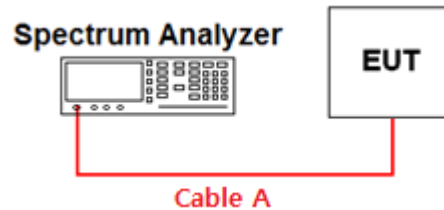


6.4. SPURIOUS EMISSION AT ANTENNA TERMINAL

Test Configuration



Test Procedure

- KDB971168 D01v03r01 - Section 6
- ANSI C63.26-2015 – Section 5.7

Test setting

- 1) RBW = 1 MHz
- 2) VBW $\geq 3 \times$ RBW
- 3) Detector = RMS & Trace mode = Max hold
- 4) Sweep time = Auto couple
- 5) Number of sweep point $\geq 2 \times$ span / RBW
- 6) The trace was allowed to stabilize

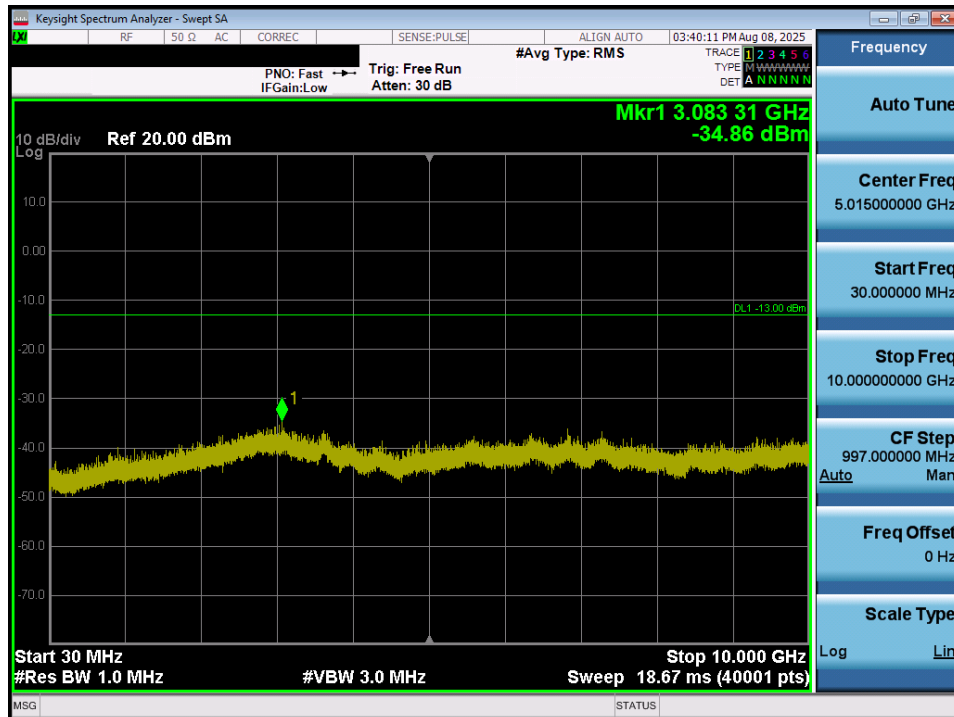
Limit

Part 25.202(f)

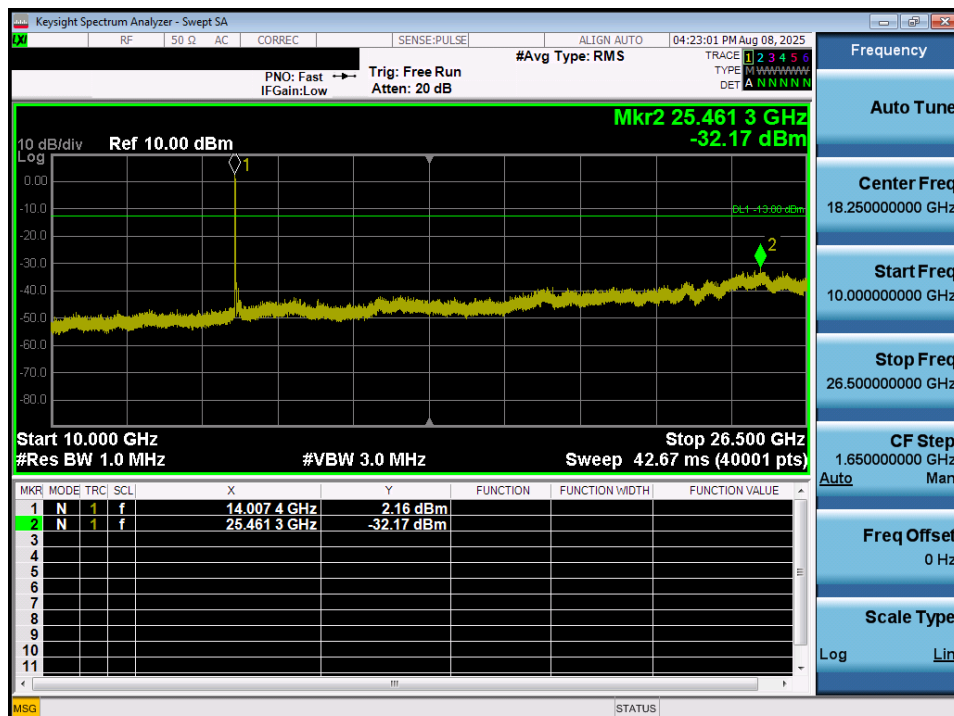
(f) *Emission limitations.* Except for SDARS terrestrial repeaters and as provided for in paragraph (i), the mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the schedule set forth in paragraphs (f)(1) through (f)(4) of this section. The out-of-band emissions of SDARS terrestrial repeaters shall be attenuated in accordance with the schedule set forth in paragraph (h) of this section.

- (1) In any 4 kHz band, the center frequency of which is removed from the assigned frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: 25 dB;
- (2) In any 4 kHz band, the center frequency of which is removed from the assigned frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: 35 dB;
- (3) In any 4 kHz band, the center frequency of which is removed from the assigned frequency by more than 250 percent of the authorized bandwidth: An amount equal to 43 dB plus 10 times the logarithm (to the base 10) of the transmitter power in watts;
- (4) In any event, when an emission outside of the authorized bandwidth causes harmful interference, the Commission may, at its discretion, require greater attenuation than specified in paragraphs (f) (1), (2) and (3) of this section.

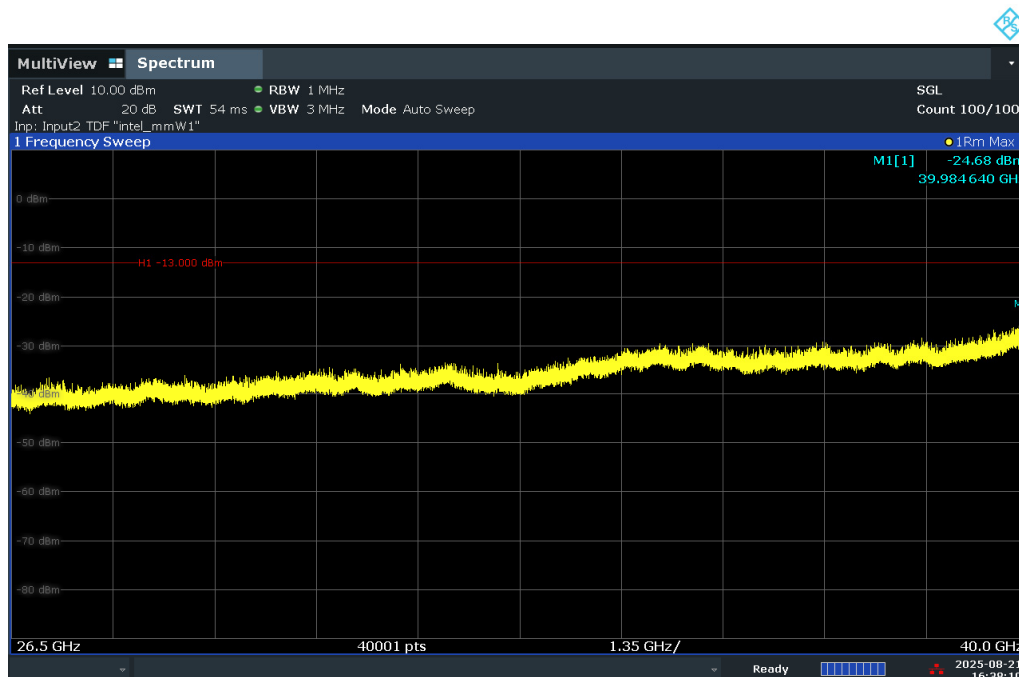
Test Results



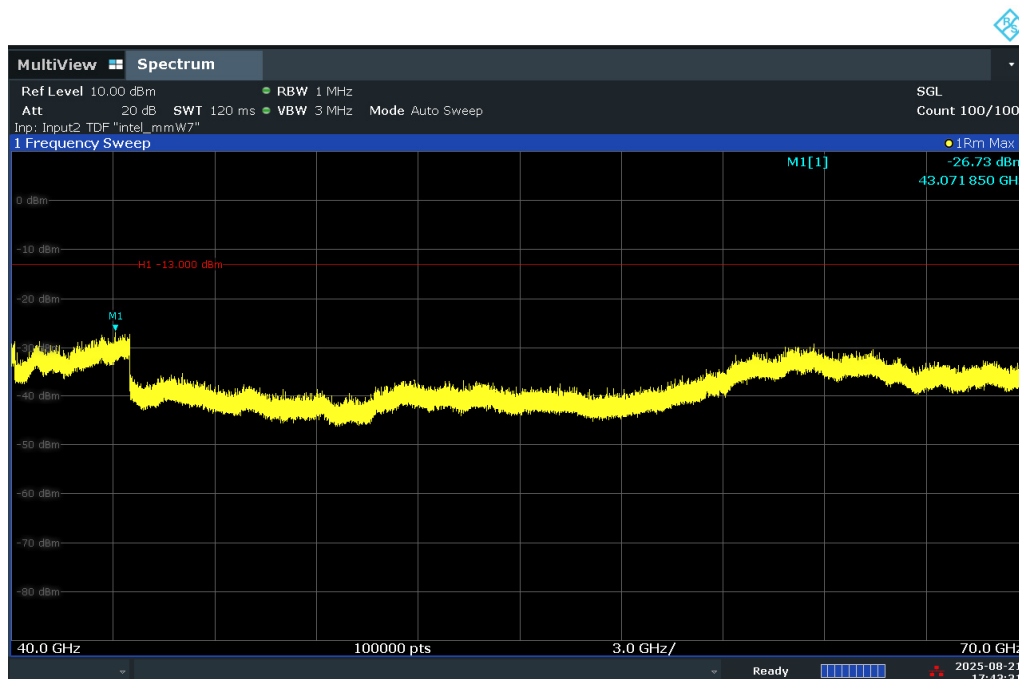
19.8 MHz / 16QAM / Lowest Channel



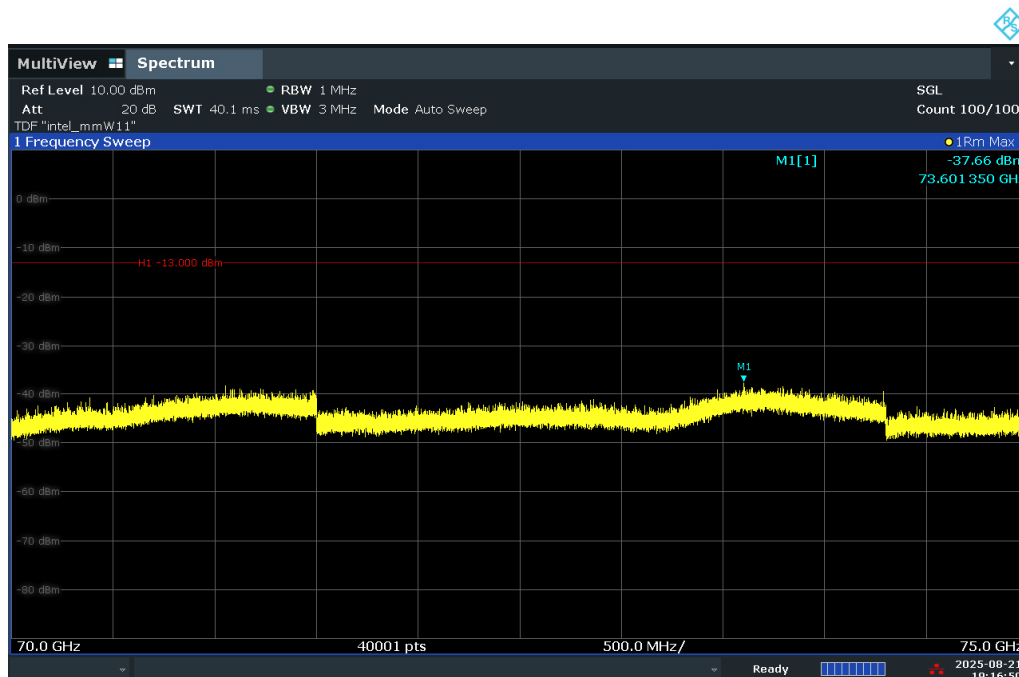
19.8 MHz / 16QAM / Lowest Channel



19.8 MHz / 16QAM / Lowest Channel

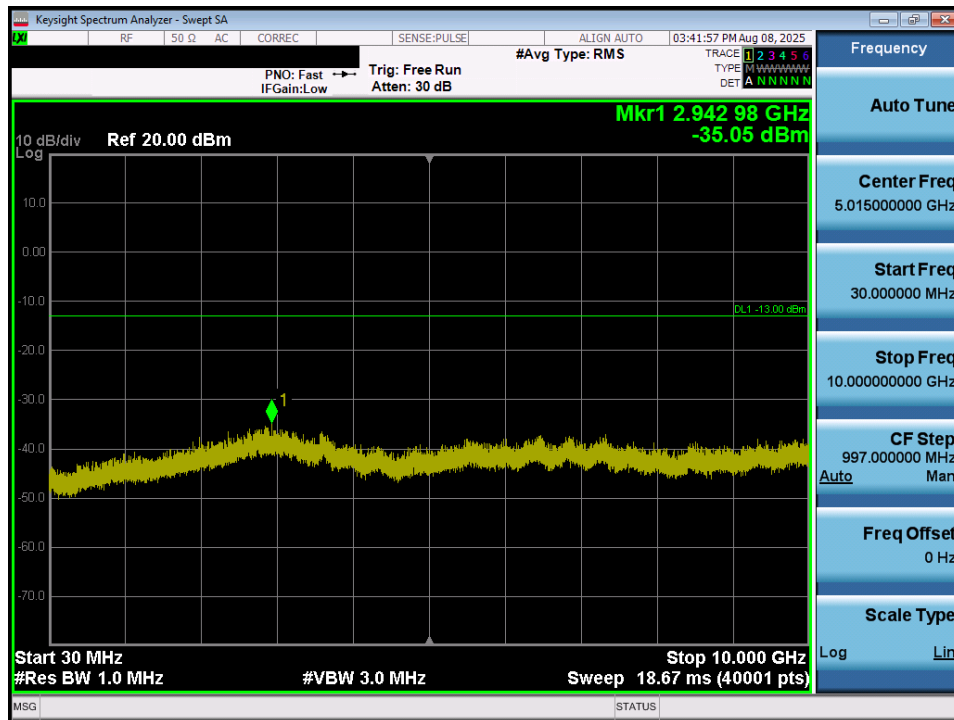


19.8 MHz / 16QAM / Lowest Channel

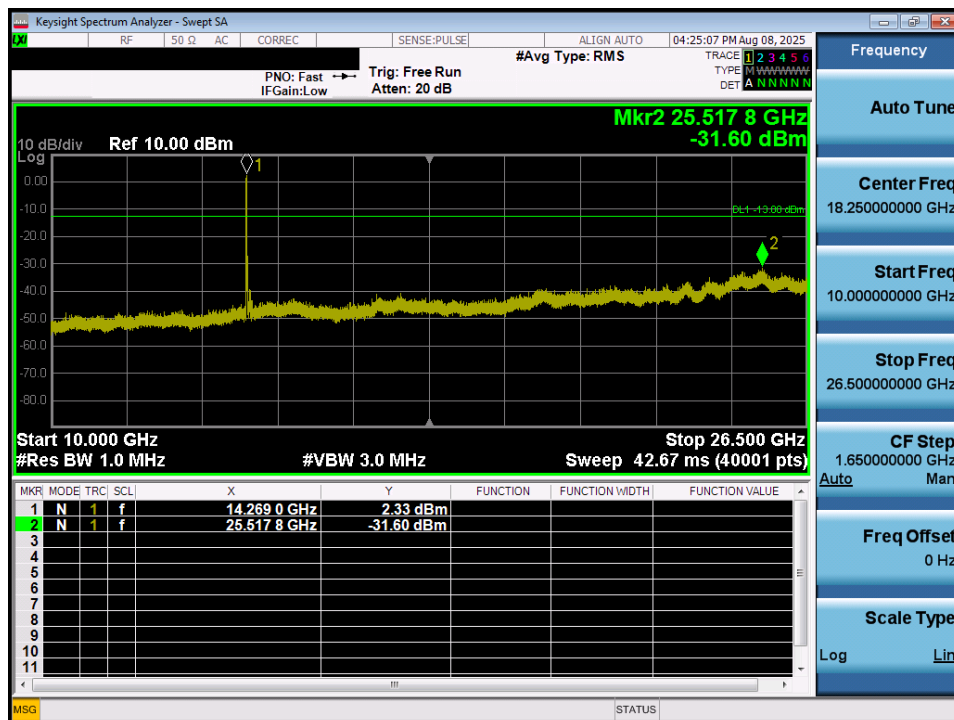


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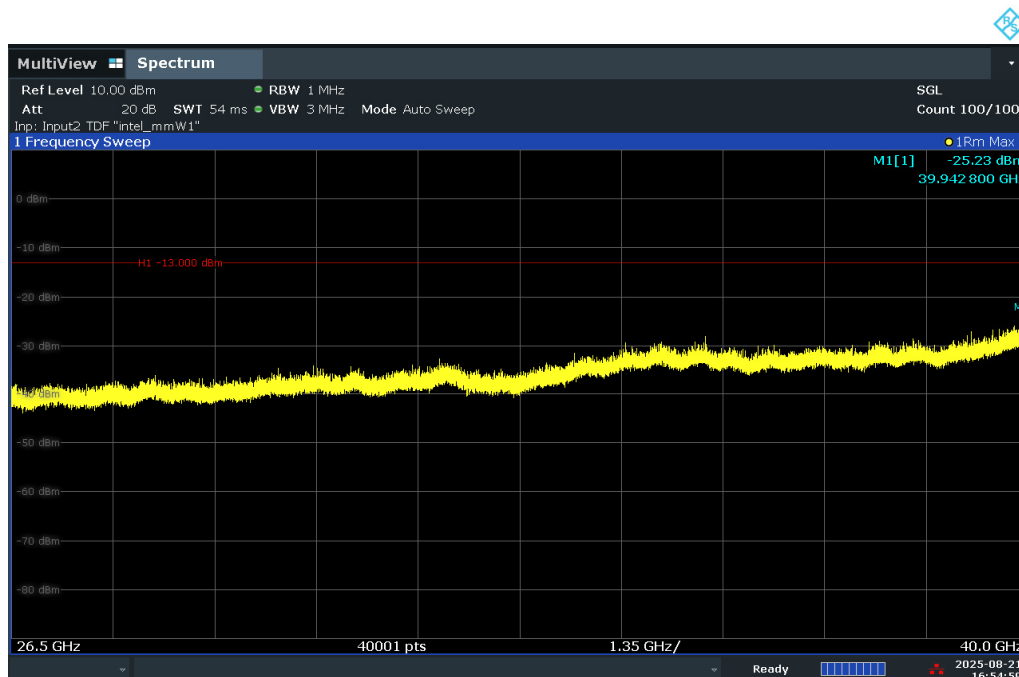
19.8 MHz / 16QAM / Lowest Channel



19.8 MHz / QPSK / Middle Channel

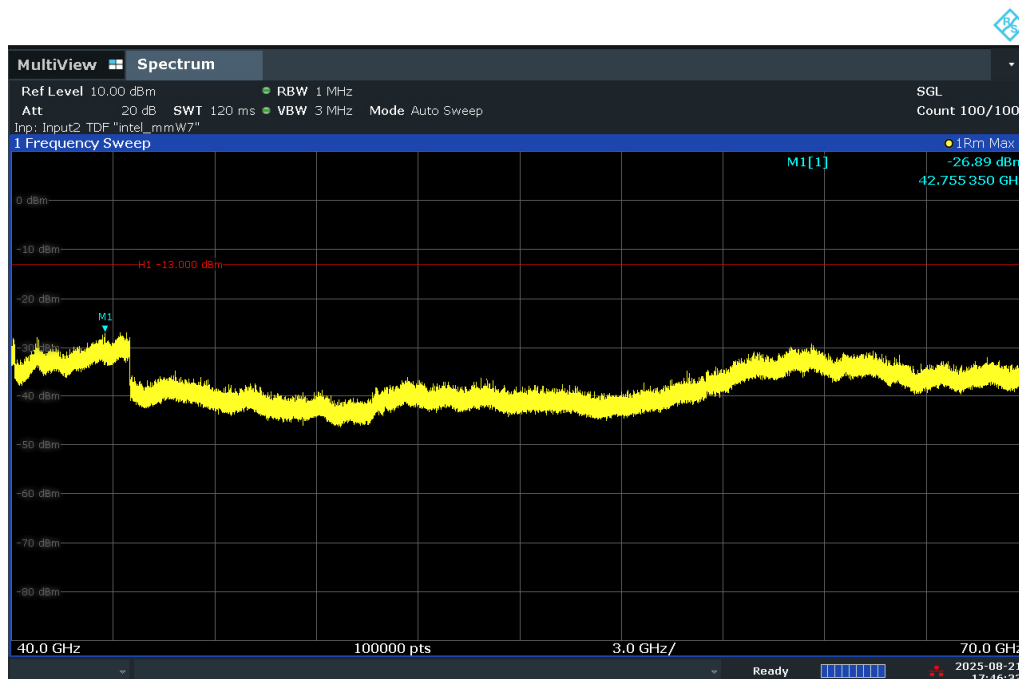


19.8 MHz / QPSK / Middle Channel



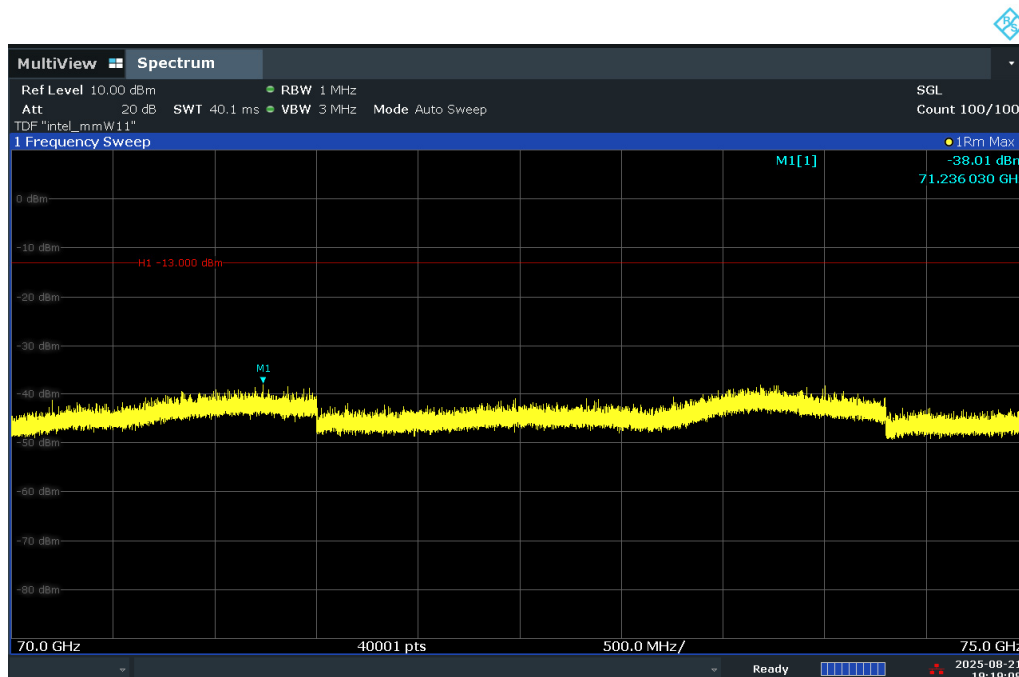
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19.8 MHz / QPSK / Middle Channel



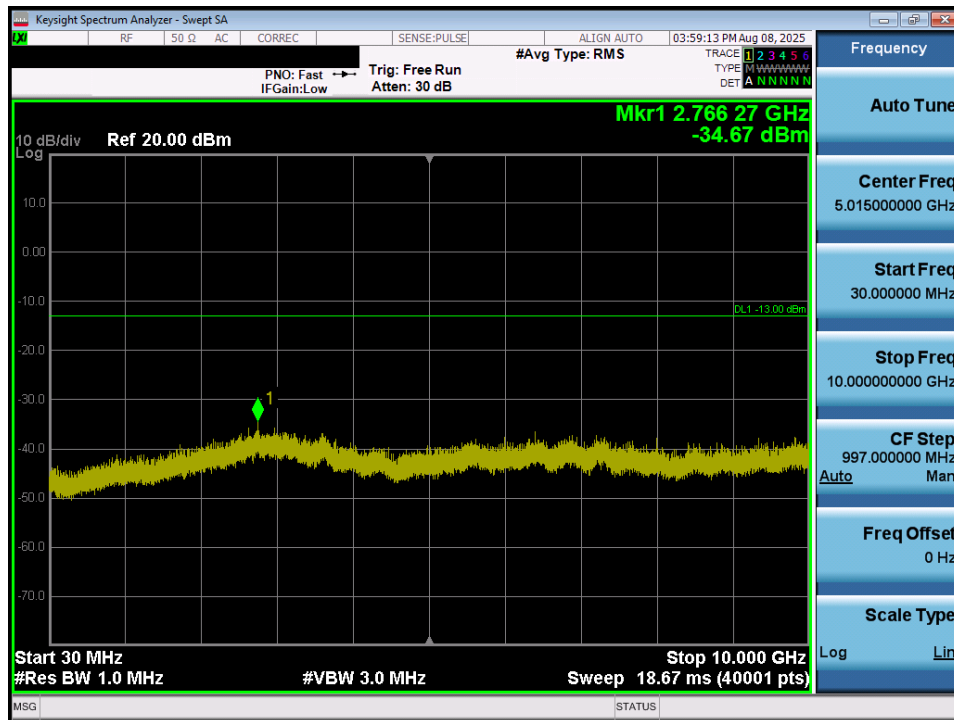
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19.8 MHz / QPSK / Middle Channel

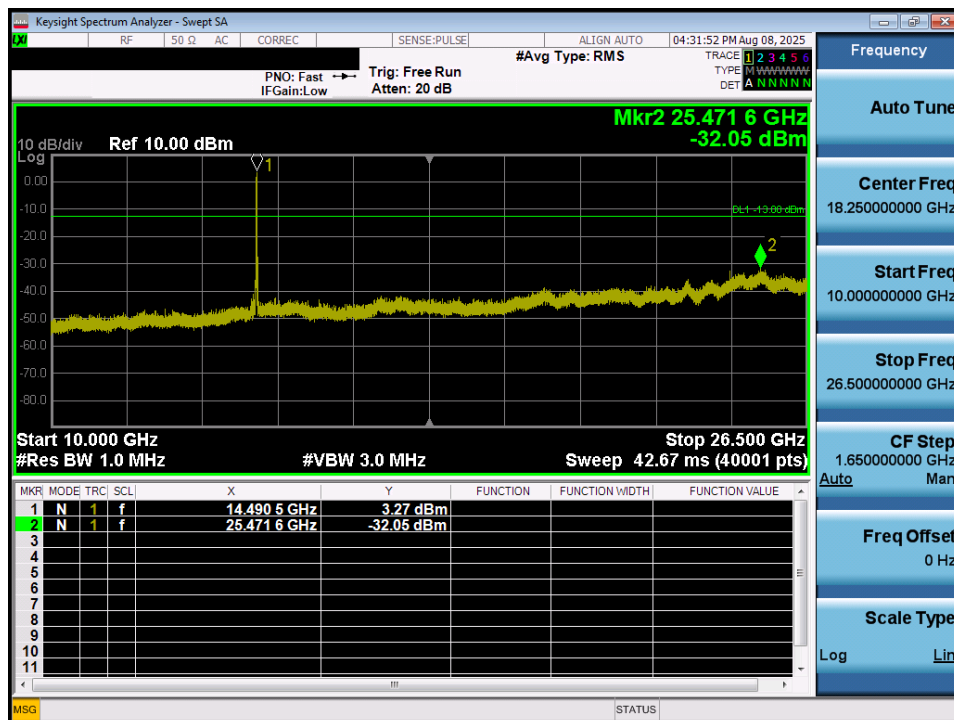


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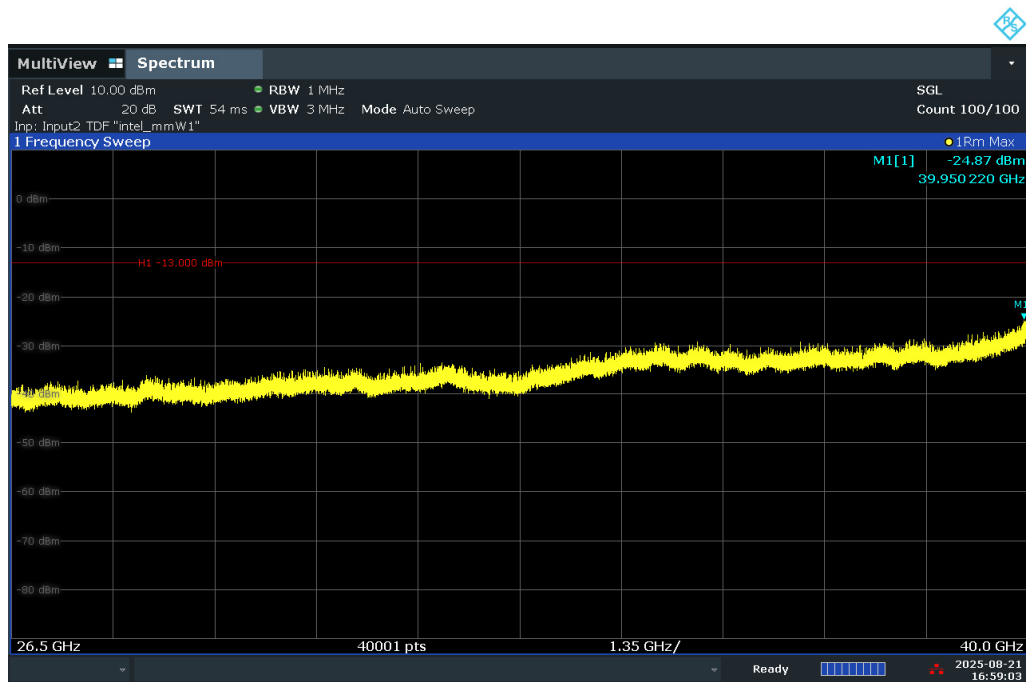
19.8 MHz / QPSK / Middle Channel



19.8 MHz / 16QAM / Highest Channel

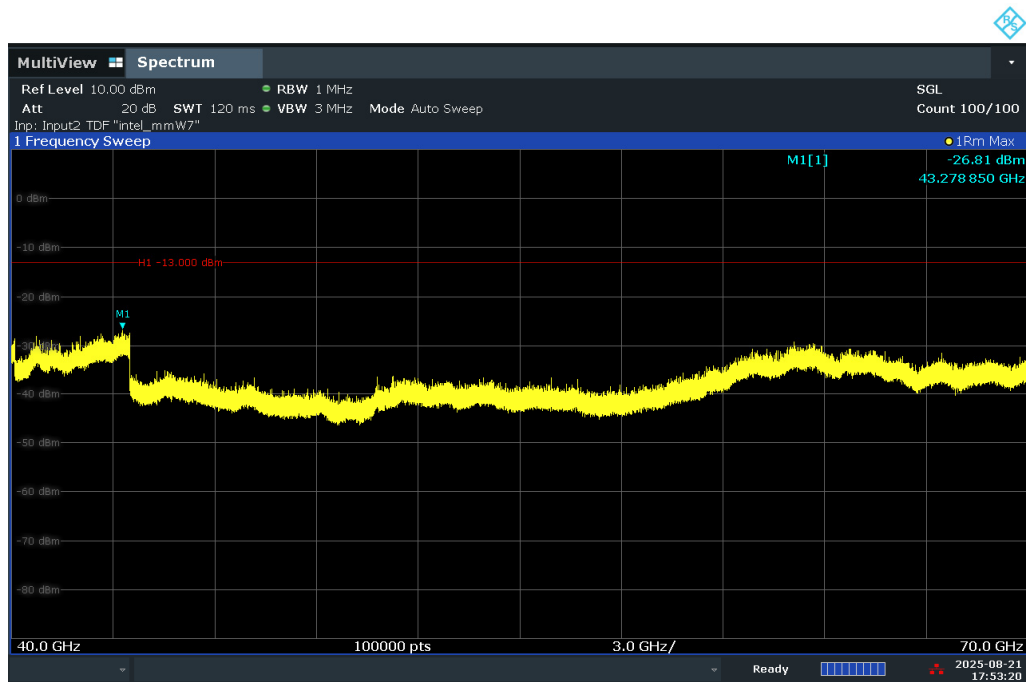


19.8 MHz / 16QAM / Highest Channel



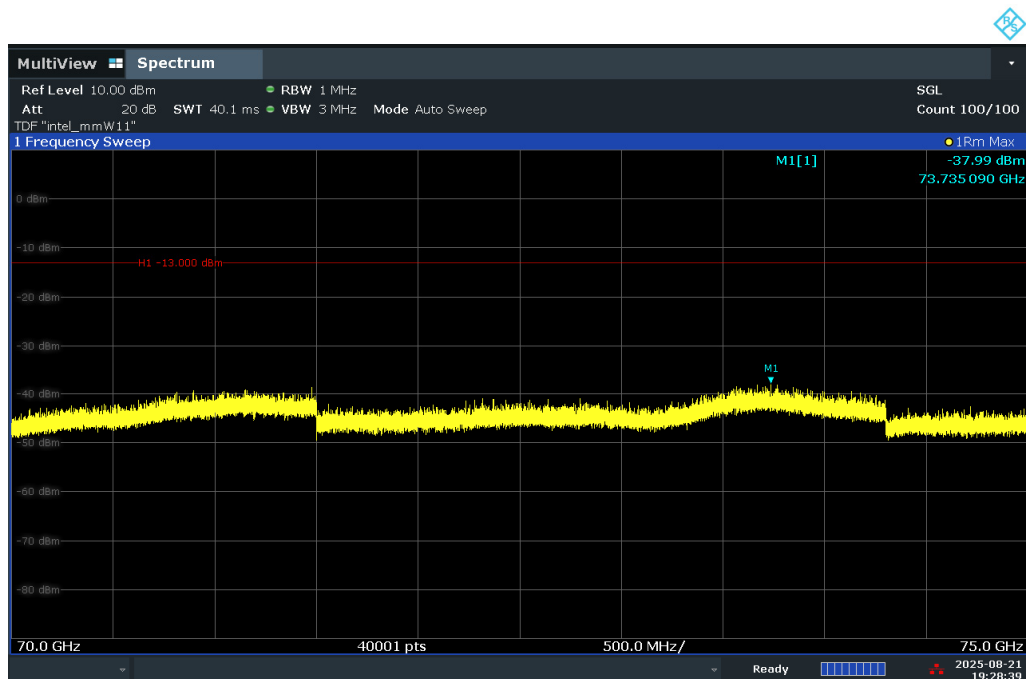
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19.8 MHz / 16QAM / Highest Channel



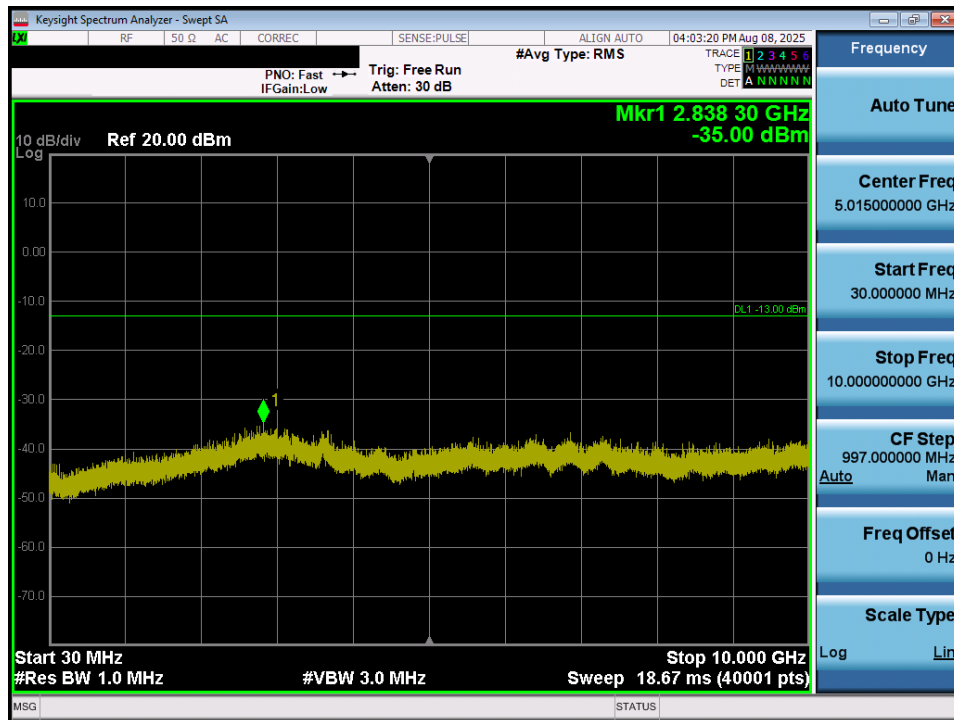
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19.8 MHz / 16QAM / Highest Channel

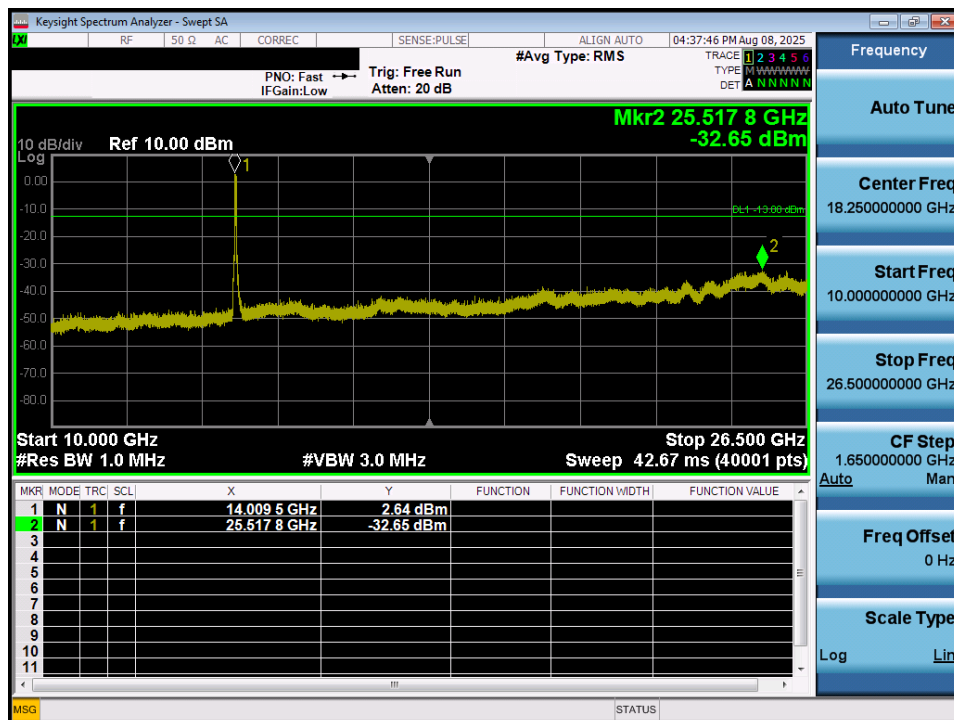


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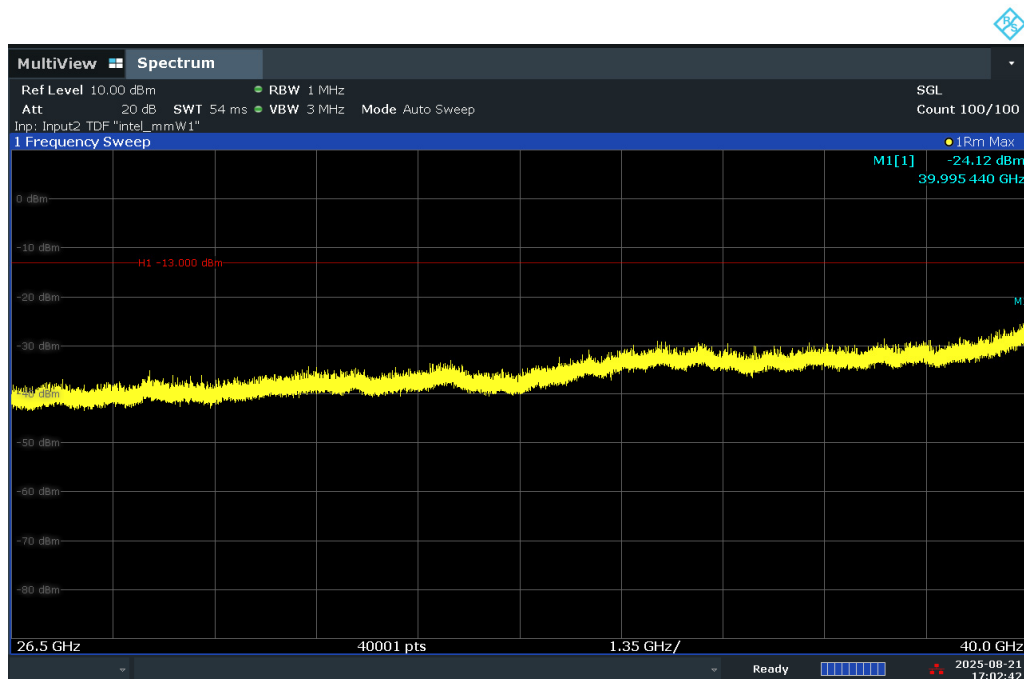
19.8 MHz / 16QAM / Highest Channel



39.6 MHz / 16QAM / Lowest Channel

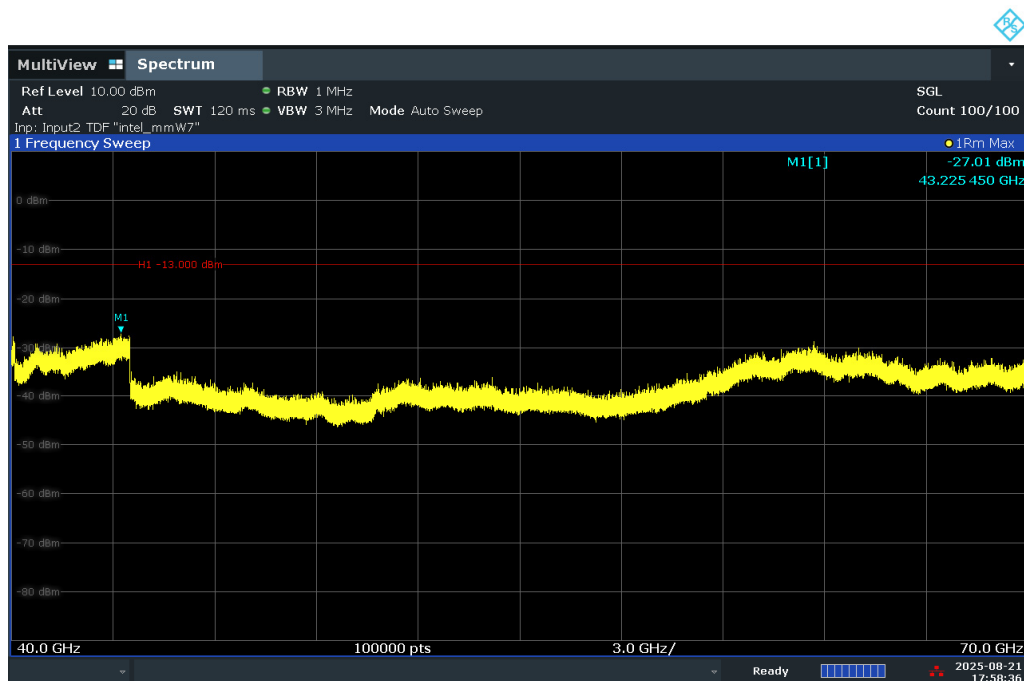


39.6 MHz / 16QAM / Lowest Channel



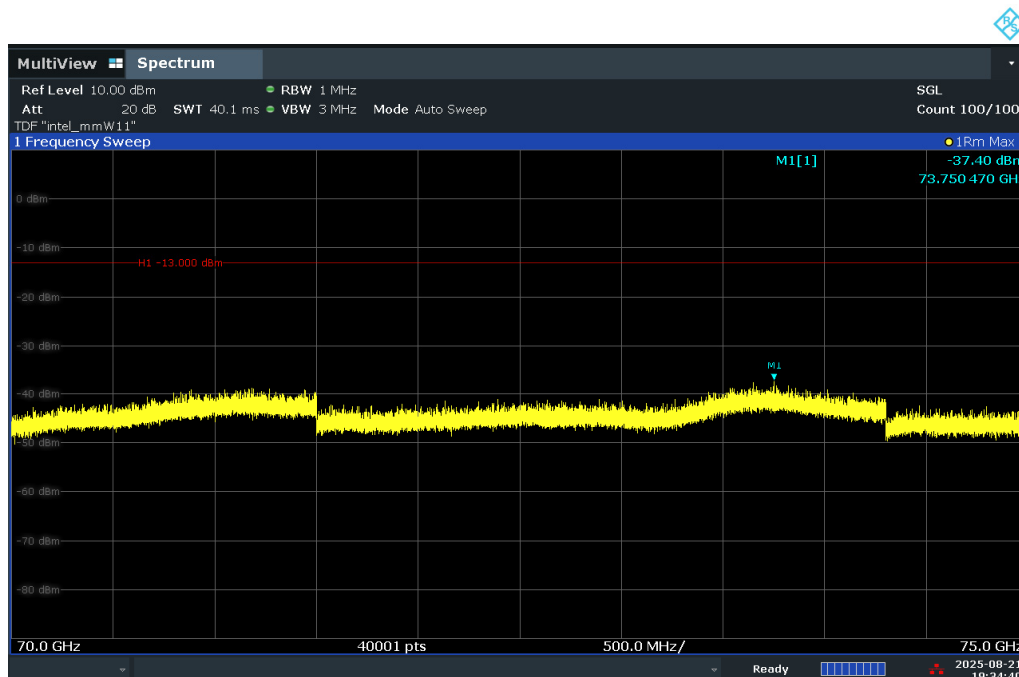
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39.6 MHz / 16QAM / Lowest Channel



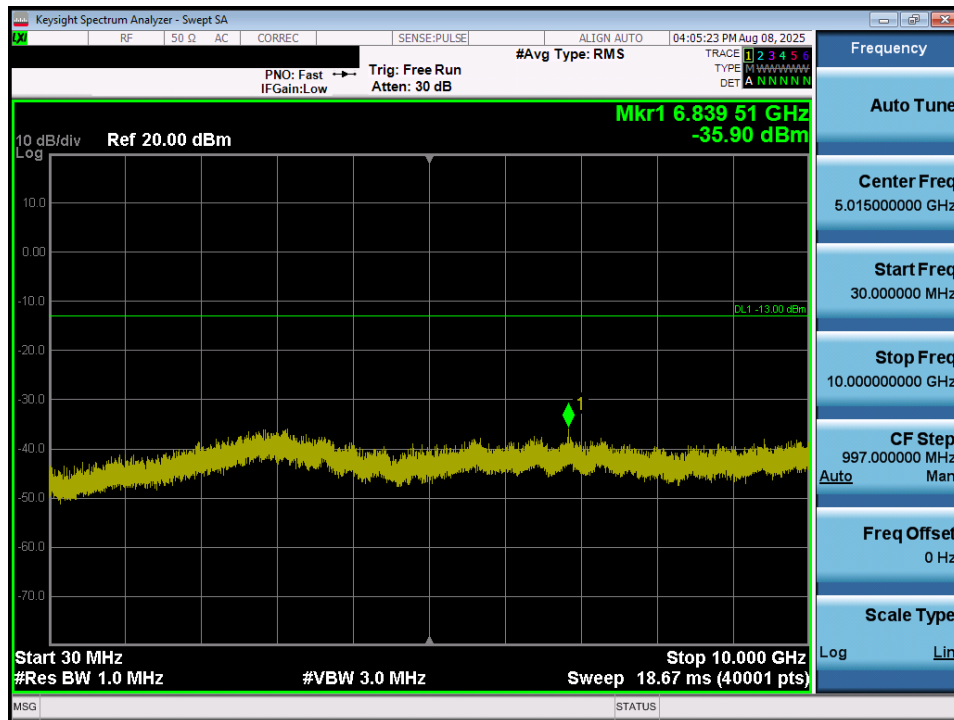
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39.6 MHz / 16QAM / Lowest Channel

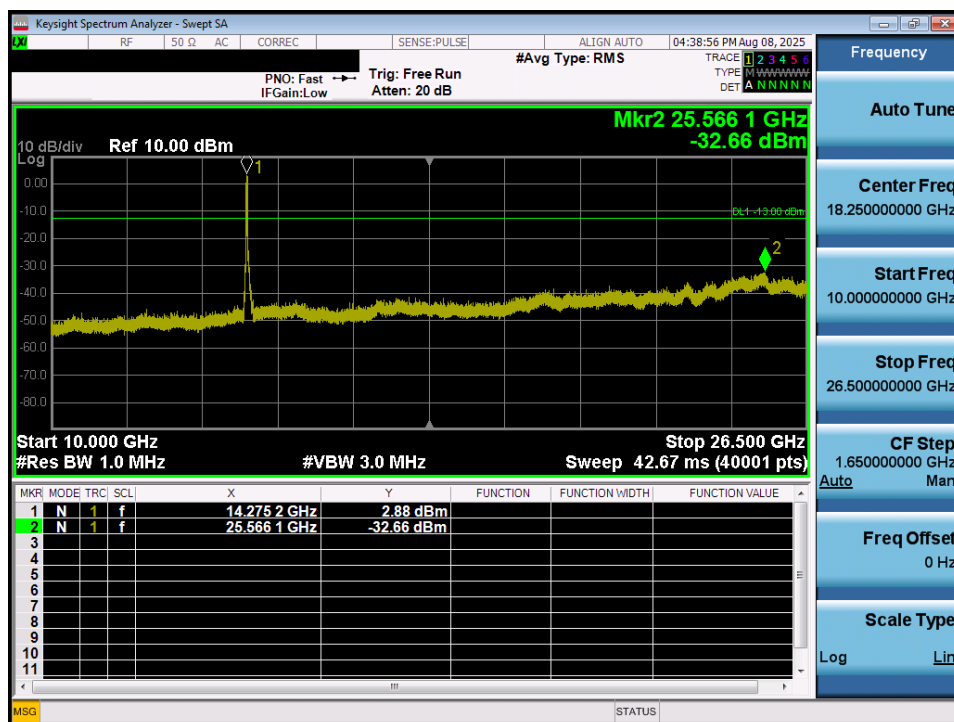


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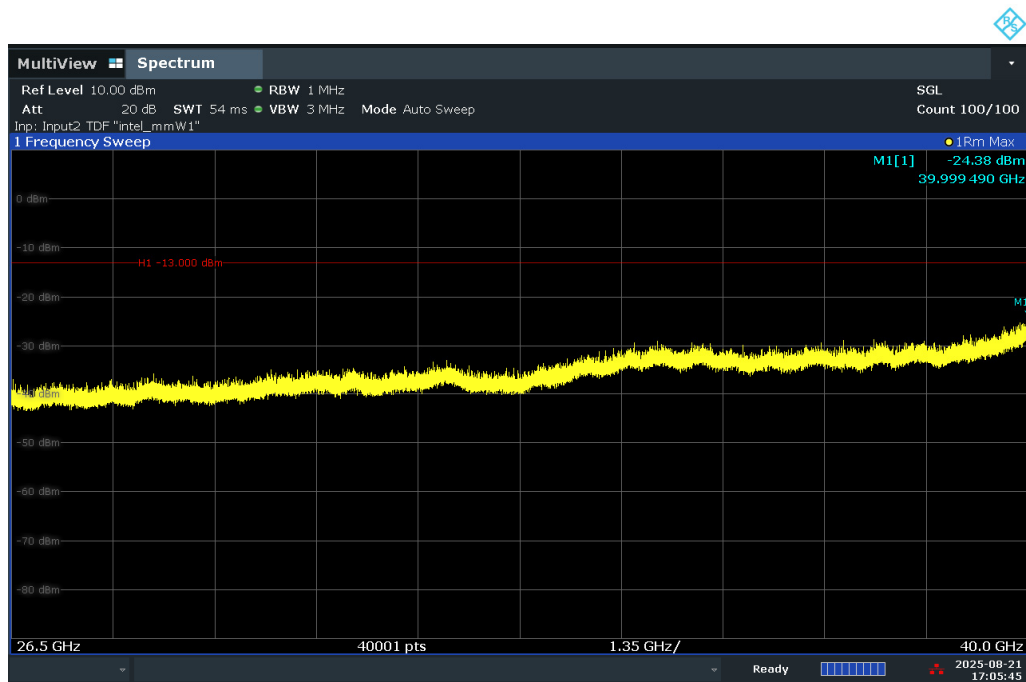
39.6 MHz / 16QAM / Lowest Channel



39.6 MHz / QPSK / Middle Channel

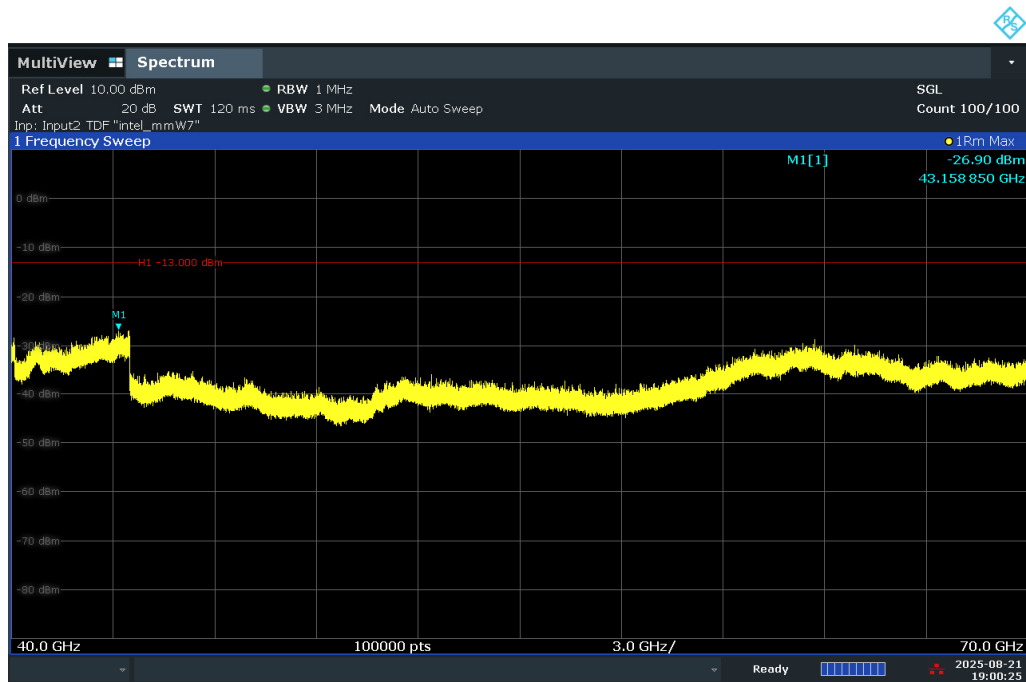


39.6 MHz / QPSK / Middle Channel



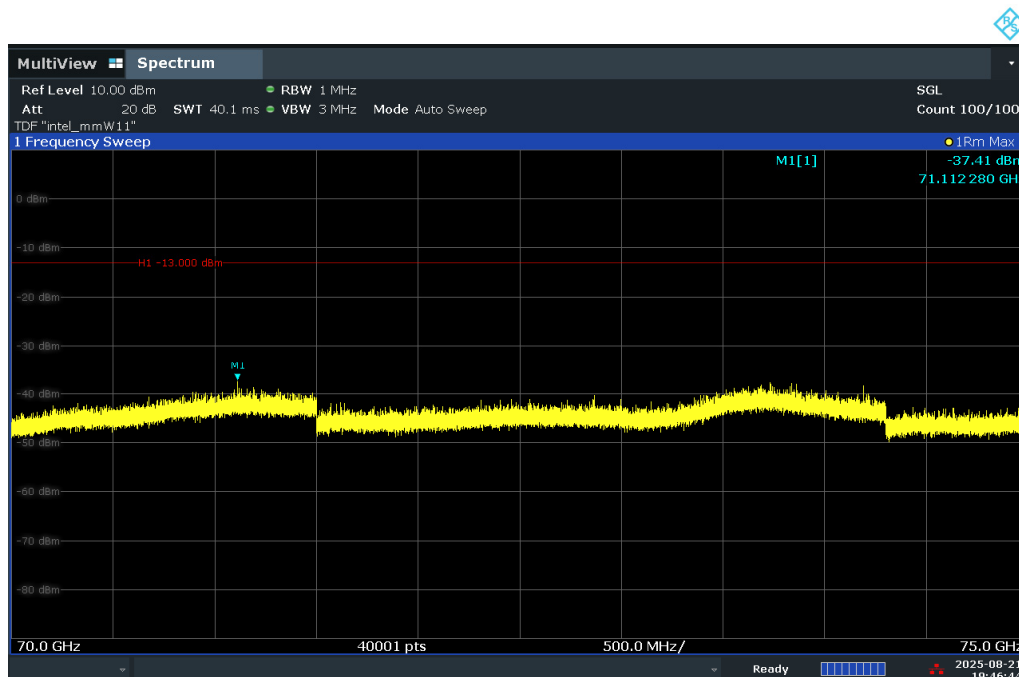
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39.6 MHz / QPSK / Middle Channel



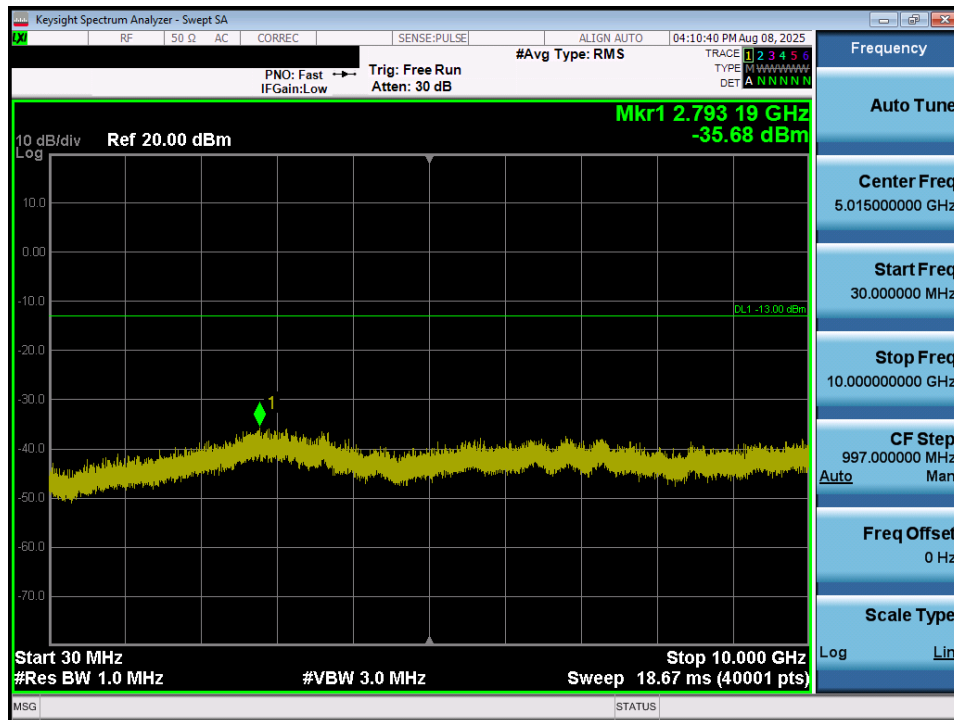
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39.6 MHz / QPSK / Middle Channel

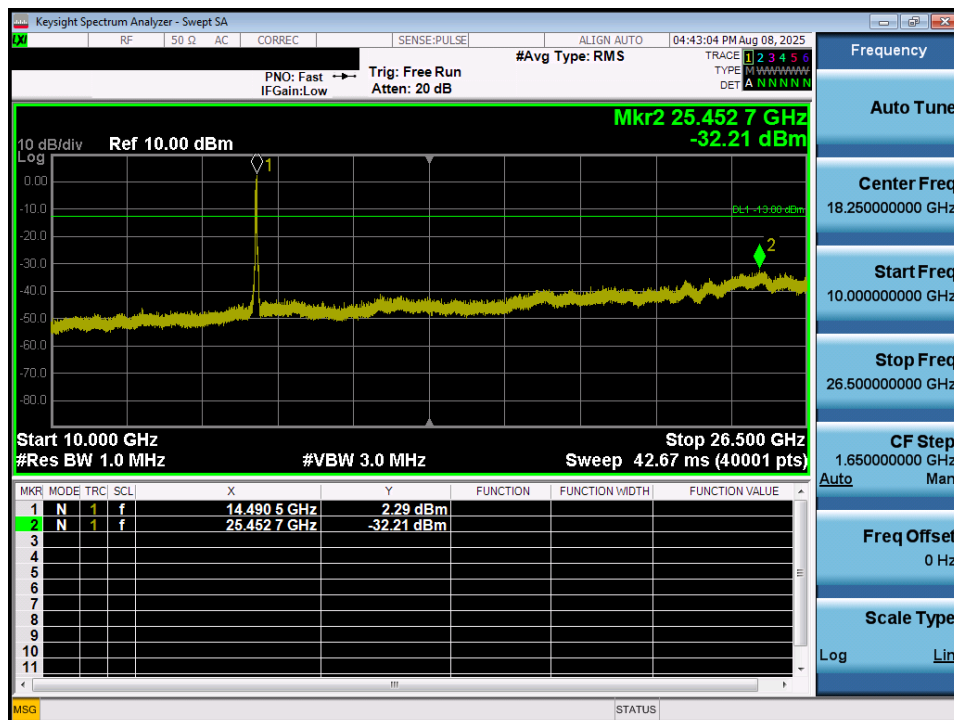


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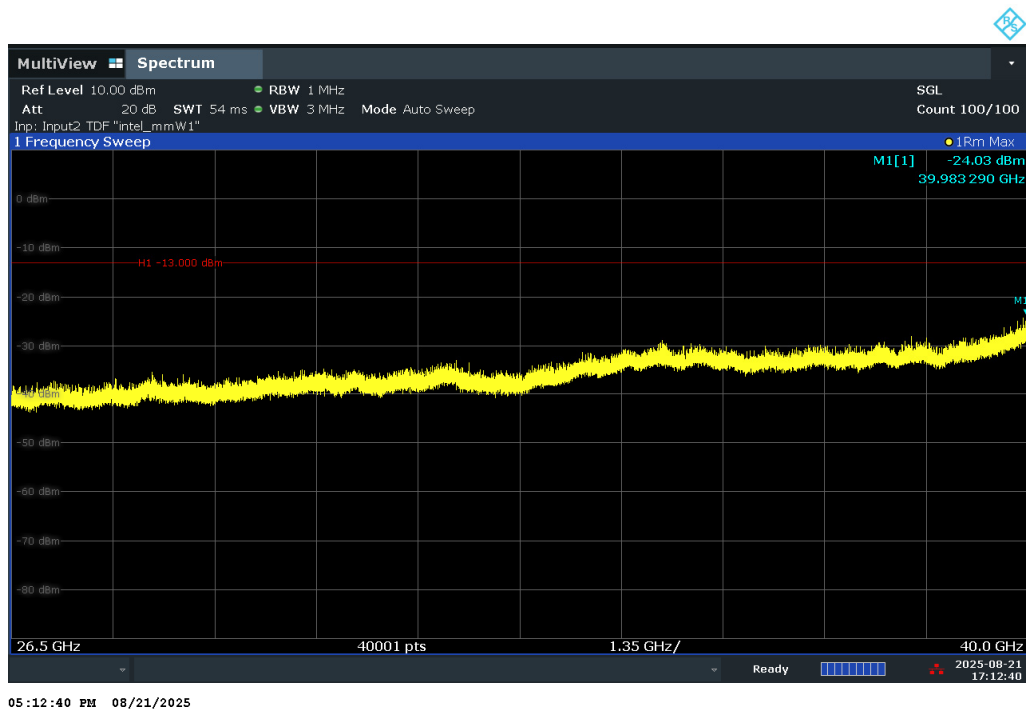
39.6 MHz / QPSK / Middle Channel



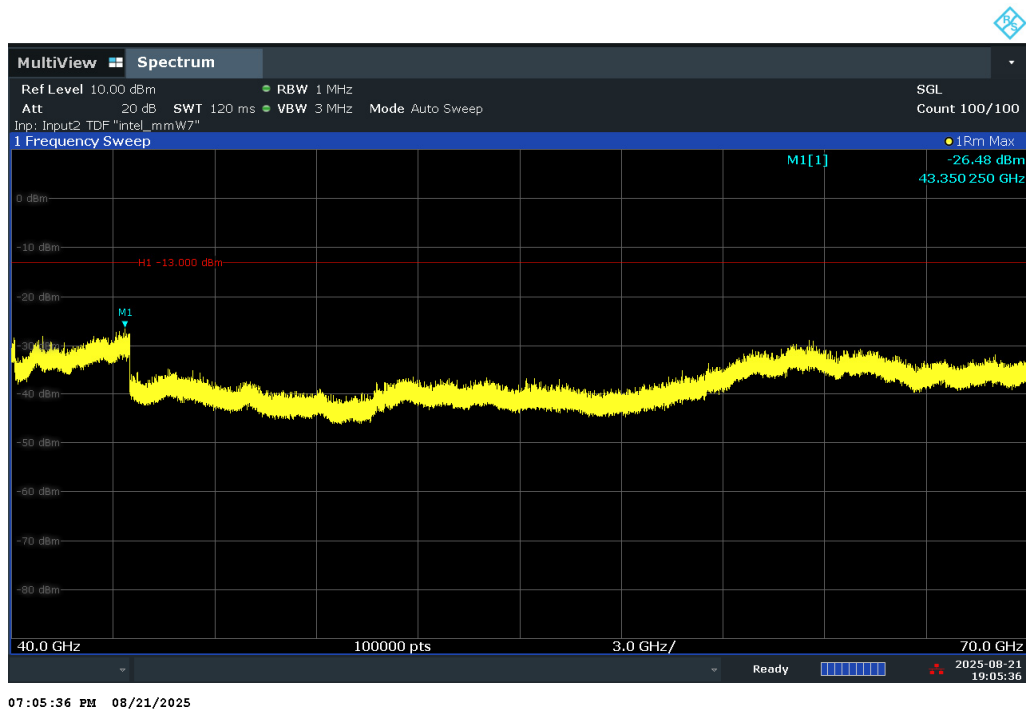
39.6 MHz / QPSK / Highest Channel



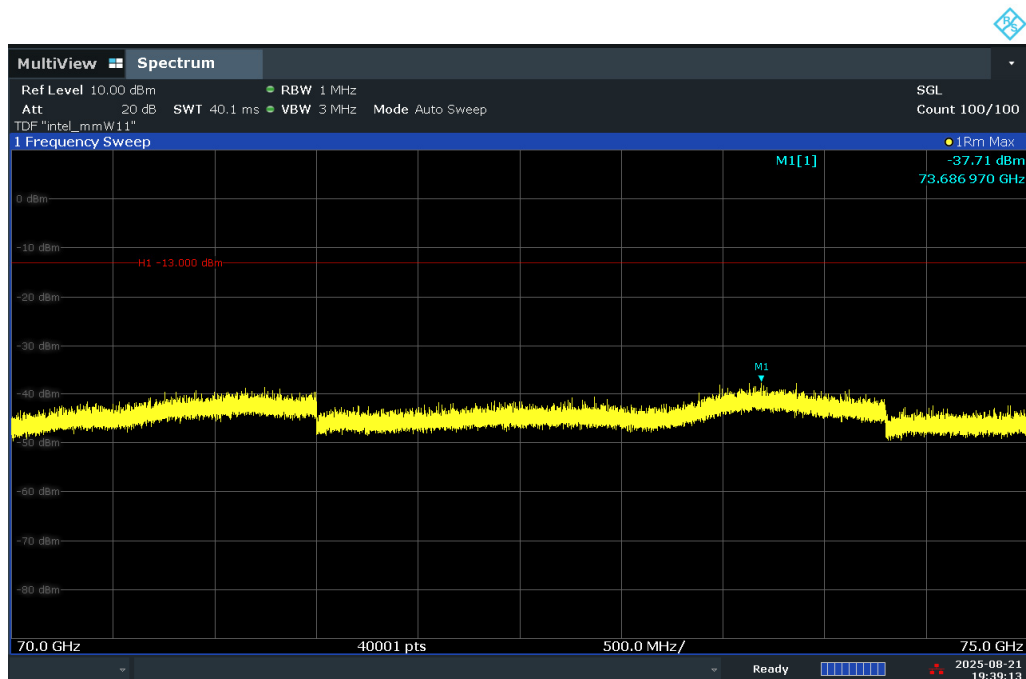
39.6 MHz / QPSK / Highest Channel



39.6 MHz / QPSK / Highest Channel



39.6 MHz / QPSK / Highest Channel

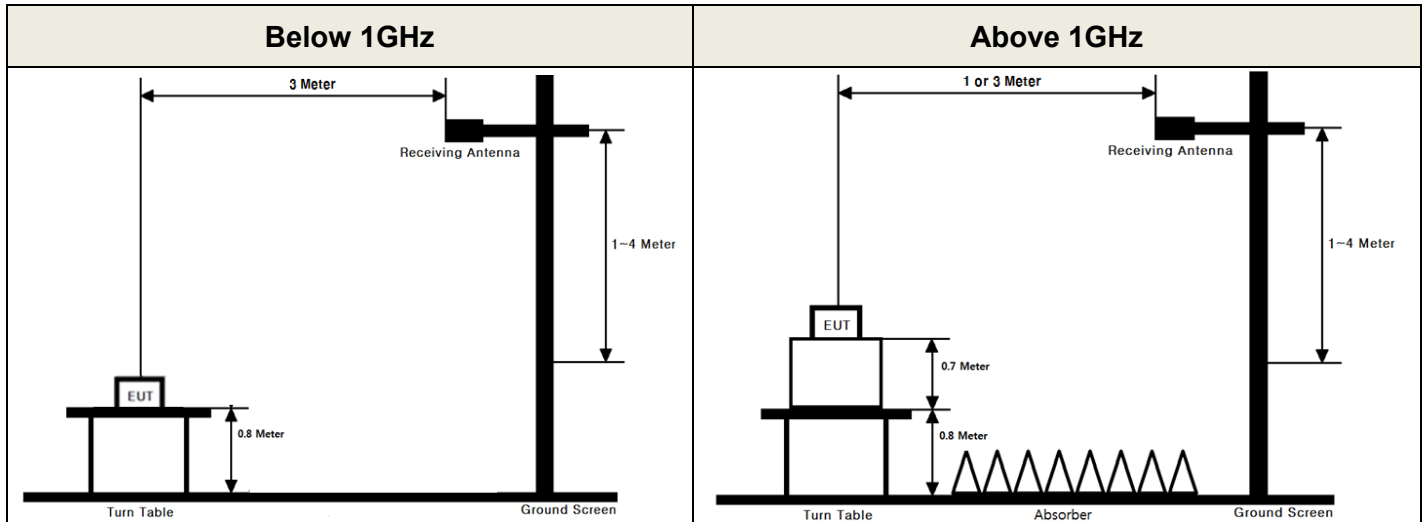


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39.6 MHz / QPSK / Highest Channel

6.5. UNDESIRABLE EMISSIONS (RADIATED)

Test Configuration



These measurements were performed at 3 test site. The equipment under test is placed on a non-conductive table 1.5-meters above a turntable which is flush with the ground plane and 3 meters(for below 1GHz: 0.8-m) from the receive antenna. For measurements above 1GHz absorbers are placed on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections. For measurements below 1 GHz, the absorbers are removed.

Test Procedure

- KDB971168 D01v03r01 - Section 5.8
- ANSI C63.26-2015 - Section 5.5

Test setting

1. RBW = 100 kHz for below 1 GHz and 1 MHz for above 1 GHz / VBW $\geq 3 \times$ RBW
2. Detector = RMS & Trace mode = Max hold
3. Sweep time = Auto couple
4. Number of sweep point $\geq 2 \times$ span / RBW
5. The trace was allowed to stabilize

Limit

Part 25.202(f)

(f) *Emission limitations.* Except for SDARS terrestrial repeaters and as provided for in paragraph (i), the mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the schedule set forth in paragraphs (f)(1) through (f)(4) of this section. The out-of-band emissions of SDARS terrestrial repeaters shall be attenuated in accordance with the schedule set forth in paragraph (h) of this section.

(1) In any 4 kHz band, the center frequency of which is removed from the assigned frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: 25 dB;

(2) In any 4 kHz band, the center frequency of which is removed from the assigned frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: 35 dB;

(3) In any 4 kHz band, the center frequency of which is removed from the assigned frequency by more than 250 percent of the authorized bandwidth: An amount equal to 43 dB plus 10 times the logarithm (to the base 10) of the transmitter power in watts;

(4) In any event, when an emission outside of the authorized bandwidth causes harmful interference, the Commission may, at its discretion, require greater attenuation than specified in paragraphs (f) (1), (2) and (3) of this section.

Test Results

Test notes

1) The frequency spectrum is examined from 9 kHz to the 5th harmonic of the fundamental frequency of the transmitter. No other spurious and harmonic emissions were reported greater than listed emissions.

2) Result (dBm) = E (dBuV/m) + 20log(D) – 104.8; where D is the measurement distance in m.

Margin(dB) = Limit (dBm) – Result (dBm)

E(dBuV/m) = Measured level (dBuV) + TF(dB/m) / TF(dB/m) = AF + CL + HL + AL – AG

where, E = field strength, TF = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,

HL = High pass filter Loss, AL = Attenuator Loss

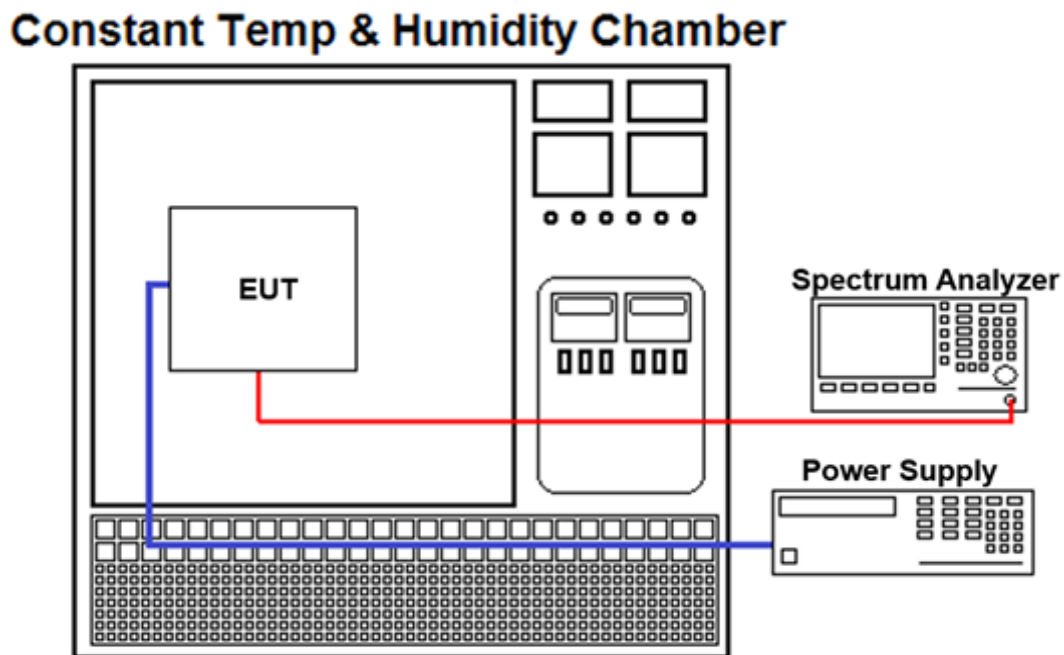
3) Limit = -13 dBm

Bandwidth (MHz)	Modulation	Tested Frequency	Frequency (MHz)	ANT Pol	Measured Level(dBuV)	TF (dB/m)	E (dBuV/m)	Result (dBm)	Limit (dBm)	Margin (dB)
19.8	QPSK	Lowest	28 026.07	H	35.71	10.98	46.69	-53.50	-13.00	40.50
			42 038.83	H	42.74	-6.39	36.35	-63.84	-13.00	50.84
			56 053.10	H	37.39	13.09	50.48	-49.71	-13.00	36.71
			70 065.12	H	40.45	20.24	60.69	-39.50	-13.00	26.50
19.8	QPSK	Middle	28 525.94	H	35.13	10.86	45.99	-54.20	-13.00	41.20
			42 787.49	H	42.13	-6.23	35.90	-64.29	-13.00	51.29
			57 051.42	H	36.47	12.56	49.03	-51.16	-13.00	38.16
			71 311.91	H	39.82	21.53	61.35	-38.84	-13.00	25.84
19.8	QPSK	Highest	28 976.01	H	35.85	10.89	46.74	-53.45	-13.00	40.45
			43 458.99	H	43.83	-5.70	38.13	-62.06	-13.00	49.06
			57 947.08	H	35.61	14.73	50.34	-49.85	-13.00	36.85
			72 431.72	H	40.61	22.90	63.51	-36.68	-13.00	23.68

Bandwidth (MHz)	Modulation	Tested Frequency	Frequency (MHz)	ANT Pol	Measured Level(dBuV)	TF (dB/m)	E (dBuV/m)	Result (dBm)	Limit (dBm)	Margin (dB)
39.6	QPSK	Lowest	28 049.97	H	36.14	10.98	47.12	-53.07	-13.00	40.07
			42 070.38	H	42.86	-6.38	36.48	-63.71	-13.00	50.71
			56 092.63	H	36.96	13.07	50.03	-50.16	-13.00	37.16
			70 111.87	H	40.26	20.27	60.53	-39.66	-13.00	26.66
39.6	QPSK	Middle	28 549.15	H	35.76	10.84	46.60	-53.59	-13.00	40.59
			42 815.15	H	42.17	-6.23	35.94	-64.25	-13.00	51.25
			57 088.16	H	36.41	12.65	49.06	-51.13	-13.00	38.13
			71 360.18	H	40.10	21.62	61.72	-38.47	-13.00	25.47
39.6	QPSK	Highest	28 955.40	H	36.06	10.91	46.97	-53.22	-13.00	40.22
			43 431.06	H	43.48	-5.73	37.75	-62.44	-13.00	49.44
			57 910.40	H	35.65	14.65	50.30	-49.89	-13.00	36.89
			72 384.56	H	39.80	22.90	62.70	-37.49	-13.00	24.49

6.6. FREQUENCY STABILITY

Test Configuration



Test Procedure

- KDB971168 D01v03r01 - Section 9
- ANSI C63.26-2015 – Section 5.6

The frequency stability of the transmitter is measured by:

a.) **Temperature:**

The temperature is varied from -30 °C to +50 °C using an environmental chamber.

b.) **Primary Supply Voltage:**

The primary supply voltage is varied from 85 % to 115 % of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

Time Period and Procedure:

1. The carrier frequency of the transmitter is measured at room temperature.
(20 °C to provide a reference)
2. The equipment is turned on in a “standby” condition for one minute before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.
3. Frequency measurements are made at 10 °C intervals ranging from -30 °C to +50 °C.
A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

Limit

Part 25.202(d)

The carrier frequency of each earth station transmitter authorized in these services shall be maintained within 0.001 percent of the reference frequency.

Test Results

OPERATING FREQUENCY : 14.263 GHz
REFERENCE VOLTAGE : 24 V DC
LIMIT : 10 ppm

VOLTAGE (%)	POWER (V DC)	TEMP (°C)	FREQ (Hz)	Deviation	
				(%)	(ppm)
100%	24.00	+20(Ref)	14,262,989,840	-0.00007123	-0.712
100%		-30	14,262,985,233	-0.00010353	-1.035
100%		-20	14,262,985,444	-0.00010205	-1.021
100%		-10	14,262,985,453	-0.00010199	-1.020
100%		0	14,262,985,304	-0.00010304	-1.030
100%		10	14,262,985,671	-0.00010046	-1.005
100%		20	14,262,989,840	-0.00007123	-0.712
100%		30	14,262,985,855	-0.00009917	-0.992
100%		40	14,262,985,330	-0.00010285	-1.029
100%		50	14,262,985,388	-0.00010245	-1.024
115%	27.60	20	14,262,989,840	-0.00007123	-0.712
85%	10.20*	20	14,262,989,834	-0.00007128	-0.713

Note: * = 85 % of the lowest rated voltage(12 V) was applied.

End of Report