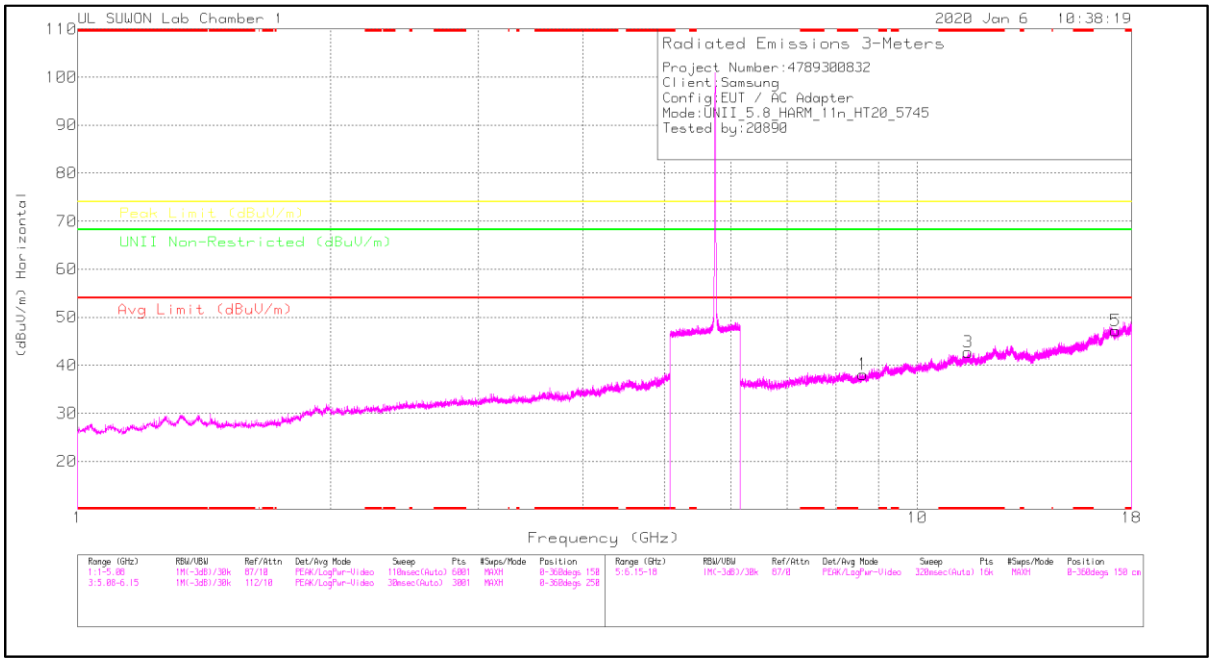
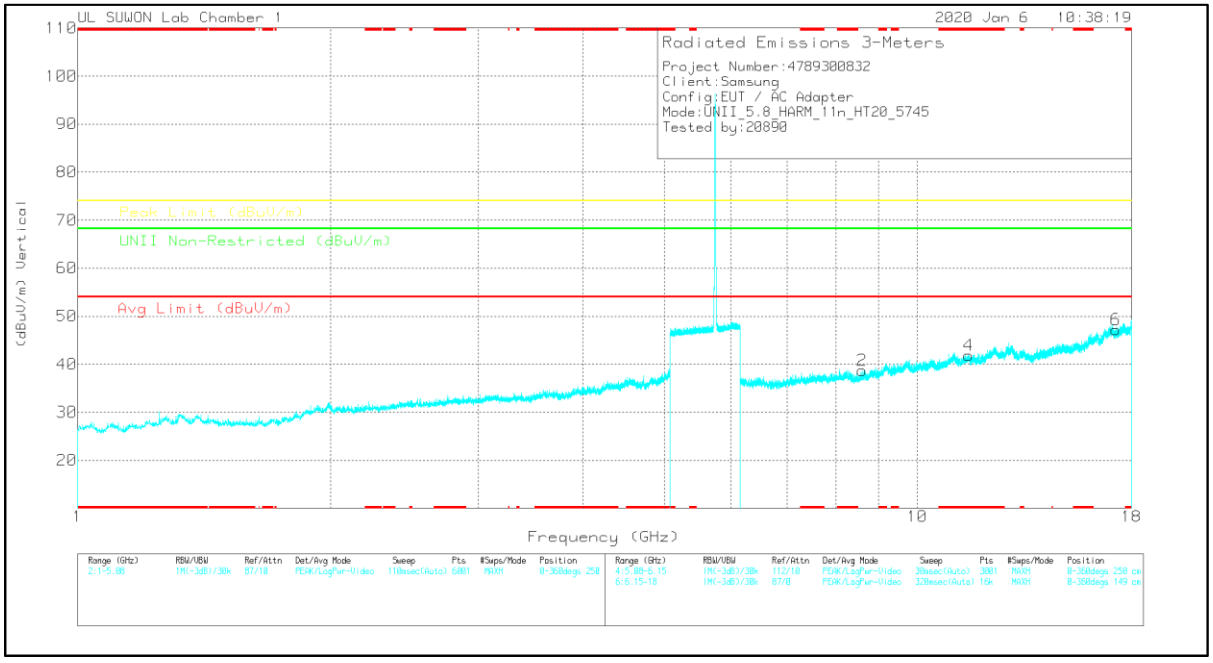
HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL HORIZONTAL



LOW CHANNEL VERTICAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

LOW CHANNEL DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	6GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	UNII Non-Restricted (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	8.61317	26.74	PK	36.3	-24.9	0	38.14	-	-	-	-	68.2	-30.06	0-360	150	H
3	* 11.50587	26.61	PK	38.5	-22.4	0	42.71	-	-	74	-31.29	-	-	0-360	150	H
5	17.22758	23.5	PK	41.3	-17.6	0	47.2	-	-	-	-	68.2	-21	0-360	150	H
2	8.60428	27.06	PK	36.3	-24.6	0	38.76	-	-	-	-	68.2	-29.44	0-360	149	V
4	* 11.50735	25.77	PK	38.5	-22.4	0	41.87	-	-	74	-32.13	-	-	0-360	149	V
6	17.23573	23.49	PK	41.3	-17.6	0	47.19	-	-	-	-	68.2	-21.01	0-360	149	V

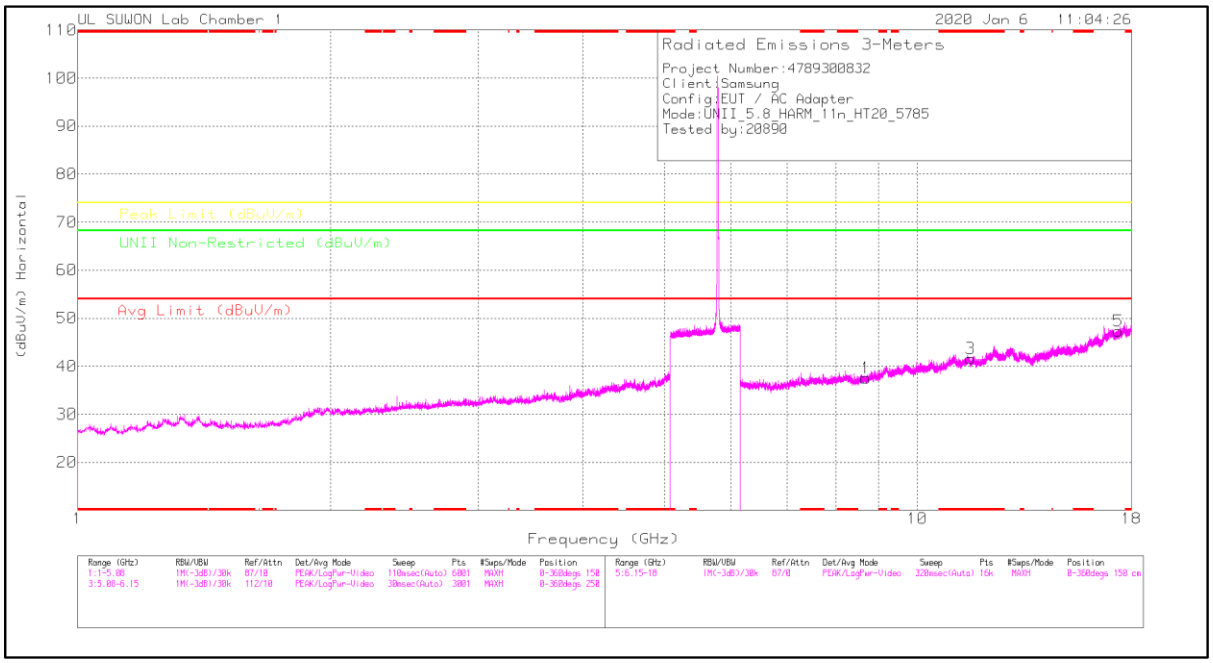
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK – Peak Detector

Radiated Emissions

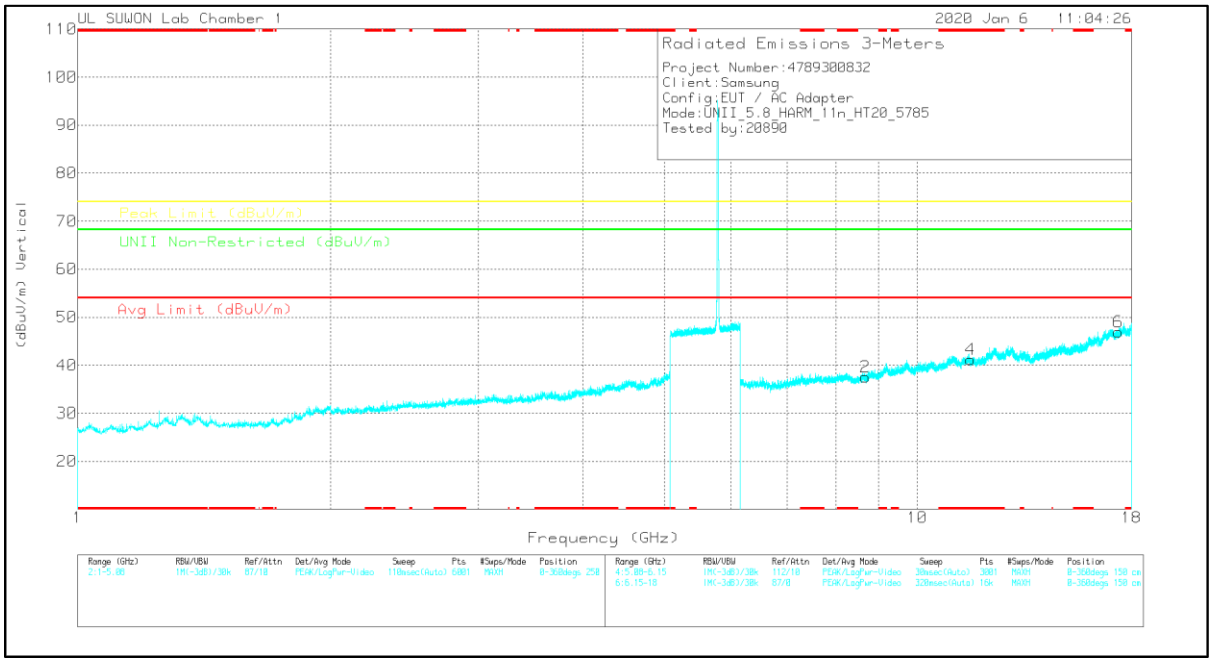
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	6GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	UNII Non-Restricted (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
8.61029	36.73	PK-U	36.3	-24.8	0	48.23	-	-	-	-	68.2	-19.97	360	100	H
8.62077	36.5	PK-U	36.3	-24.9	0	47.9	-	-	-	-	68.2	-20.3	360	100	V
* 11.50505	36.16	PK-U	38.5	-22.4	0	52.26	-	-	74	-21.74	-	-	360	100	H
* 11.50635	35.44	PK-U	38.5	-22.4	0	51.54	-	-	74	-22.46	-	-	360	100	V
17.22374	34.42	PK-U	41.3	-17.7	0	58.02	-	-	-	-	68.2	-10.18	360	100	H
17.22885	34.05	PK-U	41.3	-17.6	0	57.75	-	-	-	-	68.2	-10.45	360	100	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK-U - U-NII: Maximum Peak

MID CHANNEL HORIZONTAL



MID CHANNEL VERTICAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

MID CHANNEL DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	6GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	UNII Non-Restricted (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	8.68204	26.79	PK	36.4	-25.6	0	37.59	-	-	-	-	68.2	-30.61	0-360	150	H
3	* 11.56808	25.26	PK	38.6	-22.3	0	41.56	-	-	74	-32.44	-	-	0-360	250	H
5	17.34904	23.97	PK	41.2	-17.8	0	47.37	-	-	-	-	68.2	-20.83	0-360	150	H
2	8.67908	26.68	PK	36.4	-25.5	0	37.58	-	-	-	-	68.2	-30.62	0-360	250	V
4	* 11.57326	24.78	PK	38.6	-22.2	0	41.18	-	-	74	-32.82	-	-	0-360	150	V
6	17.35644	23.44	PK	41.2	-17.7	0	46.94	-	-	-	-	68.2	-21.26	0-360	150	V

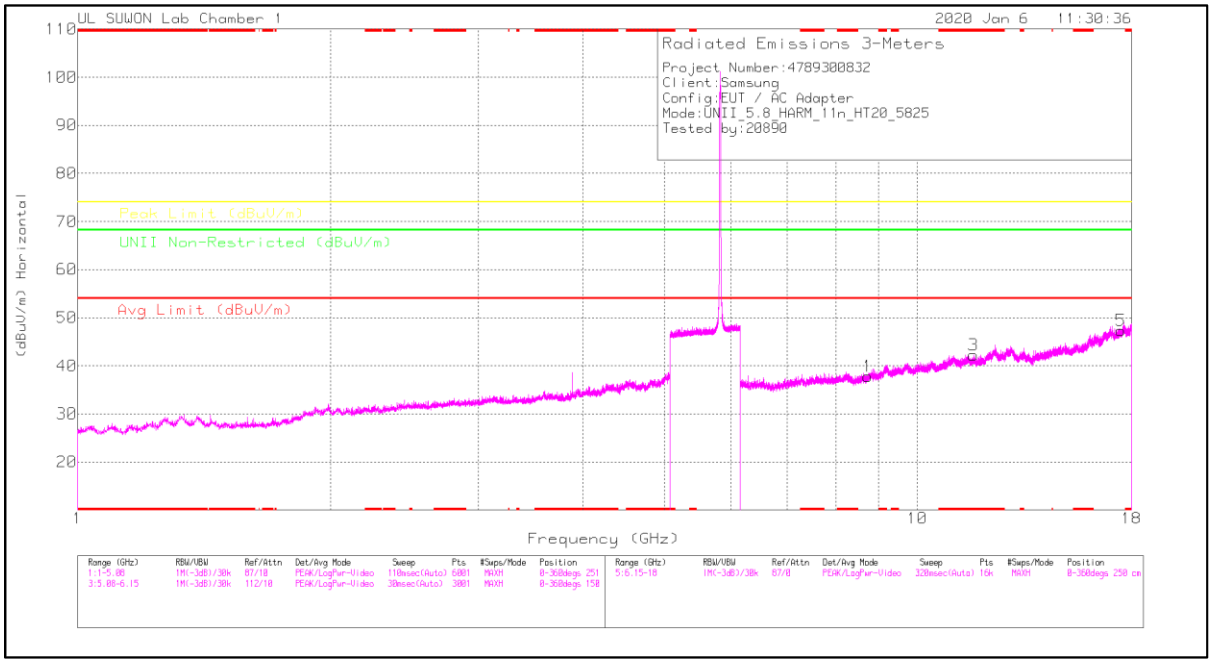
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK – Peak Detector

Radiated Emissions

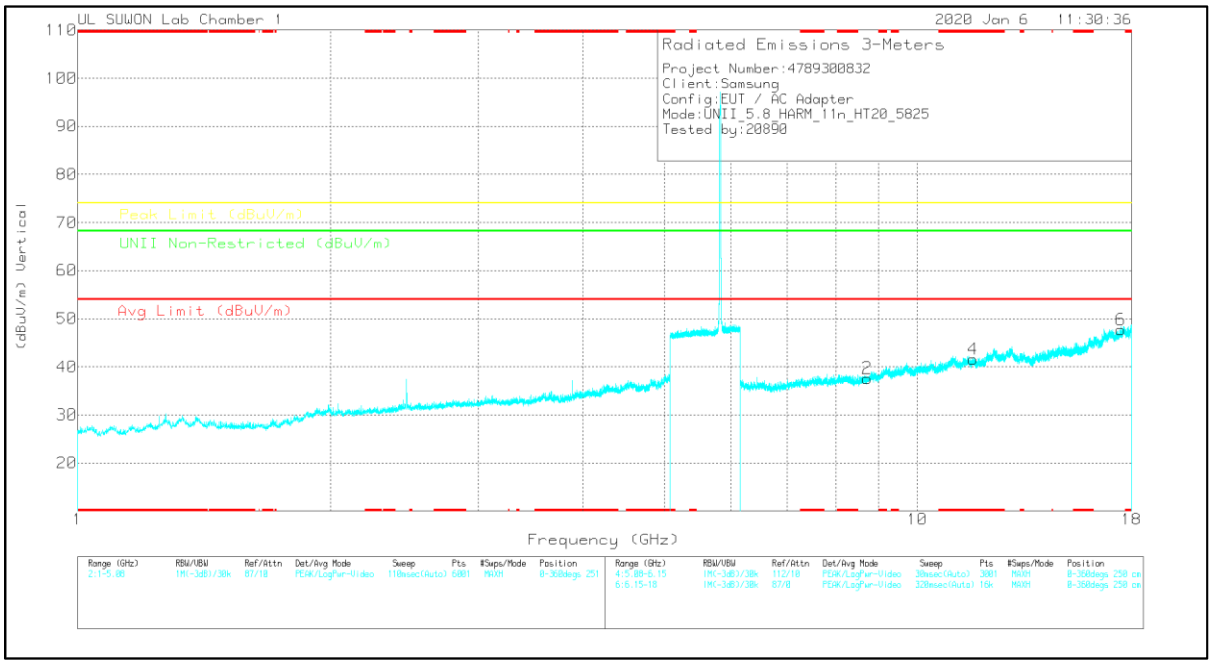
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	6GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	UNII Non-Restricted (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
8.68431	37.05	PK-U	36.4	-25.6	0	47.85	-	-	-	-	68.2	-20.35	360	100	H
8.68635	38.25	PK-U	36.4	-25.6	0	49.05	-	-	-	-	68.2	-19.15	360	100	V
* 11.56325	36.4	PK-U	38.6	-22.4	0	52.6	-	-	74	-21.4	-	-	360	100	H
* 11.56923	36.28	PK-U	38.6	-22.3	0	52.58	-	-	74	-21.42	-	-	360	100	V
17.34695	33.84	PK-U	41.2	-17.9	0	57.14	-	-	-	-	68.2	-11.06	360	100	H
17.35177	34.64	PK-U	41.2	-17.8	0	58.04	-	-	-	-	68.2	-10.16	360	100	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK-U - U-NII: Maximum Peak

HIGH CHANNEL HORIZONTAL



HIGH CHANNEL VERTICAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

HIGH CHANNEL DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	6GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	UNII Non-Restricted (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	8.7361	27.11	PK	36.4	-25.7	0	37.81	-	-	-	-	68.2	-30.39	0-360	250	H
3	* 11.66583	25.23	PK	38.7	-21.7	0	42.23	-	-	74	-31.77	-	-	0-360	150	H
5	17.48678	23.76	PK	41.2	-17.6	0	47.36	-	-	-	-	68.2	-20.84	0-360	250	H
2	8.72573	26.92	PK	36.4	-25.7	0	37.62	-	-	-	-	68.2	-30.58	0-360	250	V
4	* 11.66509	24.54	PK	38.7	-21.7	0	41.54	-	-	74	-32.46	-	-	0-360	150	V
6	17.47567	24.14	PK	41.2	-17.6	0	47.74	-	-	-	-	68.2	-20.46	0-360	150	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK – Peak Detector

Radiated Emissions

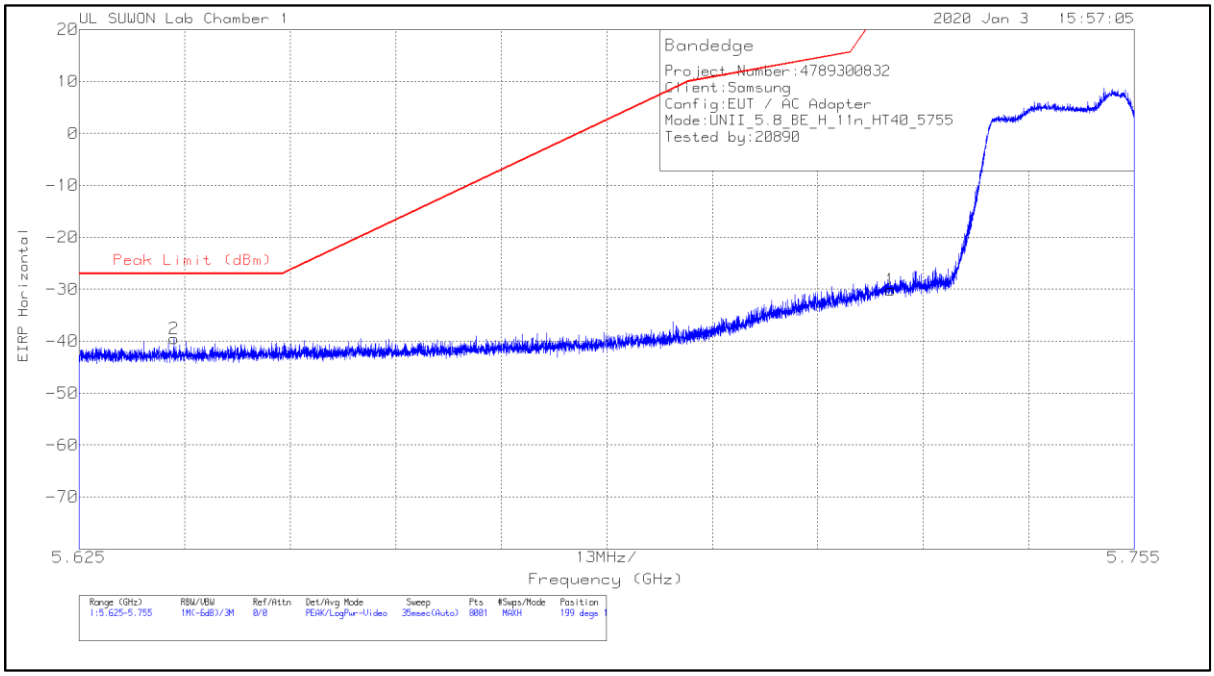
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	6GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	UNII Non-Restricted (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
8.73684	37.64	PK-U	36.4	-25.7	0	48.34	-	-	-	-	68.2	-19.86	360	100	H
8.73341	37.51	PK-U	36.4	-25.6	0	48.31	-	-	-	-	68.2	-19.89	360	100	V
* 11.66977	35.98	PK-U	38.7	-21.8	0	52.88	-	-	74	-21.12	-	-	360	100	H
* 11.6665	36.12	PK-U	38.7	-21.7	0	53.12	-	-	74	-20.88	-	-	360	100	V
17.48757	34.54	PK-U	41.2	-17.7	0	58.04	-	-	-	-	68.2	-10.16	360	100	H
17.48819	34.64	PK-U	41.2	-17.7	0	58.14	-	-	-	-	68.2	-10.06	360	100	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK-U - U-NII: Maximum Peak

11.5.3. TX ABOVE 1GHz 802.11n HT40 1Tx MODE IN THE 5.8GHz BAND

BANDEDGE (LOW CHANNEL)

HORIZONTAL PEAK DATA

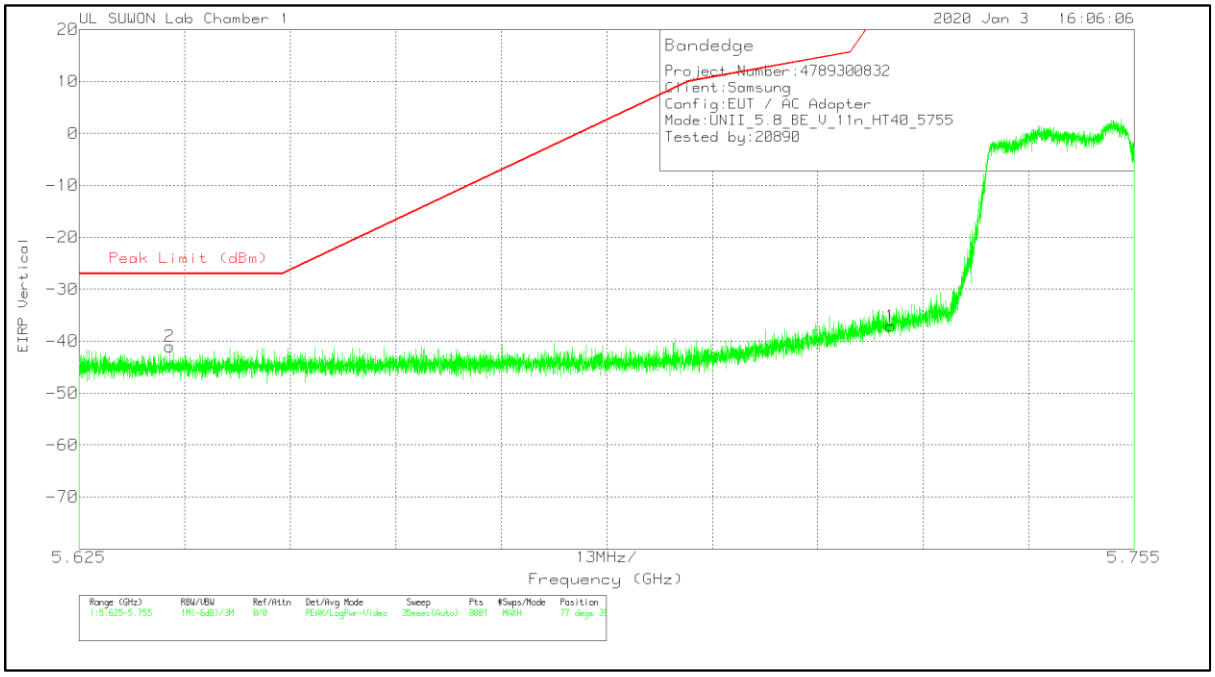


Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	3117_00168717	10dB_ATT[dB]	Conversion Factor (dB)	DC Corr (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.72499	-55.62	Pk	34.8	-21.1	11.8	0	-30.12	26.97	-57.09	199	103	H
2	5.63665	-64.92	Pk	34.7	-21.1	11.8	0	-39.52	-27	-12.52	199	103	H

Pk - Peak detector

VERTICAL PEAK DATA



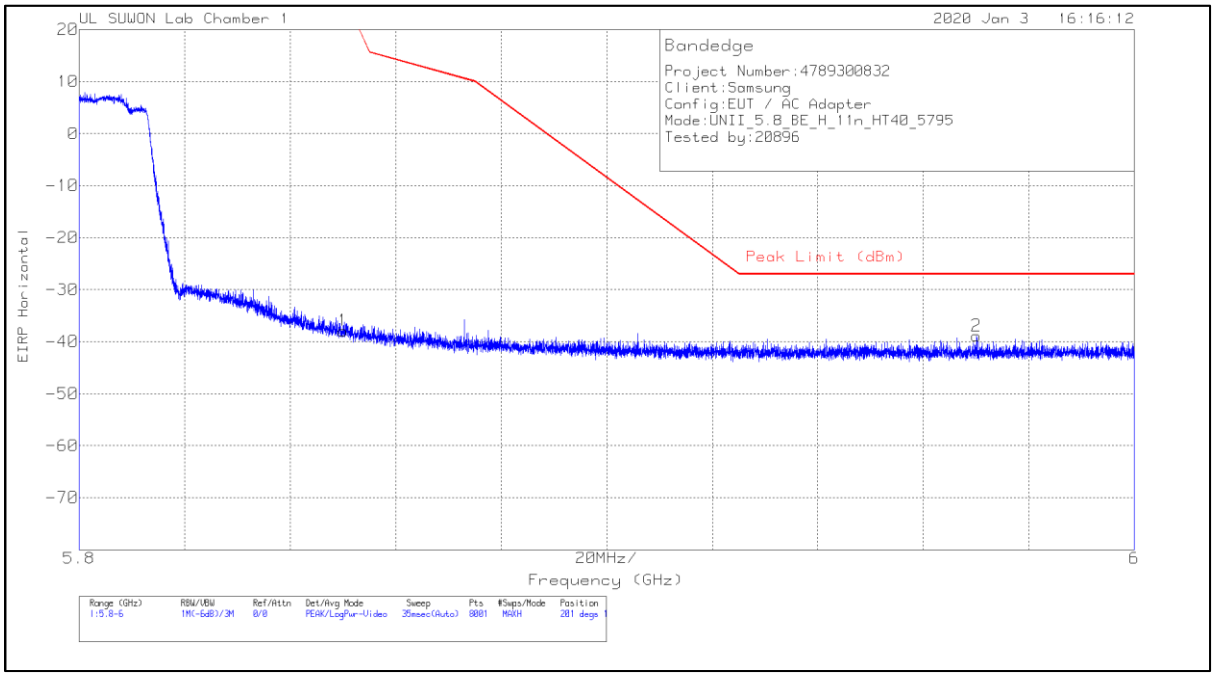
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	3117_00168717	10dB_ATT[dB]	Conversion Factor (dB)	DC Corr (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.72499	-62.6	Pk	34.8	-21.1	11.8	0	-37.1	26.97	-64.07	77	394	V
2	5.63615	-66.41	Pk	34.7	-21.1	11.8	0	-41.01	-27	-14.01	77	394	V

Pk - Peak detector

BANDEDGE (HIGH CHANNEL)

HORIZONTAL PEAK DATA

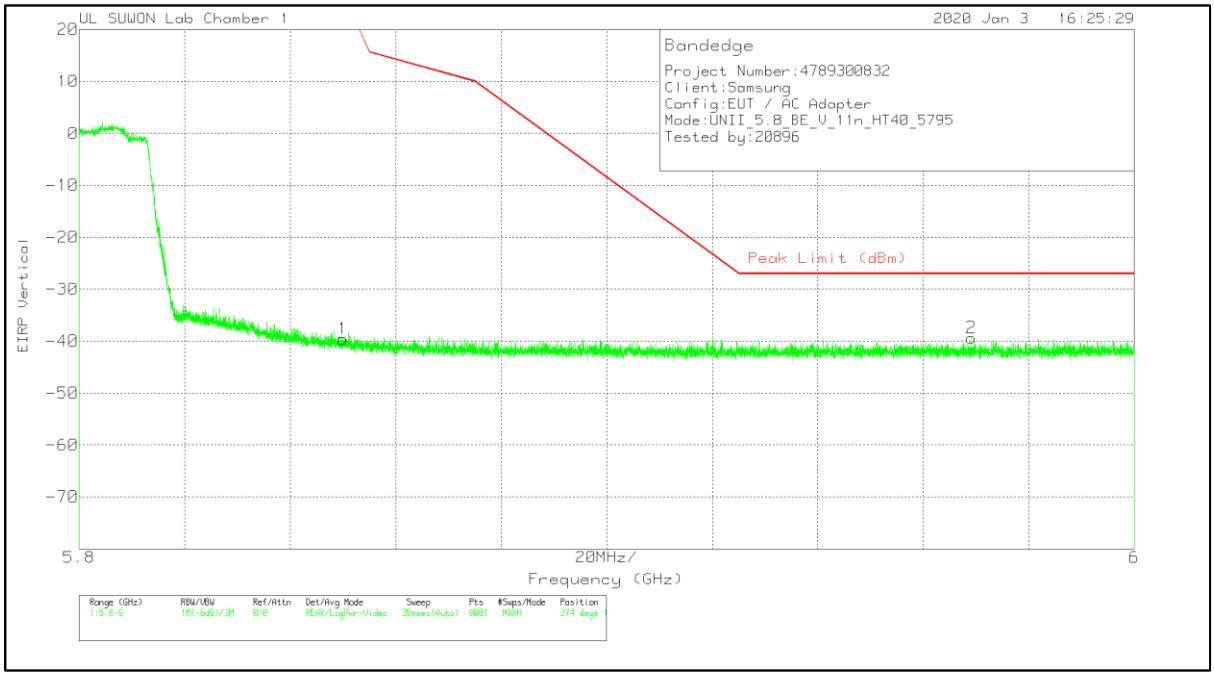


Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	3117_00168717	10dB_ATT[dB]	Conversion Factor (dB)	DC Corr (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.85003	-63.69	Pk	35	-21	11.8	0	-37.89	26.94	-64.83	201	103	H
2	5.97013	-65.1	Pk	35.1	-20.7	11.8	0	-38.9	-27	-11.9	201	103	H

Pk - Peak detector

VERTICAL PEAK DATA



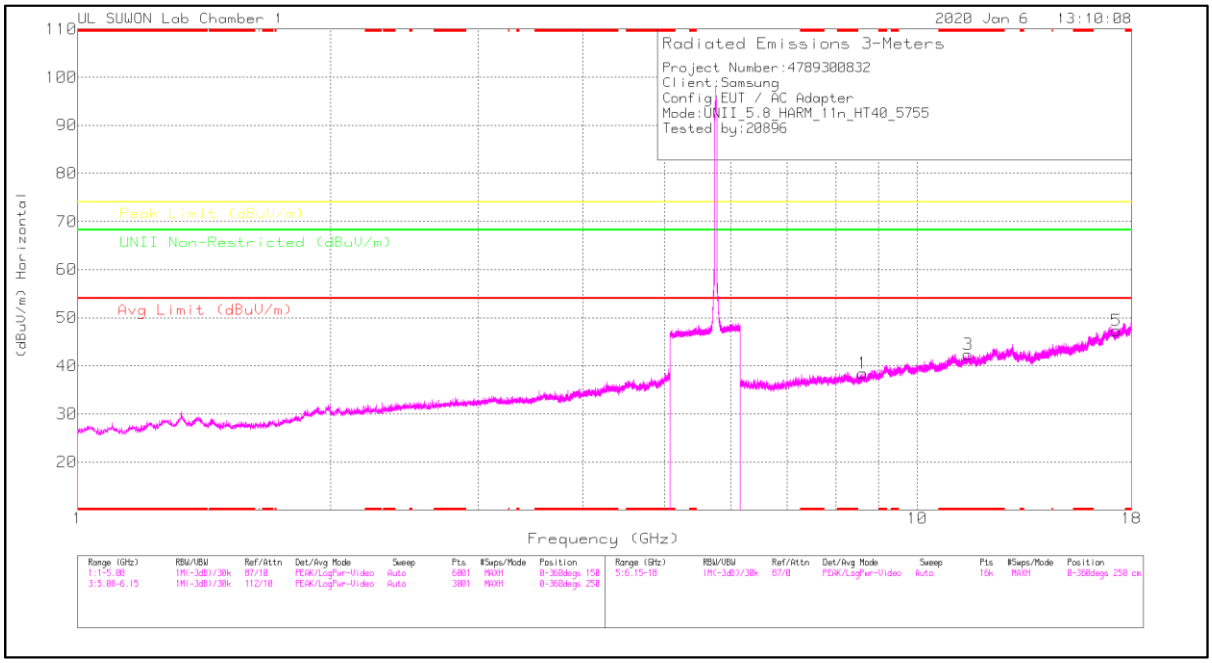
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	3117_00168717	10dB_ATT[dB]	Conversion Factor (dB)	DC Corr (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.85003	-65.37	Pk	35	-21	11.8	0	-39.57	26.94	-66.51	274	184	V
2	5.96913	-65.57	Pk	35.1	-20.7	11.8	0	-39.37	-27	-12.37	274	184	V

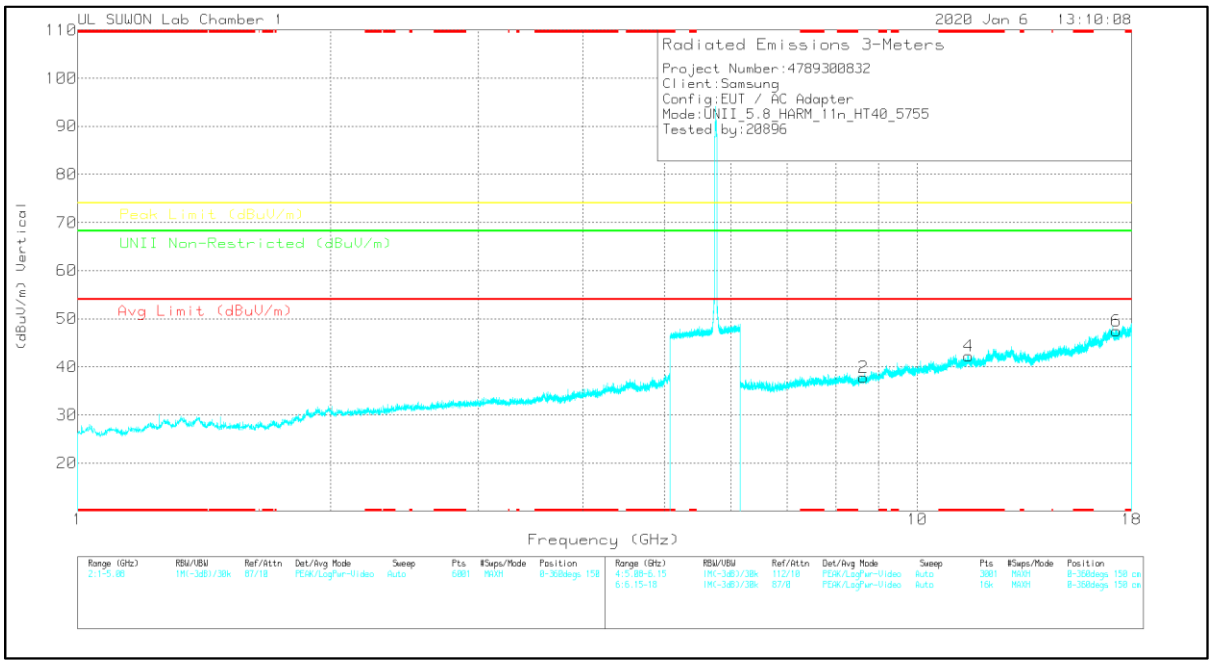
Pk - Peak detector

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL HORIZONTAL



LOW CHANNEL VERTICAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

LOW CHANNEL DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	6GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	UNII Non-Restricted (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	8.61465	27.09	PK	36.3	-24.9	0	38.49	-	-	-	-	68.2	-29.71	0-360	150	H
3	* 11.49476	26.37	PK	38.5	-22.5	0	42.37	-	-	74	-31.63	-	-	0-360	150	H
5	17.28461	23.74	PK	41.3	-17.7	0	47.34	-	-	-	-	68.2	-20.86	0-360	250	H
2	8.63242	26.47	PK	36.3	-24.9	0	37.87	-	-	-	-	68.2	-30.33	0-360	250	V
4	* 11.51031	26.11	PK	38.5	-22.4	0	42.21	-	-	74	-31.79	-	-	0-360	150	V
6	17.26831	23.86	PK	41.3	-17.7	0	47.46	-	-	-	-	68.2	-20.74	0-360	150	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK – Peak Detector

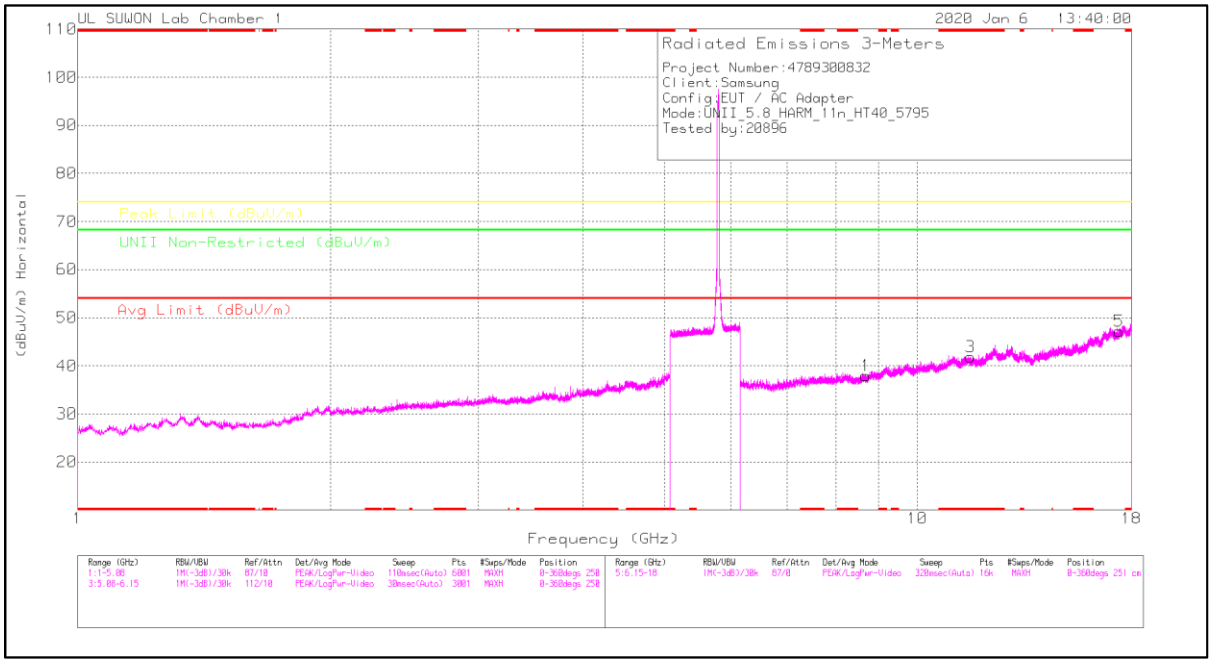
Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	6GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	UNII Non-Restricted (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
8.61302	36.94	PK-U	36.3	-24.9	0	48.34	-	-	-	-	68.2	-19.86	360	100	H
8.61386	36.4	PK-U	36.3	-24.9	0	47.8	-	-	-	-	68.2	-20.4	360	100	V
* 11.49379	36.22	PK-U	38.5	-22.4	0	52.32	-	-	74	-21.68	-	-	360	100	H
* 11.49465	35.92	PK-U	38.5	-22.5	0	51.92	-	-	74	-22.08	-	-	360	100	V
17.28405	33.99	PK-U	41.3	-17.7	0	57.59	-	-	-	-	68.2	-10.61	360	100	H
17.28329	33.58	PK-U	41.3	-17.7	0	57.18	-	-	-	-	68.2	-11.02	360	100	V

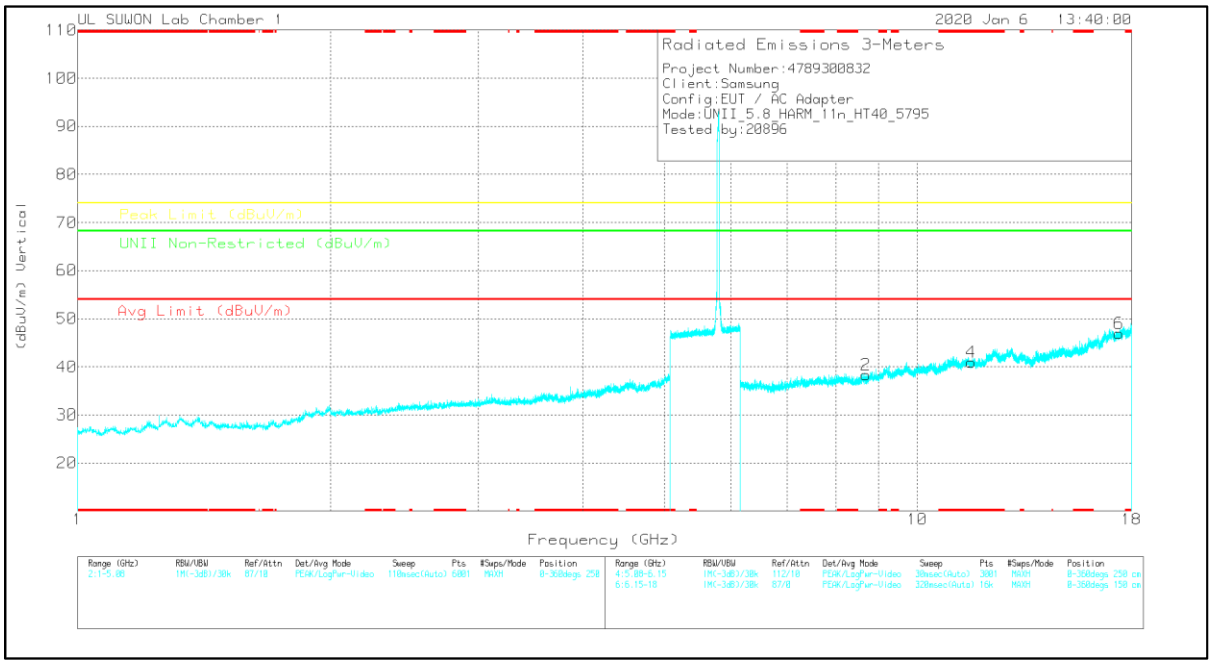
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK-U - U-NII: Maximum Peak

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_15E
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433

HIGH CHANNEL HORIZONTAL



HIGH CHANNEL VERTICAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

HIGH CHANNEL DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	6GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	UNII Non-Restricted (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	8.68204	27.12	PK	36.4	-25.6	0	37.92	-	-	-	-	68.2	-30.28	0-360	150	H
3	* 11.57104	25.58	PK	38.6	-22.3	0	41.88	-	-	74	-32.12	-	-	0-360	150	H
5	17.37718	23.62	PK	41.2	-17.6	0	47.22	-	-	-	-	68.2	-20.98	0-360	150	H
2	8.69241	27.53	PK	36.4	-25.6	0	38.33	-	-	-	-	68.2	-29.87	0-360	251	V
4	* 11.59103	24.4	PK	38.6	-22.1	0	40.9	-	-	74	-33.1	-	-	0-360	251	V
6	17.38088	23.32	PK	41.2	-17.6	0	46.92	-	-	-	-	68.2	-21.28	0-360	150	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK – Peak Detector

Radiated Emissions

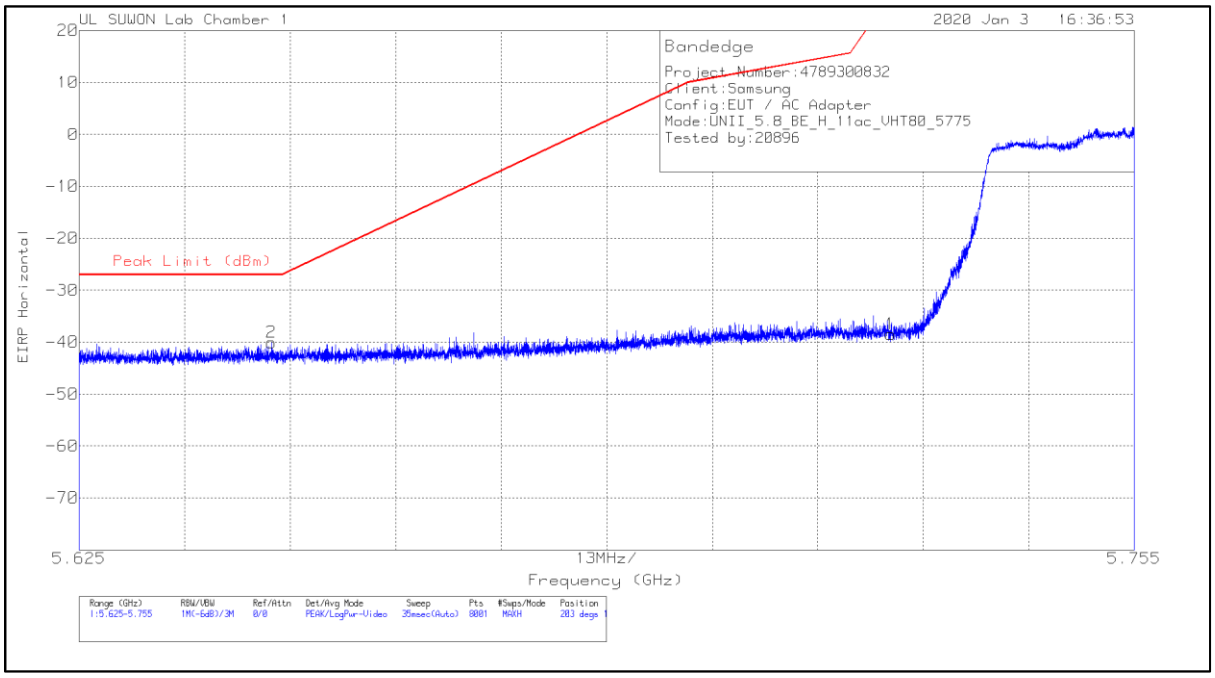
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	6GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	UNII Non-Restricted (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
8.68319	37.84	PK-U	36.4	-25.6	0	48.64	-	-	-	-	68.2	-19.56	360	100	H
8.68139	37.1	PK-U	36.4	-25.6	0	47.9	-	-	-	-	68.2	-20.3	360	100	V
* 11.57004	35.95	PK-U	38.6	-22.3	0	52.25	-	-	74	-21.75	-	-	360	100	H
* 11.57235	35.95	PK-U	38.6	-22.3	0	52.25	-	-	74	-21.75	-	-	360	100	V
17.37726	34.57	PK-U	41.2	-17.6	0	58.17	-	-	-	-	68.2	-10.03	360	100	H
17.37747	34.19	PK-U	41.2	-17.6	0	57.79	-	-	-	-	68.2	-10.41	360	100	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK-U - U-NII: Maximum Peak

11.5.4. TX ABOVE 1GHz 802.11ac VHT80 1Tx MODE IN THE 5.8GHz BAND

BANDEDGE (Lower side)

HORIZONTAL PEAK DATA

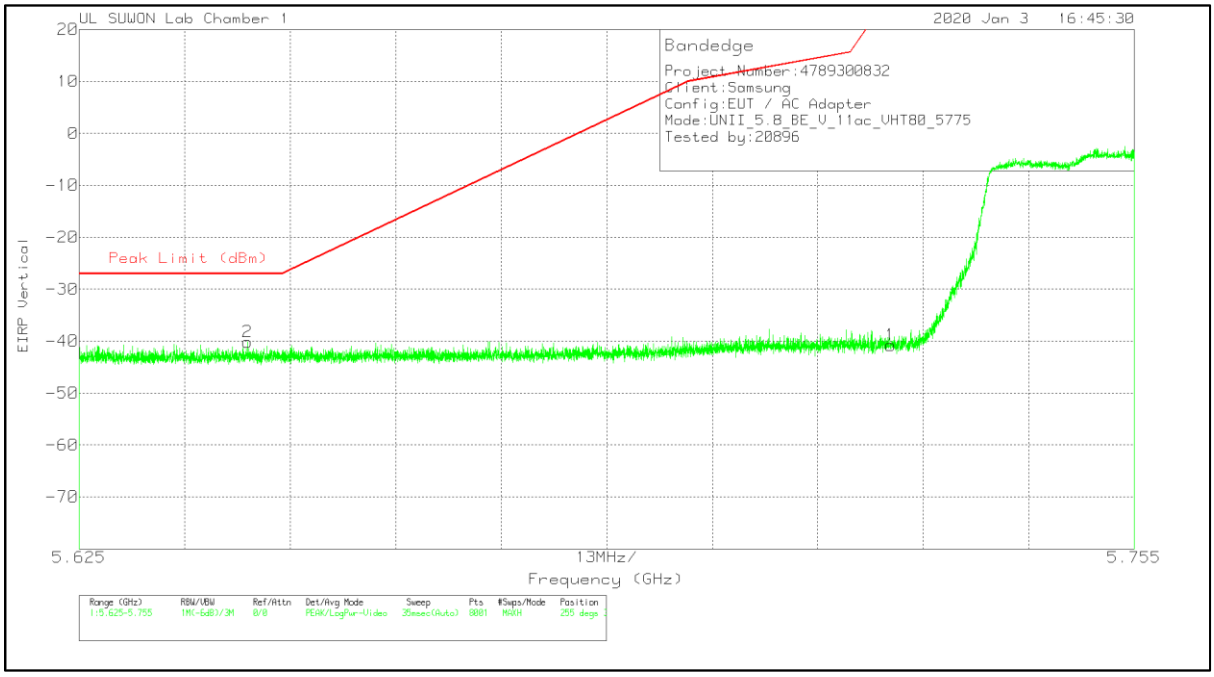


Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	3117_00168717	10dB_ATT[dB]	Conversion Factor (dB)	DC Corr (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.72499	-63.97	Pk	34.8	-21.1	11.8	0	-38.47	26.97	-65.44	203	100	H
2	5.64871	-65.45	Pk	34.7	-21.1	11.8	0	-40.05	-27	-13.05	203	100	H

Pk - Peak detector

VERTICAL PEAK DATA



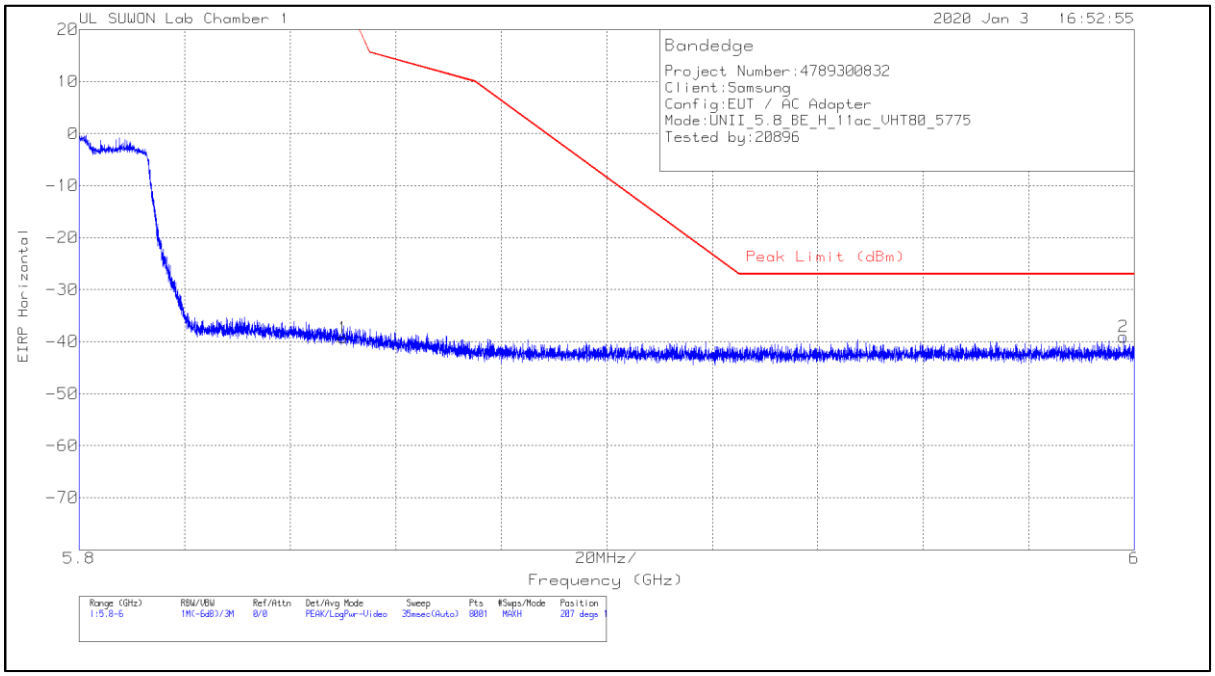
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	3117_00168717	10dB_ATT[dB]	Conversion Factor (dB)	DC Corr (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.72499	-66.26	Pk	34.8	-21.1	11.8	0	-40.76	26.97	-67.73	255	399	V
2	5.64572	-65.65	Pk	34.7	-21	11.8	0	-40.15	-27	-13.15	255	399	V

Pk - Peak detector

BANDEDGE (Upper side)

HORIZONTAL PEAK DATA

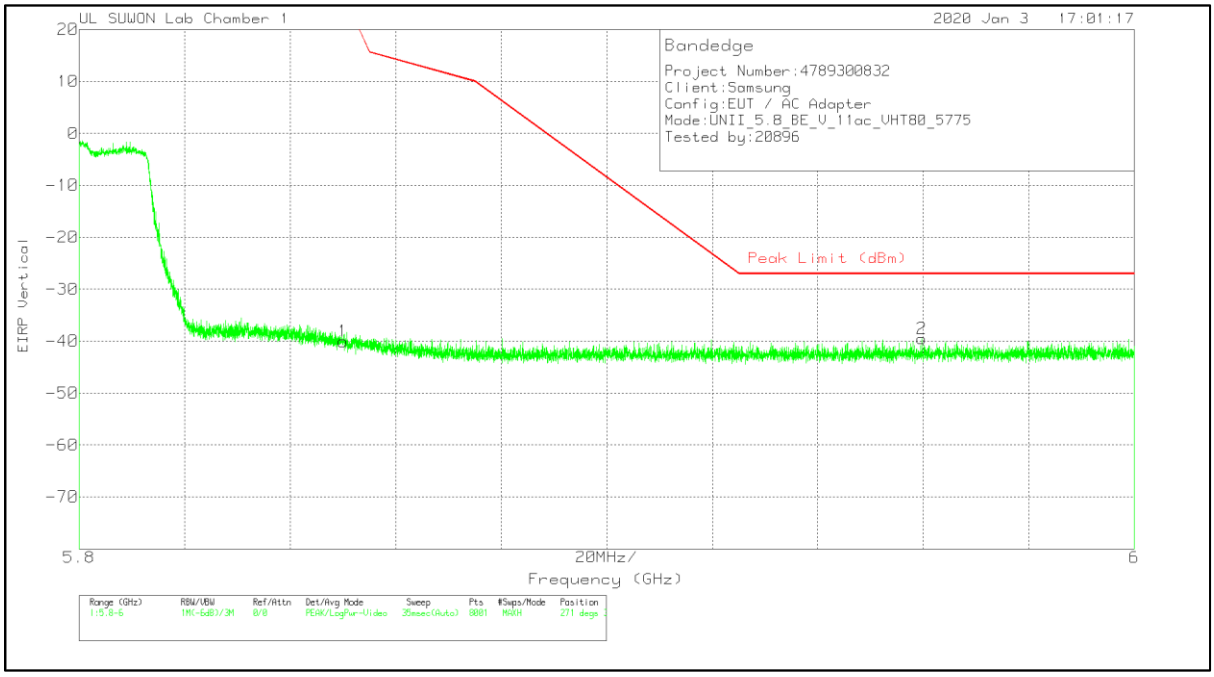


Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	3117_00168717	10dB_ATT[dB]	Conversion Factor (dB)	DC Corr (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.85003	-65.1	Pk	35	-21	11.8	0	-39.3	26.94	-66.24	207	101	H
2	5.99793	-65.37	Pk	35.1	-20.6	11.8	0	-39.07	-27	-12.07	207	101	H

Pk - Peak detector

VERTICAL PEAK DATA



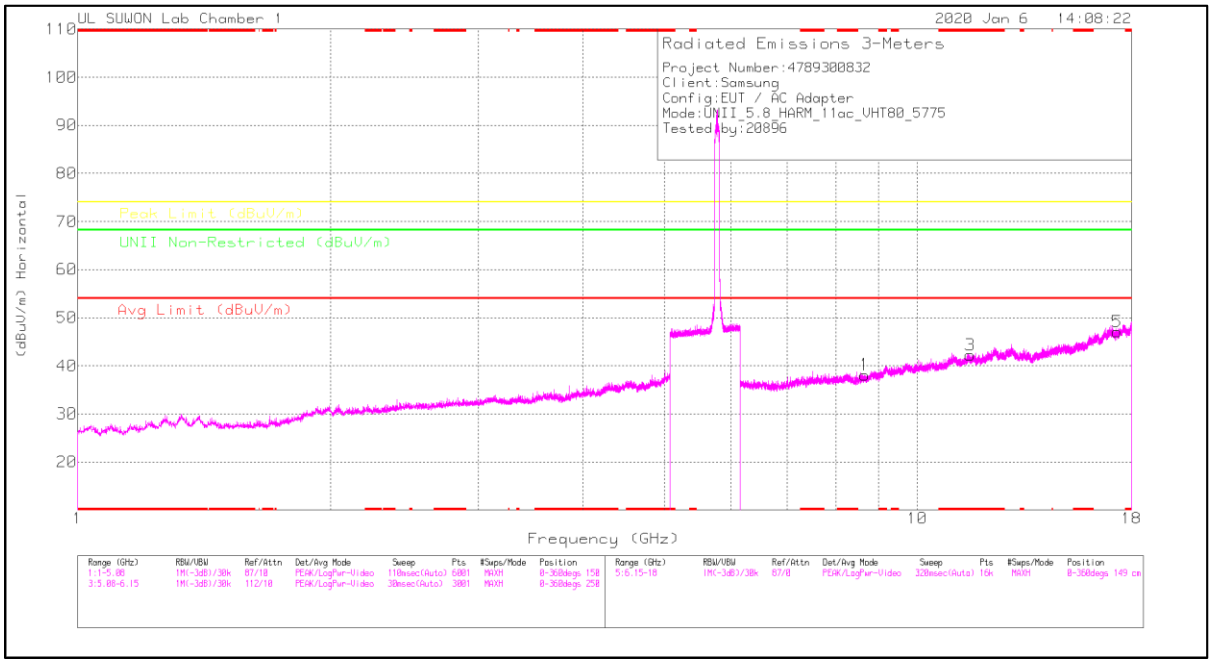
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	3117_00168717	10dB_ATT[dB]	Conversion Factor (dB)	DC Corr (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.85003	-65.83	Pk	35	-21	11.8	0	-40.03	26.94	-66.97	271	335	V
2	5.9597	-65.61	Pk	35.1	-20.8	11.8	0	-39.51	-27	-12.51	271	335	V

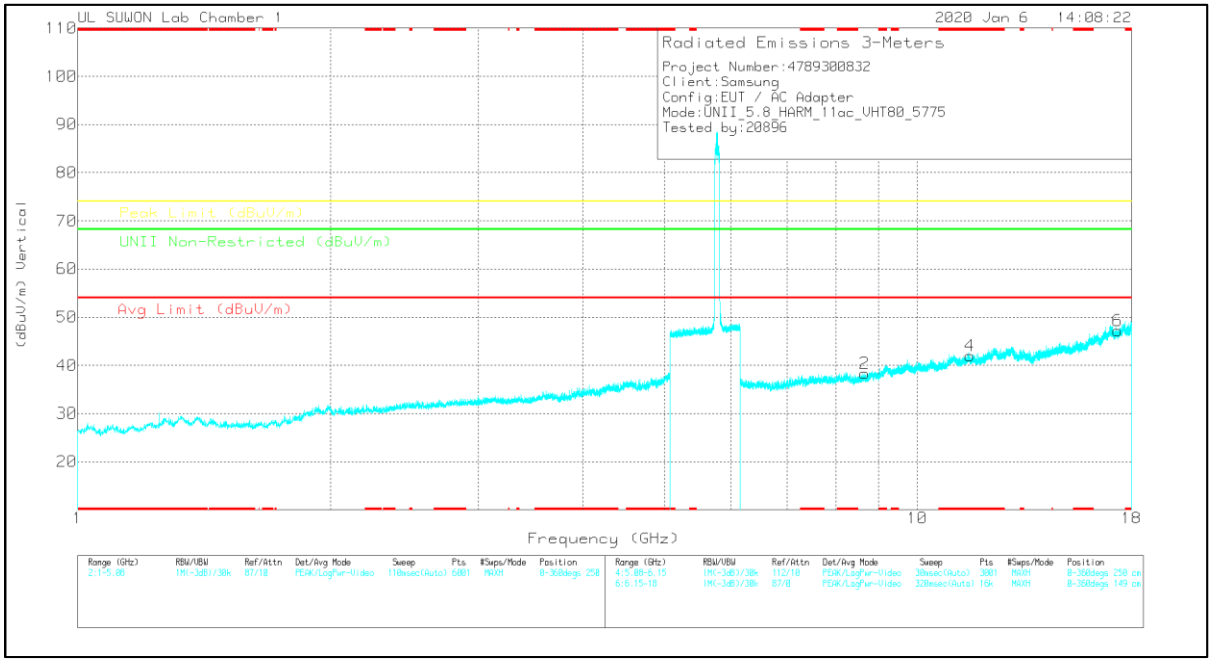
Pk - Peak detector

HARMONICS AND SPURIOUS EMISSIONS

MID CHANNEL HORIZONTAL



MID CHANNEL VERTICAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

MID CHANNEL DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	6GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	UNII Non-Restricted (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	8.65834	26.74	PK	36.4	-25	0	38.14	-	-	-	-	68.2	-30.06	0-360	149	H
3	* 11.56585	25.94	PK	38.6	-22.3	0	42.24	-	-	74	-31.76	-	-	0-360	250	H
5	17.30312	23.28	PK	41.3	-17.5	0	47.08	-	-	-	-	68.2	-21.12	0-360	149	H
2	8.65612	26.94	PK	36.4	-25	0	38.34	-	-	-	-	68.2	-29.86	0-360	250	V
4	* 11.55919	25.73	PK	38.6	-22.4	0	41.93	-	-	74	-32.07	-	-	0-360	250	V
6	17.32756	23.56	PK	41.2	-17.6	0	47.16	-	-	-	-	68.2	-21.04	0-360	250	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK – Peak Detector

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	6GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	UNII Non-Restricted (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
8.65707	36.66	PK-U	36.4	-25	0	48.06	-	-	-	-	68.2	-20.14	360	100	H
8.65861	36.68	PK-U	36.4	-25	0	48.08	-	-	-	-	68.2	-20.12	360	100	V
* 11.5678	36.55	PK-U	38.6	-22.3	0	52.85	-	-	74	-21.15	-	-	360	100	H
* 11.56573	36.24	PK-U	38.6	-22.3	0	52.54	-	-	74	-21.46	-	-	360	100	V
17.30333	34.46	PK-U	41.3	-17.5	0	58.26	-	-	-	-	68.2	-9.94	360	100	H
17.3021	33.79	PK-U	41.3	-17.6	0	57.49	-	-	-	-	68.2	-10.71	360	100	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK-U - U-NII: Maximum Peak

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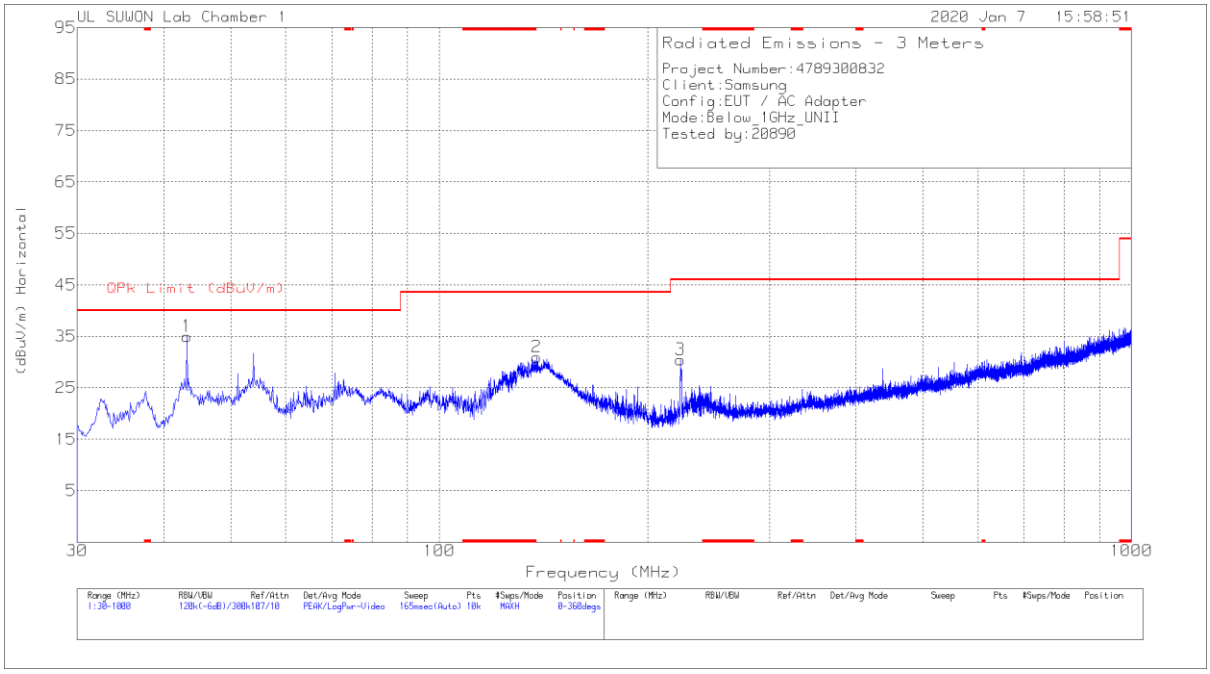
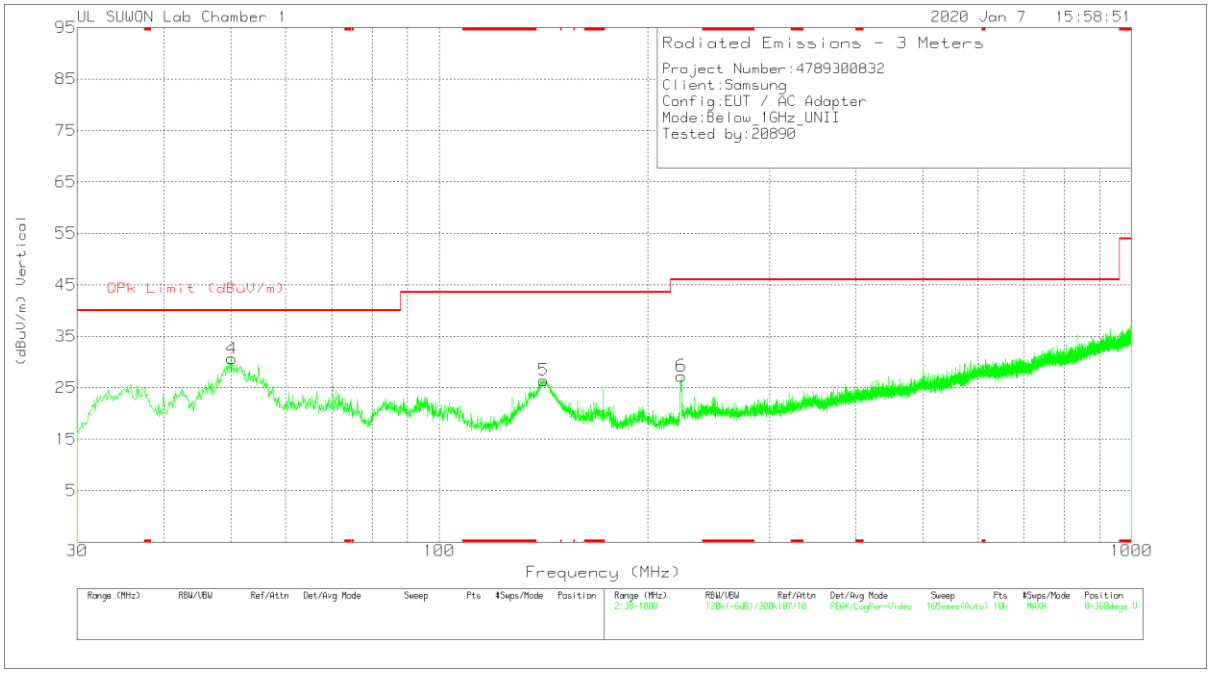
12. WORST-CASE BELOW 1 GHz

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



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



Below 1G Data

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	VULB9163_750	Below_1G[dB]	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	43.192	45.4	Pk	19.4	-29.8	35	40	-5	0-360	300	H
2	138.252	44.88	Pk	14.2	-28.1	30.98	43.52	-12.54	0-360	200	H
3	223.03	40.28	Pk	17.7	-27.5	30.48	46.02	-15.54	0-360	200	H
4	50.176	40.56	Pk	19.7	-29.6	30.66	40	-9.34	0-360	100	V
5	141.55	40.55	Pk	14.1	-28.2	26.45	43.52	-17.07	0-360	100	V
6	223.903	36.98	Pk	17.8	-27.5	27.28	46.02	-18.74	0-360	100	V

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

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13. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)
IC RSS-GEN Clause 8.8

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	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.

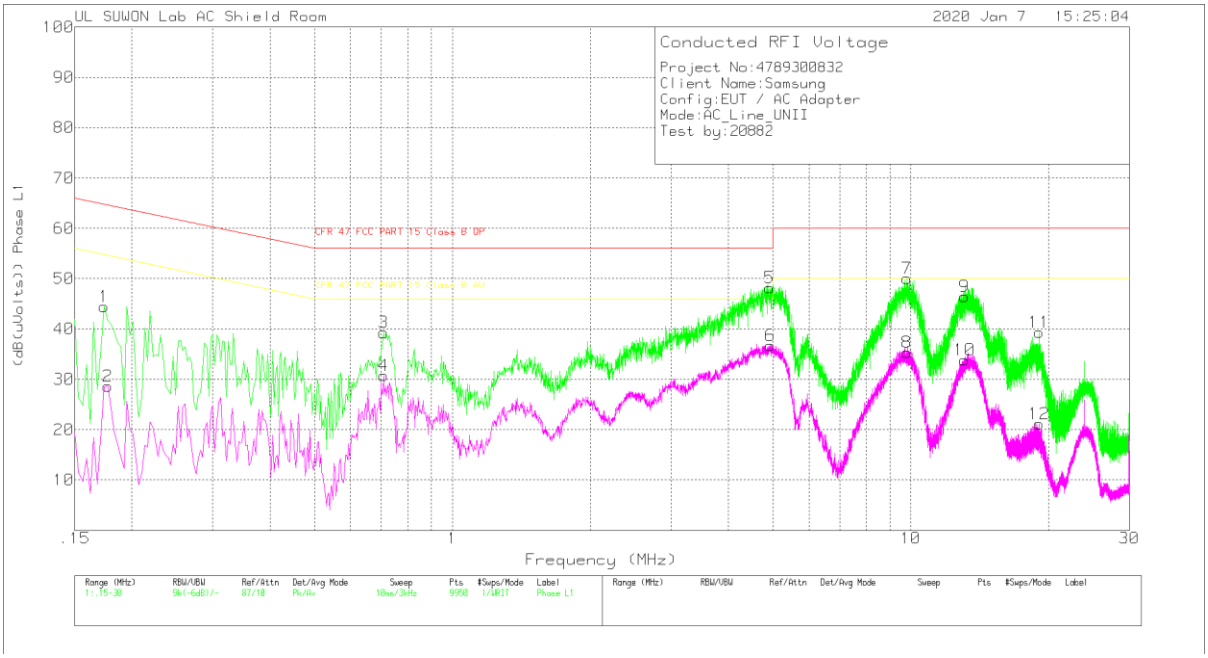
The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

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

RESULTS

WORST EMISSIONS

LINE 1 DATA



Trace Markers

Range 1: Phase L1 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	101836_With Ex_L1[dB]	CABLELOSS(dB)	Corrected Reading (dB(uVolts))	CFR 47 FCC PART 15 Class B QP	Margin (dB)	CFR 47 FCC PART 15 Class B AV	Margin (dB)
1	.174	34.15	Pk	10.1	.2	44.45	64.77	-20.32	-	-
2	.177	18.47	Av	10	.2	28.67	-	-	54.63	-25.96
3	.708	29.18	Pk	9.9	.2	39.28	56	-16.72	-	-
4	.708	20.68	Av	9.9	.2	30.78	-	-	46	-15.22
5	4.926	38.12	Pk	9.8	.3	48.22	56	-7.78	-	-
6	4.935	26.57	Av	9.8	.3	36.67	-	-	46	-9.33
7	9.804	39.79	Pk	9.9	.4	50.09	60	-9.91	-	-
8	9.825	25.01	Av	9.9	.4	35.31	-	-	50	-14.69
9	13.113	36.06	Pk	10	.4	46.46	60	-13.54	-	-
10	13.101	23.46	Av	10	.4	33.86	-	-	50	-16.14
11	19.047	28.72	Pk	10.2	.4	39.32	60	-20.68	-	-
12	19.041	10.49	Av	10.2	.4	21.09	-	-	50	-28.91

Pk - Peak detector
Av - Average detection

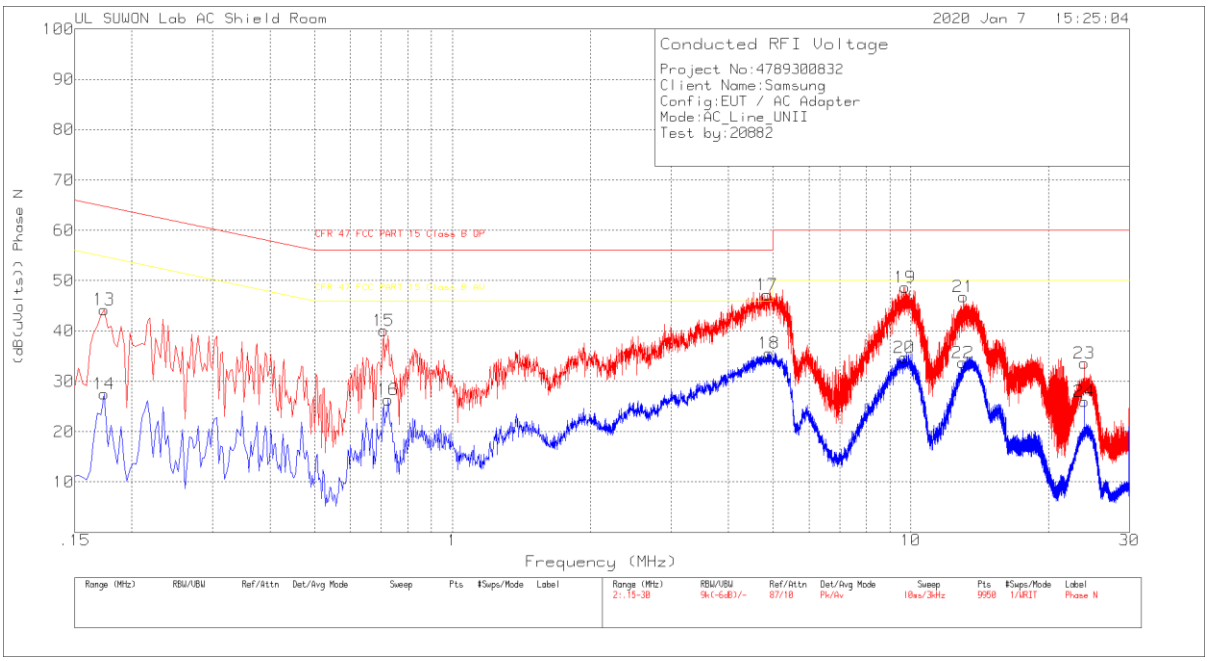
Quasi-Peak Emissions

Range 1: Phase L1 .15 - 30MHz

Frequency (MHz)	Meter Reading (dBuV)	Det	101836_With Ex_L1[dB]	CABLELOSS(dB)	Corrected Reading (dB(uVolts))	CFR 47 FCC PART 15 Class B QP	Margin (dB)	CFR 47 FCC PART 15 Class B AV	Margin (dB)
9.80475	33.97	Qp	9.9	.4	44.27	60	-15.73	-	-
4.92525	33.75	Qp	9.8	.3	43.85	56	-12.15	-	-

Qp - Quasi-Peak detector

LINE 2 DATA



Trace Markers

Range 2: Phase N .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	101836_Wit h EX_N[dB]	CABLELOS S(dB)	Corrected Reading (dB(uVolts))	CFR 47 FCC PART 15 Class B QP	Margin (dB)	CFR 47 FCC PART 15 Class B AV	Margin (dB)
13	.174	34.06	Pk	10	.2	44.26	64.77	-20.51	-	-
14	.174	17.3	Av	10	.2	27.5	-	-	54.77	-27.27
15	.708	29.93	Pk	9.9	.2	40.03	56	-15.97	-	-
16	.723	16.22	Av	9.9	.2	26.32	-	-	46	-19.68
17	4.86	37.08	Pk	9.8	.3	47.18	56	-8.82	-	-
18	4.902	25.49	Av	9.8	.3	35.59	-	-	46	-10.41
19	9.729	38.29	Pk	10	.4	48.69	60	-11.31	-	-
20	9.699	24.47	Av	9.9	.4	34.77	-	-	50	-15.23
21	13.026	36.33	Pk	10.1	.4	46.83	60	-13.17	-	-
22	13.002	23.23	Av	10.1	.4	33.73	-	-	50	-16.27
23	23.937	22.67	Pk	10.5	.4	33.57	60	-26.43	-	-
24	23.94	15.1	Av	10.5	.4	26	-	-	50	-24

Pk - Peak detector
Av - Average detection

Quasi-Peak Emissions

Range 2: Phase N .15 - 30MHz

Frequency (MHz)	Meter Reading (dBuV)	Det	101836_Wit h EX_N[dB]	CABLELOS S(dB)	Corrected Reading (dB(uVolts))	CFR 47 FCC PART 15 Class B QP	Margin (dB)	CFR 47 FCC PART 15 Class B AV	Margin (dB)
4.86075	33.18	Qp	9.8	.3	43.28	56	-12.72	-	-

Qp - Quasi-Peak detector

14. DYNAMIC FREQUENCY SELECTION

14.1. OVERVIEW

14.1.1. LIMITS

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 mill watt	-64 dBm
E.I.R.P. < 200 mill watt and power spectral density < 10 dBm/MHz	-62 dBm
E.I.R.P. < 200 mill watt 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

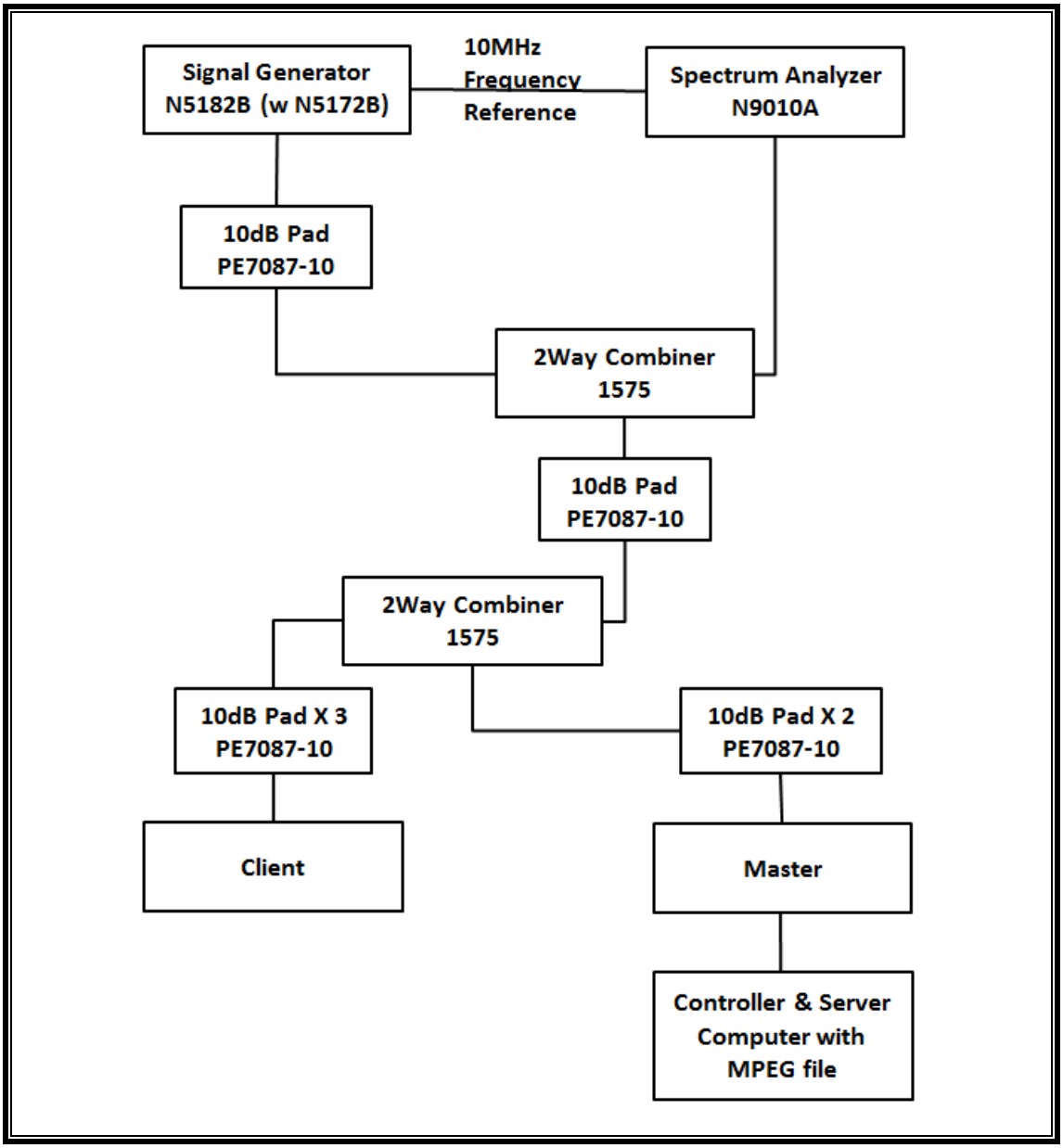
Radar Waveform Type	Pulse Width (µsec)	Chirp Width (MHz)	PRI (µsec)	Pulses per Burst	Number of Bursts	Minimum Percentage of Successful Detection	Minimum Trials
5	50-100	5-20	1000-2000	1-3	8-20	80%	30

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

14.1.2. TEST AND MEASUREMENT SYSTEM

CONDUCTED METHOD SYSTEM BLOCK DIAGRAM



SYSTEM OVERVIEW

The short pulse and long pulse signal generating system utilizes the Keysite Signal Studio for Pulse Building as N5172B. 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 1, 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.

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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.

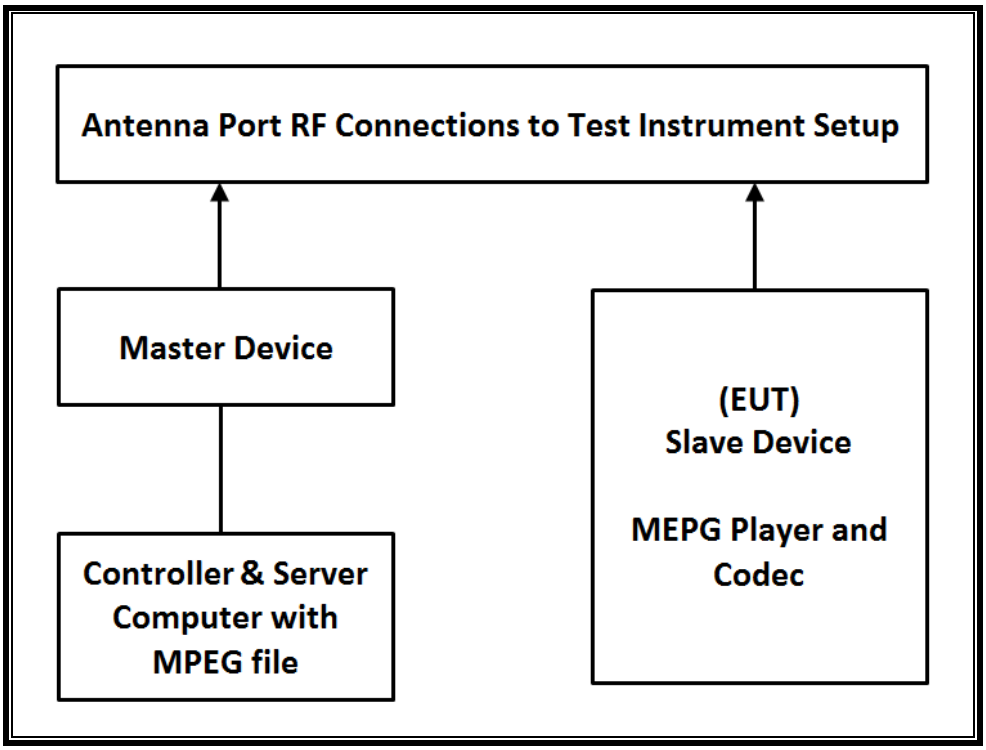
TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**S/N**	**Next Cal Due**
Spectrum Analyzer, 7 GHz	Agilent / HP	N9010A	MY54200580	08-07-20
Vector Signal Generator, 6GHz	Agilent / HP	N5182B	MY53051241	08-06-20
Combiner	AEROFLEX/WEINSCHEL	1575	2150	08-08-20
Combiner	AEROFLEX/WEINSCHEL	1575	2781	08-08-20

14.1.3. SETUP OF EUT

CONDUCTED 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**
Wireless Access Point	Cisco	AIR-CAP3702E-A-K9	FTX182276QX	LDK102087
Notebook PC (Controller/Server)	HP	HP EliteDesk 800 G1 TWR	CZC4125J25	DoC

14.1.4. DESCRIPTION OF EUT

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

The EUT is a Slave Device without Radar Detection.

The highest power level within these bands is 12.92 dBm in the 5250-5350 MHz band and 12.63 dBm in the 5470-5725 MHz band.

The antenna assembly utilized two antenna.
Gain of ANT : -2.80 dBi for UNII 2A and -2.00 dBi for UNII 2C.

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 conducted 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 that meets or exceeds the minimum required loading was generated by transferring a data stream from the controller/server PC to the EUT using iPerf version 2.0.5 software package.

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

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

The software installed in the access point is 12.4(25d)JA1.

UNIFORM CHANNEL SPREADING

This requirement is not applicable to Slave radio devices.

OVERVIEW OF MASTER DEVICE 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.

14.2. RESULTS FOR 20 MHz BANDWIDTH

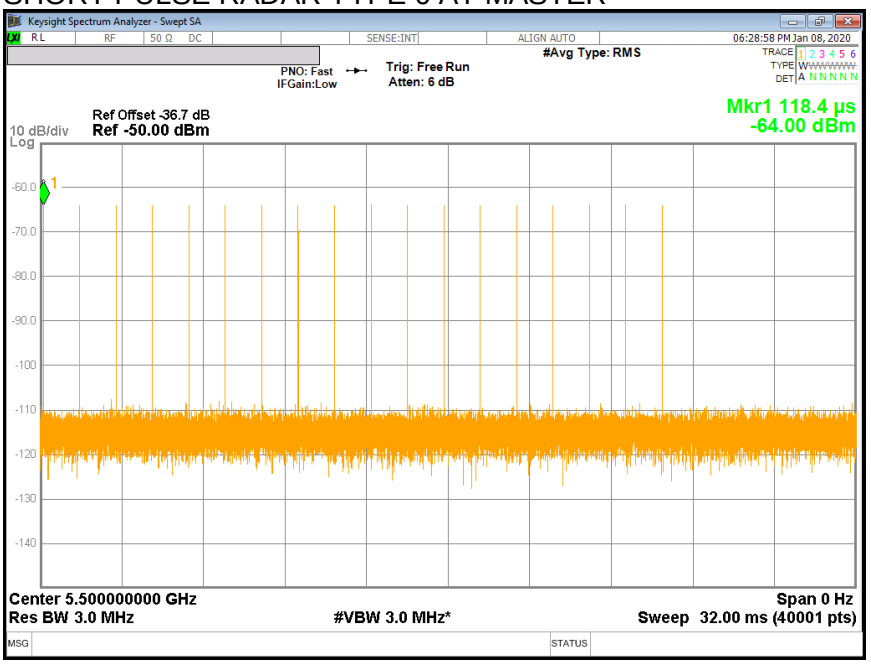
14.2.1. TEST CHANNEL

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

14.2.2. RADAR WAVEFORM AND TRAFFIC

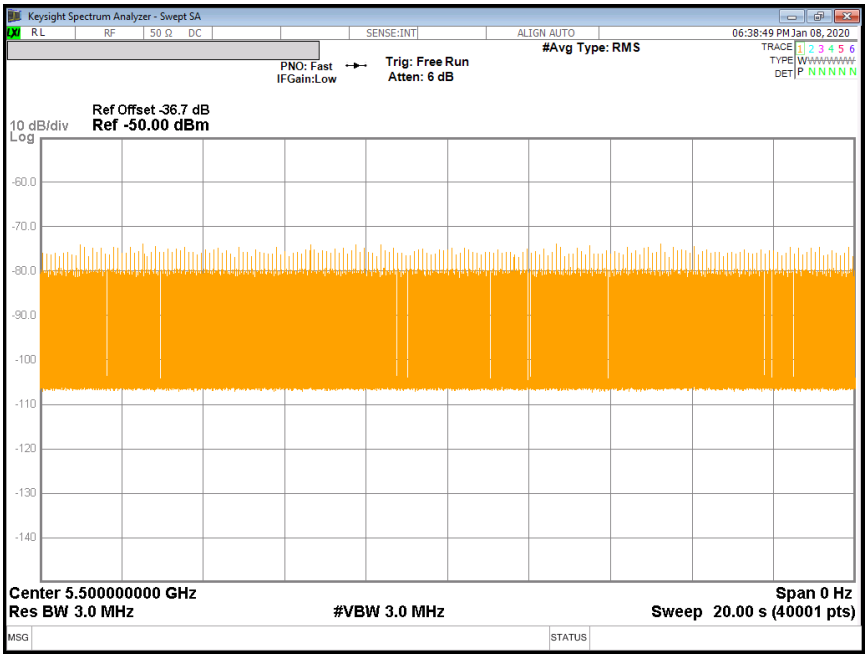
RADAR WAVEFORM

SHORT PULSE RADAR TYPE 0 AT MASTER



TRAFFIC

SLAVE TRAFFIC



14.2.3. OVERLAPPING CHANNEL TESTS

RESULTS

These tests are not applicable.

14.2.4. 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)
0.774	10

Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
3.374	60

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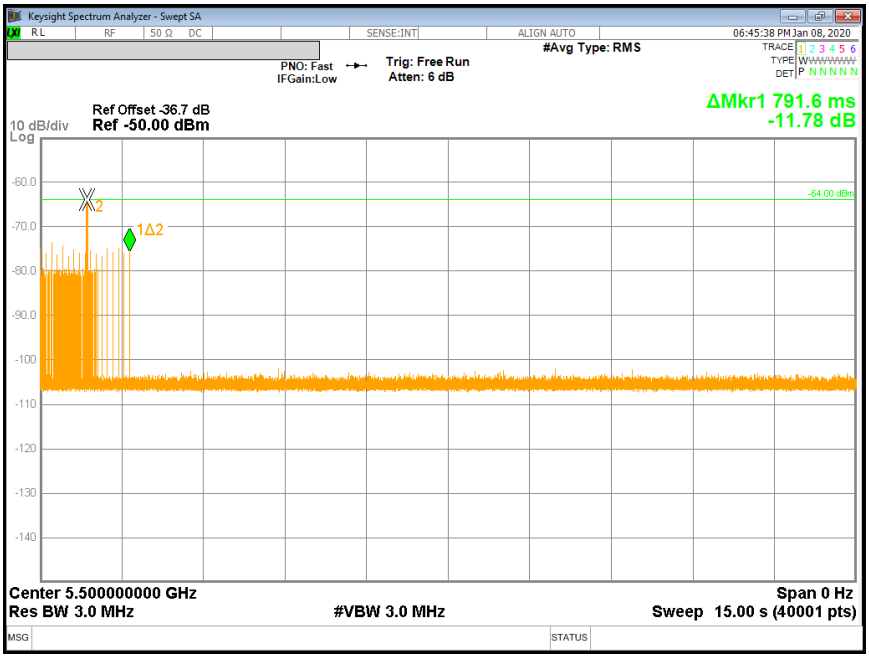
MOVE TIME & CHANNEL CLOSING TIME

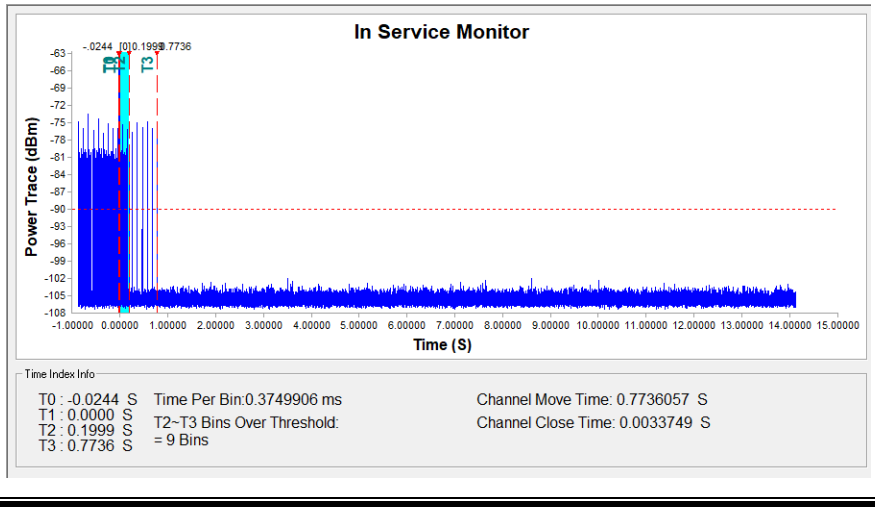
AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

No transmissions are observed during the aggregate monitoring period.

MOVE TIME & AGGREGATE CHANNEL CLOSING TRANSMISSION TIME



MOVE TIME & CLOSING TIME AT IN SERVICE MONITOR



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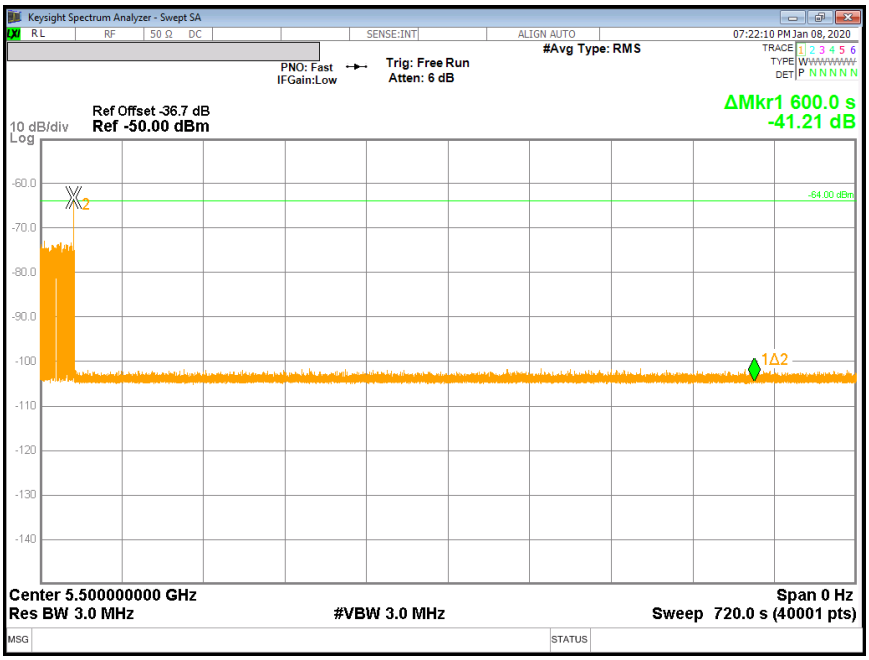
NON-OCCUPANCY PERIOD

RESULTS

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

10-MINUTE BEACON MONITORING PERIOD



14.3. RESULTS FOR 40 MHz BANDWIDTH

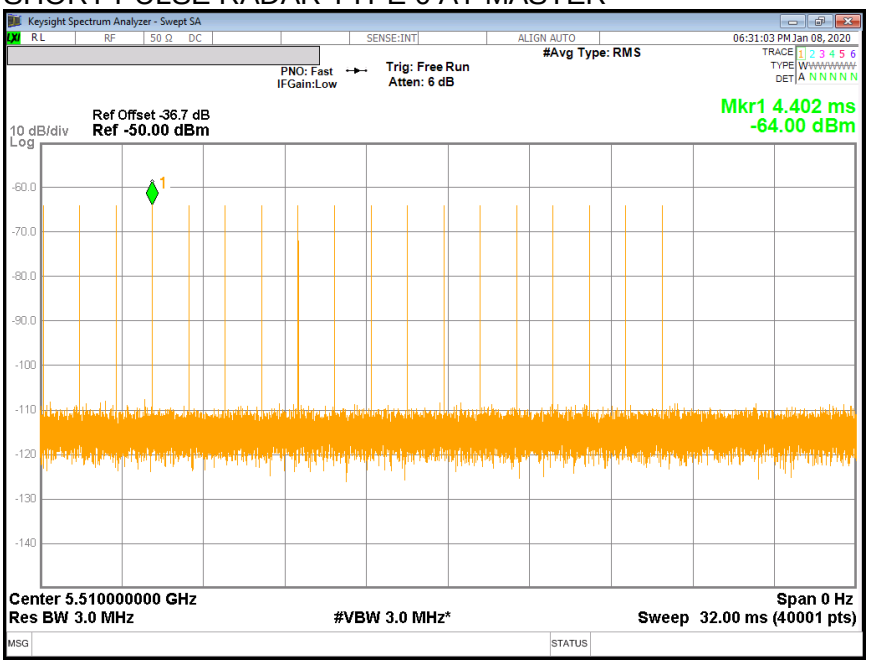
14.3.1. TEST CHANNEL

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

14.3.2. RADAR WAVEFORM AND TRAFFIC

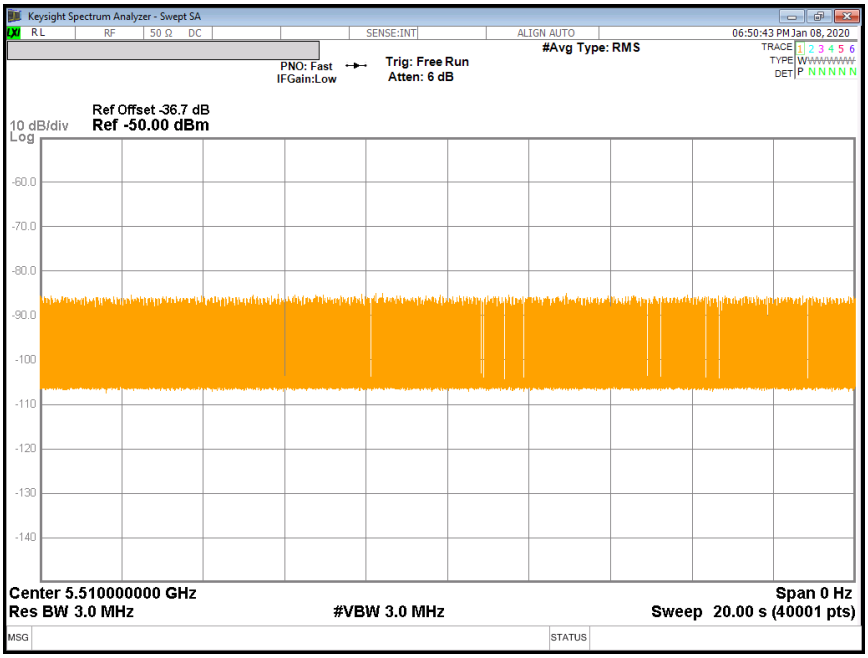
RADAR WAVEFORM

SHORT PULSE RADAR TYPE 0 AT MASTER



TRAFFIC

SLAVE TRAFFIC



14.3.3. OVERLAPPING CHANNEL TESTS

RESULTS

These tests are not applicable.

14.3.4. 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)
0.731	10

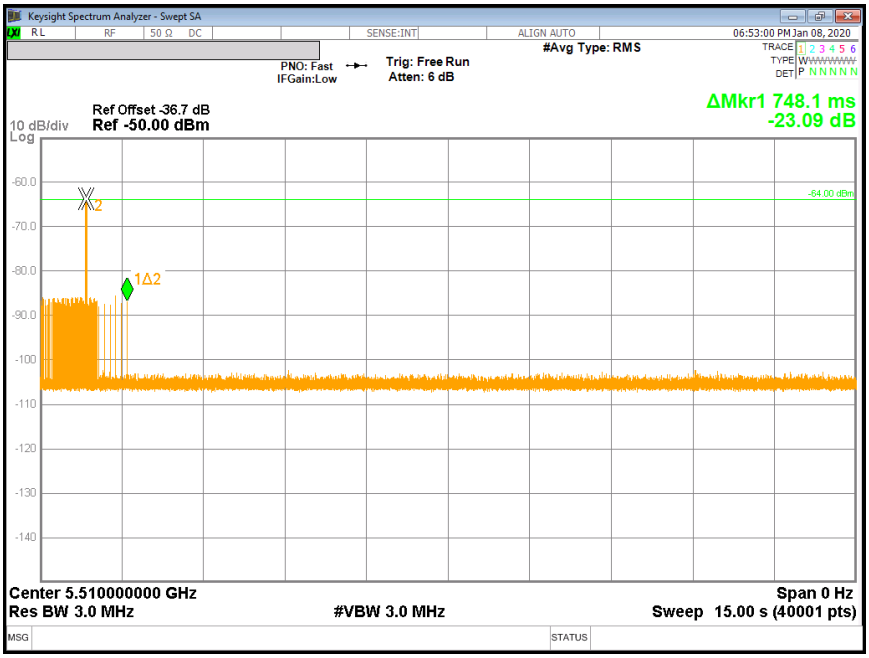
Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
3.000	60

MOVE TIME & CHANNEL CLOSING TIME

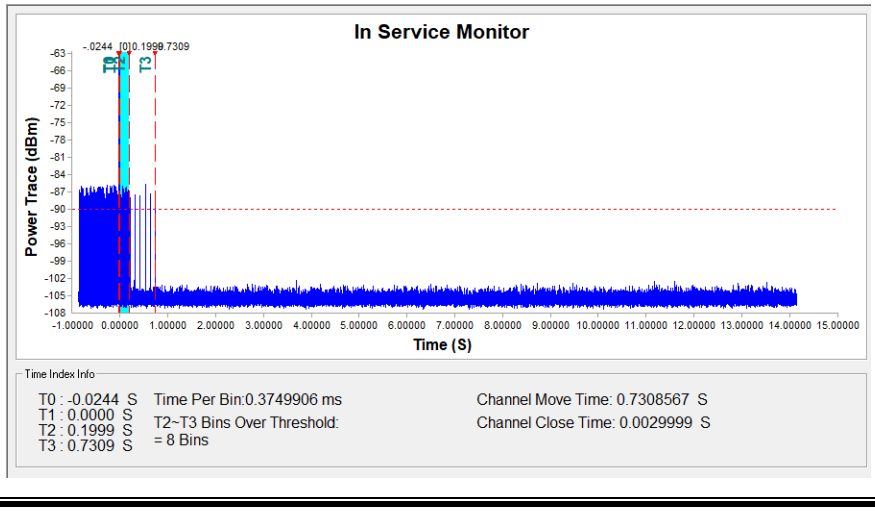
AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

No transmissions are observed during the aggregate monitoring period.

MOVE TIME & AGGREGATE CHANNEL CLOSING TRANSMISSION TIME



MOVE TIME & CLOSING TIME AT IN SERVICE MONITOR

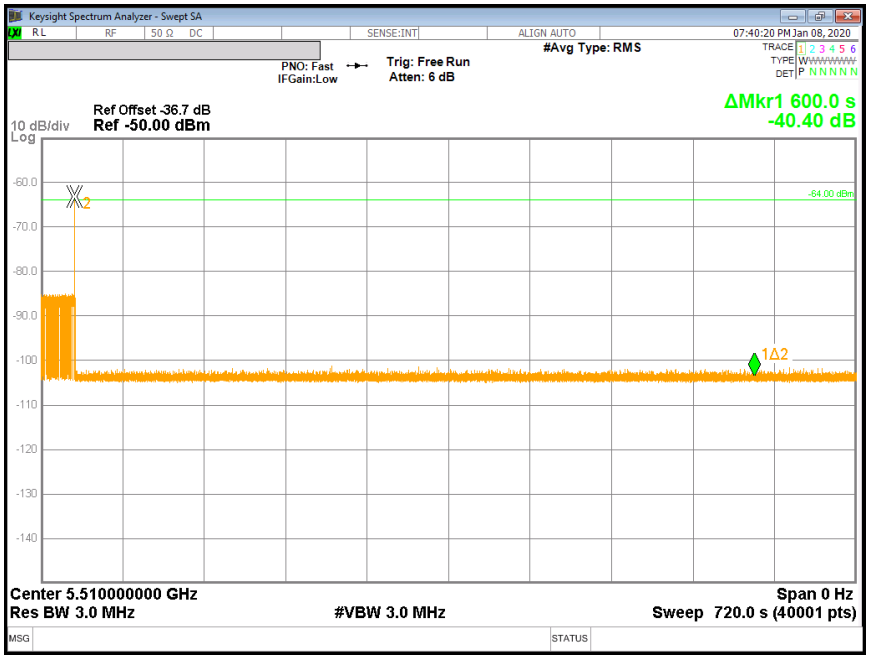


NON-OCCUPANCY PERIOD

RESULTS

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

10-MINUTE BEACON MONITORING PERIOD



14.4. RESULTS FOR 80 MHz BANDWIDTH

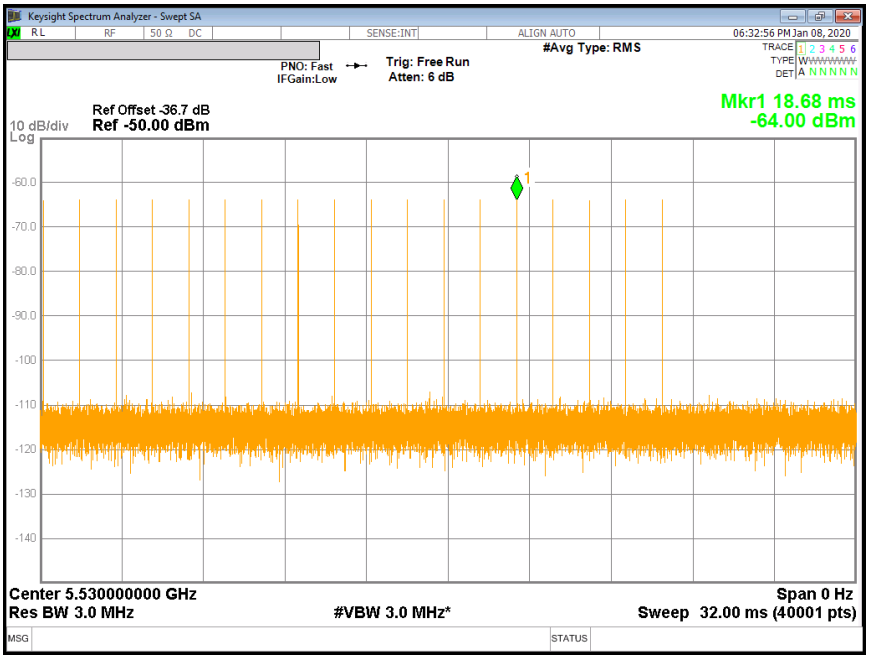
14.4.1. TEST CHANNEL

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

14.4.2. RADAR WAVEFORM AND TRAFFIC

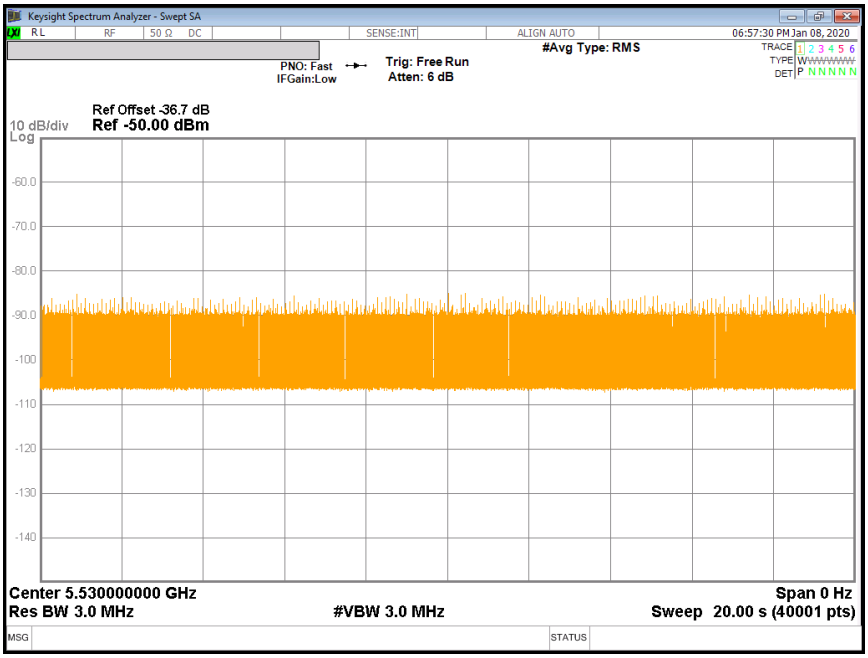
RADAR WAVEFORM

SHORT PULSE RADAR TYPE 0 AT MASTER



TRAFFIC

SLAVE TRAFFIC



14.4.3. OVERLAPPING CHANNEL TESTS

RESULTS

These tests are not applicable.

14.4.4. 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)
0.787	10

Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
3.374	60

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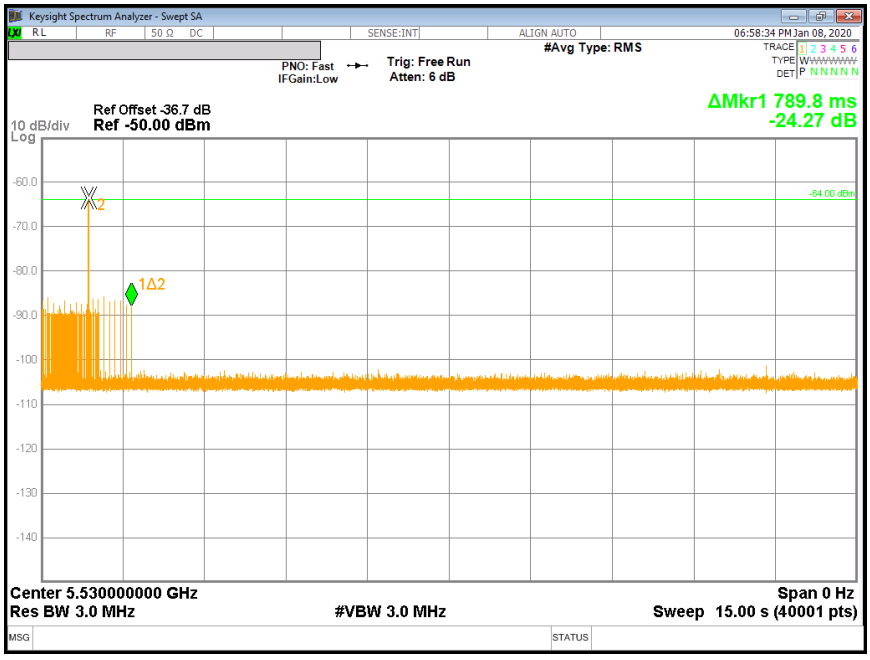
MOVE TIME & CHANNEL CLOSING TIME

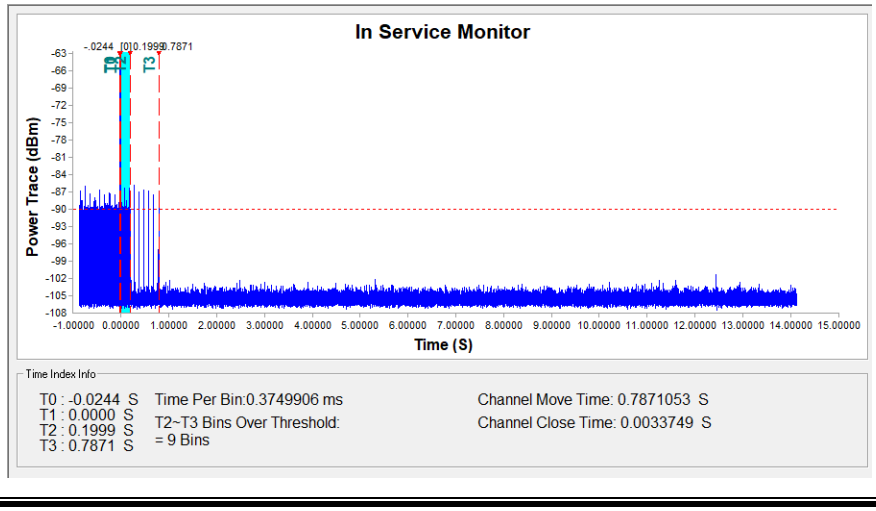
AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

No transmissions are observed during the aggregate monitoring period.

MOVE TIME & AGGREGATE CHANNEL CLOSING TRANSMISSION TIME



MOVE TIME & CLOSING TIME AT IN SERVICE MONITOR

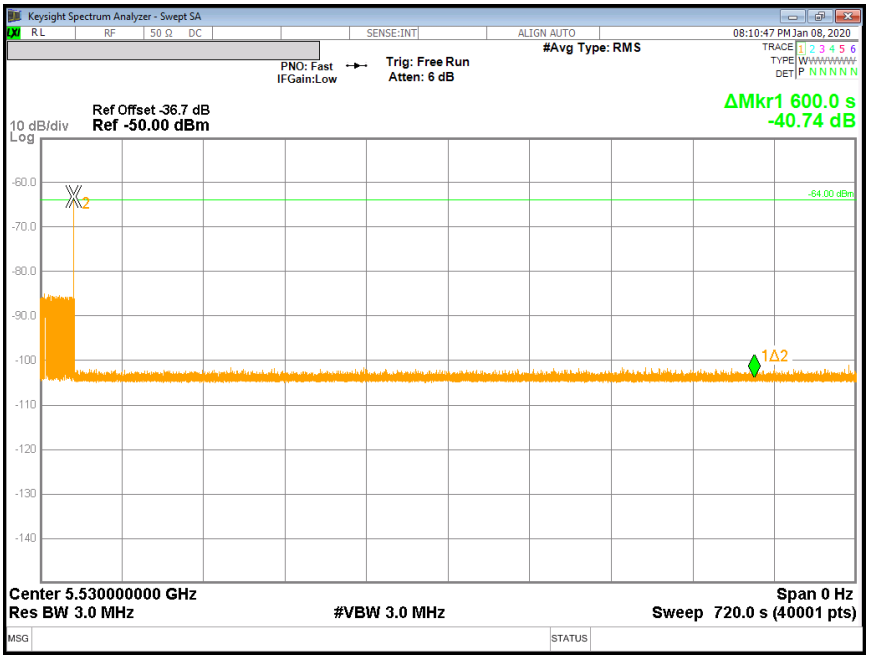


NON-OCCUPANCY PERIOD

RESULTS

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

10-MINUTE BEACON MONITORING PERIOD



END OF REPORT