10. 100 kHz BANDWIDTH OUTSIDE THE FREQUENCY BAND

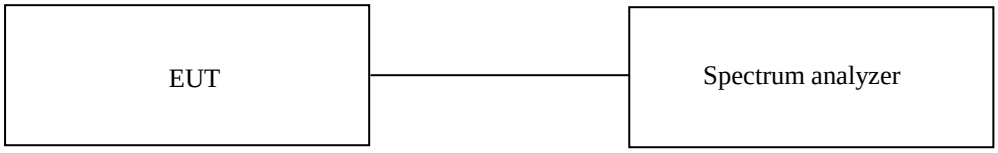
10.1 Operating environment

Temperature : 24 ℃

Relative humidity : 46 % R.H.

10.2 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.



10.3 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.

10.4 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ -	FSV40	Rohde & Schwarz	Signal Analyzer	101009	May 31, 2016 (1Y)
■ -	ESU	Rohde & Schwarz	EMI Test Receiver	100261	Apr. 06, 2016 (1Y)
■ -	310N	Sonoma Instrument	Pre-Amplifier	312544	Apr. 05, 2016 (1Y)
■ -	SCU-18	Rohde & Schwarz	Pre-Amplifier	102209	May 31, 2016 (1Y)
■	SCU40A	Rohde & Schwarz	Signal Conditioning unit	100436	May 31, 2016 (1Y)
■ -	DT3000-3t	Innco System	Turn Table	DT3000/093	N/A
■ -	MA-4000XPET	Innco System	Antenna Master	MA4000/509	N/A
■ -	VULB9163	Schwarzbeck	TRILOG Broadband Antenna	9163-421	Apr. 15, 2016 (1Y)
■ -	BBHA9120D	Schwarzbeck	Horn Antenna	BBHA9120D295	Aug. 31, 2015 (2Y)
■ -	BBHA9170	Schwarzbeck	Horn Antenna	BBHA9170178	Aug. 31, 2015 (2Y)

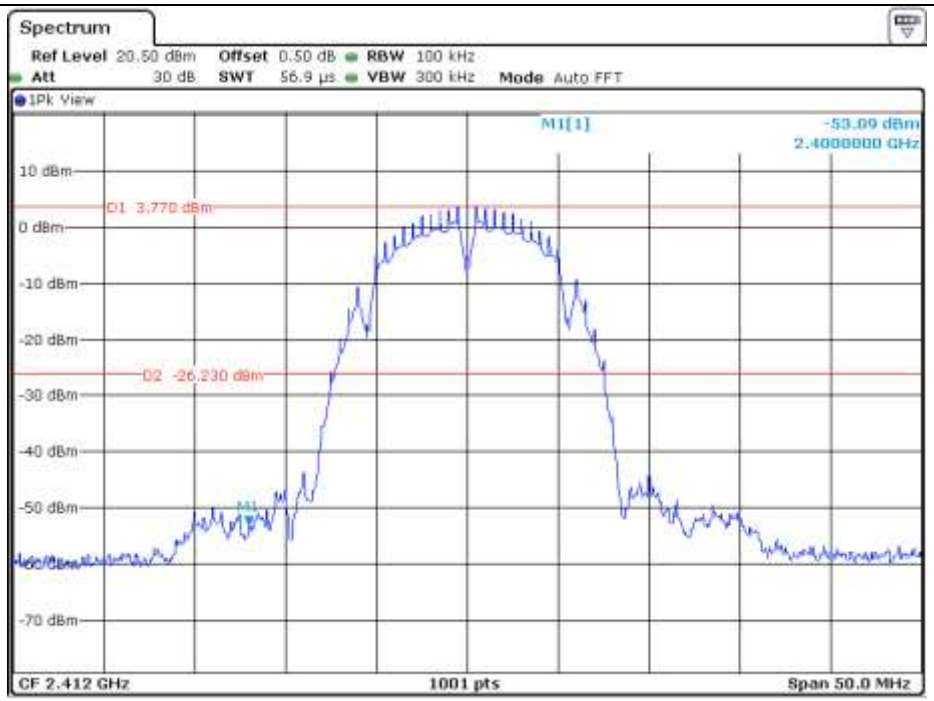
All test equipment used is calibrated on a regular basis.

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

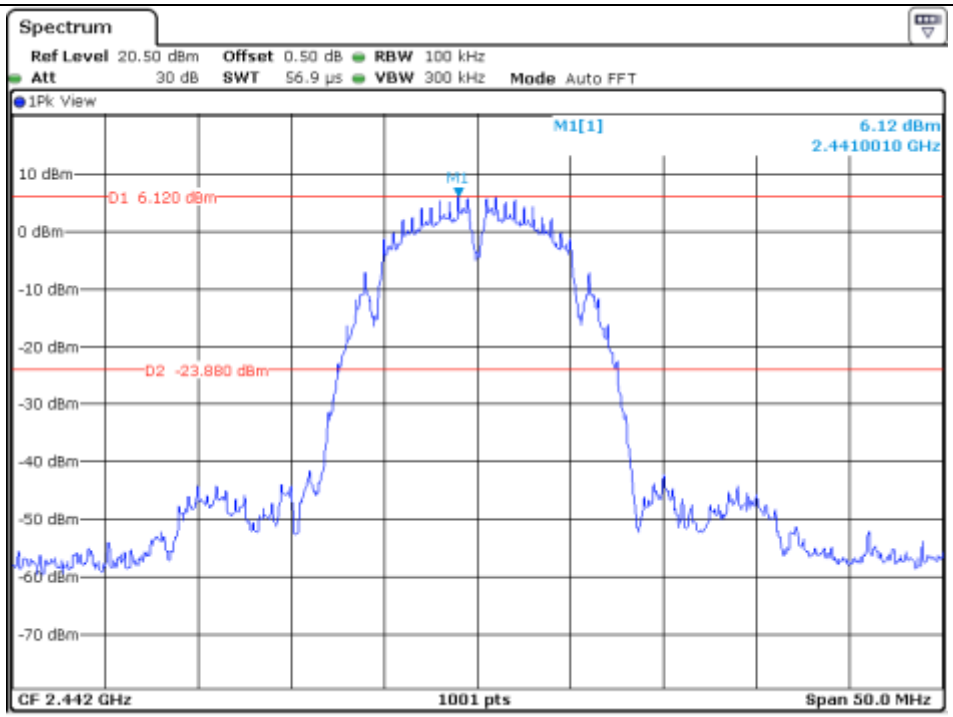
10.5 Test data for conducted emission

10.5.1 Test data for 802.11b WLAN Mode

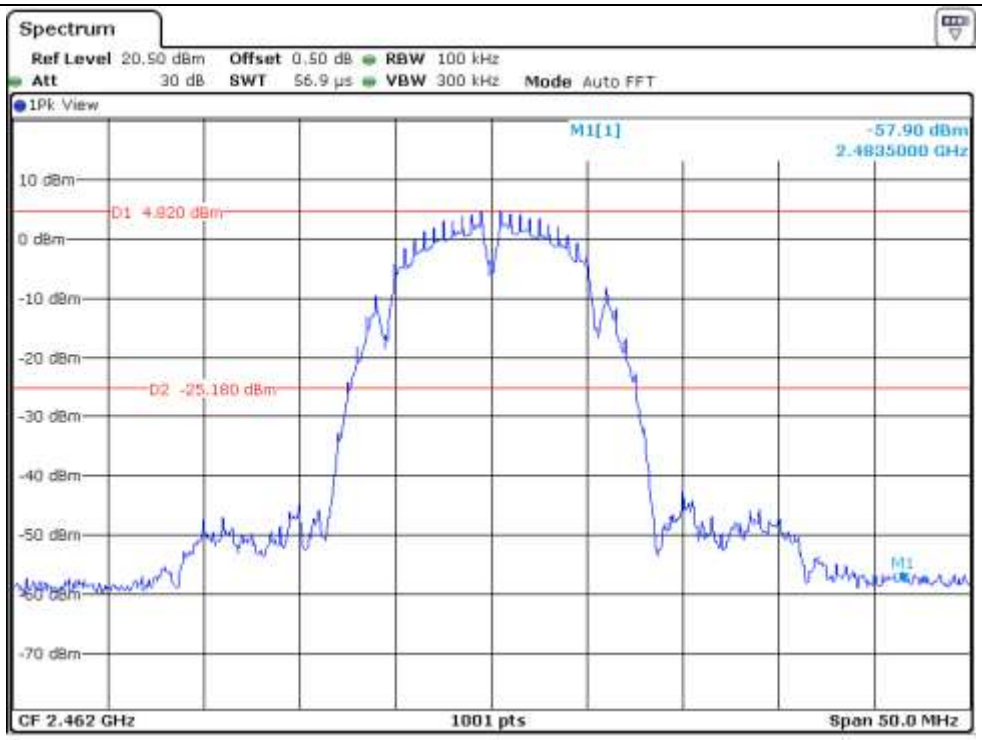
10.5.1.1 Test data for Antenna 0



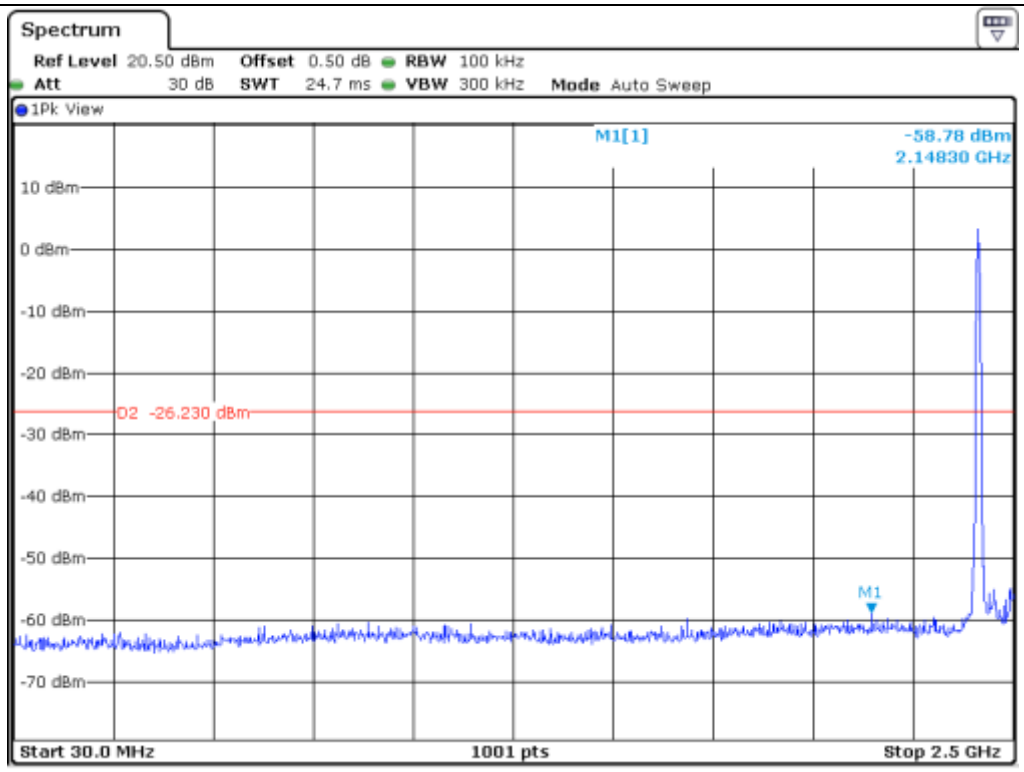
Low Channel



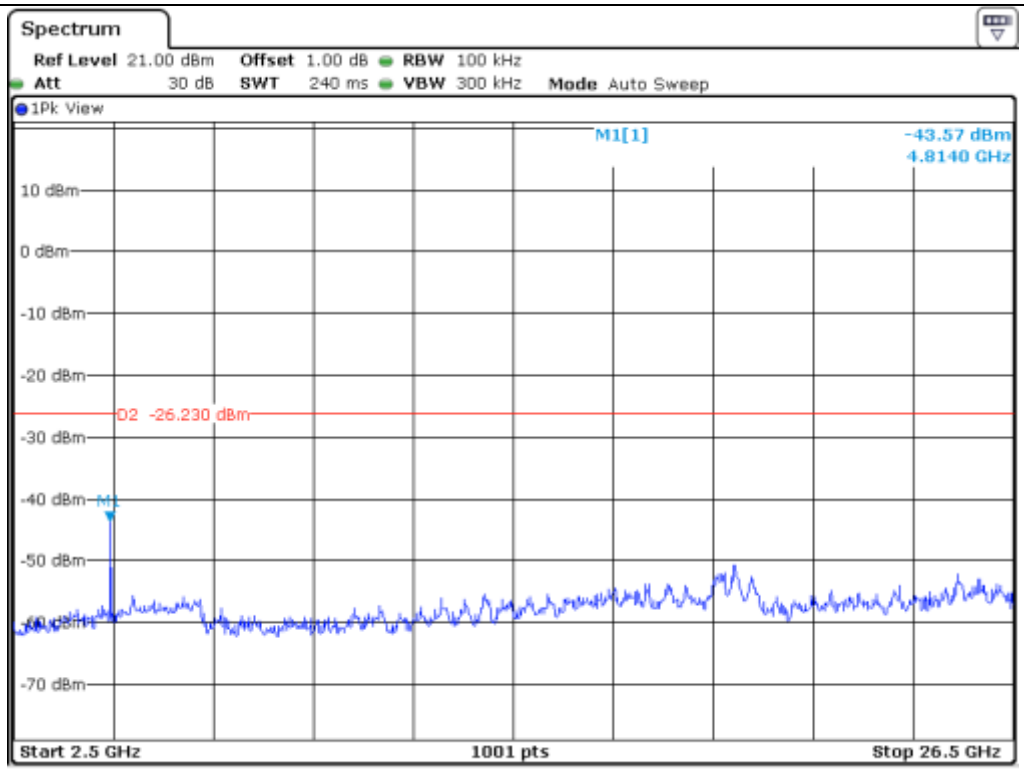
Middle Channel



High Channel

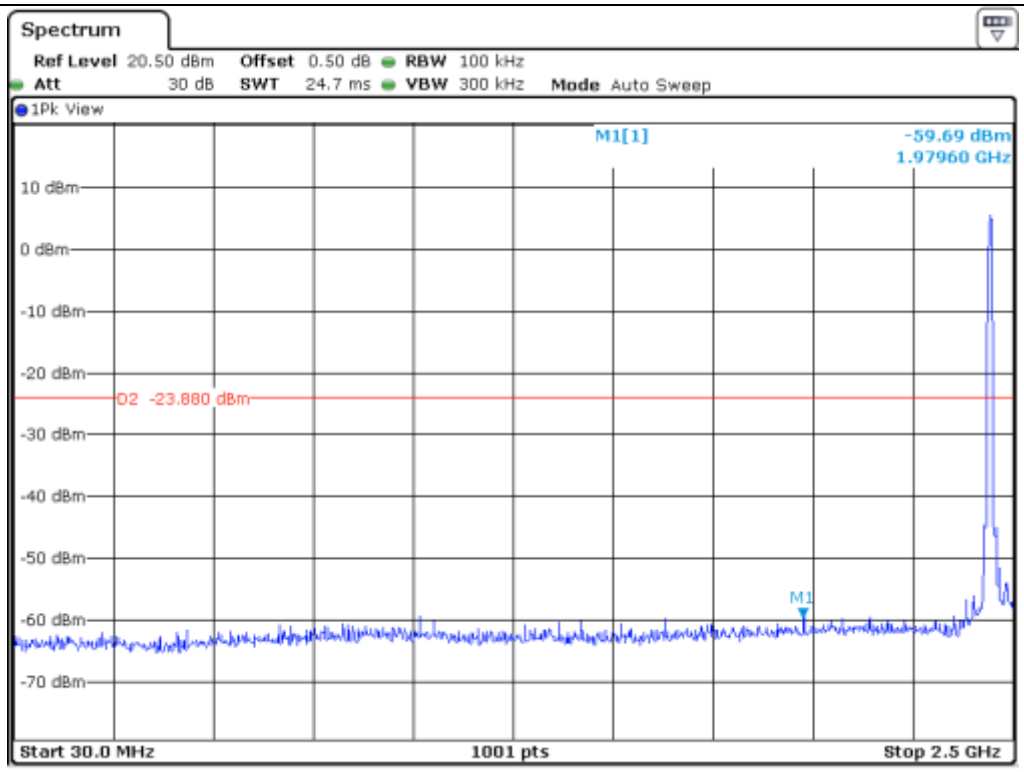


Low Channel

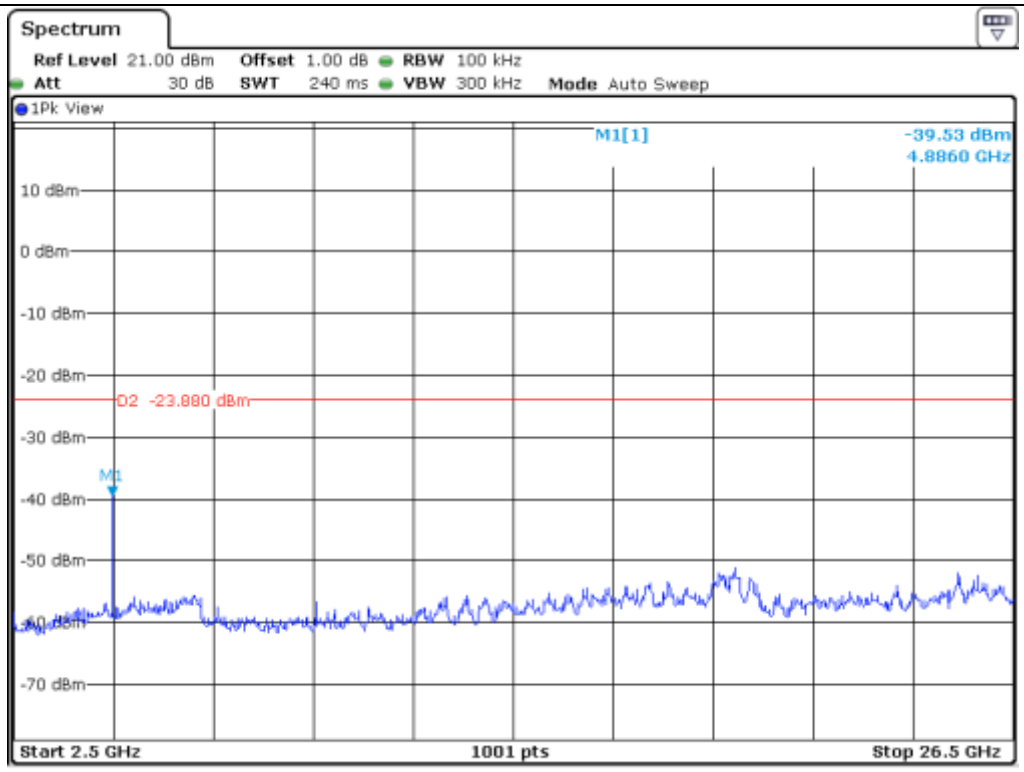


Low Channel

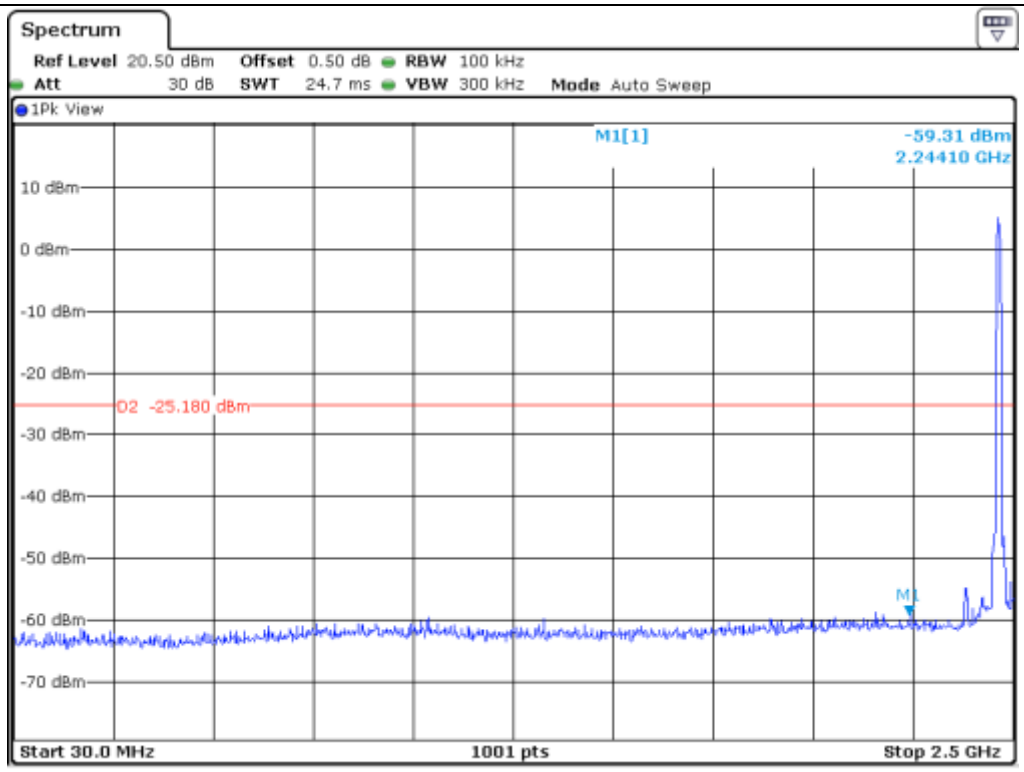
ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)



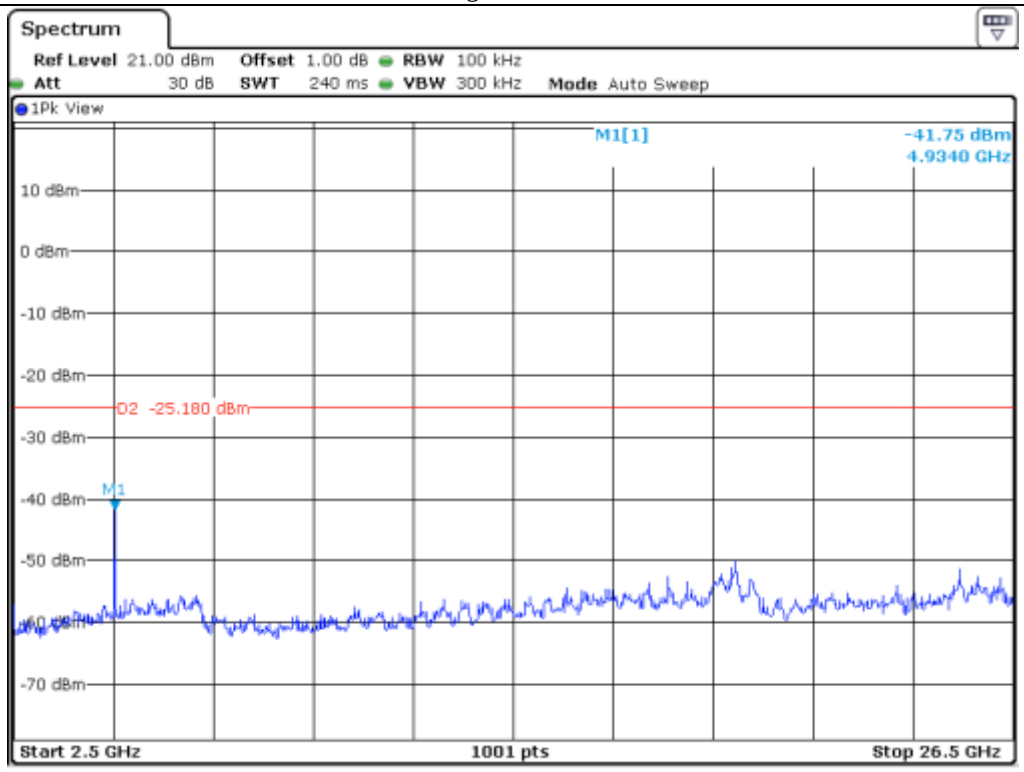
Middle Channel



Middle Channel



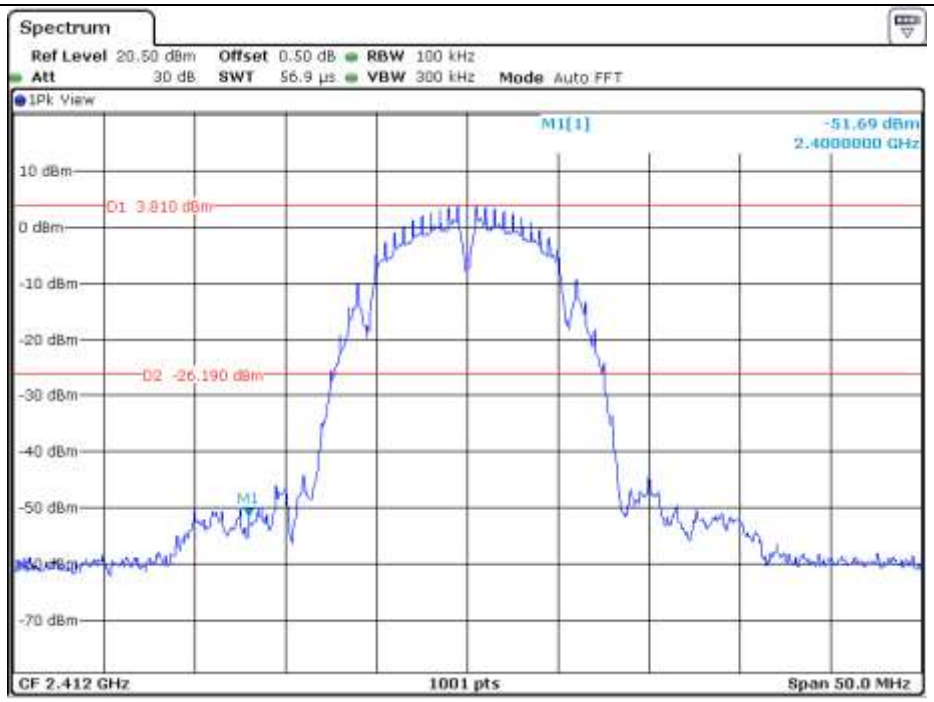
High Channel



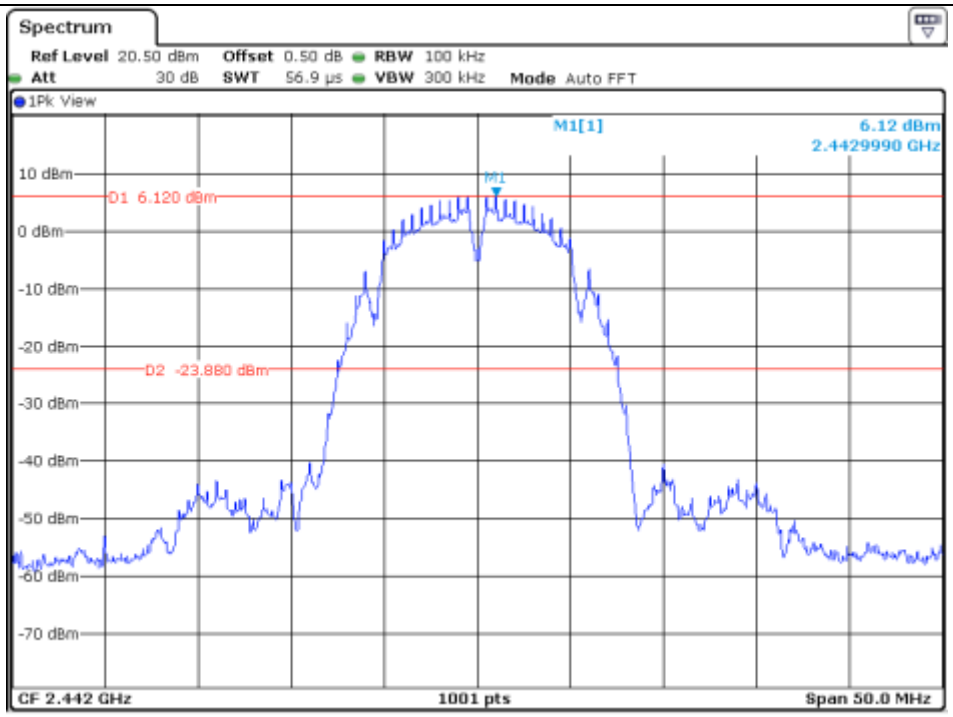
High Channel

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

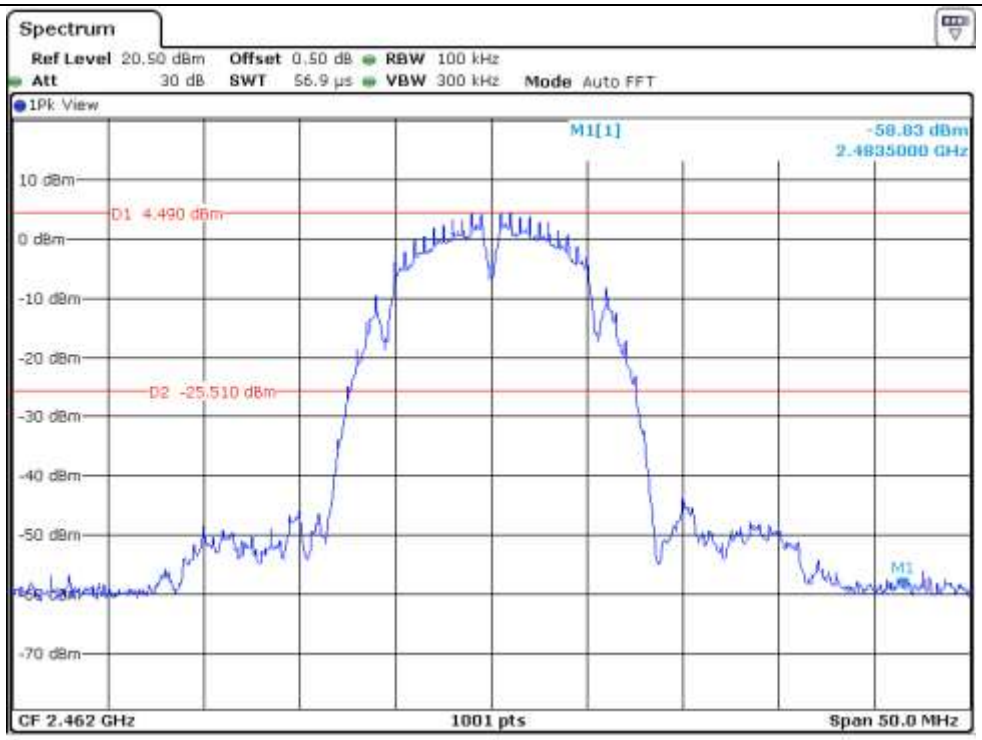
10.5.1.2 Test data for Antenna 1



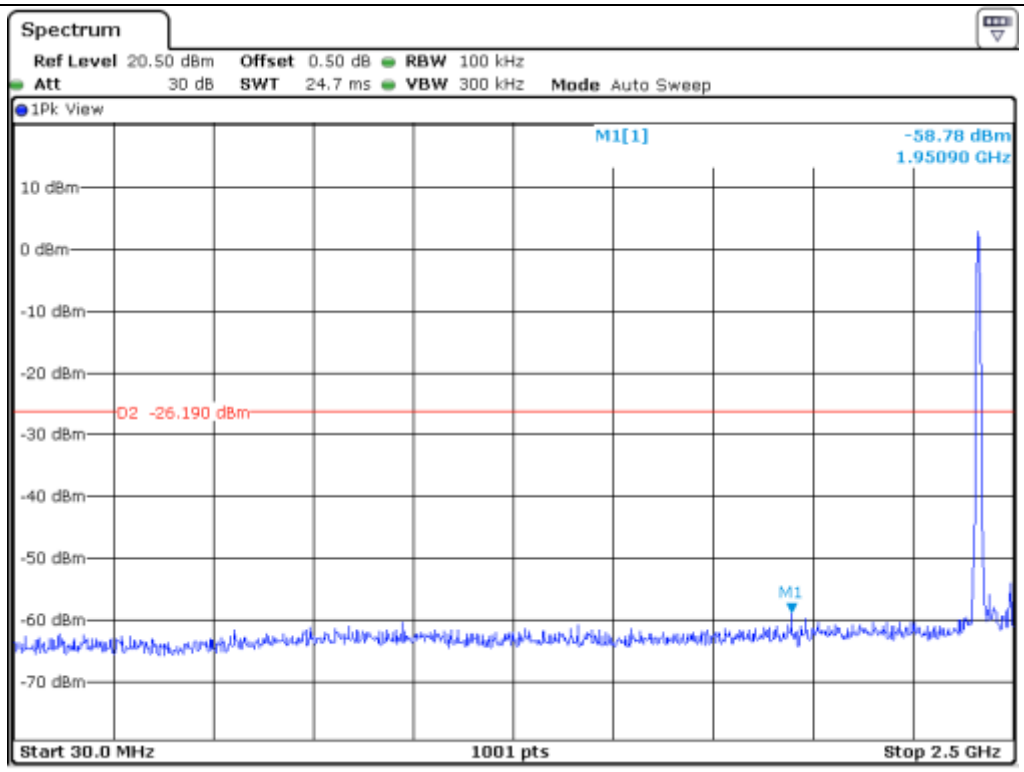
Low Channel



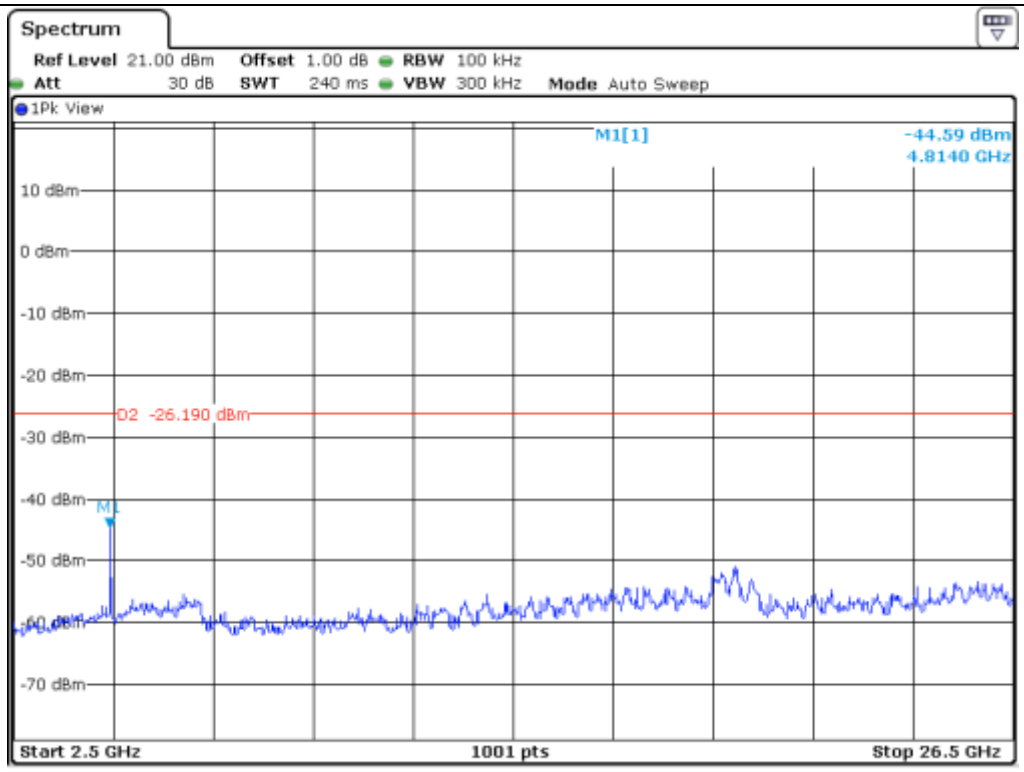
Middle Channel



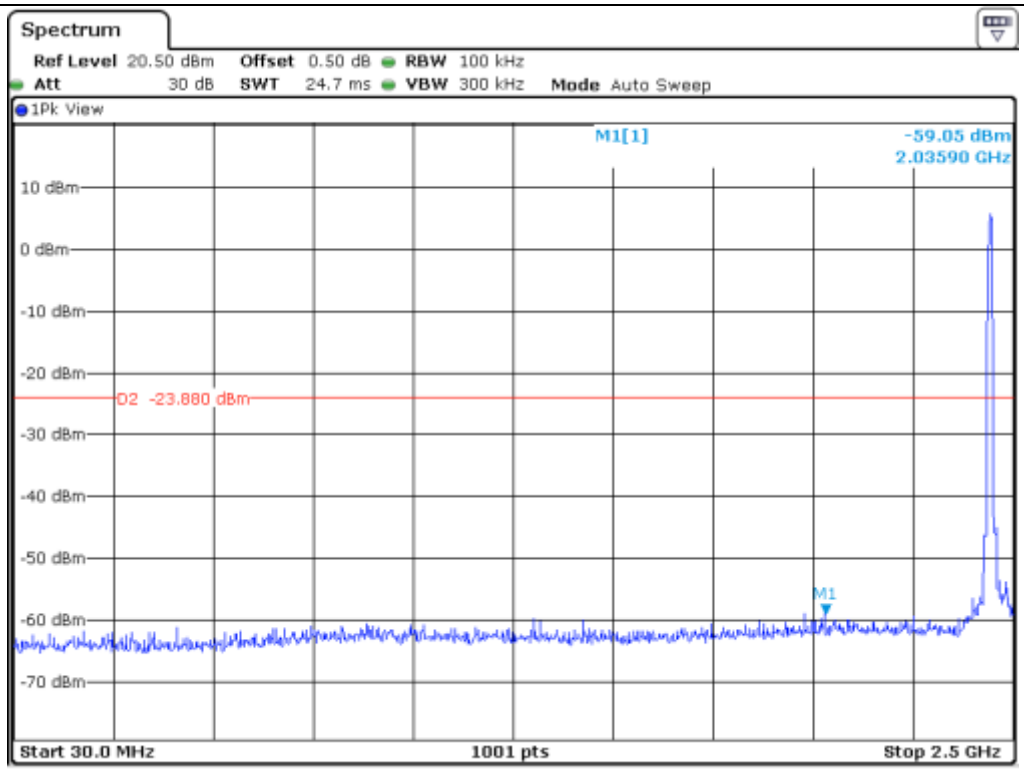
High Channel



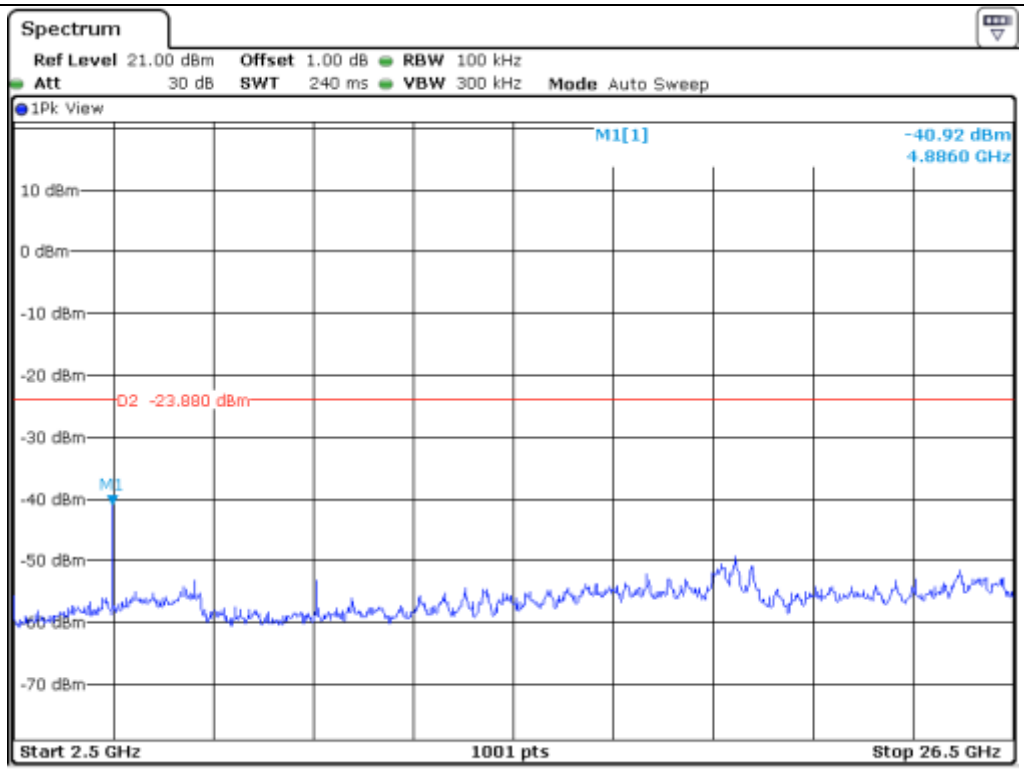
Low Channel



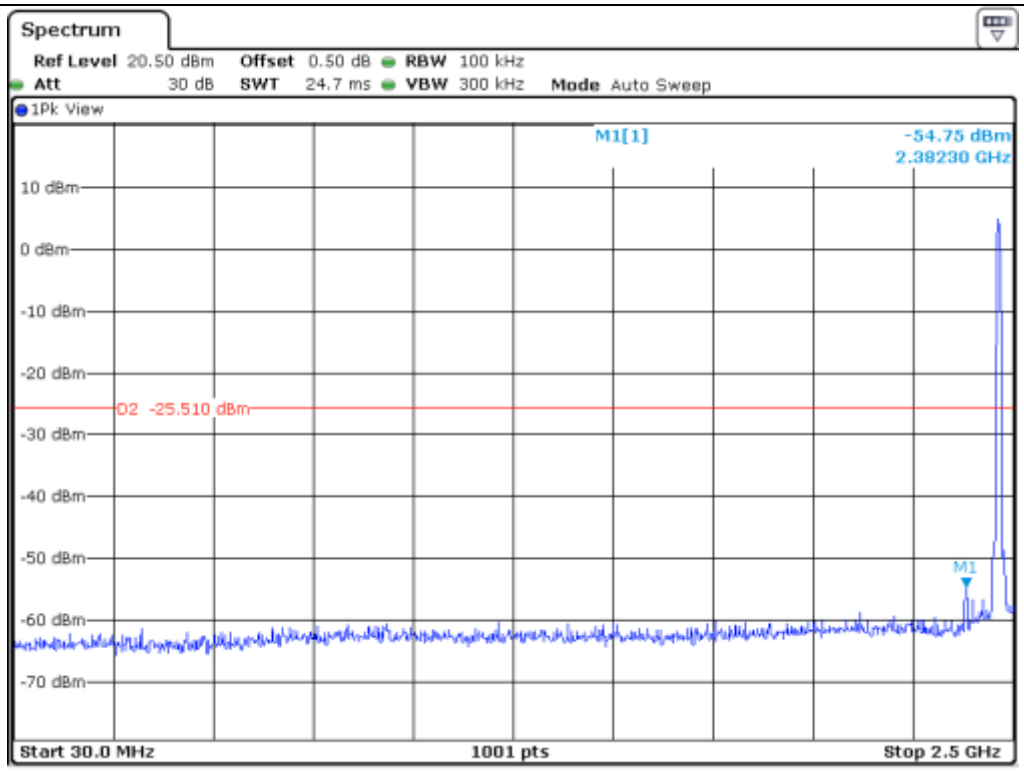
Low Channel



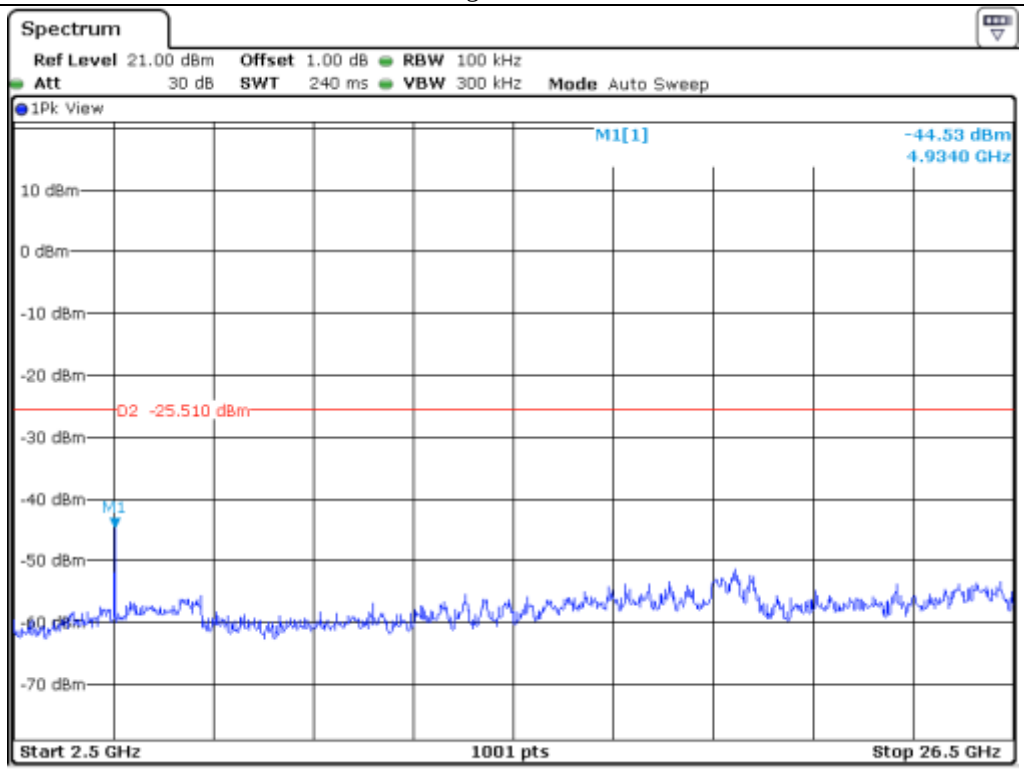
Middle Channel



Middle Channel



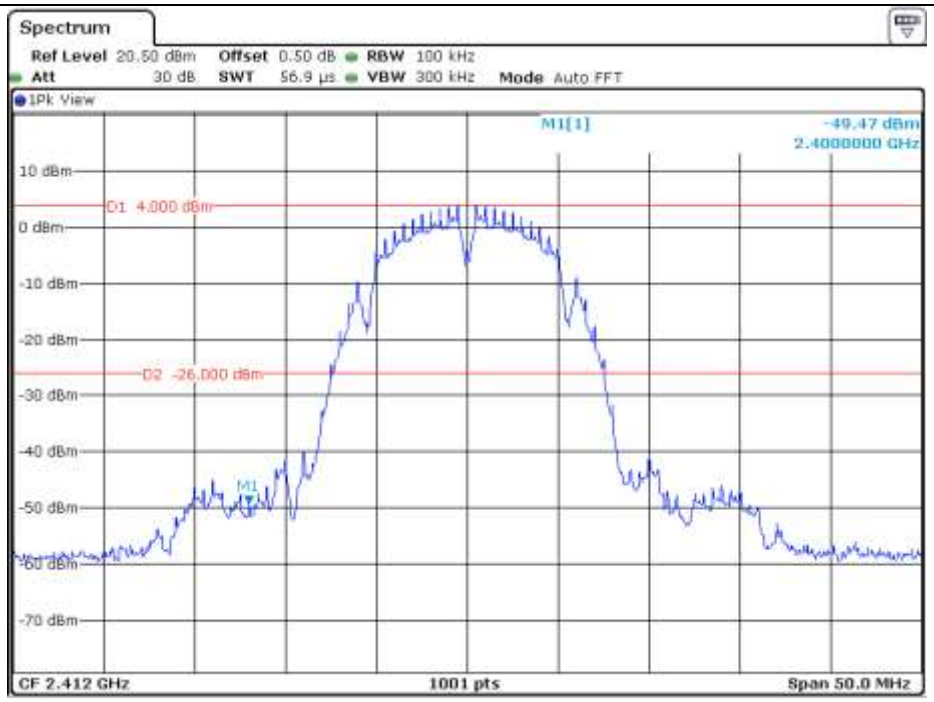
High Channel



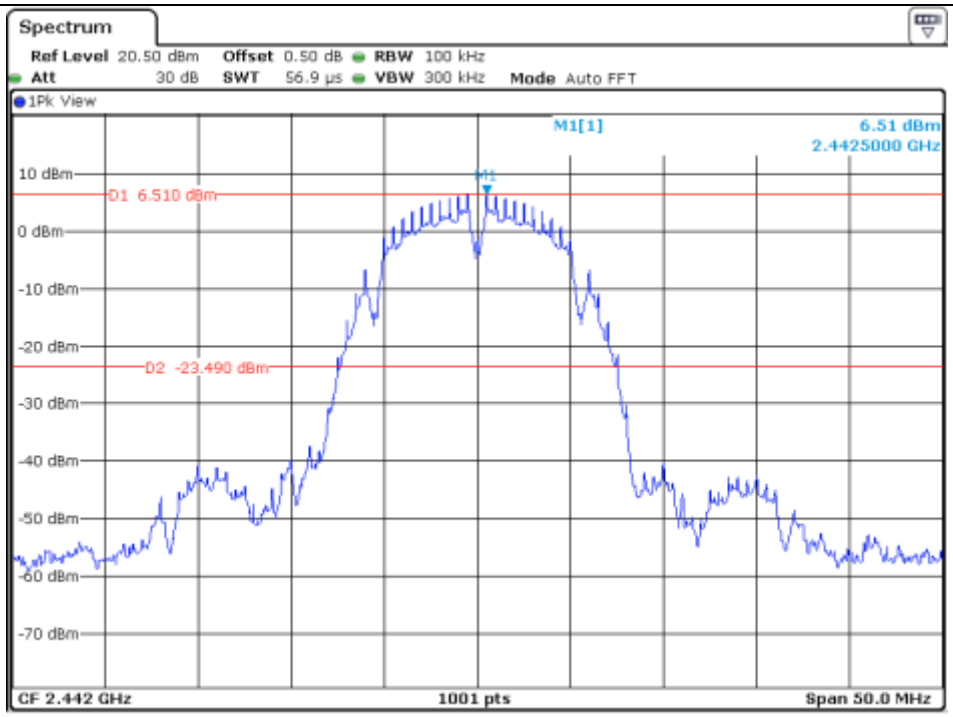
High Channel

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

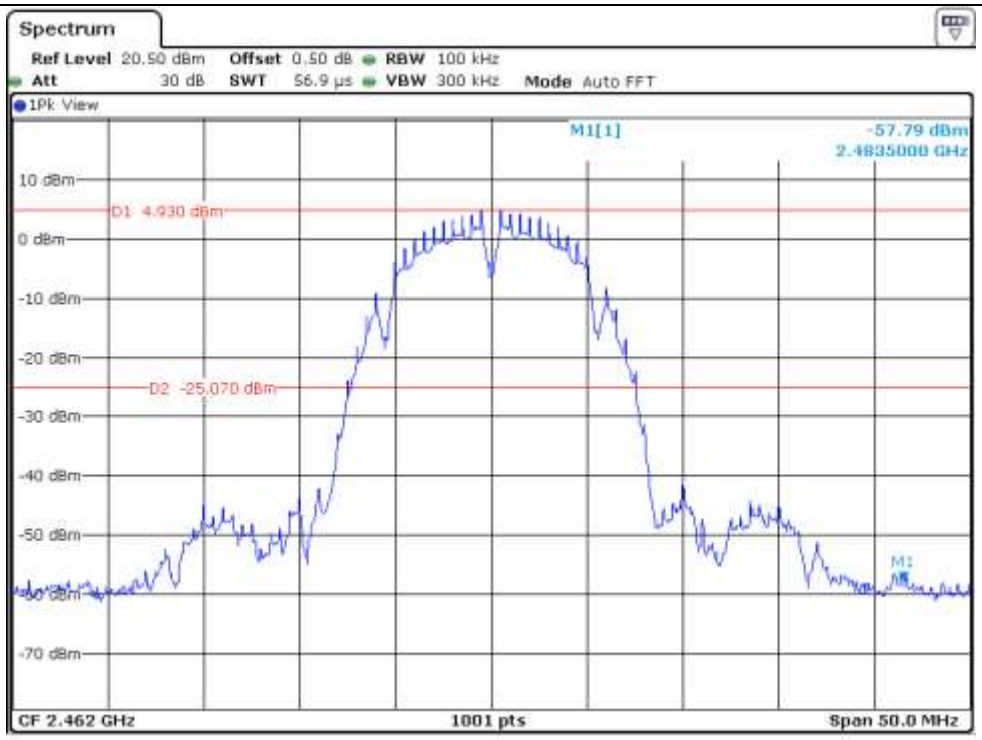
10.5.1.3 Test data for Antenna 2



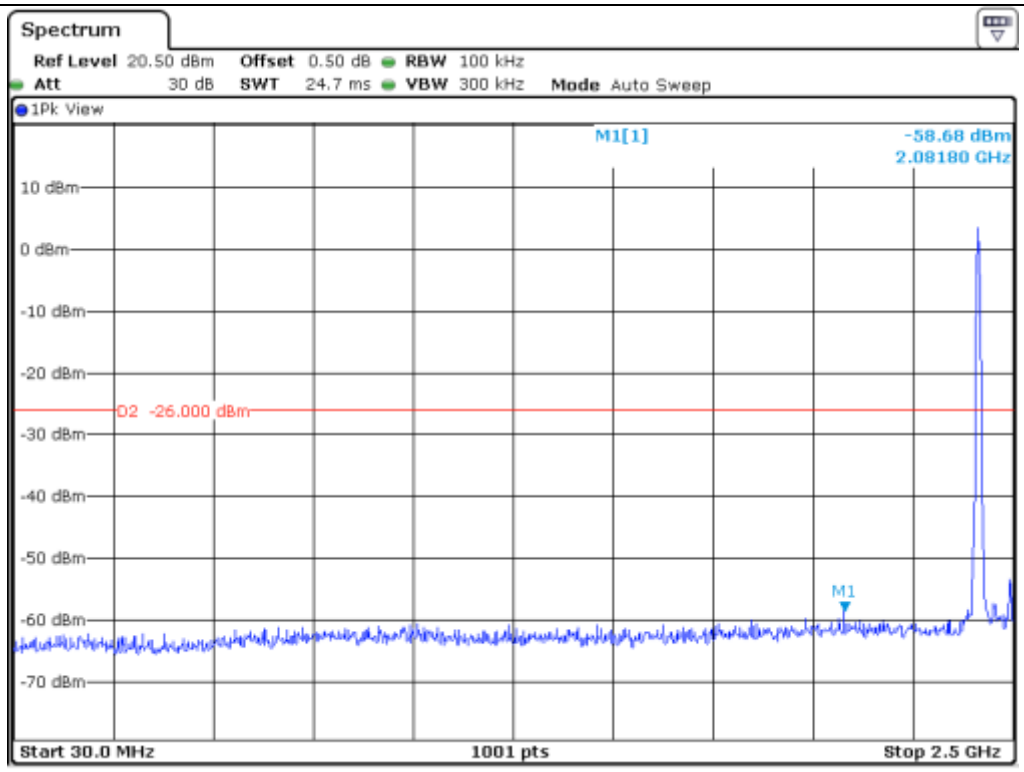
Low Channel



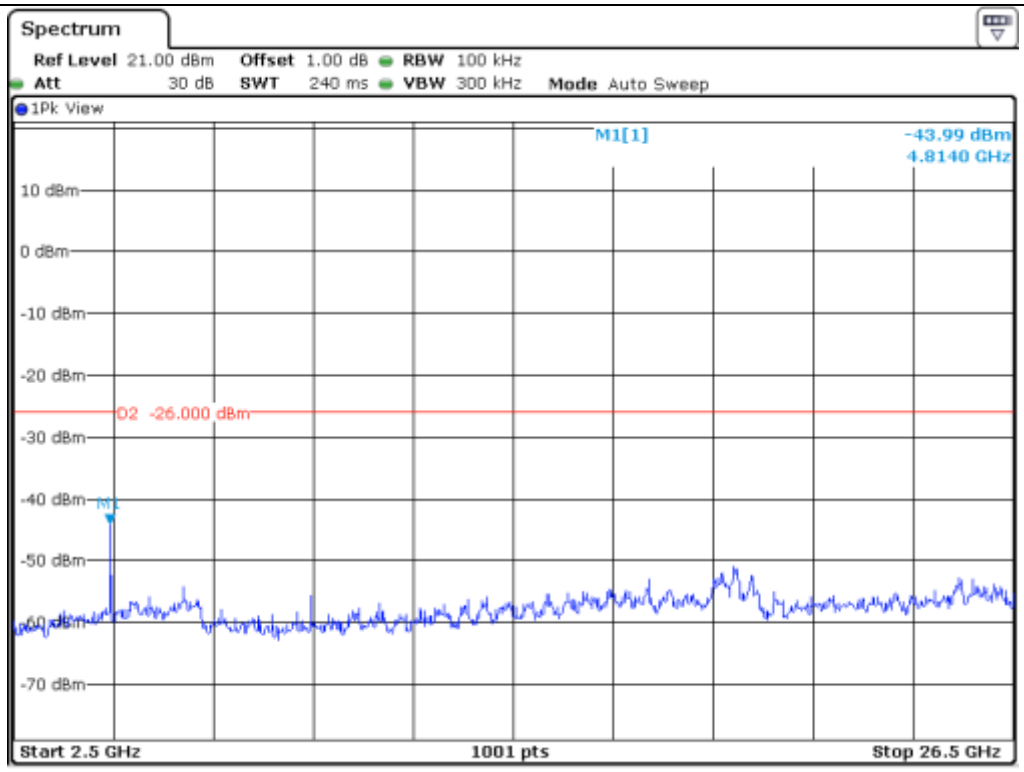
Middle Channel



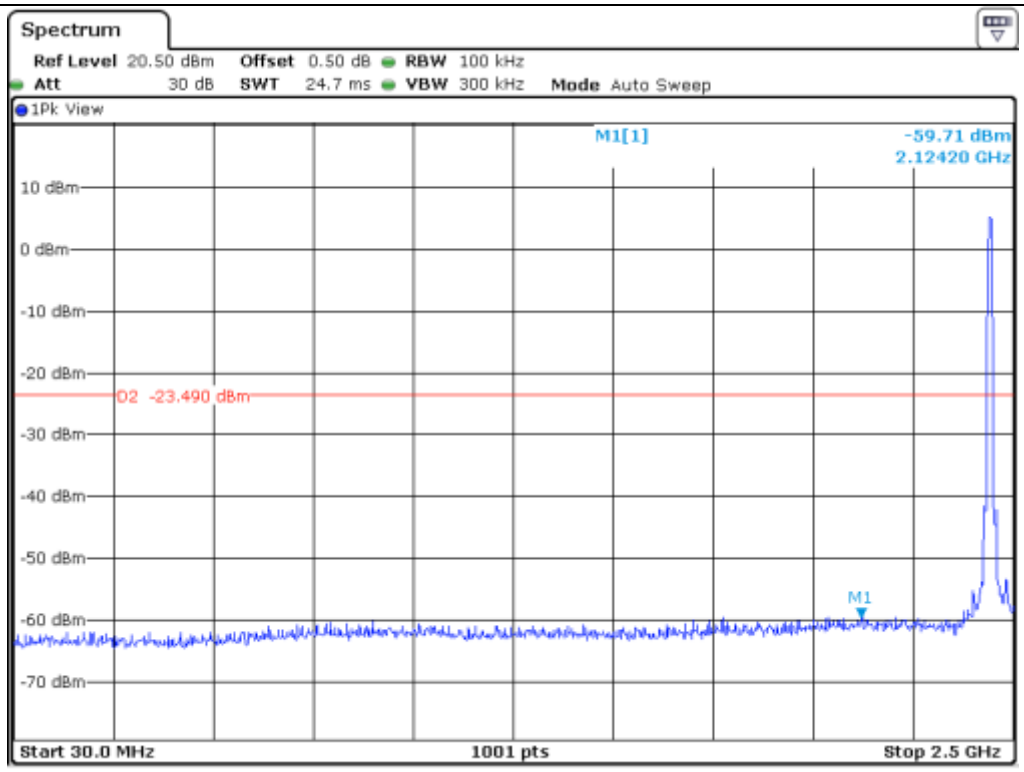
High Channel



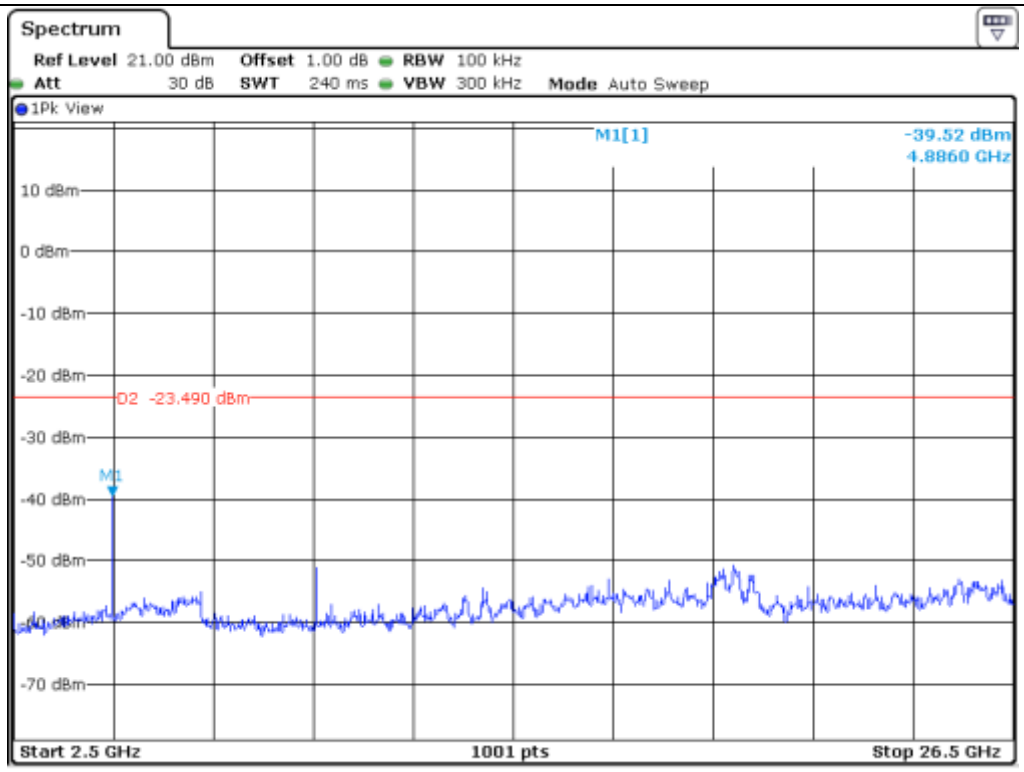
Low Channel



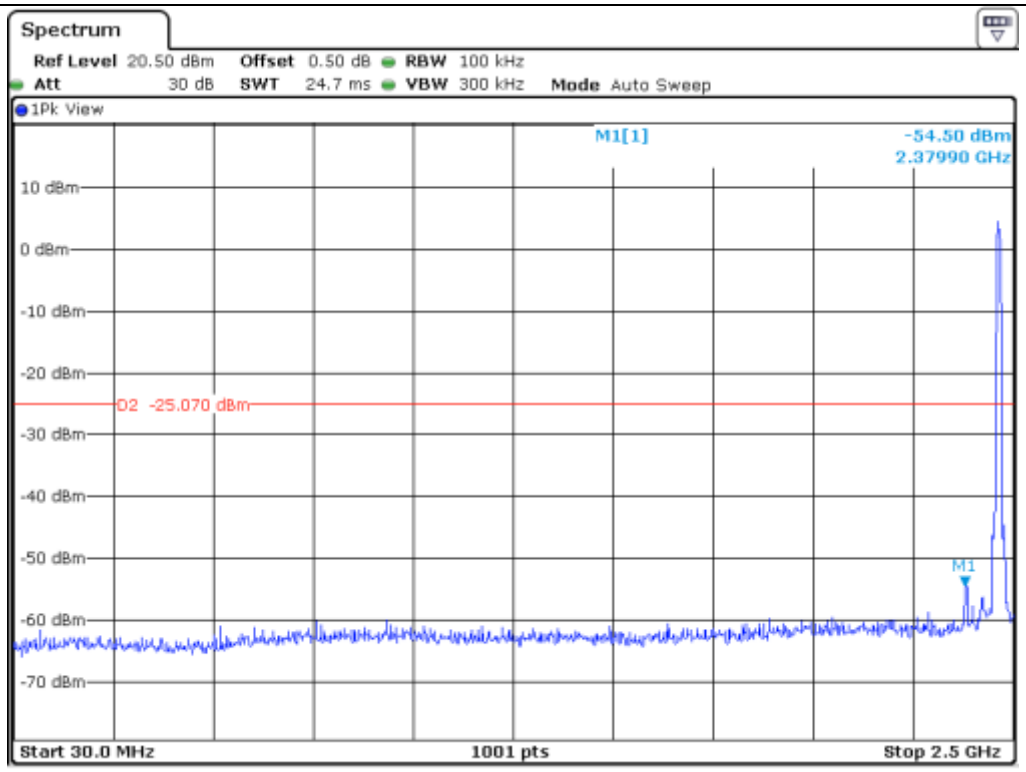
Low Channel



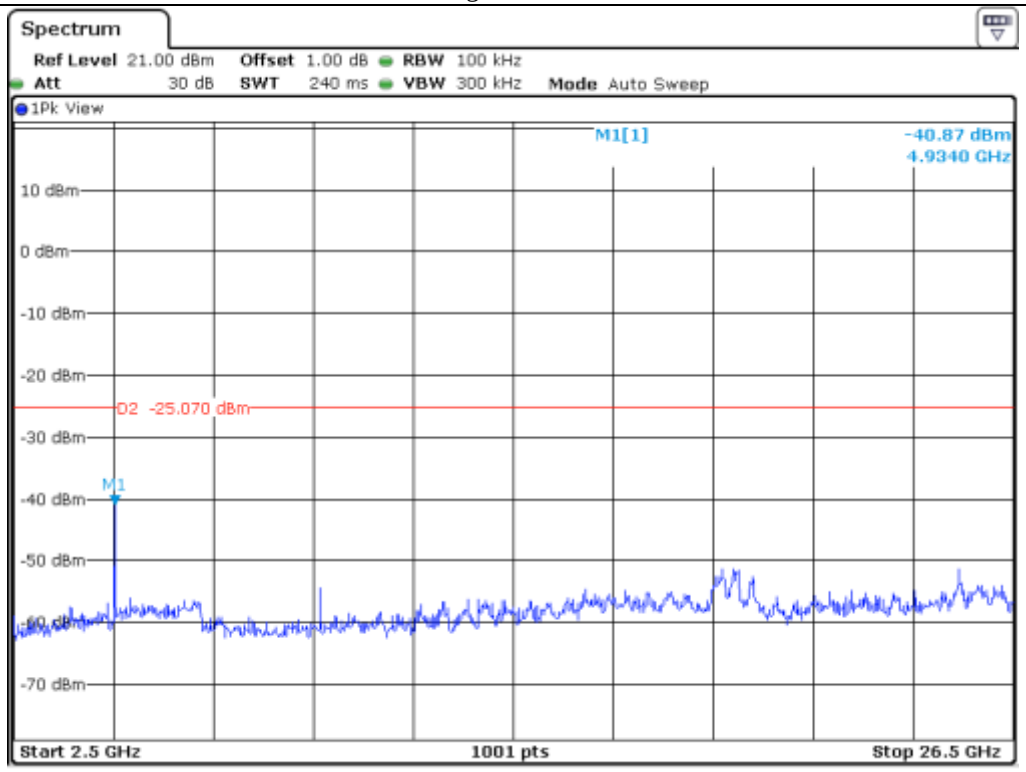
Middle Channel



Middle Channel



High Channel

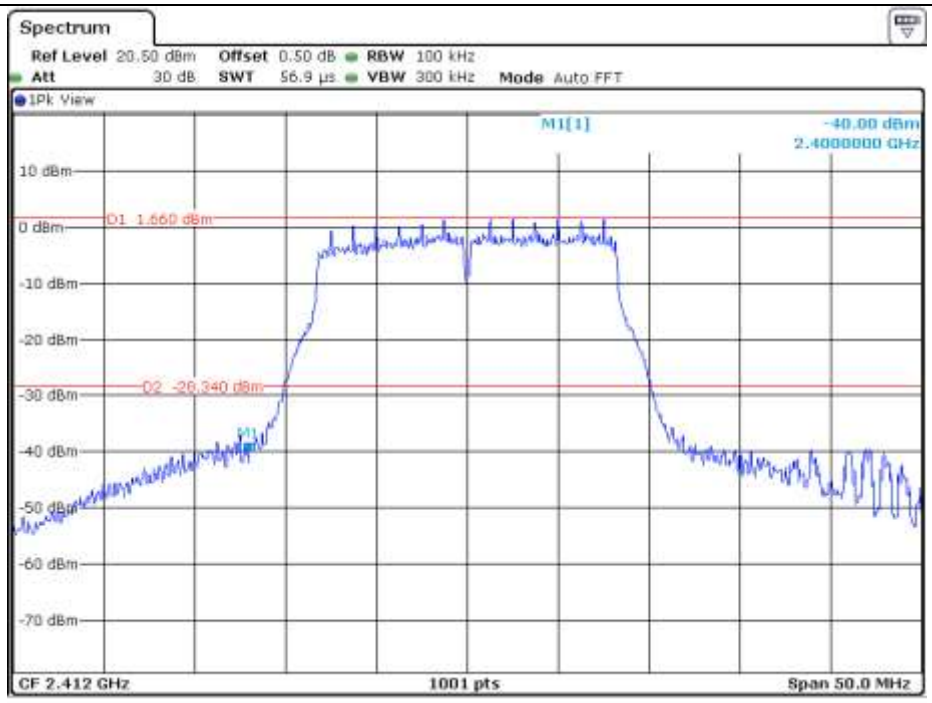


High Channel

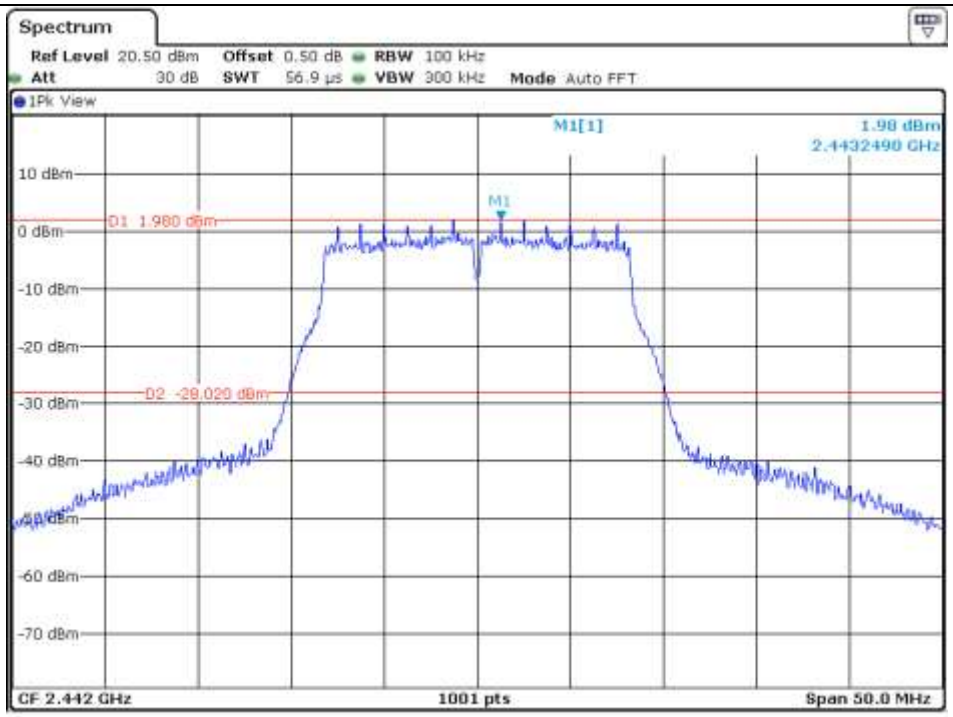
ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)

10.5.2 Test data for 802.11g WLAN Mode

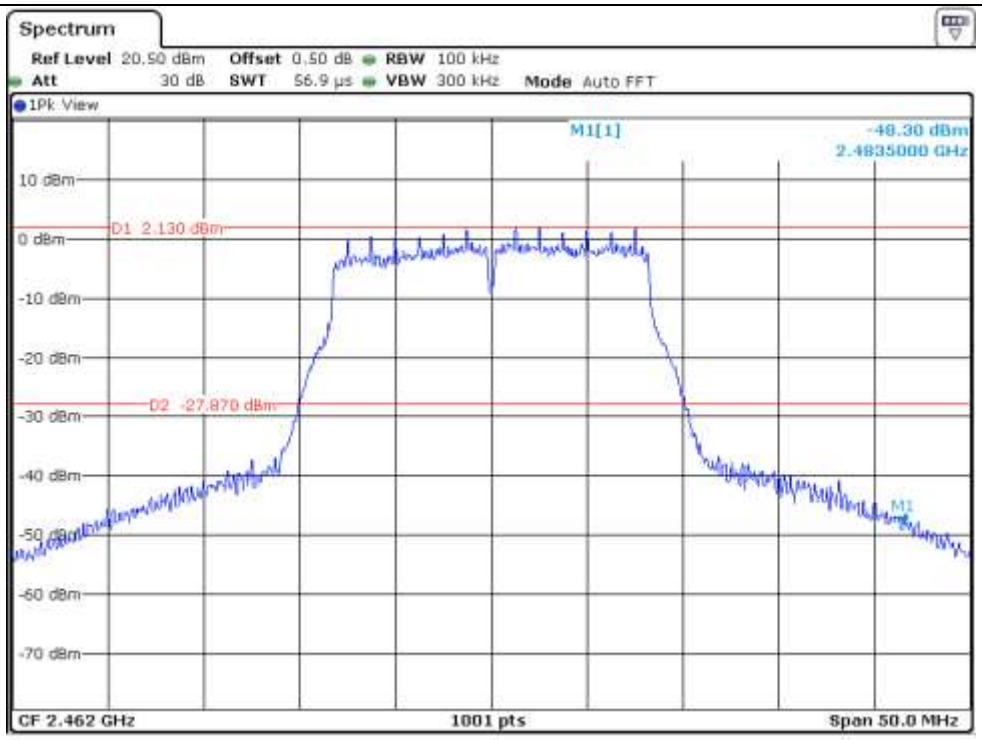
10.5.2.1 Test data for Antenna 0



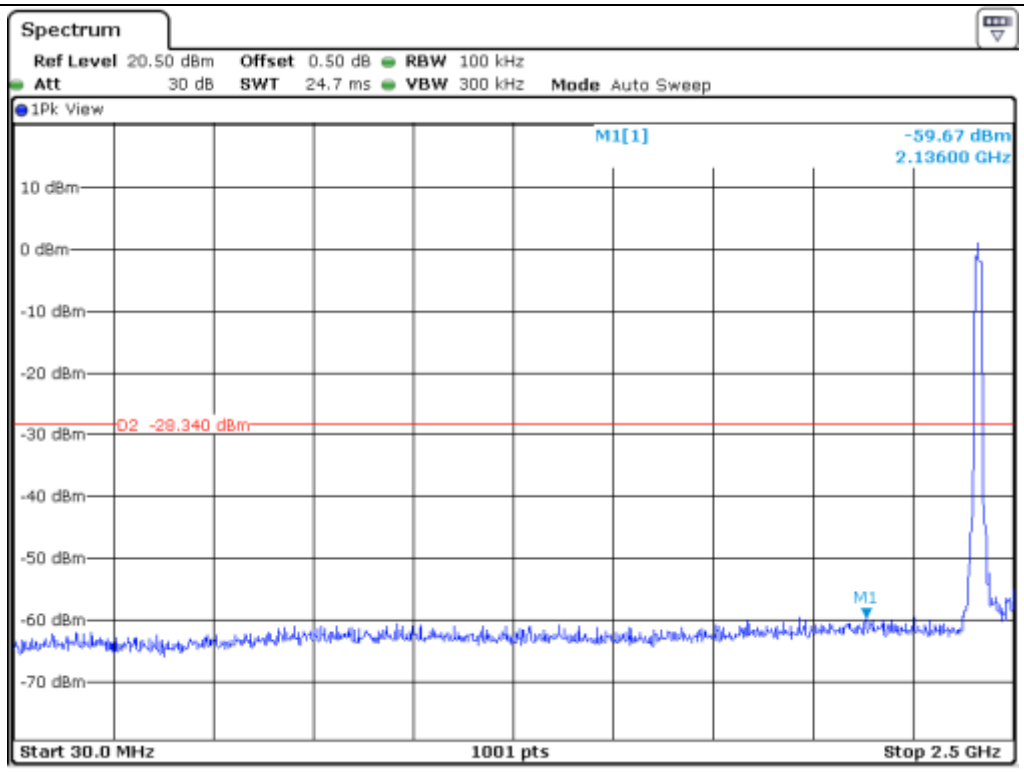
Low Channel



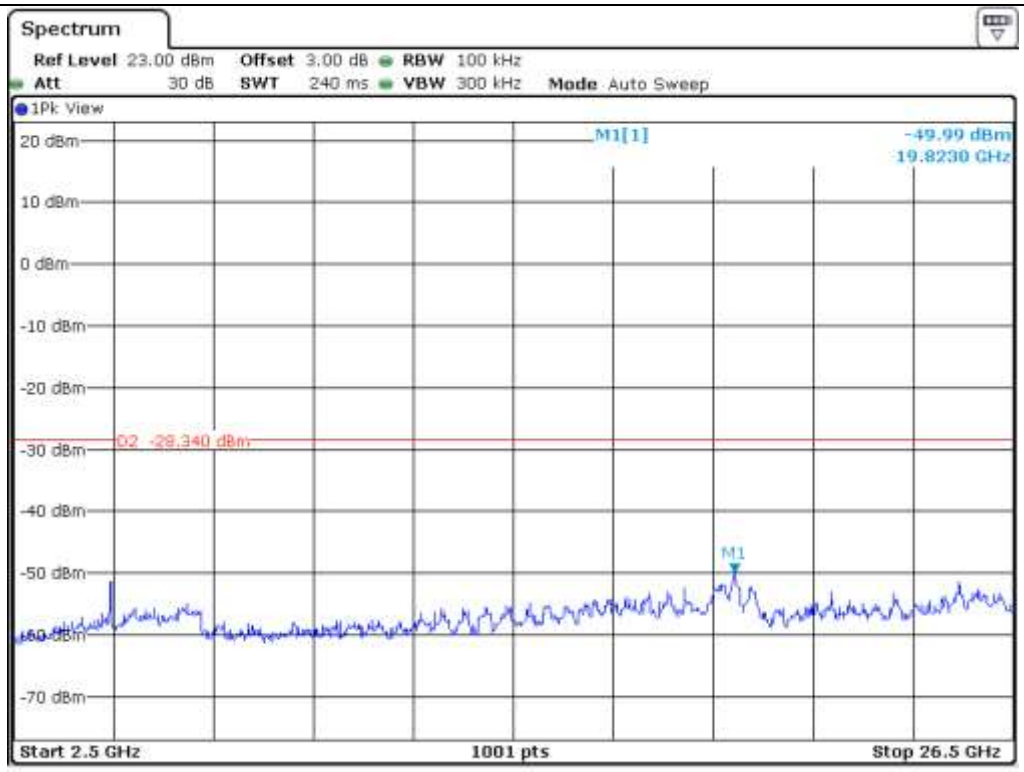
Middle Channel



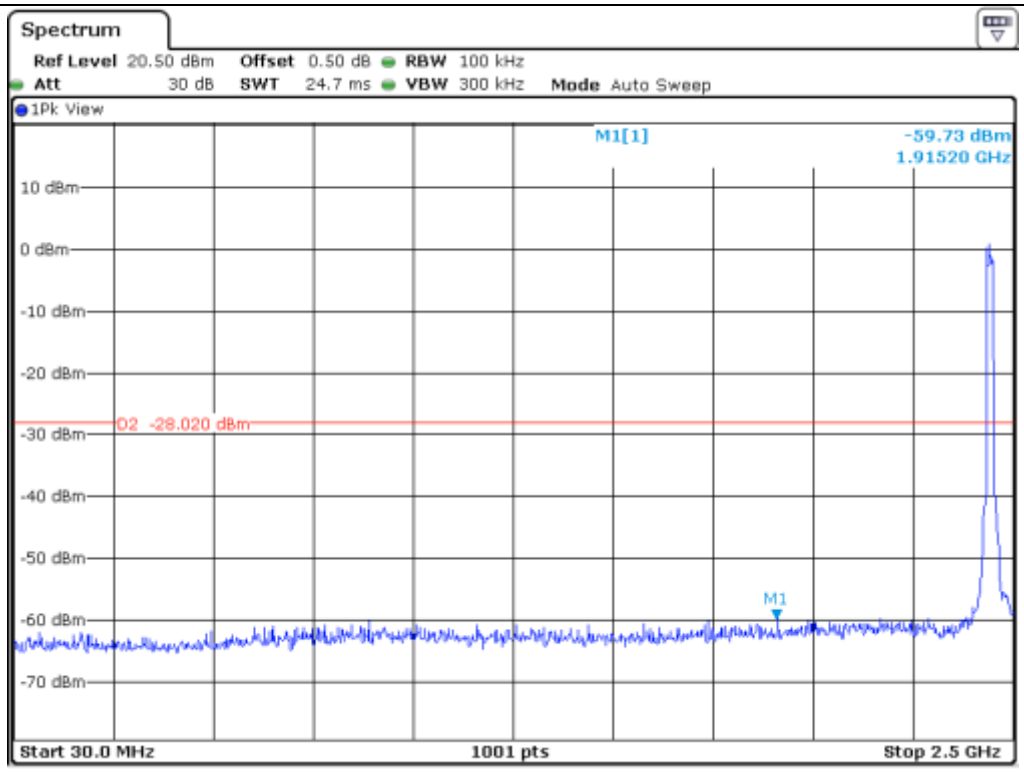
High Channel



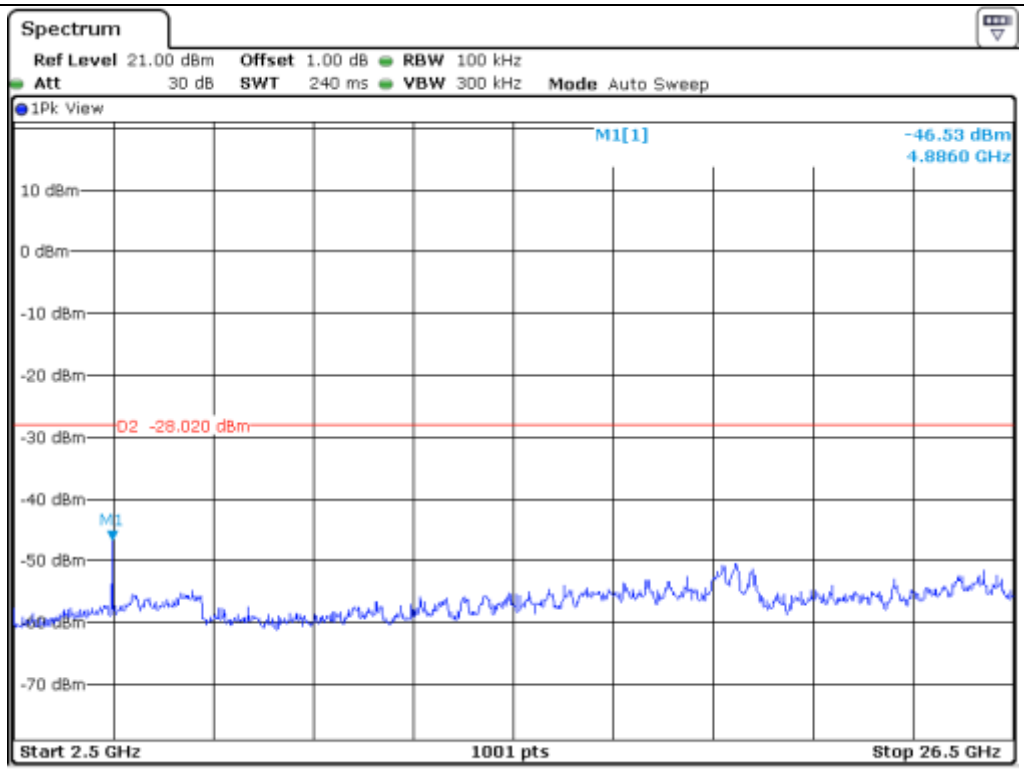
Low Channel



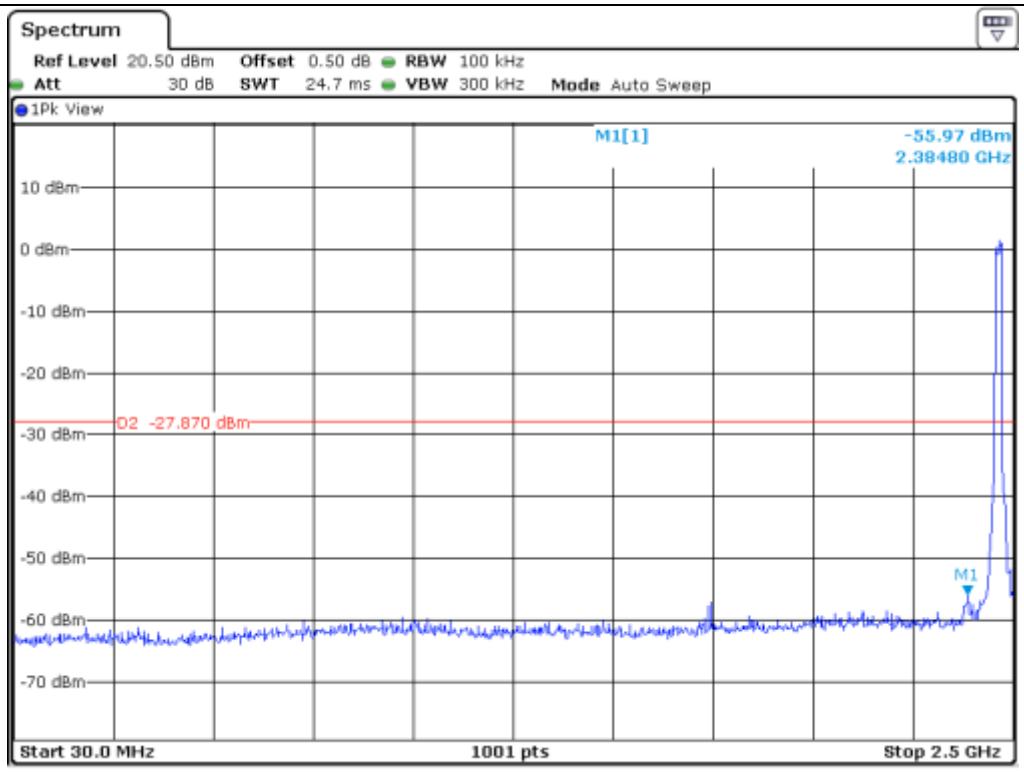
Low Channel



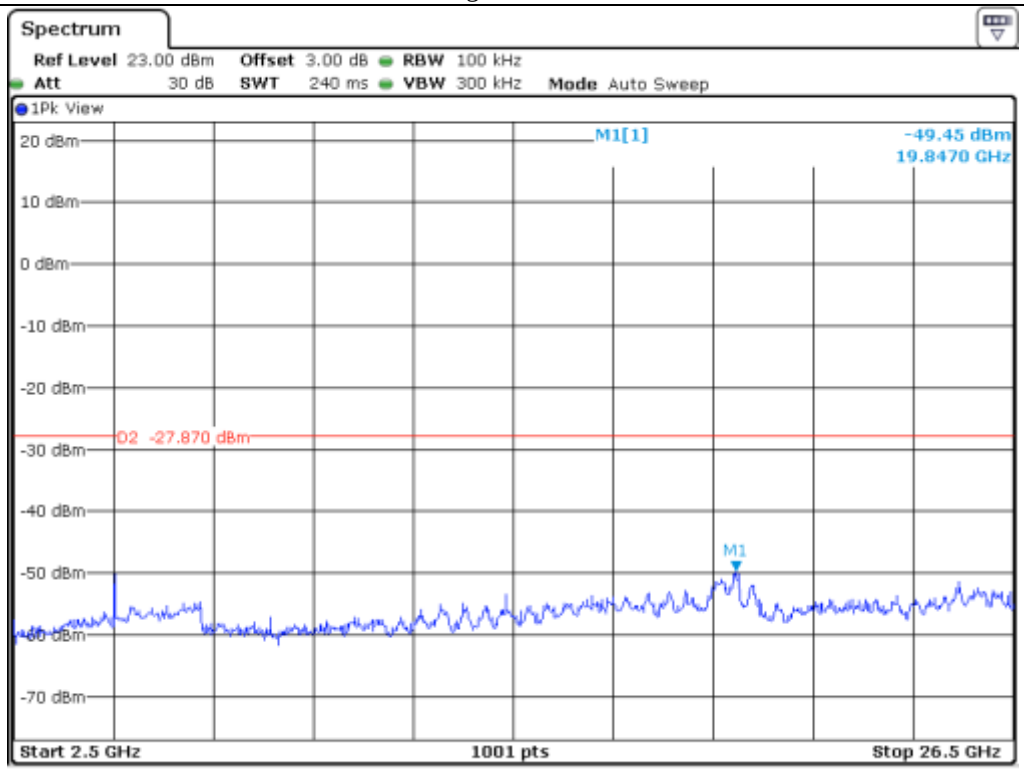
Middle Channel



Middle Channel



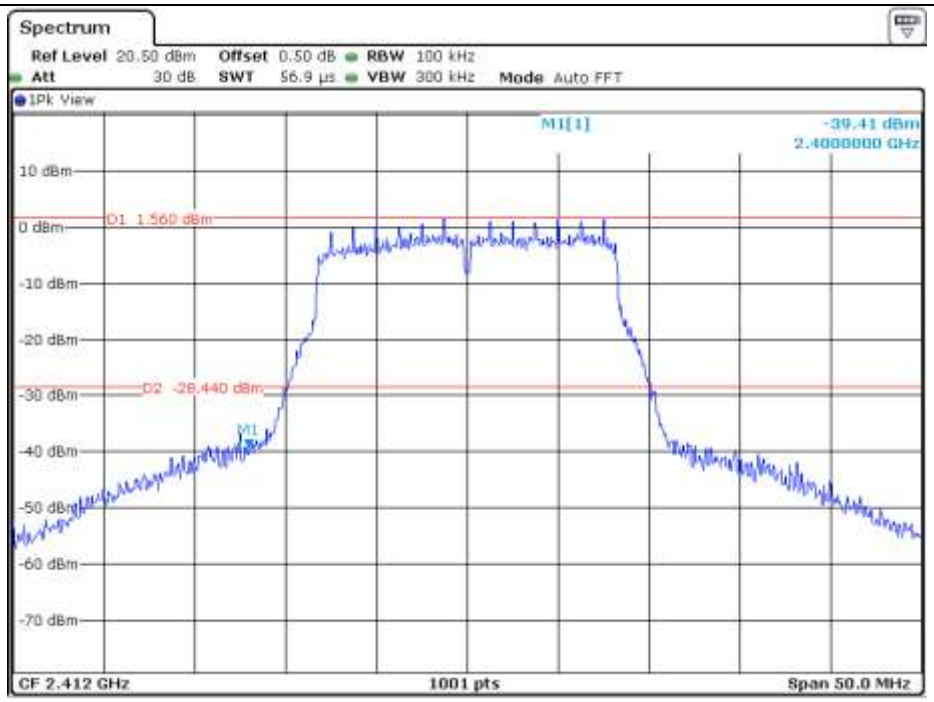
High Channel



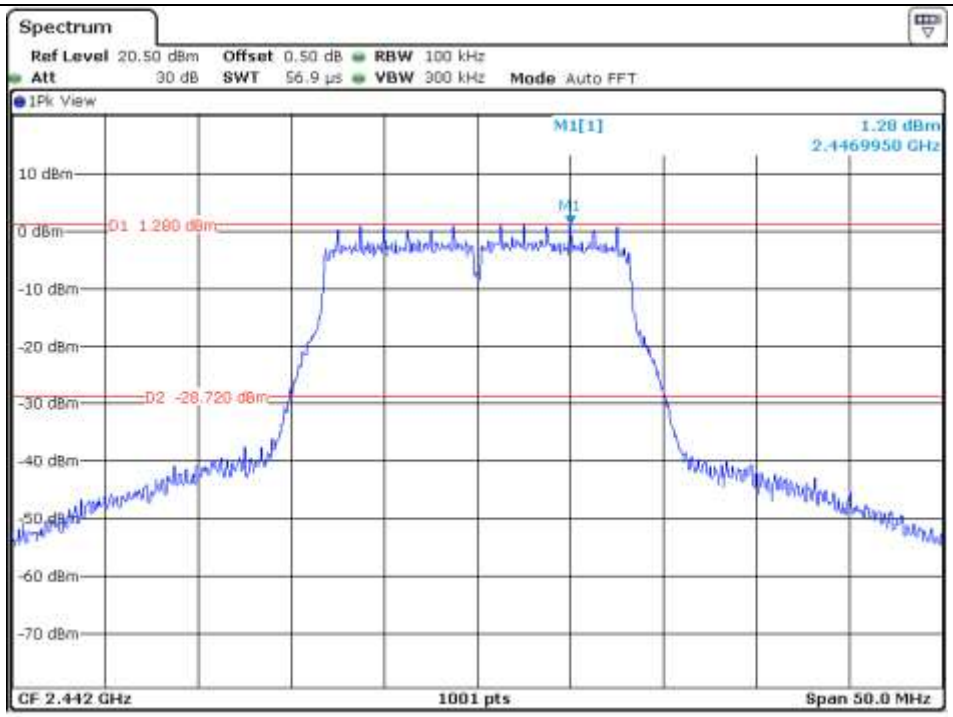
High Channel

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

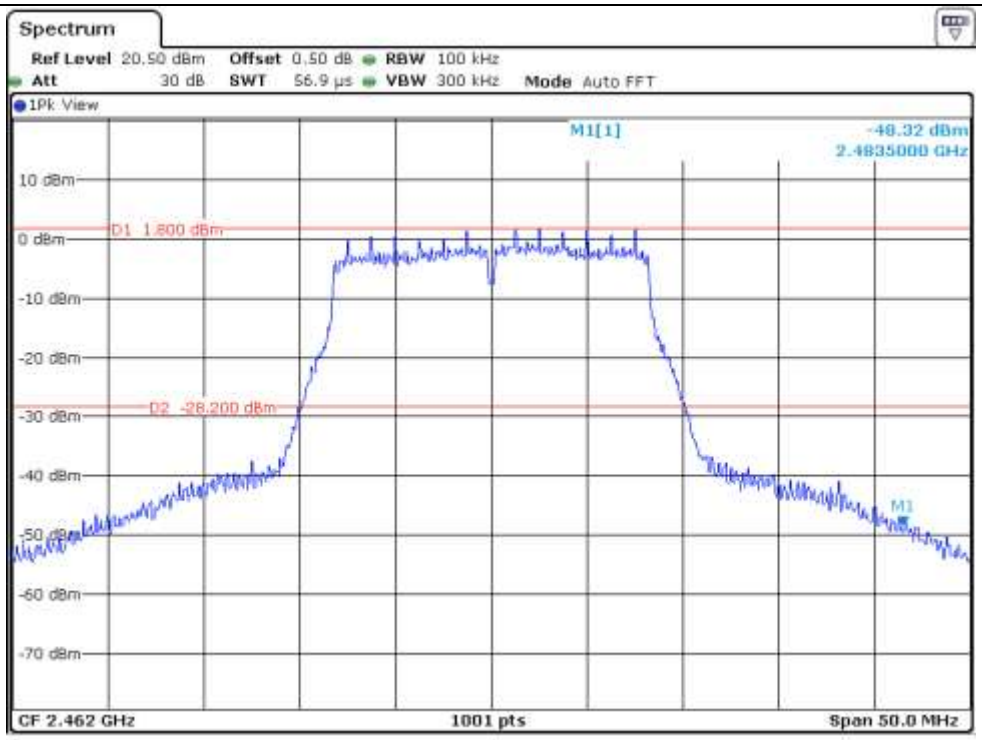
10.5.2.2 Test data for Antenna 1



Low Channel

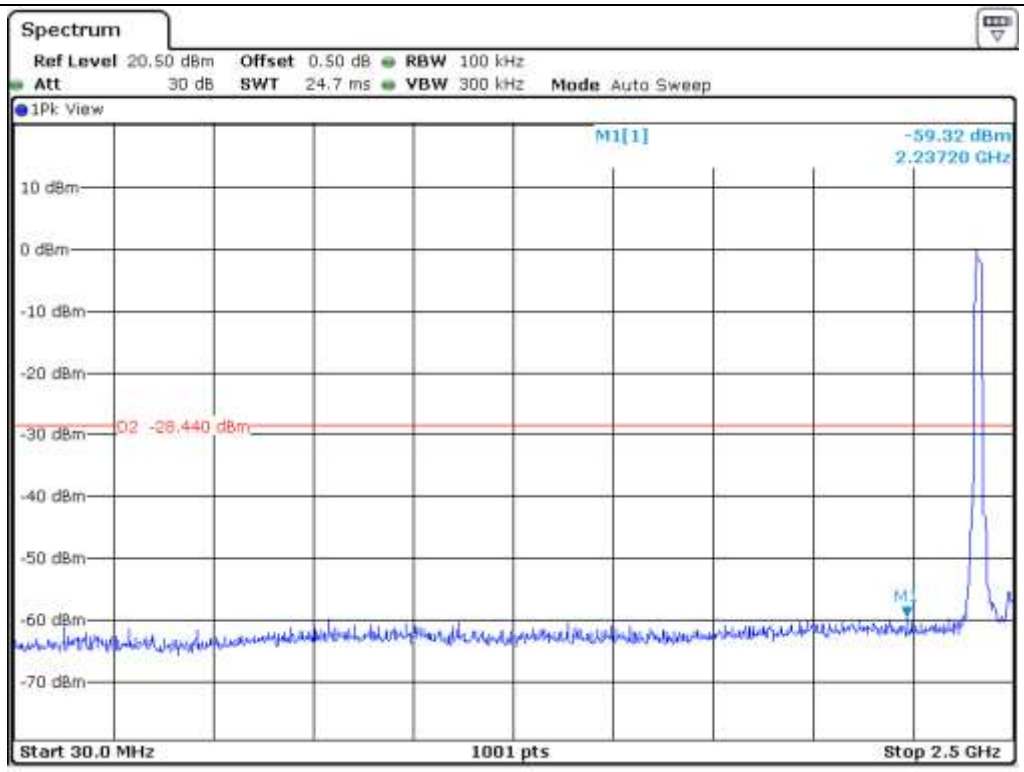


Middle Channel

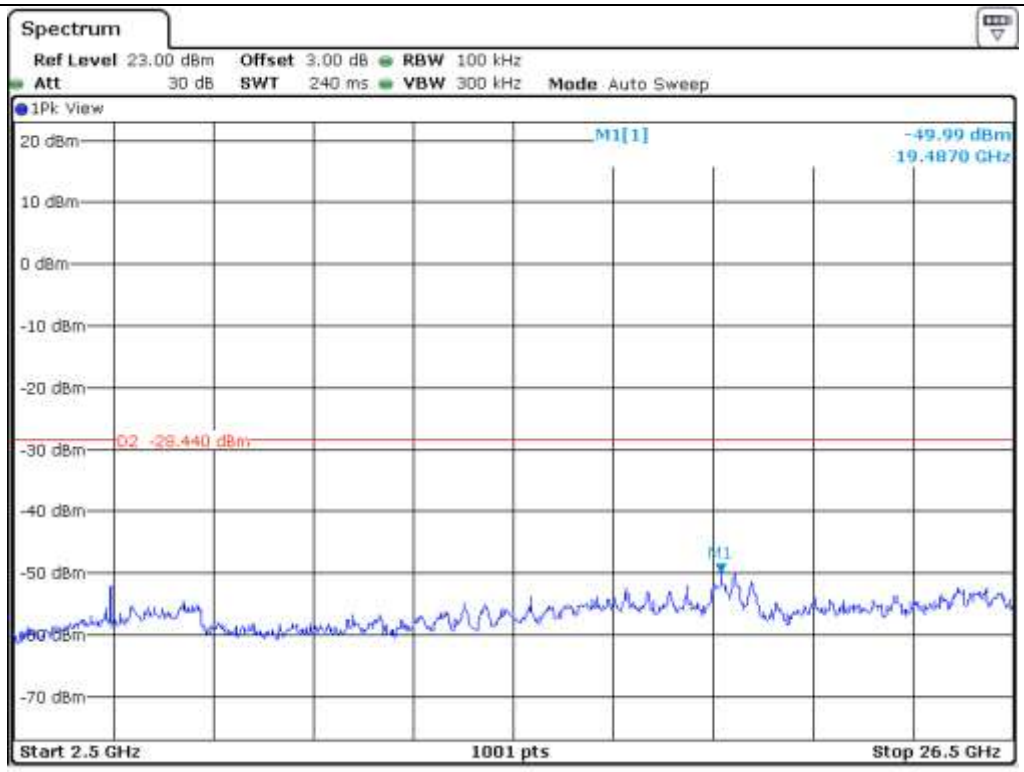


High Channel

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

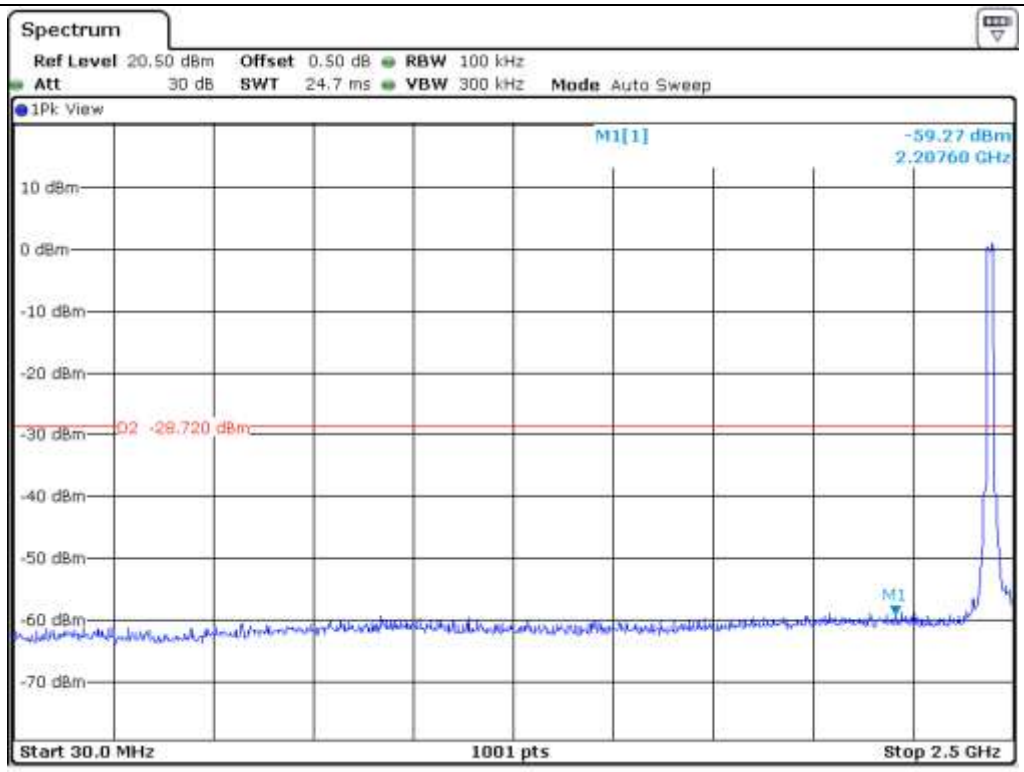


Low Channel

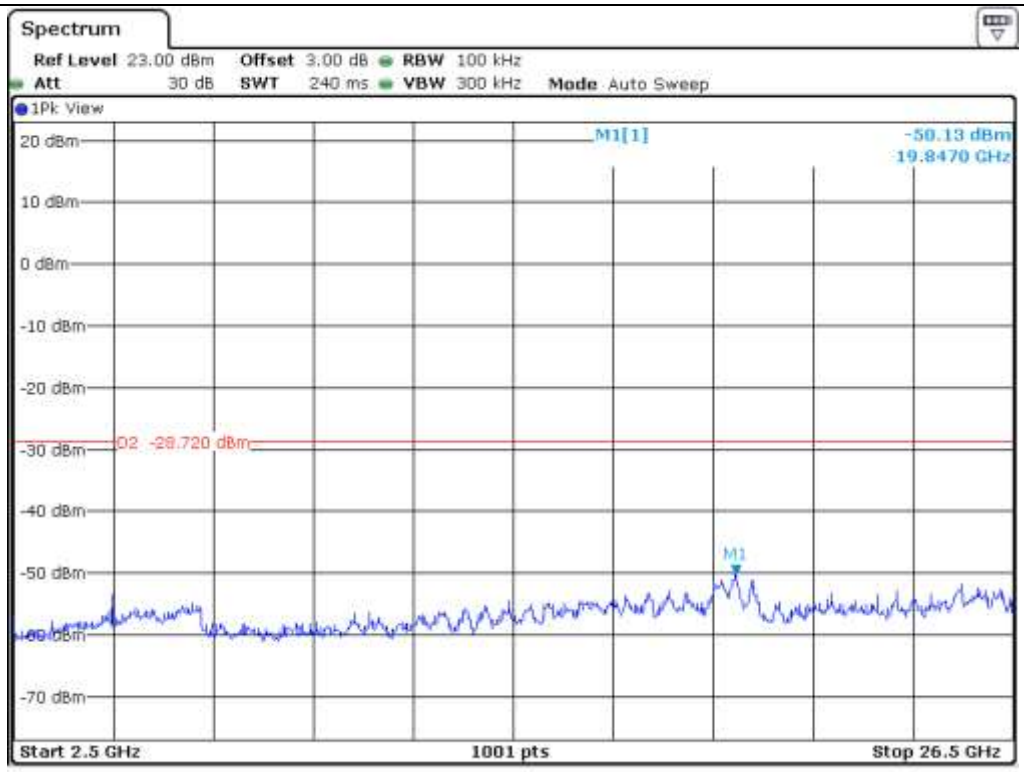


Low Channel

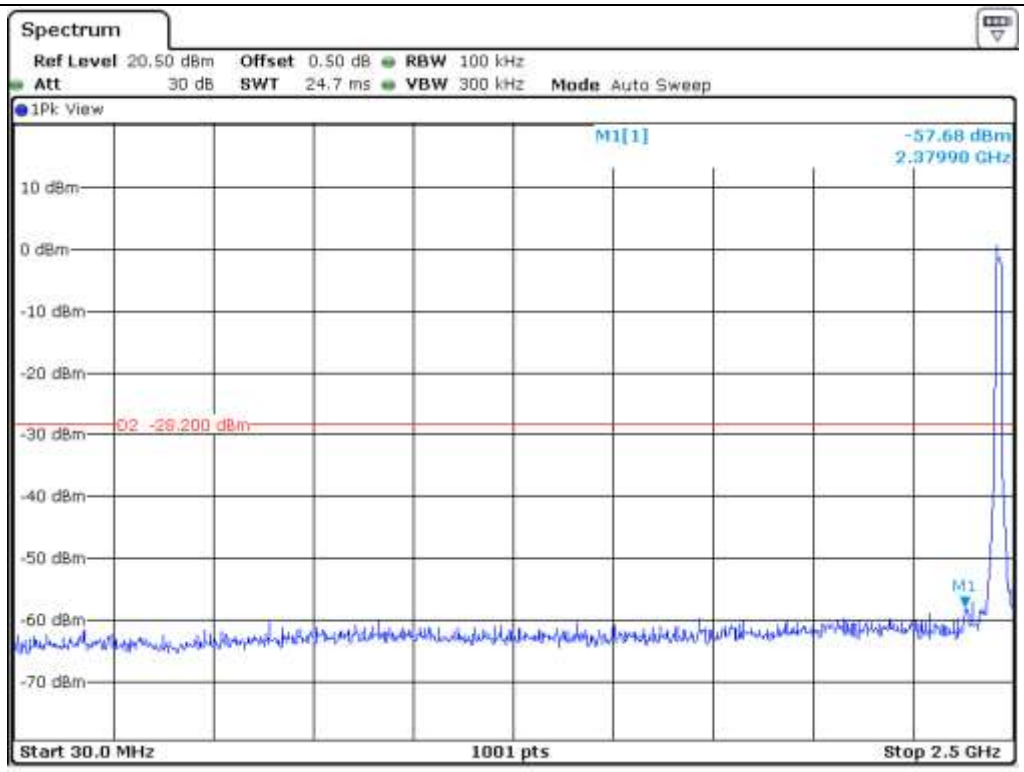
ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)



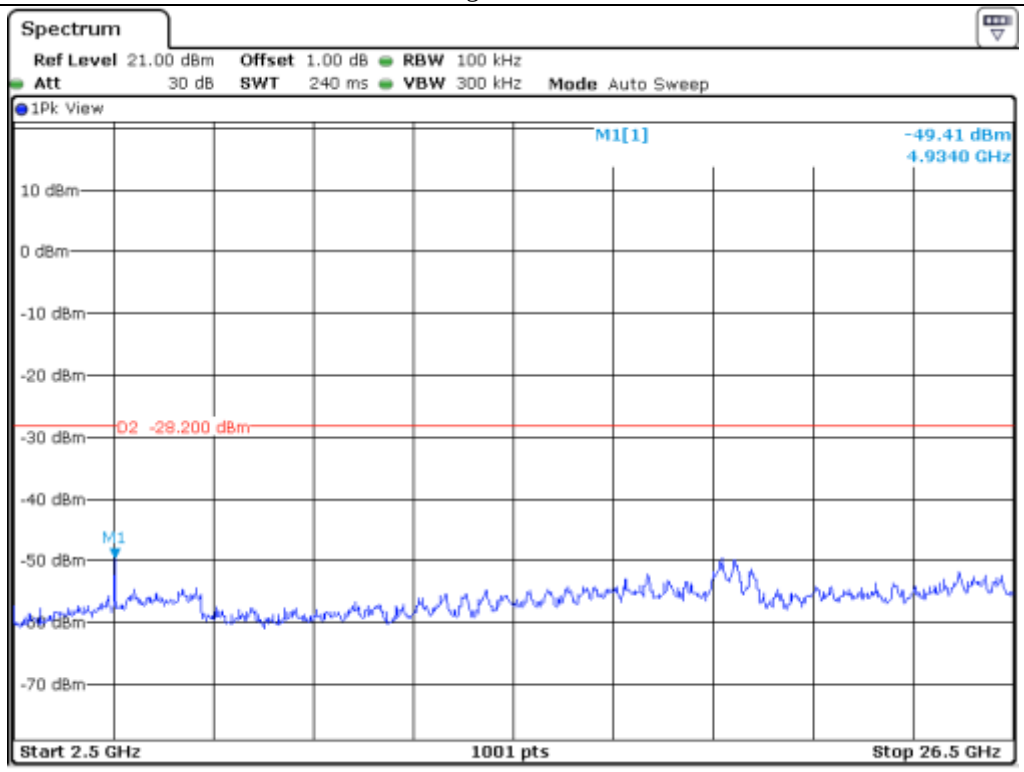
Middle Channel



Middle Channel



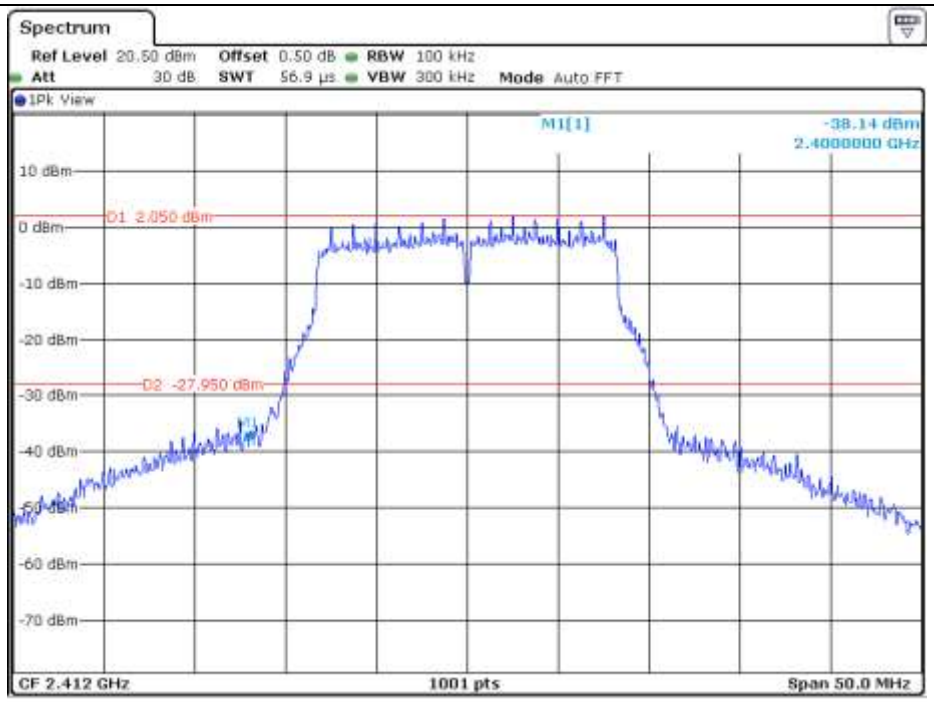
High Channel



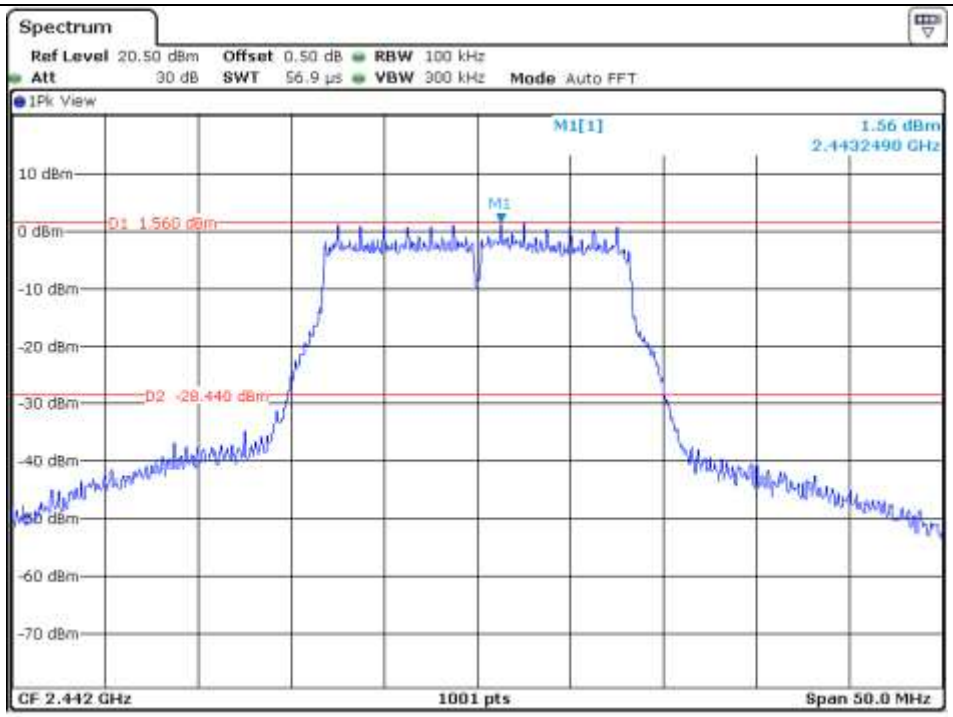
High Channel

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

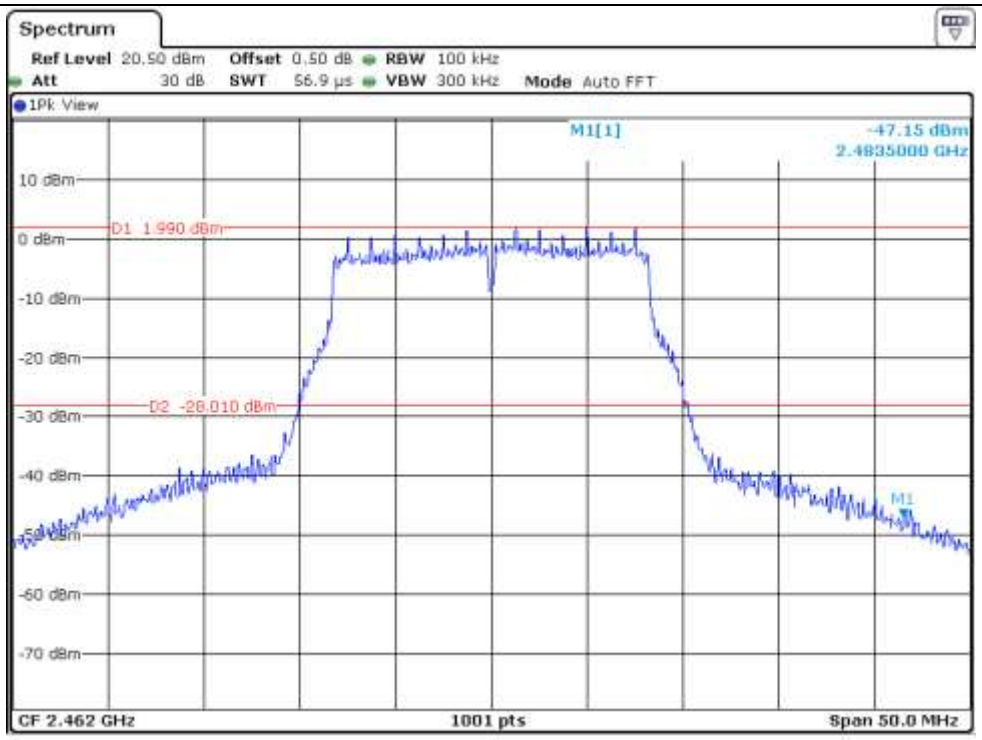
10.5.2.3 Test data for Antenna 2



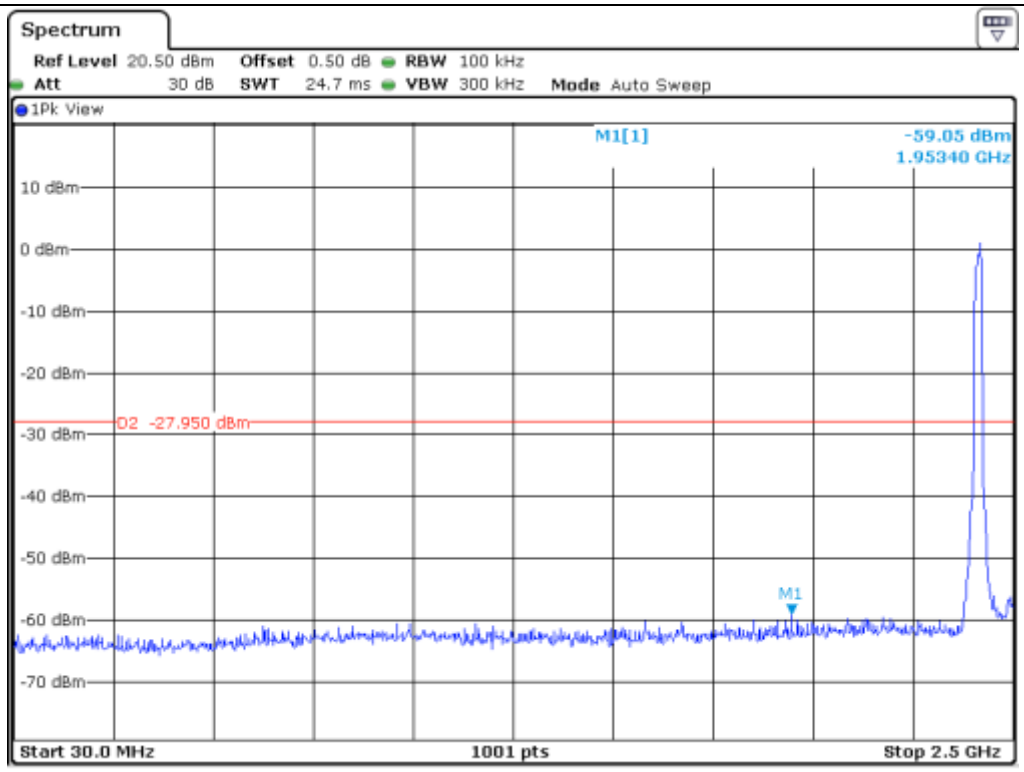
Low Channel



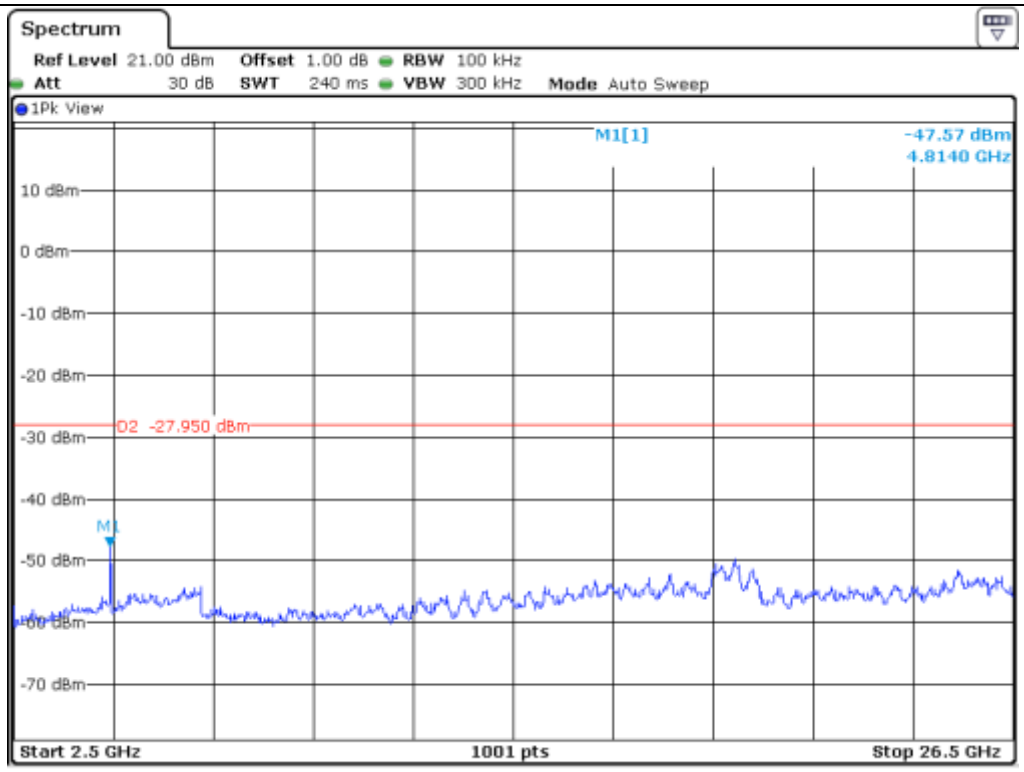
Middle Channel



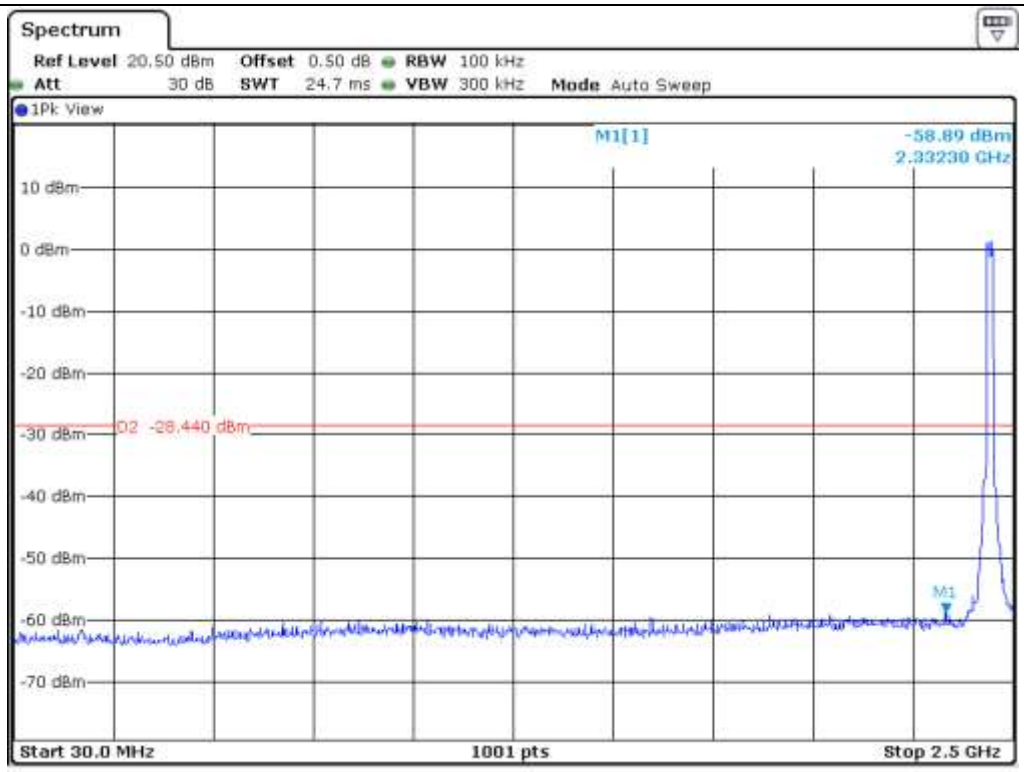
High Channel



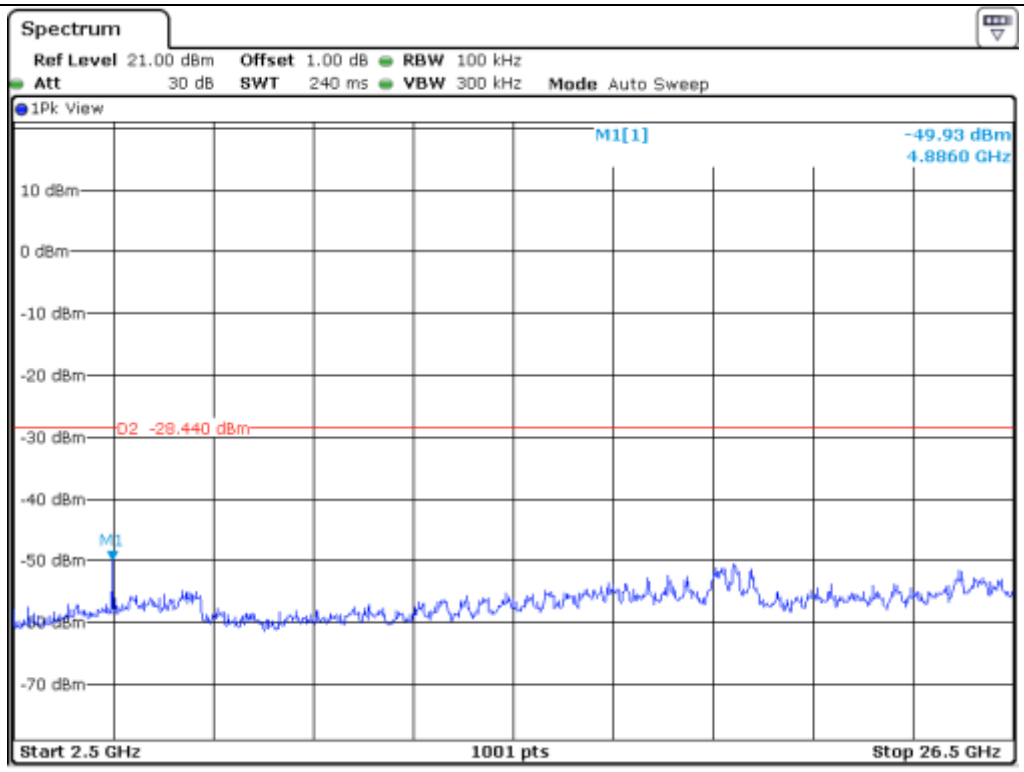
Low Channel



Low Channel

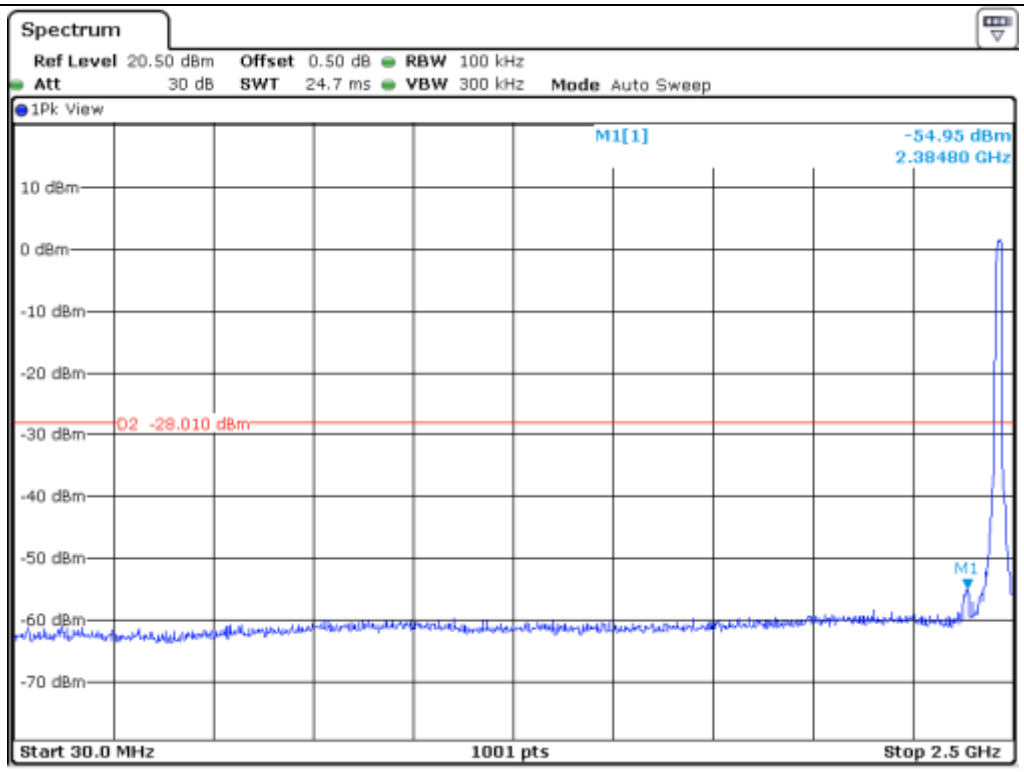


Middle Channel

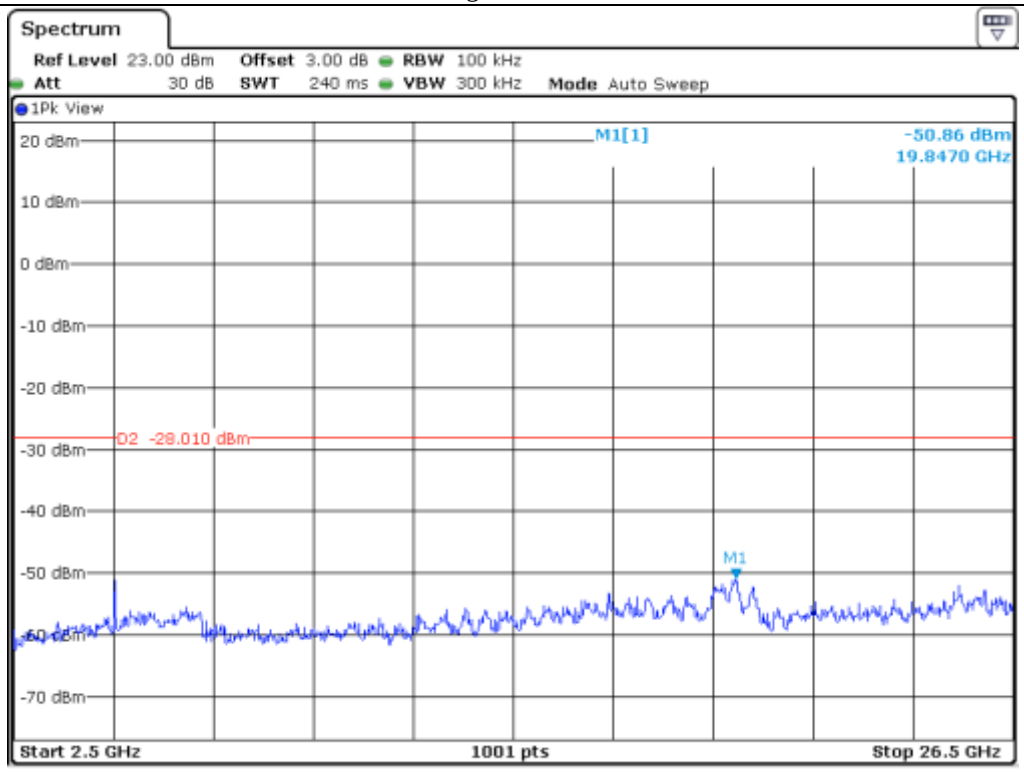


Middle Channel

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



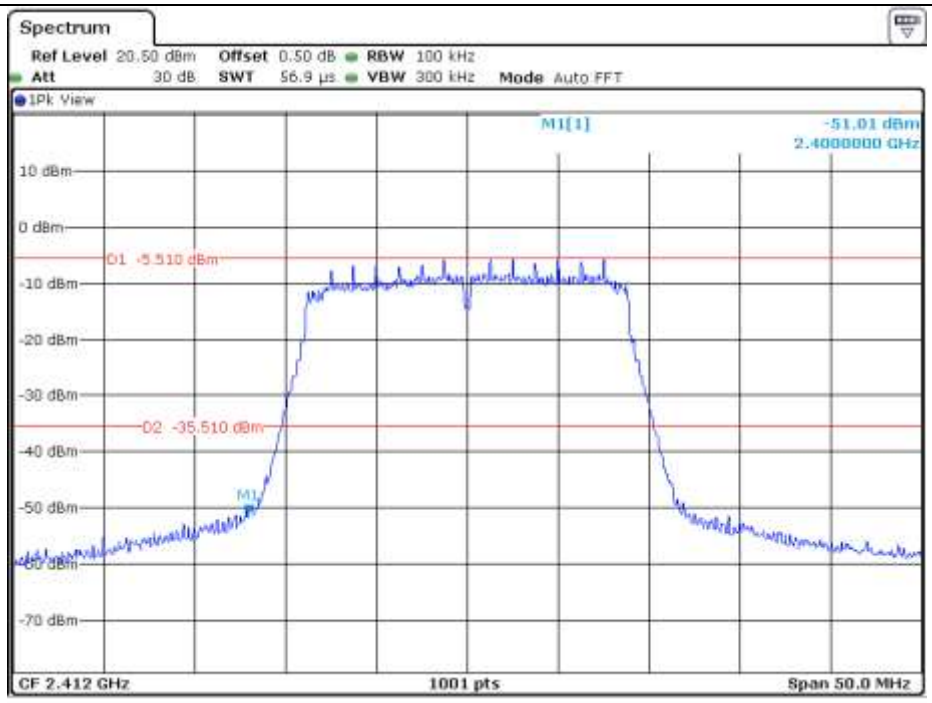
High Channel



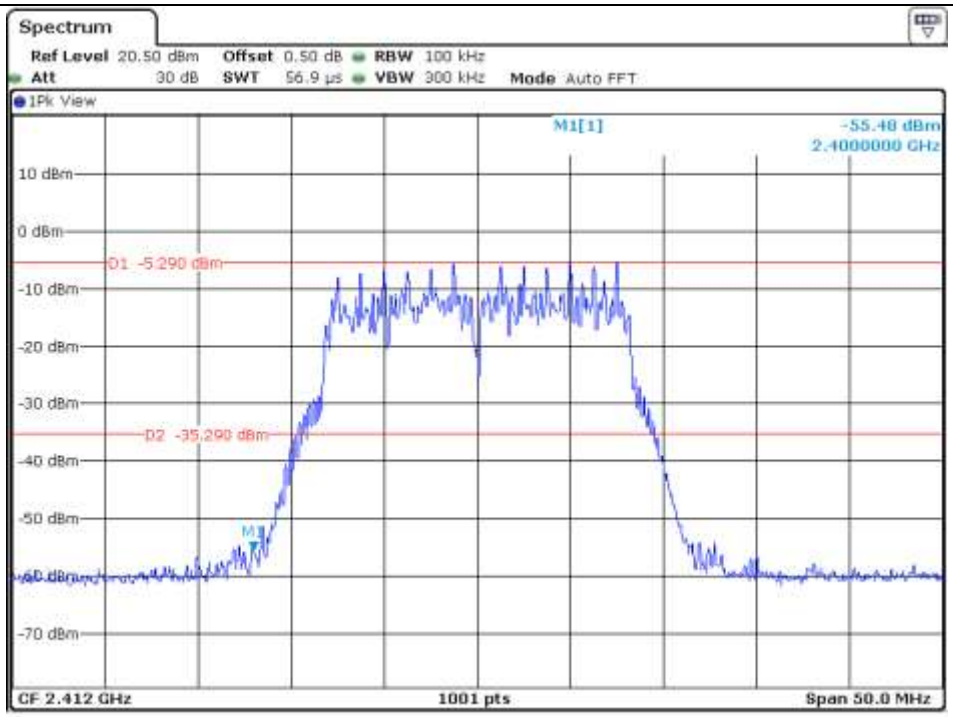
High Channel

10.5.3 Test data for 802.11n_HT20 WLAN Mode

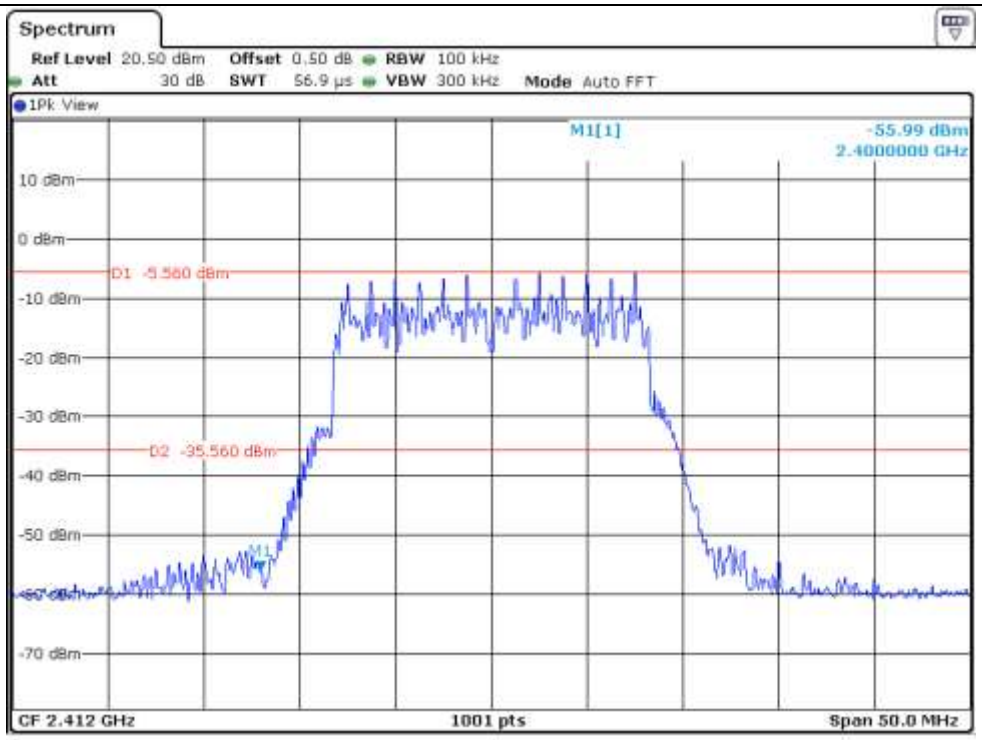
10.5.3.1 Test data for Antenna 0



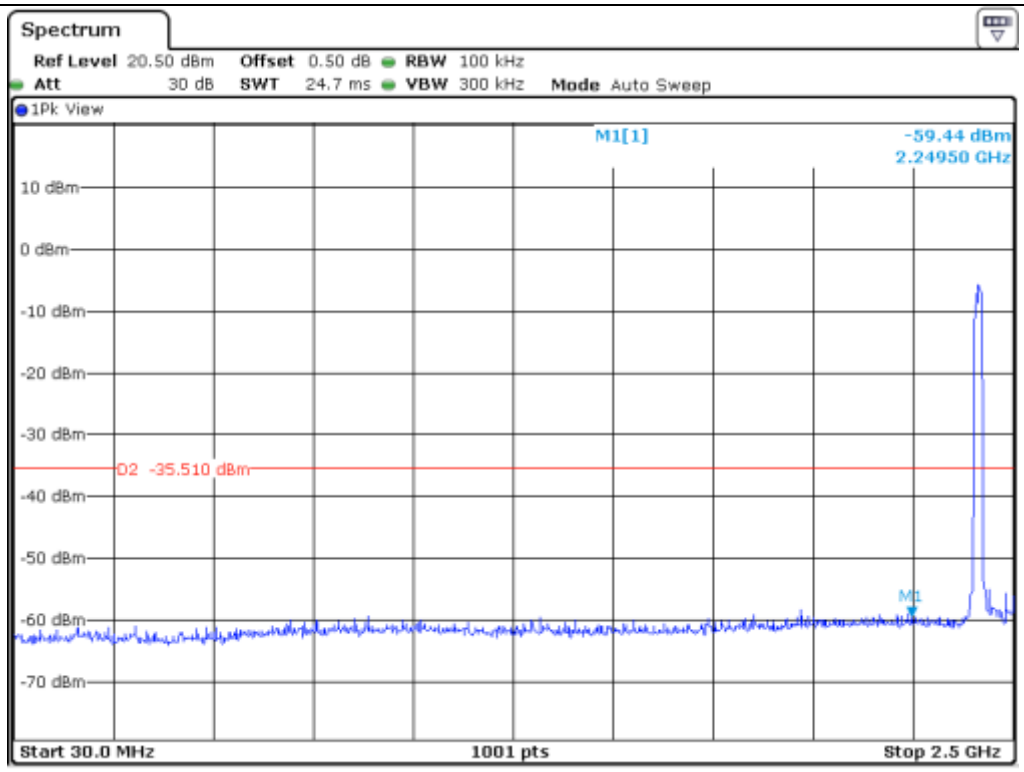
Low Channel



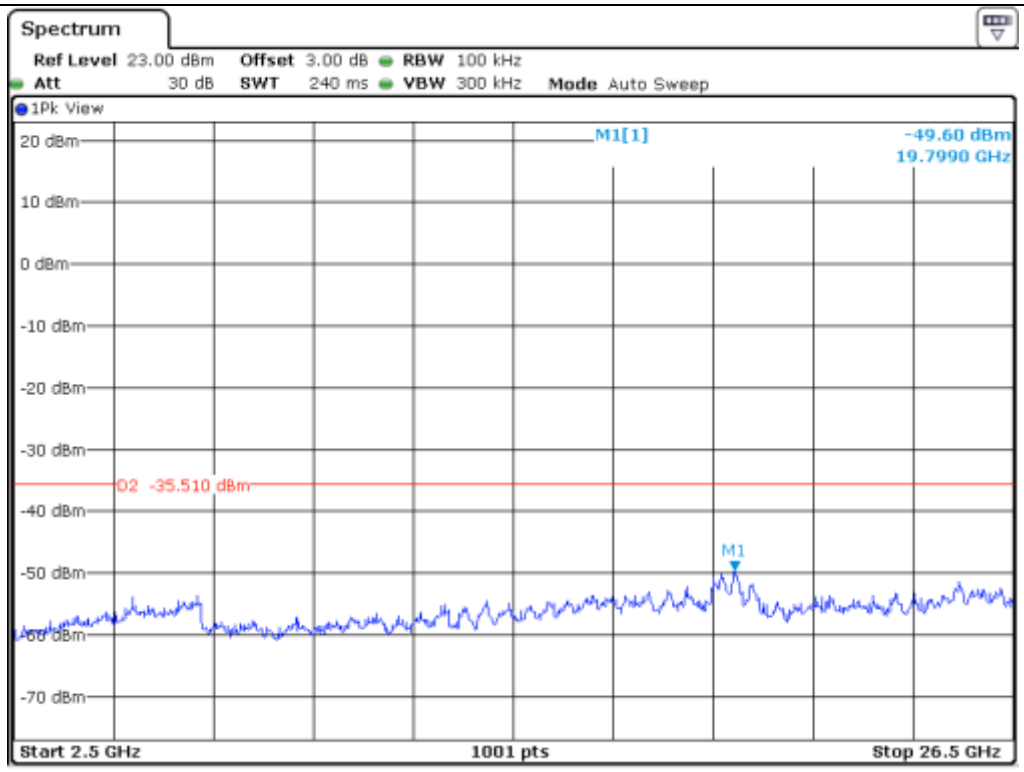
Middle Channel



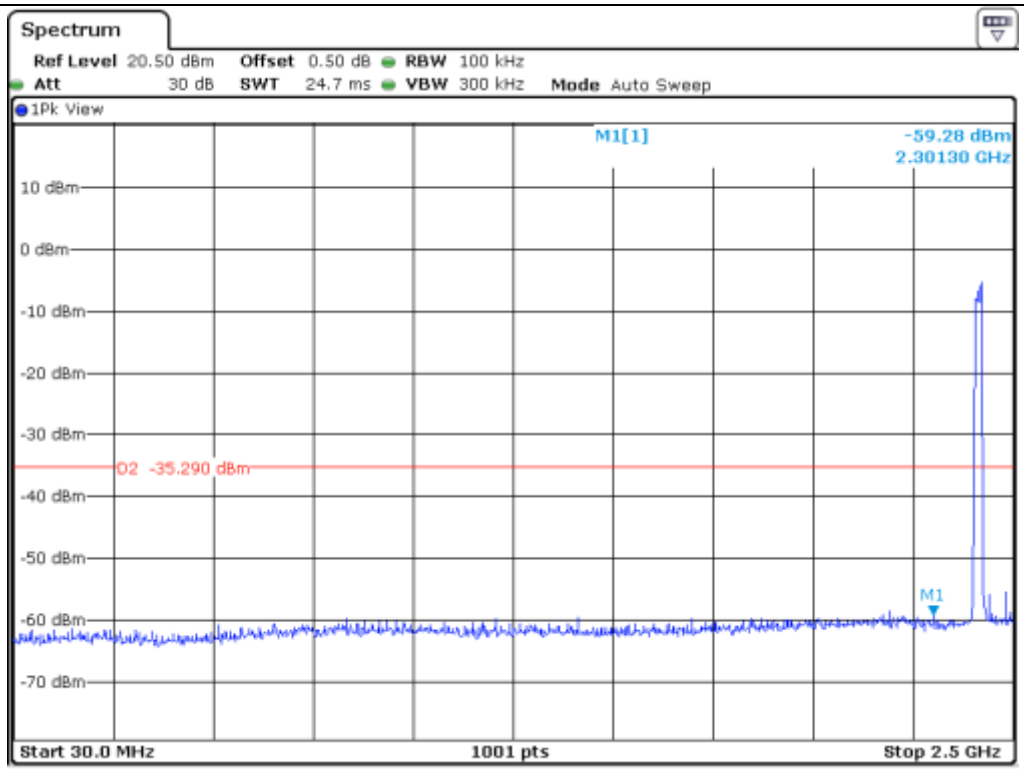
High Channel



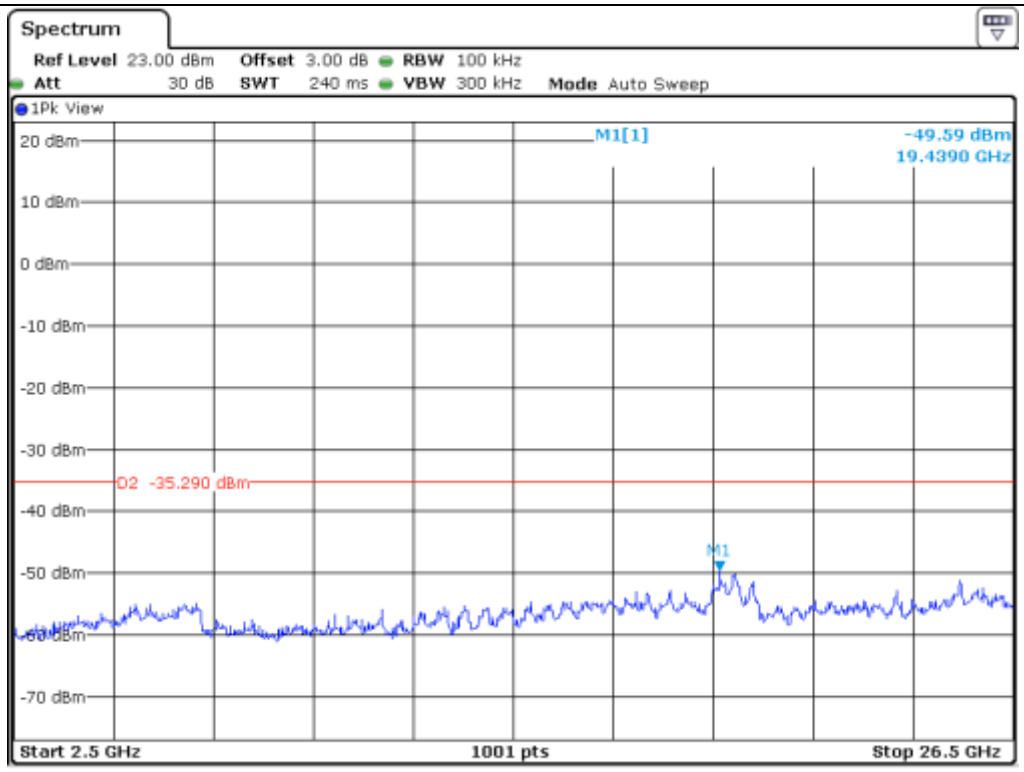
Low Channel



Low Channel

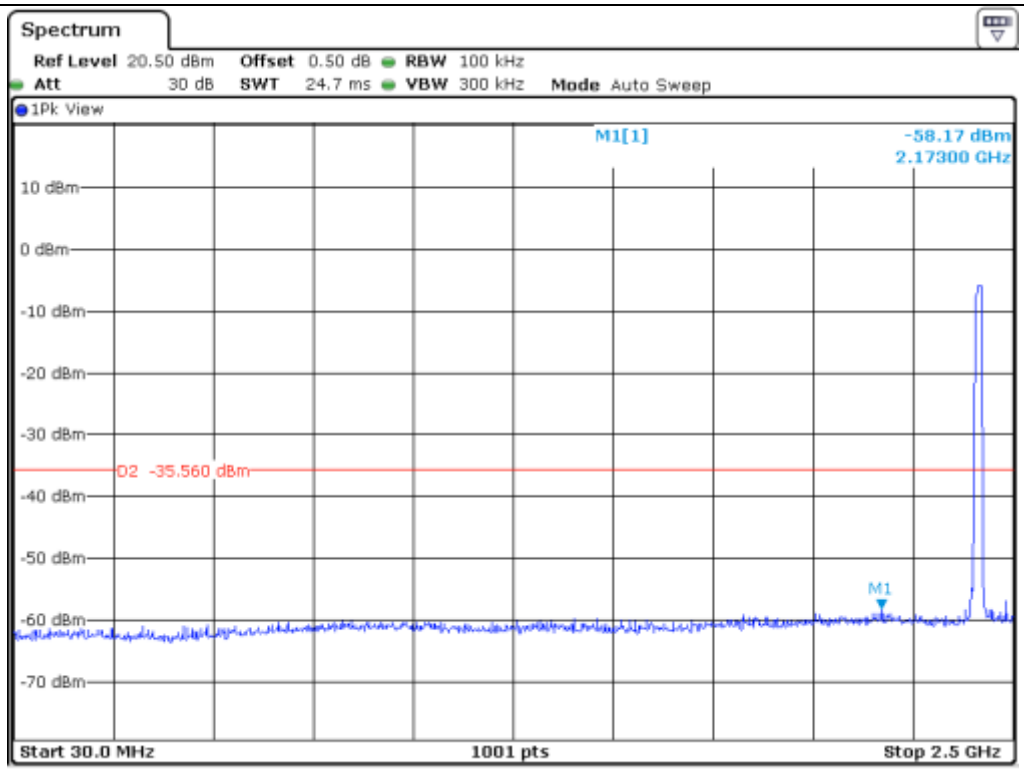


Middle Channel

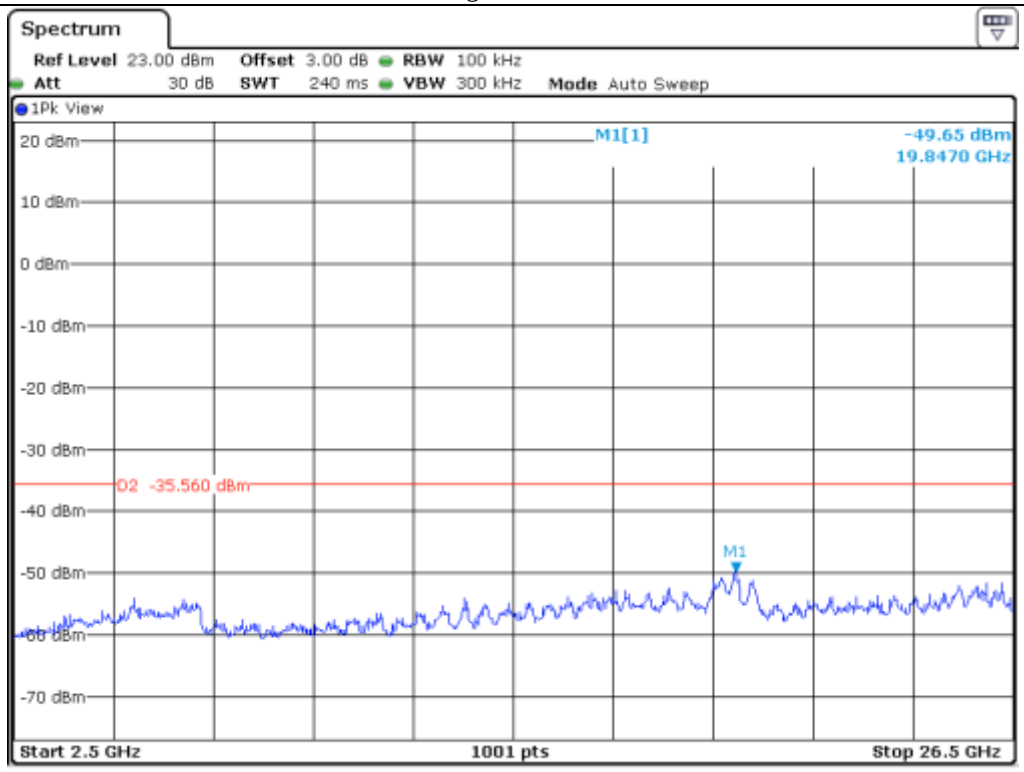


Middle Channel

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



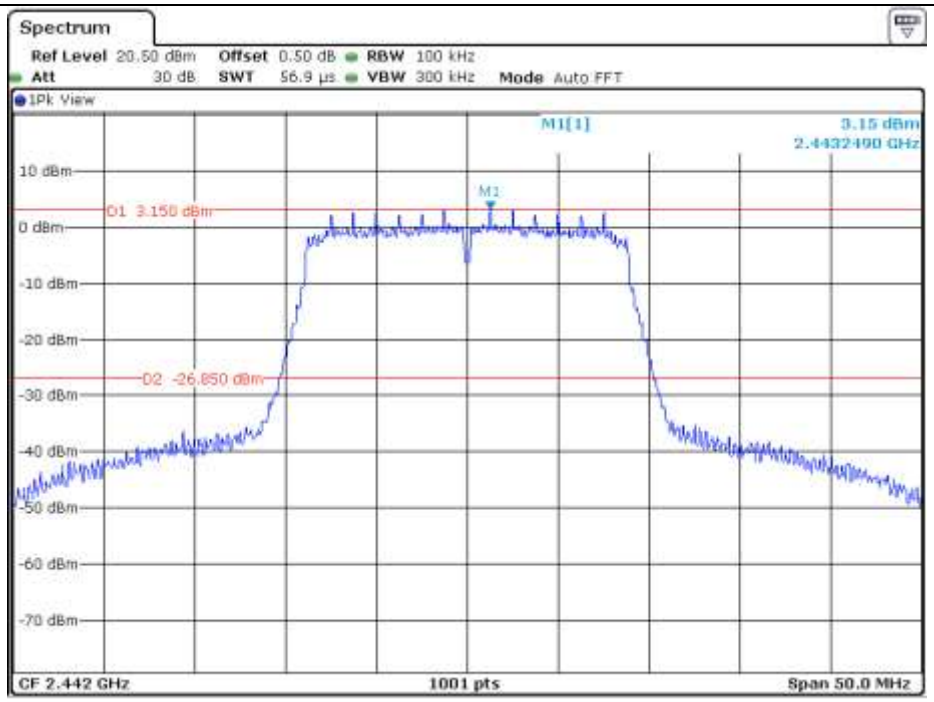
High Channel



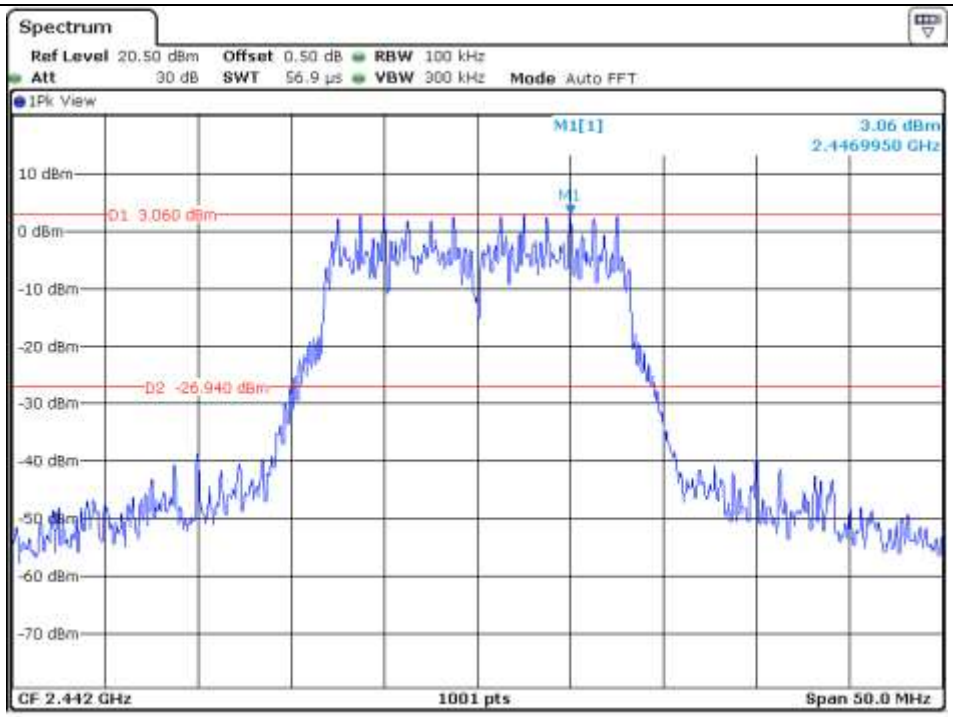
High Channel

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

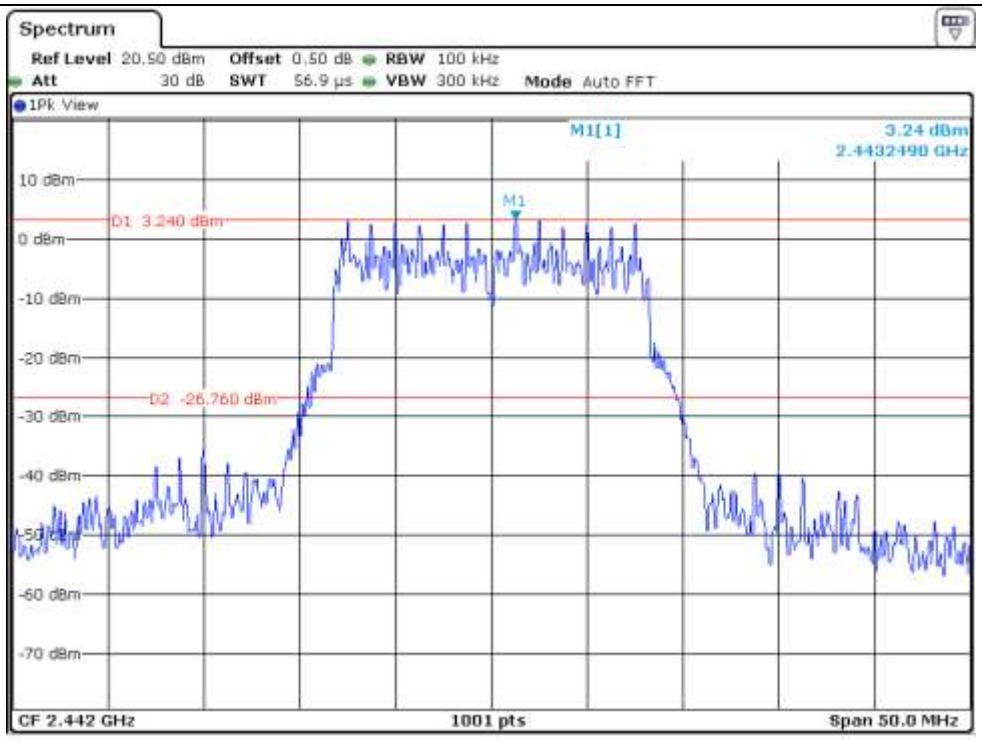
10.5.3.2 Test data for Antenna 1



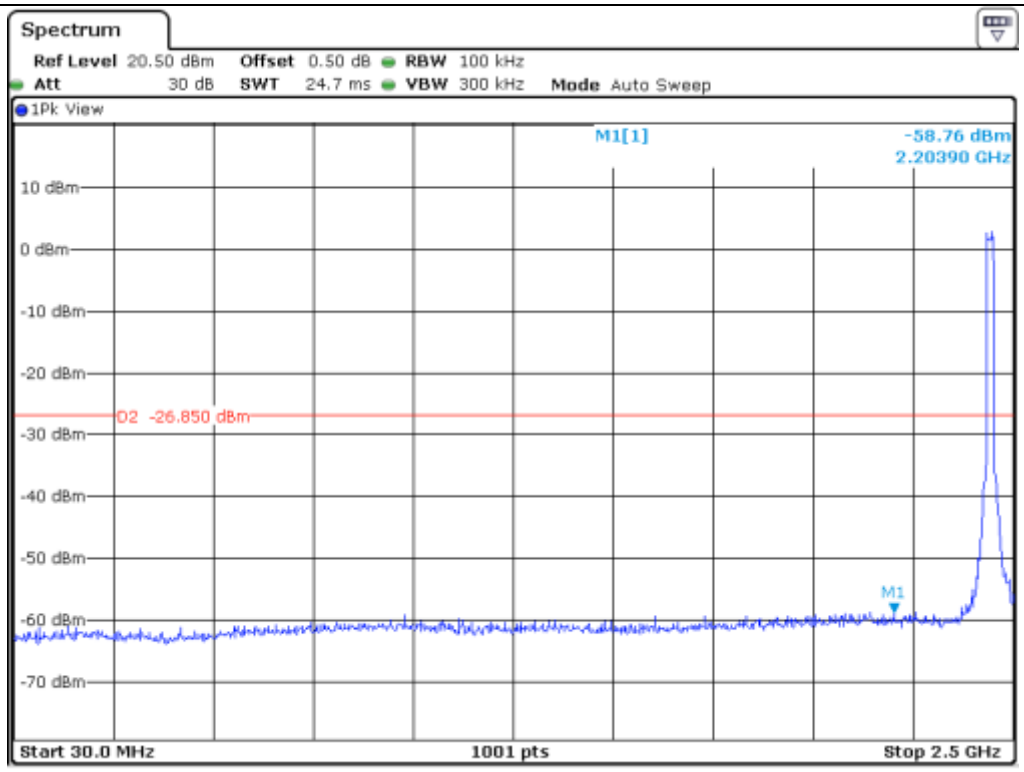
Low Channel



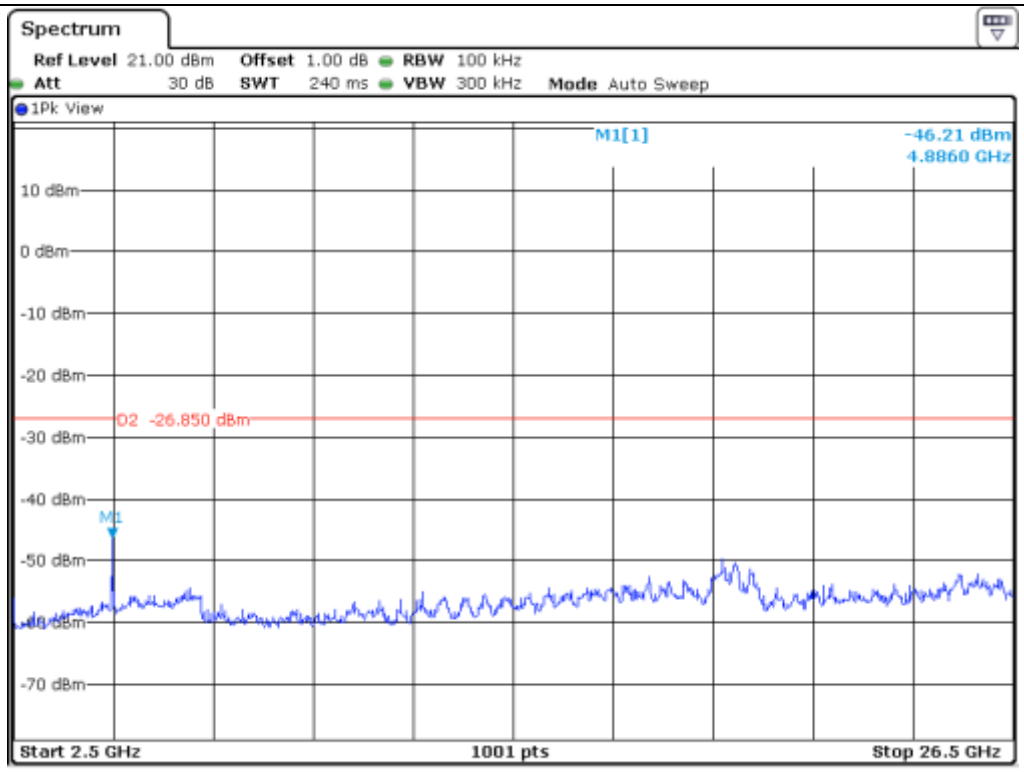
Middle Channel



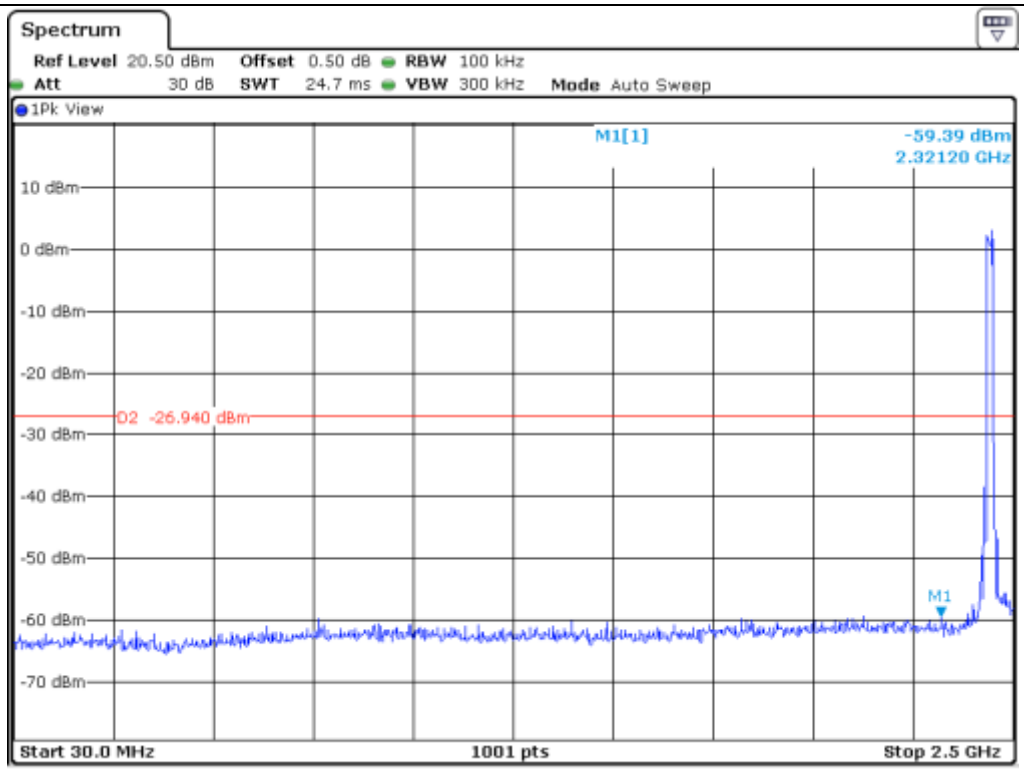
High Channel



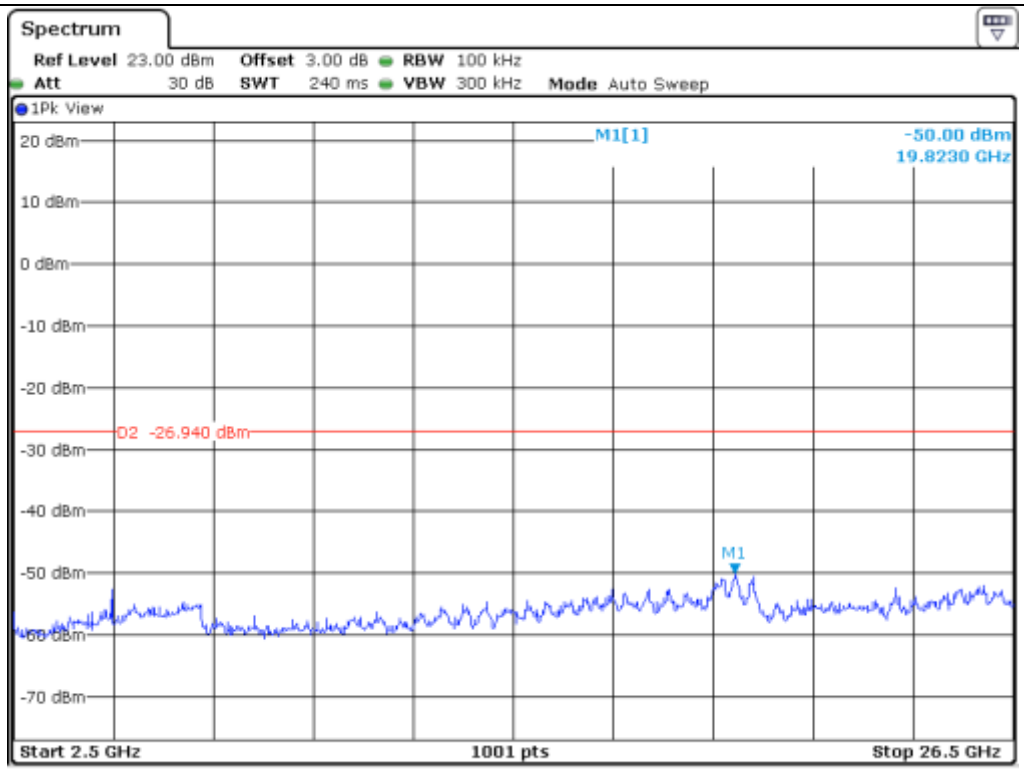
Low Channel



Low Channel

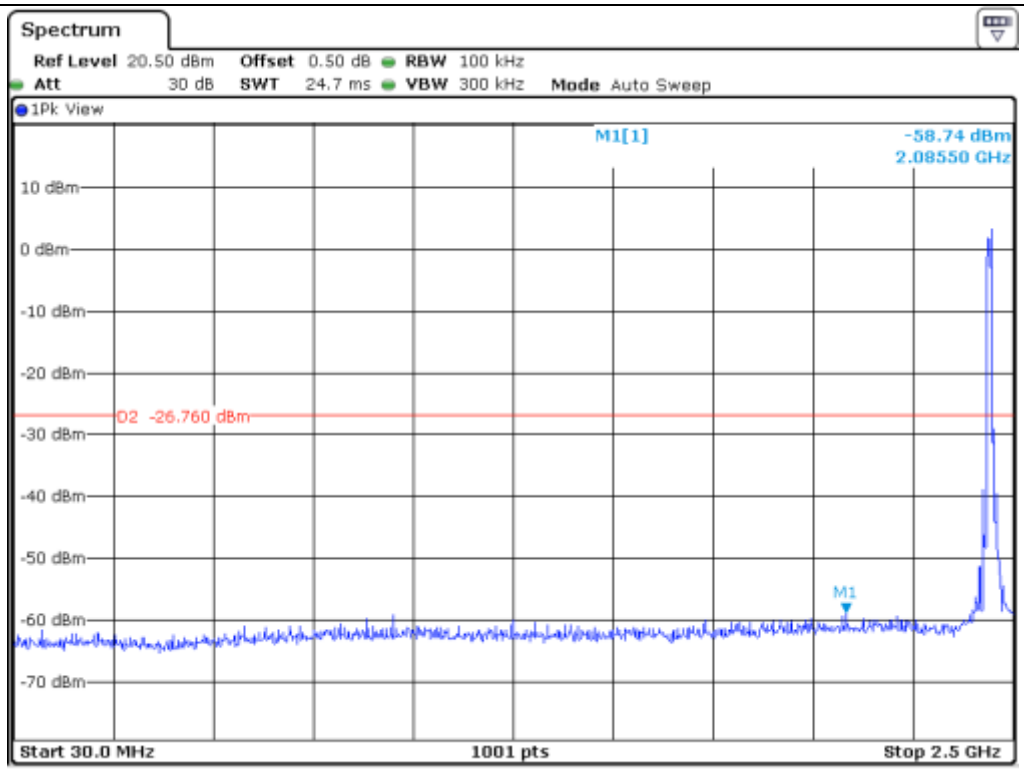


Middle Channel

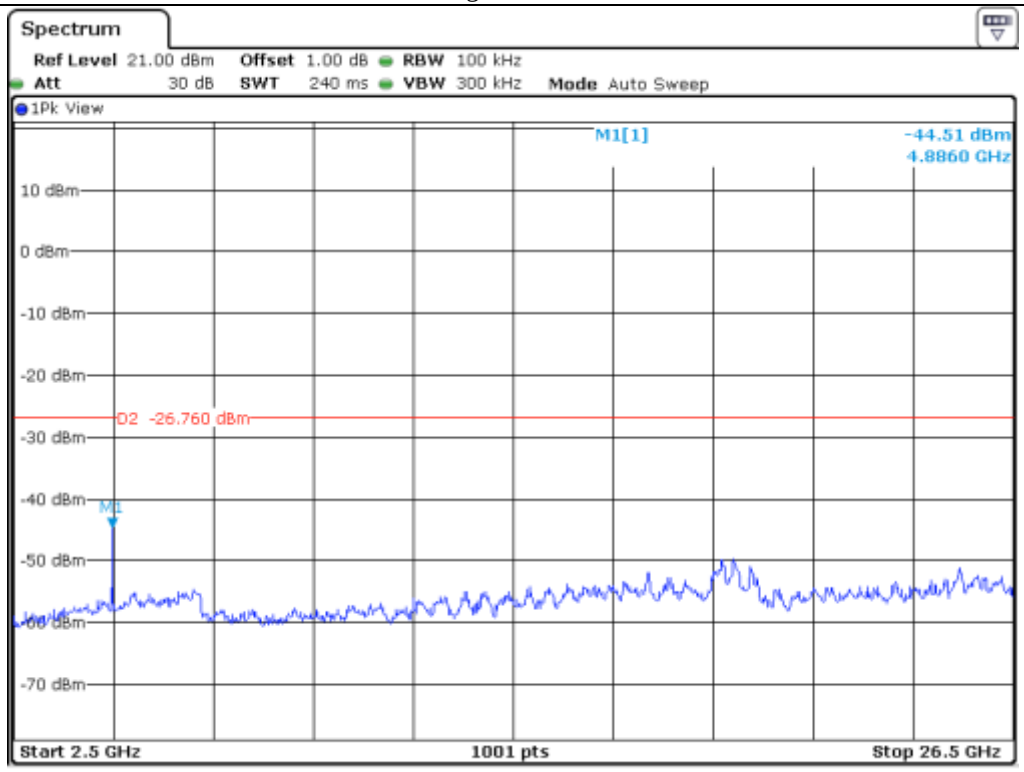


Middle Channel

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

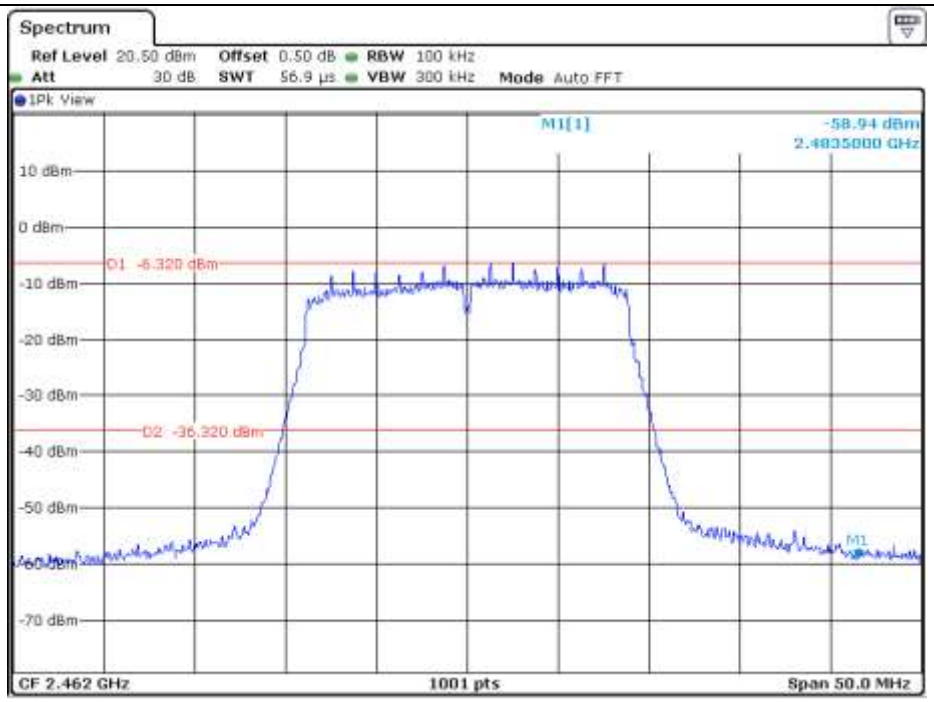


High Channel

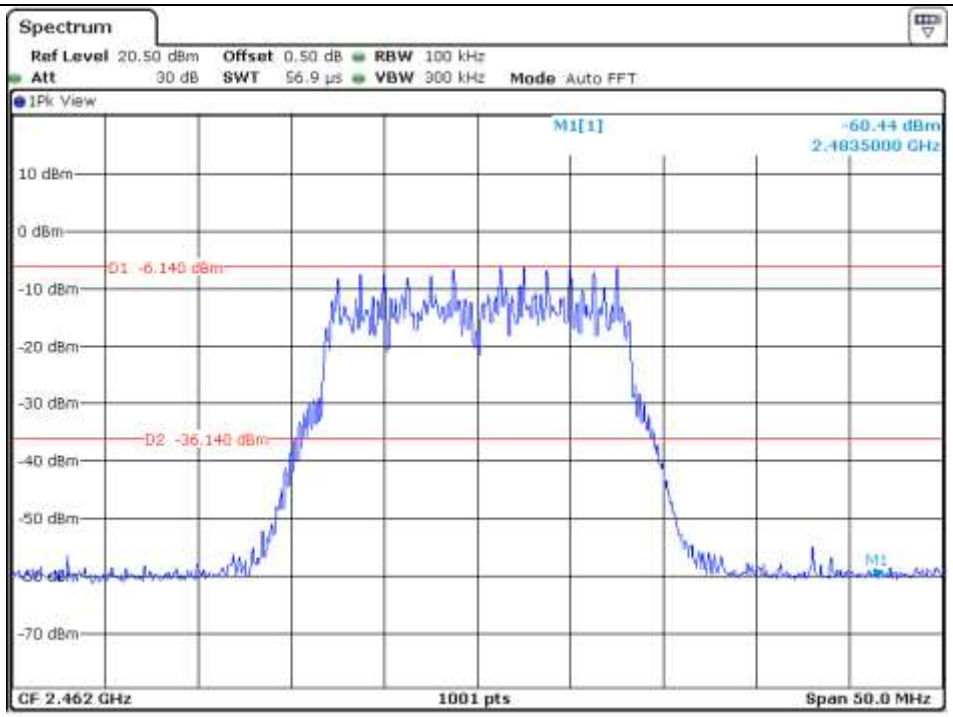


High Channel

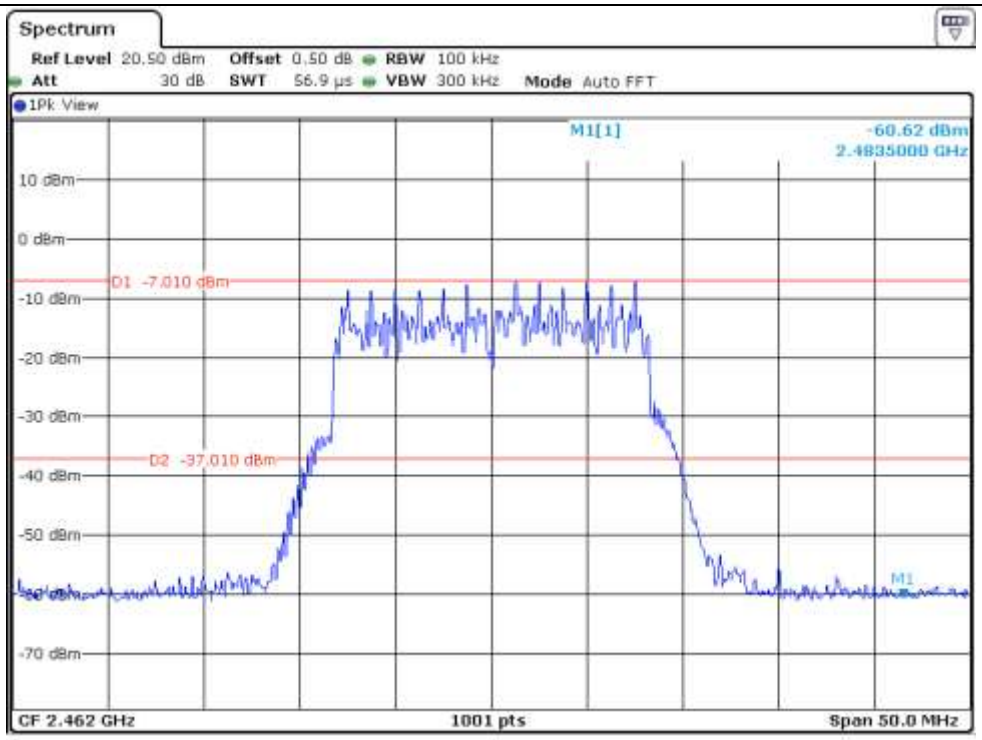
10.5.3.3 Test data for Antenna 2



Low Channel

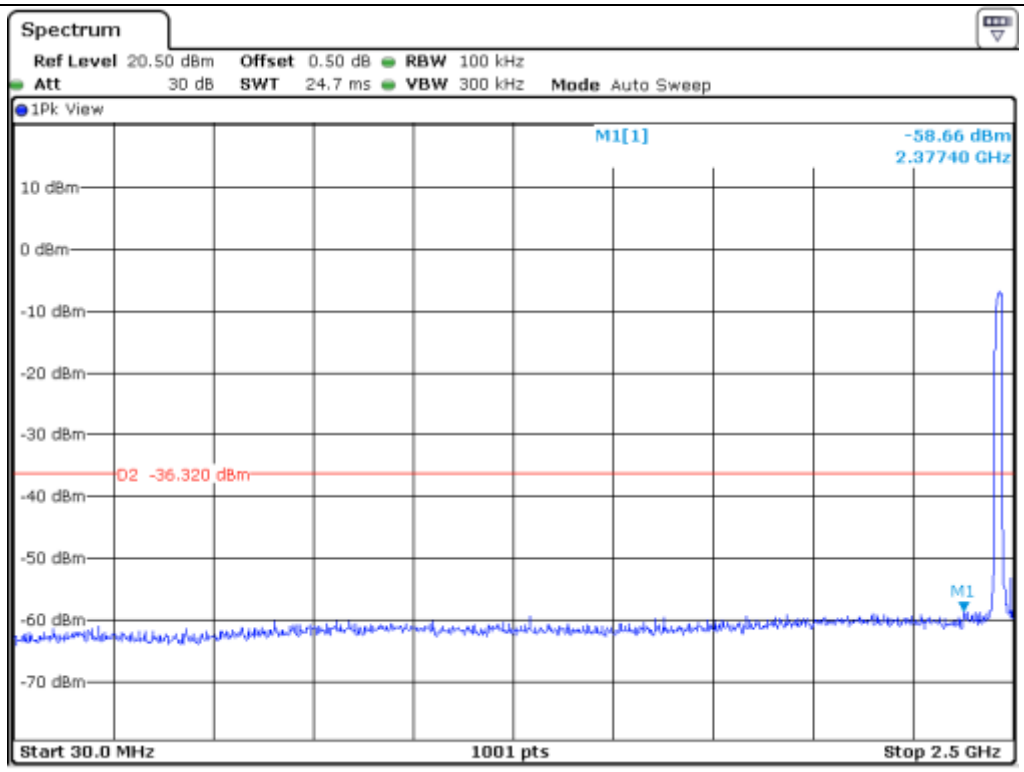


Middle Channel

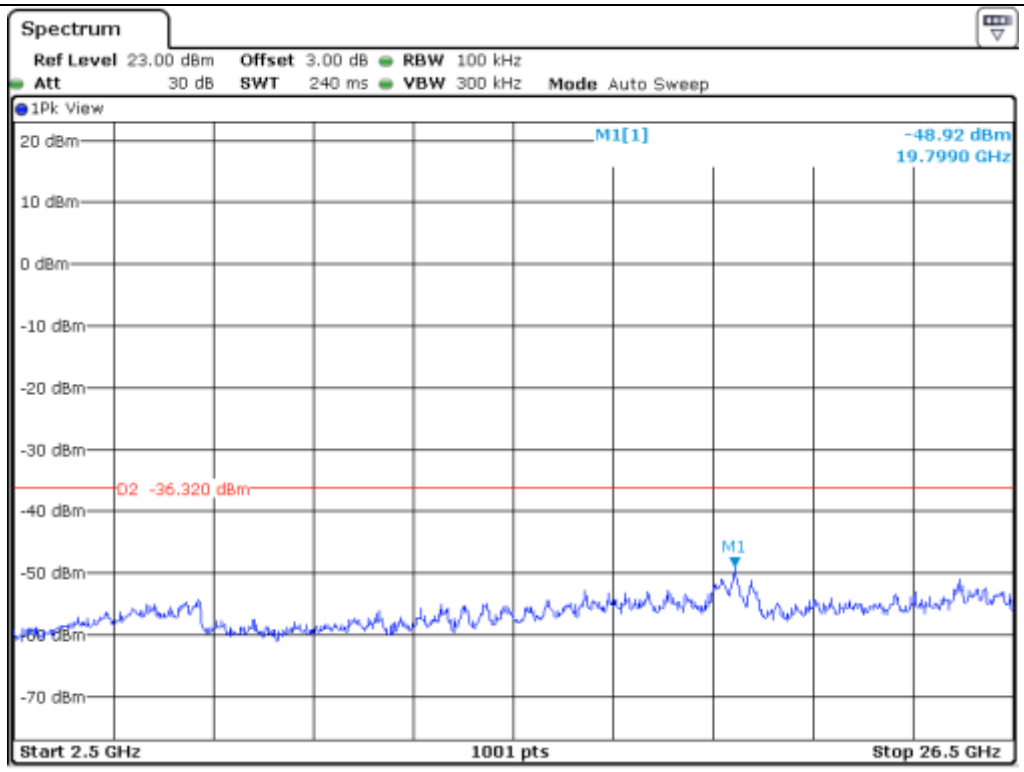


High Channel

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

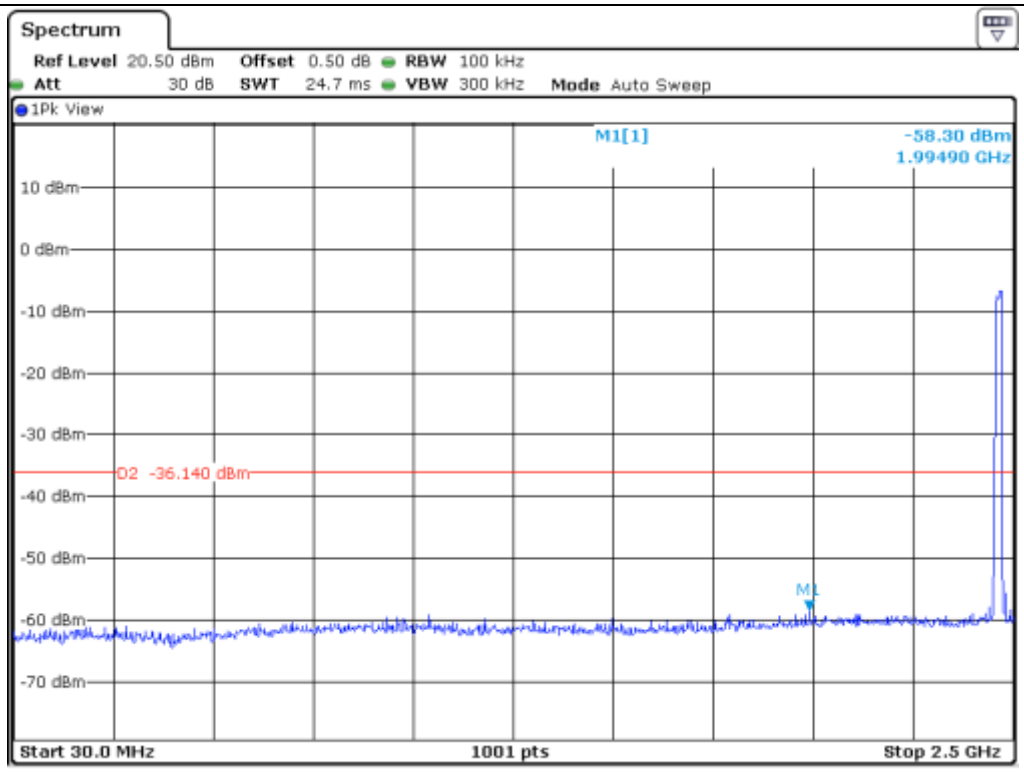


Low Channel

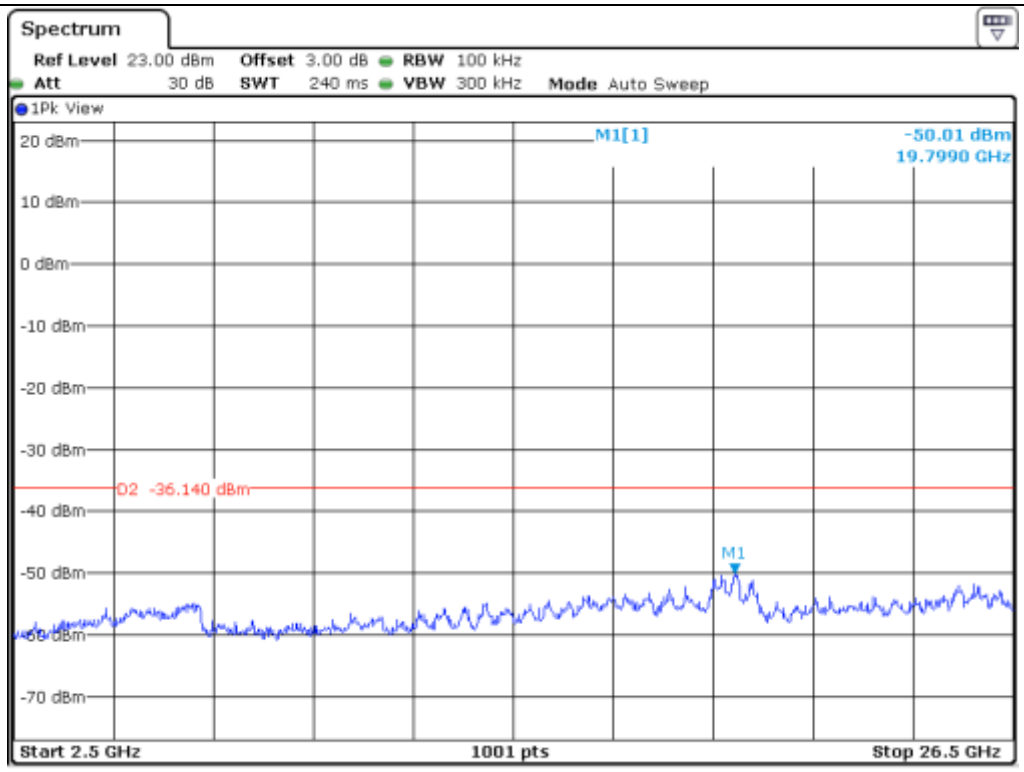


Low Channel

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

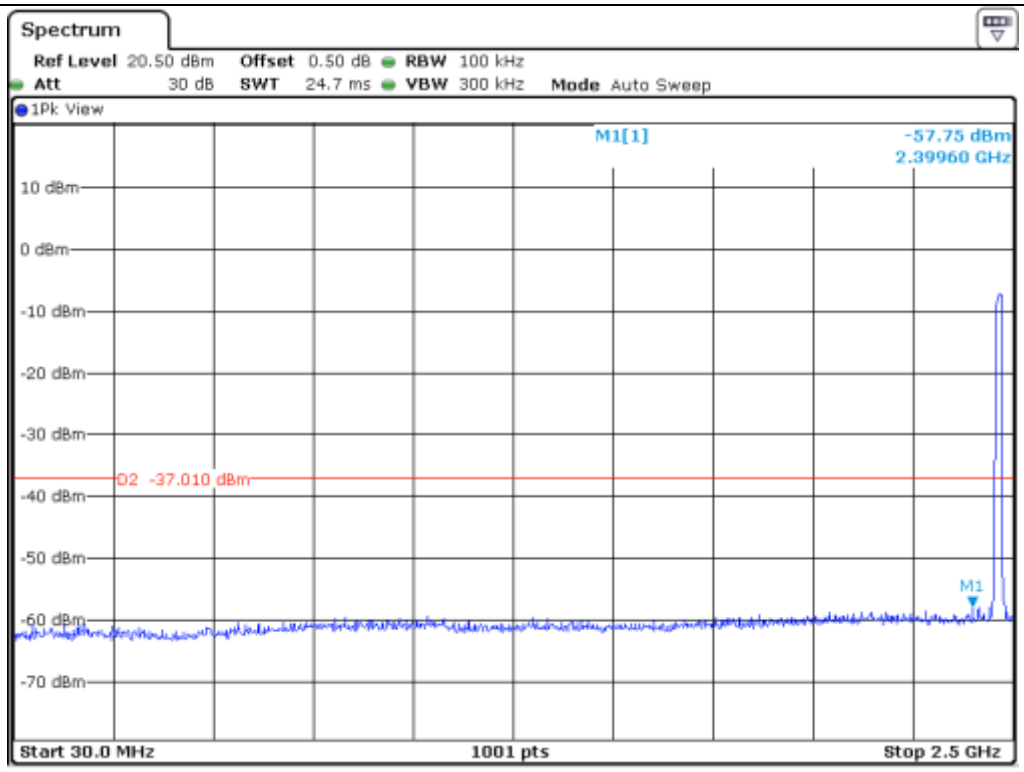


Middle Channel

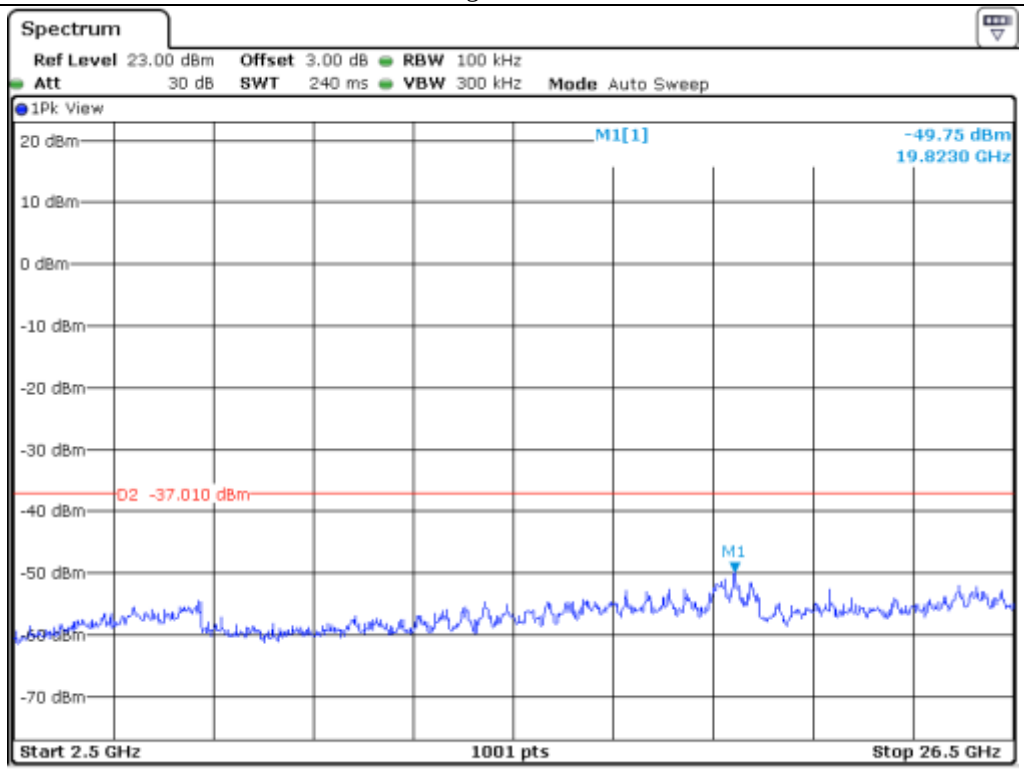


Middle Channel

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



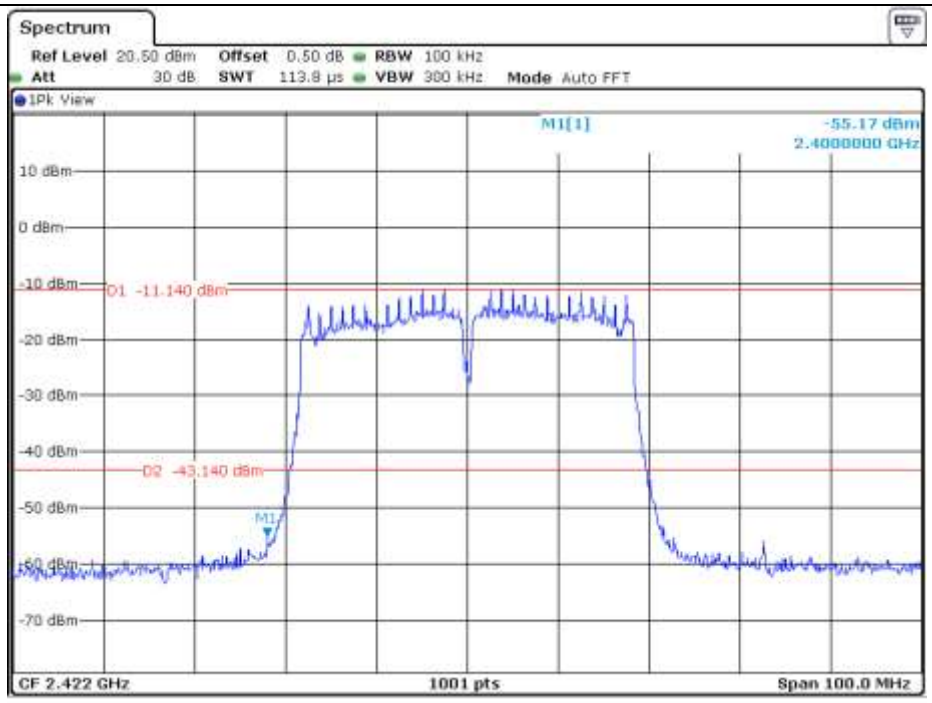
High Channel



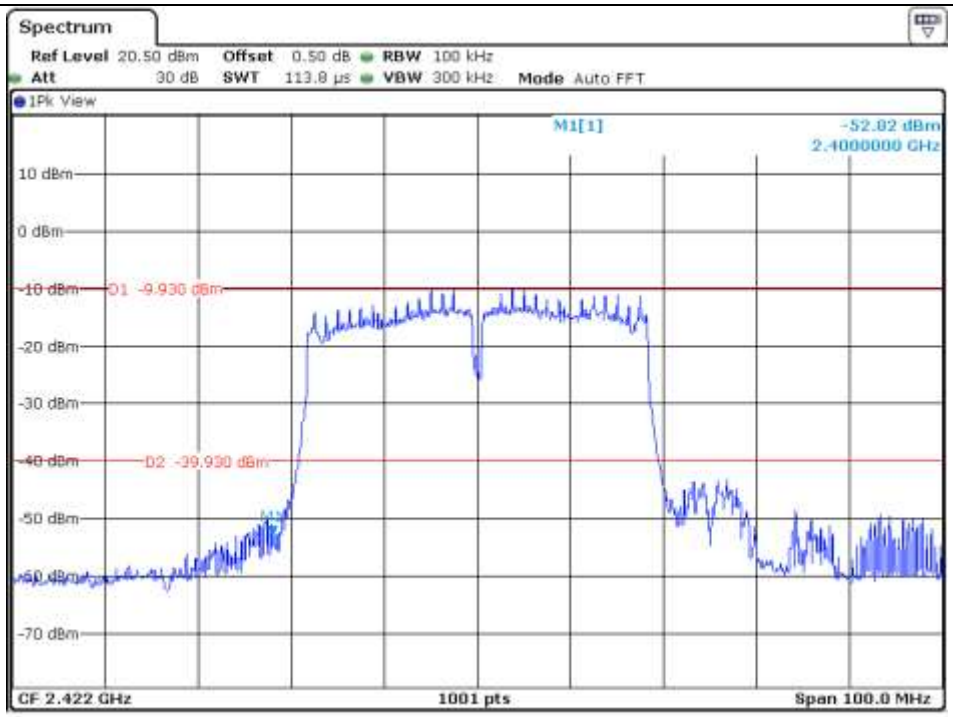
High Channel

10.5.4 Test data for 802.11n_HT40 WLAN Mode

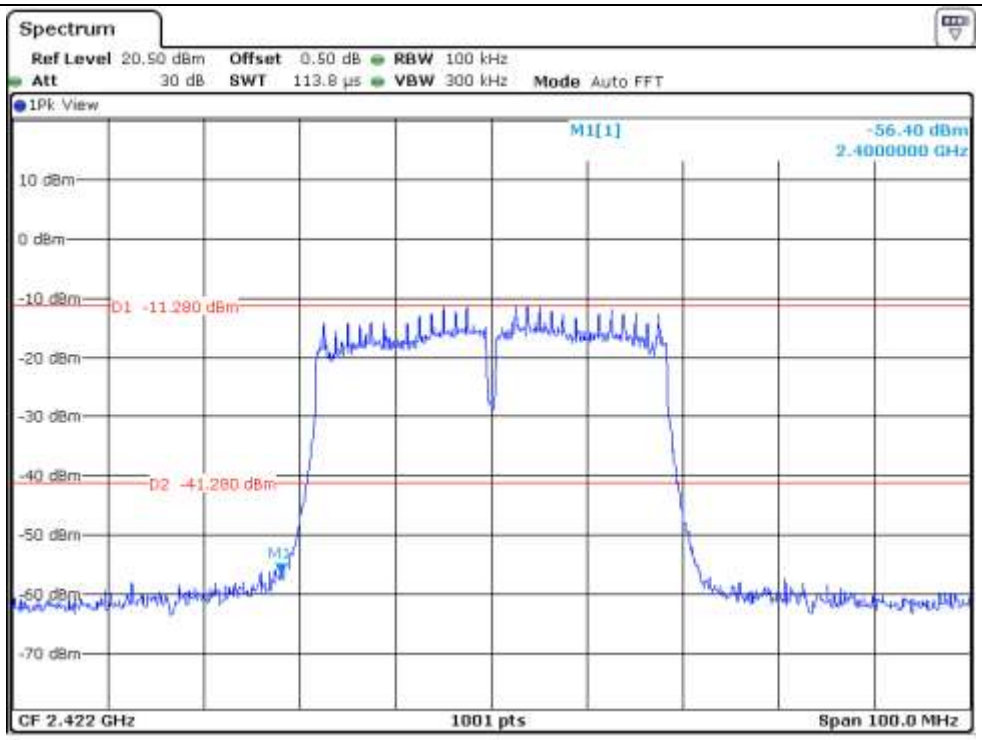
10.5.4.1 Test data for Antenna 0



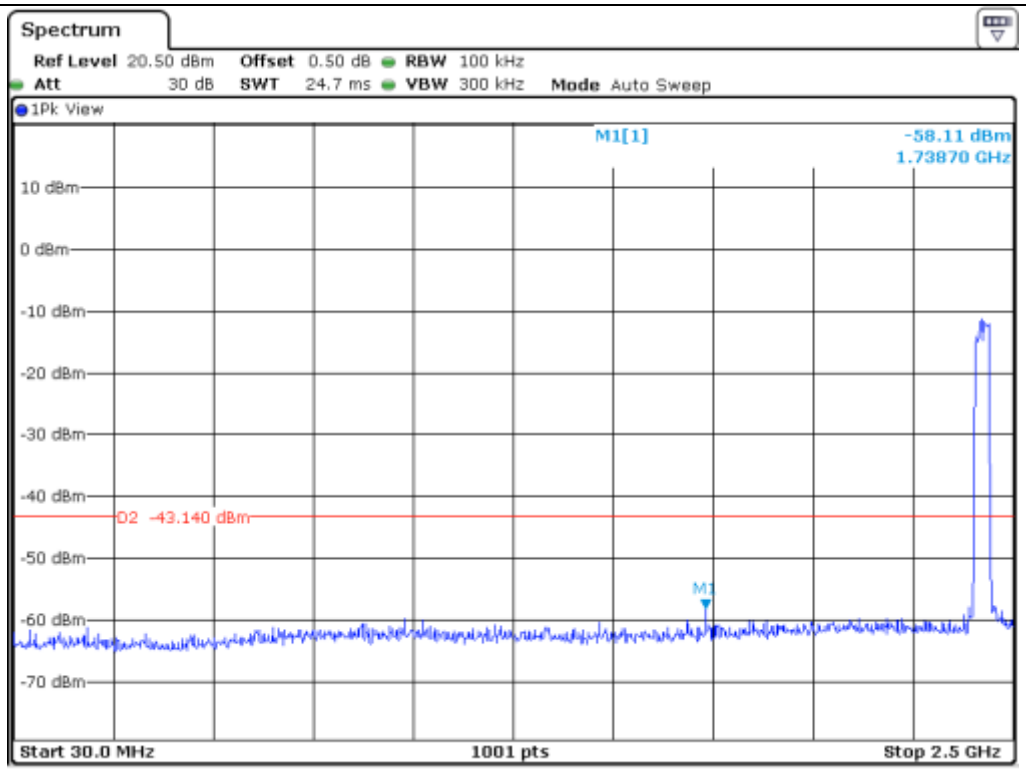
Low Channel



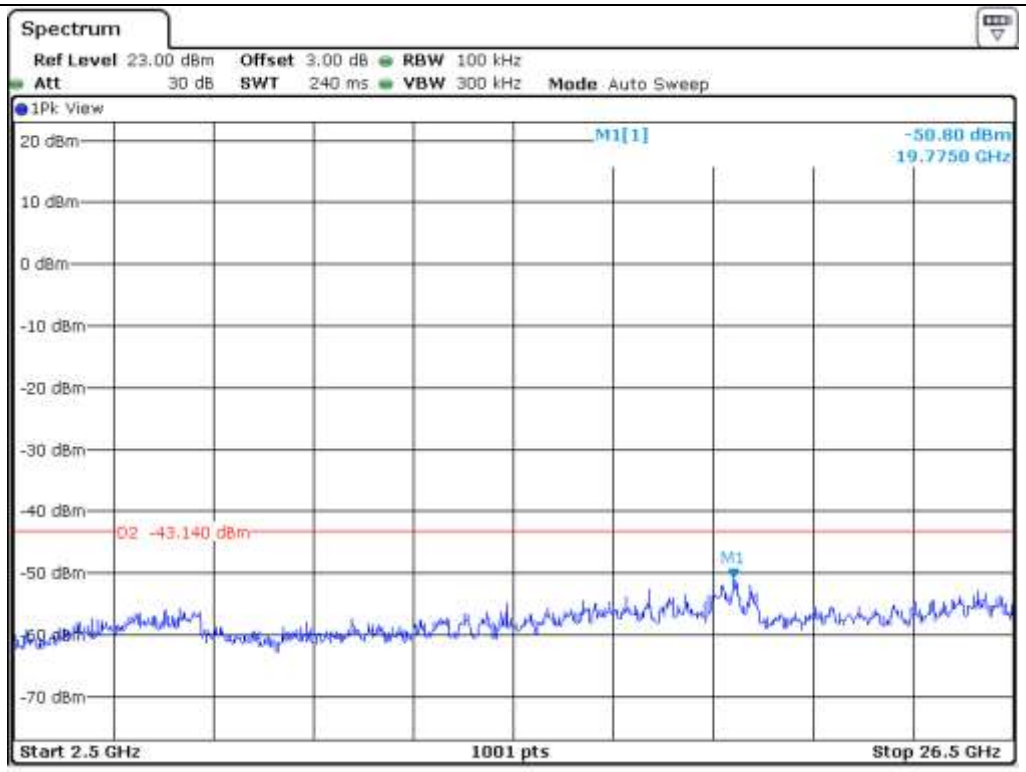
Middle Channel



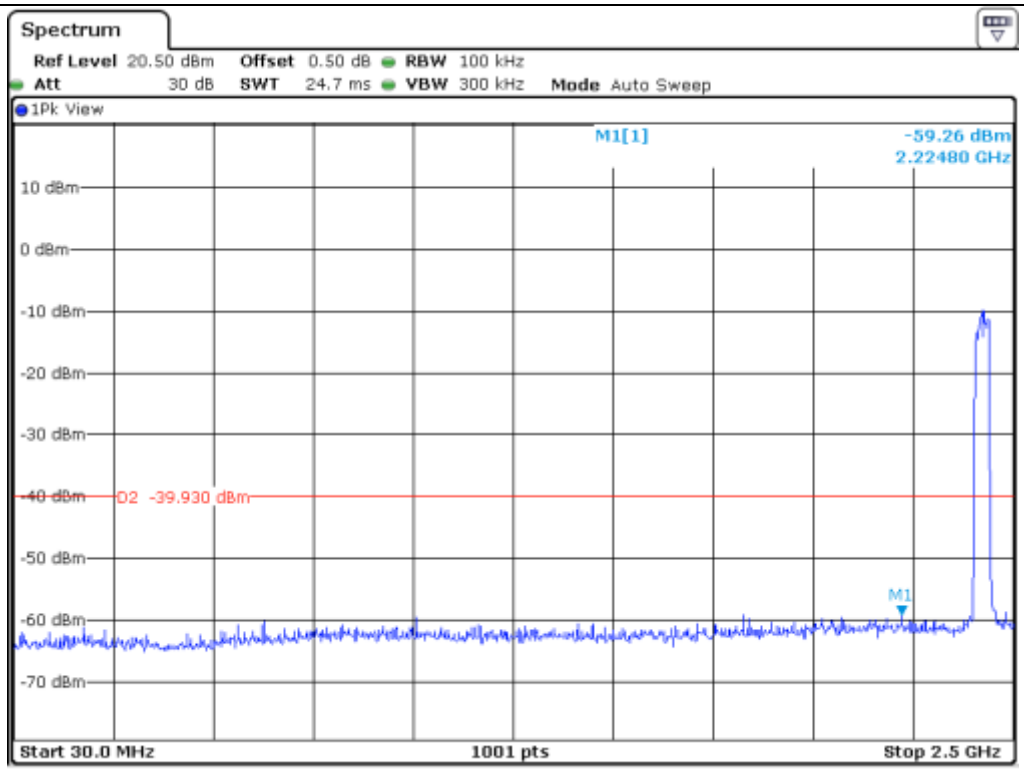
High Channel



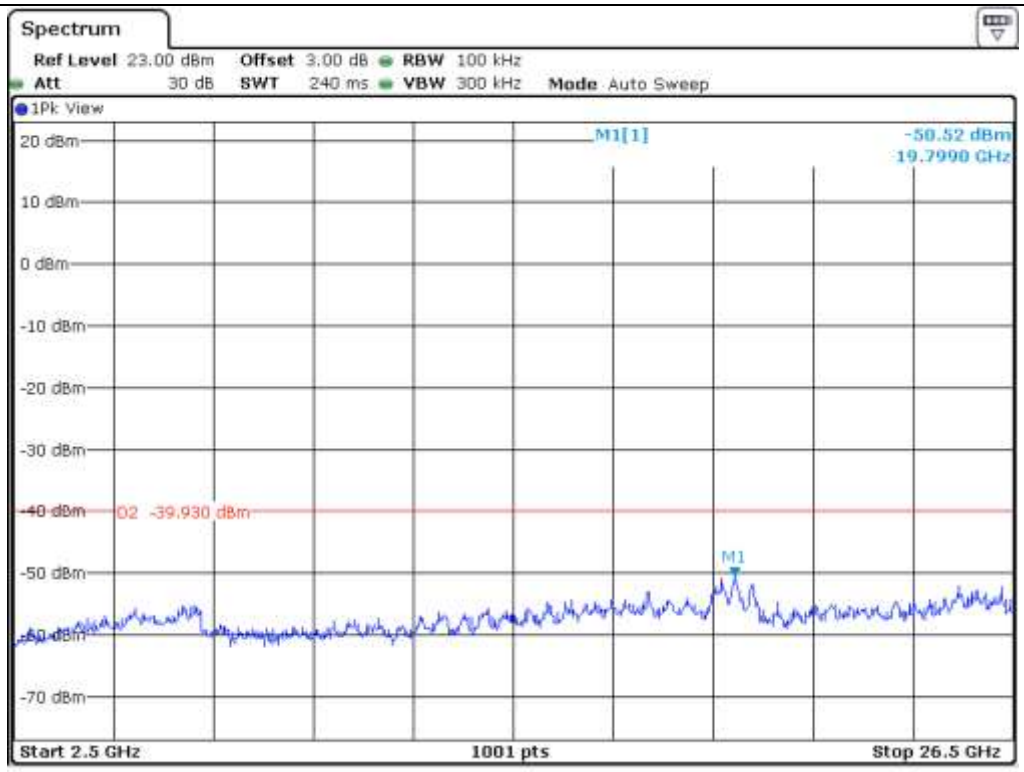
Low Channel



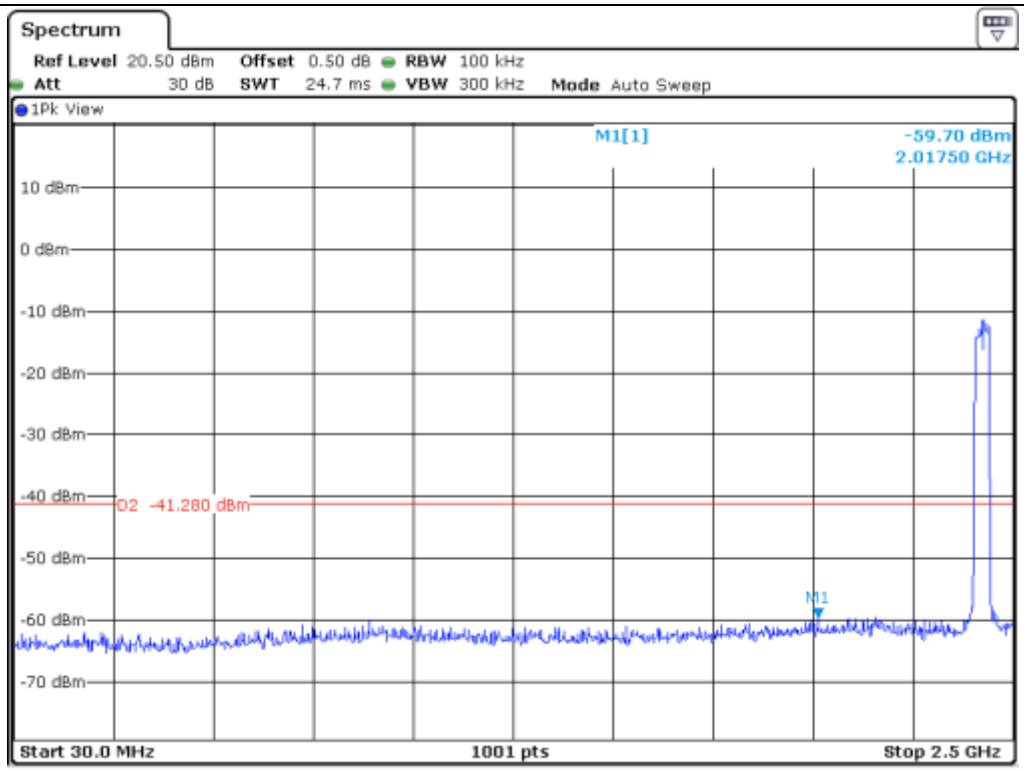
Low Channel



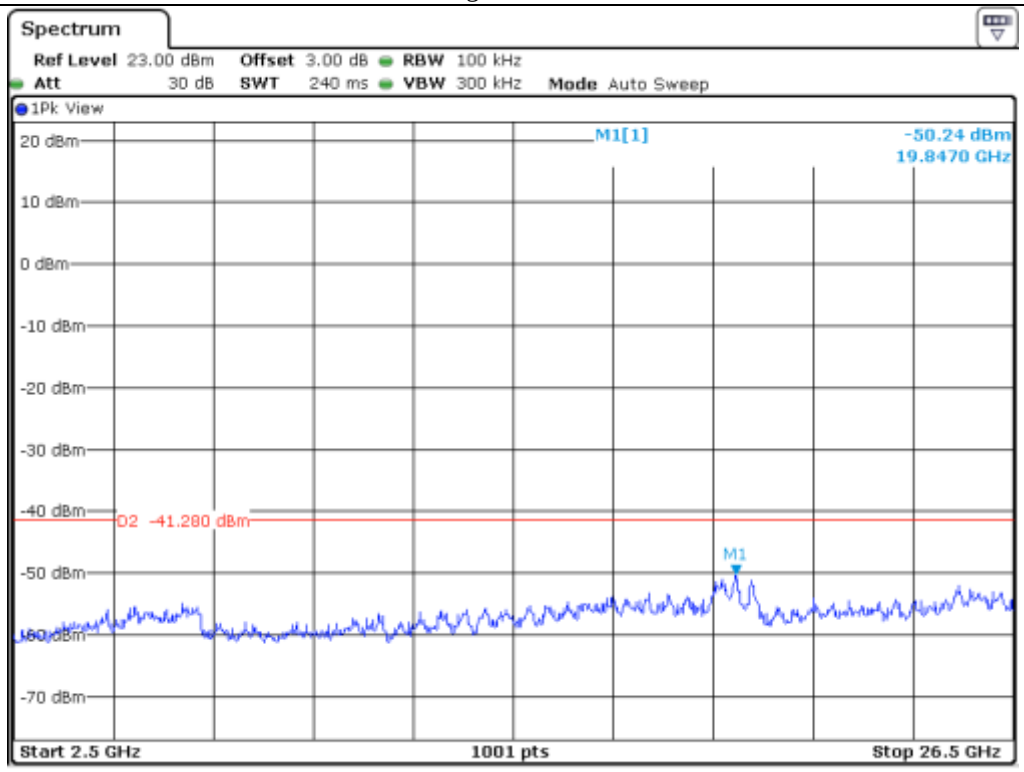
Middle Channel



Middle Channel



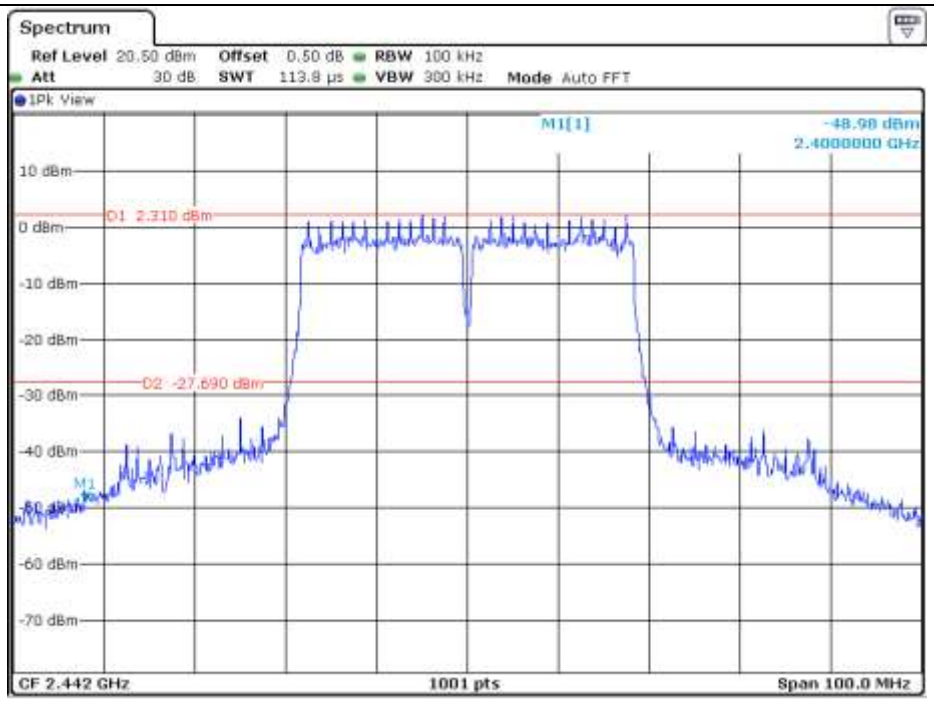
High Channel



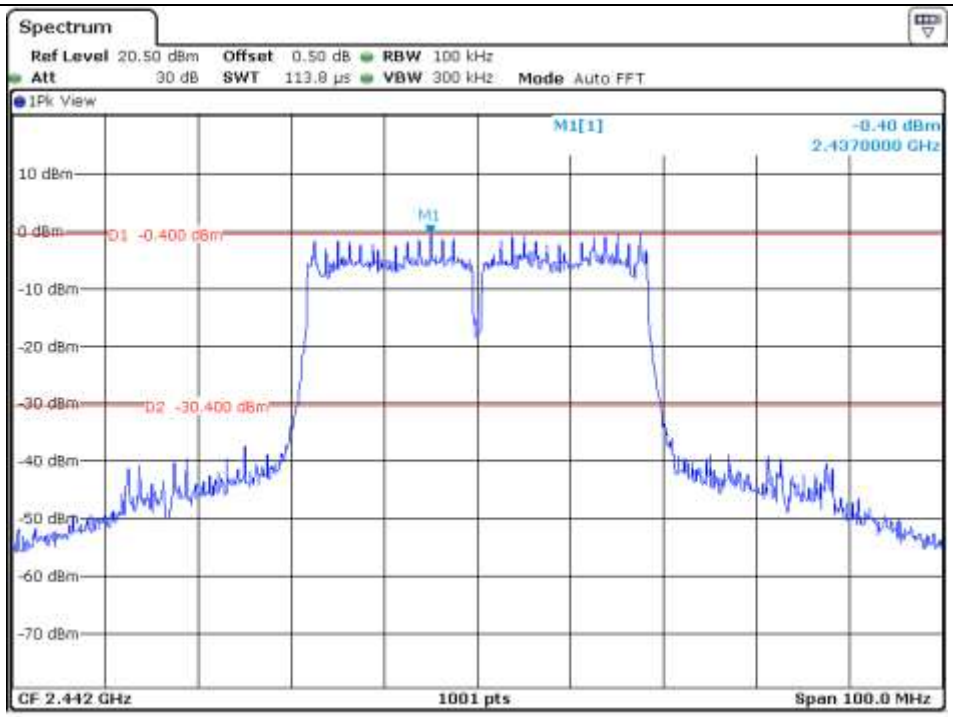
High Channel

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

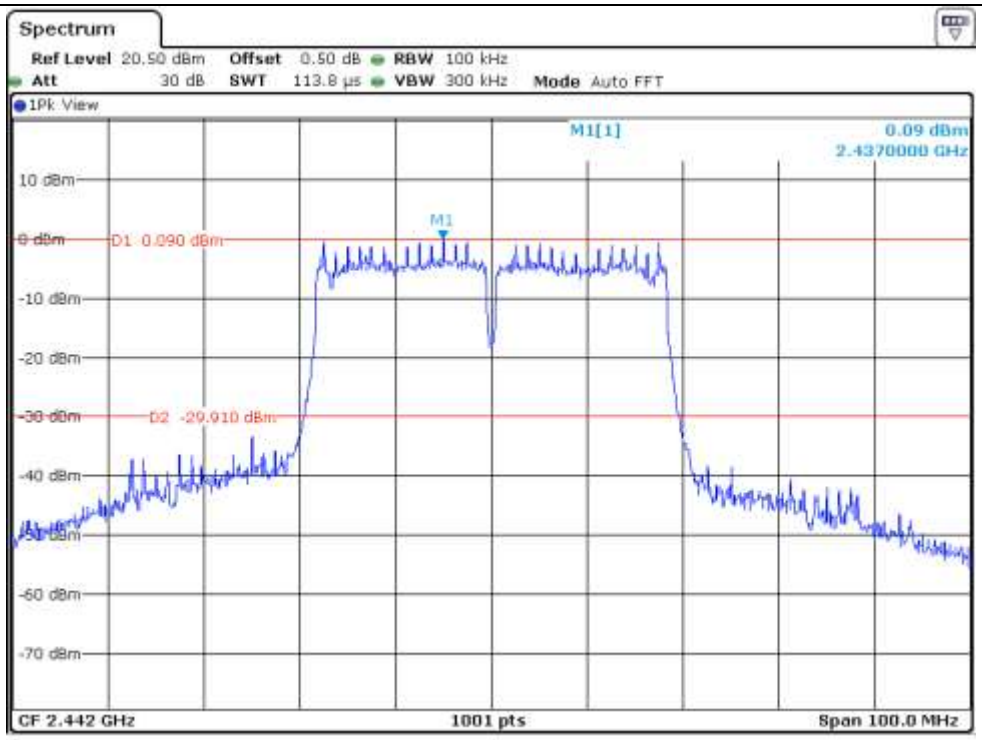
10.5.4.2 Test data for Antenna 1



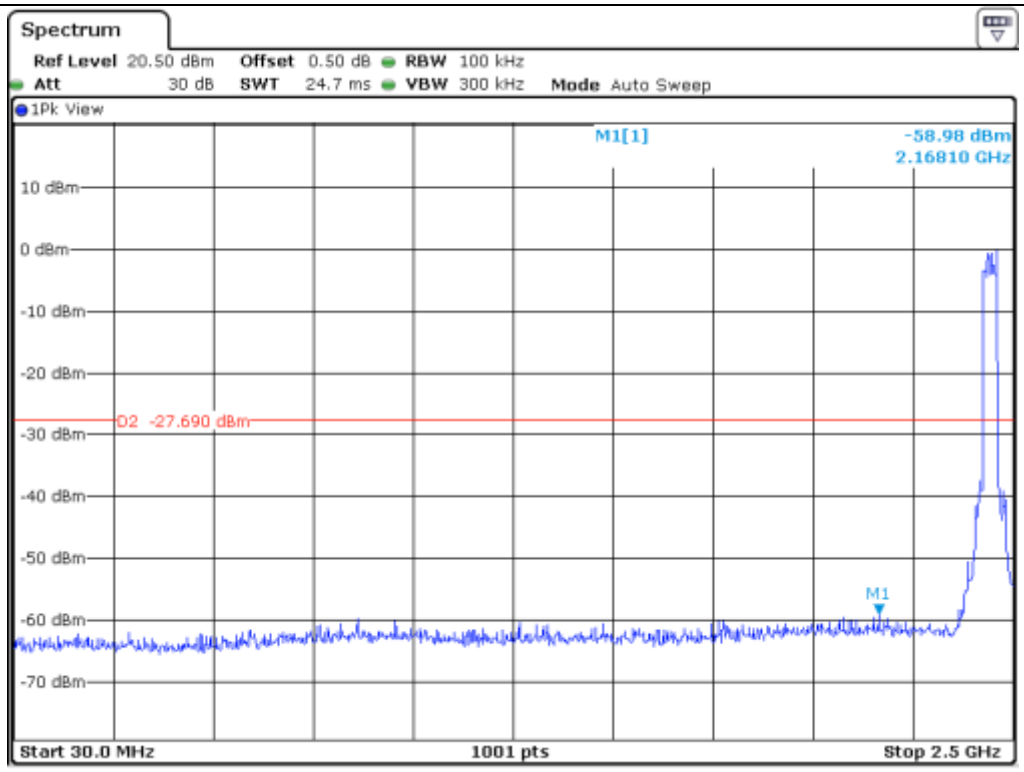
Low Channel



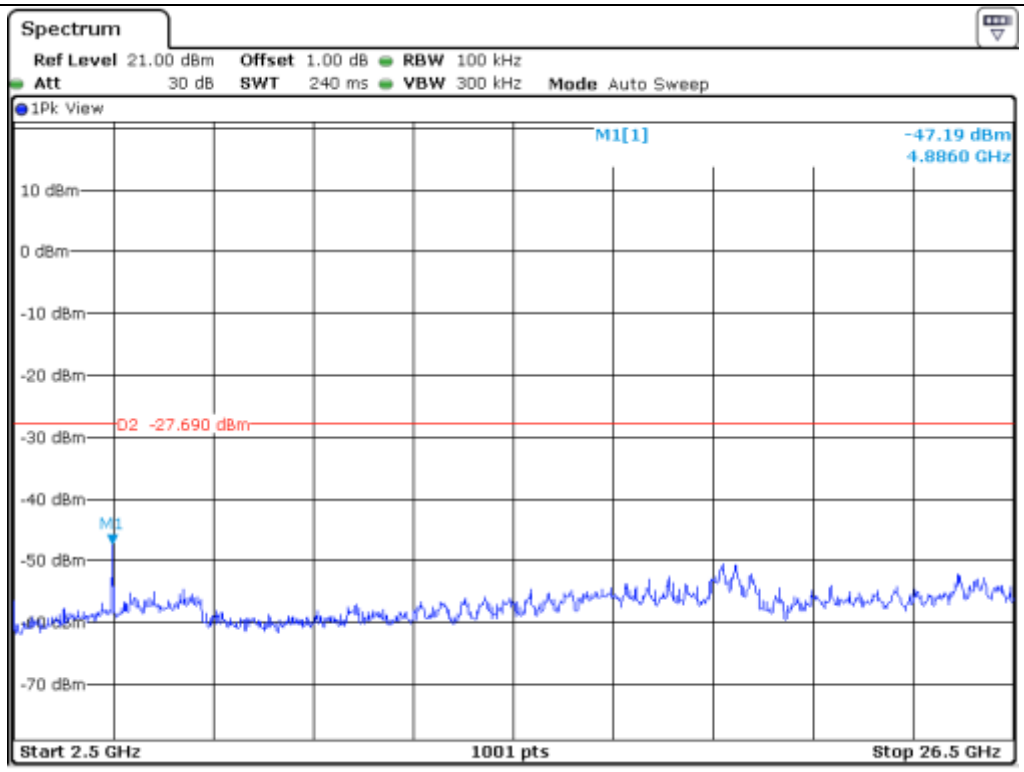
Middle Channel



High Channel

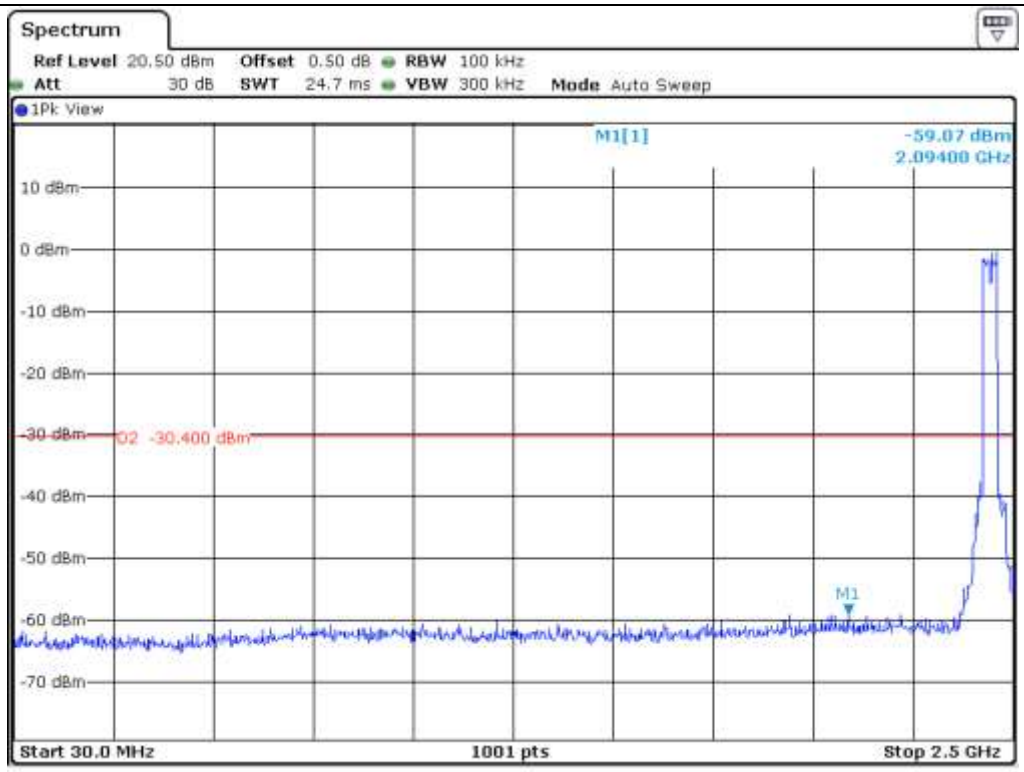


Low Channel

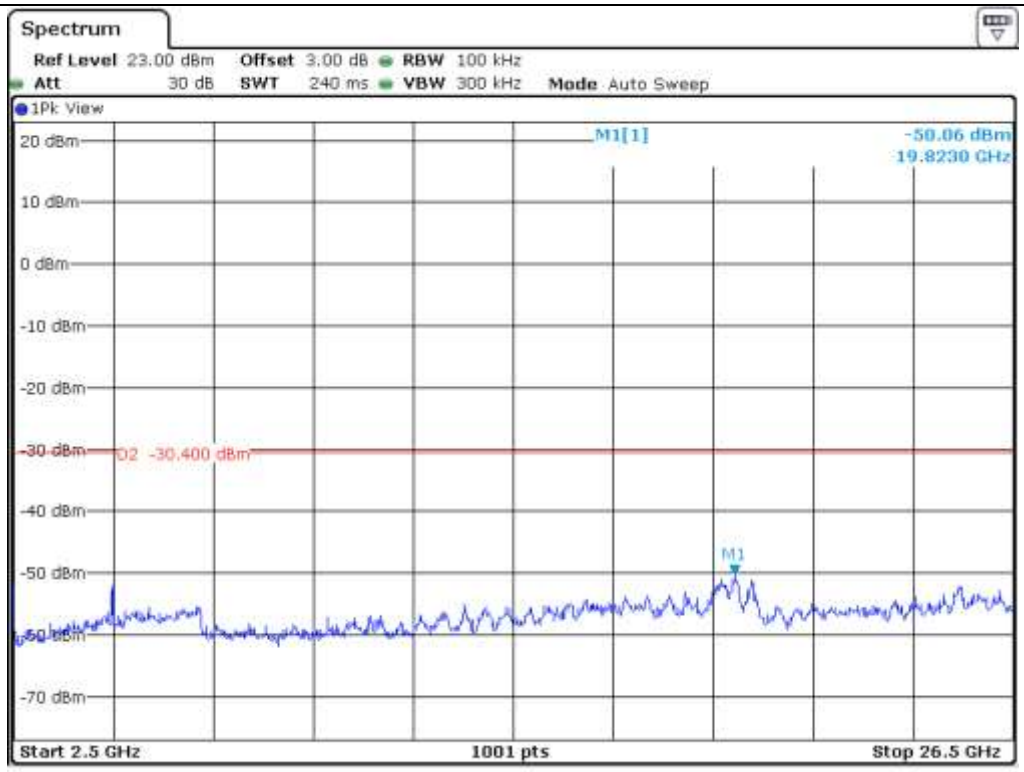


Low Channel

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

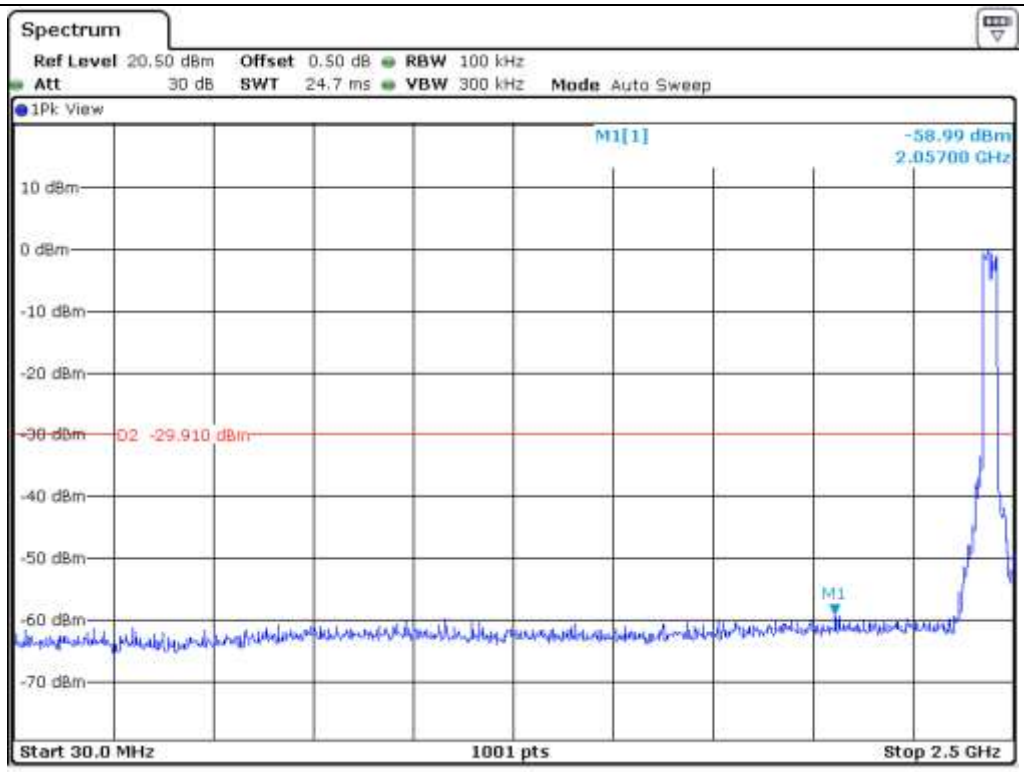


Middle Channel

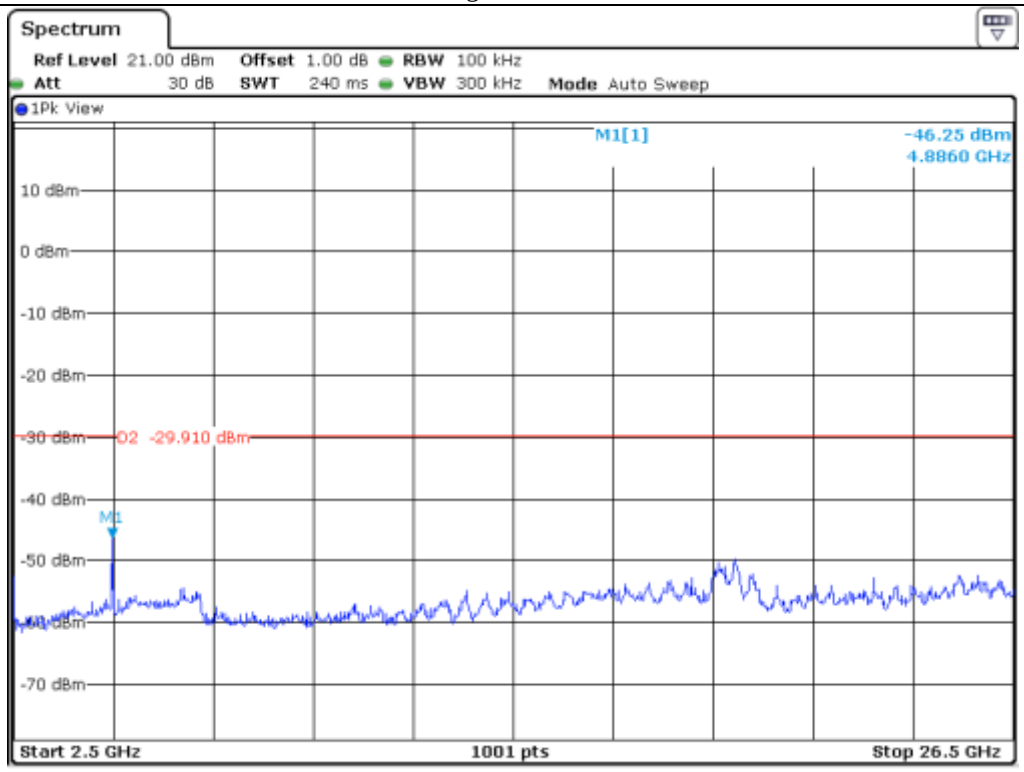


Middle Channel

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



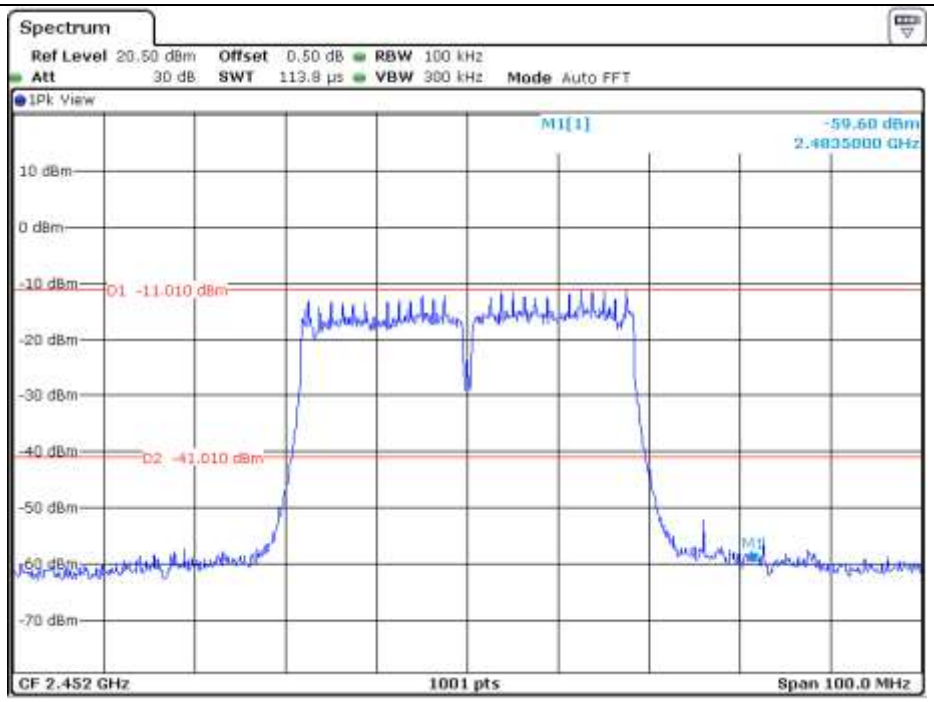
High Channel



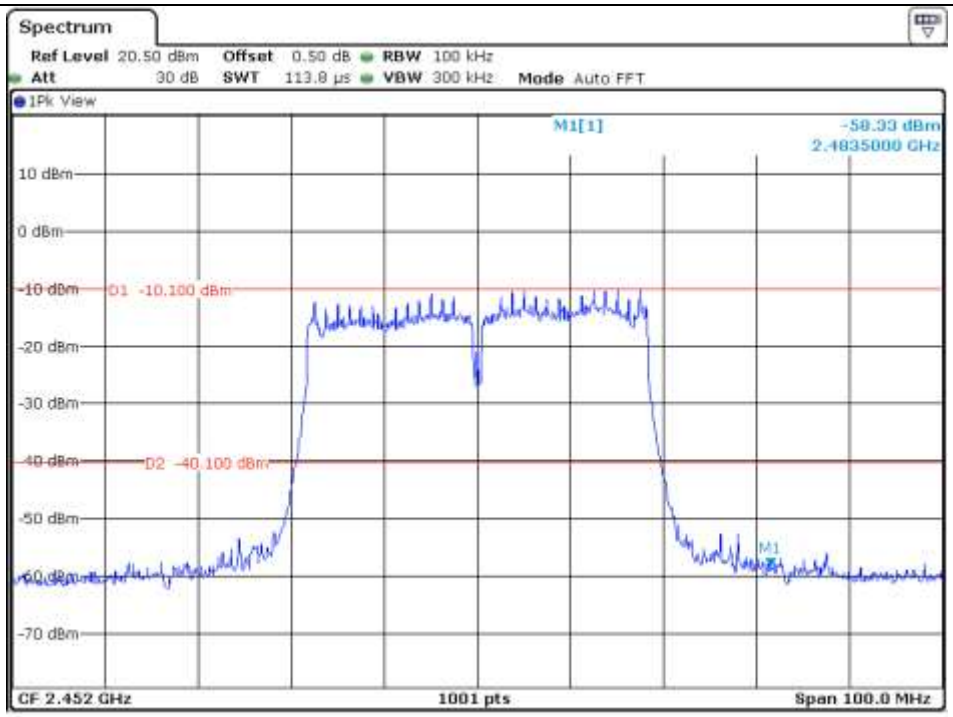
High Channel

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

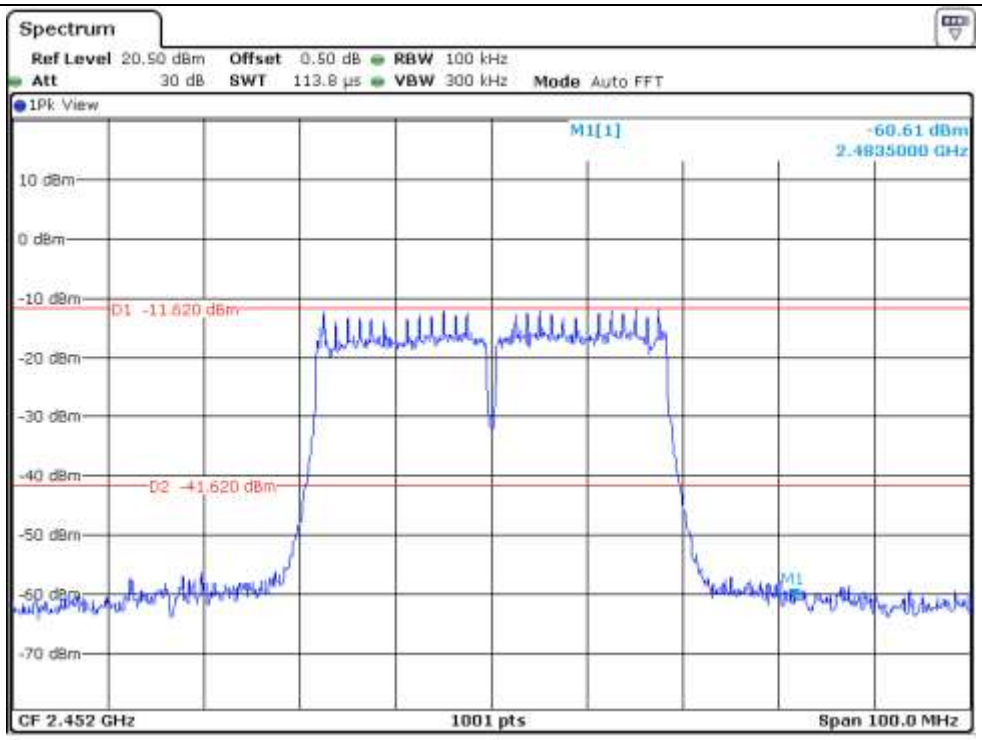
10.5.4.3 Test data for Antenna 2



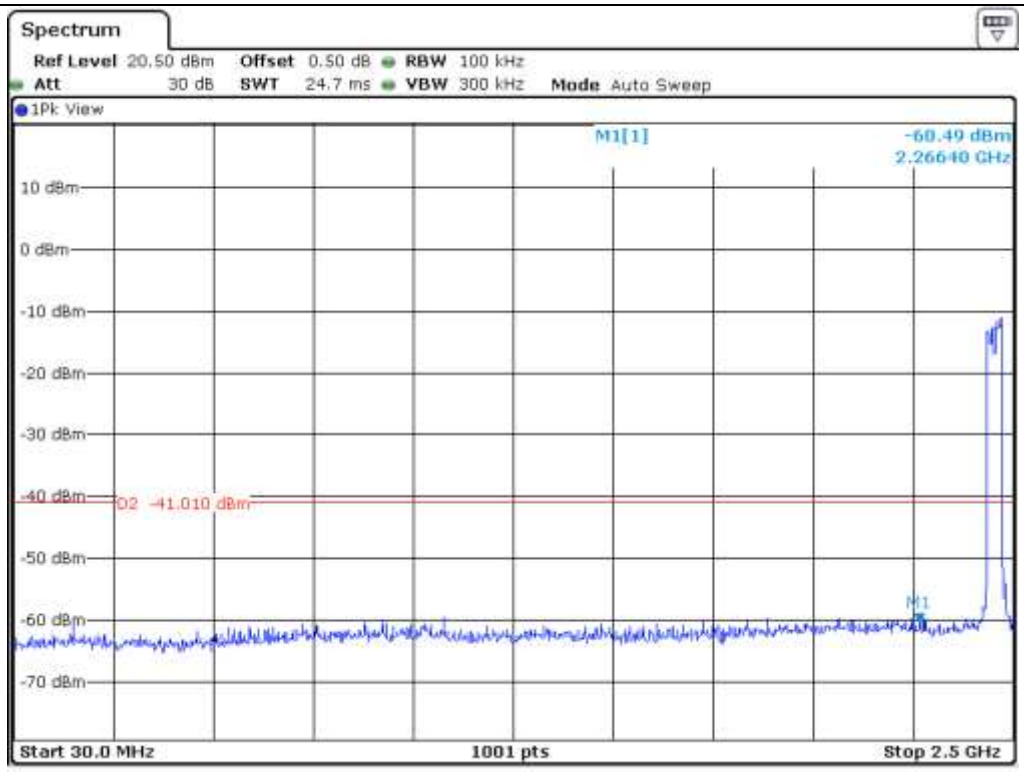
Low Channel



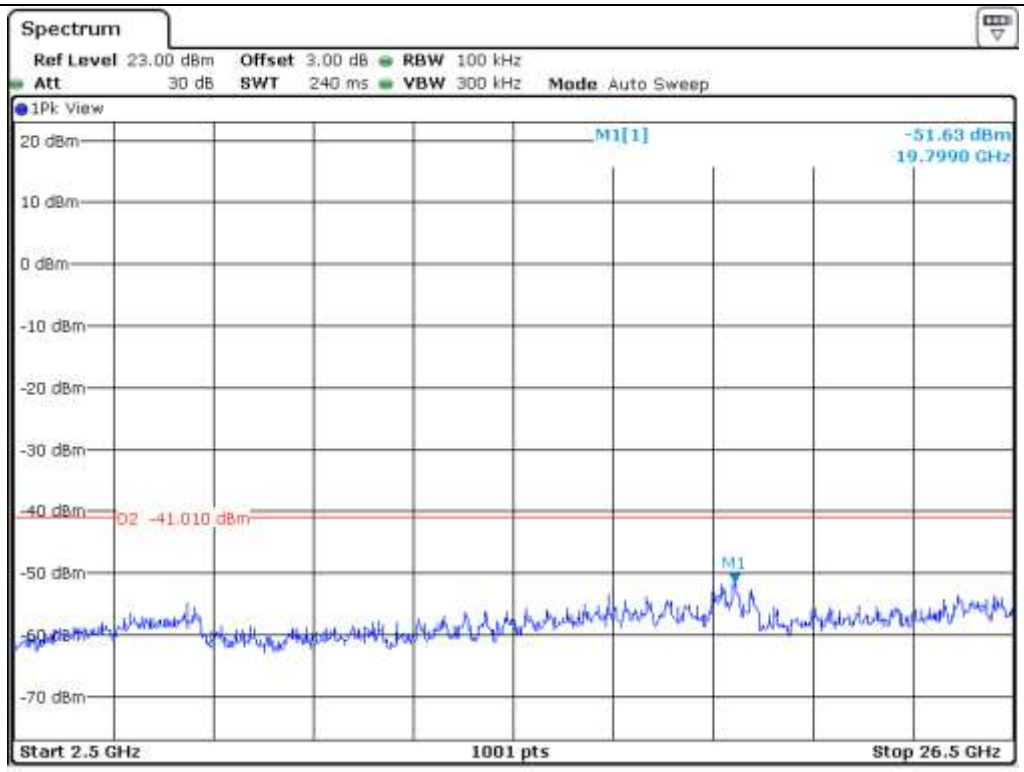
Middle Channel



High Channel

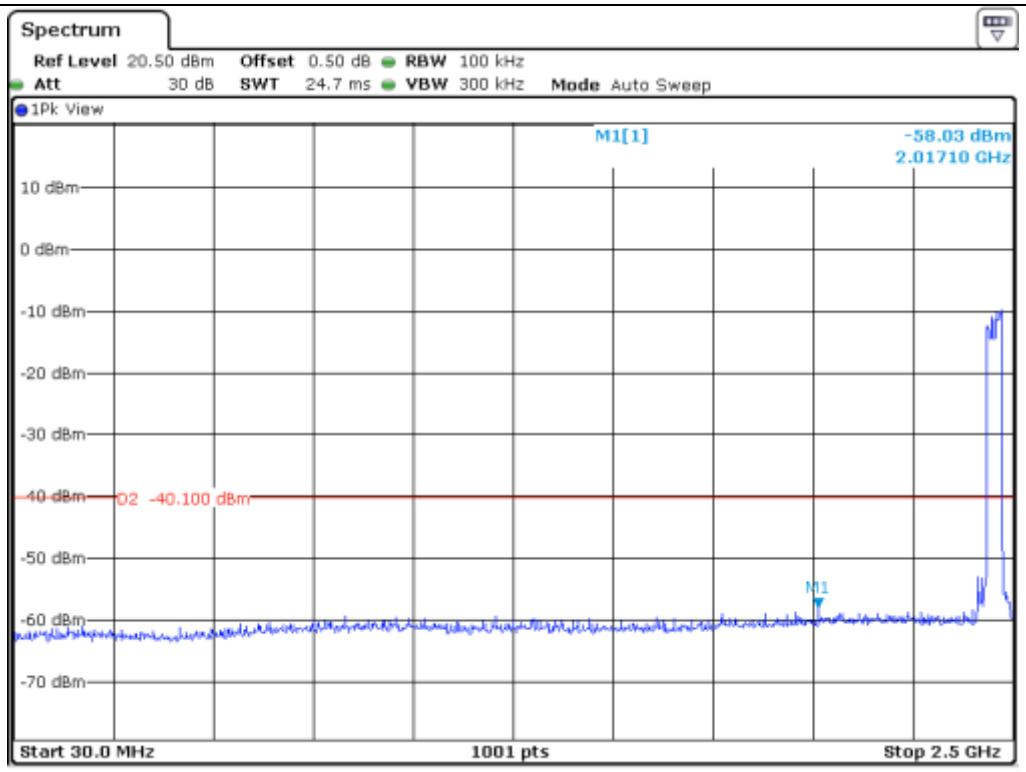


Low Channel

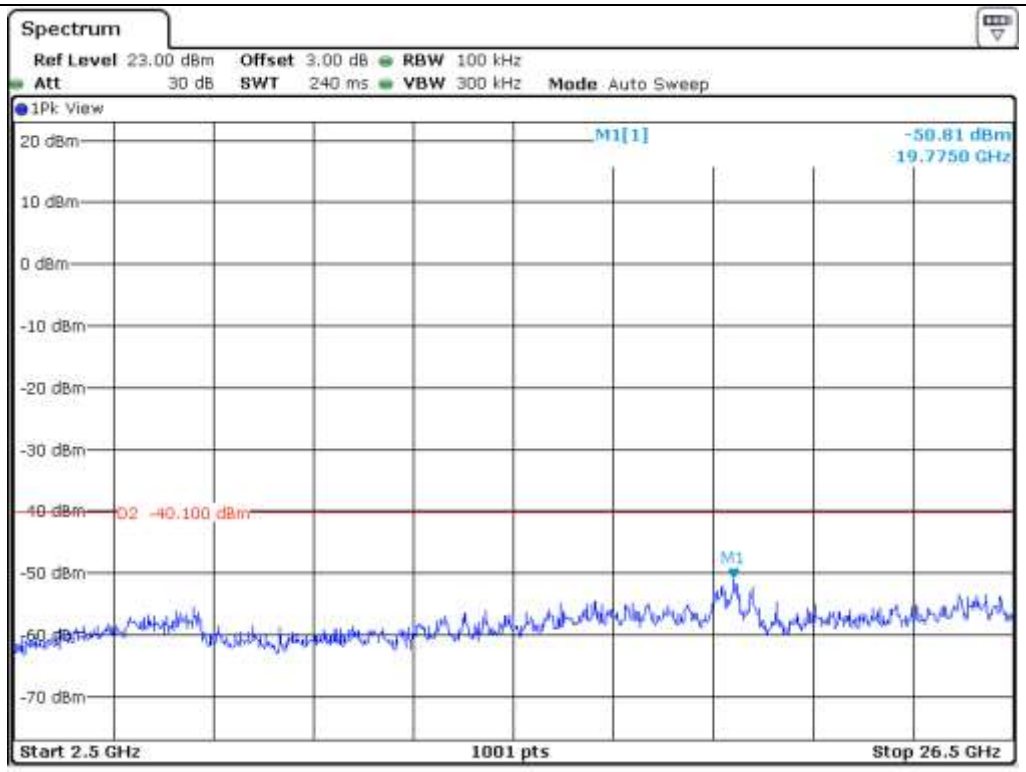


Low Channel

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

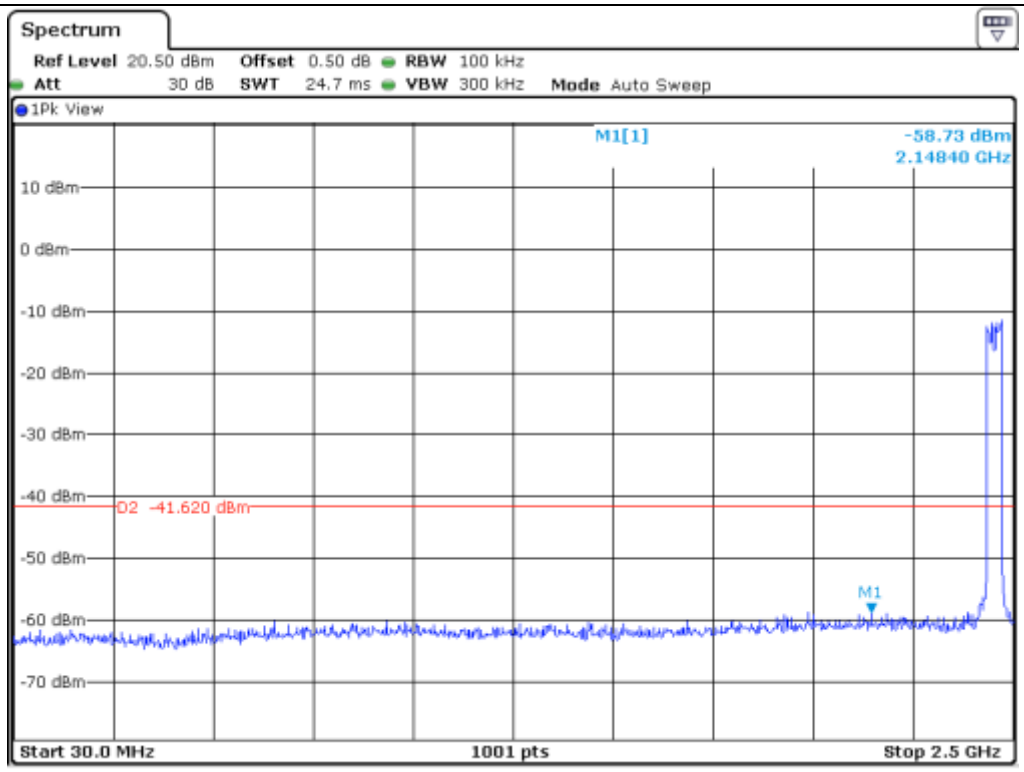


Middle Channel

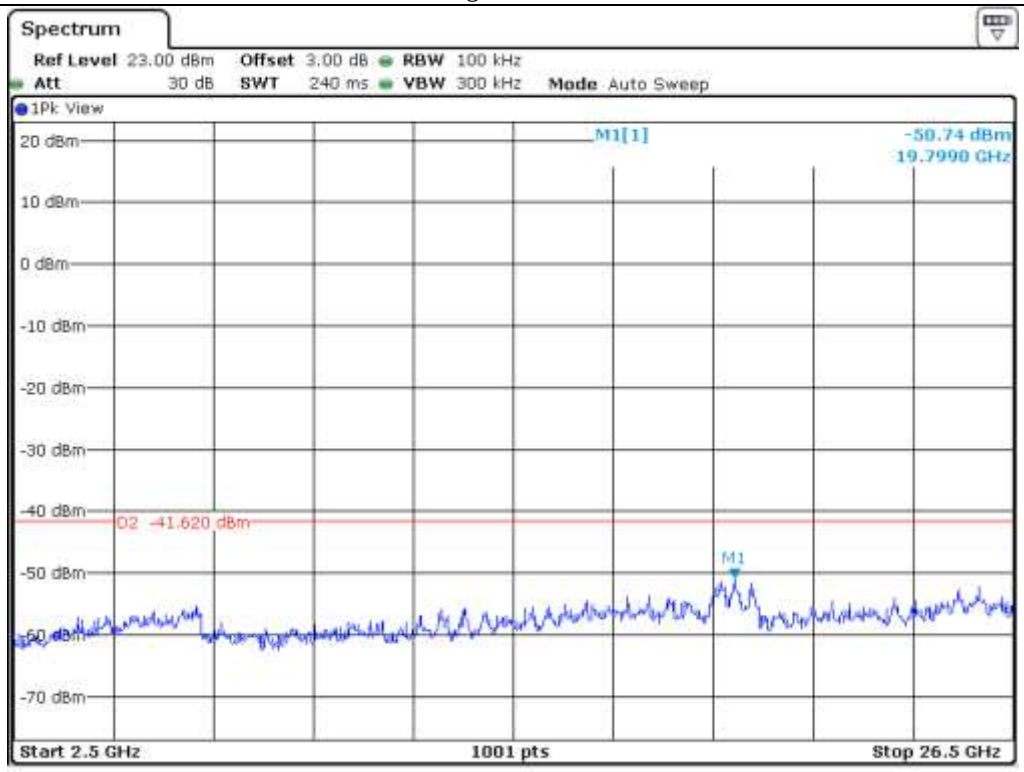


Middle Channel

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



High Channel

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

10.6 Test data for radiated emission

10.6.1 Radiated Emission which fall in the Restricted Band

10.6.1.1 Test data for 802.11b WLAN Mode (3 Tx Multiple Transmit (Worst case))

-. Test Date : March 22, 2017

-. 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 : > 98 %

-. Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel									
2 390.00	65.02	Peak	H	26.94	9.20	40.21	60.95	74.00	13.05
	56.60	Average	H				52.53	54.00	1.47
2 390.00	60.83	Peak	V				56.76	74.00	17.24
	54.63	Average	V				50.56	54.00	3.44
Test Data for High Channel									
2 483.50	60.24	Peak	H	27.47	9.49	40.16	57.04	74.00	16.96
	55.53	Average	H				52.33	54.00	1.67
2 483.50	59.98	Peak	V				56.78	74.00	17.22
	54.79	Average	V				51.59	54.00	2.41

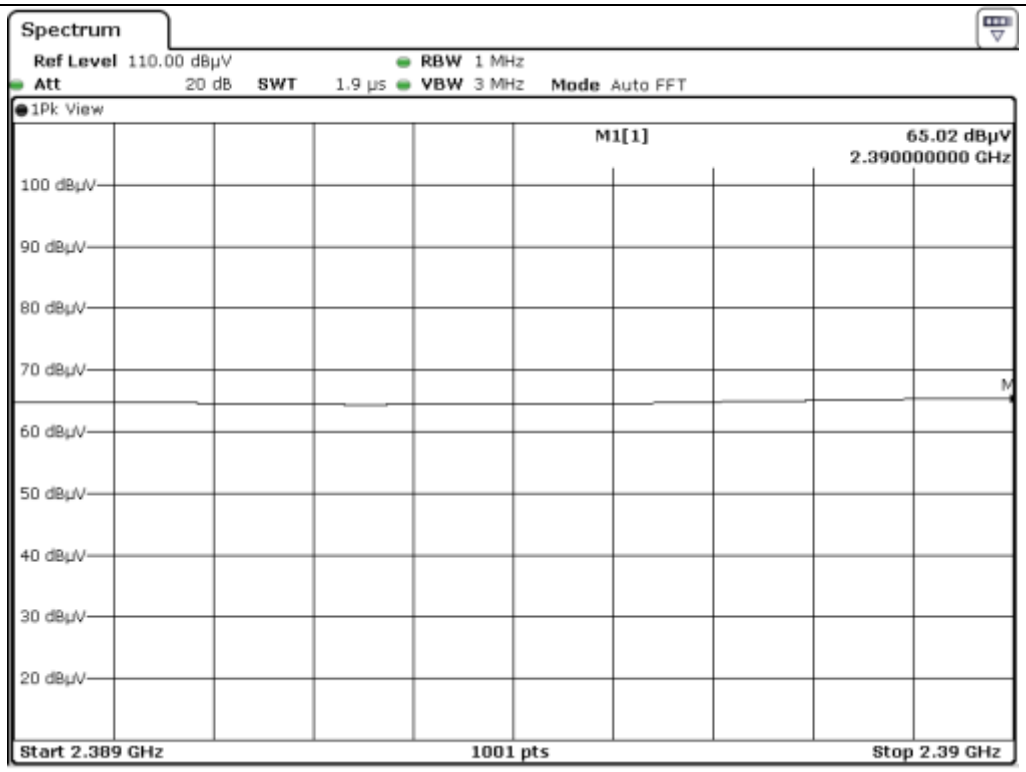
Tabulated test data for Restricted Band

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

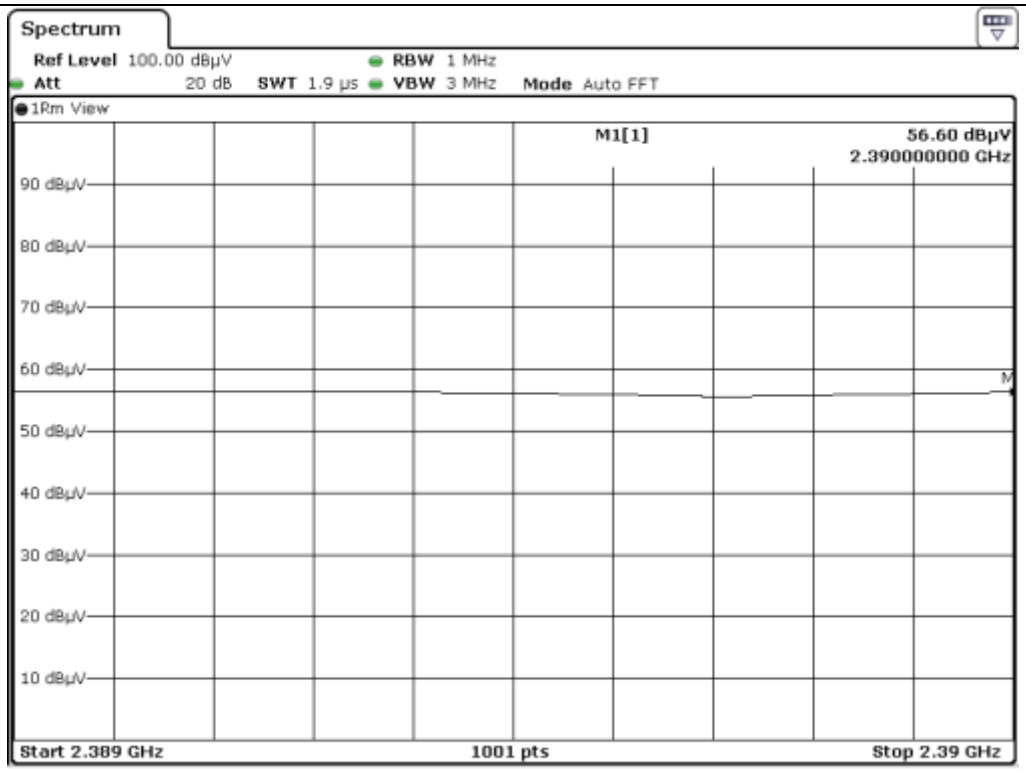
Margin (dB) = Limits (dBμV/m) - Total Level (dBμV/m)

Total Level = Reading + Antenna Factor + Cable Loss – Pre-Amplifier Gain

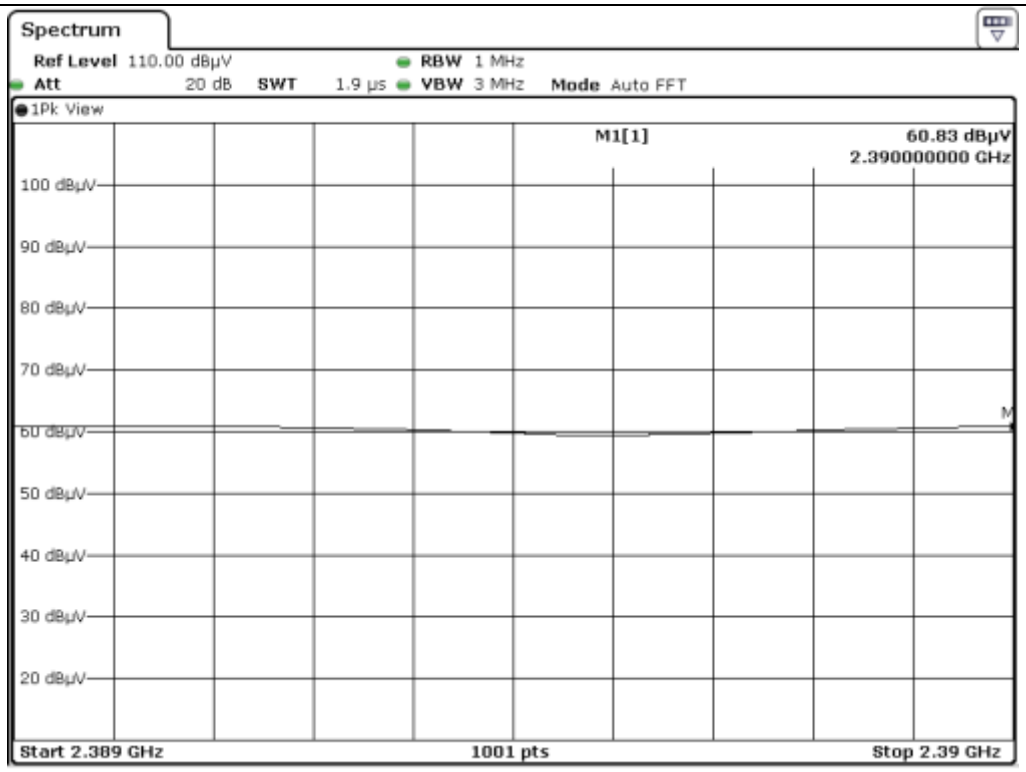
Tested by: Hyung-Kwon, Oh / Engineer



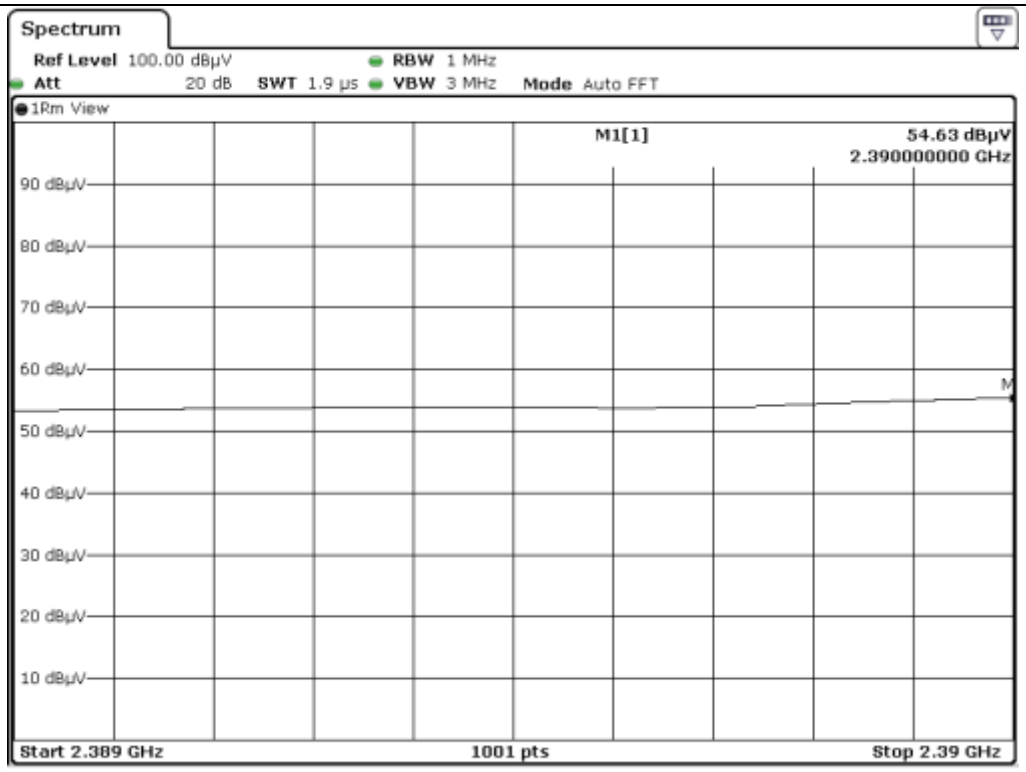
Low Channel_Peak_H



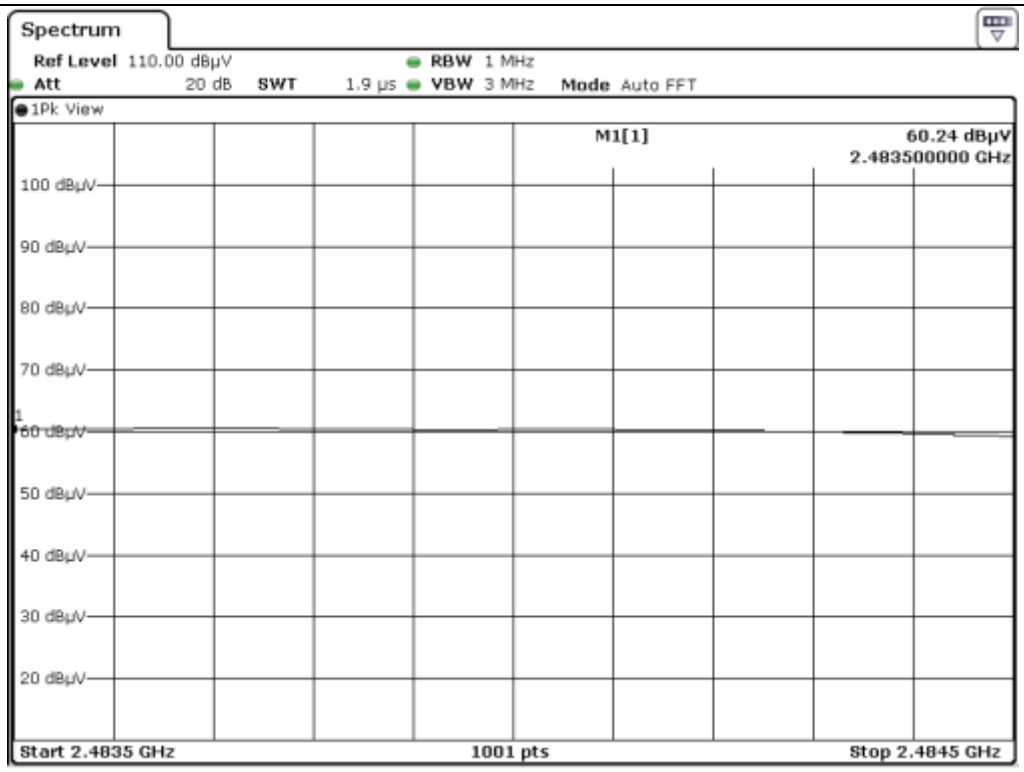
Low Channel_Average_H



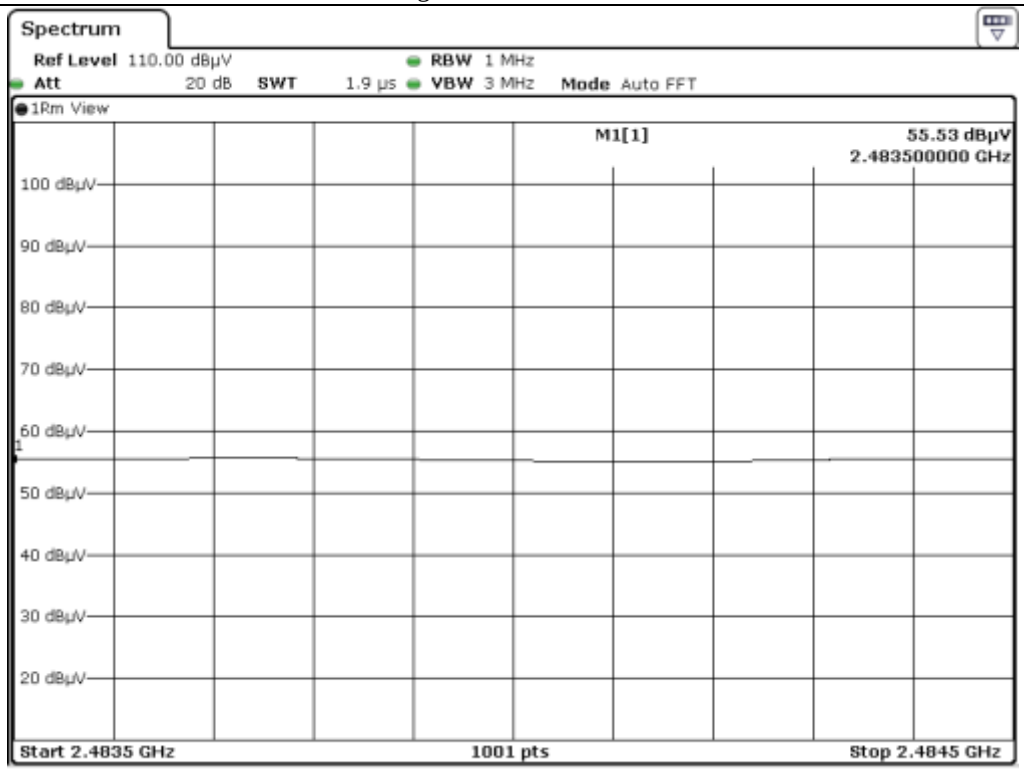
Low Channel_Peak_V



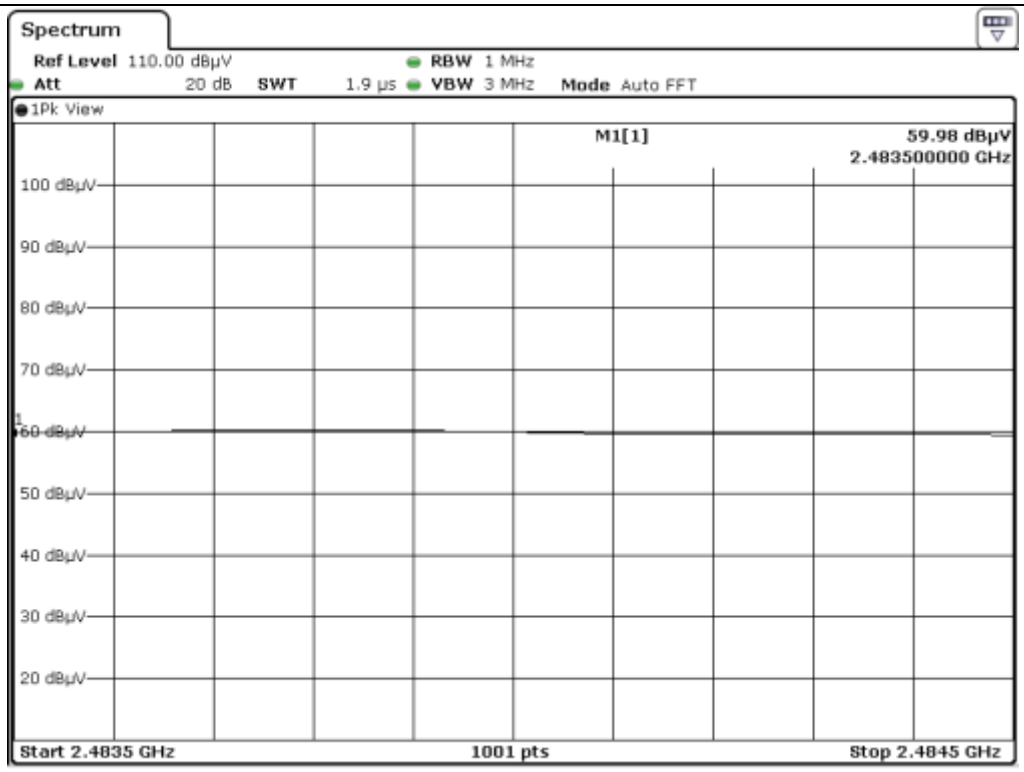
Low Channel_Average_V



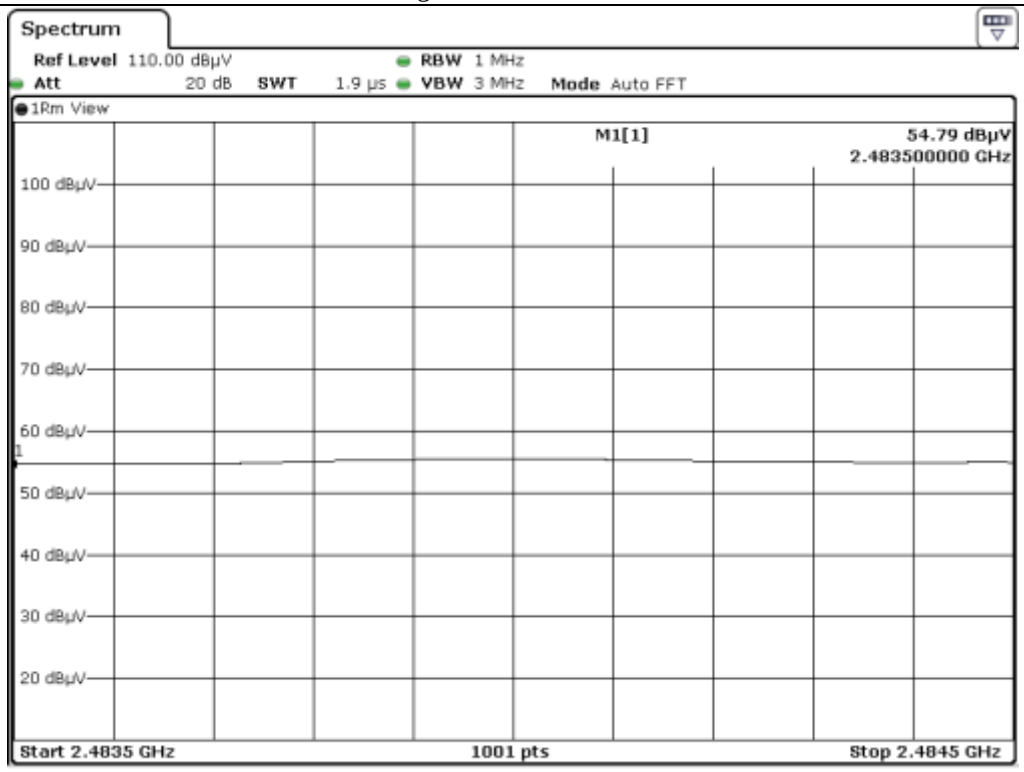
High Channel_Peak_H



High Channel_Average_H



High Channel_Peak_V



High Channel_Average_V

10.6.1.2 Test data for 802.11g WLAN Mode (3 Tx Multiple Transmit (Worst case))

-. Test Date : March 22, 2017

-. 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 : > 98 %

-. Result : PASSED

Frequency (MHz)	Reading (dBµV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBµV/m)	Limits (dBµV/m)	Margin (dB)
Test Data for Low Channel									
2 390.00	67.83	Peak	H	26.94	9.20	40.21	63.76	74.00	10.24
	55.42	Average	H				51.35	54.00	2.65
2 390.00	61.86	Peak	V				57.79	74.00	16.21
	52.52	Average	V				48.45	54.00	5.55
Test Data for High Channel									
2 483.50	62.50	Peak	H	27.47	9.49	40.16	59.30	74.00	14.70
	55.81	Average	H				52.61	54.00	1.39
2 483.50	54.93	Peak	V				51.73	74.00	22.27
	49.09	Average	V				45.89	54.00	8.11

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 – Pre-Amplifier Gain

Tested by: Hyung-Kwon, Oh / Engineer

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

10.6.1.3 Test data for 802.11n_HT20 WLAN Mode (3 Tx Multiple Transmit (Worst case))

-. Test Date : March 22, 2017

-. 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 : > 98 %

-. Result : PASSED

Frequency (MHz)	Reading (dBµV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBµV/m)	Limits (dBµV/m)	Margin (dB)
Test Data for Low Channel									
2 390.00	67.79	Peak	H	26.94	9.20	40.21	63.72	74.00	10.28
	57.08	Average	H				53.01	54.00	0.99
2 390.00	63.06	Peak	V				58.99	74.00	15.01
	53.12	Average	V				49.05	54.00	4.95
Test Data for High Channel									
2 483.50	61.21	Peak	H	27.47	9.49	40.16	58.01	74.00	15.99
	56.11	Average	H				52.91	54.00	1.09
2 483.50	59.69	Peak	V				56.49	74.00	17.51
	51.44	Average	V				48.24	54.00	5.76

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 – Pre-Amplifier Gain

Tested by: Hyung-Kwon, Oh / Engineer

10.6.1.4 Test data for 802.11n_HT40 WLAN Mode (3 Tx Multiple Transmit (Worst case))

-. Test Date : March 22, 2017

-. 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 : > 98 %

-. Result : PASSED

Frequency (MHz)	Reading (dBµV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBµV/m)	Limits (dBµV/m)	Margin (dB)
Test Data for Low Channel									
2 390.00	64.37	Peak	H	26.94	9.20	40.21	60.30	74.00	13.70
	56.29	Average	H				52.22	54.00	1.78
2 390.00	57.58	Peak	V				53.51	74.00	20.49
	51.50	Average	V				47.43	54.00	6.57
Test Data for High Channel									
2 483.50	58.48	Peak	H	27.47	9.49	40.16	55.28	74.00	18.72
	54.86	Average	H				51.66	54.00	2.34
2 483.50	53.52	Peak	V				50.32	74.00	23.68
	48.13	Average	V				44.93	54.00	9.07

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 – Pre-Amplifier Gain

Tested by: Hyung-Kwon, Oh / Engineer

10.6.2 Radiated Emission which fall in the Band Edge

10.6.2.1 Test data for 802.11b WLAN Mode (3 Tx Multiple Transmit (Worst case))

-. Test Date : March 22, 2017

-. Resolution bandwidth : 100 kHz and Peak Detector for Peak Mode
100 kHz and RMS Detector for Average Mode

-. Video bandwidth : 300 kHz for Peak and Average Mode

-. Measurement distance : 3 m

-. Duty Cycle : > 98 %

-. Result : PASSED

Frequency (MHz)	Reading (dBµV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBµV/m)	Limits (dBµV/m)	Margin (dB)
Test Data for Low Channel									
2 400.00	77.52	Peak	H	27.20	9.35	40.18	73.89	84.57	10.68
	72.61	Average	H				68.98	80.51	11.53
	74.27	Peak	V				70.64	84.27	13.63
	69.93	Average	V				66.30	81.02	14.72

Tabulated test data for Restricted Band

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

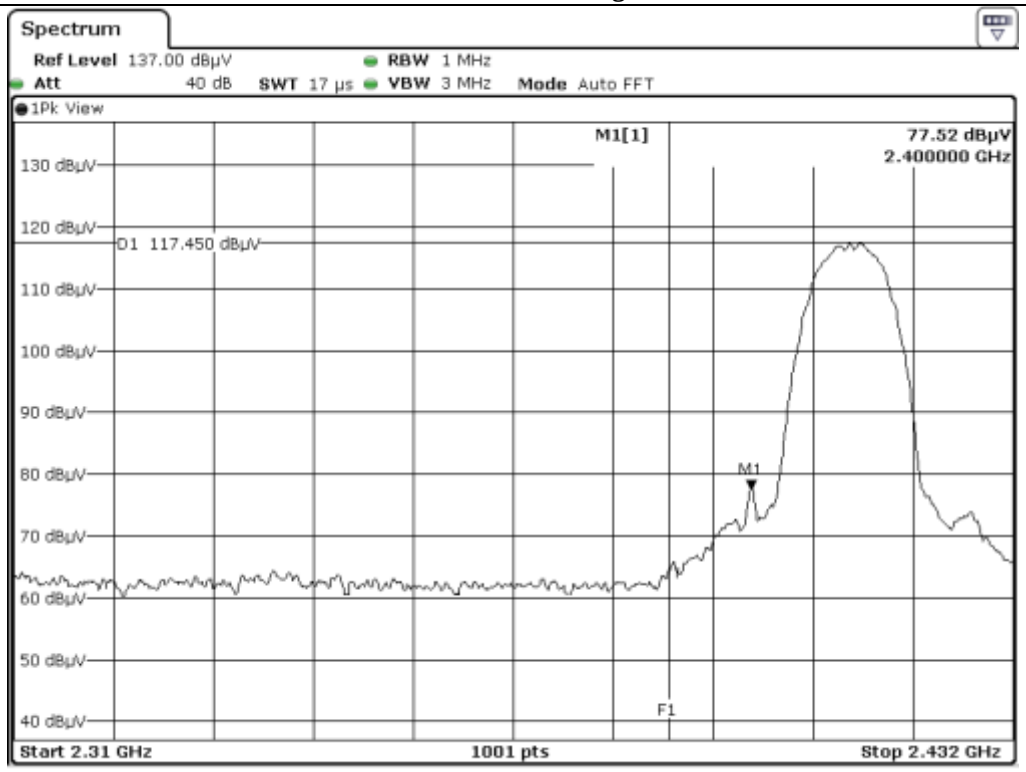
Margin (dB) = Limits (dBµV/m) - Total Level (dBµV/m)

Total Level = Reading + Antenna Factor + Cable Loss – Pre-Amplifier Gain

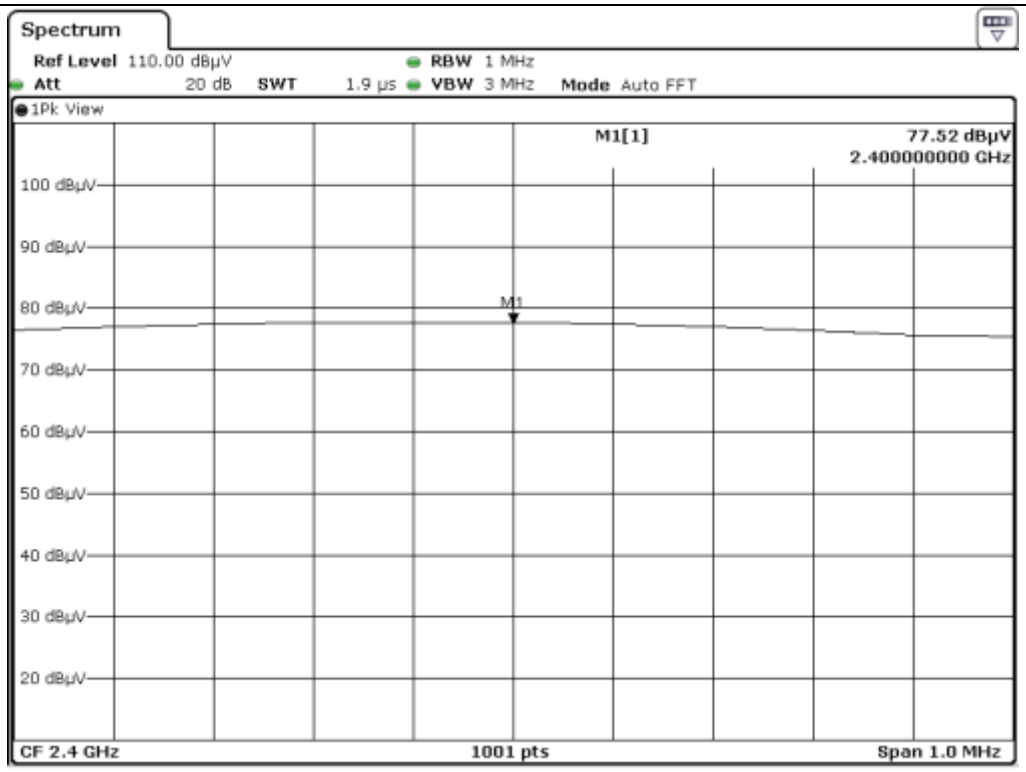
Tested by: Hyung-Kwon, Oh / Engineer

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

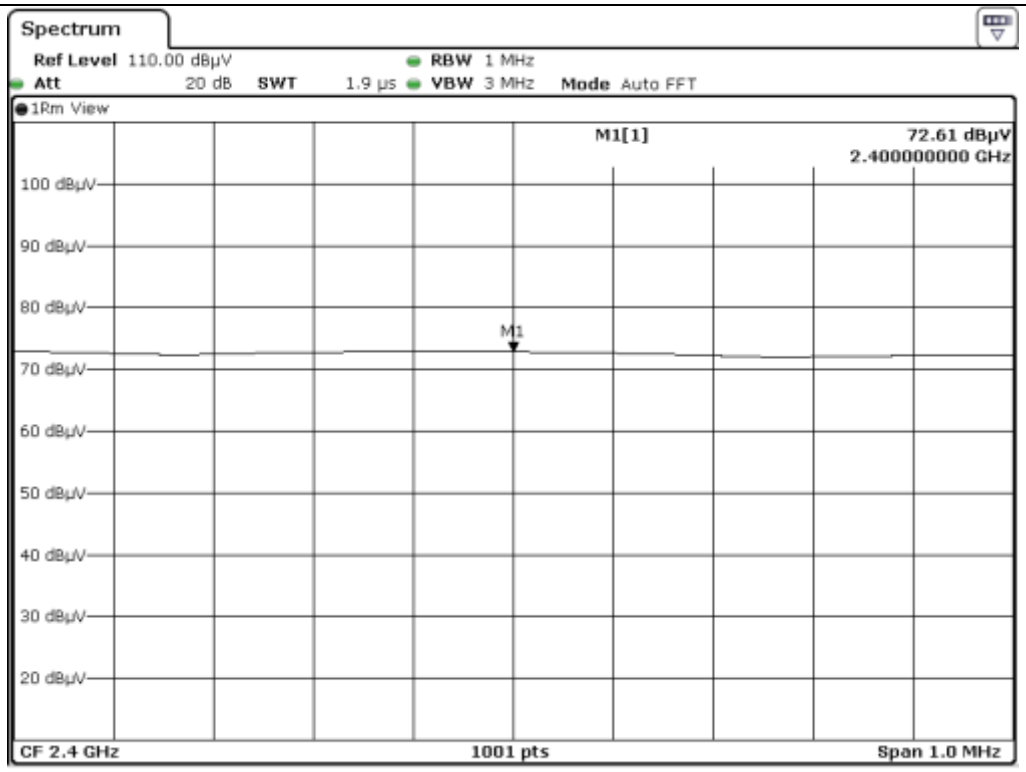
Fundamental of the signal



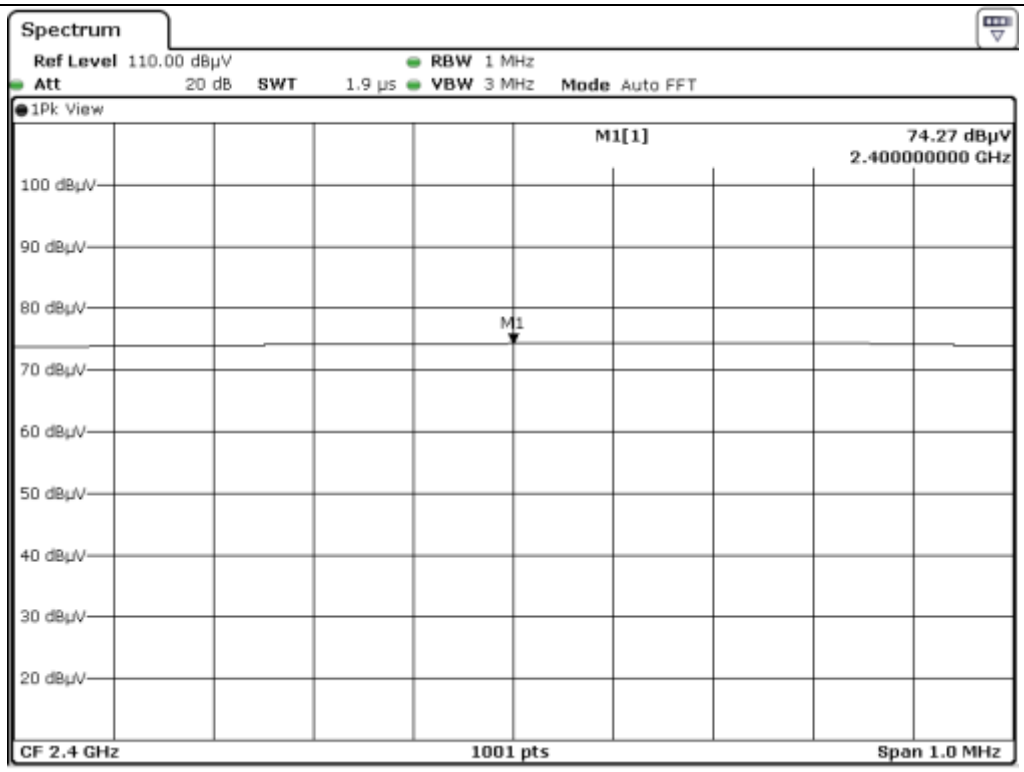
Low Channel_Peak_H



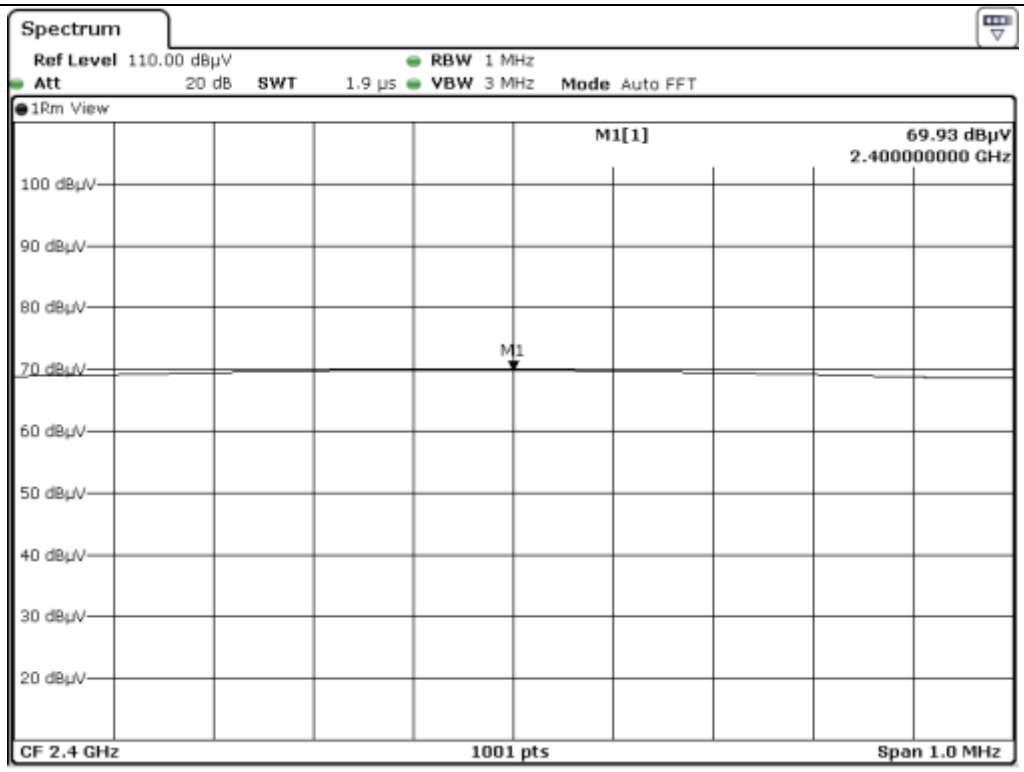
Low Channel_Peak_H



Low Channel_Average_H



Low Channel_Peak_V



Low Channel_Average_V

10.6.2.2 Test data for 802.11g WLAN Mode (3 Tx Multiple Transmit (Worst case))

-. Test Date : March 22, 2017

-. Resolution bandwidth : 100 kHz and Peak Detector for Peak Mode
100 kHz and RMS Detector for Average Mode

-. Video bandwidth : 300 kHz for Peak and Average Mode

-. Measurement distance : 3 m

-. Duty Cycle : > 98 %

-. Result : PASSED

Frequency (MHz)	Reading (dBµV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBµV/m)	Limits (dBµV/m)	Margin (dB)
Test Data for Low Channel									
2 400.00	74.27	Peak	H	27.20	9.35	40.18	70.64	79.68	9.04
	65.79	Average	H				62.16	73.77	11.61
	66.57	Peak	V				62.94	79.84	16.90
	57.87	Average	V				54.24	73.57	19.33

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 – Pre-Amplifier Gain

Tested by: Hyung-Kwon, Oh / Engineer

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

10.6.2.3 Test data for 802.11n_HT20 WLAN Mode (3 Tx Multiple Transmit (Worst case))

-. Test Date : March 22, 2017

-. Resolution bandwidth : 100 kHz and Peak Detector for Peak Mode
100 kHz and RMS Detector for Average Mode

-. Video bandwidth : 300 kHz for Peak and Average Mode

-. Measurement distance : 3 m

-. Duty Cycle : > 98 %

-. Result : PASSED

Frequency (MHz)	Reading (dBµV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBµV/m)	Limits (dBµV/m)	Margin (dB)
Test Data for Low Channel									
2 400.00	76.25	Peak	H	27.20	9.35	40.18	72.62	80.33	7.71
	71.22	Average	H				67.59	74.61	7.02
	70.13	Peak	V				66.50	78.66	12.16
	61.11	Average	V				57.48	72.81	15.33

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 – Pre-Amplifier Gain

Tested by: Hyung-Kwon, Oh / Engineer

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

10.6.2.4 Test data for 802.11n_HT40 WLAN Mode (3 Tx Multiple Transmit (Worst case))

-. Test Date : March 22, 2017

-. Resolution bandwidth : 100 kHz and Peak Detector for Peak Mode
100 kHz and RMS Detector for Average Mode

-. Video bandwidth : 300 kHz for Peak and Average Mode

-. Measurement distance : 3 m

-. Duty Cycle : > 98 %

-. Result : PASSED

Frequency (MHz)	Reading (dBµV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBµV/m)	Limits (dBµV/m)	Margin (dB)
Test Data for Low Channel									
2 400.00	63.66	Peak	H	27.20	9.35	40.18	60.03	75.91	15.88
	57.11	Average	H				53.48	70.43	16.95
	58.32	Peak	V				54.69	73.41	18.72
	51.98	Average	V				48.35	68.44	20.09

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 – Pre-Amplifier Gain

Tested by: Hyung-Kwon, Oh / Engineer

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

10.6.3 Spurious & Harmonic Radiated Emission

10.6.3.1 Test data for 802.11b WLAN Mode (3 Tx Multiple Transmit (Worst case))

-. Test Date : March 22, 2017

-. 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 : > 98 %

-. Result : PASSED

Frequency (GHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel									
4 824.00	50.91	Peak	H	30.84	12.31	40.69	53.37	74.00	20.63
	44.44	Average	H				46.90	54.00	7.10
	50.31	Peak	V				52.77	74.00	21.23
	42.77	Average	V				45.23	54.00	8.77
Test Data for Middle Channel									
4 884.00	52.82	Peak	H	30.01	12.43	40.65	54.61	74.00	19.39
	48.20	Average	H				49.99	54.00	4.01
	51.86	Peak	V				53.65	74.00	20.35
	46.40	Average	V				48.19	54.00	5.81
Test Data for High Channel									
4 924.00	50.43	Peak	H	31.15	12.81	40.61	53.78	74.00	20.22
	43.46	Average	H				46.81	54.00	7.19
	51.65	Peak	V				55.00	74.00	19.00
	45.07	Average	V				48.42	54.00	5.58

Tabulated test data for Restricted Band

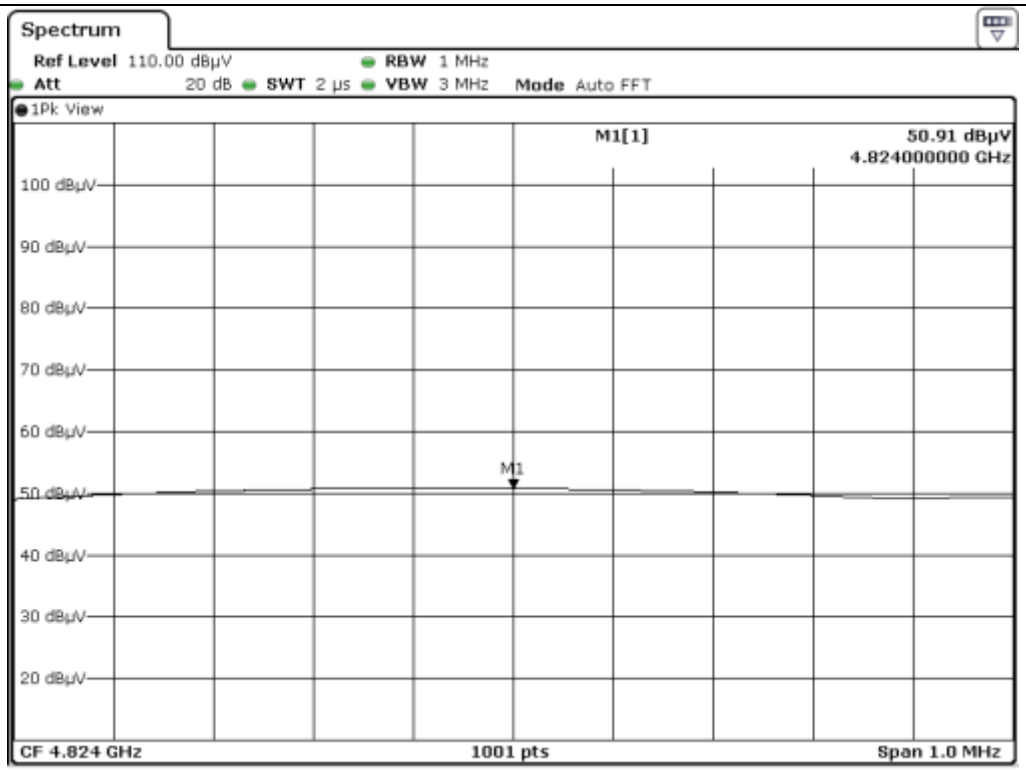
Remark: “H”: Horizontal, “V”: Vertical

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

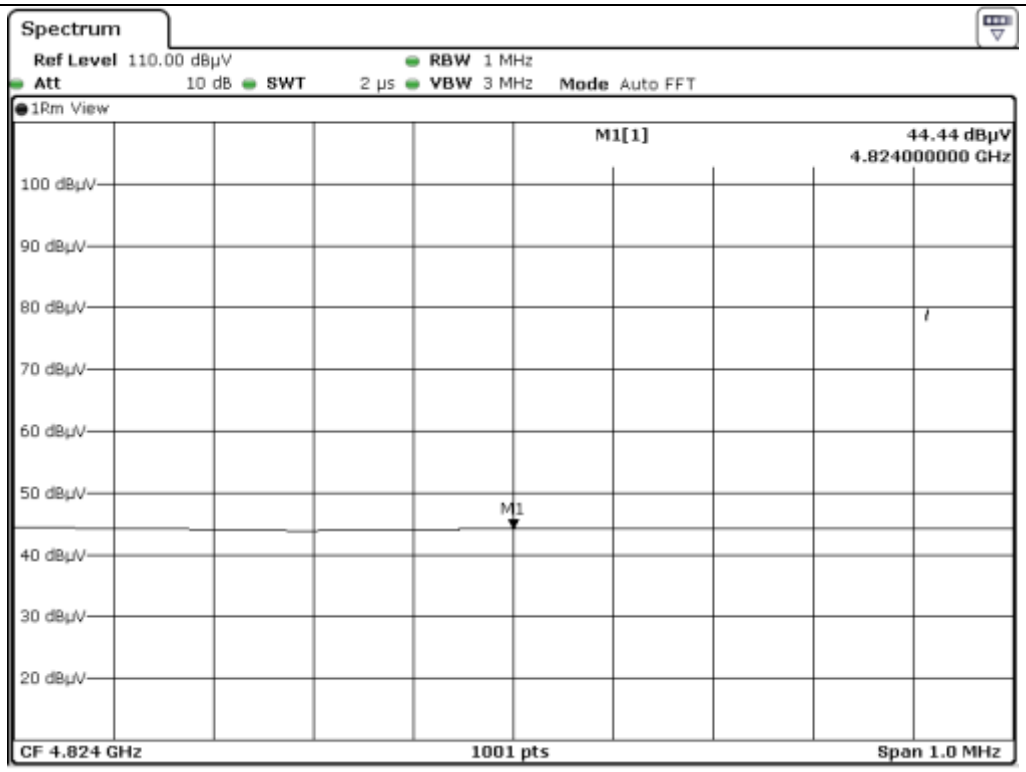
Total Level = Reading + Antenna Factor + Cable Loss – Pre-Amplifier Gain

Tested by: Hyung-Kwon, Oh / Engineer

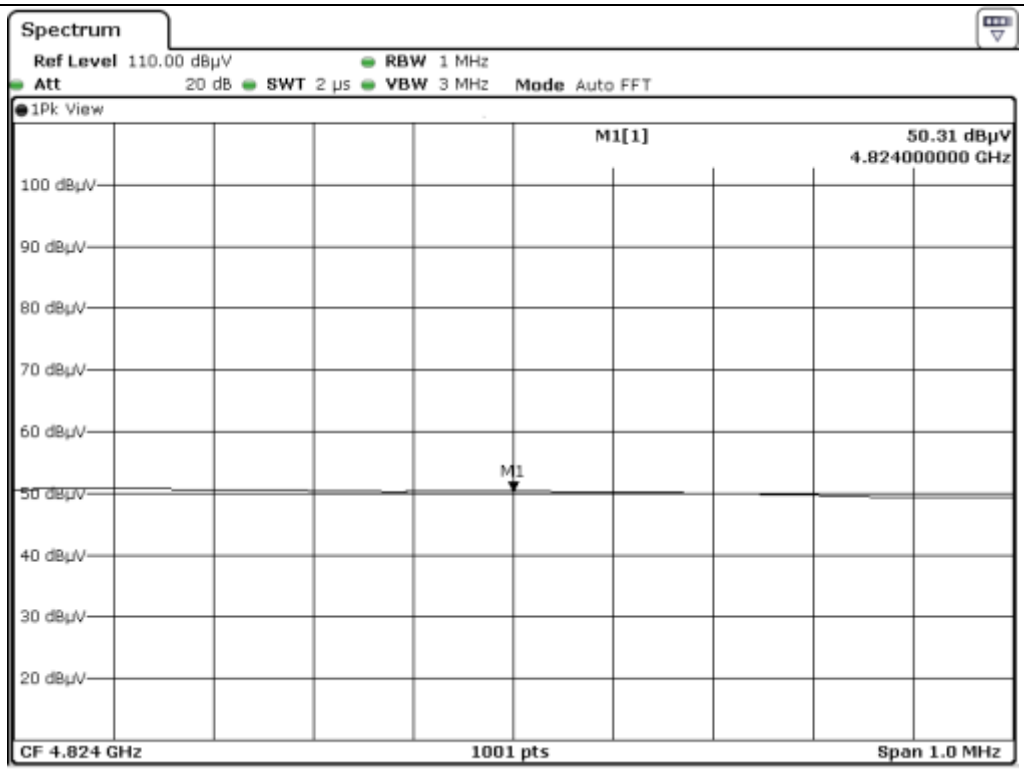
ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)



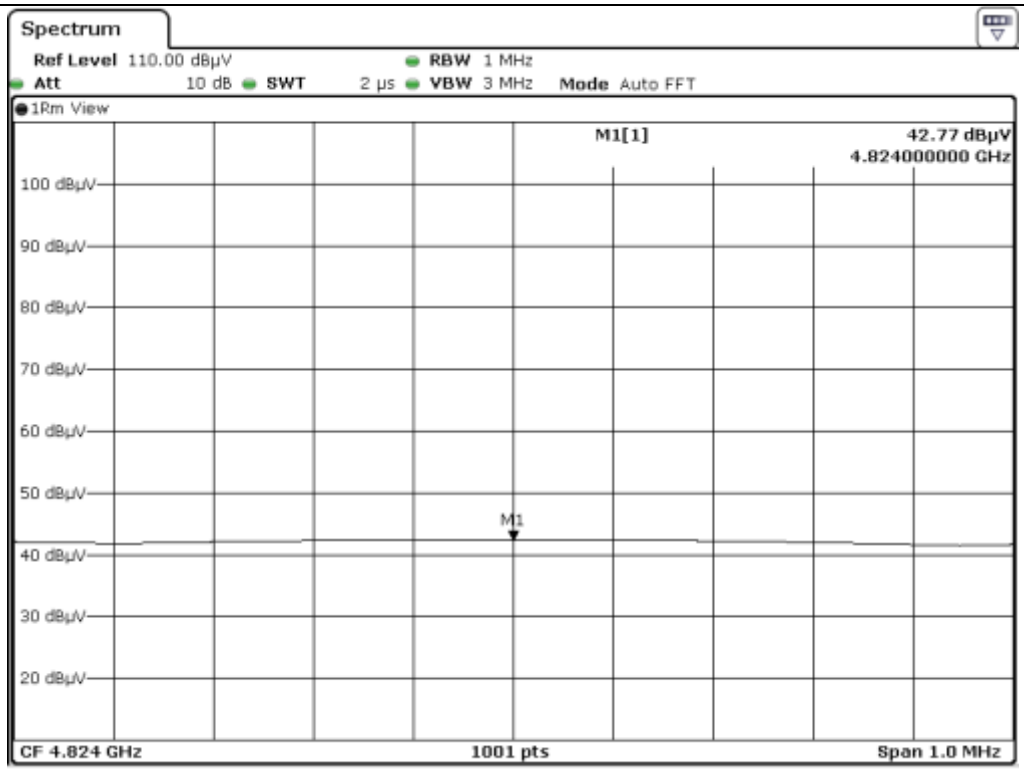
Low Channel_Peak_H



Low Channel_Average_H

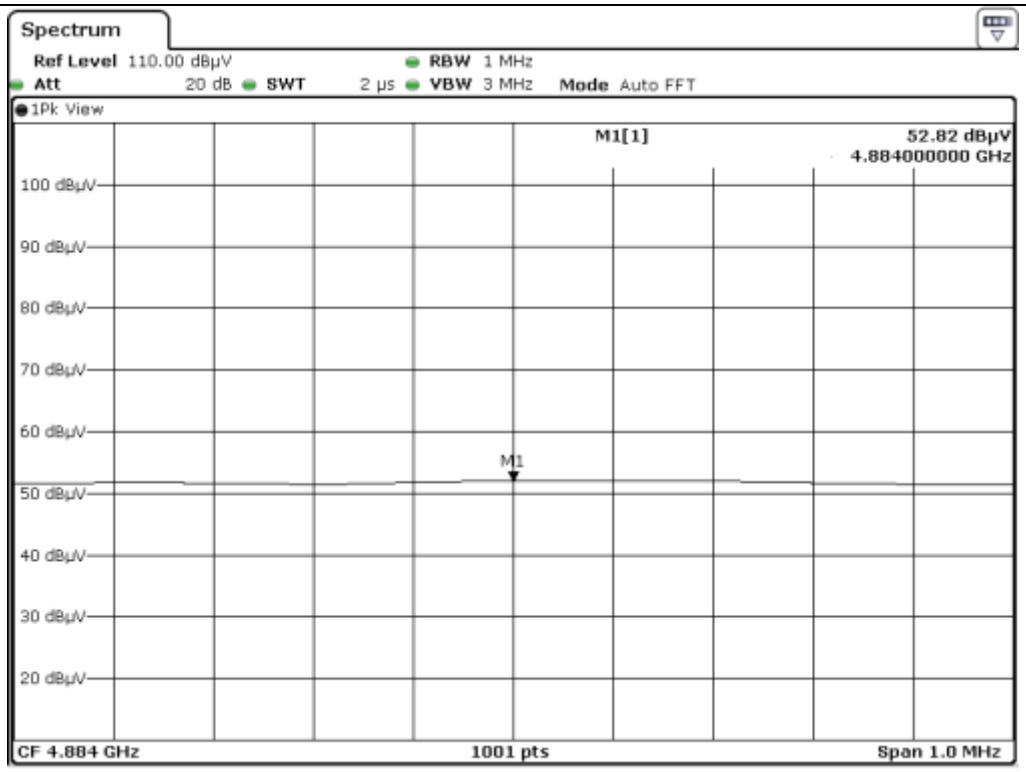


Low Channel_Peak_V

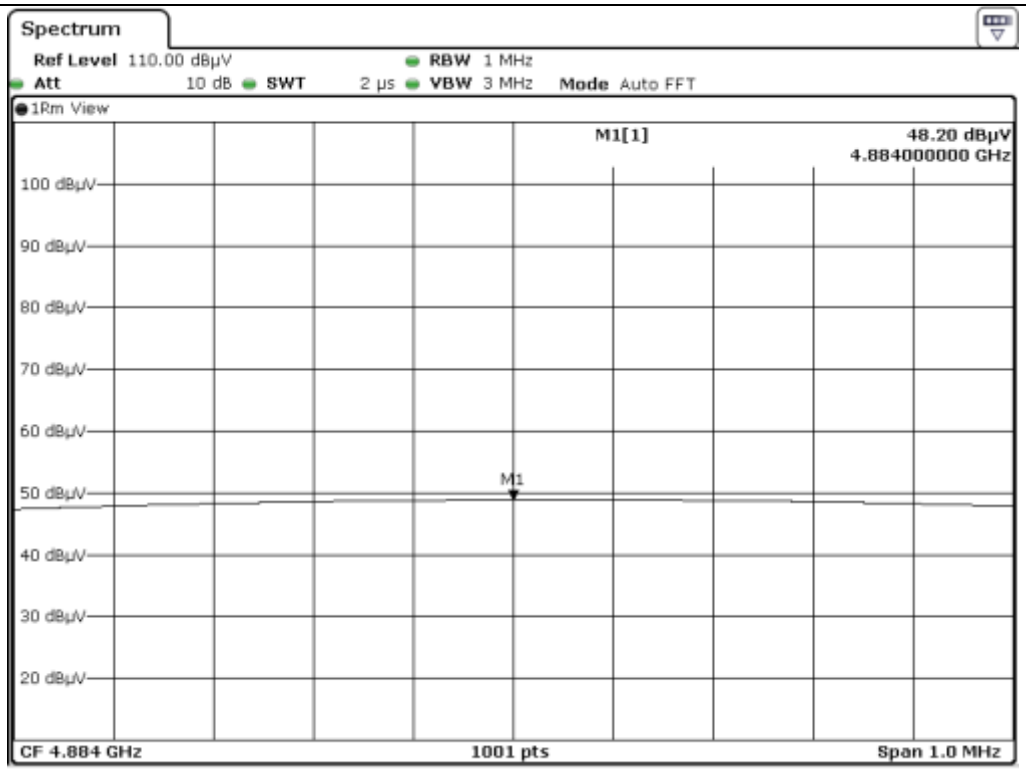


Low Channel_Average_V

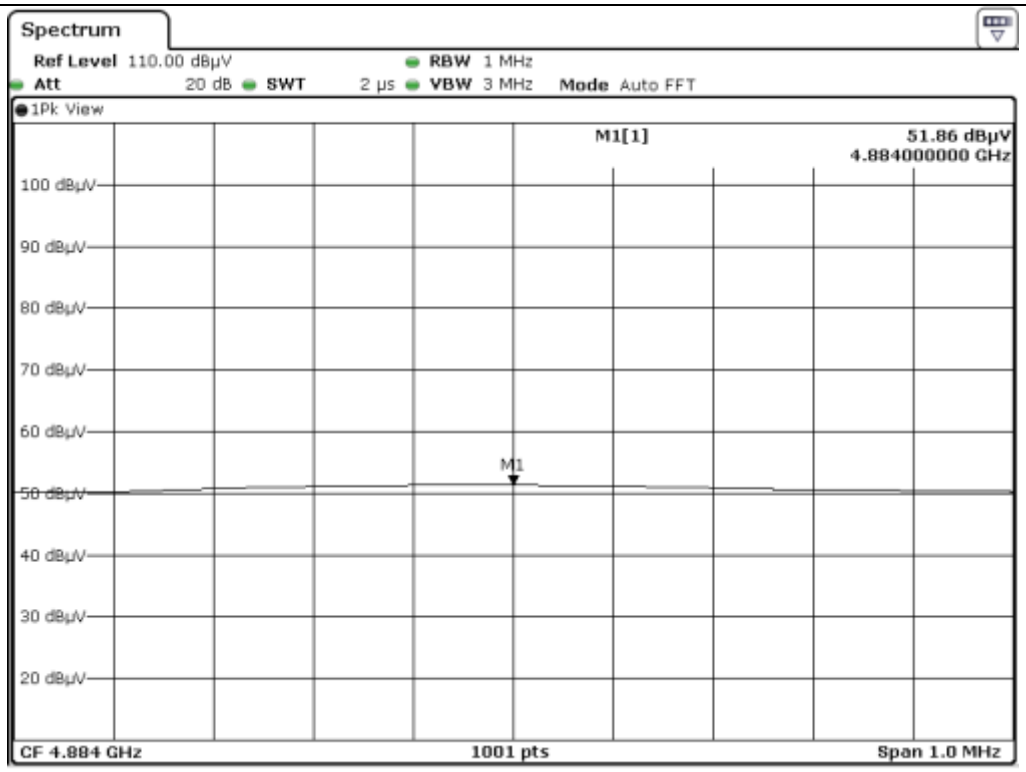
ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)



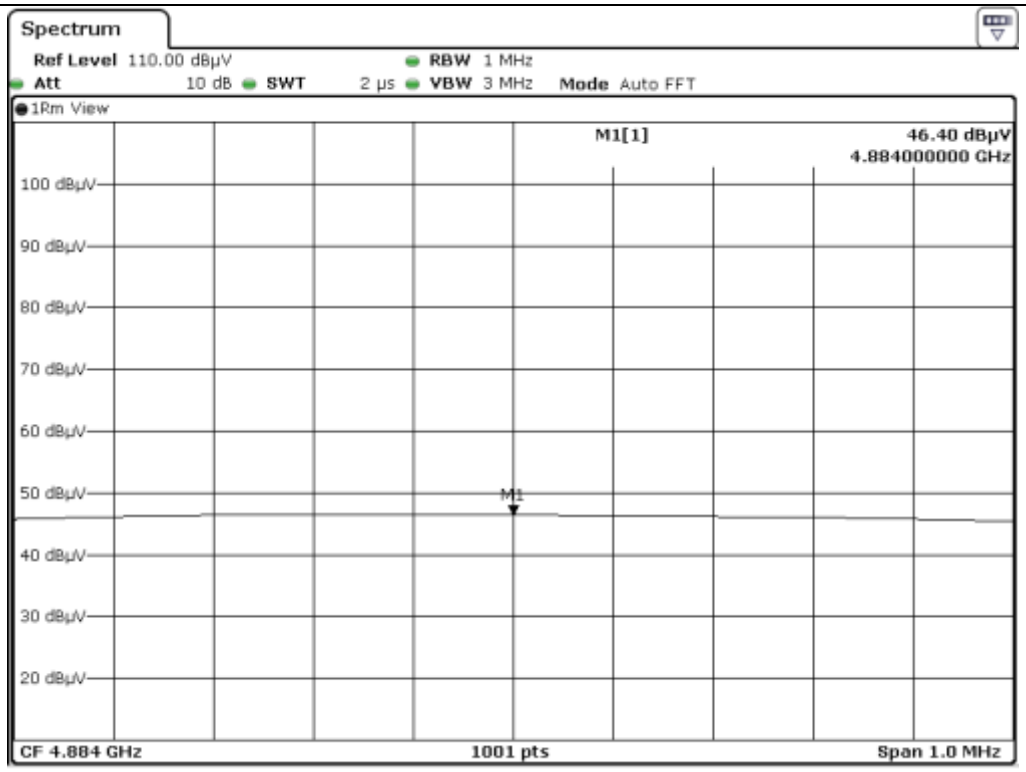
Middle Channel_Peak_H



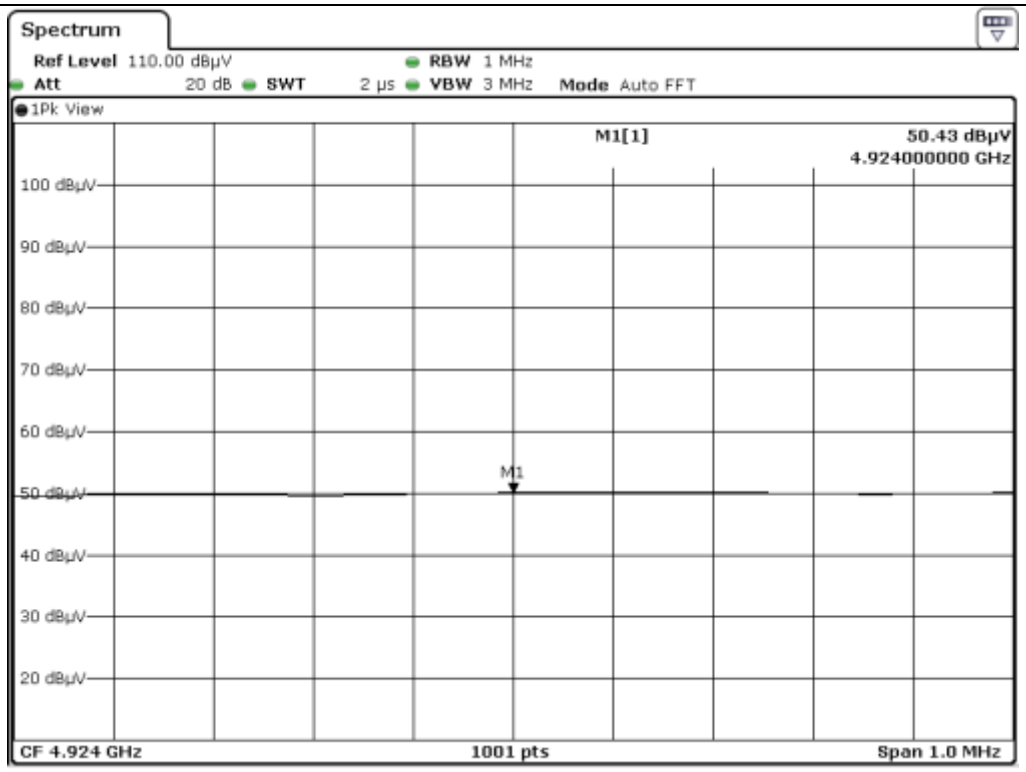
Middle Channel_Average_H



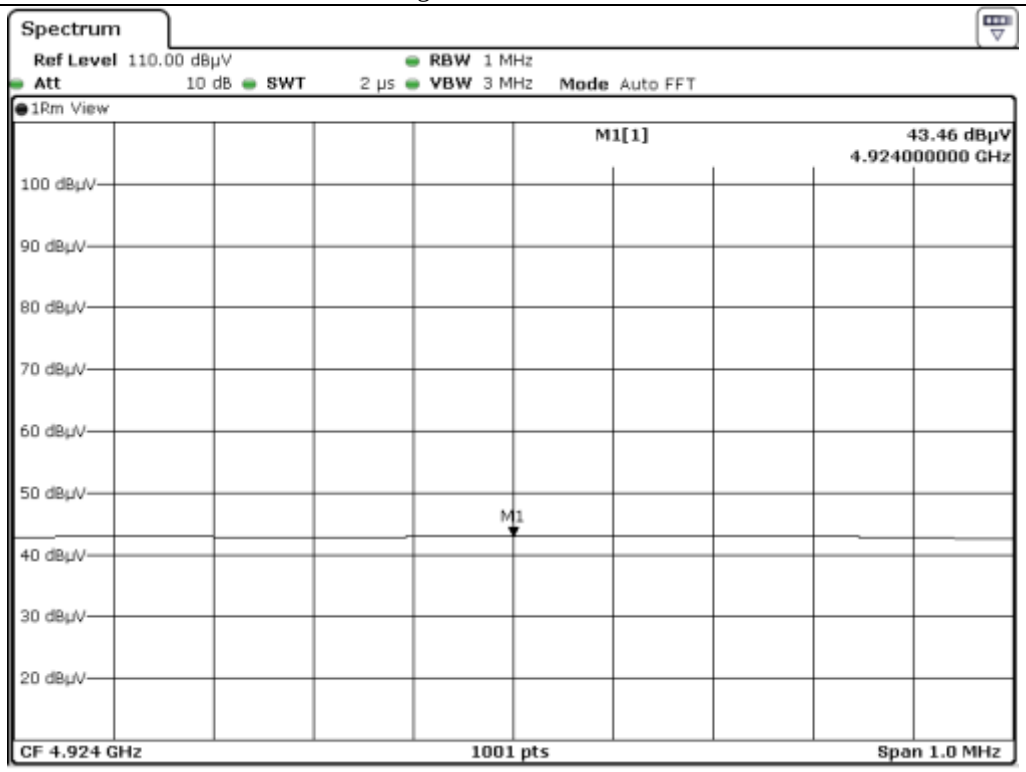
Middle Channel_Peak_V



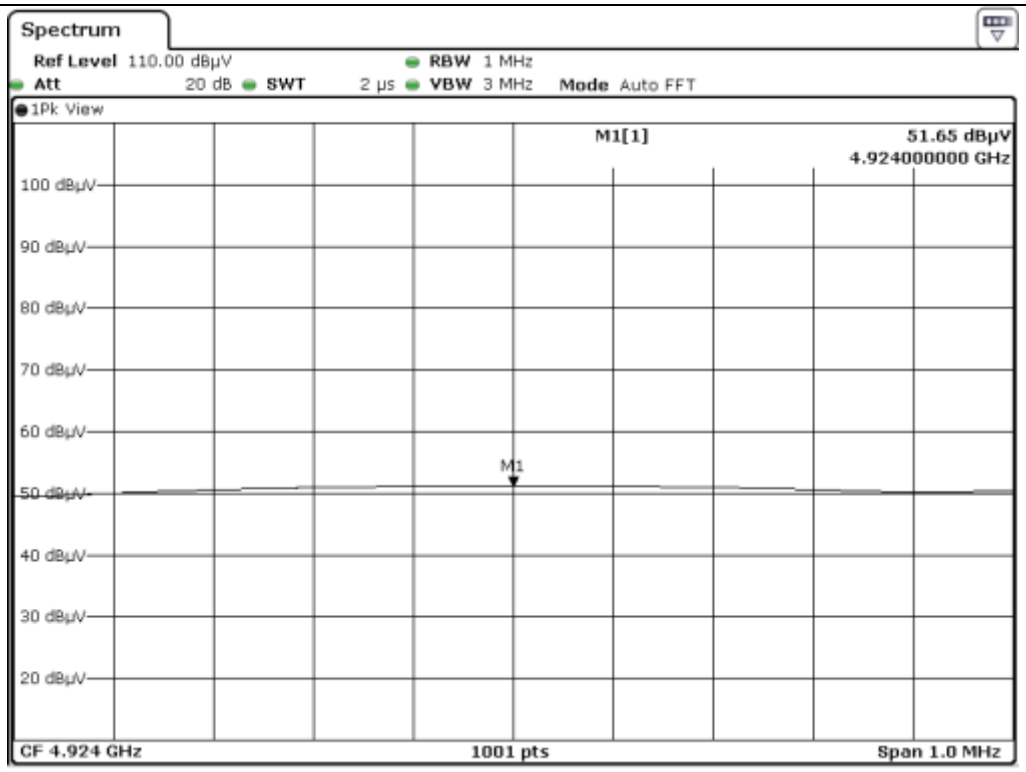
Middle Channel_Average_V



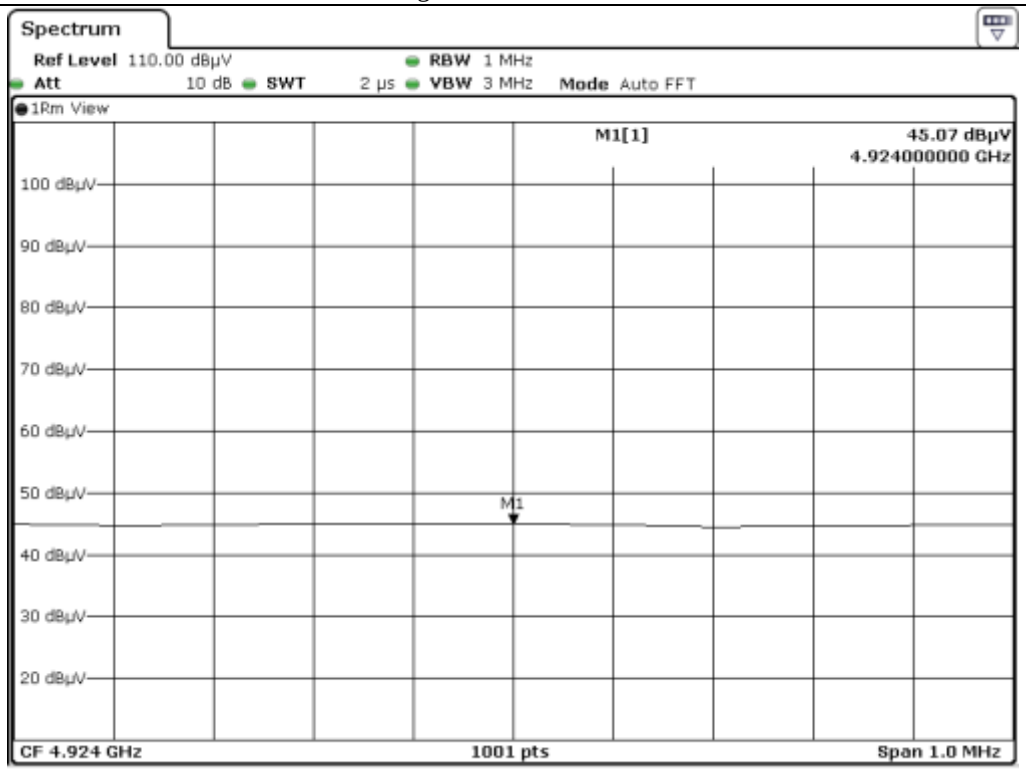
High Channel_Peak_H



High Channel_Average_H



High Channel_Peak_V



High Channel_Average_V

10.6.3.2 Test data for 802.11g WLAN Mode (3 Tx Multiple Transmit (Worst case))

-. Test Date : March 22, 2017

-. 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 : > 98 %

-. Result : PASSED

Frequency (GHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel									
4 824.00	39.02	Peak	H	30.84	12.31	40.69	41.48	74.00	32.52
	30.73	Average	H				33.19	54.00	20.81
	39.33	Peak	V				41.79	74.00	32.21
	30.87	Average	V				33.33	54.00	20.67
Test Data for Middle Channel									
4 884.00	45.92	Peak	H	30.01	12.43	40.65	47.71	74.00	26.29
	38.45	Average	H				40.24	54.00	13.76
	46.54	Peak	V				48.33	74.00	25.67
	38.91	Average	V				40.70	54.00	13.30
Test Data for High Channel									
4 924.00	39.72	Peak	H	31.15	12.81	40.61	43.07	74.00	30.93
	30.94	Average	H				34.29	54.00	19.71
	39.43	Peak	V				42.78	74.00	31.22
	31.71	Average	V				35.06	54.00	18.94

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 – Pre-Amplifier Gain

Tested by: Hyung-Kwon, Oh / Engineer

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

10.6.3.3 Test data for 802.11n_HT20 WLAN Mode (3 Tx Multiple Transmit (Worst case))

-. Test Date : March 22, 2017

-. 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 : > 98 %

-. Result : PASSED

Frequency (GHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel									
4 824.00	38.75	Peak	H	30.84	12.31	40.69	41.21	74.00	32.79
	30.51	Average	H				32.97	54.00	21.03
	38.64	Peak	V				41.10	74.00	32.90
	30.40	Average	V				32.86	54.00	21.14
Test Data for Middle Channel									
4 884.00	46.03	Peak	H	30.01	12.43	40.65	47.82	74.00	26.18
	38.25	Average	H				40.04	54.00	13.96
	46.12	Peak	V				47.91	74.00	26.09
	39.05	Average	V				40.84	54.00	13.16
Test Data for High Channel									
4 924.00	38.93	Peak	H	31.15	12.81	40.61	42.28	74.00	31.72
	30.60	Average	H				33.95	54.00	20.05
	39.28	Peak	V				42.63	74.00	31.37
	30.42	Average	V				33.77	54.00	20.23

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 – Pre-Amplifier Gain

Tested by: Hyung-Kwon, Oh / Engineer

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

10.6.3.4 Test data for 802.11n_HT40 WLAN Mode (3 Tx Multiple Transmit (Worst case))

-. Test Date : March 22, 2017

-. 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 : > 98 %

-. Result : PASSED

Frequency (GHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel									
4 844.00	38.64	Peak	H	30.84	12.31	40.69	41.10	74.00	32.90
	30.36	Average	H				32.82	54.00	21.18
	39.13	Peak	V				41.59	74.00	32.41
	31.59	Average	V				34.05	54.00	19.95
Test Data for Middle Channel									
4 884.00	42.15	Peak	H	30.01	12.43	40.65	43.94	74.00	30.06
	33.88	Average	H				35.67	54.00	18.33
	42.27	Peak	V				44.06	74.00	29.94
	33.72	Average	V				35.51	54.00	18.49
Test Data for High Channel									
4 904.00	39.25	Peak	H	31.15	12.81	40.61	42.60	74.00	31.40
	30.60	Average	H				33.95	54.00	20.05
	39.76	Peak	V				43.11	74.00	30.89
	31.25	Average	V				34.60	54.00	19.40

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 – Pre-Amplifier Gain

Tested by: Hyung-Kwon, Oh / Engineer

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. PEAK POWER SPECTRUL DENSITY

11.1 Operating environment

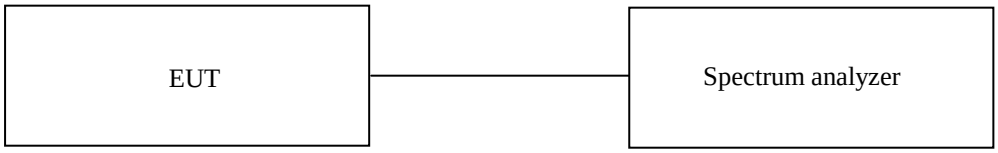
Temperature : 23 ℃

Relative humidity : 41 % 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 3 kHz ≤ RBW ≤100 kHz , the video bandwidth is set to 3 times the resolution bandwidth.



11.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ -	FSV40	Rohde & Schwarz	Signal Analyzer	101009	May 31, 2016 (1Y)

All test equipment used is calibrated on a regular basis.

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

11.4 Test data for 802.11b WLAN Mode

11.4.1 Test data for Antenna 0

-. Test Date : March 21, 2017

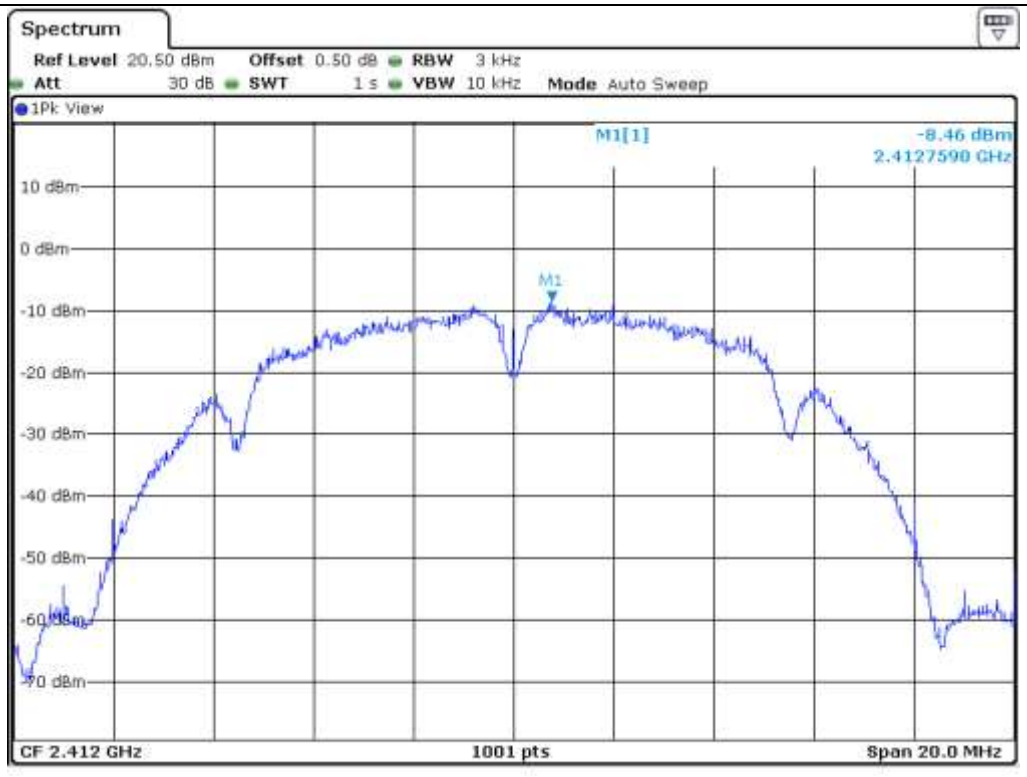
-. Test Result : Pass

-. Operating Condition : Continuous transmitting mode

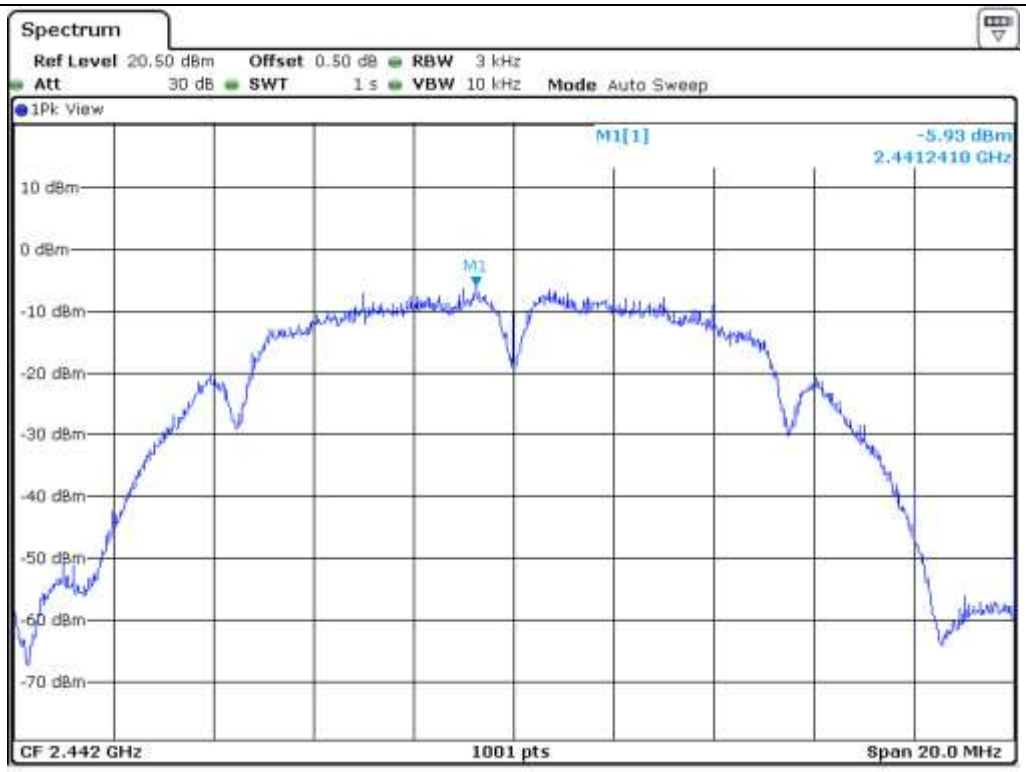
CHANNEL	FREQUENCY(MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412.00	-8.46	8.00	16.46
Middle	2 442.00	-5.93	8.00	13.93
High	2 462.00	-6.71	8.00	14.71

Remark. Margin = Limit – Measured value

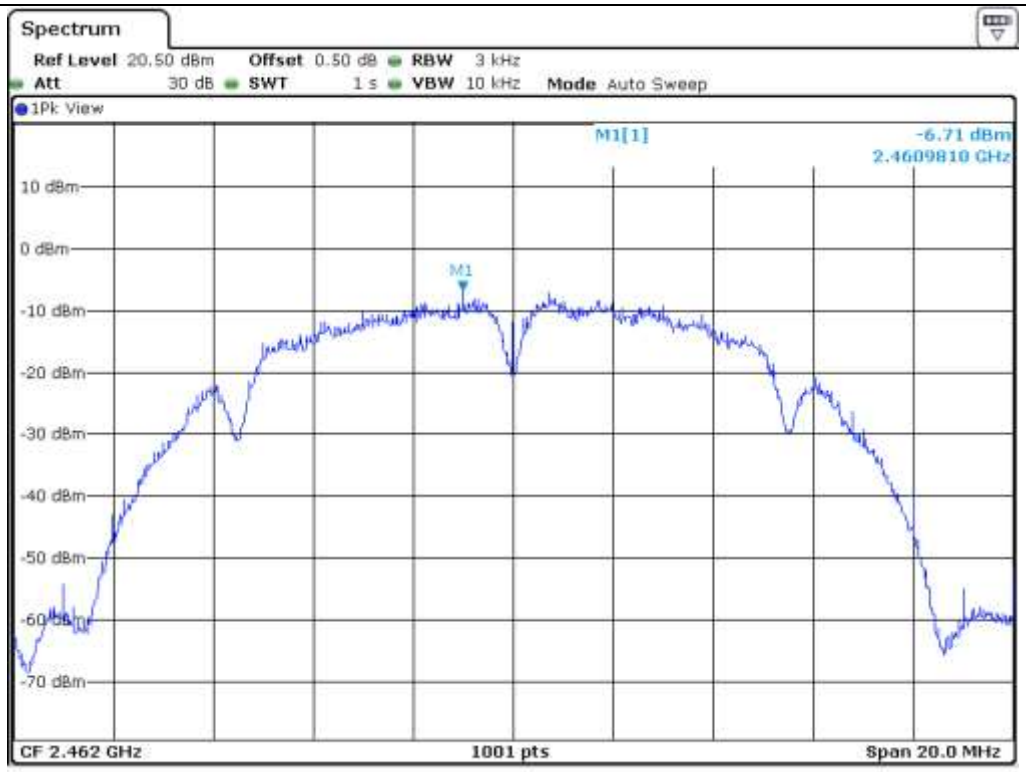
Tested by: Hyung-Kwon, Oh / Engineer



Low Channel



Middle Channel



High Channel

11.4.2 Test data for Antenna 1

-. Test Date : March 21, 2017

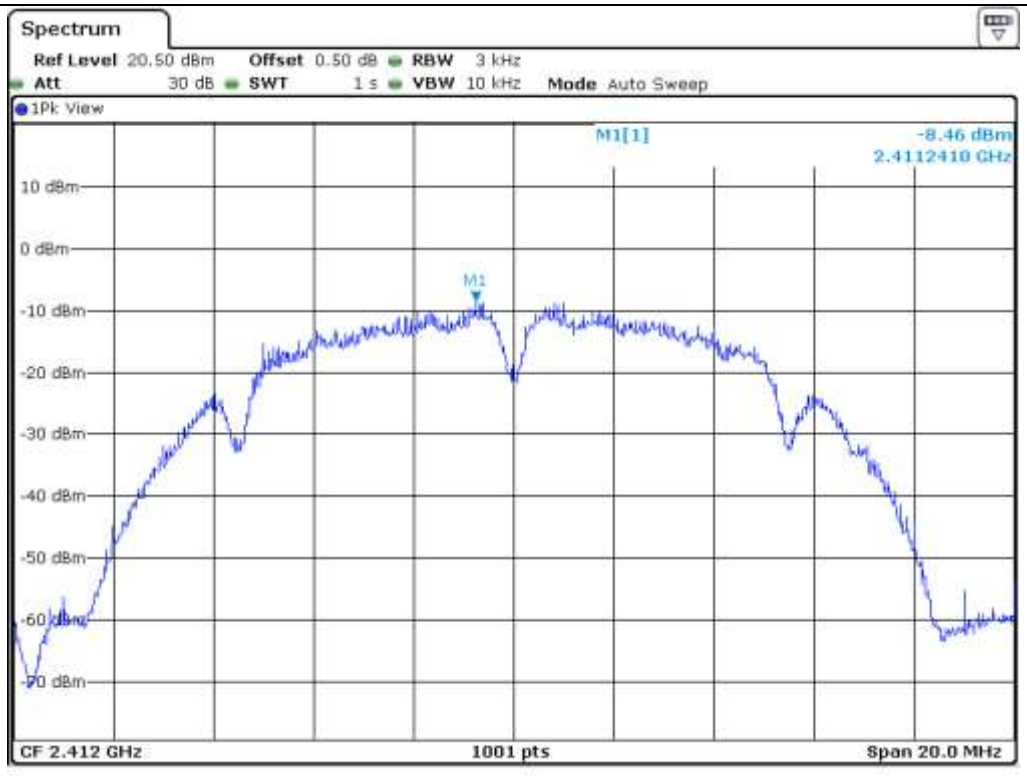
-. Test Result : Pass

-. Operating Condition : Continuous transmitting mode

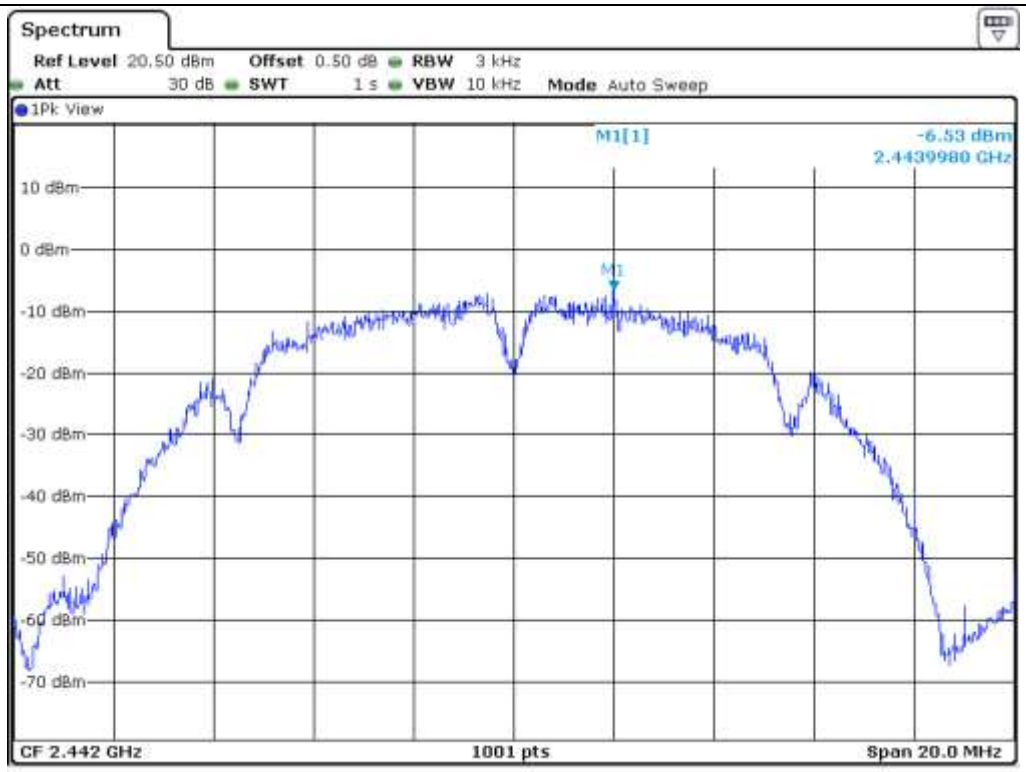
CHANNEL	FREQUENCY(MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412.00	-8.46	8.00	16.46
Middle	2 442.00	-6.53	8.00	14.53
High	2 462.00	-6.70	8.00	14.70

Remark. Margin = Limit – Measured value

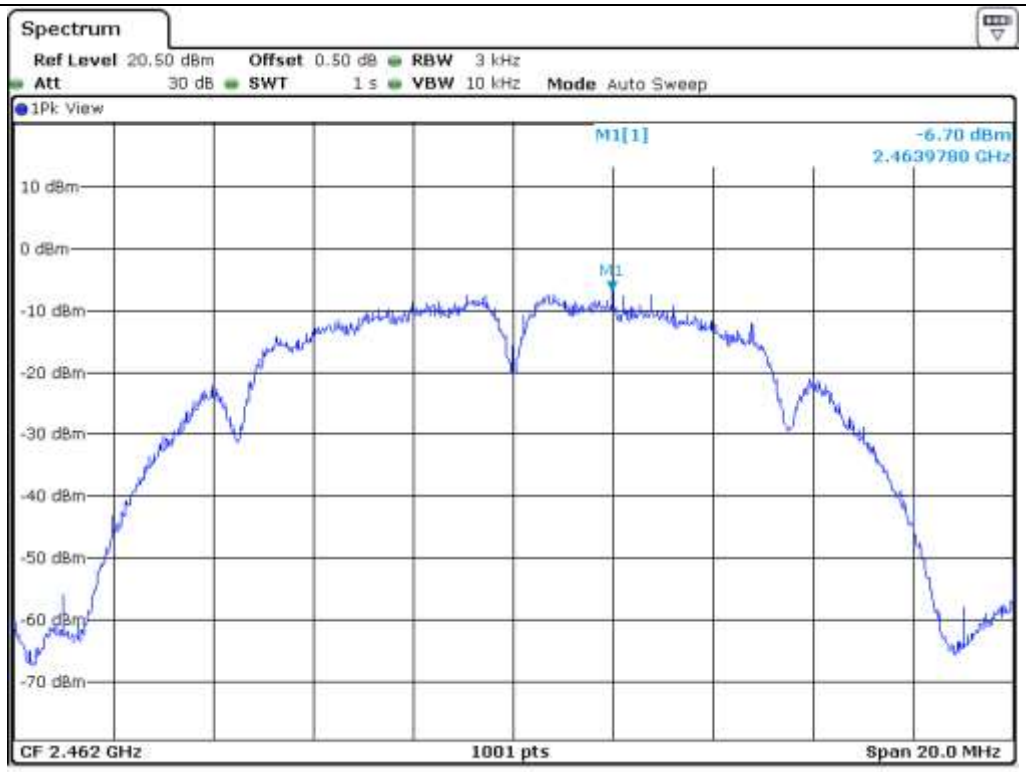
Tested by: Hyung-Kwon, Oh / Engineer



Low Channel



Middle Channel



High Channel

11.4.3 Test data for Antenna 2

-. Test Date : March 21, 2017

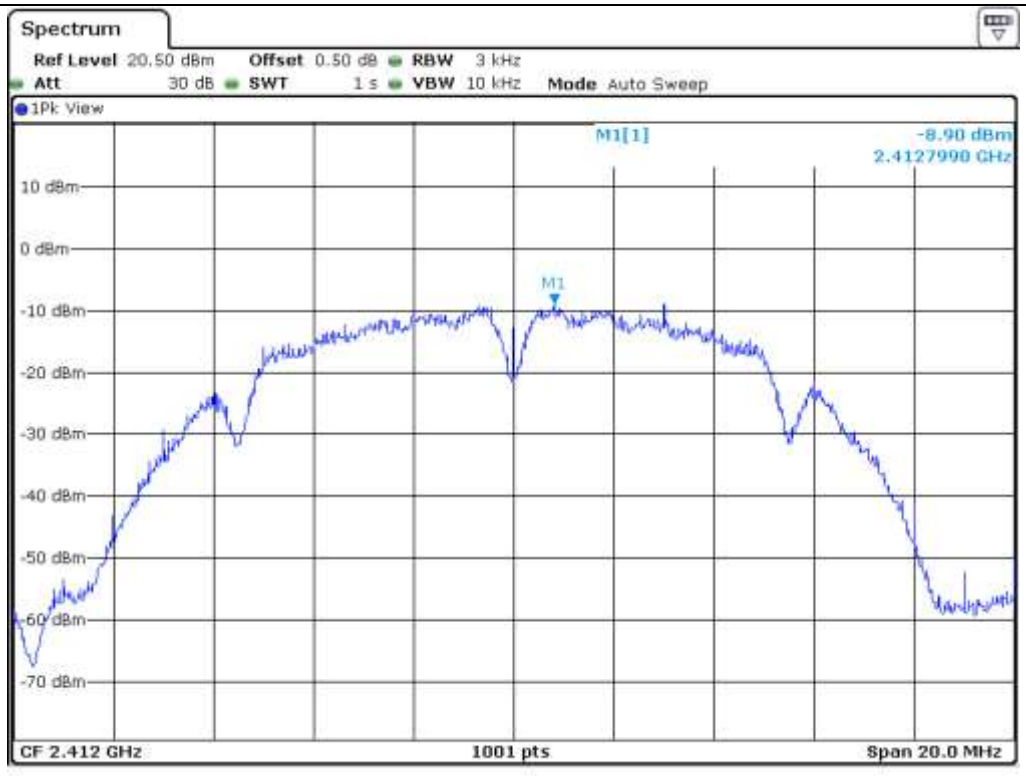
-. Test Result : Pass

-. Operating Condition : Continuous transmitting mode

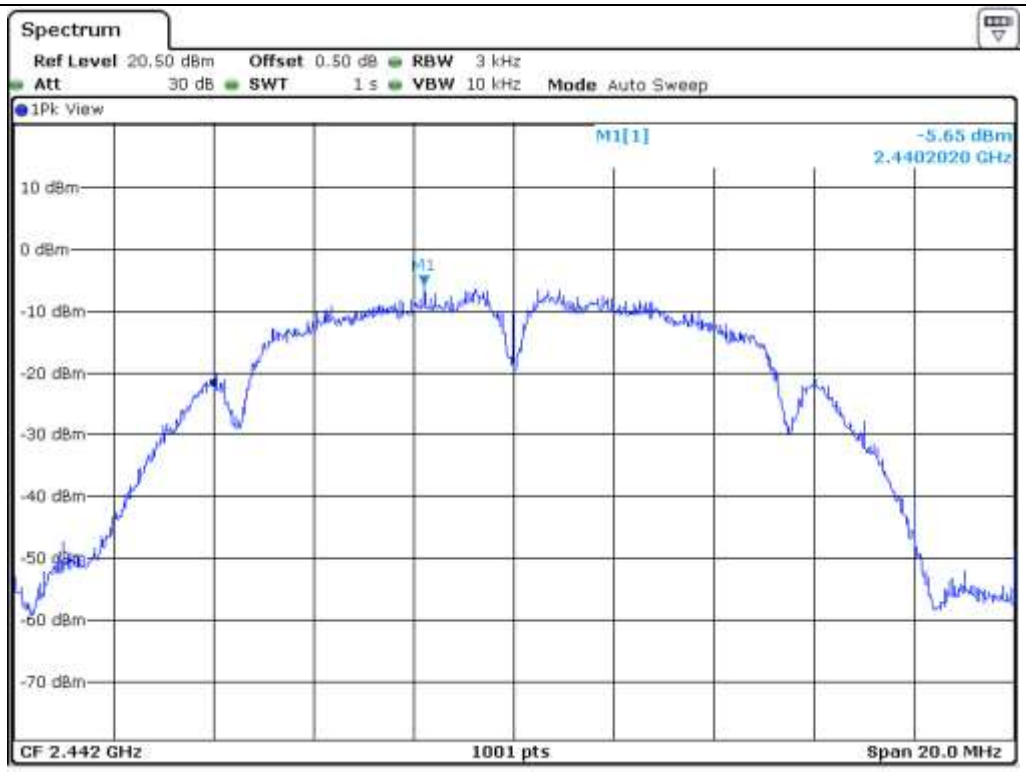
CHANNEL	FREQUENCY(MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412.00	-8.90	8.00	16.90
Middle	2 442.00	-5.65	8.00	13.65
High	2 462.00	-7.85	8.00	15.85

Remark. Margin = Limit – Measured value

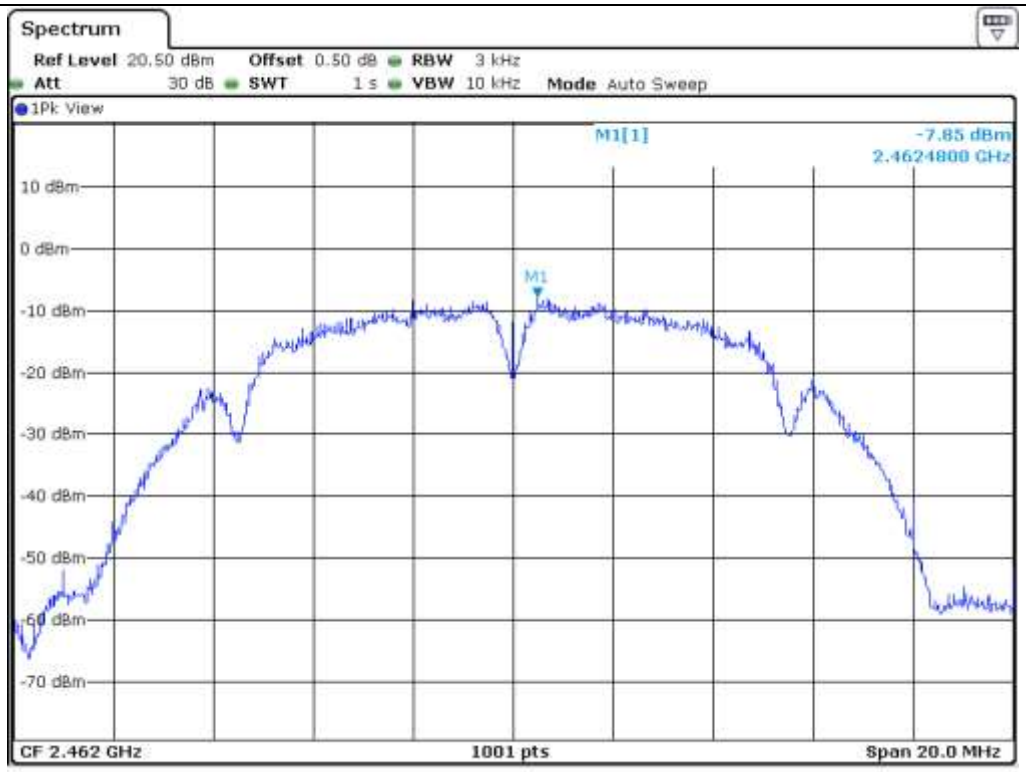
Tested by: Hyung-Kwon, Oh / Engineer



Low Channel



Middle Channel



High Channel

11.4.4 Test data for Multiple transmit

-. Test Date : March 21, 2017

-. Test Result : Pass

-. Operating Condition : Continuous transmitting mode

CHANNEL	FREQUENCY(MHz)	CALCULATED POWER (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412.00	-3.83	7.63	11.46
Middle	2 442.00	-1.25	7.63	8.88
High	2 462.00	-2.28	7.63	9.91

Remark 1 : Margin = Limit – Measured value

Remark 2 : Calculated Power Density = $10\log(10^{(\text{Antenna 0 Power Density}/10)}+10^{(\text{Antenna 1 Power Density}/10)}+10^{(\text{Antenna 2 Power Density}/10)})$

Tested by: Hyung-Kwon, Oh / Engineer

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 802.11g WLAN Mode

11.5.1 Test data for Antenna 0

-. Test Date : March 21, 2017

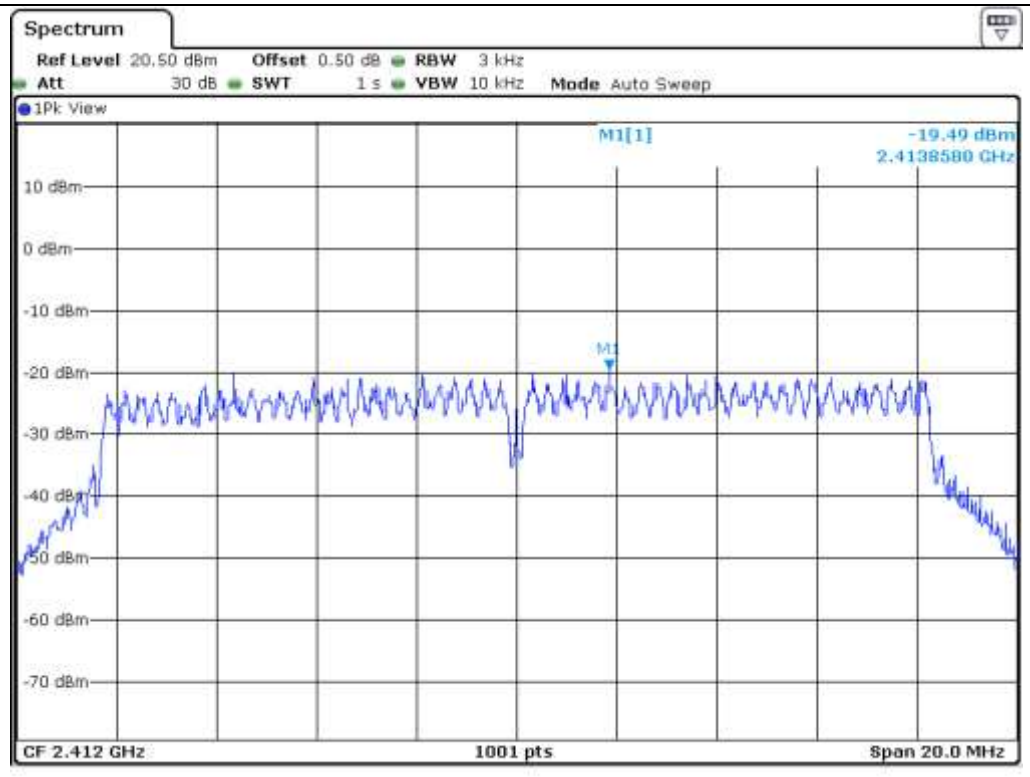
-. Test Result : Pass

-. Operating Condition : Continuous transmitting mode

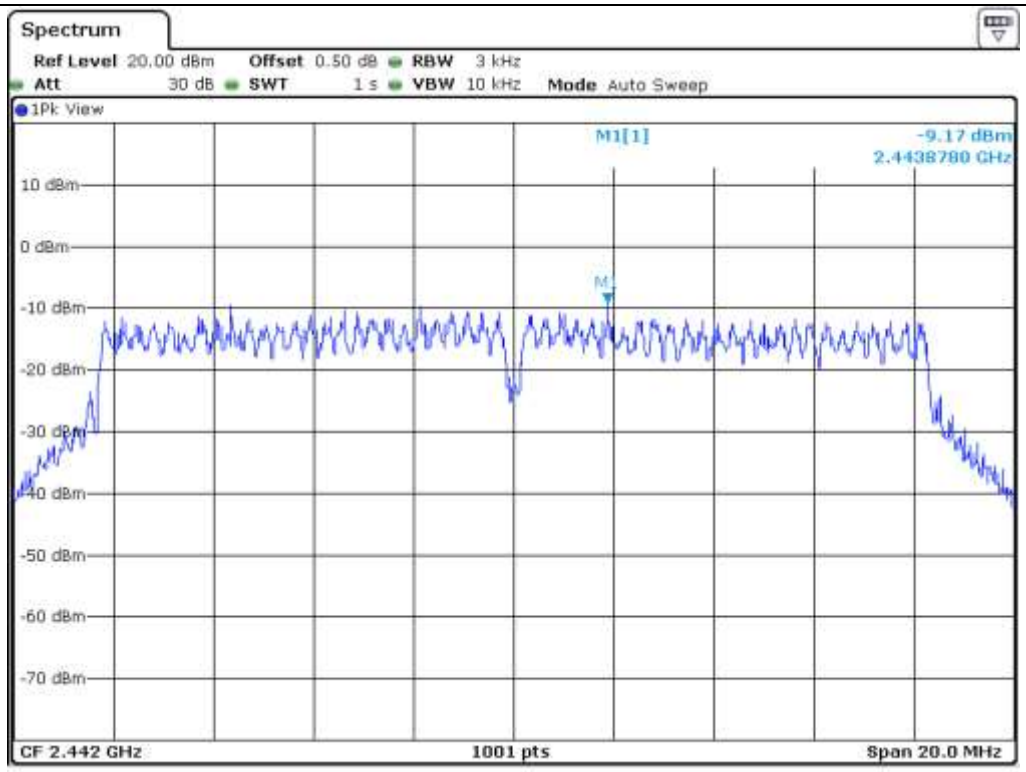
CHANNEL	FREQUENCY(MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412.00	-19.49	8.00	27.49
Middle	2 442.00	-9.17	8.00	17.17
High	2 462.00	-19.14	8.00	27.14

Remark. Margin = Limit – Measured value

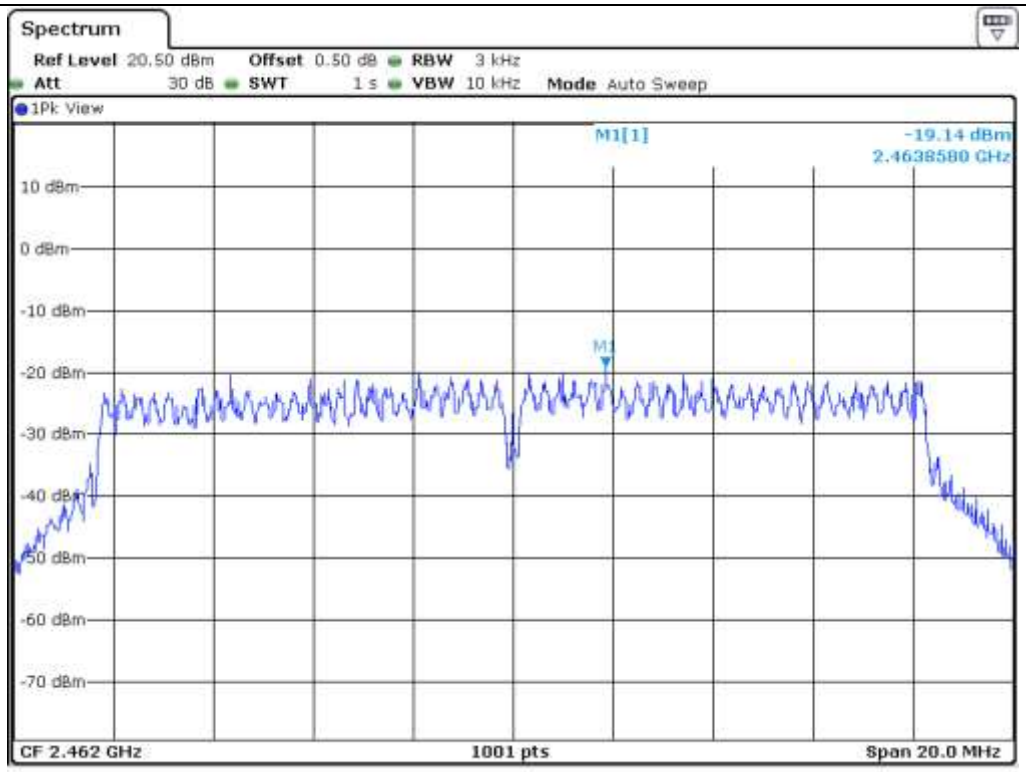
Tested by: Hyung-Kwon, Oh / Engineer



Low Channel



Middle Channel



High Channel

11.5.2 Test data for Antenna 1

-. Test Date : March 21, 2017

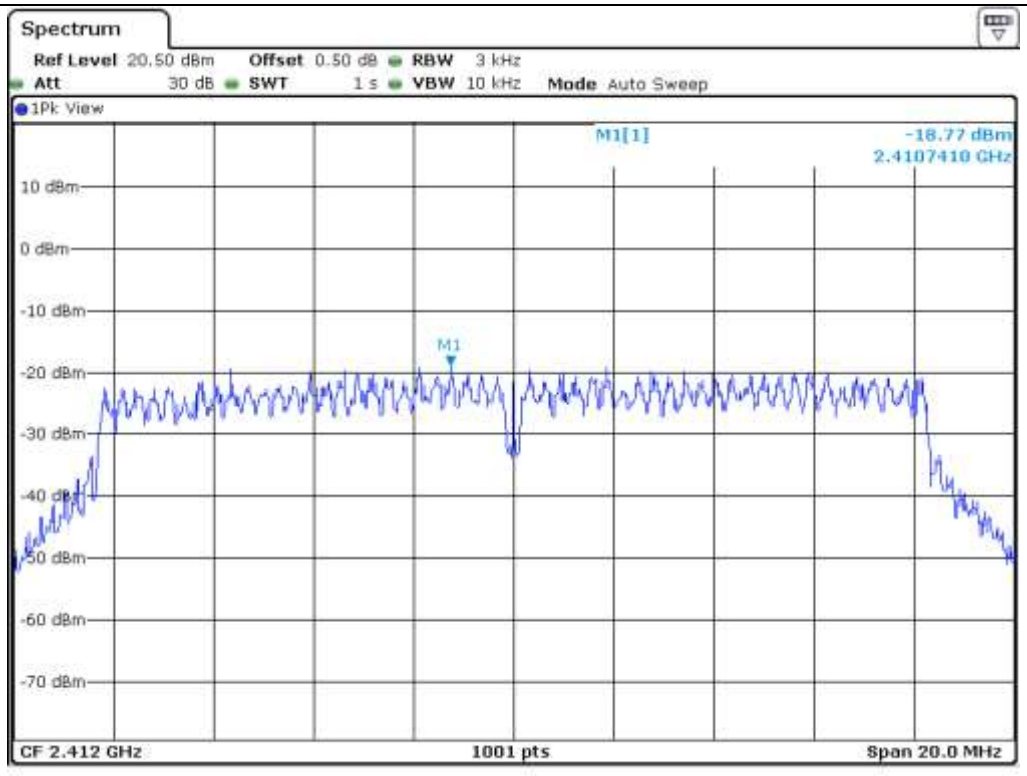
-. Test Result : Pass

-. Operating Condition : Continuous transmitting mode

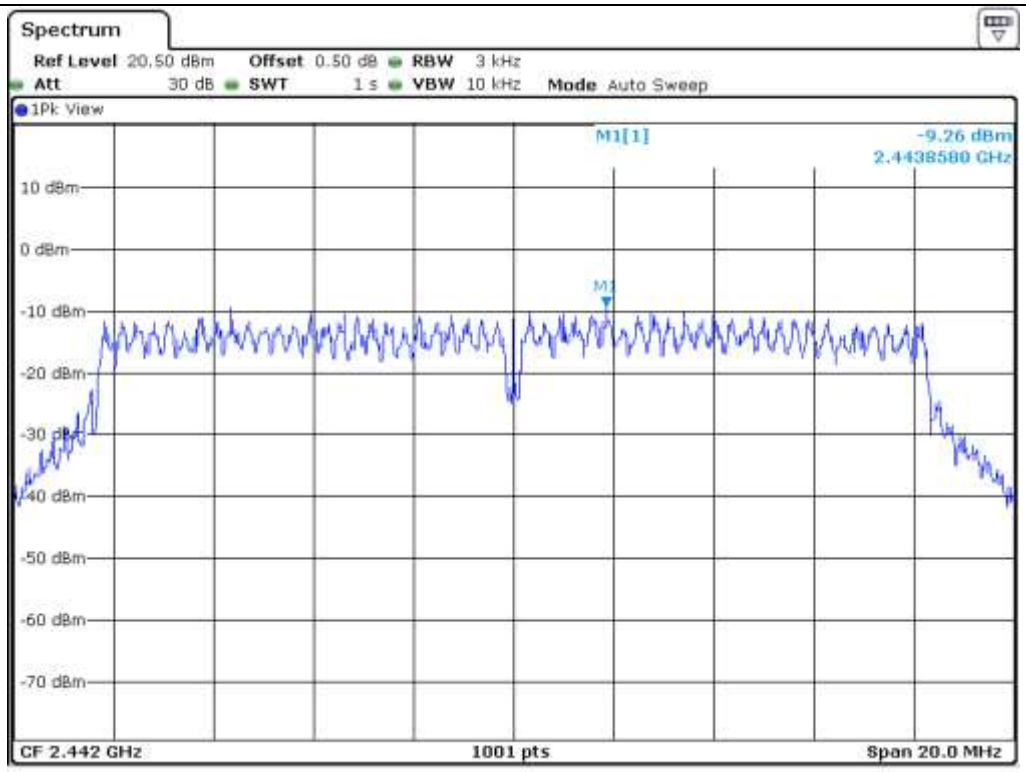
CHANNEL	FREQUENCY(MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412.00	-18.77	8.00	26.77
Middle	2 442.00	-9.26	8.00	17.26
High	2 462.00	-17.88	8.00	25.88

Remark. Margin = Limit – Measured value

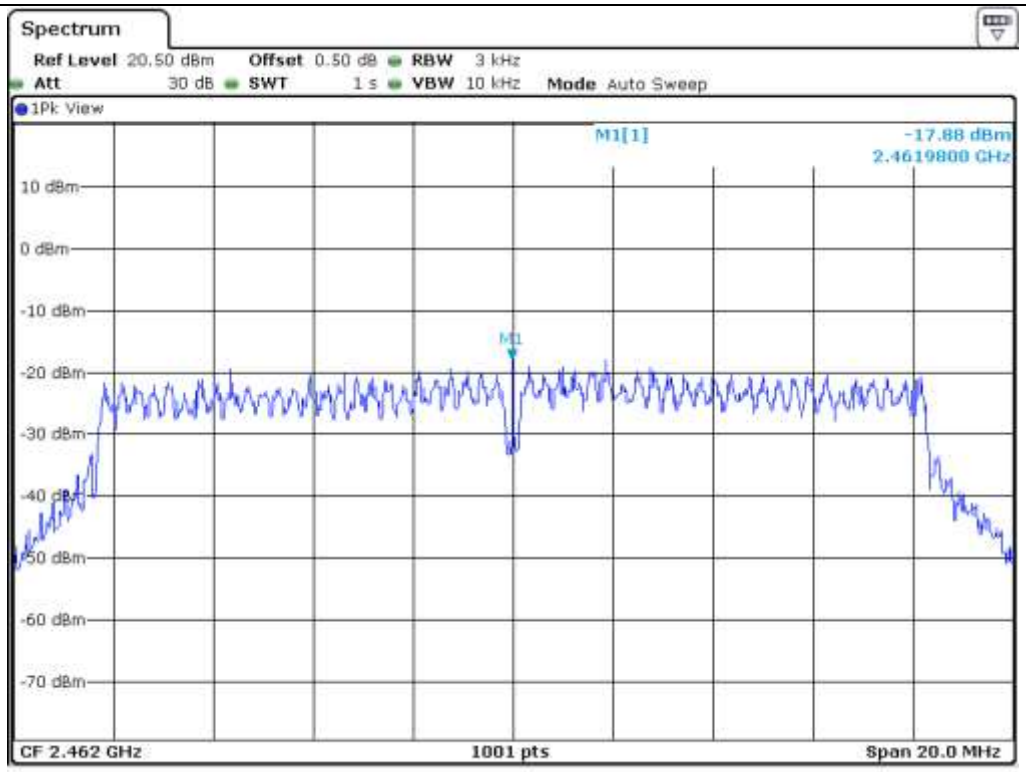
Tested by: Hyung-Kwon, Oh / Engineer



Low Channel



Middle Channel



High Channel

11.5.3 Test data for Antenna 2

-. Test Date : March 21, 2017

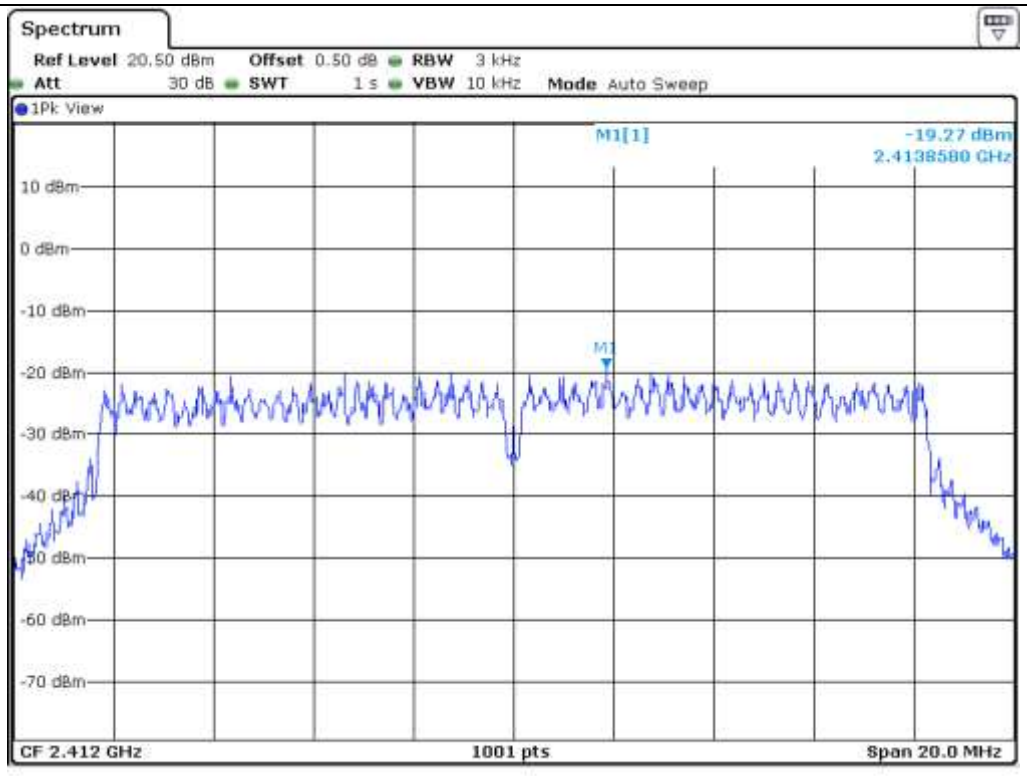
-. Test Result : Pass

-. Operating Condition : Continuous transmitting mode

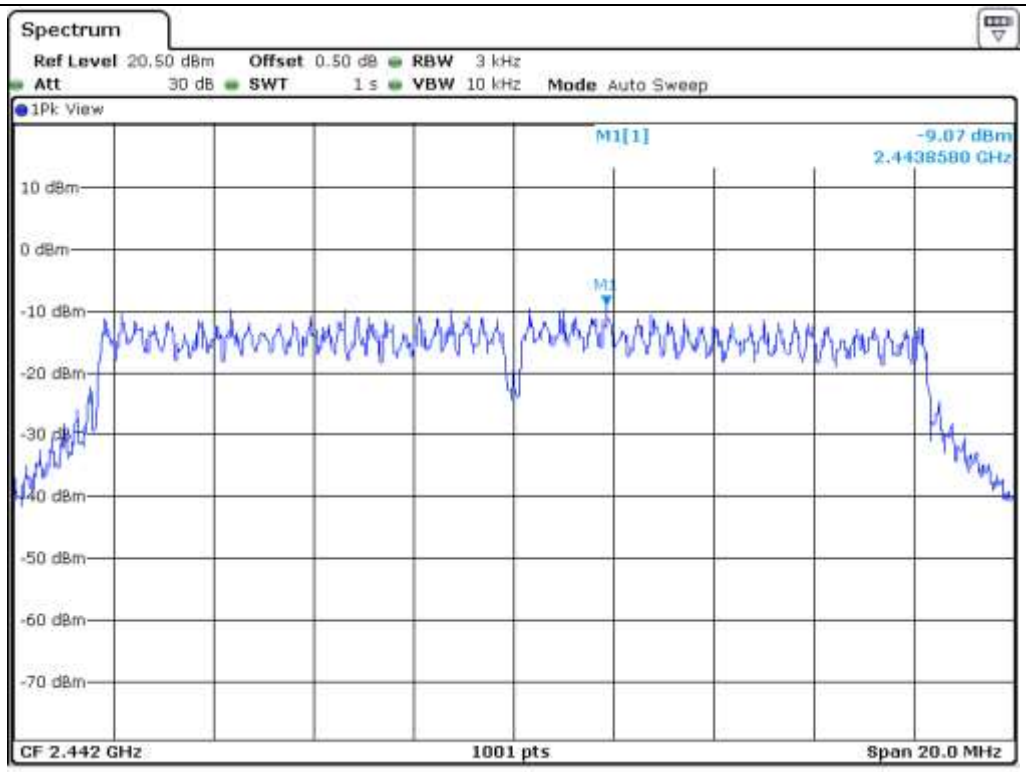
CHANNEL	FREQUENCY(MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412.00	-19.27	8.00	27.27
Middle	2 442.00	-9.07	8.00	17.07
High	2 462.00	-19.29	8.00	27.29

Remark. Margin = Limit – Measured value

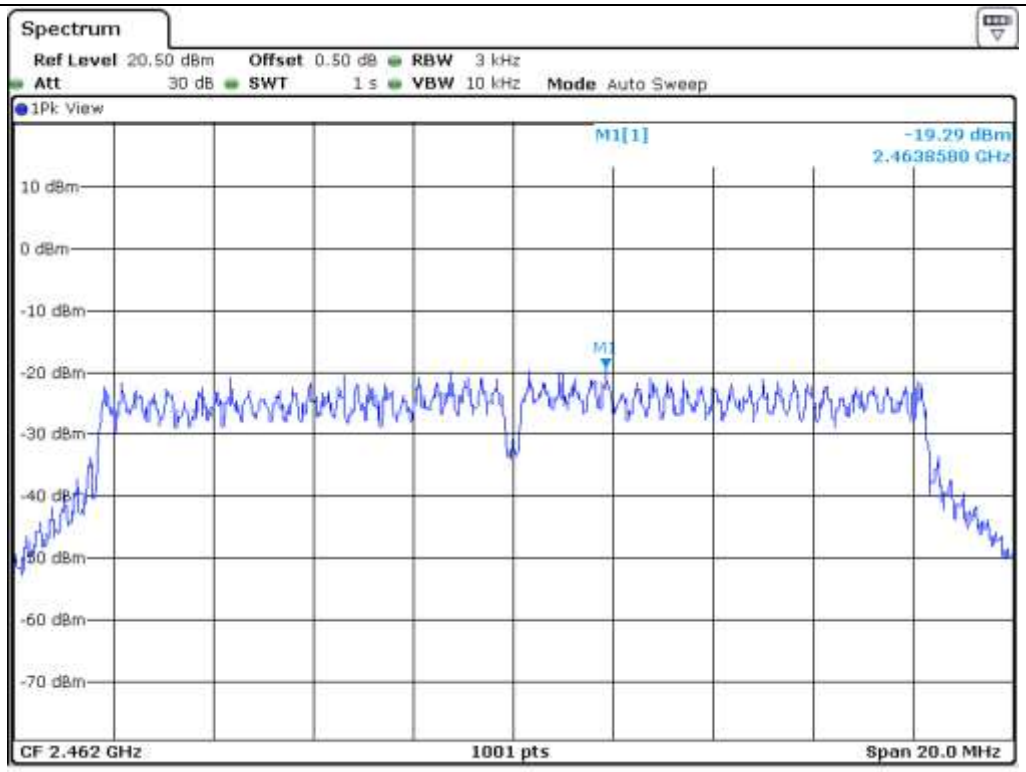
Tested by: Hyung-Kwon, Oh / Engineer



Low Channel



Middle Channel



High Channel

11.5.4 Test data for Multiple transmit

-. Test Date : March 21, 2017

-. Test Result : Pass

-. Operating Condition : Continuous transmitting mode

CHANNEL	FREQUENCY(MHz)	CALCULATED POWER (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412.00	-14.39	7.63	22.02
Middle	2 442.00	-4.39	7.63	12.02
High	2 462.00	-13.95	7.63	21.58

Remark 1 : Margin = Limit – Measured value

Remark 2 : Calculated Power Density = $10\log(10^{(\text{Antenna 0 Power Density}/10)}+10^{(\text{Antenna 1 Power Density}/10)}+10^{(\text{Antenna 2 Power Density}/10)})$

Tested by: Hyung-Kwon, Oh / Engineer

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 802.11n_HT20 WLAN Mode

11.6.1 Test data for Antenna 0

-. Test Date : March 21, 2017

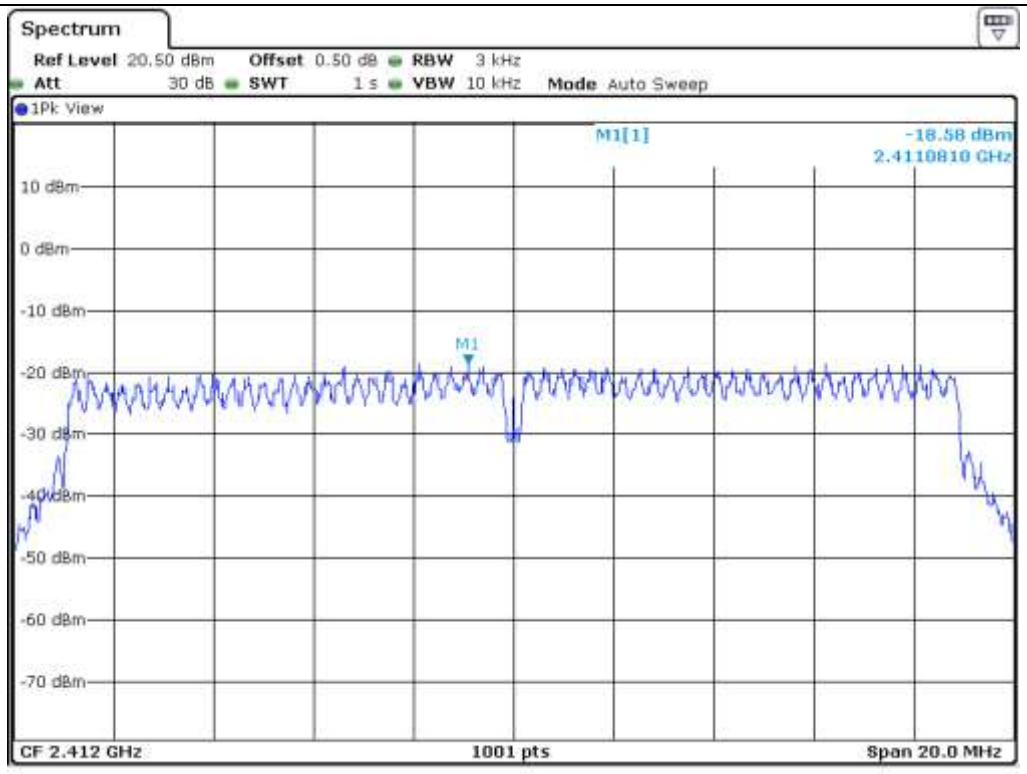
-. Test Result : Pass

-. Operating Condition : Continuous transmitting mode

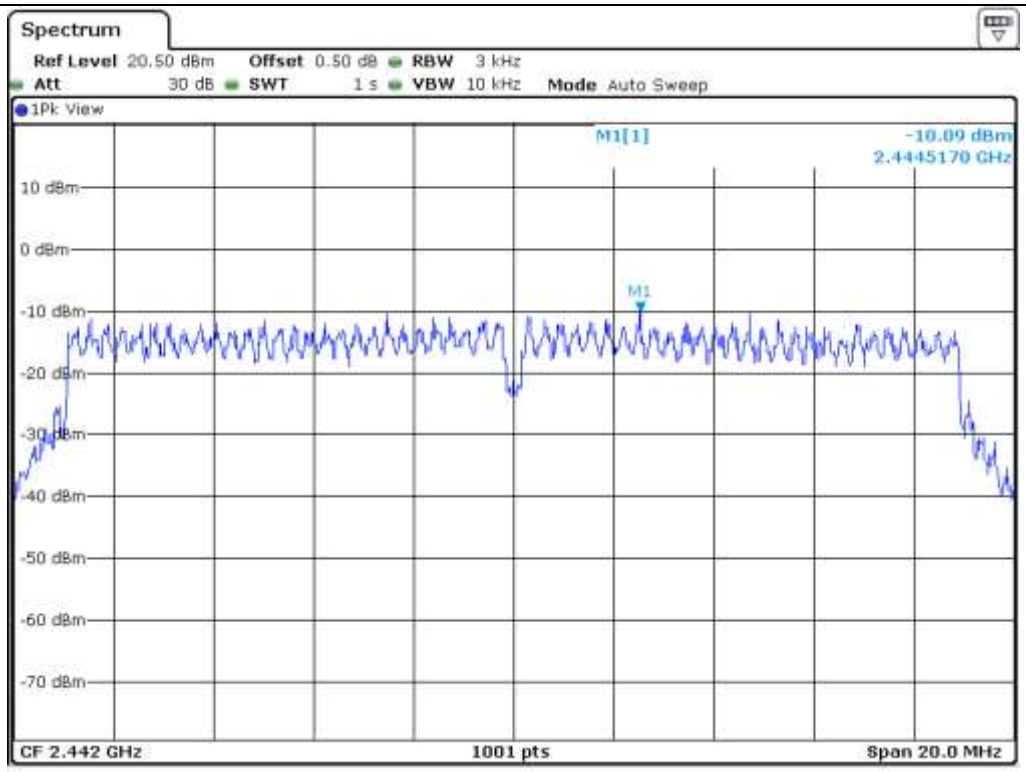
CHANNEL	FREQUENCY(MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412.00	-18.58	8.00	26.58
Middle	2 442.00	-10.09	8.00	18.09
High	2 462.00	-19.55	8.00	27.55

Remark. Margin = Limit – Measured value

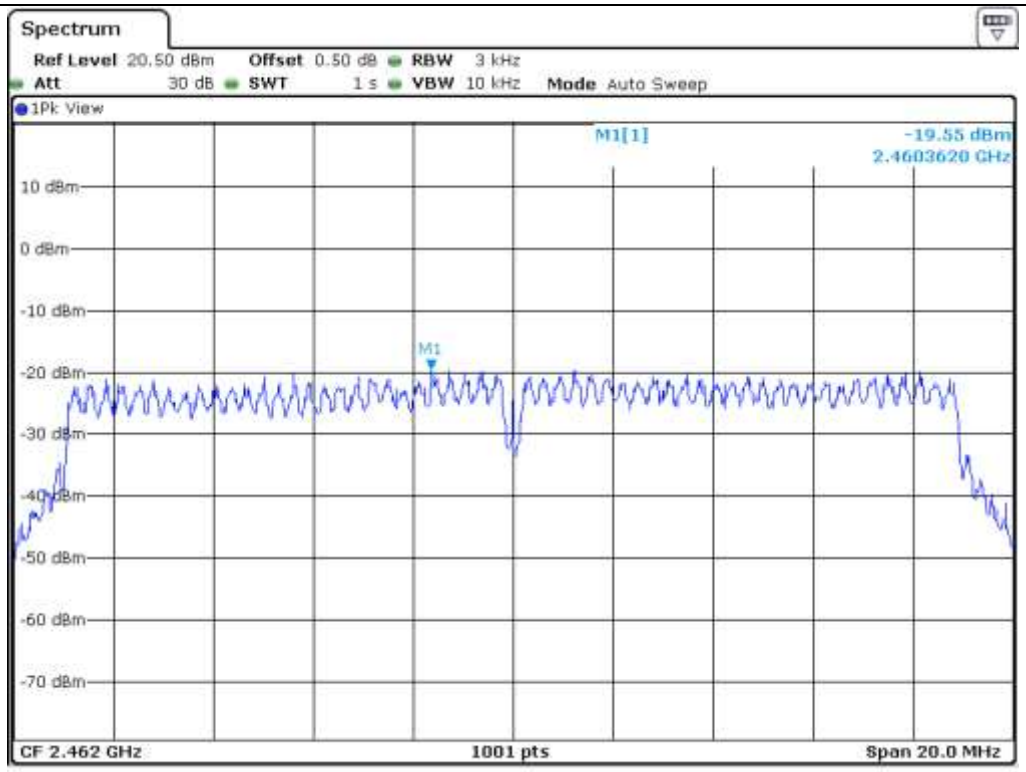
Tested by: Hyung-Kwon, Oh / Engineer



Low Channel



Middle Channel



High Channel

11.6.2 Test data for Antenna 1

-. Test Date : March 21, 2017

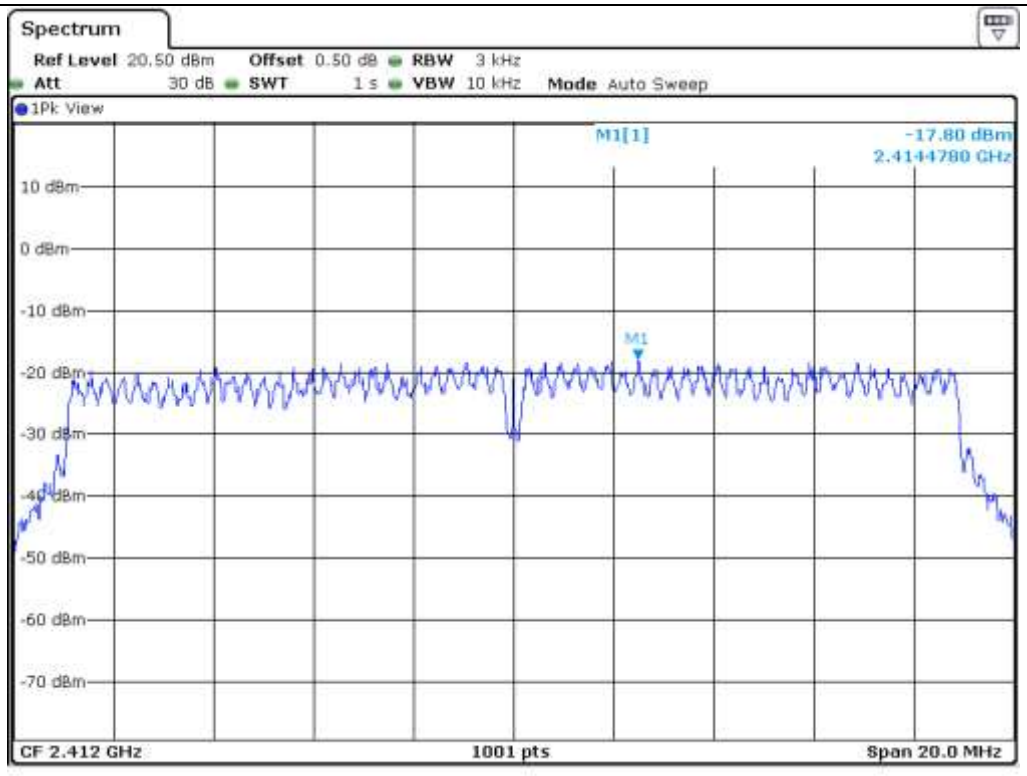
-. Test Result : Pass

-. Operating Condition : Continuous transmitting mode

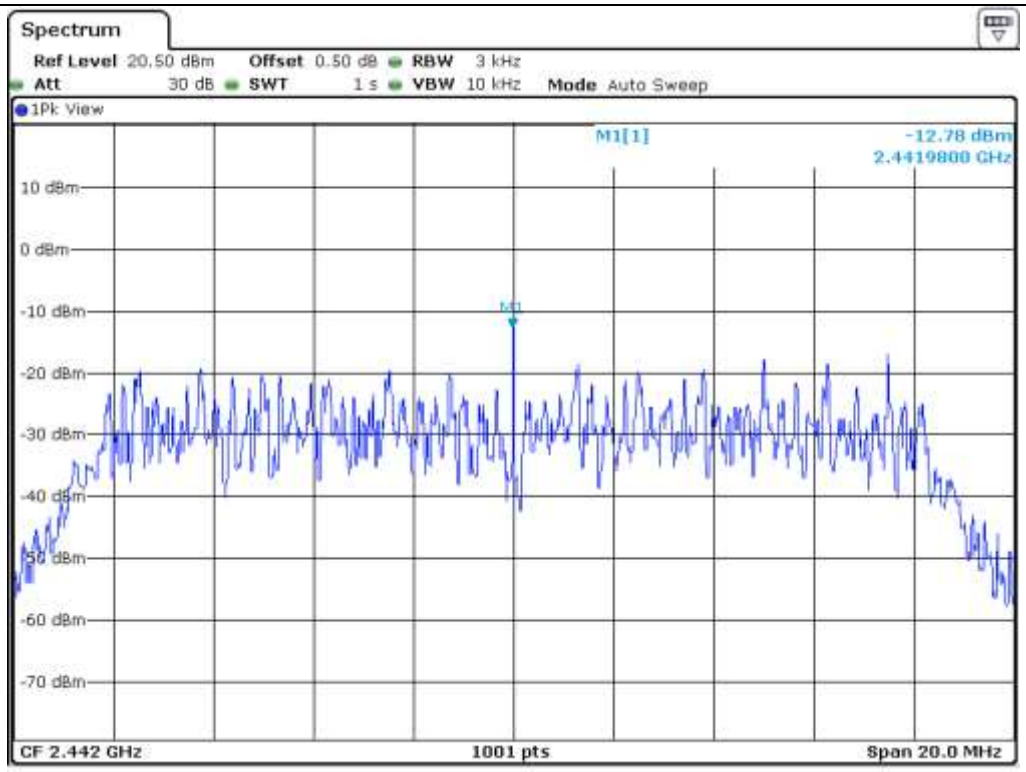
CHANNEL	FREQUENCY(MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412.00	-17.80	8.00	25.80
Middle	2 442.00	-12.78	8.00	20.78
High	2 462.00	-17.12	8.00	25.12

Remark. Margin = Limit – Measured value

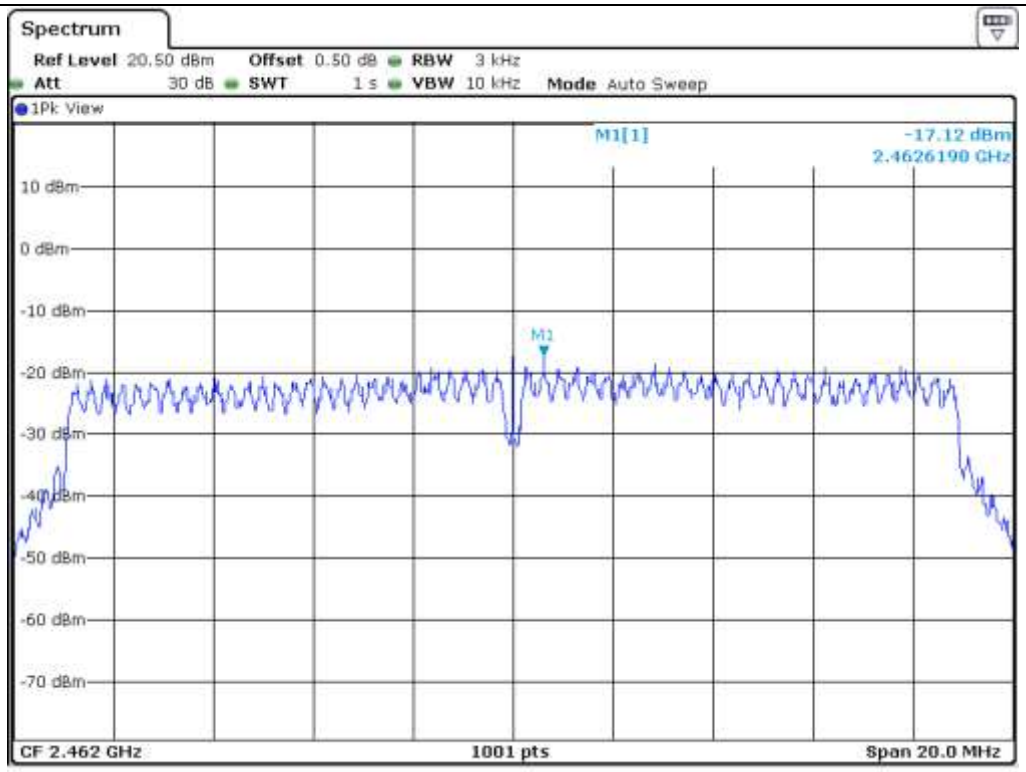
Tested by: Hyung-Kwon, Oh / Engineer



Low Channel



Middle Channel



High Channel

11.6.3 Test data for Antenna 2

-. Test Date : March 21, 2017

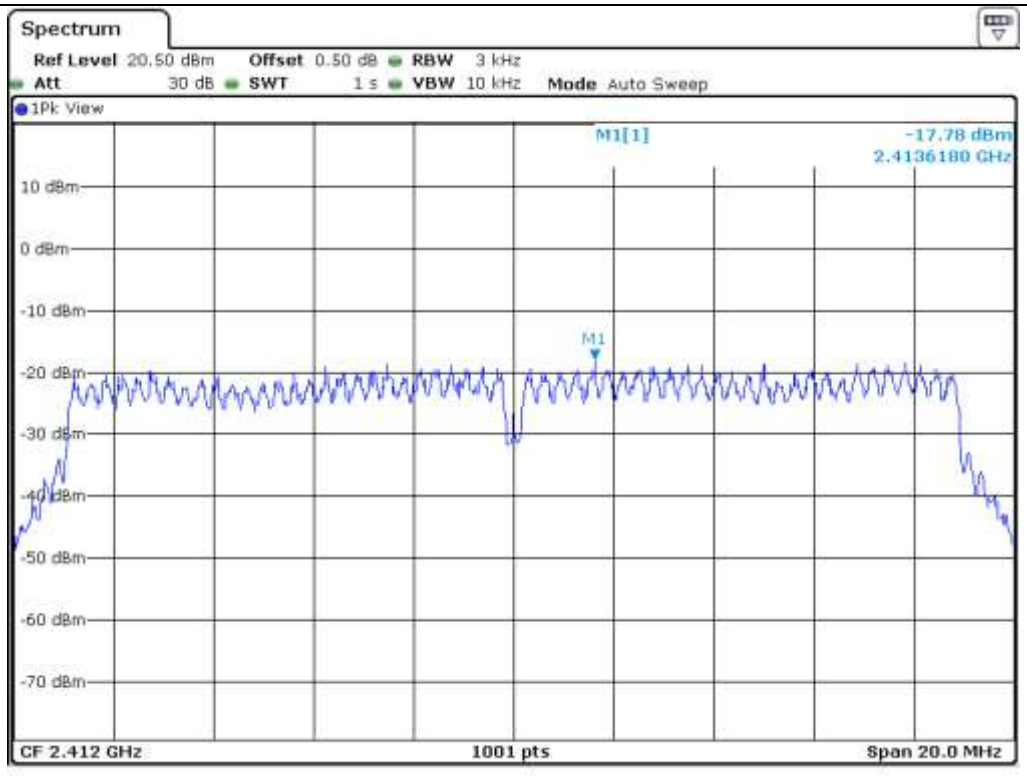
-. Test Result : Pass

-. Operating Condition : Continuous transmitting mode

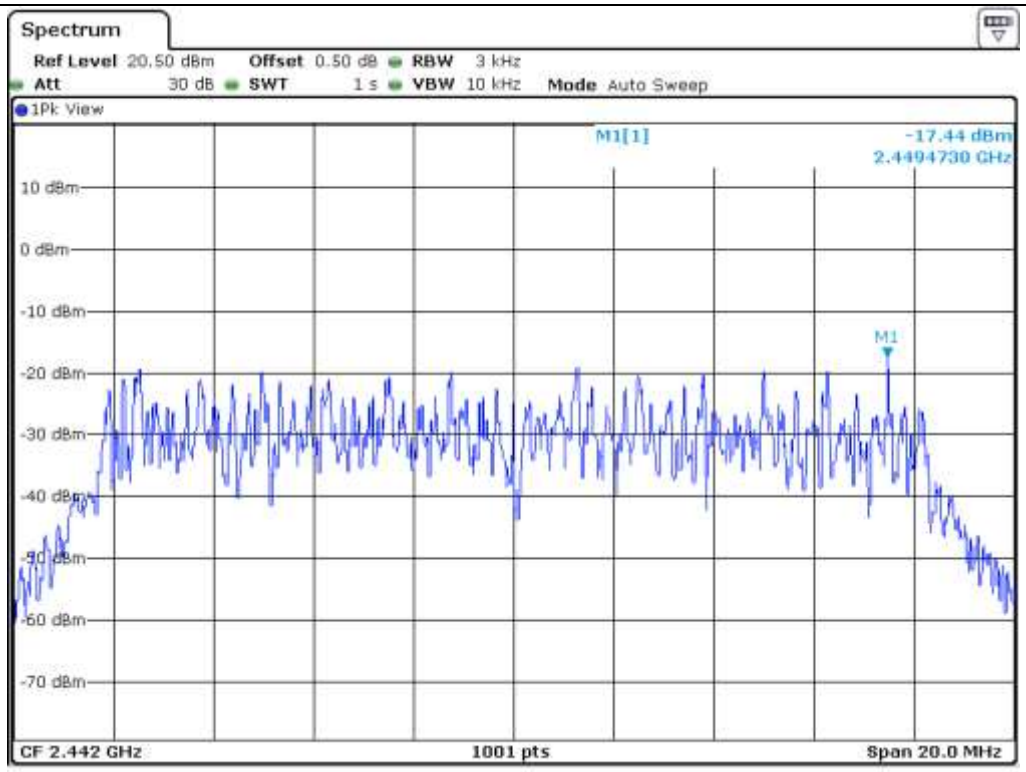
CHANNEL	FREQUENCY(MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412.00	-17.78	8.00	25.78
Middle	2 442.00	-17.44	8.00	25.44
High	2 462.00	-18.61	8.00	26.61

Remark. Margin = Limit – Measured value

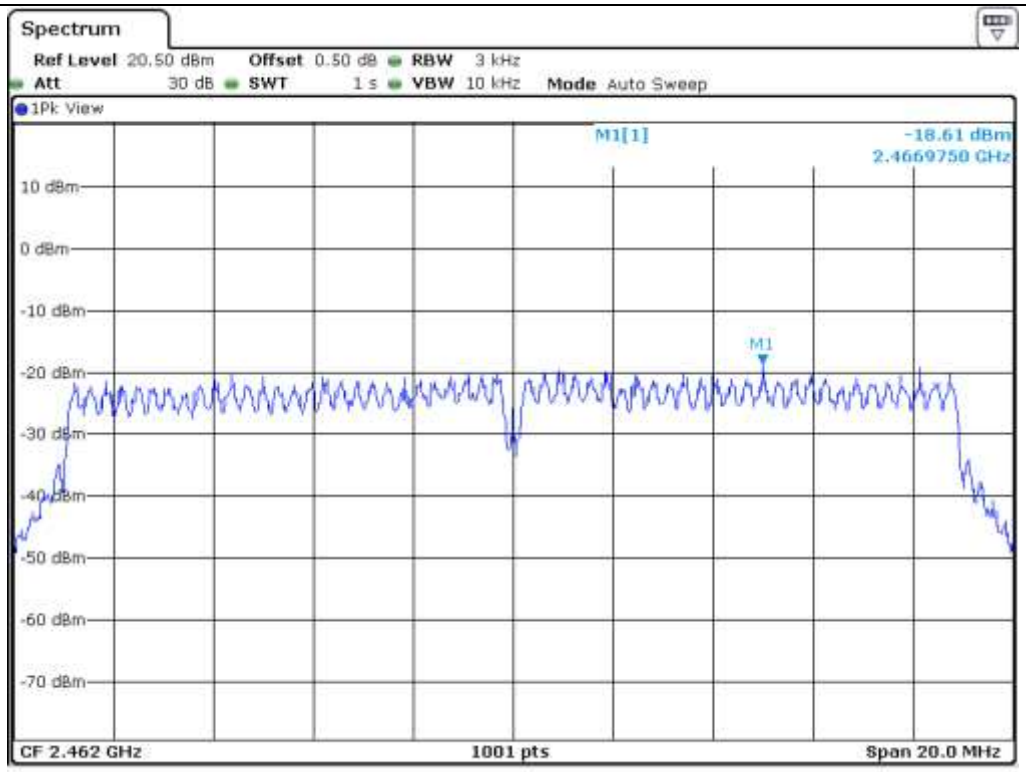
Tested by: Hyung-Kwon, Oh / Engineer



Low Channel



Middle Channel



High Channel

11.6.4 Test data for Multiple transmit

-. Test Date : March 21, 2017

-. Test Result : Pass

-. Operating Condition : Continuous transmitting mode

CHANNEL	FREQUENCY(MHz)	CALCULATED POWER (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412.00	-13.27	7.63	20.90
Middle	2 442.00	-7.73	7.63	15.36
High	2 462.00	-13.54	7.63	21.17

Remark 1 : Margin = Limit – Measured value

Remark 2 : Calculated Power Density = $10\log(10^{(\text{Antenna 0 Power Density}/10)}+10^{(\text{Antenna 1 Power Density}/10)}+10^{(\text{Antenna 2 Power Density}/10)})$

Tested by: Hyung-Kwon, Oh / Engineer

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

11.7 Test data for 802.11n_HT40 WLAN Mode

11.7.1 Test data for Antenna 0

-. Test Date : March 21, 2017

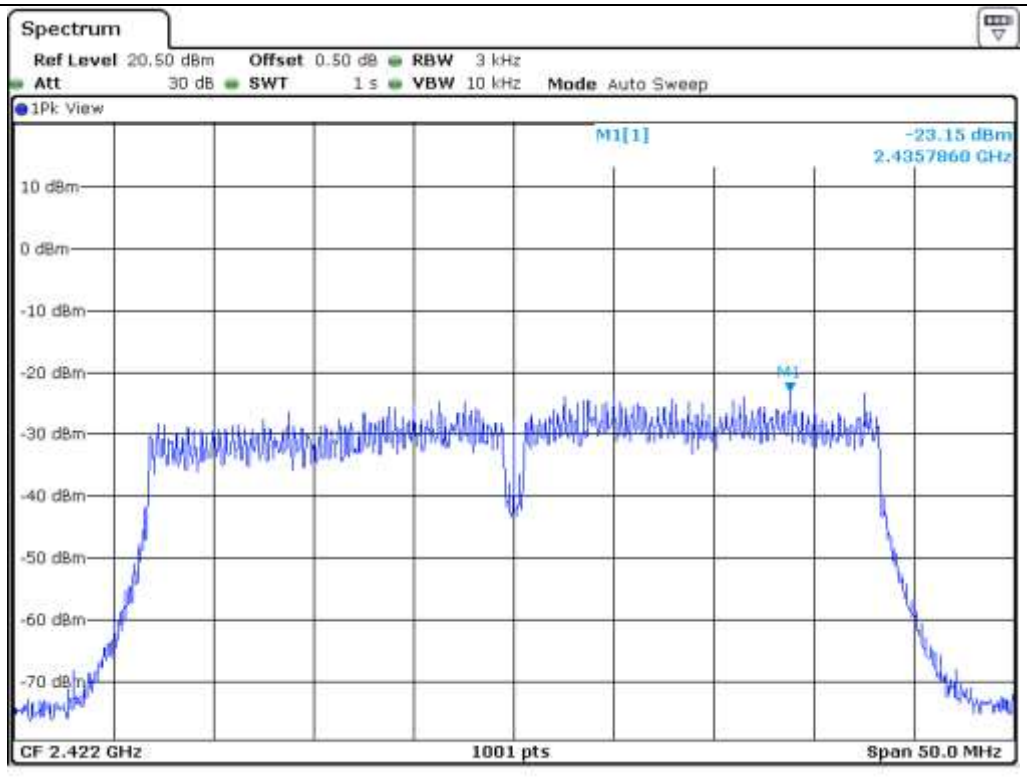
-. Test Result : Pass

-. Operating Condition : Continuous transmitting mode

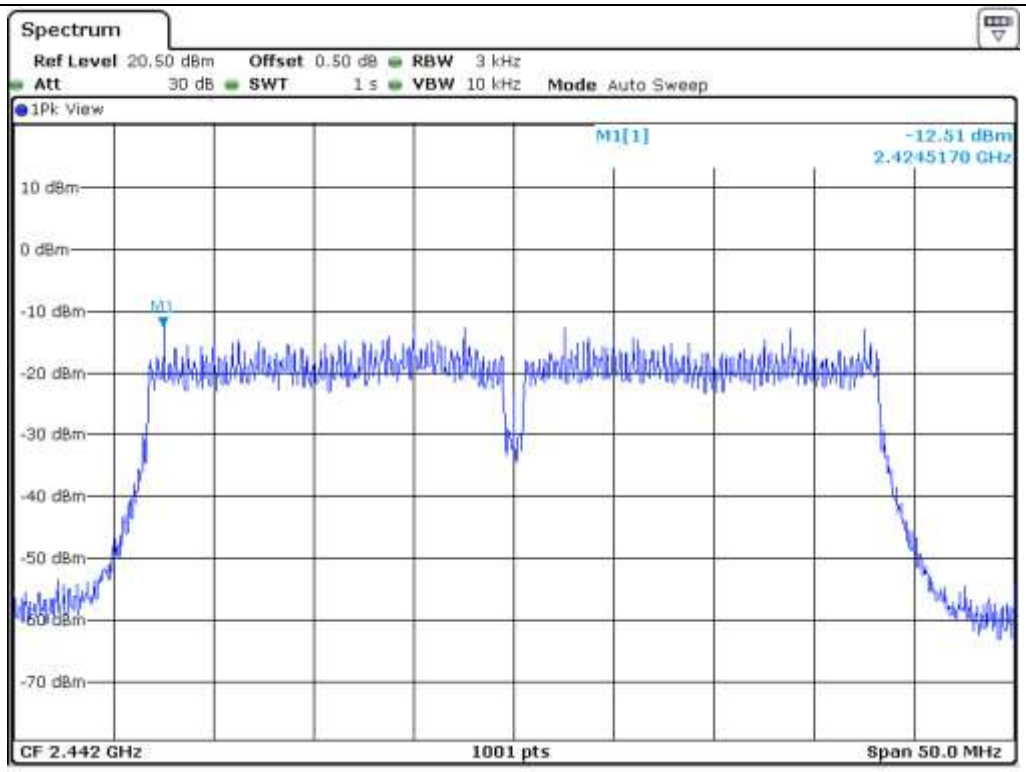
CHANNEL	FREQUENCY(MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 422.00	-23.15	8.00	31.15
Middle	2 442.00	-12.51	8.00	20.51
High	2 452.00	-25.85	8.00	33.85

Remark. Margin = Limit – Measured value

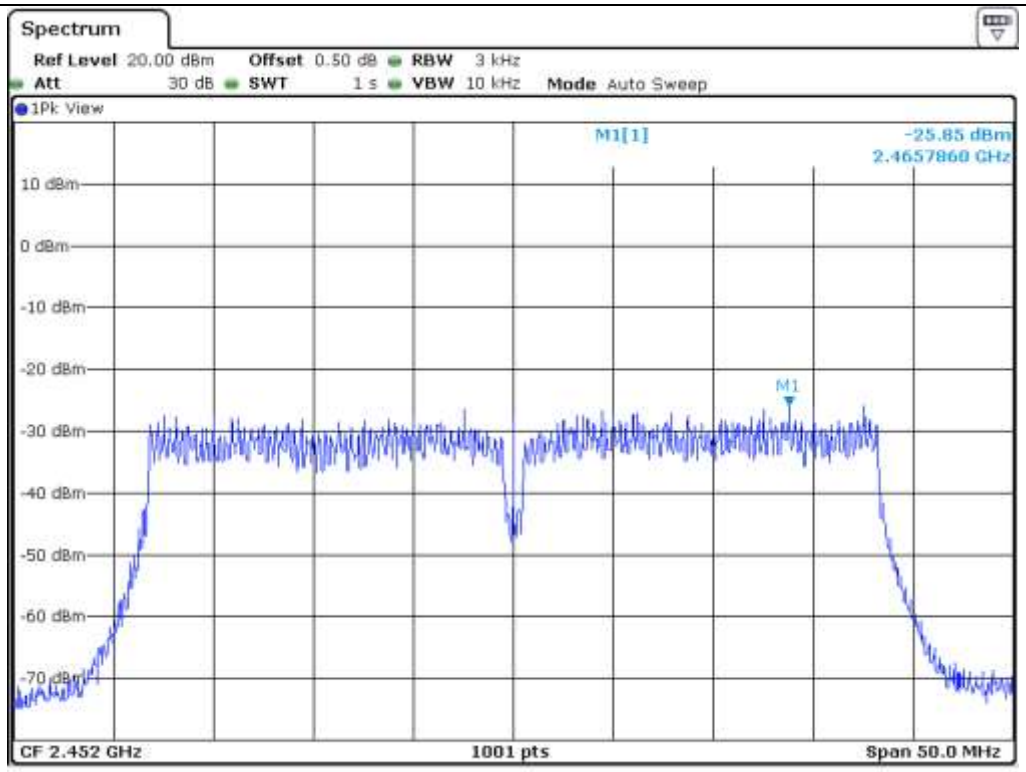
Tested by: Hyung-Kwon, Oh / Engineer



Low Channel



Middle Channel



High Channel

11.7.2 Test data for Antenna 1

-. Test Date : March 21, 2017

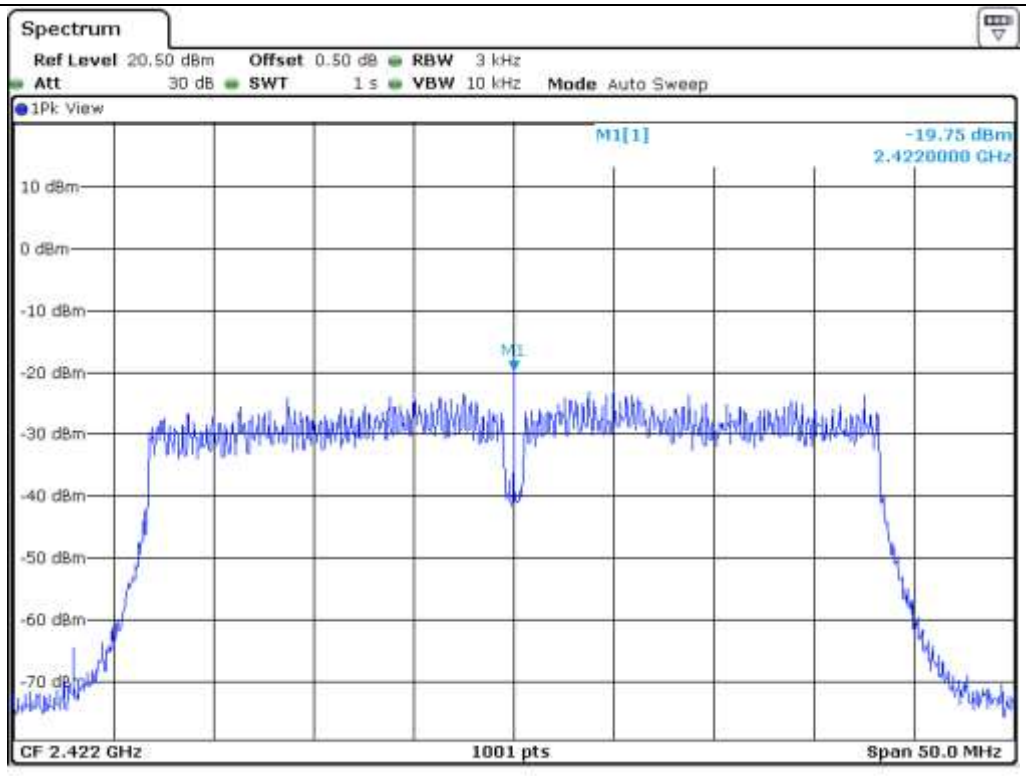
-. Test Result : Pass

-. Operating Condition : Continuous transmitting mode

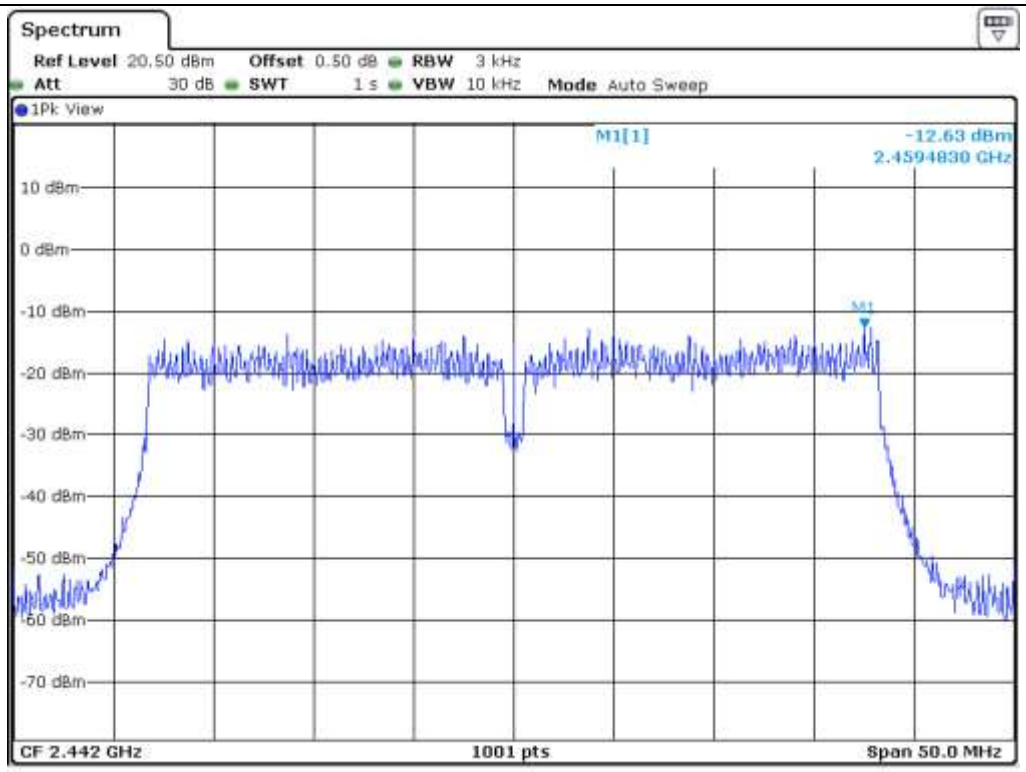
CHANNEL	FREQUENCY(MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 422.00	-19.75	8.00	27.75
Middle	2 442.00	-12.63	8.00	20.63
High	2 452.00	-19.88	8.00	27.88

Remark. Margin = Limit – Measured value

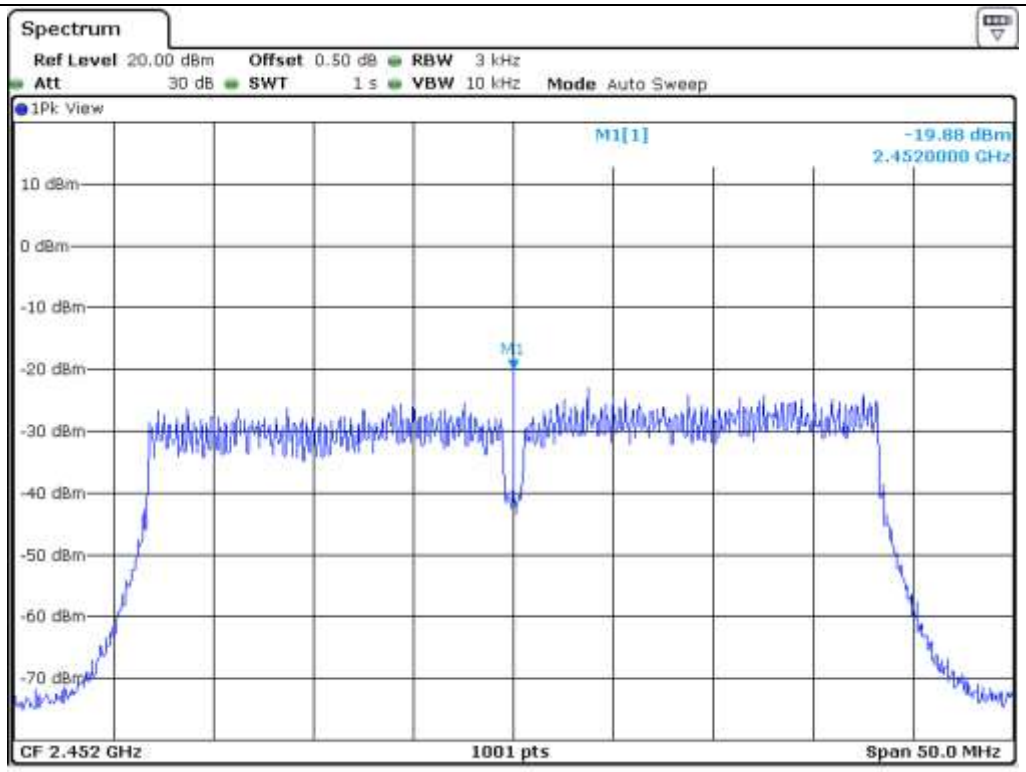
Tested by: Hyung-Kwon, Oh / Engineer



Low Channel



Middle Channel



High Channel

11.7.3 Test data for Antenna 2

-. Test Date : March 21, 2017

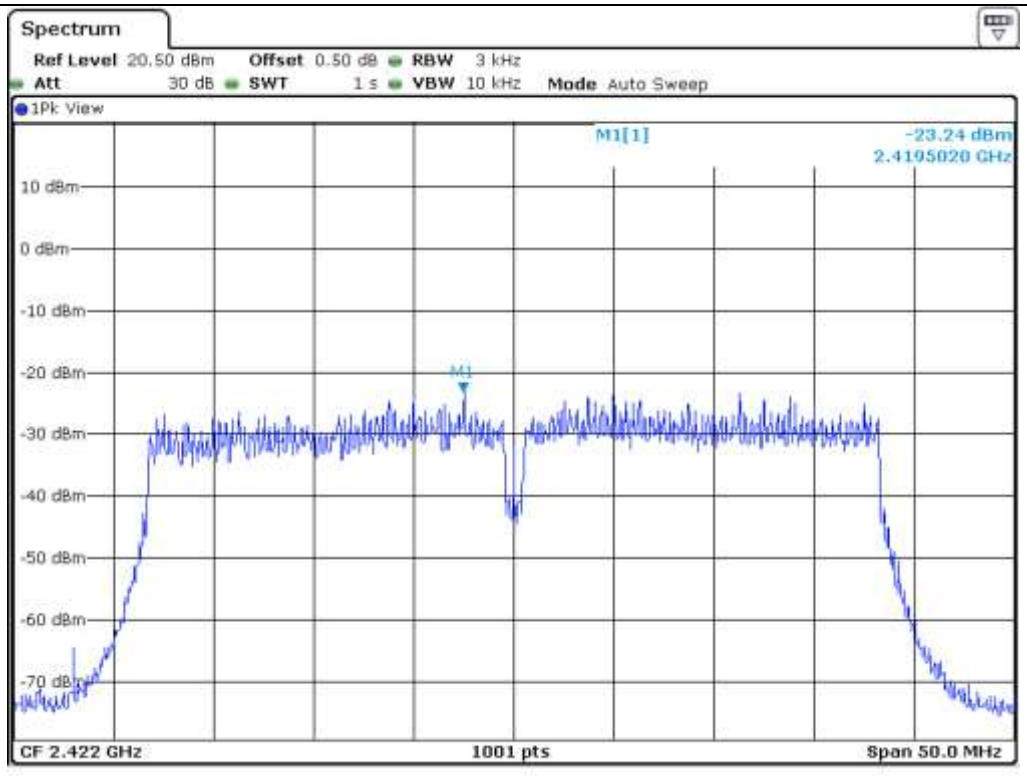
-. Test Result : Pass

-. Operating Condition : Continuous transmitting mode

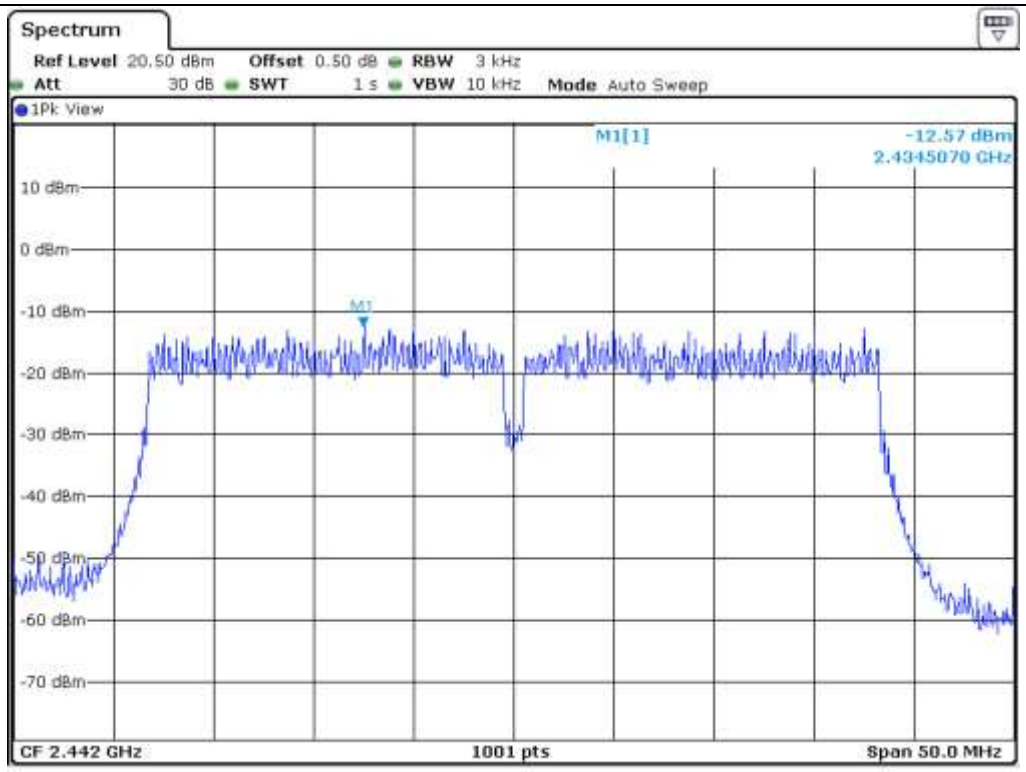
CHANNEL	FREQUENCY(MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 422.00	-23.24	8.00	31.24
Middle	2 442.00	-12.57	8.00	20.57
High	2 452.00	-25.75	8.00	33.75

Remark. Margin = Limit – Measured value

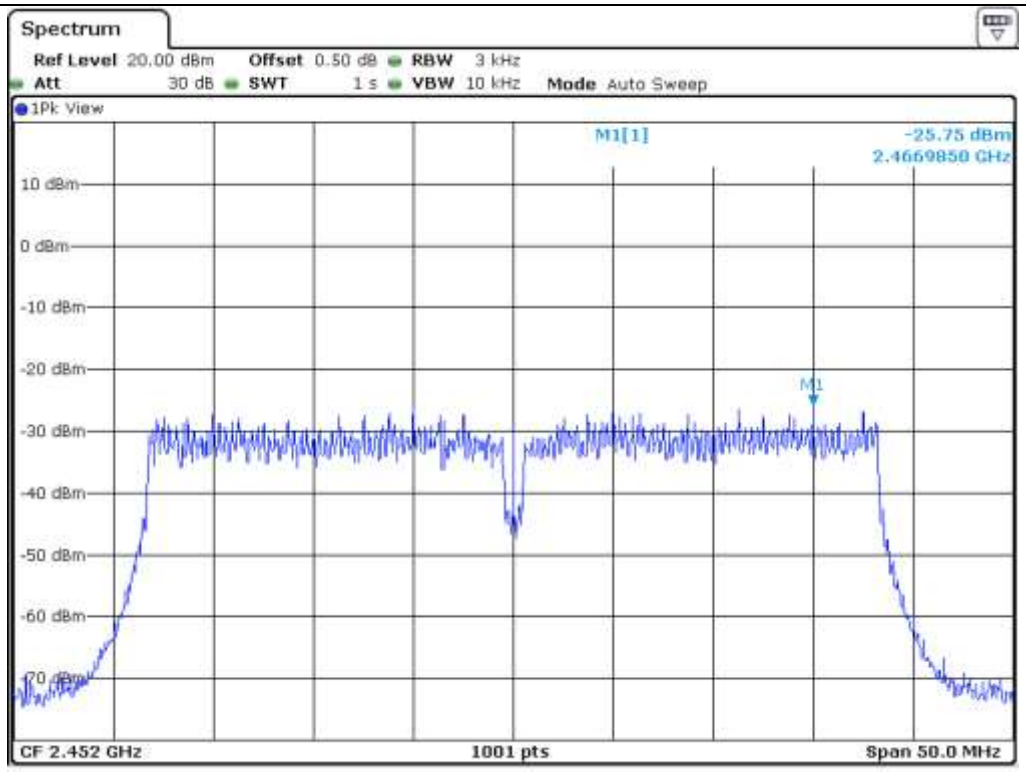
Tested by: Hyung-Kwon, Oh / Engineer



Low Channel



Middle Channel



High Channel

11.7.4 Test data for Multiple transmit

-. Test Date : March 21, 2017

-. Test Result : Pass

-. Operating Condition : Continuous transmitting mode

CHANNEL	FREQUENCY(MHz)	CALCULATED POWER (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 422.00	-16.95	7.63	24.58
Middle	2 442.00	-7.80	7.63	15.43
High	2 452.00	-18.09	7.63	25.72

Remark 1 : Margin = Limit – Measured value

Remark 2 : Calculated Power Density = $10\log(10^{(\text{Antenna 0 Power Density}/10)}+10^{(\text{Antenna 1 Power Density}/10)}+10^{(\text{Antenna 2 Power Density}/10)})$

Tested by: Hyung-Kwon, Oh / Engineer

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

12. DUTY CYCLE

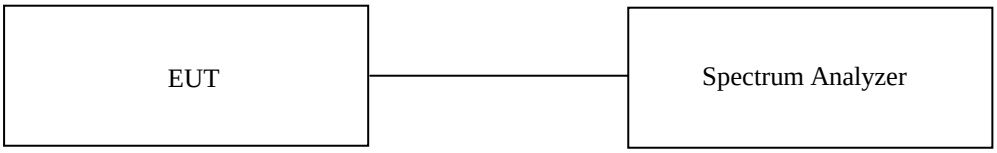
12.1 Operating environment

Temperature : (24 ~ 25) ℃

Relative humidity : (45 ~ 46) % R.H.

12.2 Test set-up

The zero-span mode on a spectrum analyzer or EMI receiver, if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the on and off times of the transmitted signal. Set the center frequency of the instrument to the center frequency of the transmission. Set RBW ≥ EBW if possible; otherwise, set RBW to the largest available value. Set VBW ≥ RBW. Set detector = peak or average. The zero-span measurement method shall not be used unless both RBW and VBW are > 50/*T*, where *T* is defined in section B)1)a), and the number of sweep points across duration *T* exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring duty cycle shall not be used if *T* ≤ 16.7 microseconds.)



12.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ -	FSV40	Rohde & Schwarz	Signal Analyzer	101009	May. 31, 2016 (1Y)

All test equipment used is calibrated on a regular basis.

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

12.4 Test data for Worst case

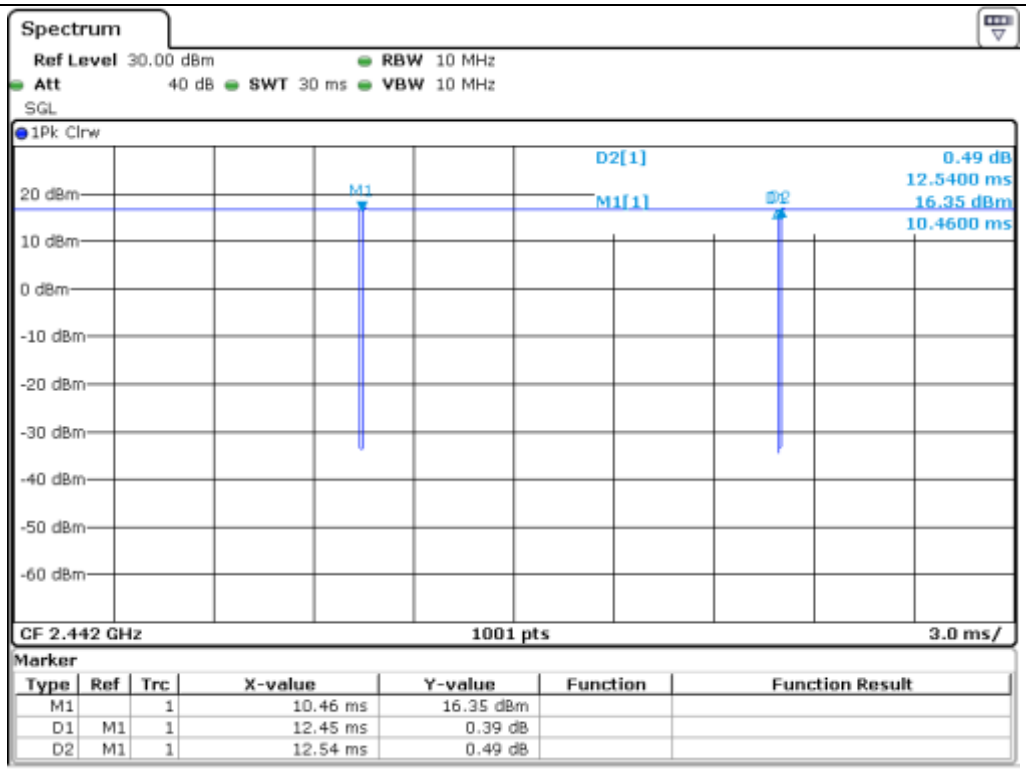
-. Test Date : March 21, 2017

-. Channel : Middle

MODE	Date Rate (Mbps)	T_{ON} (ms)	T_{TOTAL} (ms)	DUTY	FACTOR (dB)
802.11b	1.0	12.45	12.54	0.992 8	0.031 3
802.11g	6.0	12.44	12.53	0.992 8	0.031 3
802.11n_HT20	6.5	12.45	12.51	0.995 2	0.020 9
802.11n_HT40	13.5	12.44	12.52	0.993 6	0.027 8

Remark: Duty Cycle = T_{ON}/T_{TOTAL} and Duty Cycle Factor = 10*log(1/Duty Cycle)

Tested by: Hyung-Kwon, Oh / Engineer



802.11b MODE

12.5 Test data

-. Test Date : March 21, 2017

-. Channel : Middle

MODE	Date Rate (Mbps)	T_{ON} (ms)	T_{TOTAL} (ms)	DUTY	FACTOR (dB)
802.11b	1.0	12.45	12.54	0.992 8	0.031 3
	2.0	12.02	12.26	0.980 4	0.085 9
	5.5	11.87	12.03	0.986 7	0.058 1
	11.0	11.67	11.85	0.984 8	0.066 5
802.11g	6.0	12.44	12.53	0.992 8	0.031 3
	9.0	12.10	12.26	0.986 9	0.057 1
	12.0	11.95	12.15	0.983 5	0.072 1
	18.0	11.76	11.95	0.984 1	0.069 6
	24.0	11.54	11.76	0.981 3	0.082 0
	36.0	11.36	11.54	0.984 4	0.068 3
	48.0	11.28	11.47	0.983 4	0.072 5
	54.0	11.20	11.36	0.985 9	0.061 6
802.11n_HT20	6.5	12.45	12.51	0.995 2	0.020 9
	13.0	12.03	12.25	0.982 0	0.078 7
	19.5	11.87	12.03	0.986 7	0.058 1
	26.0	11.74	11.95	0.982 4	0.077 0
	39.0	11.47	11.61	0.987 9	0.052 7
	52.0	11.38	11.52	0.987 8	0.053 1
	58.5	11.30	11.46	0.986 0	0.061 1
	65.0	11.25	11.37	0.989 4	0.046 1
802.11n_HT40	13.5	12.44	12.52	0.993 6	0.027 8
	27.0	11.80	12.00	0.983 3	0.073 0
	40.5	11.79	11.95	0.986 6	0.058 5
	54.0	11.67	11.85	0.984 8	0.066 5
	81.0	11.43	11.63	0.982 8	0.075 3
	108.0	11.34	11.49	0.986 9	0.057 1
	121.5	11.30	11.47	0.985 2	0.064 8
	135.0	11.22	11.39	0.985 1	0.065 3

Remark: Duty Cycle = T_{ON}/T_{TOTAL} and Duty Cycle Factor = 10*log(1/Duty Cycle)

Tested by: Hyung-Kwon, Oh / Engineer

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

13. RADIATED EMISSION TEST

13.1 Operating environment

Temperature : (24 ~ 25) ℃

Relative humidity : (45 ~ 46) % R.H.

13.2 Test set-up

The radiated emissions measurements were on the 3 m, open-field test site. 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 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 equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ -	FSV40	Rohde & Schwarz	Signal Analyzer	101009	May 31, 2016 (1Y)
■ -	ESU	Rohde & Schwarz	EMI Test Receiver	100261	Apr. 06, 2016 (1Y)
■ -	310N	Sonoma Instrument	Pre-Amplifier	312544	Apr. 05, 2016 (1Y)
■ -	SCU-18	Rohde & Schwarz	Pre-Amplifier	102209	May 31, 2016 (1Y)
■ -	DT3000-3t	Innco System	Turn Table	DT3000/093	N/A
■ -	MA-4000XPET	Innco System	Antenna Master	MA4000/509	N/A
■ -	VULB9163	Schwarzbeck	TRILOG Broadband Antenna	9163-421	Apr. 15, 2016 (1Y)
■ -	BBHA9120D	Schwarzbeck	Horn Antenna	BBHA9120D295	Aug. 31, 2015 (2Y)
■ -	BBHA9170	Schwarzbeck	Horn Antenna	BBHA9170178	Aug. 31, 2015 (2Y)

All test equipment used is calibrated on a regular basis.

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

13.4 Test data for 802.11b WLAN Mode and 802.11a RLAN Mode

13.4.1 Test data for 30 MHz ~ 1 GHz

Humidity Level : (45 ~ 46) % R.H. Temperature: (24 ~ 25) ℃

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

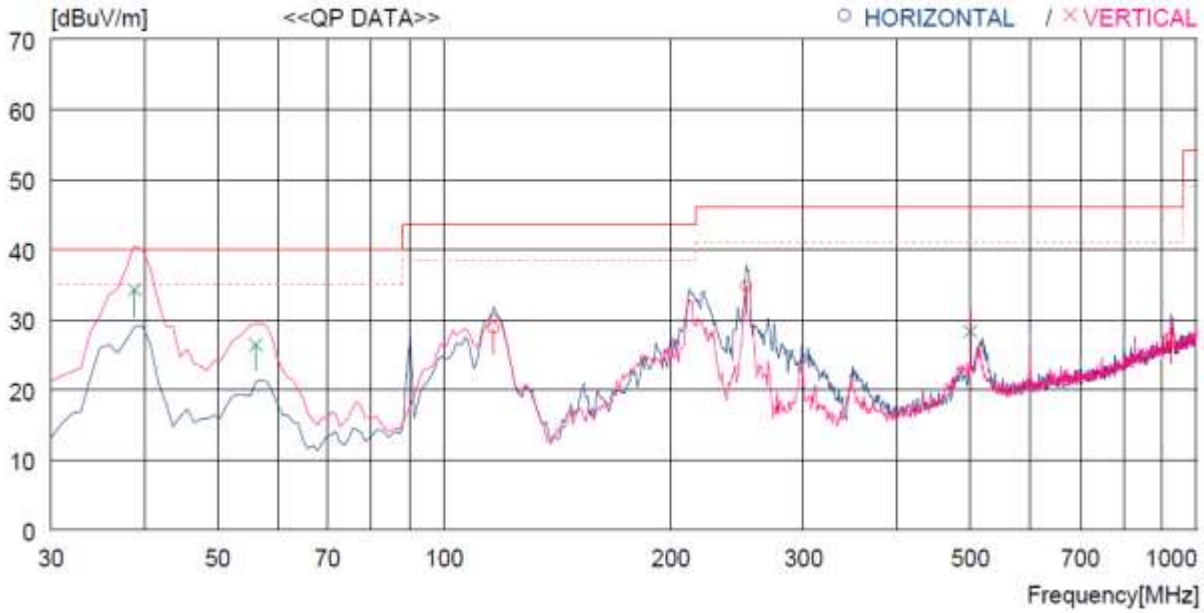
Result : PASSED

EUT : AWG (Advanced Wireless Gateway) Date: March 22, 2017

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

Note: 2.4 GHz / 5 GHz operating mode were tested, but the worst data were recorded.

(Both 802.11b WLAN Mode and 802.11a RLAN Mode)



No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal ------										
1	116.330	47.7	10.8	3.3	33.1	28.7	43.5	14.8	300	36
2	252.130	51.2	12.4	4.1	33.0	34.7	46.0	11.3	100	0
3	923.358	29.2	22.2	8.5	32.5	27.4	46.0	18.6	100	0
----- Vertical ------										
4	38.730	52.3	13.1	1.8	33.0	34.2	40.0	5.8	100	359
5	56.190	43.8	13.5	2.1	33.0	26.4	40.0	13.6	100	359
6	500.451	37.6	17.0	7.0	33.3	28.3	46.0	17.7	100	359

Tested by: Hyung-Kwon, Oh / Engineer

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

13.4.2 Test data for Below 30 MHz

-. Test Date : March 22, 2017

-. 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

-.Operating mode : Transmitting mode

Frequency (MHz)	Reading (dBµV)	Ant. Pol. (H/V)	Ant. Height (m)	Angle (°)	Ant. Factor (dB/m)	Cable Loss	Emission Level(dBµV/m)	Limits (dBµV/m)	Margin (dB)
It was not observed any emissions from the EUT.									

13.4.3 Test data for above 1 GHz

-. Test Date : March 22, 2017

-. Resolution bandwidth : 1 MHz for Peak and Average Mode

-. Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode

-. Frequency range : 1 GHz ~ 26.5 GHz

-. Measurement distance : 3 m

-.Operating mode : Transmitting mode

Frequency (MHz)	Reading (dBµV)	Ant. Pol. (H/V)	Ant. Height (m)	Angle (°)	Ant. Factor (dB/m)	Cable Loss	Emission Level(dBµV/m)	Limits (dBµV/m)	Margin (dB)
It was not observed any emissions from the EUT.									

Tested by: Hyung-Kwon, Oh / Engineer

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

14. CONDUCTED EMISSION TEST

14.1 Operating environment

Temperature : 28 ℃

Relative humidity : 45 % 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 Ω / 50 μH + 5 Ω 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 equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal. (Interval)
■ -	ESPI	Rohde & Schwarz	Test Receiver	101012	Nov. 02, 2015 (1Y)
□ -	ESHS10	Rohde & Schwarz	Test Receiver	834467/007	Apr. 05, 2016 (1Y)
□ -	NSLK8128	Schwarzbeck	AMN	8128-216	Apr. 06, 2016 (1Y)
■ -	NSLK8126	Schwarzbeck	AMN	8126-404	Apr. 05, 2016 (1Y)
□ -	3825/2	EMCO	AMN	9109-1869	Apr. 06, 2016 (1Y)
■ -	3825/2	EMCO	AMN	9109-1867	Apr. 06, 2016 (1Y)

All test equipment used is calibrated on a regular basis.

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

14.4 Test data for 802.11b WLAN Mode and 802.11a RLAN Mode

-. Test Date : April 01, 2017

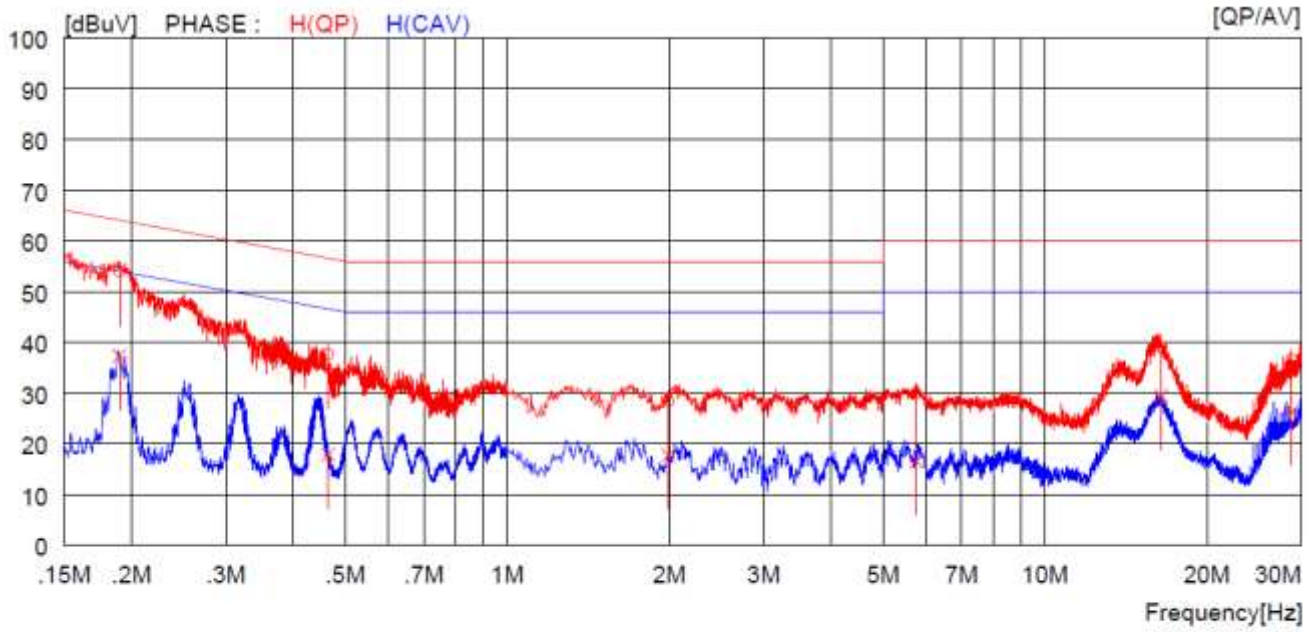
-. Resolution bandwidth : 9 kHz

-. Frequency range : 0.15 MHz ~ 30 MHz

-. Tested Line : HOT LINE

Note: 2.4 GHz / 5 GHz operating mode were tested, but the worst data were recorded.

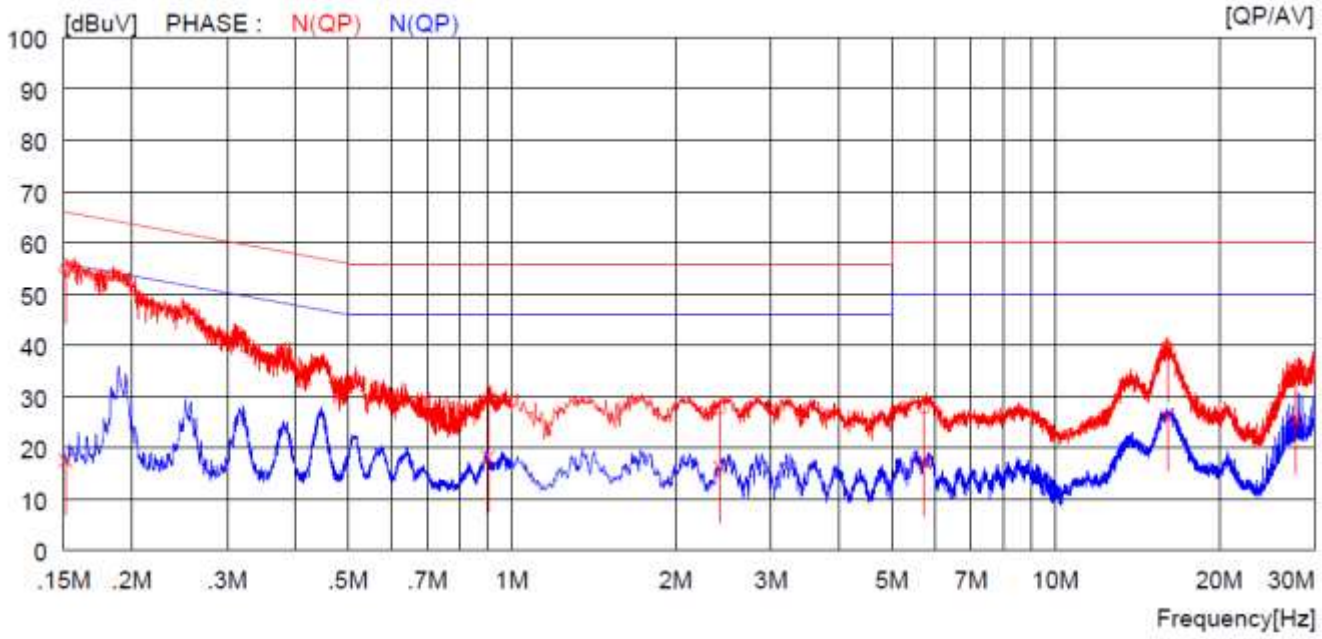
(Both 802.11b WLAN Mode and 802.11a RLAN Mode)



NO	FREQ [MHz]	READING QP [dBuV]	READING AV [dBuV]	C.FACTOR [dB]	RESULT QP [dBuV]	RESULT AV [dBuV]	LIMIT QP [dBuV]	LIMIT AV [dBuV]	MARGIN QP [dBuV]	MARGIN AV [dBuV]	PHASE
1	0.19000	53.8	----	0.1	53.9	----	64.0	----	10.1	----	H(QP)
2	0.46400	37.5	----	0.1	37.6	----	56.6	----	19.0	----	H(QP)
3	1.99200	28.3	----	0.1	28.4	----	56.0	----	27.6	----	H(QP)
4	5.76000	29.8	----	0.1	29.9	----	60.0	----	30.1	----	H(QP)
5	16.46000	38.5	----	0.5	39.0	----	60.0	----	21.0	----	H(QP)
6	28.77000	36.1	----	0.5	36.6	----	60.0	----	23.4	----	H(QP)
7	0.19000	----	37.2	0.1	----	37.3	----	54.0	----	16.7	H(CAV)
8	0.46400	----	17.8	0.1	----	17.9	----	46.6	----	28.7	H(CAV)
9	1.99200	----	17.6	0.1	----	17.7	----	46.0	----	28.3	H(CAV)
10	5.76000	----	16.5	0.1	----	16.6	----	50.0	----	33.4	H(CAV)
11	16.46000	----	29.0	0.5	----	29.5	----	50.0	----	20.5	H(CAV)
12	28.77000	----	25.8	0.5	----	26.3	----	50.0	----	23.7	H(CAV)

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

-. Tested Line : NEUTRAL LINE



NO	FREQ [MHz]	READING QP [dBuV]	READING AV [dBuV]	C.FACTOR [dB]	RESULT QP [dBuV]	RESULT AV [dBuV]	LIMIT QP [dBuV]	LIMIT AV [dBuV]	MARGIN QP [dBuV]	MARGIN AV [dBuV]	PHASE
1	0.15100	54.7	----	0.1	54.8	----	65.9	----	11.1	----	N(QP)
2	0.90400	29.6	----	0.1	29.7	----	56.0	----	26.3	----	N(QP)
3	2.42000	27.5	----	0.1	27.6	----	56.0	----	28.4	----	N(QP)
4	5.73000	27.7	----	0.1	27.8	----	60.0	----	32.2	----	N(QP)
5	16.04000	39.1	----	0.4	39.5	----	60.0	----	20.5	----	N(QP)
6	27.69000	34.9	----	0.5	35.4	----	60.0	----	24.6	----	N(QP)
7	0.15100	----	17.4	0.1	----	17.5	----	55.9	----	38.4	N(CAV)
8	0.90400	----	18.0	0.1	----	18.1	----	46.0	----	27.9	N(CAV)
9	2.42000	----	16.0	0.1	----	16.1	----	46.0	----	29.9	N(CAV)
10	5.73000	----	17.1	0.1	----	17.2	----	50.0	----	32.8	N(CAV)
11	16.04000	----	25.8	0.4	----	26.2	----	50.0	----	23.8	N(CAV)
12	27.69000	----	24.9	0.5	----	25.4	----	50.0	----	24.6	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.

Tested by: Hyung-Kwon, Oh / Engineer

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