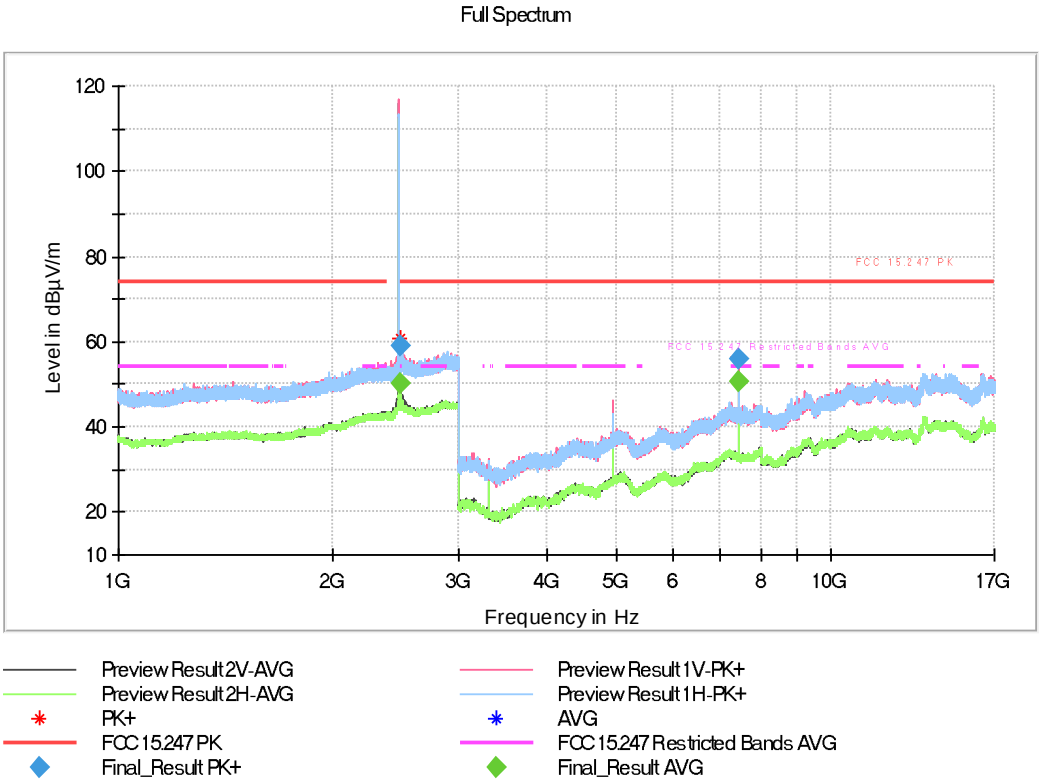
Frequency Range GHz = [1, 17] Equipment Type = Digital Transmission System (DTS)

Modulation = BTLE 5.0 (GFSK 1 Mbit/s) Frequency MHz = 2440.000078

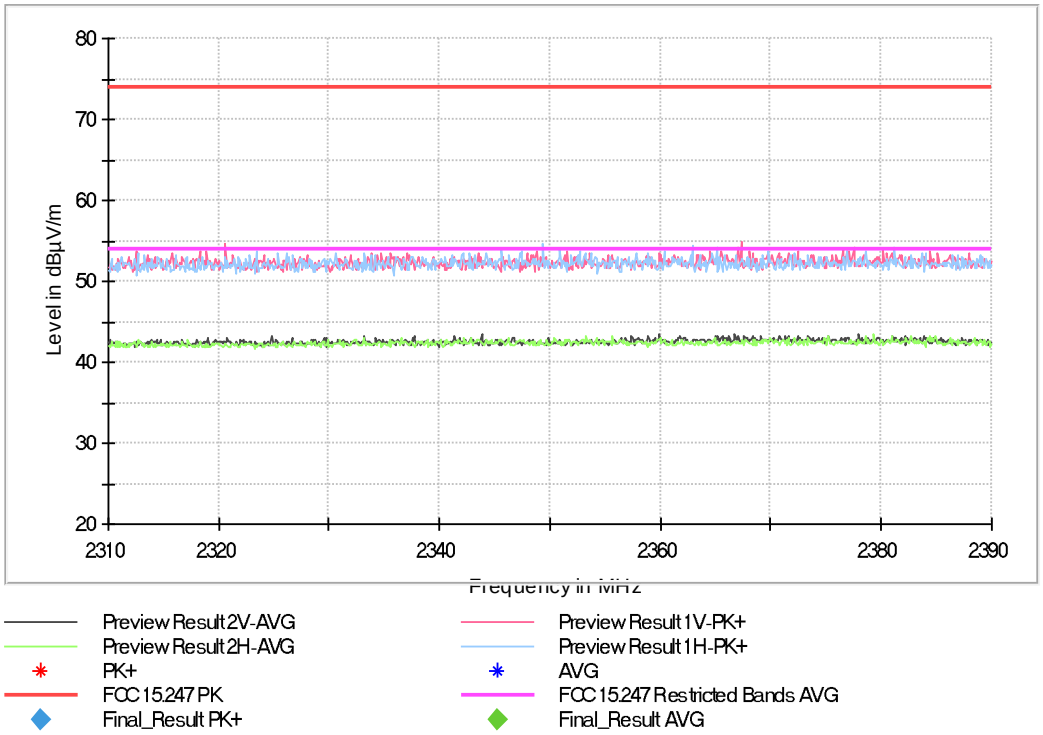
MIMO Mode = SISO Active Port = 1

Images:

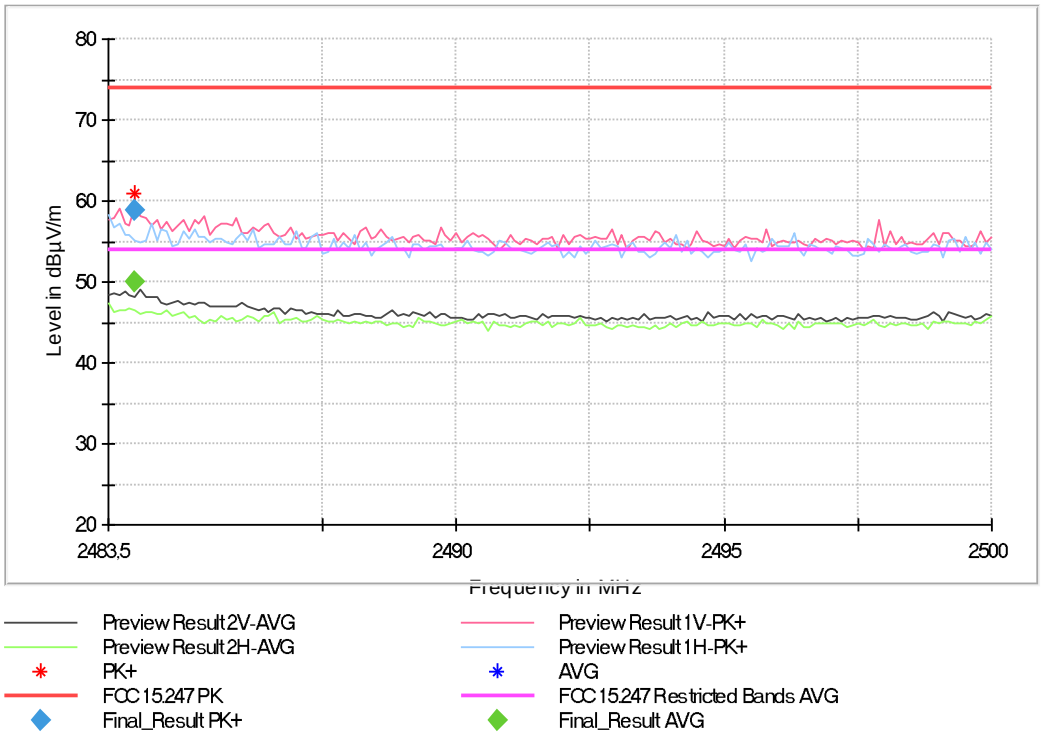


Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
2484.000000	---	50.02	54.00	3.98	1000.000	251.0	V	343.0
2484.000000	58.88	---	74.00	15.12	1000.000	251.0	V	343.0
7432.866667	---	50.79	54.00	3.21	1000.000	236.0	V	288.0
7432.866667	56.09	---	74.00	17.91	1000.000	236.0	V	288.0

Full Spectrum

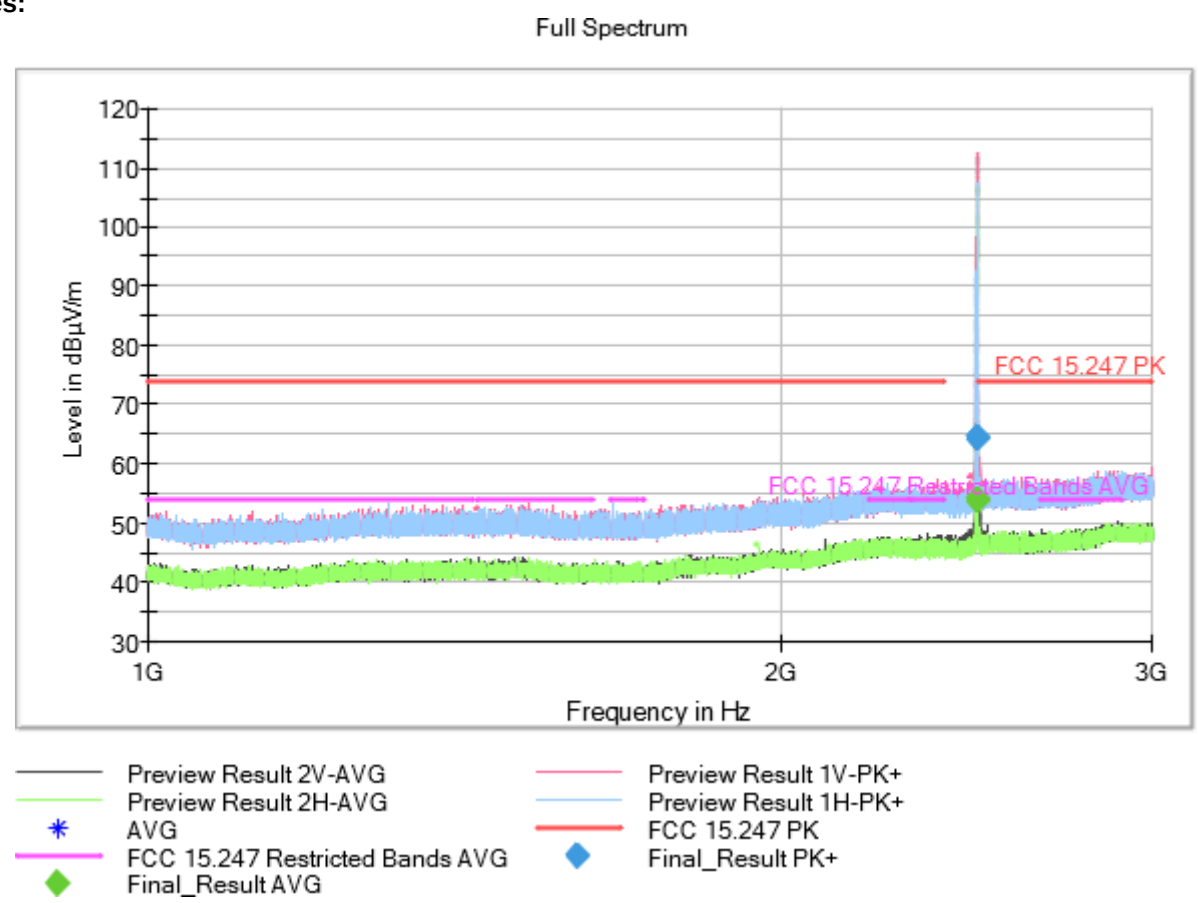


Full Spectrum

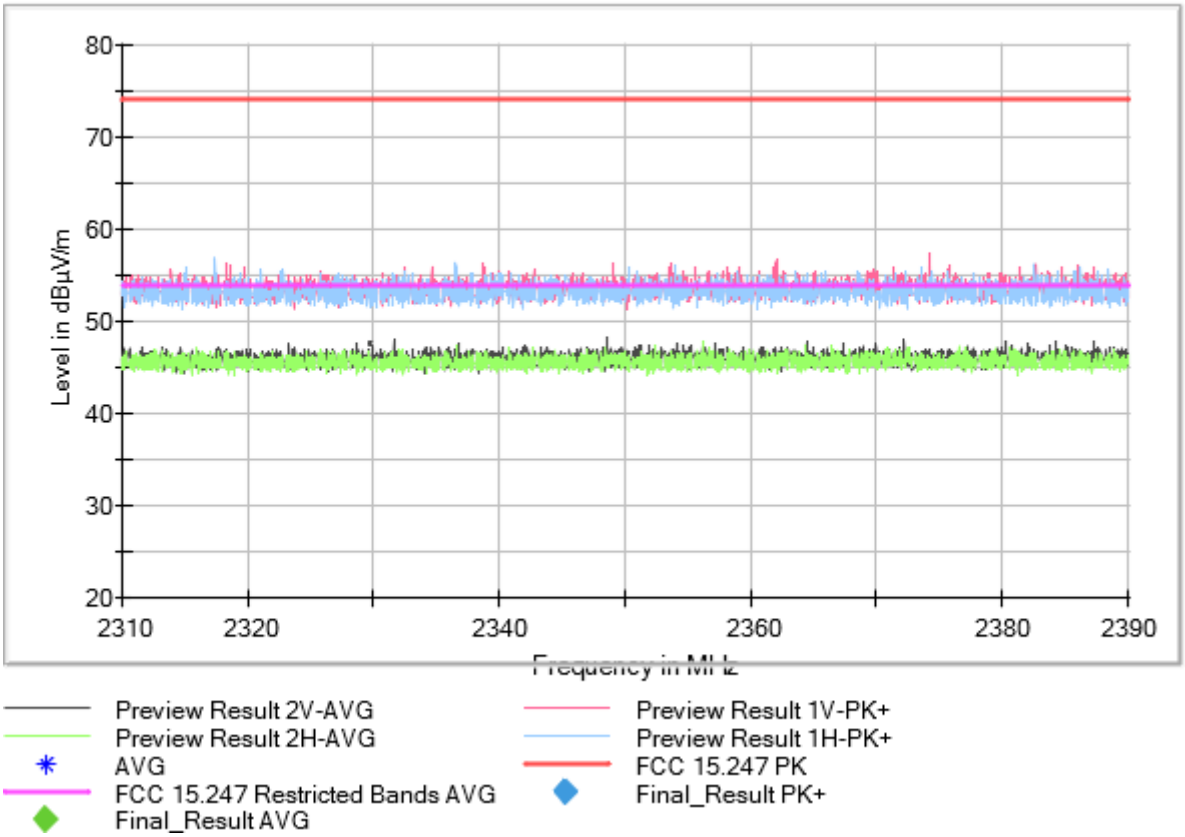


Frequency Range GHz = [1, 3]	Equipment Type = Digital Transmission System (DTS)
Modulation = BTLE 5.0 (GFSK 1 Mbit/s)	Frequency MHz = 2480.00000
MIMO Mode = SISO	Active Port = 1

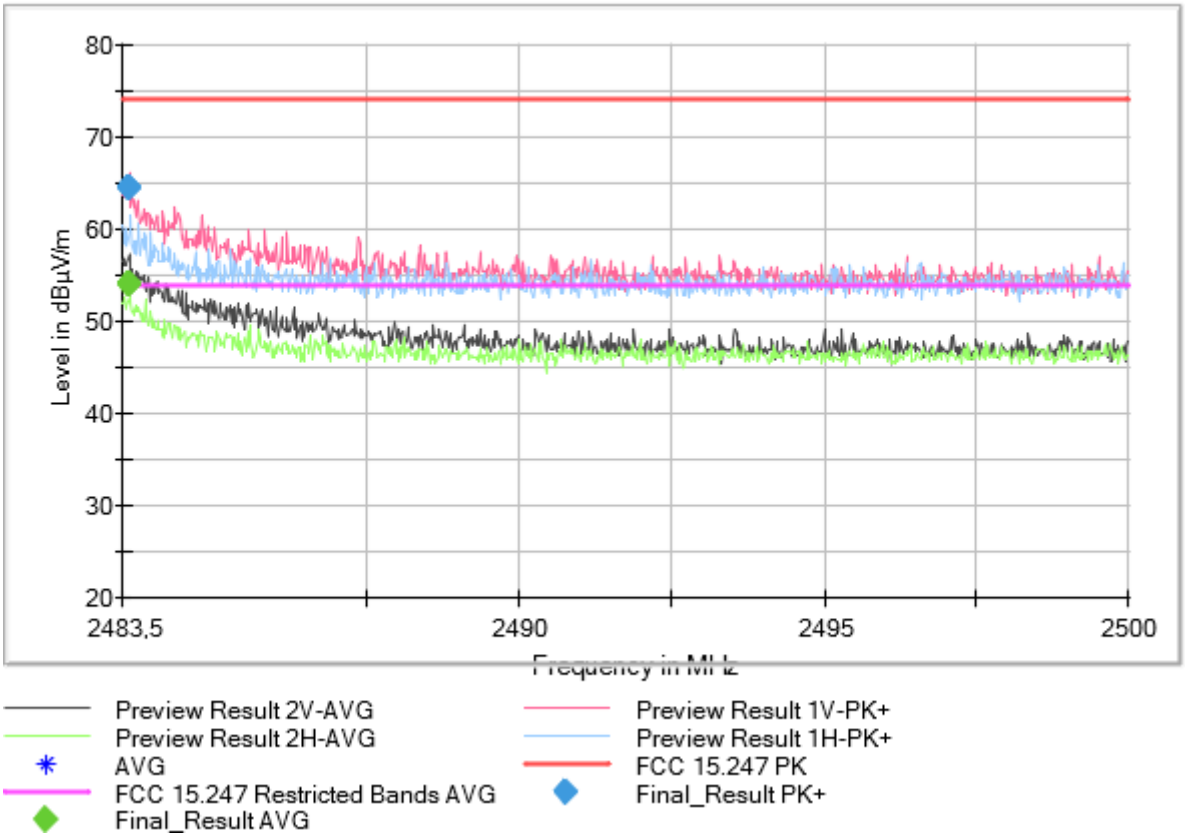
Images:



Full Spectrum

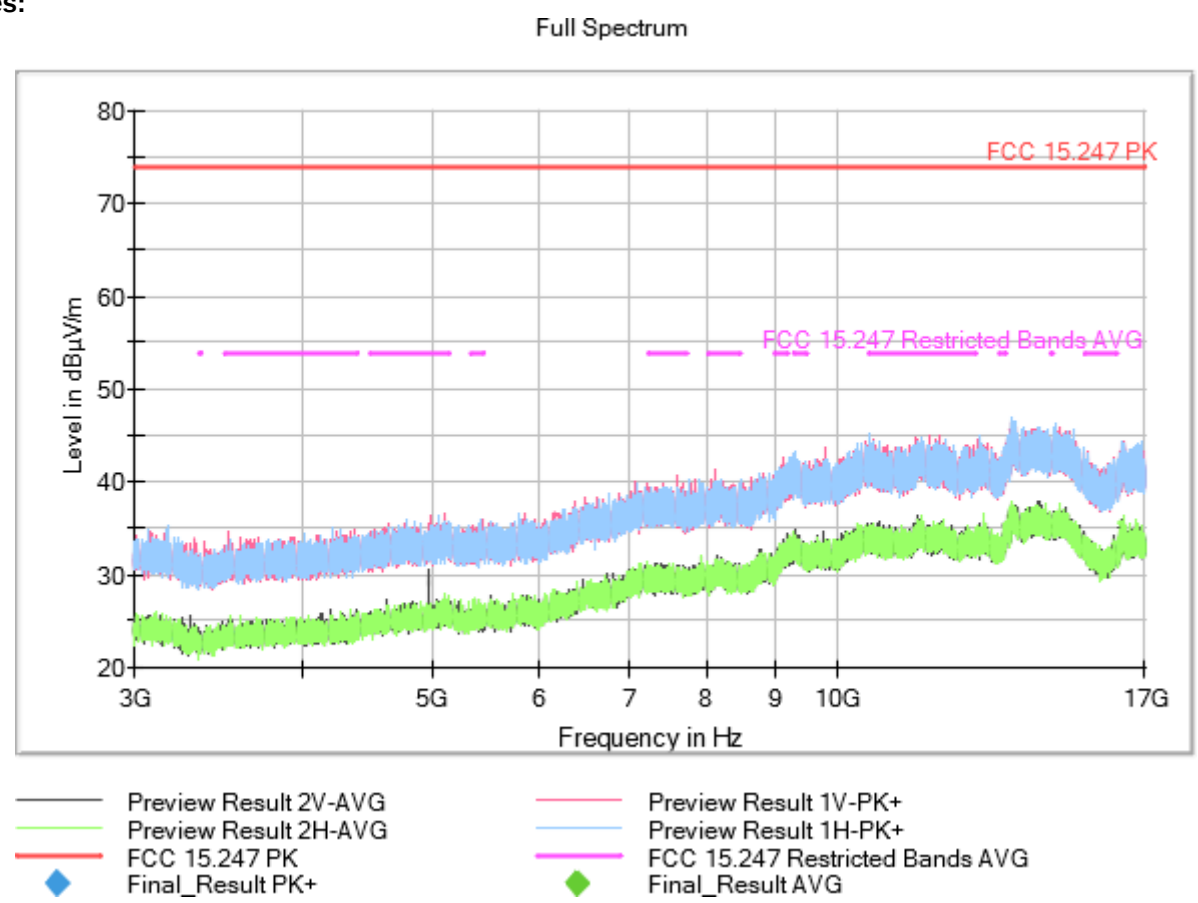


Full Spectrum



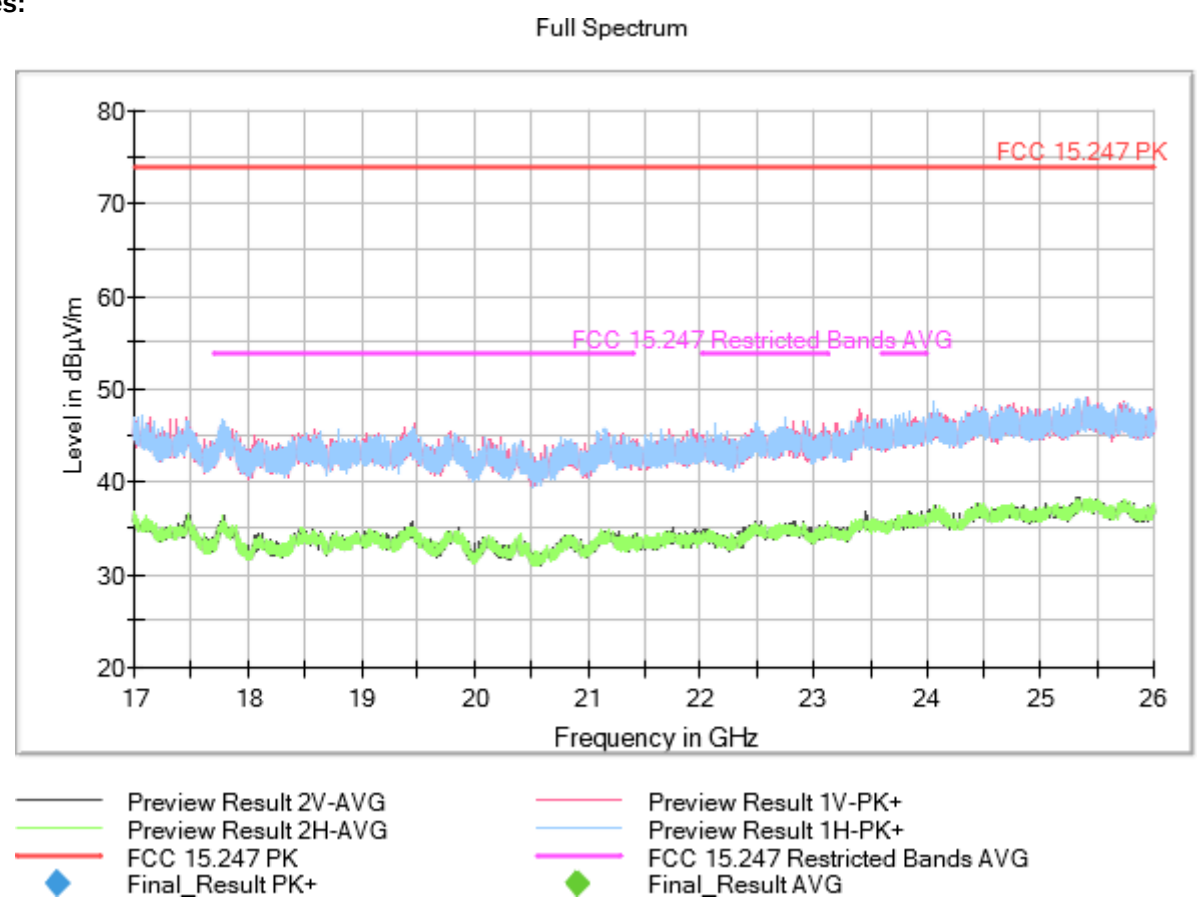
Frequency Range GHz = [3, 17]
Equipment Type = Digital Transmission System (DTS)
Modulation = BTLE 5.0 (GFSK 1 Mbit/s)
Frequency MHz = 2480.00000
MIMO Mode = SISO
Active Port = 1

Images:



Frequency Range GHz = [17, 26]	Equipment Type = Digital Transmission System (DTS)
Modulation = BTLE 5.0 (GFSK 1 Mbit/s)	Frequency MHz = The spurious frequencies detected do not depend on the transmission channel
MIMO Mode = SISO	Active Port = 1

Images:



Results

Modulation: BTLE 5.0 (GFSK 2 Mbit/s)

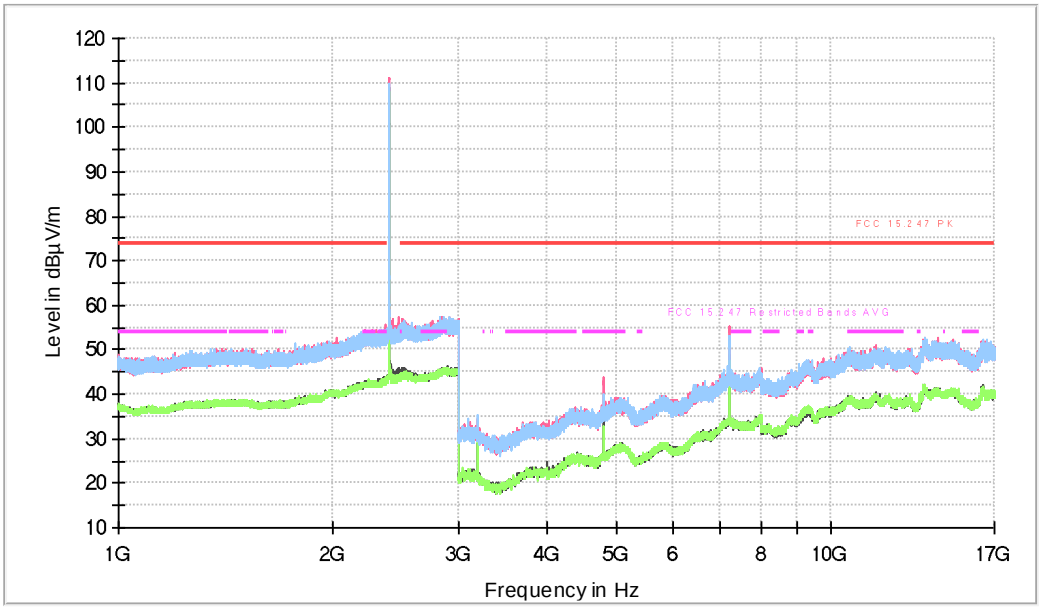
MIMO Mode: SISO

Attachments

Frequency Range GHz = [1, 17]	Equipment Type = Digital Transmission System (DTS)
Modulation = BTLE 5.0 (GFSK 2 Mbit/s)	Frequency MHz = 2402.00000
MIMO Mode = SISO	Active Port = 1

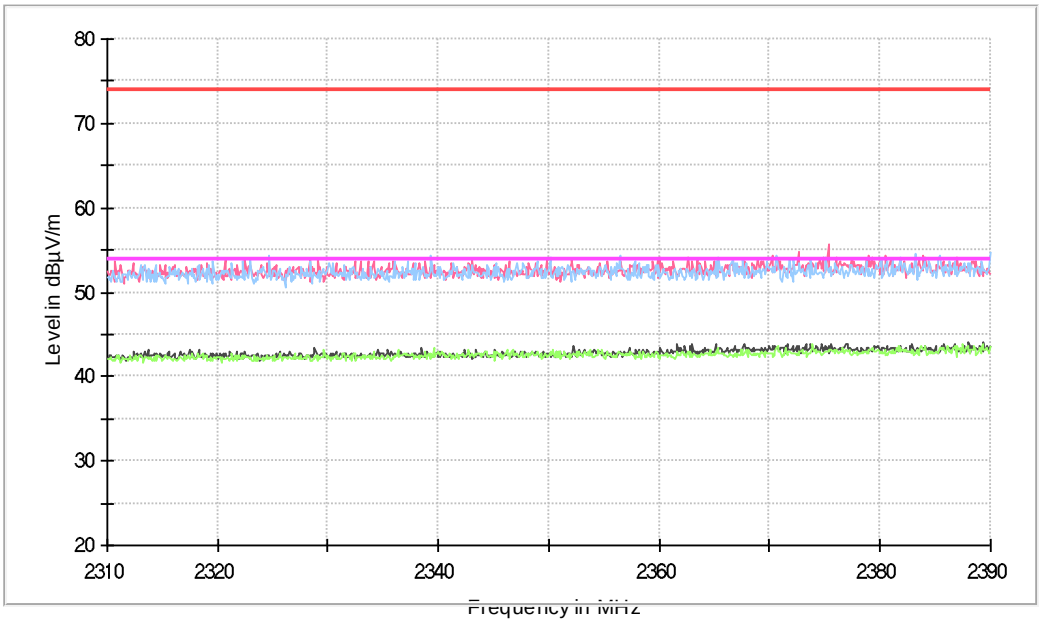
Images:

Full Spectrum



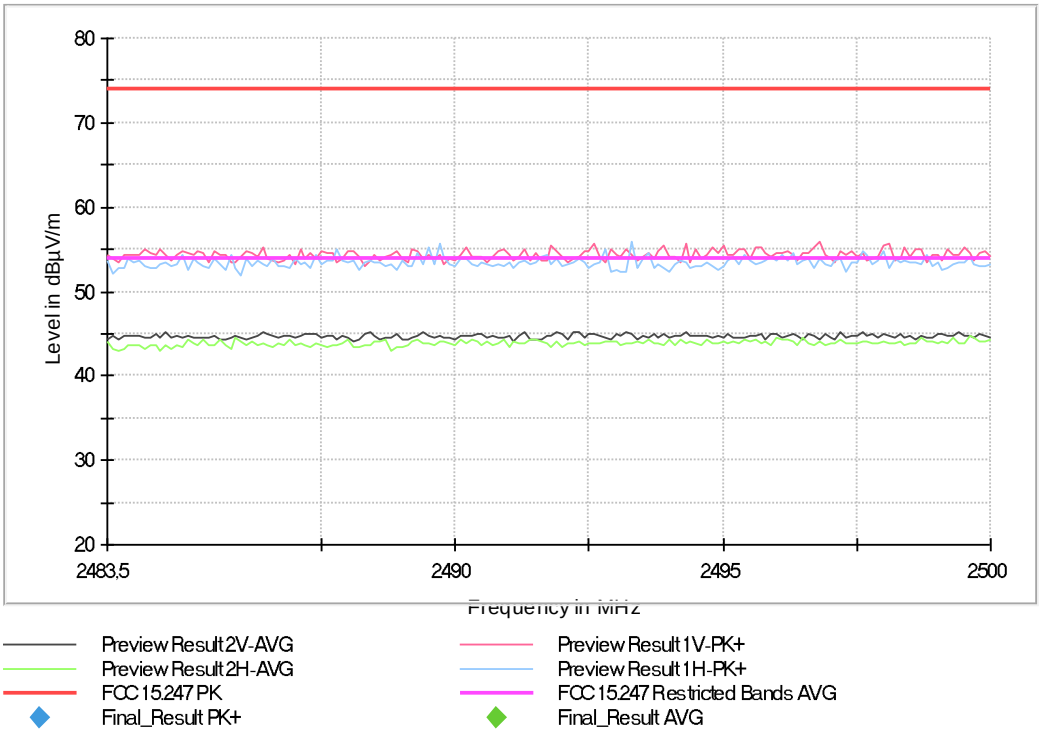
Preview Result 2V-AVG
Preview Result 2H-AVG
FCC 15.247 PK
Final_Result PK+
Preview Result 1V-PK+
Preview Result 1H-PK+
FCC 15.247 Restricted Bands AVG
Final_Result AVG

Full Spectrum



Preview Result 2V-AVG
Preview Result 2H-AVG
FCC 15.247 PK
Final_Result PK+
Preview Result 1V-PK+
Preview Result 1H-PK+
FCC 15.247 Restricted Bands AVG
Final_Result AVG

Full Spectrum

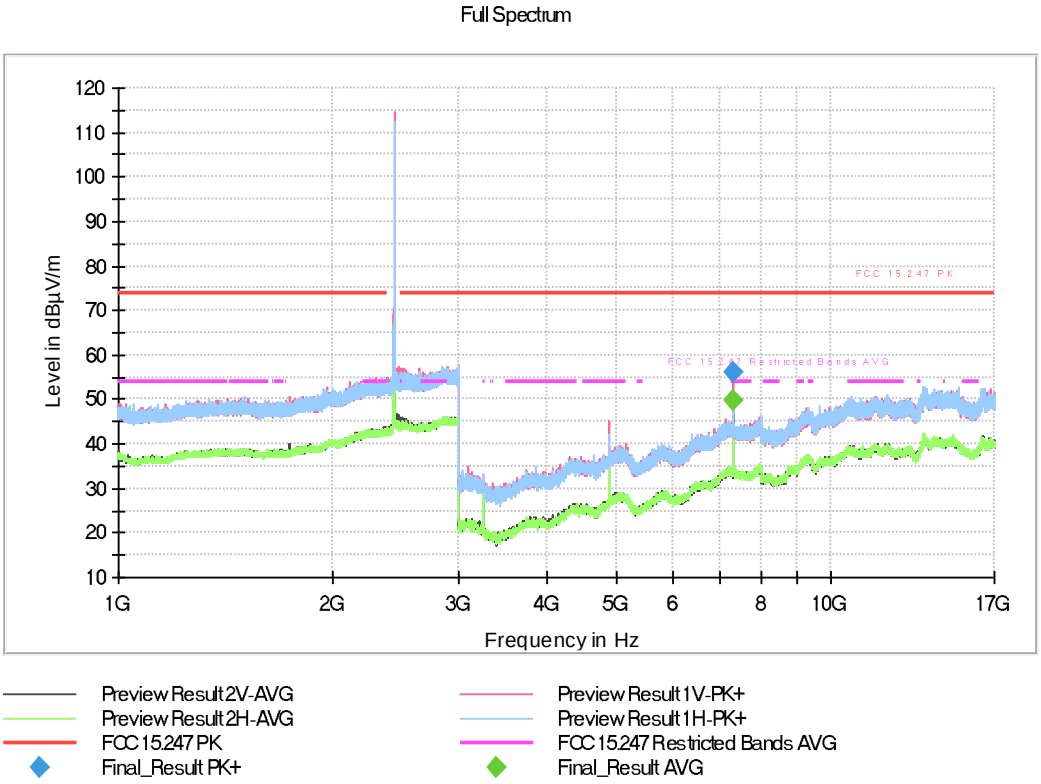


Frequency Range GHz = [1, 17] Equipment Type = Digital Transmission System (DTS)

Modulation = BTLE 5.0 (GFSK 2 Mbit/s) Frequency MHz = 2440.00000

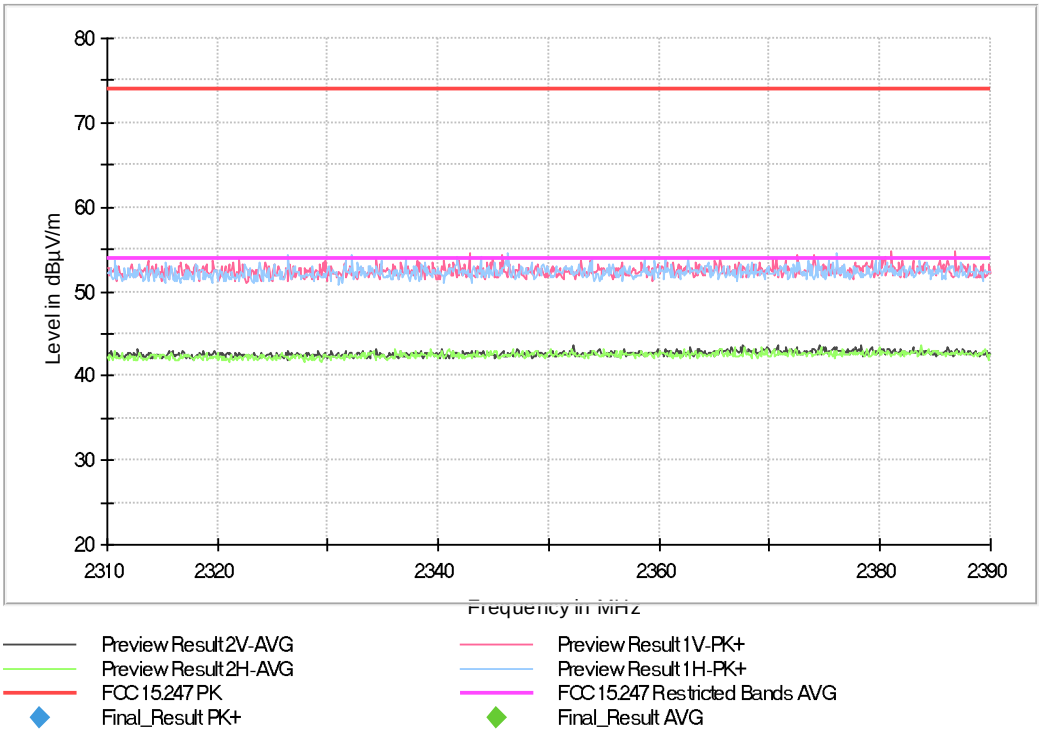
MIMO Mode = SISO Active Port = 1

Images:

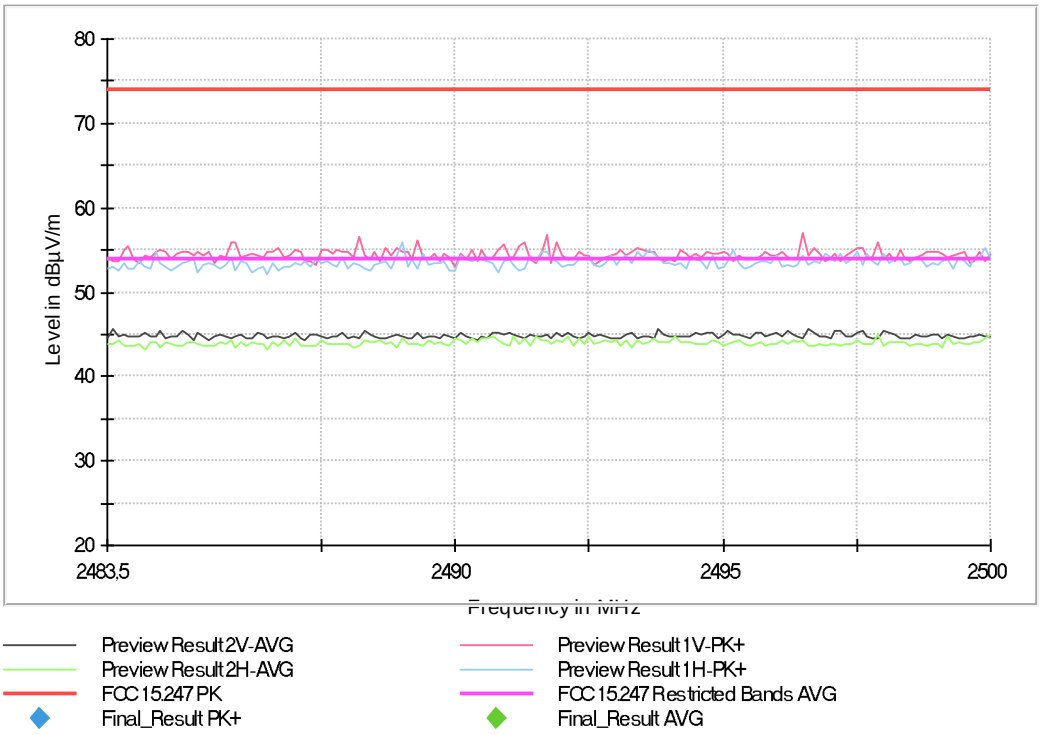


Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
7318.533333	---	49.59	54.00	4.41	244.0	V	275.0
7318.533333	55.97	---	74.00	18.03	244.0	V	275.0

Full Spectrum



Full Spectrum

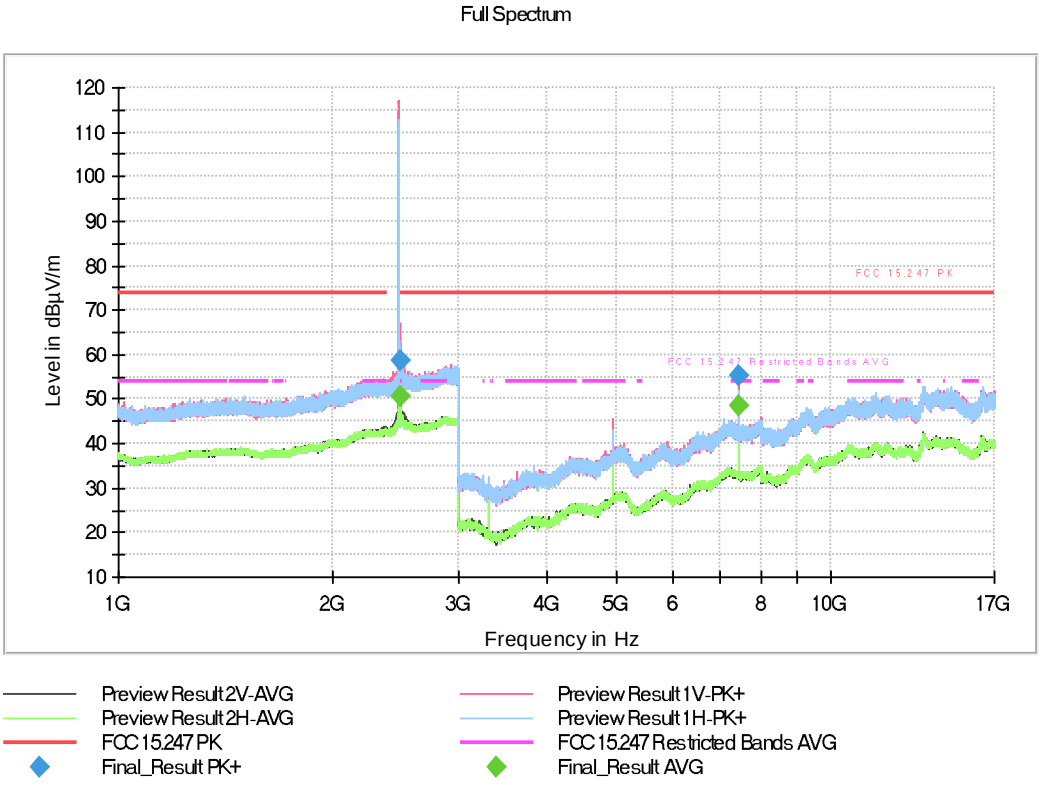


Frequency Range GHz = [1, 17] Equipment Type = Digital Transmission System (DTS)

Modulation = BTLE 5.0 (GFSK 2 Mbit/s) Frequency MHz = 2478.00000

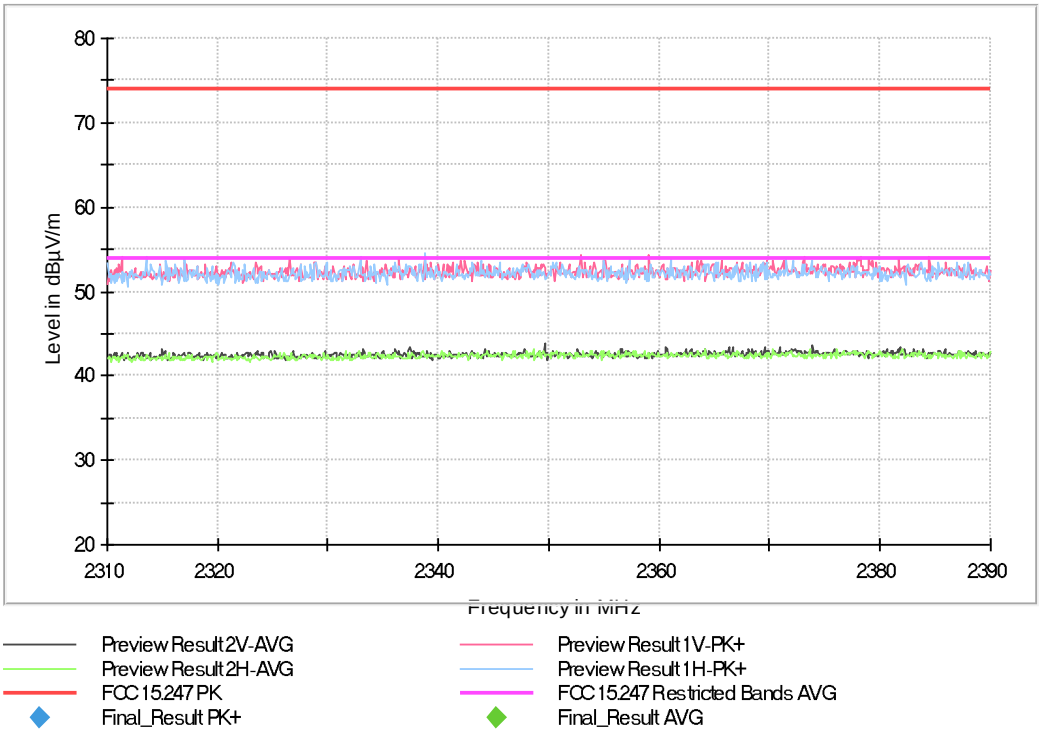
MIMO Mode = SISO Active Port = 1

Images:

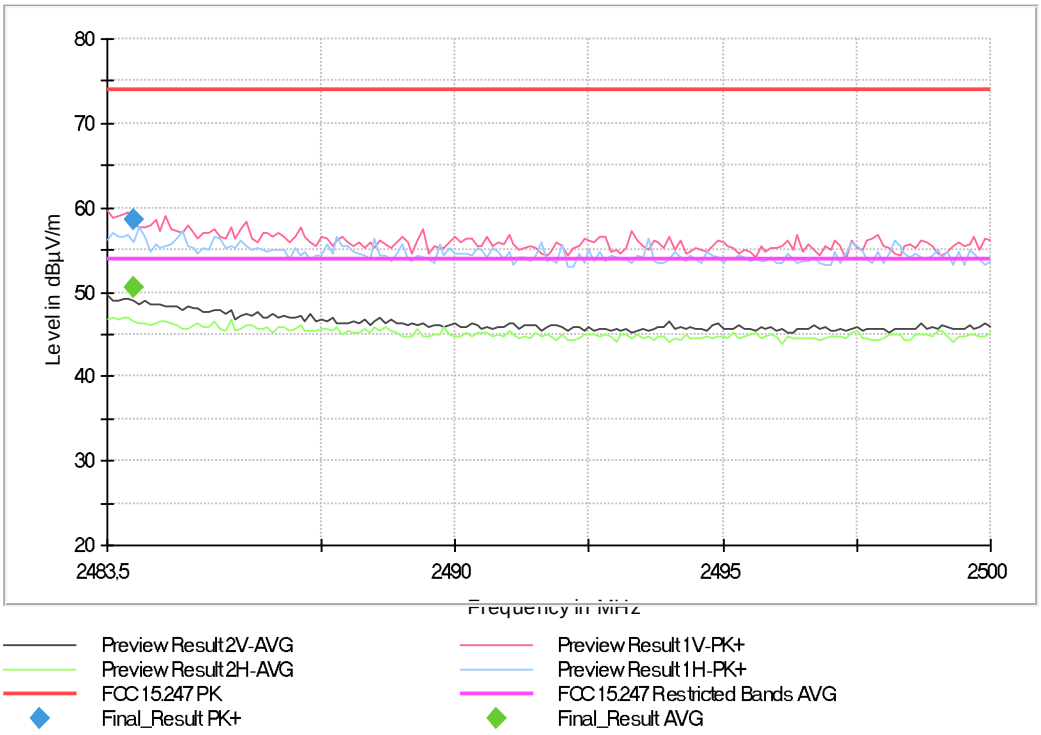


Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
2484.000000	---	50.56	54.00	3.44	241.0	V	0.0
2484.000000	58.48	---	74.00	15.52	241.0	V	0.0
7432.400000	---	48.68	54.00	5.32	257.0	V	281.0
7432.400000	55.07	---	74.00	18.93	257.0	V	281.0

Full Spectrum



Full Spectrum

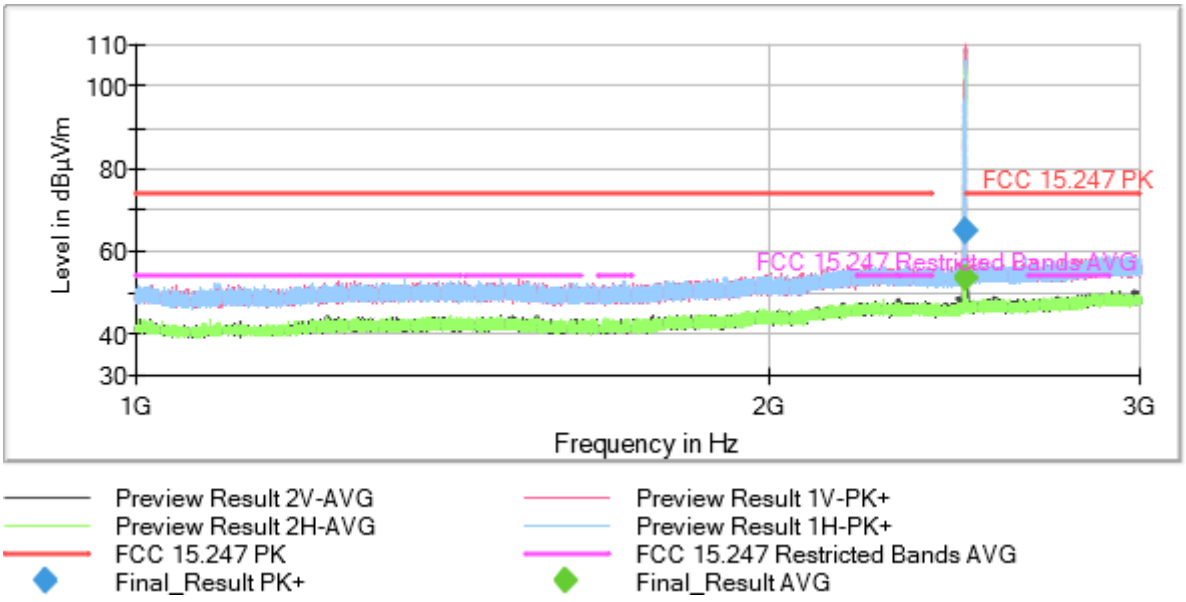


Frequency Range GHz = [1, 3] Equipment Type = Digital Transmission System (DTS)

Modulation = BTLE 5.0 (GFSK 2 Mbit/s) Frequency MHz = 2480.00000

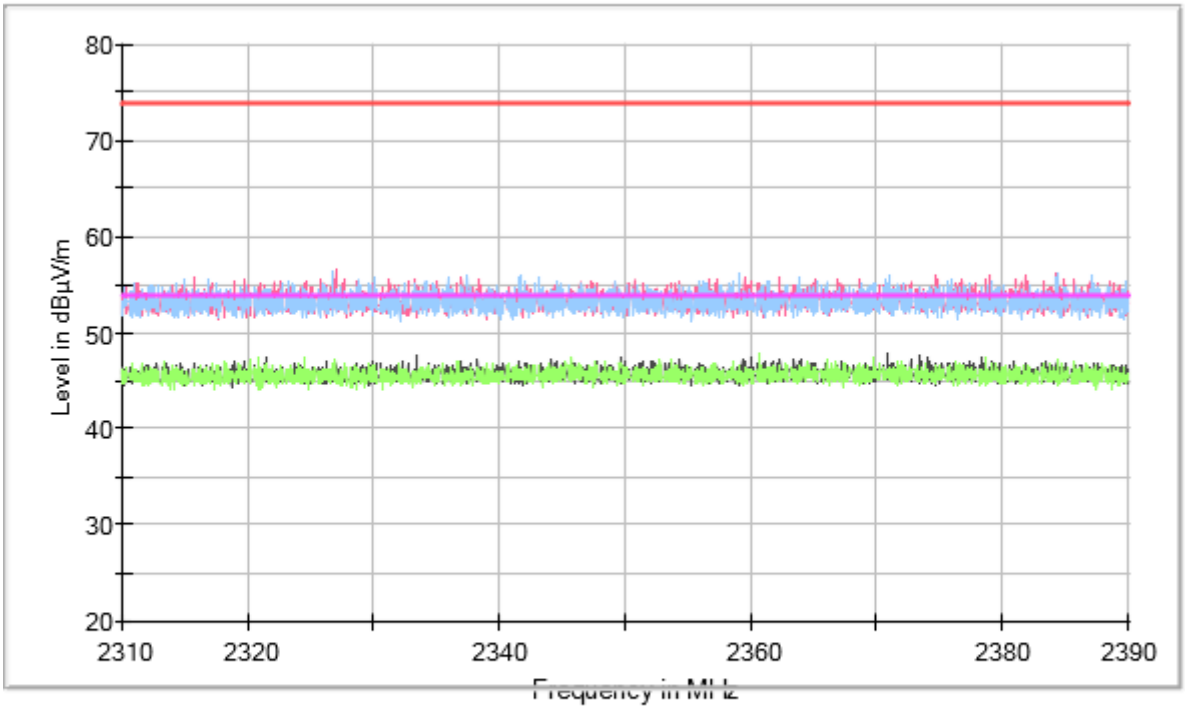
MIMO Mode = SISO Active Port = 1

Images:

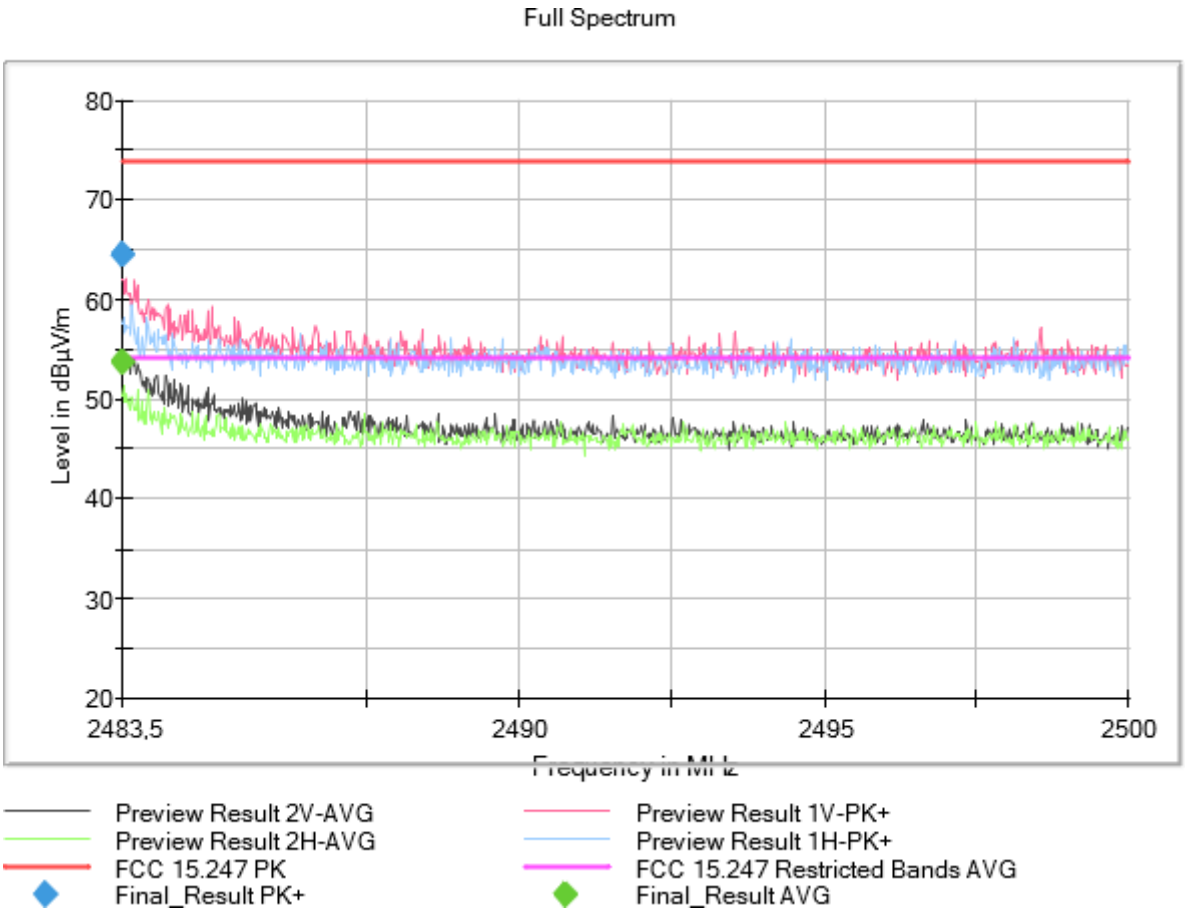


Preview Result 2V-AVG
Preview Result 2H-AVG
FCC 15.247 PK
Final_Result PK+
Preview Result 1V-PK+
Preview Result 1H-PK+
FCC 15.247 Restricted Bands AVG
Final_Result AVG

Full Spectrum

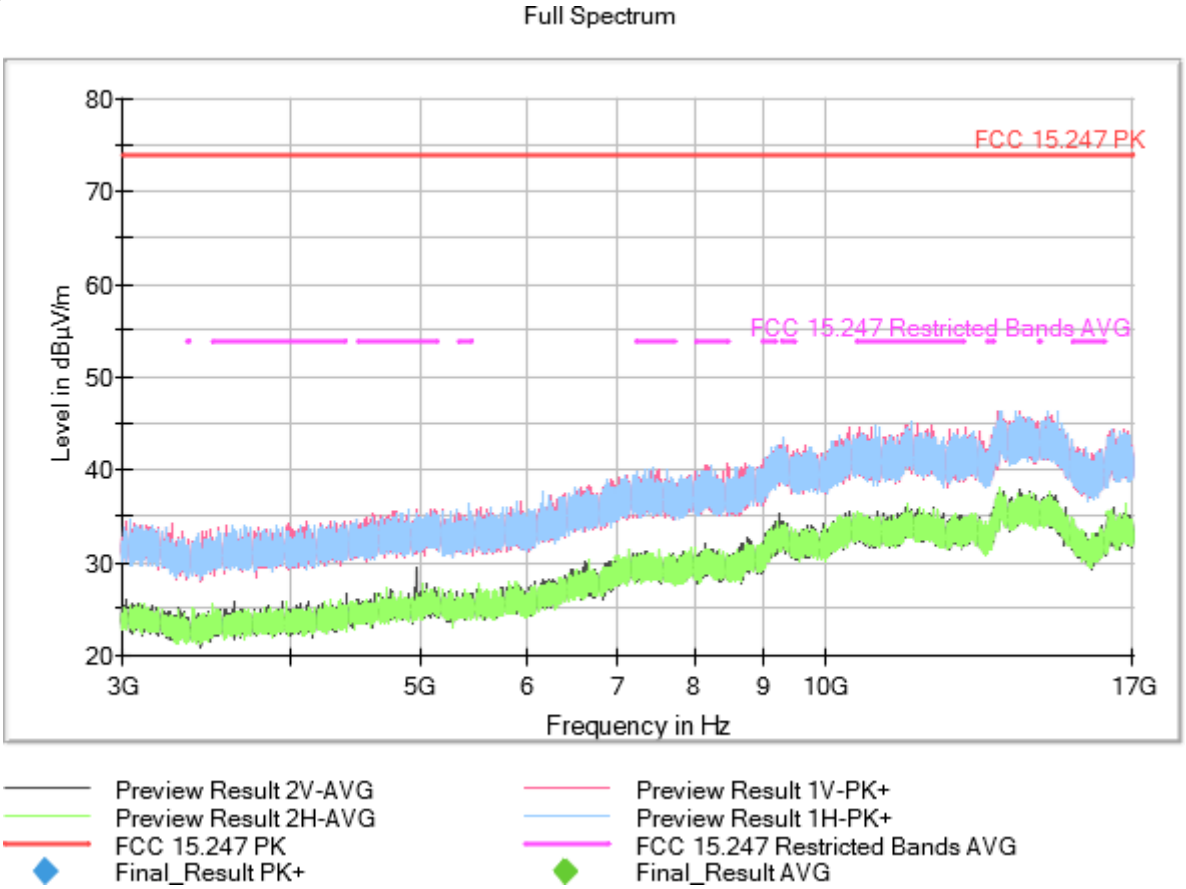


Preview Result 2V-AVG
Preview Result 2H-AVG
FCC 15.247 PK
Final_Result PK+
Preview Result 1V-PK+
Preview Result 1H-PK+
FCC 15.247 Restricted Bands AVG
Final_Result AVG


Full Spectrum
80
70
60
50
40
30
20
Level in dBµV/m
2483,5
2490
2495
2500
Preview Result 2V-AVG
Preview Result 2H-AVG
FCC 15.247 PK
Final_Result PK+
Preview Result 1V-PK+
Preview Result 1H-PK+
FCC 15.247 Restricted Bands AVG
Final_Result AVG

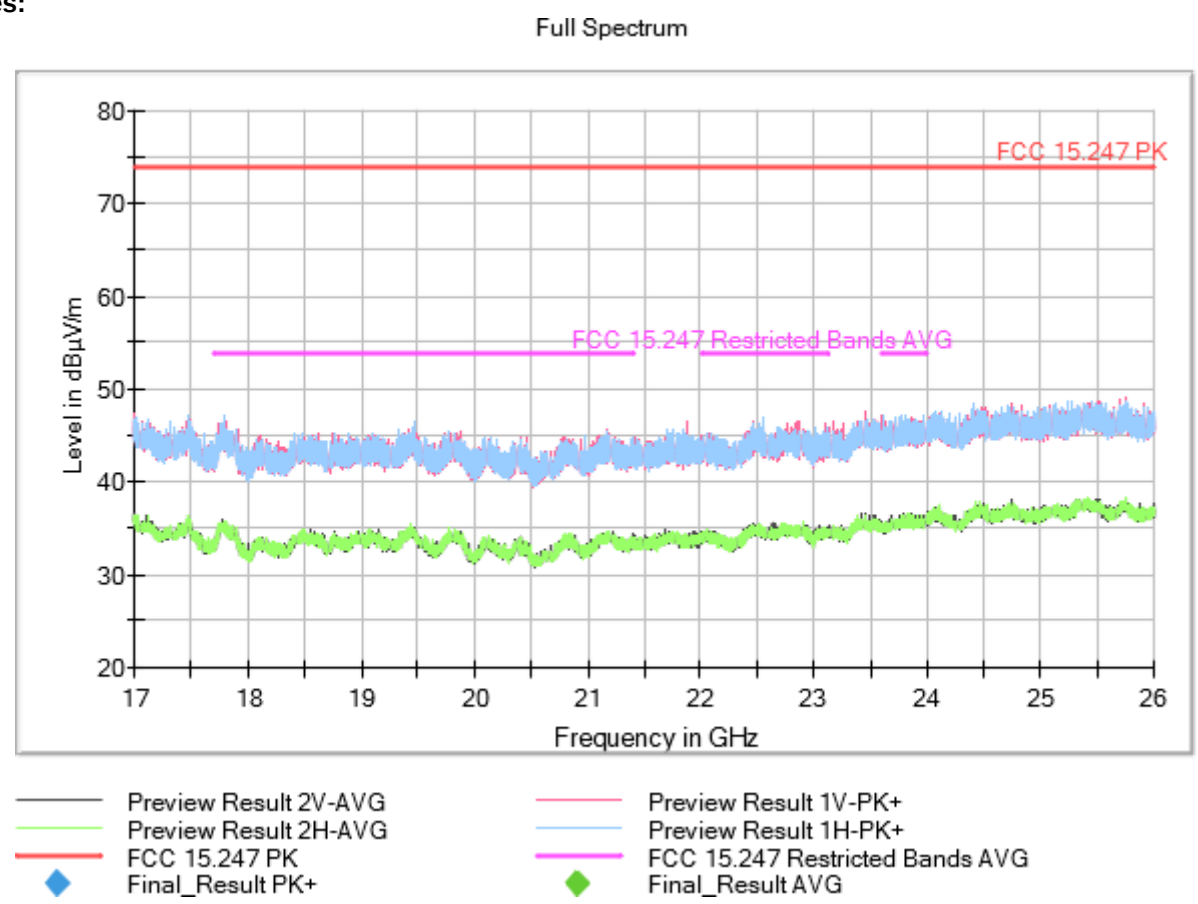
Frequency Range GHz = [3, 17]	Equipment Type = Digital Transmission System (DTS)
Modulation = BTLE 5.0 (GFSK 2 Mbit/s)	Frequency MHz = 2480.00000
MIMO Mode = SISO	Active Port = 1

Images:



Frequency Range GHz = [17, 26]	Equipment Type = Digital Transmission System (DTS)
Modulation = BTLE 5.0 (GFSK 2 Mbit/s)	The spurious frequencies detected do not depend on the transmission channel
MIMO Mode = SISO	Active Port = 1

Images:



Appendix B: Test results. 802.11 B/G/N/AX 1x1

INDEX

TEST CONDITIONS

(*): Data provided by the client.

POWER SUPPLY (*):

Vnominal: 3.3 V

Type of Power Supply: DC internal.

ANTENNA (*):

Chain #	Antenna Gain (dBi)
PRO-EX-333	3,6dBi
PRO-EX-296	3,0dBi
PRO-IS-237	3,0dBi
PRO-IS-299	2,5dBi

Radiated testing has been performed with the antenna PRO-IS-299 after a preliminary RSE testing

Conducted EIPR has been calculated using the highest antenna gain.

TEST FREQUENCIES (*):

Modulation	Data rates	Low Channel (1)	Low Channel (2)	Middle Channel	High Channel (1)	High Channel (2)
802.11b	1 Mbit/s	2412 MHz	N/A	2437 MHz	N/A	2462 MHz
	Power adjustment:	Att 0	N/A	Att 0	N/A	Att 0
802.11g	6 Mbit/s	2412 MHz	2417 MHz	2437 MHz	2447 MHz	2462 MHz
	Power adjustment:	Att 10	Att 0	Att 0	Att 0	Att 10
802.11n	HT20 MCS0 6.5 Mbit/s	2412 MHz	2417 MHz	2437 MHz	2447 MHz	2462 MHz
	Power adjustment:	Att 8	Att 0	Att 0	Att 0	Att 8
802.11n	HT40 MCS0 6.5 Mbit/s	2422 MHz	2432 MHz	2437 MHz	NA	2452 MHz
	Power adjustment:	Att 4	Att 0	Att 0	NA	Att 4
802.11ax	HE20 MCS0 (SU)	2412 MHz	2417 MHz	2437 MHz	2457 MHz	2462 MHz
	Power adjustment:	Att 5	Att 0	Att 0	Att 0	Att 5
802.11ax	HE20 MCS0 (RU)	2412 MHz	N/A	2437 MHz	2457 MHz	2462 MHz
	Power adjustment:	Att 0	N/A	Att 0	Att 0	Att 5

During transmitter test the EUT was controlled by a SW tool provided by the client to operate in a continuous transmit mode on the modulation schemes and test channels as required. Power adjustment correspond to the parameter value configured in the SW tool.

All channels with frequencies below Low Channel (2) will be configured at the same power adjustment as Low Channel (1)

All channels with frequencies above High Channel (1) will be configured at the same power adjustment as high Channel (2)

CONDUCTED MEASUREMENTS:

The equipment under test was set up in a shielded room and it is connected to the TS8997 using a low loss RF cable. The reading of the spectrum analyser is corrected taking into account the cable loss.

RADIATED MEASUREMENTS:

All radiated tests were performed in a semi-anechoic chamber. The measurement antenna (Bilog antenna for the range between 30 MHz to 1000 MHz and 1 GHz-17 GHz Double ridge horn antenna) is situated at a distance of 3 m and at a distance of 1.5 m for the frequency range 17 GHz-26 GHz (17 GHz-40 GHz horn antenna).

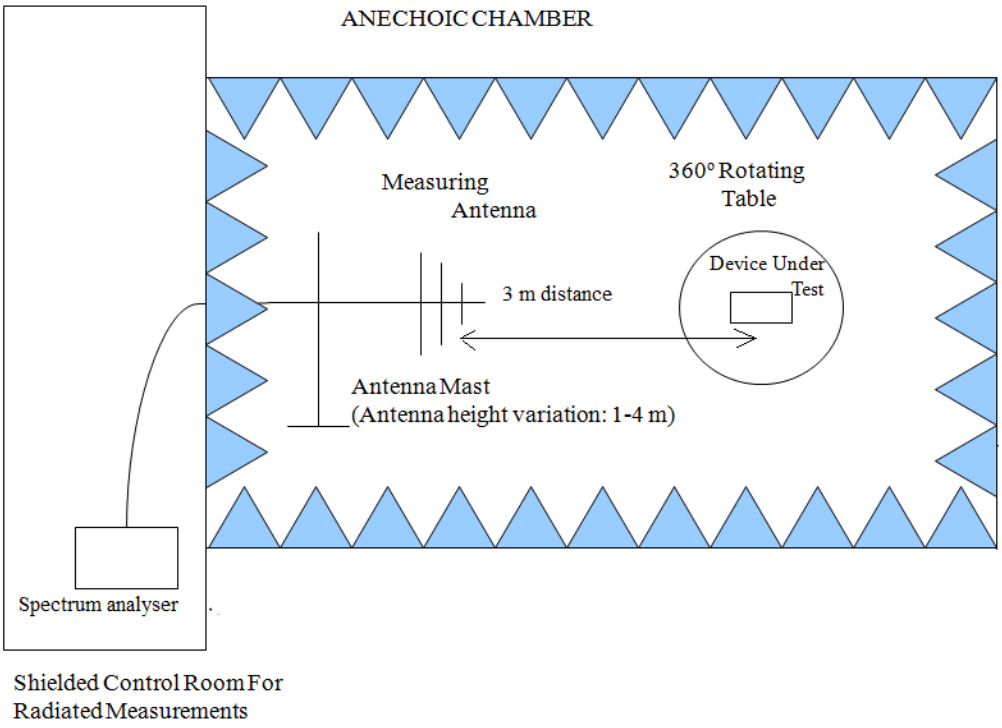
For radiated emissions in the range 17 GHz-26 GHz that is performed at a distance closer than the specified distance, an inverse proportionality factor of 20 dB per decade is used to normalize the measured data for determining compliance.

The equipment under test was set up on a non-conductive platform above the ground plane and the situation and orientation was varied to find the maximum radiated emission. It was also rotated 360º and the antenna height (Bilog antenna and Double ridge horn antenna) was varied from 1 to 4 meters to find the maximum radiated emission.

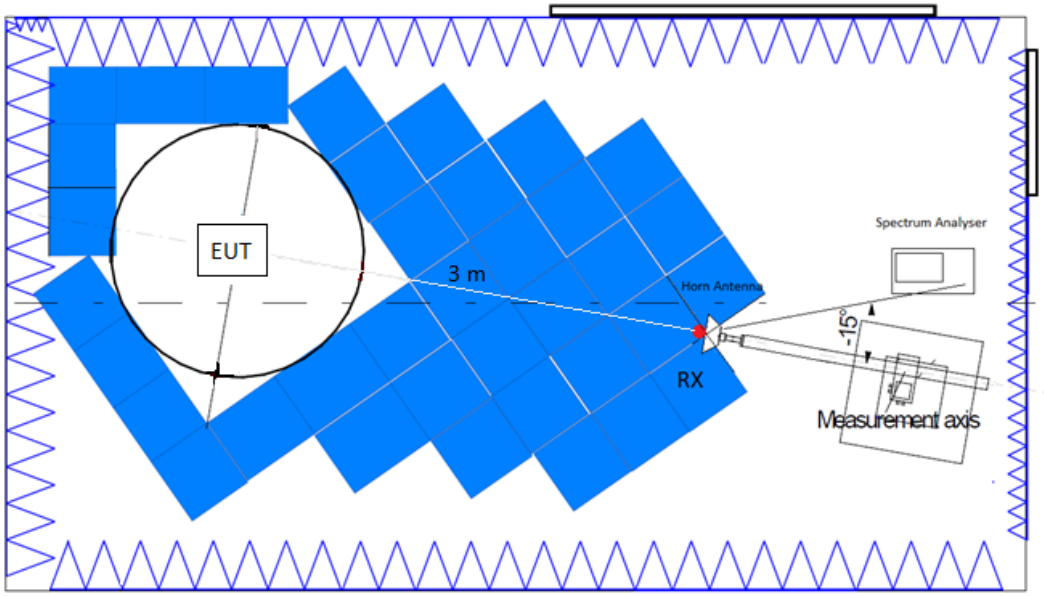
Measurements were made in both horizontal and vertical planes of polarization.

A resolution bandwidth/video bandwidth of 100 kHz / 300 kHz was used for frequencies below 1 GHz and 1 MHz / 3 MHz for frequencies above 1 GHz.

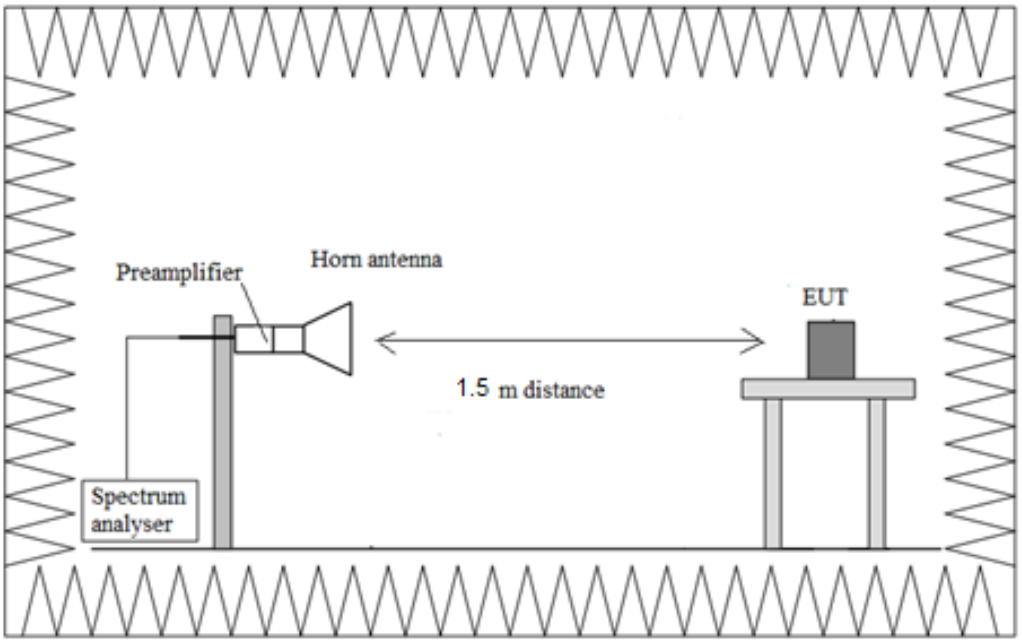
Radiated measurements setup from 30 MHz to 1 GHz:



Radiated measurements setup from 1 GHz to 17 GHz:



Radiated measurements setup f > 17 GHz:



TEST CASES DETAILS

99dBw Occupied Channel Bandwidth 99%

Limits

The occupied bandwidth or the “99% emission bandwidth” is defined as the frequency range between two points, one above and the other below the carrier frequency, within which 99% of the total transmitted power of the fundamental transmitted emission is contained.

Modulation: 802.11b (DSSS 1 Mbit/s)

MIMO Mode: SISO

Equipment	BW (MHz)	Freq (MHz)	Port	Occ Ch BW (MHz)
Digital Transmission System (DTS)	20	2412.00000	1	12.600
		2437.00000		12.600
		2462.00000		12.600

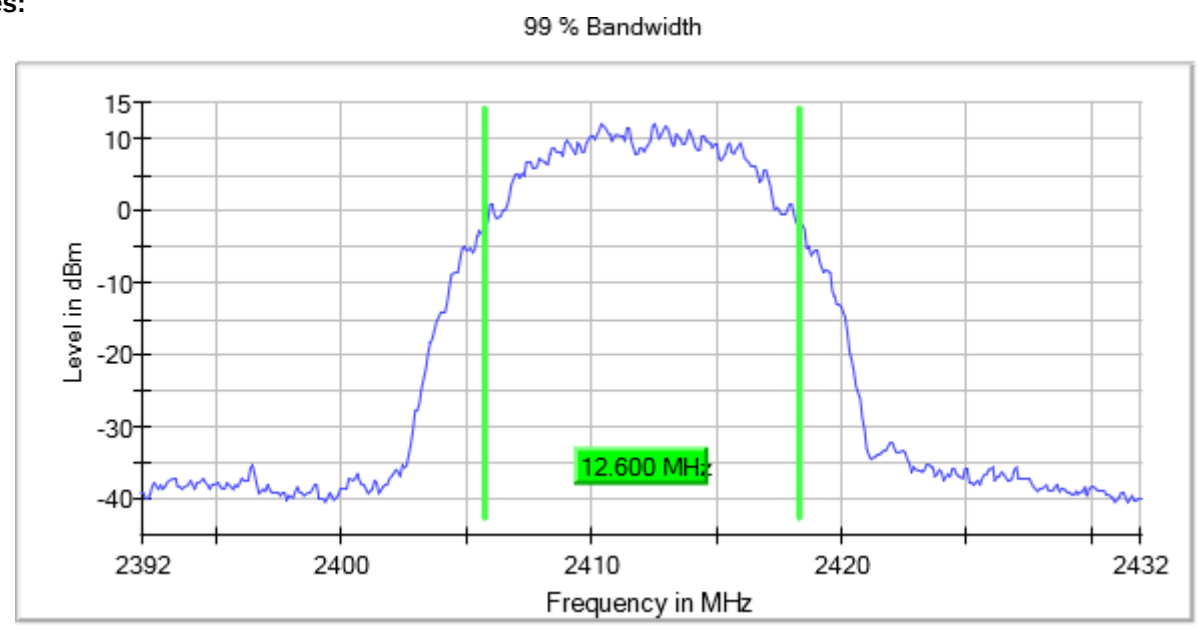
Verdict

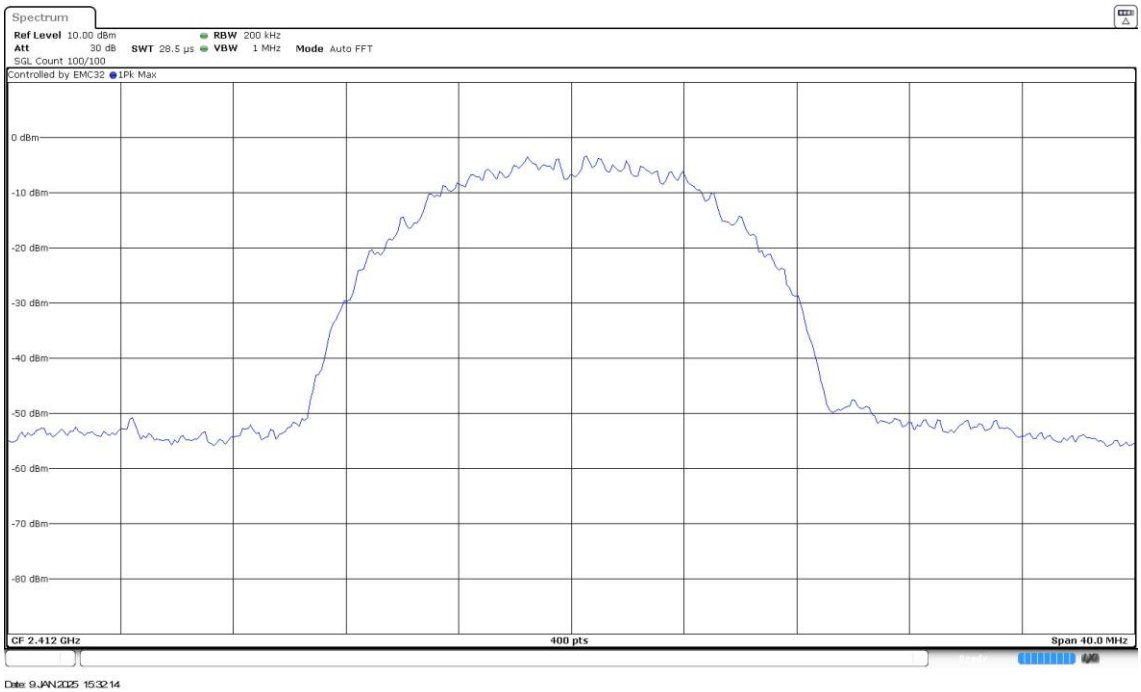
Pass

Attachments

Equipment Type = Digital Transmission System (DTS)	Bandwidth MHz = 20
Modulation = 802.11b (DSSS 1 Mbit/s)	Frequency MHz = 2412.00000
MIMO Mode = SISO	Active Port = 1

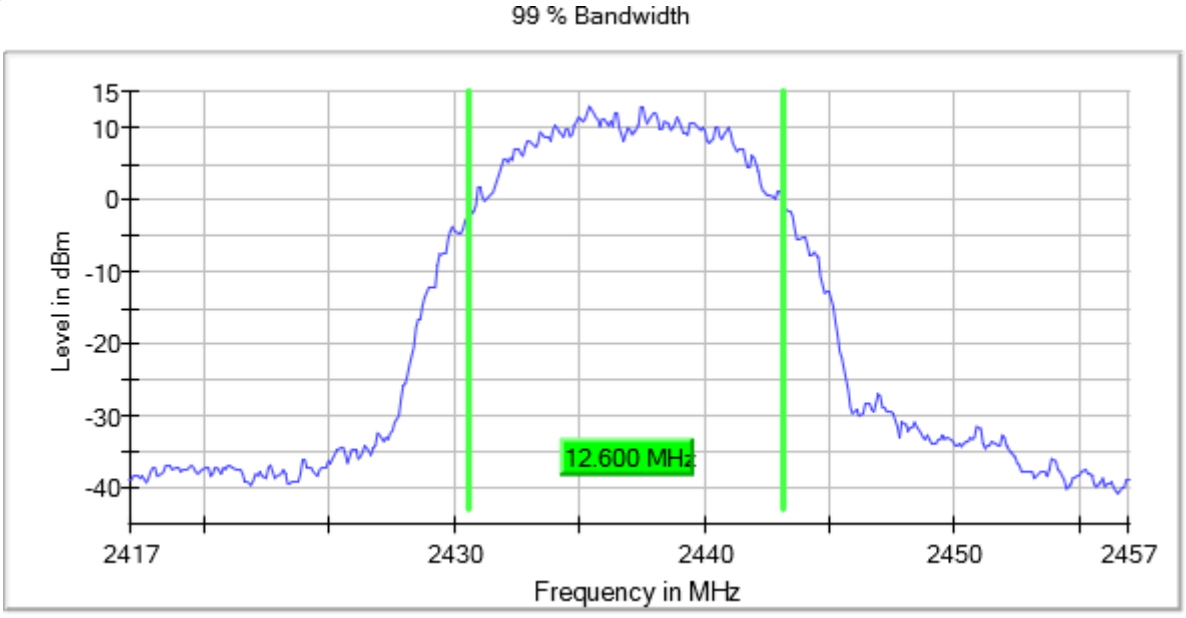
Images:

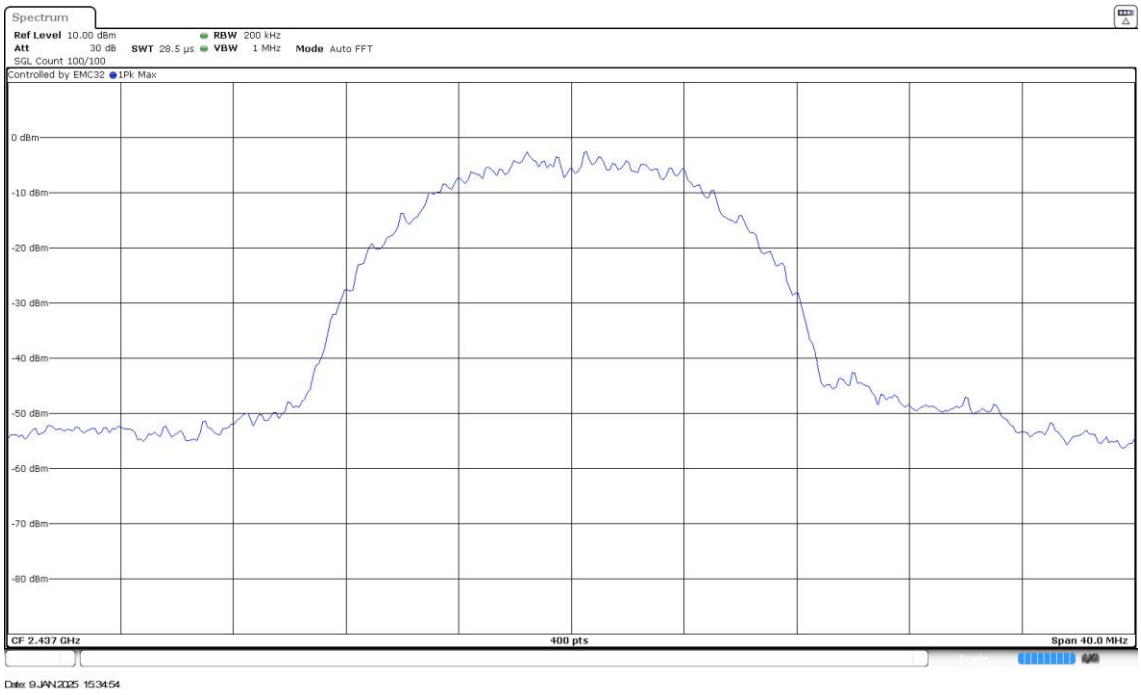




Equipment Type = Digital Transmission System (DTS)
Bandwidth MHz = 20
Modulation = 802.11b (DSSS 1 Mbit/s)
Frequency MHz = 2437.00000
MIMO Mode = SISO
Active Port = 1

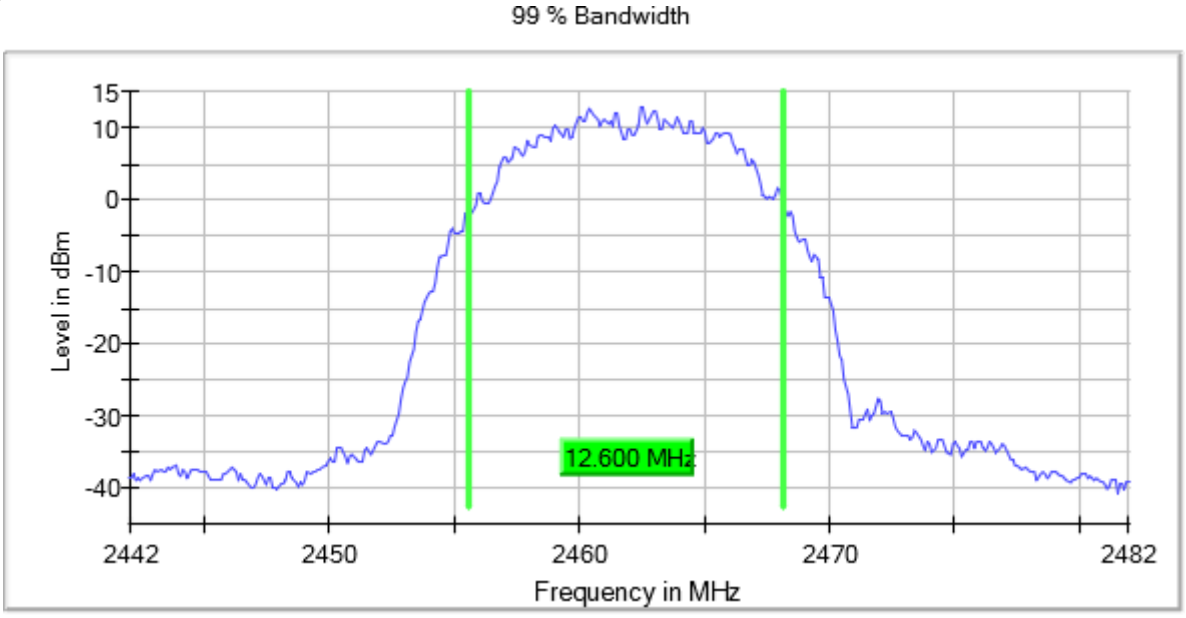
Images:

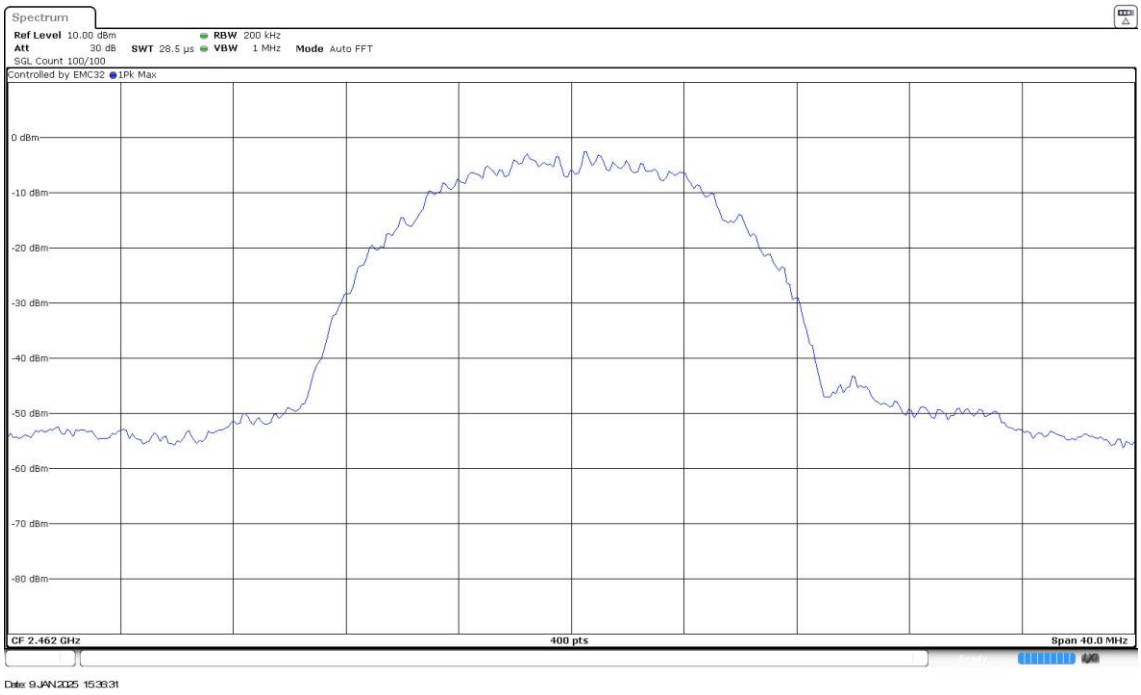




Equipment Type = Digital Transmission System (DTS)
Bandwidth MHz = 20
Modulation = 802.11b (DSSS 1 Mbit/s)
Frequency MHz = 2462.00000
MIMO Mode = SISO
Active Port = 1

Images:





Results

Modulation: 802.11g (OFDM 6 Mbit/s)

MIMO Mode: SISO

Equipment	BW (MHz)	Freq (MHz)	Port	Occ Ch BW (MHz)
Digital Transmission System (DTS)	20	2412.00000	1	16.400
		2417.00000		16.500
		2437.00000		16.600
		2447.00000		16.600
		2462.00000		16.400

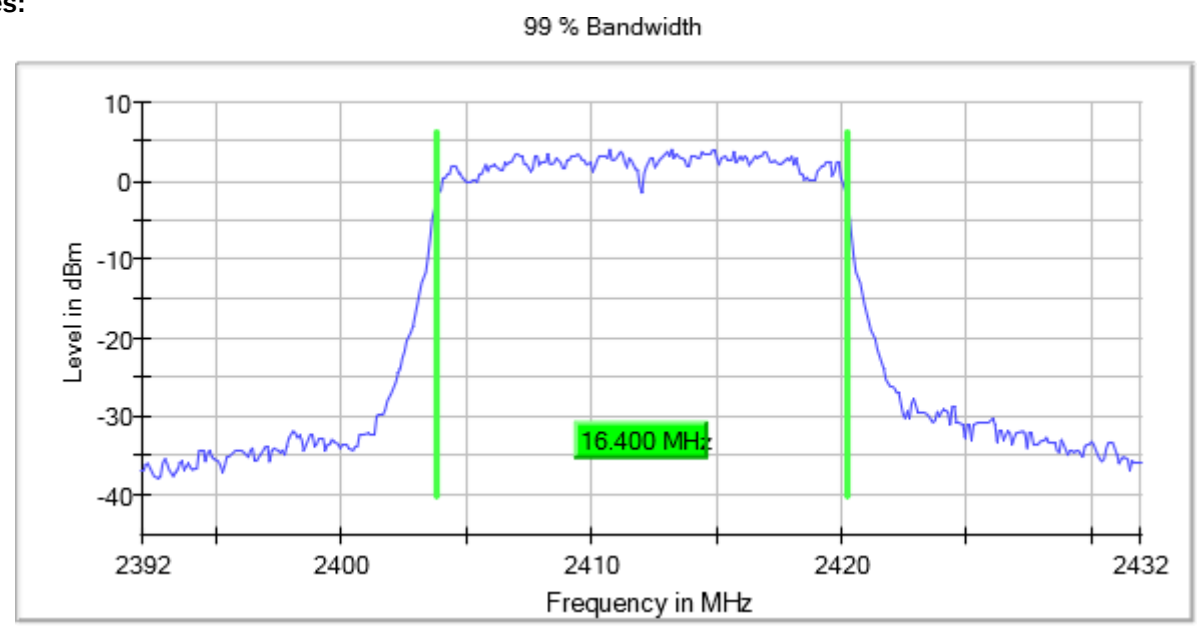
Verdict

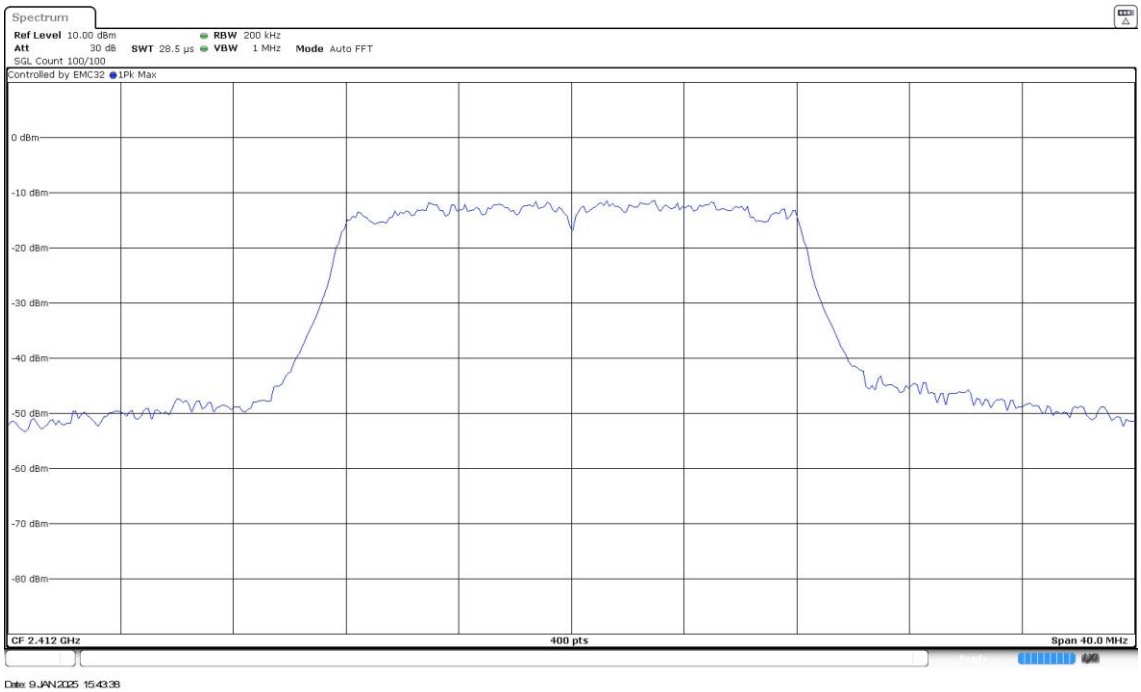
Pass

Attachments

Equipment Type = Digital Transmission System (DTS)	Bandwidth MHz = 20
Modulation = 802.11g (OFDM 6 Mbit/s)	Frequency MHz = 2412.00000
MIMO Mode = SISO	Active Port = 1

Images:



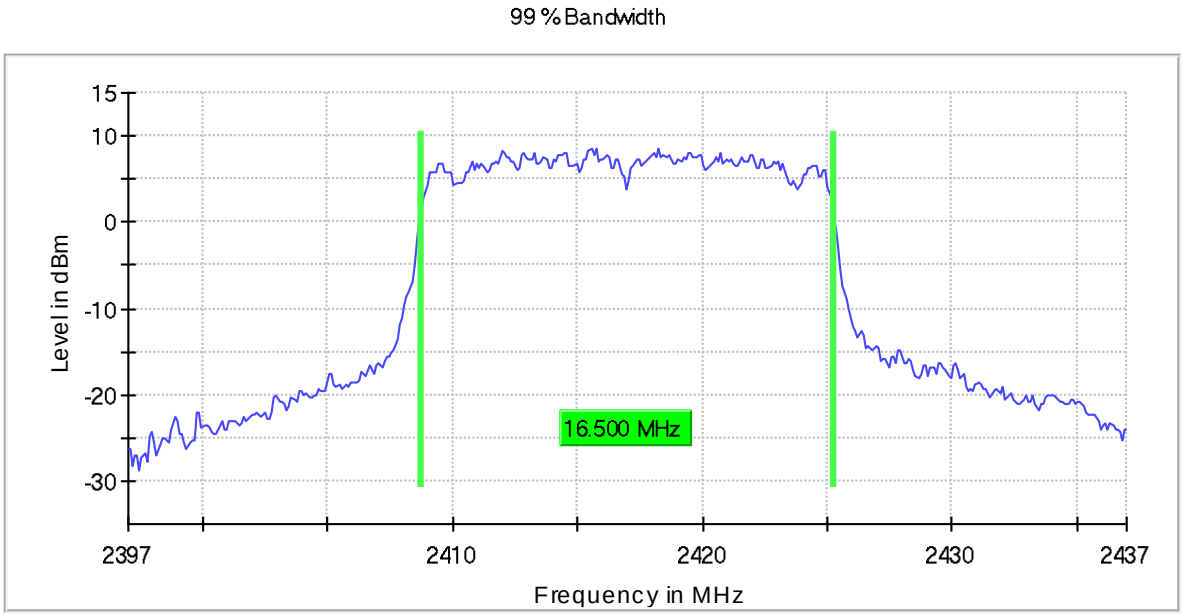


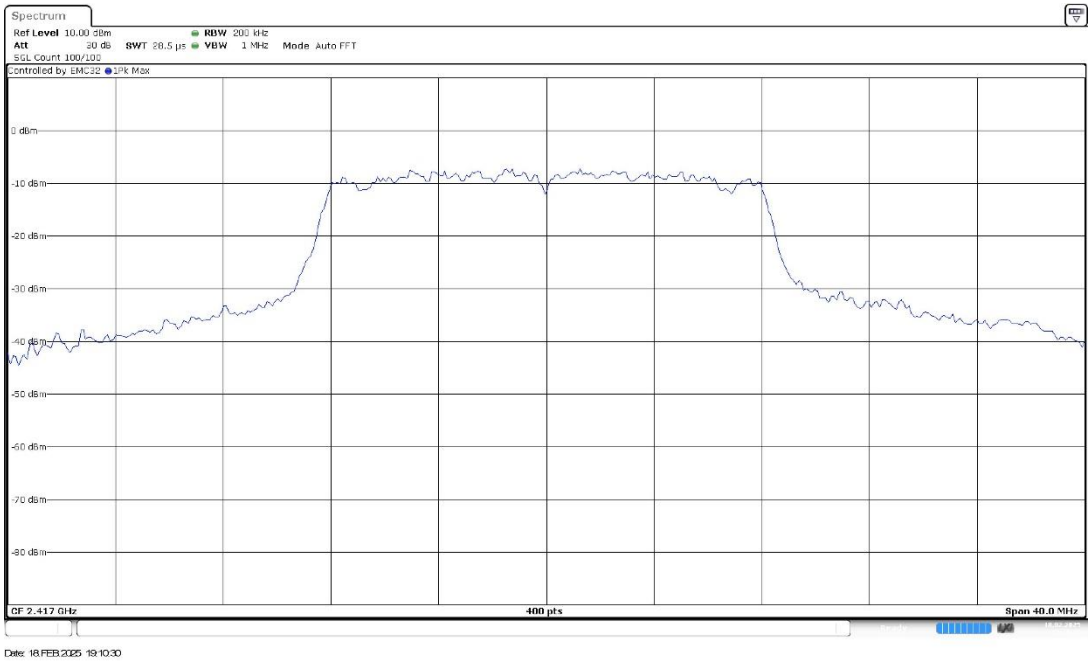
Equipment Type = Digital Transmission System (DTS) Bandwidth MHz = 20

Modulation = 802.11g (OFDM 6 Mbit/s) Frequency MHz = 2417.00000

MIMO Mode = SISO Active Port = 1

Images:





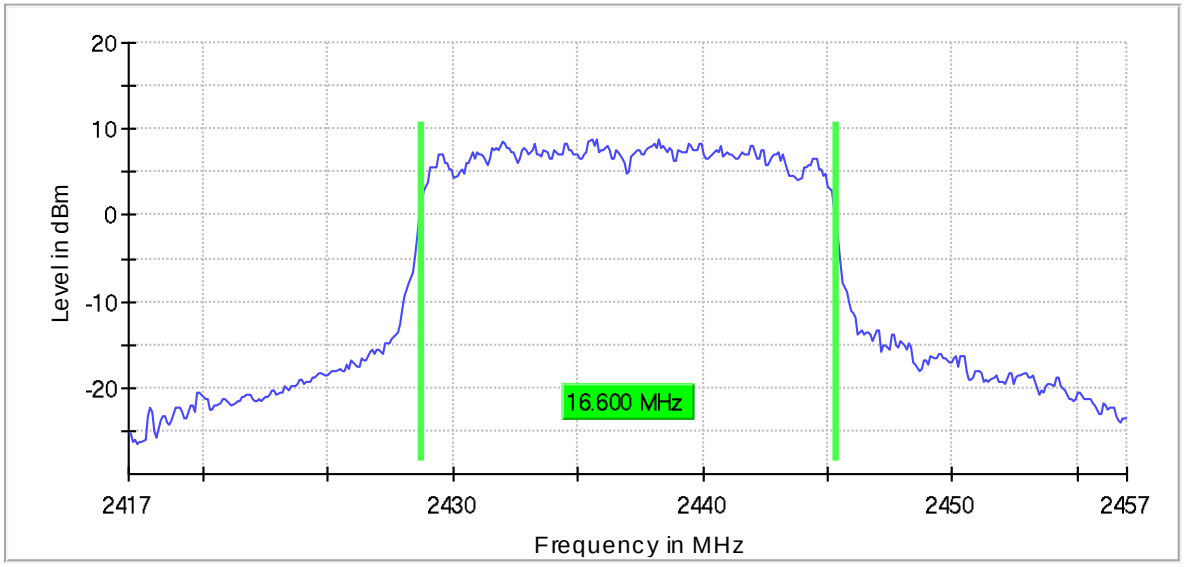
Equipment Type = Digital Transmission System (DTS) Bandwidth MHz = 20

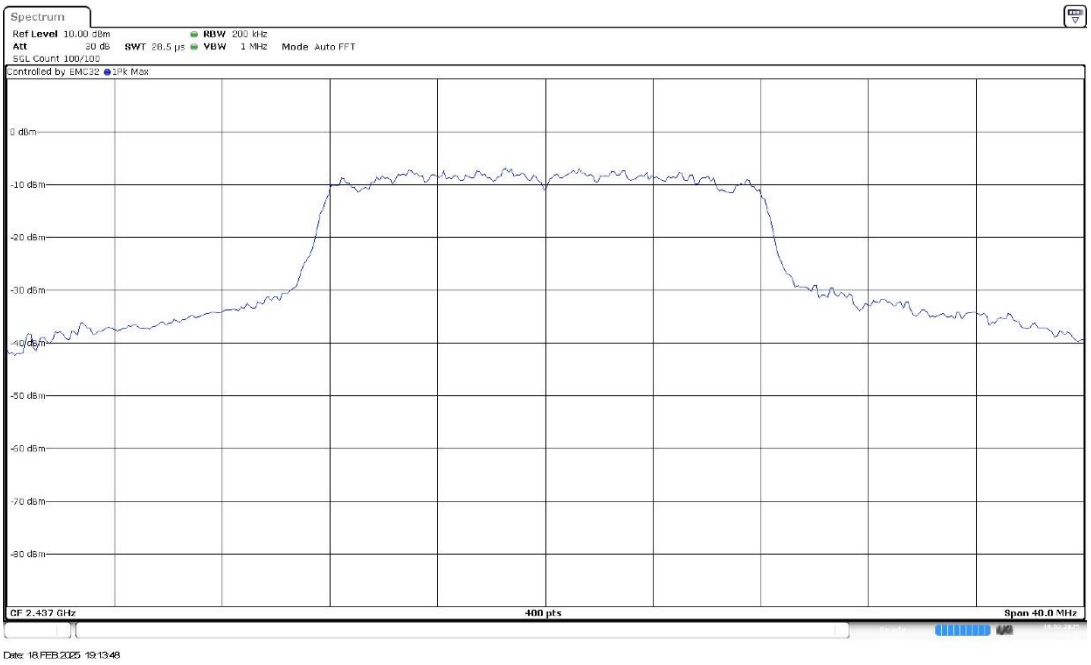
Modulation = 802.11g (OFDM 6 Mbit/s) Frequency MHz = 2437.00000

MIMO Mode = SISO Active Port = 1

Images:

99 % Bandwidth



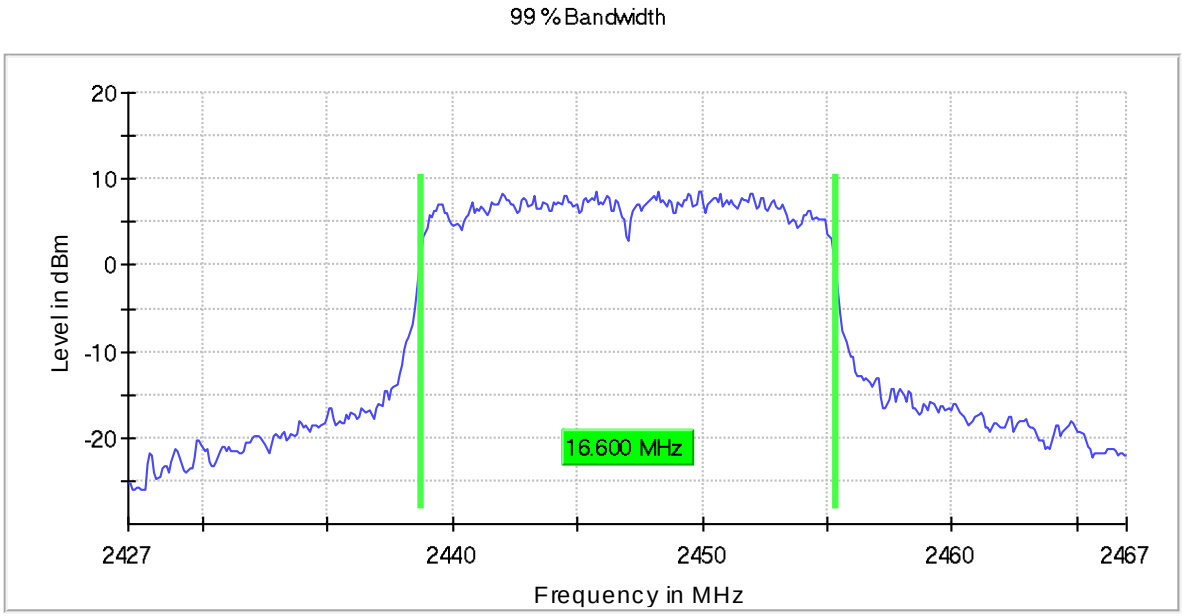


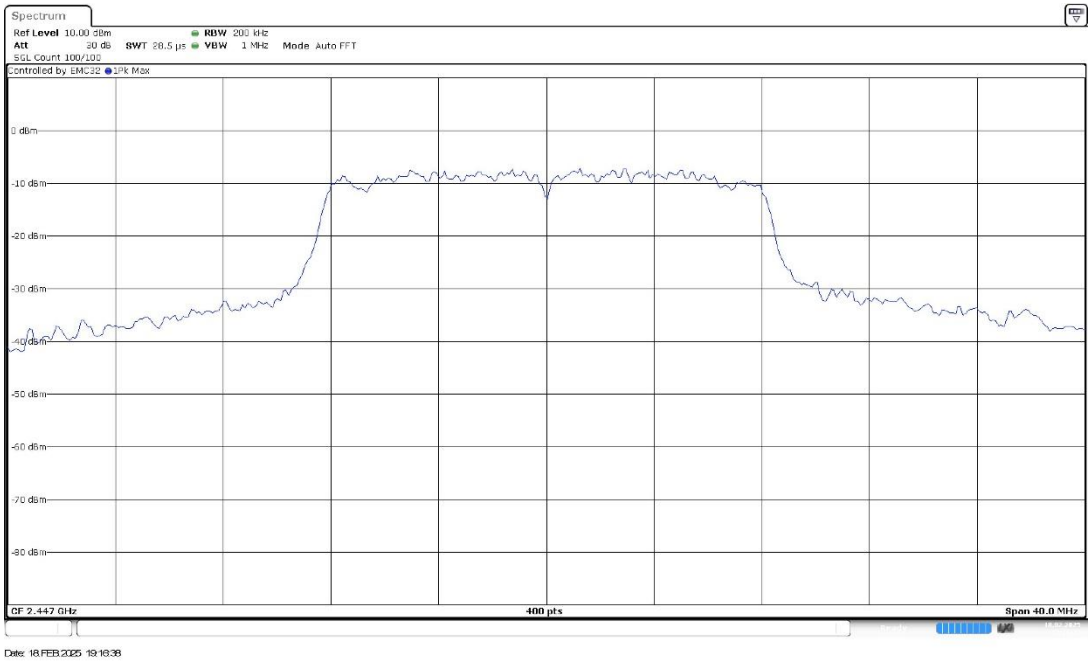
Equipment Type = Digital Transmission System (DTS) Bandwidth MHz = 20

Modulation = 802.11g (OFDM 6 Mbit/s) Frequency MHz = 2447.00000

MIMO Mode = SISO Active Port = 1

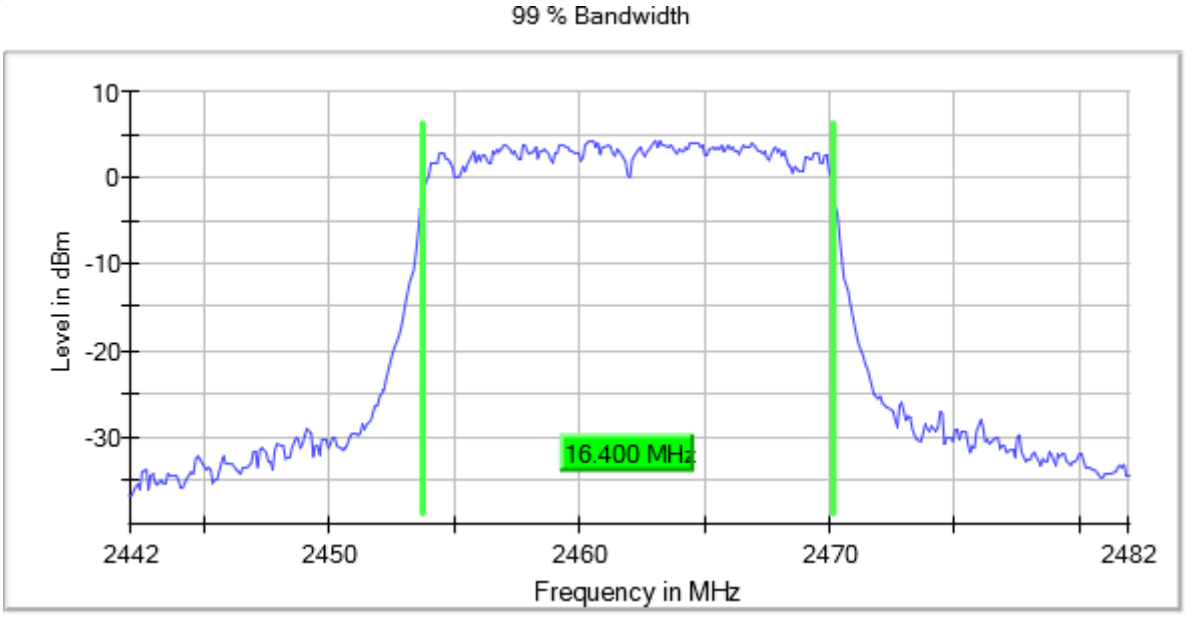
Images:

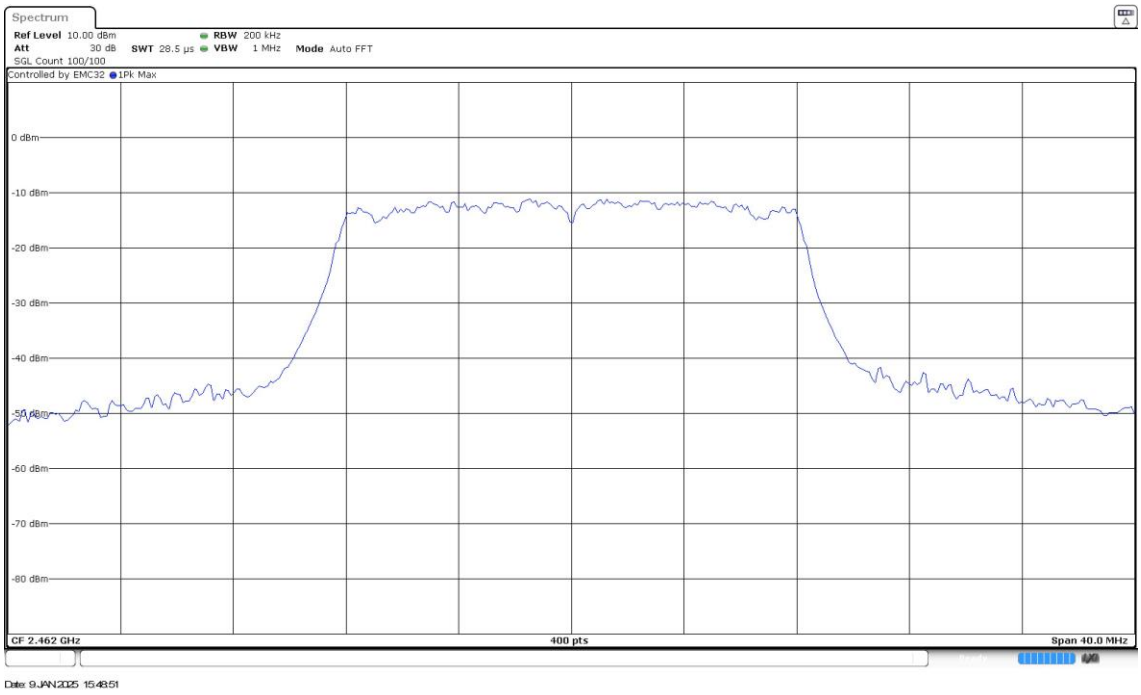




Equipment Type = Digital Transmission System (DTS)
Bandwidth MHz = 20
Modulation = 802.11g (OFDM 6 Mbit/s)
Frequency MHz = 2462.00000
MIMO Mode = SISO
Active Port = 1

Images:





Results

Modulation: 802.11n HT20 (OFDM MCS0)

MIMO Mode: SISO

Equipment	BW (MHz)	Freq (MHz)	Port	Occ Ch BW (MHz)
Digital Transmission System (DTS)	20	2412.00000	1	17.400
		2417.00000		17.500
		2437.00000		17.500
		2447.00000		17.500
		2462.00000		17.300

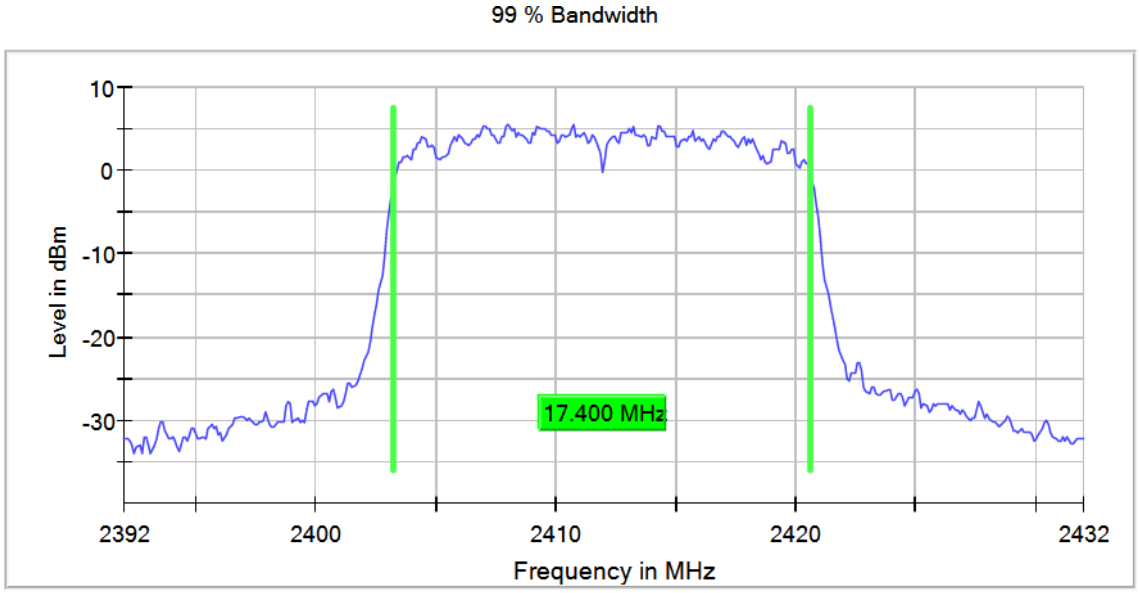
Verdict

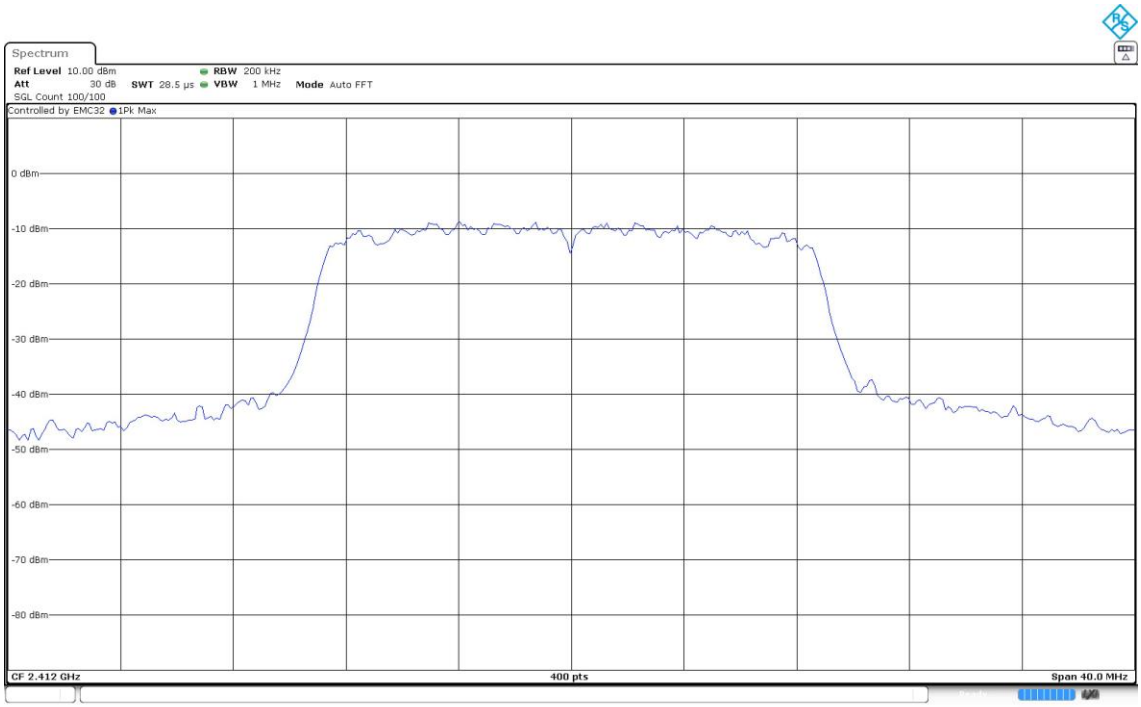
Pass

Attachments

Equipment Type = Digital Transmission System (DTS)	Bandwidth MHz = 20
Modulation = 802.11n HT20 (OFDM MCS0)	Frequency MHz = 2412.00000
MIMO Mode = SISO	Active Port = 1

Images:



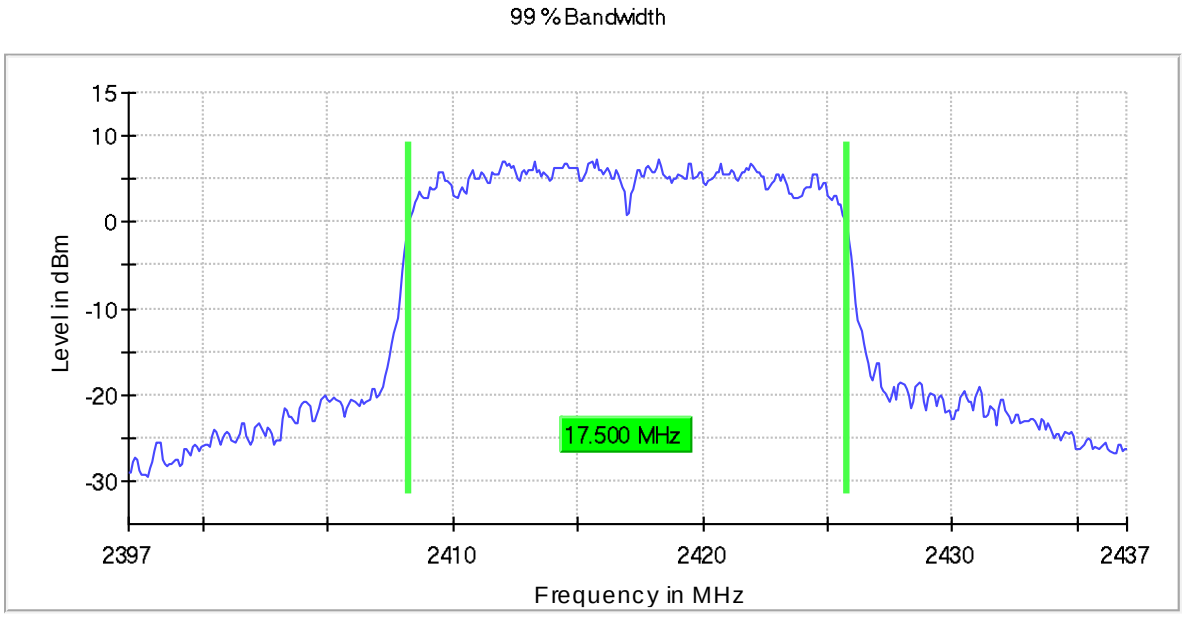


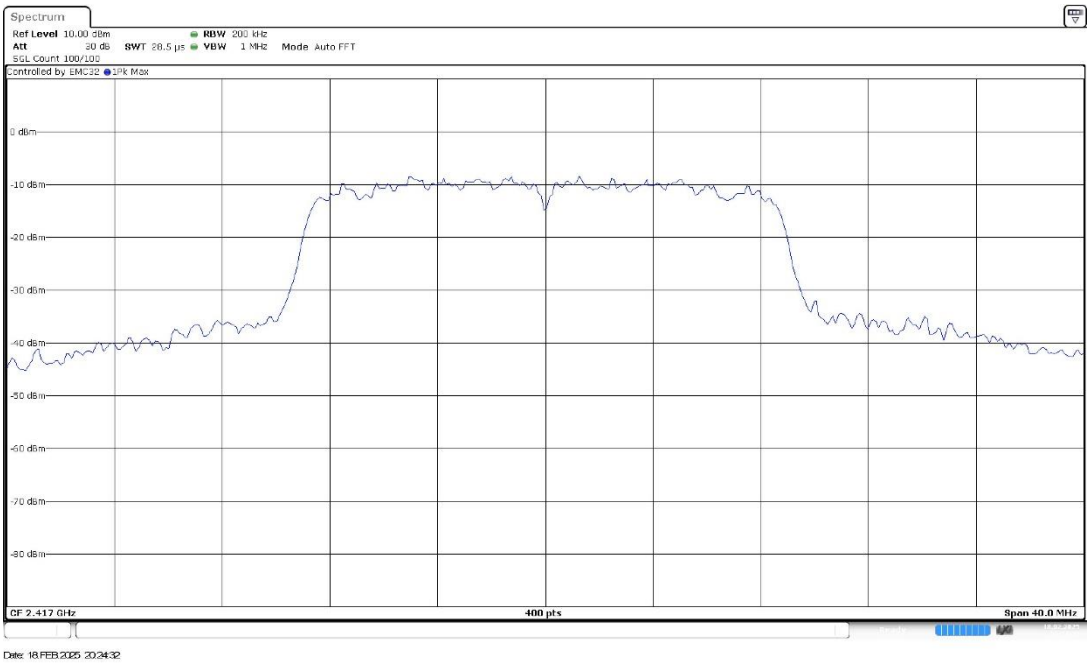
Equipment Type = Digital Transmission System (DTS) Bandwidth MHz = 20

Modulation = 802.11n HT20 (OFDM MCS0) Frequency MHz = 2417.00000

MIMO Mode = SISO Active Port = 1

Images:



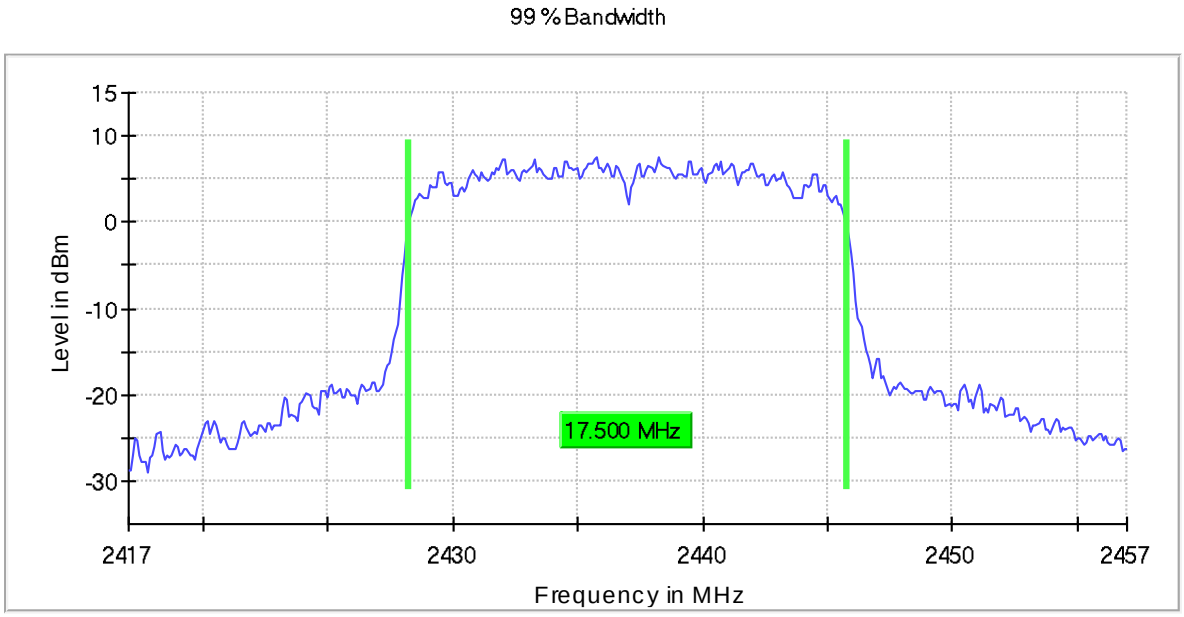


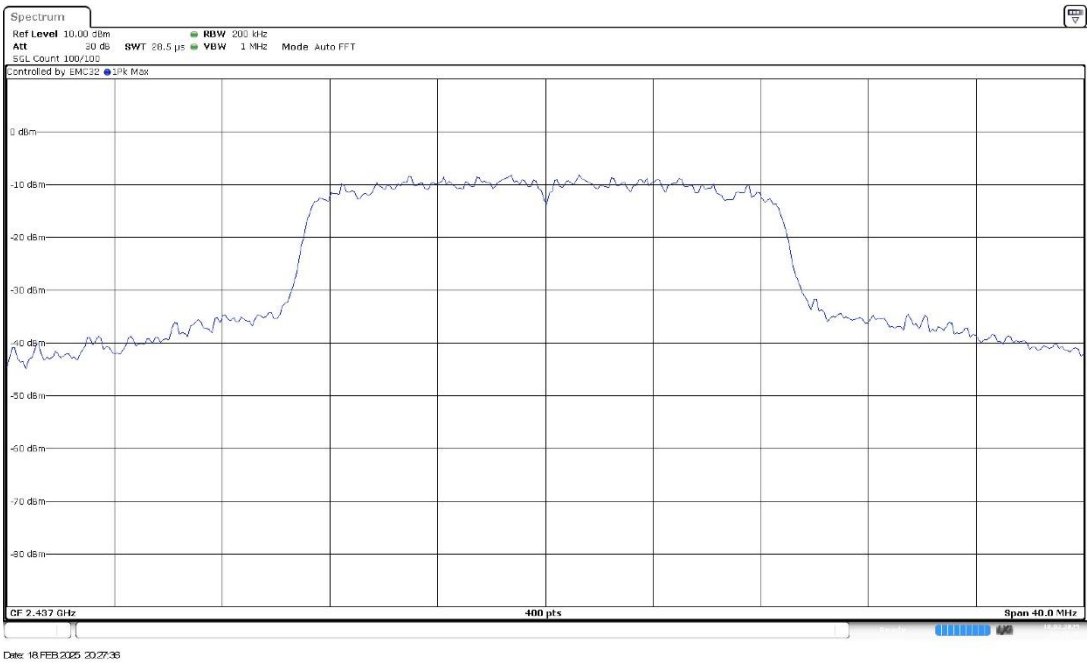
Equipment Type = Digital Transmission System (DTS) Bandwidth MHz = 20

Modulation = 802.11n HT20 (OFDM MCS0) Frequency MHz = 2437.00000

MIMO Mode = SISO Active Port = 1

Images:



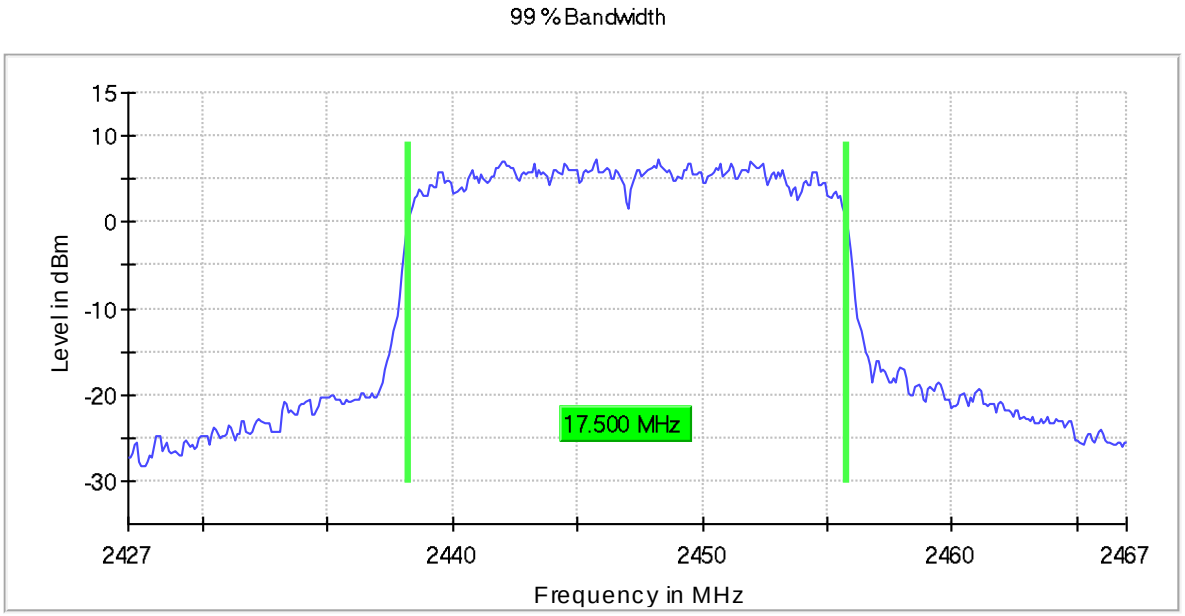


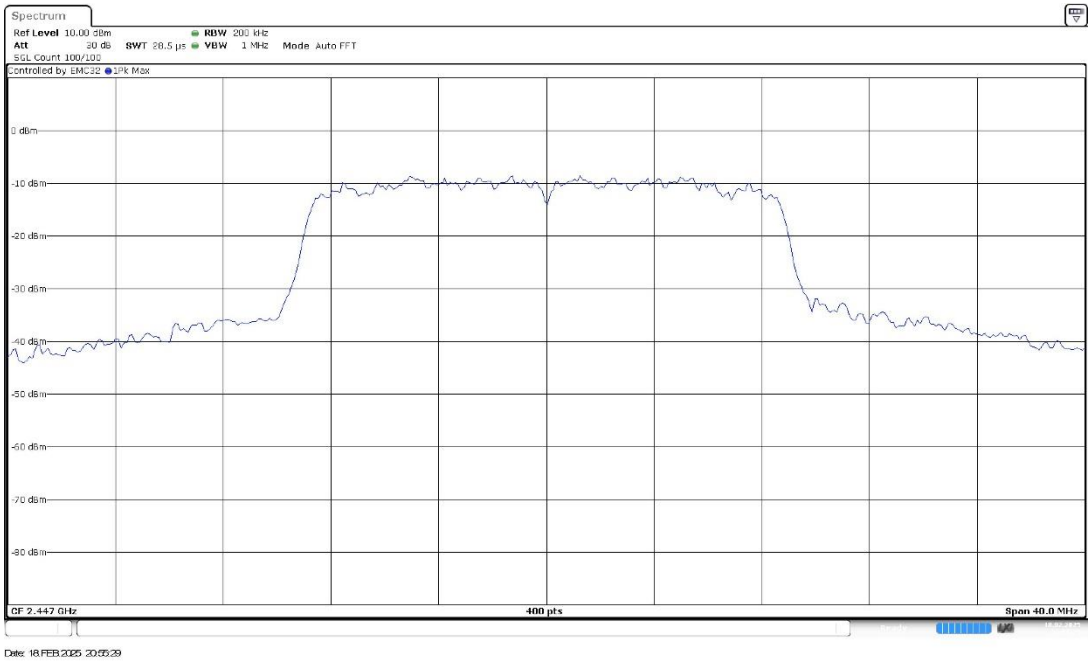
Equipment Type = Digital Transmission System (DTS) Bandwidth MHz = 20

Modulation = 802.11n HT20 (OFDM MCS0) Frequency MHz = 2447.00000

MIMO Mode = SISO Active Port = 1

Images:



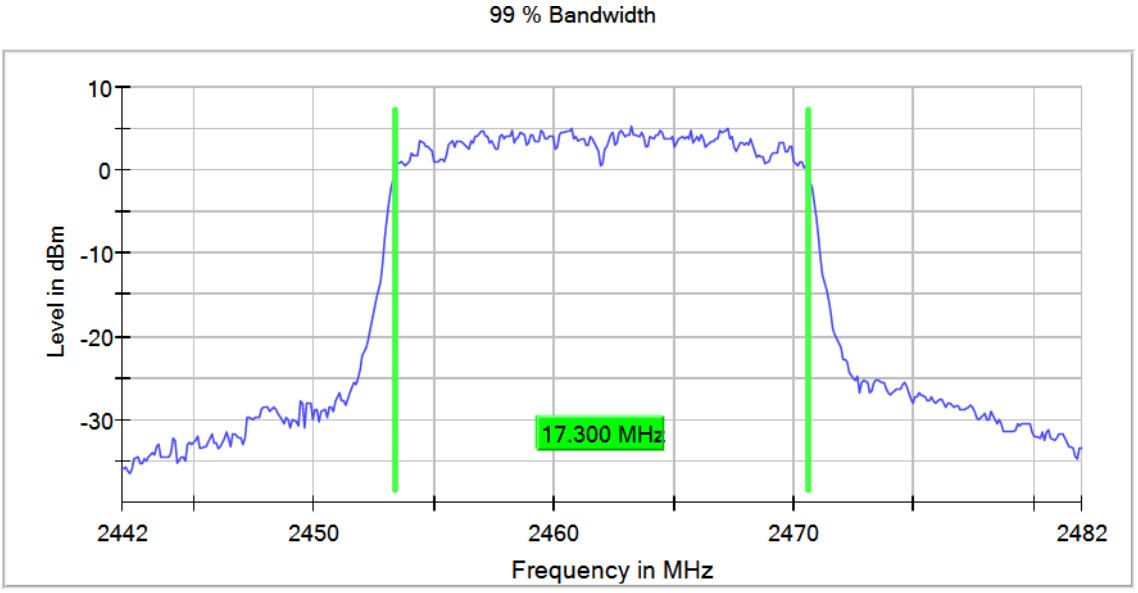


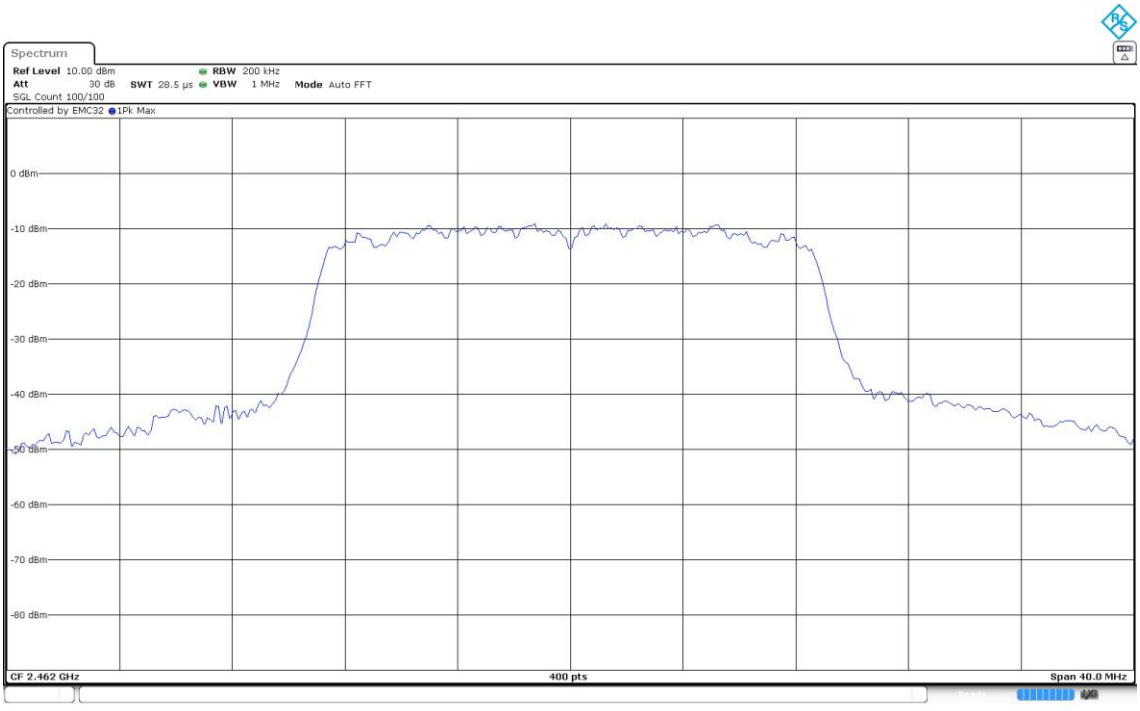
Equipment Type = Digital Transmission System (DTS) Bandwidth MHz = 20

Modulation = 802.11n HT20 (OFDM MCS0) Frequency MHz = 2462.00000

MIMO Mode = SISO Active Port = 1

Images:





Results

Modulation: 802.11ax HE20 (OFDMA MCS0) SU

MIMO Mode: SISO

Equipment	BW (MHz)	Freq (MHz)	Port	Occ Ch BW (MHz)
Digital Transmission System (DTS)	40	2412.00000	1	18.100
		2417.00000		18.500
		2437.00000		18.600
		2457.00000		18.700
		2462.00000		18.100

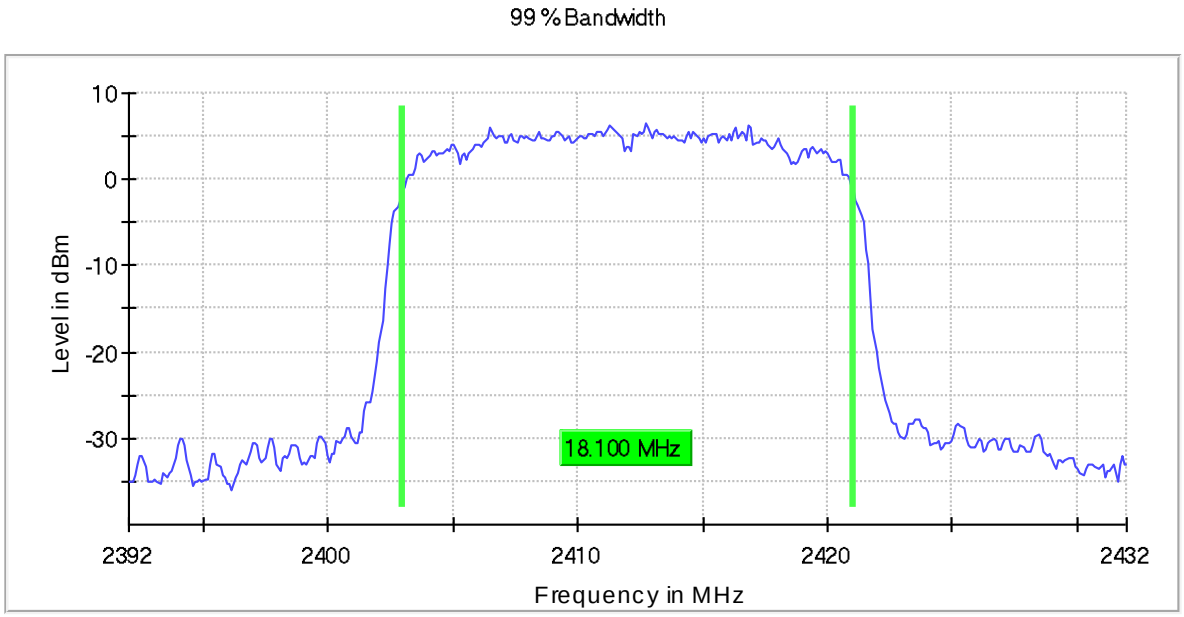
Verdict

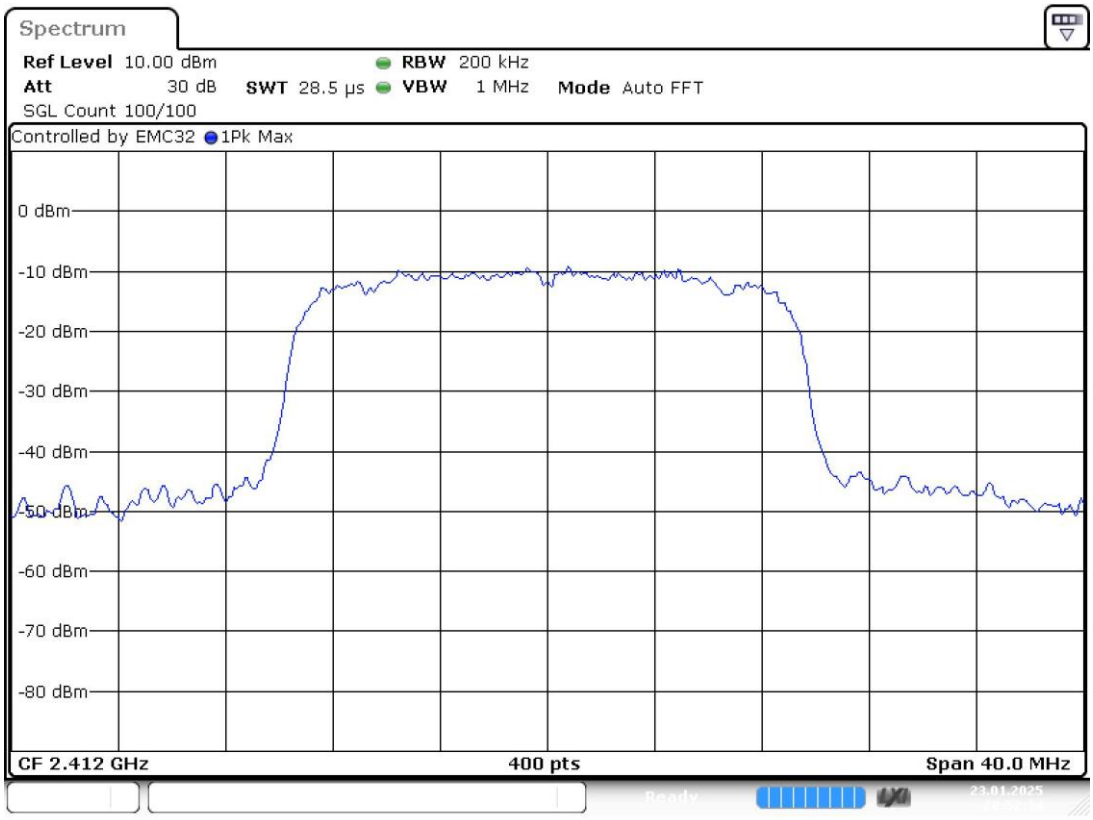
Pass

Attachments

Equipment Type = Digital Transmission System (DTS)	Bandwidth MHz = 40
Modulation = 802.11ax HE20 (OFDMA MCS0) SU	Frequency MHz = 2412.00000
MIMO Mode = SISO	Active Port = 1

Images:





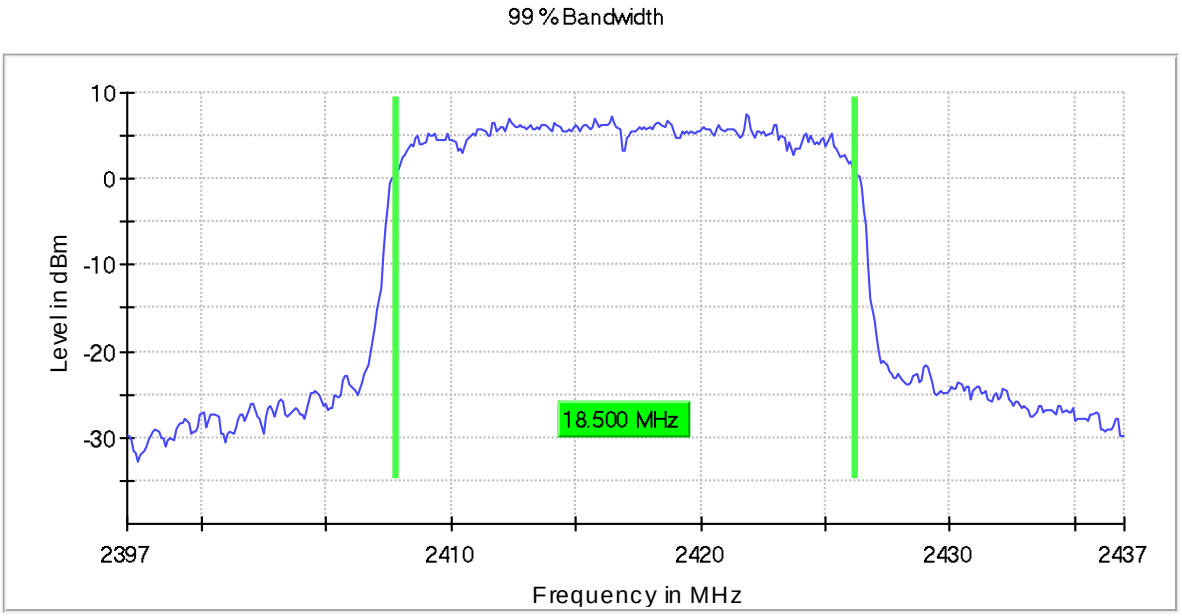
Date: 23.JAN.2025 20:52:34

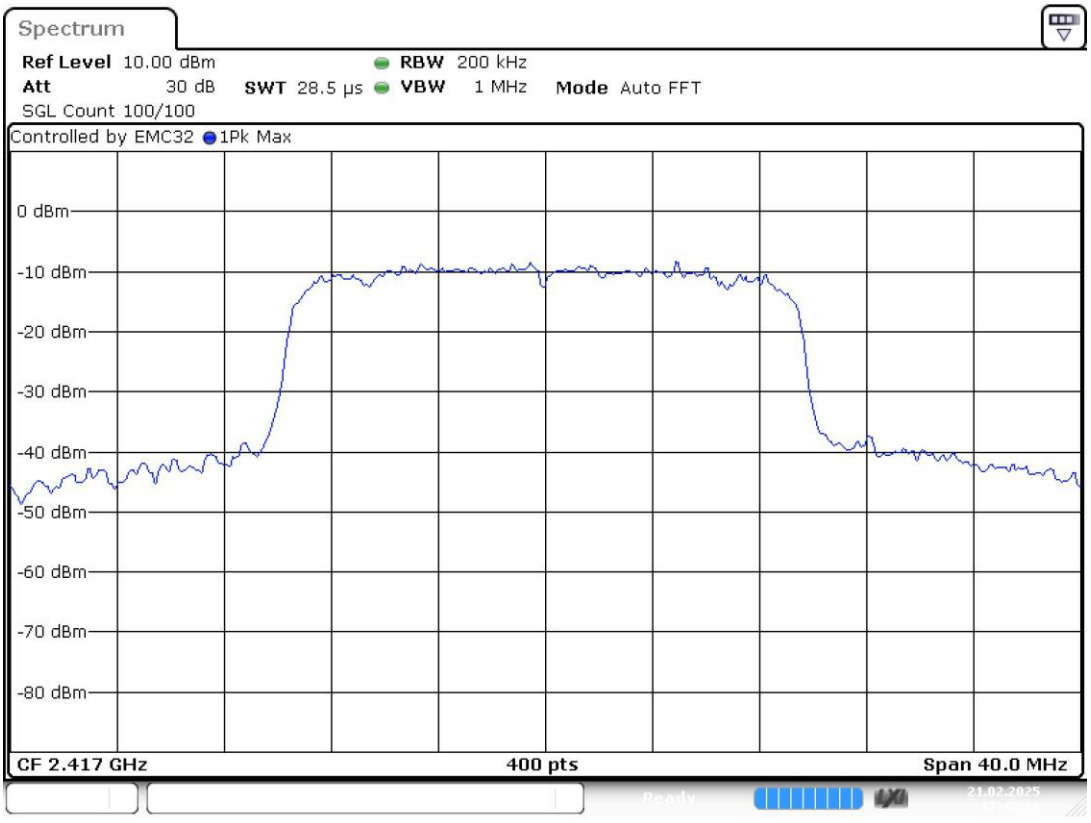
Equipment Type = Digital Transmission System (DTS) Bandwidth MHz = 40

Modulation = 802.11ax HE20 (OFDMA MCS0) SU Frequency MHz = 2417.00000

MIMO Mode = SISO Active Port = 1

Images:





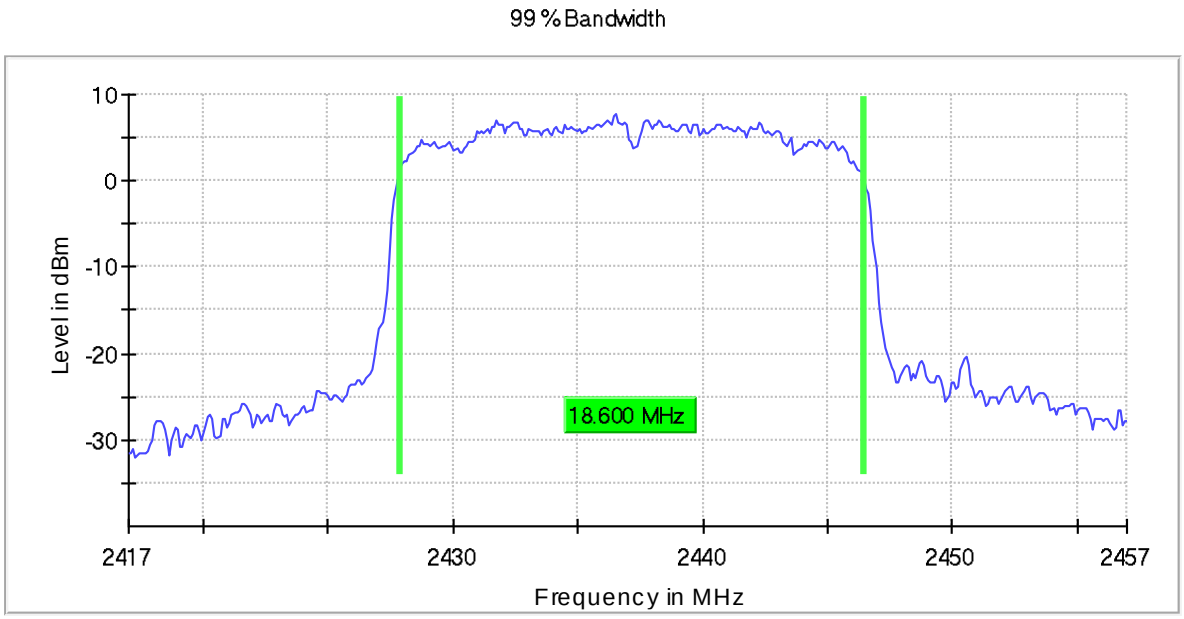
Date: 21.FEB.2025 17:48:31

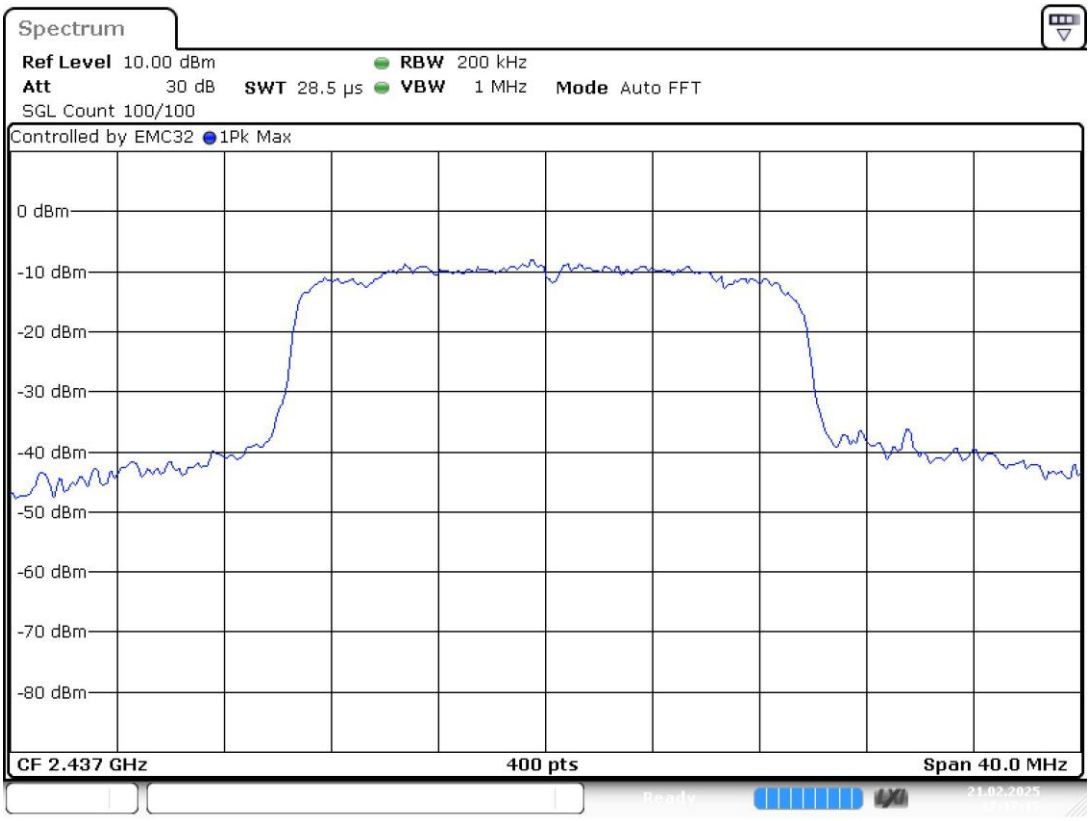
Equipment Type = Digital Transmission System (DTS) Bandwidth MHz = 40

Modulation = 802.11ax HE20 (OFDMA MCS0) SU Frequency MHz = 2437.00000

MIMO Mode = SISO Active Port = 1

Images:

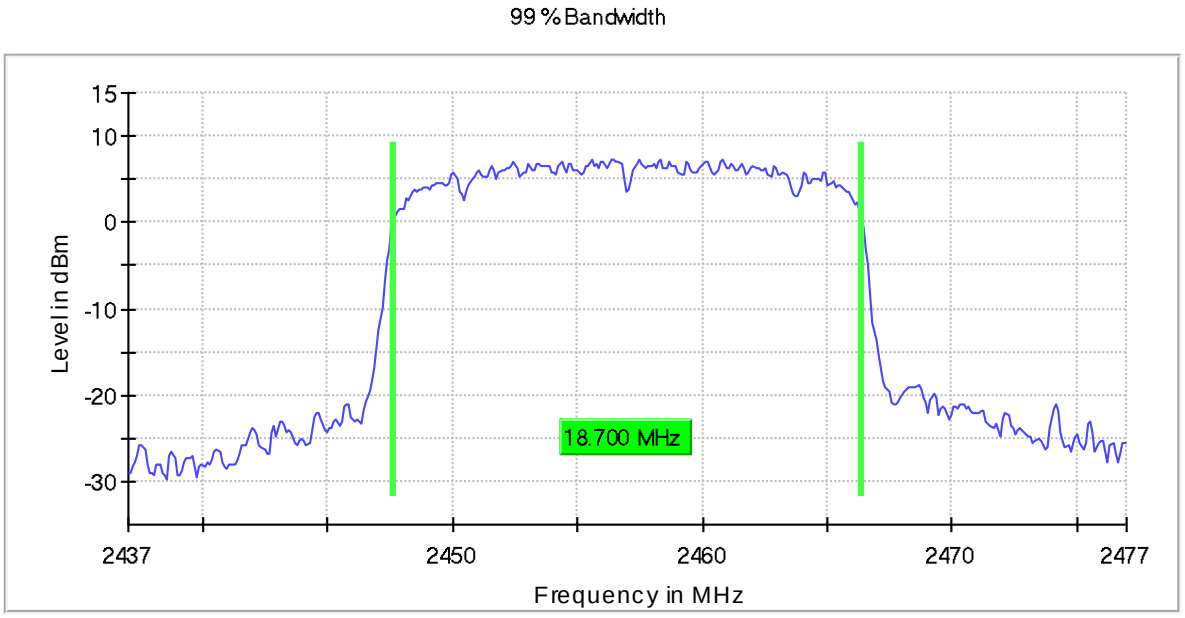


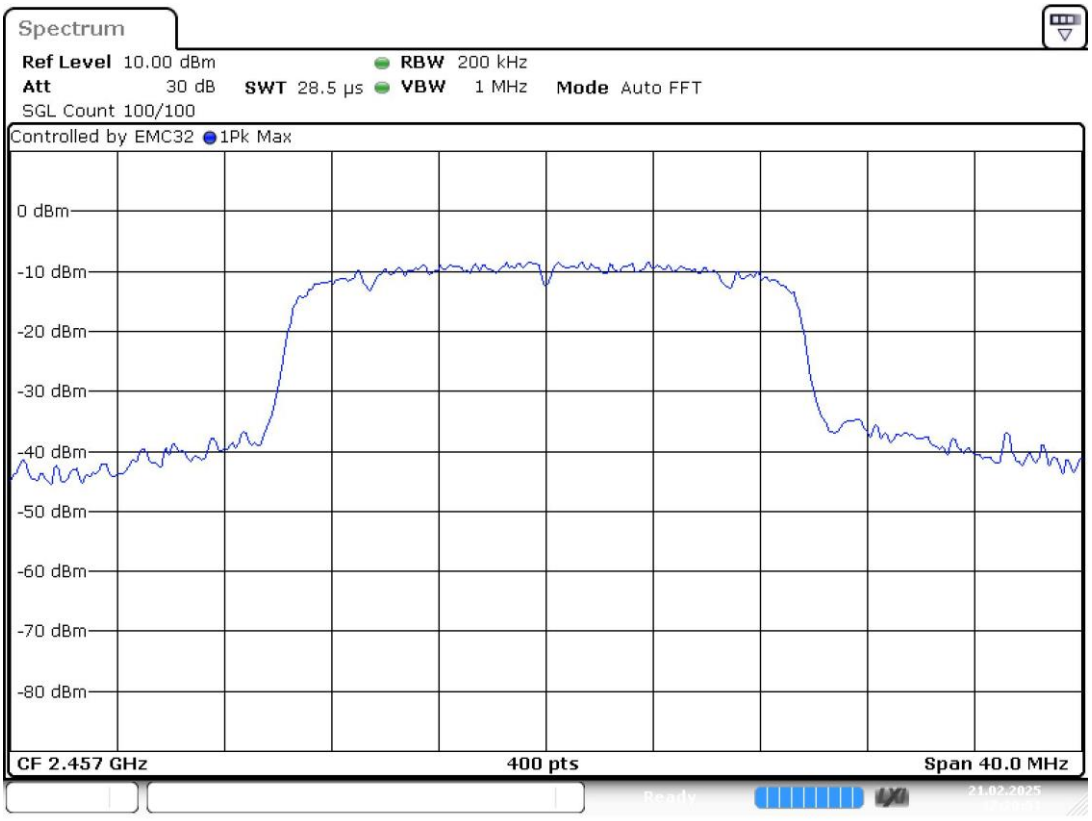


Date: 21.FEB.2025 17:17:16

Equipment Type = Digital Transmission System (DTS)	Bandwidth MHz = 40
Modulation = 802.11ax HE20 (OFDMA MCS0) SU	Frequency MHz = 2457.00000
MIMO Mode = SISO	Active Port = 1

Images:





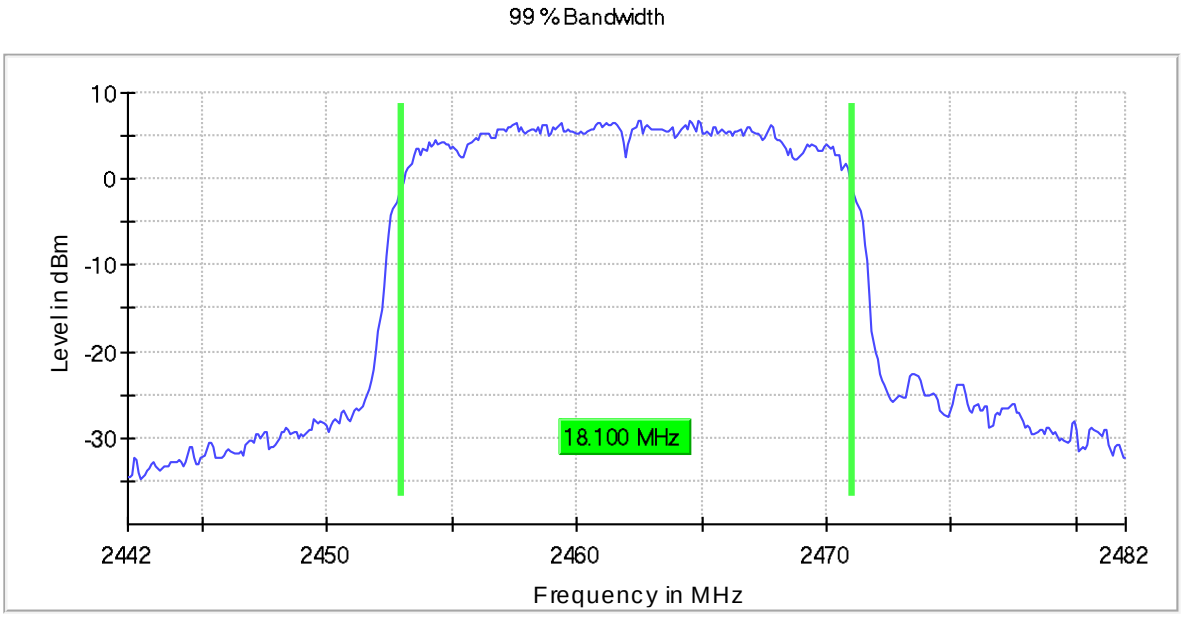
Date: 21.FEB.2025 17:20:52

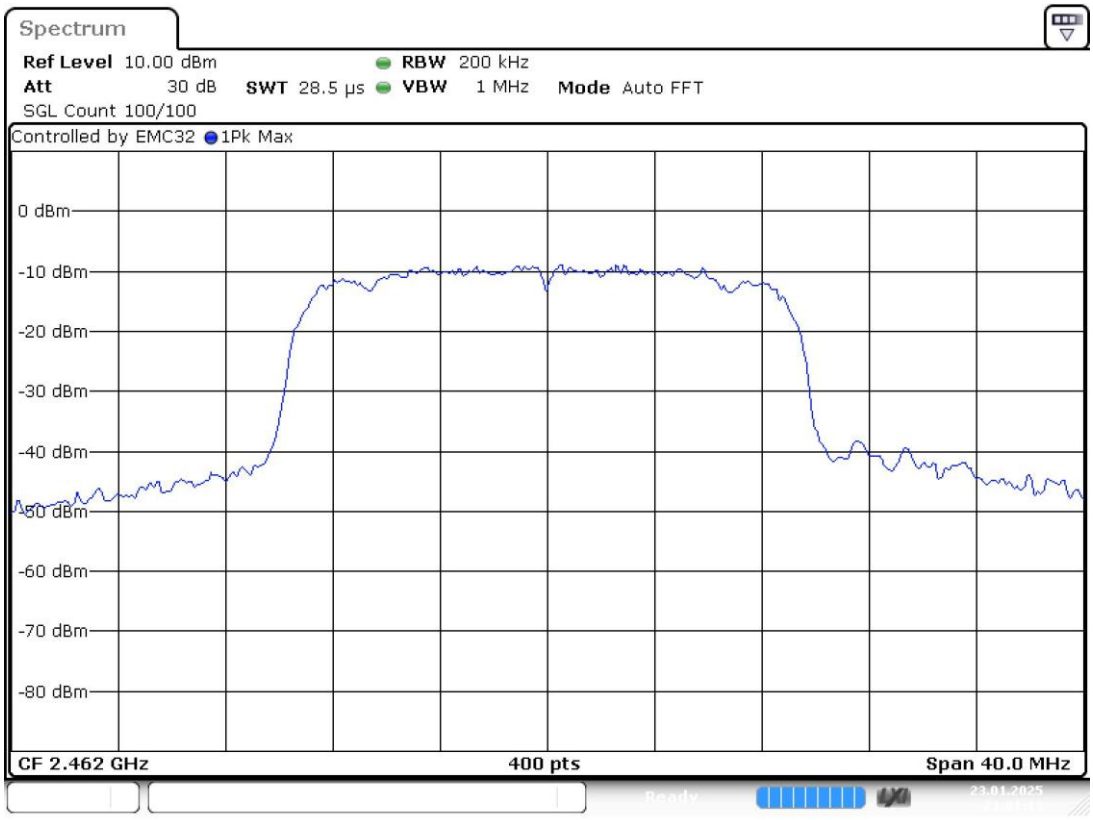
Equipment Type = Digital Transmission System (DTS) Bandwidth MHz = 40

Modulation = 802.11ax HE20 (OFDMA MCS0) SU Frequency MHz = 2462.00000

MIMO Mode = SISO Active Port = 1

Images:





Date: 23.JAN.2025 21:01:13

Results

Modulation: 802.11n HT40 (OFDM MCS0)

MIMO Mode: SISO

Equipment	BW (MHz)	Freq (MHz)	Port	Occ Ch BW (MHz)
Digital Transmission System (DTS)	40	2422.00000	1	32.250
		2432.00000		33.750
		2437.00000		32.250
		2452.00000		32.250

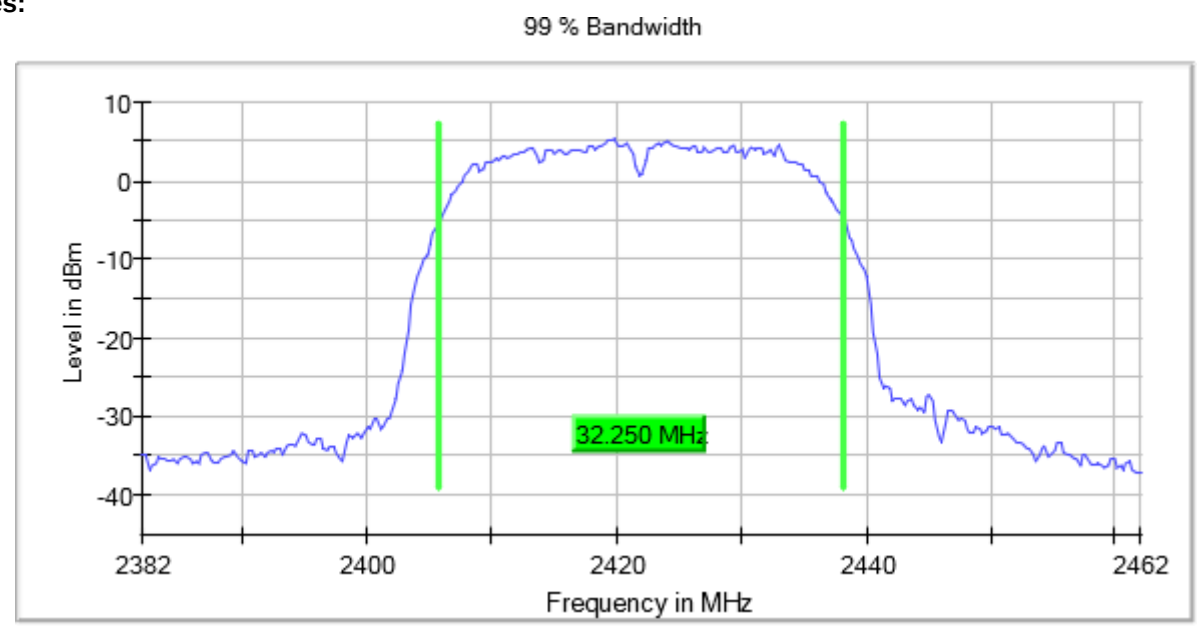
Verdict

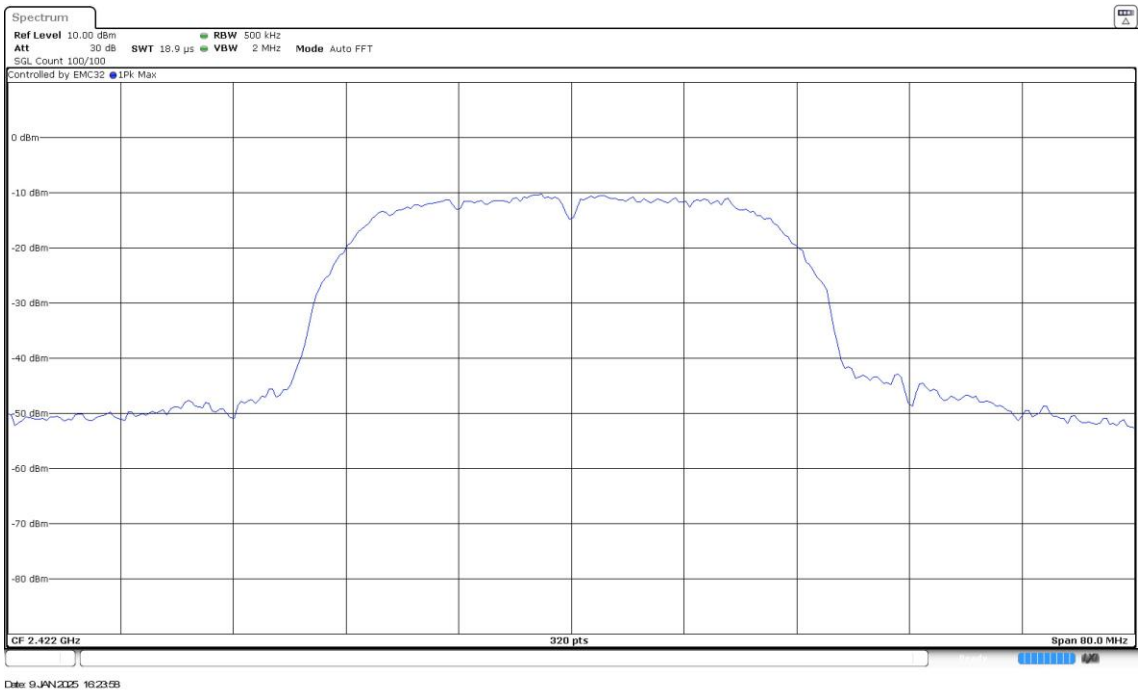
Pass

Attachments

Equipment Type = Digital Transmission System (DTS)	Bandwidth MHz = 40
Modulation = 802.11n HT40 (OFDM MCS0)	Frequency MHz = 2422.00000
MIMO Mode = SISO	Active Port = 1

Images:



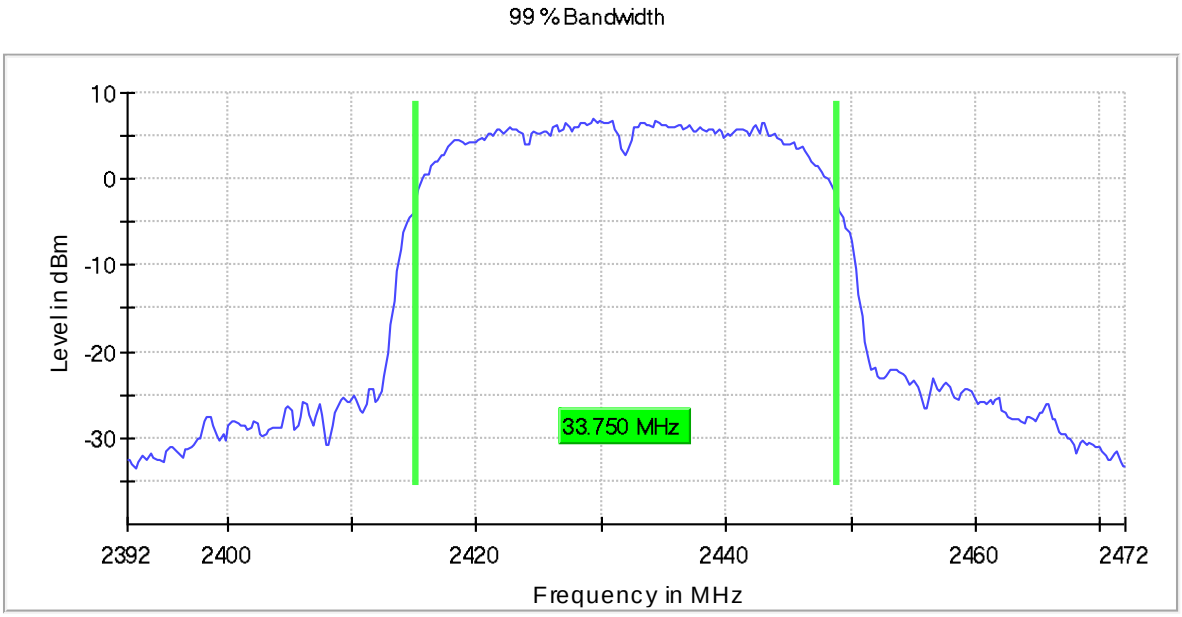


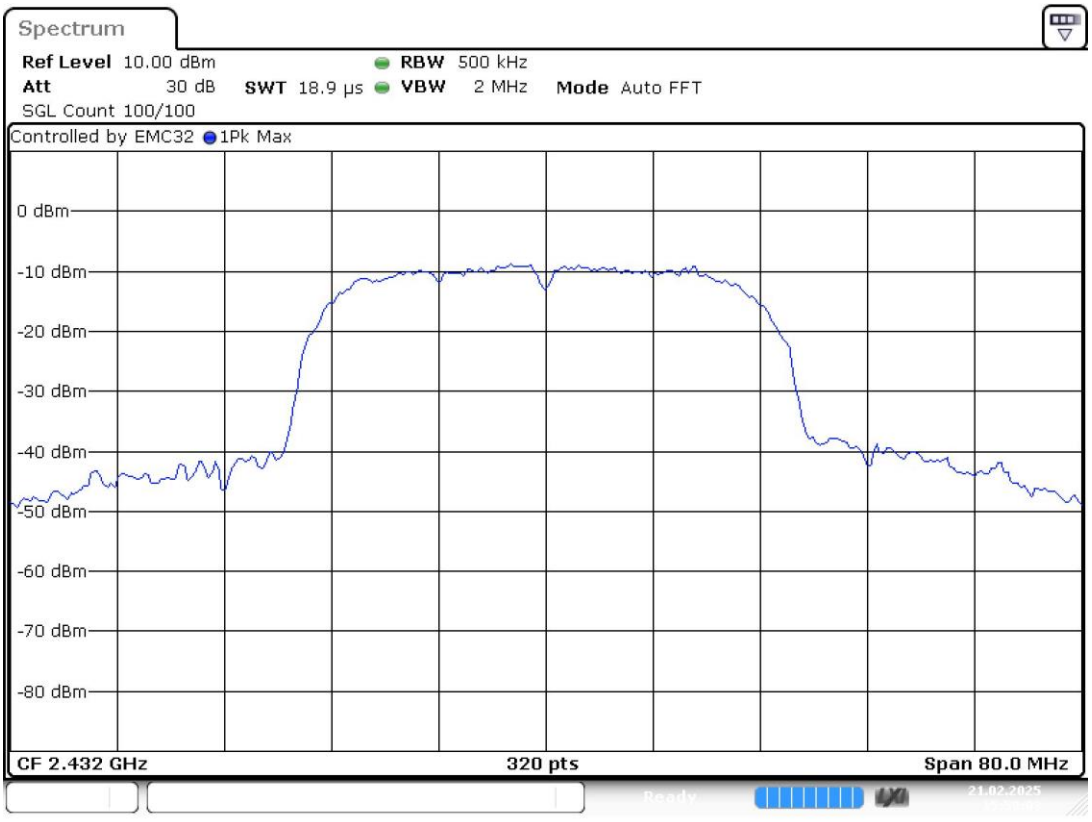
Equipment Type = Digital Transmission System (DTS) Bandwidth MHz = 40

Modulation = 802.11n HT40 (OFDM MCS0) Frequency MHz = 2432.00000

MIMO Mode = SISO Active Port = 1

Images:





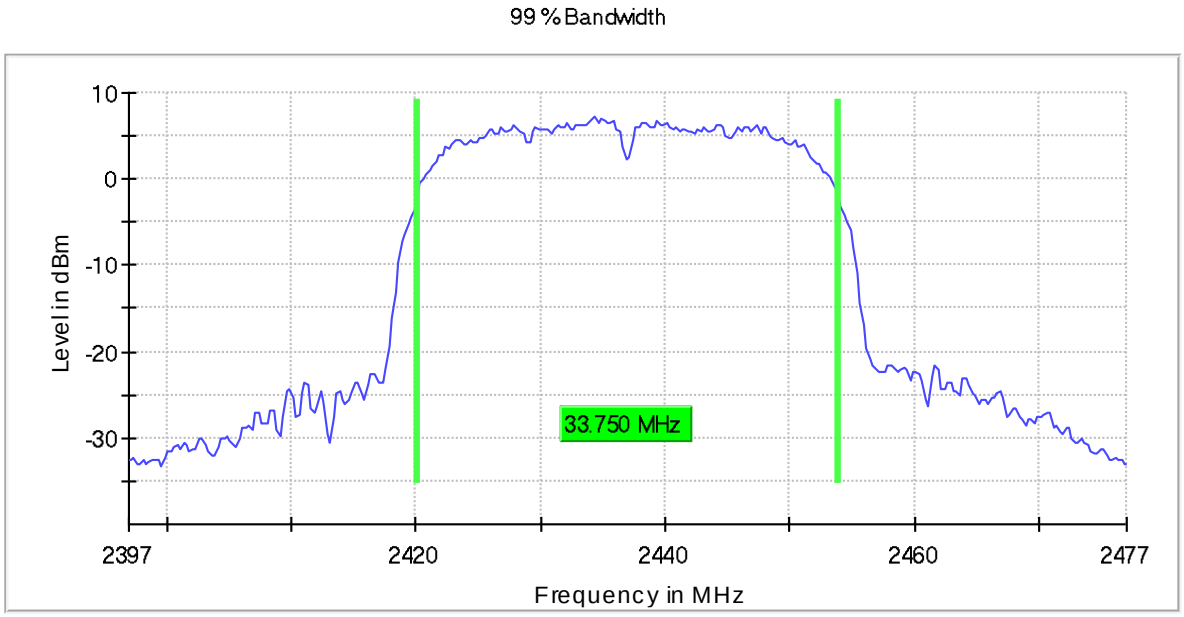
Date: 21.FEB.2025 15:59:03

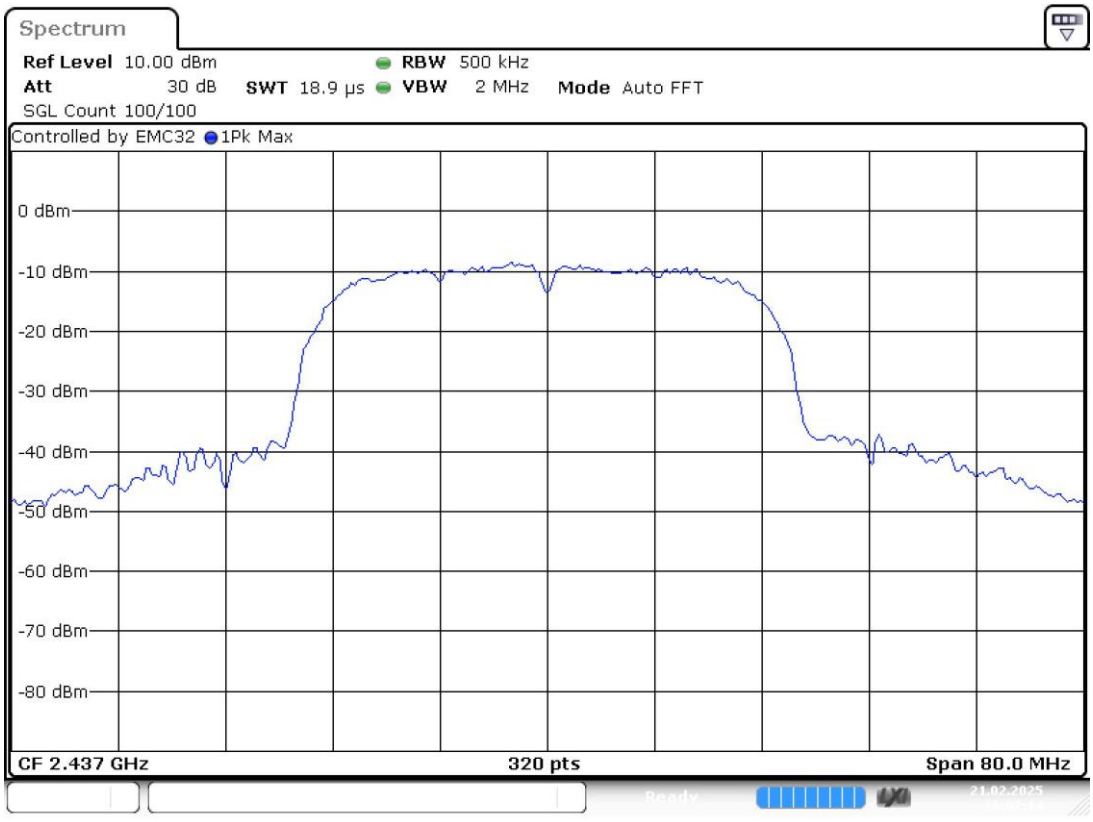
Equipment Type = Digital Transmission System (DTS) Bandwidth MHz = 40

Modulation = 802.11n HT40 (OFDM MCS0) Frequency MHz = 2437.00000

MIMO Mode = SISO Active Port = 1

Images:





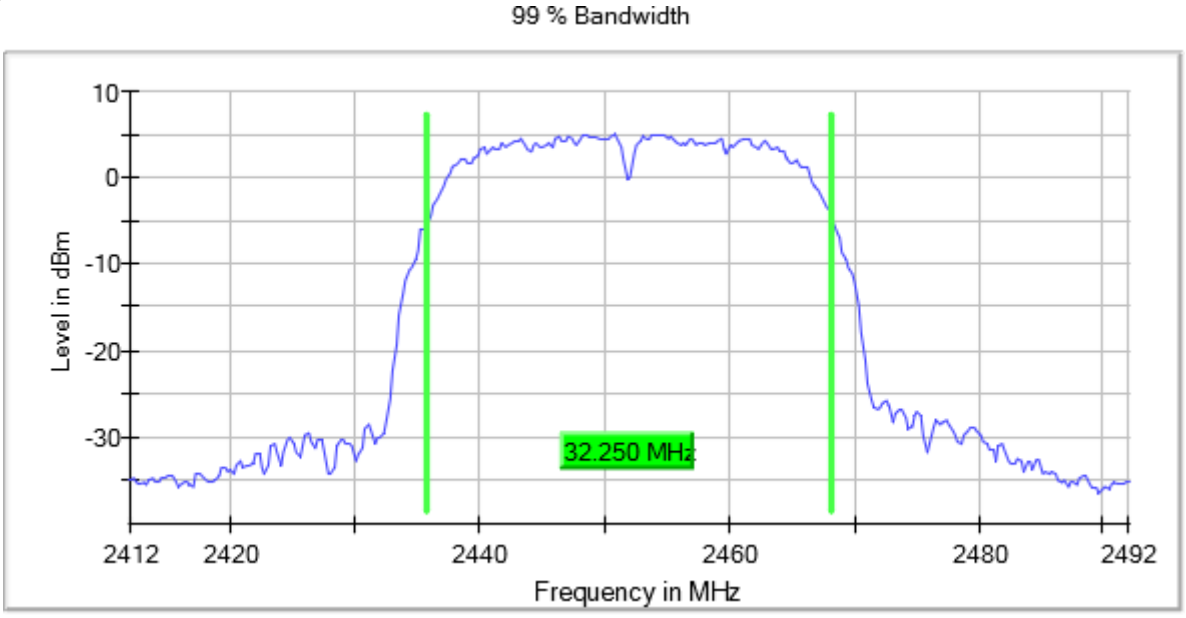
Date: 21.FEB.2025 16:02:15

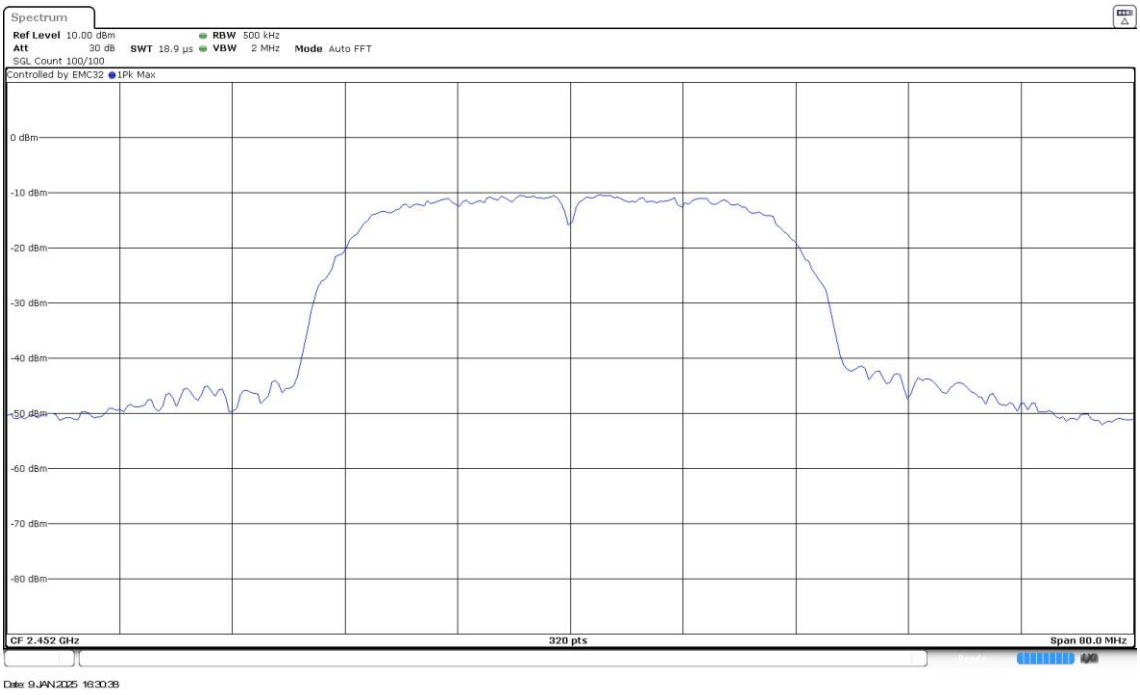
Equipment Type = Digital Transmission System (DTS) Bandwidth MHz = 40

Modulation = 802.11n HT40 (OFDM MCS0) Frequency MHz = 2452.00000

MIMO Mode = SISO Active Port = 1

Images:





RSS-247 5.2 (a) / FCC 15.247 (a) (2) [6dBw] 6 dB Bandwidth

Limits

The minimum 6 dB bandwidth shall be at least 500 kHz.

Results

Modulation: 802.11b (DSSS 1 Mbit/s)

MIMO Mode: SISO

BW (MHz)	Freq (MHz)	Port	Ebw (MHz)
20	2412.00000	1	9.650
	2437.00000		9.600
	2462.00000		9.600

Verdict

Pass

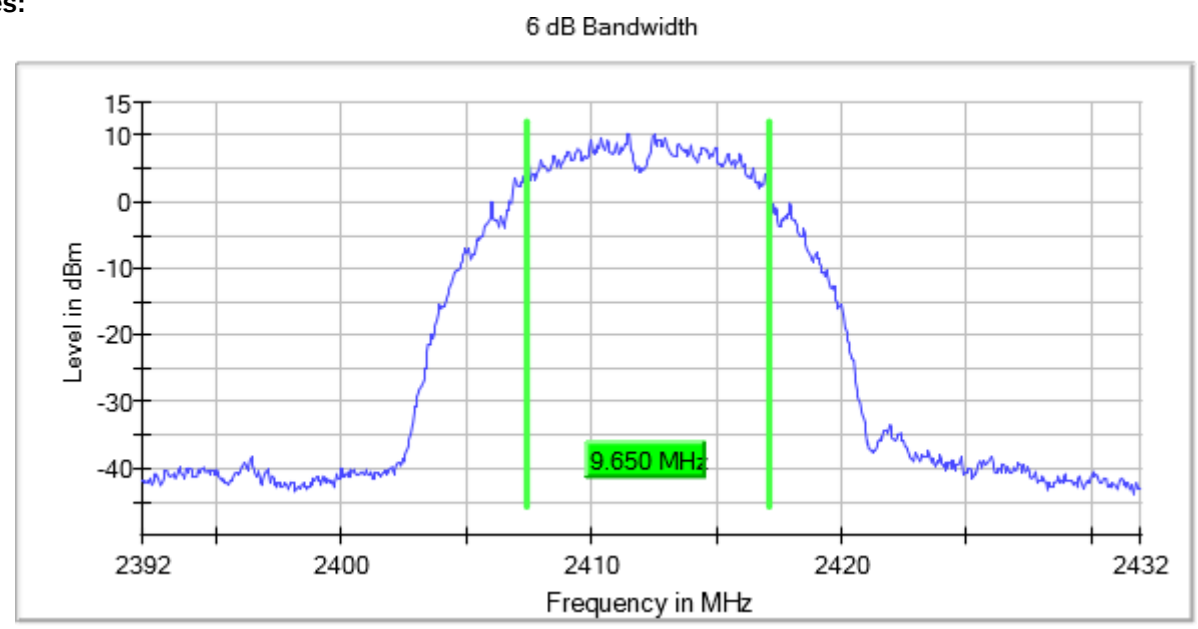
Attachments

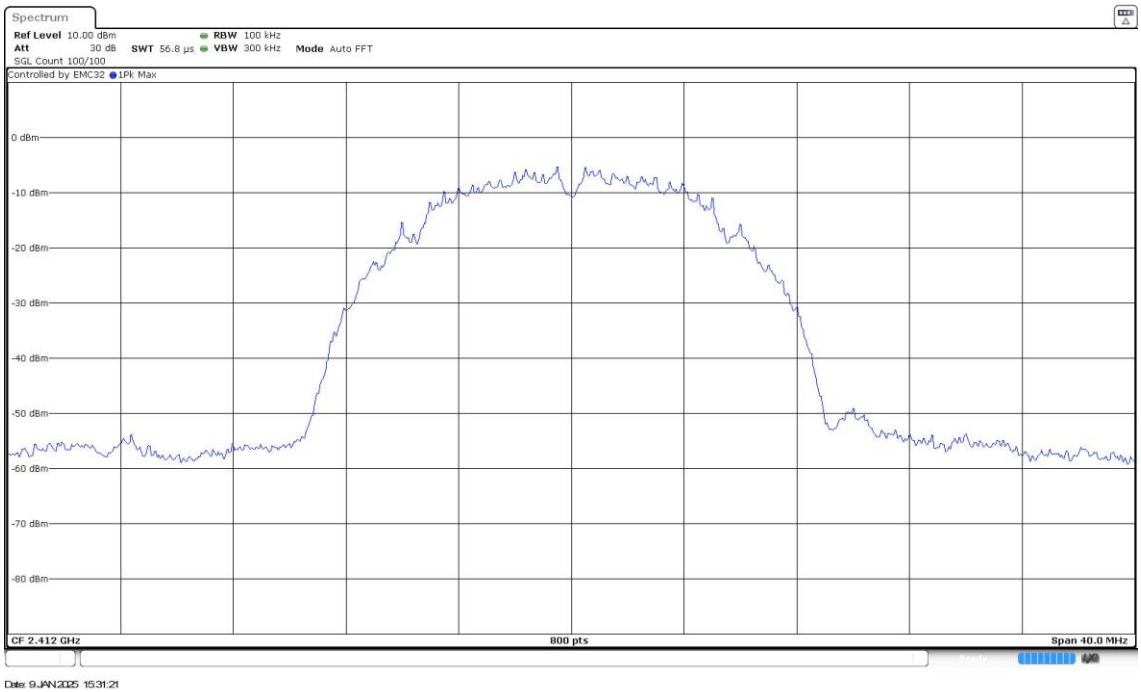
Bandwidth MHz = 20 Modulation = 802.11b (DSSS 1 Mbit/s)

Frequency MHz = 2412.00000 MIMO Mode = SISO

Active Port = 1

Images:



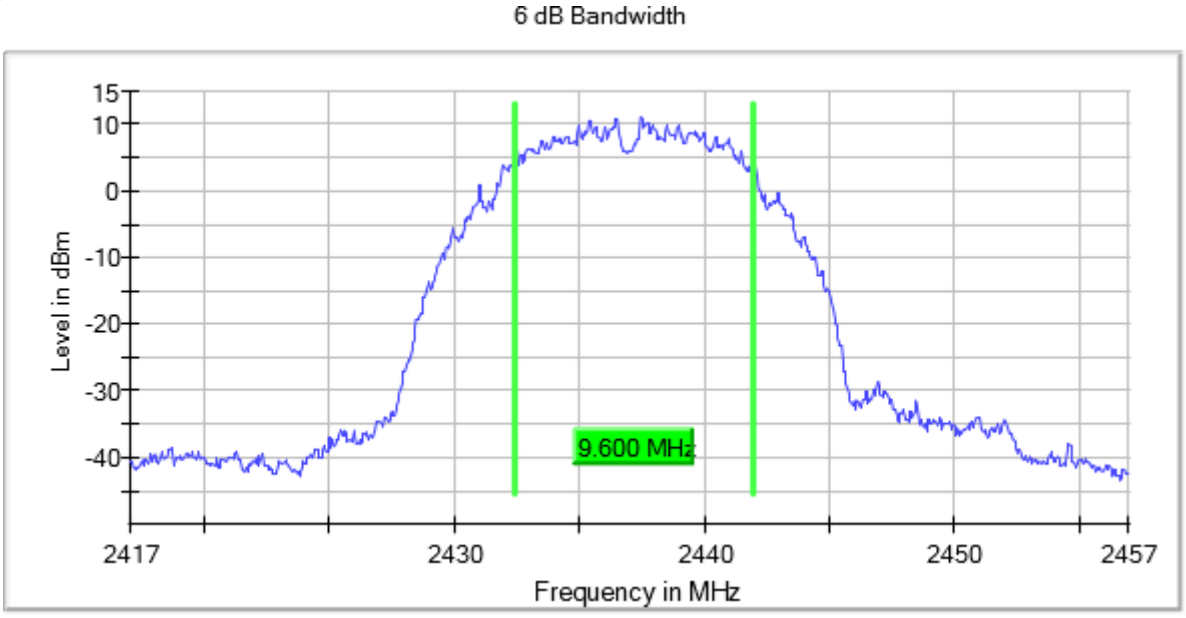


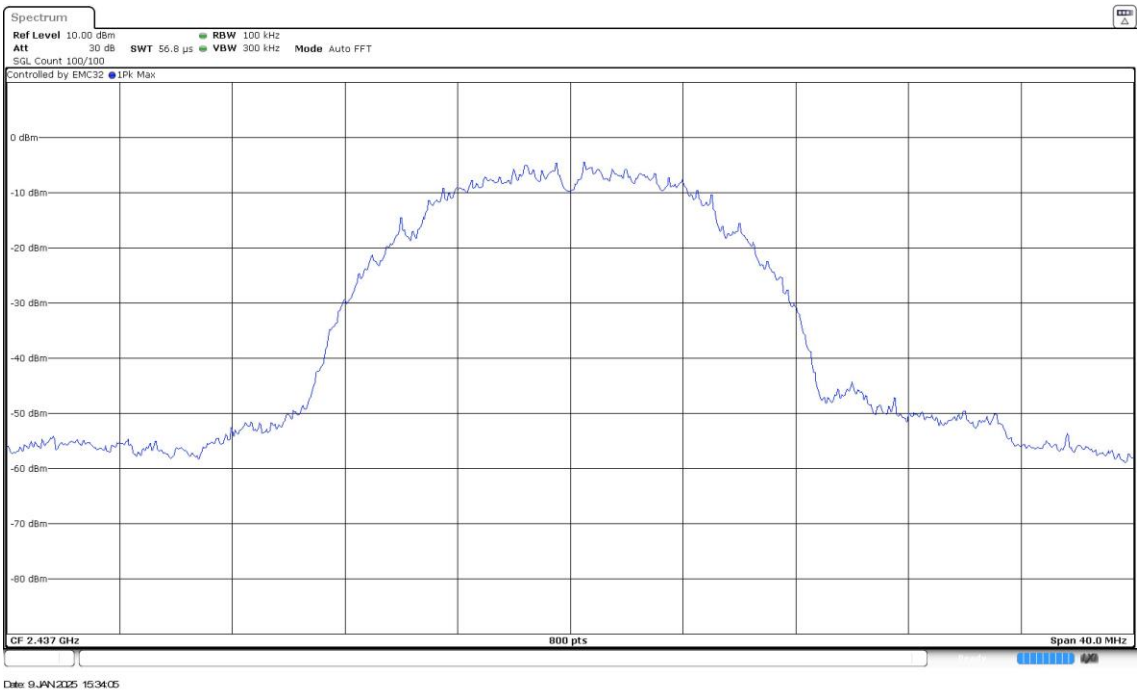
Bandwidth MHz = 20 Modulation = 802.11b (DSSS 1 Mbit/s)

Frequency MHz = 2437.00000 MIMO Mode = SISO

Active Port = 1

Images:



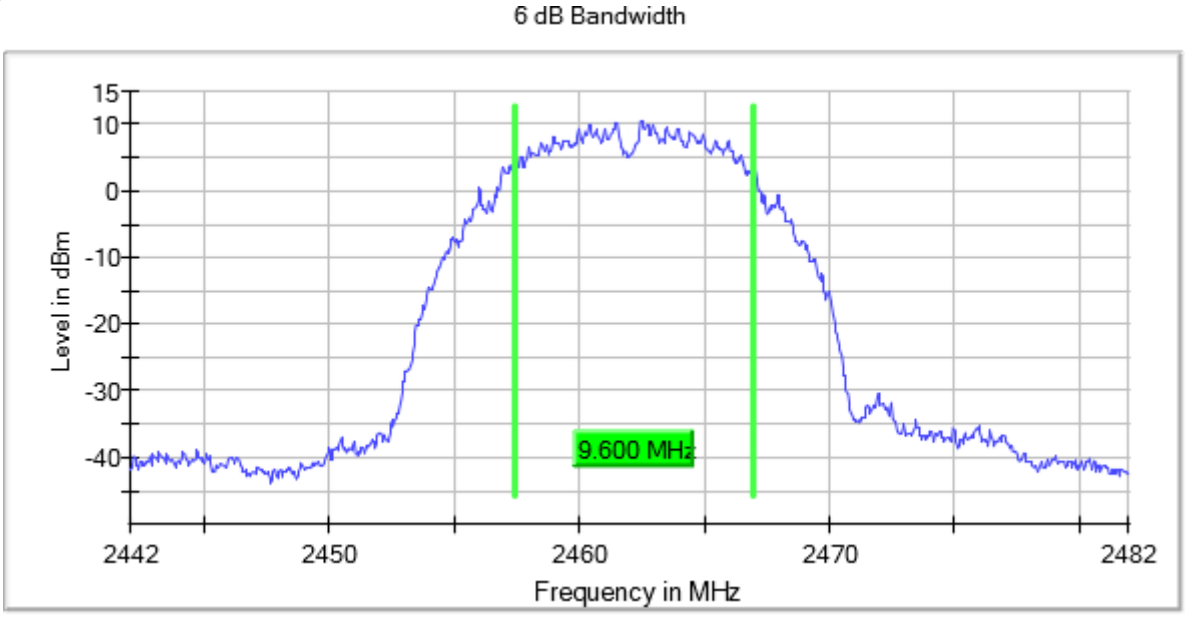


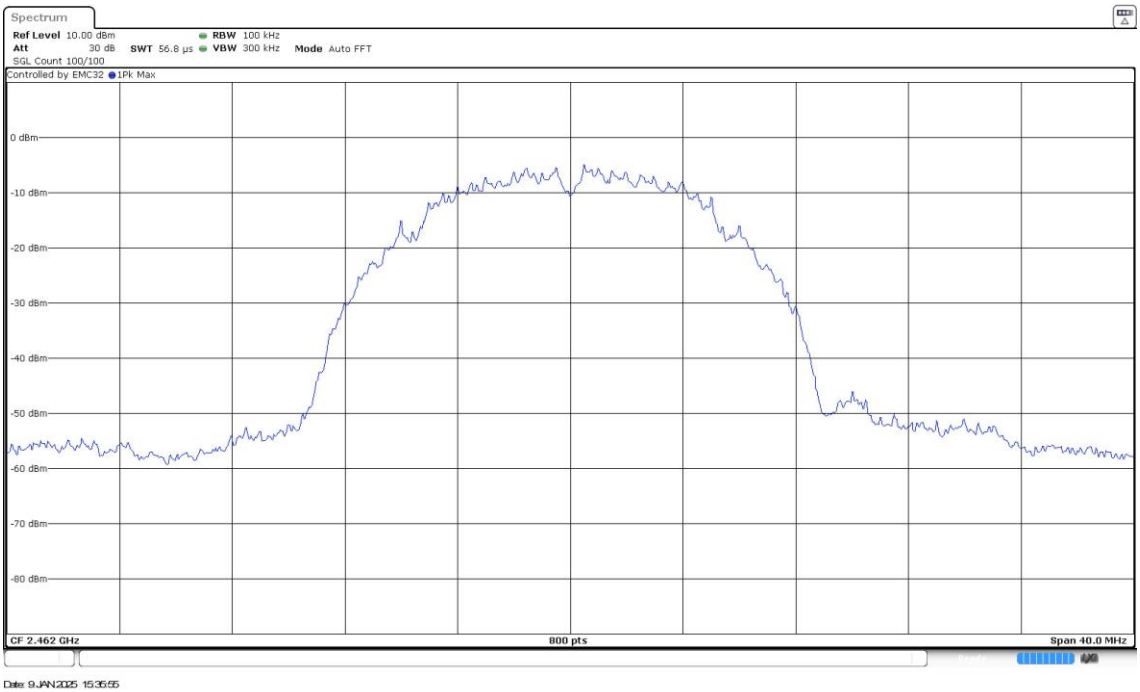
Bandwidth MHz = 20 Modulation = 802.11b (DSSS 1 Mbit/s)

Frequency MHz = 2462.00000 MIMO Mode = SISO

Active Port = 1

Images:





Results

Modulation: 802.11g (OFDM 6 Mbit/s)

MIMO Mode: SISO

BW (MHz)	Freq (MHz)	Port	Ebw (MHz)
20	2412.00000	1	16.350
	2417.00000		16.150
	2437.00000		16.150
	2447.00000		16.350
	2462.00000		16.350

Verdict

Pass

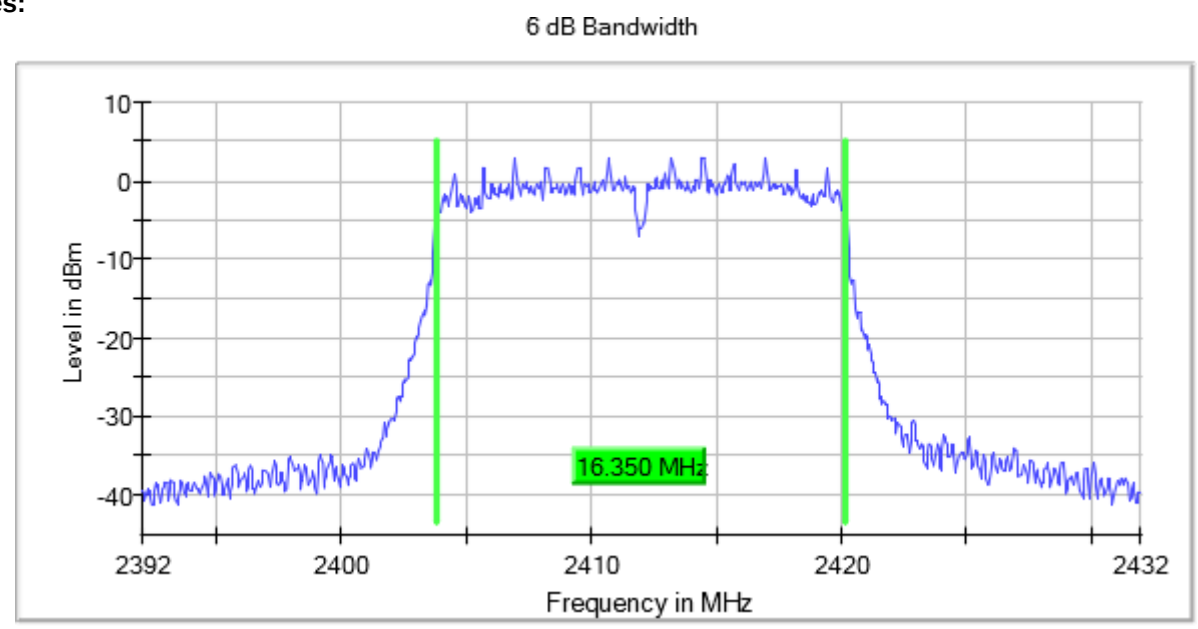
Attachments

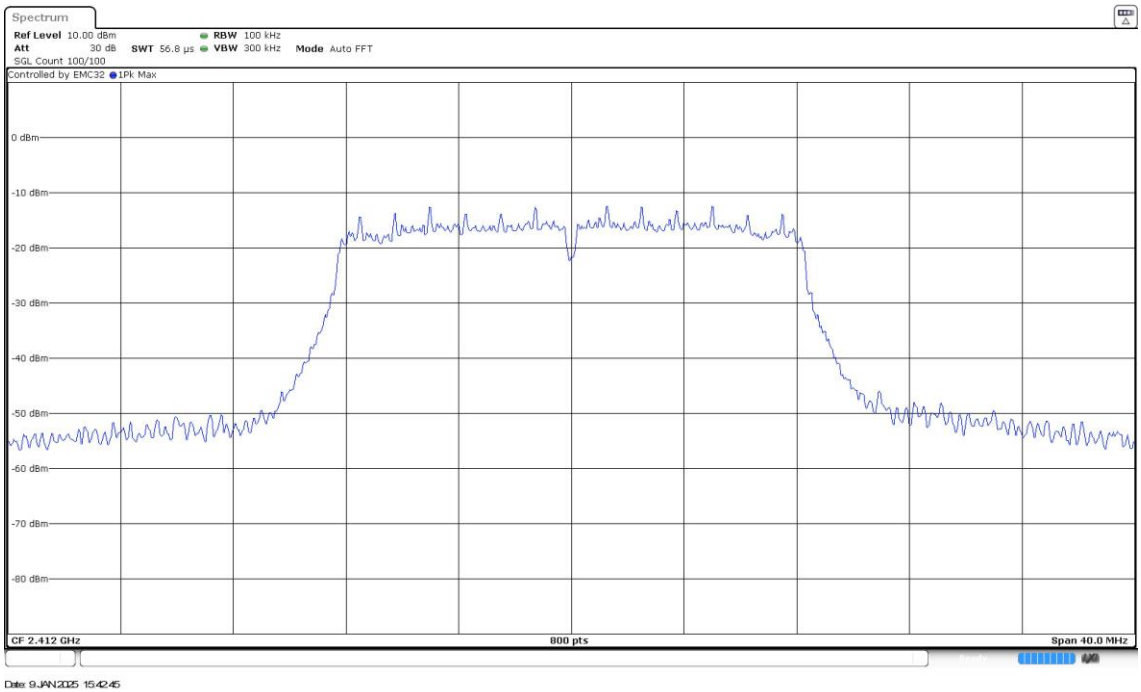
Bandwidth MHz = 20 Modulation = 802.11g (OFDM 6 Mbit/s)

Frequency MHz = 2412.00000 MIMO Mode = SISO

Active Port = 1

Images:



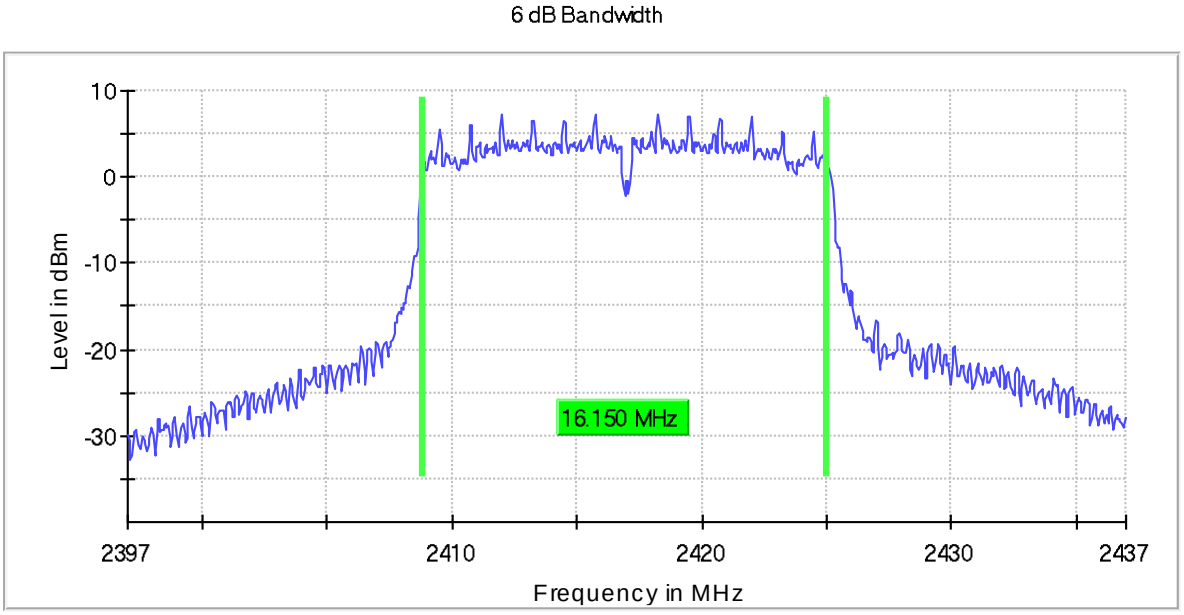


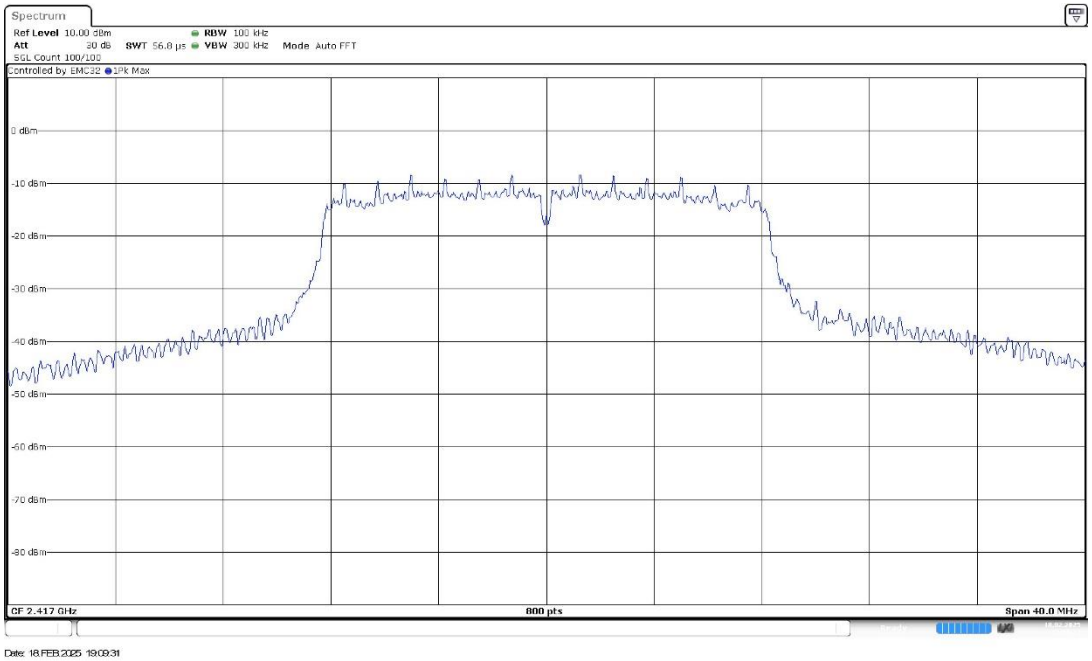
Bandwidth MHz = 20 Modulation = 802.11g (OFDM 6 Mbit/s)

Frequency MHz = 2417.00000 MIMO Mode = SISO

Active Port = 1

Images:



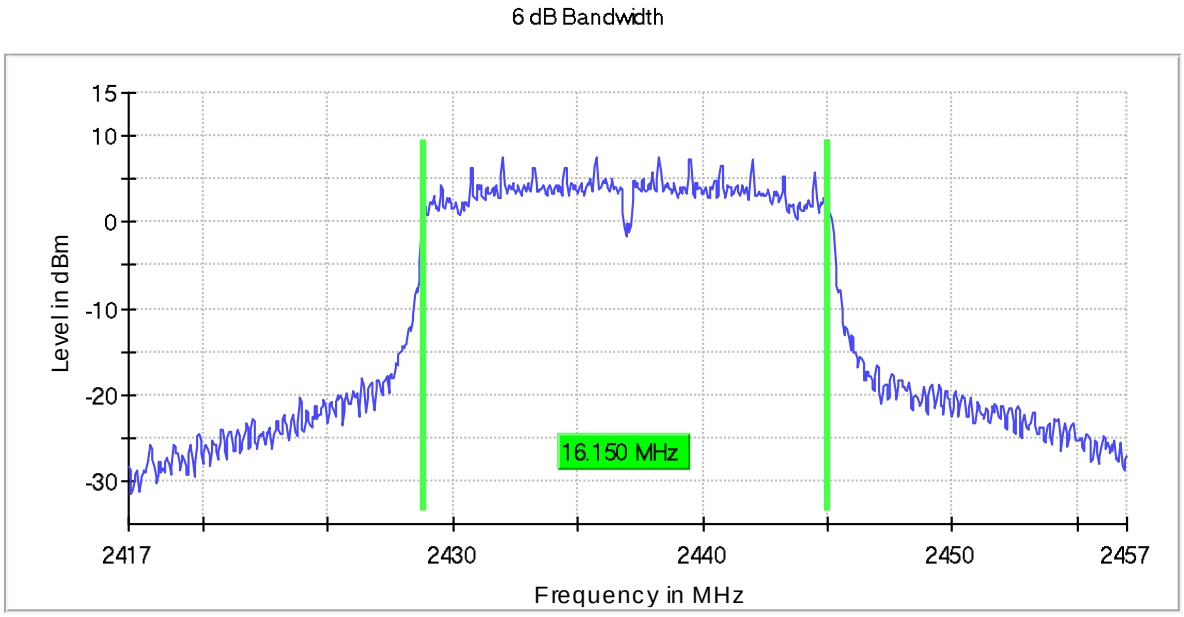


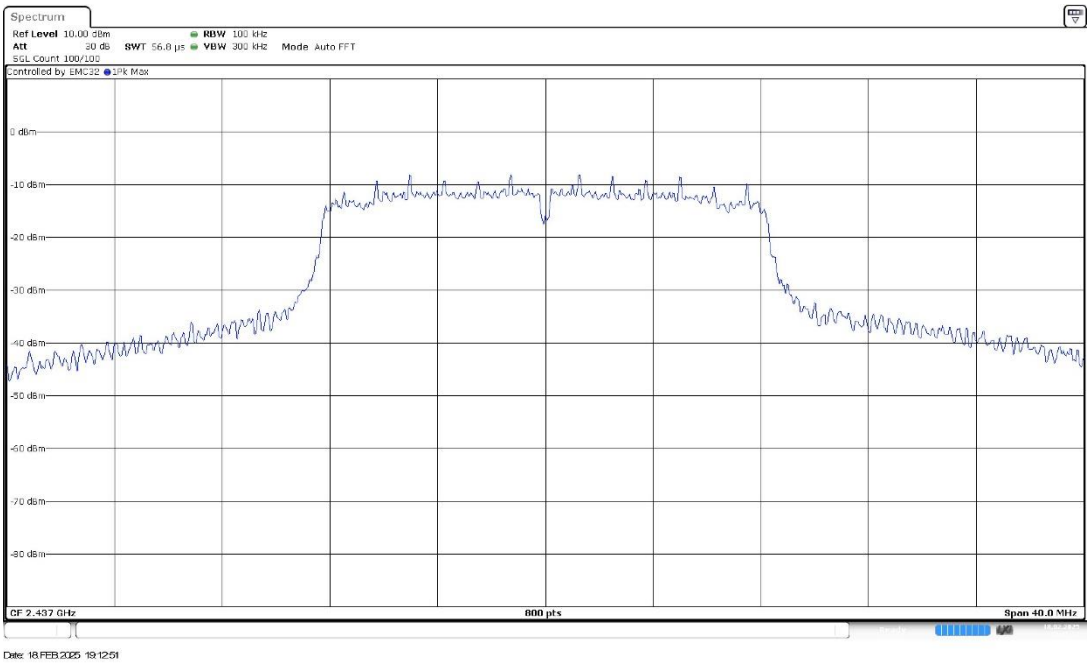
Bandwidth MHz = 20 Modulation = 802.11g (OFDM 6 Mbit/s)

Frequency MHz = 2437.00000 MIMO Mode = SISO

Active Port = 1

Images:





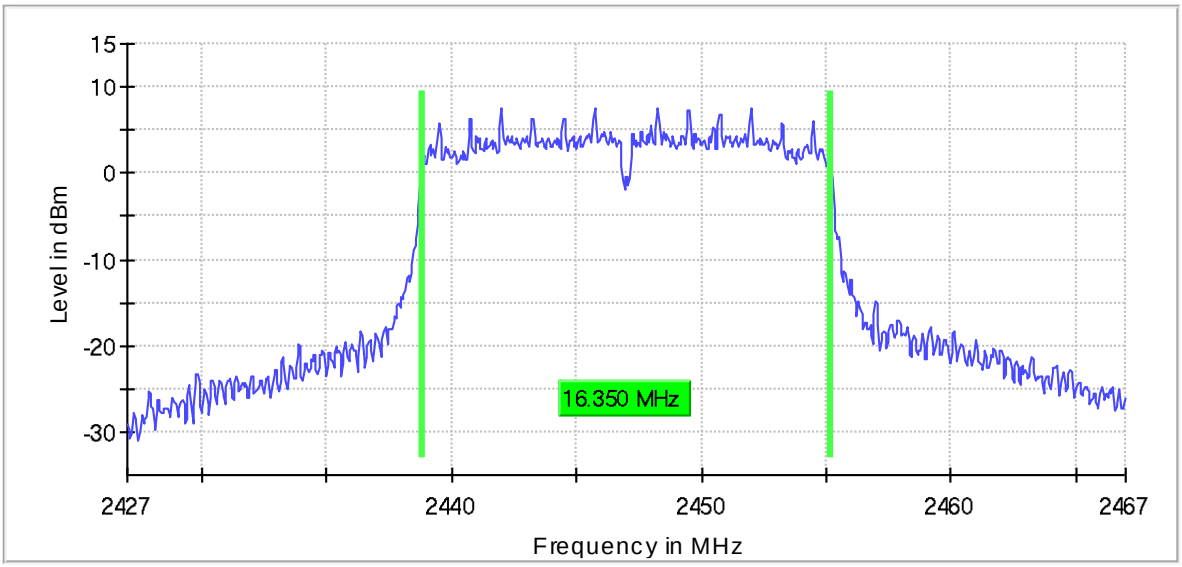
Bandwidth MHz = 20 Modulation = 802.11g (OFDM 6 Mbit/s)

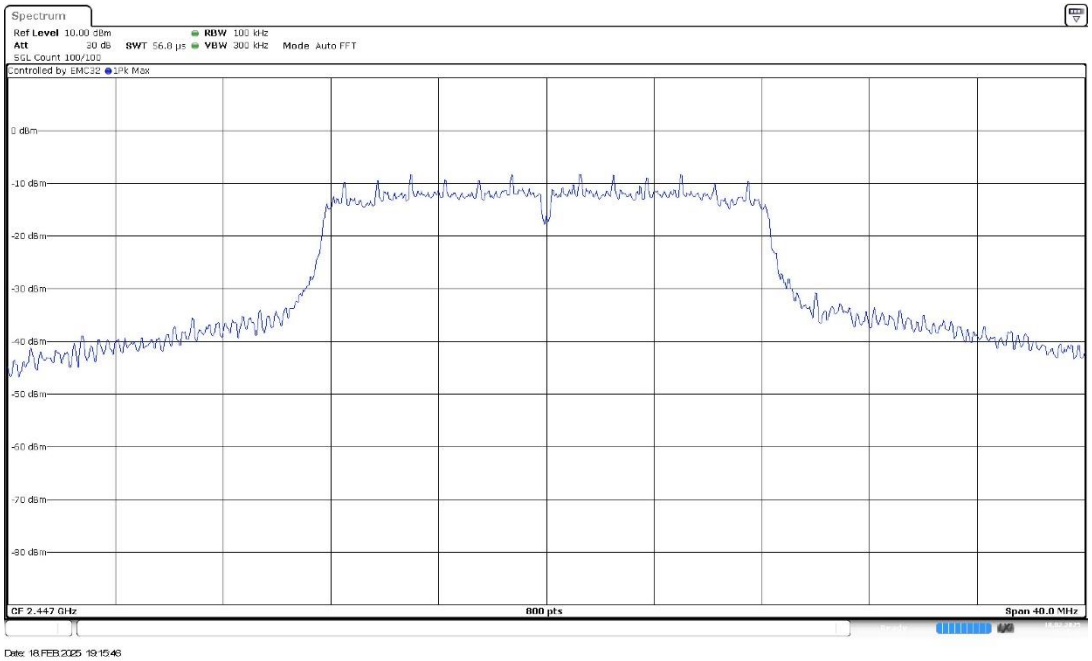
Frequency MHz = 2447.00000 MIMO Mode = SISO

Active Port = 1

Images:

6 dB Bandwidth



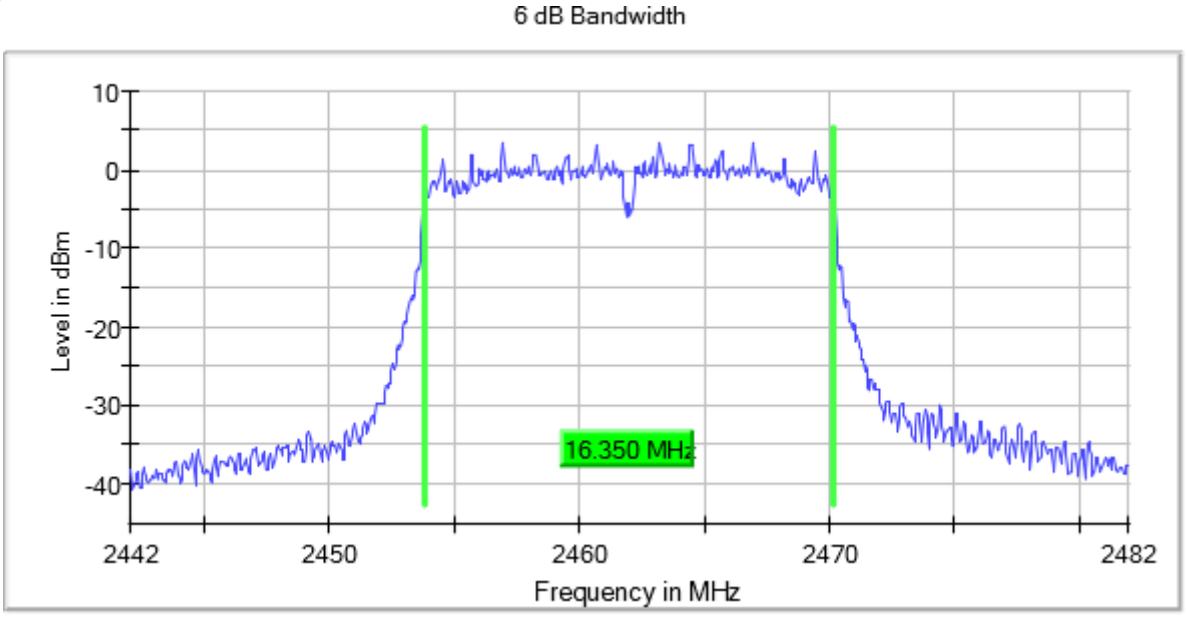


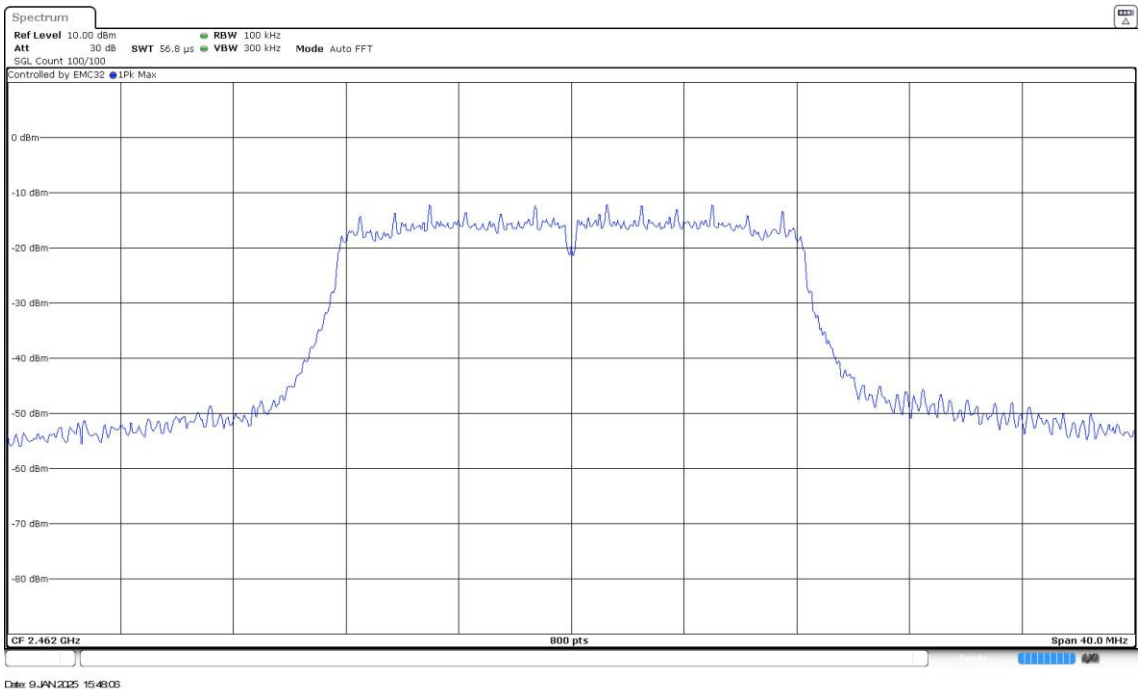
Bandwidth MHz = 20 Modulation = 802.11g (OFDM 6 Mbit/s)

Frequency MHz = 2462.00000 MIMO Mode = SISO

Active Port = 1

Images:





Results

Modulation: 802.11n HT20 (OFDM MCS0)

MIMO Mode: SISO

BW (MHz)	Freq (MHz)	Port	Ebw (MHz)
20	2412.00000	1	16.850
			16.750
	2437.00000		16.350
			16.750
	2462.00000		17.050

Verdict

Pass

Attachments

Bandwidth MHz = 20 Modulation = 802.11n HT20 (OFDM MCS0)

Frequency MHz = 2412.00000 MIMO Mode = SISO

Active Port = 1

Images: