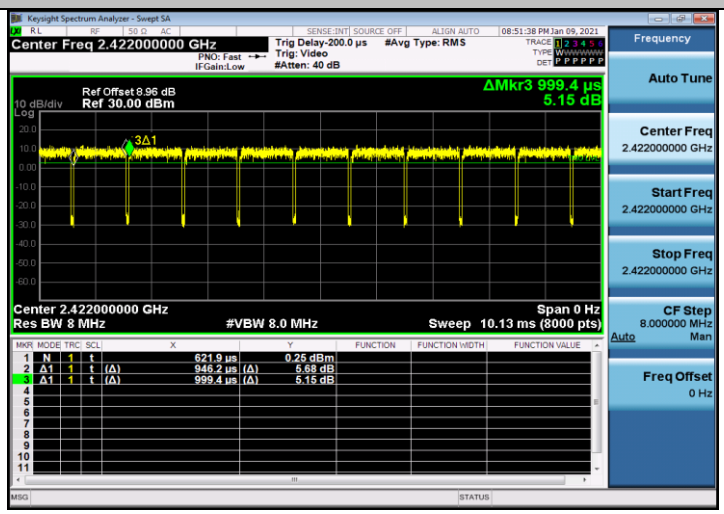
11N40MIMO_Ant1_2422



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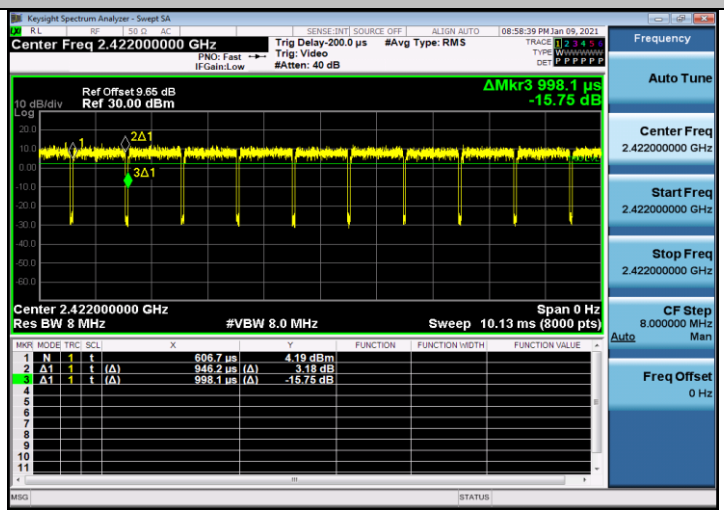

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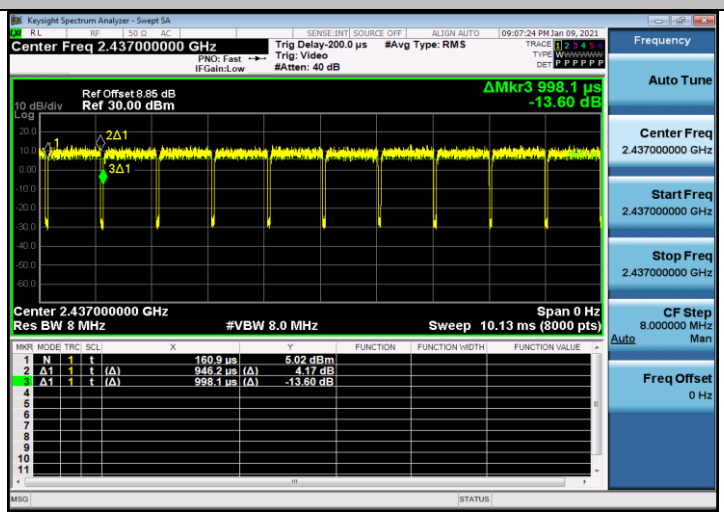

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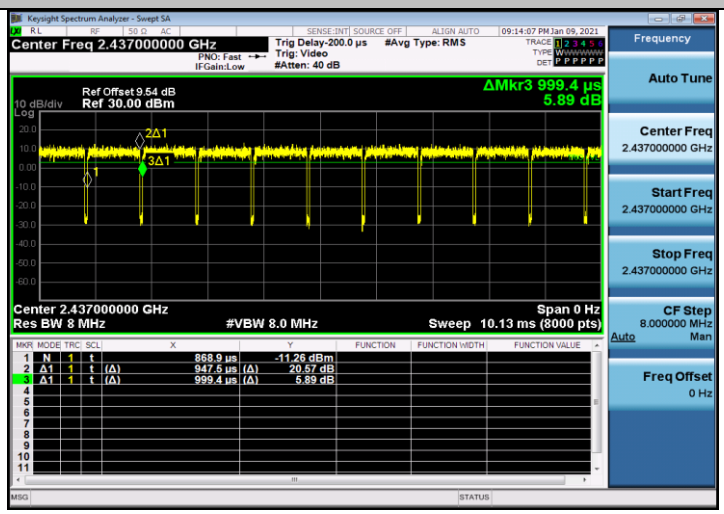

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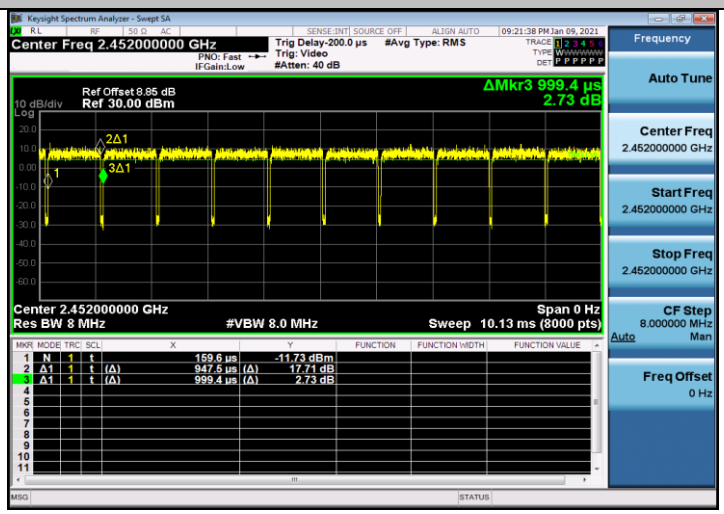

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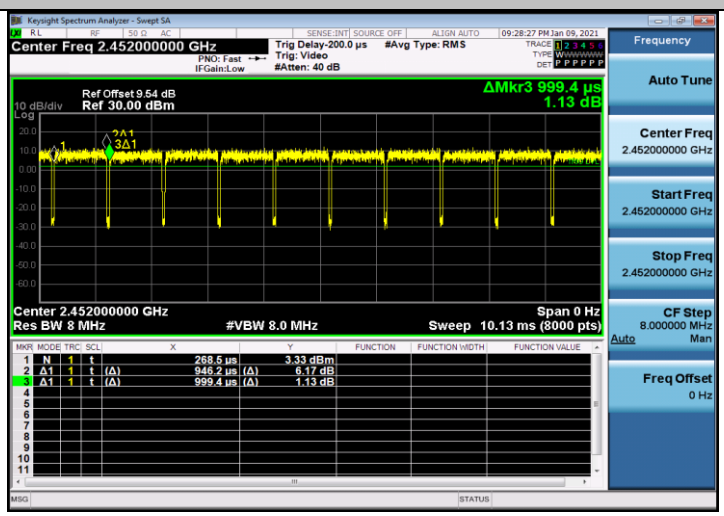


3.4 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units.

3.5 General Description of Applied Standards

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standard:

FCC Part 15, Subpart C (15.247)

KDB 558074 D01 DTS Meas Guidance v05r02

ANSI C63.10:2013

All relaxed test items have been performed and recorded as per the above standard.

4 Test Procedure and Results

4.1 AC Power Conducted Emission

4.1.1 Limits

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

Note: 1. The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

4.1.2 Test Procedures

a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.

b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

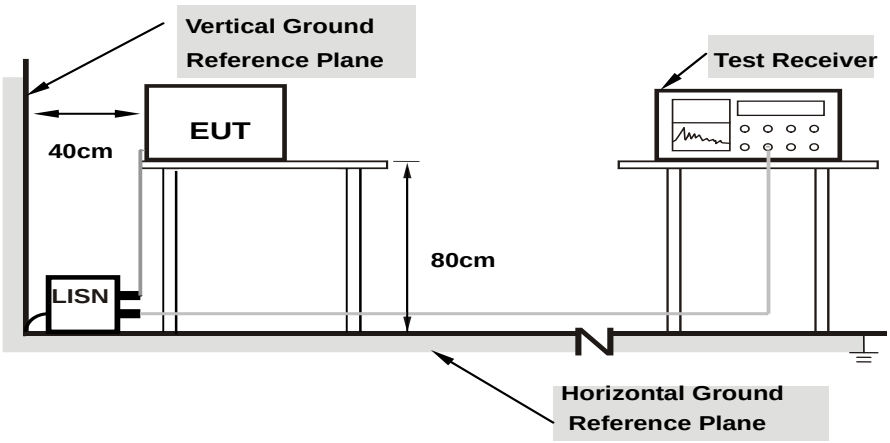
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

NOTE: The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.

4.1.3 Deviation from Test Standard

No deviation.

4.1.4 Test Setup



Note: 1.Support units were connected to second LISN.

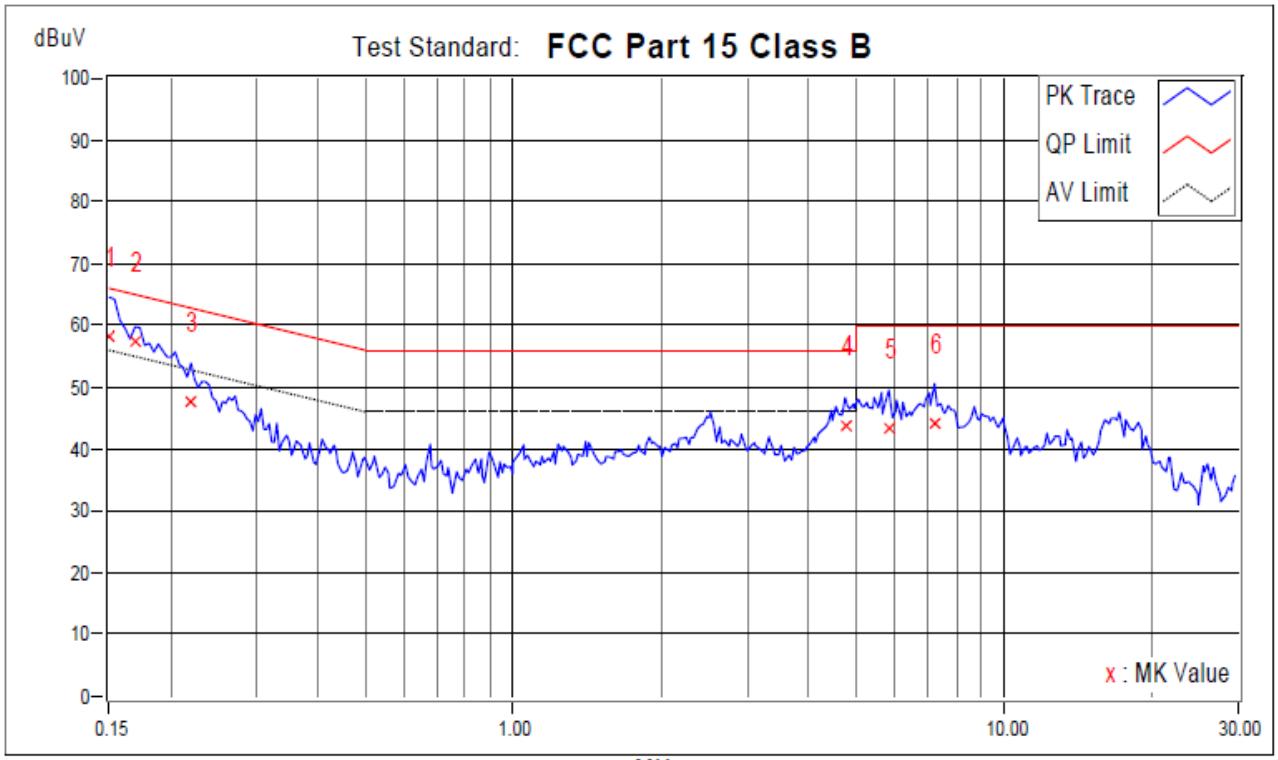
For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.1.5 EUT Operating Conditions

Same as 4.1.6.

4.1.6 Test Results

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Power supply	AC 120V, 60Hz		

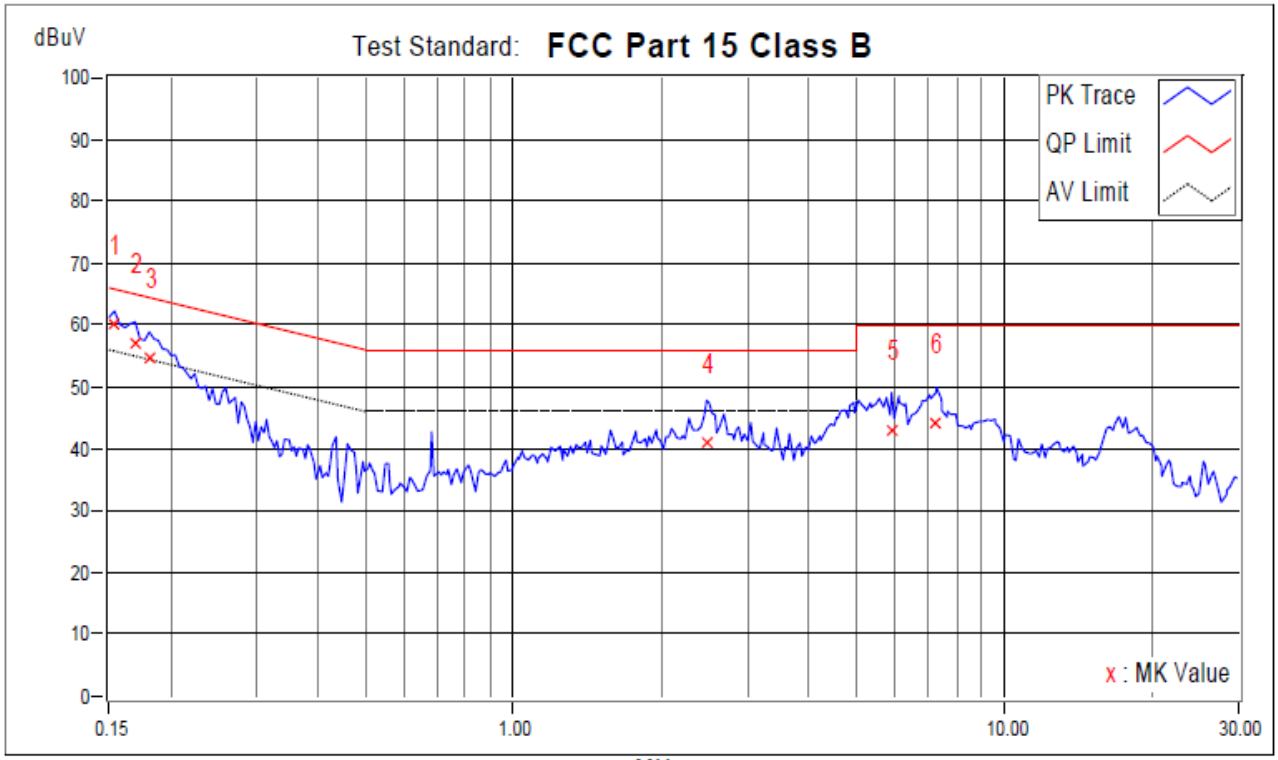


No.	Frequency MHz	Corr. Factor dB	Reading dBuV QP	Reading dBuV AV	Emission dBuV QP	Emission dBuV AV	Limit dBuV QP	Limit dBuV AV	Margins dB QP	Margins dB AV	Notes
1	0.15000	9.87	48.21	28.08	58.08	37.95	66.00	56.00	-7.92	-18.05	
+2	0.16955	9.88	47.37	27.90	57.25	37.78	64.98	54.98	-7.73	-17.20	
3	0.22038	9.86	37.74	19.30	47.60	29.16	62.80	52.80	-15.21	-23.65	
4	4.75360	10.05	33.82	26.52	43.87	36.57	56.00	46.00	-12.13	-9.43	
5	5.83667	10.13	33.09	22.85	43.22	32.98	60.00	50.00	-16.78	-17.02	
6	7.22863	10.22	33.80	23.44	44.02	33.66	60.00	50.00	-15.98	-16.34	

REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Power supply	AC 120V, 60Hz		

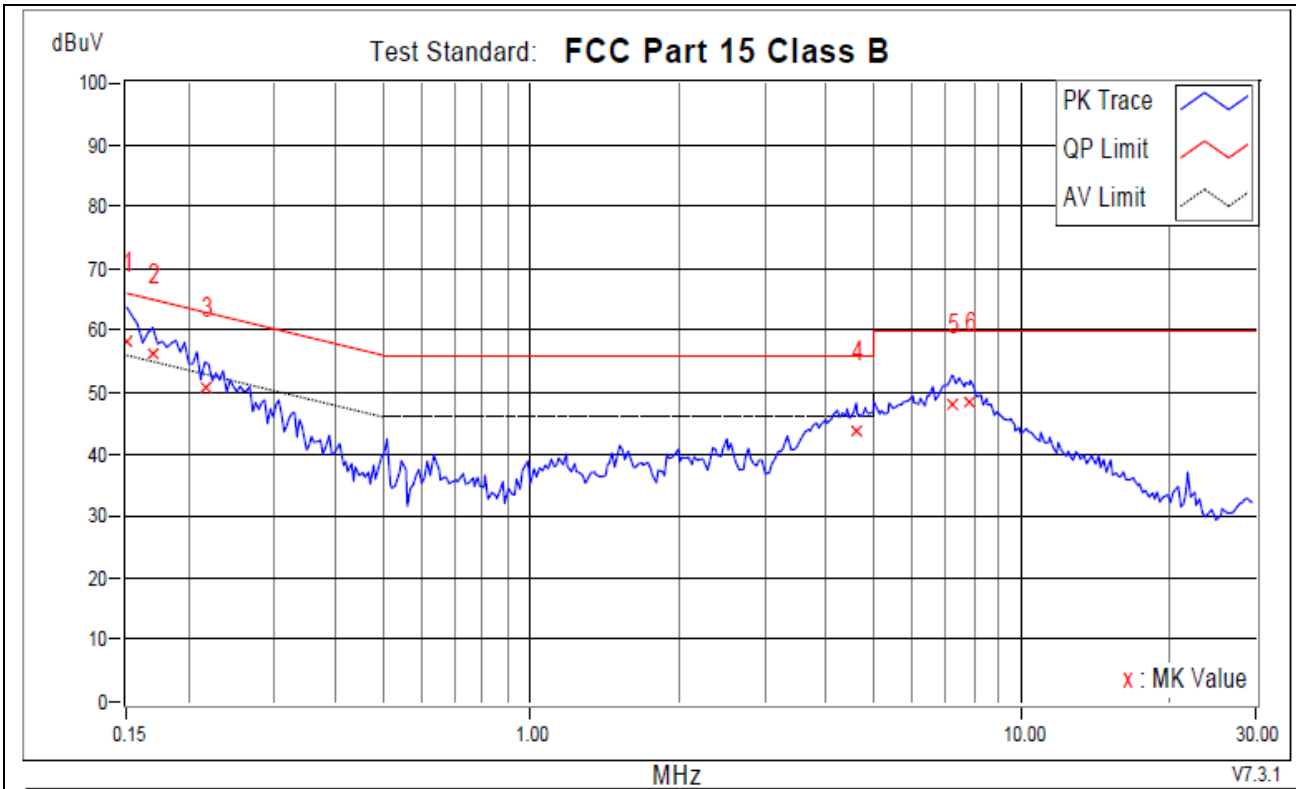


No.	Frequency MHz	Corr. Factor dB	Reading dBuV QP	Reading dBuV AV	Emission dBuV QP	Emission dBuV AV	Limit dBuV QP	Limit dBuV AV	Margins dB QP	Margins dB AV	Notes
+1	0.15391	9.88	50.13	29.86	60.01	39.74	65.79	55.79	-5.78	-16.05	
2	0.16955	9.86	47.19	28.24	57.05	38.10	64.98	54.98	-7.93	-16.88	
3	0.18128	9.85	44.66	25.08	54.51	34.93	64.43	54.43	-9.92	-19.50	
4	2.47798	10.00	31.19	23.83	41.19	33.83	56.00	46.00	-14.81	-12.17	
5	5.90705	9.94	33.06	22.88	43.00	32.82	60.00	50.00	-17.00	-17.18	
6	7.26773	10.21	33.80	23.33	44.01	33.54	60.00	50.00	-15.99	-16.46	

REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Power supply	AC 240V, 50Hz		

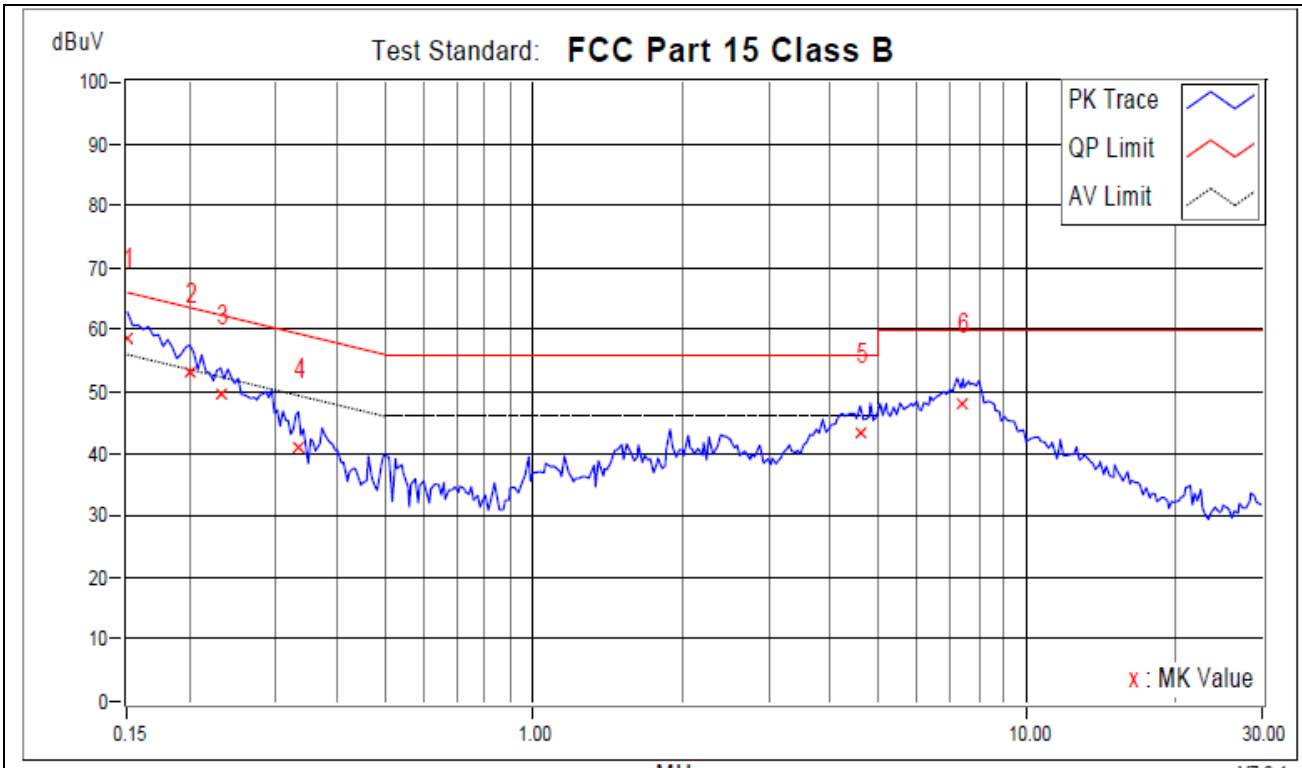


	Frequency	Corr. Factor	Reading dBuV		Emission dBuV		Limit dBuV		Margins dB		Notes
No.	MHz	dB	QP	AV	QP	AV	QP	AV	QP	AV	
+1	0.15000	9.87	48.33	26.23	58.20	36.10	66.00	56.00	-7.80	-19.90	
2	0.16955	9.88	46.25	25.26	56.13	35.14	64.98	54.98	-8.85	-19.84	
3	0.21647	9.86	40.75	24.12	50.61	33.98	62.95	52.95	-12.34	-18.97	
4	4.61675	10.03	33.87	23.49	43.90	33.52	56.00	46.00	-12.10	-12.48	
5	7.22863	10.22	37.91	29.38	48.13	39.60	60.00	50.00	-11.87	-10.40	
6	7.88160	10.26	38.32	29.64	48.58	39.90	60.00	50.00	-11.42	-10.10	

REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Power supply	AC 240V, 50Hz		



No.	Frequency MHz	Corr. Factor dB	Reading dBuV QP	Reading dBuV AV	Emission dBuV QP	Emission dBuV AV	Limit dBuV QP	Limit dBuV AV	Margins dB QP	Margins dB AV	Notes
+1	0.15000	9.88	48.75	28.50	58.63	38.38	66.00	56.00	-7.37	-17.62	
2	0.20083	9.83	43.27	24.95	53.10	34.78	63.58	53.58	-10.48	-18.80	
3	0.23211	9.85	39.71	23.27	49.56	33.12	62.37	52.37	-12.81	-19.25	
4	0.33377	9.90	31.30	18.63	41.20	28.53	59.36	49.36	-18.16	-20.83	
5	4.60502	9.79	33.57	23.26	43.36	33.05	56.00	46.00	-12.64	-12.95	
6	7.43977	10.22	37.64	28.56	47.86	38.78	60.00	50.00	-12.14	-11.22	

REMARKS:

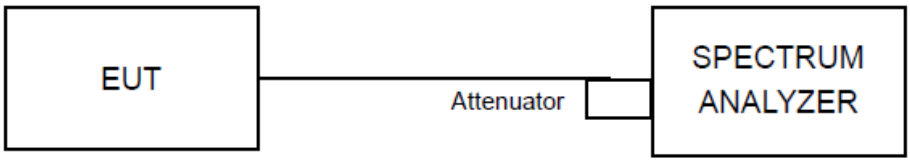
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

4.2 Minimum 6dB Bandwidth

4.2.1 Limit

For digital modulation systems, the minimum 6dB bandwidth shall be at least 500 kHz

4.2.2 Test Setup



4.2.3 Test Procedures

The EUT was tested according to DTS test procedure of “KDB558074 D01 DTS Meas Guidance” for compliance to FCC 47CFR 15.247 requirements (clause 8.2).

The automatic bandwidth measurement capability of an instrument may be employed using the X dB bandwidth mode with X set to 6 dB, if the functionality described above (i.e., RBW = 100 kHz, VBW $\geqslant$ 3 RBW, peak detector with maximum hold) is implemented by the instrumentation function.

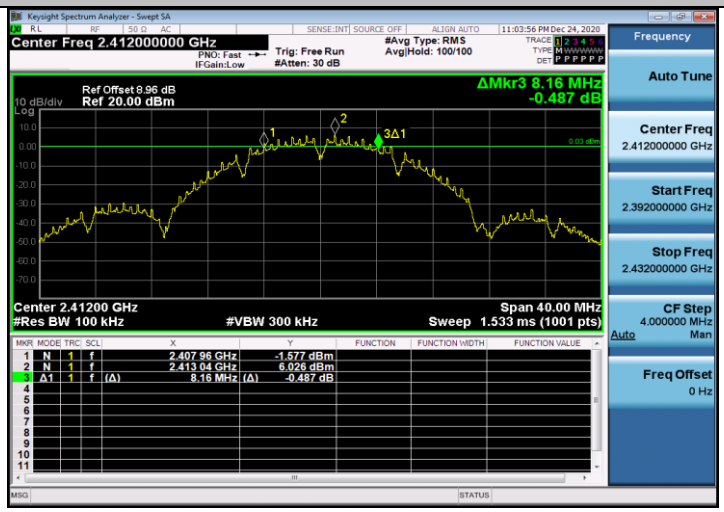
4.2.4 Deviation of Test Standard

No deviation.

4.2.5 Test Results

The test result refer to the report FVC-ESH-P20112379B-13.

Test Mode	Antenna	Channel [MHz]	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	8.160	2407.960	2416.120	>=0.5	PASS
	Ant2	2412	8.160	2407.920	2416.080	>=0.5	PASS
	Ant1	2437	7.680	2432.960	2440.640	>=0.5	PASS
	Ant2	2437	8.640	2432.920	2441.560	>=0.5	PASS
	Ant1	2462	9.120	2457.960	2467.080	>=0.5	PASS
	Ant2	2462	9.160	2457.440	2466.600	>=0.5	PASS
11G	Ant1	2412	16.480	2403.720	2420.200	>=0.5	PASS
	Ant2	2412	16.400	2403.800	2420.200	>=0.5	PASS
	Ant1	2437	16.400	2428.800	2445.200	>=0.5	PASS
	Ant2	2437	16.400	2428.800	2445.200	>=0.5	PASS
	Ant1	2462	16.440	2453.800	2470.240	>=0.5	PASS
	Ant2	2462	16.440	2453.800	2470.240	>=0.5	PASS
11N20MIMO	Ant1	2412	17.680	2403.160	2420.840	>=0.5	PASS
	Ant2	2412	17.680	2403.160	2420.840	>=0.5	PASS
	Ant1	2437	17.280	2428.160	2445.440	>=0.5	PASS
	Ant2	2437	17.640	2428.200	2445.840	>=0.5	PASS
	Ant1	2462	17.680	2453.200	2470.880	>=0.5	PASS
	Ant2	2462	17.600	2453.240	2470.840	>=0.5	PASS
11N40MIMO	Ant1	2422	36.080	2404.160	2440.240	>=0.5	PASS
	Ant2	2422	35.440	2404.800	2440.240	>=0.5	PASS
	Ant1	2437	35.280	2419.400	2454.680	>=0.5	PASS
	Ant2	2437	35.520	2419.160	2454.680	>=0.5	PASS
	Ant1	2452	35.920	2433.760	2469.680	>=0.5	PASS
	Ant2	2452	36.480	2433.760	2470.240	>=0.5	PASS

11B_Ant1_2412

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11B_Ant1_2437

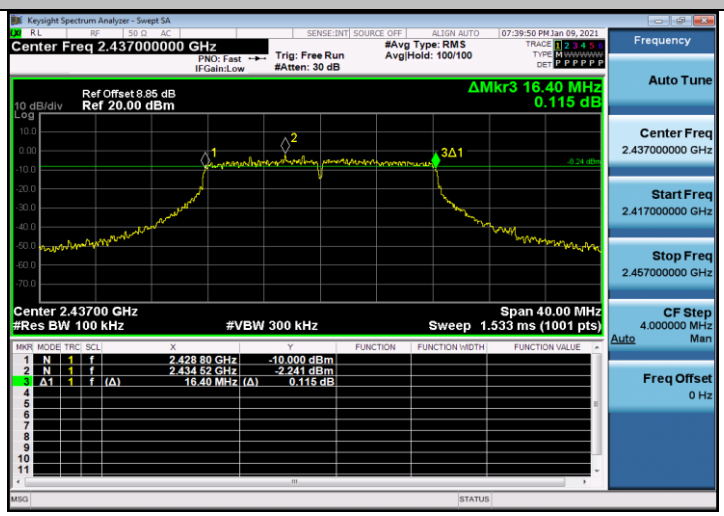

11B_Ant2_2437


11B_Ant1_2462


11B_Ant2_2462


11G_Ant1_2412

11G_Ant2_2412

11G_Ant1_2437


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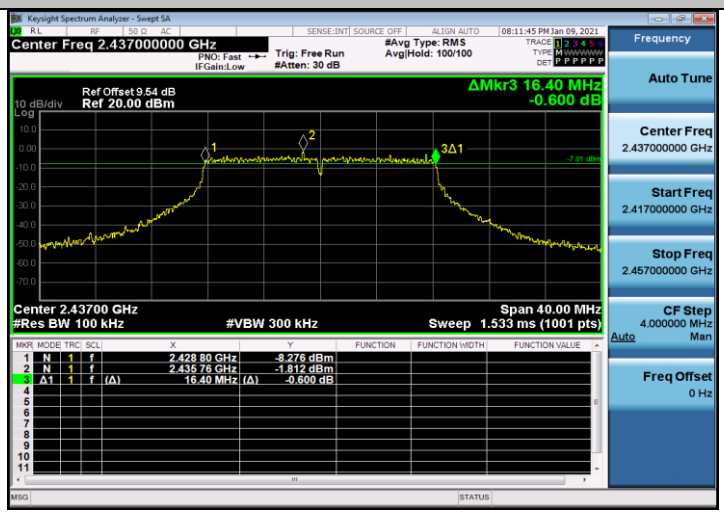
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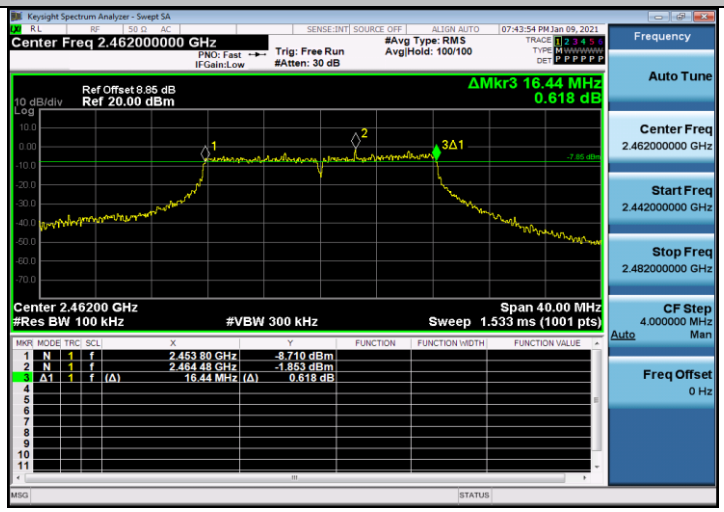
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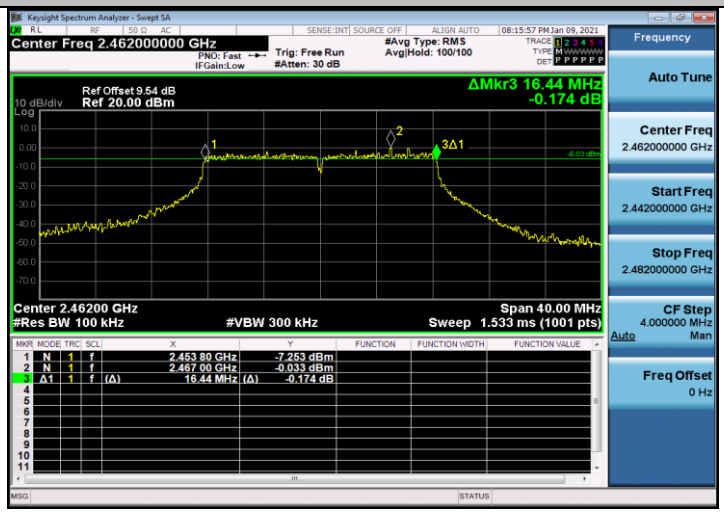

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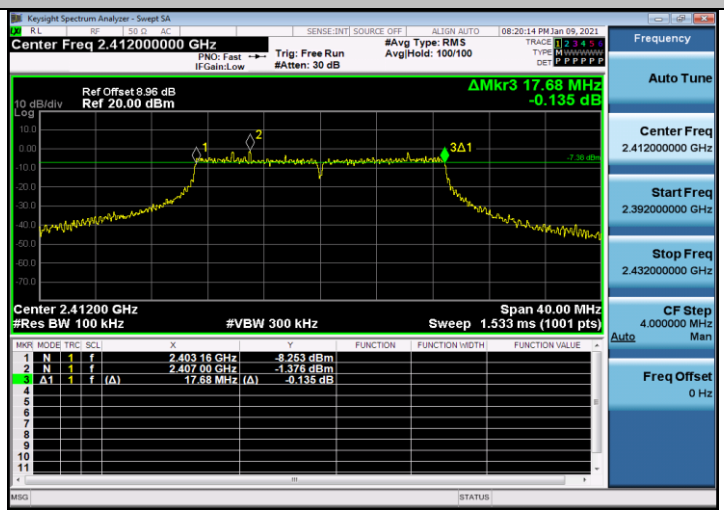

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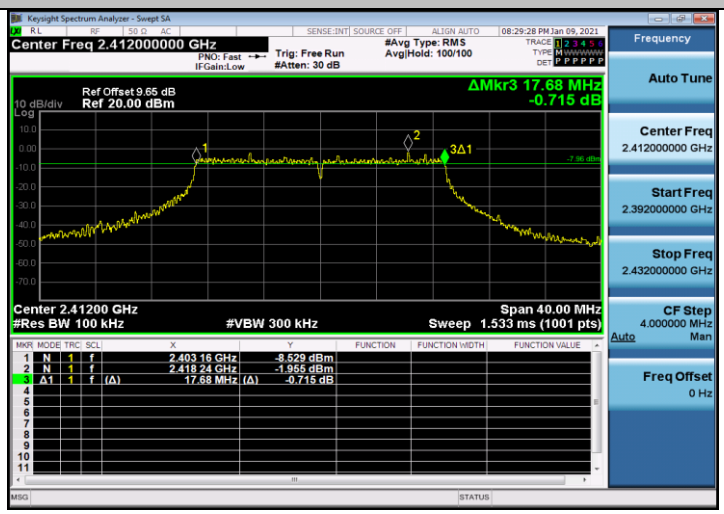

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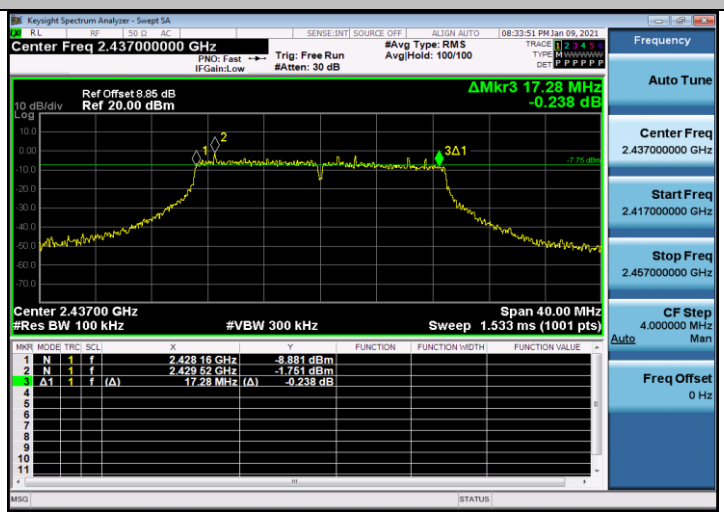

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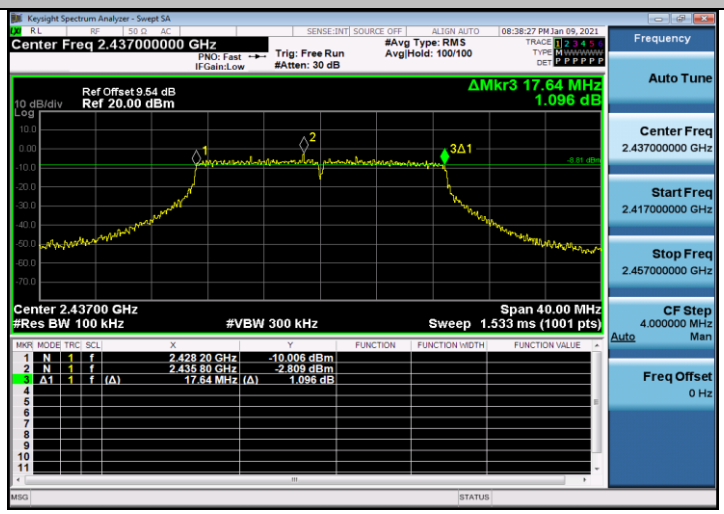
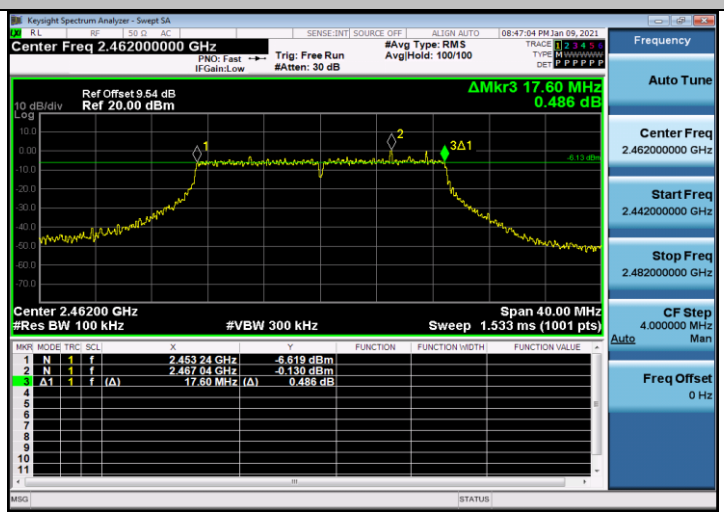


11N20MIMO_Ant1_2462


11N20MIMO_Ant2_2462


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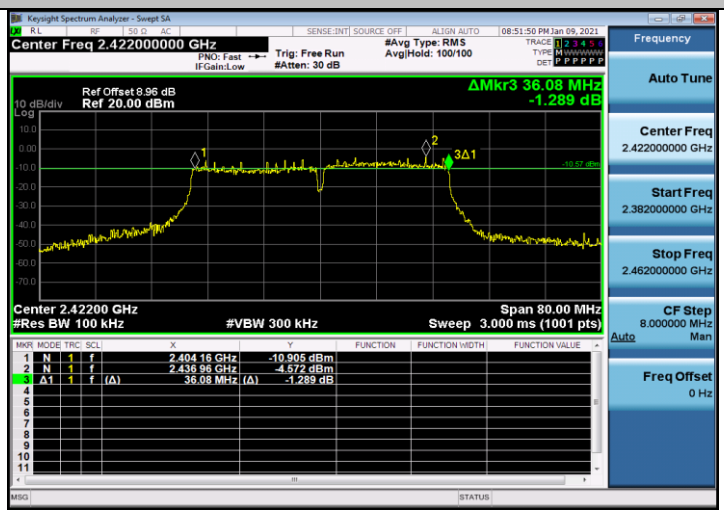

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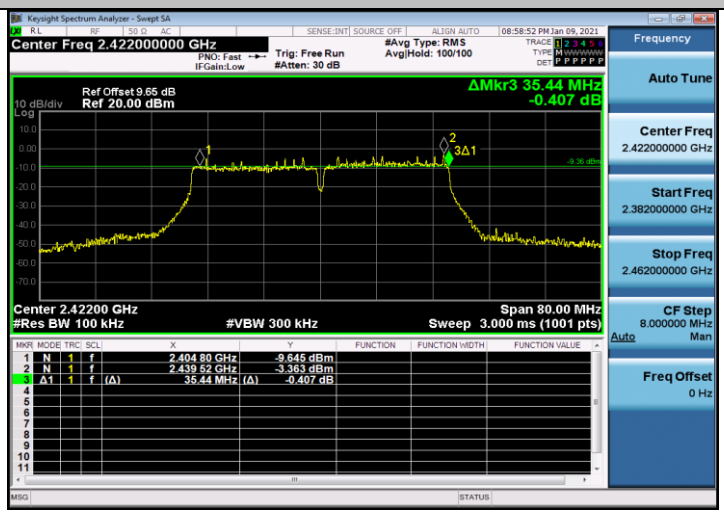

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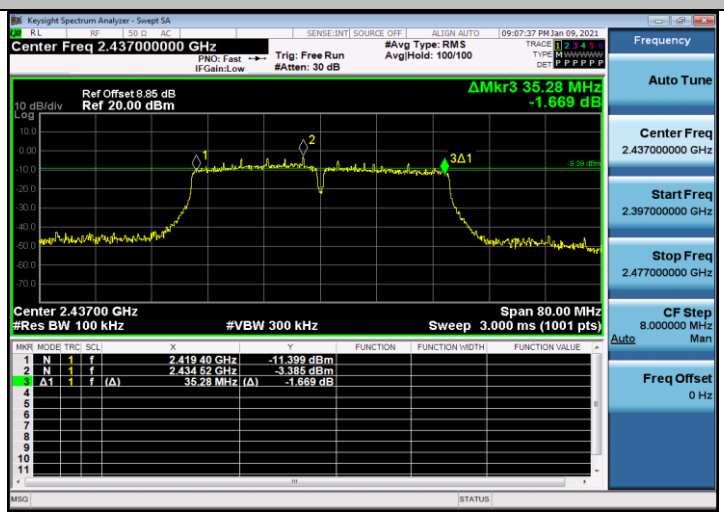

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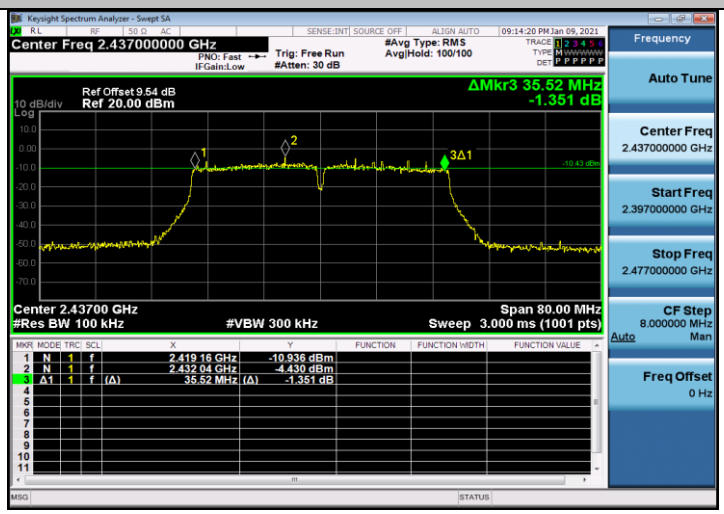

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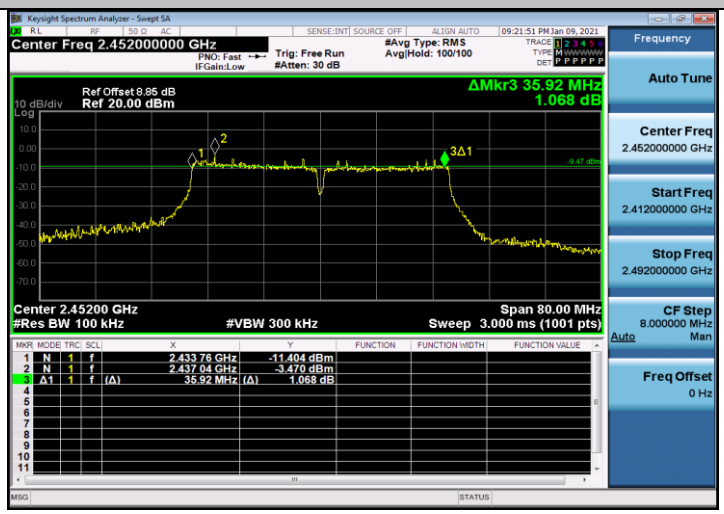

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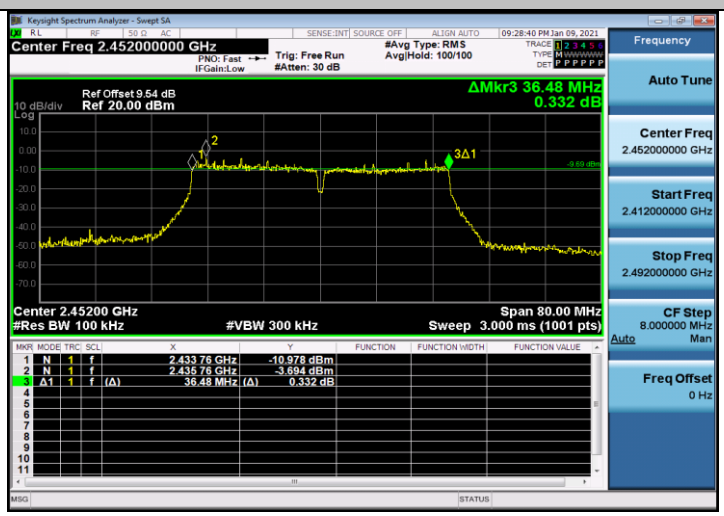
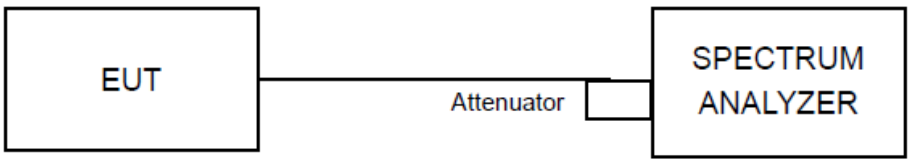


4.3 Conducted Output Power

4.3.1 Limit

For systems using digital modulation in the 2400 – 2483.5 MHz bands: 1 Watt (30 dBm)

4.3.2 Test Setup



4.3.3 Test Procedures

The EUT was tested according to DTS test procedure of “KDB558074 D01 DTS Meas Guidance” for compliance to FCC 47CFR 15.247 requirements (clause 9.2.2.4).

a) Measure the duty cycle, x, of the transmitter output signal as described in Section 6.0.

b) Set span to at least 1.5 OBW.

c) Set RBW = 1 % to 5 % of the OBW, not to exceed 1 MHz.

d) Set VBW $\geqslant$ 3 RBW.

e) Number of points in sweep $\geqslant$ 2 span / RBW. (This gives bin-to-bin spacing $\leqslant$ RBW/2, so that narrowband signals are not lost between frequency bins.)

f) Sweep time = auto.

g) Detector = RMS (i.e., power averaging), if available. Otherwise, use sample detector mode.

h) Do not use sweep triggering. Allow the sweep to “free run”.

i) Trace average at least 100 traces in power averaging (i.e., RMS) mode; however, the number of traces to be averaged shall be increased above 100 as needed such that the average accurately represents the true average over the on and off periods of the transmitter.

j) Compute power by integrating the spectrum across the OBW of the signal using the instrument’s band power measurement function with band limits set equal to the OBW band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.

k) Add 10 log (1/x), where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times (because the measurement represents an average over both the on- and off-times of the transmission). For example, add 10 log (1/0.25) = 6 dB if the duty cycle is 25 %.

4.3.4 Deviation of Test Standard

No deviation.