Report No.: DDT-RE23062503-2E02

Issued Date: Jun. 26, 2023

FCC CERTIFICATION TEST REPORT

FOR

Applicant	:	Globe Electric Company Inc.
Address	:	150 Oneida, Montreal, Quebec, Canada, H9R 1A8
Equipment under Test	:	Smart Light Switch
Model No.	:	50367
Trade Mark	:	Globe
FCC ID	:	2AQUQGE50367
Manufacturer	:	Globe Electric Company Inc.
Address	:	150 Oneida, Montreal, Quebec, Canada, H9R 1A8

Issued By: Dongguan Dongdian Testing Service Co., Ltd.

Add.: No. 17, Zongbu Road 2, Songshan Lake Sci&Tech, Industry Park, Dongguan City, Guangdong Province, China, 523808

Tel.: +86-0769-38826678, **E-mail:** ddt@dgddt.com, http://www.dgddt.com

REPORT

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Test Report Declare

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Address	**:**	150 Oneida, Montreal, Quebec, Canada, H9R 1A8

Test Standard Used: FCC Rules and Regulations Part 15 Subpart C

Test procedure used: ANSI C63.10:2013

We Declare:

The equipment described above is tested by Dongguan Dongdian Testing Service Co., Ltd. and in the configuration tested the equipment complied with the standards specified above. The test results are contained in this test report and Dongguan Dongdian Testing Service Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these tests.

After test and evaluation, our opinion is that the equipment provided for test compliance with the requirement of the above FCC standards.

Report No:	DDT-RE23062503-2E02		
Date of Receipt:	Mar. 09, 2023	**Date of Test:**	Mar. 09, 2023 ~ Apr. 20, 2023

Prepared By:

Bobo Chen

Bobo Chen/Engineer

Approved By:

DONGGUAN DONGDIAN TESTING SERVICE CO., LTD. APPROVED

Damon Hu/EMC Manager

Note: This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Dongguan Dongdian Testing Service Co., Ltd.

Revision History

Rev.	Revisions	Issue Date	Revised By
---	Initial issue	Jun. 26, 2023	

1. Summary of Test Results

The EUT have been tested according to the applicable standards as referenced below.		
Description of Test Item	**Standard**	**Results**
6dB Bandwidth	FCC Part 15: 15.247(a)(2)	PASS
Conducted Output Power	FCC Part 15: 15.247(b)(3)	PASS
Power Spectral Density	FCC Part 15:15.247(e)	PASS
Band-edge and Spurious Emissions (Conducted)	FCC Part 15: 15.247(d)	PASS
Radiated Spurious Emissions	FCC Part 15: 15.205 FCC Part 15: 15.209 FCC Part 15: 15.247(d)	PASS
Radiated Band Edge Compliance	FCC Part 15: 15.205 FCC Part 15: 15.209 FCC Part 15: 15.247(d)	PASS
Power Line Conducted Emission	FCC Part 15: 15.207(a)	PASS
Antenna requirement	FCC Part 15: 15.203	PASS
Note: All of the data and records refer to DDT-RE23030729-2E02.		

2. General Test Information

2.1. Description of EUT

EUT Name	:	Smart Light Switch
Model Number	:	50367
EUT function description	:	Please reference user manual of this device
Power supply	:	AC 120V/60Hz
Radio Technology	:	IEEE 802.11b/g/n/ax
Operation frequency	:	IEEE 802.11b: 2412MHz-2462MHz IEEE 802.11g: 2412MHz-2462MHz IEEE 802.11n HT20: 2412MHz-2462MHz IEEE 802.11n HT40: 2422MHz-2452MHz IEEE 802.11ax HE20: 2412MHz-2462MHz
Modulation	:	IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK) IEEE 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n HT20, HT40: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11ax HE20: OFDM (64QAM, 16QAM, QPSK, BPSK)
Transmitter rate	:	IEEE 802.11b: up to 11 Mbps IEEE 802.11g: up to 54 Mbps IEEE 802.11n HT20: up to 72.2 Mbps IEEE 802.11n HT40: up to 150 Mbps IEEE 802.11ax HE20: up to 86 Mbps
Antenna Type	:	PCB antenna, maximum PK gain:1.26 dBi
Sample Number	:	S23030729-02 for conductive S23030729-03 for radiation

Note: EUT is the ab. of equipment under test.

Channel information					
CH	Frequency (MHz)	CH	Frequency (MHz)	CH	Frequency (MHz)
1	2412	5	2432	9	2452
2	2417	6	2437	10	2457
3	2422	7	2442	11	2462
4	2427	8	2447	/	/

Operating Mode	Resource Unit	26 Tone(2M)
IEEE 802.11ax(HE20)	Specific Resource Unit	0
		1
		2
		3
		4
		5
		6
		7
		8
		9

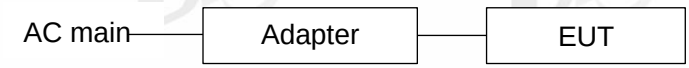
2.2. Accessories of EUT

Description of Accessories	Manufacturer	Model number	Description	Remark
N/A	N/A	N/A	N/A	N/A

2.3. Assistant equipment used for test

Assistant equipment	Manufacturer	Model number	EMC Compliance	SN
N/A	N/A	N/A	N/A	N/A

2.4. Block diagram of EUT configuration for test



Test software: RDTool.exe

The test software was used to control EUT work in Continuous Tx mode and select test channel, wireless mode as below table.

The pathloss of external cable: 0.5dB (According to the manufacturer's claims)

Tested mode, channel, and data rate information				
Mode	Setting Tx Power	data rate (Mbps) (see Note)	Channel	Frequency (MHz)
IEEE 802.11b	Default	1	LCH: CH1	2412
	Default	1	MCH: CH6	2437
	Default	1	HCH: CH11	2462
IEEE 802.11g	Default	6	LCH: CH1	2412
	Default	6	MCH: CH6	2437
	Default	6	HCH: CH11	2462
IEEE 802.11n HT20	Default	MCS 0	LCH: CH1	2412
	Default	MCS 0	MCH: CH6	2437
	Default	MCS 0	HCH: CH11	2462
IEEE 802.11n HT40	Default	MCS 0	LCH: CH3	2422
	Default	MCS 0	MCH: CH6	2437
	Default	MCS 0	HCH: CH9	2452
IEEE 802.11ax HE20	SU: Default RU: Default	MCS 0	LCH: CH1	2412
	SU: Default RU: Default	MCS 0	MCH: CH6	2437
	SU: Default RU: Default	MCS 0	HCH: CH11	2462
Note: According exploratory test, EUT will have maximum output power in those data rate, so those data rate were used for all test.				

2.5. Deviations of test standard

No Deviation

2.6. Test environment conditions

Temperature range:	+15℃ to +35 ℃
Humidity range:	20% to 75%
Pressure range:	86 kPa to106 kPa

2.7. Test laboratory

Dongguan Dongdian Testing Service Co., Ltd.

Add.: No. 17, Zongbu Road 2, Songshan Lake Sci&Tech, Industry Park, Dongguan City, Guangdong Province, China, 523808.

Tel.: +86-0769-38826678, http://www.dgddt.com, Email: ddt@dgddt.com.

CNAS Accreditation No. L6451; A2LA Accreditation Number: 3870.01

FCC Designation Number: CN1182, Test Firm Registration Number: 540522

Innovation, Science and Economic Development Canada Site Registration Number: 10288A

Conformity Assessment Body identifier: CN0048

VCCI facility registration number: C-20087, T-20088, R-20123, R-20155, G-20118

2.8. Measurement uncertainty

Test Item	Uncertainty
Bandwidth	1.1%
Peak Output Power (Conducted) (Spectrum analyzer)	0.86 dB (10 MHz ≤ f < 3.6 GHz);
	1.38 dB (3.6 GHz ≤ f < 8 GHz)
Peak Output Power (Conducted) (Power Sensor)	0.74 dB
Power Spectral Density	0.74 dB (10 MHz ≤ f < 3.6 GHz);
	1.38 dB (3.6 GHz ≤ f < 8 GHz)
Frequencies Stability	6.7×10^{-8} (Antenna couple method)
	5.5×10^{-8} (Conducted method)
Conducted spurious emissions	0.86 dB (10 MHz ≤ f < 3.6 GHz);
	1.40 dB (3.6 GHz ≤ f < 8 GHz)
	1.66 dB (8 GHz ≤ f < 22 GHz)
Uncertainty for radio frequency (RBW < 20 kHz)	3×10^{-8}
Temperature	0.4 ℃
Humidity	2 %
Uncertainty for Radiation Emission test (9 kHz – 30 MHz)	3.44 dB
Uncertainty for Radiation Emission test (30 MHz - 1 GHz)	4.70 dB (Antenna Polarize: V)
	4.84 dB (Antenna Polarize: H)
Uncertainty for Radiation Emission test (1 GHz - 40 GHz)	4.10 dB (1 - 6 GHz)
	4.40 dB (6 GHz - 18 GHz)
	3.54 dB (18 GHz - 26 GHz)
	4.30 dB (26 GHz - 40 GHz)
Uncertainty for Power line conduction emission test	3.34dB (150KHz-30MHz)
	3.72dB (9KHz-150KHz)
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.	

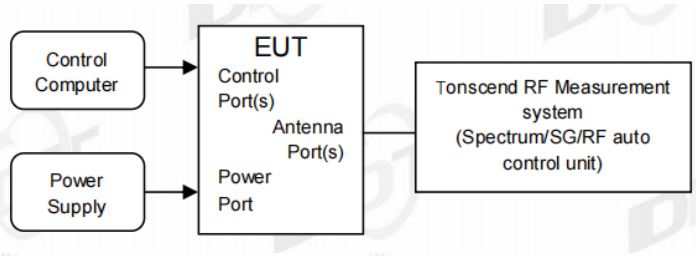
3. Equipment Used During Test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
☒RF Connected Test (Tonscend RF Measurement System 3#)					
Signal &Spectrum analyzer	R&S	FSV40	101407	Jul. 21, 2022	1 Year
Wideband Radio Communication tester	R&S	CMW500	117491	May 18, 2022	1 Year
Vector Signal Generator	Agilent	N5182A	MY19060405	May 18, 2022	1 Year
Vector Signal Generator	Agilent	N5182A	MY48180912	May 18, 2022	1 Year
RF Control Unit	Tonscend	JS0806-2	20C8060230	May 18, 2022	1 Year
Temp&Humi Programmable	ZHIXIANG	ZXGDJS-150L	ZX170110-A	May 26, 2022	1 Year
Test Software	JS Tonscend	JS1120-3	Ver.3.2.22	N/A	N/A
☒Radiation 3#chamber					
EMI Test Receiver	R&S	ESU26	100472	May 19, 2022	1 Year
Spectrum analyzer	Agilent	E4447A	MY50180031	May 17, 2022	1 Year
Active Loop antenna	Schwarzbeck	FMZB-1519	1519-038	Sep. 29, 2022	1 Year
Trilog Broadband Antenna	Schwarzbeck	VULB 9163	01429	Jul. 22, 2022	1 Year
Double Ridged Horn Antenna	Schwarzbeck	BBHA9120 D	02468	Sep. 29, 2022	1 Year
Broad Band Horn Antenna	Schwarzbeck	BBHA 9170	790	May 06, 2022	1 Year
Pre-amplifier	COM-POWER	PAM-118A	18040084	Aug. 17, 2022	1 Year
Pre-amplifier	COM-POWER	PAM-840A	461369	Apr. 11, 2022 Apr. 11, 2023	1 Year
RE Cable	N/A	W23.02 CP1-X2 + W23.09 AP1-X8+ JCT26S-NJ-NJ-1.5M+ JCT26S-NJ-NJ-1.5M	4.5M+8M+1.5M+ 1.5M	Aug. 17, 2022	1 Year
RF Cable	Yuhu Technology	JCTB810-NJ-NJ-9M	21123964	May 19, 2022	1 Year
RF Cable	Yuhu Technology	ZT26S-SMAJ-SMAJ-1M	21073466	Aug. 17, 2022	1 Year
Micro-Tronics filters	REBES	BRM50702	G555	N/A	N/A
Micro-Tronics filters	REBES	BRM50716	G392	N/A	N/A
High Pass filter	XB	XBLBQ-GTA67	210820-2-3	N/A	N/A
Test software	Tonscend	JS32-RE	V 5.0.0.1	N/A	N/A
Test software	Audix	E3	V 6.1.1.1	N/A	N/A
☒Power Line Conducted Emissions Test 1#					
Test Receiver	R&S	ESCI	100551	Aug. 26, 2022	1 Year
LISN 1	R&S	ENV216	101109	Aug. 26, 2022	1 Year
LISN 2	R&S	ESH2-Z5	100309	Aug. 26, 2022	1 Year

Pulse Limiter	R&S	ESH3-Z2	101242	Aug. 26, 2022	1 Year
CE Cable 1	HUBSER	N/A	W10.01	Aug. 26, 2022	1 Year
Test software	Audix	E3	V 6.11111b	N/A	N/A
Test Receiver	R&S	ESCI	100551	Aug. 26, 2022	1 Year

4. 6dB Bandwidth

4.1. Block diagram of test setup



4.2. Limits

For direct sequence systems, the minimum 6 dB bandwidth shall be at least 500 kHz

4.3. Test procedure

(1) The test according to ANSI C63.10-2013 clause 11.8.

(2) Connect EUT's antenna output to spectrum analyzer by RF cable, the path loss was compensated to the results

(3) Set the EUT as maximum power setting and enable the EUT transmit continuously

(4) Use the following spectrum analyzer settings for 6 dB Bandwidth:

RBW:	100 kHz
VBW:	≥ [3 × RBW]
Detector Mode:	peak
Sweep time:	auto
Trace mode	max hold

Allow the trace to stabilize, measure the 6 dB bandwidth of signal, and record the results in the report.

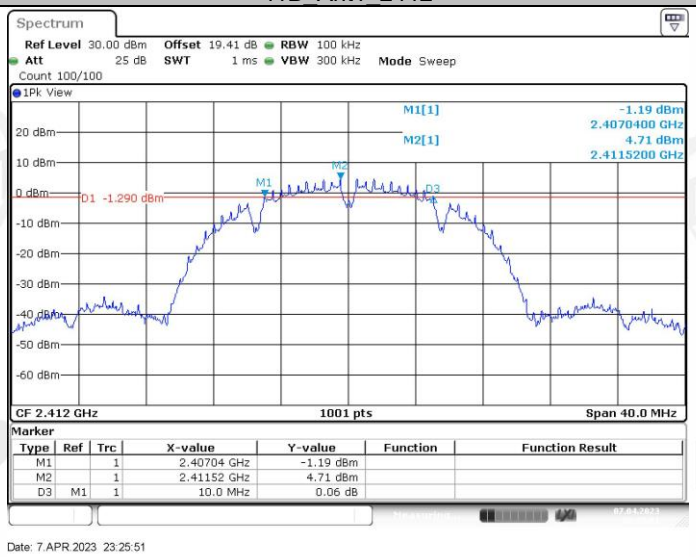
4.4. Test result

Test Mode	Antenna	Frequency [MHz]	DTS BW [MHz]	FL [MHz]	FH [MHz]	Limit [MHz]	Verdict
11B	Ant1	2412	10.00	2407.04	2417.04	0.5	PASS
		2437	10.00	2432.00	2442.00	0.5	PASS
		2462	10.04	2457.00	2467.04	0.5	PASS
11G	Ant1	2412	7.52	2408.24	2415.76	0.5	PASS
		2437	6.52	2434.24	2440.76	0.5	PASS
		2462	6.52	2459.24	2465.76	0.5	PASS
11N20SISO	Ant1	2412	7.52	2408.24	2415.76	0.5	PASS
		2437	4.72	2434.84	2439.56	0.5	PASS
		2462	5.76	2459.12	2464.88	0.5	PASS
11N40SISO	Ant1	2422	10.08	2416.96	2427.04	0.5	PASS
		2437	11.28	2430.76	2442.04	0.5	PASS
		2452	10.08	2446.96	2457.04	0.5	PASS
11AX20SISO	Ant1	2412	17.64	2403.64	2421.28	0.5	PASS
		2437	17.64	2428.64	2446.28	0.5	PASS
		2462	18.16	2453.08	2471.24	0.5	PASS

Test Mode	Antenna	Frequency [MHz]	Ru Size	Ru Index	DTS BW [MHz]	FL [MHz]	FH [MHz]	Limit [MHz]	Verdict
11AX20SISO	Ant1	2412	26Tone	RU0	13.28	2402.48	2415.76	0.5	PASS
				RU4	2.64	2410.68	2413.32	0.5	PASS
				RU8	14.48	2406.96	2421.44	0.5	PASS
		2437	26Tone	RU0	14.52	2427.48	2442.00	0.5	PASS
				RU4	3.84	2435.68	2439.52	0.5	PASS
				RU8	15.76	2430.72	2446.48	0.5	PASS
		2462	26Tone	RU0	14.48	2452.52	2467.00	0.5	PASS
				RU4	2.64	2460.68	2463.32	0.5	PASS
				RU8	15.76	2455.72	2471.48	0.5	PASS

4.5. Test graphs

11B_Ant1_2412



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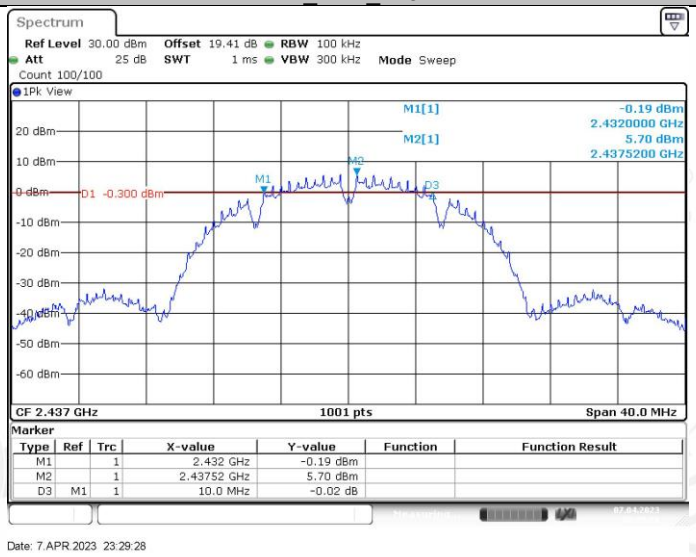

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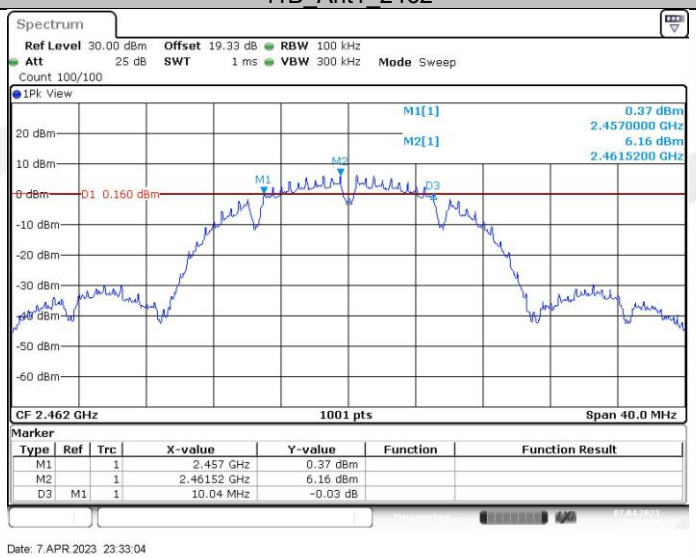

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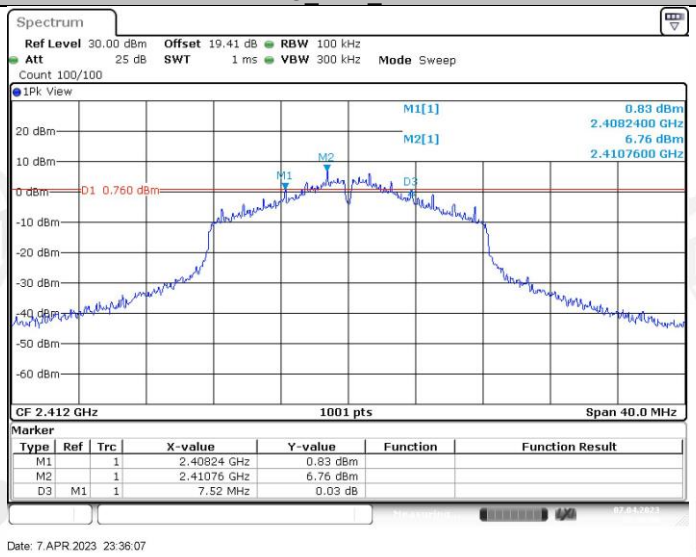

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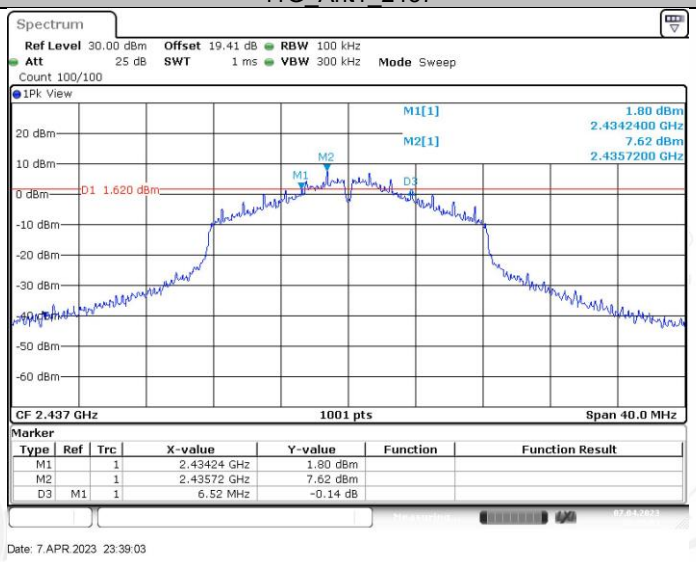

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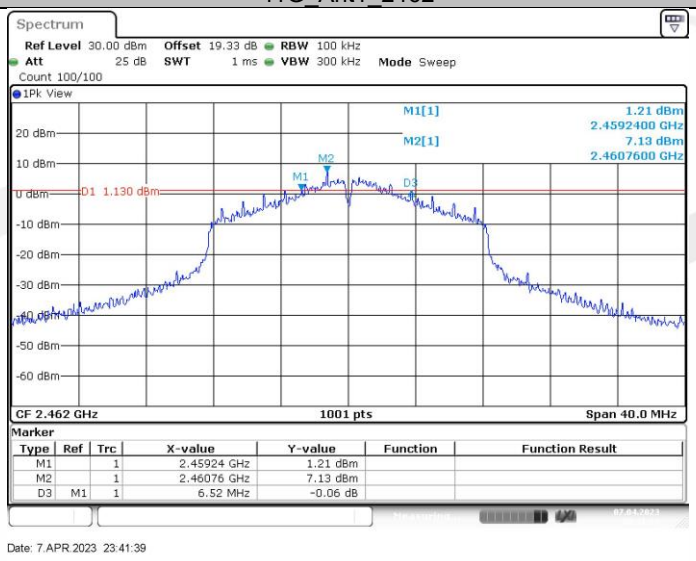

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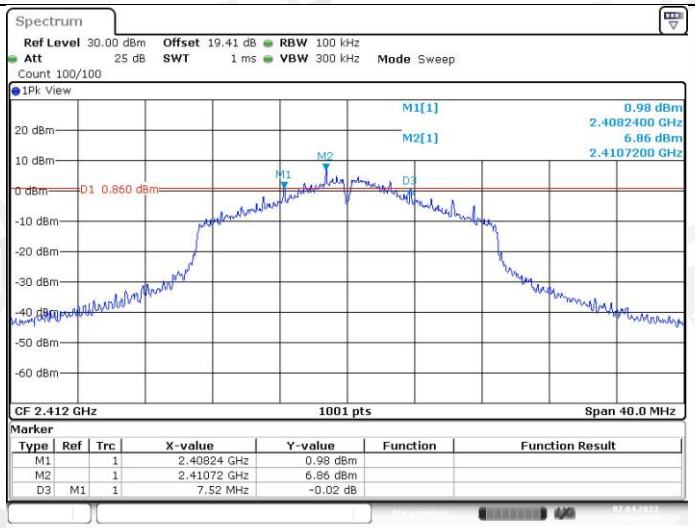

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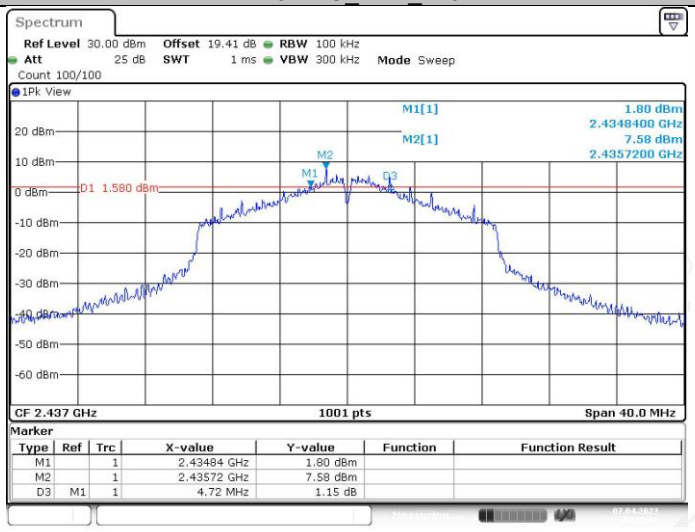

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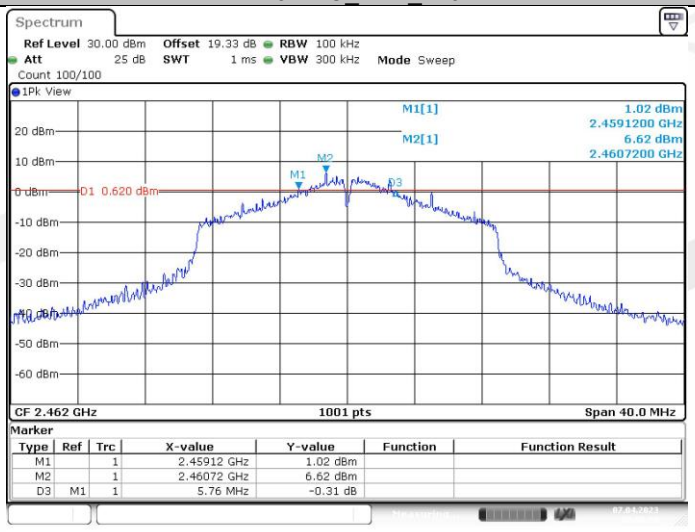

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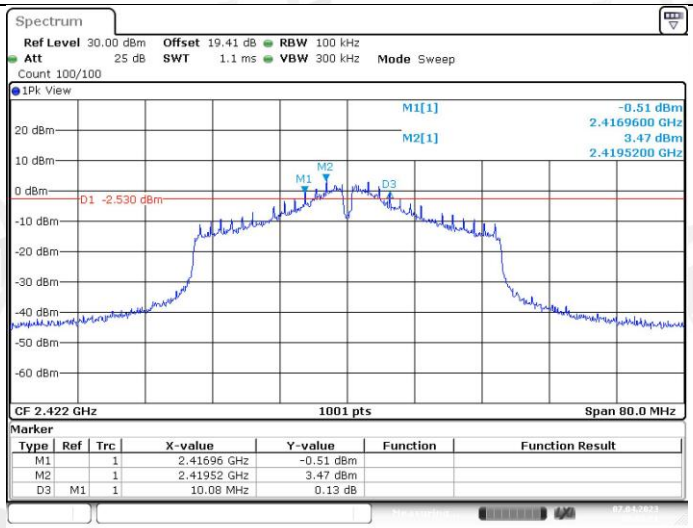

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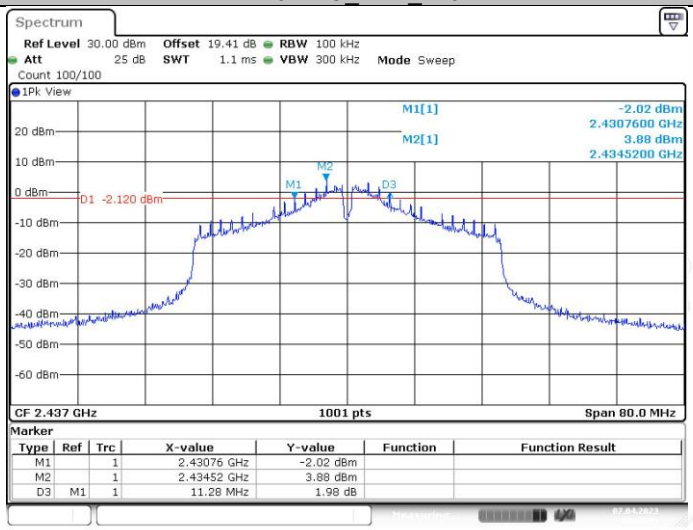

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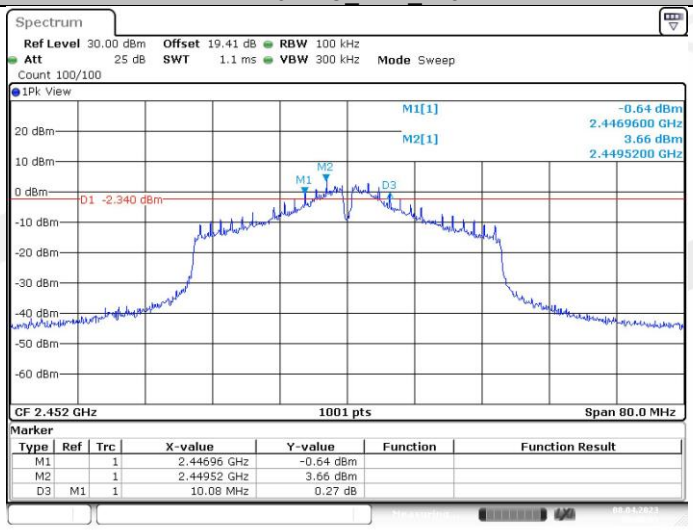

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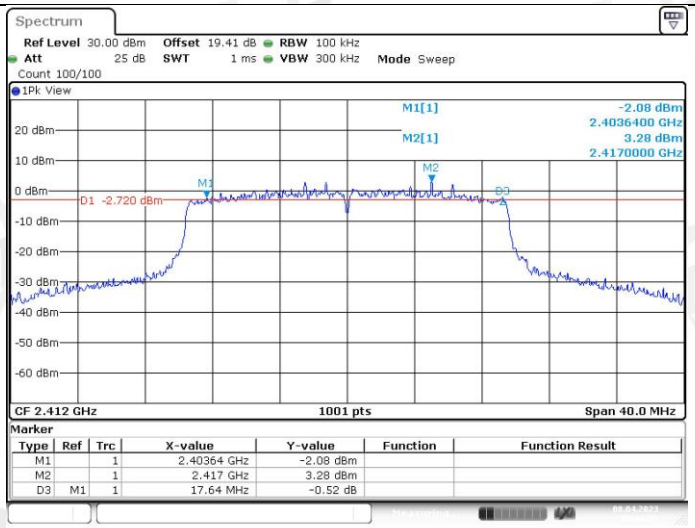

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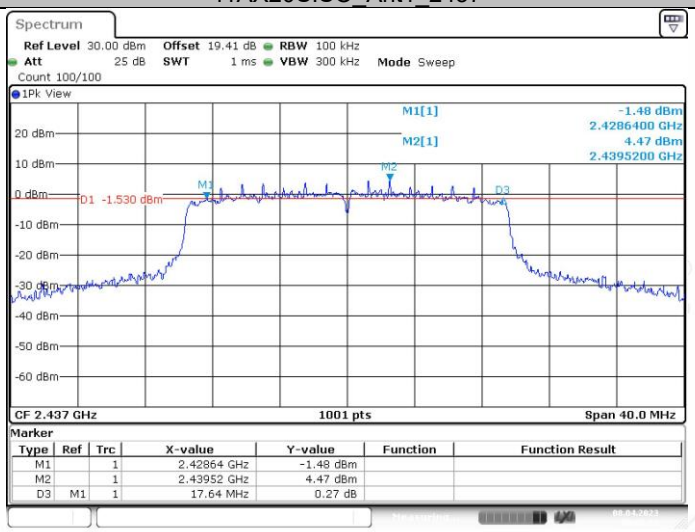

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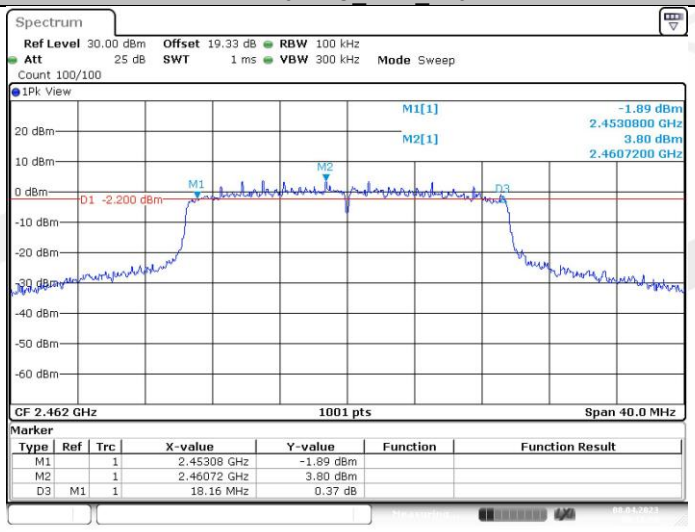

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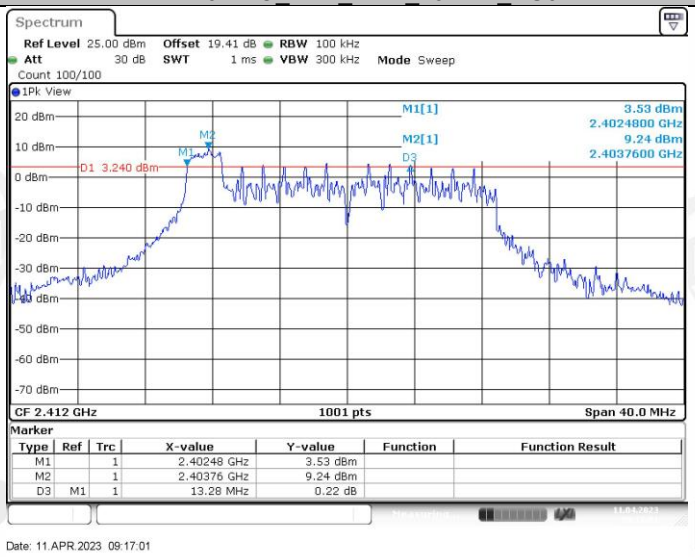

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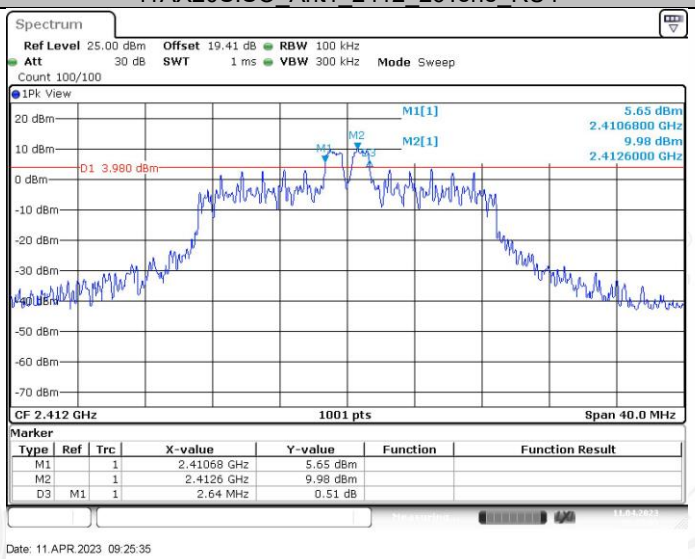

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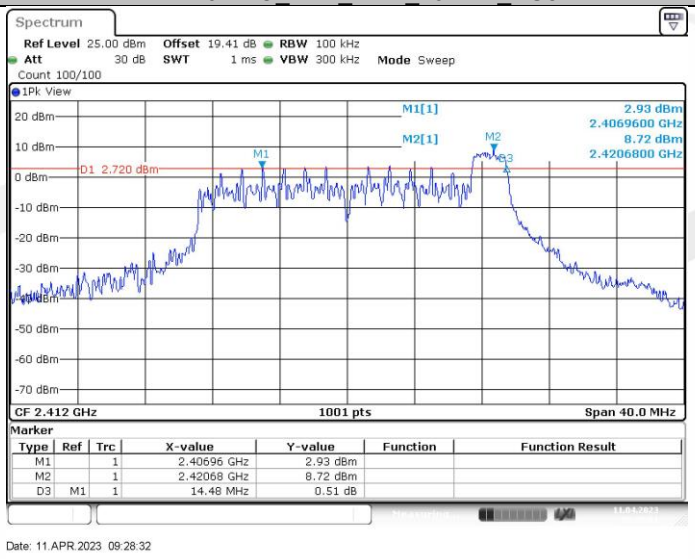

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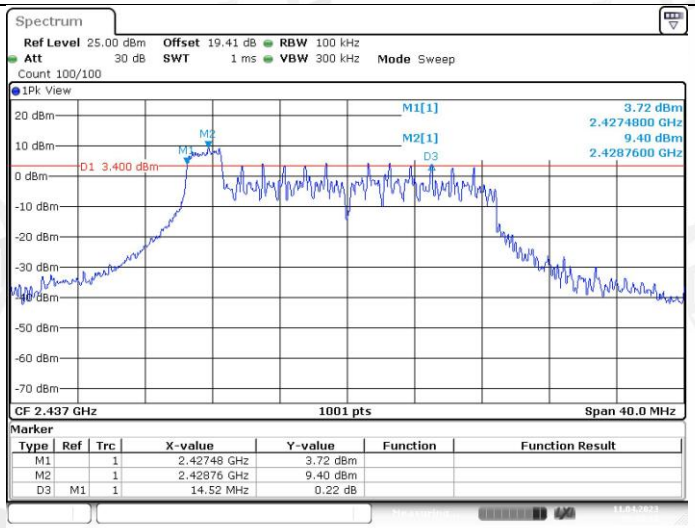

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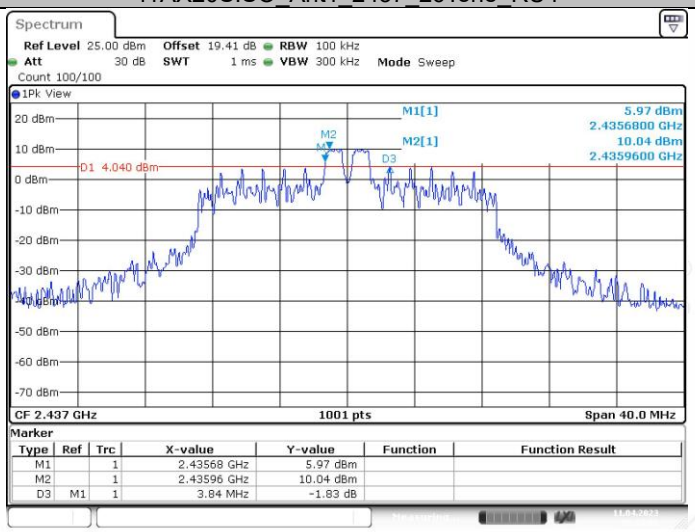

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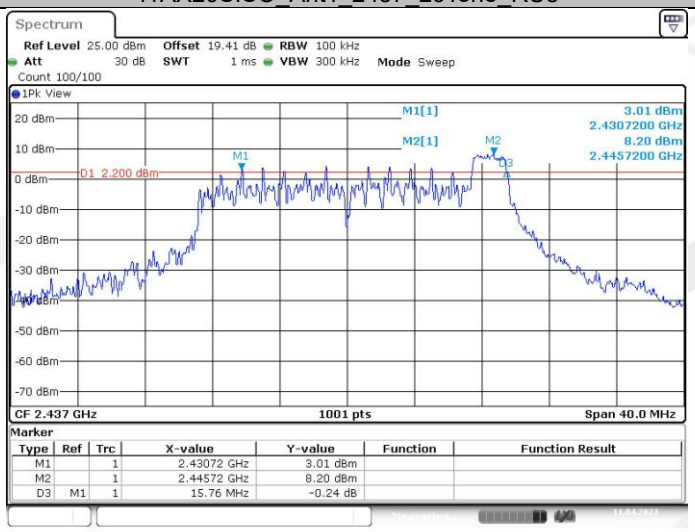

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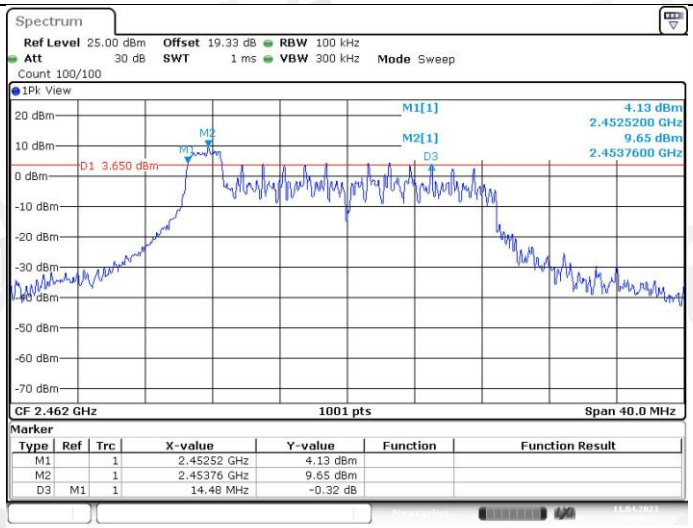

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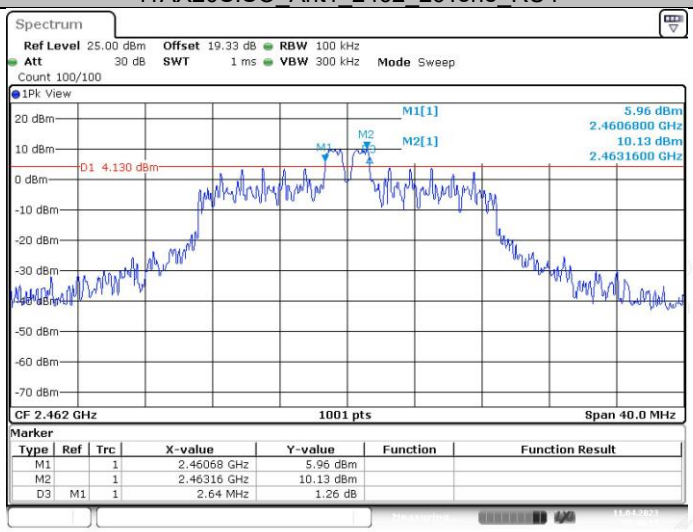
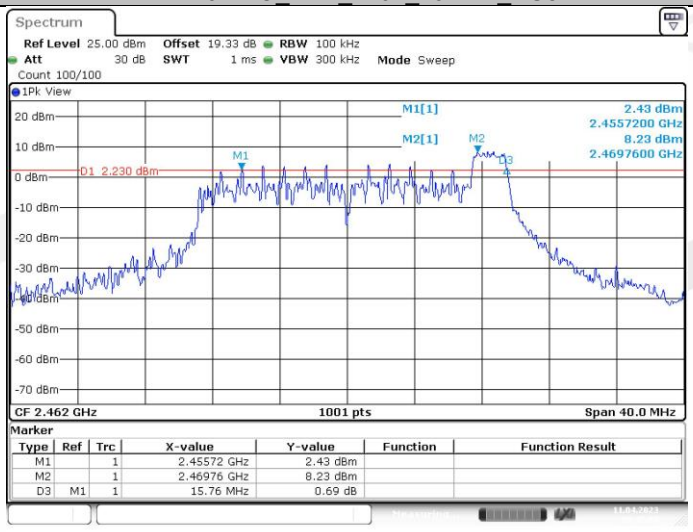
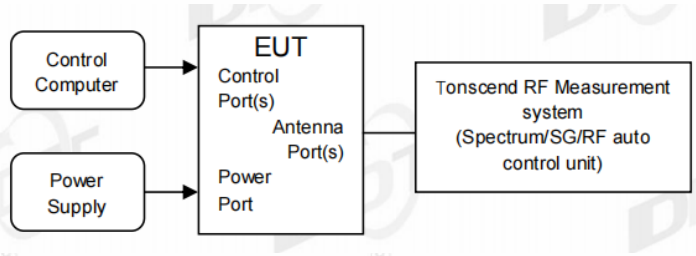


11AX20SISO_Ant1_2462_26Tone_RU8



5. Conducted Output Power

5.1. Block diagram of test setup



5.2. Limits

For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

5.3. Test procedure

(1) The test according to ANSI C63.10-2013 clause 11.9.2.3.

(2) Connect EUT's antenna output to RF power meter by RF cable, the path loss was compensated to the results.

(3) Set the EUT as maximum power setting and enable the EUT transmit continuously, If the transmitter does not transmit continuously, measure the duty cycle, D, of the transmitter output signal.

(4) Measure the average power of the transmitter. This measurement is an average over both the ON and OFF periods of the transmitter.

(5) Adjust the measurement in dBm by adding [10 log (1 / D)], where D is the duty cycle.

(6) Record the RF average power of each antenna port.

5.4. Test result average

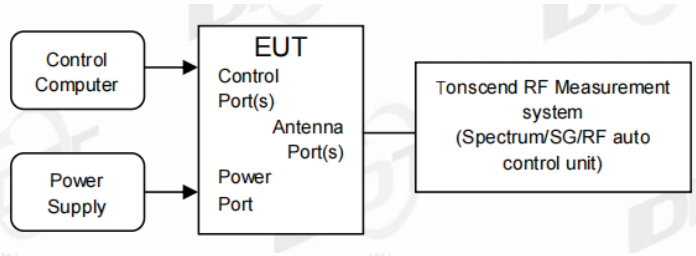
Test Mode	Antenna	Frequency [MHz]	Average power [dBm]	Duty Cycle [%]	DC Factor [dBm]	Result [dBm]	Limit [dBm]	EIRP [dBm]	EIRP Limit [dBm]	Verdict
11B	Ant1	2412	15.10	91.43	0.39	15.49	≤30	16.75	≤36	PASS
		2437	15.43	94.12	0.26	15.69	≤30	16.95	≤36	PASS
		2462	16.15	94.12	0.26	16.41	≤30	17.67	≤36	PASS
11G	Ant1	2412	15.18	97.84	0.09	15.27	≤30	16.53	≤36	PASS
		2437	15.68	97.84	0.09	15.77	≤30	17.03	≤36	PASS
		2462	15.50	97.84	0.09	15.59	≤30	16.85	≤36	PASS
11N20SISO	Ant1	2412	15.05	99.61	0.02	15.07	≤30	16.33	≤36	PASS
		2437	15.46	99.61	0.02	15.48	≤30	16.74	≤36	PASS
		2462	15.25	99.61	0.02	15.27	≤30	16.53	≤36	PASS
11N40SISO	Ant1	2422	13.86	99.20	0.03	13.89	≤30	15.15	≤36	PASS
		2437	14.02	99.20	0.03	14.05	≤30	15.31	≤36	PASS
		2452	13.79	98.80	0.05	13.84	≤30	15.10	≤36	PASS
11AX20SISO	Ant1	2412	14.90	99.49	0.02	14.92	≤30	16.18	≤36	PASS
		2437	15.32	99.23	0.03	15.35	≤30	16.61	≤36	PASS
		2462	15.67	99.23	0.03	15.70	≤30	16.96	≤36	PASS

Test Mode	Antenna	Frequency [MHz]	Ru Size	Ru Index	Peak Power [dBm]	Conducted Limit [dBm]	EIRP [dBm]	EIRP Limit [dBm]	Verdict
11AX20SISO	Ant1	2412	26Tone	RU0	13.74	≤30	15.00	≤36	PASS
				RU4	15.97	≤30	17.23	≤36	PASS
				RU8	13.74	≤30	15.00	≤36	PASS
		2437	26Tone	RU0	14.26	≤30	15.52	≤36	PASS
				RU4	16.18	≤30	17.44	≤36	PASS
				RU8	13.98	≤30	15.24	≤36	PASS
		2462	26Tone	RU0	14.32	≤30	15.58	≤36	PASS
				RU4	16.25	≤30	17.51	≤36	PASS
				RU8	14.10	≤30	15.36	≤36	PASS

Note: EIRP (dBm)=Conducted Output Power (dBm)+ Antenna Gain (dBi)

6. Power Spectral Density

6.1. Block diagram of test setup



6.2. Limits

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.

6.3. Test procedure

(1) The test according to ANSI C63.10-2013 clause 11.10.5.

(2) Connect EUT's antenna output to spectrum analyzer by RF cable, the path loss was compensated to the results.

(3) Set the EUT as maximum power setting and enable the EUT transmit continuously.

(4) Use the following spectrum analyzer settings for Power Spectral Density measurement:

Center frequency	DTS Channel center frequency
RBW:	3 kHz ≤ RBW ≤ 100 kHz
VBW:	≥ 3RBW
Span	1.5 times the DTS bandwidth
Detector Mode:	RMS
Sweep time:	auto
Trace mode	max hold
Trace	Employ trace averaging (rms) mode over a minimum of 100 traces.

(5) Add [10 log (1 / D)], where D is the duty cycle measured in step a), to the measured PSD to compute the average PSD during the actual transmission time.

If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

6.4. Test result

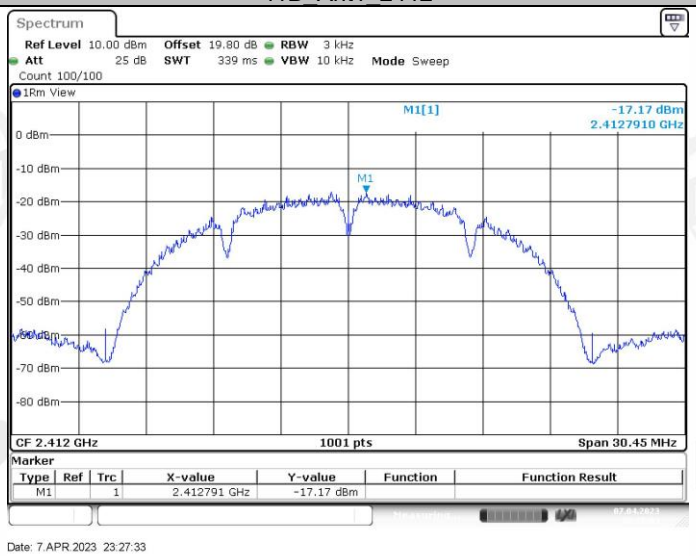
Test Mode	Antenna	Frequency [MHz]	Result[dBm/3-100kHz]	Limit[dBm/3kHz]	Verdict
11B	Ant1	2412	-17.17	≤8.00	PASS
		2437	-16.30	≤8.00	PASS
		2462	-15.28	≤8.00	PASS
11G	Ant1	2412	-15.67	≤8.00	PASS
		2437	-14.83	≤8.00	PASS
		2462	-15.23	≤8.00	PASS
11N20SISO	Ant1	2412	-15.62	≤8.00	PASS
		2437	-15.00	≤8.00	PASS
		2462	-15.46	≤8.00	PASS
11N40SISO	Ant1	2422	-18.62	≤8.00	PASS
		2437	-18.30	≤8.00	PASS
		2452	-18.47	≤8.00	PASS
11AX20SISO	Ant1	2412	-21.99	≤8.00	PASS
		2437	-21.36	≤8.00	PASS
		2462	-20.92	≤8.00	PASS

Test Mode	Antenna	Frequency [MHz]	Ru Size	Ru Index	Result [dBm/3kHz]	Limit [dBm/3kHz]	Verdict
11AX20SISO	Ant1	2412	26Tone	RU0	-13.42	≤8.00	PASS
				RU4	-11.73	≤8.00	PASS
				RU8	-13.46	≤8.00	PASS
		2437	26Tone	RU0	-12.87	≤8.00	PASS
				RU4	-11.36	≤8.00	PASS
				RU8	-13.29	≤8.00	PASS
		2462	26Tone	RU0	-12.71	≤8.00	PASS
				RU4	-11.47	≤8.00	PASS
				RU8	-13.38	≤8.00	PASS

Note：The Duty Cycle Factor is compensated in the graph.

6.5. Test graphs

11B_Ant1_2412



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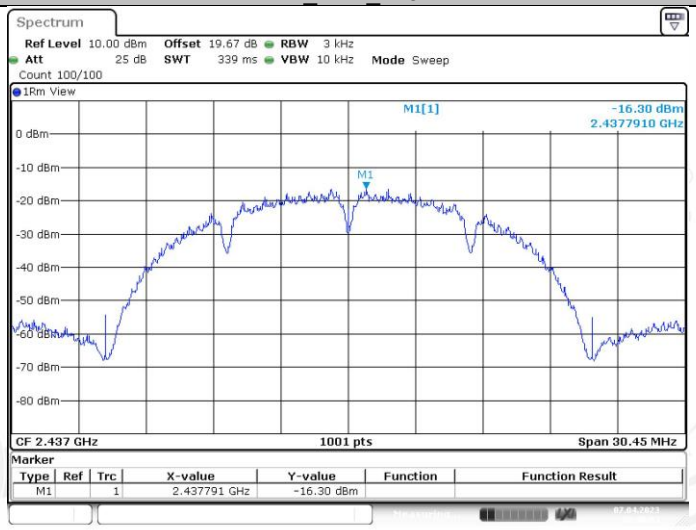
11B_Ant1_2437



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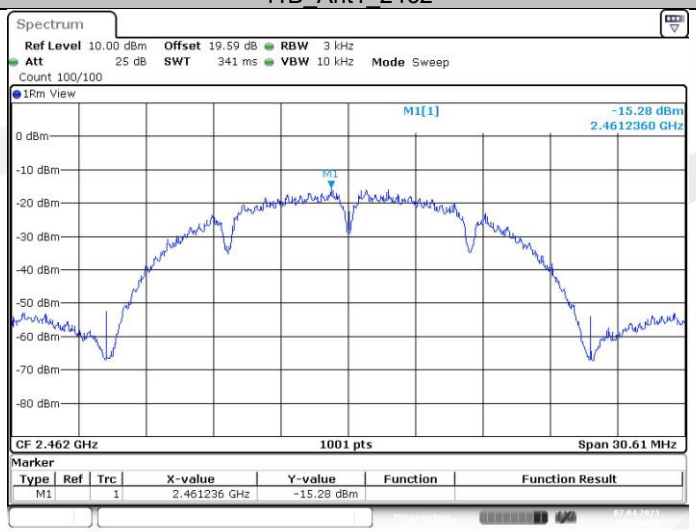
11B_Ant1_2462



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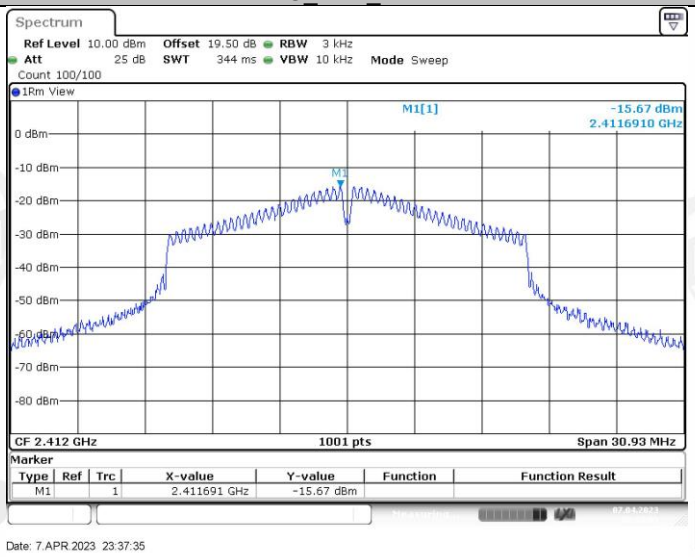
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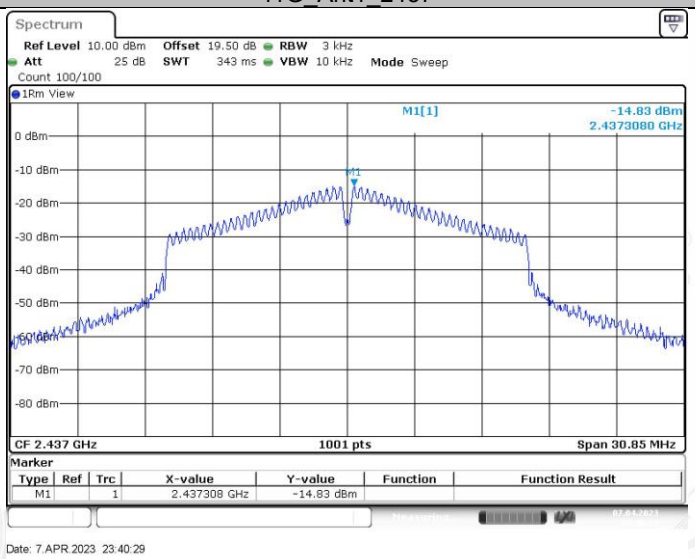
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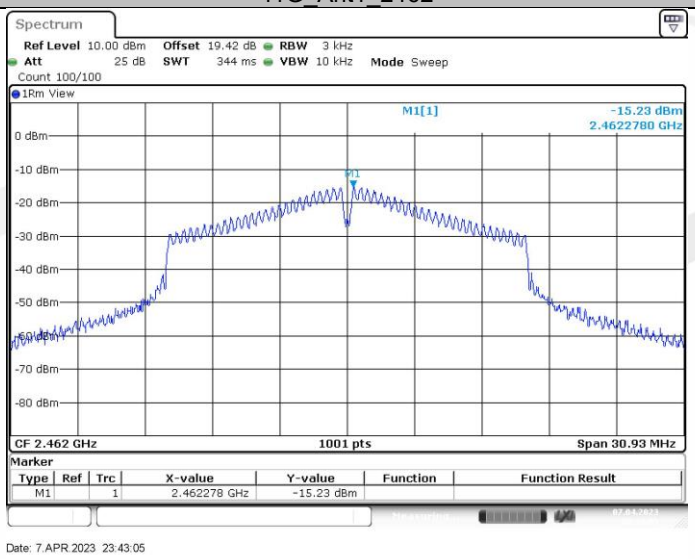
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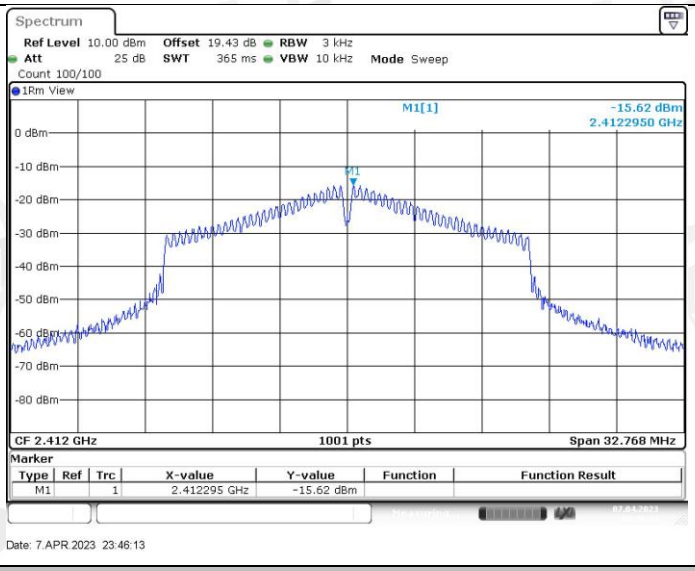

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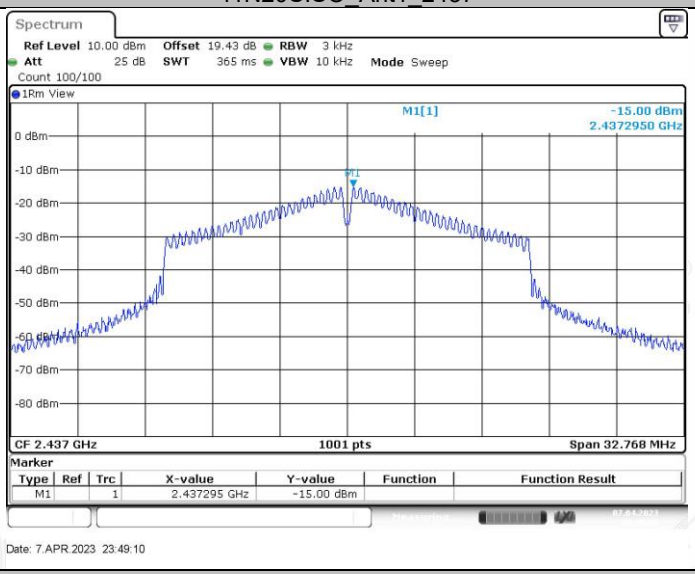

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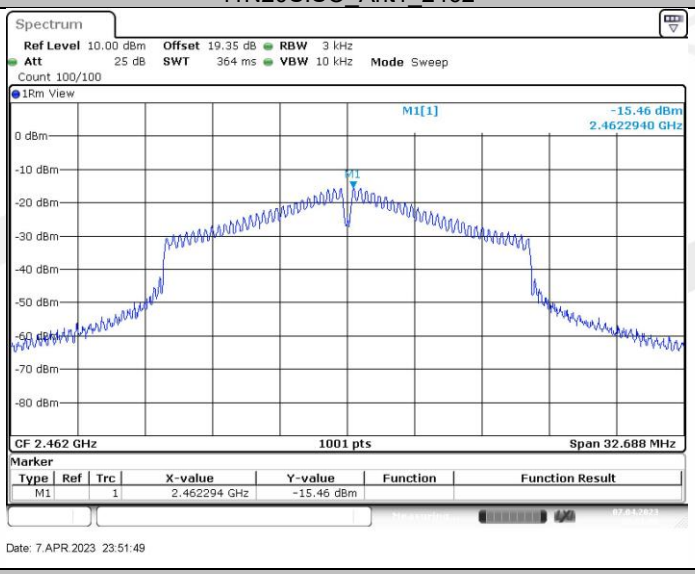

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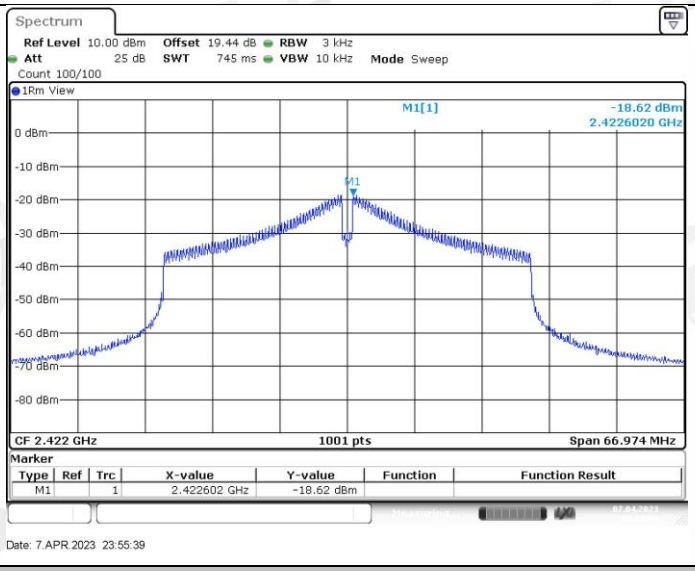

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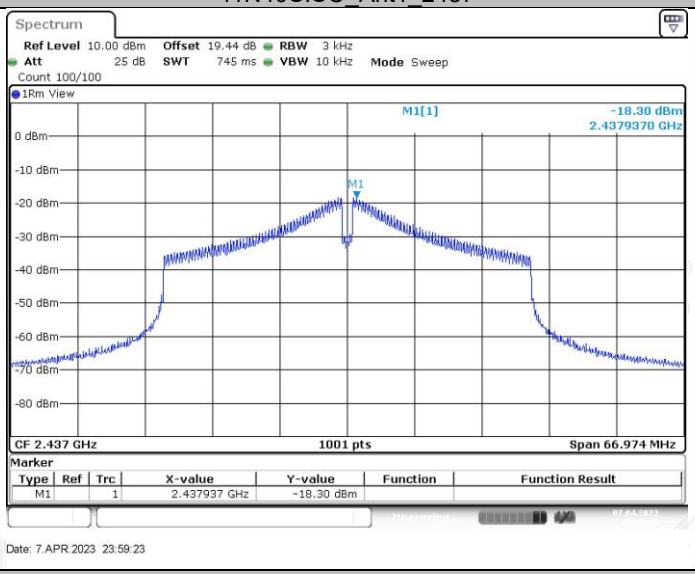

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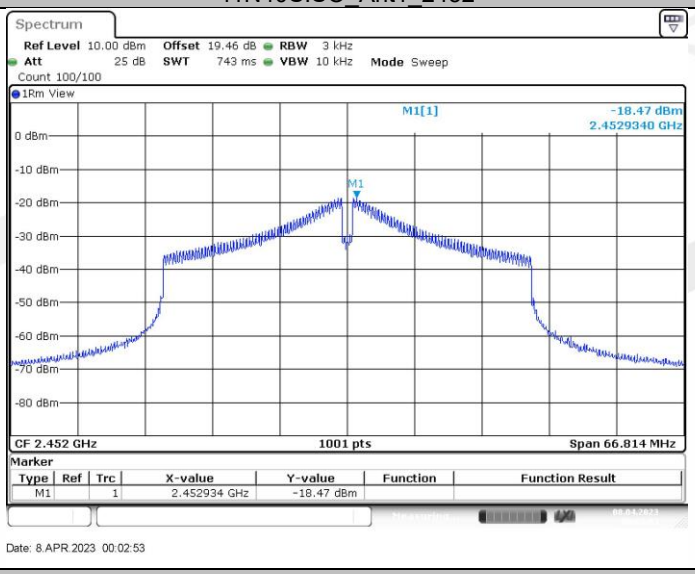

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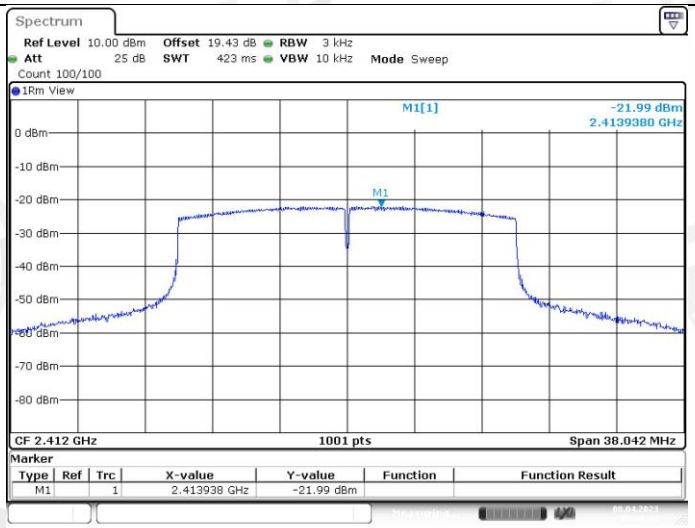

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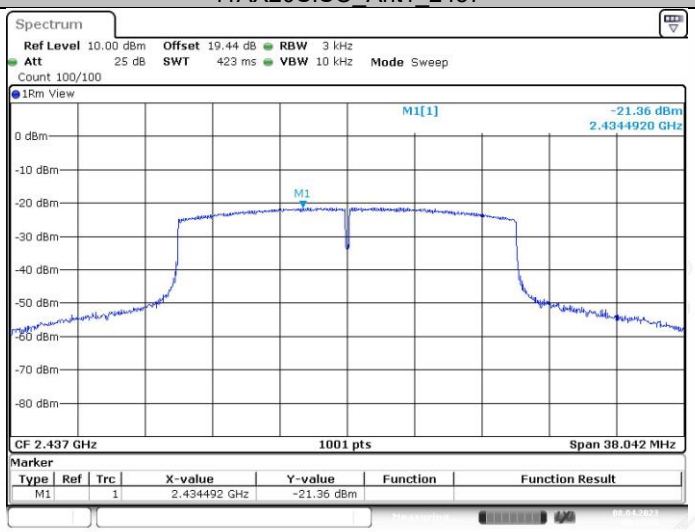

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