


RADIO TEST REPORT

STANDARD: FCC PART 15 (OPERATION WITHIN THE BAND 2400-2483.5 MHz)

This test report may contain some hidden text for internal use

General information	
Laboratory:	400 Av.de la République - 74300 CLUSES - France
Customer:	PELLE Vincent
Test Type:	Validation
Test Designation:	Radio
Author:	CHANAVAL Damien (Laboratory.SOMFY)
Approver:	Electronic signature: Approved by DELEPIERRE Alexis (Manager) Hand written signature 30/04/2024 :
 <p>SOMFY SOMFY ACTIVITES SA Société Anonyme au Capital de 35 000 000 € 50, avenue du Nouveau Monde - B.P. 152 74307 CLUSES CEDEX - FRANCE Tél. +33 (0)4 50 96 70 00 RCS Annecy 303 970 230 Siret 303 970 230 00122 - Code APE 2711Z</p>	
Radio FCC Tests on Ysia Variation Zigbee.	

Product range description	
Product Reference - PR - Designation:	PR197142-YSIA 5 Var HP Zigbee FCC
Brand:	SOMFY
Commercial name:	YSIA 5 Var HP Zigbee FCC

Reference documents
Relevant standard : FCC Part 15

REPORT CONCLUSION

Conformity to standard requirements: **PASS**

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Product information

FREQUENCY BANDS USED

 2400.000 MHz to 2483.500 MHz

FUNCTION OF THE PRODUCT

 Transmitter and receiver

TRANSMITTER TECHNICAL SPECIFICATION

 Modulation used: FHSS other forms of modulation

 Non-adaptive equipment

 Geo-location capability: Yes No

 Frequency hopping systems: Yes No

 System using digital modulation: Yes No

EQUIPMENT TYPE

 Stand-alone

USE OF THE PRODUCT

 Remote control or sensor

 Actuators

 Gate or garage door opener

 Alarm

 Other product for home motion: ...

ANTENNA TYPE

 Single Integral antenna - Antenna gain: ...

 Antenna connector

EQUIPMENT TYPE / OPERATING FREQUENCY

 Bluetooth Low Energy (BLE) / 2.402 GHz to 2.480 GHz - nominal channel bandwidth: 2MHz – 40 channels

 ZigBee / 2.405 GHz to 2.480 GHz - nominal channel bandwidth: 5MHz – 16 channels

SUPPLY VOLTAGE

 AC supply Nominal Frequency: 50Hz 60Hz

 DC supply Battery: Nickel Cadmium Lead Leclanché Lithium Other: AAA

VOLTAGE FOR TESTING

 Nominal voltage: U_{NOM} : 3V

 Extreme test voltages: U_{MIN} : 2,2V U_{MAX} : 3V

EXTREME TEMPERATURE RANGES

 Manufacturer specification: T_{MIN} : 0°C T_{MAX} : 48°C

TEMPERATURE AND HUMIDITY FOR TESTING

Normal temperature condition: +15 °C to +35 °C

Relative humidity: 20 % to 75 %

 Extreme temperature conditions: T_{MIN} : 0°C T_{MAX} : 48°C

FREQUENCY TESTED

 Equipment with BLE: Lowest frequency: 2402 MHz, middle frequency: 2440 MHz, highest frequency: 2480 MHz

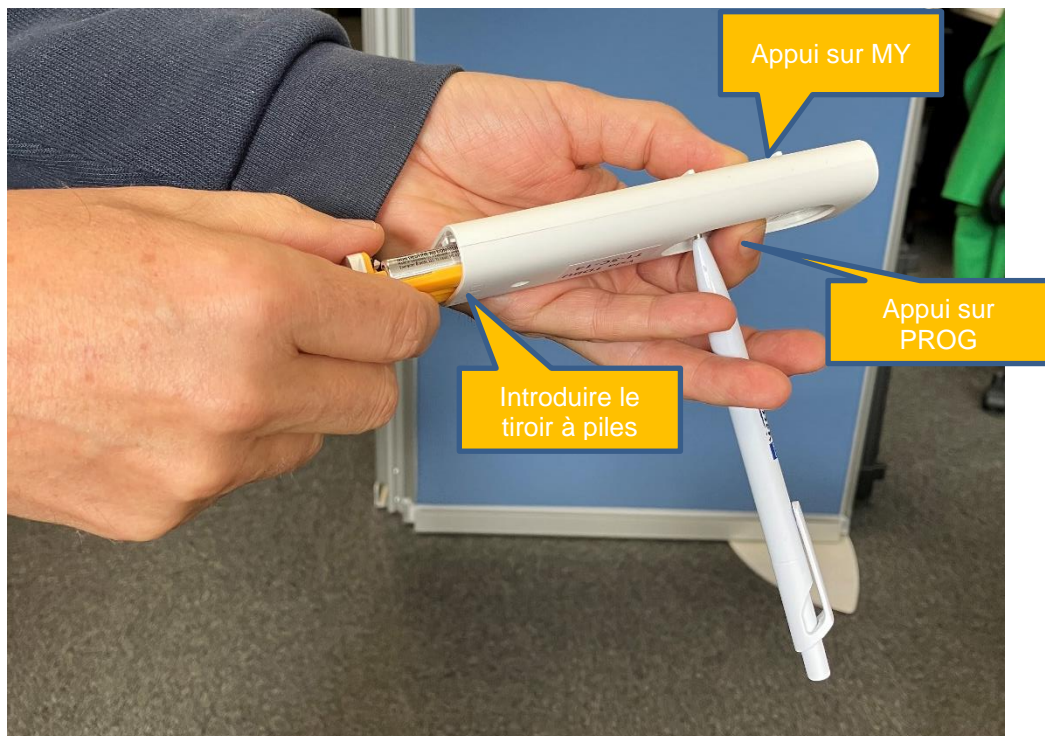
 Equipment with ZigBee: Lowest frequency: 2405 MHz, middle frequency: 2440 MHz, highest frequency: 2480 MHz

Remark: Throughout this report, a point is used as the decimal separator

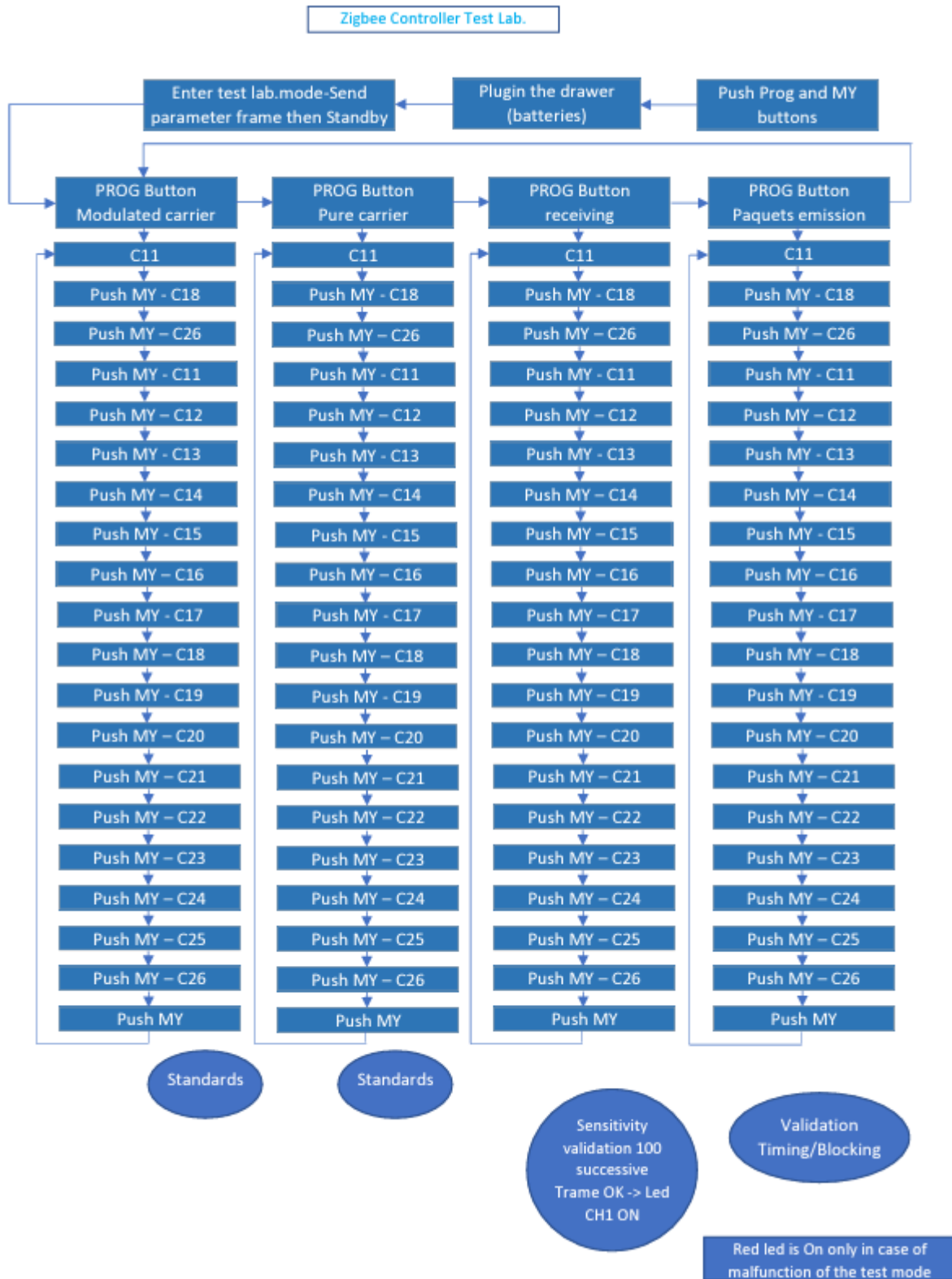
✚ Ysia Variation ZB product for test:



✚ Enter in test mode:



Operating in laboratory mode :



TEST SUMMARY

Test designation	FCC Clause	Applicable (Y/N)	PASS	FAIL	For information	Not tested	Qty of EUT	P.U.T identification
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TRANSMITTER

Antenna requirements	15.203, 15.204	Y	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	Ysia 5_n°2
RF output power	15.247 (b)	Y	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2	Ysia 5_n°1 & n°2
DTS Bandwidth	15.247 (a)	Y	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	Ysia 5_n°2
Maximum power spectral density	15.247 (e)	Y	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	Ysia 5_n°2
Band Edge (RBW 1MHz)	15.247 (d)	Y	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	Ysia 5_n°2
Band Edge (RBW 100 kHz)	15.247 (d)	Y	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	Ysia 5_n°2
Transmitter Radiated emission	15.209	Y	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	Ysia 5_n°2

RECEIVER

Receiver Radiated emission	15.209	Y	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	Ysia 5_n°2
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TRANSMITTER OR RECEIVER

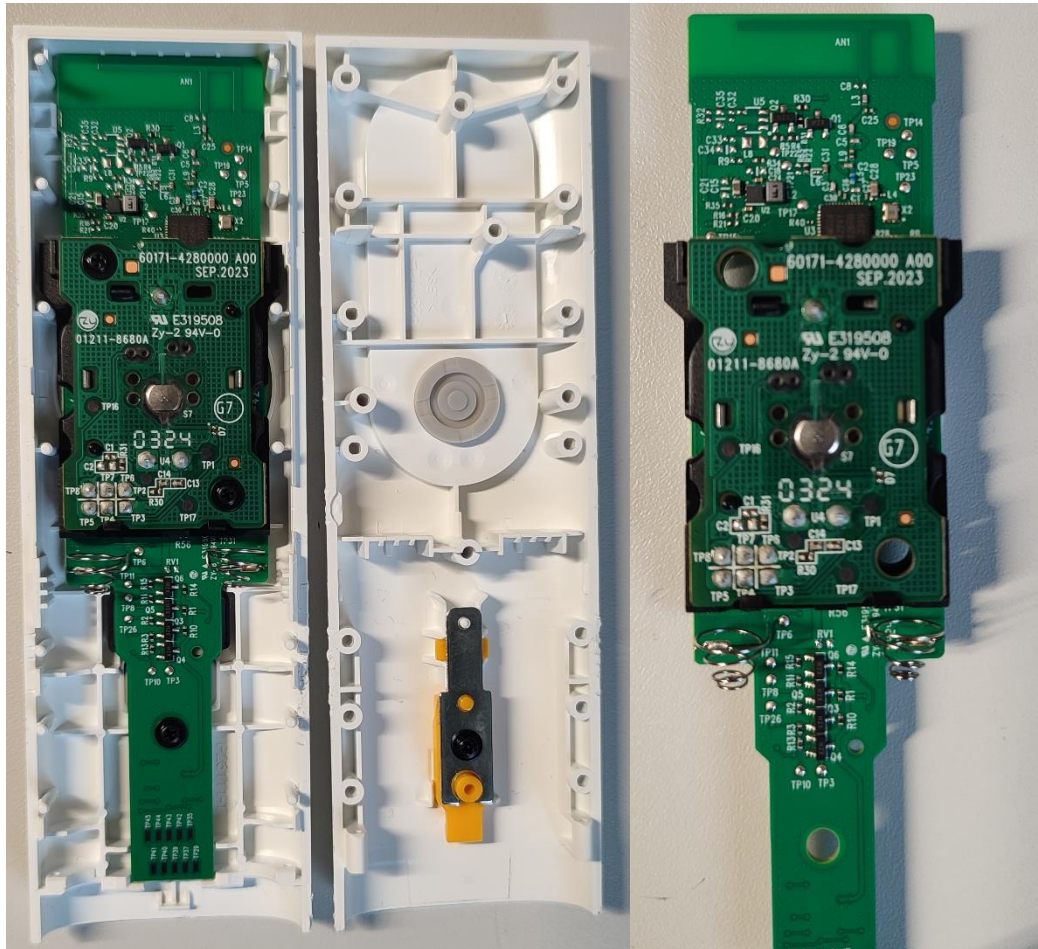
Conducted limits	15.107 / 15.207	N	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
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1 ANTENNA REQUIREMENT (CLAUSE 15.203)

1.1 REQUIREMENT

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

1.2 VISUAL ANALYSIS RESULT



1.3 TEST CONCLUSION

Conformity to standard requirements: **PASS**

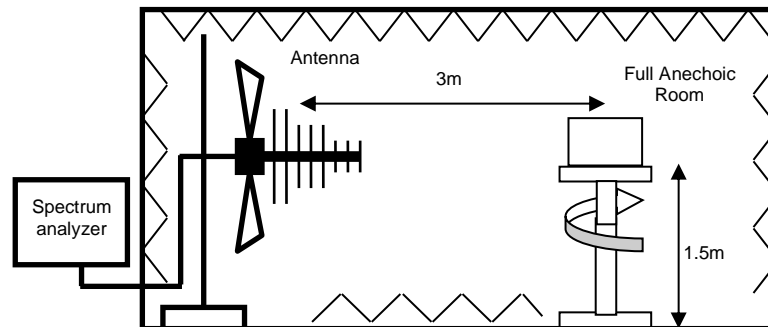
2 RF OUTPUT POWER (CLAUSE 15.247 (b))

2.1 TEST TARGET

§15.247 Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz

(b) The maximum peak conducted output power of the intentional radiator shall not exceed the following:

(3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt



2.2 TEST CONFIGURATION

EUT mode of operation	Continuous Emission. Modulation on- Measure on lowest, middle and highest frequency
Test conditions	Full anechoic room - measure at 3m Test equipment used: <input checked="" type="checkbox"/> Equipment listed in appendix, <input type="checkbox"/> other: ...
Environmental test conditions	Temperature: between +15°C and +35°C, Relative humidity: between 20% and 75% Nominal voltage, nominal frequency
Spectrum analyzer settings:	
RBW	5MHz
VBW	5MHz
SPAN	20MHz
Detector	Peak
Trace:	Max Hold

2.3 TEST METHOD

FCC Part 15

2.3.1 Deviation

None

2.3.2 Product under test configuration

Product is set in permanent emission with modulation.

2.4 LIMIT

2.4.1 Standard limits

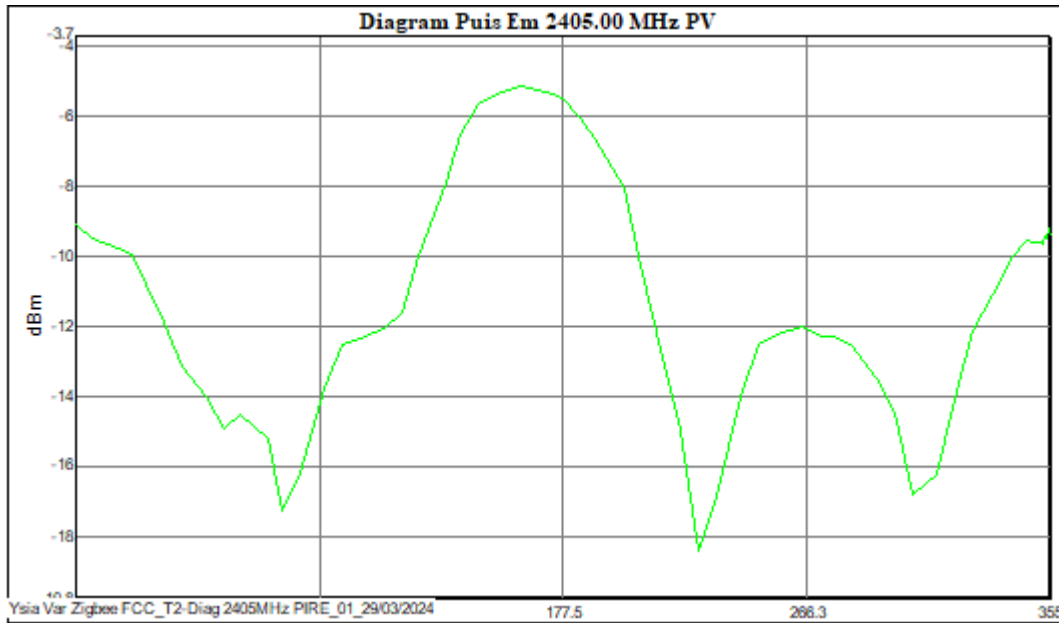
Limit	$\leq +30\text{dBm (1W) EIRP}$
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2.5 RESULTS

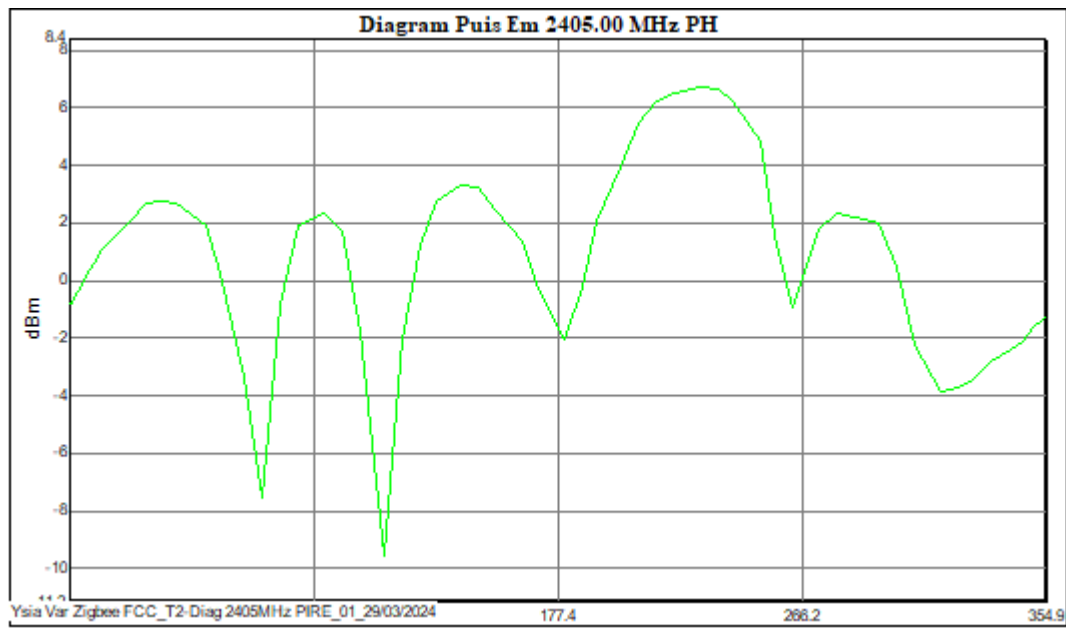
2.5.1 Ysia 5_n°1

FL: lowest frequency (2405.00MHz)

Vertical polarization



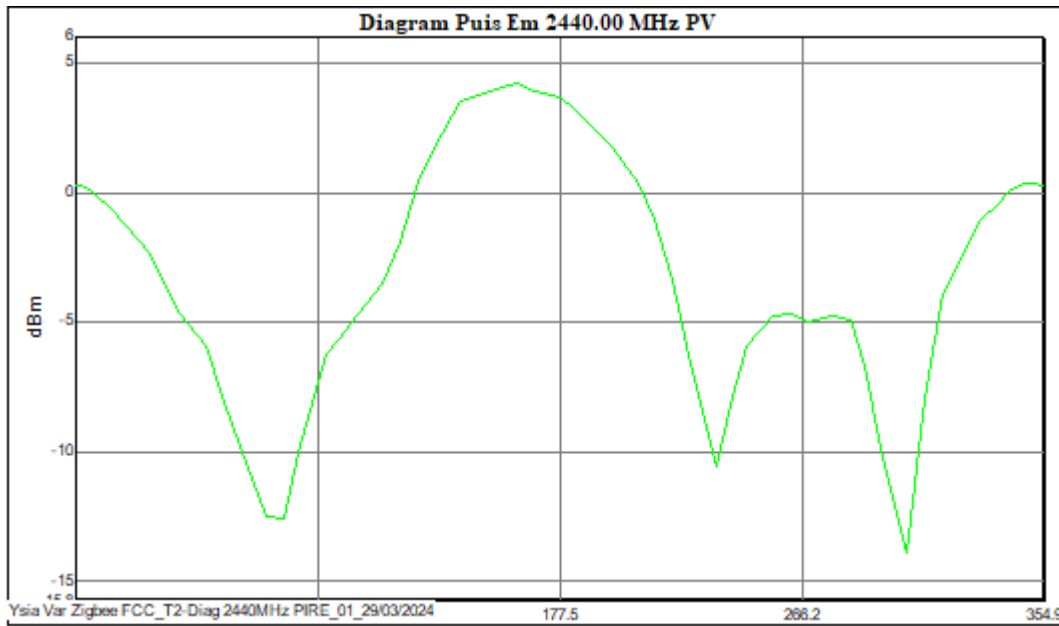
Frequency (MHz)	E.I.R.P. (dBm)	Correction (dB)	Antenna Polarization	Angle (°)
2405,00	-9.09	48	V	0.1
2405,00	-14.92	48	V	54.4
2405,00	-14.49	48	V	59.6
2405,00	-17.25	48	V	75.1
2405,00	-5.10	48	V	162.0
2405,00	-18.37	48	V	226.9
2405,00	-11.97	48	V	264.6
2405,00	-16.81	48	V	304.8
2405,00	-9.51	48	V	346.6
2405,00	-9.39	48	V	355.0

Horizontal polarization (2405.00MHz)


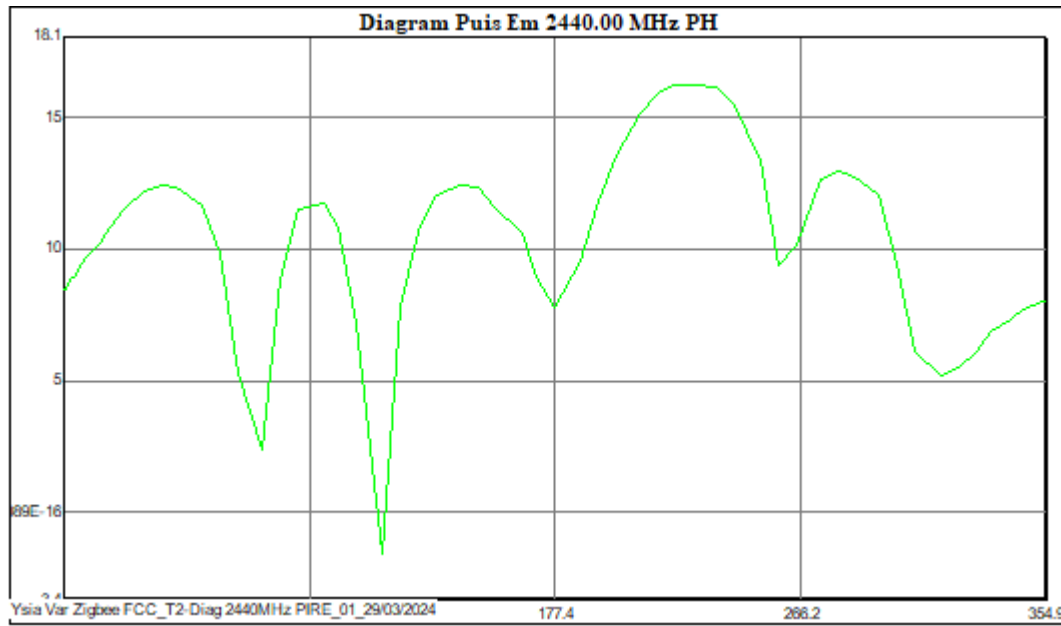
Frequency (MHz)	E.I.R.P. (dBm)	Correction (dB)	Antenna Polarization	Angle (°)
2405,00	-1.26	48	H	354.9
2405,00	-3.83	48	H	316.4
2405,00	2.37	48	H	278.7
2405,00	-0.95	48	H	263.0
2405,00	6.71	48	H	229.2
2405,00	-2.07	48	H	179.7
2405,00	3.34	48	H	142.0
2405,00	-9.57	48	H	114.6
2405,00	2.36	48	H	92.5
2405,00	-7.52	48	H	70.3
2405,00	2.79	48	H	33.9
2405,00	-0.80	48	H	0.0

F_M: middle frequency (2440.00MHz)

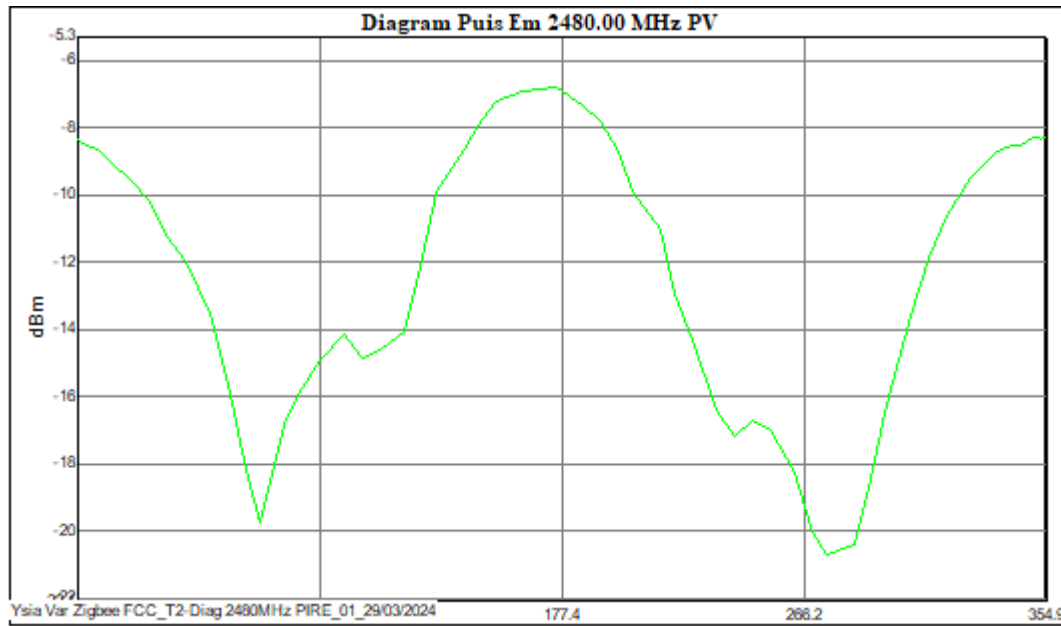
Vertical polarization



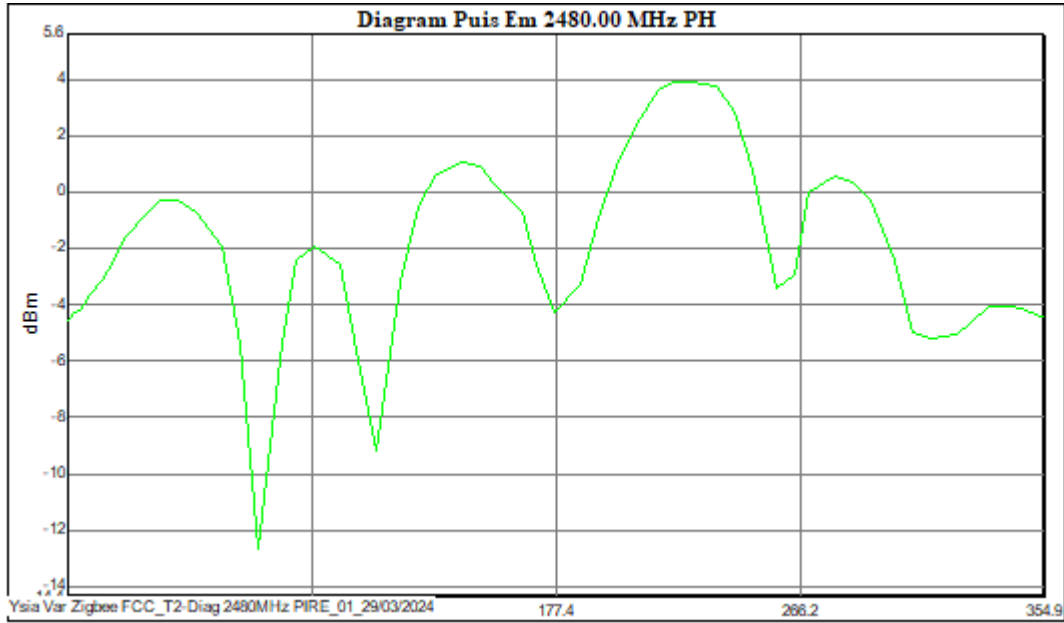
Frequency (MHz)	E.I.R.P. (dBm)	Correction (dB)	Antenna Polarization	Angle (°)
2440,00	0.30	47,9	V	0.1
2440,00	-12.61	47,9	V	76.2
2440,00	4.19	47,9	V	161.8
2440,00	-10.56	47,9	V	234.5
2440,00	-4.72	47,9	V	261.7
2440,00	-13.90	47,9	V	304.5
2440,00	0.37	47,9	V	350.3
2440,00	0.24	47,9	V	354.9

Horizontal polarization (2440.00MHz)


Frequency (MHz)	E.I.R.P. (dBm)	Correction (dB)	Antenna Polarization	Angle (°)
2440,00	7.99	47,9	H	354.9
2440,00	5.19	47,9	H	316.6
2440,00	13.01	47,9	H	280.2
2440,00	9.41	47,9	H	258.1
2440,00	16.28	47,9	H	226.8
2440,00	7.79	47,9	H	177.4
2440,00	12.47	47,9	H	143.5
2440,00	-1.59	47,9	H	114.9
2440,00	11.72	47,9	H	94.0
2440,00	2.39	47,9	H	71.9
2440,00	12.41	47,9	H	35.4
2440,00	8.46	47,9	H	0.0

F_H : highest frequency (2480.00MHz)
Vertical polarization


Frequency (MHz)	E.I.R.P. (dBm)	Correction (dB)	Antenna Polarization	Angle (°)
2480,00	-8.37	47 ,8	V	0.0
2480,00	-19.73	47 ,8	V	66.7
2480,00	-14.13	47 ,8	V	97.8
2480,00	-14.85	47 ,8	V	104.3
2480,00	-6.76	47 ,8	V	175.7
2480,00	-17.18	47 ,8	V	240.5
2480,00	-16.67	47 ,8	V	247.0
2480,00	-20.70	47 ,8	V	274.3
2480,00	-8.21	47 ,8	V	354.9

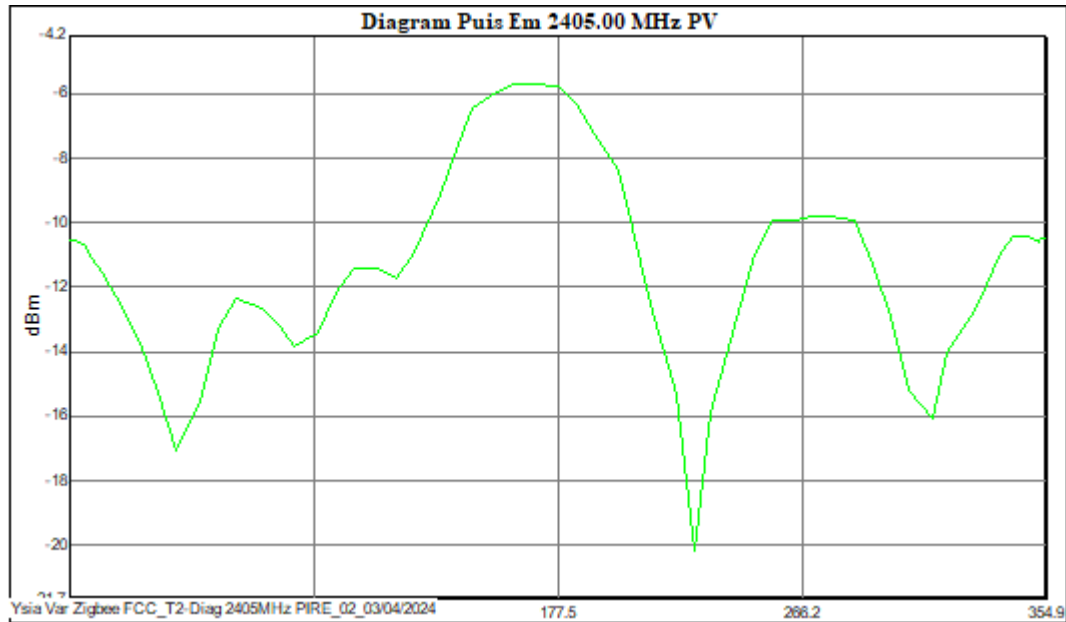
Horizontal polarization (2480.00MHz)


Frequency (MHz)	E.I.R.P. (dBm)	Correction (dB)	Antenna Polarization	Angle (°)
2480,00	-4.52	47,8	H	354.9
2480,00	-4.07	47,8	H	334.5
2480,00	-5.17	47,8	H	313.8
2480,00	0.54	47,8	H	278.7
2480,00	-3.41	47,8	H	257.8
2480,00	3.88	47,8	H	226.5
2480,00	-4.25	47,8	H	177.1
2480,00	1.03	47,8	H	143.2
2480,00	-9.14	47,8	H	112.0
2480,00	-1.95	47,8	H	89.8
2480,00	-12.69	47,8	H	69.0
2480,00	-0.28	47,8	H	33.8
2480,00	-4.53	47,8	H	0.0

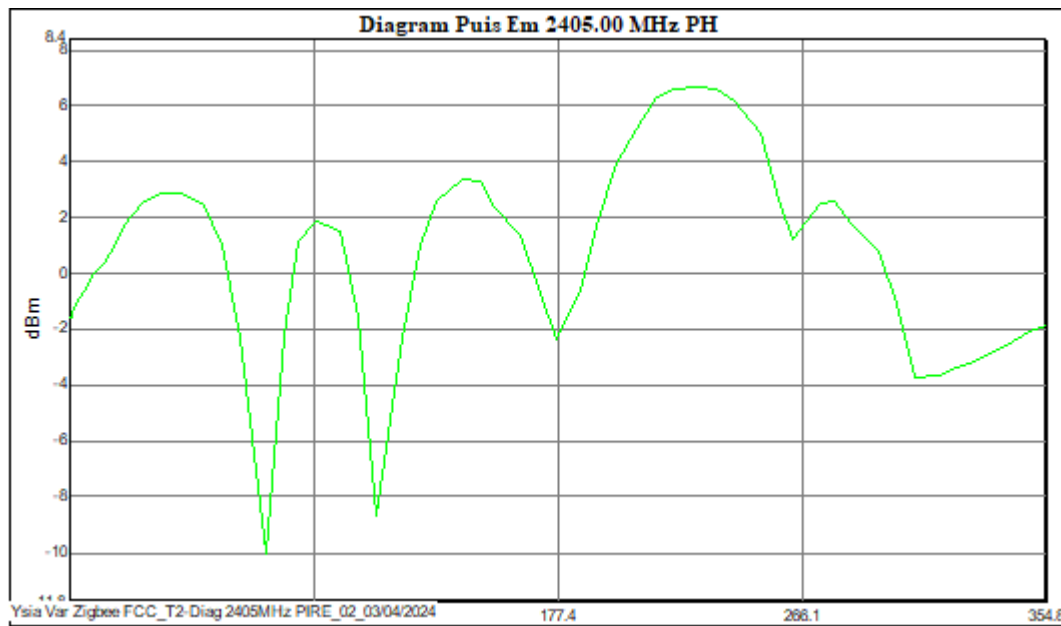
2.5.2 Ysia 5_n°2

FL: lowest frequency (2405.00MHz)

Vertical polarization



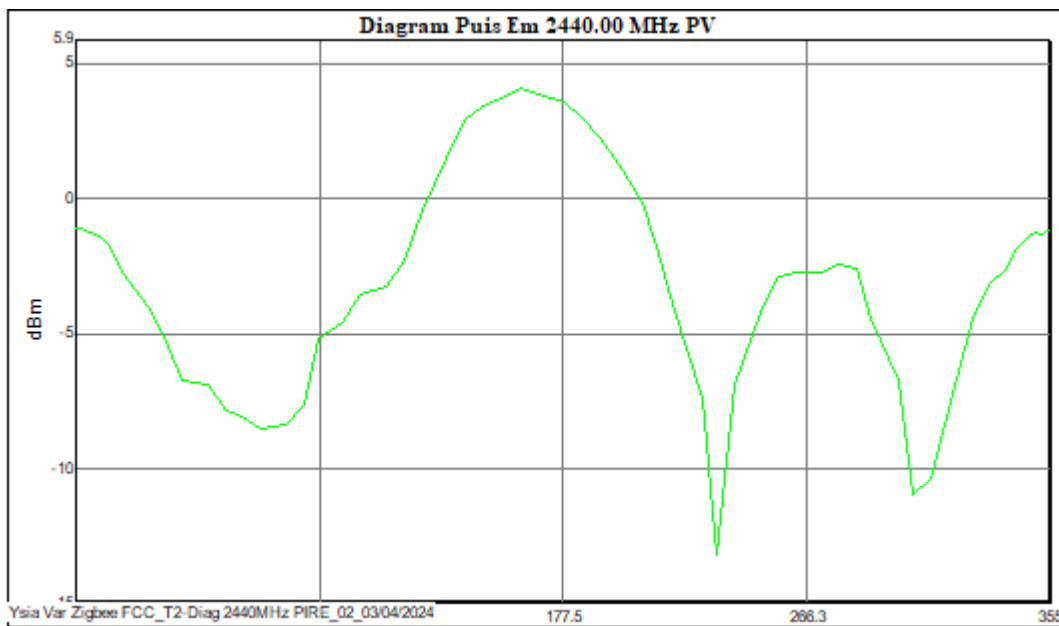
Frequency (MHz)	E.I.R.P. (dBm)	Correction (dB)	Antenna Polarization	Angle (°)
2405,00	-10.52	48	V	0.1
2405,00	-17.04	48	V	38.7
2405,00	-12.36	48	V	60.7
2405,00	-13.82	48	V	81.5
2405,00	-11.39	48	V	103.5
2405,00	-11.71	48	V	119.1
2405,00	-5.72	48	V	168.4
2405,00	-20.20	48	V	226.9
2405,00	-9.77	48	V	269.7
2405,00	-16.05	48	V	313.8
2405,00	-10.39	48	V	348.5
2405,00	-10.59	48	V	352.2
2405,00	-10.45	48	V	354.9

Horizontal polarization (2405.00MHz)


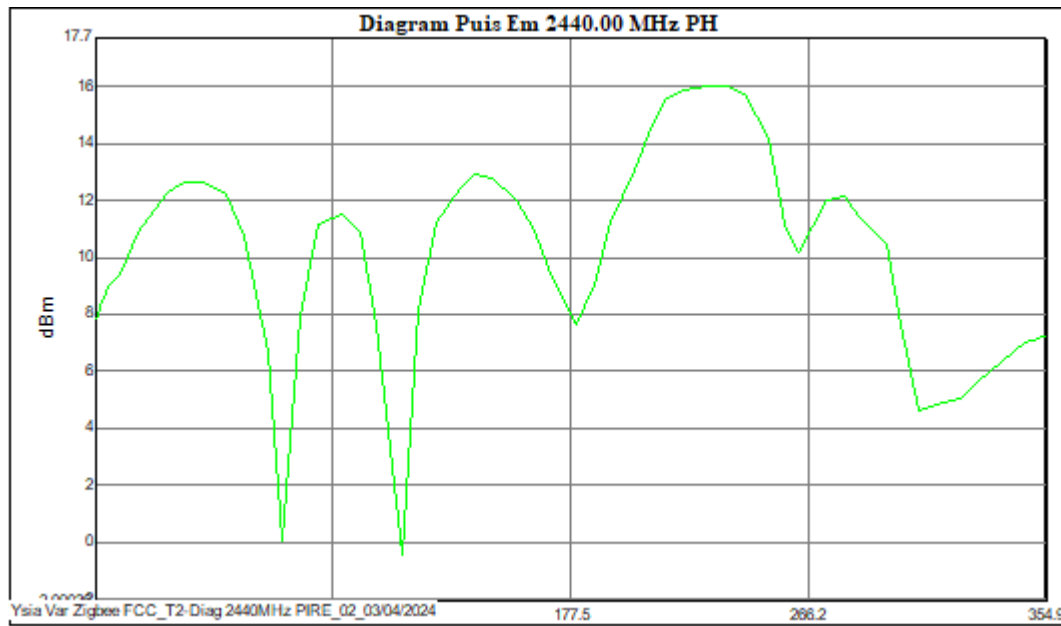
Frequency (MHz)	E.I.R.P. (dBm)	Correction (dB)	Antenna Polarization	Angle (°)
2405,00	-1.86	48	H	354.8
2405,00	-3.74	48	H	306.9
2405,00	2.59	48	H	278.2
2405,00	1.19	48	H	262.6
2405,00	6.67	48	H	228.7
2405,00	-2.37	48	H	176.6
2405,00	3.34	48	H	142.7
2405,00	-8.66	48	H	111.5
2405,00	1.89	48	H	89.4
2405,00	-10.06	48	H	71.2
2405,00	2.90	48	H	33.4
2405,00	-1.58	48	H	0.0

F_M: middle frequency (2440.00MHz)

Vertical polarization



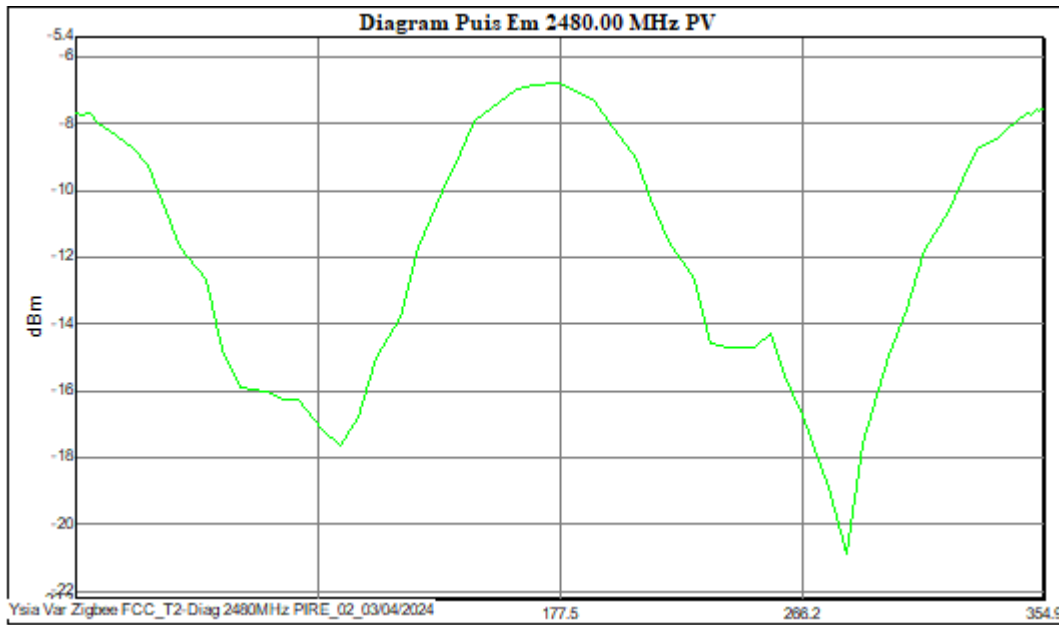
Frequency (MHz)	E.I.R.P. (dBm)	Correction (dB)	Antenna Polarization	Angle (°)
2440,00	-1.08	47,9	V	0.1
2440,00	-8.50	47,9	V	67.5
2440,00	4.12	47,9	V	162.2
2440,00	-13.20	47,9	V	233.6
2440,00	-2.45	47,9	V	277.8
2440,00	-10.98	47,9	V	305.0
2440,00	-1.25	47,9	V	349.1
2440,00	-1.29	47,9	V	351.9
2440,00	-1.19	47,9	V	354.2
2440,00	-1.21	47,9	V	355.0

Horizontal polarization (2440.00MHz)


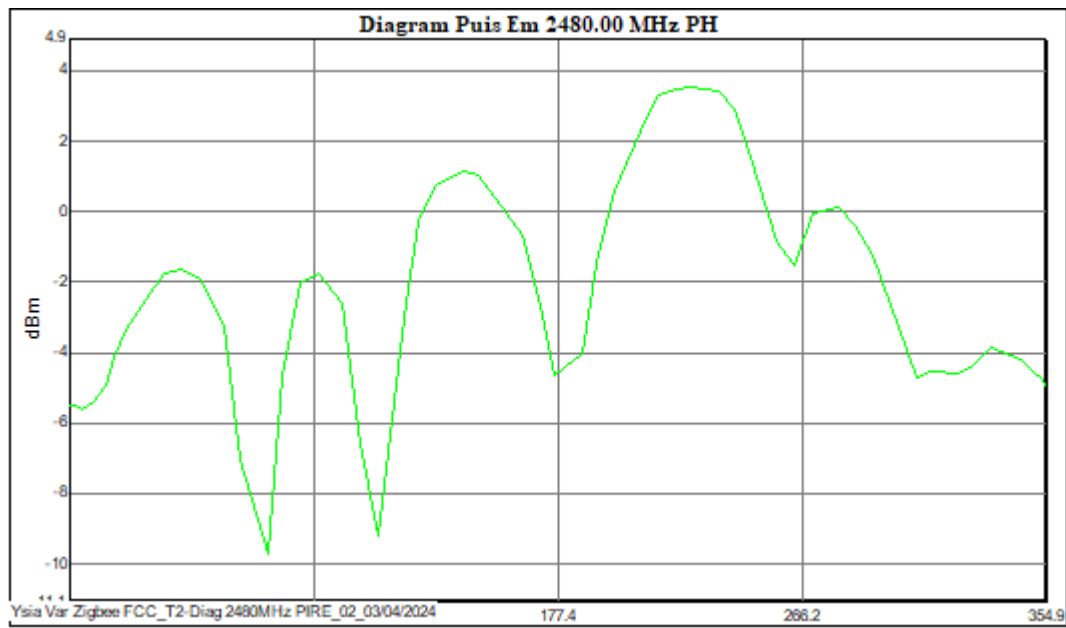
Frequency (MHz)	E.I.R.P. (dBm)	Correction (dB)	Antenna Polarization	Angle (°)
2440,00	7.20	47,9	H	354.9
2440,00	4.64	47,9	H	307.2
2440,00	12.13	47,9	H	279.9
2440,00	10.17	47,9	H	262.9
2440,00	16.03	47,9	H	229.1
2440,00	7.66	47,9	H	179.6
2440,00	12.88	47,9	H	141.8
2440,00	-0.44	47,9	H	114.5
2440,00	11.53	47,9	H	92.3
2440,00	0.05	47,9	H	70.2
2440,00	12.65	47,9	H	40.2
2440,00	7.83	47,9	H	0.1

F_H : highest frequency (2480.00MHz)

Vertical polarization



Frequency (MHz)	E.I.R.P. (dBm)	Correction (dB)	Antenna Polarization	Angle (°)
2480,00	-7.67	47 ,8	V	0.1
2480,00	-17.64	47 ,8	V	96.8
2480,00	-6.82	47 ,8	V	177.2
2480,00	-20.88	47 ,8	V	282.3
2480,00	-7.53	47 ,8	V	354.9

Horizontal polarization (2480.00MHz)


Frequency (MHz)	E.I.R.P. (dBm)	Correction (dB)	Antenna Polarization	Angle (°)
2480,00	-4.97	47,8	H	354.9
2480,00	-3.84	47,8	H	334.9
2480,00	-4.69	47,8	H	307.7
2480,00	0.11	47,8	H	279.1
2480,00	-1.51	47,8	H	263.5
2480,00	3.55	47,8	H	225.7
2480,00	-4.65	47,8	H	176.2
2480,00	1.13	47,8	H	142.4
2480,00	-9.21	47,8	H	112.4
2480,00	-1.75	47,8	H	90.3
2480,00	-9.73	47,8	H	72.1
2480,00	-1.65	47,8	H	40.8
2480,00	-5.50	47,8	H	0.0

2.5.3 Global results

Ysia versions	Operating frequency (MHz)	E.I.R.P. (dBm)	Polarization	Angle (°)
Ysia 1_n°1	2405.00	6.71	H	229
	2440.00	16.28	H	226
	2480.00	3.88	H	226
Ysia 5_n°2	2405.00	6,67	H	228
	2440.00	16,03	H	229
	2480.00	3,55	H	225

Software power setup for each channel:

C11 (2405MHz)= 3

C18 (2440MHz)= 12

C26 (2480MHz)= -2

2.6 TEST CONCLUSION

Conformity to standard requirements: **PASS**

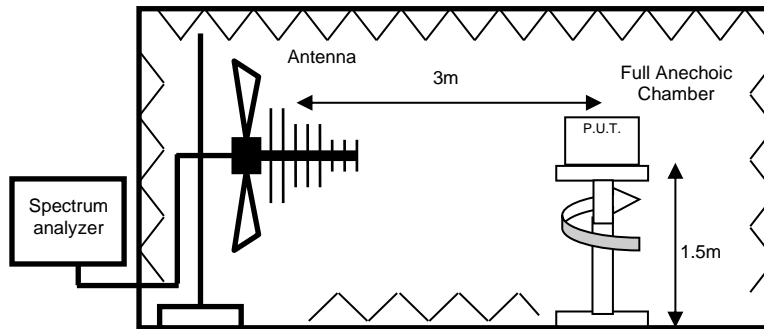
3 DTS BANDWIDTH (CLAUSE 15.247 (a))

3.1 TEST TARGET

§15.247 Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz

- (a) Operation under the provisions of this Section is limited to frequency hopping and digitally modulated intentional radiators that comply with the following provisions:
- (2) Systems using digital modulation techniques may operate in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

3.2 TEST CONFIGURATION



P.U.T. configured for maximum e.i.r.p. towards the measuring antenna.

EUT mode of operation	Continuous Emission. Modulation on Measure on lowest, middle and highest frequency
Environmental test conditions	Temperature: between +15°C and +35°C, Relative humidity: between 20% and 75% Nominal voltage, nominal frequency
Test conditions	Full anechoic room - measure at 3m Test equipment used: <input checked="" type="checkbox"/> Equipment listed in appendix, <input type="checkbox"/> other: ...
Spectrum analyzer settings:	
RBW	100kHz
VBW	300kHz
SPAN	10MHz
Detector	Peak
Trace:	Max Hold

3.3 TEST METHOD

FCC Part 15

3.3.1 Deviation

None

3.3.2 Product under test configuration

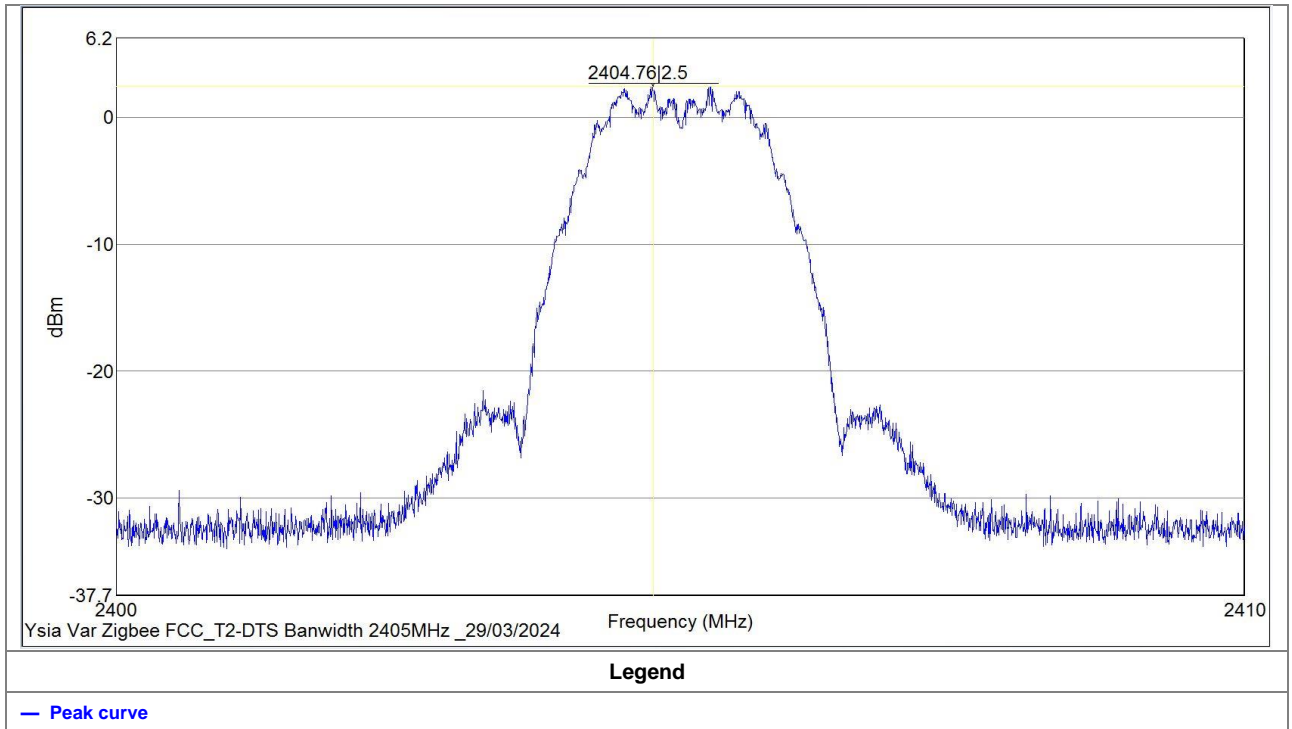
Product is in horizontal position and is set in permanent emission with modulation.
To have maximum power, product is positioned at 228° with horizontal measuring antenna.

3.4 LIMIT

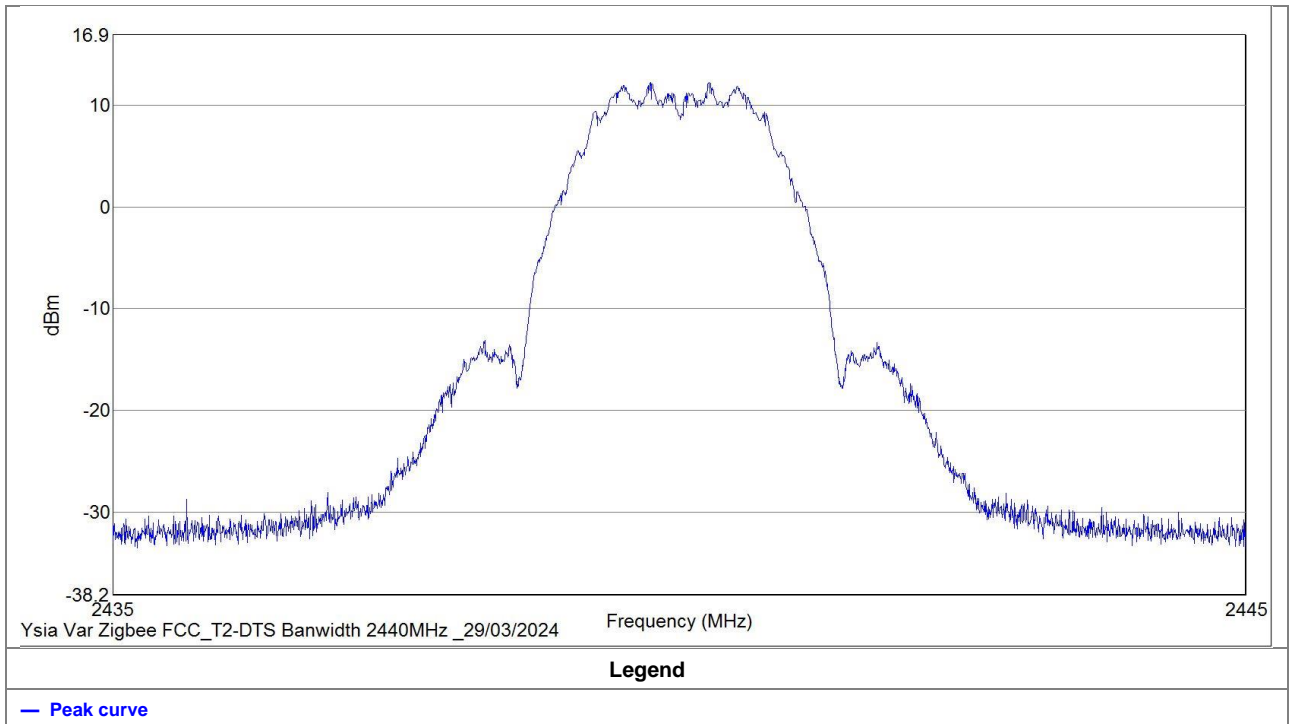
Limit	Minimum 6db bandwidth shall be at least 500kHz
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3.5 MEASURES & RESULTS

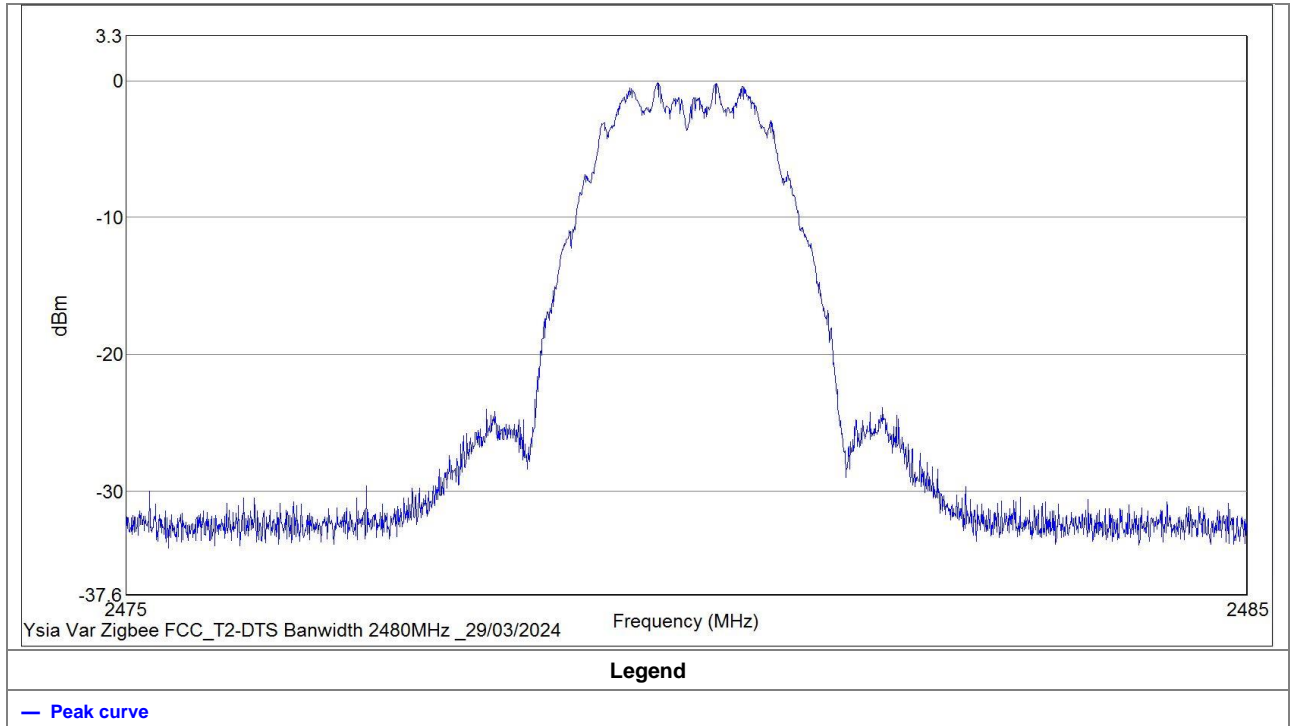
F_L: lowest frequency (2405.00MHz)



F_M: middle frequency (2440.00MHz)



F_H: highest frequency (2480.00MHz)



3.6 TEST CONCLUSION

Conformity to standard requirements: **PASS**

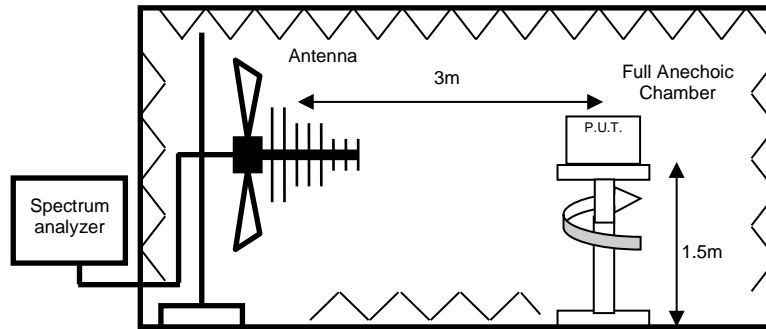
4 MAXIMUM POWER SPECTRAL DENSITY (CLAUSE 15.247 (e))

4.1 TEST TARGET

.....
§15.247 Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz

(e) For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

4.2 TEST CONFIGURATION



P.U.T. configured for maximum e.i.r.p. towards the measuring antenna.

EUT mode of operation	Continuous Emission. Modulation on Measure on lowest, middle and highest frequency
Test conditions	Full anechoic room - measure at 3m Test equipment used: <input checked="" type="checkbox"/> Equipment listed in appendix, <input type="checkbox"/> other: ...
Environmental test conditions	Temperature: between +15°C and +35°C, Relative humidity: between 20% and 75% Nominal voltage, nominal frequency
Spectrum analyzer settings:	
RBW	3kHz
VBW	10kHz
SPAN	10MHz
Detector	Peak
Trace:	Max Hold

4.3 TEST METHOD

FCC Part 15

4.3.1 Deviation

None

4.3.2 Product under test configuration

Product is in horizontal position and is set in permanent emission with modulation.

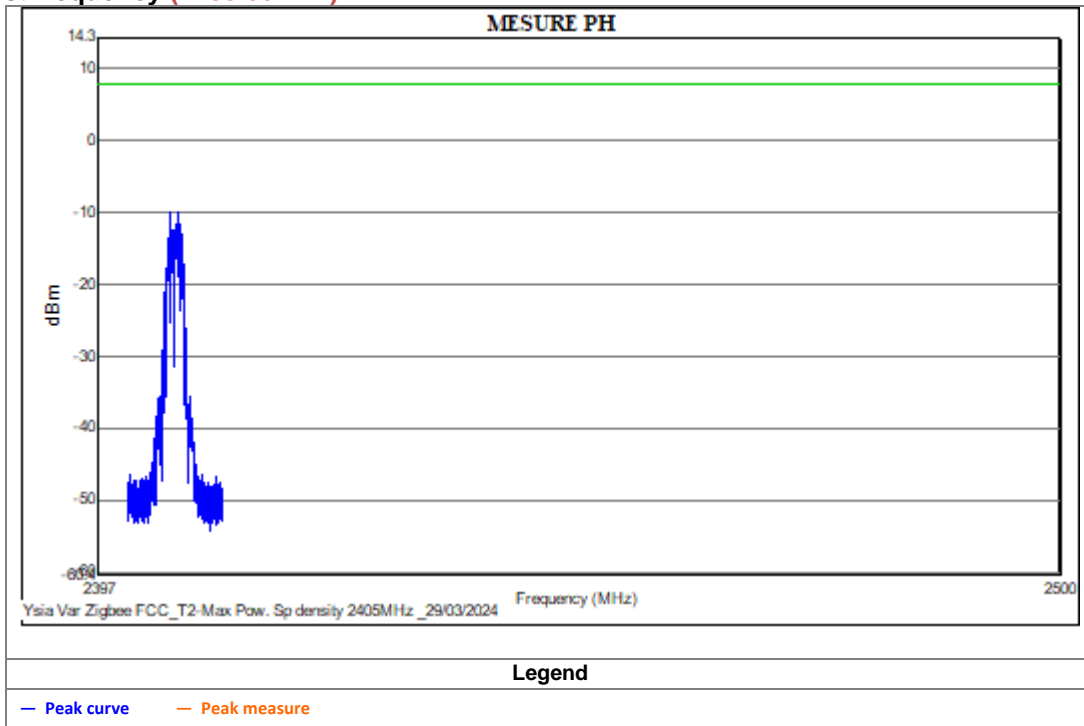
To have maximum power, product is positioned at 228° with horizontal measuring antenna.

4.4 LIMIT

Limit	≤ +8dBm (§15.247 (e): ...the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.)
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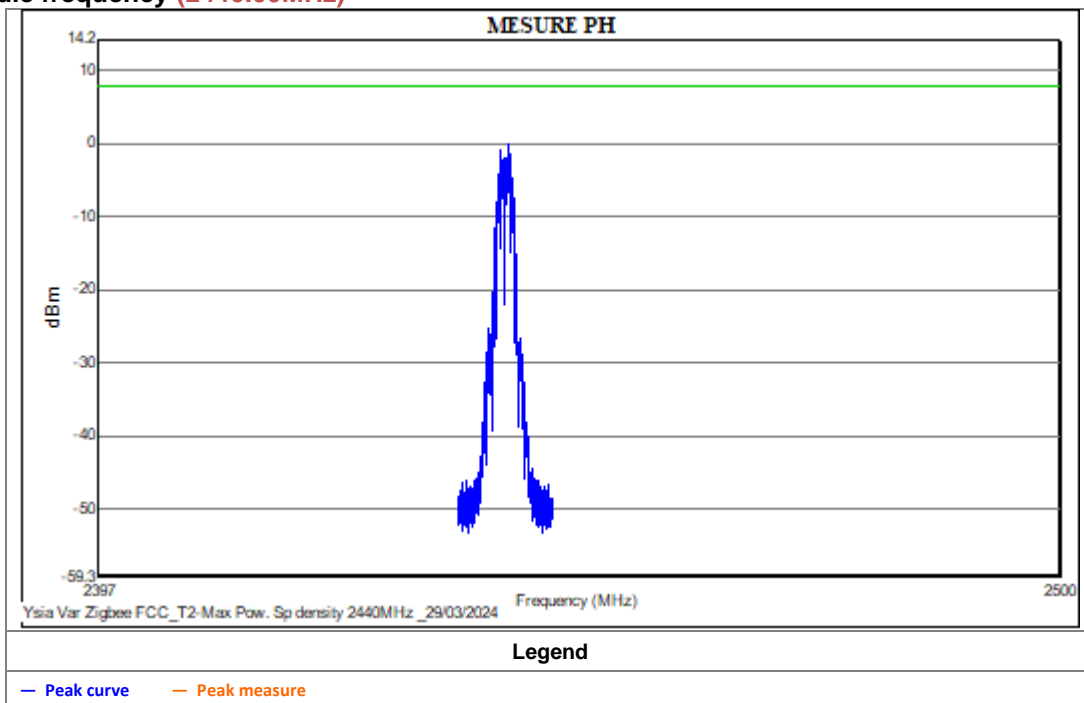
4.5 MEASURES & RESULTS

F_L: lowest frequency (2405.00MHz)



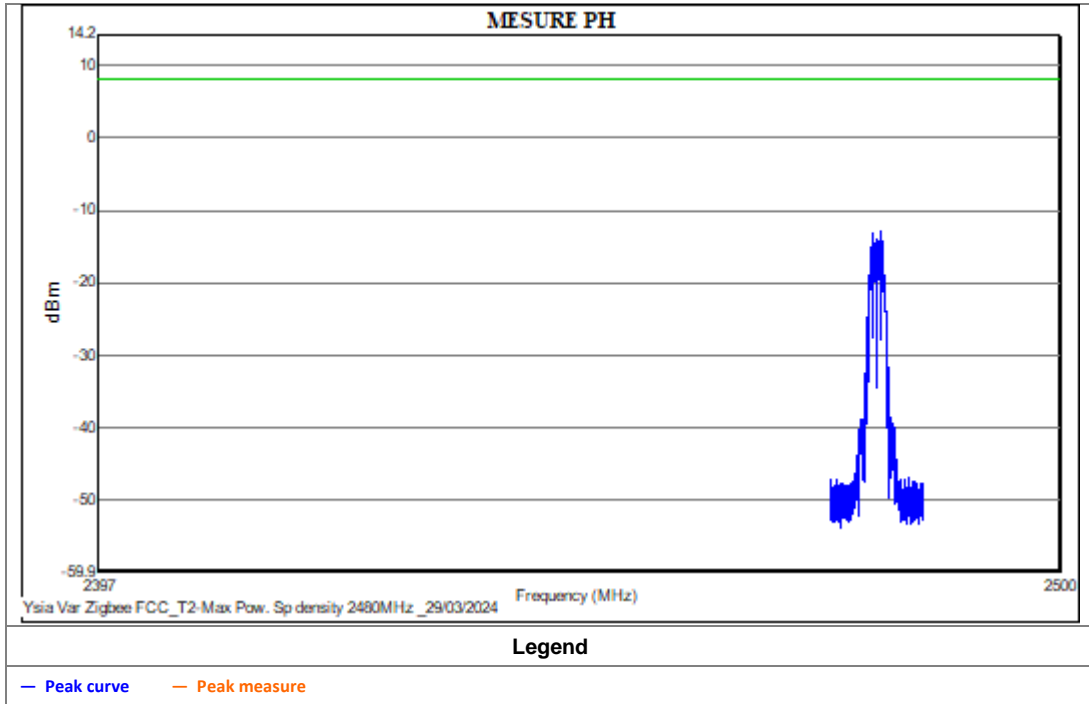
Frequency	Pk level	Marg Pk	Correction	Polar	Height	angle
2404.565000	-9.9	17,9	48	H	160	224

F_M: middle frequency (2440.00MHz)



Frequency	Pk level	Marg Pk	Correction	Polar	Height	angle
2440.450000	-0.0	8.0	47,9	H	160	224

F_H: highest frequency (2480.00MHz)



Frequency	Pk level	Marg Pk	Correction	Polar	Height	angle
2480.450000	-12.9	20.9	47,8	H	160	224

4.5.1 Global results

Operating frequency (MHz)	Power spectral density (dBm)
2405.00	-9,9
2440.00	0,0
2480.00	-12,9

4.6 TEST CONCLUSION

Conformity to standard requirements: **PASS**

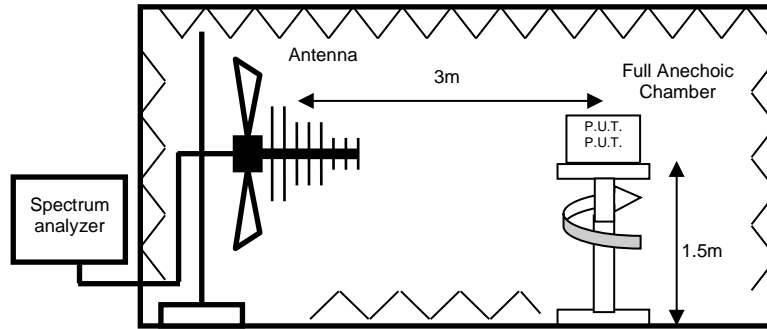
5 BAND EDGE (CLAUSE 15.247 (d))

5.1 TEST TARGET

.....
§15.247 Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz

(d) In any 100 kHz bandwidth In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a) (band 2310-2390, band 2483.5-2500), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

5.2 TEST CONFIGURATION



P.U.T. configured for maximum e.i.r.p. towards the measuring antenna.

EUT mode of operation	Continuous Emission. Modulation on Measure on lowest and highest frequency
Test conditions	Full anechoic room - measure at 3m Test equipment used: <input checked="" type="checkbox"/> Equipment listed in appendix, <input type="checkbox"/> other: ...
Environmental test conditions	Temperature: between +15°C and +35°C, Relative humidity: between 20% and 75% Nominal voltage, nominal frequency
Spectrum analyzer settings:	
RBW	1MHz
VBW	10MHz
SPAN	20MHz
Detector	Peak
Trace:	Max Hold

5.3 TEST METHOD

FCC Part 15

5.3.1 Deviation

None

5.3.2 Product under test configuration

Product is in horizontal position and is set in permanent emission with modulation.

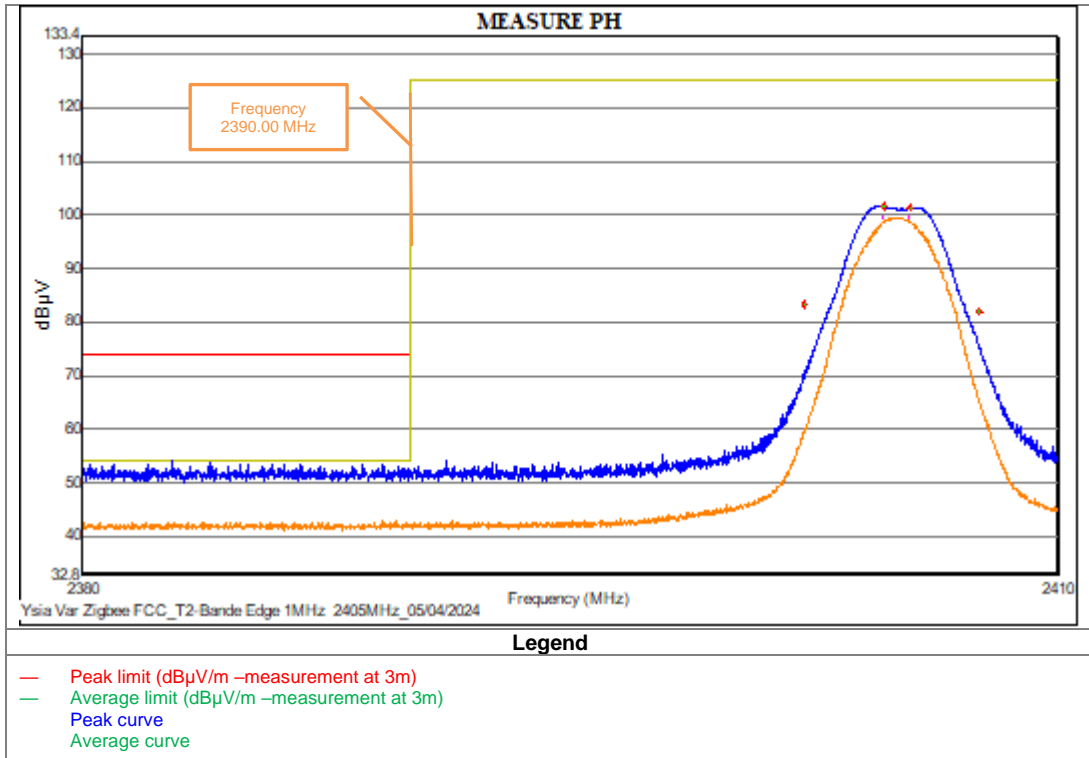
To have maximum power, product is positioned at 228° with horizontal measuring antenna.

5.4 LIMIT

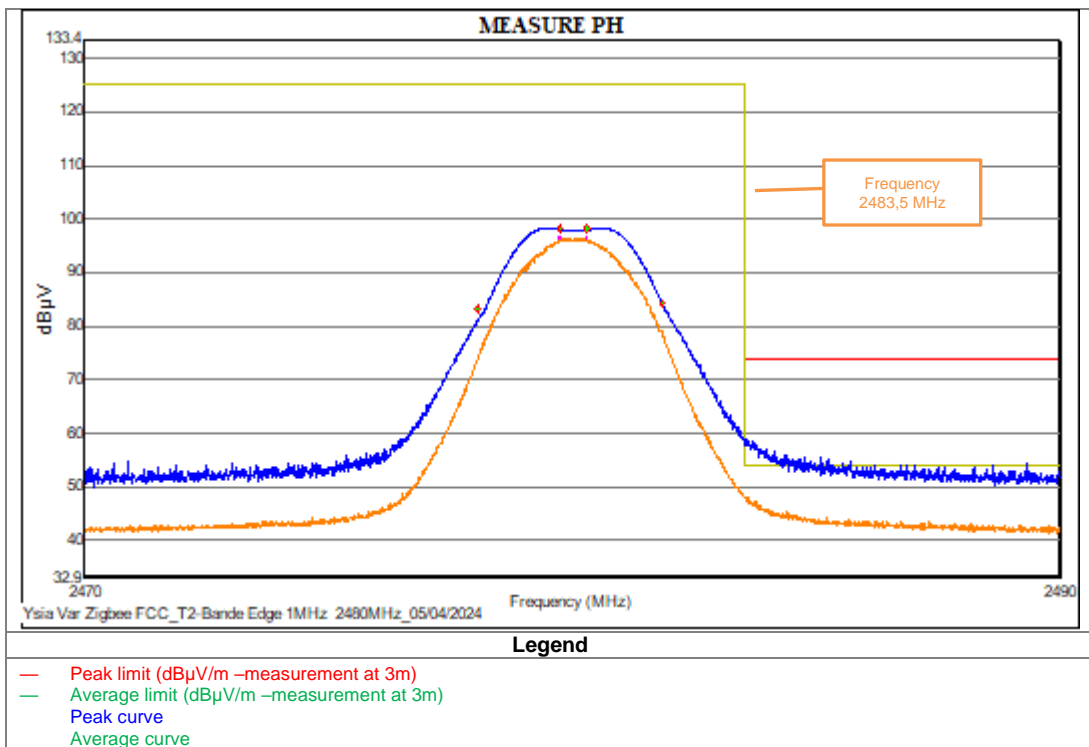
Limit	<p>Limit at 2.390 GHz: 54dbµV/m average; 74dbµV/m peak (restricted band 2310-2390MHz)</p> <p>Limit at 2.4835 GHz: 54dbµV/m average; 74dbµV/m peak (restricted band 2483.5-2500MHz)</p> <p>(...In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).</p>
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5.5 MEASURES & RESULTS

F_L: lowest frequency (2405.00MHz)



F_H: highest frequency (2480.00MHz)



5.6 TEST CONCLUSION

Conformity to standard requirements: **PASS**

6 BAND EDGE (CLAUSE 15.247 (d))

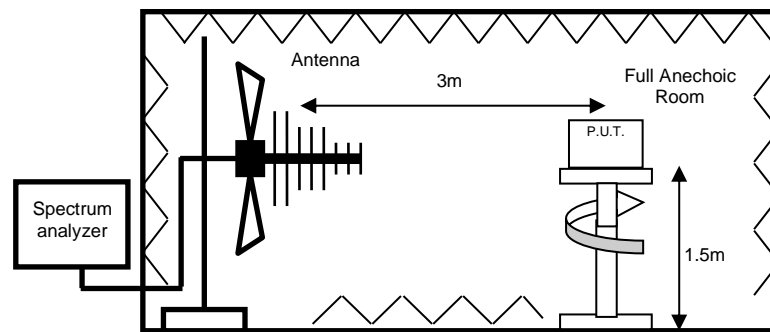
6.1 TEST TARGET

.....

§15.247 Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz

(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, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

6.2 TEST CONFIGURATION



P.U.T. configured for maximum e.i.r.p. towards the measuring antenna.

EUT mode of operation	Continuous Emission. Modulation on Measure on lowest and highest frequency
Test conditions	Full anechoic room - measure at 3m Test equipment used: <input checked="" type="checkbox"/> Equipment listed in appendix, <input type="checkbox"/> other: ...
Environmental test conditions	Temperature: between +15°C and +35°C, Relative humidity: between 20% and 75% Nominal voltage, nominal frequency
Spectrum analyzer settings:	
RBW	100kHz
VBW	300kHz
SPAN	20MHz
Detector	Peak
Trace:	Max Hold

6.3 TEST METHOD

FCC Part 15

6.3.1 Deviation

None

6.3.2 Product under test configuration

Product is in horizontal position and is set in permanent emission with modulation.

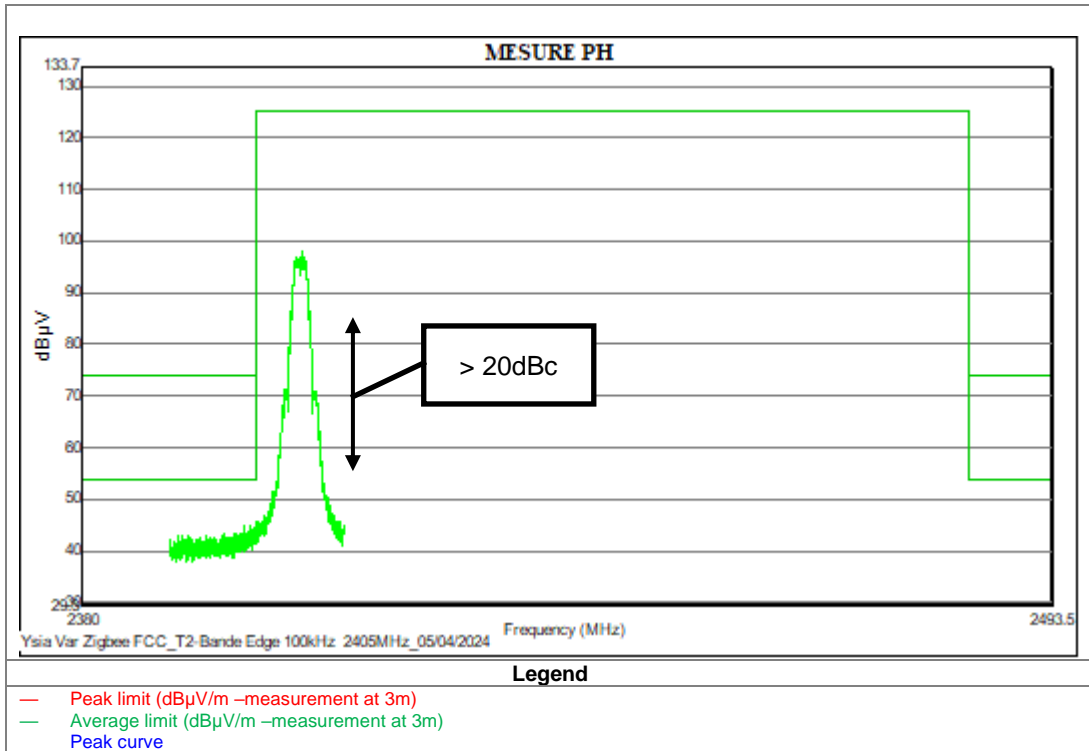
To have maximum power, product is positioned at 228° with horizontal measuring antenna.

6.4 LIMIT

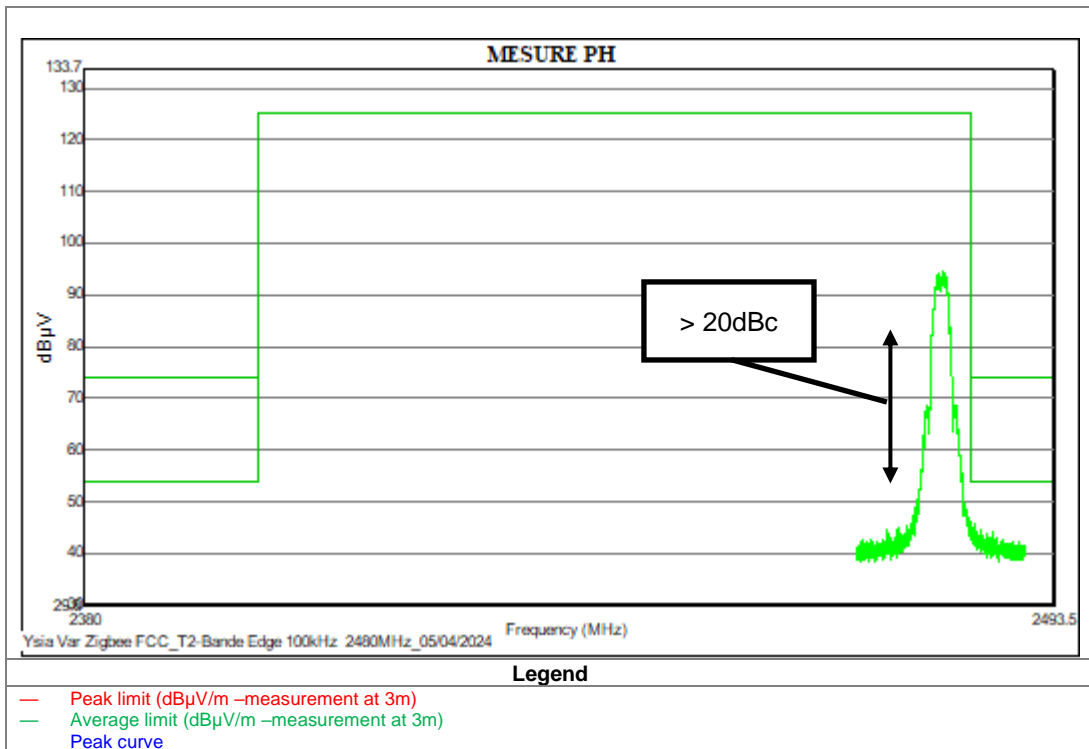
Limit	<p>≥ 20dBc (in the band 2390 and 2400MHz) (... the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power...)</p>
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6.5 MEASURES & RESULTS

F_L: lowest frequency (2405.00MHz)



F_H: highest frequency (2480.00MHz)



6.6 TEST CONCLUSION

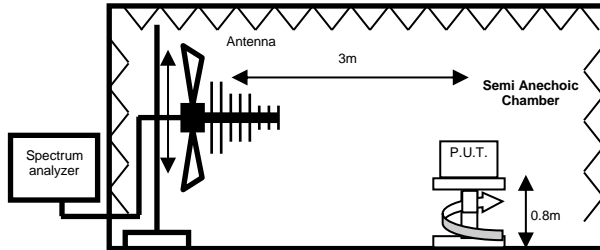
Conformity to standard requirements: **PASS**

7 TRANSMITTER RADIATED EMISSION (CLAUSE 15.109)

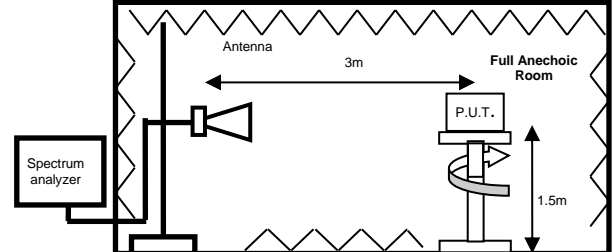
7.1 TEST TARGET

The emissions from an intentional radiator shall not exceed the field strength levels specified in the standard

7.2 TEST CONFIGURATION



From 30MHz to 1GHz: measure in a Semi Anechoic Chamber



From 1GHz to 26GHz: measure in a Full Anechoic Room

EUT mode of operation	Continuous Emission. Modulation on Measure on lowest, middle and highest frequency
Environmental test conditions	Temperature: between +15°C and +35°C, Relative humidity: between 20% and 75% Nominal voltage, nominal frequency

From 30MHz to 1GHz:

Test conditions	Semi Anechoic Chamber - measure at 3m Test equipment used: <input checked="" type="checkbox"/> Equipment listed in appendix, <input type="checkbox"/> other: ...
Spectrum analyzer settings:	
RBW	120kHz
VBW	1MHz
Detector	Peak / Quasi Peak
Trace:	Max Hold

From 1 to 26GHz:

Test conditions	Full Anechoic Room - measure at 3m Test equipment used: <input checked="" type="checkbox"/> Equipment listed in appendix, <input type="checkbox"/> other: ...
Spectrum analyzer settings:	
RBW	1MHz
VBW	3MHz
Detector	Average / Peak
Trace:	Max Hold

7.3 TEST METHOD

FCC Part 15

7.3.1 Deviation

None

7.3.2 Product under test configuration

Product is in horizontal position and is set in permanent emission with modulation.

7.4 LIMIT

7.4.1 Standard limits

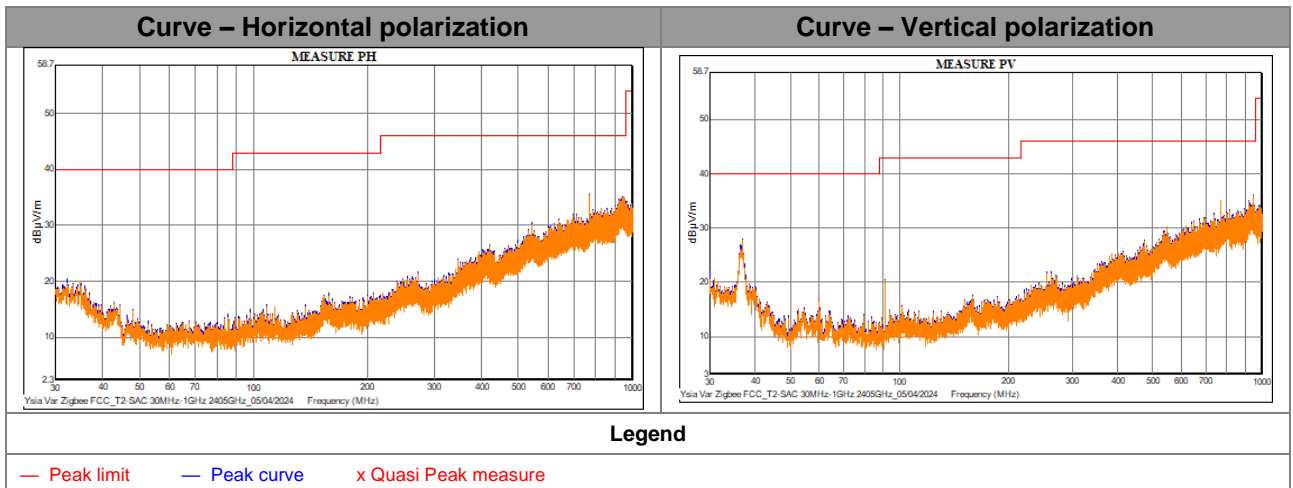
Limit	Frequency	Radiated emissions limits * (Measurement distance: 3m)
	30 - 88MHz	100µV/m (40dBµV/m)
	88 - 216MHz	150µV/m (43dBµV/m)
	216 - 960MHz	200µV/m (46dBµV/m)
	Above 960MHz**	500µV/m (54dBµV/m)

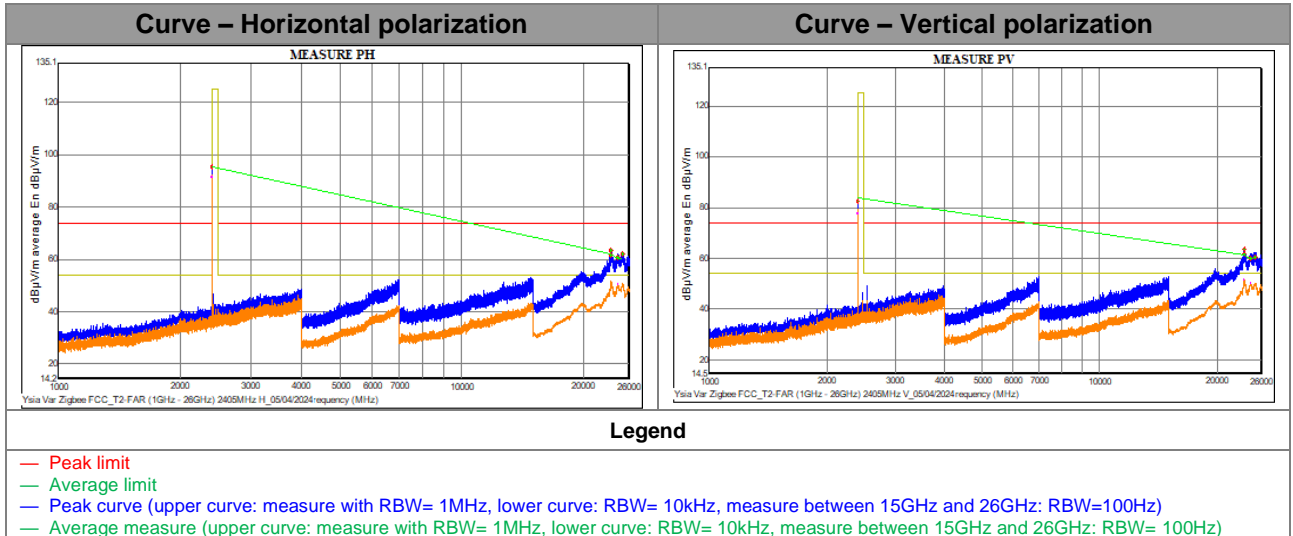
* §15.209 (d) The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz
Radiated emission limits in these three bands are based on measurements employing an average detector.

** §15.249 (e) As shown in §15.35(b), for frequencies above 1000 MHz, the field strength limits in paragraphs (a) and (b) of this section are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

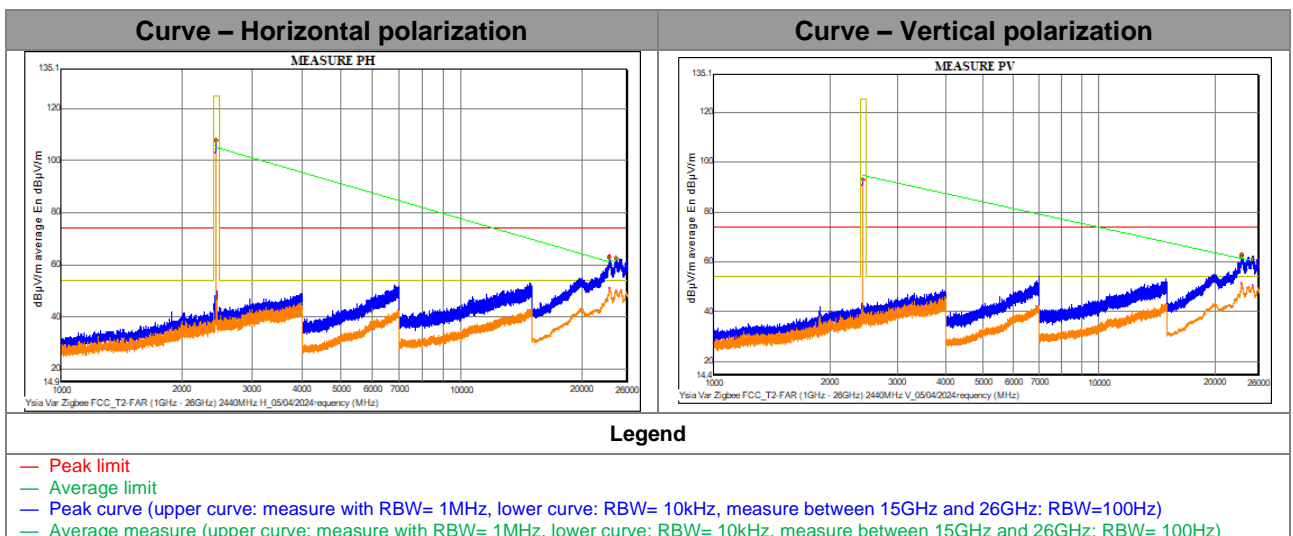
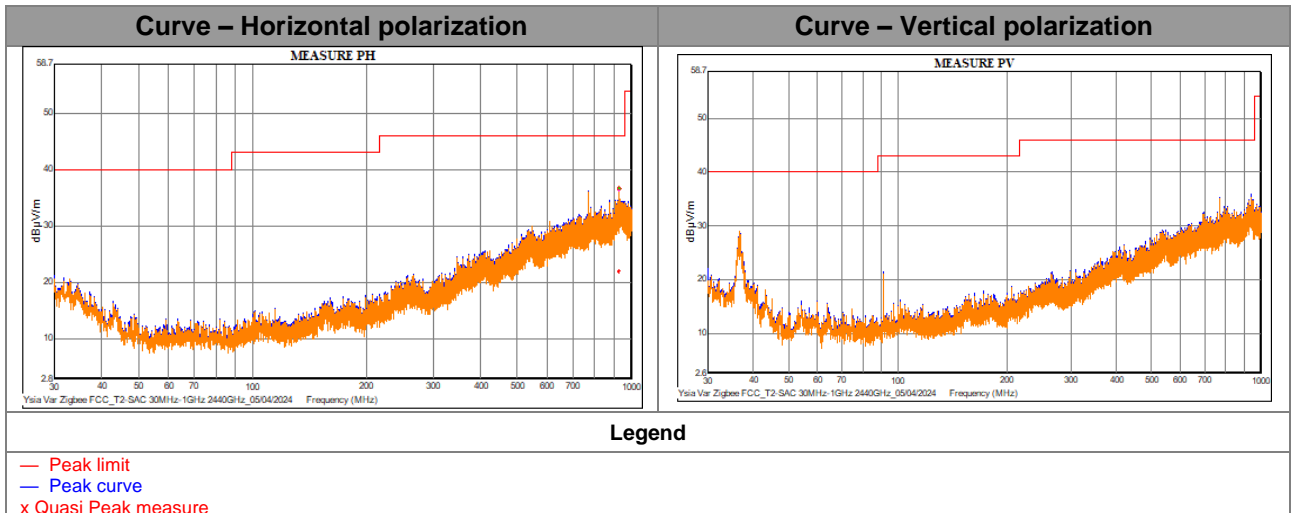
7.5 RESULTS

FL: lowest frequency (2405.00MHz)

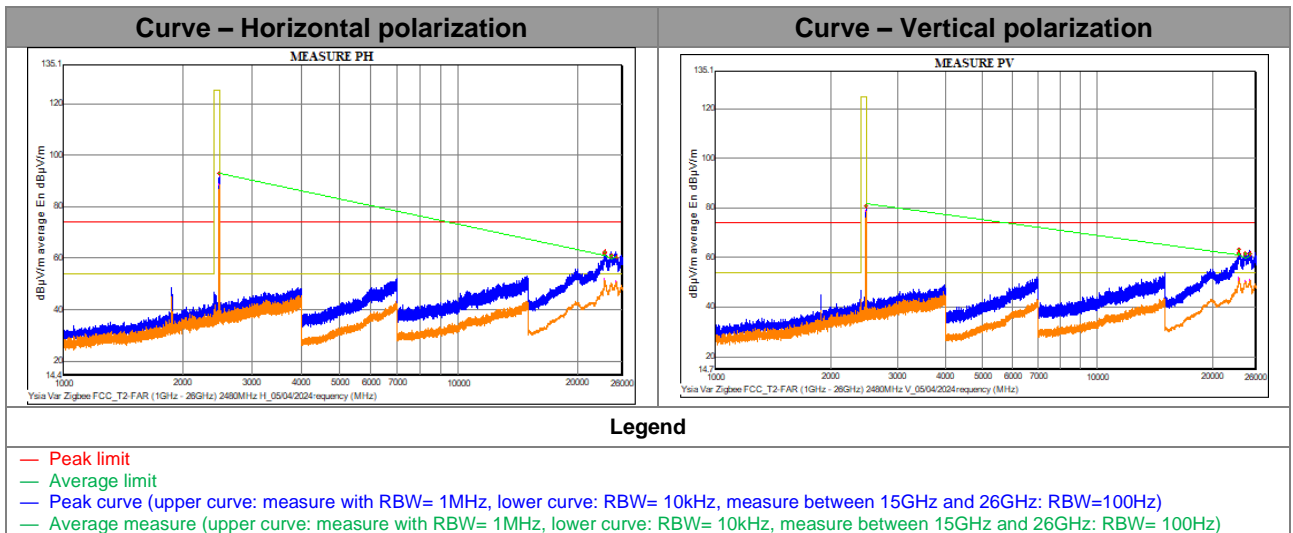
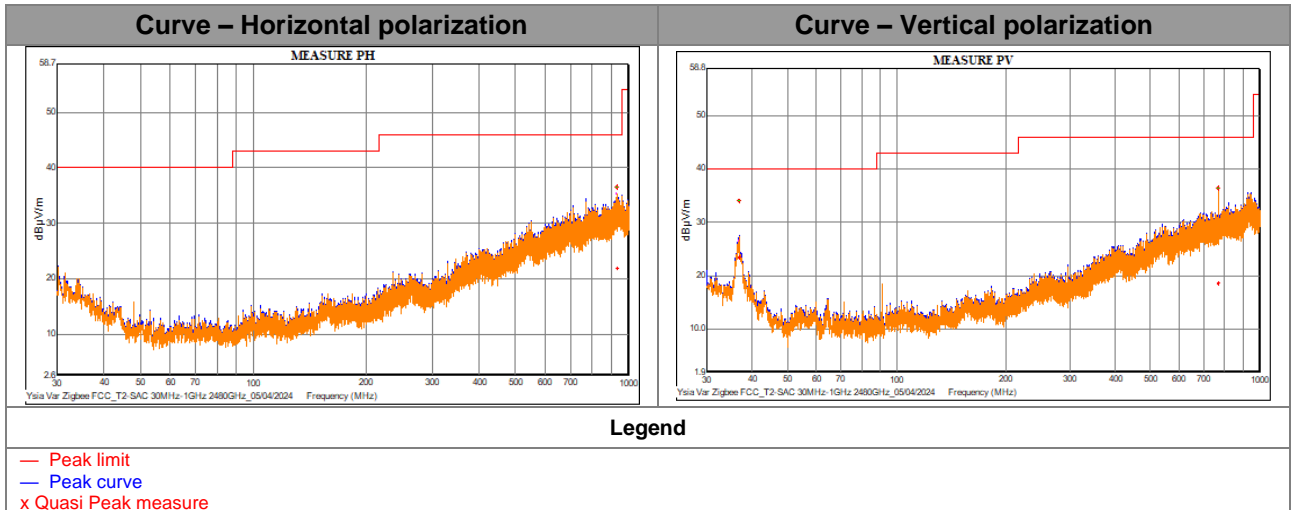




F_M: middle frequency (2440.00MHz)



F_H: highest frequency (2480.00MHz)



7.6 TEST CONCLUSION

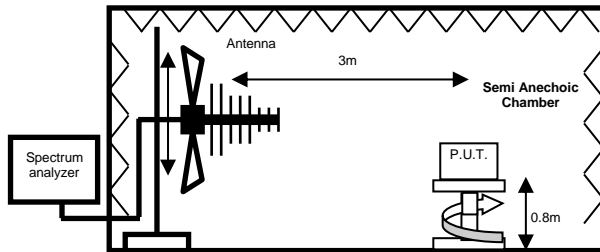
Conformity to standard requirements: **PASS**

8 RECEIVER RADIATED EMISSION (CLAUSE 15.209)

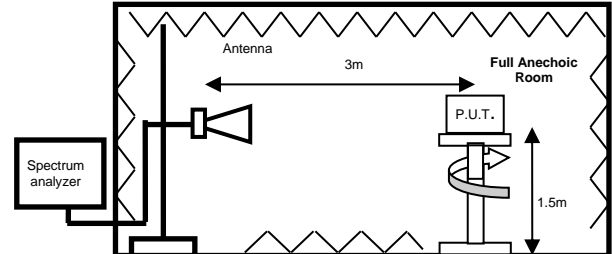
8.1 TEST TARGET

The emissions from an intentional radiator shall not exceed the field strength levels specified in the standard

8.2 TEST CONFIGURATION



From 30MHz to 1GHz: measure in a Semi Anechoic Chamber



From 1GHz to 26GHz: measure in a Full Anechoic Room

EUT mode of operation	Product in receiver mode
Environmental test conditions	Temperature: between +15°C and +35°C, Relative humidity: between 20% and 75% Nominal voltage, nominal frequency

From 30MHz to 1GHz:

Test conditions	Semi Anechoic Chamber - measure at 3m Test equipment used: <input checked="" type="checkbox"/> Equipment listed in appendix, <input type="checkbox"/> other: ...
Spectrum analyzer settings:	
RBW	120kHz
VBW	1MHz
Detector	Peak / Quasi Peak
Trace:	Max Hold

From 1 to 26GHz:

Test conditions	Full Anechoic Room - measure at 3m
Spectrum analyzer settings:	
RBW	1MHz
VBW	3MHz
Detector	Average / Peak
Trace:	Max Hold

8.3 TEST METHOD

FCC Part 15

8.3.1 Deviation

None

8.3.2 Product under test configuration

Product is in horizontal position and is set in standby mode.

8.4 LIMIT

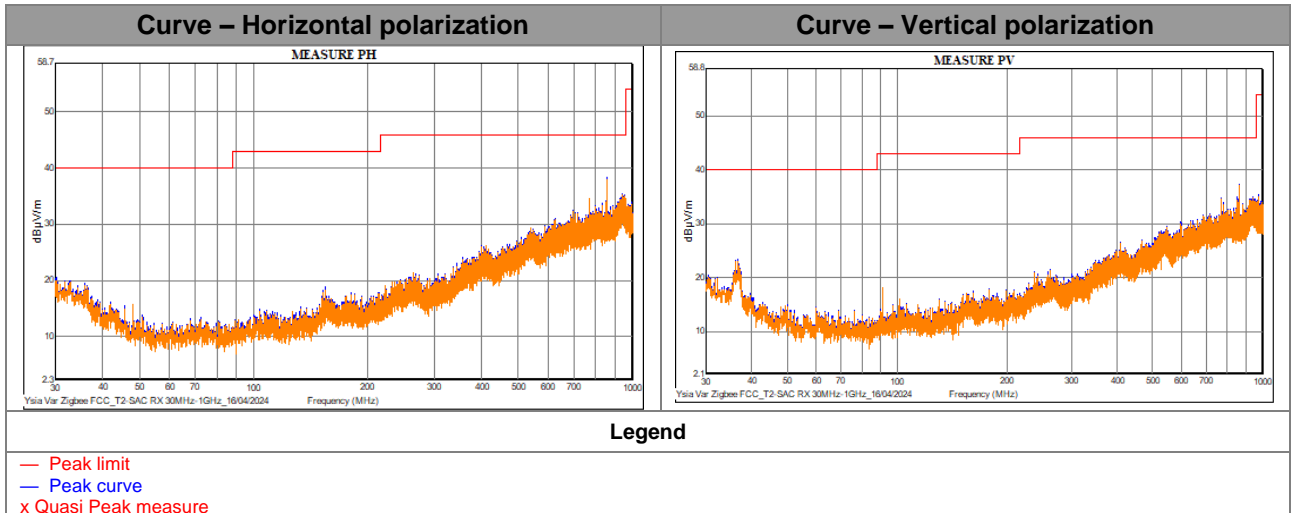
8.4.1 Standard limits

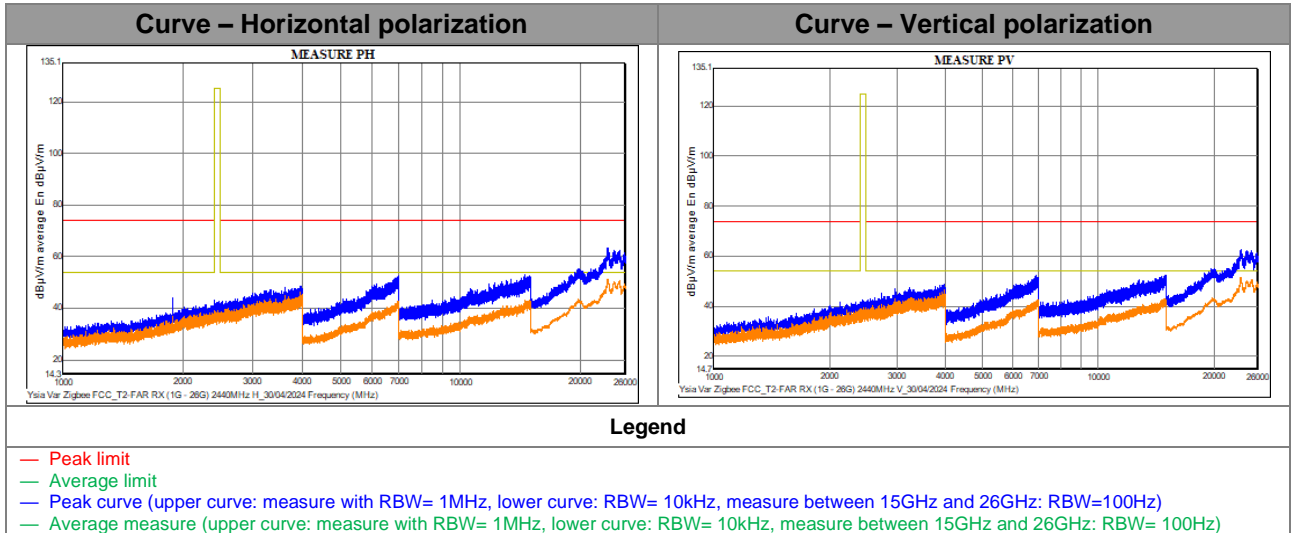
Limit	Frequency	Radiated emissions limits * (Measurement distance: 3m)
	30 - 88MHz	100µV/m (40dBµV/m)
	88 - 216MHz	150µV/m (43dBµV/m)
	216 - 960MHz	200µV/m (46dBµV/m)
	Above 960MHz**	500µV/m (54dBµV/m)

* §15.209 (d) The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

** §15.249 (e) As shown in §15.35(b), for frequencies above 1000 MHz, the field strength limits in paragraphs (a) and (b) of this section are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

8.5 RESULTS





8.6 TEST CONCLUSION

Conformity to standard requirements: **PASS**

9 OCCUPIED CHANNEL BANDWIDTH

Not test from FCC Part15

10 CARRIER FREQUENCY, NUMBER OF CHANNELS AND POWER PER CHANNEL

Not test from FCC Part15

11 RADIO SENSITIVITY (FIELD STRENGTH)

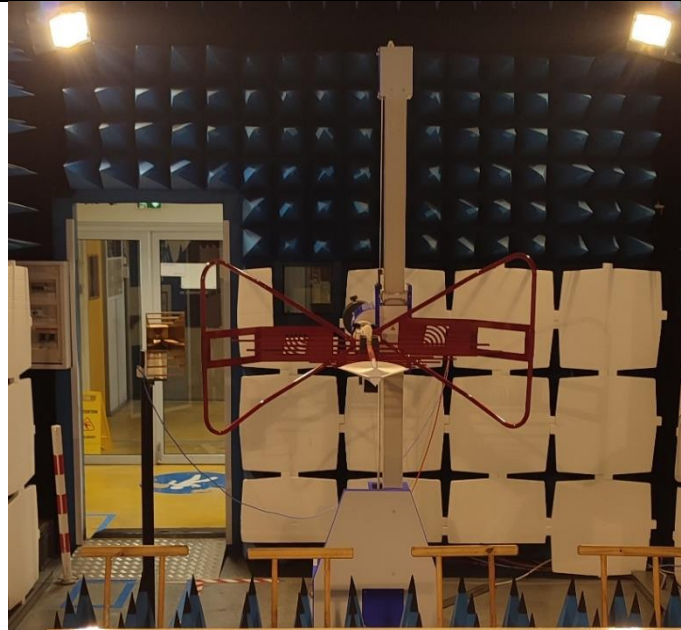
Not test from FCC Part15

APPENDIX: PHOTO OF THE EQUIPMENT UNDER TEST



APPENDIX: PHOTO OF THE EQUIPMENT DURING TEST

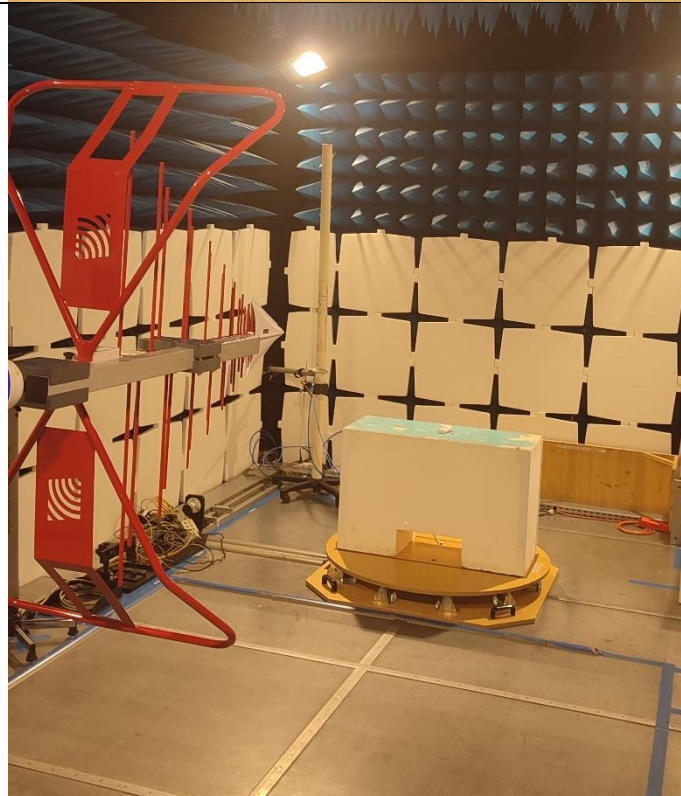
Measure in a full anechoic chamber
Measure with Bilog antenna



Measure in a full anechoic chamber
Measure with Horn antenna



Measure in a semi-anechoic chamber
Measure with Bilog antenna



APPENDIX: STANDARDS

	Version	Title
FCC Part 15	/	Electronic code of federal regulations Title 47: telecommunication Part 15: Radio frequency devices

APPENDIX: TEST EQUIPMENT USED

Equipment number	Reference	Type of product	Manufacturer	Model
1	/	Anechoic chamber	SIEPEL	/
2	I02061	Spectrum analyzer / EMI receiver	ROHDE & SCHWARZ	ESR26
3	I01102	Signal generator	ROHDE & SCHWARZ	SMR20
4	I02340	Vector Signal generator	ROHDE & SCHWARZ	SMBV100A
5	I01185	Bi-log antenna	AH System	SAS 521-4
6	I01187	Horn antenna	AH System	SAS 571
7	I01191	L.S.I.B.	AFJ	LS16

TEST DESIGNATION	Equipment number
RF output power	1,2,5
DTS Bandwidth	1,2,5
Maximum power spectral density	1,2,5
Band edge	1,2,5
Radiated emission	1,2,5,6
Occupied Channel Bandwidth	1,2,5
AC power line - Conducted emission	7,2