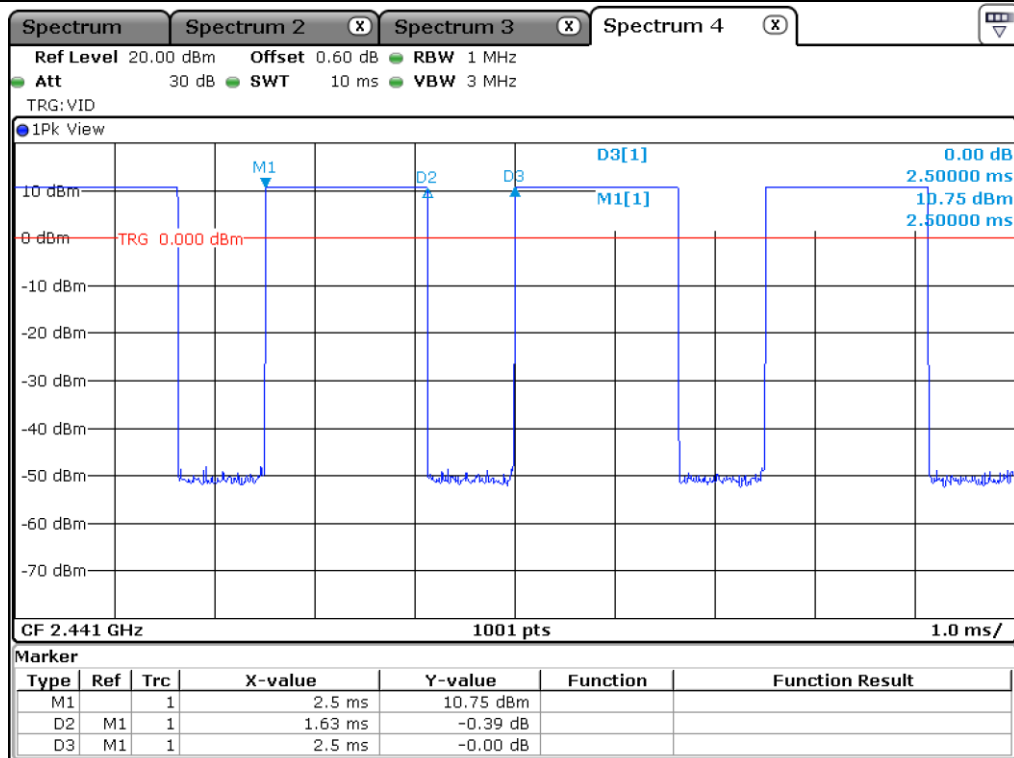
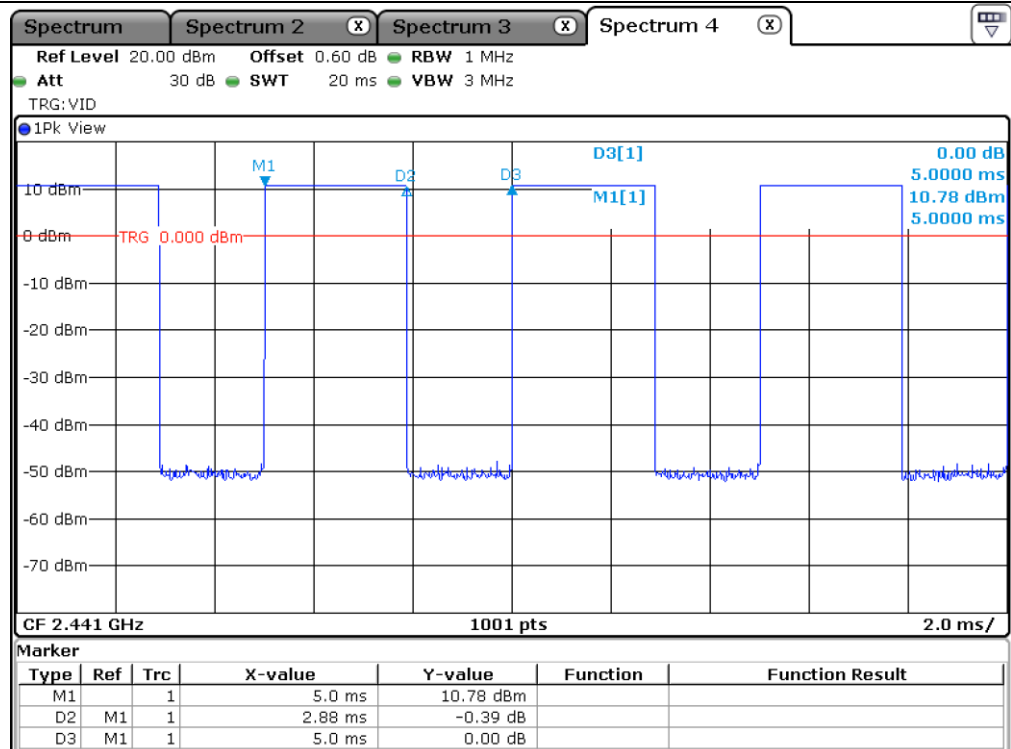




DH3



DH5

10.5 Test data for 2 Mbps

The system makes worst case 1 600 hops per second or 1 time slot has a length of 625 μ s with 79 channels.

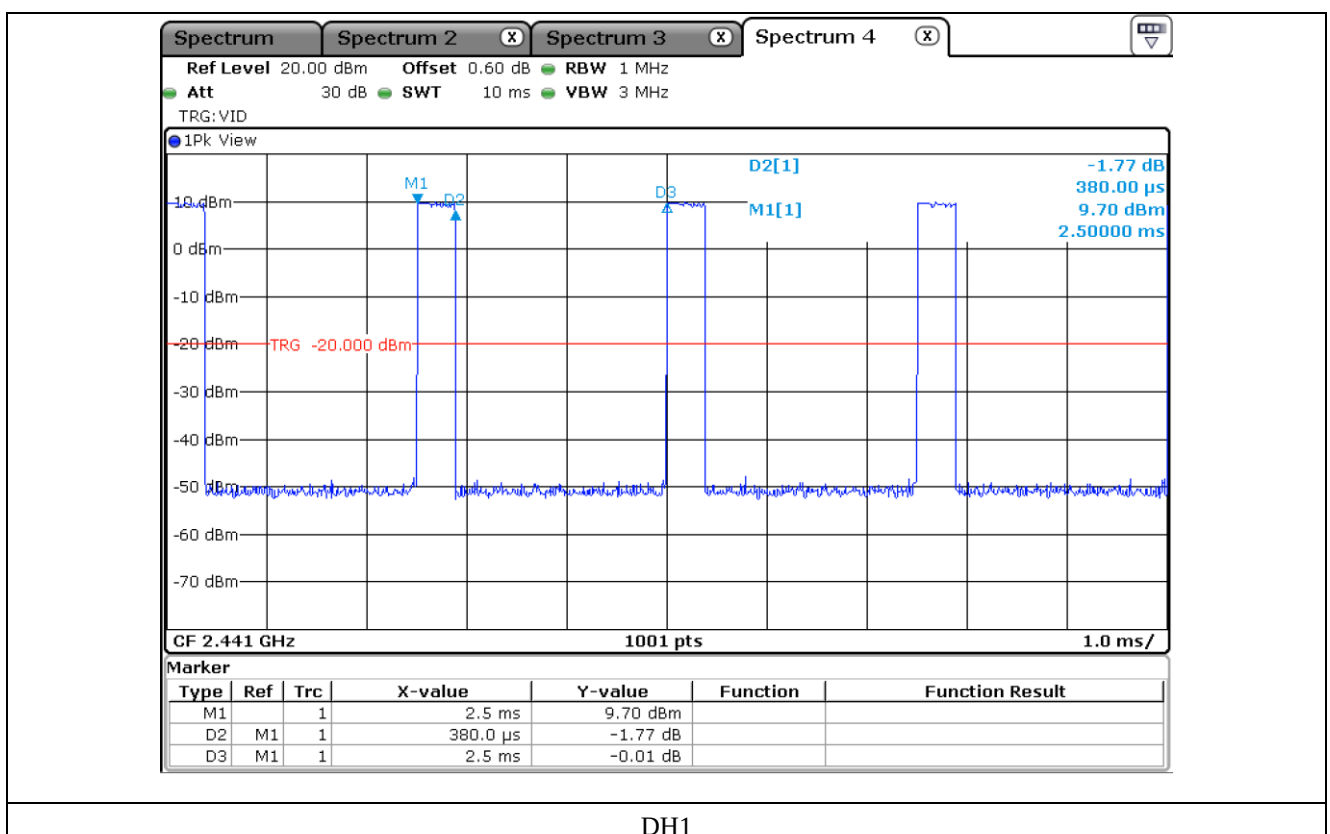
For DH1 packet type, the EUT needs 1 time slot for transmitting and 1 time slot for receiving and for DH3 packet type, the EUT needs 3 times slots for transmitting and 1 time slot for receiving, and DH5 packet needs 5 times slots for transmitting and 1 time slot for receiving. So The EUT has each channel for 10.13 times per second ($= 1\ 600/2/79$) for DH1, and 5.06 times ($= 1\ 600/4/79$) for DH3, and 3.38 times ($= 1\ 600/6/79$) for DH5.

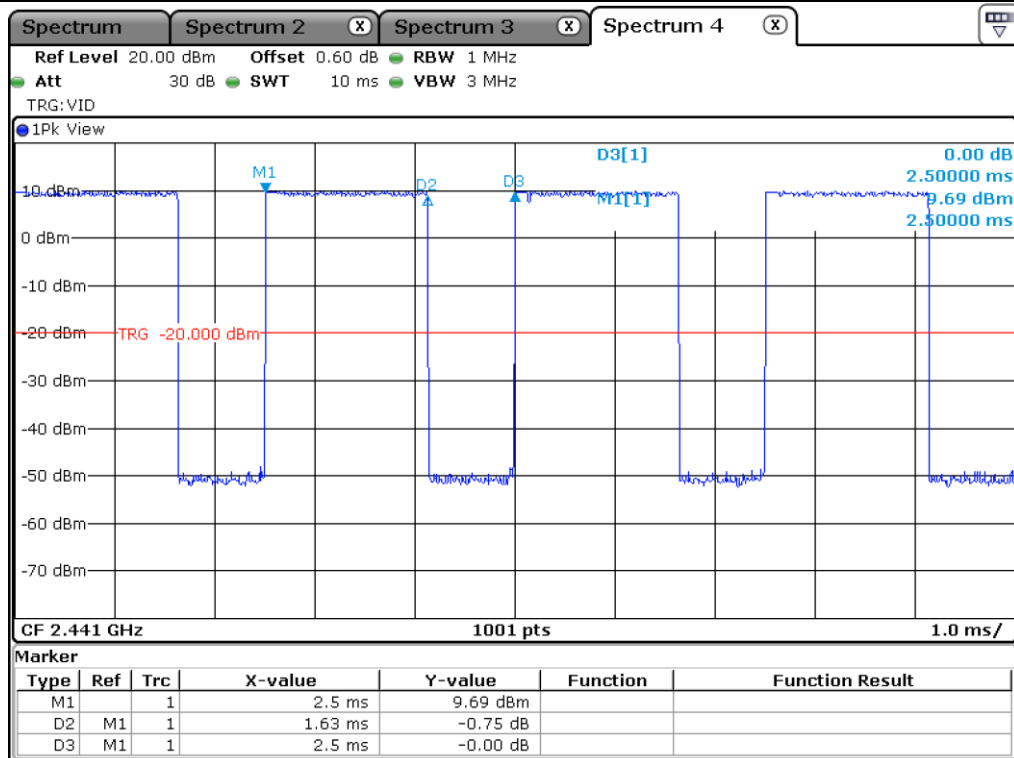
Packet Type	Pulse Time (ms)	Hops per second with channels	Period Time (ms)	Total Dwell Time (ms)	Limit (ms)	Test Result
DH1	0.38	10.13	31.60	121.64	400.00	PASS
DH3	1.63	5.06	31.60	260.63	400.00	
DH5	2.88	3.38	31.60	307.61	400.00	

Total dwell time is calculated as following.

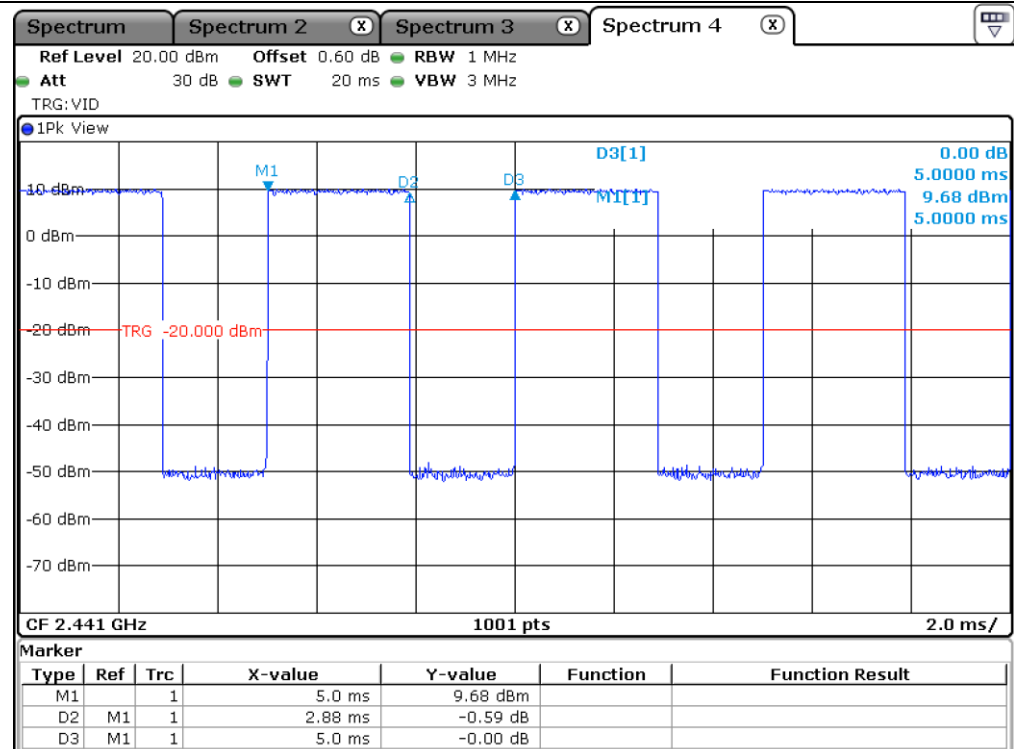
Total Dwell Time = Pulse time * Hops per second with channels * period time

Remark: See next page for an overview sweep performed with peak detector.





DH3



DH5

10.6 Test data for 3 Mbps

The system makes worst case 1 600 hops per second or 1 time slot has a length of 625 μ s with 79 channels.

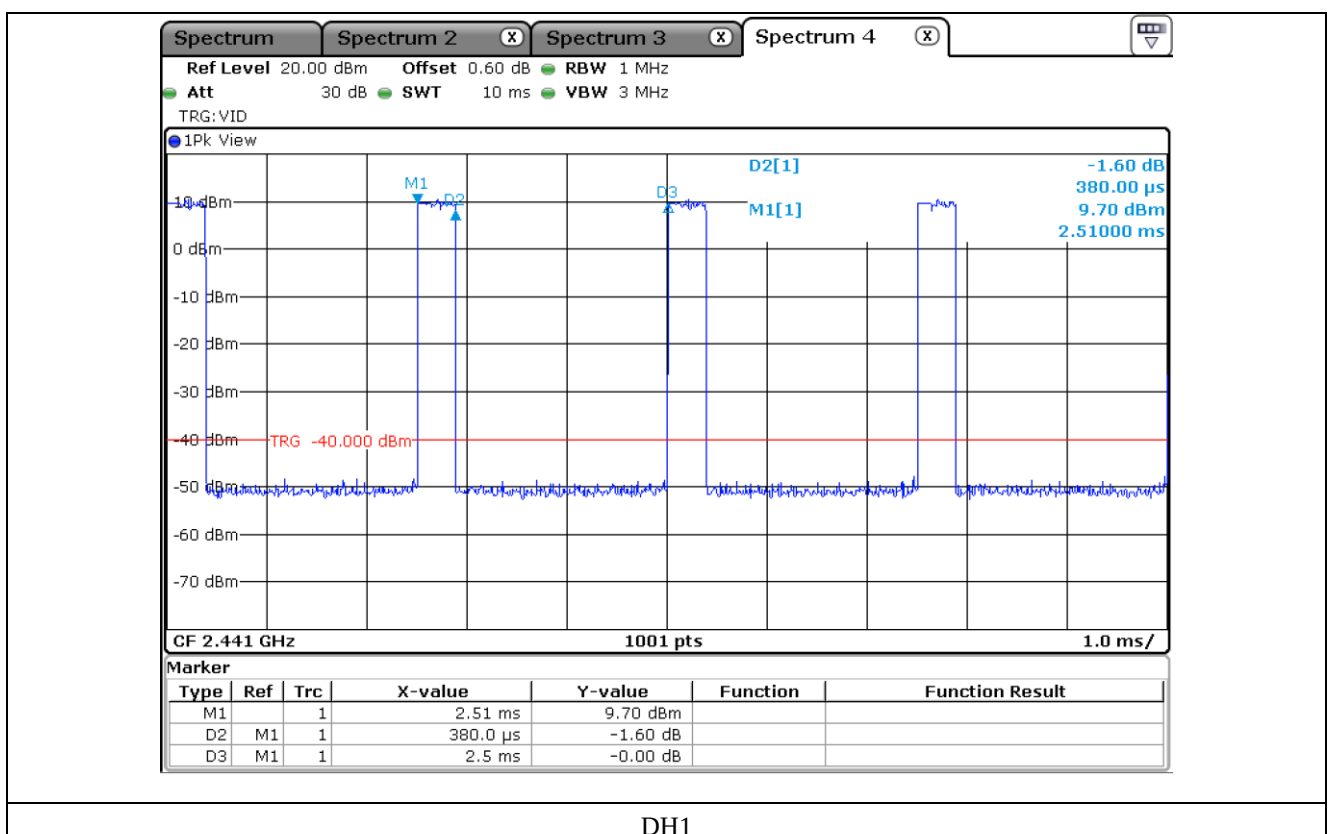
For DH1 packet type, the EUT needs 1 time slot for transmitting and 1 time slot for receiving and for DH3 packet type, the EUT needs 3 times slots for transmitting and 1 time slot for receiving, and DH5 packet needs 5 times slots for transmitting and 1 time slot for receiving. So The EUT has each channel for 10.13 times per second ($= 1\ 600/2/79$) for DH1, and 5.06 times ($= 1\ 600/4/79$) for DH3, and 3.38 times ($= 1\ 600/6/79$) for DH5.

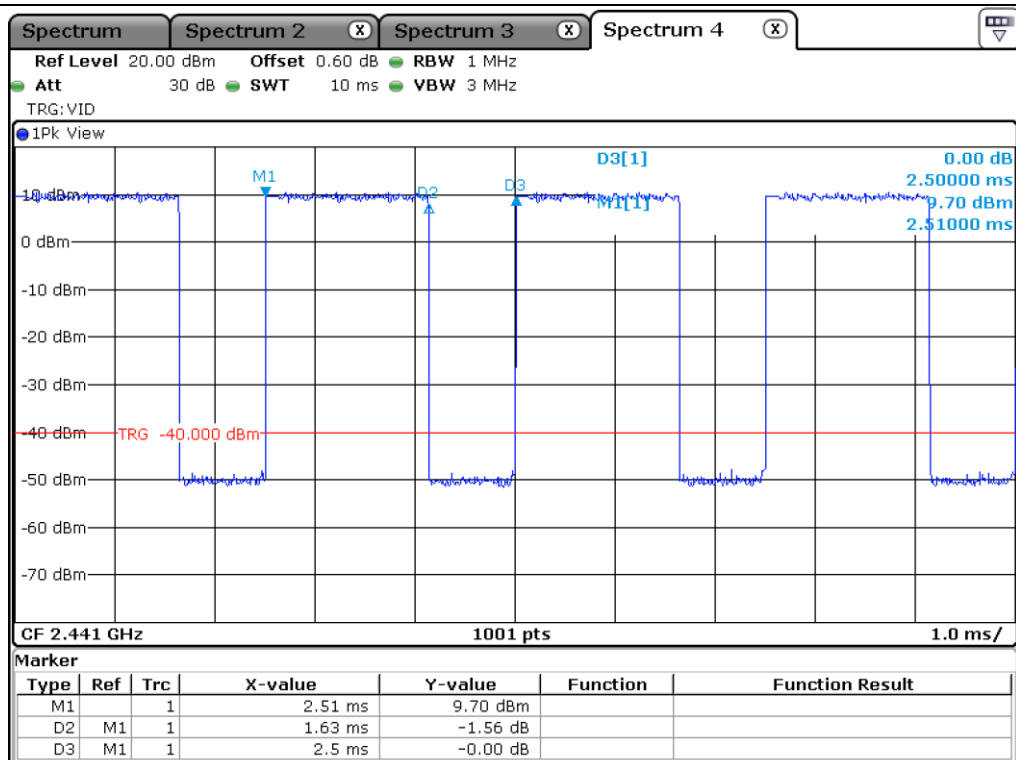
Packet Type	Pulse Time (ms)	Hops per second with channels	Period Time (ms)	Total Dwell Time (ms)	Limit (ms)	Test Result
DH1	0.38	10.13	31.60	121.64	400.00	PASS
DH3	1.63	5.06	31.60	260.63	400.00	
DH5	2.88	3.38	31.60	307.61	400.00	

Total dwell time is calculated as following.

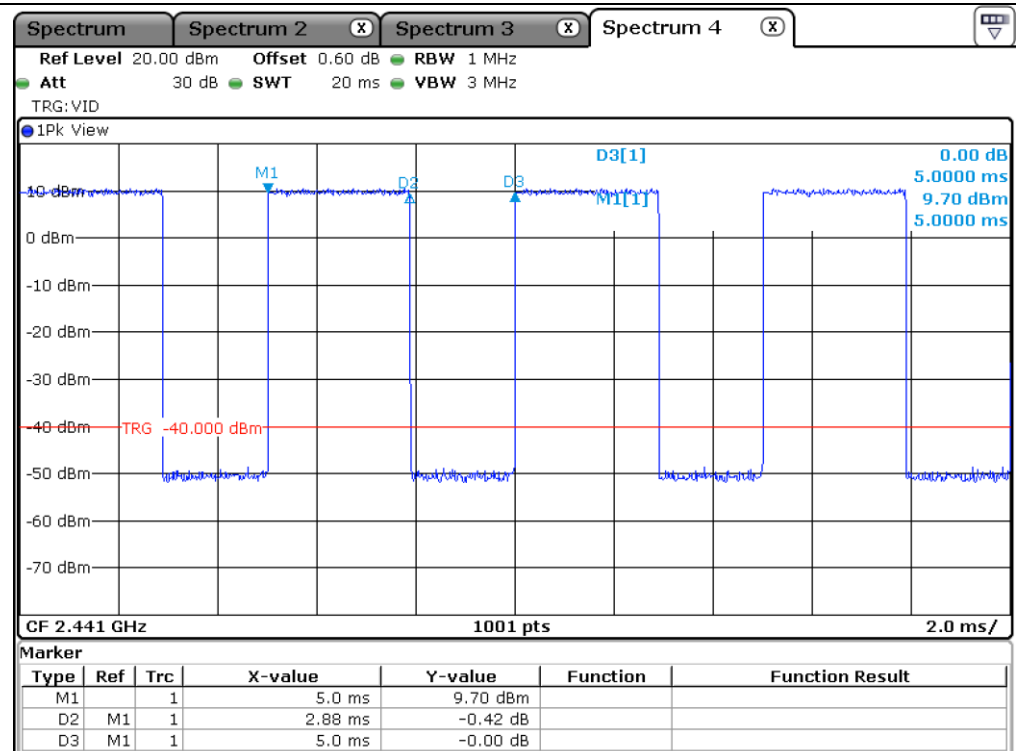
Total Dwell Time = Pulse time * Hops per second with channels * period time

Remark: See next page for an overview sweep performed with peak detector.





DH3



DH5

11. MAXIMUM PEAK OUTPUT POWER

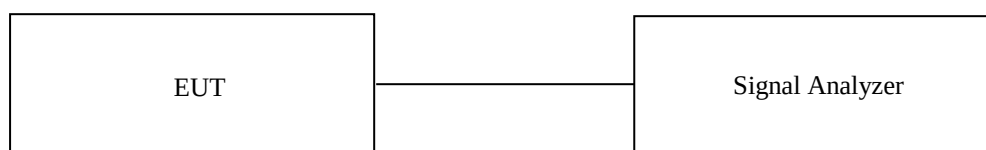
11.1 Operating environment

Temperature : 22 °C
Relative humidity : 46 % R.H.

11.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer.

The resolution bandwidth is set to $\geq$ DTS Bandwidth, the video bandwidth is set to 3 times the resolution bandwidth.



11.3 Test Date

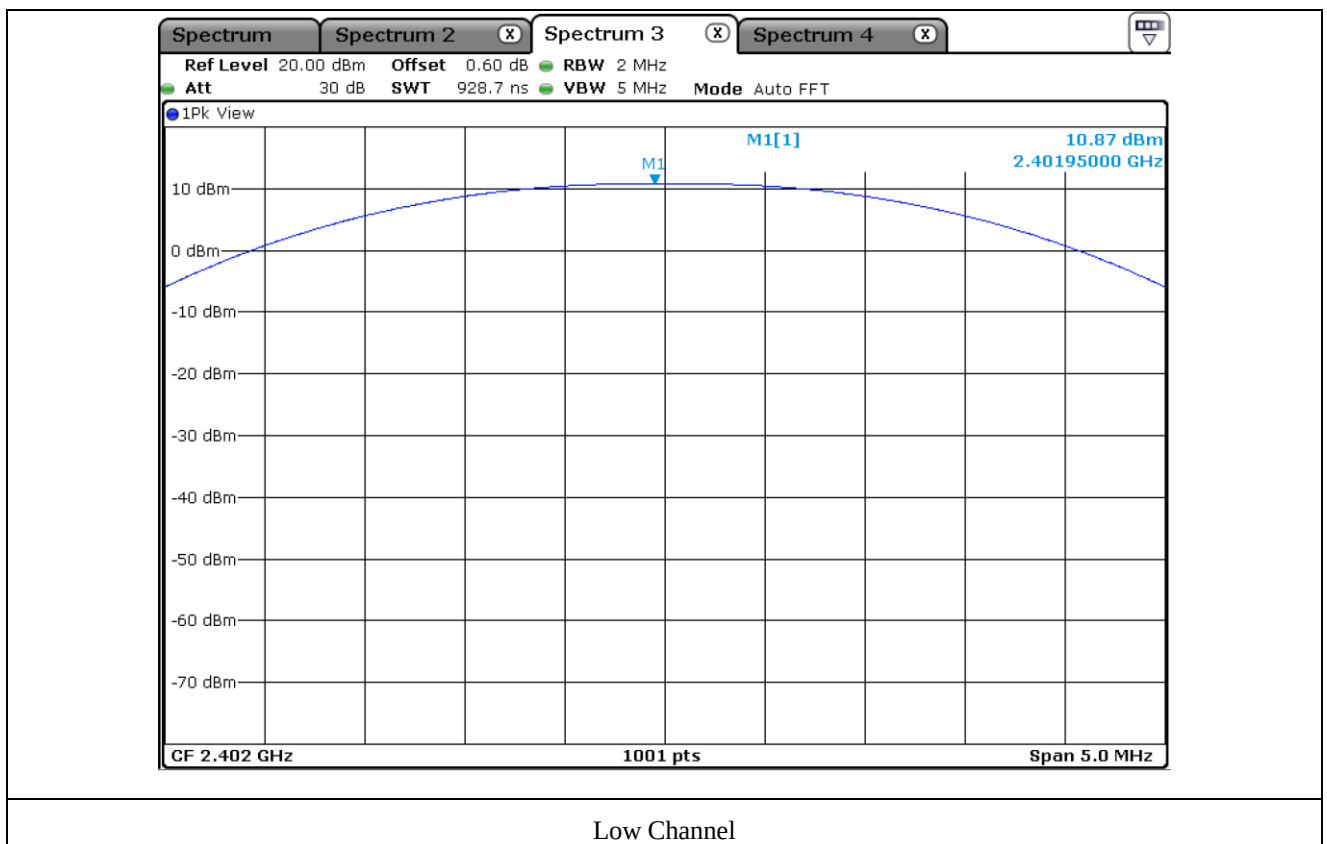
October 07, 2021 ~ October 20, 2021

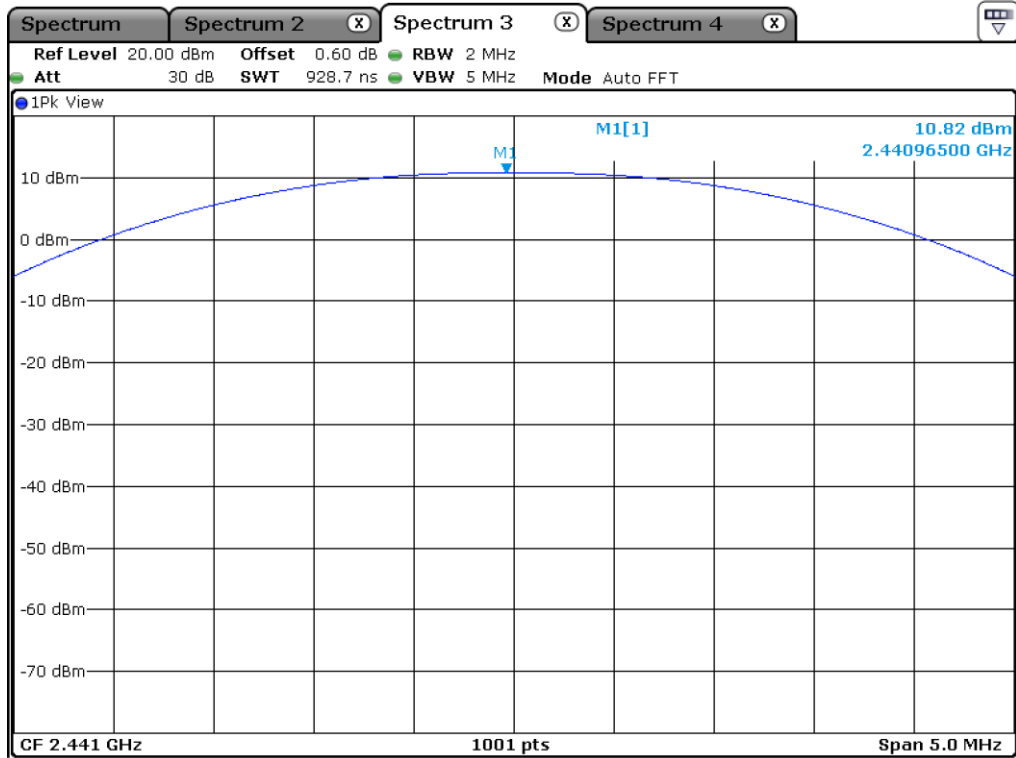
11.4 Test data for 1 Mbps

-. Test Result : Pass

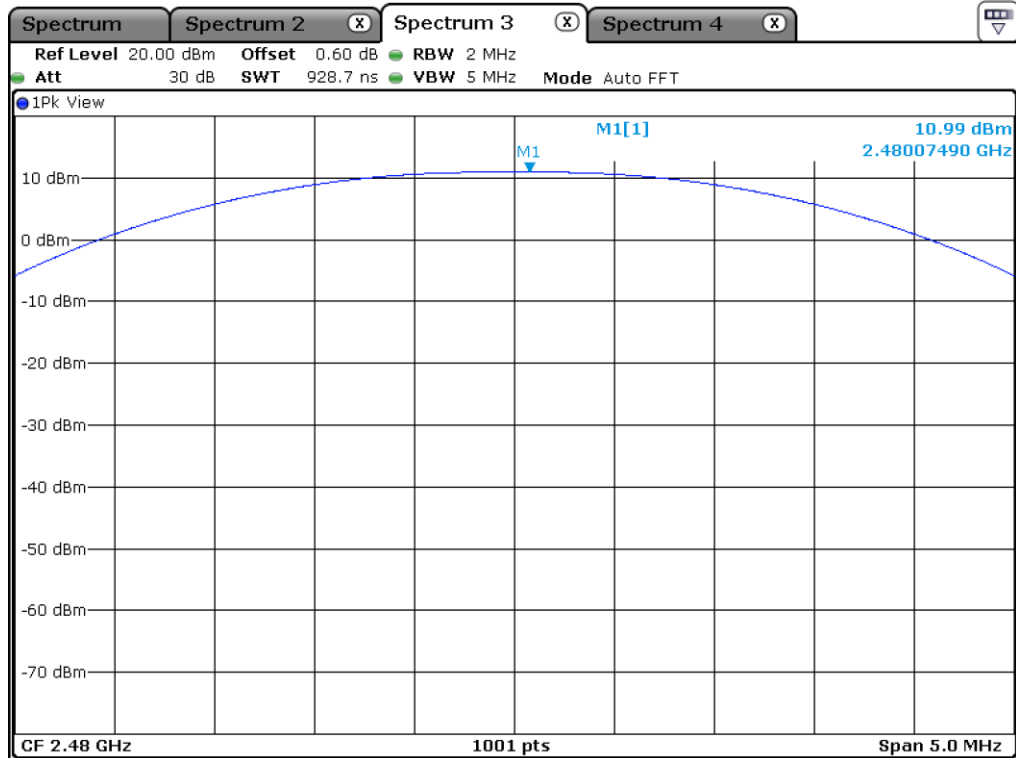
CHANNEL	FREQUENCY (MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 402.00	10.87	21.00	10.13
MIDDLE	2 441.00	10.82	21.00	10.18
HIGH	2 480.00	10.99	21.00	10.01

Remark. Margin = Limit – Measured Value (=Receiver Reading + Cable Loss)





Middle Channel



High Channel

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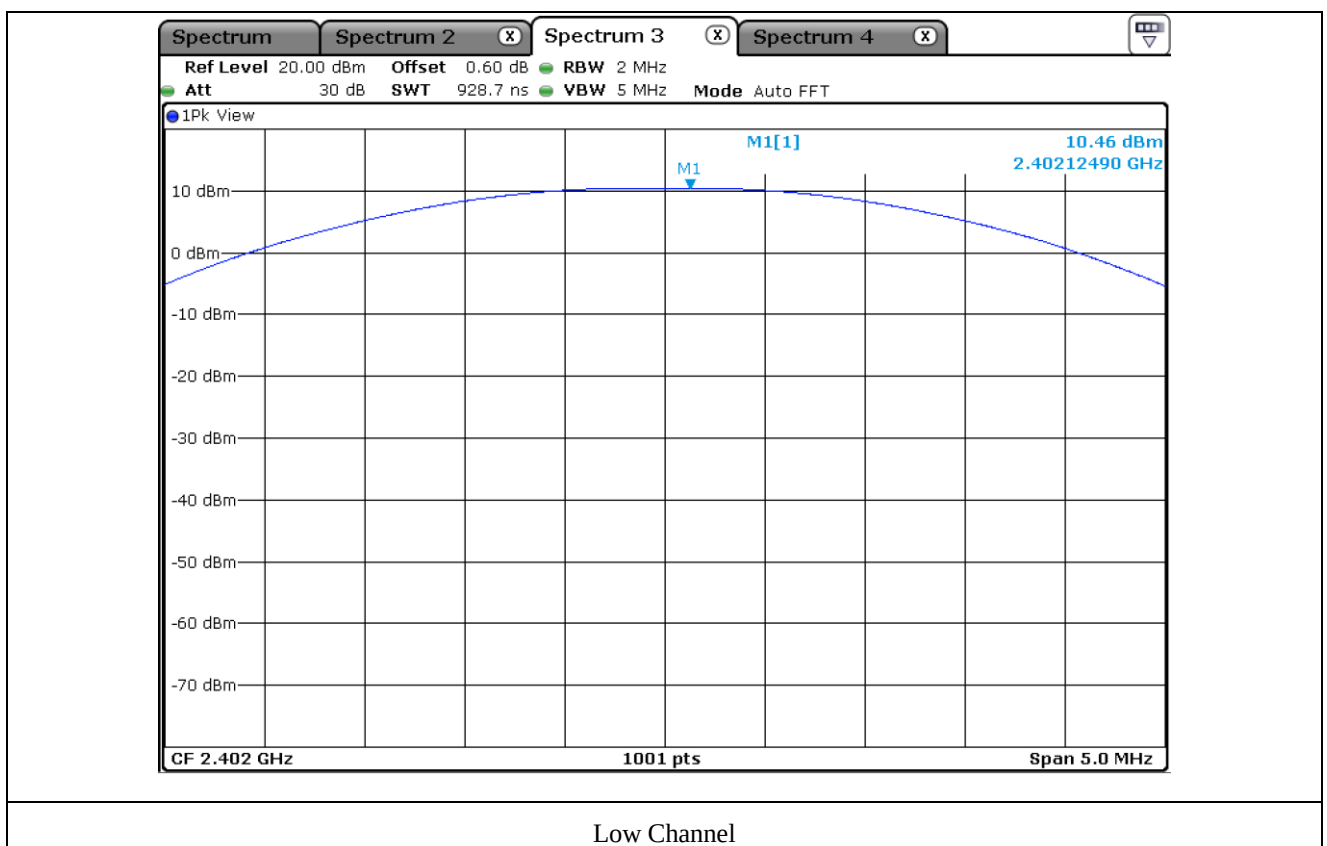
ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)

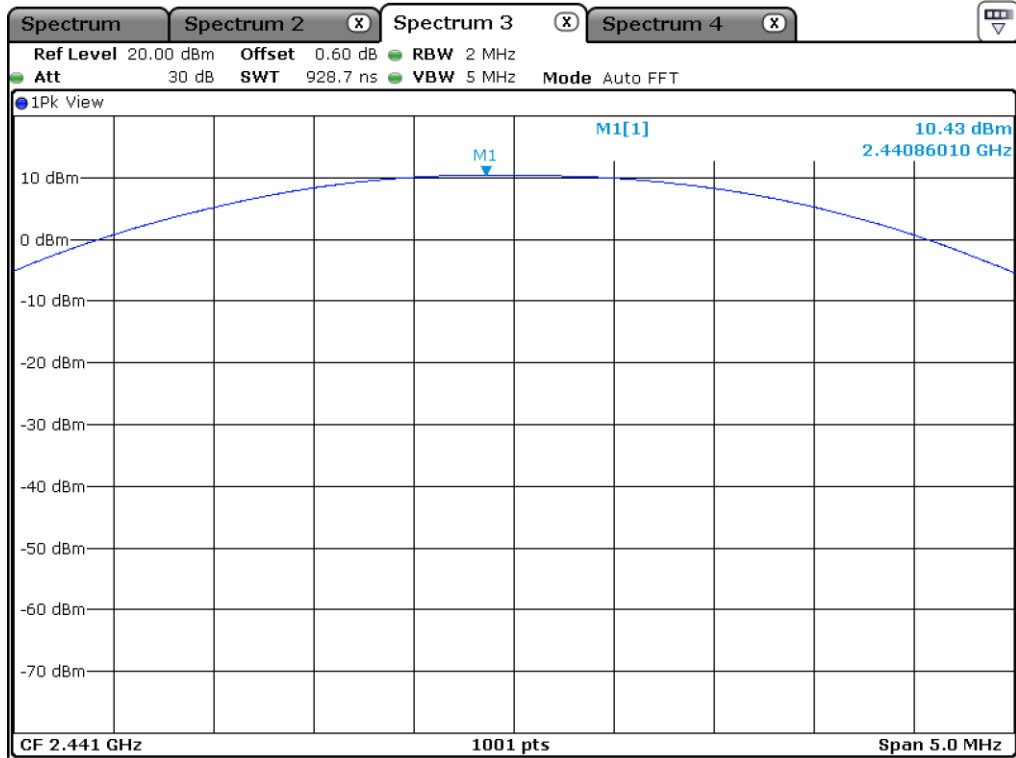
11.5 Test data for 2 Mbps

-. Test Result : Pass

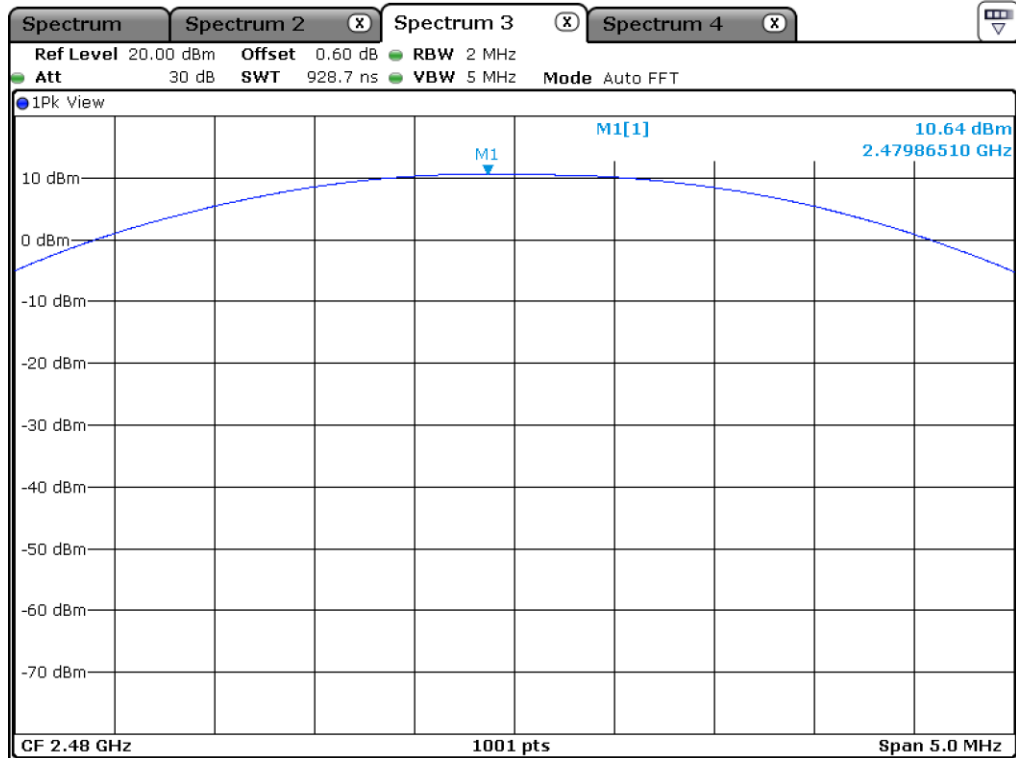
CHANNEL	FREQUENCY (MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 402.00	10.46	21.00	10.54
MIDDLE	2 441.00	10.43	21.00	10.57
HIGH	2 480.00	10.64	21.00	10.36

Remark. Margin = Limit – Measured Value (=Receiver Reading + Cable Loss)





Middle Channel



High Channel

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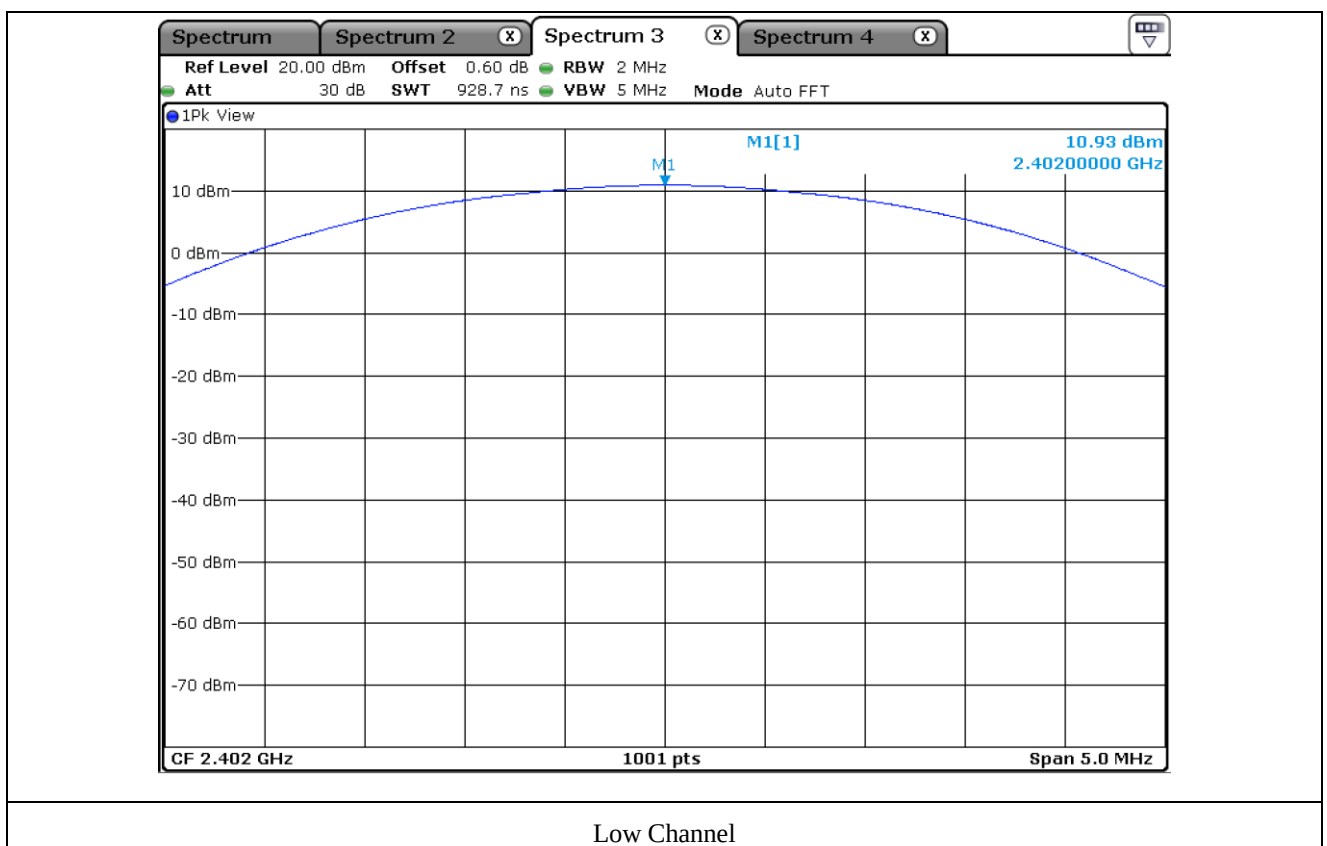
ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)

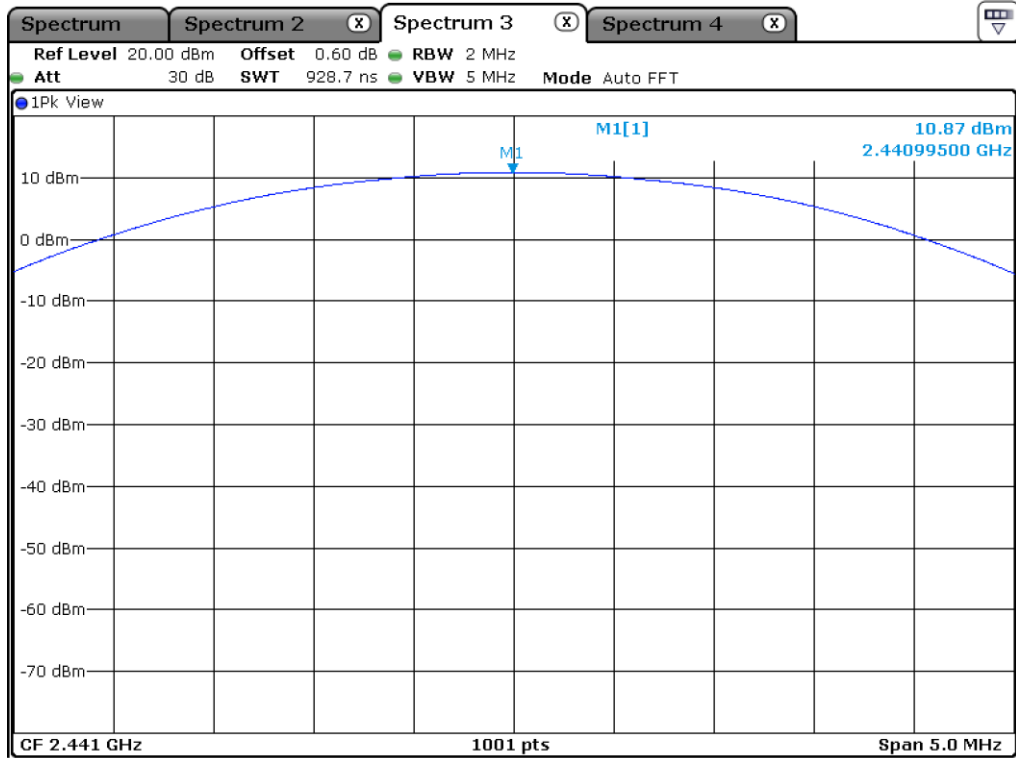
11.6 Test data for 3 Mbps

-. Test Result : Pass

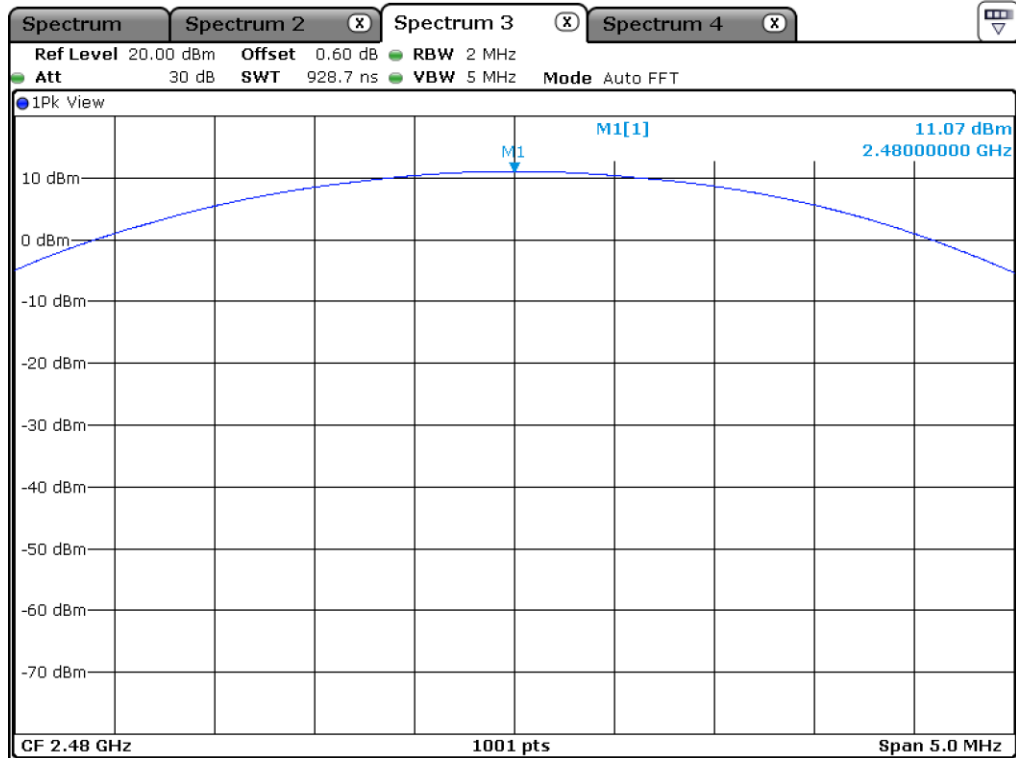
CHANNEL	FREQUENCY (MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 402.00	10.93	21.00	10.07
MIDDLE	2 441.00	10.87	21.00	10.13
HIGH	2 480.00	11.07	21.00	9.93

Remark. Margin = Limit – Measured Value (=Receiver Reading + Cable Loss)





Middle Channel



High Channel

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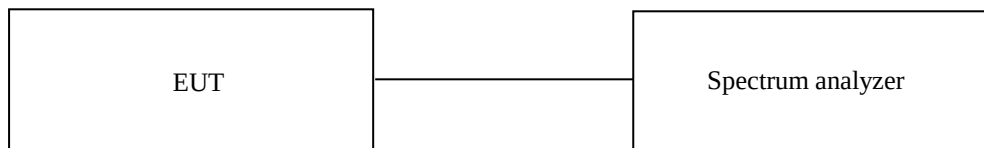
12. 100 kHz BANDWIDTH OUTSIDE THE FREQUENCY BAND

12.1 Operating environment

Temperature : 22 °C
Relative humidity : 46 % R.H.

12.2 Test set-up for conducted measurement

The antenna output of the EUT was connected to the spectrum analyzer. The resolution and video bandwidth is set to 100 kHz, and peak detection was used.



12.3 Test set-up for radiated measurement

The radiated emissions measurements were performed on the 3 m semi anechoic chamber. The EUT was placed on turntable approximately 1.5 m above the ground plane.

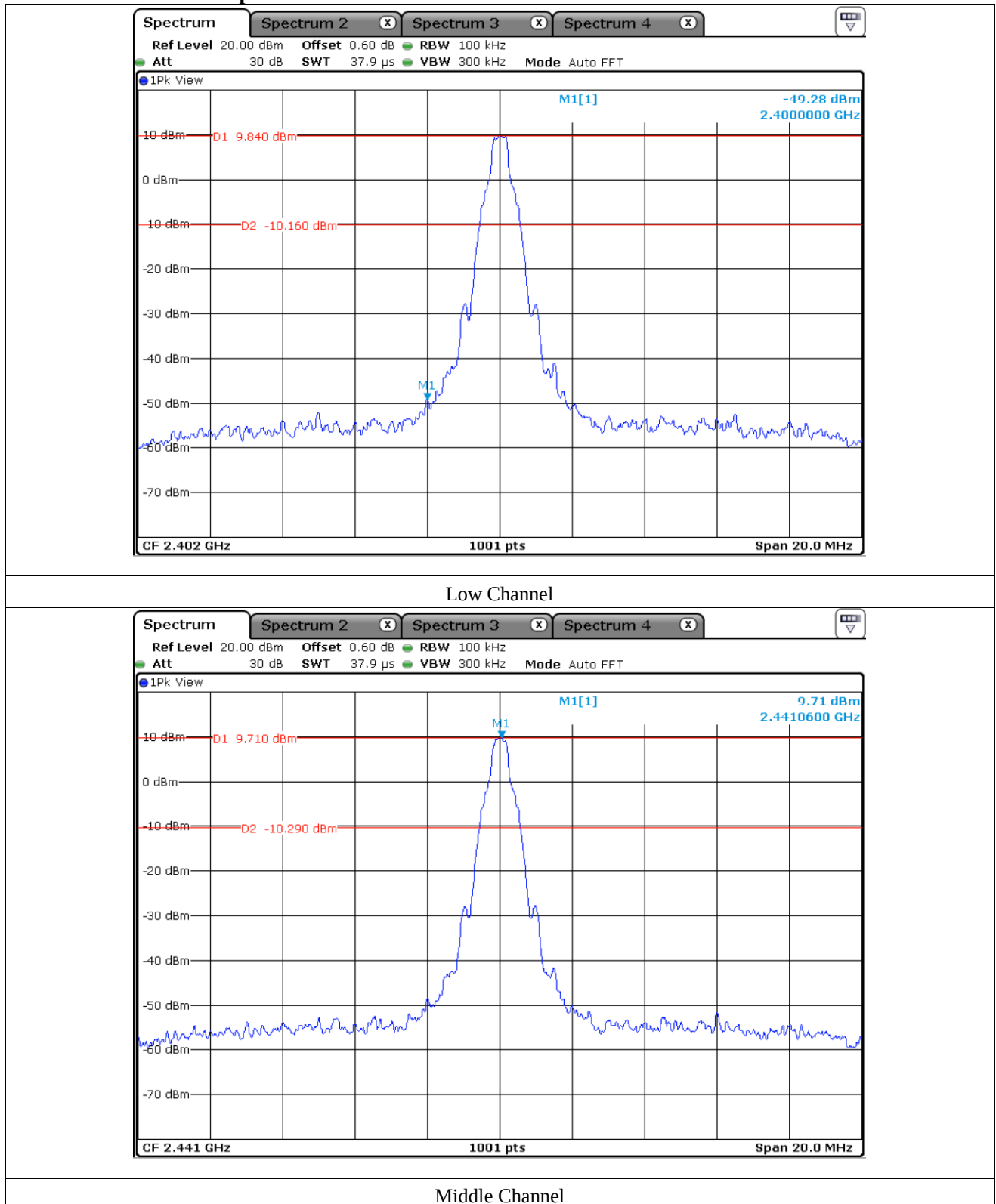
The frequency spectrum from 30 MHz to 26.5 GHz was scanned and maximum emission levels at each frequency recorded. The system was rotated 360°, and the antenna was varied in the height between 1.0 m and 4.0 m in order to determine the maximum emission levels. This procedure was performed for horizontal and vertical polarization of the receiving antenna.

12.4 Test Date

October 07, 2021 ~ October 20, 2021

12.5 Test data for conducted emission

12.5.1 Test data for 1 Mbps

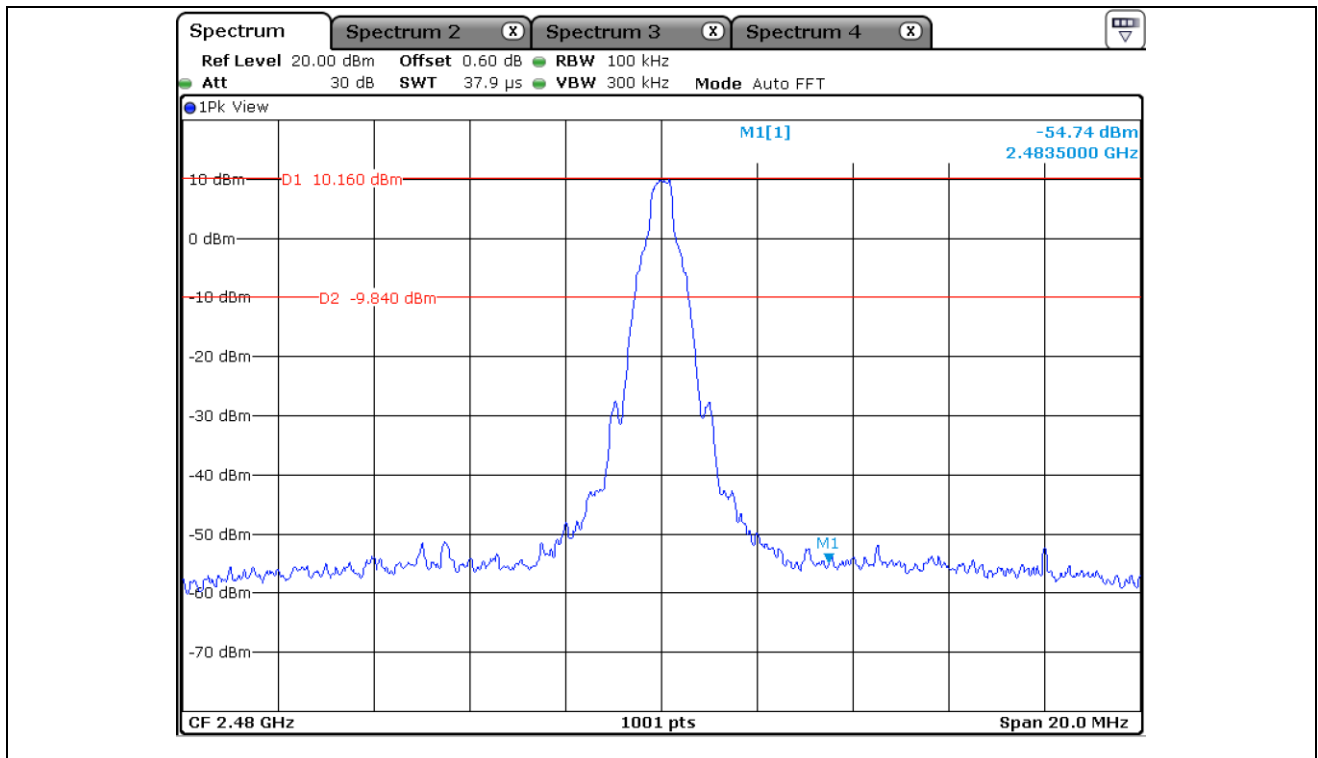


This Report is not correlated with the authentication of KOLAS

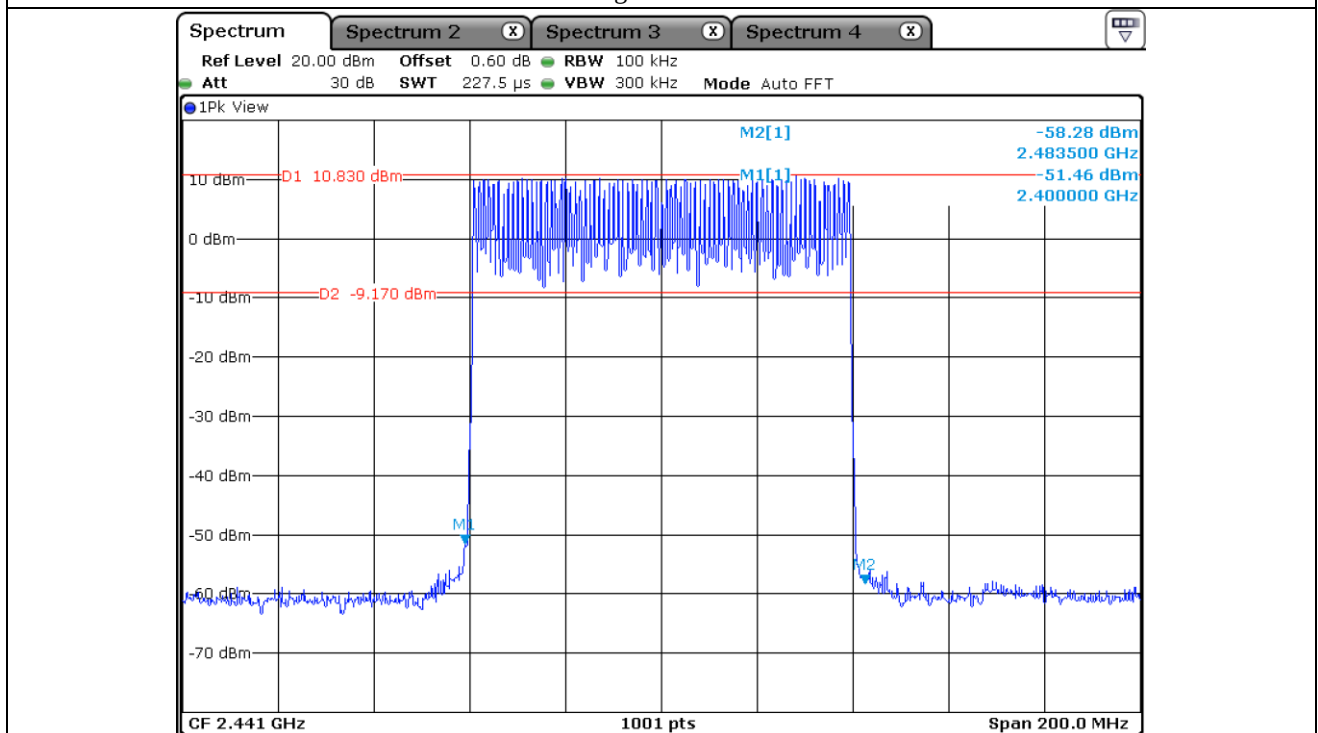
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High Channel



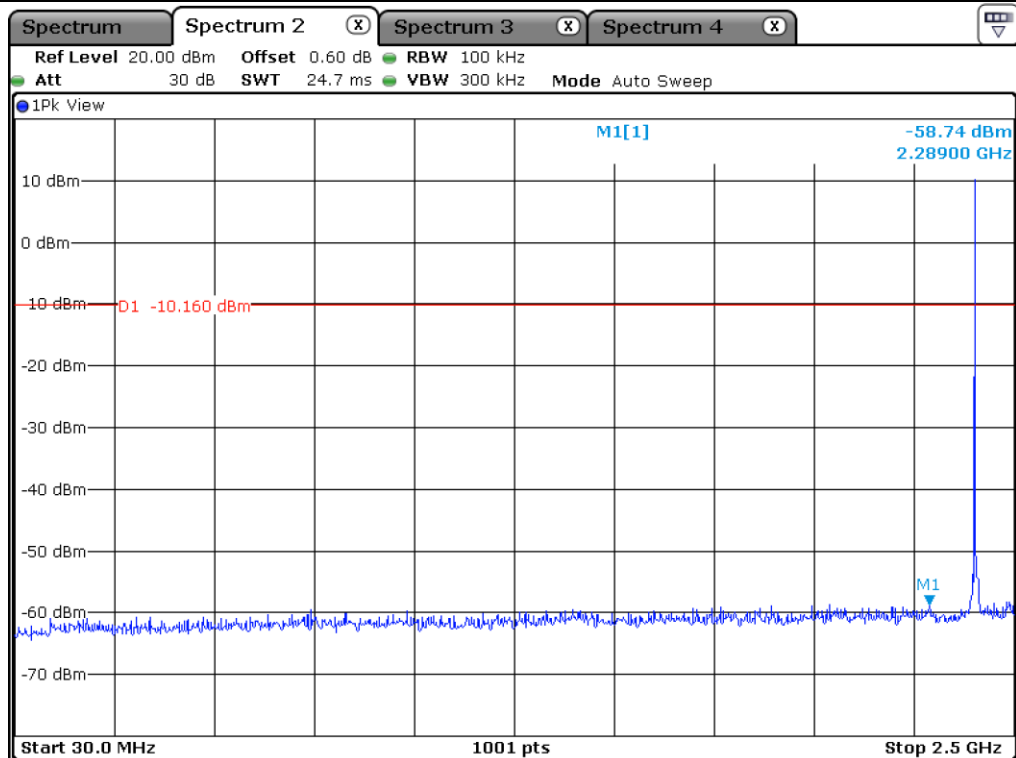
Hopping Mode

This Report is not correlated with the authentication of KOLAS

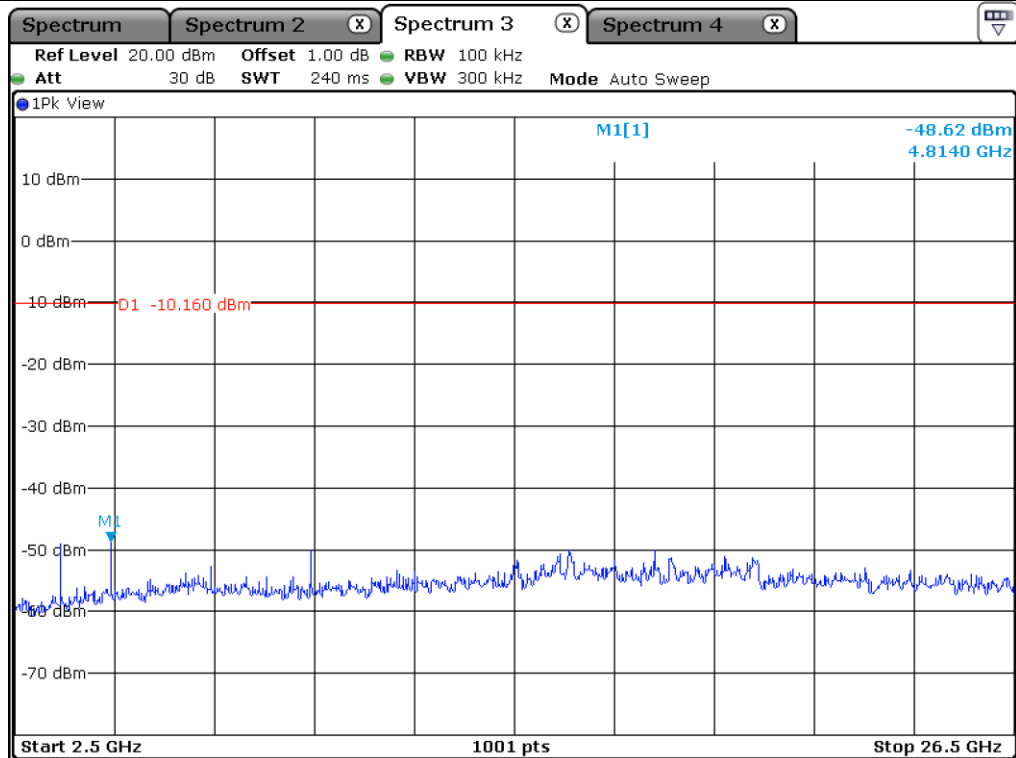
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Low Channel



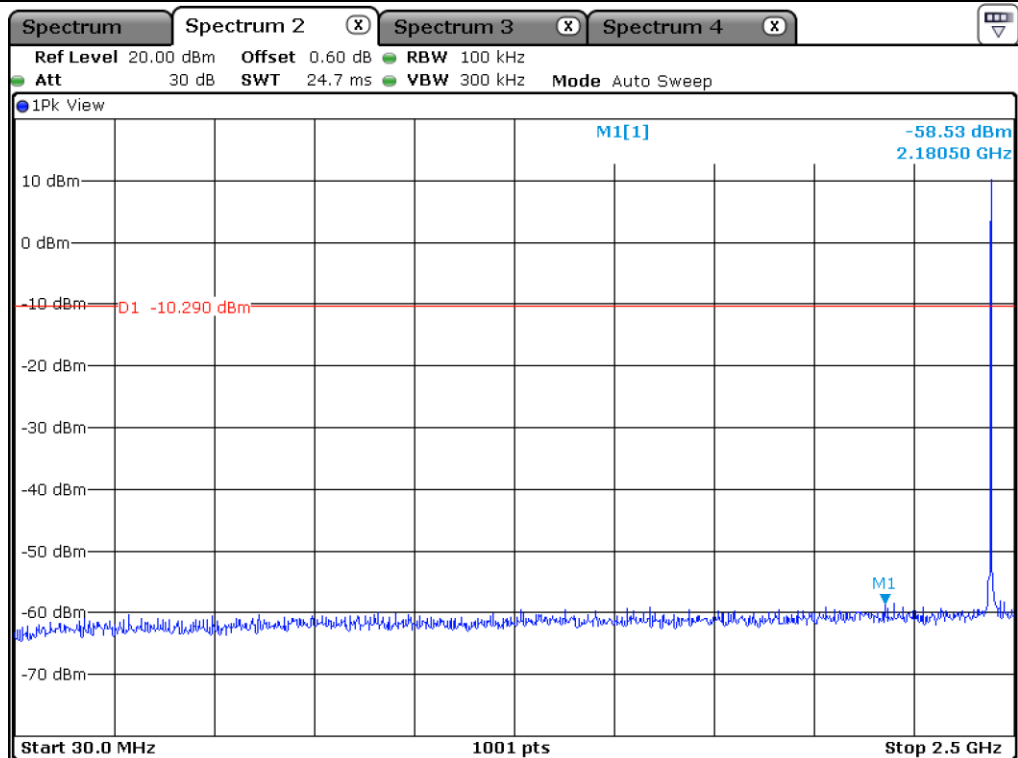
Low Channel

This Report is not correlated with the authentication of KOLAS

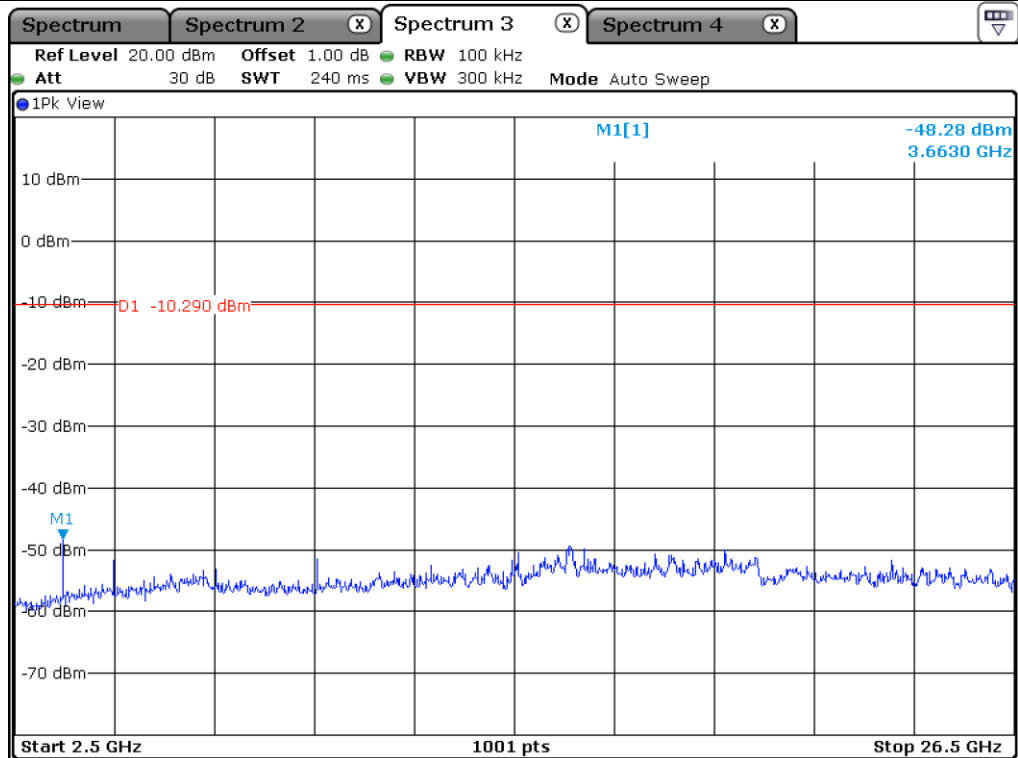
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OTC-TRF-RF-001(0)

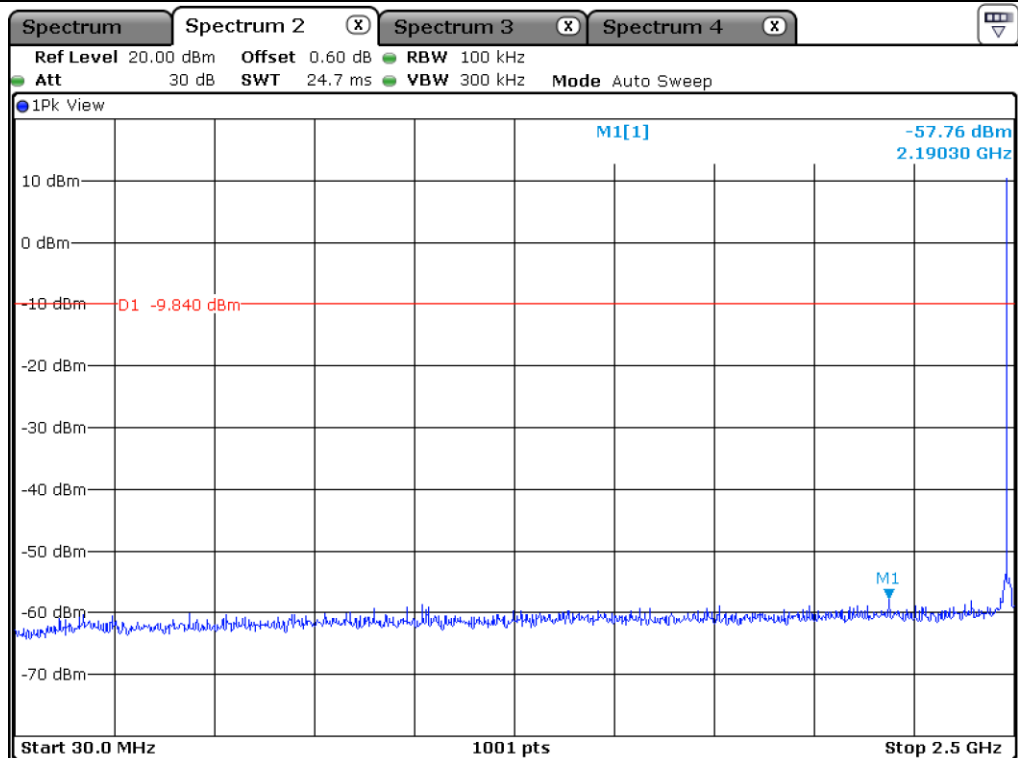
ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)



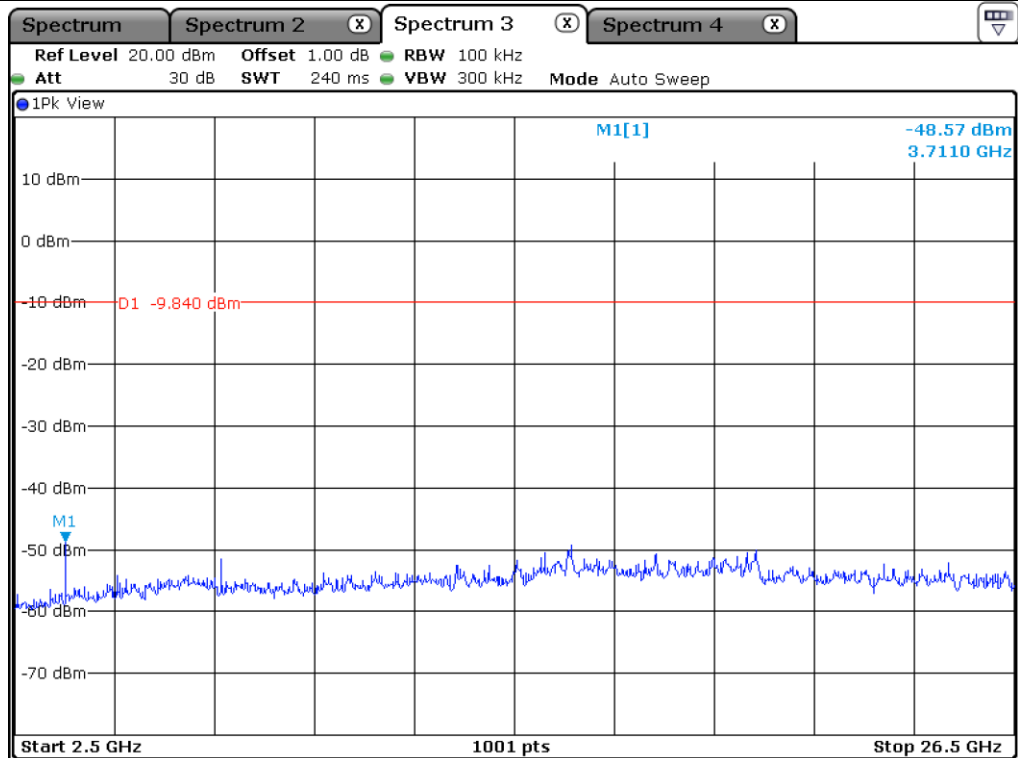
Middle Channel



Middle Channel



High Channel



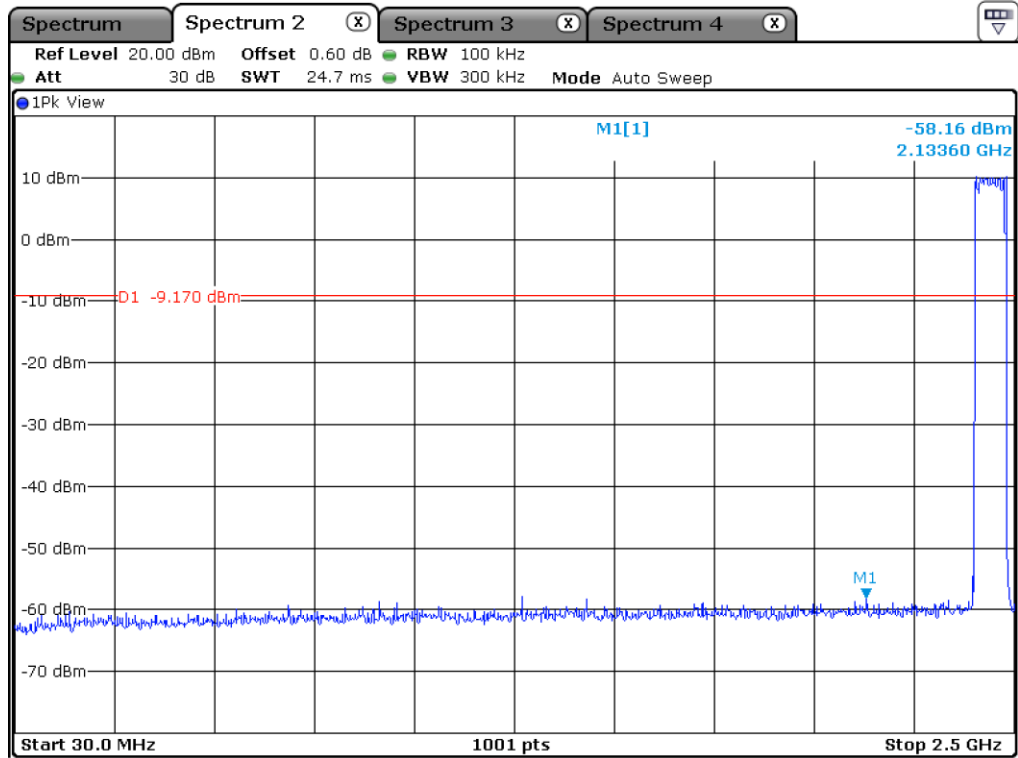
High Channel

This Report is not correlated with the authentication of KOLAS

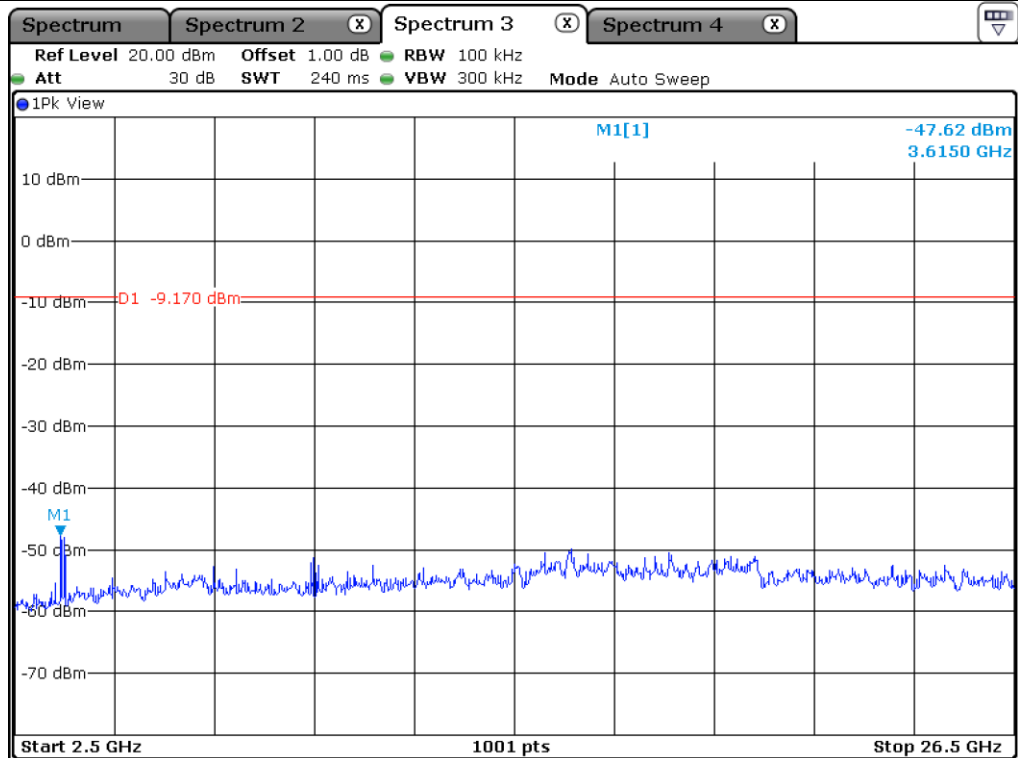
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Hopping Mode



Hopping Mode

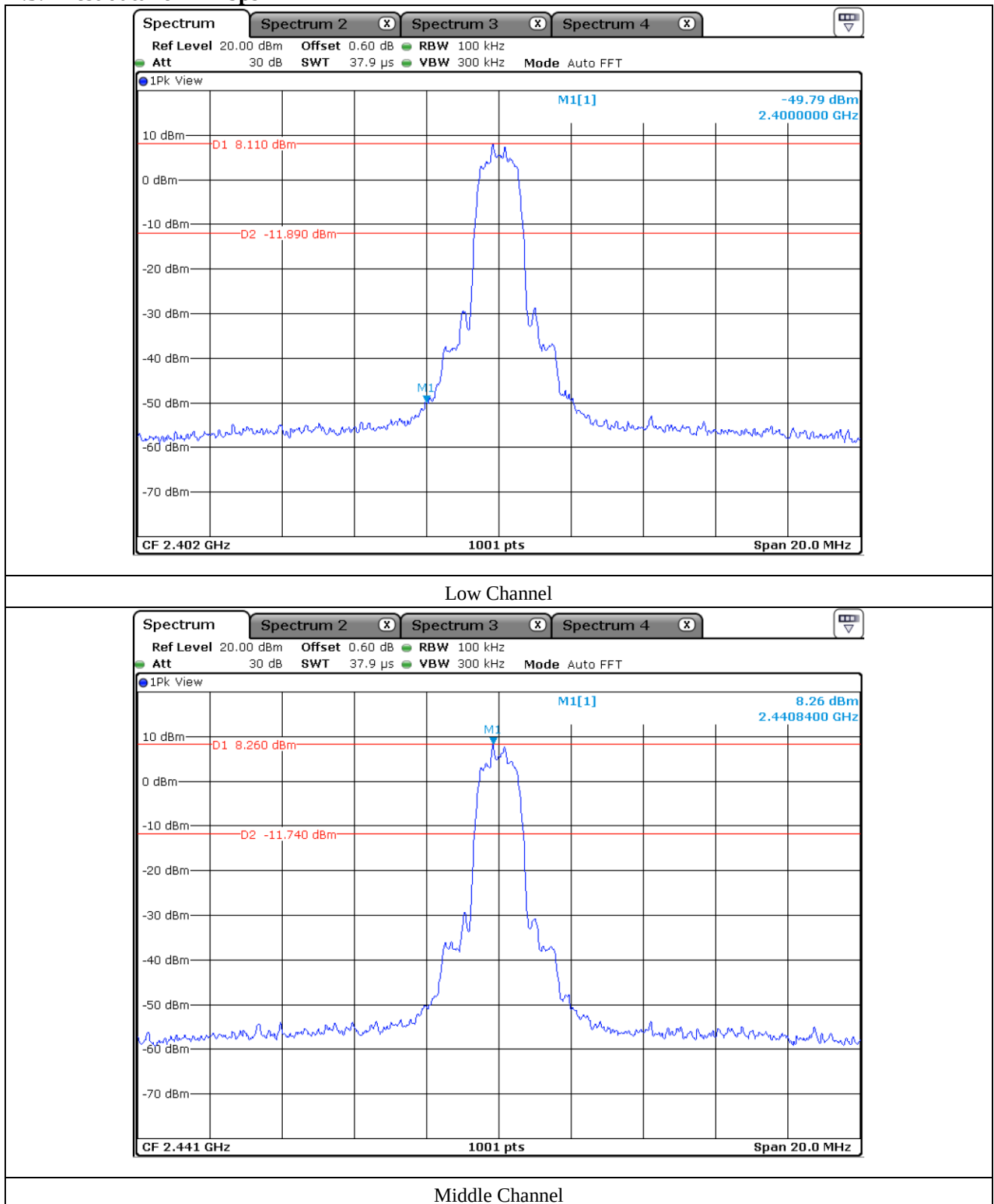
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12.5.2 Test data for 2 Mbps

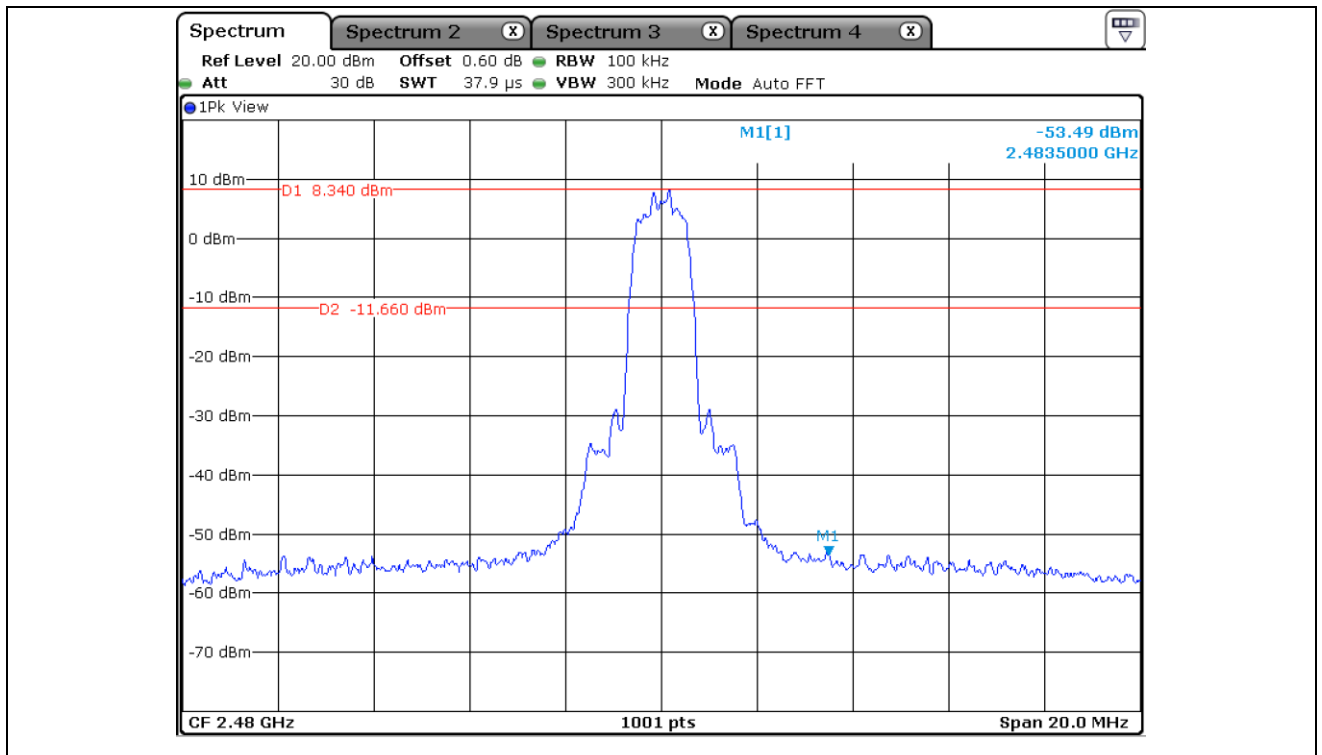


This Report is not correlated with the authentication of KOLAS

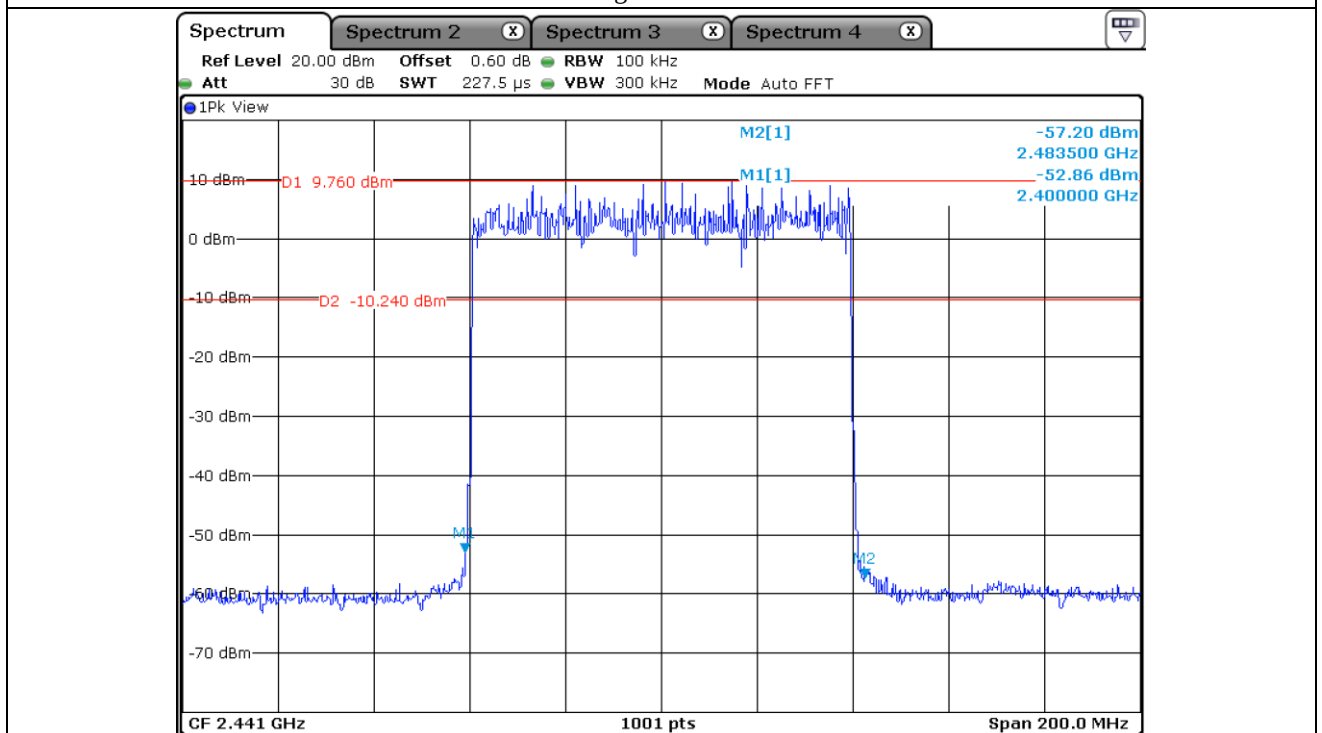
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OTC-TRF-RF-001(0)

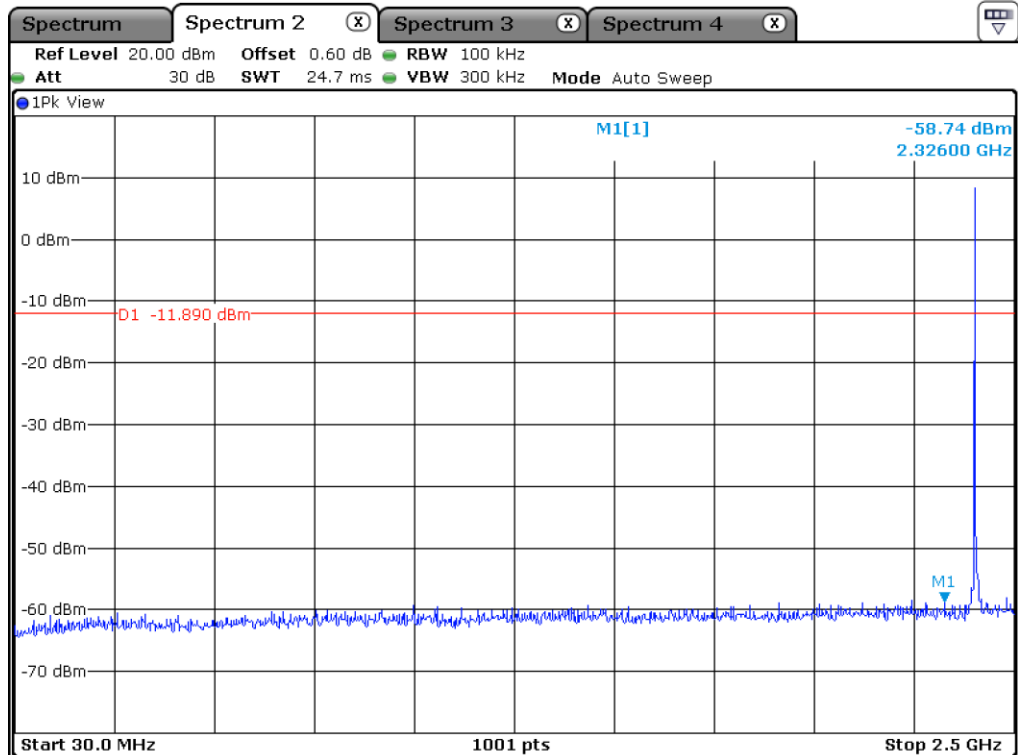
ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)



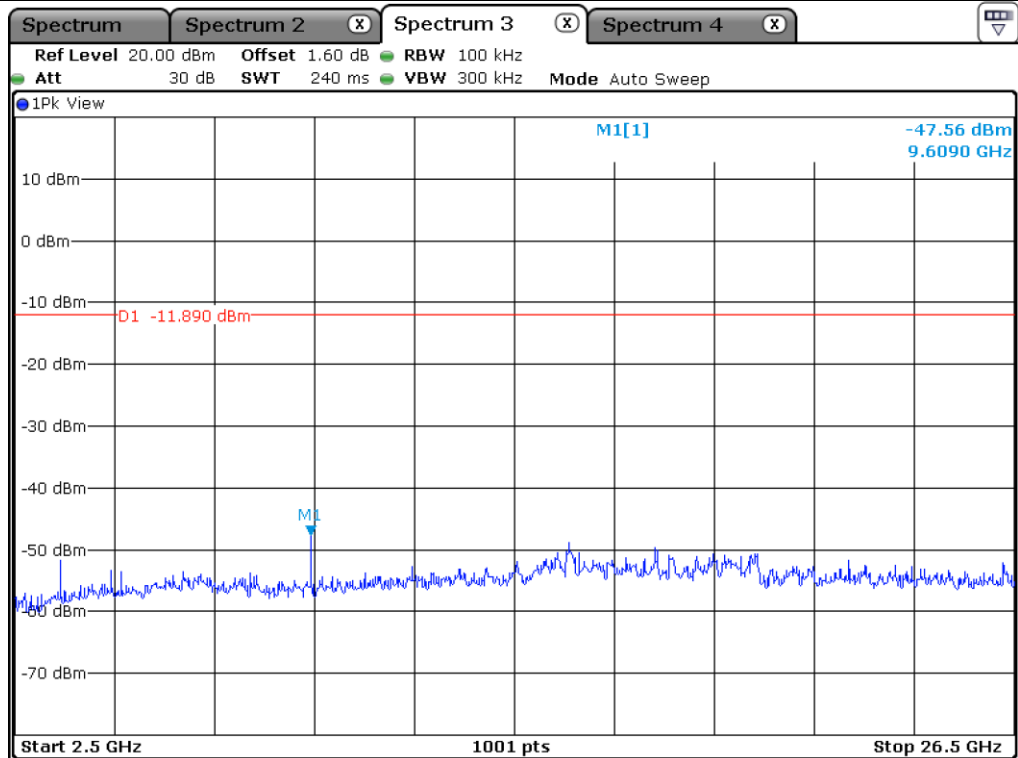
High Channel



Hopping Mode



Low Channel



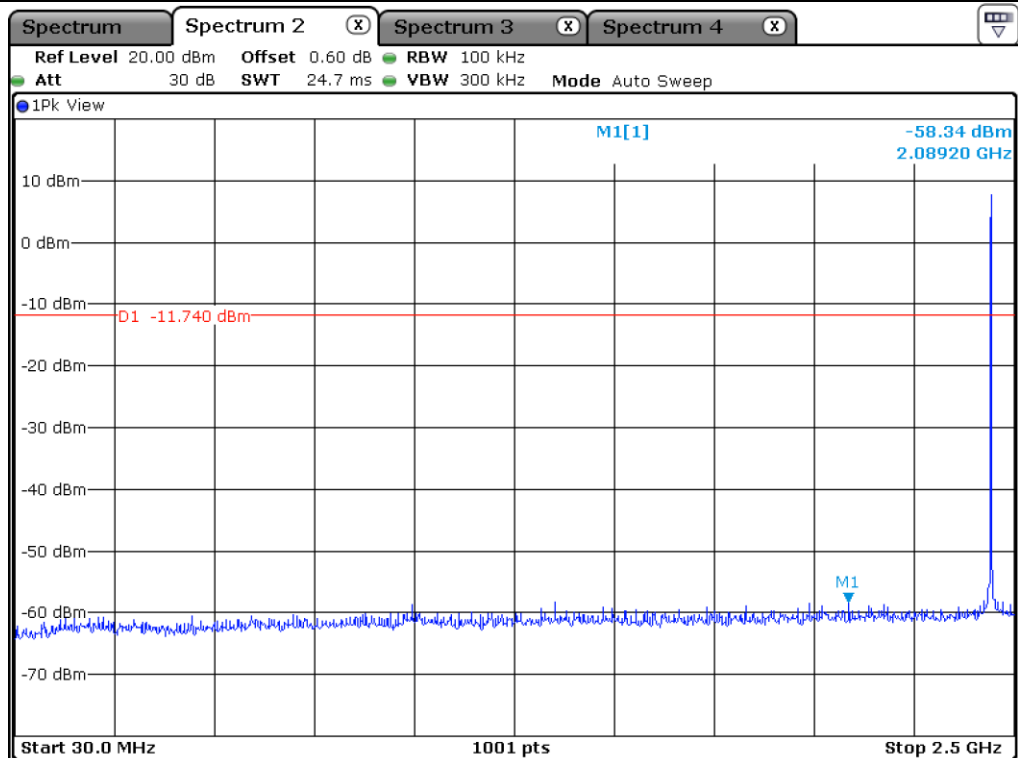
Low Channel

This Report is not correlated with the authentication of KOLAS

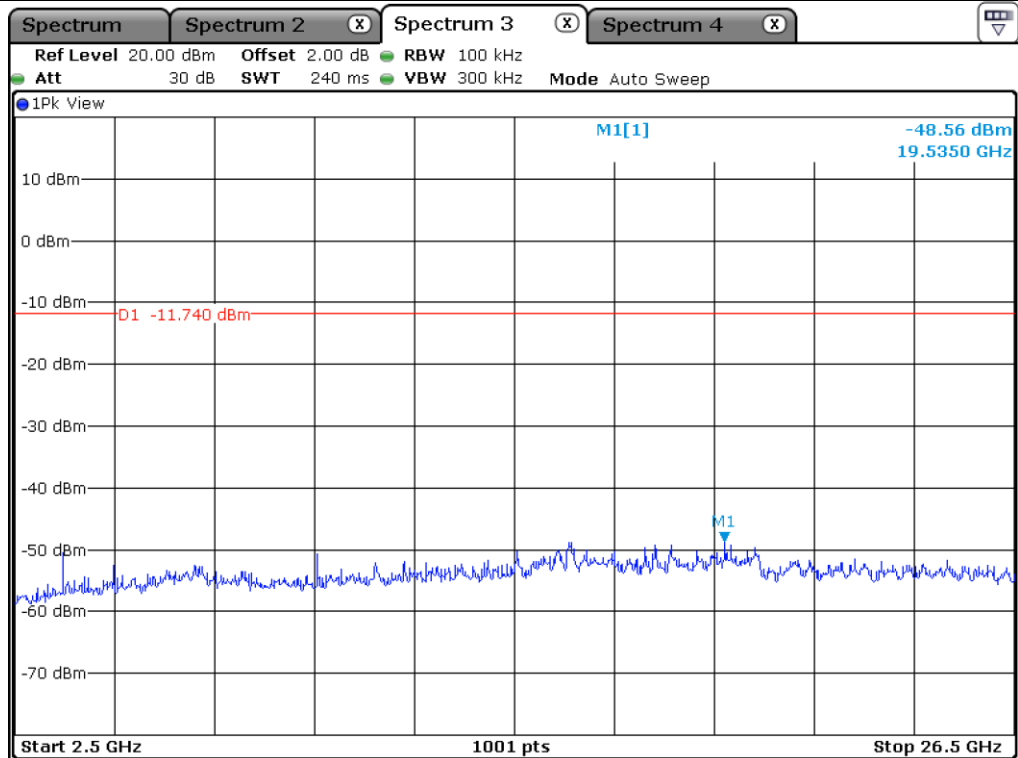
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Middle Channel



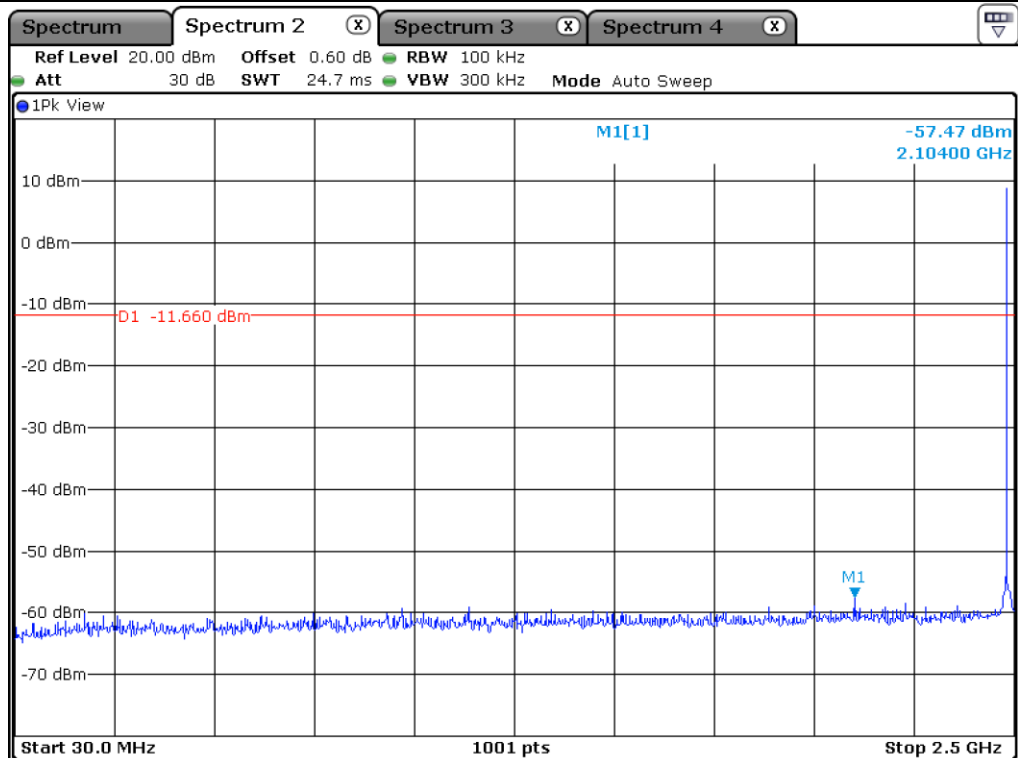
Middle Channel

This Report is not correlated with the authentication of KOLAS

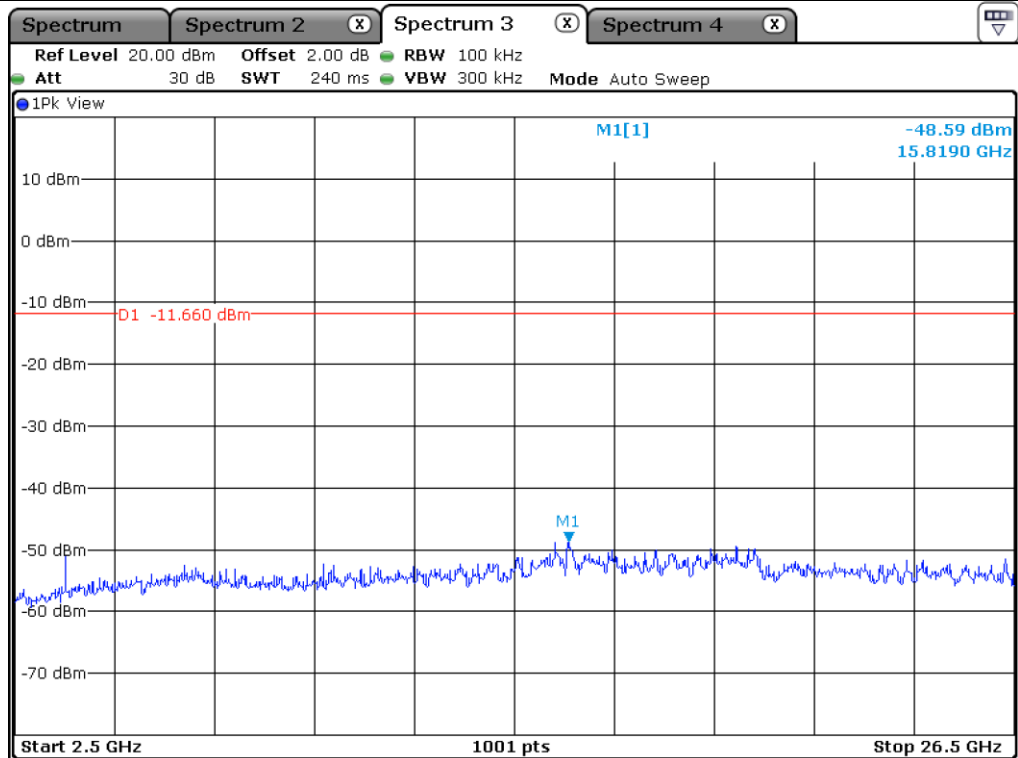
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High Channel



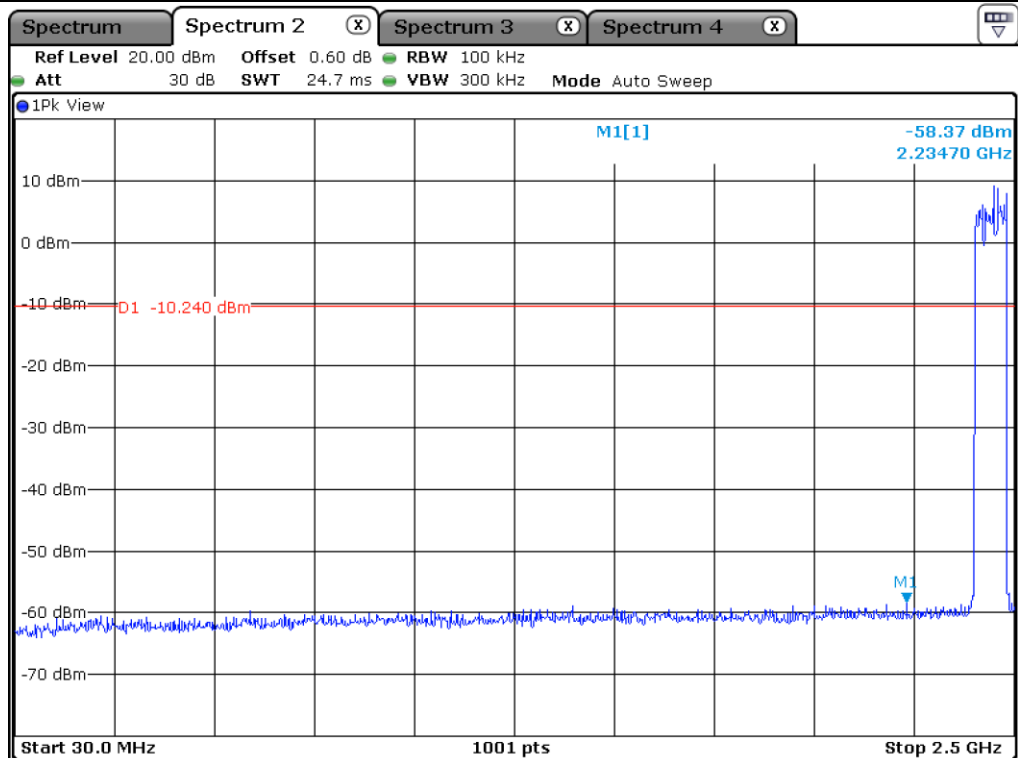
High Channel

This Report is not correlated with the authentication of KOLAS

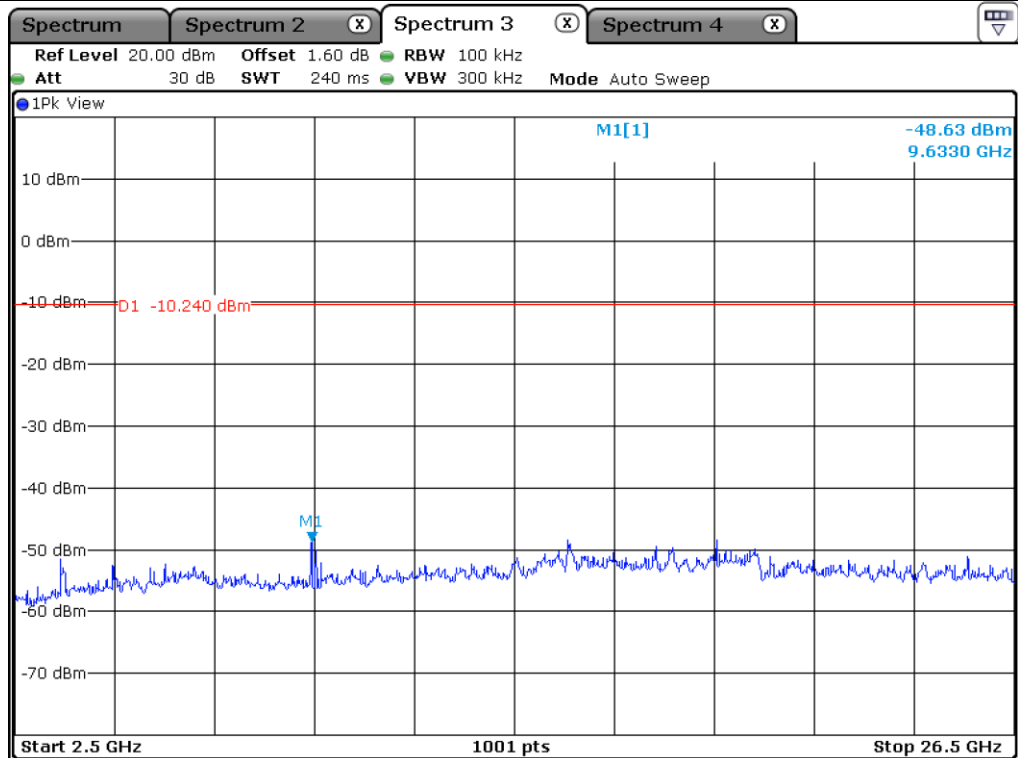
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Hopping Mode



Hopping Mode

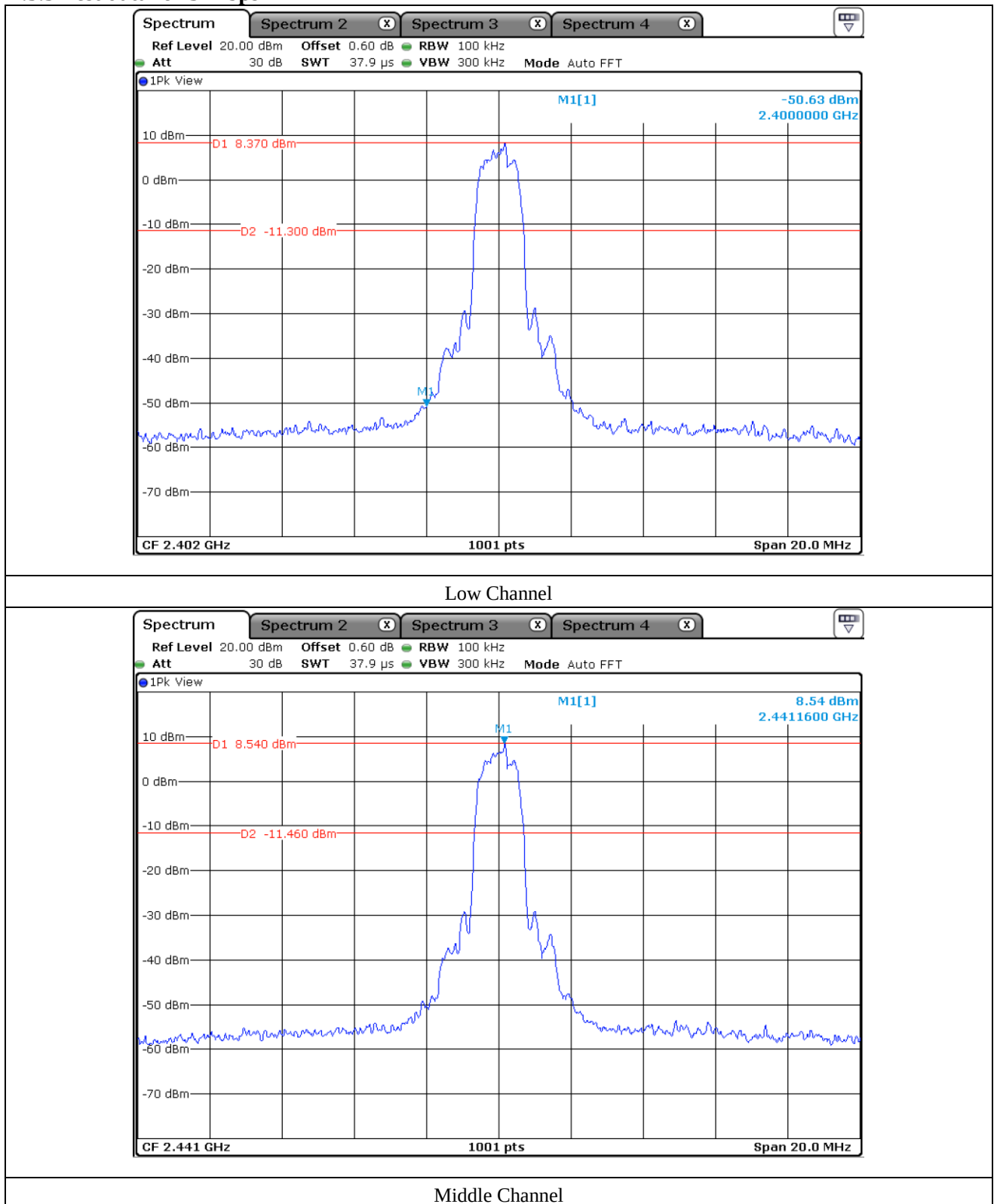
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12.5.3 Test data for 3 Mbps

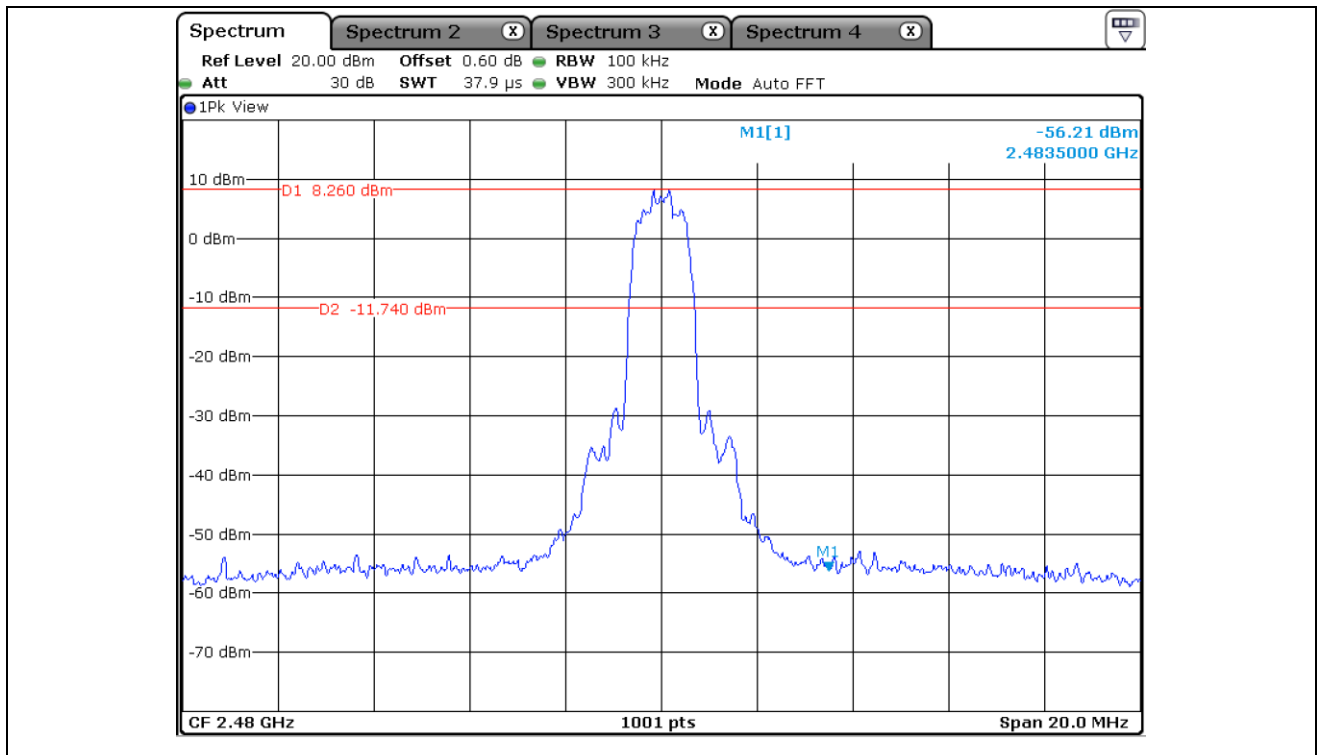


This Report is not correlated with the authentication of KOLAS

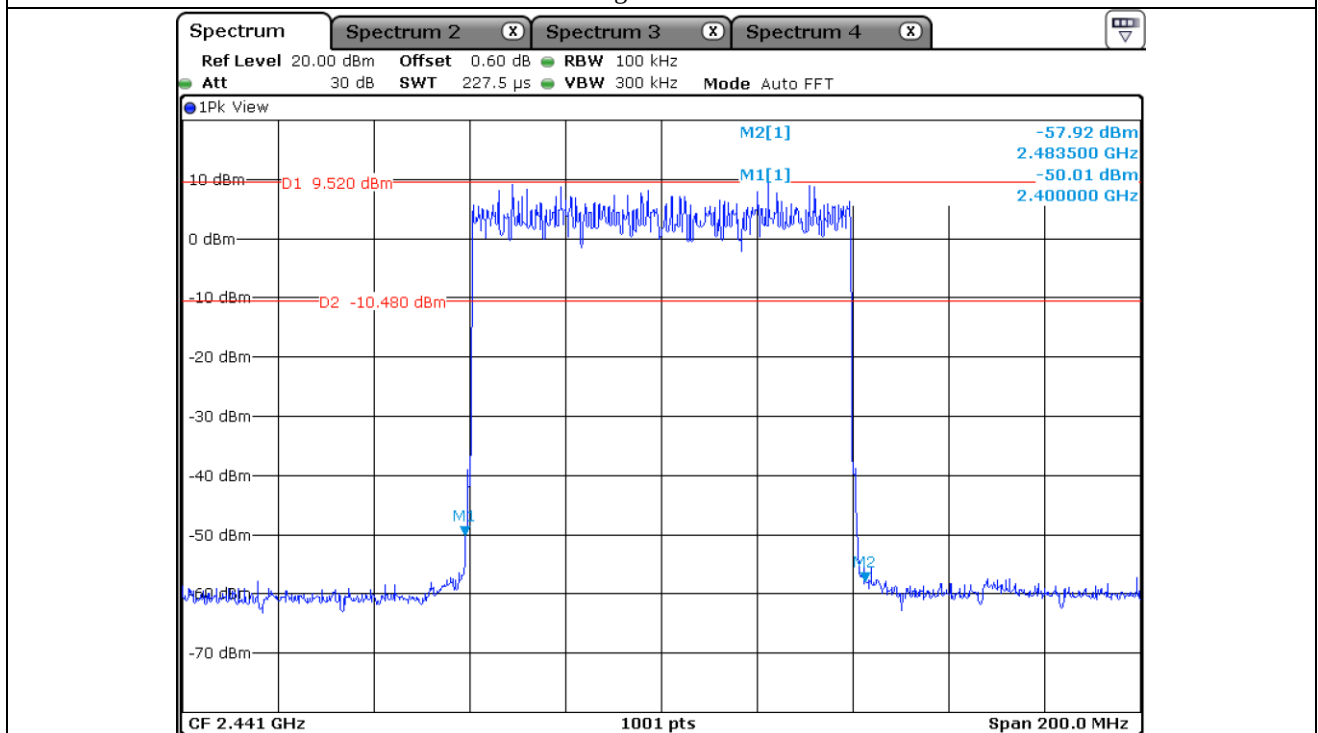
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OTC-TRF-RF-001(0)

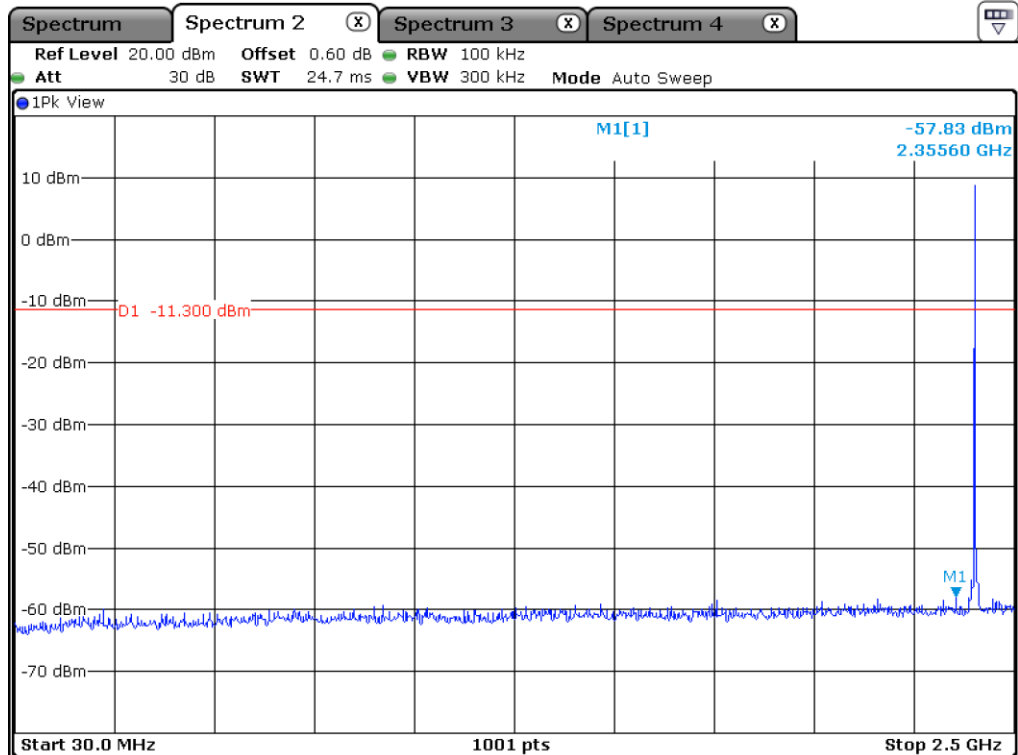
ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)



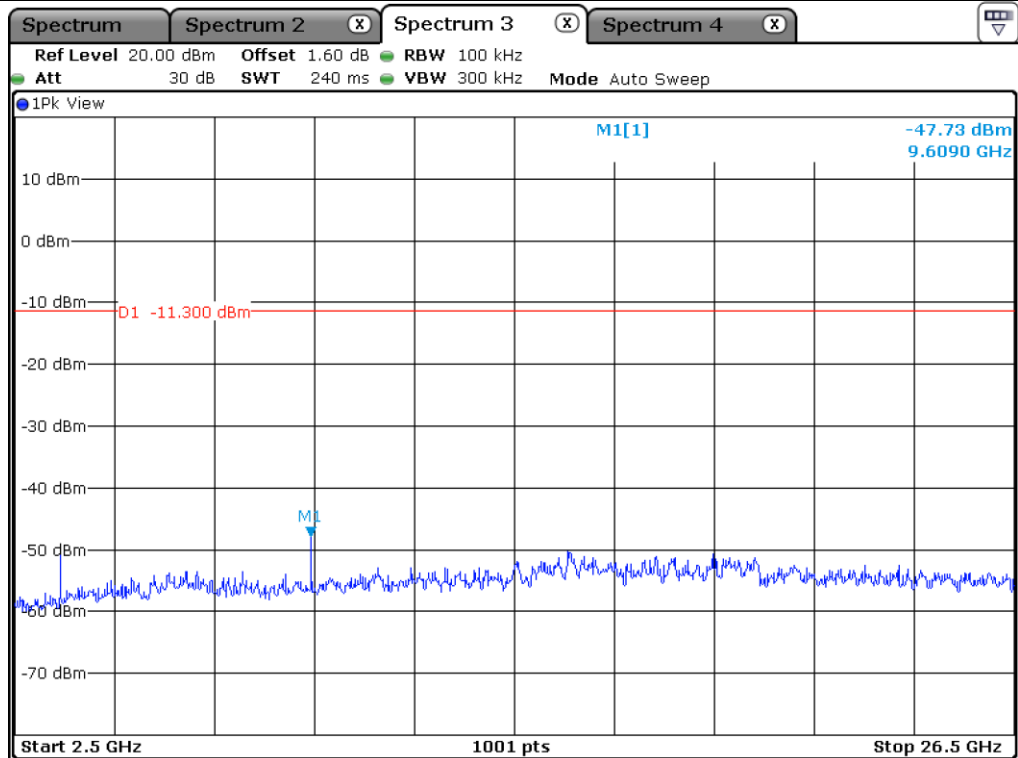
High Channel



Hopping Mode



Low Channel



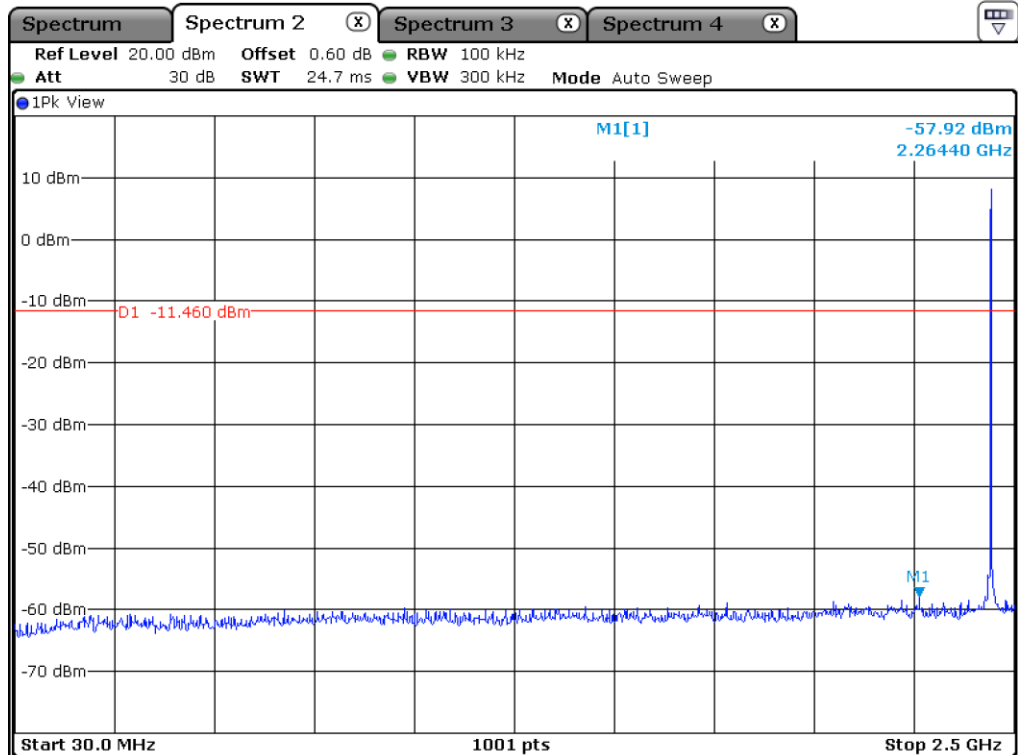
Low Channel

This Report is not correlated with the authentication of KOLAS

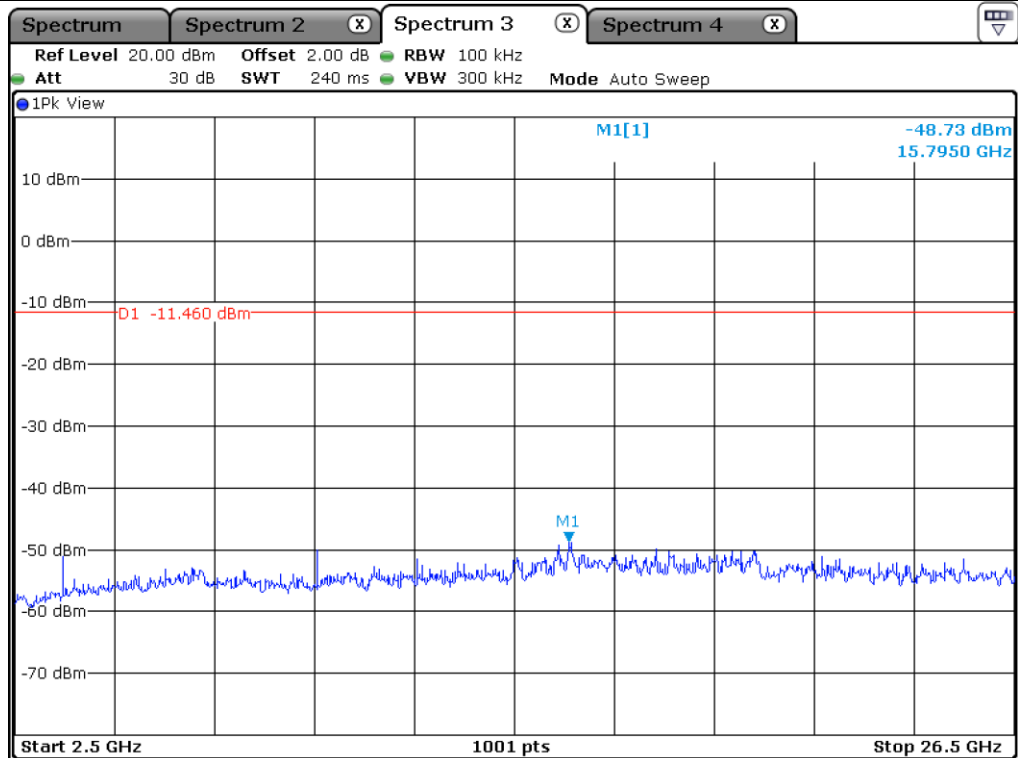
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Middle Channel



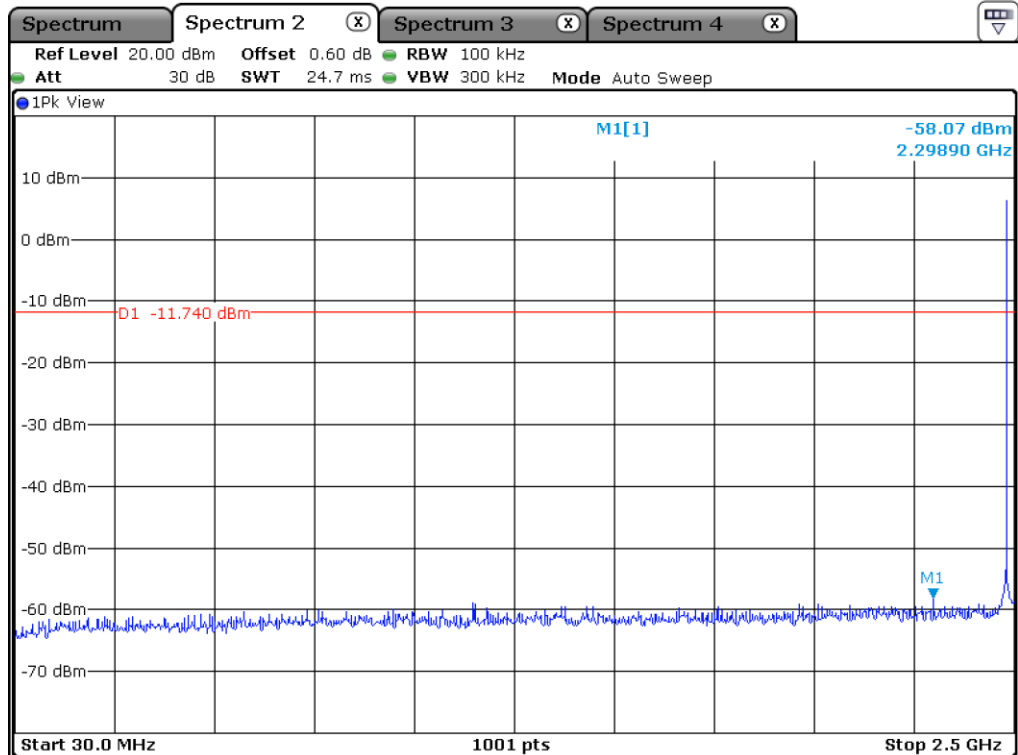
Middle Channel

This Report is not correlated with the authentication of KOLAS

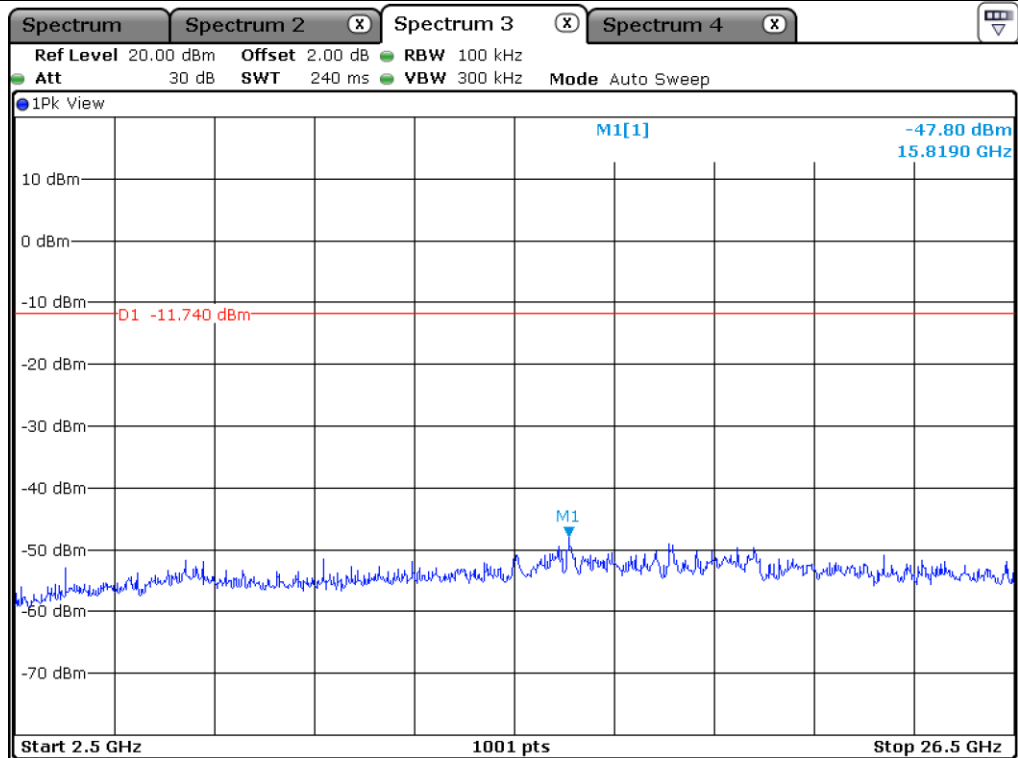
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High Channel



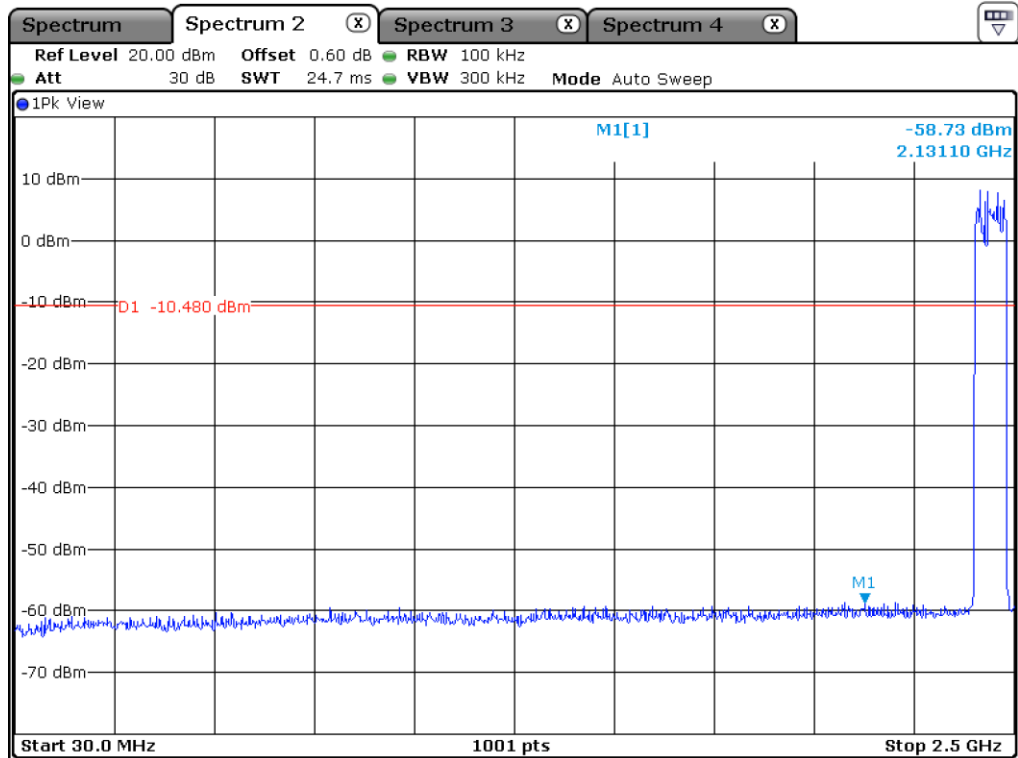
High Channel

This Report is not correlated with the authentication of KOLAS

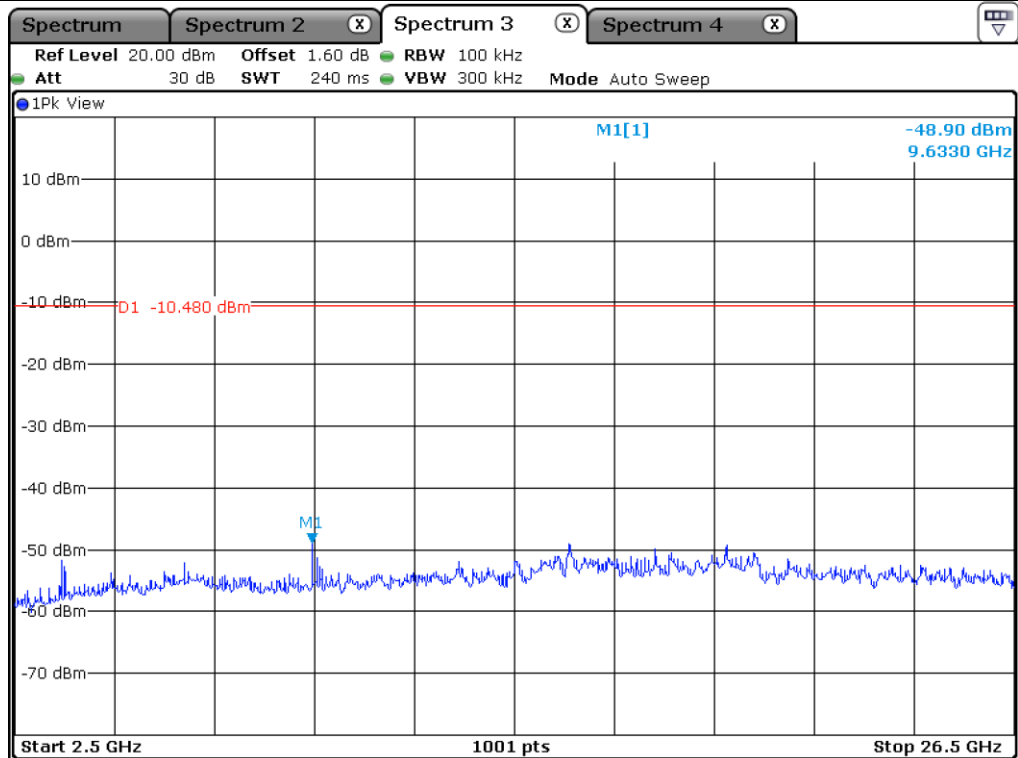
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Hopping Mode



Hopping Mode

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12.6 Test data for Transmitting mode radiated emission

12.6.1 Radiated Emission which fall in the Restricted Band

12.6.1.1 Test data for 1 Mbps

- . Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode
1 MHz and RMS Detector for Average Mode
- . Video bandwidth : 3 MHz for Peak and Average Mode
- . Measurement distance : 3 m
- . Duty Cycle : 57.60 %
- . Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Gain	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel										
2 388.29	53.60	Peak	H	27.50	8.20	45.79	-	43.51	74.00	30.49
2 390.00	43.00	Average	H	27.50	8.20	45.79	2.40	35.31	54.00	18.69
2 389.73	53.12	Peak	V	27.50	8.20	45.79	-	43.03	74.00	30.97
2 390.00	42.50	Average	V	27.50	8.20	45.79	2.40	34.81	54.00	19.19
Test Data for High Channel										
2 483.50	58.63	Peak	H	27.30	8.33	45.79	-	48.47	74.00	25.53
2 483.50	47.18	Average	H	27.30	8.33	45.79	2.40	39.42	54.00	14.58
2 485.43	57.24	Peak	V	27.30	8.33	45.79	-	47.08	74.00	26.92
2 483.50	46.12	Average	V	27.30	8.33	45.79	2.40	38.36	54.00	15.64

Tabulated test data for Restricted Band

Remark: “H”: Horizontal, “V”: Vertical

Margin (dB) = Limits (dBμV/m) - Total Level (dBμV/m)

Total Level = Reading + Antenna Factor + Cable Loss – AMP Gain + Duty Factor

12.6.1.2 Test data for 2 Mbps

- Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode
1 MHz and RMS Detector for Average Mode
- Video bandwidth : 3 MHz for Peak and Average Mode
- Measurement distance : 3 m
- Duty Cycle : 57.60 %
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Gain	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel										
2 385.50	53.04	Peak	H	27.50	8.20	45.79	-	42.95	74.00	31.05
2 390.00	42.84	Average	H	27.50	8.20	45.79	2.40	35.15	54.00	18.85
2 388.56	52.77	Peak	V	27.50	8.20	45.79	-	42.68	74.00	31.32
2 390.00	42.67	Average	V	27.50	8.20	45.79	2.40	34.98	54.00	19.02
Test Data for High Channel										
2 483.50	59.15	Peak	H	27.30	8.33	45.79	-	48.99	74.00	25.01
2 483.50	47.37	Average	H	27.30	8.33	45.79	2.40	39.61	54.00	14.39
2 484.27	58.33	Peak	V	27.30	8.33	45.79	-	48.17	74.00	25.83
2 485.15	46.28	Average	V	27.30	8.33	45.79	2.40	38.52	54.00	15.48

Tabulated test data for Restricted Band

Remark: “H”: Horizontal, “V”: Vertical

$$\text{Margin (dB)} = \text{Limits (dB}\mu\text{V/m)} - \text{Total Level (dB}\mu\text{V/m)}$$

$$\text{Total Level} = \text{Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{AMP Gain} + \text{Duty Factor}$$

12.6.1.3 Test data for 3 Mbps

- Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode
1 MHz and RMS Detector for Average Mode
- Video bandwidth : 3 MHz for Peak and Average Mode
- Measurement distance : 3 m
- Duty Cycle : 57.60 %
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Gain	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel										
2 388.83	52.89	Peak	H	27.50	8.20	45.79	-	42.80	74.00	31.20
2 390.00	43.31	Average	H	27.50	8.20	45.79	2.40	35.62	54.00	18.38
2 387.93	51.67	Peak	V	27.50	8.20	45.79	-	41.58	74.00	32.42
2 390.00	43.17	Average	V	27.50	8.20	45.79	2.40	35.48	54.00	18.52
Test Data for High Channel										
2 485.23	57.38	Peak	H	27.30	8.33	45.79	-	47.22	74.00	26.78
2 483.50	46.82	Average	H	27.30	8.33	45.79	2.40	39.06	54.00	14.94
2 483.76	56.84	Peak	V	27.30	8.33	45.79	-	46.68	74.00	27.32
2 483.50	46.18	Average	V	27.30	8.33	45.79	2.40	38.42	54.00	15.58

Tabulated test data for Restricted Band

Remark: “H”: Horizontal, “V”: Vertical

$$\text{Margin (dB)} = \text{Limits (dB}\mu\text{V/m)} - \text{Total Level (dB}\mu\text{V/m)}$$

$$\text{Total Level} = \text{Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{AMP Gain} + \text{Duty Factor}$$

12.6.2 Spurious & Harmonic Radiated Emission above 1 GHz

12.6.2.1 Test data for 1 Mbps

- Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode for the emissions fall in restricted band,
1 MHz and RMS Detector for Average Mode for the emissions fall in restricted band
100 kHz for Peak Mode for the emissions outside restricted band
- Video bandwidth : 3 MHz for Peak and Average Mode
- Frequency range : 1 GHz ~ 26.5 GHz
- Measurement distance : 3 m
- Duty Cycle : 57.60 %
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Gain	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel										
4 804.00	50.02	Peak	H	31.10	11.19	45.10	-	47.21	74.00	26.79
4 804.00	40.03	Average	H	31.10	11.19	45.10	2.40	39.62	54.00	14.38
4 804.00	49.78	Peak	V	31.10	11.19	45.10	-	46.97	74.00	27.03
4 804.00	39.80	Average	V	31.10	11.19	45.10	2.40	39.39	54.00	14.61
Test Data for Middle Channel										
4 882.00	49.84	Peak	H	31.10	11.24	45.10	-	47.08	74.00	26.92
4 882.00	40.05	Average	H	31.10	11.24	45.10	2.40	39.69	54.00	14.31
4 882.00	49.71	Peak	V	31.10	11.24	45.10	-	46.95	74.00	27.05
4 882.00	39.75	Average	V	31.10	11.24	45.10	2.40	39.39	54.00	14.61
Test Data for High Channel										
4 960.00	49.98	Peak	H	31.20	11.33	45.03	-	47.48	74.00	26.52
4 960.00	40.15	Average	H	31.20	11.33	45.03	2.40	40.05	54.00	13.95
4 960.00	49.81	Peak	V	31.20	11.33	45.03	-	47.31	74.00	26.69
4 960.00	39.83	Average	V	31.20	11.33	45.03	2.40	39.73	54.00	14.27

Remark: "H": Horizontal, "V": Vertical

$$\text{Margin (dB)} = \text{Limits (dBμV/m)} - \text{Total Level (dBμV/m)}$$

$$\text{Total Level} = \text{Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{AMP Gain} + \text{Duty Factor}$$

12.6.2.2 Test data for 2 Mbps

- Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode for the emissions fall in restricted band,
1 MHz and RMS Detector for Average Mode for the emissions fall in restricted band
100 kHz for Peak Mode for the emissions outside restricted band
- Video bandwidth : 3 MHz for Peak and Average Mode
- Frequency range : 1 GHz ~ 26.5 GHz
- Measurement distance : 3 m
- Duty Cycle : 57.60 %
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Gain	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel										
4 804.00	49.73	Peak	H	31.10	11.19	45.10	-	46.92	74.00	27.08
4 804.00	39.78	Average	H	31.10	11.19	45.10	2.40	39.37	54.00	14.63
4 804.00	49.71	Peak	V	31.10	11.19	45.10	-	46.90	74.00	27.10
4 804.00	39.68	Average	V	31.10	11.19	45.10	2.40	39.27	54.00	14.73
Test Data for Middle Channel										
4 882.00	49.64	Peak	H	31.10	11.24	45.10	-	46.88	74.00	27.12
4 882.00	39.85	Average	H	31.10	11.24	45.10	2.40	39.49	54.00	14.51
4 882.00	49.59	Peak	V	31.10	11.24	45.10	-	46.83	74.00	27.17
4 882.00	39.52	Average	V	31.10	11.24	45.10	2.40	39.16	54.00	14.84
Test Data for High Channel										
4 960.00	49.50	Peak	H	31.20	11.33	45.03	-	47.00	74.00	27.00
4 960.00	39.59	Average	H	31.20	11.33	45.03	2.40	39.49	54.00	14.51
4 960.00	49.77	Peak	V	31.20	11.33	45.03	-	47.27	74.00	26.73
4 960.00	39.65	Average	V	31.20	11.33	45.03	2.40	39.55	54.00	14.45

Remark: "H": Horizontal, "V": Vertical

Margin (dB) = Limits (dBμV/m) - Total Level (dBμV/m)

Total Level = Reading + Antenna Factor + Cable Loss – AMP Gain + Duty Factor

12.6.2.3 Test data for 3 Mbps

- Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode for the emissions fall in restricted band,
1 MHz and RMS Detector for Average Mode for the emissions fall in restricted band
100 kHz for Peak Mode for the emissions outside restricted band
- Video bandwidth : 3 MHz for Peak and Average Mode
- Frequency range : 1 GHz ~ 26.5 GHz
- Measurement distance : 3 m
- Duty Cycle : 57.60 %
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Gain	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel										
4 804.00	49.57	Peak	H	31.10	11.19	45.10	-	46.76	74.00	27.24
4 804.00	39.85	Average	H	31.10	11.19	45.10	2.40	39.44	54.00	14.56
4 804.00	49.59	Peak	V	31.10	11.19	45.10	-	46.78	74.00	27.22
4 804.00	39.71	Average	V	31.10	11.19	45.10	2.40	39.30	54.00	14.70
Test Data for Middle Channel										
4 882.00	49.75	Peak	H	31.10	11.24	45.10	-	46.99	74.00	27.01
4 882.00	39.57	Average	H	31.10	11.24	45.10	2.40	39.21	54.00	14.79
4 882.00	49.70	Peak	V	31.10	11.24	45.10	-	46.94	74.00	27.06
4 882.00	39.45	Average	V	31.10	11.24	45.10	2.40	39.09	54.00	14.91
Test Data for High Channel										
4 960.00	49.51	Peak	H	31.20	11.33	45.03	-	47.01	74.00	26.99
4 960.00	39.79	Average	H	31.20	11.33	45.03	2.40	39.69	54.00	14.31
4 960.00	49.60	Peak	V	31.20	11.33	45.03	-	47.10	74.00	26.90
4 960.00	39.58	Average	V	31.20	11.33	45.03	2.40	39.48	54.00	14.52

Remark: "H": Horizontal, "V": Vertical

Margin (dB) = Limits (dBμV/m) - Total Level (dBμV/m)

Total Level = Reading + Antenna Factor + Cable Loss – AMP Gain + Duty Factor

13. RADIATED EMISSION TEST

13.1 Operating environment

Temperature : 22 °C
Relative humidity : 46 % R.H.

13.2 Test set-up

The radiated emissions measurements were on the 3 m semi anechoic chamber. The EUT and other support equipment were placed on a non-conductive turntable above the ground plane. The interconnecting cables from outside test site were inserted into ferrite clamps at the point where the cables reach the turntable.

The frequency spectrum from 30 MHz to 26.5 GHz was scanned and emission levels maximized at each frequency recorded. The system was rotated 360°, and the antenna was varied in height between 1.0 m and 4.0 m in order to determine the maximum emission levels. This procedure was performed for both horizontal and vertical polarization of the receiving antenna.

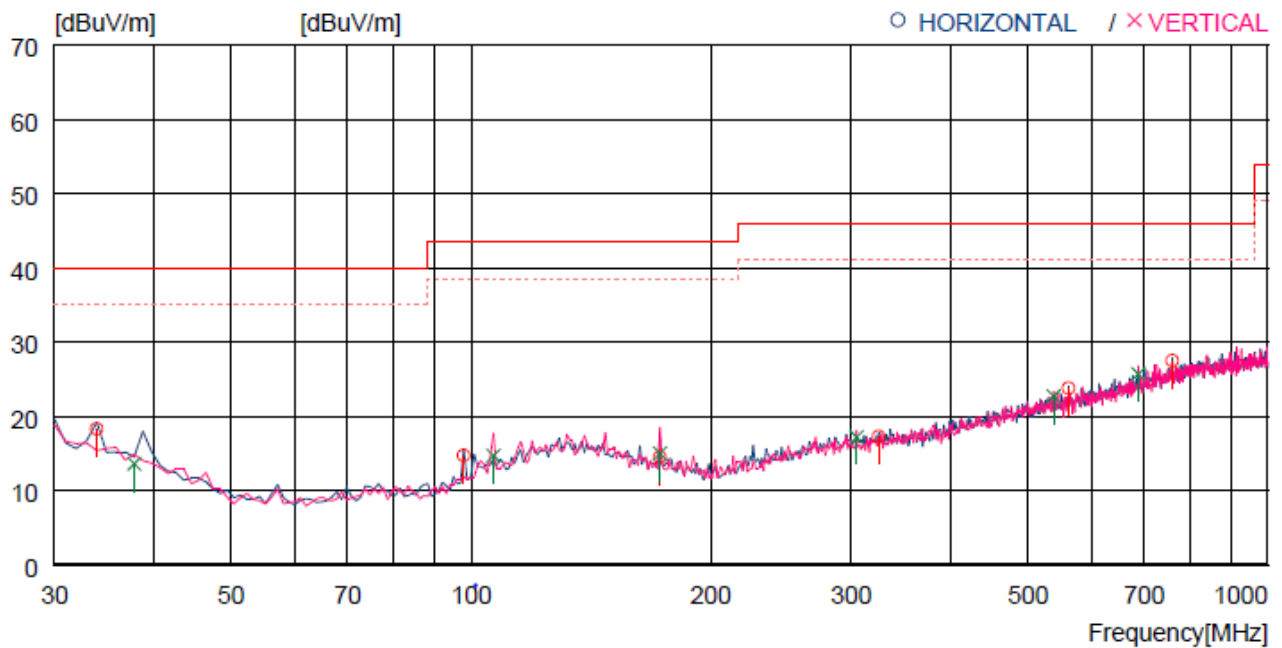
13.3 Test Date

October 07, 2021 ~ October 20, 2021

13.4 Test data for 30 MHz ~ 1 000 MHz

13.4.1 Test data for Bluetooth Mode

- . Resolution bandwidth : 120 kHz
- . Frequency range : 30 MHz ~ 1 000 MHz
- . Measurement distance : 3 m



No.	FREQ	READING	ANT	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE
	[MHz]	[dBuV]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
---- Horizontal ----										
1	33.880	29.6	19.5	1.2	32.0	18.3	40.0	21.7	100	137
2	97.900	30.0	14.9	1.8	32.0	14.7	43.5	28.8	100	2
3	172.590	27.1	17.1	2.3	32.0	14.5	43.5	29.0	100	337
4	324.880	26.6	19.6	3.1	32.0	17.3	46.0	28.7	100	337
5	562.529	28.3	23.8	4.1	32.4	23.8	46.0	22.2	100	337
6	758.463	28.3	26.5	4.8	32.1	27.5	46.0	18.5	100	16
---- Vertical ----										
7	37.760	26.2	18.1	1.3	32.0	13.6	40.0	26.4	100	178
8	106.630	28.4	16.4	1.9	32.0	14.7	43.5	28.8	100	70
9	172.590	27.6	17.1	2.3	32.0	15.0	43.5	28.5	100	70
10	304.510	26.9	19.3	3.0	32.0	17.2	46.0	28.8	100	160
11	538.280	27.5	23.5	4.0	32.3	22.7	46.0	23.3	100	220
12	687.655	28.0	25.4	4.6	32.3	25.7	46.0	20.3	100	70

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13.4.2 Test data for Intermodulation Mode(Bluetooth + WLAN 2.4 GHz + WLAN 5 GHz)

Humidity Level : 46 % R.H.

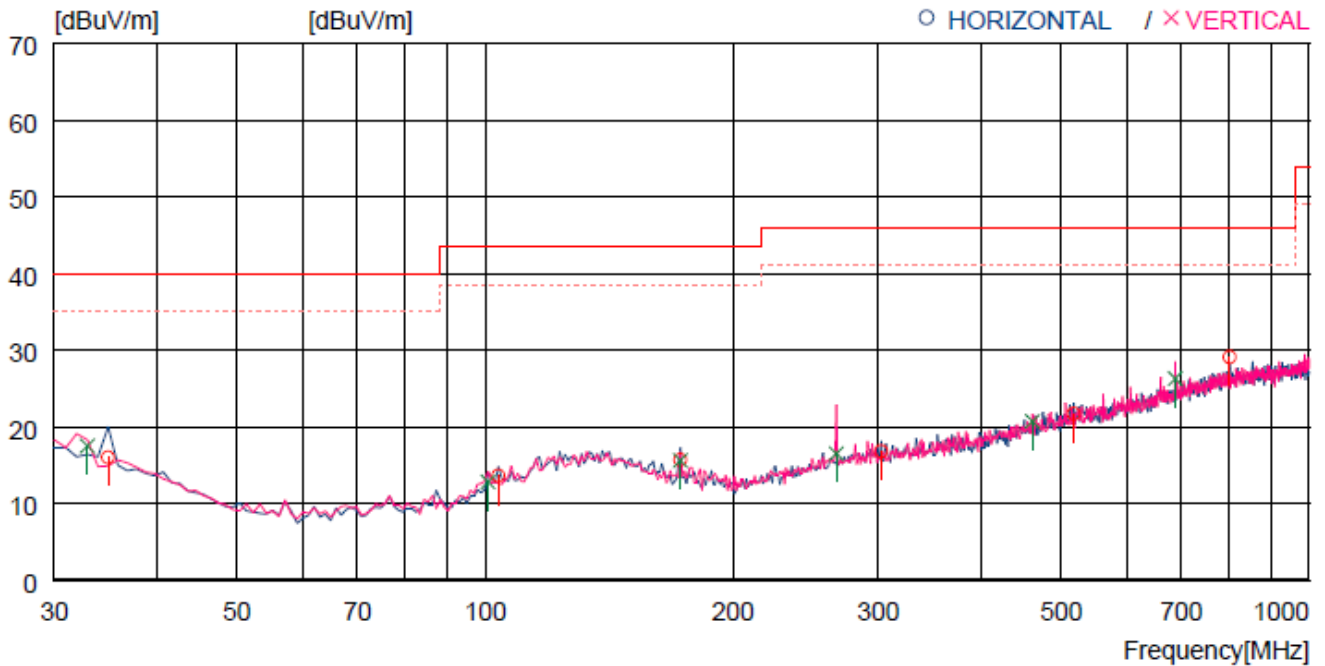
Temperature: 22 °C

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.247

Result : PASSED

EUT : Wi-Fi/BT Transceiver

Detector : CISPR Quasi-Peak (6 dB Bandwidth: 120 kHz)



No.	FREQ	READING	ANT	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE
	[MHz]	[dBuV]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
---- Horizontal ----										
1	34.850	27.6	19.2	1.2	32.0	16.0	40.0	24.0	100	284
2	103.720	27.9	15.9	1.8	32.0	13.6	43.5	29.9	100	62
3	172.590	28.3	17.1	2.3	32.0	15.7	43.5	27.8	100	261
4	302.570	26.6	19.2	3.0	32.0	16.8	46.0	29.2	100	316
5	517.910	26.8	23.3	3.9	32.3	21.7	46.0	24.3	100	78
6	801.142	29.0	27.1	5.0	32.0	29.1	46.0	16.9	100	328
---- Vertical ----										
7	32.910	28.4	19.9	1.2	32.0	17.5	40.0	22.5	100	312
8	100.810	27.6	15.4	1.8	32.0	12.8	43.5	30.7	100	145
9	172.590	28.2	17.1	2.3	32.0	15.6	43.5	27.9	100	128
10	266.680	27.3	18.3	2.9	32.0	16.5	46.0	29.5	100	41
11	461.651	27.0	22.2	3.7	32.2	20.7	46.0	25.3	100	312
12	687.655	28.6	25.4	4.6	32.3	26.3	46.0	19.7	100	312

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13.5 Test data for Below 30 MHz

- . Resolution bandwidth : 200 Hz (from 9 kHz to 0.15 MHz), 9 kHz (from 0.15 MHz to 30 MHz)
- . Frequency range : 9 kHz ~ 30 MHz
- . Measurement distance : 3 m

Frequency (MHz)	Reading (dBμV)	Ant. Pol. (H/V)	Ant. Factor (dB/m)	Cable Loss	Amp Gain	Emission Level(dBμV/m)	Limits (dBμV/m)	Margin (dB)
Emission from the EUT more than 20 dB below the limit in each frequency range.								

13.6 Test data for above 1 GHz

- . Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode
1 MHz and RMS Detector for Average Mode
- . Video bandwidth : 3 MHz for Peak and Average Mode
- . Frequency range : 1 GHz ~ 26.5 GHz
- . Measurement distance : 3 m

Frequency (MHz)	Reading (dBμV)	Ant. Pol. (H/V)	Ant. Factor (dB/m)	Cable Loss	Amp Gain	Emission Level(dBμV/m)	Limits (dBμV/m)	Margin (dB)
Emission from the EUT more than 20 dB below the limit in each frequency range.								

14. CONDUCTED EMISSION TEST

14.1 Operating environment

Temperature : 22 °C
Relative humidity : 46 % R.H.

14.2 Test set-up

The EUT was placed on a wooden table, 0.8 m height above the floor. Power was fed to the EUT through a $50\ \Omega$ / $50\ \mu\text{H}$ + $5\ \Omega$ Artificial Mains Network (AMN). The ground plane was electrically bonded to the reference ground system and all power lines were filtered from ambient.

14.3 Test Date

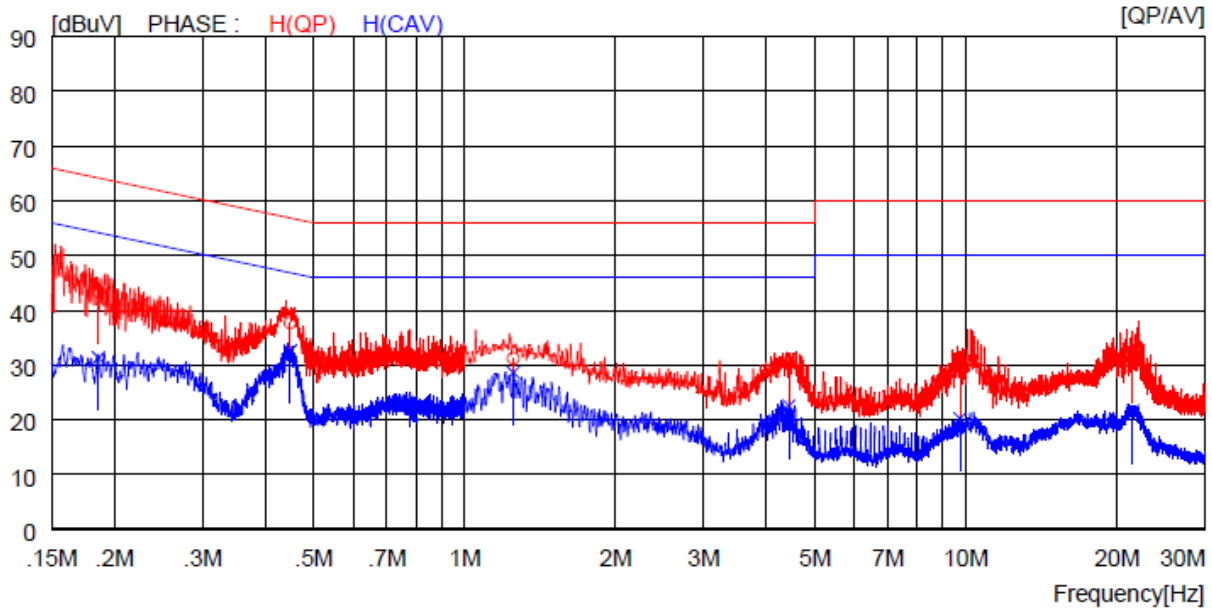
October 07, 2021 ~ October 20, 2021

14.4 Test data

14.4.1 Test data for Bluetooth

- . Resolution bandwidth : 9 kHz
- . Frequency range : 0.15 MHz ~ 30 MHz
- . Tested Line : LIVE LINE

LIMIT : EN.KN.FCC.VCCI_CISPR Pub.22 Class B, Quasi-Peak Limits (Mains Ports)
EN.KN.FCC.VCCI_CISPR Pub.22 Class B, Average Limits (Mains Ports)



NO	FREQ [MHz]	READING		C. FACTOR [dB]	RESULT		LIMIT		MARGIN		PHASE
		QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	
1	0.18600	33.5	----	9.9	43.4	----	64.2	----	20.8	----	H (QP)
2	0.44900	27.8	----	9.9	37.7	----	56.9	----	19.2	----	H (QP)
3	1.25200	21.1	----	10.1	31.2	----	56.0	----	24.8	----	H (QP)
4	4.43600	20.4	----	10.1	30.5	----	56.0	----	25.5	----	H (QP)
5	9.73000	18.9	----	10.2	29.1	----	60.0	----	30.9	----	H (QP)
6	21.55000	22.1	----	10.4	32.5	----	60.0	----	27.5	----	H (QP)
7	0.18600	----	21.4	9.9	----	31.3	----	54.2	----	22.9	H (CAV)
8	0.44900	----	22.7	9.9	----	32.6	----	46.9	----	14.3	H (CAV)
9	1.25200	----	18.5	10.1	----	28.6	----	46.0	----	17.4	H (CAV)
10	4.43600	----	12.4	10.1	----	22.5	----	46.0	----	23.5	H (CAV)
11	9.73000	----	10.0	10.2	----	20.2	----	50.0	----	29.8	H (CAV)
12	21.55000	----	11.2	10.4	----	21.6	----	50.0	----	28.4	H (CAV)

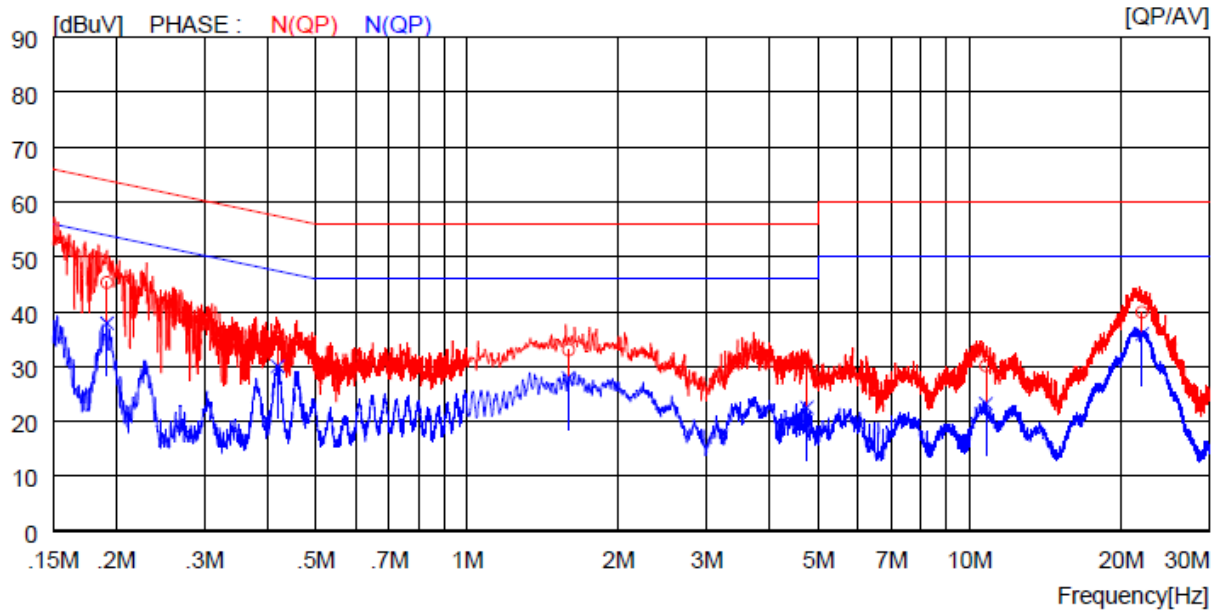
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-. Tested Line : NEUTRAL LINE

LIMIT : EN.KN.FCC.VCCI_CISPR Pub.22 Class B, Quasi-Peak Limits (Mains Ports)
EN.KN.FCC.VCCI_CISPR Pub.22 Class B, Average Limits (Mains Ports)



NO	FREQ [MHz]	READING		C. FACTOR [dB]	RESULT		LIMIT		MARGIN		PHASE
		QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	
1	0.19200	35.4	----	9.9	45.3	----	63.9	----	18.6	----	N (QP)
2	0.42000	25.7	----	9.9	35.6	----	57.4	----	21.8	----	N (QP)
3	1.59200	22.9	----	10.1	33.0	----	56.0	----	23.0	----	N (QP)
4	4.74400	20.6	----	10.1	30.7	----	56.0	----	25.3	----	N (QP)
5	10.78000	19.9	----	10.2	30.1	----	60.0	----	29.9	----	N (QP)
6	22.05000	29.5	----	10.4	39.9	----	60.0	----	20.1	----	N (QP)
7	0.19200	----	28.0	9.9	----	37.9	----	53.9	----	16.0	N (CAV)
8	0.42000	----	20.1	9.9	----	30.0	----	47.4	----	17.4	N (CAV)
9	1.59200	----	17.8	10.1	----	27.9	----	46.0	----	18.1	N (CAV)
10	4.74400	----	12.4	10.1	----	22.5	----	46.0	----	23.5	N (CAV)
11	10.78000	----	13.0	10.2	----	23.2	----	50.0	----	26.8	N (CAV)
12	22.05000	----	25.5	10.4	----	35.9	----	50.0	----	14.1	N (CAV)

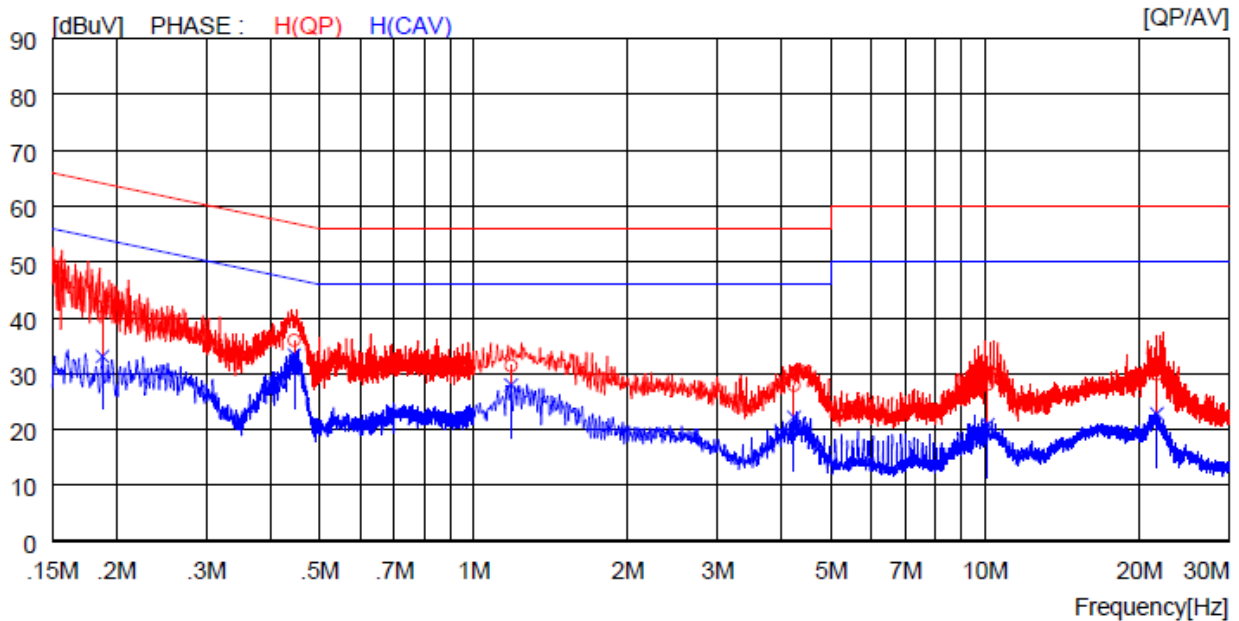
Remark: Margin (dB) = Limit – Level (Result)

The emission level in above table is included the transducer factor that means insertion loss (LISN), cable loss and attenuator.

14.4.2 Test data for Intermodulation Mode(Bluetooth + WLAN 2.4 GHz + WLAN 5 GHz)

- Resolution bandwidth : 9 kHz
- Frequency range : 0.15 MHz ~ 30 MHz
- Tested Line : LIVE LINE

LIMIT : EN.KN.FCC.VCCI_CISPR Pub.22 Class B, Quasi-Peak Limits (Mains Ports)
EN.KN.FCC.VCCI_CISPR Pub.22 Class B, Average Limits (Mains Ports)



NO	FREQ [MHz]	READING		C.FACTOR [dB]	RESULT		LIMIT		MARGIN		PHASE
		QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	
1	0.18800	32.1	----	9.9	42.0	----	64.1	----	22.1	----	H (QP)
2	0.44600	26.1	----	9.9	36.0	----	56.9	----	20.9	----	H (QP)
3	1.18400	21.4	----	10.0	31.4	----	56.0	----	24.6	----	H (QP)
4	4.23200	17.8	----	10.1	27.9	----	56.0	----	28.1	----	H (QP)
5	10.13000	17.9	----	10.2	28.1	----	60.0	----	31.9	----	H (QP)
6	21.66000	19.5	----	10.4	29.9	----	60.0	----	30.1	----	H (QP)
7	0.18800	----	23.2	9.9	----	33.1	----	54.1	----	21.0	H (CAV)
8	0.44600	----	23.4	9.9	----	33.3	----	46.9	----	13.6	H (CAV)
9	1.18400	----	18.0	10.0	----	28.0	----	46.0	----	18.0	H (CAV)
10	4.23200	----	12.1	10.1	----	22.2	----	46.0	----	23.8	H (CAV)
11	10.13000	----	10.7	10.2	----	20.9	----	50.0	----	29.1	H (CAV)
12	21.66000	----	12.4	10.4	----	22.8	----	50.0	----	27.2	H (CAV)

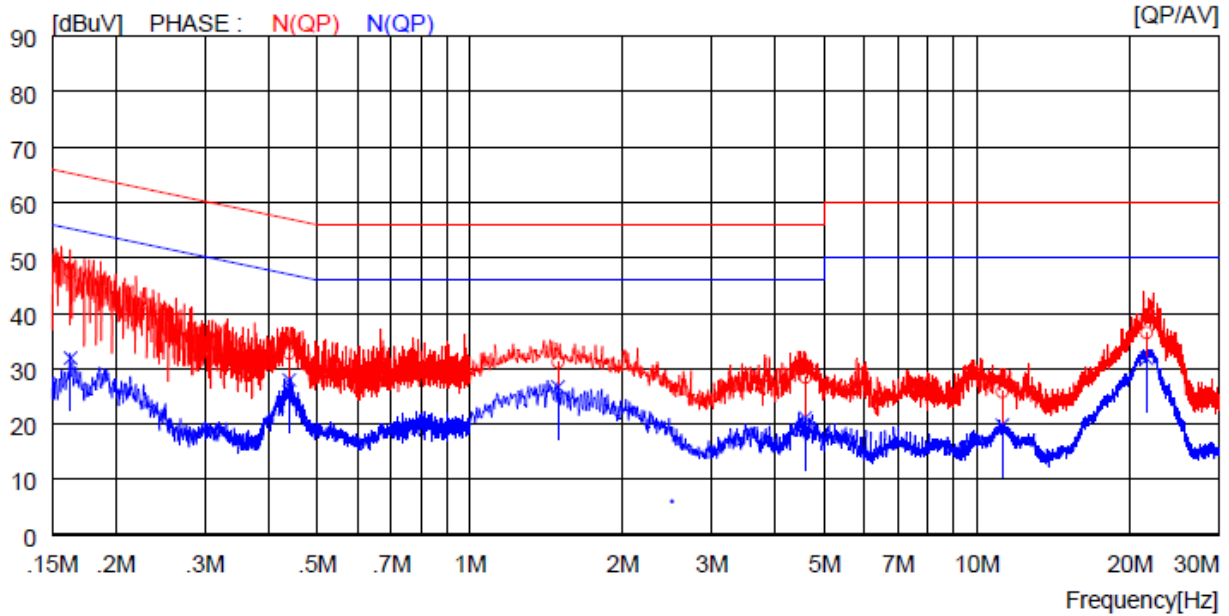
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-. Tested Line : NEUTRAL LINE

LIMIT : EN.KN.FCC.VCCI_CISPR Pub.22 Class B, Quasi-Peak Limits (Mains Ports)
EN.KN.FCC.VCCI_CISPR Pub.22 Class B, Average Limits (Mains Ports)



NO	FREQ [MHz]	READING		C.FACTOR [dB]	RESULT		LIMIT		MARGIN		PHASE
		QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	
1	0.16300	37.5	----	9.9	47.4	----	65.3	----	17.9	----	N (QP)
2	0.44000	22.9	----	9.9	32.8	----	57.1	----	24.3	----	N (QP)
3	1.49200	21.1	----	10.1	31.2	----	56.0	----	24.8	----	N (QP)
4	4.59200	18.3	----	10.1	28.4	----	56.0	----	27.6	----	N (QP)
5	11.21000	15.6	----	10.2	25.8	----	60.0	----	34.2	----	N (QP)
6	21.61000	26.1	----	10.4	36.5	----	60.0	----	23.5	----	N (QP)
7	0.16300	----	22.0	9.9	----	31.9	----	55.3	----	23.4	N (CAV)
8	0.44000	----	18.1	9.9	----	28.0	----	47.1	----	19.1	N (CAV)
9	1.49200	----	16.6	10.1	----	26.7	----	46.0	----	19.3	N (CAV)
10	4.59200	----	11.0	10.1	----	21.1	----	46.0	----	24.9	N (CAV)
11	11.21000	----	9.6	10.2	----	19.8	----	50.0	----	30.2	N (CAV)
12	21.61000	----	21.4	10.4	----	31.8	----	50.0	----	18.2	N (CAV)

Remark: Margin (dB) = Limit – Level (Result)

The emission level in above table is included the transducer factor that means insertion loss (LISN), cable loss and attenuator.

15. LIST OF TEST EQUIPMENT

Model Number	Manufacturer	Description	Serial Number	Last Cal.(Interval)
FSV40-N	Rohde & Schwarz	Signal Analyzer	102177	Apr. 16, 2021 (1Y)
ESW 44	Rohde & Schwarz	EMI Test Receiver	101851	Mar. 23, 2021 (1Y)
310N	Sonoma Instrument	Pre-Amplifier	392756	Oct. 14, 2021 (1Y)
SCU18	Rohde & Schwarz	Pre-Amplifier	102266	Jul. 14, 2021 (1Y)
PAM-840A	Com-Power	Pre-Amplifier	461339	Oct. 12, 2021 (1Y)
DT3000-3t	Innco System	Turn Table	DT3000/093	N/A
MA-4000XPET	Innco System	Antenna Master	MA4000/509	N/A
FMZB 1513	Schwarzbeck	Loop Antenna	1513-235	Mar. 24, 2020 (2Y)
HLP-2008	TDK	Hybrid Antenna	131316	Feb. 27, 2020 (2Y)
BBHA9120D	Schwarzbeck	Horn Antenna	9120D-1366	Jul. 20, 2021 (1Y)
BBHA9170	Schwarzbeck	Horn Antenna	BBHA9170178	Jan. 07, 2021(1Y)
HPF 3GHz	Rohde & Schwarz	High Pass Filter	N/A	Feb. 08, 2021 (1Y)
ESCI	Rohde & Schwarz	EMI TEST RECEIVER	101012	Oct. 20, 2021 (1Y)
NSLK8126	Schwarzbeck	AMN	8126-404	Mar. 16, 2021 (1Y)
ESH3-Z2	Rohde & Schwarz	PULSE LIMITER	100655	Mar. 15, 2021 (1Y)

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