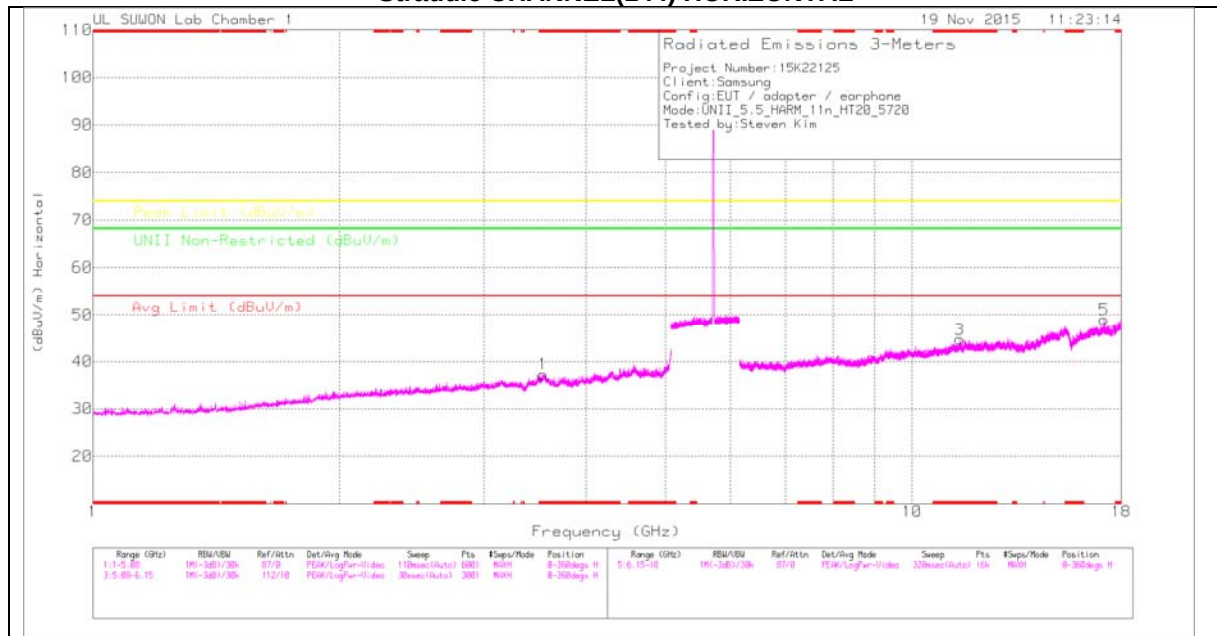
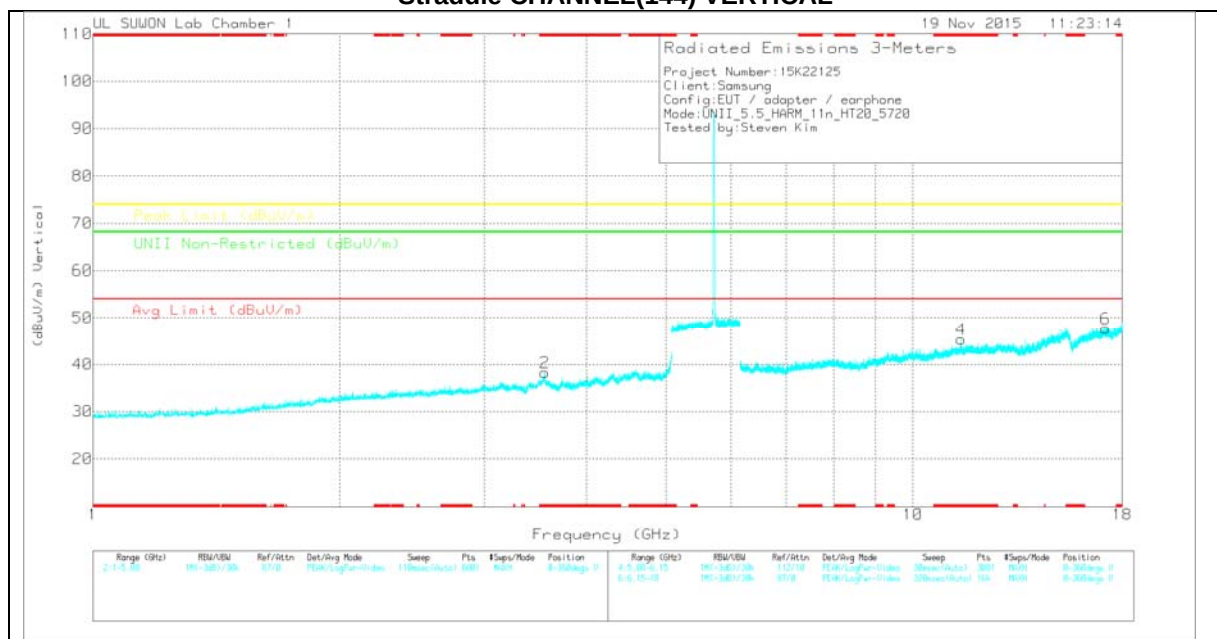


Straddle CHANNEL(144) HORIZONTAL



Straddle CHANNEL(144) 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.

Straddle CHANNEL(144) DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117(0016 8717)_150 619	Path_4	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	* 3.545	38.99	PK	32.8	-34.5	0	37.29	-	-	74	-36.71	-	-	0-360	100	H
2	* 3.554	39.95	PK	32.8	-34.5	0	38.25	-	-	74	-35.75	-	-	0-360	200	V
3	* 11.437	33.04	PK	38.6	-26.9	0	44.74	-	-	74	-29.26	-	-	0-360	200	H
5	17.154	29.21	PK	41.3	-21.5	0	49.01	-	-	-	-	68.2	-19.19	0-360	200	H
4	* 11.443	33.68	PK	38.6	-26.9	0	45.38	-	-	74	-28.62	-	-	0-360	100	V
6	17.167	27.68	PK	41.3	-21.3	0	47.68	-	-	-	-	68.2	-20.52	0-360	100	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK – Peak Detector

Radiated Emissions

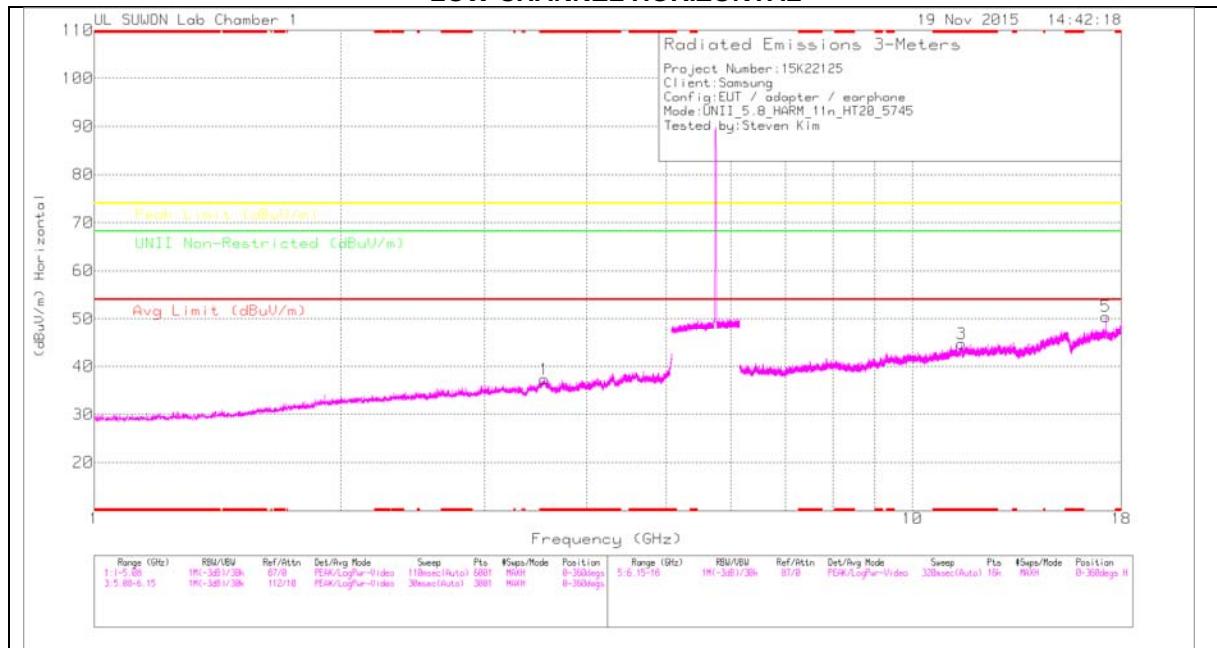
Frequency (GHz)	Meter Reading (dBuV)	Det	3117(001687 17)_150619	Path_5	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	UNII Non-Restricted (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 11.44	45.08	PK-U	38.6	-26.9	0	56.78	-	-	74	-17.22	-	-	4	199	H
* 11.44	31.6	ADR	38.6	-26.9	.32	43.62	54	-10.38	-	-	-	-	4	199	H
17.158	42.99	PK-U	41.3	-21.5	0	62.79	-	-	-	-	68.2	-5.41	175	218	H
* 11.444	44.47	PK-U	38.6	-26.9	0	56.17	-	-	74	-17.83	-	-	197	251	V
* 11.44	30.67	ADR	38.6	-26.9	.32	42.69	54	-11.31	-	-	-	-	197	251	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

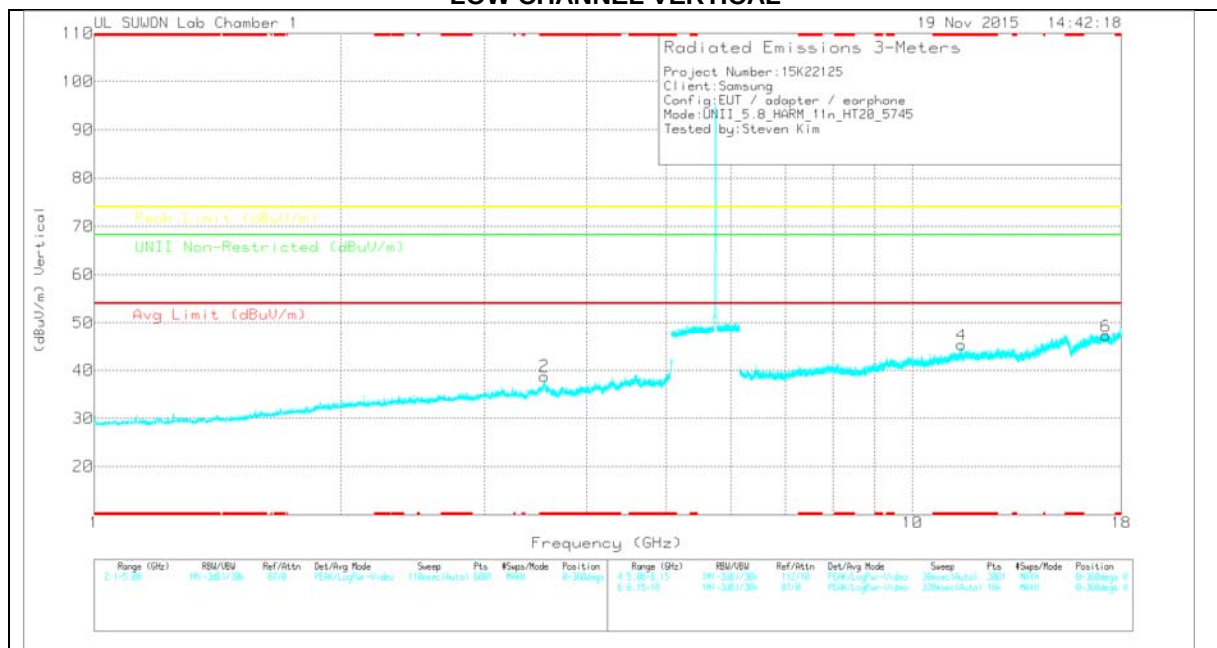
PK-U - U-NII: Maximum Peak

ADR - U-NII AD primary method, RMS average

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(0016 8717)_150 619	Path_4	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	* 3.553	38.99	PK	32.8	-34.5	0	37.29	-	-	74	-36.71	-	-	0-360	100	H
2	* 3.55	40.45	PK	32.8	-34.5	0	38.75	-	-	74	-35.25	-	-	0-360	100	V
3	* 11.49	32.83	PK	38.6	-26.7	0	44.73	-	-	74	-29.27	-	-	0-360	200	H
5	17.235	30.08	PK	41.2	-20.8	0	50.48	-	-	-	-	68.2	-17.72	0-360	200	H
4	* 11.489	33.42	PK	38.6	-26.7	0	45.32	-	-	74	-28.68	-	-	0-360	100	V
6	17.233	26.8	PK	41.2	-20.8	0	47.2	-	-	-	-	68.2	-21	0-360	200	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK – Peak Detector

Radiated Emissions

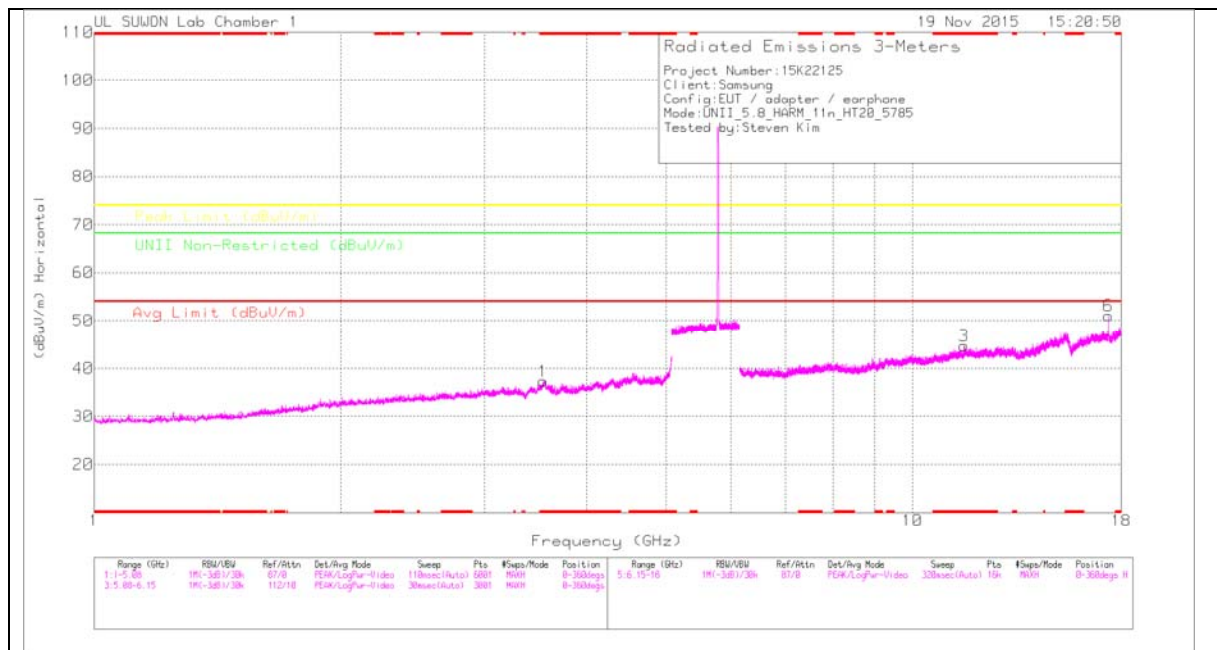
Frequency (GHz)	Meter Reading (dBuV)	Det	3117(001687 17)_150619	Path_5	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	UNII Non-Restricted (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 11.491	42.88	PK-U	38.6	-26.7	0	54.78	-	-	74	-19.22	-	-	85	252	H
* 11.491	30.21	ADR	38.6	-26.7	.32	42.43	54	-11.57	-	-	-	-	85	252	H
17.236	43.11	PK-U	41.2	-20.8	0	63.51	-	-	-	-	68.2	-4.69	160	151	H
* 11.491	43.91	PK-U	38.6	-26.7	0	55.81	-	-	74	-18.19	-	-	204	284	V
* 11.491	30.96	ADR	38.6	-26.6	.32	43.28	54	-10.72	-	-	-	-	204	284	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

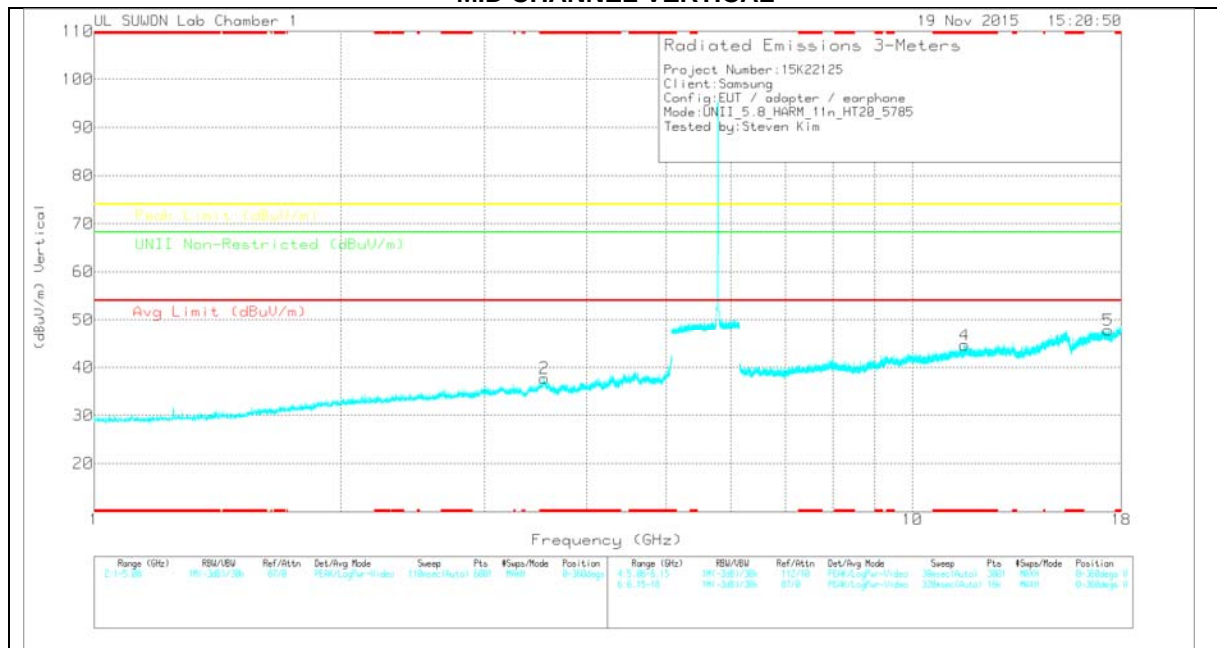
PK-U - U-NII: Maximum Peak

ADR - U-NII AD primary method, RMS average

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(0016 8717)_150 619	Path_4	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	* 3.54	38.99	PK	32.8	-34.5	0	37.29	-	-	74	-36.71	-	-	0-360	100	H
2	* 3.551	39.42	PK	32.8	-34.5	0	37.72	-	-	74	-36.28	-	-	0-360	200	V
3	* 11.57	32.61	PK	38.7	-26.6	0	44.71	-	-	74	-29.29	-	-	0-360	200	H
6	17.357	30.98	PK	41.2	-21.1	0	51.08	-	-	-	-	68.2	-17.12	0-360	200	H
4	* 11.577	32.54	PK	38.7	-26.6	0	44.64	-	-	74	-29.36	-	-	0-360	200	V
5	17.345	27.82	PK	41.2	-21.2	0	47.82	-	-	-	-	68.2	-20.38	0-360	200	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK – Peak Detector

Radiated Emissions

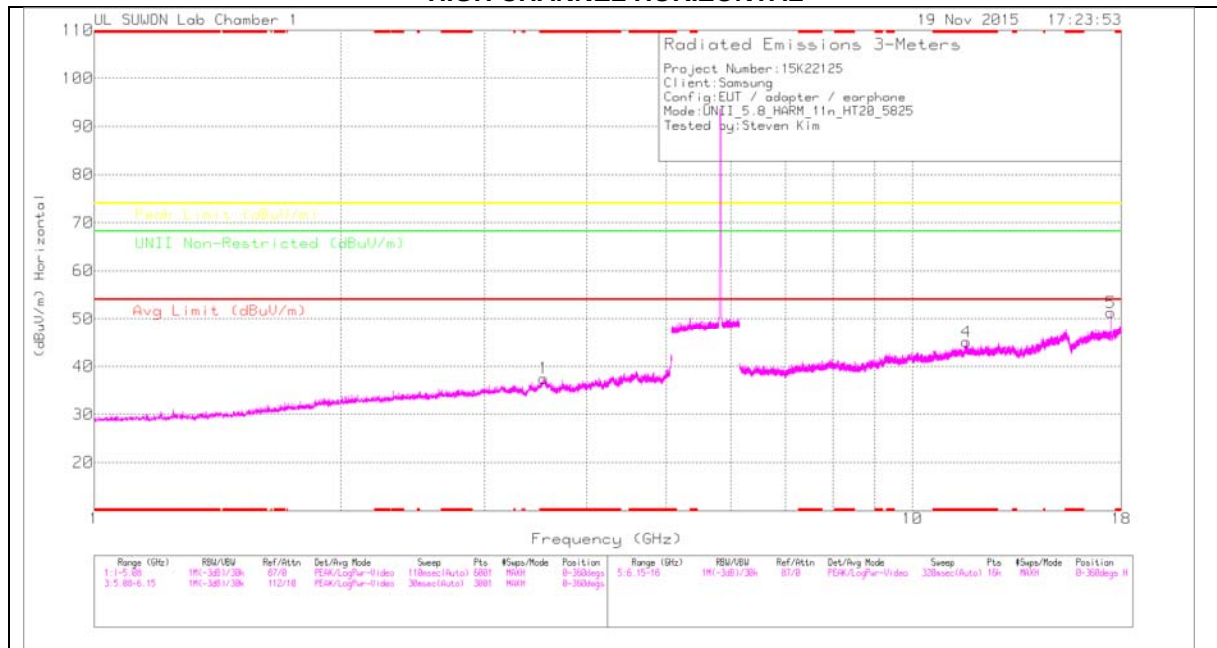
Frequency (GHz)	Meter Reading (dBuV)	Det	3117(001687 17)_150619	Path_5	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	UNII Non-Restricted (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 11.573	42.88	PK-U	38.7	-26.6	0	54.98	-	-	74	-19.02	-	-	284	217	H
* 11.571	29.71	ADR	38.7	-26.6	.32	42.13	54	-11.87	-	-	-	-	284	217	H
17.352	44.49	PK-U	41.2	-21.1	0	64.59	-	-	-	-	68.2	-3.61	183	167	H
* 11.576	41.97	PK-U	38.7	-26.6	0	54.07	-	-	74	-19.93	-	-	132	156	V
* 11.571	27.86	ADR	38.7	-26.6	.32	40.28	54	-13.72	-	-	-	-	132	156	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

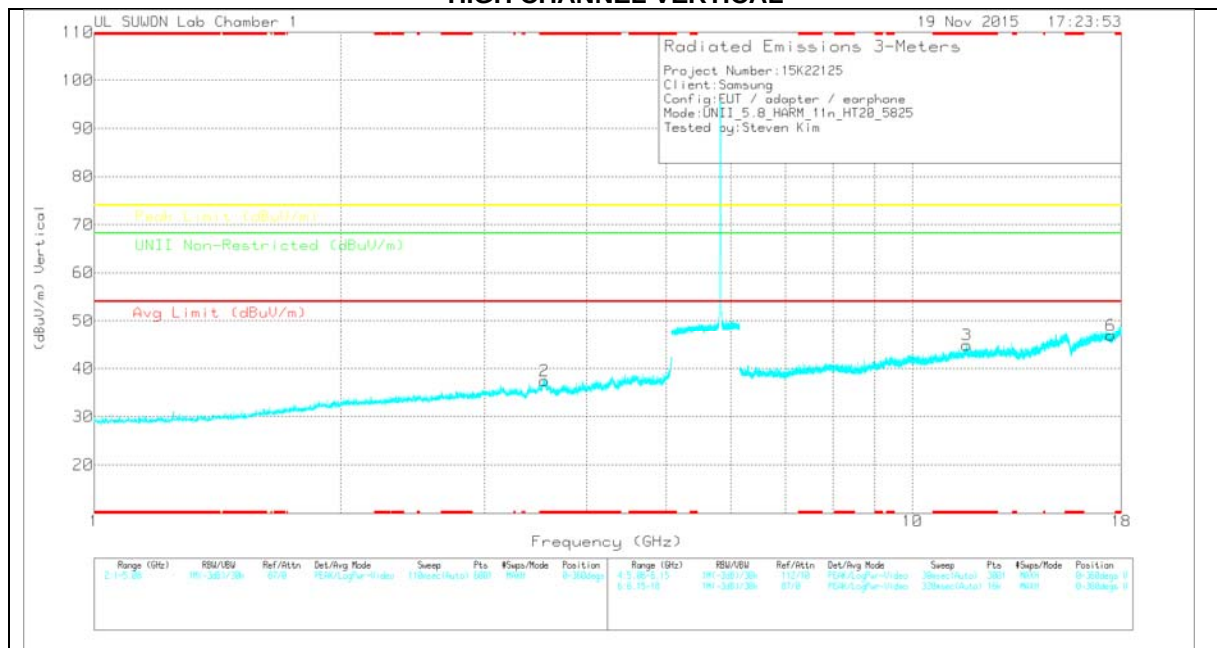
PK-U - U-NII: Maximum Peak

ADR - U-NII AD primary method, RMS average

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(0016 8717)_150 619	Path_4	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	* 3.545	39.2	Pk	32.8	-34.5	0	37.5	-	-	74	-36.5	-	-	0-360	200	H
2	* 3.552	39.11	Pk	32.8	-34.5	0	37.41	-	-	74	-36.59	-	-	0-360	100	V
4	* 11.647	33.32	Pk	38.7	-26.9	0	45.12	-	-	74	-28.88	-	-	0-360	200	H
5	17.476	31.09	Pk	41.1	-20.9	0	51.29	-	-	-	-	68.2	-16.91	0-360	200	H
3	* 11.654	33.07	Pk	38.7	-26.9	0	44.87	-	-	74	-29.13	-	-	0-360	100	V
6	17.476	26.71	Pk	41.1	-20.9	0	46.91	-	-	-	-	68.2	-21.29	0-360	100	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk – Peak Detector

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	3117(001687 17)_150619	Path_5	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
17.475	43.43	PK-U	41.1	-20.9	0	63.63	-	-	-	-	68.2	-4.57	157	150	H
* 11.653	45.03	PK-U	38.7	-26.9	0	56.83	-	-	74	-17.17	-	-	7	248	H
* 11.65	31.52	ADR	38.7	-26.9	.32	43.64	54	-10.36	-	-	-	-	7	248	H
* 11.652	42.42	PK-U	38.7	-26.9	0	54.22	-	-	74	-19.78	-	-	193	252	V
* 11.65	29.81	ADR	38.7	-26.9	.32	41.93	54	-12.07	-	-	-	-	193	252	V

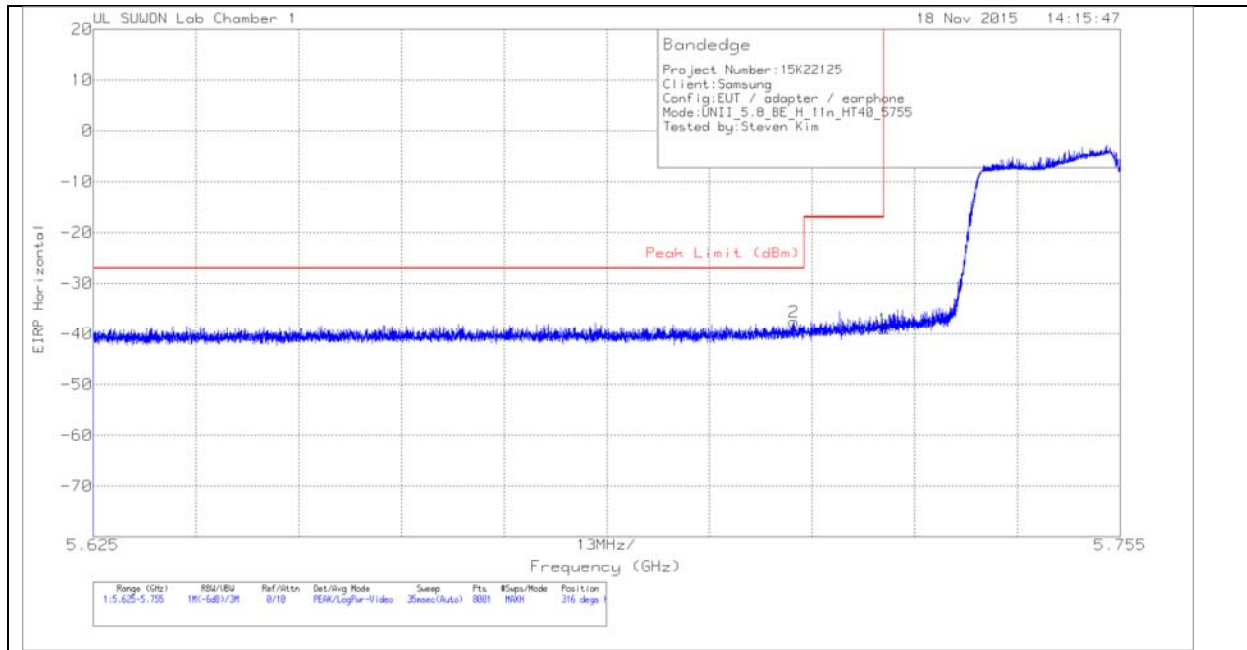
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK-U - U-NII: Maximum Peak

ADR - U-NII AD primary method, RMS average

11.4.3. TX ABOVE 1 GHz 802.11n HT40 MODE IN THE 5.8 GHz BAND HARMONICS AND SPURIOUS EMISSIONS

HORIZONTAL PEAK PLOT



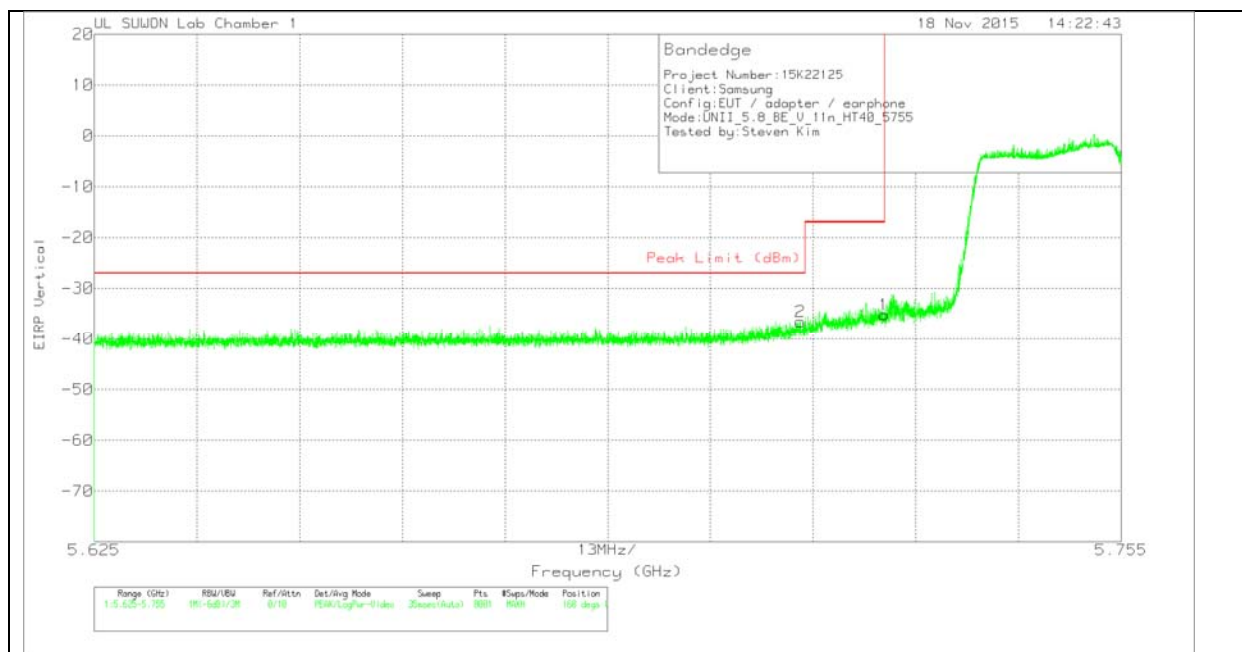
HORIZONTAL DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	3117(0016 8717)_150 619	Path_2	Conversion Factor (dB)	DC Corr (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.725	-63.21	Pk		-22.4	11.8	0	-39.01	-17	-22.01	316	274	H
2	5.714	-61.77	Pk		-22.4	11.8	0	-37.57	-27	-10.57	316	274	H

Pk - Peak detector

VERTICAL PEAK PLOT



VERTICAL DATA

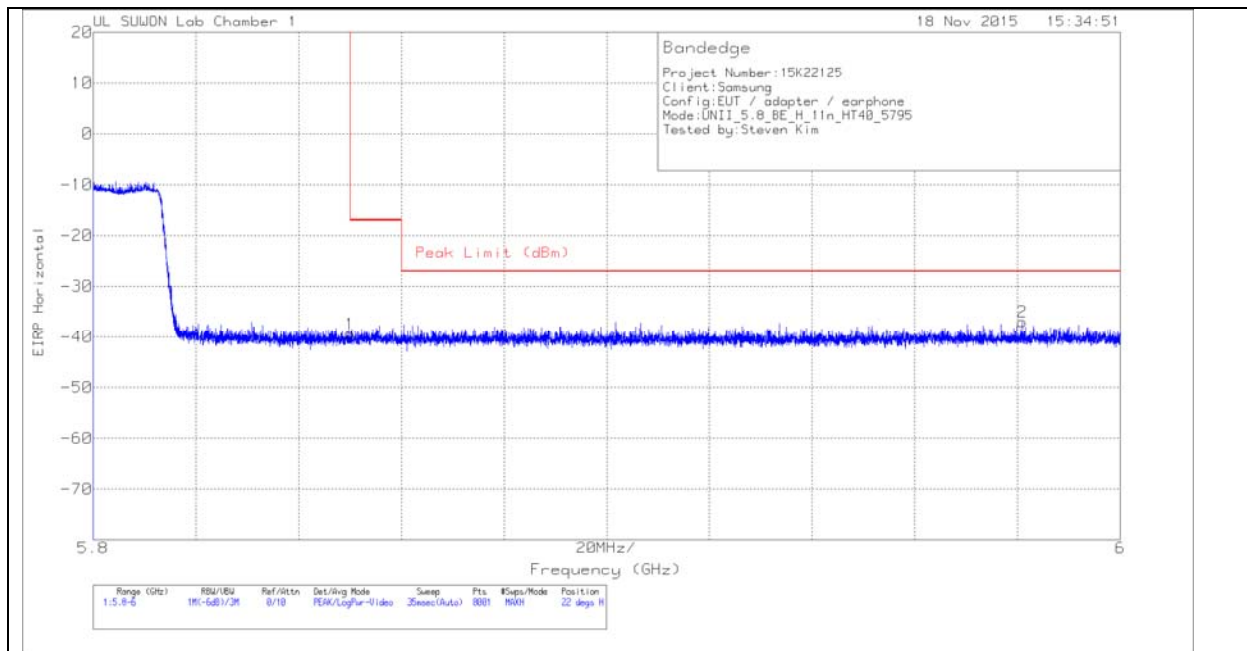
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	3117(0016 8717)_150 619	Path_2	Conversion Factor (dB)	DC Corr (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.725	-59.36	Pk	34.8	-22.4	11.8	0	-35.16	-17	-18.16	168	100	V
2	5.714	-60.74	Pk	34.8	-22.4	11.8	0	-36.54	-27	-9.54	168	100	V

Pk - Peak detector

AUTHORIZED BANDEDGE (HIGH CHANNEL)

HORIZONTAL PEAK PLOT



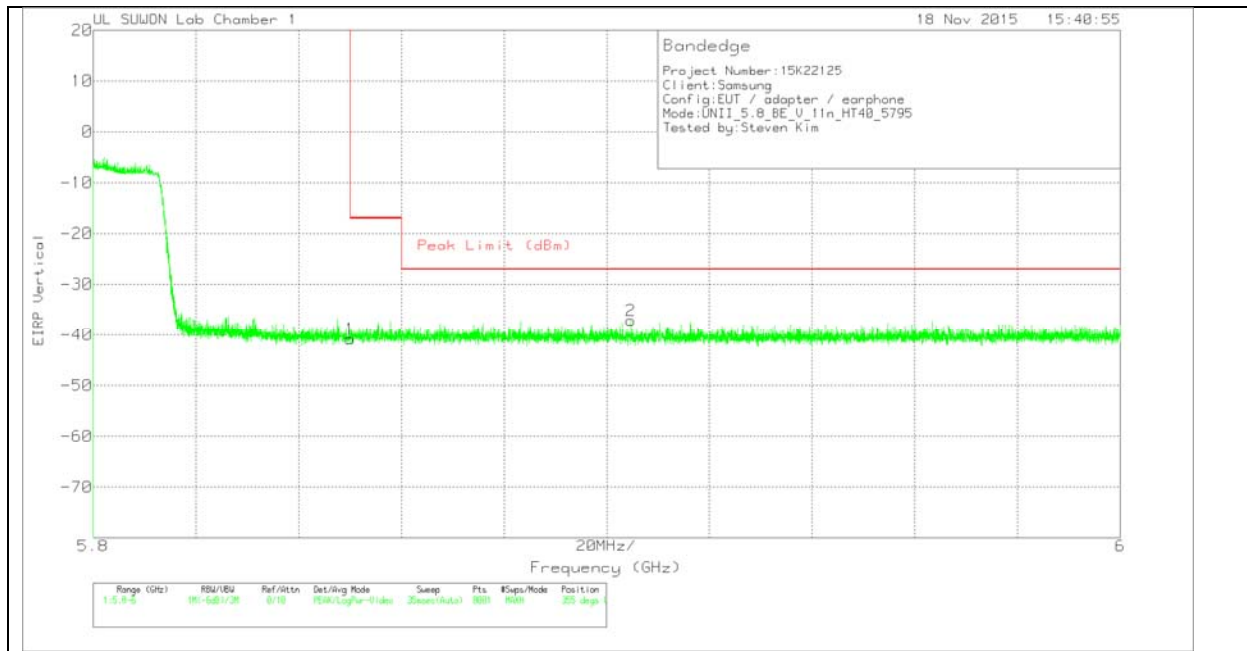
HORIZONTAL DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	3117(0016 8717)_150 619	Path_2	Conversion Factor (dB)	DC Corr (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.85	-64.3	Pk	34.9	-21.8	11.8	0	-39.4	-17	-22.4	22	274	H
2	5.981	-61.87	Pk	34.9	-21.8	11.8	0	-36.97	-27	-9.97	22	274	H

Pk - Peak detector

VERTICAL PEAK PLOT



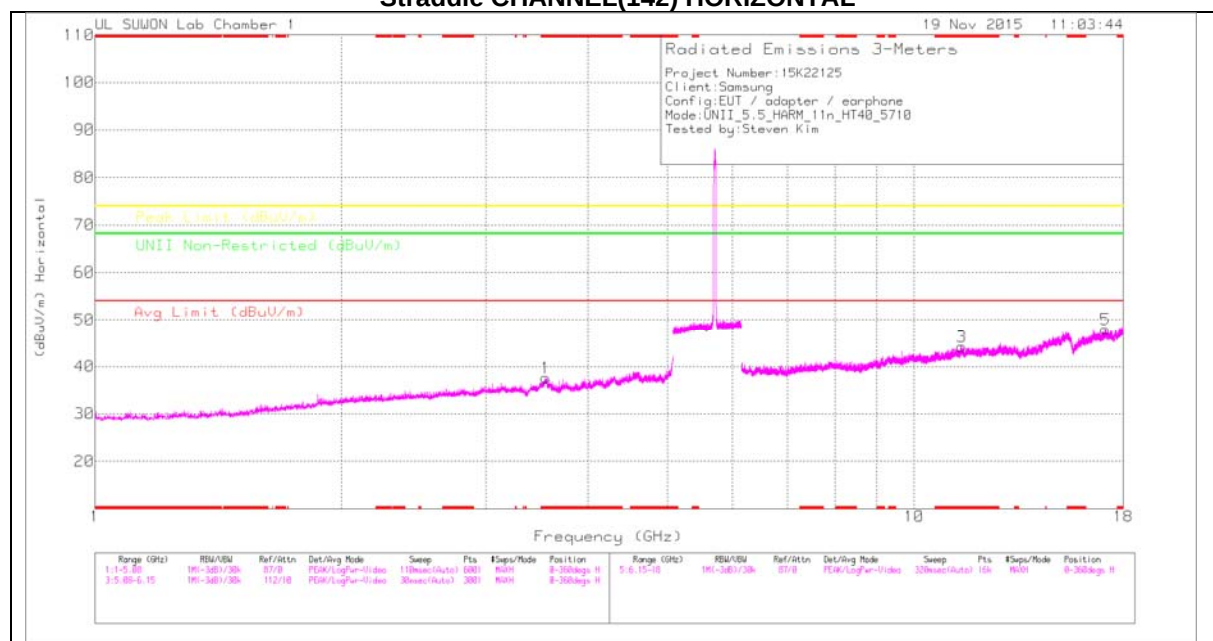
VERTICAL DATA

Trace Markers

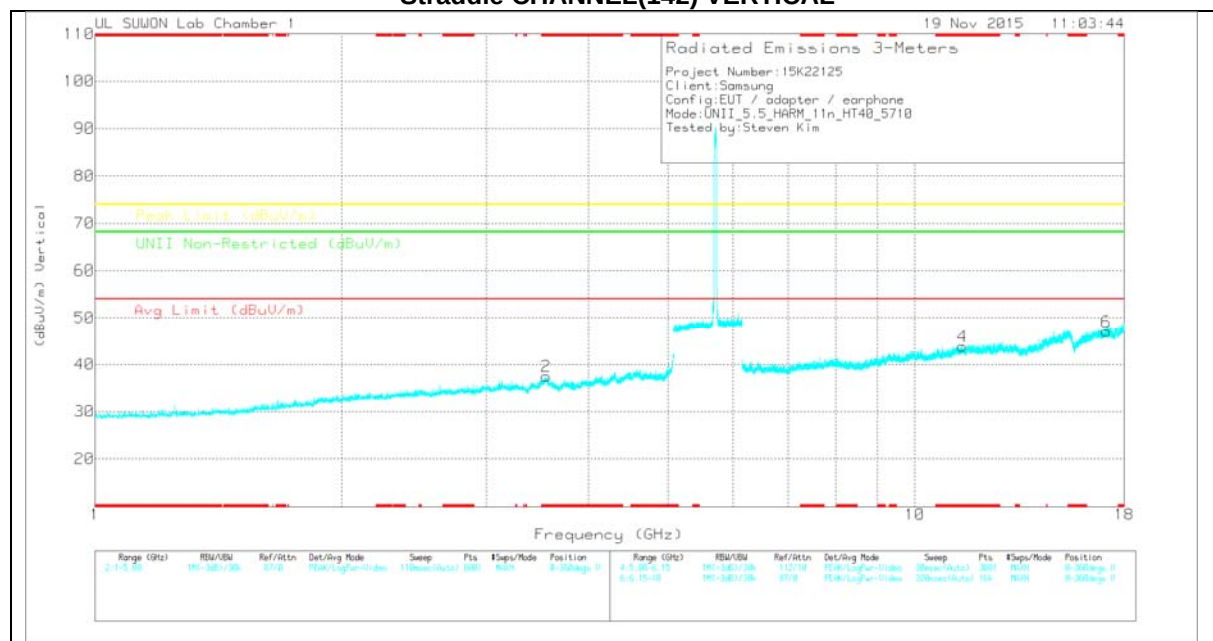
Marker	Frequency (GHz)	Meter Reading (dBm)	Det	3117(0016 8717)_150 619	Path_2	Conversion Factor (dB)	DC Corr (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.85	-65.68	Pk	34.9	-21.8	11.8	0	-40.78	-17	-23.78	355	276	V
2	5.905	-61.92	Pk	34.9	-21.9	11.8	0	-37.12	-27	-10.12	355	276	V

Pk - Peak detector

Straddle CHANNEL(142) HORIZONTAL



Straddle CHANNEL(142) 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.

Straddle CHANNEL(142) DATA

Trace Markers

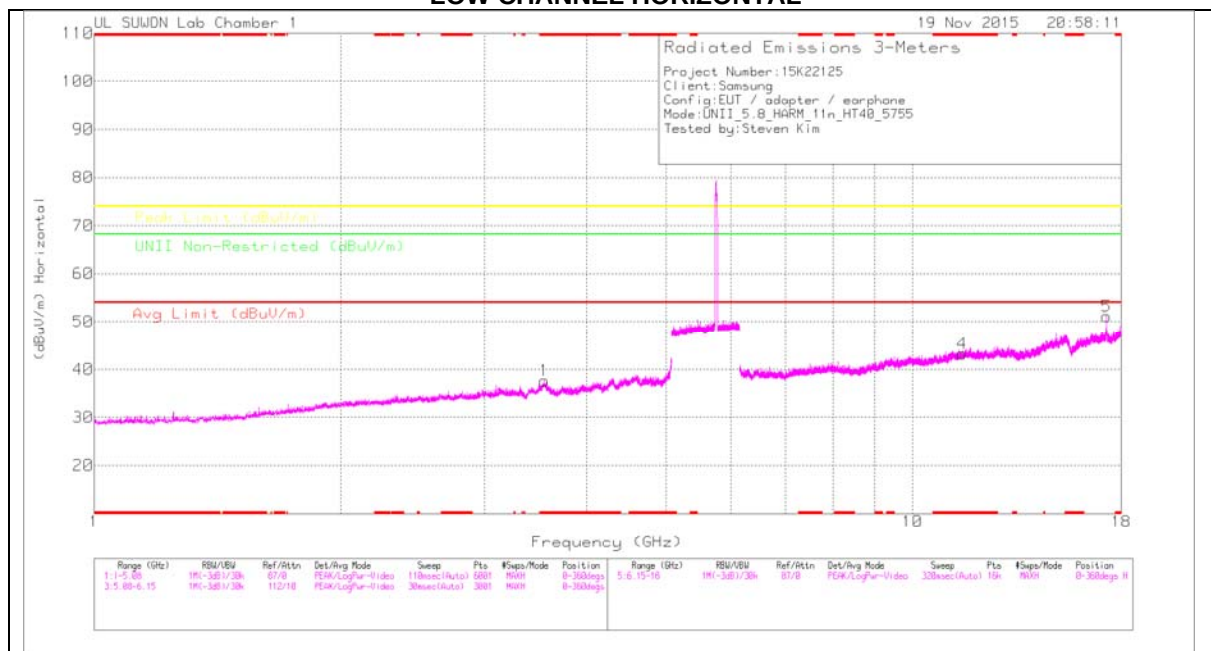
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117(0016 8717)_150 619	Path_4	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	UNII Non-Restricted (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 3.552	39.36	PK	32.8	-34.5	0	37.66	-	-	74	-36.34	-	-	0-360	200	H
2	* 3.549	39.21	PK	32.8	-34.5	0	37.51	-	-	74	-36.49	-	-	0-360	100	V
3	* 11.424	32.37	PK	38.6	-26.8	0	44.17	-	-	74	-29.83	-	-	0-360	100	H
5	17.127	27.84	PK	41.3	-21.2	0	47.94	-	-	-	-	68.2	-20.26	0-360	200	H
4	* 11.421	32.05	PK	38.6	-26.8	0	43.85	-	-	74	-30.15	-	-	0-360	200	V
6	17.133	27.01	PK	41.3	-21.3	0	47.01	-	-	-	-	68.2	-21.19	0-360	200	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

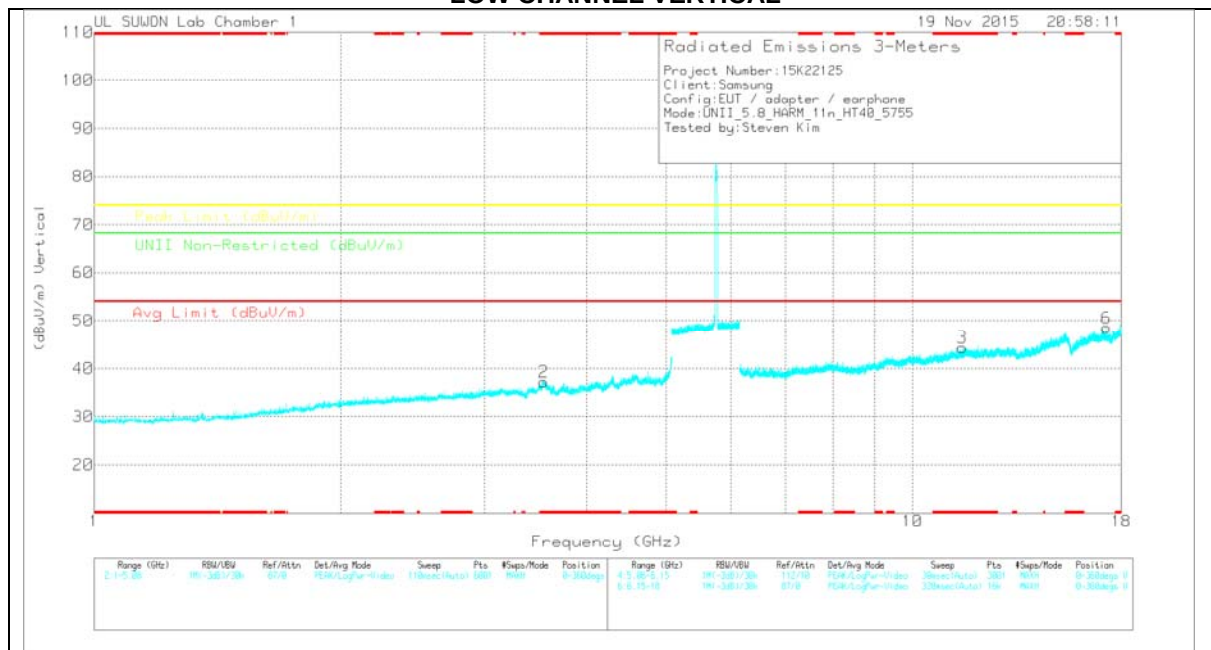
PK – Peak Detector

Note: Only peak measurement was performed. Because peak measurement result of unwanted emission is less than average limit (54dBuV/m).

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(0016 8717)_150 619	Path_4	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	* 3.552	39.34	Pk	32.8	-34.5	0	37.64	-	-	74	-36.36	-	-	0-360	200	H
2	* 3.547	38.9	Pk	32.8	-34.5	0	37.2	-	-	74	-36.8	-	-	0-360	100	V
4	* 11.511	31.25	Pk	38.6	-26.6	0	43.25	-	-	74	-30.75	-	-	0-360	200	H
5	17.275	30.93	Pk	41.2	-21	0	51.13	-	-	-	-	68.2	-17.07	0-360	200	H
3	* 11.509	32.35	Pk	38.6	-26.6	0	44.35	-	-	74	-29.65	-	-	0-360	200	V
6	17.259	28.11	Pk	41.2	-20.8	0	48.51	-	-	-	-	68.2	-19.69	0-360	200	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk – Peak Detector

Radiated Emissions

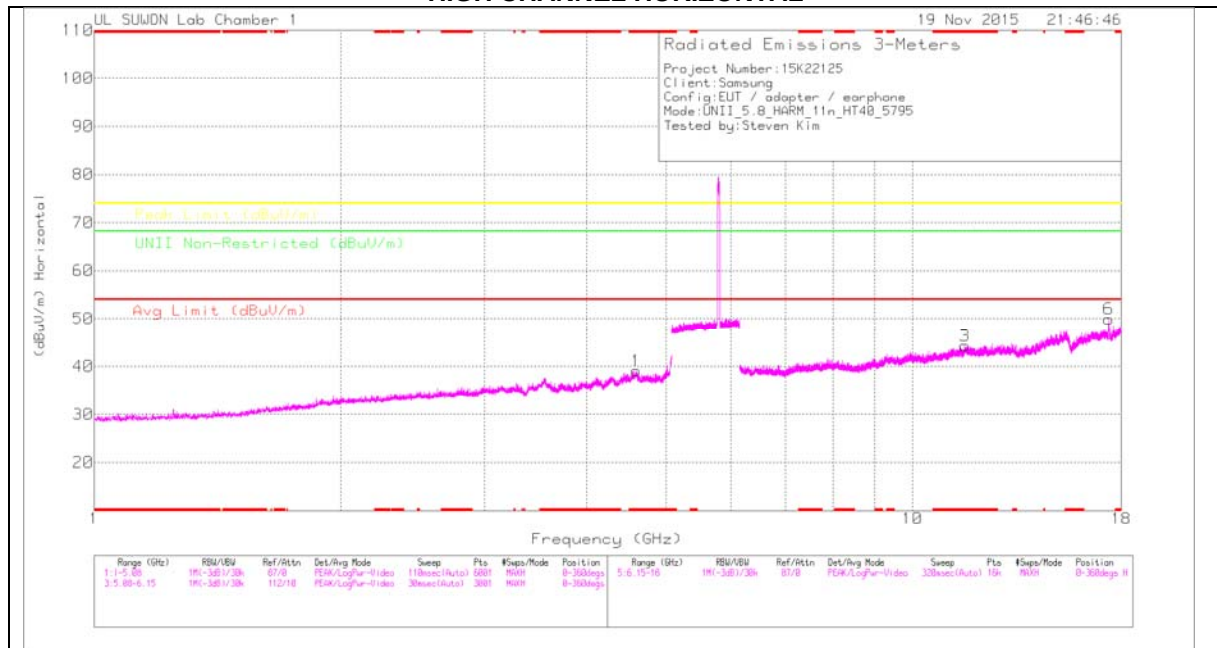
Frequency (GHz)	Meter Reading (dBuV)	Det	3117(001687 17)_150619	Path_5	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	UNII Non-Restricted (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
17.278	42.73	PK-U	41.2	-21	0	62.93	-	-	-	-	68.2	-5.27	134	192	H
17.267	37.74	PK-U	41.2	-20.9	0	58.04	-	-	-	-	68.2	-10.16	342	269	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

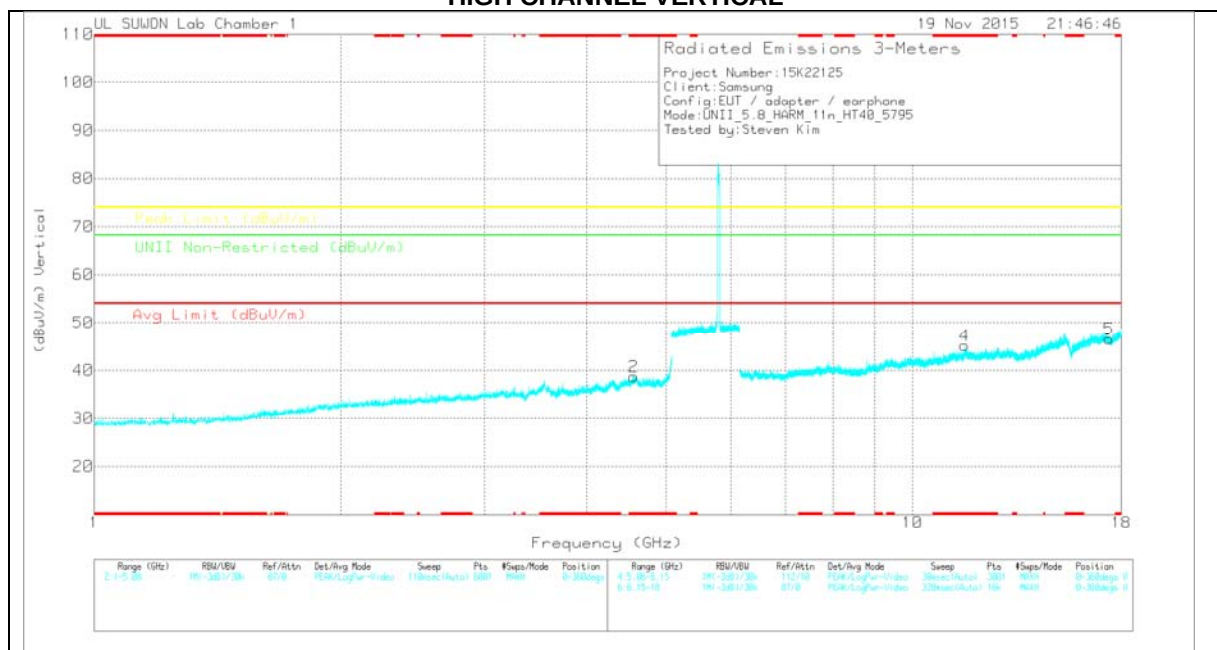
PK-U - U-NII: Maximum Peak

ADR - U-NII AD primary method, RMS average

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(0016 8717)_150 619	Path_4	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	* 4.597	37.98	Pk	33.9	-32.8	0	39.08	-	-	74	-34.92	-	-	0-360	100	H
2	* 4.567	37.67	Pk	33.9	-32.9	0	38.67	-	-	74	-35.33	-	-	0-360	200	V
3	* 11.592	32.27	Pk	38.7	-26.7	0	44.27	-	-	74	-29.73	-	-	0-360	200	H
6	17.373	29.77	Pk	41.2	-21	0	49.97	-	-	-	-	68.2	-18.23	0-360	200	H
4	* 11.591	33.16	Pk	38.7	-26.7	0	45.16	-	-	74	-28.84	-	-	0-360	200	V
5	17.379	26.26	Pk	41.2	-20.9	0	46.56	-	-	-	-	68.2	-21.64	0-360	200	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk – Peak Detector

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	3117(0016871 7)_150619	Path_5	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
17.375	41.86	PK-U	41.2	-21	0	62.06	-	-	-	-	68.2	-6.14	164	171	H

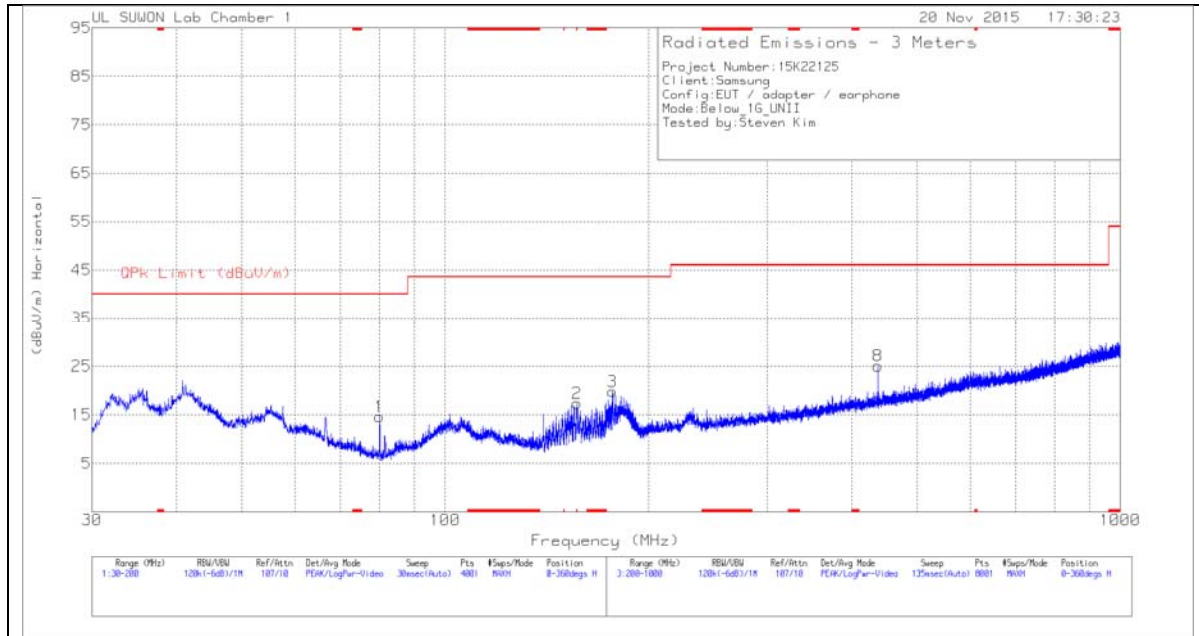
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK-U - U-NII: Maximum Peak

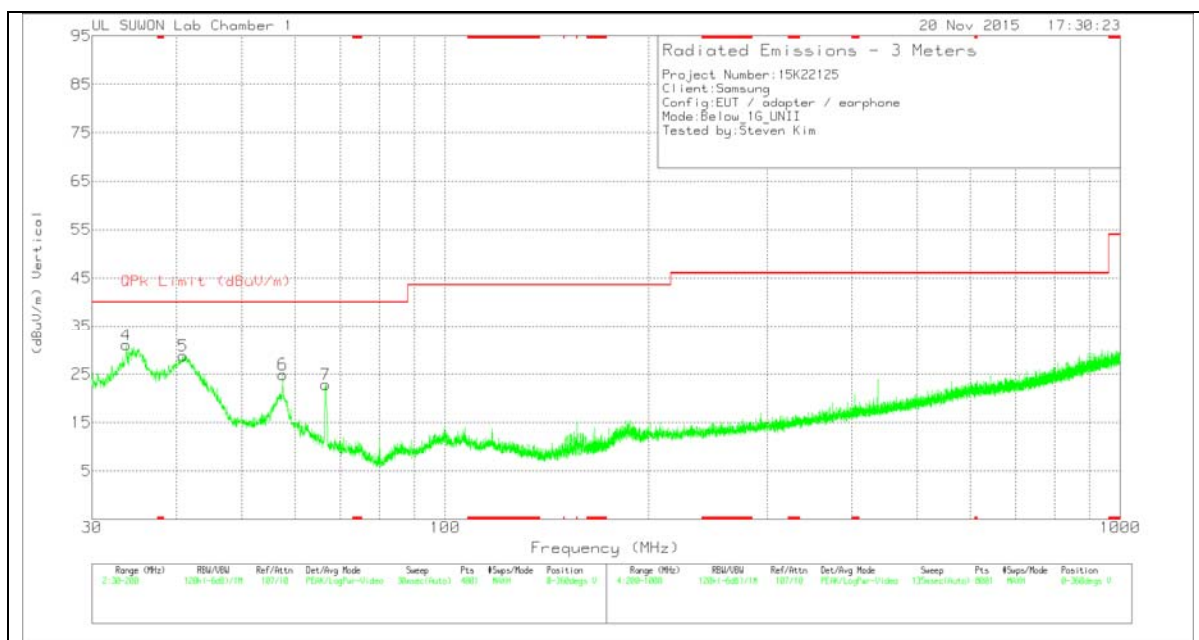
Note: Only peak measurement was performed. Because peak measurement result of unwanted emission is less than average limit (54dBuV/m).

12. WORST-CASE BELOW 1 GHz (in the 5.3 GHz Band)

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	Bi-Log	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	79.98	37.27	Pk	6.9	-29.6	14.57	40	-25.43	0-360	400	H
2	* 156.8625	37.64	Pk	8.4	-28.6	17.44	43.52	-26.08	0-360	200	H
3	176.8375	38.86	Pk	9.3	-28.4	19.76	43.52	-23.76	0-360	200	H
4	33.74	51.1	Pk	10.4	-30.5	31	40	-9	0-360	100	V
5	40.9225	46.36	Pk	12.7	-30.3	28.76	40	-11.24	0-360	100	V
6	57.4975	41.92	Pk	13	-30	24.92	40	-15.08	0-360	100	V
7	66.55	41.95	Pk	10.7	-29.8	22.85	40	-17.15	0-360	100	V
8	437.5	35.55	Pk	16.1	-26.6	25.05	46.02	-20.97	0-360	301	H

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk - Peak detector

13. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

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

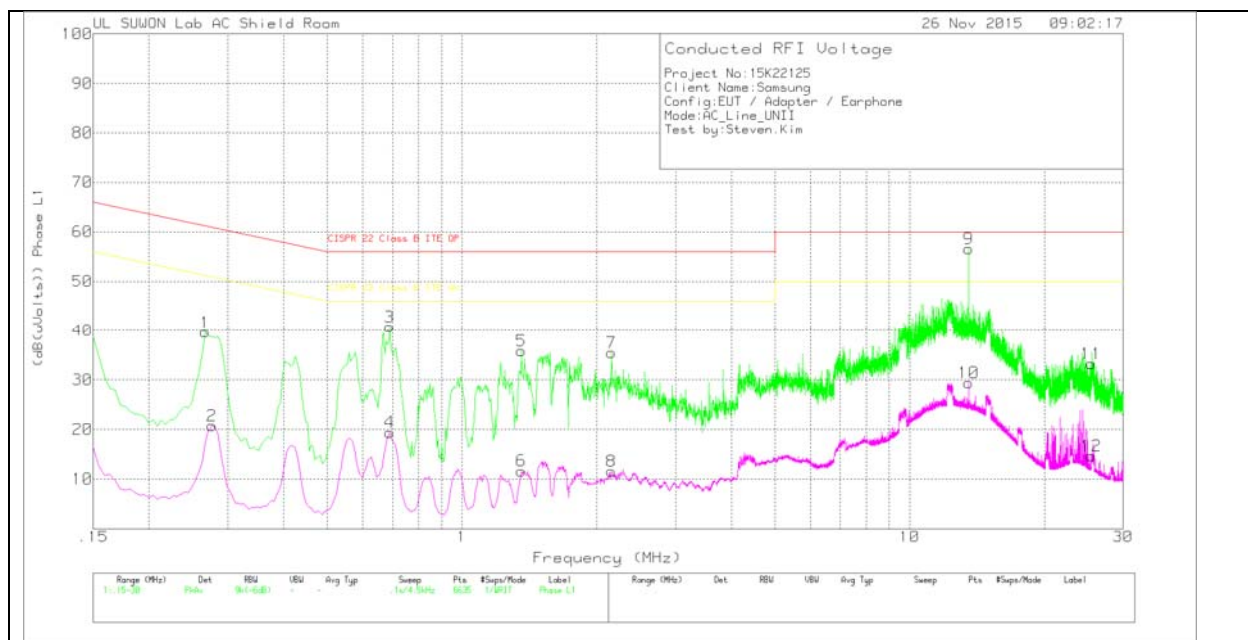
The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.10.

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

LINE 1 PLOT



LINE 1 RESULTS

Trace Markers

Phase L1 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	101837_w ith ex- cord_L1	CE Shield Room	Corrected Reading (dB(uVolts))	CISPR 22 Class B ITE QP	Margin (dB)	CISPR 22 Class B ITE AV	Margin (dB)
1	.267	29.92	Pk	9.8	0	39.72	61.21	-21.49	-	-
2	.276	11	Av	9.8	0	20.8	-	-	50.94	-30.14
3	.69	30.7	Pk	10.1	0	40.8	56	-15.2	-	-
4	.69	9.35	Av	10.1	0	19.45	-	-	46	-26.55
5	1.356	25.93	Pk	9.8	.1	35.83	56	-20.17	-	-
6	1.356	1.76	Av	9.8	.1	11.66	-	-	46	-34.34
7	2.157	25.53	Pk	9.8	.1	35.43	56	-20.57	-	-
8	2.157	1.67	Av	9.8	.1	11.57	-	-	46	-34.43
9	13.5555	46.3	Pk	10.1	.2	56.6	60	-3.4	-	-
10	13.5555	19.06	Av	10.1	.2	29.36	-	-	50	-20.64
11	25.476	22.43	Pk	10.5	.3	33.23	60	-26.77	-	-
12	25.4535	3.86	Av	10.5	.3	14.66	-	-	50	-35.34

Pk - Peak detector

Av - Average detection

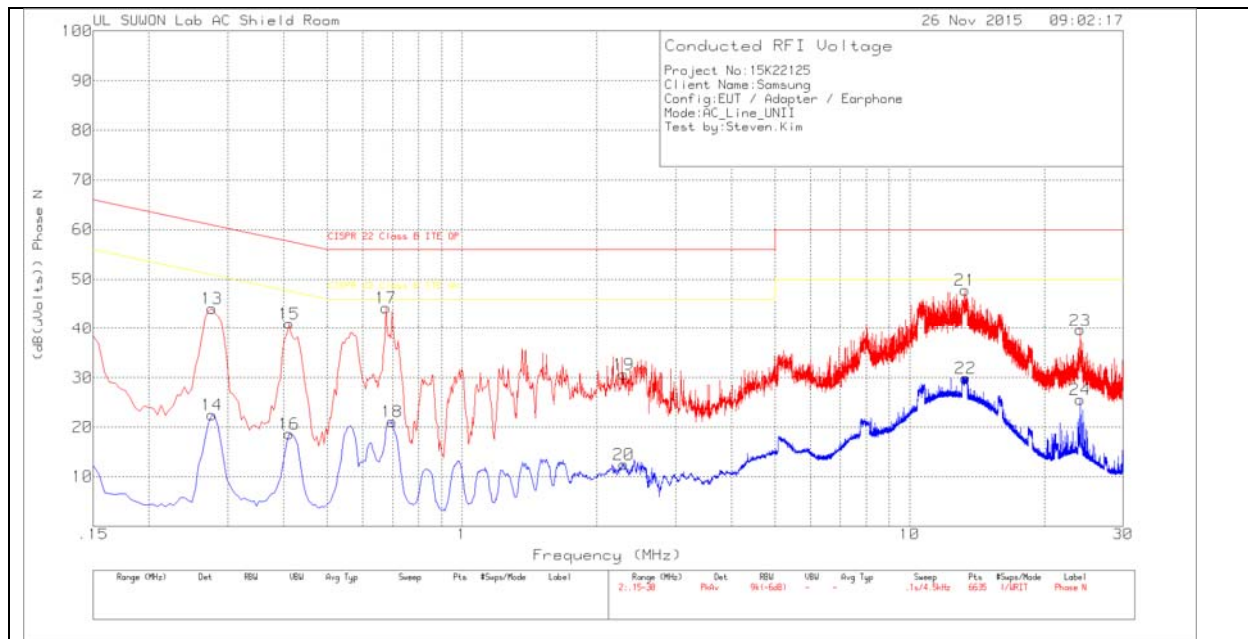
Quasi-Peak Emissions

Phase L1 .15 - 30MHz

Frequency (MHz)	Meter Reading (dBuV)	Det	101837_wit h ex-cord_L1	CE Shield Room	Corrected Reading (dB(uVolts))	CISPR 22 Class B ITE QP	Margin (dB)	CISPR 22 Class B ITE AV	Margin (dB)
12.6555	24.27	Qp	10.1	.2	34.57	60	-25.43	-	-
12.6276	23.98	Qp	10.1	.2	34.28	60	-25.72	-	-

Qp - Quasi-Peak detector

LINE 2 PLOT



LINE 2 RESULTS

Trace Markers

Phase N .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	101837_w ith ex- cord_N	CE Shield Room	Corrected Reading (dB(uVolts)	CISPR 22 Class B ITE QP	Margin (dB)	CISPR 22 Class B ITE AV	Margin (dB)
13	.276	34.35	Pk	9.8	0	44.15	60.94	-16.79	-	-
14	.276	12.73	Av	9.8	0	22.53	-	-	50.94	-28.41
15	.411	30.96	Pk	10.1	0	41.06	57.63	-16.57	-	-
16	.411	8.52	Av	10.1	0	18.62	-	-	47.63	-29.01
17	.6765	34.21	Pk	10	0	44.21	56	-11.79	-	-
18	.699	11.1	Av	10	0	21.1	-	-	46	-24.9
19	2.301	20.77	Pk	9.8	.1	30.67	56	-25.33	-	-
20	2.301	2.61	Av	9.8	.1	12.51	-	-	46	-33.49
21	13.281	37.4	Pk	10.2	.2	47.8	60	-12.2	-	-
22	13.3215	19.46	Av	10.2	.2	29.86	-	-	50	-20.14
23	24.045	28.75	Pk	10.7	.2	39.65	60	-20.35	-	-
24	24.045	14.73	Av	10.7	.2	25.63	-	-	50	-24.37

Pk - Peak detector

Av - Average detection

14. DYNAMIC FREQUENCY SELECTION

14.1. OVERVIEW

14.1.1. LIMITS

INDUSTRY CANADA

IC RSS-210 is closely harmonized with FCC Part 15 DFS rules. The deviations are as follows:

RSS-247 Issue §6.3

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

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

FCC

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

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

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

Table 2: Applicability of DFS requirements during normal operation

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

Additional requirements for devices with multiple bandwidth modes	Master Device or Client with Radar DFS	Client (without DFS)
U-NII Detection Bandwidth and Statistical Performance Check	All BW modes must be tested	Not required
Channel Move Time and Channel Closing Transmission Time	Test using widest BW mode available	Test using the widest BW mode available for the link
All other tests	Any single BW mode	Not required

Note: Frequencies selected for statistical performance check (Section 7.8.4) should include several frequencies within the radar detection bandwidth and frequencies near the edge of the radar detection bandwidth. For 802.11 devices it is suggested to select frequencies in all 20 MHz channel blocks and a null frequency between the bonded 20 MHz channel blocks.

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

Maximum Transmit Power	Value (see notes)
E.I.R.P. $\geq$ 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
<i>Non-occupancy period</i>	30 minutes
<i>Channel Availability Check Time</i>	60 seconds
<i>Channel Move Time</i>	10 seconds (See Note 1)
<i>Channel Closing Transmission Time</i>	200 milliseconds + approx. 60 milliseconds over remaining 10 second period. (See Notes 1 and 2)
<i>U-NII Detection Bandwidth</i>	Minimum 100% of the U- NII 99% transmission power bandwidth. (See Note 3)
Note 1: <i>Channel Move Time</i> and the <i>Channel Closing Transmission Time</i> should be performed with Radar Type 0. The measurement timing begins at the end of the Radar Type 0 burst. Note 2: The <i>Channel Closing Transmission Time</i> is comprised of 200 milliseconds starting at the beginning of the <i>Channel Move Time</i> plus any additional intermittent control signals required to facilitate a <i>Channel</i> 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 <i>U-NII Detection Bandwidth</i> 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: $\{(1/360) \times (19 \times 10^6 \text{ PRI}_{\text{usec}})\}$	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 <i>Detection Bandwidth</i> test, <i>Channel Move Time</i> , and <i>Channel Closing Time</i> tests.					

Table 6 – Long Pulse Radar Test Signal

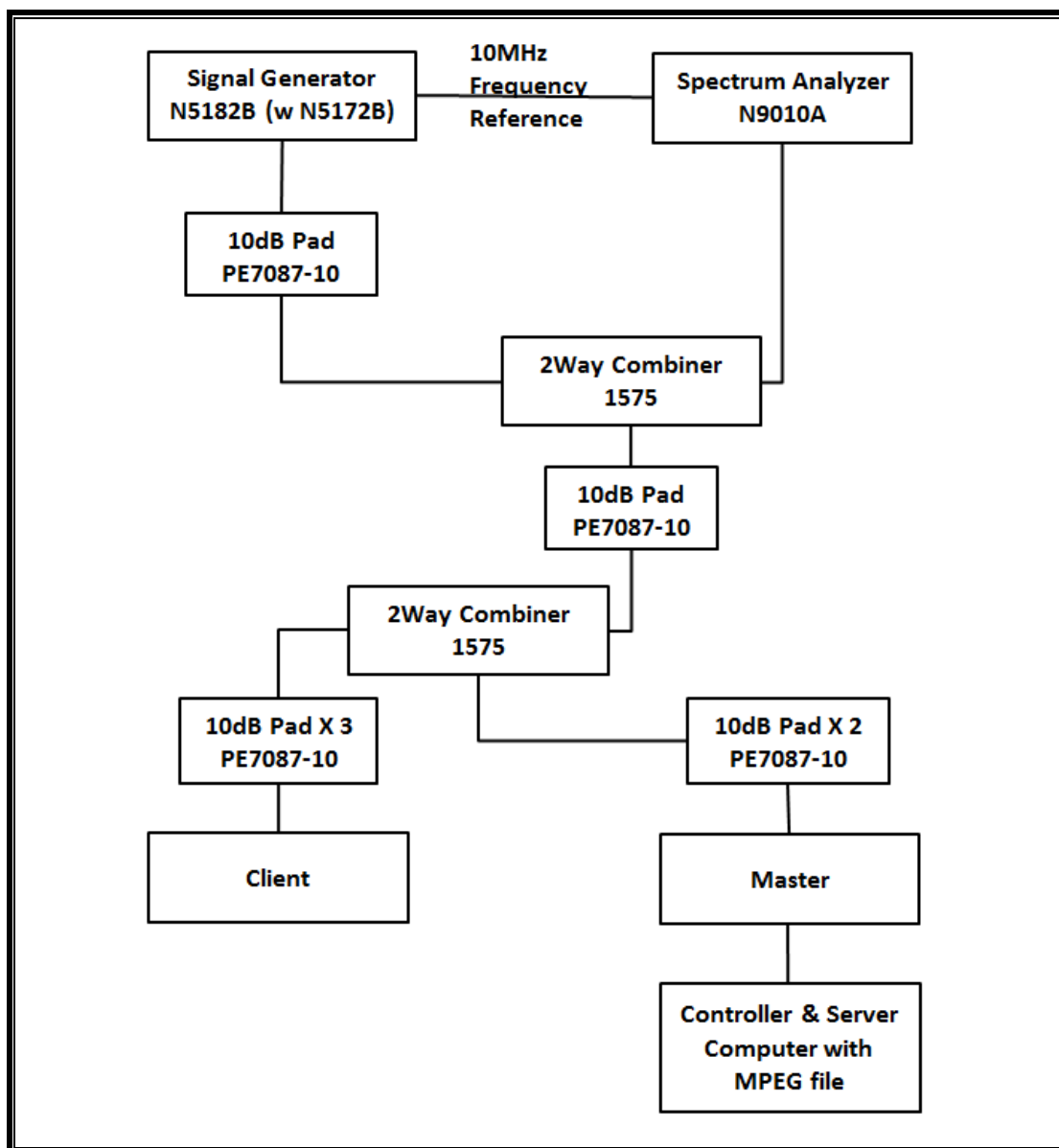
Radar Waveform Type	Pulse Width (μsec)	Chirp Width (MHz)	PRI (μsec)	Pulses per Burst	Number of Bursts	Minimum Percentage of Successful Detection	Minimum Trials
5	50-100	5-20	1000-2000	1-3	8-20	80%	30

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

14.1.1. 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.

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.

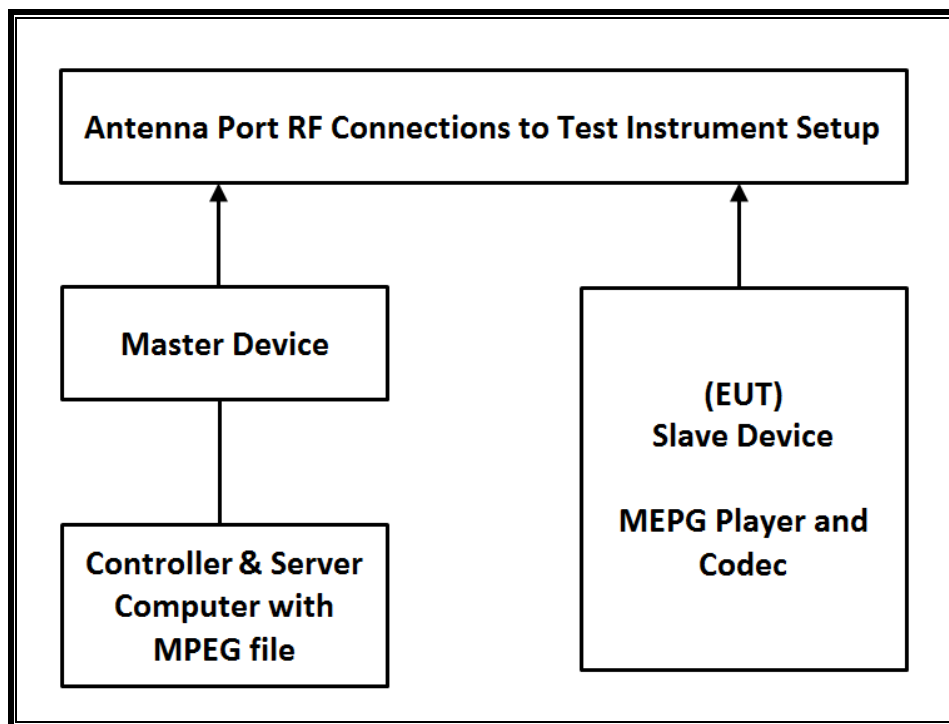
TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST				
Description	Manufacturer	Model	S/N	Cal Due
Spectrum Analyzer, 7 GHz	Agilent / HP	N9010A	MY54200580	08-19-16
Vector Signal Generator, 6GHz	Agilent / HP	N5182B	MY53051241	08-19-16

14.1.2. 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

14.1.3. 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 12.644 dBm in the 5250-5350 MHz band and 12.557 dBm in the 5470-5725 MHz band.

The antenna assembly utilized antenna with the EUT is -1.02 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 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 802.11a, 802.11n architecture. Two nominal channel bandwidths are implemented: 20 MHz and 40 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.

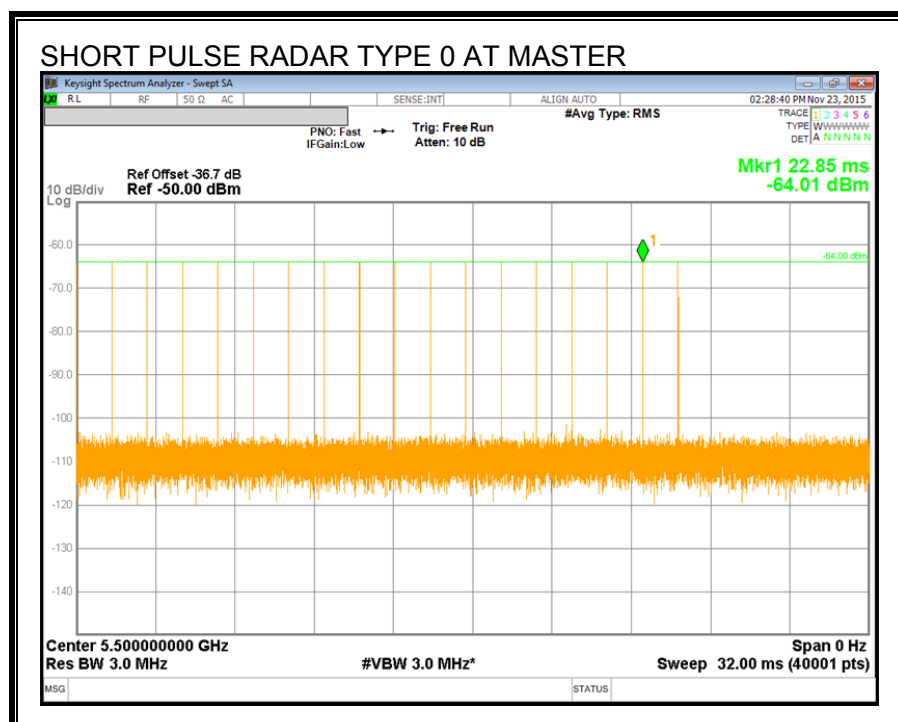
14.2. RESULTS FOR 20 MHz BANDWIDTH

14.2.1. TEST CHANNEL

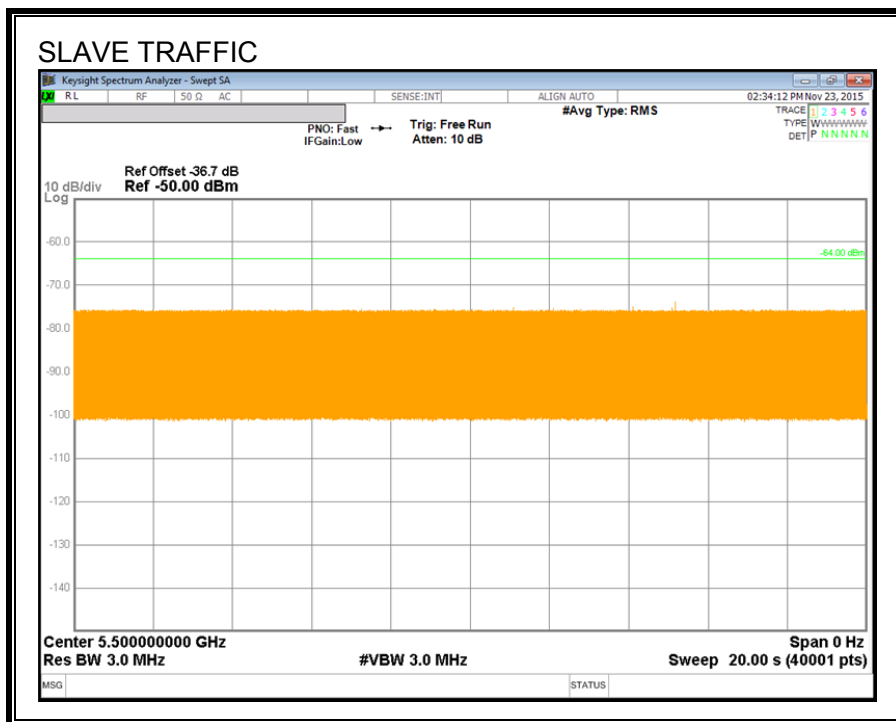
All tests were performed at a channel center frequency of 5500 MHz.

14.2.2. RADAR WAVEFORM AND TRAFFIC

RADAR WAVEFORM



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

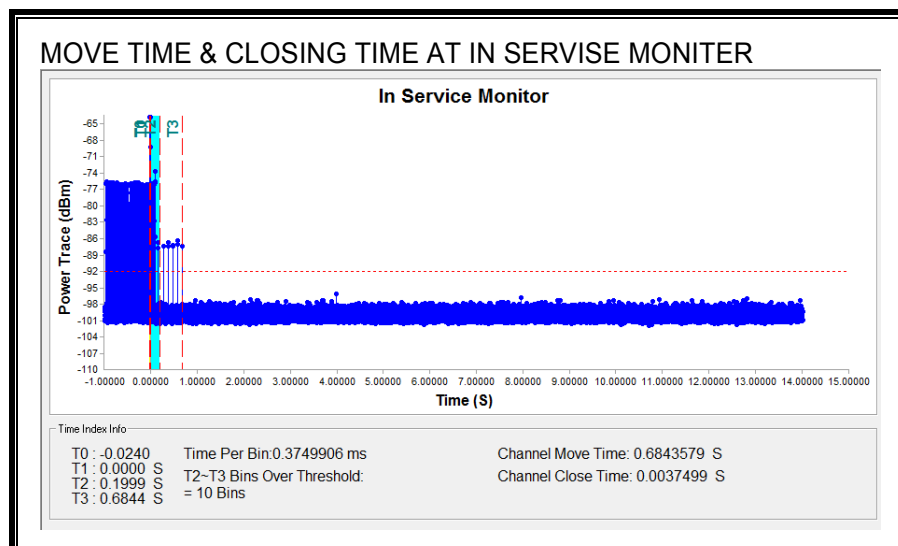
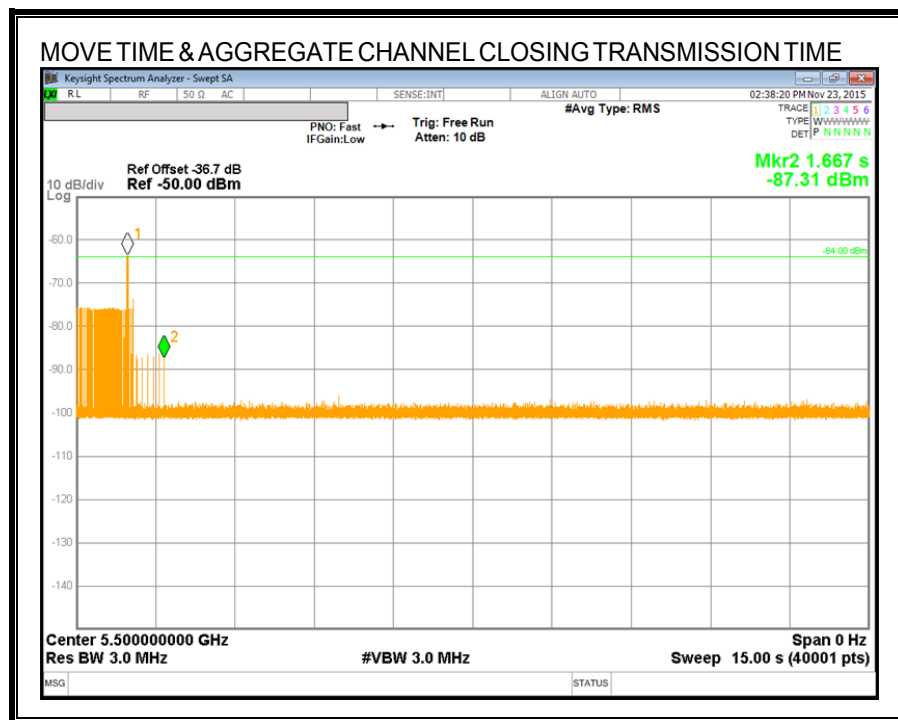
Channel Move Time (sec)	Limit (sec)
0.684	10

Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
3.750	60

MOVE TIME & CHANNEL CLOSING TIME

AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

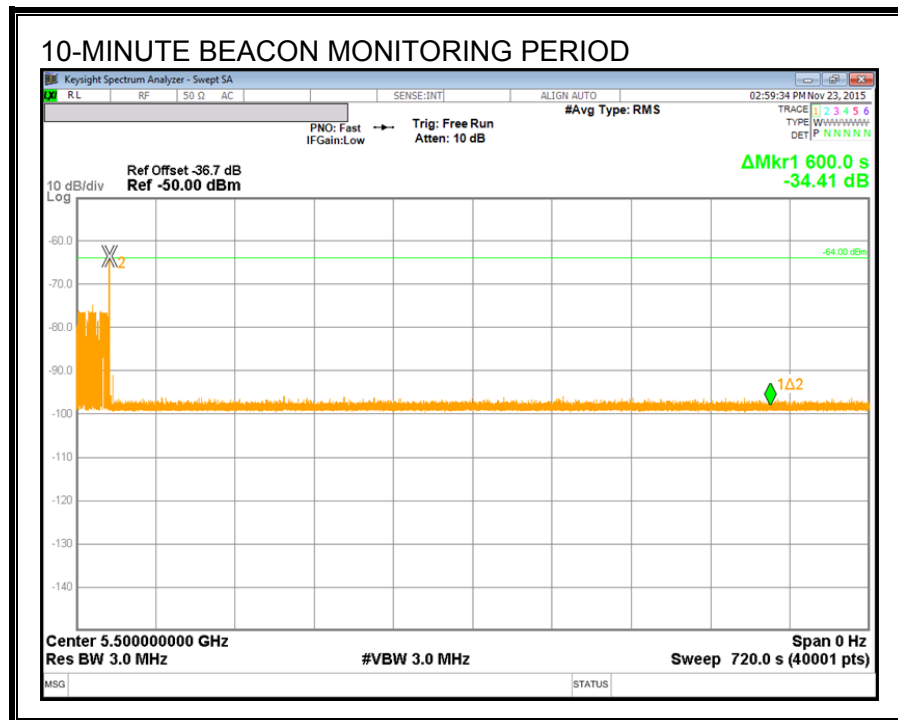
No transmissions are observed during the aggregate monitoring period.



NON-OCCUPANCY PERIOD

RESULTS

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



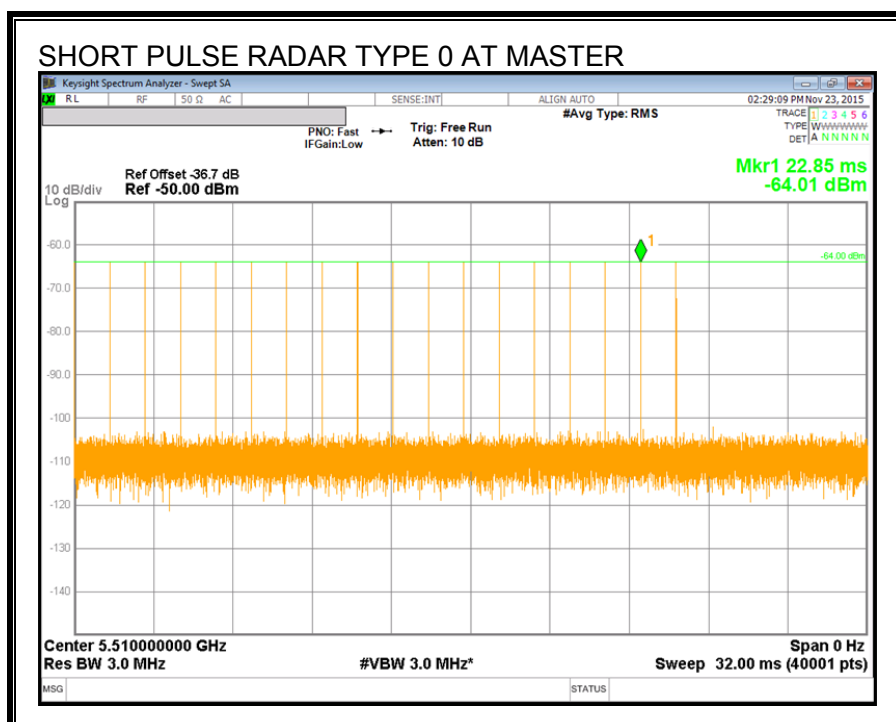
14.3. RESULTS FOR 40 MHz BANDWIDTH

14.3.1. TEST CHANNEL

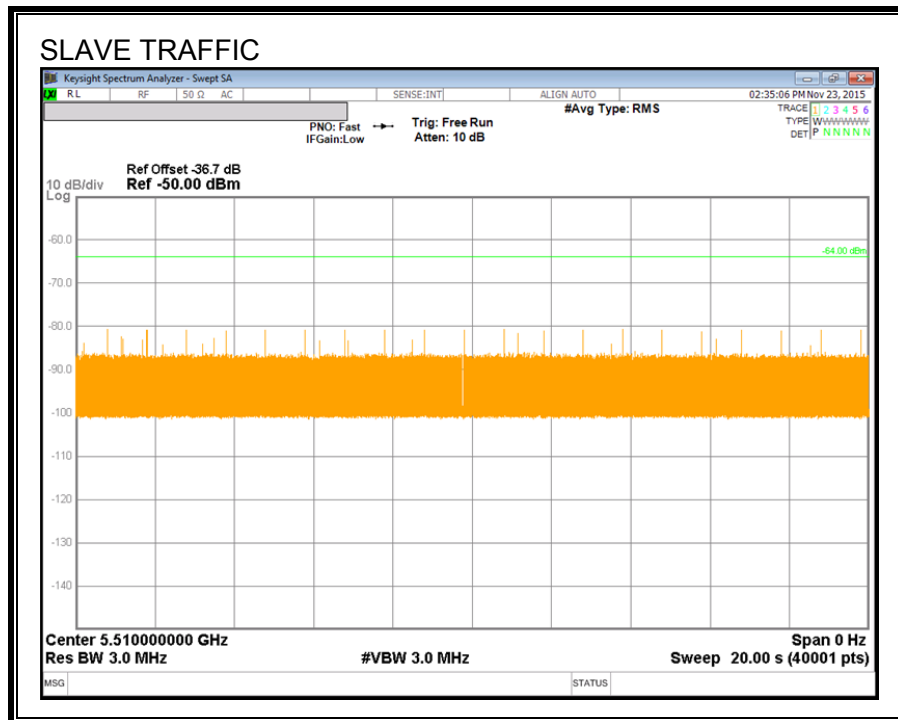
All tests were performed at a channel center frequency of 5510 MHz.

14.3.2. RADAR WAVEFORM AND TRAFFIC

RADAR WAVEFORM



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

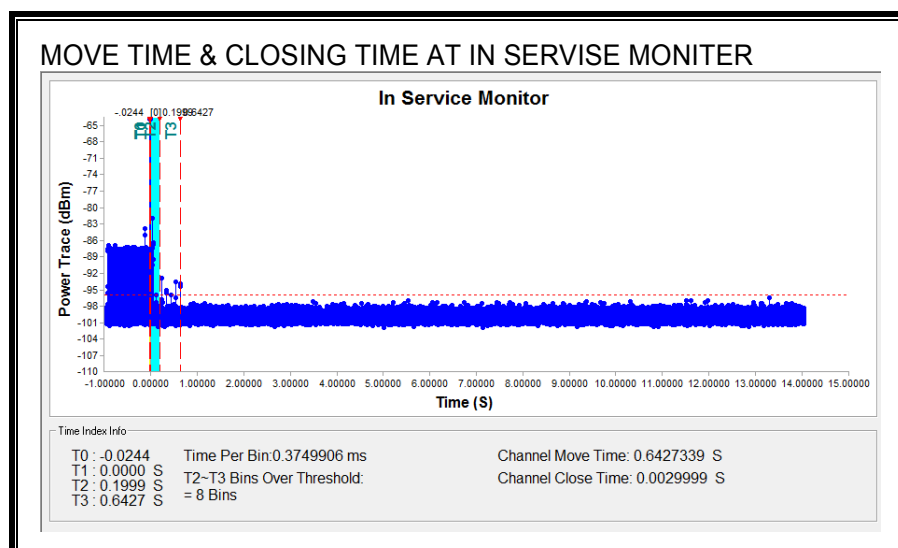
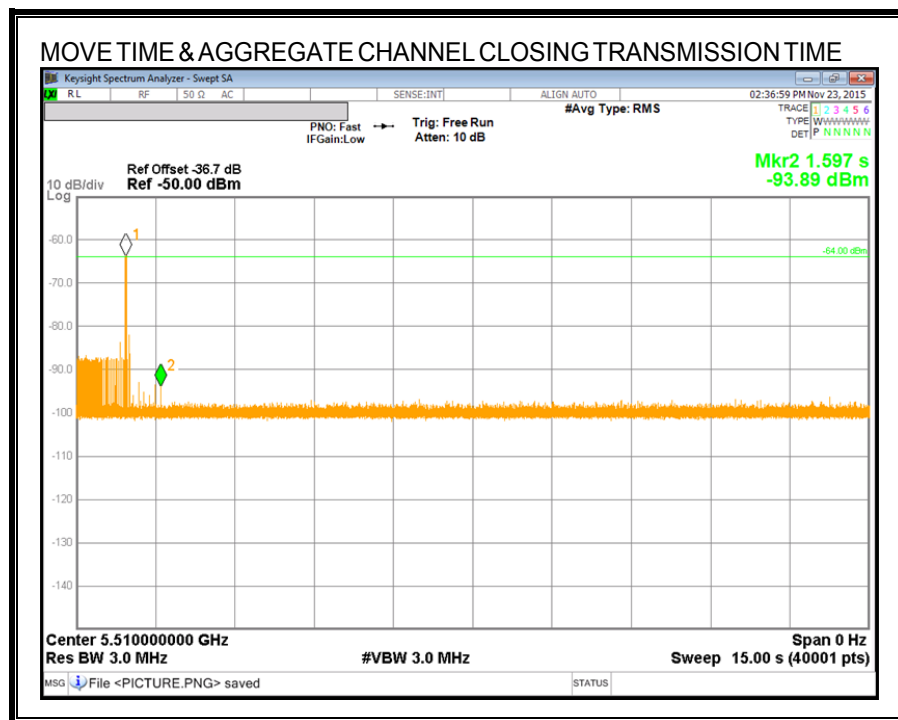
Channel Move Time (sec)	Limit (sec)
0.643	10

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.



NON-OCCUPANCY PERIOD

RESULTS

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

