

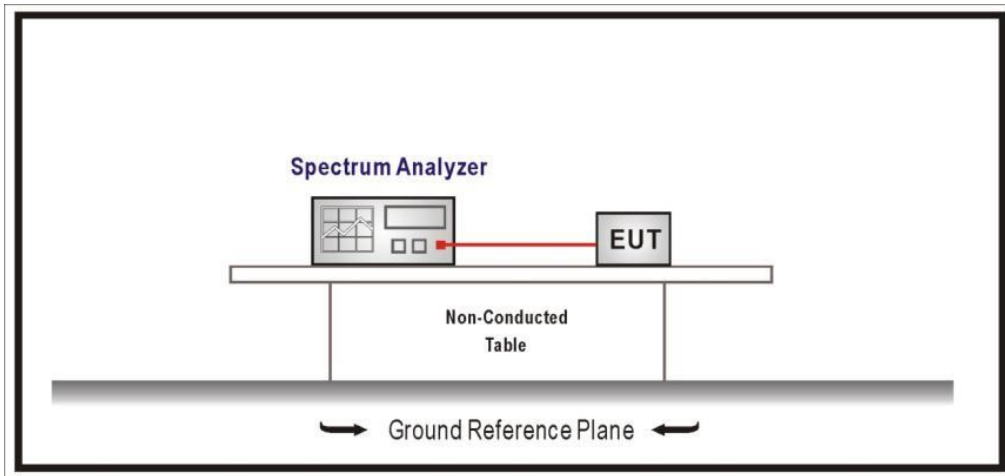
**TEST B.1: 20DB EMISSION BANDWIDTH, OCCUPIED BANDWIDTH AND CARRIER FREQUENCY SEPARATION**

<b>LIMITS:</b>	Product standard:	§ 2.1049, Part 15 Subpart C §15.247 and RSS-247
	Test standard:	Part 15 Subpart C §15.247(a) (1) and RSS-247 5.1 (b)

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.

**TEST SETUP:**



<b>TESTED SAMPLES:</b>	S/01
<b>TESTED CONDITIONS MODES:</b>	TC#01
<b>TEST RESULTS:</b>	PASS

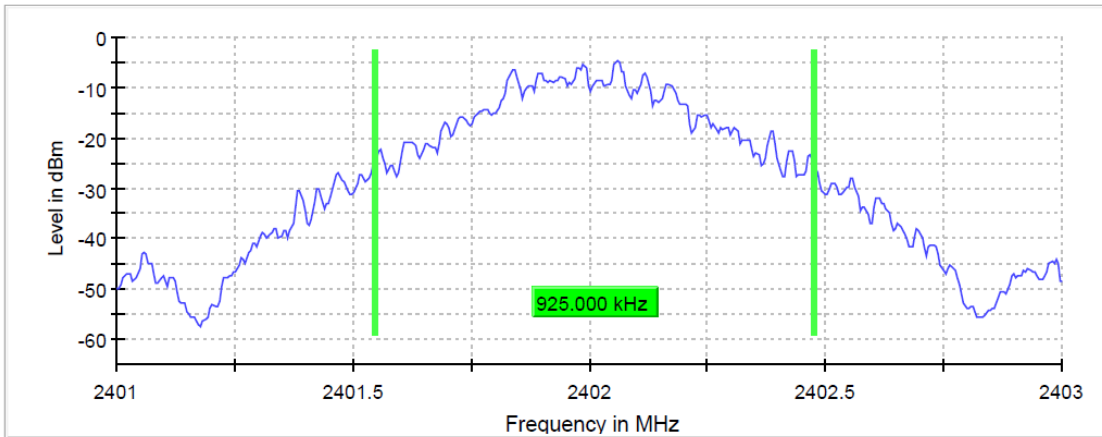
	Lowest frequency 2402 MHz	Middle frequency 2441 MHz	Highest frequency 2480 MHz
20dB Bandwidth (kHz)	925	925	925
Occupied bandwidth (kHz)	860	860	860

**Measurement Set up**

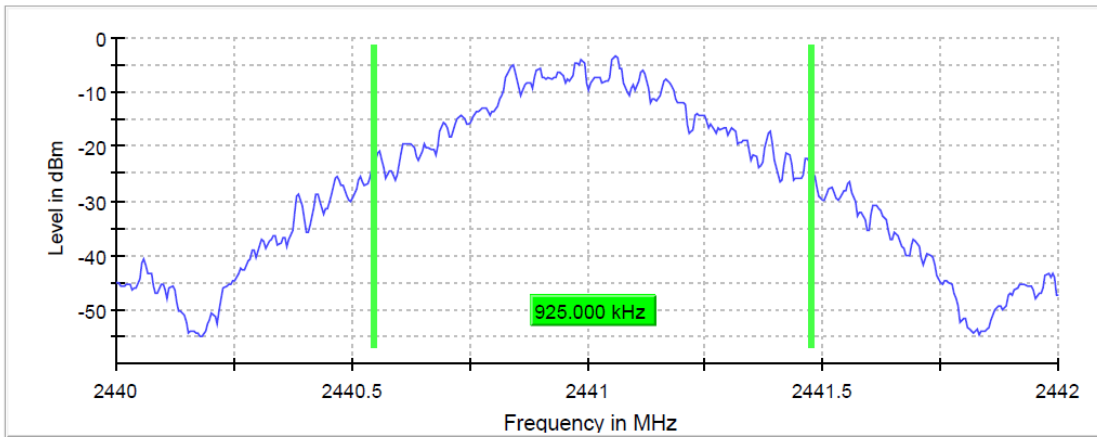
Setting	Instrument Value	Instrument Value	Instrument Value
Start Frequency	2.40100 GHz	2.43900	2.47900
Stop Frequency	2.40300 GHz	2.44100	2.48100
Span	2.000 MHz	2.000 MHz	2.000 MHz
RBW	10.000 kHz	10.000 kHz	10.000 kHz
VBW	30.000 kHz	30.000 kHz	30.000 kHz
Sweep Points	400	400	400
Sweep time	189.648 us	189.648 us	189.648 us
Reference Level	10.000 dBm	10.000 dBm	10.000
Attenuation	30.000 dB	30.000 dB	30.000 dB
Detector	MaxPeak	MaxPeak	MaxPeak
Sweep Count	200	200	200
Filter	3 dB	3 dB	3 dB
Trace Mode	Max Hold	Max Hold	Max Hold
Sweep type	FFT	FFT	FFT
Preamplifier	off	off	off
Stable mode	Trace	Trace	Trace
Stable value	0.50 dB	0.50 dB	0.50 dB
Run	12 / max. 150	8 / max.	9 / max.
Stable	5 / 5	5 / 5	5 / 5
Max Stable Difference	0.09 dB	0.10 dB	0.04 dB

**TEST RESULTS (Cont.):** **20 dB BANDWIDTH**

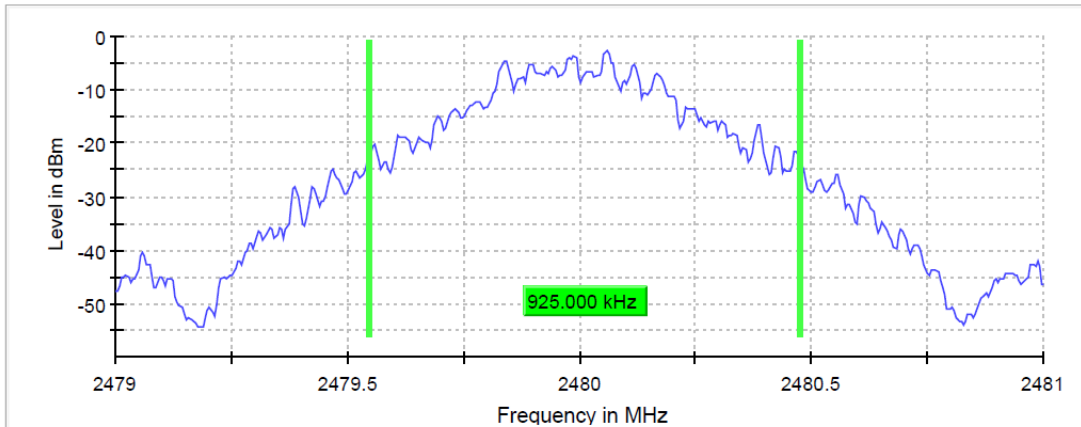
**Lowest Channel**

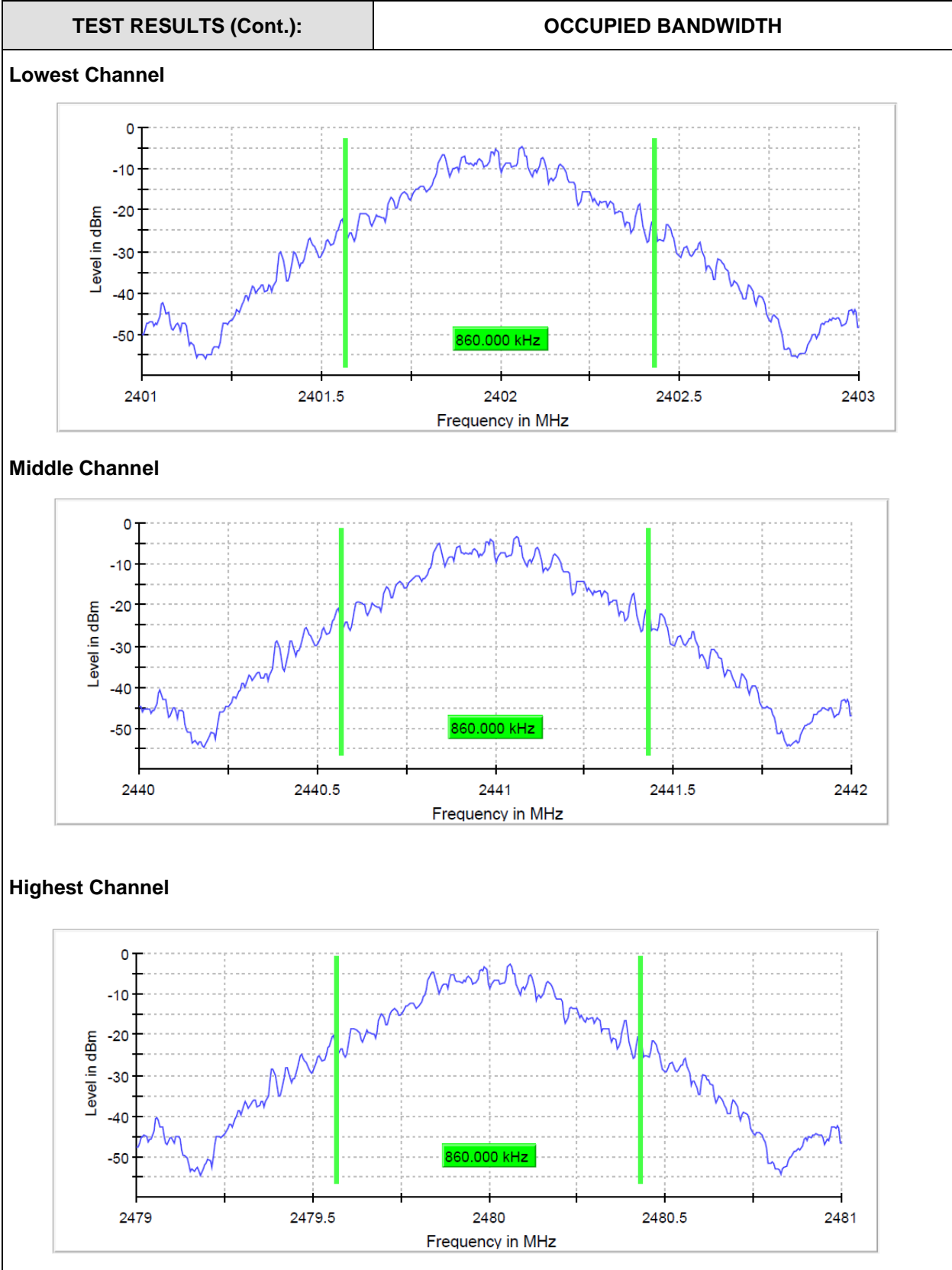


**Middle Channel**

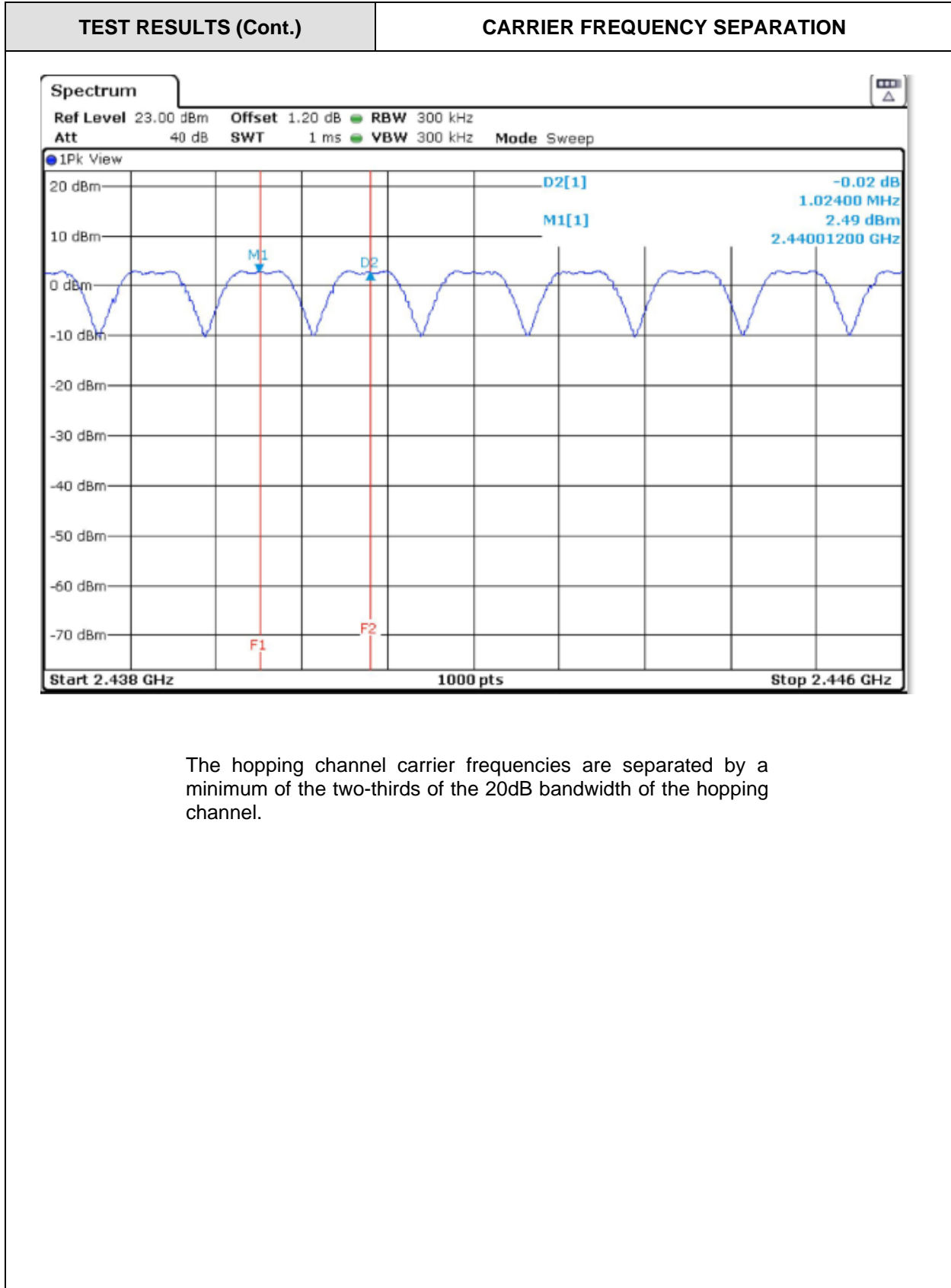


**Highest Channel**





TEST RESULTS (Cont.):	OCCUPIED BANDWIDTH		
<b>Measurement Set- up</b>			
Setting	Instrument Value	Instrument Value	Instrument Value
Start Frequency	2.40100 GHz	2.43900	2.47900
Stop Frequency	2.40300 GHz	2.44100	2.48100
Span	2.000 MHz	2.000 MHz	2.000 MHz
RBW	10.000 kHz	10.000 kHz	10.000 kHz
VBW	30.000 kHz	30.000 kHz	30.000 kHz
Sweep Points	400	400	400
Sweep time	189.648 us	189.648 us	189.648 us
Reference Level	10.000 dBm	10.000 dBm	10.000 dBm
Attenuation	30.000 dB	30.000 dB	30.000 dB
Detector	MaxPeak	MaxPeak	MaxPeak
Sweep Count	500	500	500
Filter	3 dB	3 dB	3 dB
Trace Mode	Max Hold	Max Hold	Max Hold
Sweep type	FFT	FFT	FFT
Preamp	off	off	off
Stable mode	Trace	Trace	Trace
Stable value	0.30 dB	0.30 dB	0.30 dB
Run	5 / max.150	5 / max.150	6 / max.150
Stable	3 / 3	3 / 3	3 / 3
Max Stable Difference	0.05 dB	0.05 dB	0.07 dB



<b>TESTED SAMPLES:</b>	S/01
<b>TESTED CONDITIONS MODES:</b>	TC#02
<b>TEST RESULTS:</b>	PASS

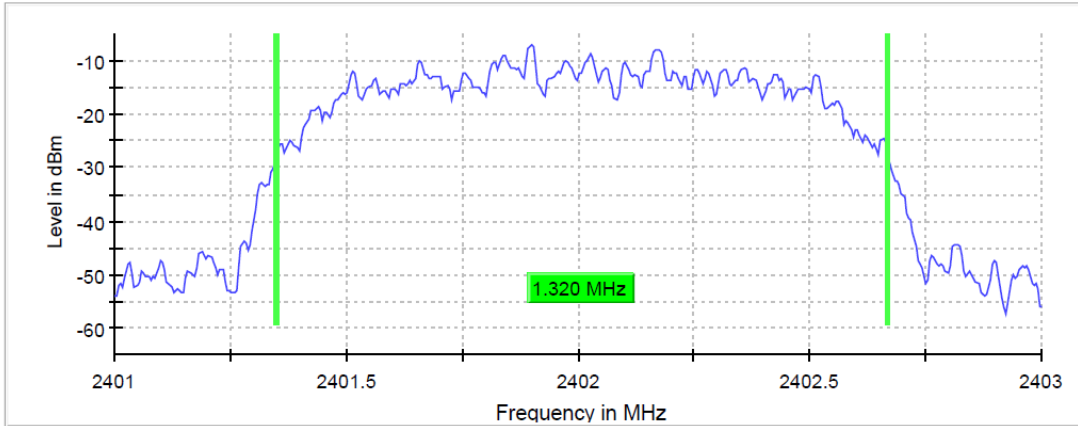
	Lowest frequency 2402 MHz	Middle frequency 2441 MHz	Highest frequency 2480 MHz
20dB bandwidth (MHz)	1.320	1.320	1.320
Occupied bandwidth (MHz)	1.165	1.165	1.170

**Measurement Setup**

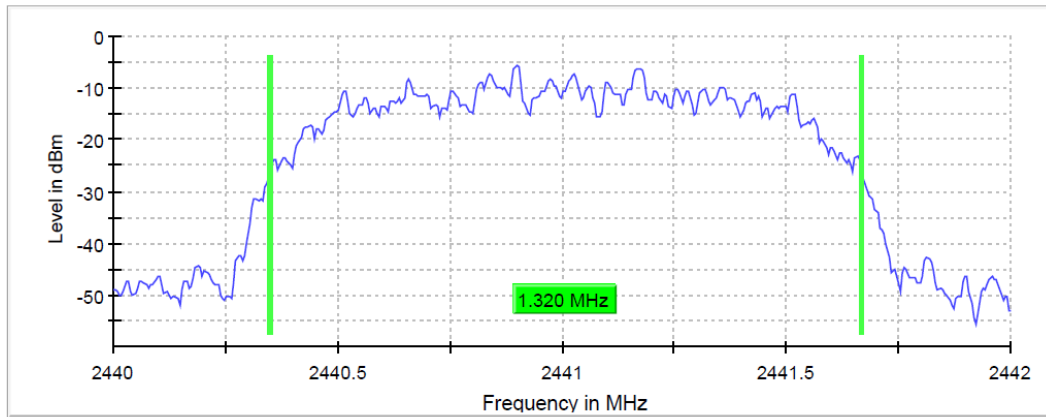
Setting	Instrument Value	Instrument Value	Instrument Value
Start Frequency	2.40100 GHz	2.43900 GHz	2.47900 GHz
Stop Frequency	2.40300 GHz	2.44100 GHz	2.48100 GHz
Span	2.00 MHz	2.00 MHz	2.00 MHz
RBW	10.000 KHz	10.000 KHz	10.000 KHz
VBW	30.000 kHz	30.000 kHz	30.000 kHz
Sweep Points	400	400	400
Sweep time	189.648 $\mu$ s	189.648 $\mu$ s	189.648 $\mu$ s
Reference Level	10.000 dBm	10.000 dBm	10.000 dBm
Attenuation	30.000 dB	30.000 dB	30.000 dB
Detector	MaxPeak	MaxPeak	MaxPeak
Sweep Count	200	200	200
Filter	3 dB	3 dB	3 dB
Trace Mode	Max Hold	Max Hold	Max Hold
Sweep type	FFT	FFT	FFT
Preamp	off	off	off
Stable mode	Trace	Trace	Trace
Stable value	0.50 dB	0.50 dB	0.50 dB
Run	10 / max. 150	7 / max. 150	8 / max. 150
Stable	5 / 5	5 / 5	5 / 5
Max Stable	0.10 dB	0.10 dB	0.07 dB

**TEST RESULTS (Cont.):** **20 dB BANDWIDTH**

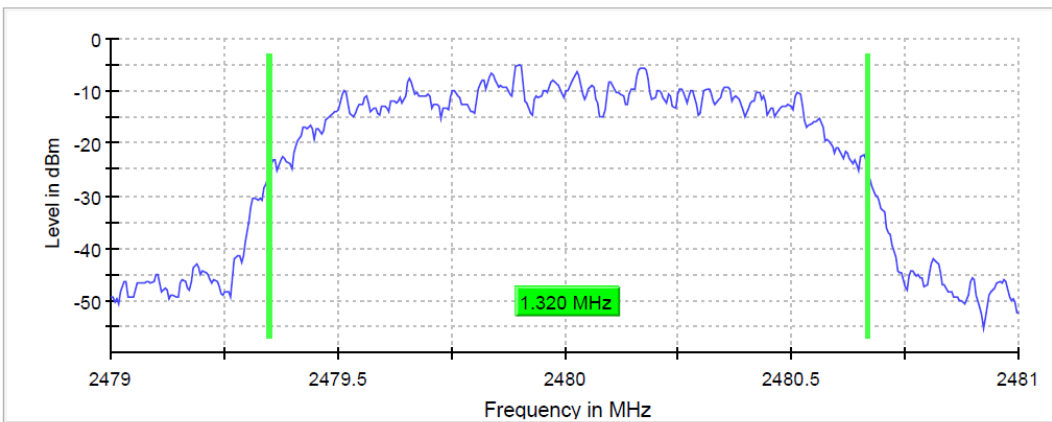
**Lowest Channel**



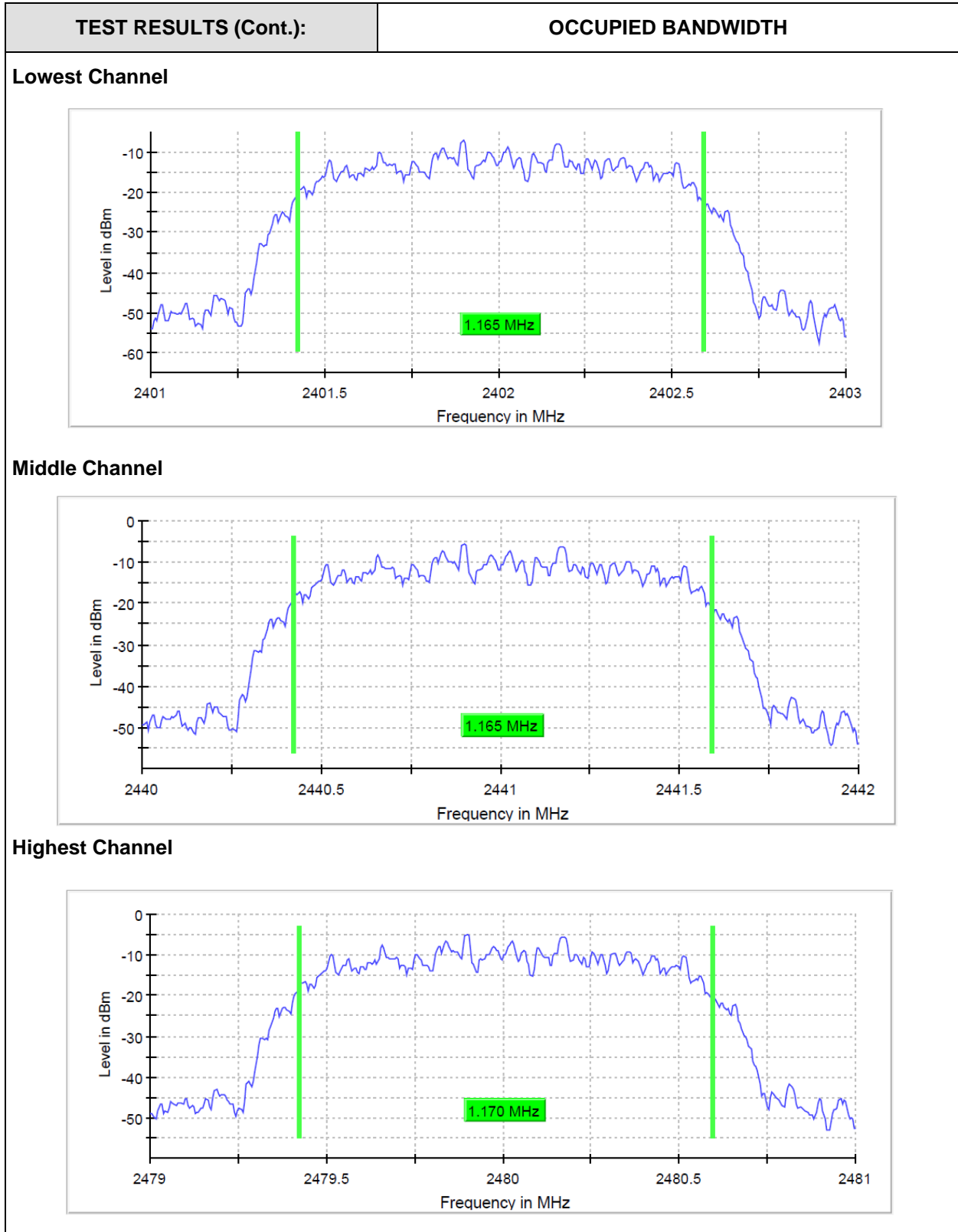
**Middle Channel**



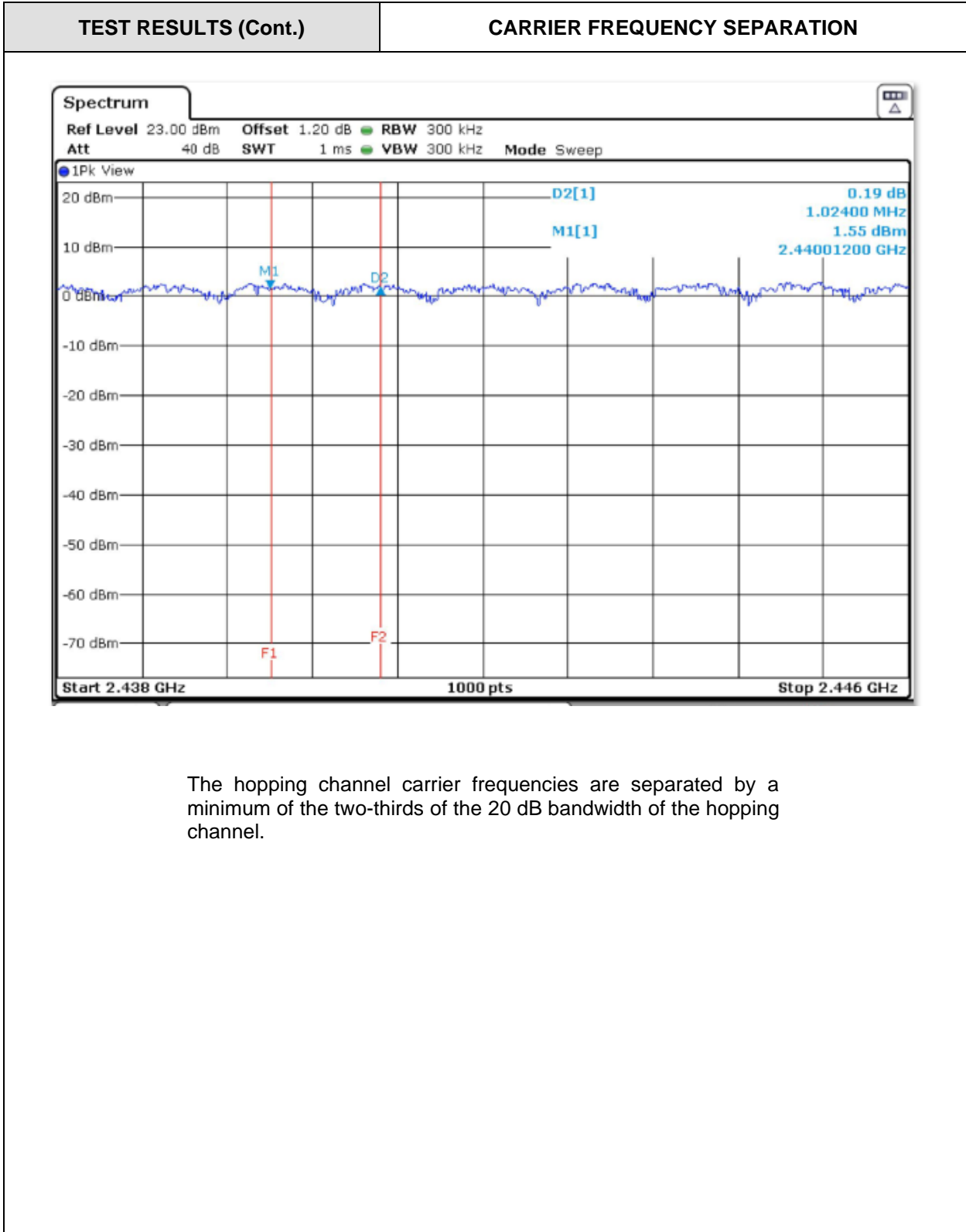
**Highest Channel**







TEST RESULTS (Cont.):	OCCUPIED BANDWIDTH		
<b>Measurement Set- up</b>			
Setting	Instrument Value	Instrument Value	Instrument Value
Start Frequency	2.40100 GHz	2.43900 GHz	2.47900
Stop Frequency	2.40300 GHz	2.44100 GHz	2.48100
Span	2.000 MHz	2.000 MHz	2.000 MHz
RBW	10.000 kHz	10.000 kHz	10.000 kHz
VBW	30.000 kHz	30.000 kHz	30.000 kHz
Sweep Points	400	400	400
Sweep time	189.648 us	189.648 us	189.648 us
Reference Level	10.000 dBm	10.000 dBm	10.000 dBm
Attenuation	30.000 dB	30.000 dB	30.000 dB
Detector	MaxPeak	MaxPeak	MaxPeak
Sweep Count	500	500	500
Filter	3 dB	3 dB	3 dB
Trace Mode	Max Hold	Max Hold	Max Hold
Sweep type	FFT	FFT	FFT
Preamp	off	off	off
Stable mode	Trace	Trace	Trace
Stable value	0.30 dB	0.30 dB	0.30 dB
Run	5 / max. 150	5 / max. 150	5 / max. 150
Stable	3 / 3	3 / 3	3 / 3
Max Stable Difference	0.09 dB	0.06 dB	0.30 dB

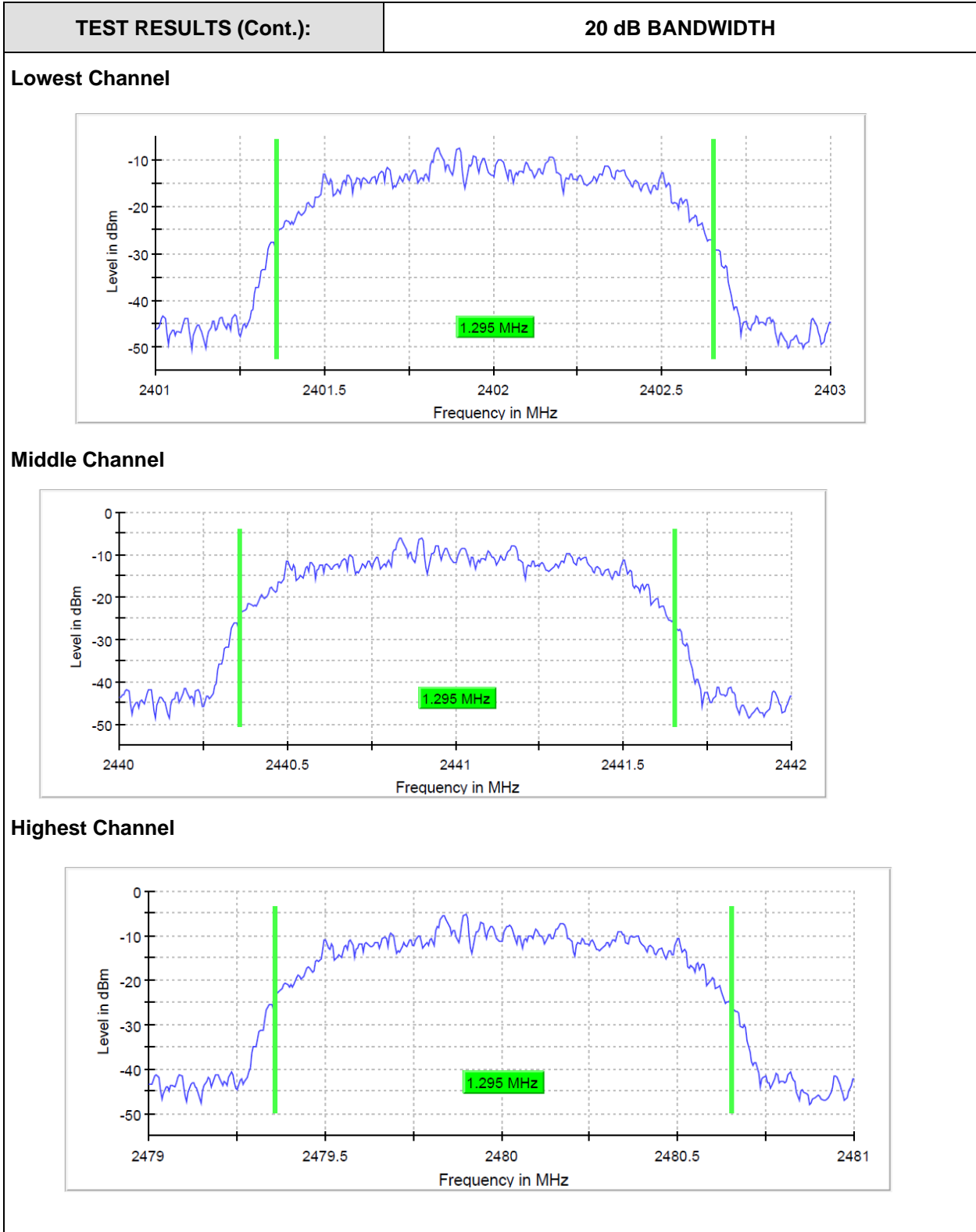


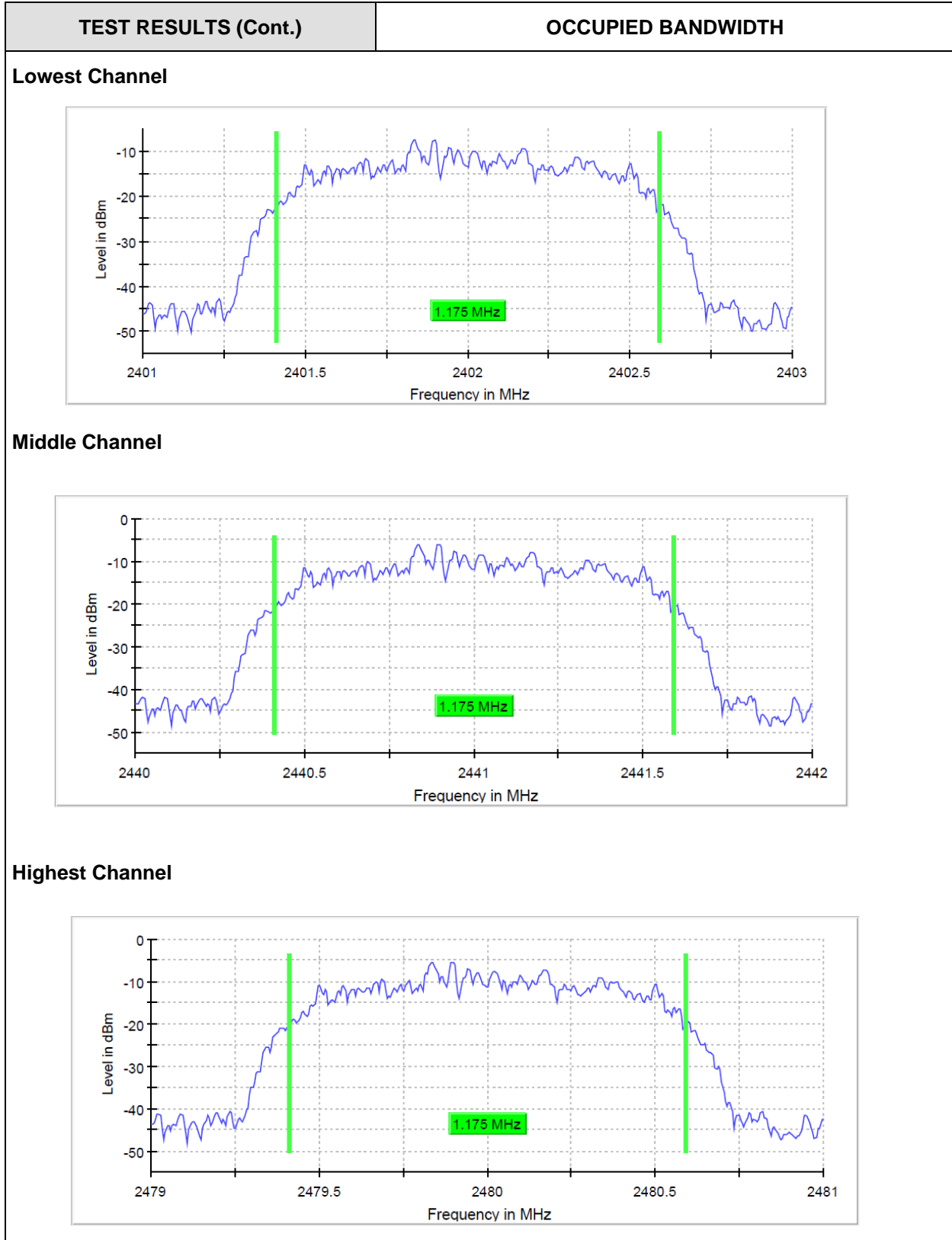
<b>TESTED SAMPLES:</b>	S/01
<b>TESTED CONDITIONS MODES:</b>	TC#03
<b>TEST RESULTS:</b>	PASS

	Lowest frequency 2402 MHz	Middle frequency 2441 MHz	Highest frequency 2480 MHz
20dB bandwidth (MHz)	1.295	1.295	1.295
Occupied bandwidth (MHz)	1.175	1.175	1.175

**Measurement Setup**

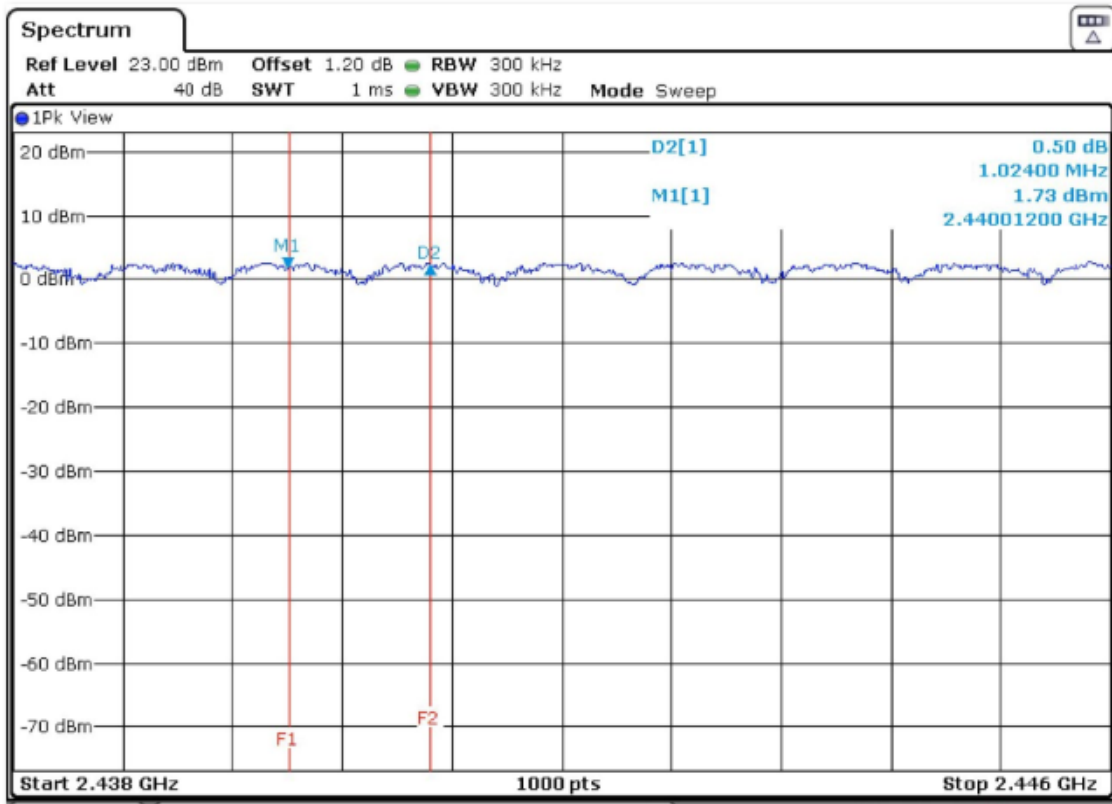
Setting	Instrument Value	Instrument Value	Instrument Value
Start Frequency	2.40100 GHz	2.43900 GHz	2.47900 GHz
Stop Frequency	2.40300 GHz	2.44100 GHz	2.48100 GHz
Span	2.00 MHz	2.00 MHz	2.00 MHz
RBW	10.000 kHz	10.000 kHz	10.000 kHz
VBW	30.000 kHz	30.000 kHz	30.000 kHz
Sweep Points	400	400	400
Sweep time	189.648 us	189.648 us	189.648 us
Reference Level	10.000 dBm	10.000 dBm	10.000 dBm
Attenuation	30.000 dB	30.000 dB	30.000 dB
Detector	MaxPeak	MaxPeak	MaxPeak
Sweep Count	200	200	200
Filter	3 dB	3 dB	3 dB
Trace Mode	Max Hold	Max Hold	Max Hold
Sweep type	FFT	FFT	FFT
Preamplifier	off	off	off
Stable mode	Trace	Trace	Trace
Stable value	0.50 dB	0.50 dB	0.50 dB
Run	7 / max. 150	7 / max. 150	8 / max. 150
Stable	5 / 5	3 / 3	5 / 5
Max Stable	0.07 dB	0.04 dB	0.09 dB





TEST RESULTS (Cont.):	OCCUPIED BANDWIDTH		
<b>Measurement Set- up</b>			
Setting	Instrument Value	Instrument Value	Instrument Value
Start Frequency	2.40100 GHz	2.43900 GHz	2.47900
Stop Frequency	2.40300 GHz	2.44100 GHz	2.48100
Span	2.000 MHz	2.000 MHz	2.000 MHz
RBW	10.000 kHz	10.000 kHz	10.000 kHz
VBW	30.000 kHz	30.000 kHz	30.000 kHz
Sweep Points	400	400	400
Sweep time	189.648 us	189.648 us	189.648 us
Reference Level	10.000 dBm	10.000 dBm	10.000 dBm
Attenuation	30.000 dB	30.000 dB	30.000 dB
Detector	MaxPeak	MaxPeak	MaxPeak
Sweep Count	500	500	500
Filter	3 dB	3 dB	3 dB
Trace Mode	Max Hold	Max Hold	Max Hold
Sweep type	FFT	FFT	FFT
Preamp	off	off	off
Stable mode	Trace	Trace	Trace
Stable value	0.30 dB	0.30 dB	0.30 dB
Run	5 / max. 150	5 / max. 150	5 / max. 150
Stable	3 / 3	3 / 3	3 / 3
Max Stable Difference	0.11 dB	0.10 dB	0.10 dB

<b>TEST RESULTS (Cont.)</b>	<b>CARRIER FREQUENCY SEPARATION</b>
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The hopping channel carrier frequencies are separated by a minimum of the two-thirds of the 20 dB bandwidth of the hopping channel.

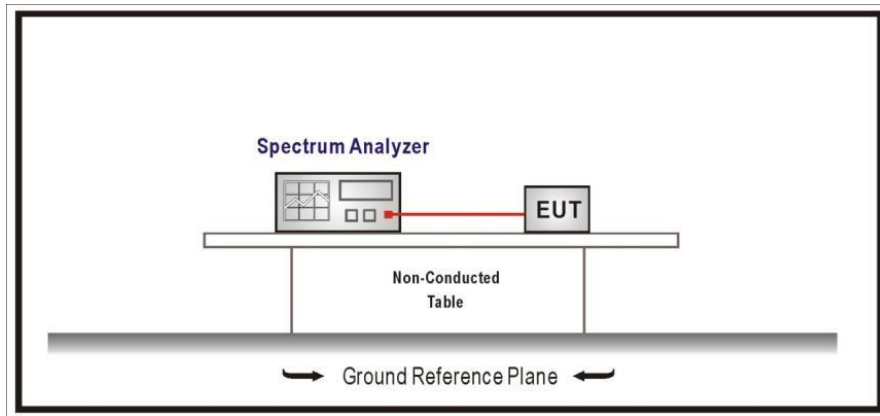


## TEST B.2: NUMBER OF HOPPING CHANNELS

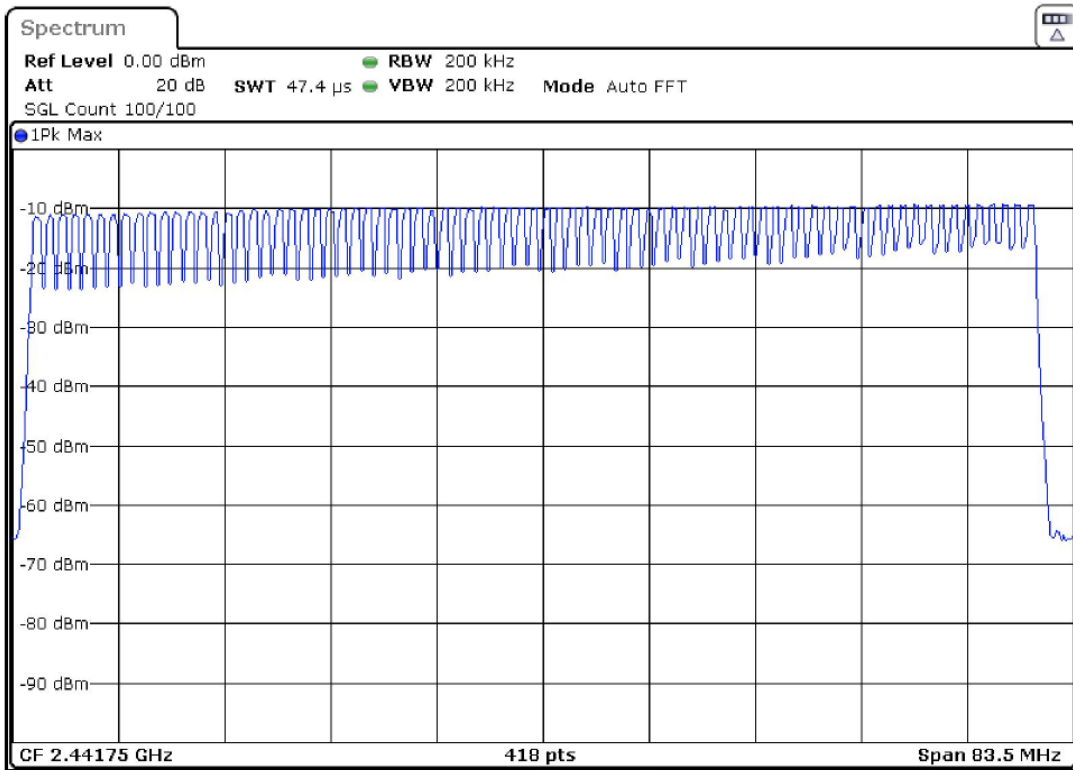
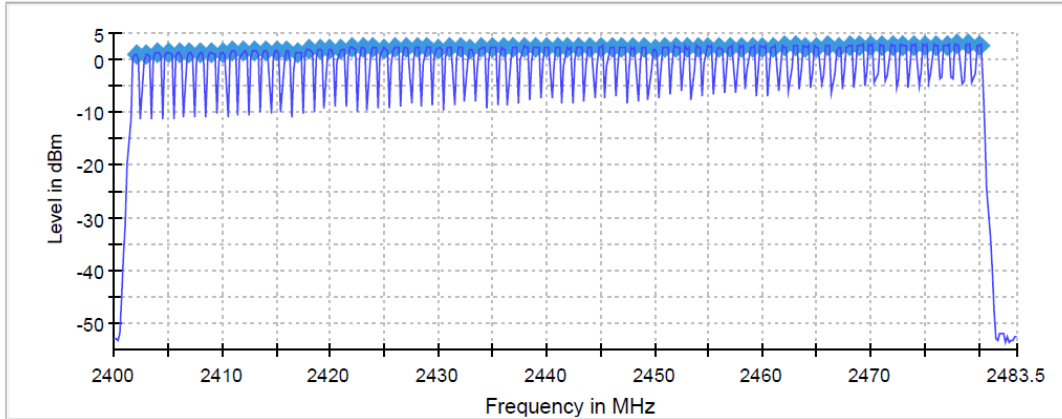
<b>LIMITS:</b>	Product standard:	Part 15 Subpart C §15.247 and RSS-247
	Test standard:	Part 15 Subpart C §15.247(a) (1) (iii) and RSS-247 5.1 (d)

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

### TEST SETUP:

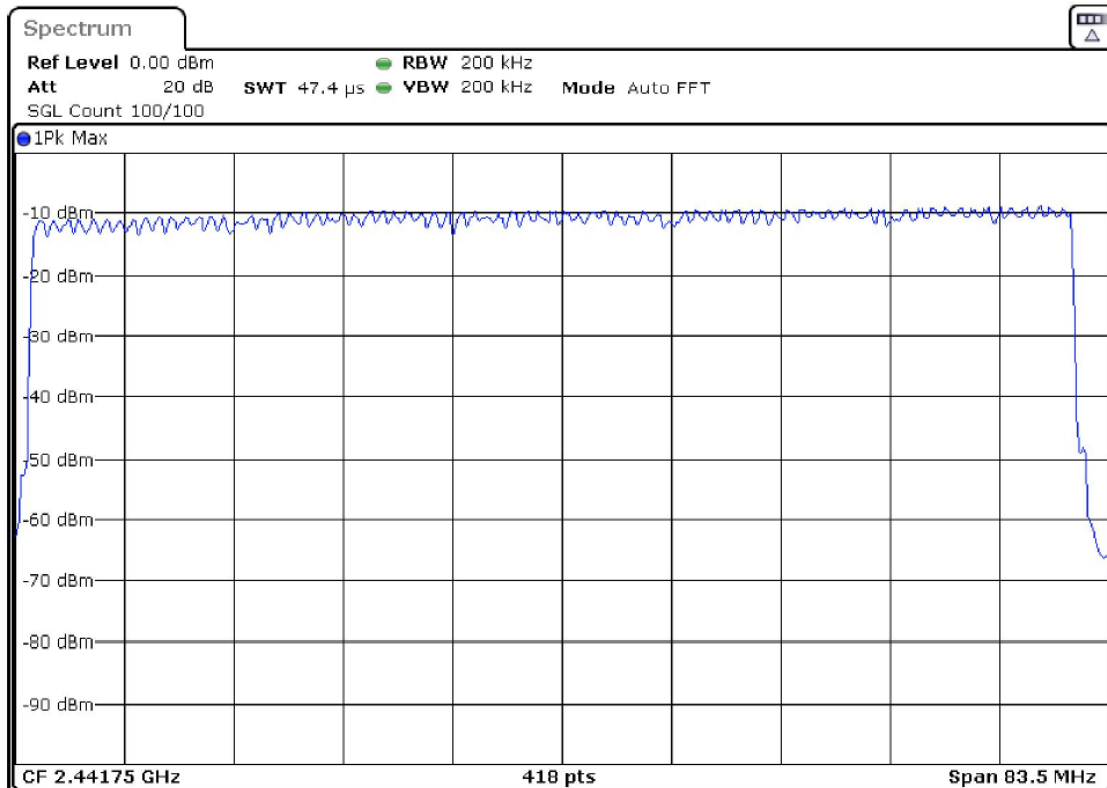
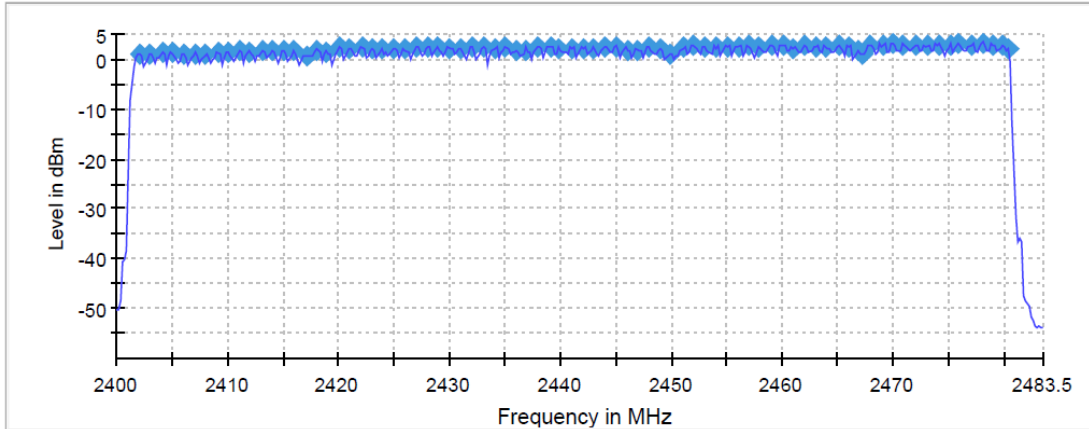


<b>TESTED SAMPLES:</b>	S/01
<b>TESTED CONDITIONS MODES:</b>	TC#01
<b>TEST RESULTS:</b>	PASS



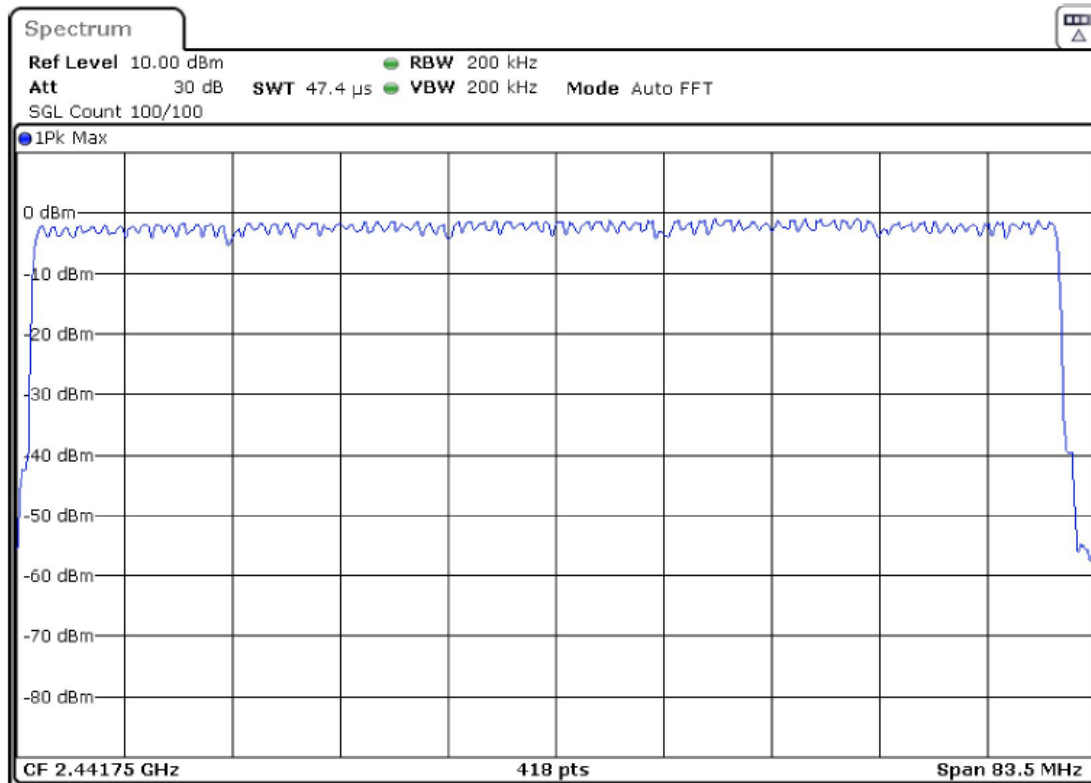
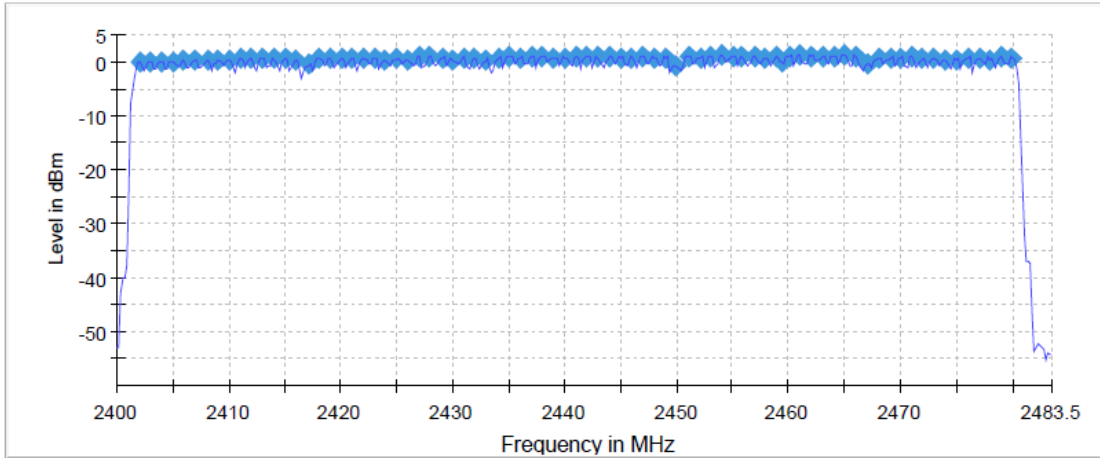
Number of Hopping Frequencies: 79

<b>TESTED SAMPLES:</b>	S/01
<b>TESTED CONDITIONS MODES:</b>	TC#02
<b>TEST RESULTS:</b>	PASS



Number of Hopping Frequencies: 81

<b>TESTED SAMPLES:</b>	S/01
<b>TESTED CONDITIONS MODES:</b>	TC#03
<b>TEST RESULTS:</b>	PASS



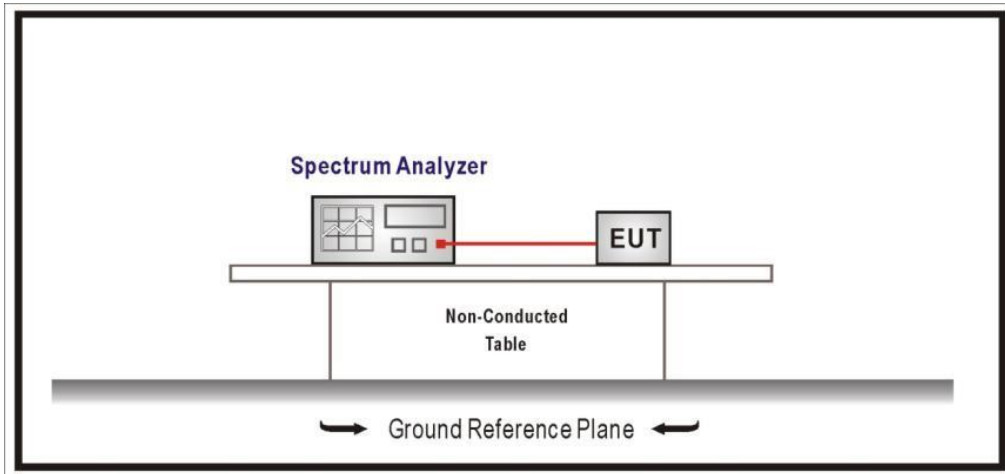
Number of Hopping Frequencies: 79

**TEST B.3: TIME OF OCCUPANCY (DWELL TIME)**

<b>LIMITS:</b>	Product standard:	Part 15 Subpart C §15.247 and RSS-247
	Test standard:	Part 15 Subpart C §15.247(a)(1)(iii) and RSS-247 5.1(d)

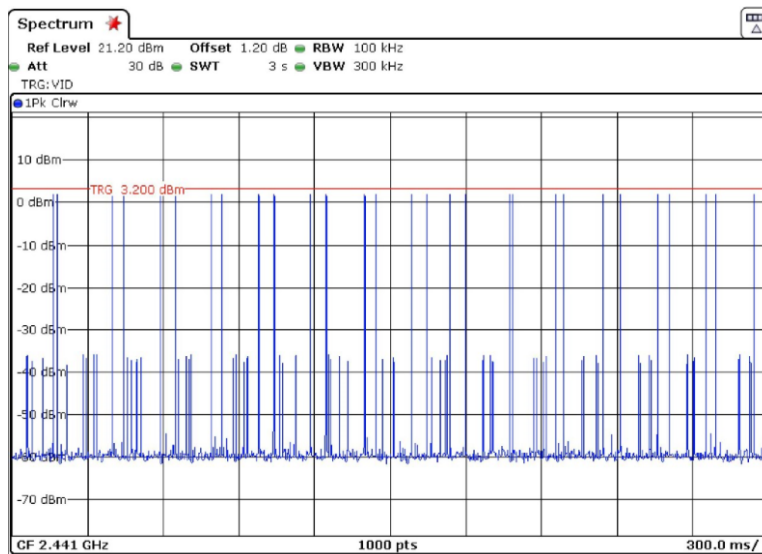
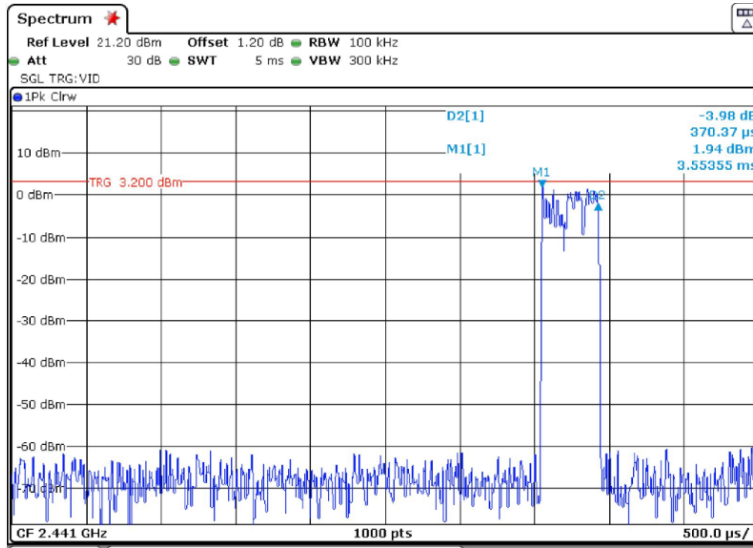
LIMITS  
 The average time of occupancy on any channel shall not be greater than 0.4 seconds (400 ms) within a period of 0.4 seconds multiplied by the number of hopping channels employed =  $0.4 \times 79 = 31.6$  seconds.

**TEST SETUP:**



<b>TESTED SAMPLES:</b>	S/01
<b>TESTED CONDITIONS MODES:</b>	TC#01 (GFSK)
<b>TEST RESULTS:</b>	PASS
<b>TEST RESULTS (Cont.)</b>	<b>PACKET TYPE DH1</b>

Transmit Time per Hop: 0.370 ms



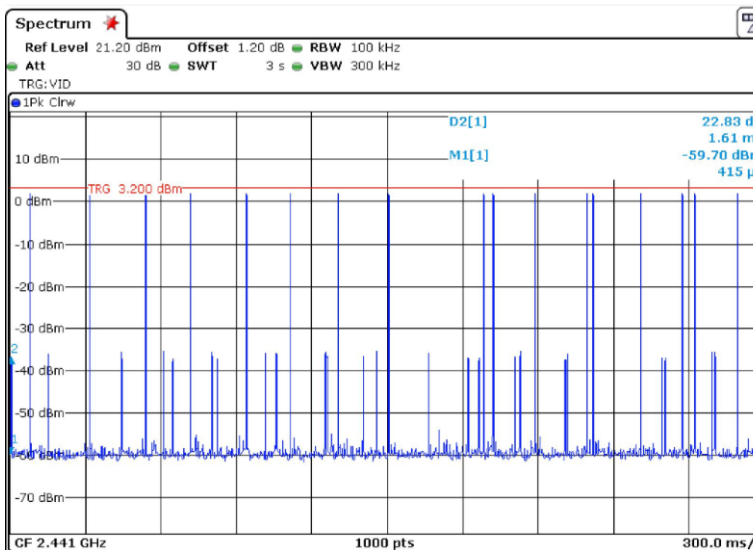
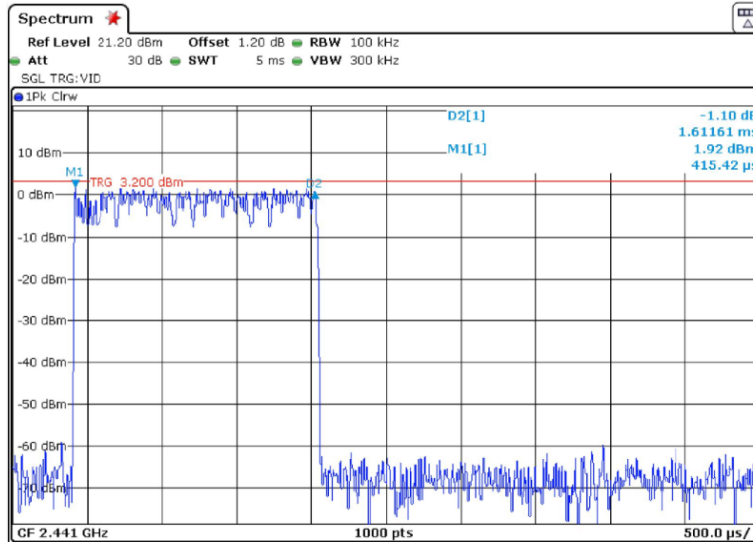
Number of hops over a period of 3 seconds: 28 hops.

Number of hops in the period specified in the requirements = (28 hops) x (31.6 s / 3 s) = 294 hops.

Averaging time of occupancy = 0.370ms x 294 hops = 108.78 ms per 31.6 seconds.

<b>TESTED SAMPLES:</b>	S/01
<b>TESTED CONDITIONS MODES:</b>	TC#01 (GFSK)
<b>TEST RESULTS:</b>	PASS
<b>TEST RESULTS (Cont.)</b>	<b>PACKET TYPE DH3</b>

Transmit Time per Hop: 1.161 ms

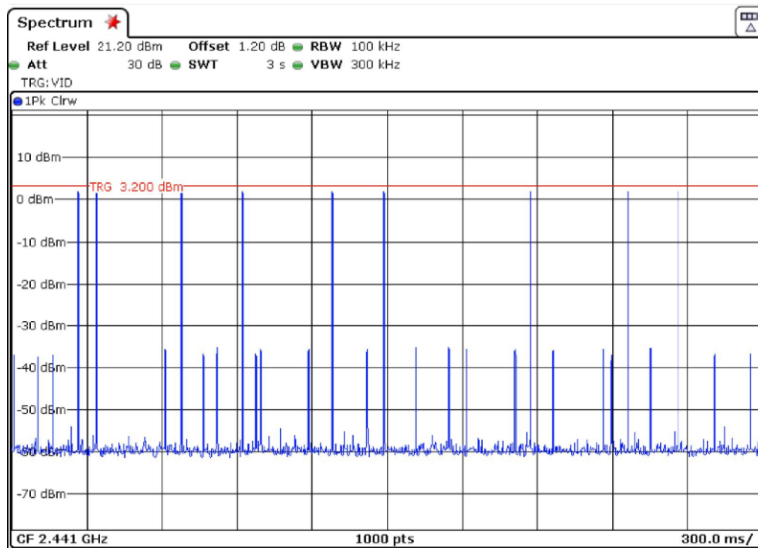
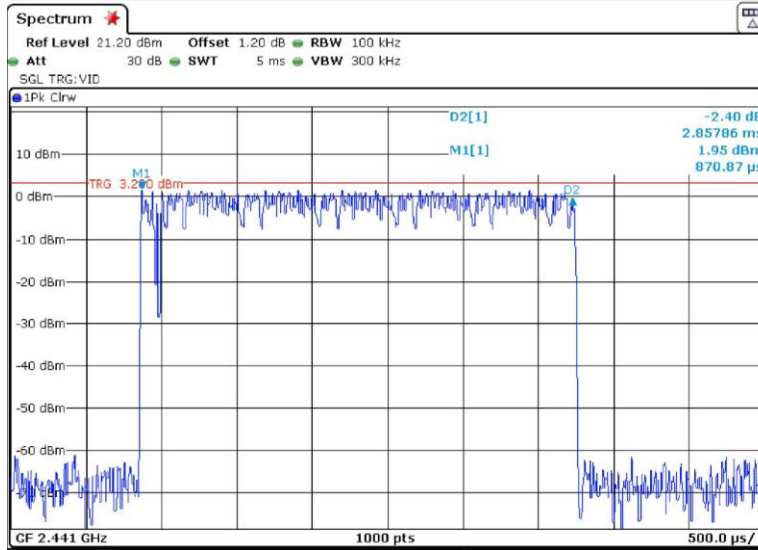


Number of hops over a period of 3 seconds: 14 hops.

Number of hops in the period specified in the requirements = (14 hops) x (31.6 s / 3 s) = 147 hops.  
 Averaging time of occupancy = 1.161 ms x 147 hops = 170.67 ms per 31.6 seconds.

<b>TESTED SAMPLES:</b>	S/01
<b>TESTED CONDITIONS MODES:</b>	TC#01 (GFSK)
<b>TEST RESULTS:</b>	PASS
<b>TEST RESULTS (Cont.)</b>	<b>PACKET TYPE DH5</b>

Transmit Time per Hop: 2.858 ms



Number of hops over a period of 3 seconds: 9 hops.

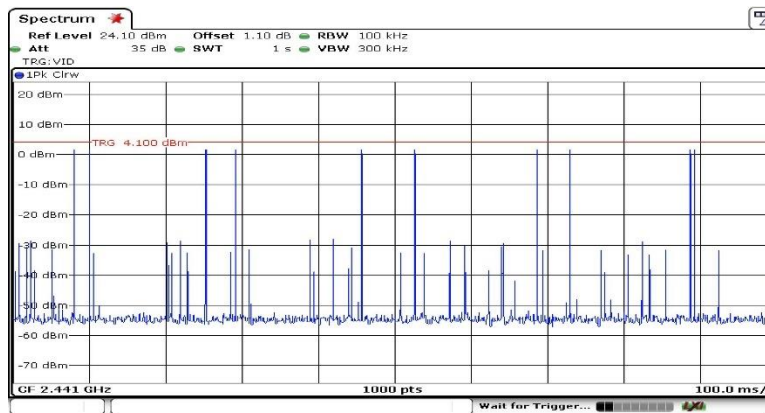
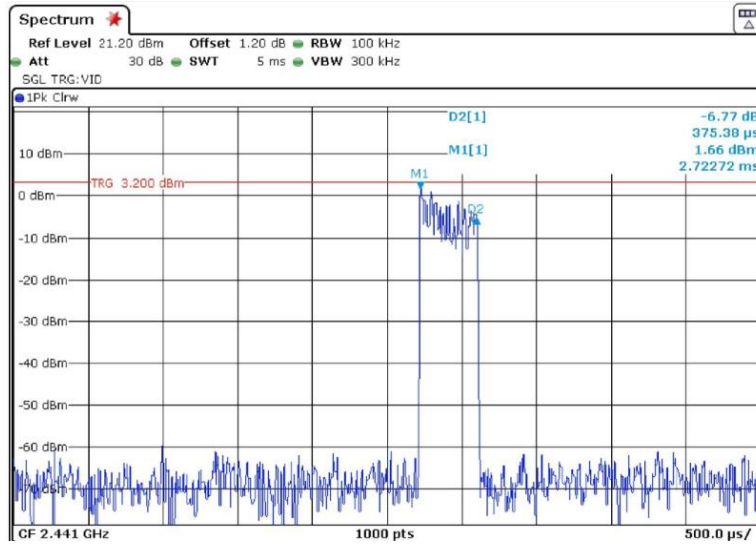
Number of hops in the period specified in the requirements = (9 hops) x (31.6 s / 3 s) = 94 hops.

Averaging time of occupancy = 2.858 ms x 94 hops = 268.652 ms per 31.6 seconds.



<b>TESTED SAMPLES:</b>	S/01
<b>TESTED CONDITIONS MODES:</b>	TC#02 ( $\pi/4$ -DQPSK)
<b>TEST RESULTS:</b>	PASS
<b>TEST RESULTS (Cont.)</b>	<b>PACKET TYPE 2DH1</b>

Transmit Time per Hop: 0.375 ms



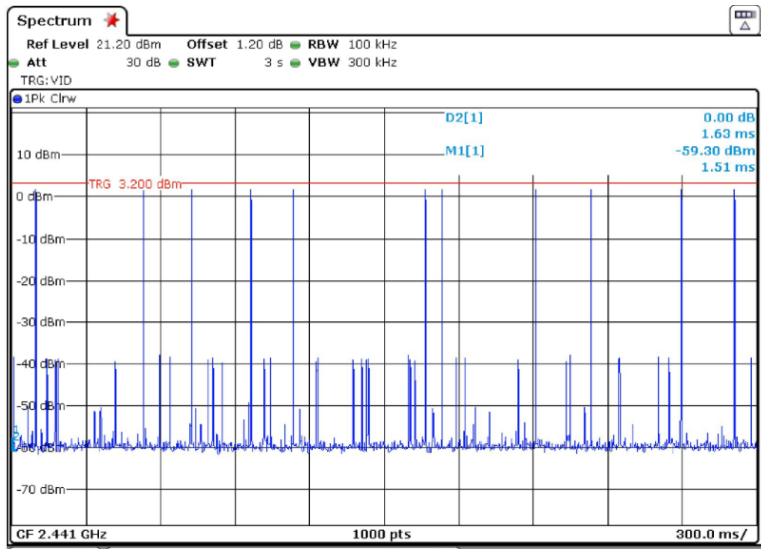
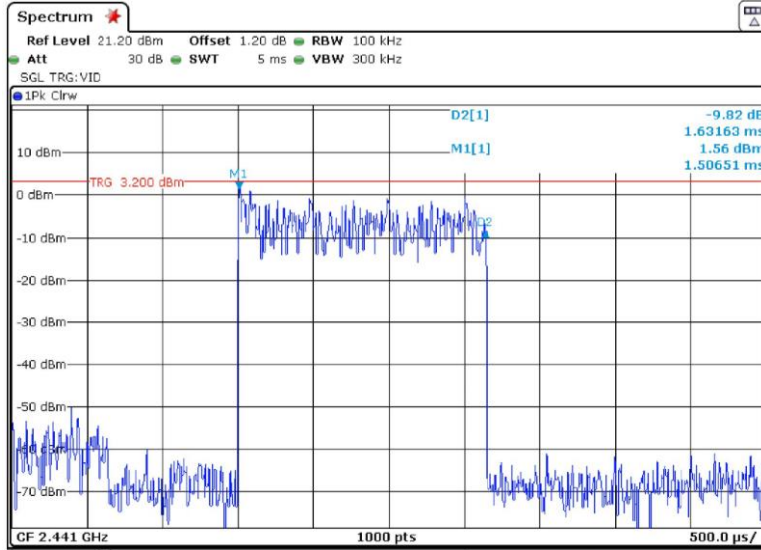
Number of hops over a period of 3 seconds: 31 hops.

Number of hops in the period specified in the requirements = (31 hops) x (31.6 s / 3 s) = 326 hops.

Averaging time of occupancy = 0.375 ms x 326 hops = 122.25 ms per 31.6 seconds.

<b>TESTED SAMPLES:</b>	S/01
<b>TESTED CONDITIONS MODES:</b>	TC#02 ( $\pi/4$ -DQPSK)
<b>TEST RESULTS:</b>	PASS
<b>TEST RESULTS (Cont.)</b>	<b>PACKET TYPE 2DH3</b>

Transmit Time per Hop: 1.631 ms



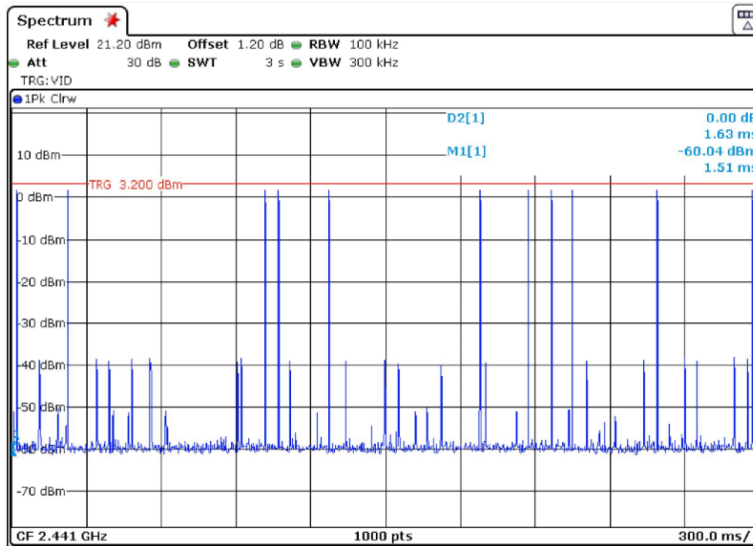
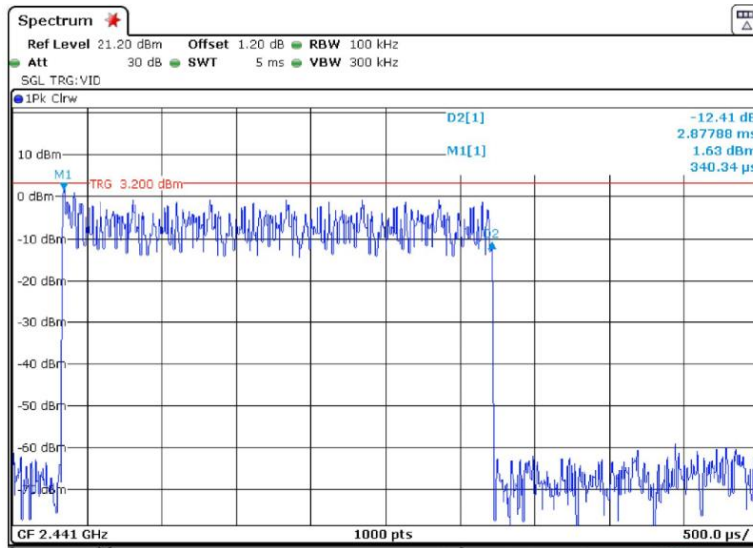
Number of hops over a period of 3 seconds: 10 hops.

Number of hops in the period specified in the requirements = (10 hops) x (31.6 s / 3 s) = 105 hops.

Averaging time of occupancy = 1.631 ms x 105 hops = 171.26 ms per 31.6 seconds.

<b>TESTED SAMPLES:</b>	S/01
<b>TESTED CONDITIONS MODES:</b>	TC#02 ( $\pi/4$ -DQPSK)
<b>TEST RESULTS:</b>	PASS
<b>TEST RESULTS (Cont.)</b>	<b>PACKET TYPE 2DH5</b>

Transmit Time per Hop: 2.877 ms

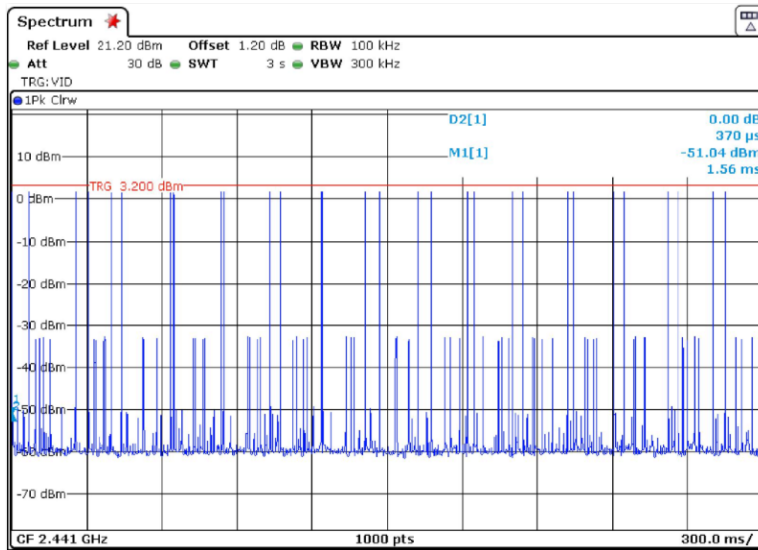
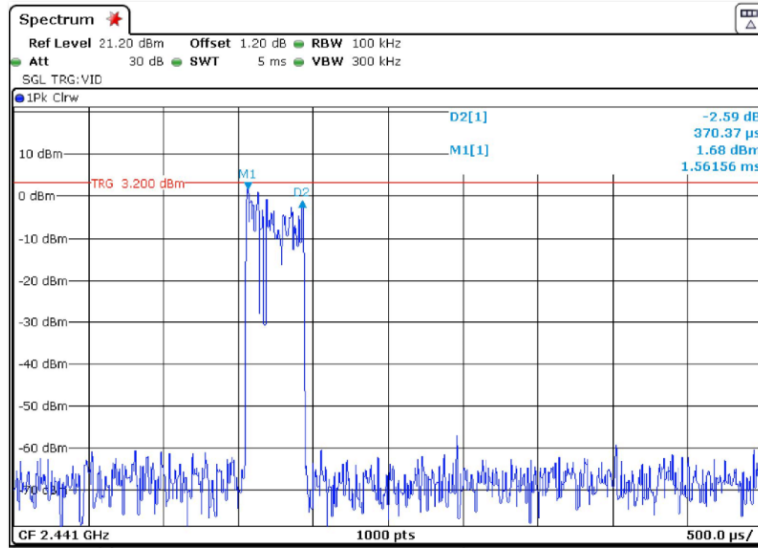


Number of hops over a period of 3 seconds: 10 hops.

Number of hops in the period specified in the requirements = (10 hops) x (31.6 s / 3 s) = 105 hops.  
 Averaging time of occupancy = 2.877 ms x 105 hops = 302.08 ms per 31.6 seconds.

<b>TESTED SAMPLES:</b>	S/01
<b>TESTED CONDITIONS MODES:</b>	TC#03 (8DPSK)
<b>TEST RESULTS:</b>	PASS
<b>TEST RESULTS (Cont.)</b>	<b>PACKET TYPE 3DH1</b>

Transmit Time per Hop: 0.370 ms

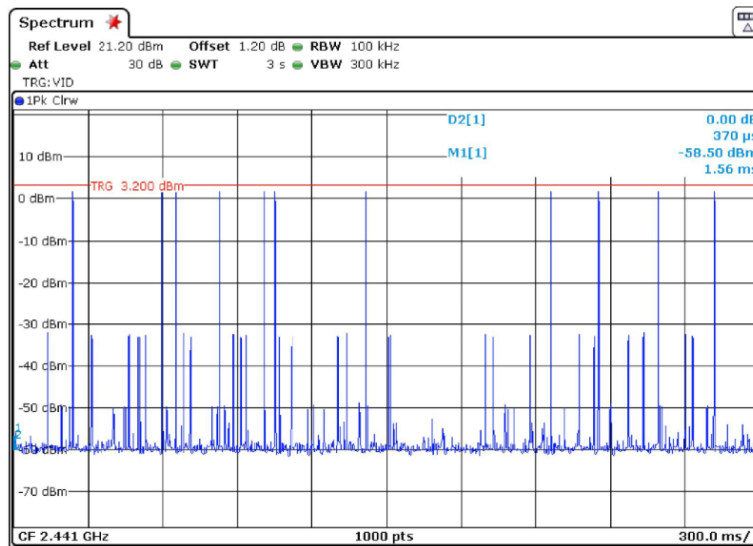
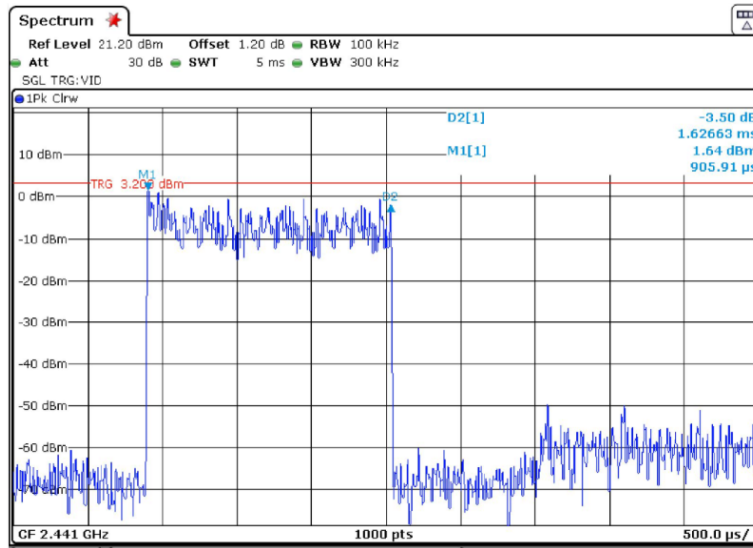


Number of hops over a period of 3 seconds: 25 hops.

Number of hops in the period specified in the requirements = (25 hops) x (31.6 s / 3 s) = 263 hops.  
 Averaging time of occupancy = 0.370 ms x 263 hops = 97.31 ms per 31.6 seconds.

<b>TESTED SAMPLES:</b>	S/01
<b>TESTED CONDITIONS MODES:</b>	TC#03 (8DPSK)
<b>TEST RESULTS:</b>	PASS
<b>TEST RESULTS (Cont.)</b>	<b>PACKET TYPE 3DH3</b>

Transmit Time per Hop: 1.626 ms

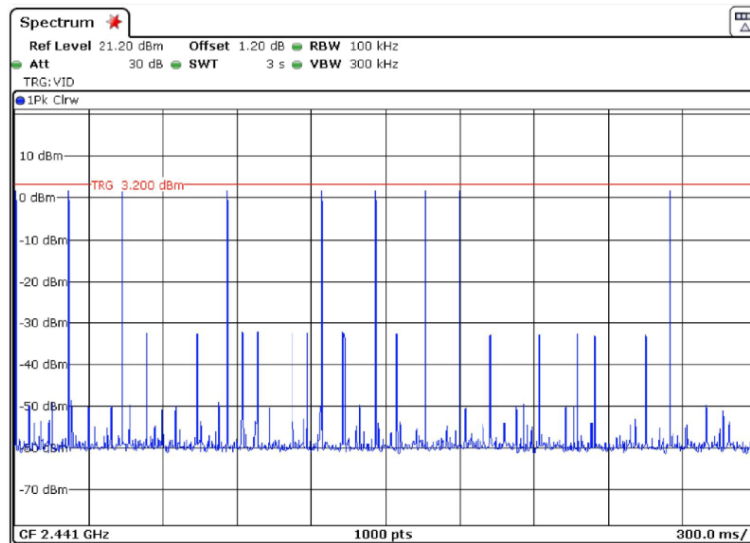
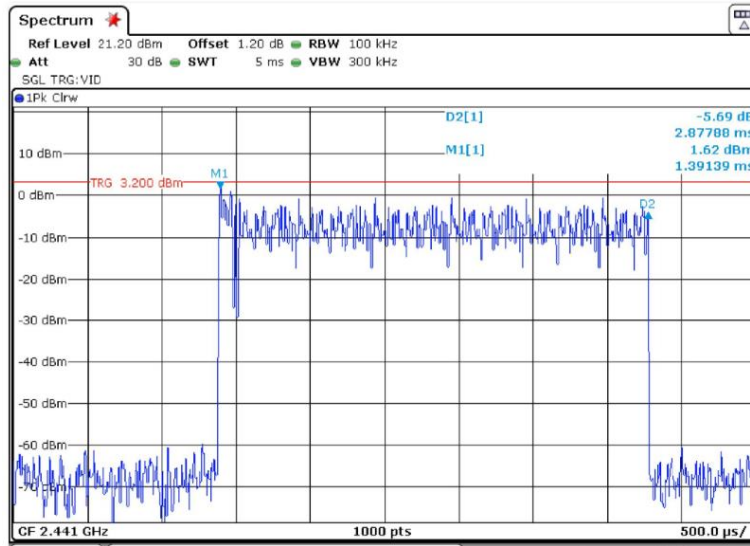


Number of hops over a period of 3 seconds: 10 hops.

Number of hops in the period specified in the requirements = (10 hops) x (31.6 s / 3 s) = 105 hops.  
 Averaging time of occupancy = 1.626 ms x 105 hops = 170.73 ms per 31.6 seconds.

<b>TESTED SAMPLES:</b>	S/01
<b>TESTED CONDITIONS MODES:</b>	TC#03 (8DPSK)
<b>TEST RESULTS:</b>	PASS
<b>TEST RESULTS (Cont.)</b>	<b>PACKET TYPE 3DH5</b>

Transmit Time per Hop: 2.877 ms



Number of hops over a period of 3 seconds: 7 hops.

Number of hops in the period specified in the requirements = (7 hops) x (31.6 s / 3 s) = 73 hops.

Averaging time of occupancy = 2.877 ms x 73 hops = 210.02 ms per 31.6 seconds.

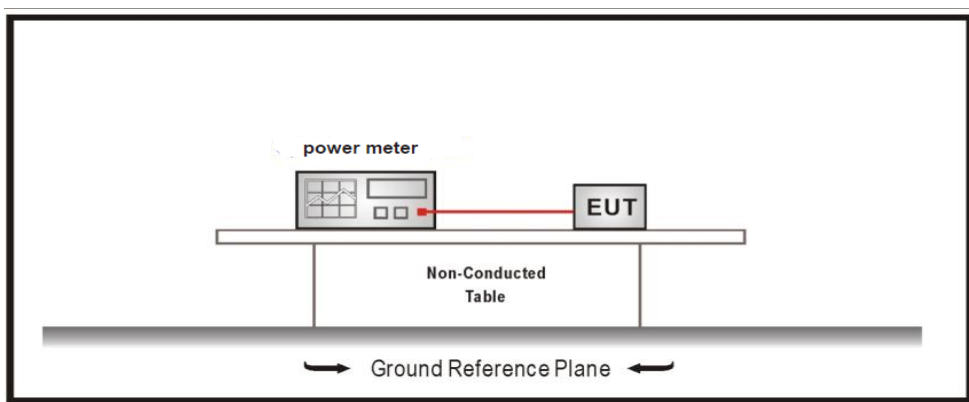
**TEST B.4: MAXIMUM PEAK CONDUCTED OUTPUT POWER AND ANTENNA GAIN**

<b>LIMITS:</b>	Product standard:	Part 15 Subpart C §15.247 and RSS-247
	Test standard:	Part 15 Subpart C §15.247(b) (3) and RSS-247 5.4(b)

LIMITS  
 For Frequency Hopping systems operating in the 2400 – 2483.5 MHz band employing at least 75 hopping channels: 1 watt (30 dBm). (Part 15 Subpart C §15.247).  
 The e.i.r.p. shall not exceed 4 W (RSS-247).

**TEST SETUP**

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

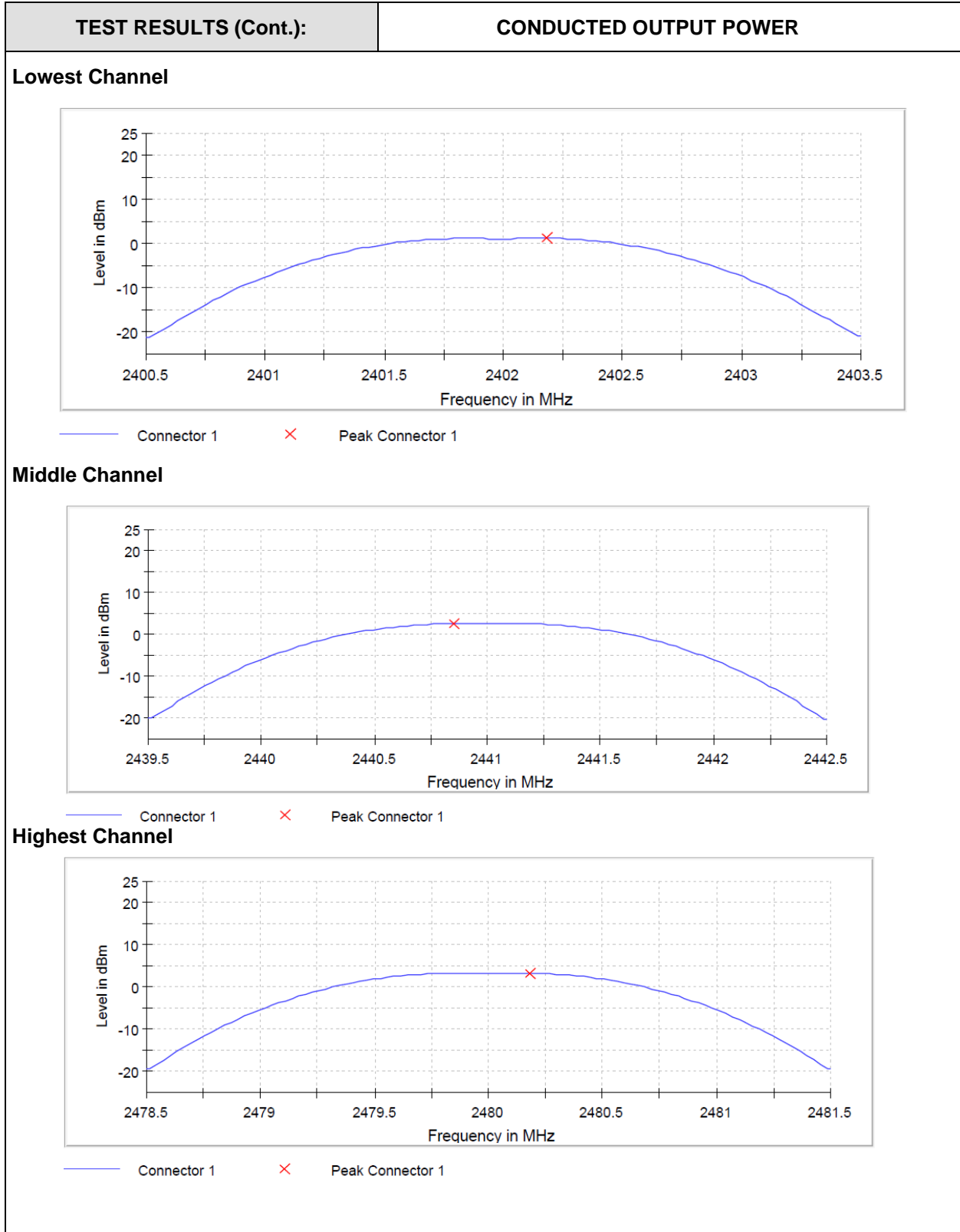


<b>TESTED SAMPLES:</b>	S/01
<b>TESTED CONDITIONS MODES:</b>	TC#01
<b>TEST RESULTS:</b>	PASS

Maximum declared antenna gain: -2.5 dBi

	Lowest frequency 2402 MHz	Middle frequency 2441 MHz	Highest frequency 2480 MHz
Maximum conducted power (dBm)	1.2	2.5	3.1
Maximum EIRP power (dBm)	-1.3	0.0	0.6

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.





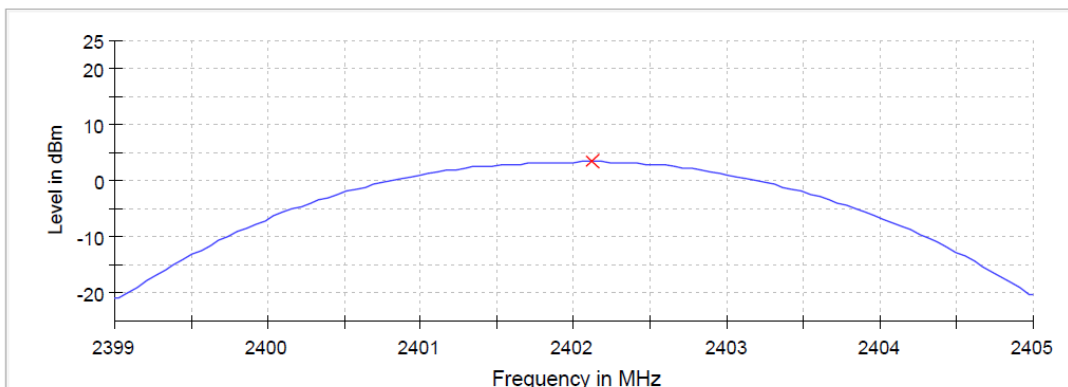
<b>TESTED SAMPLES:</b>	S/01
<b>TESTED CONDITIONS MODES:</b>	TC#02
<b>TEST RESULTS:</b>	PASS

Maximum declared antenna gain: -2.5 dBi

	Lowest frequency 2402 MHz	Middle frequency 2441 MHz	Highest frequency 2480 MHz
Maximum conducted power (dBm)	3.3	4.6	5.5
Maximum EIRP power (dBm)	0.8	2.1	3.0

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.

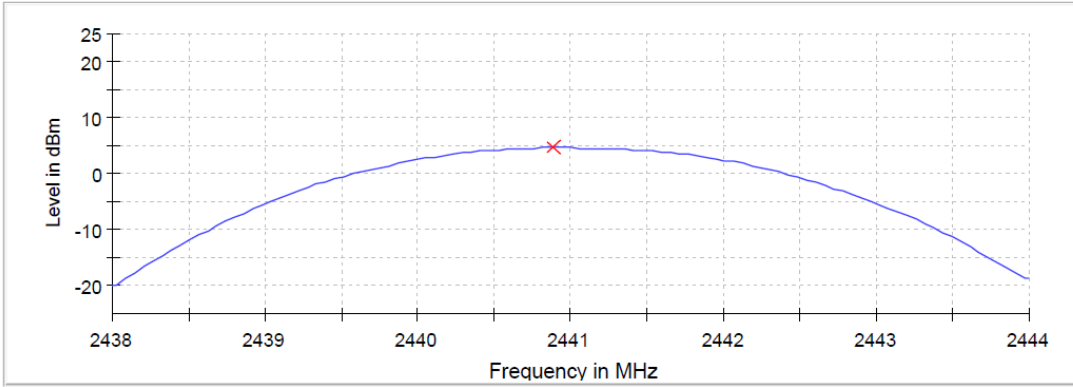
**Lowest Channel**



— Connector 1      × Peak Connector 1

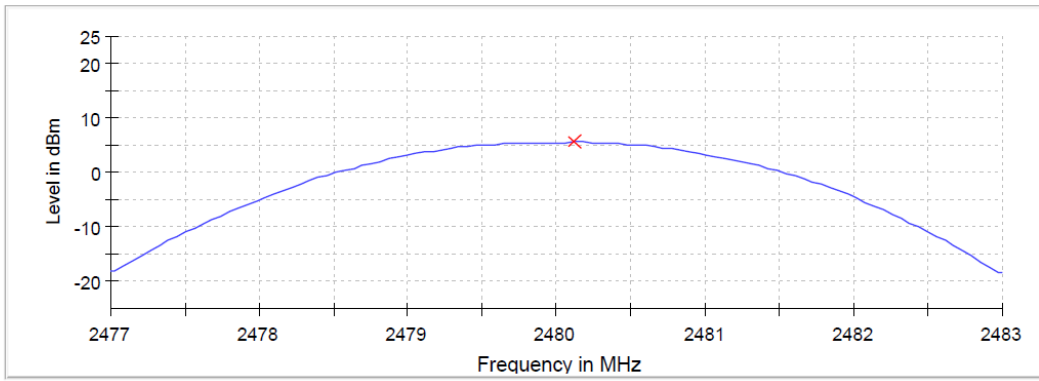
<b>TEST RESULTS (Cont.)</b>	<b>CONDUCTED OUTPUT POWER</b>
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**Middle Channel**



— Connector 1      × Peak Connector 1

**Highest Channel**



— Connector 1      × Peak Connector 1

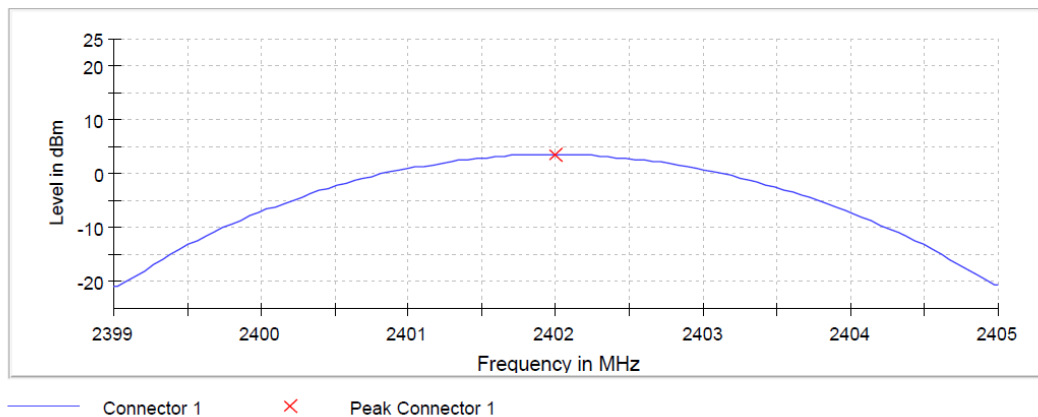
<b>TESTED SAMPLES:</b>	S/01
<b>TESTED CONDITIONS MODES:</b>	TC#03
<b>TEST RESULTS:</b>	PASS

Maximum declared antenna gain: -2.5 dBi

	Lowest frequency 2402 MHz	Middle frequency 2441 MHz	Highest frequency 2480 MHz
Maximum conducted power (dBm)	3.5	4.9	5.3
Maximum EIRP power (dBm)	1.0	2.4	2.8

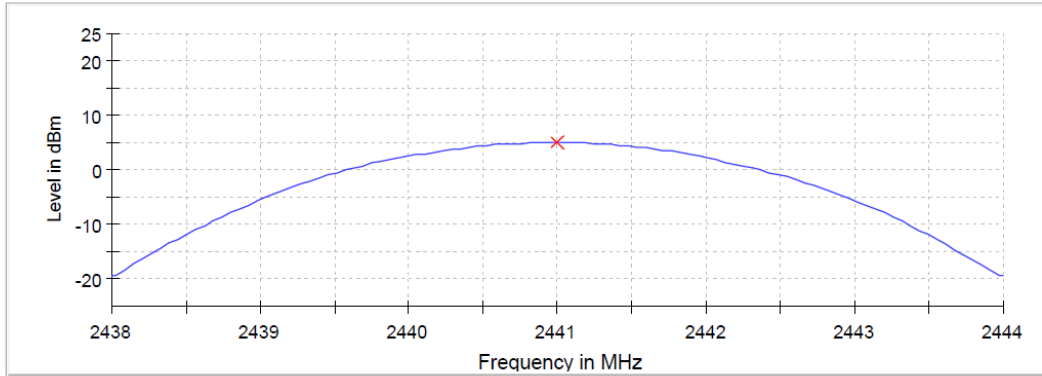
The maximum directional gain of the antenna is less than 6 dBi and therefore the maximum output power is not required to be reduced from the stated values.

**Lowest Channel**



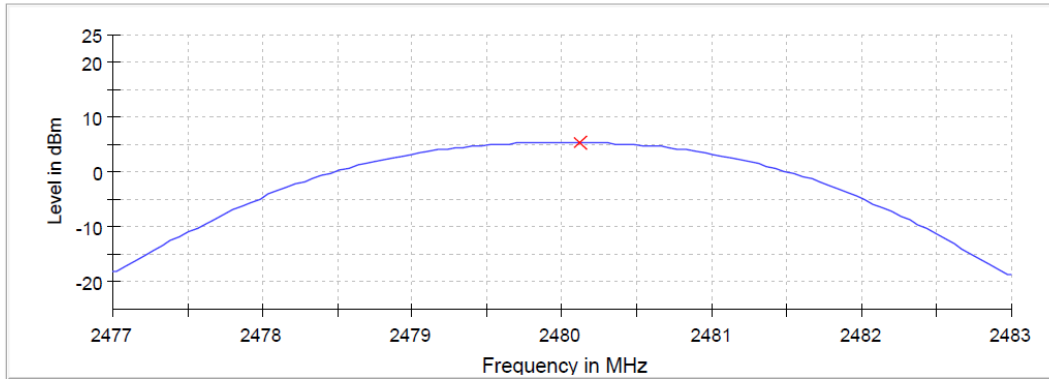
### TEST RESULTS (Cont.)

#### Middle Channel



— Connector 1      × Peak Connector 1

#### Highest Channel



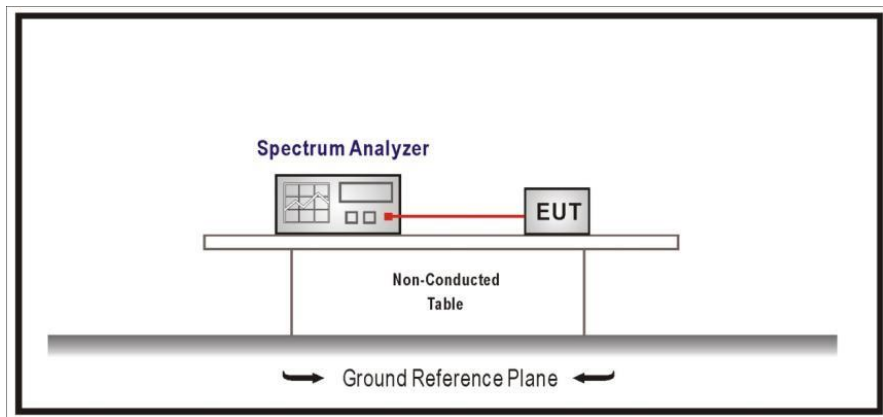
— Connector 1      × Peak Connector 1

**TEST B.5: BAND-EDGE EMISSIONS COMPLIANCE (TRANSMITTER)**

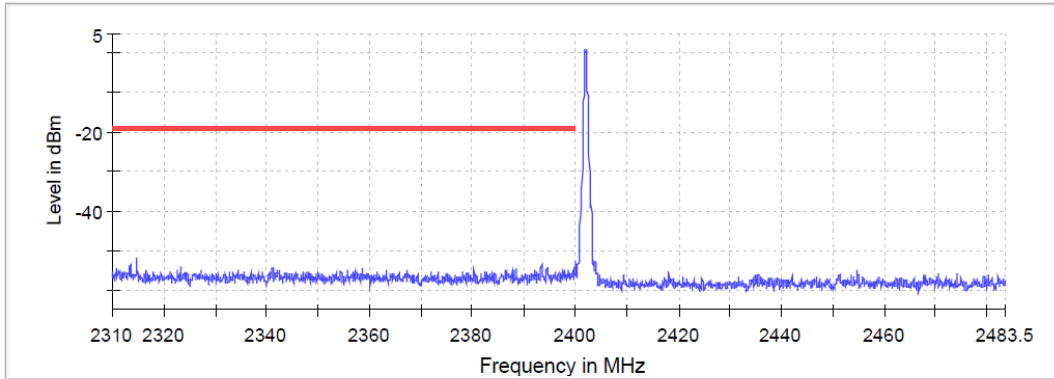
<b>LIMITS:</b>	Product standard:	Part 15 Subpart C §15.247 and RSS-247
	Test standard:	Part 15 Subpart C §15.247(d) and RSS-247 5.5

LIMITS  
 Emissions outside the frequency band in which the intentional radiator is operating shall be at least 20dB below the highest level of the desired power.

**TEST SETUP**



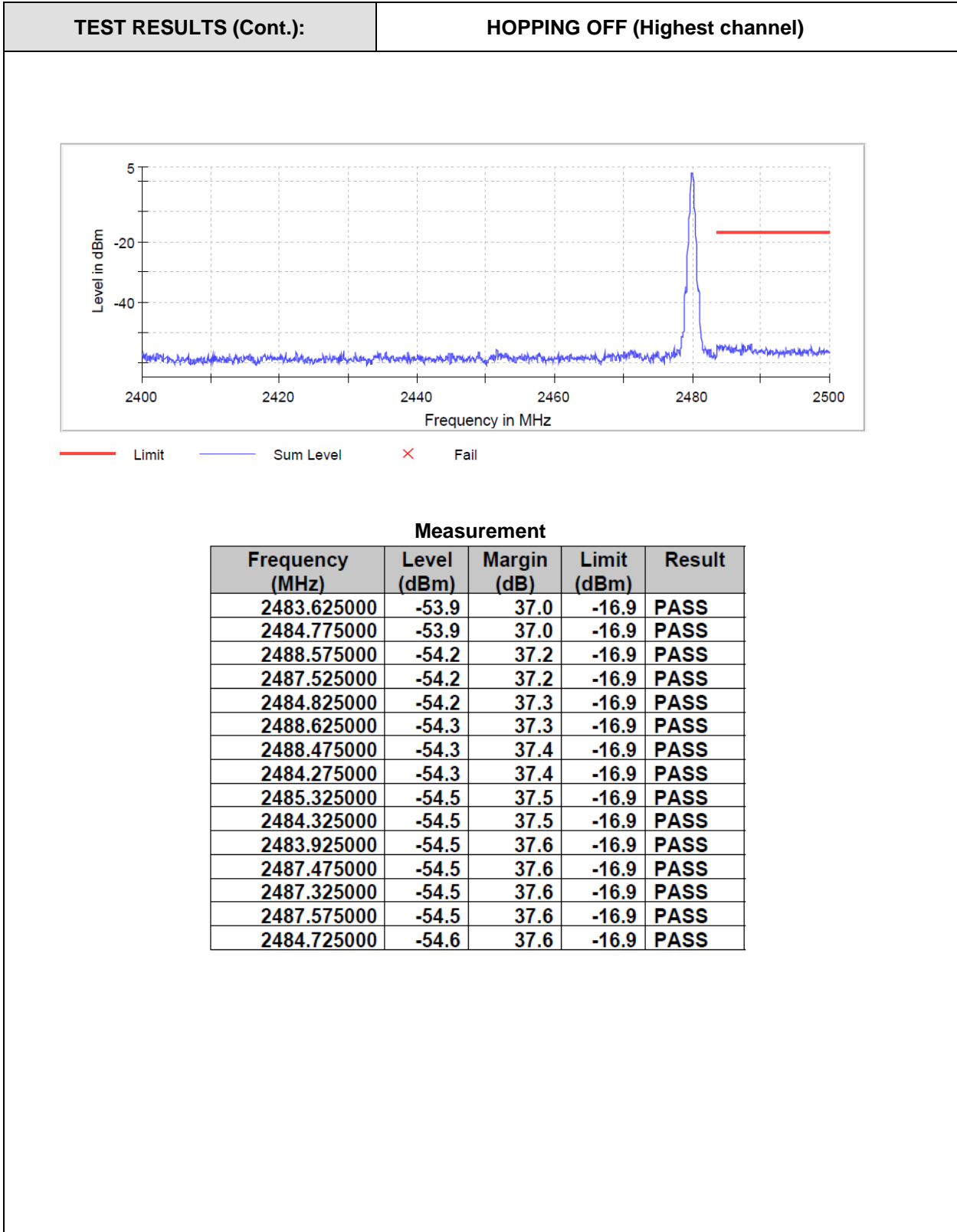
<b>TESTED SAMPLES:</b>	S/01
<b>TESTED CONDITIONS MODES:</b>	TC#01
<b>TEST RESULTS:</b>	PASS
<b>TEST RESULTS (Cont.)</b>	<b>HOPPING OFF (Lowest channel)</b>

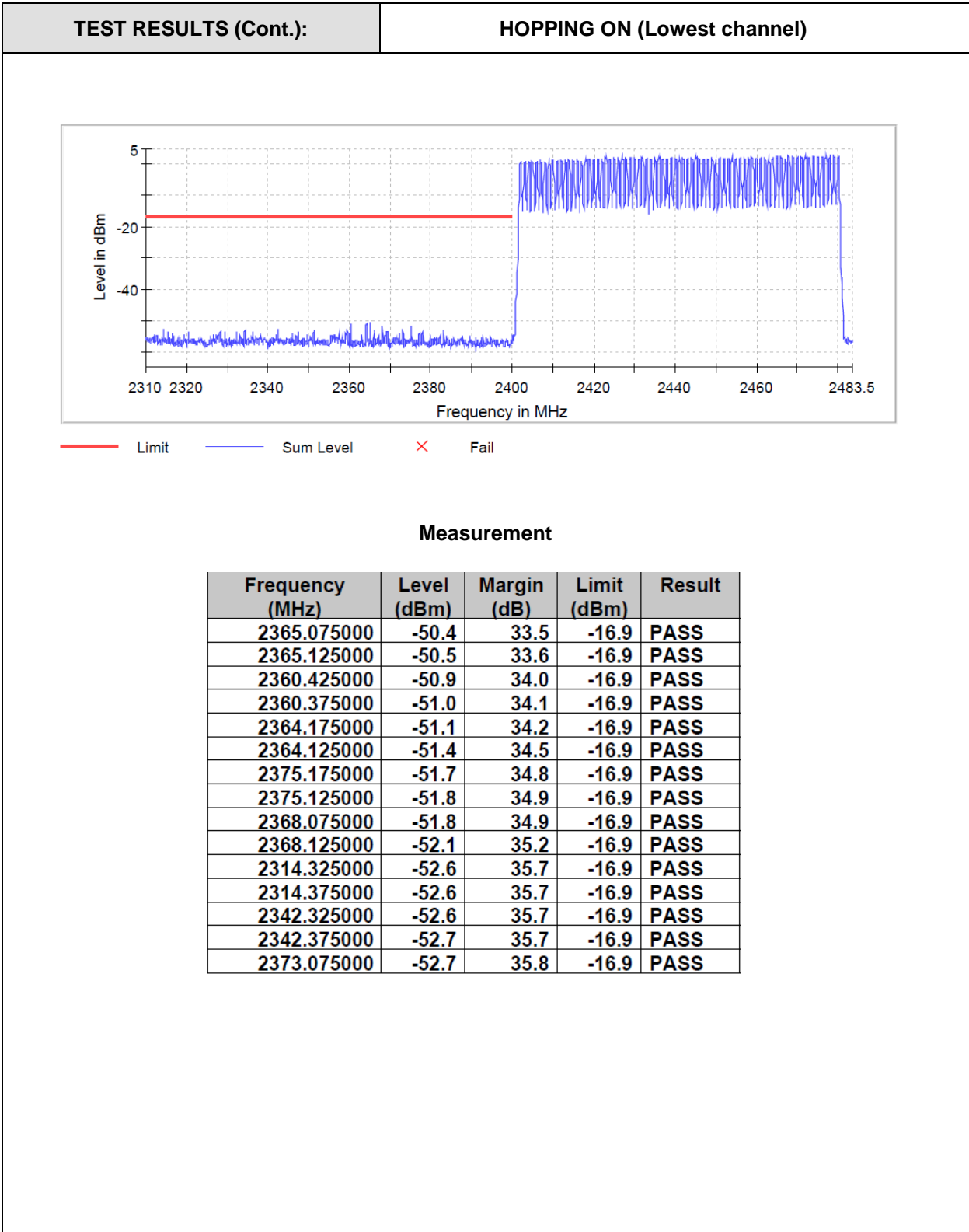


— Limit    — Sum Level    × Fail

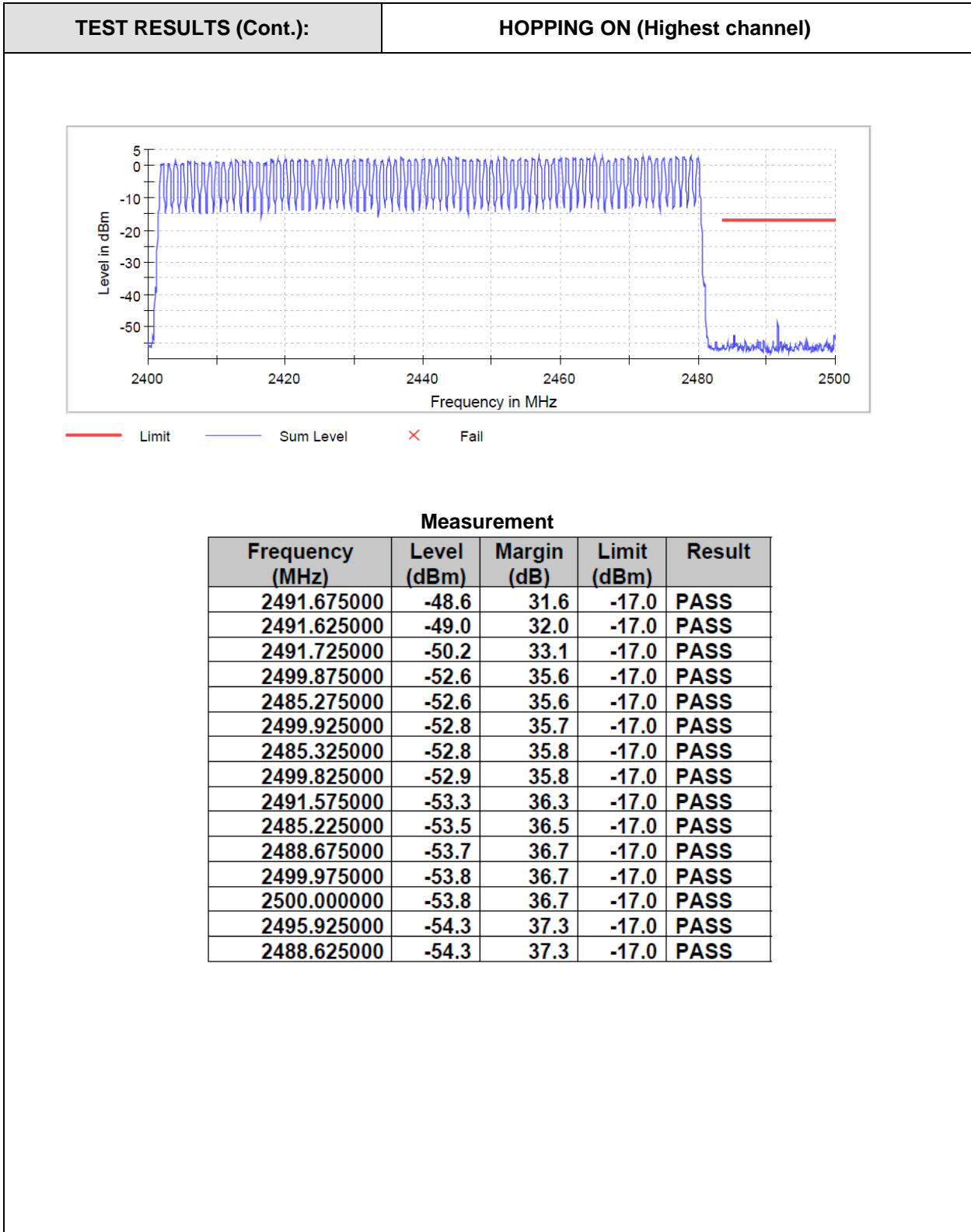
**Measurement**

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2314.675000	-51.7	32.8	-18.9	PASS
2314.625000	-52.1	33.1	-18.9	PASS
2399.975000	-52.5	33.6	-18.9	PASS
2314.725000	-53.2	34.3	-18.9	PASS
2393.375000	-53.6	34.7	-18.9	PASS
2314.775000	-53.8	34.8	-18.9	PASS
2393.425000	-53.8	34.8	-18.9	PASS
2313.425000	-53.8	34.9	-18.9	PASS
2313.375000	-53.8	34.9	-18.9	PASS
2323.325000	-54.0	35.0	-18.9	PASS
2323.375000	-54.0	35.1	-18.9	PASS
2314.575000	-54.1	35.2	-18.9	PASS
2393.575000	-54.3	35.3	-18.9	PASS
2393.625000	-54.4	35.5	-18.9	PASS
2341.125000	-54.5	35.5	-18.9	PASS

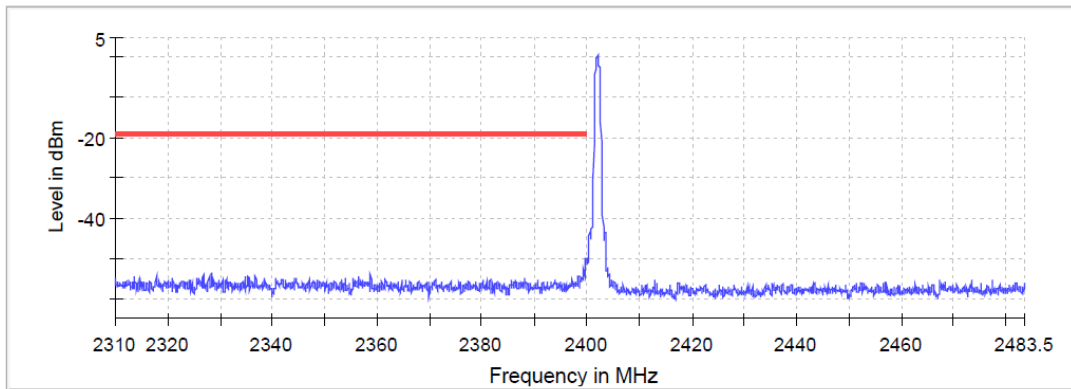








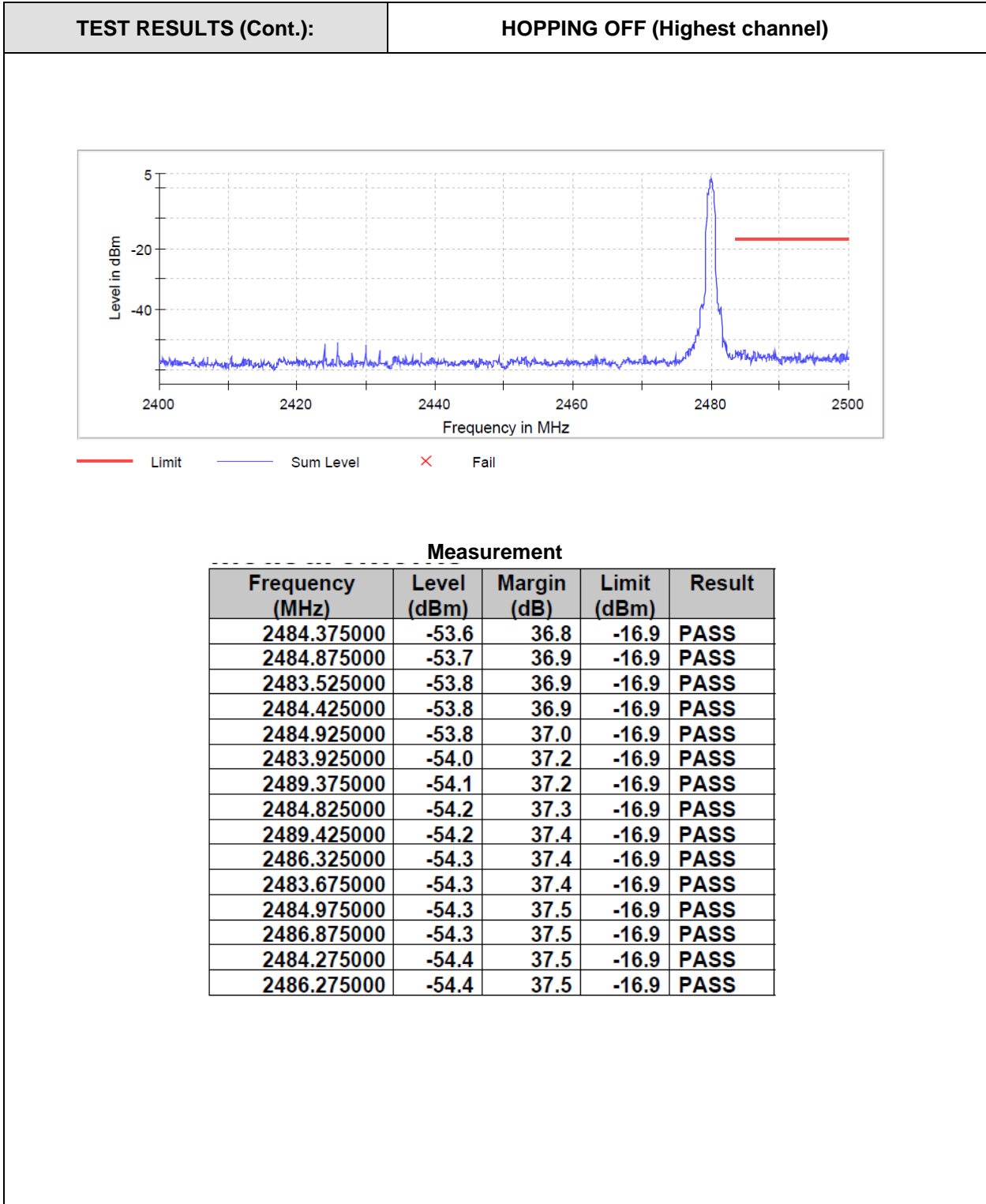
<b>TESTED SAMPLES:</b>	S/01
<b>TESTED CONDITIONS MODES:</b>	TC#02 ( $\pi/4$ -DQPSK)
<b>TEST RESULTS:</b>	PASS
<b>TEST RESULTS (Cont.)</b>	<b>HOPPING OFF (Lowest channel)</b>



— Limit    — Sum Level    × Fail

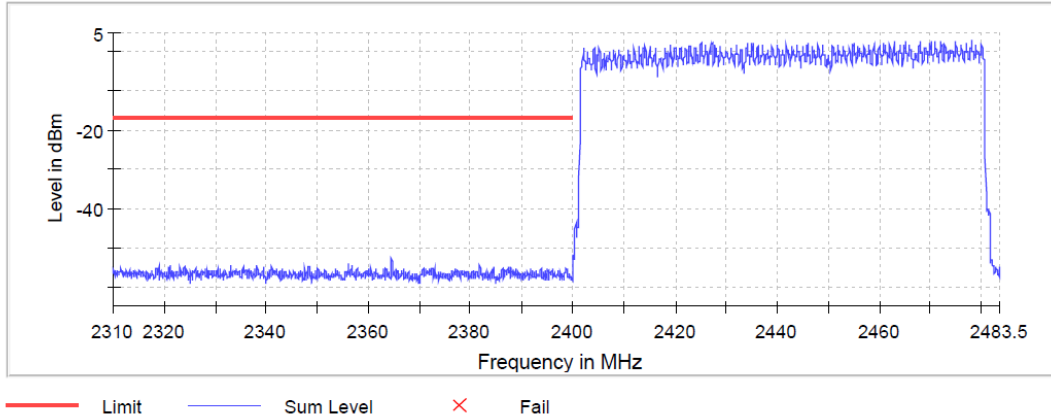
**Measurement**

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2399.825000	-50.0	30.8	-19.2	PASS
2399.875000	-50.2	31.0	-19.2	PASS
2399.925000	-50.2	31.0	-19.2	PASS
2399.775000	-50.3	31.1	-19.2	PASS
2399.975000	-50.6	31.4	-19.2	PASS
2399.725000	-50.7	31.5	-19.2	PASS
2399.675000	-52.3	33.1	-19.2	PASS
2399.625000	-52.9	33.7	-19.2	PASS
2399.425000	-52.9	33.7	-19.2	PASS
2399.575000	-52.9	33.7	-19.2	PASS
2399.375000	-53.0	33.8	-19.2	PASS
2399.275000	-53.1	33.9	-19.2	PASS
2399.325000	-53.4	34.2	-19.2	PASS
2328.475000	-53.5	34.3	-19.2	PASS
2328.425000	-53.5	34.3	-19.2	PASS



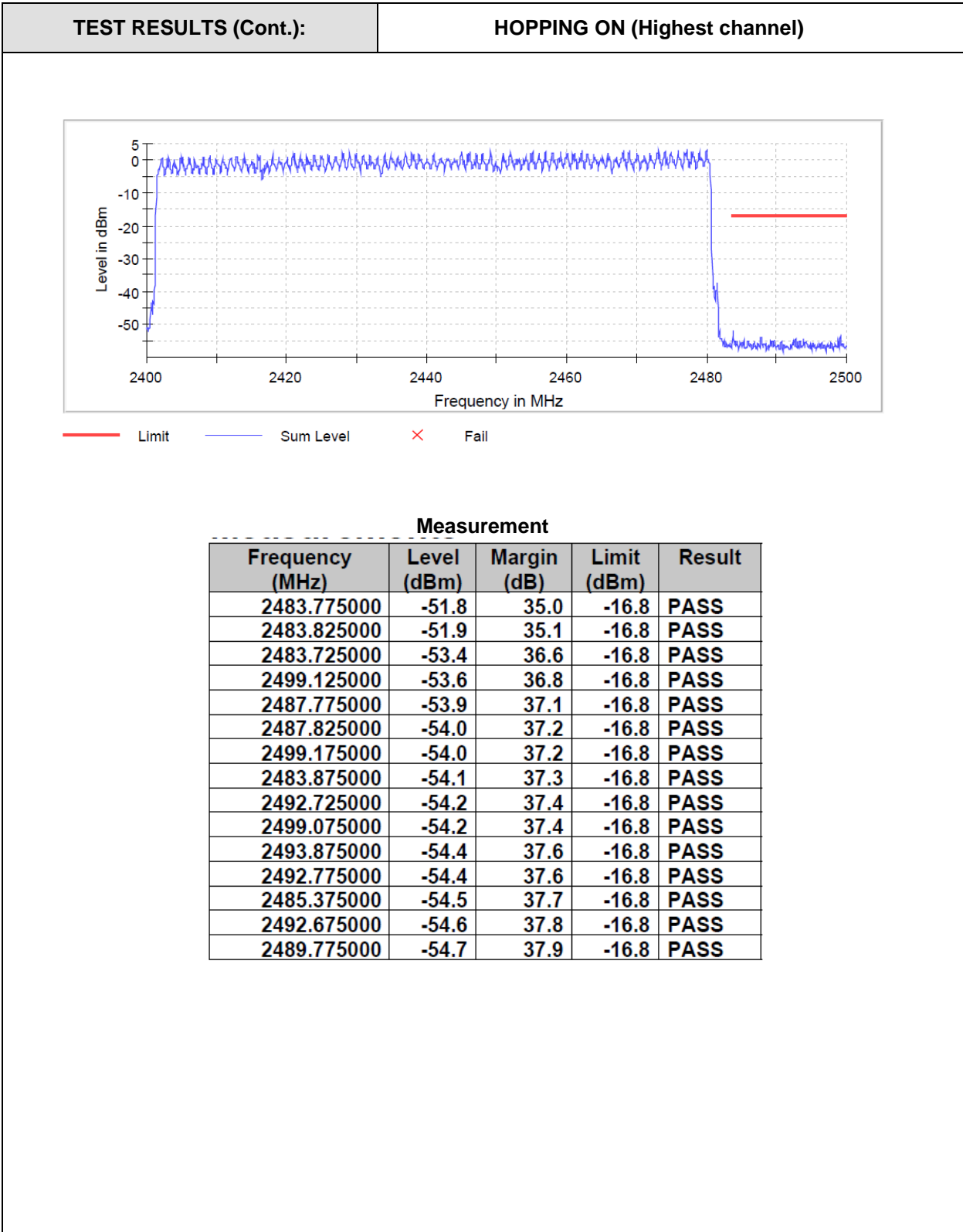
<b>TEST RESULTS (Cont.):</b>	<b>HOPPING ON (Lowest channel)</b>
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**Lowest Channel**

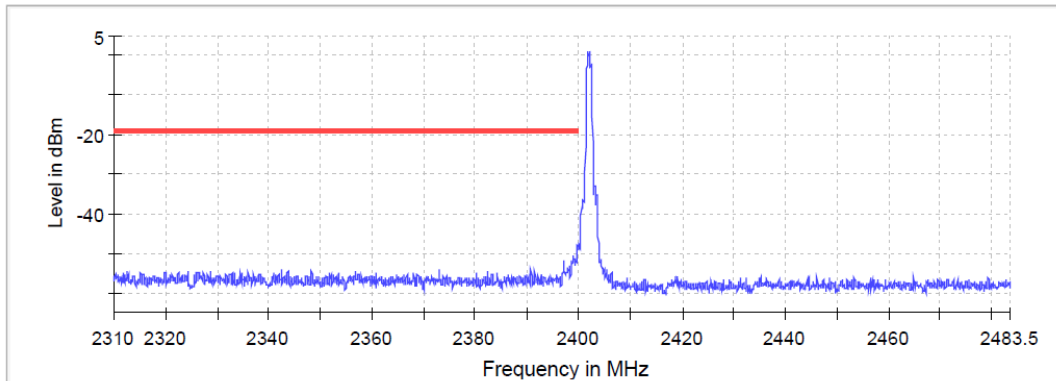


**Measurement**

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2364.525000	-52.9	36.1	-16.8	PASS
2364.575000	-53.4	36.7	-16.8	PASS
2364.475000	-53.6	36.8	-16.8	PASS
2356.075000	-54.0	37.3	-16.8	PASS
2356.025000	-54.1	37.3	-16.8	PASS
2321.075000	-54.5	37.7	-16.8	PASS
2356.725000	-54.5	37.7	-16.8	PASS
2338.175000	-54.7	37.9	-16.8	PASS
2333.075000	-54.7	37.9	-16.8	PASS
2381.775000	-54.7	38.0	-16.8	PASS
2323.125000	-54.8	38.0	-16.8	PASS
2333.125000	-54.8	38.0	-16.8	PASS
2318.825000	-54.8	38.1	-16.8	PASS
2318.875000	-54.8	38.1	-16.8	PASS
2320.875000	-54.9	38.1	-16.8	PASS

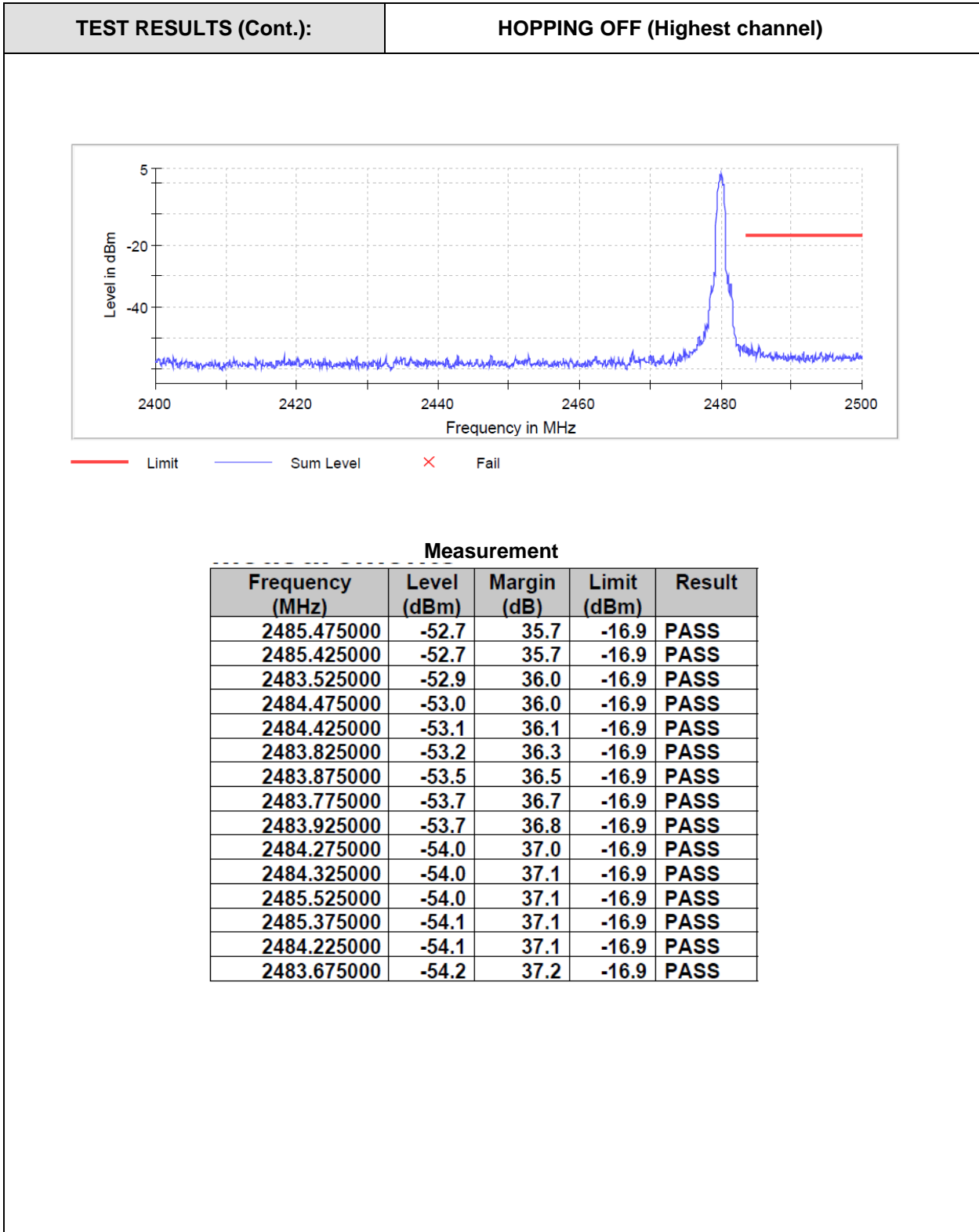


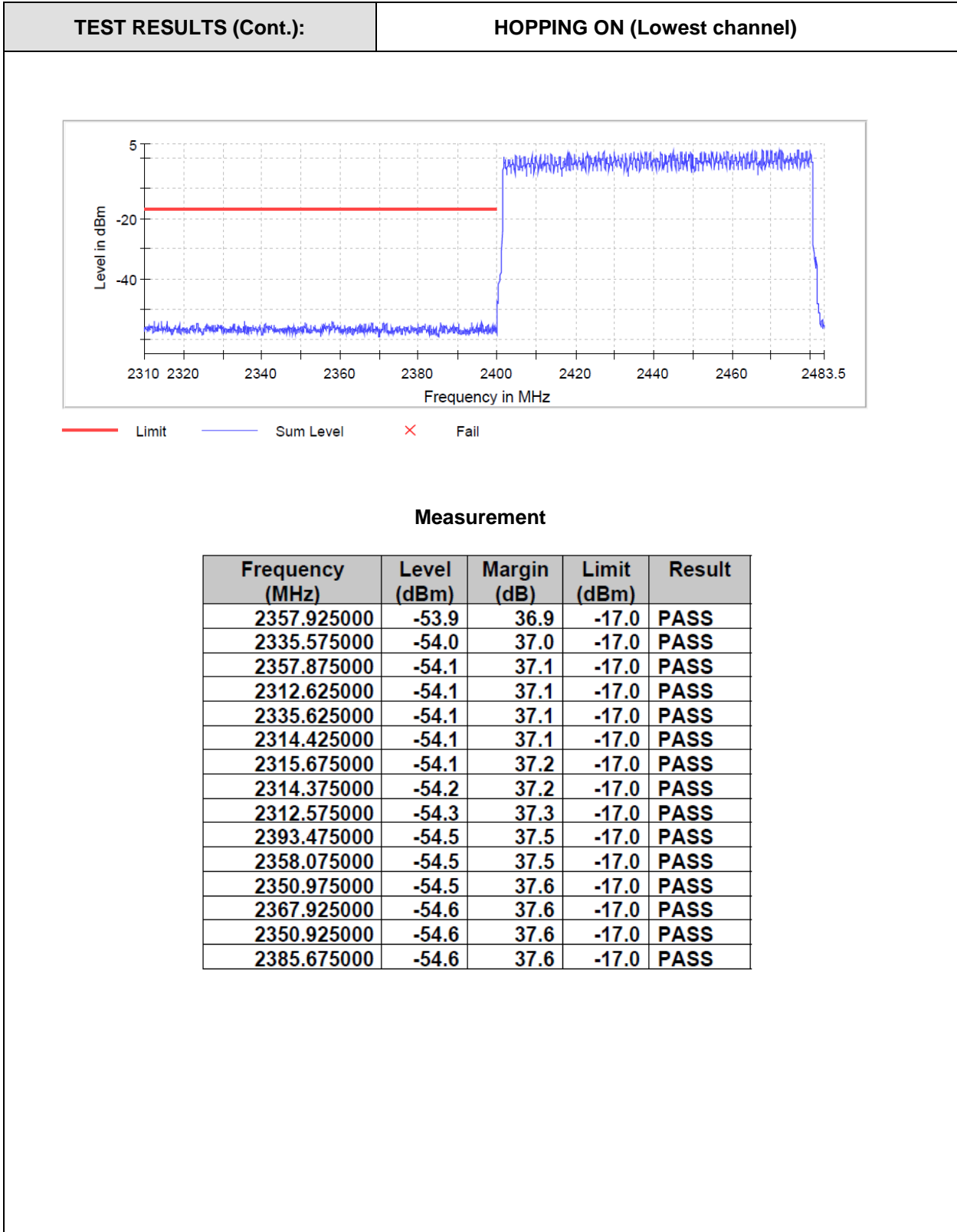
<b>TESTED SAMPLES:</b>	S/01
<b>TESTED CONDITIONS MODES:</b>	TC#03 (8DPSK)
<b>TEST RESULTS:</b>	PASS
<b>TEST RESULTS (Cont.)</b>	<b>HOPPING OFF (Lowest channel)</b>



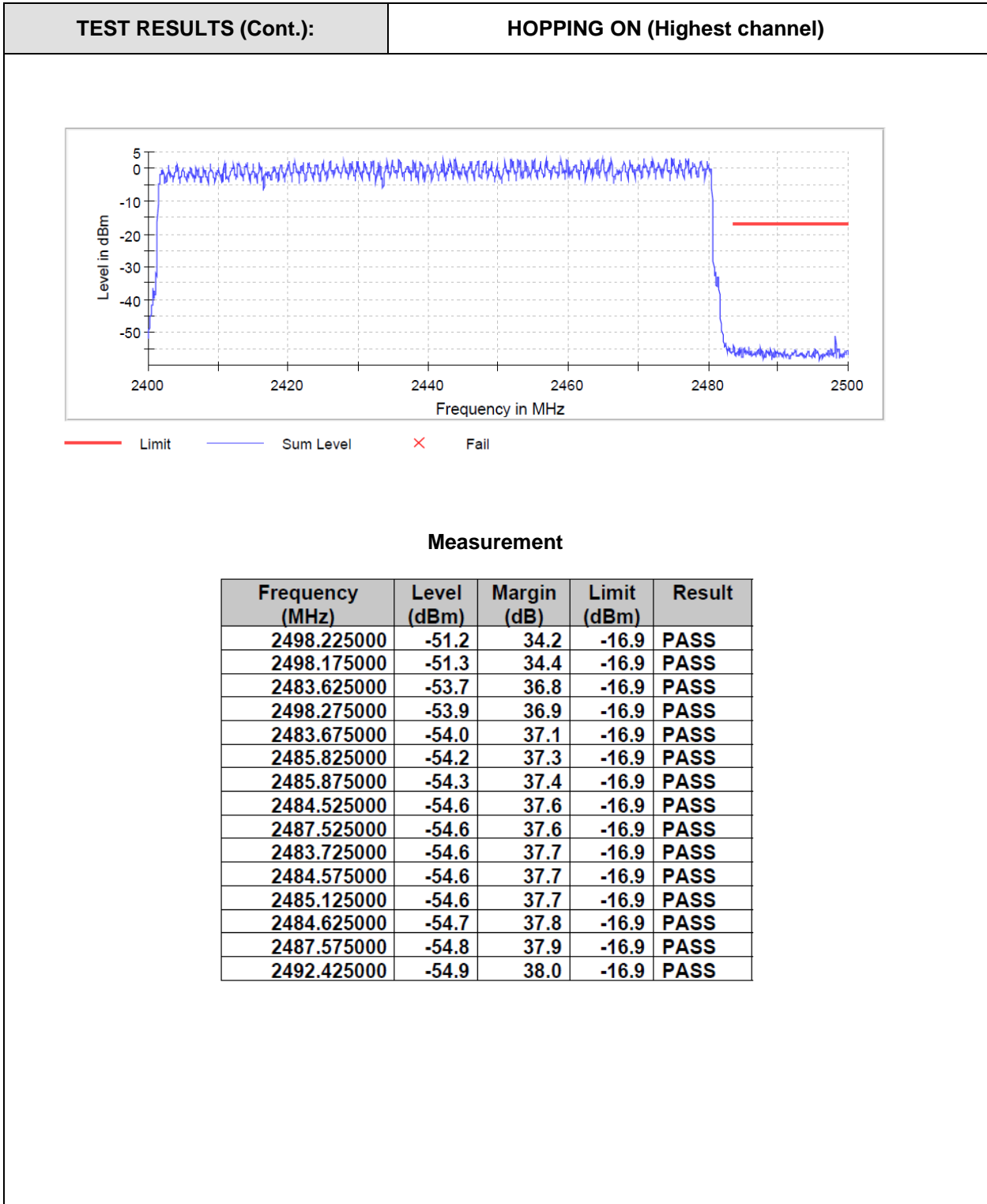
**Measurement**

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2399.875000	-47.3	28.2	-19.1	PASS
2399.925000	-47.3	28.3	-19.1	PASS
2399.775000	-48.1	29.0	-19.1	PASS
2399.825000	-48.3	29.2	-19.1	PASS
2399.625000	-49.0	29.9	-19.1	PASS
2399.675000	-49.0	29.9	-19.1	PASS
2399.975000	-49.2	30.1	-19.1	PASS
2399.725000	-49.3	30.2	-19.1	PASS
2399.575000	-49.9	30.8	-19.1	PASS
2398.925000	-50.6	31.5	-19.1	PASS
2398.875000	-50.7	31.6	-19.1	PASS
2398.975000	-50.8	31.7	-19.1	PASS
2399.525000	-51.0	31.9	-19.1	PASS
2399.375000	-51.3	32.2	-19.1	PASS
2399.075000	-51.5	32.4	-19.1	PASS









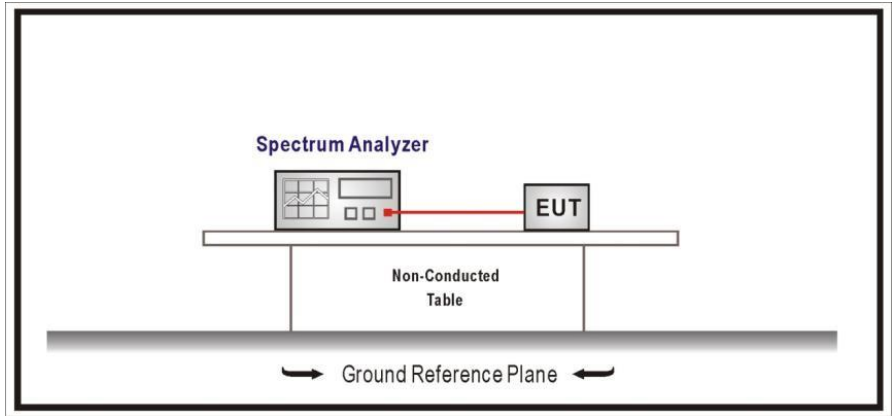
**TEST B.6: EMISSION LIMITATIONS CONDUCTED (TRANSMITTER)**

<b>LIMITS:</b>	Product standard:	Part 15 Subpart C §15.247 and RSS-247
	Test standard:	Part 15 Subpart C §15.247(d) and RSS-Gen 8.9 and 8.10

**SPECIFICATION**

In any 100 kHz bandwidth outside the frequency band in which the digitally modulated 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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required shall be 30 dB instead of 20 dB.

**TEST SETUP**

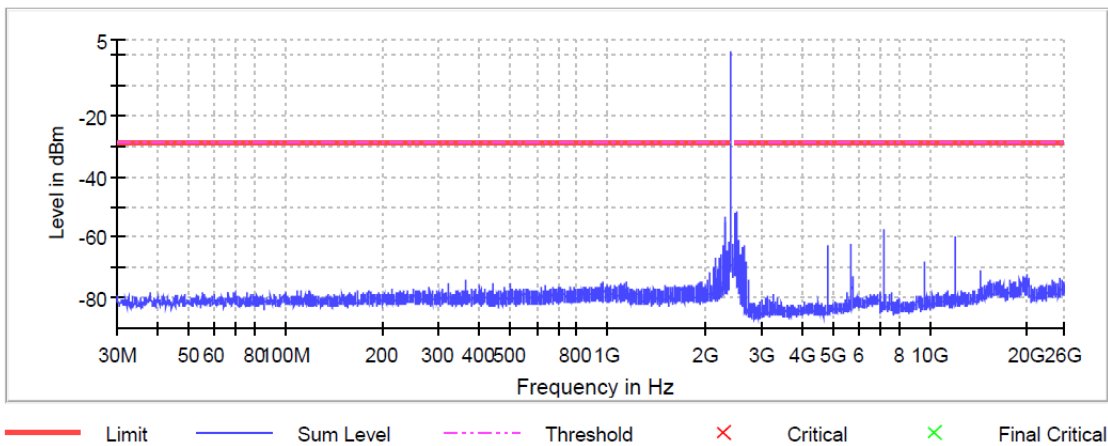


<b>TESTED SAMPLES:</b>	S/01
<b>TESTED CONDITIONS MODES:</b>	TC#01 (GFSK)
<b>TEST RESULTS:</b>	PASS

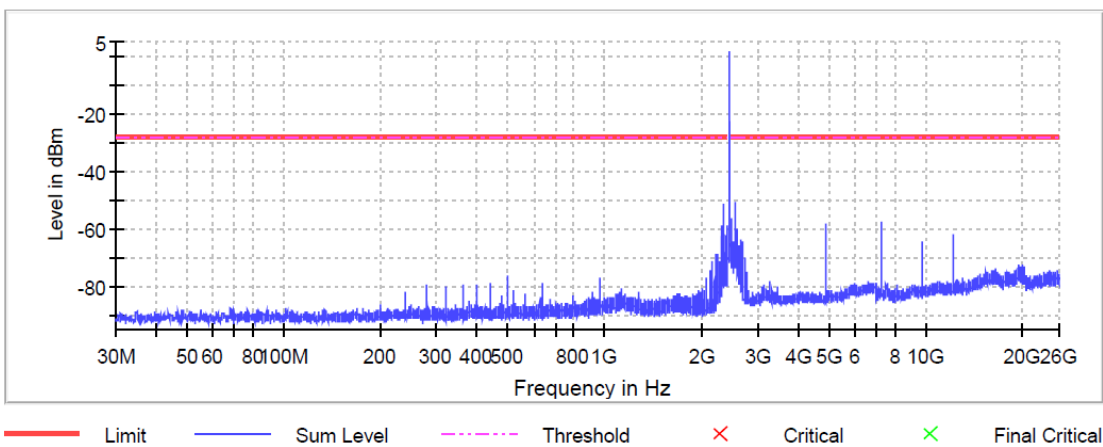
**Frequency range 30 MHz – 26 GHz**

Conducted spurious signals detected were minimum 20 dB below the reference limit for low, mid and high operating channels.

**Low Channel:**

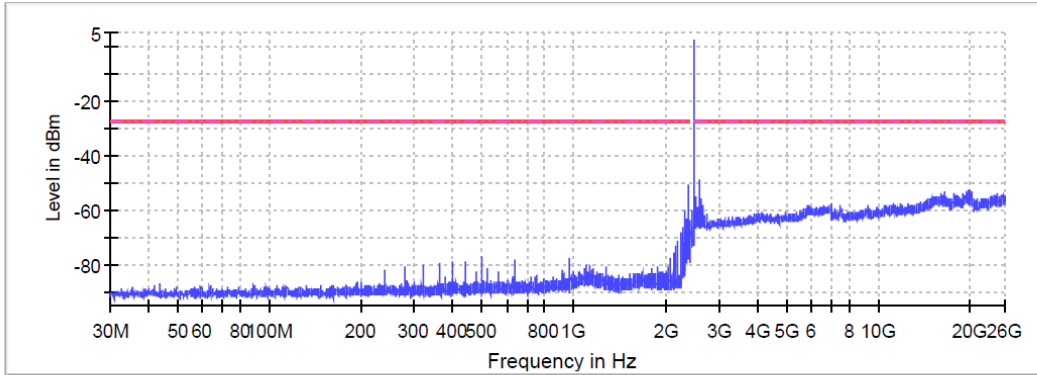


**Mid Channel:**



**TEST RESULTS (Cont.):**

**High Channel:**



— Limit    — Sum Level    - - - Threshold    × Critical    × Final Critical

**Measurement Settings**

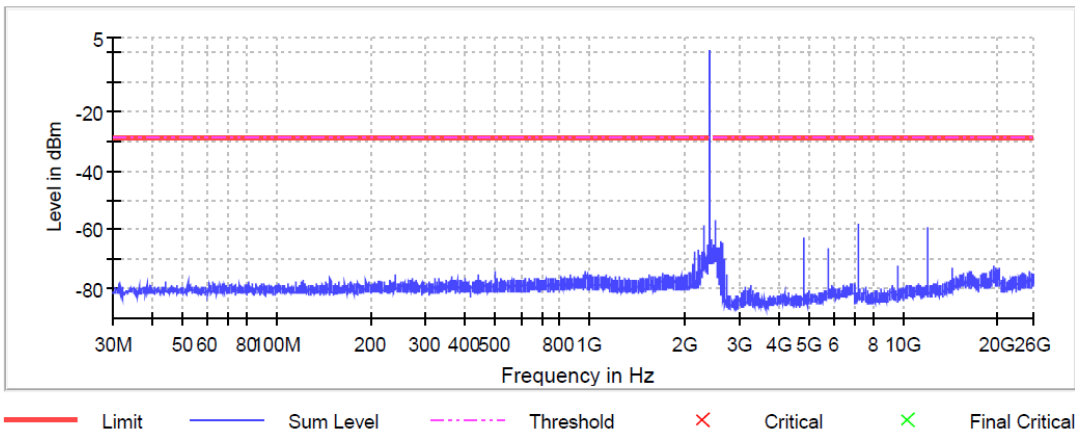
Setting	Instrument Value
Start Frequency	30.000 MHz
Stop Frequency	26 GHz
RBW	100.000 kHz
VBW	300.000 kHz
Sweep Points	32001
Sweep time	32.100 ms
Reference Level	-30.000 dBm
Attenuation	0.000 dB
Detector	MaxPeak
Sweep Count	30
Filter	3 dB
Trace Mode	Max Hold
Sweep type	FFT
Preamp	off
Stable mode	Trace
Stable value	1.00 dB
Run	6 / max. 40
Stable	1 / 1
Max Stable	0.00 dB

<b>TESTED SAMPLES:</b>	S/01
<b>TESTED CONDITIONS MODES:</b>	TC#02 ( $\pi/4$ -DQPSK)
<b>TEST RESULTS:</b>	PASS

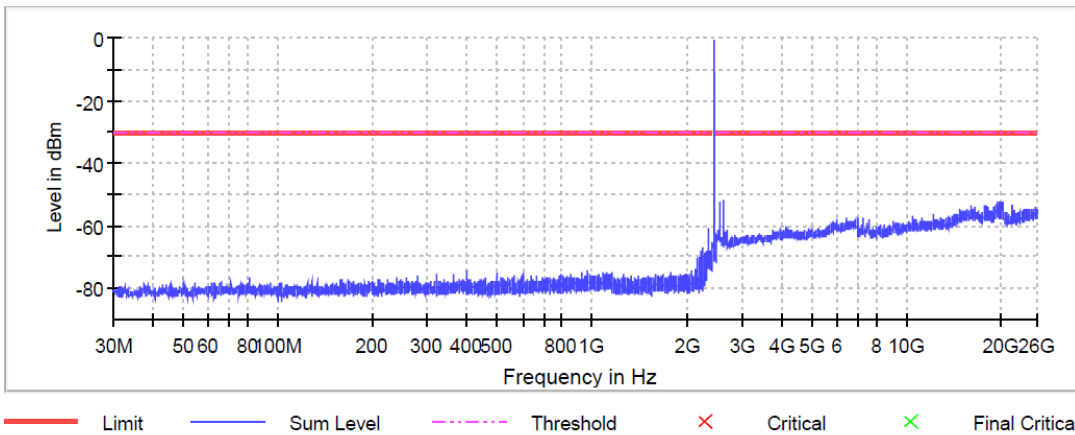
**Frequency range 30 MHz – 26 GHz**

Conducted spurious signals detected were minimum 20 dB below the reference limit for low and high operating channels.

**Low Channel:**

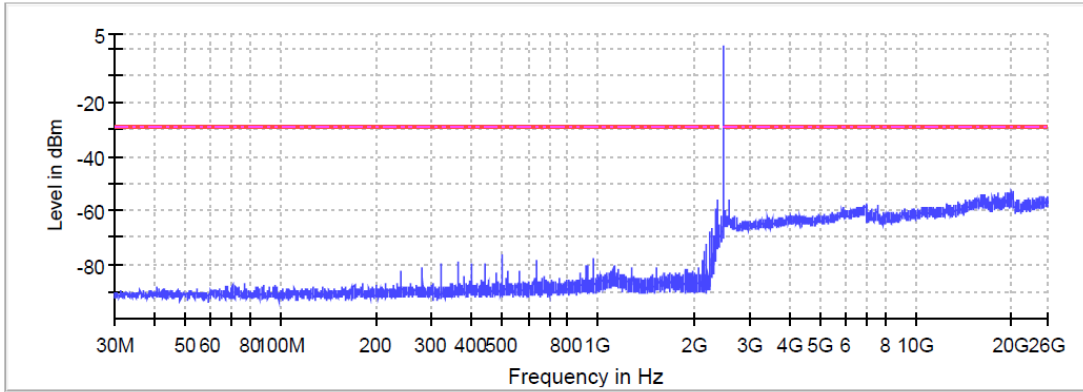


**Mid Channel:**



**TEST RESULTS (Cont.):**

**High Channel:**



— Limit    — Sum Level    - - - Threshold    × Critical    × Final Critical

**Measurement Settings**

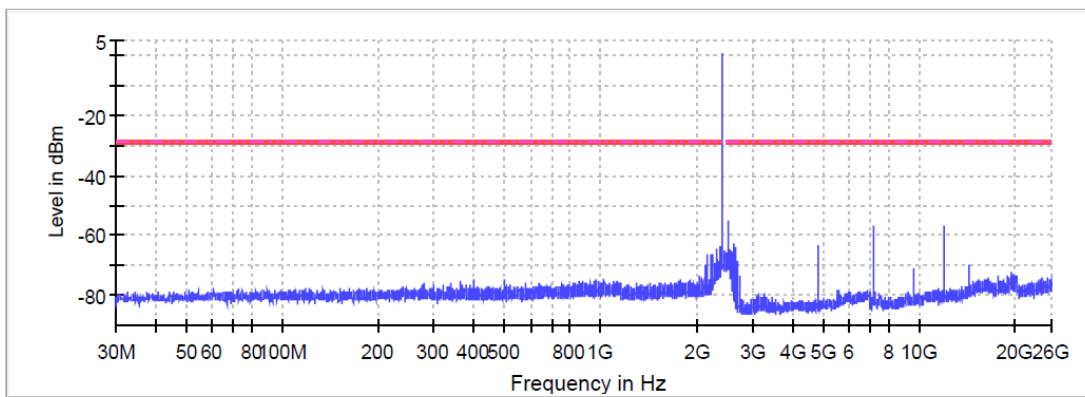
Setting	Instrument Value
Start Frequency	30.000 MHz
Stop Frequency	26 GHz
RBW	100.000 kHz
VBW	300.000 kHz
Sweep Points	32001
Sweep time	32.100 ms
Reference Level	-30.000 dBm
Attenuation	0.000 dB
Detector	MaxPeak
Sweep Count	30
Filter	3 dB
Trace Mode	Max Hold
Sweep type	FFT
Preamp	off
Stable mode	Trace
Stable value	1.00 dB
Run	3 / max. 40
Stable	1 / 1
Max Stable	0.00 dB

<b>TESTED SAMPLES:</b>	S/01
<b>TESTED CONDITIONS MODES:</b>	TC#03 (8DPSK)
<b>TEST RESULTS:</b>	PASS

**Frequency range 30 MHz – 26 GHz**

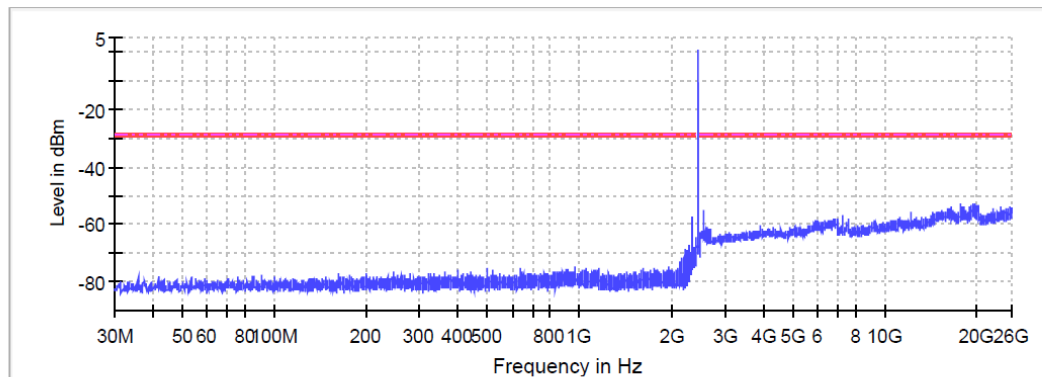
Conducted spurious signals detected were minimum 20 dB below the reference limit for low and high operating channels.

**Low Channel:**



— Limit    — Sum Level    - - - Threshold    × Critical    × Final Critical

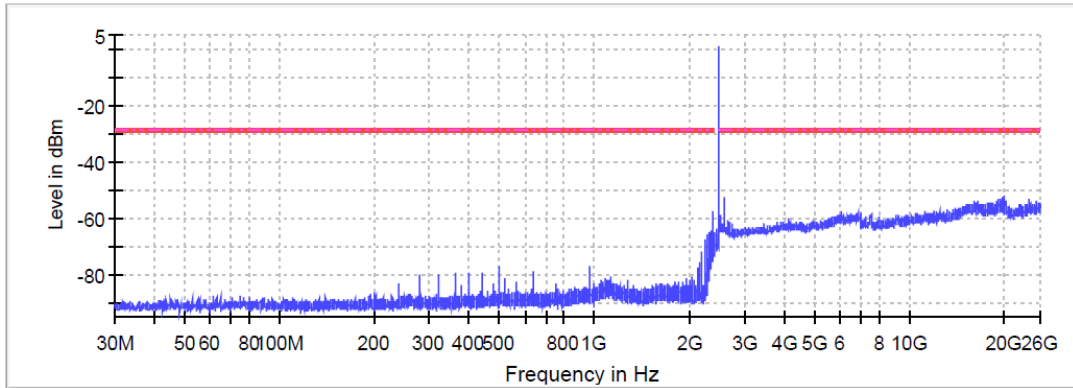
**Mid Channel:**



— Limit    — Sum Level    - - - Threshold    × Critical    × Final Critical

**TEST RESULTS (Cont.):**

**High Channel:**



— Limit    — Sum Level    - - - - Threshold    × Critical    × Final Critical

**Measurement Settings**

Setting	Instrument Value
Start Frequency	30.000 MHz
Stop Frequency	26 GHz
RBW	100.000 kHz
VBW	300.000 kHz
Sweep Points	32001
Sweep time	32.100 ms
Reference Level	-30.000 dBm
Attenuation	0.000 dB
Detector	MaxPeak
Sweep Count	30
Filter	3 dB
Trace Mode	Max Hold
Sweep type	FFT
Preamp	off
Stable mode	Trace
Stable value	1.00 dB
Run	3 / max. 40
Stable	1 / 1
Max Stable	0.00 dB



**TEST B.7: EMISSION LIMITATIONS RADIATED (TRANSMITTER)**

<b>LIMITS:</b>	Product standard:	Part 15 Subpart C §15.247 and RSS-247
	Test standard:	Part 15 Subpart C §15.247(d) and RSS-247 5.5

LIMITS

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

Frequency Range (MHz)	Field strength (µV/m)	Field strength (dBµV/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
960 - 25000	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.

RSS-247. Attenuation below the general field strength limits specified in RSS-Gen is not required

**TEST SETUP**

All radiated tests were performed in a semi-anechoic chamber. The measurement antenna is situated at 3 m for the frequency range 30-1000 MHz (Bilog antenna) and 1-18 GHz (Double ridge horn antenna), and 1m for the frequency range 18 GHz- 26 GHz (Double ridge horn antenna).

For radiated emissions in the range 18 - 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.

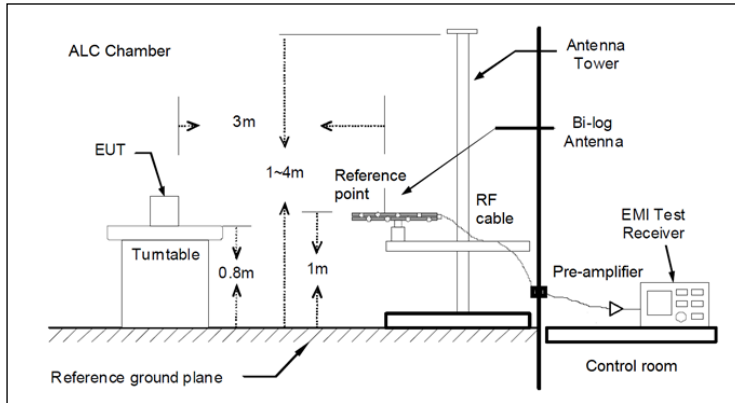
The equipment under test was set up on a non-conductive platform above the ground plane and the situation and orientation was varied to find the maximum radiated emission. It was also rotated 360° and the antenna height was varied from 1 to 4 meters to find the maximum radiated emission.

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

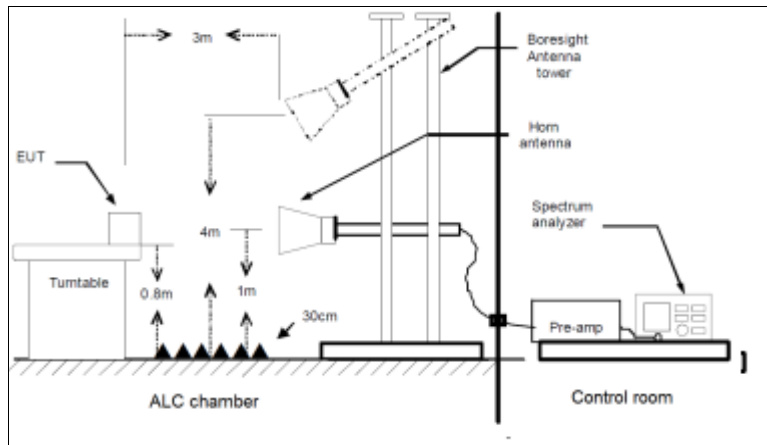
The field strength is calculated by adding correction factor to the measured level from the spectrum analyzer. This correction factor includes antenna factor, cable loss and pre-amplifiers gain.

**TEST SETUP (CONT.)**

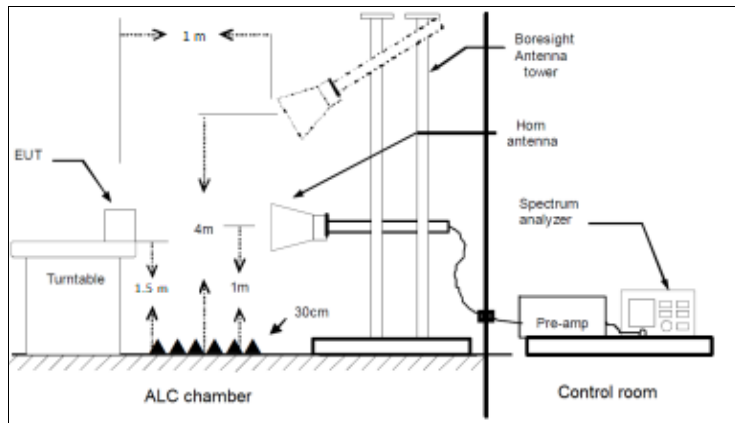
Radiated measurements Setup  $f < 1$  GHz



Radiated measurements setup  $f > 1-18$  GHz



Radiated measurements setup  $f > 18$  GHz



<b>TESTED SAMPLES:</b>	S/02
<b>TESTED CONDITIONS MODES:</b>	TC#01 (GFSK)
<b>TEST RESULTS:</b>	PASS

**Frequency range 30 MHz – 1000 MHz**

The spurious emissions below 1 GHz do not depend on the operating channel selected in the EUT.

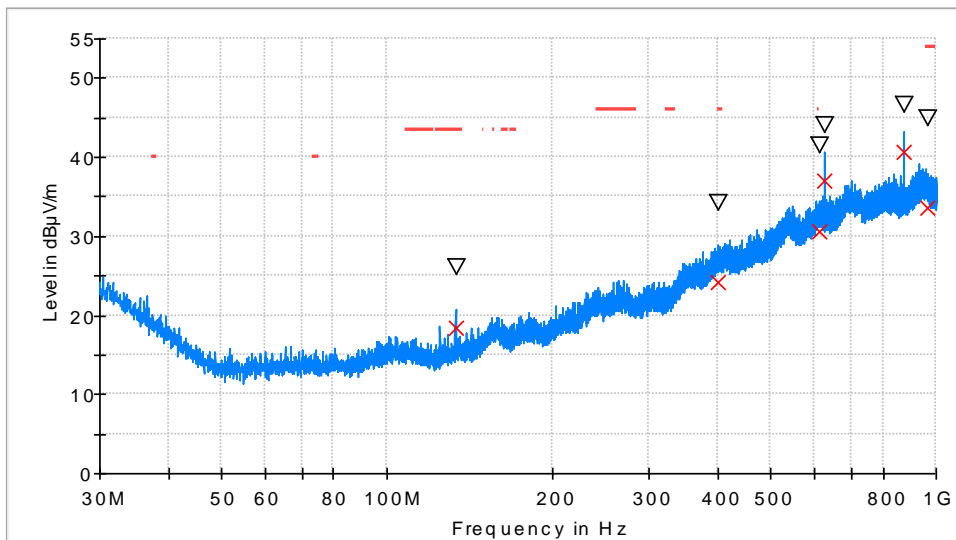
**Frequency range 1 GHz – 26 GHz**

The results in the following plots and tables show the maximum measured levels in the 1-26 GHz range including the restricted bands 2.31-2.5 GHz.

<b>TEST RESULTS (Cont.):</b>	<b>30 MHz – 1000 MHz (GFSK)</b>
------------------------------	---------------------------------

**Mid Channel**

RF\_FCC\_15.247\_E Field\_30MHz\_1GHz



- PK+\_MAXH
- TX limits to Spurious Emission FCC15.247 (30MHz to 1GHz) Restricted Bands QPK Lir
- ▽ MaxPeak-PK+ (Single)
- × QuasiPeak-QPK (Single)

Frequency (MHz)	MaxPeak (dBµV/m)	QuasiPeak (dBµV/m)	Pol	Margin - QPK (dB)	Limit - QPK (dBµV/m)
133.353500	26.0	18.5	V	25.1	43.5
400.055000	34.2	24.3	V	21.7	46.0
612.194000	41.6	30.6	V	15.5	46.0
625.046500	44.0	37.0	V	---	---
875.015500	46.6	40.7	H	---	---
966.923000	44.9	33.6	V	20.4	54.0