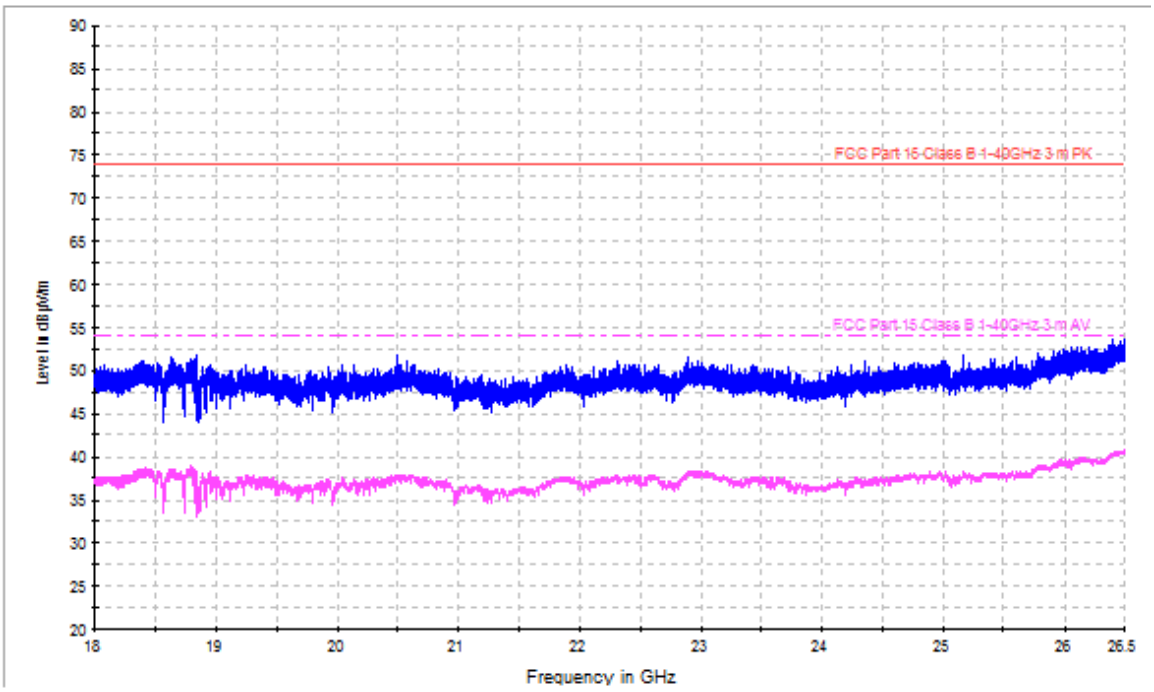
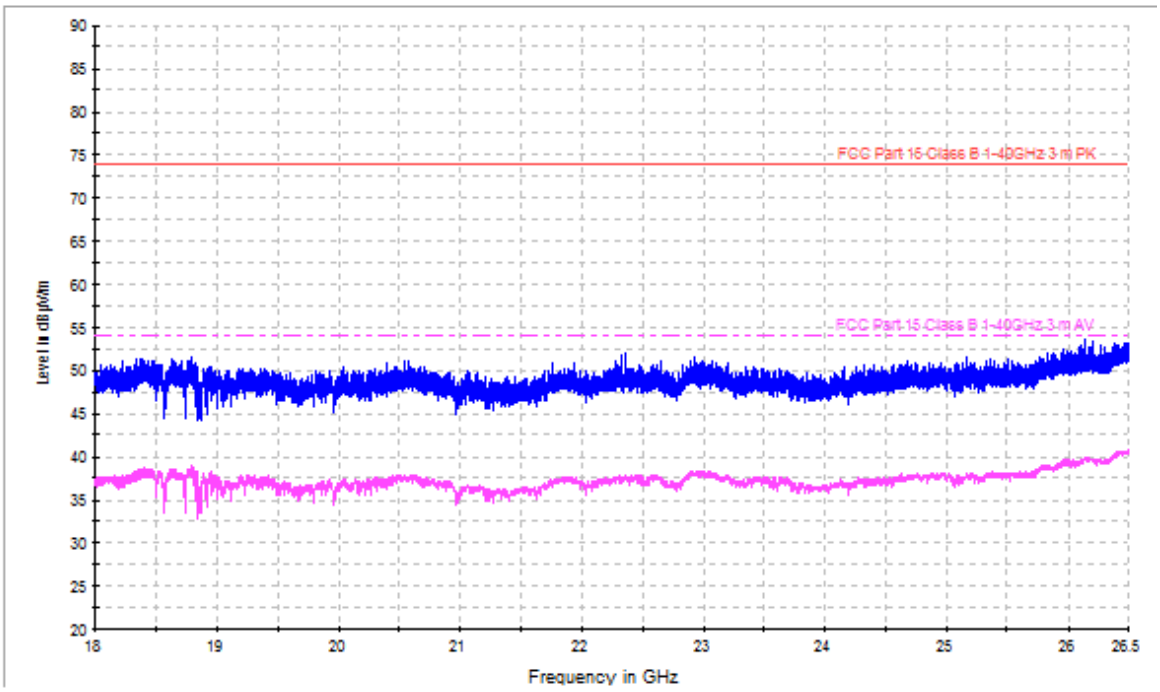
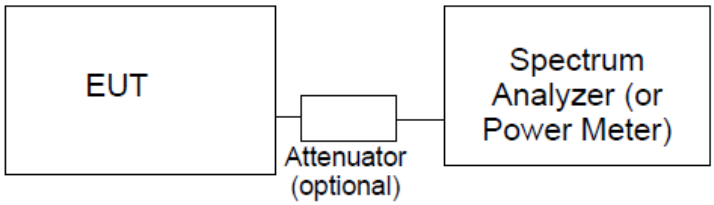
Graphical representation of Radiated Emission Measurement
Operation Mode: #2 – High Channel (2462 MHz) – 6Mbit/s (worst case)
Frequency: 18GHz – 26,5GHz
Antenna Polarization: Horizontal (worst case with EUT on X,Y and Z axis)



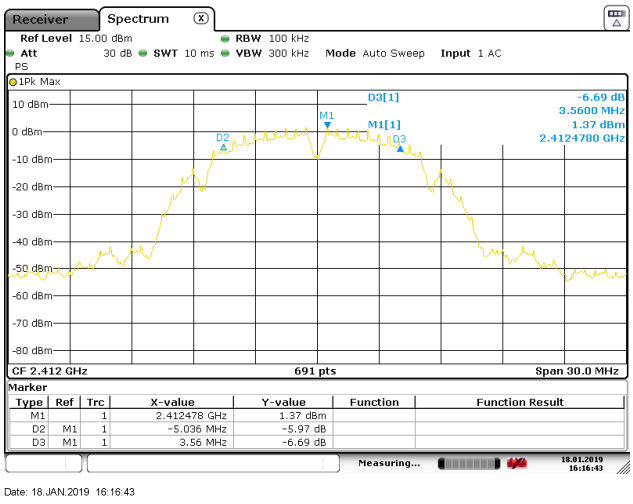
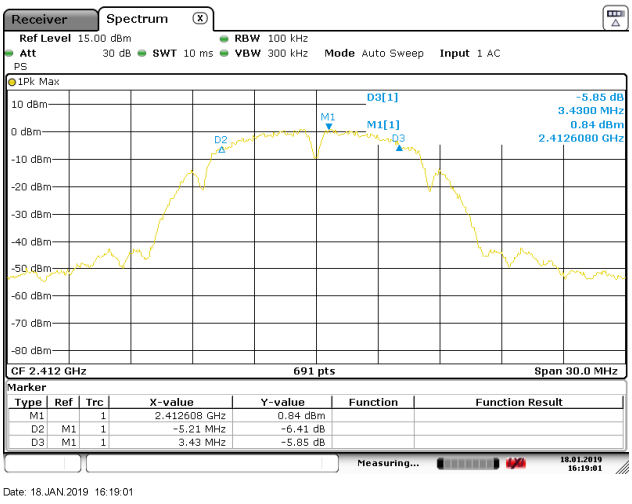
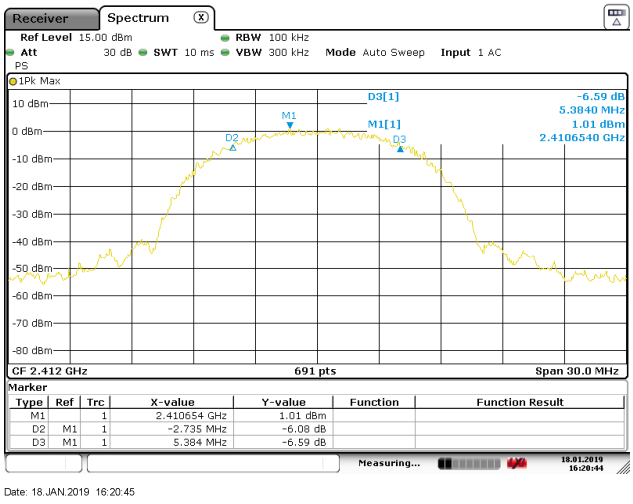
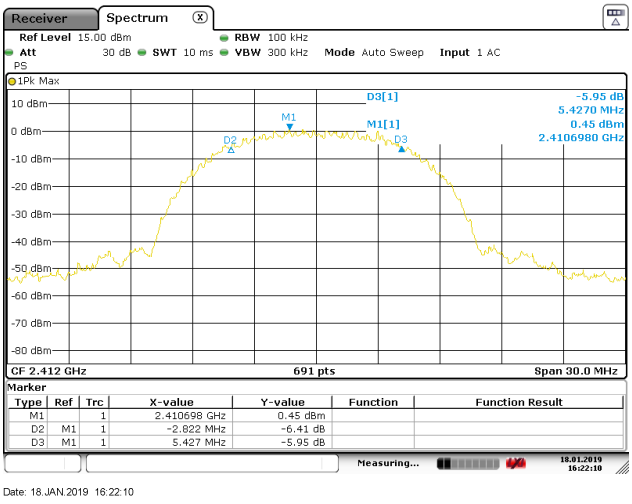
Graphical representation of Radiated Emission Measurement
Operation Mode: #3 – High Channel (2462 MHz) – MCS0 (worst case)
Frequency: 18GHz – 26,5GHz
Antenna Polarization: Horizontal (worst case with EUT on X,Y and Z axis)



12.3 TEST: 6dB Bandwidth			PASS
Parameters required prior to the test	Laboratory Ambient Temperature (°C)	15 to 35 °C	
	Relative Humidity (%)	30 to 60 %	
Parameters recorded during the test	Laboratory Ambient Temperature (°C)	24°C	
	Relative Humidity (%)	48%	
	Air pressure (hPa)	1020	
—	Frequency	Application Point	
Fully configured sample tested at the power line frequency	+3,7V dc	SMA Connector	
Equipment mode:	Operation mode	#1 #2 #3	
FCC Standard	§15.247 (A) (2)		
Systems using digital modulation techniques may operate in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.			
Further information to test setup			

Test Equipment Used					
Description	Manufacturer	Model	Identifier	Calibration date	Calibration due
EMI Test Receiver	R&S	ESR 3	2782768	12/2018	12/2019

Test Method Used
According to Par. 8.2 of KDB 558074 D01 15.247 Meas Guidance v05r02 (and par. 11.8.1 Option 1 of ANSI C63.10)

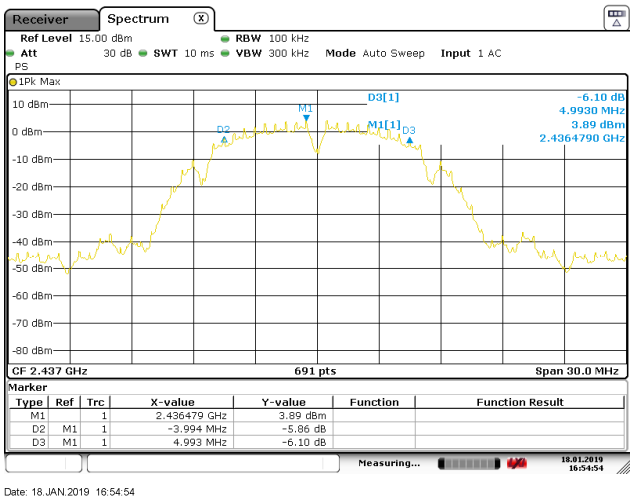
Graphical representation of 6dB Bandwidth	
Operation Mode: #1 – Low Channel (2412 MHz)	
 Date: 18.JAN.2019 16:16:43 **Data rate 1Mbit/s**	 Date: 18.JAN.2019 16:19:01 **Data rate 2Mbit/s**
 Date: 18.JAN.2019 16:20:45 **Data rate 5,5Mbit/s**	 Date: 18.JAN.2019 16:22:10 **Data rate 11Mbit/s**

Graphical representation of 6dB Bandwidth
Operation Mode: #1 – Low Channel (2412 MHz)

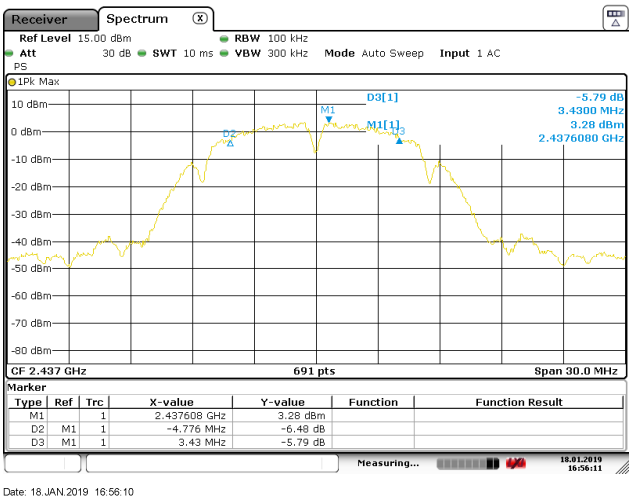
Channel (No.)	Frequency (MHz)	Data rate	Channel Bandwidth at -6dB (MHz)
Low	2412	1Mbit/s	8,596
Low	2412	2Mbit/s	8,640
Low	2412	5,5Mbit/s	8,119
Low	2412	11Mbit/s	8,249

Bandwidth at -6dB (Fmin and Fmax)				
1Mbit/s	Fmin	2407,442 MHz	Fmax	2416,038 MHz
2Mbit/s	Fmin	2407,398 MHz	Fmax	2416,038 MHz
5,5Mbit/s	Fmin	2407,919 MHz	Fmax	2416,038 MHz
11Mbit/s	Fmin	2407,876 MHz	Fmax	2416,125 MHz

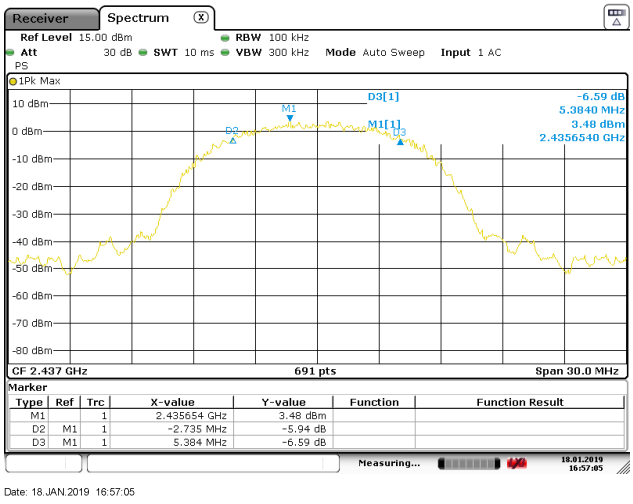
Graphical representation of 6dB Bandwidth
Operation Mode: #1 – Middle Channel (2437 MHz)



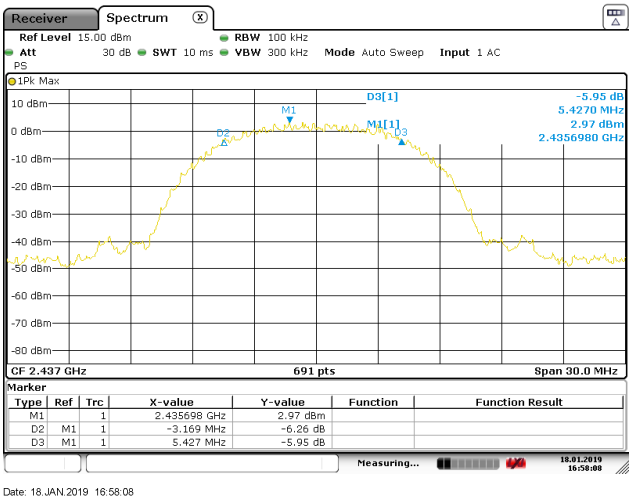
Data rate 1Mbit/s



Data rate 2Mbit/s



Data rate 5,5Mbit/s



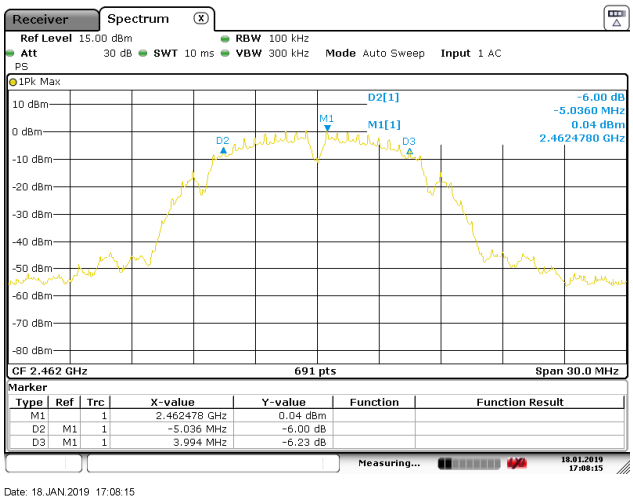
Data rate 11Mbit/s

Graphical representation of 6dB Bandwidth
Operation Mode: #1 – Middle Channel (2437 MHz)

Channel (No.)	Frequency (MHz)	Data rate	Channel Bandwidth at -6dB (MHz)
Middle	2437	1Mbit/s	8,987
Middle	2437	2Mbit/s	8,206
Middle	2437	5,5Mbit/s	8,119
Middle	2437	11Mbit/s	8,596

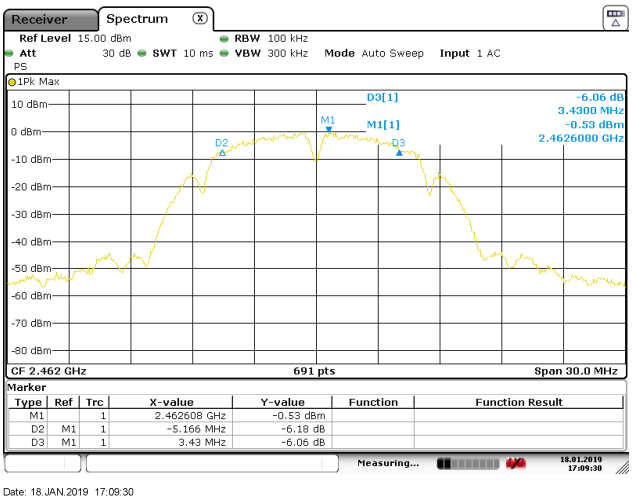
Bandwidth at -6dB (Fmin and Fmax)				
1Mbit/s	Fmin	2432,485 MHz	Fmax	2441,472 MHz
2Mbit/s	Fmin	2432,832 MHz	Fmax	2441,038 MHz
5,5Mbit/s	Fmin	2432,919 MHz	Fmax	2441,038 MHz
11Mbit/s	Fmin	2432,529 MHz	Fmax	2441,125 MHz

Graphical representation of 6dB Bandwidth
Operation Mode: #1 – High Channel (2462 MHz)



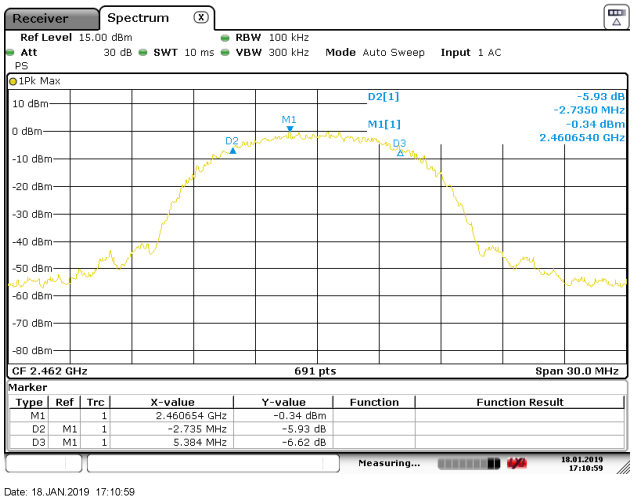
Date: 18.JAN.2019 17:08:15

Data rate 1Mbit/s



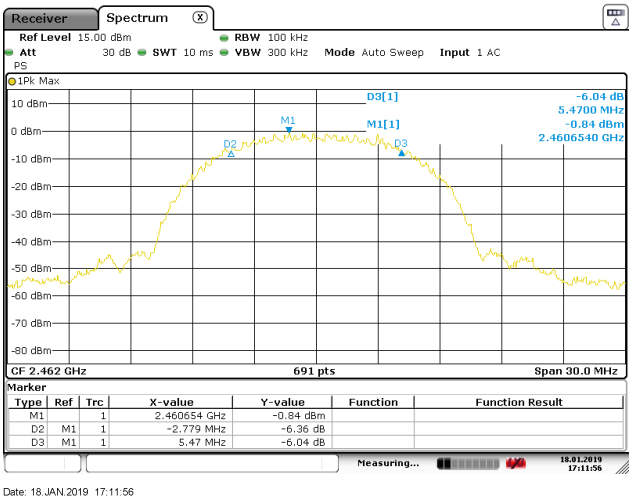
Date: 18.JAN.2019 17:09:30

Data rate 2Mbit/s



Date: 18.JAN.2019 17:10:59

Data rate 5,5Mbit/s



Date: 18.JAN.2019 17:11:56

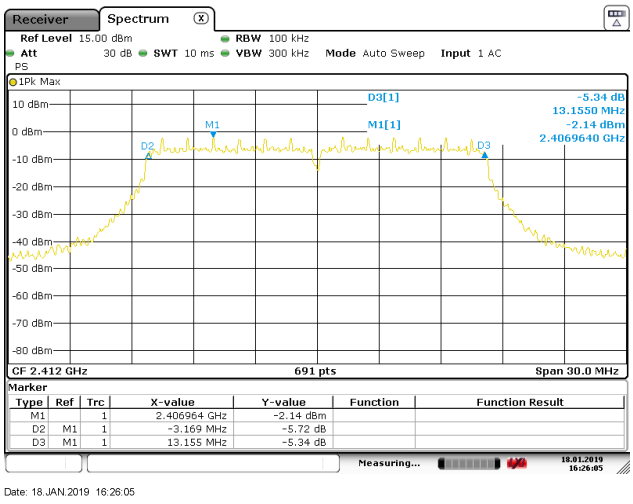
Data rate 11Mbit/s

Graphical representation of 6dB Bandwidth
Operation Mode: #1 – High Channel (2462 MHz)

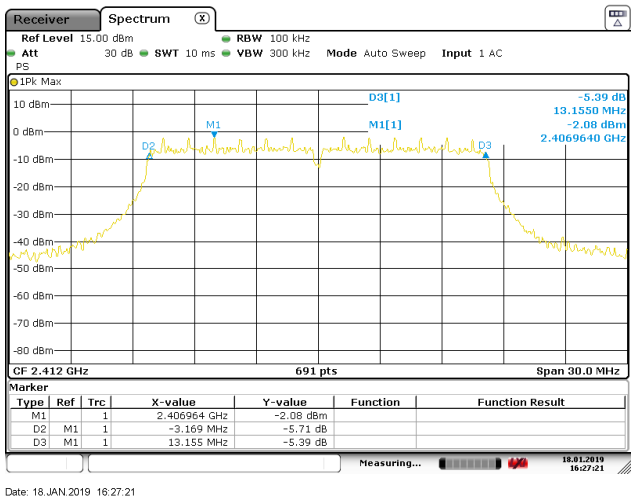
Channel (No.)	Frequency (MHz)	Data rate	Channel Bandwidth at -6dB (MHz)
High	2462	1Mbit/s	9,030
High	2462	2Mbit/s	8,596
High	2462	5,5Mbit/s	8,119
High	2462	11Mbit/s	8,249

Bandwidth at -6dB (Fmin and Fmax)				
1Mbit/s	Fmin	2457,442 MHz	Fmax	2466,472 MHz
2Mbit/s	Fmin	2457,442 MHz	Fmax	2466,038 MHz
5,5Mbit/s	Fmin	2457,919 MHz	Fmax	2466,038 MHz
11Mbit/s	Fmin	2457,875 MHz	Fmax	2466,124 MHz

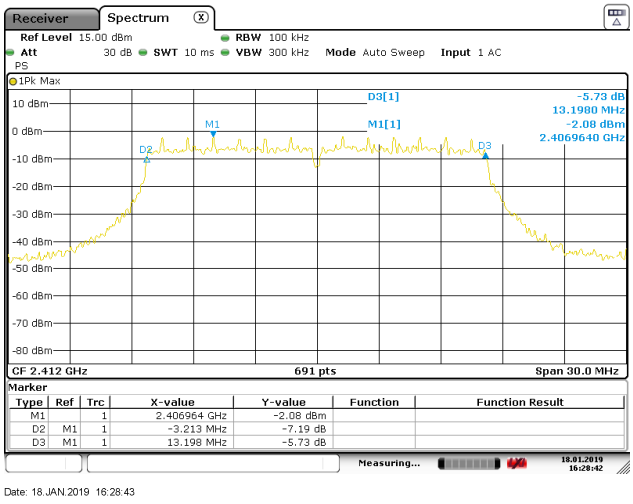
Graphical representation of 6dB Bandwidth
Operation Mode: #2 – Low Channel (2412 MHz)



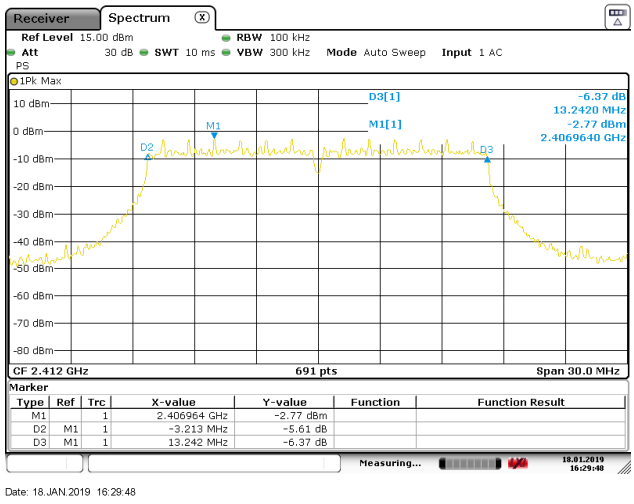
Data rate 6Mbit/s



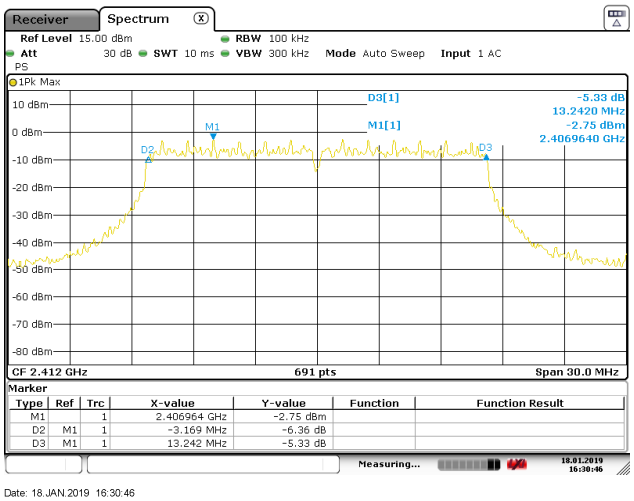
Data rate 9Mbit/s



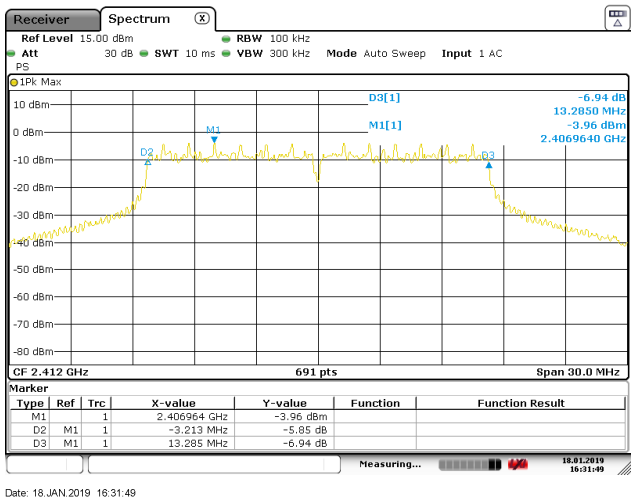
Data rate 12Mbit/s



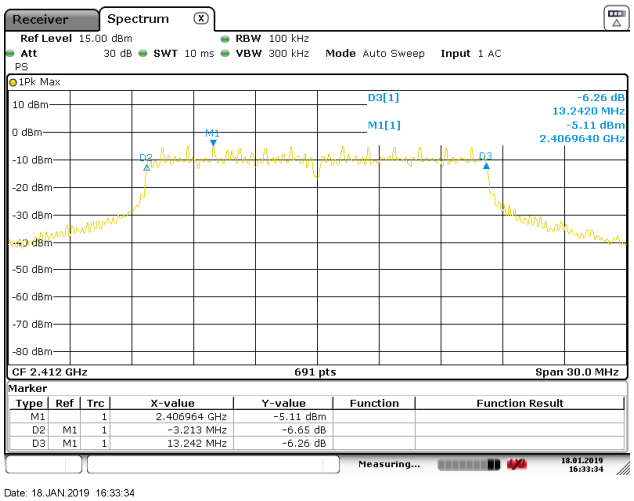
Data rate 18Mbit/s



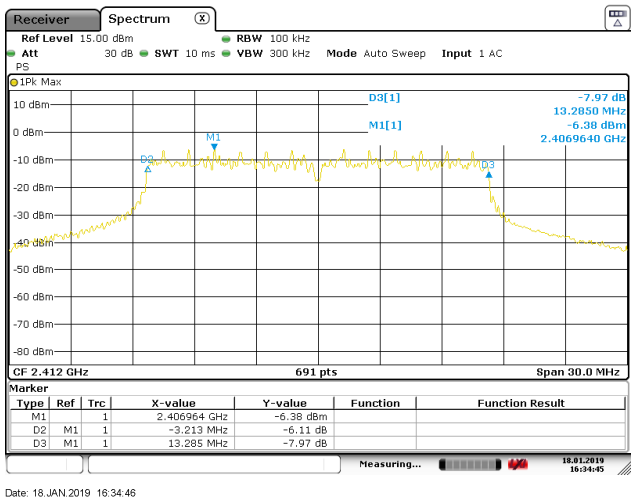
Data rate 24Mbit/s



Data rate 36Mbit/s



Data rate 48Mbit/s



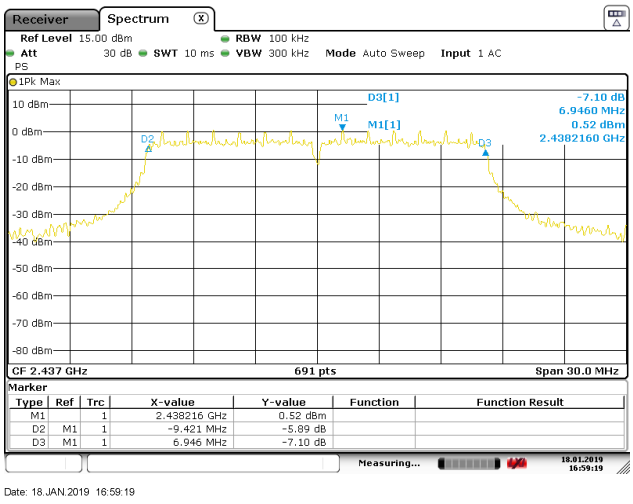
Data rate 54Mbit/s

Graphical representation of 6dB Bandwidth
Operation Mode: #2 – Low Channel (2412 MHz)

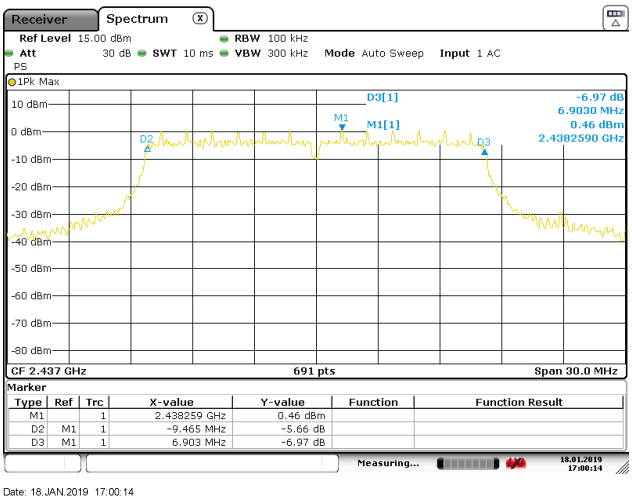
Channel (No.)	Frequency (MHz)	Data rate	Channel Bandwidth at -6dB (MHz)
Low	2412	6Mbit/s	16,324
Low	2412	9Mbit/s	16,324
Low	2412	12Mbit/s	16,411
Low	2412	18Mbit/s	16,455
Low	2412	24Mbit/s	16,411
Low	2412	36Mbit/s	16,498
Low	2412	48Mbit/s	16,455
Low	2412	54Mbit/s	16,498

Bandwidth at -6dB (Fmin and Fmax)				
6Mbit/s	Fmin	2403,795 MHz	Fmax	2420,119 MHz
9Mbit/s	Fmin	2403,795 MHz	Fmax	2420,119 MHz
12Mbit/s	Fmin	2403,751 MHz	Fmax	2420,162 MHz
18Mbit/s	Fmin	2403,751 MHz	Fmax	2420,206 MHz
24Mbit/s	Fmin	2403,795 MHz	Fmax	2420,206 MHz
36Mbit/s	Fmin	2403,751 MHz	Fmax	2420,249 MHz
48Mbit/s	Fmin	2403,751 MHz	Fmax	2420,206 MHz
54Mbit/s	Fmin	2403,751 MHz	Fmax	2420,249 MHz

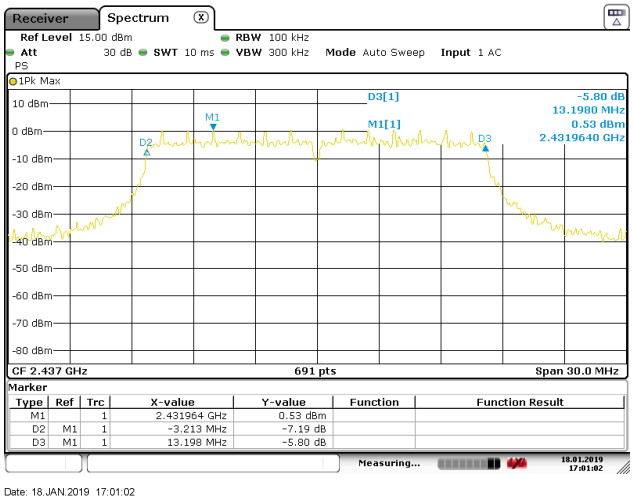
Graphical representation of 6dB Bandwidth
Operation Mode: #2 – Middle Channel (2437 MHz)



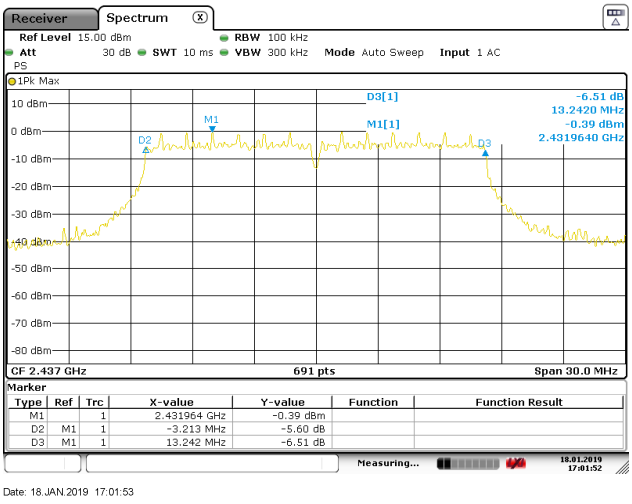
Data rate 6Mbit/s



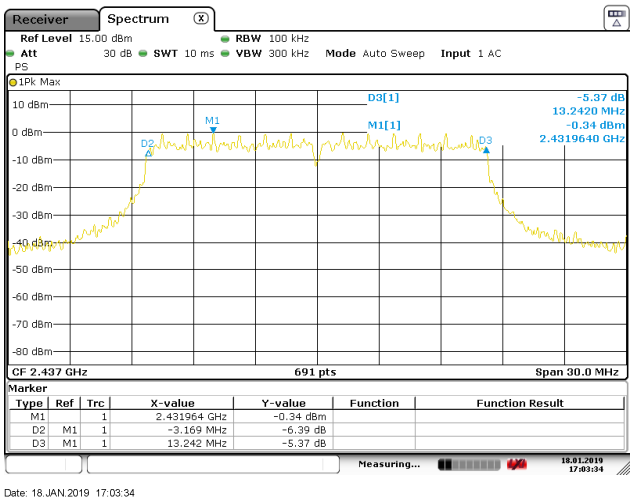
Data rate 9Mbit/s



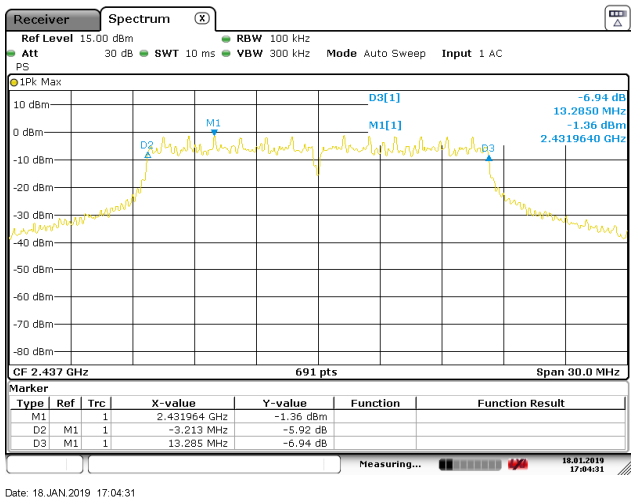
Data rate 12Mbit/s



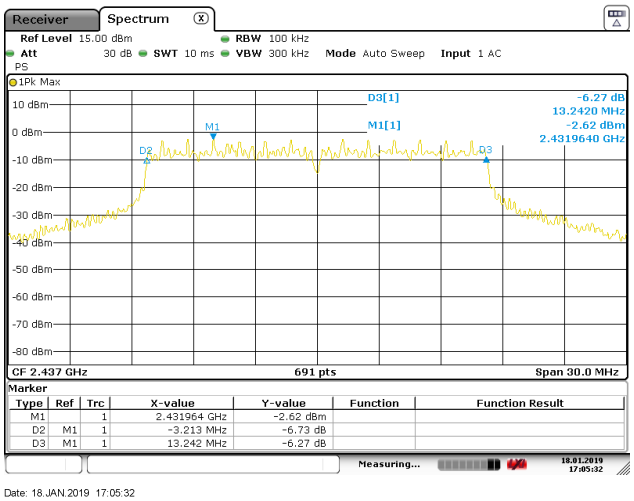
Data rate 18Mbit/s



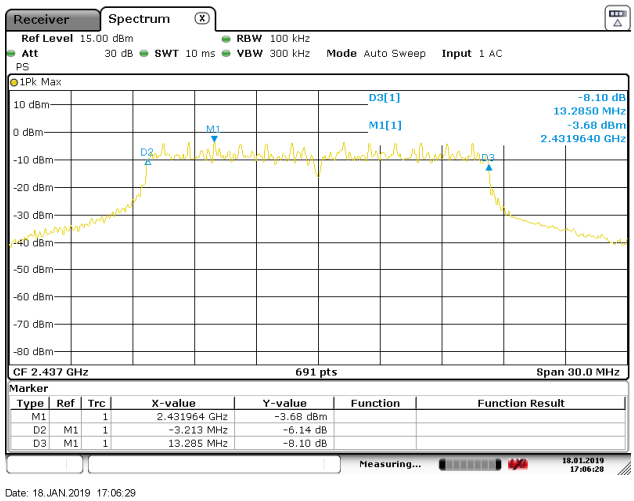
Data rate 24Mbit/s



Data rate 36Mbit/s



Data rate 48Mbit/s



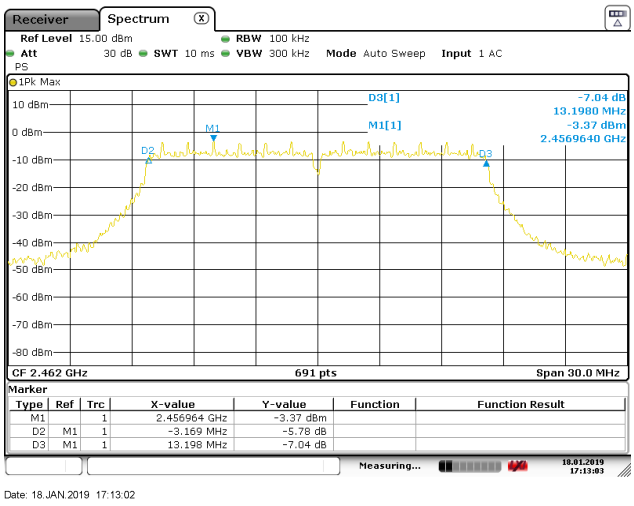
Data rate 54Mbit/s

Graphical representation of 6dB Bandwidth
Operation Mode: #2 – Middle Channel (2437 MHz)

Channel (No.)	Frequency (MHz)	Data rate	Channel Bandwidth at -6dB (MHz)
Middle	2437	6Mbit/s	16,367
Middle	2437	9Mbit/s	16,368
Middle	2437	12Mbit/s	16,411
Middle	2437	18Mbit/s	16,455
Middle	2437	24Mbit/s	16,411
Middle	2437	36Mbit/s	16,498
Middle	2437	48Mbit/s	16,455
Middle	2437	54Mbit/s	16,498

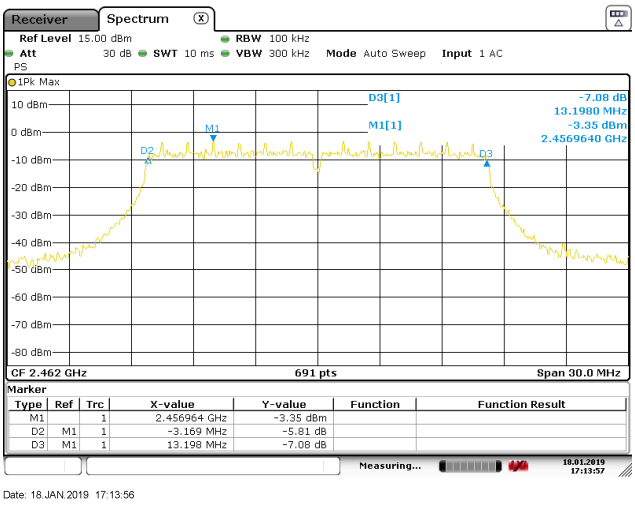
Bandwidth at -6dB (Fmin and Fmax)				
6Mbit/s	Fmin	2428,795 MHz	Fmax	2445,162 MHz
9Mbit/s	Fmin	2428,794 MHz	Fmax	2445,162 MHz
12Mbit/s	Fmin	2428,751 MHz	Fmax	2445,162 MHz
18Mbit/s	Fmin	2428,751 MHz	Fmax	2445,206 MHz
24Mbit/s	Fmin	2428,795 MHz	Fmax	2445,206 MHz
36Mbit/s	Fmin	2428,751 MHz	Fmax	2445,249 MHz
48Mbit/s	Fmin	2428,751 MHz	Fmax	2445,206 MHz
54Mbit/s	Fmin	2428,751 MHz	Fmax	2445,249 MHz

Graphical representation of 6dB Bandwidth
Operation Mode: #2 – High Channel (2462 MHz)



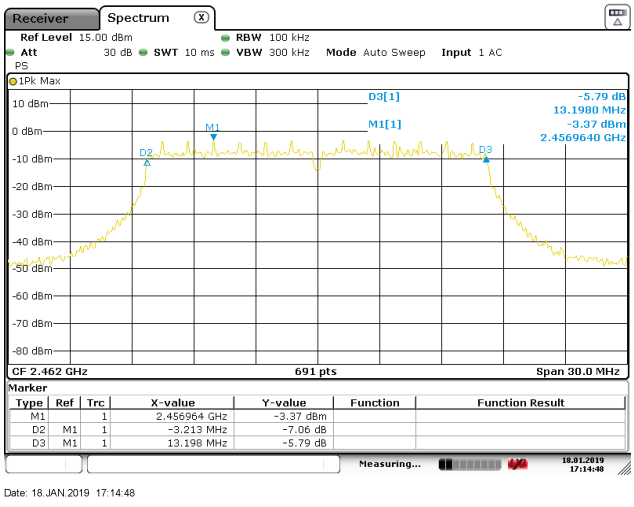
Date: 18.JAN.2019 17:13:02

Data rate 6Mbit/s



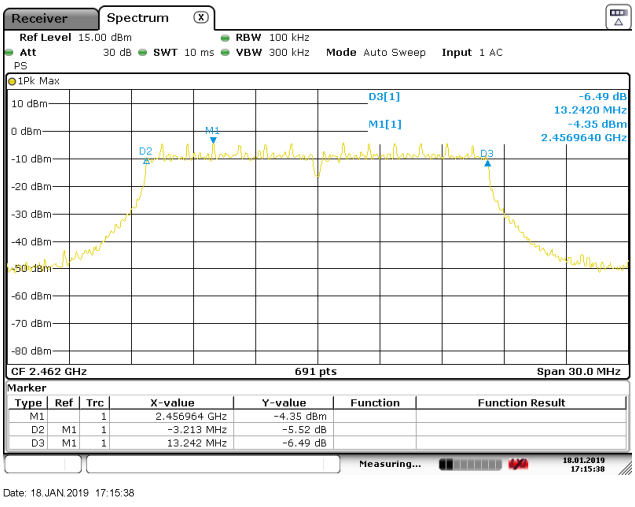
Date: 18.JAN.2019 17:13:56

Data rate 9Mbit/s



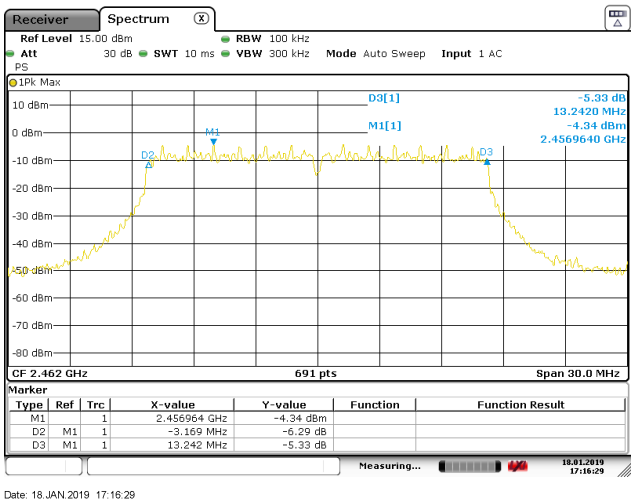
Date: 18.JAN.2019 17:14:48

Data rate 12Mbit/s

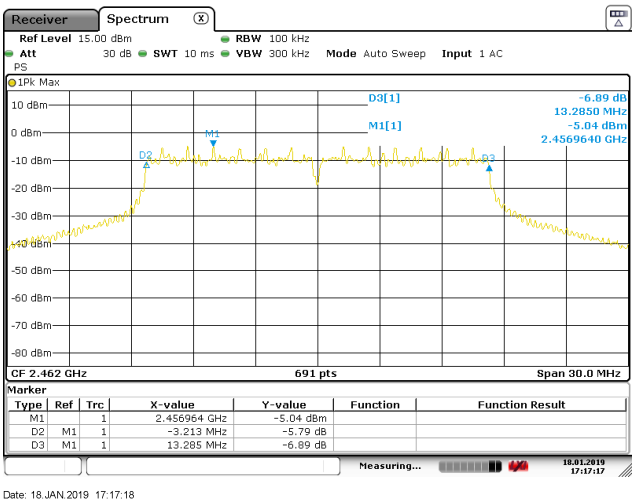


Date: 18.JAN.2019 17:15:38

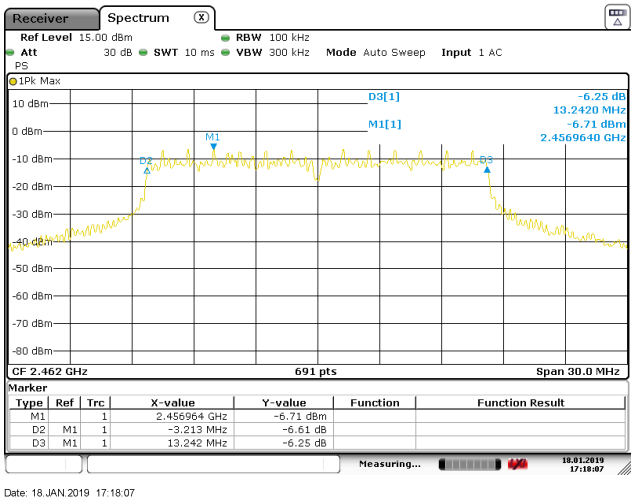
Data rate 18Mbit/s



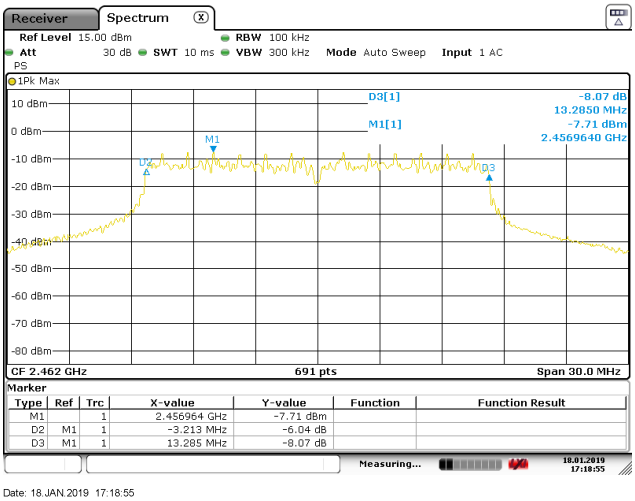
Data rate 24Mbit/s



Data rate 36Mbit/s



Data rate 48Mbit/s



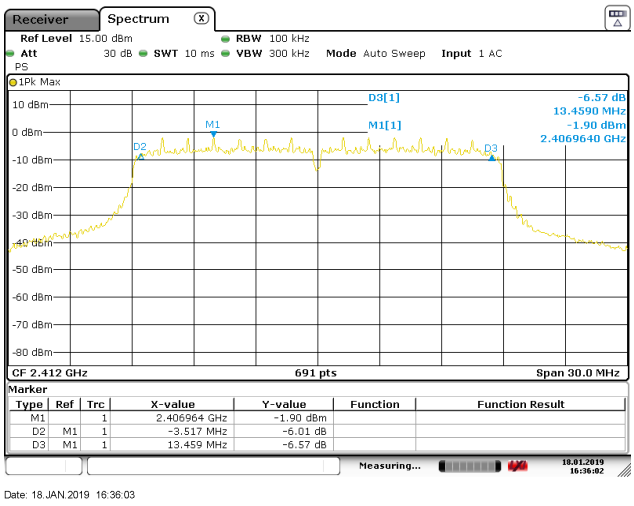
Data rate 54Mbit/s

Graphical representation of 6dB Bandwidth
Operation Mode: #2 – High Channel (2462 MHz)

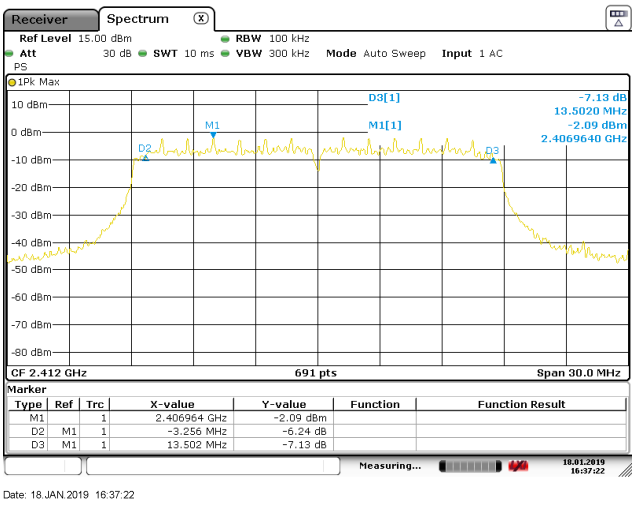
Channel (No.)	Frequency (MHz)	Data rate	Channel Bandwidth at -6dB (MHz)
High	2462	6Mbit/s	16,367
High	2462	9Mbit/s	16,367
High	2462	12Mbit/s	16,411
High	2462	18Mbit/s	16,455
High	2462	24Mbit/s	16,411
High	2462	36Mbit/s	16,498
High	2462	48Mbit/s	16,637
High	2462	54Mbit/s	16,498

Bandwidth at -6dB (Fmin and Fmax)				
6Mbit/s	Fmin	2453,795 MHz	Fmax	2470,162 MHz
9Mbit/s	Fmin	2453,795 MHz	Fmax	2470,162 MHz
12Mbit/s	Fmin	2453,751 MHz	Fmax	2470,162 MHz
18Mbit/s	Fmin	2453,751 MHz	Fmax	2470,206 MHz
24Mbit/s	Fmin	2453,795 MHz	Fmax	2470,206 MHz
36Mbit/s	Fmin	2453,751 MHz	Fmax	2470,249 MHz
48Mbit/s	Fmin	2453,751 MHz	Fmax	2470,206 MHz
54Mbit/s	Fmin	2453,751 MHz	Fmax	2470,249 MHz

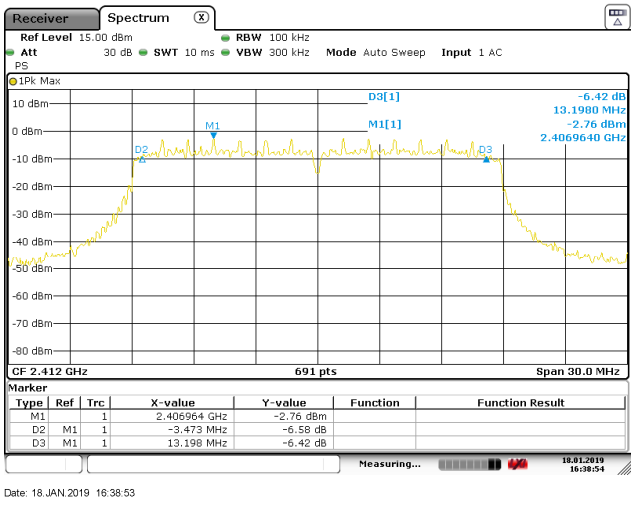
Graphical representation of 6dB Bandwidth
Operation Mode: #3 – Low Channel (2412 MHz)



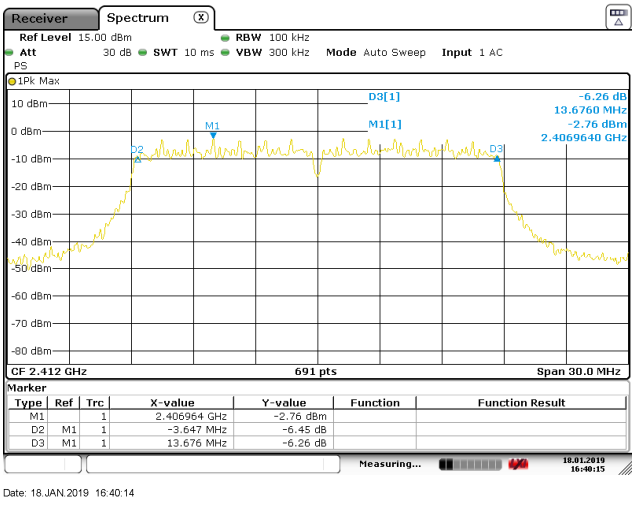
Data rate MCS0



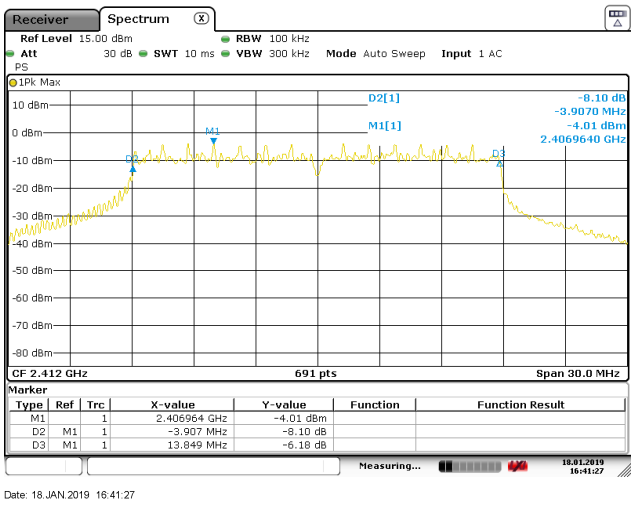
Data rate MCS1



Data rate MCS2

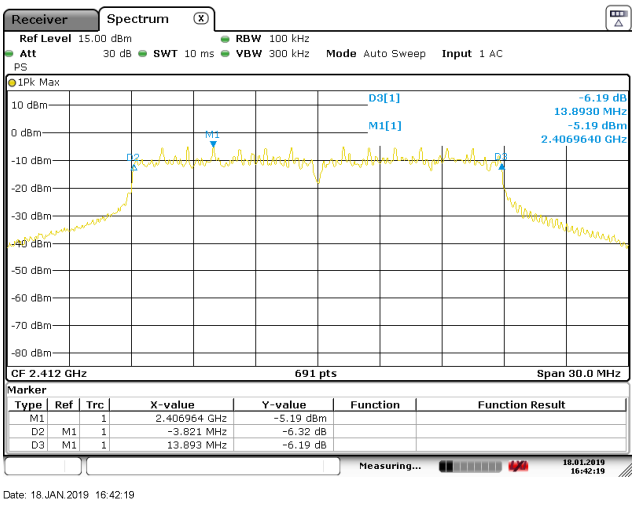


Data rate MCS3



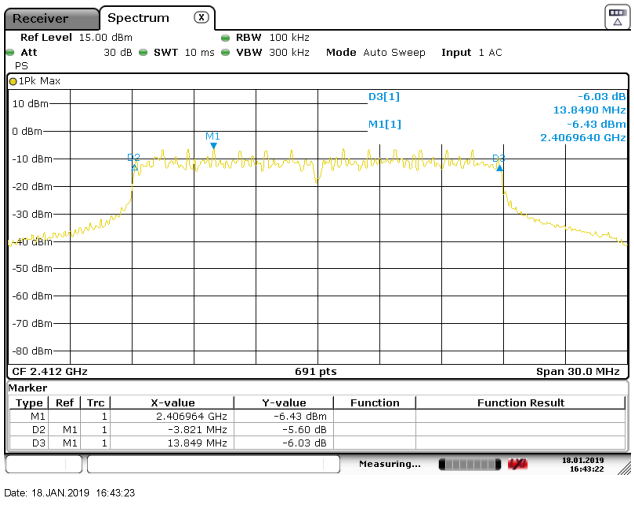
Date: 18.JAN.2019 16:41:27

Data rate MCS4



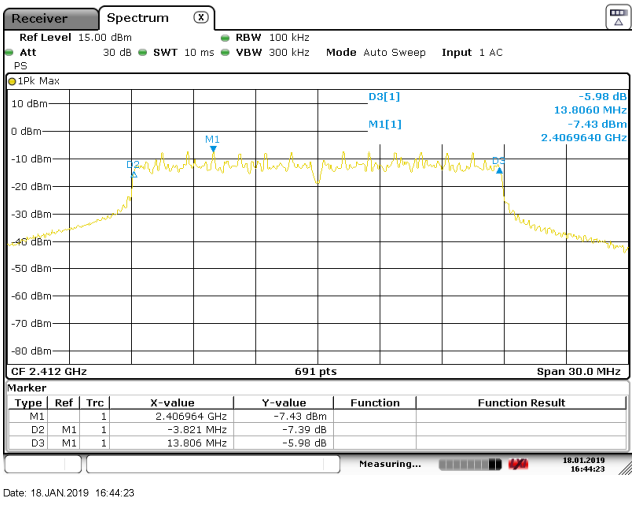
Date: 18.JAN.2019 16:42:19

Data rate MCS5



Date: 18.JAN.2019 16:43:23

Data rate MCS6



Date: 18.JAN.2019 16:44:23

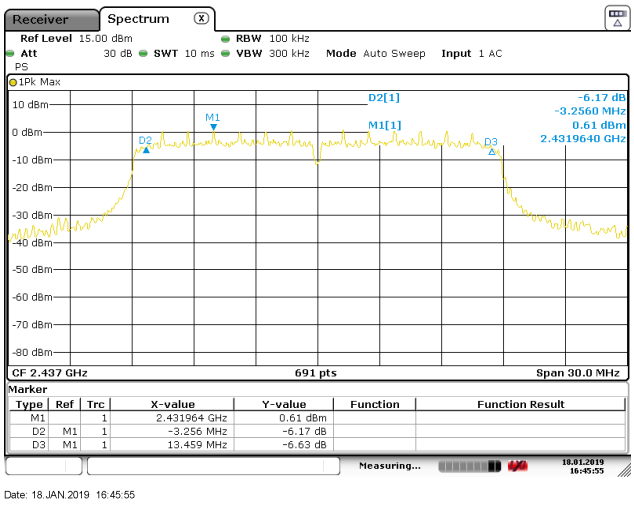
Data rate MCS7

Graphical representation of 6dB Bandwidth
Operation Mode: #3 – Low Channel (2412 MHz)

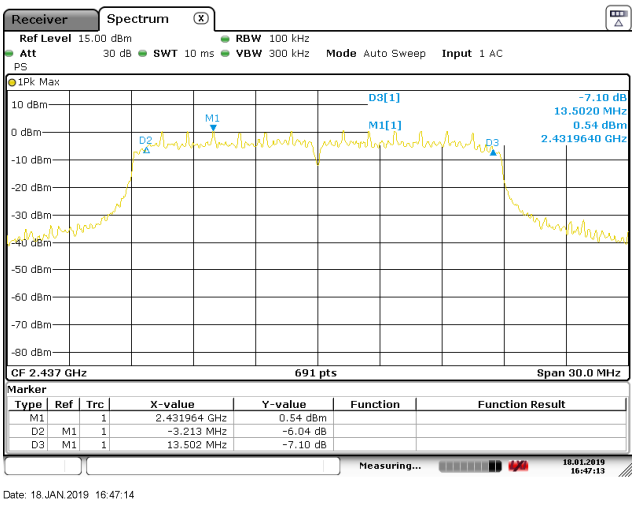
Channel (No.)	Frequency (MHz)	Data rate	Channel Bandwidth at -6dB (MHz)
Low	2412	MCS0	16,976
Low	2412	MCS1	16,758
Low	2412	MCS2	16,671
Low	2412	MCS3	17,323
Low	2412	MCS4	17,756
Low	2412	MCS5	17,714
Low	2412	MCS6	17,670
Low	2412	MCS7	17,627

Bandwidth at -6dB (Fmin and Fmax)				
MCS0	Fmin	2403,447 MHz	Fmax	2420,423 MHz
MCS1	Fmin	2403,708 MHz	Fmax	2420,466 MHz
MCS2	Fmin	2403,491 MHz	Fmax	2420,162 MHz
MCS3	Fmin	2403,317 MHz	Fmax	2420,640 MHz
MCS4	Fmin	2403,057 MHz	Fmax	2420,813 MHz
MCS5	Fmin	2403,143 MHz	Fmax	2420,857 MHz
MCS6	Fmin	2403,143 MHz	Fmax	2420,813 MHz
MCS7	Fmin	2403,143 MHz	Fmax	2420,770 MHz

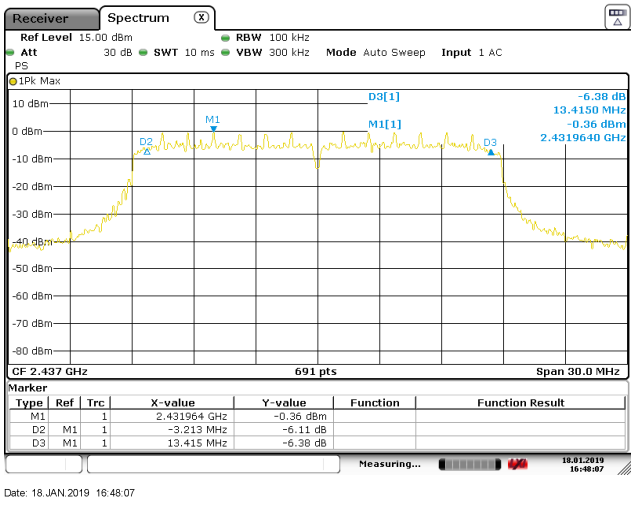
Graphical representation of 6dB Bandwidth
Operation Mode: #3 – Middle Channel (2437 MHz)



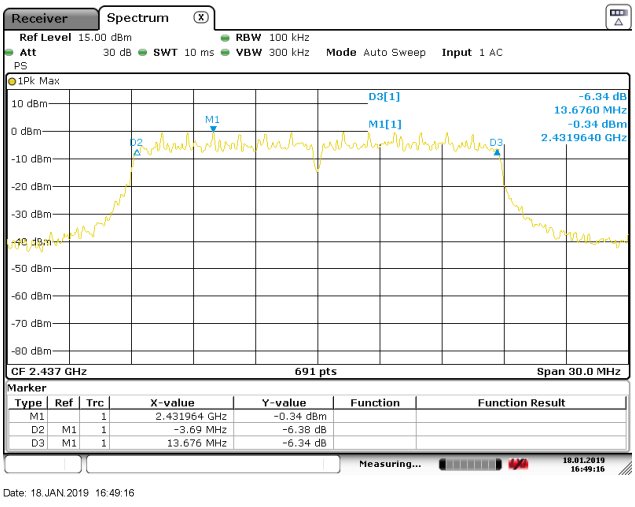
Data rate MCS0



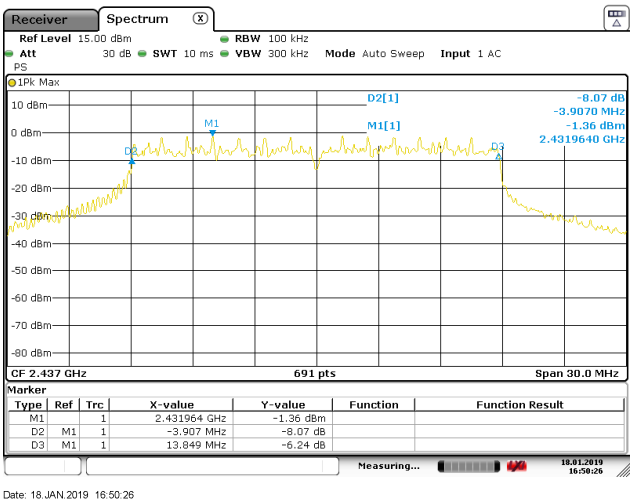
Data rate MCS1



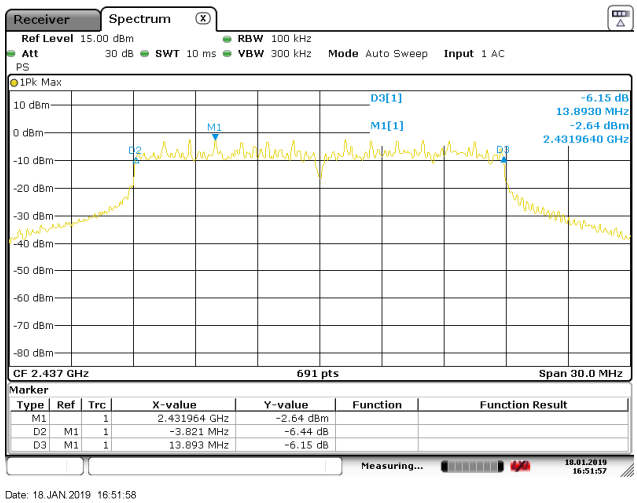
Data rate MCS2



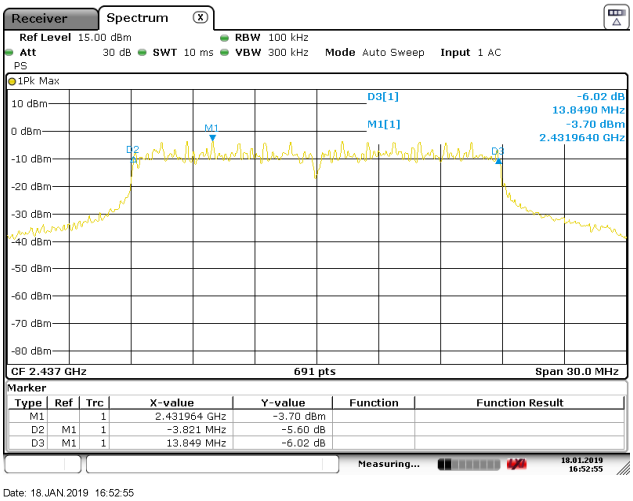
Data rate MCS3



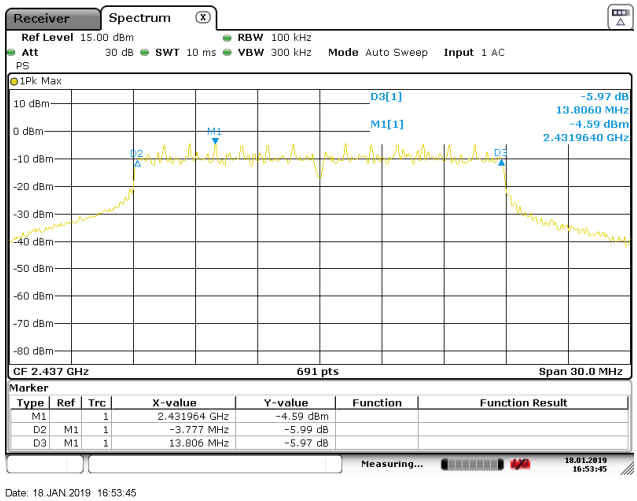
Data rate MCS4



Data rate MCS5



Data rate MCS6



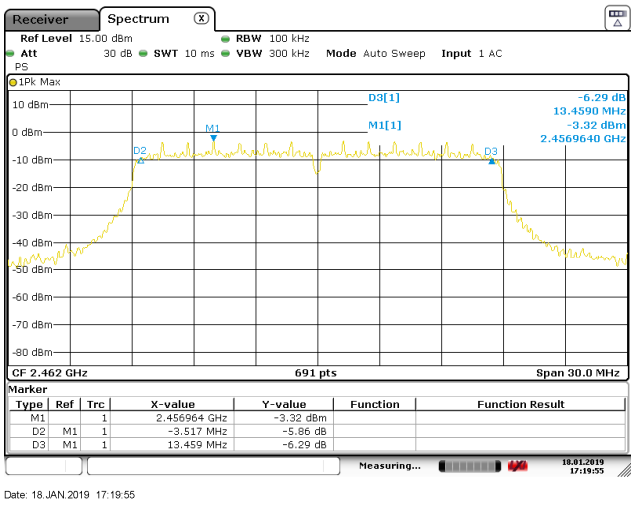
Data rate MCS7

Graphical representation of 6dB Bandwidth
Operation Mode: #3 – Middle Channel (2437 MHz)

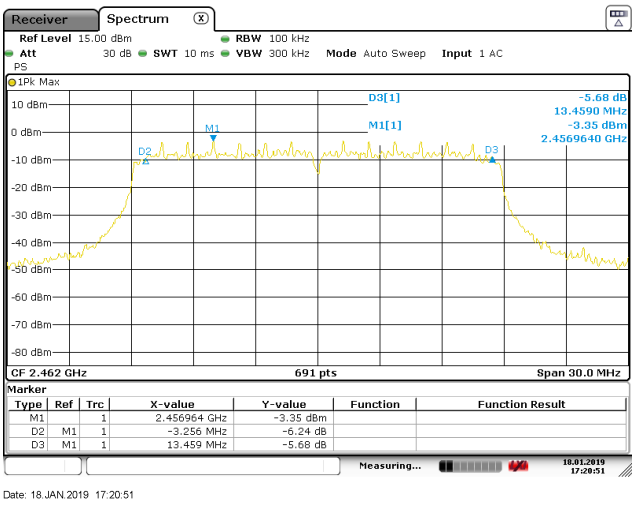
Channel (No.)	Frequency (MHz)	Data rate	Channel Bandwidth at -6dB (MHz)
Middle	2437	MCS0	16,715
Middle	2437	MCS1	16,715
Middle	2437	MCS2	16,628
Middle	2437	MCS3	17,366
Middle	2437	MCS4	17,756
Middle	2437	MCS5	17,714
Middle	2437	MCS6	17,670
Middle	2437	MCS7	17,583

Bandwidth at -6dB (Fmin and Fmax)				
MCS0	Fmin	2428,708 MHz	Fmax	2445,423 MHz
MCS1	Fmin	2428,751 MHz	Fmax	2445,466 MHz
MCS2	Fmin	2428,751 MHz	Fmax	2445,379 MHz
MCS3	Fmin	2428,274 MHz	Fmax	2445,640 MHz
MCS4	Fmin	2428,057 MHz	Fmax	2445,813 MHz
MCS5	Fmin	2428,143 MHz	Fmax	2445,857 MHz
MCS6	Fmin	2428,143 MHz	Fmax	2445,813 MHz
MCS7	Fmin	2428,187 MHz	Fmax	2445,770 MHz

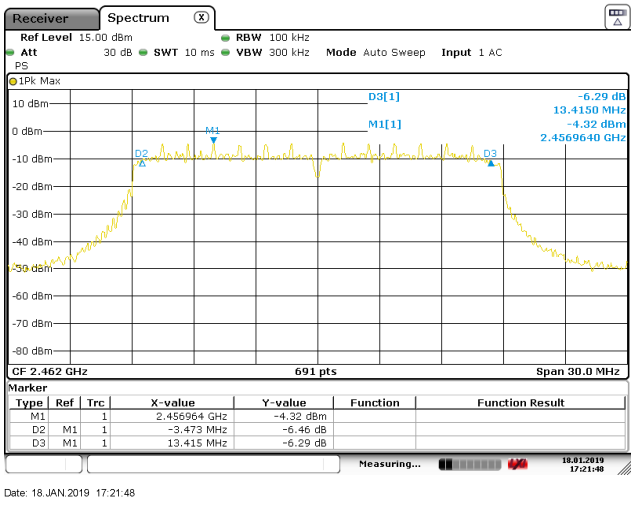
Graphical representation of 6dB Bandwidth
Operation Mode: #3 – High Channel (2462 MHz)



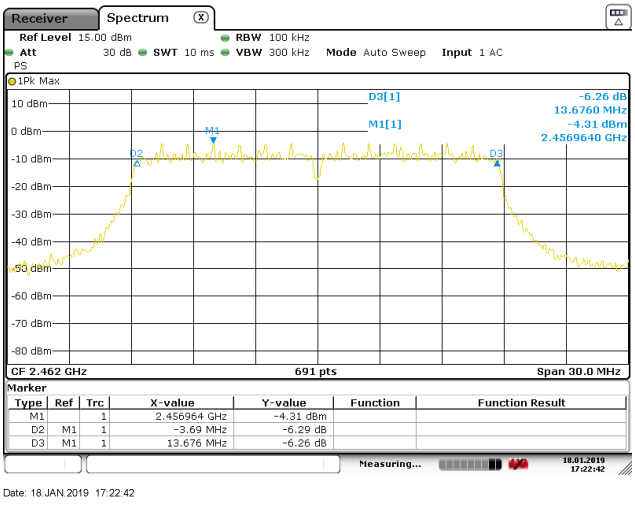
Data rate MCS0



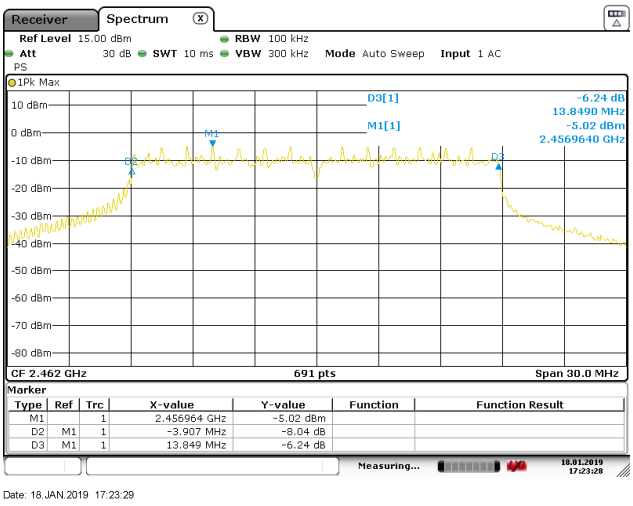
Data rate MCS1



Data rate MCS2

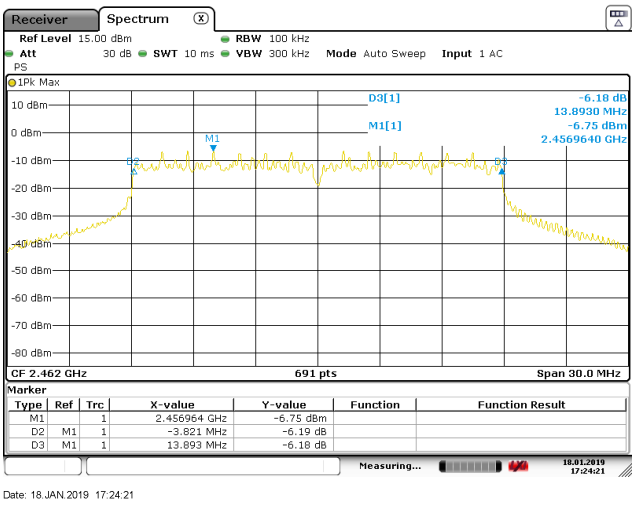


Data rate MCS3



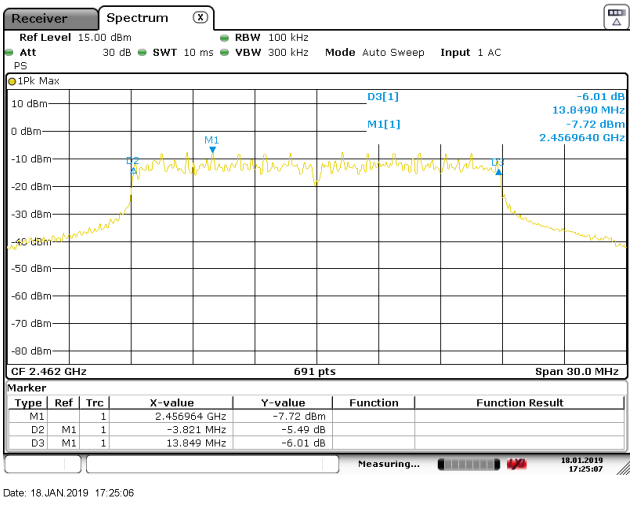
Date: 18.JAN.2019 17:23:29

Data rate MCS4



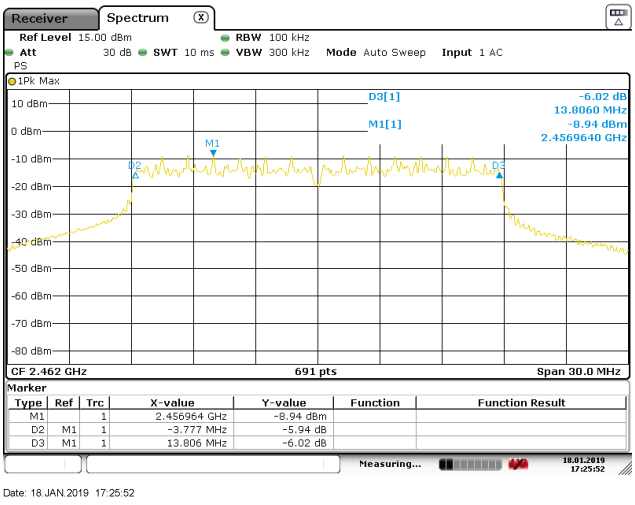
Date: 18.JAN.2019 17:24:21

Data rate MCS5



Date: 18.JAN.2019 17:25:06

Data rate MCS6



Date: 18.JAN.2019 17:25:52

Data rate MCS7

Graphical representation of 6dB Bandwidth
Operation Mode: #3 – High Channel (2462 MHz)

Channel (No.)	Frequency (MHz)	Data rate	Channel Bandwidth at -6dB (MHz)
High	2462	MCS0	16,976
High	2462	MCS1	16,715
High	2462	MCS2	16,888
High	2462	MCS3	17,366
High	2462	MCS4	17,756
High	2462	MCS5	17,714
High	2462	MCS6	17,670
High	2462	MCS7	17,583

Bandwidth at -6dB (Fmin and Fmax)				
MCS0	Fmin	2453,447 MHz	Fmax	2470,423 MHz
MCS1	Fmin	2453,708 MHz	Fmax	2470,423 MHz
MCS2	Fmin	2453,491 MHz	Fmax	2470,379 MHz
MCS3	Fmin	2453,274 MHz	Fmax	2470,640 MHz
MCS4	Fmin	2453,057 MHz	Fmax	2470,813 MHz
MCS5	Fmin	2453,143 MHz	Fmax	2470,857 MHz
MCS6	Fmin	2453,143 MHz	Fmax	2470,813 MHz
MCS7	Fmin	2453,187 MHz	Fmax	2470,770 MHz

11.4 TEST: RF power output, radiated (EIRP)			PASS
Parameters required prior to the test	Laboratory Ambient Temperature (°C)	15 to 35 °C	
	Relative Humidity (%)	30 to 60 %	
Parameters recorded during the test	Laboratory Ambient Temperature (°C)	22,5°C	
	Relative Humidity (%)	51%	
	Air pressure (hPa)	1020	
—	Power Supply / Frequency	Application Point	
Fully configured sample tested at the power line frequency	+3,7V dc	RF Connector	
Equipment mode:	Operation mode	#1 #2 #3	
FCC Standard	§15.247 (B) (3)		

(b) The maximum peak conducted output power of the intentional radiator shall not exceed the following:

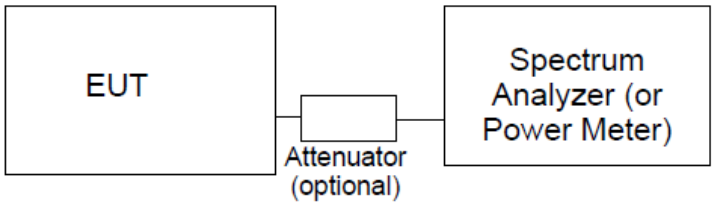
(1) For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

(2) For frequency hopping systems operating in the 902-928 MHz band: 1 watt for systems employing at least 50 hopping channels; and, 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels, as permitted under paragraph (a)(1)(i) of this section.

(3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

(4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Further information to test setup



Test Equipment Used					
Description	Manufacturer	Model	Identifier	Calibration date	Calibration due
EMI Test Receiver	R&S	ESR 3	2782768	12/2018	12/2019
Fast Power Sensor	R&S	NRP-Z81	87020796	04/2018	04/2019

Test Method Used
According to Par. 8.2.2.3 (Measurement using a power meter (PM)) of KDB 558074 D01 15.247 Meas Guidance v05r02 (and par. 11.9.2.3.2 of ANSI C63.10) **AVGPM-G (Measurement using a gated RF average-reading power meter)** Measurements has been performed using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since this measurement is made only during the ON time of the transmitter, no duty cycle correction is required.

Operation Mode: #1 - RF power output (Conducted)

Channel (No.)	Frequency (MHz)	Data rate (Mbit/s)	Conducted Output Power		Limit (W)
			(dBm)	(mW)	
Low	2412	1	12,74	18,79	1
Low	2412	2	12,61	18,23	1
Low	2412	5,5	12,65	18,40	1
Low	2412	11	12,62	18,28	1

Channel (No.)	Frequency (MHz)	Data rate (Mbit/s)	Conducted Output Power		Limit (W)
			(dBm)	(mW)	
Middle	2437	1	15,02	31,76	1
Middle	2437	2	14,98	31,47	1
Middle	2437	5,5	14,91	30,97	1
Middle	2437	11	14,95	31,26	1

Channel (No.)	Frequency (MHz)	Data rate (Mbit/s)	Conducted Output Power		Limit (W)
			(dBm)	(mW)	
High	2462	1	11,91	15,52	1
High	2462	2	11,78	15,06	1
High	2462	5,5	11,88	15,41	1
High	2462	11	11,80	15,13	1

Operation Mode: #2 - RF power output (Conducted)

Channel (No.)	Frequency (MHz)	Data rate (Mbit/s)	Conducted Output Power		Limit (W)
			(dBm)	(mW)	
Low	2412	6	12,35	17,18	1
Low	2412	9	12,32	17,06	1
Low	2412	12	12,34	17,14	1
Low	2412	18	11,37	13,70	1
Low	2412	24	11,45	13,96	1
Low	2412	36	10,74	11,85	1
Low	2412	48	8,56	7,17	1
Low	2412	54	7,54	5,67	1

Channel (No.)	Frequency (MHz)	Data rate (Mbit/s)	Conducted Output Power		Limit (W)
			(dBm)	(mW)	
Middle	2437	6	14,81	30,27	1
Middle	2437	9	14,72	29,64	1
Middle	2437	12	14,76	29,92	1
Middle	2437	18	13,76	23,76	1
Middle	2437	24	13,75	23,71	1
Middle	2437	36	13,08	20,32	1
Middle	2437	48	10,89	12,27	1
Middle	2437	54	10,03	10,07	1

Channel (No.)	Frequency (MHz)	Data rate (Mbit/s)	Conducted Output Power		Limit (W)
			(dBm)	(mW)	
High	2462	6	11,73	14,89	1
High	2462	9	11,73	14,89	1
High	2462	12	11,71	14,82	1
High	2462	18	10,39	10,94	1
High	2462	24	10,42	11,01	1
High	2462	36	9,49	8,89	1
High	2462	48	7,50	5,62	1

High	2462	54	6,67	4,64	1

Operation Mode: #3 - RF power output (Conducted)

Channel (No.)	Frequency (MHz)	Data rate (Mbit/s)	Conducted Output Power		Limit (W)
			(dBm)	(mW)	
Low	2412	MCS0	12,28	16,90	1
Low	2412	MCS1	12,24	16,75	1
Low	2412	MCS2	11,29	13,45	1
Low	2412	MCS3	11,28	13,42	1
Low	2412	MCS4	10,70	11,74	1
Low	2412	MCS5	8,93	7,81	1
Low	2412	MCS6	7,59	5,74	1
Low	2412	MCS7	6,43	4,39	1

Channel (No.)	Frequency (MHz)	Data rate (Mbit/s)	Conducted Output Power		Limit (W)
			(dBm)	(mW)	
Middle	2437	MCS0	14,68	29,37	1
Middle	2437	MCS1	14,64	29,10	1
Middle	2437	MCS2	13,64	23,12	1
Middle	2437	MCS3	13,69	23,38	1
Middle	2437	MCS4	13,09	20,37	1
Middle	2437	MCS5	11,32	13,55	1
Middle	2437	MCS6	10,03	10,06	1
Middle	2437	MCS7	8,99	7,92	1

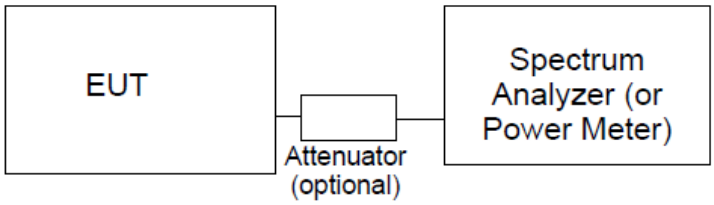
Channel (No.)	Frequency (MHz)	Data rate (Mbit/s)	Conducted Output Power		Limit (W)
			(dBm)	(mW)	
High	2462	MCS0	11,68	14,72	1
High	2462	MCS1	11,63	14,55	1
High	2462	MCS2	10,36	10,86	1
High	2462	MCS3	10,38	10,91	1
High	2462	MCS4	9,49	8,89	1
High	2462	MCS5	7,99	6,29	1
High	2462	MCS6	6,68	4,65	1

High	2462	MCS7	5,06	3,20	1

11.5 TEST: Out-of-band emissions			PASS
Parameters required prior to the test	Laboratory Ambient Temperature (°C)	15 to 35 °C	
	Relative Humidity (%)	30 to 60 %	
Parameters recorded during the test	Laboratory Ambient Temperature (°C)	22°C	
	Relative Humidity (%)	50%	
	Air pressure (hPa)	1020	
—	Power Supply / Frequency	Application Point	
Fully configured sample tested at the power line frequency	+3,7V dc	RF Connector	
Equipment mode:	Operation mode	#1 #2 #3	
FCC Standard	§15.247 (D)		

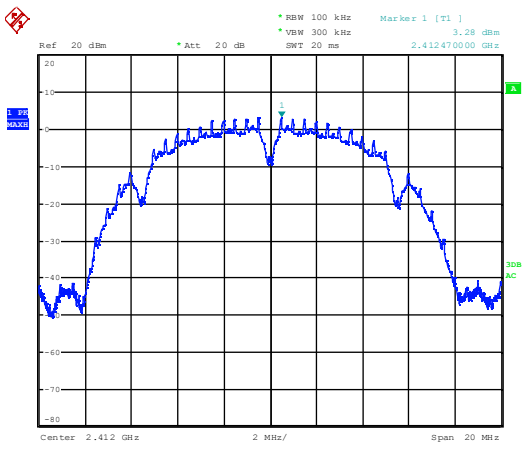
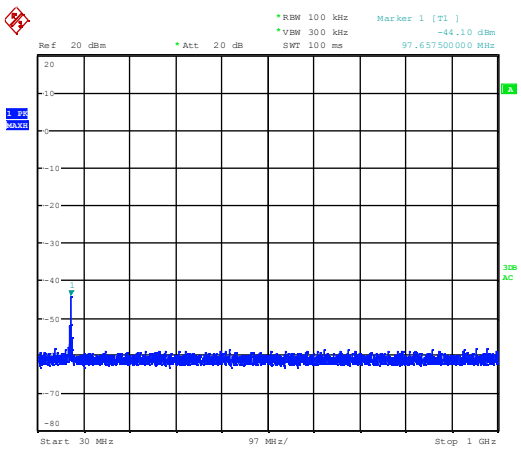
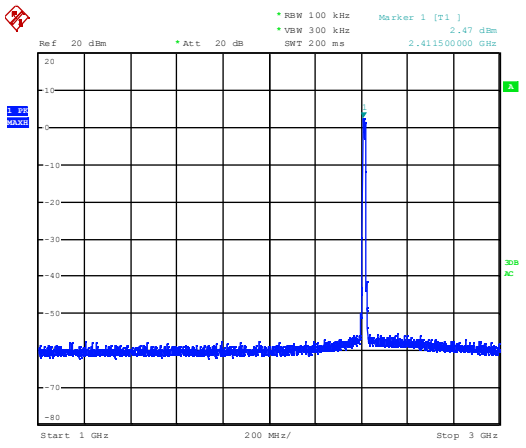
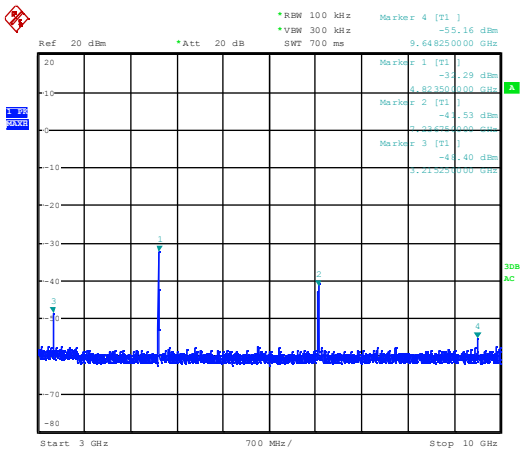
(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, 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, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, 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)).

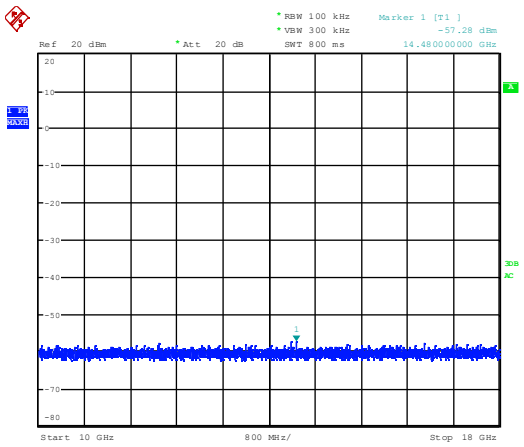
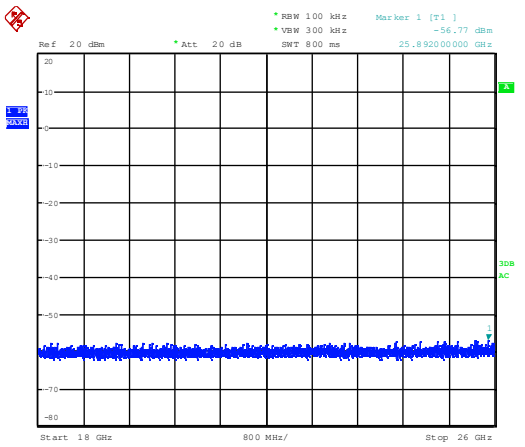
Further information to test setup



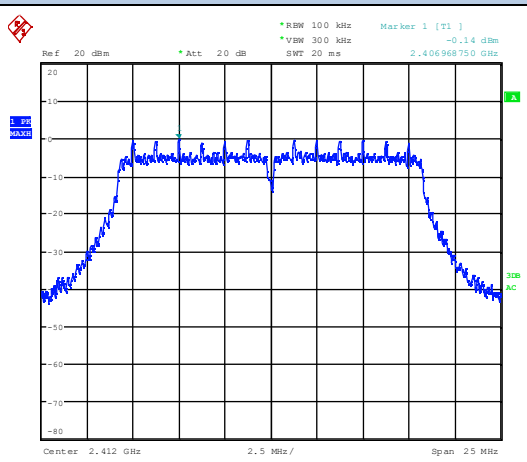
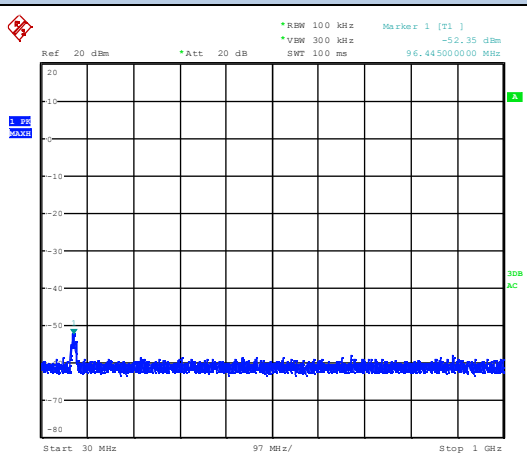
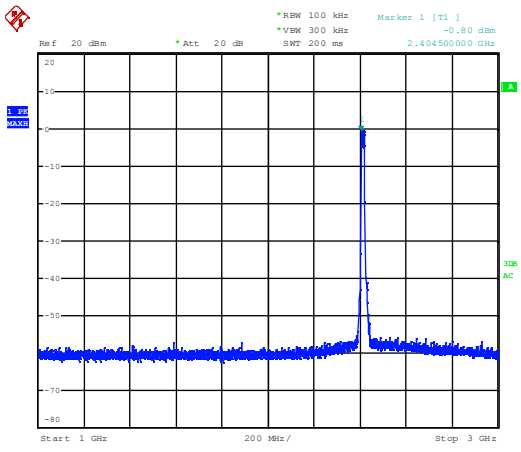
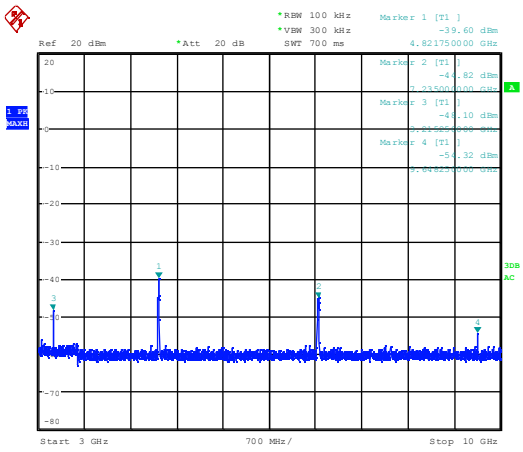
Test Equipment Used					
Description	Manufacturer	Model	Identifier	Calibration date	Calibration due
EMI Test Receiver	R&S	ESU 40	2782345	05/2018	05/2019
Highpass Filter	Wainwright Instr.	WHKX10-2520-2800	2782704	05/2018	05/2019

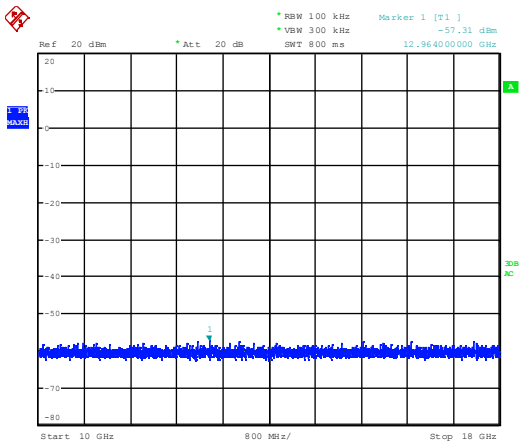
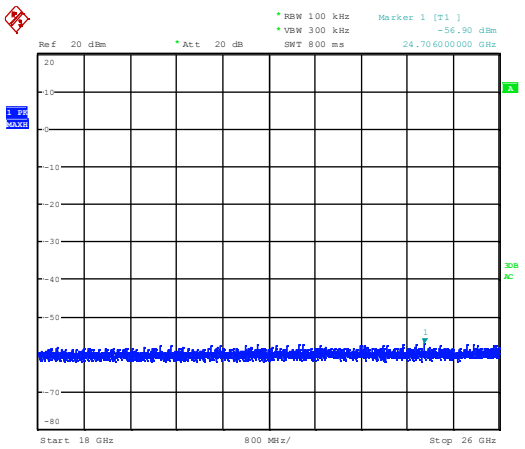
Test Method Used
According to Par. 8.5 of KDB 558074 D01 15.247 Meas Guidance v05r02 (and par. 11.11 of ANSI C63.10) If maximum conducted (average) output power was used to determine compliance as described in 11.9.2, then the peak power in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum in-band peak PSD level in 100 kHz (i.e., 30 dBc).

Graphical representation of Antenna Port Spurious Emission - Conducted	
Operation Mode: #1 – Low Channel (2412 MHz) – 1Mbit/s (worst case)	
Fundamental	Frequency: 30MHz – 1000MHz
	
Frequency: 1GHz – 3GHz	Frequency: 3GHz – 10GHz
	

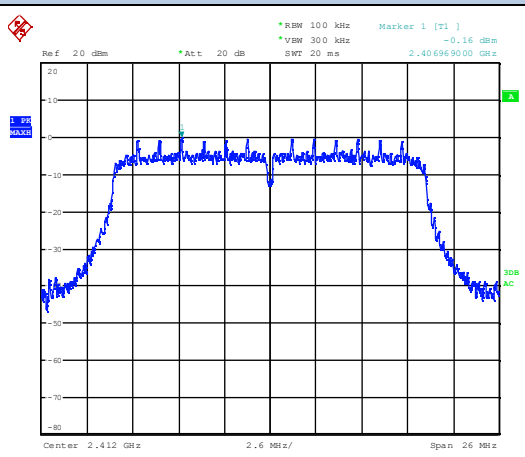
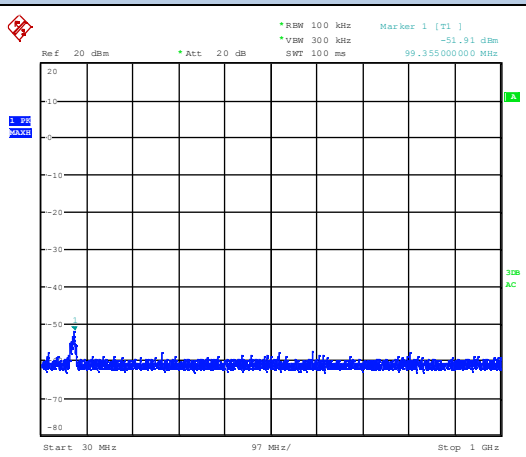
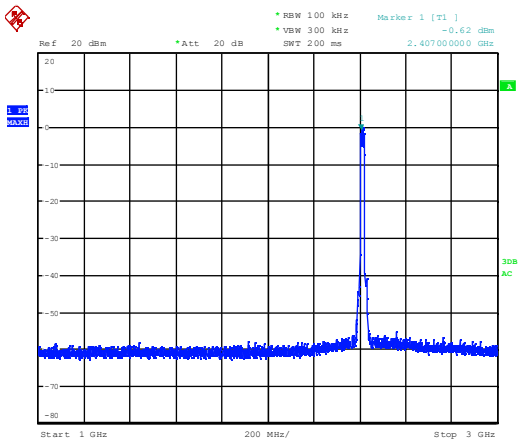
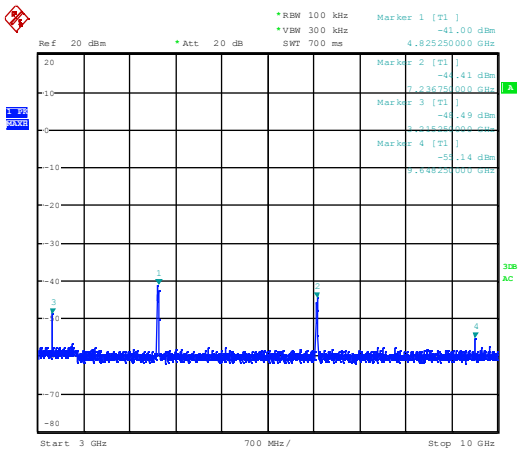
Frequency: 10GHz – 18GHz	Frequency: 18GHz – 26GHz
	

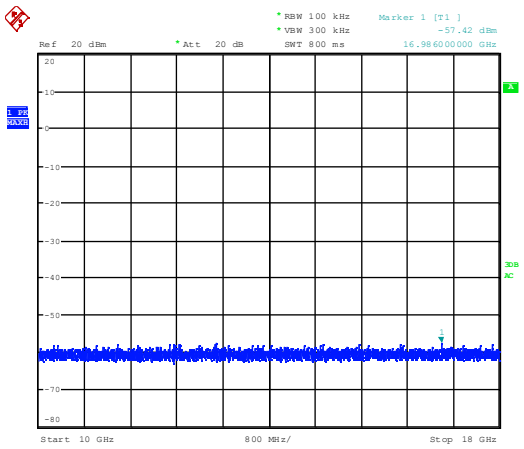
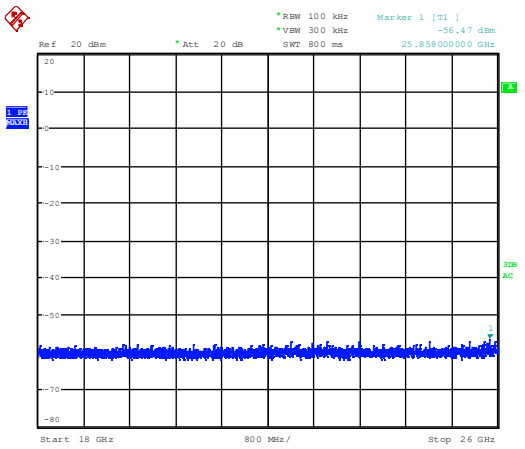
Frequency (MHz)	Measured power (dBm)	Fundamental Level (dBm)	Difference Peak / Spurious (dB)	Peak Limit at PK power –30dB (dBm)	Margin (dB)
97,65	**-44,19**		**47,47**		**17,47**
3215,25	**-48,40**		**51,68**		**21,68**
4823,50	**-32,29**		**35,57**		**5,57**
7236,75	**-41,53**	**+3,28**	**44,81**	**-26,72**	**14,81**
9648,25	**-55,16**		**58,44**		**28,44**
14480,0	**-57,28**		**60,56**		**30,56**
25892,00	**-56,77**		**60,05**		**30,05**

Graphical representation of Antenna Port Spurious Emission - Conducted	
Operation Mode: #2 – Low Channel (2412 MHz) – 6Mbit/s (worst case)	
Fundamental	Frequency: 30MHz – 1000MHz
	
Frequency: 1GHz – 3GHz	Frequency: 3GHz – 10GHz
	

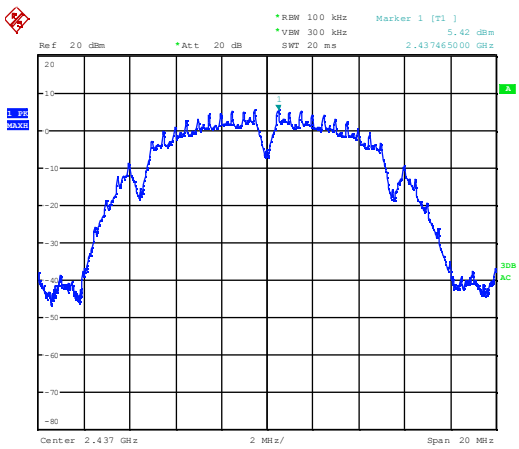
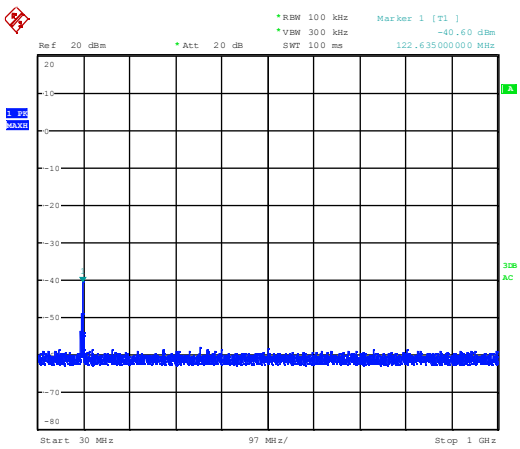
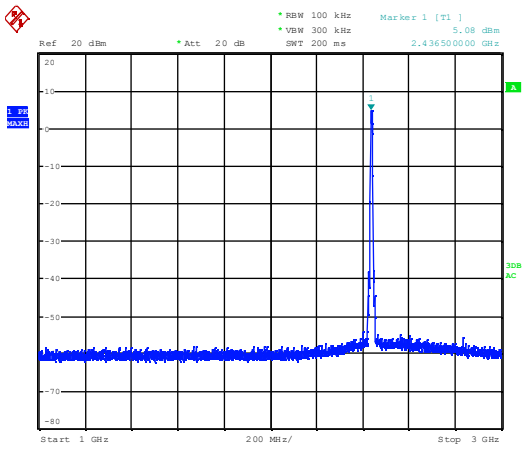
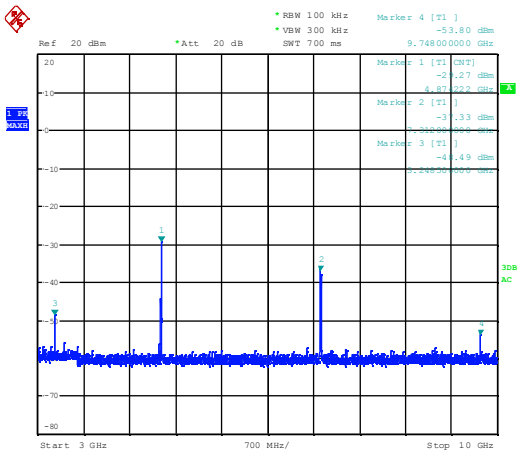
Frequency: 10GHz – 18GHz	Frequency: 18GHz – 26GHz
	

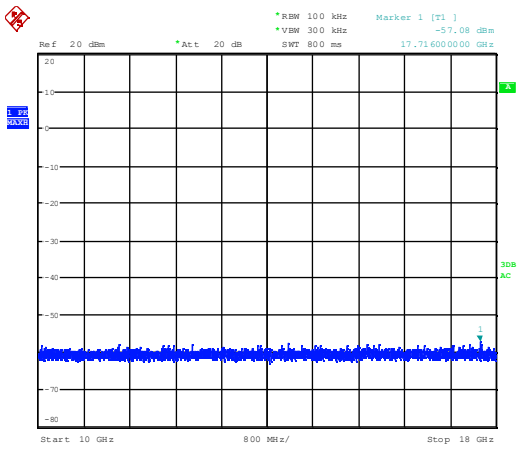
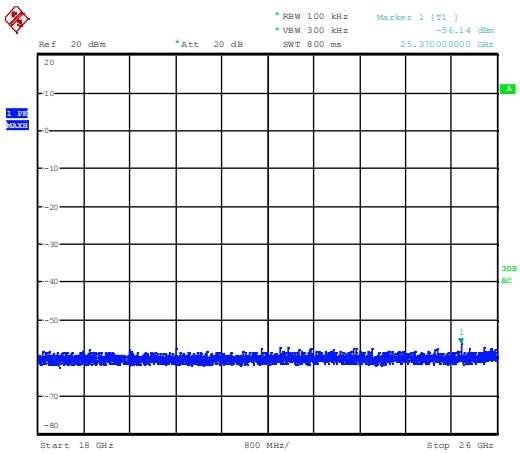
Frequency (MHz)	Measured power (dBm)	Fundamental Level (dBm)	Difference Peak / Spurious (dB)	Peak Limit at PK power –30dB (dBm)	Margin (dB)
96,44	**-52,35**		**52,21**		**22,21**
3215,25	**-48,10**		**47,96**		**17,96**
4821,75	**-39,60**		**39,46**		**9,46**
7235,00	**-44,82**	**-0,14**	**44,68**	**-30,14**	**14,68**
9648,25	**-54,32**		**54,18**		**24,18**
12964,0	**-57,31**		**57,17**		**27,17**
24706,00	**-56,90**		**56,76**		**26,76**

Graphical representation of Antenna Port Spurious Emission - Conducted	
Operation Mode: #3 – Low Channel (2412 MHz) – MCS0 (worst case)	
Fundamental	Frequency: 30MHz – 1000MHz
	
Frequency: 1GHz – 3GHz	Frequency: 3GHz – 10GHz
	

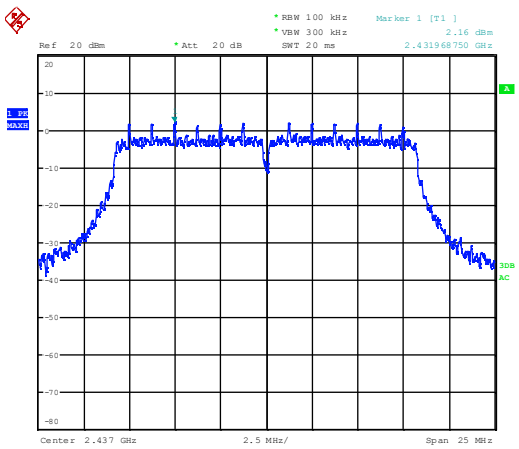
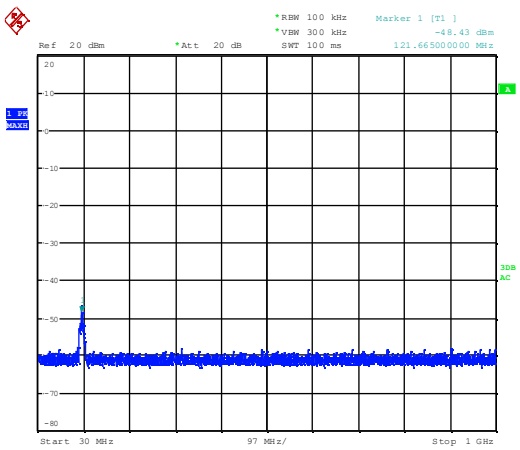
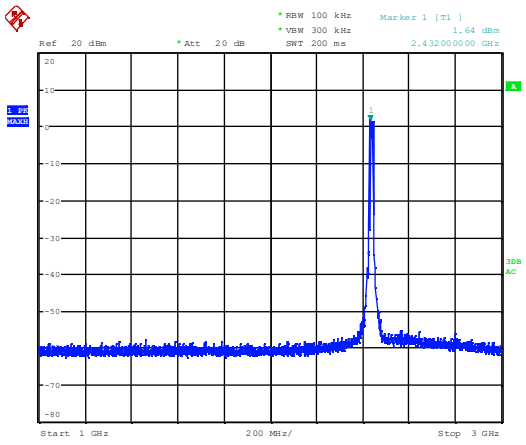
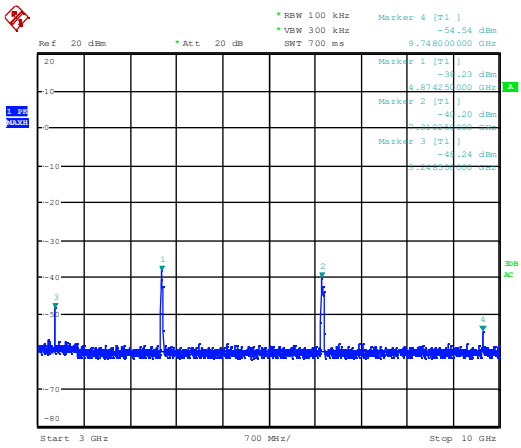
Frequency: 10GHz – 18GHz	Frequency: 18GHz – 26GHz
	

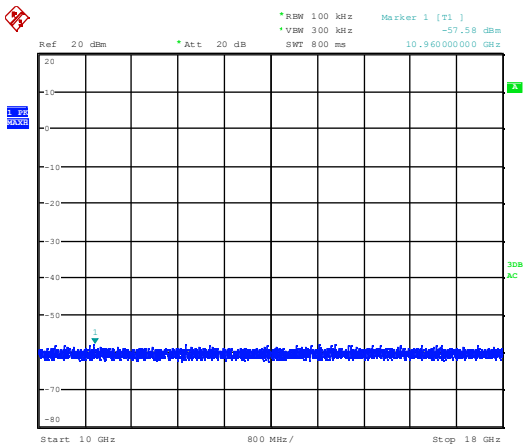
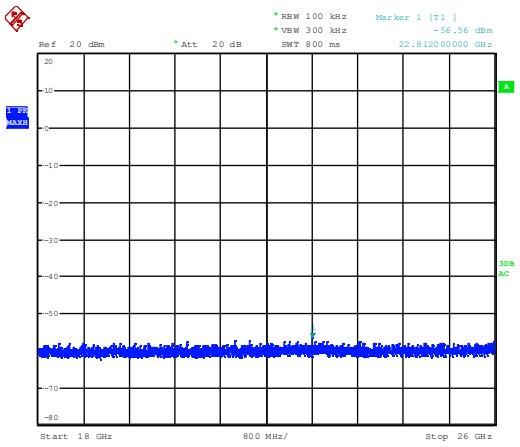
Frequency (MHz)	Measured power (dBm)	Fundamental Level (dBm)	Difference Peak / Spurious (dB)	Peak Limit at PK power –30dB (dBm)	Margin (dB)
99,35	**-51,91**		**51,75**		**21,75**
3215,25	**-48,49**		**48,33**		**18,33**
4825,25	**-41,00**		**40,84**		**10,84**
7236,75	**-44,41**	**-0,16**	**44,25**	**-30,16**	**14,25**
9648,25	**-55,14**		**54,98**		**24,98**
16986,0	**-57,42**		**57,26**		**27,26**
25858,0	**-56,47**		**56,31**		**26,31**

Graphical representation of Antenna Port Spurious Emission - Conducted	
Operation Mode: #1 – Middle Channel (2437 MHz) – 1Mbit/s (worst case)	
Fundamental	Frequency: 30MHz – 1000MHz
	
Frequency: 1GHz – 3GHz	Frequency: 3GHz – 10GHz
	

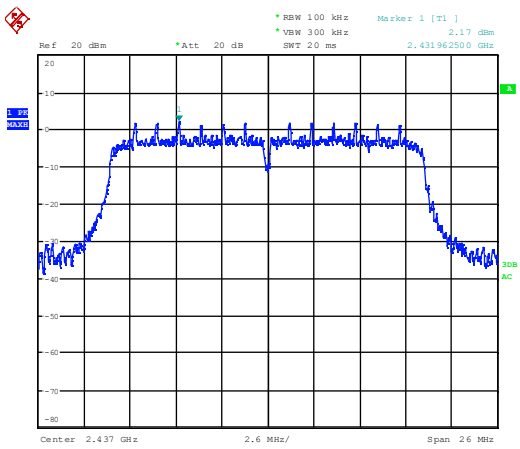
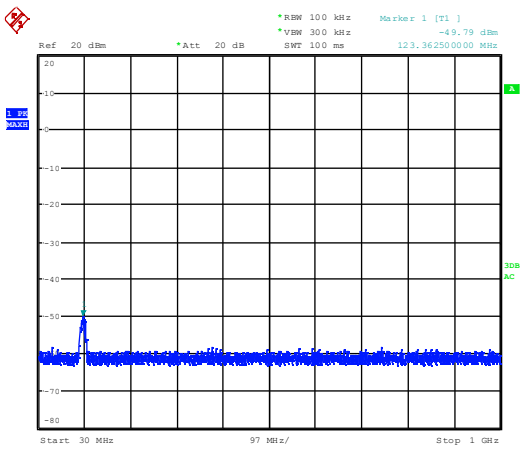
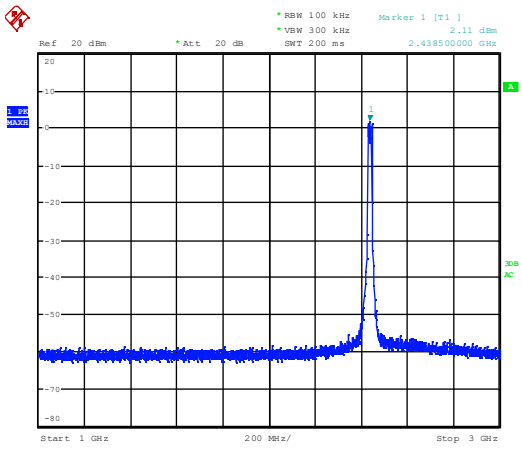
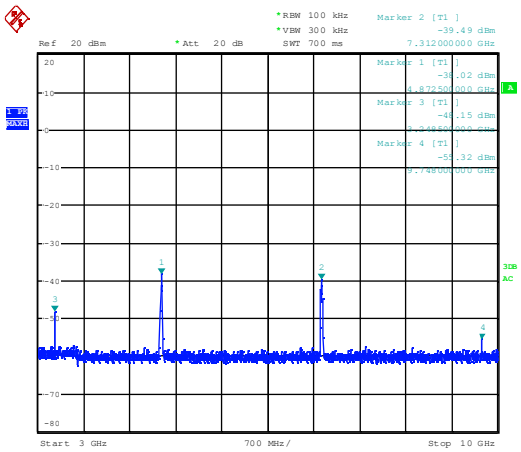
Frequency: 10GHz – 18GHz	Frequency: 18GHz – 26GHz
	

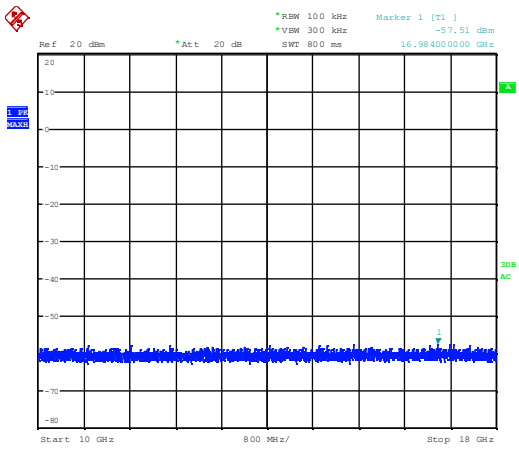
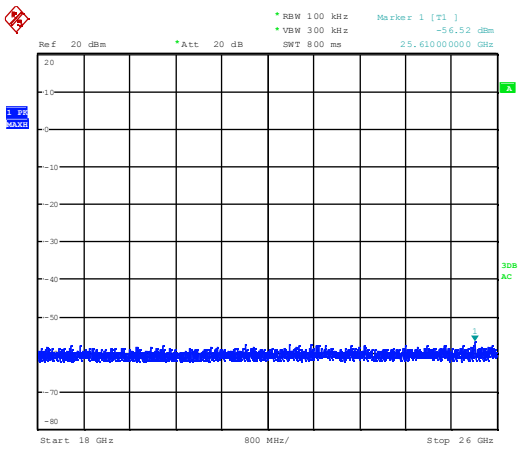
Frequency (MHz)	Measured power (dBm)	Fundamental Level (dBm)	Difference Peak / Spurious (dB)	Peak Limit at PK power –30dB (dBm)	Margin (dB)
122,63	**-40,60**		**46,02**		**16,02**
3248,50	**-48,49**		**53,91**		**23,91**
4874,22	**-29,27**		**34,69**		**4,69**
7312,00	**-37,33**	**5,42**	**42,75**	**-24,58**	**12,75**
9748,00	**-53,80**		**59,22**		**29,22**
17716,0	**-57,08**		**62,50**		**32,50**
25370,0	**-56,14**		**61,56**		**31,56**

Graphical representation of Antenna Port Spurious Emission - Conducted	
Operation Mode: #2 – Middle Channel (2437 MHz) – 6Mbit/s (worst case)	
Fundamental	Frequency: 30MHz – 1000MHz
	
Frequency: 1GHz – 3GHz	Frequency: 3GHz – 10GHz
	

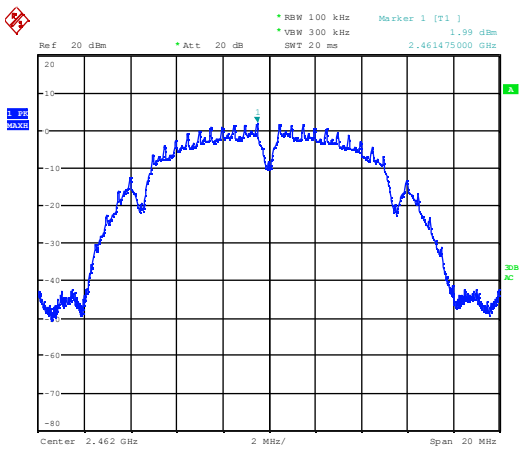
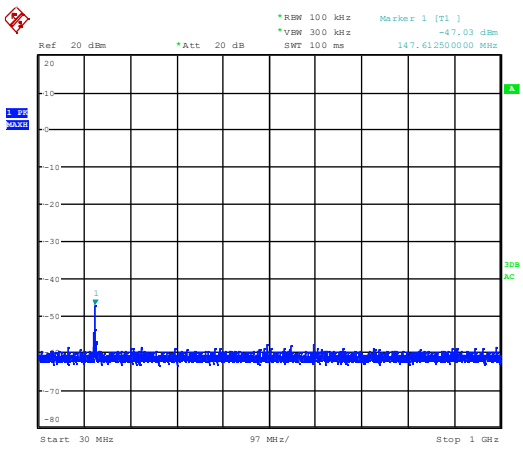
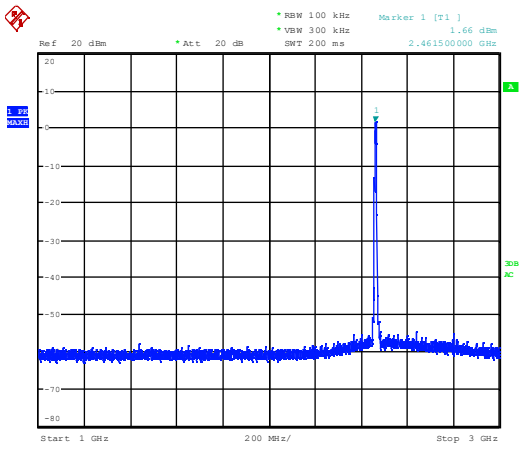
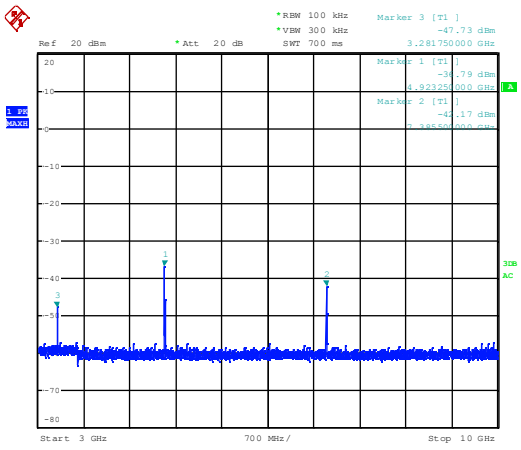
Frequency: 10GHz – 18GHz	Frequency: 18GHz – 26GHz
	

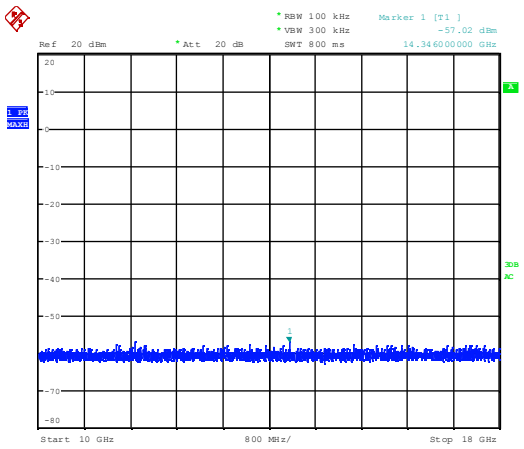
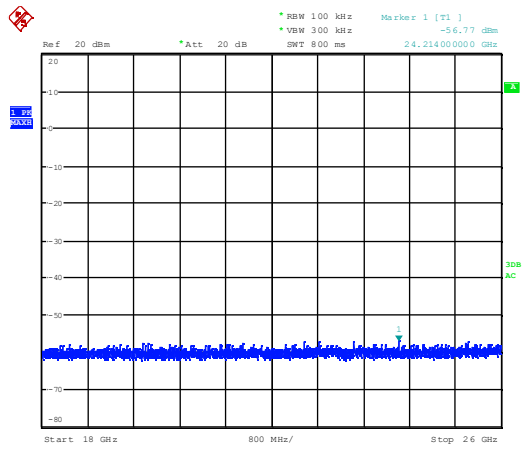
Frequency (MHz)	Measured power (dBm)	Fundamental Level (dBm)	Difference Peak / Spurious (dB)	Peak Limit at PK power –30dB (dBm)	Margin (dB)
121,66	**-48,43**		**50,59**		**20,59**
3248,50	**-48,24**		**50,40**		**20,40**
4874,25	**-38,23**		**40,39**		**10,39**
7310,25	**-40,20**	**2,16**	**42,36**	**-27,84**	**12,36**
9748,00	**-54,54**		**56,70**		**26,70**
10960,0	**-57,58**		**59,74**		**29,74**
22812,0	**-56,56**		**58,72**		**28,72**

Graphical representation of Antenna Port Spurious Emission - Conducted	
Operation Mode: #3 – Middle Channel (2437 MHz) – MCS0 (worst case)	
Fundamental	Frequency: 30MHz – 1000MHz
	
Frequency: 1GHz – 3GHz	Frequency: 3GHz – 10GHz
	

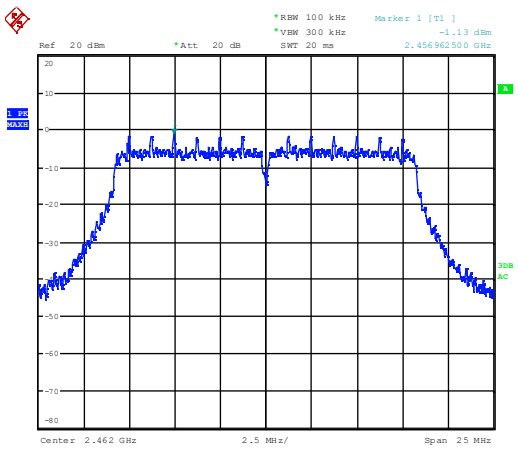
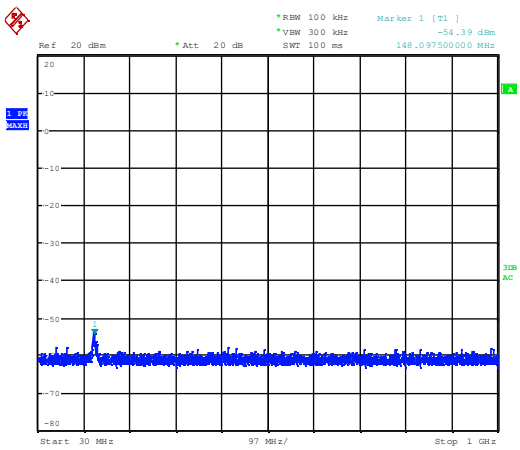
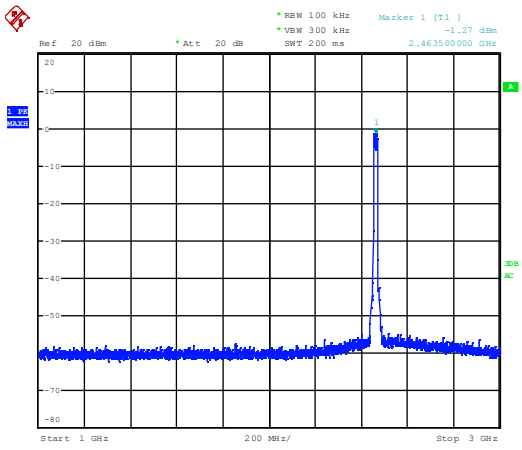
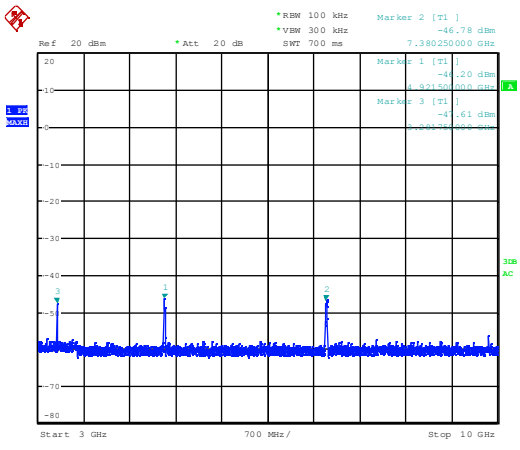
Frequency: 10GHz – 18GHz	Frequency: 18GHz – 26GHz
	

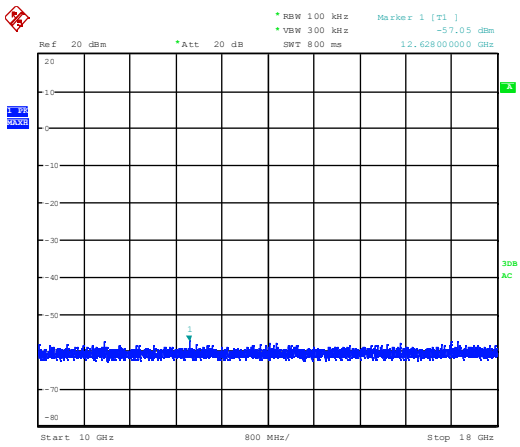
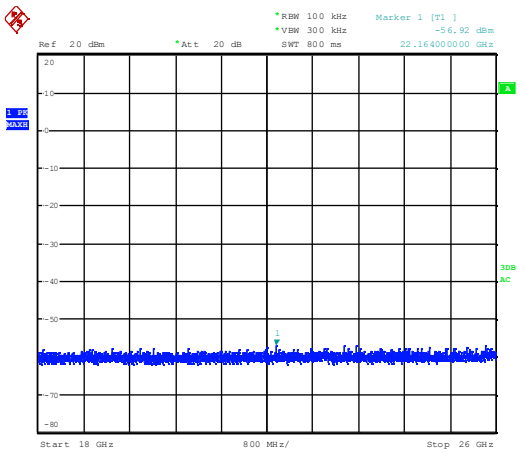
Frequency (MHz)	Measured power (dBm)	Fundamental Level (dBm)	Difference Peak / Spurious (dB)	Peak Limit at PK power –30dB (dBm)	Margin (dB)
123,36	**-49,79**		**51,96**		**21,96**
3248,50	**-48,15**		**50,32**		**20,32**
4872,50	**-38,02**		**40,19**		**10,19**
7312,00	**-39,49**	**2,17**	**41,66**	**-27,83**	**11,66**
9748,00	**-55,32**		**57,49**		**27,49**
16984,0	**-57,51**		**59,68**		**29,68**
25610,0	**-56,52**		**58,69**		**28,69**

Graphical representation of Antenna Port Spurious Emission - Conducted	
Operation Mode: #1 – High Channel (2462 MHz) – 1Mbit/s (worst case)	
Fundamental	Frequency: 30MHz – 1000MHz
	
Frequency: 1GHz – 3GHz	Frequency: 3GHz – 10GHz
	

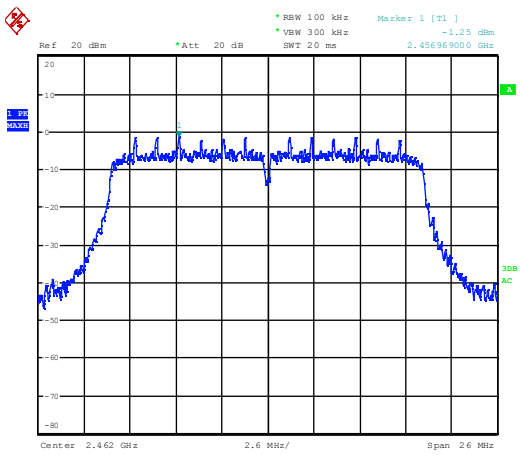
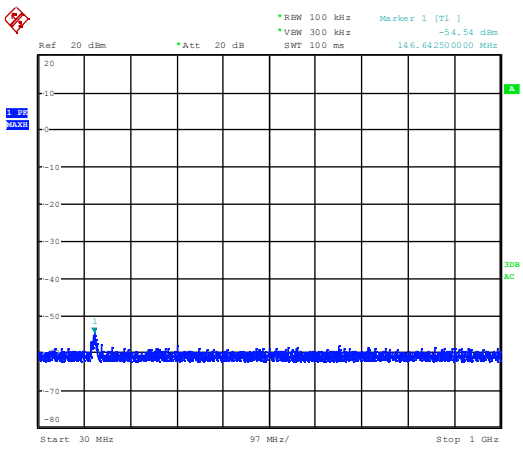
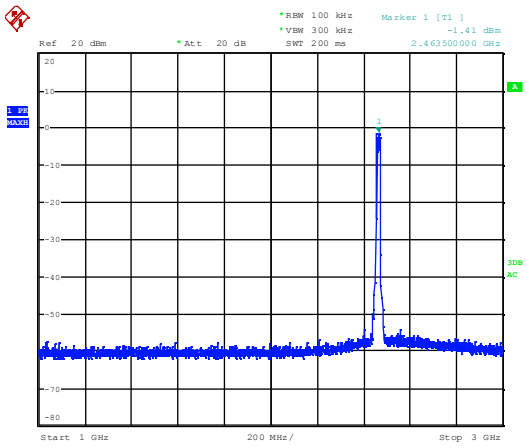
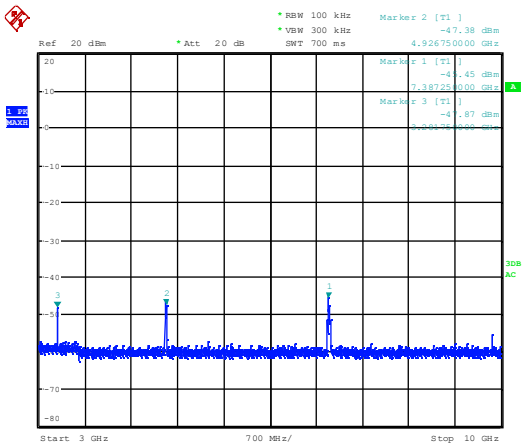
Frequency: 10GHz – 18GHz	Frequency: 18GHz – 26GHz
	

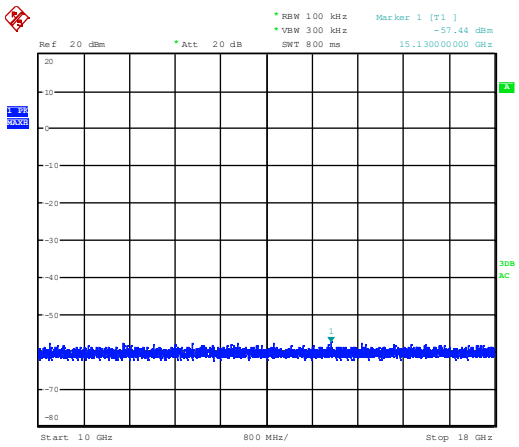
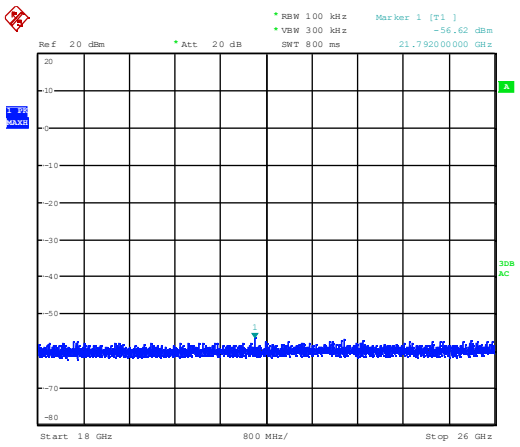
Frequency (MHz)	Measured power (dBm)	Fundamental Level (dBm)	Difference Peak / Spurious (dB)	Peak Limit at PK power –30dB (dBm)	Margin (dB)
147,61	**-47,03**	**1,99**	**49,02**	**-28,01**	**19,02**
3281,75	**-47,73**		**49,72**		**19,72**
4923,25	**-36,79**		**38,78**		**8,78**
7385,50	**-42,17**		**44,16**		**14,16**
14346,0	**-57,02**		**59,01**		**29,01**
24214,0	**-56,77**		**58,76**		**28,76**

Graphical representation of Antenna Port Spurious Emission - Conducted	
Operation Mode: #2 – High Channel (2462 MHz) – 6Mbit/s (worst case)	
Fundamental	Frequency: 30MHz – 1000MHz
	
Frequency: 1GHz – 3GHz	Frequency: 3GHz – 10GHz
	

Frequency: 10GHz – 18GHz	Frequency: 18GHz – 26GHz
	

Frequency (MHz)	Measured power (dBm)	Fundamental Level (dBm)	Difference Peak / Spurious (dB)	Peak Limit at PK power –30dB (dBm)	Margin (dB)
148,09	**-54,39**	**-1,13**	**53,26**	**-31,13**	**23,26**
3281,75	**-47,61**		**46,48**		**16,48**
4921,50	**-46,20**		**45,07**		**15,07**
7380,25	**-46,78**		**45,65**		**15,65**
12628,0	**-57,05**		**55,92**		**25,92**
22164,0	**-56,92**		**55,79**		**25,79**

Graphical representation of Antenna Port Spurious Emission - Conducted	
Operation Mode: #3 – High Channel (2462 MHz) – MCS0 (worst case)	
Fundamental	Frequency: 30MHz – 1000MHz
	
Frequency: 1GHz – 3GHz	Frequency: 3GHz – 10GHz
	

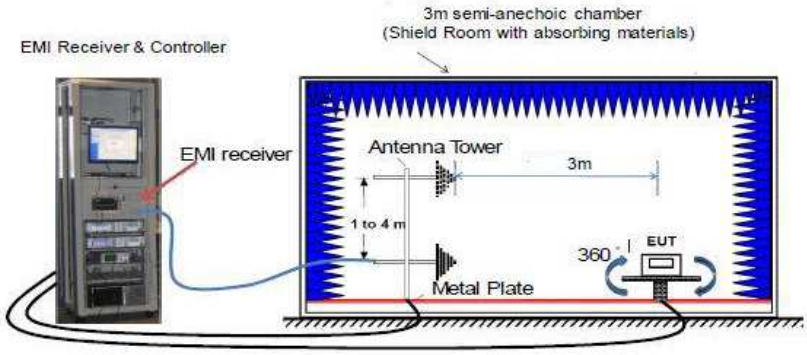
Frequency: 10GHz – 18GHz	Frequency: 18GHz – 26GHz
	

Frequency (MHz)	Measured power (dBm)	Fundamental Level (dBm)	Difference Peak / Spurious (dB)	Peak Limit at PK power –30dB (dBm)	Margin (dB)
146,64	**-54,54**	**-1,25**	**53,29**	**-31,25**	**23,29**
3281,75	**-47,87**		**46,62**		**16,62**
4926,75	**-47,38**		**46,13**		**16,13**
7387,25	**-45,45**		**44,20**		**14,20**
15130,0	**-57,44**		**56,19**		**26,19**
21792,0	**-56,62**		**55,37**		**25,37**

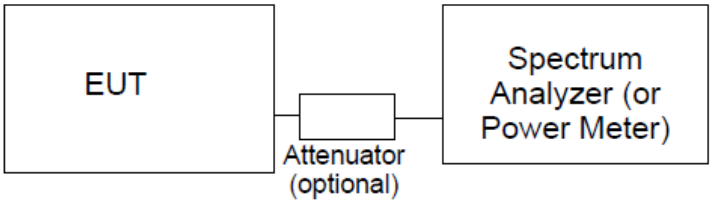
11.6 TEST: 100 kHz Bandwidth of Frequency Band Edges			PASS
Parameters required prior to the test	Laboratory Ambient Temperature (°C)	15 to 35 °C	
	Relative Humidity (%)	30 to 60 %	
Parameters recorded during the test	Laboratory Ambient Temperature (°C)	21°C	
	Relative Humidity (%)	52%	
	Air pressure (hPa)	1020	
—	Power Supply / Frequency	Application Point	
Fully configured sample tested at the power line frequency	+3,7V dc	RF Connector Enclosure	
Equipment mode:	Operation mode	#1 #2 #3	
FCC Standard	§15.247 (D)		

(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or 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, 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, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, 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)).

Further information to test setup (Radiated)



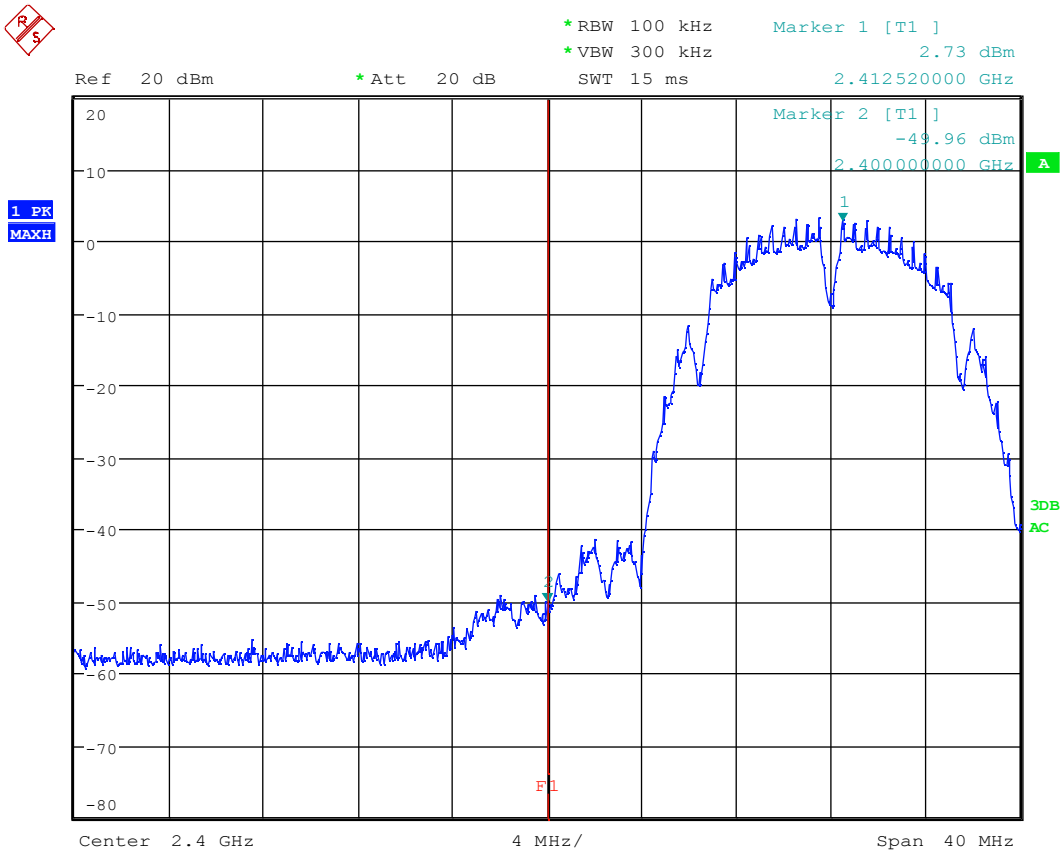
Further information to test setup (conducted)



Test Equipment Used					
Description	Manufacturer	Model	Identifier	Calibration date	Calibration due
CSSA	ETS Lindgren	FACT3	2926063	05/2017	05/2019
EMI Test Receiver	R&S	ESU 40	2782345	05/2018	05/2019
Antenna BiConiLog	ETS Lindgren	3124E-PA	2782348	04/2017	04/2020

Test Method Used
According to Par. 8.7.2 (Marker-Delta method) of KDB 558074 D01 15.247 Meas Guidance v05r02 (and par. 11.13.2 of ANSI C63.10)

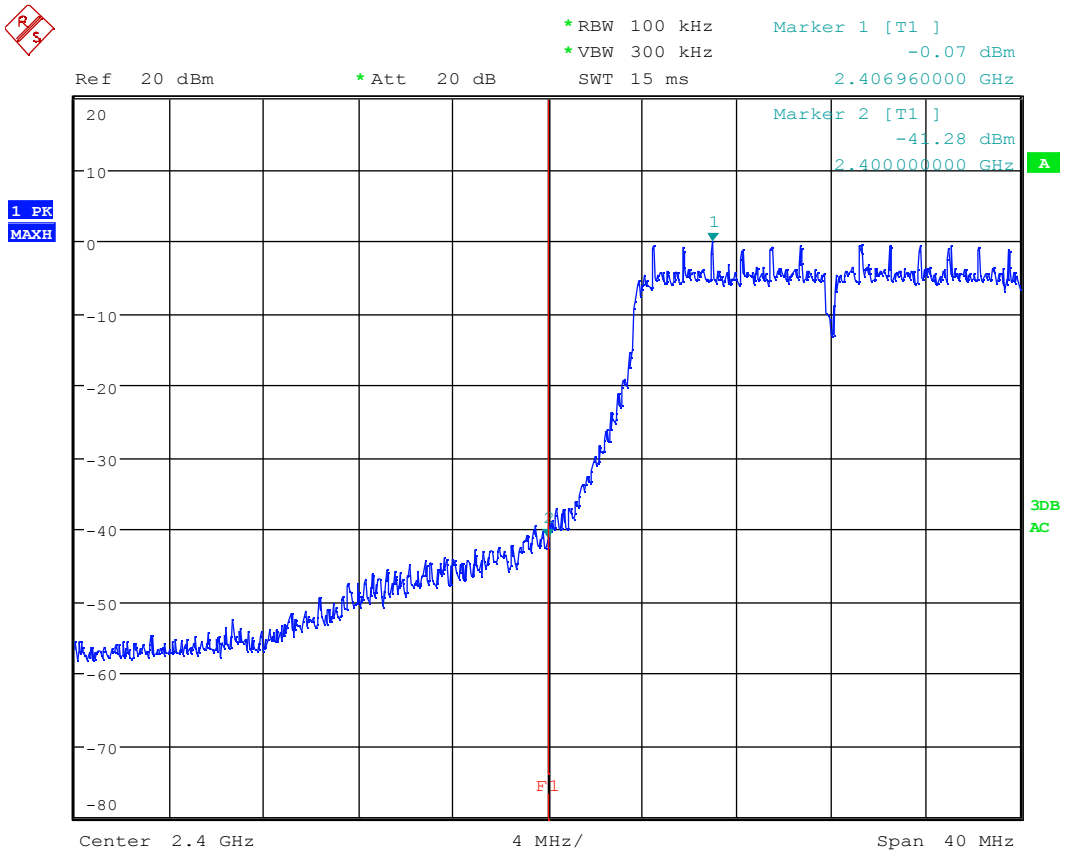
Graphical representation of 100 kHz Bandwidth of Frequency Band Edges - Conducted
Operation Mode: #1 – Low Channel (2412 MHz) – 1Mbit/s (worst case)



Frequency (MHz	Measured power at the band edge (dBm)	Measured peak power at fundamental frequency (dBm)	Difference Peak / band edge (dB)	Peak Limit at PK power –30 dB (dBm)	Margin (dB)
2400	**-49,96**	**+2,73**	**52,69**	**-27,27**	**22,69**

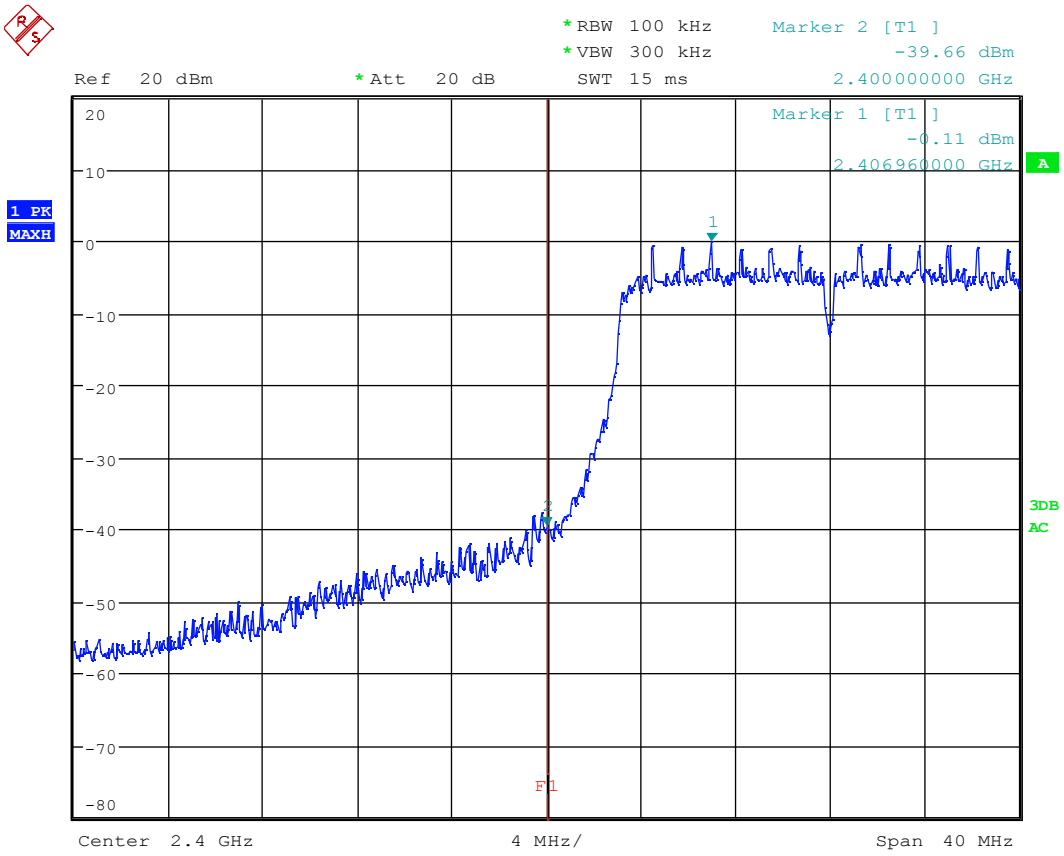
Graphical representation of 100 kHz Bandwidth of Frequency Band Edges - Conducted

Operation Mode: #2 – Low Channel (2412 MHz) – 6Mbit/s (worst case)



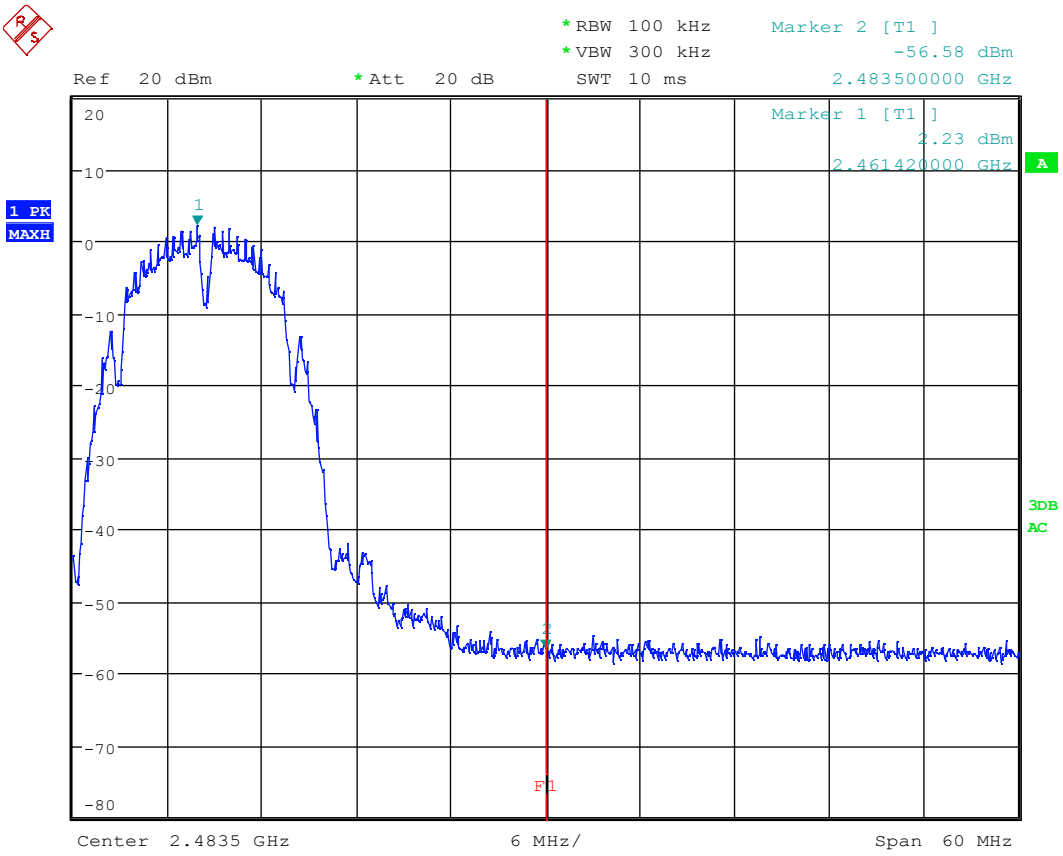
Frequency (MHz	Measured power at the band edge (dBm)	Measured peak power at fundamental frequency (dBm)	Difference Peak / band edge (dB)	Peak Limit at PK power –30 dB (dBm)	Margin (dB)
2400	**-41,28**	**-0,07**	**41,21**	**-30,07**	**11,21**

Graphical representation of 100 kHz Bandwidth of Frequency Band Edges - Conducted
Operation Mode: #3 – Low Channel (2412 MHz) – MCS0 (worst case)



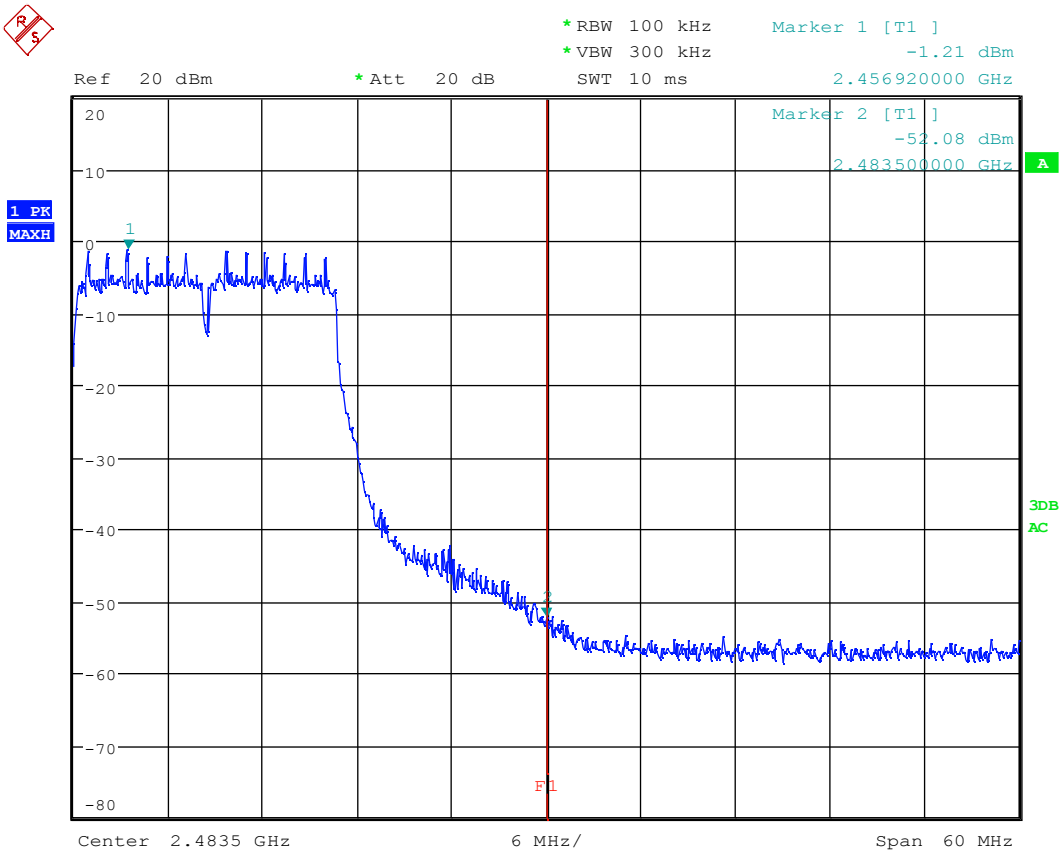
Frequency (MHz	Measured power at the band edge (dBm)	Measured peak power at fundamental frequency (dBm)	Difference Peak / band edge (dB)	Peak Limit at PK power –30 dB (dBm)	Margin (dB)
2400	**-39,66**	**-0,11**	**39,55**	**-30,11**	**9,55**

Graphical representation of 100 kHz Bandwidth of Frequency Band Edges - Conducted
Operation Mode: #1 – High Channel (2462 MHz) – 1Mbit/s (worst case)



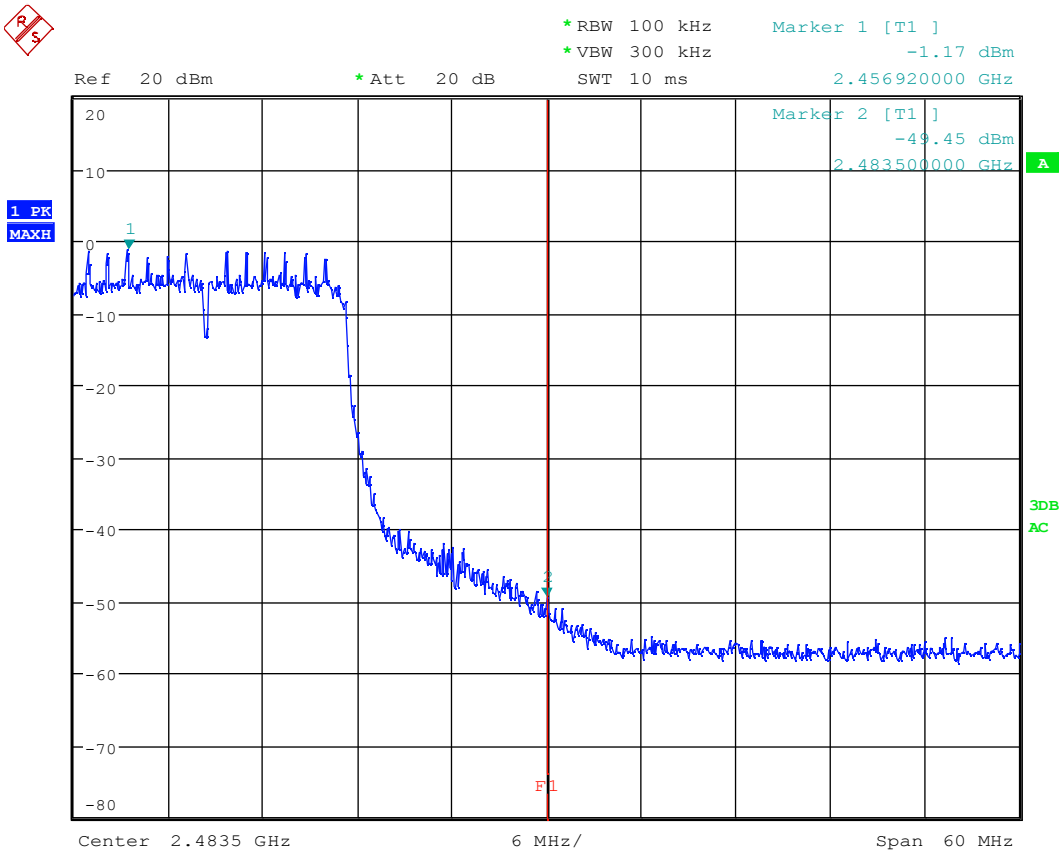
Frequency (MHz	Measured power at the band edge (dBm)	Measured peak power at fundamental frequency (dBm)	Difference Peak / band edge (dB)	Peak Limit at PK power –30 dB (dBm)	Margin (dB)
2483,5	**-56,58**	**+2,23**	**58,81**	**-27,77**	**28,81**

Graphical representation of 100 kHz Bandwidth of Frequency Band Edges - Conducted
Operation Mode: #2 – High Channel (2462 MHz) – 6Mbit/s (worst case)



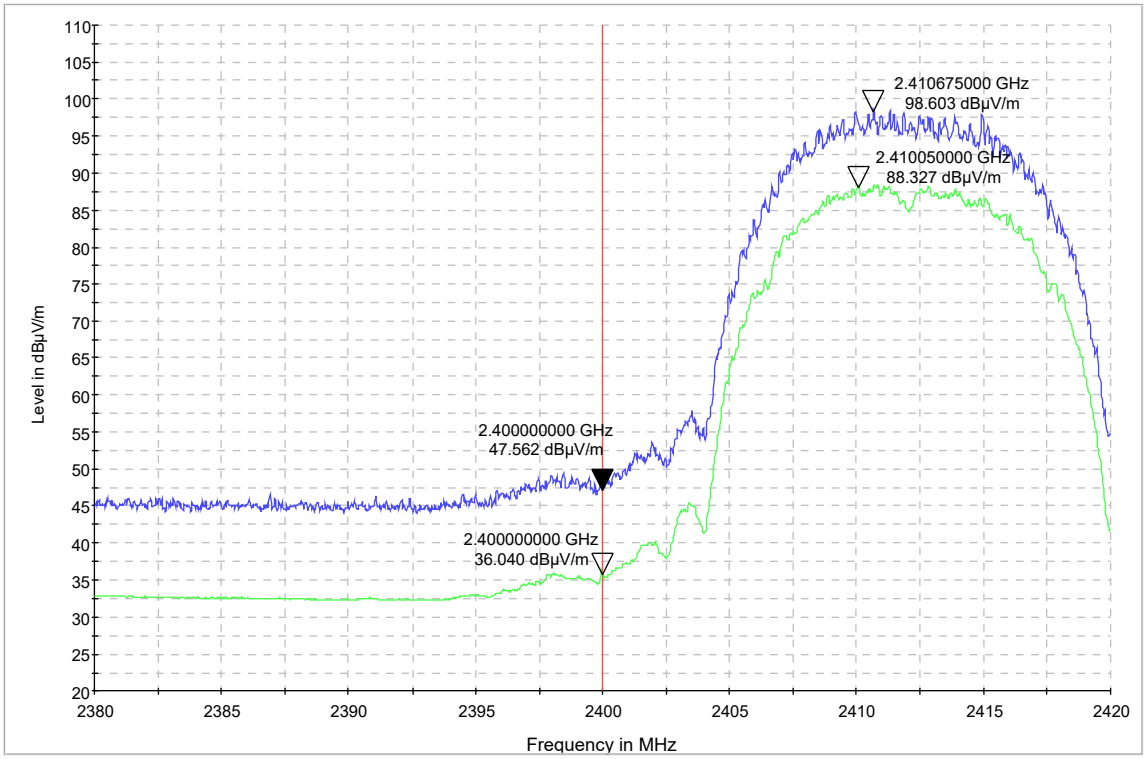
Frequency (MHz	Measured power at the band edge (dBm)	Measured peak power at fundamental frequency (dBm)	Difference Peak / band edge (dB)	Peak Limit at PK power –30 dB (dBm)	Margin (dB)
2483,5	**-52,08**	**-1,21**	**50,87**	**-31,21**	**20,87**

Graphical representation of 100 kHz Bandwidth of Frequency Band Edges - Conducted
Operation Mode: #3 – High Channel (2462 MHz) – MCS0 (worst case)



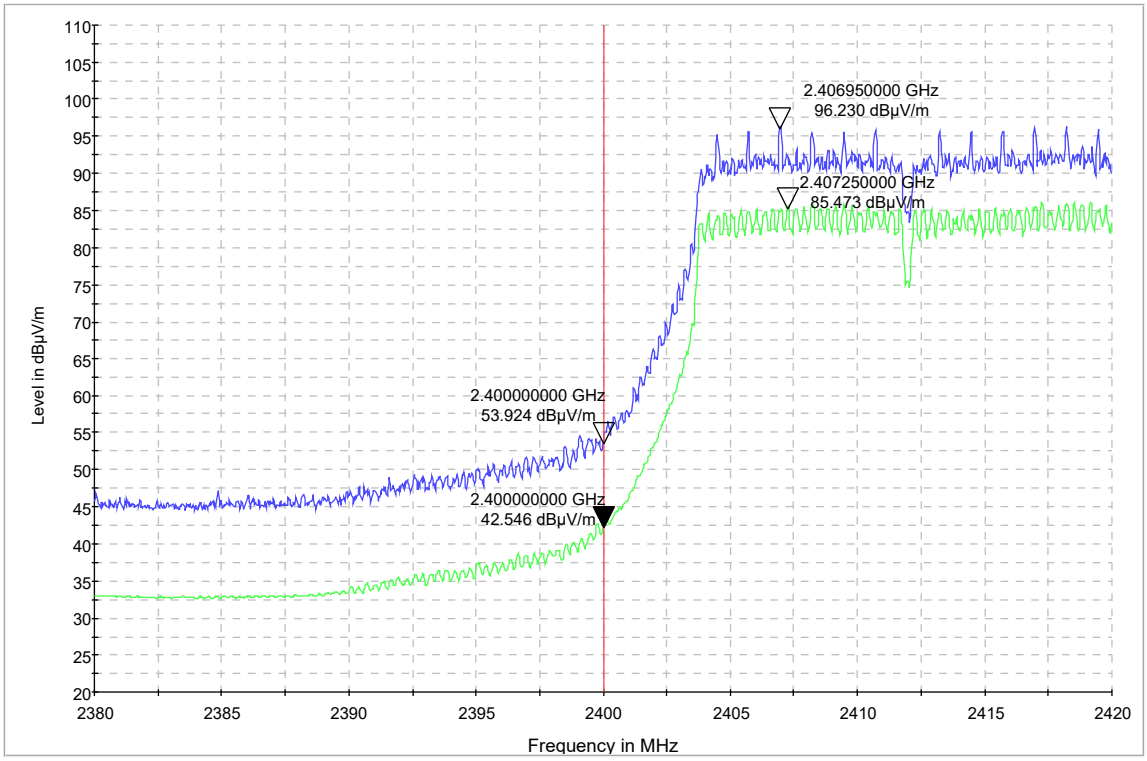
Frequency (MHz	Measured power at the band edge (dBm)	Measured peak power at fundamental frequency (dBm)	Difference Peak / band edge (dB)	Peak Limit at PK power –30 dB (dBm)	Margin (dB)
2483,5	**-49,45**	**-1,17**	**48,28**	**-31,17**	**18,28**

Graphical representation of 100 kHz Bandwidth of Frequency Band Edges - Radiated
Operation Mode: #1 – Low Channel (2412 MHz) – 11Mbit/s (worst case)



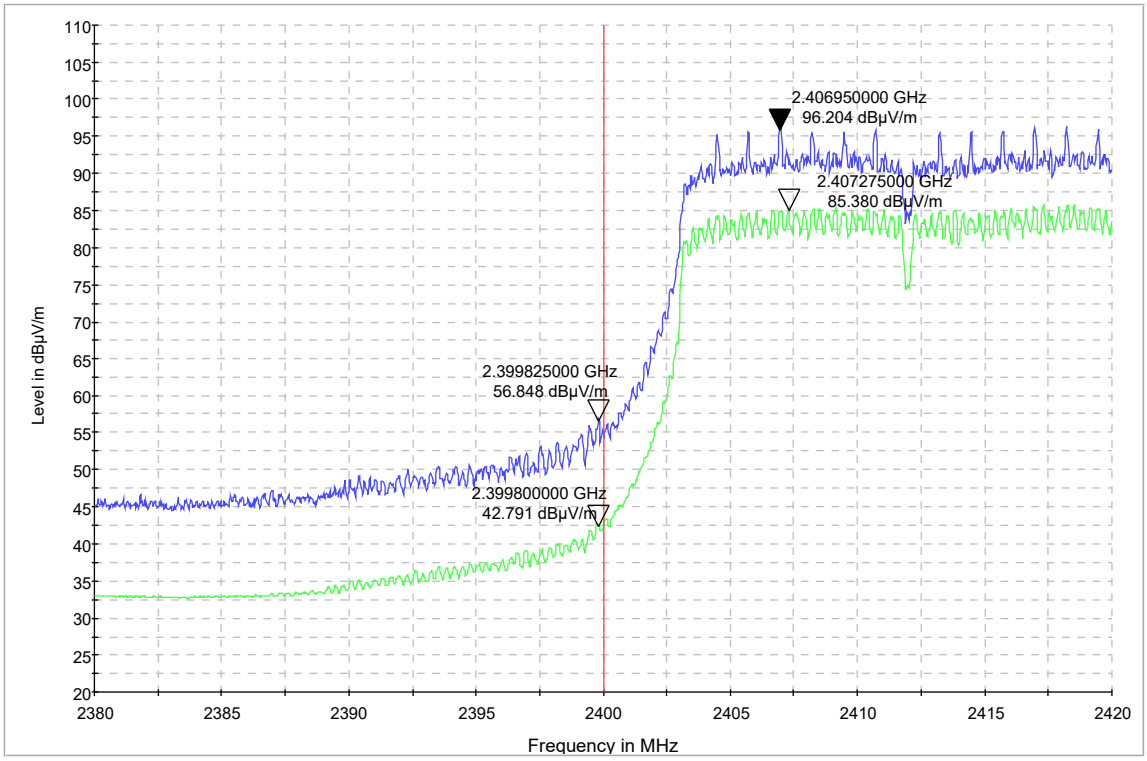
PEAK					
Frequency (MHz	Measured power at the band edge (dBµV/m)	Measured power at fundamental frequency (dBµV/m)	Difference Peak / band edge (dB)	Peak Limit at PK power –30 dB (dBµV/m)	Margin (dB)
2400	**47,56**	**98,60**	**51,04**	**68,60**	**21,04**

Graphical representation of 100 kHz Bandwidth of Frequency Band Edges - Radiated
Operation Mode: #2 – Low Channel (2412 MHz) – 6Mbit/s (worst case)



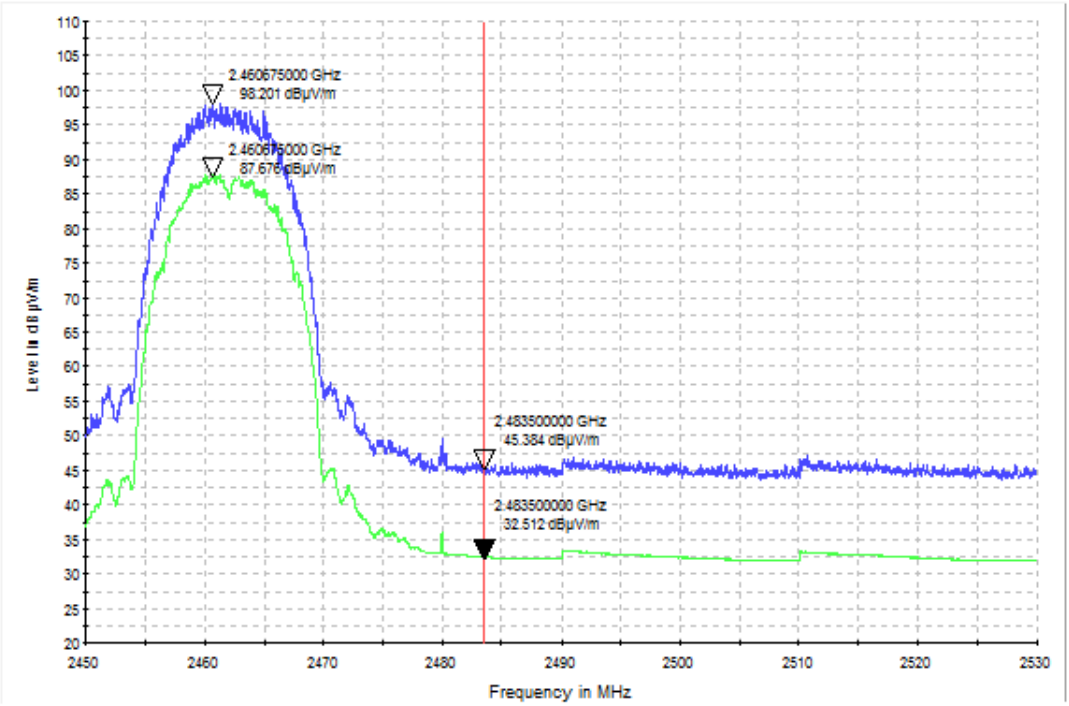
PEAK					
Frequency (MHz	Measured power at the band edge (dBµV/m)	Measured power at fundamental frequency (dBµV/m)	Difference Peak / band edge (dB)	Peak Limit at PK power –30 dB (dBµV/m)	Margin (dB)
2400	**53,92**	**96,23**	**42,31**	**66,23**	**12,31**

Graphical representation of 100 kHz Bandwidth of Frequency Band Edges - Radiated
Operation Mode: #3 – Low Channel (2412 MHz) – MCS0 (worst case)



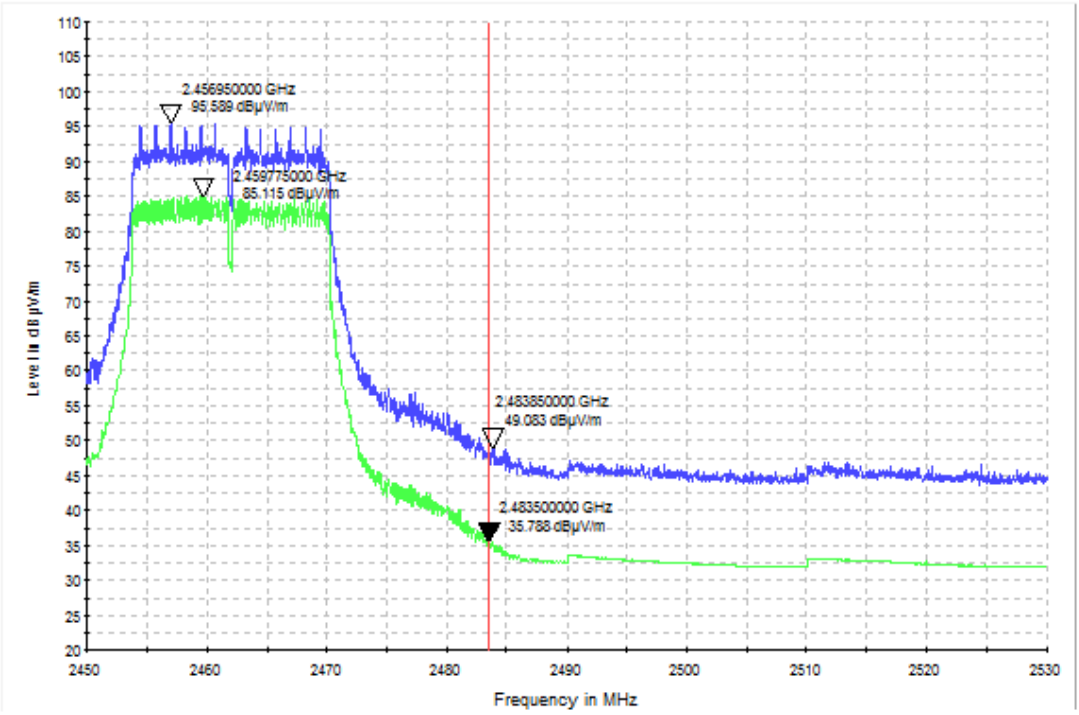
PEAK					
Frequency (MHz	Measured power at the band edge (dBµV/m)	Measured power at fundamental frequency (dBµV/m)	Difference Peak / band edge (dB)	Peak Limit at PK power –30 dB (dBµV/m)	Margin (dB)
2400	**56,85**	**96,20**	**39,35**	**66,20**	**9,35**

Graphical representation of 100 kHz Bandwidth of Frequency Band Edges - Radiated
Operation Mode: #1 – High Channel (2462 MHz) – 11Mbit/s (worst case)



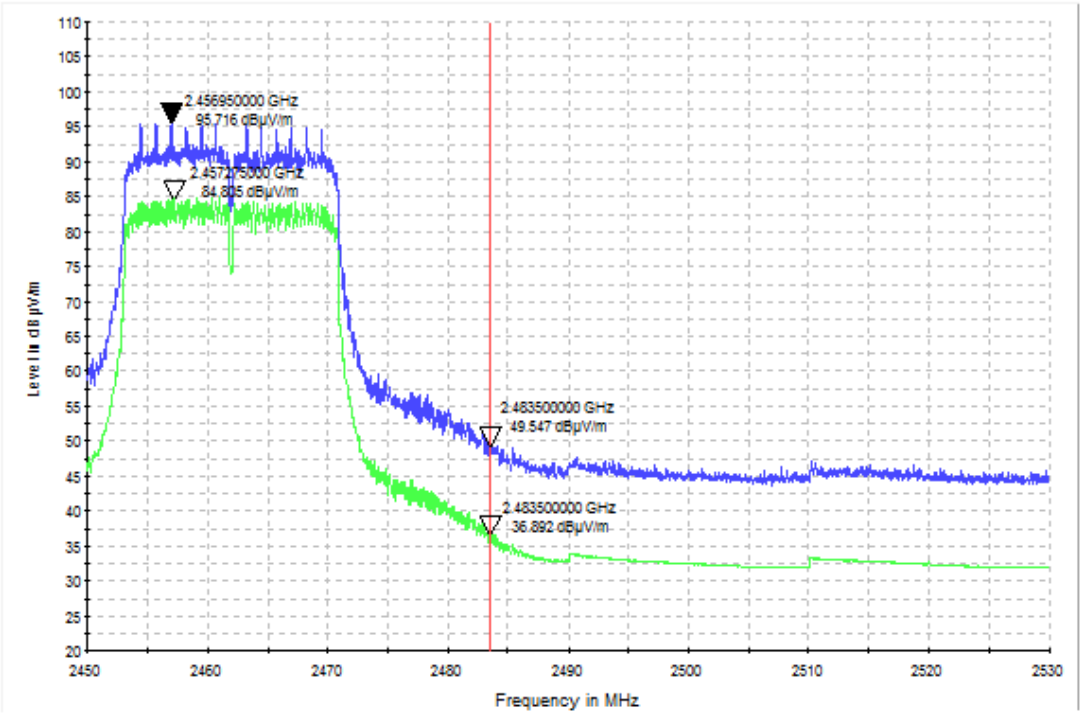
PEAK					
Frequency (MHz	Measured power at the band edge (dBµV/m)	Measured power at fundamental frequency (dBµV/m)	Difference Peak / band edge (dB)	Peak Limit at PK power –30 dB (dBµV/m)	Margin (dB)
2483,5	**45,38**	**98,20**	**52,82**	**68,20**	**22,82**

Graphical representation of 100 kHz Bandwidth of Frequency Band Edges - Radiated
Operation Mode: #2 – High Channel (2462 MHz) – 6Mbit/s (worst case)



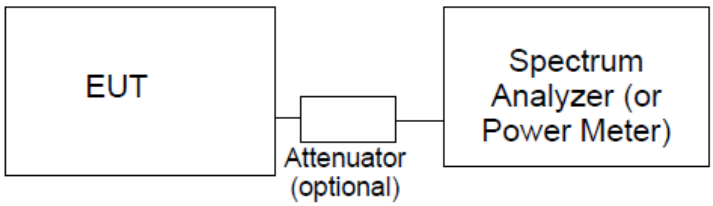
PEAK					
Frequency (MHz	Measured power at the band edge (dBµV/m)	Measured power at fundamental frequency (dBµV/m)	Difference Peak / band edge (dB)	Peak Limit at PK power –30 dB (dBµV/m)	Margin (dB)
2483,5	**49,08**	**95,59**	**46,51**	**65,59**	**16,51**

Graphical representation of 100 kHz Bandwidth of Frequency Band Edges - Radiated
Operation Mode: #3 – High Channel (2462 MHz) – MCS0 (worst case)



PEAK					
Frequency (MHz	Measured power at the band edge (dBµV/m)	Measured power at fundamental frequency (dBµV/m)	Difference Peak / band edge (dB)	Peak Limit at PK power –30 dB (dBµV/m)	Margin (dB)
2483,5	**49,54**	**95,71**	**46,17**	**65,71**	**16,17**

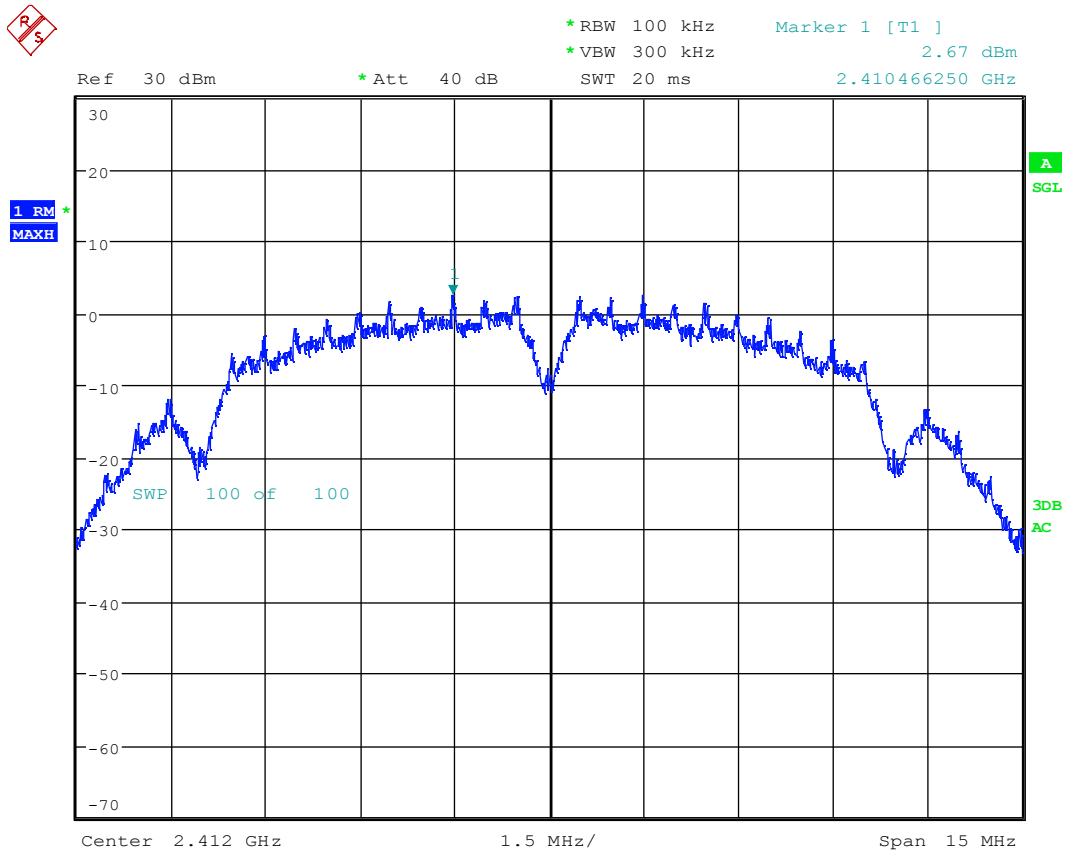
11.7 TEST: Additional provisions to the general radiated emission limitations.			PASS
Parameters required prior to the test	Laboratory Ambient Temperature (°C)	15 to 35 °C	
	Relative Humidity (%)	30 to 60 %	
Parameters recorded during the test	Laboratory Ambient Temperature (°C)	24°C	
	Relative Humidity (%)	37%	
	Air pressure (hPa)	1020	
—	Power Supply / Frequency	Application Point	
Fully configured sample tested at the power line frequency	+3,7V dc	---------	
Equipment mode:	Operation mode	#1 #2 #3	
FCC Standard	§15.215 (A) (B) (C)		
(A) The regulations in §§ 15.217-15.257 provide alternatives to the general radiated emission limits for intentional radiators operating in specified frequency bands. Unless otherwise stated, there are no restrictions as to the types of operation permitted under these sections.			
(B) In most cases, unwanted emissions outside of the frequency bands shown in these alternative provisions must be attenuated to the emission limits shown in Section 15.209. In no case shall the level of the unwanted emissions from an intentional radiator operating under these additional provisions exceed the field strength of the fundamental emission.			VERDICT PASS
(C) Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least			VERDICT PASS

11.8 TEST: Power Spectral Density			PASS
Parameters required prior to the test	Laboratory Ambient Temperature (°C)	15 to 35 °C	
	Relative Humidity (%)	30 to 60 %	
Parameters recorded during the test	Laboratory Ambient Temperature (°C)	24°C	
	Relative Humidity (%)	37%	
	Air pressure (hPa)	1020	
—	Power Supply / Frequency	Application Point	
Fully configured sample tested at the power line frequency	+3,7V dc	RF Connector	
Equipment mode:	Operation mode	#1 #2 #3	
FCC Standard	§15.247 (E)		
(e) For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.			
Further information to test setup			

Test Equipment Used					
Description	Manufacturer	Model	Identifier	Calibration date	Calibration due
EMI Test Receiver	R&S	ESU 40	2782345	05/2018	05/2019

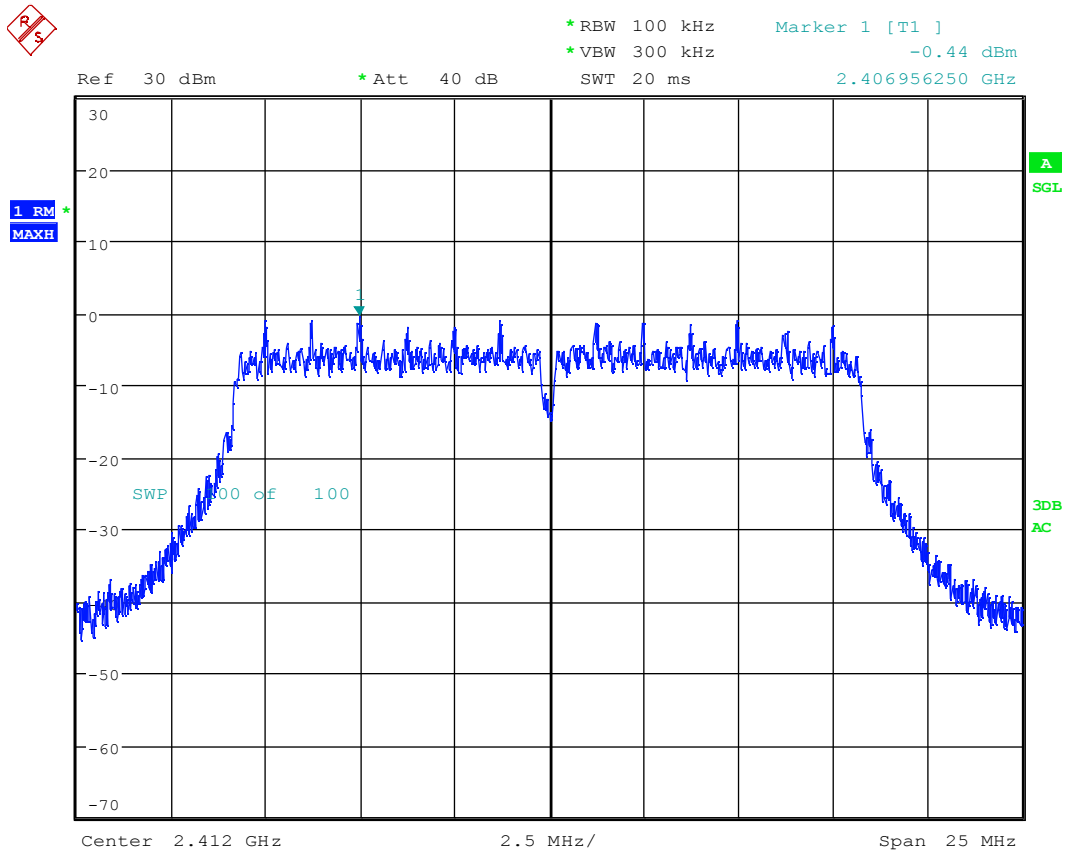
Test Method Used
According to Par. 8.4 of KDB 558074 D01 15.247 Meas Guidance v05r02 (and par. 11.10.5 Method AVGPSD-2 of ANSI C63.10)

Graphical representation of Power Spectral Density
Operation Mode: #1 – Low Channel (2412 MHz) – 1Mbit/s (worst case)



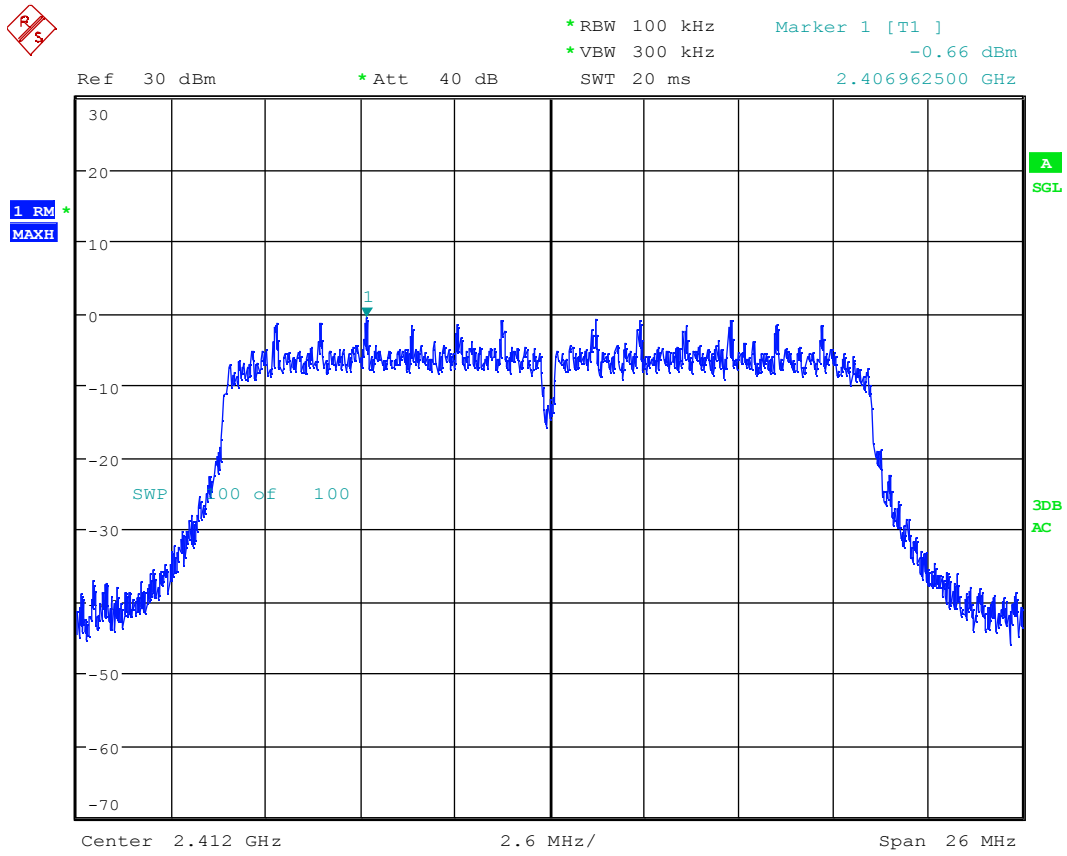
Channel (No.)	Frequency (MHz)	Conducted Power Spectral Density			Limit (dBm)
		Measured (dBm)	Duty cycle (dB)	Total (dBm)	
Low	2412	2,67	0,50	3,17	8

Graphical representation of Power Spectral Density
Operation Mode: #2 – Low Channel (2412 MHz) – 6Mbit/s (worst case)



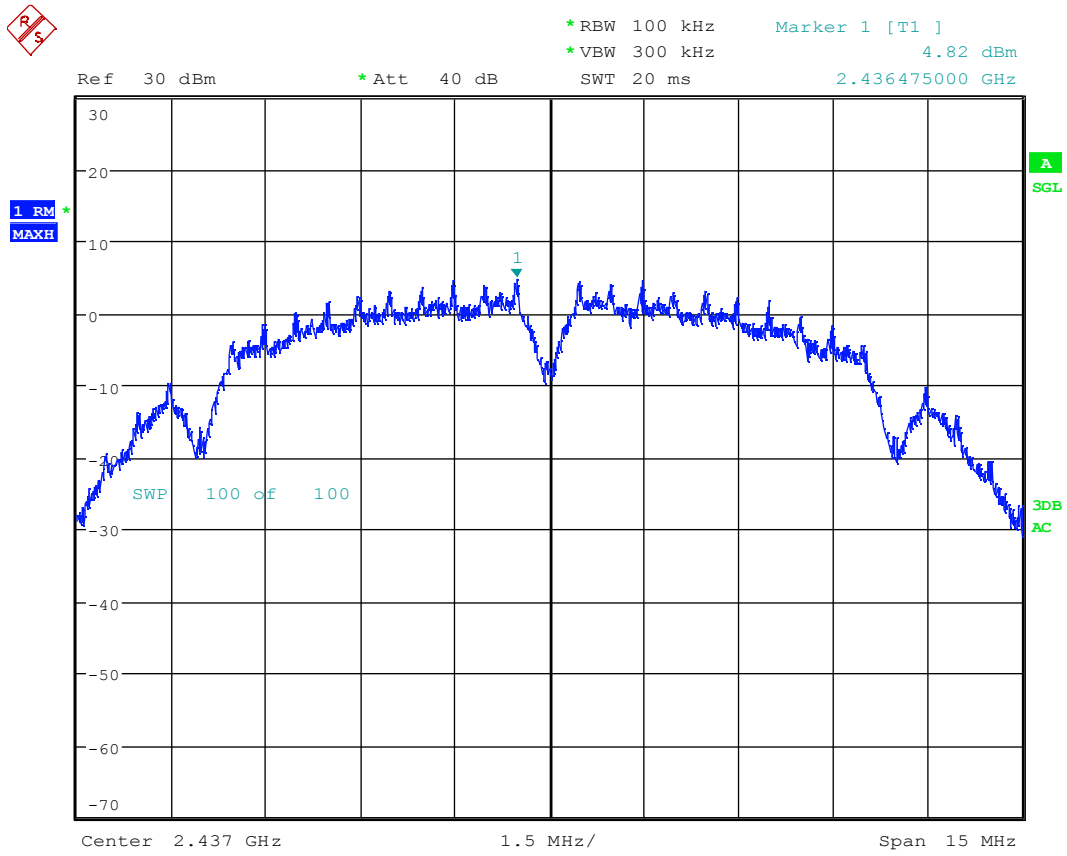
Channel (No.)	Frequency (MHz)	Conducted Power Spectral Density			Limit (dBm)
		Measured (dBm)	Duty cycle (dB)	Total (dBm)	
Low	2412	-0,44	0,55	0,11	8

Graphical representation of Power Spectral Density
Operation Mode: #3 – Low Channel (2412 MHz) – MCS0 (worst case)



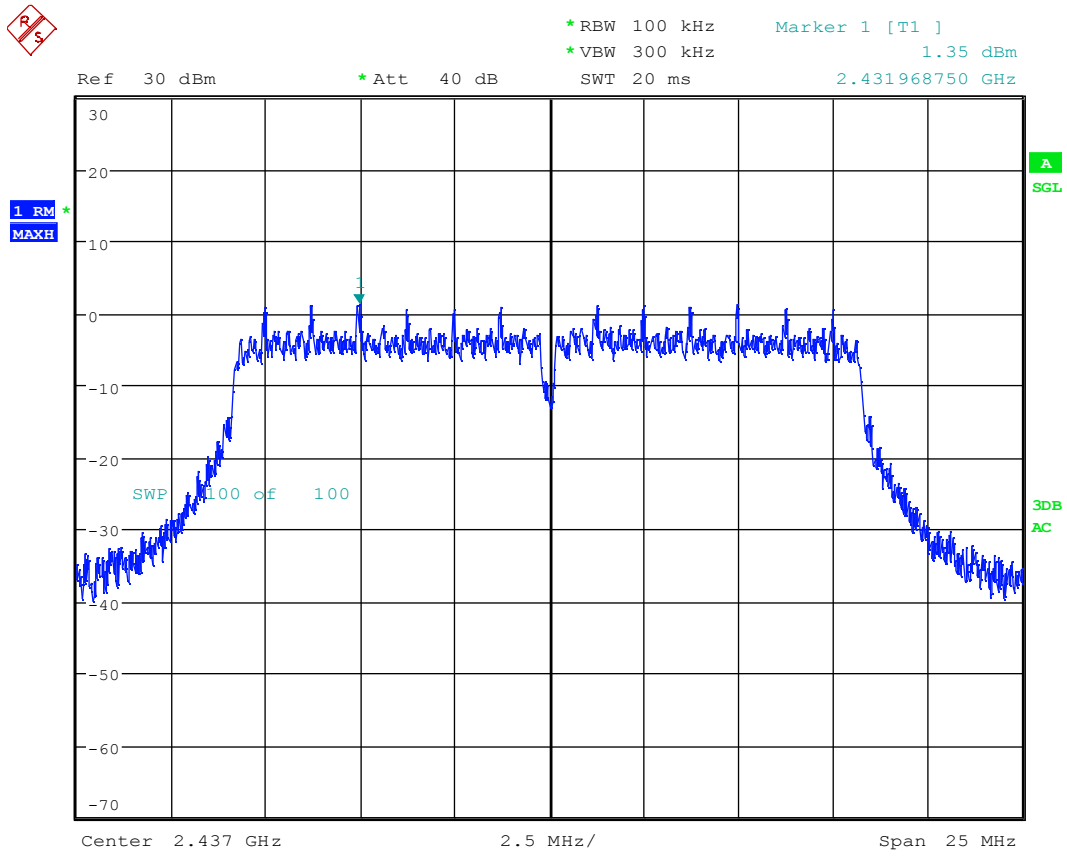
Channel (No.)	Frequency (MHz)	Conducted Power Spectral Density			Limit (dBm)
		Measured (dBm)	Duty cycle (dB)	Total (dBm)	
Low	2412	-0,66	0,59	-0,07	8

Graphical representation of Power Spectral Density
Operation Mode: #1 – Middle Channel (2437 MHz) – 1Mbit/s (worst case)



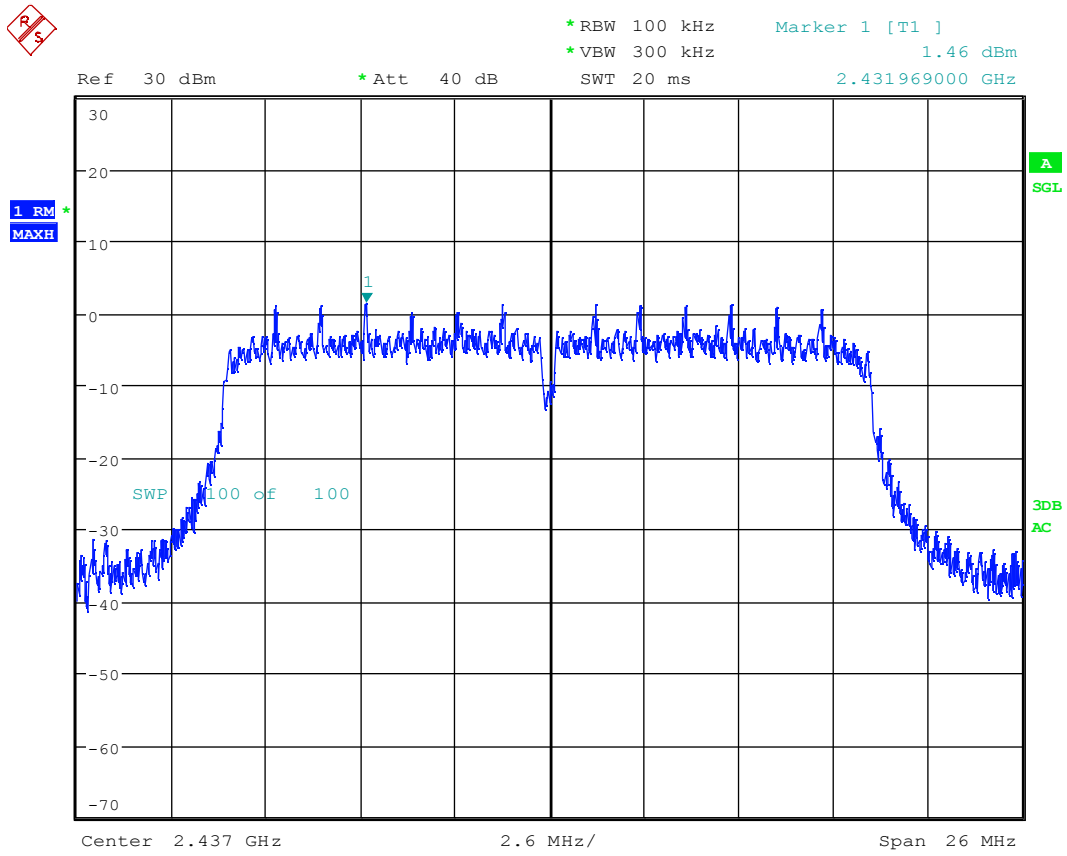
Channel (No.)	Frequency (MHz)	Conducted Power Spectral Density			Limit (dBm)
		Measured (dBm)	Duty cycle (dB)	Total (dBm)	
Middle	2437	4,82	0,50	5,32	8

Graphical representation of Power Spectral Density
Operation Mode: #2 – Middle Channel (2437 MHz) – 6Mbit/s (worst case)



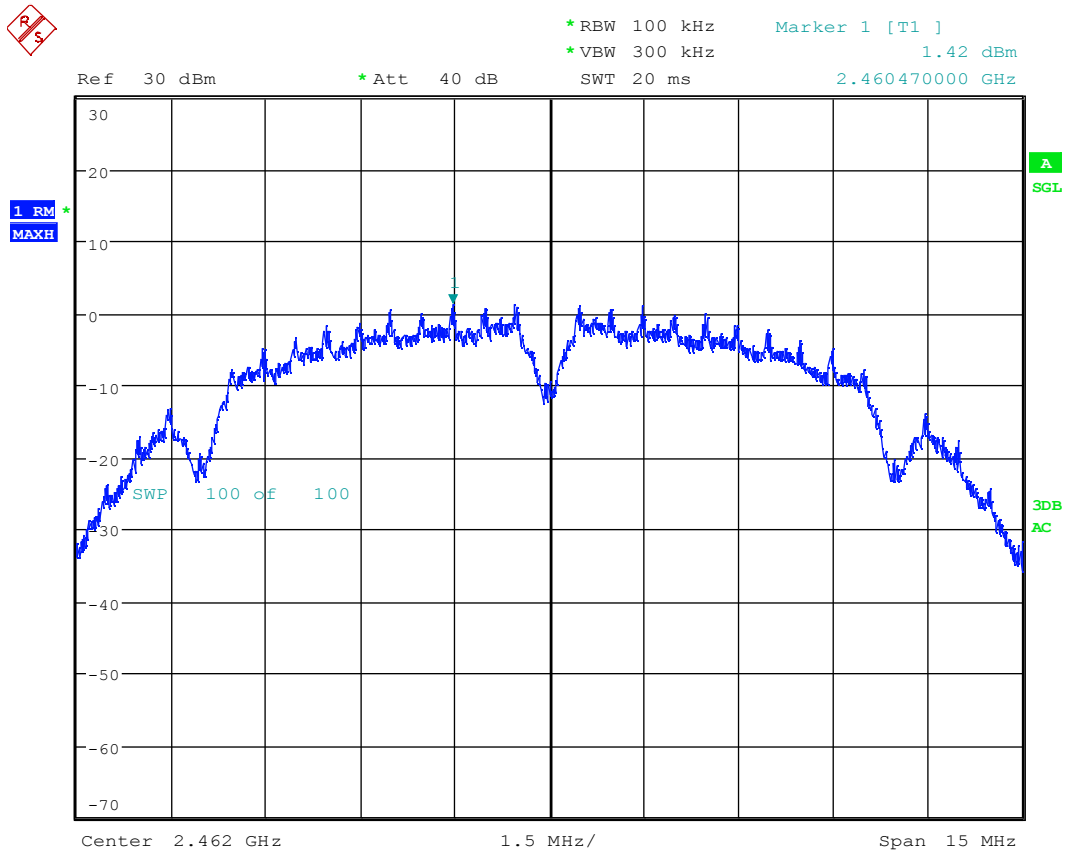
Channel (No.)	Frequency (MHz)	Conducted Power Spectral Density			Limit (dBm)
		Measured (dBm)	Duty cycle (dB)	Total (dBm)	
Middle	2437	1,35	0,55	1,90	8

Graphical representation of Power Spectral Density
Operation Mode: #3 – Middle Channel (2437 MHz) – MCS0 (worst case)



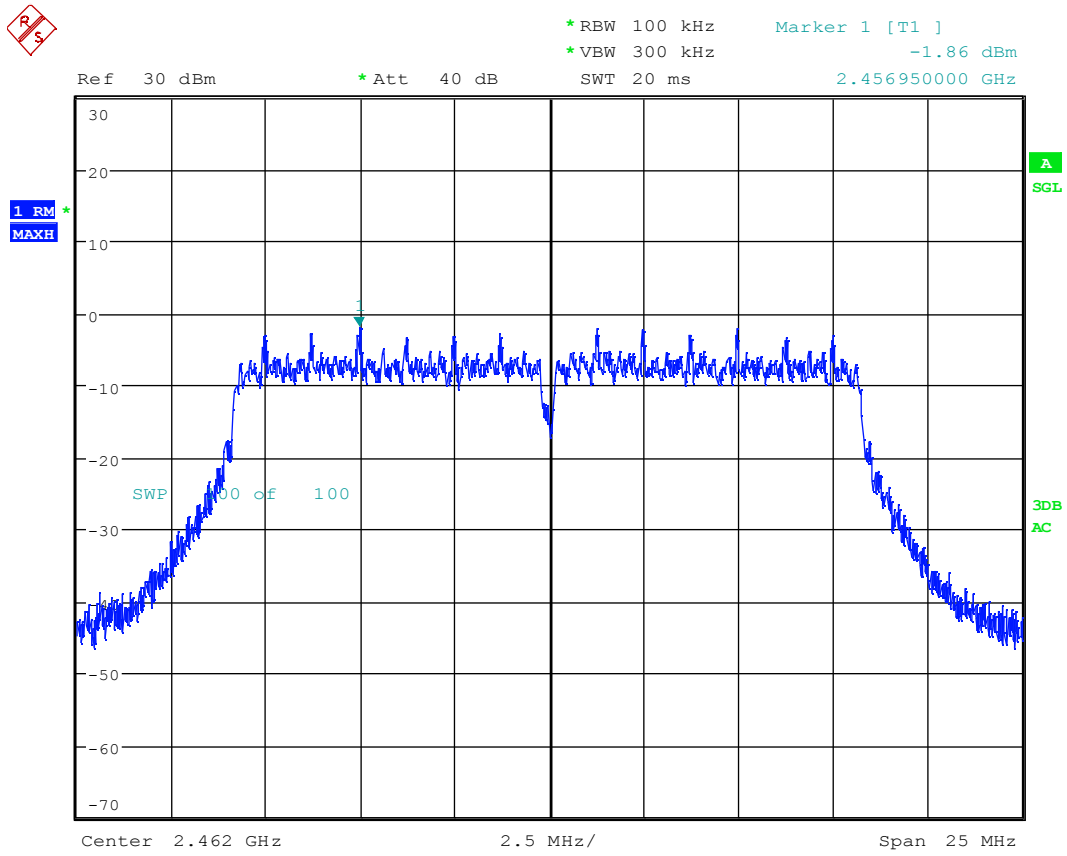
Channel (No.)	Frequency (MHz)	Conducted Power Spectral Density			Limit (dBm)
		Measured (dBm)	Duty cycle (dB)	Total (dBm)	
Middle	2437	1,46	0,59	2,05	8

Graphical representation of Power Spectral Density
Operation Mode: #1 – High Channel (2462 MHz) – 1Mbit/s (worst case)



Channel (No.)	Frequency (MHz)	Conducted Power Spectral Density			Limit (dBm)
		Measured (dBm)	Duty cycle (dB)	Total (dBm)	
High	2462	1,42	0,50	1,92	8

Graphical representation of Power Spectral Density
Operation Mode: #2 – High Channel (2462 MHz) – 6Mbit/s (worst case)



Channel (No.)	Frequency (MHz)	Conducted Power Spectral Density			Limit (dBm)
		Measured (dBm)	Duty cycle (dB)	Total (dBm)	
High	2462	-1,86	0,55	-1,31	8