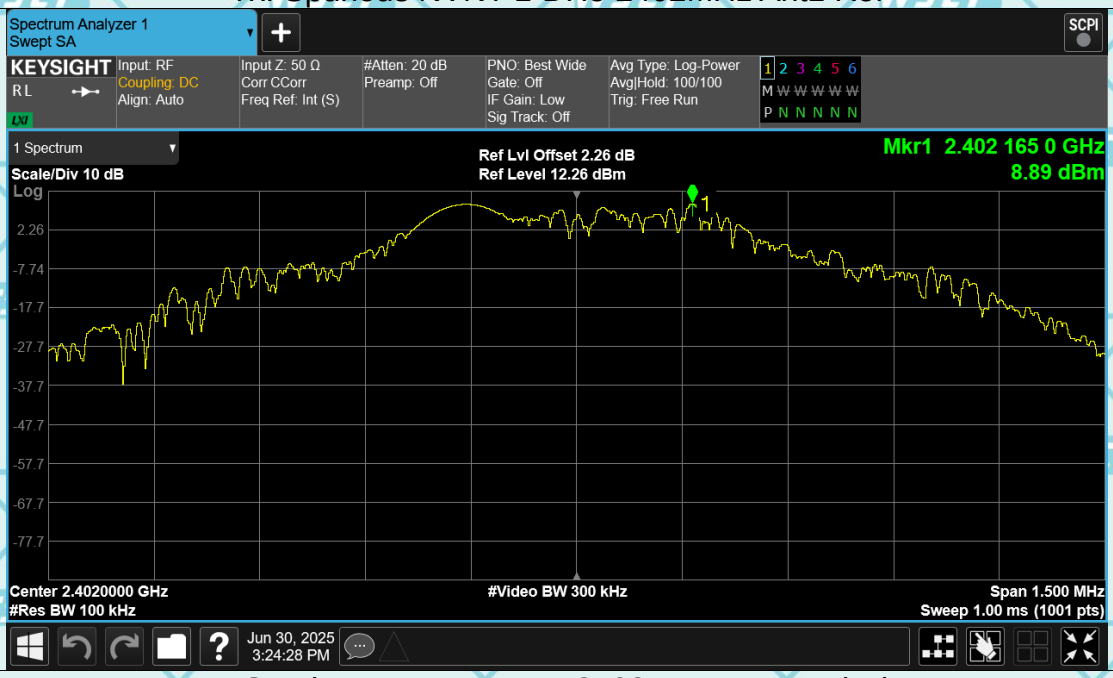
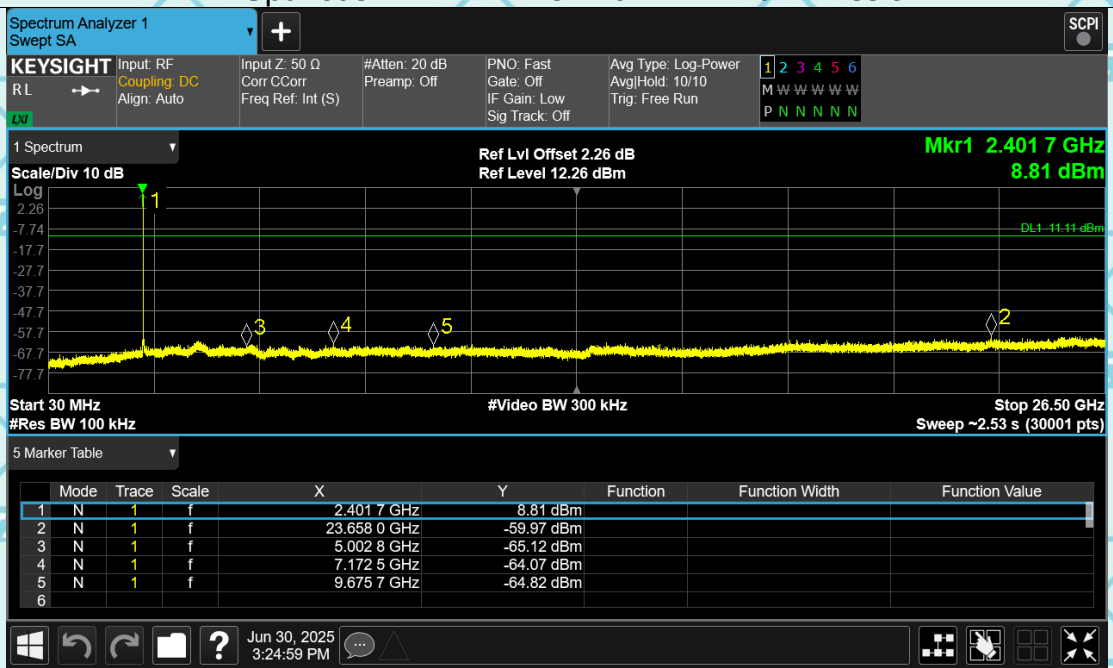
Test Data

Test Graphs

Tx. Spurious NVNT 1-DH5 2402MHz Ant1 Ref

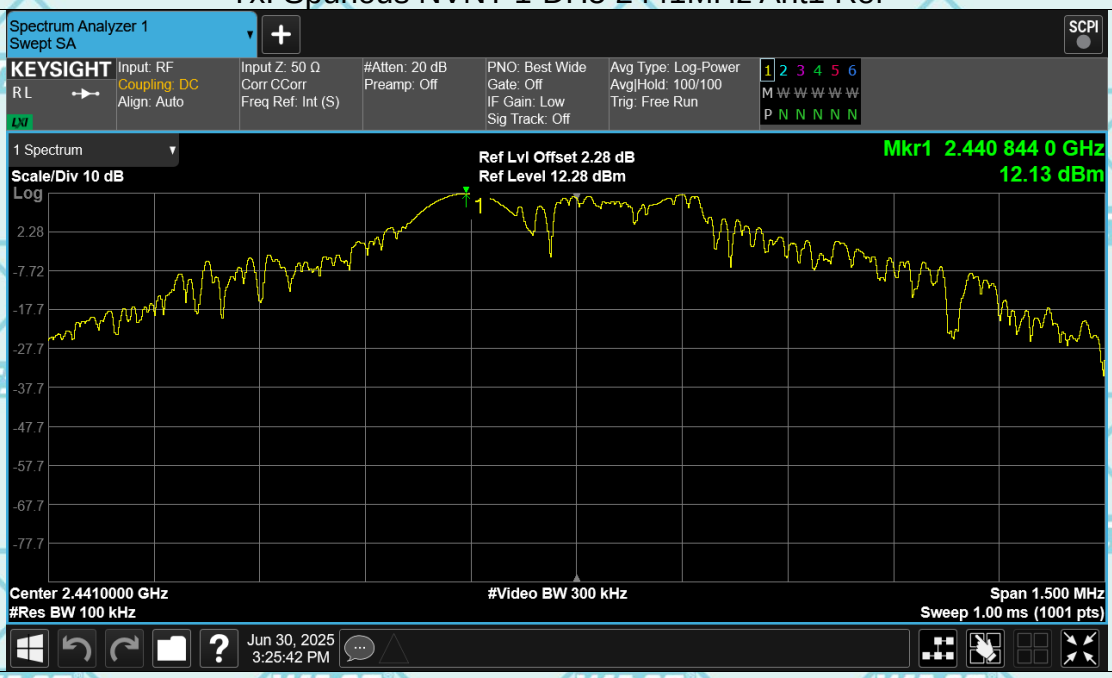


Tx. Spurious NVNT 1-DH5 2402MHz Ant1 Emission

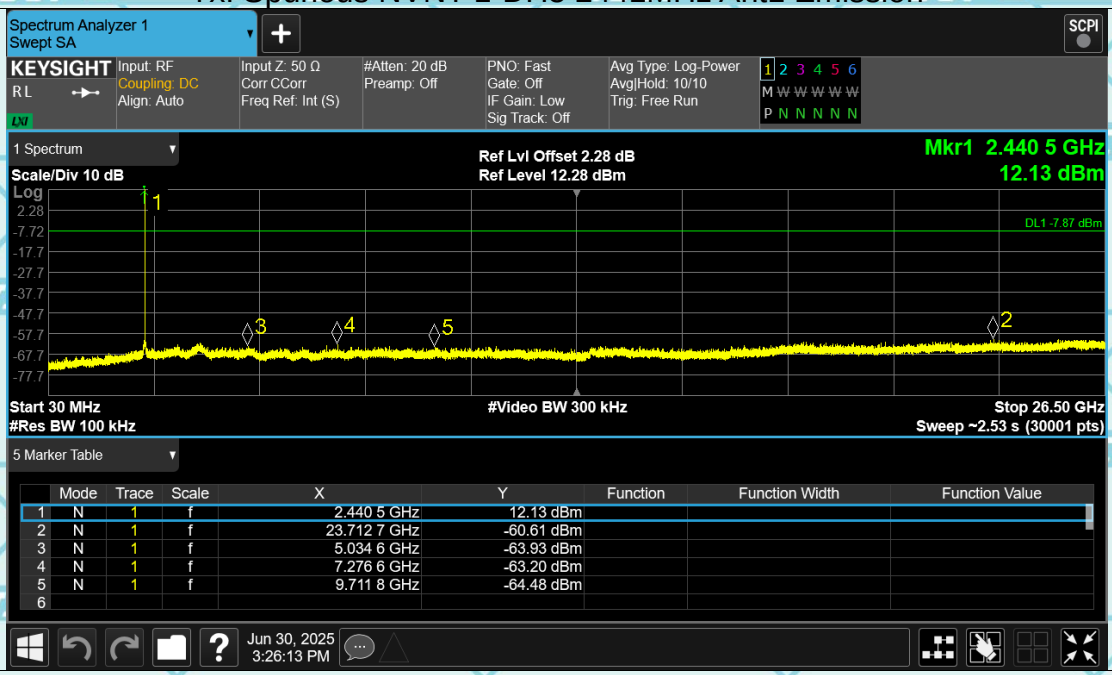


	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	2.401 7 GHz	8.81 dBm			
2	N	1	f	23.658 0 GHz	-59.97 dBm			
3	N	1	f	5.002 8 GHz	-65.12 dBm			
4	N	1	f	7.172 5 GHz	-64.07 dBm			
5	N	1	f	9.675 7 GHz	-64.82 dBm			
6								

Tx. Spurious NVNT 1-DH5 2441MHz Ant1 Ref

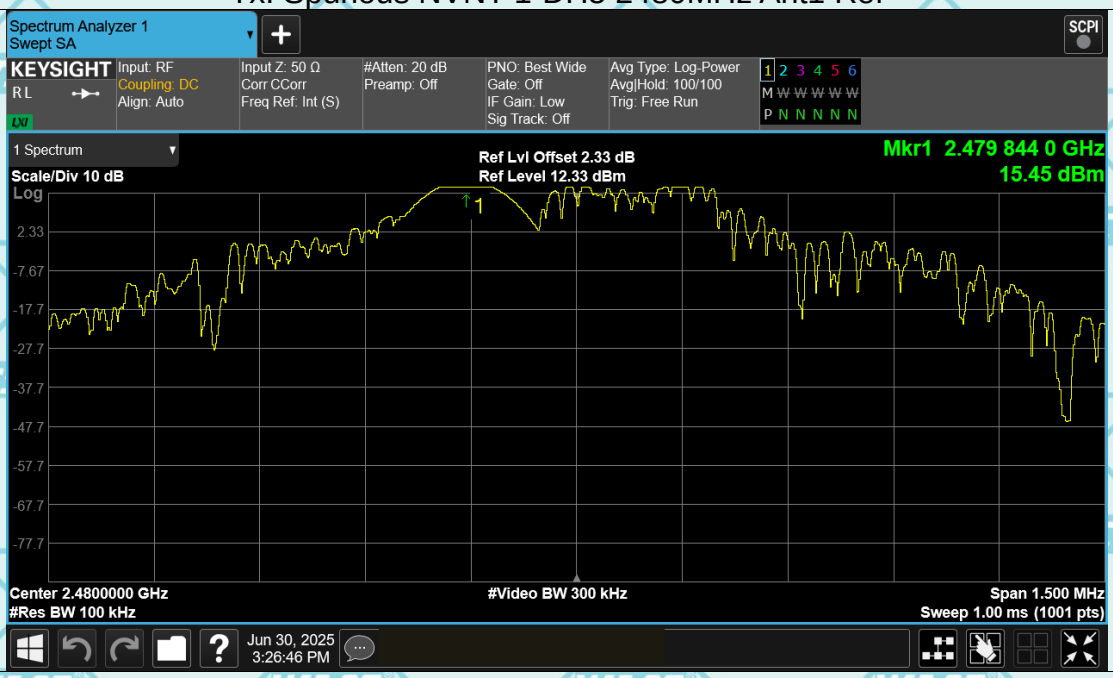


Tx. Spurious NVNT 1-DH5 2441MHz Ant1 Emission

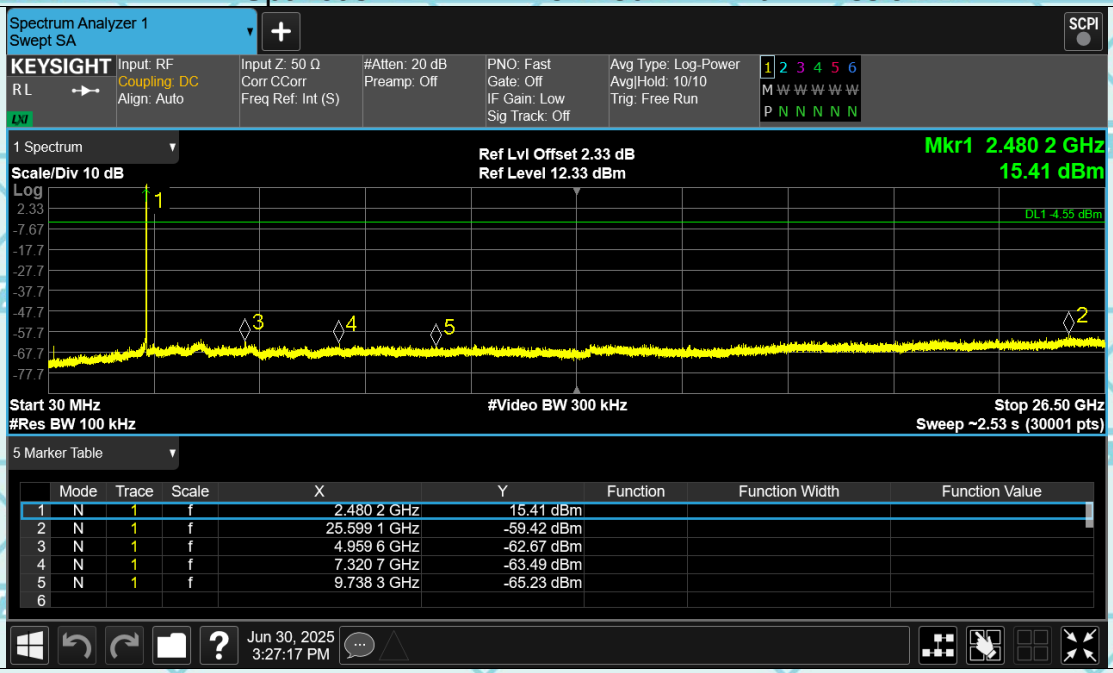


	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	2.440 5 GHz	12.13 dBm			
2	N	1	f	23.712 7 GHz	-60.61 dBm			
3	N	1	f	5.034 6 GHz	-63.93 dBm			
4	N	1	f	7.276 6 GHz	-63.20 dBm			
5	N	1	f	9.711 8 GHz	-64.48 dBm			
6								

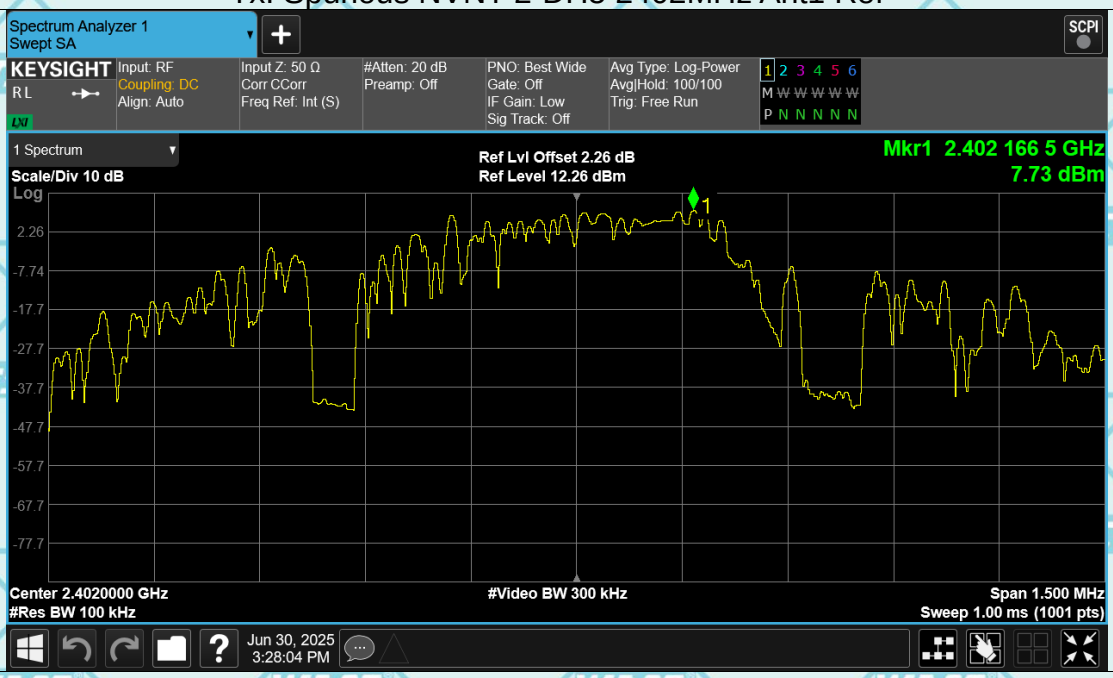
Tx. Spurious NVNT 1-DH5 2480MHz Ant1 Ref



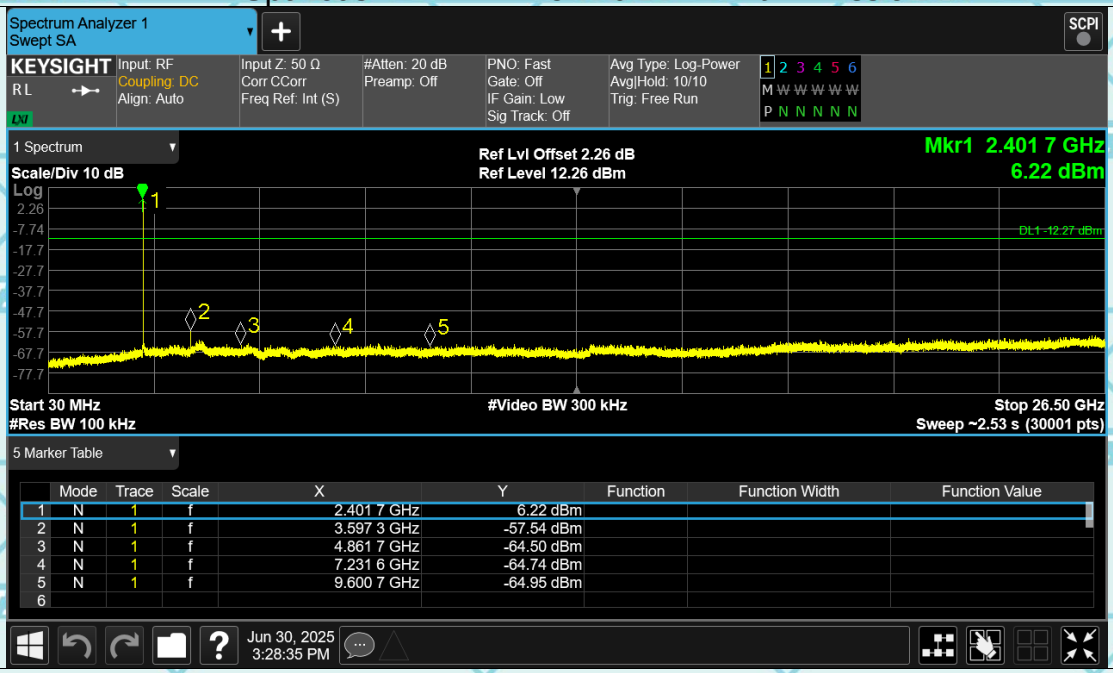
Tx. Spurious NVNT 1-DH5 2480MHz Ant1 Emission



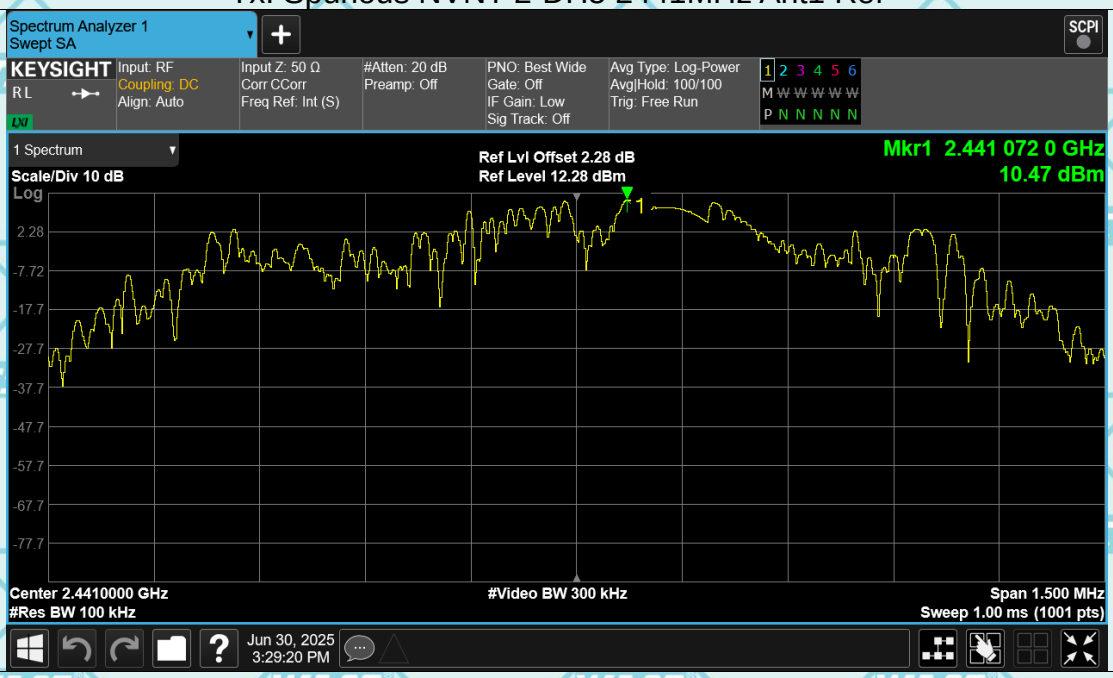
Tx. Spurious NVNT 2-DH5 2402MHz Ant1 Ref



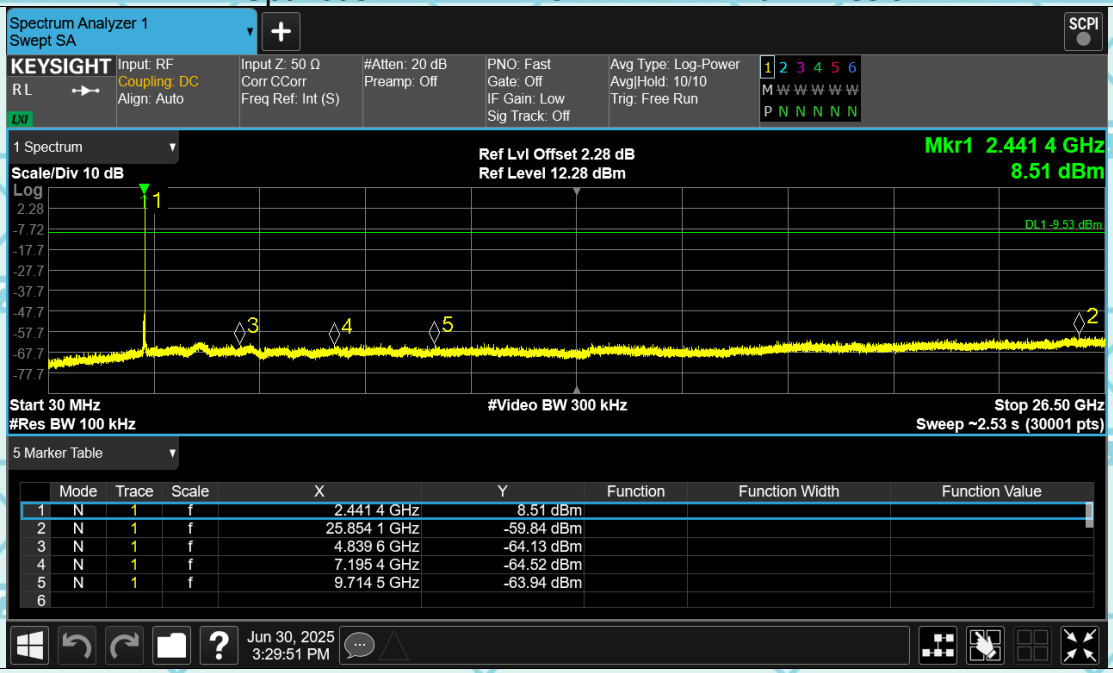
Tx. Spurious NVNT 2-DH5 2402MHz Ant1 Emission



Tx. Spurious NVNT 2-DH5 2441MHz Ant1 Ref

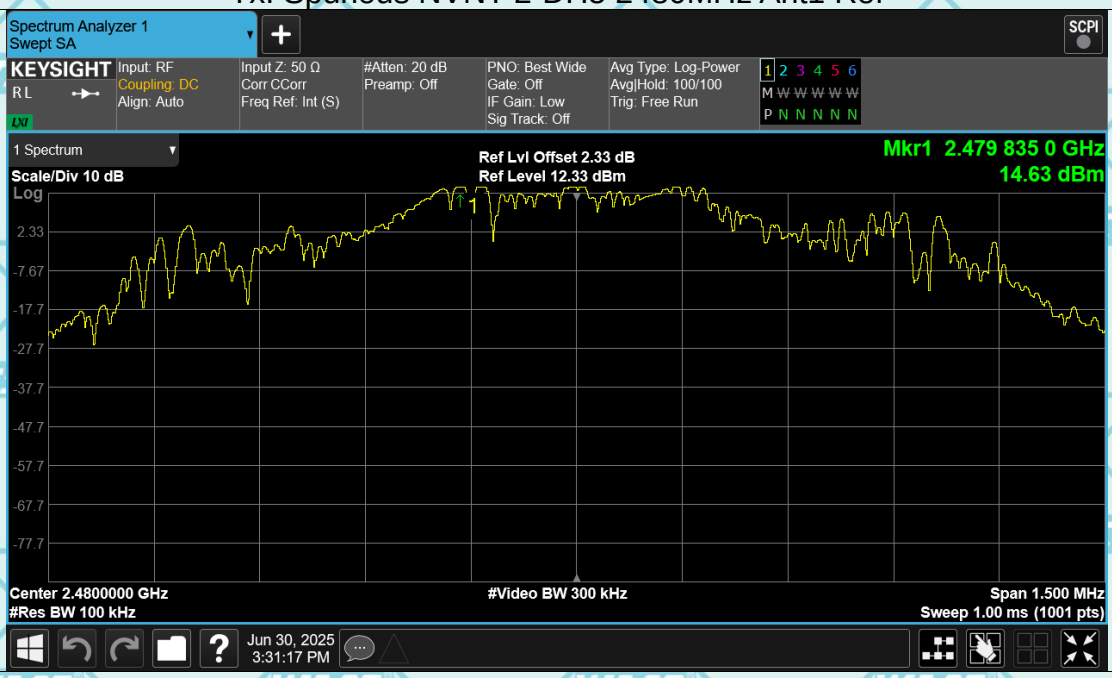


Tx. Spurious NVNT 2-DH5 2441MHz Ant1 Emission

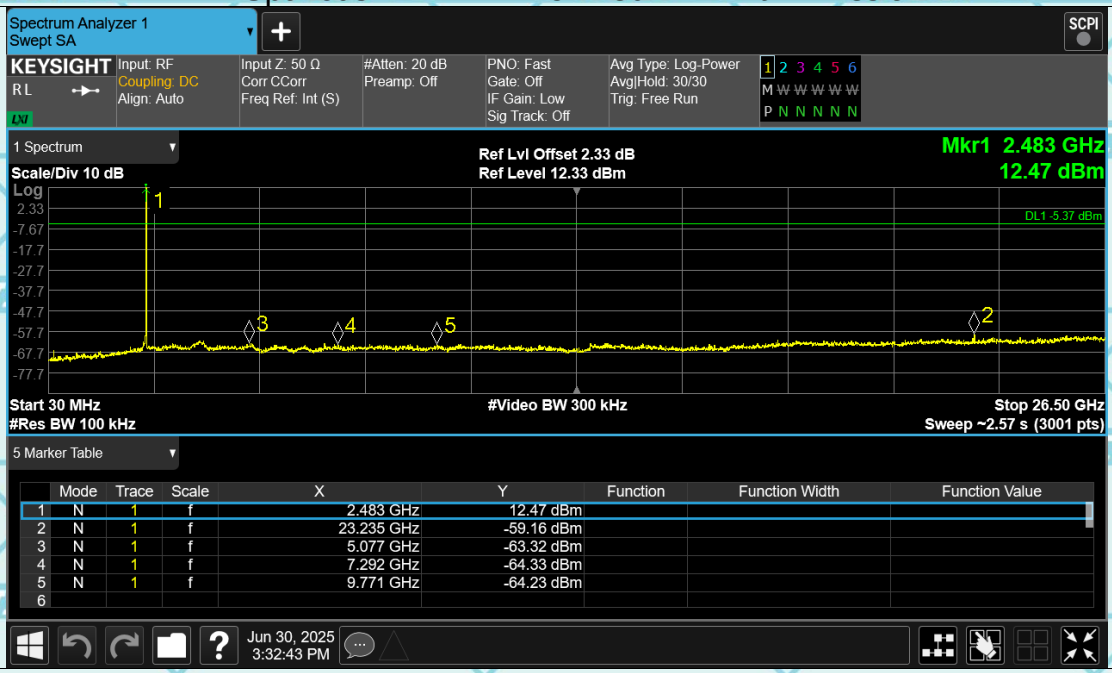


	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	2.441 4 GHz	8.51 dBm			
2	N	1	f	25.854 1 GHz	-59.84 dBm			
3	N	1	f	4.839 6 GHz	-64.13 dBm			
4	N	1	f	7.195 4 GHz	-64.52 dBm			
5	N	1	f	9.714 5 GHz	-63.94 dBm			
6								

Tx. Spurious NVNT 2-DH5 2480MHz Ant1 Ref

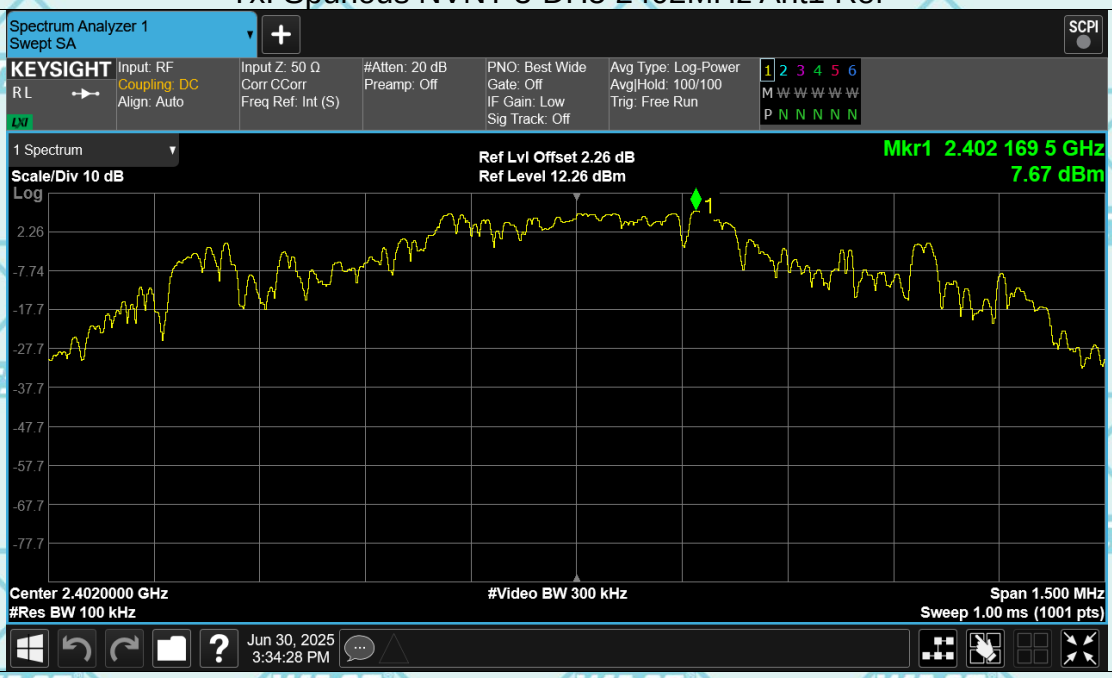


Tx. Spurious NVNT 2-DH5 2480MHz Ant1 Emission

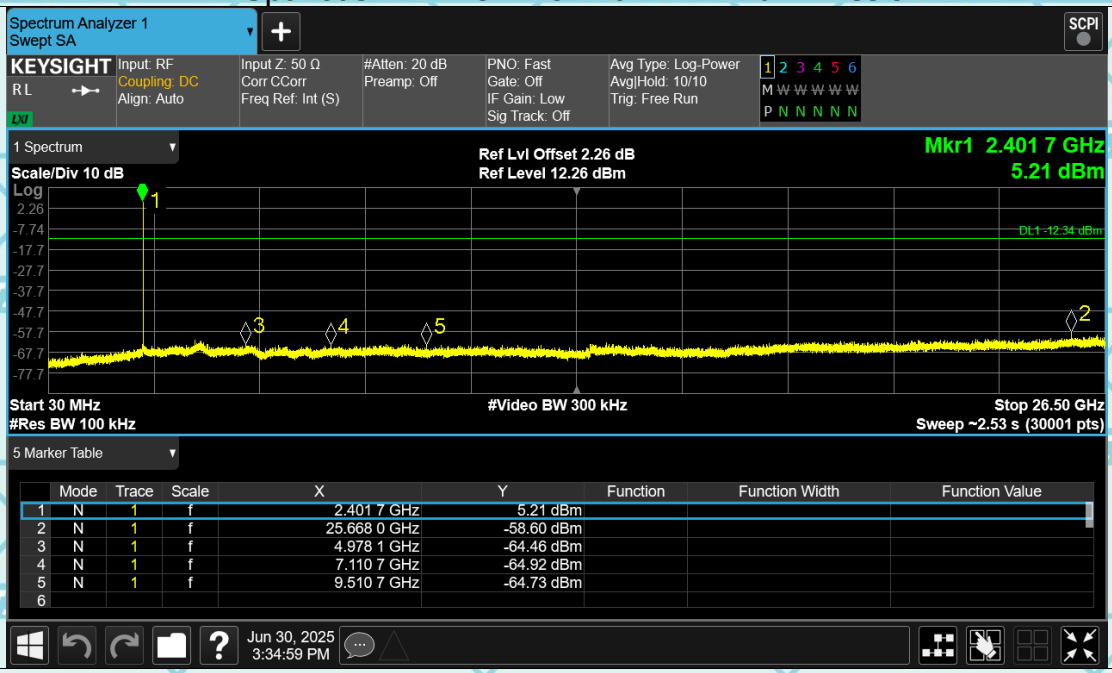


	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	2.483 GHz	12.47 dBm			
2	N	1	f	23.235 GHz	-59.16 dBm			
3	N	1	f	5.077 GHz	-63.32 dBm			
4	N	1	f	7.292 GHz	-64.33 dBm			
5	N	1	f	9.771 GHz	-64.23 dBm			
6								

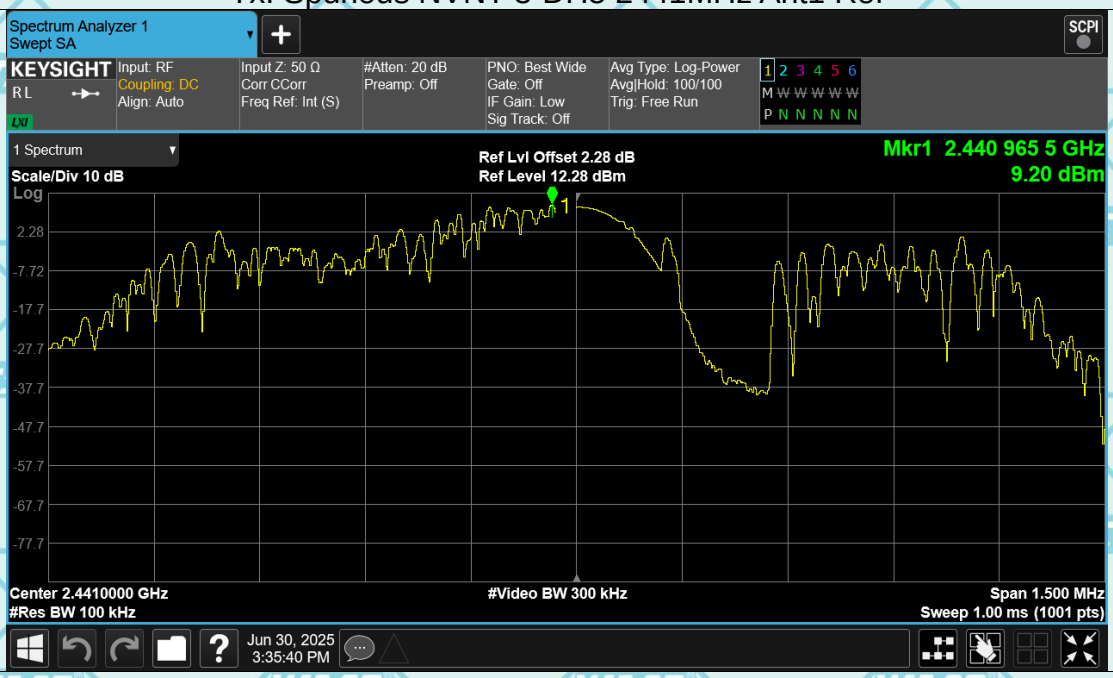
Tx. Spurious NVNT 3-DH5 2402MHz Ant1 Ref



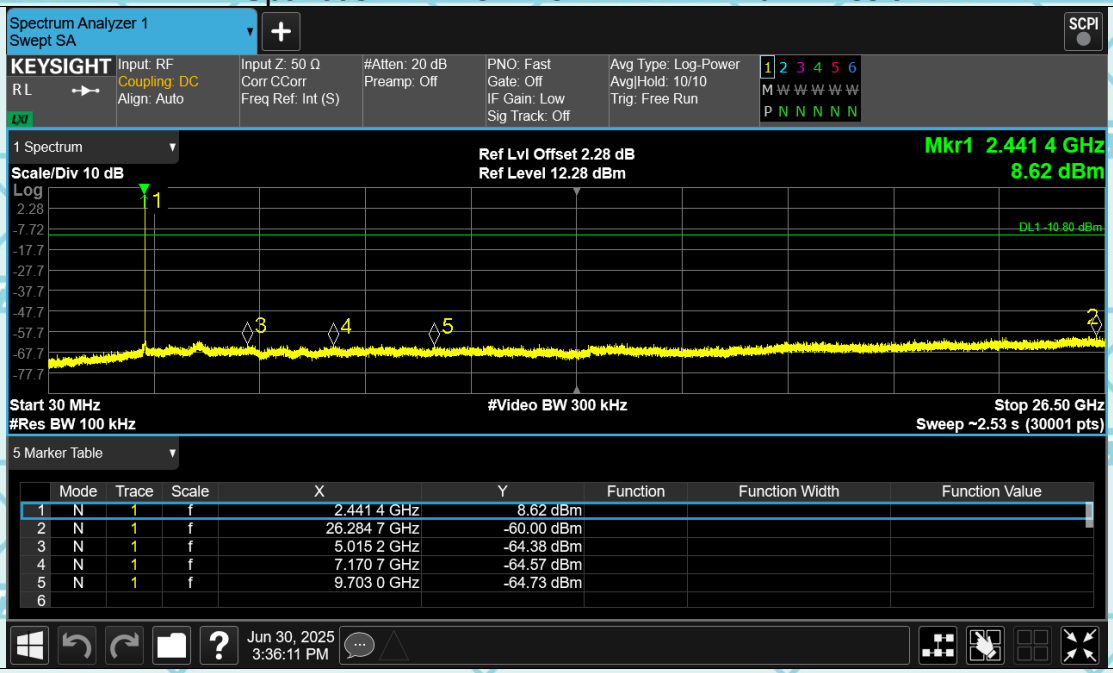
Tx. Spurious NVNT 3-DH5 2402MHz Ant1 Emission



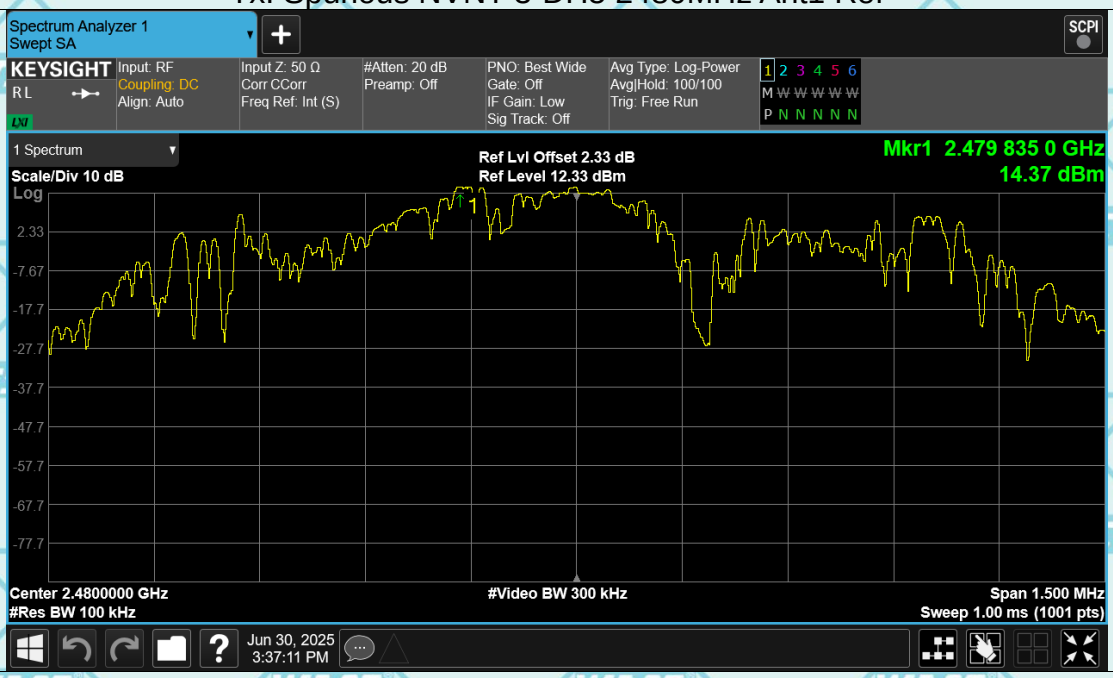
Tx. Spurious NVNT 3-DH5 2441MHz Ant1 Ref



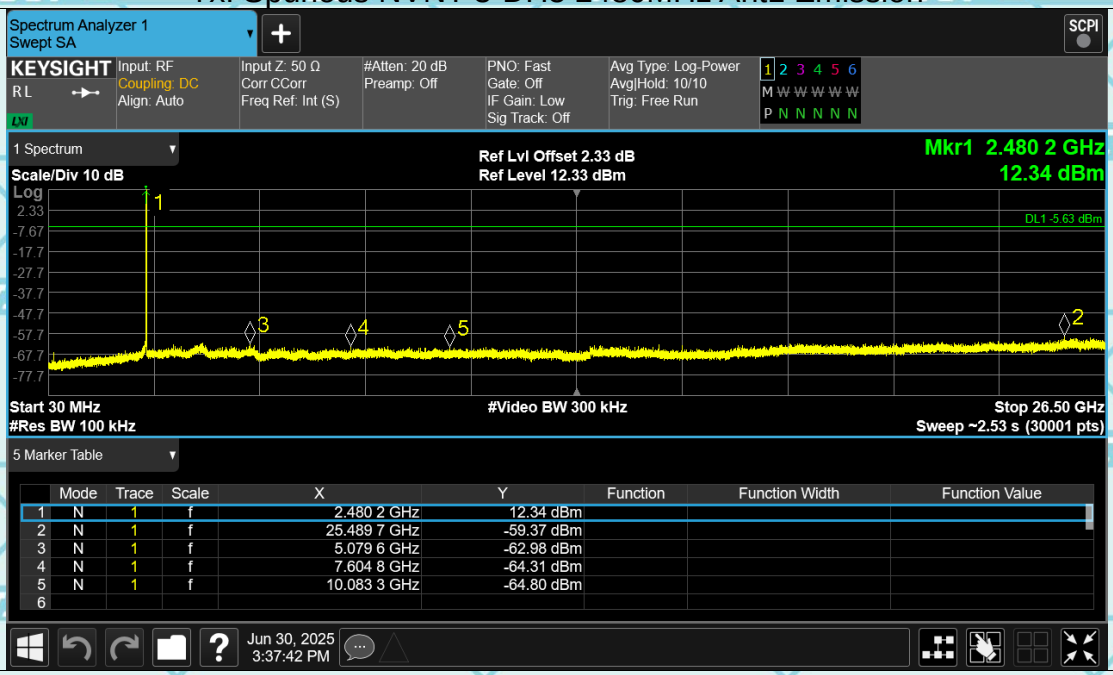
Tx. Spurious NVNT 3-DH5 2441MHz Ant1 Emission



Tx. Spurious NVNT 3-DH5 2480MHz Ant1 Ref



Tx. Spurious NVNT 3-DH5 2480MHz Ant1 Emission



	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	2.480 2 GHz	12.34 dBm			
2	N	1	f	25.489 7 GHz	-59.37 dBm			
3	N	1	f	5.079 6 GHz	-62.98 dBm			
4	N	1	f	7.604 8 GHz	-64.31 dBm			
5	N	1	f	10.083 3 GHz	-64.80 dBm			
6								

6.10. Radiated Spurious Emission Measurement

6.10.1. Test Specification

Test Requirement:	FCC Part15 C Section 15.209
Test Method:	ANSI C63.10:2013
Frequency Range:	9 kHz to 25 GHz
Measurement Distance:	3 m
Antenna Polarization:	Horizontal & Vertical

Receiver Setup:

Frequency	Detector	RBW	VBW	Remark
9kHz- 150kHz	Quasi-peak	200Hz	1kHz	Quasi-peak Value
150kHz-30MHz	Quasi-peak	9kHz	30kHz	Quasi-peak Value
30MHz-1GHz	Quasi-peak	100KHz	300KHz	Quasi-peak Value
Above 1GHz	Peak	1MHz	3MHz	Peak Value
	Peak	1MHz	10Hz	Average Value

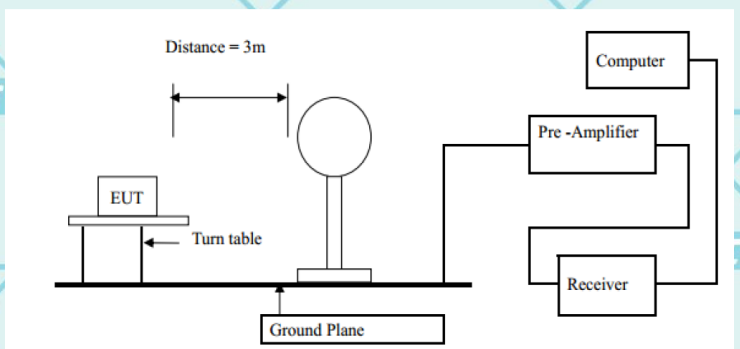
Limit:

Frequency	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	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

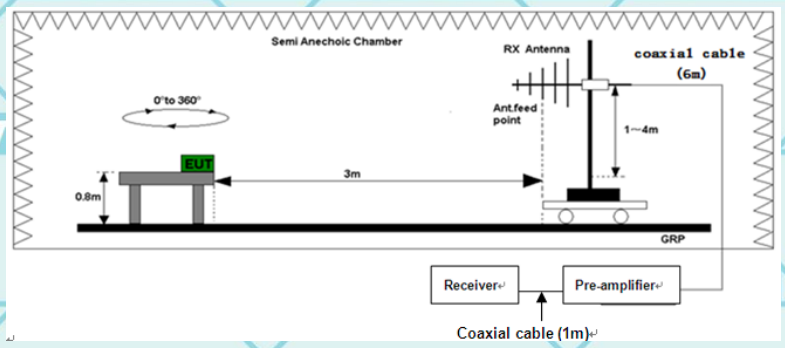
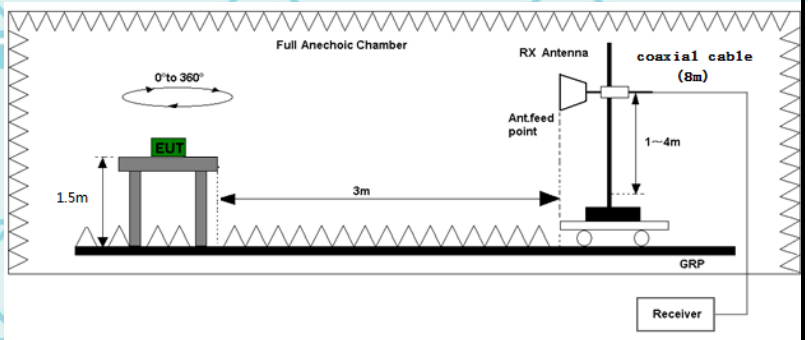
Frequency	Field Strength (microvolts/meter)	Measurement Distance (meters)	Detector
Above 1GHz	500	3	Average
	5000	3	Peak

Test setup:

For radiated emissions below 30MHz



30MHz to 1GHz

	 Above 1GHz 
Test Mode:	Transmitting mode with modulation
Test Procedure:	1. The testing follows the guidelines in Spurious Radiated Emissions of ANSI C63.10:2013 Measurement Guidelines. 2. For the radiated emission test below 1GHz: The EUT was placed on a turntable with 0.8 meter above ground. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high PASS filter are used for the test in order to get better signal level. For the radiated emission test above 1GHz: Place the measurement antenna on a turntable with 1.5 meter above ground, which is away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which

	maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane. 3. Set to the maximum power setting and enable the EUT transmit continuously. 4. Use the following spectrum analyzer settings: (1) Span shall wide enough to fully capture the emission being measured; (2) Set RBW=100 kHz for f < 1 GHz, RBW=1MHz for f>1GHz ; VBW≥RBW; Sweep = auto; Detector function = peak; Trace = max hold for peak (3) For average measurement: use duty cycle correction factor method per 15.35(c). Duty cycle = On time/100 milliseconds On time =N1*L1+N2*L2+...+Nn-1*LNn-1+Nn*Ln Where N1 is number of type 1 pulses, L1 is length of type 1 pulses, etc. Average Emission Level = Peak Emission Level + 20*log(Duty cycle) Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
Test results:	PASS

Note 1: The symbol of "--" in the table which means not application.

Note 2: For the test data above 1 GHz，According the ANSI C63.10-2013, where limits are specified for both average and peak (or quasi-peak) detector functions, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement.

Note 3: The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.

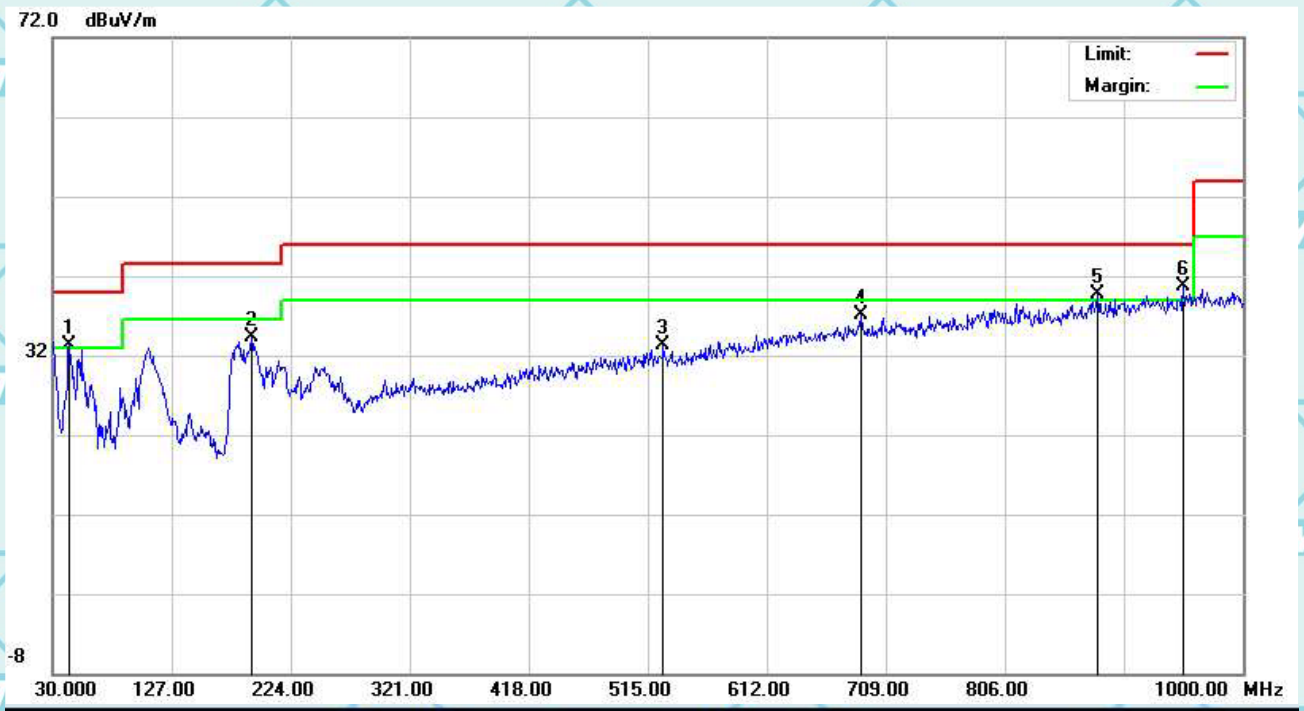
Note 4: The EUT is working in the Normal link mode below 1 GHz. All modes have been tested and normal link mode is worst.

6.10.2. Test Data

Please refer to following diagram for individual

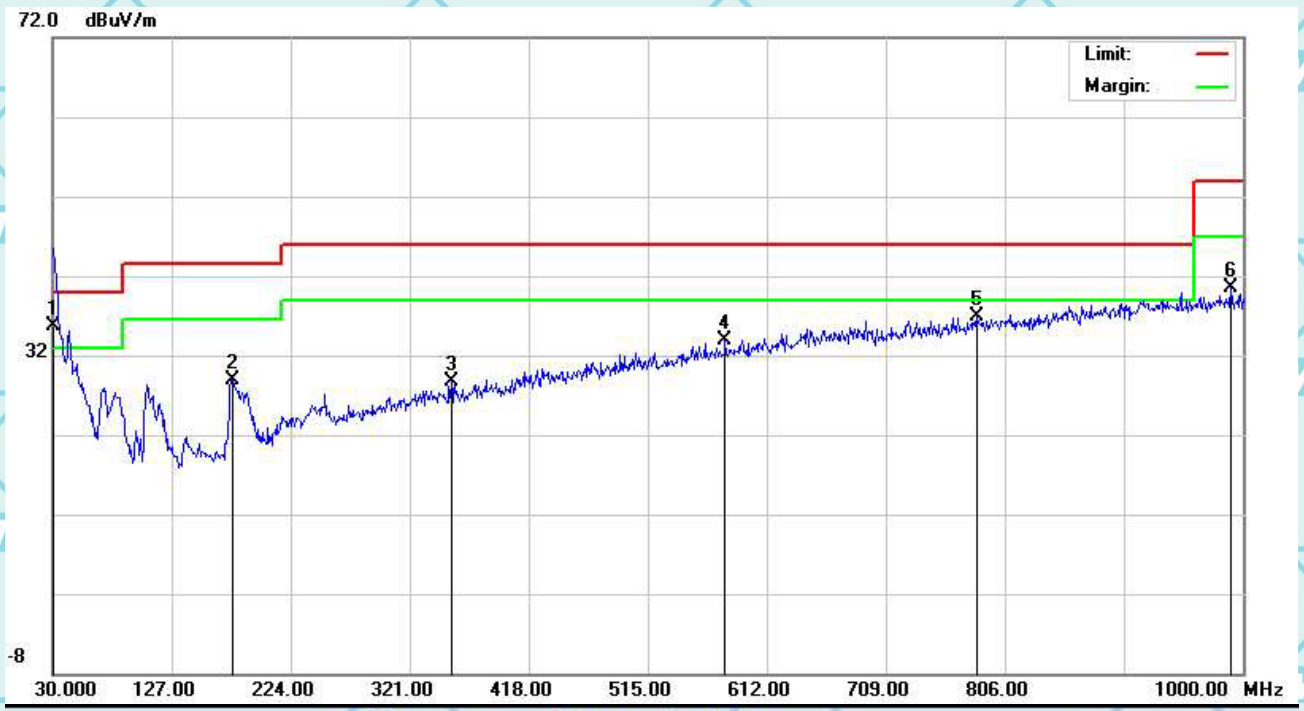
Below 1GHz

Horizontal:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1	!	43.5800	40.14	-6.88	33.26	40.00	-6.74	QP
2		191.9900	37.84	-3.62	34.22	43.50	-9.28	QP
3		527.6100	27.59	5.74	33.33	46.00	-12.67	QP
4		688.6300	27.61	9.54	37.15	46.00	-8.85	QP
5	!	881.6600	27.06	12.63	39.69	46.00	-6.31	QP
6	*	951.5000	26.88	13.79	40.67	46.00	-5.33	QP

Vertical:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1	*	30.9700	56.22	-20.52	35.70	40.00	-4.30	QP
2		176.4700	48.75	-19.80	28.95	43.50	-14.55	QP
3		354.9500	47.79	-18.99	28.80	46.00	-17.20	QP
4		578.0500	51.75	-17.84	33.91	46.00	-12.09	QP
5		782.7199	53.57	-16.76	36.81	46.00	-9.19	QP
6		990.3000	55.87	-15.34	40.53	54.00	-13.47	QP

Note1:
Freq. = Emission frequency in MHz
Reading level (dBμV) = Receiver reading
Corr. Factor (dB) = Antenna factor + Cable loss - Amplifier factor.
Measurement (dBμV) = Reading level (dBμV) + Corr. Factor (dB)
Limit (dBμV) = Limit stated in standard
Margin (dB) = Measurement (dBμV) – Limits (dBμV)

Above 1GHz

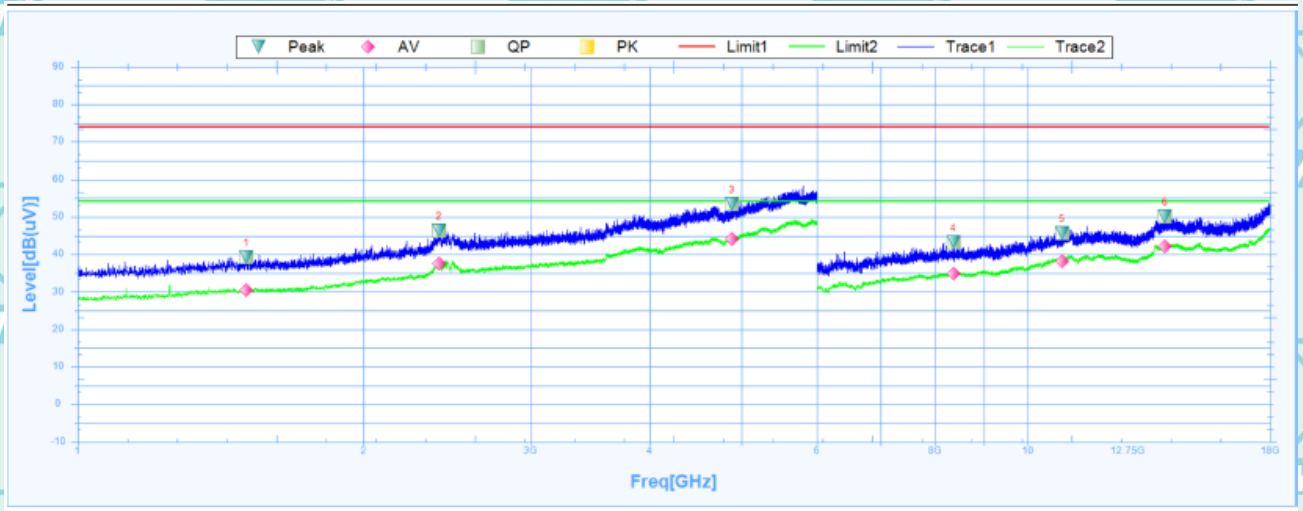
Note 1: The marked spikes near 2400 MHz with circle should be ignored because they are Fundamental signal.

Note 2: The spurious above 18G is noise only, do not show on the report.

GFSK

Low channel: 2402MHz

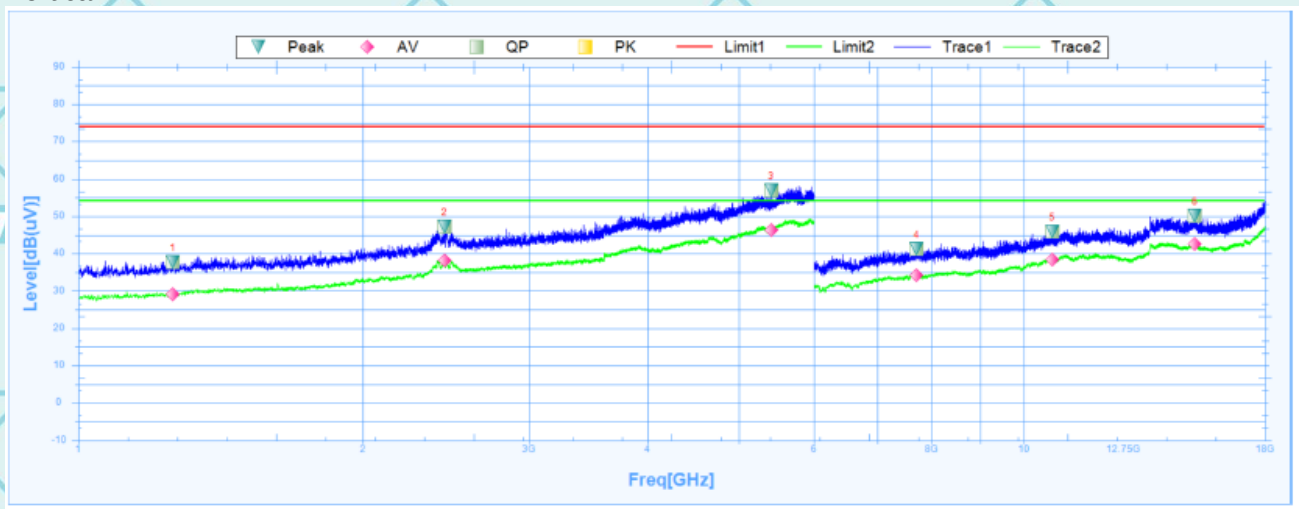
Horizontal:



Susputed Data List

NO.	Freq. [MHz]	Level [dB(uV)]	Factor [dB]	Reading [dB(uV)]	Limit [dB]	Margin [dB]	Deg [°]	Polarity	Trace	Verdict
1	1505.6250	39.21	24.99	14.22	74	-34.79	31.6	Horizontal	PK	Pass
1	1505.6250	30.52	24.99	5.53	54	-23.48	31.6	Horizontal	AV	Pass
2	2401.2500	46.42	27.26	19.16	74	-27.58	185.8	Horizontal	PK	Pass
2	2401.2500	37.45	27.26	10.19	54	-16.55	185.8	Horizontal	AV	Pass
3	4885.0000	53.33	31.37	21.96	74	-20.67	210.9	Horizontal	PK	Pass
3	4885.0000	44.14	31.37	12.77	54	-9.86	210.9	Horizontal	AV	Pass
4	8356.5000	43.29	9.02	34.27	74	-30.71	243.6	Horizontal	PK	Pass
4	8356.5000	34.78	9.02	25.76	54	-19.22	243.6	Horizontal	AV	Pass
5	10872.0000	45.66	14.91	30.75	74	-28.34	13	Horizontal	PK	Pass
5	10872.0000	38.25	14.91	23.34	54	-15.75	13	Horizontal	AV	Pass
6	13959.0000	50.16	19	31.16	74	-23.84	93	Horizontal	PK	Pass
6	13959.0000	42.11	19	23.11	54	-11.89	93	Horizontal	AV	Pass

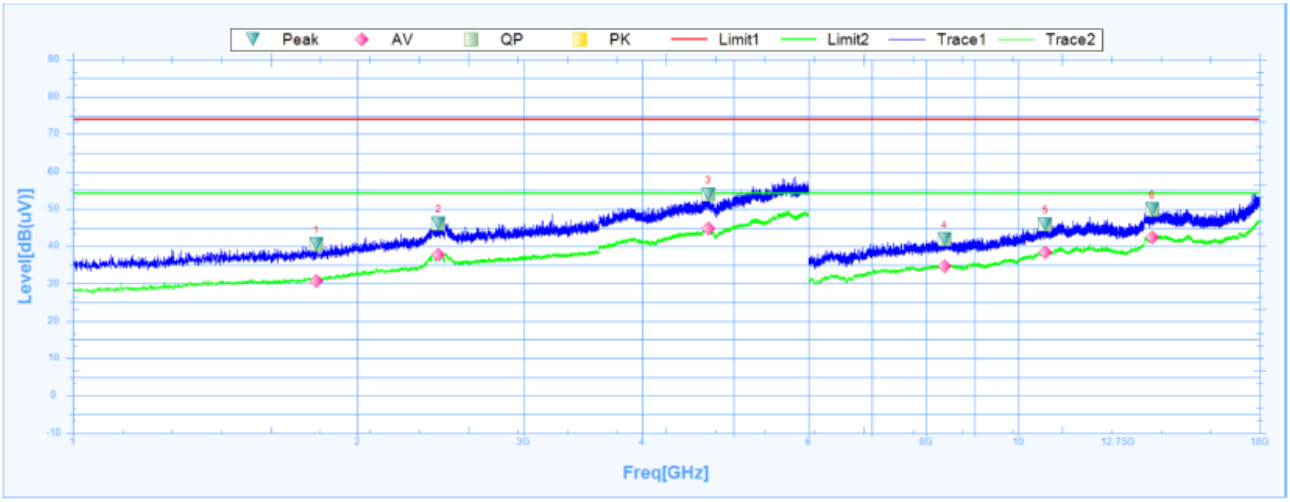
Vertical:



Susputed Data List

NO.	Freq. [MHz]	Level [dB(uV)]	Factor [dB]	Reading [dB(uV)]	Limit [dB]	Margin [dB]	Deg [°]	Polarity	Trace	Verdict
1	1259.3750	37.81	24.61	13.2	74	-36.19	3.1	Vertical	PK	Pass
1	1259.3750	29.02	24.61	4.41	54	-24.98	3.1	Vertical	AV	Pass
2	2439.3750	47.18	27.39	19.79	74	-26.82	55.5	Vertical	PK	Pass
2	2439.3750	38.07	27.39	10.68	54	-15.93	55.5	Vertical	AV	Pass
3	5408.7500	56.93	31.93	25	74	-17.07	8.1	Vertical	PK	Pass
3	5408.7500	46.43	31.93	14.5	54	-7.57	8.1	Vertical	AV	Pass
4	7707.0000	41.29	7.96	33.33	74	-32.71	206.5	Vertical	PK	Pass
4	7707.0000	34.2	7.96	26.24	54	-19.8	206.5	Vertical	AV	Pass
5	10719.0000	45.89	14.64	31.25	74	-28.11	268.6	Vertical	PK	Pass
5	10719.0000	38.45	14.64	23.81	54	-15.55	268.6	Vertical	AV	Pass
6	15178.5000	50.03	19.31	30.72	74	-23.97	7.9	Vertical	PK	Pass
6	15178.5000	42.49	19.31	23.18	54	-11.51	7.9	Vertical	AV	Pass

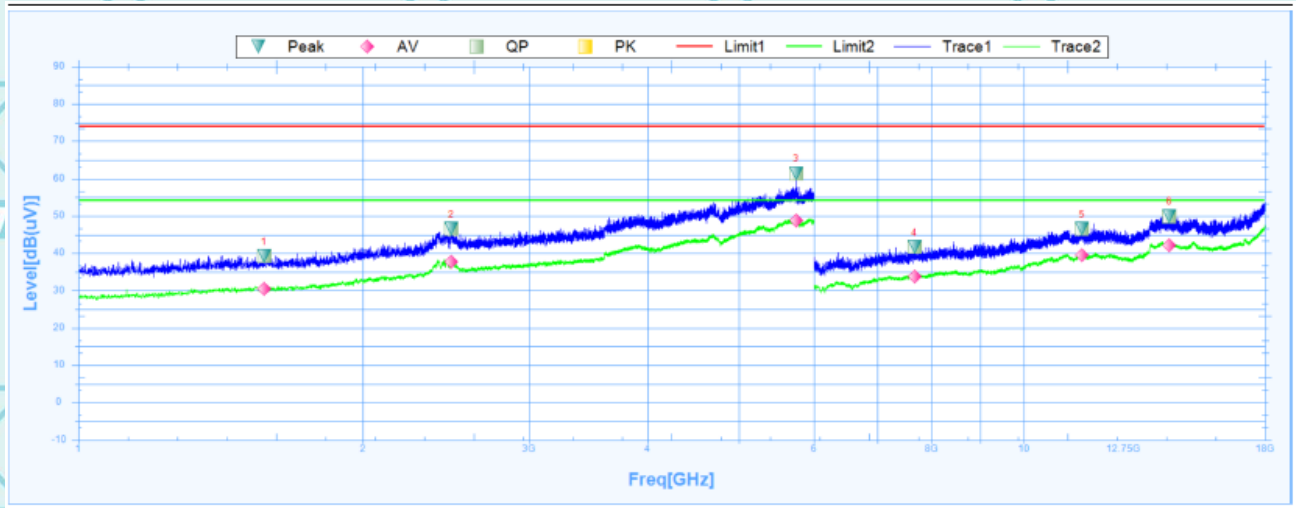
Middle channel: 2441MHz
Horizontal:



Susputed Data List

NO.	Freq. [MHz]	Level [dB(uV)]	Factor [dB]	Reading [dB(uV)]	Limit [dB]	Margin [dB]	Deg [°]	Polarity	Trace	Verdict
1	1809.3750	40.59	25.04	15.55	74	-33.41	59	Horizontal	PK	Pass
1	1809.3750	30.73	25.04	5.69	54	-23.27	59	Horizontal	AV	Pass
2	2436.8750	46.16	27.39	18.77	74	-27.84	292.1	Horizontal	PK	Pass
2	2436.8750	37.8	27.39	10.41	54	-16.2	292.1	Horizontal	AV	Pass
3	4701.2500	53.92	31	22.92	74	-20.08	360	Horizontal	PK	Pass
3	4701.2500	44.77	31	13.77	54	-9.23	360	Horizontal	AV	Pass
4	8356.5000	41.82	9.02	32.8	74	-32.18	132.4	Horizontal	PK	Pass
4	8356.5000	34.71	9.02	25.69	54	-19.29	132.4	Horizontal	AV	Pass
5	10687.5000	45.98	14.58	31.4	74	-28.02	359	Horizontal	PK	Pass
5	10687.5000	38.29	14.58	23.71	54	-15.71	359	Horizontal	AV	Pass
6	13855.5000	49.79	18.7	31.09	74	-24.21	26.1	Horizontal	PK	Pass
6	13855.5000	42.35	18.7	23.65	54	-11.65	26.1	Horizontal	AV	Pass

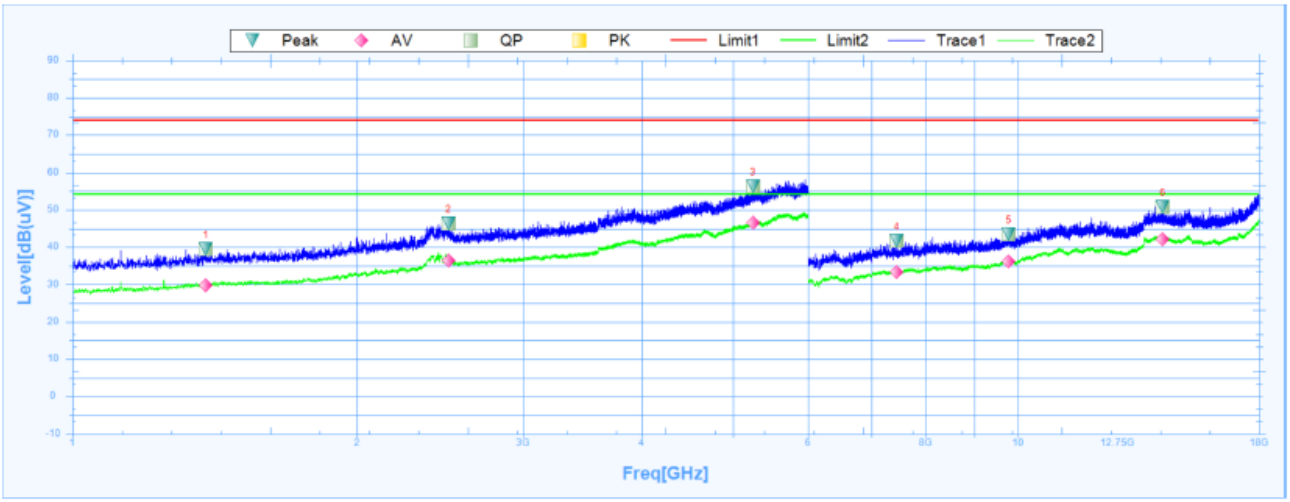
Vertical:



Susputed Data List

NO.	Freq. [MHz]	Level [dB(uV)]	Factor [dB]	Reading [dB(uV)]	Limit [dB]	Margin [dB]	Deg [°]	Polarity	Trace	Verdict
1	1571.8750	39.33	24.93	14.4	74	-34.67	304.2	Vertical	PK	Pass
1	1571.8750	30.5	24.93	5.57	54	-23.5	304.2	Vertical	AV	Pass
2	2480.6250	46.64	27.53	19.11	74	-27.36	6.6	Vertical	PK	Pass
2	2480.6250	37.67	27.53	10.14	54	-16.33	6.6	Vertical	AV	Pass
3	5747.5000	61.47	32.4	29.07	74	-12.53	313.8	Vertical	PK	Pass
3	5747.5000	48.69	32.4	16.29	54	-5.31	313.8	Vertical	AV	Pass
4	7663.5000	41.62	7.96	33.66	74	-32.38	342.7	Vertical	PK	Pass
4	7663.5000	33.83	7.96	25.87	54	-20.17	342.7	Vertical	AV	Pass
5	11530.5000	46.59	16.21	30.38	74	-27.41	335.5	Vertical	PK	Pass
5	11530.5000	39.5	16.21	23.29	54	-14.5	335.5	Vertical	AV	Pass
6	14262.0000	49.97	18.86	31.11	74	-24.03	259	Vertical	PK	Pass
6	14262.0000	42.04	18.86	23.18	54	-11.96	259	Vertical	AV	Pass

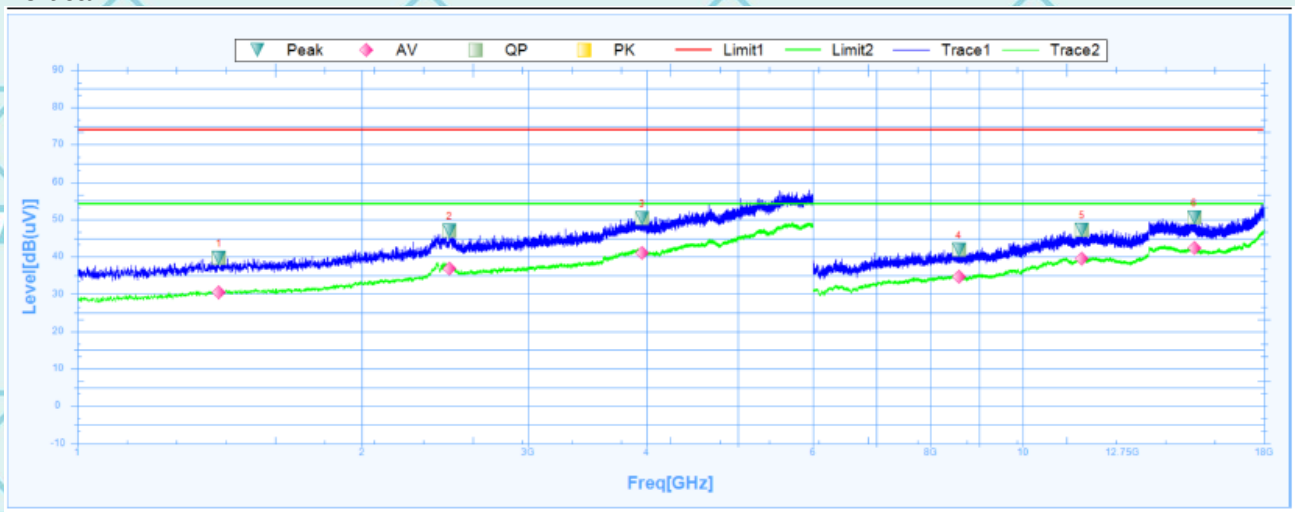
High channel: 2480MHz
Horizontal:



Susputed Data List

NO.	Freq. [MHz]	Level [dB(uV)]	Factor [dB]	Reading [dB(uV)]	Limit [dB]	Margin [dB]	Deg [°]	Polarity	Trace	Verdict
1	1384.3750	39.46	25.05	14.41	74	-34.54	8.6	Horizontal	PK	Pass
1	1384.3750	29.79	25.05	4.74	54	-24.21	8.6	Horizontal	AV	Pass
2	2500.0000	46.35	27.6	18.75	74	-27.65	251.6	Horizontal	PK	Pass
2	2500.0000	36.46	27.6	8.86	54	-17.54	251.6	Horizontal	AV	Pass
3	5250.0000	56.25	31.8	24.45	74	-17.75	321	Horizontal	PK	Pass
3	5250.0000	46.6	31.8	14.8	54	-7.4	321	Horizontal	AV	Pass
4	7450.5000	41.75	7.34	34.41	74	-32.25	194.1	Horizontal	PK	Pass
4	7450.5000	33.29	7.34	25.95	54	-20.71	194.1	Horizontal	AV	Pass
5	9786.0000	43.38	11.86	31.52	74	-30.62	251.5	Horizontal	PK	Pass
5	9786.0000	36.14	11.86	24.28	54	-17.86	251.5	Horizontal	AV	Pass
6	14239.5000	50.72	18.88	31.84	74	-23.28	79.4	Horizontal	PK	Pass
6	14239.5000	42.04	18.88	23.16	54	-11.96	79.4	Horizontal	AV	Pass

Vertical:



Susputed Data List

NO.	Freq. [MHz]	Level [dB(uV)]	Factor [dB]	Reading [dB(uV)]	Limit [dB]	Margin [dB]	Deg [°]	Polarity	Trace	Verdict
1	1411.8750	39.64	25.09	14.55	74	-34.36	171.9	Vertical	PK	Pass
1	1411.8750	30.45	25.09	5.36	54	-23.55	171.9	Vertical	AV	Pass
2	2475.6250	47.07	27.52	19.55	74	-26.93	257.9	Vertical	PK	Pass
2	2475.6250	36.93	27.52	9.41	54	-17.07	257.9	Vertical	AV	Pass
3	3959.3750	50.33	29.6	20.73	74	-23.67	193.4	Vertical	PK	Pass
3	3959.3750	41.15	29.6	11.55	54	-12.85	193.4	Vertical	AV	Pass
4	8559.0000	41.9	9.29	32.61	74	-32.1	360.1	Vertical	PK	Pass
4	8559.0000	34.58	9.29	25.29	54	-19.42	360.1	Vertical	AV	Pass
5	11557.5000	47.28	16.21	31.07	74	-26.72	128.4	Vertical	PK	Pass
5	11557.5000	39.4	16.21	23.19	54	-14.6	128.4	Vertical	AV	Pass
6	15186.0000	50.45	19.25	31.2	74	-23.55	15.6	Vertical	PK	Pass
6	15186.0000	42.32	19.25	23.07	54	-11.68	15.6	Vertical	AV	Pass

Note:

1. *The emission levels of other frequencies are very lower than the limit and not show in test report.*
2. *Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency.*
3. *Data of measurement shown "---"in the above table mean that the reading of emissions is attenuated more than 20 dB below the limits or the field strength is too small to be measured.*
4. *Measurements were conducted in all three modulation (GFSK, Pi/4 DQPSK, 8DPSK), and the worst case Mode (GFSK) was submitted only.*
5. *EUT has been tested in unfolded states, and the report only reflects data in the unfolded state (worst-case scenario)*

6.10.3. Restricted Bands Requirements

Bluetooth (GFSK, Pi/4-DQPSK, 8DPSK)mode have been tested, and the worst result GFSK model was report as below

Frequency	Reading	Correct Factor	Emission Level	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel							
2387	64.57	-8.76	55.81	74	18.19	H	PK
2387	56.30	-8.76	47.54	54	6.46	H	AV
2387	61.99	-8.73	53.26	74	20.74	V	PK
2387	54.29	-8.73	45.56	54	8.44	V	AV
2390	62.61	-8.76	53.85	74	20.15	H	PK
2390	54.02	-8.76	45.26	54	8.74	H	AV
2390	60.49	-8.73	51.76	74	22.24	V	PK
2390	55.35	-8.73	46.62	54	7.38	V	AV
High Channel							
2483.5	60.74	-8.17	52.57	74	21.43	H	PK
2483.5	53.06	-8.17	44.89	54	9.11	H	AV
2483.5	62.99	-8.17	54.82	74	19.18	V	PK
2483.5	53.20	-8.17	45.03	54	8.97	V	AV

Note: Freq. = Emission frequency in MHz
Reading level (dBµV) = Receiver reading
Corr. Factor (dB) = Attenuation factor + Cable loss
Level (dBµV) = Reading level (dBµV) + Corr. Factor (dB)
Limit (dBµV) = Limit stated in standard
Margin (dB) = Level (dBµV) – Limits (dBµV)

7. Test Setup Photographs

Please refer to Annex "Set Up Photos-15C" for test setup photos

*******END OF REPORT*******