TEST REPORT

Applicant& Manufacturer:	NiceRF Wireless Technology Co., Ltd.
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Report Number :	RA240320-14269E-RF-22A

Test Standard (s)

ETSI EN 300 440 V2.2.1 (2018-07)

Sample Description

Product Type:	Wireless Module
Model No.:	RF2401F20
Trade Mark:	G-NiceRF®
Date Received:	2024-03-20
Date of Test:	2024-04-09 to 2024-04-30
Report Date:	2024-04-30

Test Result:	The EUT complied with the standards above.

Prepared and Checked By:

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EMC Engineer

Approved By:

Bob. Liao
EMC Engineer

ACCURATE TECHNOLOGY CO. LTD
ATC
APPROVED

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
Rev.00	RA240320-14269E-RF-22A	Original Report	2024-04-30

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Product	Wireless Module
Tested Model	RF2401F20
Radio Type	SRD
Frequency Range	2402-2480MHz
Maximum EIRP	7.78 dBm
Modulation Technique	GFSK
Data Rate	250Kbps, 1Mbps, 2Mbps
Antenna Specification#	3 dBi (It is provided by the manufacturer.)
Voltage Range#	DC 3.3V
Sample Serial Number	2IX4-1 for RF Radiated Test& RF Conducted Test (Assigned by ATC, Shenzhen)
Sample/EUT Status	Good condition
Normal/Extreme Condition#	L.T.: Low Temperature: -20 ℃ N.T.: Normal Temperature: +25 ℃ H.T.: High Temperature: +55 ℃ L.V.: Low Voltage: 1.9 V_{DC} N.V.: Normal Voltage: 3.3 V_{DC} H.V.: High Voltage: 3.6 V_{DC} (Note: the extreme test condition was declared by manufacturer.)

Objective

This report is in accordance with ETSI EN 300 440 V2.2.1 (2018-07), Short Range Devices (SRD); Radio equipment to be used in the 1 GHz to 40 GHz frequency range; Harmonised Standard for access to radio spectrum.

The object is to determine compliance with ETSI EN 300 440 V2.2.1 (2018-07).

Related Submittal(s)/Grant(s)

No Related Submittals.

Test Methodology

All measurements contained in this report were conducted with ETSI EN 300 440 V2.2.1 (2018-07).

Test Facility

The test site used by Shenzhen Accurate Technology Co., Ltd. to collect test data is located on the Floor 1, KuMaKe Building, Dongzhou Community, Guangming Street, Guangming District, Shenzhen, Guangdong, China.

Measurement Uncertainty

Parameter		Uncertainty
Occupied Channel Bandwidth		5%
RF Frequency		$0.064*10^{-7}$
RF output power, conducted		0.3 dB
Unwanted Emission, conducted		1.2 dB
Emissions Spurious Radiated	30MHz - 1GHz	4.3 dB
	1GHz - 18GHz	4.9 dB
	18GHz - 26.5GHz	5.2 dB
	26.5GHz - 40GHz	4.6 dB
Temperature		1℃
Humidity		7%
Supply voltages		0.4%

Note: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in an engineering mode, which was provided by manufacturer.

79 channels are provided for testing:

Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
0	2402	20	2422	40	2442	60	2462
1	2403	21	2423	41	2443	61	2463
2	2404	22	2424	42	2444	62	2464
...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...
17	2419	37	2439	57	2459	77	2479
18	2420	38	2440	58	2460	78	2480
19	2421	39	2441	59	2461	/	/

Channel 0, Channel 38 and Channel 78 were selected for testing.

EUT Exercise Software#

No software was used during testing and the power level was 0#, which were provided by the manufacturer.

Special Accessories

No special accessory.

Equipment Modifications

No modifications were made to the unit tested.

Support Equipment List and Details

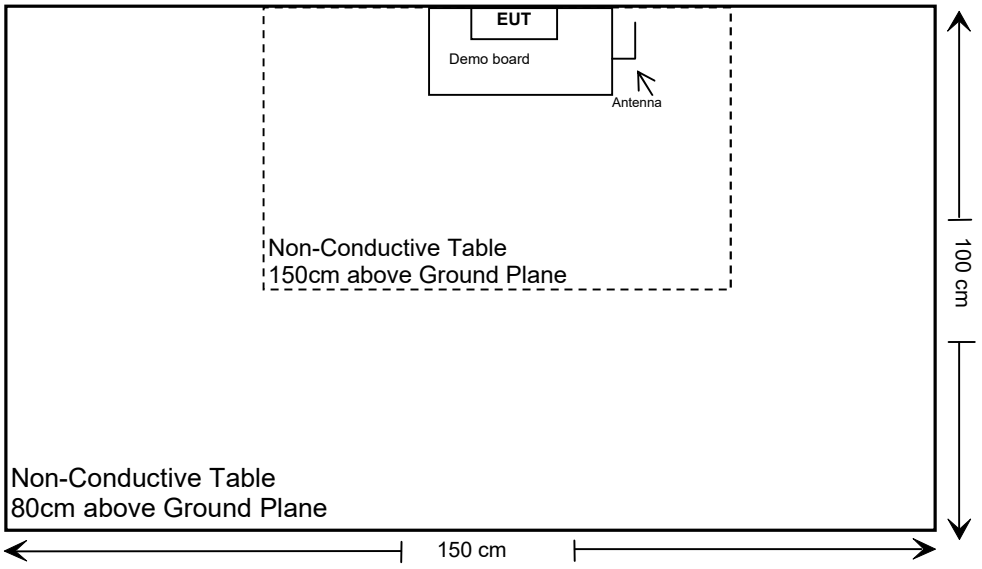
Manufacturer	Description	Model	Serial Number
Unknown	DEMO Board#	Unknown	Unknown
Unknown	External Antenna#	Unknown	Unknown

Note: The DEMO Board and external antenna were provided by the applicant for testing.

External I/O Cable

Cable Description	Length (m)	From Port	To
/	/	/	/

Block Diagram of Test Setup



Note: The support table edge was flush with the center of turntable.

SUMMARY OF TEST RESULTS

ETSI EN 300 440 V2.2.1 (2018-07)	Description of test	Result
§ 4.2.2	Equivalent isotropically radiated power	Compliance
§ 4.2.3	Permitted range of operating frequencies	Compliance
§ 4.2.4	Unwanted emissions in the spurious domain	Compliance
§ 4.2.5.4	Duty Cycle	Compliance*
§ 4.2.6	Additional requirements for FHSS equipment	Not Applicable
§ 4.3.3	Adjacent channel selectivity	Not Applicable*
§ 4.3.4	Blocking or desensitization	Compliance
§ 4.3.5	Spurious radiation	Compliance
§ 4.4	Spectrum access techniques	Not Applicable**
§ 4.6.4	GBSAR antenna pattern	Not Applicable***
Annex F	Limits for GBSAR	Not Applicable***

Note1: Not Applicable: The EUT is not a FHSS equipment.

Note2: Not Applicable*: The receiver category is 3, which was declared by manufacturer.

Note3: Compliance*: There is no restriction for 2400-2483.5MHz.

Note4: Not Applicable**: The EUT is not used for media access.

Note5: Not Applicable***: The EUT is not used in the GBSAR system.

Note6: The cable loss is 0.5 dB, which was added into the all RF conducted test results.

Note7: The antenna gain is 3 dBi$^{\#}$, which was added into the result of EIRP.

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Spurious Emission Test(Below 1GHz)					
Rohde & Schwarz	Test Receiver	ESR	102725	2023/11/17	2024/11/16
SONOMA INSTRUMENT	Amplifier	310 N	186131	2023/06/02	2024/06/01
Schwarzbeck	Bilog Antenna	VULB9163	9163-194	2023/02/14	2026/02/13
Schwarzbeck	Bilog Antenna	VULB9163	9163-323	2021/07/06	2024/07/05
Unknown	RF Coaxial Cable	No.12	N040	2023/11/17	2024/11/16
Unknown	RF Coaxial Cable	No.13	N300	2023/11/17	2024/11/16
Unknown	RF Coaxial Cable	No.14	N800	2023/11/17	2024/11/16
Unknown	RF Coaxial Cable	No.16	N200	2023/11/17	2024/11/16
Agilent	Signal Generator	N5183A	MY51040755	2023/11/17	2024/11/16
Radiated Emission Test Software: e3 191218 (V9)					
Radiated Spurious Emission Test(Above 1GHz)					
Rohde & Schwarz	Spectrum Analyzer	FSV40	101949	2023/11/17	2024/11/16
A.H. Systems, inc.	Preamplifier	PAM-0118P	135	2023/06/02	2024/06/01
Wainwright	High Pass Filter	WHKX3.6/18 G-10SS	5	2023/11/17	2024/11/16
Wainwright	Band Reject Filter	WRCG2400/2 485-2375/251 0-60/11SS	10	2023/11/17	2024/11/16
Schwarzbeck	Horn Antenna	BBHA9120D	9120D-655	2023/11/27	2026/11/26
Schwarzbeck	Horn Antenna	BBHA9120D	837	2023/02/22	2026/02/21
Unknown	RF Coaxial Cable	No.10	N050	2023/11/17	2024/11/16
Unknown	RF Coaxial Cable	No.11	N1000	2023/11/17	2024/11/16
Unknown	RF Coaxial Cable	No.16	N200	2023/11/17	2024/11/16
Agilent	Signal Generator	N5183A	MY51040755	2023/11/17	2024/11/16
Radiated Emission Test Software: e3 191218 (V9)					
RF Conducted Test					
AGILENT	Vector Signal Generator	N5182A	MY50143401	2023/11/17	2024/11/16
Anritsu	Microwave Peak Power Sensor	MA24418A	12619	2023/05/09	2024/05/08
Rohde & Schwarz	Spectrum Analyzer	FSV-40	101948	2023/11/17	2024/11/16
WEINSCHEL	10dB Attenuator	5324	AU 3842	2023/11/17	2024/11/16
Mini-Circuits	Power Splitter	DC-18000MH z	SF10944151S	2023/11/17	2024/11/16
UNI-T	DC Power Supply	UTP1306S	2109D0903324	2023/05/16	2024/05/15
BACL	Temp. & Humid. Chamber	BTH-150-40	30192	2024/01/12	2025/01/11
Unknown	RF Coaxial Cable	No.33	RF-03	Each time	

*** Statement of Traceability:** Shenzhen Accurate Technology Co., Ltd. attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

§4.2.2-EQUIVALENT ISOTROPICALLY RADIATED POWER (E.I.R.P.)

Applicable Standard

According to ETSI EN 300 440 section 5, the effective radiated power applies to equipment with an integral antenna and to equipment supplied with a dedicated antenna.

If the equipment is designed to operate with different carrier powers, the rated power for each level of range of levels shall be declared by the manufacturer.

Limit

The transmitter maximum e.i.r.p. under normal and extreme test conditions shall not exceed the values given in table 2.

Table 2: Maximum radiated power (e.i.r.p.)

Entry	Frequency Bands	Power	Application	Notes
1	2 400 MHz to 2 483,5 MHz	10 mW e.i.r.p.	Non-specific short range devices	
2	2 400 MHz to 2 483,5 MHz	25 mW e.i.r.p.	Radiodetermination devices	
3	(a) 2 446 MHz to 2 454 MHz	500 mW e.i.r.p.	Radio Frequency Identification (RFID) devices	See also table 4 and Annex G
4	(b) 2 446 MHz to 2 454 MHz	4 W e.i.r.p.	Radio Frequency Identification (RFID) devices	See also table 4 and Annex G
5	5 725 MHz to 5 875 MHz	25 mW e.i.r.p.	Non-specific short range devices	
6	9 200 MHz to 9 500 MHz	25 mW e.i.r.p.	Radiodetermination devices	
7	9 500 MHz to 9 975 MHz	25 mW e.i.r.p.	Radiodetermination devices	
8	10,5 GHz to 10,6 GHz	500 mW e.i.r.p.	Radiodetermination devices	
9	13,4 GHz to 14,0 GHz	25 mW e.i.r.p.	Radiodetermination devices	
10	17,1 GHz to 17,3 GHz	400 mW e.i.r.p.	Radiodetermination devices	See Annex H
11	24,00 GHz to 24,25 GHz	100 mW e.i.r.p.	Non-specific short range devices and radiodetermination devices	
NOTE: The spectrum ranges in some entries are not harmonised throughout all EU territory, specifically entries 4, 9, and 11 have been identified as such. Implementers are cautioned to refer to CEPT/ERC Recommendation 70-03 [i.2] as well as current National Radio plans to verify acceptance within intended regions of use.				

Test Procedure

According to ETSI EN 300 440 §4.2.2.3.

Test Data

Environmental Conditions

Temperature:	23-24 ℃
Relative Humidity:	51-53 %
ATM Pressure:	100.4 kPa

The testing was performed by Benny Li from 2024-04-09 to 2024-04-10.

EUT operation mode: Transmitting

Test Result: Compliance, please refer to Appendix A.

§4.2.3-PERMITTED RANGE OF OPERATING FREQUENCIES

Applicable Standard

According to ETSI EN 300 440 §4.2.3.The permitted range of operating frequencies includes all frequencies on which the equipment may operate within an assigned frequency band. The operating frequency range shall be declared by the manufacturer.

The frequency range of the equipment is determined by the lowest and highest frequencies occupied by the power envelope in accordance with clause 4.2.2.4, table 2.

FH is the highest frequency of the power envelope, it is the frequency furthest above the frequency of maximum power where the output power envelope drops below the level of -75 dBm/Hz spectral power density (e.g. -30 dBm if measured in a 30 kHz reference bandwidth) e.i.r.p.

FL is the lowest frequency of the power envelope; it is the frequency furthest below the frequency of maximum power where the output power drops below the level of -75 dBm/Hz spectral power density (e.g. -30 dBm if measured in a 30 kHz reference bandwidth) e.i.r.p.

Where differing modes of emission are available, all modes and their associated bandwidths shall be stated.

Limit

The width of the power spectrum envelope is f_H -f_L for a given operating frequency. In equipment that allows adjustment or selection of different operating frequencies, the power envelope takes up different positions in the allowed band. The frequency range is determined by the lowest value of f_L and the highest value of f_H resulting from the adjustment of the equipment to the lowest and highest operating frequencies.

The occupied bandwidth (i.e. the bandwidth in which 99 % of the wanted emission is contained) of the transmitter shall fall within the assigned frequency band.

For all equipment the frequency range shall lie within the frequency band given by clause 4.2.2.4, table 2. For non-harmonized frequency bands the available frequency range may differ between national administrations.

Test Procedure

According to ETSI EN 300 440 §4.2.3.3.

These measurements shall be performed under both normal and extreme operating conditions except for the occupied bandwidth assessment for which measurement at normal operating conditions is sufficient.

The measurement procedure shall be as follows:

a) put the spectrum analyser in video averaging mode with a minimum of H.T. sweeps selected;

b) select the lowest operating frequency of the equipment under test and activate the transmitter with modulation applied. The RF emission of the equipment shall be displayed on the spectrum analyser;

c) using the marker of the spectrum analyser, find the lowest frequency below the operating frequency at which the spectral power density drops below the level given in clause 7.2. This frequency shall be recorded in the test report;

d) select the highest operating frequency of the equipment under test and find the highest frequency at which the spectral power density drops below the value given in clause 7.2. This frequency shall be recorded in the test report;

e) the difference between the frequencies measured in steps c) and d) is the operating frequency range. It shall be recorded in the test report.

This measurement shall be repeated for each frequency range declared by the manufacturer.

Test Data

Environmental Conditions

Temperature:	23-24 ℃
Relative Humidity:	51-53 %
ATM Pressure:	100.4 kPa

The testing was performed by Benny Li from 2024-04-09 to 2024-04-10.

EUT operation mode: Transmitting

Test Result: Compliance, please refer to Appendix B.

§4.2.4-UNWANTED EMISSION IN THE SPURIOUS EMISSIONS DOMAIN

Applicable Standard

According to ETSI EN 300 440 §4.2.4. The unwanted emissions in the spurious domain requirement shall apply to all transmitters.

General Requirements

The level of spurious emissions shall be measured as either:

a) their power level in a specified load (conducted emission); and their effective radiated power when radiated by the cabinet and structure of the equipment (cabinet radiation); or

b) their effective radiated power when radiated by the cabinet and the integral or dedicated antenna, in the case of equipment fitted with such an antenna and no permanent RF connector.

For measurements above 1 000 MHz the peak value shall be measured using a spectrum analyser. The "max hold" function of a spectrum analyser shall be used. For measurements up to 1 000 MHz the quasi-peak detector set in accordance with the specification of CISPR 16 [1], [2] and [3] shall be used.

The correction for RBW described in clause 5.8.5 is to be applied to the measured results as applicable.

Limits

The maximum power limits of any unwanted emissions in the spurious domain are given in table 3.

Table 3: Spurious emissions

Frequency ranges / State	47 MHz to 74 MHz 87,5 MHz to 108 MHz 174 MHz to 230 MHz 470 MHz to 862 MHz	Other frequencies ≤ 1 000 MHz	Frequencies > 1 000 MHz
Operating	4 nW	250 nW	1 µW
Standby	2 nW	2 nW	20 nW

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

EUT Setup

The radiated emission tests were performed in the 3-meter Chamber, using the setup accordance with ETSI EN 300 440. The specifications used were the ETSI EN 300 440 limits.

Spectrum Analyzer Setup

According to ETSI EN 300 440, the EUT was tested from 25MHz to 24.8 GHz.

During the radiated emission test, the spectrum analyzer was set with the following configurations:

Frequency Range	RBW	Video B/W	Detector
Below 30 MHz	10 kHz	30 kHz	Peak
30 MHz - 1000 MHz	100 kHz	300 kHz	Peak
Above 1 GHz	1 MHz	3 MHz	Peak

Test Procedure

According to ETSI EN 300 440 §4.2.4.3&4.2.4.4.

1）Method of measurement cabinet spurious radiation

This method of measurement applies to transmitters having a permanent antenna connector. For equipment without a permanent antenna connector see clause 4.2.4.3.3.

Additional requirements for equipment employing FHSS modulation are given in clause 4.2.4.3.4.

a) A test site selected from annex B which fulfils the requirements of the specified frequency range of this measurement shall be used. The test antenna shall be oriented initially for vertical polarization and connected to a measuring receiver. The bandwidth of the measuring receiver shall be adjusted until the sensitivity of the measuring receiver, after allowing for the coupling loss, is at least 6 dB below the spurious emission limit given in table 3, see clause 4.2.4.4. This bandwidth shall be recorded in the test report.

The transmitter under test shall be placed on the support in its standard position, connected to an artificial antenna (see clause 5.8.2) and switched on without modulation. If modulation cannot be inhibited then the test shall be carried out with modulation, (see clause 5.8.1), and this fact shall be recorded in the test report.

b) For carrier frequencies in the range 1 GHz to 20 GHz the frequency of the measuring receiver shall be adjusted over the frequency range 25MHz to 10 times the carrier frequency, not exceeding 40 GHz. For carrier frequencies above 20 GHz the measuring receiver shall be tuned over the range 25MHz up to twice the carrier frequency, not exceeding 66 GHz, except for the channel on which the transmitter is intended to operate and for channelized systems, its adjacent channels. The frequency of each spurious emission detected shall be noted. If the test site is disturbed by interference coming from outside the site, this qualitative search may be performed in a screened room, with a reduced distance between the transmitter and the test antenna.

c) At each frequency at which an emission has been detected, the measuring receiver shall be tuned and the test antenna shall be raised or lowered through the specified height range until the maximum signal level is detected on the measuring receiver.

d) The transmitter shall be rotated through 360° about a vertical axis, to maximize the received signal.

e) The test antenna shall be raised or lowered again through the specified height range until a maximum is obtained. This level shall be noted.

f) The substitution antenna (see clause B.2.3) shall replace the transmitter antenna in the same position and in vertical polarization. It shall be connected to the signal generator.

g) At each frequency at which an emission has been detected, the signal generator, substitution antenna, and measuring receiver shall be tuned. The test antenna shall be raised or lowered through the specified height range until the maximum signal level is detected on the measuring receiver. The level of the signal generator giving the same signal level on the measuring receiver as in item e) shall be noted. After corrections due to the gain of the substitution antenna and the cable loss between the signal generator and the substitution antenna, is the radiated spurious emission at this frequency.

h) The frequency and level of each spurious emission measured and the bandwidth of the measuring receiver shall be recorded in the test report.

i) Steps c) to h) shall be repeated with the test antenna oriented in horizontal polarization.

j) If a user accessible power adjustment is provided then the tests in steps c) to h) shall be repeated at the lowest power setting available.

k) Steps c) to i) shall be repeated with the transmitter in the standby condition if this option is available.

2) Method of measurement radiated spurious emission

This method of measurement applies to transmitters having an integral antenna.

Additional requirements for equipment employing FHSS modulation are given in clause 4.2.4.3.4.

a) A test site selected from annex B which fulfils the requirements of the specified frequency range of this measurement shall be used. The test antenna shall be oriented initially for vertical polarization and connected to a measuring receiver, through a suitable filter to avoid overloading of the measuring receiver if required. The bandwidth of the measuring receiver shall be adjusted until the sensitivity of the measuring receiver, after allowing for the coupling loss, is at least 6 dB below the spurious emission limit given in table 3, see clause 4.2.4.4. This bandwidth shall be recorded in the test report.

For the measurement of spurious emissions below the second harmonic of the carrier frequency the optional filter used shall be a high "Q" (notch) filter centred on the transmitter carrier frequency and attenuating this signal by at least 30 dB.

For the measurement of spurious emissions at and above the second harmonic of the carrier frequency the optional filter used shall be a high pass filter with a stop band rejection exceeding 40 dB. The cut-off frequency of the high pass filter shall be approximately 1,5 times the transmitter carrier frequency.

The transmitter under test shall be placed on the support in its standard position and shall be switched on without modulation. If modulation cannot be inhibited then the test shall be carried out with modulation (see clause 6.1) and this fact shall be recorded in the test report.
b) The same method of measurement as steps b) and k) of clause 4.2.4.3.2 shall be used.

Test Data

Environmental Conditions

Temperature:	23-25 ℃
Relative Humidity:	49-58 %
ATM Pressure:	100.4 kPa

The radiated emission of Below 1GHz testing was performed by Jason Liu on 2024-04-11.
The radiated emission of Above 1GHz testing was performed by Jimi Zheng on 2024-04-11.
For conducted emissions, the testing was performed by Benny Li on 2024-04-11 to 2024-04-30.

EUT operation mode: Transmitting/ Standby

Note: Pretest three rates and only recorded the worst case in the report.

Test Result: Compliance, please refer to below data for worst case.

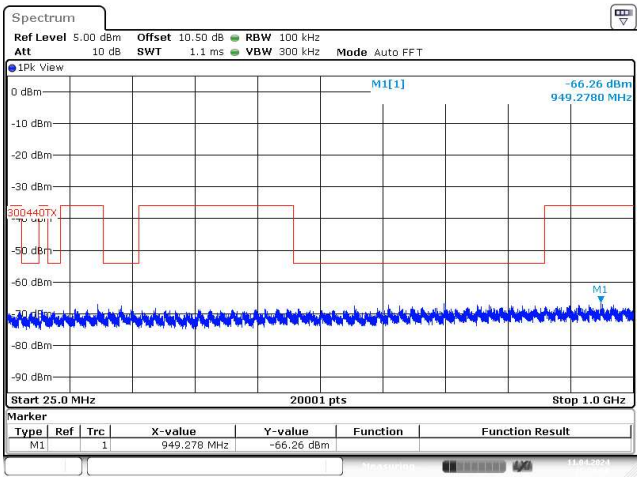
Radiated Spurious Emission

Frequency (MHz)	Receiver Reading (dBm)	Turntable Degree	Rx Antenna		Substituted Factor (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)				
2402MHz, 1Mbps								
50.23	-78.65	130	1.6	H	5.53	-73.12	-54	-19.12
663.18	-79.3	315	1.4	V	8.85	-70.45	-54	-16.45
1201	-31.74	90	2.0	H	0.67	-31.07	-30	-1.07
1201	-32.13	337	1.0	V	1.00	-31.13	-30	-1.13
4804	-51.36	13	1.7	H	8.42	-42.94	-30	-12.94
4804	-52.36	224	1.7	V	8.90	-43.46	-30	-13.46
2480MHz, 1Mbps								
50.23	-78.74	257	2.1	H	5.53	-73.21	-54	-19.21
663.18	-79.23	296	2.1	V	8.85	-70.38	-54	-16.38
1240	-32.34	194	1.4	H	1.47	-30.87	-30	-0.87
1240	-33.27	354	1.2	V	2.25	-31.02	-30	-1.02
4960	-50.69	57	1.9	H	8.52	-42.17	-30	-12.17
4960	-52.2	338	2.1	V	8.61	-43.59	-30	-13.59
Standby								
58.48	-79.27	217	1.8	H	4.5	-74.77	-57	-17.77
603.54	-79.86	164	2.1	V	6.42	-73.44	-57	-16.44
1339.28	-60.3	278	1.5	H	1.45	-58.85	-47	-11.85
3708.38	-58.78	295	1.9	V	6.42	-52.36	-47	-5.36

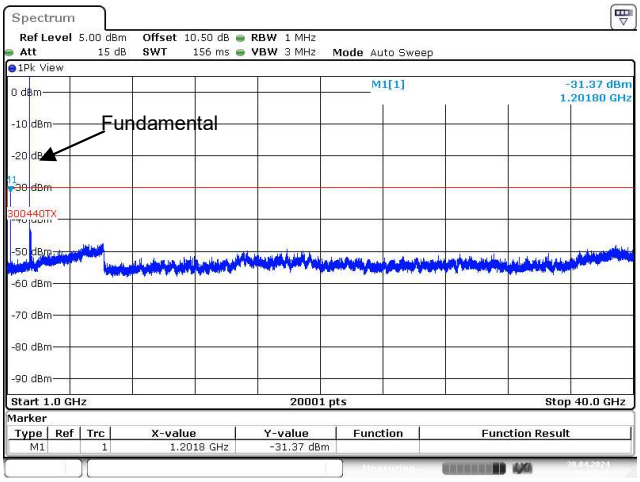
Note1: Absolute Level = Reading Level + Substituted Factor
Note2: Substituted Factor contains: SG Level - Cable loss+ Antenna Gain
Note3: Margin = Absolute Level - Limit
Note4: Standby mode is same to receiver mode.

Conducted Emissions

2.4G_1Mbps_2402MHz

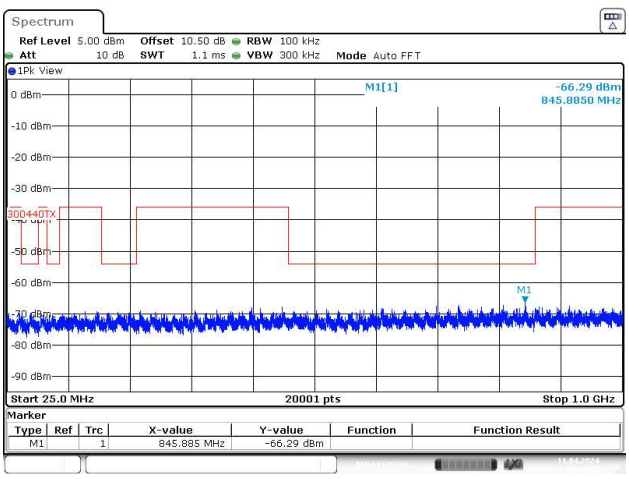


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Date: 11.APR.2024 15:38:50

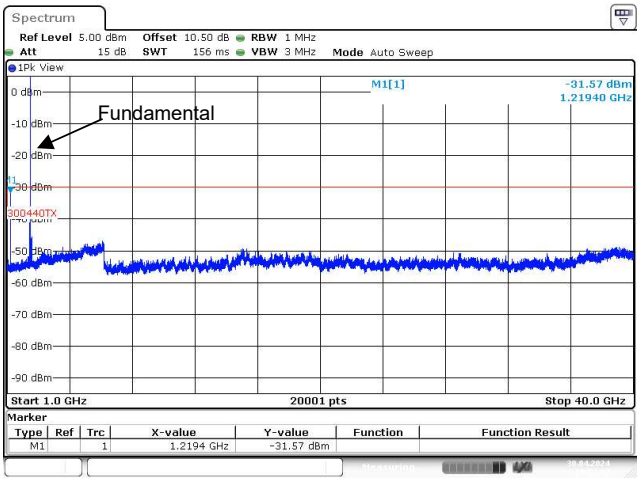


ProjectNo.:RA240320-14269E-RF Tester:Benny Li
Date: 30.APR.2024 10:57:40

2.4G_1Mbps_2440MHz

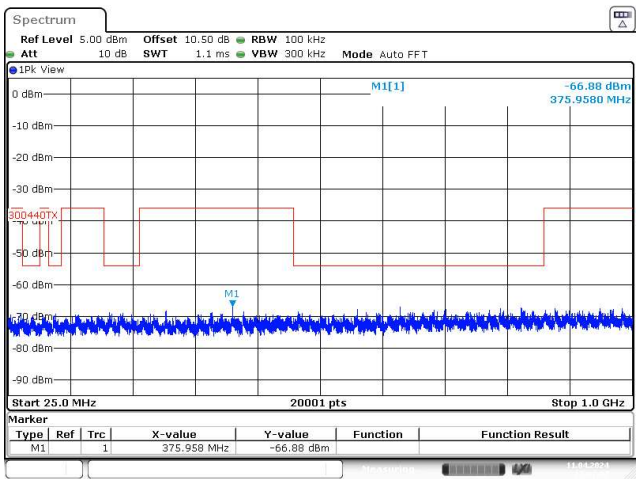


ProjectNo.:RA240320-14269E-RF Tester:Benny Li
Date: 11.APR.2024 13:41:57

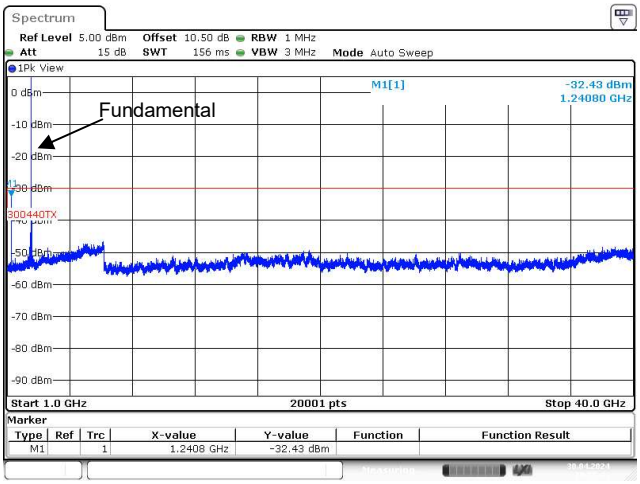


ProjectNo.:RA240320-14269E-RF Tester:Benny Li
Date: 30.APR.2024 10:53:08

2.4G_1Mbps_2480MHz

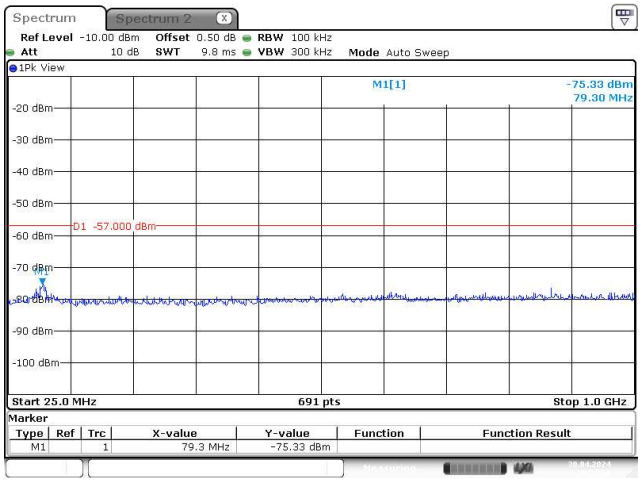


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Date: 11.APR.2024 13:41:08

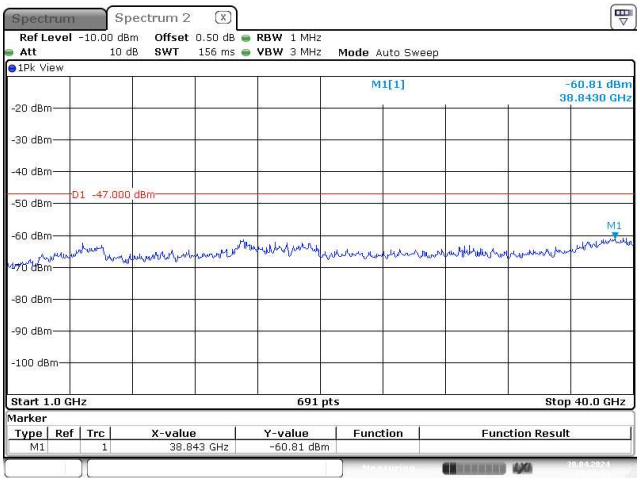


ProjectNo.:RA240320-14269E-RF Tester:Benny Li
Date: 30.APR.2024 10:55:42

Standby



ProjectNo.:RA240320-14269E-RF Tester:Benny Li
Date: 30.APR.2024 10:37:50



ProjectNo.:RA240320-14269E-RF Tester:Benny Li
Date: 30.APR.2024 10:38:12

§4.2.5-DUTY CYCLE

Applicable Standard

Duty Cycle (DC) shall apply to all transmitting equipment except those which utilize Listen Before Talk (LBT) clause 4.4.2, or Detect And Avoid (DAA) clause 4.4.3.
RFID transmitters operating in the 2 446 MHz to 2 454 MHz frequency band that transmit at a maximum radiated peak power level of less than 500 mWe.i.r.p. are also excluded.
For equipment utilizing table B.1 bands C or E, with a radiated power of less than 100 uWe.i.r.p., no duty cycle is specified.

Limit

Table 4 defines the maximum duty cycle within a 1 hour period.

Table 4: Duty cycle limits

Frequency Band	Duty cycle	Application	Notes
2 400 MHz to 2 483,5 MHz	No Restriction	Generic use	
2 400 MHz to 2 483,5 MHz	No Restriction	Radiodetermination	
(a) 2 446 MHz to 2 454 MHz	No Restriction	RFID	Limits shown in Annex G shall apply
(b) 2 446 MHz to 2 454 MHz	≤ 15 %	RFID	Limits shown in Annex G shall apply
5 725 MHz to 5 875 MHz	No Restriction	Generic use	
9 200 MHz to 9 500 MHz	No Restriction	Radiodetermination	
9 500 MHz to 9 975 MHz	No Restriction	Radiodetermination	
10,5 GHz to 10,6 GHz	No Restriction	Radiodetermination	
13,4 GHz to 14,0 GHz	No Restriction	Radiodetermination	
17,1 GHz to 17,3 GHz	DAA or equivalent techniques	Radiodetermination, limited to GBSAR detecting and movement and alert applications	Limits shown in Annex I shall apply
24,00 GHz to 24,25 GHz	No Restriction	Generic use and for radiodetermination	
NOTE: The spectrum ranges in some entries are not harmonised throughout all EU territory, specifically entries 4, 9, and 11 have been identified as such. Implementers are cautioned to refer to CEPT/ERC Recommendation 70-03 [i.2] as well as current National Radio plans to verify acceptance within intended regions of use.			

For devices with a 100 % duty cycle transmitting an unmodulated carrier most of the time, a time-out shut-off facility shall be implemented in order to improve the efficient use of spectrum.
NOTE: The maximum duty cycle of the transmitter under test should not be confused with the duty cycle of the equipment under normal operating conditions.

Test Procedure

According to ETSI EN 300 440 V2.2.1 (2018-07)§4.2.5.3

Test Data

Environmental Conditions

Temperature:	24 ℃
Relative Humidity:	53 %
ATM Pressure:	100.4 kPa

The testing was performed by Benny Li on 2024-04-10.

EUT operation mode: Transmitting

Test Result: Compliance, please refer to Appendix C.

§4.3.4-BLOCKING OR DESENSITIZATION

Applicable Standard

According to ETSI EN 300 440 §4.3.4. Blocking is a measure of the capability of the receiver to receive a wanted modulated signal without exceeding a given degradation due to the presence of an unwanted input signal at any frequencies other than those of the spurious responses or the occupied bandwidth.

Limits

The blocking level, for any frequency within the specified ranges, shall not be less than the values given in table 6, except at frequencies on which spurious responses are found.

Table 6: Limits for blocking or desensitization

Receiver category	Limit
1	-30 dBm + k
2	-45 dBm + k
3	-60 dBm + k

The correction factor, k, is as follows:

$$k = -20\log f - 10\log BW$$

Where:

- f is the frequency in GHz;
- BW is the occupied bandwidth in MHz.

The factor k is limited within the following:

- -40 dB < k < 0 dB.

Test Procedure

According to ETSI EN 300 440 §4.3.4.3

This measurement shall be conducted under normal conditions.

Two signal generators A and B shall be connected to the receiver via a combining network to the receiver, either:

a) via a test fixture or a test antenna to the receiver integrated, dedicated or test antenna; or

b) directly to the receiver permanent or temporary antenna connector.

The method of coupling to the receiver shall be stated in the test report.

Signal generator A shall be at the nominal frequency of the receiver, with normal modulation of the wanted signal.
Signal generator B shall be unmodulated and shall be adjusted to a test frequency at approximately 10 times, 20 times and 50 times of the occupied bandwidth above upper band edge of occupied bandwidth.

Initially signal generator B shall be switched off and using signal generator A the level which still gives sufficient response shall be established. The output level of generator A shall then be increased by 3 dB.

Signal generator B is then switched on and adjusted until the wanted criteria are met. This level shall be recorded.

The measurement shall be repeated with the test frequency for signal generator B at 10 times, 20 times and 50 times of the occupied bandwidth below the lower band edge of the occupied bandwidth.

The blocking or desensitization shall be recorded as the level in dBm of lowest level of the unwanted signal (generator B).

For tagging systems (e.g. RF identification, anti-theft, access control, location and similar systems) signal generator A may be replaced by a physical tag positioned at 70 % of the measured system range in metres. In this case, the blocking or desensitization shall be recorded as the ratio in dB of lowest level of the unwanted signal (generator B) resulting in a non-read of the tag. to the declared sensitivity of the receiver +3 dB.

Test Data

Environmental Conditions

Temperature:	23 ℃
Relative Humidity:	51 %
ATM Pressure:	100.4 kPa

The testing was performed by Benny Li on 2024-04-09.

Select the Type b connection mode for testing.

EUT operation mode: Receiving

Test Result: Compliance, please refer to Appendix D.

§4.3.5-RECEIVER SPURIOUS RADIATIONS

Applicable Standard

According to ETSI EN 300 440 §4.3.5. For measurements above 1 000 MHz the peak value shall be measured using a spectrum analyser. The "max hold" function of a spectrum analyser shall be used. For measurements up to 1 000 MHz the quasi-peak detector set in accordance with the specification of CISPR 16 [1], [2] and [3] shall be used.

EUT Setup

The radiated emission tests were performed in the 3-meter Chamber, using the setup accordance with ETSI EN 300 440. The specifications used were the ETSI EN 300 440 limits.

Spectrum Analyzer Setup

According to ETSI EN 300 440, the EUT was tested from 25MHz to 40 GHz.

During the radiated emission test, the spectrum analyzer was set with the following configurations:

Frequency Range	RBW	Video B/W	Detector
Below 30 MHz	10 kHz	30 kHz	Peak
30 MHz – 1000 MHz	100 kHz	300 kHz	Peak
Above 1 GHz	1 MHz	3 MHz	Peak

Test Procedure

According to ETSI EN 300 440 §4.2.5.3.1&4.2.5.3.3.

1) Method of measurement conducted spurious components

This method of measurement applies to receivers having a permanent antenna connector.

A test load, H.T.Ω power attenuator, may be used to protect the measuring receiver (see clause 6.5) against damage when testing a receiver combined in one unit with a transmitter.

The measuring receiver used shall have sufficient dynamic range and sensitivity to achieve the required measurement accuracy at the specified limit. The bandwidth of the measuring receiver shall be adjusted until the sensitivity of the measuring receiver is at least 6 dB below the spurious emission limit given in clause 4.3.5.4. This bandwidth shall be recorded in the test report:

a) The receiver input terminals shall be connected to a measuring receiver having an input impedance of H.T. Ω and the receiver is switched on.

b) For carrier frequencies in the range 1 GHz to 20 GHz the frequency of the measuring receiver shall be adjusted over the frequency range 25MHz to 10 times the carrier frequency, not exceeding 40 GHz. For carrier frequencies above 20 GHz the measuring receiver shall be tuned over the range 25MHz up to twice the carrier frequency not exceeding 66 GHz. The frequency and the absolute power level of each of the spurious components found shall be noted.

c) If the detecting device is not calibrated in terms of power input, the level of any detected components shall be determined by replacing the receiver by the signal generator and adjusting it to reproduce the

frequency and level of every spurious component noted in step b). The absolute power level of each spurious component shall be noted.

d) The frequency and level of each spurious emission measured and the bandwidth of the measuring receiver shall be recorded in the test report.

2) Method of measurement cabinet radiation

This method of measurement applies to receivers having a permanent antenna connector.

a) A test site selected from annex B which fulfils the requirements of the specified frequency range of this measurement shall be used. The test antenna shall be oriented initially for vertical polarization and connected to a measuring receiver. The bandwidth of the measuring receiver shall be adjusted until the sensitivity of the measuring receiver is at least 6 dB below the spurious emission limit given in clause 4.3.5.4. This bandwidth shall be recorded in the test report.

The receiver under test shall be placed on the support in its standard position and connected to an artificial antenna, see clause 5.8.2.

b) For carrier frequencies in the range 1 GHz to 20 GHz the frequency of the measuring receiver shall be adjusted over the frequency range 25 MHz to 10 times the carrier frequency, not exceeding 40 GHz. For carrier frequencies above 20 GHz the measuring receiver shall be tuned over the range 25 MHz up to twice the carrier frequency not exceeding 66 GHz. The frequency of each spurious component shall be noted. If the test site is disturbed by radiation coming from outside the site, this qualitative search may be performed in a screened room with reduced distance between the transmitter and the test antenna.

c) At each frequency at which a component has been detected, the measuring receiver shall be tuned and the test antenna shall be raised or lowered through the specified height range until the maximum signal level is detected on the measuring receiver.

d) The receiver shall be rotated up to 360° about a vertical axis, to maximize the received signal.

e) The test antenna shall be raised or lowered again through the specified height range until a maximum is obtained. This level shall be noted.

f) The substitution antenna (see clause B.3.2) shall replace the receiver antenna in the same position and in vertical polarization. It shall be connected to the signal generator.

g) At each frequency at which a component has been detected, the signal generator, substitution antenna and measuring receiver shall be tuned. The test antenna shall be raised or lowered through the specified height range until the maximum signal level is detected on the measuring receiver. The level of the signal generator giving the same signal level on the measuring receiver as in step e) shall be noted. This level, after correction due to the gain of the substitution antenna and the cable loss, is the radiated spurious component at this frequency.

h) The frequency and level of each spurious emission measured and the bandwidth of the measuring receiver shall be recorded in the test report.

i) Measurements b) to h) shall be repeated with the test antenna oriented in horizontal polarization.

3) Method of measurement radiated spurious components

This method of measurement applies to receivers having an integral antenna.

a) A test site selected from annex B which fulfils the requirements of the specified frequency range of this measurement shall be used. The test antenna shall be oriented initially for vertical polarization and connected to a measuring receiver. The bandwidth of the measuring receiver shall be adjusted until the sensitivity of the measuring receiver is at least 6 dB below the spurious emission limit given in clause 4.3.5.4. This bandwidth shall be recorded in the test report.

The receiver under test shall be placed on the support in its standard position.

b) The same method of measurement as items b) to i) of clause 4.3.5.3.2 shall apply.

Test Data

Environmental Conditions

Temperature:	23-24 ℃
Relative Humidity:	49-58 %
ATM Pressure:	100.4 kPa

The Below 1GHz testing was performed by Jason Liu on 2024-04-11.
The Above 1GHz testing was performed by Jimi Zheng on 2024-04-11.
For conducted emissions, the testing was performed by Benny Li on 2024-04-11.

EUT operation mode: Receiving

Note: Pretest three rates and only recorded the worst case in the report.

Test Result: Compliance, please refer to below data for worst case.

Radiated Spurious Emission

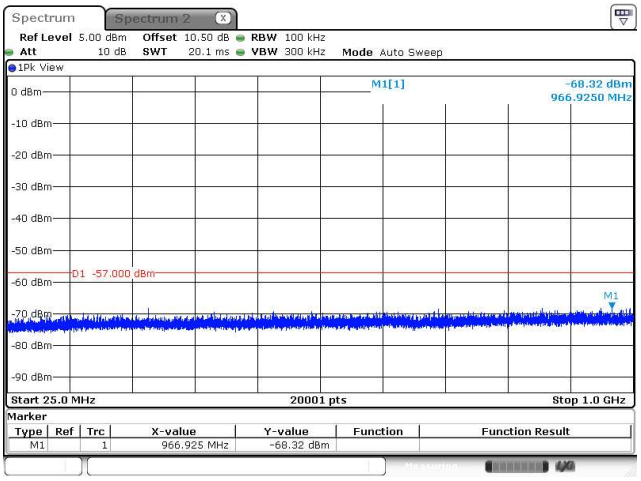
25MHz-12.4GHz

Frequency (MHz)	Receiver Reading (dBm)	Turntable Degree	Rx Antenna		Substituted Factor (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)				
2402MHz, 1Mbps								
53.65	-77.97	25	1.3	H	4.3	-73.67	-57	-16.67
514.08	-78.7	219	1.1	V	7.56	-71.14	-57	-14.14
1254.09	-60.79	97	1.4	H	1.64	-59.15	-47	-12.15
3608.5	-59.59	213	1.3	V	5.76	-53.83	-47	-6.83
2480MHz, 1Mbps								
53.65	-78.09	217	1.8	H	4.3	-73.79	-57	-16.79
514.08	-78.49	164	2.1	V	7.56	-70.93	-57	-13.93
1254.09	-59.51	28	1.7	H	1.64	-57.87	-47	-10.87
3608.5	-58.64	268	1.5	V	5.76	-52.88	-47	-5.88

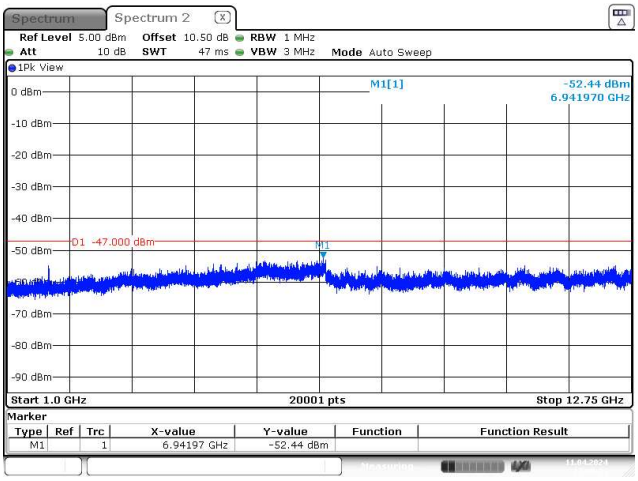
Note1: Absolute Level = Reading Level + Substituted Factor
Note2: Substituted Factor contains: SG Level - Cable loss+ Antenna Gain
Note3: Margin = Absolute Level - Limit

Conducted Emissions

2.4G_1Mbps_2402MHz

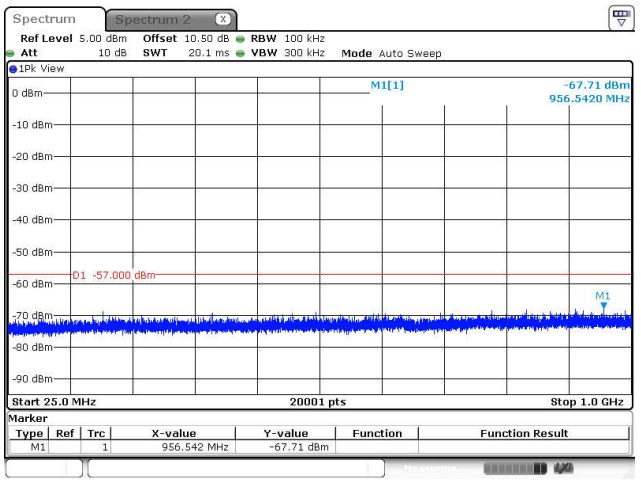


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Date: 11.APR.2024 15:25:59

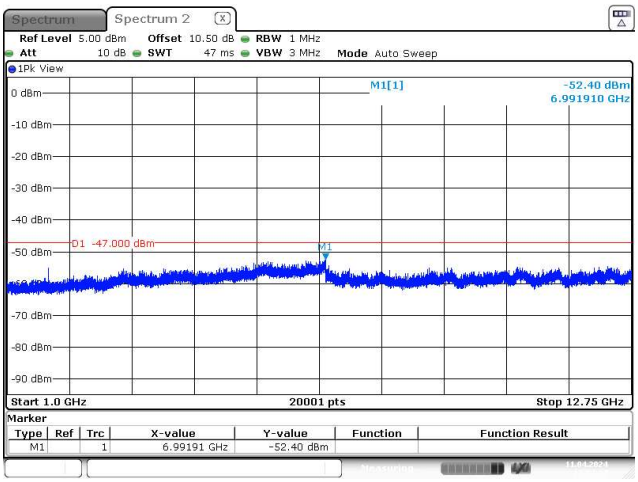


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Date: 11.APR.2024 13:48:20

2.4G_1Mbps_2440MHz

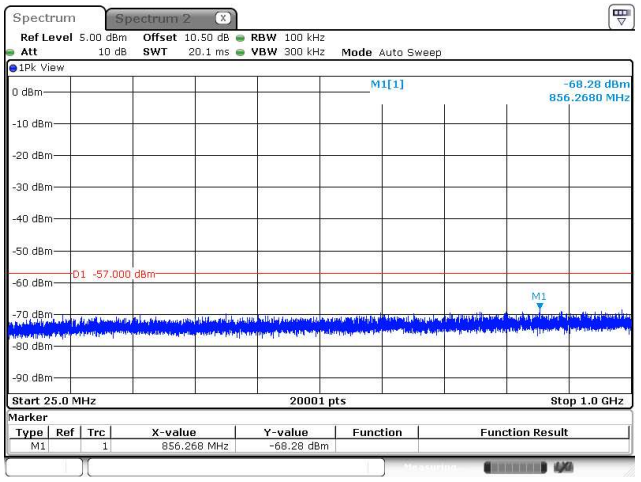


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Date: 11.APR.2024 15:24:56

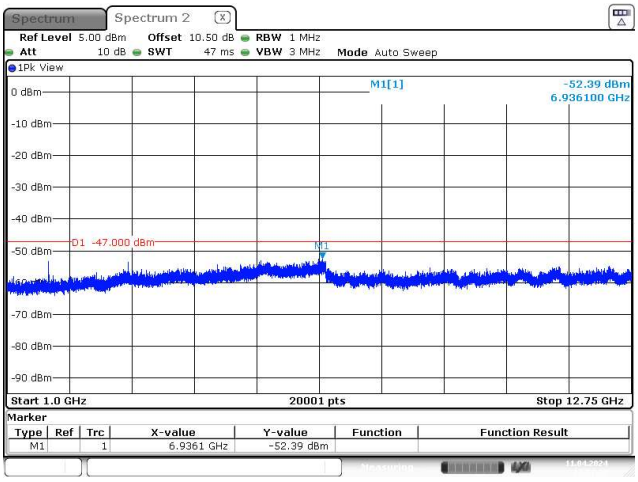


ProjectNo.:RA240320-14269E-RF Tester:Benny Li
Date: 11.APR.2024 13:52:37

2.4G_1Mbps_2480MHz



ProjectNo.:RA240320-14269E-RF Tester:Benny Li
Date: 11.APR.2024 15:21:46



ProjectNo.:RA240320-14269E-RF Tester:Benny Li
Date: 11.APR.2024 13:51:32

APPENDIX

Appendix A: Equivalent Isotropically Radiated Power

Test Result

Test Condition	Data Rate	Freq. [MHz]	Antenna	Reading [dBm]	Antenna Gain [dBi]	Duty Factor	EIRP [dBm]	EIRP Limit [dBm]	Verdict
NTNV	250Kbps	2402	Ant1	-3.46	3	8.03	7.57	10	PASS
		2440	Ant1	-4.55	3	7.98	6.43	10	PASS
		2480	Ant1	-3.69	3	7.96	7.27	10	PASS
	1Mbps	2402	Ant1	-8.44	3	13.13	7.69	10	PASS
		2440	Ant1	-8.66	3	12.96	7.30	10	PASS
		2480	Ant1	-9.51	3	12.98	6.47	10	PASS
	2Mbps	2402	Ant1	-10.91	3	15.23	7.32	10	PASS
		2440	Ant1	-11.11	3	15.51	7.40	10	PASS
		2480	Ant1	-11.96	3	15.51	6.55	10	PASS
LTHV	250Kbps	2402	Ant1	-3.39	3	8.03	7.64	10	PASS
		2440	Ant1	-4.46	3	7.98	6.52	10	PASS
		2480	Ant1	-3.61	3	7.96	7.35	10	PASS
	1Mbps	2402	Ant1	-8.35	3	13.13	7.78	10	PASS
		2440	Ant1	-8.55	3	12.96	7.41	10	PASS
		2480	Ant1	-9.69	3	12.98	6.29	10	PASS
	2Mbps	2402	Ant1	-10.98	3	15.23	7.25	10	PASS
		2440	Ant1	-11.19	3	15.51	7.32	10	PASS
		2480	Ant1	-12.05	3	15.51	6.46	10	PASS
LTLV	250Kbps	2402	Ant1	-3.71	3	8.03	7.32	10	PASS
		2440	Ant1	-4.76	3	7.98	6.22	10	PASS
		2480	Ant1	-3.95	3	7.96	7.01	10	PASS
	1Mbps	2402	Ant1	-8.51	3	13.13	7.62	10	PASS
		2440	Ant1	-8.78	3	12.96	7.18	10	PASS
		2480	Ant1	-9.80	3	12.98	6.18	10	PASS
	2Mbps	2402	Ant1	-10.75	3	15.23	7.48	10	PASS
		2440	Ant1	-11.16	3	15.51	7.35	10	PASS
		2480	Ant1	-12.09	3	15.51	6.42	10	PASS
HTHV	250Kbps	2402	Ant1	-3.44	3	8.03	7.59	10	PASS
		2440	Ant1	-4.46	3	7.98	6.52	10	PASS
		2480	Ant1	-3.90	3	7.96	7.06	10	PASS
	1Mbps	2402	Ant1	-8.76	3	13.13	7.37	10	PASS
		2440	Ant1	-8.92	3	12.96	7.04	10	PASS
		2480	Ant1	-9.62	3	12.98	6.36	10	PASS
	2Mbps	2402	Ant1	-11.07	3	15.23	7.16	10	PASS
		2440	Ant1	-11.49	3	15.51	7.02	10	PASS
		2480	Ant1	-11.98	3	15.51	6.53	10	PASS
HTLV	250Kbps	2402	Ant1	-3.65	3	8.03	7.38	10	PASS
		2440	Ant1	-4.66	3	7.98	6.32	10	PASS
		2480	Ant1	-3.81	3	7.96	7.15	10	PASS
	1Mbps	2402	Ant1	-8.54	3	13.13	7.59	10	PASS
		2440	Ant1	-8.76	3	12.96	7.20	10	PASS
		2480	Ant1	-9.73	3	12.98	6.25	10	PASS
	2Mbps	2402	Ant1	-11.24	3	15.23	6.99	10	PASS
		2440	Ant1	-11.25	3	15.51	7.26	10	PASS
		2480	Ant1	-12.08	3	15.51	6.43	10	PASS

Appendix B: Permitted Range of Operating Frequencies

Test Result

Operation frequency range:

For Data Rate 250Kbps:

Test Condition		Frequency[MHz]			
Temperature	Voltage	f_L at Low Channel	f_H at High Channel	f_L Limit	f_H Limit
N.T	N.V.	2401.7598	2480.2750	2400	2483.5
L.T	L.V.	2401.7611	2480.2748	2400	2483.5
	H.V.	2401.7594	2480.2759	2400	2483.5
H.T	L.V.	2401.7601	2480.2755	2400	2483.5
	H.V.	2401.7587	2480.2762	2400	2483.5

For Data Rate 1Mbps:

Test Condition		Frequency[MHz]			
Temperature	Voltage	f_L at Low Channel	f_H at High Channel	f_L Limit	f_H Limit
N.T	N.V.	2401.5514	2480.4892	2400	2483.5
L.T	L.V.	2401.5525	2480.4890	2400	2483.5
	H.V.	2401.5516	2480.4894	2400	2483.5
H.T	L.V.	2401.5519	2480.4887	2400	2483.5
	H.V.	2401.5511	2480.4893	2400	2483.5

For Data Rate 2Mbps:

Test Condition		Frequency[MHz]			
Temperature	Voltage	f_L at Low Channel	f_H at High Channel	f_L Limit	f_H Limit
N.T	N.V.	2401.1491	2480.8741	2400	2483.5
L.T	L.V.	2401.1481	2480.8725	2400	2483.5
	H.V.	2401.1487	2480.8736	2400	2483.5
H.T	L.V.	2401.1488	2480.8742	2400	2483.5
	H.V.	2401.1493	2480.8745	2400	2483.5

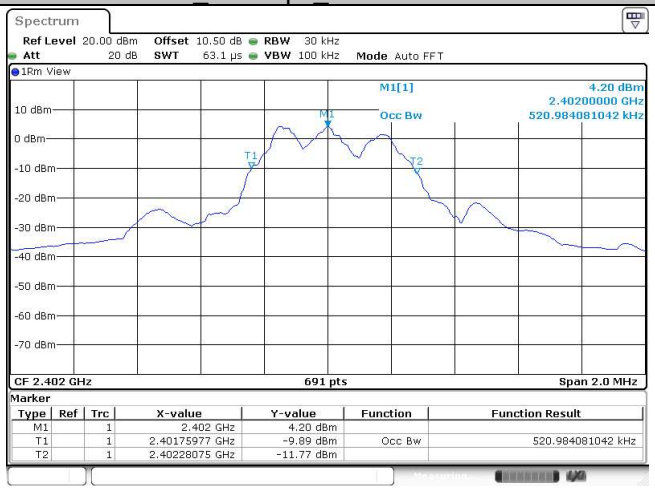
Occupied Bandwidth:

Data Rate	Freq[MHz]	Antenna	OBW[MHz]	Limit[MHz]	Verdict
250Kbps	2402	Ant1	0.521	The whole OBW fall full within 2400-2483.5MHz range	PASS
	2440	Ant1	0.521		PASS
	2480	Ant1	0.509		PASS
1Mbps	2402	Ant1	0.932		PASS
	2440	Ant1	0.932		PASS
	2480	Ant1	0.932		PASS
2Mbps	2402	Ant1	1.725		PASS
	2440	Ant1	1.725		PASS
	2480	Ant1	1.713		PASS

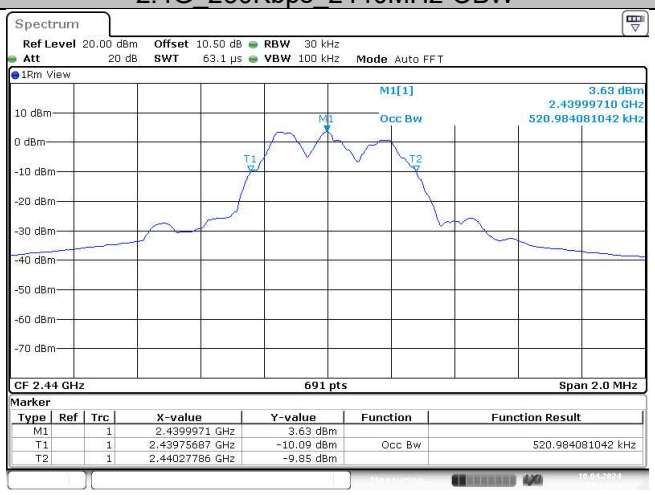
Test Graphs

Occupied Bandwidth:

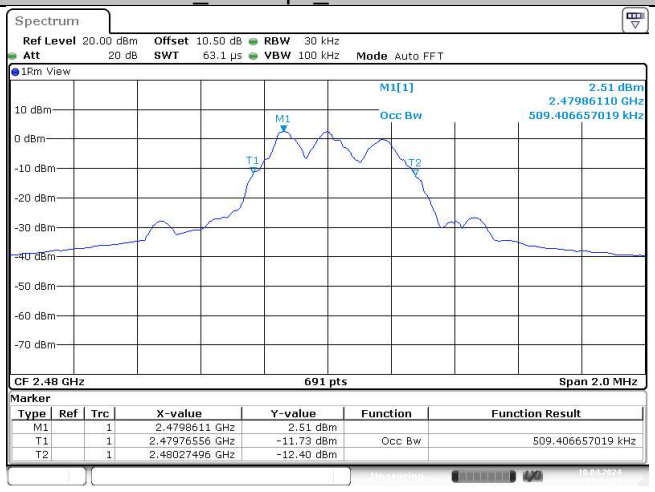
2.4G_250Kbps_2402MHz-OBW



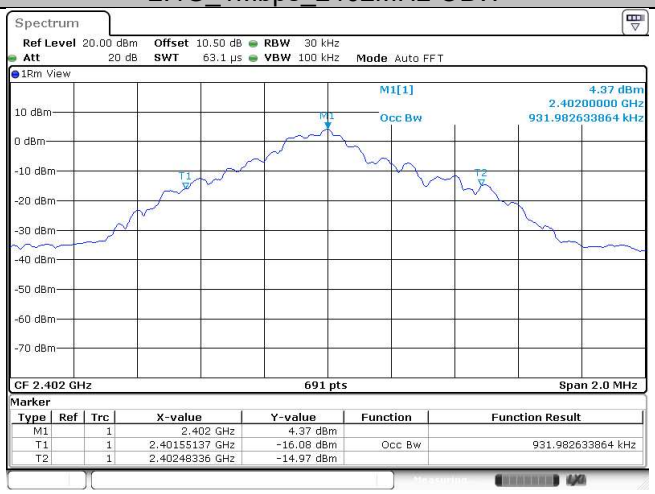
2.4G_250Kbps_2440MHz-OBW



2.4G_250Kbps_2480MHz-OBW

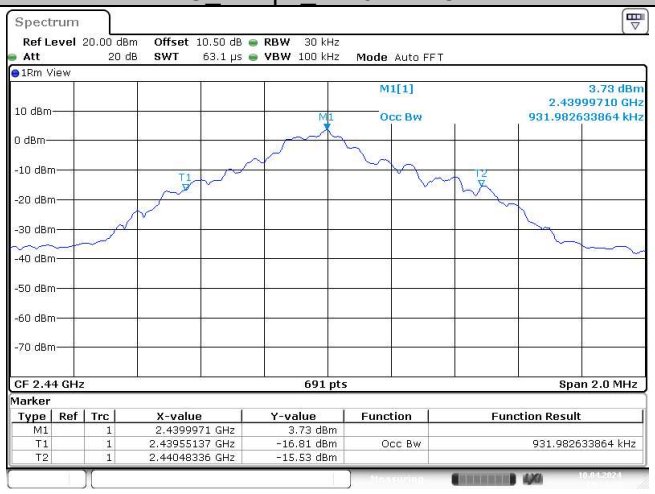


2.4G_1Mbps_2402MHz-OBW



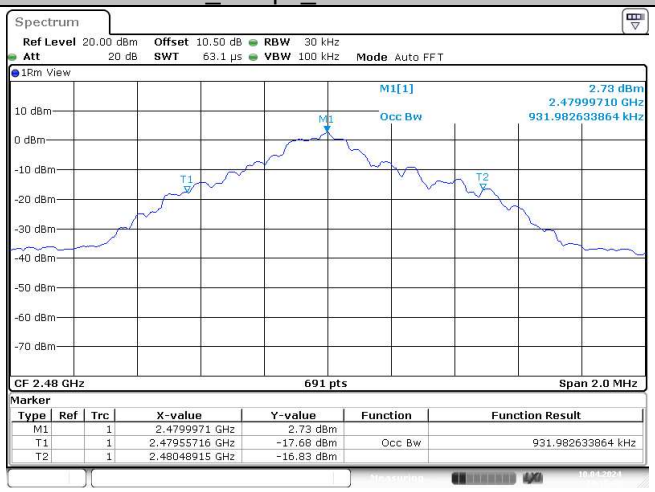
ProjectNo.:RA240320-14269E-RF Tester:Benny Li
Date: 9.APR.2024 18:58:10

2.4G_1Mbps_2440MHz-OBW



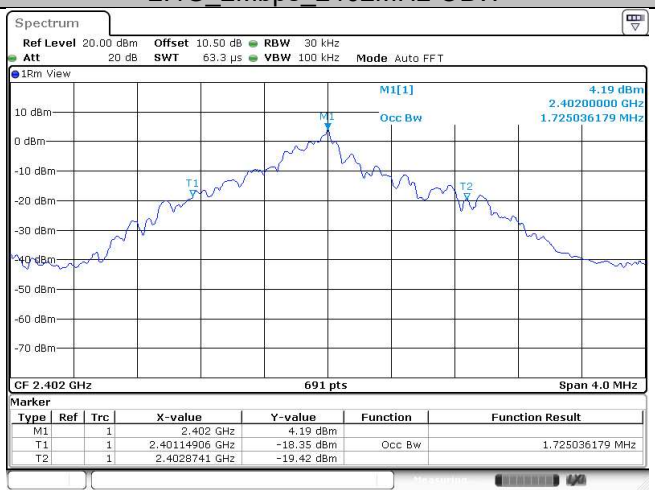
ProjectNo.:RA240320-14269E-RF Tester:Benny Li
Date: 10.APR.2024 14:12:32

2.4G_1Mbps_2480MHz-OBW



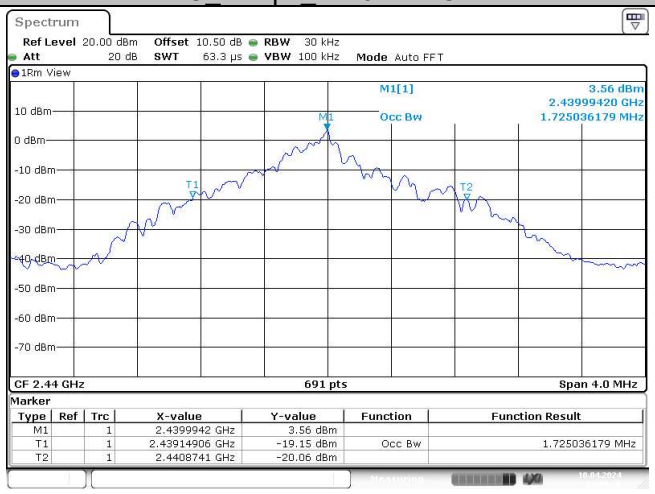
ProjectNo.:RA240320-14269E-RF Tester:Benny Li
Date: 10.APR.2024 14:15:42

2.4G_2Mbps_2402MHz-OBW



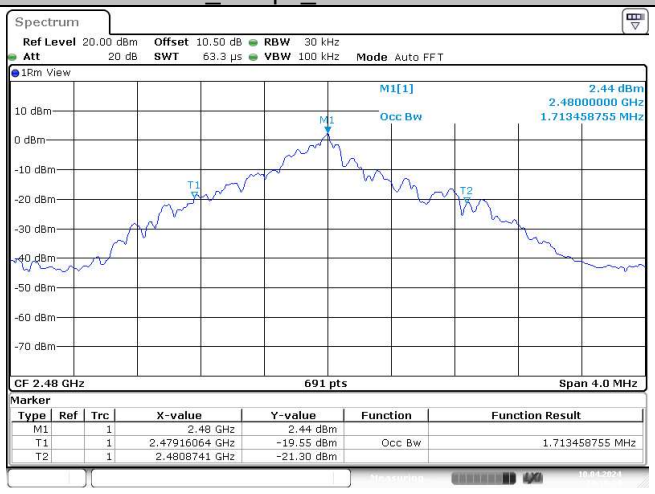
ProjectNo.:RA240320-14269E-RF Tester:Benny Li
Date: 9.APR.2024 18:59:06

2.4G_2Mbps_2440MHz-OBW



ProjectNo.:RA240320-14269E-RF Tester:Benny Li
Date: 10.APR.2024 14:08:31

2.4G_2Mbps_2480MHz-OBW



ProjectNo.:RA240320-14269E-RF Tester:Benny Li
Date: 10.APR.2024 14:16:34

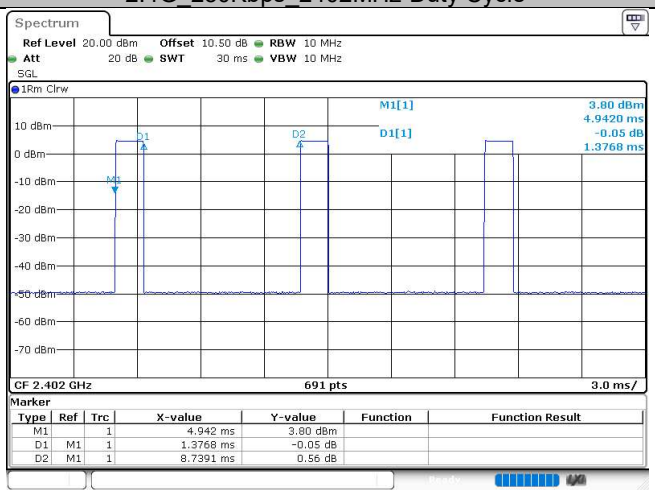
Appendix C: Duty Cycle

Test Result

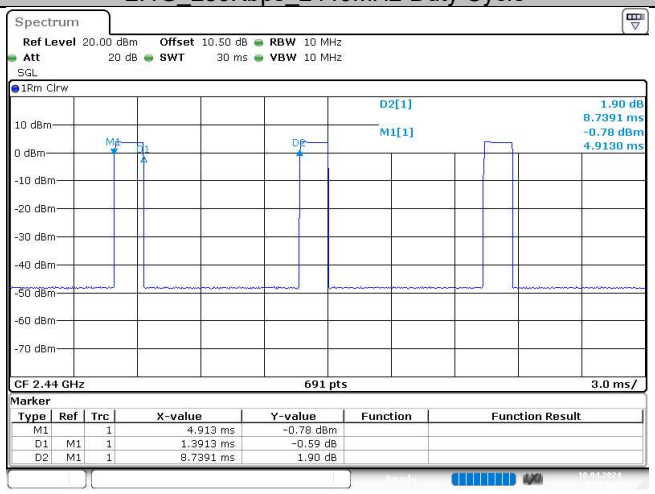
Data Rate	Freq. [MHz]	Antenna	Ton [ms]	Period [ms]	Duty Cycle [%]	Duty Factor
250Kbps	2402	Ant1	1.3768	8.7391	15.75	8.03
	2440	Ant1	1.3913	8.7391	15.92	7.98
	2480	Ant1	1.3913	8.6957	16.00	7.96
1Mbps	2402	Ant1	0.3768	7.7391	4.87	13.13
	2440	Ant1	0.3913	7.7391	5.06	12.96
	2480	Ant1	0.3913	7.7826	5.03	12.98
2Mbps	2402	Ant1	0.2319	7.7391	3.00	15.23
	2440	Ant1	0.2174	7.7391	2.81	15.51
	2480	Ant1	0.2174	7.7391	2.81	15.51

Test Graphs

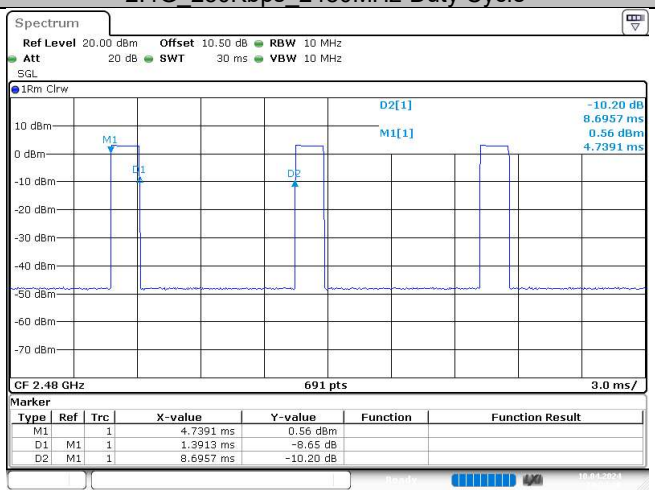
2.4G_250Kbps_2402MHz-Duty Cycle



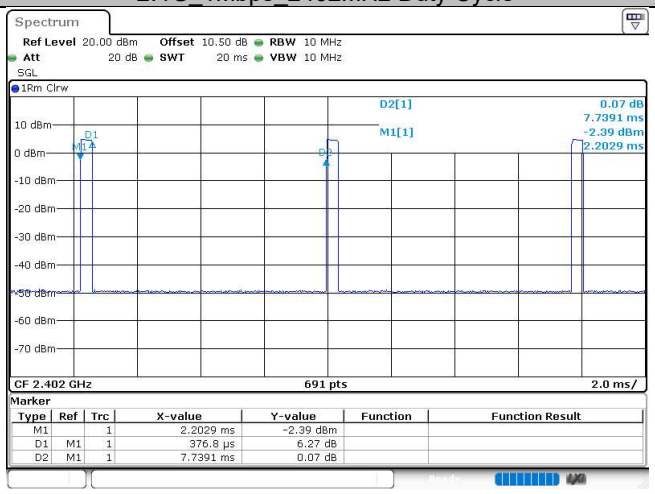
2.4G_250Kbps_2440MHz-Duty Cycle



2.4G_250Kbps_2480MHz-Duty Cycle



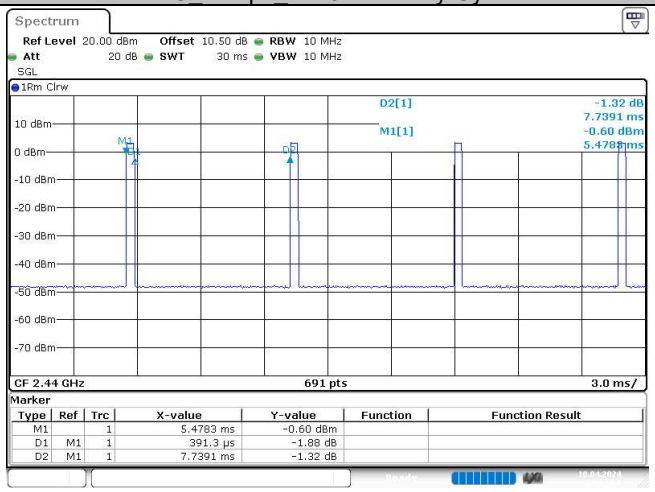
2.4G_1Mbps_2402MHz-Duty Cycle



ProjectNo.:RA240320-14269E-RF Tester:Benny Li

Date: 9.APR.2024 19:15:21

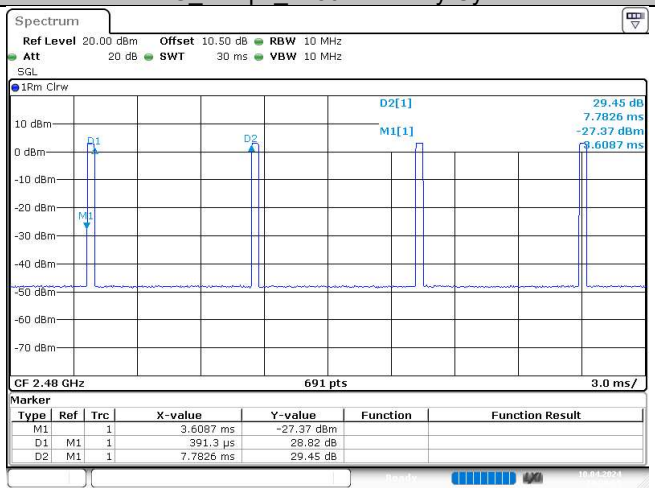
2.4G_1Mbps_2440MHz-Duty Cycle



ProjectNo.:RA240320-14269E-RF Tester:Benny Li

Date: 10.APR.2024 14:03:51

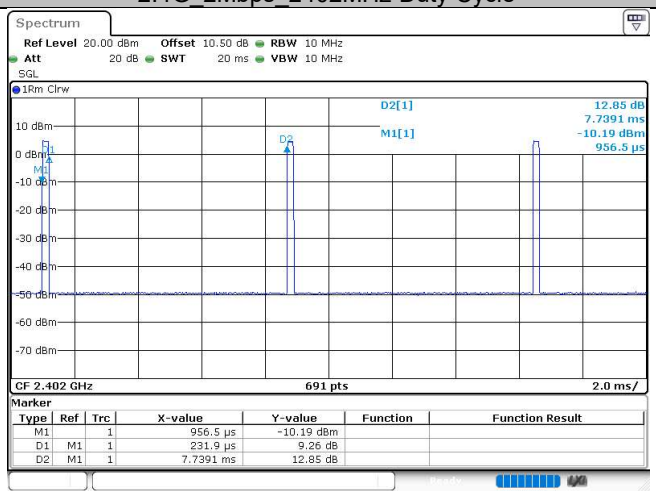
2.4G_1Mbps_2480MHz-Duty Cycle



ProjectNo.:RA240320-14269E-RF Tester:Benny Li

Date: 10.APR.2024 14:20:54

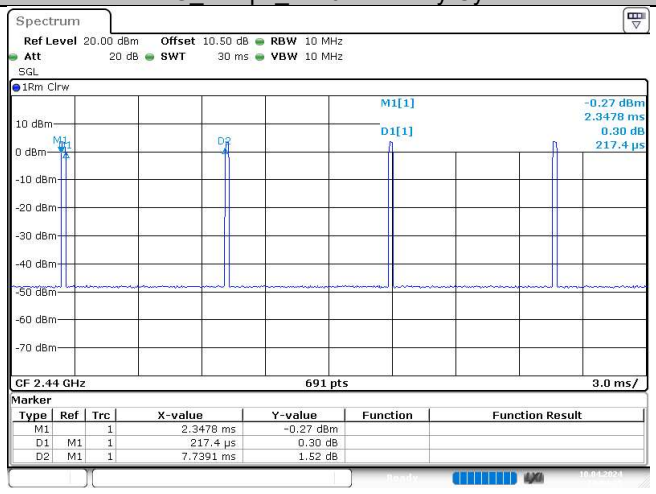
2.4G_2Mbps_2402MHz-Duty Cycle



ProjectNo.:RA240320-14269E-RF Tester:Benny Li

Date: 9.APR.2024 19:01:15

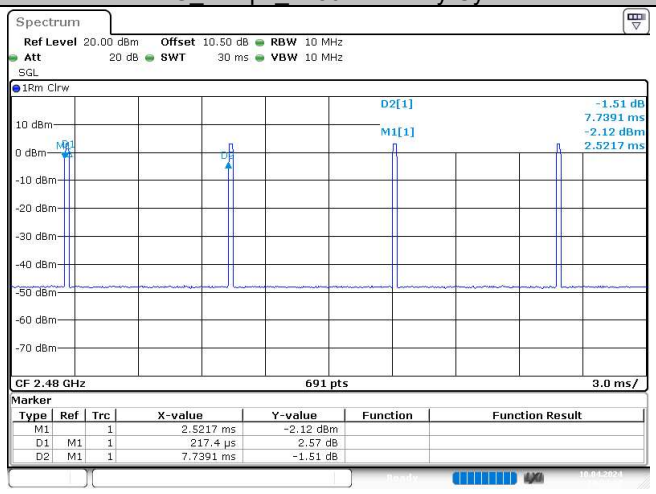
2.4G_2Mbps_2440MHz-Duty Cycle



ProjectNo.:RA240320-14269E-RF Tester:Benny Li

Date: 10.APR.2024 14:04:40

2.4G_2Mbps_2480MHz-Duty Cycle



ProjectNo.:RA240320-14269E-RF Tester:Benny Li

Date: 10.APR.2024 14:23:27

Appendix D: Blocking or Desensitization

Test Result

Note: EUT belong to Category 3 receiver. Choose the data rate 250Kbps for testing.

Frequency [MHz]	Frequency offset [MHz]	Test Result [dBm]	Limit [dBm]	Result
2402	10*OBW below OBW low edge	-60.12	-64.78	PASS
	10*OBW above OBW high edge	-60.05	-64.78	PASS
	20*OBW below OBW low edge	-60.03	-64.78	PASS
	20*OBW above OBW high edge	-60.11	-64.78	PASS
	50*OBW below OBW low edge	-59.98	-64.78	PASS
	50*OBW above OBW high edge	-59.91	-64.78	PASS

Frequency [MHz]	Frequency offset [MHz]	Test Result [dBm]	Limit [dBm]	Result
2480	10*OBW below OBW low edge	-59.89	-64.96	PASS
	10*OBW above OBW high edge	-60.04	-64.96	PASS
	20*OBW below OBW low edge	-60.17	-64.96	PASS
	20*OBW above OBW high edge	-60.13	-64.96	PASS
	50*OBW below OBW low edge	-59.95	-64.96	PASS
	50*OBW above OBW high edge	-60.02	-64.96	PASS

Note1: Low channel: 2.402GHz, BW= 0.521MHz;
High channel: 2.480GHz, BW= 0.509MHz;

Note2: K=-20*logf-10*logBW; -40 dB < K < 0 dB

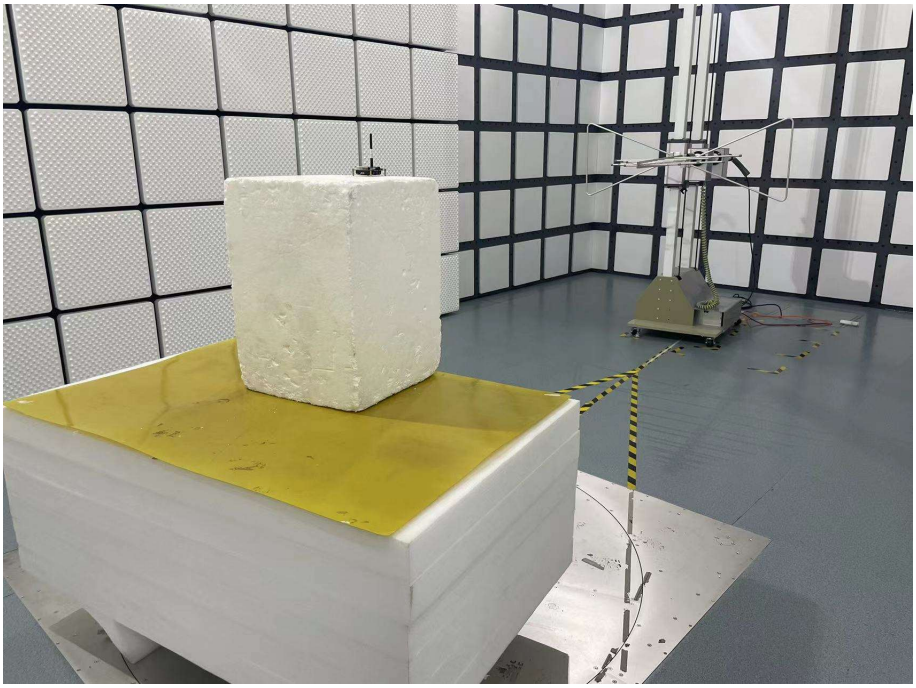
Note3: Low channel limit=-60+k dBm= -64.78 dBm
High channel limit=-60+k dBm= -64.96 dBm

EXHIBIT A-EUT PHOTOGRAPHS

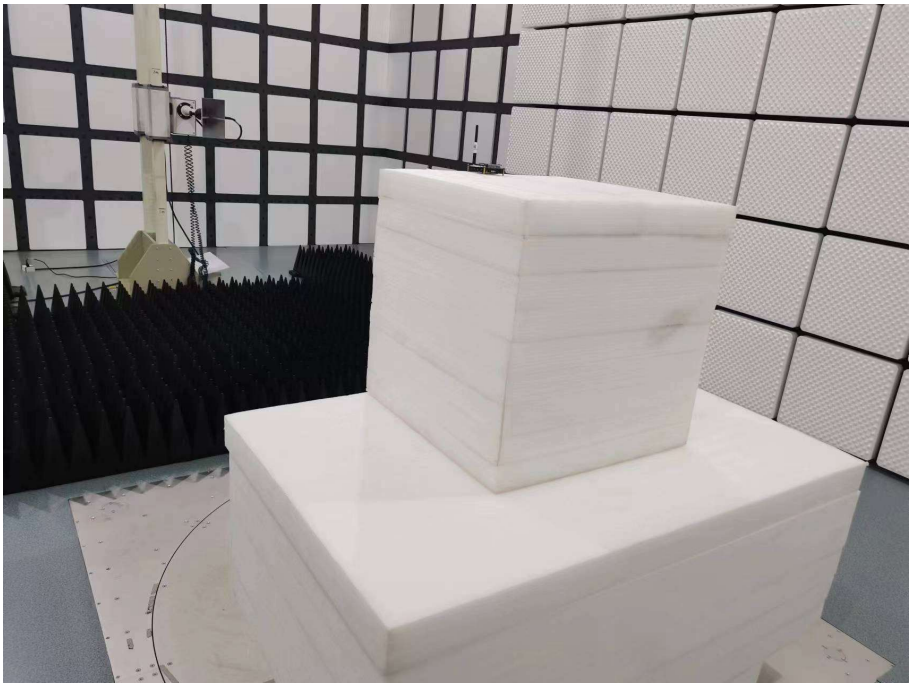
Please refer to the Attachment of RA240320-14269E EUT Photographs

EXHIBIT B-TEST SETUP PHOTOGRAPHS

Radiated Spurious Emissions Test View (Below 1GHz)



Radiated Spurious Emissions Test View (Above 1GHz)



******* END OF REPORT *******