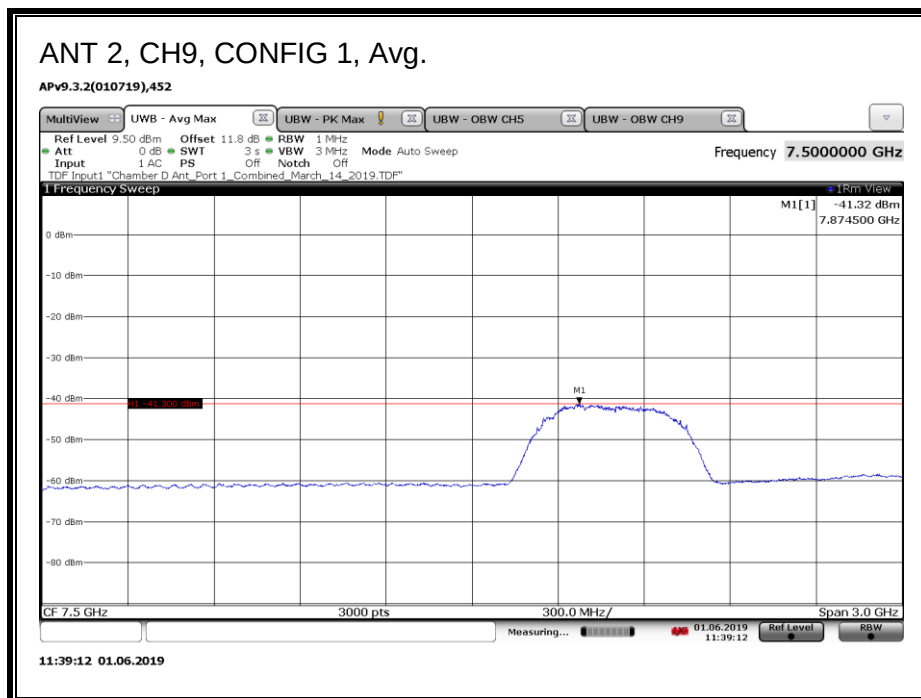
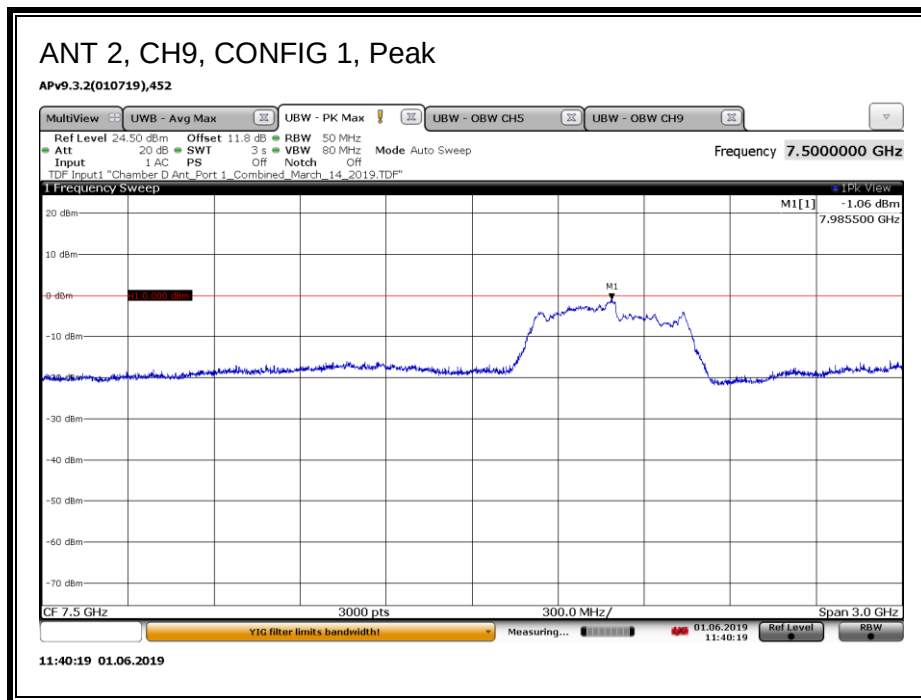
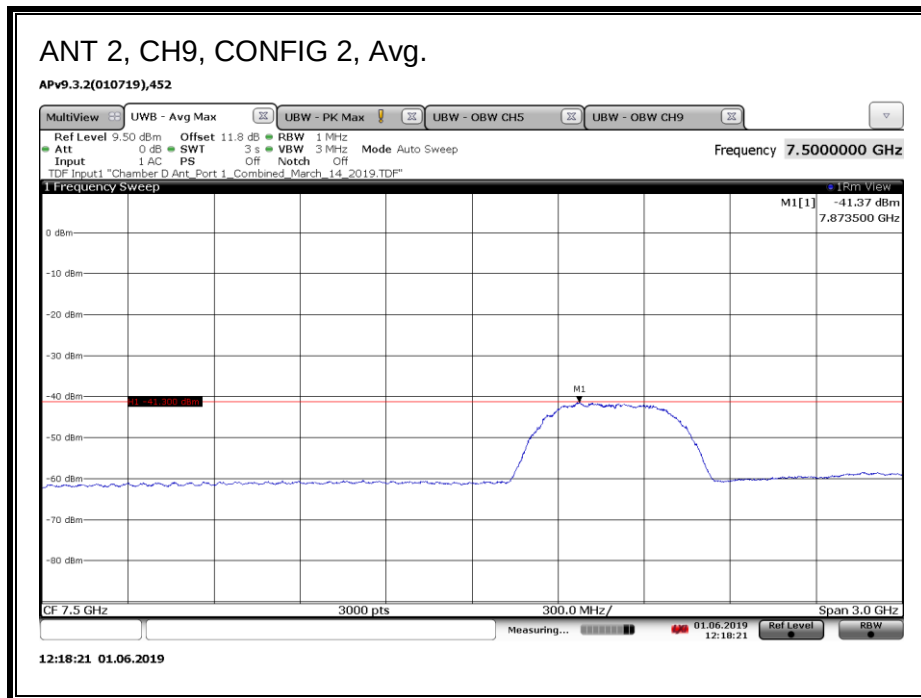
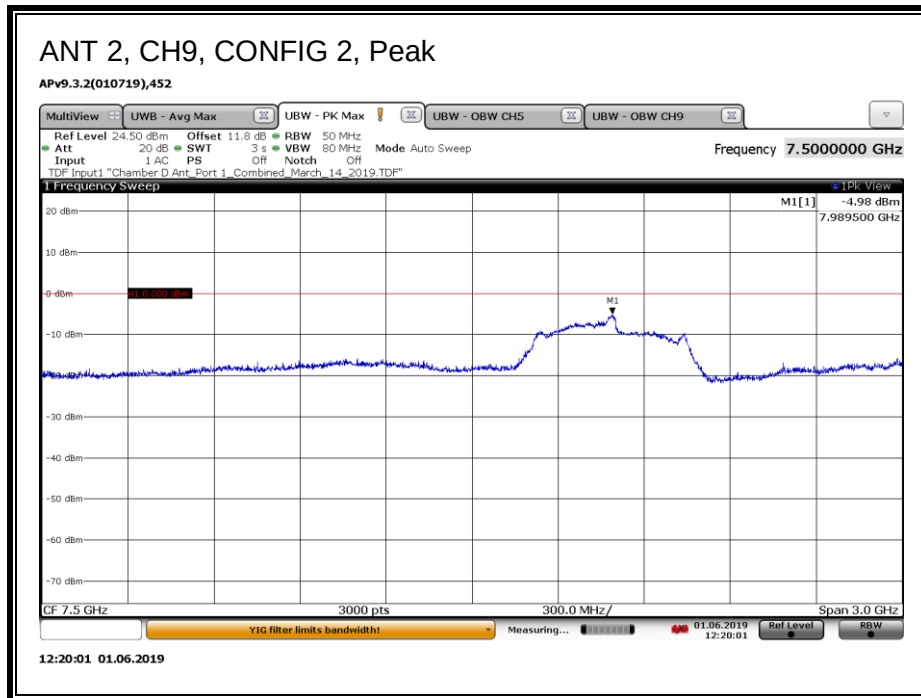
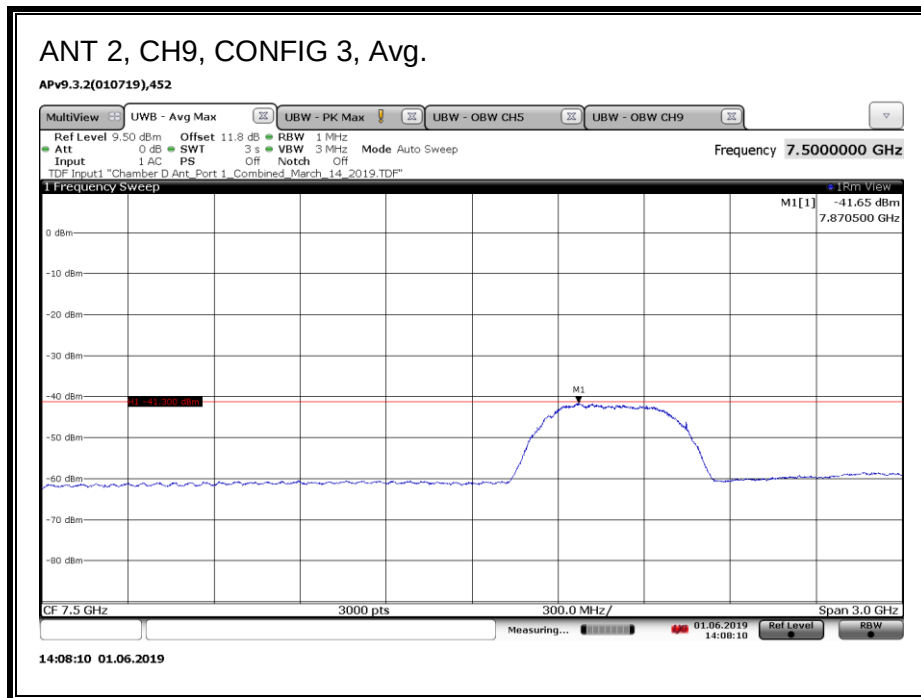
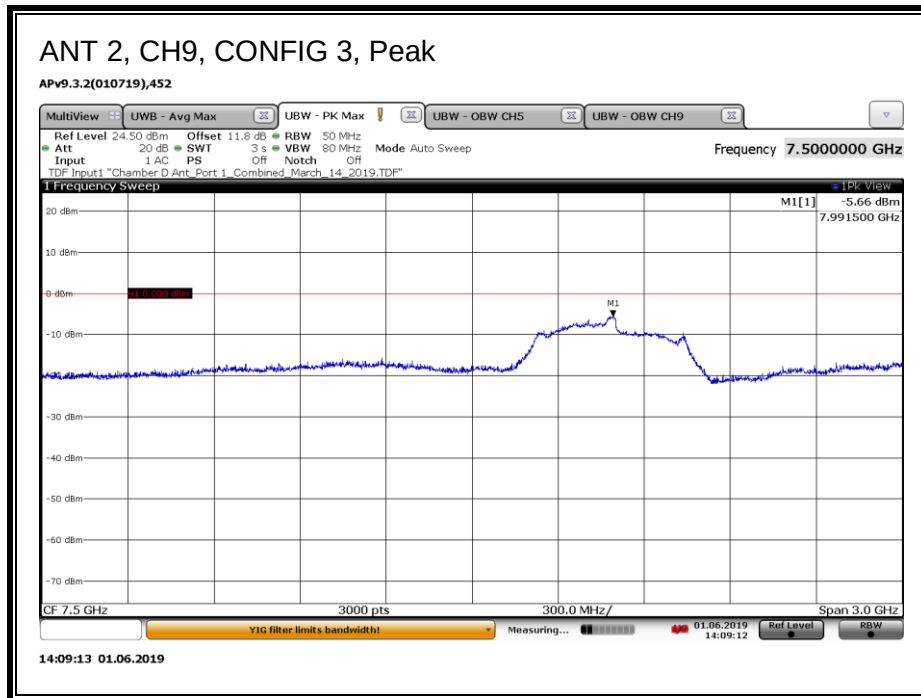
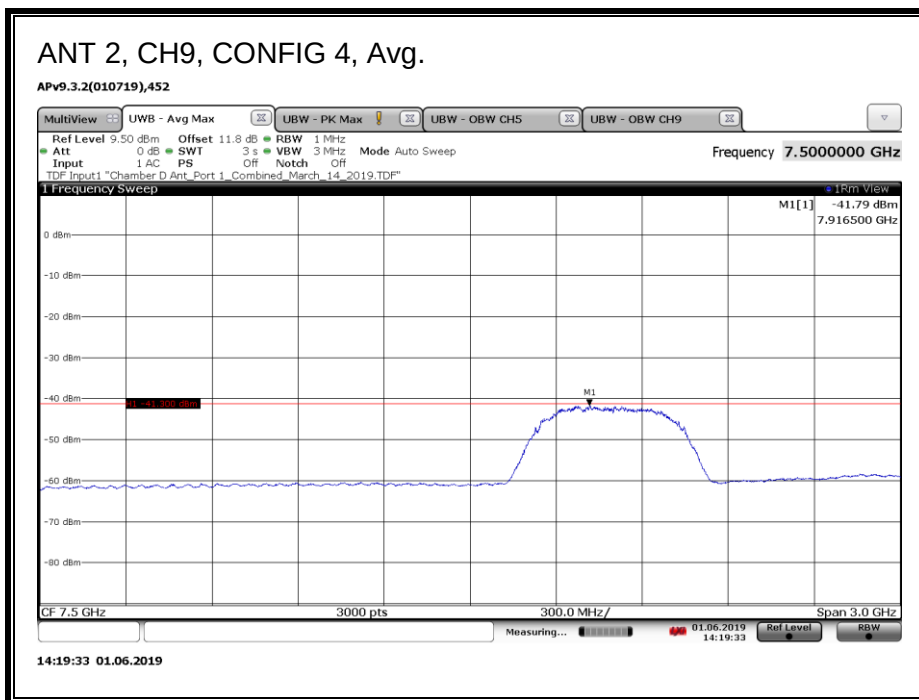
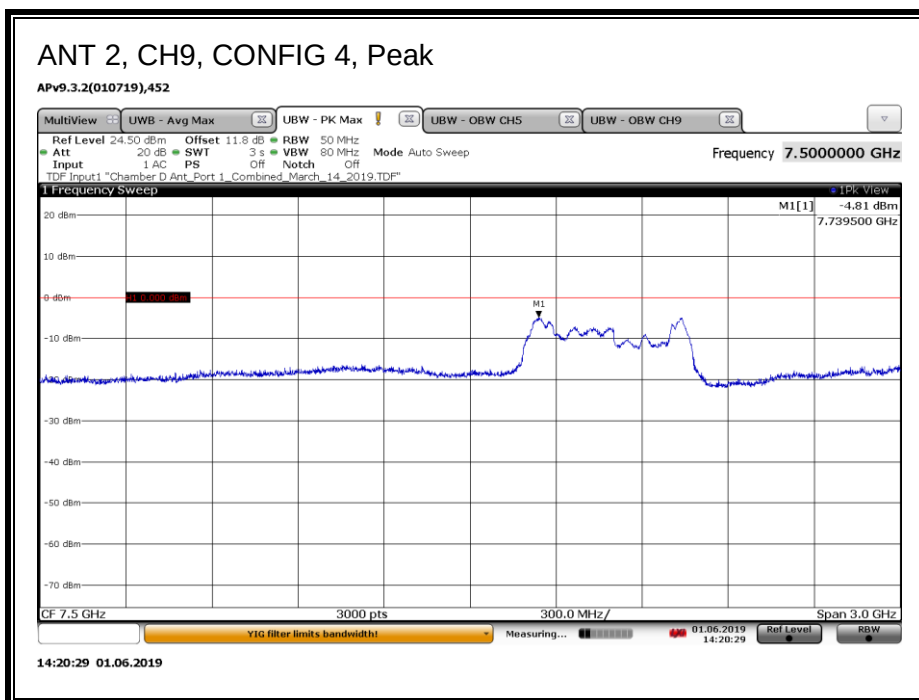
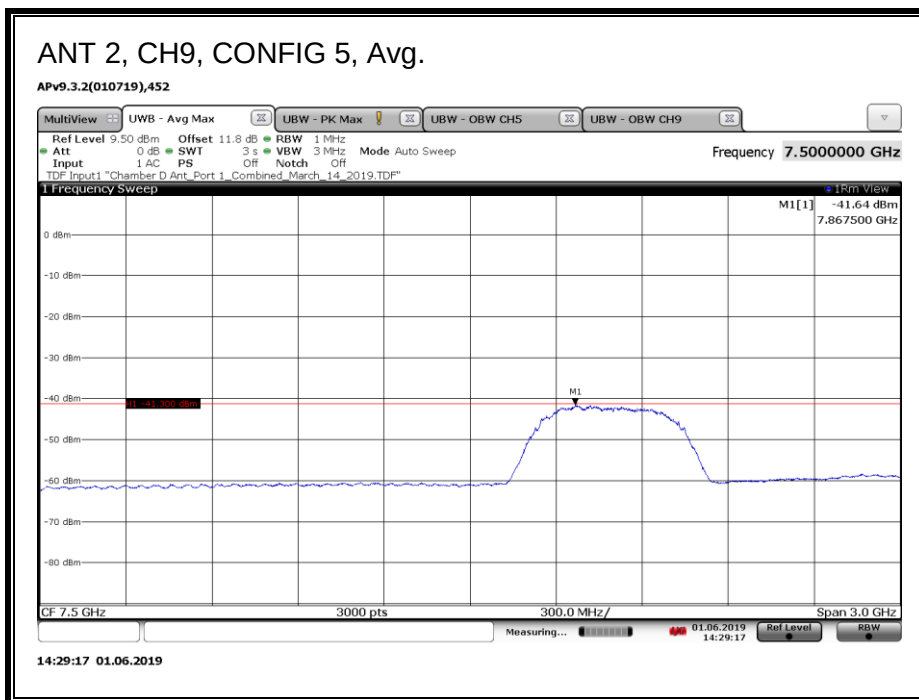
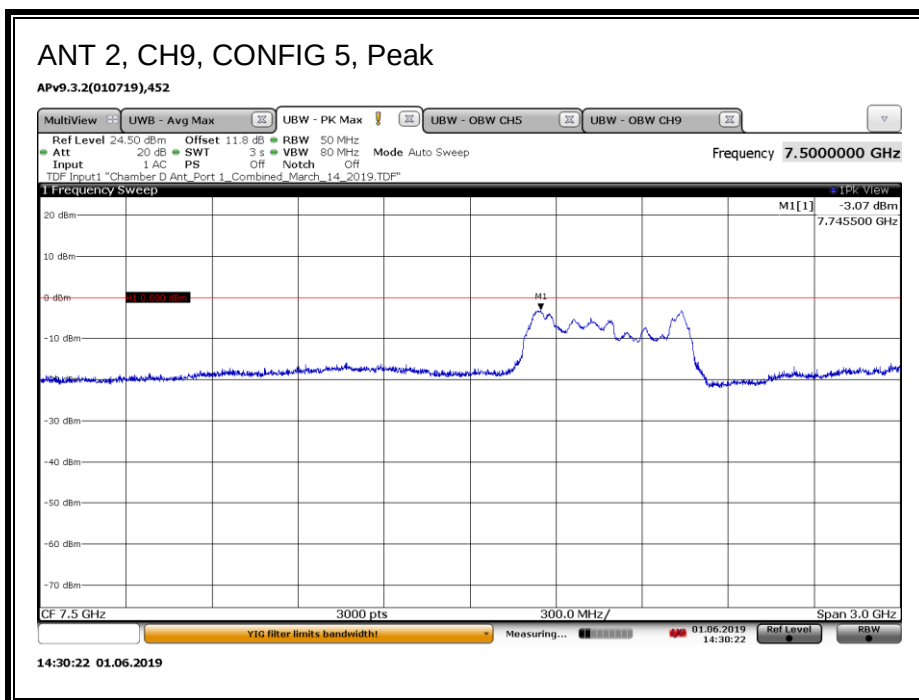


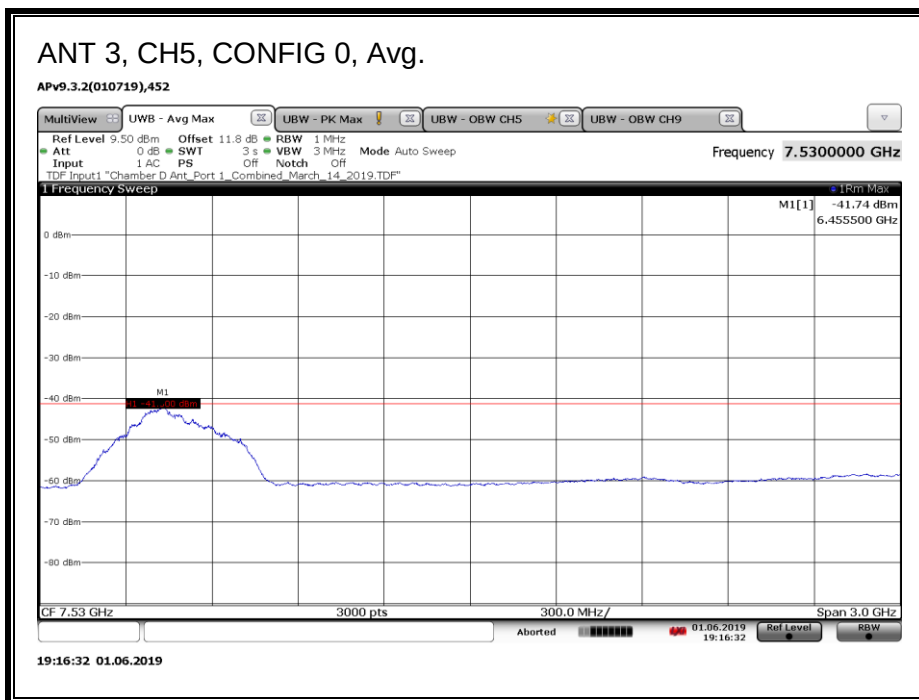
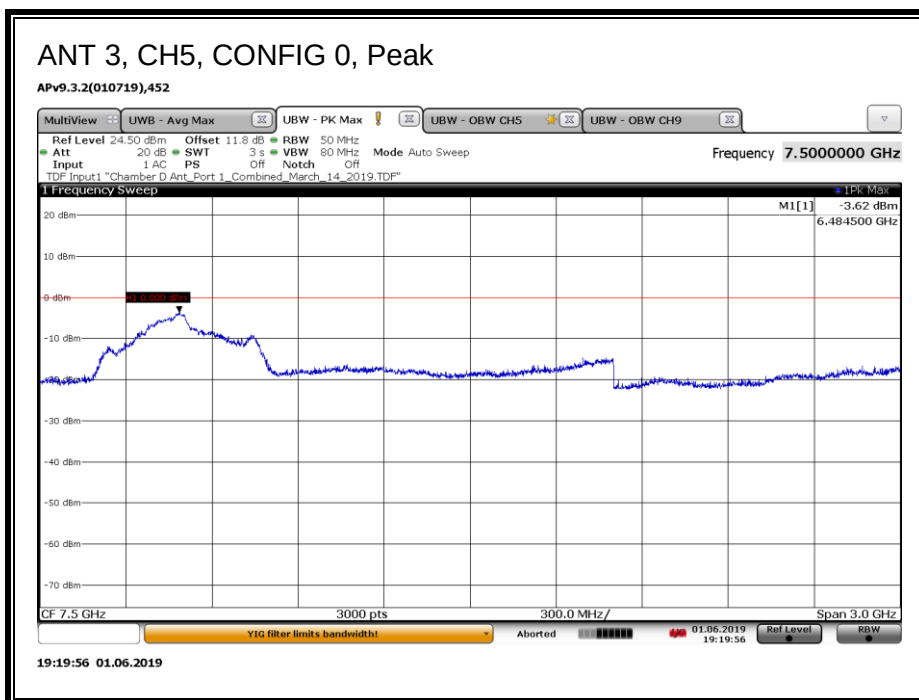


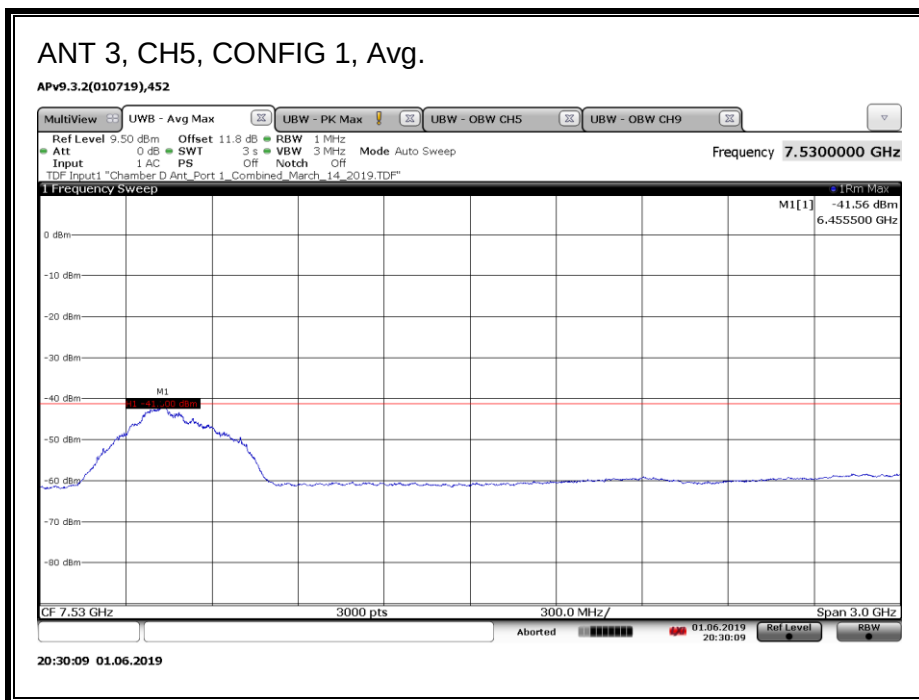
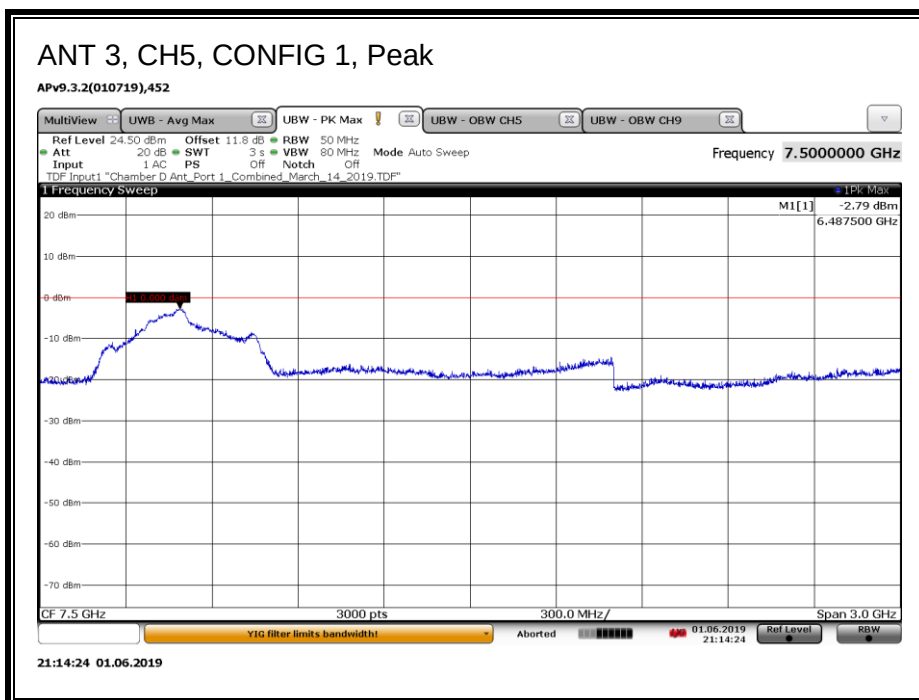


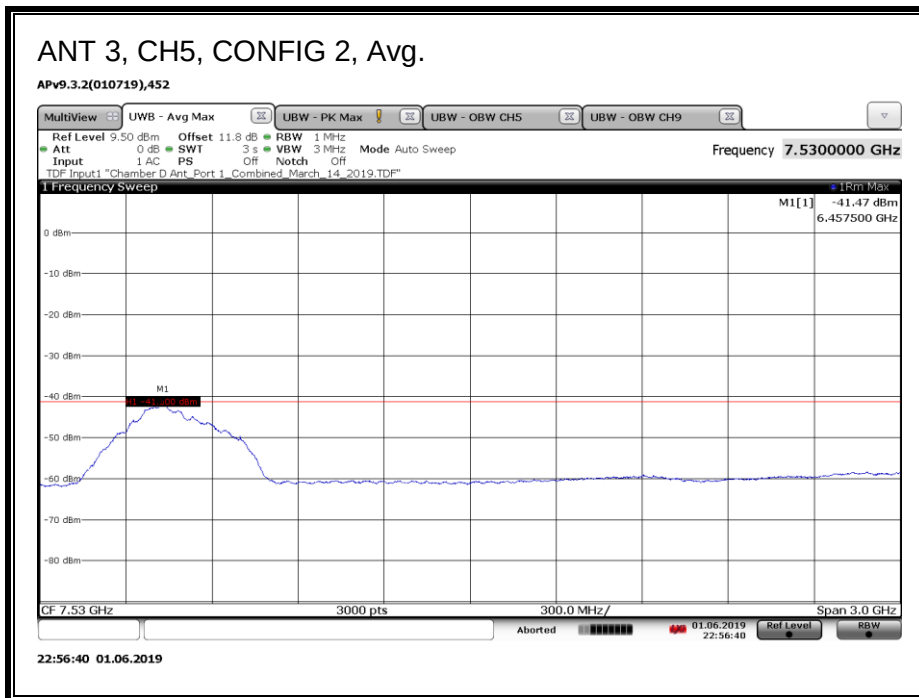
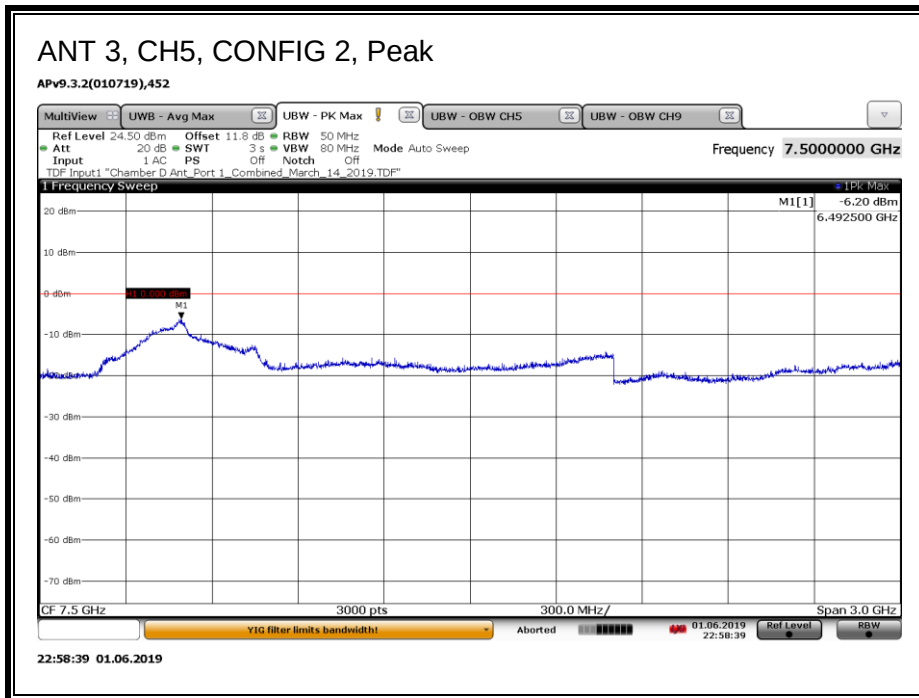


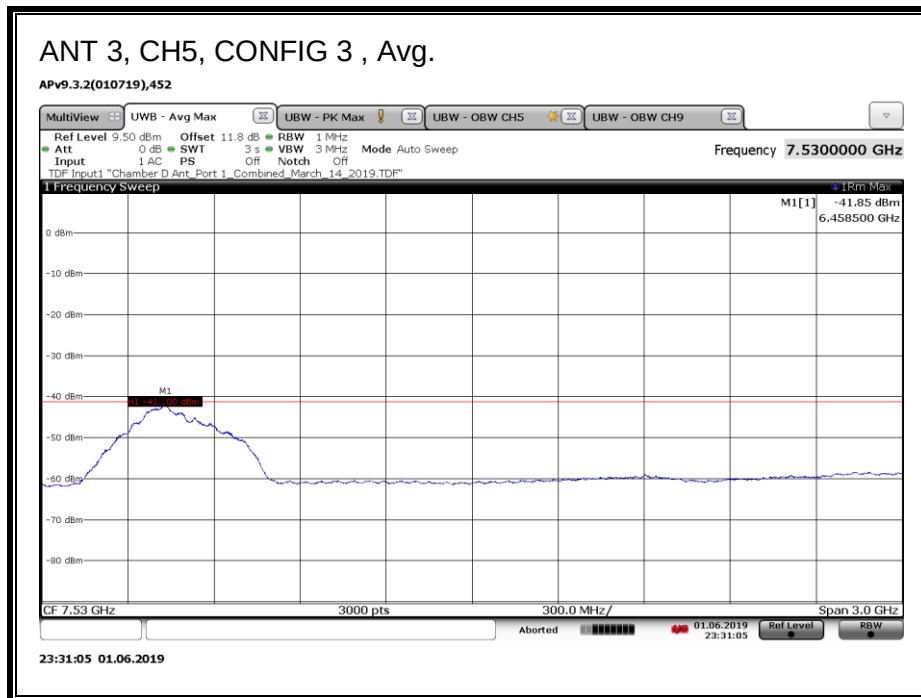
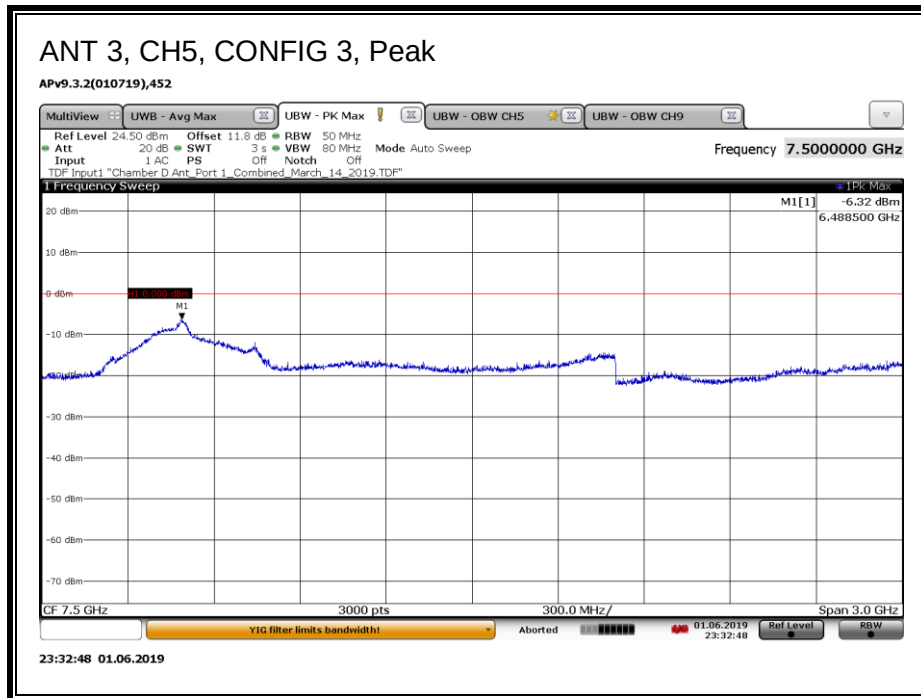


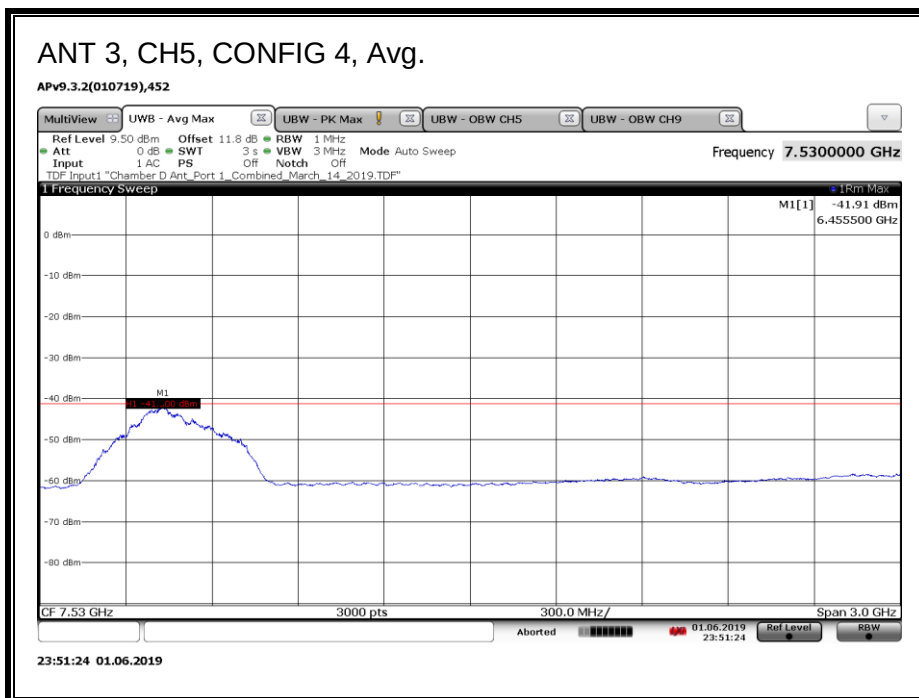
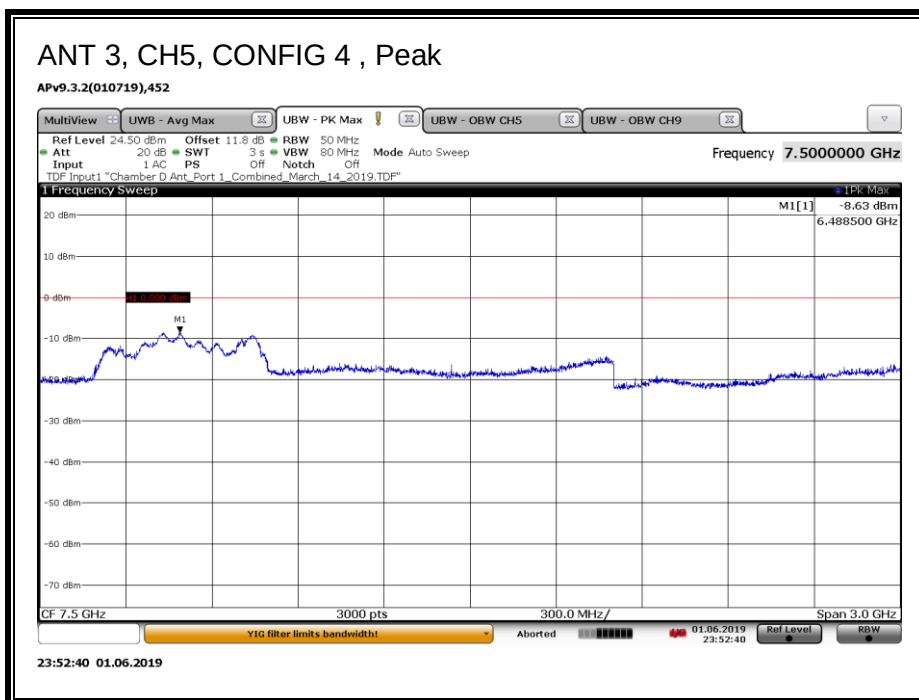


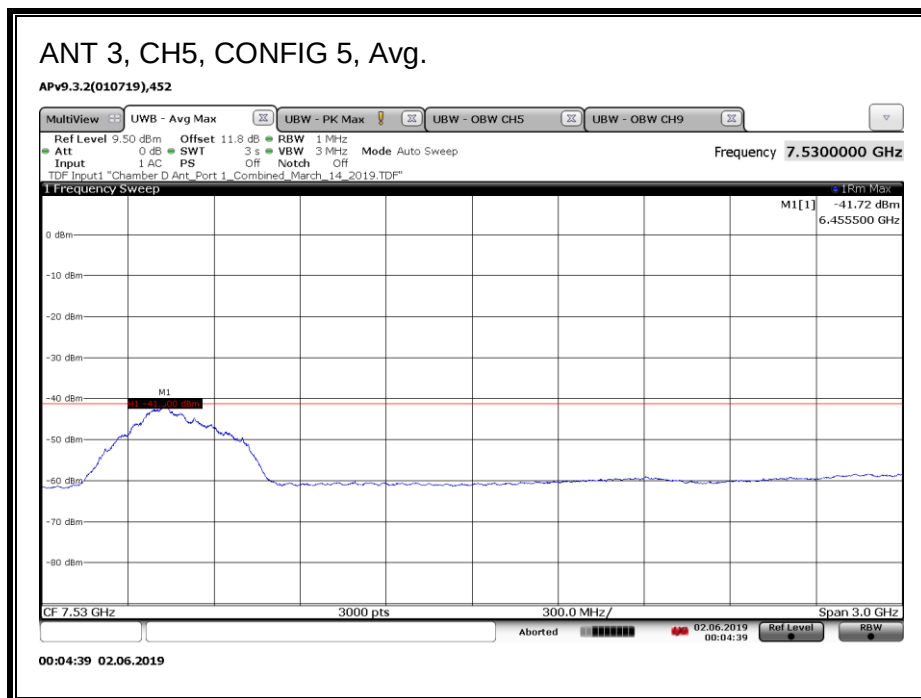
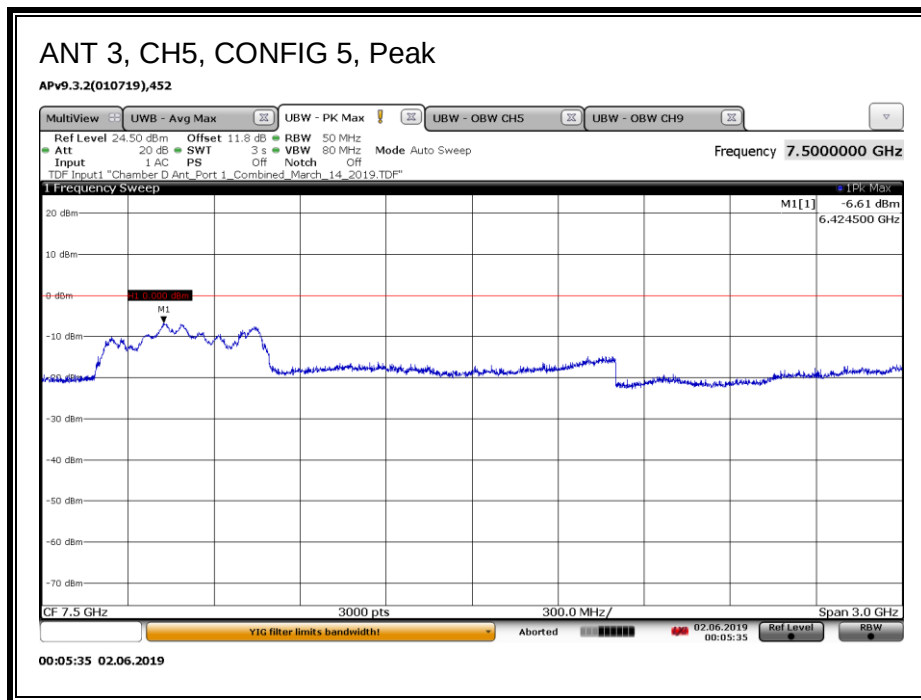


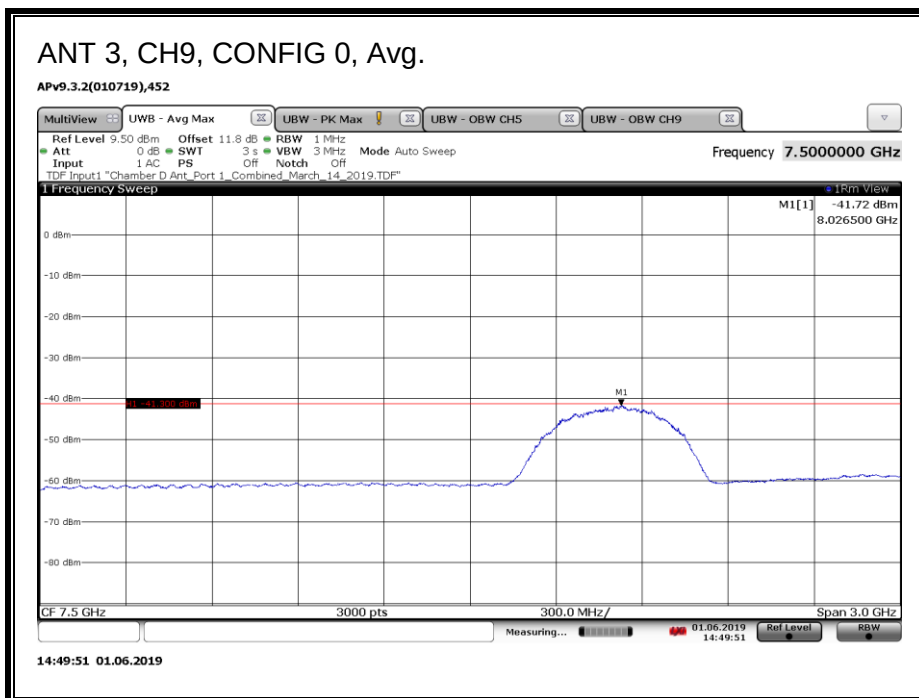
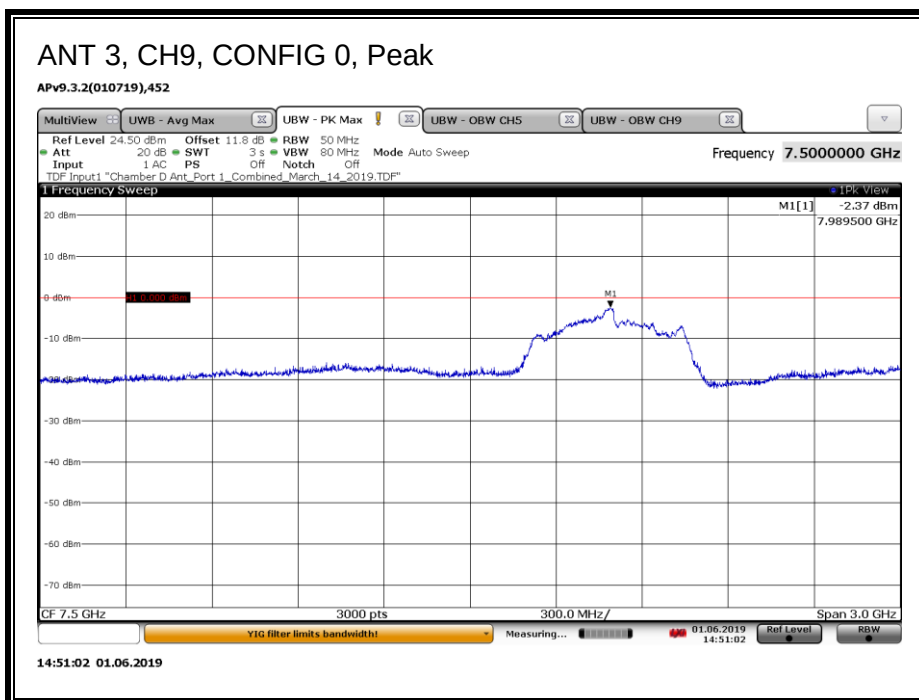


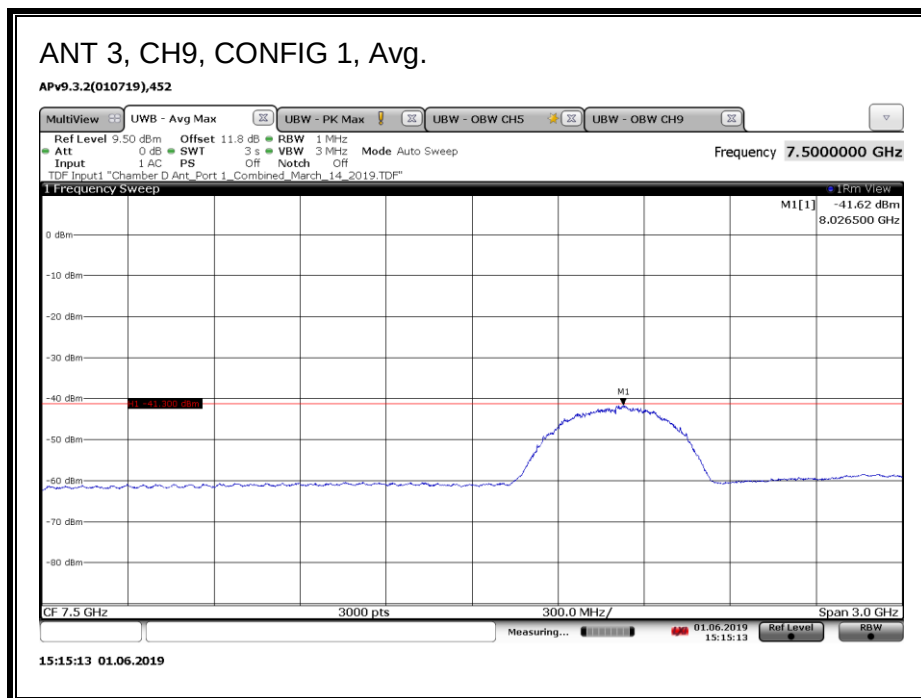
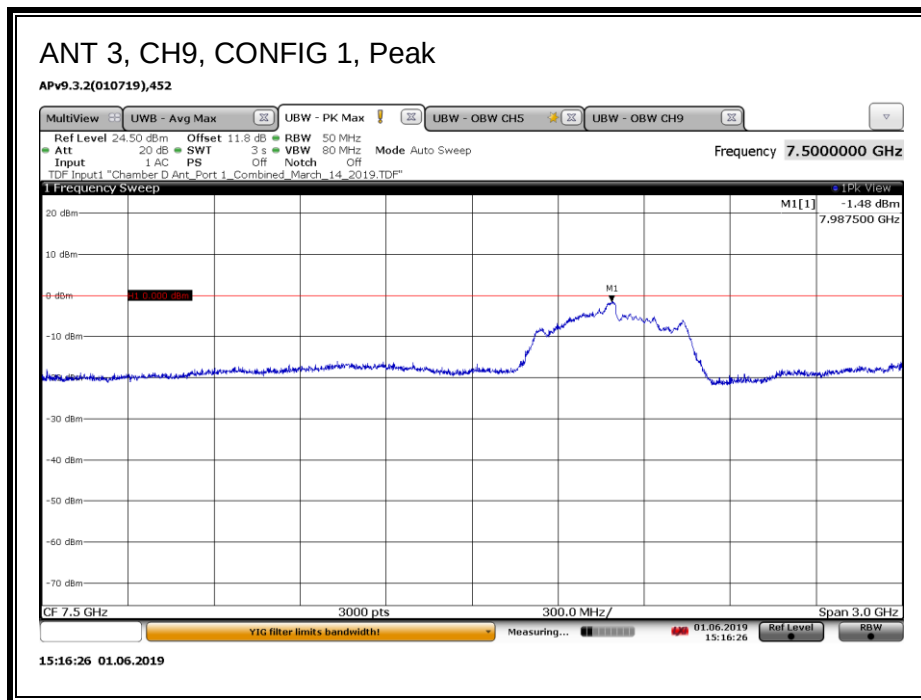


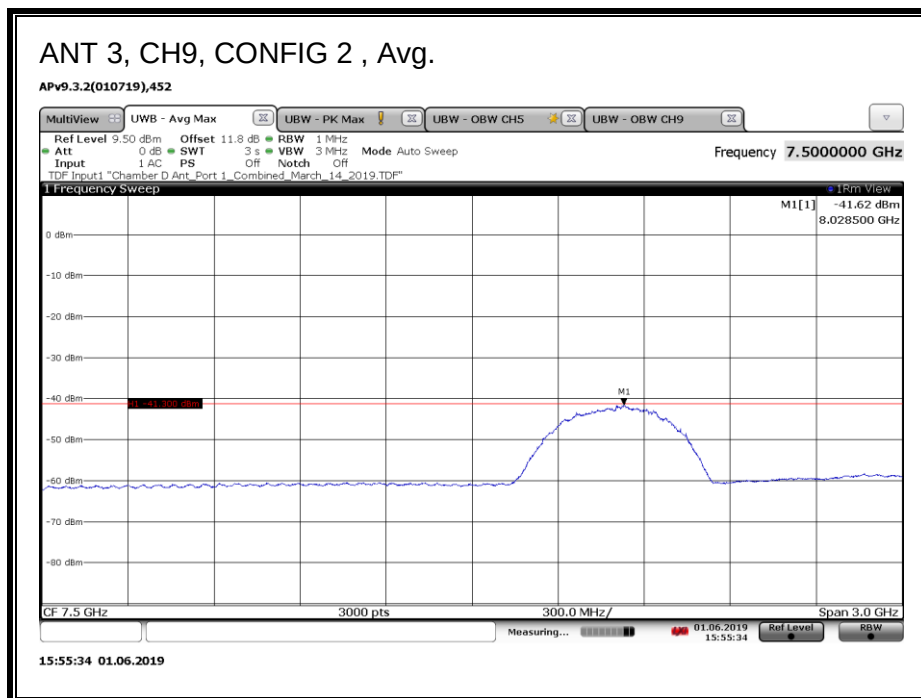
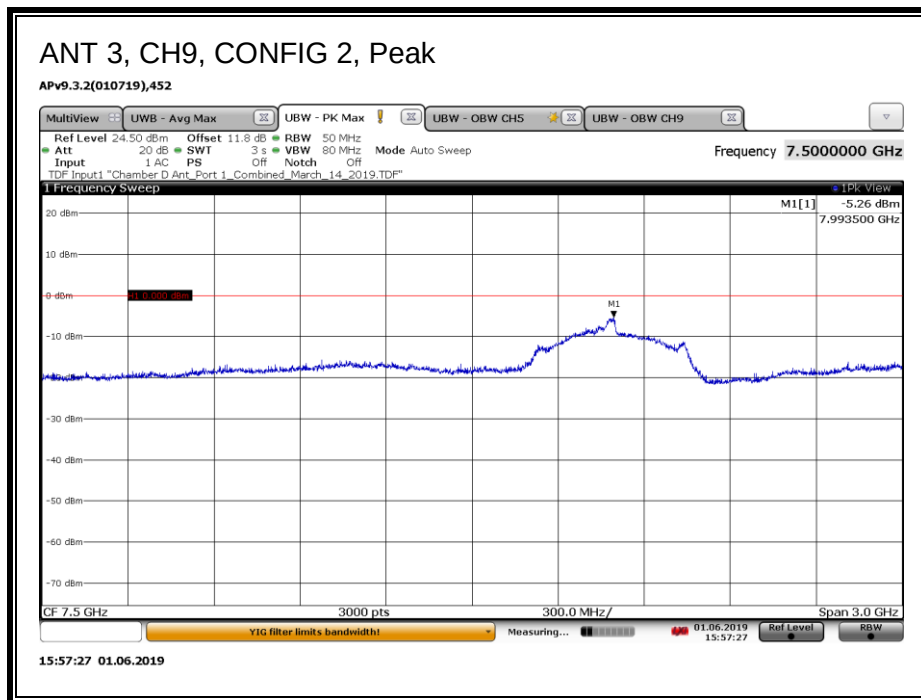


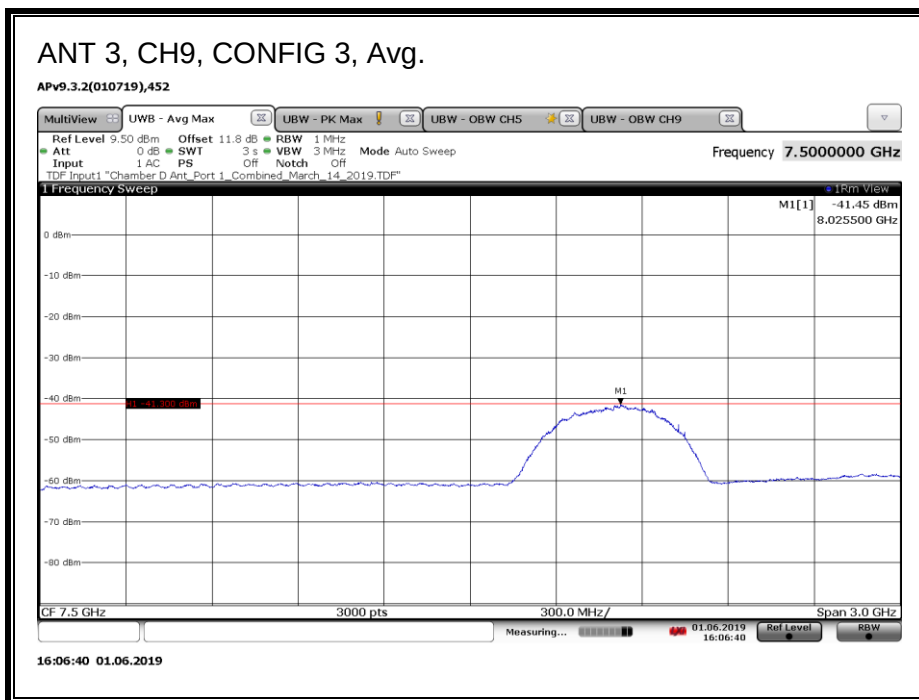
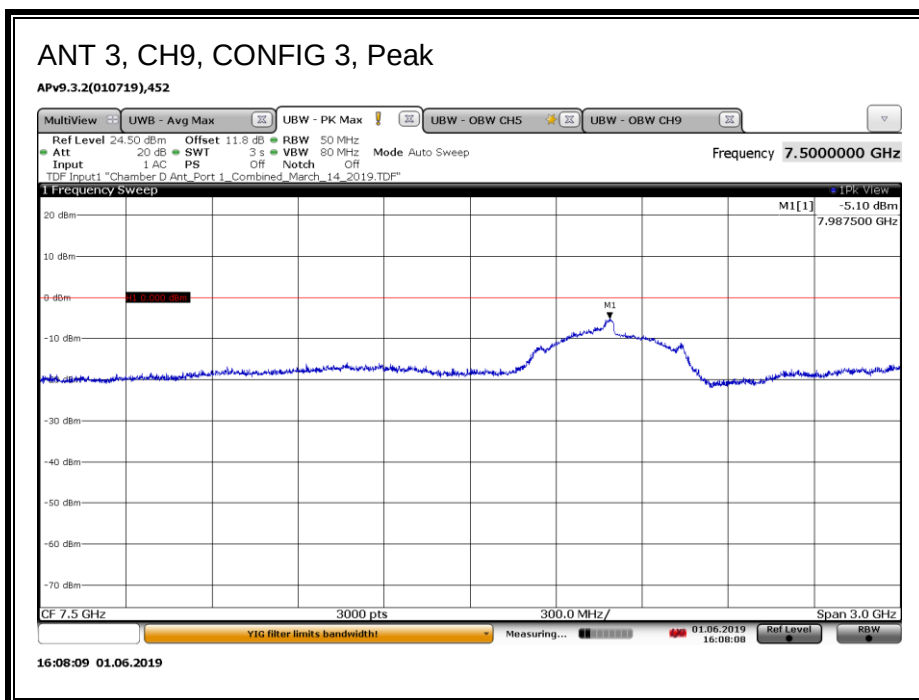


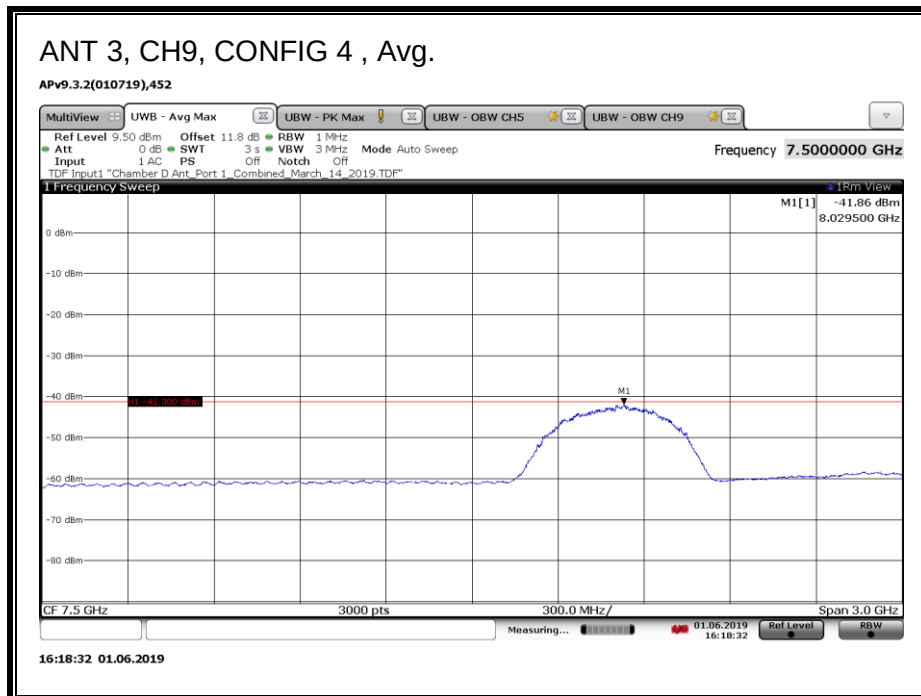
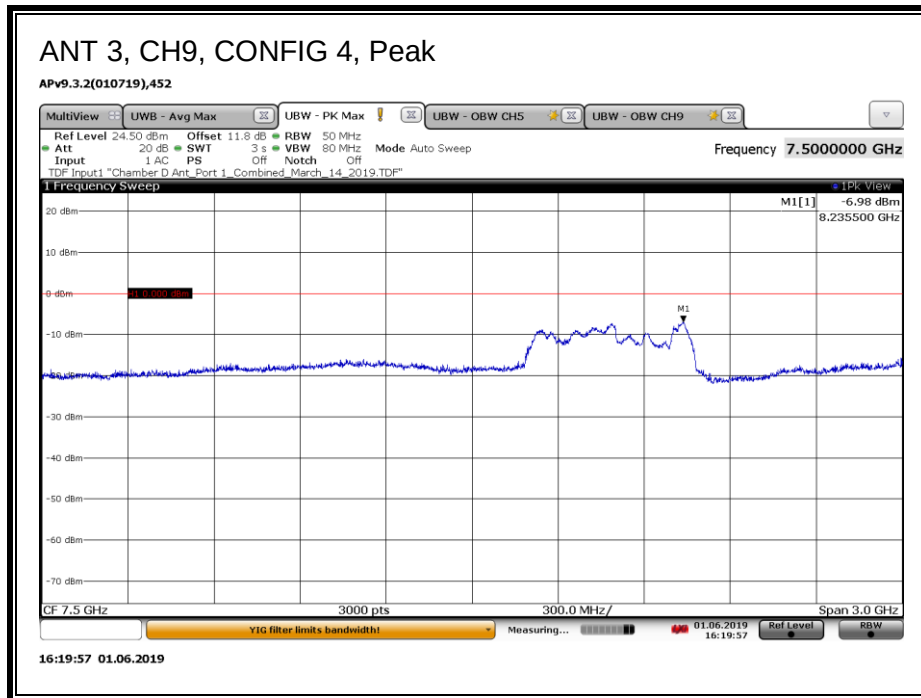


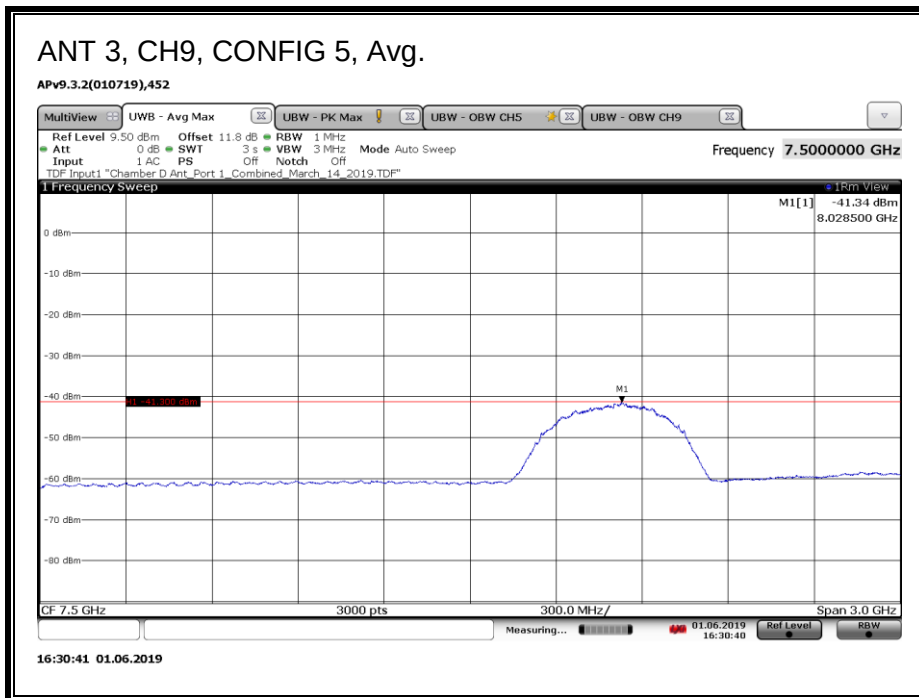
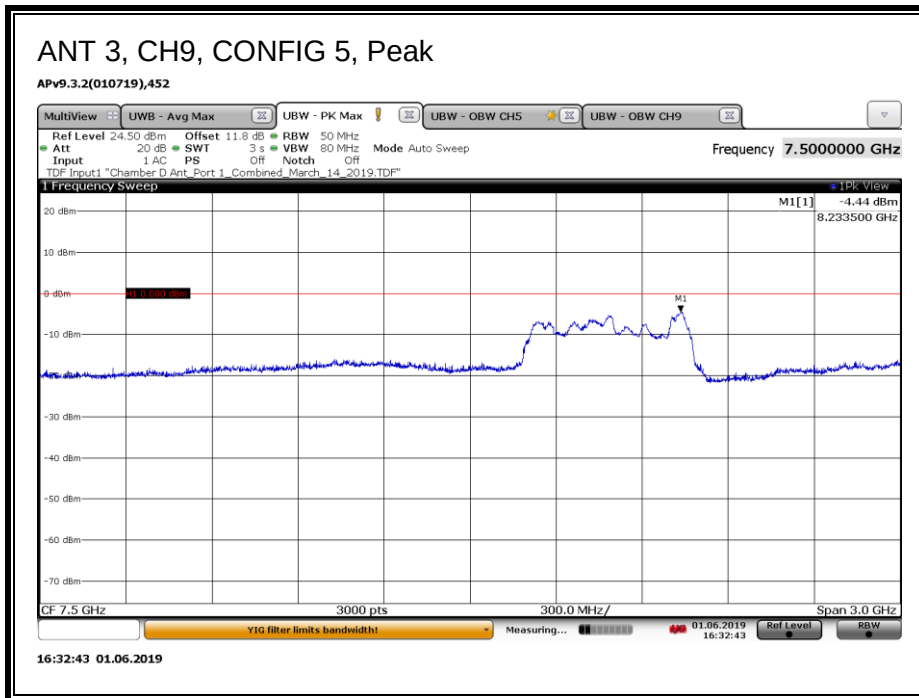












8.3. CESSATION TIME

LIMIT

§15.519(a)(1) A UWB device operating under the provisions of this section shall transmit only when it is sending information to an associated receiver. The UWB intentional radiator shall cease transmission within 10 seconds unless it receives an acknowledgement from the associated receiver that its transmission is being received. An acknowledgment of reception must continue to be received by the UWB intentional radiator at least every 10 seconds or the UWB device must cease transmitting.

TEST PROCEDURES

Transmissions are monitored for two cases:

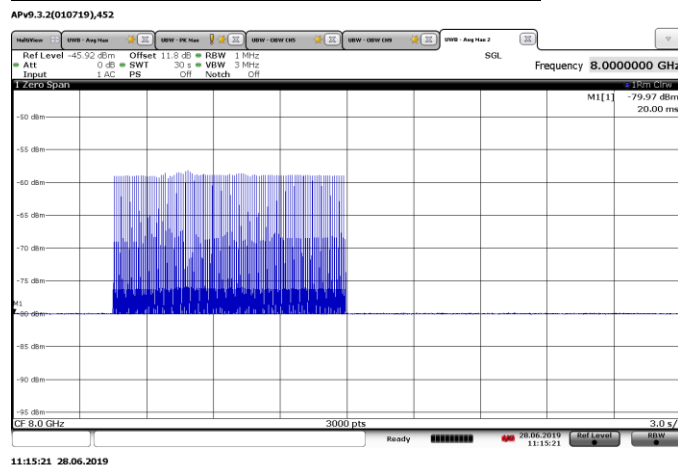
1. The smart phone ends the UWB link.
2. The EUT ends the UWB link.

RESULTS

Signal Levels on all Plots

- EUT is High Amplitude
- Smart Phone is Low Amplitude

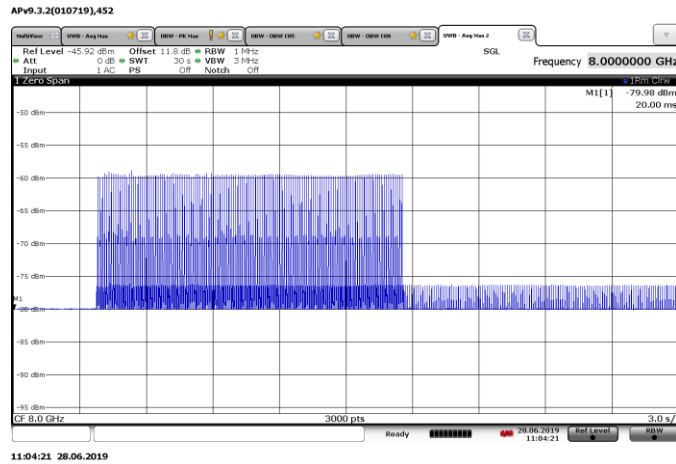
Case 1: Smart Phone ends the UWB link



RESULT

- All devices, including the EUT, cease transmissions

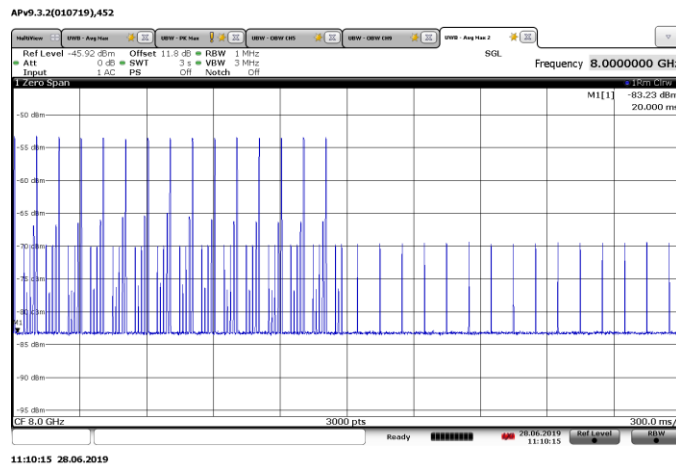
Case 2: EUT ends the UWB link



RESULT

- EUT ends the link, Smart Phone stops Acknowledgements but continues Polling
 - EUT ceases transmissions, does not respond to Polling Signals

Zoom-in Plot during On-Off Transition



RESULT

- Shows Link Traffic, Acknowledgements and Polling Signals while Link is established
- Shows Polling Signals after Link has ended

8.4. AVERAGE EMISSIONS

LIMIT

§15.519 (3)(c) The radiated emissions at or below 960 MHz from a device operating under the provisions of this section shall not exceed the emission levels in §15.209. The radiated emissions above 960 MHz from a device operating under the provisions of this section shall not exceed the following average limits when measured using a resolution bandwidth of 1 MHz:

15.209 (a)

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

15.519 (3)(c)

Frequency in MHz	EIRP in dBm
960-1610	-75.3
1610-1990	-63.3
1990-3100	-61.3
3100-10600	-41.3
Above 10600	-61.3

§15.519 (3)(d) In addition to the radiated emission limits specified in the table in paragraph (c) of this section, UWB transmitters operating under the provisions of this section shall not exceed the following average limits when measured using a resolution bandwidth of no less than 1 kHz:

Frequency in MHz	EIRP in dBm
1164-1240	-85.3
1559-1610	-85.3

TEST PROCEDURE

ANSI C63.10 Clause 10.2 and 10.3.

PROCEDURE FOR 9 kHz TO 960 MHz

Measurements are made with the antenna feeding a spectrum analyzer via a preamplifier and cables, at a maximum distance of 3m from the EUT.

PROCEDURE FOR 960 MHz TO 6 GHz

Measurements are made with the antenna feeding a spectrum analyzer via a preamplifier and cables, at a maximum distance of 0.5m from the EUT.

A low pass filter with a cut off frequency of 6 GHz is used to suppress the fundamental and perform measurement for 0.96 - 6 GHz.

RESULTS FOR 6 GHz TO 9 GHz

The 6 - 9 GHz frequency band is covered in Section 8.2.

PROCEDURE FOR 9 GHz TO 18 GHz

Measurements are made with the antenna feeding a spectrum analyzer via a preamplifier and cables, at a maximum distance of 0.5m from the EUT.

A high pass filter with pass band frequency beyond 9 GHz is used to suppress the fundamental and perform measurement for 9 - 18 GHz.

PROCEDURE FOR 1.164 TO 1.240 GHz

Measurements are made with the antenna feeding a spectrum analyzer via a preamplifier and cables, at a maximum distance of 0.5m from the EUT.

RBW = 120kHz & VBW = 360 kHz were used at pre-scan.

PROCEDURE FOR 1.559 – 1.610 GHz

Measurements are made with the antenna feeding a spectrum analyzer via a preamplifier and cables, at a maximum distance of 0.5m from the EUT.

RBW = 120kHz & VBW = 360 kHz were used at pre-scan.

PROCEDURE FOR 18 GHz TO 40 GHz

Measurements are made with the antenna feeding a spectrum analyzer via a preamplifier and cables, at a maximum distance of 0.5m from the EUT.

A final test is made at any frequencies at which emissions are found. During this final scan, the antenna is kept no further from the EUT than the maximum distance calculated for each band that yields a minimum system noise floor.

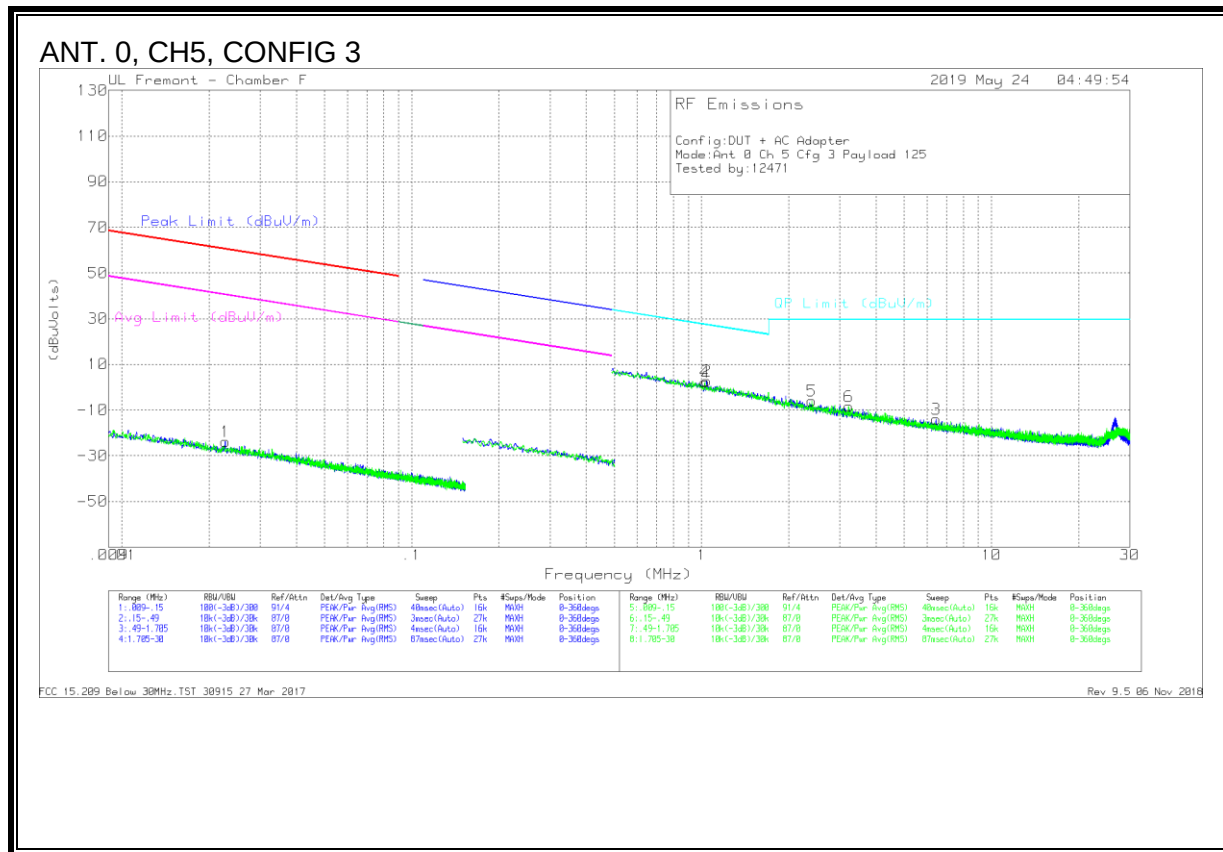
Distance Correction Factor from 3m to 0.5m = $20 \cdot \log(0.5\text{m}/3\text{m}) = -15.56 \text{ dB}$

RESULTS

AVERAGE Emissions Summary

Ant	CH	Config	Payload	Power Setting	Frequency Range						
					9 kHz - 30 MHz	30 - 960 MHz	1164 - 1240 MHz	1559 - 1610 MHz	0.96 - 18 GHz	18 - 26 GHz	26 - 40 GHz
0	5	3	125	Max	PASS	PASS	PASS	PASS	PASS	PASS	PASS
0	9	3	125	Max	PASS	PASS	PASS	PASS	PASS	PASS	PASS
1	5	3	125	Max	PASS	PASS	PASS	PASS	PASS	PASS	PASS
1	9	3	125	Max	PASS	PASS	PASS	PASS	PASS	PASS	PASS
2	5	3	125	Max	PASS	PASS	PASS	PASS	PASS	PASS	PASS
2	9	3	125	Max	PASS	PASS	PASS	PASS	PASS	PASS	PASS
3	5	3	125	Max	PASS	PASS	PASS	PASS	PASS	PASS	PASS
3	9	3	125	Max	PASS	PASS	PASS	PASS	PASS	PASS	PASS

8.4.1. AVERAGE EMISSIONS, 9 kHz – 30 MHz



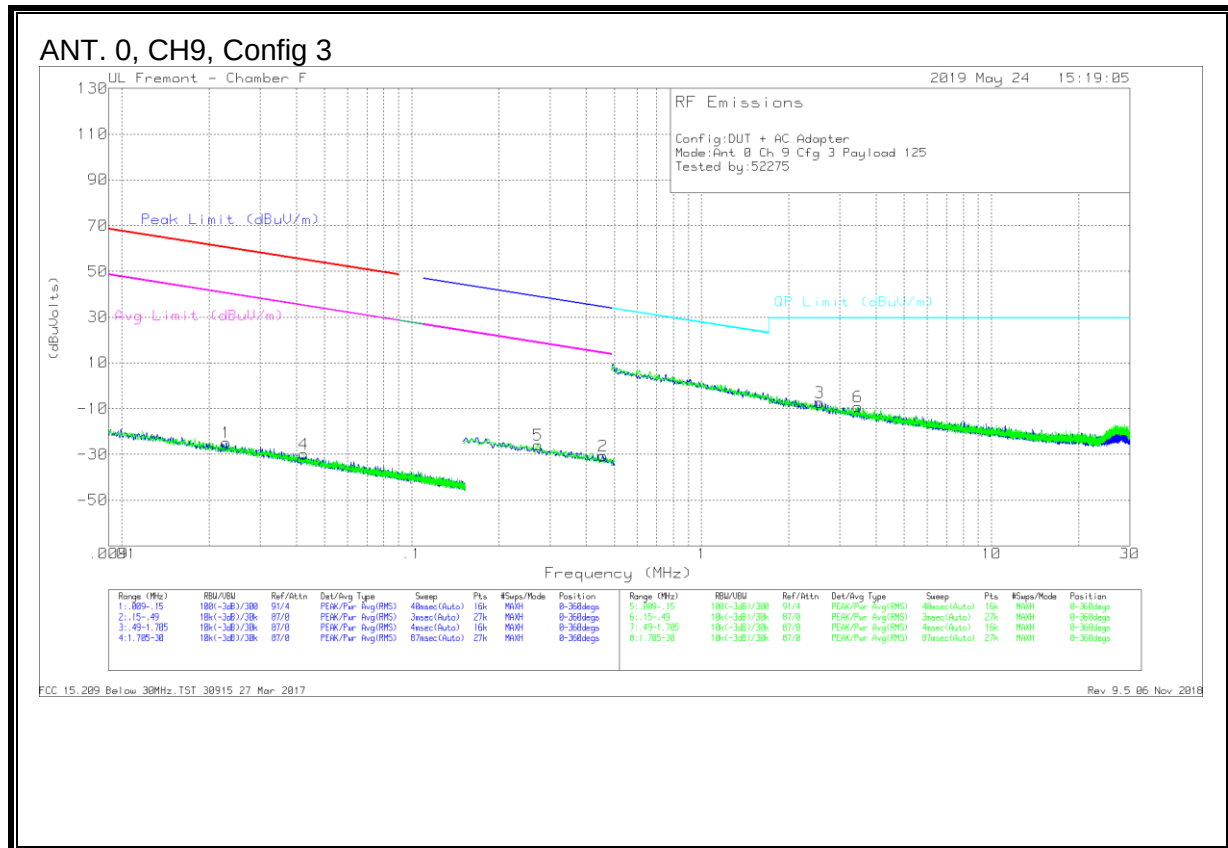
Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Cables (dB)	Dist Corr 300m	Corrected Reading (dBuVolts)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
1	.02275	41.8	Pk	14.4	0	-80	-23.8	60.44	-84.24	40.44	-64.24	0-360

Pk - Peak detector

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Cables (dB)	Dist Corr (dB) 40Log	Corrected Reading (dBuVolts)	QP Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
2	1.04089	31.96	Pk	10.6	.1	-40	2.66	27.27	-24.61	0-360
3	6.44406	15.08	Pk	10.6	.3	-40	-14.02	29.5	-43.52	0-360
4	1.0269	31.52	Pk	10.6	.1	-40	2.22	27.39	-25.17	0-360
5	2.39982	23.16	Pk	10.7	.2	-40	-5.94	29.5	-35.44	0-360
6	3.21517	20.76	Pk	10.7	.2	-40	-8.34	29.5	-37.84	0-360

Pk - Peak detector



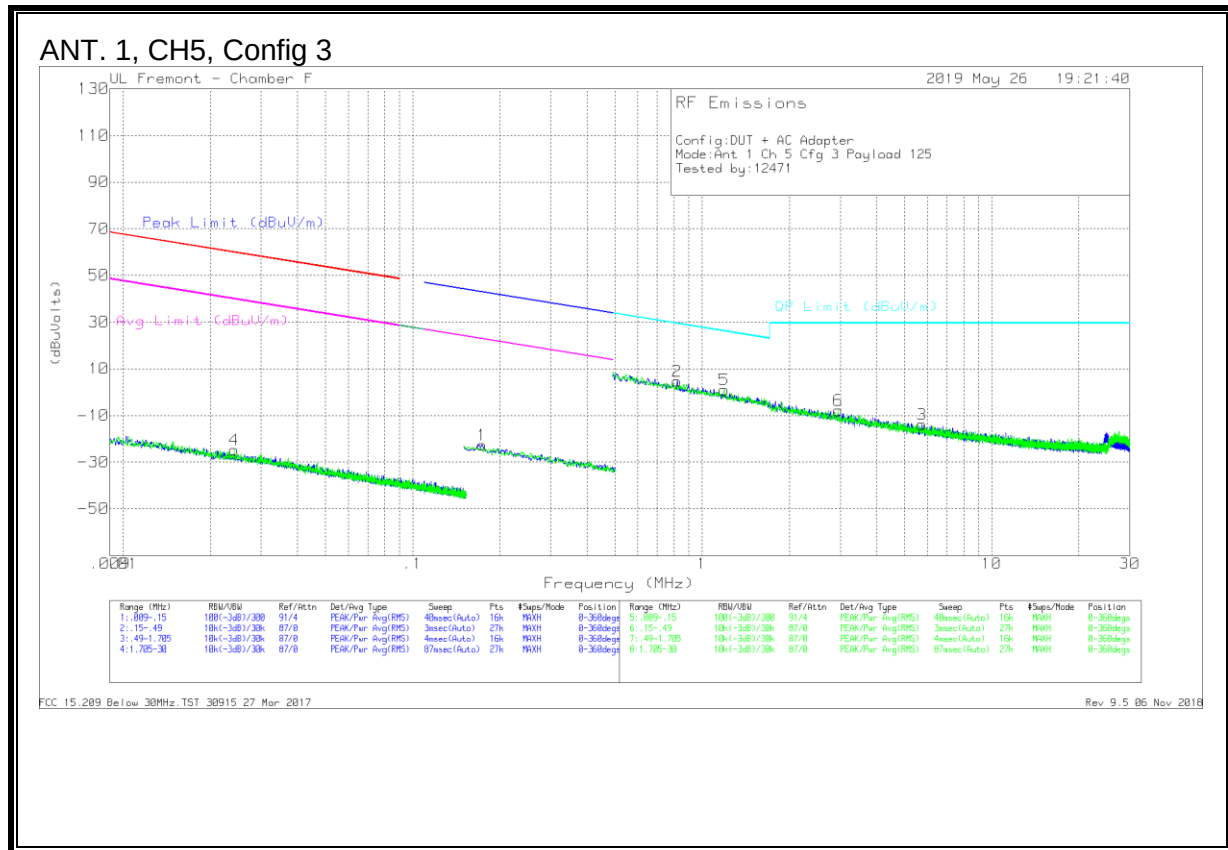
Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Cables (dB)	Dist Corr 300m	Corrected Reading (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
1	.02296	40.91	Pk	14.3	0	-80	-24.79	60.37	-85.16	40.37	-65.16	-	-	-	-	0-360
2	.45634	38.52	Pk	10.6	.1	-80	-30.78	-	-	-	-	34.42	-65.2	14.42	-45.2	0-360
4	.04245	37.43	Pk	12.6	0	-80	-29.97	55.03	-85	35.03	-65	-	-	-	-	0-360
5	.27328	43.19	Pk	10.7	.1	-80	-26.01	-	-	-	-	38.88	-64.89	18.88	-44.89	0-360

Pk - Peak detector

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Cables (dB)	Dist Corr (dB) 40Log	Corrected Reading (dBuV/m)	QP Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
3	2.55074	21.87	Pk	10.7	.2	-40	-7.23	29.5	-36.73	0-360
6	3.45411	19.93	Pk	10.7	.2	-40	-9.17	29.5	-38.67	0-360

Pk - Peak detector



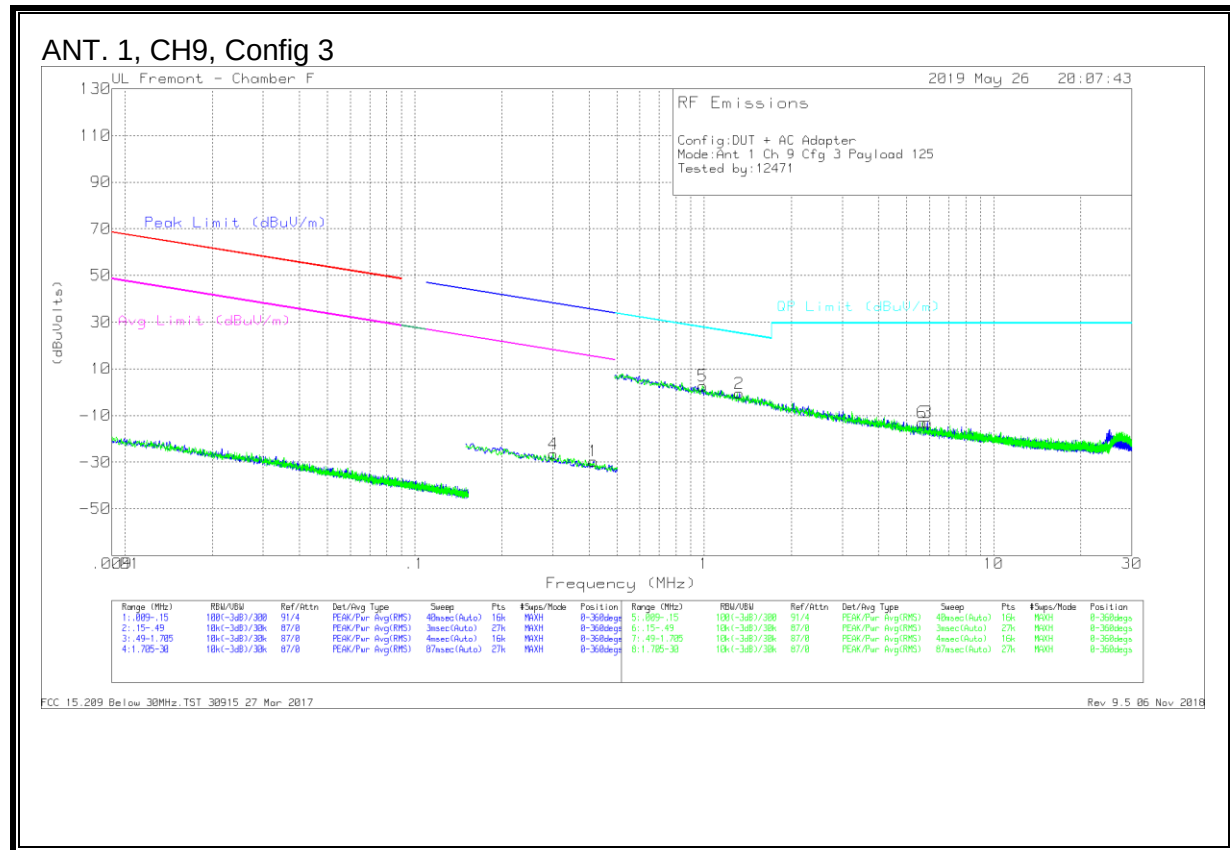
Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dBm)	Cables (dB)	Dist Corr 300m	Corrected Reading (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
1	.17391	46.44	Pk	10.8	.1	-80	-22.66	-	-	-	-	42.81	-65.47	22.81	-45.47	0-360
4	.0242	41.06	Pk	14.2	0	-80	-24.74	59.91	-84.65	39.91	-64.65	-	-	-	-	0-360

Pk - Peak detector

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dBm)	Cables (dB)	Dist Corr 40Log	Corrected Reading (dBuV/m)	QP Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
2	.8209	33.98	Pk	10.6	.1	-40	4.68	29.33	-24.65	0-360
3	5.74923	15.11	Pk	10.7	.3	-40	-13.89	29.5	-43.39	0-360
5	1.19186	30.26	Pk	10.6	.1	-40	.96	26.1	-25.14	0-360
6	2.95107	21.19	Pk	10.7	.2	-40	-7.91	29.5	-37.41	0-360

Pk - Peak detector



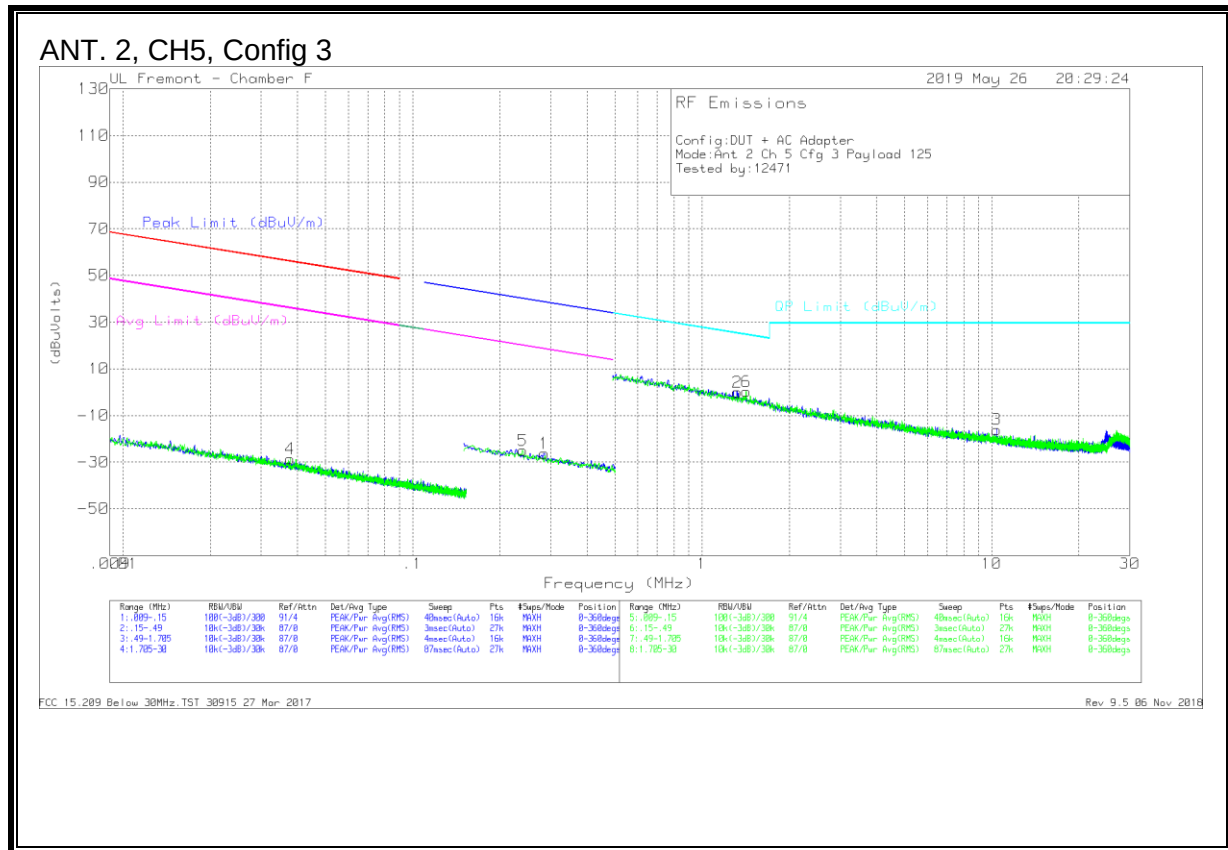
Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Cables (dB)	Dist Corr 300m	Corrected Reading (dBuVolts)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
1	.41532	39.74	Pk	10.6	.1	-80	-29.56	35.24	-64.8	15.24	-44.8	0-360
4	.30163	42.68	Pk	10.7	.1	-80	-26.52	38.02	-64.54	18.02	-44.54	0-360

Pk - Peak detector

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Cables (dB)	Dist Corr (dB) 40Log	Corrected Reading (dBuVolts)	QP Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
2	1.32342	28.78	Pk	10.6	.1	-40	-52	25.19	-25.71	0-360
3	5.90329	16.04	Pk	10.7	.3	-40	-12.96	29.5	-42.46	0-360
5	.98841	31.95	Pk	10.6	.1	-40	2.65	27.72	-25.07	0-360
6	5.65596	16.02	Pk	10.7	.3	-40	-12.98	29.5	-42.48	0-360

Pk - Peak detector



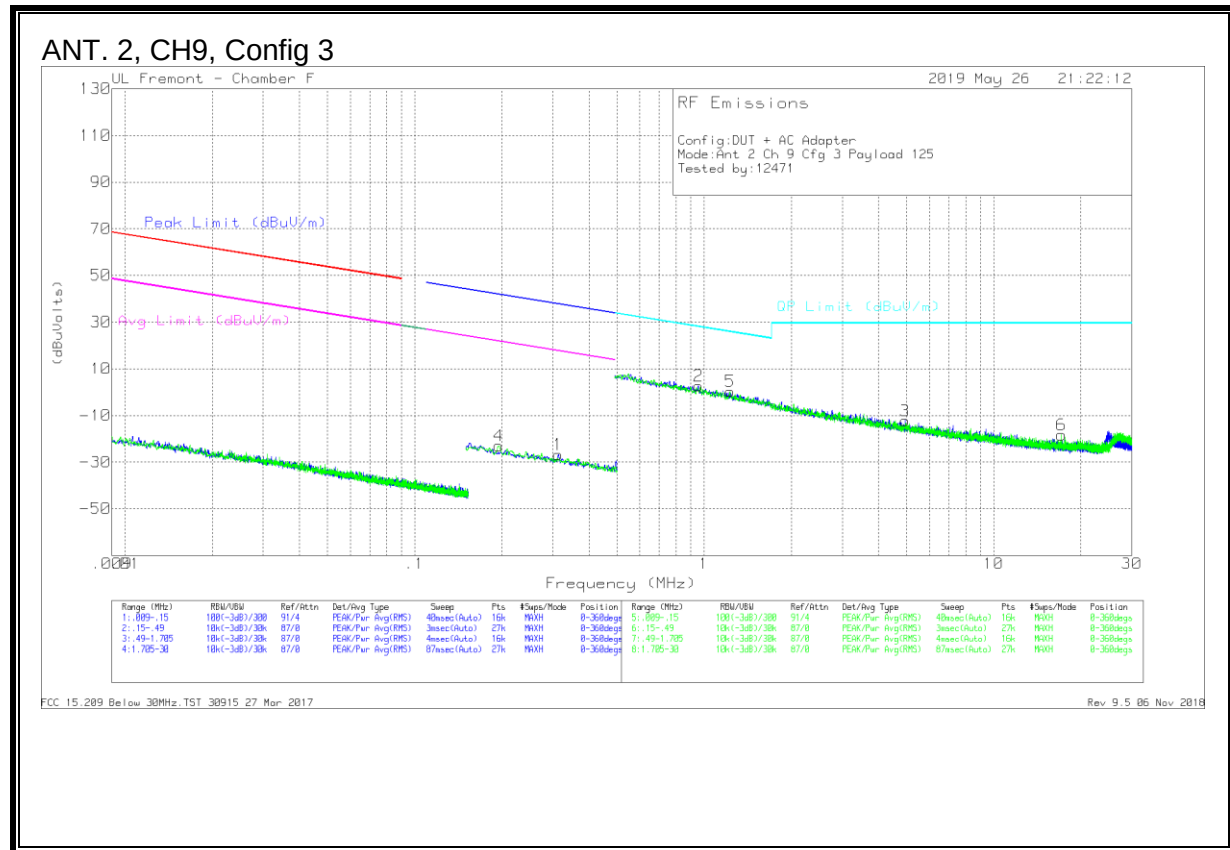
Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Cables (dB)	Dist Corr 300m	Corrected Reading (dBuVolts)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
1	.28515	42.93	Pk	10.7	.1	-80	-26.27	-	-	-	-	38.51	-64.78	18.51	-44.78	0-360
4	.03779	38.38	Pk	13	0	-80	-28.62	56.04	-84.66	36.04	-64.66	-	-	-	-	0-360
5	.23995	44.16	Pk	10.7	.1	-80	-25.04	-	-	-	-	40.01	-65.05	20.01	-45.05	0-360

Pk - Peak detector

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Cables (dB)	Dist Corr (dB) 40Log	Corrected Reading (dBuVolts)	QP Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
2	1.32022	29.24	Pk	10.6	.1	-40	-.06	25.22	-25.28	0-360
3	10.42646	13.18	Pk	10.4	.4	-40	-16.02	29.5	-45.52	0-360
6	1.41986	29.54	Pk	10.6	.1	-40	.24	24.59	-24.35	0-360

Pk - Peak detector



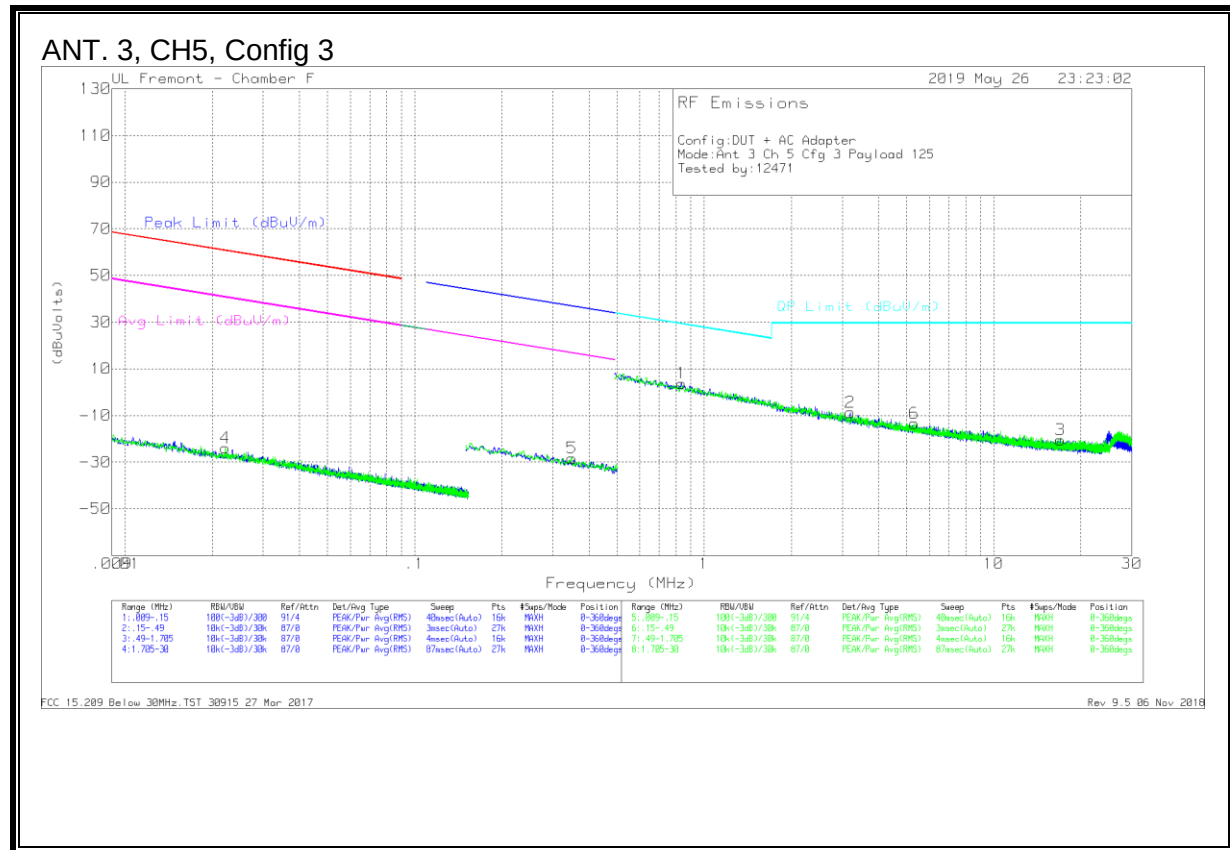
Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Cables (dB)	Dist Corr 300m	Corrected Reading (dBuVolts)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
1	.31341	42.45	Pk	10.7	.1	-80	-26.75	37.69	-64.44	17.69	-44.44	0-360
4	.19508	46.08	Pk	10.8	.1	-80	-23.02	41.81	-64.83	21.81	-44.83	0-360

Pk - Peak detector

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Cables (dB)	Dist Corr (dB) 40Log	Corrected Reading (dBuVolts)	QP Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
2	.95504	31.93	Pk	10.6	.1	-40	2.63	28.02	-25.39	0-360
3	4.94227	16.82	Pk	10.7	.2	-40	-12.28	29.5	-41.78	0-360
5	1.22788	29.63	Pk	10.6	.1	-40	.33	25.84	-25.51	0-360
6	17.15252	11.58	Pk	9.6	.5	-40	-18.32	29.5	-47.82	0-360

Pk - Peak detector



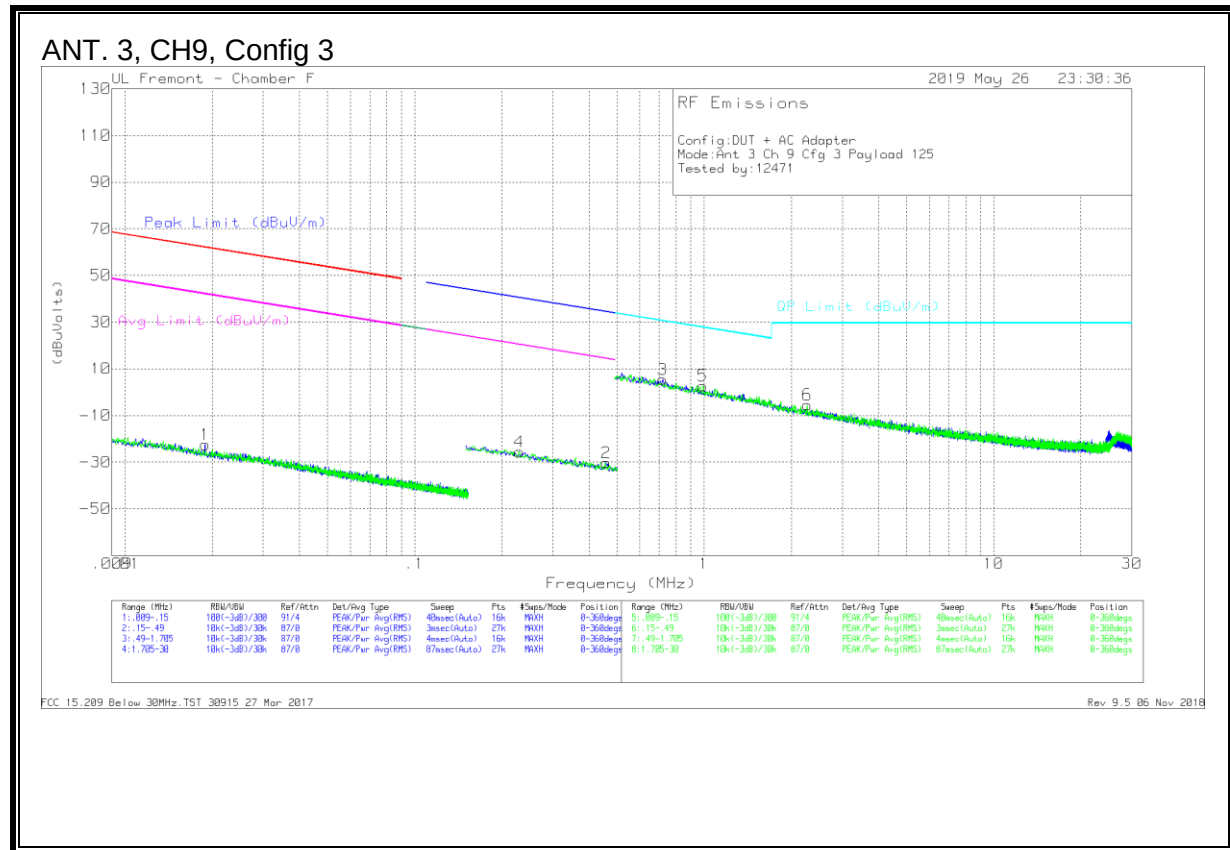
Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Cables (dB)	Dist Corr 300m	Corrected Reading (dBuVolts)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
4	.02221	41.67	Pk	14.4	0	-80	-23.93	60.65	-84.58	40.65	-64.58	-	-	-	-	0-360
5	.34939	40.94	Pk	10.7	.1	-80	-28.26	-	-	-	-	36.74	-65	16.74	-45	0-360

Pk - Peak detector

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Cables (dB)	Dist Corr (dB) 40Log	Corrected Reading (dBuVolts)	QP Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
1	.83534	33.09	Pk	10.6	.1	-40	3.79	29.18	-25.39	0-360
2	3.19526	20.4	Pk	10.7	.2	-40	-8.7	29.5	-38.2	0-360
3	16.99008	9.35	Pk	9.7	.5	-40	-20.45	29.5	-49.95	0-360
6	5.31222	15.61	Pk	10.7	.3	-40	-13.39	29.5	-42.89	0-360

Pk - Peak detector



Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Cables (dB)	Dist Corr 300m	Corrected Reading (dBuVolts)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
1	.0189	42.54	Pk	15	0	-80	-22.46	62.06	-84.52	42.06	-64.52	-	-	-	-	0-360
2	.45902	39.05	Pk	10.6	.1	-80	-30.25	-	-	-	-	34.37	-64.62	14.37	-44.62	0-360
4	.23008	43.6	Pk	10.7	.1	-80	-25.6	-	-	-	-	40.38	-65.98	20.38	-45.98	0-360

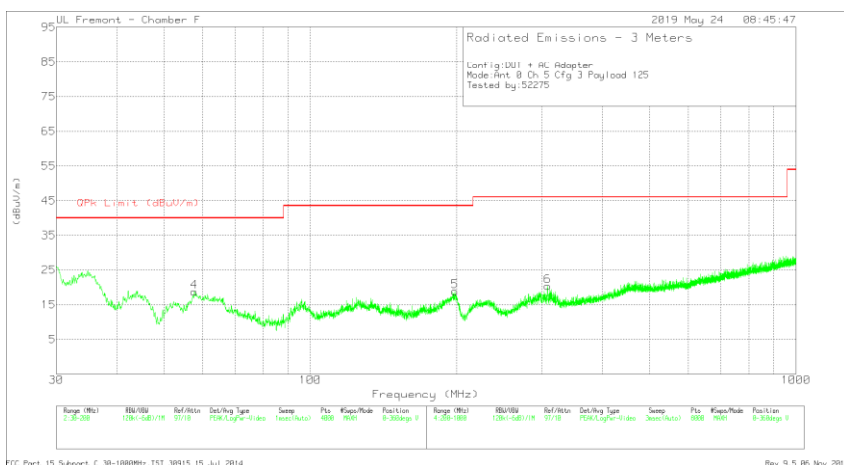
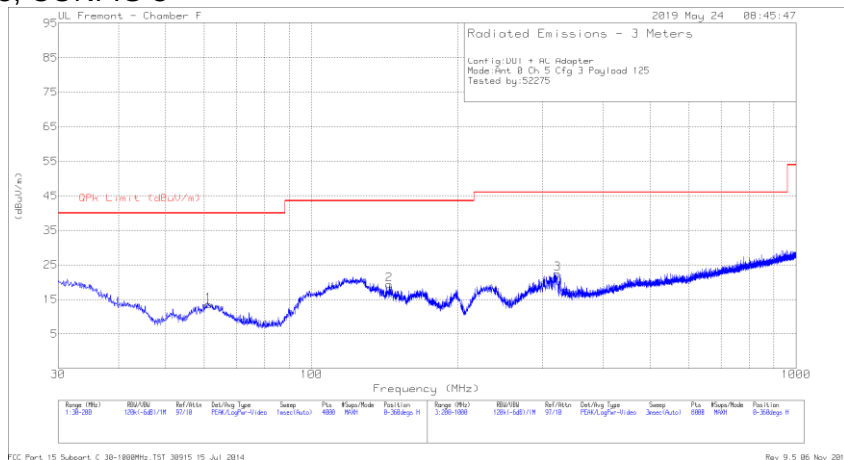
PK - Peak detector

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Cables (dB)	Dist Corr (dB) 40Log	Corrected Reading (dBuVolts)	QP Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
3	.71975	34.73	Pk	10.6	.1	-40	5.43	30.47	-25.04	0-360
5	.99061	32	Pk	10.6	.1	-40	2.7	27.7	-25	0-360
6	2.27092	23.7	Pk	10.7	.2	-40	-5.4	29.5	-34.9	0-360

PK - Peak detector

8.4.2. AVERAGE EMISSIONS, 30 – 960 MHz

ANT. 0, CH5, CONFIG 3

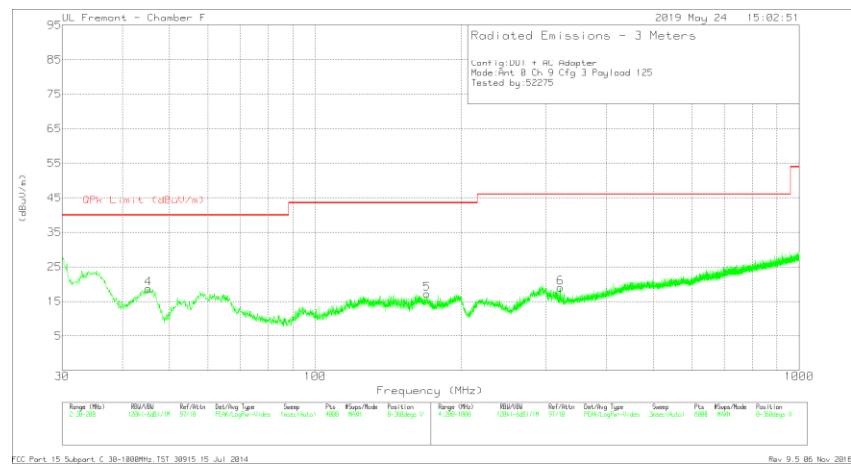
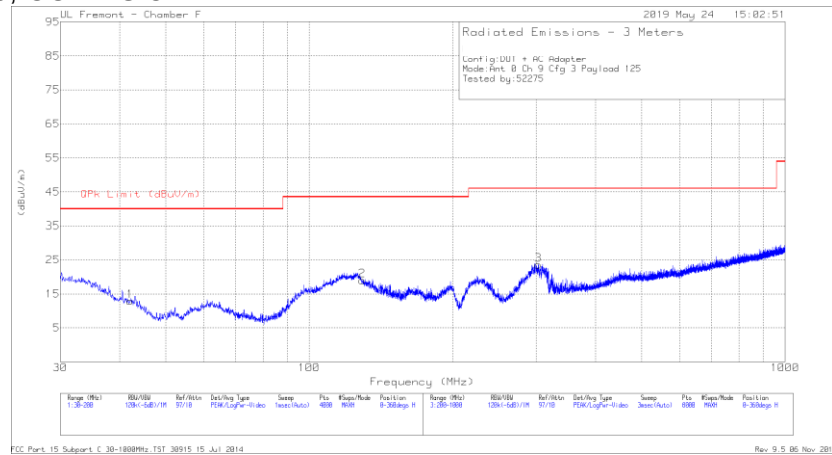


Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T900 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	61.3306	33.23	Pk	11.9	-31.6	13.53	40	-26.47	0-360	399	H
2	144.6947	33.28	Pk	17	-30.9	19.38	43.52	-24.14	0-360	199	H
4	57.7172	38.9	Pk	11.4	-31.5	18.8	40	-21.2	0-360	100	V
5	198.3861	32.68	Pk	16.7	-30.5	18.88	43.52	-24.64	0-360	100	V
3	* 322.0159	34.39	Pk	17.9	-29.8	22.49	46.02	-23.53	0-360	99	H
6	307.814	32.64	Pk	17.6	-29.8	20.44	46.02	-25.58	0-360	199	V

Pk - Peak detector

ANT. 0, CH9, CONFIG 3

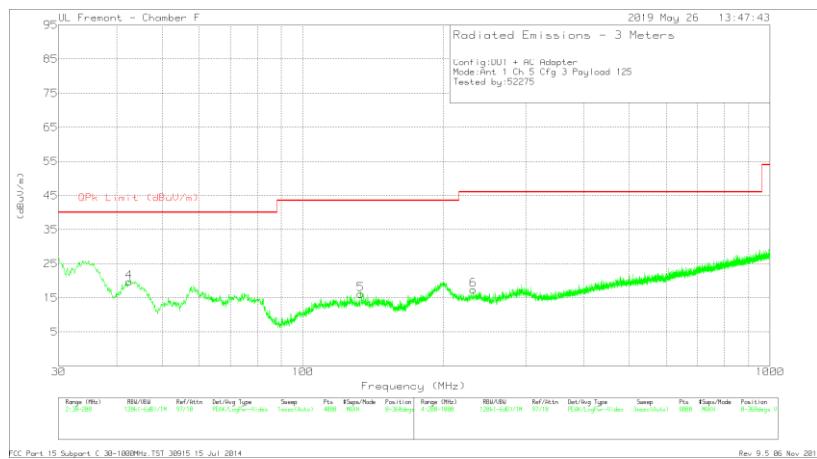
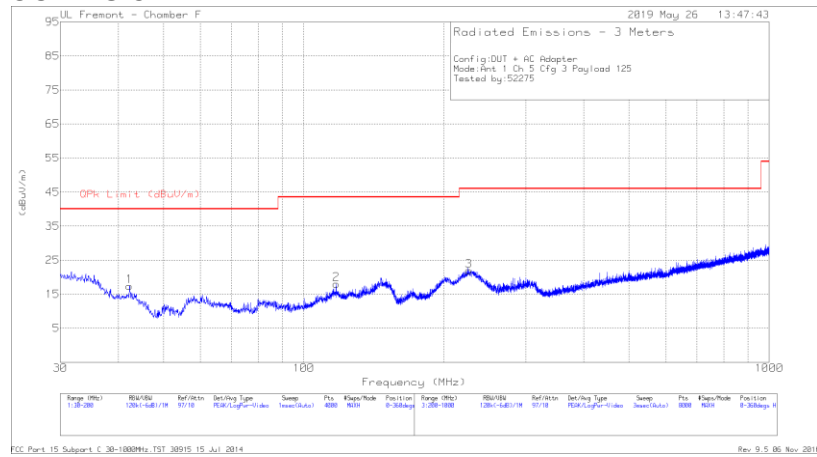


Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T900 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	42.0731	28.04	Pk	16.7	-31.8	12.94	40	-27.06	0-360	299	H
2	* 129.3057	32.05	Pk	17.8	-30.9	18.95	43.52	-24.57	0-360	199	H
4	45.2189	36.1	Pk	14.3	-31.7	18.7	40	-21.3	0-360	100	V
5	* 170.1163	32.23	Pk	15.7	-30.7	17.23	43.52	-26.29	0-360	100	V
3	303.3134	36.08	Pk	17.4	-29.9	23.58	46.02	-22.44	0-360	100	H
6	320.9157	30.75	Pk	17.9	-29.7	18.95	46.02	-27.07	0-360	99	V

Pk - Peak detector

ANT.1, CH5, CONFIG 3

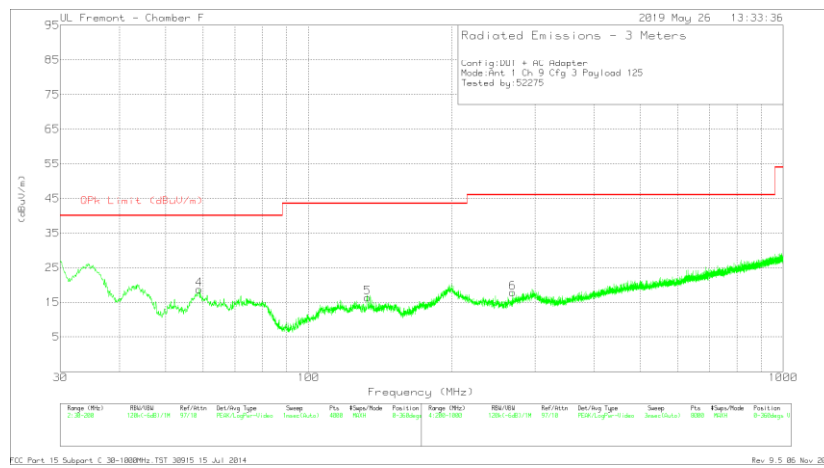
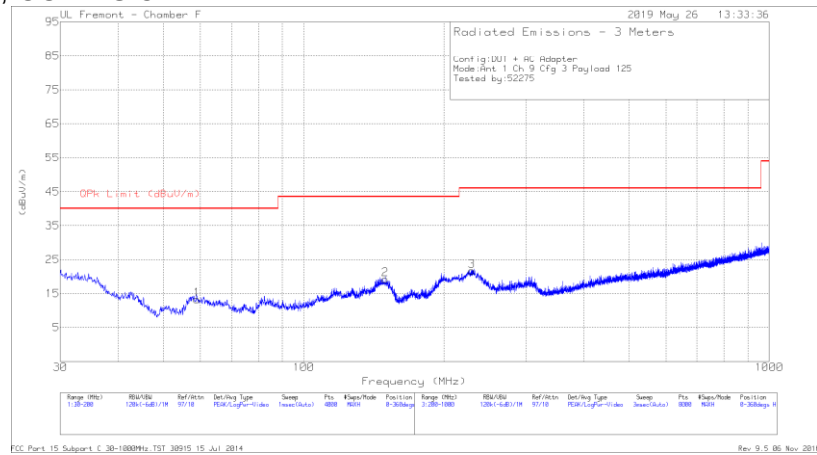


Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T900 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degr)	Height (cm)	Polarity
1	42.2432	32.59	Pk	16.6	-31.8	17.39	40	-22.61	0-360	299	H
2	* 117.4876	31.71	Pk	17.4	-31.1	18.01	43.52	-25.51	0-360	199	H
4	42.4982	35.11	Pk	16.4	-31.8	19.71	40	-20.29	0-360	100	V
5	* 133.0467	29.34	Pk	17.7	-30.9	16.14	43.52	-27.38	0-360	100	V
3	226.4034	37.43	Pk	14.8	-30.3	21.93	46.02	-24.09	0-360	99	H
6	231.6041	32.5	Pk	15.1	-30.2	17.4	46.02	-28.62	0-360	99	V

Pk - Peak detector

ANT. 1, CH9, CONFIG 3

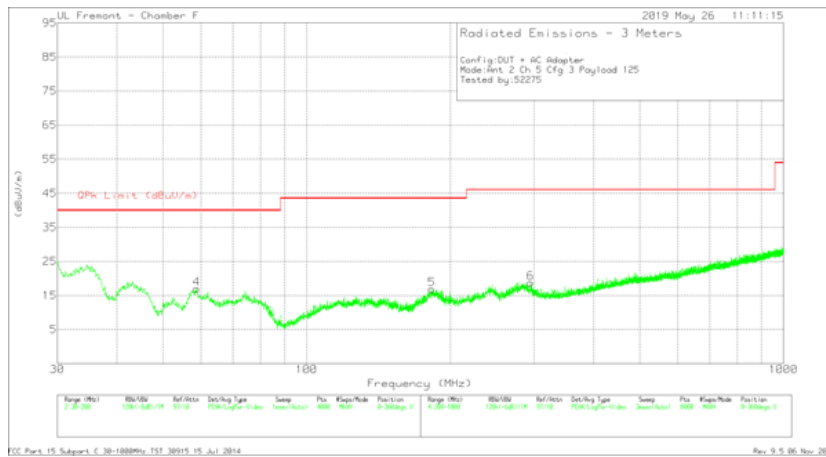
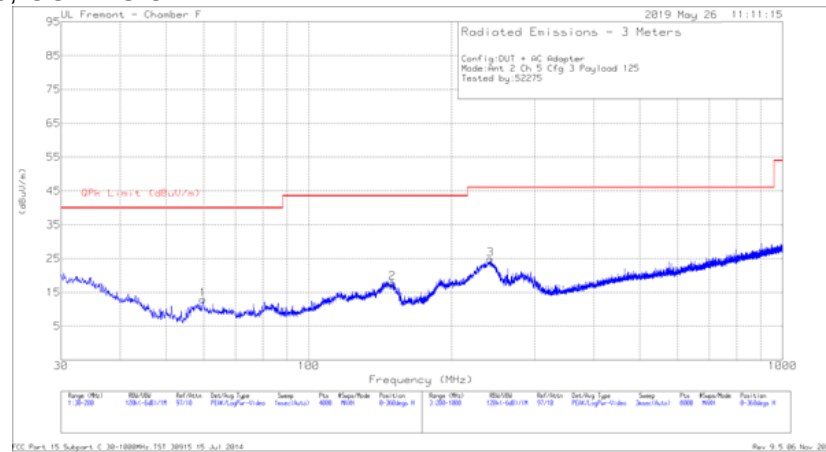


Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T900 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	58.9925	33.28	Pk	11.6	-31.6	13.28	40	-26.72	0-360	399	H
2	149.7535	33.43	Pk	16.6	-30.8	19.23	43.52	-24.29	0-360	199	H
4	58.9075	38.75	Pk	11.6	-31.6	18.75	40	-21.25	0-360	100	V
5	* 133.1317	29.59	Pk	17.7	-30.9	16.39	43.52	-27.13	0-360	100	V
3	229.7039	36.91	Pk	15	-30.2	21.71	46.02	-24.31	0-360	99	H
6	* 269.209	30.74	Pk	17.1	-30	17.84	46.02	-28.18	0-360	99	V

Pk - Peak detector

ANT. 2, CH5, CONFIG 3



Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T900 (dB/m)	Amp/Cbl (dB)	EIRP (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	59.7577	32.79	Pk	11.7	-31.6	12.89	40	-27.11	0-360	399	H
2	150.0511	32.01	Pk	16.6	-30.8	17.81	43.52	-25.71	0-360	299	H
4	58.8225	37.02	Pk	11.6	-31.6	17.02	40	-22.98	0-360	100	V
5	183.0821	32.22	Pk	15.2	-30.6	16.82	43.52	-26.7	0-360	100	V
3	* 241.7054	39.59	Pk	15.5	-30.2	24.89	46.02	-21.13	0-360	99	H
6	295.0124	31.25	Pk	17.3	-29.8	18.75	46.02	-27.27	0-360	199	V

Pk - Peak detector