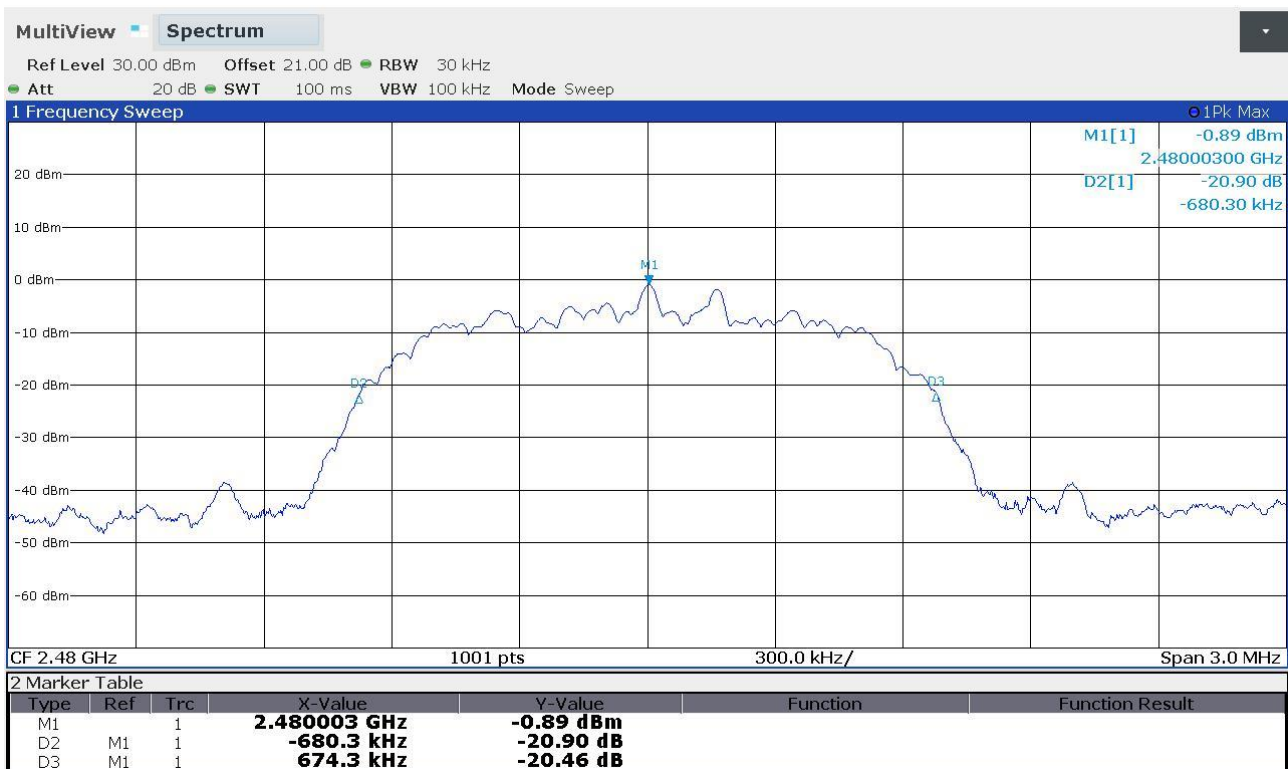




Segalla 20168894

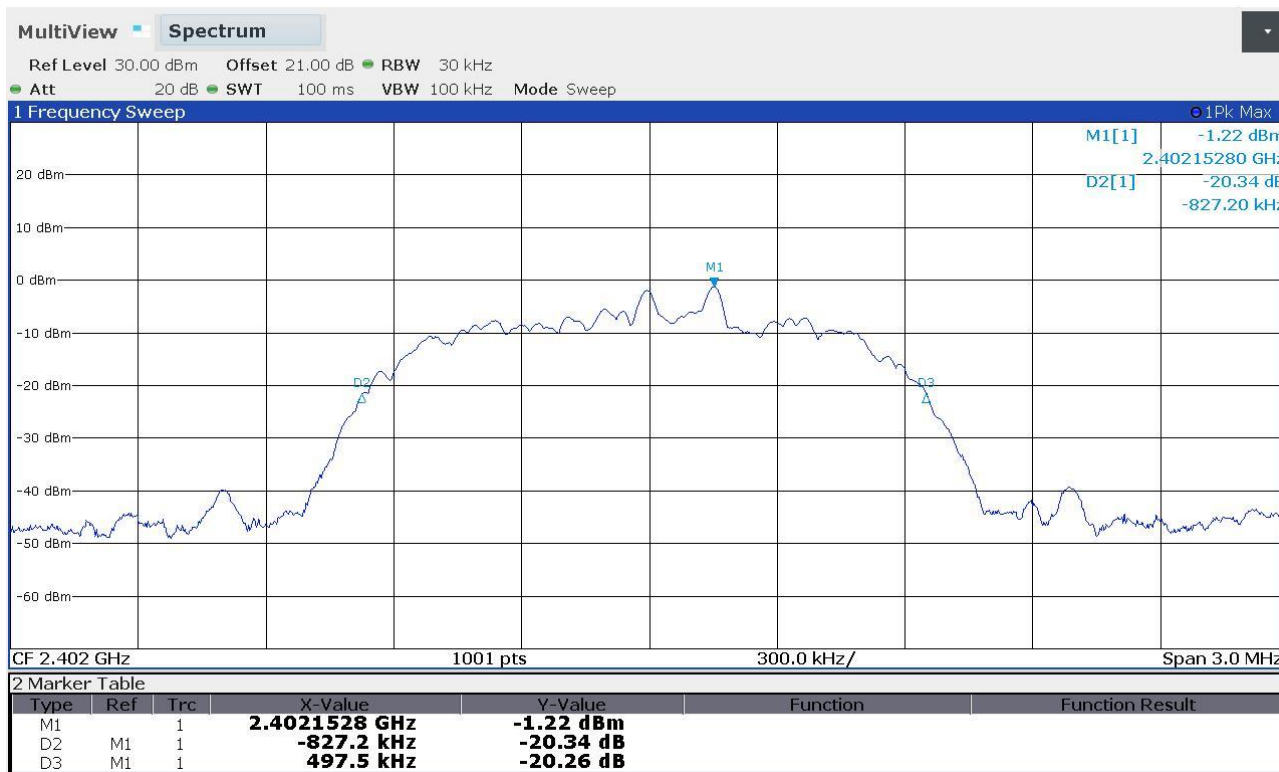


Segalla 20168897

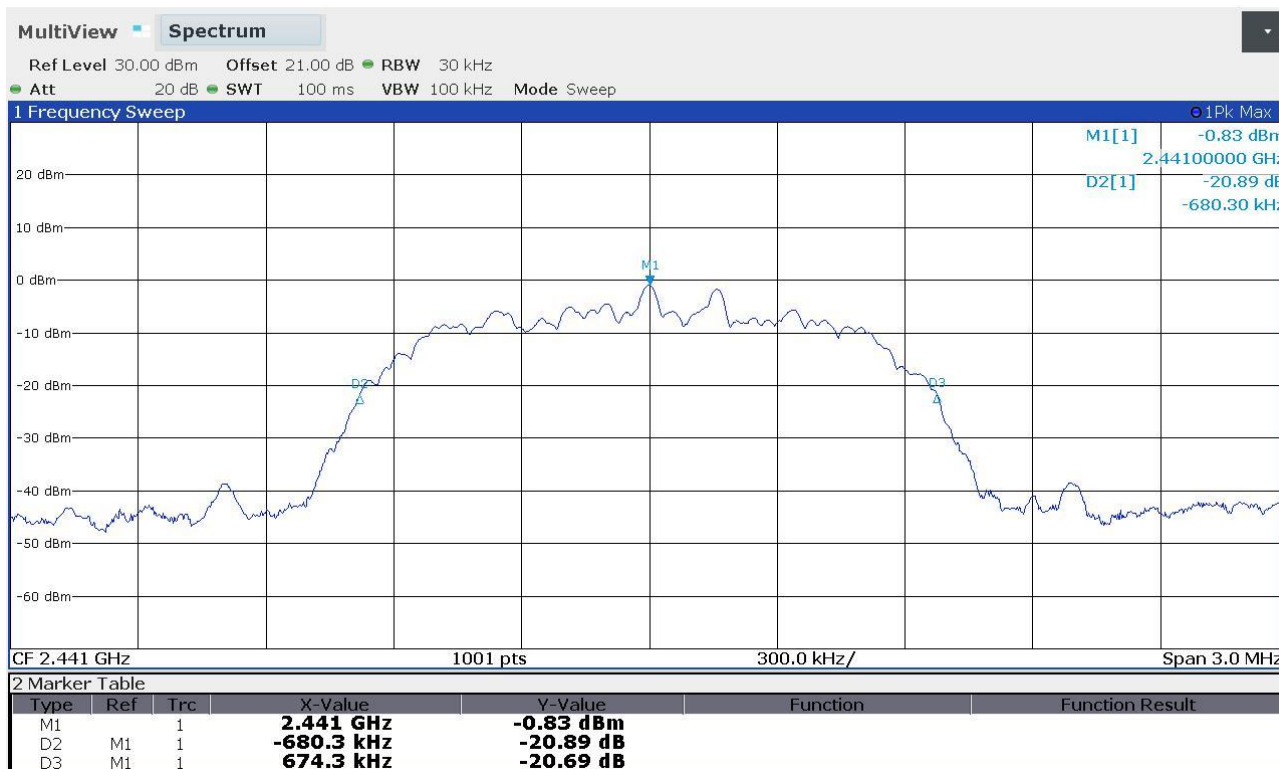




Segalla 201688A01

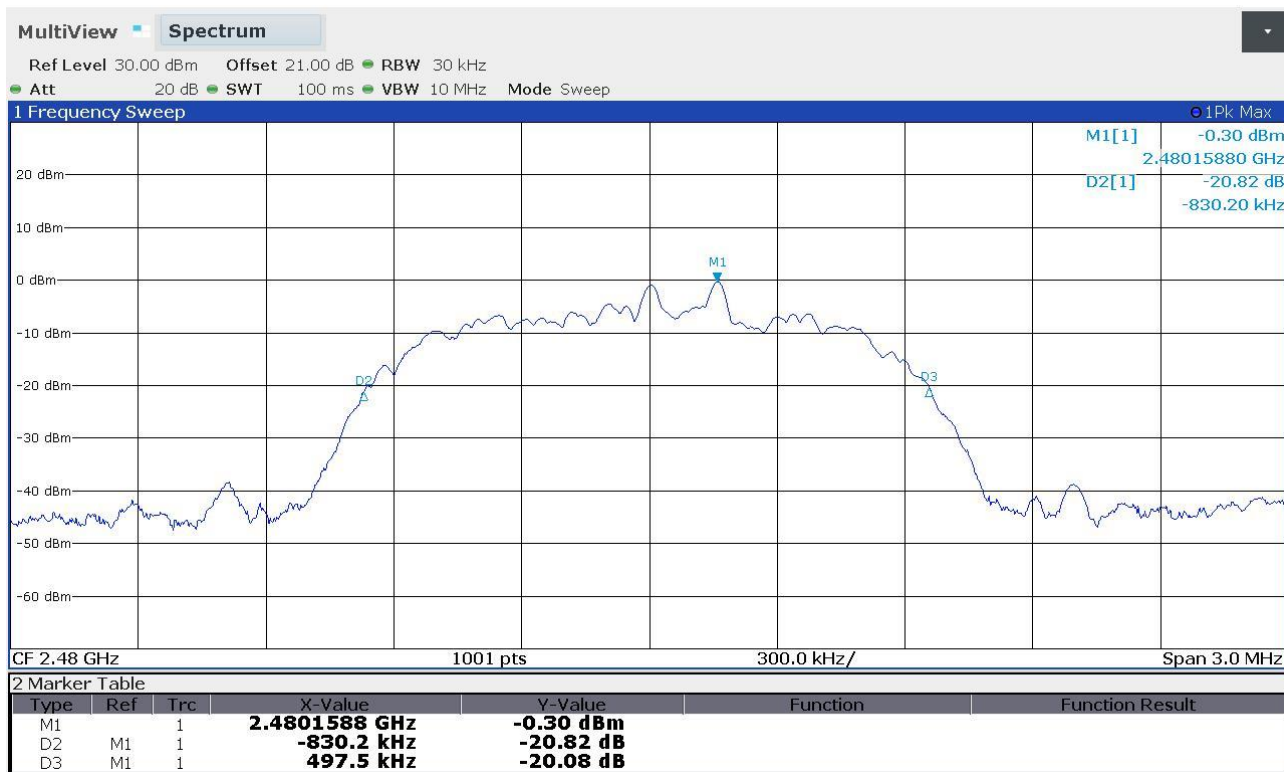


Segalla 201688A04





Segalla 201688A07





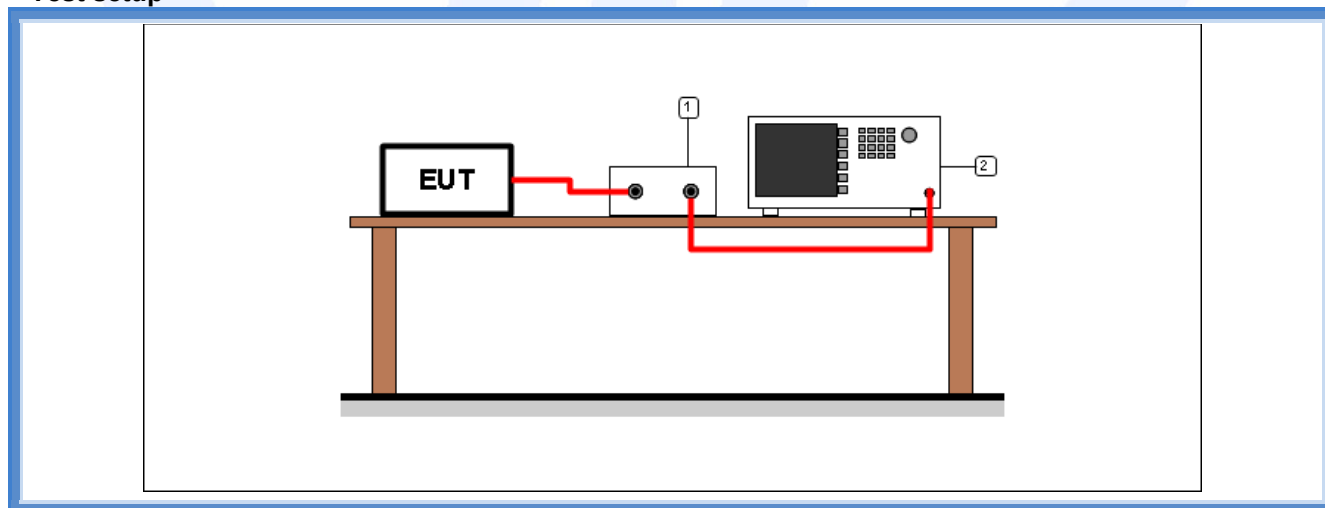
9.4 Channel separation

Tested by	M. Segalla
Test date	29.09.2020
Test location (stand)	Laboratory
Reference standards	FCC Rules and Regulation; Titles 47 Part. 15.247 KDB 558074 D01 15.247 Meas Guidance v05r02 cl. 9 b) ANSI C63.10 cl. 7.8.2
Supplementary test set-up description	--
Supplementary information.....	--

Acceptance 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. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

Test setup



Test setup PR002_01

Nr.	Id. Number	Manufacturer	Model	Description
2	CMC S295	Rohde & Schwarz	FSW43	Spectrum Analyzer 43GHz
1	--	--	--	Cable + attenuator (calibrated before the test)



Result

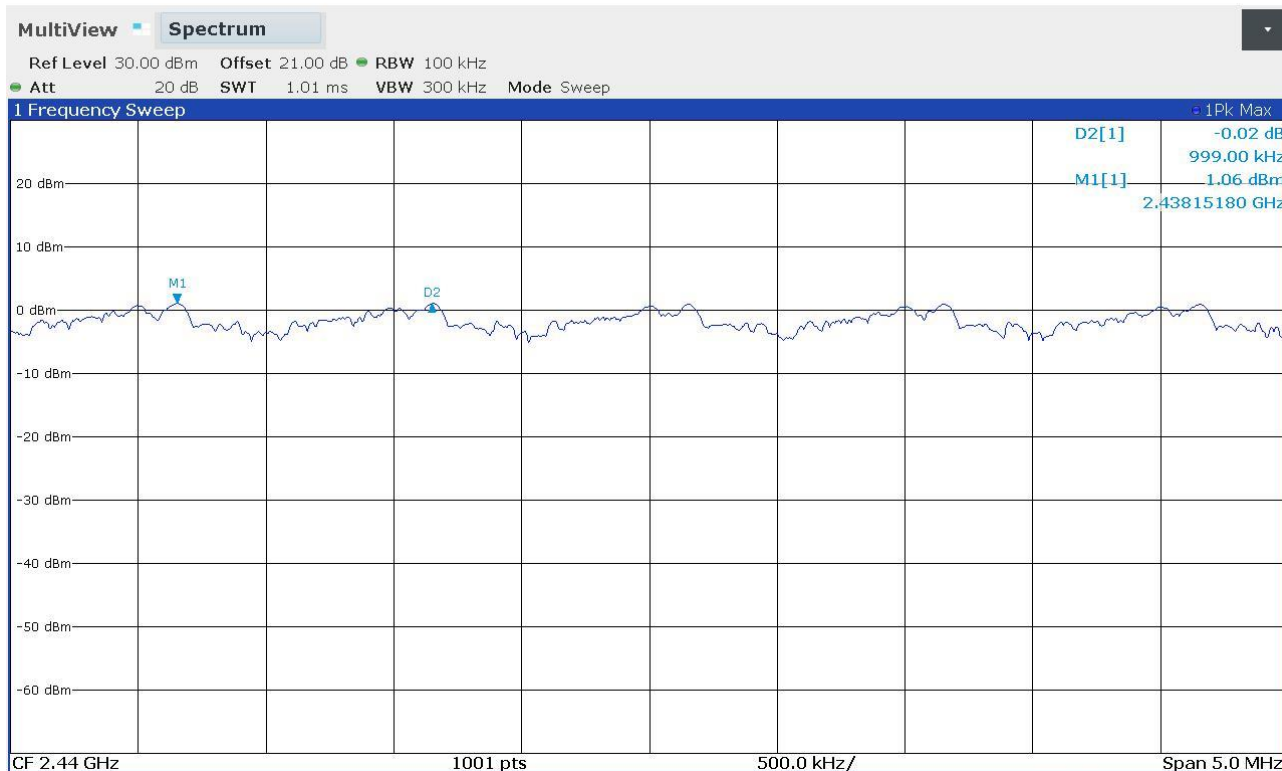
Modulation	Frequency band (MHz)	Graphs	Channel separation (kHz)	Minimum channel separation required (kHz)	Results
DH5	2400 – 2483,5	G201688A12	998	689,27	Complies
2DH5	2400 – 2483,5	G201688A11	999	903,07	Complies
3DH5	2400 – 2483,5	G201688A10	999	903,07	Complies



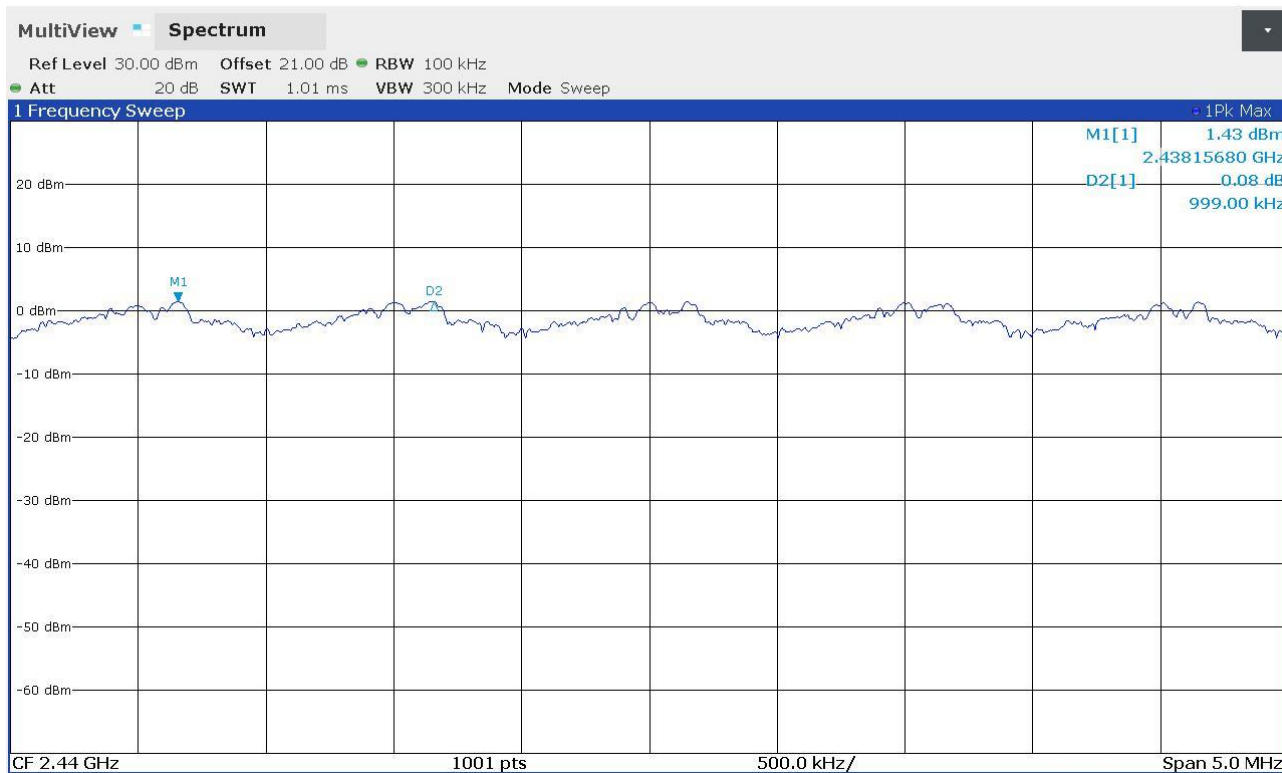


Graphs

Segalla 201688A10

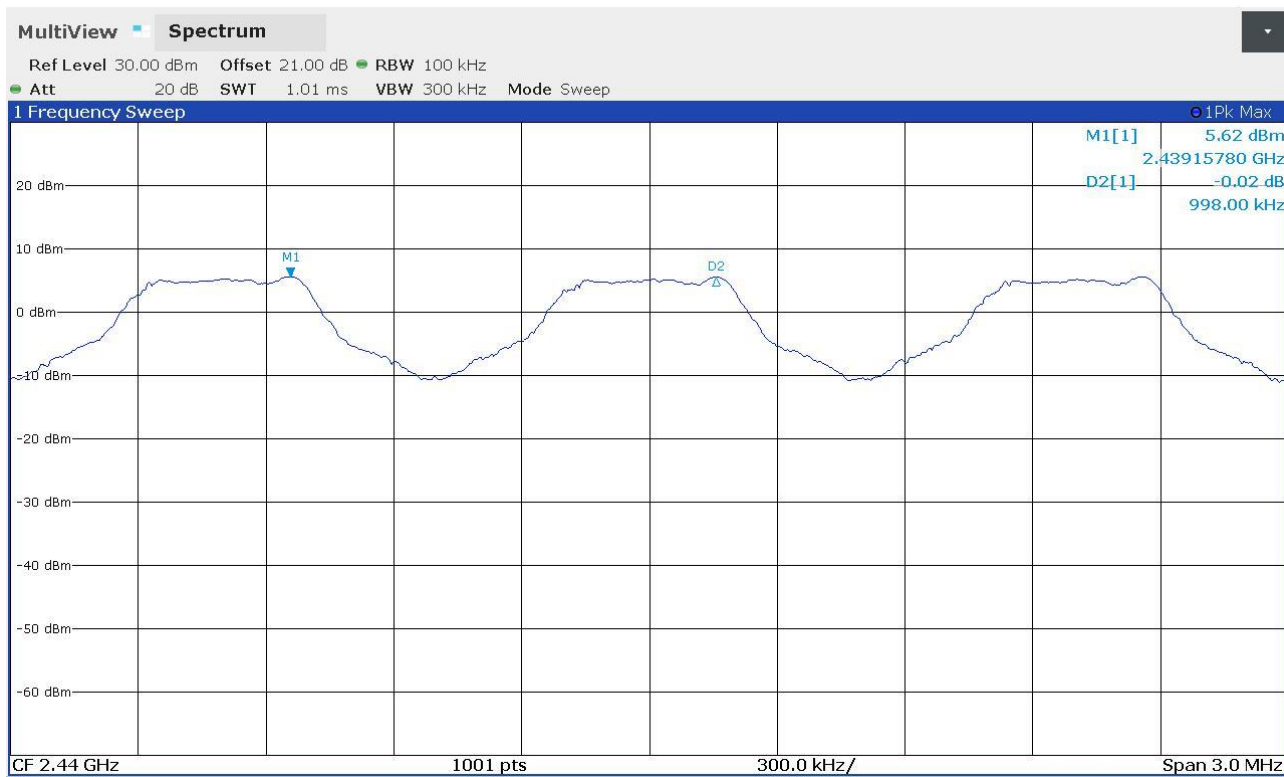


Segalla 201688A11





Segalla 201688A12





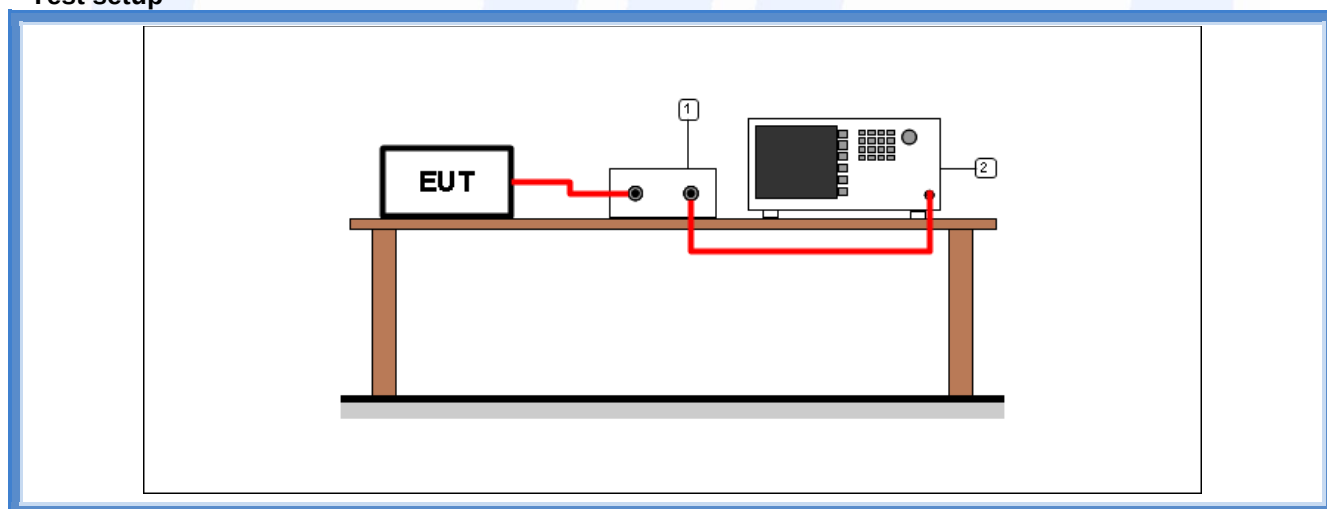
9.5 Number of hopping channels

Tested by	M. Segalla
Test date	29.09.2020
Test location (stand)	Laboratory
Reference standards	FCC Rules and Regulation; Titles 47 Part. 15.247 KDB 558074 D01 15.247 Meas Guidance v05r02 cl. 9 b) ANSI C63.10 cl. 7.8.3
Supplementary test set-up description	--
Supplementary information.....	--

Acceptance limits

Frequency hopping systems in the 2400 – 2483,5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0,4 seconds within a period of 0,4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

Test setup



Test setup PR002_01				
Nr.	Id. Number	Manufacturer	Model	Description
2	CMC S295	Rohde & Schwarz	FSW43	Spectrum Analyzer 43GHz
1	--	--	--	Cable + attenuator (calibrated before the test)



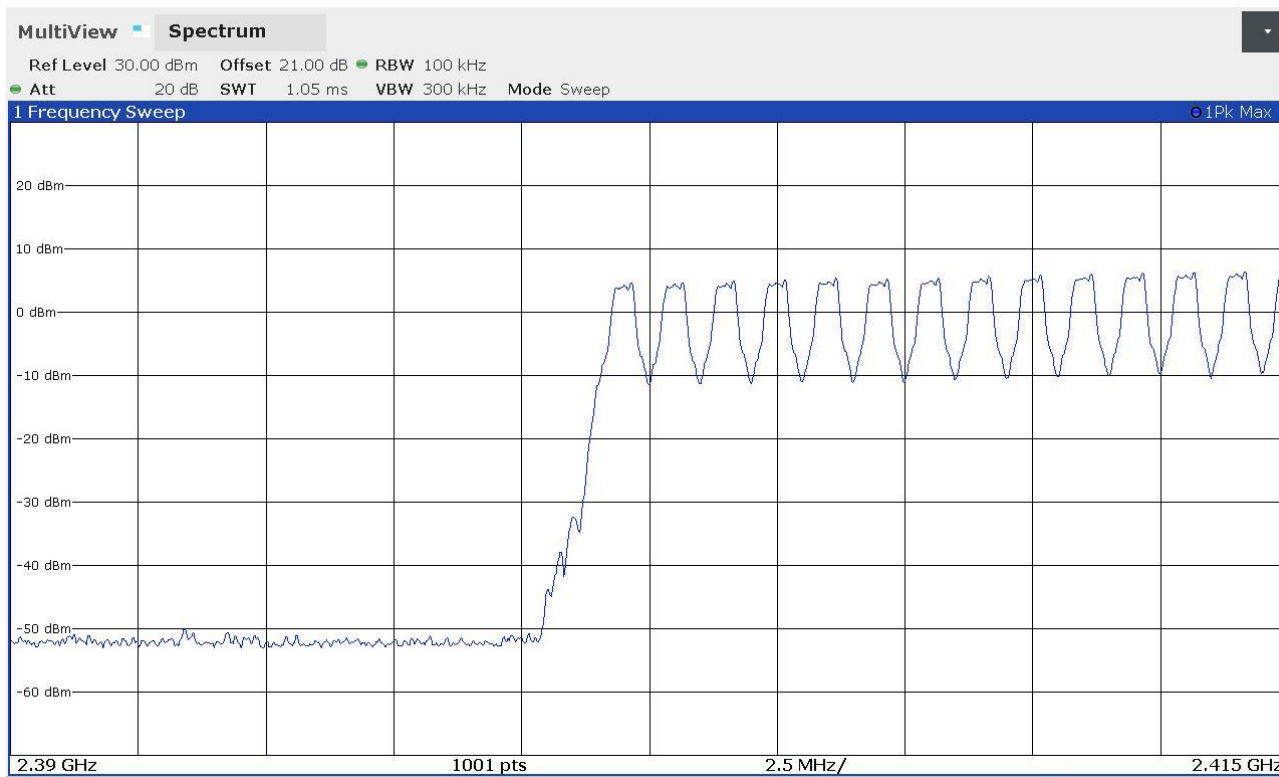
Result

<i>Modulation</i>	<i>Frequency band (MHz)</i>	<i>Graphs</i>	<i>Number of hopping channels</i>	<i>Minimum number of hopping channels required</i>	<i>Results</i>
DH5	2400 – 2483,5	G201688A13 G201688A14 G201688A15 G201688A16	79	15	Complies
2DH5	2400 – 2483,5	G201688A17 G201688A18 G201688A19 G201688A20	79	15	Complies
3DH5	2400 – 2483,5	G201688A21 G201688A22 G201688A23 G201688A24	79	15	Complies

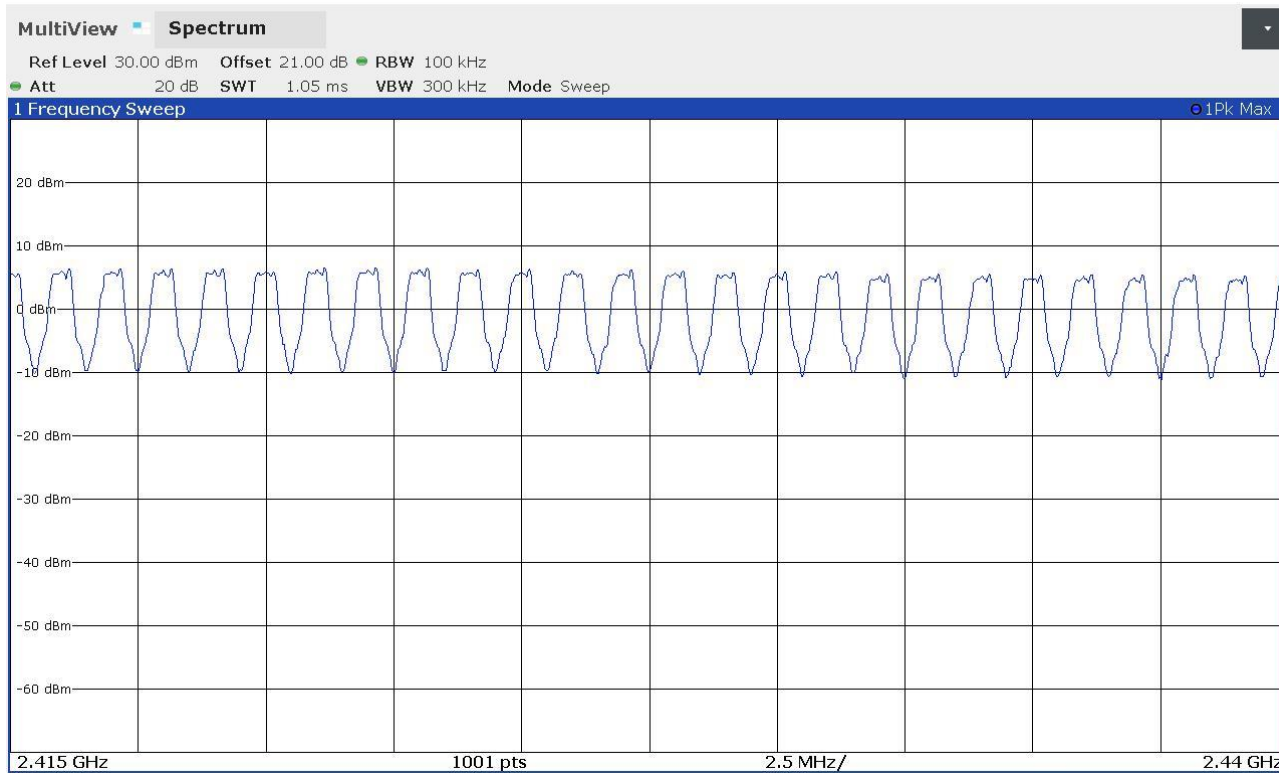


Graphs

Segalla 201688A13

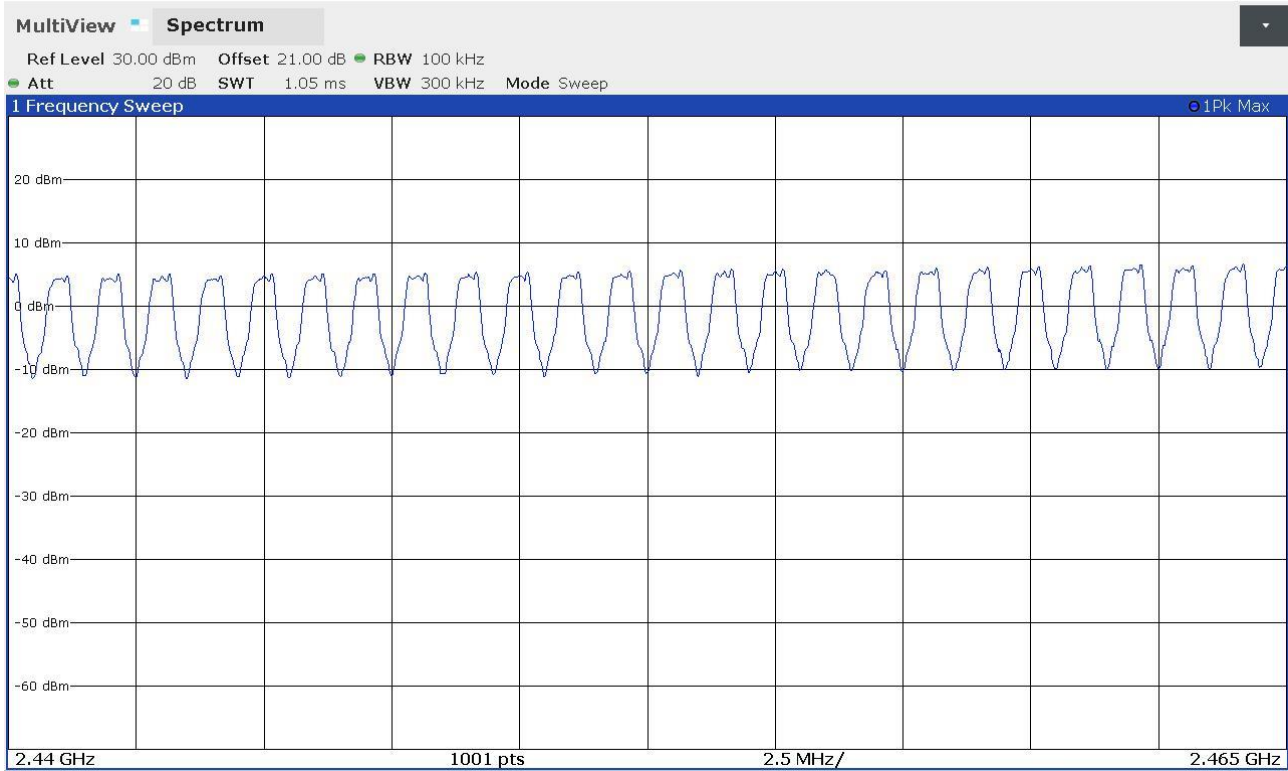


Segalla 201688A14

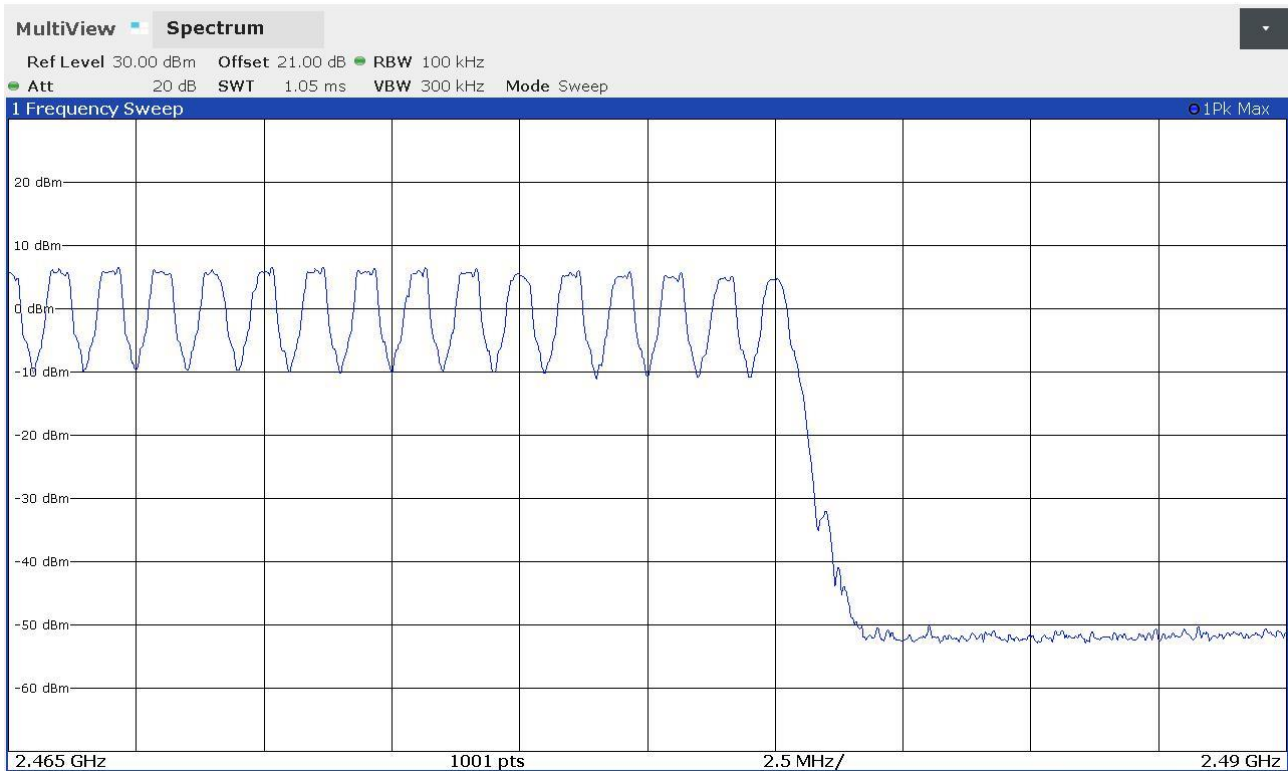




Segalla 201688A15

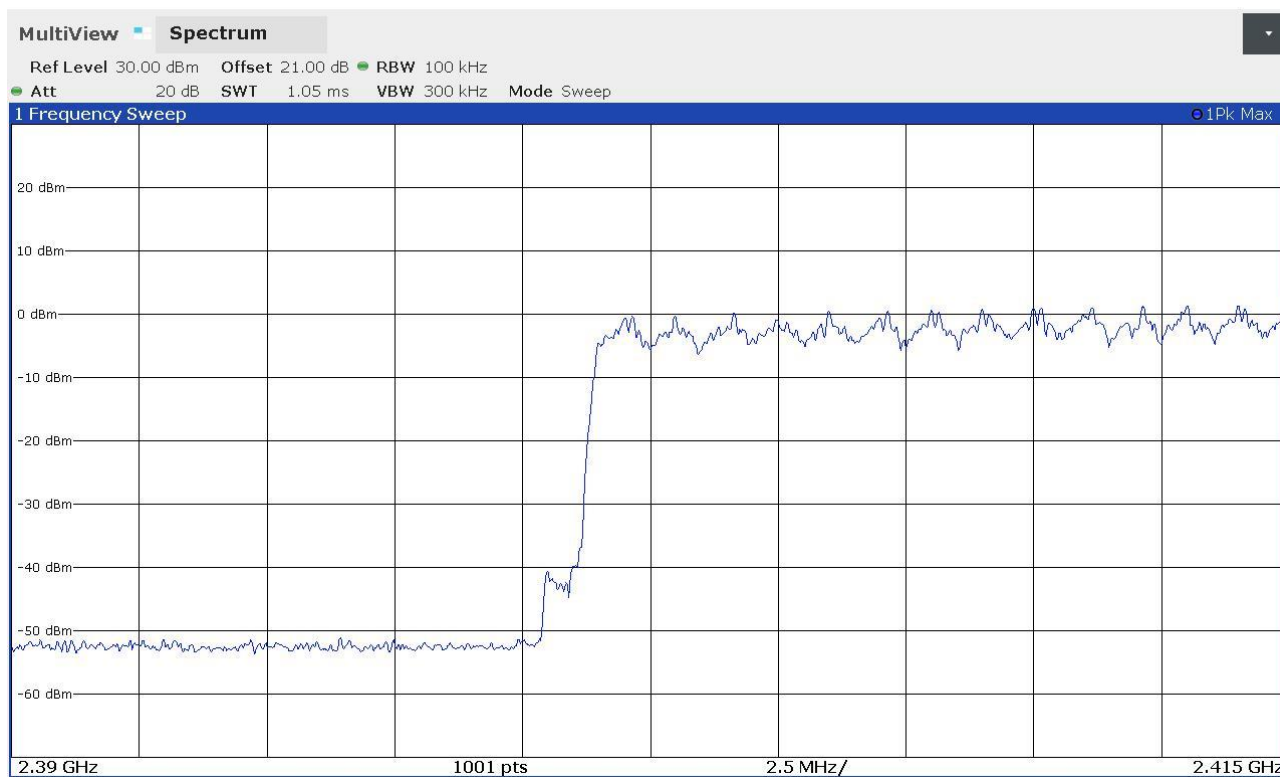


Segalla 201688A16

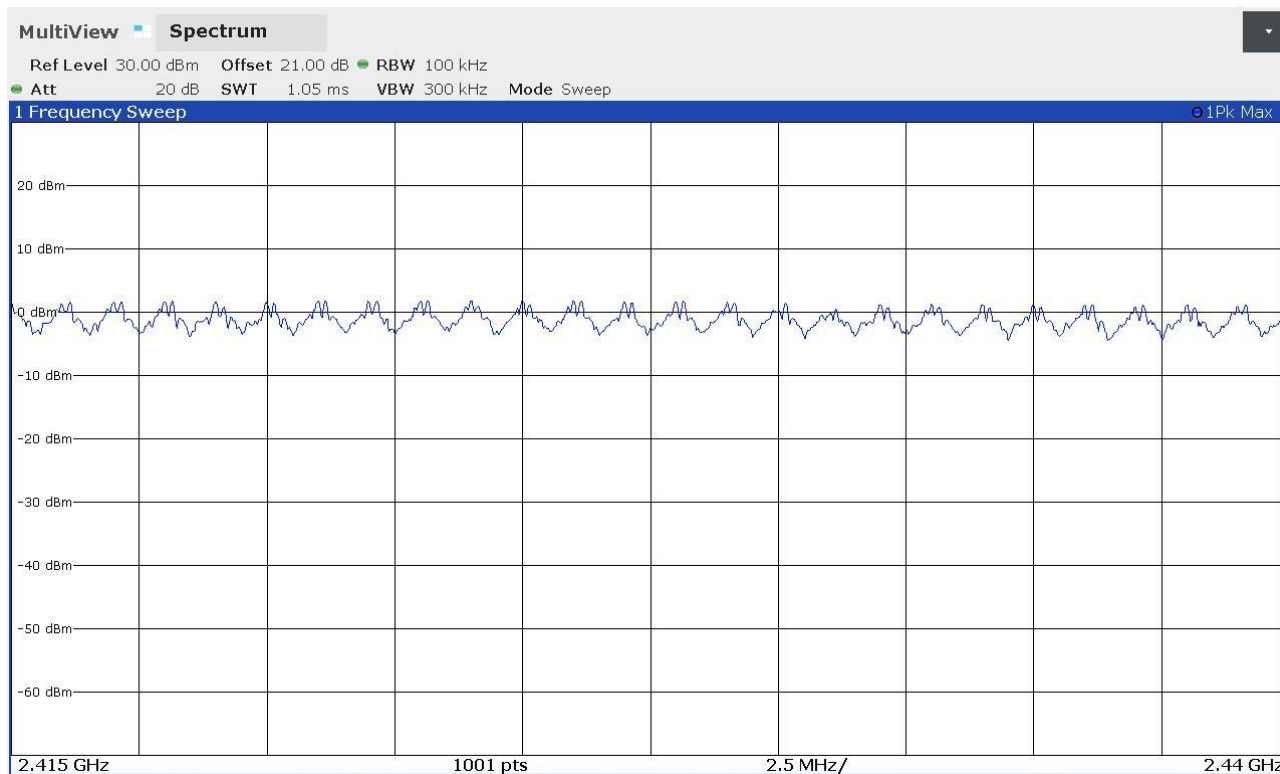




Segalla 201688A17

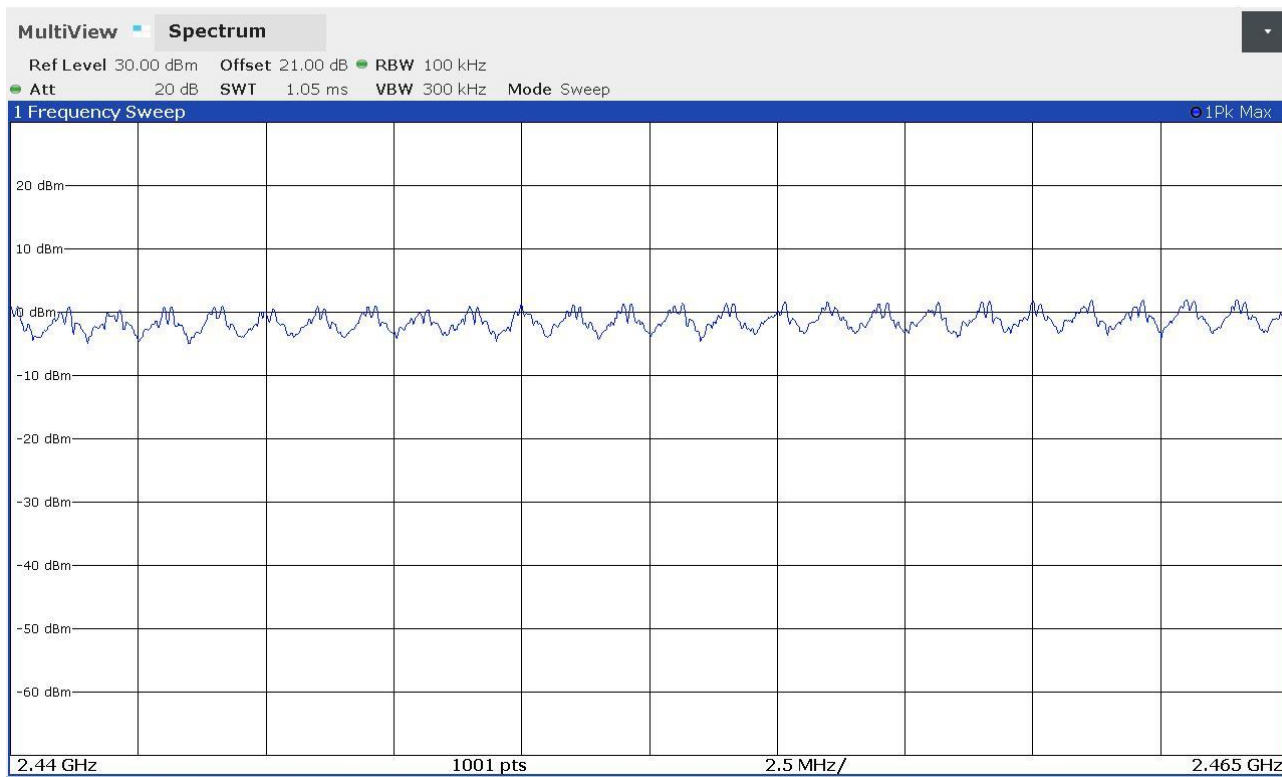


Segalla 201688A18

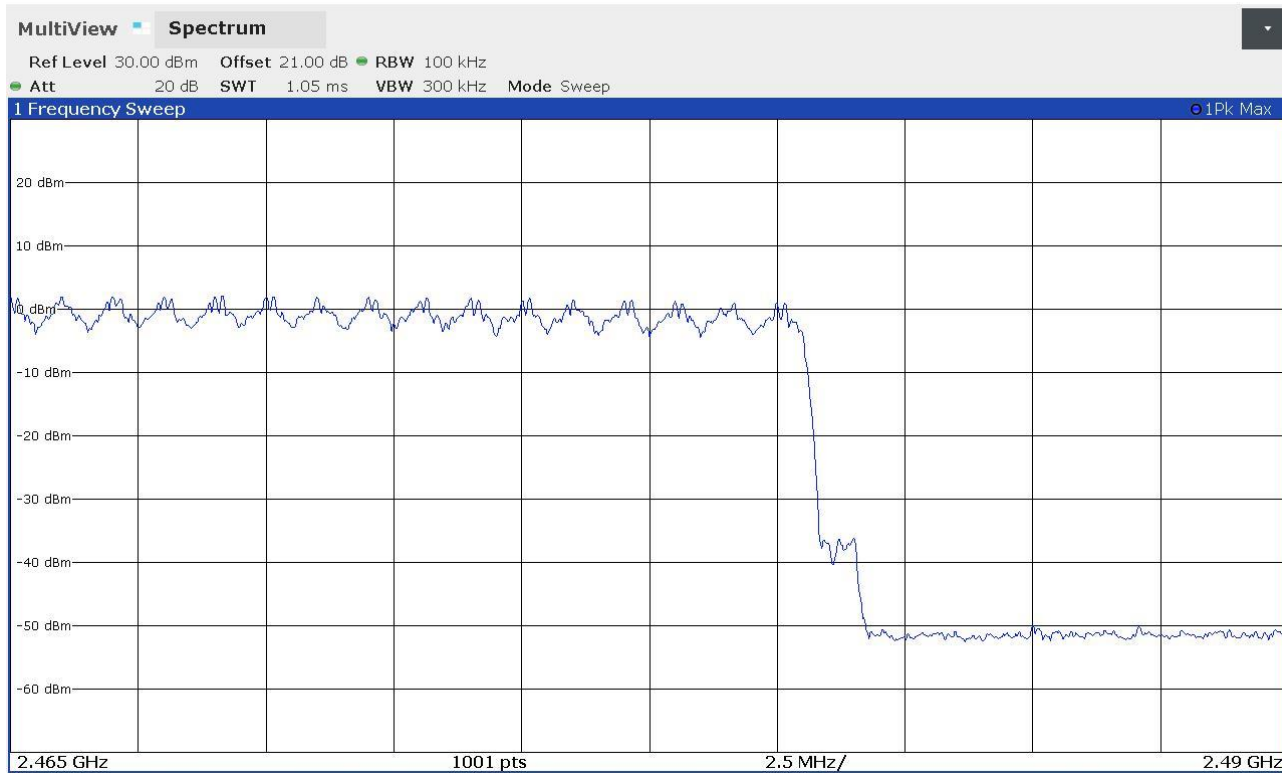




Segalla 201688A19

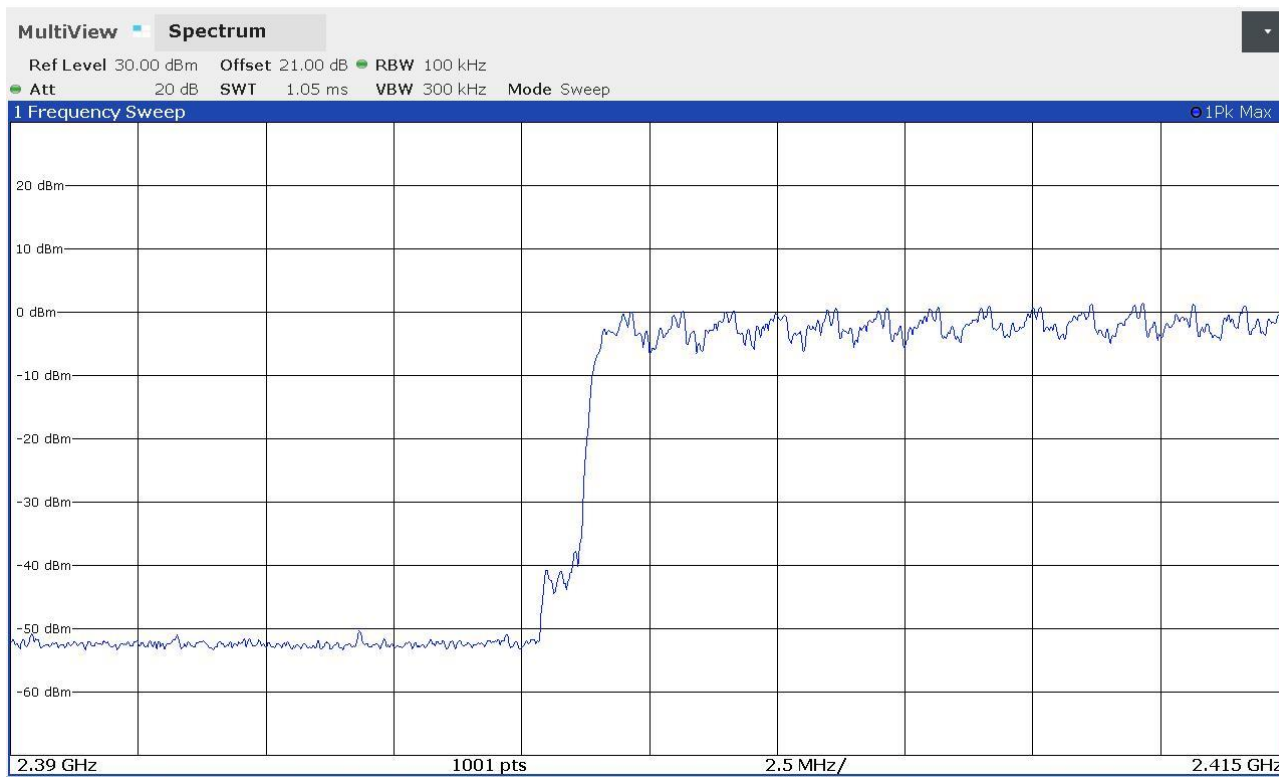


Segalla 201688A20

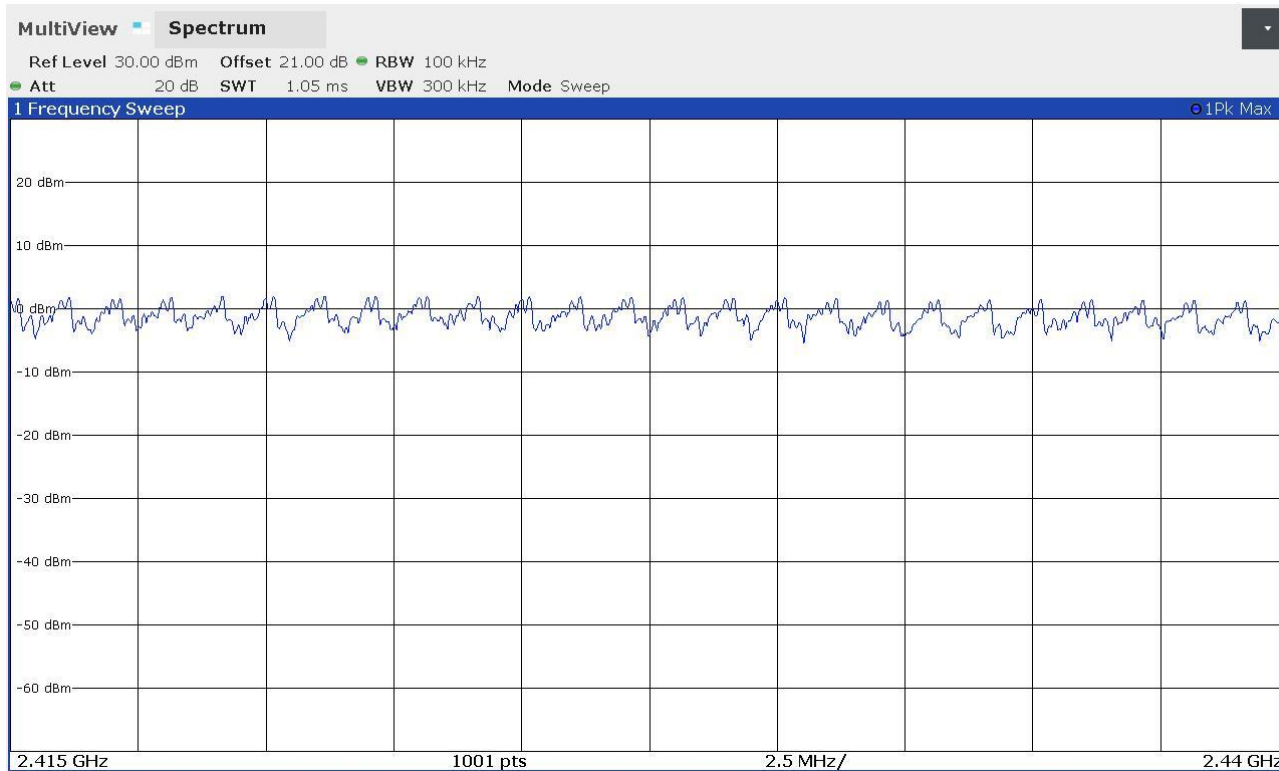




Segalla 201688A21

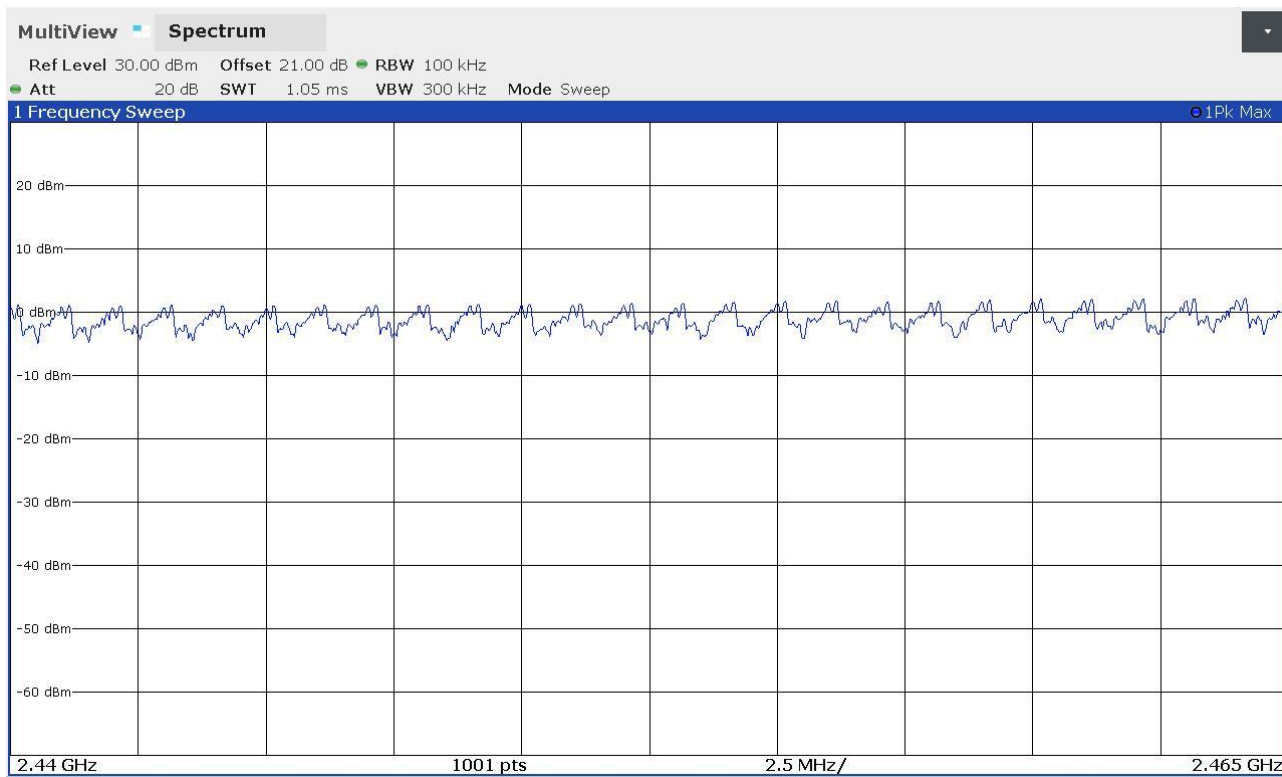


Segalla 201688A22

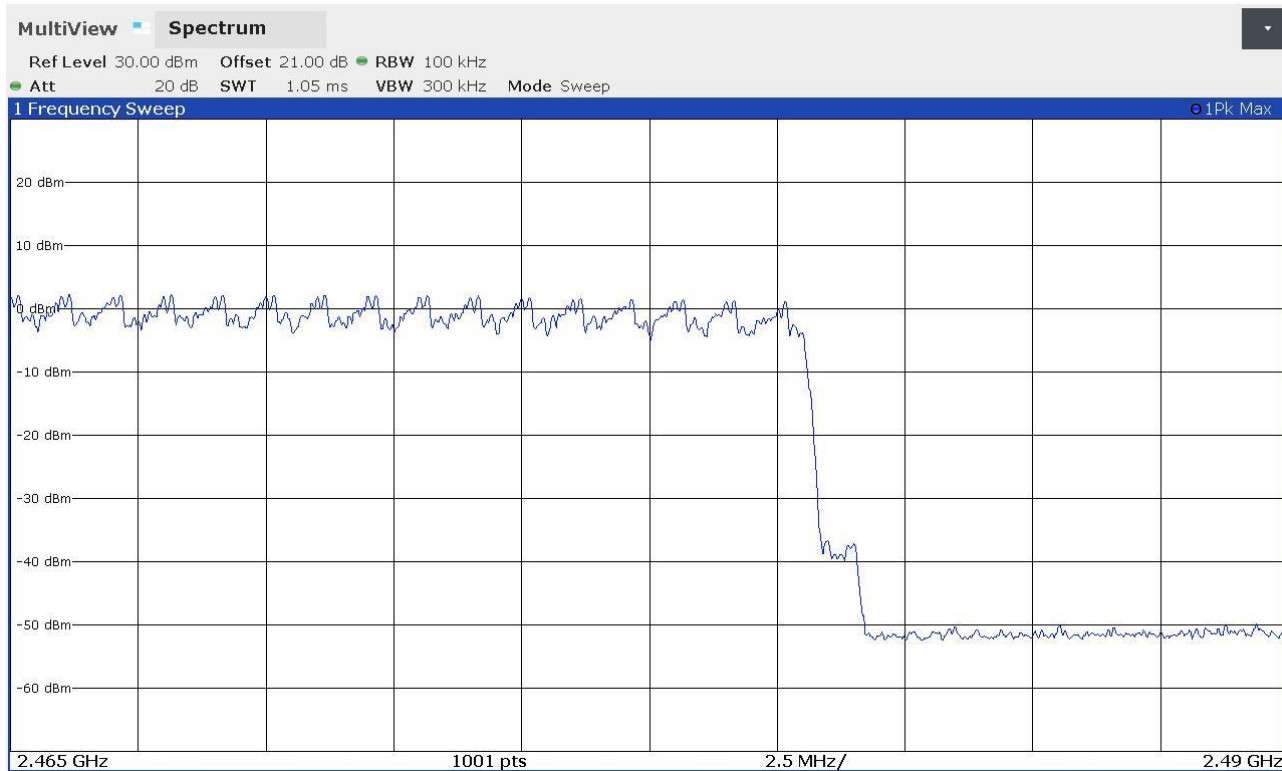




Segalla 201688A23



Segalla 201688A24





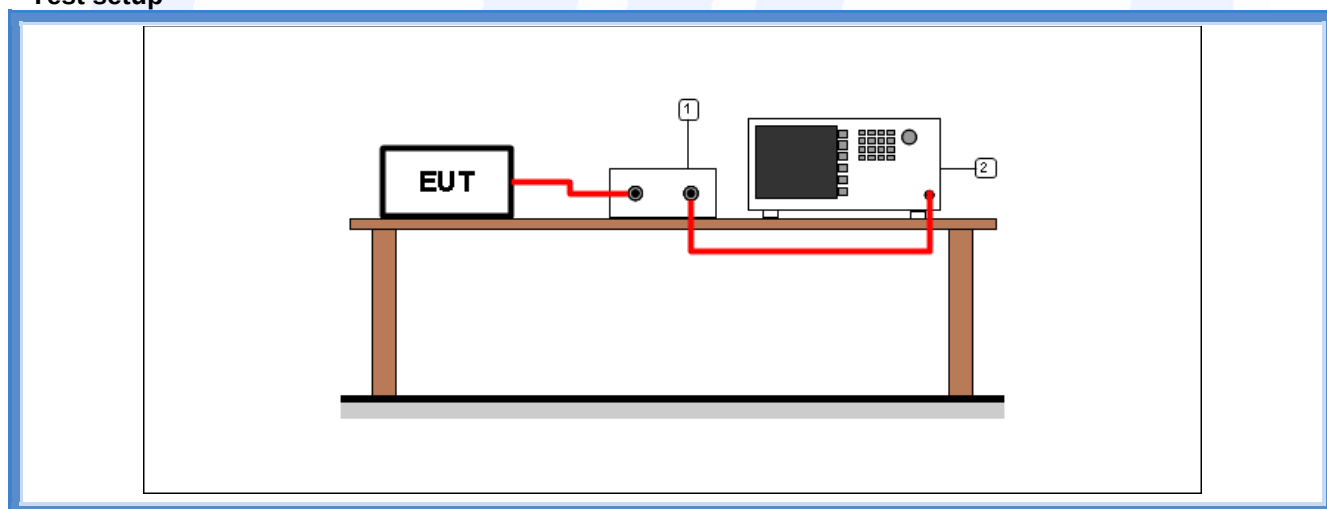
9.6 Time of occupancy

Tested by	M. Segalla
Test date	29.09.2020
Test location (stand)	Laboratory
Reference standards	FCC Rules and Regulation; Titles 47 Part. 15.247 KDB 558074 D01 15.247 Meas Guidance v05r02 cl. 9 b) ANSI C63.10 cl. 7.8.4
Supplementary test set-up description	--
Supplementary information.....	--

Acceptance limits

Frequency hopping systems in the 2400 – 2483,5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0,4 seconds within a period of 0,4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

Test setup



Test setup PR002_01				
Nr.	Id. Number	Manufacturer	Model	Description
2	CMC S295	Rohde & Schwarz	FSW43	Spectrum Analyzer 43GHz
1	--	--	--	Cable + attenuator (calibrated before the test)



Result

Modulation	Frequency (MHz)	Graphs	Dwell time (ms)
DH5	2441	G201688A29	2,225
2DH5	2441	G201688A27	1,200
3DH5	2441	G201688A25	0,854

Modulation	Frequency (MHz)	Graphs	Period	Number of transmissions	Number of transmissions in 31,6 s
DH5	2441	G201688A30	10 s	38	120
2DH5	2441	G201688A28	10 s	38	120
3DH5	2441	G201688A26	10 s	37	117

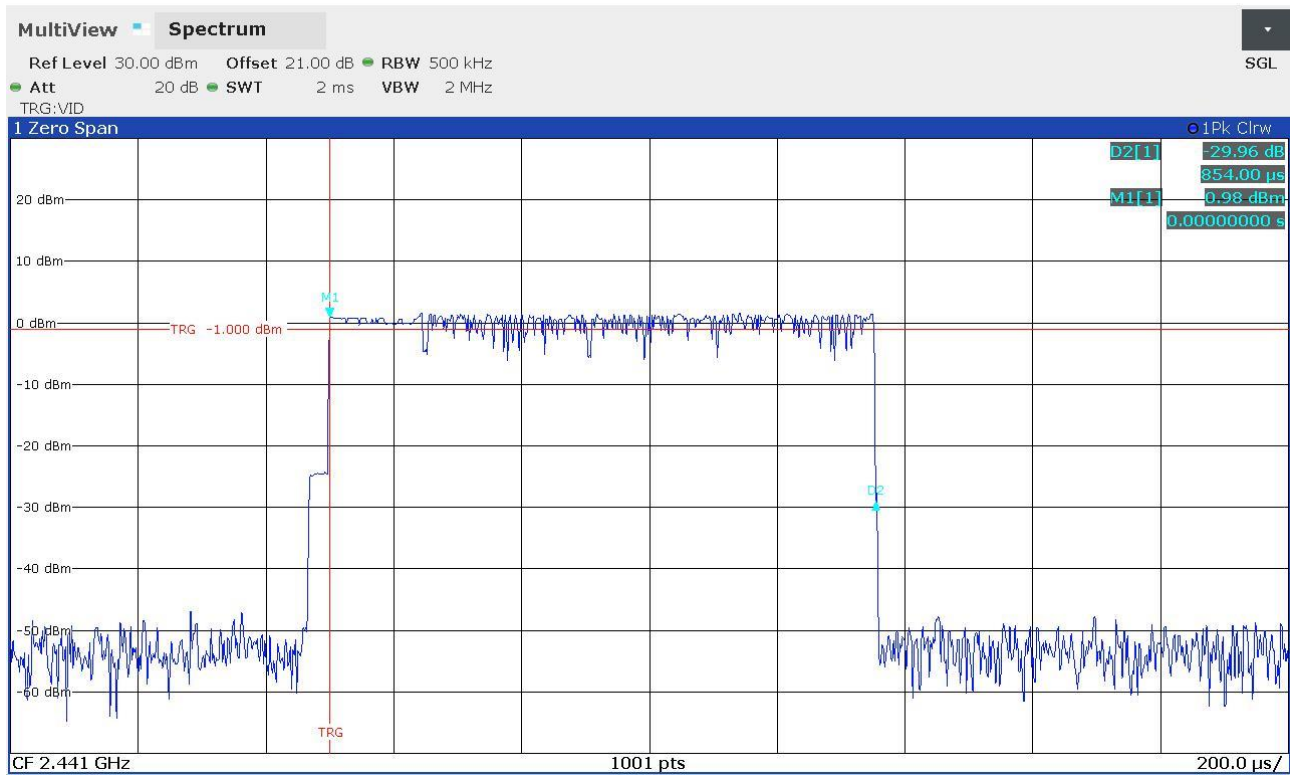
Remarks: only the highest peaks have been considered. The lowest peaks are due to the transmission peaks of the other channels

Modulation	Time of occupancy (Dwell time x Nr. transmissions)	Maximum allowed time of occupancy	Results
DH5	267 ms	400 ms	Complies
2DH5	144 ms	400 ms	Complies
3DH5	99,92 ms	400 ms	Complies

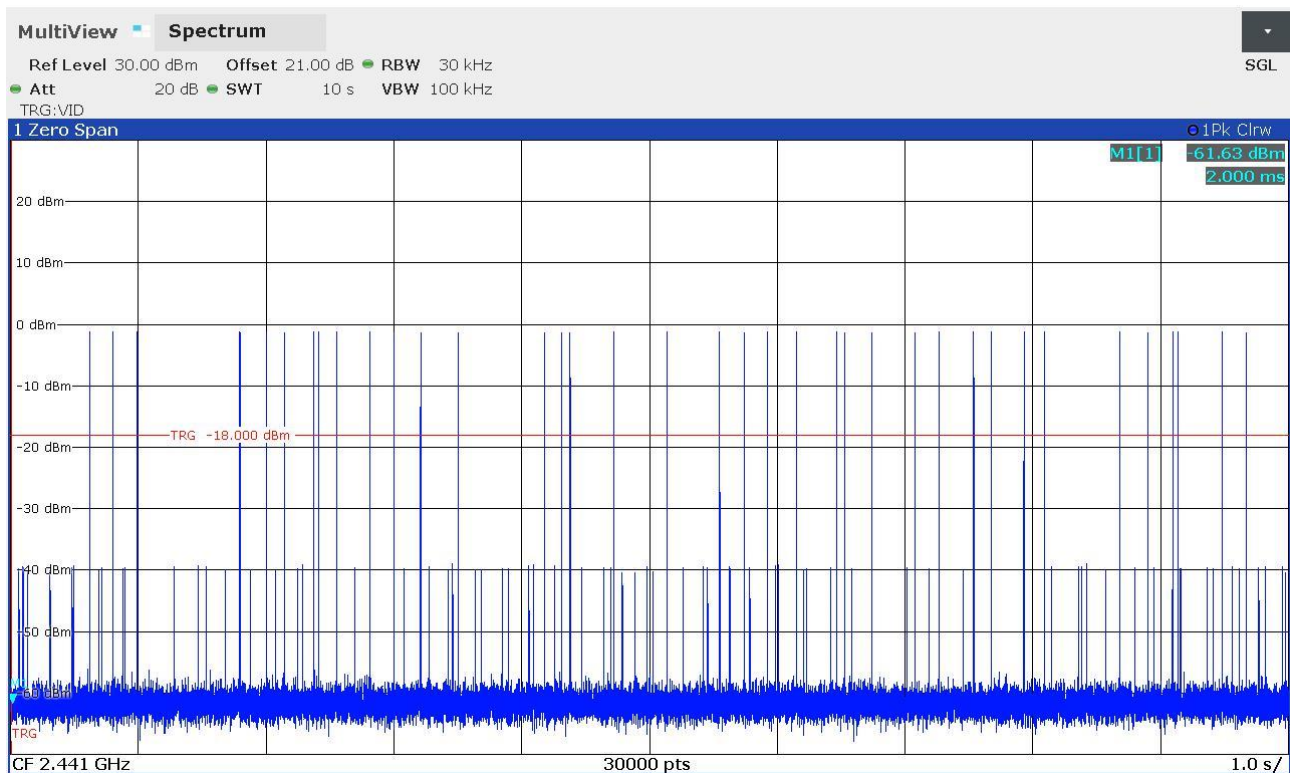


Graphs

Segalla 201688A25

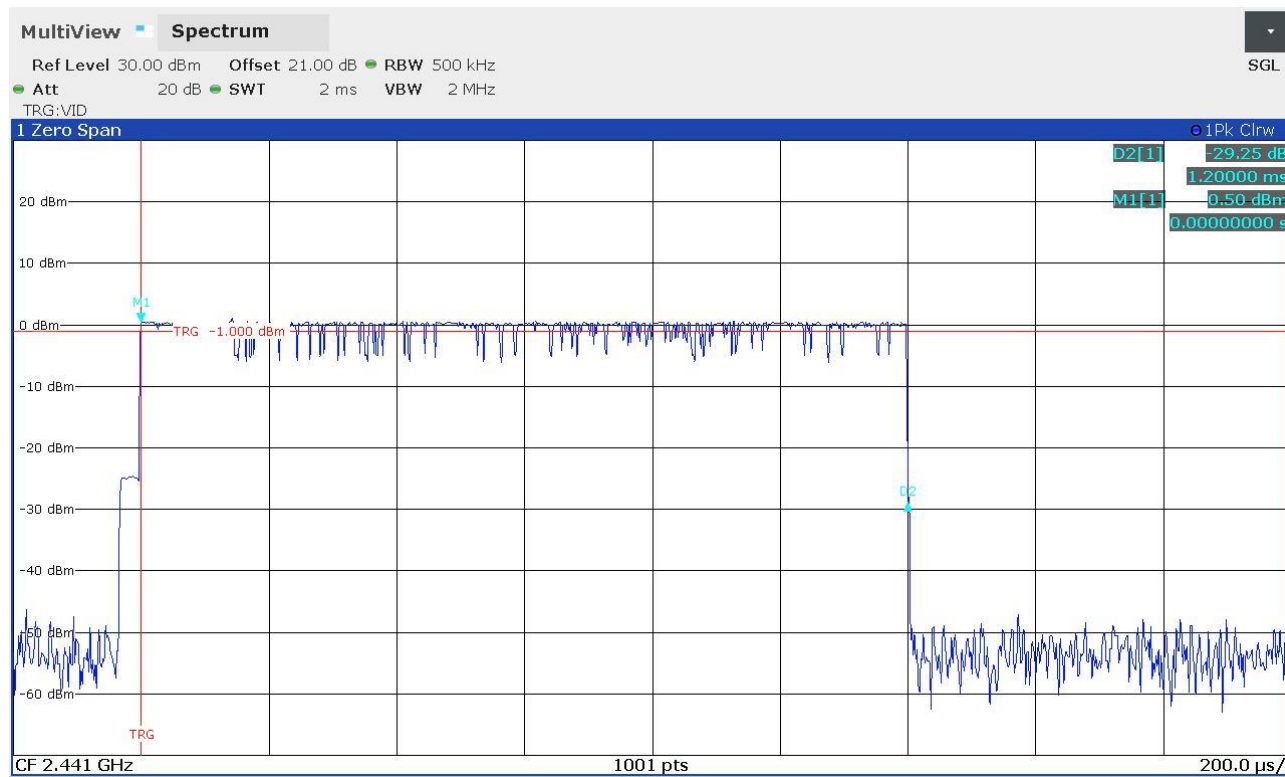


Segalla 201688A26

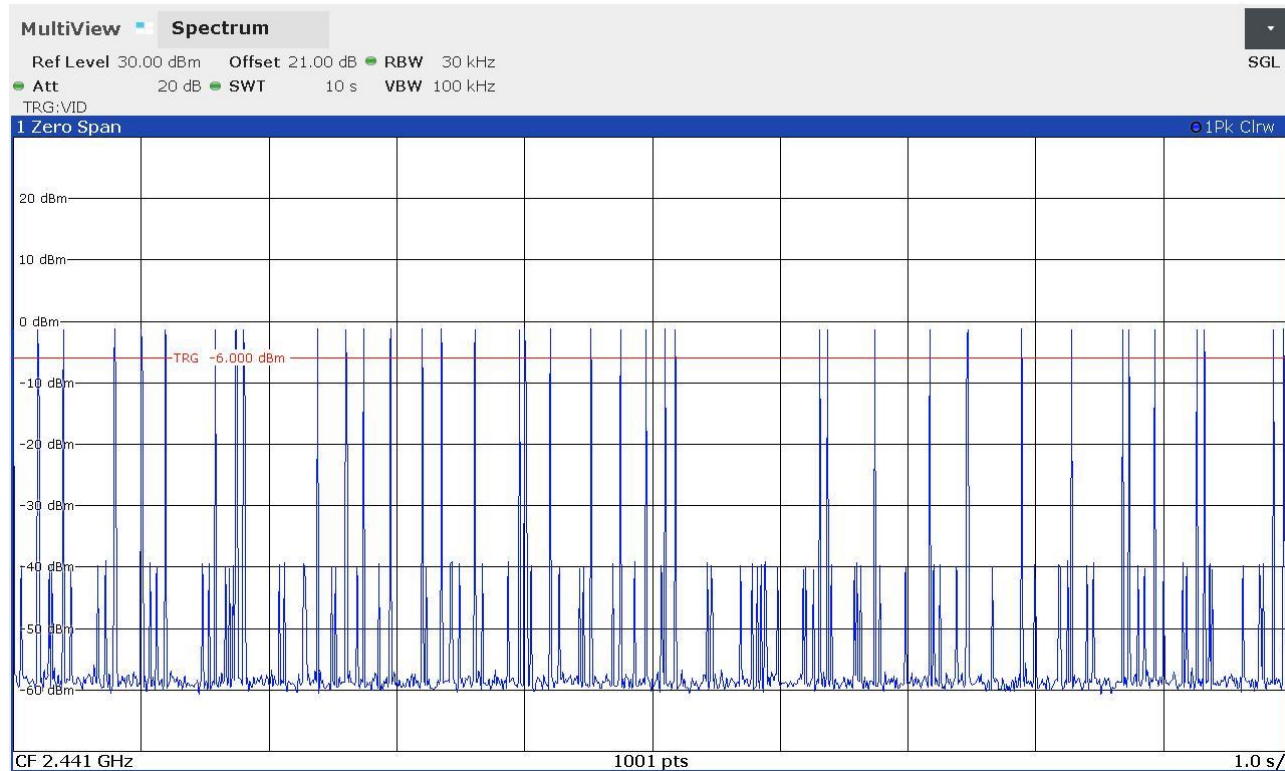




Segalla 201688A27

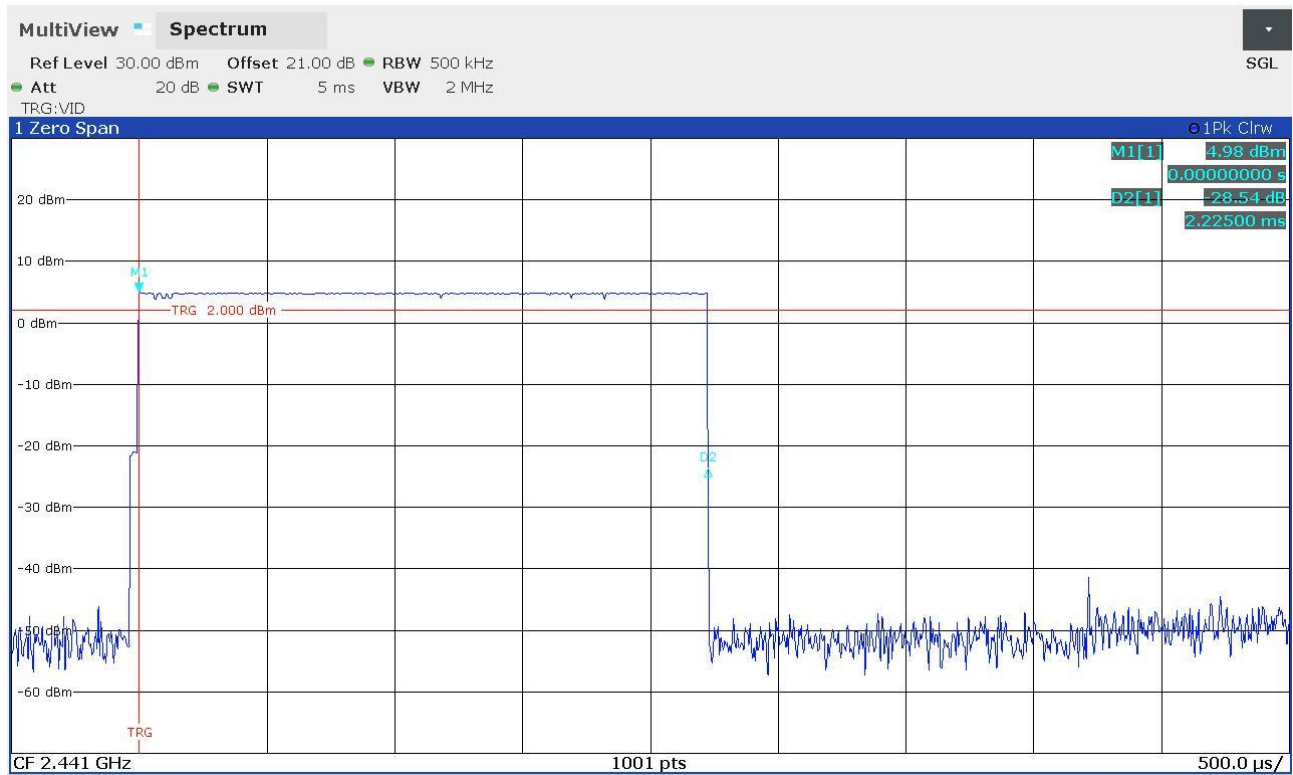


Segalla 201688A28

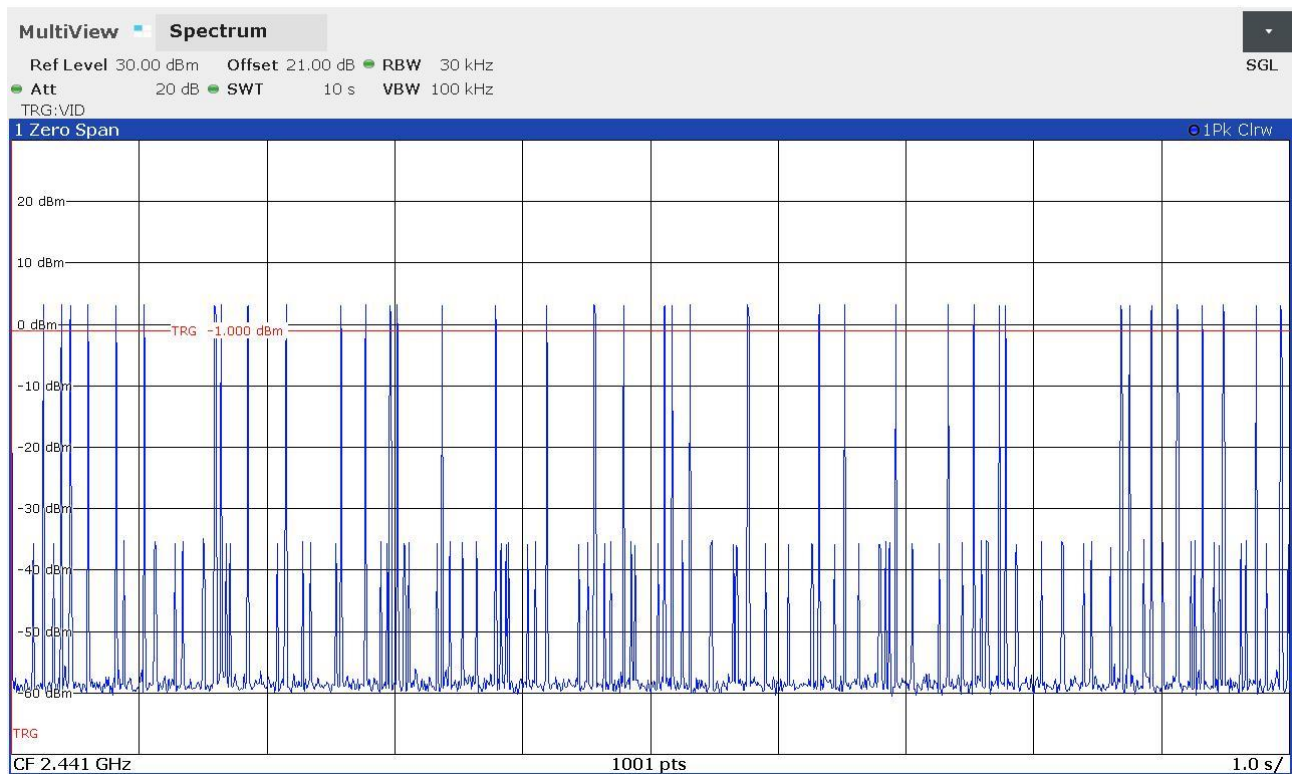




Segalla 201688A29



Segalla 201688A30





9.7 Band edge

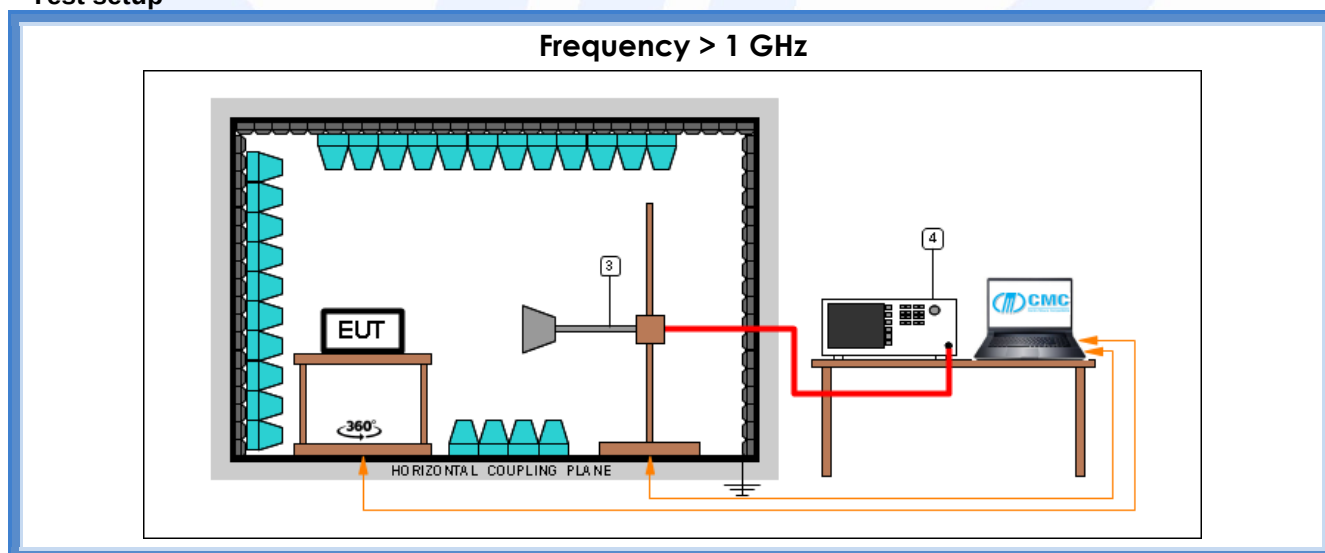
Tested by	M. Segalla
Test date	28.09.2020
Test location (stand)	Semi-anechoic chamber (CMC A070)
Reference standards	FCC Rules and Regulation; Titles 47 Part. 15.247 ANSI C63.10 cl. 7.8.6
Supplementary test set-up description	--
Supplementary information.....	--

Acceptance limits

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)).

Operation within the band 2400 – 2483,5 MHz

Test setup



Test setup PE004_04				
Nr.	Id. Number	Manufacturer	Model	Description
4	CMC S164	Rohde & Schwarz	ESU26	Receiver 20 Hz - 26.5 GHz
3	CMC S108	Emco	3115	Waveguide antenna



Result – DH5

Frequency (MHz)	Bandwidth	Graph(s) – Hopping	Results	
2402	1 MHz	G20168848	--	*
2402	100 kHz	G20168843	F _L : 2401,434 MHz	Complies
2480	1 MHz	G20168849	F _H : 2483,404 MHz	Complies
2480	1 MHz	G20168850	--	**

*: this graph shows the emissions in 2310 – 2390 MHz restricted band

**: this graph shows the emissions in 2483,5 – 2500 MHz restricted band

Frequency (MHz)	Bandwidth	Graph(s) – No hopping	Results	
2402	1 MHz	G20168837	--	*
2402	100 kHz	G20168842	F _L : 2401,407 MHz	Complies
2480	1 MHz	G20168855	F _H : 2483,430 MHz	Complies
2480	1 MHz	G20168856	--	**

*: this graph shows the emissions in 2310 – 2390 MHz restricted band

**: this graph shows the emissions in 2483,5 – 2500 MHz restricted band

Result – 2DH5

Frequency (MHz)	Bandwidth	Graph(s) – Hopping	Results	
2402	1 MHz	G20168847	--	*
2402	100 kHz	G20168844	F _L : 2401,280 MHz	Complies
2480	1 MHz	G20168852	F _H : 2483,436 MHz	Complies
2480	1 MHz	G20168851	--	**

*: this graph shows the emissions in 2310 – 2390 MHz restricted band

**: this graph shows the emissions in 2483,5 – 2500 MHz restricted band

Frequency (MHz)	Bandwidth	Graph(s) – No hopping	Results	
2402	1 MHz	G20168838	--	*
2402	100 kHz	G20168841	F _L : 2401,260 MHz	Complies
2480	1 MHz	G20168858	F _H : 2483,470 MHz	Complies
2480	1 MHz	G20168857	--	**

*: this graph shows the emissions in 2310 – 2390 MHz restricted band

**: this graph shows the emissions in 2483,5 – 2500 MHz restricted band



Result – 3DH5

Frequency (MHz)	Bandwidth	Graph(s) – Hopping	Results	
2402	1 MHz	G20168846	--	*
2402	100 kHz	G20168845	F _L : 2401,280 MHz	Complies
2480	1 MHz	G20168853	F _H : 2483,436 MHz	Complies
2480	1 MHz	G20168854	--	**

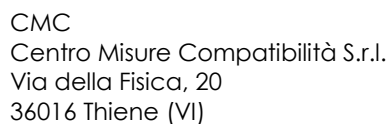
*: this graph shows the emissions in 2310 – 2390 MHz restricted band

**: this graph shows the emissions in 2483,5 – 2500 MHz restricted band

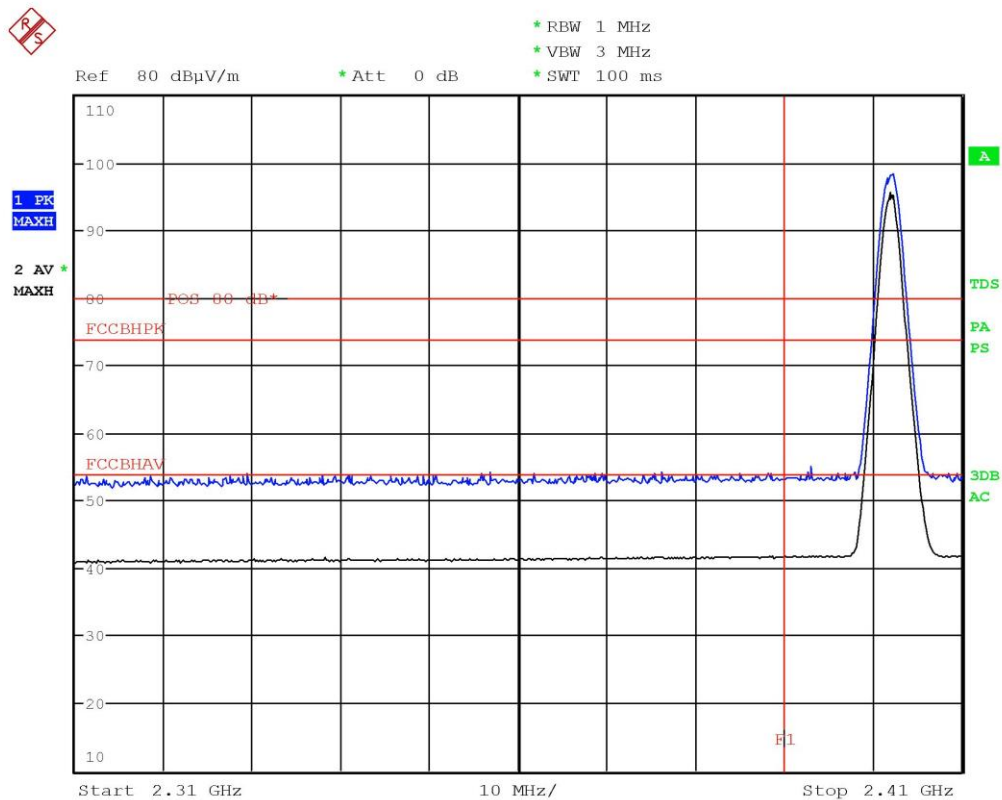
Frequency (MHz)	Bandwidth	Graph(s) – No hopping	Results	
2402	1 MHz	G20168839	--	*
2402	100 kHz	G20168840	F _L : 2401,280 MHz	Complies
2480	1 MHz	G20168859	F _H : 2483,440 MHz	Complies
2480	1 MHz	G20168860	--	**

*: this graph shows the emissions in 2310 – 2390 MHz restricted band

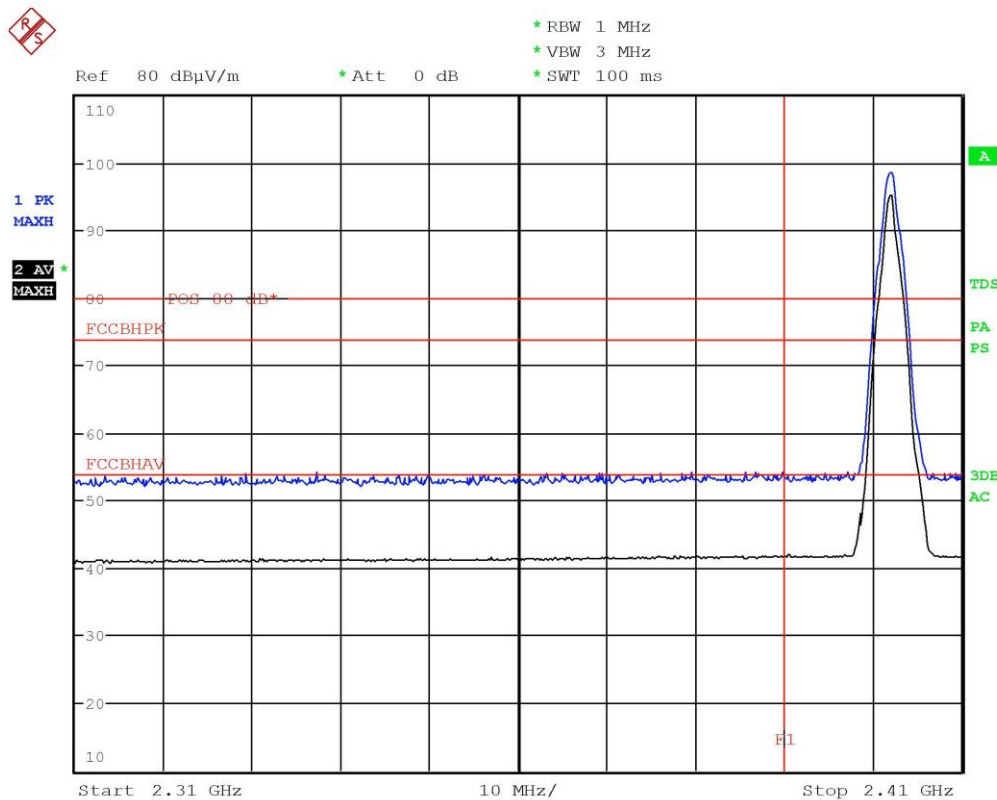
**: this graph shows the emissions in 2483,5 – 2500 MHz restricted band



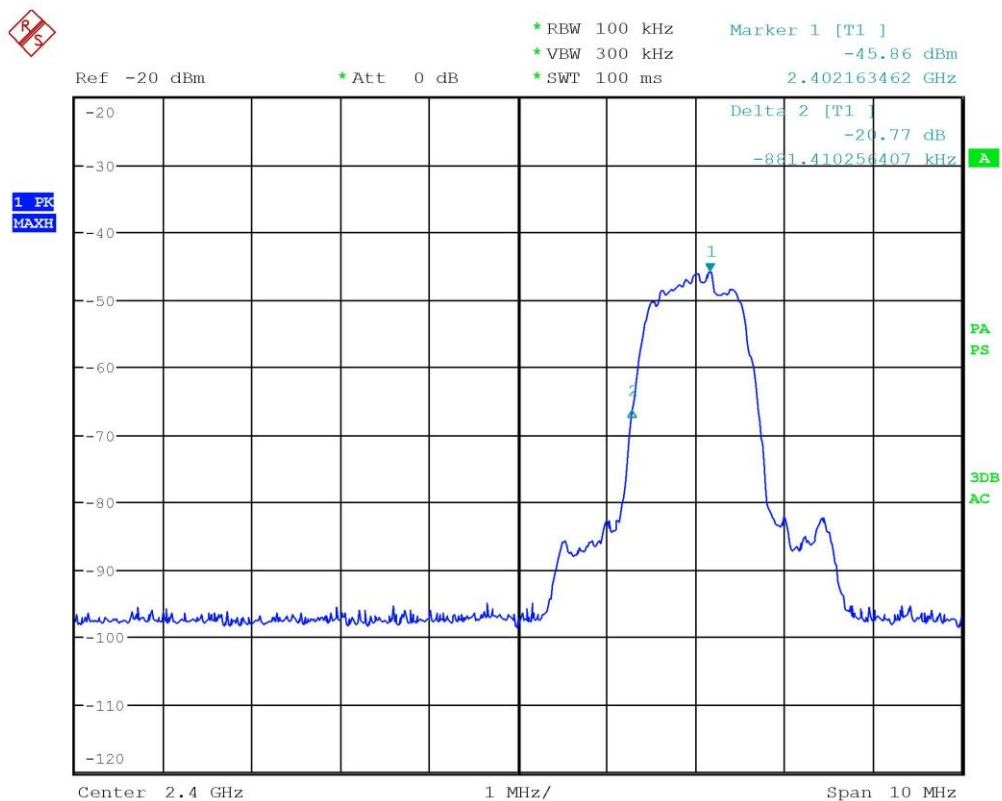
LAB N° 0168 L



Segalla 20168838



Segalla 20168839



Segalla 20168840