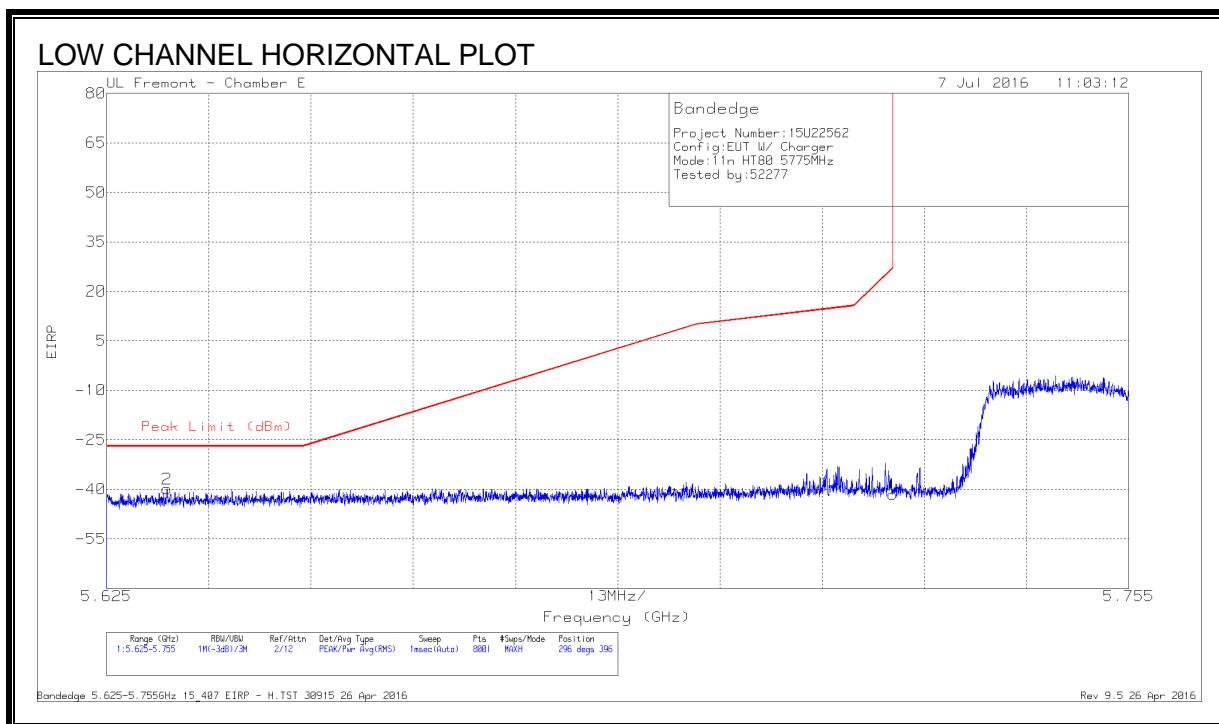
RESTRICTED BANDEDGE (LOW) (FCC)


LOW CHANNEL HORIZONTAL PLOT

DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T711 (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	5.633	-66.66	Pk	34.8	-19.8	11.8	-39.86	-27	-12.86	296	396	H
1	5.725	-68.42	Pk	34.9	-19.8	11.8	-41.52	26.97	-68.49	296	396	H

Pk - Peak detector
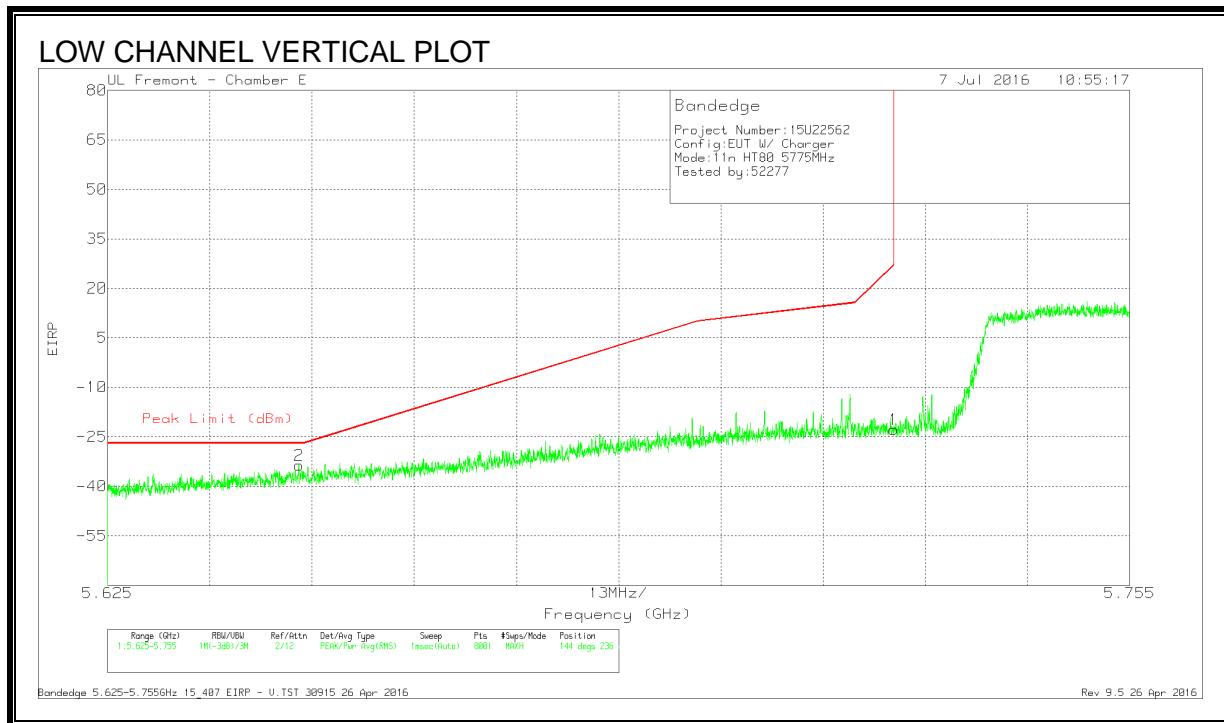
LOW CHANNEL VERTICAL PLOT

UL Fremont - Chamber E   7 Jul 2016 10:55:17

Bandedge
Project Number:15U22562
Config:EUT W/ Charger
Mode:11n HT80 5775MHz
Tested by:52277

Peak Limit (dBm)

Frequency (GHz)

| Range (GHz) | RBW/VBW | Ref/Attn | Det/Avg Type | Sweep | Pts | #Swps/Mode | Position |
| 1:5.625-5.755 | 1M(-3dB)/3M | 2/12 | PEAK/Pwr Avg(RMS) | 1msec(Auto) | 8001 | MAXH | 144 degs 236 |

Bandedge 5.625-5.755GHz 15_407 EIRP - V.TST 30915 26 Apr 2016   Rev 9.5 26 Apr 2016

DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T711 (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	5.649	-60.35	Pk	34.8	-19.8	11.8	-33.55	-27	-6.55	144	236	V
1	5.725	-49.64	Pk	34.9	-19.8	11.8	-22.74	26.97	-49.71	144	236	V

Pk - Peak detector
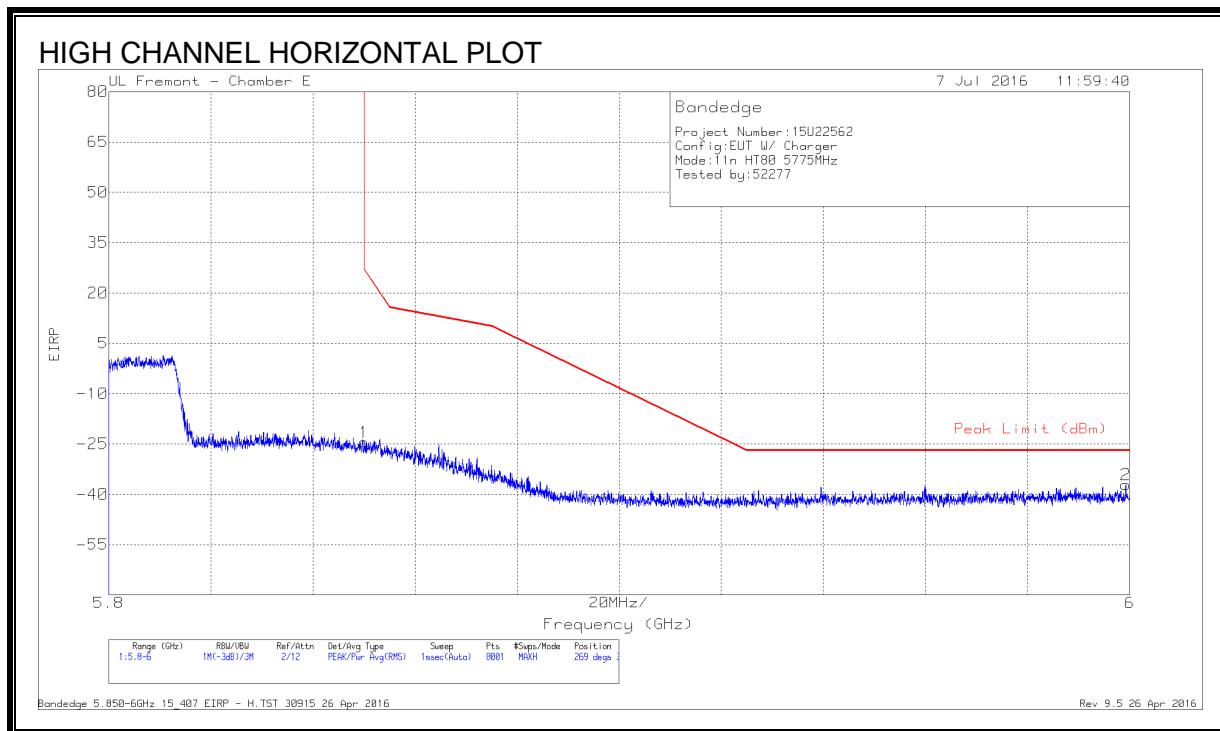
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RESTRICTED BANDEDGE (HIGH) (FCC)

DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T711 (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	-51.16	Pk	34.9	-20	11.8	-24.46	26.94	-51.4	269	382	H
2	5.999	-64.62	Pk	35.1	-19.4	11.8	-37.12	-27	-10.12	269	382	H

Pk - Peak detector
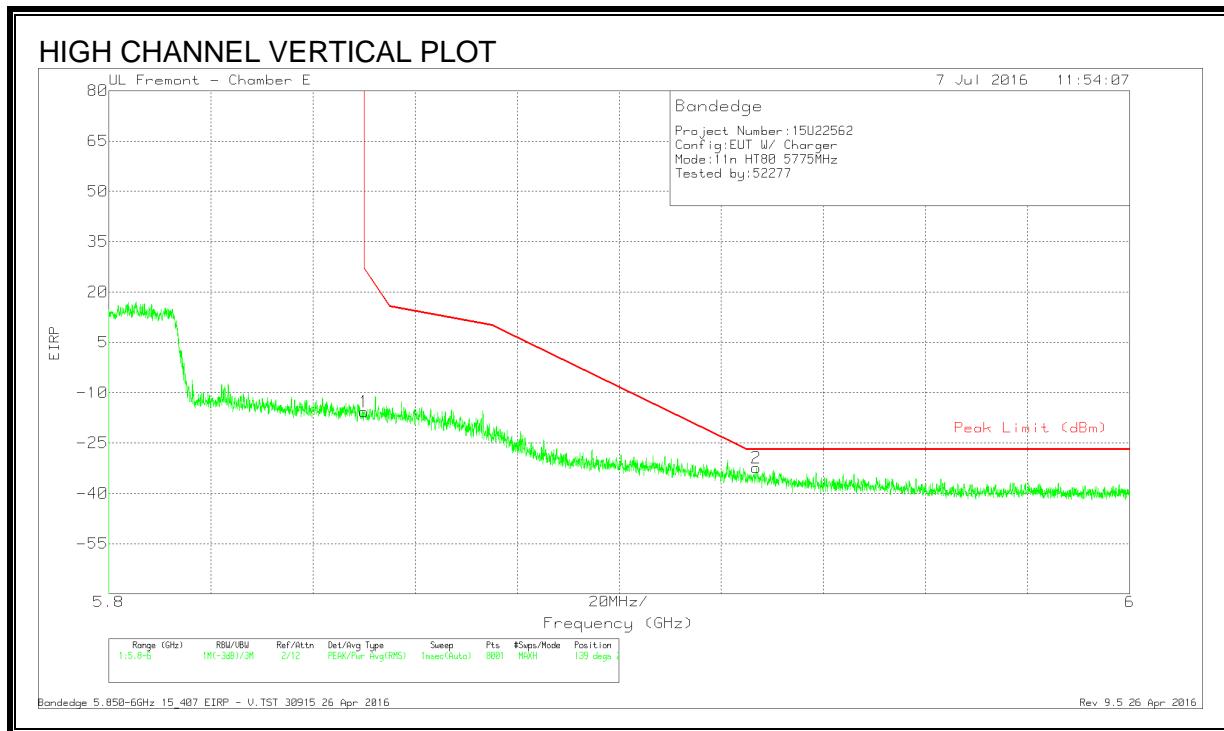
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HIGH CHANNEL VERTICAL PLOT

DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T711 (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	-42.39	Pk	34.9	-20	11.8	-15.69	26.94	-42.63	139	236	V
2	5.927	-59.48	Pk	35	-19.7	11.8	-32.38	-27	-5.38	139	236	V

Pk - Peak detector
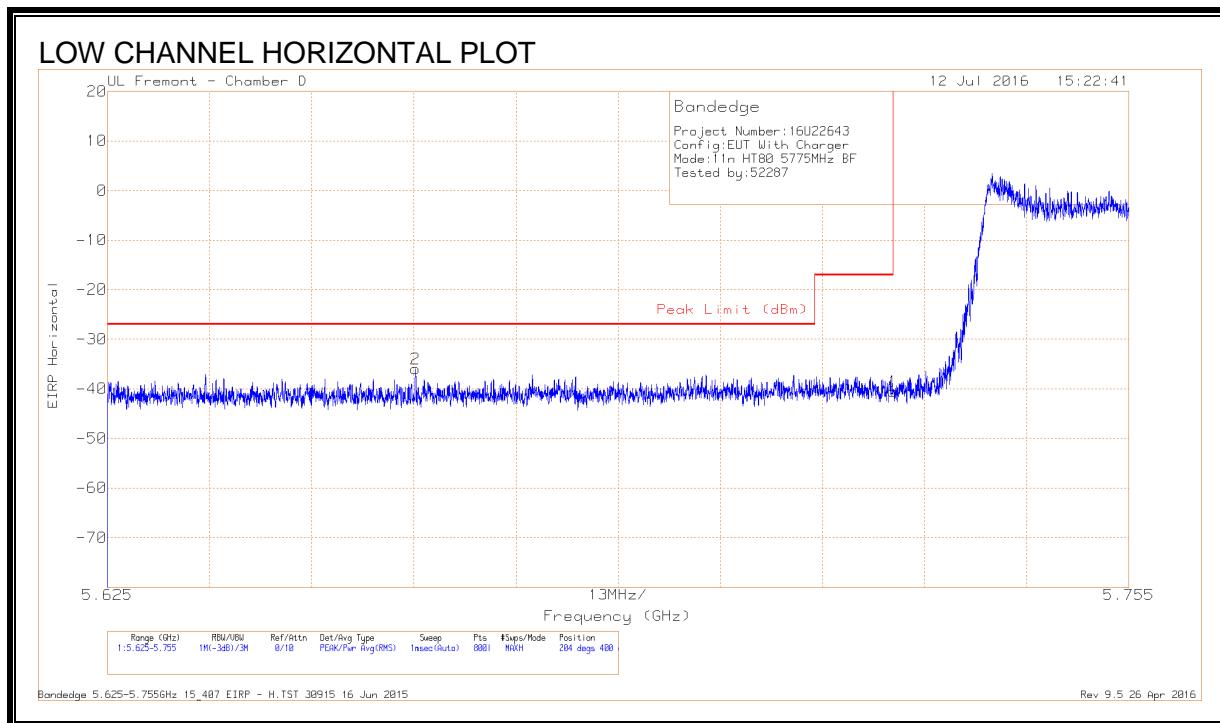
RESTRICTED BANDEDGE (LOW CHANNEL) (IC)

LOW CHANNEL HORIZONTAL PLOT

DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T712 (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	5.664	-65.26	Pk	34.7	-17.2	11.8	0	-35.96	-27	-8.96	204	400	H
1	5.725	-69.82	Pk	34.8	-17.3	11.8	0	-40.52	-17	-23.52	204	400	H

Pk - Peak detector
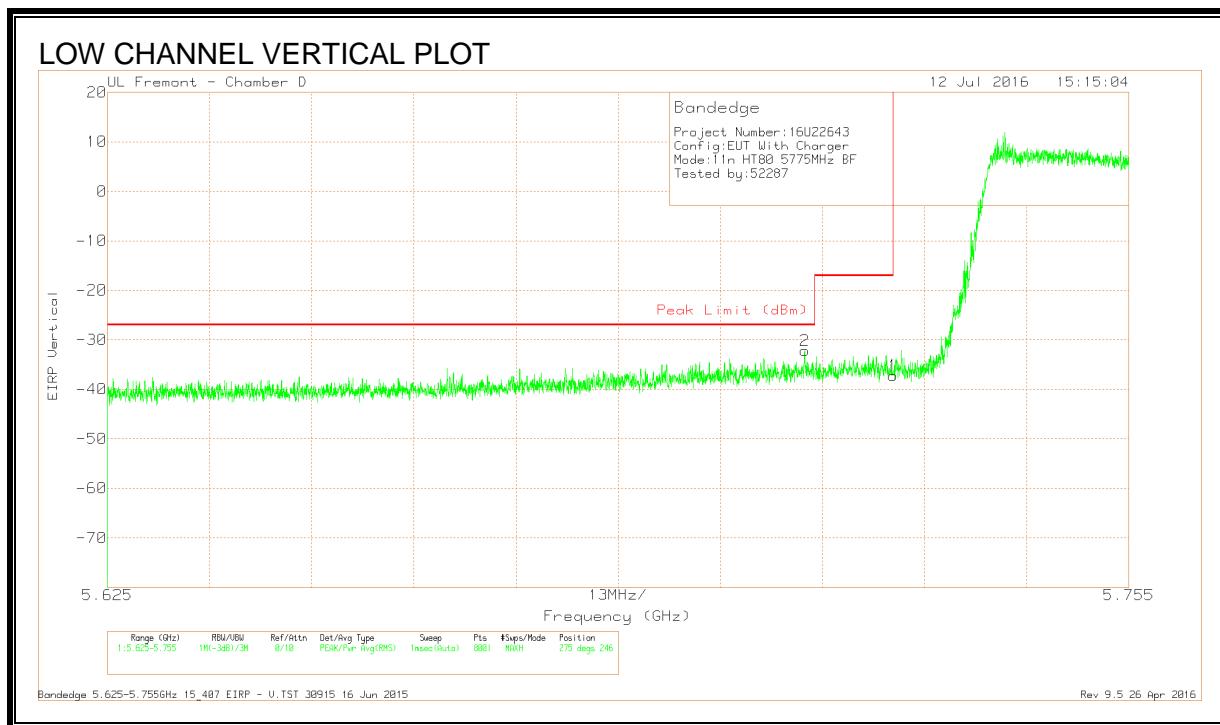
LOW CHANNEL VERTICAL PLOT

UL Fremont - Chamber D   12 Jul 2016   15:15:04

Bandedge
Project Number:16U22643
Config:EUT With Charger
Mode:11n HT80 5775MHz BF
Tested by:52287

Peak Limit (dBm)

Range (GHz) RBW/VBW   Ref/Attn Det/Avg Type   Sweep   Pts #Sups/Mode Position
1:5.625-5.755 1M(-3dB)/3M 0/10   PEAK/Pwr Avg(RMS) 1msec(Auto) 801 MAXH 275 degs 246

Bandedge 5.625-5.755GHz 15_407 EIRP - V.TST 30915 16 Jun 2015   Rev 9.5 26 Apr 2016

DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T712 (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	5.714	-61.53	Pk	34.8	-17.2	11.8	0	-32.13	-27	-5.13	275	246	V
1	5.725	-66.44	Pk	34.8	-17.3	11.8	0	-37.14	-17	-20.14	275	246	V

Pk - Peak detector
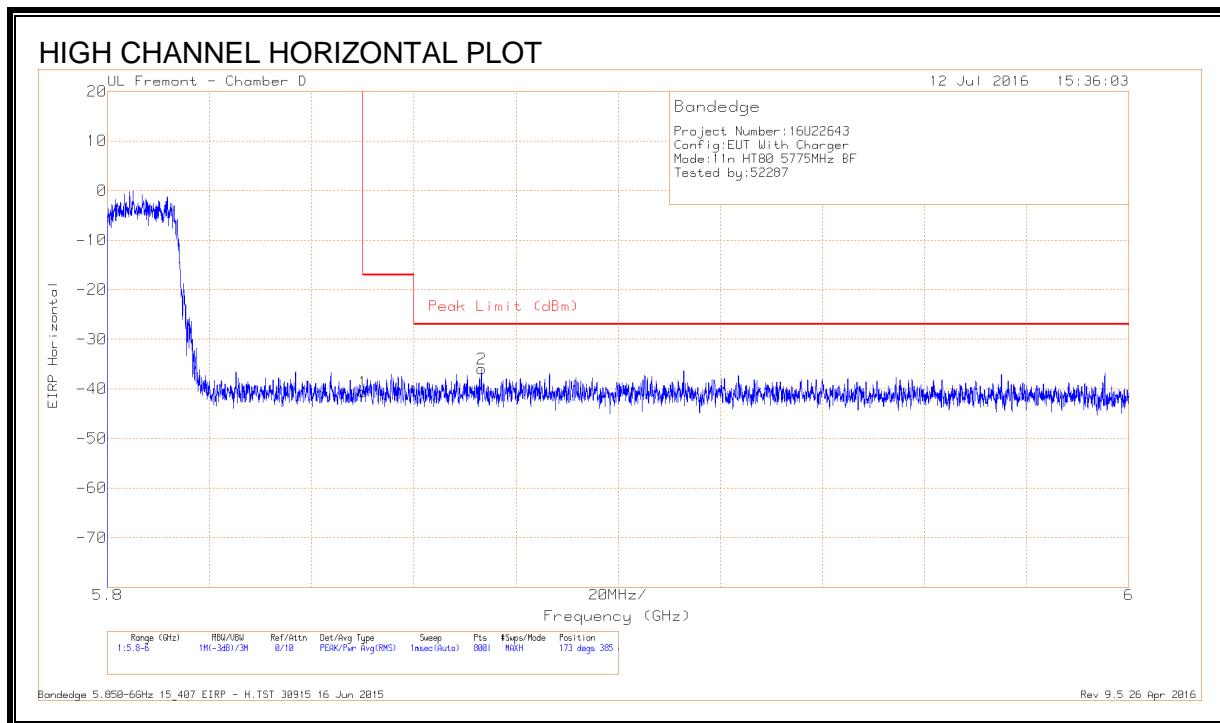
RESTRICTED BANDEDGE (HIGH CHANNEL) (IC)

HIGH CHANNEL HORIZONTAL PLOT

DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T712 (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	-70.01	Pk	34.9	-17.3	11.8	0	-40.61	-17	-23.61	173	385	H
2	5.873	-65.47	Pk	34.9	-17.2	11.8	0	-35.97	-27	-8.97	173	385	H

Pk - Peak detector
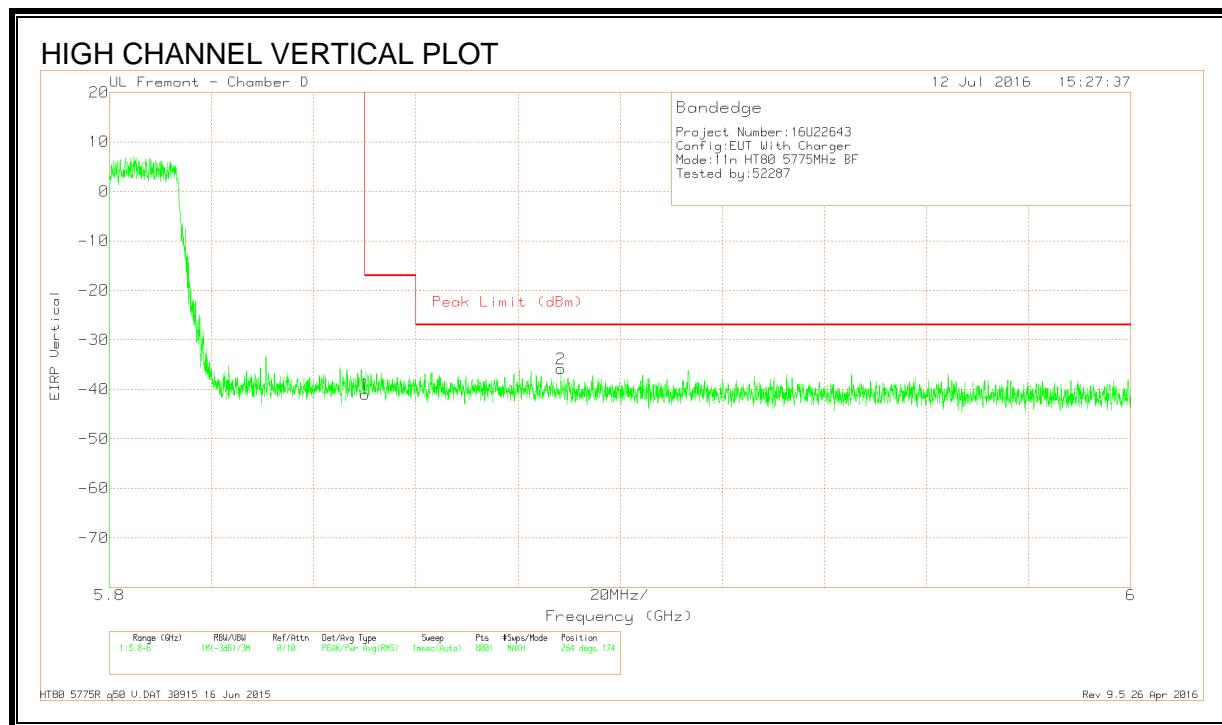
HIGH CHANNEL VERTICAL PLOT

DATA

Mark er	Freque ncy (GHz)	Meter Readin g (dBm)	Det	AF T712 (dB/m)	Amp/Cbl/Fl tr/Pad (dB)	Conversion Factor (dB)	DC Corr (dB)	Correcte d Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimu th (Degs)	Heig ht (cm)	Polar ity
1	5.85	-70.36	Pk	34.9	-17.3	11.8	0	-40.96	-17	-23.96	264	174	V
2	5.888	-65.4	Pk	35	-17.2	11.8	0	-35.8	-27	-8.8	264	174	V

Pk - Peak detector

CHANNEL 155 HARMONICS AND SPURIOUS EMISSIONS

CHANNEL 155 HORIZONTAL PLOT

CHANNEL 155 VERTICAL PLOT
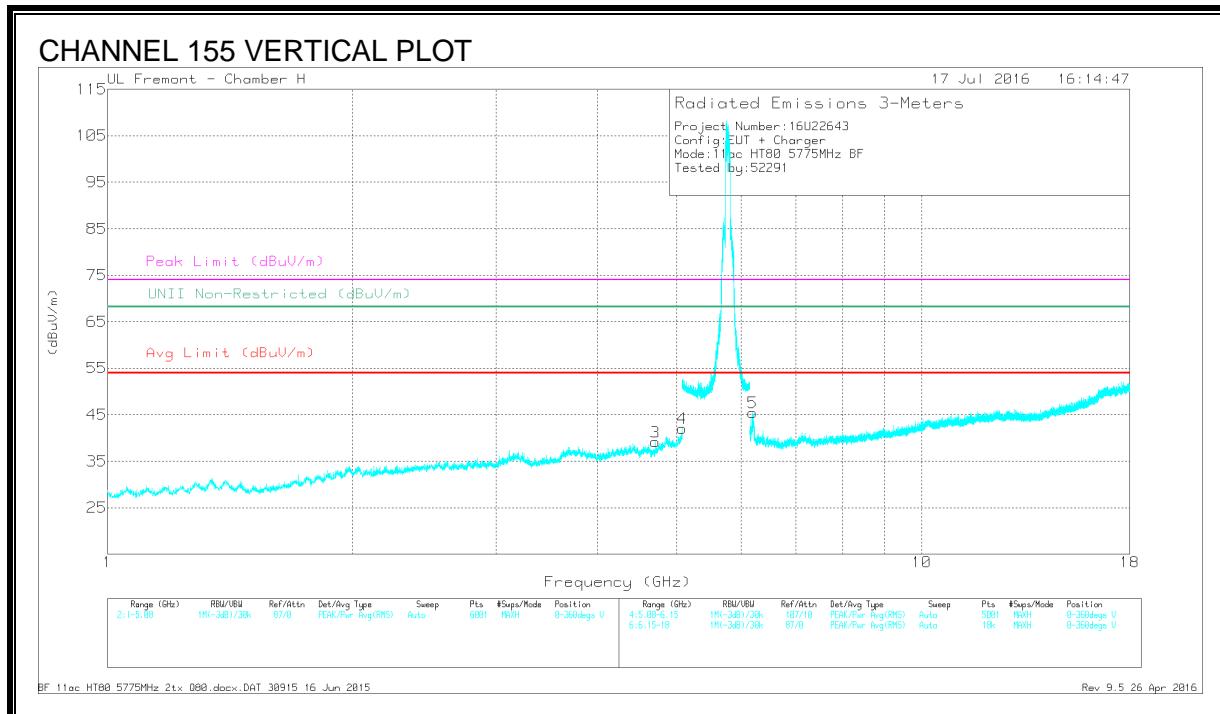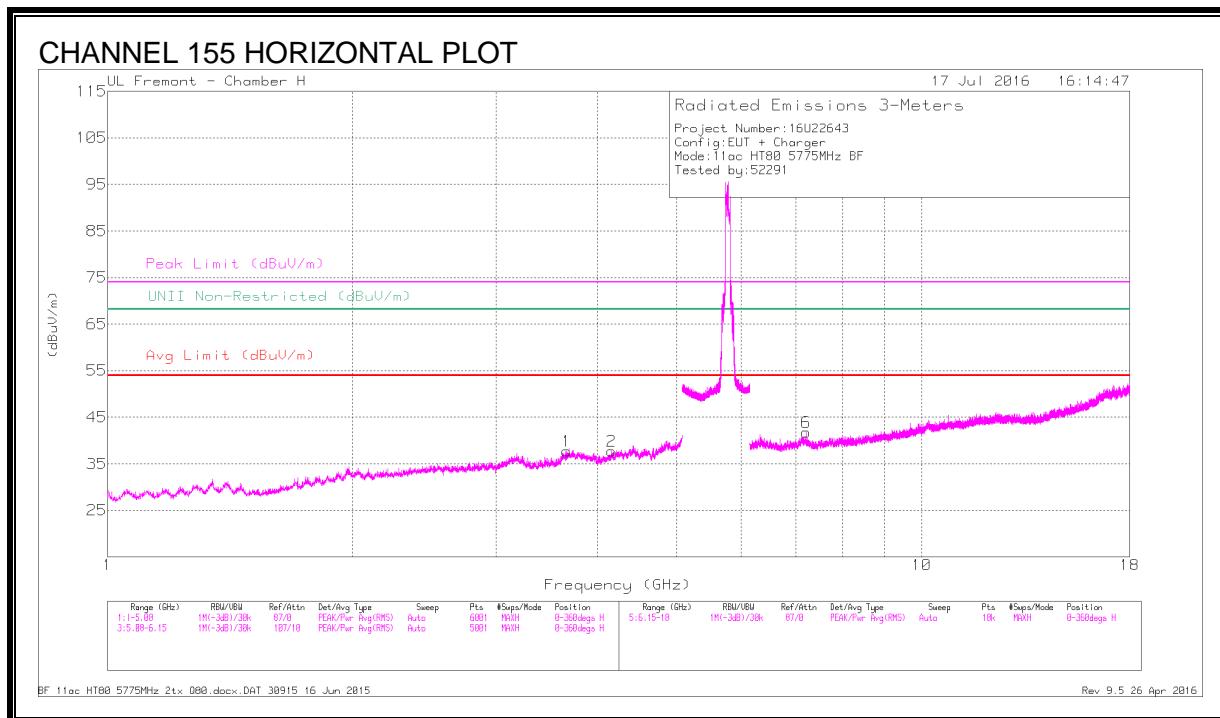
DATA

|	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T712 (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	* 3.663	37.18	PK-U	33.4	-28.9	0	41.68	-	-	74	-32.32	-	-	235	279	H
	* 3.665	27.14	ADR	33.4	-28.9	.33	31.97	54	-22.03	-	-	-	-	235	279	H
2	* 4.161	38.15	PK-U	33.5	-28.1	0	43.55	-	-	74	-30.45	-	-	77	242	H
	* 4.164	27.83	ADR	33.5	-28.2	.33	33.46	54	-20.54	-	-	-	-	77	242	H
3	* 4.705	41.53	PK-U	34	-27.9	0	47.63	-	-	74	-26.37	-	-	88	238	V
	* 4.706	31.83	ADR	34	-27.9	.33	38.26	54	-15.74	-	-	-	-	88	238	V
4	* 5.077	37.71	PK-U	34	-24.4	0	47.31	-	-	74	-26.69	-	-	88	200	V
	* 5.077	27.78	ADR	34	-24.4	.33	37.71	54	-16.29	-	-	-	-	88	200	V
5	6.199	43.73	PK-U	35.6	-26.2	0	53.13	-	-	-	-	68.2	-15.07	109	217	V
6	7.214	35.46	PK-U	35.7	-23.9	0	47.26	-	-	-	-	68.2	-20.94	69	183	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK-U - U-NII: Maximum Peak

ADR - U-NII AD primary method, RMS average

9.62. WORST CASE CO-LOCATION

BLUETOOTH AND 802.11 HT20 2Tx CDD MODE IN THE 5.2GHz BAND
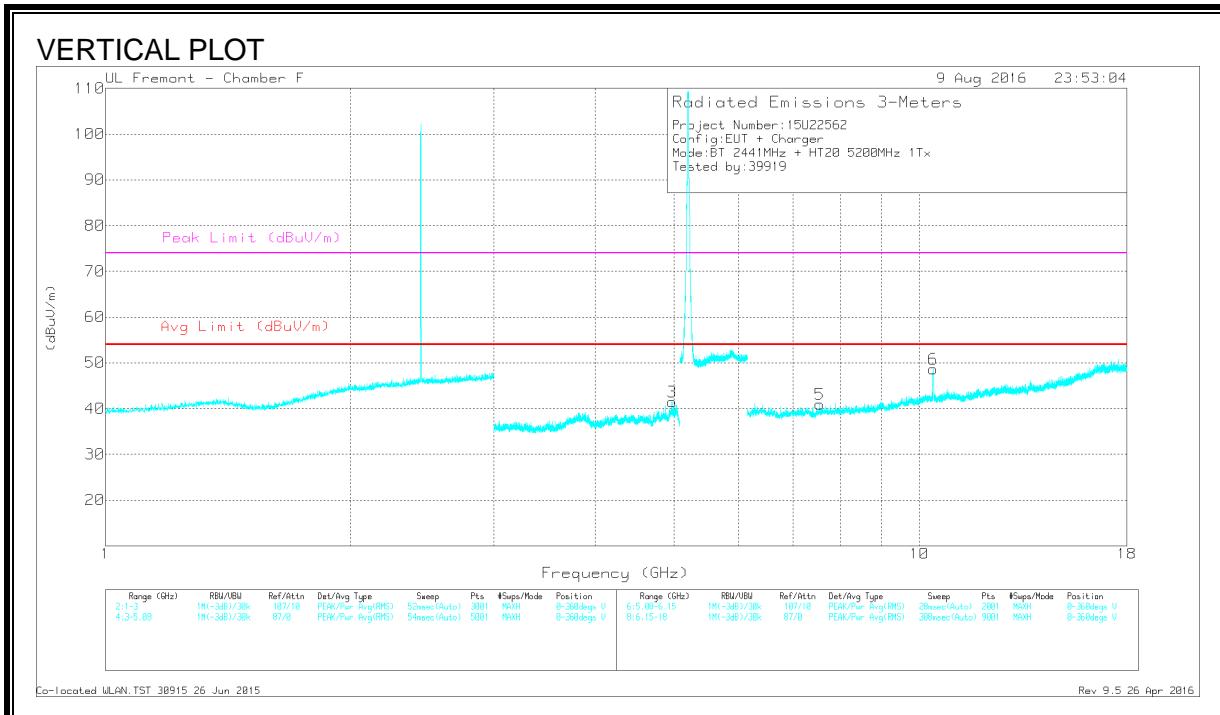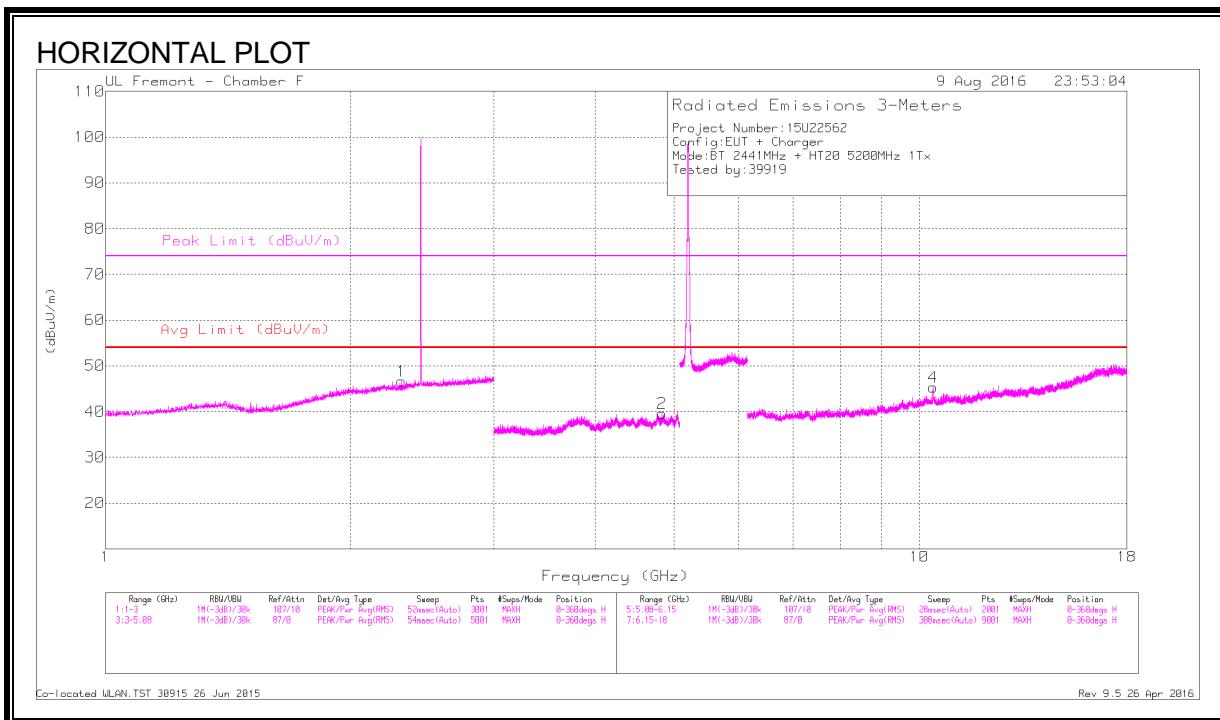
HORIZONTAL AND VERTICAL DATA

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)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	42.18	PK-U	32.1	-20.9	53.38	-	-	74	-20.62	78	231	H
	* 2.358	41.71	PK-U	32	-20.9	52.81	-	-	74	-21.19	78	231	H
2	* 2.346	30.62	ADR	31.9	-21	41.52	53.97	-12.45	-	-	78	231	H
	* 4.831	36.96	PK-U	34	-27.1	43.86	-	-	74	-30.14	39	340	H
3	* 4.968	40.98	PK-U	34.2	-28.6	46.58	-	-	74	-27.42	82	203	V
	* 4.969	30.51	ADR	34.2	-28.6	36.11	53.97	-17.86	-	-	82	203	V
4	10.402	36.04	PK-U	37.3	-21.3	52.04	-	-	74	-21.96	162	318	H
5	* 7.545	35.33	PK-U	35.6	-24.6	46.33	-	-	74	-27.67	319	265	V
	* 7.544	24.89	ADR	35.6	-24.6	35.89	53.97	-18.08	-	-	319	265	V
6	10.402	40.39	PK-U	37.3	-21.3	56.39	-	-	74	-17.61	213	105	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK-U - U-NII: Maximum Peak

ADR - U-NII AD primary method, RMS average

BLUETOOTH LOW ENERGY AND 802.11 HT20 2Tx CDD MODE IN THE 5.6GHz BAND
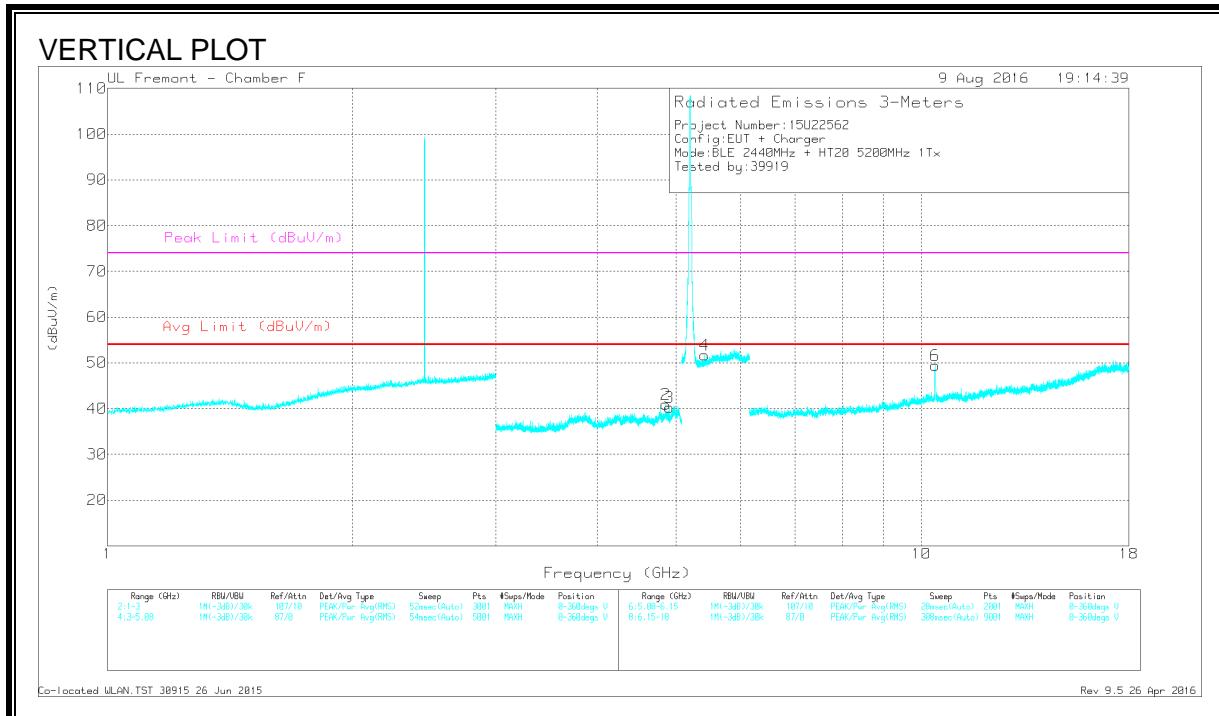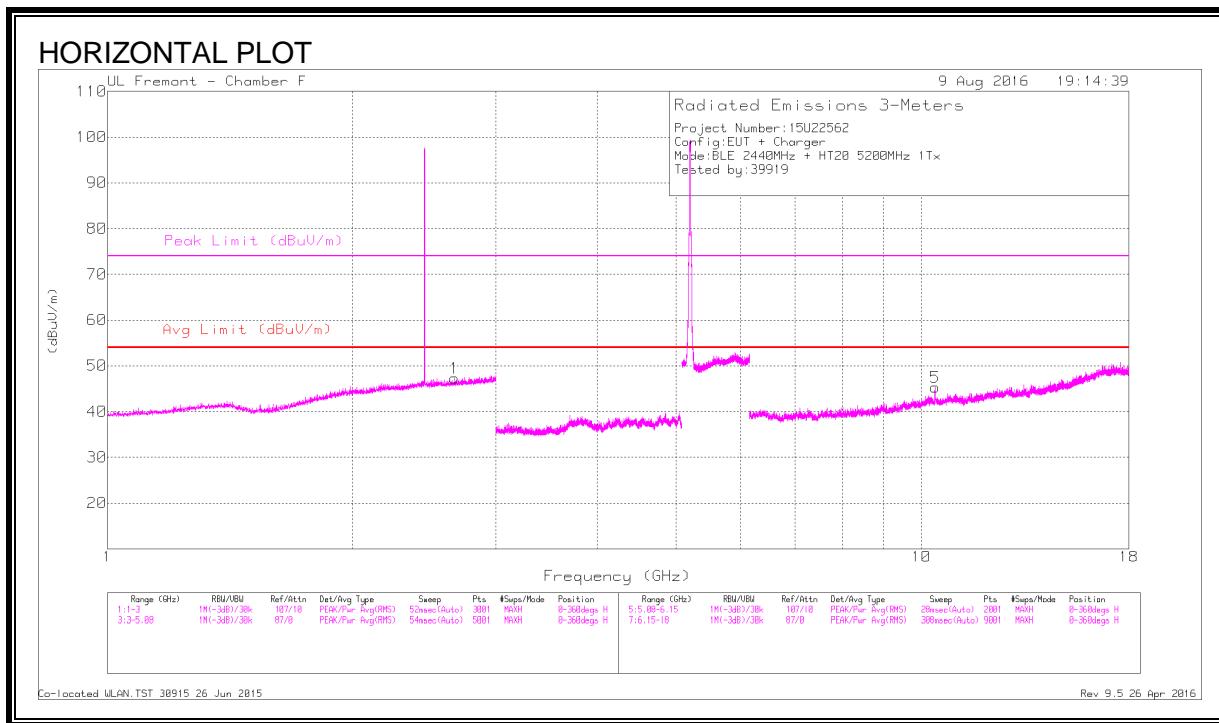
HORIZONTAL AND VERTICAL DATA

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)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.669	41.7	PK-U	32.3	-20.7	53.3	-	-	74	-20.7	242	266	H
	* 2.668	30.43	ADR	32.3	-20.7	42.03	53.97	-11.94	-	-	242	266	H
2	* 4.853	39.95	PK-U	34.1	-27.3	46.75	-	-	74	-27.25	92	285	V
	* 4.853	31.56	ADR	34.1	-27.3	38.36	53.97	-15.61	-	-	92	285	V
3	* 4.904	39.75	PK-U	34.1	-28.1	45.75	-	-	74	-28.25	93	296	V
	* 4.904	29.19	ADR	34.1	-28.1	35.19	53.97	-18.78	-	-	93	296	V
4	* 5.418	41.78	PK-U	34.5	-18.8	57.48	-	-	74	-16.52	100	284	V
	* 5.418	30.61	ADR	34.5	-18.8	46.31	53.97	-7.66	-	-	100	284	V
5	10.401	39.46	PK-U	37.3	-21.3	55.46	-	-	74	-18.54	356	337	H
6	10.399	33.39	PK-U	37.3	-21.3	49.39	-	-	74	-24.61	70	118	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK-U - U-NII: Maximum Peak

ADR - U-NII AD primary method, RMS average

9.63. WORST-CASE BELOW 1 GHz

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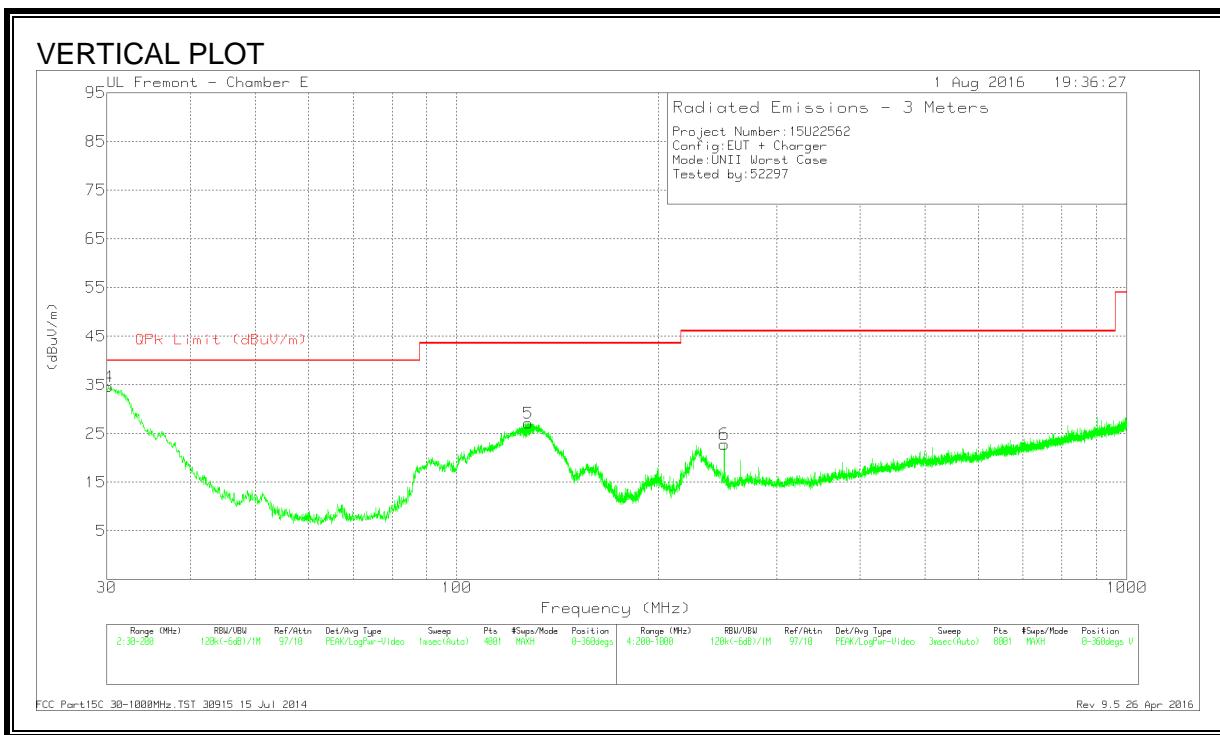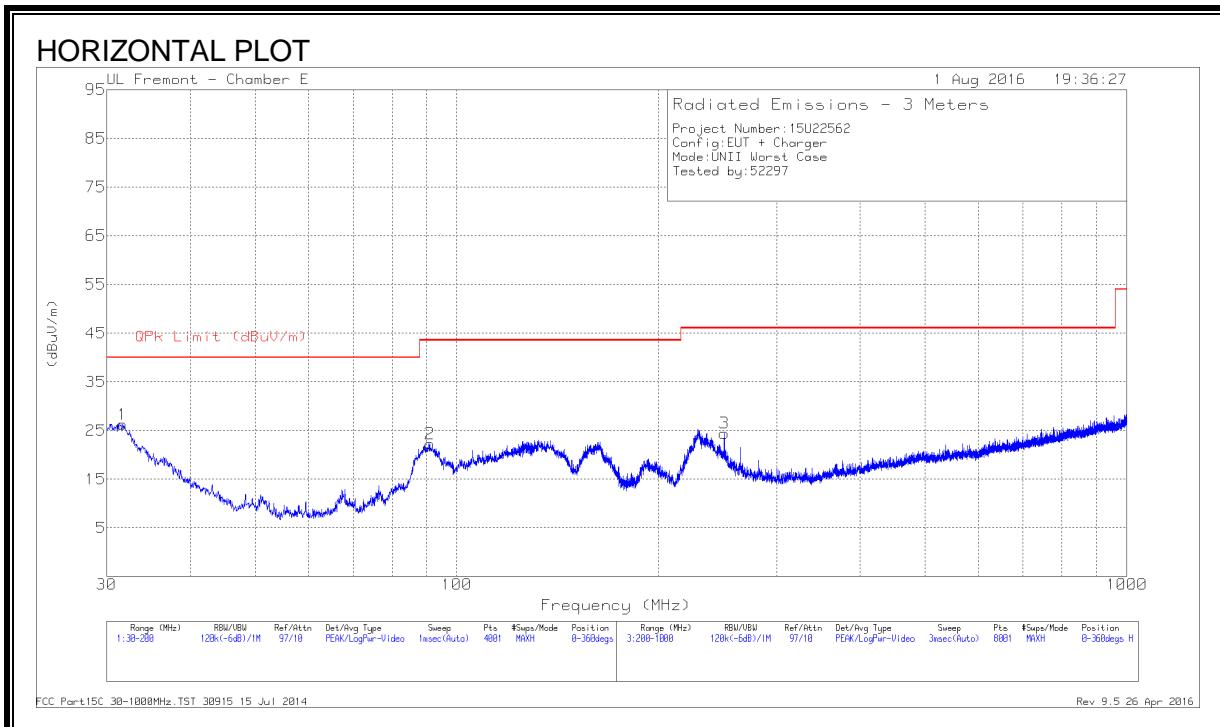
HORIZONTAL AND VERTICAL DATA

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T243 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
5	* 127.835	40.24	Pk	18	-31.1	27.14	43.52	-16.38	0-360	100	V
3	* 250.7	39.66	Pk	15.4	-30.6	24.46	46.02	-21.56	0-360	100	H
6	* 250.7	38.01	Pk	15.4	-30.6	22.81	46.02	-23.21	0-360	200	V
4	30.1913	41.45	Pk	25	-31.8	34.65	40	-5.35	0-360	100	V
1	31.7	34.26	Pk	23.8	-31.8	26.26	40	-13.74	0-360	200	H
2	91.0725	41.9	Pk	11.8	-31.4	22.3	43.52	-21.22	0-360	200	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

9.64. WORST-CASE ABOVE 18 GHz

SPURIOUS EMISSIONS 18000 TO 26000 MHz (WORST-CASE CONFIGURATION)
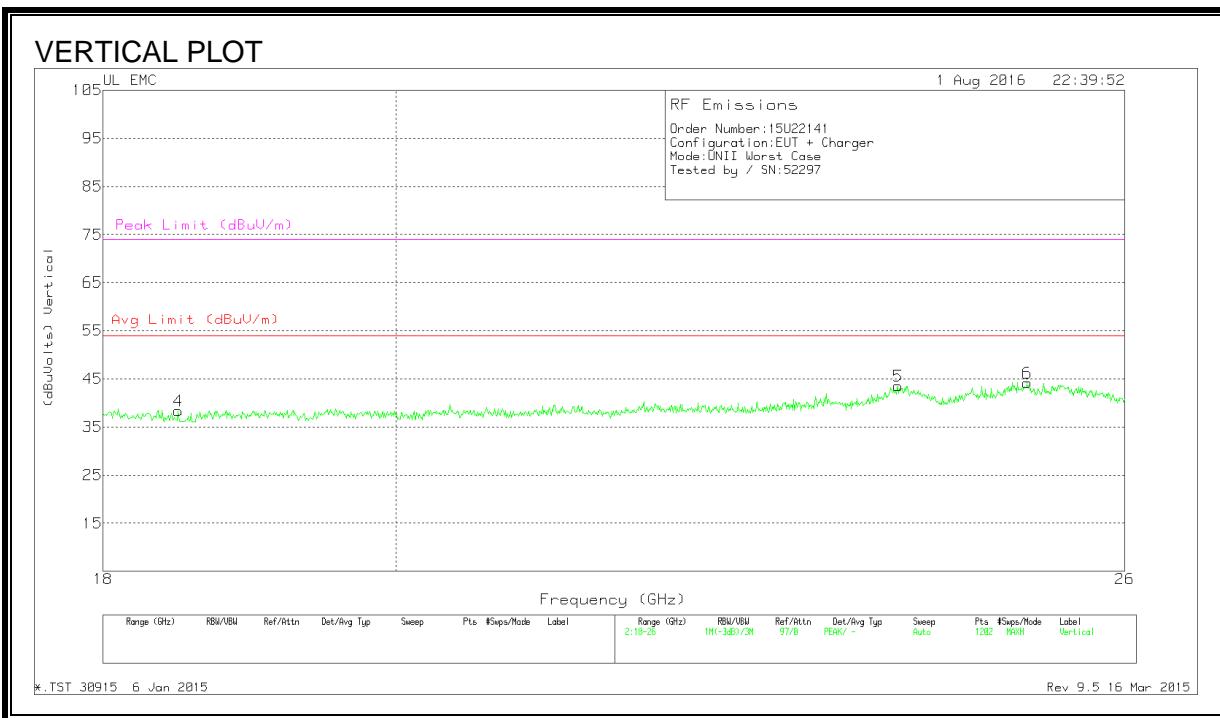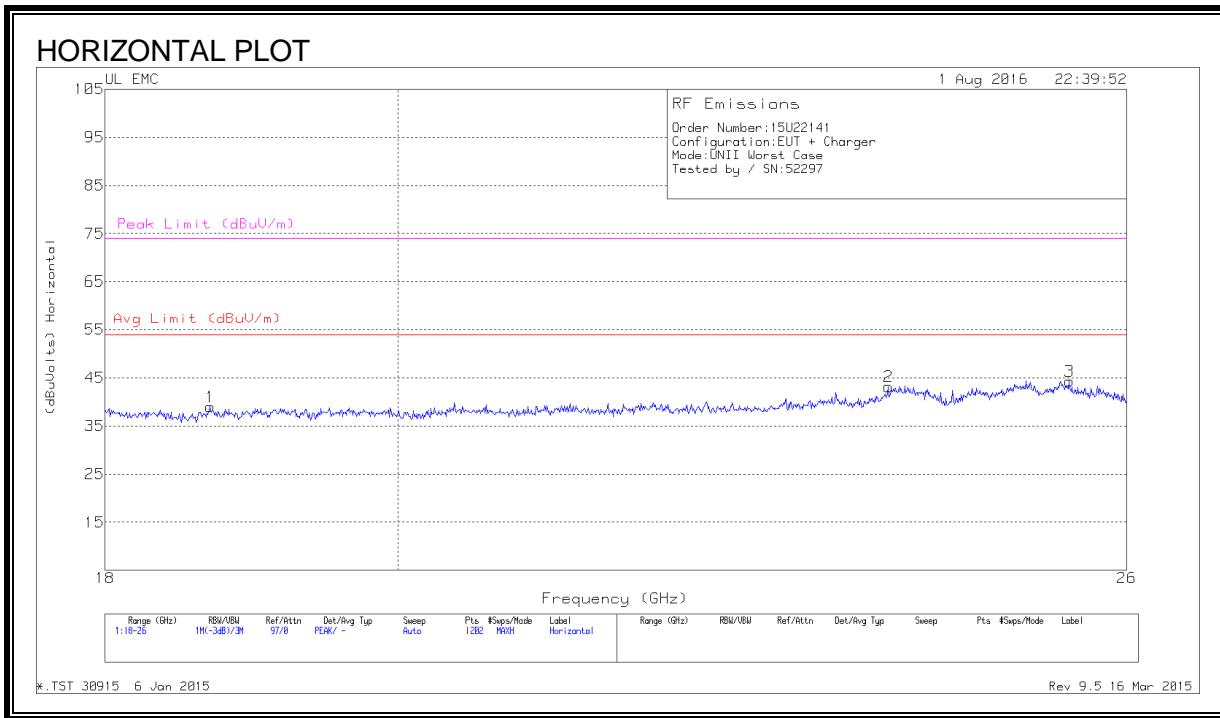
UL VERIFICATION SERVICES INC.
47173 BENICIA STREET, FREMONT, CA 94538, USA   TEL: (510) 771-1000   FAX: (510) 661-0888

FORM NO: CCSUP4701J

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HORIZONTAL AND VERTICAL DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T449 (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	18.693	40.3	Pk	32.4	-24.2	-9.5	39	54	-15	74	-35
2	23.862	42.87	Pk	33.9	-24.1	-9.5	43.17	54	-10.83	74	-30.83
3	25.467	44.03	Pk	34.4	-24.6	-9.5	44.33	54	-9.67	74	-29.67
4	18.493	40.93	Pk	32.6	-25.7	-9.5	38.33	54	-15.67	74	-35.67
5	23.962	43.2	Pk	34	-24.2	-9.5	43.5	54	-10.5	74	-30.5
6	25.101	43.77	Pk	34.3	-24.4	-9.5	44.17	54	-9.83	74	-29.83

Pk - Peak detector

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

HORIZONTAL PLOT

VERTICAL PLOT
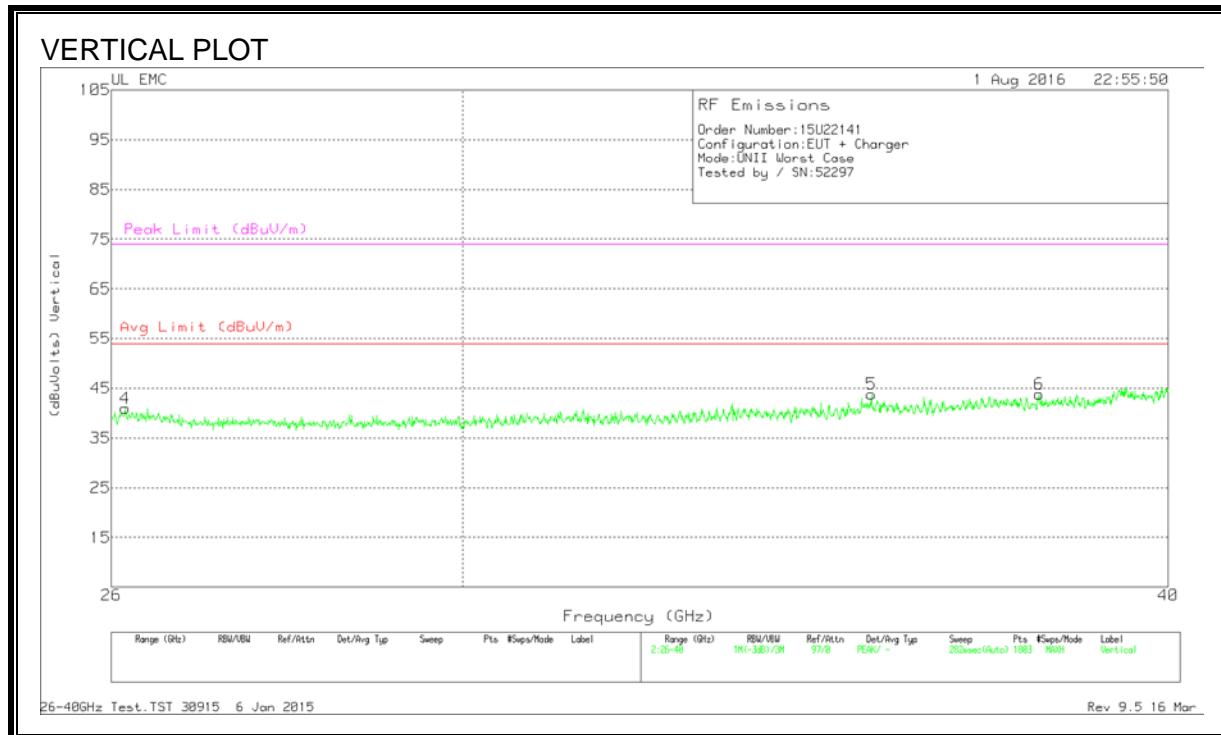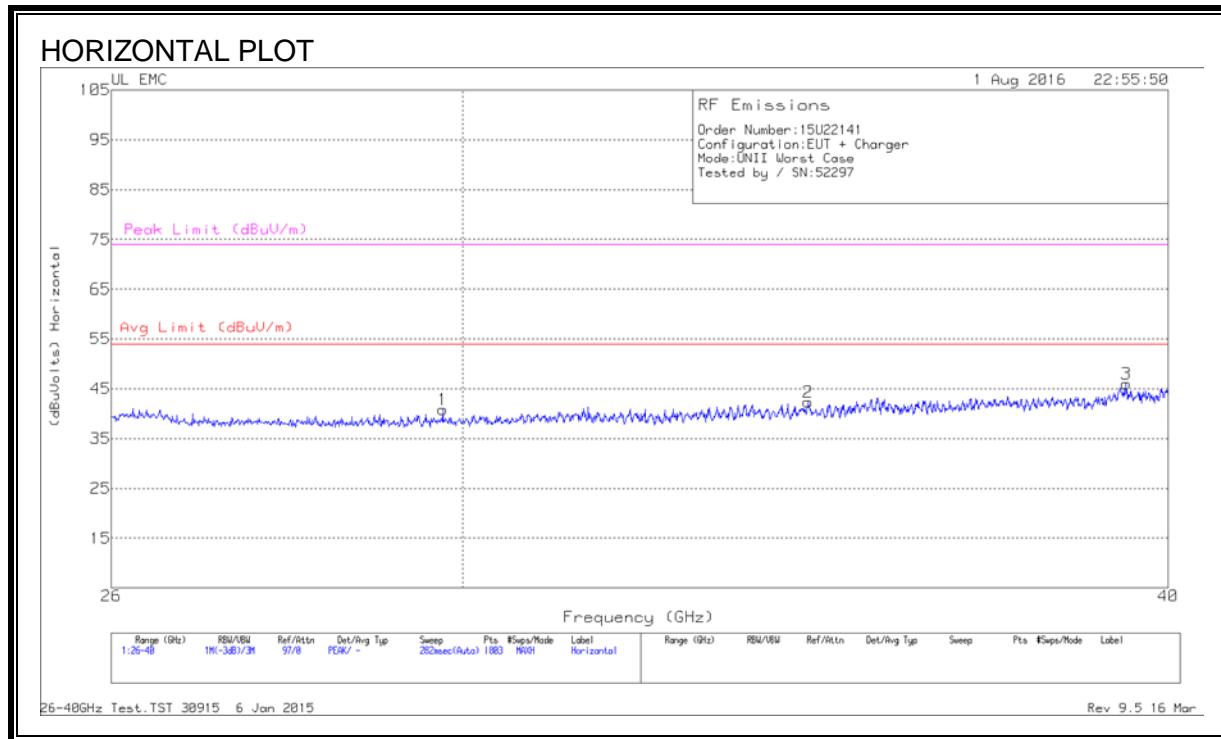
HORIZONTAL AND VERTICAL DATA

Trace Markers

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	29.76	47.23	Pk	36.1	-33	-9.5	40.83	54	-13.17	74	-33.17
2	34.538	48.33	Pk	37.4	-33.9	-9.5	42.33	54	-11.67	74	-31.67
3	39.316	49.5	Pk	38.3	-32.3	-9.5	46	54	-8	74	-28
4	26.148	46	Pk	35.6	-31.1	-9.5	41	54	-13	74	-33
5	35.44	49.23	Pk	37.9	-33.8	-9.5	43.83	54	-10.17	74	-30.17
6	37.949	50.03	Pk	37.2	-33.9	-9.5	43.83	54	-10.17	74	-30.17

Pk - Peak detector

10. 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.

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

EUT POWERED BY AC/DC ADAPTER

LINE 1 RESULTS
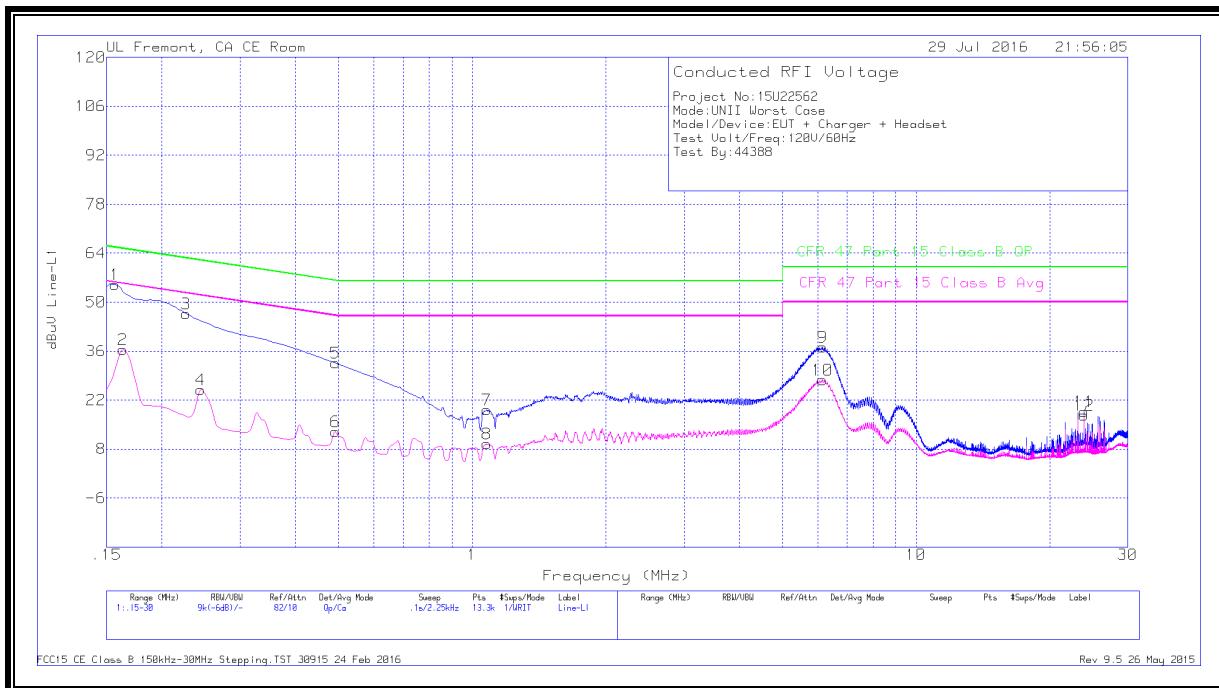
WORST EMISSIONS

Range 1: Line-L1 .15 - 30MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L1	LC Cables 1&3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR) Margin (dB)
1	.15675	44.97	Qp	0	0	10.1	55.07	65.63	-10.56	-	-
2	.1635	26.32	Ca	0	0	10.1	36.42	-	-	55.28	-18.86
3	.2265	36.63	Qp	0	0	10.1	46.73	62.58	-15.85	-	-
4	.2445	14.92	Ca	0	0	10.1	25.02	-	-	51.94	-26.92
5	.492	22.44	Qp	0	0	10.1	32.54	56.13	-23.59	-	-
6	.492	2.81	Ca	0	0	10.1	12.91	-	-	46.13	-33.22
7	1.07925	9.1	Qp	0	0	10.1	19.2	56	-36.8	-	-
8	1.07925	-.65	Ca	0	0	10.1	9.45	-	-	46	-36.55
9	6.15525	26.82	Qp	0	.1	10.2	37.12	60	-22.88	-	-
10	6.153	17.43	Ca	0	.1	10.2	27.73	-	-	50	-22.27
11	23.919	8.05	Qp	.1	.2	10.4	18.75	60	-41.25	-	-
12	23.919	7.03	Ca	.1	.2	10.4	17.73	-	-	50	-32.27

LINE 2 RESULTS
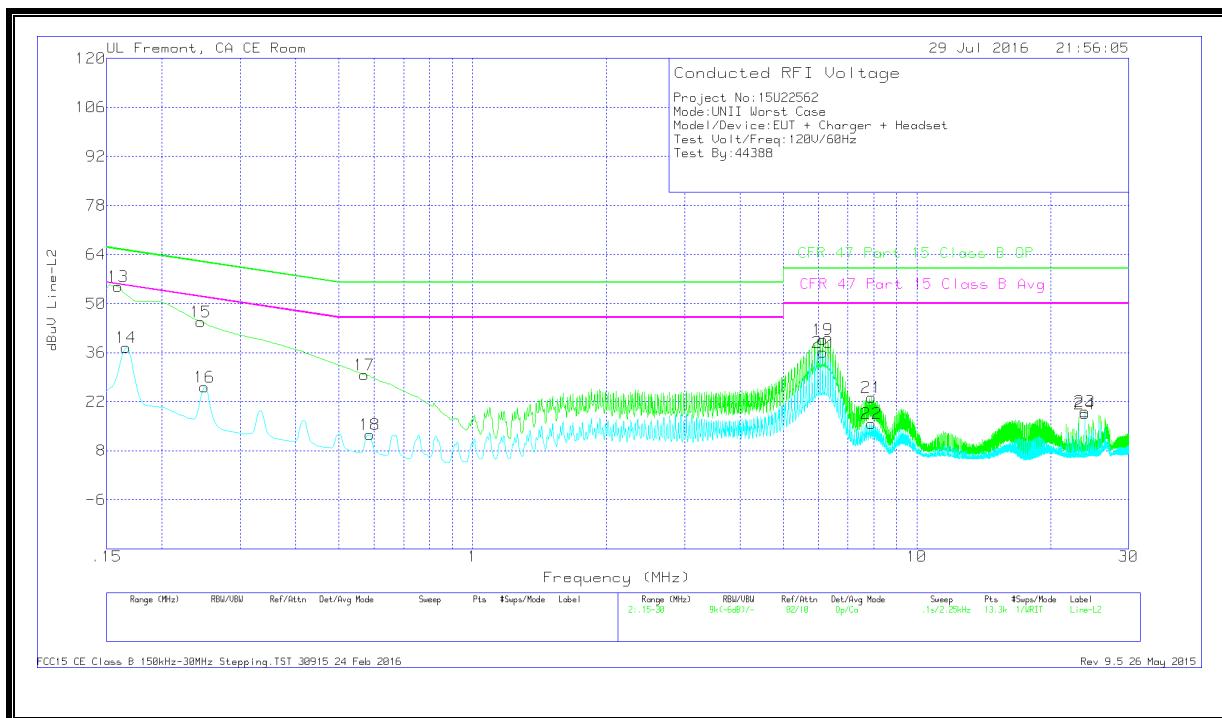
WORST EMISSIONS

Range 2: Line-L2 .15 - 30MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L2	LC Cables 2&3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR) Margin (dB)
13	.159	44.82	Qp	0	0	10.1	54.92	65.52	-10.6	-	-
14	.16575	27.4	Ca	0	0	10.1	37.5	-	-	55.17	-17.67
15	.2445	34.7	Qp	0	0	10.1	44.8	61.94	-17.14	-	-
16	.249	16.06	Ca	0	0	10.1	26.16	-	-	51.79	-25.63
17	.57075	19.61	Qp	0	0	10.1	29.71	56	-26.29	-	-
18	.5865	2.59	Ca	0	0	10.1	12.69	-	-	46	-33.31
19	6.1395	29.39	Qp	0	.1	10.2	39.69	60	-20.31	-	-
20	6.1395	25.79	Ca	0	.1	10.2	36.09	-	-	50	-13.91
21	7.90575	12.92	Qp	0	.1	10.2	23.22	60	-36.78	-	-
22	7.90575	5.49	Ca	0	.1	10.2	15.79	-	-	50	-34.21
23	23.919	8.45	Qp	.1	.2	10.4	19.15	60	-40.85	-	-
24	23.919	7.9	Ca	.1	.2	10.4	18.6	-	-	50	-31.4

11. DYNAMIC FREQUENCY SELECTION

11.1. OVERVIEW

11.1.1. 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.		

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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: $\{(1/360) \times (19 \times 10^6 \text{ PRI}_{usec})\}$	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

11.1.2. TEST AND MEASUREMENT SYSTEM

RADIATED METHOD SYSTEM BLOCK DIAGRAM

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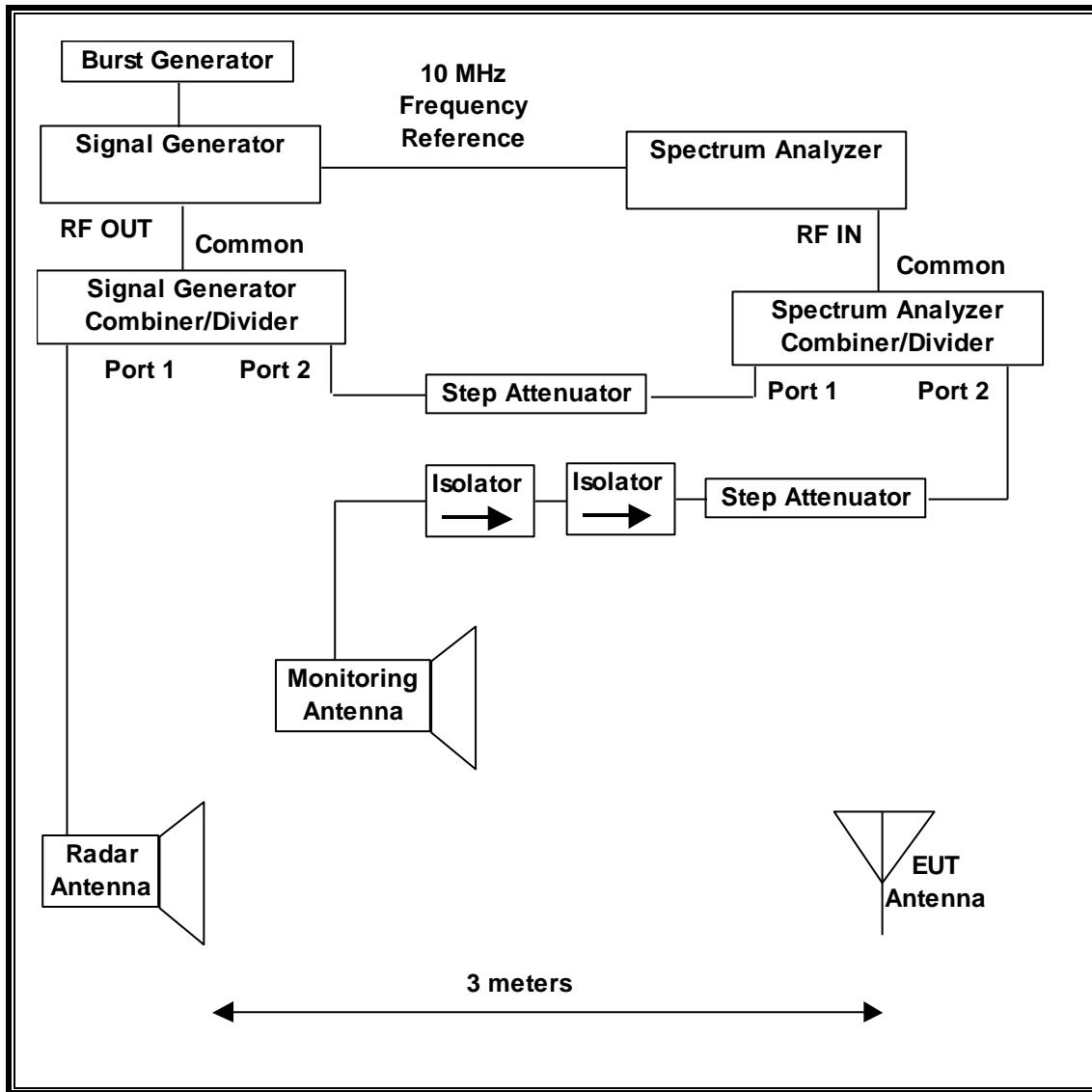
SYSTEM OVERVIEW

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 for the DFS tests documented in this report:

TEST EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Asset Number**	**Cal Due**
Spectrum Analyzer, PXA, 3Hz to 44GHz	Keysight	N9030A	US51350187	06/13/17
Signal Generator, MXG X-Series RF Vector	Agilent	N5182B	MY51350337	03/11/17

11.1.3.   TEST AND MEASUREMENT SOFTWARE

The following test and measurement software was utilized for the tests documented in this report:

TEST SOFTWARE LIST		
Name	**Version**	**Test / Function**
Aggregate Time-PXA	3.0	Channel Loading and Aggregate Closing Time
PXA Read	3.0.0.9	Signal Generator Screen Capture
SGXProject.exe	1.7	Radar Waveform Generation and Download

11.1.4.   SETUP OF EUT (CLIENT MODE)

RADIATED METHOD EUT TEST SETUP
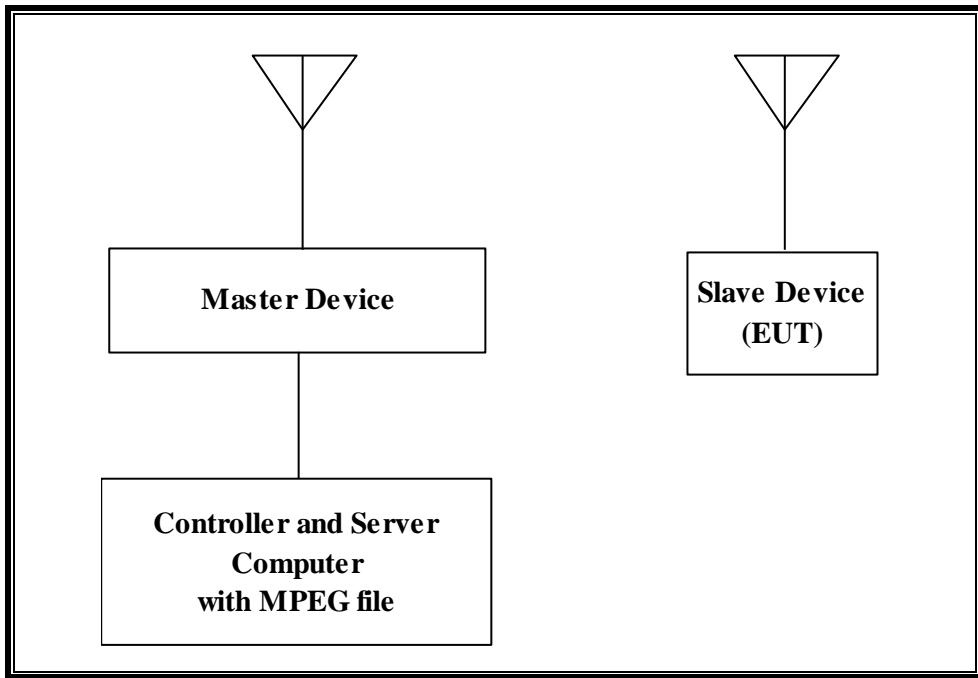
SUPPORT EQUIPMENT

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

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
AC Adapter (EUT)	Apple	B280	No Serial Number	DoC
3x3 MIMO Base Station (Master Device)	Apple	A1521	C86L3BA8FJ1R	BCGA1521
Notebook PC (Controller/Server)	Apple	A1502	C02LRKYFH00	DoC
AC Adapter (Controller/Server PC)	Apple	A1436	C045204H7VAG6HH AW	DoC

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

RADIATED METHOD EUT TEST SETUP

SUPPORT EQUIPMENT

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

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter (EUT)	Apple	B280	No Serial Number	DoC
3x3 MIMO Base Station (Master Device)	Apple	A1521	C86PJ60JFJ1R	BCGA1521
Notebook PC (Controller/Server)	Apple	A1181	4H629022WLV	DoC
AC Adapter (Controller/Server PC)	Delta Electronics	A1344	MV05104CNAL1A	DoC
Apple TV (Peer Slave Device)	Apple	A1625	C07PR001GPWK	BCGA1625
Video Display	Polaroid	TLX-01511C	02006	DoC

11.1.6.   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 22.93 dBm EIRP in the 5250-5350 MHz band and 23.2 dBm EIRP in the 5470-5725 MHz band.

The only antenna assembly utilized with the EUT has a gain of 7.75dBi & 7.25 dBi in the 5250-5350 MHz band and 8 dBi & 6.5 dBi in the 5470-5725 MHz band.

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 EUT uses two transmitter/receiver chains, each connected to an antenna to perform radiated tests.

In standard client mode WLAN traffic that meets or exceeds the minimum required loading was generated by transferring a data stream from the Master Device to the Slave Device using iPerf version 2.0.5 software package.

In client to client mode WLAN traffic is generated by streaming the compressed version of the video test file "6 ½ Magic Hours" from the Master to the Slave and then on to the peer slave device in full motion video mode using VLC version 2.2.4 Weatherwax media player and embedded proprietary AirPlay software.

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.

The software installed in the access point used during Client Mode is 7.7.2f0 dev.

The software installed in the access point used during Client-to-Client Communications Mode is 7.7.4f0 dev.

The software installed in the EUT is Mac OS Sierra revision 10.12 (16A232)

UNIFORM CHANNEL SPREADING

This function is not required per KDB 905462.

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

The Master Device is an Apple, Inc. Access Point, FCC ID: BCGA1521. 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 used during Client Mode is 7.7.2f0 dev.

The software installed in the access point used during Client-to-Client Communications Mode is 7.7.4f0 dev.

11.2. CLIENT MODE RESULTS FOR 20 MHz BANDWIDTH

11.2.1. TEST CHANNEL

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

11.2.2. RADAR WAVEFORM AND TRAFFIC

RADAR WAVEFORM

SHORT PULSE RADAR TYPE 0 AT MASTER
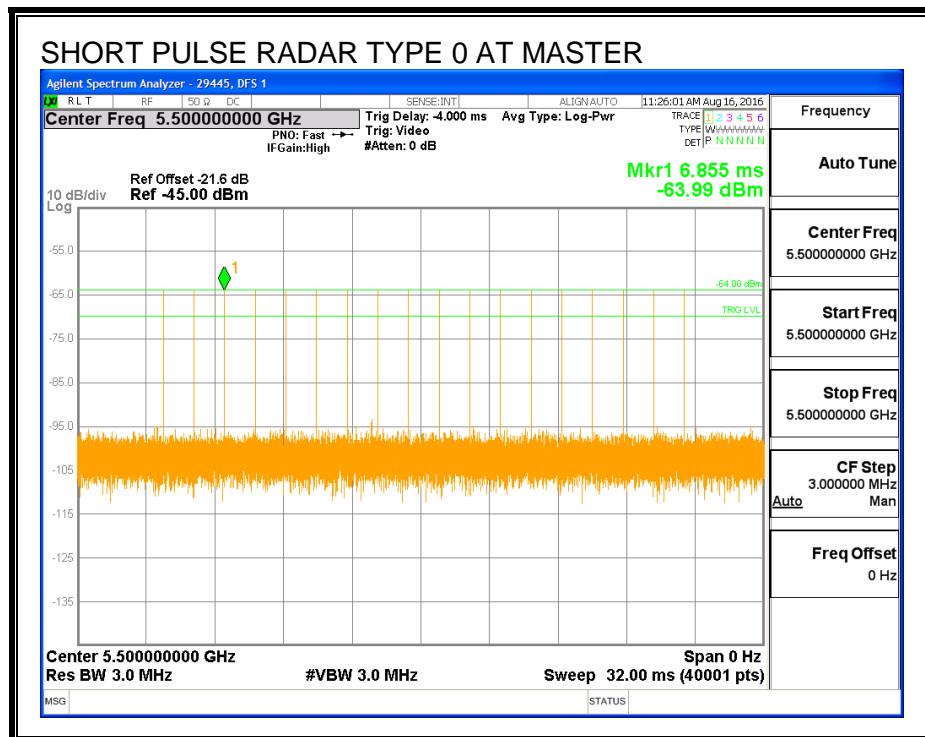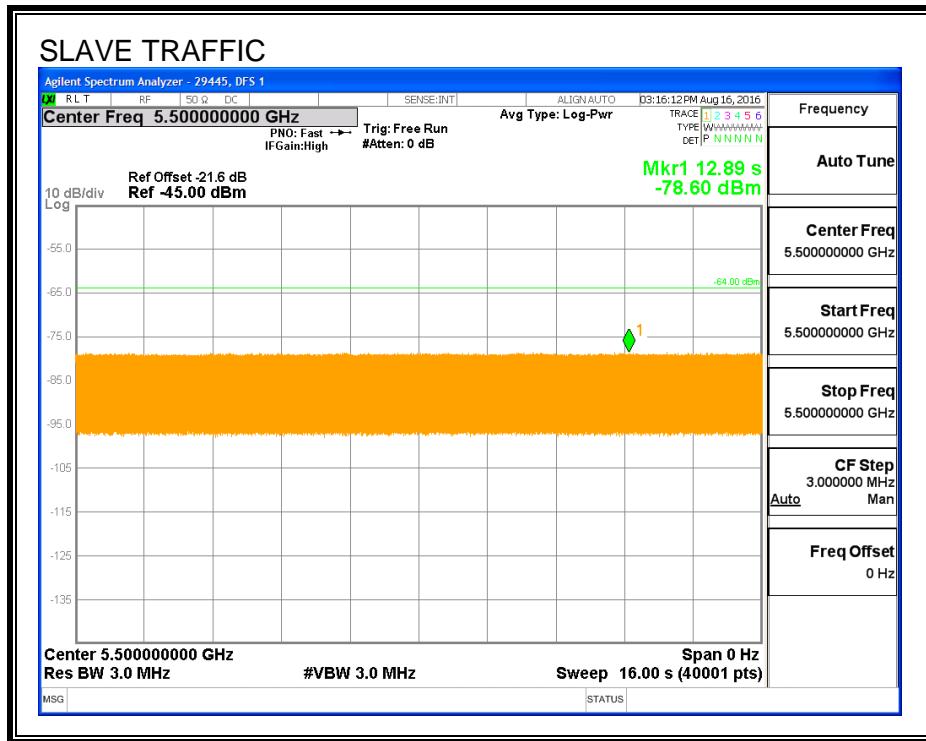
TRAFFIC
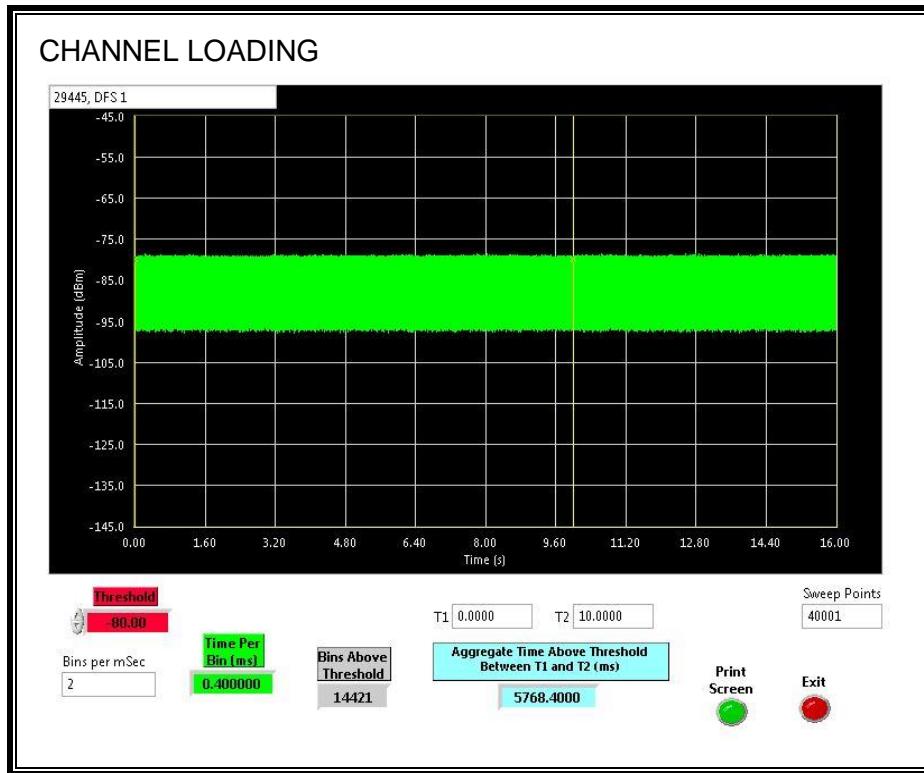
CHANNEL LOADING

The level of traffic loading on the channel by the EUT is 57.68%

11.2.3. OVERLAPPING CHANNEL TESTS

RESULTS

These tests are not applicable.

11.2.4. 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)
0.0596	10

| Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
0.0	60
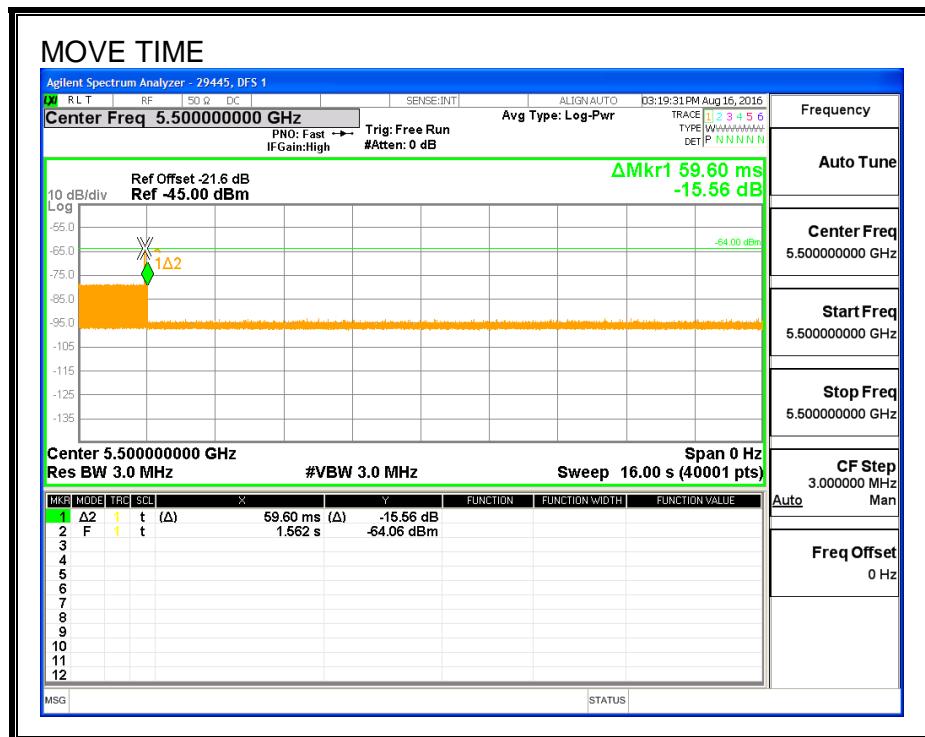
MOVE TIME

CHANNEL CLOSING TIME
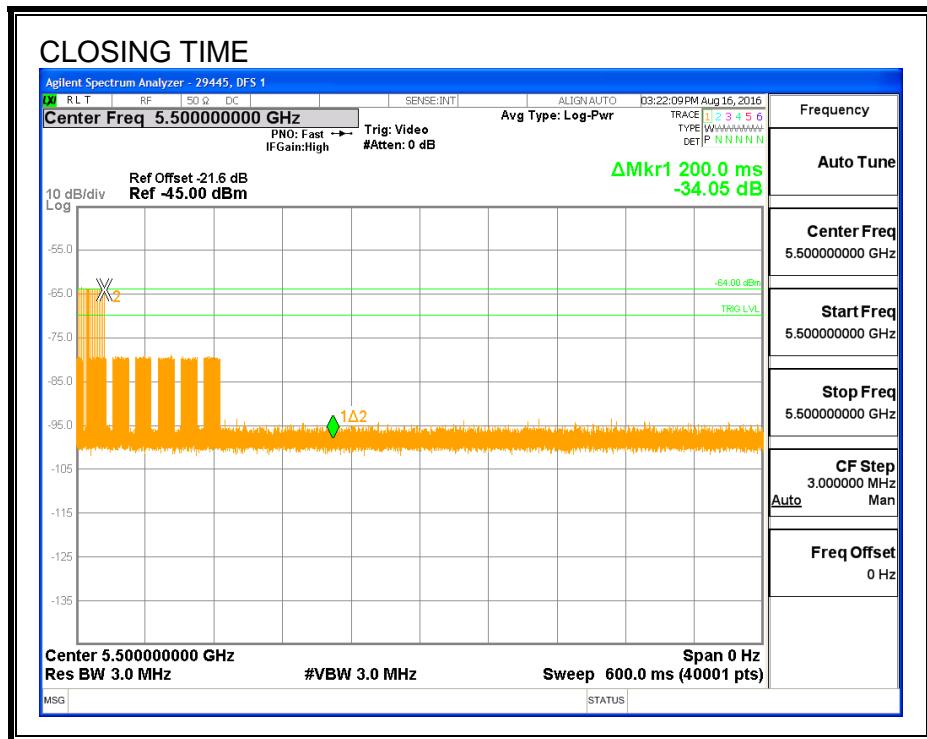
AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

No transmissions are observed during the aggregate monitoring period.
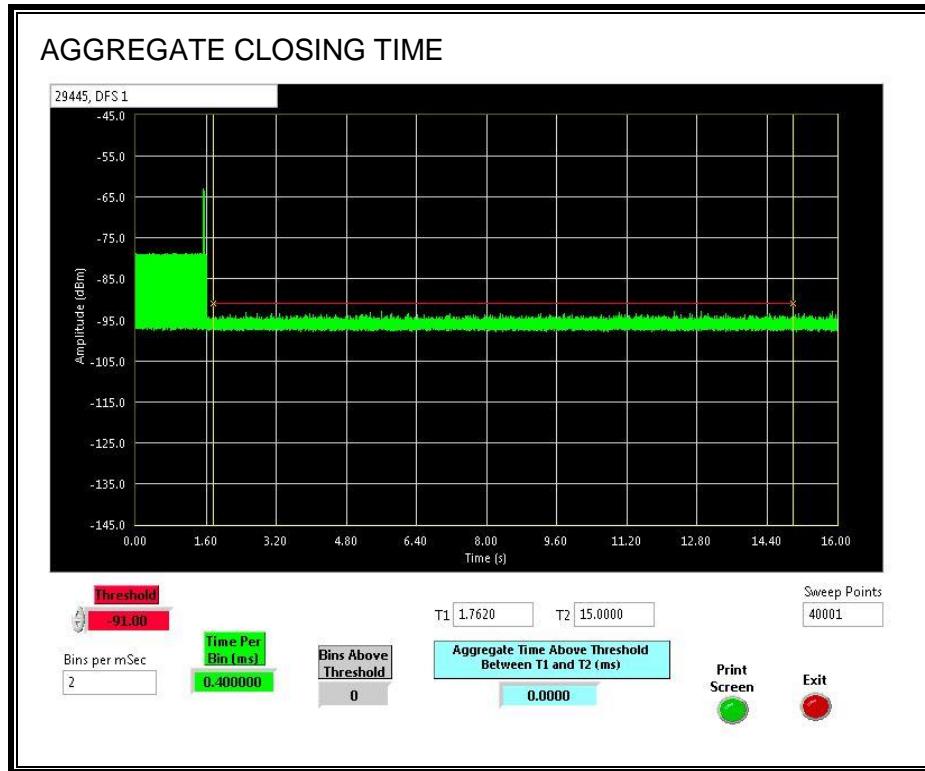
## 11.3. CLIENT MODE RESULTS FOR 40 MHz BANDWIDTH

11.3.1. TEST CHANNEL

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

11.3.2. RADAR WAVEFORM AND TRAFFIC

RADAR WAVEFORM

TRAFFIC

SLAVE TRAFFIC
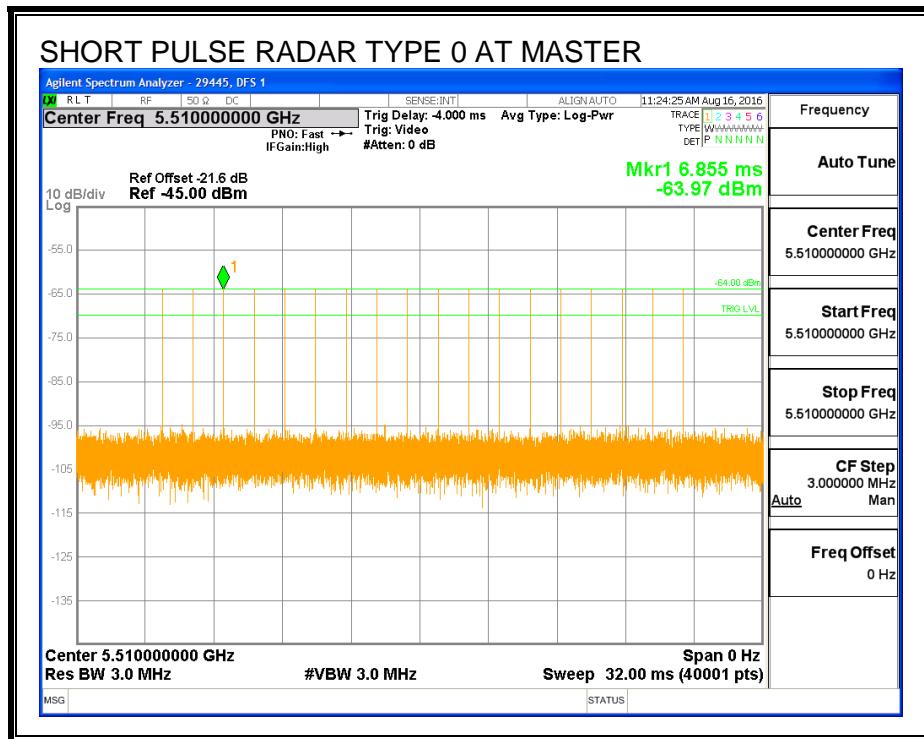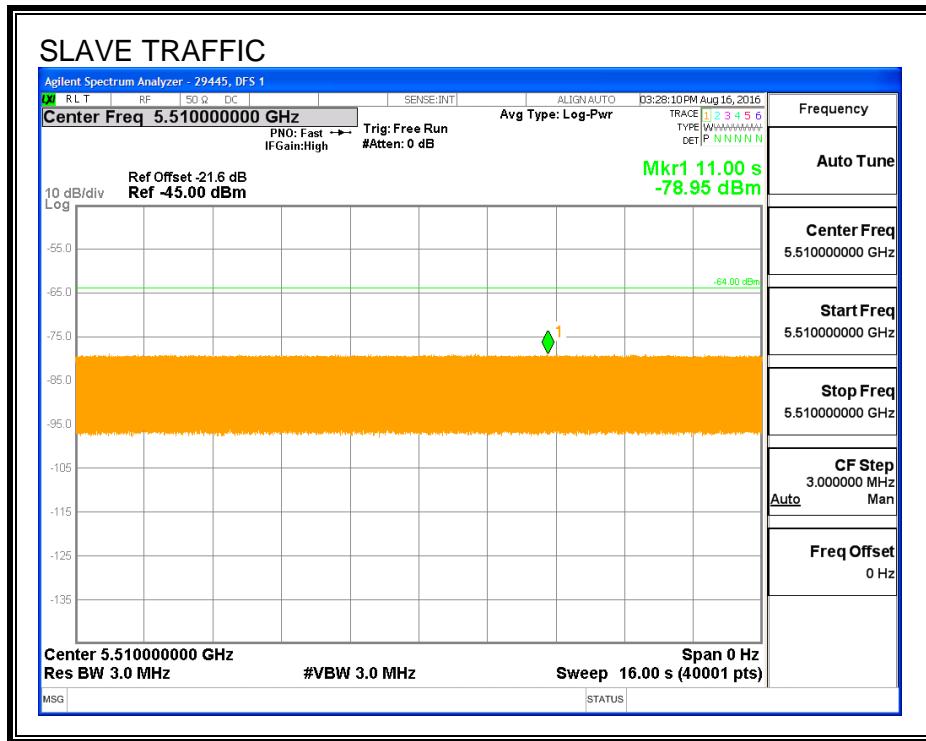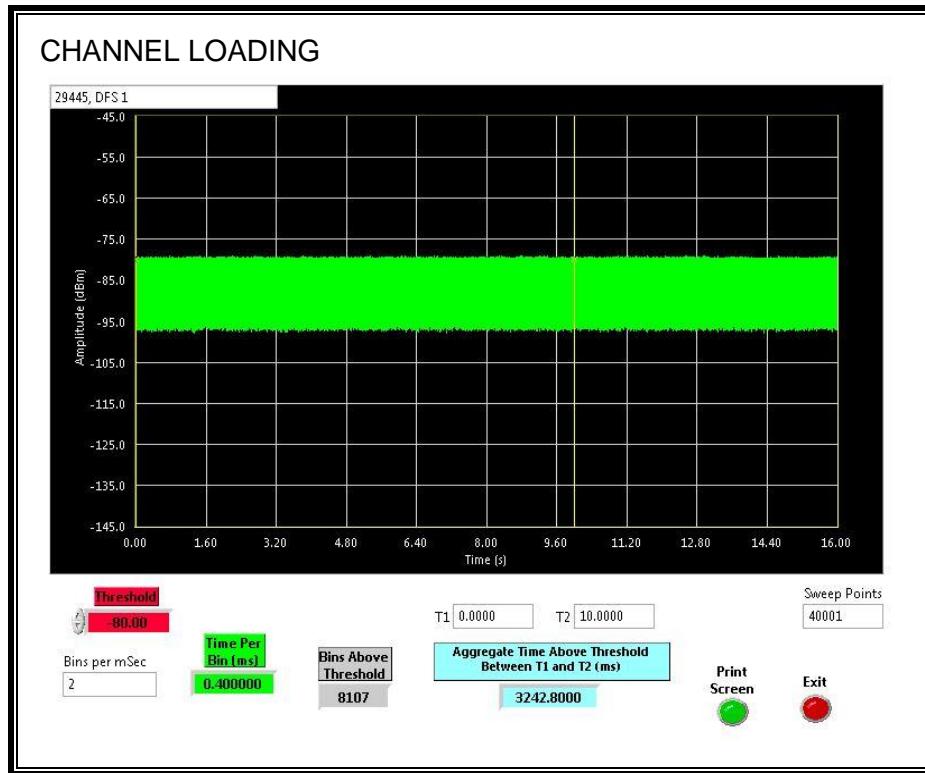
CHANNEL LOADING

The level of traffic loading on the channel by the EUT is 32.42%

11.3.3. OVERLAPPING CHANNEL TESTS

RESULTS

These tests are not applicable.

11.3.4. 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)
0.0788	10

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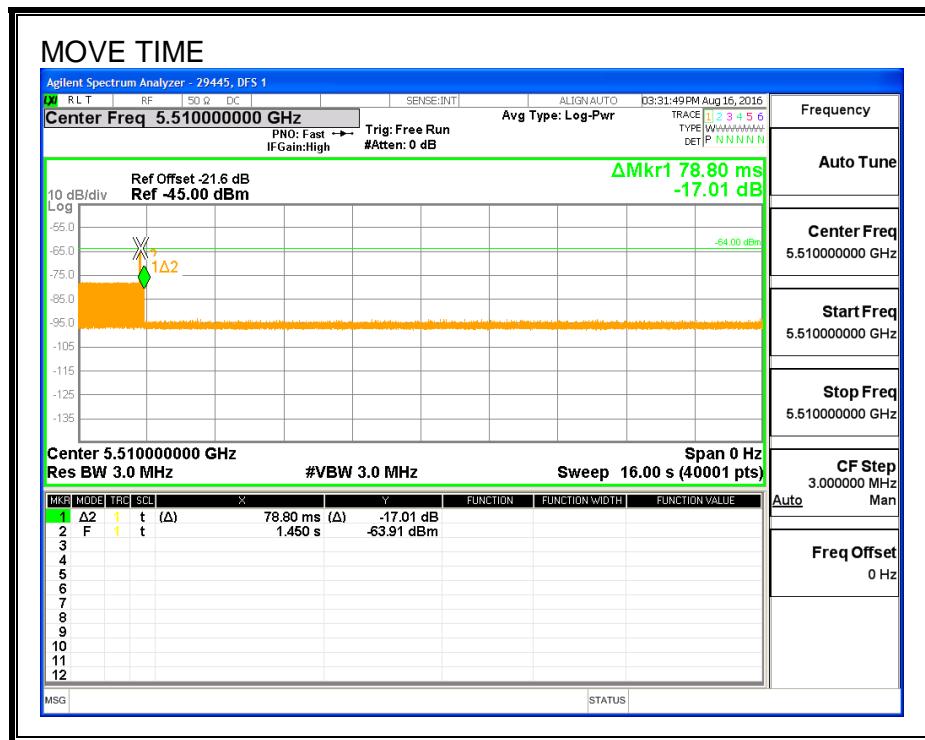
MOVE TIME

CHANNEL CLOSING TIME

CLOSING TIME

AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

No transmissions are observed during the aggregate monitoring period.

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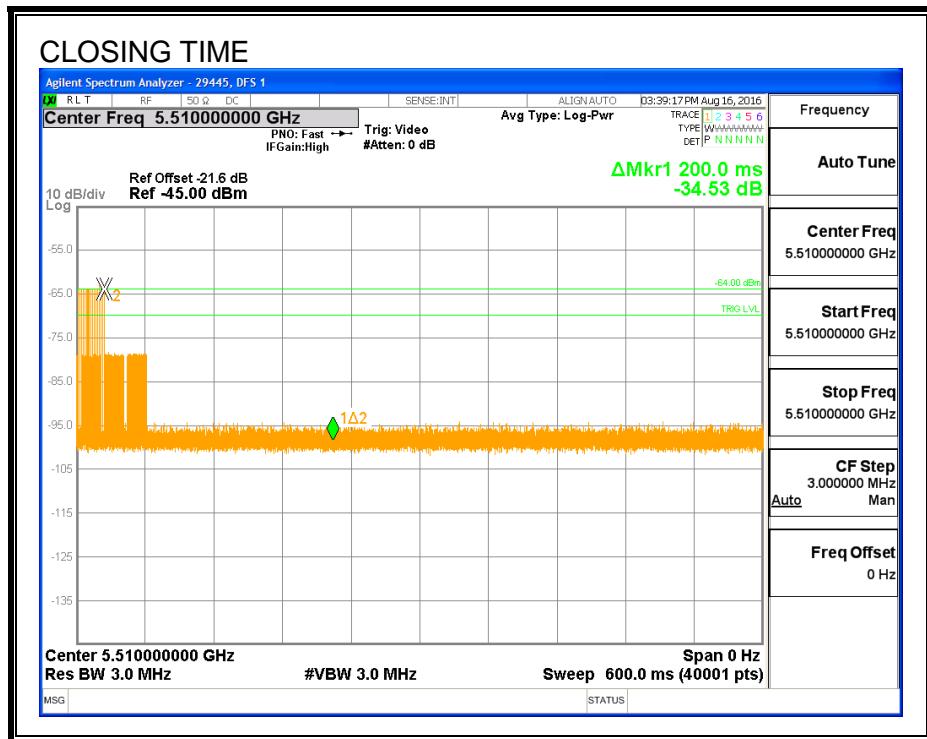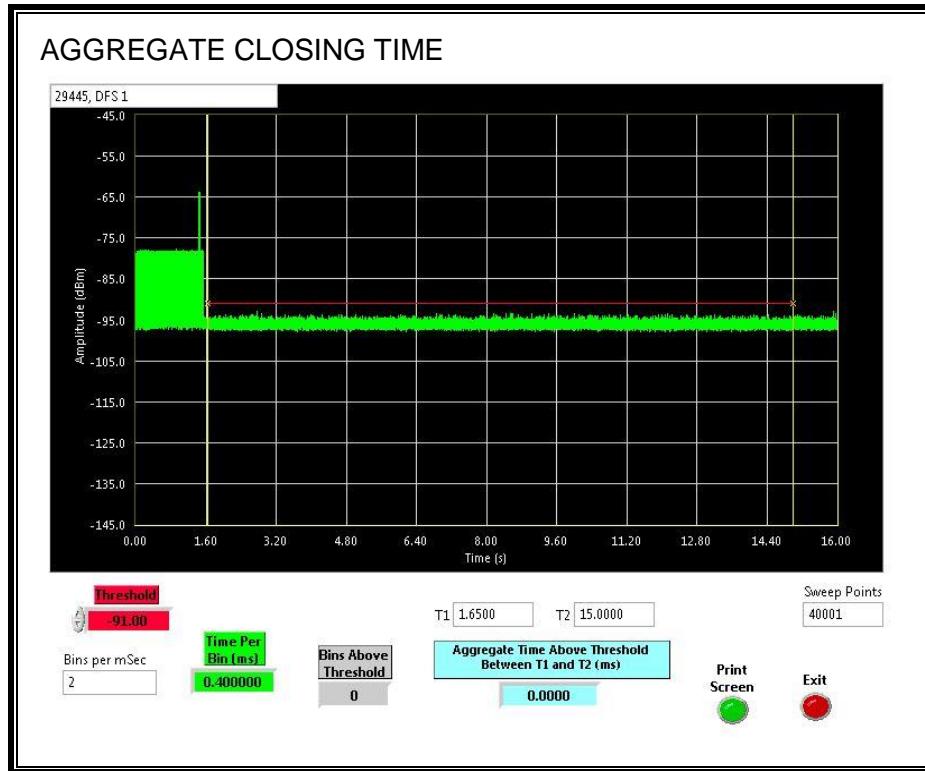
11.4.   CLIENT MODE RESULTS FOR 80 MHz BANDWIDTH

11.4.1.   TEST CHANNEL

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

11.4.2.   RADAR WAVEFORM AND TRAFFIC
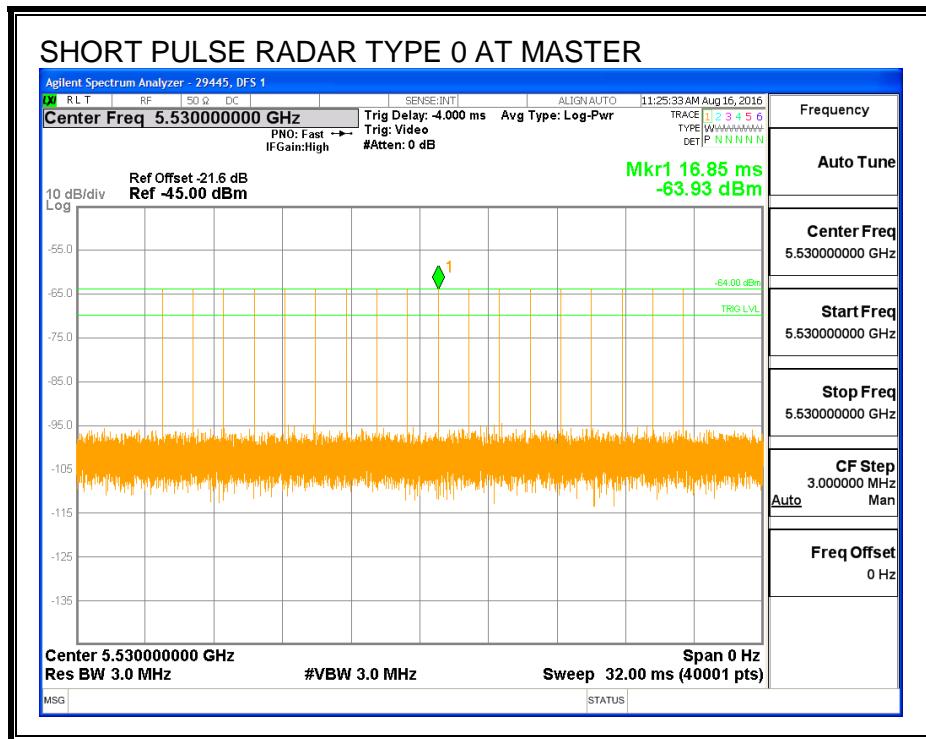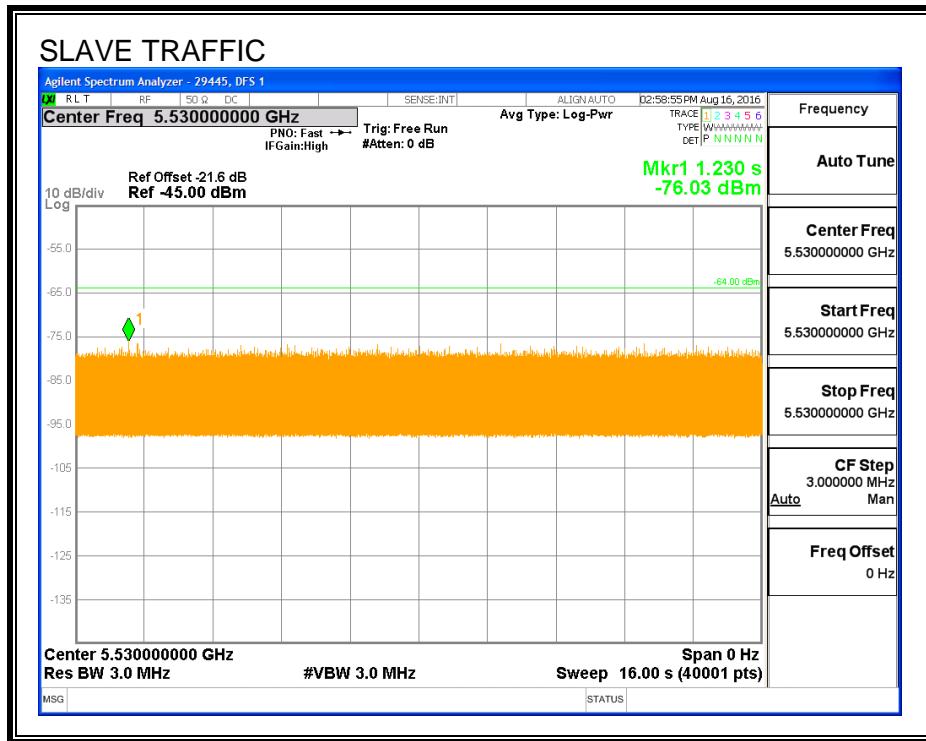
RADAR WAVEFORM

TRAFFIC

CHANNEL LOADING

The level of traffic loading on the channel by the EUT is 22.88%

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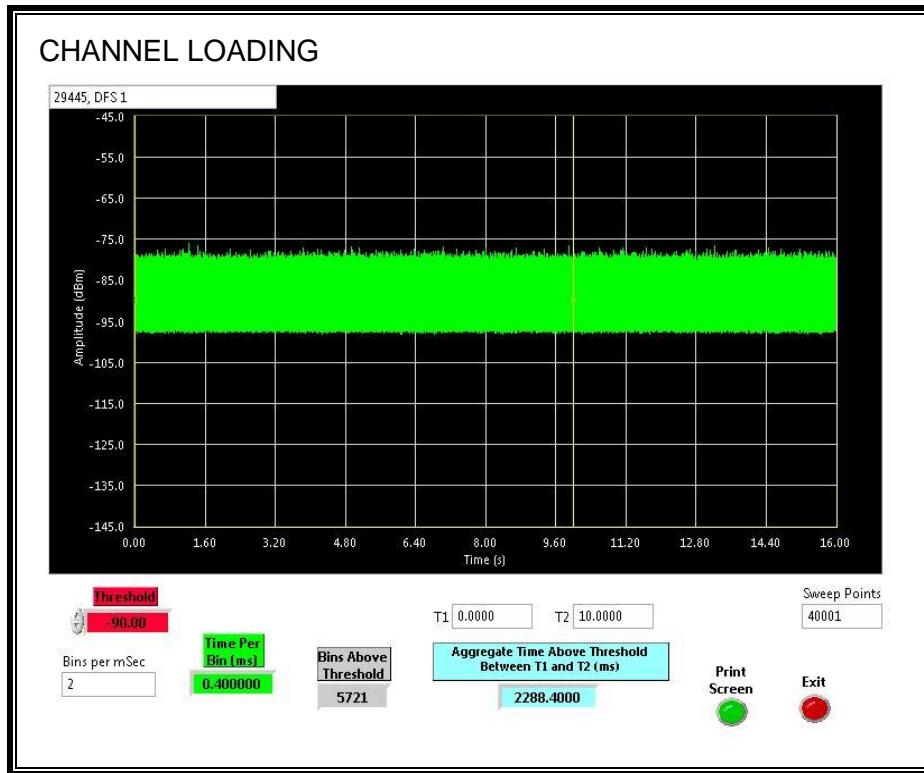
11.4.3.　　OVERLAPPING CHANNEL TESTS

RESULTS

These tests are not applicable.

11.4.4.　　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)
0.0492	10

| Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
0.0	60
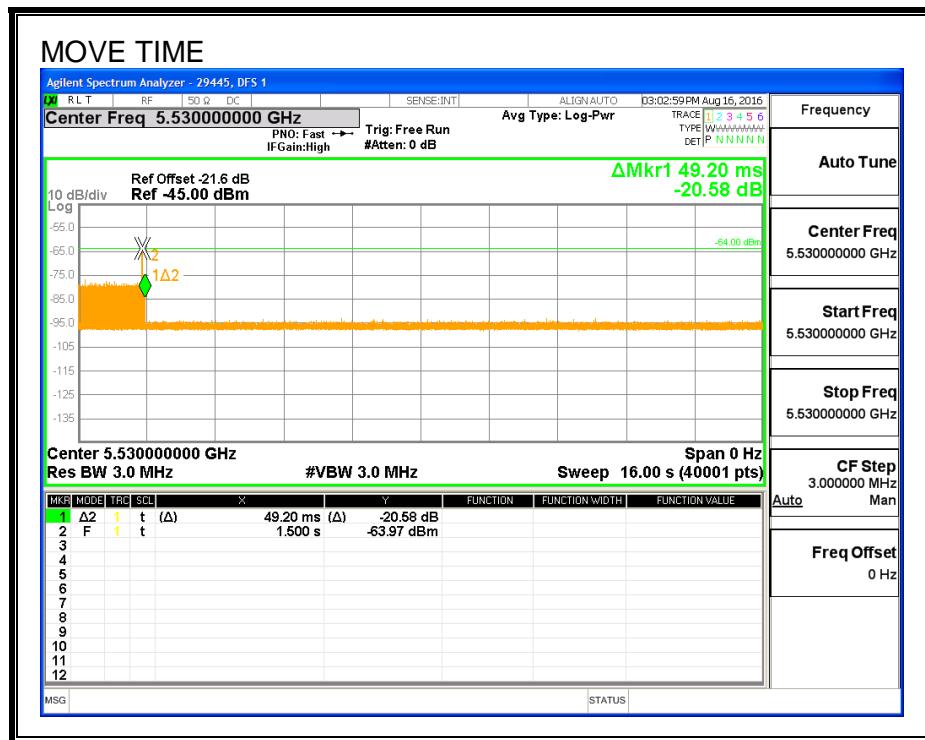
MOVE TIME

CHANNEL CLOSING TIME
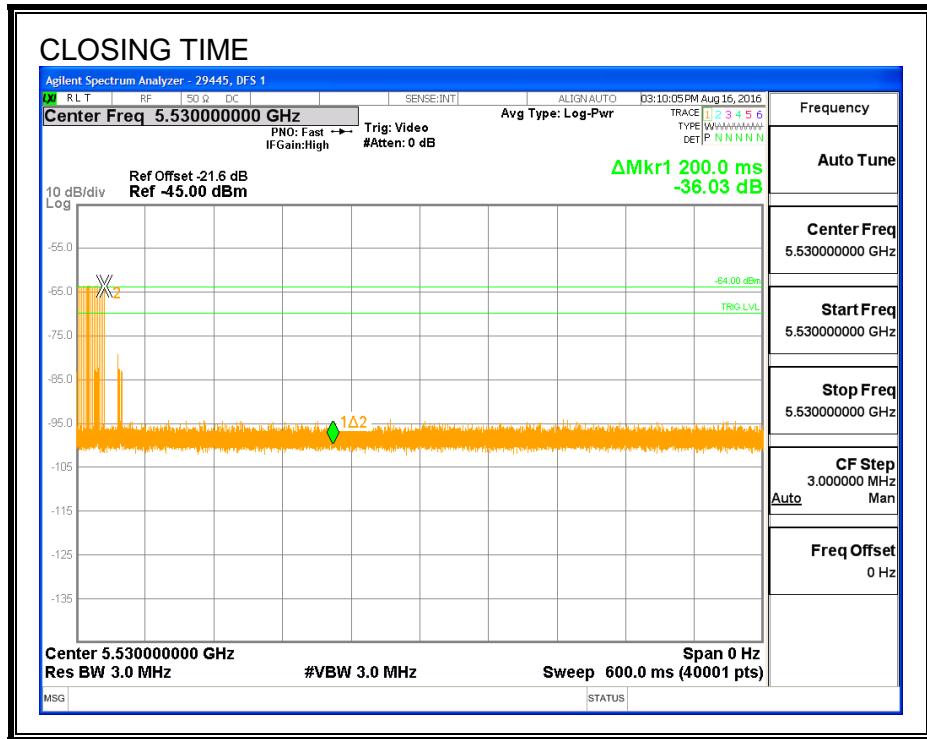
CLOSING TIME

AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

No transmissions are observed during the aggregate monitoring period.
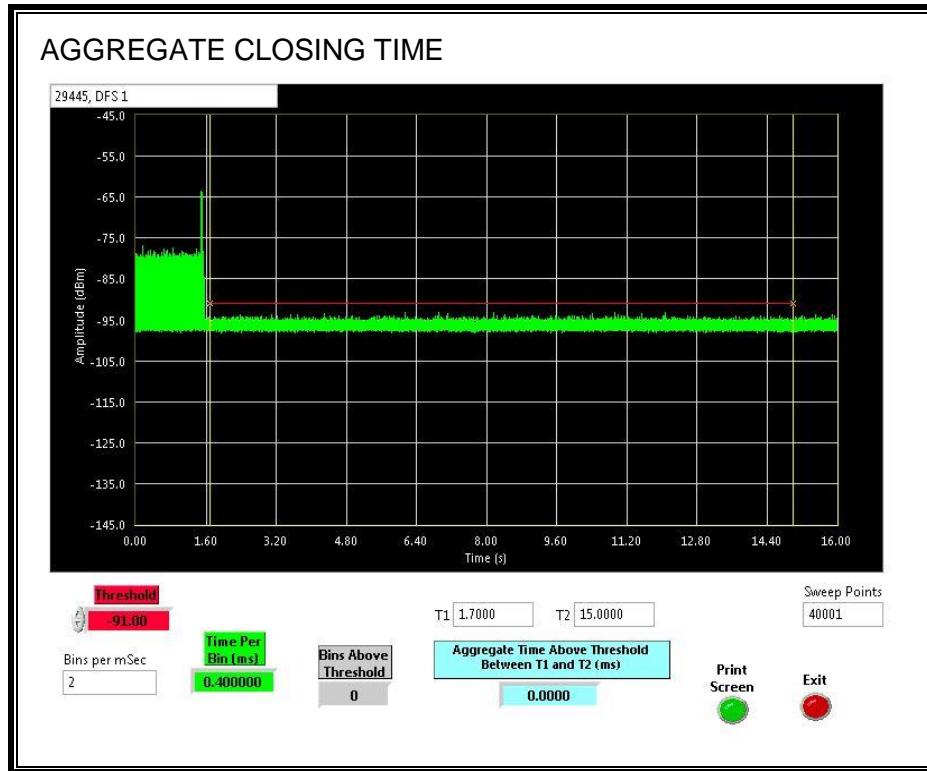
11.4.5. 10-MINUTE CLIENT Tx MONITORING PERIOD

RESULTS

No EUT transmissions were observed on the test channel during the 10-minute observation time.
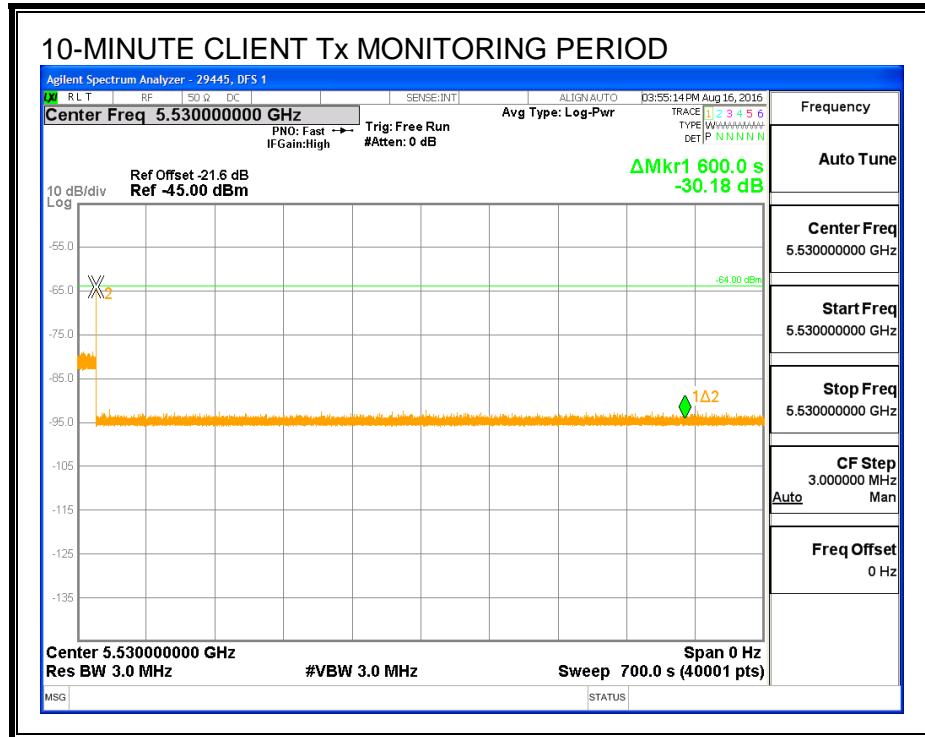
11.5. CLIENT-TO-CLIENT COMMUNICATIONS MODE RESULTS FOR 20 MHz BANDWIDTH

11.5.1. TEST CHANNEL

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

11.5.2. RADAR WAVEFORM AND TRAFFIC

RADAR WAVEFORM
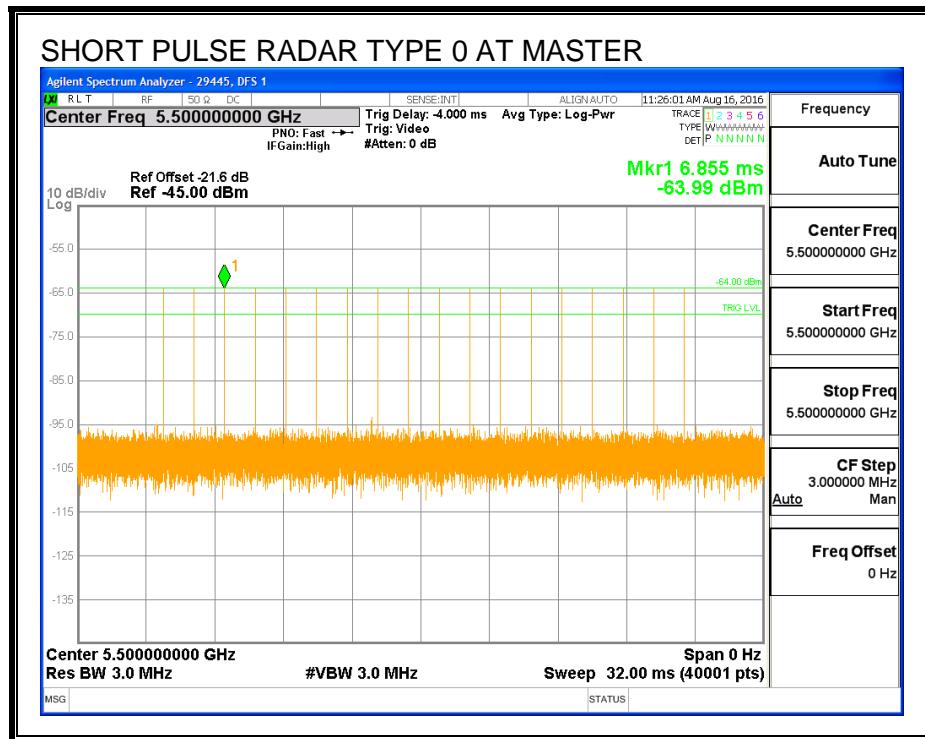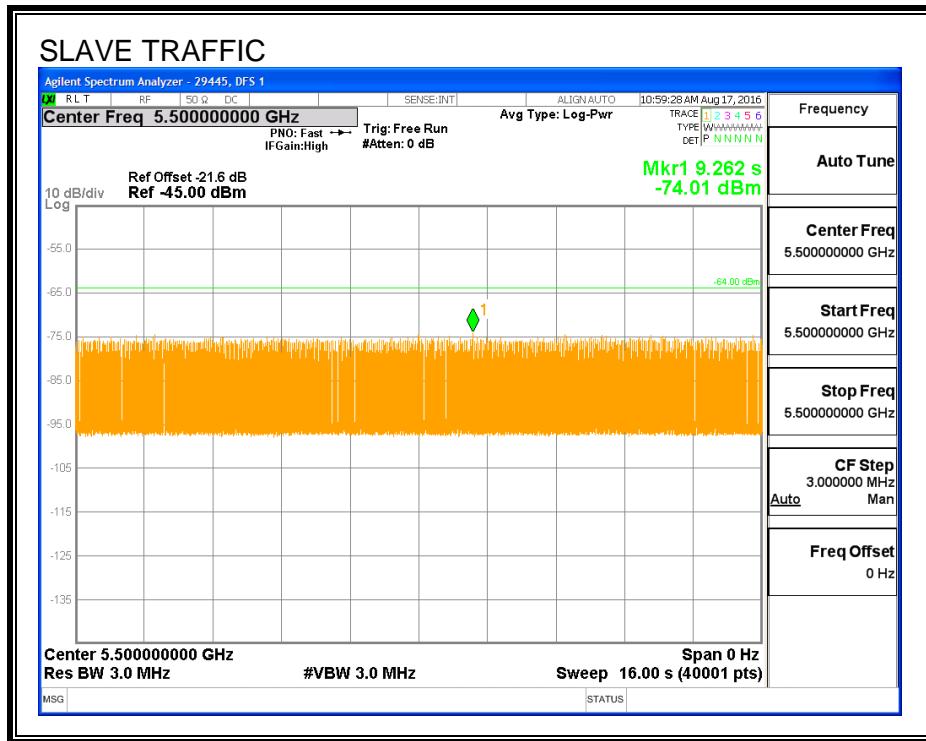
TRAFFIC
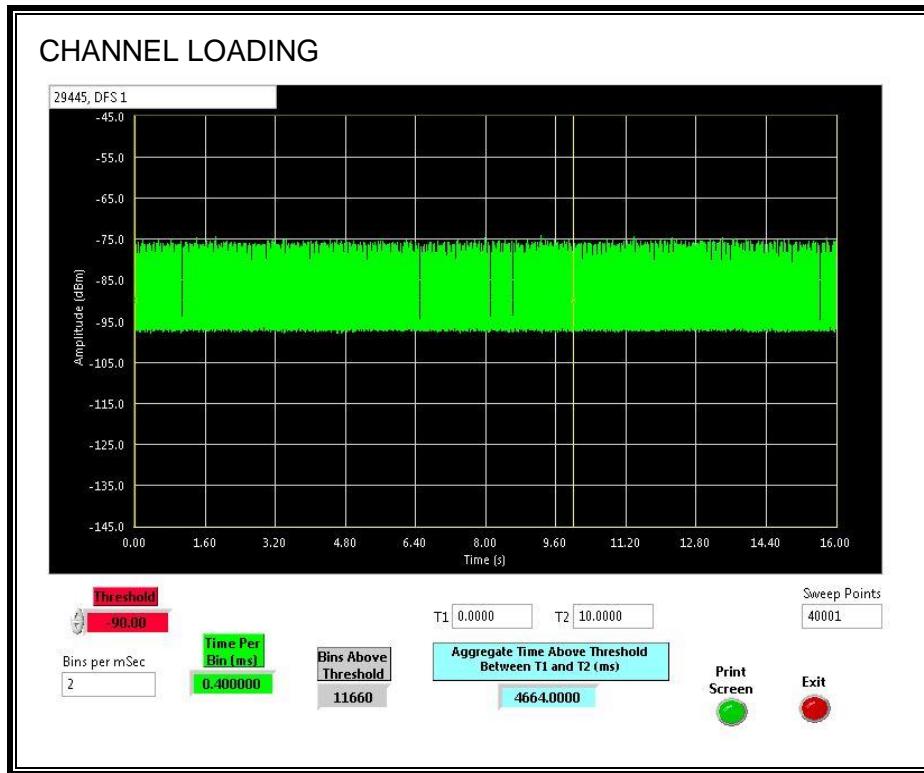
CHANNEL LOADING

The level of traffic loading on the channel by the EUT is 46.64%

11.5.3.   OVERLAPPING CHANNEL TESTS

RESULTS

These tests are not applicable.

11.5.4.   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	Limit
(sec)	(sec)
0.1096	10

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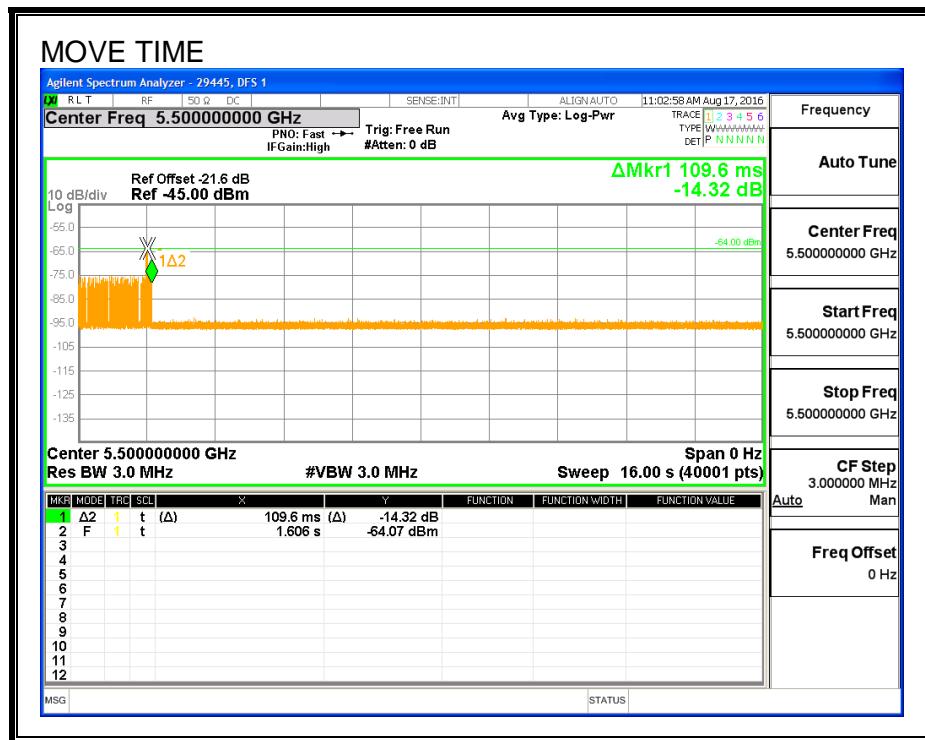
MOVE TIME

CHANNEL CLOSING TIME
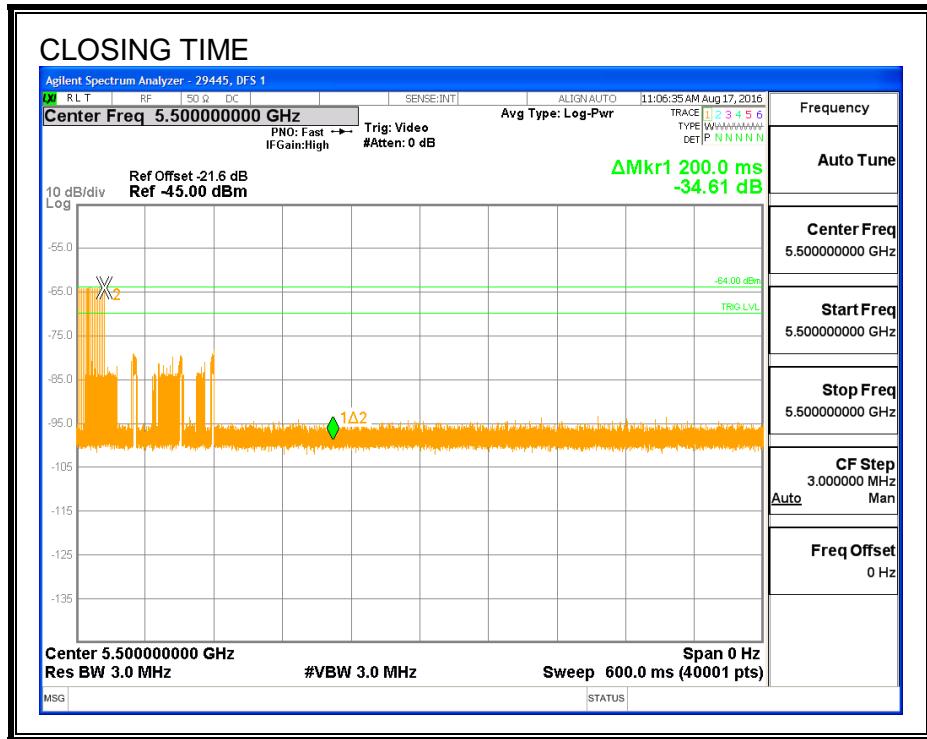
AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

No transmissions are observed during the aggregate monitoring period.
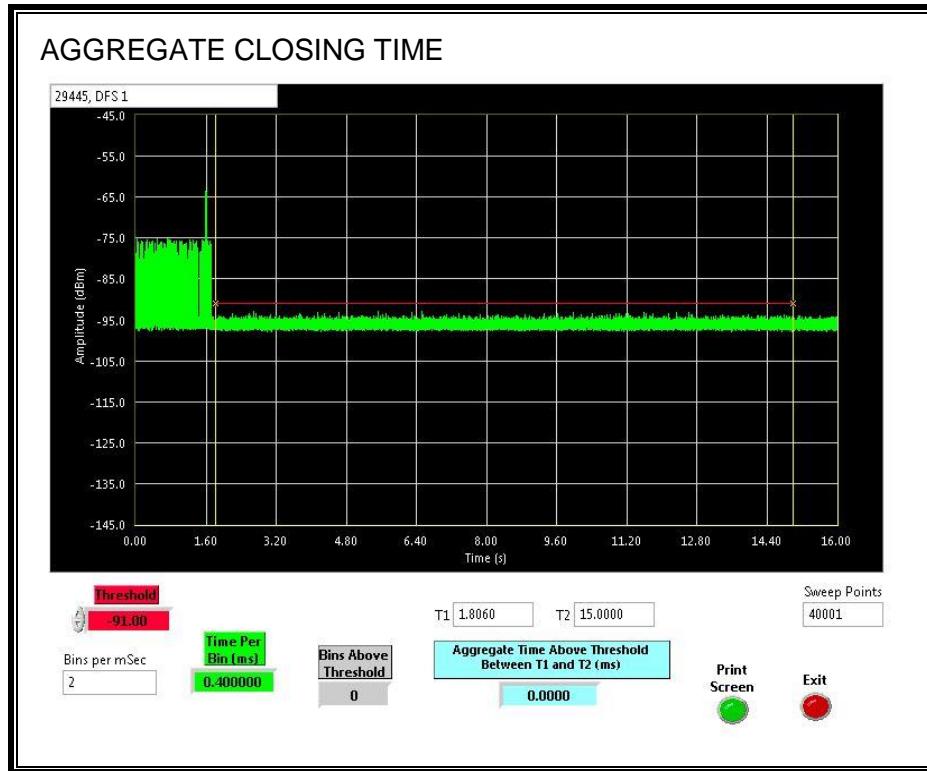
11.6. CLIENT-TO-CLIENT COMMUNICATIONS MODE RESULTS FOR 40 MHz BANDWIDTH

11.6.1. TEST CHANNEL

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

11.6.2. RADAR WAVEFORM AND TRAFFIC

RADAR WAVEFORM
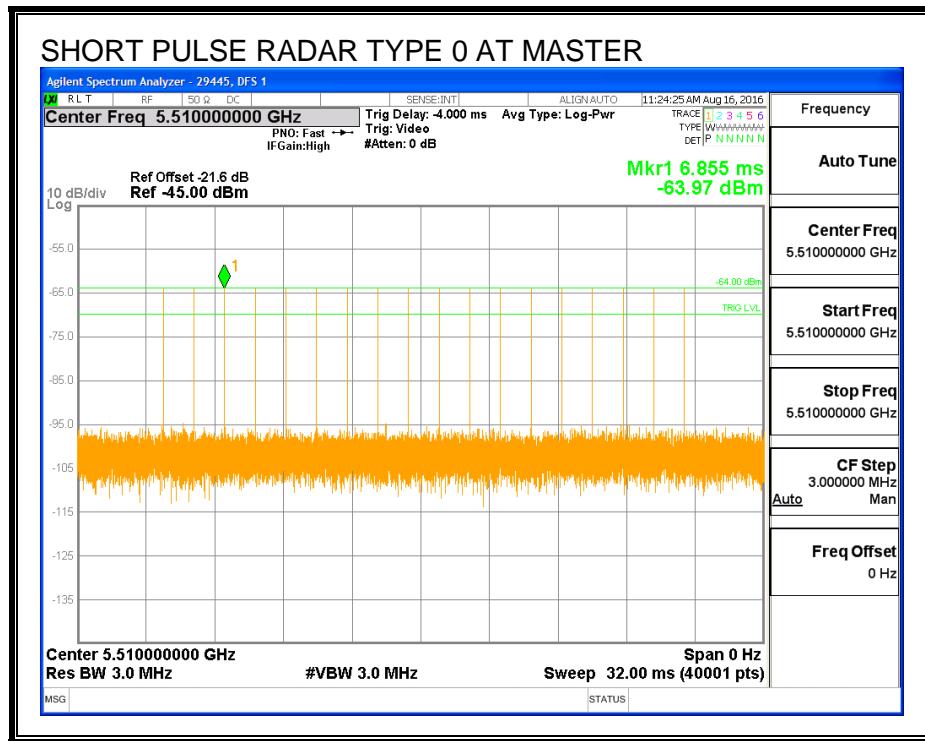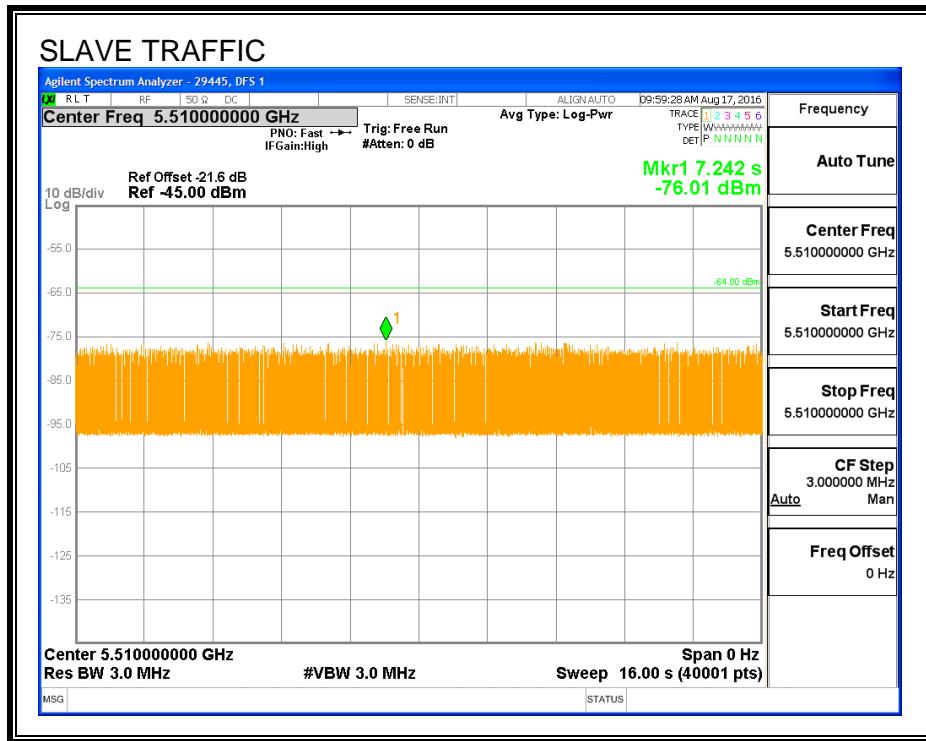
TRAFFIC
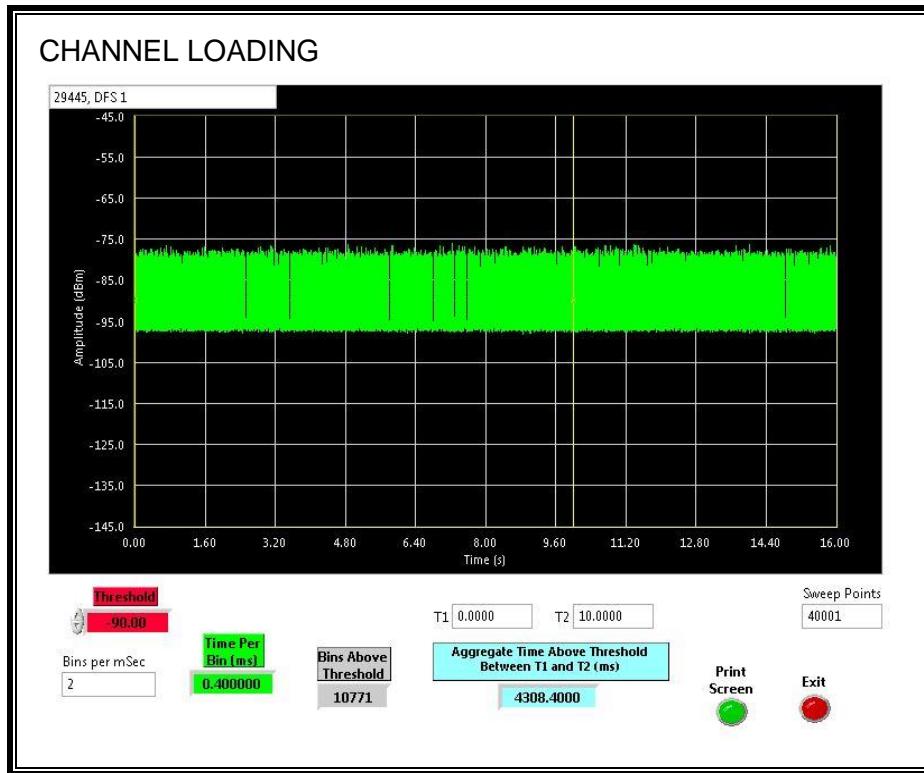
CHANNEL LOADING

The level of traffic loading on the channel by the EUT is 43.08%

11.6.3. OVERLAPPING CHANNEL TESTS

RESULTS

These tests are not applicable.

11.6.4. 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)
0.1472	10

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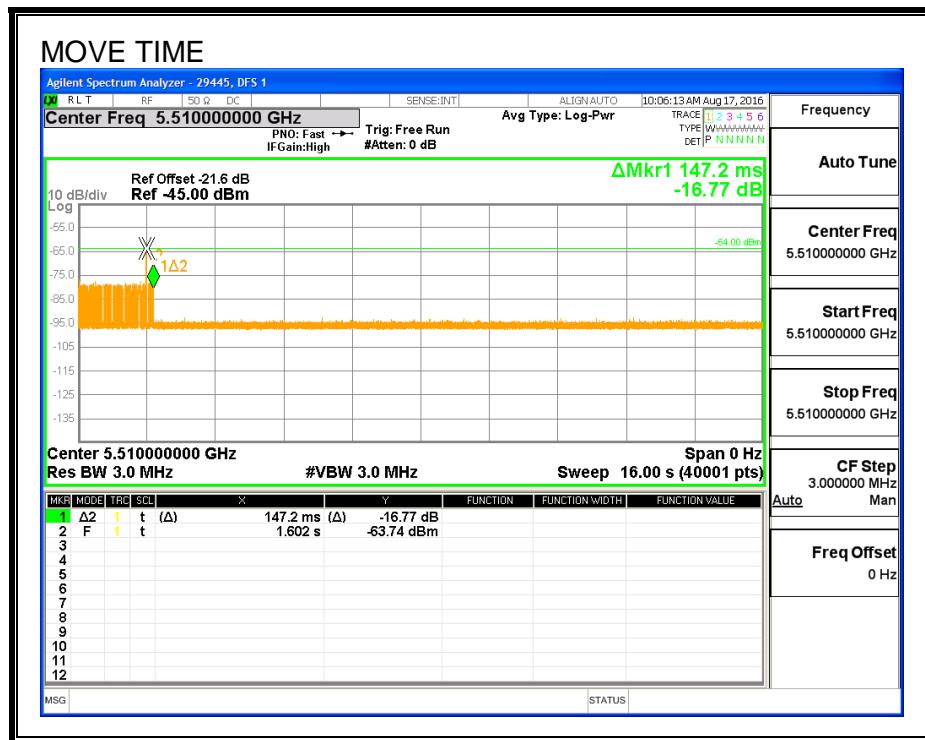
MOVE TIME

CHANNEL CLOSING TIME

CLOSING TIME

Agilent Spectrum Analyzer - 29445, DFS 1

ΔMkr1 200.0 ms
-35.22 dB

Center Freq 5.510000000 GHz

Ref Offset -21.6 dB
Ref -45.00 dBm

Center 5.510000000 GHz
Res BW 3.0 MHz   #VBW 3.0 MHz   Span 0 Hz
Sweep 600.0 ms (40001 pts)

AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

No transmissions are observed during the aggregate monitoring period.

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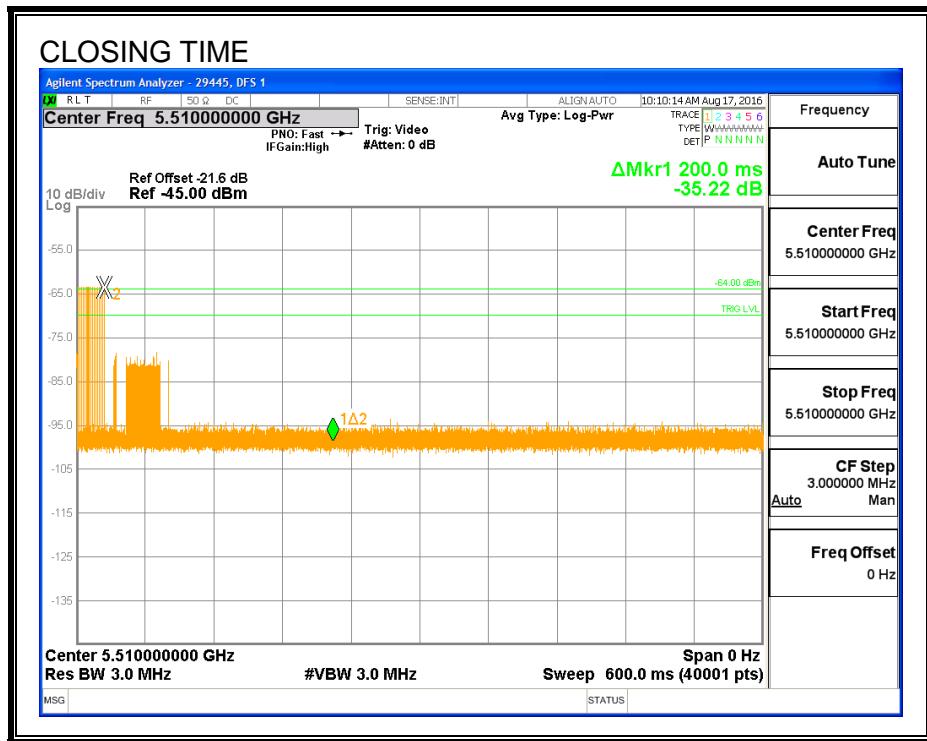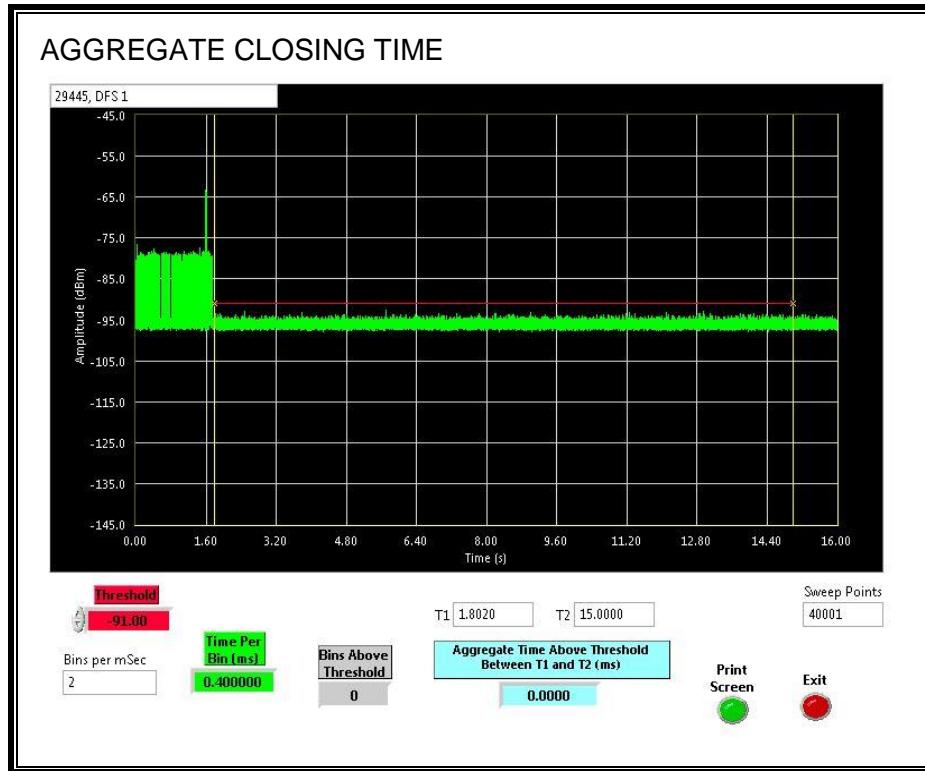
11.7. BCLIENT-TO-CLIENT COMMUNICATIONS MODE RESULTS FOR 80 MHz BANDWIDTH

11.7.1. TEST CHANNEL

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

11.7.2. RADAR WAVEFORM AND TRAFFIC

RADAR WAVEFORM
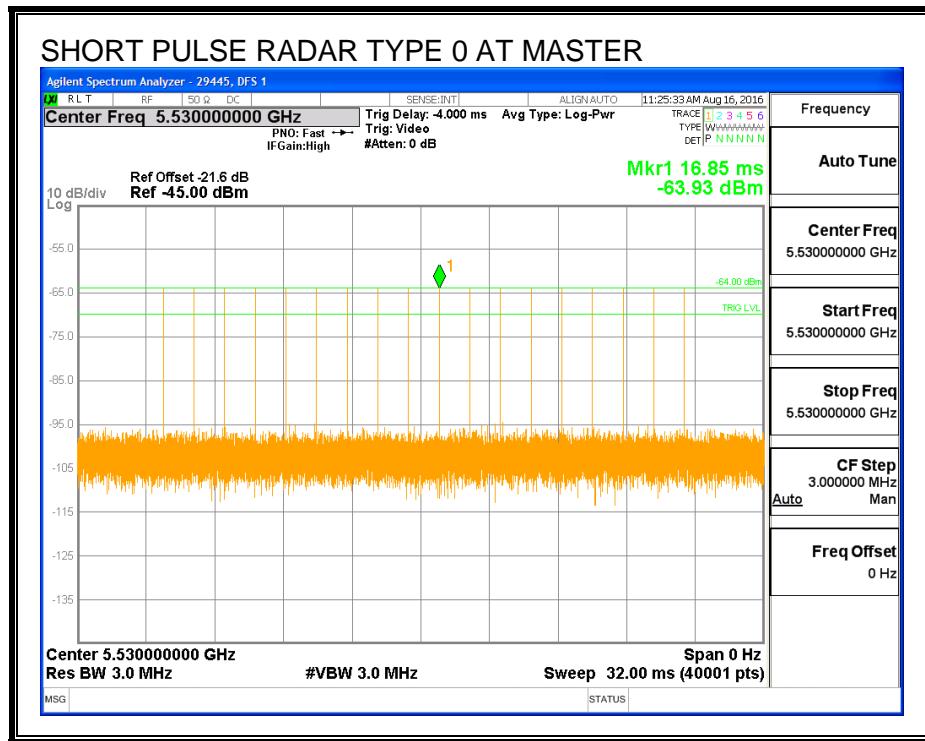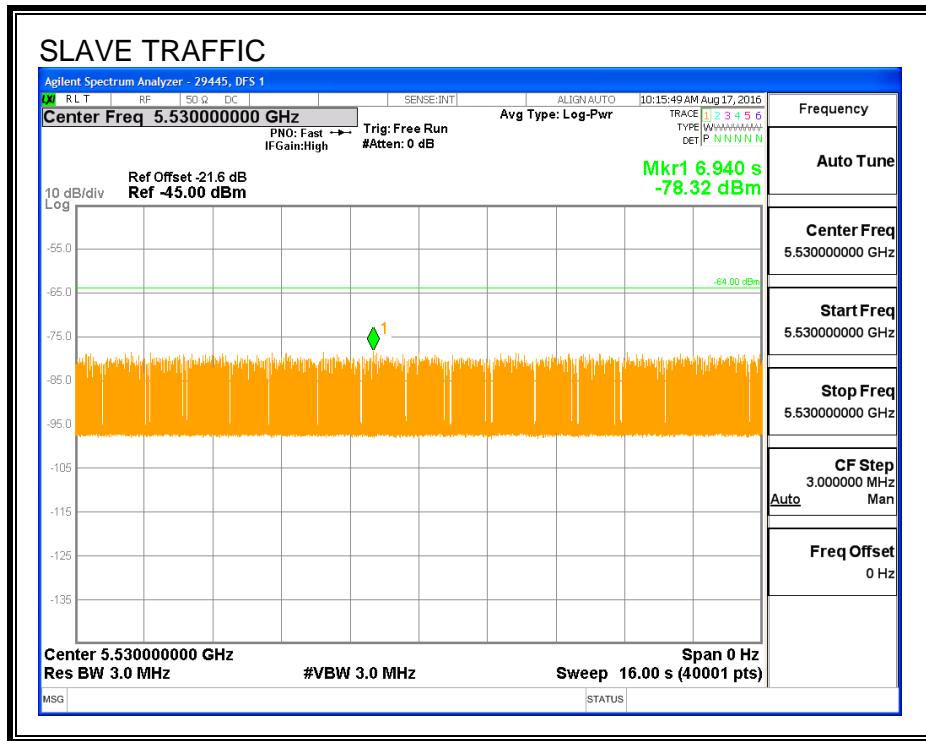
TRAFFIC
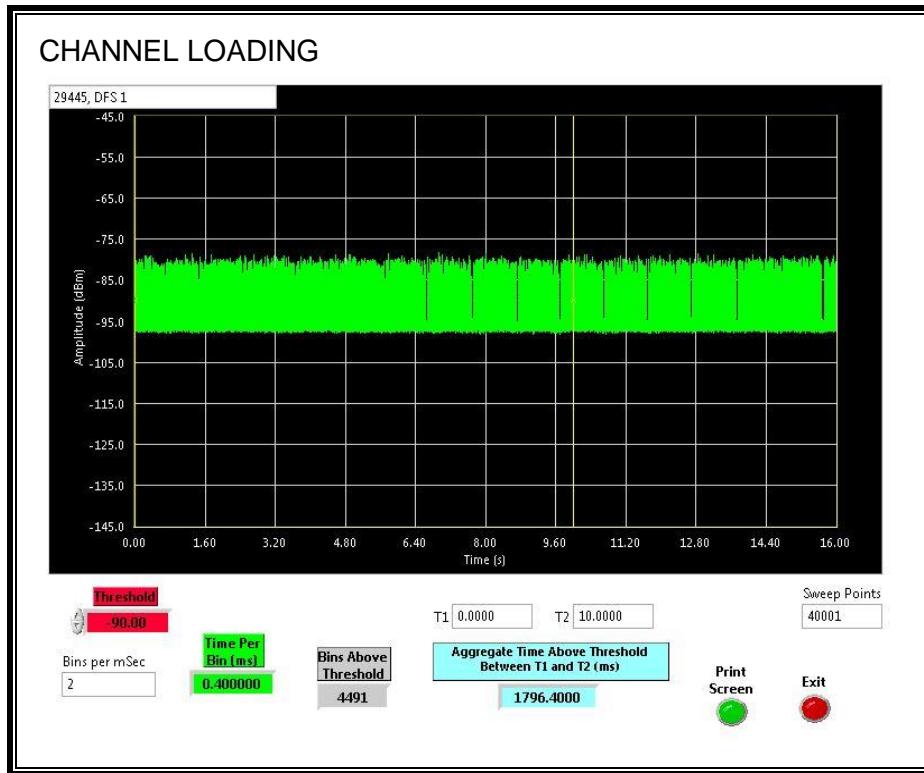
CHANNEL LOADING

The level of traffic loading on the channel by the EUT is 17.96%

11.7.3. OVERLAPPING CHANNEL TESTS

RESULTS

These tests are not applicable.

11.7.4. 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)
4.078	10

| Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
0.4	60

MOVE TIME
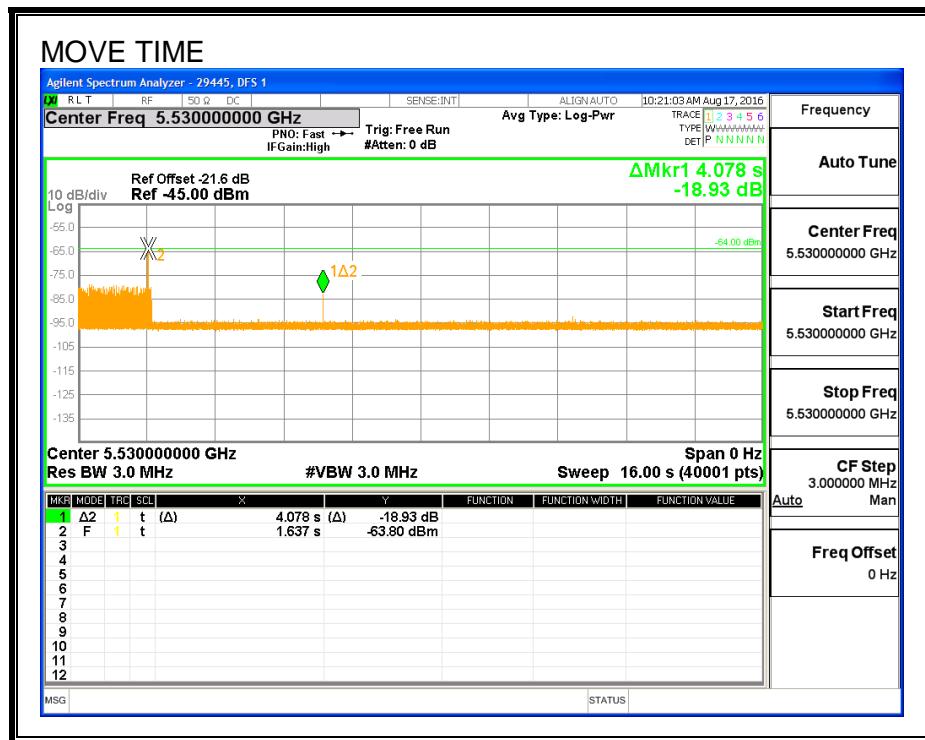
CHANNEL CLOSING TIME
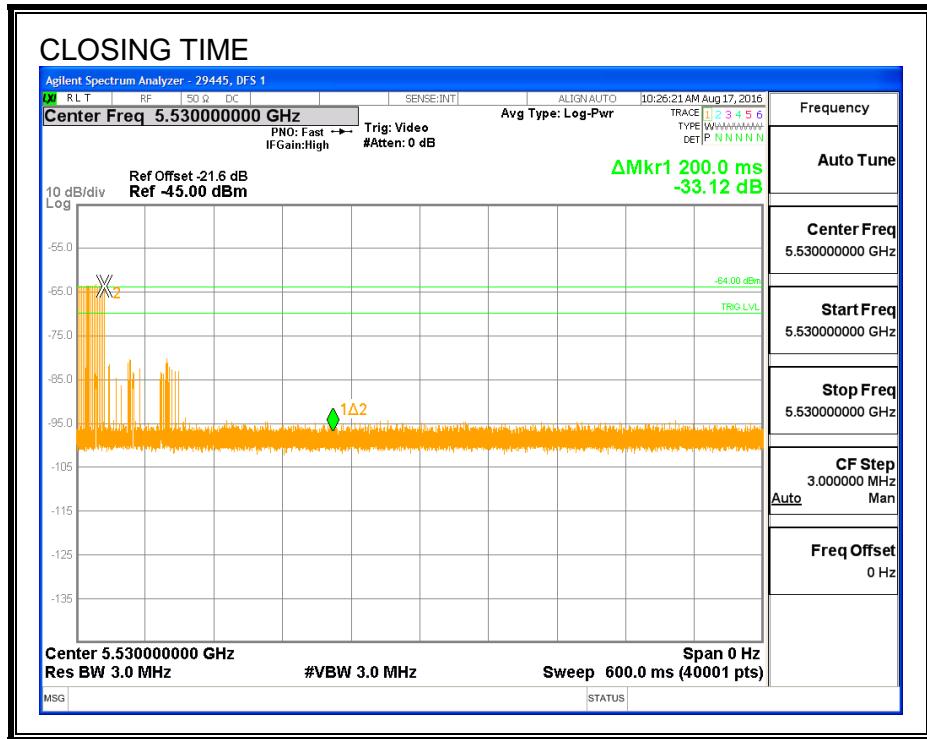
AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

Only intermittent transmissions are observed during the aggregate monitoring period.

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11.7.5. 10-MINUTE CLIENT Tx MONITORING PERIOD

RESULTS

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

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