

Annex 1: Measurement diagrams to Test Report 19-1-0137401T01a-C01-A1a



Number of pages:	14	Date of Report:	2021-Mai-03
Testing company:	CETECOM GmbH Im Teelbruch 116 45219 Essen Germany Tel. + 49 (0) 20 54 / 95 19-0 Fax: + 49 (0) 20 54 / 95 19-150	Applicant:	Bosch Healthcare Solutions GmbH
Test Object / Tested Device(s):	Vivatmo pro (Handheld), System for quantitative measurement of fractional nitric oxide (FeNO) in human breath		
Listing FCC ID:	2AVQ9VMPPH1	ISED:	25928-VMPPH1
Testing has been carried out in accordance with:	Title 47 CFR, Chapter I FCC Regulations, Subchapter A §15.247 (DTS) ISED-Regulations RSS-Gen, Issue 5 RSS-210, Issue 10		

Table of contents

1	Radiated field strength measurements accord. §15.209&15.205	3
1.1	Magnetic field measurements $f < 30\text{MHz}$	3
1.2	Field strength measurements $30\text{MHz} < f < 1\text{GHz}$	7
1.3	Field strength measurements $1\text{GHz} < f < 18\text{GHz}$	11
1.4	Field strength measurements $18\text{GHz} < f < 26.5\text{GHz}$	12
2	Radiated band-edge measurements accord. §15.209 & §15.205 (§15.247)	13

1 Radiated field strength measurements accord. §15.209&15.205

1.1 Magnetic field measurements $f < 30\text{MHz}$

2.01_FCC_Mg_Feld_Ch_Low_Laying

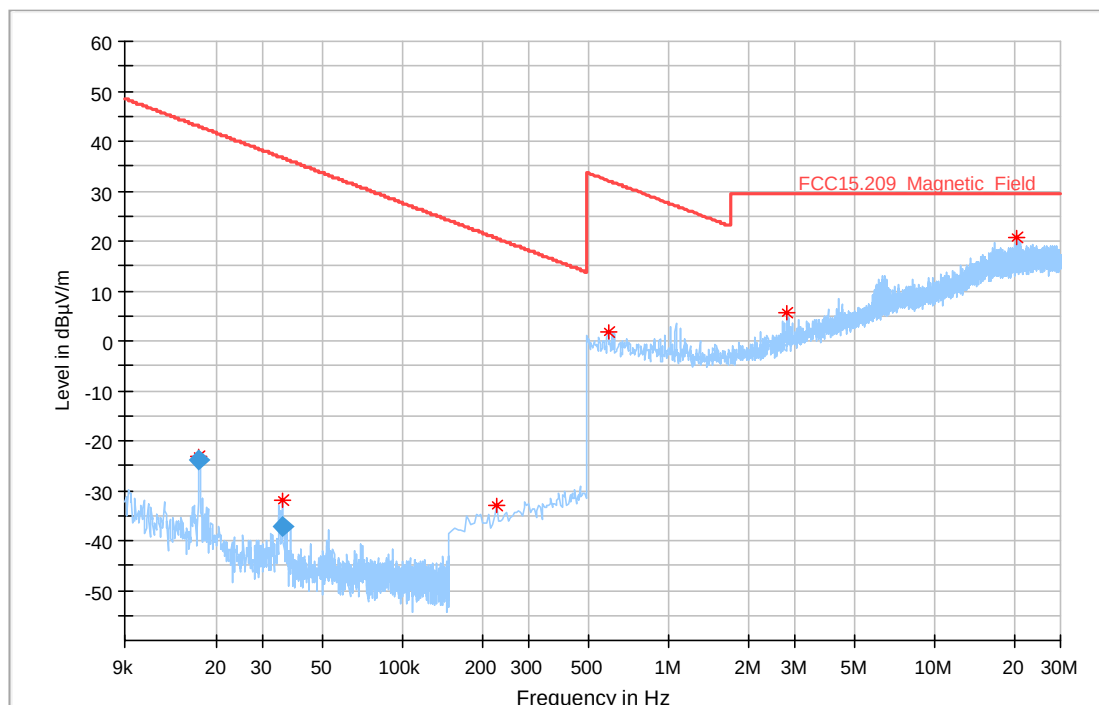
Common Information

Test Description:	Magnetic Field Strength Measurement related to 30/300 m distance
Test Site Location:	Ref.-Nr. 441 Semi Anechoic Room (SAR) with 3 m measurement distance
Version of Testsoftware:	EMC32 V9.25.0
Distance correction:	used accord. table, pls. see test report
Technical Data:	Please see page 2 for detailed data of measurement setup
Rec. antenna (pre-scan):	height 1.00 m, parallel and 90° to EUT polarisation
Used Filter:	bypass
Test Standard:	FCC 15.205 § 15.209; RSS-Gen: Issue 5
Operator:	MKh
Operating Mode:	Bluetooth LE , Ch Low , 2402 MHz
Environmental Conditions:	Humidity : 56%rH; Temperature: 23°C
EUT Setup:	Laying
Verdict:	Passed

EUT Information

PMT number:	19-1-01374S10
Manufacturer:	Bosch Healthcare Solutions GmbH
Product:	Vivatmo pro (Handheld)
Model:	System for quantitative measurement of fractional nitric oxide (FeNO) in human
HW version:	F09G100078
SW version:	Prod_Test.hex Version 3.0.10.1
Serial number:	BLE-DUT20
Power Supply:	3.7 V DC

Full Spectrum



Final_Result

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Pol	Azimuth (deg)	Corr. (dB)	Comment
0.017220	-24.00	42.88	66.87	0.200	V	15.0	-59.5	17:52:19 - 21.11.2019
0.035380	-37.29	36.62	73.91	0.200	V	200.0	-60.3	17:58:11 - 21.11.2019

Critical_Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Azimuth (deg)	Corr. (dB)	Comment
0.017220	-23.17	42.91	66.08	---	---	V	16.0	-59.4	17:51:31 - 21.11.2019
0.035380	-31.80	36.60	68.40	---	---	V	201.0	-60.3	17:57:23 - 21.11.2019
0.226000	-33.04	20.52	53.56	---	---	V	215.0	-57.6	17:59:34 - 21.11.2019
0.594000	1.80	32.13	30.33	---	---	V	215.0	-20.7	17:59:35 - 21.11.2019
2.786000	5.58	29.54	23.96	---	---	H	35.0	-15.9	17:59:37 - 21.11.2019
20.430000	20.83	29.54	8.71	---	---	H	35.0	1.0	17:59:40 - 21.11.2019

2.02_FCC_Mg_Feld_Ch_Low_Standing

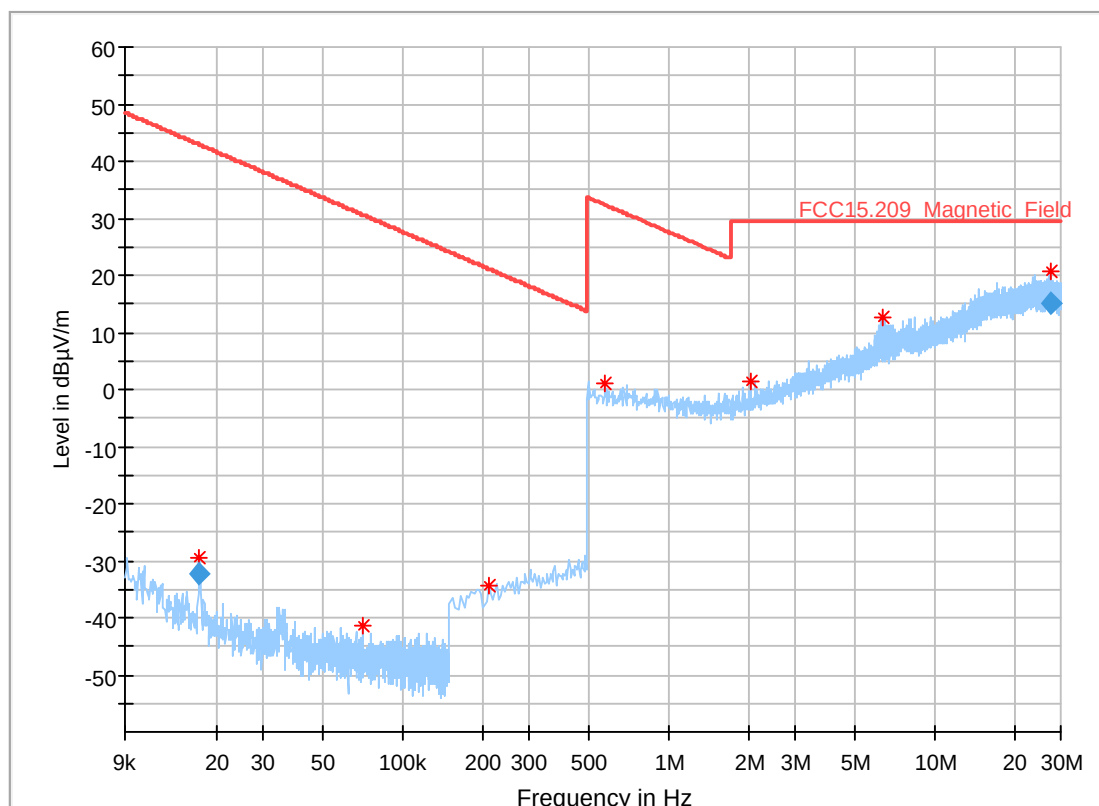
Common Information

Test Description:	Magnetic Field Strength Measurement related to 30/300 m distance
Test Site Location:	Ref.-Nr. 441 Semi Anechoic Room (SAR) with 3 m measurement distance
Version of Testsoftware:	EMC32 V9.25.0
Distance correction:	used accord. table, pls. see test report
Technical Data:	Please see page 2 for detailed data of measurement setup
Rec. antenna (pre-scan):	height 1.00 m, parallel and 90° to EUT polarisation
Used Filter:	bypass
Test Standard:	FCC 15.205 § 15.209; RSS-Gen: Issue 5
Operator:	MKh
Operating Mode:	Bluetooth LE , Ch Low , 2402 MHz
Environmental Conditions:	Humidity : 56%rH; Temperature: 23°C
EUT Setup:	Standing
Verdict:	Passed

EUT Information

PMT number:	19-1-01374S10
Manufacturer:	Bosch Healthcare Solutions GmbH
Product:	Vivatmo pro (Handheld)
Model:	System for quantitative measurement of fractional nitric oxide (FeNO) in human
HW version:	F09G100078
SW version:	Prod_Test.hex Version 3.0.10.1
Serial number:	BLE-DUT20
Power Supply:	3.7 V DC

Full Spectrum



Final_Result

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Pol	Azimuth (deg)	Corr. (dB)	Comment
0.017180	-32.17	42.90	75.07	0.200	V	91.0	-59.4	18:31:13 - 21.11.2019
27.716600	15.00	29.54	14.54	9.000	V	155.0	1.8	18:36:38 - 21.11.2019

Critical_Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Azimuth (deg)	Corr. (dB)	Comment
0.017180	-29.60	42.91	72.51	---	---	V	91.0	-59.4	18:30:20 - 21.11.2019
0.070680	-41.25	30.61	71.87	---	---	V	215.0	-60.5	18:37:05 - 21.11.2019
0.210000	-34.49	21.16	55.65	---	---	V	305.0	-58.3	18:37:07 - 21.11.2019
0.578000	1.06	32.37	31.31	---	---	H	35.0	-20.7	18:37:10 - 21.11.2019
2.050000	1.39	29.54	28.15	---	---	H	215.0	-18.5	18:37:15 - 21.11.2019
6.454000	12.67	29.54	16.87	---	---	H	35.0	-8.7	18:37:12 - 21.11.2019
27.716600	20.74	29.54	8.80	---	---	V	156.0	1.8	18:35:40 - 21.11.2019

1.2 Field strength measurements 30MHz <f <1GHz

3.01_FCC_Ch_Low_Laying

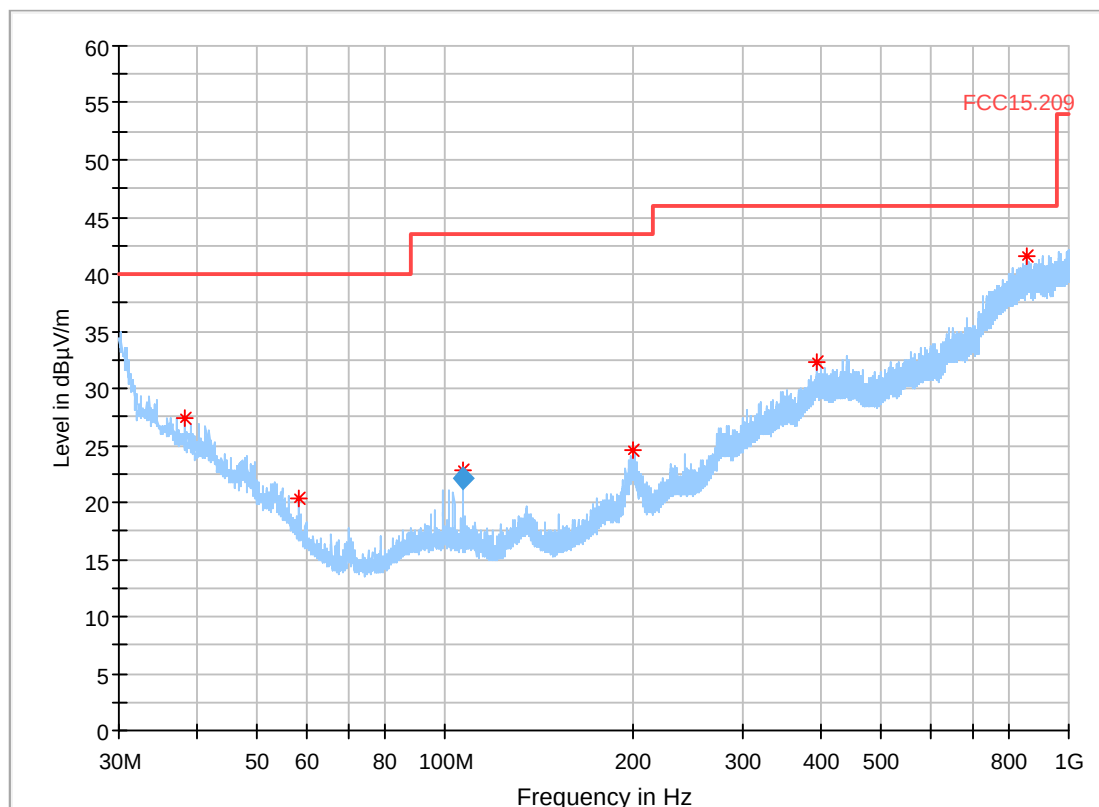
Common Information

Test Description:	Electric Field Strength Measurement
Test Site Location:	Ref.-Nr. 441 Semi Anechoic Room (SAR) with 3 m measurement distance
Version of Testsoftware:	EMC32 V9.25.0
Distance correction:	not used
Used Filter:	not used
Technical Data:	please see page 2 for detailed data of measurement setup
Test Standard.:	FCC 15.209; RSS-Gen: Issue 5
Operator:	MKh
Operating Mode:	Bluetooth LE , Ch Low , 2402 MHz
Environmental Conditions.:	Humidity : 60%rH; Temperature: 23°C
EUT Setup:	Laying
Verdict:	Passed

EUT Information

PMT number:	19-1-01374S10
Manufacturer:	Bosch Healthcare Solutions GmbH
Product:	Vivatmo pro (Handheld)
Model:	System for quantitative measurement of fractional nitric oxide (FeNO) in human
HW version:	F09G100078
SW version:	Prod_Test.hex Version 3.0.10.1
Serial number:	BLE-DUT20
Power Supply:	3.7 V DC

Full Spectrum



Final_Result

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
106.676000	22.19	43.50	21.31	120.000	169.0	H	214.0	8.1

Critical_Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
38.360000	27.34	40.00	12.66	---	---	105.0	H	90.0	17.8
58.240000	20.35	40.00	19.65	---	---	105.0	V	180.0	9.7
106.676000	22.80	43.50	20.70	---	---	169.0	H	214.0	8.1
200.400000	24.62	43.50	18.88	---	---	105.0	V	0.0	11.3
395.160000	32.22	46.00	13.78	---	---	182.0	H	180.0	18.6
859.400000	41.62	46.00	4.38	---	---	105.0	V	180.0	26.5

3.02_FCC_Ch_Low_Standing

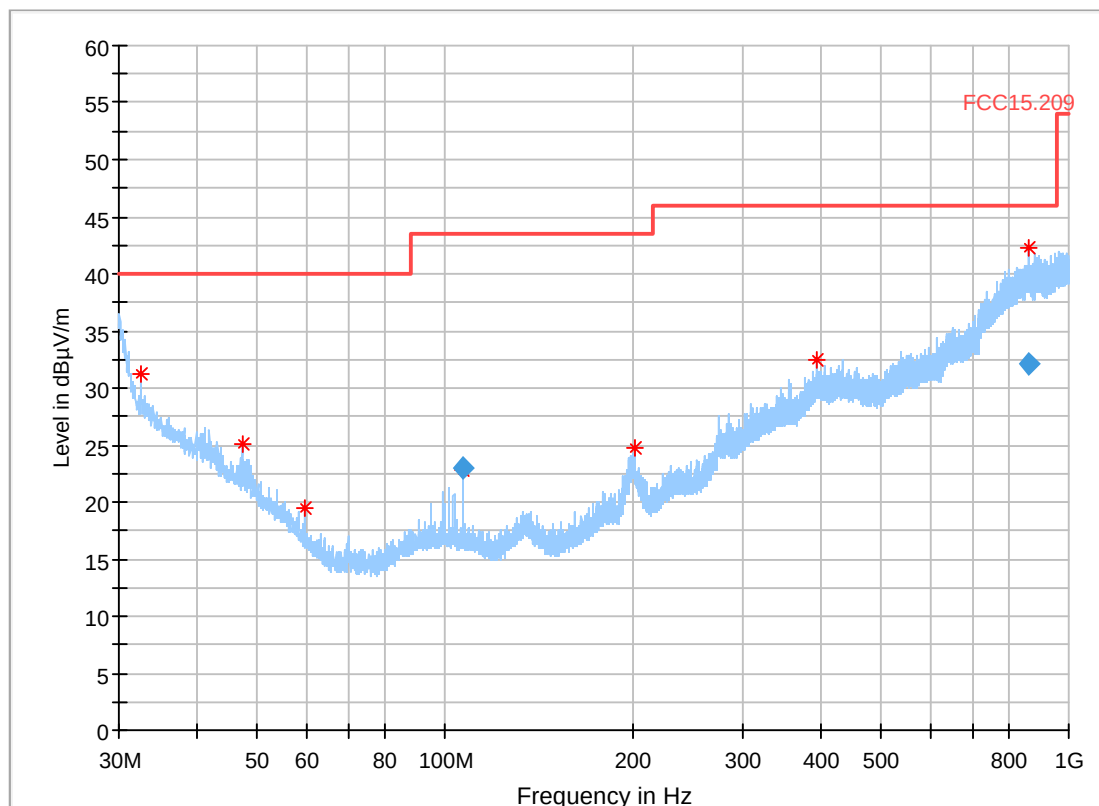
Common Information

Test Description:	Electric Field Strength Measurement
Test Site Location:	Ref.-Nr. 441 Semi Anechoic Room (SAR) with 3 m measurement distance
Version of Testsoftware:	EMC32 V9.25.0
Distance correction:	not used
Used Filter:	not used
Technical Data:	please see page 2 for detailed data of measurement setup
Test Standard.:	FCC 15.209; RSS-Gen: Issue 5
Operator:	MKh
Operating Mode:	Bluetooth LE , Ch Low , 2402 MHz
Environmental Conditions.:	Humidity : 60%rH; Temperature: 23°C
EUT Setup:	Standing
Verdict:	Passed

EUT Information

PMT number:	19-1-01374S10
Manufacturer:	Bosch Healthcare Solutions GmbH
Product:	Vivatmo pro (Handheld)
Model:	System for quantitative measurement of fractional nitric oxide (FeNO) in human
HW version:	F09G100078
SW version:	Prod_Test.hex Version 3.0.10.1
Serial number:	BLE-DUT20
Power Supply:	3.7 V DC

Full Spectrum



Final_Result

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
106.692000	22.93	43.50	20.57	120.000	186.0	H	140.0	8.1
863.404000	32.11	46.00	13.89	120.000	273.0	H	129.0	26.6

Critical_Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
32.560000	31.29	40.00	8.71	---	---	182.0	H	270.0	20.4
47.240000	25.16	40.00	14.84	---	---	105.0	V	90.0	14.1
59.440000	19.51	40.00	20.49	---	---	105.0	H	90.0	9.1
106.692000	22.80	43.50	20.70	---	---	186.0	H	141.0	8.1
201.760000	24.74	43.50	18.76	---	---	182.0	V	90.0	11.3
395.160000	32.42	46.00	13.58	---	---	182.0	H	180.0	18.6
863.404000	42.26	46.00	3.74	---	---	273.0	H	130.0	26.6

1.3 Field strength measurements $1\text{GHz} < f < 18\text{GHz}$

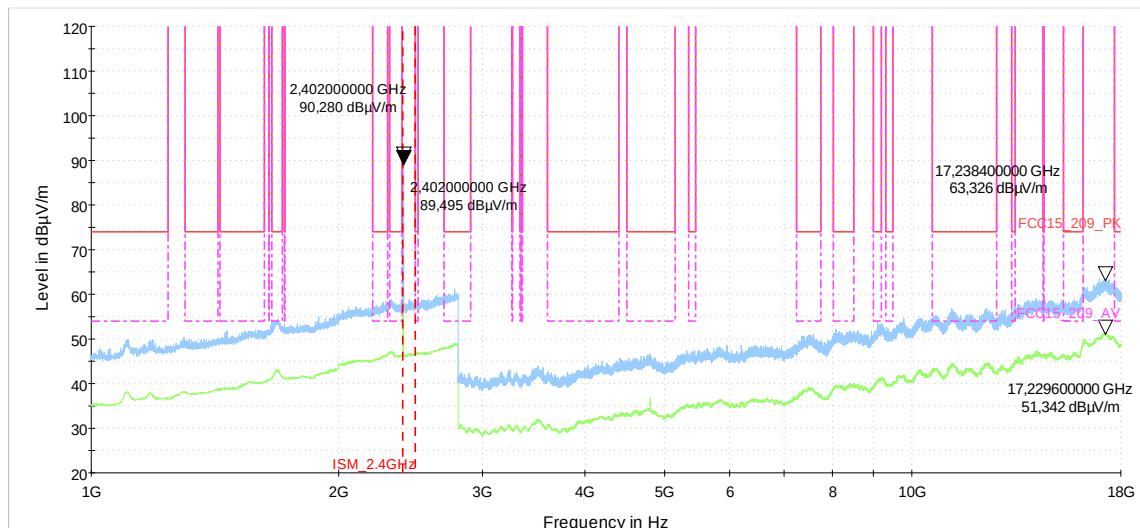
4.01_BT_Ch_Low

Common Information

Test Description:	Radiated field strength emission in 3m distance
Test Site:	CETECOM GmbH Essen
Test Standard:	FCC 15.247&15.209 Intentional Radiator / RSS-Gen, Issue 5, RSS-210 Issue 10
Antenna polarisation:	B.10(a) horizontal/vertical
Operating Mode:	BT-LE PRBS9 Ch Low 2402 MHz
Operator:	RI

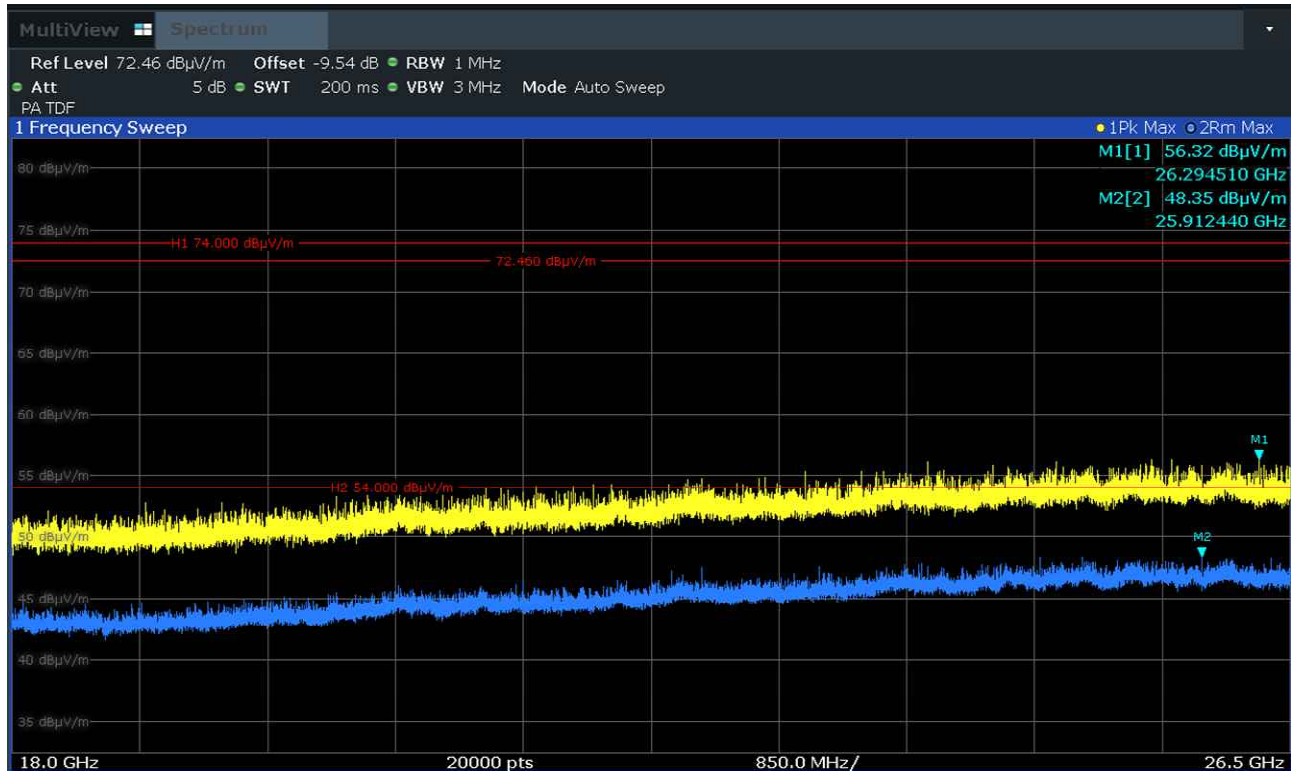
EUT Information

PMT number:	19-1-01374S10
Manufacturer:	Bosch Healthcare Solutions GmbH
Product:	Vivatmo pro (Handheld)
Model:	System for quantitative measurement of fractional nitric oxide (FeNO) in human
HW version:	F09G100078
SW version:	Prod_Test.hex Version 3.0.10.1
Serial number:	BLE-DUT20
Power Supply:	3.7 V DC



1.4 Field strength measurements $18\text{GHz} < f < 26.5\text{GHz}$

4.02_BT_Ch_low



2 Radiated band-edge measurements accord. §15.209 & §15.205 (§15.247)

9.01_BT_BE_Ch_Low

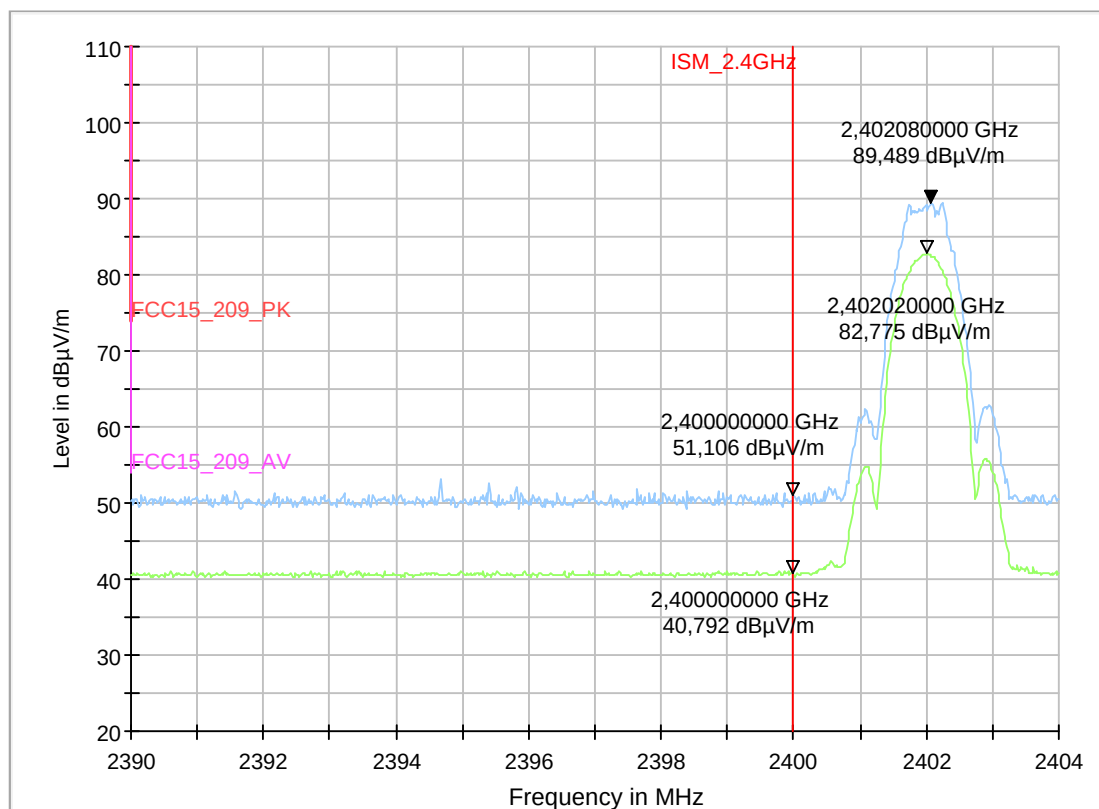
Common Information

Test Description:	Band-Edge: Radiated Field Strength Emissions Emissions in 3m distance
Test Site:	CETECOM GmbH Essen
Test Standard:	FCC 15.247&15.209 Intentional Radiator / RSS-Gen, Issue 5
Antenna polarisation:	horizontal/vertical
Operating Mode:	BT Ch Low 2402 MHz
Operator:	RLs

EUT Information

PMT number:	19-1-01374S10
Manufacturer:	Bosch Healthcare Solutions GmbH
Product:	Vivatmo pro (Handheld)
Model:	System for quantitative measurement of fractional nitric oxide (FeNO) in human
HW version:	F09G100078
SW version:	Prod_Test.hex Version 3.0.10.1
Serial number:	BLE-DUT20
Power Supply:	3.7 V DC

Full Spectrum



9.02_BT_BE_Ch_High

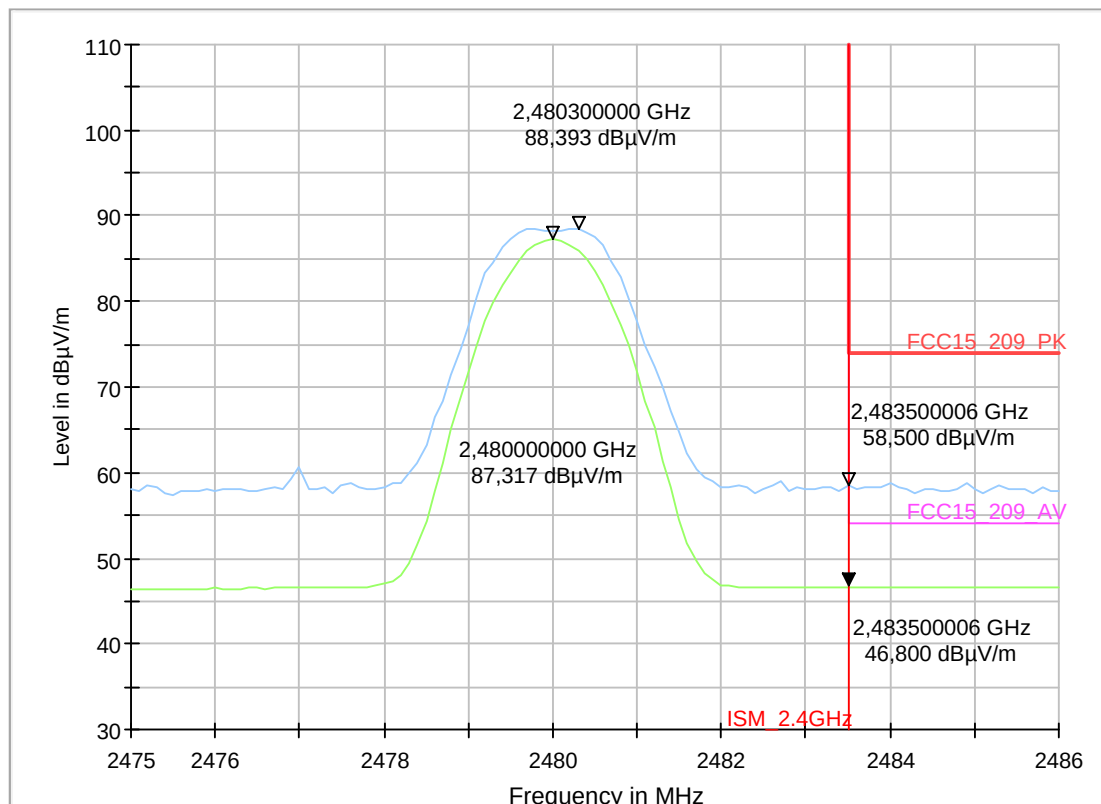
Common Information

Test Description:	Band-Edge: Radiated Field Strength Emissions Emissions in 3m distance
Test Site:	CETECOM GmbH Essen
Test Standard:	FCC 15.247&15.209 Intentional Radiator / RSS-Gen, Issue 5
Antenna polarisation:	horizontal/vertical
Operating Mode:	BT-LE PRBS9 Ch High 2480 MHz
Operator:	MKh
Verdict:	Passed

EUT Information

PMT number:	19-1-01374S10
Manufacturer:	Bosch Healthcare Solutions GmbH
Product:	Vivatmo pro (Handheld)
Model:	System for quantitative measurement of fractional nitric oxide (FeNO) in human
HW version:	F09G100078
SW version:	Prod_Test.hex Version 3.0.10.1
Serial number:	BLE-DUT20
Power Supply:	3.7 V DC

Full Spectrum



End Of Annex 1