

RADIO REPORT FCC 47 CFR Part 15E Unlicensed National Information Infrastructure Devices in the 5 GHz Bands	
Report Reference No	G0M-1905-8256-TFC407WF-V01
Testing Laboratory	Eurofins Product Service GmbH
Address	Storkower Str. 38c 15526 Reichenwalde Germany
Accreditation	 DAkkS - Registration number : D-PL-12092-01-04 FCC Filed Test Laboratory, Reg.-No.: 96970
Applicant	BIOTRONIK SE & Co. KG
Address	Woermannkehre 1 12359 Berlin GERMANY
Test Specification	According to FCC rules
Standard	47 CFR Part 15E
Non-Standard Test Method	None
Equipment under Test (EUT):	
Product Description	programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
Model(s)	Renamic Neo
Additional Model(s)	None
Brand Name(s)	BIOTRONIK
Hardware Version(s)	A.x
Software Version(s)	Porto_WLAN: 1_1_0
FCC-ID	QRI-RENAMICNEO
Test Result	PASSED

Possible test case verdicts:		
required by standard but not tested	N/T	
not required by standard	N/R	
not applicable to EUT	N/A	
test object does meet the requirement	P(PASS)	
test object does not meet the requirement	F(FAIL)	
Testing:		
Test Lab Temperature	20 - 23 °C	
Test Lab Humidity	32 – 38 %	
Date of receipt of test item	2019-05-22	
Report:		
Compiled by	Christian Weber	
Tested by (+ signature) (Responsible for Test)	Christian Weber	
	Abdullah Al Jamal	
	Florian Voigt (supervised by Christian Weber)	
Approved by (+ signature) (Deputy Head of Lab)	Toralf Jahn	
Date of Issue	2019-12-17	
Total number of pages	528	
General Remarks:		
The test results presented in this report relate only to the object tested. The results contained in this report reflect the results for this particular model and serial number. It is the responsibility of the manufacturer to ensure that all production models meet the intent of the requirements detailed within this report. This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.		
Additional Comments:		
Internal equipment photos provided by applicant.		

VERSION HISTORY

Version History			
Version	Issue Date	Remarks	Revised By
01	2019-12-17	Initial Release	

ABBREVIATIONS AND ACRONYMS

Acronyms	
Acronym	Description
BPSK	Binary Phase Shift Keying
EIRP	Equivalent Isotropic Radiated Power
EUT	Equipment Under Test
FCC	Federal Communications Commission
HT	High Throughput
IEEE 802.11	MAC and PHY Layer for WiFi
OFDM	Orthogonal Frequency Division Multiplexing
QAM	Quadrature Amplitude Modulation
QPSK	Quadrature Phase Shift Keying
RBW	Resolution bandwidth
RMS	Root mean square
TPC	Transmit Power Control
VBW	Video bandwidth
VHT	Very High Throughput

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1 Equipment (Test Item) Under Test

Description	programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs	
Model	Renamic Neo	
Additional Model(s)	None	
Brand Name(s)	BIOTRONIK	
Serial Number(s)	80001084 (Conducted test sample 24936) 80001091 (Radiated test sample 24164)	
Hardware Version(s)	A.x	
Software Version(s)	Porto_WLAN: 1_1_0	
FCC-ID	QRI-RENAMICNEO	
Equipment type	End Product	
Device type	Client	
Radio type	Transceiver	
Assigned frequency bands	5150 - 5250 MHz 5250 - 5350 MHz 5470 - 5725 MHz 5725 - 5850 MHz	
Radio technology	IEEE 802.11a IEEE 802.11n (HT20) IEEE 802.11ac (VHT20)	
Modulation	BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM	
Number of antenna ports	2	
Transmit power control	Yes	
Antenna 1 – Antenna port W	Type	Integrated
	Model	N/A
	Manufacturer	BIOTRONIK
	Gain	7 dBi
Antenna 2 – Antenna port B	Type	Integrated
	Model	N/A
	Manufacturer	BIOTRONIK
	Gain	7 dBi
Supply Voltage	V _{NOM}	120 VAC
	V _{MIN}	90 VAC
	V _{MAX}	240 VAC
Operating Temperature	T _{NOM}	25 °C
	T _{MIN}	0 °C
	T _{MAX}	40 °C
Battery supply	No	
AC/DC-Adaptor	Model	AHM85PS19C2-8
	Vendor	XP Power
	Input	100 VAC – 240 VAC / 50/60 Hz
	Output	19 VDC / 4.477 A
Manufacturer	BIOTRONIK SE & Co. KG Woermannkehre 1 12359 Berlin GERMANY	

1.4 Support Equipment

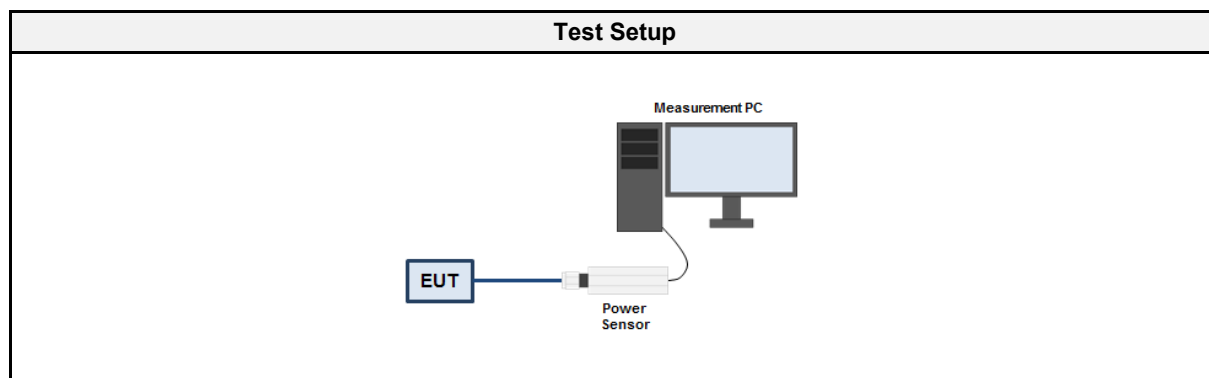
Product Type	Device	Manufacturer	Model	Comment
AE	WiFi Access Point	Cisco	AIR-CAP3702E-A-K9	FCC-ID: LDK102087, for client testing
Description:				
AE	Auxiliary Equipment			
SIM	Simulator			
CBL	Connecting Cable			
SFT	Software			
Comment:				

1.5 Test mode data rate evaluation

1.5.1 Information

Test Information	
Measurement Method	KDB 789033 E
Operator	Christian Weber
Date	2019-10-07

1.5.2 Setup



1.5.3 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Power Sensor	ETS-Lindgren	7002-006	EF00935	2019-03	2020-03
Power Sensor	ETS-Lindgren	7002-006	EF00934	2019-08	2020-08

1.5.4 Procedure

Test Procedure
1. EUT set to test mode on the first supported channel for each modulation and data rate 2. The conducted power is measured with a wide band power sensor 3. The power is measured for all data rates/modulations supported by the EUT 4. The data rate with the highest output power for each technology is selected for test mode

1.5.5 Results

OFDM - 5180 MHz							
Output power [dBm] - Antenna W							
6 Mbps	9 Mbps	12 Mbps	18 Mbps	24 Mbps	36 Mbps	48 Mbps	54 Mbps
9.9	9.9	9.9	9.9	9.9	9.9	6.6	6.6
Output power [dBm] - Antenna B							
6 Mbps	9 Mbps	12 Mbps	18 Mbps	24 Mbps	36 Mbps	48 Mbps	54 Mbps
11.1	11.1	11.0	11.1	11.1	10.6	7.3	7.0

HT20 - 5180 MHz							
Output power [dBm] - Antenna W							
MCS 0	MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7
9.9	9.7	9.8	9.9	9.9	6.5	6.5	6.4
Output power [dBm] - Antenna B							
MCS 0	MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7
10.7	10.7	10.8	10.8	10.9	7.2	7.2	7.6
Output power [dBm] - Antenna W+B							
MCS 8	MCS 9	MCS 10	MCS 11	MCS 12	MCS 13	MCS 14	MCS 15
13.3	13.2	13.1	13.1	13.2	12.4	12.5	12.4

VHT20 - 5180 MHz									
Output power [dBm] - Antenna W									
MCS 0	MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7	MCS 8	MCS 9
9.7	9.8	9.9	9.9	10.0	6.2	6.7	6.6	6.7	6.6
Output power [dBm] - Antenna B									
MCS 0	MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7	MCS 8	MCS 9
10.9	10.9	10.5	10.6	10.6	7.3	6.9	7.3	7.3	7.4
Output power [dBm] - Antenna W+B									
MCS 0	MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7	MCS 8	MCS 9
13.3	13.2	13.4	13.4	13.2	12.5	12.6	12.3	9.8	9.9

1.6 Test mode duty cycle evaluation

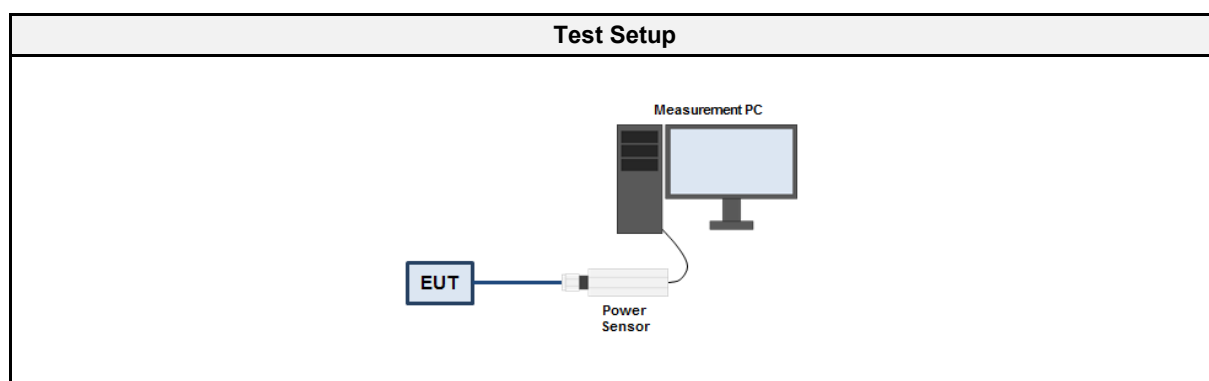
1.6.1 Information

Test Information	
Measurement Method	ANSI C63.10 12.2
Operator	Christian Weber
Date	2019-10-07

1.6.2 Requirements

Requirements	
Duty cycle	Duty cycle correction
≥ 98 %	No correction required
< 98 %	Correction required ($10 \times \log_{10}(1/DC)$)

1.6.3 Setup



1.6.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Power Sensor	ETS-Lindgren	7002-006	EF00935	2019-03	2020-03

1.6.5 Procedure

Test Procedure
1. EUT set to test mode 2. Sweep time is set long enough to capture at least 5 bursts 3. The maximum burst duration T_{ON} is measured 4. The minimum idle duration T_{OFF} is measured 5. The duty cycle is calculated by $DC = T_{ON} / (T_{ON} + T_{OFF})$ 6. The duty cycle correction is calculated by $DC = 10 \times \log_{10}(T_{ON} / (T_{ON} + T_{OFF}))$

1.6.6 Results

Duty Cycle Results (SS1 – 1 Simultaneous Tx)				
Mode	Channel [MHz]	Data rate	Duty Cycle	Correction Factor [dB]
OFDM	5180	6 Mbit/s	0.47	-6.56
HT20	5180	MCS4	0.08	-21.94
VHT20	5180	MCS0	0.43	-7.33

Duty Cycle Results (SS2 – 2 Simultaneous Tx)				
Mode	Channel [MHz]	Data rate	Duty Cycle	Correction Factor [dB]
HT20	5180	MCS8	0.23	-12.77
VHT20	5180	MCS2	0.08	-21.94

1.7 Test Modes

Mode	Description
OFDM (IEEE 802.11a)	Mode = Transmit Modulation = BPSK Spreading = OFDM Bandwidth = 20 MHz Duty cycle (Antenna W or B) = 47% Data rate (Antenna W or B) = 6 Mbps
HT20 (IEEE 802.11n) SS1	Mode = Transmit Modulation (Antenna W) = BPSK Modulation (Antenna B) = 16-QAM Spreading = OFDM Bandwidth = 20 MHz Duty cycle (Antenna W) = 47%, Duty Cycle (Antenna B) = 8 % Data rate (Antenna W) = 6.5 Mbps Data rate (Antenna B) = 39 Mbps MCS (Antenna W) = 0 MCS (Antenna B) = 4
HT20 (IEEE 802.11n) SS2	Mode = Transmit Modulation = BPSK Spreading = OFDM Bandwidth = 20 MHz Duty cycle = 23% Data rate = 13 Mbps MCS = 8
VHT20 (IEEE 802.11ac) SS1	Mode = Transmit Modulation (Antenna W) = 16-QAM Modulation (Antenna B) = BPSK Spreading = OFDM Bandwidth = 20 MHz Duty cycle (Antenna W) = 43%, Duty Cycle (Antenna B) = 8 % Data rate (Antenna W) = 39 Mbps Data rate (Antenna B) = 6.5 Mbps MCS (Antenna W) = 4 MCS (Antenna B) = 0
VHT20 (IEEE 802.11ac) SS2	Mode = Transmit Modulation = QPSK Spreading = OFDM Bandwidth = 20 MHz Duty cycle = 8% Data rate = 39 Mbps MCS = 2
Comment:	

1.8 Test Frequencies

Designator	Mode	Channel	Frequency [MHz]
F1	Tx / Rx	36	5180
F2	Tx / Rx	40	5200
F3	Tx / Rx	48	5240
F4	Tx / Rx	52	5260
F5	Tx / Rx	56	5280
F6	Tx / Rx	64	5320
F7	Tx / Rx	100	5500
F8	Tx / Rx	120	5600
F9	Tx / Rx	144	5720
F10	Tx / Rx	149	5745
F11	Tx / Rx	157	5785
F12	Tx / Rx	165	5825

1.9 Sample emission level calculation

The following is a description of terms and a sample calculation, as appears in the radiated emissions data table. The numbers used in the calculation are for example only. There is no direct correlation to the specific data taken for the product described in this document:

Reading:

This is the reading obtained on the spectrum analyzer in dBμV. Any external preamplifiers used are taken into account through internal analyzer settings.

A.F.:

This is the antenna factor for the receiving antenna. It is a conversion factor, which converts electric fields strengths to voltages, which can be measured directly on the spectrum analyzer. It is treated as a loss in dB. Cable losses have been included with the A.F. to simplify the calculations. The antenna factor is used in calculations as follows:

$$\text{Reading on Analyzer (dB}\mu\text{V)} + \text{A.F. (dB/m)} = \text{Net field strength (dB}\mu\text{V/m)}$$

Net:

This is the net field strength measurement (as shown above).

Limit:

This is the FCC Class B radiated emission limit (in units of dBμV/m). The FCC limits are given in units of μV/m. The following formula is used to convert the units of μV/m to dBμV/m:

$$\text{Limit (dB}\mu\text{V/m)} = 20 \cdot \log(\mu\text{V/m})$$

Margin:

This is the margin of compliance below the FCC limit. The units are given in dB. A negative margin indicates the emission was below the limit. A positive margin indicates that the emission exceeds the limit.

Example only:

Reading + AF	= Net Reading	:	Net reading - FCC limit	= Margin
+21.5 dBμV + 26 dB/m	= 47.5 dBμV/m	:	47.5 dBμV/m - 57.0 dBμV/m	= -9.5 dB

1.10 Normative References

References	
Designator	Reference
KDB 789033	KDB 789033 D02 v02r01
ANSI C63.10	ANSI C63.10:2013

2 Result Summary

FCC 47 CFR Part 15E				
Product Standard Reference	Requirement	Reference Method	Result	Remarks
FCC 15.407(e)	6 dB bandwidth	KDB 789033 C.2	PASS	Only required in 5725-5850 MHz band.
FCC 15.407(a)(2),(a)(5),(h)(2)	26 dB bandwidth	KDB 789033 C.1	PASS	No limit. Basis for other measurements.
FCC 15.407(a)	Maximum output power	KDB 789033 E	PASS	
FCC 15.407(a)	Transmit power control	KDB 789033 E	N/R	Required in 5250-5350 and 5470-5725 MHz bands. Not required for EIRP < 500 mW.
FCC 15.407(a)	Power spectral density	KDB 789033 F	PASS	
FCC 15.407(g)	Frequency stability	ANSI C63.10 6.8	PASS	
FCC 15E.407 (h)(2)	In-Service Monitoring for Channel Closing Transmission and Channel Move Time	KDB 905462 D02 v02 Section 7.8.3	PASS	
FCC 15E.407 (h)(2)	In-Service Monitoring for Non-Occupancy Time	KDB 905462 D02 v02 Section 7.8.3	PASS	
FCC 15.207	AC power line conducted emissions	ANSI C63.10 6.2	PASS	
FCC 15.407(b)	Transmitter radiated emissions	KDB 789033 G	PASS	
FCC 15.407(a)	Radiation pattern	KDB 789033 H	N/R	Outdoor access points in the 5150-5250 MHz band with EIRP > 21 dBm only
Comment:				

Possible Test Case Verdicts	
PASS	Test object does meet the requirements
FAIL	Test object does not meet the requirements
N/T	Required by standard but not tested
N/R	Not required by standard for the test object

3 Test Conditions and Results

3.1 Test Conditions and Results - 6 dB bandwidth

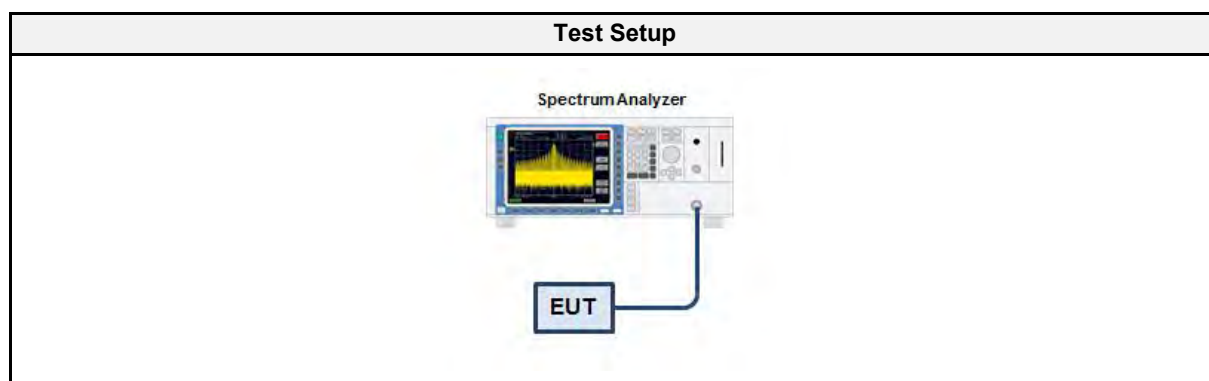
3.1.1 Information

Test Information	
Reference	FCC 15.407(e)
Measurement Method	KDB 789033 C.2
Operator	Christian Weber
Date	2019-10-08

3.1.2 Limits

Limits
≥ 500 kHz

3.1.3 Setup



3.1.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSW 43	EF00896	2019-07	2020-07

3.1.5 Procedure

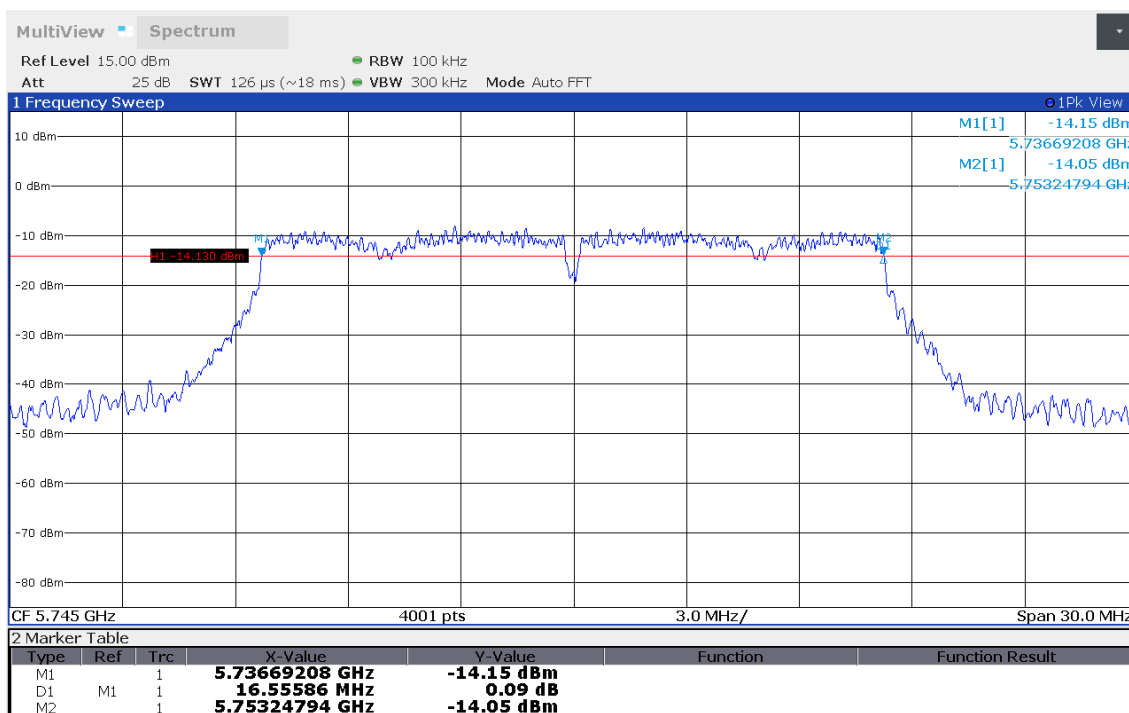
Test Procedure
1. EUT transmitter is activated in test mode under normal conditions 2. The spectrum analyzer is set to peak detection and maximum hold with a span twice the nominal channel bandwidth 3. The resolution bandwidth is set to 100 kHz and video bandwidth $\geq 3 \times$ RBW 4. The peak of the emission spectrum is determined 5. The left most frequency that corresponds to an emission level 6 dB below the maximum is determined 6. The right most frequency that corresponds to an emission level 6 dB below the maximum is determined 7. The 6 dB bandwidth is calculated from the two edge frequencies

3.1.6 Results

Test Results - 5725 - 5850 MHz						
Mode	Channel [MHz]	Frequencvy [MHz]	Nominal BW [MHz]	BW Port W [MHz]	BW Port B [MHz]	Verdict
OFDM	149	5745	20	16533.4	16555.9	PASS
OFDM	157	5785	20	16510.9	16548.4	PASS
OFDM	165	5825	20	16390.9	16548.4	PASS
HT20	149	5745	20	17613.1	17658.1	PASS
HT20	157	5785	20	17598.1	17590.6	PASS
HT20	165	5825	20	17590.6	17613.1	PASS
VHT20	149	5745	20	17605.6	17635.6	PASS
VHT20	157	5765	20	17613.1	17598.1	PASS
VHT20	165	5805	20	17598.1	17583.1	PASS

DTS (6 dB) Bandwidth

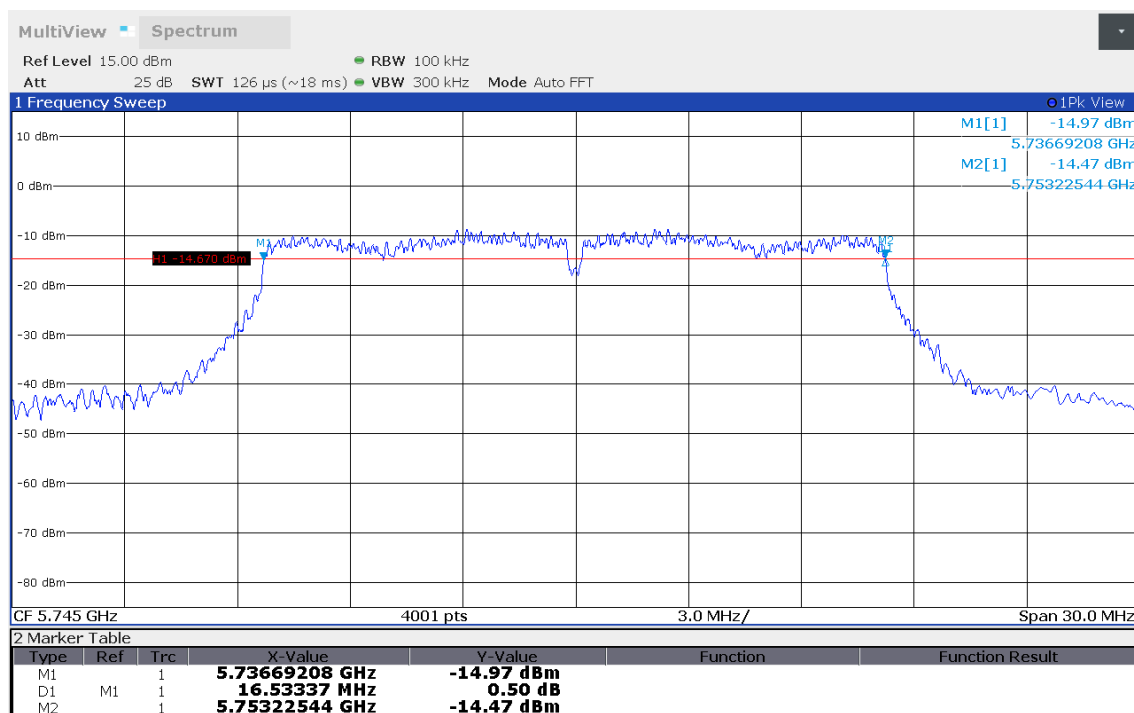
Project Number: G0M-1905-8256
 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11a, Channel: 149, 5745 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: B
 Lower Frequency [MHz]: 5736.692
 Upper Frequency [MHz]: 5753.248
 6 dB Bandwidth [kHz]: 16555.9



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DTS (6 dB) Bandwidth

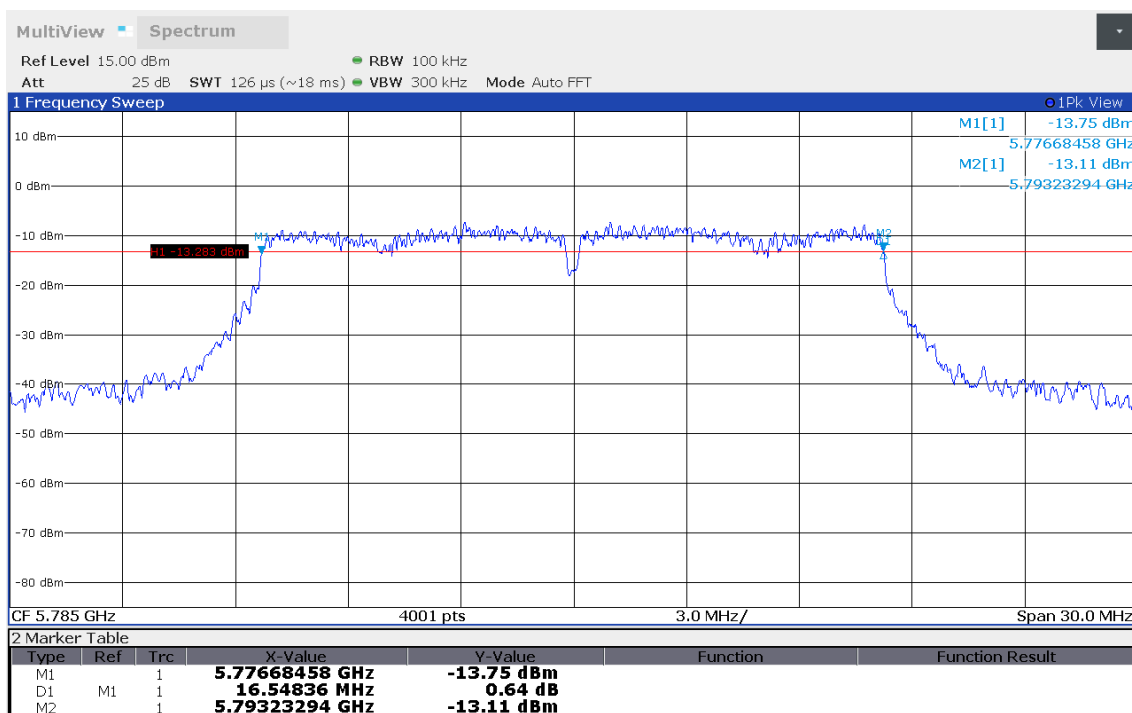
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 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11a, Channel: 149, 5745 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: W
 Lower Frequency [MHz]: 5736.692
 Upper Frequency [MHz]: 5753.225
 6 dB Bandwidth [kHz]: 16533.4



12:17:36 08.10.2019

DTS (6 dB) Bandwidth

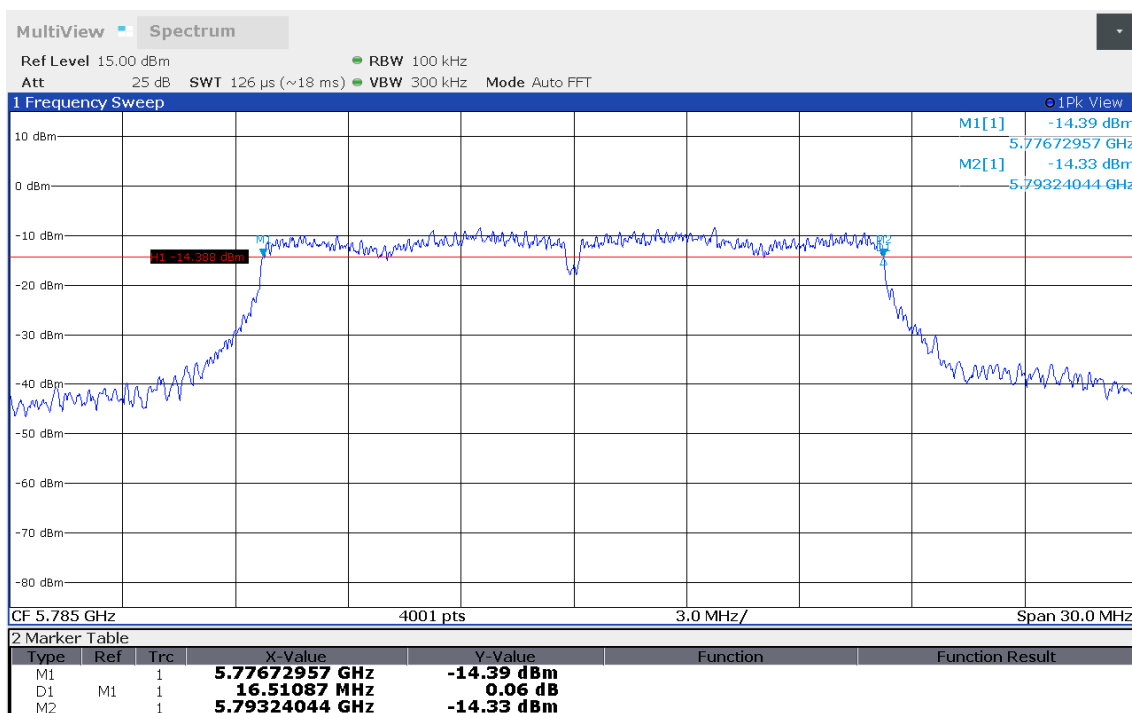
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 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11a, Channel: 157, 5785 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: B
 Lower Frequency [MHz]: 5776.685
 Upper Frequency [MHz]: 5793.233
 6 dB Bandwidth [kHz]: 16548.4



12:35:03 08.10.2019

DTS (6 dB) Bandwidth

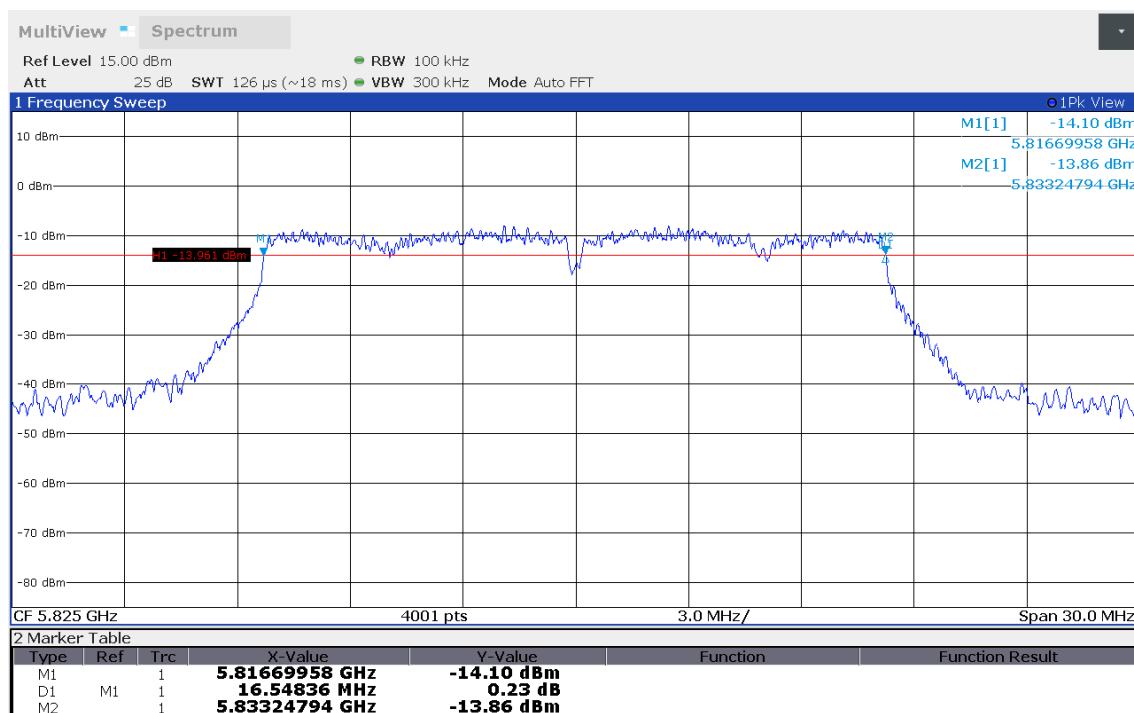
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 Applicant: BIOTRONIK SE & Co. KG
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 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11a, Channel: 157, 5785 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: W
 Lower Frequency [MHz]: 5776.730
 Upper Frequency [MHz]: 5793.240
 6 dB Bandwidth [kHz]: 16510.9



12:19:09 08.10.2019

DTS (6 dB) Bandwidth

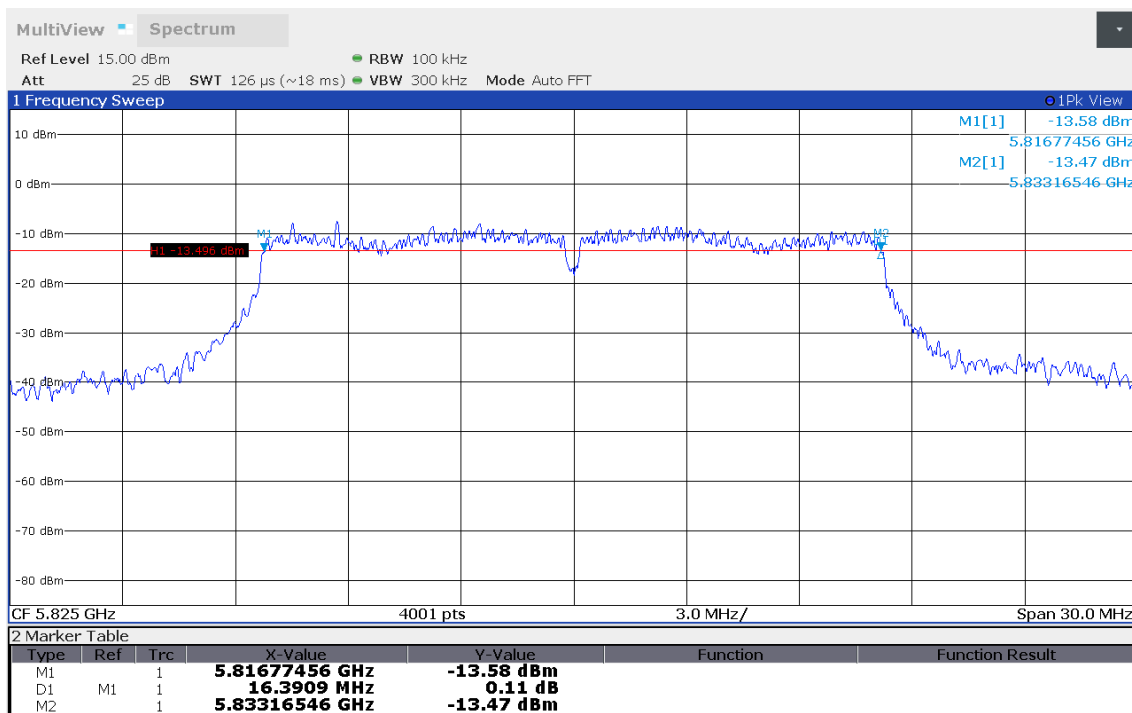
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 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11a, Channel: 165, 5825 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: B
 Lower Frequency [MHz]: 5816.700
 Upper Frequency [MHz]: 5833.248
 6 dB Bandwidth [kHz]: 16548.4



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DTS (6 dB) Bandwidth

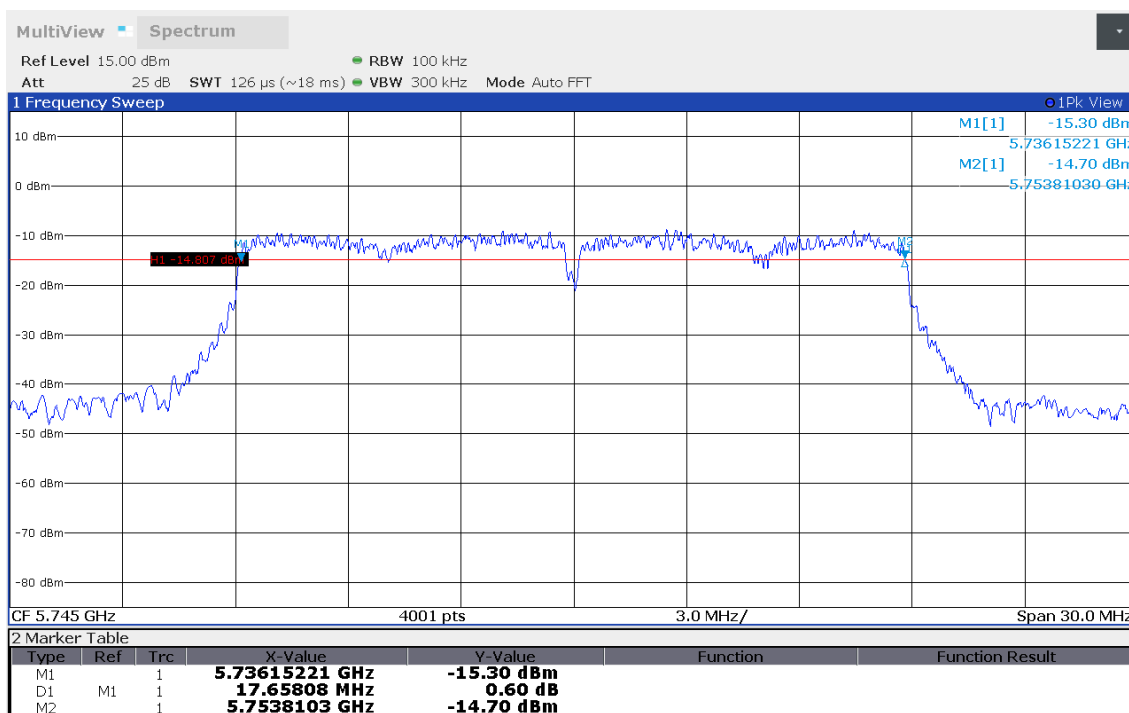
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 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11a, Channel: 165, 5825 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: W
 Lower Frequency [MHz]: 5816.775
 Upper Frequency [MHz]: 5833.165
 6 dB Bandwidth [kHz]: 16390.9



12:20:16 08.10.2019

DTS (6 dB) Bandwidth

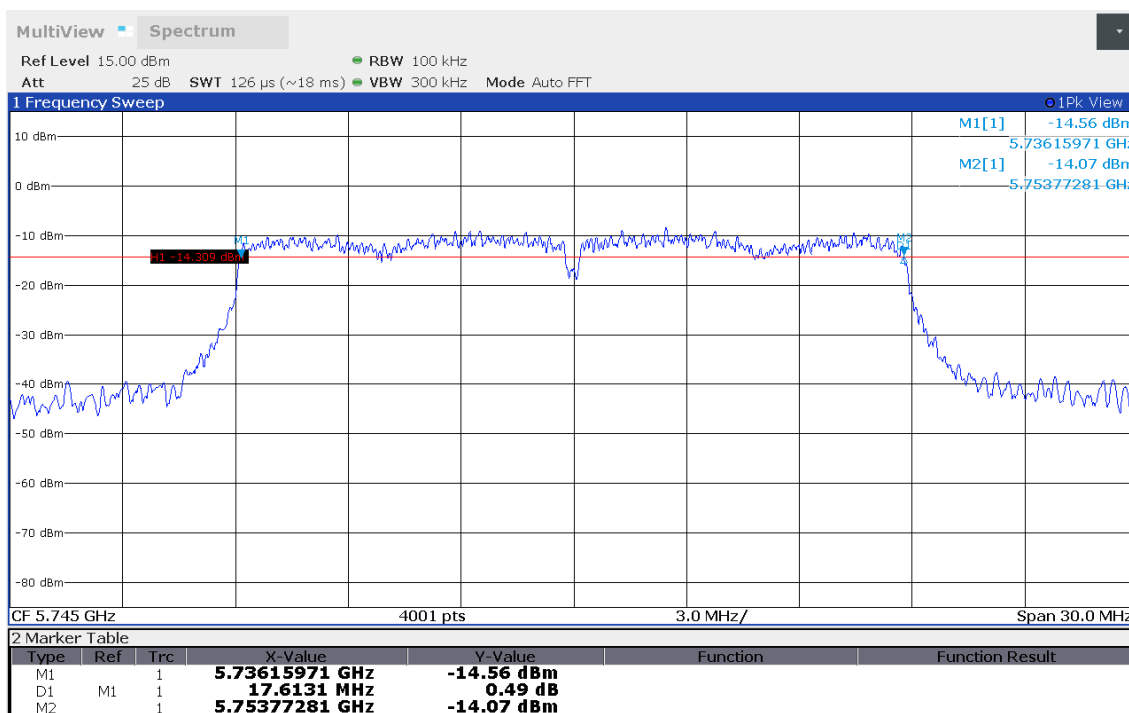
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 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11n (HT20), Channel: 149, 5745 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: B
 Lower Frequency [MHz]: 5736.152
 Upper Frequency [MHz]: 5753.810
 6 dB Bandwidth [kHz]: 17658.1



12:38:05 08.10.2019

DTS (6 dB) Bandwidth

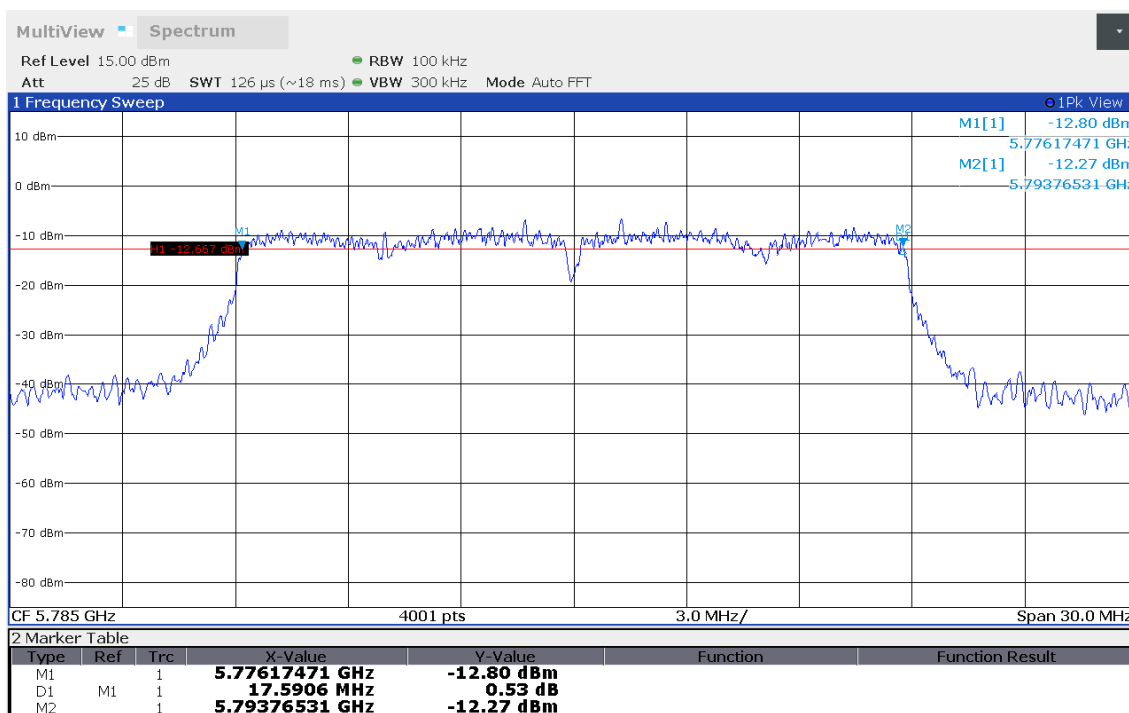
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 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11n (HT20), Channel: 149, 5745 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: W
 Lower Frequency [MHz]: 5736.160
 Upper Frequency [MHz]: 5753.773
 6 dB Bandwidth [kHz]: 17613.1



12:21:30 08.10.2019

DTS (6 dB) Bandwidth

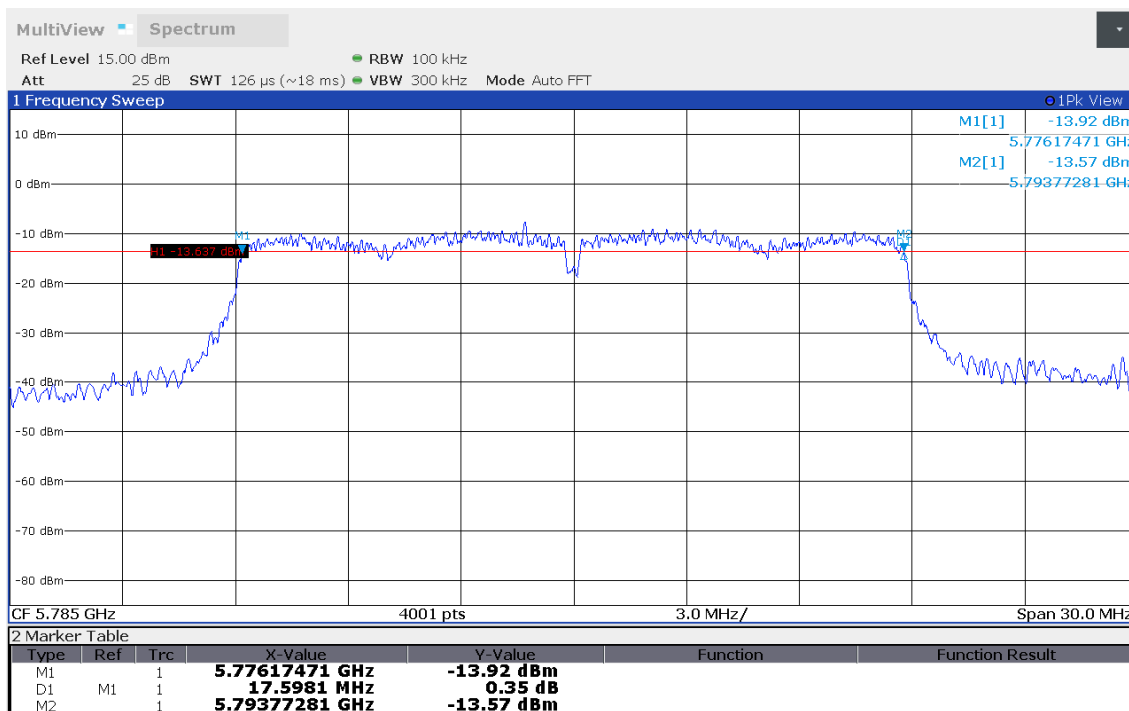
Project Number: G0M-1905-8256
 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11n (HT20), Channel: 157, 5785 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: B
 Lower Frequency [MHz]: 5776.175
 Upper Frequency [MHz]: 5793.765
 6 dB Bandwidth [kHz]: 17590.6



12:39:14 08.10.2019

DTS (6 dB) Bandwidth

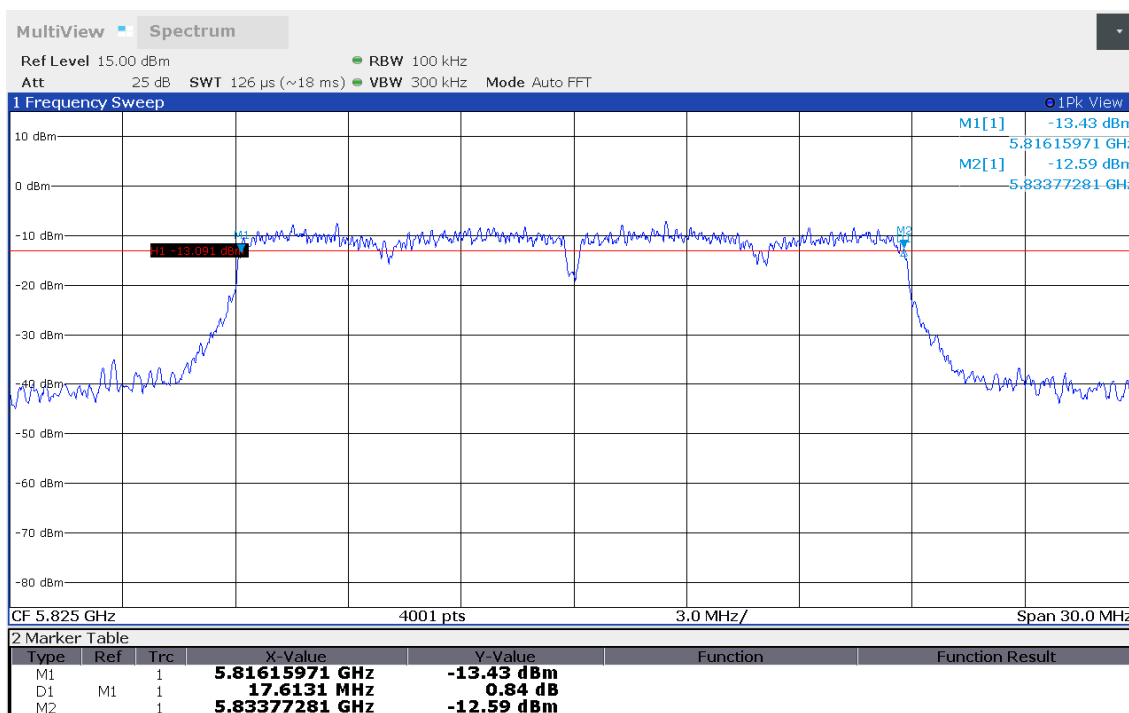
Project Number: G0M-1905-8256
 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11n (HT20), Channel: 157, 5785 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: W
 Lower Frequency [MHz]: 5776.175
 Upper Frequency [MHz]: 5793.773
 6 dB Bandwidth [kHz]: 17598.1



12:22:28 08.10.2019

DTS (6 dB) Bandwidth

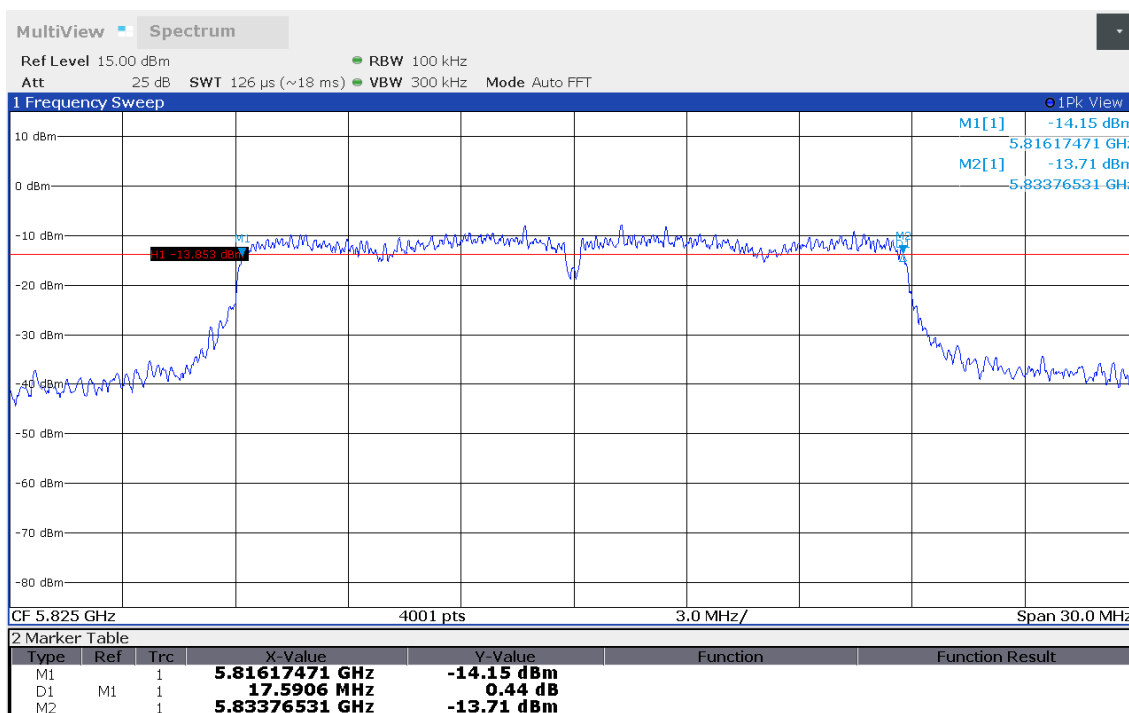
Project Number: G0M-1905-8256
 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11n (HT20), Channel: 165, 5825 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: B
 Lower Frequency [MHz]: 5816.160
 Upper Frequency [MHz]: 5833.773
 6 dB Bandwidth [kHz]: 17613.1



12:40:15 08.10.2019

DTS (6 dB) Bandwidth

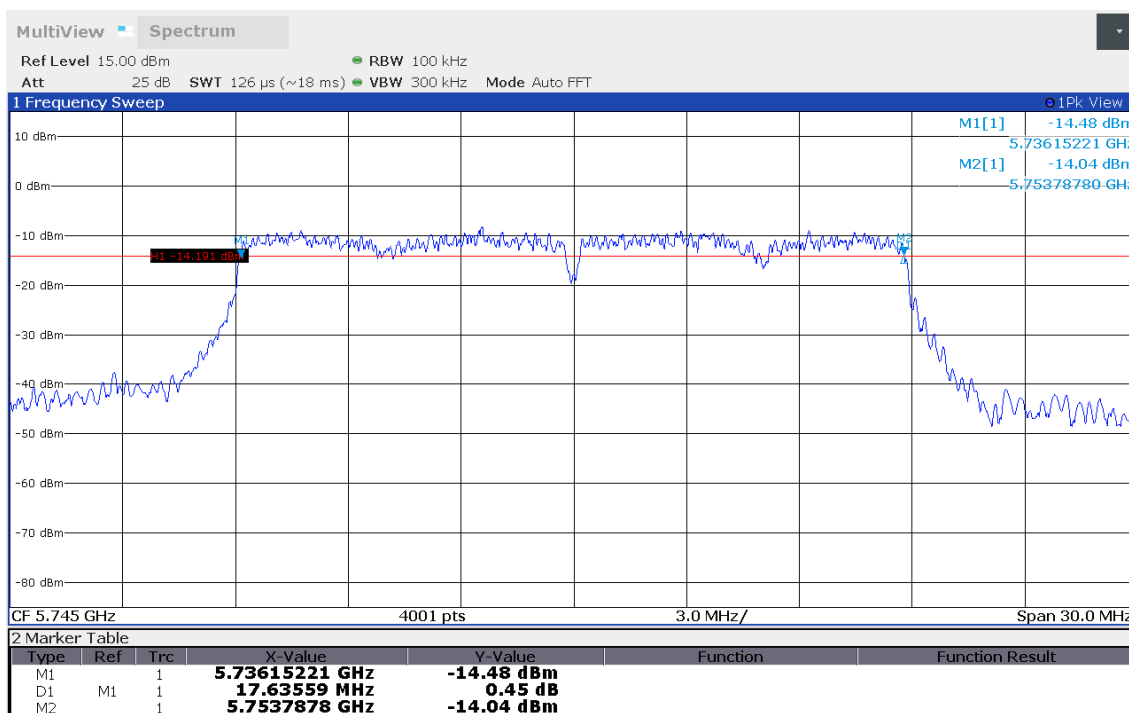
Project Number: G0M-1905-8256
 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11n (HT20), Channel: 165, 5825 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: W
 Lower Frequency [MHz]: 5816.175
 Upper Frequency [MHz]: 5833.765
 6 dB Bandwidth [kHz]: 17590.6



12:23:27 08.10.2019

DTS (6 dB) Bandwidth

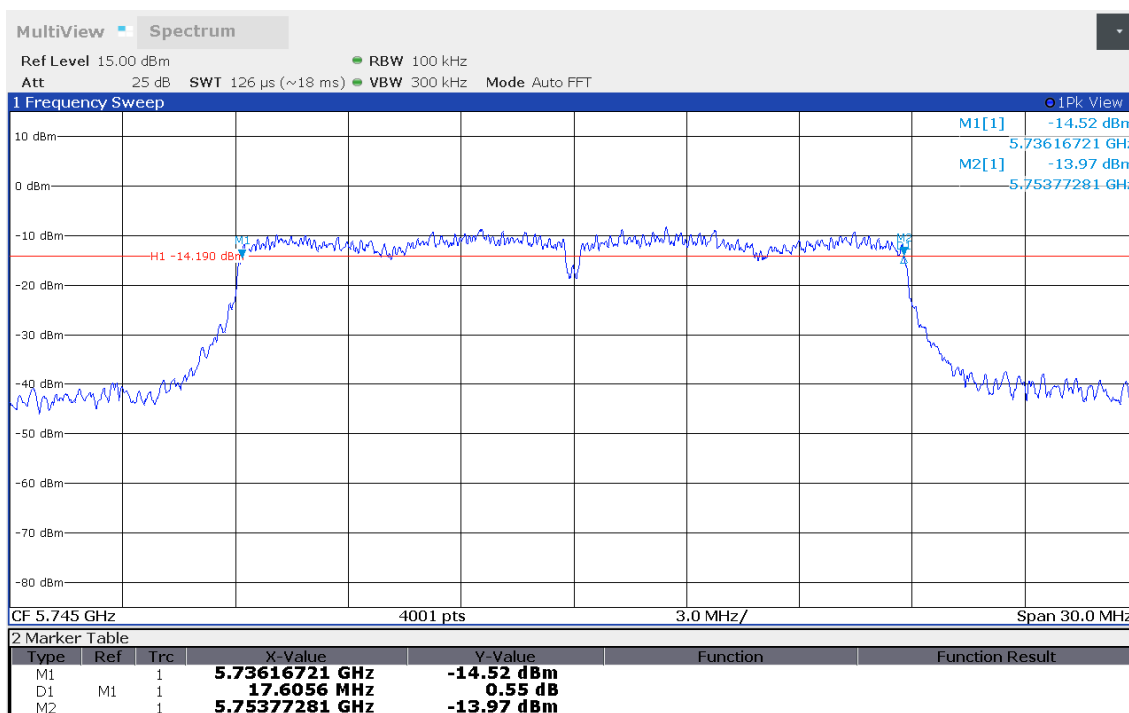
Project Number: G0M-1905-8256
 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11ac (VHT20), Channel: 149, 5745 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: B
 Lower Frequency [MHz]: 5736.152
 Upper Frequency [MHz]: 5753.788
 6 dB Bandwidth [kHz]: 17635.6



12:41:27 08.10.2019

DTS (6 dB) Bandwidth

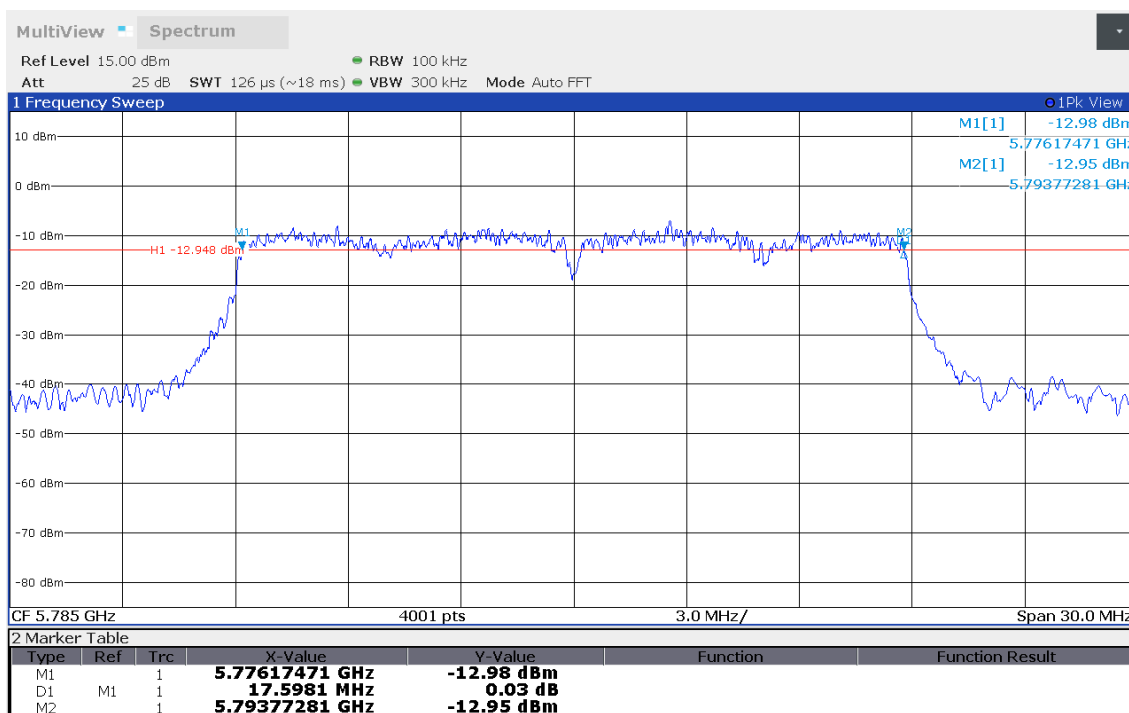
Project Number: G0M-1905-8256
 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11ac (VHT20), Channel: 149, 5745 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: W
 Lower Frequency [MHz]: 5736.167
 Upper Frequency [MHz]: 5753.773
 6 dB Bandwidth [kHz]: 17605.6



12:24:38 08.10.2019

DTS (6 dB) Bandwidth

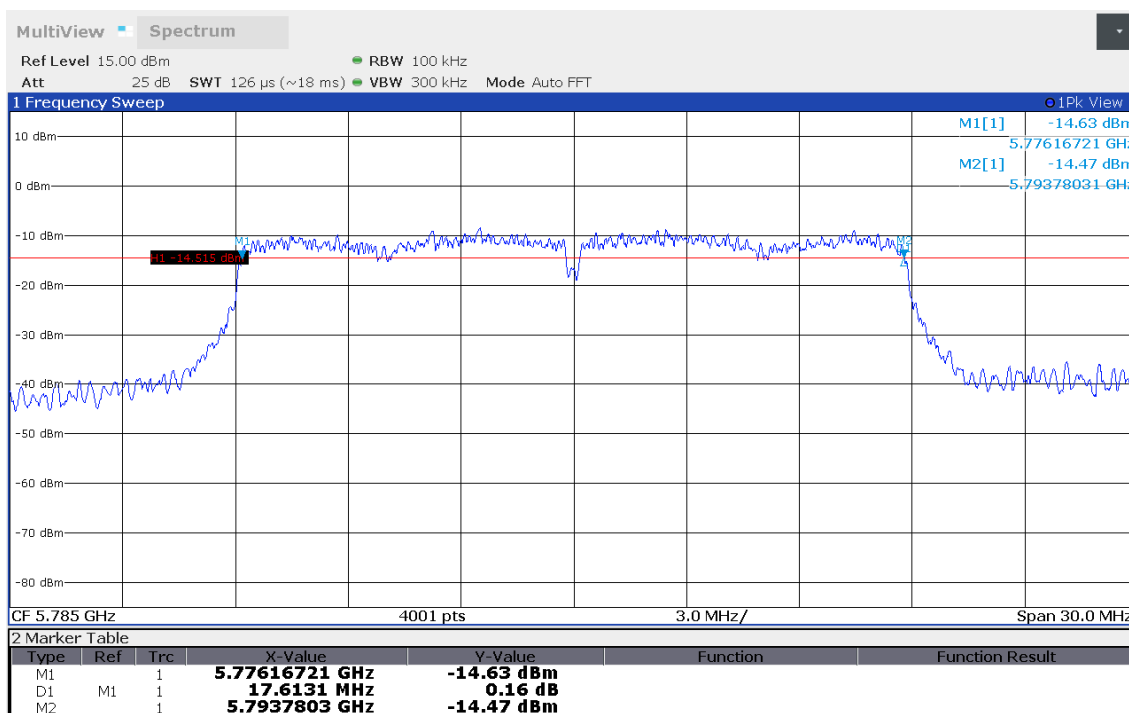
Project Number: G0M-1905-8256
 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11ac (VHT20), Channel: 157, 5785 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: B
 Lower Frequency [MHz]: 5776.175
 Upper Frequency [MHz]: 5793.773
 6 dB Bandwidth [kHz]: 17598.1



12:42:30 08.10.2019

DTS (6 dB) Bandwidth

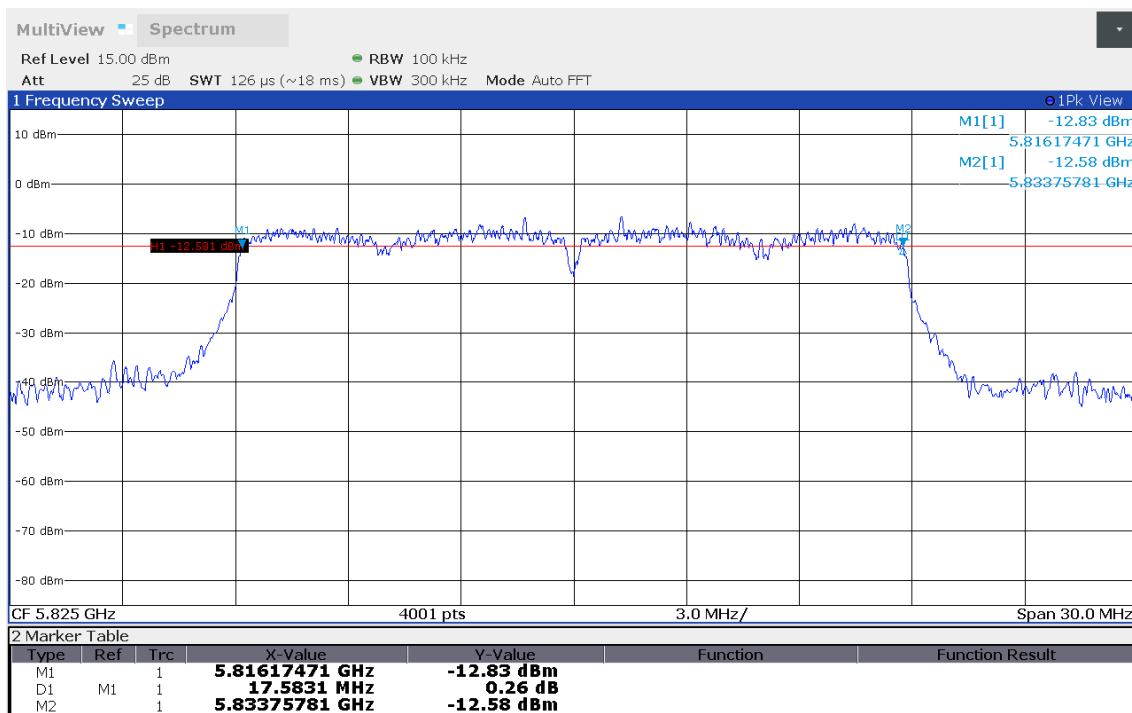
Project Number: G0M-1905-8256
 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11ac (VHT20), Channel: 157, 5785 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: W
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 Upper Frequency [MHz]: 5793.780
 6 dB Bandwidth [kHz]: 17613.1



12:25:38 08.10.2019

DTS (6 dB) Bandwidth

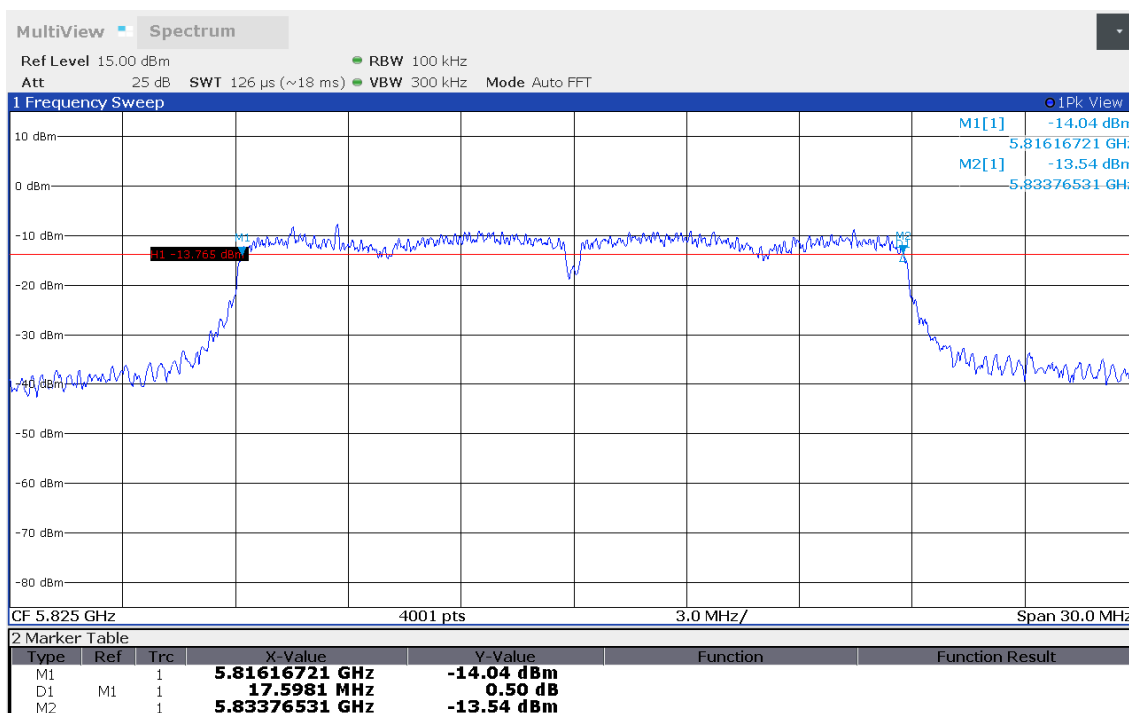
Project Number: G0M-1905-8256
 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11ac (VHT20), Channel: 165, 5825 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: B
 Lower Frequency [MHz]: 5816.175
 Upper Frequency [MHz]: 5833.758
 6 dB Bandwidth [kHz]: 17583.1



12:43:36 08.10.2019

DTS (6 dB) Bandwidth

Project Number: G0M-1905-8256
 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11ac (VHT20), Channel: 165, 5825 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: W
 Lower Frequency [MHz]: 5816.167
 Upper Frequency [MHz]: 5833.765
 6 dB Bandwidth [kHz]: 17598.1



12:26:35 08.10.2019

3.2 Test Conditions and Results - 26 dB emission bandwidth

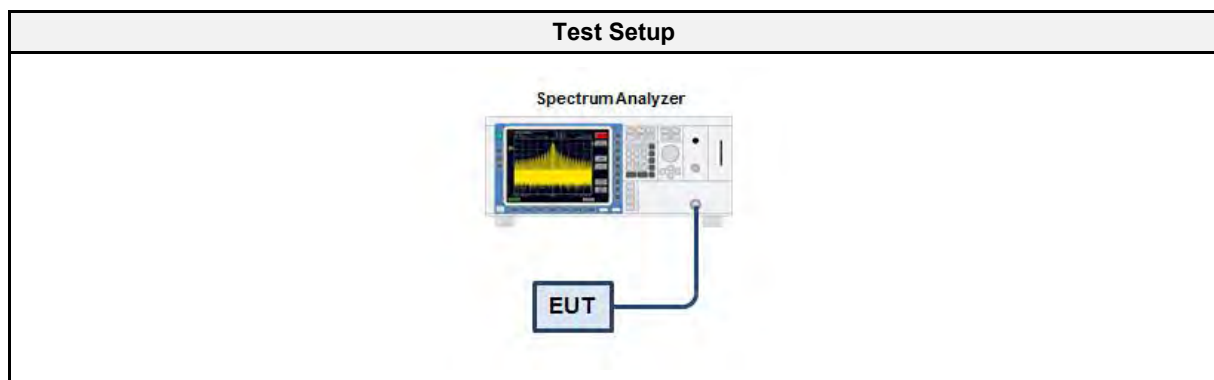
3.2.1 Information

Test Information	
Reference	FCC 15.407(a)(2),(a)(5),(h)(2)
Measurement Method	KDB 789033 C.1
Operator	Christian Weber
Date	2019-10-08

3.2.2 Limits

Limits
None, used to determine power limit and necessary DFS functionality

3.2.3 Setup



3.2.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSW 43	EF00896	2019-07	2020-07

3.2.5 Procedure

Test Procedure
1. EUT transmitter is activated in test mode under normal conditions 2. The spectrum analyzer is set to peak detection and maximum hold with a span twice the nominal channel bandwidth 3. The resolution bandwidth is set to approximately 1% of the emission bandwidth and video bandwidth $\geq$ RBW 4. The peak of the emission spectrum is determined 5. The left most frequency that corresponds to an emission level 26 dB below the maximum is determined 6. The right most frequency that corresponds to an emission level 26 dB below the maximum is determined 7. The 26 dB bandwidth is calculated from the two edge frequencies 8. The RBW is corrected and the measurement is repeated if needed

3.2.6 Results

Test Results - 5150 - 5250 MHz							
Mode	Channel	Frequency [MHz]	Nominal BW [MHz]	BW Upper Edge Port W [MHz]	BW Port W [MHz]	BW Upper Edge Port B [MHz]	BW Port B [MHz]
OFDM	36	5180	20	N/A	18.681	N/A	18.756
OFDM	40	5200	20	N/A	18.651	N/A	18.741
OFDM	48	5240	20	5249.370	18.906	5249.355	18.741
HT20	36	5180	20	N/A	19.355	N/A	19.355
HT20	40	5200	20	N/A	19.340	N/A	19.310
HT20	48	5240	20	5249.640	19.355	5249.625	19.325
VHT20	36	5180	20	N/A	19.355	N/A	19.355
VHT20	40	5200	20	N/A	19.325	N/A	19.310
VHT20	48	5240	20	5249.610	19.340	5249.625	19.340

Test Results - 5150 - 5250 MHz - 99% BW							
Mode	Channel	Frequency [MHz]	Nominal BW [MHz]	BW Upper Edge Port W [MHz]	BW Port W [MHz]	BW Upper Edge Port B [MHz]	BW Port B [MHz]
OFDM	48	5240	20	N/R	N/R	N/R	N/R
HT20	48	5240	20	N/R	N/R	N/R	N/R
VHT20	48	5240	20	N/R	N/R	N/R	N/R
If the Emission Bandwidth (26 dB) does not fall entirely in the band, Occupied Bandwidth (99%) can be used instead to determine whether DFS testing is required for this band							

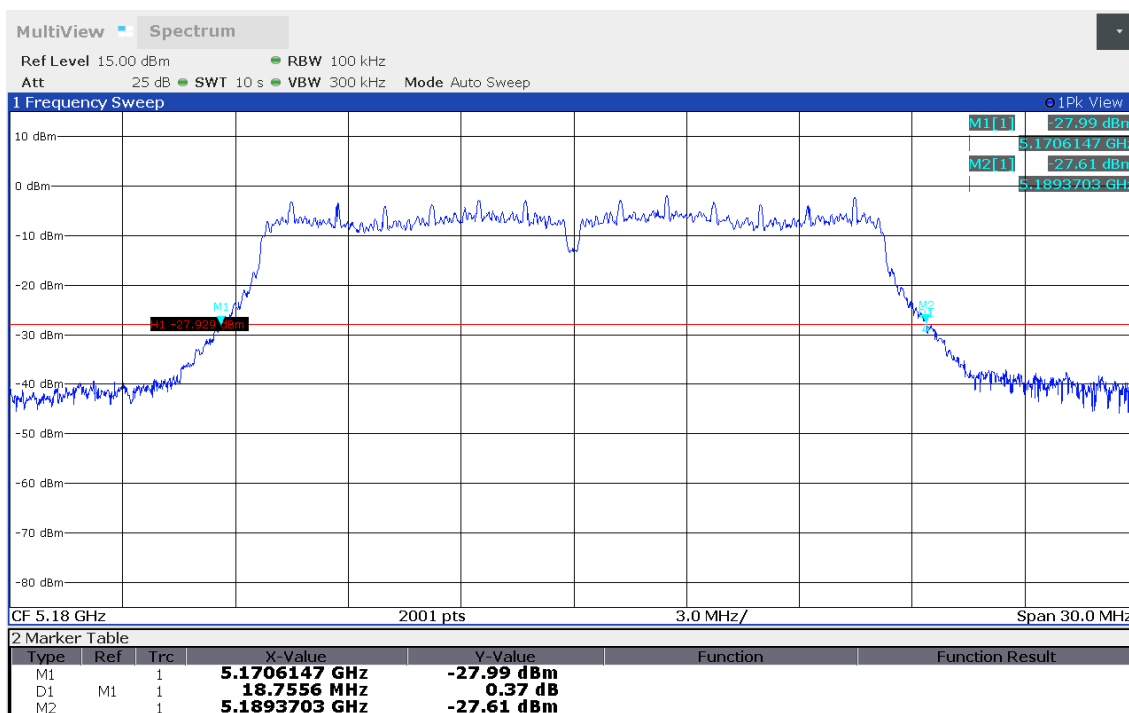
Test Results - 5250 - 5350 MHz						
Mode	Channel	Frequency [MHz]	Nominal BW [MHz]	BW Port W [MHz]	BW Port B [MHz]	
OFDM	52	5260	20	18.846	18.726	
OFDM	56	5280	20	18.861	18.876	
OFDM	64	5320	20	18.876	18.876	
HT20	52	5260	20	19.325	19.385	
HT20	56	5280	20	19.310	19.355	
HT20	64	5320	20	19.355	19.400	
VHT20	52	5260	20	19.325	19.340	
VHT20	56	5280	20	19.310	19.385	
VHT20	64	5320	20	19.340	19.340	

Test Results - 5470 - 5725 MHz					
Mode	Channel	Frequency [MHz]	Nominal BW [MHz]	BW Port W [MHz]	BW Port B [MHz]
OFDM	100	5500	20	18.666	18.711
OFDM	120	5600	20	18.666	18.726
OFDM	140	5700	20	18.906	18.876
HT20	100	5500	20	19.355	19.310
HT20	120	5600	20	19.340	19.325
HT20	140	5700	20	19.340	19.355
VHT20	100	5500	20	19.310	19.370
VHT20	120	5600	20	19.325	19.340
VHT20	140	5700	20	19.265	19.325

Test Results - 5725 - 5850 MHz							
Mode	Channel	Frequency [MHz]	Nominal BW [MHz]	BW Upper Edge Port W [MHz]	BW Port W [MHz]	BW Upper Edge Port B [MHz]	BW Port B [MHz]
OFDM	149	5745	20	5735.645	18.831	5735.645	18.666
OFDM	157	5785	20	N/A	18.636	N/A	19.010
OFDM	165	5825	20	N/A	19.385	N/A	18.756
HT20	149	5745	20	5735.300	19.535	5735.210	19.430
HT20	157	5785	20	N/A	20.945	N/A	19.370
HT20	165	5825	20	N/A	19.745	N/A	19.400
VHT20	149	5745	20	5735.075	19.565	5735.285	19.370
VHT20	157	5785	20	N/A	19.400	N/A	19.340
VHT20	165	5825	20	N/A	20.075	N/A	19.400

26 dB Bandwidth

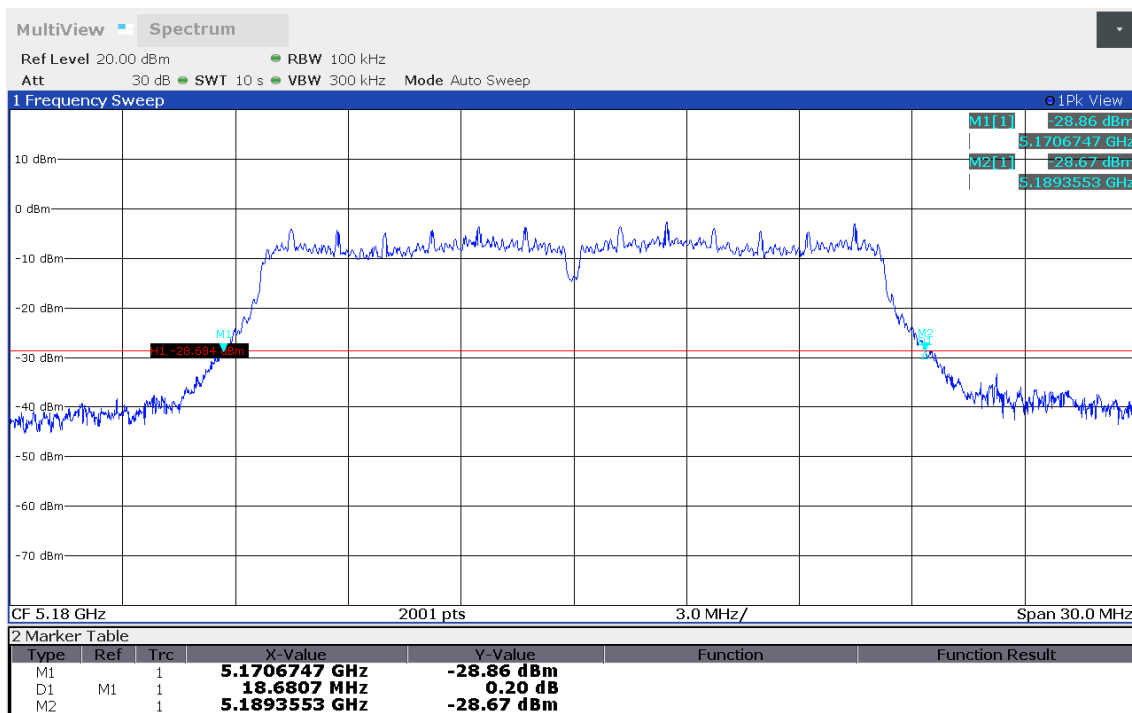
Project Number: G0M-1905-8256
 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11a, Channel: 36, 5180 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: B
 Lower Frequency [MHz]: 5170.615
 Upper Frequency [MHz]: 5189.370
 26 dB Bandwidth [MHz]: 18.756



13:54:35 08.10.2019

26 dB Bandwidth

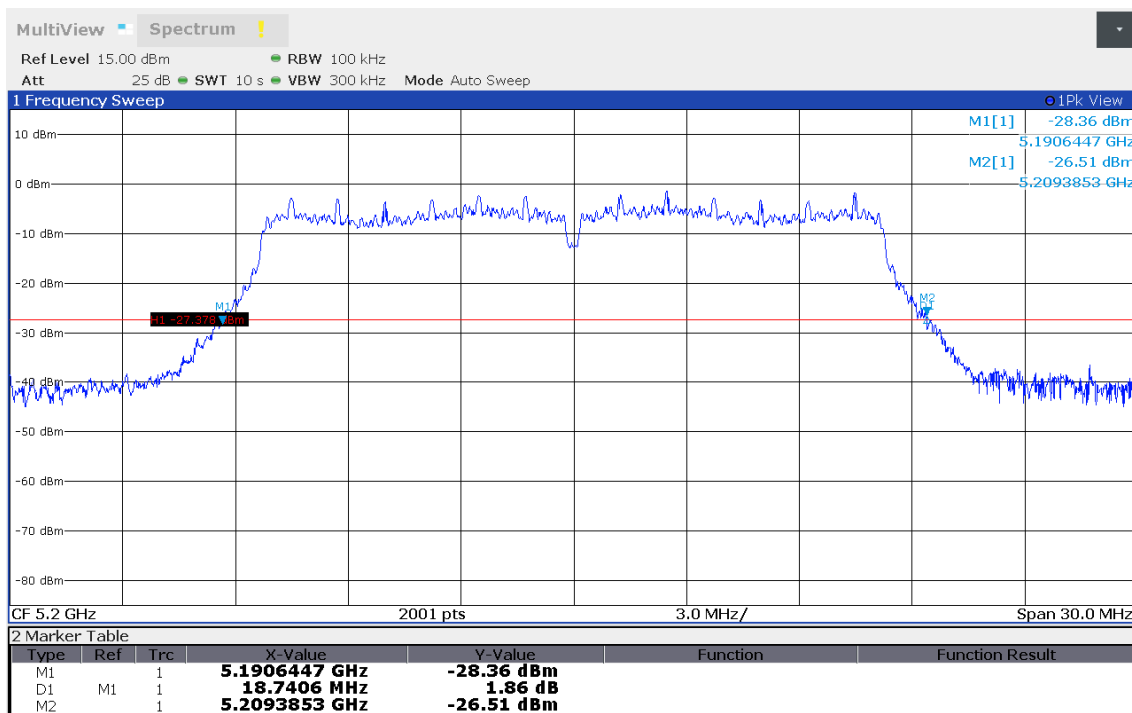
Project Number: G0M-1905-8256
 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11a, Channel: 36, 5180 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: W
 Lower Frequency [MHz]: 5170.675
 Upper Frequency [MHz]: 5189.355
 26 dB Bandwidth [MHz]: 18.681



14:07:34 08.10.2019

26 dB Bandwidth

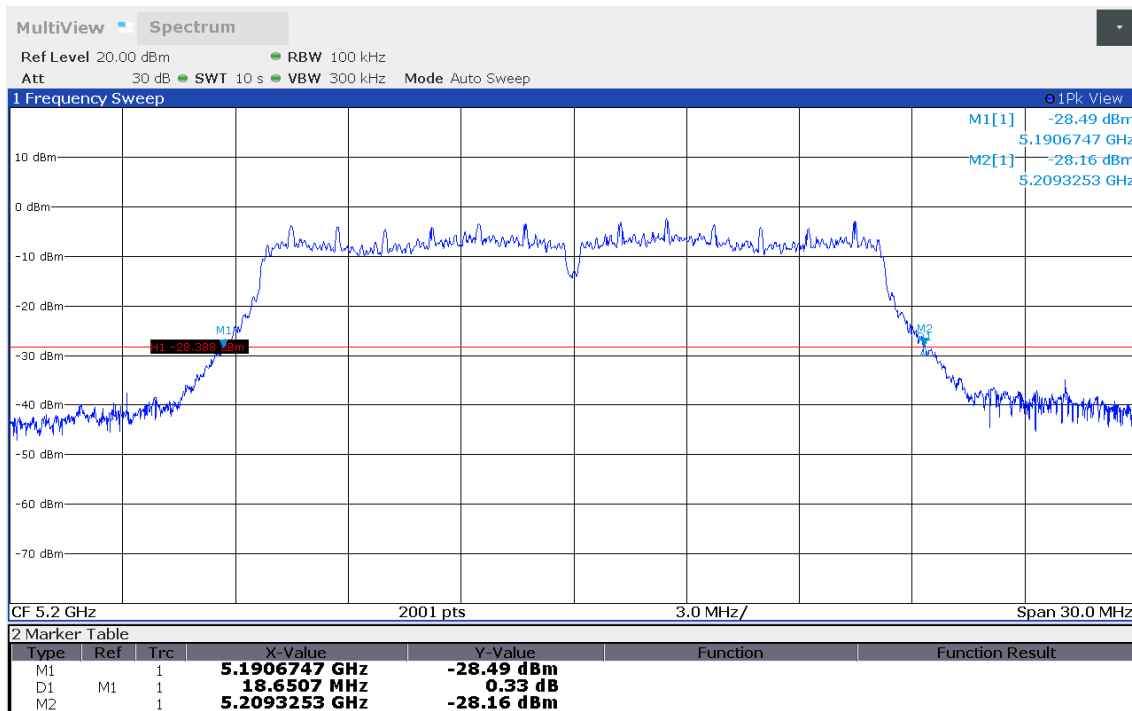
Project Number: G0M-1905-8256
 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11a, Channel: 40, 5200 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: B
 Lower Frequency [MHz]: 5190.645
 Upper Frequency [MHz]: 5209.385
 26 dB Bandwidth [MHz]: 18.741



13:55:43 08.10.2019

26 dB Bandwidth

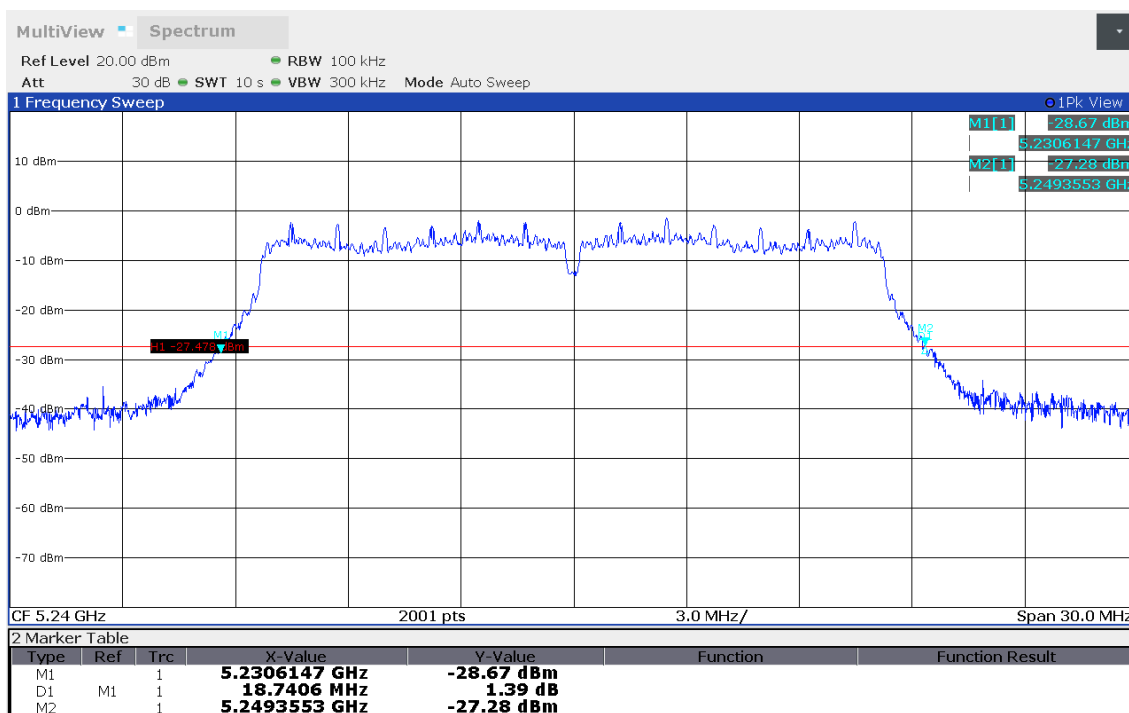
Project Number: G0M-1905-8256
 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11a, Channel: 40, 5200 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: W
 Lower Frequency [MHz]: 5190.675
 Upper Frequency [MHz]: 5209.325
 26 dB Bandwidth [MHz]: 18.651



14:08:38 08.10.2019

26 dB Bandwidth

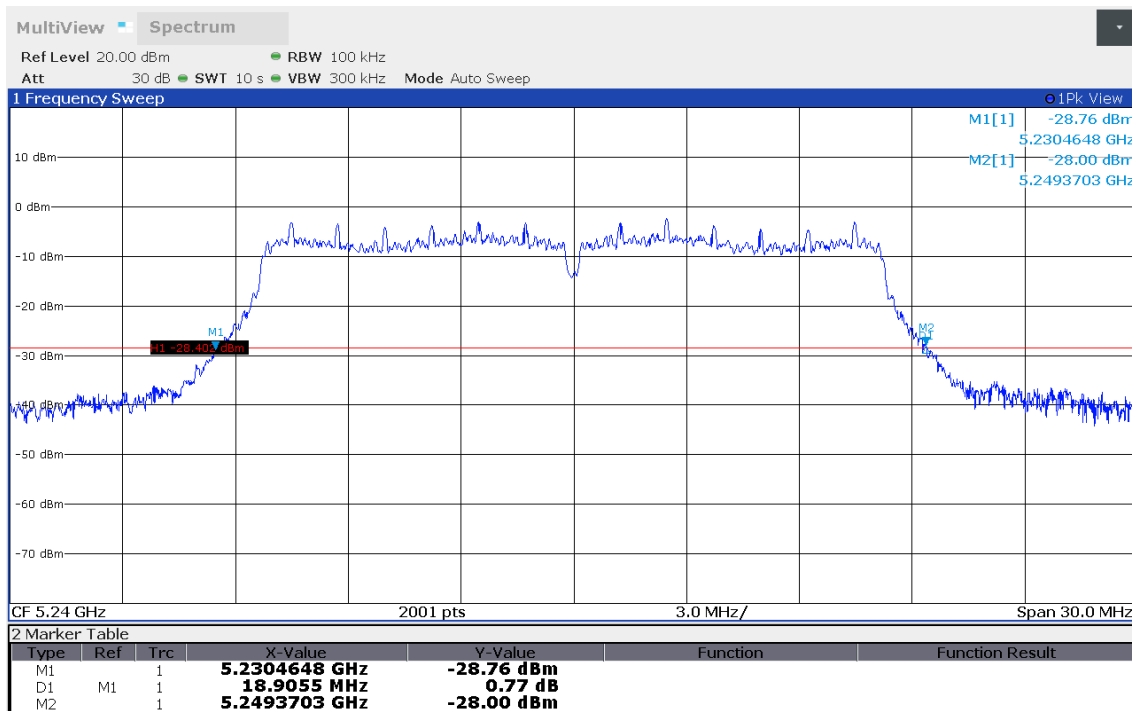
Project Number: G0M-1905-8256
 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11a, Channel: 48, 5240 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: B
 Lower Frequency [MHz]: 5230.615
 Upper Frequency [MHz]: 5249.355
 26 dB Bandwidth [MHz]: 18.741



13:57:46 08.10.2019

26 dB Bandwidth

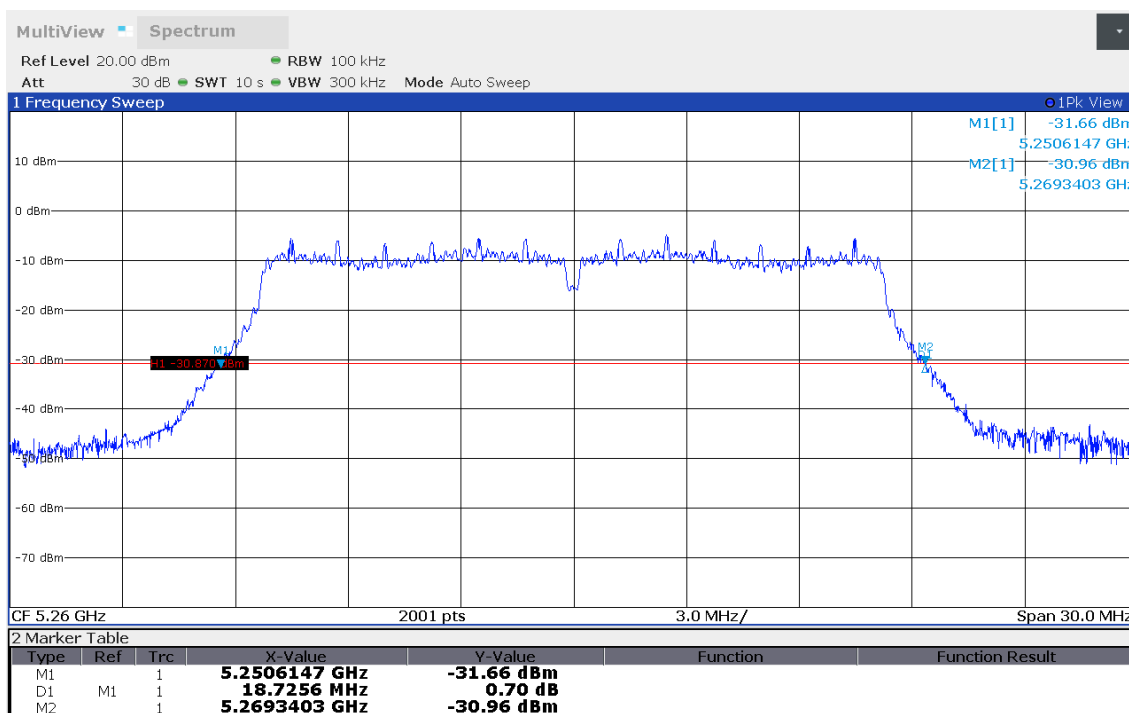
Project Number: G0M-1905-8256
 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11a, Channel: 48, 5240 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: W
 Lower Frequency [MHz]: 5230.465
 Upper Frequency [MHz]: 5249.370
 26 dB Bandwidth [MHz]: 18.906



14:09:56 08.10.2019

26 dB Bandwidth

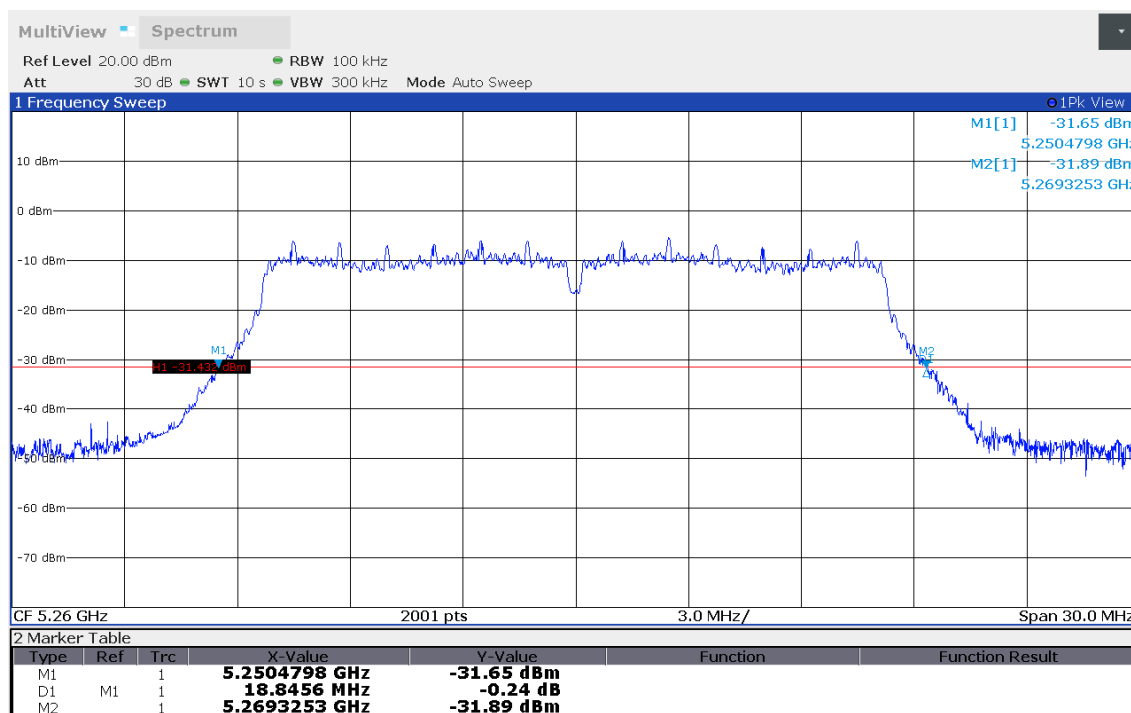
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 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11a, Channel: 52, 5260 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: B
 Lower Frequency [MHz]: 5250.615
 Upper Frequency [MHz]: 5269.340
 26 dB Bandwidth [MHz]: 18.726



14:35:06 08.10.2019

26 dB Bandwidth

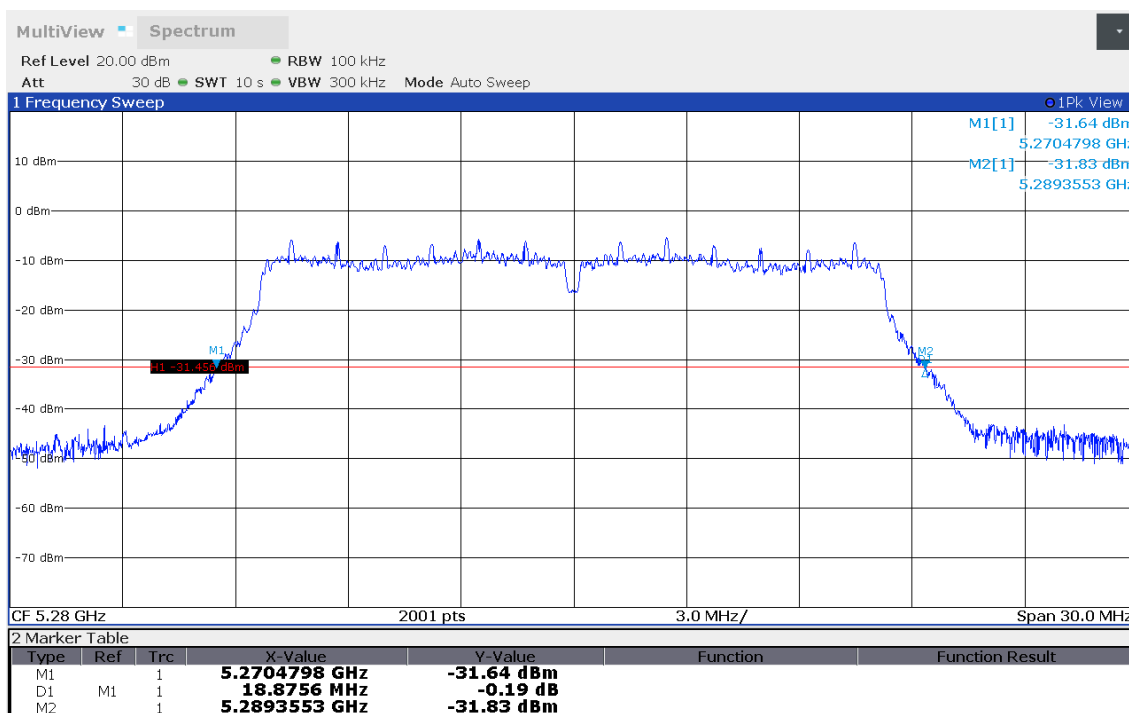
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 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11a, Channel: 52, 5260 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: W
 Lower Frequency [MHz]: 5250.480
 Upper Frequency [MHz]: 5269.325
 26 dB Bandwidth [MHz]: 18.846



14:23:45 08.10.2019

26 dB Bandwidth

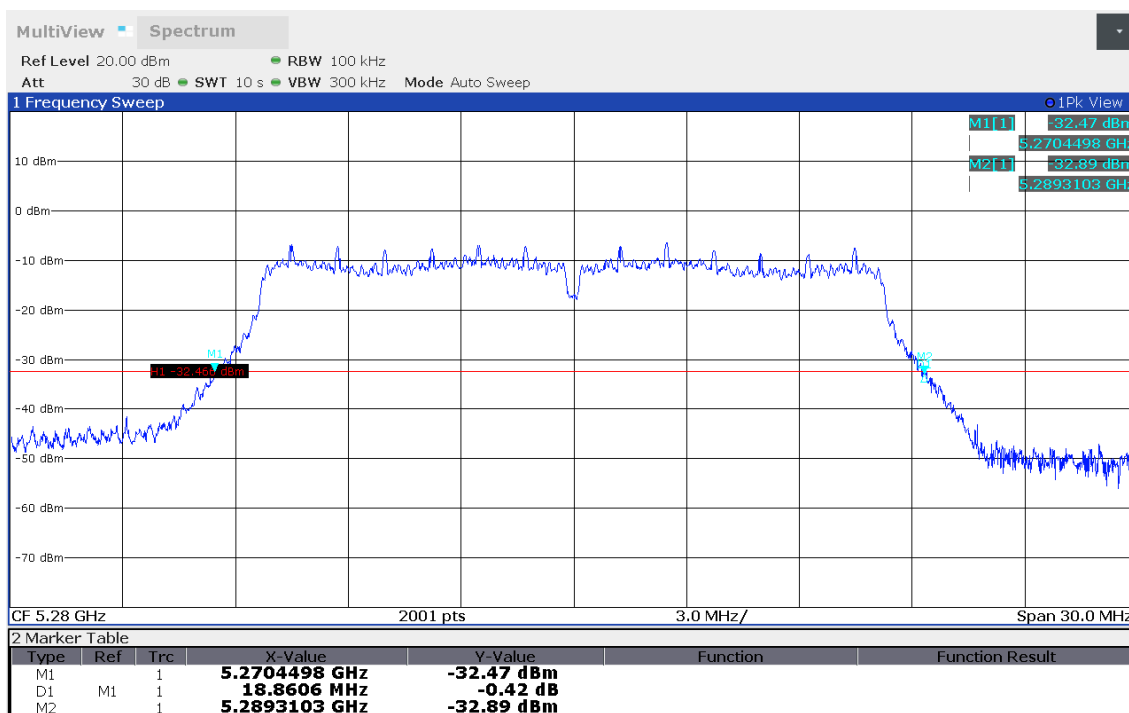
Project Number: G0M-1905-8256
 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11a, Channel: 56, 5280 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: B
 Lower Frequency [MHz]: 5270.480
 Upper Frequency [MHz]: 5289.355
 26 dB Bandwidth [MHz]: 18.876



14:36:18 08.10.2019

26 dB Bandwidth

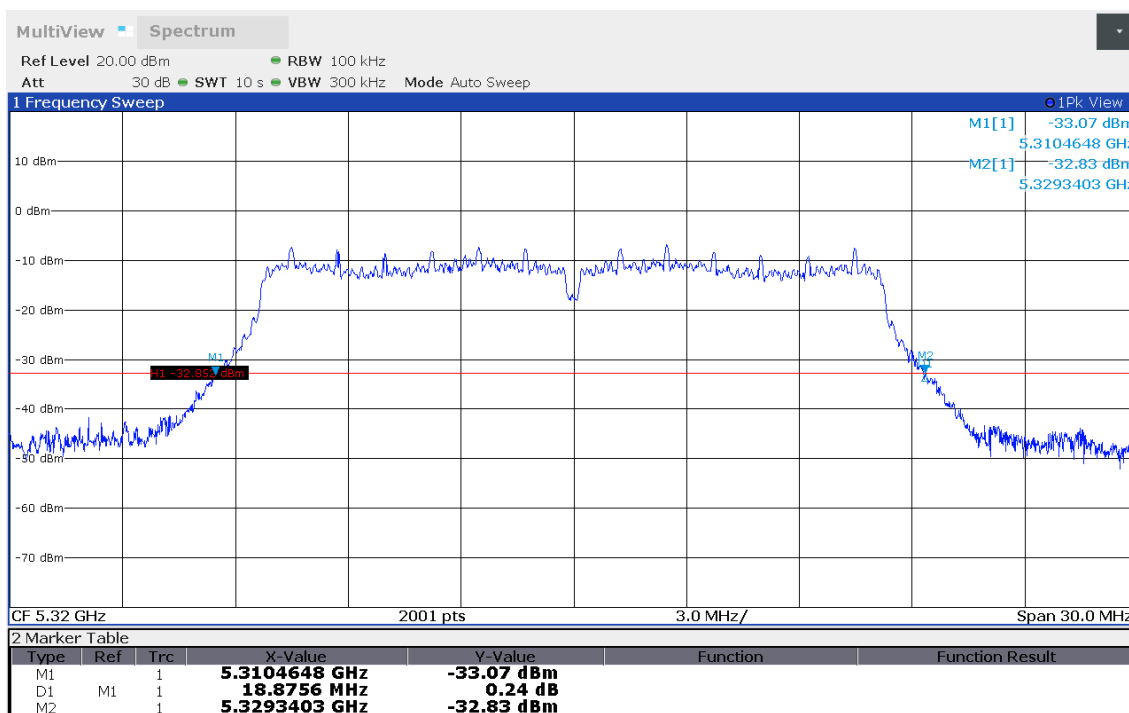
Project Number: G0M-1905-8256
 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11a, Channel: 56, 5280 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: W
 Lower Frequency [MHz]: 5270.450
 Upper Frequency [MHz]: 5289.310
 26 dB Bandwidth [MHz]: 18.861



14:24:58 08.10.2019

26 dB Bandwidth

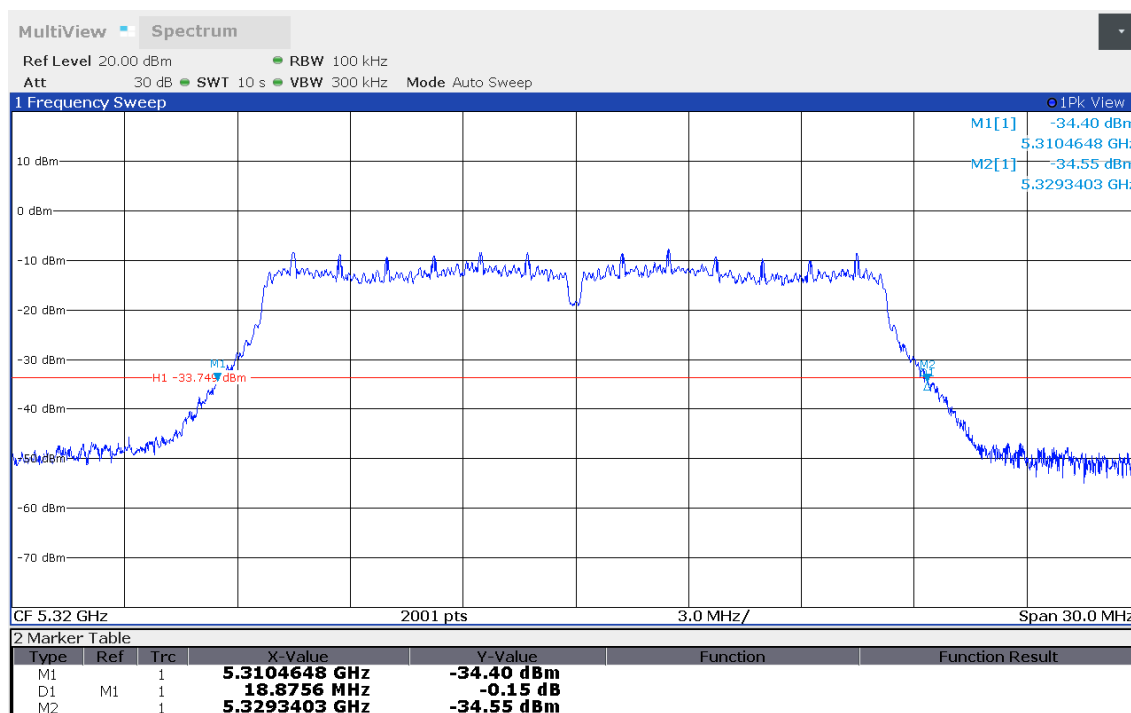
Project Number: G0M-1905-8256
 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11a, Channel: 64, 5320 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: B
 Lower Frequency [MHz]: 5310.465
 Upper Frequency [MHz]: 5329.340
 26 dB Bandwidth [MHz]: 18.876



14:37:20 08.10.2019

26 dB Bandwidth

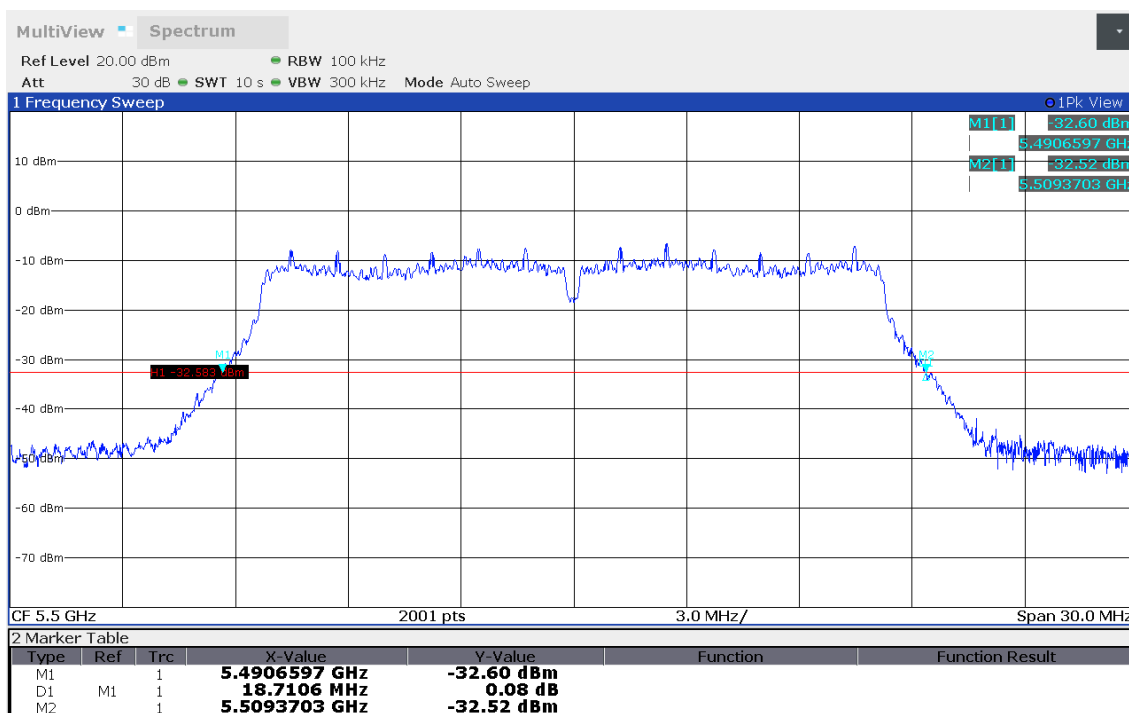
Project Number: G0M-1905-8256
 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11a, Channel: 64, 5320 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: W
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 Upper Frequency [MHz]: 5329.340
 26 dB Bandwidth [MHz]: 18.876



14:26:16 08.10.2019

26 dB Bandwidth

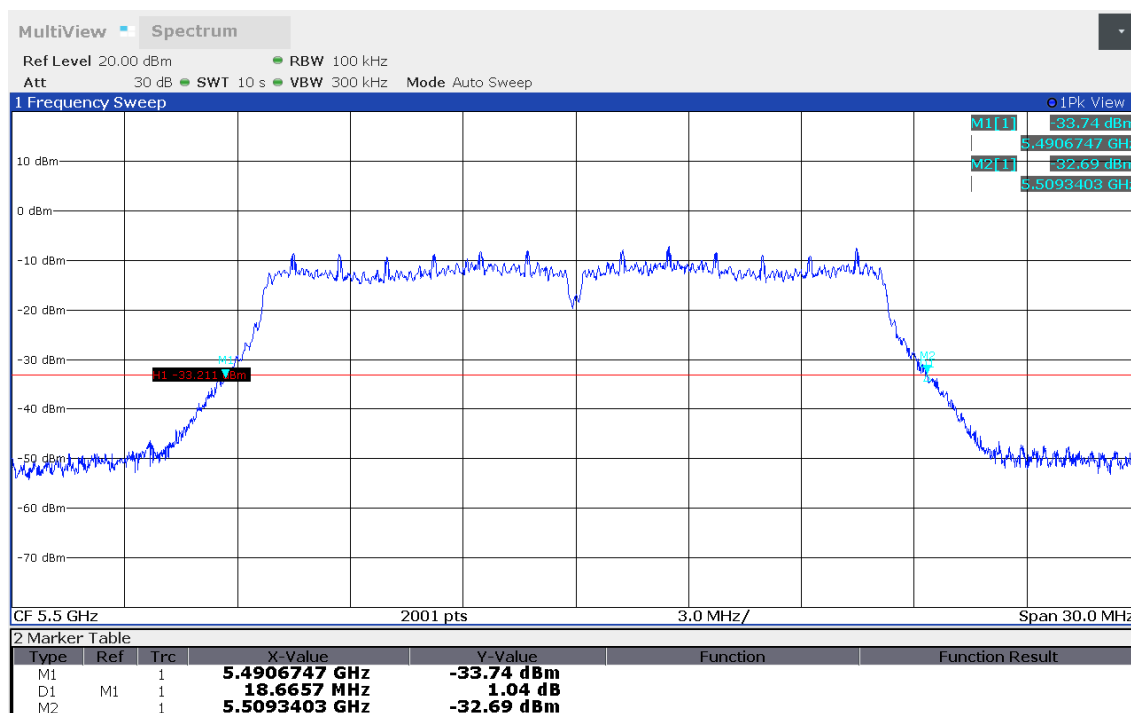
Project Number: G0M-1905-8256
 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11a, Channel: 100, 5500 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: B
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 26 dB Bandwidth [MHz]: 18.711



14:46:32 08.10.2019

26 dB Bandwidth

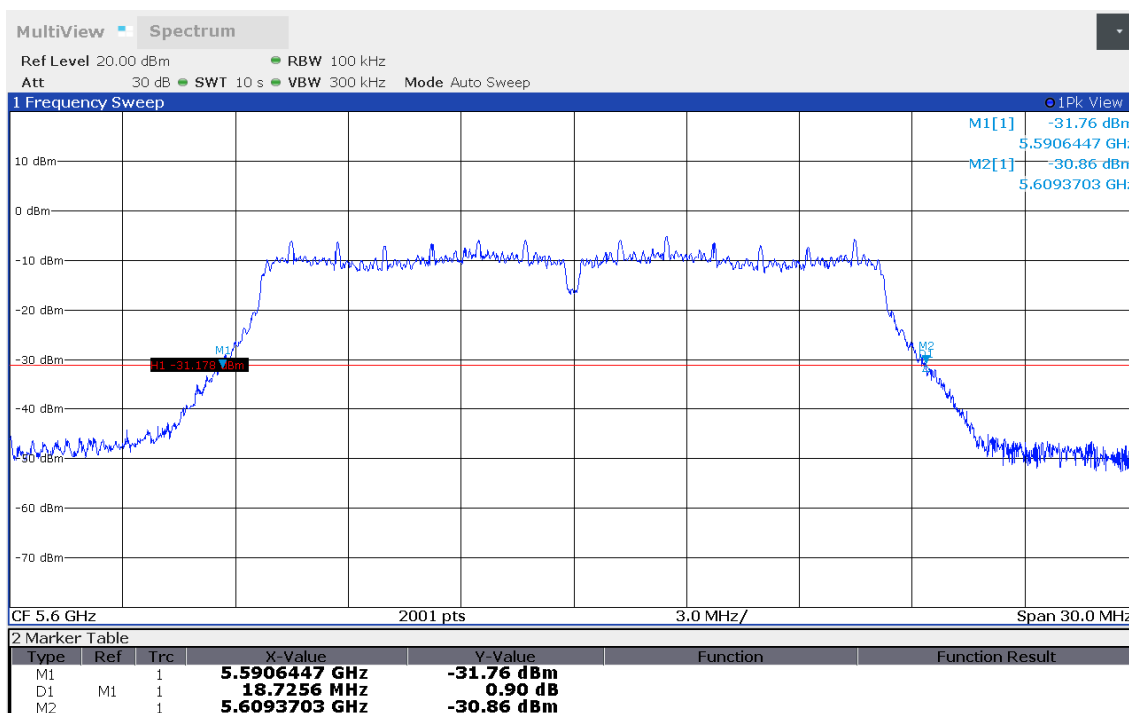
Project Number: G0M-1905-8256
 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11a, Channel: 100, 5500 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: W
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 Upper Frequency [MHz]: 5509.340
 26 dB Bandwidth [MHz]: 18.666



15:18:33 08.10.2019

26 dB Bandwidth

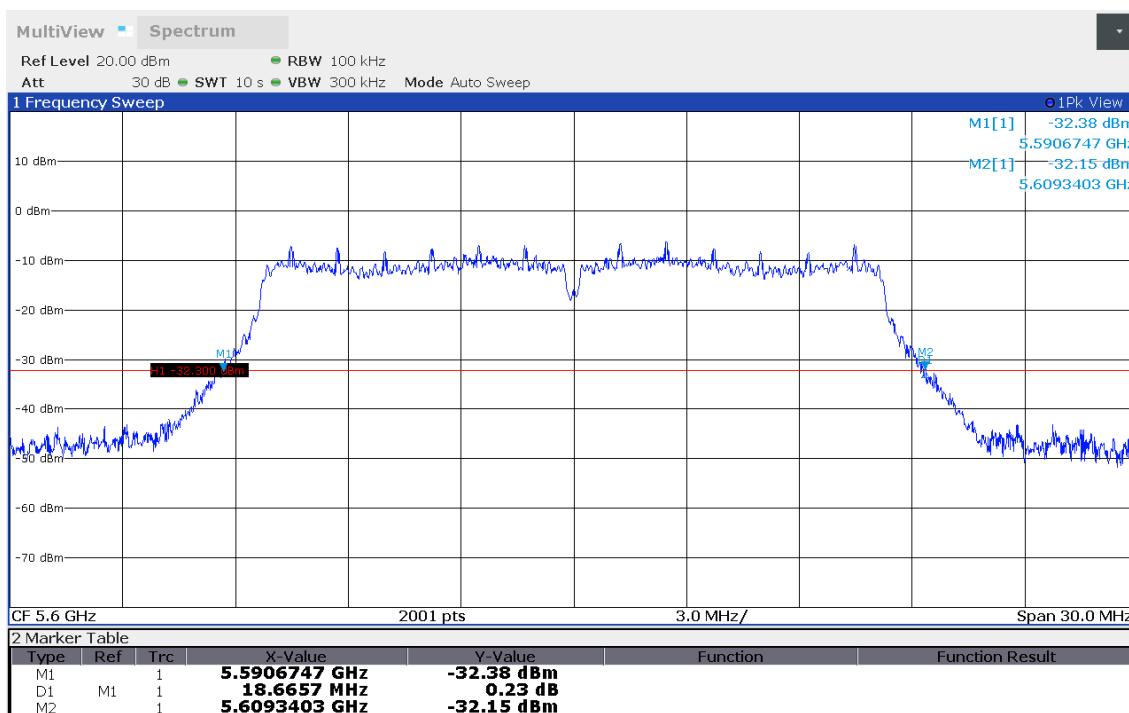
Project Number: G0M-1905-8256
 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11a, Channel: 120, 5600 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: B
 Lower Frequency [MHz]: 5590.645
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 26 dB Bandwidth [MHz]: 18.726



14:50:43 08.10.2019

26 dB Bandwidth

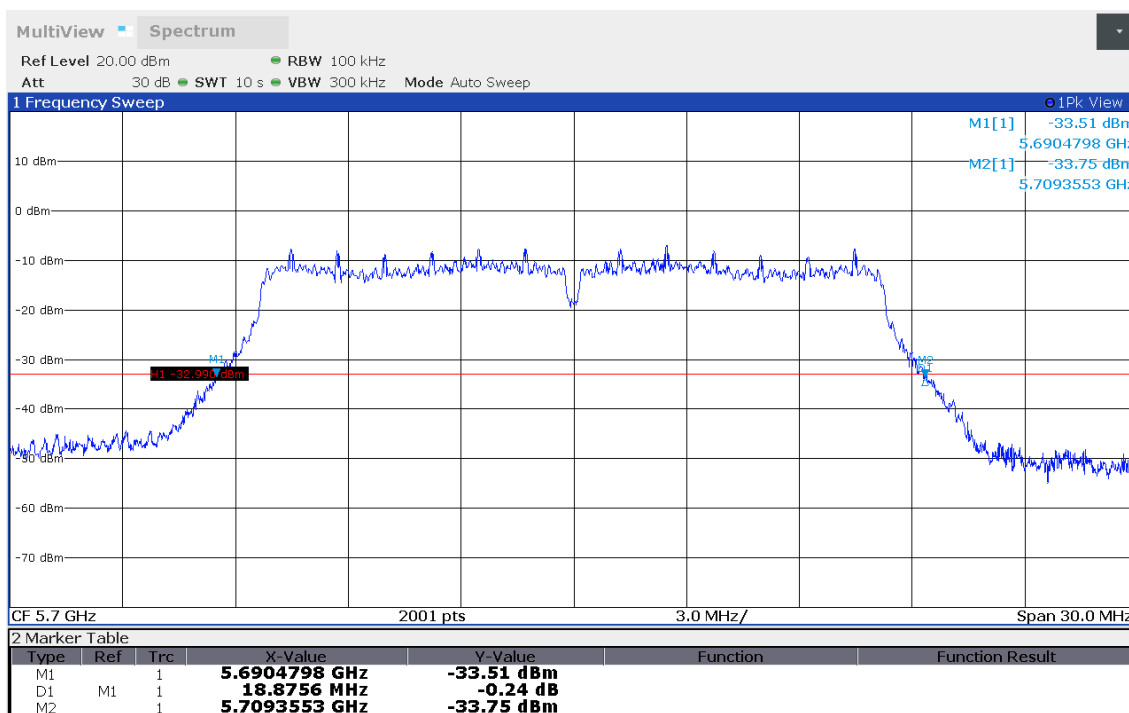
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 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11a, Channel: 120, 5600 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: W
 Lower Frequency [MHz]: 5590.675
 Upper Frequency [MHz]: 5609.340
 26 dB Bandwidth [MHz]: 18.666



15:20:25 08.10.2019

26 dB Bandwidth

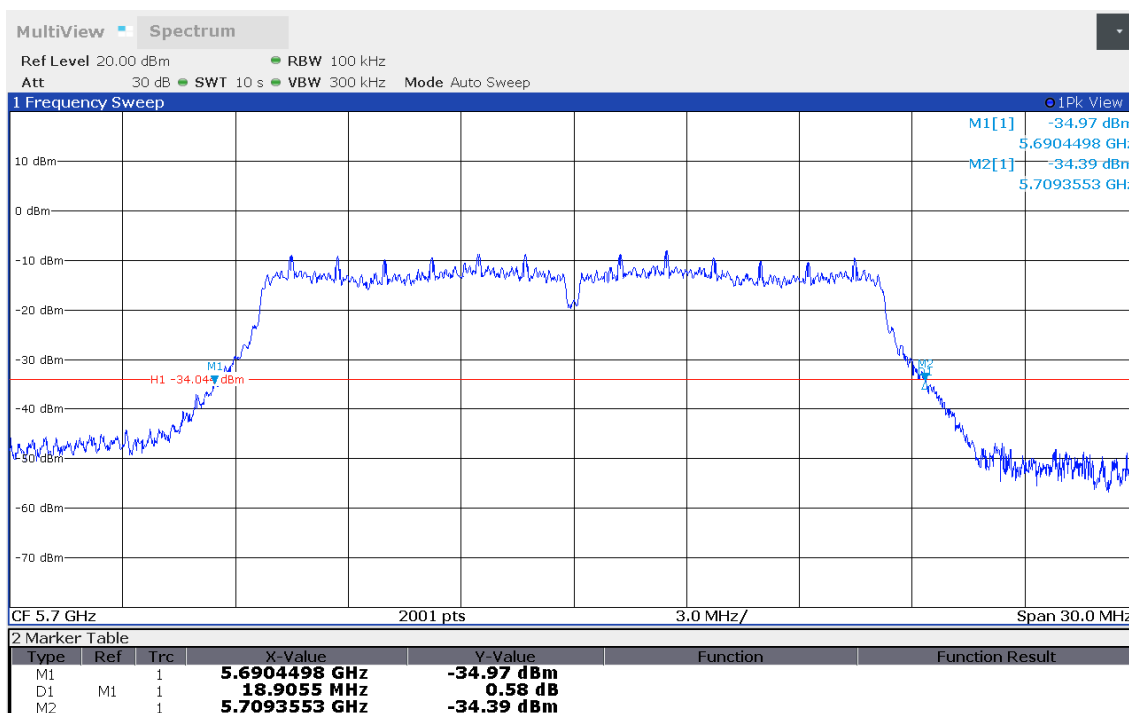
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 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11a, Channel: 140, 5700 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: B
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 Upper Frequency [MHz]: 5709.355
 26 dB Bandwidth [MHz]: 18.876



14:52:51 08.10.2019

26 dB Bandwidth

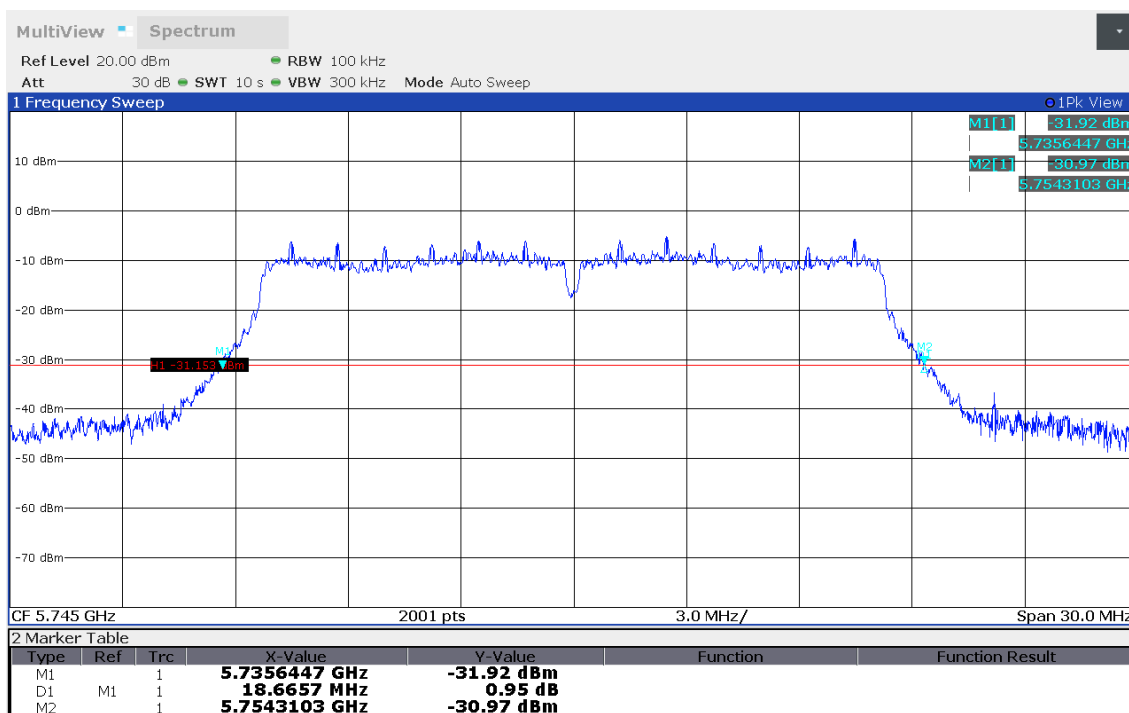
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 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11a, Channel: 140, 5700 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: W
 Lower Frequency [MHz]: 5690.450
 Upper Frequency [MHz]: 5709.355
 26 dB Bandwidth [MHz]: 18.906



15:22:15 08.10.2019

26 dB Bandwidth

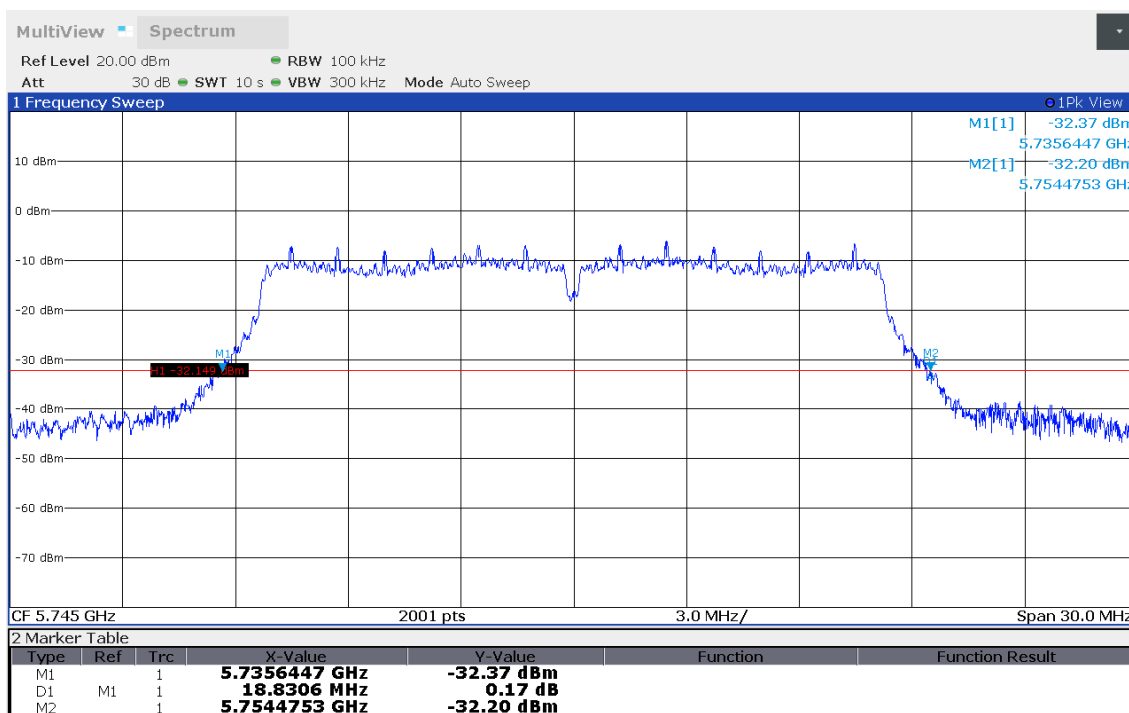
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 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11a, Channel: 149, 5745 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: B
 Lower Frequency [MHz]: 5735.645
 Upper Frequency [MHz]: 5754.310
 26 dB Bandwidth [MHz]: 18.666



15:54:28 08.10.2019

26 dB Bandwidth

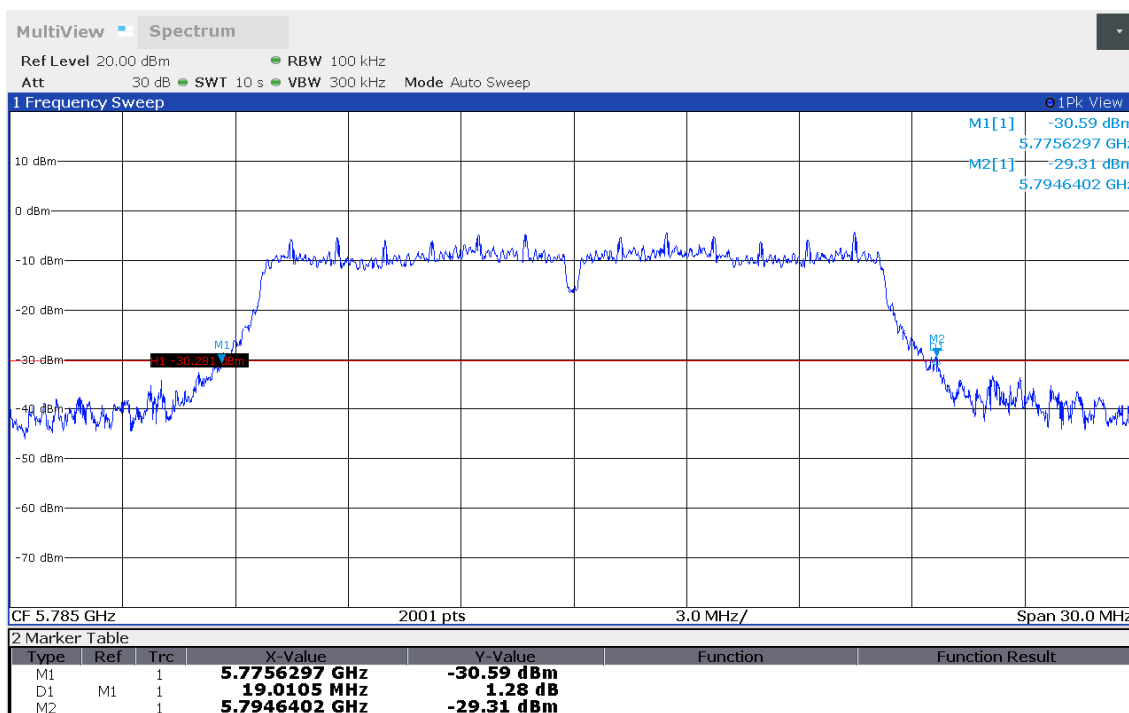
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 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11a, Channel: 149, 5745 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: W
 Lower Frequency [MHz]: 5735.645
 Upper Frequency [MHz]: 5754.475
 26 dB Bandwidth [MHz]: 18.831



15:43:39 08.10.2019

26 dB Bandwidth

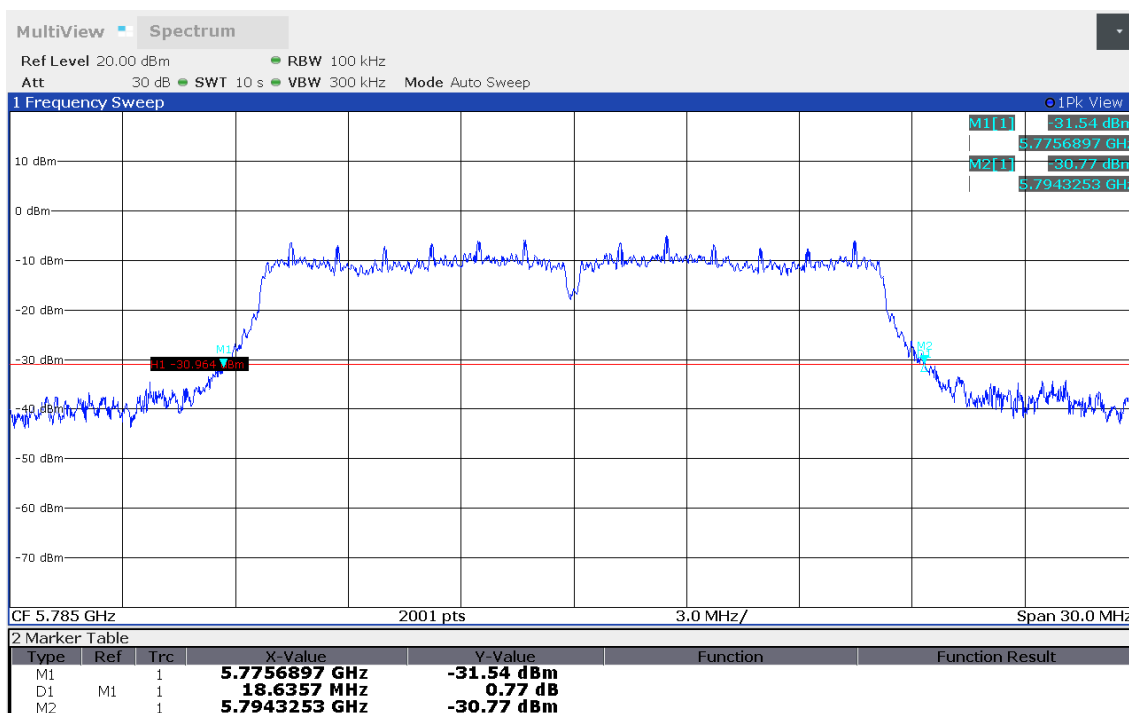
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 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11a, Channel: 157, 5785 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: B
 Lower Frequency [MHz]: 5775.630
 Upper Frequency [MHz]: 5794.640
 26 dB Bandwidth [MHz]: 19.010



15:55:32 08.10.2019

26 dB Bandwidth

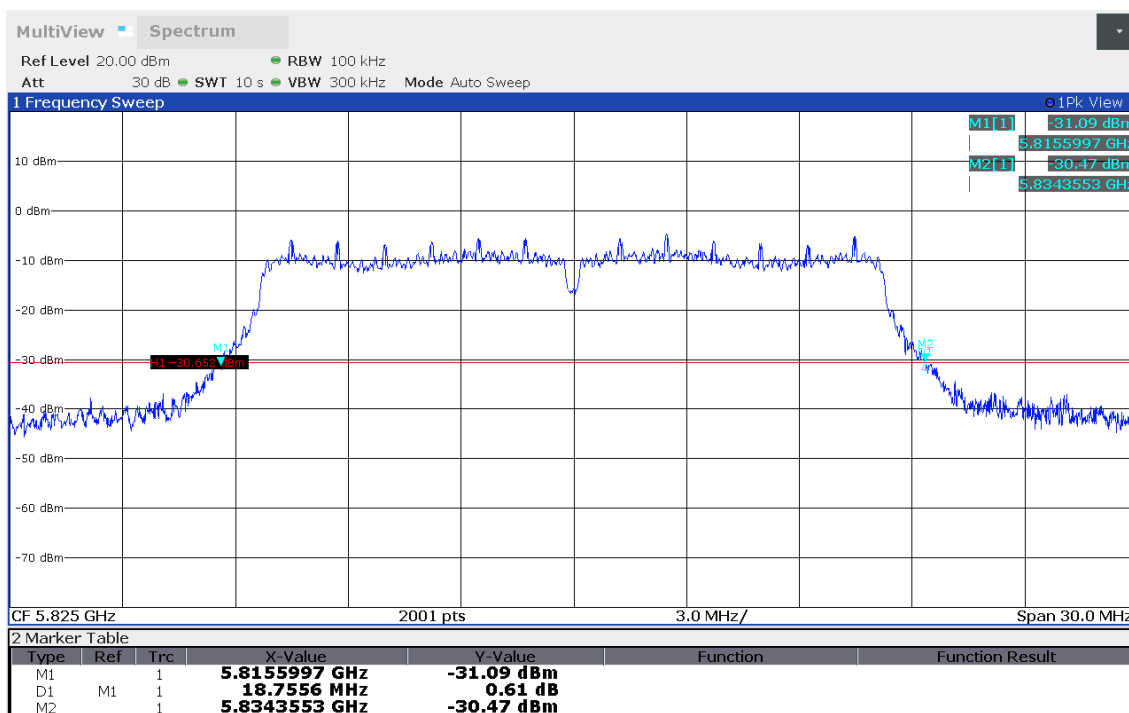
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 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11a, Channel: 157, 5785 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: W
 Lower Frequency [MHz]: 5775.690
 Upper Frequency [MHz]: 5794.325
 26 dB Bandwidth [MHz]: 18.636



15:45:16 08.10.2019

26 dB Bandwidth

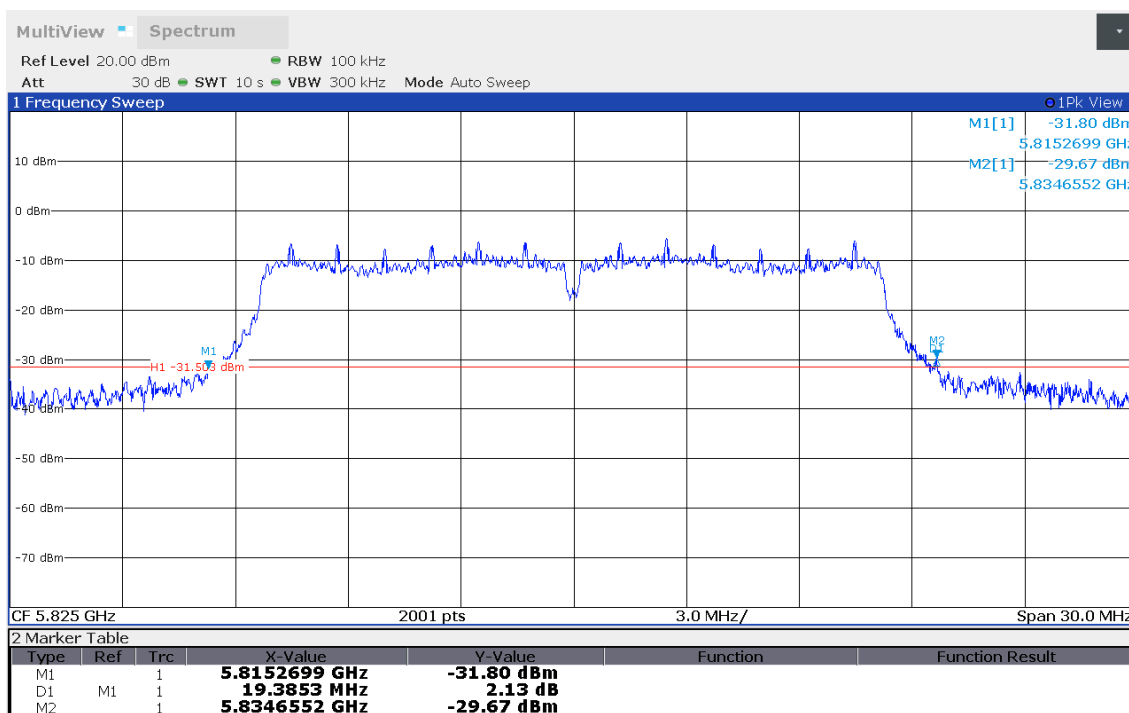
Project Number: G0M-1905-8256
 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11a, Channel: 165, 5825 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: B
 Lower Frequency [MHz]: 5815.600
 Upper Frequency [MHz]: 5834.355
 26 dB Bandwidth [MHz]: 18.756



15:57:05 08.10.2019

26 dB Bandwidth

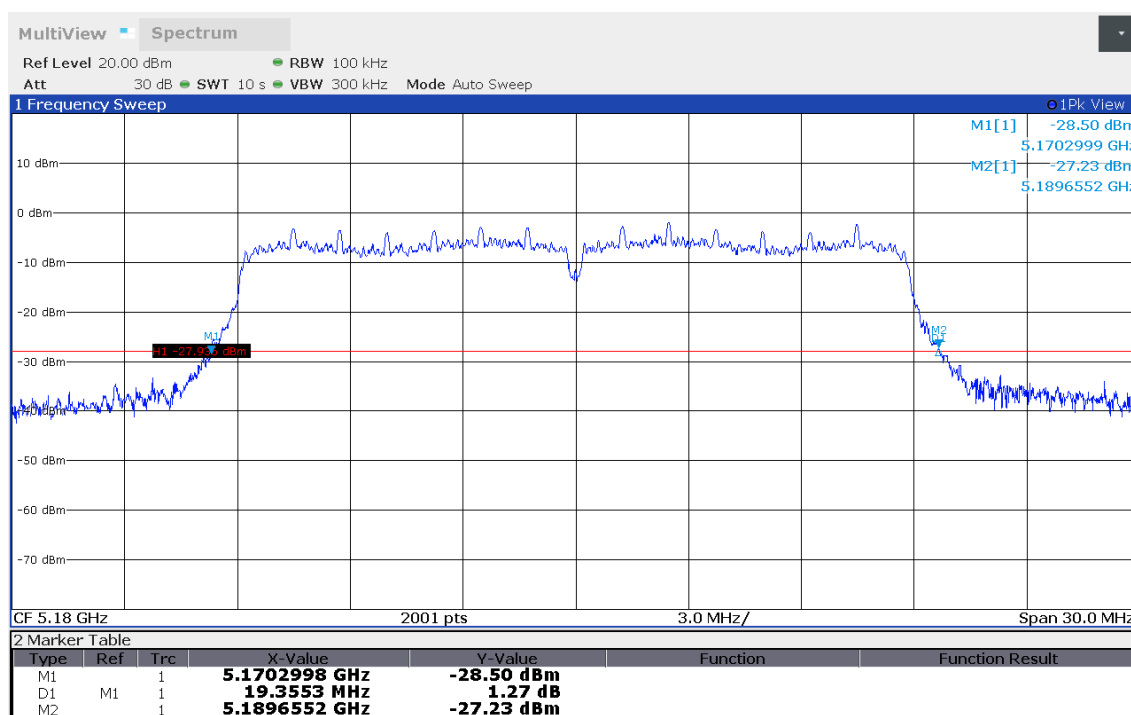
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 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11a, Channel: 165, 5825 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: W
 Lower Frequency [MHz]: 5815.270
 Upper Frequency [MHz]: 5834.655
 26 dB Bandwidth [MHz]: 19.385



15:46:11 08.10.2019

26 dB Bandwidth

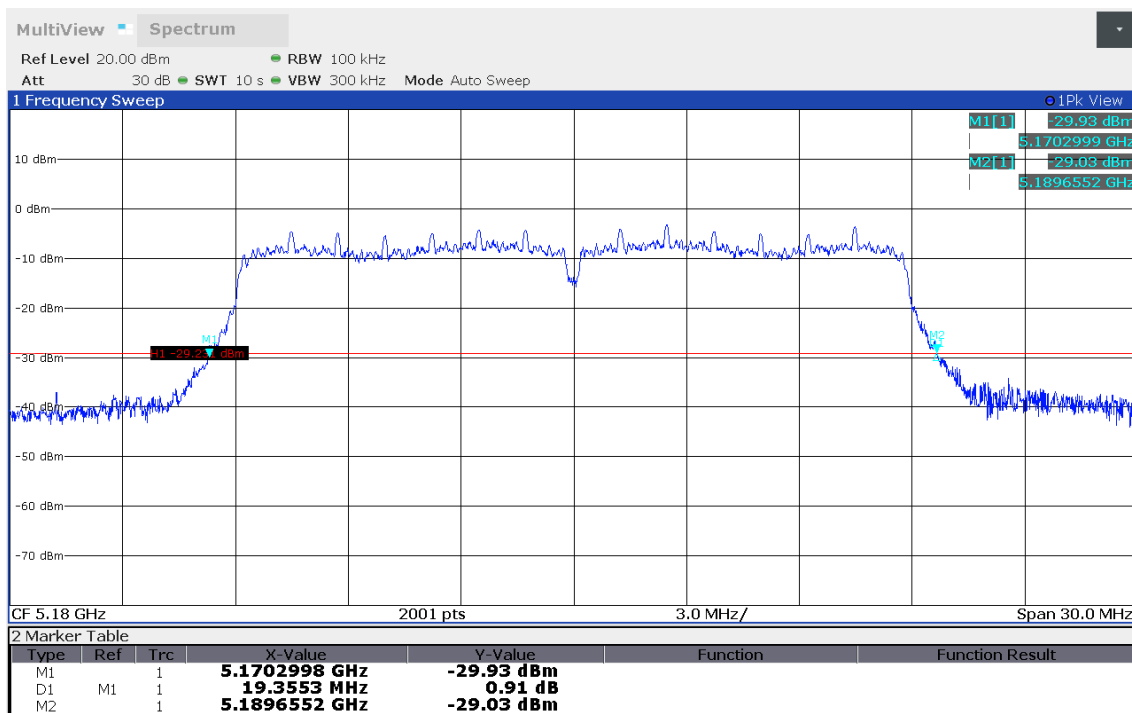
Project Number: G0M-1905-8256
 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11n (HT20), Channel: 36, 5180 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: B
 Lower Frequency [MHz]: 5170.300
 Upper Frequency [MHz]: 5189.655
 26 dB Bandwidth [MHz]: 19.355



13:59:32 08.10.2019

26 dB Bandwidth

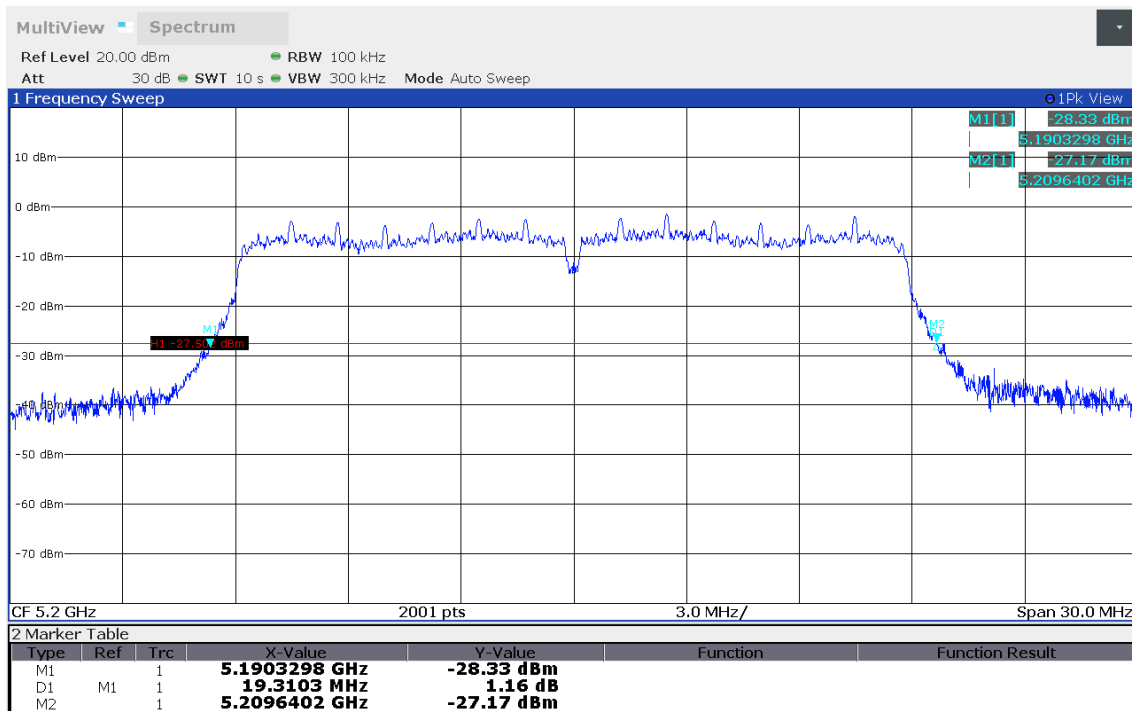
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 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11n (HT20), Channel: 36, 5180 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: W
 Lower Frequency [MHz]: 5170.300
 Upper Frequency [MHz]: 5189.655
 26 dB Bandwidth [MHz]: 19.355



14:11:16 08.10.2019

26 dB Bandwidth

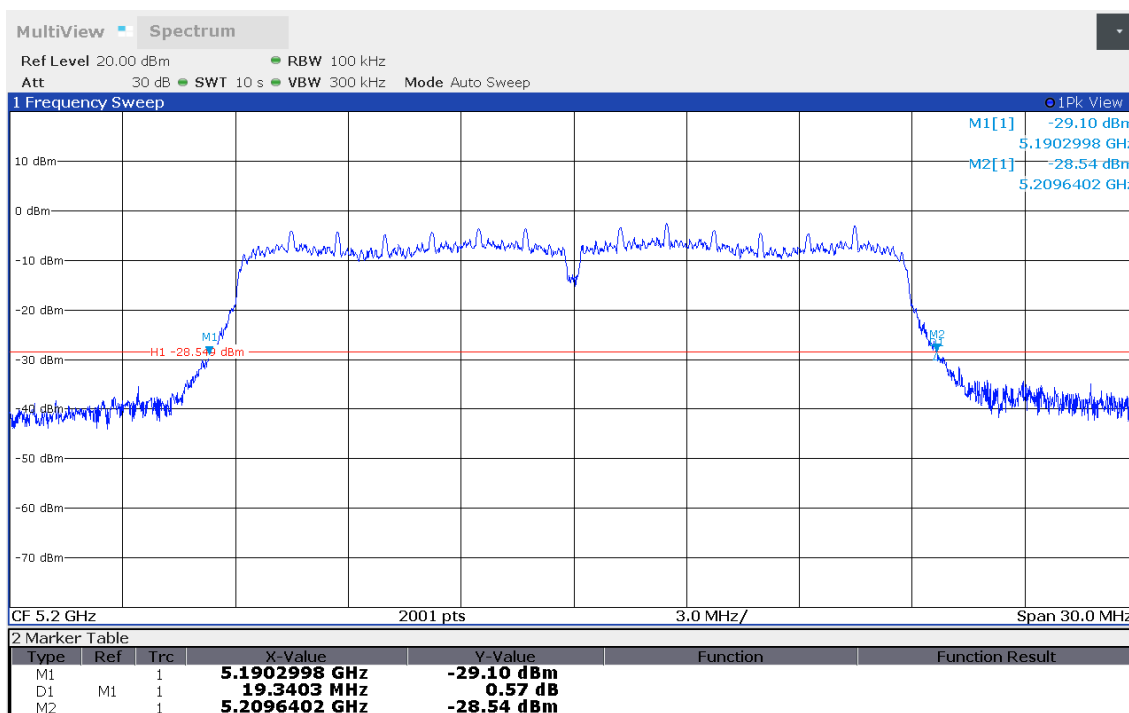
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 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11n (HT20), Channel: 40, 5200 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: B
 Lower Frequency [MHz]: 5190.330
 Upper Frequency [MHz]: 5209.640
 26 dB Bandwidth [MHz]: 19.310



14:00:38 08.10.2019

26 dB Bandwidth

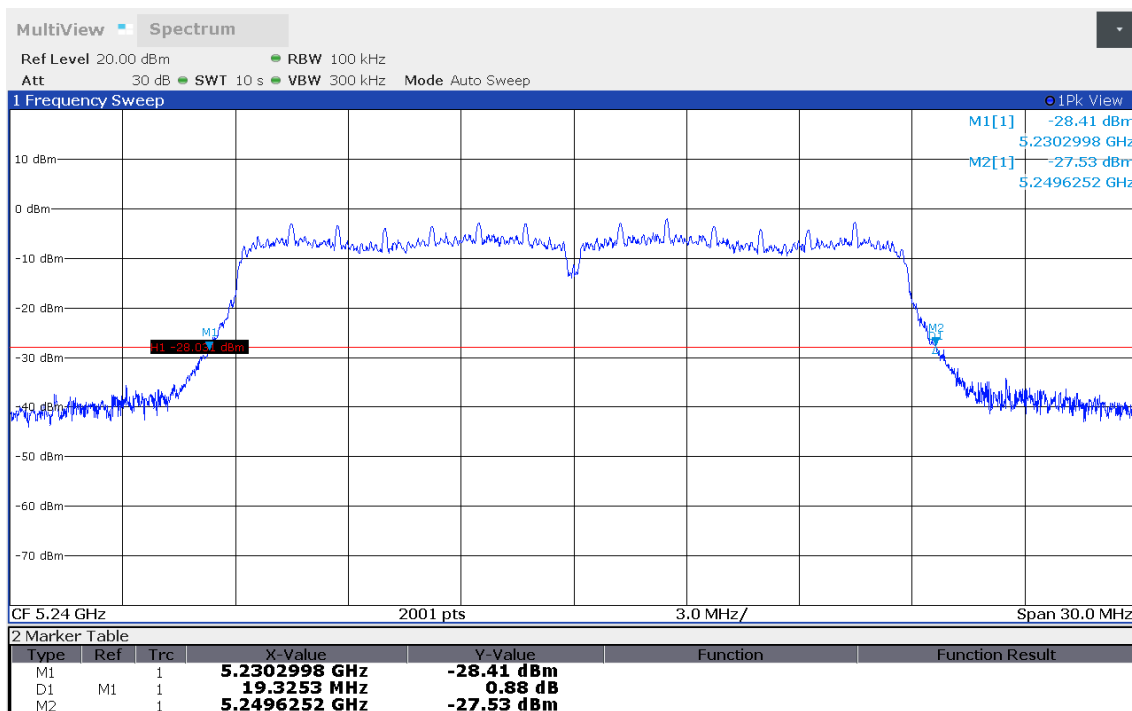
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 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11n (HT20), Channel: 40, 5200 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: W
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 Upper Frequency [MHz]: 5209.640
 26 dB Bandwidth [MHz]: 19.340



14:12:19 08.10.2019

26 dB Bandwidth

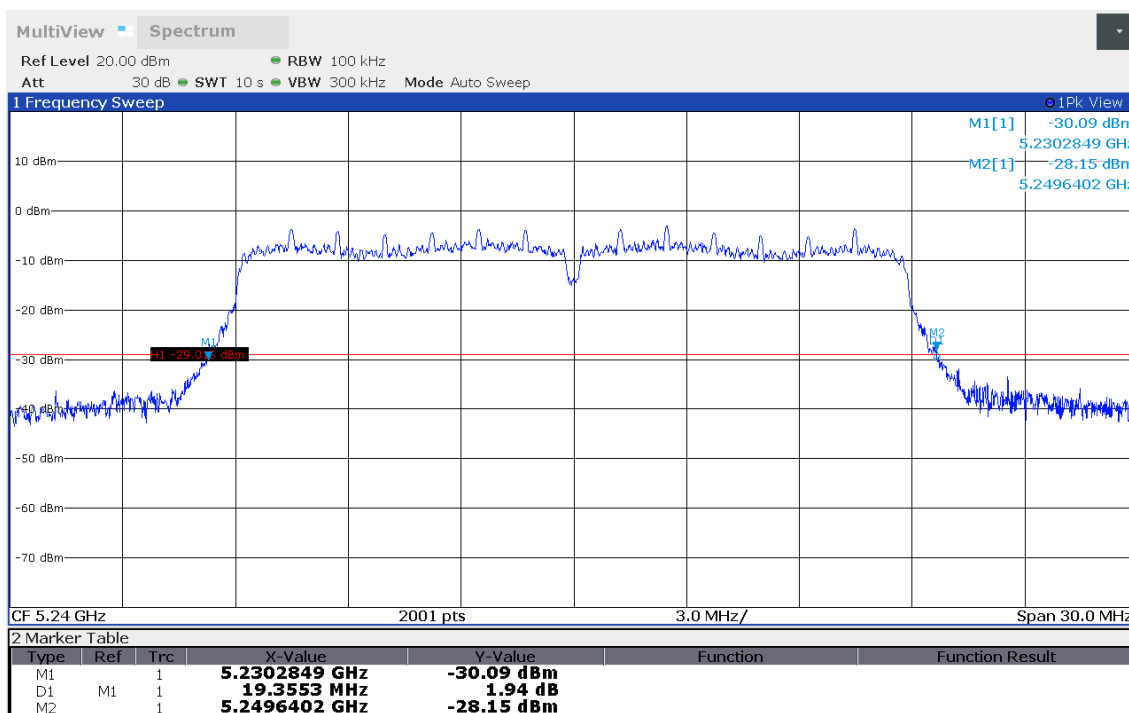
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 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11n (HT20), Channel: 48, 5240 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: B
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 Upper Frequency [MHz]: 5249.625
 26 dB Bandwidth [MHz]: 19.325



14:01:41 08.10.2019

26 dB Bandwidth

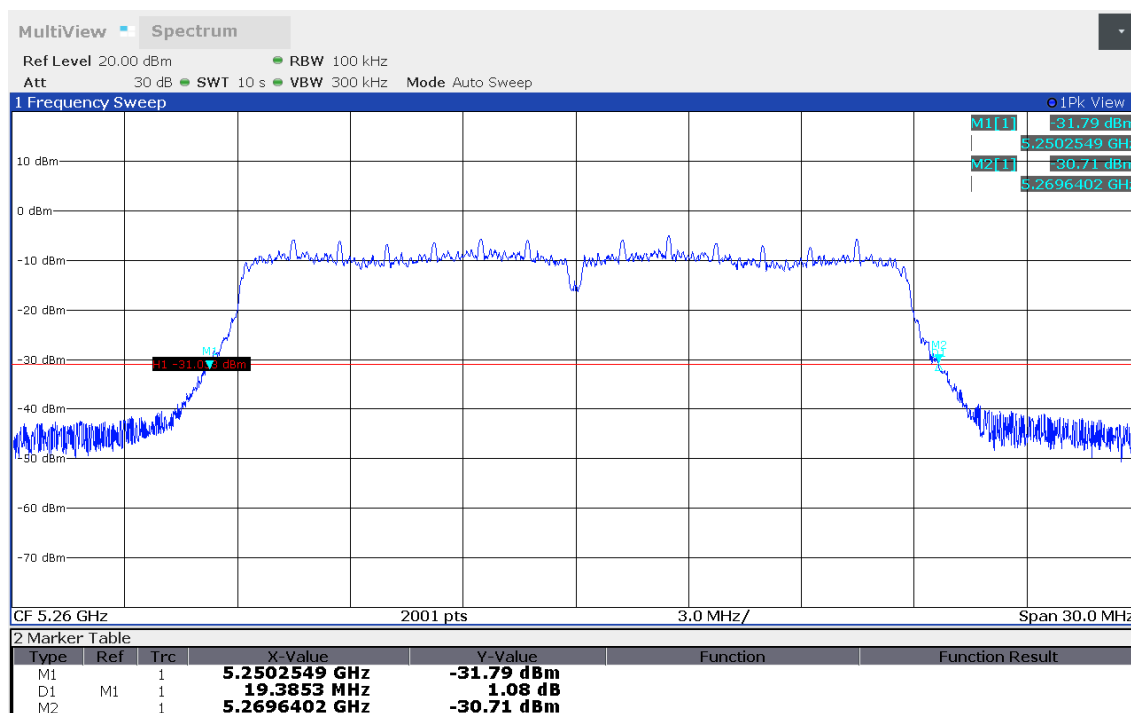
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 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11n (HT20), Channel: 48, 5240 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
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 26 dB Bandwidth [MHz]: 19.355



14:13:20 08.10.2019

26 dB Bandwidth

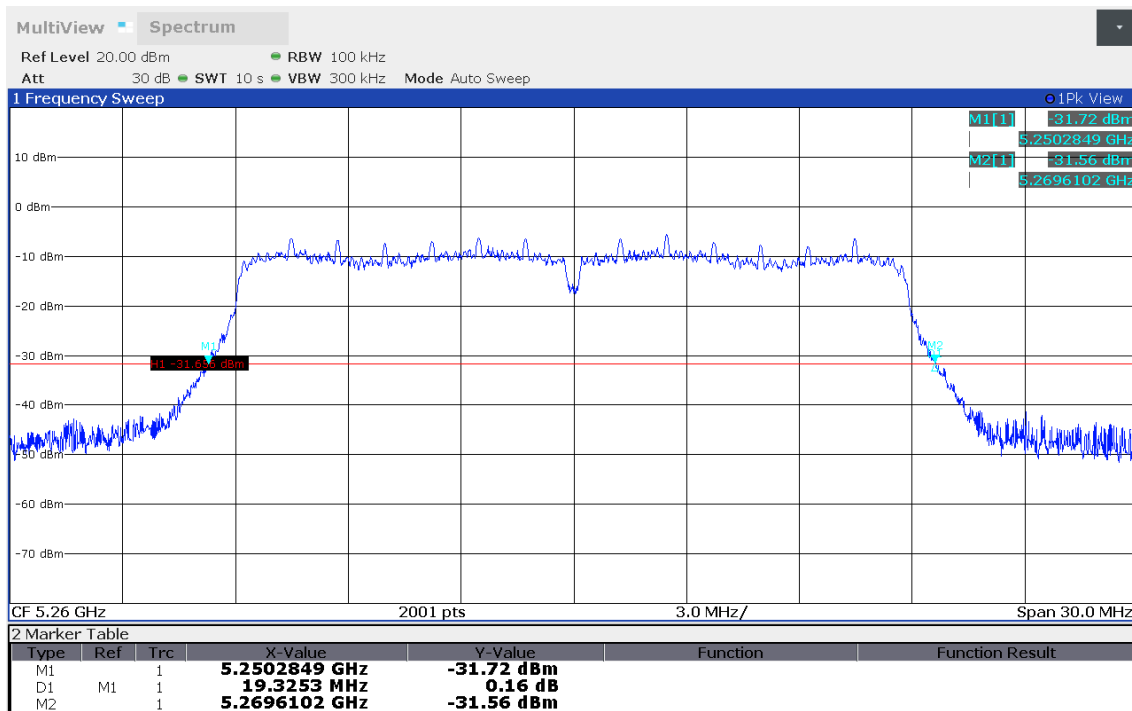
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 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11n (HT20), Channel: 52, 5260 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: B
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 26 dB Bandwidth [MHz]: 19.385



14:39:03 08.10.2019

26 dB Bandwidth

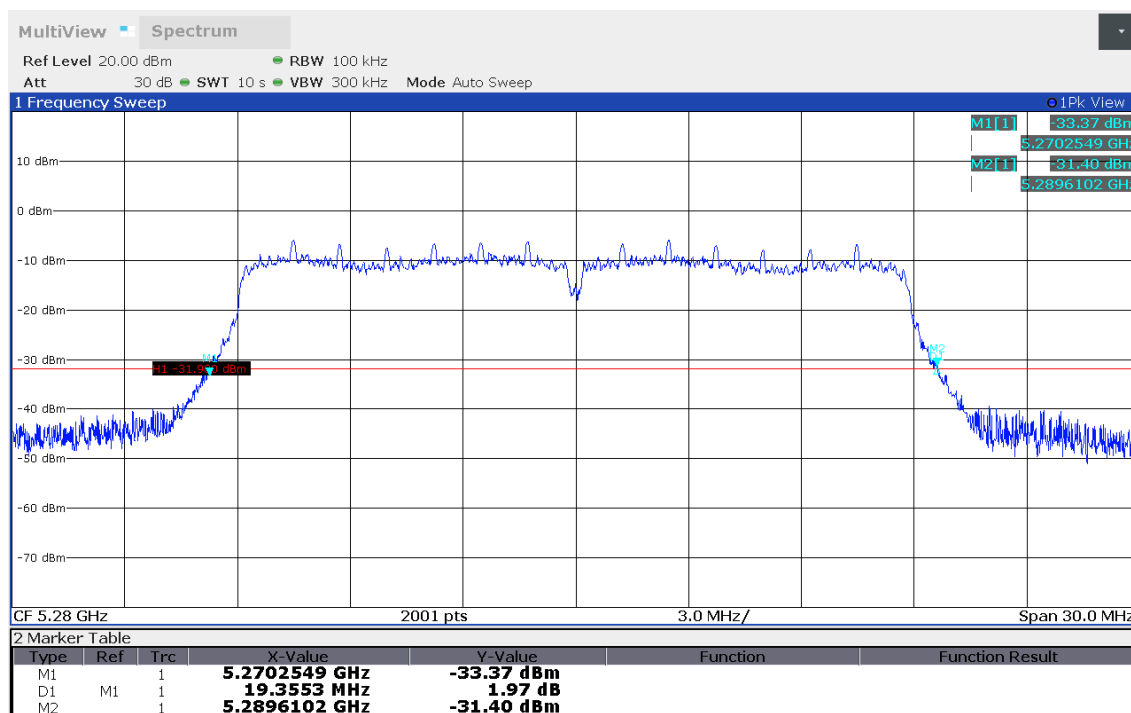
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 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11n (HT20), Channel: 52, 5260 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: W
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 26 dB Bandwidth [MHz]: 19.325



14:27:51 08.10.2019

26 dB Bandwidth

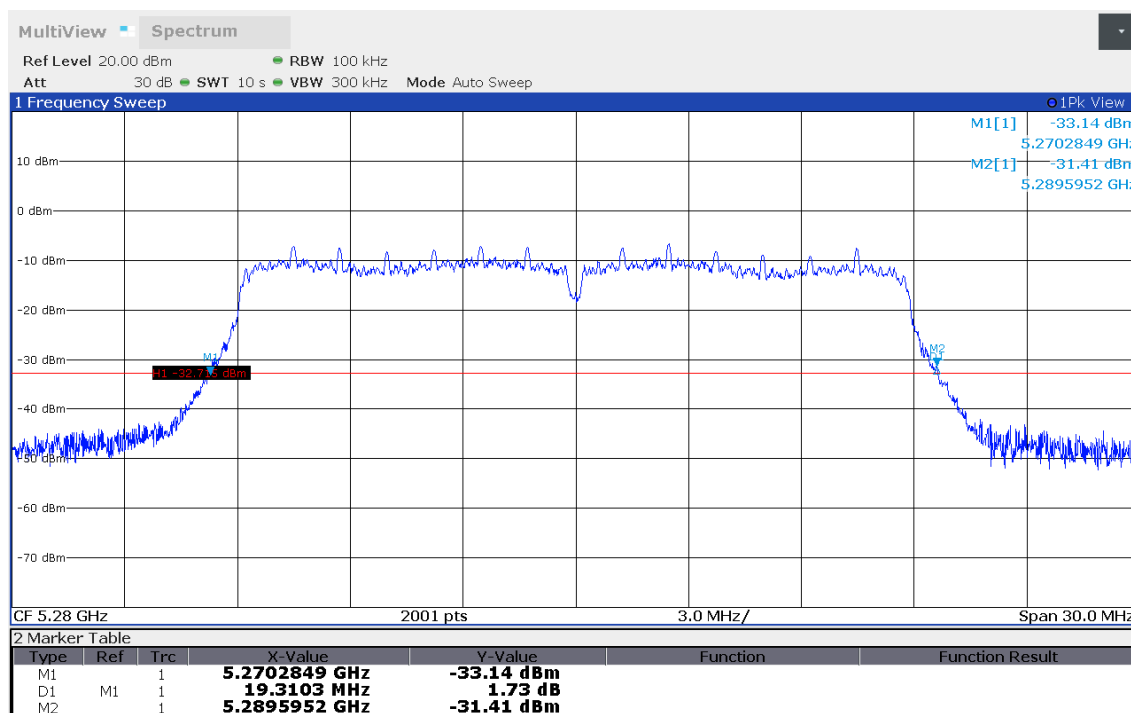
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 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11n (HT20), Channel: 56, 5280 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: B
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 Upper Frequency [MHz]: 5289.610
 26 dB Bandwidth [MHz]: 19.355



14:40:48 08.10.2019

26 dB Bandwidth

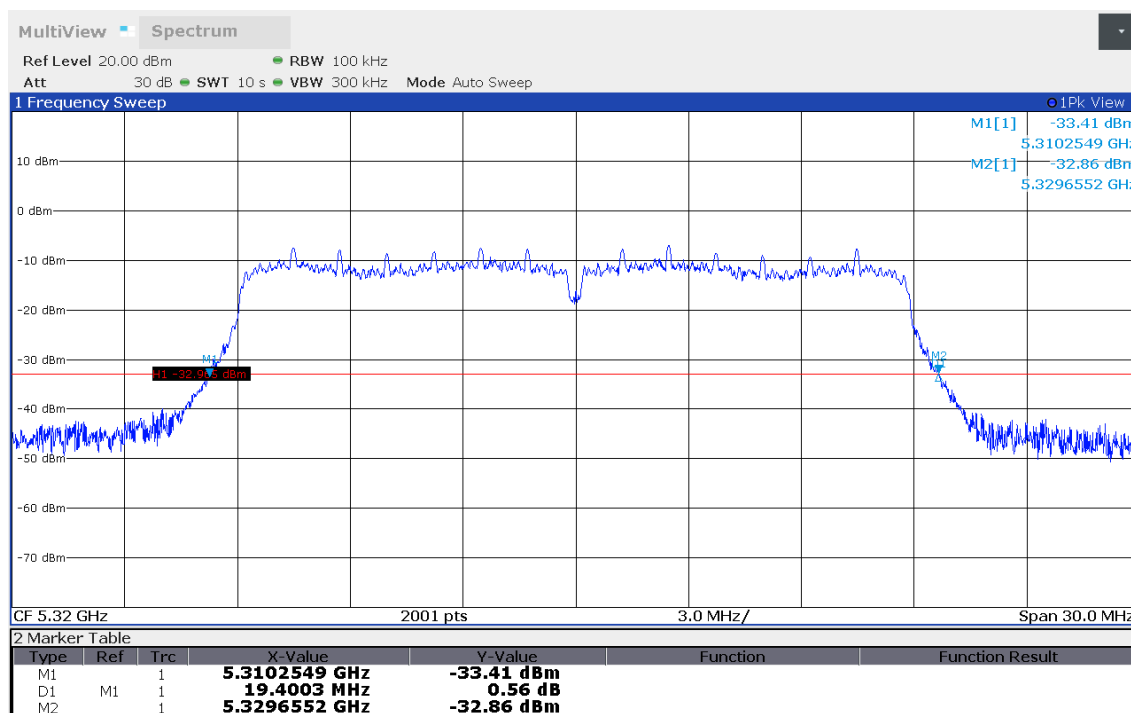
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 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11n (HT20), Channel: 56, 5280 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: W
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 Upper Frequency [MHz]: 5289.595
 26 dB Bandwidth [MHz]: 19.310



14:28:52 08.10.2019

26 dB Bandwidth

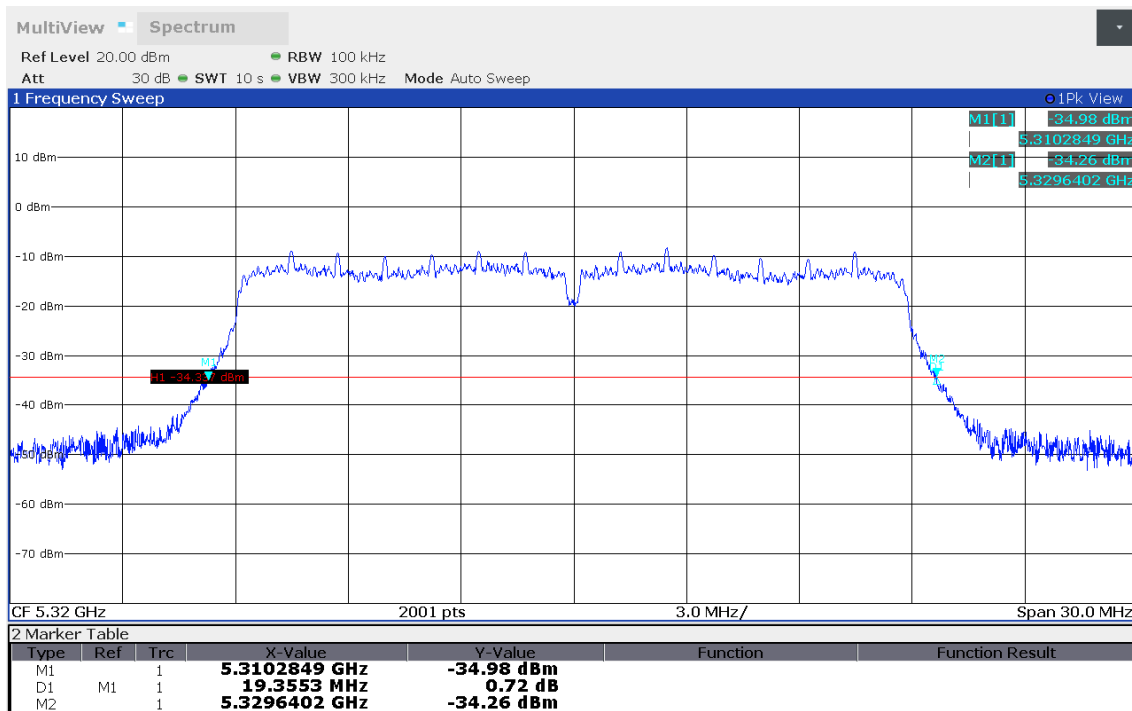
Project Number: G0M-1905-8256
 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11n (HT20), Channel: 64, 5320 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: B
 Lower Frequency [MHz]: 5310.255
 Upper Frequency [MHz]: 5329.655
 26 dB Bandwidth [MHz]: 19.400



14:41:54 08.10.2019

26 dB Bandwidth

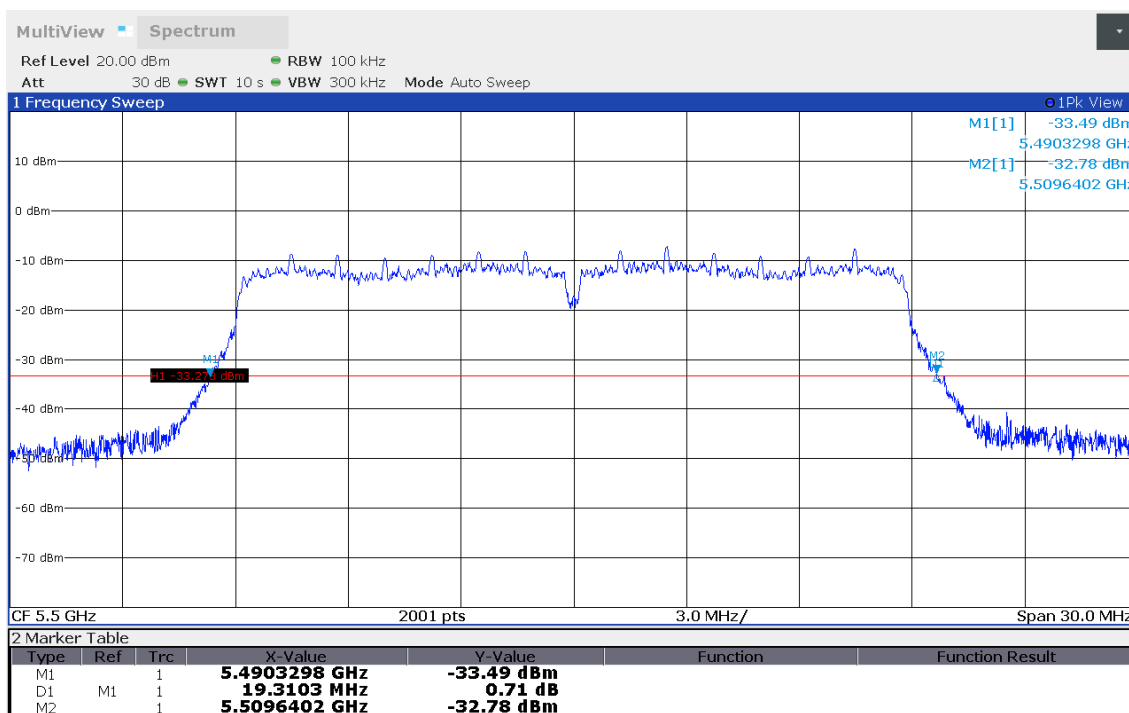
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 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
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 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11n (HT20), Channel: 64, 5320 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: W
 Lower Frequency [MHz]: 5310.285
 Upper Frequency [MHz]: 5329.640
 26 dB Bandwidth [MHz]: 19.355



14:29:52 08.10.2019

26 dB Bandwidth

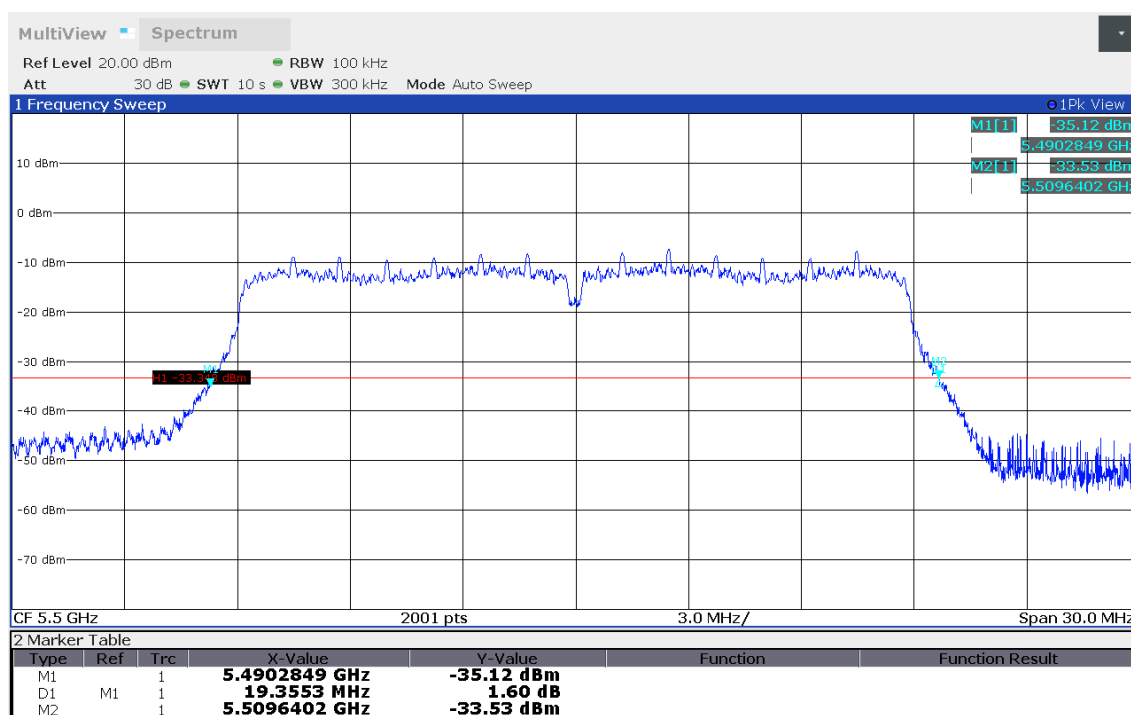
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 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11n (HT20), Channel: 100, 5500 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: B
 Lower Frequency [MHz]: 5490.330
 Upper Frequency [MHz]: 5509.640
 26 dB Bandwidth [MHz]: 19.310



14:54:11 08.10.2019

26 dB Bandwidth

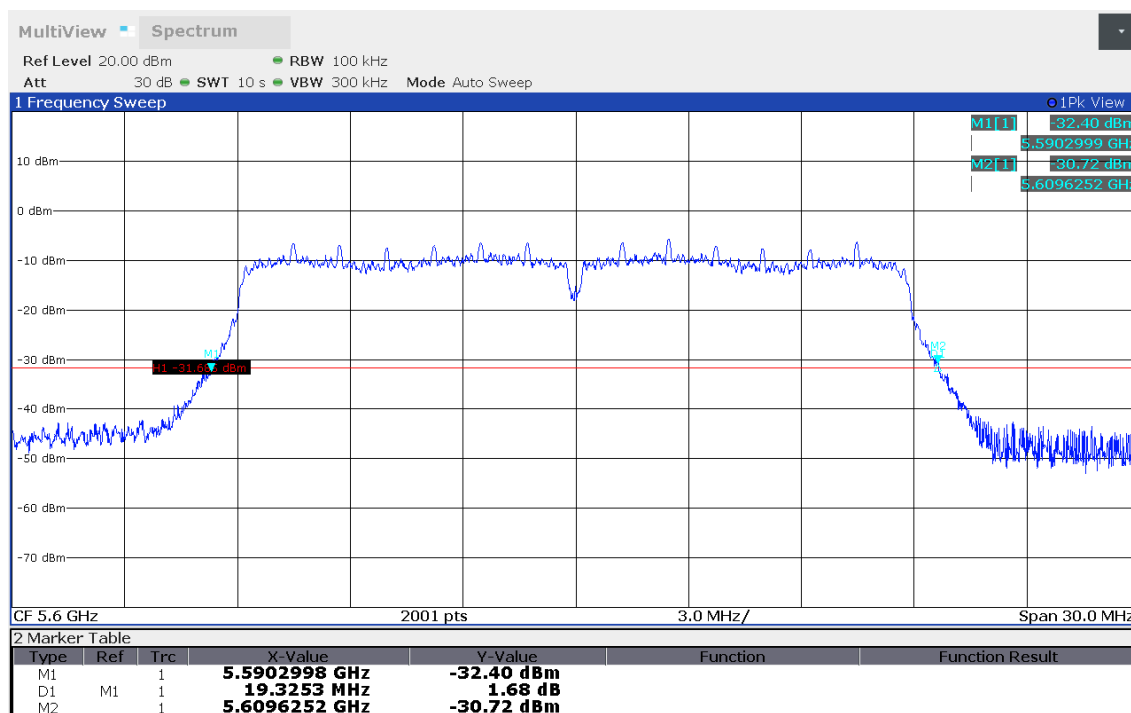
Project Number: G0M-1905-8256
 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11n (HT20), Channel: 100, 5500 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: W
 Lower Frequency [MHz]: 5490.285
 Upper Frequency [MHz]: 5509.640
 26 dB Bandwidth [MHz]: 19.355



15:23:21 08.10.2019

26 dB Bandwidth

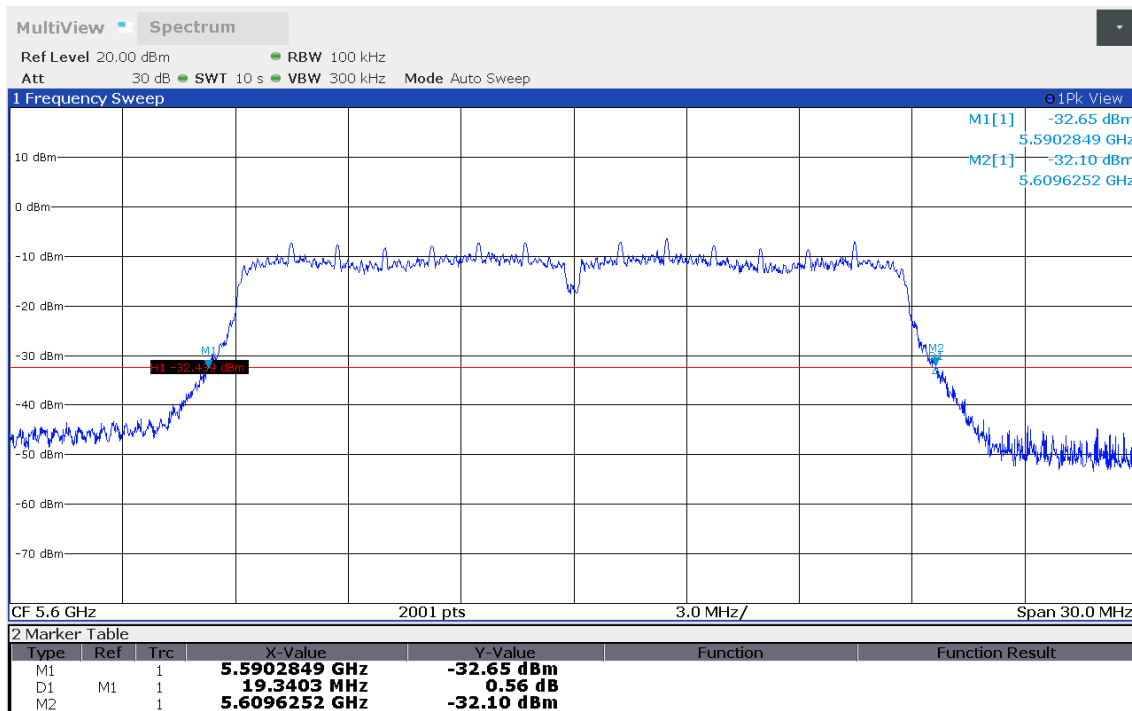
Project Number: G0M-1905-8256
 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11n (HT20), Channel: 120, 5600 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: B
 Lower Frequency [MHz]: 5590.300
 Upper Frequency [MHz]: 5609.625
 26 dB Bandwidth [MHz]: 19.325



14:56:13 08.10.2019

26 dB Bandwidth

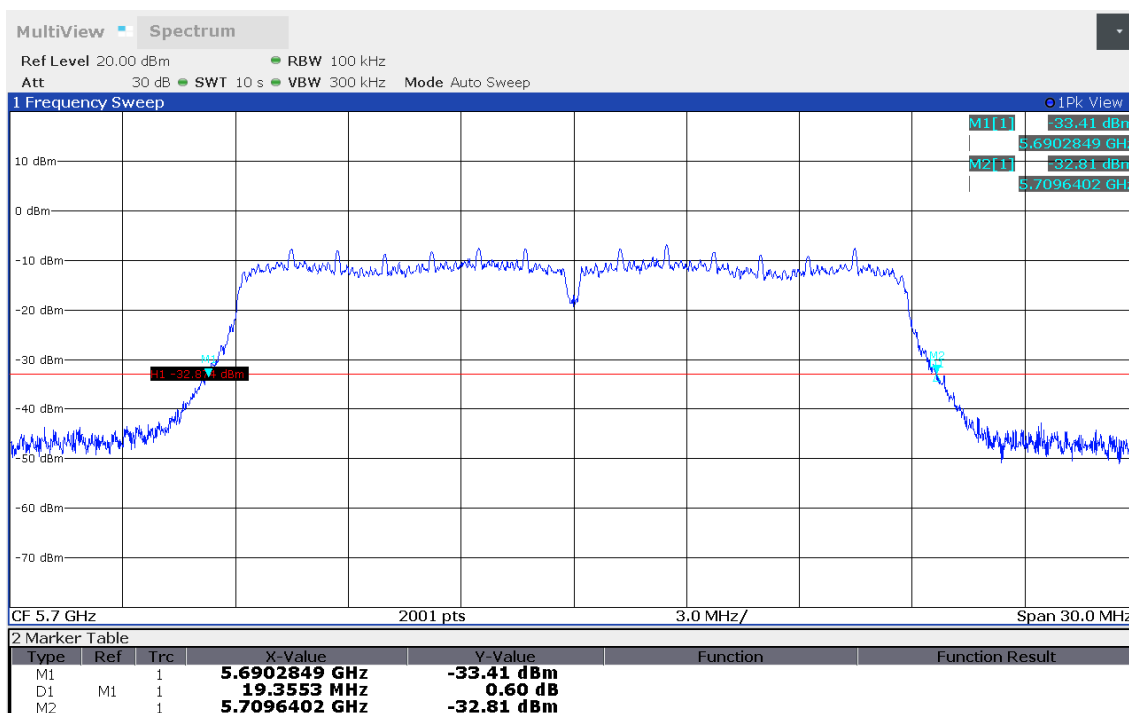
Project Number: G0M-1905-8256
 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11n (HT20), Channel: 120, 5600 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: W
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 Upper Frequency [MHz]: 5609.625
 26 dB Bandwidth [MHz]: 19.340



15:37:17 08.10.2019

26 dB Bandwidth

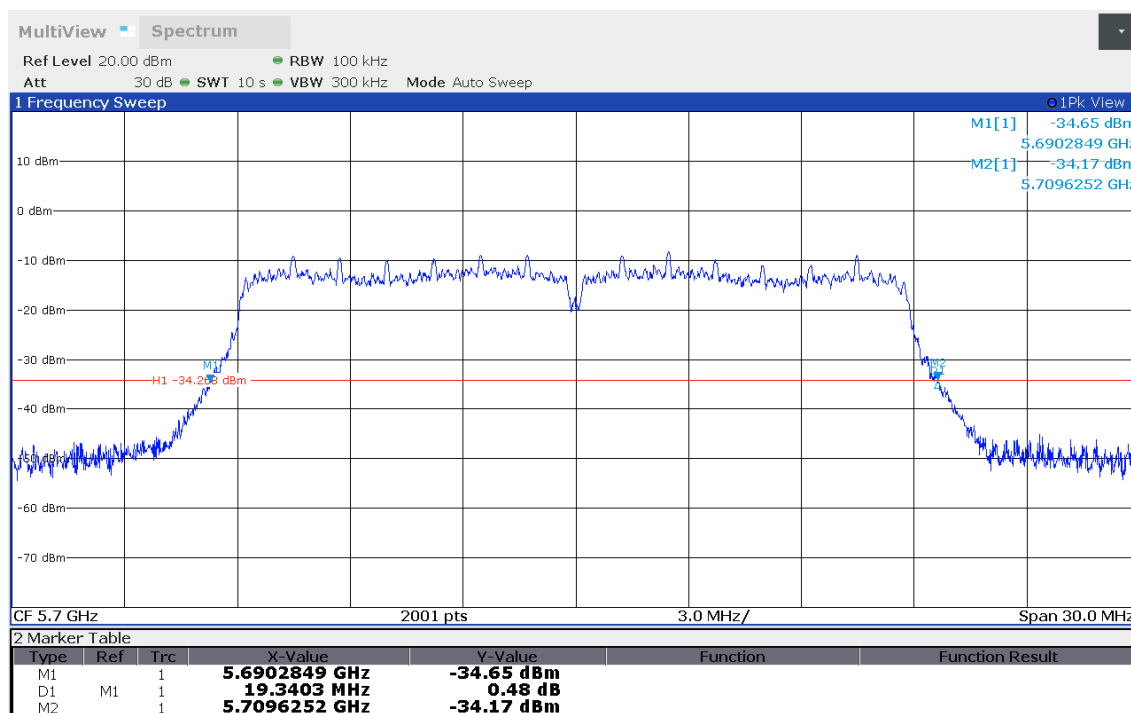
Project Number: G0M-1905-8256
 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11n (HT20), Channel: 140, 5700 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: B
 Lower Frequency [MHz]: 5690.285
 Upper Frequency [MHz]: 5709.640
 26 dB Bandwidth [MHz]: 19.355



15:10:07 08.10.2019

26 dB Bandwidth

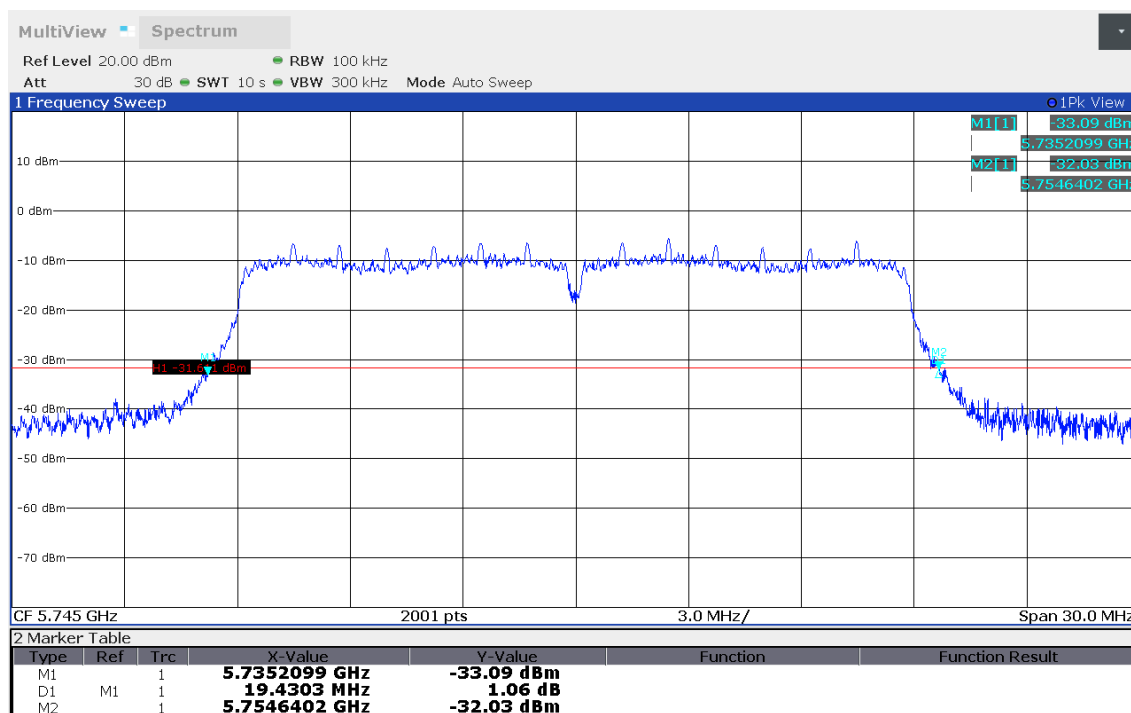
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 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11n (HT20), Channel: 140, 5700 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: W
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 Upper Frequency [MHz]: 5709.625
 26 dB Bandwidth [MHz]: 19.340



15:35:59 08.10.2019

26 dB Bandwidth

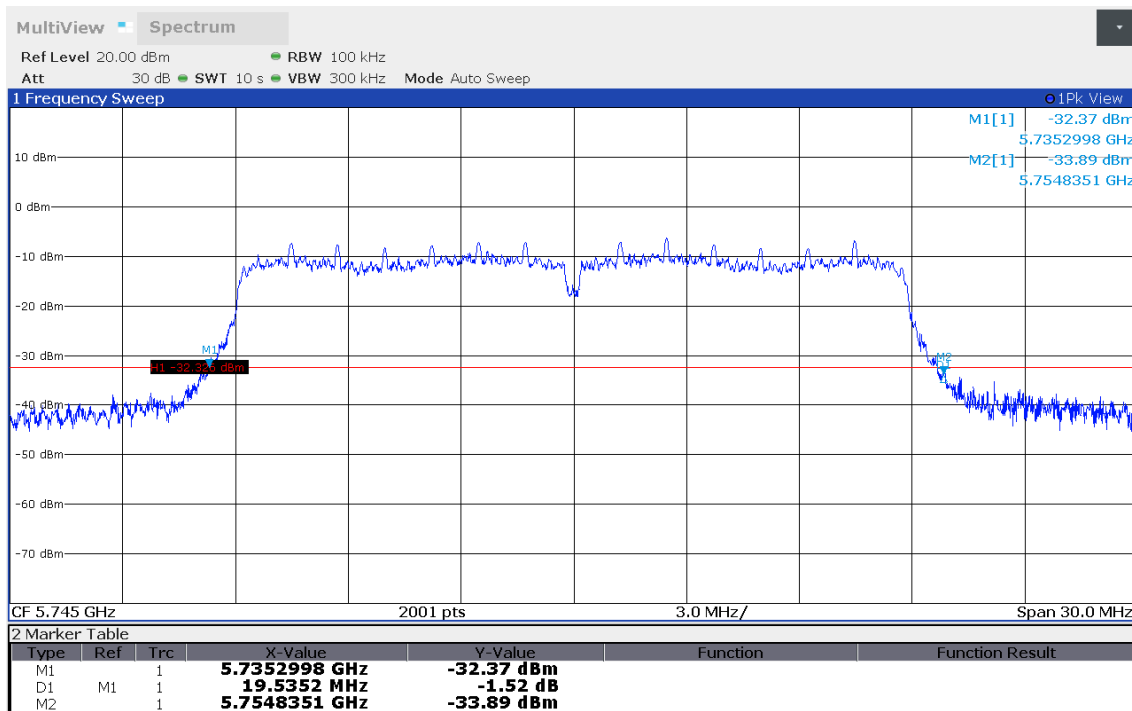
Project Number: G0M-1905-8256
 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11n (HT20), Channel: 149, 5745 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: B
 Lower Frequency [MHz]: 5735.210
 Upper Frequency [MHz]: 5754.640
 26 dB Bandwidth [MHz]: 19.430



16:14:18 08.10.2019

26 dB Bandwidth

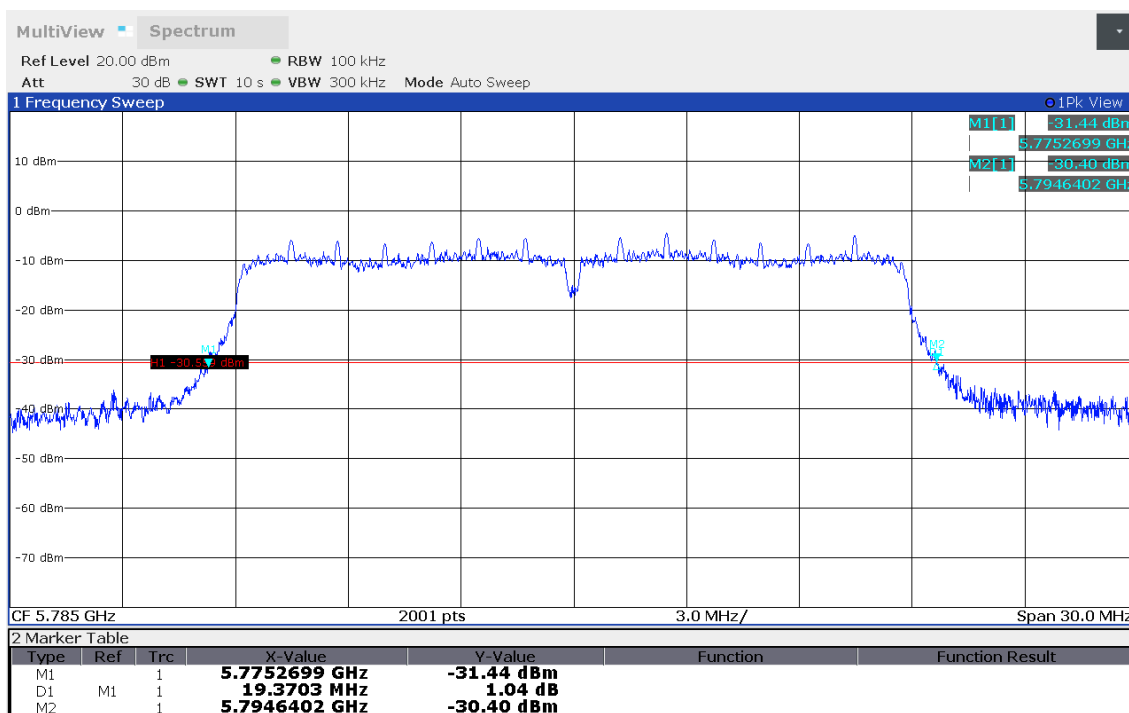
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 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11n (HT20), Channel: 149, 5745 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: W
 Lower Frequency [MHz]: 5735.300
 Upper Frequency [MHz]: 5754.835
 26 dB Bandwidth [MHz]: 19.535



15:47:12 08.10.2019

26 dB Bandwidth

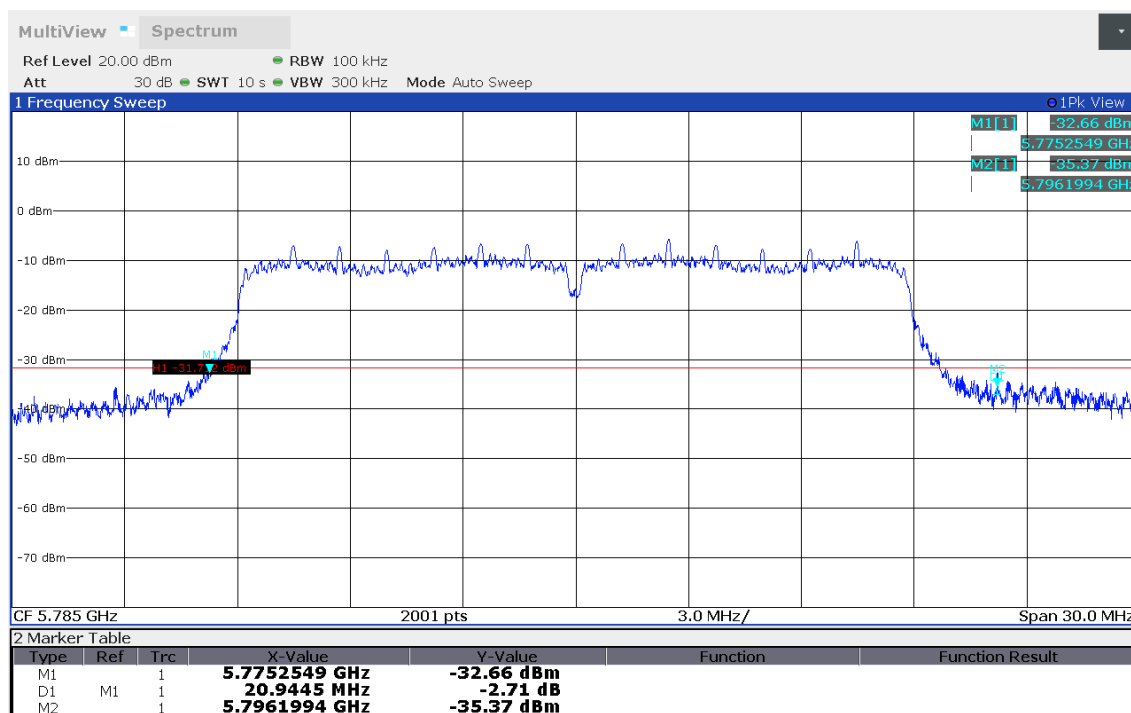
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 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11n (HT20), Channel: 157, 5785 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: B
 Lower Frequency [MHz]: 5775.270
 Upper Frequency [MHz]: 5794.640
 26 dB Bandwidth [MHz]: 19.370



16:15:27 08.10.2019

26 dB Bandwidth

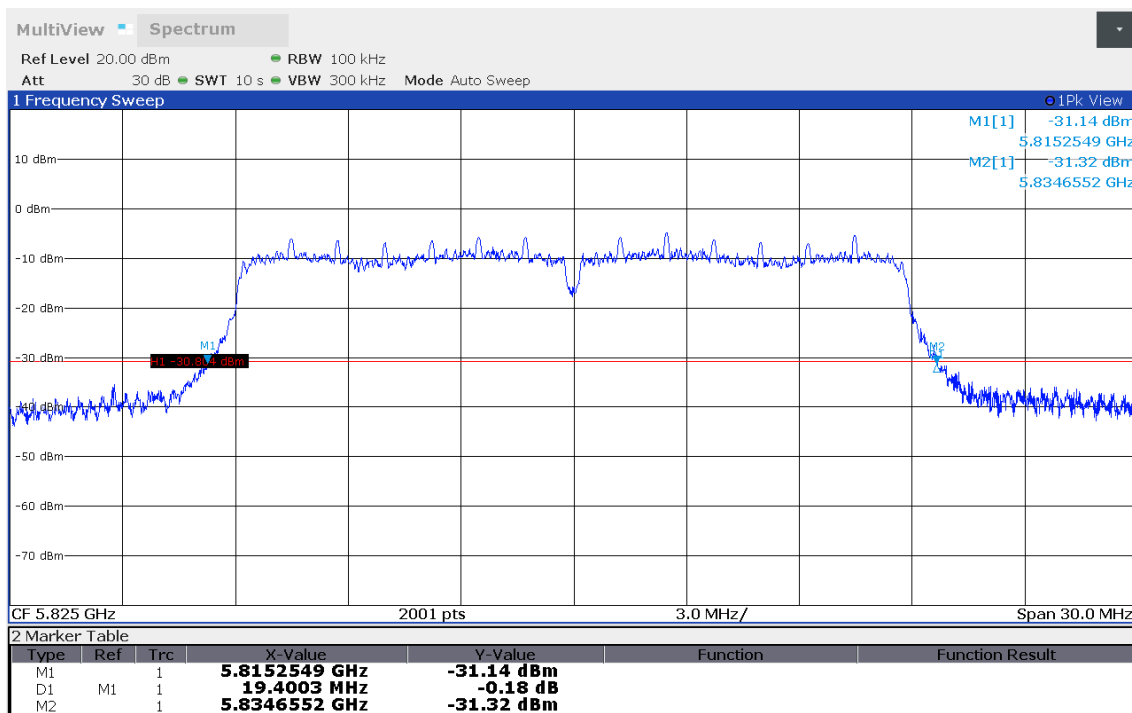
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 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
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 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11n (HT20), Channel: 157, 5785 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: W
 Lower Frequency [MHz]: 5775.255
 Upper Frequency [MHz]: 5796.199
 26 dB Bandwidth [MHz]: 20.945



15:48:18 08.10.2019

26 dB Bandwidth

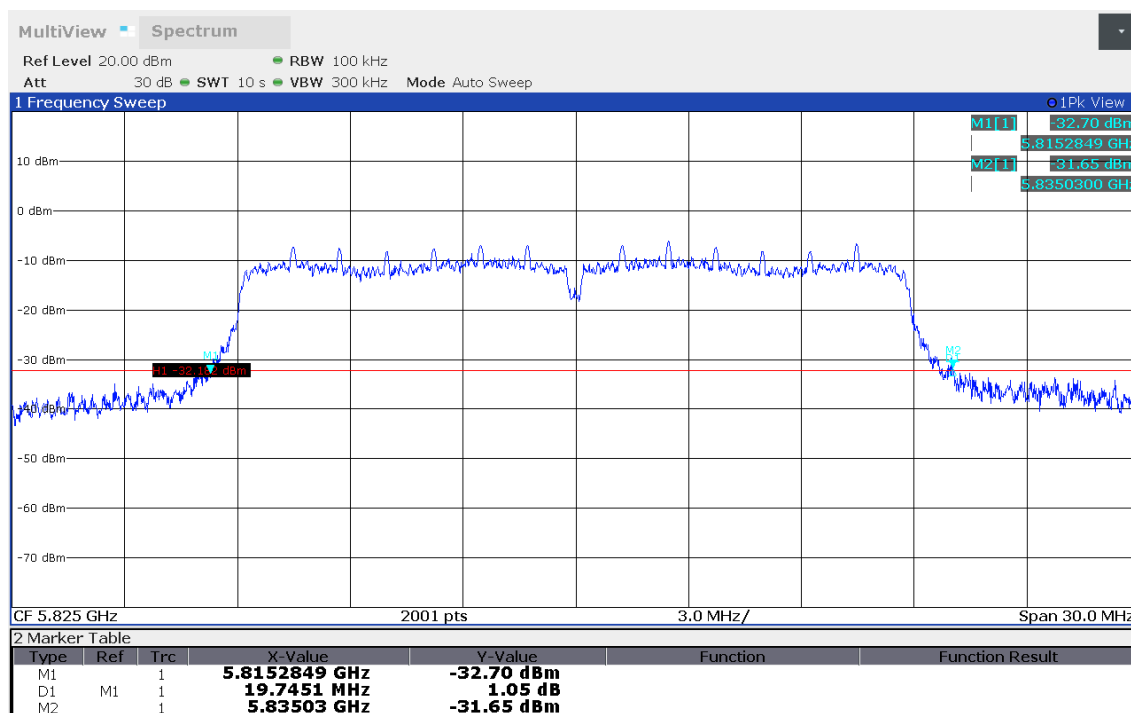
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 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11n (HT20), Channel: 165, 5825 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: B
 Lower Frequency [MHz]: 5815.255
 Upper Frequency [MHz]: 5834.655
 26 dB Bandwidth [MHz]: 19.400



16:17:17 08.10.2019

26 dB Bandwidth

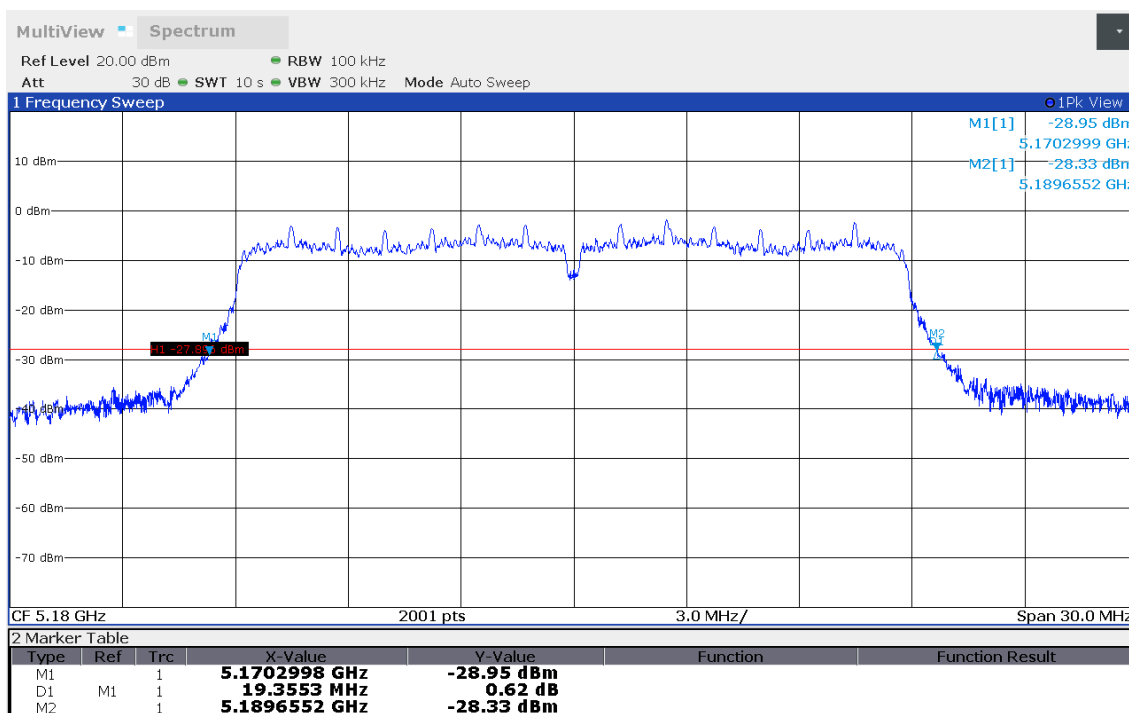
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 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11n (HT20), Channel: 165, 5825 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: W
 Lower Frequency [MHz]: 5815.285
 Upper Frequency [MHz]: 5835.030
 26 dB Bandwidth [MHz]: 19.745



15:49:27 08.10.2019

26 dB Bandwidth

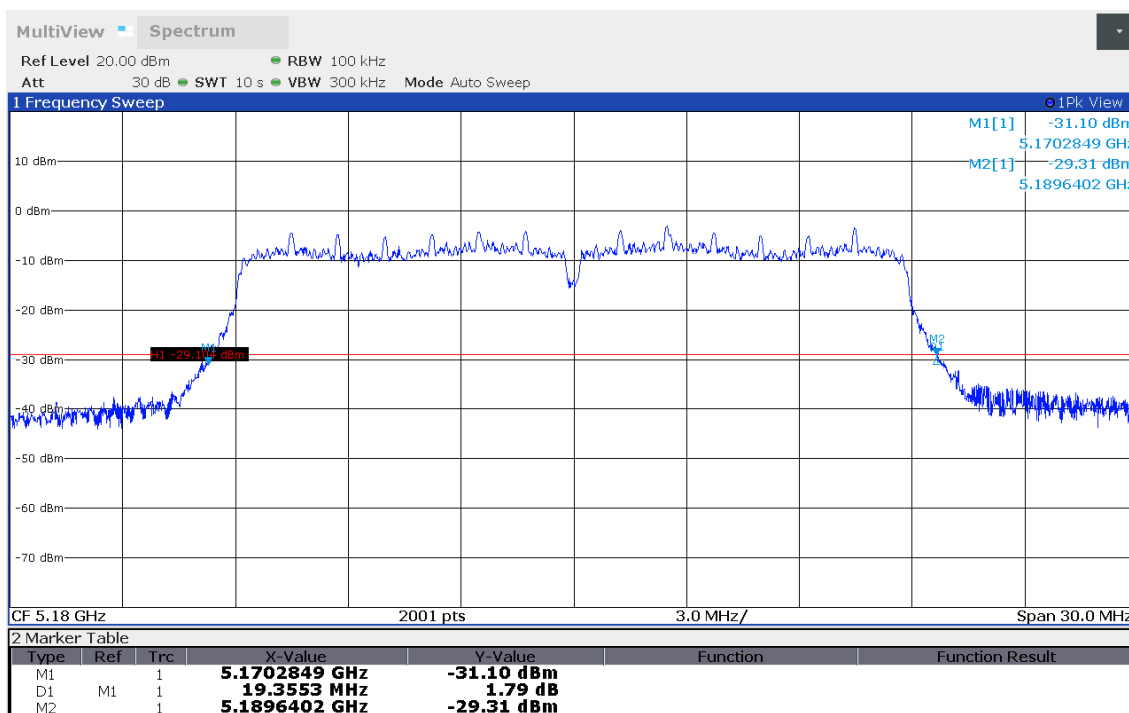
Project Number: G0M-1905-8256
 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11ac (VHT20), Channel: 36, 5180 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: B
 Lower Frequency [MHz]: 5170.300
 Upper Frequency [MHz]: 5189.655
 26 dB Bandwidth [MHz]: 19.355



14:03:02 08.10.2019

26 dB Bandwidth

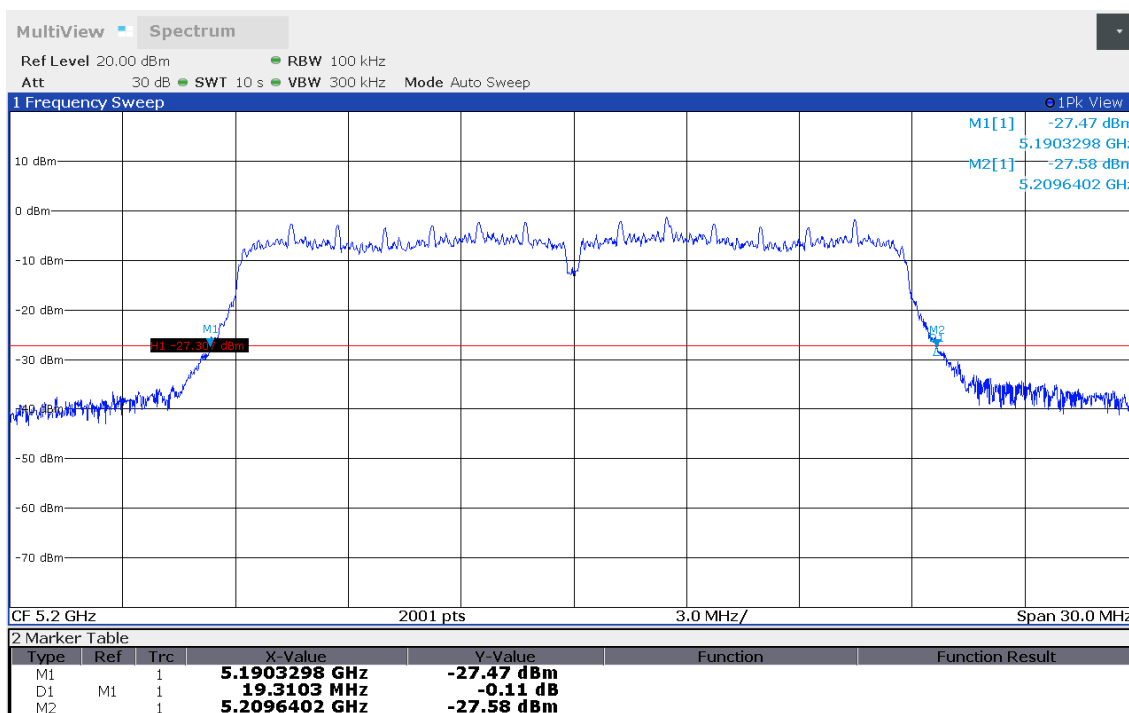
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 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11ac (VHT20), Channel: 36, 5180 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: W
 Lower Frequency [MHz]: 5170.285
 Upper Frequency [MHz]: 5189.640
 26 dB Bandwidth [MHz]: 19.355



14:14:56 08.10.2019

26 dB Bandwidth

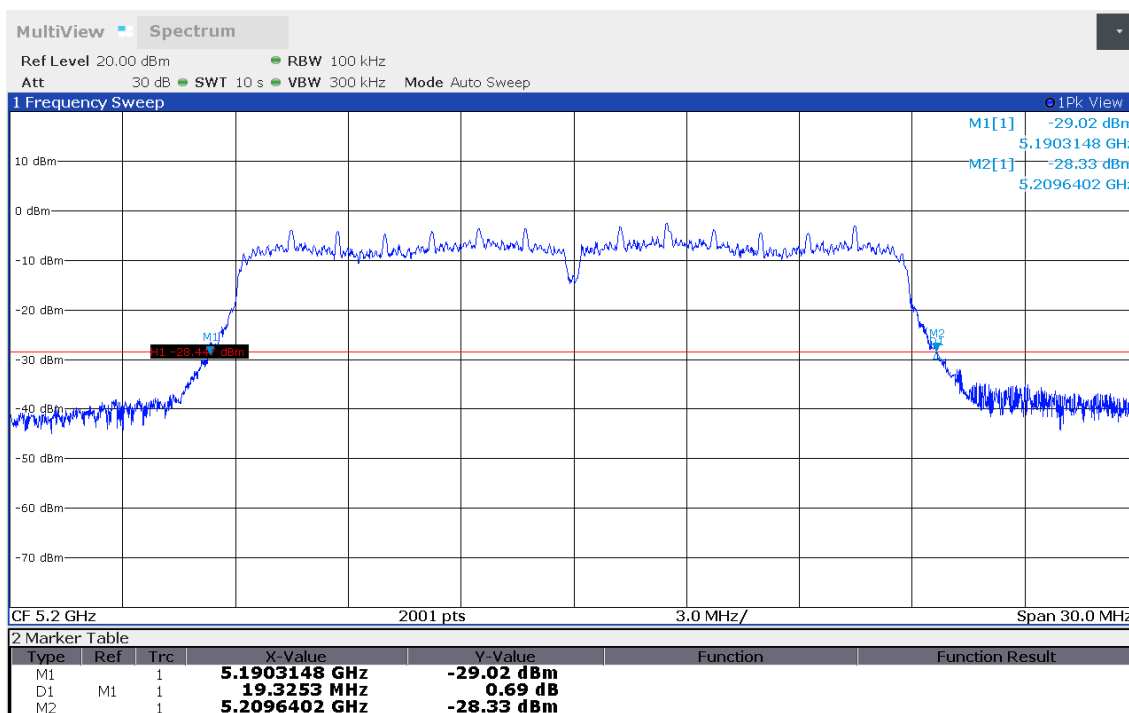
Project Number: G0M-1905-8256
 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11ac (VHT20), Channel: 40, 5200 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: B
 Lower Frequency [MHz]: 5190.330
 Upper Frequency [MHz]: 5209.640
 26 dB Bandwidth [MHz]: 19.310



14:04:18 08.10.2019

26 dB Bandwidth

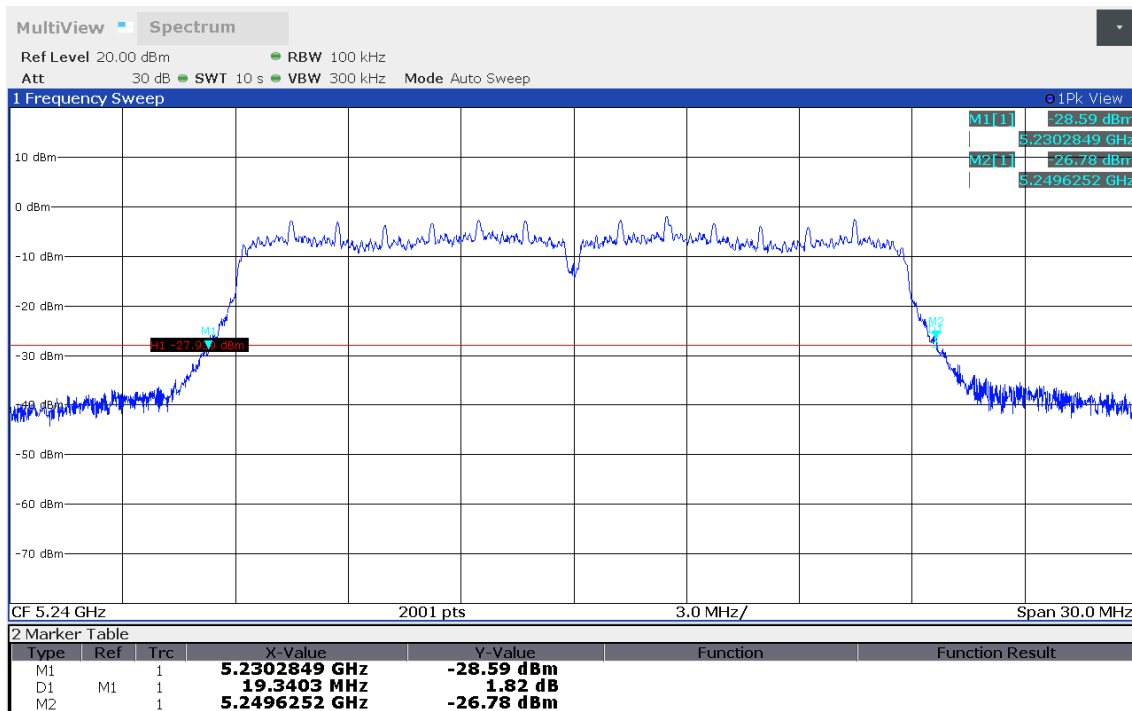
Project Number: G0M-1905-8256
 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11ac (VHT20), Channel: 40, 5200 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: W
 Lower Frequency [MHz]: 5190.315
 Upper Frequency [MHz]: 5209.640
 26 dB Bandwidth [MHz]: 19.325



14:16:02 08.10.2019

26 dB Bandwidth

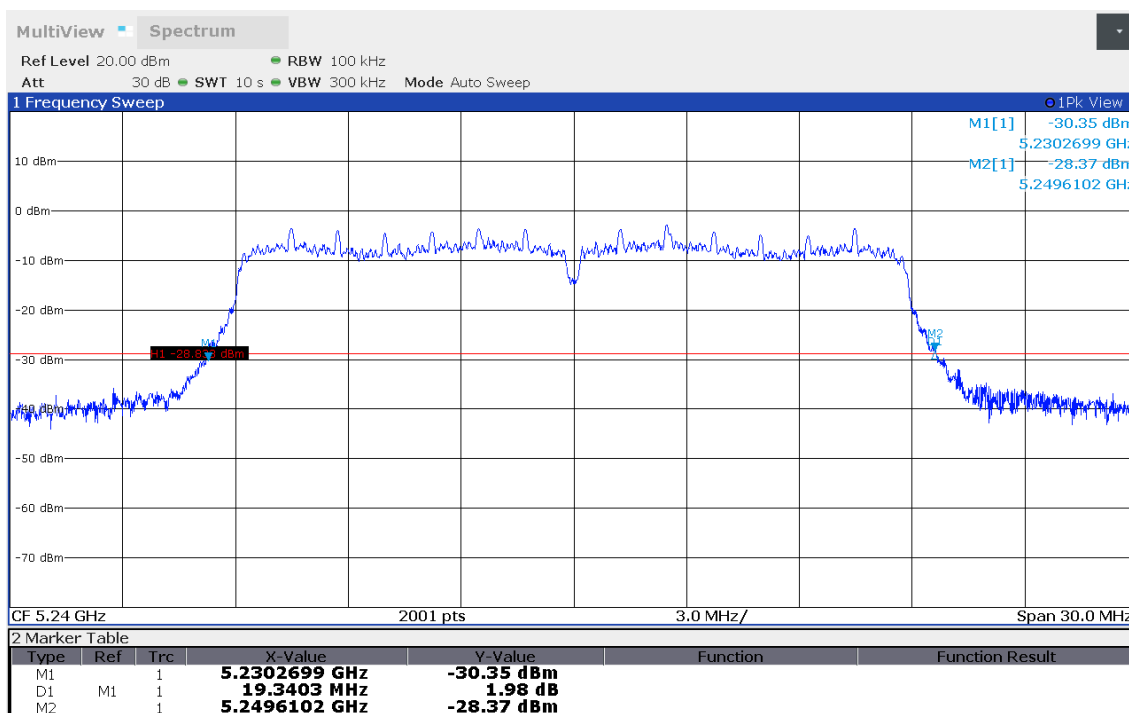
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 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11ac (VHT20), Channel: 48, 5240 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: B
 Lower Frequency [MHz]: 5230.285
 Upper Frequency [MHz]: 5249.625
 26 dB Bandwidth [MHz]: 19.340



14:05:23 08.10.2019

26 dB Bandwidth

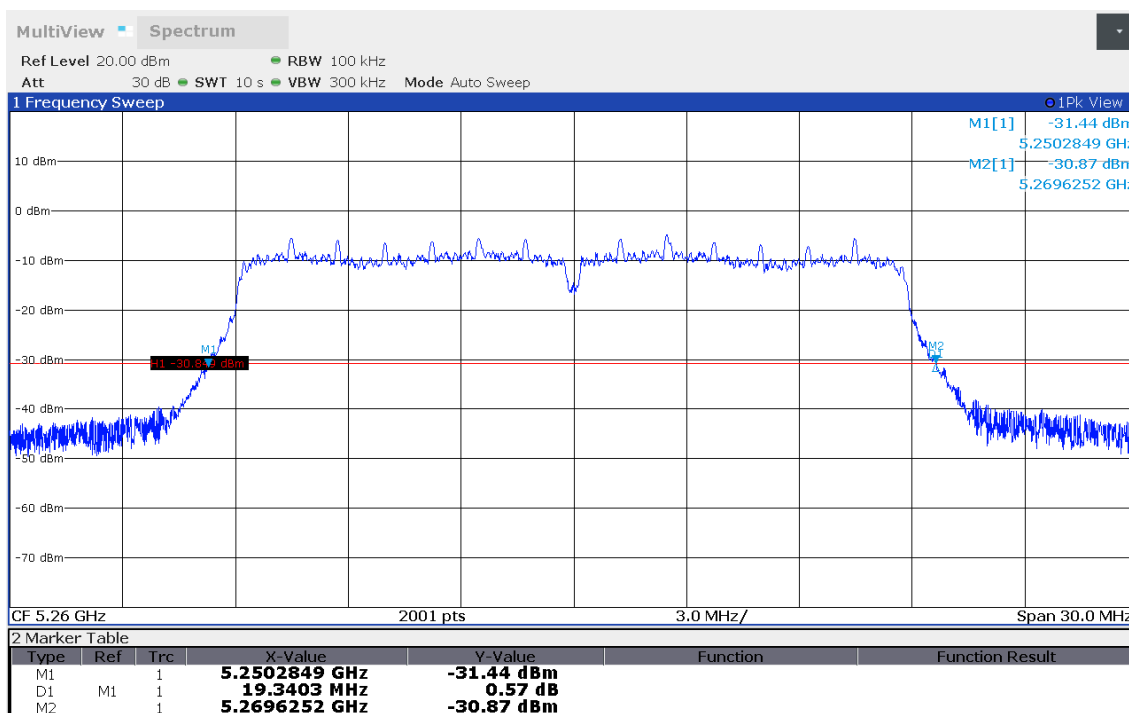
Project Number: G0M-1905-8256
 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11ac (VHT20), Channel: 48, 5240 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: W
 Lower Frequency [MHz]: 5230.270
 Upper Frequency [MHz]: 5249.610
 26 dB Bandwidth [MHz]: 19.340



14:17:05 08.10.2019

26 dB Bandwidth

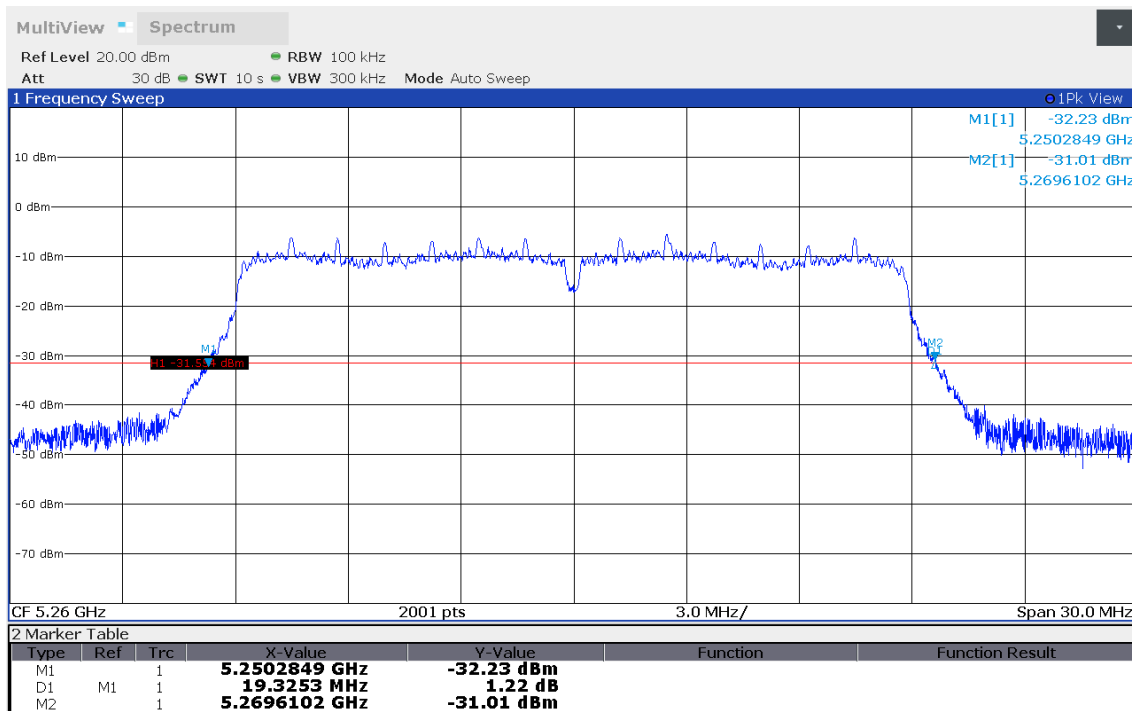
Project Number: G0M-1905-8256
 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11ac (VHT20), Channel: 52, 5260 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: B
 Lower Frequency [MHz]: 5250.285
 Upper Frequency [MHz]: 5269.625
 26 dB Bandwidth [MHz]: 19.340



14:43:05 08.10.2019

26 dB Bandwidth

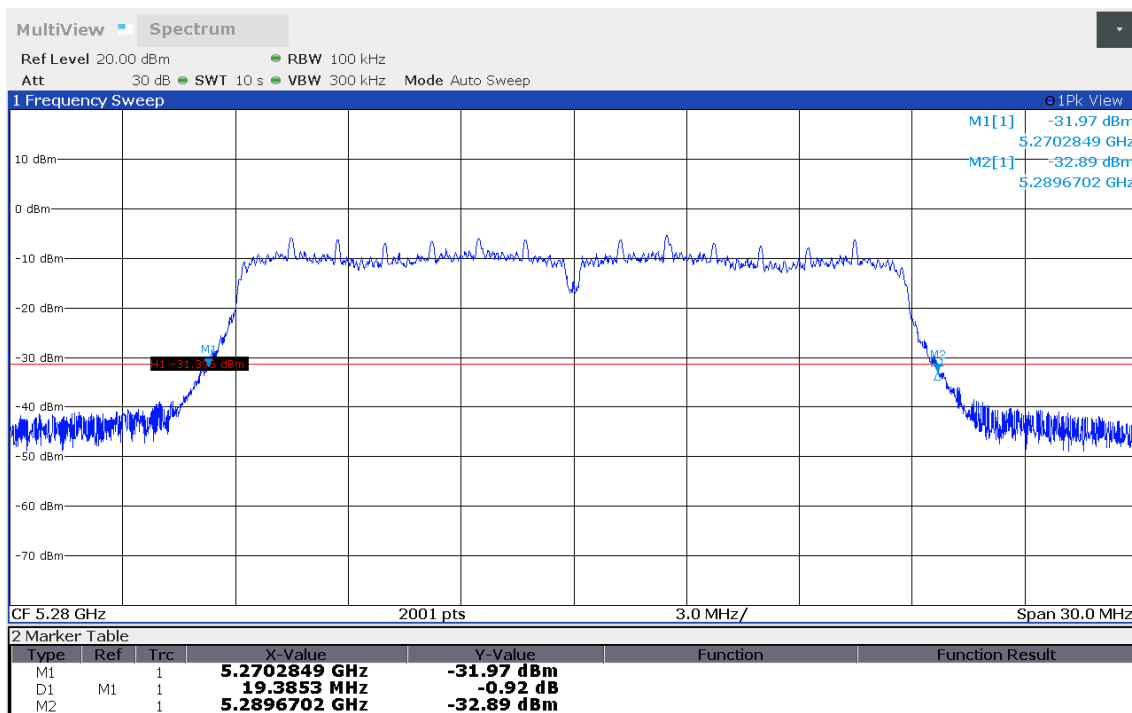
Project Number: G0M-1905-8256
 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-
 devices and ICMS
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11ac (VHT20), Channel: 52, 5260 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: W
 Lower Frequency [MHz]: 5250.285
 Upper Frequency [MHz]: 5269.610
 26 dB Bandwidth [MHz]: 19.325



14:30:59 08.10.2019

26 dB Bandwidth

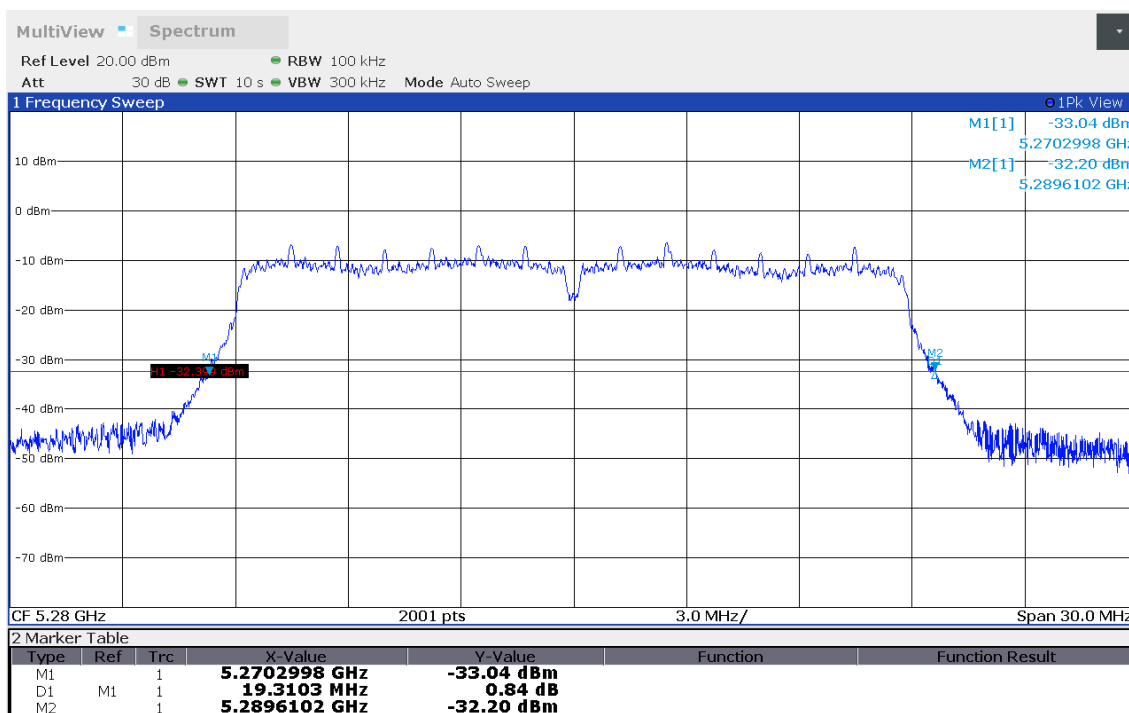
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 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11ac (VHT20), Channel: 56, 5280 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: B
 Lower Frequency [MHz]: 5270.285
 Upper Frequency [MHz]: 5289.670
 26 dB Bandwidth [MHz]: 19.385



14:44:07 08.10.2019

26 dB Bandwidth

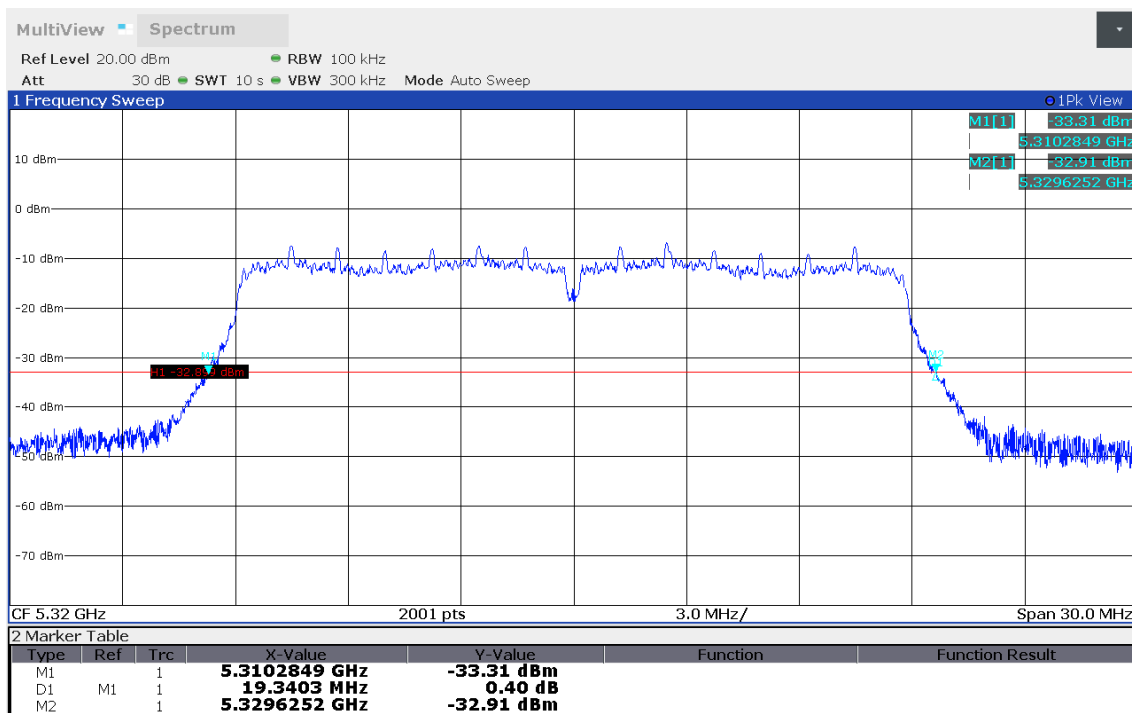
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 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11ac (VHT20), Channel: 56, 5280 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: W
 Lower Frequency [MHz]: 5270.300
 Upper Frequency [MHz]: 5289.610
 26 dB Bandwidth [MHz]: 19.310



14:32:04 08.10.2019

26 dB Bandwidth

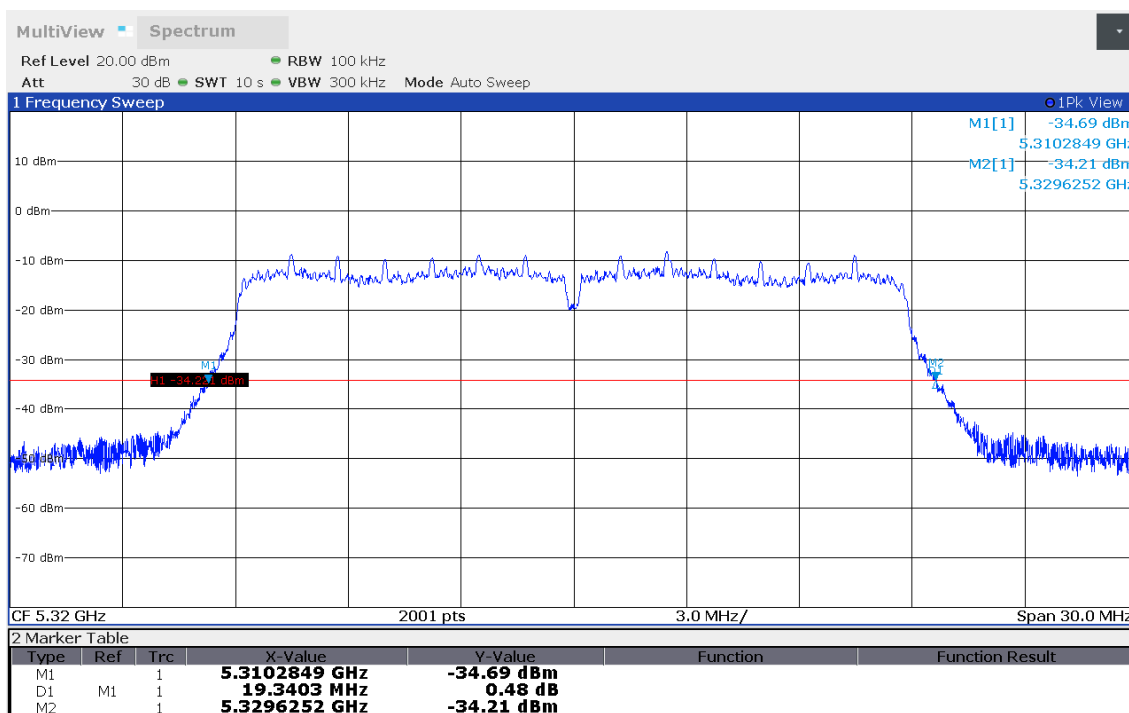
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 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11ac (VHT20), Channel: 64, 5320 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: B
 Lower Frequency [MHz]: 5310.285
 Upper Frequency [MHz]: 5329.625
 26 dB Bandwidth [MHz]: 19.340



14:45:09 08.10.2019

26 dB Bandwidth

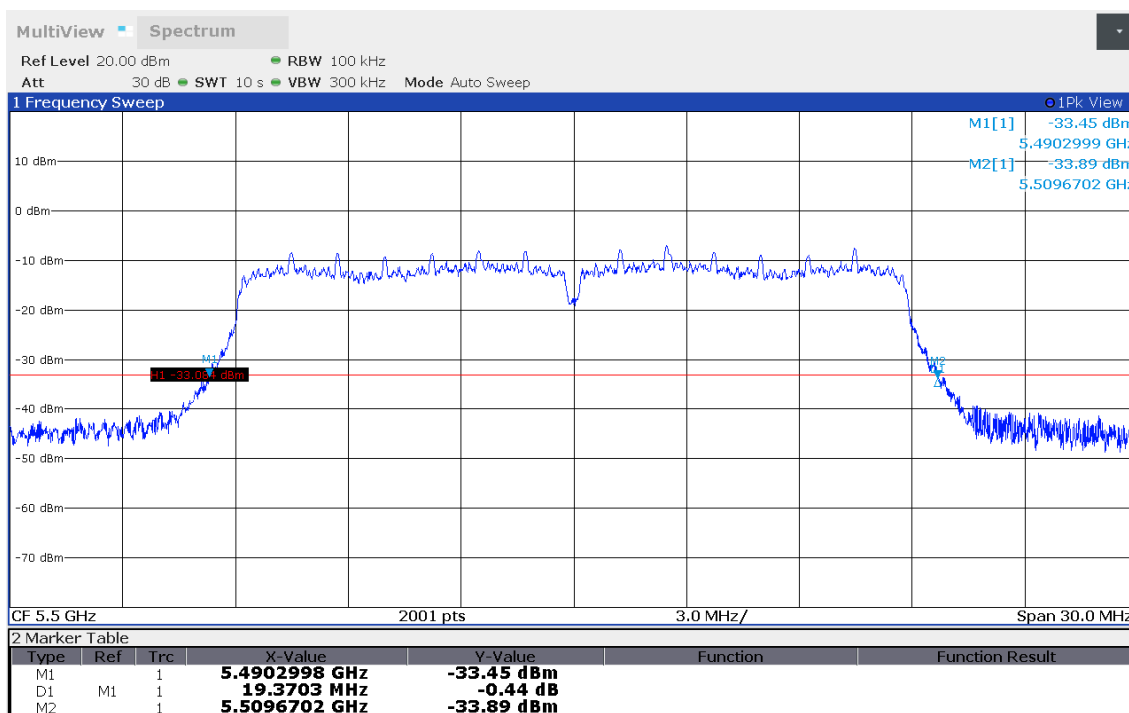
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 Applicant: BIOTRONIK SE & Co. KG
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 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11ac (VHT20), Channel: 64, 5320 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: W
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 Upper Frequency [MHz]: 5329.625
 26 dB Bandwidth [MHz]: 19.340



14:33:15 08.10.2019

26 dB Bandwidth

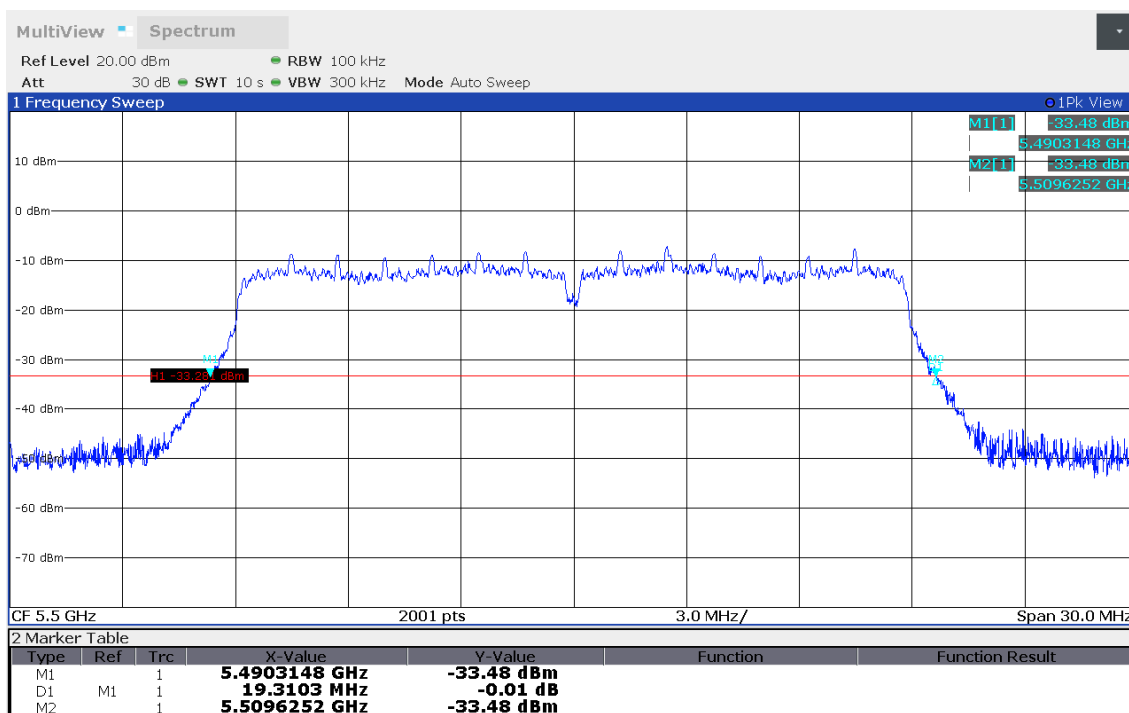
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 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11ac (VHT20), Channel: 100, 5500 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: B
 Lower Frequency [MHz]: 5490.300
 Upper Frequency [MHz]: 5509.670
 26 dB Bandwidth [MHz]: 19.370



15:11:38 08.10.2019

26 dB Bandwidth

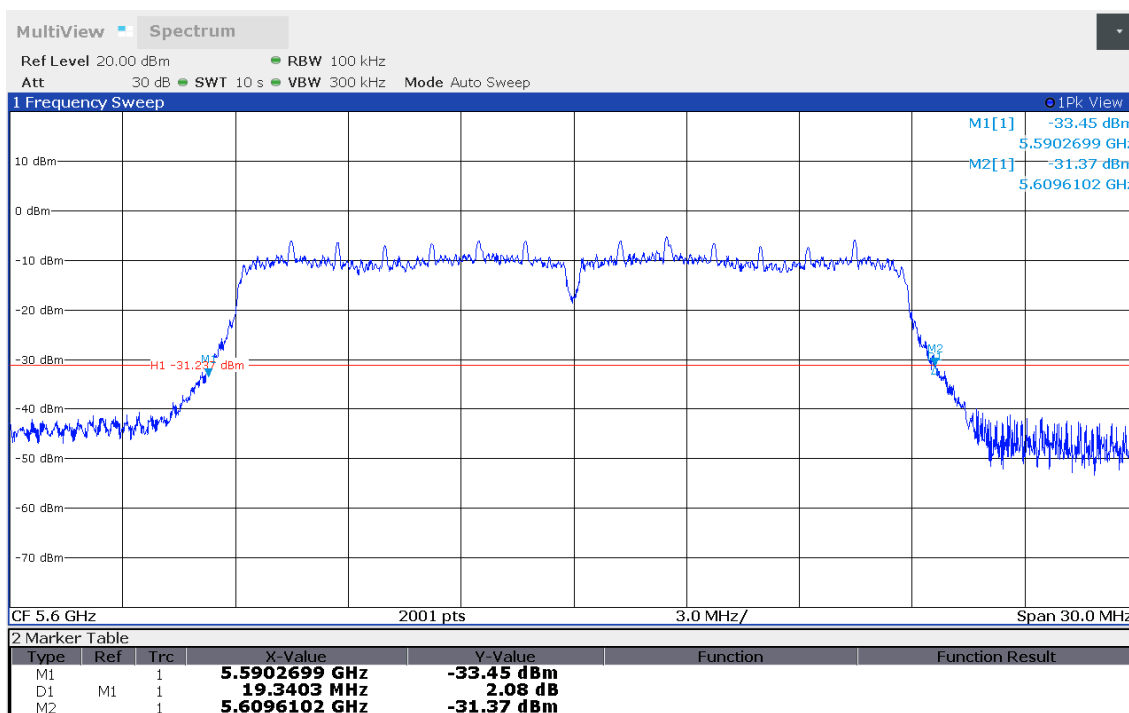
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 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11ac (VHT20), Channel: 100, 5500 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: W
 Lower Frequency [MHz]: 5490.315
 Upper Frequency [MHz]: 5509.625
 26 dB Bandwidth [MHz]: 19.310



15:38:34 08.10.2019

26 dB Bandwidth

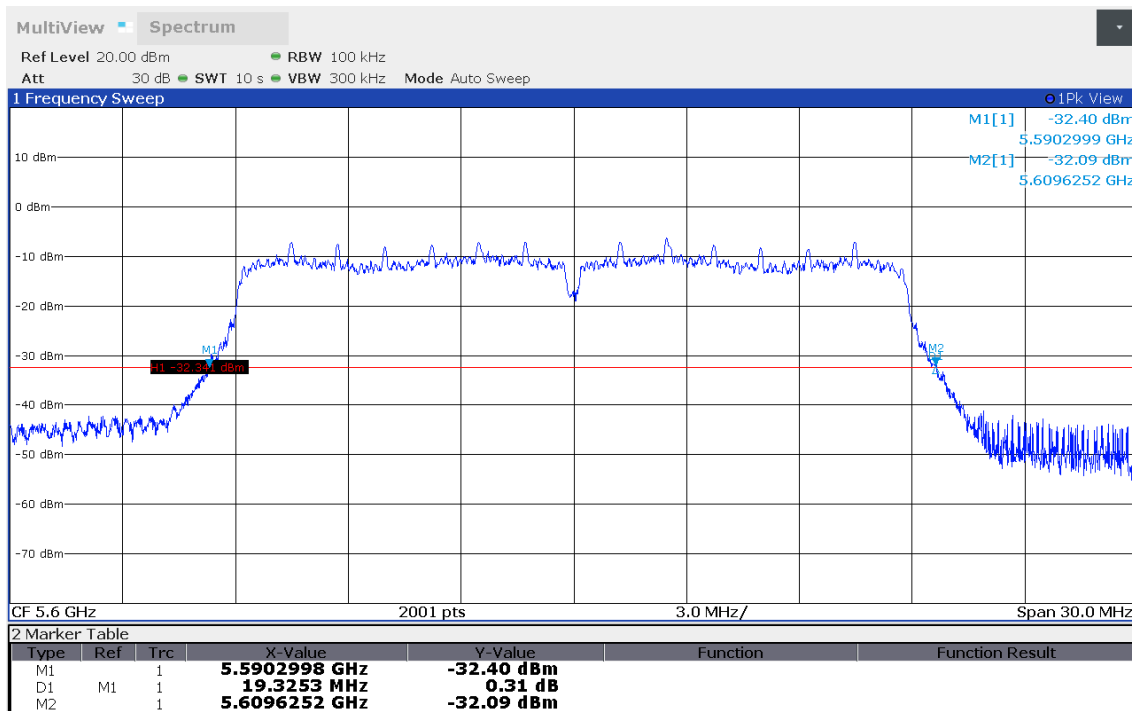
Project Number: G0M-1905-8256
 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11ac (VHT20), Channel: 120, 5600 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: B
 Lower Frequency [MHz]: 5590.270
 Upper Frequency [MHz]: 5609.610
 26 dB Bandwidth [MHz]: 19.340



15:14:17 08.10.2019

26 dB Bandwidth

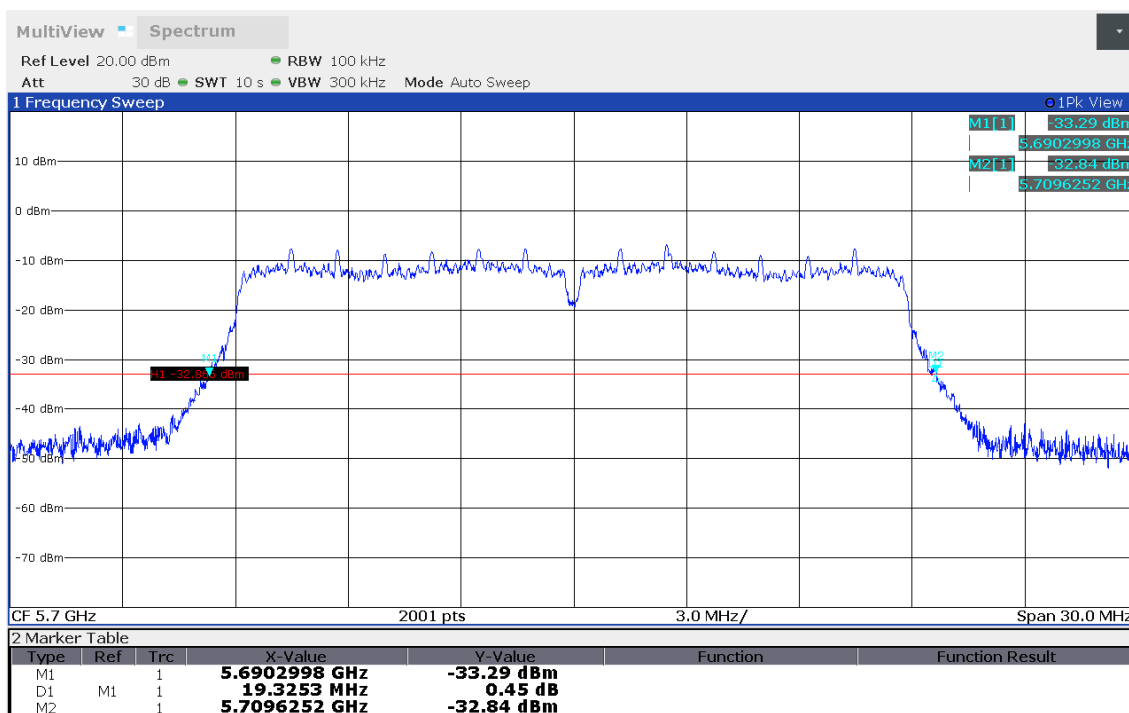
Project Number: G0M-1905-8256
 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11ac (VHT20), Channel: 120, 5600 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: W
 Lower Frequency [MHz]: 5590.300
 Upper Frequency [MHz]: 5609.625
 26 dB Bandwidth [MHz]: 19.325



15:40:32 08.10.2019

26 dB Bandwidth

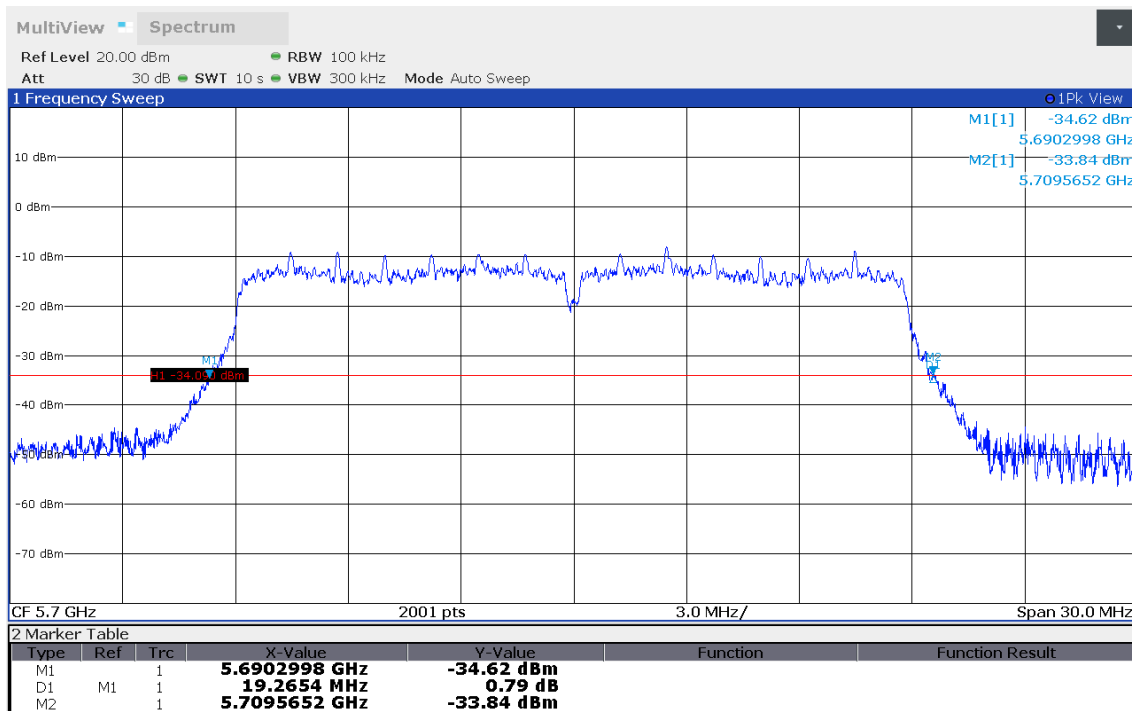
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 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11ac (VHT20), Channel: 140, 5700 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: B
 Lower Frequency [MHz]: 5690.300
 Upper Frequency [MHz]: 5709.625
 26 dB Bandwidth [MHz]: 19.325



15:16:21 08.10.2019

26 dB Bandwidth

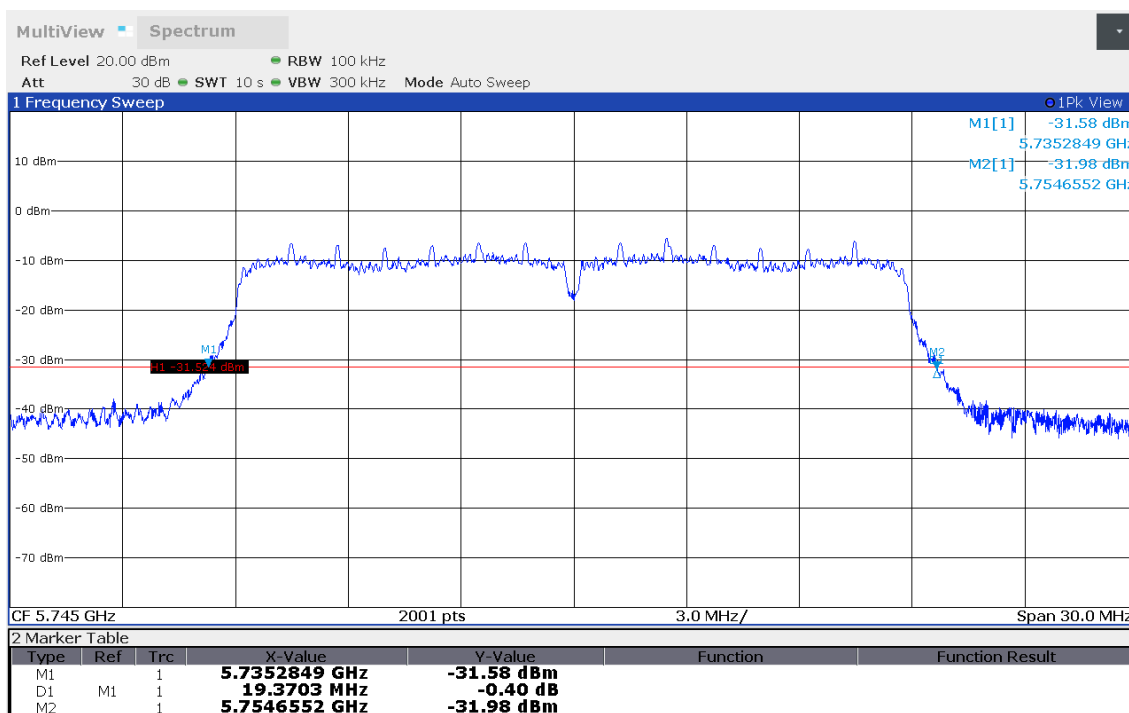
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 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11ac (VHT20), Channel: 140, 5700 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: W
 Lower Frequency [MHz]: 5690.300
 Upper Frequency [MHz]: 5709.565
 26 dB Bandwidth [MHz]: 19.265



15:42:24 08.10.2019

26 dB Bandwidth

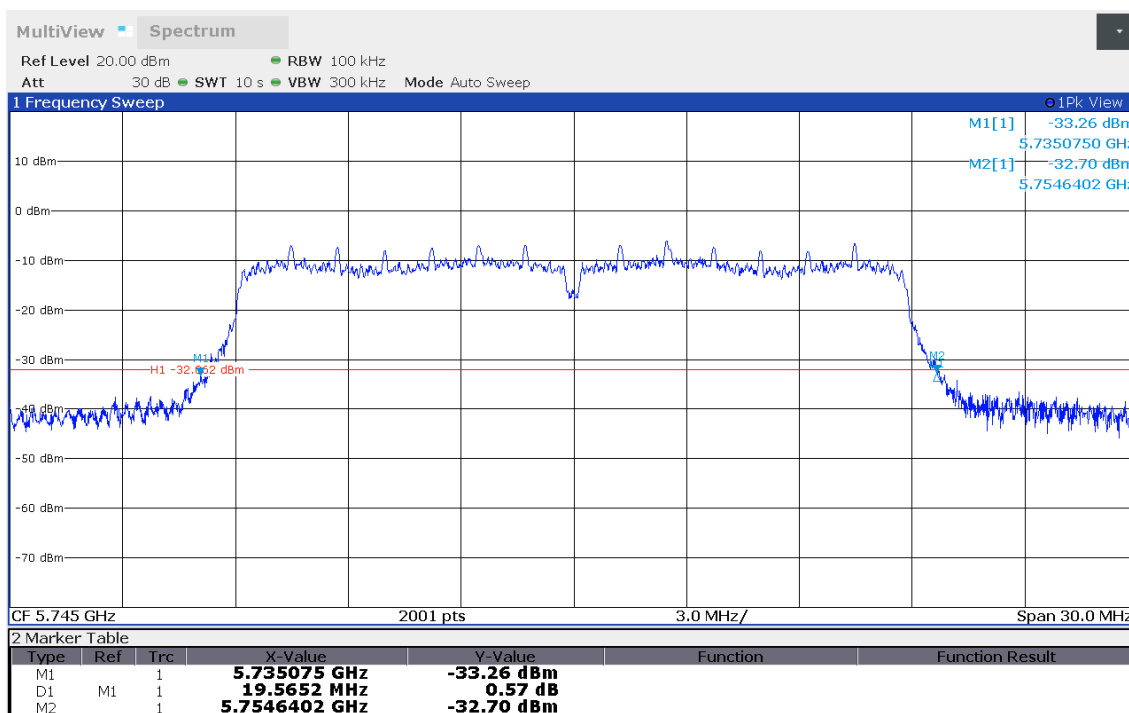
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 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11ac (VHT20), Channel: 149, 5745 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: B
 Lower Frequency [MHz]: 5735.285
 Upper Frequency [MHz]: 5754.655
 26 dB Bandwidth [MHz]: 19.370



16:18:47 08.10.2019

26 dB Bandwidth

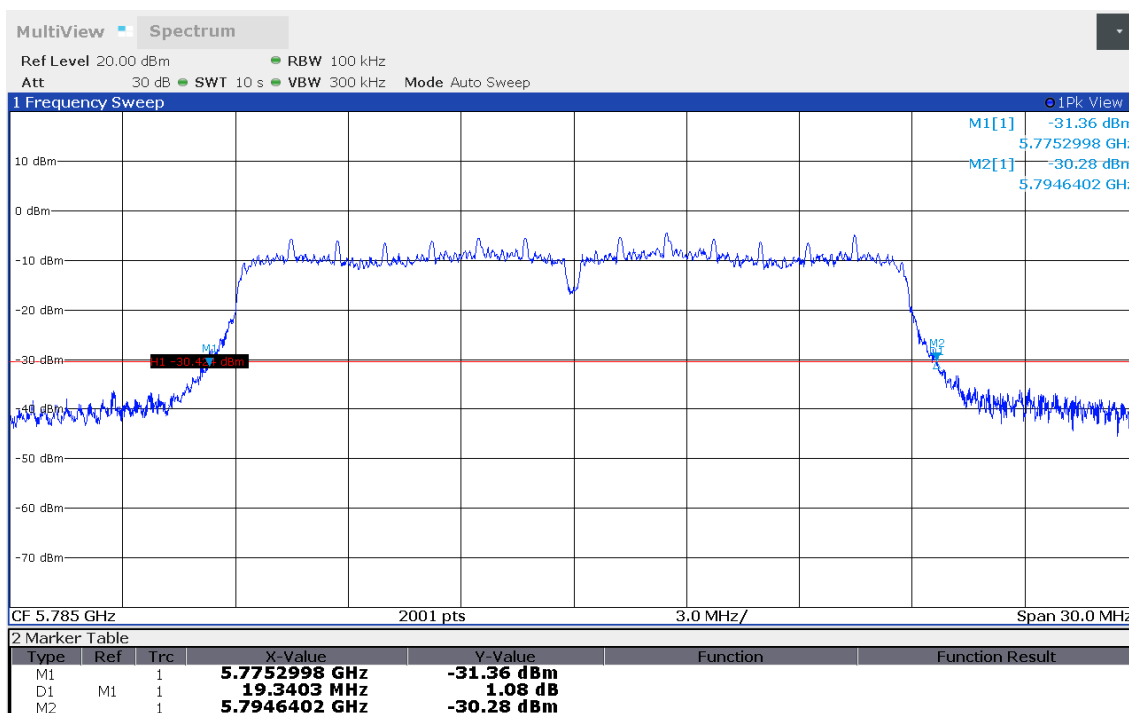
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 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11ac (VHT20), Channel: 149, 5745 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: W
 Lower Frequency [MHz]: 5735.075
 Upper Frequency [MHz]: 5754.640
 26 dB Bandwidth [MHz]: 19.565



15:50:27 08.10.2019

26 dB Bandwidth

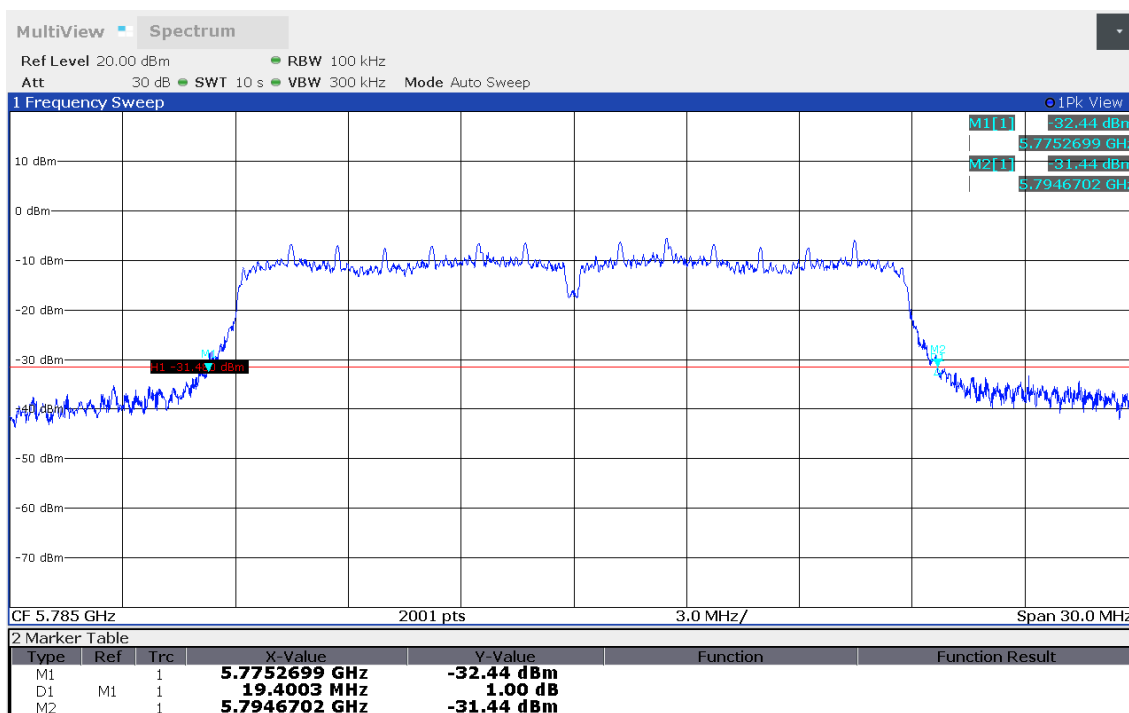
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 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11ac (VHT20), Channel: 157, 5785 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: B
 Lower Frequency [MHz]: 5775.300
 Upper Frequency [MHz]: 5794.640
 26 dB Bandwidth [MHz]: 19.340



16:21:09 08.10.2019

26 dB Bandwidth

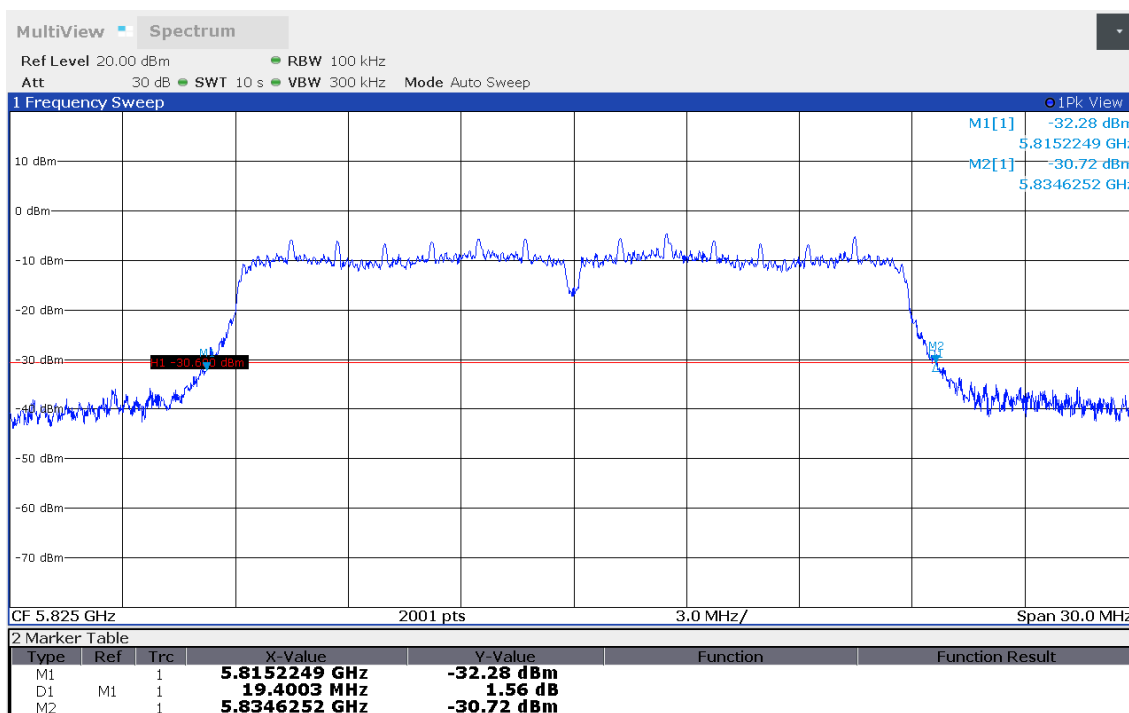
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 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11ac (VHT20), Channel: 157, 5785 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: W
 Lower Frequency [MHz]: 5775.270
 Upper Frequency [MHz]: 5794.670
 26 dB Bandwidth [MHz]: 19.400



15:51:33 08.10.2019

26 dB Bandwidth

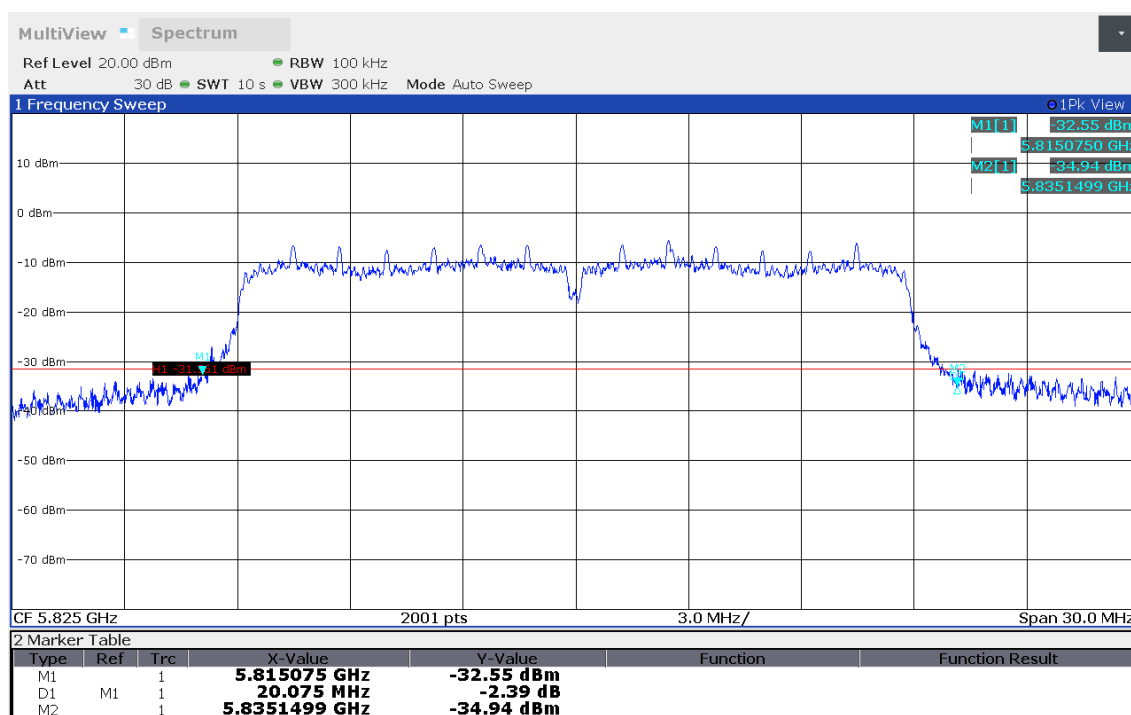
Project Number: G0M-1905-8256
 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11ac (VHT20), Channel: 165, 5825 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: B
 Lower Frequency [MHz]: 5815.225
 Upper Frequency [MHz]: 5834.625
 26 dB Bandwidth [MHz]: 19.400



16:23:23 08.10.2019

26 dB Bandwidth

Project Number: G0M-1905-8256
 Applicant: BIOTRONIK SE & Co. KG
 Model Description: programming device for BIOTRONIK pacemakers, ICDs, CRT-devices and ICMs
 Model: Renamic Neo
 Test Sample ID: 24936
 Reference Standards: FCC 15.407, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.11ac (VHT20), Channel: 165, 5825 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Christian Weber
 Test Site: Eurofins Product Service GmbH
 Test Date: 2019-10-08
 Antenna Port: W
 Lower Frequency [MHz]: 5815.075
 Upper Frequency [MHz]: 5835.150
 26 dB Bandwidth [MHz]: 20.075



15:52:28 08.10.2019

3.3 Test Conditions and Results - Maximum output power

3.3.1 Information

Test Information	
Reference	FCC 15.407(a)
Measurement Method	KDB 789033 E
Operator	Christian Weber
Date	2019-10-09

3.3.2 Limits

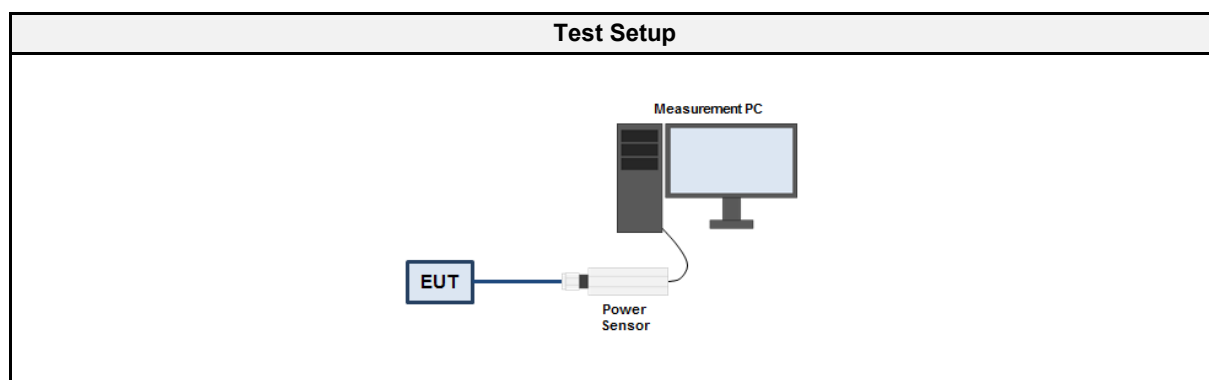
Limits			
Frequency band	Condition	Power limit	Maximum antenna gain ¹
5150 - 5250 MHz	Access point, indoor	1 W/30 dBm	6 dBi
5150 - 5250 MHz	Access point, outdoor	1 W/30 dBm	6 dBi
5150 - 5250 MHz	Access point, fixed point to point	1 W/30 dBm	23 dBi
5150 - 5250 MHz	Client	250 mW/24 dBm	6 dBi
5250 - 5350 MHz	-	Minimum of 250 mW/24 dBm or 11 dBm + 10*Log ₁₀ (BW ³)	6 dBi
5470 - 5725 MHz	-	Minimum of 250 mW/24 dBm or 11 dBm + 10*Log ₁₀ (BW ³)	6 dBi
5725 - 5850 MHz	-	1 W/30 dBm ²	6 dBi

Note 1: The maximum output power must be reduced by the amount in dB that the gain exceeds the maximum allowed gain

Note 2: Fixed point to point applications are excluded from power reduction according to Note 1

Note 3: BW is the 26 dB bandwidth in MHz

3.3.3 Setup



3.3.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Power sensor	ETS-Lindgren	7002-006	EF00934	2019-08	2020-08
Power sensor	ETS-Lindgren	7002-006	EF00935	2019-03	2020-03

3.3.5 Procedure

Test Procedure							
- One wide band power sensor is connected to each antenna port of the EUT - EUT transmitter is activated in test mode under normal conditions - The output power is measured simultaneously at all antenna ports - The maximum power level is determined							

3.3.6 Results

Test Results - 5150 - 5250 MHz – SS1							
Mode	Channel	Frequency [MHz]	Nominal BW [MHz]	Power Port W [dBm]	Power Port B [dBm]	Limit [dBm]	Verdict
OFDM	36	5180	20	9.9	10.7	23	PASS
OFDM	40	5200	20	10.2	10.8	23	PASS
OFDM	48	5240	20	9.6	10.5	23	PASS
HT20	36	5180	20	10.6	11.7	23	PASS
HT20	40	5200	20	10.9	11.9	23	PASS
HT20	48	5240	20	10.4	11.7	23	PASS
VHT20	36	5180	20	10.9	11.8	23	PASS
VHT20	40	5200	20	11.2	12.1	23	PASS
VHT20	48	5240	20	10.3	11.8	23	PASS

Test Results - 5150 - 5250 MHz – SS2						
Mode	Channel	Freq. [MHz]	Nominal BW [MHz]	Total Power Ports W+B [dBm]	Limit [dBm]	Verdict
HT20	36	5180	20	14.3	23	PASS
HT20	40	5200	20	14.5	23	PASS
HT20	48	5240	20	13.9	23	PASS
VHT20	36	5180	20	14.3	23	PASS
VHT20	40	5200	20	14.6	23	PASS
VHT20	48	5240	20	13.9	23	PASS

Test Results - 5250 - 5350 MHz – SS1							
Mode	Channel	Frequency [MHz]	Nominal BW [MHz]	Power Port W [dBm]	Power Port B [dBm]	Limit ¹ [dBm]	Verdict
OFDM	52	5260	20	7.4	8.8	22.8	PASS
OFDM	56	5280	20	6.9	8.0	22.8	PASS
OFDM	64	5320	20	5.1	7.5	22.8	PASS
HT20	52	5260	20	7.6	8.6	22.9	PASS
HT20	56	5280	20	6.5	8.3	22.9	PASS
HT20	64	5320	20	4.9	6.9	22.9	PASS
VHT20	52	5260	20	7.5	8.5	22.9	PASS
VHT20	56	5280	20	6.3	8.1	22.9	PASS
VHT20	64	5320	20	5.2	7.1	22.9	PASS

Note 1:
Limit OFDM = $\text{Min}(24 \text{ dBm}, 11 + 10 \cdot \text{Log}_{10}(18.9)) = 23.8 \text{ dBm}$,
Limit HT20/VHT20 = $\text{Min}(24 \text{ dBm}, 11 + 10 \cdot \text{Log}_{10}(19.4)) = 23.9 \text{ dBm}$
Limits reduced by 1 dB due to antenna excess gain

Test Results - 5250 - 5350 MHz – SS2						
Mode	Channel	Freq. [MHz]	Nominal BW [MHz]	Total Power Ports W+B [dBm]	Limit [dBm]	Verdict
HT20	52	5260	20	11.2	22.9	PASS
HT20	56	5280	20	10.4	22.9	PASS
HT20	64	5320	20	9.1	22.9	PASS
VHT20	52	5260	20	11.1	22.9	PASS
VHT20	56	5280	20	10.3	22.9	PASS
VHT20	64	5320	20	9.2	22.9	PASS
Note 1: Limit HT20/VHT20 = $\text{Min}(24 \text{ dBm}, 11 + 10 \cdot \log_{10}(19.4)) = 23.9 \text{ dBm}$ Limits reduced by 1 dB due to antenna excess gain						

Test Results - 5470 - 5725 MHz – SS1							
Mode	Channel	Frequency [MHz]	Nominal BW [MHz]	Power Port W [dBm]	Power Port B [dBm]	Limit [dBm]	Verdict
OFDM	100	5500	20	5.6	5.7	22.8	PASS
OFDM	120	5600	20	6.1	6.3	22.8	PASS
OFDM	140	5700	20	3.6	5.6	22.8	PASS
HT20	100	5500	20	5.4	5.6	22.9	PASS
HT20	120	5600	20	5.8	6.3	22.9	PASS
HT20	140	5700	20	3.7	5.5	22.9	PASS
VHT20	100	5500	20	5.7	5.4	22.9	PASS
VHT20	120	5600	20	5.6	6.5	22.9	PASS
VHT20	140	5700	20	3.5	5.8	22.9	PASS
Note 1: Limit OFDM = $\text{Min}(24 \text{ dBm}, 11 + 10 \cdot \log_{10}(18.9)) = 23.8 \text{ dBm}$, Limit HT20/VHT20 = $\text{Min}(24 \text{ dBm}, 11 + 10 \cdot \log_{10}(19.4)) = 23.9 \text{ dBm}$ Limits reduced by 1 dB due to antenna excess gain							

Test Results - 5470 - 5725 MHz – SS2						
Mode	Channel	Freq. [MHz]	Nominal BW [MHz]	Total Power Ports W+B [dBm]	Limit [dBm]	Verdict
HT20	100	5500	20	8.4	22.9	PASS
HT20	120	5600	20	9.2	22.9	PASS
HT20	140	5700	20	7.8	22.9	PASS
VHT20	100	5500	20	8.4	22.9	PASS
VHT20	120	5600	20	9.3	22.9	PASS
VHT20	140	5700	20	8.0	22.9	PASS
Note 1: Limit HT20/VHT20 = $\text{Min}(24 \text{ dBm}, 11 + 10 \cdot \log_{10}(19.4)) = 23.9 \text{ dBm}$ Limits reduced by 1 dB due to antenna excess gain						

Test Results - 5725 - 5850 MHz – SS1							
Mode	Channel	Frequency [MHz]	Nominal BW [MHz]	Power Port W [dBm]	Power Port B [dBm]	Limit [dBm]	Verdict
OFDM	149	5745	20	6.4	7.7	29	PASS
OFDM	157	5785	20	6.4	8.3	29	PASS
OFDM	165	5825	20	6.0	7.5	29	PASS
HT20	149	5745	20	6.1	7.9	29	PASS
HT20	157	5785	20	6.1	8.0	29	PASS
HT20	165	5825	20	6.2	7.5	29	PASS
VHT20	149	5745	20	6.0	7.6	29	PASS
VHT20	157	5785	20	6.1	8.1	29	PASS
VHT20	165	5825	20	5.8	7.7	29	PASS
Note 1: Limits reduced by 1 dB due to antenna excess gain							

Test Results - 5725 - 5850 MHz – SS2						
Mode	Channel	Freq. [MHz]	Nominal BW [MHz]	Total Power Ports W+B [dBm]	Limit [dBm]	Verdict
HT20	149	5745	20	9.9	29	PASS
HT20	157	5785	20	10.4	29	PASS
HT20	165	5825	20	9.8	29	PASS
VHT20	149	5745	20	10.1	29	PASS
VHT20	157	5785	20	10.4	29	PASS
VHT20	165	5825	20	10.1	29	PASS
Note 1: Limits reduced by 1 dB due to antenna excess gain						