

Annex 1: Measurement diagrams 21-1-0171401T01a-C02-A1

Number of pages:	64	Date of Report:	2023-May-02
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:	Siemens AG
Product: Model:	Vibration and temperature sensor SITRANS MS200		
FCC ID:	LYH-MS200	IC:	267AA-MS200
Testing has been carried out in accordance with:	Title 47 CFR, Chapter I FCC Regulations, Subchapter A Subpart C: §15.247 (DTS) RSS-247, Issue 2 (DTS) RSS-Gen, Issue 5 Deviations, modifications or clarifications (if any) to above mentioned documents are written in each section under "Test method and limit".		



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1 Measurement diagrams

1.1 Radiated measurements

2.01a_BLE_LE_low_laying

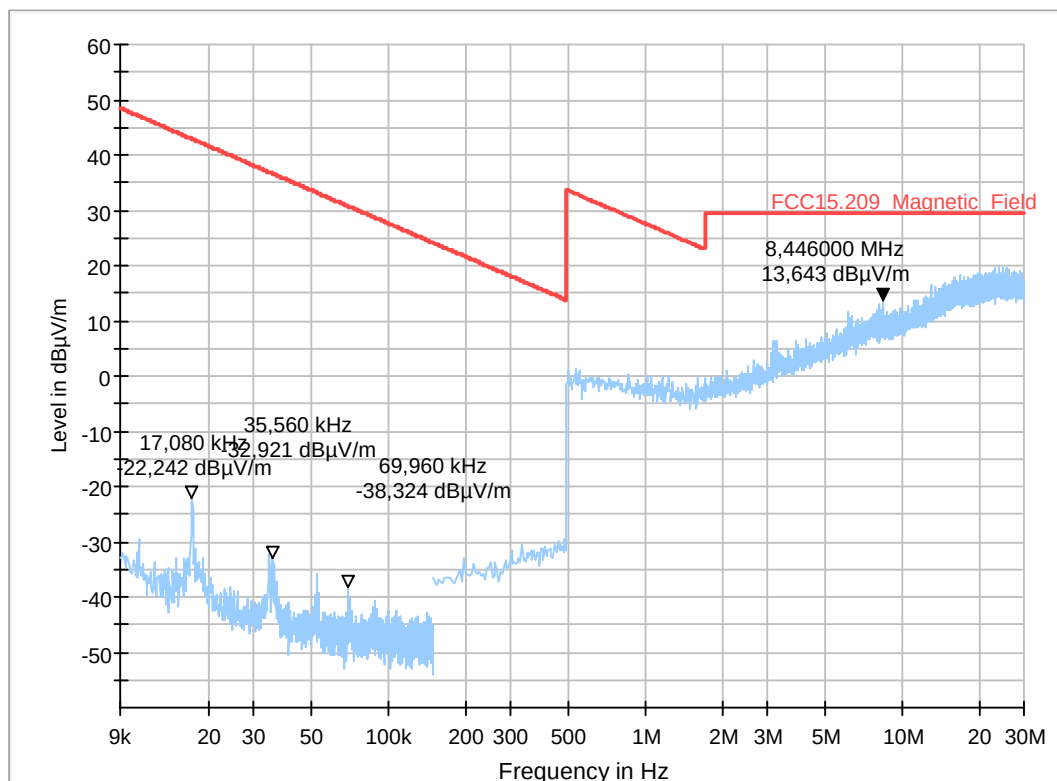
Common Information

Test Description:	Magnetic Field Strength Measurement related to 30/300 m distance
Test Site Location:	Ref.-Nr. 441 Semi Anechoic Chamber (SAC1) with 3 m measurement distance
Version of Testsoftware:	EMC32 V10.50.0
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:	HEI
Operating Mode:	BLE CH:00
Power during tests:	12 VDC over AE AC/DC
Comment 1:	Channel low
Comment 2:	-
Environmental Conditions:	Humidity : 40% rH; Temperature: 19 °C
EUT Setup:	1
Verdict:	Passed

EUT Information

PMT number:	21-1-01714S16_C01
	Full Spectrum



2.01b_BLE_LE_low_standing

Common Information

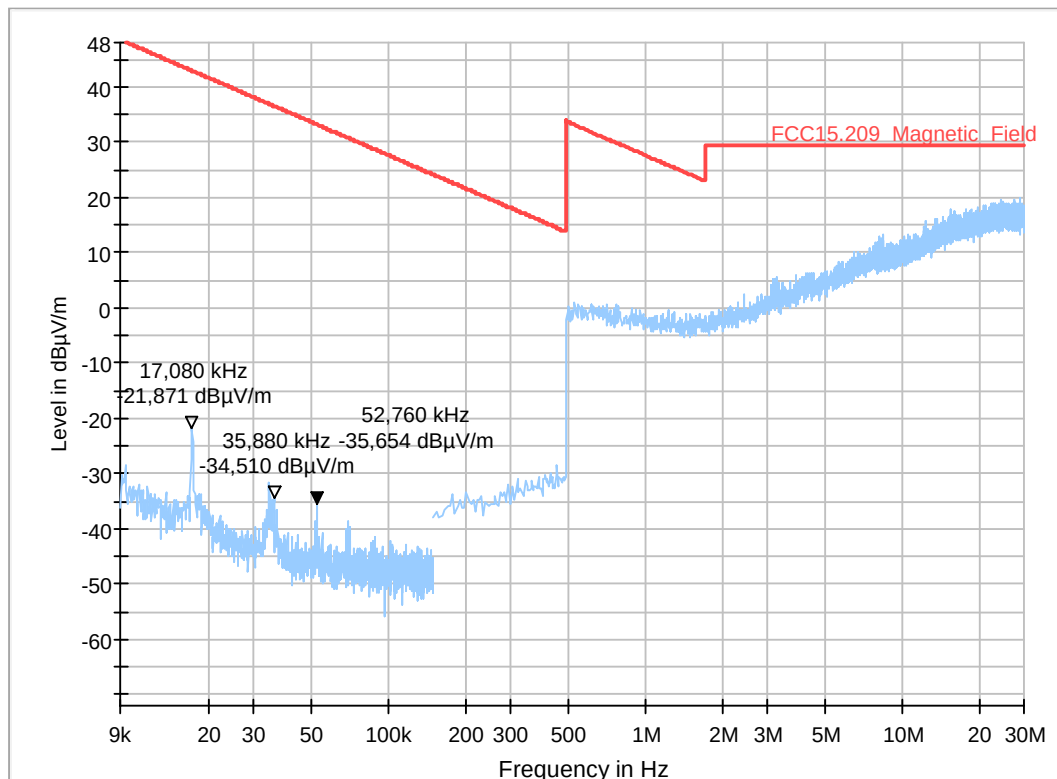
Test Description:	Magnetic Field Strength Measurement related to 30/300 m distance
Test Site Location:	Ref.-Nr. 441 Semi Anechoic Chamber (SAC1) with 3 m measurement distance
Version of Testsoftware:	EMC32 V10.50.0
Distance correction:	used accord. table, pls. see test report
Technical Data:	Please see 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:	HEI
Operating Mode:	BLE CH:00
Power during tests:	12 VDC over AE AC/DC
Comment 1:	Channel low
Comment 2:	-
Environmental Conditions:	Humidity : 40% rH; Temperature: 19 °C
EUT Setup:	1
Verdict:	Passed
Comment:	-

EUT Information

PMT number:	21-1-01714S16_C01
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Full Spectrum



2.02a_BLE_LE_mid_laying

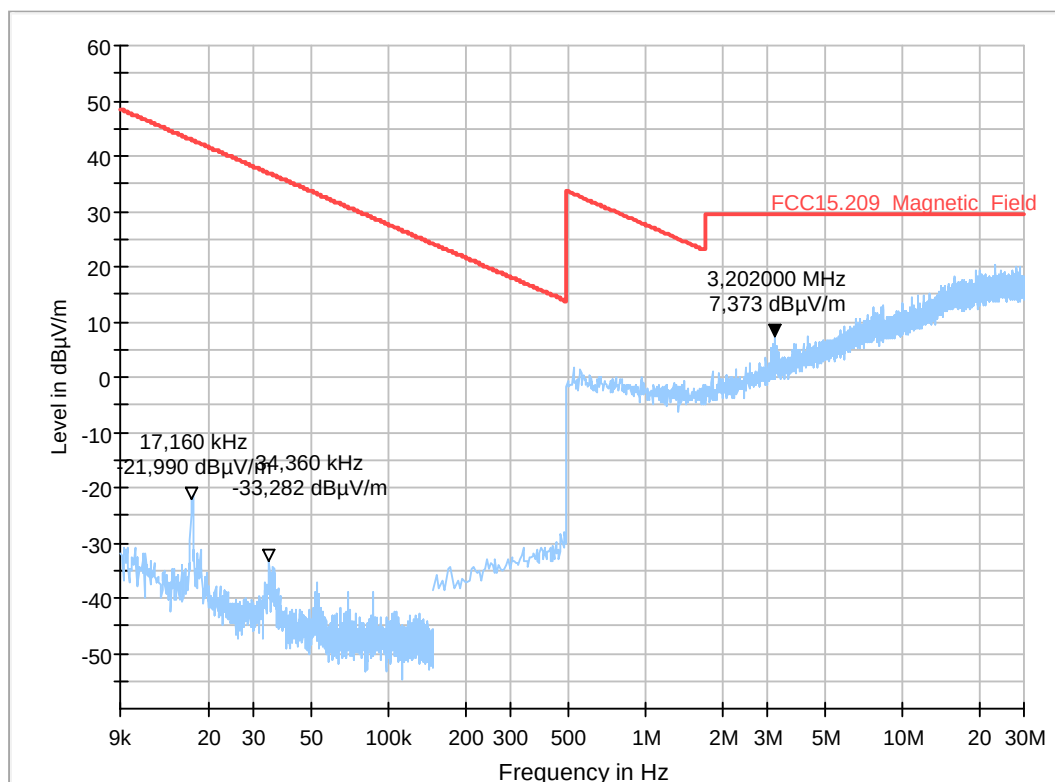
Common Information

Test Description:	Magnetic Field Strength Measurement related to 30/300 m distance
Test Site Location:	Ref.-Nr. 441 Semi Anechoic Chamber (SAC1) with 3 m measurement distance
Version of Testsoftware:	EMC32 V10.50.0
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:	HEI
Operating Mode:	BLE CH:19
Power during tests:	12 VDC over AE AC/DC
Comment 1:	Channel middle
Comment 2:	-
Environmental Conditions::	Humidity : 40% rH; Temperature: 19 °C
EUT Setup:	1
Verdict:	Passed
Comment:	-

EUT Information

PMT number: 21-1-01714S16_C01

Full Spectrum



2.02b_BLE_LE_high_standing

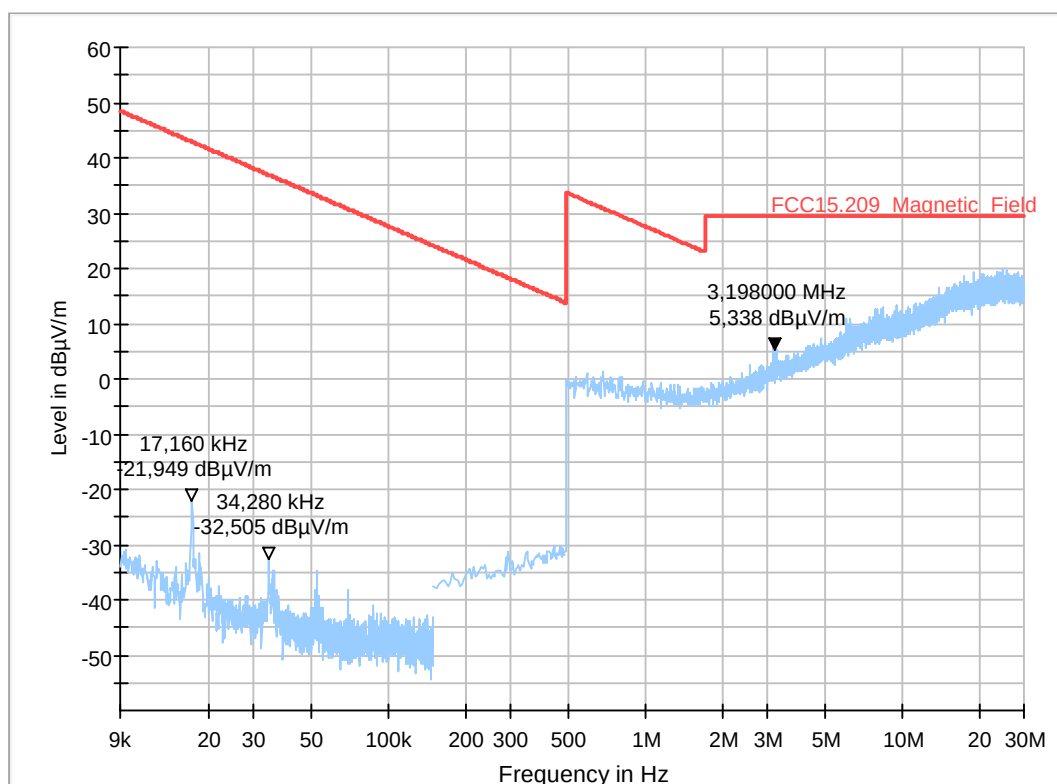
Common Information

Test Description:	Magnetic Field Strength Measurement related to 30/300 m distance
Test Site Location:	Ref.-Nr. 441 Semi Anechoic Chamber (SAC1) with 3 m measurement distance
Version of Testsoftware:	EMC32 V10.50.0
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:	HEI
Operating Mode:	BLE CH:19
Power during tests:	12 VDC over AE AC/DC
Comment 1:	Channel middle
Comment 2:	-
Environmental Conditions::	Humidity : 40% rH; Temperature: 19 °C
EUT Setup:	1
Verdict:	Passed
Comment:	-

EUT Information

PMT number: 21-1-01714S16_C01

Full Spectrum



2.03a_BLE_LE_high_laying

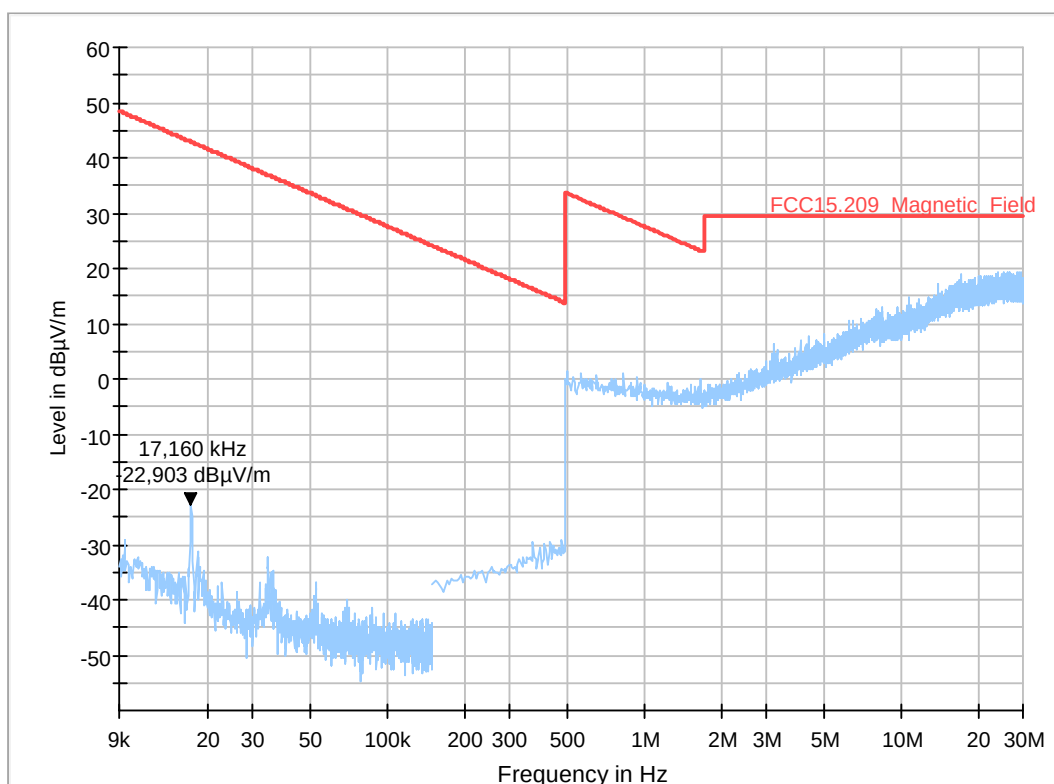
Common Information

Test Description:	Magnetic Field Strength Measurement related to 30/300 m distance
Test Site Location:	Ref.-Nr. 441 Semi Anechoic Chamber (SAC1) with 3 m measurement distance
Version of Testsoftware:	EMC32 V10.50.0
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:	HEI
Operating Mode:	BLE CH:39
Power during tests:	12 VDC over AE AC/DC
Comment 1:	Channel high
Comment 2:	-
Environmental Conditions::	Humidity : 40% rH; Temperature: 19 °C
EUT Setup:	1
Verdict:	Passed
Comment:	-

EUT Information

PMT number: 21-1-01714S16_C01

Full Spectrum



2.03b_BLE_LE_high_standing

Common Information

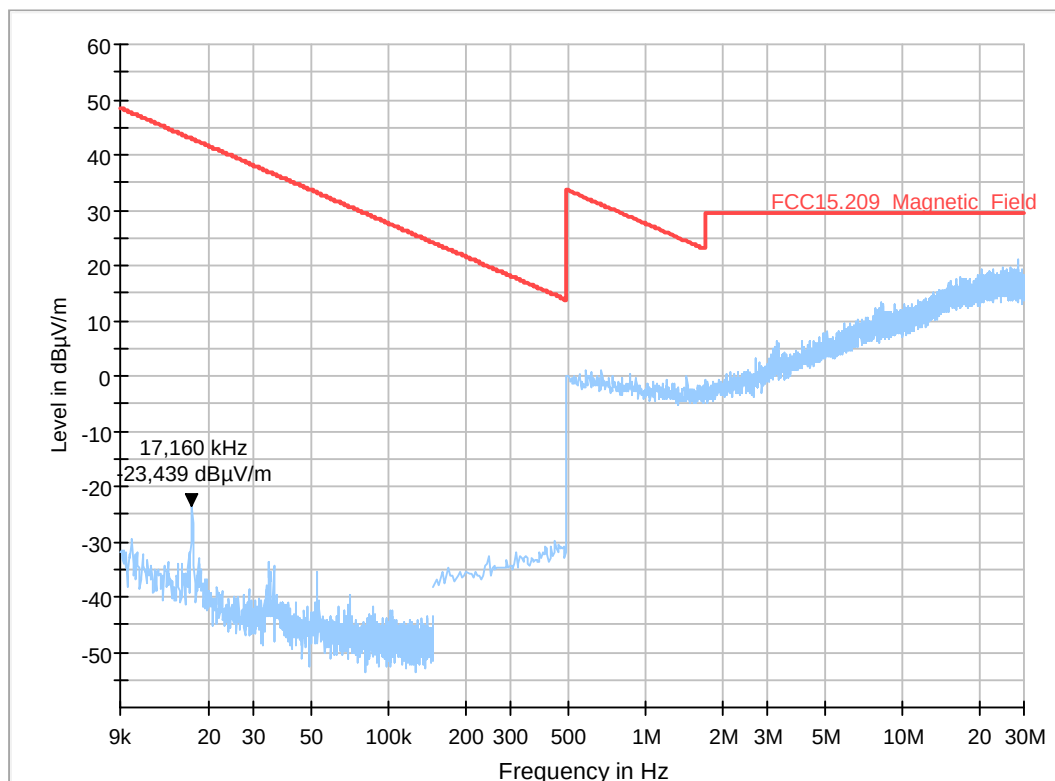
Test Description:	Magnetic Field Strength Measurement related to 30/300 m distance
Test Site Location:	Ref.-Nr. 441 Semi Anechoic Chamber (SAC1) with 3 m measurement distance
Version of Testsoftware:	EMC32 V10.50.0
Distance correction:	used accord. table, pls. see test report
Technical Data:	Please see 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:	HEI
Operating Mode:	1
Power during tests:	12 V DC
Comment 1:	Channel high
Comment 2:	-
Environmental Conditions::	Humidity : 40% rH; Temperature: 19 °C
EUT Setup:	1
Verdict:	Passed
Comment:	-

EUT Information

PMT number:	21-1-01714S16_C01
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Full Spectrum



3.01a_BLE_LE_low_laying

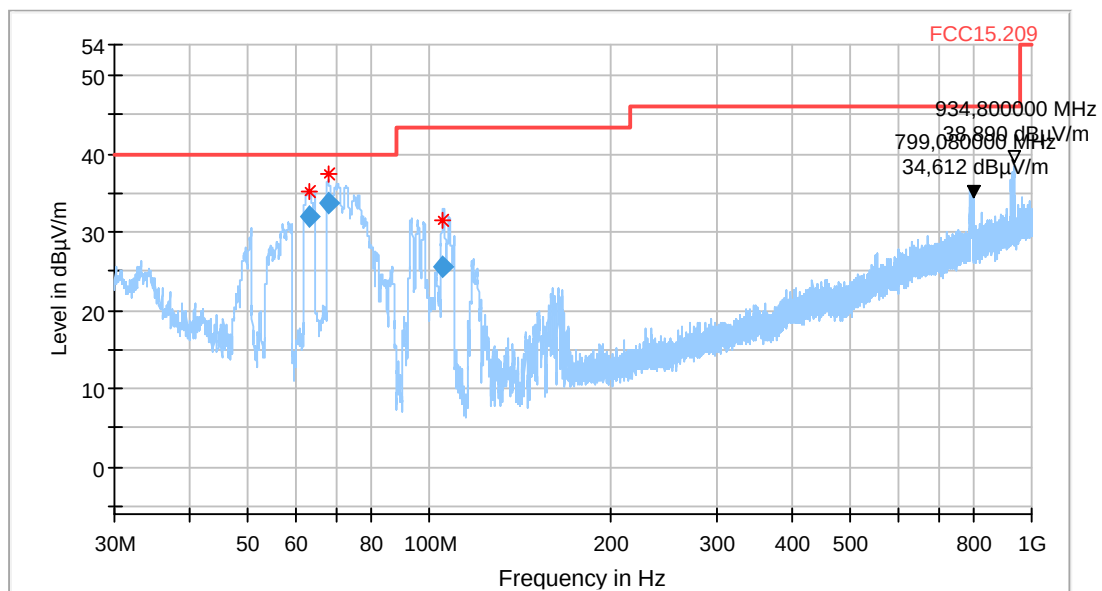
Common Information

Test Description:	Radiated field strength emission in 3m distance
Test Site:	CETECOM GmbH Essen
Test Standard:	FCC 15.205&15.209 & RSS Gen. Issue 5
Antenna polarisation:	horizontal/vertical
Environmental Conditions:	Humidity : 40% rH; Temperature: 19 °C
Operator Name:	HEI
EUT Setup:	1
Operating Mode:	1
Power supply:	12 V DC
Comment:	Channel no. low
Verdict:	Passed

EUT Information

PMT number: 21-1-01714S16_C01

Full Spectrum



Remark: Peaks @ 799 and 934 MHz are caused by external interferers.

Final_Result

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Sig Path (dB)	Preamp (dB)	Trd Corr. (dB/m)
63.063000	32.05	40.00	7.95	120.000	148.0	V	120.0	7.8	0.0	0.8	7.0
67.983000	33.67	40.00	6.33	120.000	191.0	V	82.0	6.8	0.0	0.8	6.0
105.599000	25.59	43.50	17.91	120.000	111.0	V	0.0	8.1	0.0	1.0	7.1

(continuation of the "Final_Result" table from column 19 ...)

Frequency (MHz)	Raw Rec (dBμV)
63.063000	24.2
67.983000	26.9
105.599000	17.5

3.01b_BLE_LE_low_standing

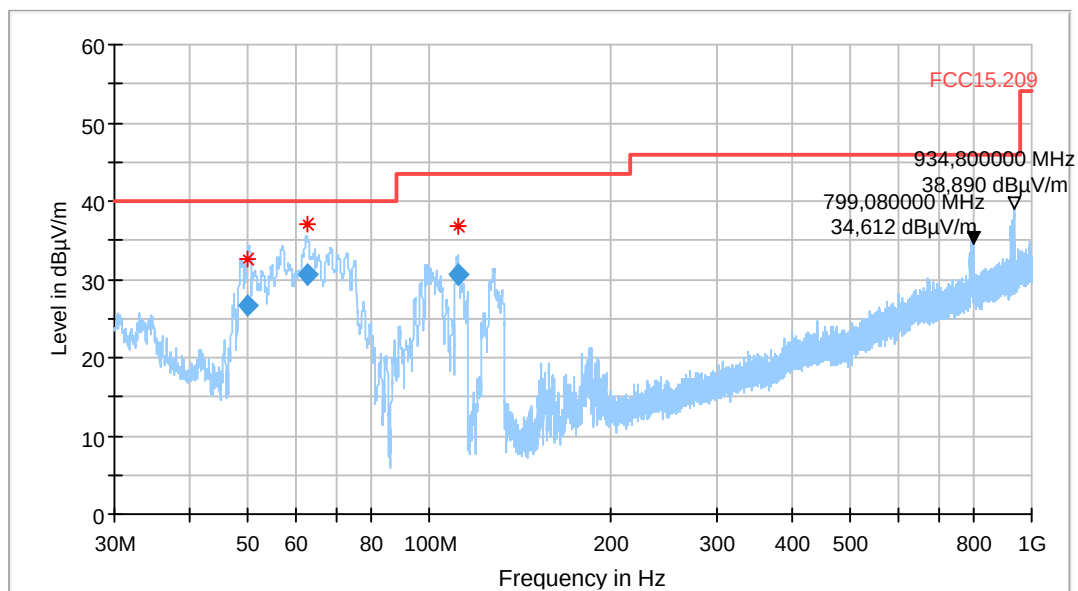
Common Information

Test Description:	Radiated field strength emission in 3m distance
Test Site:	CETECOM GmbH Essen
Test Standard:	FCC 15.205&15.209 & RSS Gen. Issue 5
Antenna polarisation:	horizontal/vertical
Environmental Conditions:	Humidity : 40% rH; Temperature: 19 °C
Operator Name:	HEI
EUT Setup:	1
Operating Mode:	1
Power supply:	12 V DC
Comment:	Channel no. low
Verdict:	Passed

EUT Information

PMT number:	21-1-01714S16_C01
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Full Spectrum



Remark: Peaks @ 799 and 934 MHz are caused by external interferers.

Final_Result

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Sig Path (dB)	Preamp (dB)	Trd Corr. (dB/m)
50.043000	26.71	40.00	13.29	120.000	105.0	V	174.0	12.9	0.0	0.7	12.2
62.665000	30.72	40.00	9.28	120.000	176.0	V	307.0	8.0	0.0	0.8	7.2
111.475000	30.73	43.50	12.77	120.000	105.0	V	357.0	8.1	0.0	1.2	7.0

(continuation of the "Final_Result" table from column 19 ...)

Frequency (MHz)	Raw Rec (dBμV)
50.043000	13.8
62.665000	22.8
111.475000	22.6

3.02a_BLE_LE_mid_laying

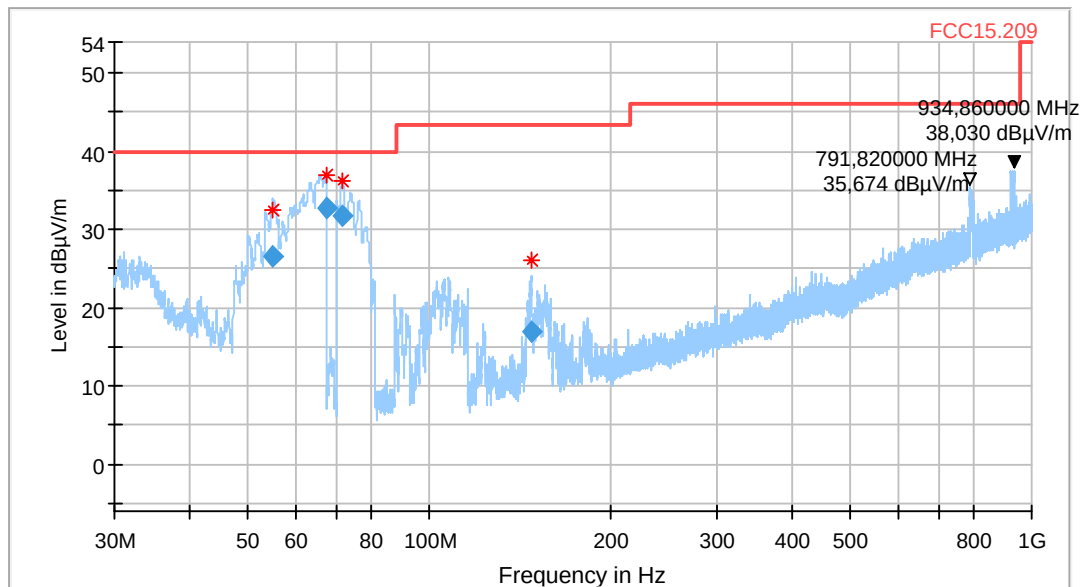
Common Information

Test Description:	Radiated field strength emission in 3m distance
Test Site:	CETECOM GmbH Essen
Test Standard:	FCC 15.205&15.209 & RSS Gen. Issue 5
Antenna polarisation:	horizontal/vertical
Environmental Conditions::	Humidity : 40% rH; Temperature: 19 °C
Operator Name:	HEI
EUT Setup:	1
Operating Mode:	1
Power supply:	12 V DC
Comment:	Channel no. mid
Verdict:	Passed

EUT Information

PMT number: 21-1-01714S16_C01

Full Spectrum



Remark: Peaks @ 791 and 934 MHz are caused by external interferers.

Final_Result

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Sig Path (dB)	Preamp (dB)	Trd Corr. (dB/m)
55.055000	26.71	40.00	13.29	120.000	112.0	V	43.0	11.1	0.0	0.7	10.4
67.565000	32.66	40.00	7.34	120.000	109.0	V	330.0	6.8	0.0	0.8	6.0
71.735000	31.67	40.00	8.33	120.000	143.0	V	306.0	6.6	0.0	0.8	5.8
147.395000	16.88	43.50	26.62	120.000	112.0	V	98.0	8.6	0.0	1.1	7.5

(continuation of the "Final_Result" table from column 19 ...)

Frequency (MHz)	Raw Rec (dBμV)
55.055000	15.6
67.565000	25.8
71.735000	25.1
147.395000	8.3

3.02b_BLE_LE_mid_standing

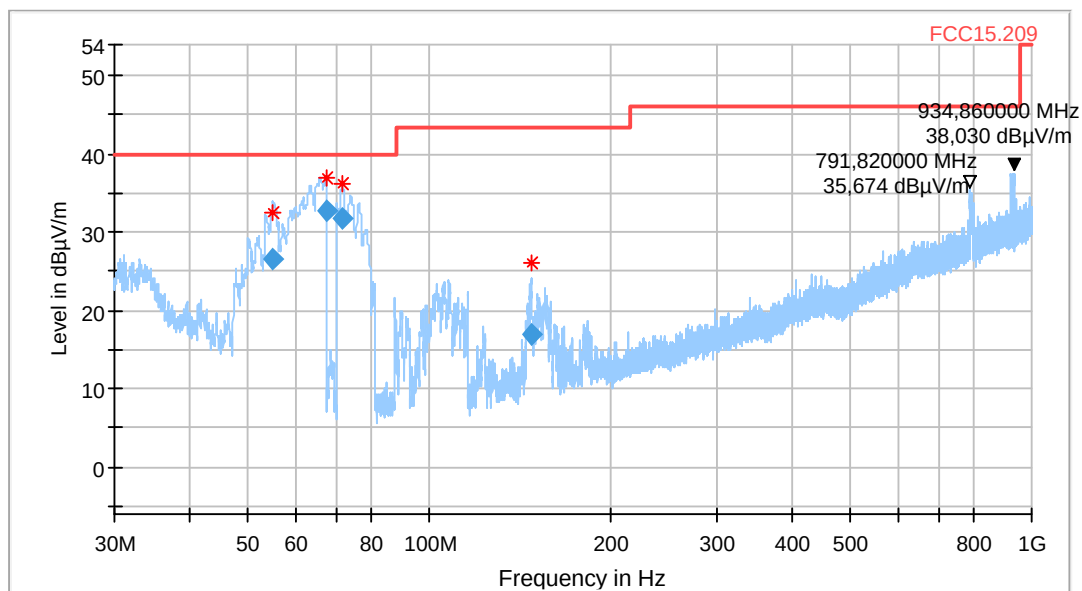
Common Information

Test Description:	Radiated field strength emission in 3m distance
Test Site:	CETECOM GmbH Essen
Test Standard:	FCC 15.205&15.209 & RSS Gen. Issue 5
Antenna polarisation:	horizontal/vertical
Environmental Conditions:	Humidity : 40% rH; Temperature: 19 °C
Operator Name:	HEI
EUT Setup:	1
Operating Mode:	1
Power supply:	12 V DC
Comment:	Channel no. mid
Verdict:	Passed

EUT Information

PMT number: 21-1-01714S16_C01

Full Spectrum



Remark: Peaks @ 791 and 934 MHz are caused by external interferers.

Final_Result

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Sig Path (dB)	Preamp (dB)	Trd Corr. (dB/m)
55.055000	26.71	40.00	13.29	120.000	112.0	V	43.0	11.1	0.0	0.7	10.4
67.565000	32.66	40.00	7.34	120.000	109.0	V	330.0	6.8	0.0	0.8	6.0
71.735000	31.67	40.00	8.33	120.000	143.0	V	306.0	6.6	0.0	0.8	5.8
147.395000	16.88	43.50	26.62	120.000	112.0	V	98.0	8.6	0.0	1.1	7.5

(continuation of the "Final_Result" table from column 19 ...)

Frequency (MHz)	Raw Rec (dBμV)
55.055000	15.6
67.565000	25.8
71.735000	25.1
147.395000	8.3

3.03a_BLE_LE_high_laying

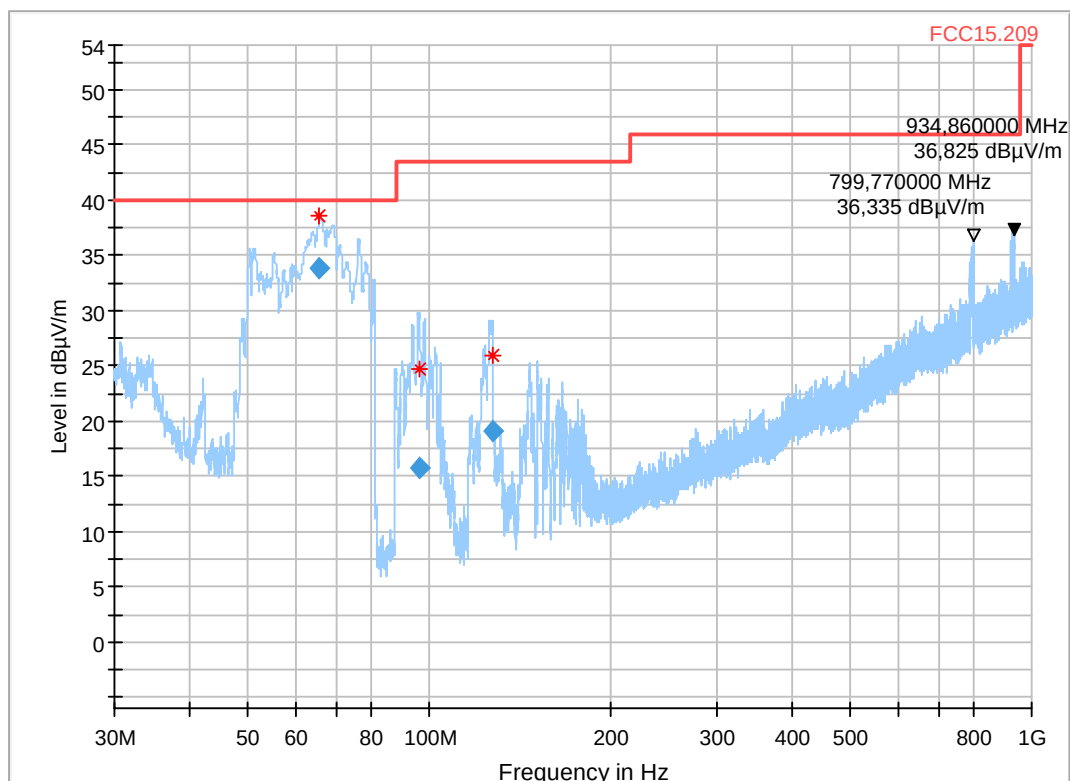
Common Information

Test Description:	Radiated field strength emission in 3m distance
Test Site:	CETECOM GmbH Essen
Test Standard:	FCC 15.205&15.209 & RSS Gen. Issue 5
Antenna polarisation:	horizontal/vertical
Environmental Conditions:	Humidity : 40% rH; Temperature: 19 °C
Operator Name:	HEI
EUT Setup:	1
Operating Mode:	1
Power supply:	12 V DC
Comment:	Channel no. high
Verdict:	Passed

EUT Information

PMT number: 21-1-01714S16_C01

Full Spectrum



Remark: Peaks @ 799 and 934 MHz are caused by external interferers.

Final_Result

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Sig Path (dB)	Preamp (dB)	Trd Corr. (dB/m)
65.575000	33.79	40.00	6.21	120.000	117.0	V	0.0	7.1	0.0	0.7	6.4
96.239000	15.81	43.50	27.69	120.000	152.0	V	35.0	8.2	0.0	0.9	7.3
127.593000	19.01	43.50	24.49	120.000	112.0	V	319.0	8.6	0.0	1.0	7.6

(continuation of the "Final_Result" table from column 19 ...)

Frequency (MHz)	Raw Rec (dBμV)
65.575000	26.7
96.239000	7.6
127.593000	10.4

3.03b_BLE_LE_high_standing

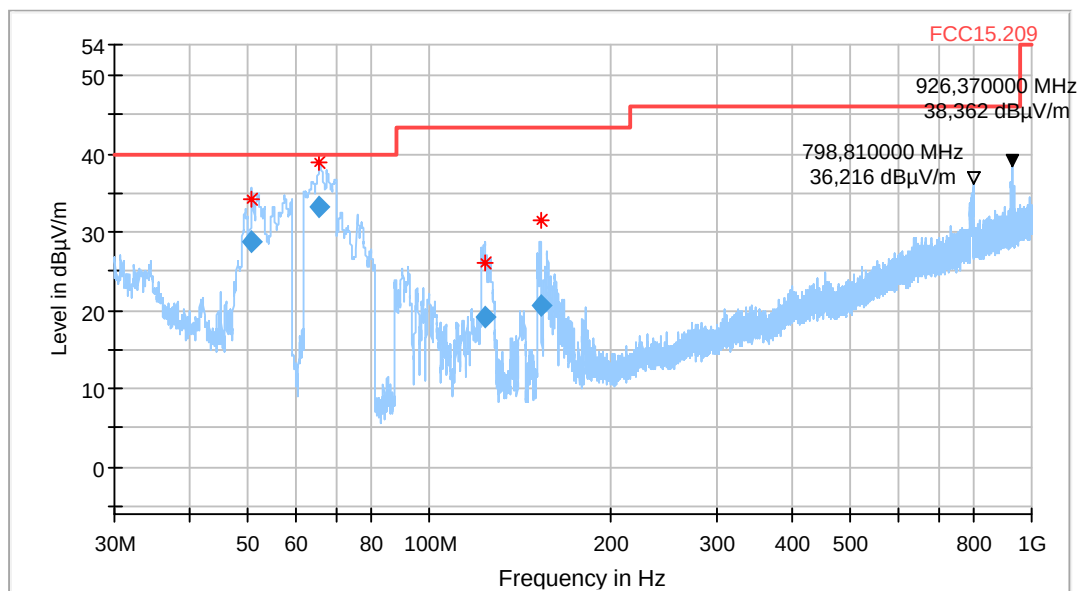
Common Information

Test Description:	Radiated field strength emission in 3m distance
Test Site:	CETECOM GmbH Essen
Test Standard:	FCC 15.205&15.209 & RSS Gen. Issue 5
Antenna polarisation:	horizontal/vertical
Environmental Conditions:	Humidity : 40% rH; Temperature: 19 °C
Operator Name:	HEI
EUT Setup:	1
Operating Mode:	1
Power supply:	12 V DC
Comment:	Channel no. high
Verdict:	Passed

EUT Information

PMT number:	21-1-01714S16_C01
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Full Spectrum



Remark: Peaks @ 798 and 926 MHz are caused by external interferers.

Final_Result

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Sig Path (dB)	Preamp (dB)	Trd Corr. (dB/m)
50.705000	28.82	40.00	11.18	120.000	105.0	V	234.0	12.7	0.0	0.7	12.0
65.615000	33.33	40.00	6.67	120.000	143.0	V	339.0	7.1	0.0	0.7	6.4
123.663000	19.18	43.50	24.32	120.000	109.0	V	169.0	8.1	0.0	1.1	7.0
152.849000	20.75	43.50	22.75	120.000	124.0	V	82.0	8.8	0.0	1.2	7.6

(continuation of the "Final_Result" table from column 19 ...)

Frequency (MHz)	Raw Rec (dBμV)
50.705000	16.1
65.615000	26.3
123.663000	11.1
152.849000	12.0

4.01a_BLE_LE_low_1-15G

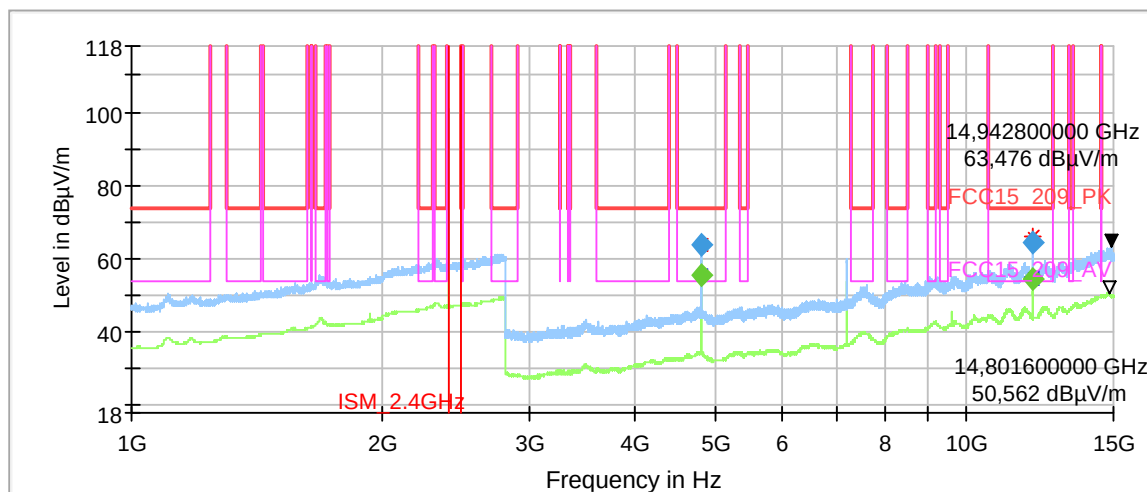
Common Information

Test Description:	Radiated field strength emission in 3m distance
Test Site:	Fully Anechoic Chamber (FAC1) - EMC32 V10.60.20
Test Standard:	FCC 15.247&15.209 Intentional Radiator / RSS-Gen, Issue 5
Antenna polarisation:	horizontal/vertical
Operating Mode:	1
Set-up no.	1
Operator:	npe
Comment:	-
Comment2:	-
Environmental Conditions:	Humidity : 41% rH; Temperature: 21 °C
Verdict:	Passed *)

EUT Information

PMT number:	21-1-01714S16_C01
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Full Spectrum



Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin	Meas. Time (ms)	Bandwidth	Height	Pol	Azimuth	Elevation
4804.000000	63.69	---	74.00	10.31	100.0	1000.000	155.0	H	268.0	0.0
4804.400000	---	45.97 *)	54.00	8.03	100.0	1000.000	155.0	H	268.0	0.0
12011.200000	64.42	---	74.00	9.58	100.0	1000.000	155.0	H	319.0	0.0
12011.600000	---	46.70 *)	54.00	7.30	100.0	1000.000	155.0	H	318.0	0.0

*) Duty Cycle correction factor applied (17.72 dB) on Peak Value to determine Average value.

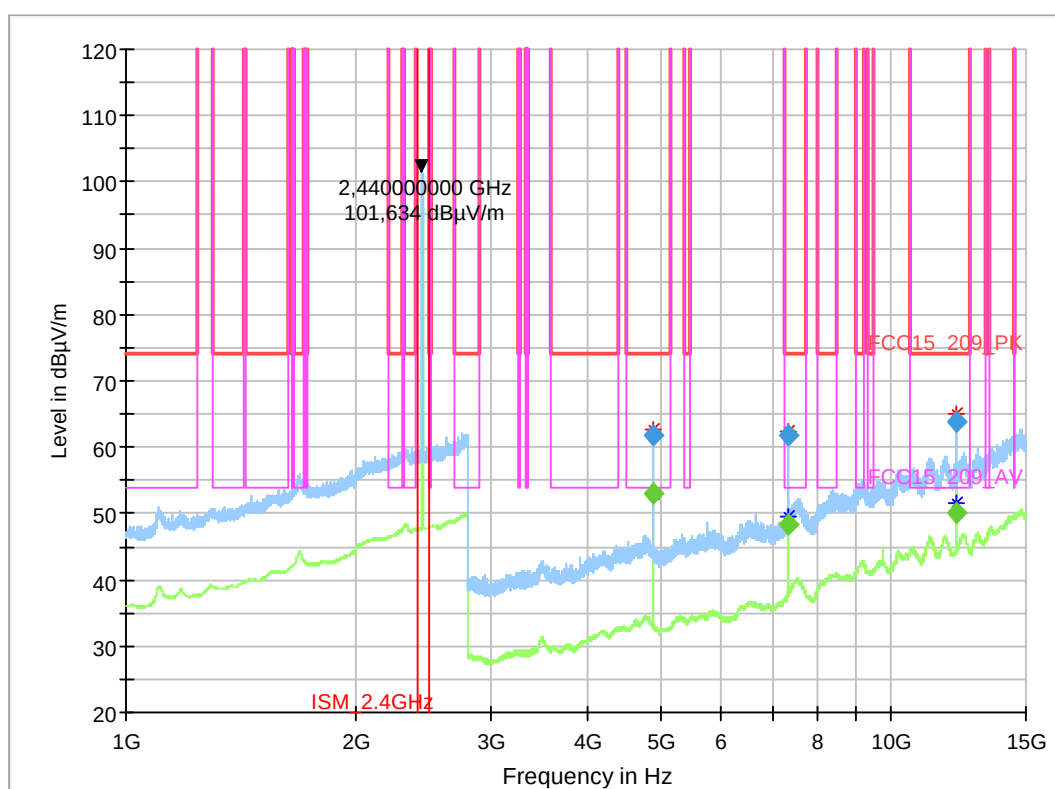
4.02a_BLE_LE_mid_1-15G

Common Information

Test Description:	Radiated field strength emission in 3m distance
Test Site:	Fully Anechoic Chamber (FAC1) - EMC32 V10.60.20
Test Standard:	FCC 15.247&15.209 Intentional Radiator / RSS-Gen, Issue 5
Antenna polarisation:	horizontal/vertical
Operating Mode:	1
Set-up no.	1
Operator:	Lor
Comment:	-
Comment2:	-
Environmental Conditions:	Humidity : 20% rH; Temperature: 38 °C
Verdict:	Passed *)

EUT Information

PMT number:	21-1-01714S16_C01
	Full Spectrum



Final_Result

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)
4879.600000	61.94	---	74.00	12.06	100.0	1000.000	155.0	H	90.0	90.0
4880.000000	---	52.98	54.00	1.02	100.0	1000.000	155.0	V	94.0	0.0
7320.800000	---	48.48	54.00	5.52	100.0	1000.000	155.0	V	-7.0	90.0
7320.800000	61.76	---	74.00	12.24	100.0	1000.000	155.0	V	-13.0	90.0
12200.400000	63.75	---	74.00	10.25	100.0	1000.000	155.0	H	45.0	90.0
12201.200000	---	50.26	54.00	3.74	100.0	1000.000	155.0	H	60.0	90.0

(continuation of the "Final_Result" table from column 16 ...)

Frequency (MHz)	Corr. (dB/m)	Sig Path (dB)	Preamp (dB)	Trd Corr. (dB/m)	Raw Rec (dBμV)	Comment
4879.600000	7	-29	0	36	---	12:06:45 - 03.05.2022
4880.000000	7	-29	0	36	---	12:09:58 - 03.05.2022
7320.800000	14	-25	0	39	---	12:13:25 - 03.05.2022
7320.800000	14	-25	0	39	---	12:08:30 - 03.05.2022
12200.400000	21	-22	0	43	---	12:05:32 - 03.05.2022
12201.200000	21	-22	0	43	---	12:11:44 - 03.05.2022

4.03a_BLE_LE_high_1-15G

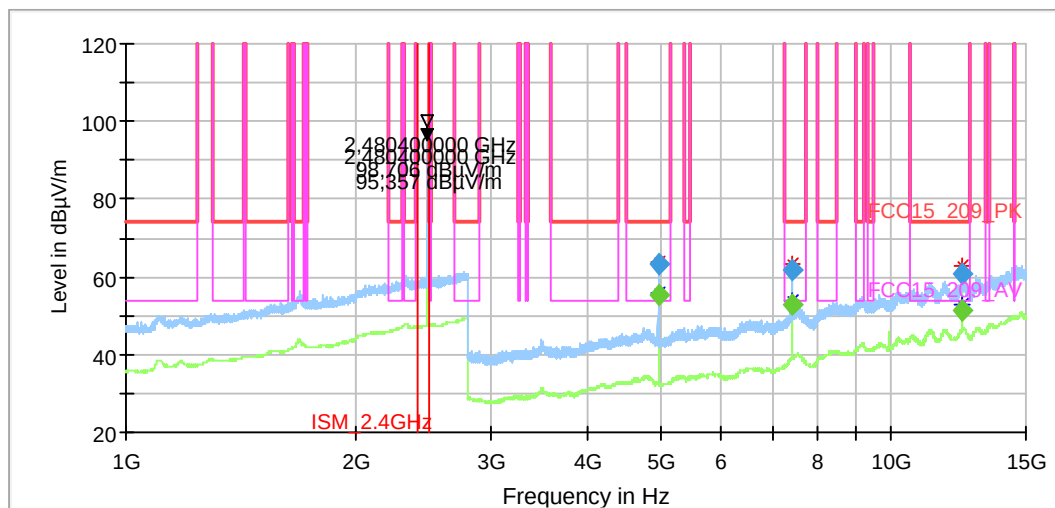
Common Information

Test Description:	Radiated field strength emission in 3m distance
Test Site:	Fully Anechoic Chamber (FAC1) - EMC32 V10.60.20
Test Standard:	FCC 15.247&15.209 Intentional Radiator / RSS-Gen, Issue 5
Antenna polarisation:	horizontal/vertical
Operating Mode:	1
Set-up no.	1
Operator:	npe
Comment:	-
Comment2:	-
Environmental Conditions:	Humidity : 41% rH; Temperature: 21 °C
Verdict:	Passed

EUT Information

PMT number:	21-1-01714S16_C01
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Full Spectrum



Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)
4959.600000	63.47	---	74.00	10.53	100.0	1000.000	155.0	H	268.0	90.0
4960.400000	---	45.75 *)	54.00	8.25	100.0	1000.000	155.0	H	268.0	90.0
7440.800000	---	52.76	54.00	1.24	100.0	1000.000	155.0	V	216.0	90.0
7440.800000	61.69	---	74.00	12.31	100.0	1000.000	155.0	V	222.0	90.0
12401.200000	61.03	---	74.00	12.97	100.0	1000.000	155.0	H	315.0	90.0
12401.200000	---	51.22	54.00	2.78	100.0	1000.000	155.0	H	324.0	90.0

*) Duty Cycle correction factor applied (17.72 dB) on Peak Value to determine Average value.



4.01c_BLE_LE_low_15-18G_AntV

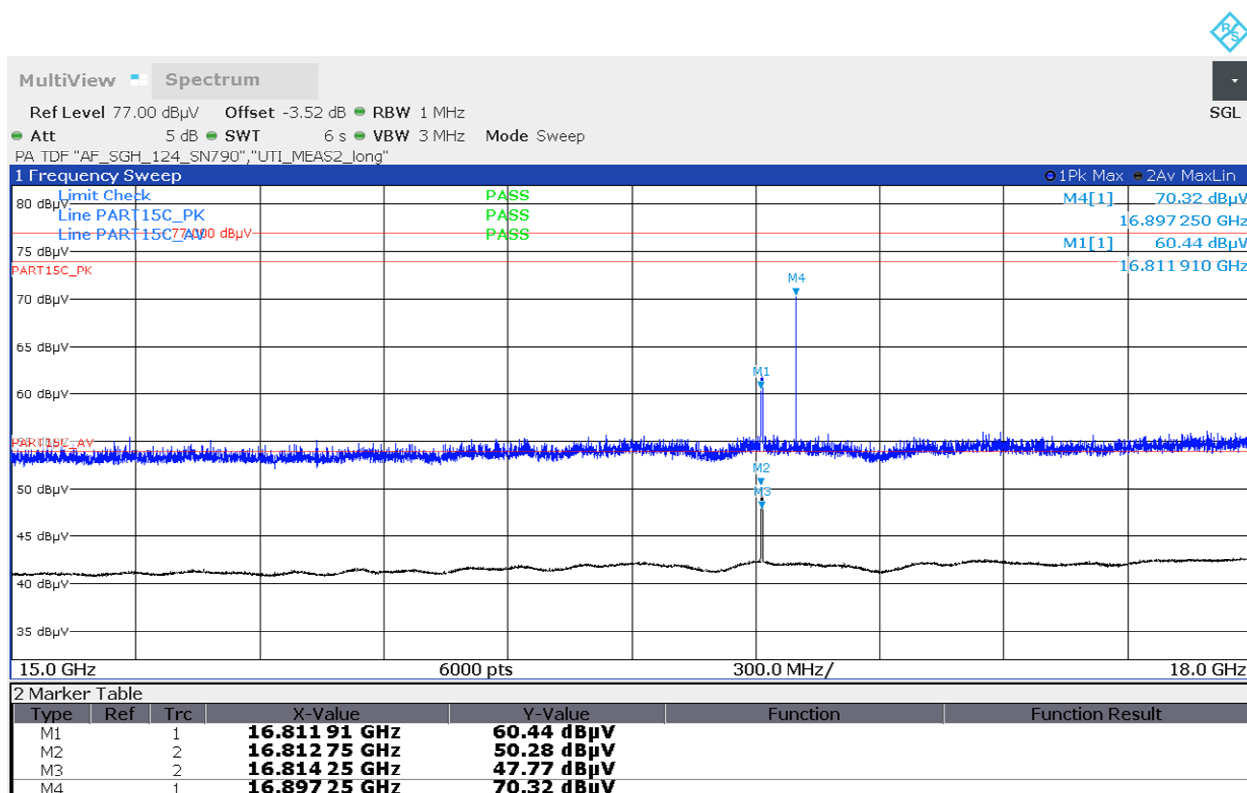
Common Information

Test Description: Radiated field strength emission in 3m distance
 Test Site: Fully Anechoic Chamber (FAC1) - EMC32 V10.60.20
 Test Standard: FCC 15.247&15.209 Intentional Radiator / RSS-Gen, Issue 5
 Antenna polarisation: horizontal/vertical

Operating Mode: 1
 Set-up no. 1
 Operator: Lor
 Comment: -
 Comment2: -
 Environmental Conditions: Humidity : 41% rH; Temperature: 21 °C
 Verdict: Passed

EUT Information

PMT number: 21-1-01714S16_C01



4.02b_BLE_LE_low_15-18G_AntH

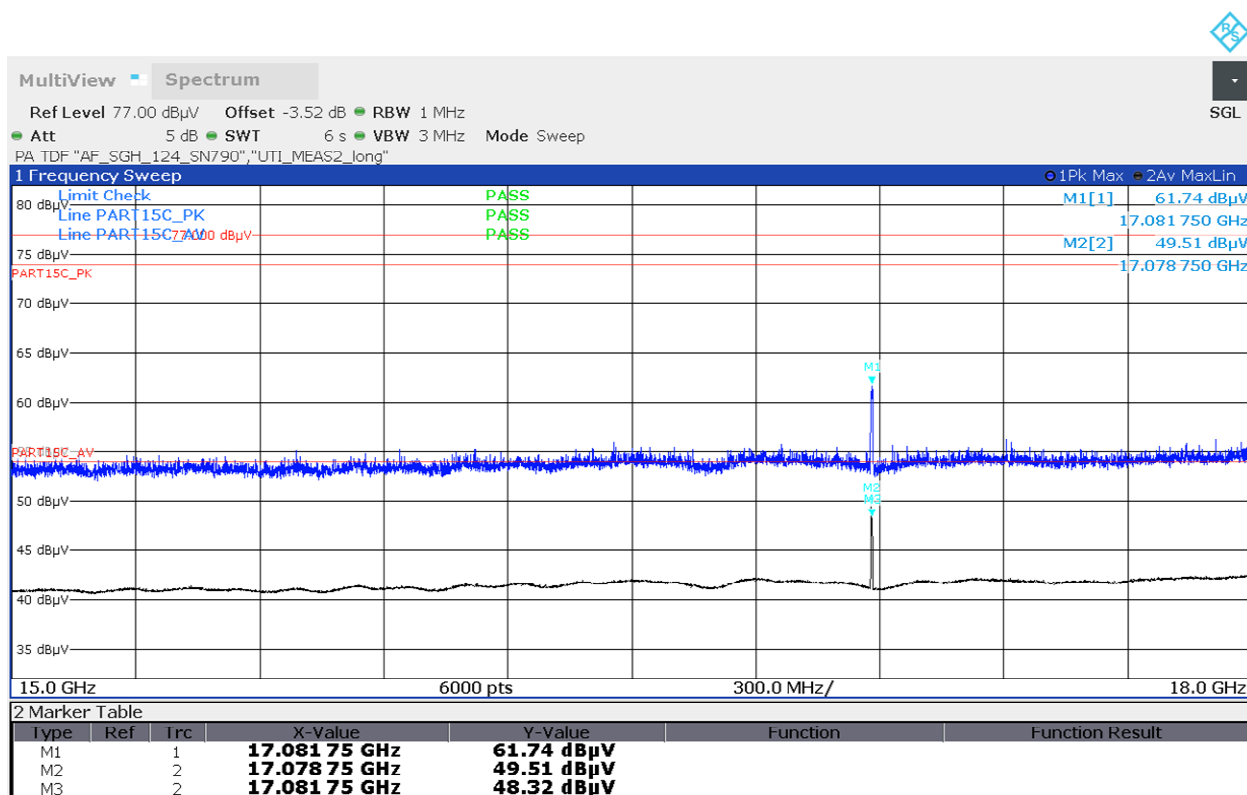
Common Information

Test Description: Radiated field strength emission in 3m distance
 Test Site: Fully Anechoic Chamber (FAC1) - EMC32 V10.60.20
 Test Standard: FCC 15.247&15.209 Intentional Radiator / RSS-Gen, Issue 5
 Antenna polarisation: horizontal/vertical

Operating Mode: 1
 Set-up no. 1
 Operator: Lor
 Comment: -
 Comment2: -
 Environmental Conditions: Humidity : 41% rH; Temperature: 21 °C
 Verdict: Passed

EUT Information

PMT number: 21-1-01714S16_C01



4.02c_BLE_LE_low_15-18G_AntV

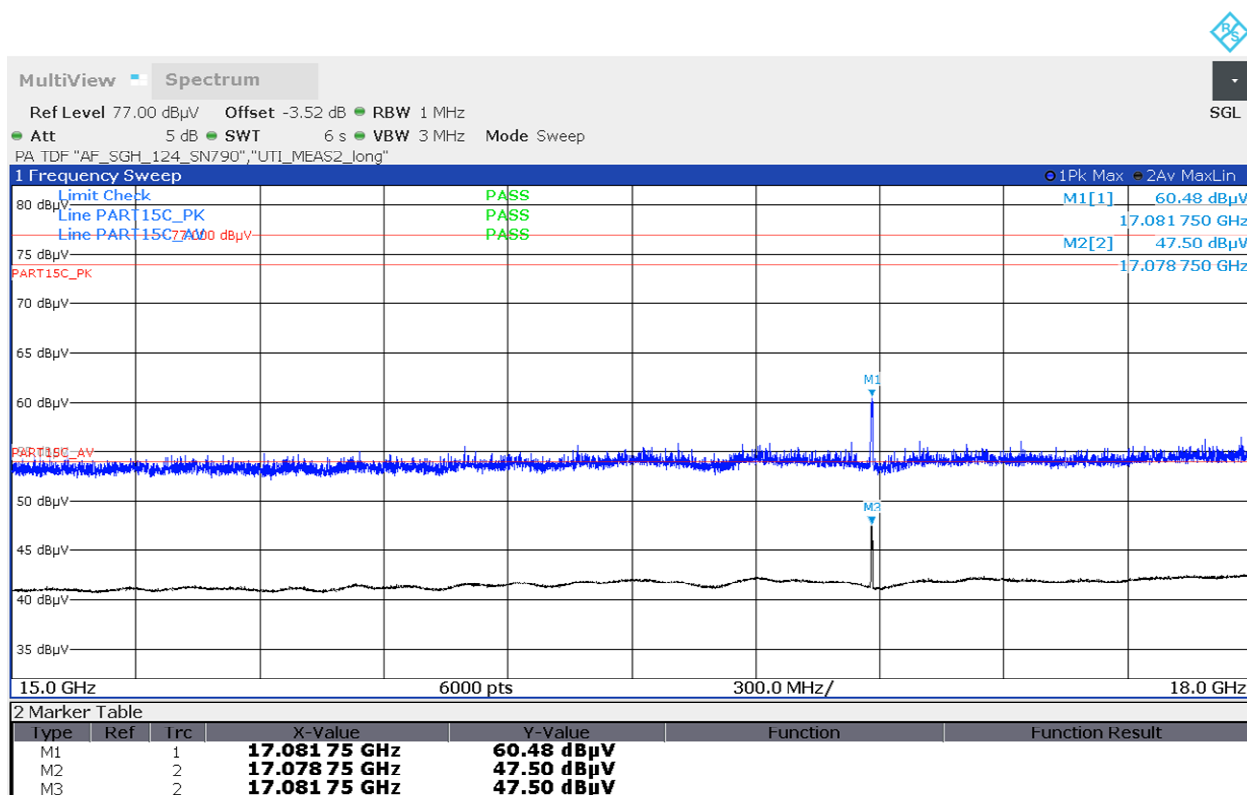
Common Information

Test Description: Radiated field strength emission in 3m distance
 Test Site: Fully Anechoic Chamber (FAC1) - EMC32 V10.60.20
 Test Standard: FCC 15.247&15.209 Intentional Radiator / RSS-Gen, Issue 5
 Antenna polarisation: horizontal/vertical

Operating Mode: 1
 Set-up no. 1
 Operator: Lor
 Comment: -
 Comment2: -
 Environmental Conditions: Humidity : 41% rH; Temperature: 21 °C
 Verdict: Passed

EUT Information

PMT number: 21-1-01714S16_C01



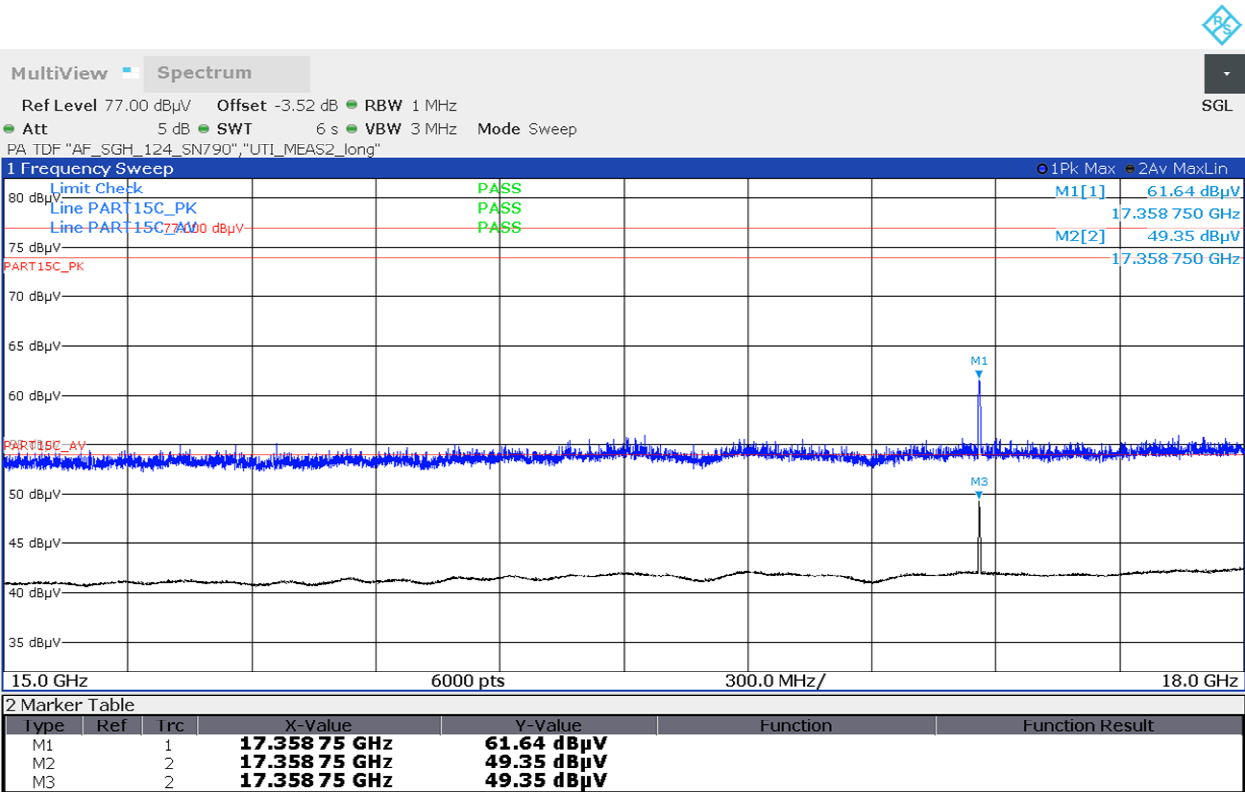
4.03b_BLE_LE_high_15-18G_AntH

Common Information

Test Description:	Radiated field strength emission in 3m distance
Test Site:	Fully Anechoic Chamber (FAC1) - EMC32 V10.60.20
Test Standard:	FCC 15.247&15.209 Intentional Radiator / RSS-Gen, Issue 5
Antenna polarisation:	horizontal/vertical
Operating Mode:	1
Set-up no.	1
Operator:	Lor
Comment:	-
Comment2:	-
Environmental Conditions:	Humidity : 41% rH; Temperature: 21 °C
Verdict:	Passed

EUT Information

PMT number:	21-1-01714S16_C01
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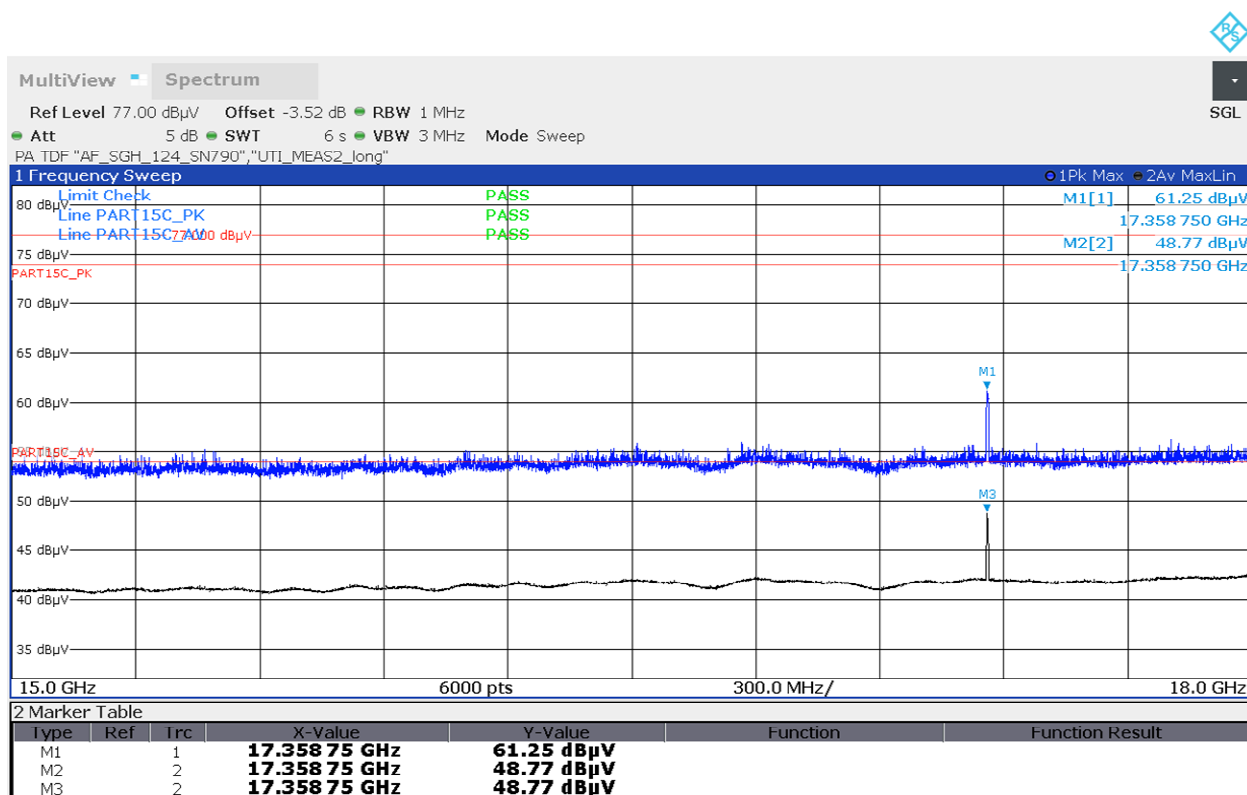
4.03c_BLE_LE_high_15-18G_AntV

Common Information

Test Description:	Radiated field strength emission in 3m distance
Test Site:	Fully Anechoic Chamber (FAC1) - EMC32 V10.60.20
Test Standard:	FCC 15.247&15.209 Intentional Radiator / RSS-Gen, Issue 5
Antenna polarisation:	horizontal/vertical
Operating Mode:	1
Set-up no.	1
Operator:	Lor
Comment:	-
Comment2:	-
Environmental Conditions:	Humidity : 41% rH; Temperature: 21 °C
Verdict:	Passed

EUT Information

PMT number:	21-1-01714S16_C01
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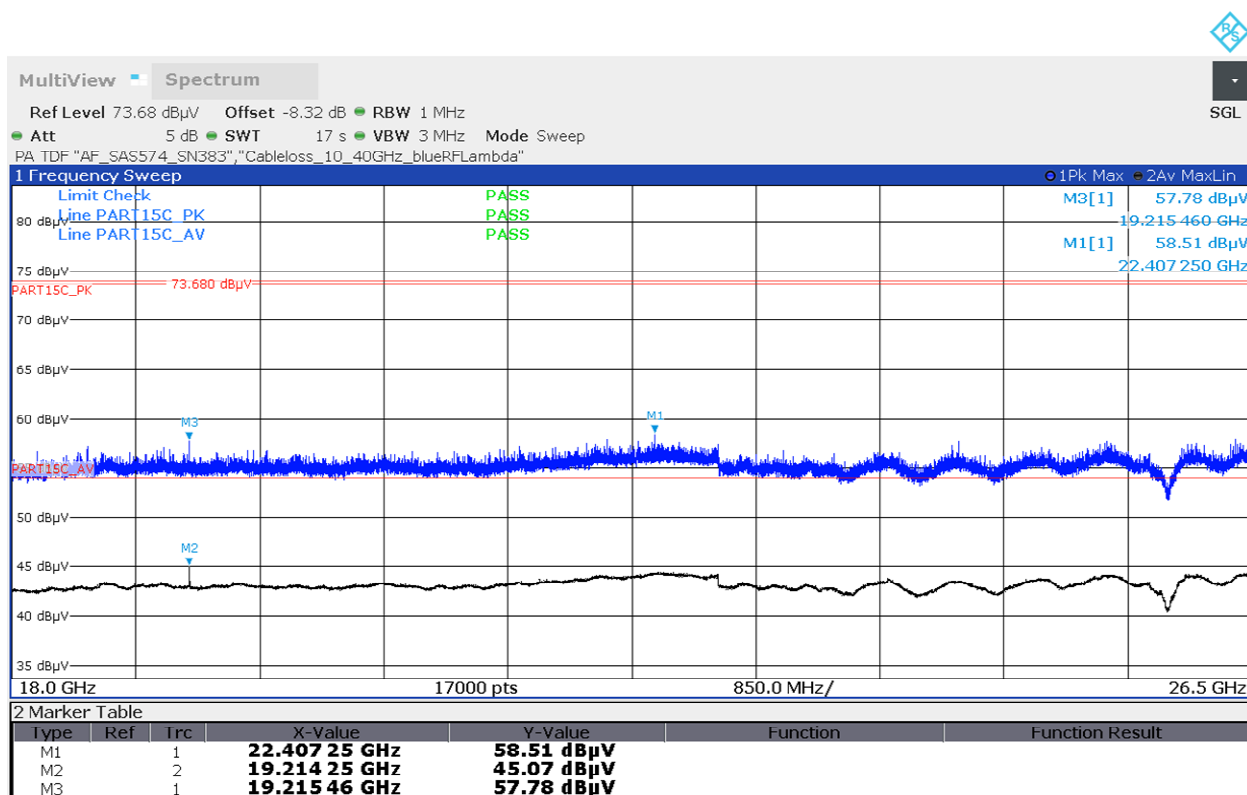
4.01d_BLE_LE_low_18-26.5G_AntH

Common Information

Test Description:	Radiated field strength emission in 3m distance
Test Site:	Fully Anechoic Chamber (FAC1) - EMC32 V10.60.20
Test Standard:	FCC 15.247&15.209 Intentional Radiator / RSS-Gen, Issue 5
Antenna polarisation:	horizontal/vertical
Operating Mode:	1
Set-up no.	1
Operator:	Lor
Comment:	-
Comment2:	-
Environmental Conditions:	Humidity : 41% rH; Temperature: 21 °C
Verdict:	Passed

EUT Information

PMT number:	21-1-01714S16_C01
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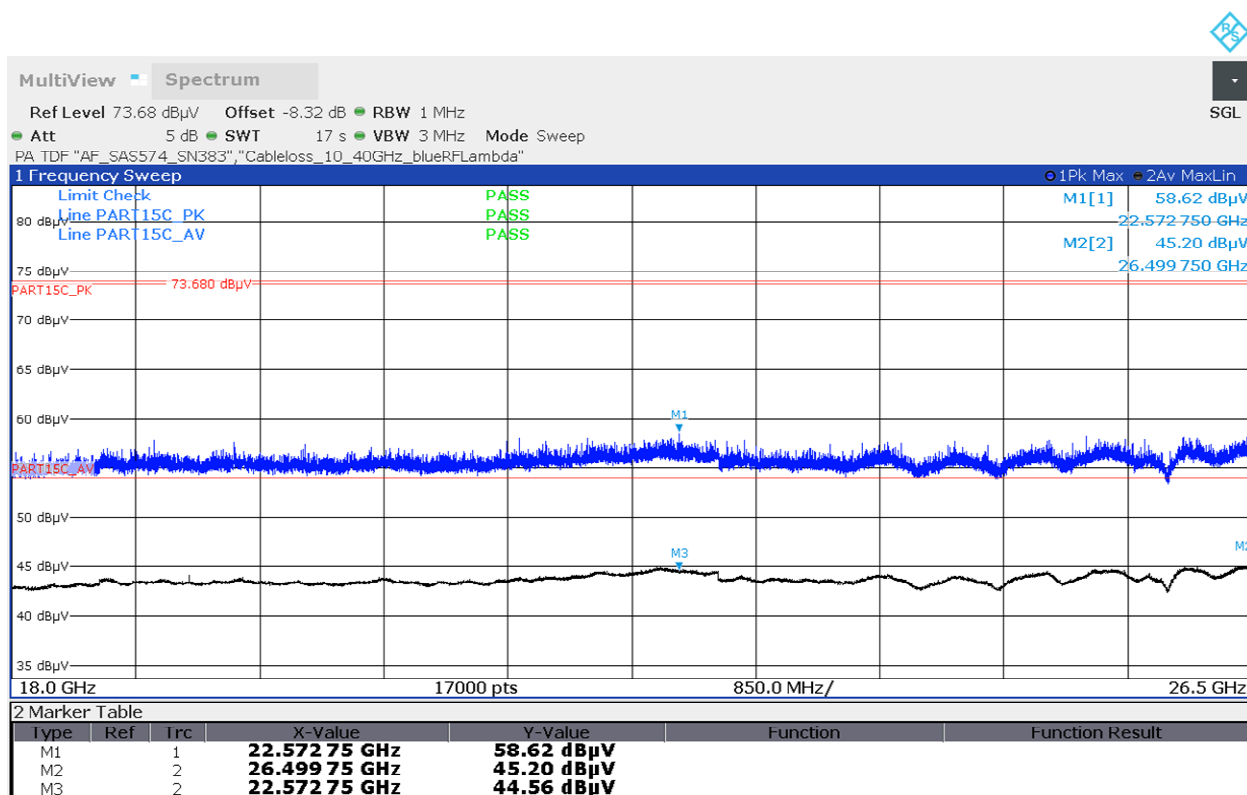
4.01e_BLE_LE_low_18-26.5G_AntV

Common Information

Test Description:	Radiated field strength emission in 3m distance
Test Site:	Fully Anechoic Chamber (FAC1) - EMC32 V10.60.20
Test Standard:	FCC 15.247&15.209 Intentional Radiator / RSS-Gen, Issue 5
Antenna polarisation:	horizontal/vertical
Operating Mode:	1
Set-up no.	1
Operator:	Lor
Comment:	-
Comment2:	-
Environmental Conditions:	Humidity : 41% rH; Temperature: 21 °C
Verdict:	Passed

EUT Information

PMT number:	21-1-01714S16_C01
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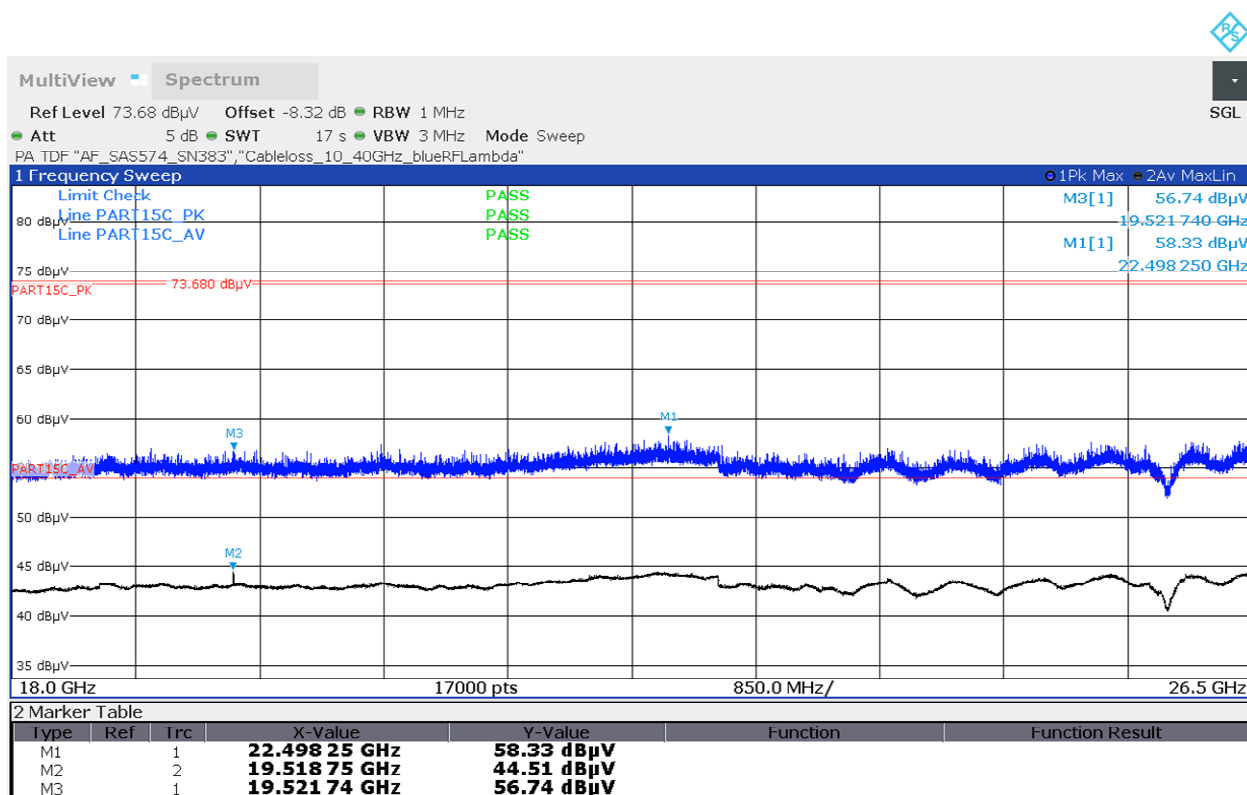
4.02d_BLE_LE_low_18-26.5G_AntH

Common Information

Test Description:	Radiated field strength emission in 3m distance
Test Site:	Fully Anechoic Chamber (FAC1) - EMC32 V10.60.20
Test Standard:	FCC 15.247&15.209 Intentional Radiator / RSS-Gen, Issue 5
Antenna polarisation:	horizontal/vertical
Operating Mode:	1
Set-up no.	1
Operator:	Lor
Comment:	-
Comment2:	-
Environmental Conditions:	Humidity : 41% rH; Temperature: 21 °C
Verdict:	Passed

EUT Information

PMT number:	21-1-01714S16_C01
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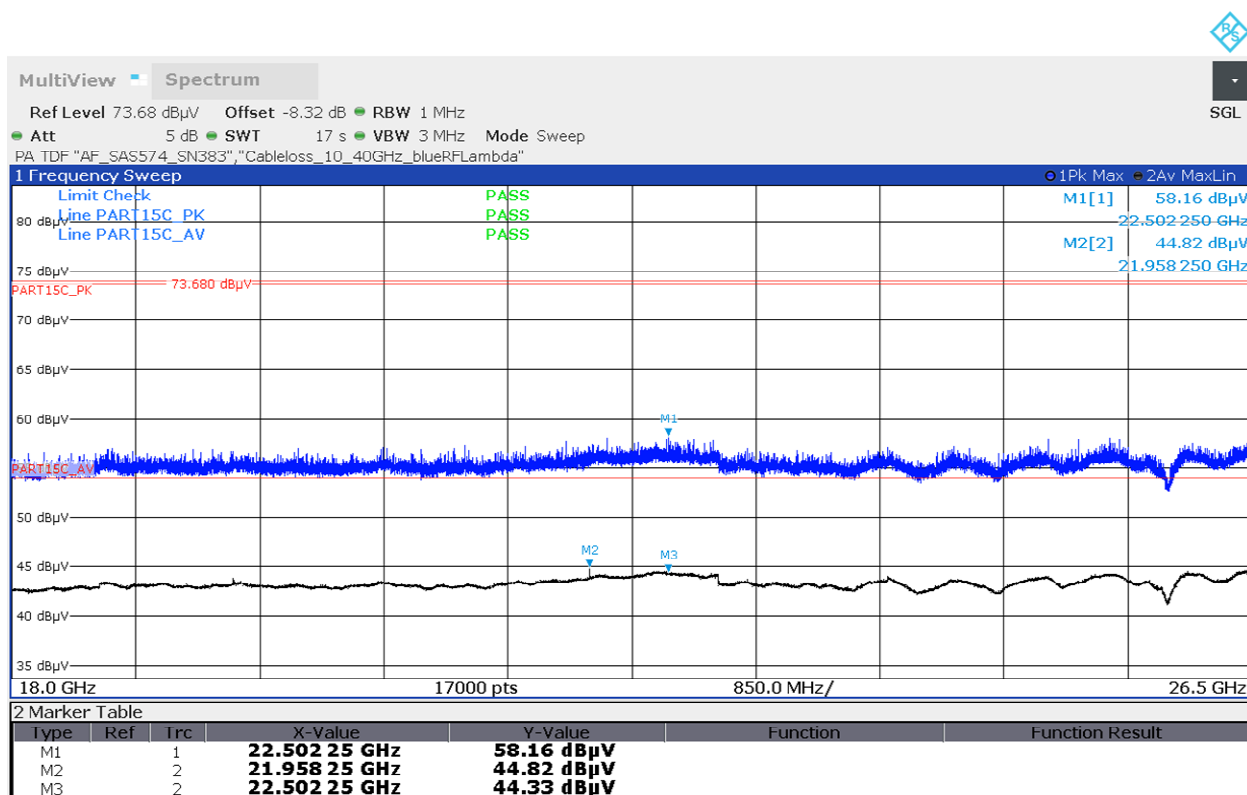
4.02e_BLE_LE_low_18-26.5G_AntV

Common Information

Test Description:	Radiated field strength emission in 3m distance
Test Site:	Fully Anechoic Chamber (FAC1) - EMC32 V10.60.20
Test Standard:	FCC 15.247&15.209 Intentional Radiator / RSS-Gen, Issue 5
Antenna polarisation:	horizontal/vertical
Operating Mode:	1
Set-up no.	1
Operator:	Lor
Comment:	-
Comment2:	-
Environmental Conditions:	Humidity : 41% rH; Temperature: 21 °C
Verdict:	Passed

EUT Information

PMT number:	21-1-01714S16_C01
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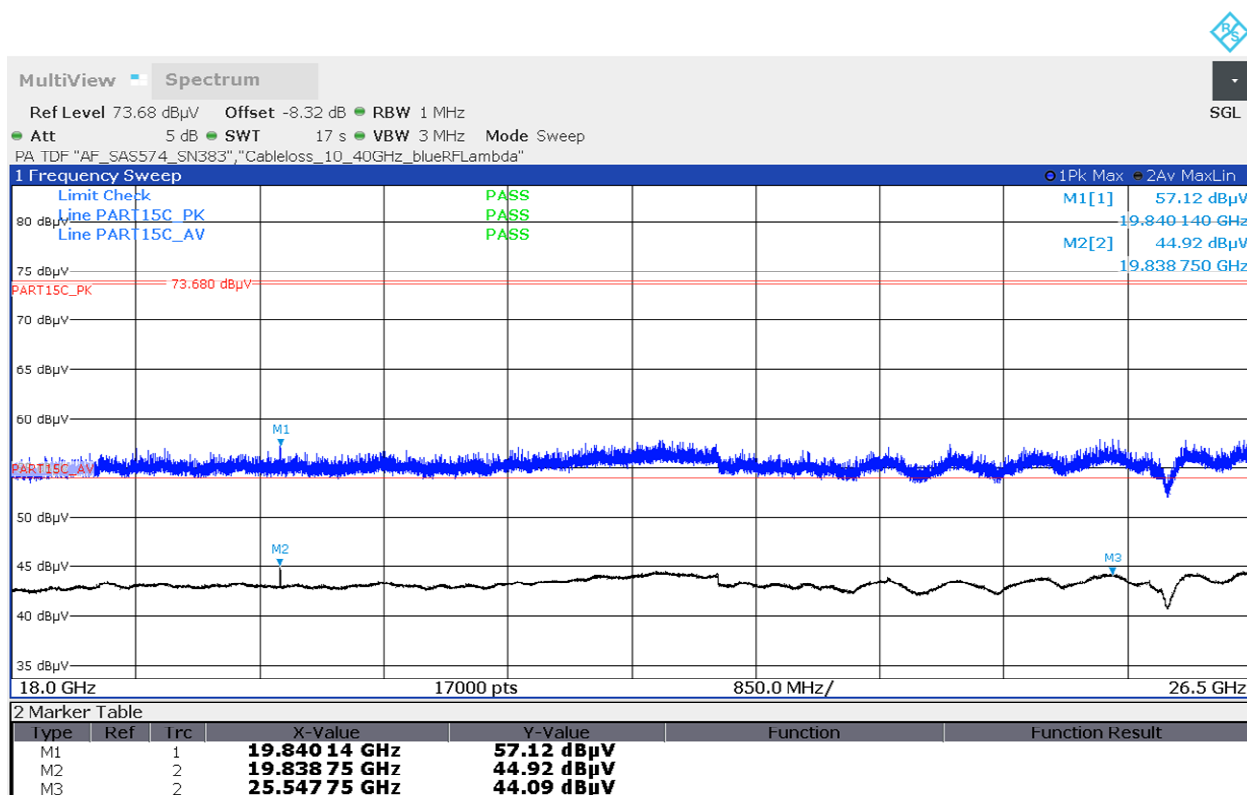
4.03d_BLE_LE_high_18-26.5G_AntH

Common Information

Test Description:	Radiated field strength emission in 3m distance
Test Site:	Fully Anechoic Chamber (FAC1) - EMC32 V10.60.20
Test Standard:	FCC 15.247&15.209 Intentional Radiator / RSS-Gen, Issue 5
Antenna polarisation:	horizontal/vertical
Operating Mode:	1
Set-up no.	1
Operator:	Lor
Comment:	-
Comment2:	-
Environmental Conditions:	Humidity : 41% rH; Temperature: 21 °C
Verdict:	Passed

EUT Information

PMT number:	21-1-01714S16_C01
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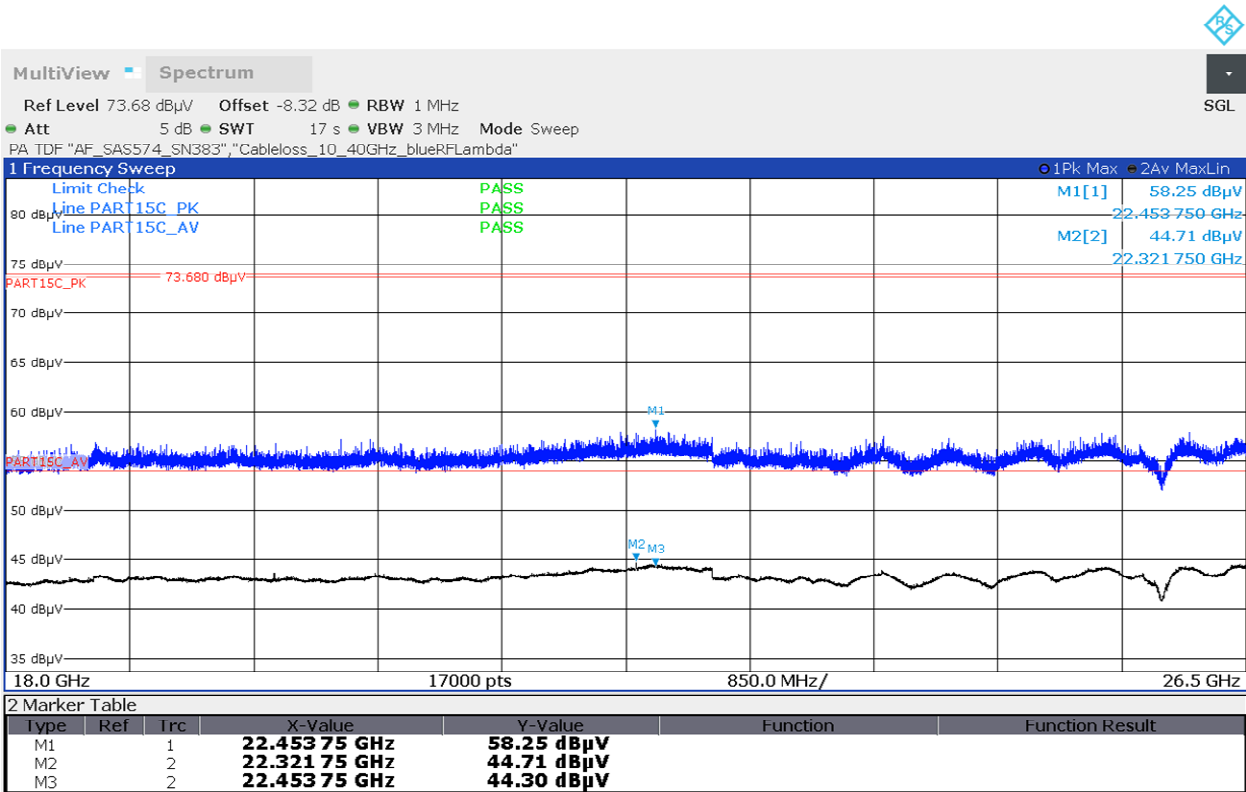
4.03e_BLE_LE_high_18-26.5G_AntV

Common Information

Test Description:	Radiated field strength emission in 3m distance
Test Site:	Fully Anechoic Chamber (FAC1) - EMC32 V10.60.20
Test Standard:	FCC 15.247&15.209 Intentional Radiator / RSS-Gen, Issue 5
Antenna polarisation:	horizontal/vertical
Operating Mode:	1
Set-up no.	1
Operator:	Lor
Comment:	-
Comment2:	-
Environmental Conditions:	Humidity : 41% rH; Temperature: 21 °C
Verdict:	Passed

EUT Information

PMT number:	21-1-01714S16_C01
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9.01_BE_BLE_LE_low

Common Information

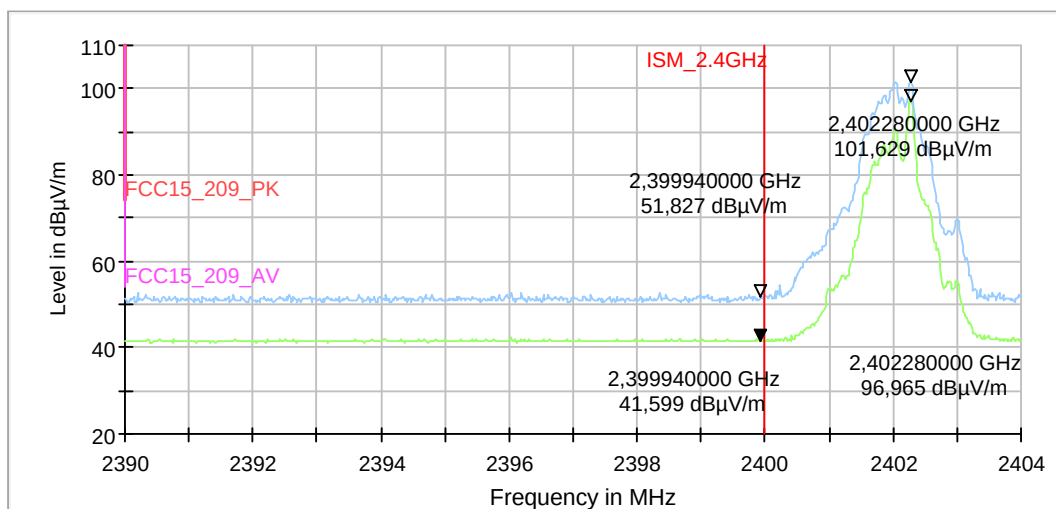
Test Description:	Band-Edge: Radiated Field Strength Emissions Emissions in 3m distance
Test Site:	Fully Anechoic Chamber (FAC1) - EMC32 V10.60.20
Test Standard:	FCC 15.247&15.209 Intentional Radiator / RSS-Gen, Issue 5
Antenna polarisation:	horizontal/vertical

Operating Mode:	1
Operator:	1
Comment:	-
Comment2:	-
EUT Setup:	1
Verdict:	Passed

EUT Information

PMT number:	21-1-01714S16_C01
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Full Spectrum



9.02_BE_BLE_LE_high

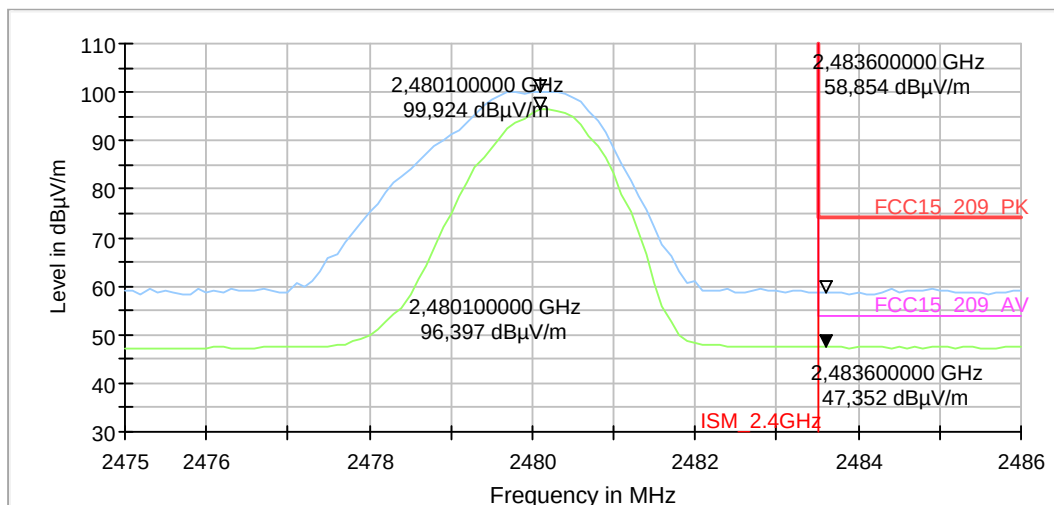
Common Information

Test Description:	Band-Edge: Radiated Field Strength Emissions Emissions in 3m distance
Test Site:	Fully Anechoic Chamber (FAC1) - EMC32 V10.60.20
Test Standard:	FCC 15.247&15.209 Intentional Radiator / RSS-Gen, Issue 5
Antenna polarisation:	horizontal/vertical
Operating Mode:	1
Operator:	1
Comment:	-
Comment2:	-
EUT Setup:	1
Verdict:	Passed

EUT Information

PMT number:	21-1-01714S16_C01
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Full Spectrum



1.2 Conucted measurements

Peak output power (Sweep)

Mode	DUT Frequency (MHz)	Peak Power (dBm)	Limit Max (dBm)	Result
BLE [GFSK]; 2402MHz	2402.000000	3.3	30.0	PASS
BLE [GFSK]; 2440MHz	2440.000000	3.2	30.0	PASS
BLE [GFSK]; 2480MHz	2480.000000	3.4	30.0	PASS

Minimum Emission Bandwidth 6 dB

Mode	DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
BLE [GFSK]; 2402MHz	2402.0000	0.673268	0.500000	---	2401.6831	2402.3564
BLE [GFSK]; 2440MHz	2440.0000	0.673268	0.500000	---	2439.6831	2440.3564
BLE [GFSK]; 2480MHz	2480.0000	0.673268	0.500000	---	2479.6831	2480.3564

Emission Bandwidth 20 dB

Mode	DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
BLE [GFSK]; 2402MHz	2402.0000	0.680000	---	---	2401.6475	2402.3275
BLE [GFSK]; 2440MHz	2440.0000	0.680000	---	---	2439.6475	2440.3275
BLE [GFSK]; 2480MHz	2480.0000	0.680000	---	---	2479.6475	2480.3275

Peak Power Spectral Density

Mode	DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
BLE [GFSK]; 2402MHz	2402.000000	2402.262500	3.199	8.0	PASS
BLE [GFSK]; 2440MHz	2440.000000	2440.262500	3.027	8.0	PASS
BLE [GFSK]; 2480MHz	2480.000000	2480.262500	3.242	8.0	PASS

Occupied Channel Bandwidth 99%

Mode	DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
BLE [GFSK]; 2402MHz	2402.0000	0.935000	---	---	2401.5475	2402.4825
BLE [GFSK]; 2440MHz	2440.0000	0.935000	---	---	2439.5425	2440.4775
BLE [GFSK]; 2480MHz	2480.0000	0.920000	---	---	2479.5475	2480.4675

Tx Spurious Emission

Mode	DUT Frequency (MHz)	Result
BLE [GFSK]; 2402MHz	2402.000000	PASS
BLE [GFSK]; 2440MHz	2440.000000	PASS
BLE [GFSK]; 2480MHz	2480.000000	PASS

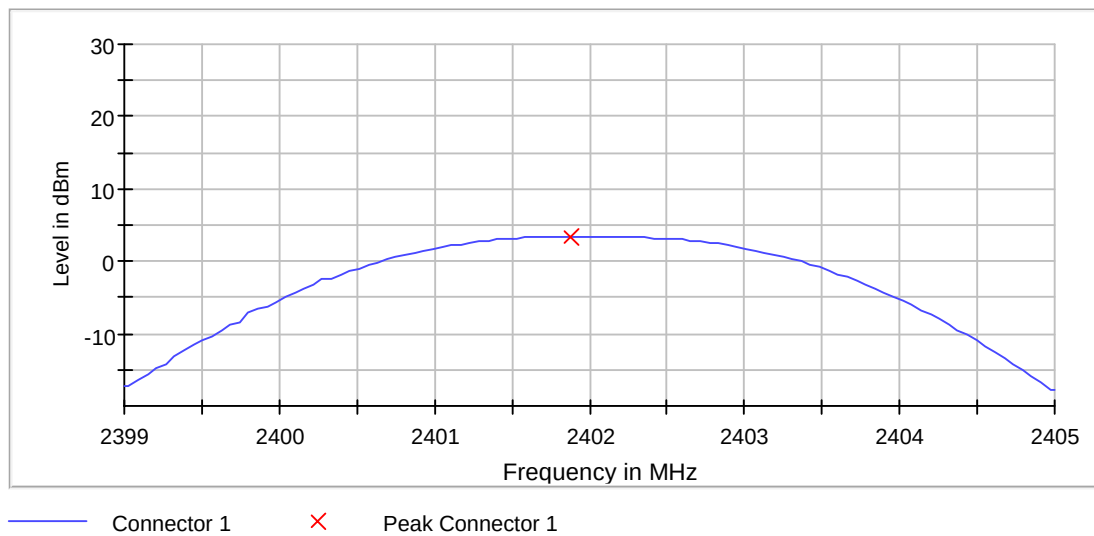
Peak output power (Sweep) (2402 MHz; BLE [GFSK] 1Mbps (10 dBm); 1 MHz)

Test according to FCC title 47 part 15 §15.247(b), KDB 558074 D01 DTS Meas Guidance v05r02 and ANSI C63.10-2013

Result

DUT Frequency (MHz)	Peak Power (dBm)	Limit Max (dBm)	Result
2402.000000	3.3	30.0	PASS

Peak Power



Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.39900 GHz	2.39900 GHz
Stop Frequency	2.40500 GHz	2.40500 GHz
Span	6.000 MHz	6.000 MHz
RBW	2.000 MHz	>= 1.000 MHz
VBW	10.000 MHz	>= 6.000 MHz
SweepPoints	101	~ 101
SweepTime	1.000 ms	AUTO
Reference Level	10.000 dBm	10.000 dBm
Attenuation	20.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	Sweep	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	4 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.05 dB	0.50 dB

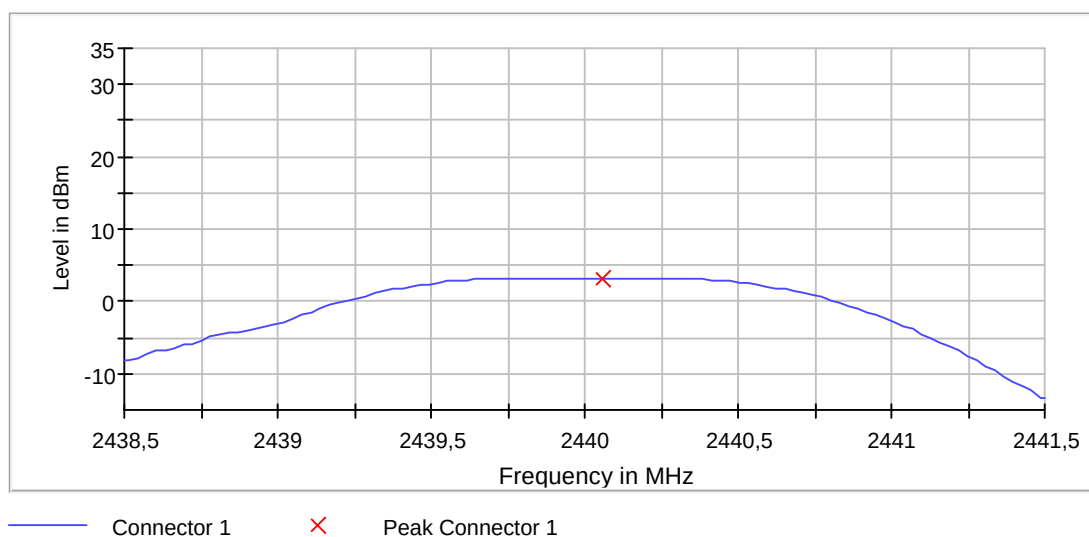
Peak output power (Sweep) (2440 MHz; BLE [GFSK] 1Mbps (10 dBm); 1 MHz)

Test according to FCC title 47 part 15 §15.247(b), KDB 558074 D01 DTS Meas Guidance v05r02 and ANSI C63.10-2013

Result

DUT Frequency (MHz)	Peak Power (dBm)	Limit Max (dBm)	Result
2440.000000	3.2	30.0	PASS

Peak Power



Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.43850 GHz	2.43850 GHz
Stop Frequency	2.44150 GHz	2.44150 GHz
Span	3.000 MHz	3.000 MHz
RBW	1.000 MHz	>= 673.269 kHz
VBW	3.000 MHz	>= 3.000 MHz
SweepPoints	101	~ 101
SweepTime	1.000 ms	AUTO
Reference Level	10.000 dBm	10.000 dBm
Attenuation	20.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	Sweep	AUTO
Preamplifier	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	4 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.08 dB	0.50 dB

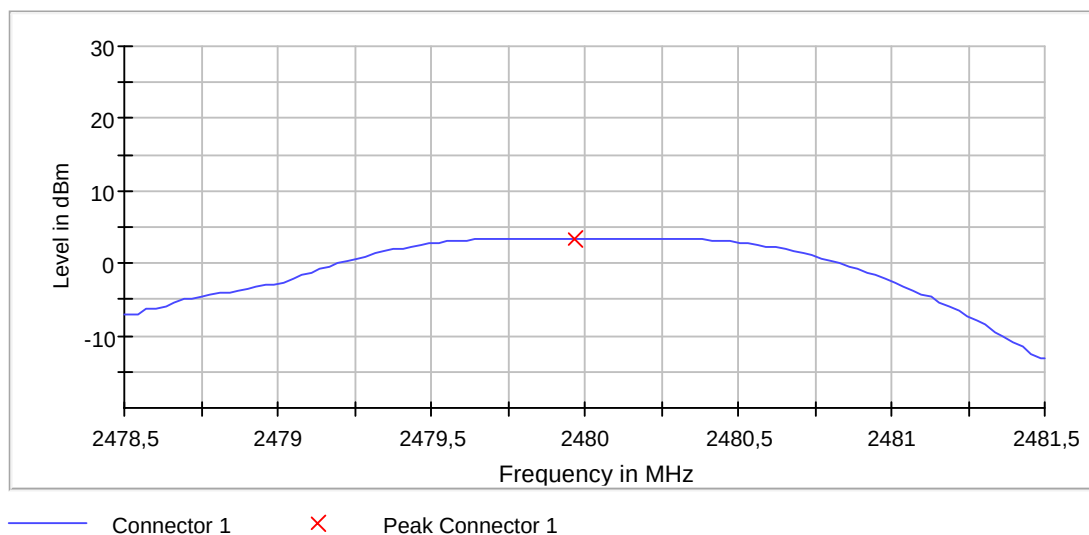
Peak output power (Sweep) (2480 MHz; BLE [GFSK] 1Mbps (10 dBm); 1 MHz)

Test according to FCC title 47 part 15 §15.247(b), KDB 558074 D01 DTS Meas Guidance v05r02 and ANSI C63.10-2013

Result

DUT Frequency (MHz)	Peak Power (dBm)	Limit Max (dBm)	Result
2480.000000	3.4	30.0	PASS

Peak Power



Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.47850 GHz	2.47850 GHz
Stop Frequency	2.48150 GHz	2.48150 GHz
Span	3.000 MHz	3.000 MHz
RBW	1.000 MHz	≥ 673.269 kHz
VBW	3.000 MHz	≥ 3.000 MHz
SweepPoints	101	~ 101
SweepTime	1.000 ms	AUTO
Reference Level	10.000 dBm	10.000 dBm
Attenuation	20.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	Sweep	AUTO
Preamplifier	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	4 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.17 dB	0.50 dB

Minimum Emission Bandwidth 6 dB (2402 MHz; BLE [GFSK] 1Mbps (10 dBm); 1 MHz)

Test according to FCC title 47 part 15 §15.247(a), KDB 558074 D01 DTS Meas Guidance v05r02 and ANSI C63.10-2013

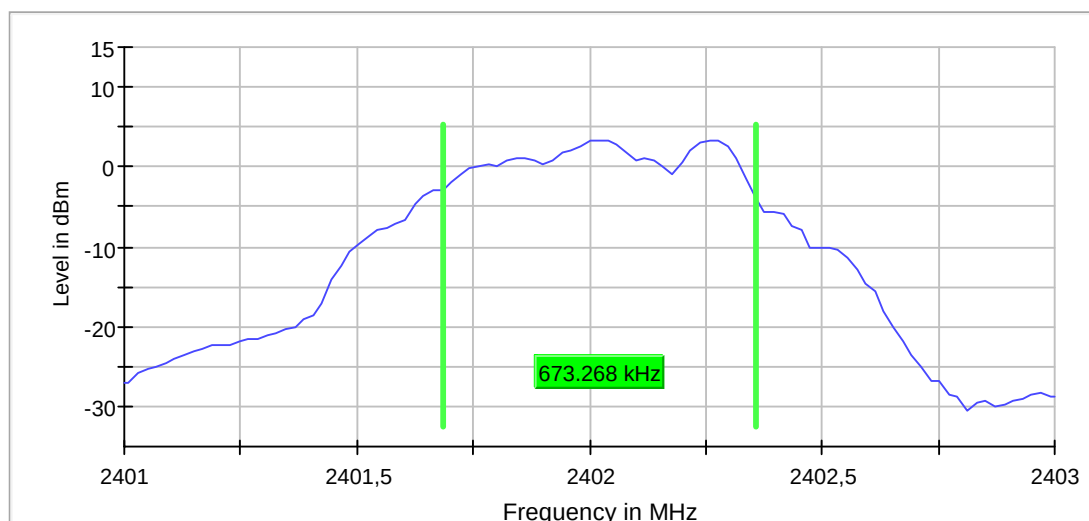
6 dB Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
2402.000000	0.673268	0.500000	---	2401.683168	2402.356436

(continuation of the "6 dB Bandwidth" table from column 6 ...)

DUT Frequency (MHz)	Max Level (dBm)	Result
2402.000000	3.2	PASS

6 dB Bandwidth



Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.40100 GHz	2.40100 GHz
Stop Frequency	2.40300 GHz	2.40300 GHz
Span	2.000 MHz	2.000 MHz
RBW	100.000 kHz	~ 100.000 kHz
VBW	300.000 kHz	~ 300.000 kHz
SweepPoints	101	~ 40
SweepTime	1.000 ms	AUTO
Reference Level	0.000 dBm	0.000 dBm
Attenuation	10.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	Sweep	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	12 / max. 150	max. 150
Stable	5 / 5	5
Max Stable Difference	0.07 dB	0.50 dB

Minimum Emission Bandwidth 6 dB (2440 MHz; BLE [GFSK] 1Mbps (10 dBm); 1 MHz)

Test according to FCC title 47 part 15 §15.247(a), KDB 558074 D01 DTS Meas Guidance v05r02 and ANSI C63.10-2013

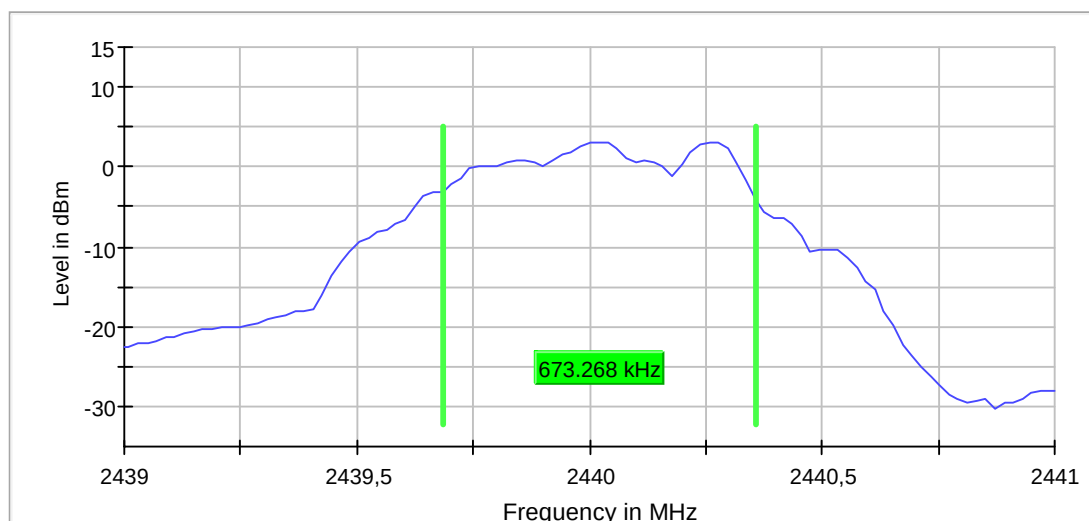
6 dB Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
2440.000000	0.673268	0.500000	---	2439.683168	2440.356436

(continuation of the "6 dB Bandwidth" table from column 6 ...)

DUT Frequency (MHz)	Max Level (dBm)	Result
2440.000000	3.1	PASS

6 dB Bandwidth



Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.43900 GHz	2.43900 GHz
Stop Frequency	2.44100 GHz	2.44100 GHz
Span	2.000 MHz	2.000 MHz
RBW	100.000 kHz	~ 100.000 kHz
VBW	300.000 kHz	~ 300.000 kHz
SweepPoints	101	~ 40
SweepTime	1.000 ms	AUTO
Reference Level	0.000 dBm	0.000 dBm
Attenuation	10.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	Sweep	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	9 / max. 150	max. 150
Stable	5 / 5	5
Max Stable Difference	0.01 dB	0.50 dB

Minimum Emission Bandwidth 6 dB (2480 MHz; BLE [GFSK] 1Mbps (10 dBm); 1 MHz)

Test according to FCC title 47 part 15 §15.247(a), KDB 558074 D01 DTS Meas Guidance v05r02 and ANSI C63.10-2013

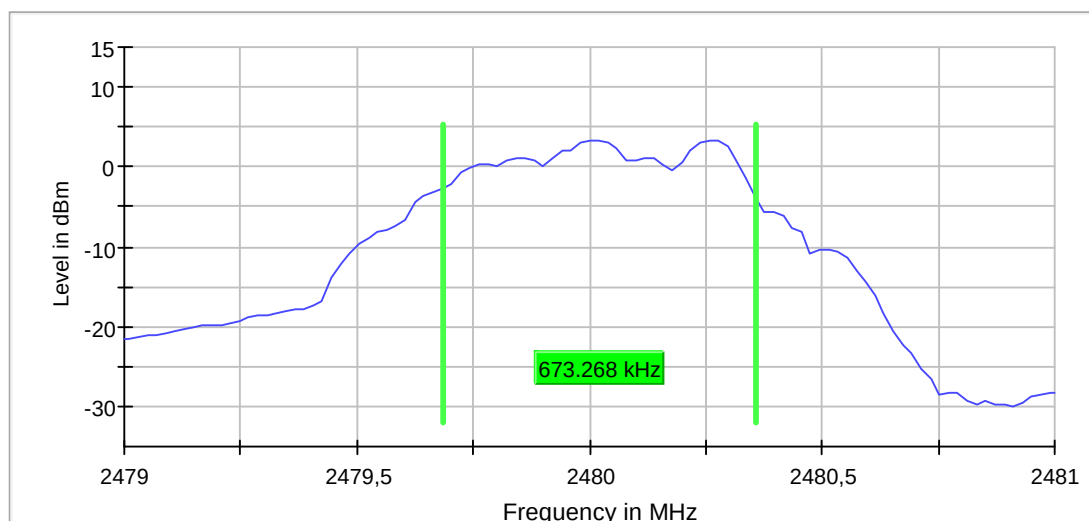
6 dB Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
2480.000000	0.673268	0.500000	---	2479.683168	2480.356436

(continuation of the "6 dB Bandwidth" table from column 6 ...)

DUT Frequency (MHz)	Max Level (dBm)	Result
2480.000000	3.3	PASS

6 dB Bandwidth



Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.47900 GHz	2.47900 GHz
Stop Frequency	2.48100 GHz	2.48100 GHz
Span	2.000 MHz	2.000 MHz
RBW	100.000 kHz	~ 100.000 kHz
VBW	300.000 kHz	~ 300.000 kHz
SweepPoints	101	~ 40
SweepTime	1.000 ms	AUTO
Reference Level	0.000 dBm	0.000 dBm
Attenuation	10.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	Sweep	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	7 / max. 150	max. 150
Stable	5 / 5	5
Max Stable Difference	0.11 dB	0.50 dB

Emission Bandwidth 20 dB (2402 MHz; BLE [GFSK] 1Mbps (10 dBm); 1 MHz)

Test according to FCC title 47 part 15 §15.247(a), KDB 558074 D01 DTS Meas Guidance v05r02 and ANSI C63.10-2013

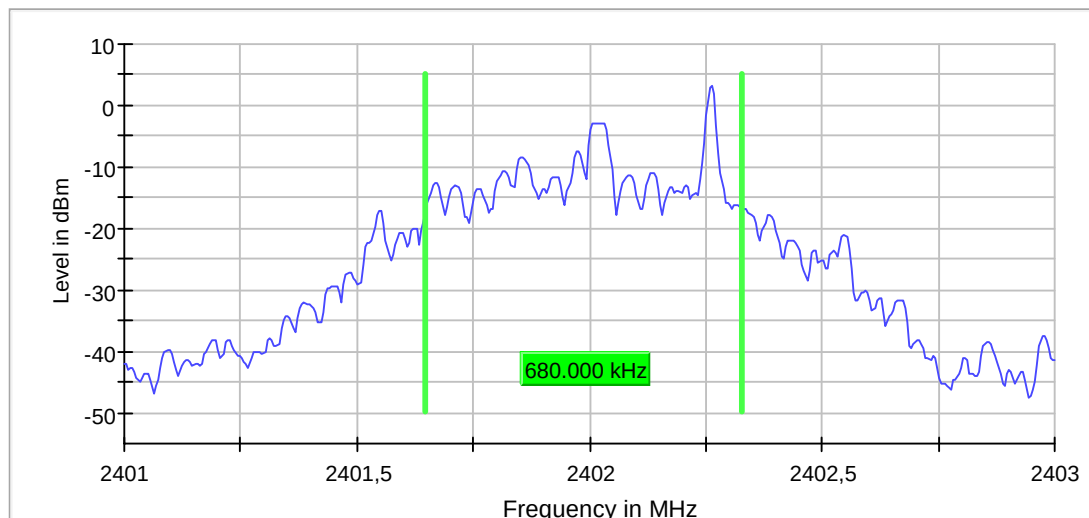
20 dB Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
2402.000000	0.680000	---	---	2401.647500	2402.327500

(continuation of the "20 dB Bandwidth" table from column 6 ...)

DUT Frequency (MHz)	Max Level (dBm)	Result
2402.000000	3.2	PASS

20 dB Bandwidth



Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.40100 GHz	2.40100 GHz
Stop Frequency	2.40300 GHz	2.40300 GHz
Span	2.000 MHz	2.000 MHz
RBW	10.000 kHz	>= 10.000 kHz
VBW	30.000 kHz	>= 30.000 kHz
SweepPoints	400	~ 400
SweepTime	2.000 ms	AUTO
Reference Level	0.000 dBm	0.000 dBm
Attenuation	10.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	Sweep	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	9 / max. 150	max. 150
Stable	5 / 5	5
Max Stable Difference	0.01 dB	0.50 dB

Emission Bandwidth 20 dB (2440 MHz; BLE [GFSK] 1Mbps (10 dBm); 1 MHz)

Test according to FCC title 47 part 15 §15.247(a), KDB 558074 D01 DTS Meas Guidance v05r02 and ANSI C63.10-2013

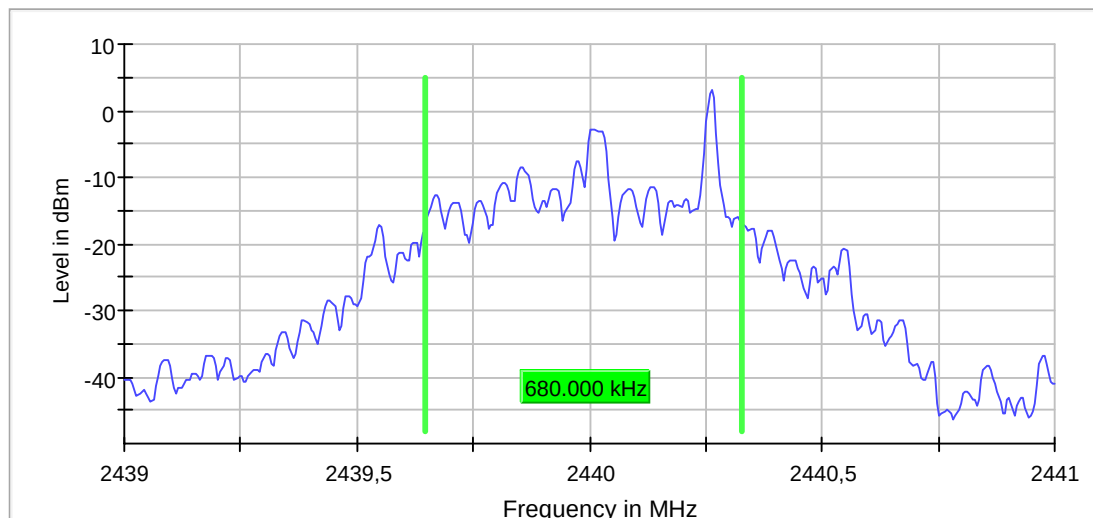
20 dB Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
2440.000000	0.680000	---	---	2439.647500	2440.327500

(continuation of the "20 dB Bandwidth" table from column 6 ...)

DUT Frequency (MHz)	Max Level (dBm)	Result
2440.000000	3.0	PASS

20 dB Bandwidth



Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.43900 GHz	2.43900 GHz
Stop Frequency	2.44100 GHz	2.44100 GHz
Span	2.000 MHz	2.000 MHz
RBW	10.000 kHz	>= 10.000 kHz
VBW	30.000 kHz	>= 30.000 kHz
SweepPoints	400	~ 400
SweepTime	2.000 ms	AUTO
Reference Level	0.000 dBm	0.000 dBm
Attenuation	10.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	Sweep	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	6 / max. 150	max. 150
Stable	5 / 5	5
Max Stable Difference	0.18 dB	0.50 dB

Emission Bandwidth 20 dB (2480 MHz; BLE [GFSK] 1Mbps (10 dBm); 1 MHz)

Test according to FCC title 47 part 15 §15.247(a), KDB 558074 D01 DTS Meas Guidance v05r02 and ANSI C63.10-2013

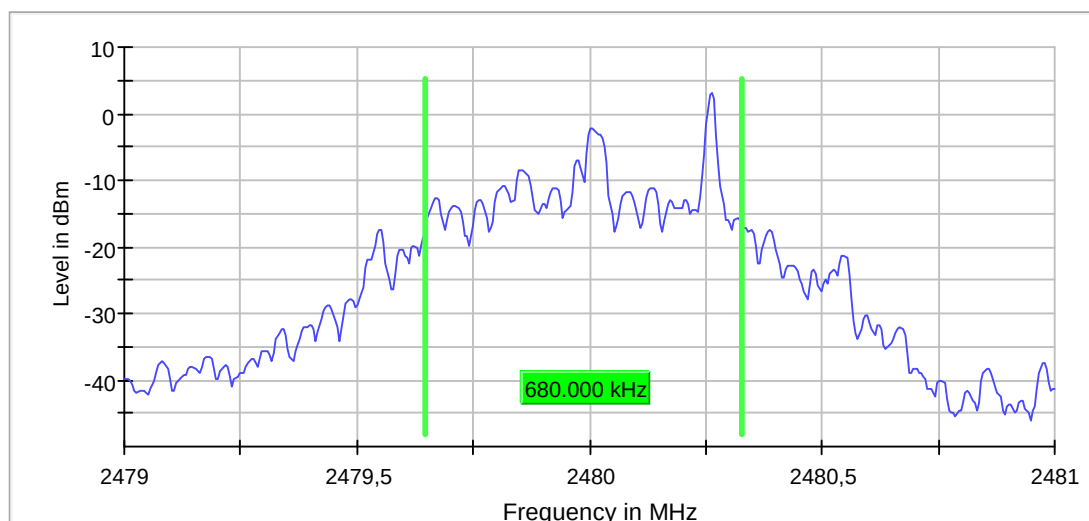
20 dB Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
2480.000000	0.680000	---	---	2479.647500	2480.327500

(continuation of the "20 dB Bandwidth" table from column 6 ...)

DUT Frequency (MHz)	Max Level (dBm)	Result
2480.000000	3.2	PASS

20 dB Bandwidth



Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.47900 GHz	2.47900 GHz
Stop Frequency	2.48100 GHz	2.48100 GHz
Span	2.000 MHz	2.000 MHz
RBW	10.000 kHz	>= 10.000 kHz
VBW	30.000 kHz	>= 30.000 kHz
SweepPoints	400	~ 400
SweepTime	2.000 ms	AUTO
Reference Level	0.000 dBm	0.000 dBm
Attenuation	10.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	Sweep	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	13 / max. 150	max. 150
Stable	5 / 5	5
Max Stable Difference	0.00 dB	0.50 dB

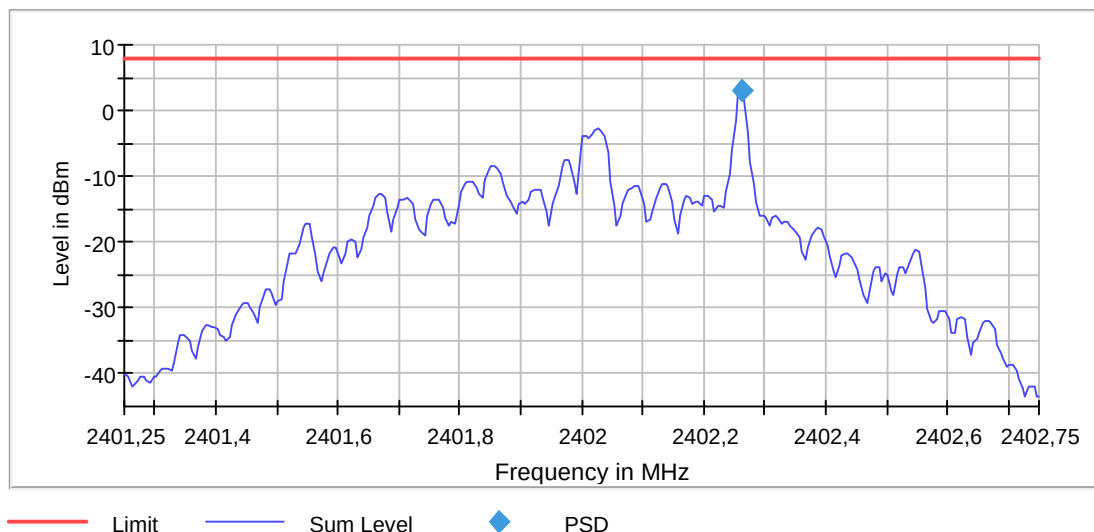
Peak Power Spectral Density (2402 MHz; BLE [GFSK] 1Mbps (10 dBm); 1 MHz)

Test according to FCC title 47 part 15 §15.247(a),(e), KDB 558074 D01 DTS Meas Guidance v05r02 and ANSI C63.10-2013

Result

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2402.000000	2402.262500	3.199	8.0	PASS

Peak Power Spectral Density



Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.40125 GHz	2.40125 GHz
Stop Frequency	2.40275 GHz	2.40275 GHz
Span	1.500 MHz	1.500 MHz
RBW	10.000 kHz	<= 10.000 kHz
VBW	30.000 kHz	>= 30.000 kHz
SweepPoints	300	~ 300
Sweeptime	1.500 ms	AUTO
Reference Level	0.000 dBm	0.000 dBm
Attenuation	10.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	Sweep	Sweep
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	3 / max. 150	max. 150
Stable	2 / 2	2
Max Stable Difference	0.10 dB	0.50 dB

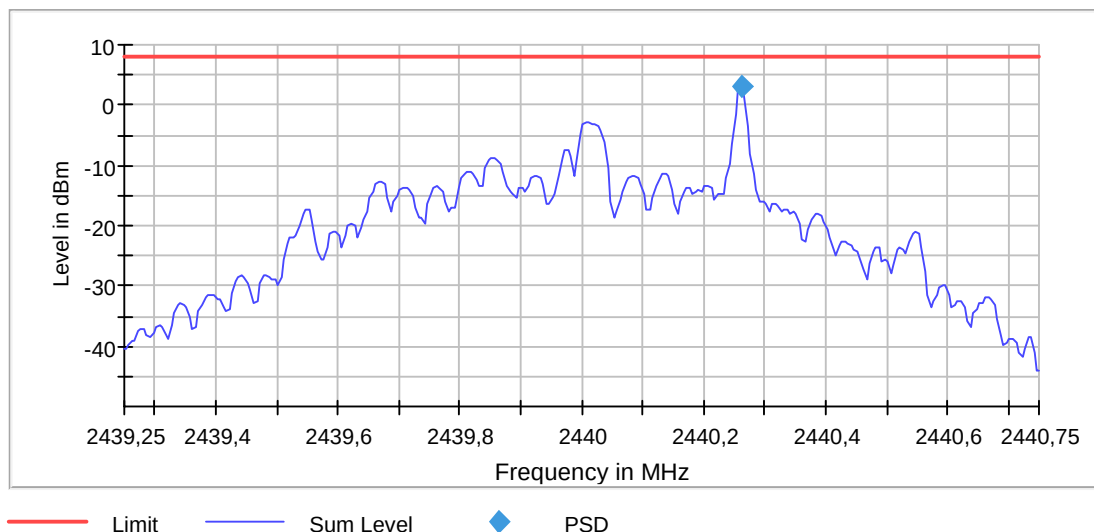
Peak Power Spectral Density (2440 MHz; BLE [GFSK] 1Mbps (10 dBm); 1 MHz)

Test according to FCC title 47 part 15 §15.247(a),(e), KDB 558074 D01 DTS Meas Guidance v05r02 and ANSI C63.10-2013

Result

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2440.000000	2440.262500	3.027	8.0	PASS

Peak Power Spectral Density



— Limit — Sum Level ◆ PSD

Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.43925 GHz	2.43925 GHz
Stop Frequency	2.44075 GHz	2.44075 GHz
Span	1.500 MHz	1.500 MHz
RBW	10.000 kHz	<= 10.000 kHz
VBW	30.000 kHz	>= 30.000 kHz
SweepPoints	300	~ 300
SweepTime	1.500 ms	AUTO
Reference Level	0.000 dBm	0.000 dBm
Attenuation	10.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	Sweep	Sweep
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	4 / max. 150	max. 150
Stable	2 / 2	2
Max Stable Difference	0.04 dB	0.50 dB

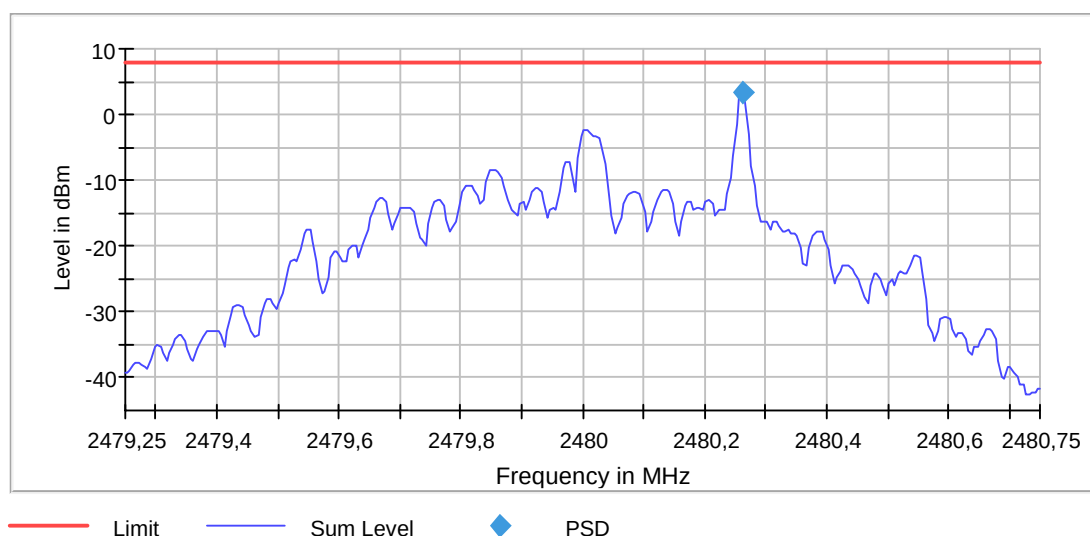
Peak Power Spectral Density (2480 MHz; BLE [GFSK] 1Mbps (10 dBm); 1 MHz)

Test according to FCC title 47 part 15 §15.247(a),(e), KDB 558074 D01 DTS Meas Guidance v05r02 and ANSI C63.10-2013

Result

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2480.000000	2480.262500	3.242	8.0	PASS

Peak Power Spectral Density



— Limit — Sum Level ◆ PSD

Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.47925 GHz	2.47925 GHz
Stop Frequency	2.48075 GHz	2.48075 GHz
Span	1.500 MHz	1.500 MHz
RBW	10.000 kHz	<= 10.000 kHz
VBW	30.000 kHz	>= 30.000 kHz
SweepPoints	300	~ 300
Sweeptime	1.500 ms	AUTO
Reference Level	0.000 dBm	0.000 dBm
Attenuation	10.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	Sweep	Sweep
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	3 / max. 150	max. 150
Stable	2 / 2	2
Max Stable Difference	0.11 dB	0.50 dB

Occupied Channel Bandwidth 99% (2402 MHz; BLE [GFSK] 1Mbps (10 dBm); 1 MHz)

Test according to FCC title 47 part 15 §15.247(a), KDB 558074 D01 DTS Meas Guidance v05r02 and ANSI C63.10-2013

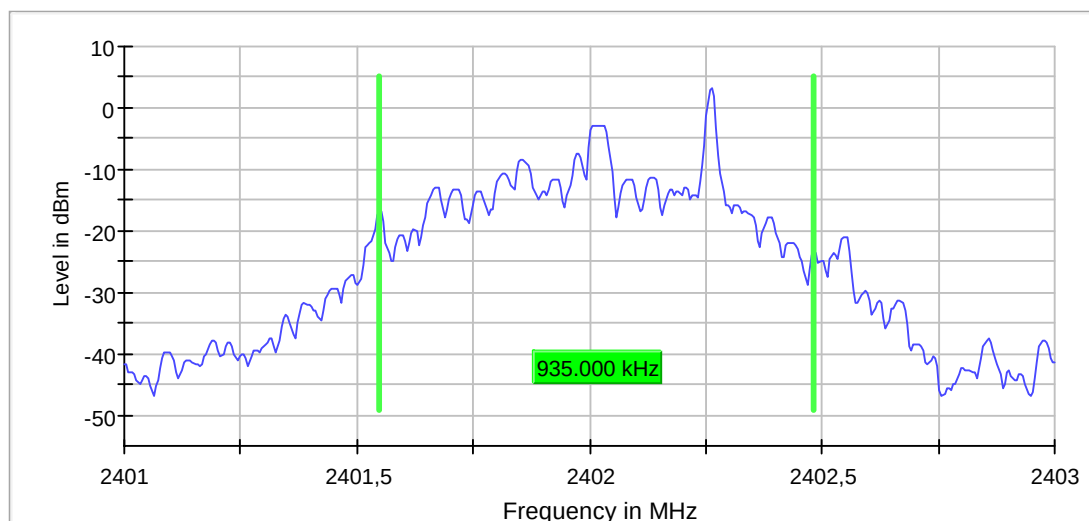
99 % Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
2402.000000	0.935000	---	---	2401.547500	2402.482500

(continuation of the "99 % Bandwidth" table from column 6 ...)

DUT Frequency (MHz)	Result
2402.000000	PASS

99 % Bandwidth



Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.40100 GHz	2.40100 GHz
Stop Frequency	2.40300 GHz	2.40300 GHz
Span	2.000 MHz	2.000 MHz
RBW	10.000 kHz	>= 10.000 kHz
VBW	30.000 kHz	>= 30.000 kHz
SweepPoints	400	~ 400
SweepTime	2.000 ms	AUTO
Reference Level	0.000 dBm	0.000 dBm
Attenuation	10.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	Sweep	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.30 dB	0.30 dB
Run	13 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.00 dB	0.30 dB

Occupied Channel Bandwidth 99% (2440 MHz; BLE [GFSK] 1Mbps (10 dBm); 1 MHz)

Test according to FCC title 47 part 15 §15.247(a), KDB 558074 D01 DTS Meas Guidance v05r02 and ANSI C63.10-2013

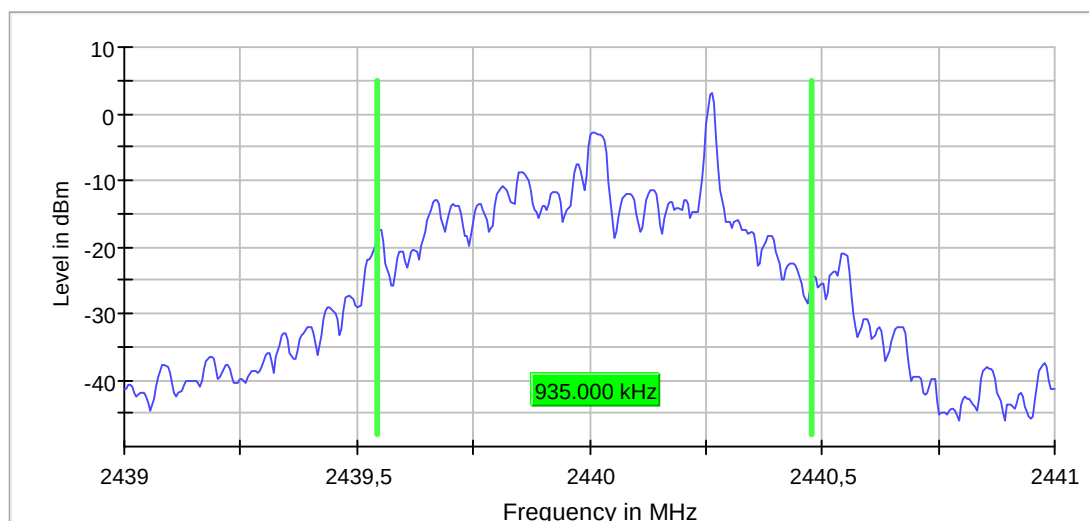
99 % Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
2440.000000	0.935000	---	---	2439.542500	2440.477500

(continuation of the "99 % Bandwidth" table from column 6 ...)

DUT Frequency (MHz)	Result
2440.000000	PASS

99 % Bandwidth



Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.43900 GHz	2.43900 GHz
Stop Frequency	2.44100 GHz	2.44100 GHz
Span	2.000 MHz	2.000 MHz
RBW	10.000 kHz	>= 10.000 kHz
VBW	30.000 kHz	>= 30.000 kHz
SweepPoints	400	~ 400
SweepTime	2.000 ms	AUTO
Reference Level	0.000 dBm	0.000 dBm
Attenuation	10.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	Sweep	AUTO
Preamplifier	off	off
Stablemode	Trace	Trace
Stablevalue	0.30 dB	0.30 dB
Run	4 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.10 dB	0.30 dB

Occupied Channel Bandwidth 99% (2480 MHz; BLE [GFSK] 1Mbps (10 dBm); 1 MHz)

Test according to FCC title 47 part 15 §15.247(a), KDB 558074 D01 DTS Meas Guidance v05r02 and ANSI C63.10-2013

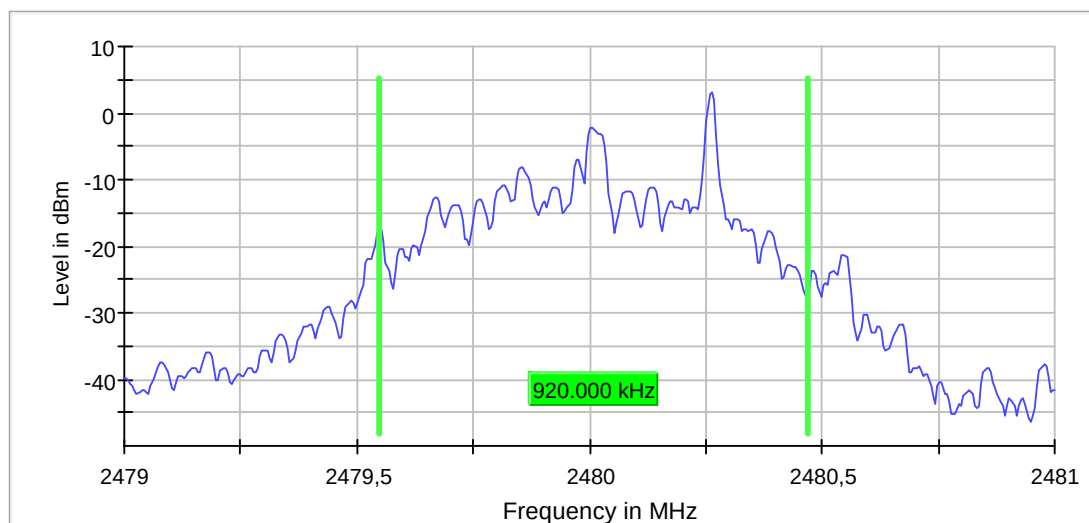
99 % Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
2480.000000	0.920000	---	---	2479.547500	2480.467500

(continuation of the "99 % Bandwidth" table from column 6 ...)

DUT Frequency (MHz)	Result
2480.000000	PASS

99 % Bandwidth



Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.47900 GHz	2.47900 GHz
Stop Frequency	2.48100 GHz	2.48100 GHz
Span	2.000 MHz	2.000 MHz
RBW	10.000 kHz	>= 10.000 kHz
VBW	30.000 kHz	>= 30.000 kHz
SweepPoints	400	~ 400
SweepTime	2.000 ms	AUTO
Reference Level	0.000 dBm	0.000 dBm
Attenuation	10.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	Sweep	AUTO
Preamplifier	off	off
Stablemode	Trace	Trace
Stablevalue	0.30 dB	0.30 dB
Run	9 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.00 dB	0.30 dB

Tx Spurious Emission (2402 MHz; BLE [GFSK] 1Mbps (10 dBm); 1 MHz)

Test according to FCC title 47 part 15 §15.247(d), KDB 558074 D01 DTS Meas Guidance v05r02 and ANSI C63.10-2013

Result

DUT Frequency (MHz)	Result
2402.000000	PASS

Final measurements

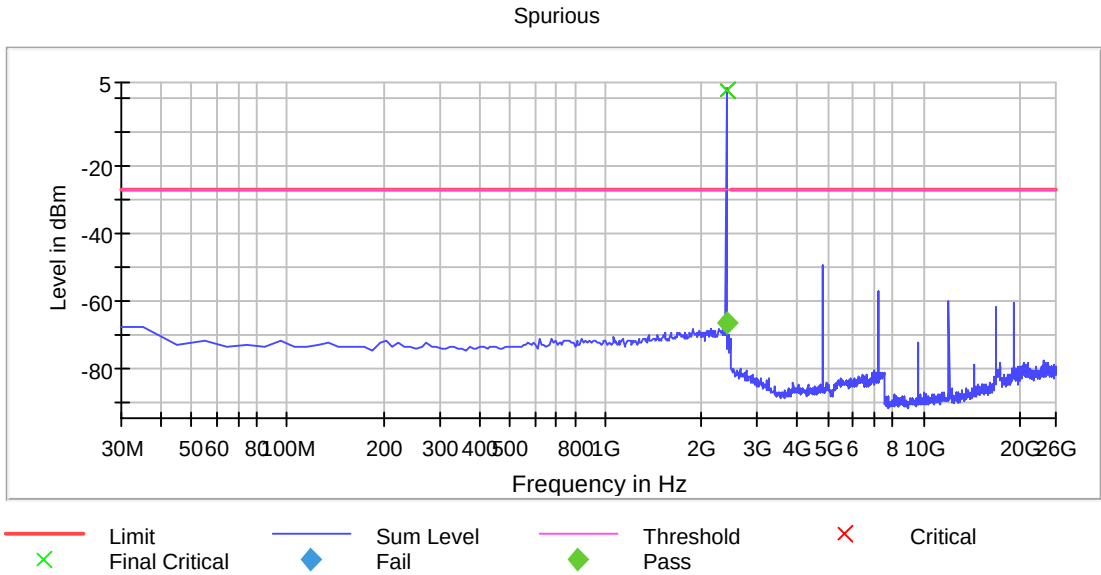
Frequency (MHz)	Level Pre Measurement (dBm)	level (dBm)	Limit (dBm)	Margin (dB)	Result
2399.958664	0.5	-66.5	-26.9	39.6	PASS

Pre Measurements

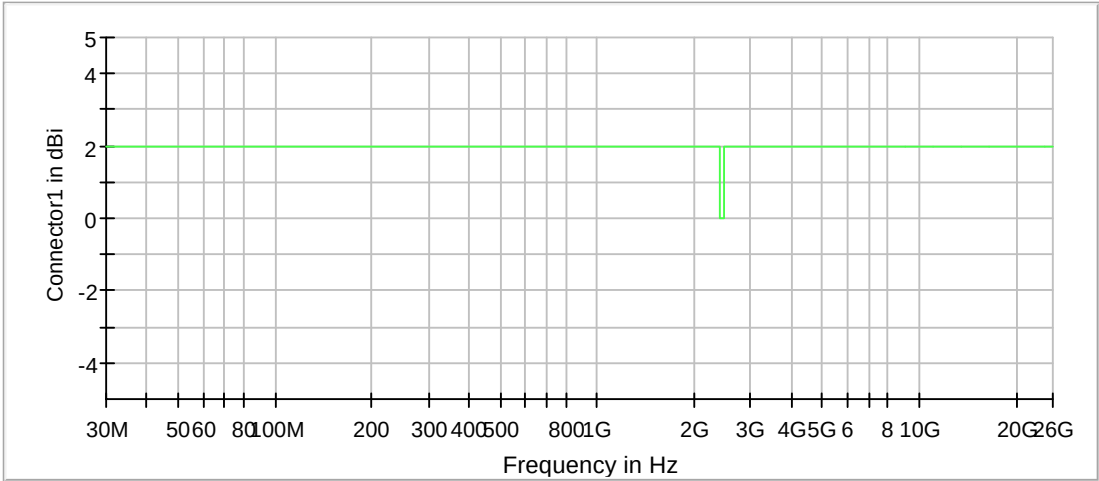
Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
2395.021008	2.5	-29.4	-26.9
4807.166065	-49.6	22.7	-26.9
7205.789099	-57.4	30.5	-26.9
12013.029431	-60.1	33.2	-26.9
19218.892796	-60.9	34.0	-26.9
16820.269762	-62.1	35.2	-26.9
16810.275499	-64.2	37.3	-26.9
2345.231092	-67.7	40.8	-26.9
2385.063025	-67.7	40.8	-26.9
2375.105042	-67.8	40.9	-26.9
30.000000	-68.0	41.1	-26.9
34.978992	-68.0	41.1	-26.9
1877.205882	-68.2	41.3	-26.9
2255.609244	-68.4	41.5	-26.9
2146.071429	-68.6	41.6	-26.9

Measurement Settings

Start Frequency (MHz)	Stop Frequency (MHz)	Pre Measurement	Final Measurement
30.000000	2400.000000	1	1
2400.000000	2483.500000	1	1
2483.500000	26000.000000	1	1

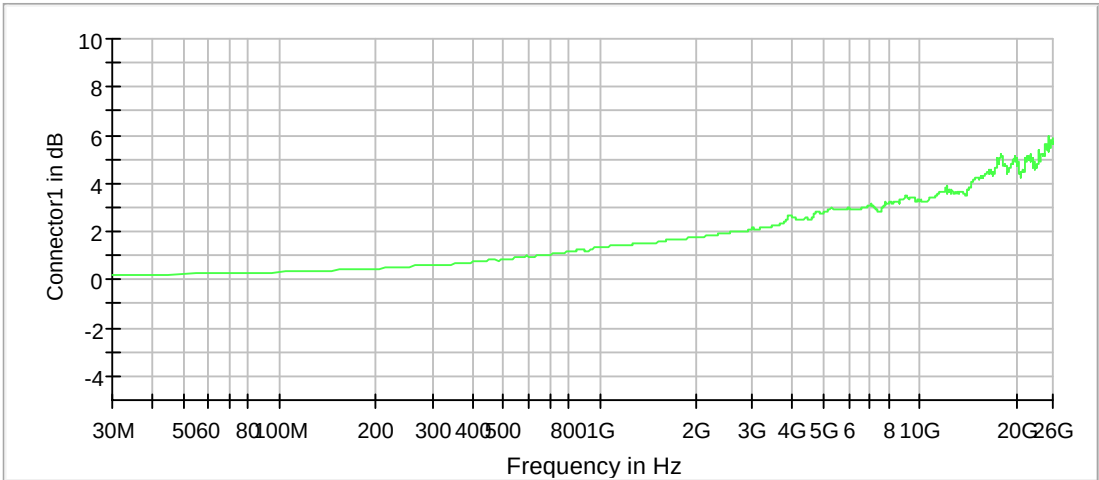


Gain



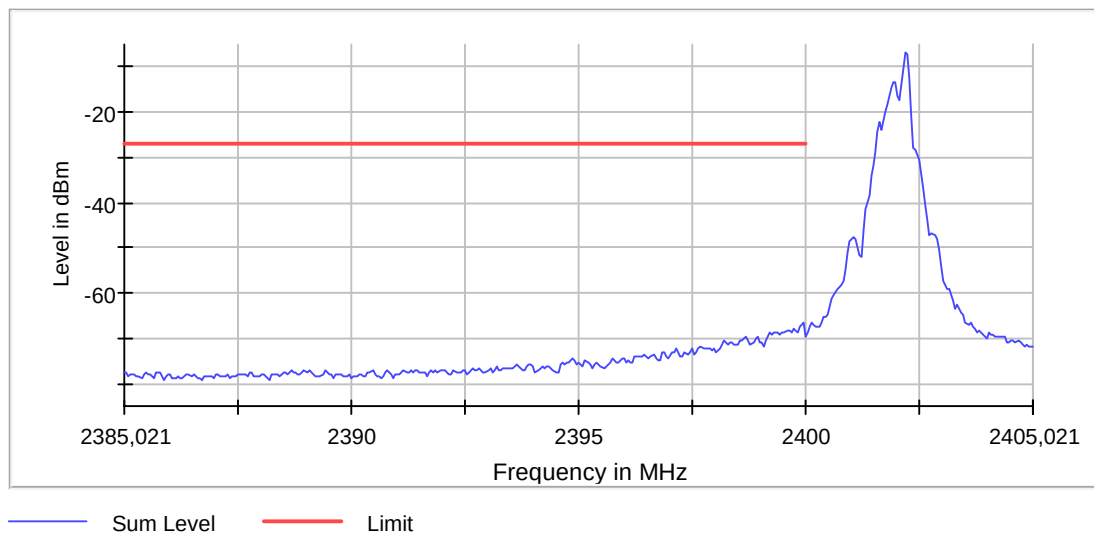
Connector1

Attenuation



Connector1

FinalMeas_2395021008Hz



Pre Measurement 1

Setting	Instrument Value	Target Value
RBW	100.000 kHz	<= 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	238	~ 238
SweepTime	23.700 ms	AUTO
Reference Level	-10.000 dBm	-30.000 dBm
Attenuation	20.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	3	3
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	Sweep	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	5 / max. 40	max. 40
Stable	3 / 3	3
Max Stable Difference	0.00 dB	0.50 dB

Final Measurement 1

Setting	Instrument Value	Target Value
RBW	100.000 kHz	<= 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	401	~ 401
SweepTime	1.000 ms	AUTO
Reference Level	10.000 dBm	10.000 dBm
Attenuation	20.000 dB	AUTO
Detector	Sample	Sample
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Average Linear	Average Linear
SweepType	Sweep	AUTO
Preamp	off	off

Tx Spurious Emission (2440 MHz; BLE [GFSK] 1Mbps (10 dBm); 1 MHz)

Test according to FCC title 47 part 15 §15.247(d), KDB 558074 D01 DTS Meas Guidance v05r02 and ANSI C63.10-2013

Result

DUT Frequency (MHz)	Result
2440.000000	PASS

Final measurements

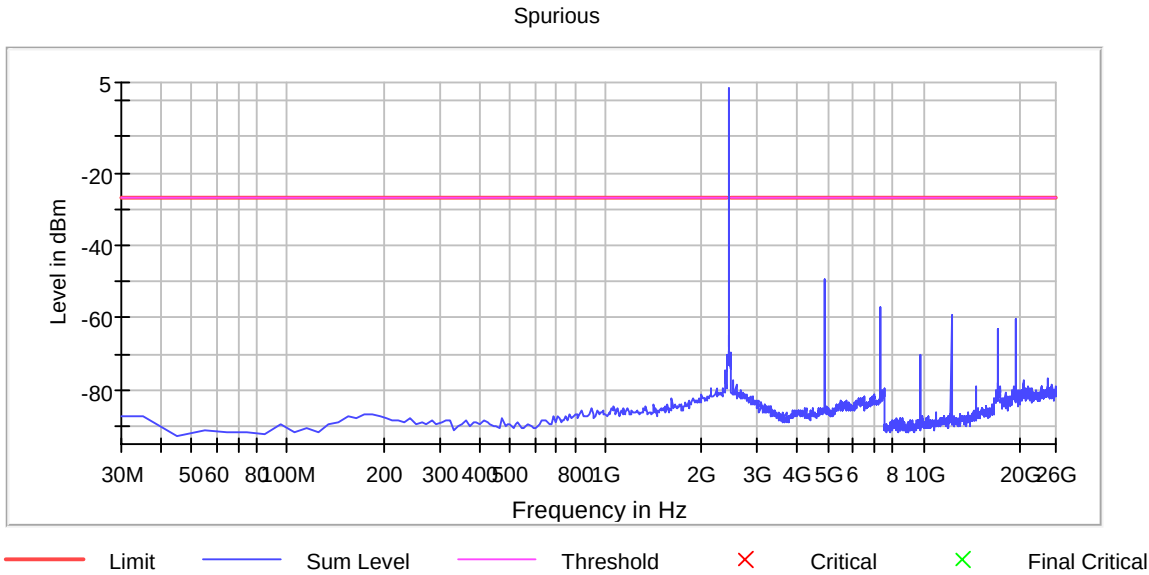
Frequency (MHz)	Level Pre Measurement (dBm)	level (dBm)	Limit (dBm)	Margin (dB)	Result
---	---	---	---	---	---

Pre Measurements

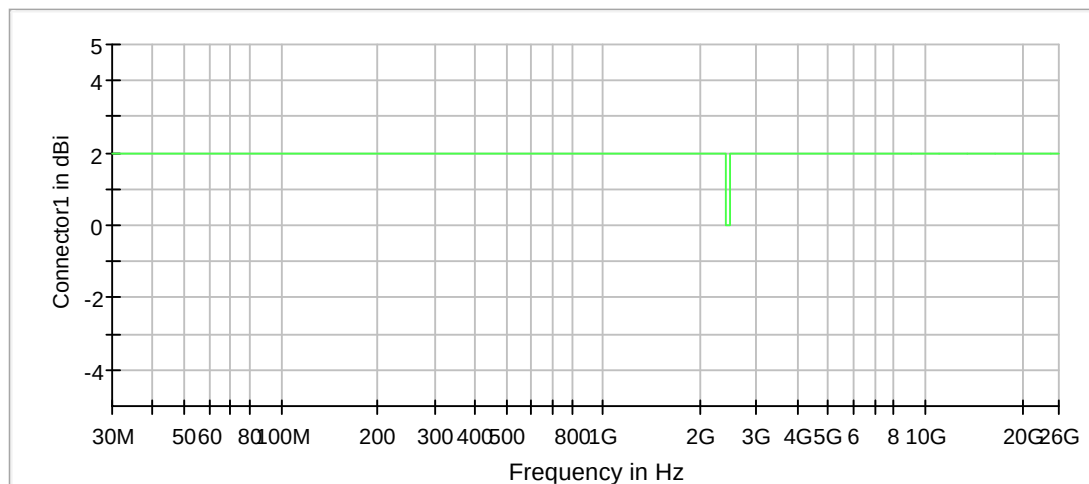
Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
4877.125903	-49.5	22.7	-26.8
7325.720251	-57.3	30.6	-26.8
7315.725988	-57.8	31.0	-26.8
12202.920421	-59.5	32.8	-26.8
19518.720676	-60.6	33.8	-26.8
17080.120591	-63.3	36.5	-26.8
9764.320336	-70.2	43.4	-26.8
2375.105042	-74.4	47.7	-26.8
9754.326073	-74.9	48.2	-26.8
24405.915108	-76.7	50.0	-26.8
20628.083829	-77.1	50.4	-26.8
2385.063025	-77.3	50.6	-26.8
2508.485657	-77.5	50.8	-26.8
20508.152677	-78.0	51.2	-26.8
20538.135465	-78.2	51.4	-26.8

Measurement Settings

Start Frequency (MHz)	Stop Frequency (MHz)	Pre Measurement	Final Measurement
30.000000	2400.000000	1	1
2400.000000	2483.500000	1	1
2483.500000	26000.000000	1	1

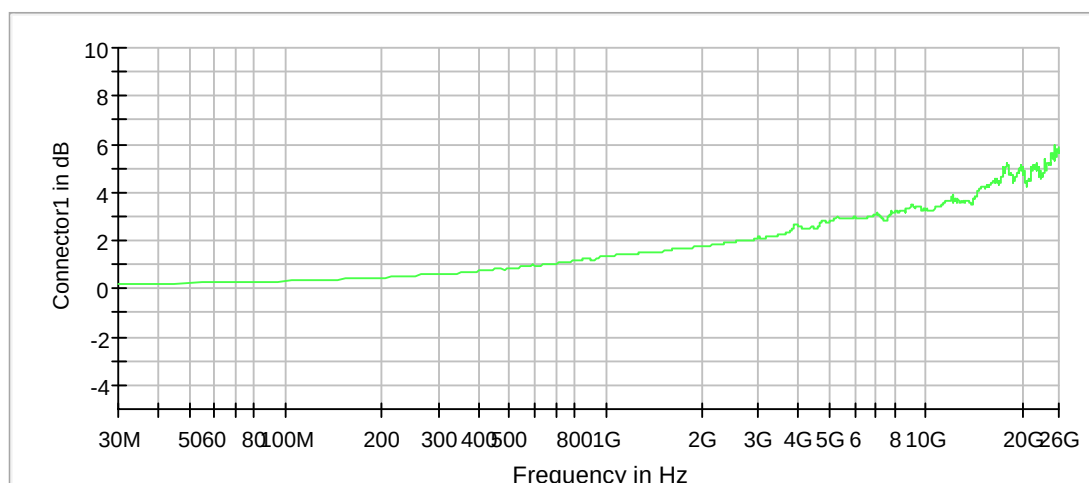


Gain



Connector1

Attenuation



Connector1

Pre Measurement 1

Setting	Instrument Value	Target Value
RBW	100.000 kHz	≤ 100.000 kHz
VBW	300.000 kHz	≥ 300.000 kHz
SweepPoints	238	~ 238
SweepTime	23.700 ms	AUTO
Reference Level	-30.000 dBm	-30.000 dBm
Attenuation	0.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	3	3
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	Sweep	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	19 / max. 40	max. 40
Stable	3 / 3	3
Max Stable Difference	0.00 dB	0.50 dB

Tx Spurious Emission (2480 MHz; BLE [GFSK] 1Mbps (10 dBm); 1 MHz)

Test according to FCC title 47 part 15 §15.247(d), KDB 558074 D01 DTS Meas Guidance v05r02 and ANSI C63.10-2013

Result

DUT Frequency (MHz)	Result
2480.000000	PASS

Final measurements

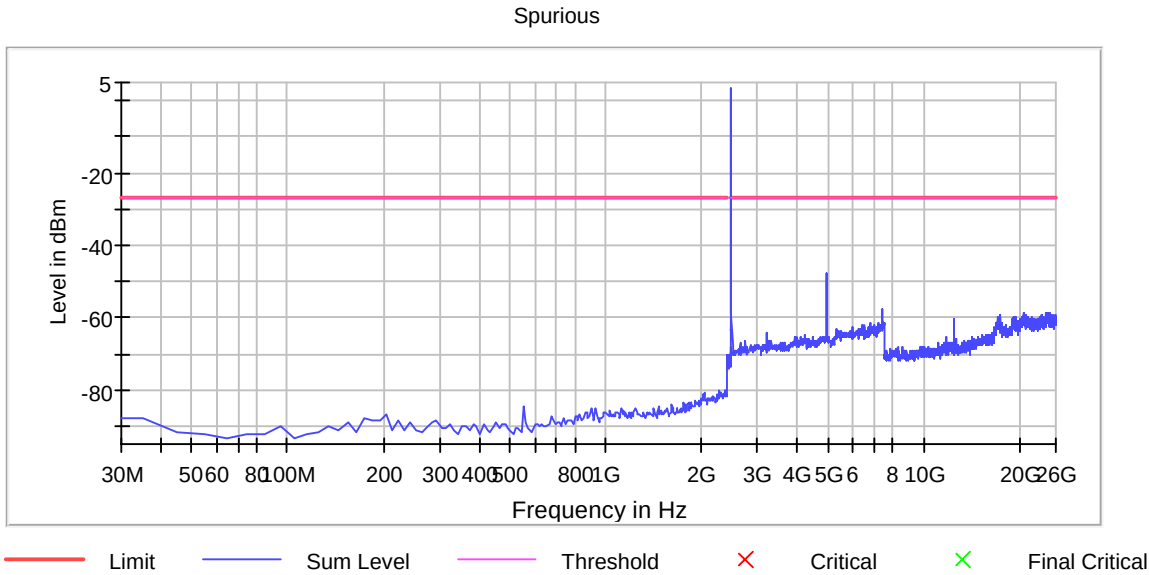
Frequency (MHz)	Level Pre Measurement (dBm)	level (dBm)	Limit (dBm)	Margin (dB)	Result
---	---	---	---	---	---

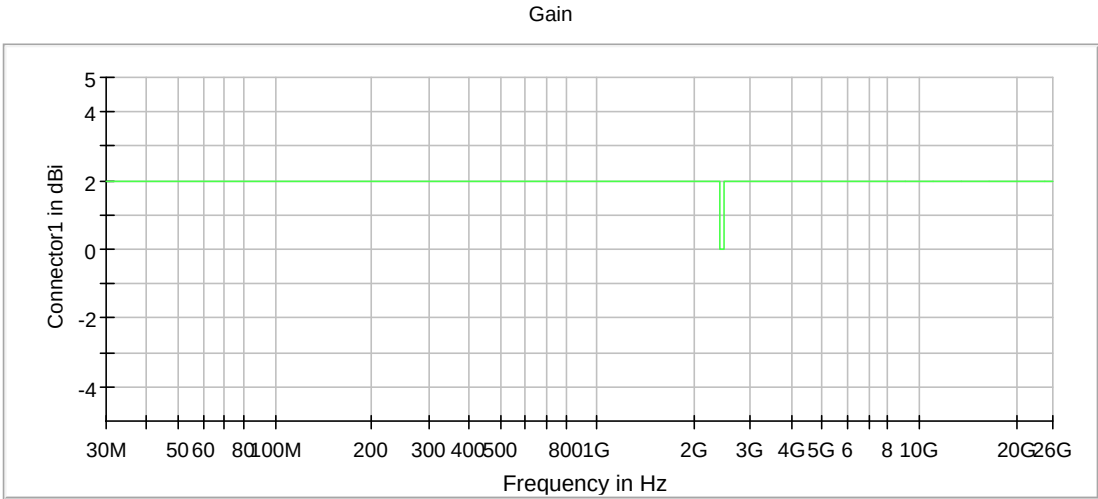
Pre Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
4957.080004	-47.6	20.7	-26.8
7445.651402	-57.9	31.1	-26.8
20598.101041	-58.5	31.7	-26.8
24795.691351	-58.6	31.8	-26.8
24605.800361	-58.7	31.9	-26.8
24315.966745	-58.7	31.9	-26.8
2488.497131	-58.8	32.0	-26.8
17339.971419	-59.0	32.2	-26.8
20638.078092	-59.0	32.2	-26.8
26000.000000	-59.1	32.3	-26.8
25995.002869	-59.1	32.3	-26.8
20568.118253	-59.1	32.3	-26.8
24066.110178	-59.1	32.3	-26.8
24615.794624	-59.3	32.5	-26.8
24675.760200	-59.4	32.5	-26.8

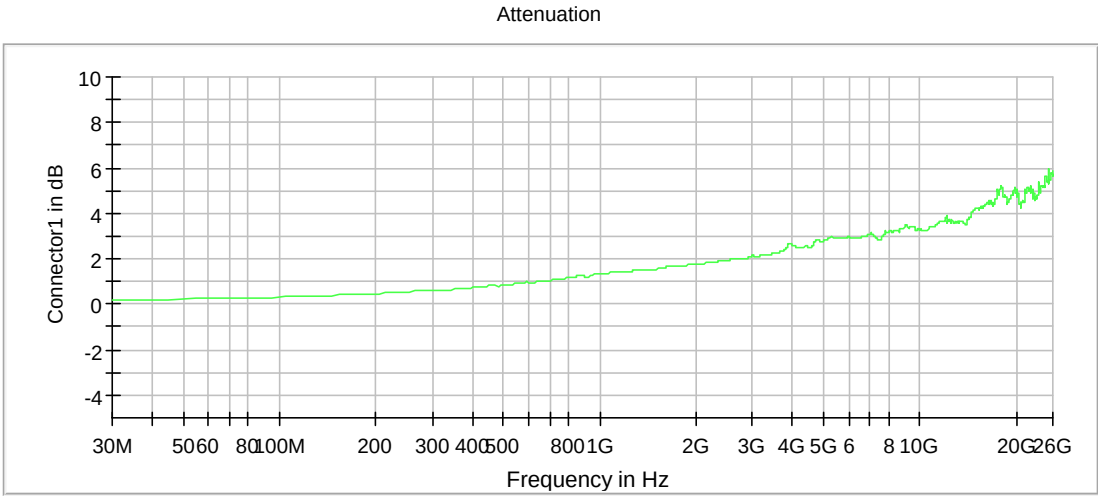
Measurement Settings

Start Frequency (MHz)	Stop Frequency (MHz)	Pre Measurement	Final Measurement
30.000000	2400.000000	1	1
2400.000000	2483.500000	1	1
2483.500000	26000.000000	1	1





Connector1



Connector1

Pre Measurement 1

Setting	Instrument Value	Target Value
RBW	100.000 kHz	<= 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	238	~ 238
SweepTime	23.700 ms	AUTO
Reference Level	-30.000 dBm	-30.000 dBm
Attenuation	0.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	3	3
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	Sweep	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	5 / max. 40	max. 40
Stable	3 / 3	3
Max Stable Difference	0.00 dB	0.50 dB

End Of Annex 1