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RADIO TEST REPORT

REPORT NUMBER: M2007049-1

**TEST STANDARD: FCC PART 15 SUBPART C
SECTION 15.247**

CLIENT: ANALYTICA LTD

DEVICE: PERICOACH

MODEL: PERICOACH

FCC ID: 2AXG8-PC4

DATE OF ISSUE: 13 OCTOBER 2020

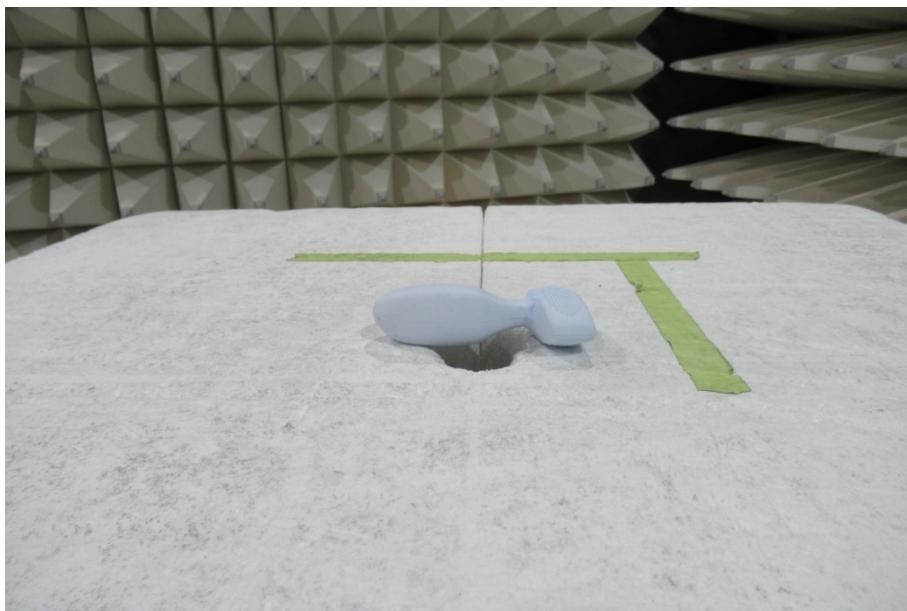
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Accreditation No.5292

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Equipment Under Test (EUT): PeriCoach

REVISION TABLE

Version	Sec/Para Changed	Change Made	Date
1		Initial issue of document	13/10/2020

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RADIO TEST REPORT

CERTIFICATE OF COMPLIANCE

Device: PeriCoach
Model: PeriCoach
Manufacturer: Analytica Ltd

Radio Module: BT Chip TI CC2564C (Bluetooth Low Energy)
FCC ID: 2AXG8-PC4

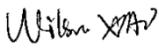
Tested for: Analytica Ltd
Address: 320 Adelaide St, Brisbane, QLD 4000
Phone Number: +61 407 093 364
Contact: Tom Stamp
Email: tom@bluecurve.com.au

Standard: FCC Part 15, Subpart C, Section 15.247 Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz

Result: The PeriCoach complied with the applicable requirements above standards. Refer to Report M2007049-1 for full details.

Test Date(s): 17 – 26 August 2020

Issue Date: 13 October 2020

Test Engineer(s): 

Wilson Xiao

Attestation: *I hereby certify that the device(s) described herein were tested as described in this report and that the data included is that which was obtained during such testing.*

Authorised Signatory: 

Shabbir Ahmed
Lead Engineer – RF & Wireless

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RADIO REPORT FOR CERTIFICATION

1 TEST SUMMARY

Section	Description	FCC	Result(s)
6.1	Antenna Requirement	§15.203	Complied
6.2	Restricted Bands of Operation	§15.205	Complied
6.3	Conducted Limits	§15.207	Not Applicable
6.4	Radiated emission limits; general requirements	§15.209	Complied
6.5	6 dB Bandwidth	§15.247(a)(2)	Complied
6.6	Peak Output Power	§15.247(b)(3)	Complied
6.7	Out-of-Band/Spurious Emissions	§15.247(d)	Complied
6.8	Band-Edge Emission Measurements	§15.247(d)	Complied
6.9	Power spectral density	§15.247(e)	Complied
6.10	Maximum Permissible Exposure	§15.247(i)	Complied
6.11	Occupied Bandwidth – 99% power	§15.215	Complied

2 TEST FACILITY

2.1 General

EMC Technologies Pty Ltd is accredited by the FCC as a test laboratory able to perform compliance testing for the public. EMC Technologies Pty Ltd has also been designated as a Conformity Assessment Body (CAB) by Australian Communications and Media Authority (ACMA) under the APECTEL MRA and is designated to perform compliance testing on equipment subject to Declaration of Conformity (DoC) and Certification under Parts 15 and 18 of the FCC Commission's rules – **Registration Number 494713 & Designation number AU0001**.

EMC Technologies Pty Ltd is also an ISED Canada recognized testing laboratory – **ISED company number: 3569B** and **CAB identifier number: AU0001**.

2.2 Test Laboratory/Accreditations

NATA is the Australian National laboratory accreditation body and has accredited EMC Technologies to operate to the IEC/ISO17025 requirements. A major requirement for accreditation is the assessment of the company and its personnel as being technically competent in testing to the standards. This requires fully documented test procedures, continued calibration of all equipment to the National Standard at the National Measurements Institute (NMI) and an internal quality system similar to ISO 9002. NATA has mutual recognition agreements with the National Voluntary Laboratory Accreditation Program (NVLAP) and the American Association for Laboratory Accreditation (A²LA).

All testing in this report has been conducted in accordance with EMC Technologies' scope of NATA accreditation to ISO 17025 for both testing and calibration and ISO 17020 for Inspection – **Accreditation Number 5292**.

The current full scope of accreditation can be found on the NATA website: www.nata.com.au

3 TEST EQUIPMENT CALIBRATION

Measurement instrumentation and transducers were calibrated in accordance with the applicable standards by an independent NATA registered laboratory such as Keysight Technologies (Australia) Pty Ltd or the National Measurement Institute (NMI) or in-house. All equipment calibration is traceable to Australian national standards at the National Measurements Institute.

Equipment Type	Make/Model/Serial Number	Last Cal. dd/mm/yyyy	Due Date dd/mm/yyyy	Cal. Interval
Chamber	Frankonia SAC-3-2 (R-144)	10/08/2020	10/08/2023	3 Year ^{*1}
EMI Receiver	R&S ESW26 Sn: 101306 (R-143)	05/06/2020	05/06/2021	1 Year ^{*2}
Antennas	EMCO 6502 Active Loop Antenna Sn: 9311-2801 (A-231)	16/11/2018	16/11/2020	2 Year ^{*2}
	SUNOL JB1 Sn: A061917 (A-425)	04/09/2019	04/09/2021	2 Year ^{*2}
	EMCO 3115 Horn Antenna Sn: 8908-3282 (A-004)	16/01/2019	16/01/2022	3 Year ^{*1}
	ETS-Lindgren Horn Antenna Sn:66032 (A-307)	12/06/2018	12/06/2021	3 Year ^{*2}
Cables ^{*3}	Huber & Suhner Sucoflex 104A Sn: 503055 (C-457)	04/06/2020	04/06/2021	1 Year ^{*1}
	Huber & Suhner Sucoflex 104A Sn: 800448 (C-520)	04/06/2020	04/06/2021	1 Year ^{*1}
	Huber & Suhner Sucoflex 102DC Sn: 27319/2 (C-273)	06/01/2020	06/01/2021	1 Year ^{*1}

Note *1. Internal NATA calibration.

Note *2. External NATA / A2LA calibration.

Note *3. Cables are verified before measurements are taken.

4 MEASUREMENT UNCERTAINTY

EMC Technologies has evaluated the equipment and the methods used to perform the emissions testing. The estimated measurement uncertainties for emissions tests shown within this report are as follows:

Radiated Emissions:	9 kHz to 30 MHz	±4.1 dB
	30 MHz to 300 MHz	±5.1 dB
	300 MHz to 1000 MHz	±4.7 dB
	1 GHz to 18 GHz	±4.6 dB
	18 GHz to 40 GHz	±4.6 dB
Peak Output Power:		±1.5 dB

The above expanded uncertainties are based on standard uncertainties multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%.

Application of measurement uncertainty for this report:

The referenced uncertainty standard specifies that determination of compliance shall be based on measurements without taking into account measurement instrumentation uncertainty. However, the measurement uncertainty shall appear in the test report.



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5 Device Details

(Information supplied by the Client)

The PeriCoach is a perineometer designed to treat stress, mild-moderate urge and mixed urinary incontinence in women, as well as pelvic organ prolapse by strengthening of the pelvic floor muscles through exercise. This device provides biofeedback via smart phone technology.

5.1 EUT (Transmitter) Details

Radio:	BT Chip TI CC2564C
Bluetooth Type	Bluetooth Low Energy (DTS)
Number of Channels:	40
Frequency Band:	2400 – 2483.5 MHz
	Low Channel: 2402 MHz
Operating Frequency:	Mid Channel: 2440 MHz
	High Channel: 2480 MHz
Nominal Bandwidth:	1 MHz (<i>declared by client</i>)
Modulation:	GFSK
Antenna:	Johanson Technology 2450AT42100 Chip antenna
Antenna Peak Gain:	0 dBi

5.2 EUT (Host) Details

Test Sample:	PeriCoach
Model:	PeriCoach
Supply Rating:	3.7 VDC (Lithium-polymer battery)
Manufacturer:	Analytica Ltd

5.3 Test Configuration

Testing was performed with the transceiver set to transmit continuously (100% Duty Cycle) at Low channel (2402 MHz), Mid Channel (2440 MHz) and High Channel (2483.5 MHz).

5.4 Modifications

No modifications were required to achieve compliance.

5.5 Deviations from the Standard

Note any deviations to the standard

6 RESULTS

6.1 §15.203 Antenna Requirement

The transceiver incorporates an integral Chip antenna that cannot be replaced by another type.

Antenna Type: Chip Antenna

Antenna gain: 0 dBi

Connector: Not Applicable

6.2 §15.205 Restricted Bands of Operation

The provisions of the §15.205 restricted bands of operation and §15.209 radiated emissions limits have been met, refer to section 6.7

6.3 §15.207 Conducted Limits

The device is battery DC powered and does not connect directly or indirectly to the AC mains network. Test was not applicable.

6.4 §15.209 Radiated emission limits; general requirements

The provisions of the §15.205 restricted bands of operation and §15.209 radiated emissions limits have been met, refer to section 6.7

6.5 §15.247(a)(2) 6 dB bandwidth

6.5.1 Test Procedure

The tests were performed in accordance with ANSI C63.10: 2013 Clause 11.8 DTS bandwidth.

The 6 dB bandwidth was measured while the device was transmitting with typical modulation applied. The resolution bandwidth of 100 kHz and the video bandwidth of 300 kHz were utilised when measuring the bandwidth.

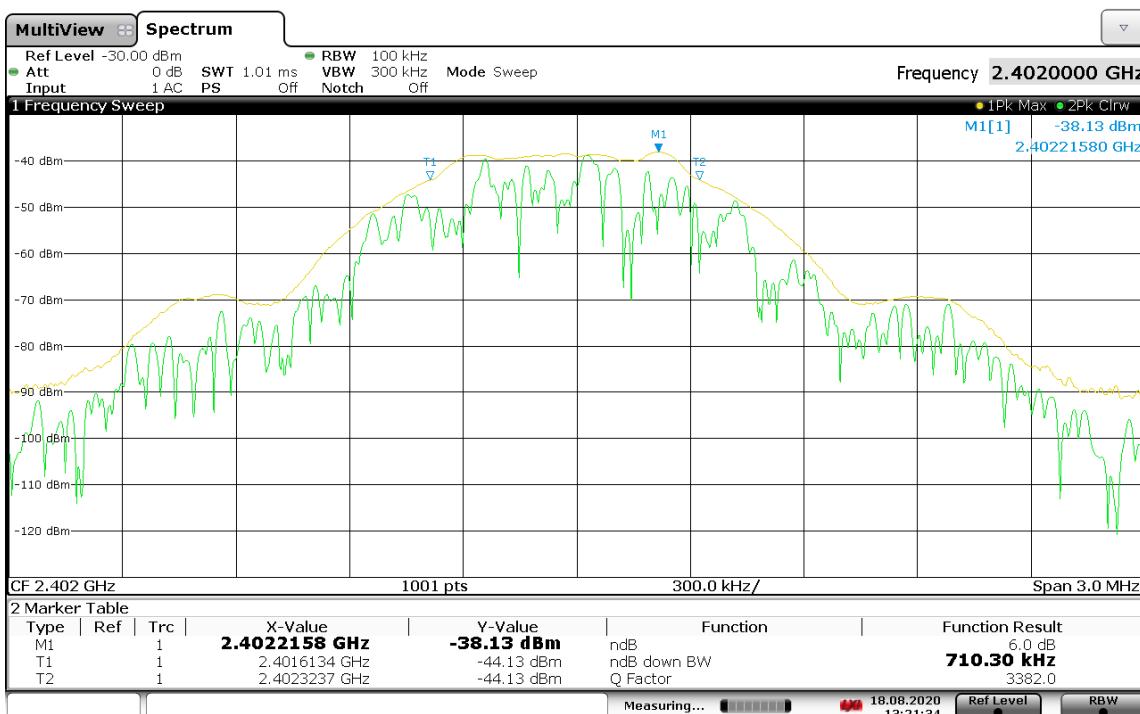
6.5.2 Limits

In the band 2400 – 2483.5 MHz, the minimum 6 dB bandwidth is to be at least 500 kHz.

6.5.3 Results

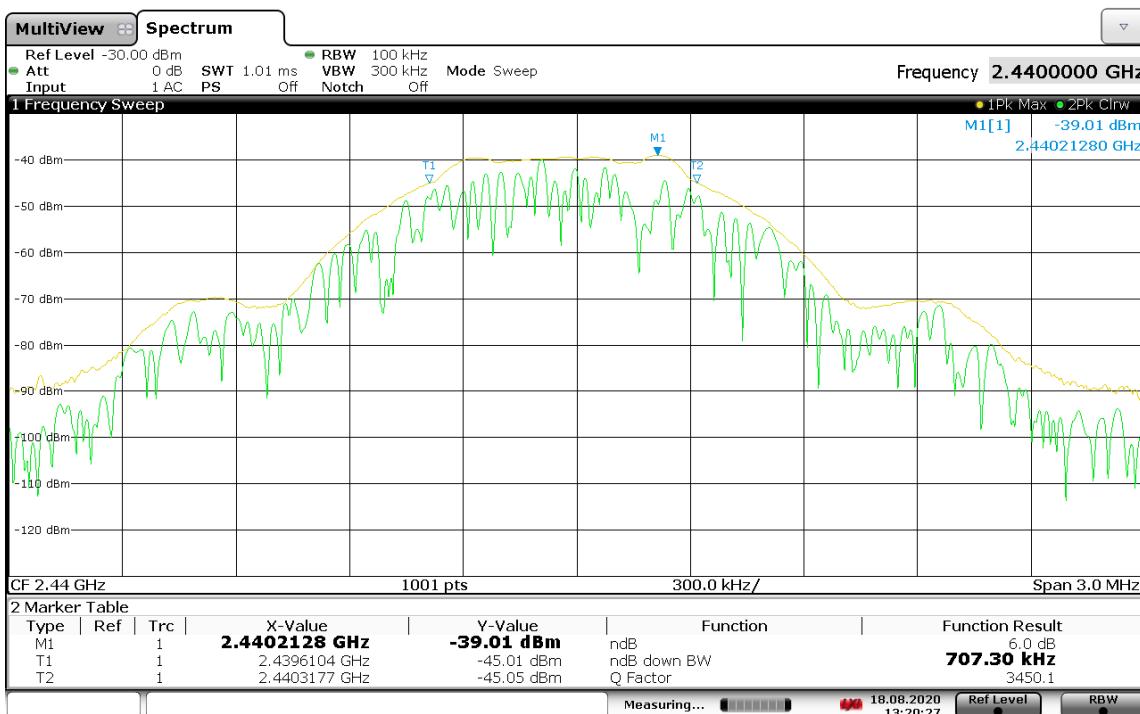
Table 6-1: 6dB Bandwidth

Freq. [MHz]	6 dB Bandwidth [kHz]	Limit [kHz]
2402	710.30	>= 500
2440	707.30	>= 500
2480	710.30	>= 500



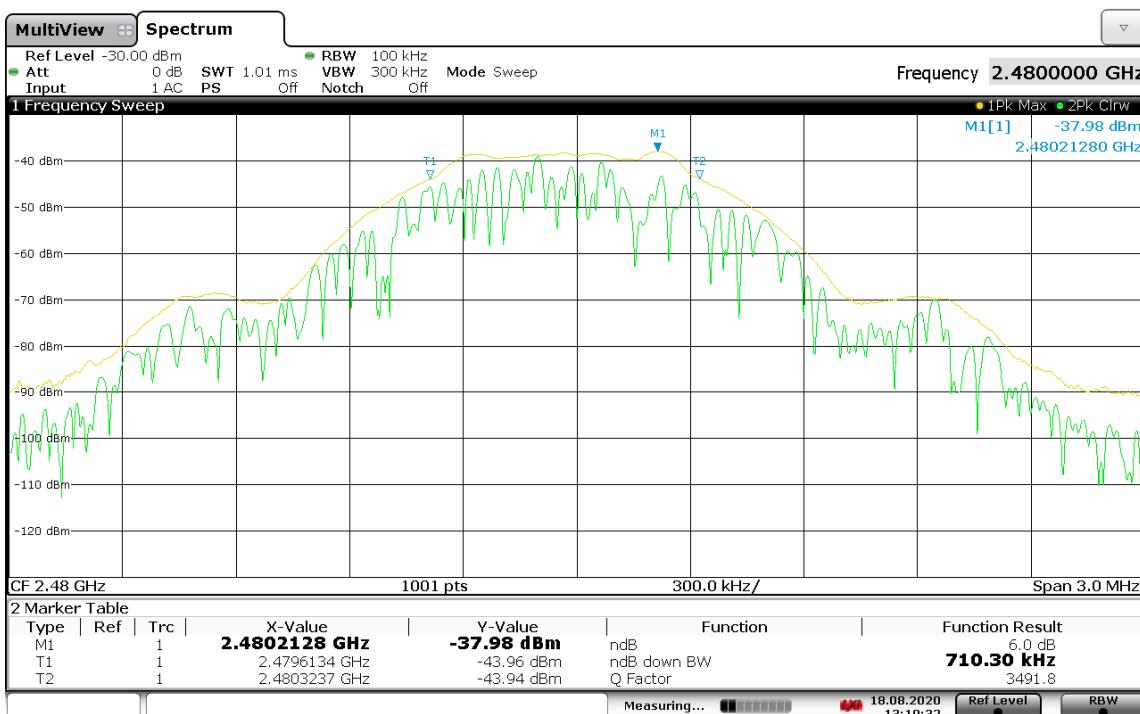
13:21:35 18.08.2020

Graph 6-1: 6 dB bandwidth, 2402 MHz



13:20:27 18.08.2020

Graph 6-2: 6 dB bandwidth, 2440 MHz



Graph 6-3: 6 dB bandwidth, 2480 MHz

6.6 §15.247(b)(3) Peak Output Power

6.6.1 Test Procedure

The field strength of the fundamental transmitted frequency was measured inside a semi-anechoic chamber compliant with ANSI C63.4: 2014 in accordance to ANSI C63.10: 2013 clause 11.9.1.1.

The EUT was positioned on a test turn-table and rotated through 360° to determine the highest emissions. The measurement antenna was also varied between 1 and 4 metres height. Different orientations of the EUT (x, y and z-axis) and measurement antenna polarisations (vertical and horizontal) were investigated to produce the highest emission EIRP.

All measurements were made at a distance of 3 metres. Measurements on the worst orientation presented below.

6.6.2 Limits

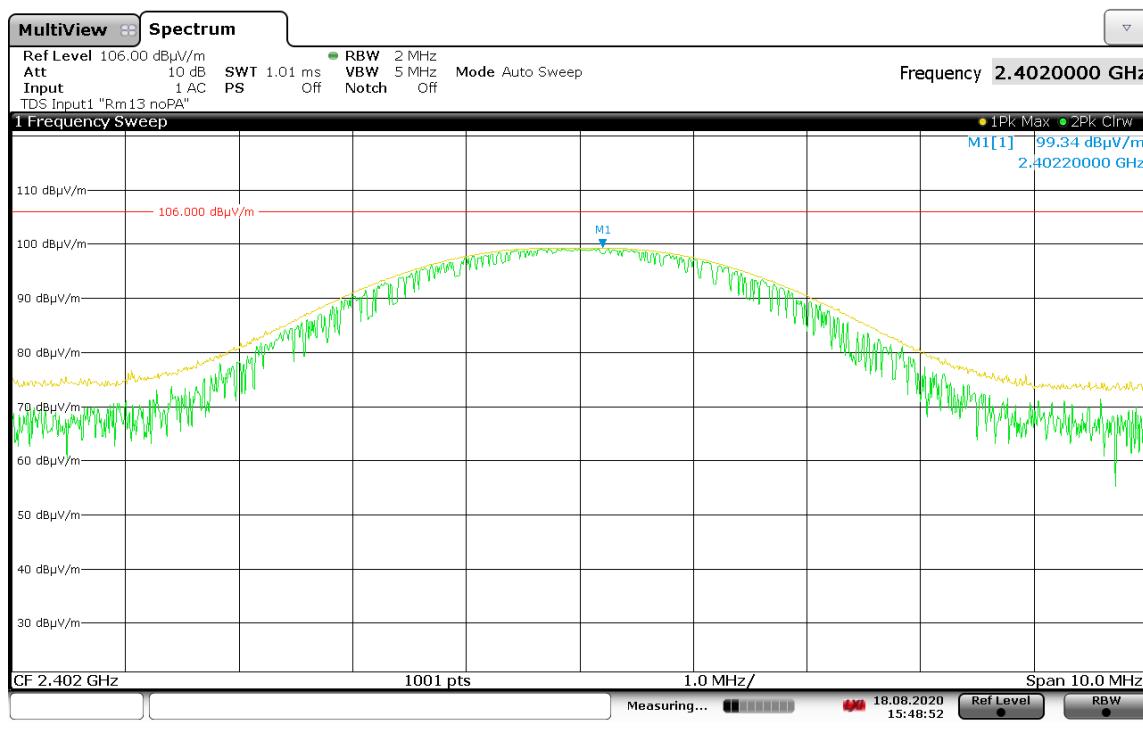
The maximum conducted output power at 2400 – 2483.5 MHz is 1 Watts or 30 dBm.

6.6.3 Results

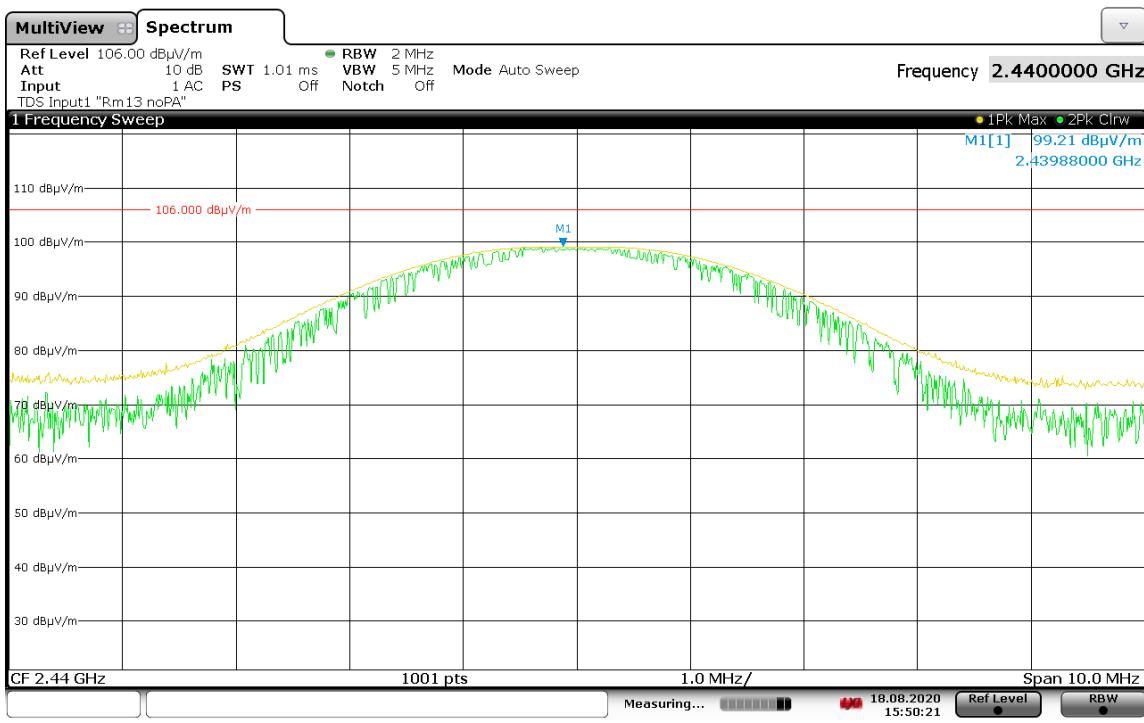
Table 6-2: Maximum EIRP

Freq. [MHz]	E-Field@ 3 m dB μ V/m	EIRP (dBm)	Antenna Gain (dBi)	Equivalent Conducted Output Power (dBm)	Limit (dBm)	Results
2402	99.34	4.11	0	4.11	30	Complied
2440	99.21	3.98	0	3.98	30	Complied
2480	98.45	3.22	0	3.22	30	Complied

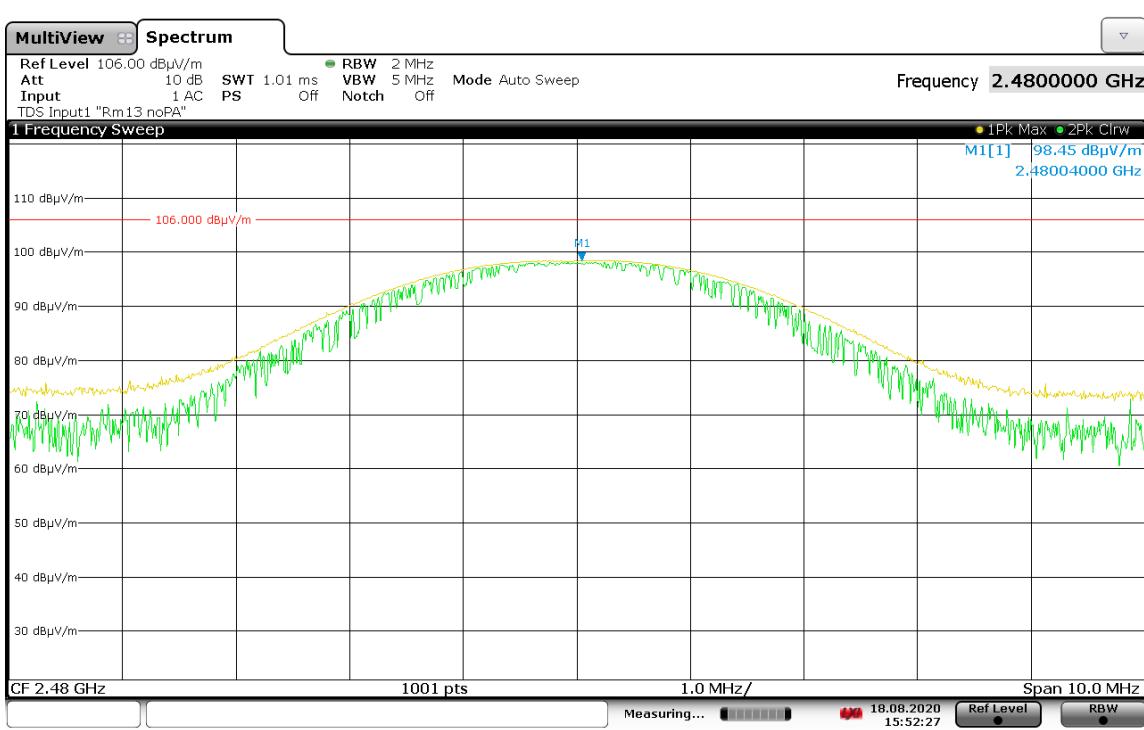
The measured radiated field strength is converted to equivalent conducted output power for checking compliance (KDB 558074 D01 Section 3).



Graph 6-4: Max EIRP, 2402 MHz (Low Channel), X-axis Horizontal



Graph 6-5: Max EIRP, 2440 MHz (Mid Channel), X-axis Horizontal



Graph 6-6: Max EIRP, 2480 MHz (High Channel), X-axis Horizontal

6.7 §15.247(d) Out-of-Band/Spurious Emissions

6.7.1 Test procedure

Radiated out-of-band/spurious emissions measurements were performed in a semi-anechoic chamber compliant with ANSI C63.4: 2014.

The test frequency range was sub-divided into smaller bands with the defined resolution bandwidths to permit reliable display and identification of emissions.

Frequency range [MHz]	Measurement Bandwidth [kHz]	Measurement Distance [m]	Antenna
0.009 to 0.150	0.2	3	
0.150 to 30	9	3	0.6 metre loop antenna
30 to 1000	120	3	Biconilog hybrid
1000 to 18 000	1000	3	Standard gain or broadband horn
18 000 to 40 000	1000	1	

EUT was set at a height of 0.8 m for measurements below 1000 MHz and set at a height of 1.5 m for measurements above 1000 MHz.

The sample was slowly rotated with the spectrum analyser set to Max-Hold. This was performed for at least two antenna heights. When an emission was located, it was positively identified and its maximum level found by rotating the automated turntable and by varying the antenna height. For below 1000 MHz the emissions were measured with a Quasi-Peak detector, and for above 1000 MHz the emissions were measured with Peak and Average detectors.

The measurement data for each frequency range was corrected for cable losses, antenna factors and preamplifier gain. This process was performed for both horizontal and vertical polarisations of the measurement antenna.

EUT was investigated on all three axes (x, y, and z). Measurements on the worst axis are presented below.

6.7.2 Limits

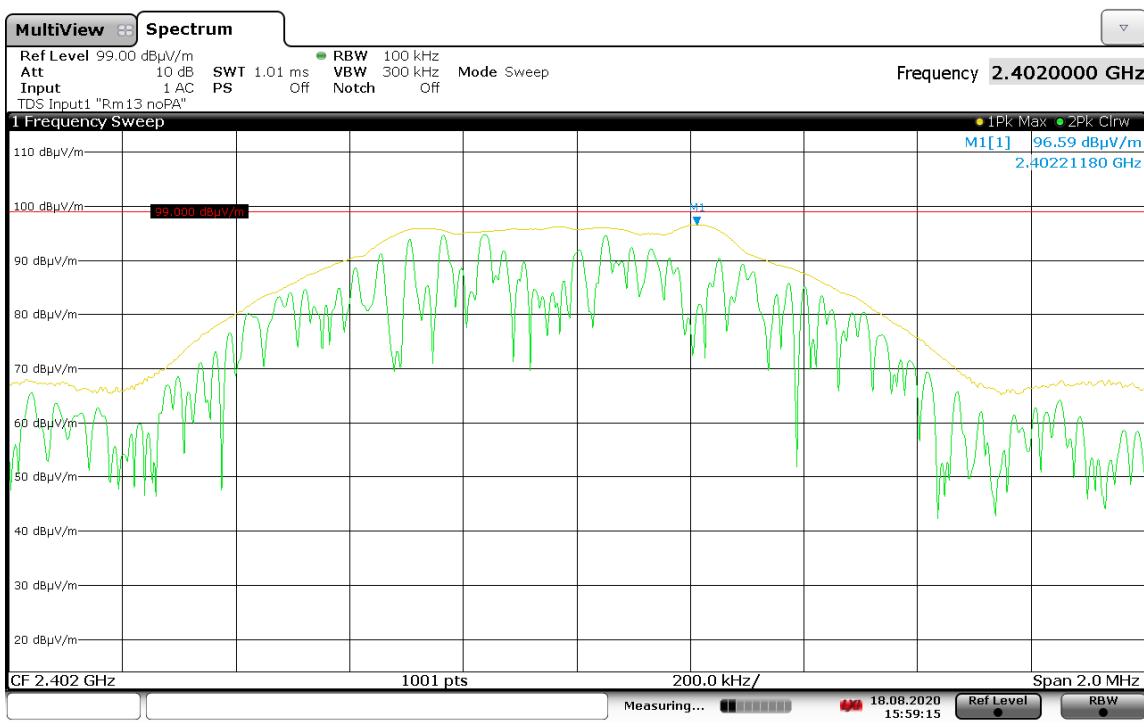
The limit applied is in accordance with the out-of-band/spurious emissions limit defined in §15.247(d).

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power.

The in-band peak PSD in 100 kHz bandwidth were measured on all channels according to ANSI C63.10-2013 clause 11.11.2. The maximum PSD level was used to establish the limit for nonrestricted frequency bands. However, the general limits of §15.209 apply for the restricted bands of operation defined in §15.205.

Table 6-3: 100 kHz reference level measurement

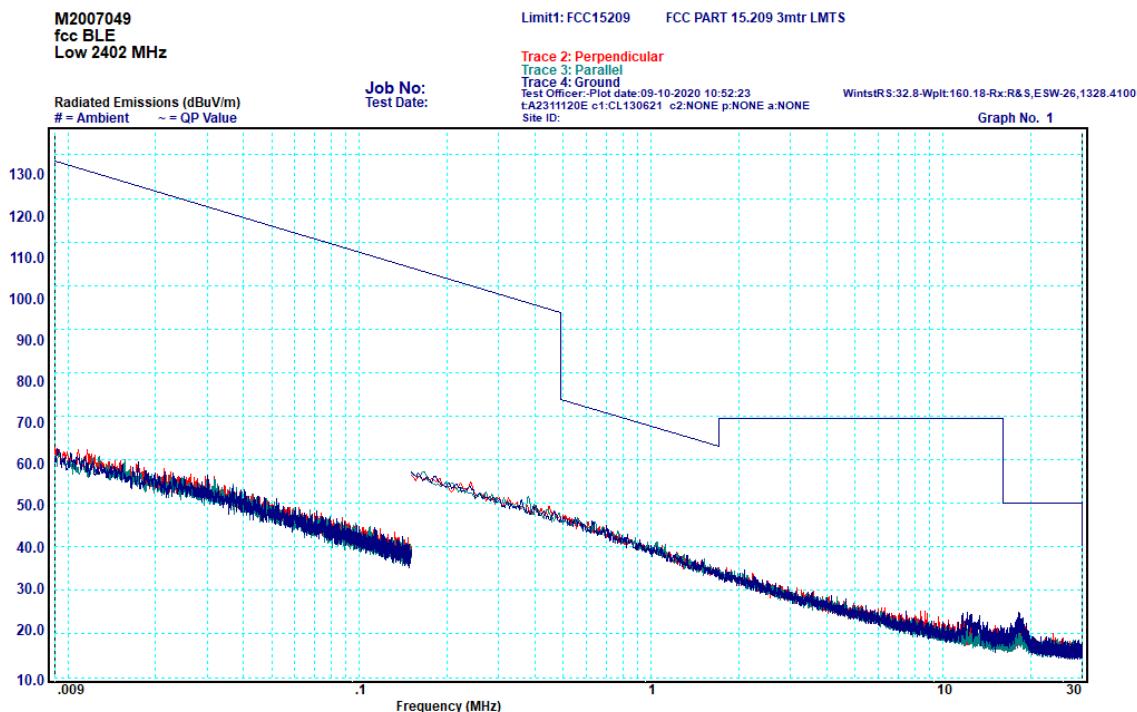
Freq. (MHz)	Peak at 3 m (dB μ V/m)	Established Limit (dB μ V/m)	
		@ 3 m	@ 1 m
2402	96.59	76.59	86.13



Graph 6-7: 100 kHz bandwidth reference level

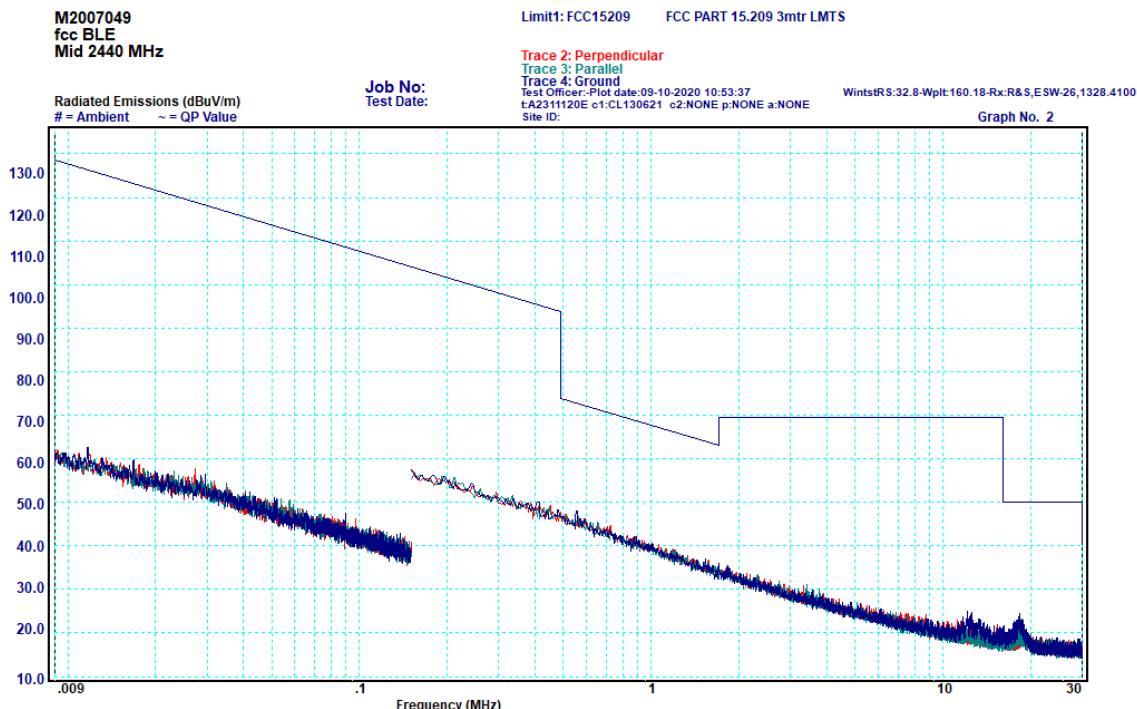
6.7.3 Transmitter Spurious Emissions: 9 kHz to 30 MHz

All emissions measured in the frequency band 9kHz - 30MHz complied with the requirements of the standard.



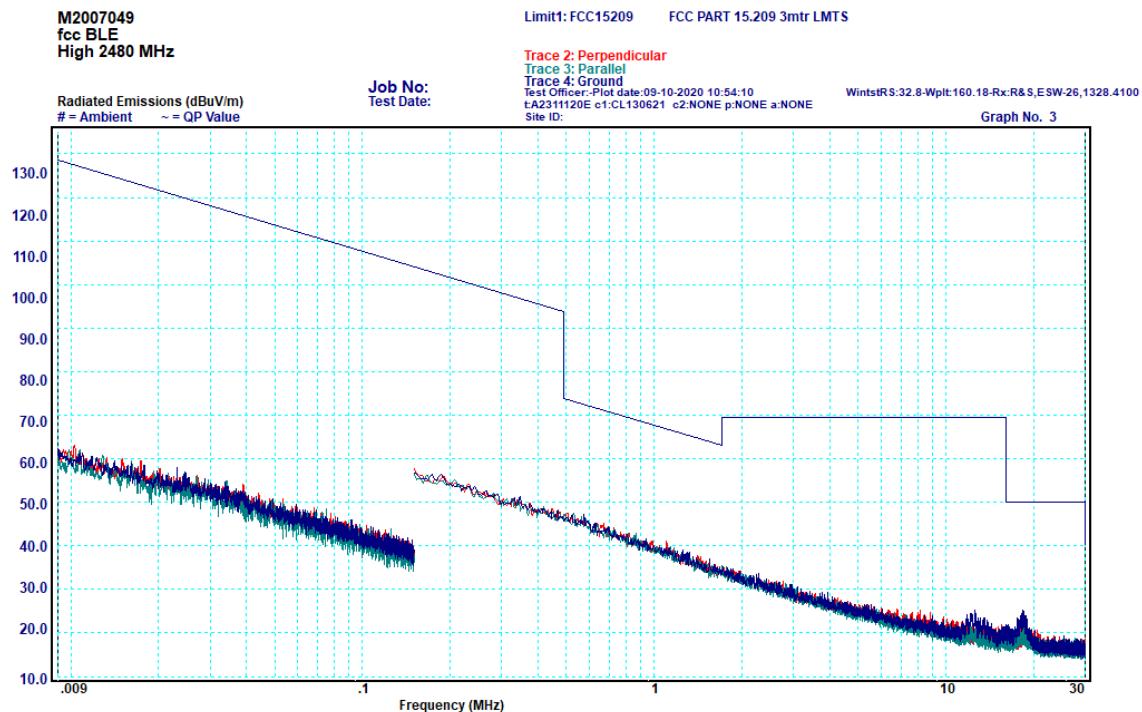
Graph 6-8: Transmitter Spurious Emissions, 9kHz – 30 MHz, 2402 MHz (Low Channel)

No peaks were measured within 10 dB of the limit.



Graph 6-9: Transmitter Spurious Emissions, 9kHz – 30 MHz, 2440 MHz (Mid Channel)

No peaks were measured within 10 dB of the limit.

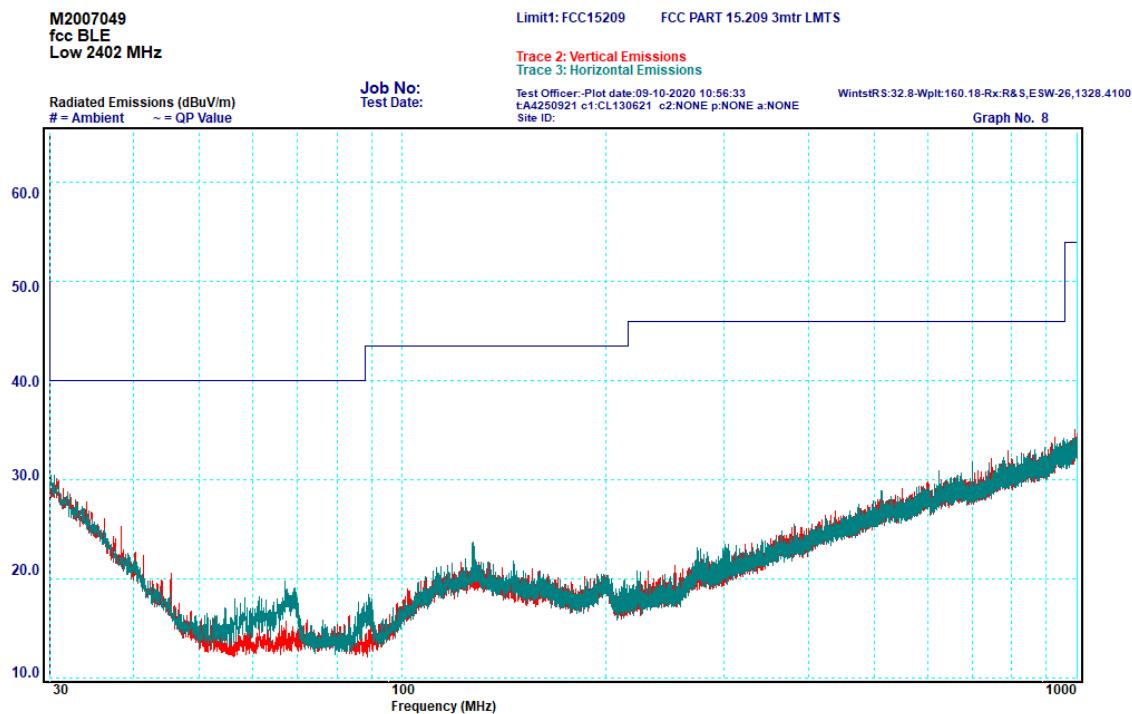


Graph 6-10: Transmitter Spurious Emissions, 9kHz – 30 MHz, 2480 MHz (High Channel)

No peaks were measured within 10 dB of the limit.

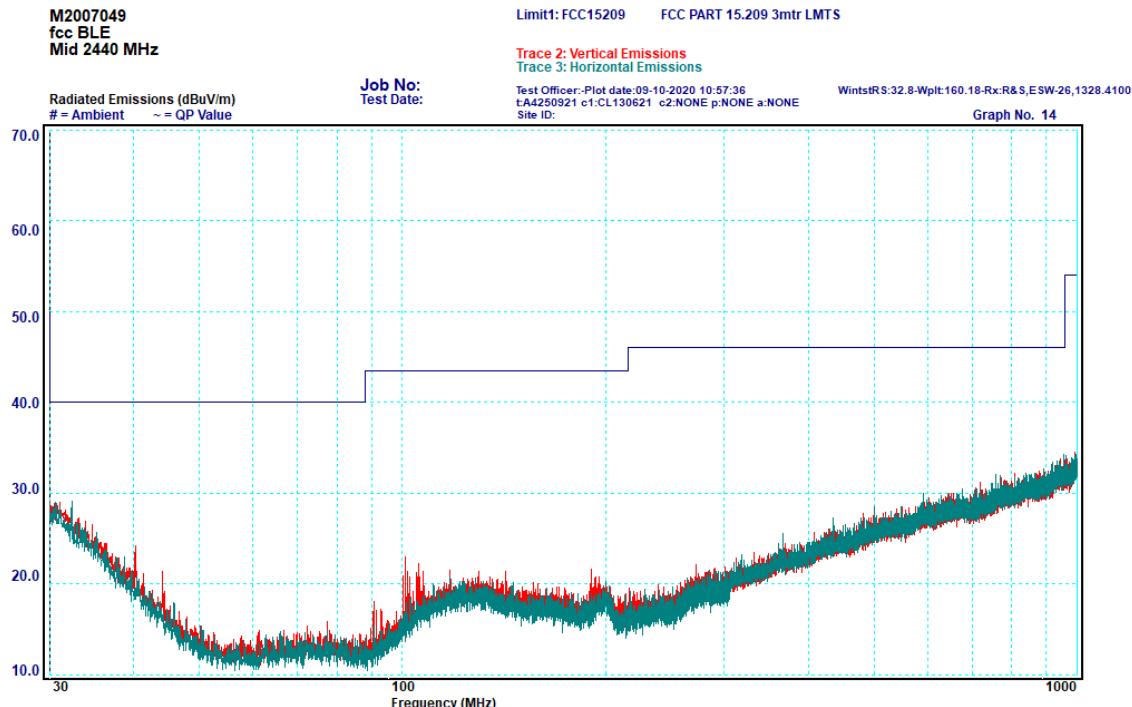
6.7.4 Transmitter Spurious Emissions: 30 - 1000 MHz

All emissions measured in the frequency band 30 – 1000 MHz complied with the requirements of the standard.



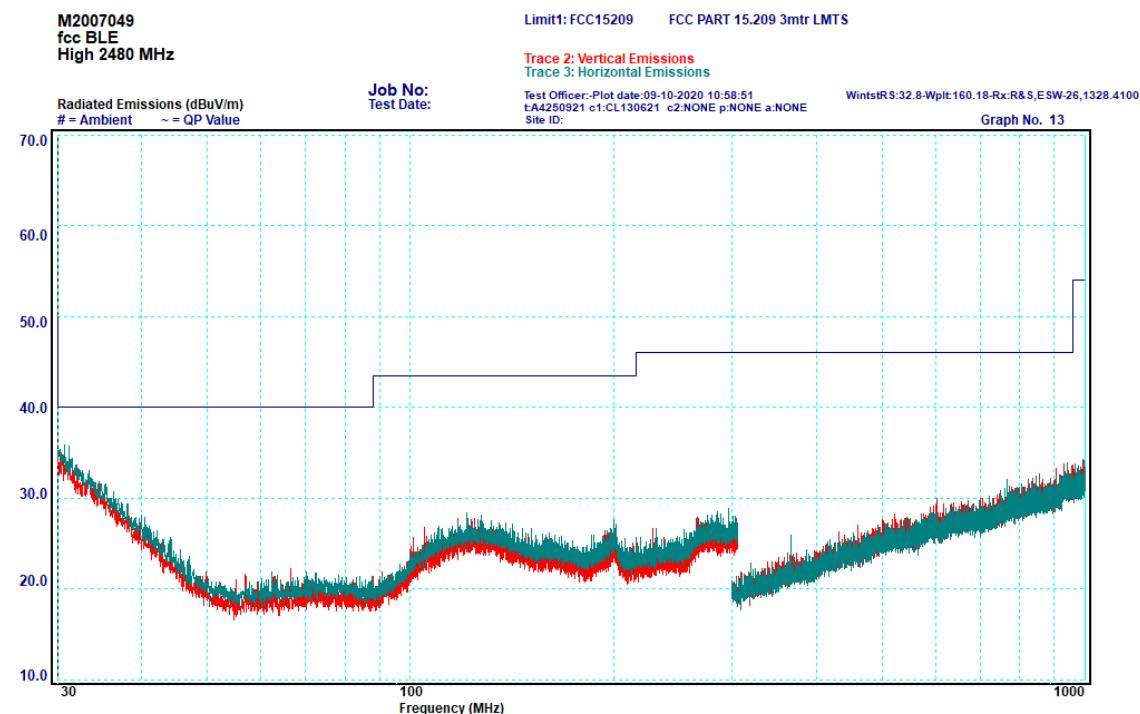
Graph 6-11: Transmitter Spurious Emissions, 30 – 1000 MHz, 2402 MHz (Low Channel)

No peaks were measured within 10 dB of the limit.



Graph 6-12: Transmitter Spurious Emissions, 30 – 1000 MHz, 2440 MHz (Mid Channel)

No peaks were measured within 10 dB of the limit.



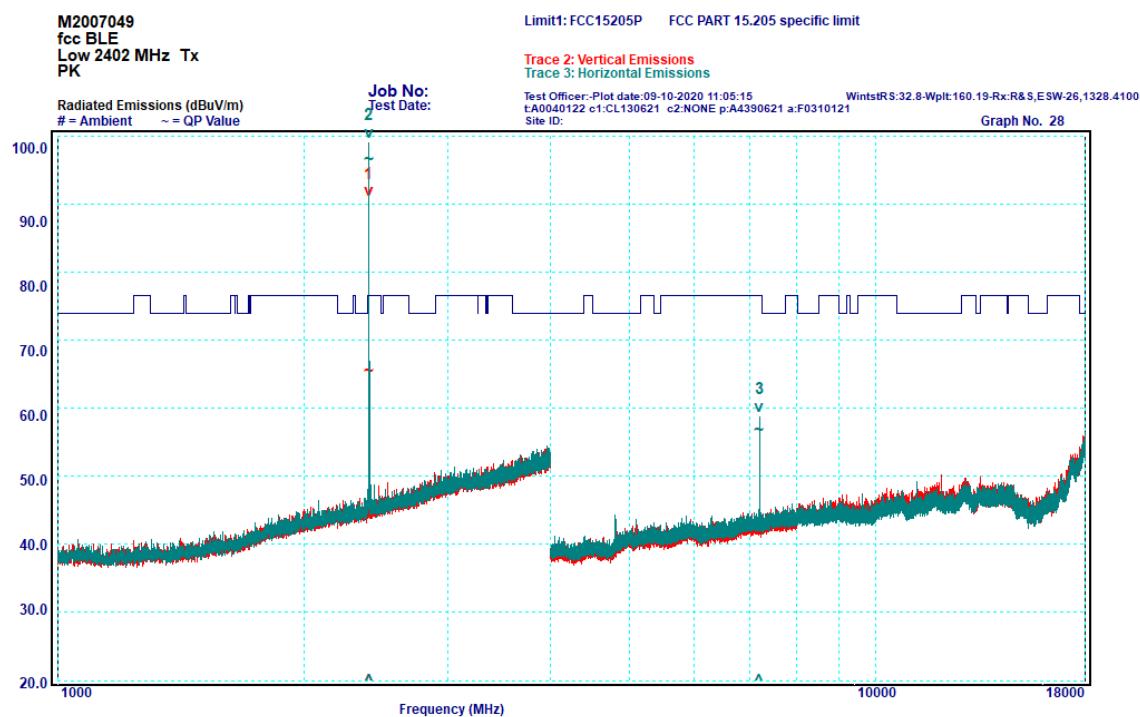
Graph 6-13: Transmitter Spurious Emissions, 30 – 1000 MHz, 2480 MHz (High Channel)

No peaks were measured within 10 dB of the limit.

6.7.5 Transmitter Spurious Emissions: 1 - 18 GHz

All emissions measured in the frequency band 1 – 18 GHz complied with the requirements of the standard.

Peak Measurements:

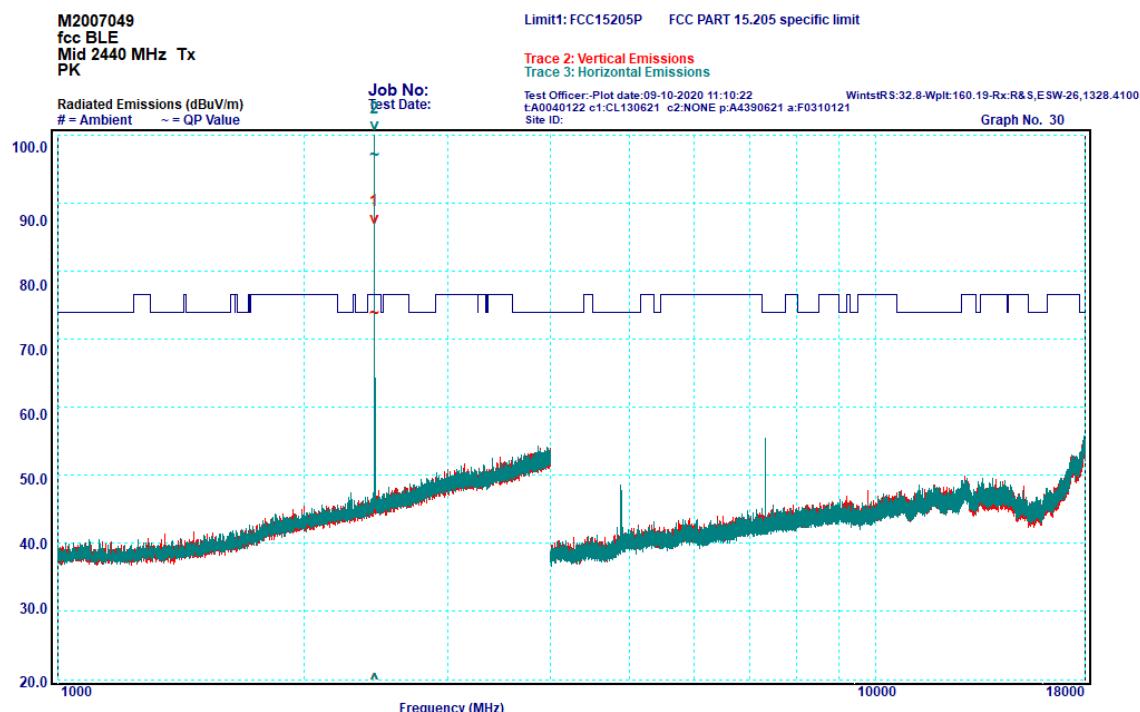


Graph 6-14: Transmitter Spurious Emissions, 1 – 18 GHz, 2402 MHz, Peak

Table 6-4: Transmitter Spurious Emissions, 1 – 18 GHz, 2402 MHz, Peak

Peak	Frequency [MHz]	Polarisation	Peak		
			Level [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]
1*	2401.99	Vertical	N/A	N/A	N/A
2*	2401.98	Horizontal	N/A	N/A	N/A
3	7205.87	Horizontal	56.8	76.6	-19.8

*Peaks 1 and 2 are the fundamental transmissions and are not subject to the spurious emissions limit of the standard.



Graph 6-15: Transmitter Spurious Emissions, 1 – 18 GHz, 2440 MHz, Peak

Table 6-5: Transmitter Spurious Emissions, 1 – 18 GHz, 2440 MHz, Peak

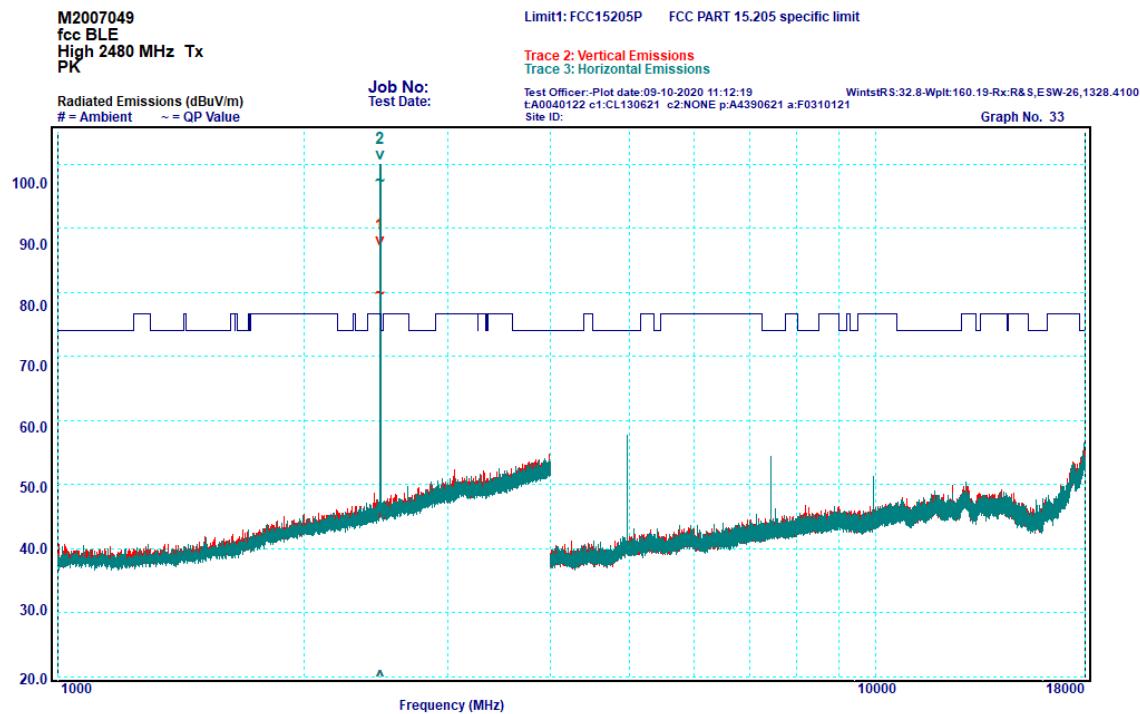
Peak	Frequency [MHz]	Polarisation	Peak		
			Level [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]
1*	2440	Vertical	N/A	N/A	N/A
2*	2440	Horizontal	N/A	N/A	N/A

*Peaks 1 and 2 are the fundamental transmissions and are not subject to the spurious emissions limit of the standard.



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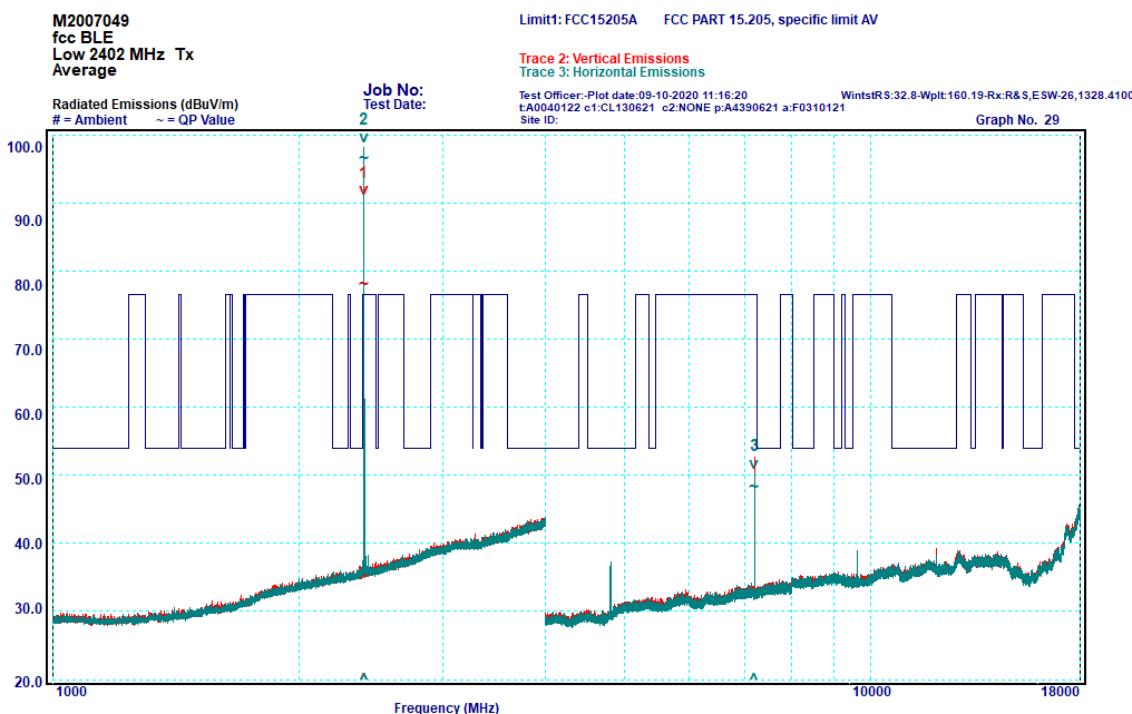
Graph 6-16: Transmitter Spurious Emissions, 1 – 18 GHz, 2480 MHz, Peak

Table 6-6: Transmitter Spurious Emissions, 1 – 18 GHz, 2480 MHz, Peak

Peak	Frequency [MHz]	Polarisation	Peak		
			Level [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]
1*	2480	Vertical	N/A	N/A	N/A
2*	2480	Horizontal	N/A	N/A	N/A

*Peaks 1 and 2 are the fundamental transmissions and are not subject to the spurious emissions limit of the standard.

Average Measurements:

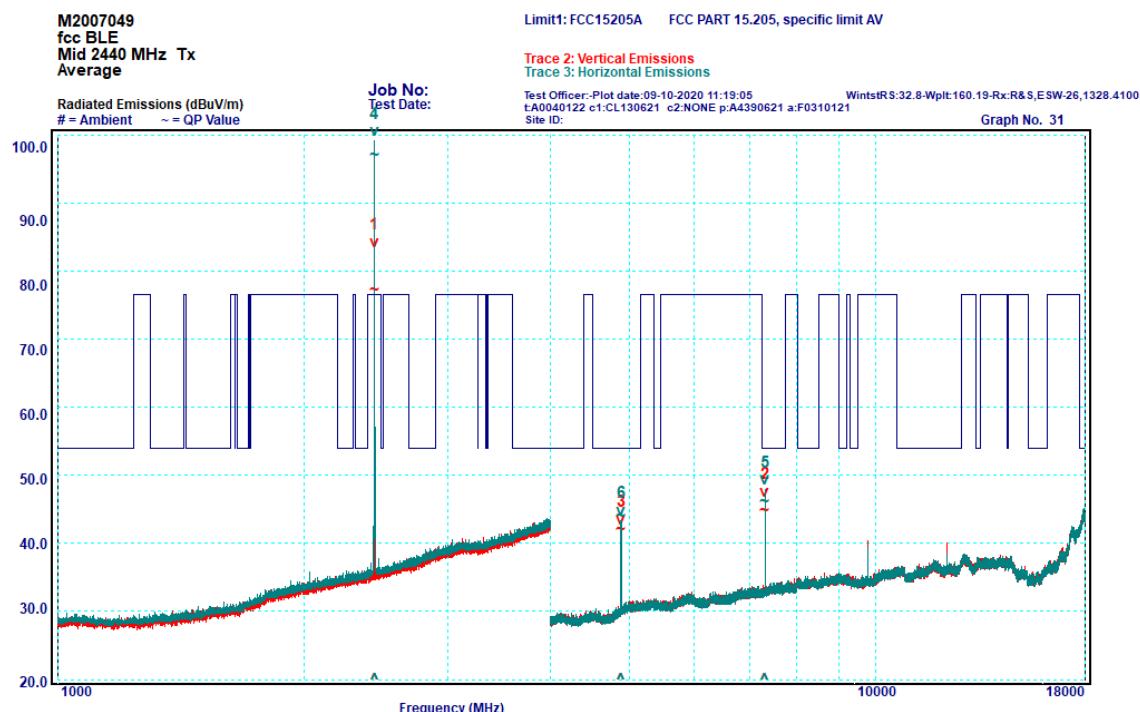


Graph 6-17: Transmitter Spurious Emissions, 1 – 18 GHz, 2402 MHz, Average

Table 6-7: Transmitter Spurious Emissions, 1 – 18 GHz, 2402 MHz, Average

Peak	Frequency [MHz]	Polarisation	Avg		
			Level [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]
1*	2401.93	Vertical	N/A	N/A	N/A
2*	2401.93	Horizontal	N/A	N/A	N/A
3	7205.43	Horizontal	48.2	76.6	-28.4

*Peaks 1 and 2 are the fundamental transmissions and are not subject to the spurious emissions limit of the standard.

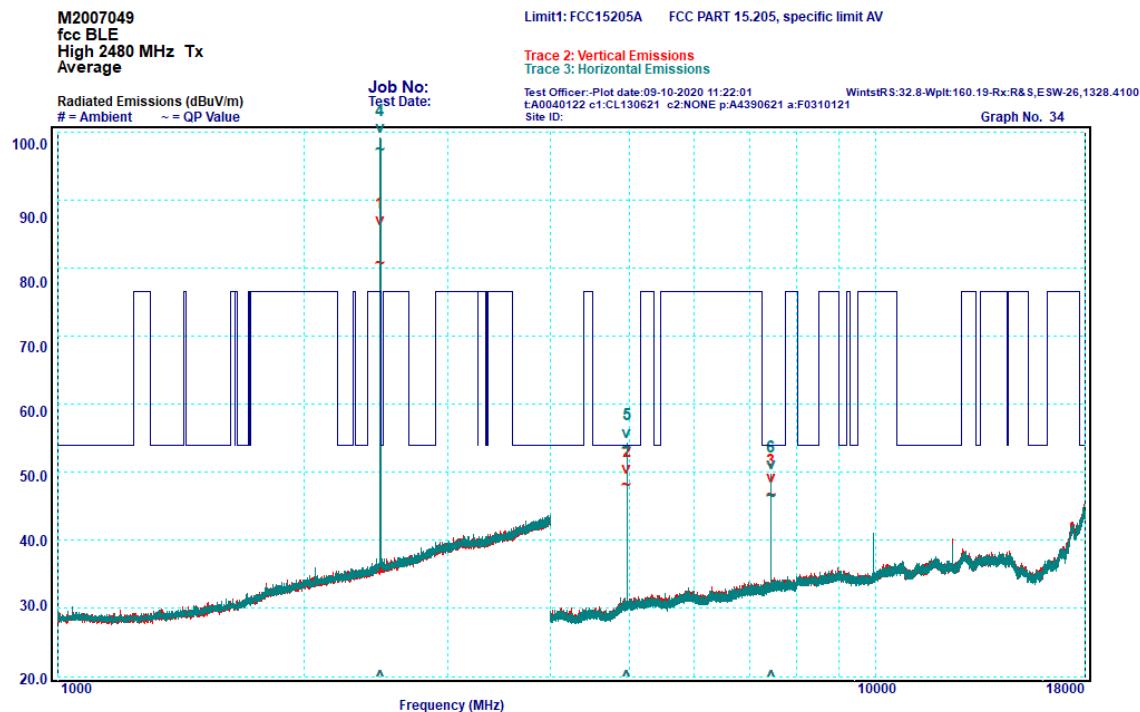


Graph 6-18: Transmitter Spurious Emissions, 1 – 18 GHz, 2440 MHz, Average

Table 6-8: Transmitter Spurious Emissions, 1 – 18 GHz, 2440 MHz, Average

Peak	Frequency [MHz]	Polarisation	Avg		
			Level [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]
1*	2439.97	Vertical	N/A	N/A	N/A
2	7319.33	Vertical	44.8	54	-9.2
3	4879.92	Vertical	42	54	-12
4*	2439.95	Horizontal	N/A	N/A	N/A
5	7319.37	Horizontal	46.1	54	-7.9
6	4879.86	Horizontal	44	54	-10

*Peaks 1 and 4 are the fundamental transmissions and are not subject to the spurious emissions limit of the standard.



Graph 6-19: Transmitter Spurious Emissions, 1 – 18 GHz, 2480 MHz, Average

Table 6-9: Transmitter Spurious Emissions, 1 – 18 GHz, 2480 MHz, Average

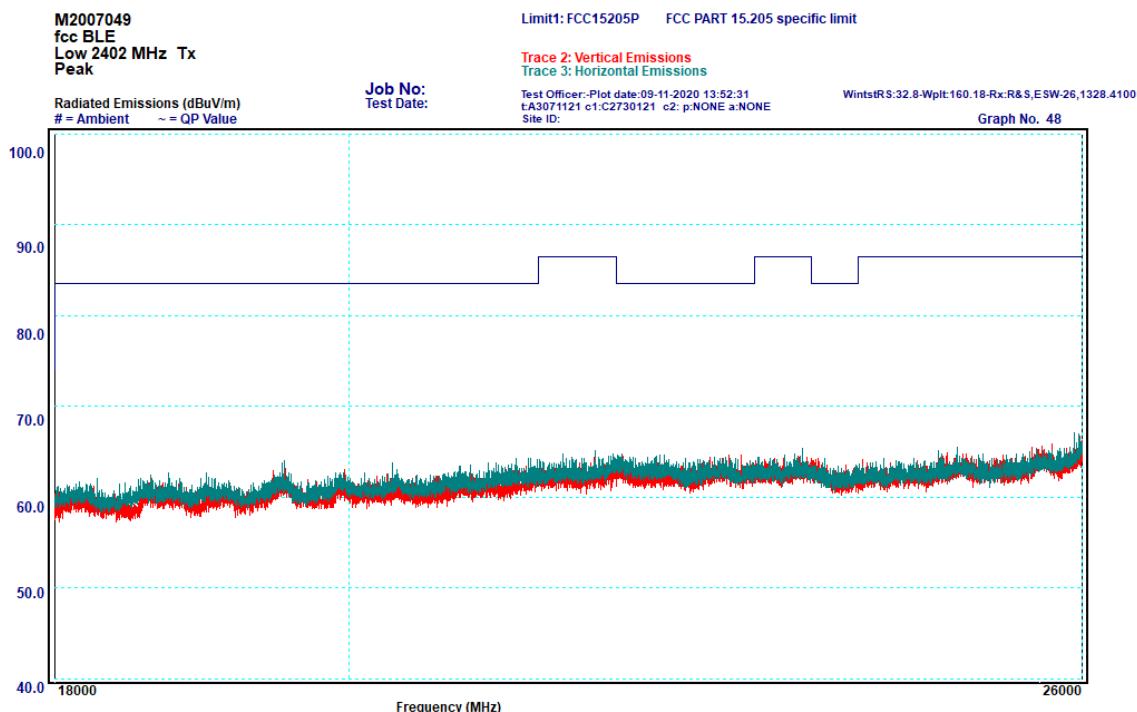
Peak	Frequency [MHz]	Polarisation	Avg		
			Level [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]
1*	2479.95	Vertical	N/A	N/A	N/A
2	4959.87	Vertical	48.1	54	-5.9
3	7439.97	Vertical	46.6	54	-7.4
4*	2479.95	Horizontal	N/A	N/A	N/A
5	4959.85	Horizontal	53.5	54	-0.5
6	7439.87	Horizontal	46.5	54	-7.5

*Peaks 1 and 4 are the fundamental transmissions and are not subject to the spurious emissions limit of the standard.

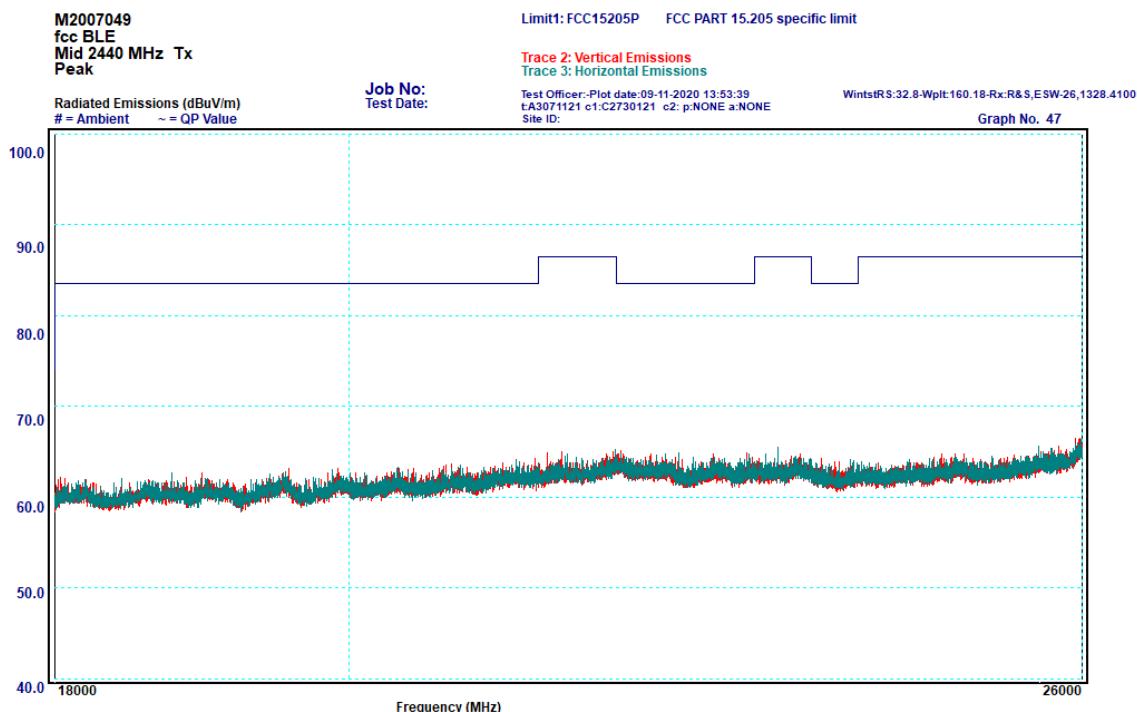
6.7.6 Transmitter Spurious Emissions: 18 - 26 GHz

All emissions measured in the frequency band 18 – 26 GHz complied with the requirements of the standard.

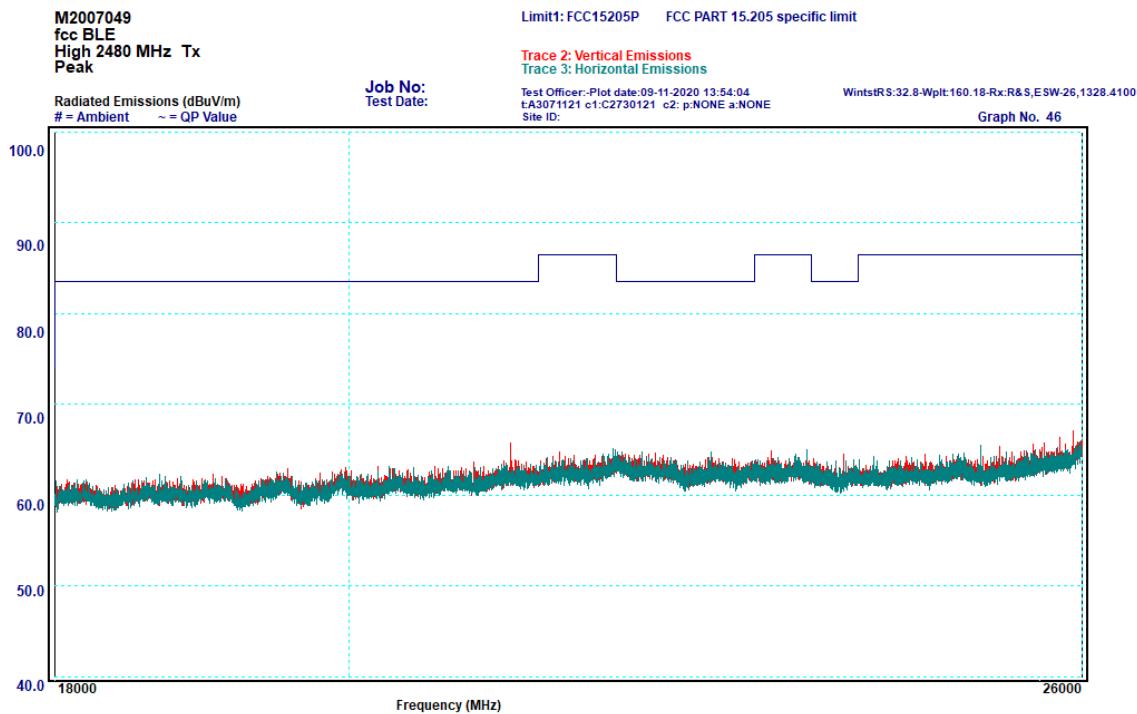
Peak Measurements:



Graph 6-20: Transmitter Spurious Emissions, 18 – 26 GHz, 2402 MHz, Peak
No peaks were measured within 10 dB of the limit.

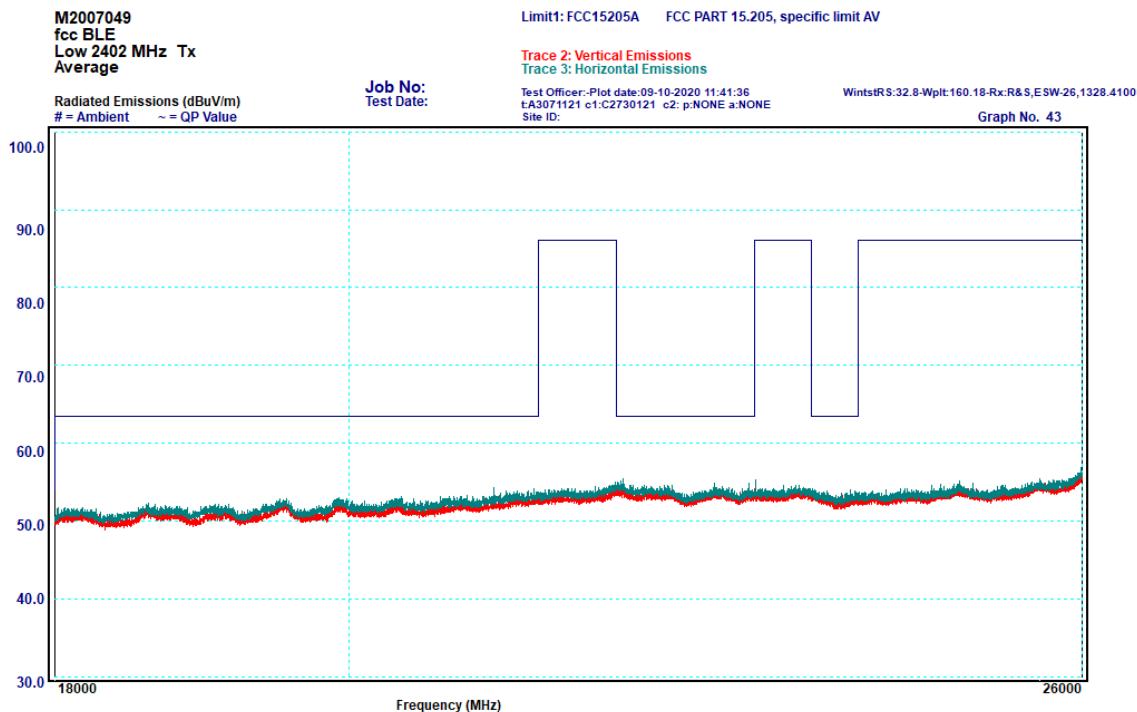


Graph 6-21: Transmitter Spurious Emissions, 18 – 26 GHz, 2440 MHz, Peak
No peaks were measured within 10 dB of the limit.

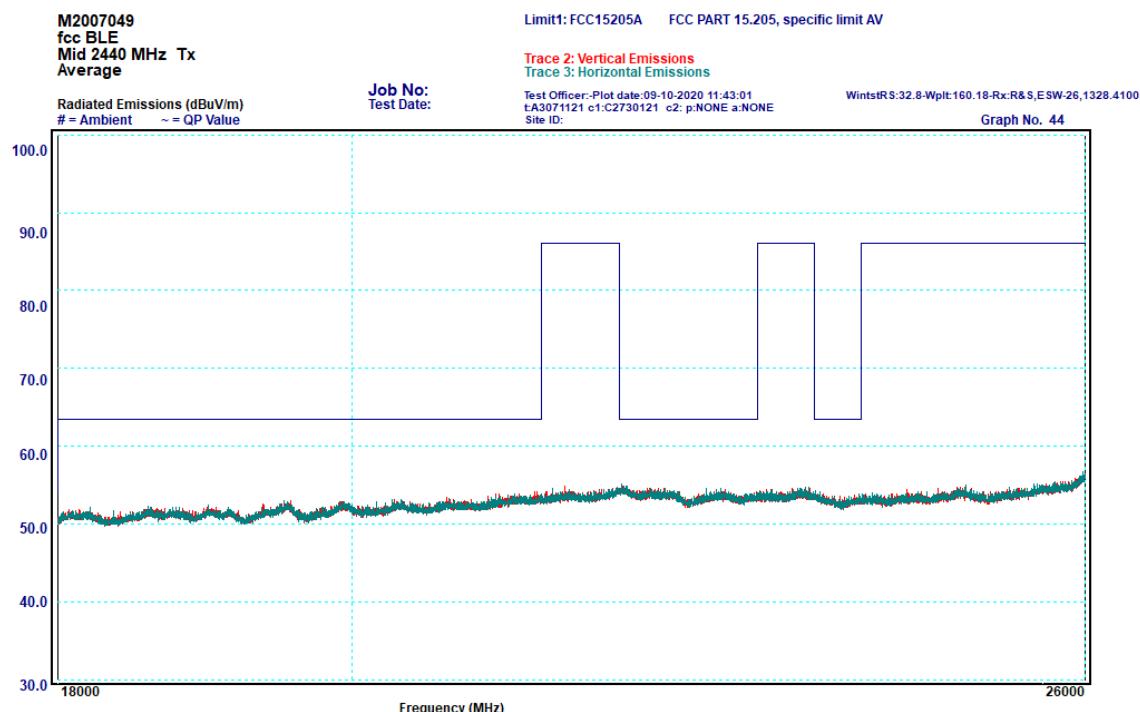


Graph 6-22: Transmitter Spurious Emissions, 18 – 26 GHz, 2480 MHz, Peak
No peaks were measured within 10 dB of the limit.

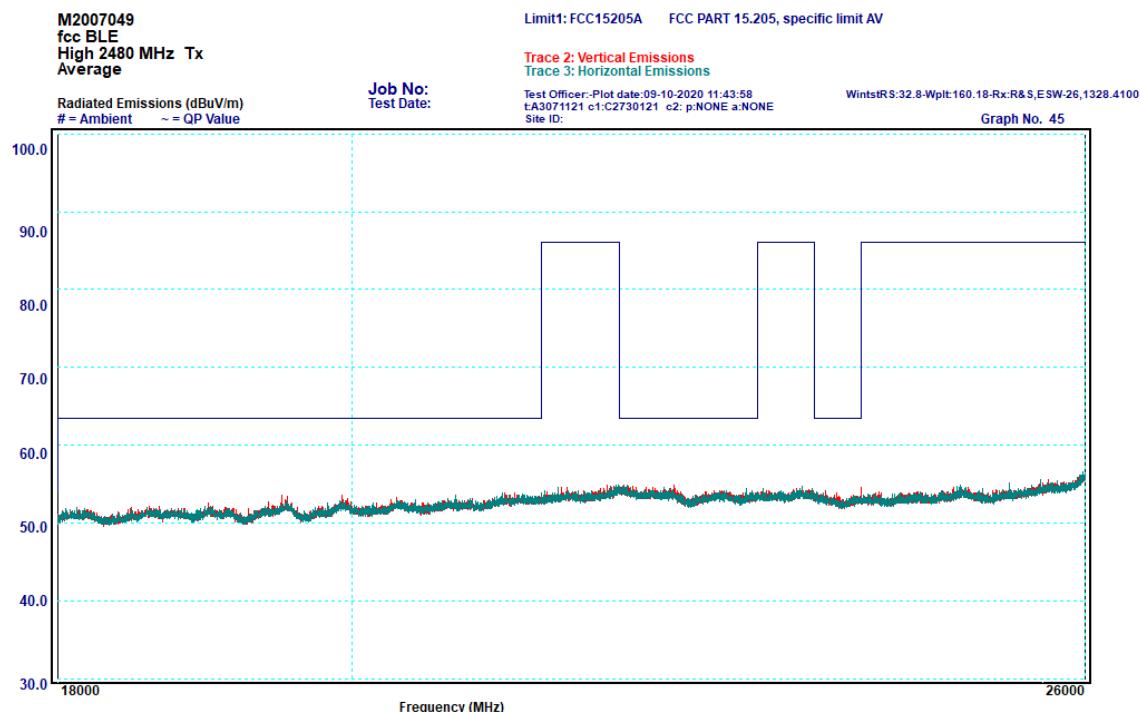
Average Measurements:



Graph 6-23: Transmitter Spurious Emissions, 18 – 26 GHz, 2402 MHz, Average
No peaks were measured within 10 dB of the limit.



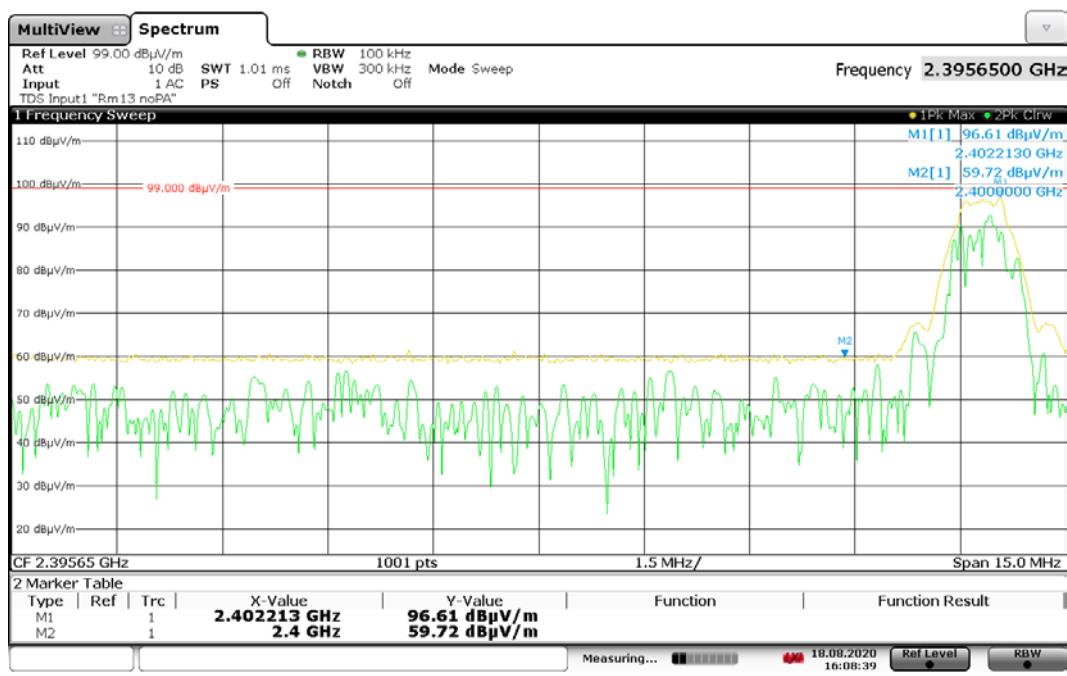
Graph 6-24: Transmitter Spurious Emissions, 18 – 26 GHz, 2440 MHz, Average
No peaks were measured within 10 dB of the limit.



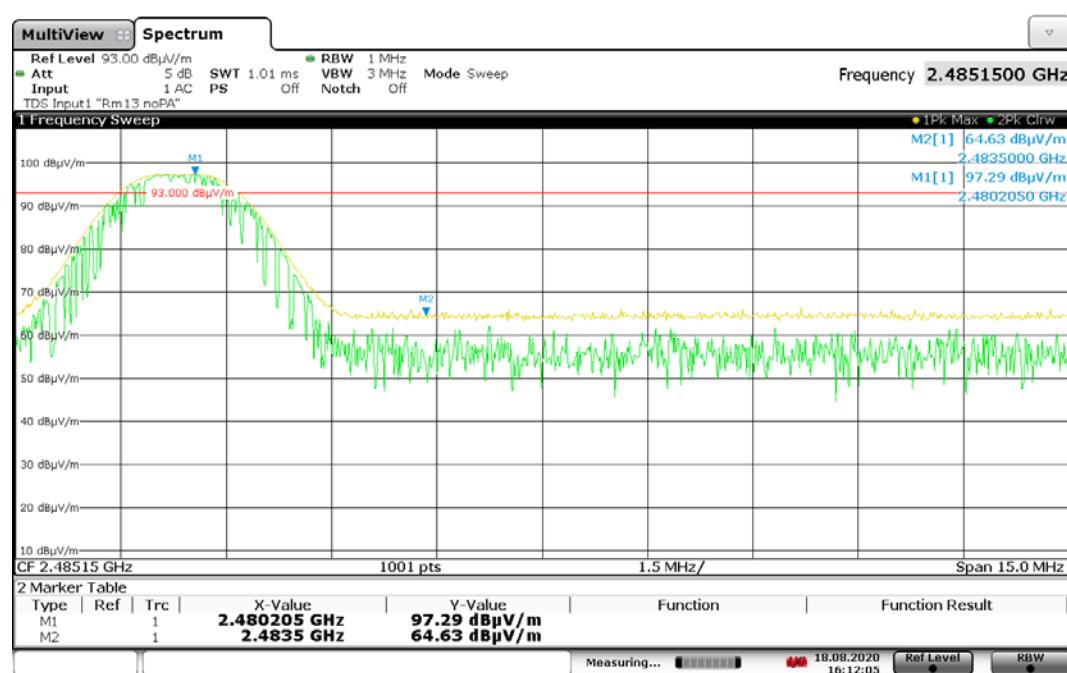
Graph 6-25: Transmitter Spurious Emissions, 18 – 26 GHz, 2480 MHz, Average
No peaks were measured within 10 dB of the limit.

6.8 §15.247(d) Band Edge Emission Measurements

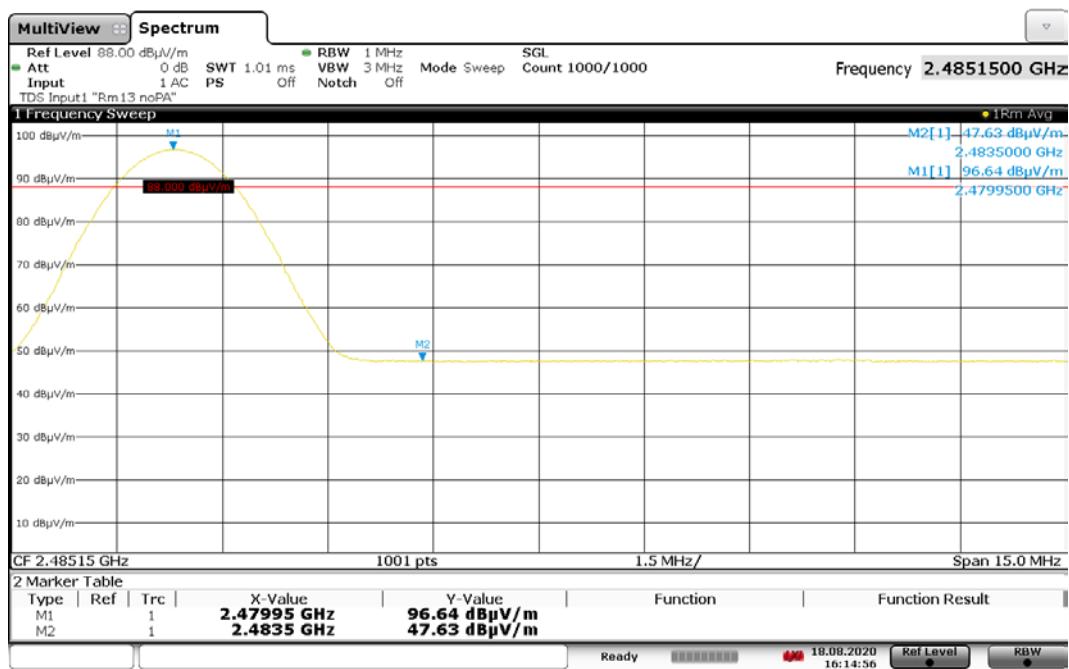
Band-edge measurements were done using radiated in accordance to ANSI C63.10 clause 11.13.1. All emissions measured near the lower and upper band edge complied with the requirements of §15.247. Authorised-band band-edges were measured in the lower end and Restricted-band band-edges were measured in the upper end.



Graph 6-26: Lower Band edge (Authorised-band), 2402 MHz, Peak



Graph 6-27: Upper Band edge (Restricted-band), 2480 MHz, Peak



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Graph 6-28: Upper Band edge (Restricted-band), 2480 MHz, Average

Table 6-10: Band edge Measurement

Measurement Type	Freq [MHz]	Measurement [dBuV/m]	Limit [dBuV/m]	Result
Peak	2400	59.72	76.59	Complied
Peak	2483.5	64.63	74	Complied
Average	2483.5	47.63	54	Complied

6.9 §15.247(e) Power Spectral Density

6.9.1 Test procedure

The tests were performed in accordance with ANSI C63.10: 2013 Clause 11.10 Maximum power spectral density level in the fundamental emissions.

Power spectral density measurements were made at 3 metres. The measurement resolution bandwidth was 3 kHz. The orientation of the EUT and the measurement antenna height and polarisation that produced the highest EIRP was used.

6.9.2 Limits

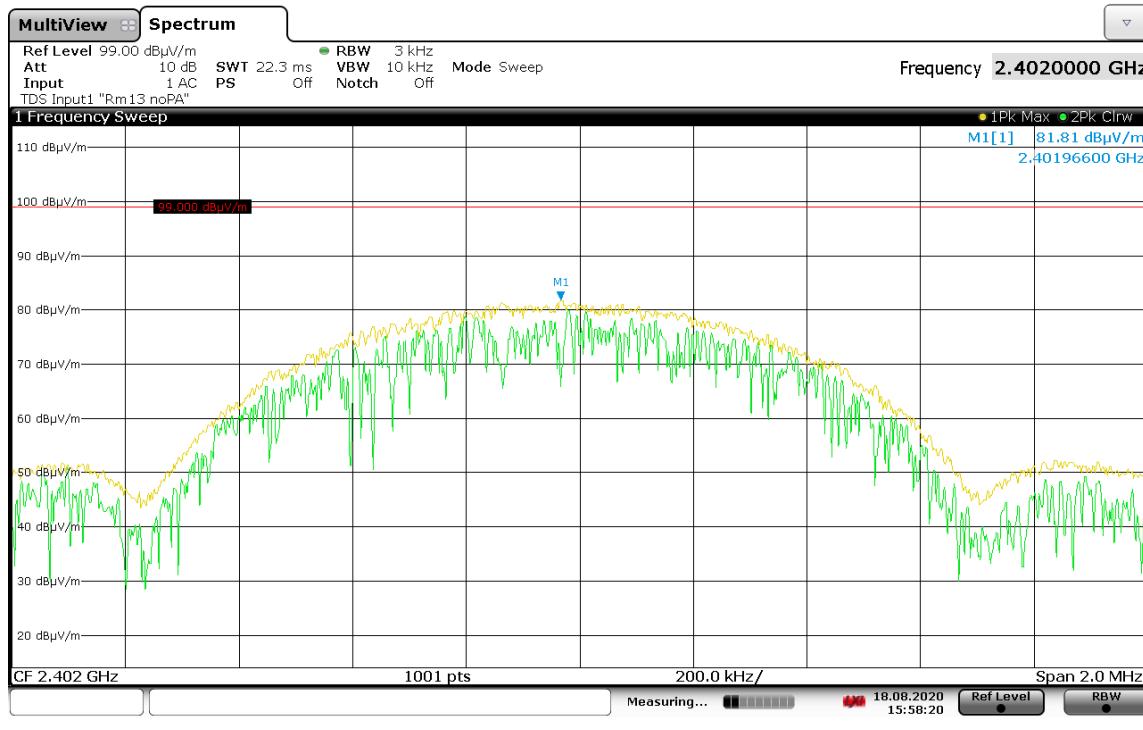
The maximum conducted power spectral density (PSD) is 8 dBm per 3 kHz.

6.9.3 Results

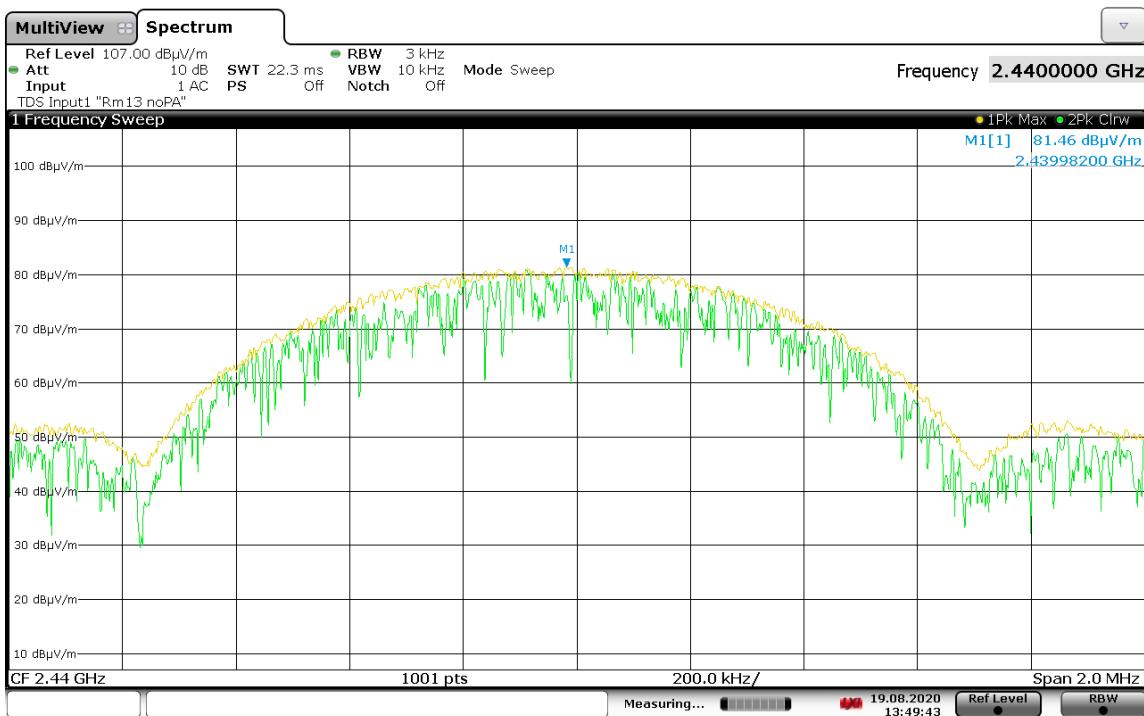
The measured radiated field strength is converted to equivalent conducted output power spectral density for checking compliance (KDB 558074 D01 Section 3).

Table 6-11: Power spectral density

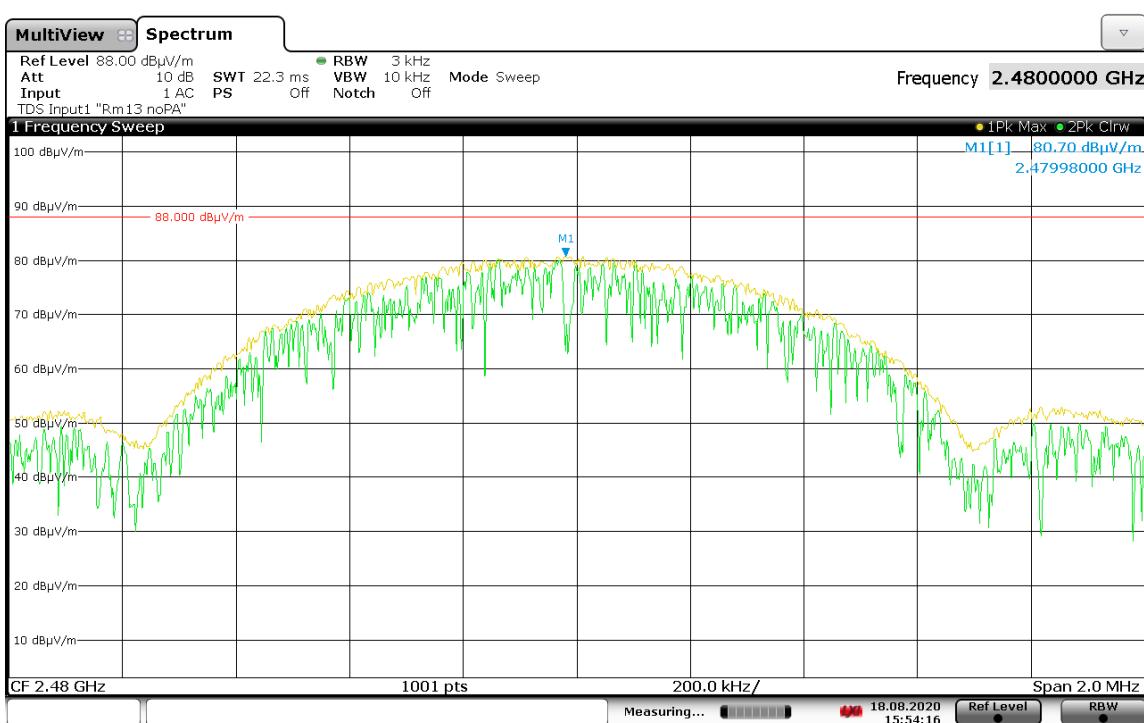
Freq. [MHz]	E-Field@ 3 m		Antenna Gain (dBi)	Equivalent Conducted Output PSD (dBm)	Limit (dBm)	Results
	dB μ V/m	dBm				
2402	81.81	-13.42	0	-13.42	8	Complied
2440	81.46	-13.77	0	-13.77	8	Complied
2480	80.70	-14.53	0	-14.53	8	Complied



Graph 6-29: Radiated Power Spectral Density, 2402 MHz



Graph 6-30: Radiated Power Spectral Density, 2440 MHz



Graph 6-31: Radiated Power Spectral Density, 2480 MHz

6.10 §15.247(i) Maximum Permissible Exposure

The EUT complied with the applicable maximum permissible exposure levels. Refer to EMC Technologies report M2007049-6.

6.11 §15.215 Occupied Bandwidth – 99% power

6.11.1 Test procedure

The bandwidth containing 99% power of the transmitted signal was measured using the procedure from ANSI C63.10 section 6.9.

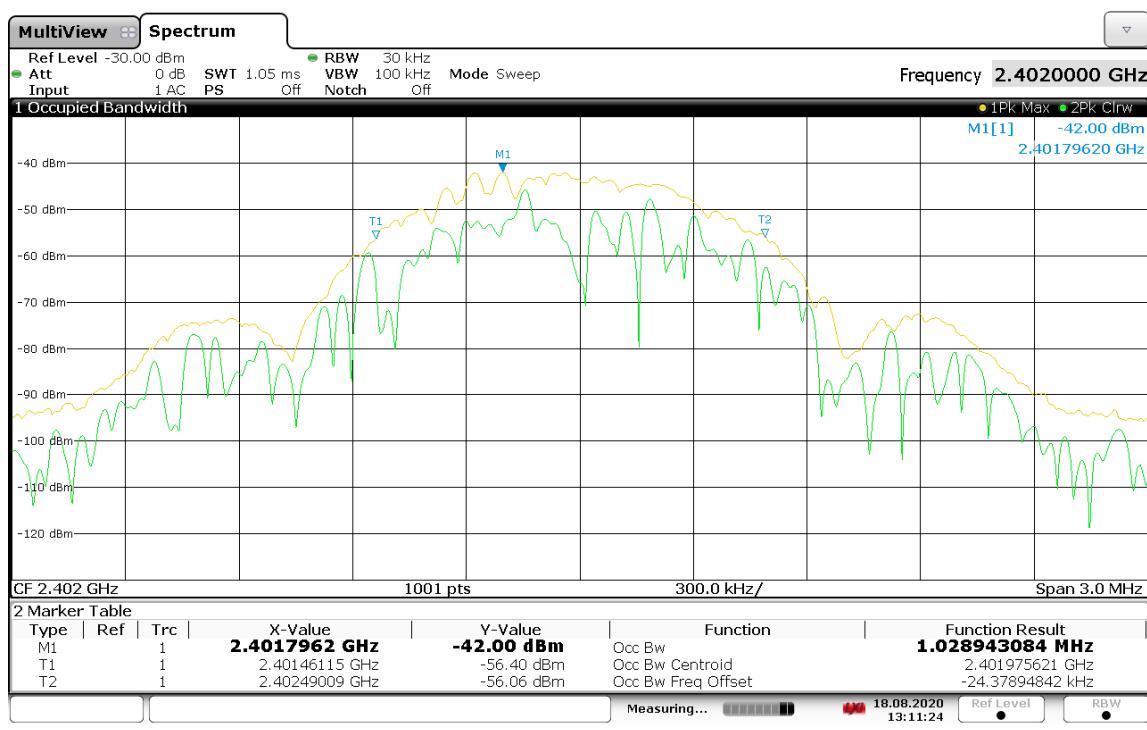
6.11.2 Limits

The 99% power should be contained within the frequency band 2400 – 2483.5 MHz.

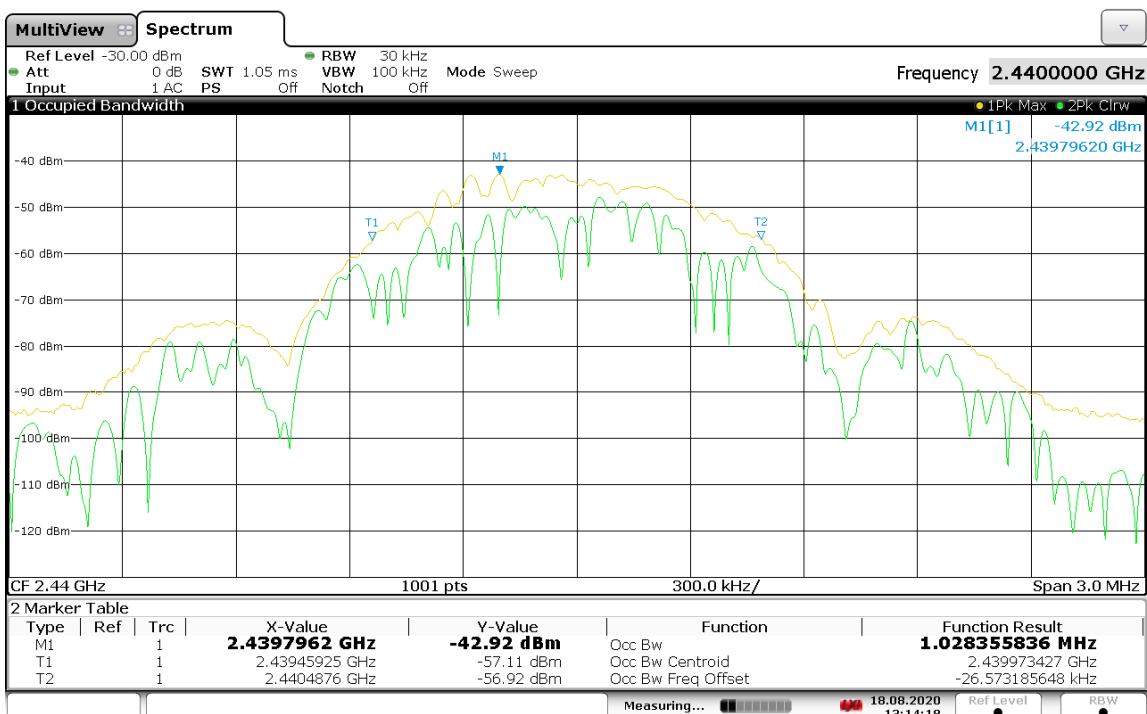
6.11.3 Results

Table 6-12: Occupied Bandwidth

Freq. [MHz]	99% Bandwidth [kHz]	Low Frequency [MHz]	High Frequency [MHz]	Result
2402	1.02	2401.46	2402.49	Complied
2440	1.02	2439.45	2440.48	Complied
2480	1.03	2479.45	2480.48	Complied

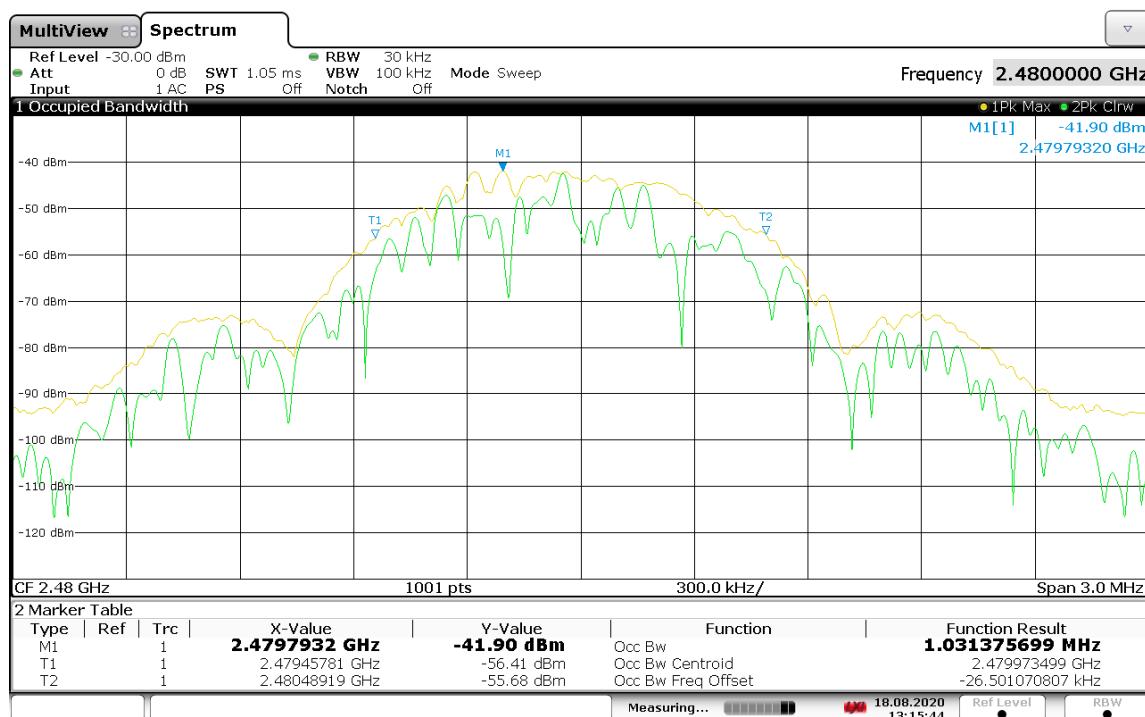


Graph 6-32: Occupied bandwidth, 2402 MHz



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Graph 6-33: Occupied bandwidth, 2440 MHz



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Graph 6-34: Occupied bandwidth, 2480 MHz

END OF REPORT