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RADIO REPORT FOR CERTIFICATION

REPORT NUMBER: M180429-4

TEST STANDARD: FCC PART 15 SUBPART C SECTION 15.249

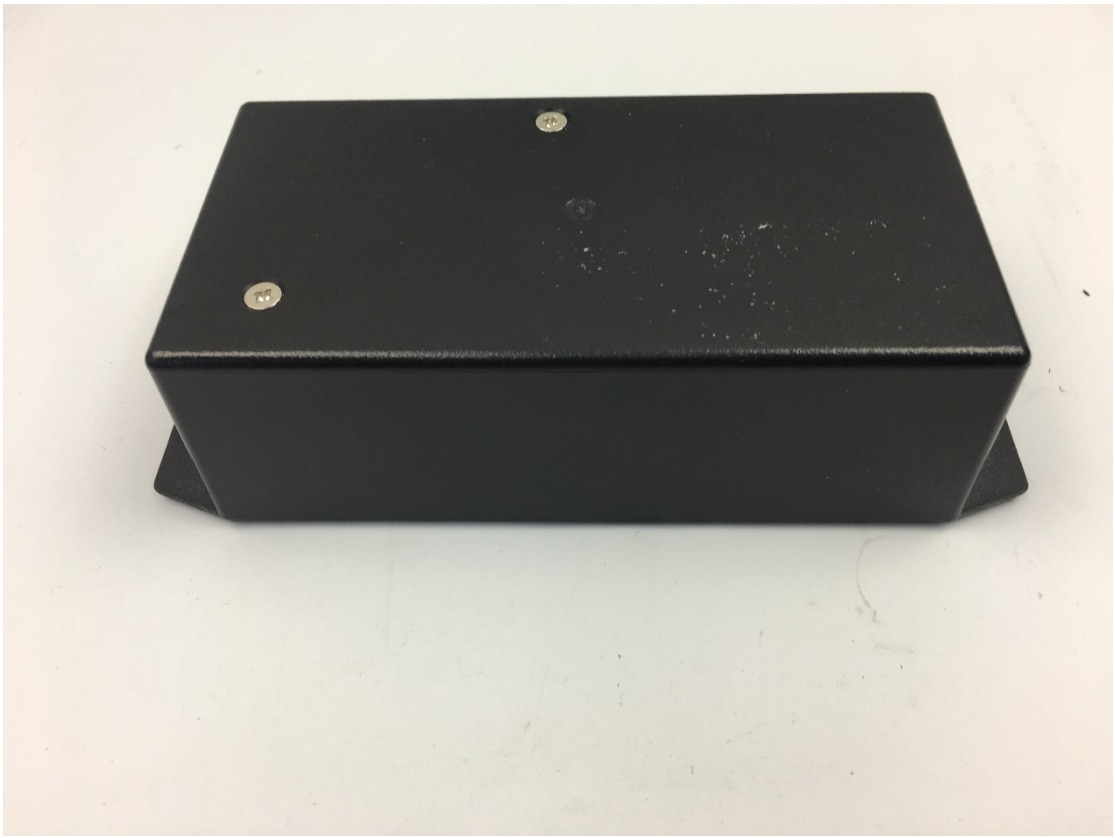
ISED RSS-210, SECTION B.10

CLIENT: LASERFORCE INTERNATIONAL PTY LTD

DEVICE: LASERFORCE BASE STATION

MODEL: LF901

DATE OF ISSUE: 3 APRIL 2019



Equipment Under Test: Laserforce Base Station

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CERTIFICATE OF COMPLIANCE

Device:	LASERFORCE BASE STATION
Model Number:	LF901
Serial Number:	00976
Manufacturer:	Laserforce International Pty Ltd
FCC ID:	MOQ-LF901
IC:	9262A-LF901
Tested for:	Laserforce International Pty Ltd
Address:	55 Ipswich Road, Woolloongabba, QLD 4102, Australia
Phone Number:	+61 7 3391 0155
Contact:	Paul McGougan
Email:	paul@laserforcetag.com
Standard:	FCC Part 15, Subpart C, Section 15.249 Operation within the bands 902-928 MHz, 2400-2483.5 MHz, 5725-5850 MHz and 24.0-24.25 GHz ISED RSS-210, Section B.10 Bands 902-928 MHz, 2400-2483.5 MHz and 5725-5875 MHz
Result:	The test sample complied with applicable requirements of the above standards.
Test Date(s):	22 Aug, 7, 10 Sep 2018 and 13, 27 Mar 2019
Issue Date:	3 April 2019
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, PhD Senior EMC and RF Engineer EMC Technologies Pty Ltd

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RADIO REPORT FOR CERTIFICATION

1 TEST SUMMARY

Section	Description	FCC	ISED	Result(s)
6.1	Antenna Requirement	§15.203	§RSS-Gen 6.8	Complied
6.2	Conducted emission limits	§15.207	§RSS-Gen 8.8	Complied
6.3	Radiated emission limits; general requirements	§15.209	§RSS-Gen 8.9	Complied
6.4	Field strength of fundamental	§15.249 (a)	§RSS-210 B.10(a)	Complied
6.5	Harmonics and Out-of-Band/ Spurious Emissions	§15.249 (a) & (d)	§RSS-210 B.10(a) & (b)	Complied
6.6	Radiofrequency radiation exposure evaluation	§2.1091	§RSS-102	Complied
6.7	Occupied Bandwidth – 99% power	§15.215	§RSS-Gen 6.7	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 accredited 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 – **Industry Canada Company Number - IC 3569B** and **CAB identifier number: AU0001.**

2.2 NATA Accreditation

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 (A^2LA).

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 Agilent 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)	17/07/2017	17/07/2020	1 Year*1
EMI Receiver	R&S ESW26 Sn: 101306 (R-143)	14/05/2018	14/05/2019	1 Year*2
	R&S ESR7 Sn: 101804 (R-142)	24/07/2018	24/072019	1 Year*2
Antennas	EMCO 6502 Active Loop 9 kHz – 30 MHz Sn. 9311-2801 (A-231)	15/08/2018	15/08/2021	3 Year*2
	SUNOL JB1 Sn. A061917 (A-425)	21/07/2017	21/07/2019	2 Year*2
	EMCO 3115 Double Ridge Horn Sn: 8908-3282 (A-004)	15/07/2016	15/07/2019	3 Year*1
Cables*4	BNC Cable, 3 m Yellow Cable Sn: C284-3m (C-284)	21/01/2019	21/01/2020	1 Year*1
	BNC Cable, 3 m Yellow Cable Sn: C444-3m (C-444)	18/01/2019	18/01/2020	1 Year*1
	Huber & Suhner Sucoflex 104A Sn: 503055 (C-457)	21/01/2019	21/01/2020	1 Year*1
	Huber & Suhner Sucoflex 104A Sn: 507099 (C-479)	21/01/2019	21/01/2020	1 Year*1
	Huber & Suhner Sucoflex 104A Sn: 503061 (C-463)	21/01/2019	21/01/2020	1 Year*1

Note *1. Internal NATA calibration.
Note *2. External NATA / A2LA calibration.
Note *3. Calibration date was valid during the time of testing.
Note *4. 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:

Conducted Emissions:	9 kHz to 30 MHz	±3.2 dB
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
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%.

5 DEVICE DETAILS

(Information supplied by the Client)

The Laserforce Base Station is part of the laser-tag system. The Battlesuit is a player worn vest (with phaser gun) that communicates wirelessly with the base station unit.

5.1 EUT (Transmitter) Details

Radio:	2.4 GHz transceiver (nRF24E1)
Operating Frequency Range:	2402 -2480 MHz
Modulation:	GFSK
Manufacturer:	Nordic Semiconductor
Antenna:	Integral PCB chip antenna
Antenna gain:	0.5 dBi
Highest frequency related to the transmitter circuit	2480 MHz

5.2 EUT (Host) Details

Test Sample:	Laserforce Base Station
Model Number:	LF901
Serial Number:	00976
Manufacturer:	Laserforce International Pty Ltd.
Supply Rating:	48 V DC (PoE)

5.3 Test Configuration

Testing was performed with the EUT set to transmit continuously (with modulation applied).

5.4 Modifications

No modification was required to achieve compliance.

6 RESULTS

6.1 §15.203/ RSS-Gen 6.8 Antenna Requirement

The Laserforce Base Station 2.4 GHz transmitter incorporates an integral PCB chip antenna that cannot be replaced by another type.

Antenna Type: PCB chip
Antenna gain: 0.5 dBi
Connector: Not Applicable

6.2 §15.207/ RSS-Gen 8.8 Conducted Emission Limits

The Laserforce Base Station is powered by PoE. The PoE injector used for the conducted emissions measurement was provided by the manufacturer.

PoE Injector details:
Manufacturer: D-Link
Model No.: DGS-1100-08P
AC Adapter Model No.: UP0851A-54PB
AC Input: 120 V, 60 Hz

6.2.1 Test Procedure

The arrangement specified in ANSI C63.10: 2013 was adhered to for the conducted EMI measurements. The EUT was placed in the RF screened enclosure and a CISPR EMI Receiver as defined in ANSI C63.2: 2009 was used to perform the measurements.

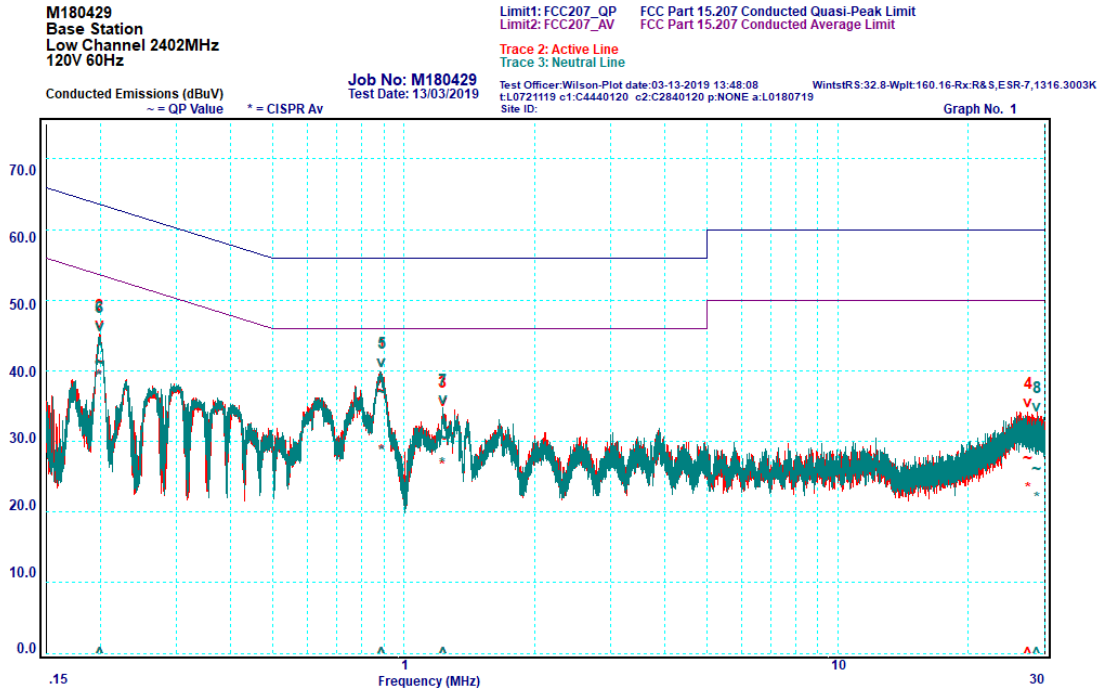
The specified 0.15 MHz to 30 MHz frequency range was sub-divided into sub-ranges to ensure that all short duration peaks were captured. For each of the sub-ranges, the EMI receiver was set to continuous scan with the Peak detector set to Max-Hold mode. The Quasi-Peak detector and the Average detector were then invoked to measure the actual Quasi-Peak and Average level of the most significant peaks, which were detected.

6.2.2 Limits

The limit applied was in accordance to the conducted limits defined in §15.207 / RSS-Gen 8.8.

6.2.3 Results

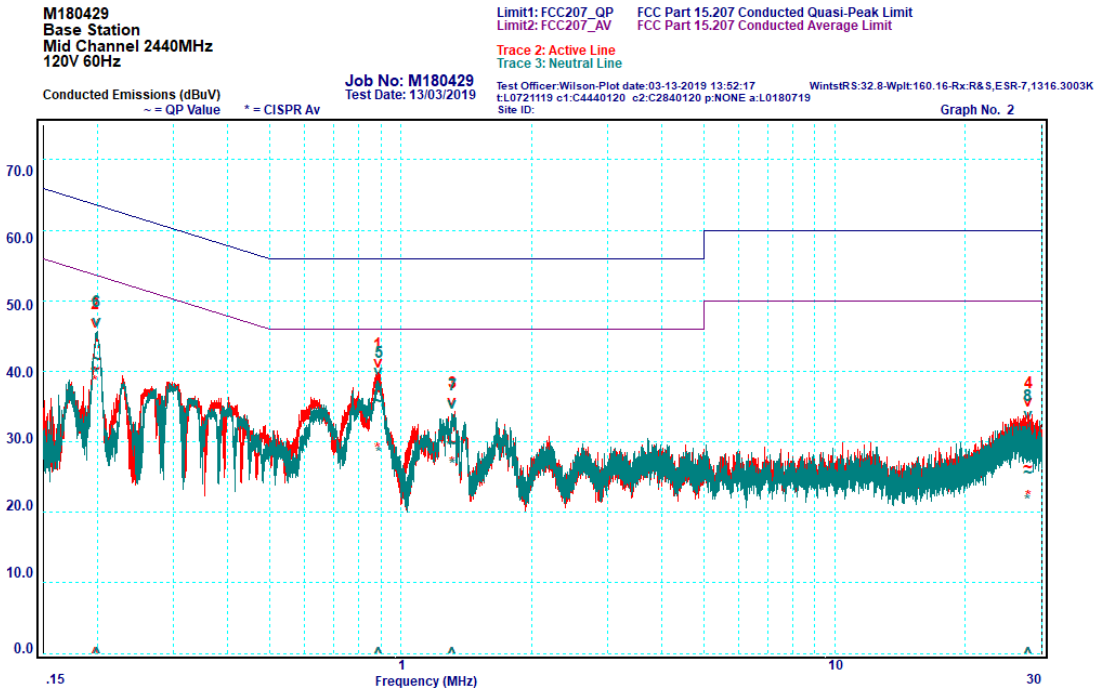
The sample complied with the conducted emission limits of §15.207/ RSS-Gen 8.8.



Graph 6-1: Conducted AC mains emission, 0.15 – 30 MHz, Low channel – 2402 MHz

Table 6-1: Conducted AC mains emission, 0.15 – 30 MHz, Low channel – 2402 MHz

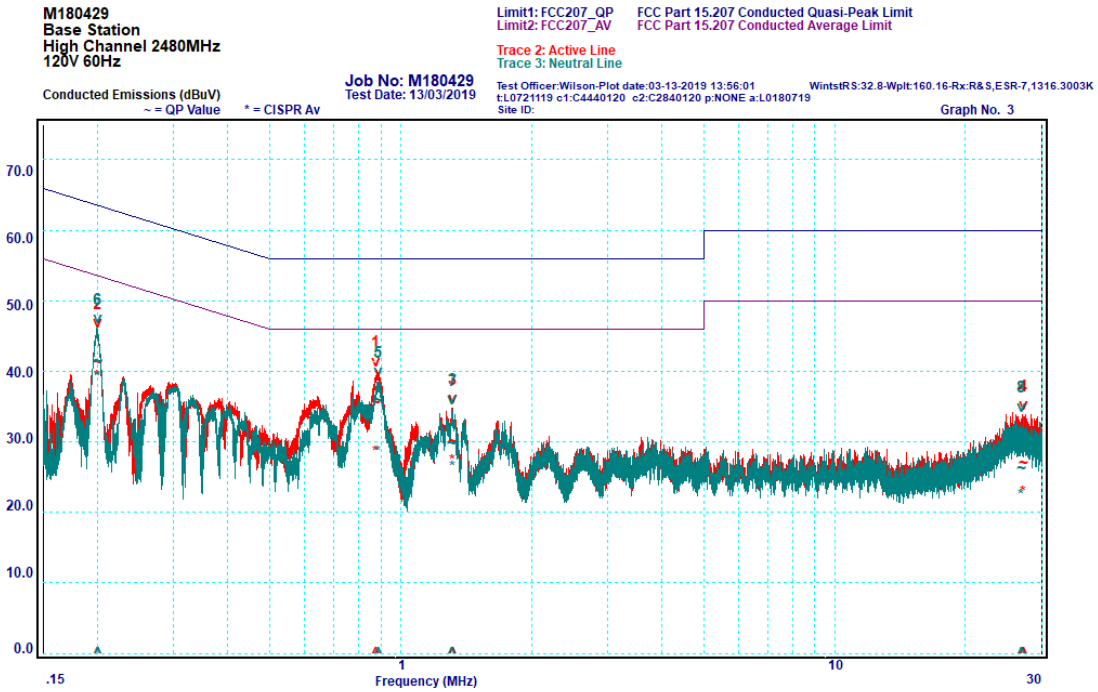
Peak	Frequency [MHz]	Line	Quasi-Peak			Average		
			Level [dBµV]	Limit [dBµV]	Δ Limit [±dB]	Level [dBµV]	Limit [dBµV]	Δ Limit [±dB]
1	0.89	Active	37.1	56	-18.9	28.7	46	-17.3
2	0.199	Active	41.2	63.6	-22.4	39.2	53.6	-14.4
3	1.231	Active	30.3	56	-25.7	26.5	46	-19.5
4	27.44	Active	27.5	60	-32.5	23.2	50	-26.8
5	0.89	Neutral	37	56	-19	28.5	46	-17.5
6	0.199	Neutral	41.1	63.6	-22.5	39.1	53.6	-14.5
7	1.233	Neutral	30.5	56	-25.5	26.8	46	-19.2
8	28.79	Neutral	26.1	60	-33.9	21.8	50	-28.2



Graph 6-2: Conducted AC mains emission, 0.15 – 30 MHz, Middle channel – 2440 MHz

Table 6-2: Conducted AC mains emission, 0.15 – 30 MHz, Middle channel – 2440 MHz

Peak	Frequency [MHz]	Line	Quasi-Peak			Average		
			Level [dBµV]	Limit [dBµV]	Δ Limit [±dB]	Level [dBµV]	Limit [dBµV]	Δ Limit [±dB]
1	0.888	Active	37.1	56	-18.9	28.9	46	-17.1
2	0.198	Active	40.4	63.7	-23.3	38.4	53.7	-15.3
3	1.318	Active	29.8	56	-26.2	26.9	46	-19.1
4	27.93	Active	26.4	60	-33.6	22.2	50	-27.8
5	0.89	Neutral	35.7	56	-20.3	28.3	46	-17.7
6	0.2	Neutral	41.7	63.6	-21.9	39.5	53.6	-14.1
7	1.318	Neutral	29.7	56	-26.3	26.6	46	-19.4
8	27.89	Neutral	25.6	60	-34.4	21.6	50	-28.4



Graph 6-3: Conducted AC mains emission, 0.15 – 30 MHz, High channel – 2480 MHz

Table 6-3: Conducted AC mains emission, 0.15 – 30 MHz, High channel – 2480 MHz

Peak	Frequency [MHz]	Line	Quasi-Peak			Average		
			Level [dBµV]	Limit [dBµV]	Δ Limit [±dB]	Level [dBµV]	Limit [dBµV]	Δ Limit [±dB]
1	0.879	Active	35.6	56	-20.4	28.5	46	-17.5
2	0.201	Active	41.3	63.6	-22.3	39.2	53.6	-14.4
3	1.318	Active	30	56	-26	27.3	46	-18.7
4	27.27	Active	27	60	-33	22.8	50	-27.2
5	0.888	Neutral	35.9	56	-20.1	28.5	46	-17.5
6	0.201	Neutral	41.4	63.6	-22.2	39.1	53.6	-14.5
7	1.315	Neutral	29.6	56	-26.4	26.3	46	-19.7
8	26.91	Neutral	26.2	60	-33.8	22.3	50	-27.7

6.3 §15.209/ RSS-Gen 8.9 Radiated emission limits; general requirements

Provisions of §15.209/ RSS-Gen 8.9 radiated emission limits have been met, refer to section 6.5.

6.4 §15.249(a)/ RSS-210 B.10(a) Field strength of fundamental

6.4.1 Test Procedure

The field strength of the fundamental transmitted frequency was measured inside a semi-anechoic chamber compliant with ANSI C63.4: 2014.

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. A calibrated horn antenna was used for measurement. 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. The fundamental emissions were measured using a peak detector.

6.4.2 Limits

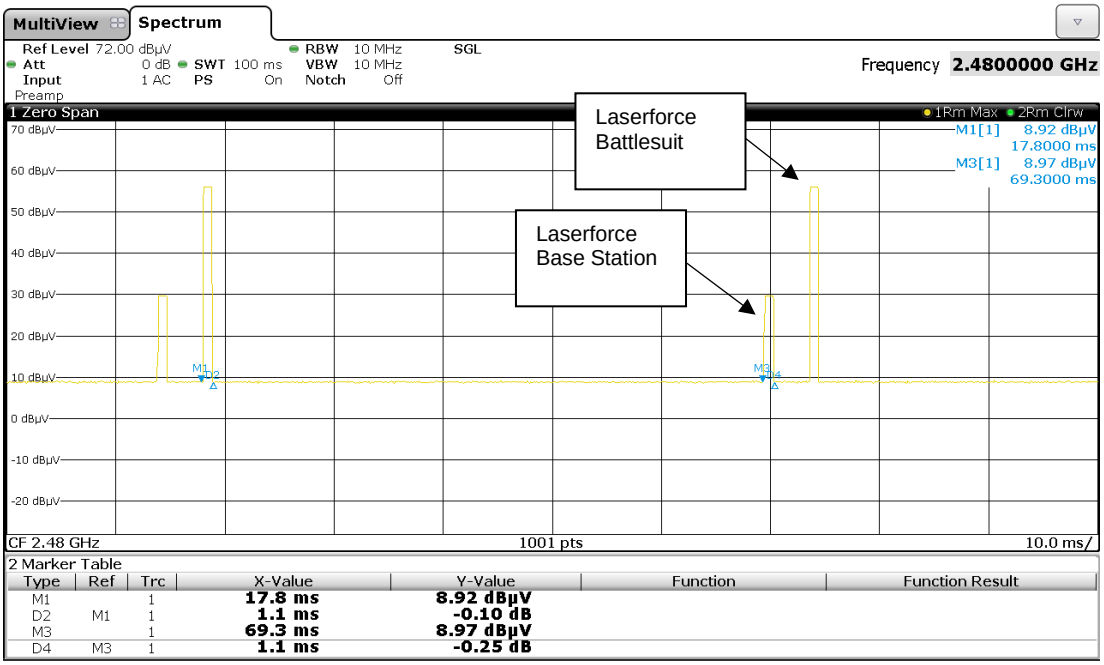
According to §15.249(a)/ RSS-210 B.10(a), the field strength of emissions from intentional radiators operated within the frequency band of interest shall comply with the following:

Fundamental frequency	Field strength of fundamental
2400-2483.5 MHz	50 mV/m or 94 dBuV/m

Note: Field strength limits are based on average limits for frequencies above 1000 MHz. However, the peak field strength of emissions shall not exceed the maximum permitted average limits by more than 20 dB under any condition of modulation.

6.4.3 Duty cycle correction factor

The Laserforce Base Station communicates with Laserforce Battlesuits. The Laserforce Base Station transmits in pulses. The maximum duty cycle of the Laserforce Base Station under normal operation was measured to calculate the duty cycle correction factor. The measurement method outlined in section 7.5 of ANSI C63.10 was used.



Duty cycle of the Laserforce Base Station = (1.1 ms x 2) / 100 ms= 0.022

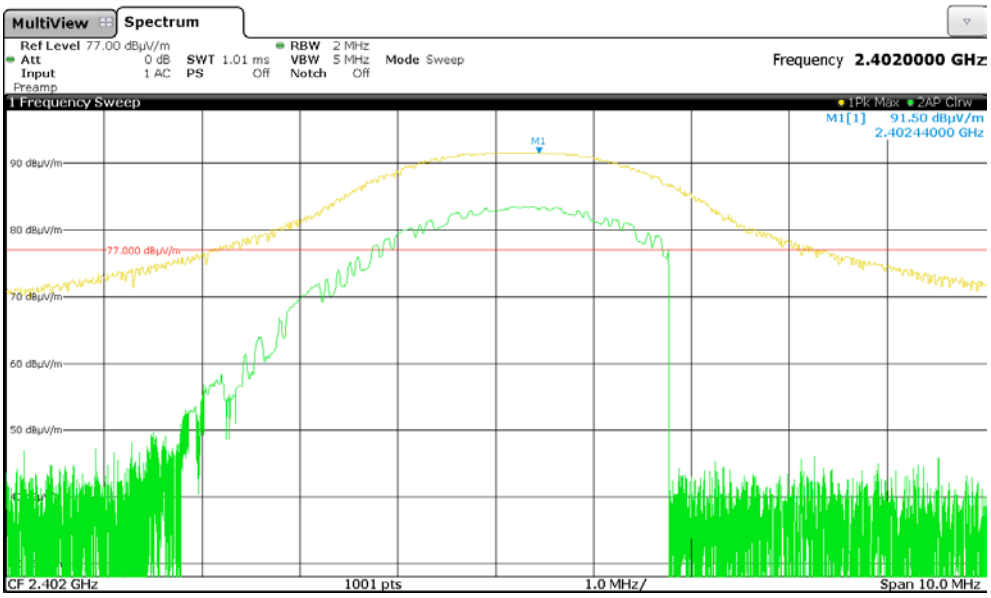
Therefore, Duty cycle correction factor, δ = 20 log10 (0.022) = -33.15 dB

6.4.4 Results

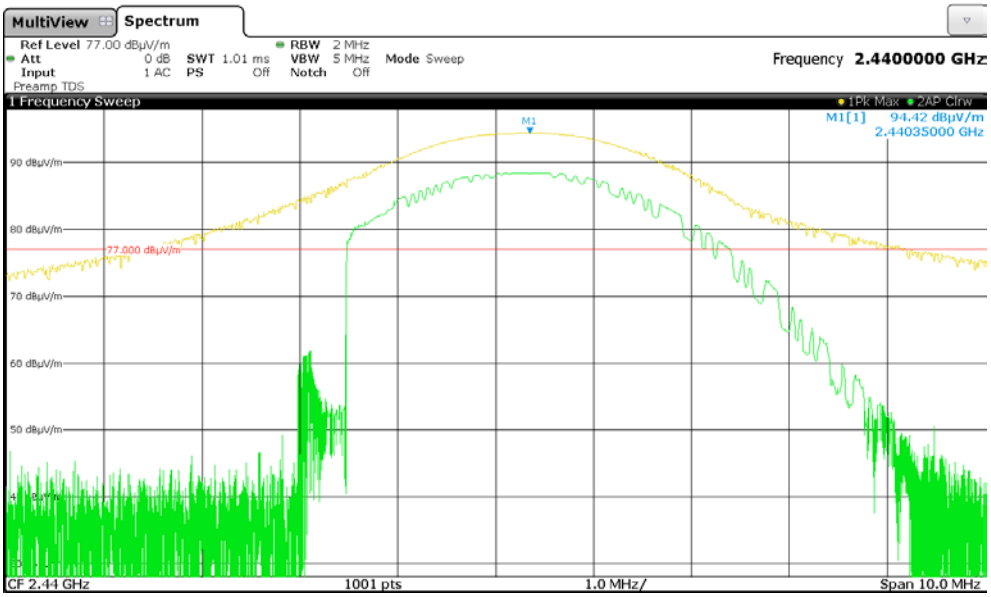
The maximum field strength was measured with the EUT oriented on its X-axis with a horizontally polarised measurement antenna.

Channel	Freq. MHz	E (peak) dBµV/m	Limit (peak) dBµV/m	Δ Limit dB*	E (avg)# dBµV/m	Limit (avg) dBµV/m	Δ Limit dB*	Result
Low	2402	91.50	114	-22.50	58.35	94	-35.65	Complied
Middle	2440	94.42	114	-19.58	61.27	94	-32.73	Complied
High	2480	95.01	114	-18.99	61.86	94	-32.14	Complied

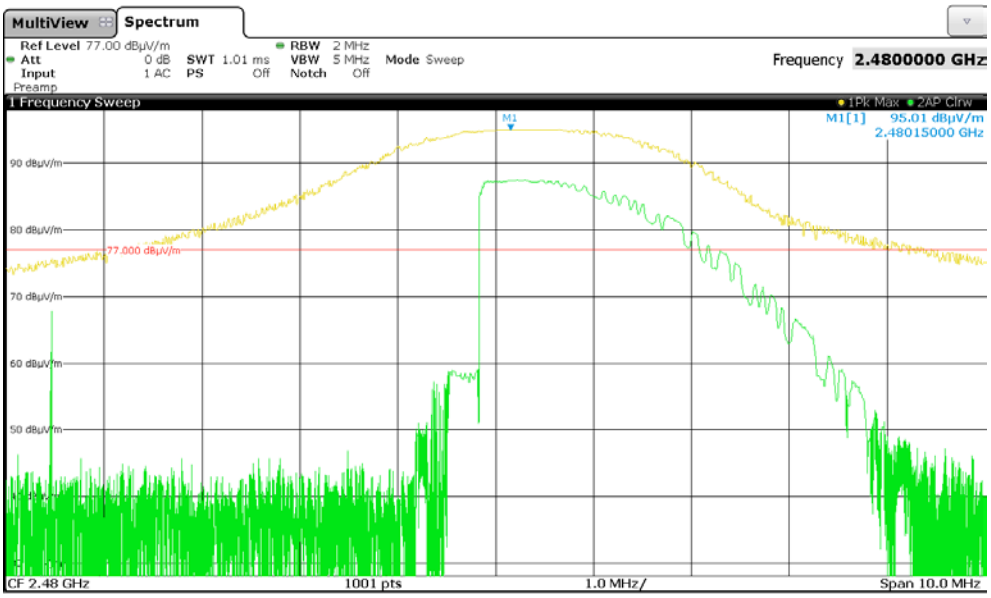
#E(avg) = E(peak) + δ
Where:
E(avg) = Average electric field (dBµV/m)
E(peak)= Peak electric field (dBµV/m)
δ = duty cycle correction factor (dB) = -33.15 dB



Graph 6-4: Fundamental Field Strength – Peak measurement, EUT x-axis
Measurement antenna – Horizontal polarisation, Low channel – 2402 MHz



Graph 6-5: Fundamental Field Strength – Peak measurement, EUT x-axis
Measurement antenna – Horizontal polarisation, Middle channel – 2440 MHz



Graph 6-6: Fundamental Field Strength – Peak measurement, EUT x-axis
Measurement antenna – Horizontal polarisation, High channel – 2480 MHz

6.5 §15.249 (a) & (d)/ RSS-210 B.10 (a) & (b) Harmonics and Out-of-Band/ Spurious Emissions

6.5.1 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	0.6 metre loop antenna
0.150 to 30	9	3	
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 0.8 m for measurements below 1000 MHz and set at 1.5 m at 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.

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

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.

6.5.2 Evaluation of field strength

Field strengths were calculated automatically by the software using pre-stored calibration data. The method of calculation is shown below:

$$E = V + AF - G + L$$

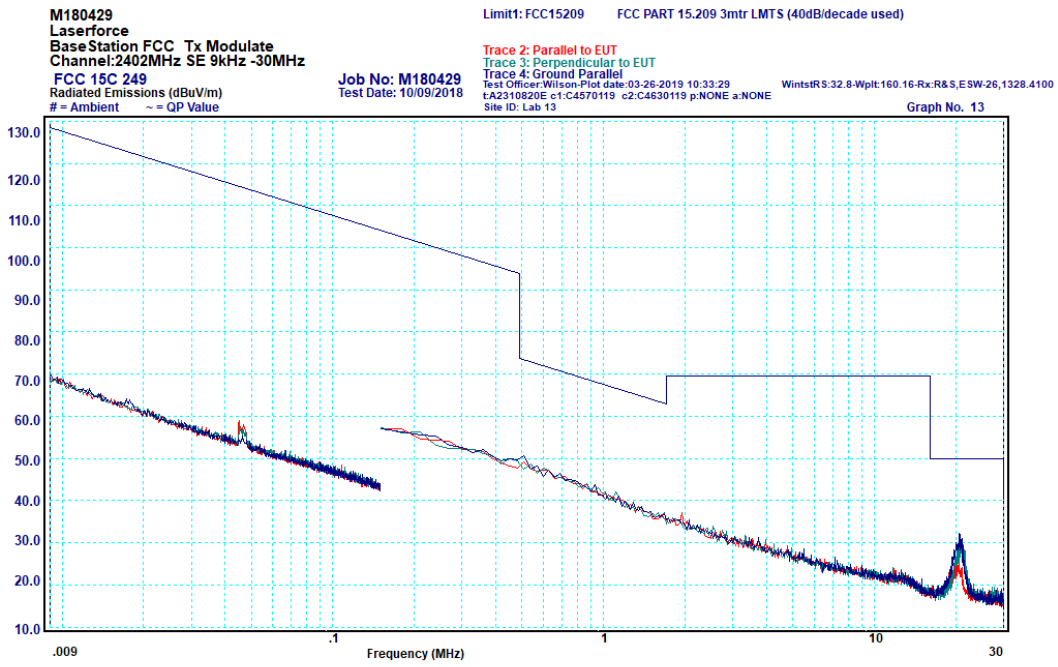
Where: *E* = Radiated Field Strength in dBµV/m.
V = EMI Receiver Voltage in dBµV/m.
AF = Antenna Factor in dB (stored as a data array).
G = Preamplifier Gain in dB (stored as a data array).
L = Cable loss in dB (stored as a data array of Insertion Loss versus frequency).

6.5.3 Limits

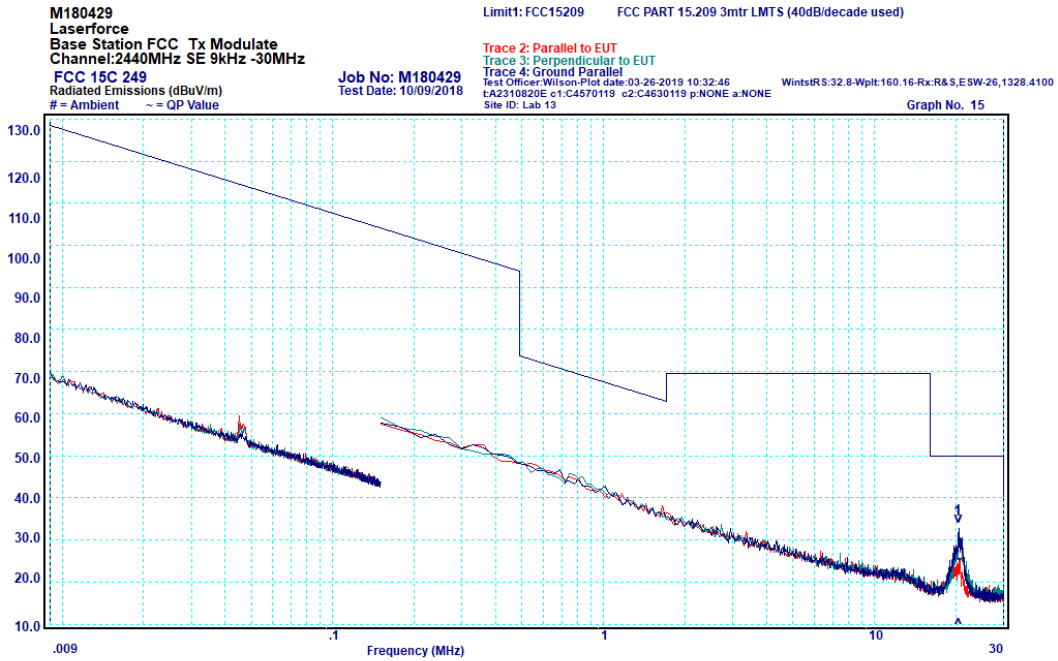
The limit applied is in accordance to limits defined in §15.249(a)/ RSS-210 B.10(a) for the harmonics and §15.249(d)/ RSS-210 B.10(b) for the out-of-band/ spurious emissions.

6.5.4 Results: Frequency Band: 9 kHz - 30 MHz

All emissions measured in the frequency band 9 kHz to 30 MHz complied with the requirements of §15.249/ RSS-210 B.10. The emissions were more than 10 dB below the limit.



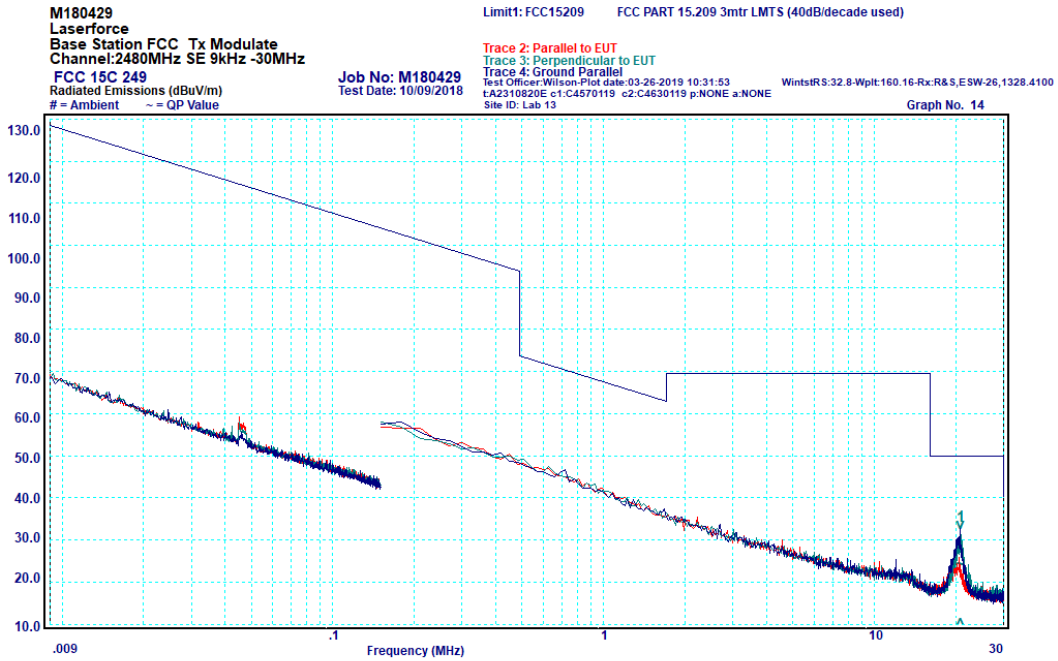
Graph 6-7: Spurious Emissions, 9 kHz – 30 MHz, Low channel – 2402 MHz



Graph 6-8: Spurious Emissions, 9 kHz – 30 MHz, Middle channel – 2440 MHz

Table 6-4: Spurious Emissions, 9 kHz – 30 MHz, Middle channel – 2440 MHz

Peak	Polarisation	Frequency (MHz)	Quasi-Peak (dBµV/m)	Limit (dBµV/m)	Delta Limit (dB)
1	Ground Parallel	20.37	25.3	50.0	-24.7



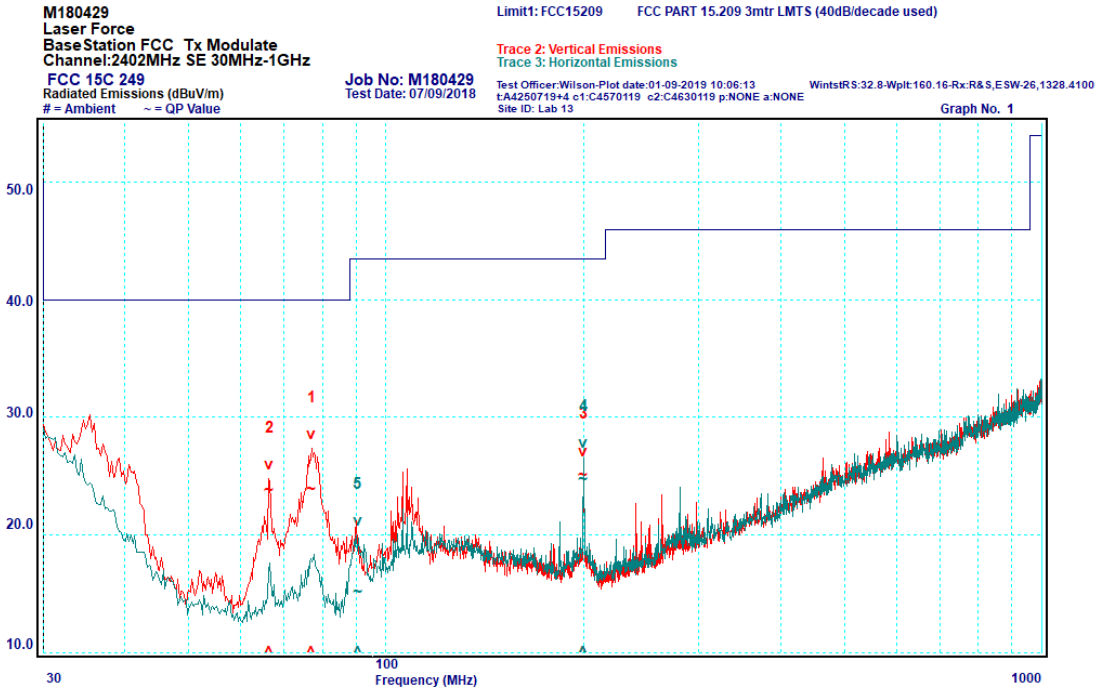
Graph 6-9: Spurious Emissions, 9 kHz – 30 MHz, High channel – 2480 MHz

Table 6-5: Spurious Emissions, 9 kHz – 30 MHz, High channel – 2480 MHz

Peak	Polarisation	Frequency (MHz)	Quasi-Peak (dBµV/m)	Limit (dBµV/m)	Delta Limit (dB)
1	Perpendicular to EUT	20.83	24.2	50.0	-25.8

6.5.5 Results: Frequency Band: 30 - 1000 MHz

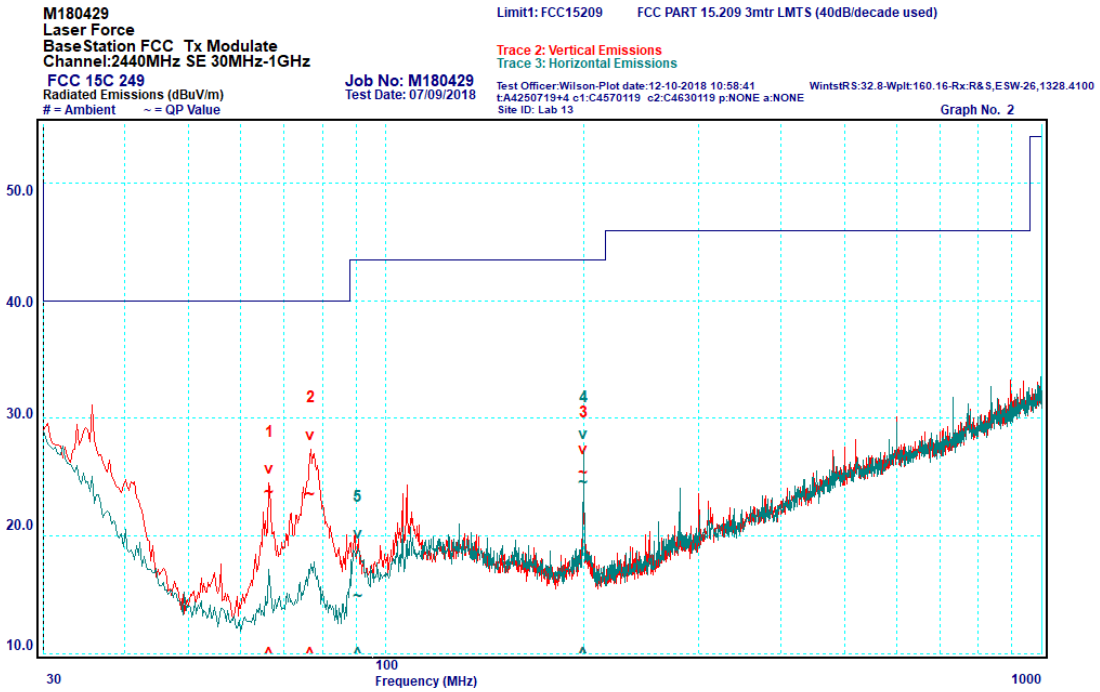
All spurious emissions measured in the frequency band 30 MHz to 1000 MHz complied with the requirements of §15.249/ RSS-210 B.10.



Graph 6-10: Spurious Emissions, 30 – 1000 MHz, Low channel, 2402 MHz

Table 6-6: Spurious Emissions, 30 – 1000 MHz, Low channel, 2402 MHz

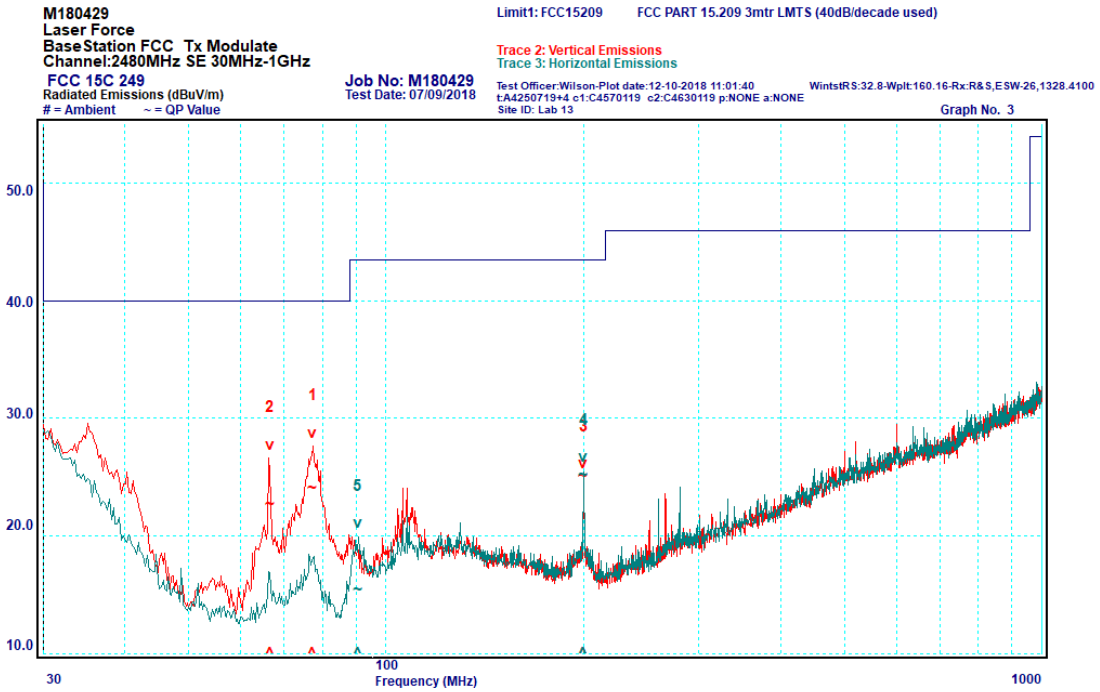
Peak	Polarisation	Frequency (MHz)	Quasi-Peak (dBµV/m)	Limit (dBµV/m)	Delta Limit (dB)
1	Vertical	77.10	23.8	40.0	-16.2
2	Vertical	66.44	23.8	40.0	-16.2
3	Vertical	199.98	25.0	43.5	-18.5
4	Horizontal	199.97	24.7	43.5	-18.8
5	Horizontal	90.50	15.1	43.5	-28.4



Graph 6-11: Spurious Emissions, 30 – 1000 MHz, Middle channel 2440 MHz

Table 6-7: Spurious Emissions, 30 – 1000 MHz, Middle channel 2440 MHz

Peak	Polarisation	Frequency (MHz)	Quasi-Peak (dBµV/m)	Limit (dBµV/m)	Delta Limit (dB)
1	Vertical	66.41	23.6	40.0	-16.4
2	Vertical	76.82	23.5	40.0	-16.5
3	Vertical	199.99	25.3	43.5	-18.2
4	Horizontal	199.97	24.5	43.5	-19.0
5	Horizontal	90.50	14.9	43.5	-28.6



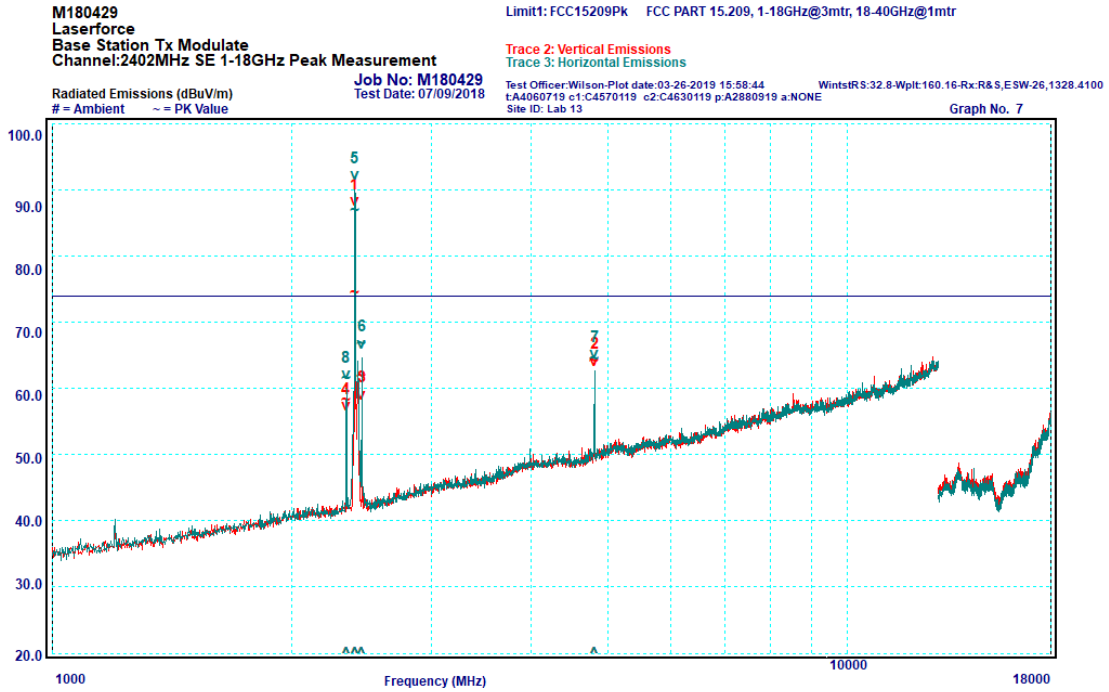
Graph 6-12: Spurious Emissions, 30 – 1000 MHz, High channel 2480 MHz

Table 6-8: Spurious Emissions, 30 - 1000 MHz, High channel 2480 MHz

Peak	Polarisation	Frequency (MHz)	Quasi-Peak (dBµV/m)	Limit (dBµV/m)	Delta Limit (dB)
1	Vertical	77.31	24.0	40.0	-16.0
2	Vertical	66.52	22.7	40.0	-17.3
3	Vertical	199.98	25.0	43.5	-18.5
4	Horizontal	199.97	25.2	43.5	-18.3
5	Horizontal	90.61	15.4	43.5	-28.1

6.5.6 Results: Frequency Band: 1000 – 18000 MHz

All spurious emissions measured in the frequency band 1000 MHz to 18000 MHz complied with the requirements of §15.249/ RSS-210 B.10.



Graph 6-13: Spurious Emissions, 1000 - 18000 MHz, Low channel 2402 MHz

Table 6-9: Spurious Emissions, 1000 - 18000 MHz, Low channel 2402 MHz

Peak	Pol.	Freq. (MHz)	Peak (dBµV/m)	Peak Limit (dBµV/m)	Delta Pk Limit (dB)	Average (dBµV/m)	Average Limit (dBµV/m)	Delta Avg Limit (dB)
1*	Vertical	2401.93	N/A	N/A	N/A	N/A	N/A	N/A
2	Vertical	4804.44	64.1	74.0	-9.9	30.95#	54	-23.05
3	Vertical	2451.86	61.8	74.0	-12.2	31.9	54	-22.1
4	Vertical	2343.41	58.2	74.0	-15.8	30.6	54	-23.4
5*	Horizontal	2402.05	86.8	N/A	N/A	N/A	N/A	N/A
6	Horizontal	2451.13	66.7	74.0	-7.3	32.3	54	-21.7
7	Horizontal	4804.50	64.4	74.0	-9.6	31.25#	54	-22.75
8	Horizontal	2343.00	61.5	74.0	-12.5	30.7	54	-23.3

*Peak 1 and Peak 5 are the fundamental transmission and are not subject to the spurious emission limits of the standard

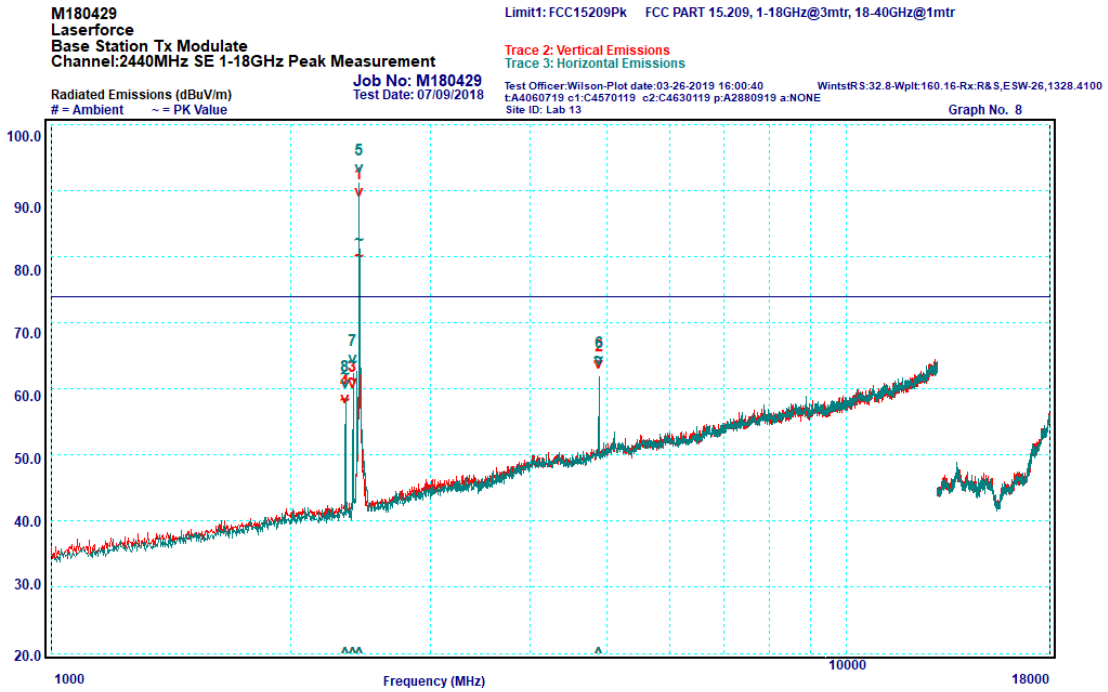
#All emissions were measured using a Peak and an Average detector except for emissions related to the fundamental transmission (e.g. harmonics) which used the duty cycle correction factor to evaluate the average value as given below,

$E(avg) = E(peak) + \delta$

Where: E(avg) = Average electric field (dBµV/m)

E(peak)= Peak electric field (dBµV/m)

δ = duty cycle correction factor (dB) = -33.15 dB



Graph 6-14: Spurious Emissions, 1000 - 18000 MHz, Middle channel 2440 MHz

Table 6-10: Spurious Emissions, 1000 - 18000 MHz, Middle channel 2440 MHz

Peak	Pol.	Freq. (MHz)	Peak (dBµV/m)	Peak Limit (dBµV/m)	Delta Pk Limit (dB)	Average (dBµV/m)	Average Limit (dBµV/m)	Delta Avg Limit (dB)
1*	Vertical	2440.39	N/A	N/A	N/A	N/A	N/A	N/A
2	Vertical	4880.30	64.0	74.0	-10.0	30.85#	54	-23.15
3	Vertical	2395.09	61.3	74.0	-12.7	30.7	54	-23.3
4	Vertical	2343.18	58.3	74.0	-15.7	30.6	54	-23.4
5*	Horizontal	2440.39	N/A	N/A	N/A	N/A	N/A	N/A
6	Horizontal	4880.99	64.6	74.0	-9.4	31.45#	54	-22.55
7	Horizontal	2394.86	63.9	74.0	-10.1	31.0	54	-23.0
8	Horizontal	2343.00	62.2	74.0	-11.8	30.7	54	-23.3

*Peak 1 and Peak 5 are the fundamental transmission and are not subject to the spurious limits of the standard

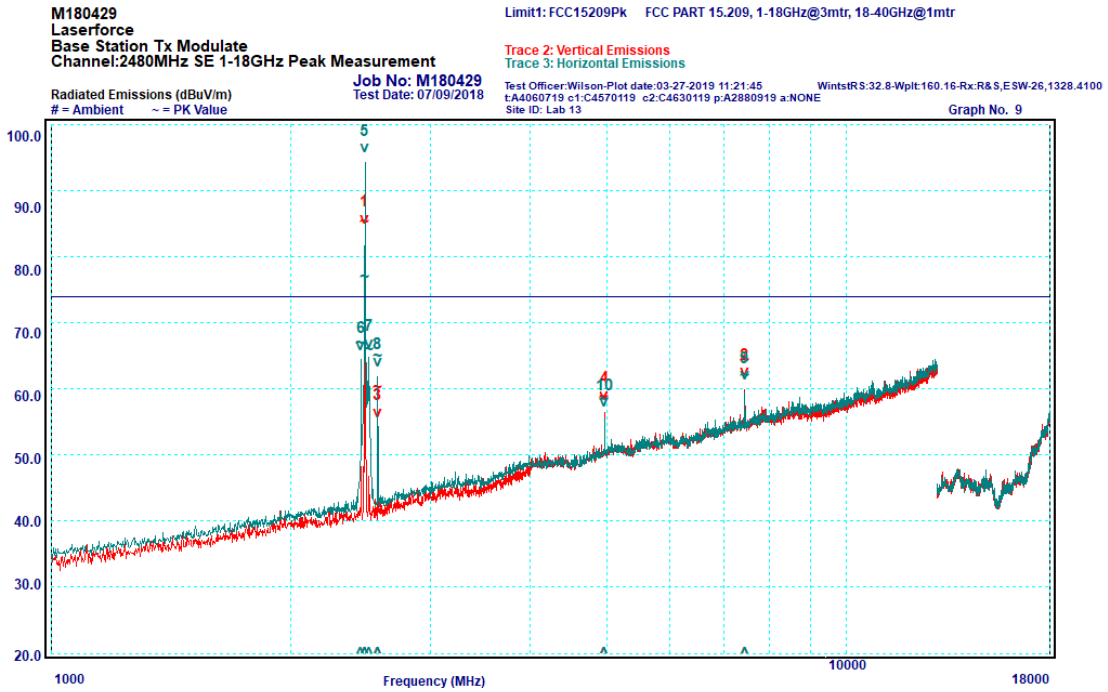
#All emissions were measured using a Peak and an Average detector except for emissions related to the fundamental transmission (e.g. harmonics) which used the duty cycle correction factor to evaluate the average value as given below,

$E(avg) = E(peak) + \delta$

Where: E(avg) = Average electric field (dBµV/m)

E(peak)= Peak electric field (dBµV/m)

δ = duty cycle correction factor (dB) = -33.15 dB



Graph 6-15: Spurious Emissions, 1000 - 18000 MHz, High channel 2480 MHz

Table 6-11: Spurious Emissions, 1000 - 18000 MHz, High channel 2480 MHz

Peak	Pol.	Freq. (MHz)	Peak (dBµV/m)	Peak Limit (dBµV/m)	Delta Pk Limit (dB)	Average (dBµV/m)	Average Limit (dBµV/m)	Delta Avg Limit (dB)
1*	Vertical	2479.98	N/A	N/A	N/A	N/A	N/A	N/A
2	Vertical	7440.55	64.3	74.0	-9.7	31.15#	54	-22.85
3	Vertical	2571.87	60.2	74.0	-13.8	31.3	54	-22.7
4	Vertical	4960.31	58.7	74.0	-15.3	25.55#	54	-28.45
5*	Horizontal	2480.15	N/A	N/A	N/A	N/A	N/A	N/A
6	Horizontal	2451.31	66.9	74.0	-7.1	31.2	54	-22.8
7	Horizontal	2507.98	65.9	74.0	-8.1	35.0	54	-19.0
8	Horizontal	2571.75	65.0	74.0	-9.0	31.6	54	-22.4
9	Horizontal	7440.00	62.0	74.0	-12.0	28.85#	54	-25.15
10	Horizontal	4960.34	58.4	74.0	-15.6	25.25#	54	-28.75

*Peak 1 and Peak 5 are the fundamental transmission and are not subject to the spurious limits of the standard

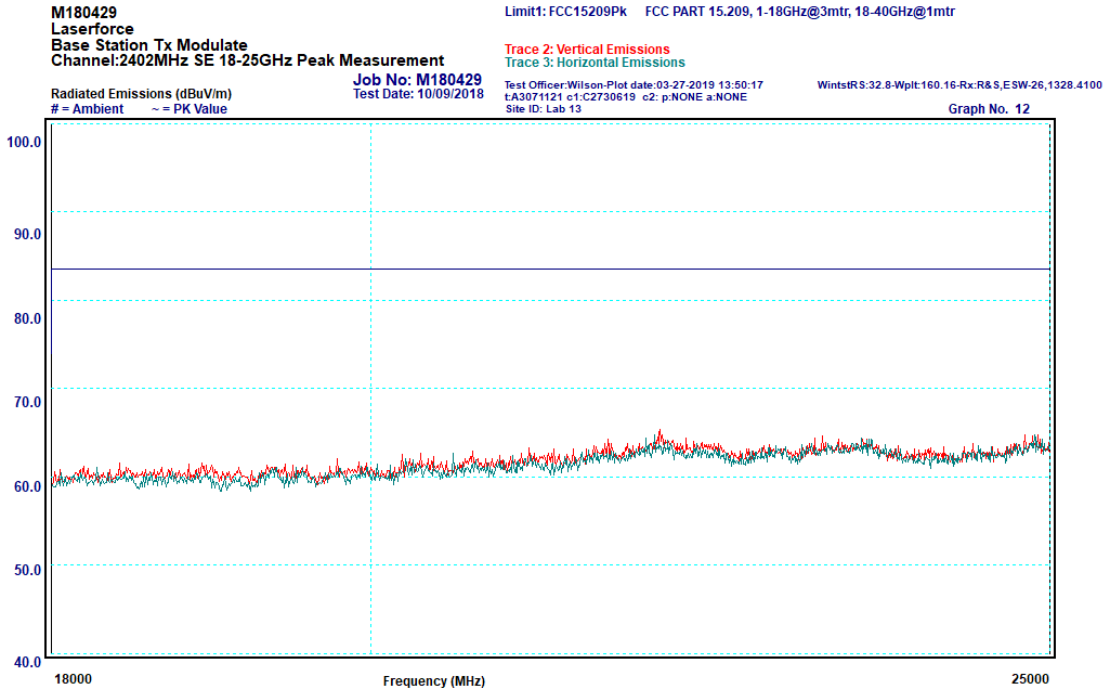
#All emissions were measured using a Peak and an Average detector except for emissions related to the fundamental transmission (e.g. harmonics) which used the duty cycle correction factor to evaluate the average value as given below,

E(avg) = E(peak) + δ

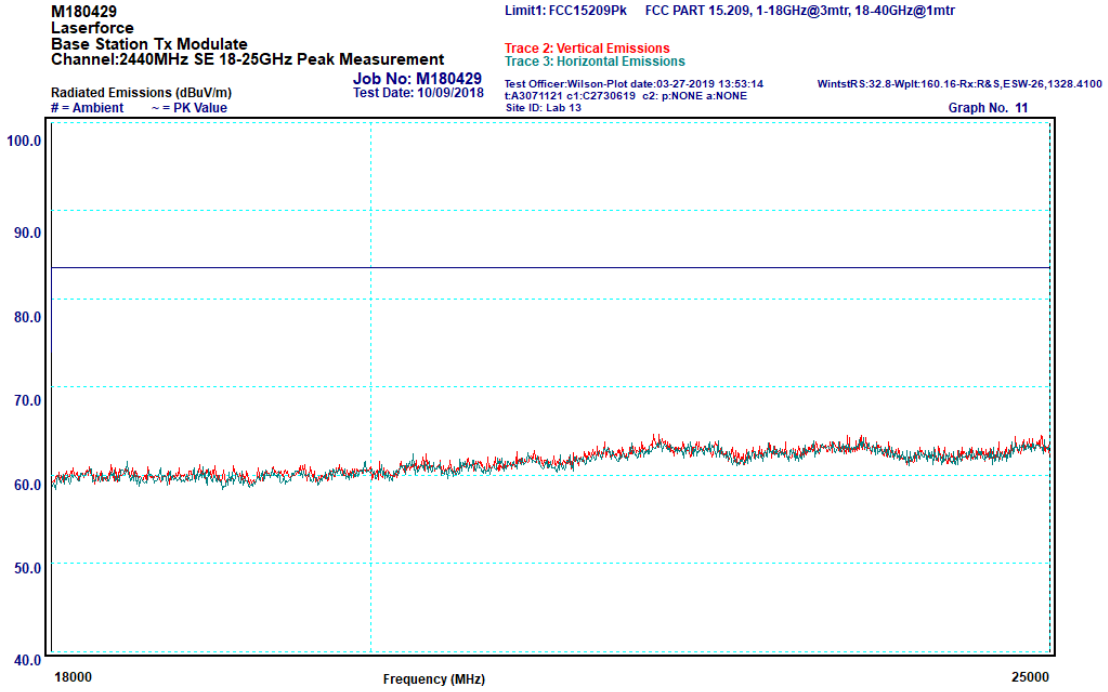
Where: E(avg) = Average electric field (dBµV/m)
E(peak)= Peak electric field (dBµV/m)
δ = duty cycle correction factor (dB) = -33.15 dB

6.5.7 Results: Frequency Band: 18000 - 25000 MHz

All spurious emissions measured in the frequency band 18000 MHz to 25000 MHz complied with the requirements of §15.249/ RSS-210 B.10. The emissions were more than 10 dB below the limit.



Graph 6-16: Spurious Emissions, 18000 - 25000 MHz, Low channel 2402 MHz

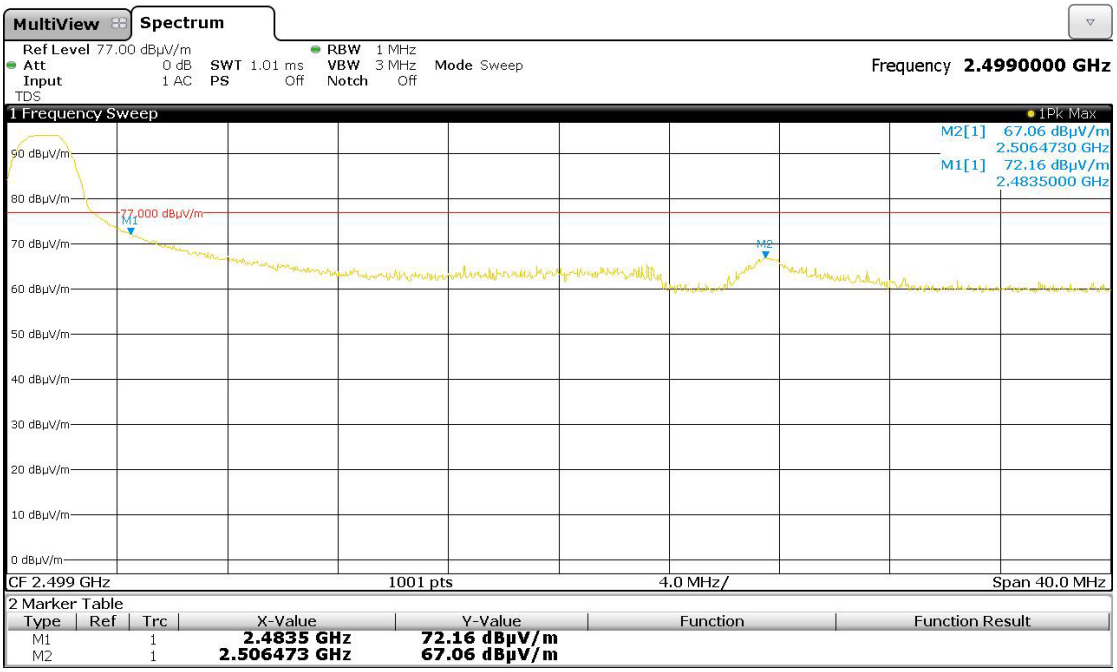


Graph 6-17: Spurious Emissions, 18000 - 25000 MHz, Middle channel 2440 MHz

Graph 6-18: Spurious Emissions, 18000 - 25000 MHz, High channel 2480 MHz

6.5.8 Band-edge Emission Measurements

Band-edge measurements were done using radiated methods in accordance to ANSI C63.10 clause 6.10. All emissions measured near the lower and higher band-edge complied with the requirement of §15.249/ RSS-210 B.10. The orientation of the EUT and the measurement antenna height and polarisation that produced the highest EIRP was used.



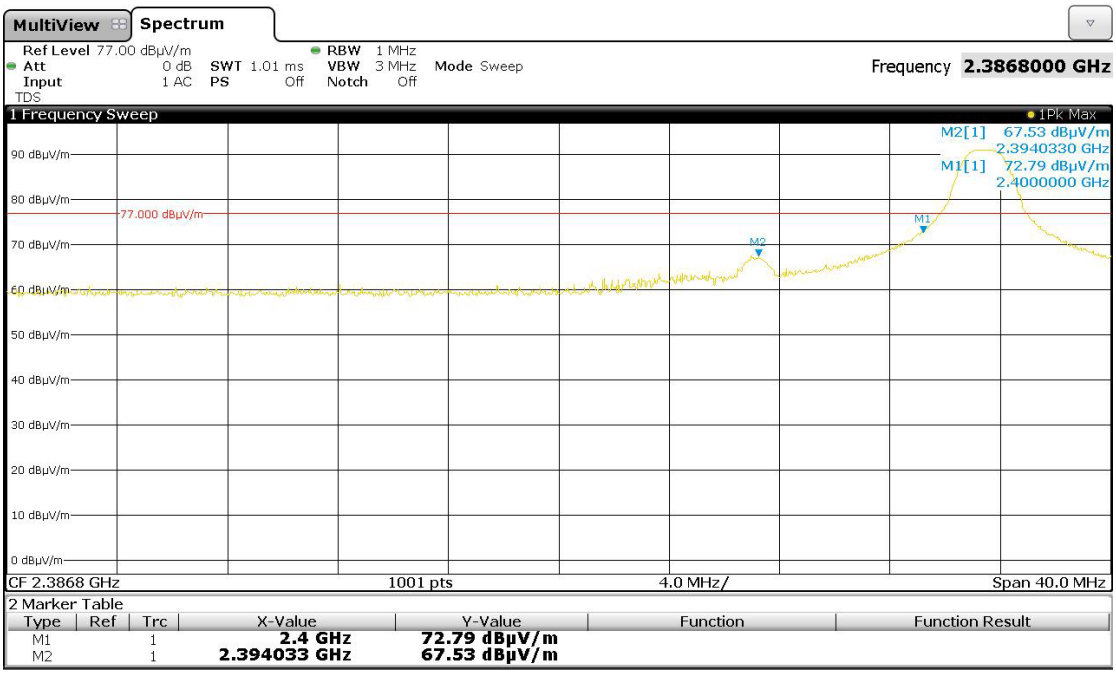
Graph 6-19: Higher band-edge 2483.5 MHz, Peak, High channel 2480 MHz

Table 6-12: Higher band-edge 2483.5 MHz, High channel 2480 MHz

Peak	Pol.	Freq. (MHz)	Peak (dBµV/m)	Peak Limit (dBµV/m)	Delta Pk Limit (dB)	Average# (dBµV/m)	Average Limit (dBµV/m)	Delta Avg Limit (dB)
M1	Horizontal	2483.50	72.16	74.0	-1.84	39.01	54	-14.99
M2	Horizontal	2506.47	67.06	74.0	-6.94	33.91	54	-20.09

#E(avg) = E(peak) + δ

Where: E(avg) = Average electric field (dBµV/m)
E(peak)= Peak electric field (dBµV/m)
δ = duty cycle correction factor (dB) = -33.15 dB



Graph 6-20: Lower band-edge 2400 MHz, Peak, Low channel 2402 MHz

Table 6-13: Lower band-edge 2400 MHz, Low channel 2402 MHz

Peak	Pol.	Freq. (MHz)	Peak (dBµV/m)	Peak Limit (dBµV/m)	Delta Pk Limit (dB)	Average# (dBµV/m)	Average Limit (dBµV/m)	Delta Avg Limit (dB)
M1	Horizontal	2400	72.79	74.0	-1.21	39.64	54	-14.36
M2	Horizontal	2394.03	67.53	74.0	-6.47	34.38	54	-19.62

#E(avg) = E(peak) + δ

Where: E(avg) = Average electric field (dBµV/m)

E(peak)= Peak electric field (dBµV/m)

δ = duty cycle correction factor (dB) = -33.15 dB

6.6 §2.1091/ RSS-102 Radiofrequency radiation exposure evaluation

The EUT complied with the applicable maximum permissible exposure levels. Refer to EMC Technologies report M180429-8B / M180429-12B.

6.7 §15.215/ RSS-Gen 6.7 Occupied Bandwidth – 99% power

6.7.1 Test procedure

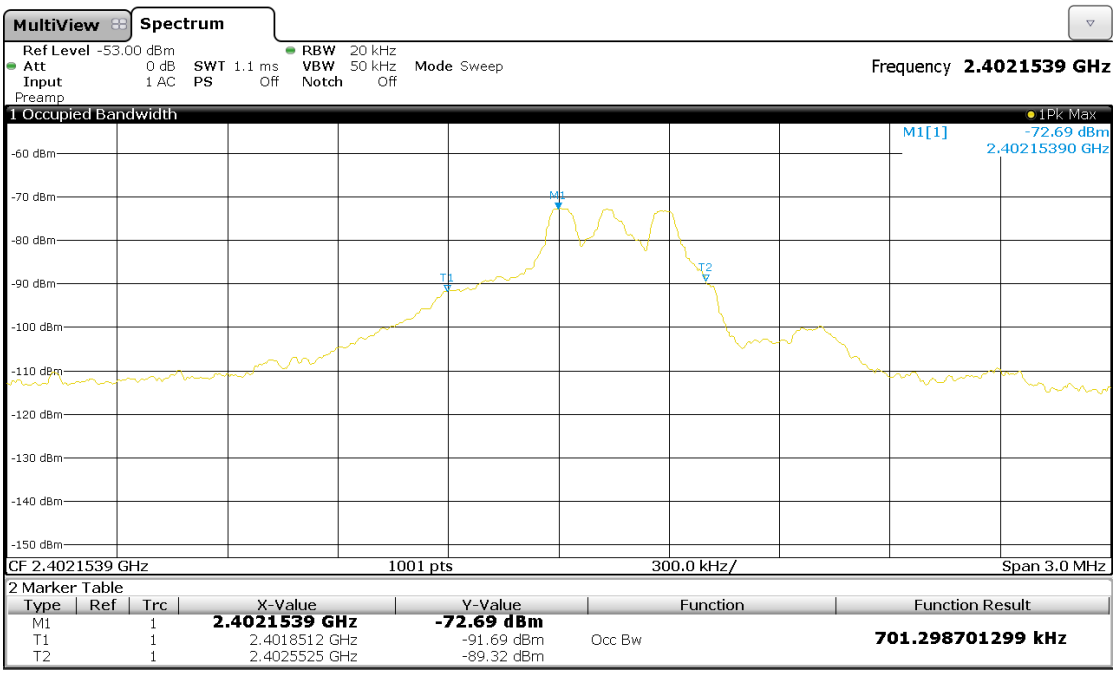
The bandwidth containing 99% power of the transmitted signal was measured using the procedure from ANSI C63.10 section 6.9.

6.7.2 Limits

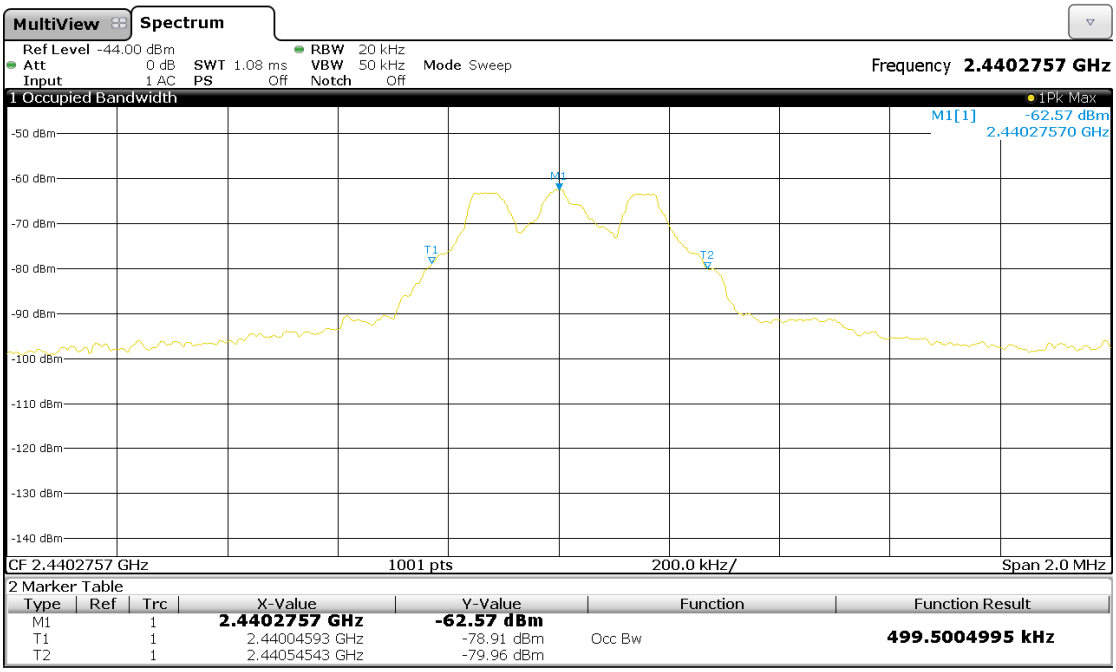
The 99% power should be contained within the frequency band 2400 – 2483.5 MHz.

6.7.3 Results

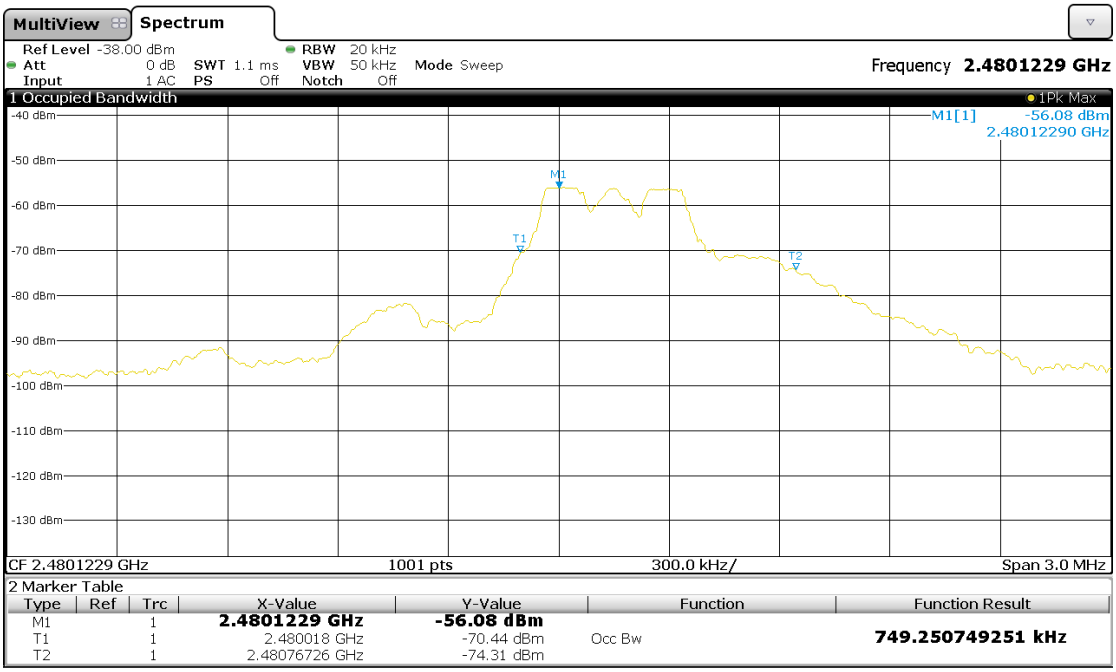
Channel	99% Bandwidth [MHz]	Low Frequency [MHz]	High Frequency [MHz]	Result
Low	0.70	**2401.851**	2402.552	Complied
Middle	0.49	2440.045	2440.545	N/A
High	0.74	2480.018	**2480.767**	Complied



Graph 6-21: Occupied bandwidth – Low channel 2402 MHz



Graph 6-22: Occupied bandwidth – Middle channel 2440 MHz



Graph 6-23: Occupied bandwidth – High channel 2480 MHz