

Appendix B: Test results. Bluetooth EDR.

Approved by (name / position & signature)	Rafael López Martín EMC Consumer & RF Lab. Manager
Date of issue	2022-10-28

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TEST CONDITIONS

(*): Data provided by the client.

POWER SUPPLY (*):

Vnominal:	5V
Type of Power Supply:	External Power supply / Battery

ANTENNA (*):

Type of Antenna:	Internal IFA (muxed)
Maximum Declared Antenna Gain:	1.3dBi

TEST FREQUENCIES (*):

Low Channel:	2402 MHz
Middle Channel:	2441 MHz
High Channel:	2480 MHz

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).

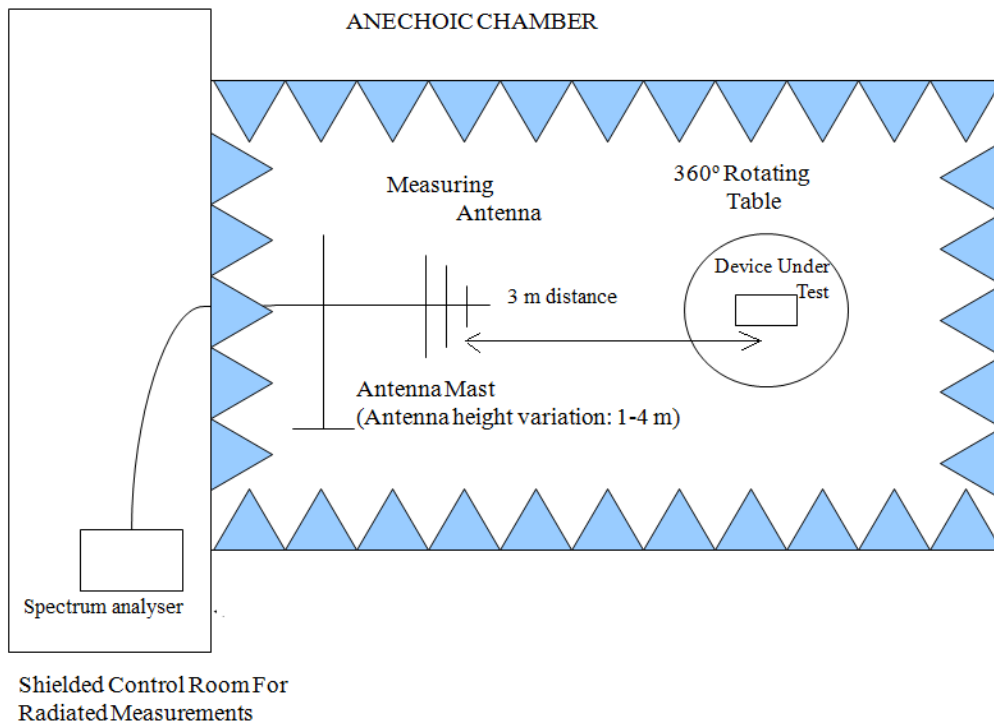
For radiated emissions in the range 17 GHz-26 GHz that is performed at a distance closer than the specified distance, an inverse proportionality factor of 20 dB per decade is used to normalize the measured data for determining compliance.

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 360° and the antenna height (Bilog antenna and Double ridge horn antenna) was varied from 1 to 4 meters to find the maximum radiated emission.

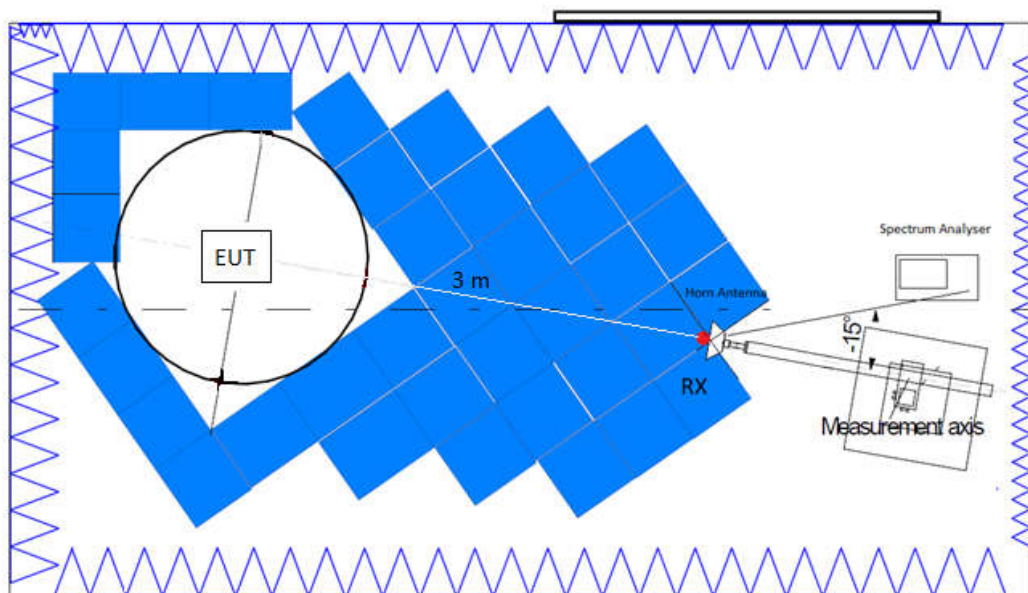
Measurements were made in both horizontal and vertical planes of polarization.

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.

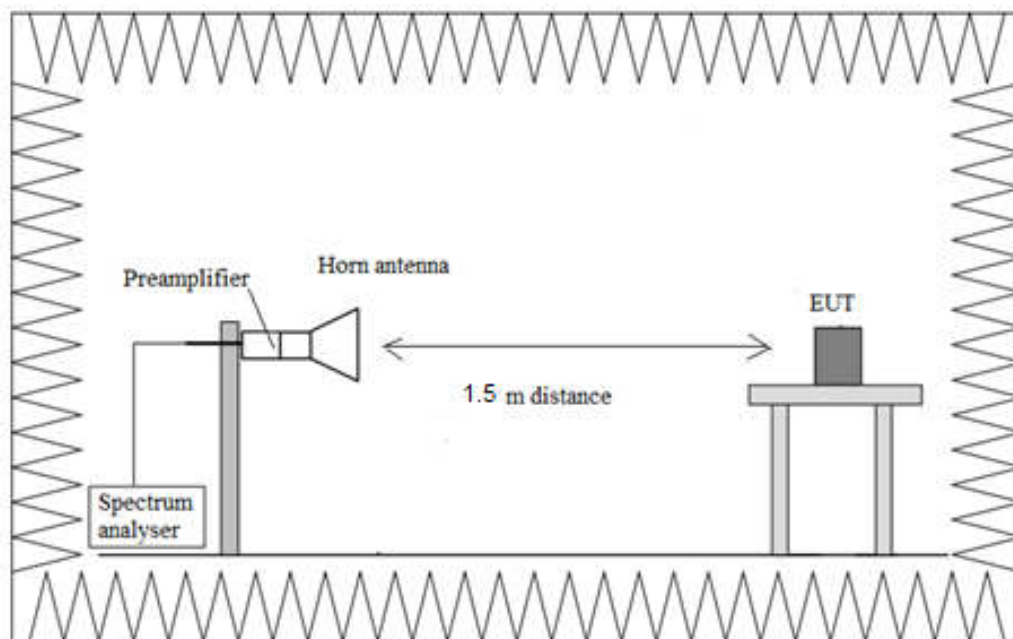
Radiated measurements setup from 30 MHz to 1 GHz:



Radiated measurements setup from 1 GHz to 17 GHz:



Radiated measurements setup $f > 17$ GHz:



TEST CASES DETAILS

FCC 47 CFR Part 15.247 / RSS-247 99dBw Occupied Channel Bandwidth 99%

Results

Modulation: BT (GFSK 1-DH5)

Freq (MHz)	Occ Ch BW (MHz)
2402.00000	0.865
2441.00000	0.865
2480.00000	0.865

Modulation: BT (Pi/4 DQPSK 2-DH5)

Freq (MHz)	Occ Ch BW (MHz)
2402.00	1.325
2441.00	1.335
2480.00	1.310

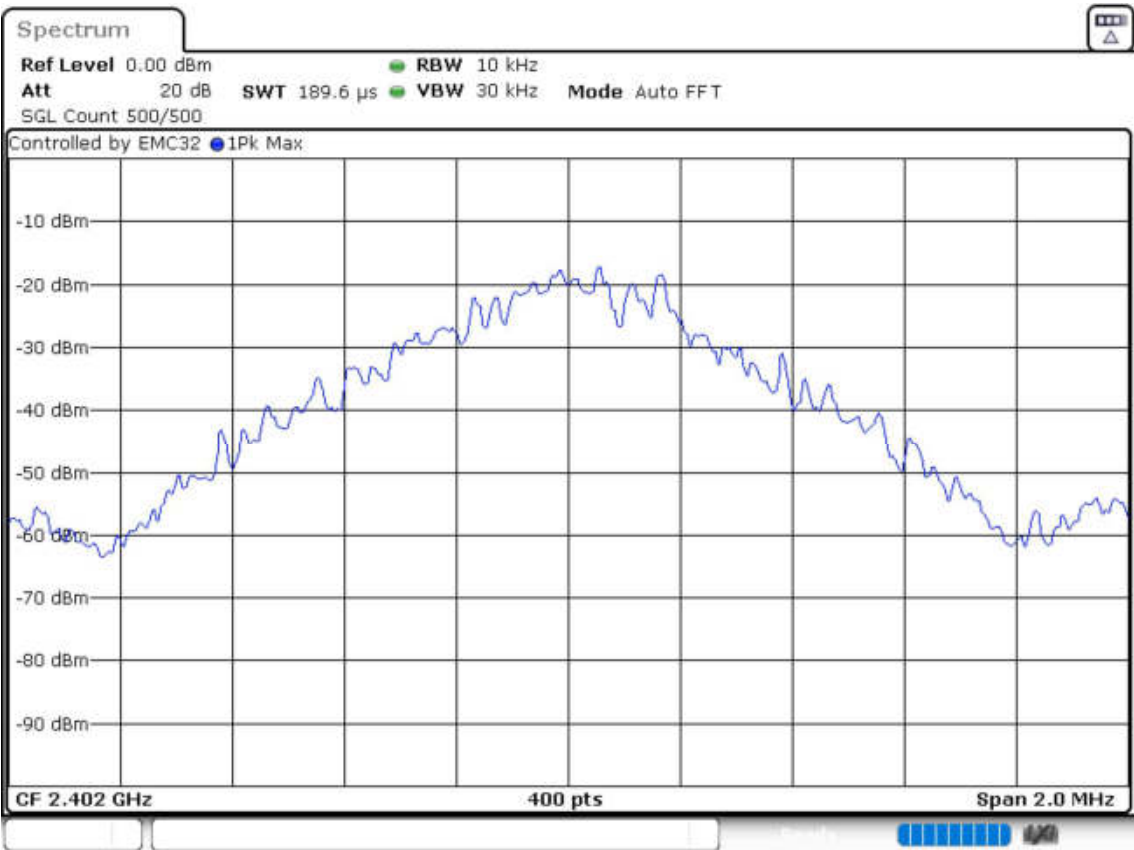
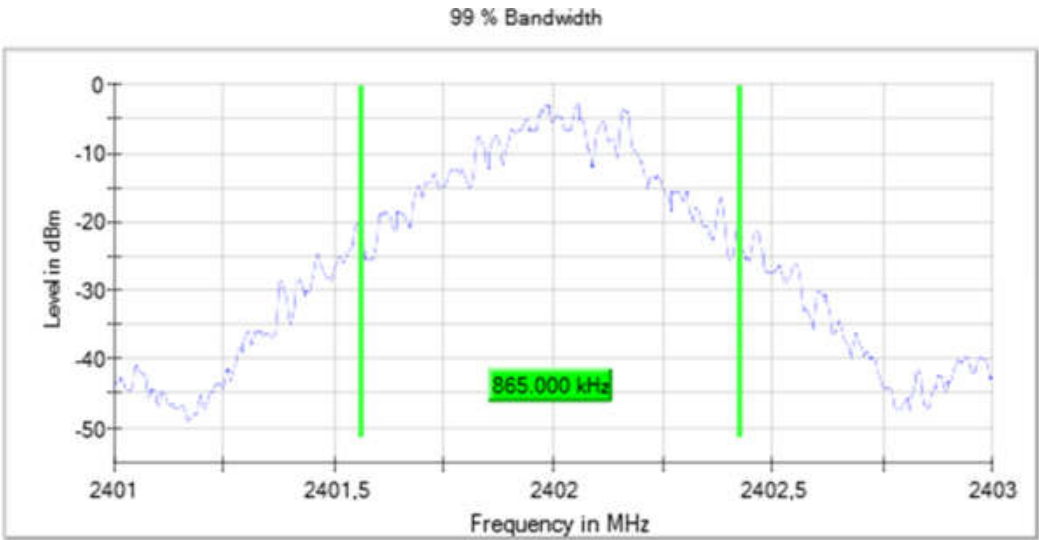
Modulation: BT (8DPSK 3-DH5)

Freq (MHz)	Occ Ch BW (MHz)
2402.00	1.295
2441.00	1.295
2480.00	1.280

Attachments

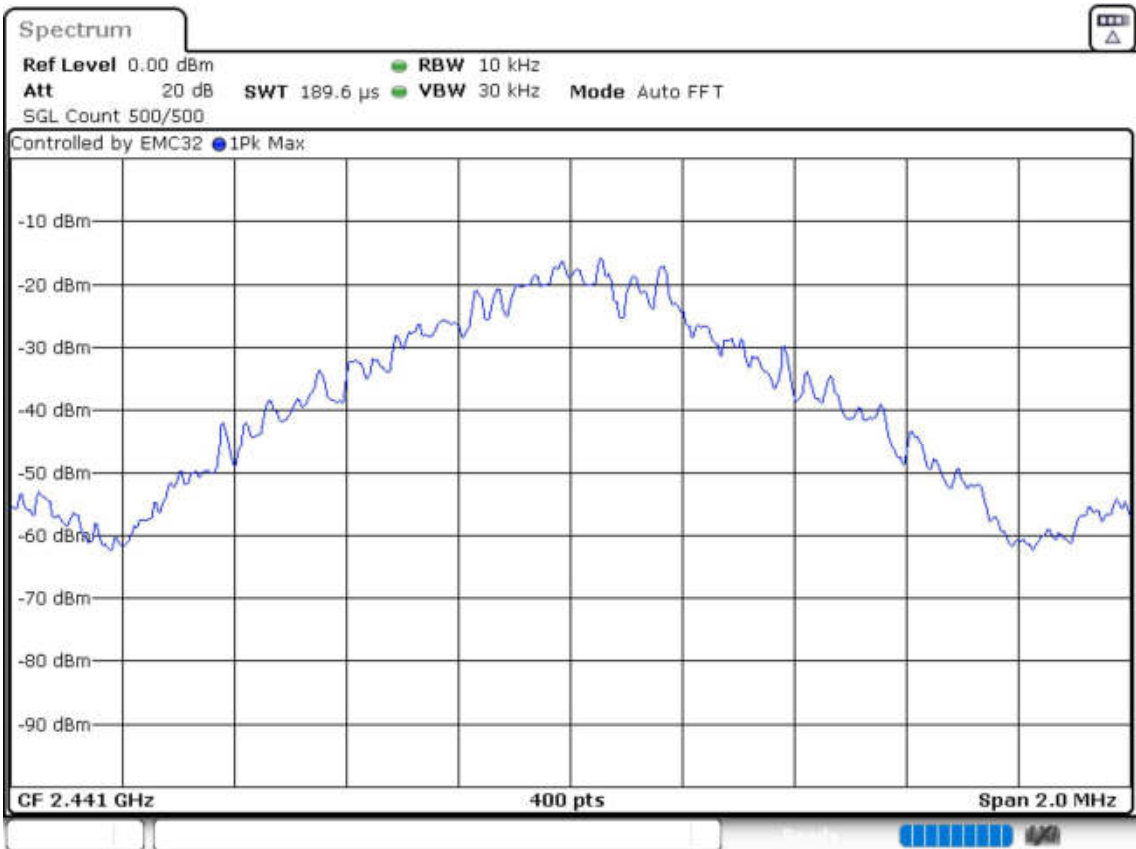
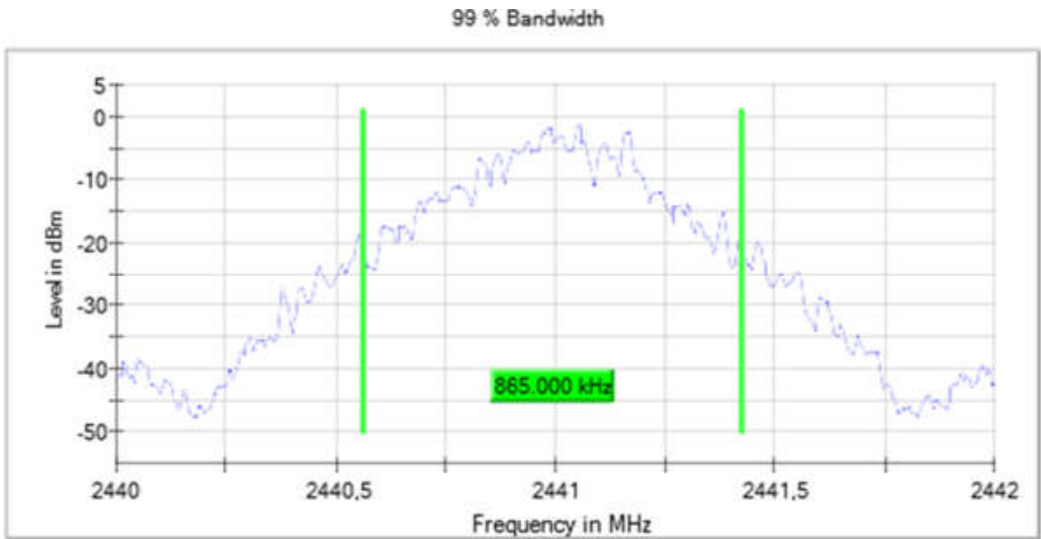
Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH5), Number of Transmission Chains = 1, Active Port = 1

Images:



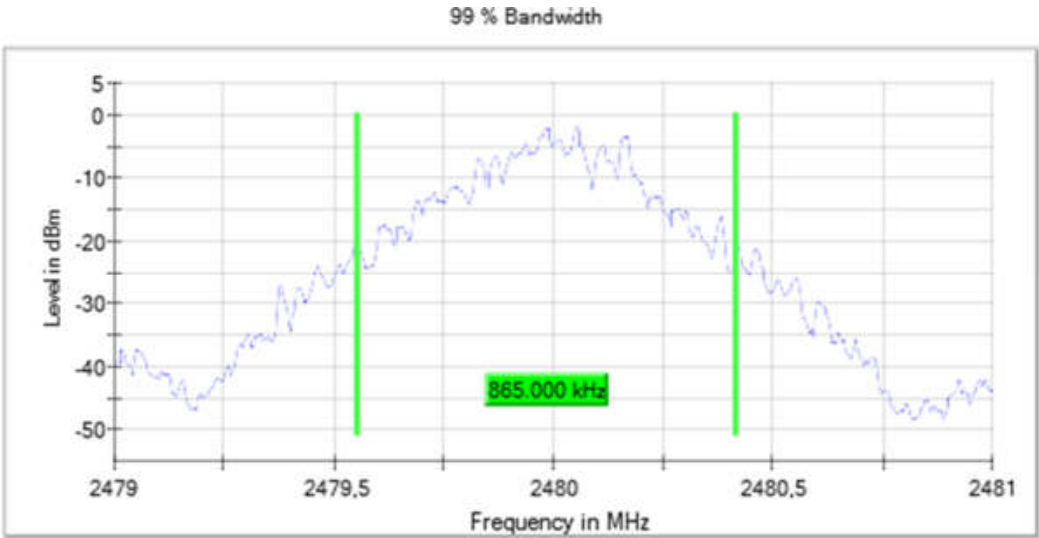
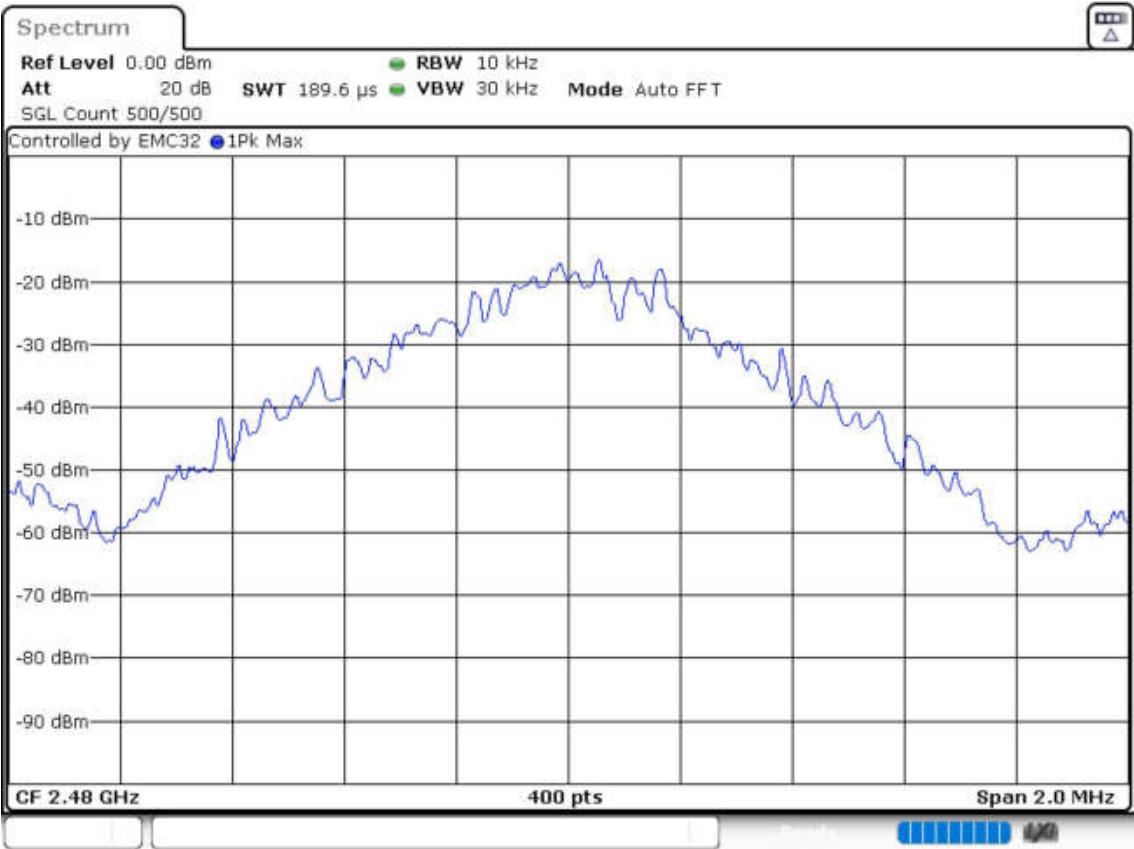
Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH5), Number of Transmission Chains = 1, Active Port = 1

Images:



Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH5), Number of Transmission Chains = 1, Active Port = 1

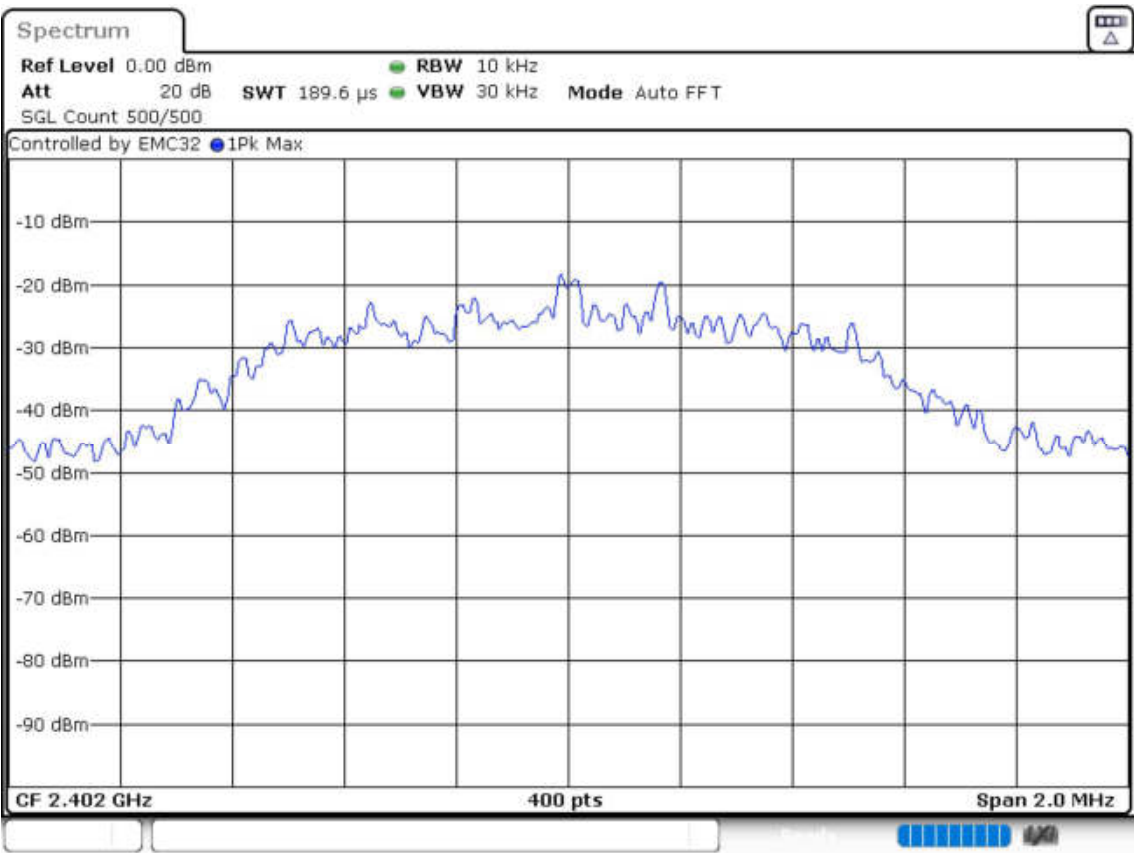
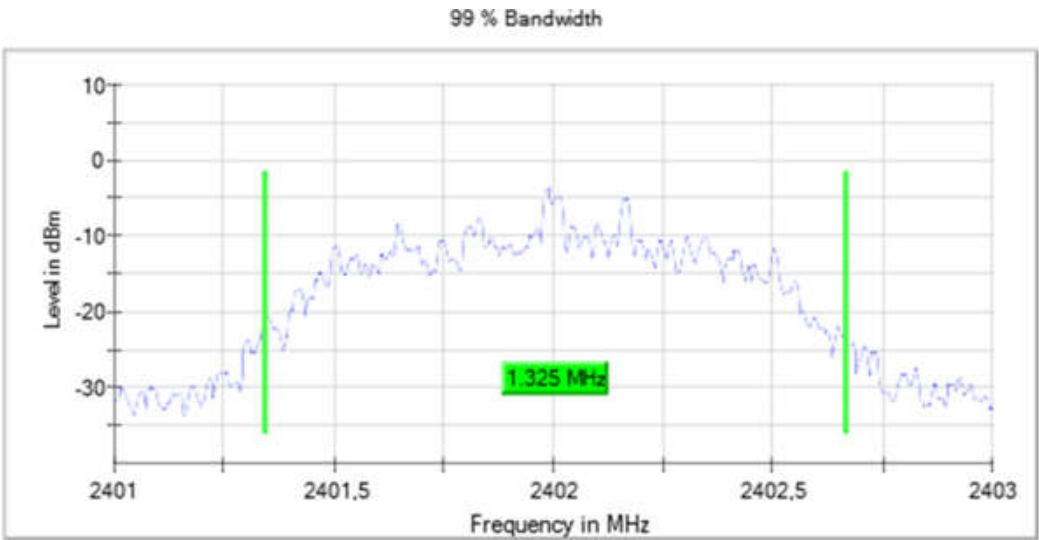
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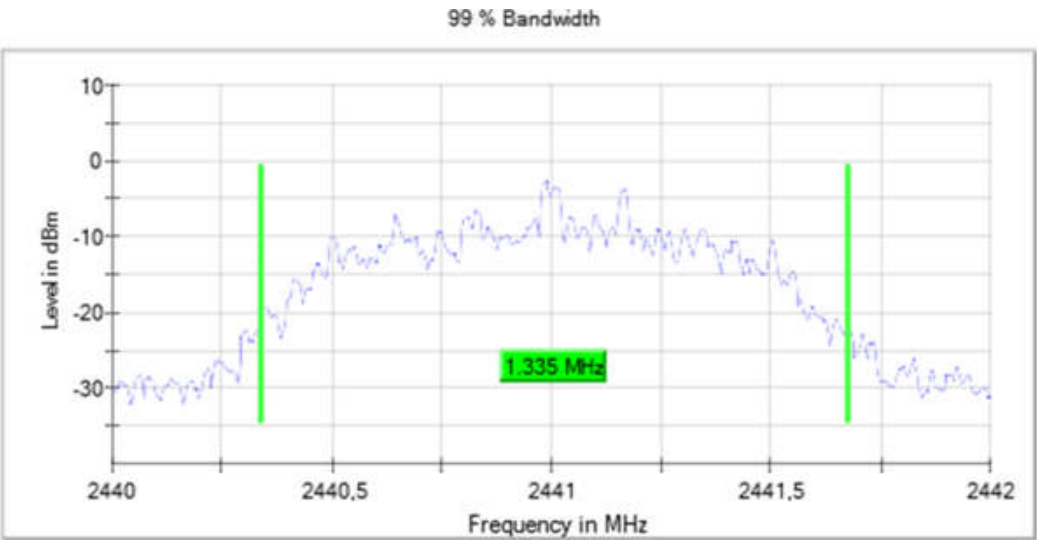
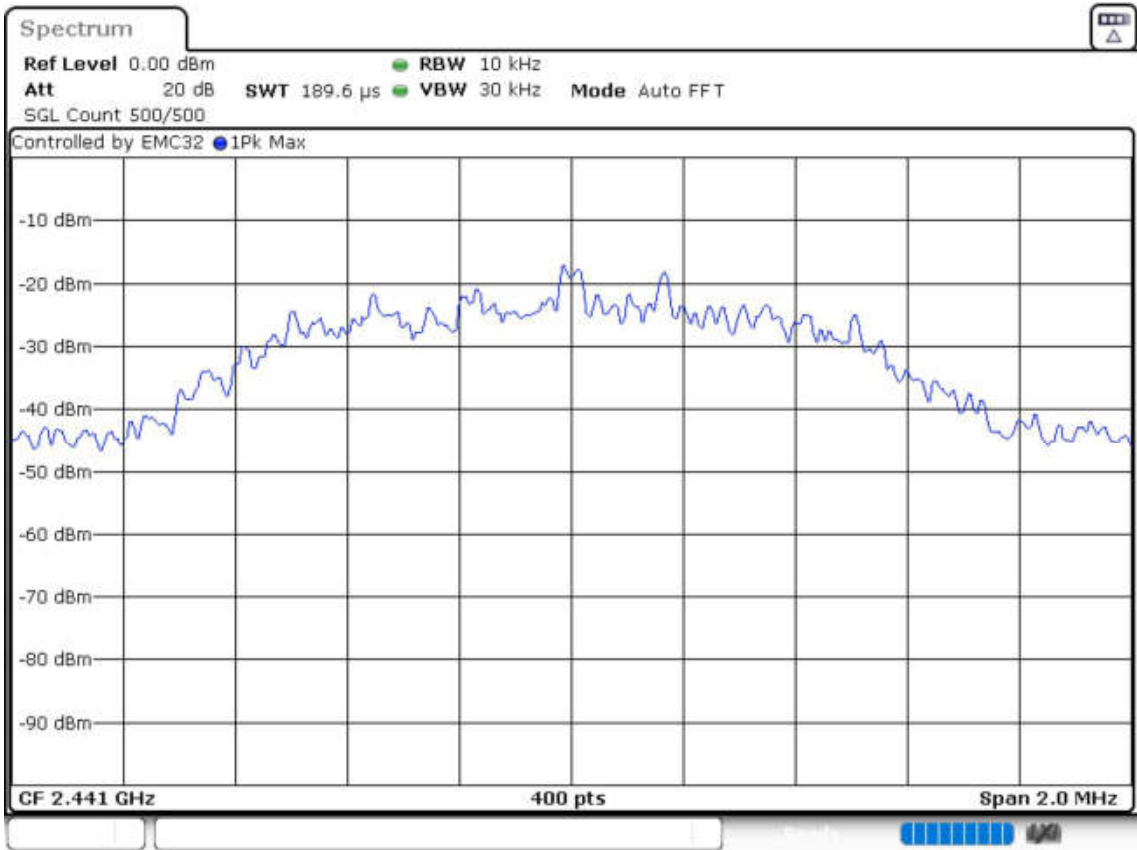
Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
Bandwidth MHz = 1, Modulation = BT (Pi/4 DQPSK 2-DH5), Number of Transmission Chains = 1, Active
Port = 1

Images:



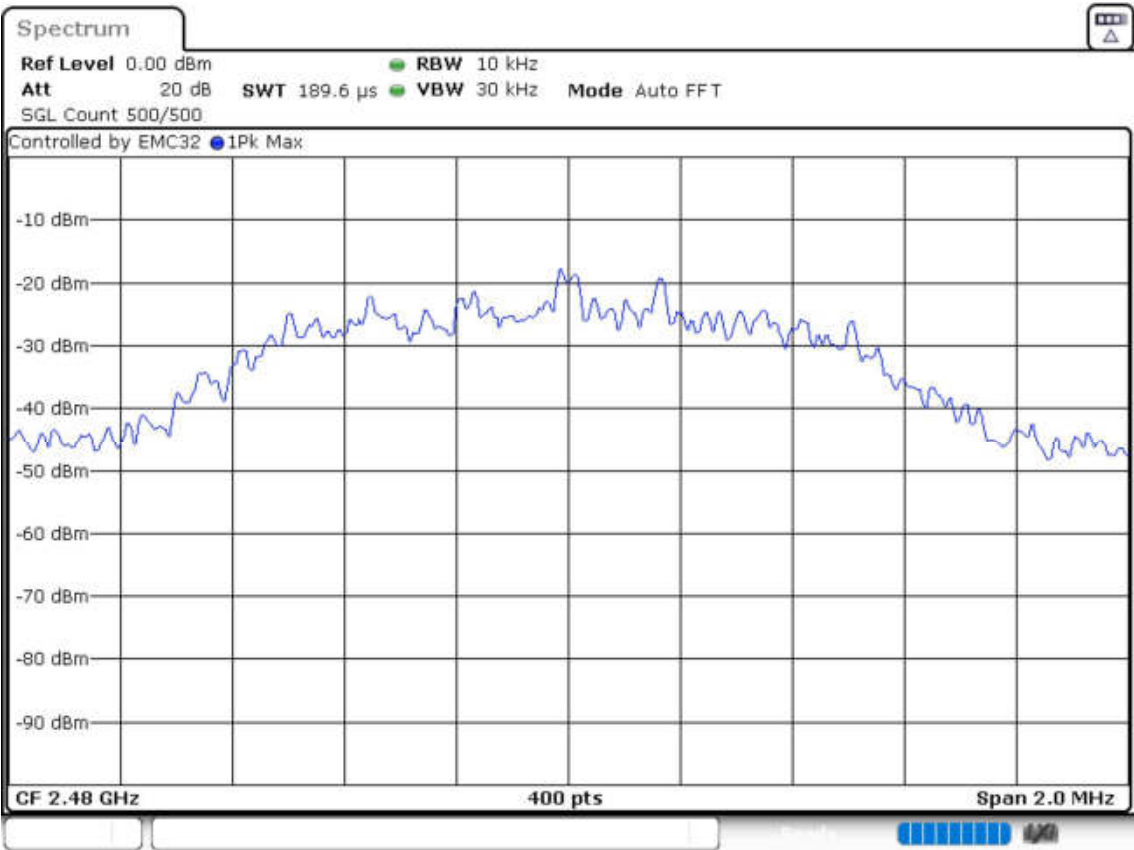
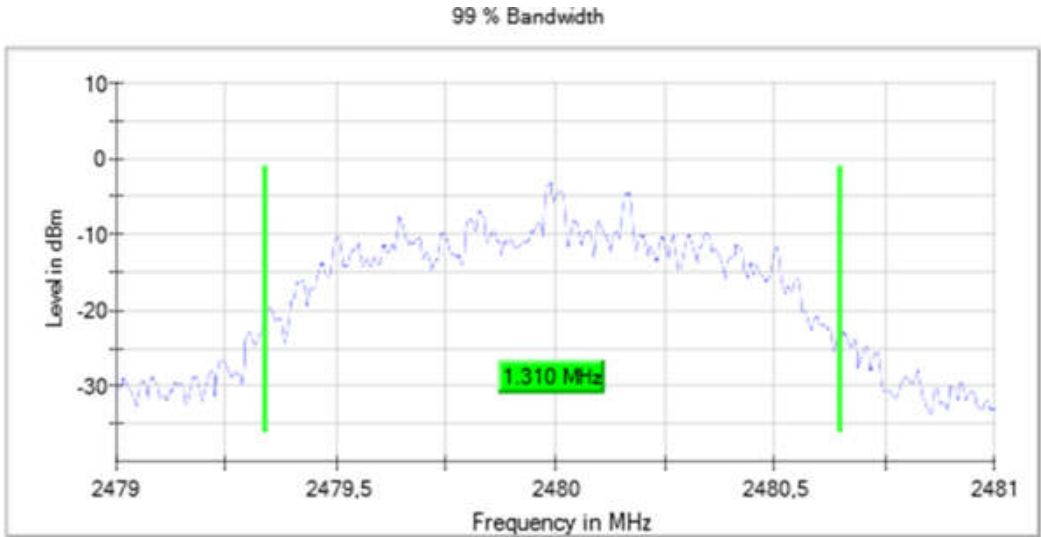
Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
Bandwidth MHz = 1, Modulation = BT (Pi/4 DQPSK 2-DH5), Number of Transmission Chains = 1, Active
Port = 1

Images:



Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
Bandwidth MHz = 1, Modulation = BT (Pi/4 DQPSK 2-DH5), Number of Transmission Chains = 1, Active
Port = 1

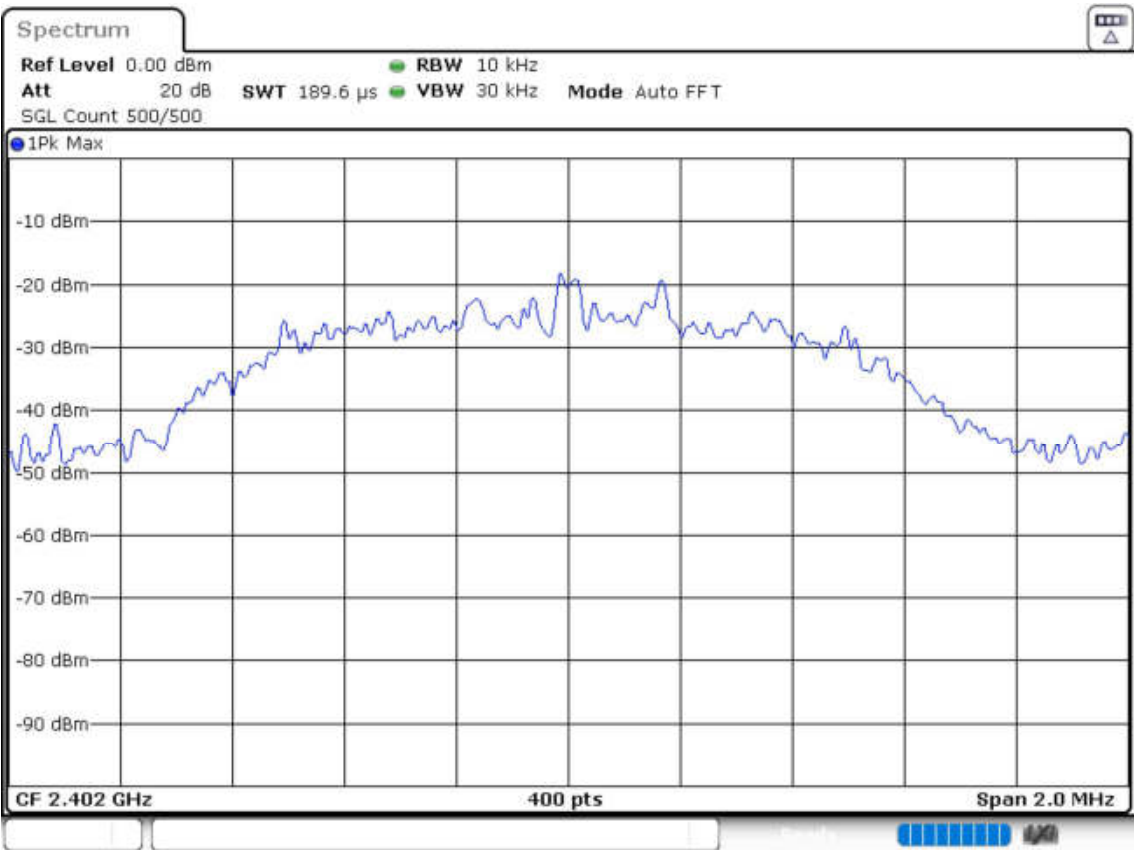
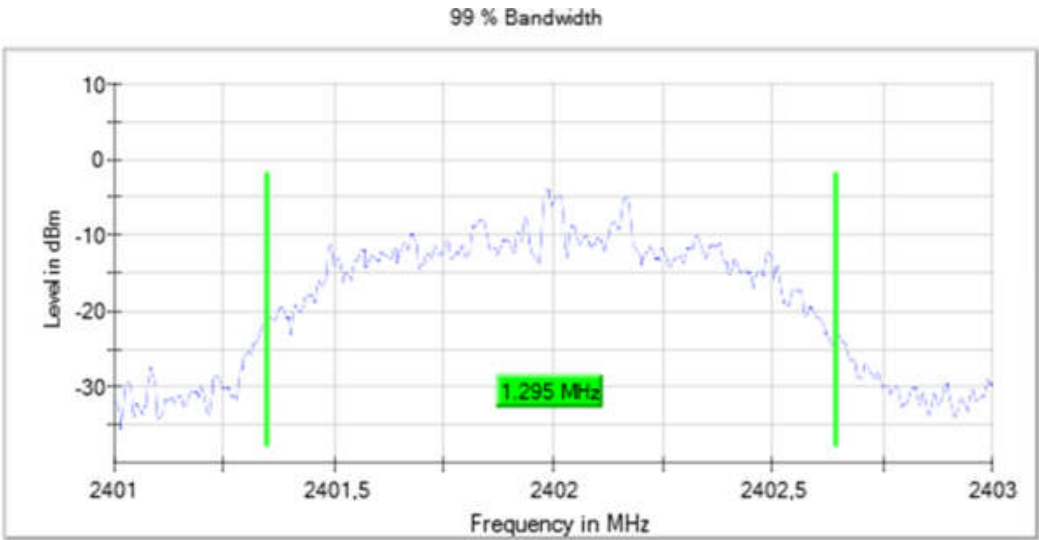
Images:



Attachments

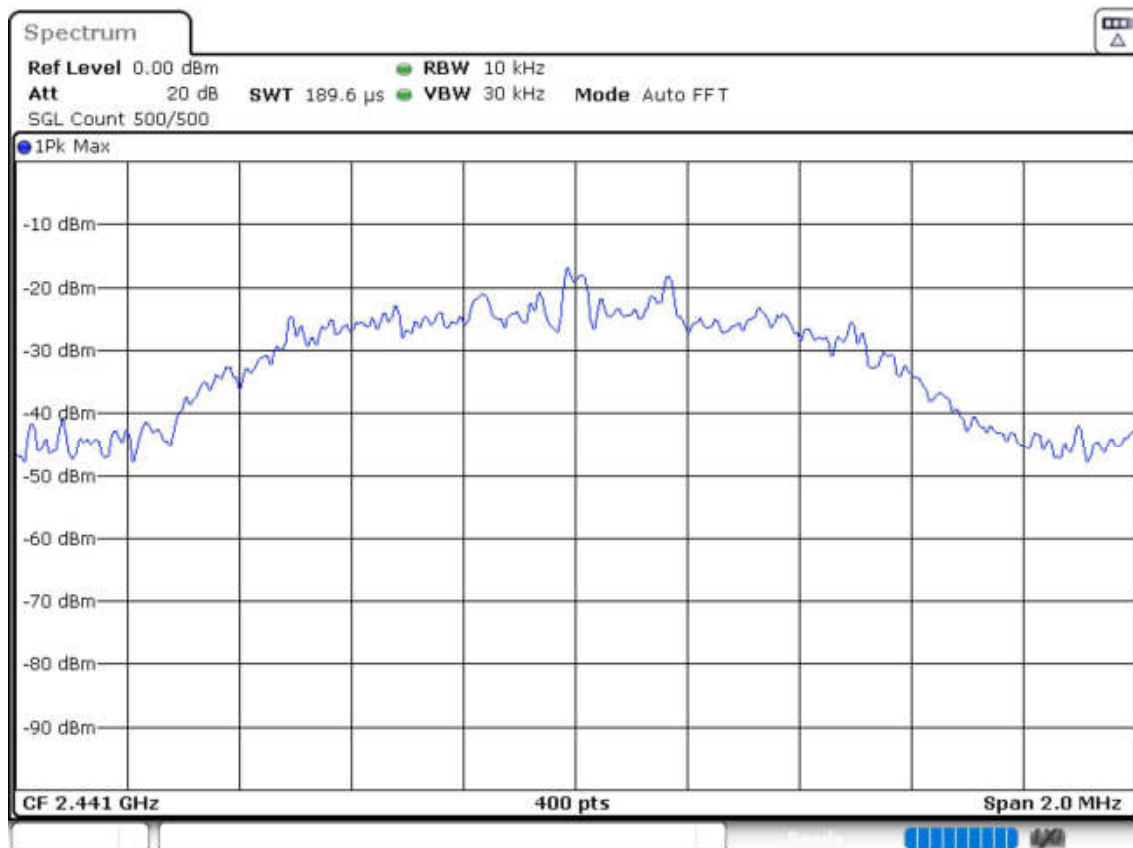
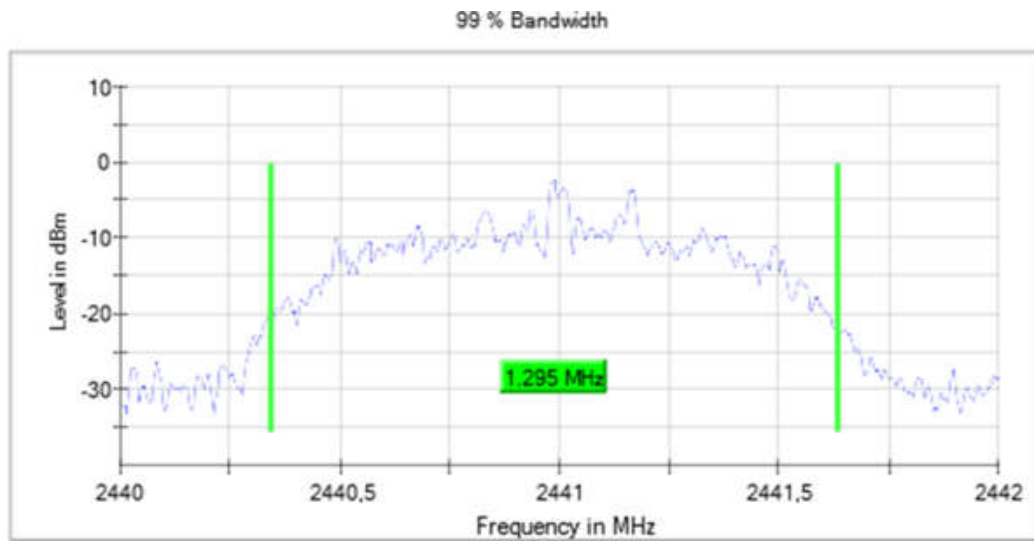
Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5), Number of Transmission Chains = 1, Active Port = 1

Images:



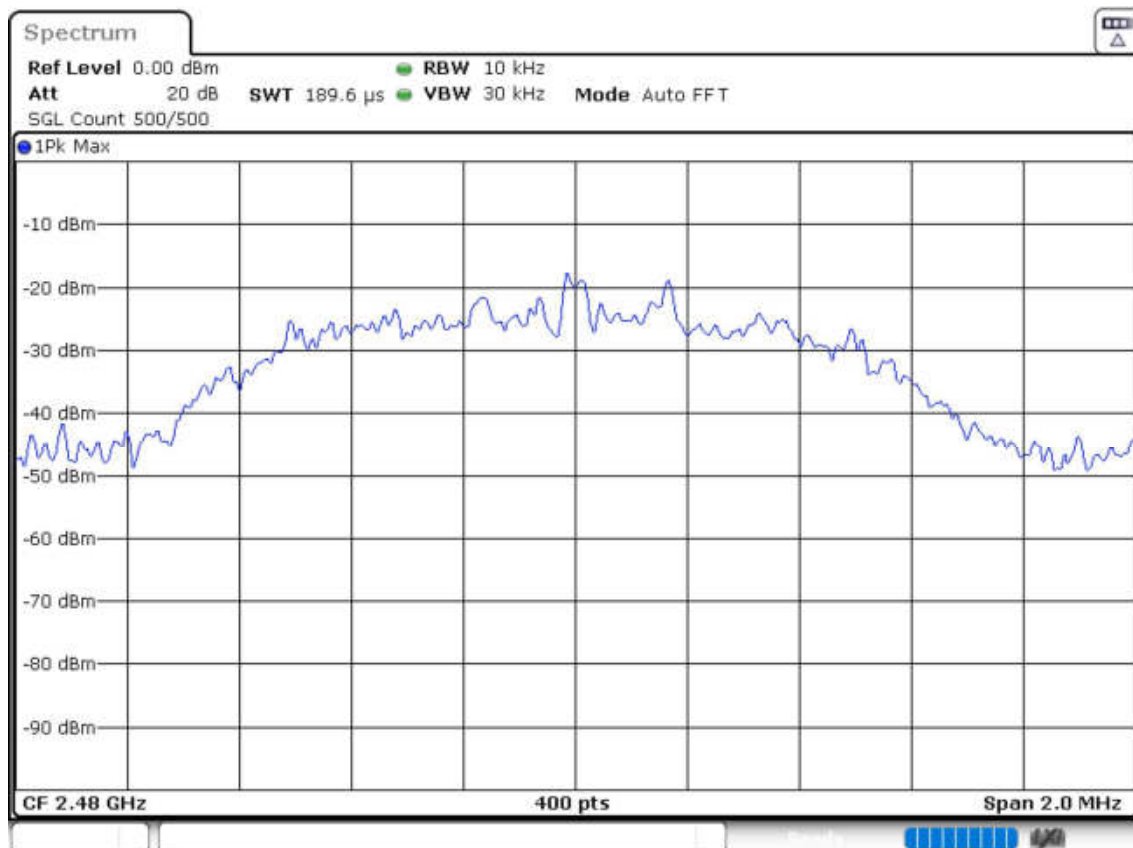
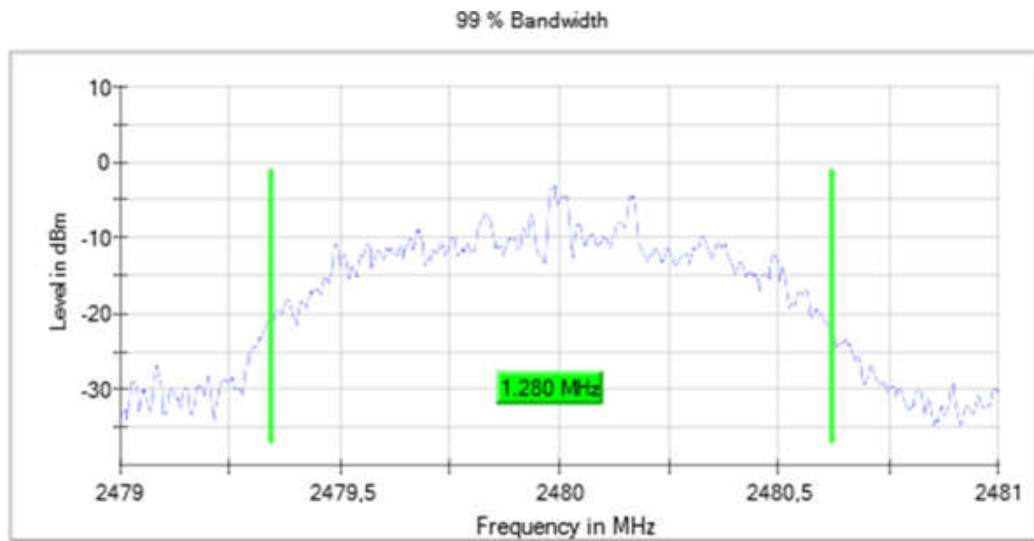
**Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
 Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5), Number of Transmission Chains = 1, Active Port = 1**

Images:



**Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
 Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5), Number of Transmission Chains = 1, Active Port = 1**

Images:



RSS-247 5.1 (b) / FCC 15.247 (a) (1) [20dBW] 20 dB Bandwidth

Limits

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

Modulation: BT (GFSK 1-DH5)

Results

Freq (MHz)	20dB BW (MHz)
2402.00000	0.930
2441.00000	0.930
2480.00000	0.930

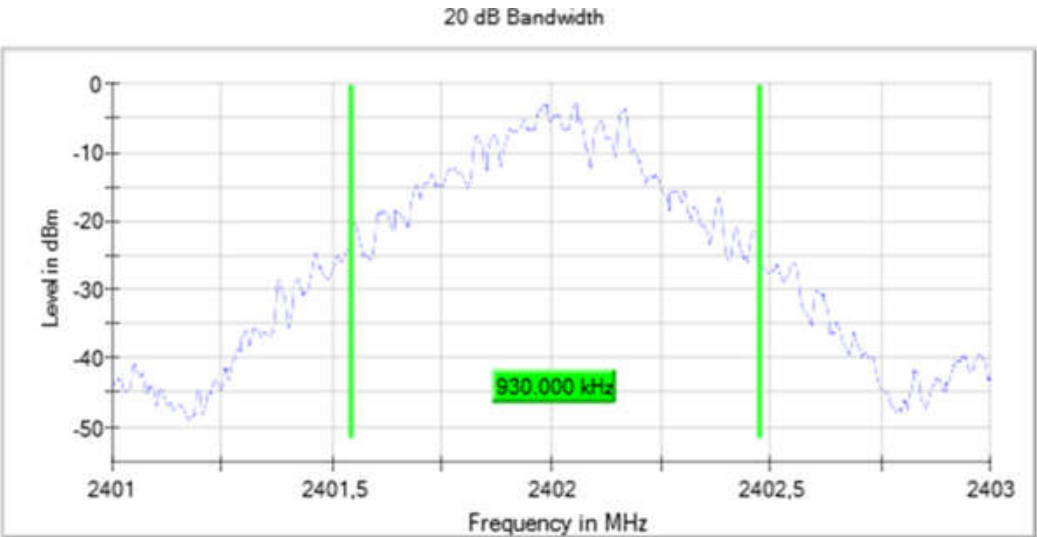
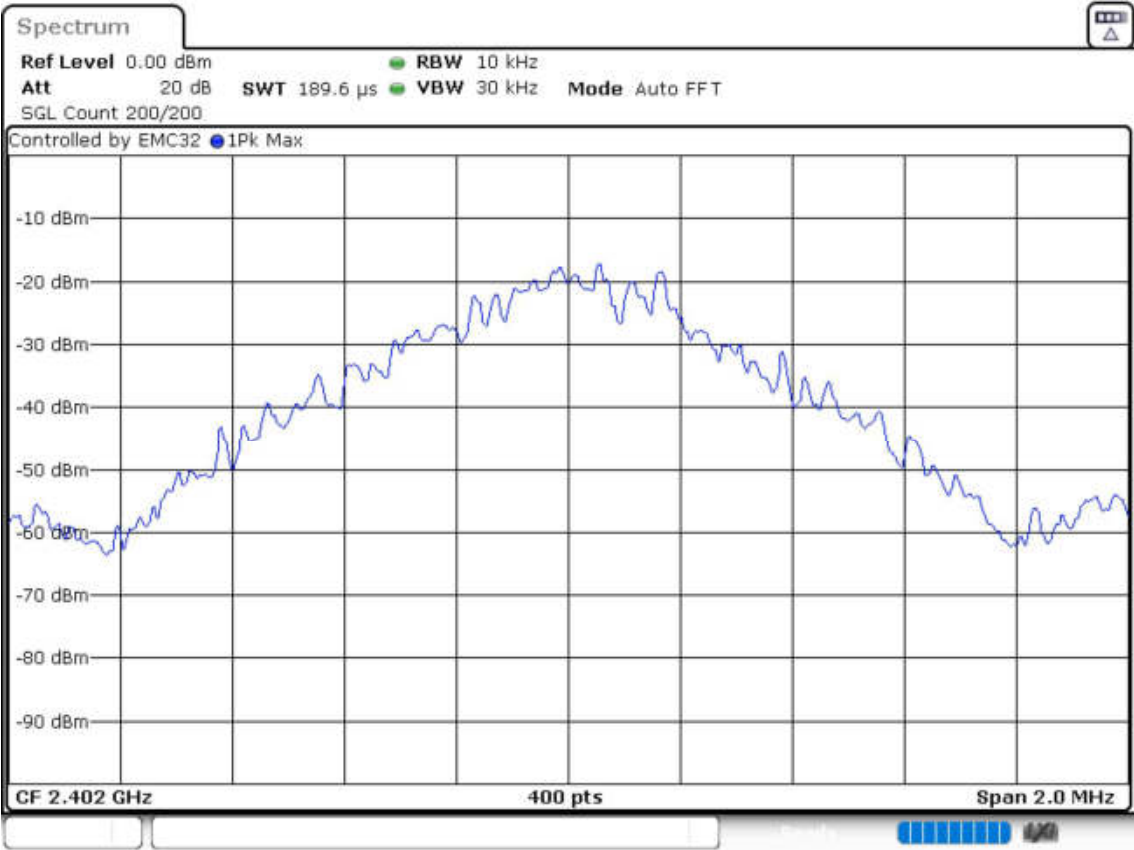
Verdict

Pass

Attachments

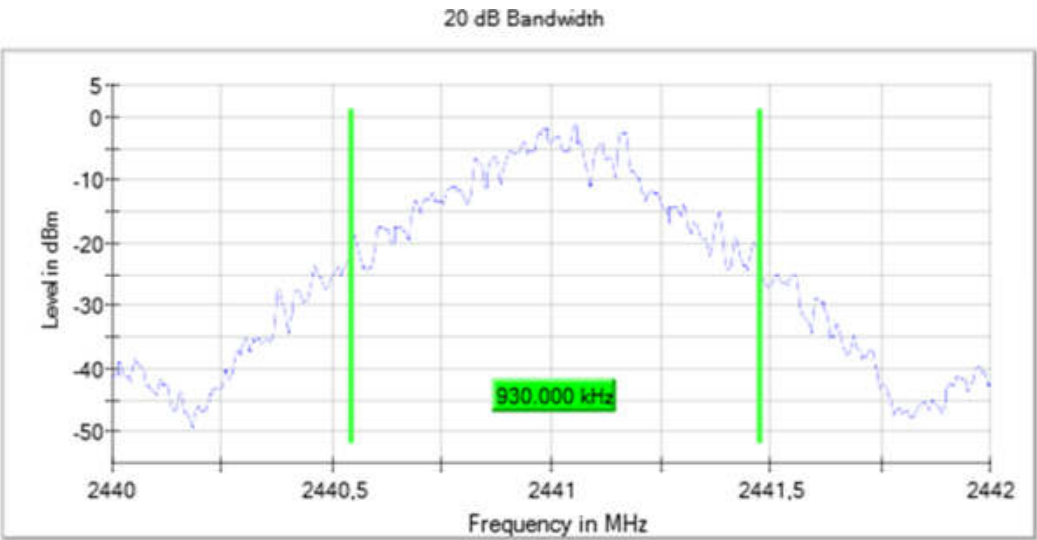
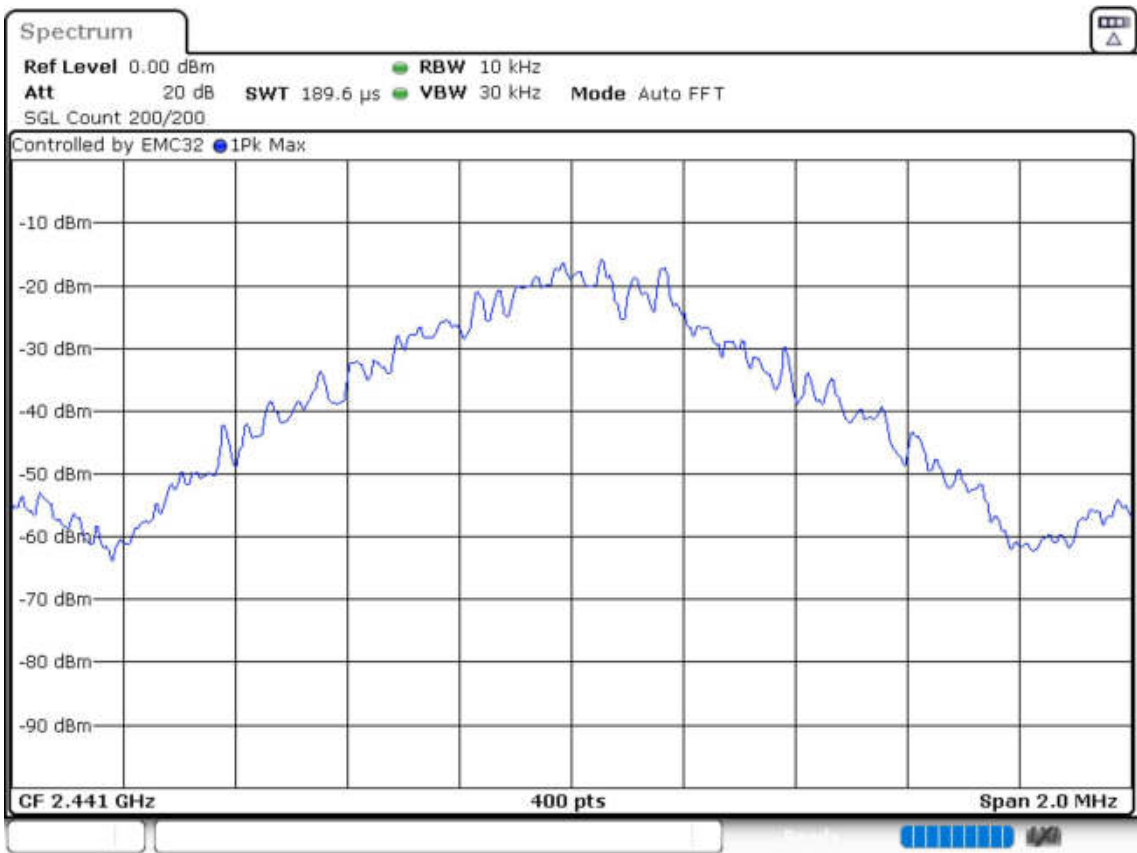
Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH5), Number of Transmission Chains = 1, Active Port = 1

Images:



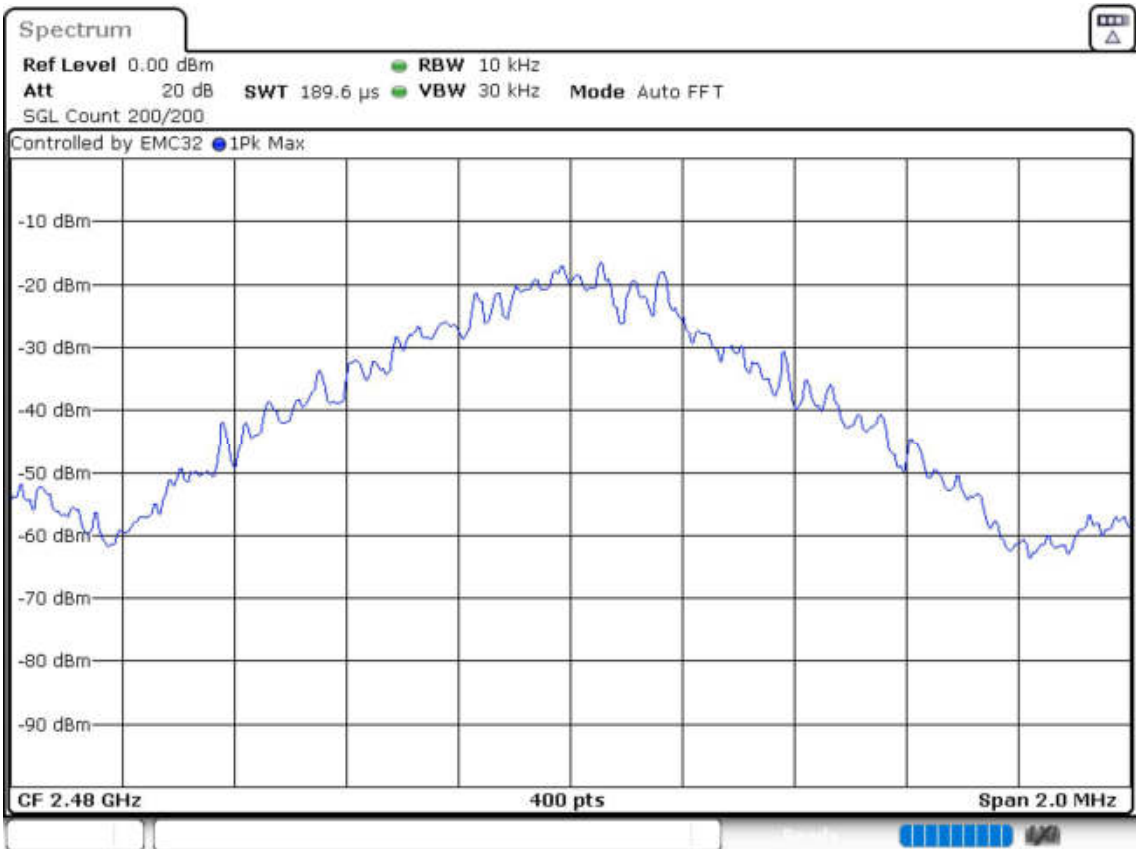
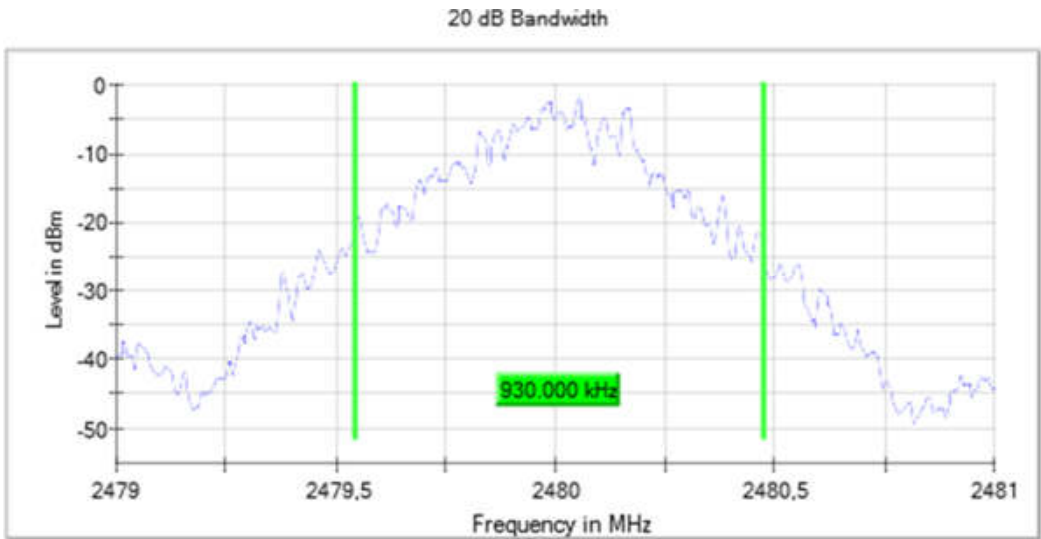
Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH5), Number of Transmission Chains = 1, Active Port = 1

Images:



Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH5), Number of Transmission Chains = 1, Active Port = 1

Images:



Modulation: BT (Pi/4 DQPSK 2-DH5)

Results

Freq (MHz)	20dB BW (MHz)
2402.00000	1.370
2441.00000	1.370
2480.00000	1.365

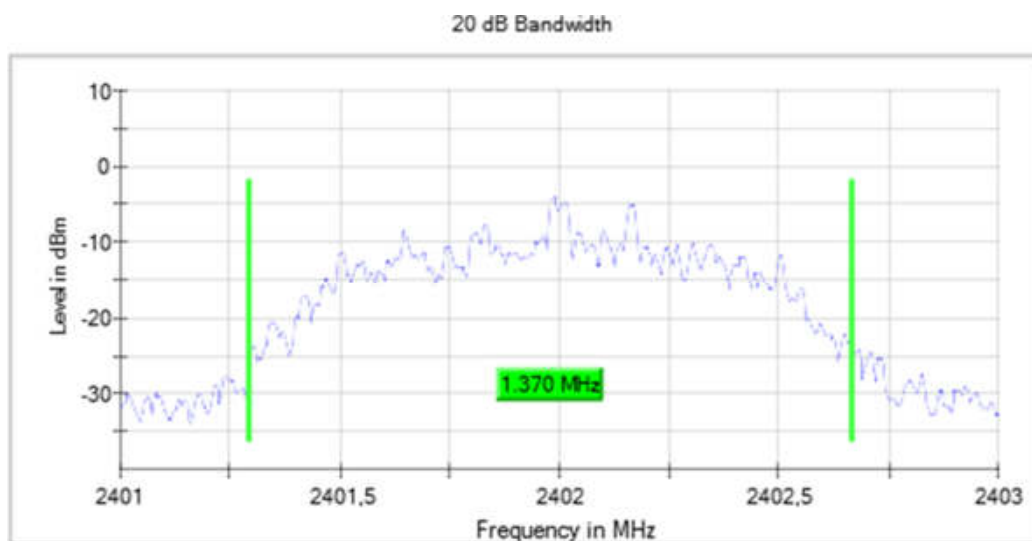
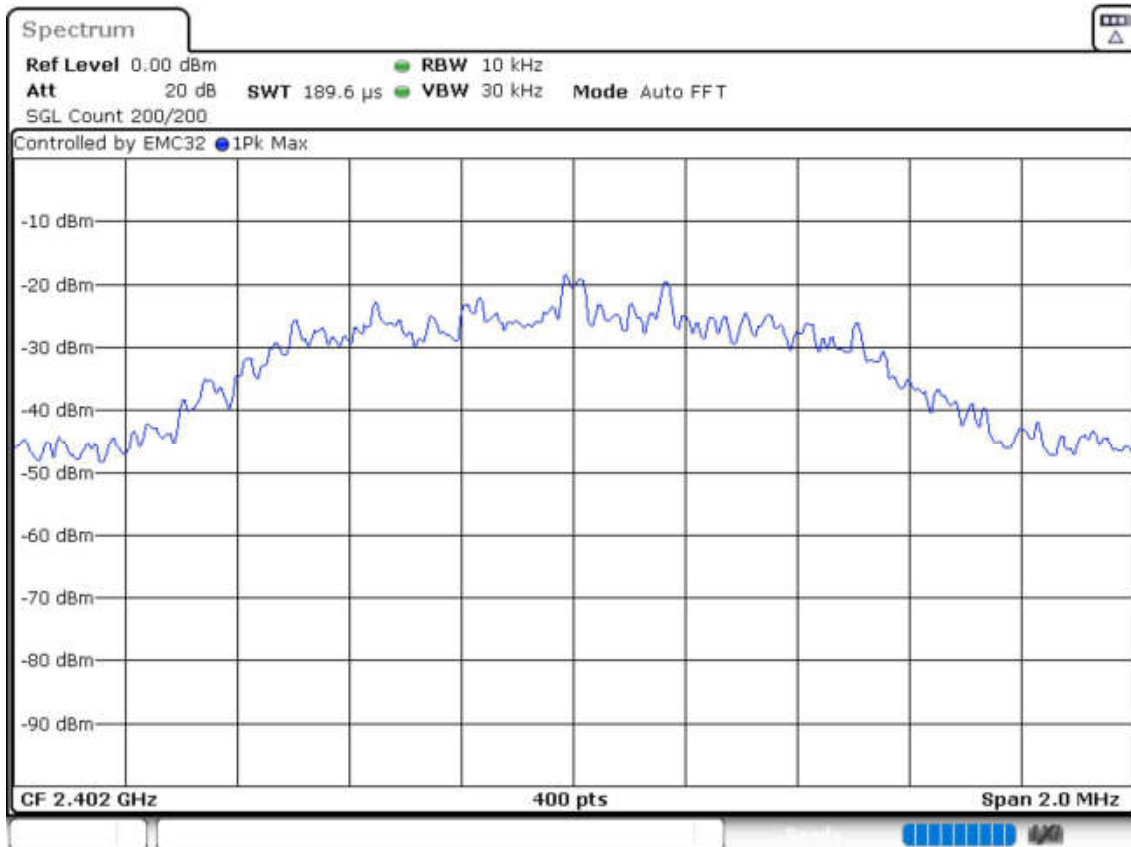
Verdict

Pass

Attachments

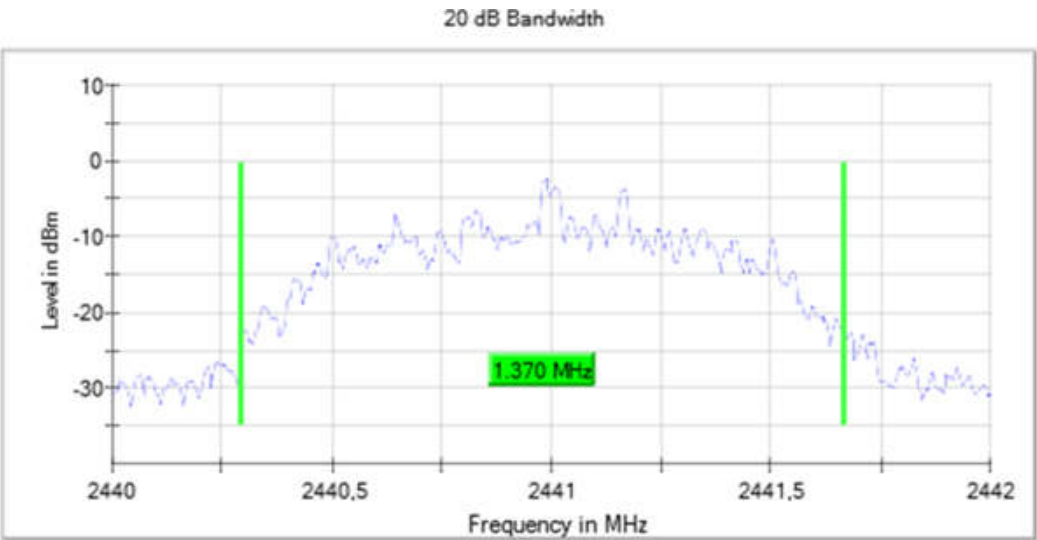
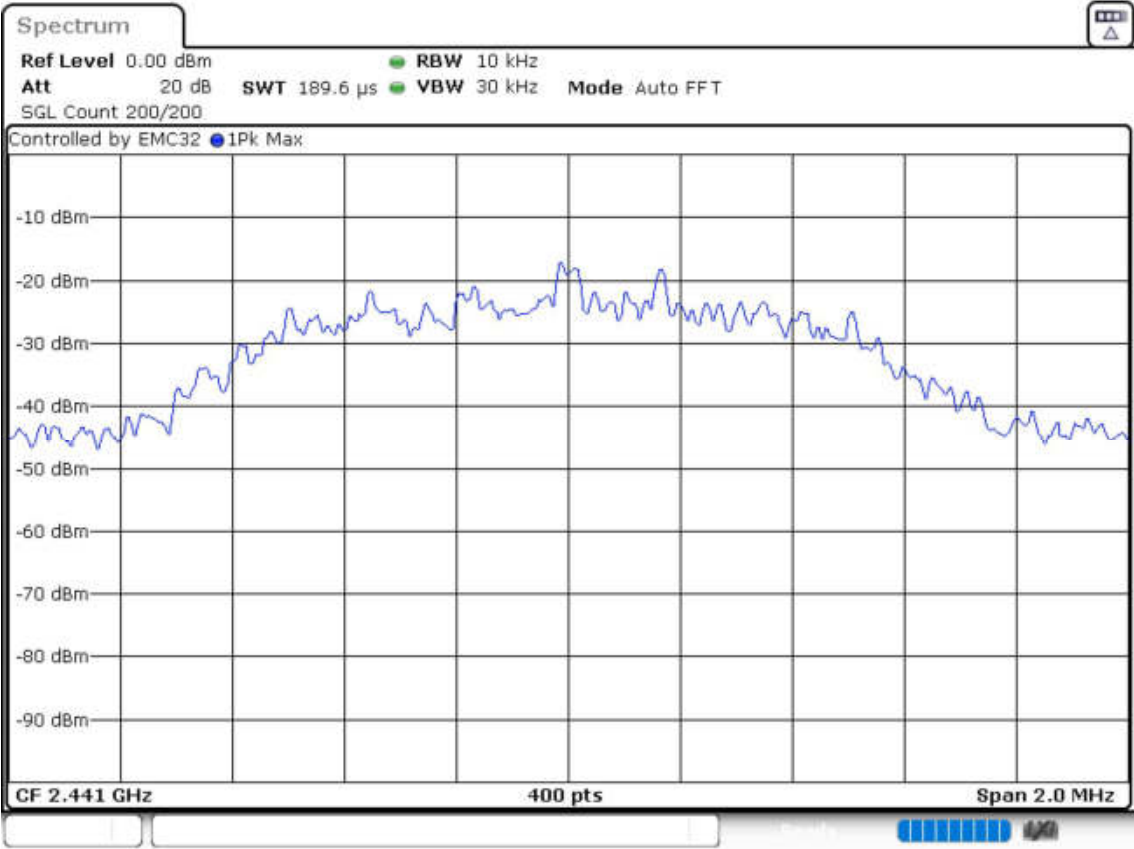
Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
 Bandwidth MHz = 1, Modulation = BT (Pi/4 DQPSK 2-DH5), Number of Transmission Chains = 1, Active
 Port = 1

Images:



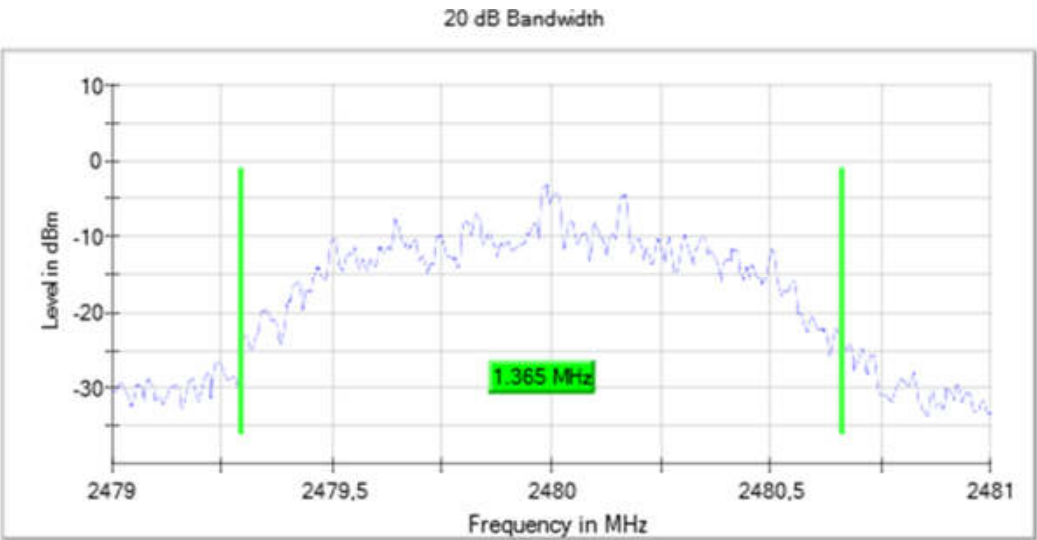
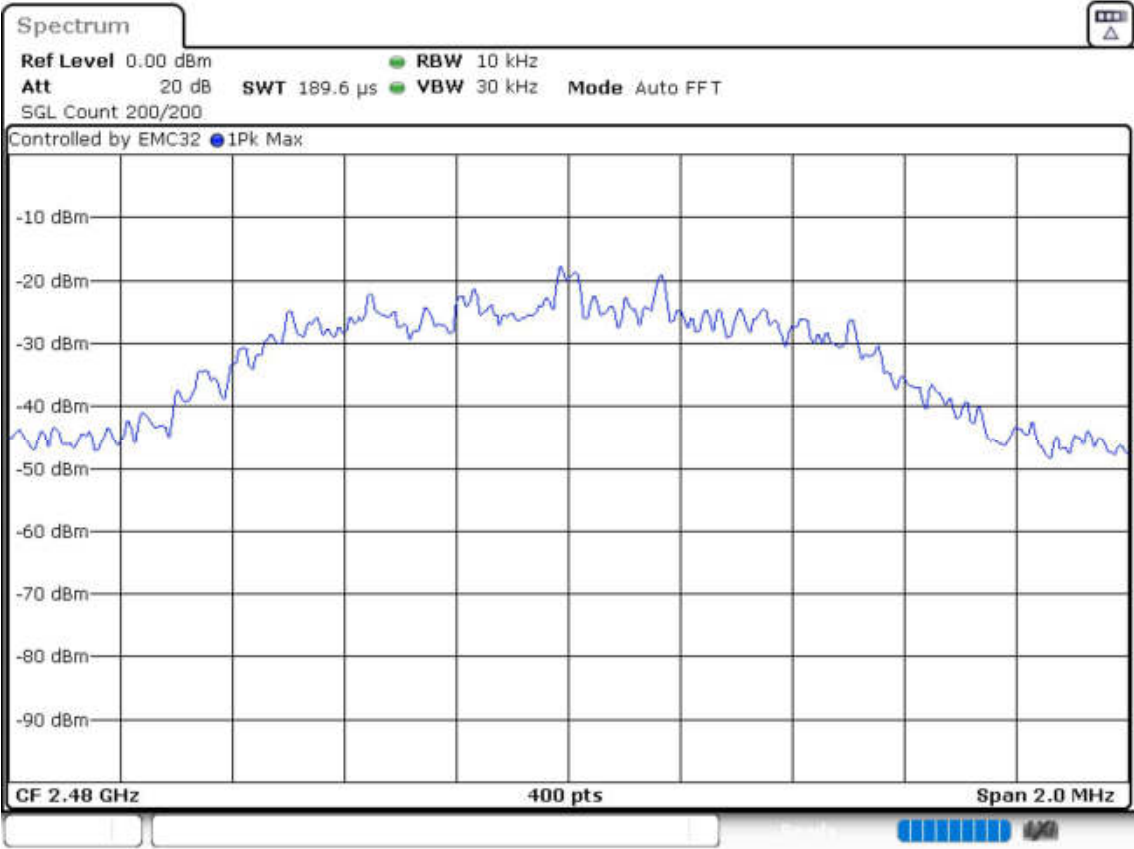
Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
Bandwidth MHz = 1, Modulation = BT (Pi/4 DQPSK 2-DH5), Number of Transmission Chains = 1, Active
Port = 1

Images:



Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
Bandwidth MHz = 1, Modulation = BT (Pi/4 DQPSK 2-DH5), Number of Transmission Chains = 1, Active
Port = 1

Images:



Modulation: BT (8DPSK 3-DH5)

Results

Freq (MHz)	20dB BW (MHz)
2402.00000	1.330
2441.00000	1.335
2480.00000	1.310

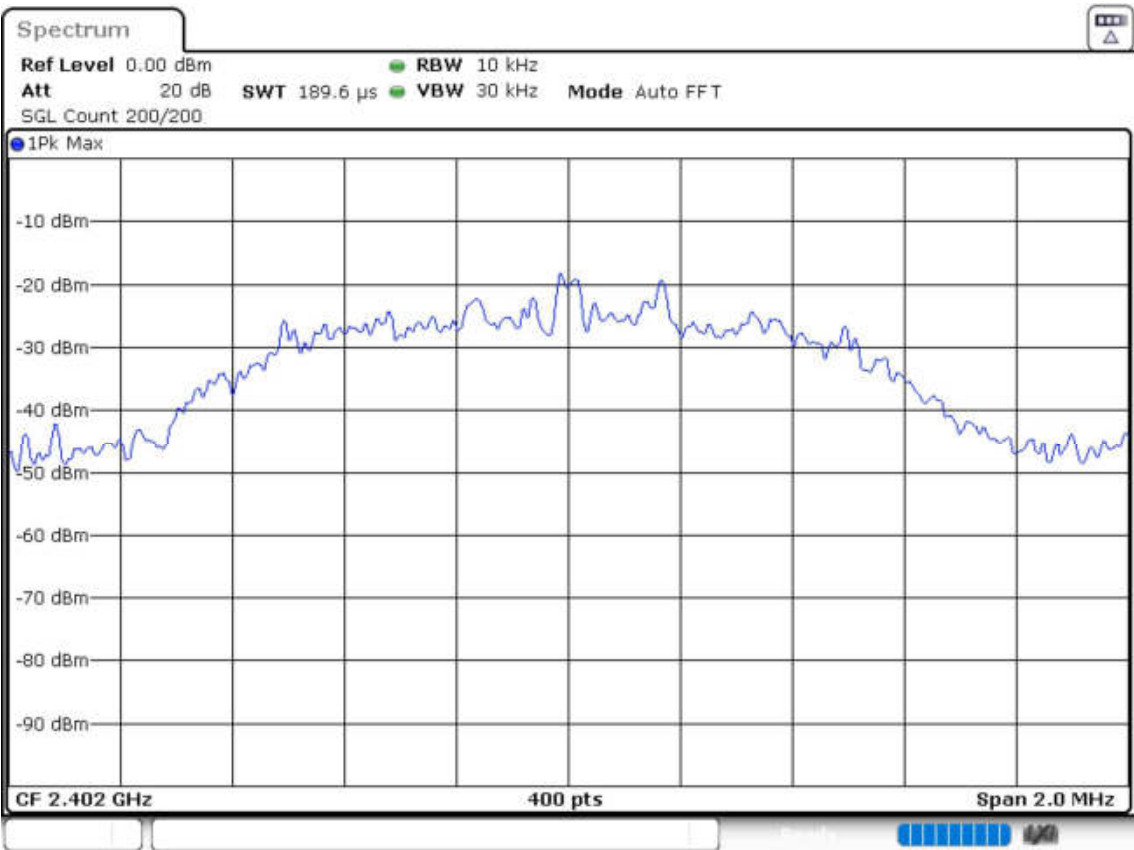
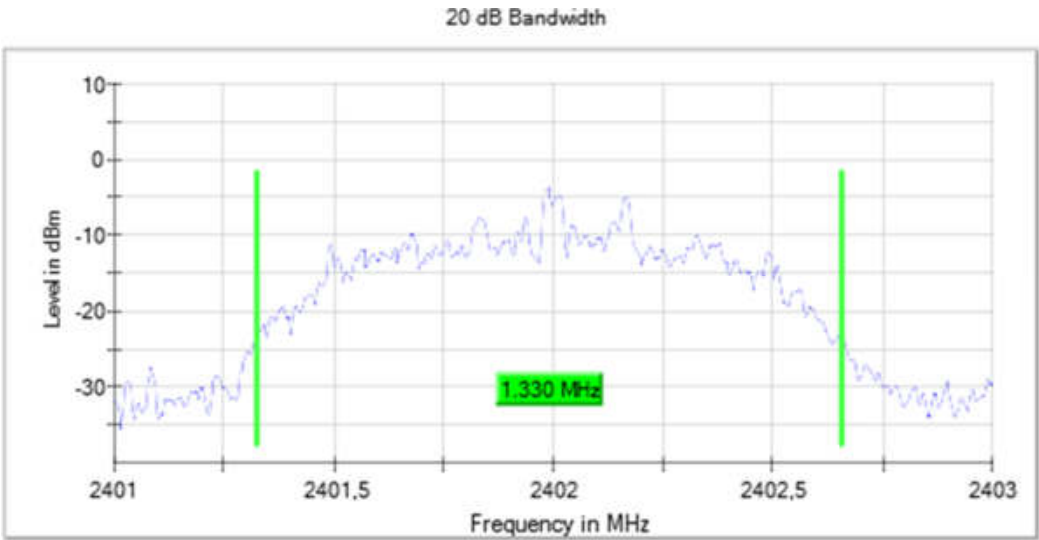
Verdict

Pass

Attachments

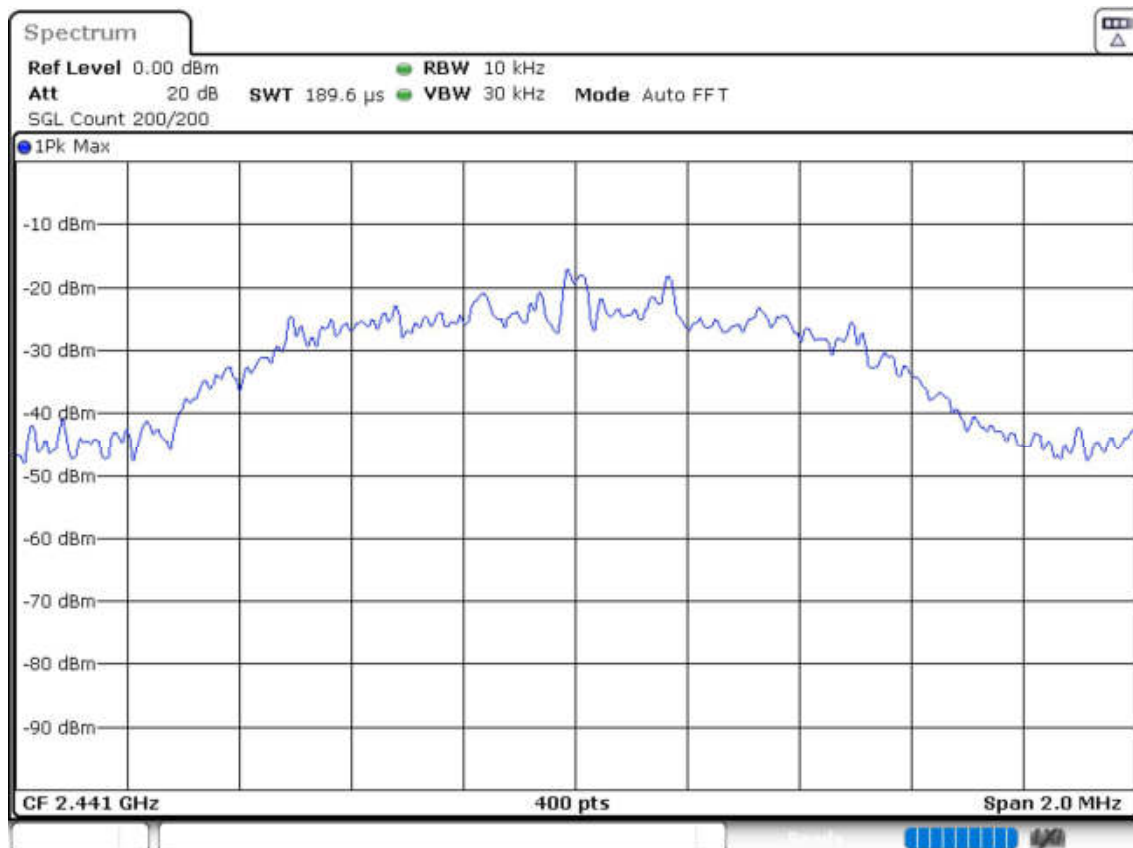
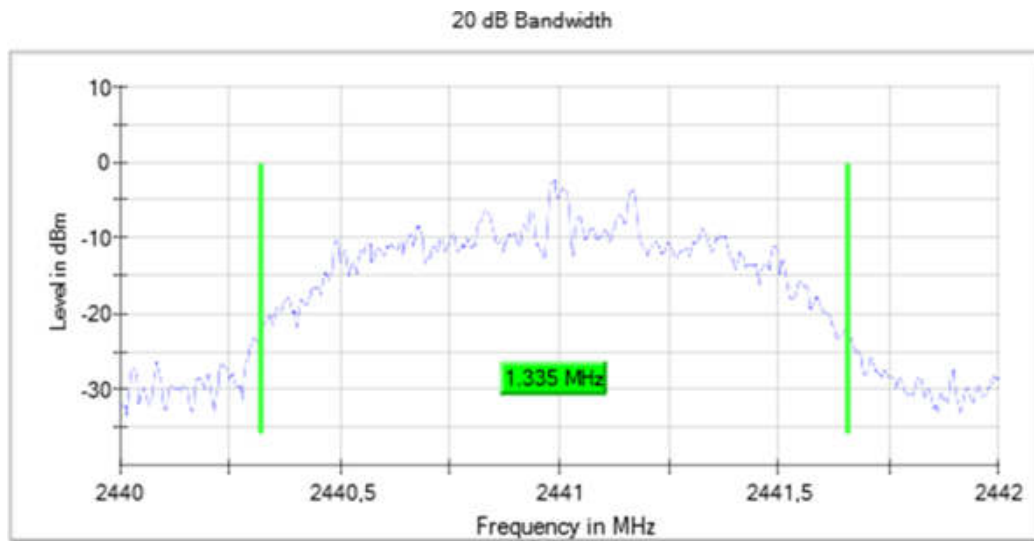
Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5), Number of Transmission Chains = 1, Active Port = 1

Images:



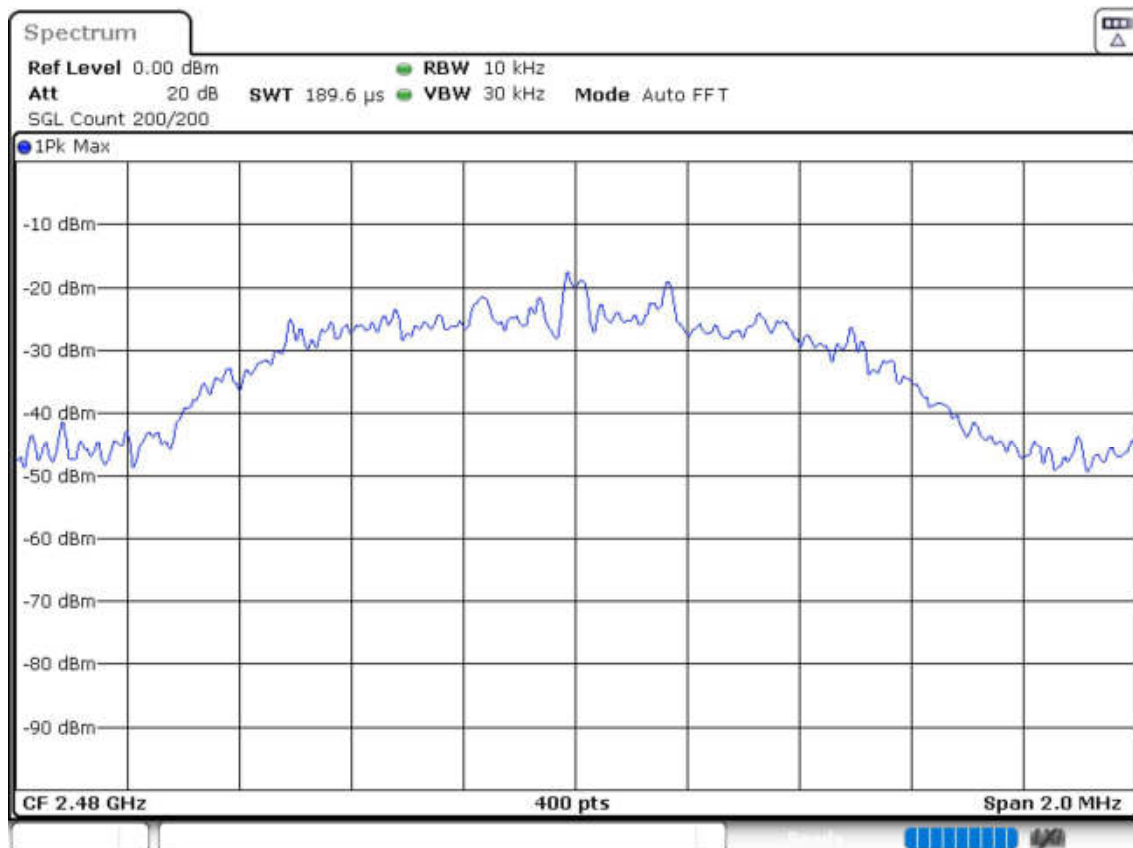
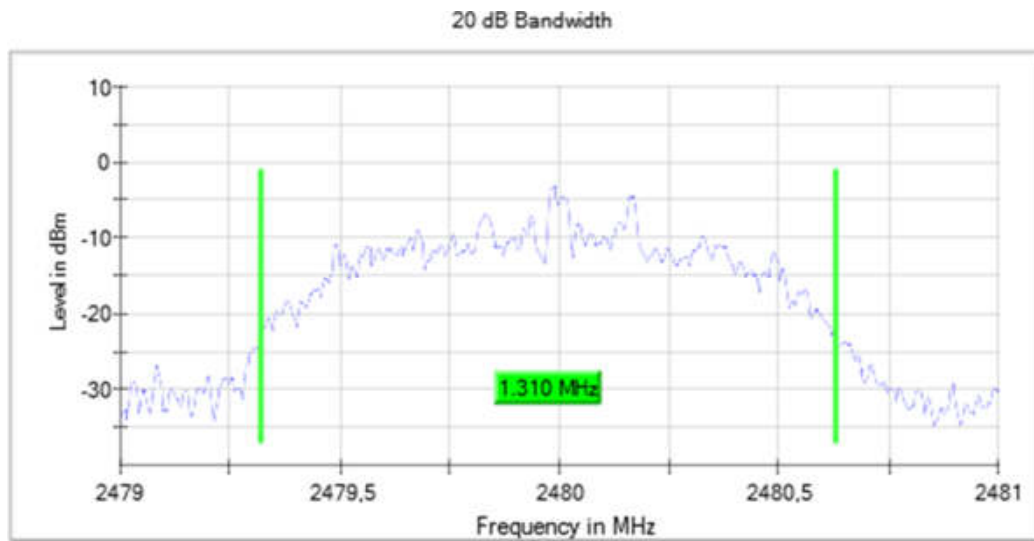
**Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
 Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5), Number of Transmission Chains = 1, Active Port = 1**

Images:



**Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
 Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5), Number of Transmission Chains = 1, Active Port = 1**

Images:



RSS-247 5.1 (b) / FCC 15.247 (a) (1) Carrier Frequency Separation

Modulation: BT (GFSK 1-DH5)

Results

Equipment	BW (MHz)	# of Tx Chains	Port	Freq Sep (MHz)
Frequency Hopping Spread Spectrum systems (DSS)	1	1	1	0.98

The hopping channel carrier frequencies are separated by a minimum of two-thirds of the 20 dB bandwidth of the hopping channel.

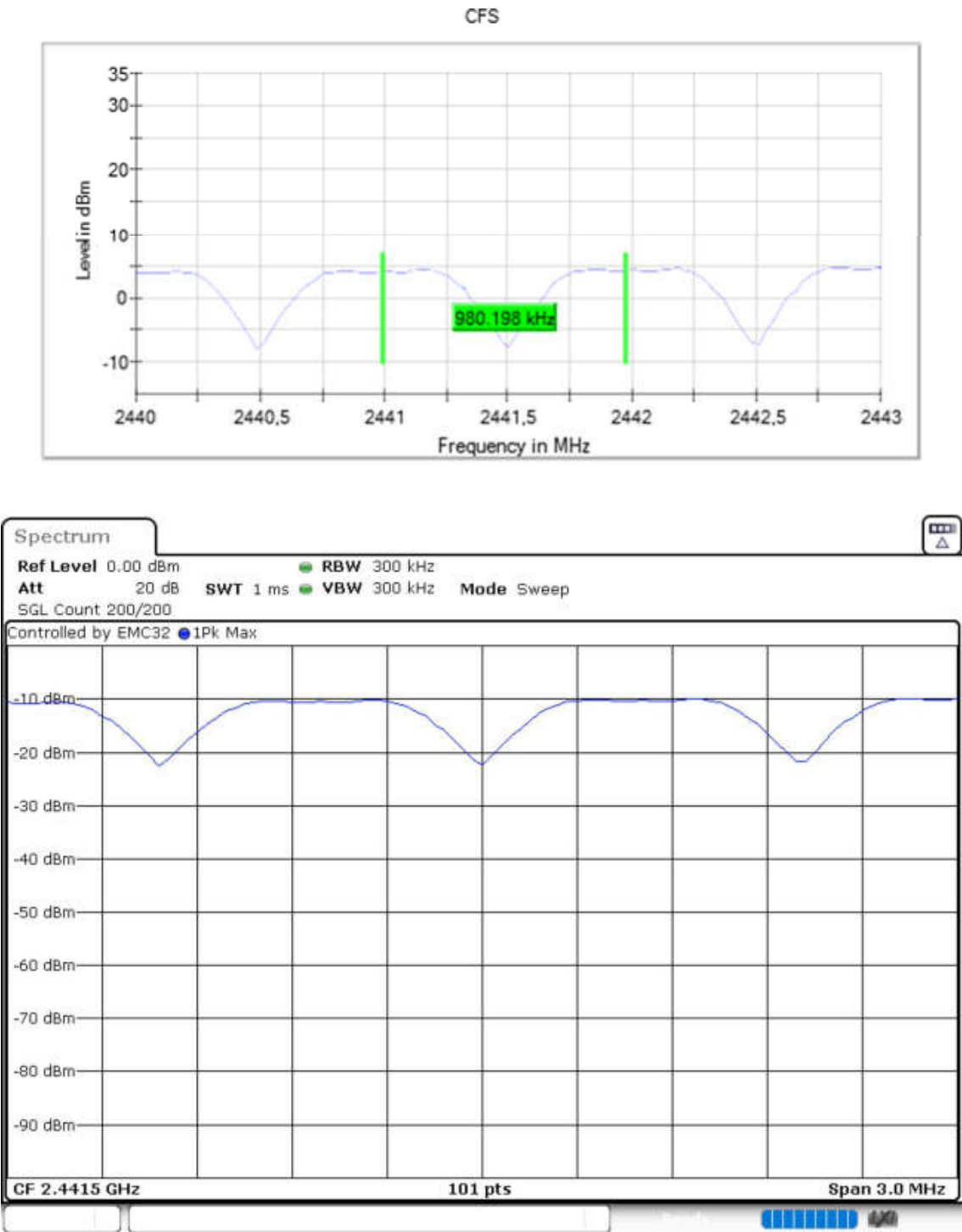
Verdict

Pass

Attachments

Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH5), Number of Transmission Chains = 1, Active Port = 1

Images:



Modulation: BT (Pi/4 DQPSK 2-DH5)

Results

Equipment	BW (MHz)	# of Tx Chains	Port	Freq Sep (MHz)
Frequency Hopping Spread Spectrum systems (DSS)	1	1	1	1.03375

The hopping channel carrier frequencies are separated by a minimum of two-thirds of the 20 dB bandwidth of the hopping channel.

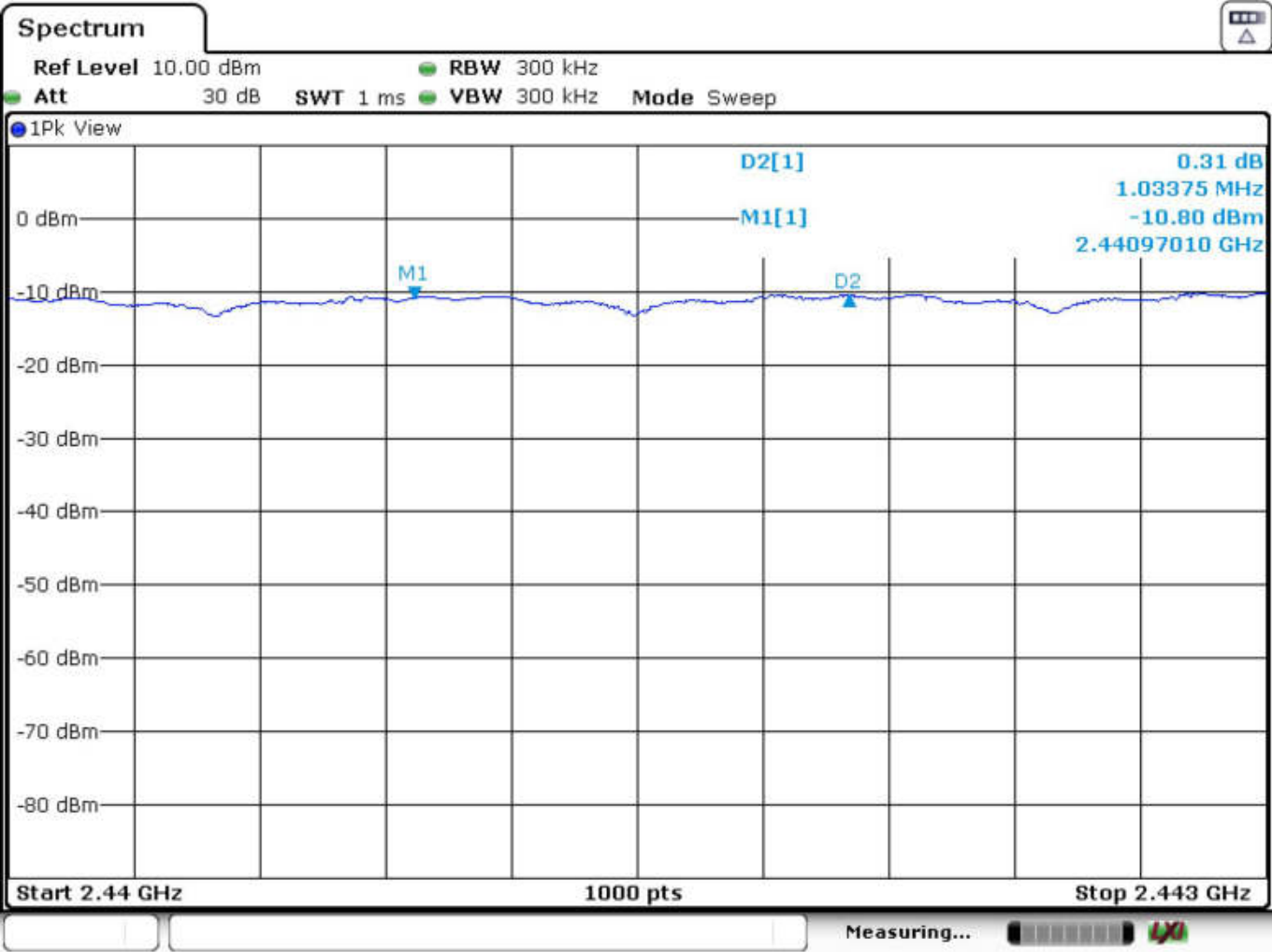
Verdict

Pass

Attachments

Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (Pi/4 DQPSK 2-DH5), Number of Transmission Chains = 1, Active Port = 1

Images:



Modulation: BT (8DPSK 3-DH5)

Results

Equipment	BW (MHz)	# of Tx Chains	Port	Freq Sep (MHz)
Frequency Hopping Spread Spectrum systems (DSS)	1	1	1	1.03375

The hopping channel carrier frequencies are separated by a minimum of two-thirds of the 20 dB bandwidth of the hopping channel.

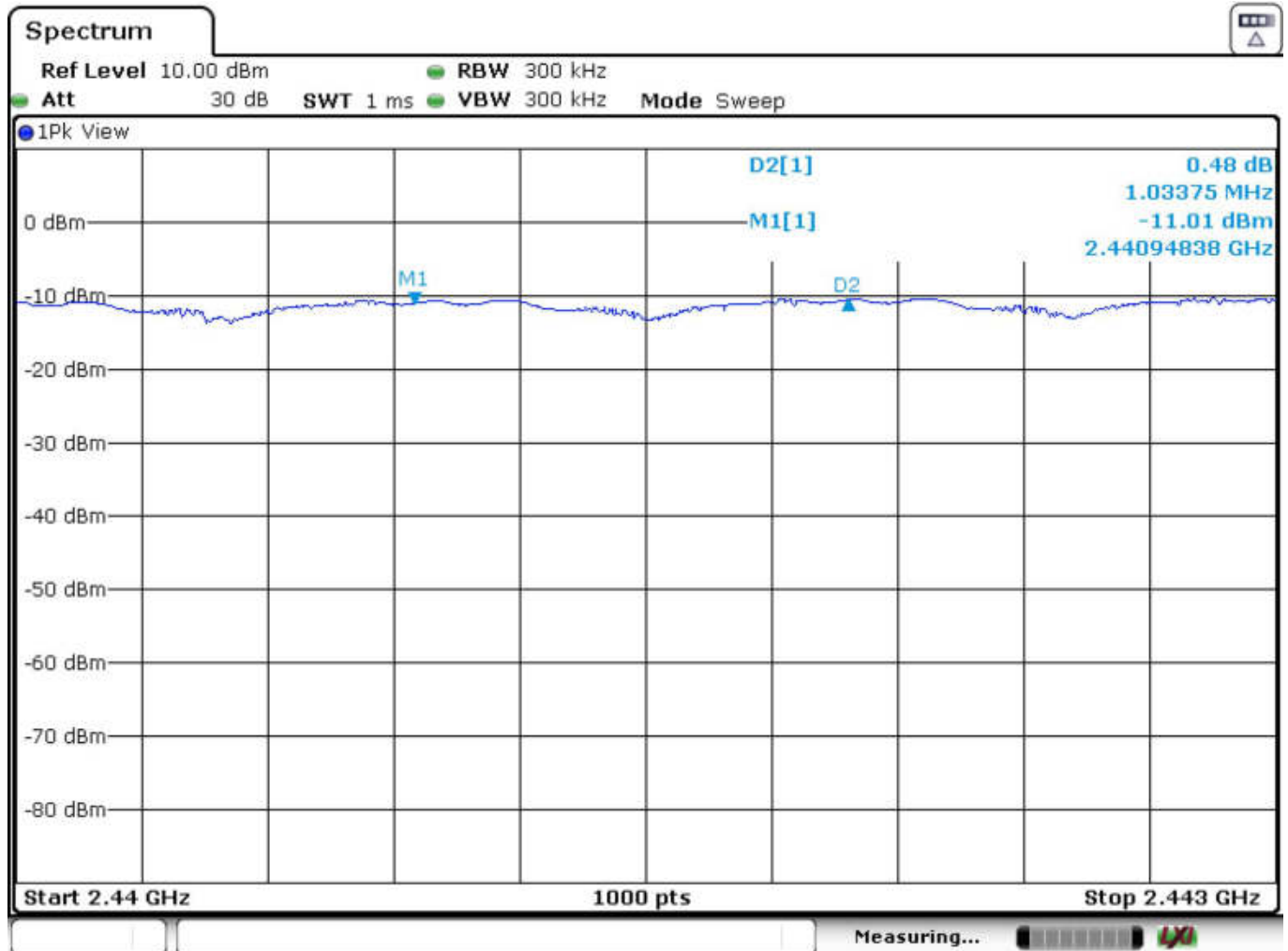
Verdict

Pass

Attachments

Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5), Number of Transmission Chains = 1, Active Port = 1

Images:



RSS-247 5.1 (d) / FCC 15.247 (a) (1) (iii) Time of Occupancy (Dwell Time)

Limits

The average time of occupancy on any channel shall not be greater than 0.4 seconds (400 ms) within a period of 0.4 seconds multiplied by the number of hopping channels employed = $0.4 \times 79 = 31.6$ seconds.

Modulation: BT (GFSK 1-DH5)

Results

Equipment	BW (MHz)	# of Tx Chains	Port	NHp	Avg COT (ms)
Frequency Hopping Spread Spectrum systems (DSS)	1	1	1	105	309.15
Frequency Hopping Spread Spectrum systems (DSS)	1	1	1	106	312.17
Frequency Hopping Spread Spectrum systems (DSS)	1	1	1	105	309.20

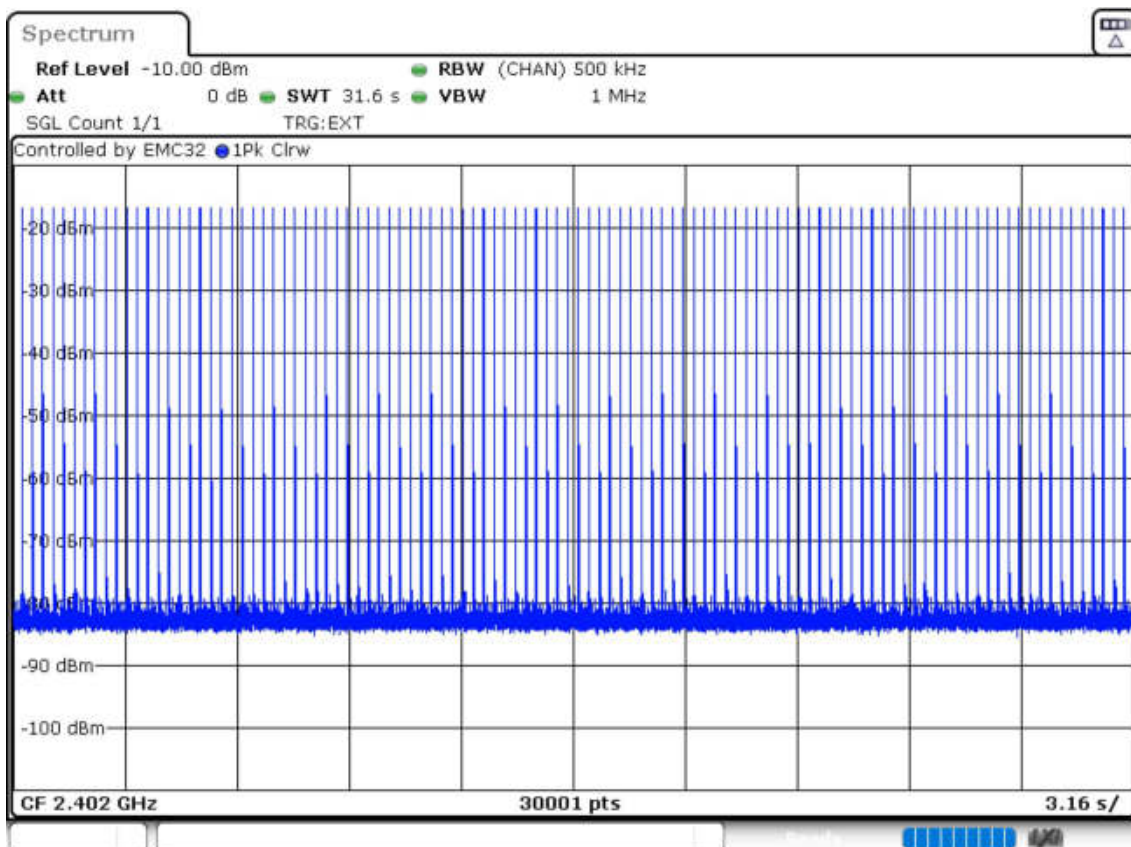
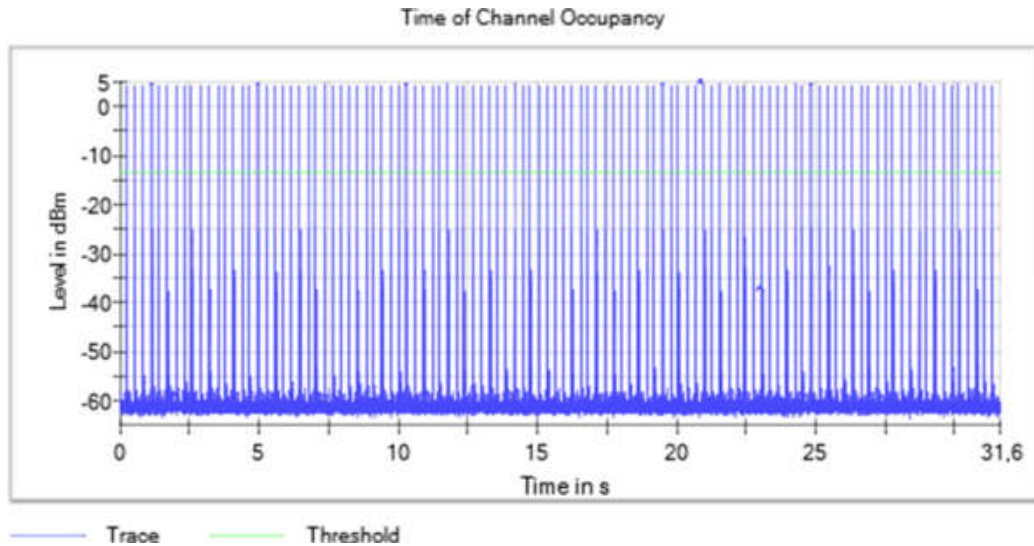
Verdict

Pass

Attachments

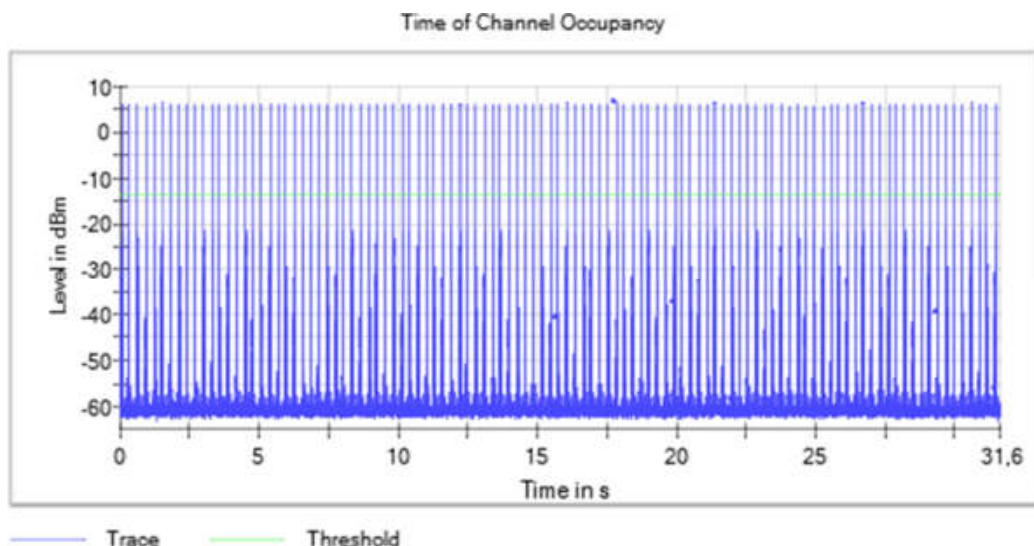
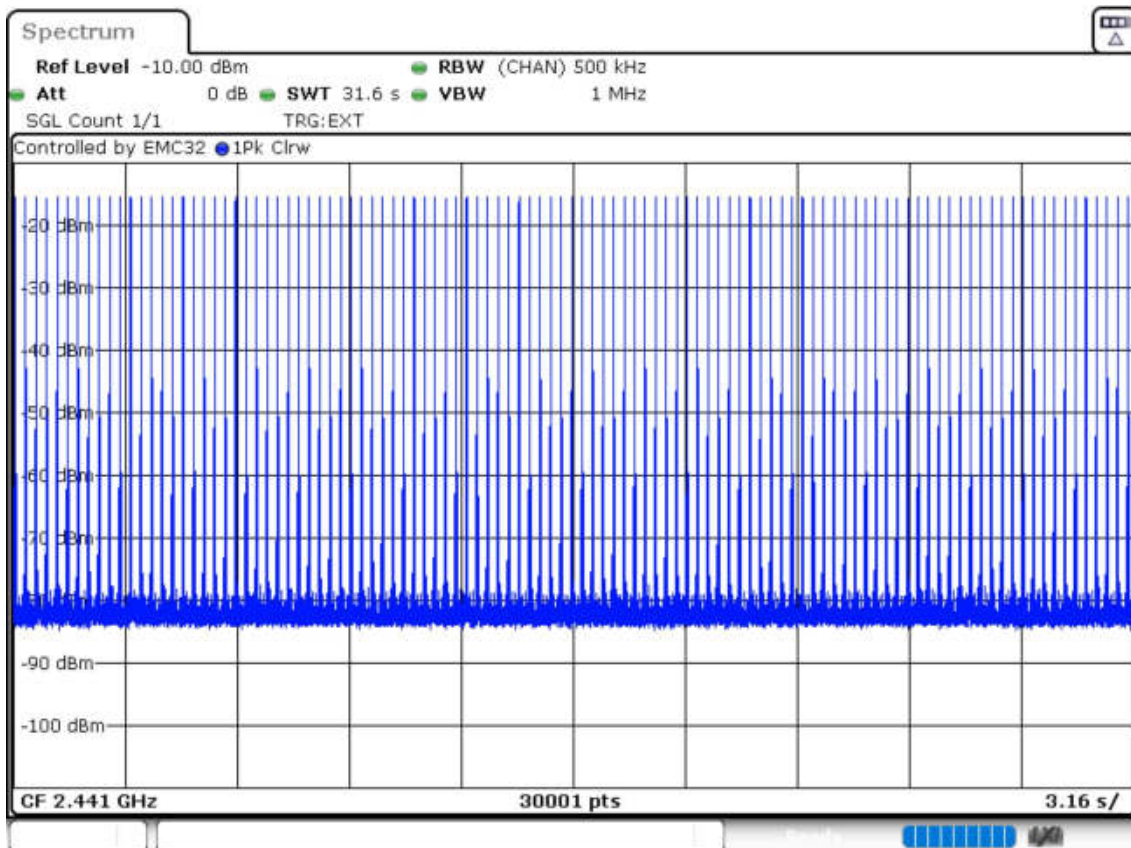
Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH5), Number of Transmission Chains = 1, Active Port = 1

Images:



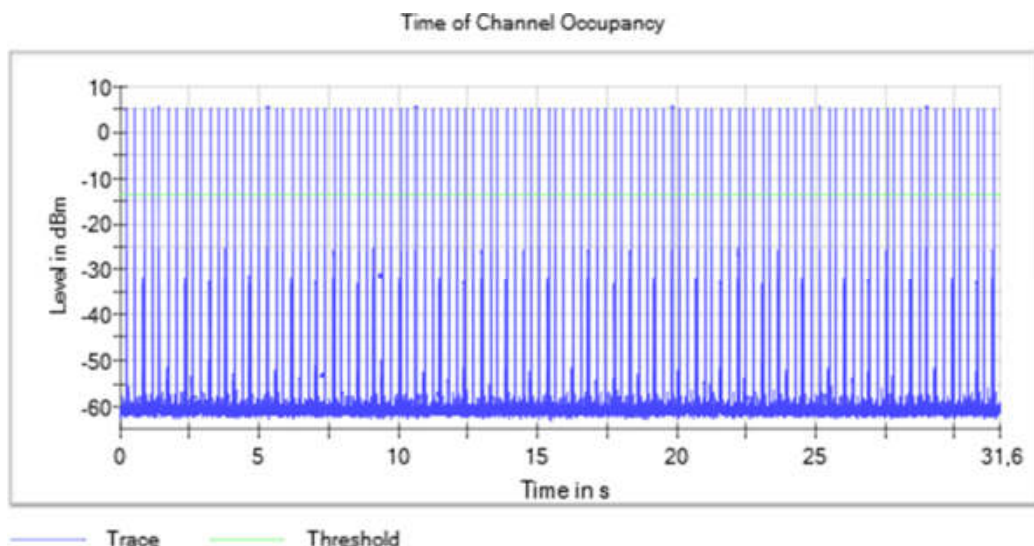
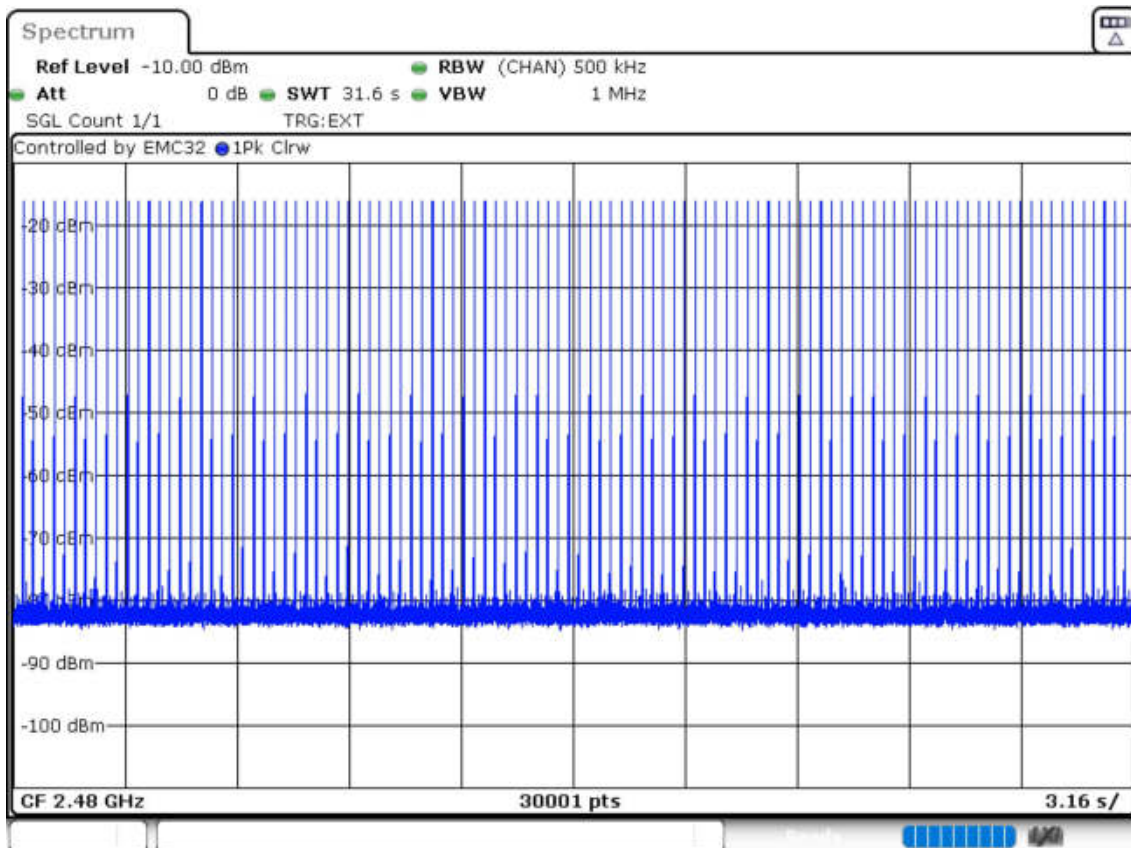
Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH5), Number of Transmission Chains = 1, Active Port = 1

Images:



Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH5), Number of Transmission Chains = 1, Active Port = 1

Images:



Modulation: BT (Pi/4 DQPSK 2-DH5)

Results

Equipment	BW (MHz)	# of Tx Chains	Port	NHp	Avg COT (ms)
Frequency Hopping Spread Spectrum systems (DSS)	1	1	1	106	312.59
Frequency Hopping Spread Spectrum systems (DSS)	1	1	1	216	316.26
Frequency Hopping Spread Spectrum systems (DSS)	1	1	1	105	309.65

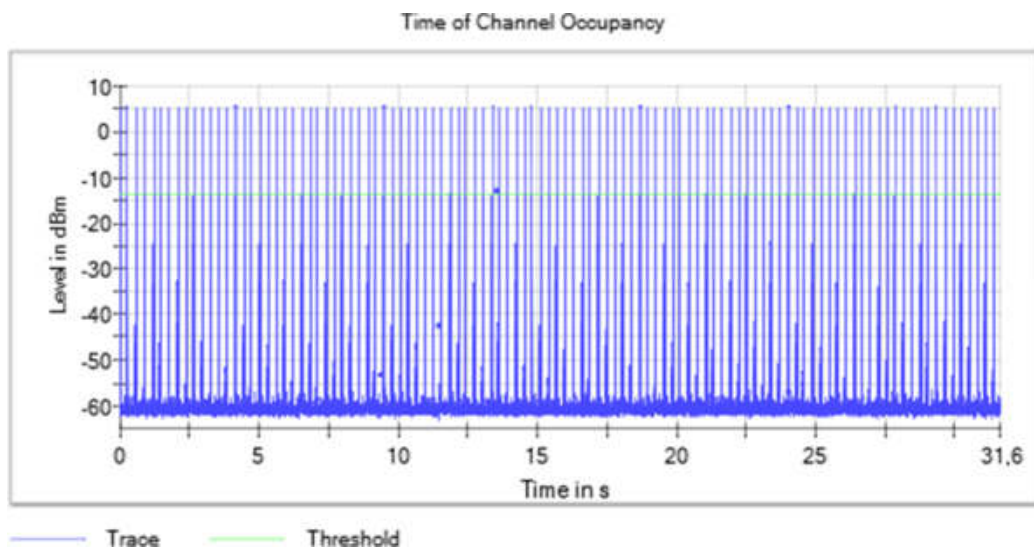
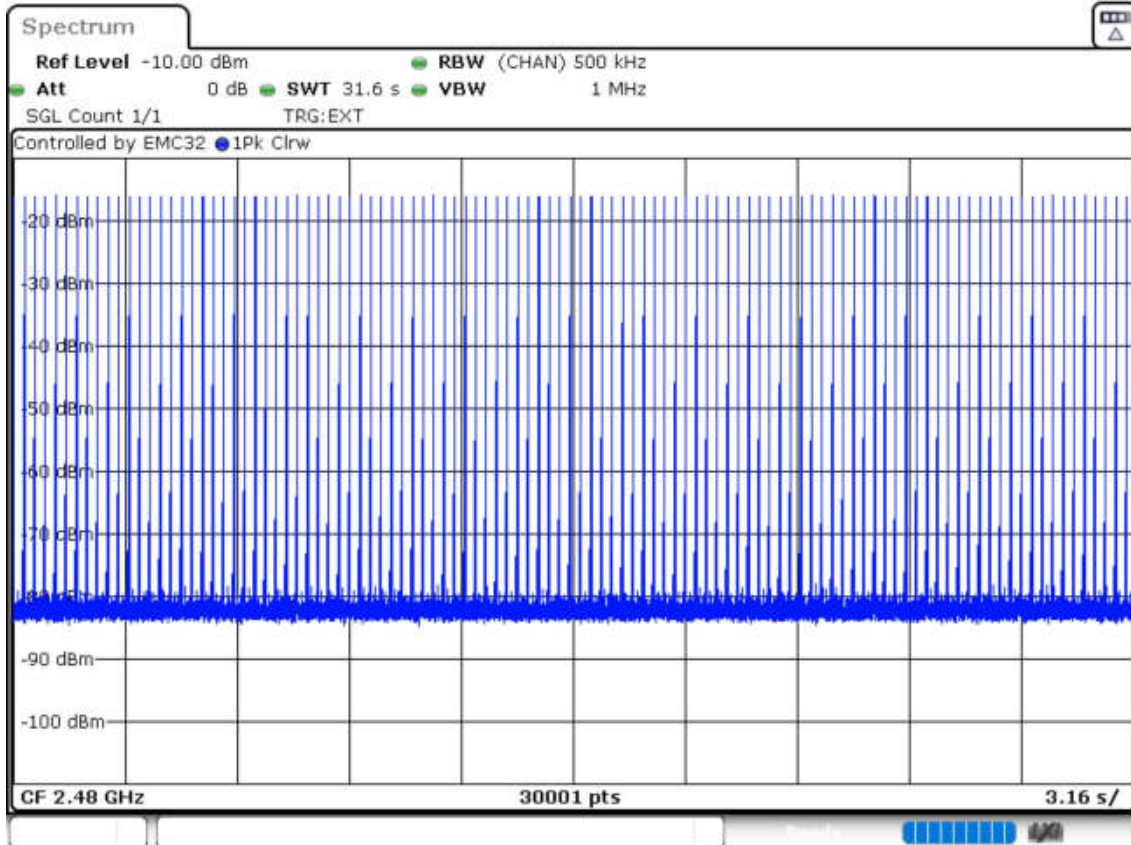
Verdict

Pass

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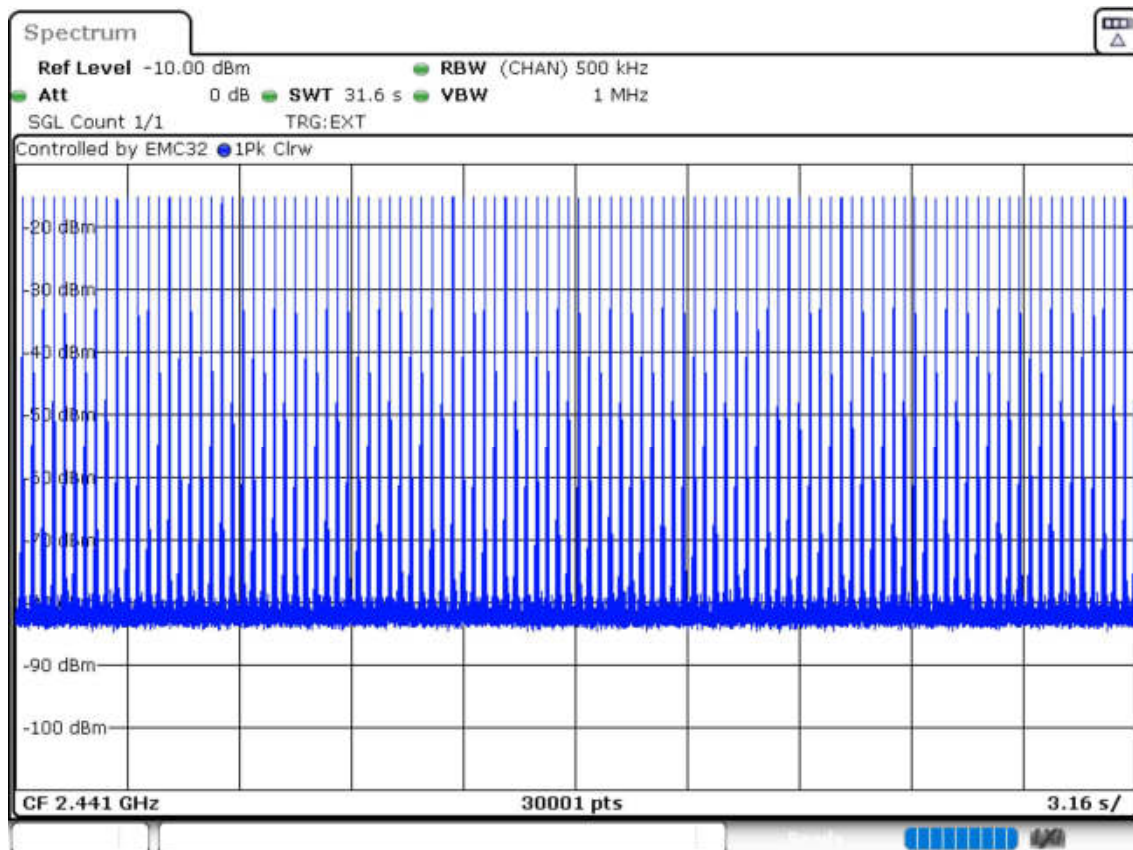
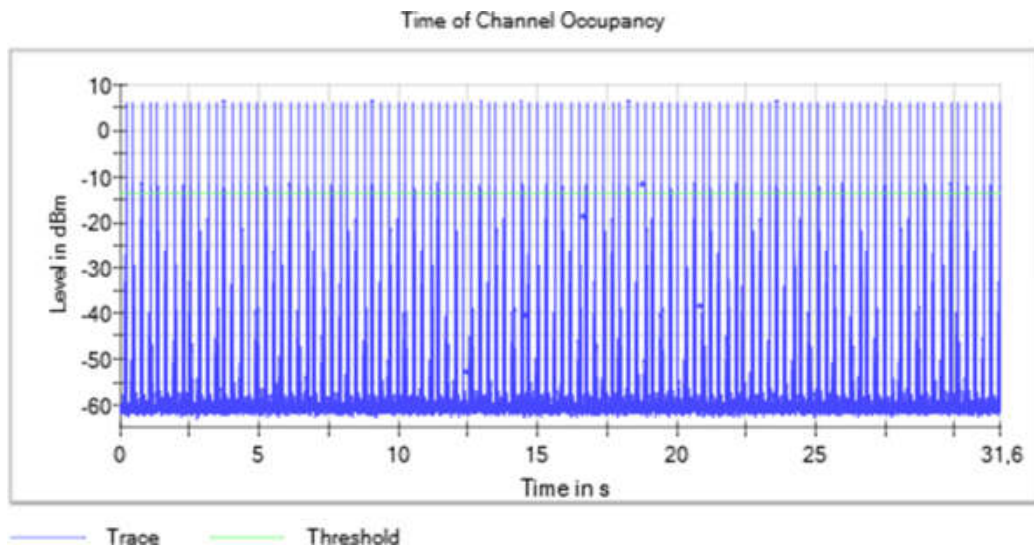
Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (Pi/4 DQPSK 2-DH5), Number of Transmission Chains = 1, Active Port = 1

Images:



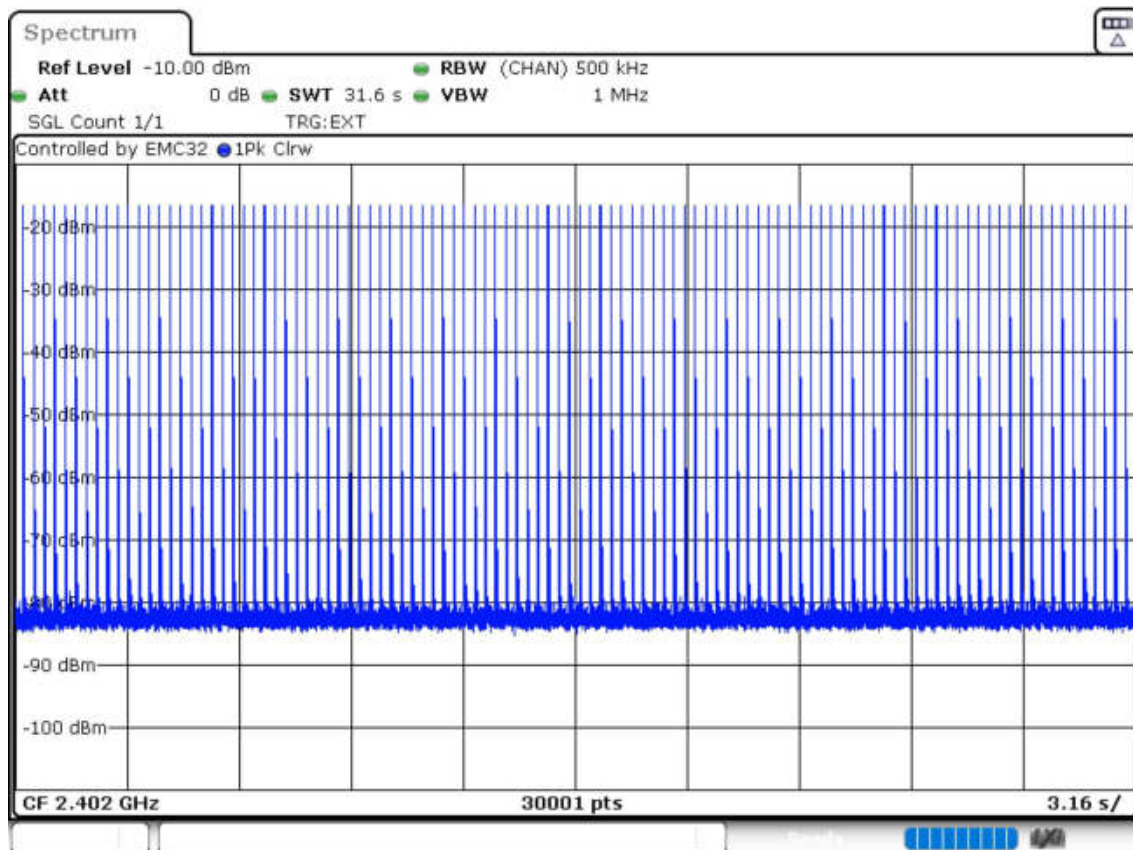
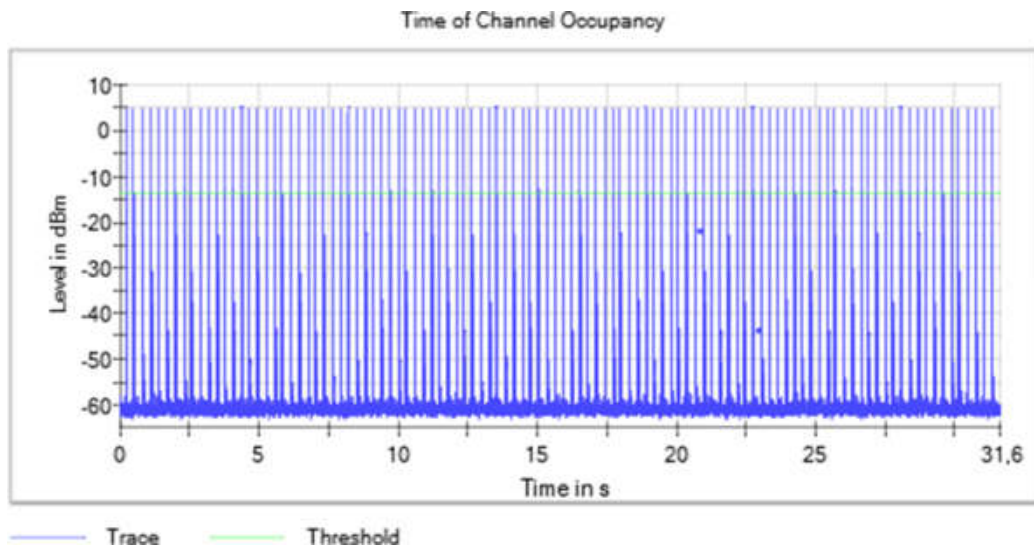
Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (Pi/4 DQPSK 2-DH5), Number of Transmission Chains = 1, Active Port = 1

Images:



Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (Pi/4 DQPSK 2-DH5), Number of Transmission Chains = 1, Active Port = 1

Images:



Modulation: BT (8DPSK 3-DH5)

Results

Equipment	BW (MHz)	# of Tx Chains	Port	NHp	Avg COT (ms)
Frequency Hopping Spread Spectrum systems (DSS)	1	1	1	165	314.24
Frequency Hopping Spread Spectrum systems (DSS)	1	1	1	106	313.00
Frequency Hopping Spread Spectrum systems (DSS)	1	1	1	284	317.97

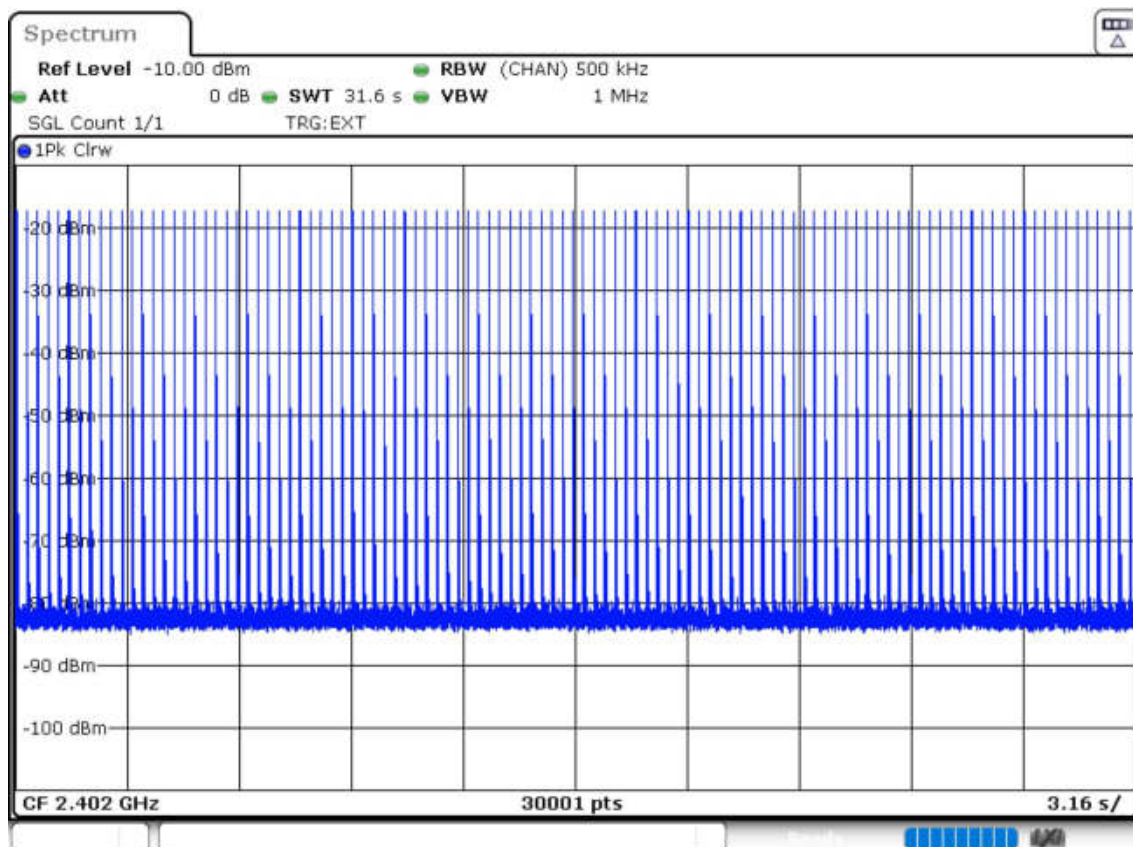
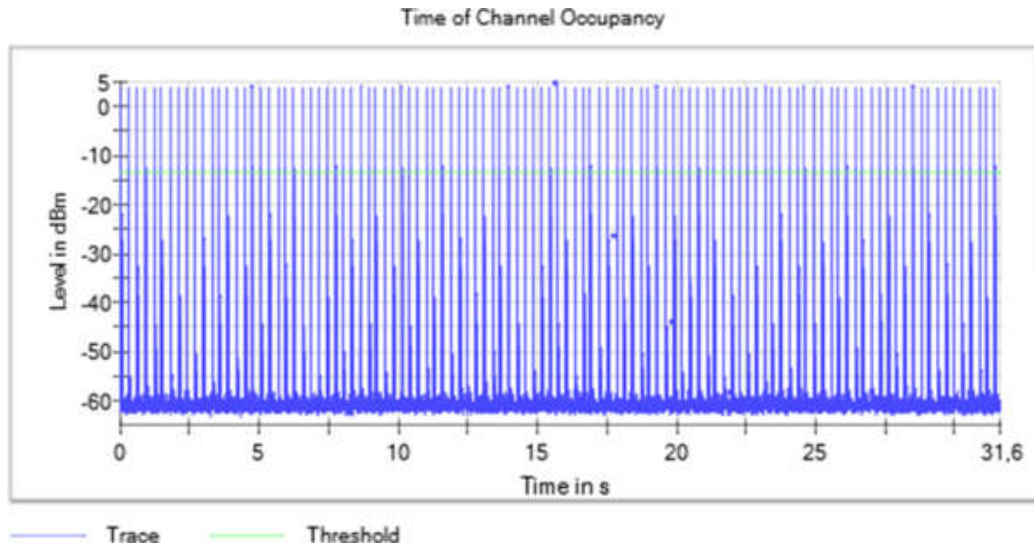
Verdict

Pass

Attachments

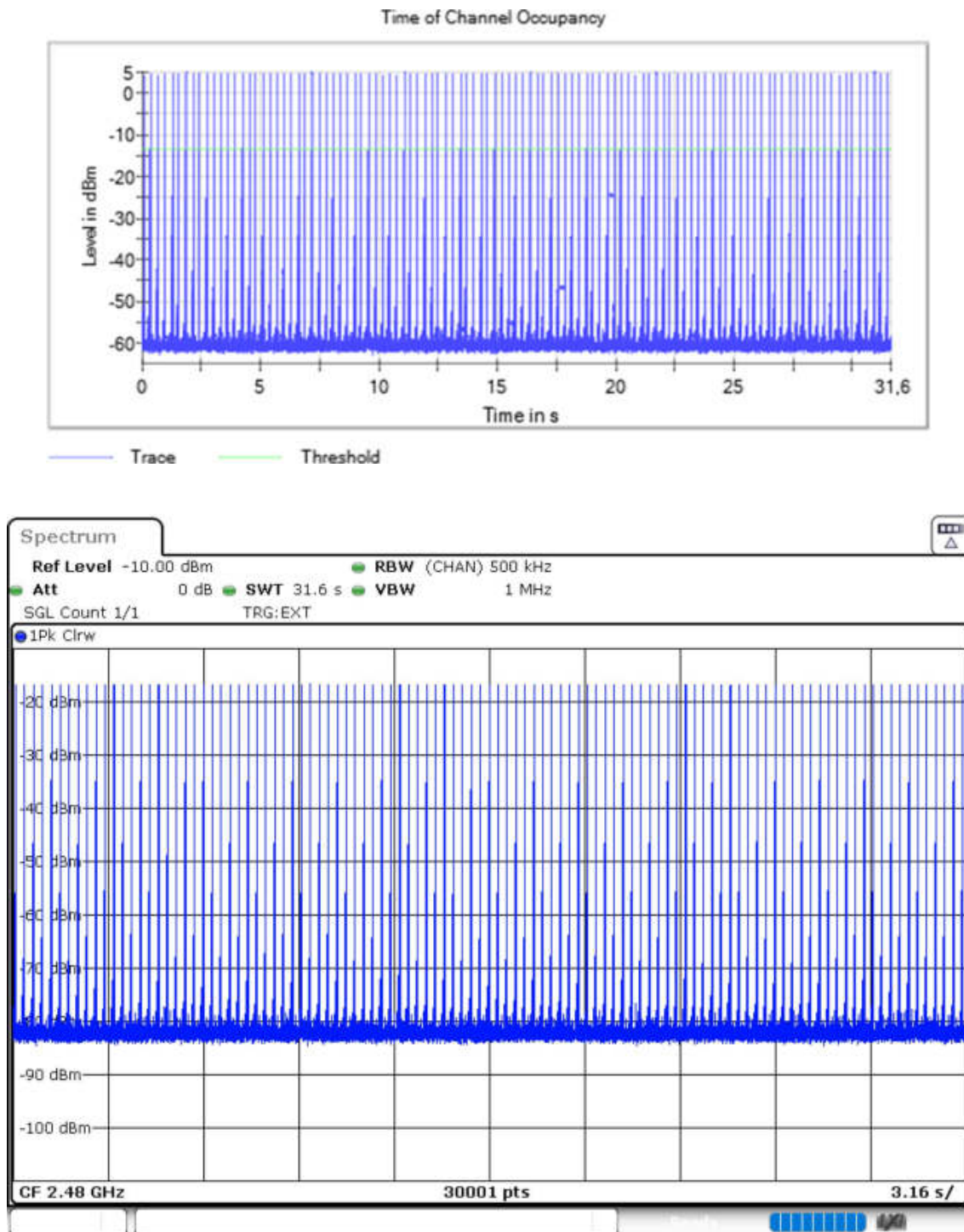
Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5), Number of Transmission Chains = 1, Active Port = 1

Images:



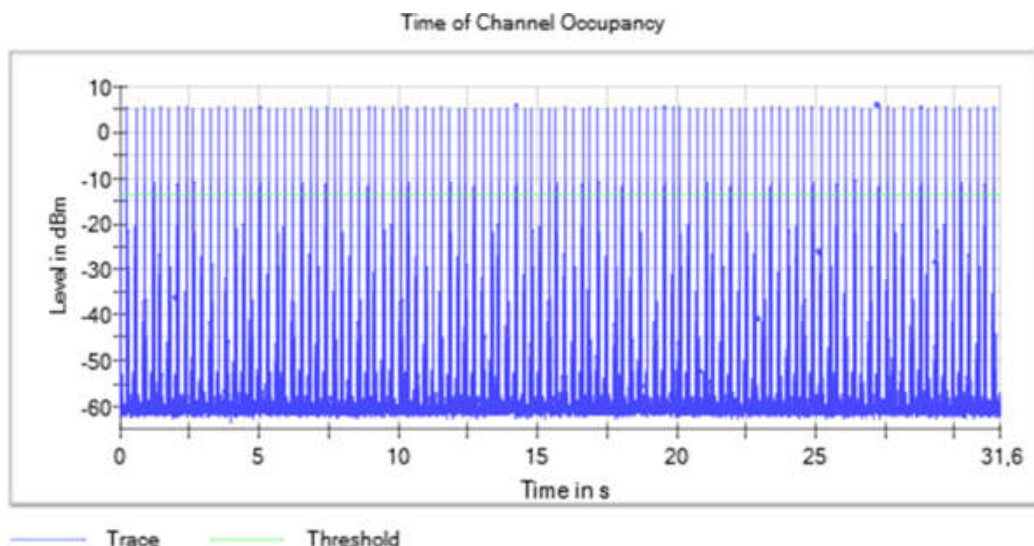
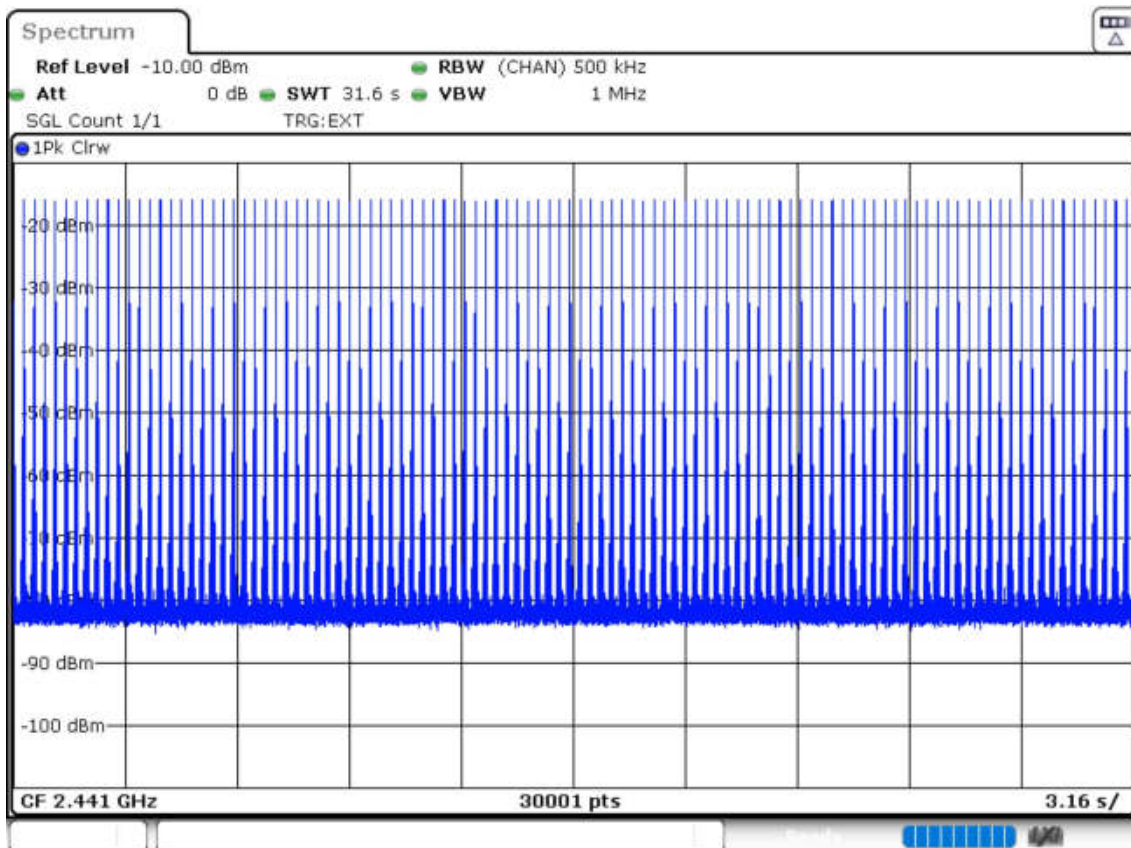
Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5), Number of Transmission Chains = 1, Active Port = 1

Images:



Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5), Number of Transmission Chains = 1, Active Port = 1

Images:



RSS-247 5.1 (d) / FCC 15.247 (a) (1) (iii) Number of hopping channels

Limits

Frequency hopping system in the 2400-2483.5 MHz band shall use at least 15 channels.

Modulation: BT (GFSK 1-DH5)

Results

Equipment	BW (MHz)	# of Tx Chains	Port	NHC
Frequency Hopping Spread Spectrum systems (DSS)	1	1	1	79

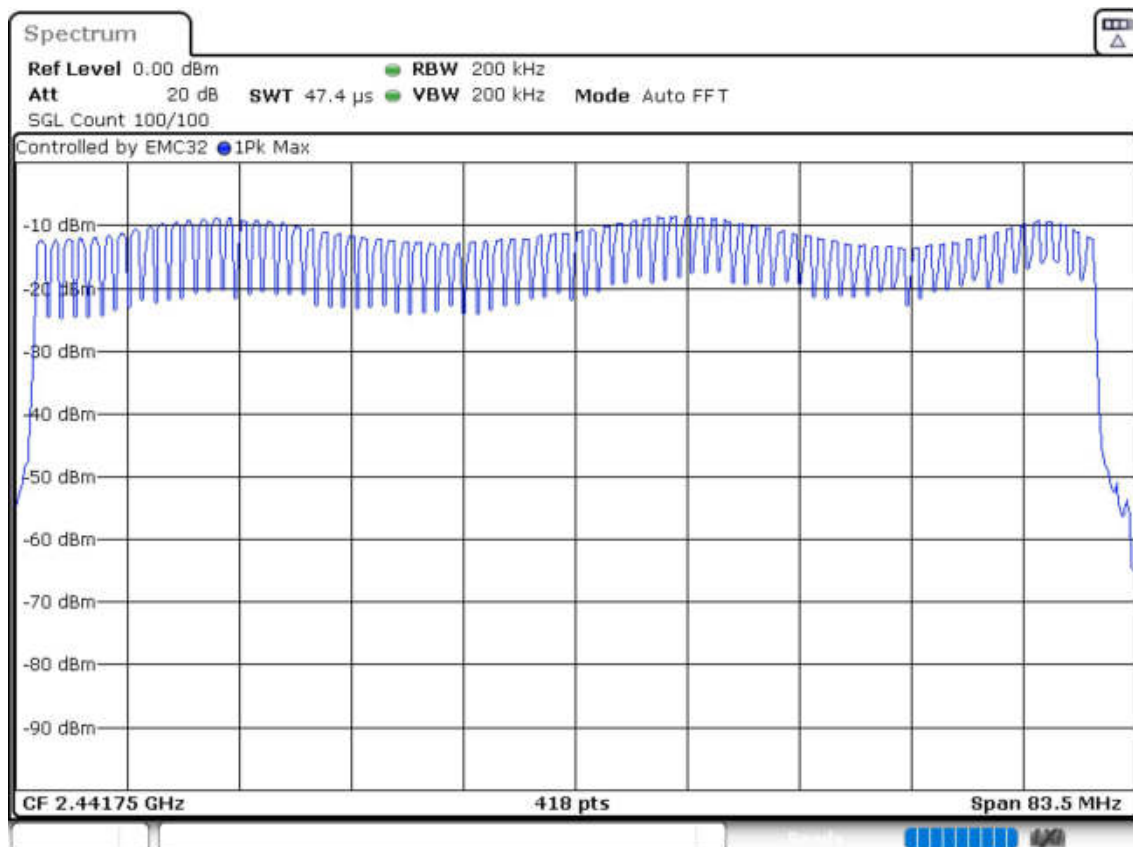
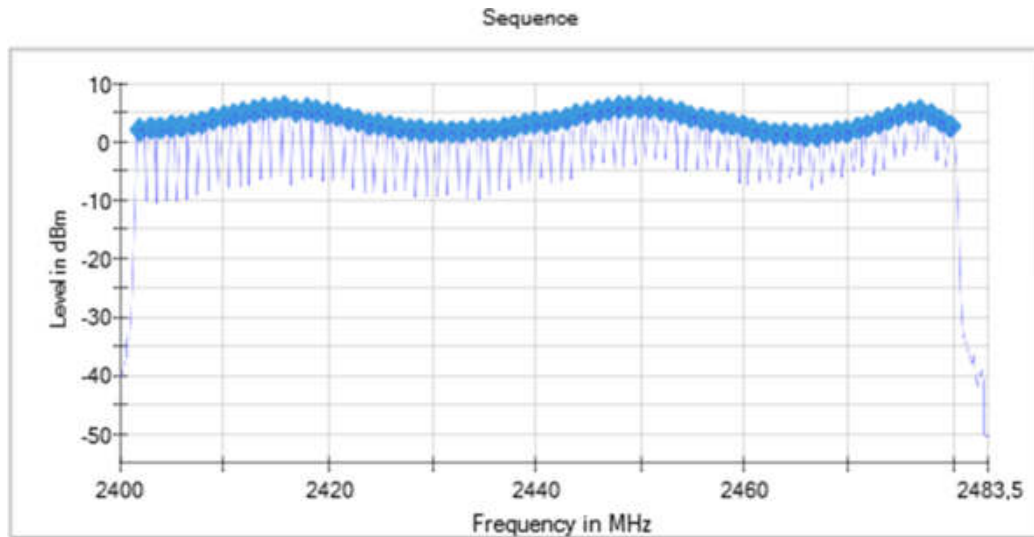
Verdict

Pass

Attachments

Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH5), Number of Transmission Chains = 1, Active Port = 1

Images:



Modulation: BT (Pi/4 DQPSK 2-DH5)

Results

Equipment	BW (MHz)	# of Tx Chains	Port	NHC
Frequency Hopping Spread Spectrum systems (DSS)	1	1	1	79

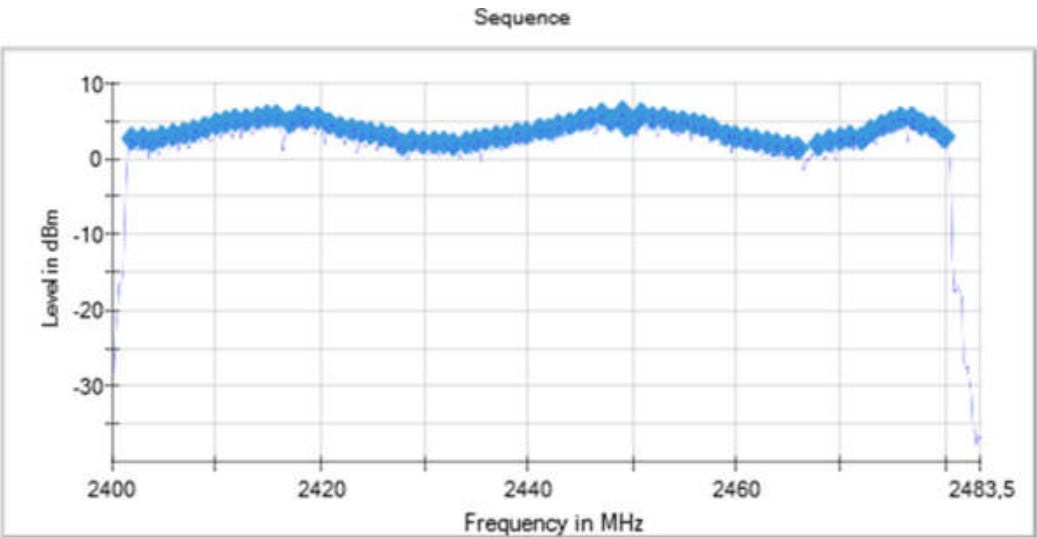
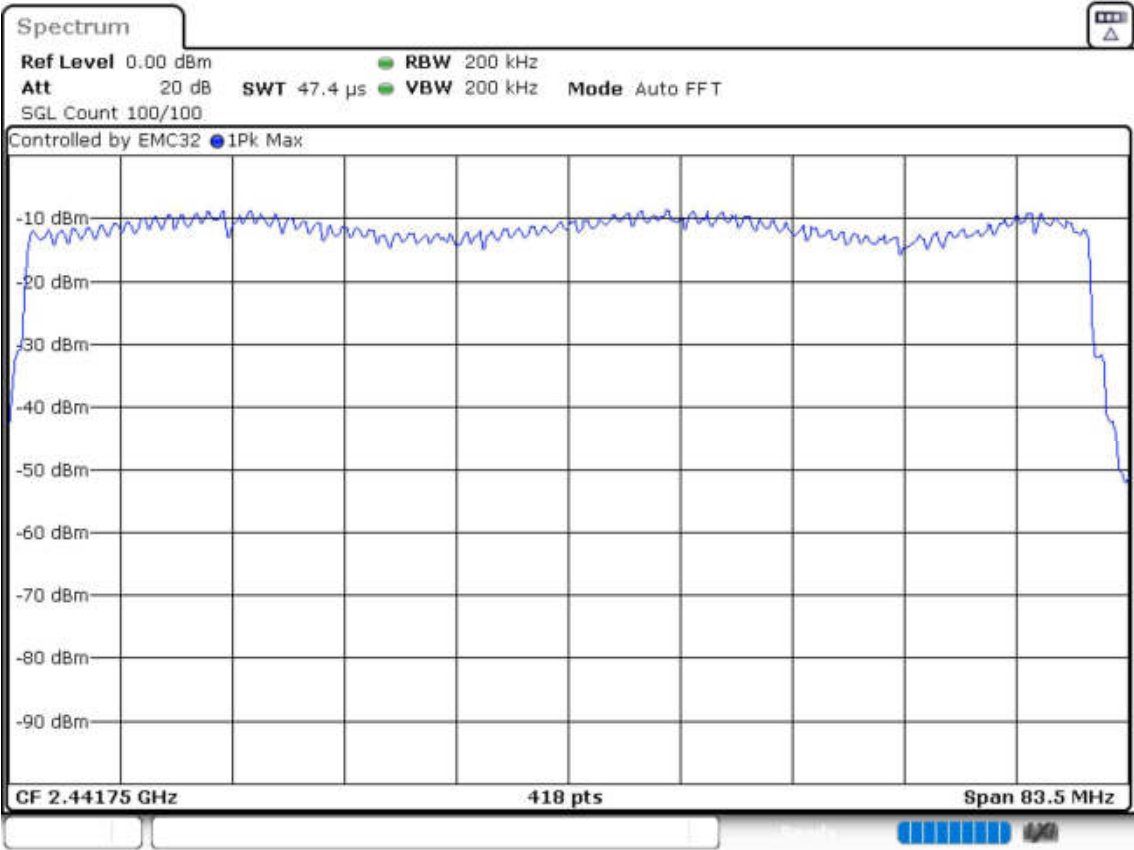
Verdict

Pass

Attachments

Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (Pi/4 DQPSK 2-DH5), Number of Transmission Chains = 1, Active Port = 1

Images:



Modulation: BT (8DPSK 3-DH5)

Results

Equipment	BW (MHz)	# of Tx Chains	Port	NHC
Frequency Hopping Spread Spectrum systems (DSS)	1	1	1	79

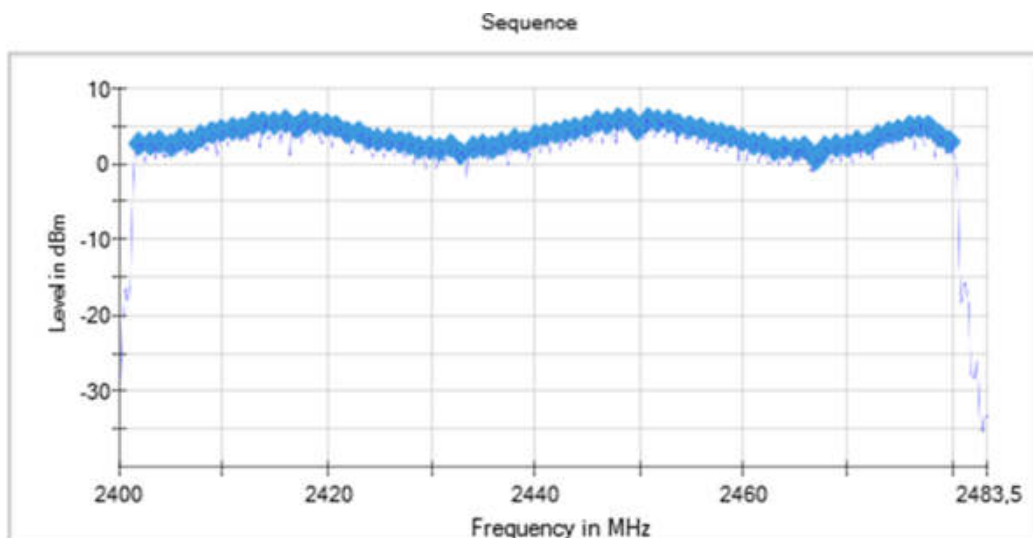
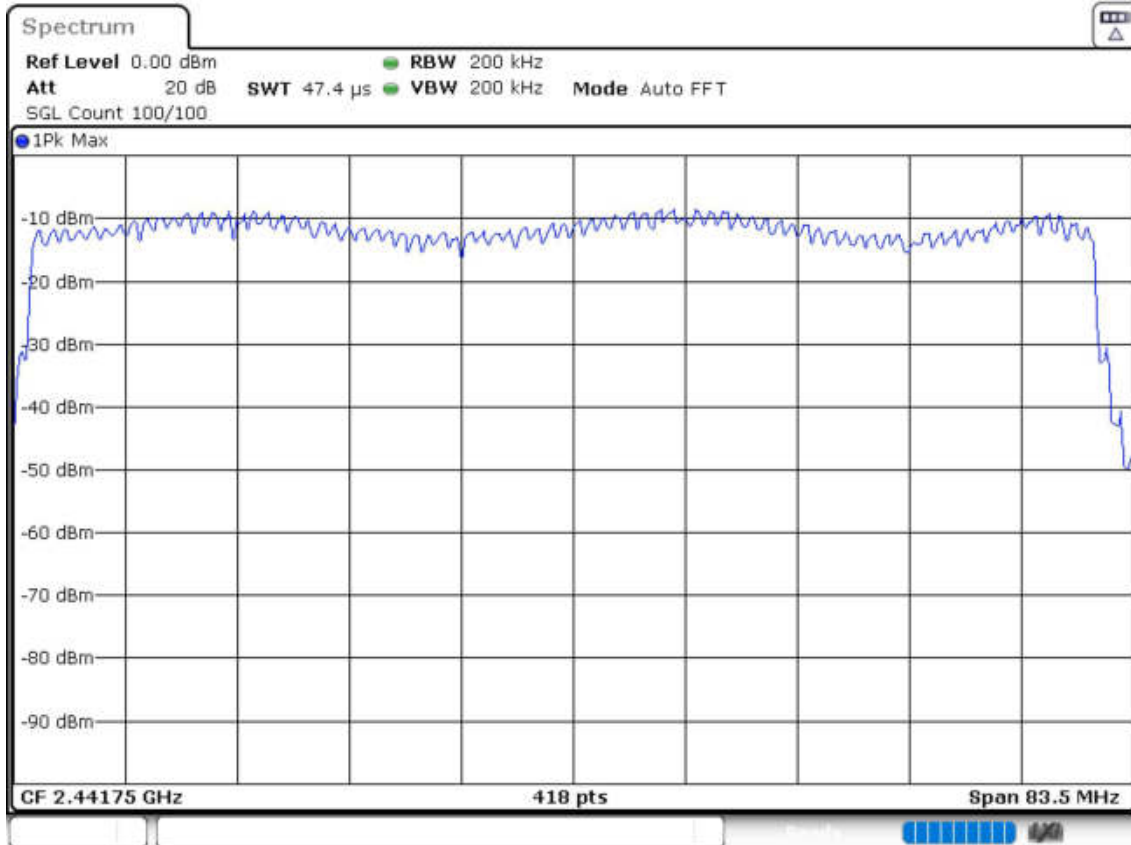
Verdict

Pass

Attachments

Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5), Number of Transmission Chains = 1, Active Port = 1

Images:



RSS-247 5.4 (b) / FCC 15.247 (b) (1) Maximum Peak Conducted output power

Limits

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 hopping channels: 1 watt (30 dBm).

The maximum peak conducted output power level of the fundamental emission was measured according to clause 7.8.5 "Output power test procedure for frequency-hopping spread-spectrum (FHSS) devices" of ANSI C63.10-2013.

The EIRP power (dBm) is calculated by adding the maximum declared antenna gain to the measured conducted power.

Maximum Declared Antenna Gain: 1,3 dBi

The maximum directional gain of the antenna is less than 6 dBi and therefore the maximum output power is not required to be reduced from the stated values.

Modulation: BT (GFSK 1-DH5)

Results

Freq (MHz)	Equipment	Peak Power (dBm)	EIRP (dBm)
2402.00000	Frequency Hopping Spread Spectrum systems (DSS)	3.1	4.4
2441.00000	Frequency Hopping Spread Spectrum systems (DSS)	4.1	5.4
2480.00000	Frequency Hopping Spread Spectrum systems (DSS)	3.8	5.1

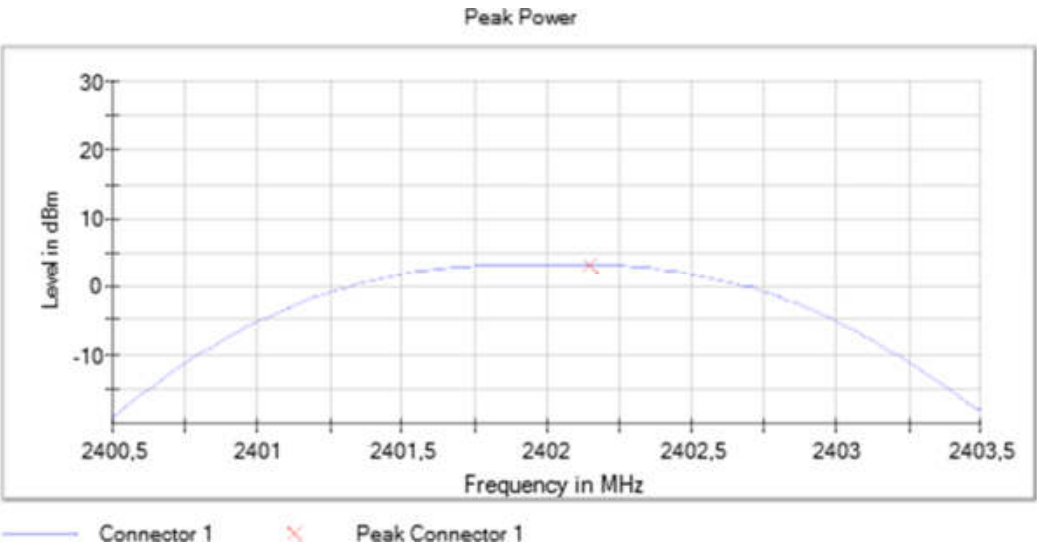
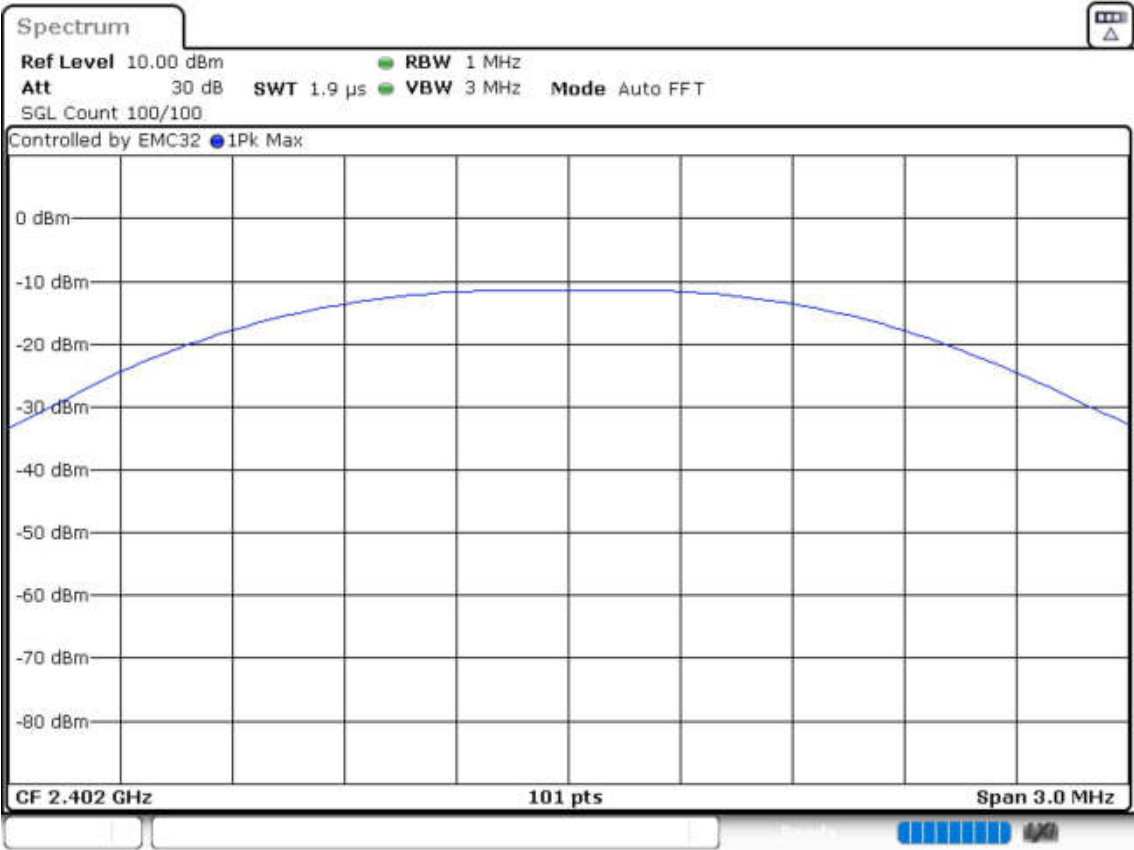
Verdict

Pass

Attachments

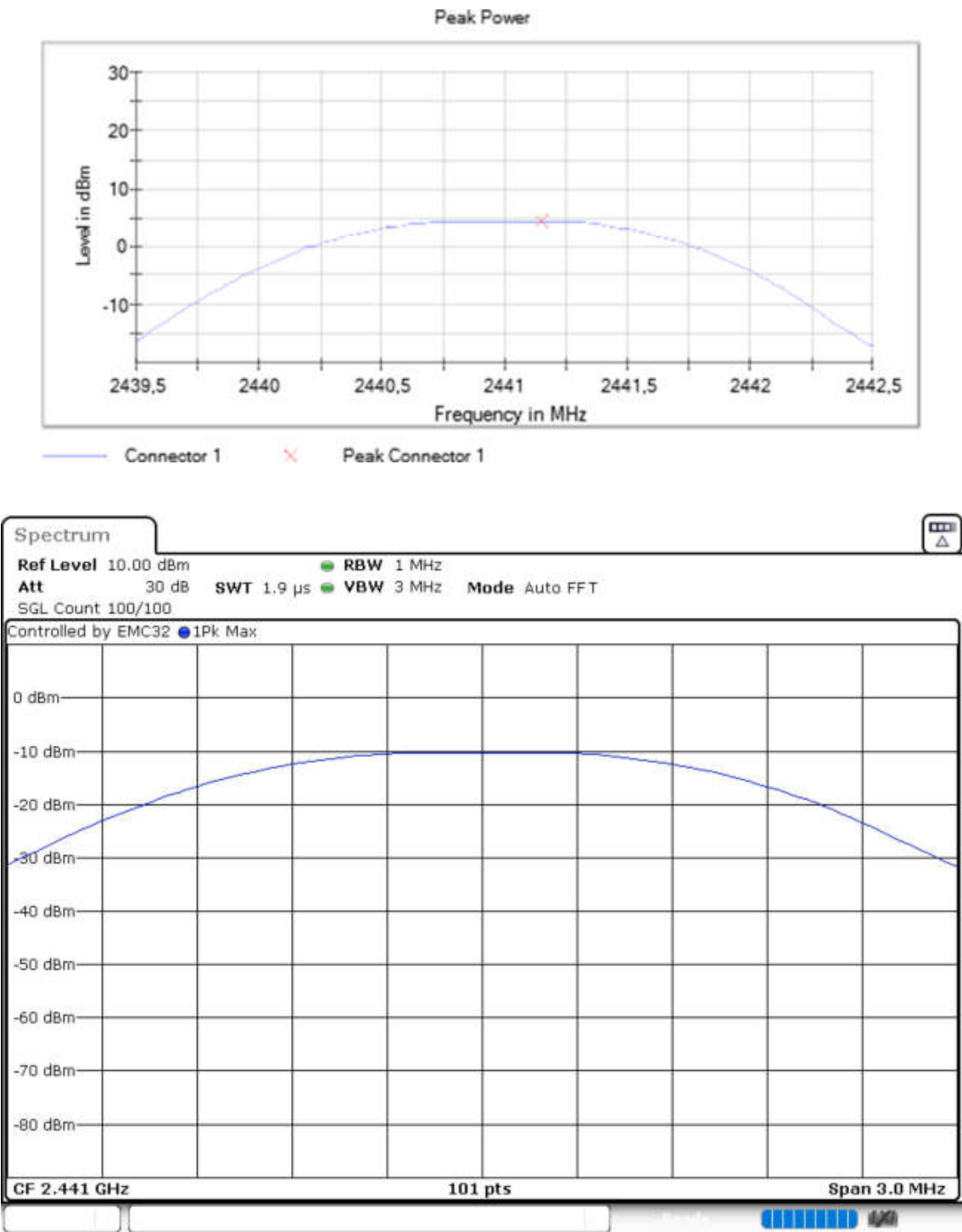
Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH5), Number of Transmission Chains = 1, Active Port = 1

Images:



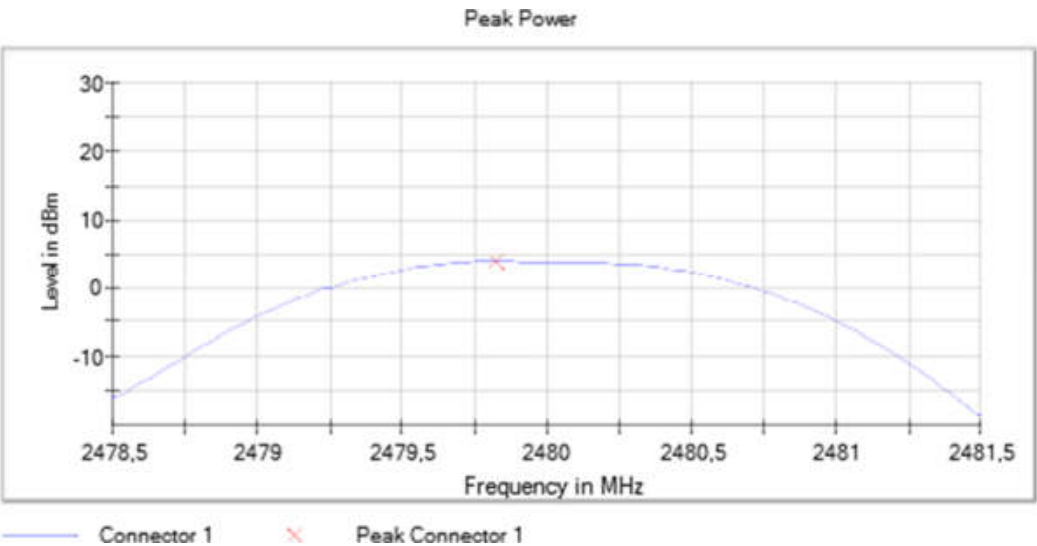
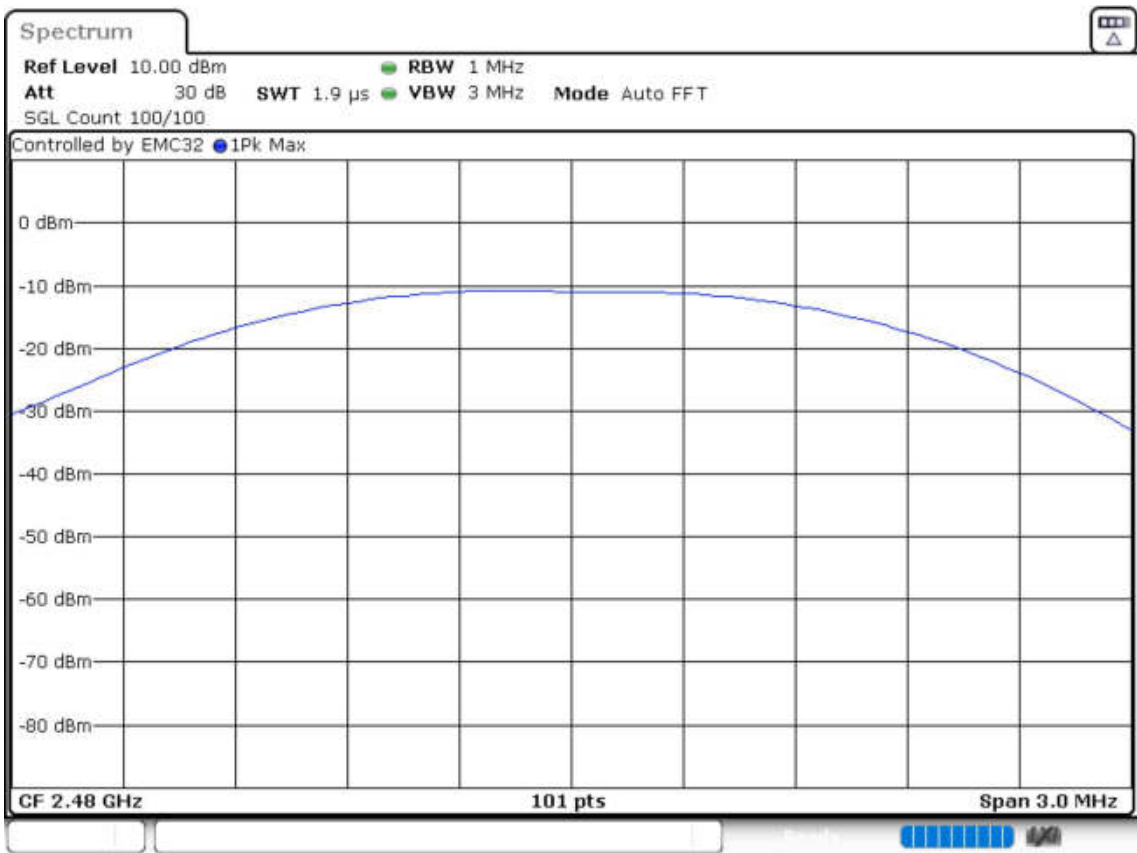
Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH5), Number of Transmission Chains = 1, Active Port = 1

Images:



Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH5), Number of Transmission Chains = 1, Active Port = 1

Images:



Modulation: BT (Pi/4 DQPSK 2-DH5)

Results

Freq (MHz)	Equipment	Peak Power (dBm)	EIRP (dBm)
2402.00000	Frequency Hopping Spread Spectrum systems (DSS)	2.9	4.2
2441.00000	Frequency Hopping Spread Spectrum systems (DSS)	4.1	5.4
2480.00000	Frequency Hopping Spread Spectrum systems (DSS)	3.5	4.8

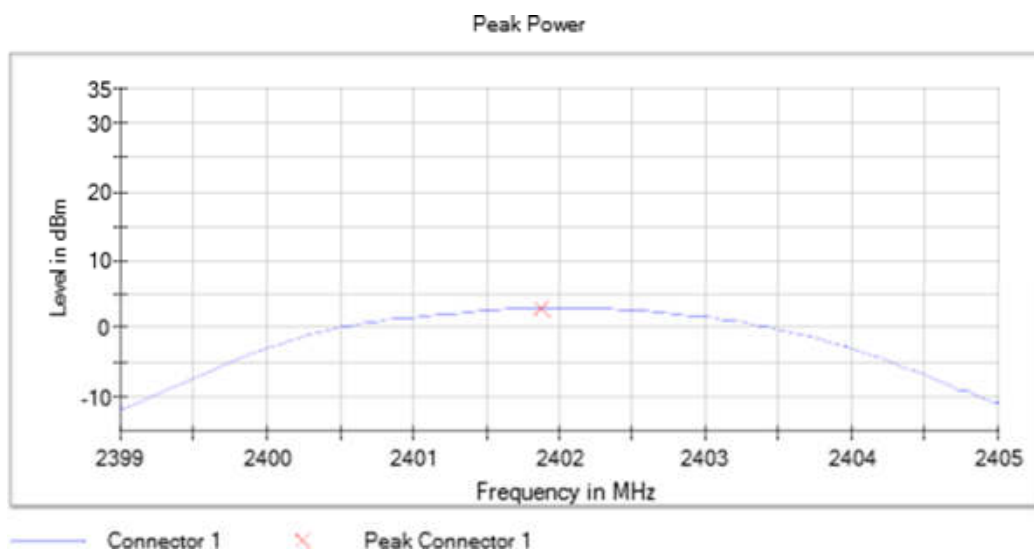
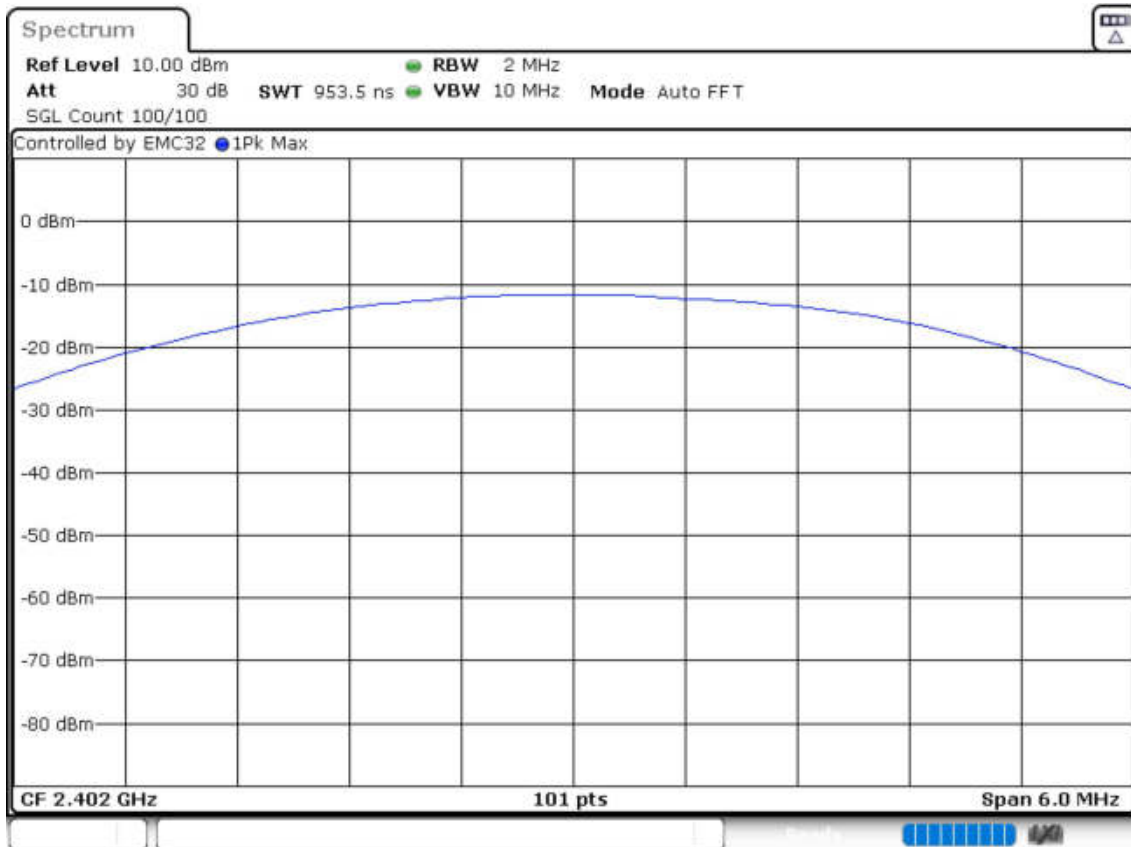
Verdict

Pass

Attachments

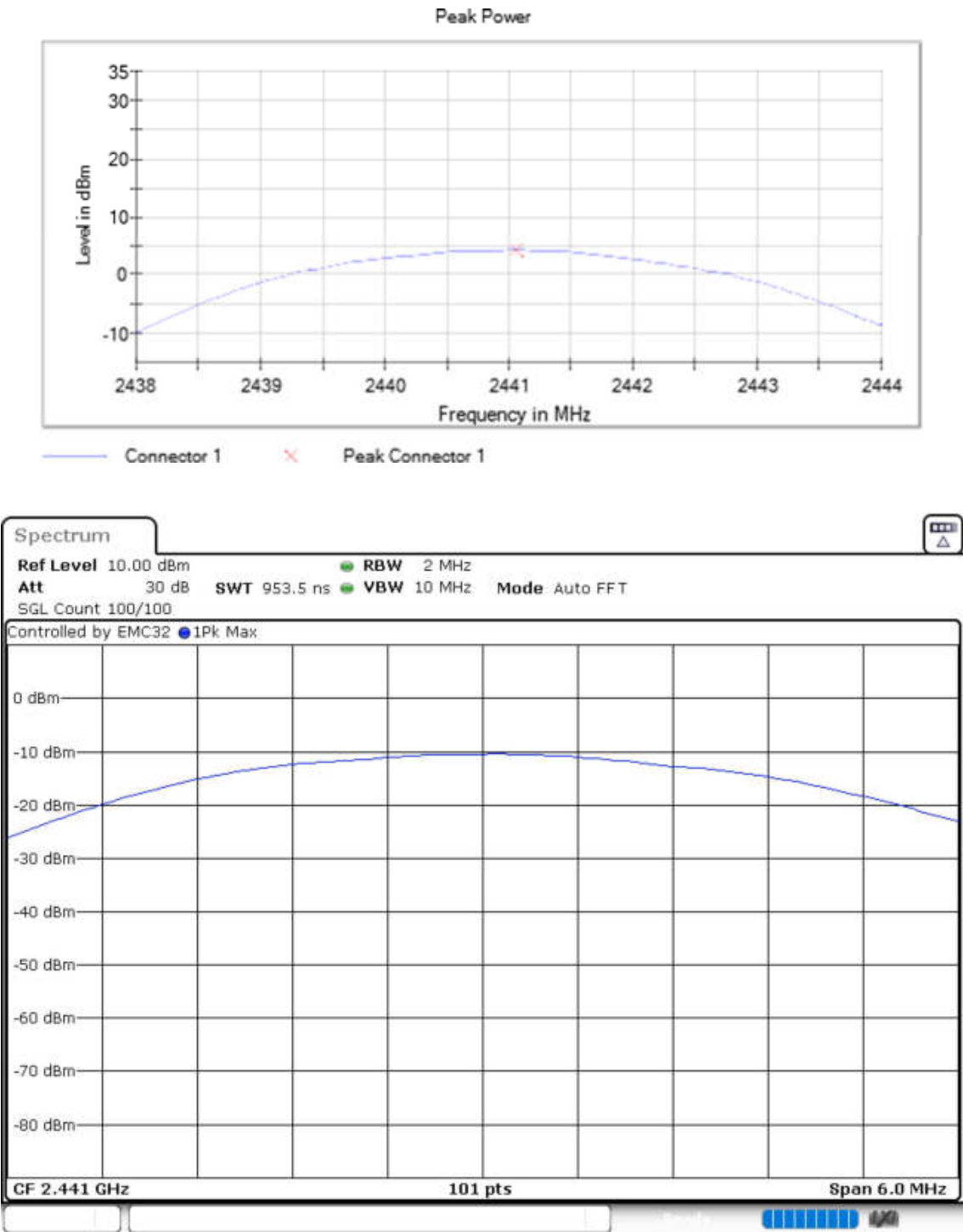
Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
 Bandwidth MHz = 1, Modulation = BT (Pi/4 DQPSK 2-DH5), Number of Transmission Chains = 1, Active
 Port = 1

Images:



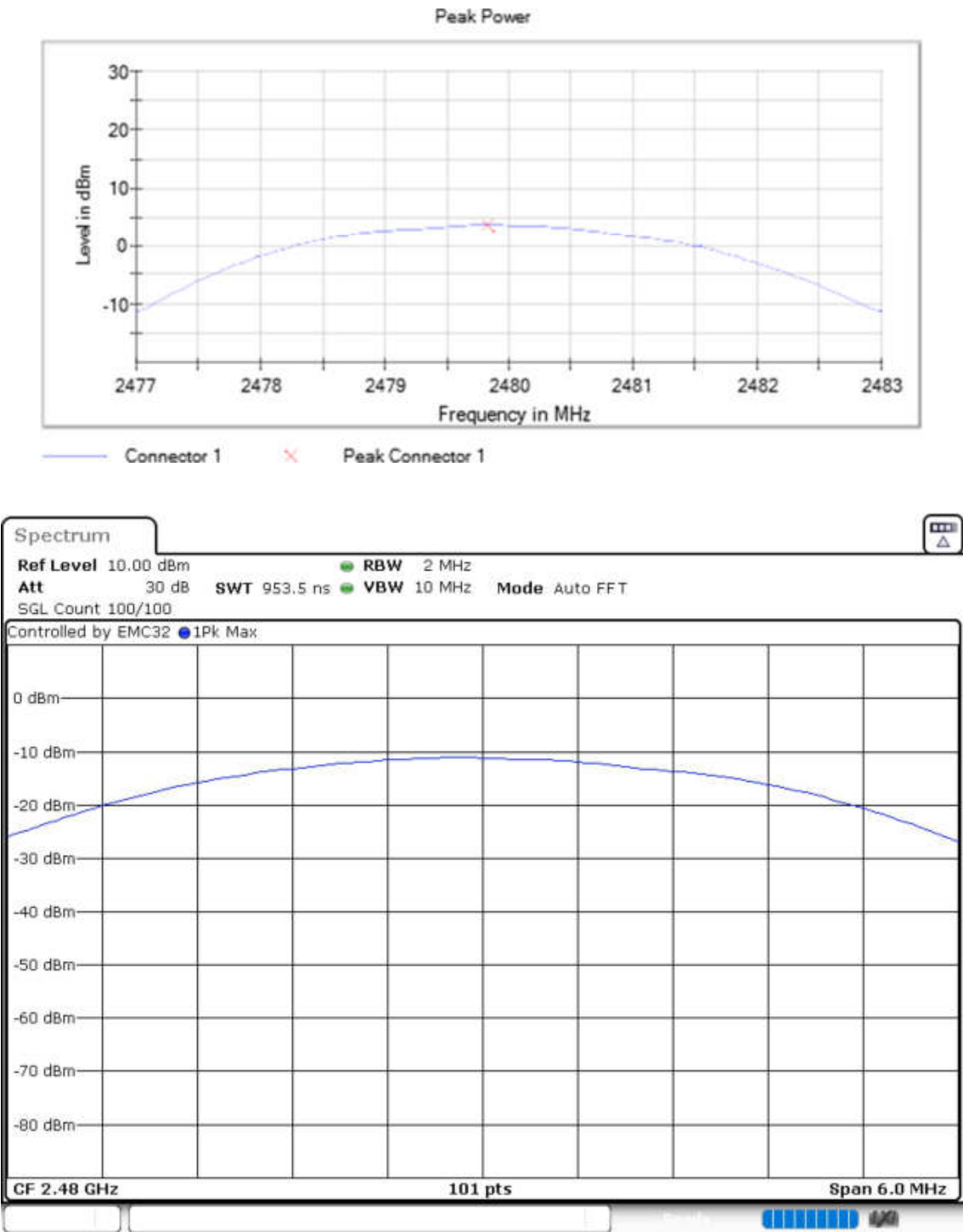
Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
Bandwidth MHz = 1, Modulation = BT (Pi/4 DQPSK 2-DH5), Number of Transmission Chains = 1, Active
Port = 1

Images:



Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
Bandwidth MHz = 1, Modulation = BT (Pi/4 DQPSK 2-DH5), Number of Transmission Chains = 1, Active
Port = 1

Images:



Modulation: BT (8DPSK 3-DH5)

Results

Freq (MHz)	Equipment	Peak Power (dBm)	EIRP (dBm)
2402.00000	Frequency Hopping Spread Spectrum systems (DSS)	2.8	4.1
2441.00000	Frequency Hopping Spread Spectrum systems (DSS)	4.1	5.4
2480.00000	Frequency Hopping Spread Spectrum systems (DSS)	3.5	4.8

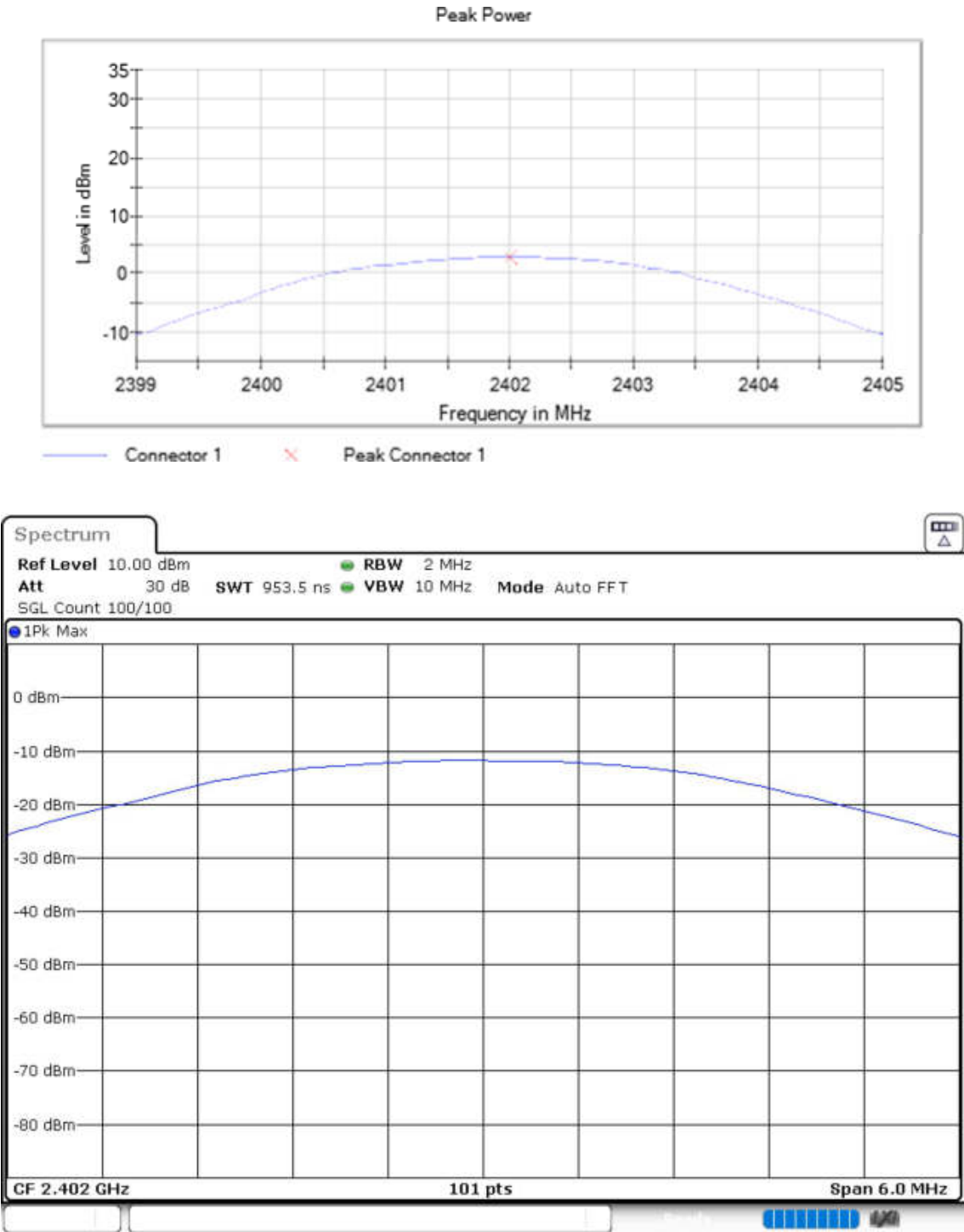
Verdict

Pass

Attachments

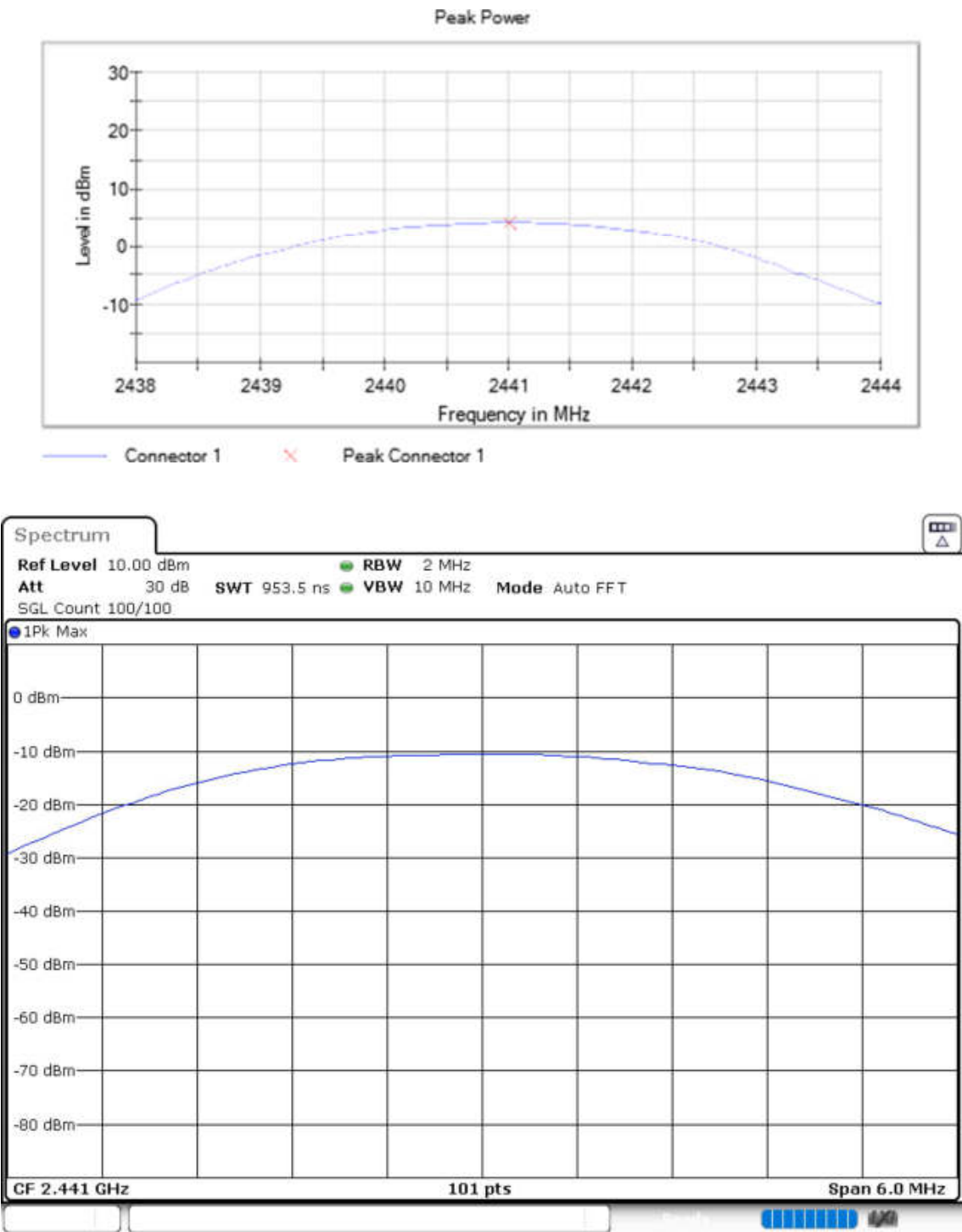
Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5), Number of Transmission Chains = 1, Active Port = 1

Images:



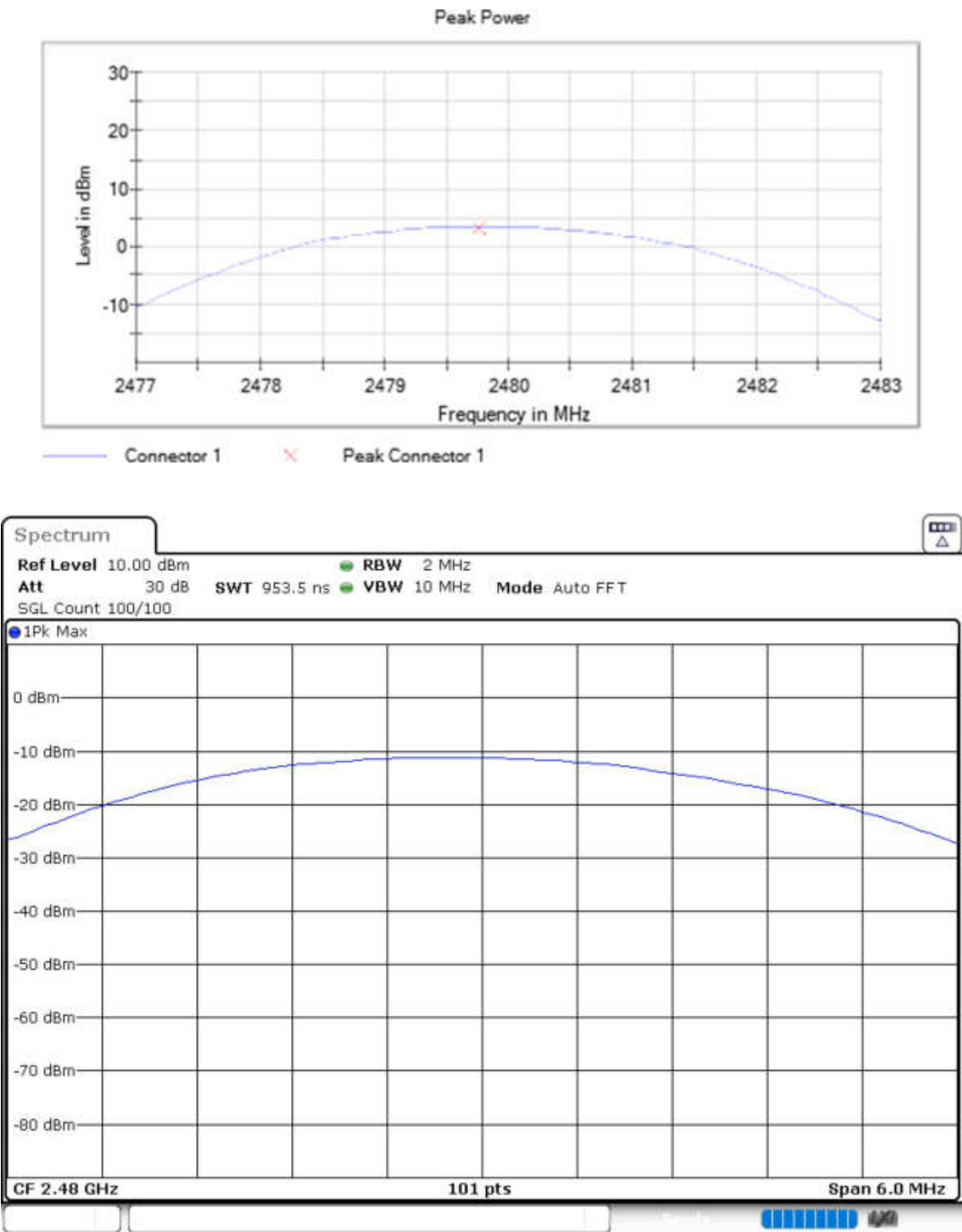
Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5), Number of Transmission Chains = 1, Active Port = 1

Images:



Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5), Number of Transmission Chains = 1, Active Port = 1

Images:



RSS-247 5.5 / FCC 15.247 (d) Band-edge emissions compliance (Transmitter)

Limits

In any 100 kHz bandwidths outside the frequency band in which the intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

Radiated measurements were used to show compliance with the limits in the restricted bands 2.31-2.39 GHz and 2.4835-2.5 GHz.

Results

Modulation: BT (GFSK 1-DH5)

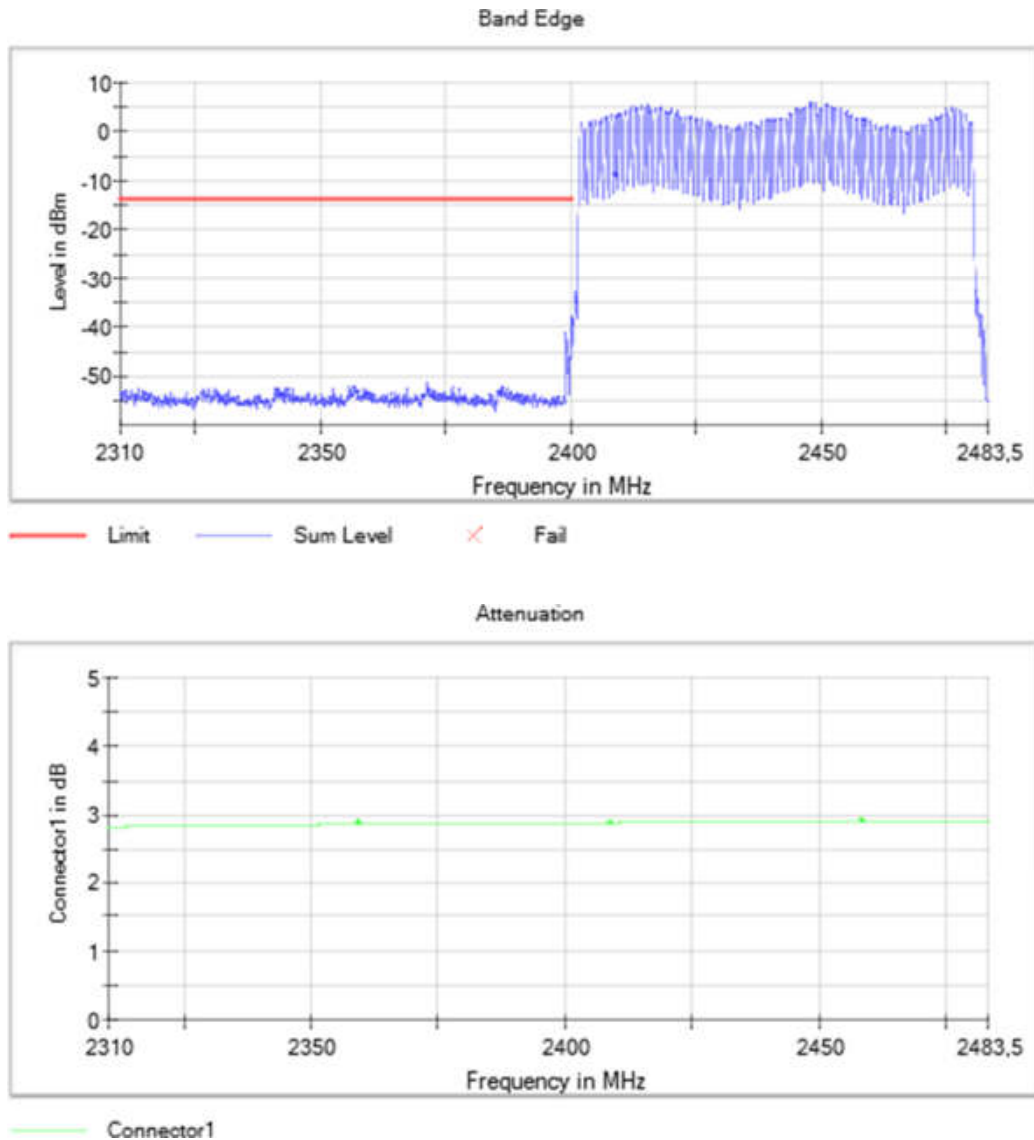
Verdict

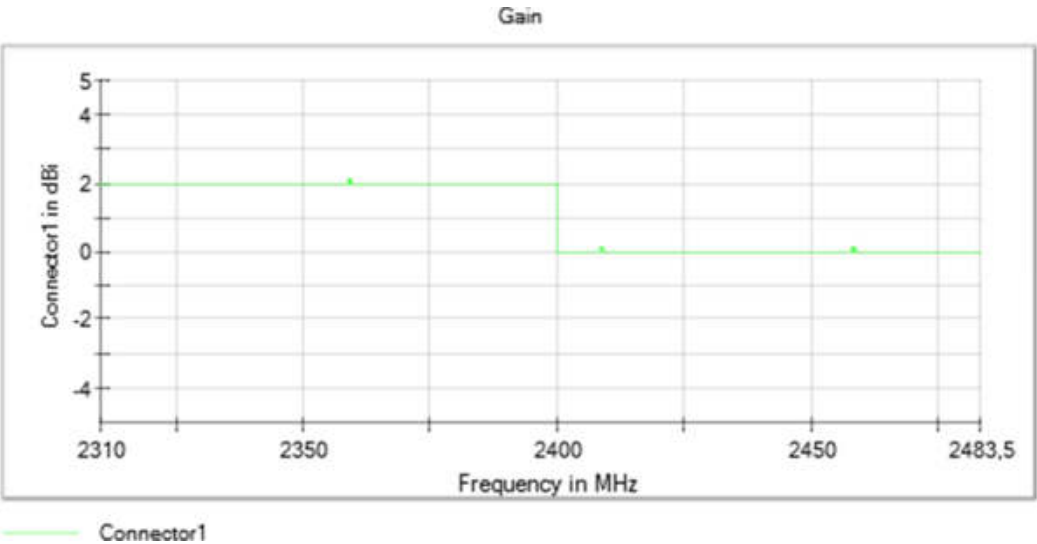
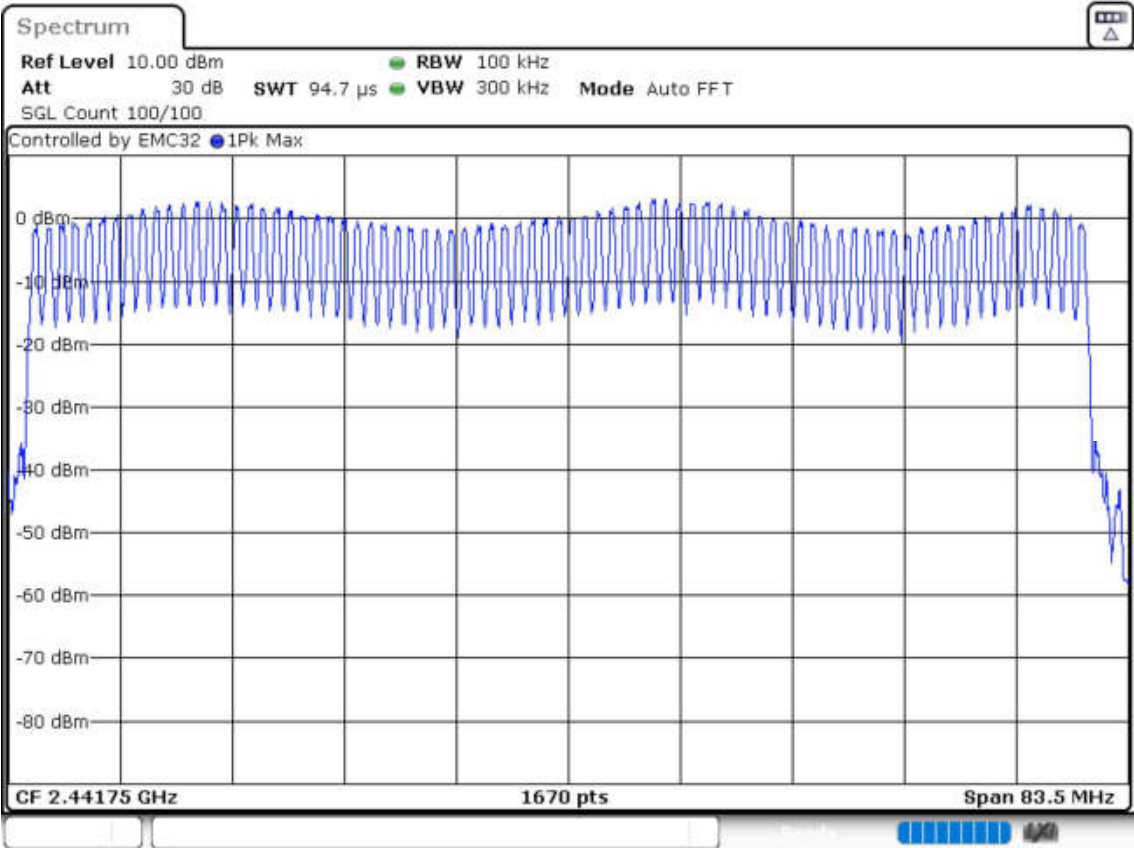
Pass

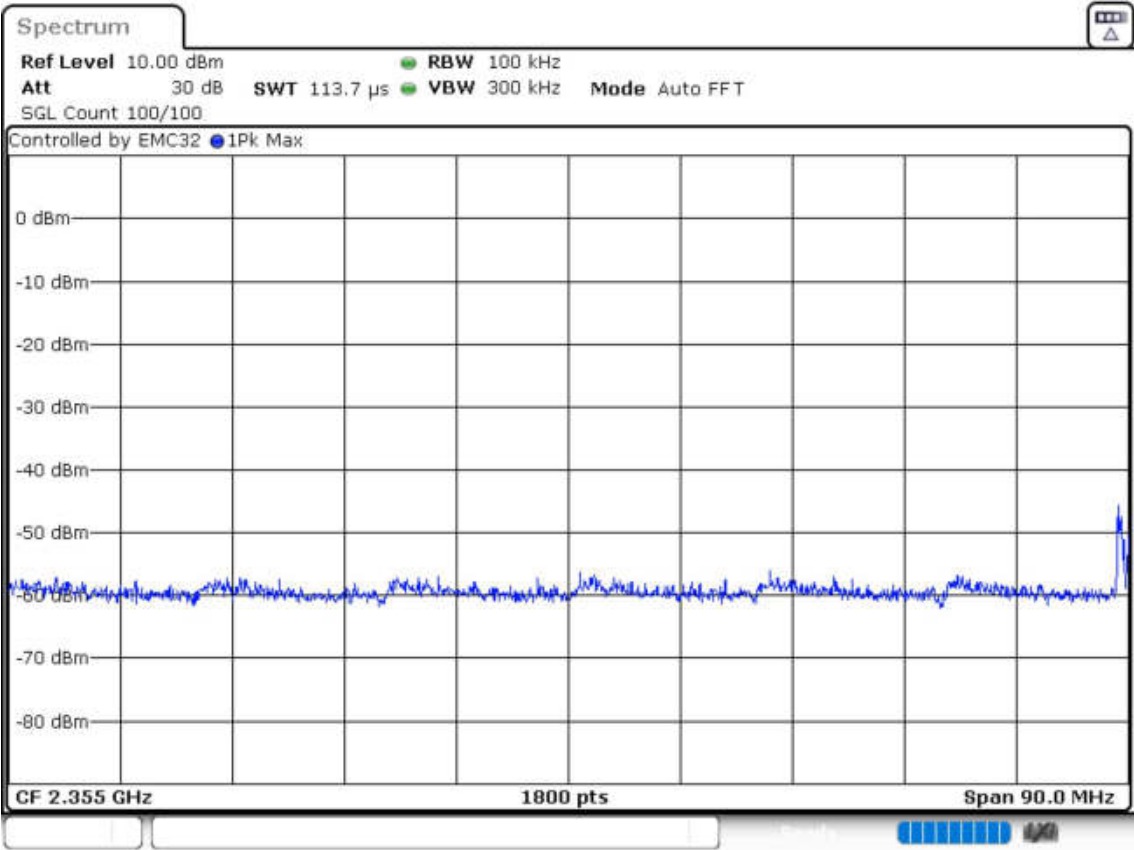
Attachments

Frequency MHz = 0.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH5), Number of Transmission Chains = 1, Measurement
Point = 1, Active Port = 1

Images:

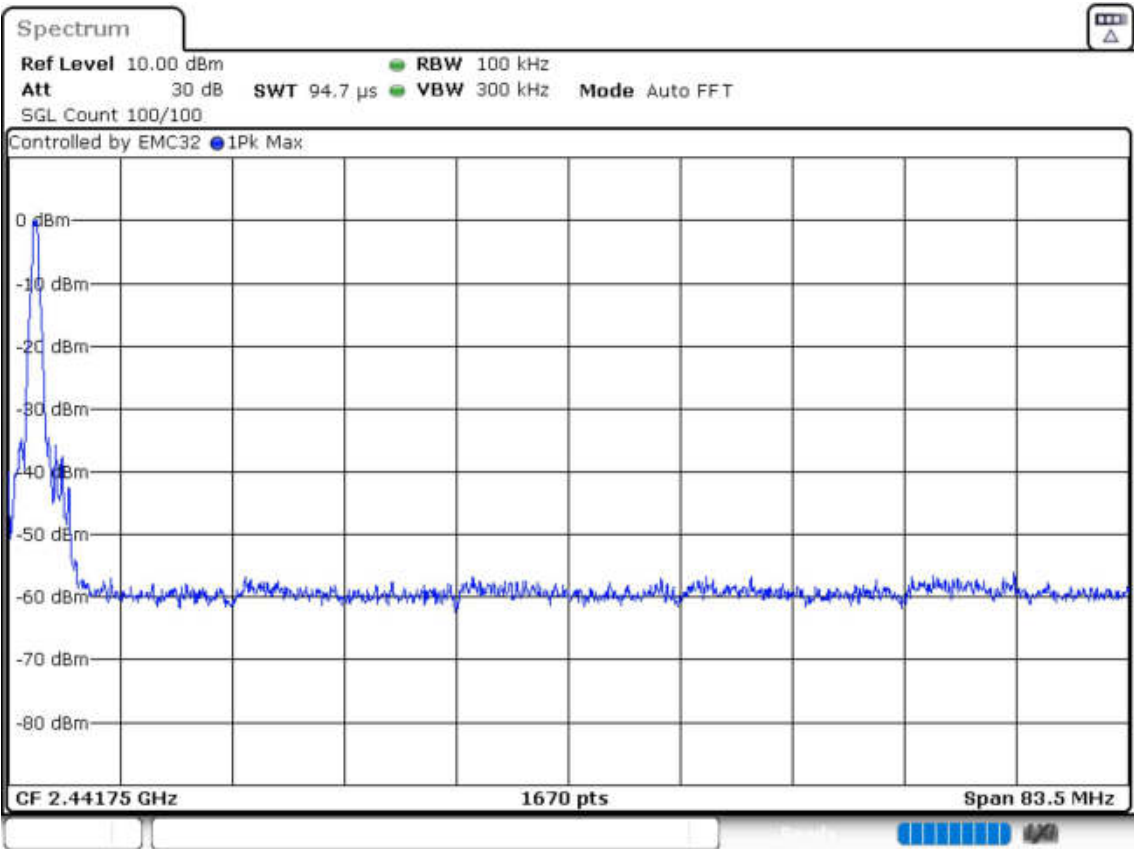
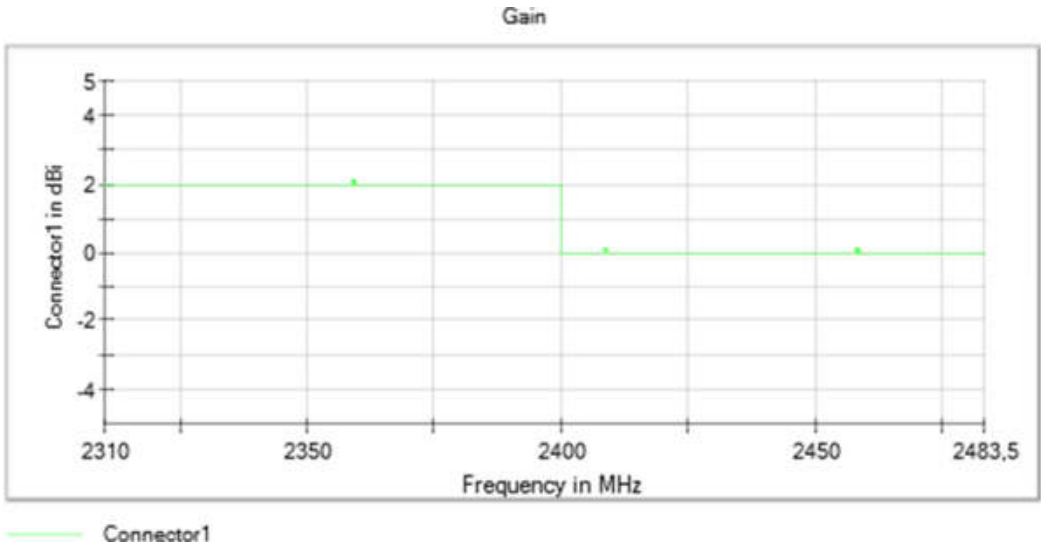


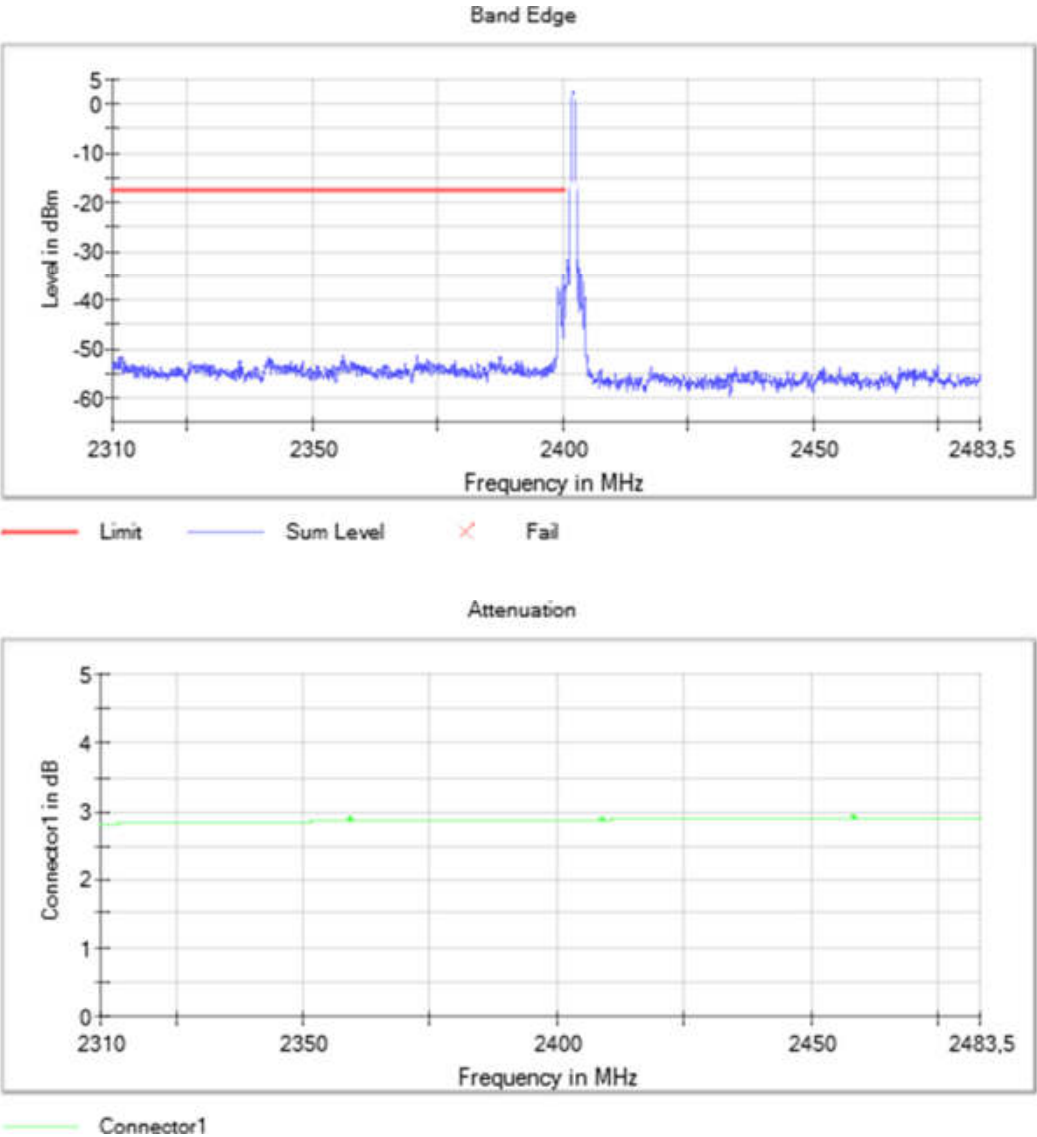


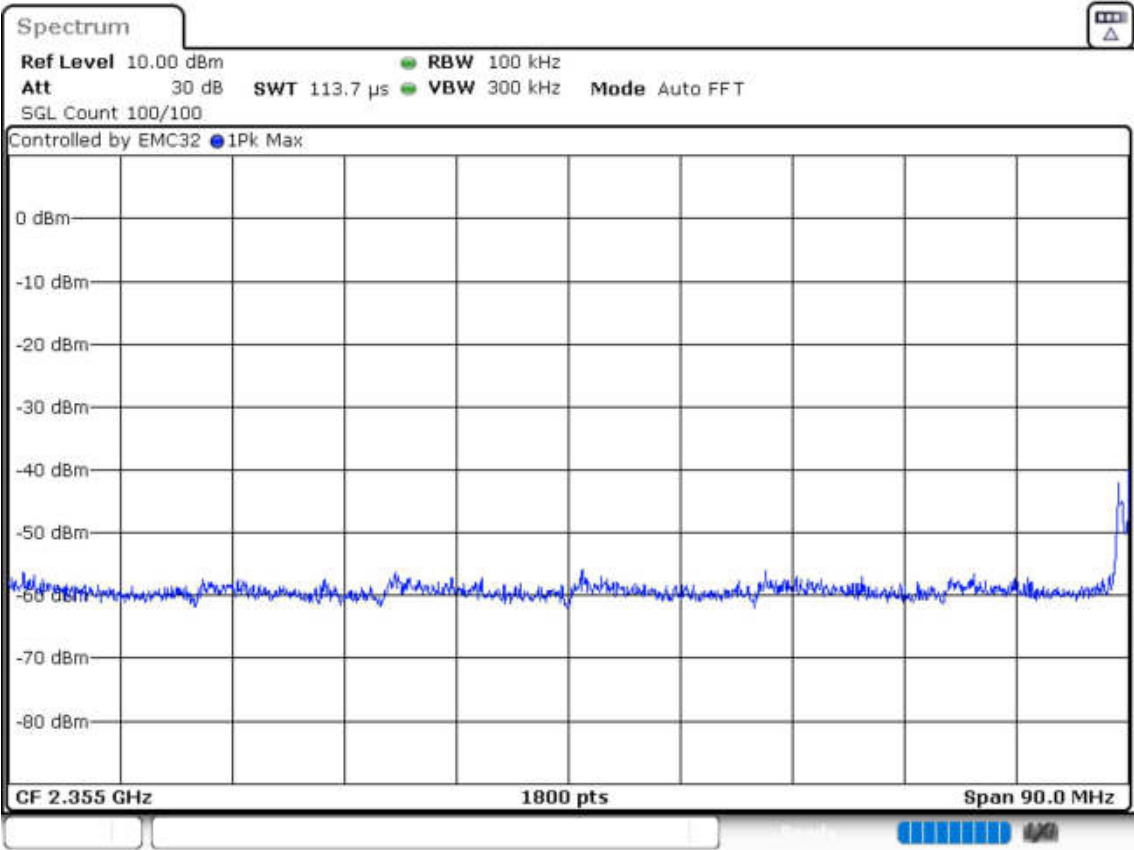


Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH5), Number of Transmission Chains = 1, Measurement
Point = 1, Active Port = 1

Images:

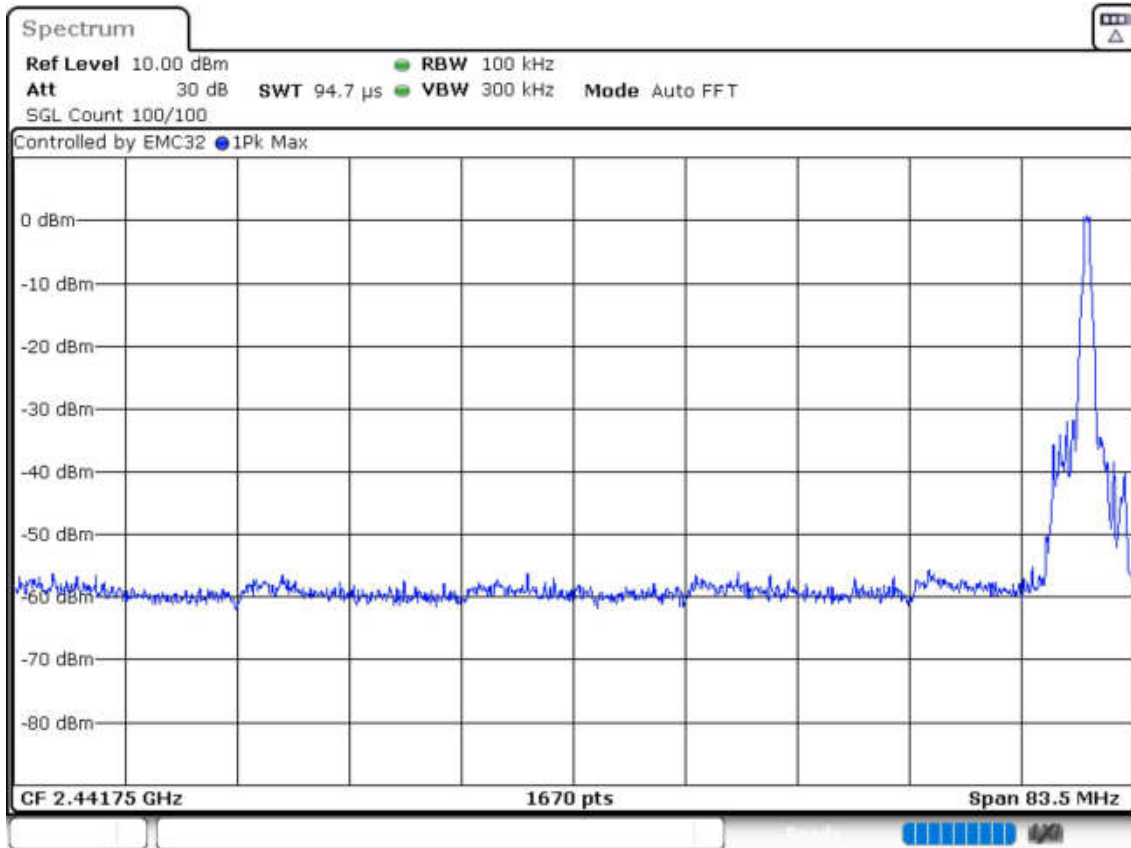


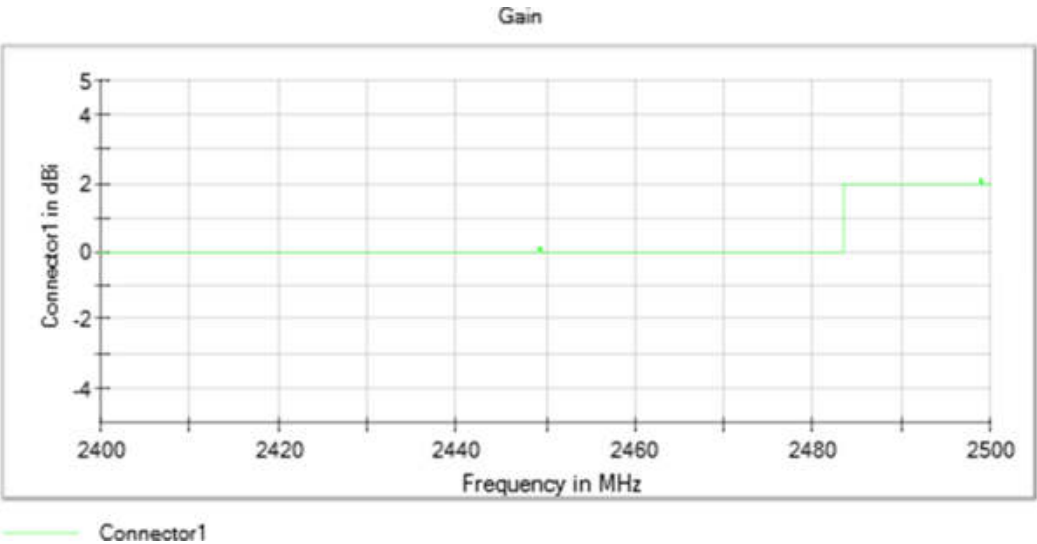
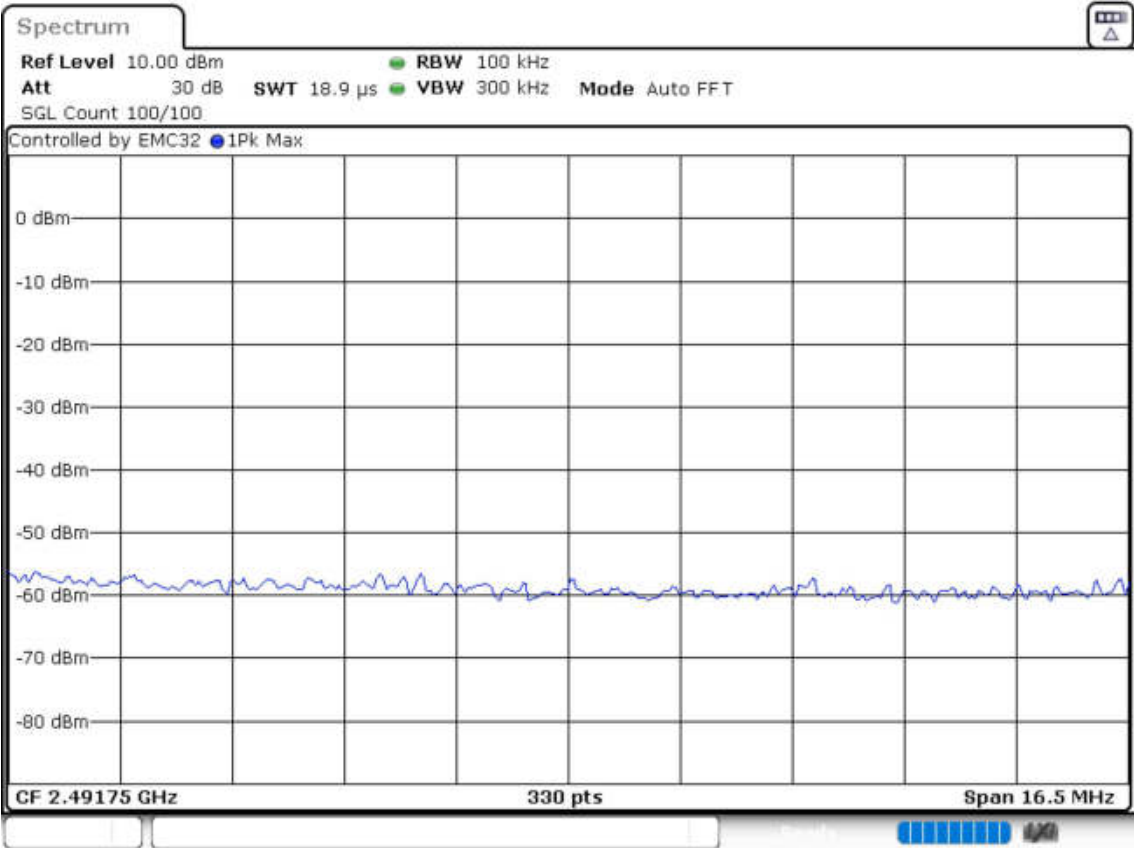


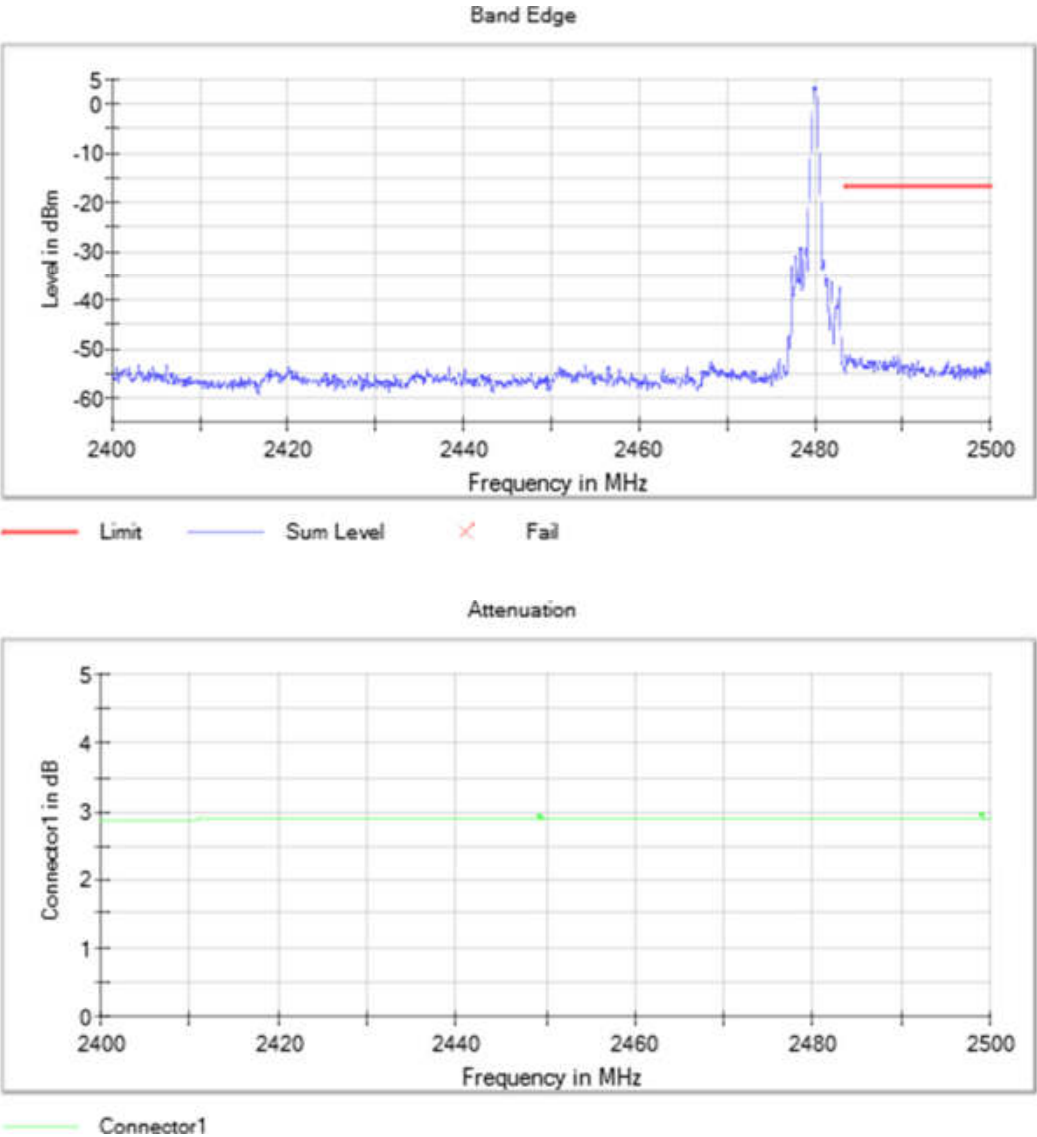


Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH5), Number of Transmission Chains = 1, Measurement
Point = 1, Active Port = 1

Images:







Modulation: BT (Pi/4 DQPSK 2-DH5)

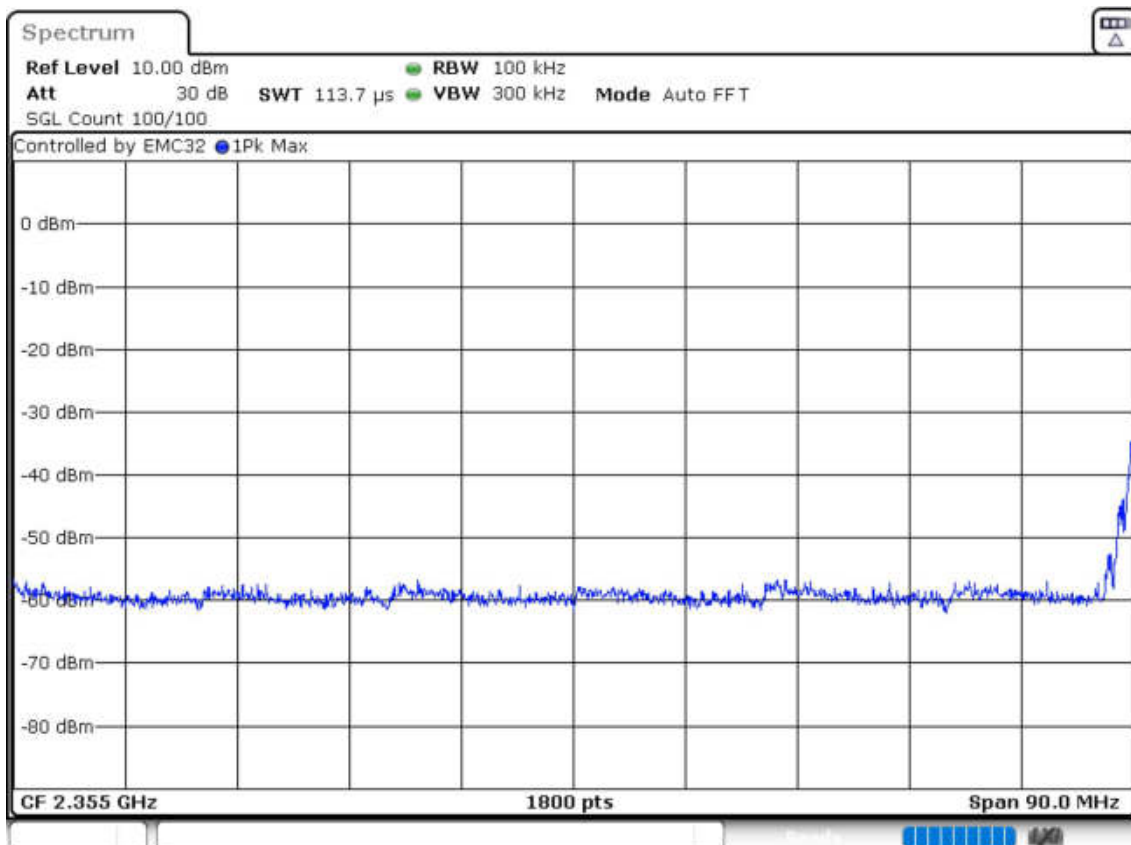
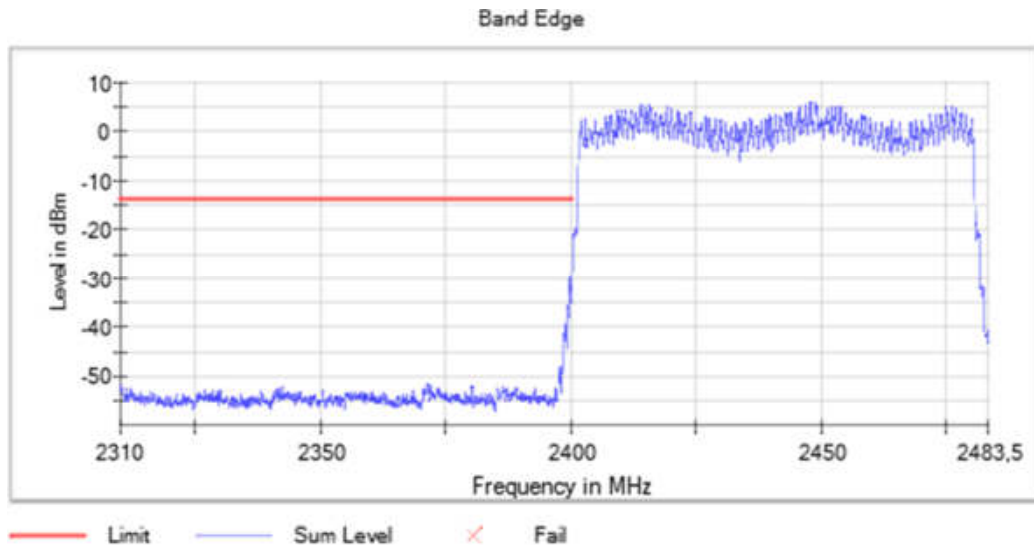
Verdict

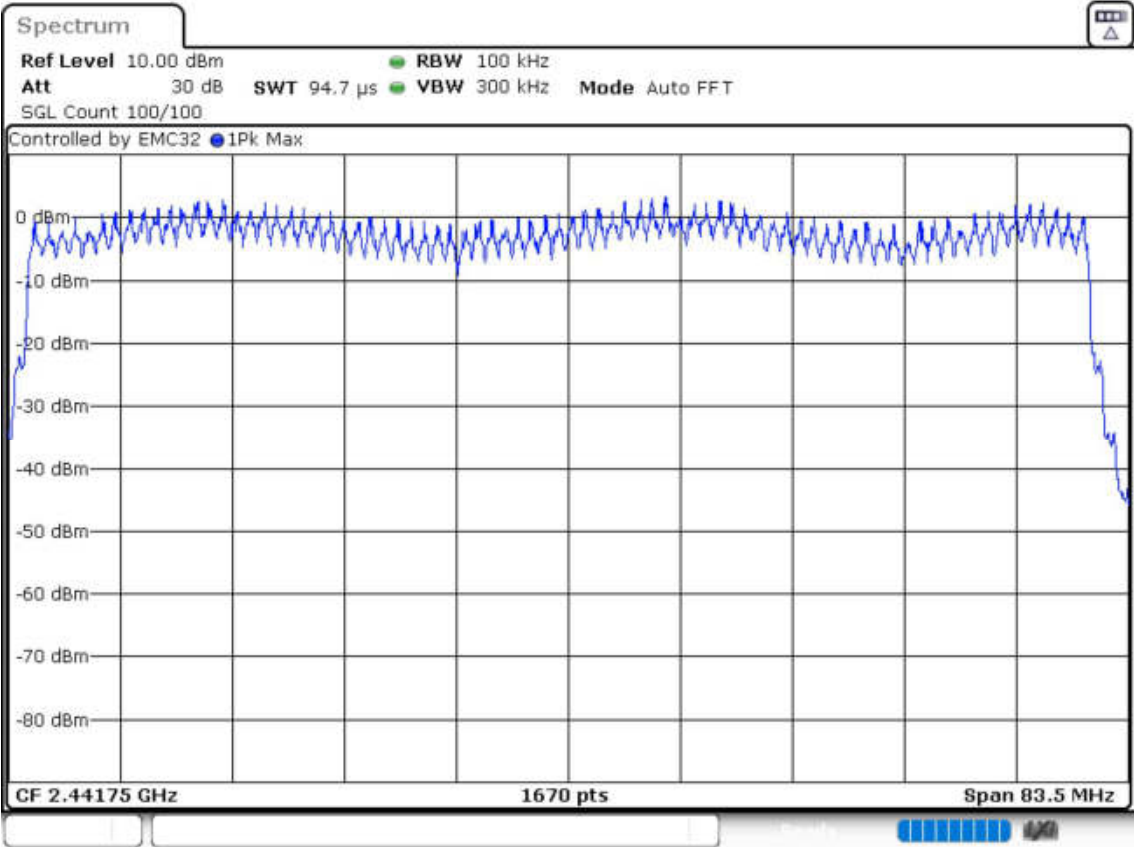
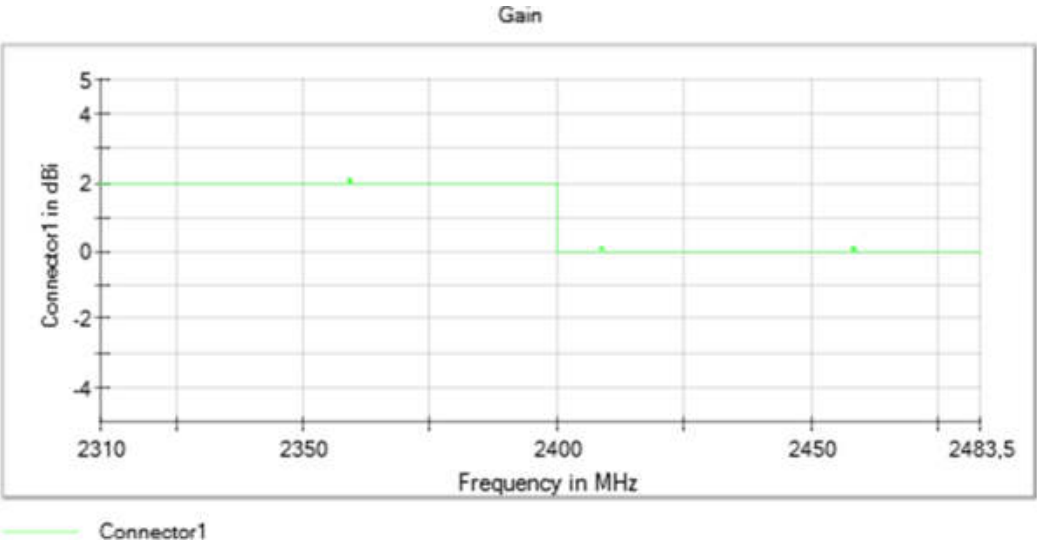
Pass

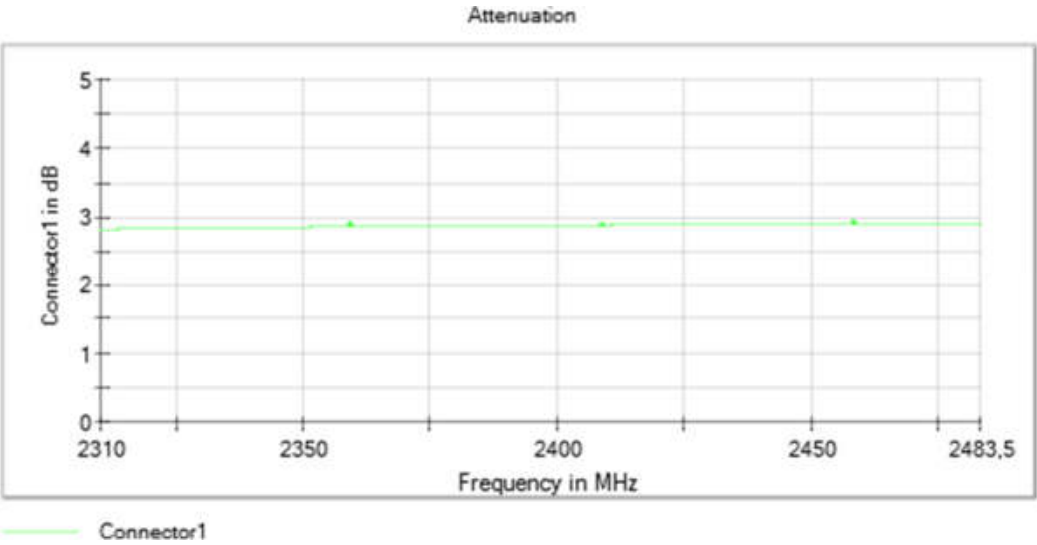
Attachments

Frequency MHz = 0.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
 Bandwidth MHz = 1, Modulation = BT (Pi/4 DQPSK 2-DH5), Number of Transmission Chains = 1,
 Measurement Point = 1, Active Port = 1

Images:

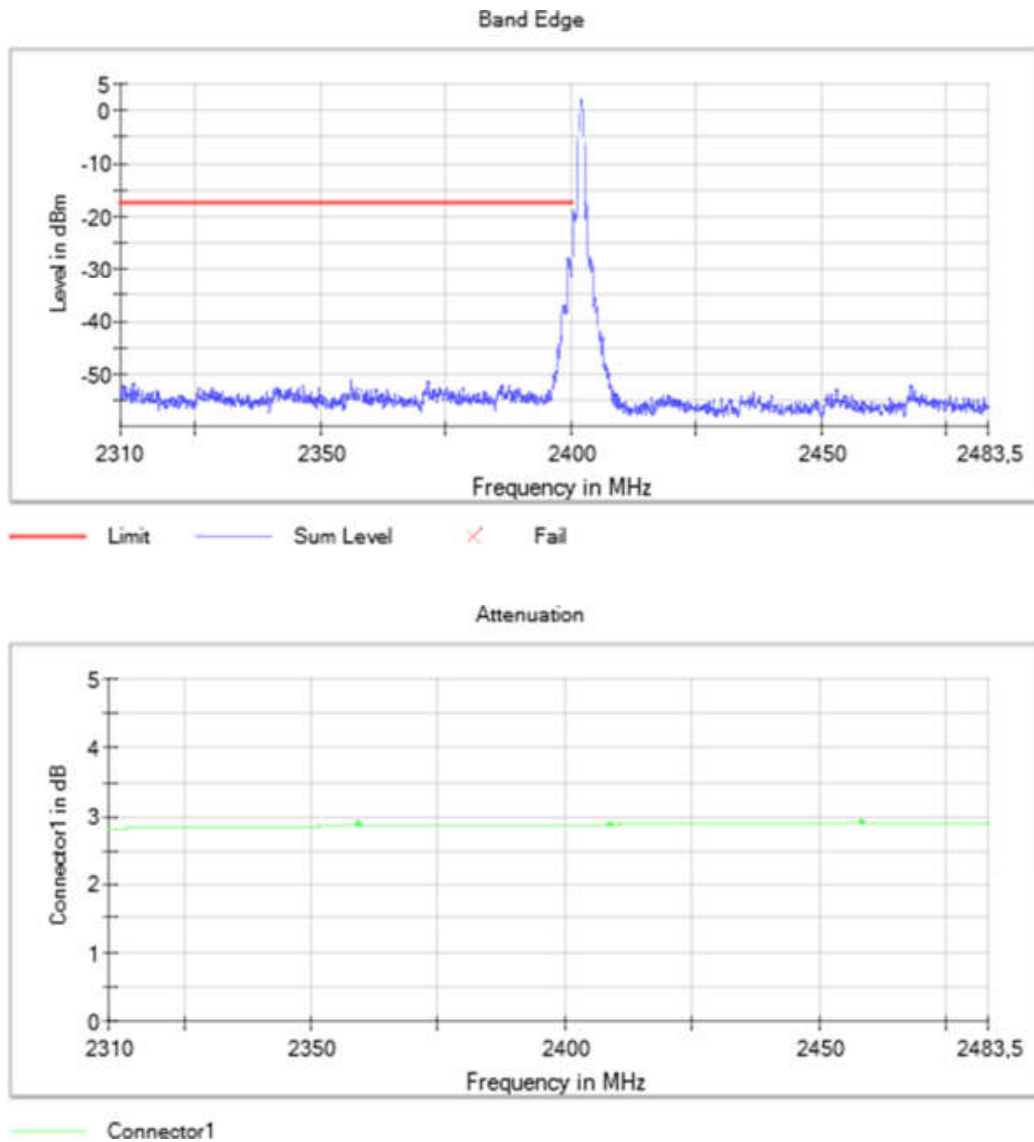


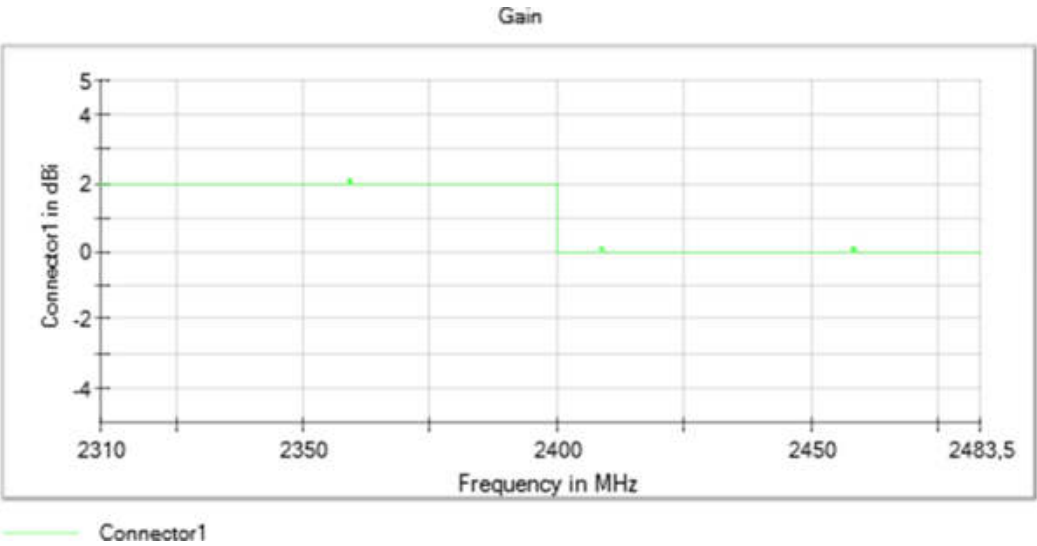
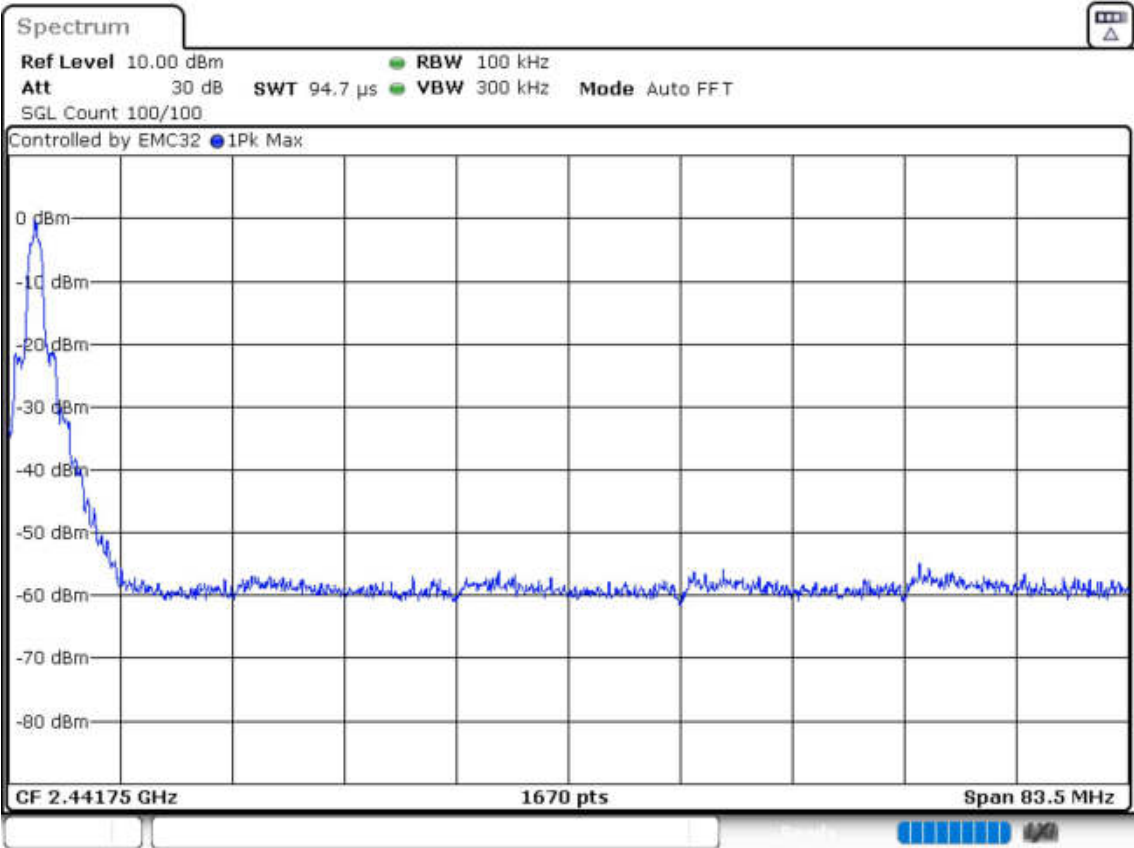


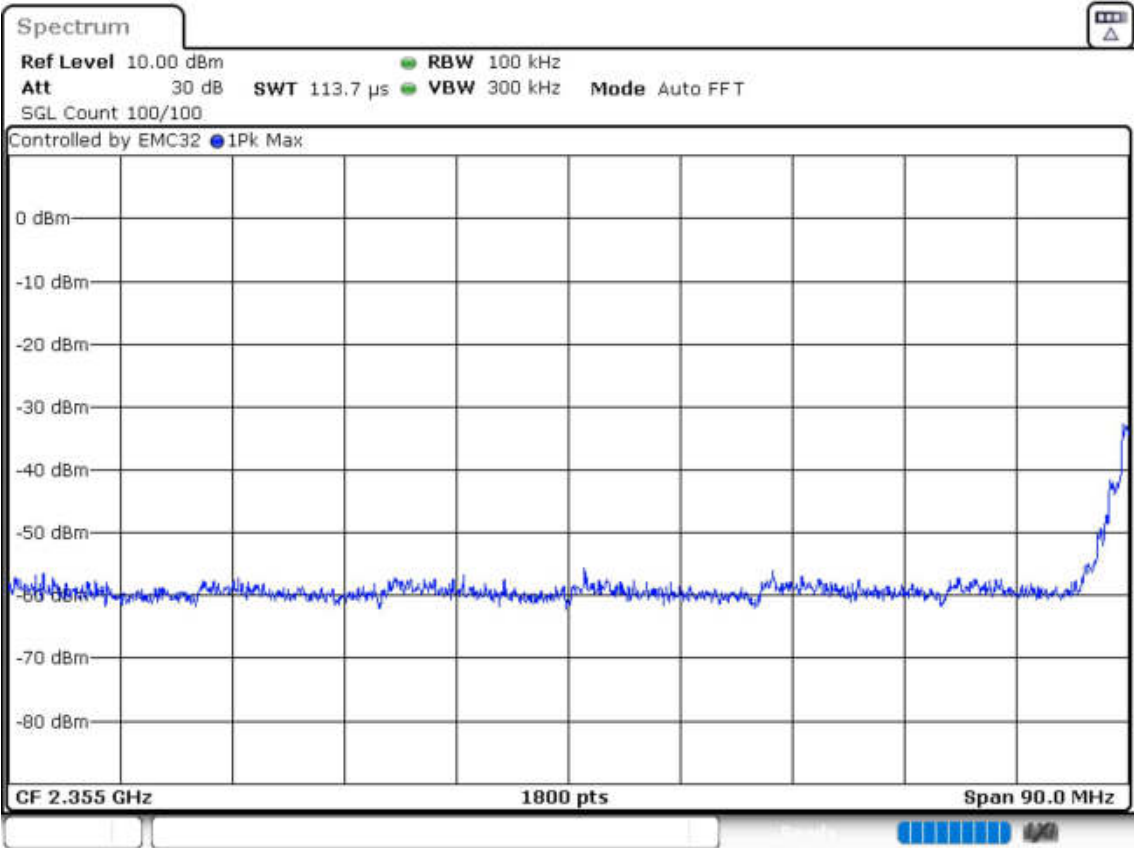


**Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
 Bandwidth MHz = 1, Modulation = BT (Pi/4 DQPSK 2-DH5), Number of Transmission Chains = 1,
 Measurement Point = 1, Active Port = 1**

Images:

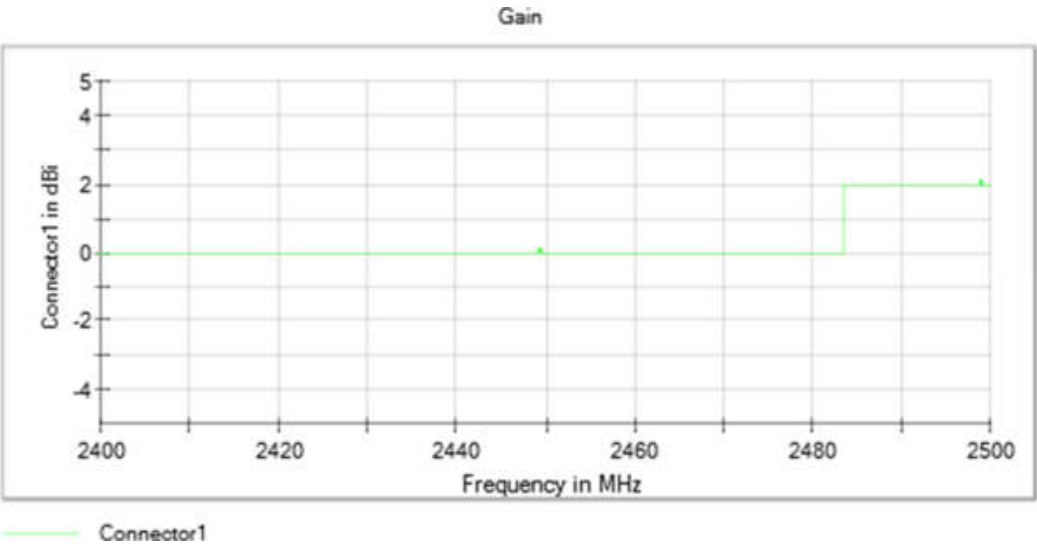
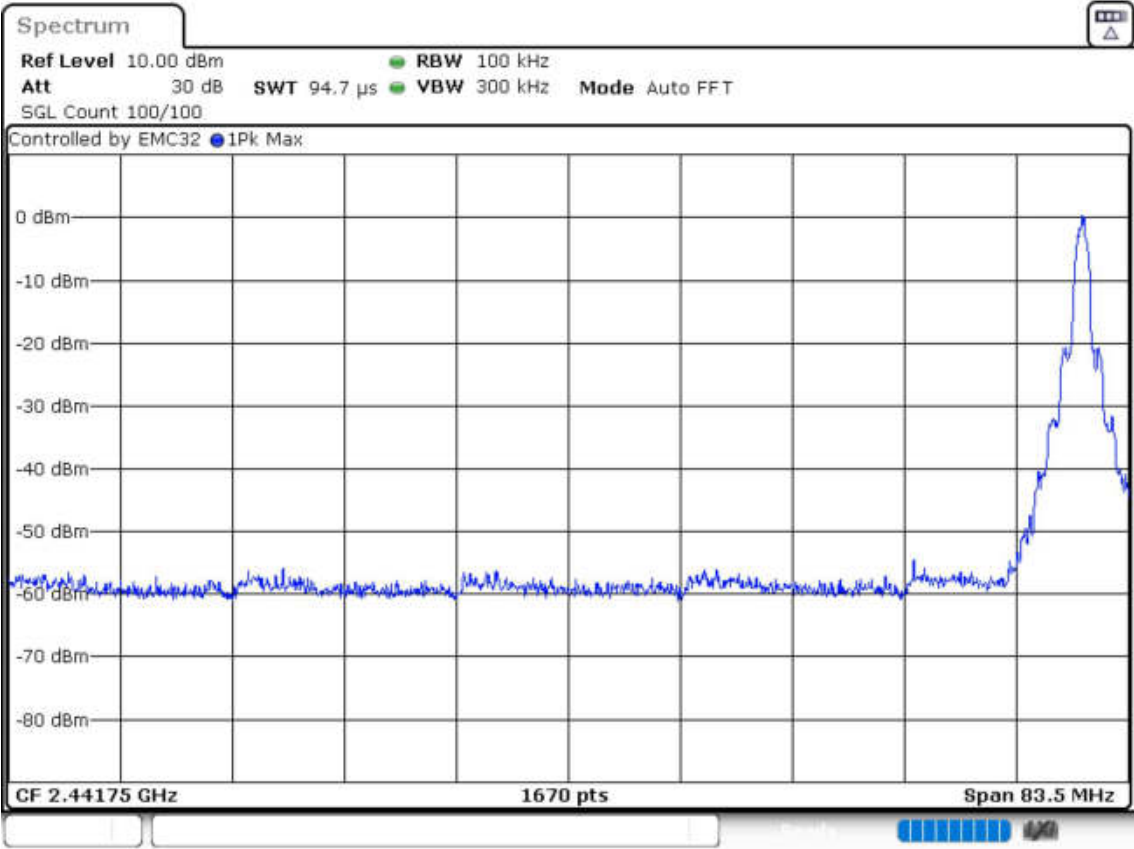


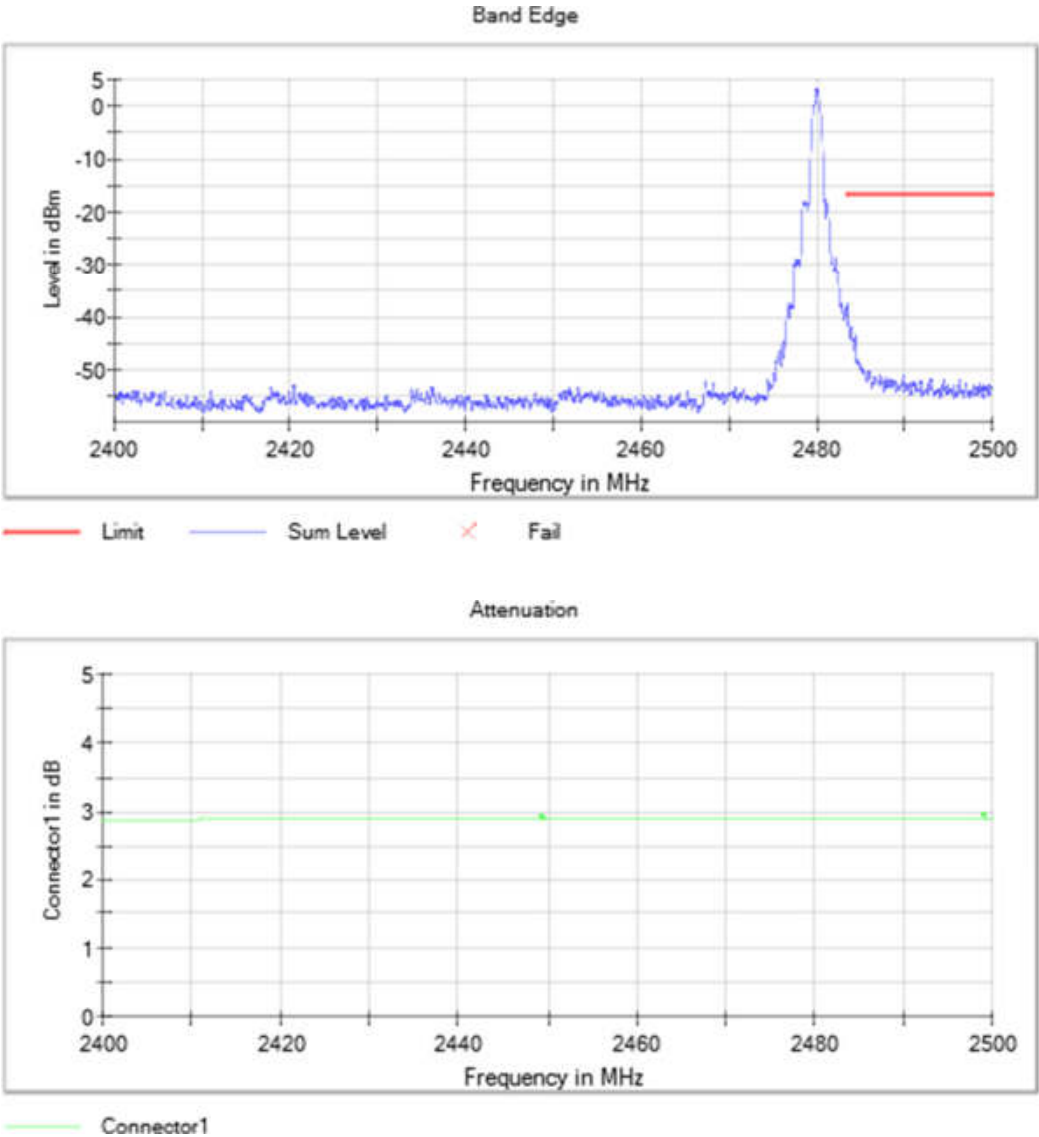


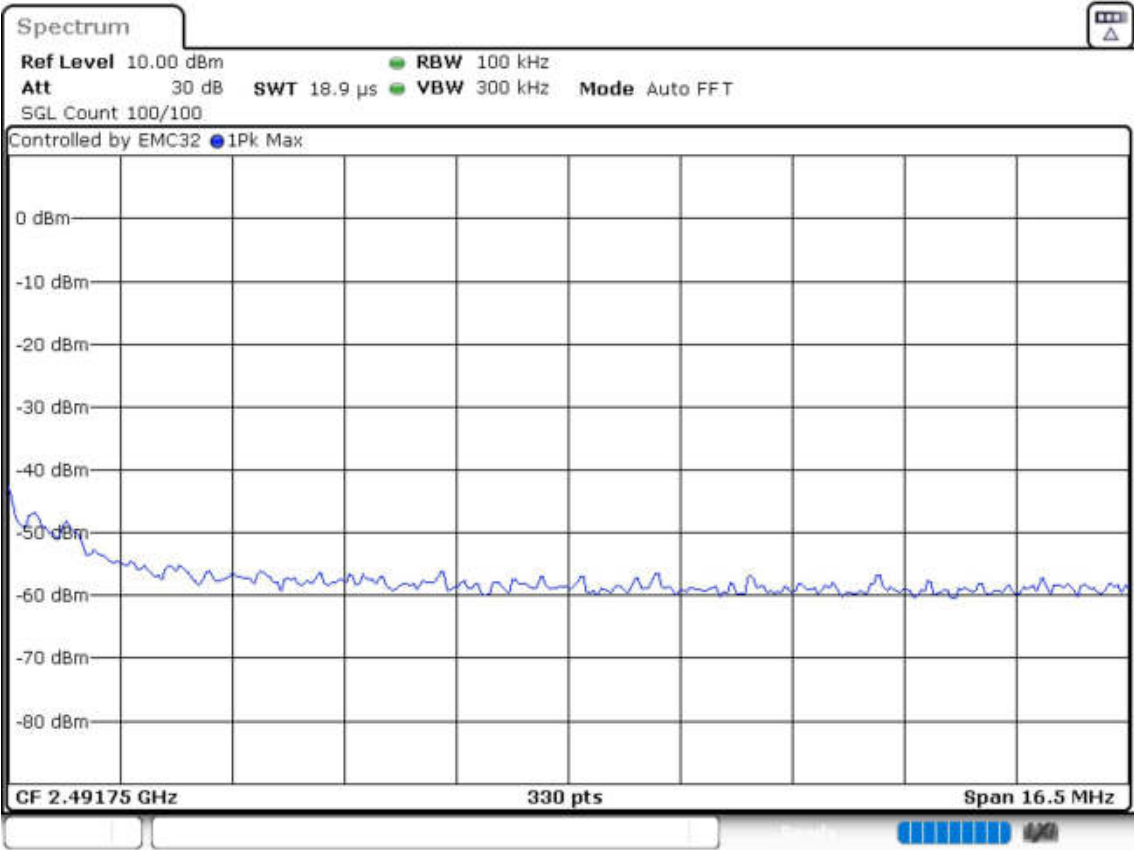


Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
Bandwidth MHz = 1, Modulation = BT (Pi/4 DQPSK 2-DH5), Number of Transmission Chains = 1,
Measurement Point = 1, Active Port = 1

Images:







Modulation: BT (8DPSK 3-DH5)

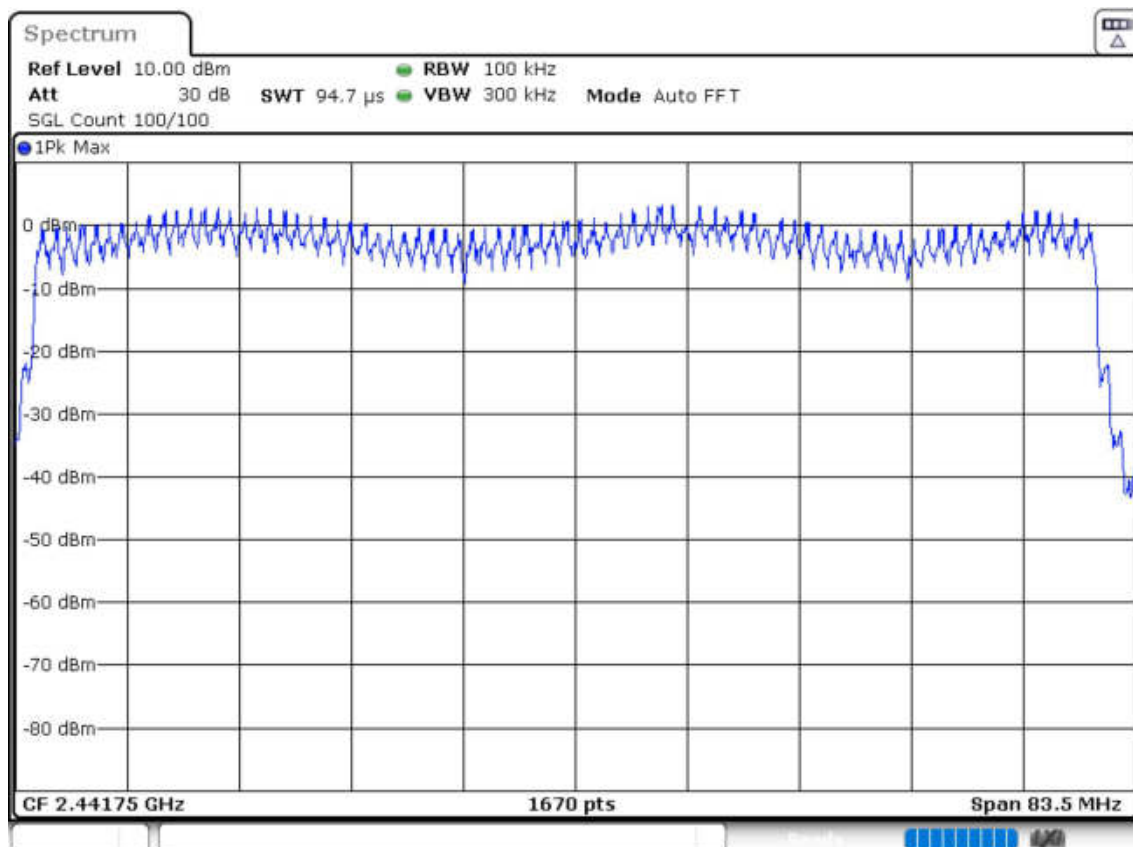
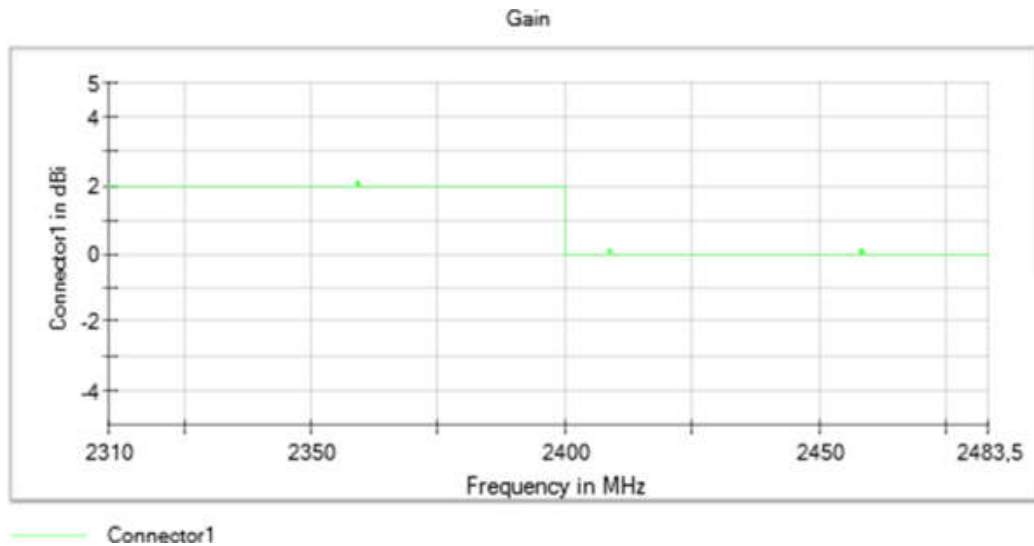
Verdict

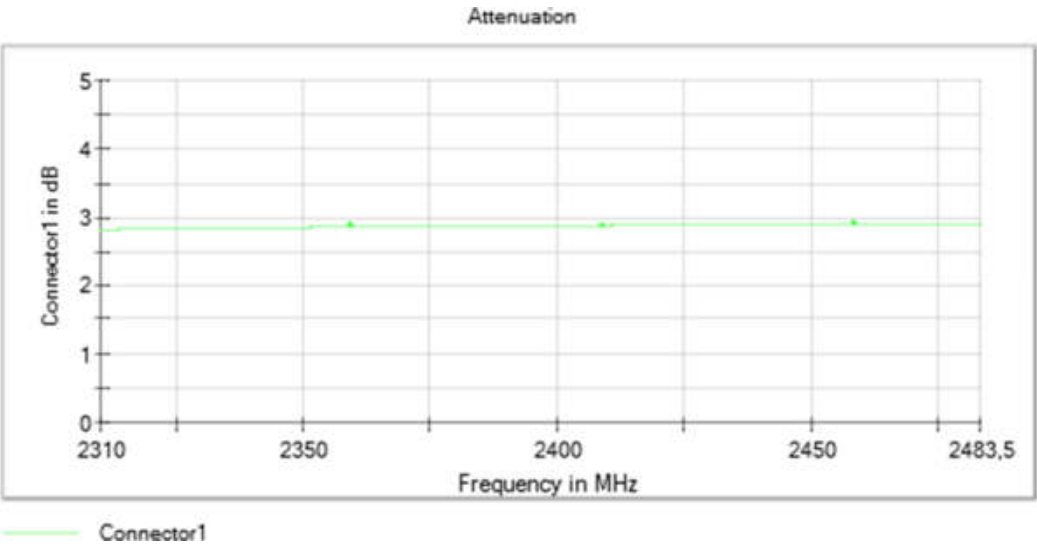
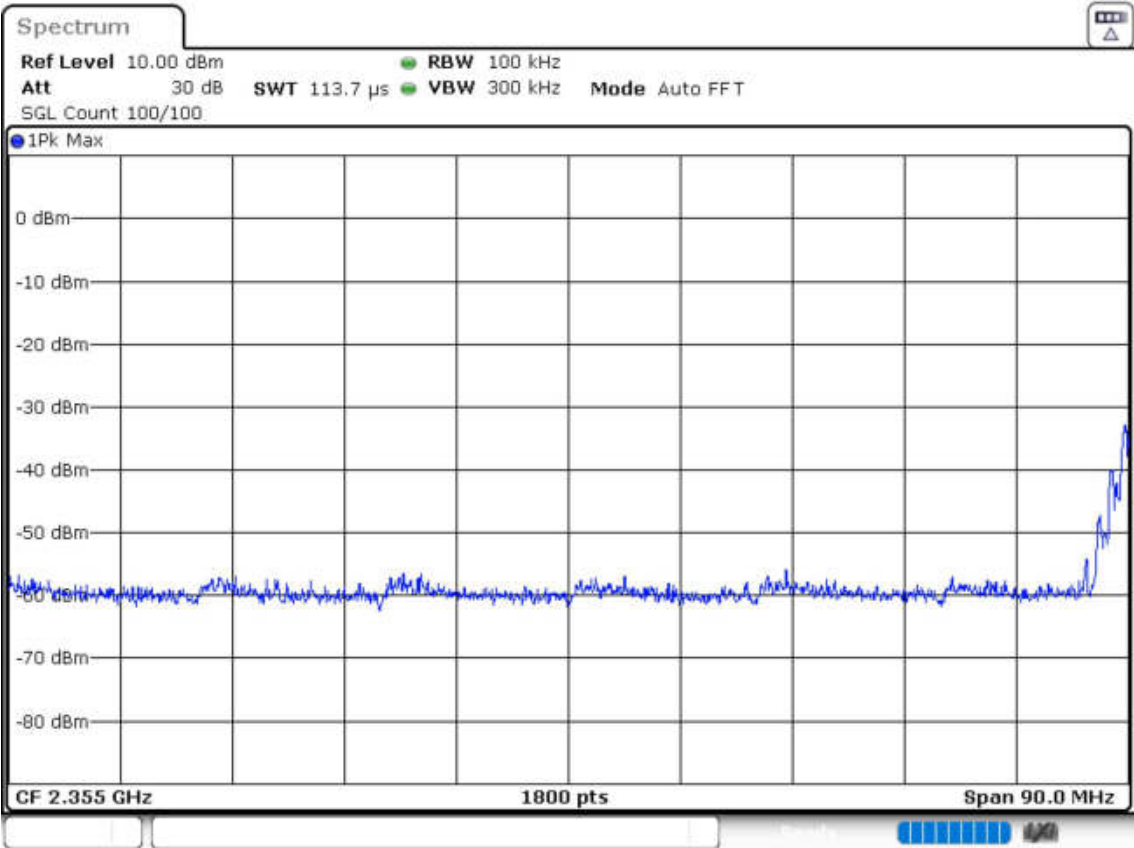
Pass

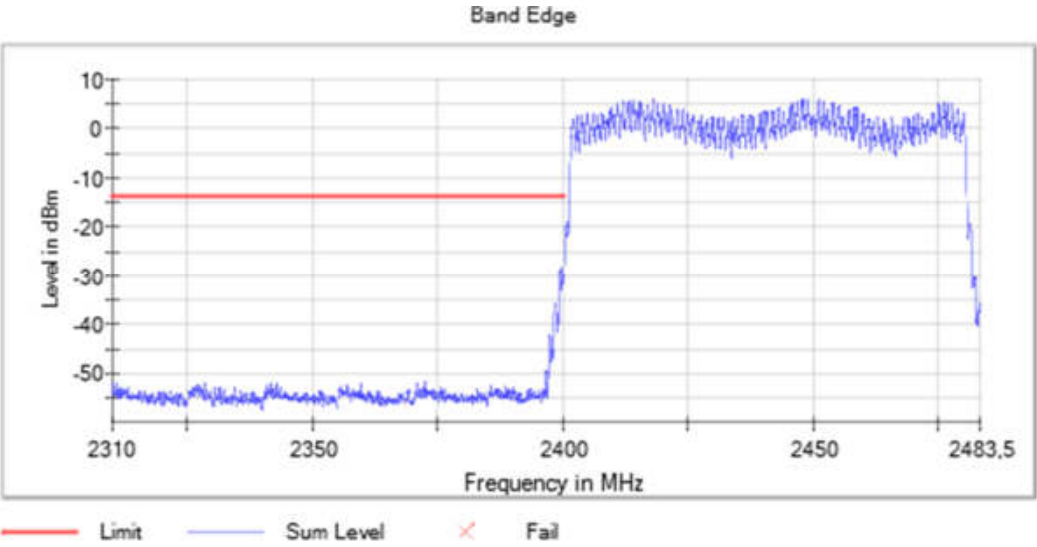
Attachments

Frequency MHz = 0.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
 Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5), Number of Transmission Chains = 1, Measurement
 Point = 1, Active Port = 1

Images:

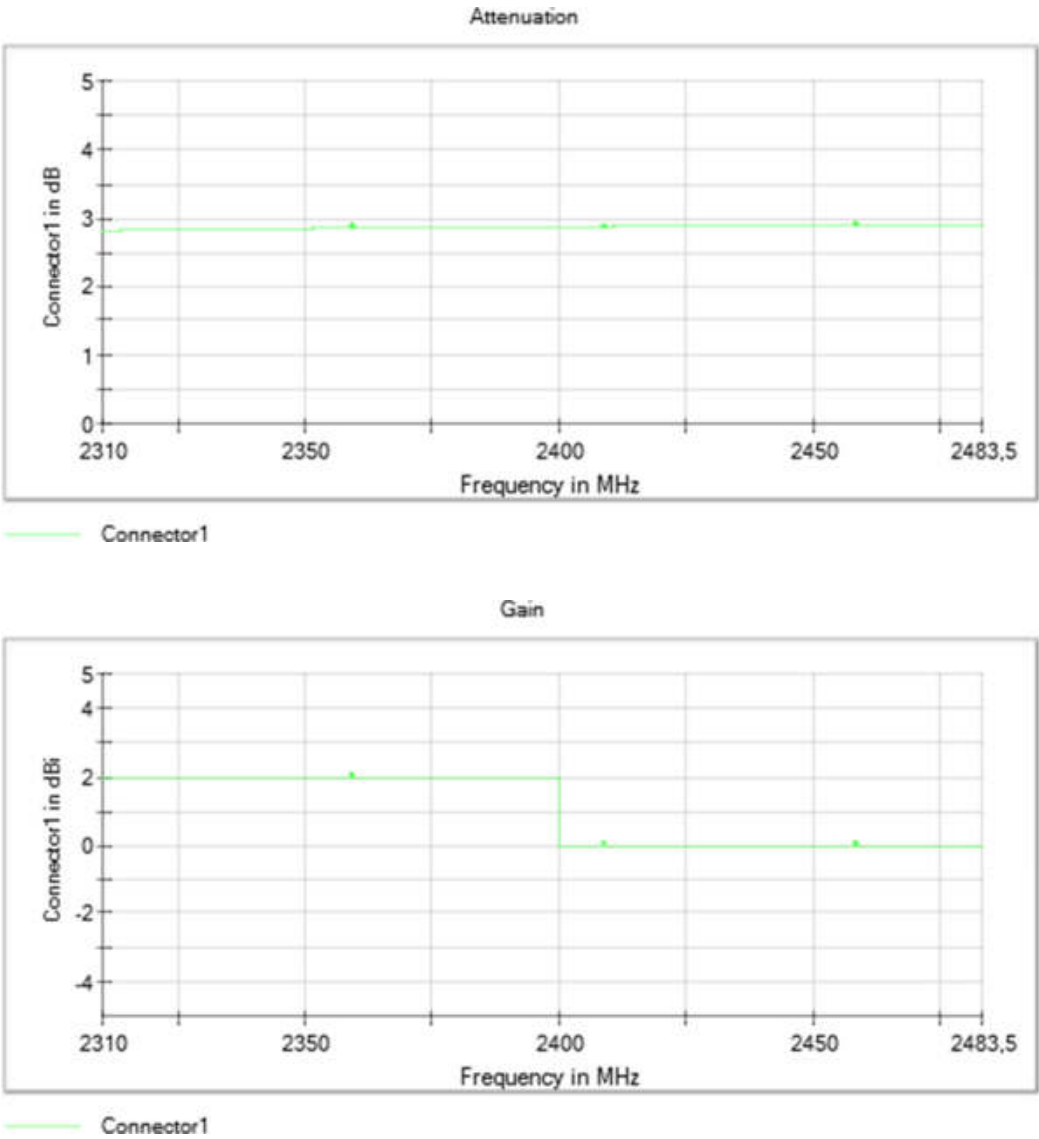


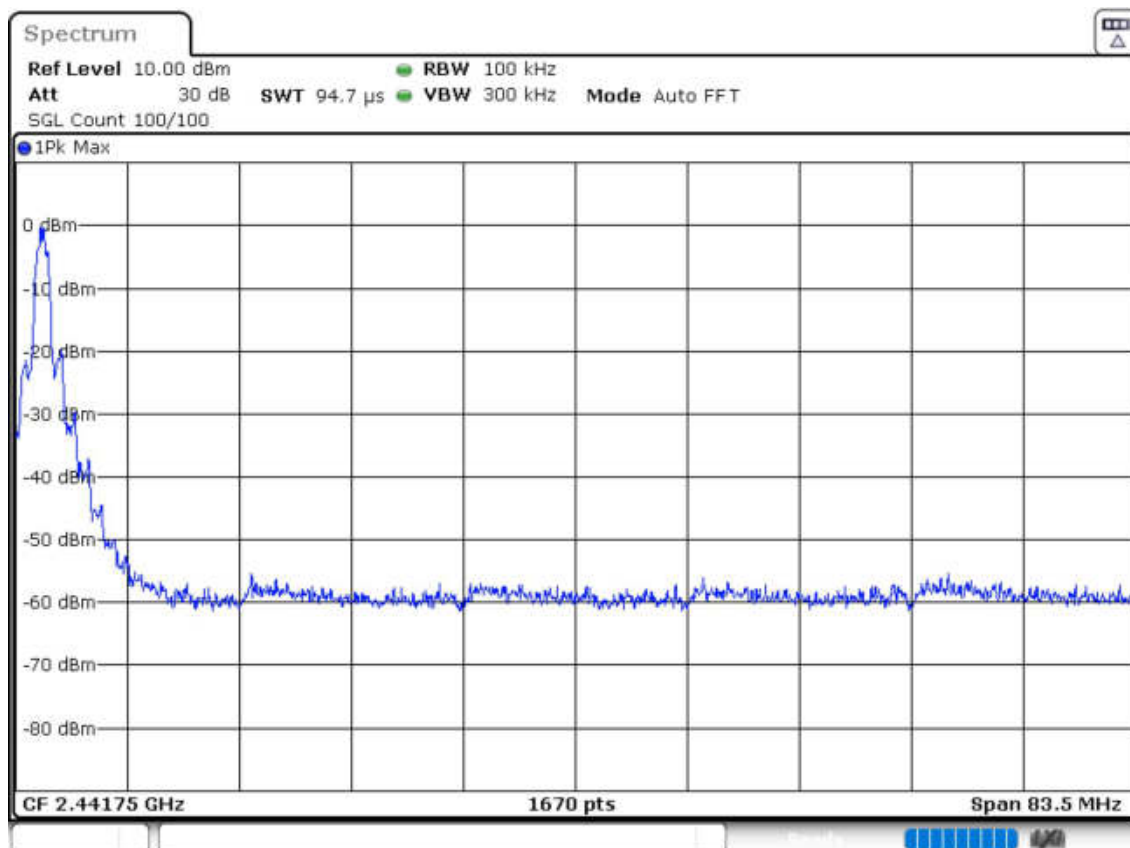
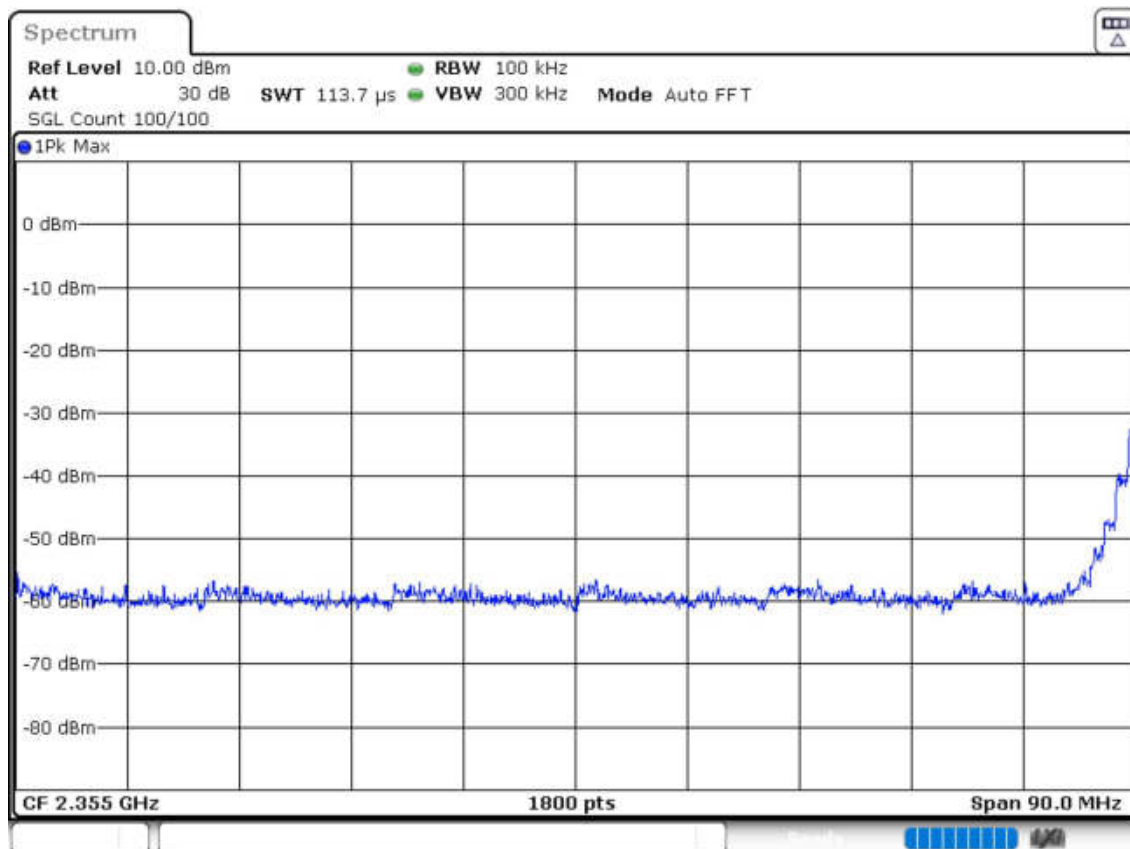


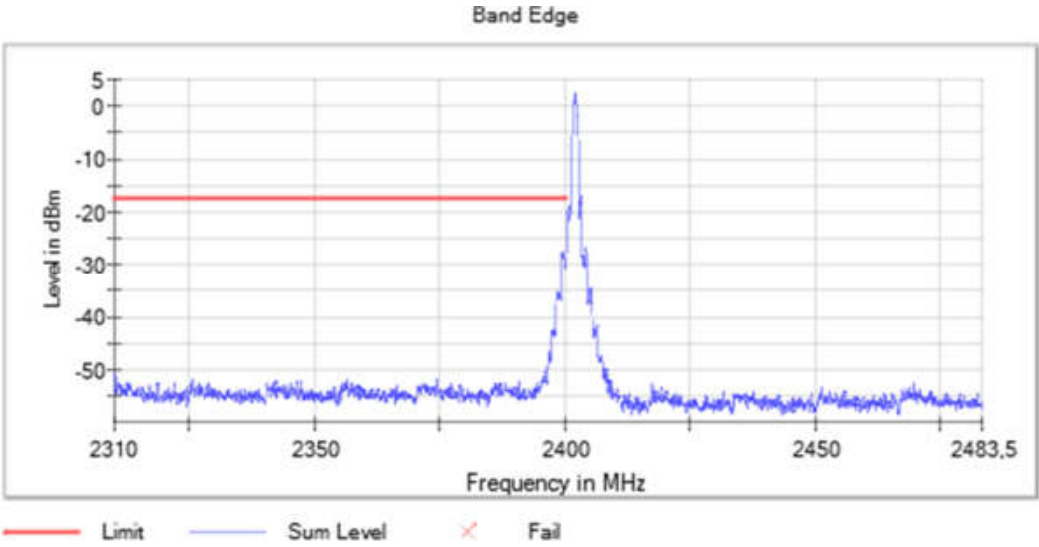


Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5), Number of Transmission Chains = 1, Measurement
Point = 1, Active Port = 1

Images:

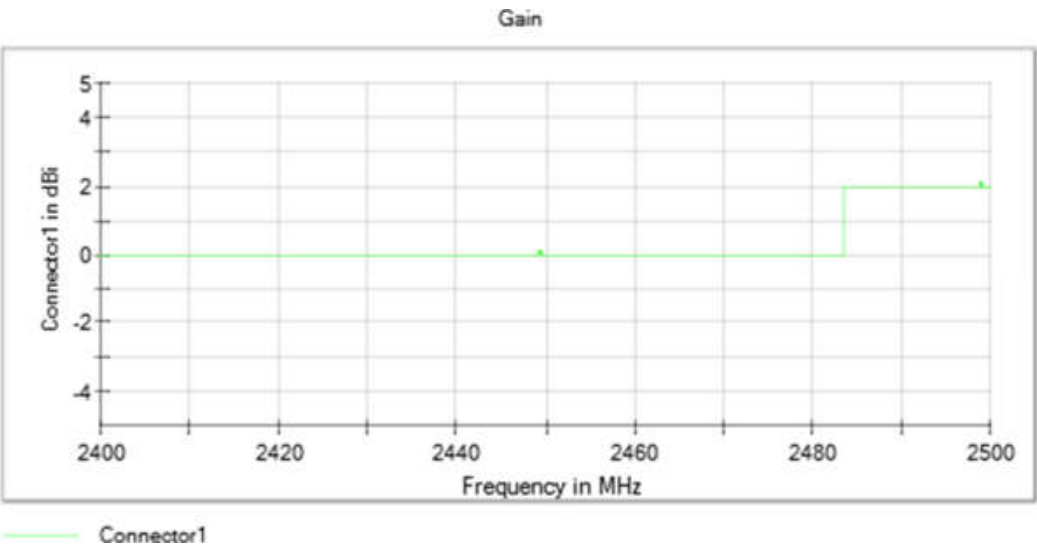
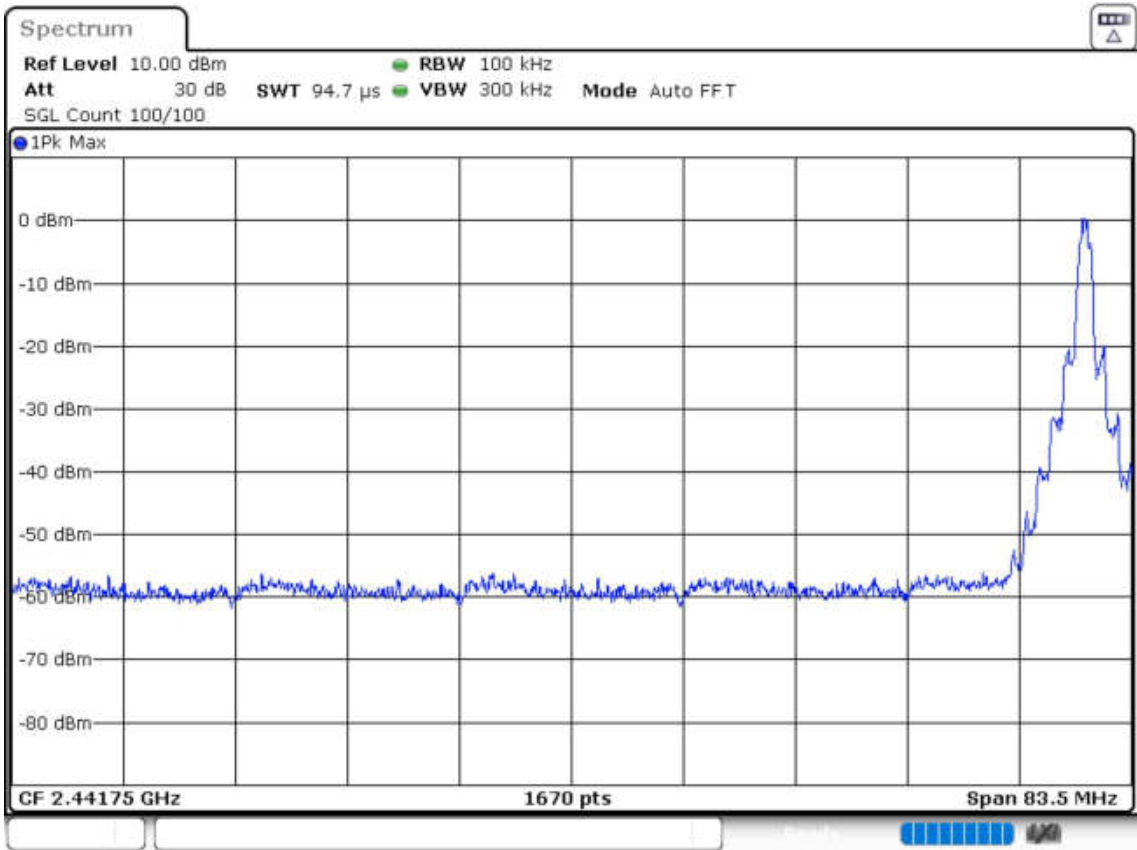


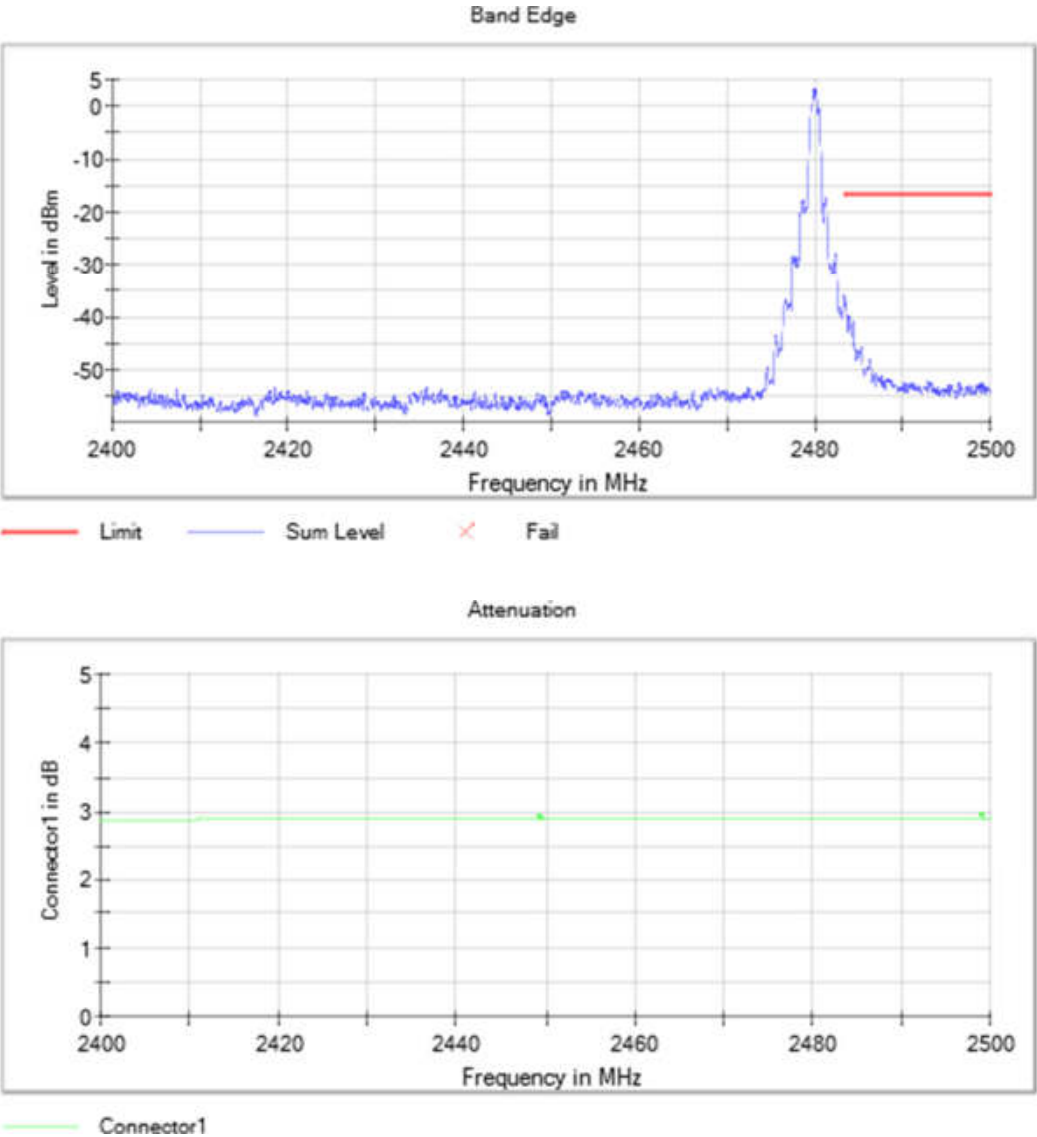


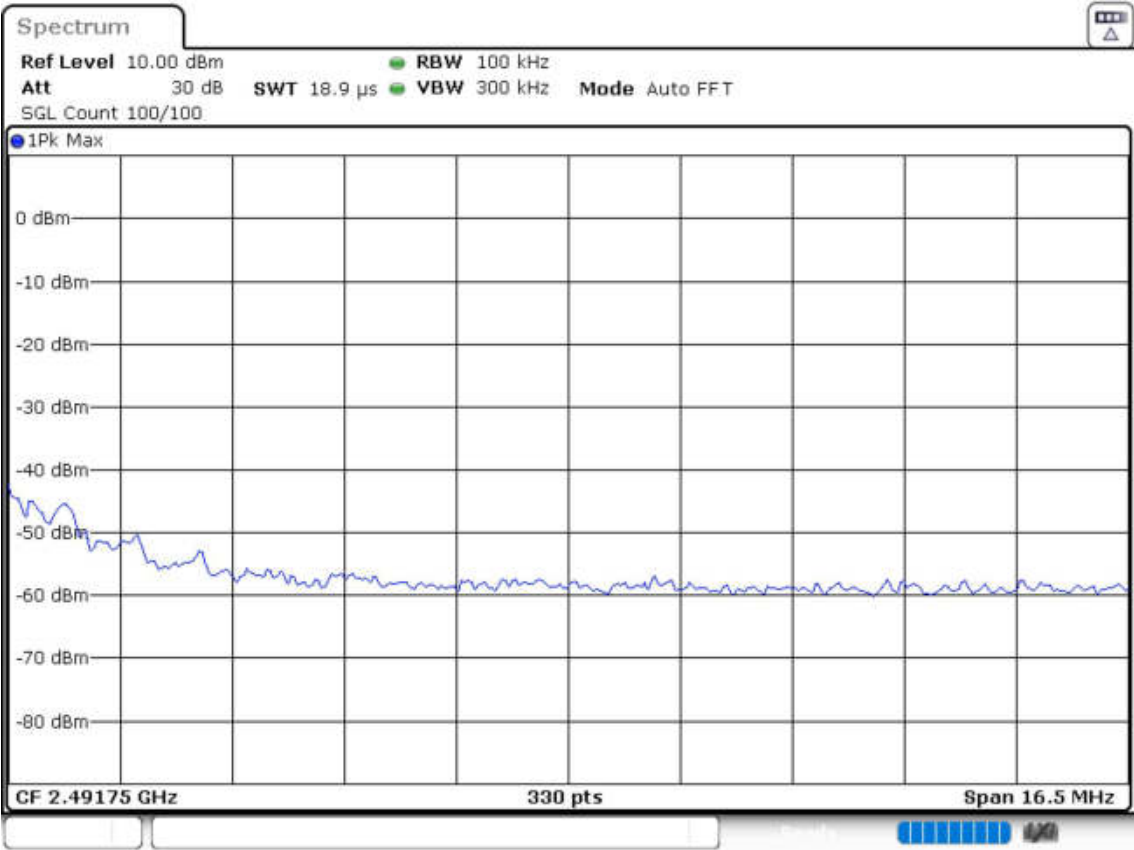


Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5), Number of Transmission Chains = 1, Measurement
Point = 1, Active Port = 1

Images:







RSS-247 5.5 / FCC 15.247 (d) Emission limitations radiated (Transmitter)

Limits

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)):

Frequency Range (MHz)	Field strength ($\mu\text{V/m}$)	Field strength ($\text{dB}\mu\text{V/m}$)	Measurement distance (m)
0.009-0.490	2400/F(kHz)	-	300
0.490-1.705	24000/F(kHz)	-	30
1.705 - 30.0	30	-	30
30 - 88	100	40	3
88 - 216	150	43.5	3
216 - 960	200	46	3
Above 960	500	54	3

The emission limits shown in the above table are based on measurements employing CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

For average radiated emission measurements above 1000 MHz, there is also a limit corresponding to 20 dB above the indicated values in the table is specified when measuring with peak detector function.

Results

Modulation: BT (GFSK 1-DH5)

Frequency range 30 MHz – 1 GHz:

The spurious frequencies detected do not depend on either the modulation or the operating channel.

Spurious frequencies detected within 20 dB of the limit:

Channel (MHz)	Equipment	Freq Rng (GHz)	Unwanted Freq (MHz)	Unwanted Lvl (dBμV/m)	PoI	Detector
2402.00000	Frequency Hopping Spread Spectrum systems (DSS)	[0.03, 1]	30.000	35.95	V	PK
2402.00000	Frequency Hopping Spread Spectrum systems (DSS)	[0.03, 1]	30.000	22.16	V	QP
2402.00000	Frequency Hopping Spread Spectrum systems (DSS)	[0.03, 1]	58.809	21.28	V	PK
2402.00000	Frequency Hopping Spread Spectrum systems (DSS)	[0.03, 1]	58.809	14.96	V	QP
2402.00000	Frequency Hopping Spread Spectrum systems (DSS)	[0.03, 1]	504.039	28.28	V	PK
2402.00000	Frequency Hopping Spread Spectrum systems (DSS)	[0.03, 1]	504.039	23.27	V	QP
2402.00000	Frequency Hopping Spread Spectrum systems (DSS)	[0.03, 1]	511.945	28.15	V	PK
2402.00000	Frequency Hopping Spread Spectrum systems (DSS)	[0.03, 1]	511.945	22.49	V	QP
2402.00000	Frequency Hopping Spread Spectrum systems (DSS)	[0.03, 1]	704.005	30.31	H	PK
2402.00000	Frequency Hopping Spread Spectrum systems (DSS)	[0.03, 1]	704.005	24.37	H	QP

All the quasi-peak maximizations are below the limit.

Verdict

Pass

Frequency range 1 – 3 GHz:

Spurious frequencies detected within 20 dB of the limit:

Channel (MHz)	Equipment	Freq Rng (GHz)	Unwanted Freq (MHz)	Unwanted Lvl (dBµV/m)	Pol	Detector
2480.00000	Frequency Hopping Spread Spectrum systems (DSS)	[1, 3]	2483.533	62.29	V	PK
2480.00000	Frequency Hopping Spread Spectrum systems (DSS)	[1, 3]	2483.533	51.89	V	AVG

All maximizations are below the limit.

Verdict

Pass

Frequency range 3 – 17 GHz:

Spurious frequencies detected within 20 dB of the limit:

Channel (MHz)	Equipment	Freq Rng (GHz)	Unwanted Freq (MHz)	Unwanted Lvl (dBµV/m)	Pol	Detector
2402.00000	Frequency Hopping Spread Spectrum systems (DSS)	[3, 17]	4804.000	46.58	H	PK
2440.00000	Frequency Hopping Spread Spectrum systems (DSS)	[3, 17]	4880.000	45.67	H	PK
2480.00000	Frequency Hopping Spread Spectrum systems (DSS)	[3, 17]	4960.000	53.39	V	PK

All maximizations are below the limit.

Verdict

Pass

Frequency range 17 – 26 GHz:

The spurious frequencies detected do not depend on either the modulation or the operating channel.

No spurious frequencies detected at less than 20 dB below the limit.

Verdict

Pass

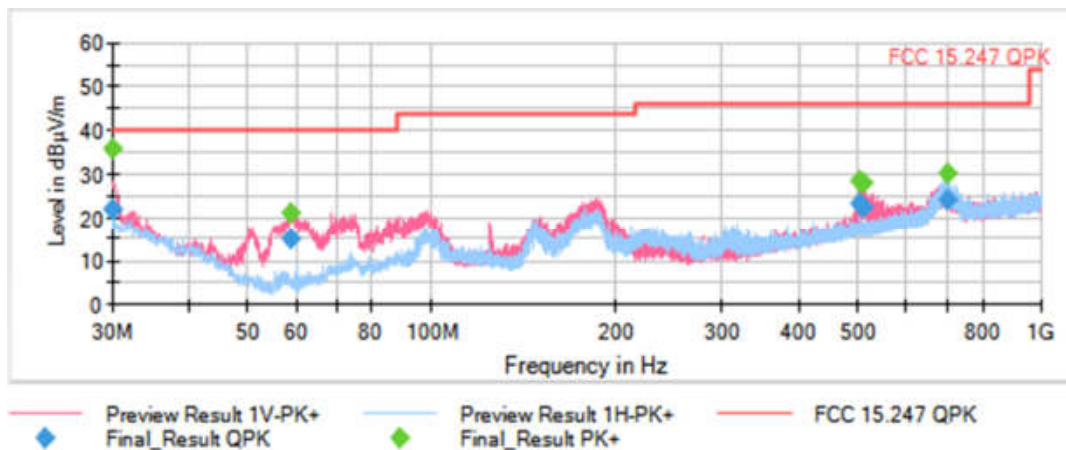
Attachments

The receiver settings for each range of frequency is indicated in the following tables:

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
Receiver: [ESW 44] 30 MHz - 1 GHz	30,312 kHz	PK+	100 kHz	1 s	0 dB
Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
Receiver: [ESW 44] 1 GHz - 3 GHz	30,769 kHz	PK+ ; AVG	1 MHz	1 s	0 dB
Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
Receiver: [ESW 44] 3 GHz - 17 GHz	140 kHz	PK+ ; AVG	1 MHz	1 s	30 dB
Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
Receiver: [FSV 40] 17 GHz - 26 GHz	300 kHz	PK+ ; AVG	1 MHz	1 s	0 dB

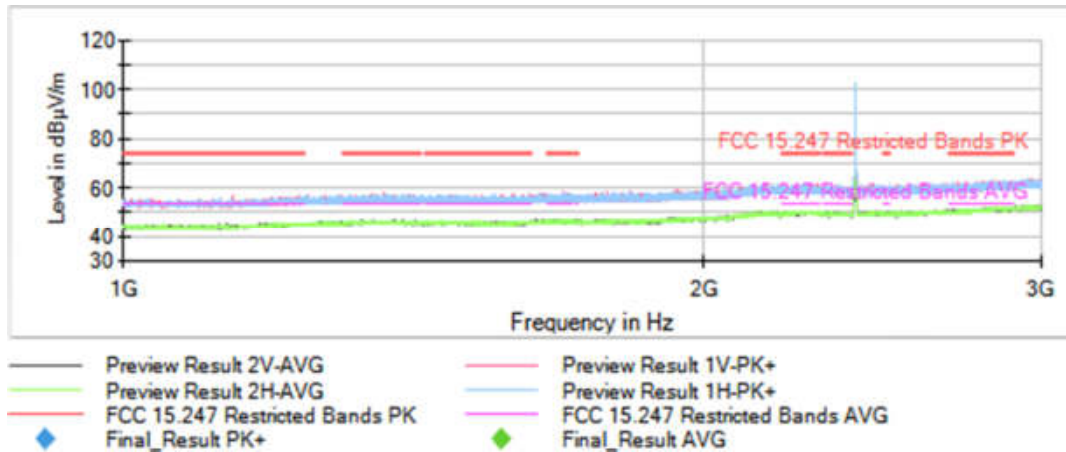
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Modulation = BT (GFSK 1-DH5), Frequency Range GHz = [0.03, 1], Number of Transmission Chains = 1,
Measurement Point = 1, Active Port = 1

Images:

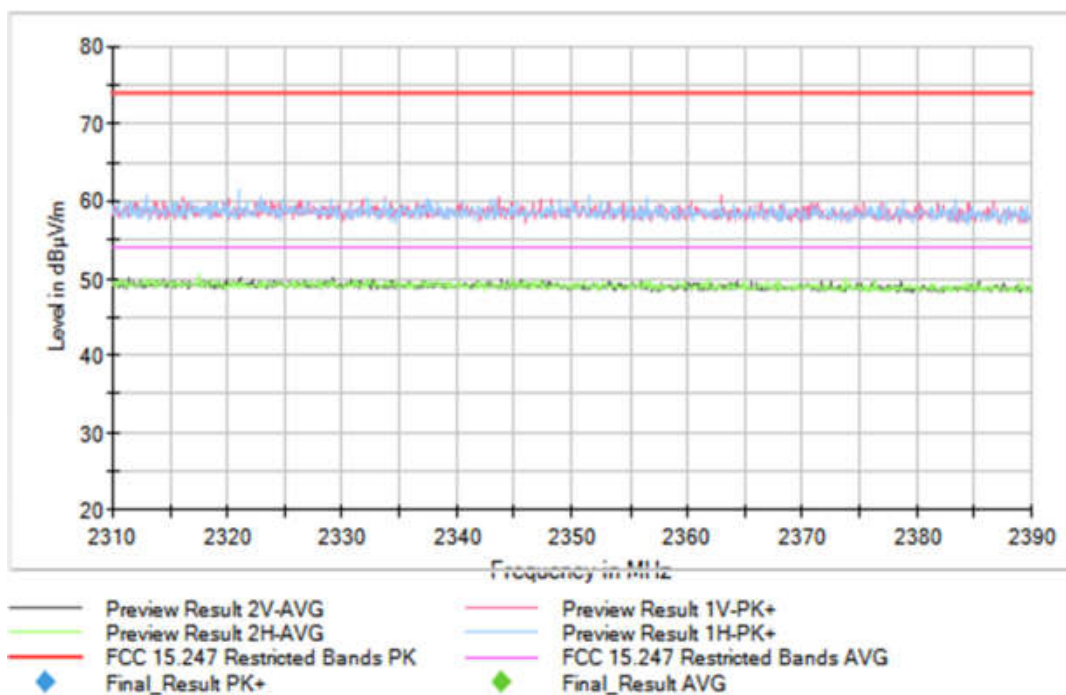


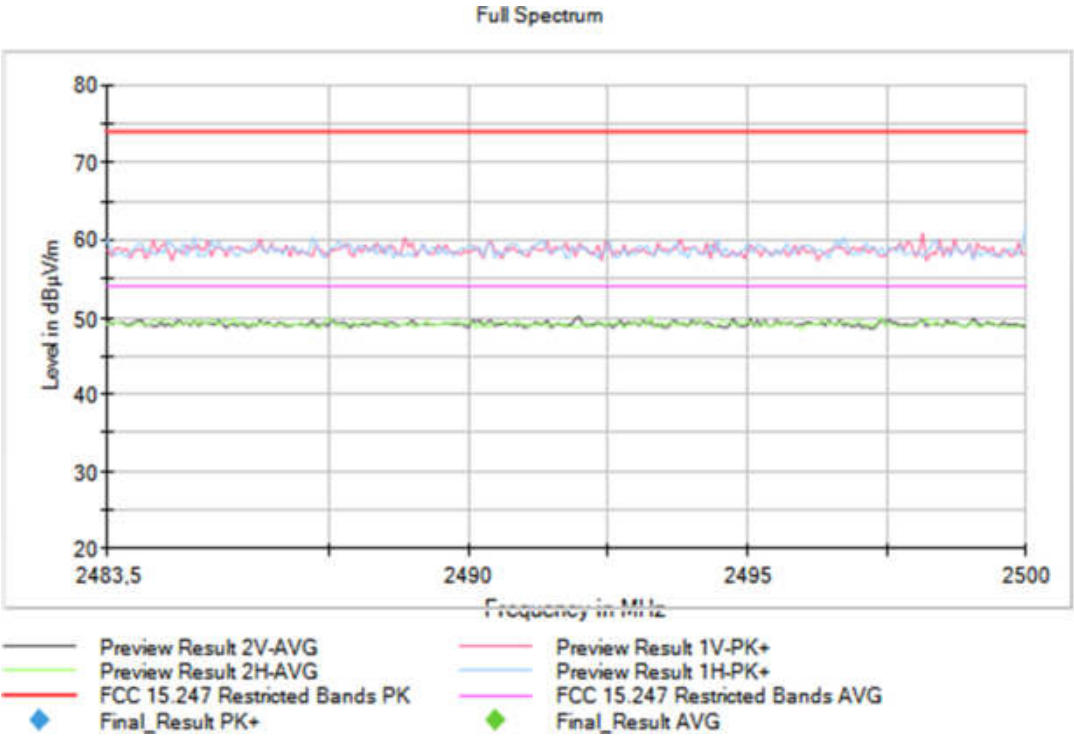
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 Modulation = BT (GFSK 1-DH5), Frequency Range GHz = [1, 3], Number of Transmission Chains = 1,
 Measurement Point = 1, Active Port = 1**

Images:



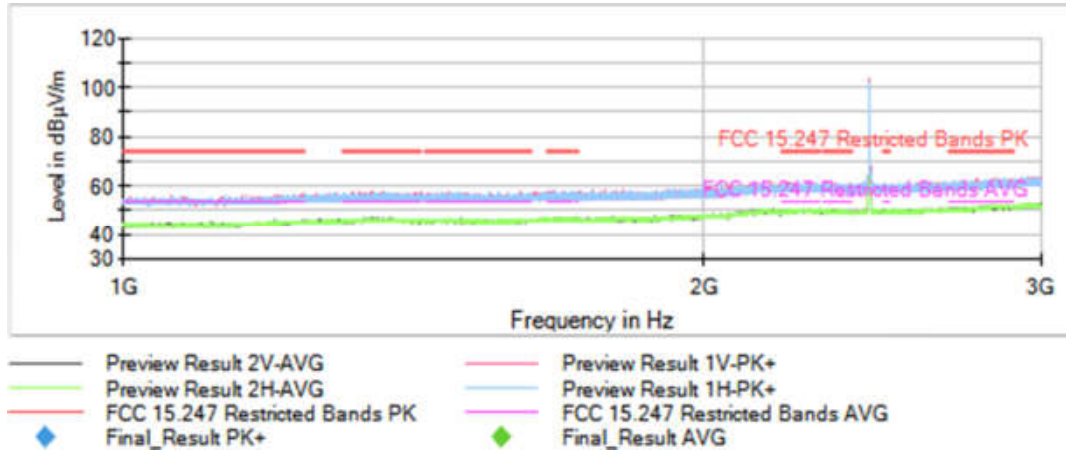
Full Spectrum



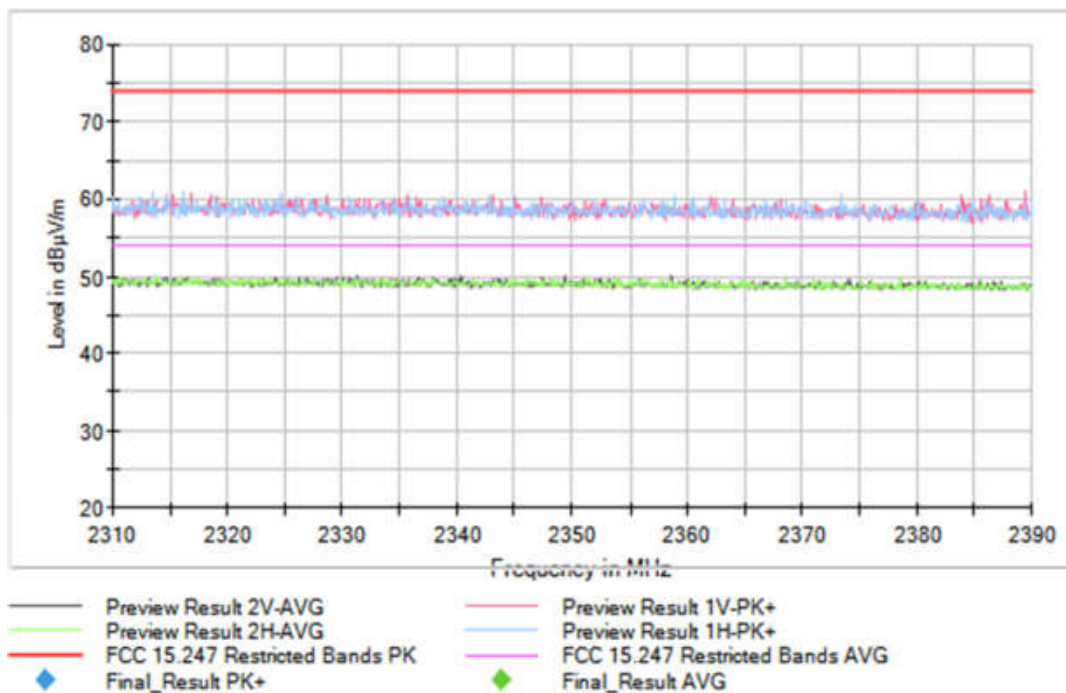


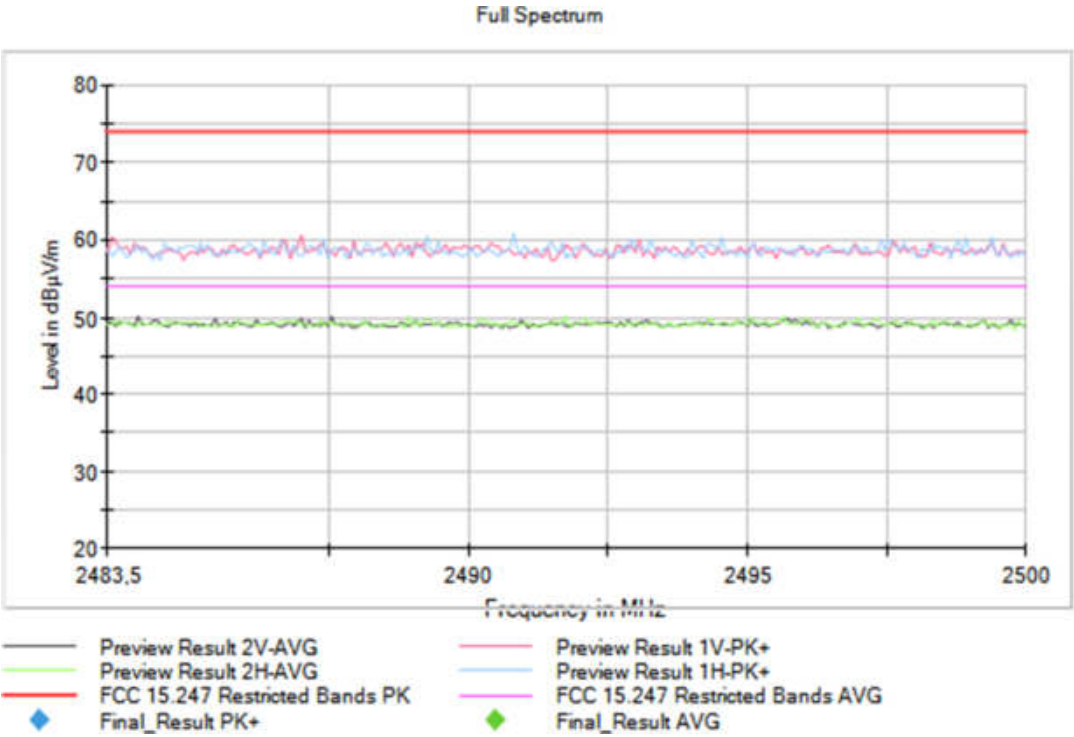
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 Modulation = BT (GFSK 1-DH5), Frequency Range GHz = [1, 3], Number of Transmission Chains = 1,
 Measurement Point = 1, Active Port = 1**

Images:



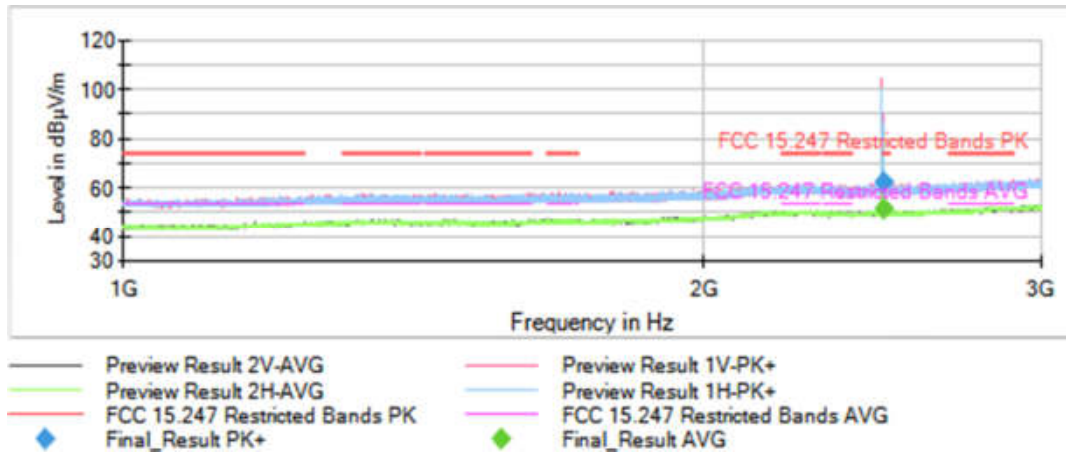
Full Spectrum



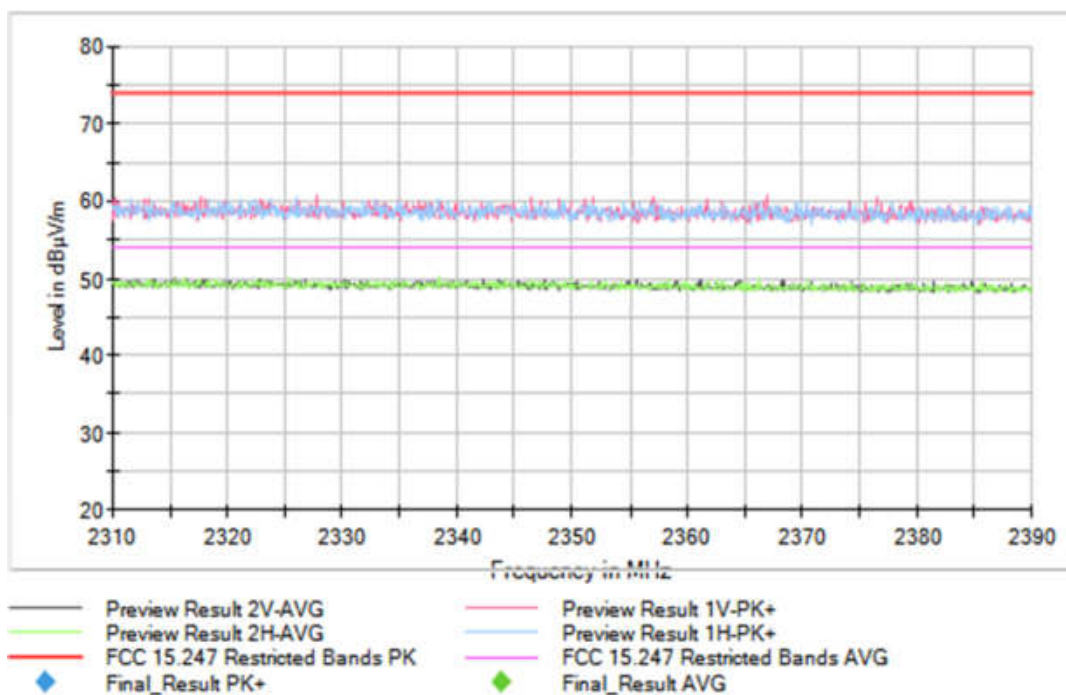


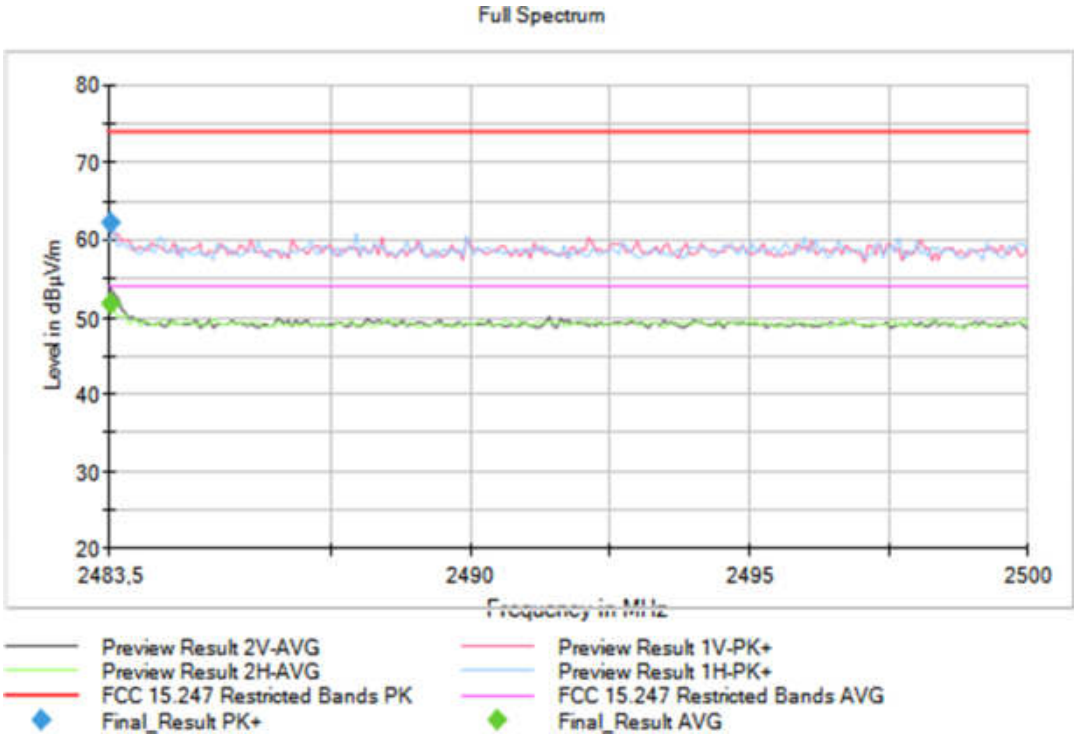
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 Measurement Point = 1, Active Port = 1**

Images:



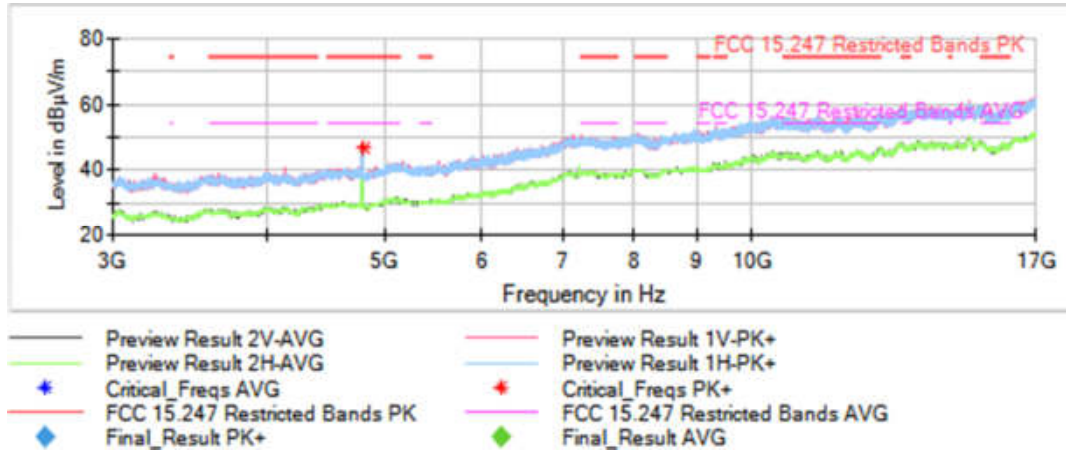
Full Spectrum





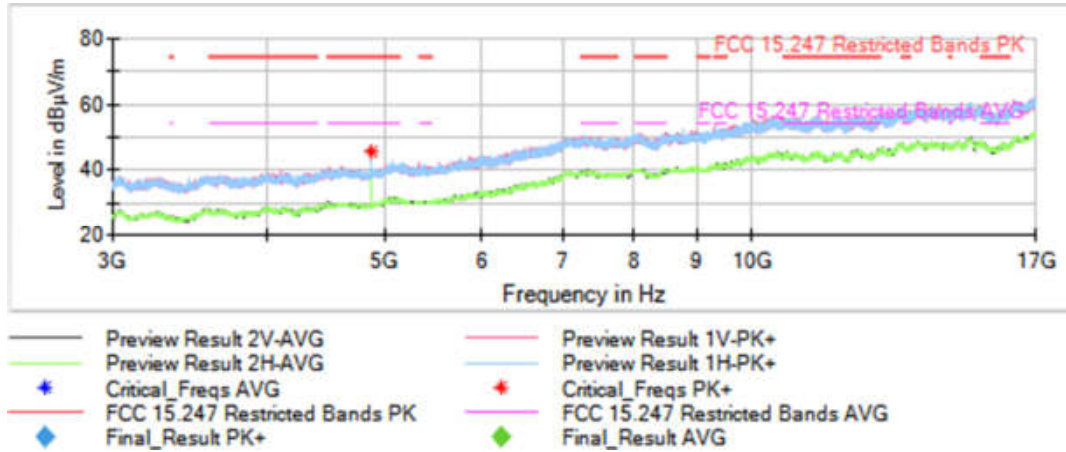
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 Measurement Point = 1, Active Port = 1**

Images:



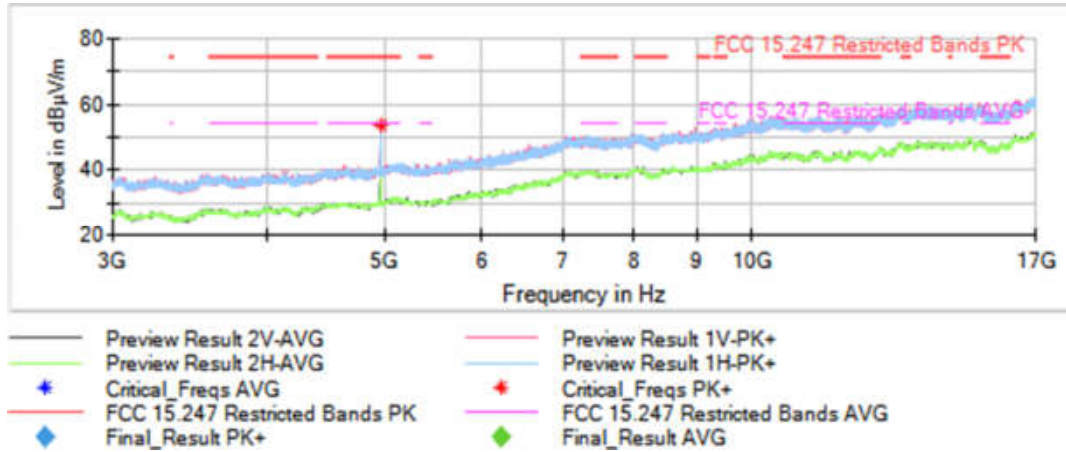
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 Measurement Point = 1, Active Port = 1**

Images:



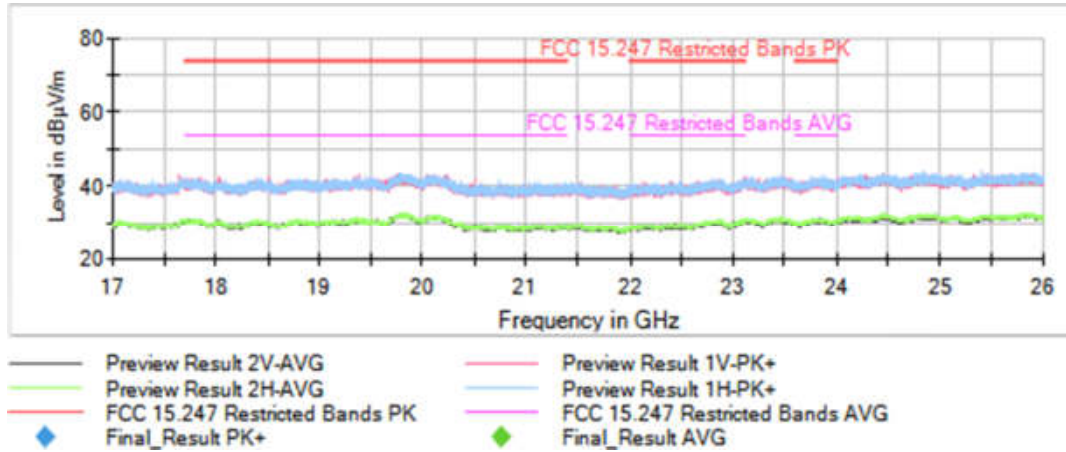
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 Modulation = BT (GFSK 1-DH5), Frequency Range GHz = [3, 17], Number of Transmission Chains = 1,
 Measurement Point = 1, Active Port = 1**

Images:



**Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
 Modulation = BT (GFSK 1-DH5), Frequency Range GHz = [17, 26], Number of Transmission Chains = 1,
 Measurement Point = 1, Active Port = 1**

Images:



Modulation: BT (Pi/4 DQPSK 2-DH5)

Frequency range 30 MHz – 1 GHz:

The spurious frequencies detected do not depend on either the modulation or the operating channel.

Spurious frequencies detected within 20 dB of the limit:

Channel (MHz)	Equipment	Freq Rng (GHz)	Unwanted Freq (MHz)	Unwanted Lvl (dBμV/m)	Pol	Detector
2440.00000	Frequency Hopping Spread Spectrum systems (DSS)	[0.03, 1]	30.097	24.78	V	PK
2440.00000	Frequency Hopping Spread Spectrum systems (DSS)	[0.03, 1]	30.097	14.02	V	QP
2440.00000	Frequency Hopping Spread Spectrum systems (DSS)	[0.03, 1]	73.844	21.86	V	PK
2440.00000	Frequency Hopping Spread Spectrum systems (DSS)	[0.03, 1]	73.844	12.89	V	QP
2440.00000	Frequency Hopping Spread Spectrum systems (DSS)	[0.03, 1]	84.708	20.23	V	PK
2440.00000	Frequency Hopping Spread Spectrum systems (DSS)	[0.03, 1]	84.708	10.82	V	QP
2440.00000	Frequency Hopping Spread Spectrum systems (DSS)	[0.03, 1]	504.039	28.51	V	PK
2440.00000	Frequency Hopping Spread Spectrum systems (DSS)	[0.03, 1]	504.039	23.49	V	QP
2440.00000	Frequency Hopping Spread Spectrum systems (DSS)	[0.03, 1]	511.993	28.82	V	PK
2440.00000	Frequency Hopping Spread Spectrum systems (DSS)	[0.03, 1]	511.993	24.40	V	QP
2440.00000	Frequency Hopping Spread Spectrum systems (DSS)	[0.03, 1]	684.023	30.06	H	PK
2440.00000	Frequency Hopping Spread Spectrum systems (DSS)	[0.03, 1]	684.023	23.52	H	QP

All the quasi-peak maximizations are below the limit.

Verdict

Pass

Frequency range 1 – 3 GHz:

Spurious frequencies detected within 20 dB of the limit:

Channel (MHz)	Equipment	Freq Rng (GHz)	Unwanted Freq (MHz)	Unwanted Lvl (dBµV/m)	Pol	Detector
2480.00000	Frequency Hopping Spread Spectrum systems (DSS)	[1, 3]	2483.533	64.33	V	PK
2480.00000	Frequency Hopping Spread Spectrum systems (DSS)	[1, 3]	2483.533	51.64	V	AVG

All maximizations are below the limit.

Verdict

Pass

Frequency range 3 – 17 GHz:

Spurious frequencies detected within 20 dB of the limit:

Channel (MHz)	Equipment	Freq Rng (GHz)	Unwanted Freq (MHz)	Unwanted Lvl (dBµV/m)	Pol	Detector
2402.00000	Frequency Hopping Spread Spectrum systems (DSS)	[3, 17]	4803.500	43.14	V	PK
2440.00000	Frequency Hopping Spread Spectrum systems (DSS)	[3, 17]	4879.500	42.99	H	PK
2480.00000	Frequency Hopping Spread Spectrum systems (DSS)	[3, 17]	4959.500	50.71	V	PK

All maximizations are below the limit.

Verdict

Pass

Frequency range 17 – 26 GHz:

The spurious frequencies detected do not depend on either the modulation or the operating channel.

No spurious frequencies detected at less than 20 dB below the limit.

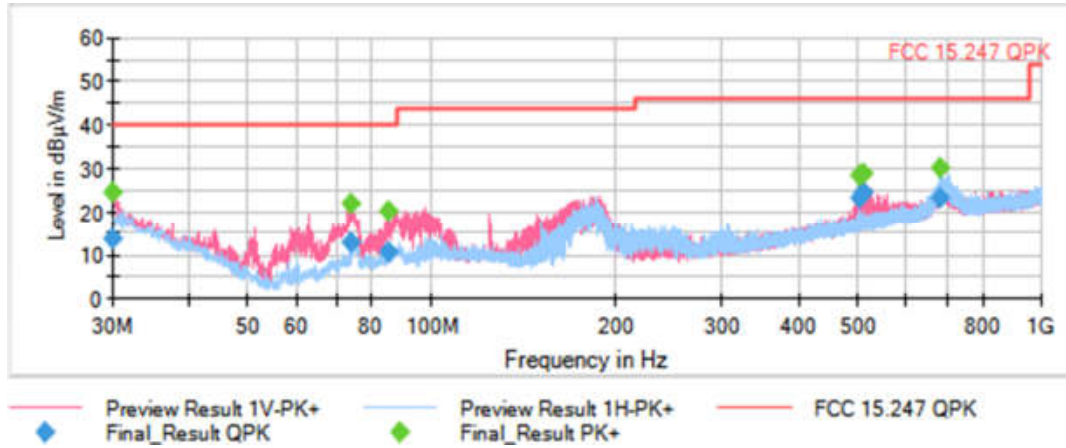
Verdict

Pass

Attachments

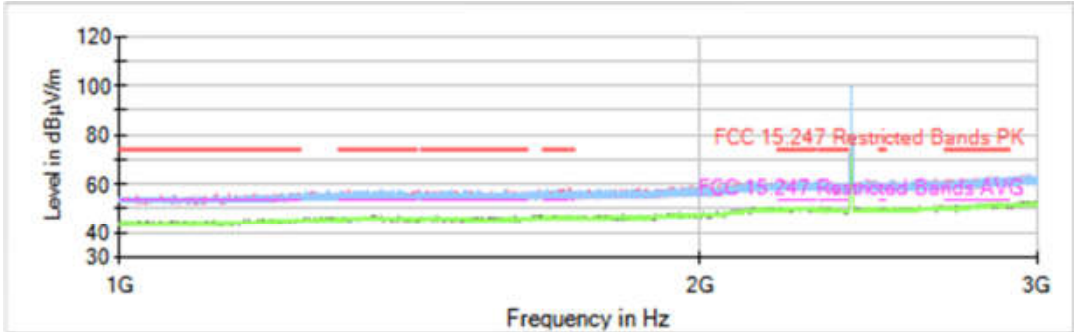
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Images:



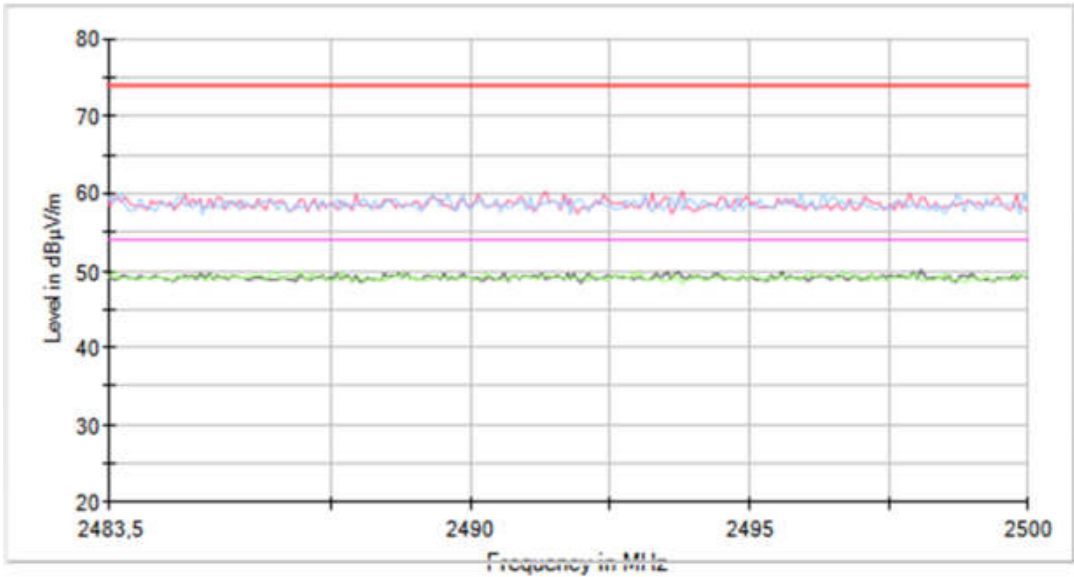
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Measurement Point = 1, Active Port = 1

Images:

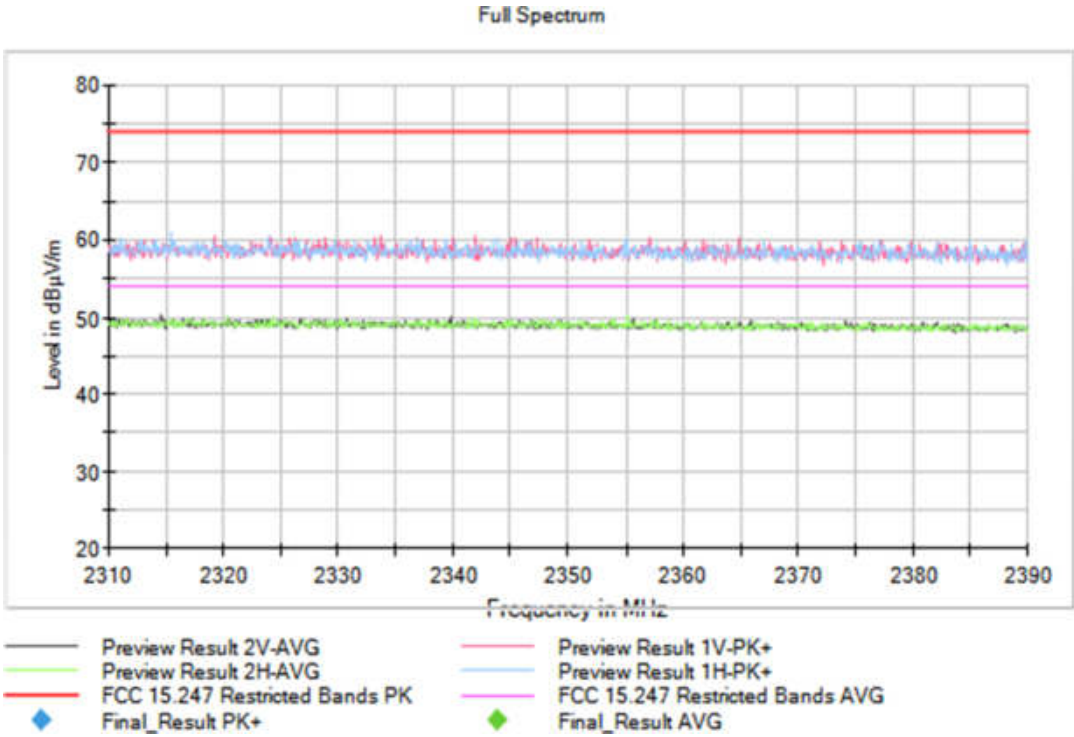


Preview Result 2V-AVG
Preview Result 2H-AVG
FCC 15.247 Restricted Bands PK
Final_Result PK+
Preview Result 1V-PK+
Preview Result 1H-PK+
FCC 15.247 Restricted Bands AVG
Final_Result AVG

Full Spectrum

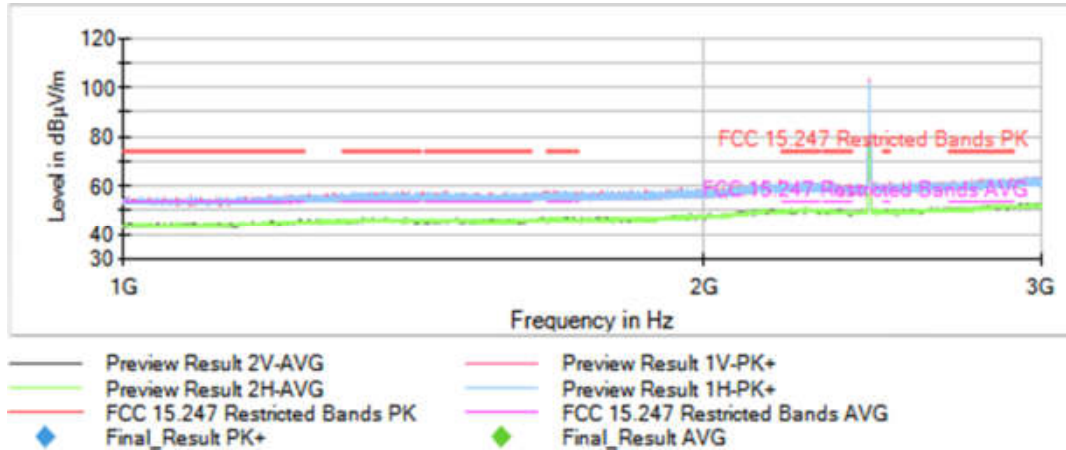


Preview Result 2V-AVG
Preview Result 2H-AVG
FCC 15.247 Restricted Bands PK
Final_Result PK+
Preview Result 1V-PK+
Preview Result 1H-PK+
FCC 15.247 Restricted Bands AVG
Final_Result AVG

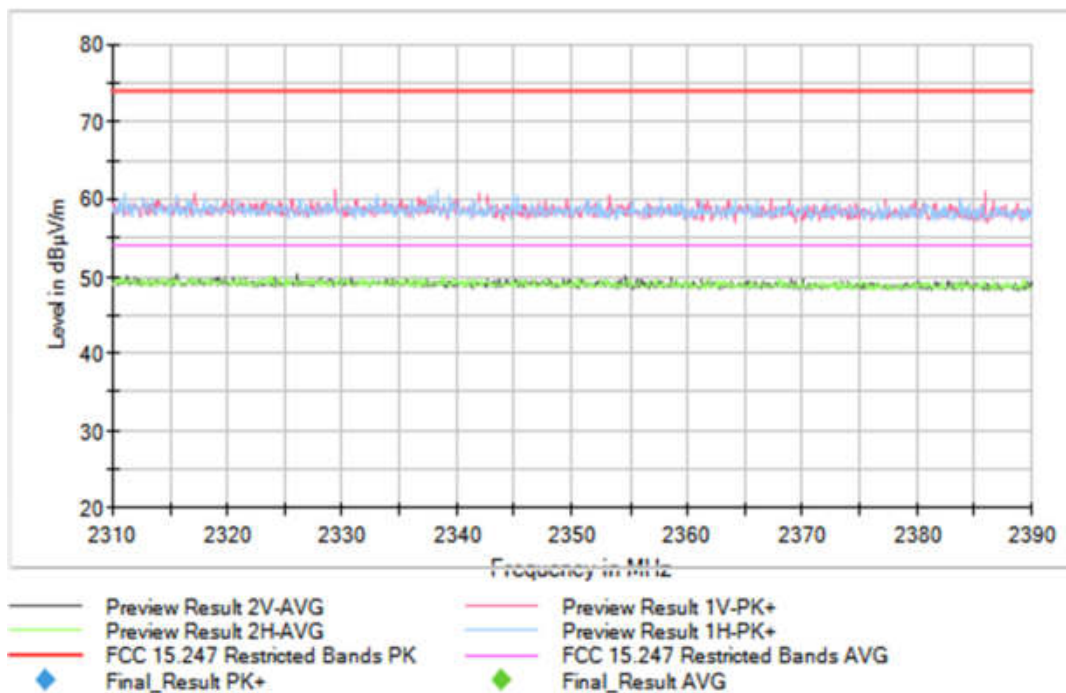


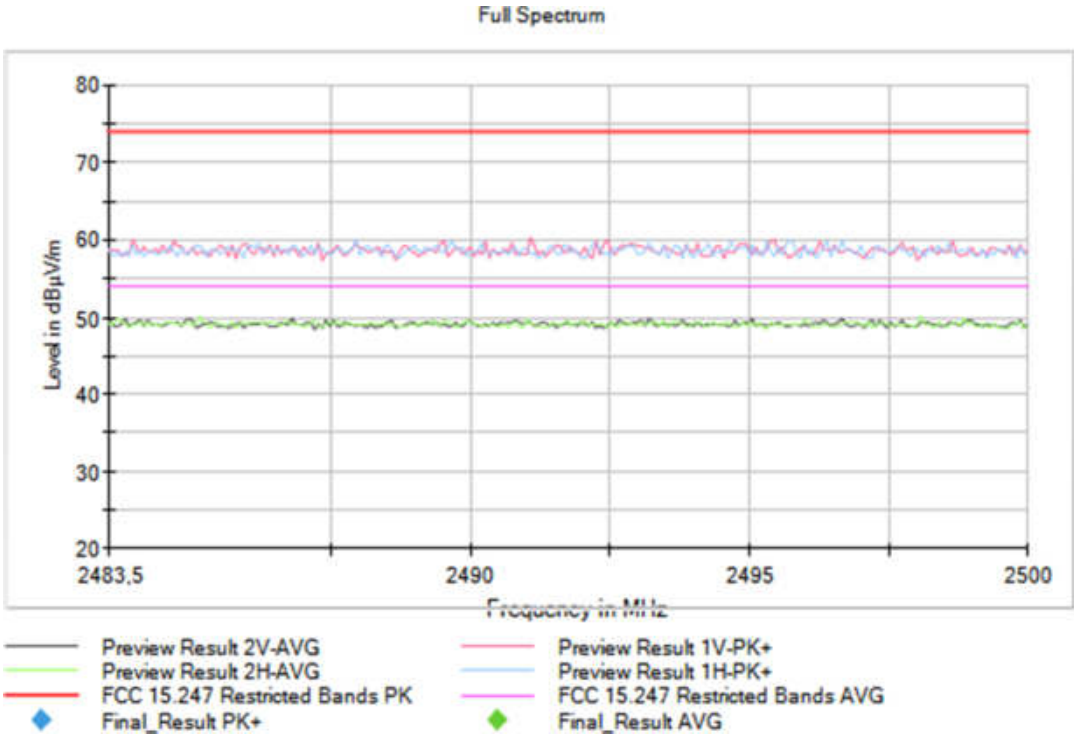
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Images:



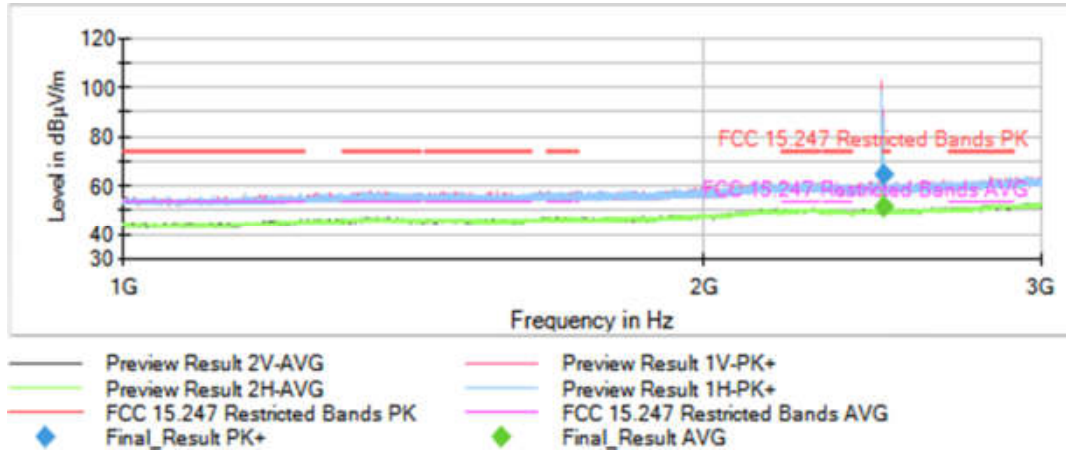
Full Spectrum



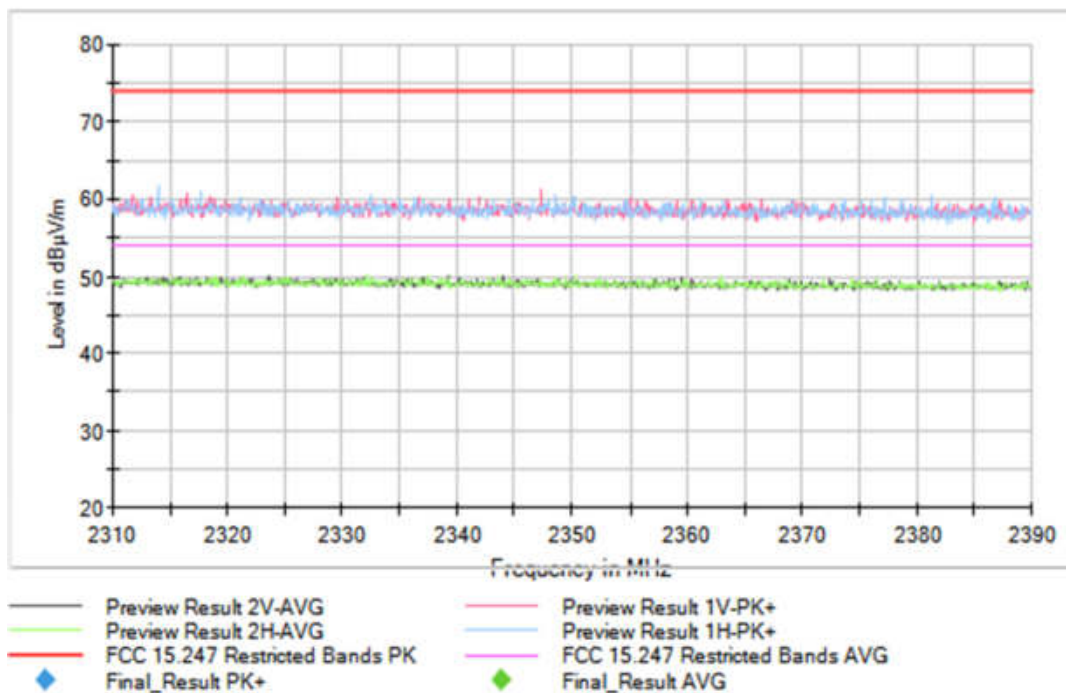


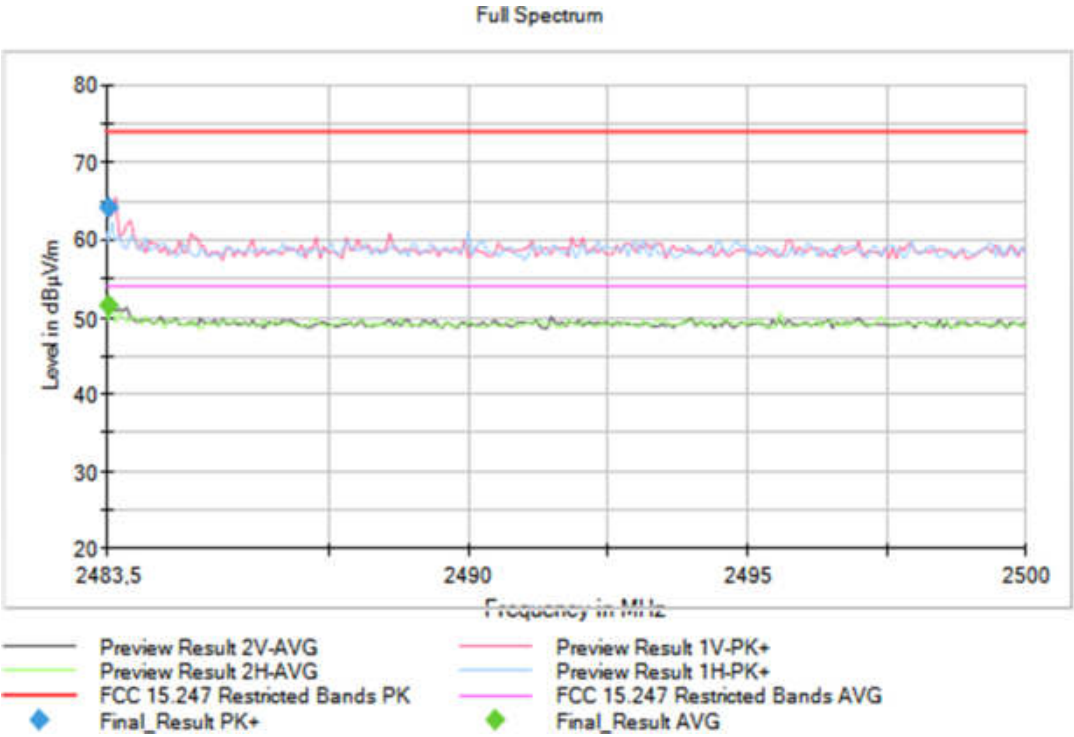
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 Measurement Point = 1, Active Port = 1**

Images:



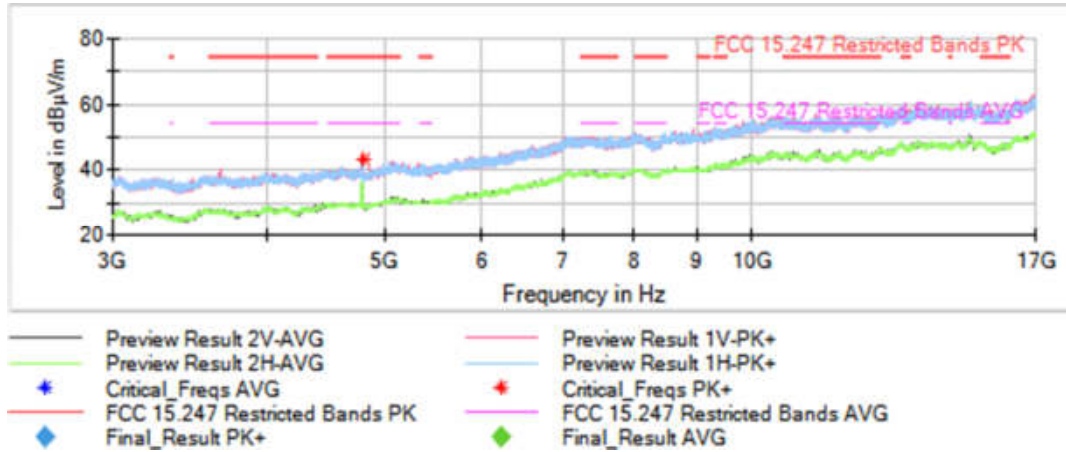
Full Spectrum





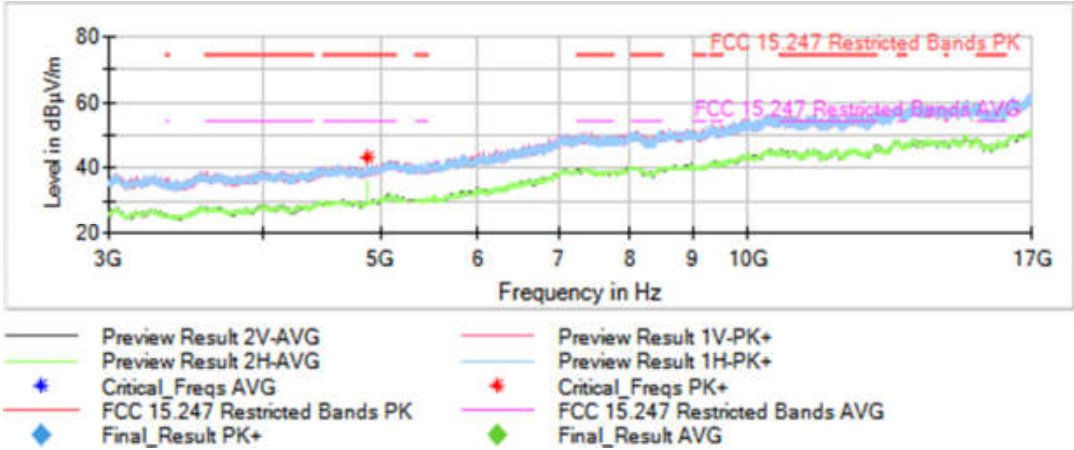
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Images:



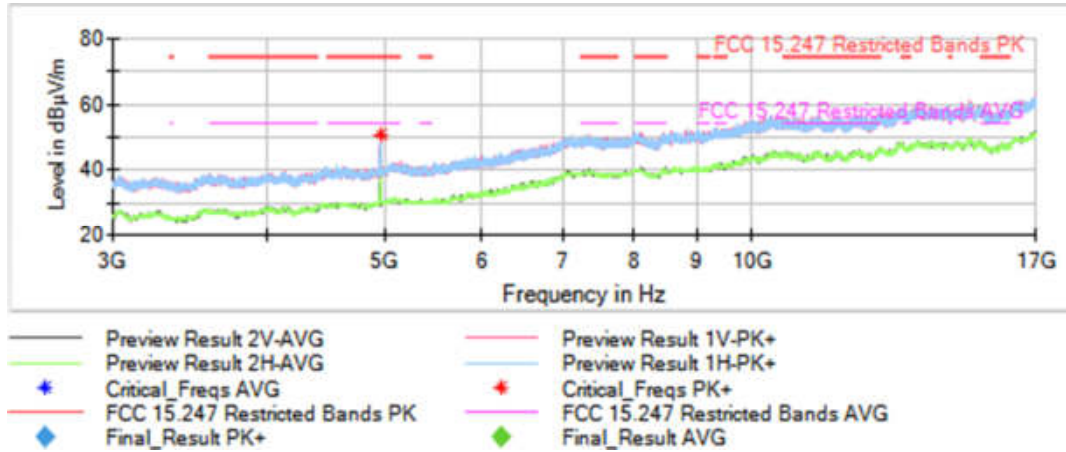
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Modulation = BT (Pi/4 DQPSK 2-DH5), Frequency Range GHz = [3, 17], Number of Transmission Chains =
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Images:



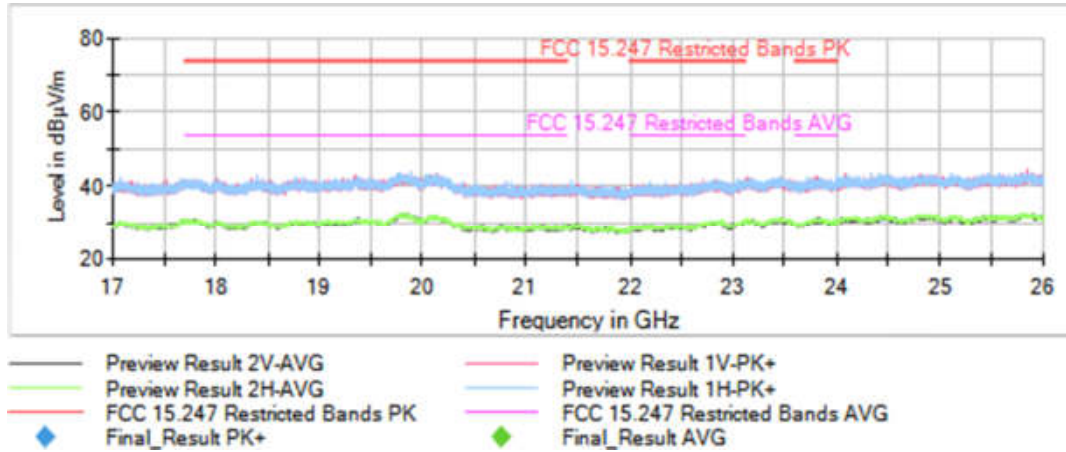
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 Modulation = BT (Pi/4 DQPSK 2-DH5), Frequency Range GHz = [3, 17], Number of Transmission Chains =
 1, Measurement Point = 1, Active Port = 1

Images:



**Frequency MHz = 2440.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
 Modulation = BT (Pi/4 DQPSK 2-DH5), Frequency Range GHz = [17, 26], Number of Transmission Chains =
 1, Measurement Point = 1, Active Port = 1**

Images:



Modulation: BT (8DPSK 3-DH5)

Frequency range 30 MHz – 1 GHz:

The spurious frequencies detected do not depend on either the modulation or the operating channel.

Spurious frequencies detected within 20 dB of the limit:

Channel (MHz)	Equipment	Freq Rng (GHz)	Unwanted Freq (MHz)	Unwanted Lvl (dBμV/m)	Pol	Detector
2480.00000	Frequency Hopping Spread Spectrum systems (DSS)	[0.03, 1]	30.049	26.02	V	PK
2480.00000	Frequency Hopping Spread Spectrum systems (DSS)	[0.03, 1]	30.049	14.38	V	QP
2480.00000	Frequency Hopping Spread Spectrum systems (DSS)	[0.03, 1]	74.329	20.52	V	PK
2480.00000	Frequency Hopping Spread Spectrum systems (DSS)	[0.03, 1]	74.329	12.69	V	QP
2480.00000	Frequency Hopping Spread Spectrum systems (DSS)	[0.03, 1]	186.121	23.46	V	PK
2480.00000	Frequency Hopping Spread Spectrum systems (DSS)	[0.03, 1]	186.121	16.43	V	QP
2480.00000	Frequency Hopping Spread Spectrum systems (DSS)	[0.03, 1]	503.990	28.58	V	PK
2480.00000	Frequency Hopping Spread Spectrum systems (DSS)	[0.03, 1]	503.990	23.92	V	QP
2480.00000	Frequency Hopping Spread Spectrum systems (DSS)	[0.03, 1]	511.993	30.00	V	PK
2480.00000	Frequency Hopping Spread Spectrum systems (DSS)	[0.03, 1]	511.993	25.13	V	QP
2480.00000	Frequency Hopping Spread Spectrum systems (DSS)	[0.03, 1]	704.053	29.44	H	PK
2480.00000	Frequency Hopping Spread Spectrum systems (DSS)	[0.03, 1]	704.053	22.25	H	QP

All the quasi-peak maximizations are below the limit.

Verdict

Pass

Frequency range 1 – 3 GHz:

Spurious frequencies detected within 20 dB of the limit:

Channel (MHz)	Equipment	Freq Rng (GHz)	Unwanted Freq (MHz)	Unwanted Lvl (dBµV/m)	Pol	Detector
2480.00000	Frequency Hopping Spread Spectrum systems (DSS)	[1, 3]	2483.600	65.94	V	PK
2480.00000	Frequency Hopping Spread Spectrum systems (DSS)	[1, 3]	2483.600	51.80	V	AVG

All maximizations are below the limit.

Verdict

Pass

Frequency range 3 – 17 GHz:

Spurious frequencies detected within 20 dB of the limit:

Channel (MHz)	Equipment	Freq Rng (GHz)	Unwanted Freq (MHz)	Unwanted Lvl (dBµV/m)	Pol	Detector
2402.00000	Frequency Hopping Spread Spectrum systems (DSS)	[3, 17]	4804.000	43.48	H	PK
2440.00000	Frequency Hopping Spread Spectrum systems (DSS)	[3, 17]	4879.500	42.39	H	PK
2480.00000	Frequency Hopping Spread Spectrum systems (DSS)	[3, 17]	4960.000	50.97	V	PK

Verdict

Pass

Frequency range 17 – 26 GHz:

The spurious frequencies detected do not depend on either the modulation or the operating channel.

No spurious frequencies detected at less than 20 dB below the limit.

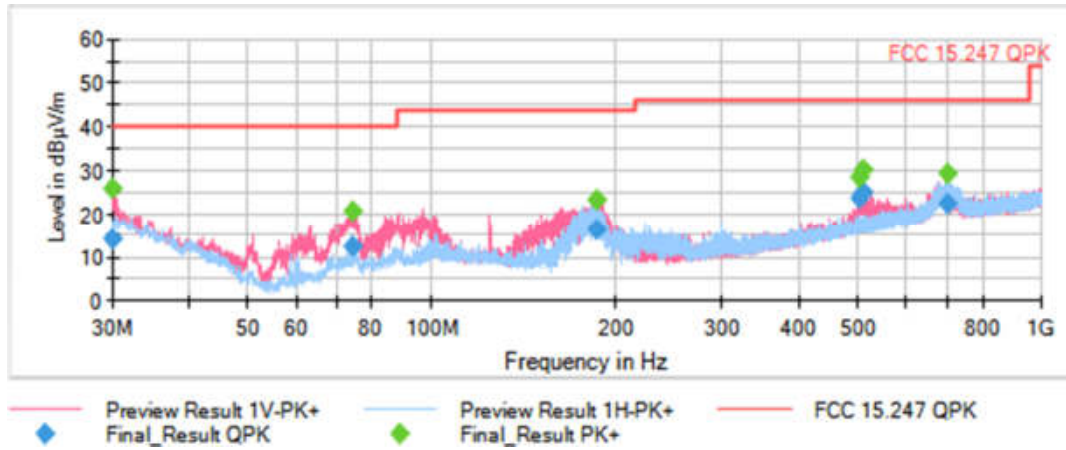
Verdict

Pass

Attachments

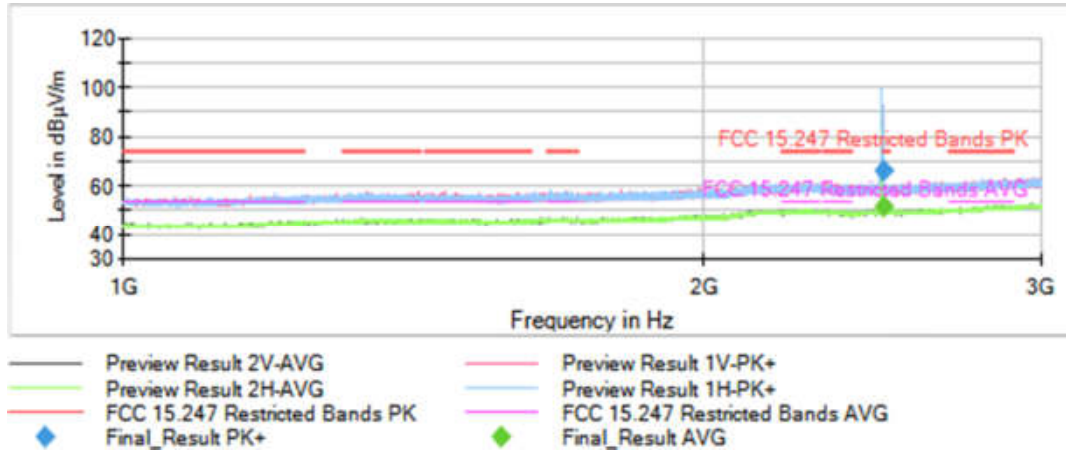
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Images:

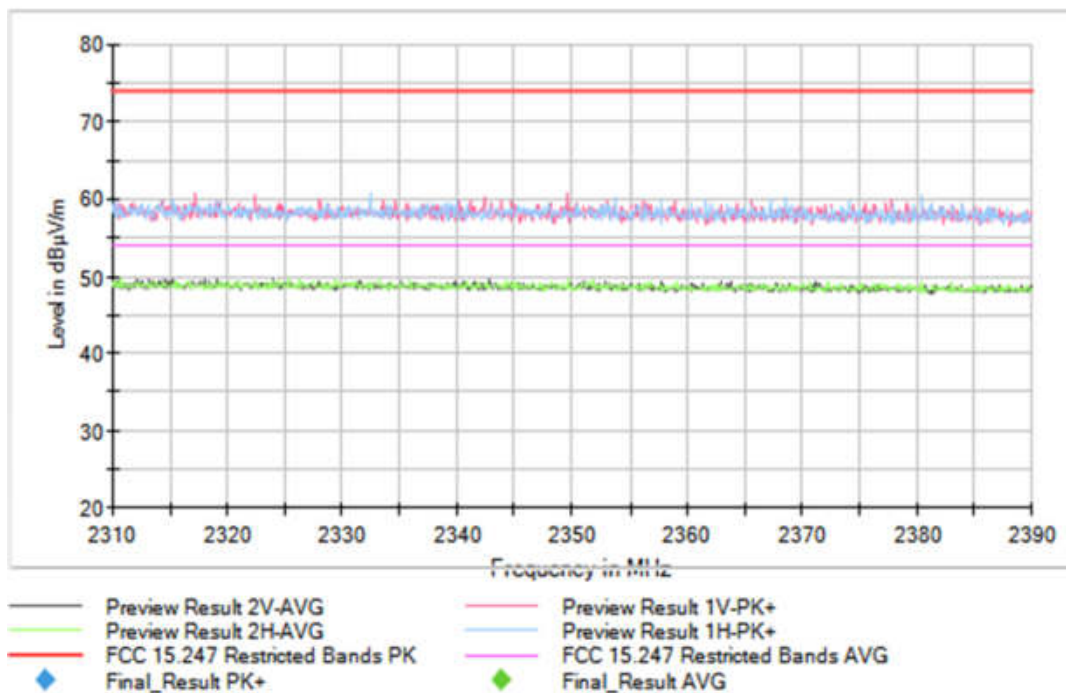


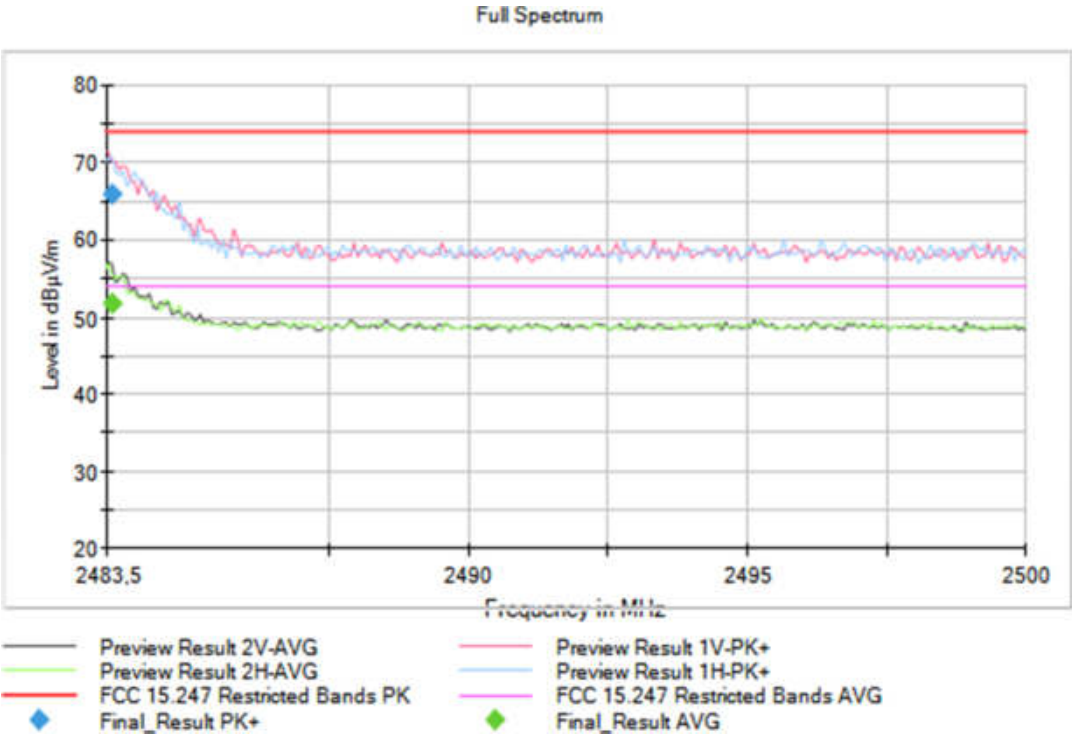
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Measurement Point = 1, Active Port = 1

Images:



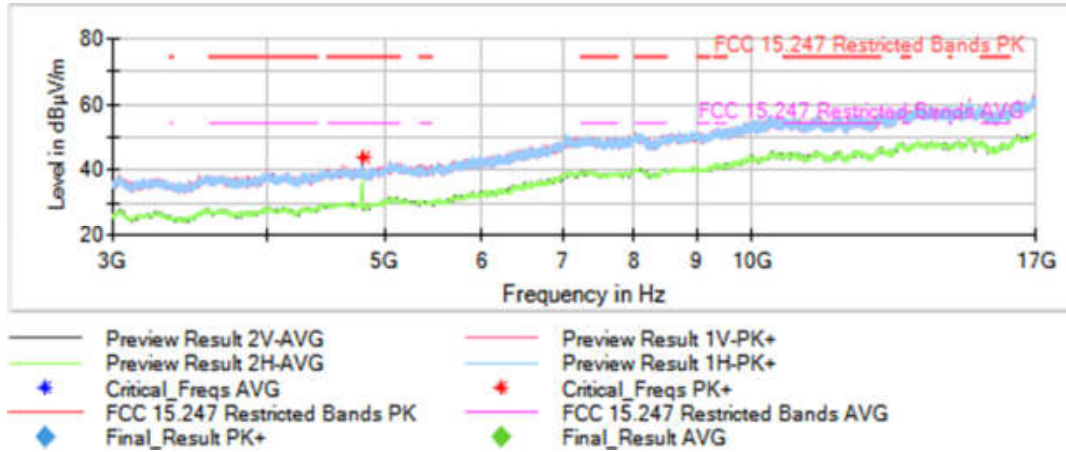
Full Spectrum





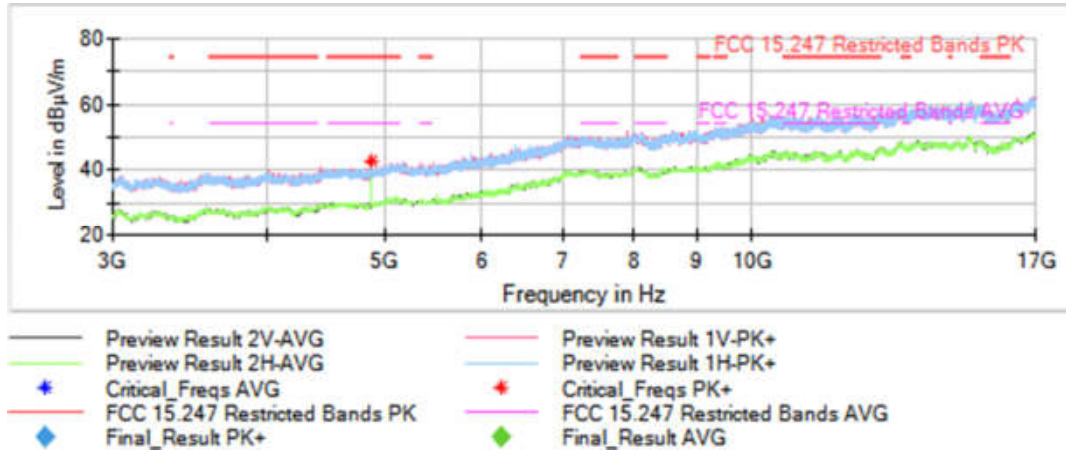
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 Measurement Point = 1, Active Port = 1**

Images:



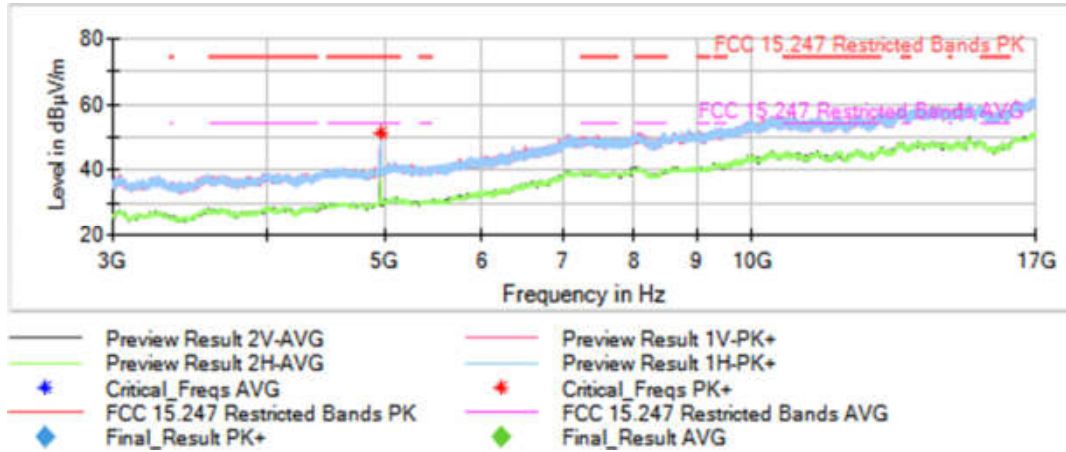
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 Measurement Point = 1, Active Port = 1**

Images:



**Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
 Modulation = BT (8DPSK 3-DH5), Frequency Range GHz = [3, 17], Number of Transmission Chains = 1,
 Measurement Point = 1, Active Port = 1**

Images:



**Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
 Modulation = BT (8DPSK 3-DH5), Frequency Range GHz = [17, 26], Number of Transmission Chains = 1,
 Measurement Point = 1, Active Port = 1**

Images:

