



# MEASUREMENT REPORT

## FCC PART 15.247 WLAN 802.11b/g/n

Report No.: S202311075127E01

Issue Date: 01-10-2024

**Applicant:** Jiangsu Shushi Technology Co., Ltd.  
**Address:** NO.9 Nanxu Road, RunZhou District, Zhenjiang, Jiangsu, China  
**FCC ID:** 2BAGQ-3RMB01033WBZ  
**Product:** Smart Bridge MZ1  
**Model No.:** 3RMB01033WBZ  
**FCC Classification:** Digital Transmission System (DTS)  
**FCC Rule Part(s):** Part 15 Subpart C (15.247)  
**Test Procedure(s):** ANSI C63.10-2013, KDB 558074 D01v05r02  
**Result:** Pass  
**Receipt date:** Nov. 15, 2023  
**Test Date:** Nov. 15~ Dec. 7, 2023

Compiled By

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The test results relate only to the samples tested.

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in KDB 558074 D01. Test results reported herein relate only to the item(s) tested.

The test report shall not be reproduced except in full without the written approval of Fanguang Inspection & Testing Co., Ltd. Wuxi Branch

The test report must not be used by the client to claim product certifications, approval, or endorsement by NVLAP, NIST or any agency of U.S. Government.

## Revision History

Report No.	Version	Description	Issue Date
S202311075127E01	Rev. 01	/	01-10-2024

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## §2.1033 General Information

<b>Applicant:</b>	Jiangsu Shushi Technology Co., Ltd.
<b>Applicant Address:</b>	NO.9 Nanxu Road,RunZhou District,Zhenjiang,Jiangsu,China
<b>Manufacturer:</b>	Jiangsu Shushi Technology Co., Ltd.
<b>Manufacturer Address:</b>	NO.9 Nanxu Road,RunZhou District,Zhenjiang,Jiangsu,China
<b>Factory:</b>	Shushi (Zhenjiang) Intelligent Technology Co., Ltd.
<b>Factory Address:</b>	NO.9 Nanxu Road,RunZhou District,Zhenjiang,Jiangsu,China
<b>Test Site:</b>	Fanguang Inspection & Testing Co., Ltd.
<b>LAB ID:</b>	CN5037
<b>Test Site Address:</b>	G9 Building, China Sensor Network International Innovation Park No.200, Linghu Avenue Wuxi, Jiangsu 214000 China
<b>FCC Rule Part(s):</b>	Part 15 Subpart C (15.247)
<b>FCC ID:</b>	2BAGQ-3RMB01033WBZ
<b>Test Device Serial No.:</b>	S/N:/ <input type="checkbox"/> Production <input checked="" type="checkbox"/> Pre-Production <input type="checkbox"/> Engineering
<b>FCC Classification:</b>	Digital Transmission System (DTS)

## **1. INTRODUCTION**

### **1.1. Scope**

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Innovation, Science and Economic Development Canada.

### **1.2. Fangguang Test Location**

These measurement tests were performed at the Fangguang Inspection and testing Co.,LTD located at 200 Linghu Avenue, Xinwu District, Wuxi City. The detailed description of the measurement facility was found to be in compliance with the requirements of ANSI C63.4-2014.

## 2. PRODUCT INFORMATION

### 2.1. Equipment Description

Product Name:	Smart Bridge MZ1
Model Name:	3RMB01033WBZ
Trade Mark:	ThirdReality
Input Voltage Range:	DC 5V
Wi-Fi Specification:	802.11b/g/n20

### 2.2. Product Specification Subjective to this Report

Frequency Range:	802.11b/g/n20: 2412 ~ 2462MHz
Channel Number:	802.11b/g/n20: 11
Type of Modulation:	802.11b: DSSS 802.11g/n: OFDM
Data Rate:	802.11b: 1/2/5.5/11Mbps 802.11g: 6/9/12/18/24/36/48/54Mbps 802.11n: MCS0~MCS7
Antenna Type:	Ceramic antenna
Antenna Gain:	2.8dBi

### 2.3. Operation Frequency / Channel List

802.11b/g/n20

Channel	Frequency	Channel	Frequency	Channel	Frequency
01	2412 MHz	02	2417 MHz	03	2422 MHz
04	2427 MHz	05	2432 MHz	06	2437 MHz
07	2442 MHz	08	2447 MHz	09	2452 MHz
10	2457 MHz	11	2462 MHz	--	--

## 2.4. Description of Available Antennas

Antenna	Frequency Band (MHz)	Product Number	Tx Paths	Antenna
Ceramic antenna	2400 ~ 2500	/	1	Ant 1

Antenna	Frequency Band (MHz)	Tx Paths	Per Chain Max Antenna Gain (dBi)	Beam Forming Directional Gain (dBi)	CDD Directional Gain (dBi)
			Ant 1		
Ceramic antenna	2400 ~ 2500	1	2.8	NA	NA

Note:

Unequal Antenna gains, with equal transmit powers. For Antenna gains given by  $G_1, G_2, \dots, G_N$  dBi transmit signals are correlated, then

Directional gain =  $10 \cdot \log[(10^{G_1/20} + 10^{G_2/20} + \dots + 10^{G_N/20})^2 / N_{ANT}]$  dBi [Note the “20”s in the denominator of each exponent and the square of the sum of terms; the object is to combine the signal levels coherently.]



## 2.5. Device Capabilities

This device contains the following capabilities:

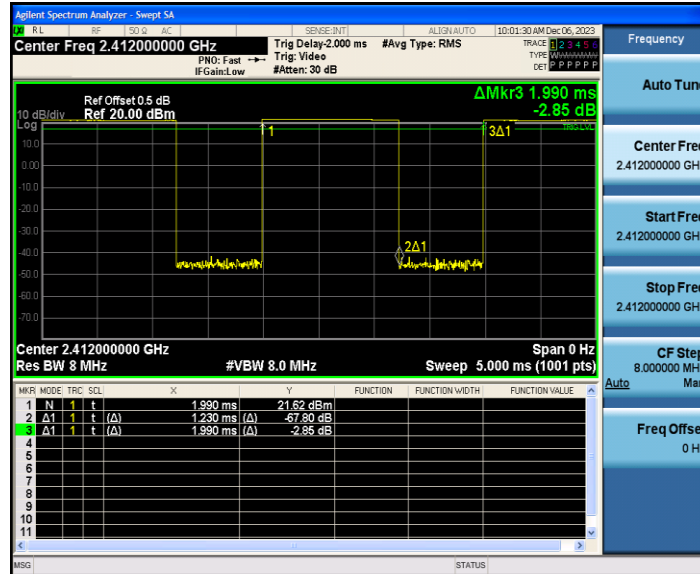
2.4GHz WLAN (DTS)

**Note:** 2.4GHz WLAN (DTS) operation is possible in 20MHz channel bandwidths. The maximum achievable duty cycle was determined based on measurements performed on a spectrum analyzer in zero-span mode with RBW = 8MHz, VBW = 50MHz. The RBW and VBW were both greater than  $50/T$ , where T is the minimum transmission duration, and the number of sweep points across T was greater than 100. The duty cycles:

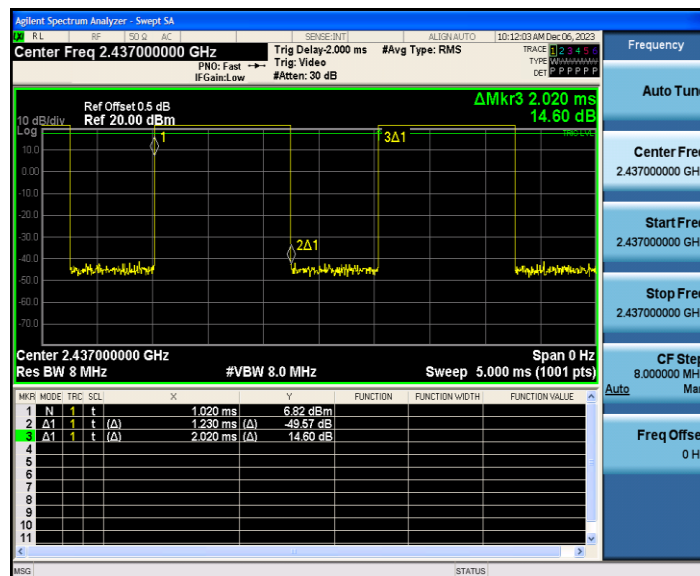
Test Mode	Antenna	Frequency[MHz]	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]
11B	Ant1	2412	1.23	1.99	61.81
		2437	1.23	2.02	60.89
		2462	1.23	2.00	61.50
11G	Ant1	2412	0.54	0.81	66.67
		2437	0.55	1.02	53.92
		2462	0.55	1.01	54.46
11N20SISO	Ant1	2412	0.55	1.01	54.46
		2437	0.55	1.02	53.92
		2462	0.54	1.02	52.94

## Test Graphs

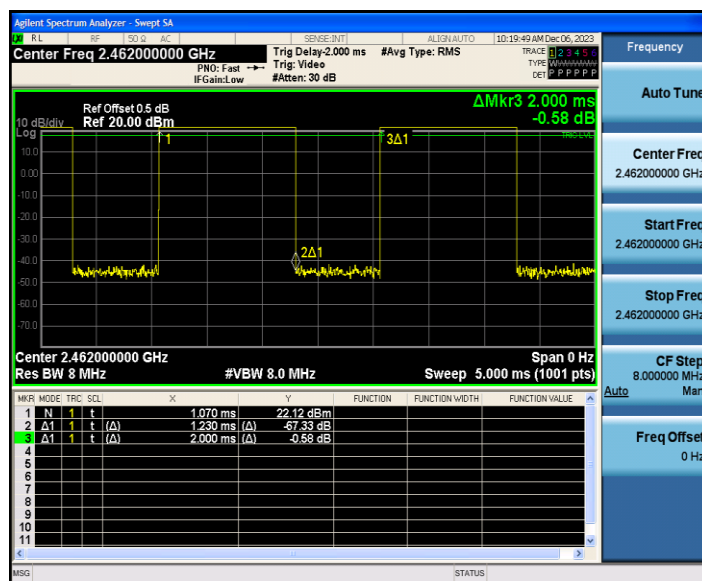
11B\_Ant1\_2412



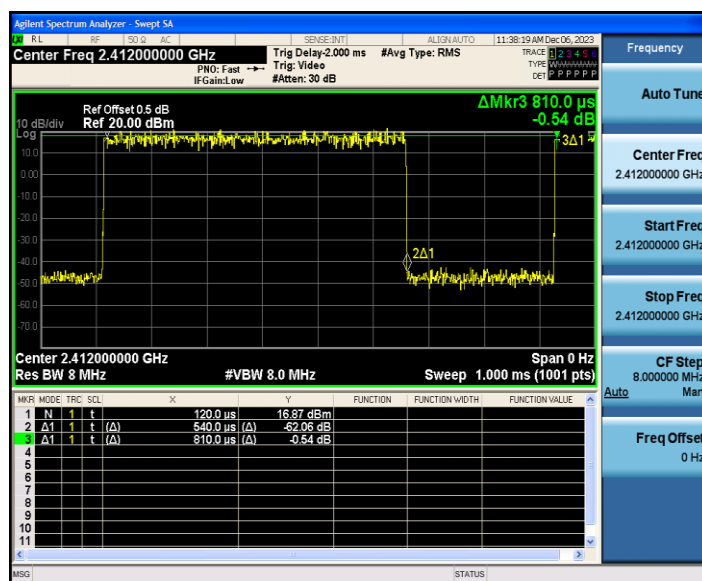
11B\_Ant1\_2437



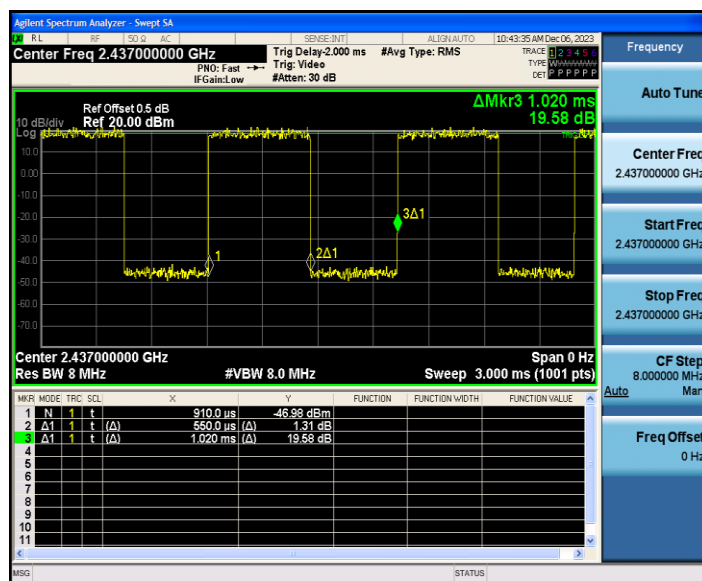
## 11B\_Ant1\_2462



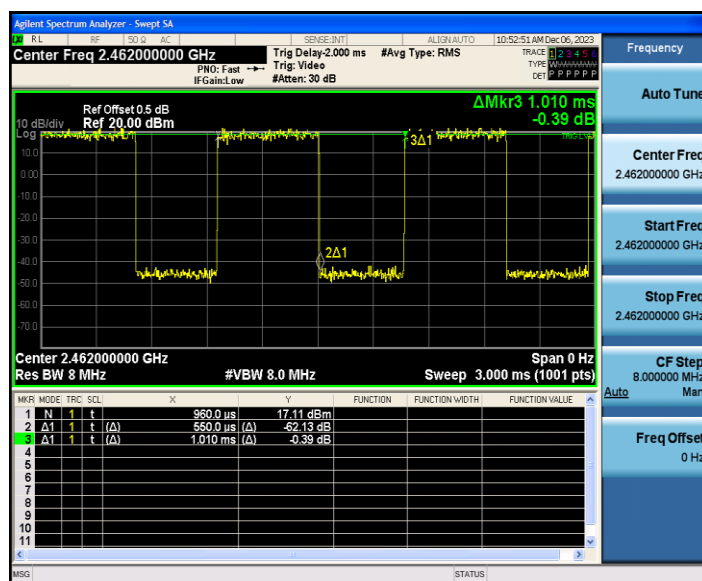
## 11G\_Ant1\_2412



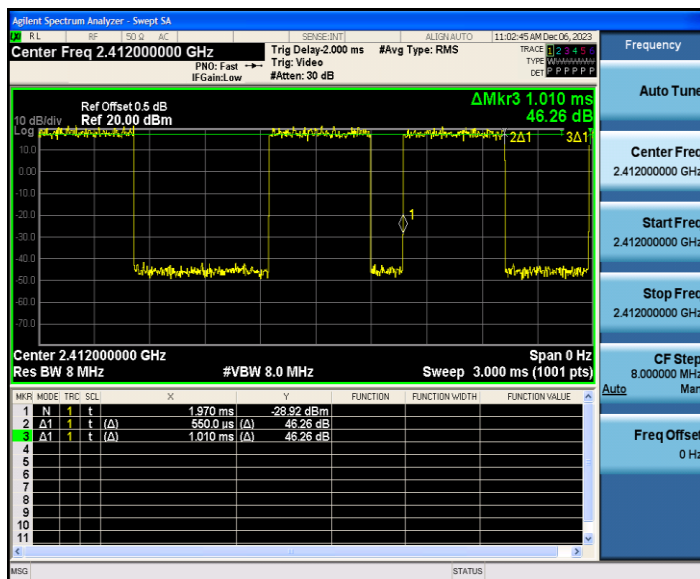
## 11G\_Ant1\_2437



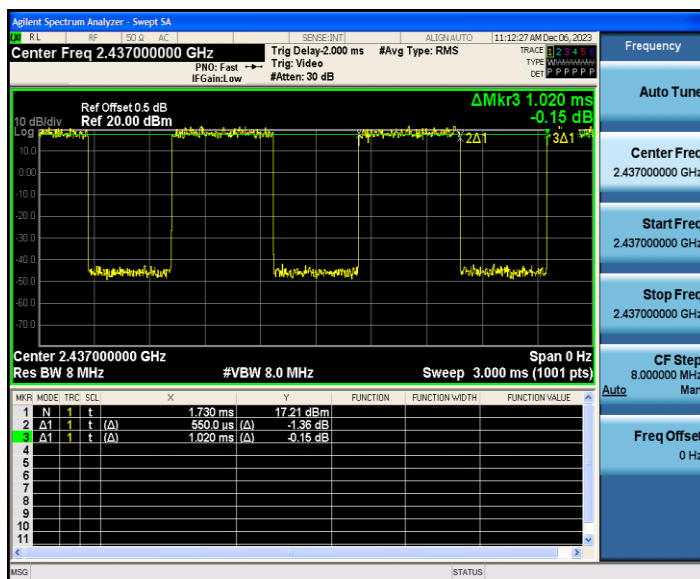
## 11G\_Ant1\_2462



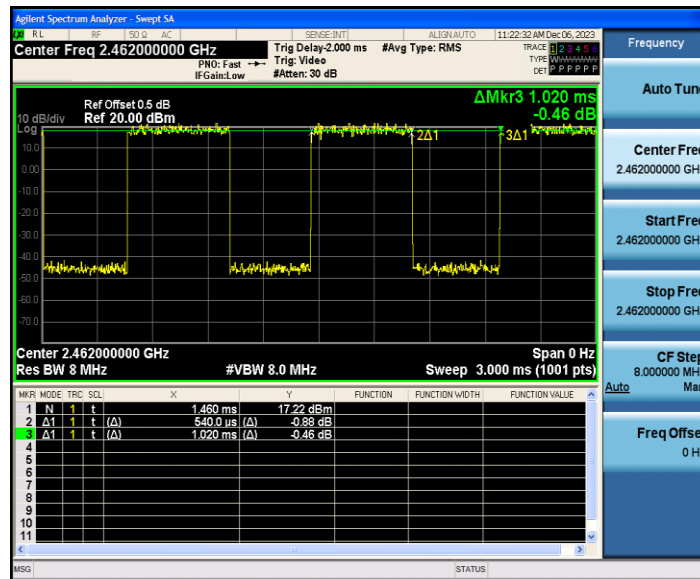
## 11N20SISO\_Ant1\_2412



## 11N20SISO\_Ant1\_2437



## 11N20SISO\_Ant1\_2462



## 2.6. Description of Test Software

The test utility software used during testing was “Bouffalo Lab Dev Cube 1.7.5”, Power Parameter Value:

Test Mode	ANT1
B	22
G	19
N20	19

## 2.7. Test Mode

Test Mode	Mode 1: Transmit by 802.11b
	Mode 2: Transmit by 802.11g
	Mode 3: Transmit by 802.11n20

## 2.8. Test Configuration

The EUT was tested per the guidance of KDB 558074 D01 v05r02. ANSI C63.10-2013 was used to reference the appropriate EUT setup for radiated spurious emissions testing and AC line conducted testing.

## 2.9. EMI Suppression Device(s)/Modifications

No EMI suppression device(s) were added and/or no modifications were made during testing.

## 2.10. Labeling Requirements

Per 2.1074 & 15.19; Docket 95-19

The label shall be permanently affixed at a conspicuous location on the device; instruction manual or pamphlet supplied to the user and be readily visible to the purchaser at the time of purchase.

However, when the device is so small wherein placement of the label with specified statement is not practical, only the FCC ID must be displayed on the device per Section 15.19(a)(5). Please see attachment for FCC ID label and label location.

### 3. DESCRIPTION OF TEST

#### 3.1. Evaluation Procedure

The measurement procedures described in the American National Standard for Testing Unlicensed Wireless Devices (ANSI C63.10-2013), and the guidance provided in KDB 558074 D01 v05r02 were used in the measurement of the EUT.

**Deviation from measurement procedure.....None**

#### 3.2. AC Line Conducted Emissions

The line-conducted facility is located inside an 8'x4'x4' shielded enclosure. A 1m x 2m wooden table 80cm high is placed 40cm away from the vertical wall and 80cm away from the sidewall of the shielded room. Two 10kHz-30MHz, 50Ω/50uH Line-Impedance Stabilization Networks (LISNs) are bonded to the shielded room floor. Power to the LISNs is filtered by external high-current high-insertion loss power line filters. These filters attenuate ambient signal noise from entering the measurement lines. These filters are also bonded to the shielded enclosure.

The EUT is powered from one LISN and the support equipment is powered from the second LISN. All interconnecting cables more than 1 meter were shortened to a 1 meter length by non-inductive bundling (serpentine fashion) and draped over the back edge of the test table. All cables were at least 40cm above the horizontal reference ground-plane. Power cables for support equipment were routed down to the second LISN while ensuring that that cables were not draped over the second LISN.

Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the receiver and exploratory measurements were made to determine the frequencies producing the maximum emission from the EUT. The receiver was scanned from 150kHz to 30MHz. The detector function was set to peak mode for exploratory measurements while the bandwidth of the analyzer was set to 9kHz. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Each emission was also maximized by varying: power lines, the mode of operation or data exchange speed, or support equipment whichever determined the worst-case emission. Once the worst case emissions have been identified, the one EUT cable configuration/arrangement and mode of operation that produced these emissions are used for final measurements on the same test site. The analyzer is set to CISPR quasi-peak and average detectors with a 9kHz resolution bandwidth for final measurements.

An extension cord was used to connect to a single LISN which powered by EUT. The extension cord was calibrated with LISN, the impedance and insertion loss are compliance with the requirements as stated in ANSI C63.10-2013.



### 3.3. Radiated Emissions

The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. For measurements above 1GHz absorbers are arranged on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections. For measurements below 1GHz, the absorbers are removed. The turntable is used for radiated measurement. It is a continuously rotatable, remote controlled, metallic turntable and 2 meters (6.56 ft.) in diameter. The turn table is flush with the raised floor of the chamber in order to maintain its function as a ground plane. An 80cm high PVC support structure is placed on top of the turntable.

For all measurements, the spectrum was scanned through all EUT azimuths and from 1 to 4 meter receive antenna height using a broadband antenna from 30MHz up to the upper frequency shown in 15.33(b)(1) depending on the highest frequency generated or used in the device or on which the device operates or tunes. For frequencies above 1GHz, linearly polarized double ridge horn antennas were used. For frequencies below 30MHz, a calibrated loop antenna was used. When exploratory measurements were necessary, they were performed at 1 meter test distance inside the semi-anechoic chamber using broadband antennas, broadband amplifiers, and spectrum analyzers to determine the frequencies and modes producing the maximum emissions. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The test set-up for frequencies below 1GHz was placed on top of the 0.8 meter high, 1 x 1.5 meter table; and test set-up for frequencies 1-25GHz was placed on top of the 1.5 meter high, 1 x 1.5 meter table. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Appropriate precaution was taken to ensure that all emissions from the EUT were maximized and investigated. The system configuration, clock speed, mode of operation or video resolution, if applicable, turntable azimuth, and receive antenna height was noted for each frequency found.

Final measurements were made in the semi-anechoic chamber using calibrated, linearly polarized broadband and horn antennas. The test setup was configured to the setup that produced the worst case emissions. The spectrum analyzer was set to investigate all frequencies required for testing to compare the highest radiated disturbances with respect to the specified limits. The turntable containing the EUT was rotated through 360 degrees and the height of the receive antenna was varied 1 to 4 meters and stopped at the azimuth and height producing the maximum emission. Each emission was maximized by changing the orientation of the EUT through three orthogonal planes and changing the polarity of the receive antenna, whichever produced the worst-case emissions. According to 3dB Beam-Width of horn antenna, the horn antenna should be always directed to the EUT when rising height.

## 4. ANTENNA REQUIREMENTS

### **Excerpt from §15.203 of the FCC Rules/Regulations:**

“An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can 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.”

- Use a unique coupling to the intentional radiator.

## 5. TEST EQUIPMENT CALIBRATION DATE

### Conducted Emissions

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR3	FWXGJC-2016-181	1 year	2024/03/14
Two-Line V-Network	R&S	ENV 216	FWXGJC-2016-182	1 year	2024/05/14
Thermohygrometer	Yuhuaze	HTC-1	FWXDA-2016-385	1 year	2024/03/21

### Radiated Emission

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Loop Antenna	Schwarzbeck	FMZB 1519B	FWXGJC-2018-015	3 year	2024/08/13
Bi-Log Antenna	R&S	HL562E	FWXGJC-2016-267-06	1 year	2024/03/10
Broadband Horn Antenna	R&S	HF907	FWXGJC-2016-267-07	1 year	2024/03/02
Broadband Horn Antenna	Schwarzbeck	BBHA9170	FWXGJC-2018-016	3 year	2024/06/04
EMI Receiver	R&S	ESR26	FWXGJC-2016-267-01	1 year	2024/11/05
Pre-Amplifier	R&S	SCU-18D	FWXGJC-2016-267-05	1 year	2024/11/05
Pre-Amplifier	R&S	EMC184055 SE	FWXGJC-2018-018	3 year	2025/04/13
Hygrothermograph	Mittel	HTC-1	FWXDA-2016-386	1 year	2024/11/03
Anechoic Chamber	Aimuke	EMCCT-3	FWXGJC-2016-270	3 year	2025/06/07

### Conducted Test Equipment

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EXA Signal Analyzer	Keysight	N9010B	FWXGJC-2018-010	1 year	2024/03/13
RF Control Unit	Toncend	JS0806-2	FWXGJC-2018-013	1 year	2024/05/14
Thermohygrometer	Yuhuaze	HTC-1	FWXDA-2016-385	1 year	2024/03/21

Test Software	Manufacturer	Version	Asset No.	Function
EMI Test Software	Tonscend	V2.5.2.4	FWXWA-2018-004	Emission Test
RF Test Software	Tonscend	3.3.38	/	/

## 6. MEASUREMENT UNCERTAINTY

Where relevant, the following test uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of  $k = 2$ .

AC Conducted Emission Measurement
Measuring Uncertainty for a Level of Confidence of 95% ( $U=2Uc(y)$ ): 2.05dB
Radiated Emission Measurement
Measuring Uncertainty for a Level of Confidence of 95% ( $U=2Uc(y)$ ): 30MHz-1GHz: 3.06dB 1GHz-12.75GHz: 4.13dB
Spurious Emissions, Conducted
Measuring Uncertainty for a Level of Confidence of 95% ( $U=2Uc(y)$ ): 30MHz-1GHz: 1.00 dB 1GHz-26.5GHz: 1.30 dB
Output Power
Measuring Uncertainty for a Level of Confidence of 95% ( $U=2Uc(y)$ ): 0.60dB
Power Spectrum Density
Measuring Uncertainty for a Level of Confidence of 95% ( $U=2Uc(y)$ ): 0.80dB
Occupied Bandwidth
Measuring Uncertainty for a Level of Confidence of 95% ( $U=2Uc(y)$ ): 0.20MHz

## 7. TEST RESULT

### 7.1. Summary

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
15.203	Antenna Requirement	/	/	Pass	Section 4
15.247(a)(2)	6dB Bandwidth	$\geq 500\text{kHz}$	Conducted	Pass	Section 7.2
15.247(b)(3)	Output Power	$\leq 30\text{dBm}$		Pass	Section 7.3
15.247(e)	Power Spectral Density	$\leq 8\text{dBm}/3\text{kHz}$		Pass	Section 7.4
15.247(d)	Band Edge	$\geq 20\text{dBc}$		Pass	Section 7.5
15.247(d)	Out-of-Band Emissions	$\geq 20\text{dBc}$		Pass	Section 7.5
15.205	Restricted Bands	Emissions in restricted bands must meet the radiated limits detailed in 15.205	Radiated	Pass	Section 7.7
15.209	General Field Strength Limits (Radiated Emission Limits)	Radiated Emission must meet the radiated limits detailed in 15.209 (RSS GEN [8.9])		Pass	Section 7.6
15.207	AC Conducted Emissions 150kHz - 30MHz	< FCC 15.207 limits	AC Line Conducted	Pass	Section 7.8

**Notes:**

- 1) All modes of operation and data rates were investigated. For radiated emission test, every axis (X, Y, Z) was also verified. The test results shown in the following sections represent the worst case emissions.
- 2) The analyzer plots shown in this section were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables and attenuators used as part of the system to connect the EUT to the analyzer at all frequencies of interest.
- 3) All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables and attenuators.

## 7.2. 6dB Bandwidth Measurement

### 7.2.1. Test Limit

The minimum permissible 6dB bandwidth is 500 kHz.

### 7.2.2. Test Procedure used

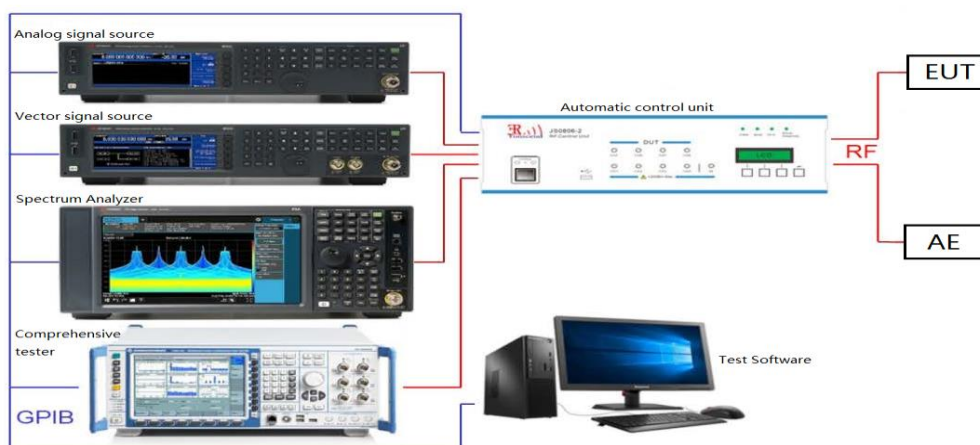
ANSI C63.10-2013 Section 11.8.2 Option 1

KDB 558074 D01 v05r02 – Section 8.2

### 7.2.3. Test Setting

1. Set RBW = 100 kHz
2. VBW  $\geq 3 \times$  RBW
3. Detector = peak
4. Trace mode = max hold
5. Sweep = auto couple
6. Allow the trace was allowed to stabilize
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

### 7.2.4. Test Setup



### 7.2.5. Test Result

Test Mode	Antenna	Frequency[MHz]	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	99%BW	Verdict
11B	Ant1	2412	9.040	2407.520	2416.560	0.5	13.273	PASS
		2437	9.000	2432.520	2441.520	0.5	13.251	PASS
		2462	9.080	2457.520	2466.600	0.5	13.229	PASS
11G	Ant1	2412	15.080	2404.480	2419.560	0.5	16.595	PASS
		2437	13.160	2430.160	2443.320	0.5	16.632	PASS
		2462	15.080	2454.520	2469.600	0.5	16.671	PASS
11N20SISO	Ant1	2412	15.160	2404.520	2419.680	0.5	17.471	PASS
		2437	15.080	2429.480	2444.560	0.5	17.443	PASS
		2462	15.440	2454.160	2469.600	0.5	17.447	PASS



## Test Graphs of 6dB Bandwidth

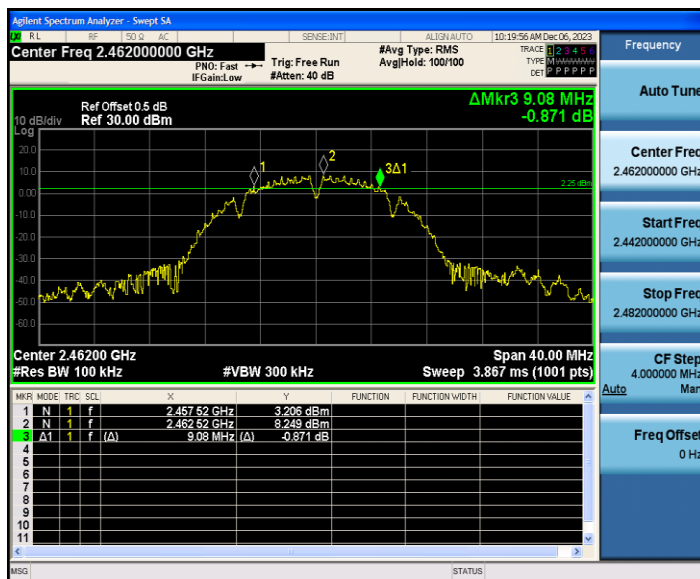
11B\_Ant1\_2412



11B\_Ant1\_2437



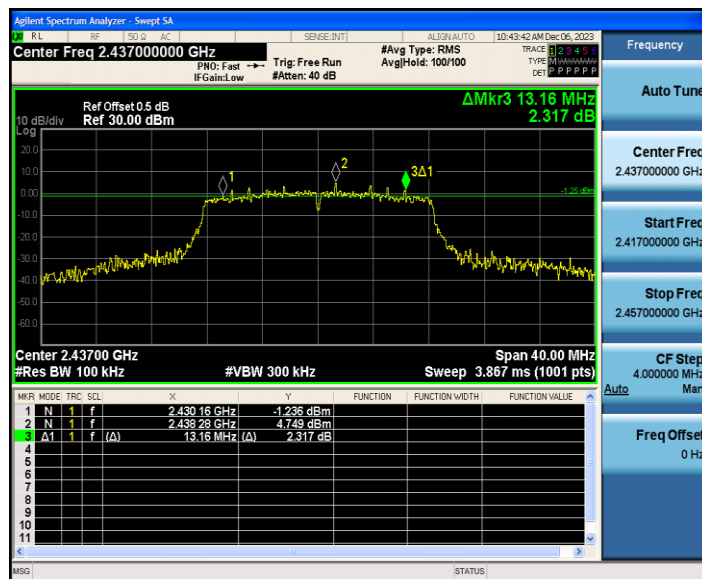
## 11B\_Ant1\_2462



## 11G\_Ant1\_2412



## 11G\_Ant1\_2437



## 11G\_Ant1\_2462



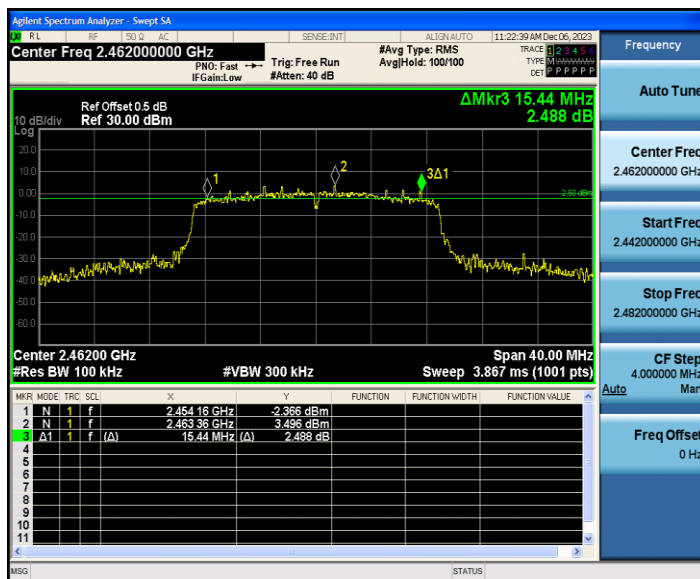
## 11N20SISO\_Ant1\_2412



## 11N20SISO\_Ant1\_2437

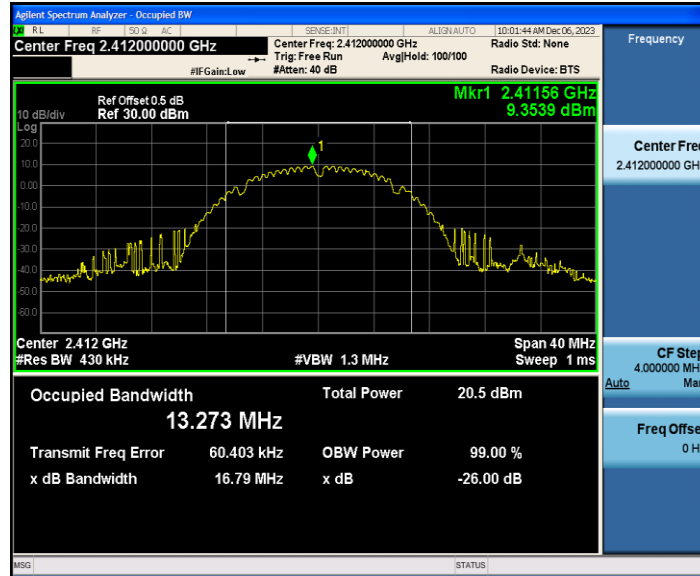


## 11N20SISO\_Ant1\_2462

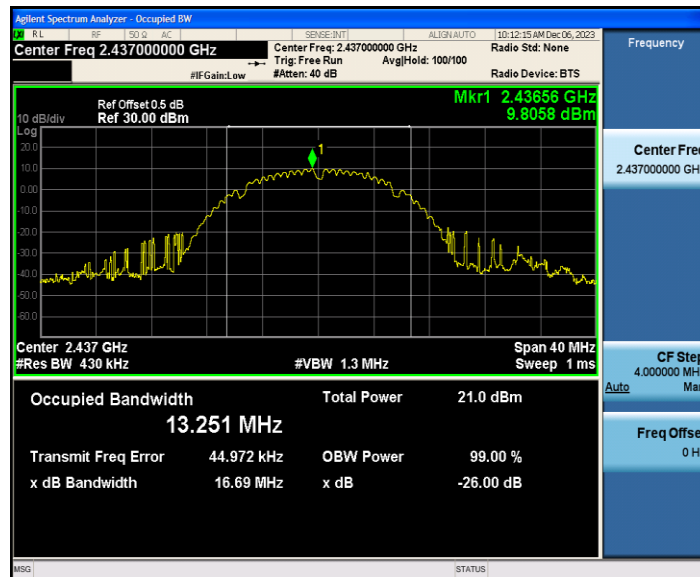


## Test Graphs of Occupied Channel Bandwidth

11B\_Ant1\_2412



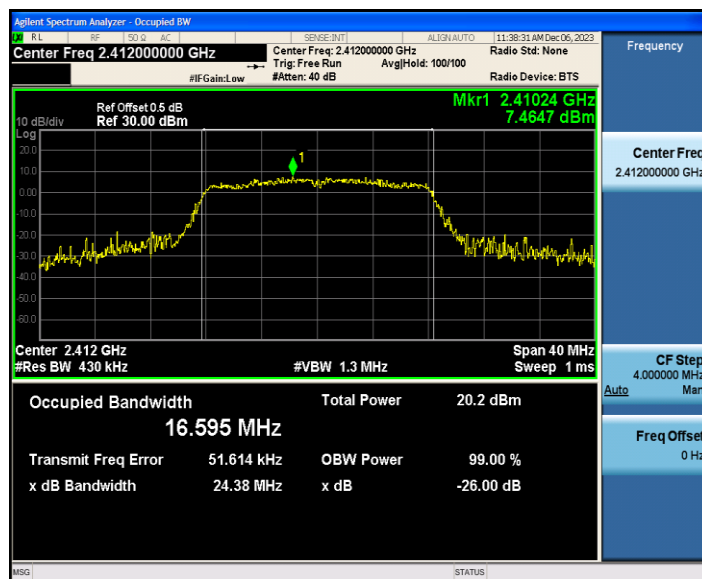
11B\_Ant1\_2437



## 11B\_Ant1\_2462



## 11G\_Ant1\_2412



## 11G\_Ant1\_2437

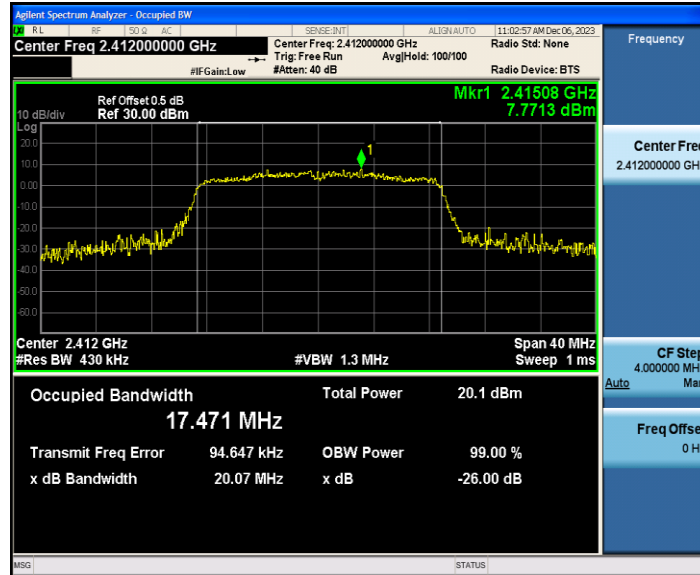


## 11G\_Ant1\_2462

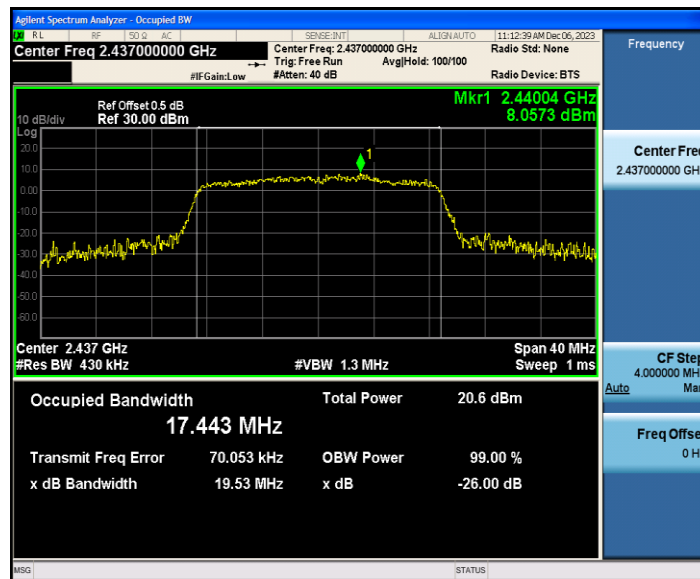




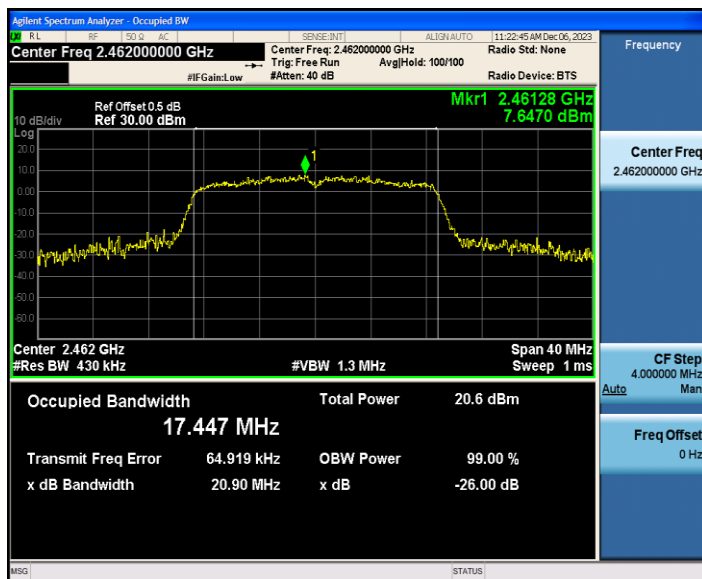
## 11N20SISO\_Ant1\_2412



## 11N20SISO\_Ant1\_2437



## 11N20SISO\_Ant1\_2462



### 7.3. Output Power Measurement

#### 7.3.1. Test Limit

The maximum conducted output power is 1 Watt. And for antenna gain greater than 6dBi the limit shall reduce by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

#### 7.3.2. Test Procedure Used

ANSI C63.10-2013 – Section 11.9.2.2.4

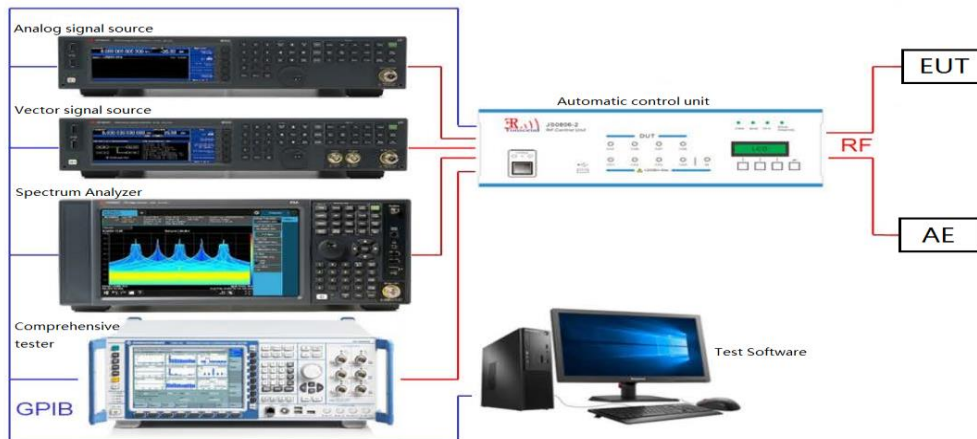
KDB 558074 D01 v05r02 – Section 8.3.2.2

#### 7.3.3. Test Setting

1. Set span to at least 1.5 times the OBW..
2. Set RBW = 1% to 5% of the OBW, not to exceed 1 MHz.
3. Set VBW  $\geq [3 \times \text{RBW}]$ .
4. Number of points in sweep  $\geq [2 \times \text{span} / \text{RBW}]$ . (This gives bin-to-bin spacing  $\text{RBW} / 2$ , so that narrowband signals are not lost between frequency bins.)
5. Sweep time = auto.
6. Detector = RMS (i.e., power averaging), if available. Otherwise, use sample detector mode.
7. Do not use sweep triggering. Allow the sweep to “free run.”
8. Trace average at least 100 traces in power averaging (rms) mode; however, the number of traces to be averaged shall be increased above 100 as needed such that the average accurately represents the true average over the ON and OFF periods of the transmitter.
9. Compute power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function with band limits set equal to the OBW band edges. If the instrument does not have a band power function, then sum the spectrum levels (in power units) at intervals equal to the RBW extending across the entire OBW of the spectrum. 10Add  $[10 \log (1 / D)]$ , where D is the duty cycle, to the measured power to compute the average power during the actual transmission times (because the measurement represents an average over both

the ON and OFF times of the transmission). For example, add  $[10 \log (1/0.25)] = 6 \text{ dB}$  if the duty cycle is 25%.

#### 7.3.4. Test Setup



### 7.3.5. Test Result

Power output test was verified over all data rates of each mode shown as below, and then choose the maximum power output (yellow marker) for final test of each channel.

N <sub>TX</sub>	Data Rate (Mbps)	
	802.11b	802.11g
1	1	6
1	2	9
1	5.5	12
1	11	18
1	--	24
1	--	36
1	--	48
1	--	54

N <sub>TX</sub>	MCS Index for 802.11n	Data Rate (Mbps)			
		20MHz Bandwidth		40MHz Bandwidth	
		800ns GI	400ns GI	800ns GI	400ns GI
1	0	6.5	7.2	13.5	15.0
1	1	13.0	14.4	27.0	30.0
1	2	19.5	21.7	40.5	45.0
1	3	26.0	28.9	54.0	60.0
1	4	39.0	43.3	81.0	90.0
1	5	52.0	57.8	108.0	120.0
1	6	58.5	65.0	121.5	135.0
1	7	65.0	72.2	135.0	150.0

Note: Power output test was verified over all data rates of each mode shown as above, and then choose the maximum power output (yellow marker) for final test of each channel.

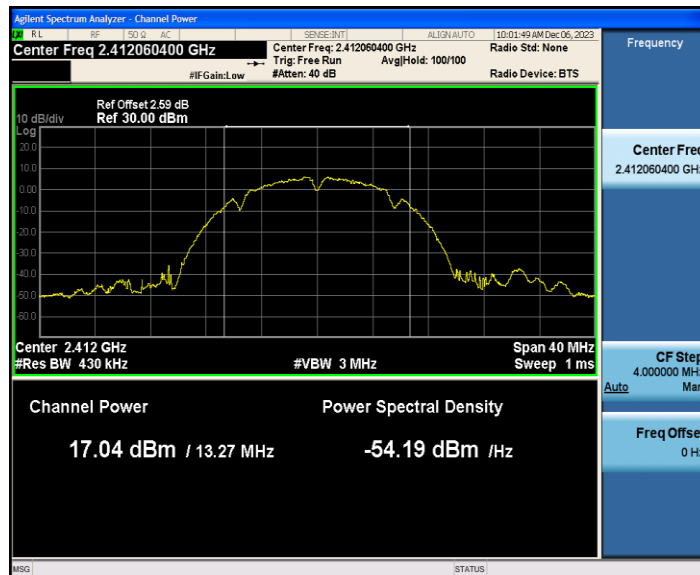
### Test Result of Maximum conducted output power

Test Mode	Antenna	Frequency[MHz]	Average power [dBm]	Result [dBm]	Limit [dBm]	Verdict
11B	Ant1	2412	14.95	17.04	≤30.00	PASS
		2437	16.09	18.24	≤30.00	PASS
		2462	16.18	18.29	≤30.00	PASS
11G	Ant1	2412	12.13	13.89	≤30.00	PASS
		2437	12.11	14.79	≤30.00	PASS
		2462	12.77	15.41	≤30.00	PASS
11N20SISO	Ant1	2412	11.39	14.03	≤30.00	PASS
		2437	11.38	14.06	≤30.00	PASS
		2462	11.76	14.52	≤30.00	PASS

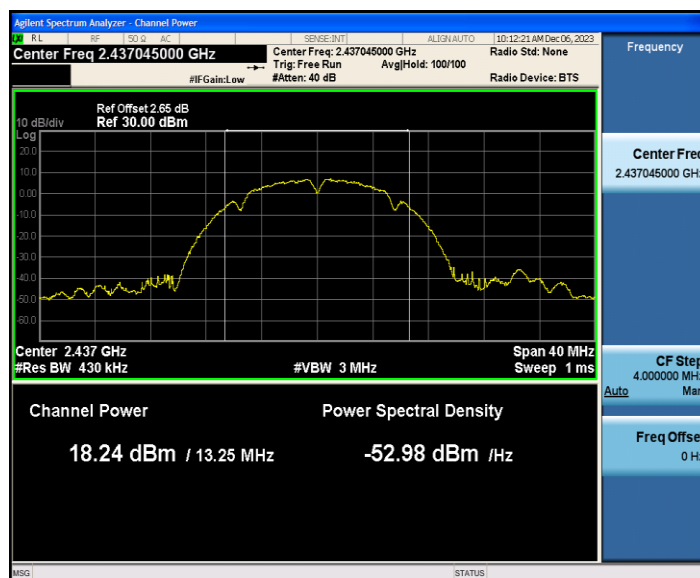
The Duty Cycle Factor is compensated in the Offset of graph.

## Test Graphs

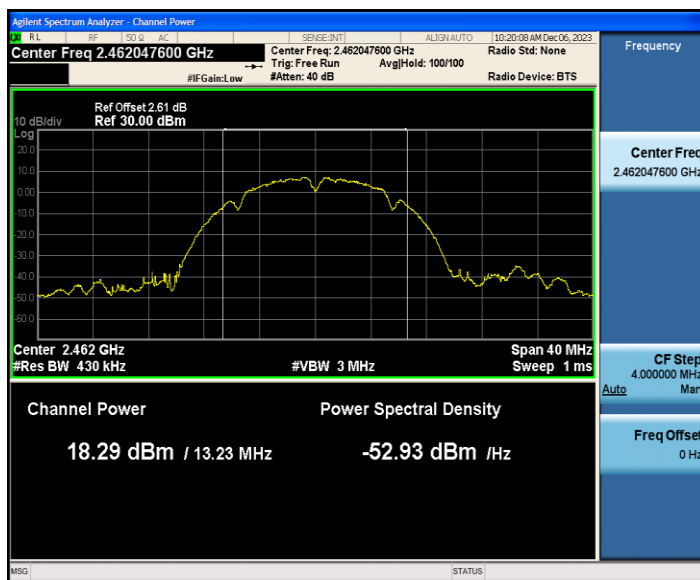
11B\_Ant1\_2412



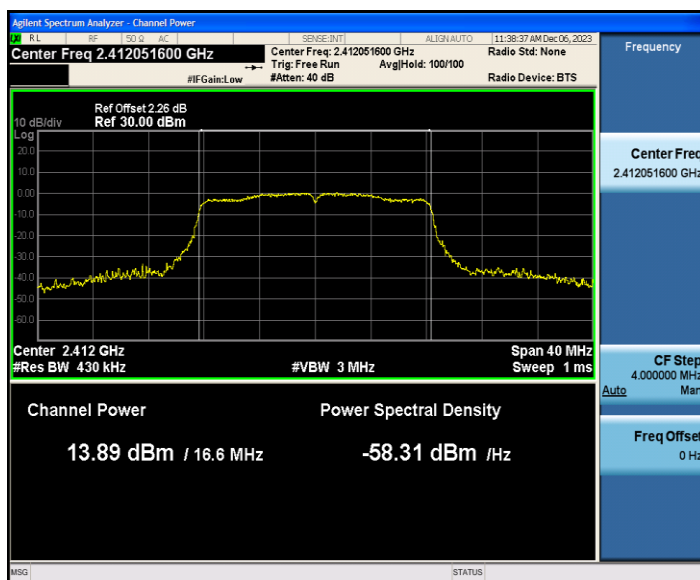
11B\_Ant1\_2437



11B\_Ant1\_2462

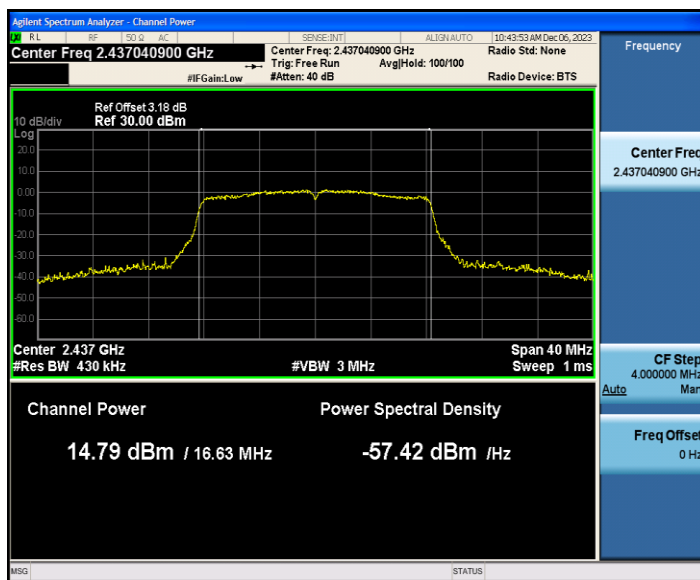


11G\_Ant1\_2412

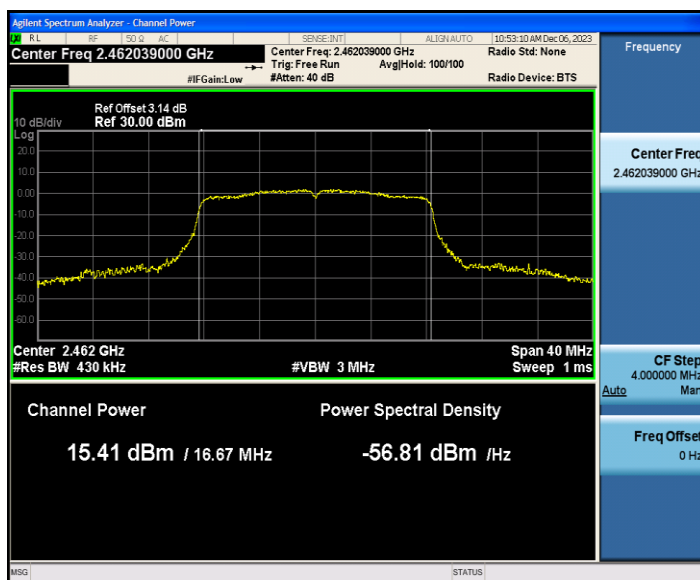


11G\_Ant1\_2437

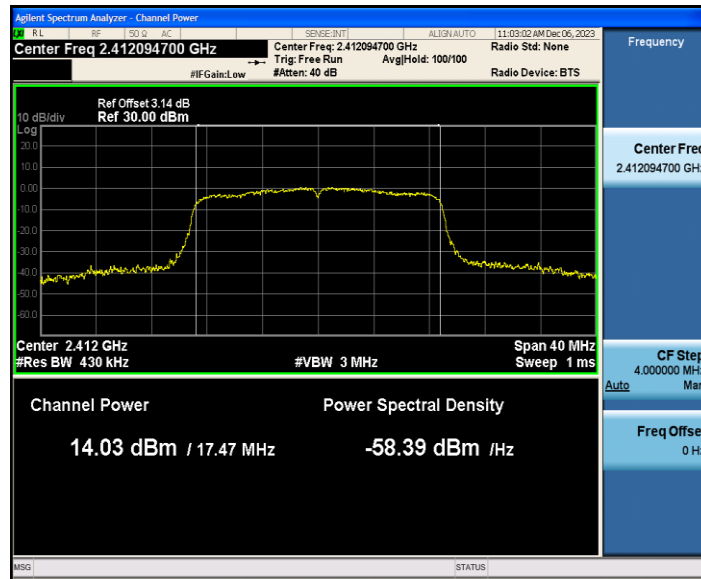




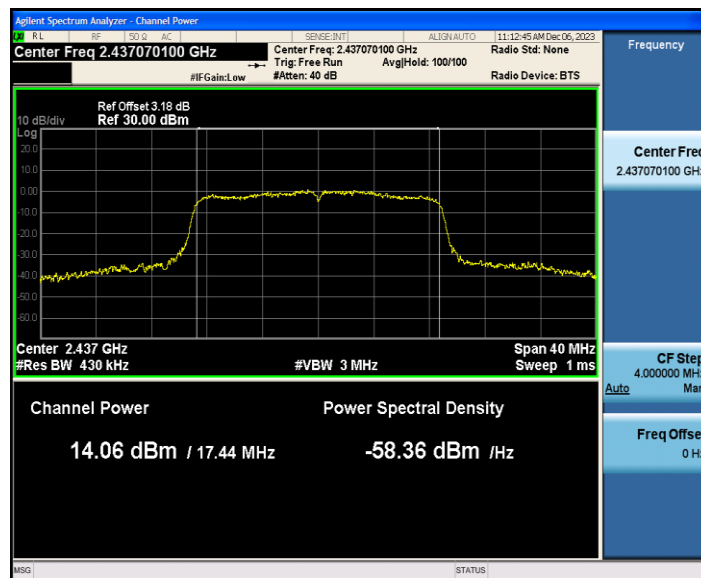
11G\_Ant1\_2462



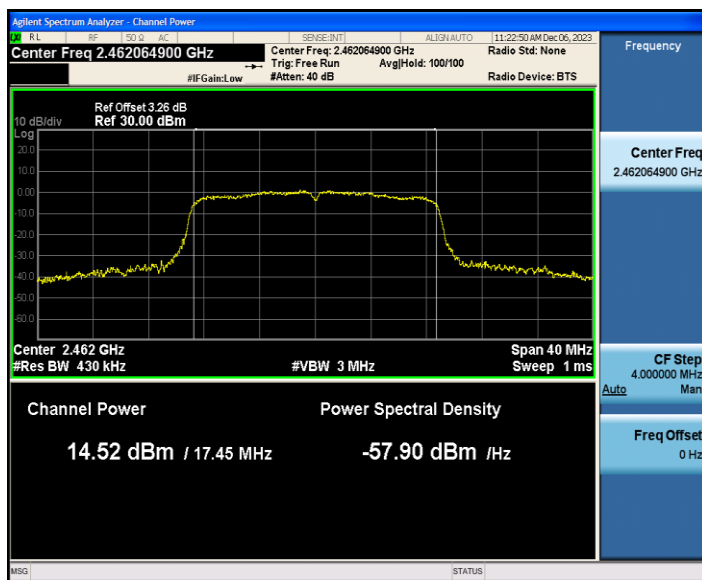
11N20SISO\_Ant1\_2412



11N20SISO\_Ant1\_2437



11N20SISO\_Ant1\_2462



## 7.4. Power Spectral Density Measurement

### 7.4.1. Test Limit

The maximum permissible power spectral density is 8dBm in any 3 kHz band. And for antenna gain greater than 6dBi the limit shall reduce by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

### 7.4.2. Test Procedure Used

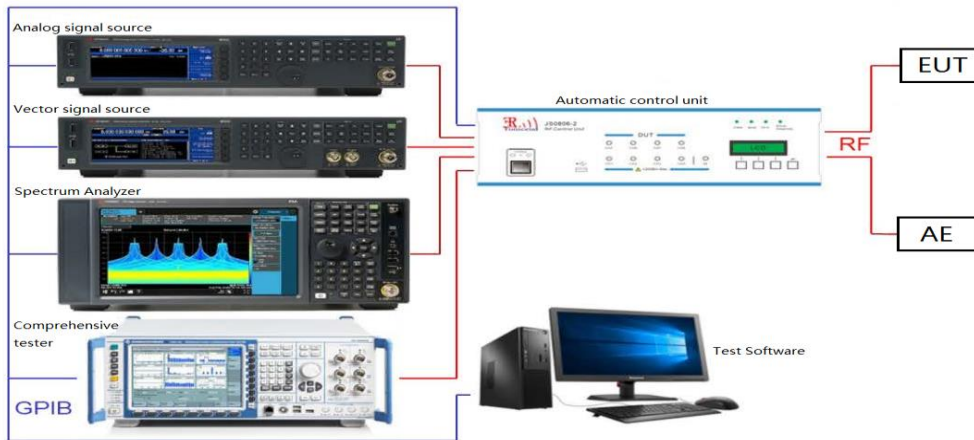
KDB 558074 D01 v05r02 - Section 8.4

ANSI C63.10 – Section 11.10.5

### 7.4.3. Test Setting

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the OBW.
3. Set the RBW to  $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$ .
4. Set the VBW  $\geq [3 \times \text{RBW}]$ .
5. Detector = power averaging (rms) or sample detector (when rms not available).
6. Ensure that the number of measurement points in the sweep  $\geq [2 \times \text{span} / \text{RBW}]$ .
7. Sweep time = auto couple.
8. Do not use sweep triggering; allow sweep to “free run.”
9. Employ trace averaging (rms) mode over a minimum of 100 traces.
10. Use the peak marker function to determine the maximum amplitude level.
11. Add  $[10 \log (1 / D)]$ , where D is the duty cycle measured in step a), to the measured PSD to
12. If measured value exceeds requirement specified by regulatory agency, then reduce RBW (but no less than 3 kHz) and repeat (note that this may require zooming in on the emission of interest and reducing the span to meet the minimum measurement point requirement as the RBW is reduced)..

#### 7.4.4. Test Setup

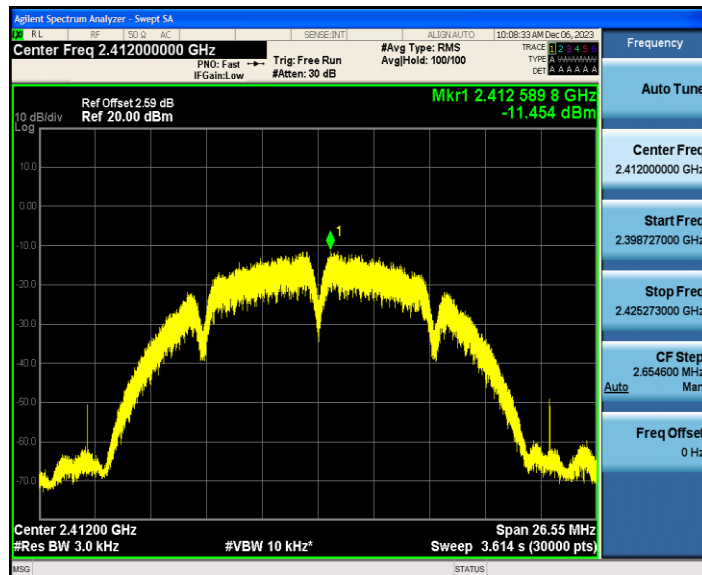


**7.4.5. Test Result**

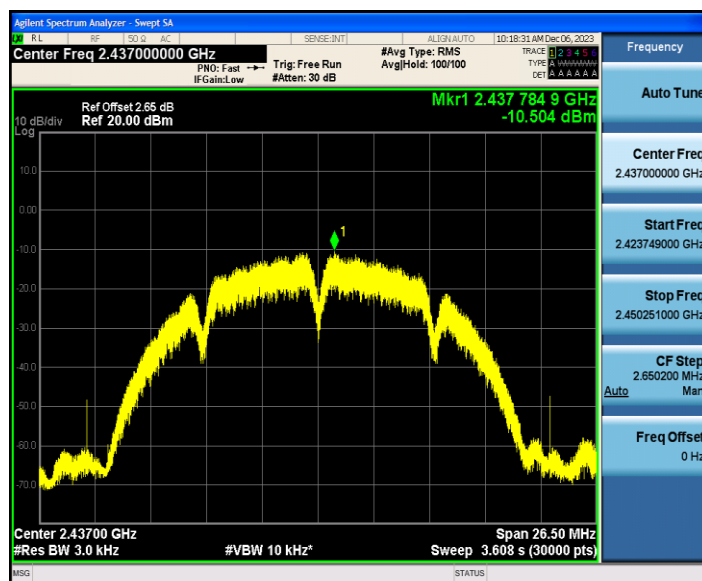
Test Mode	Antenna	Frequency[MHz]	Result[dBm/3-100kHz]	Limit[dBm/3kHz]	Verdict
11B	Ant1	2412	-11.45	≤8.00	PASS
		2437	-10.50	≤8.00	PASS
		2462	-10.46	≤8.00	PASS
11G	Ant1	2412	-18.50	≤8.00	PASS
		2437	-17.51	≤8.00	PASS
		2462	-17.77	≤8.00	PASS
11N20SISO	Ant1	2412	-17.44	≤8.00	PASS
		2437	-17.07	≤8.00	PASS
		2462	-16.53	≤8.00	PASS

## Test Graphs

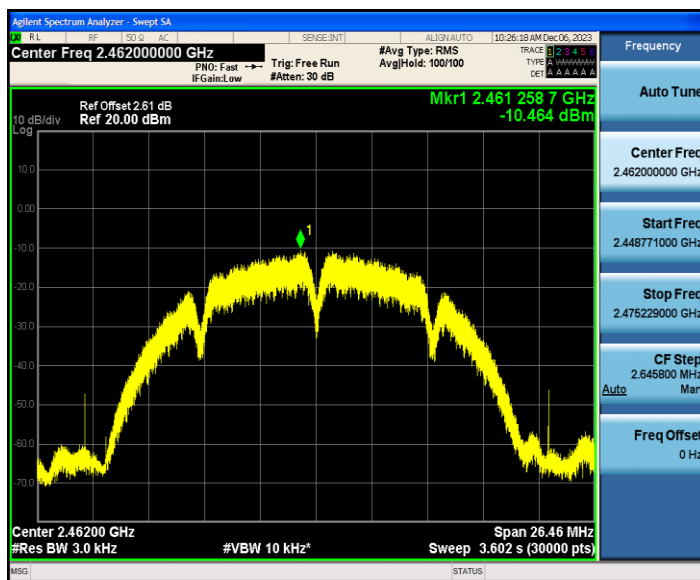
11B\_Ant1\_2412



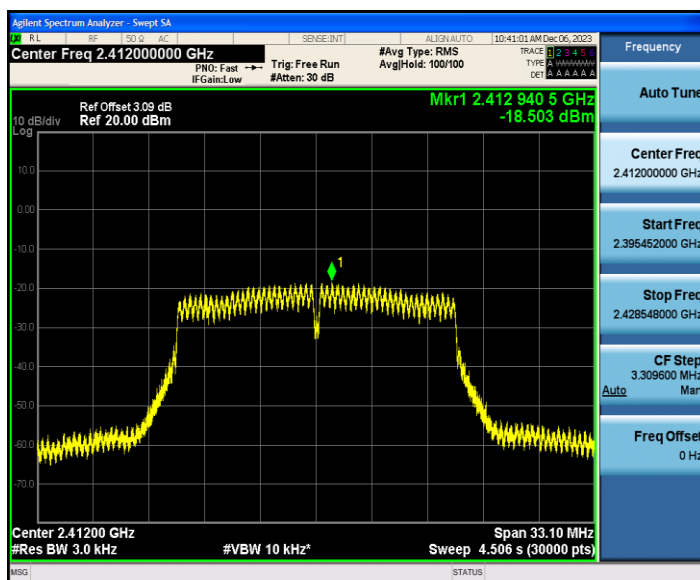
11B\_Ant1\_2437



11B\_Ant1\_2462

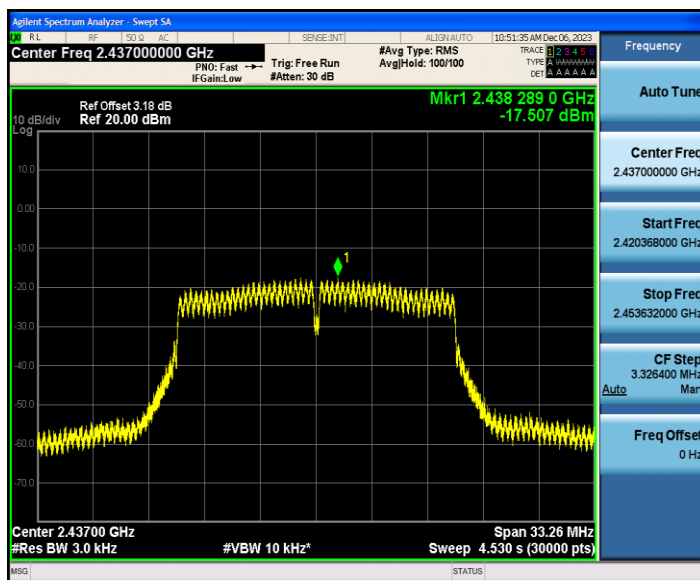


11G\_Ant1\_2412

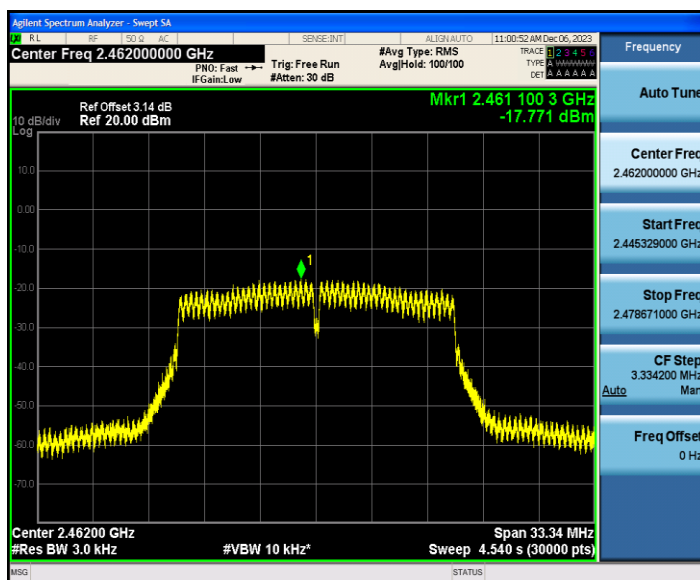


11G\_Ant1\_2437

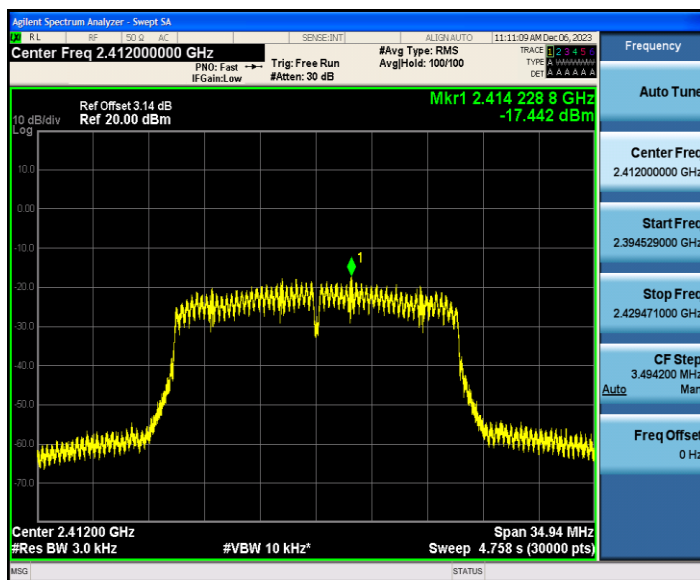




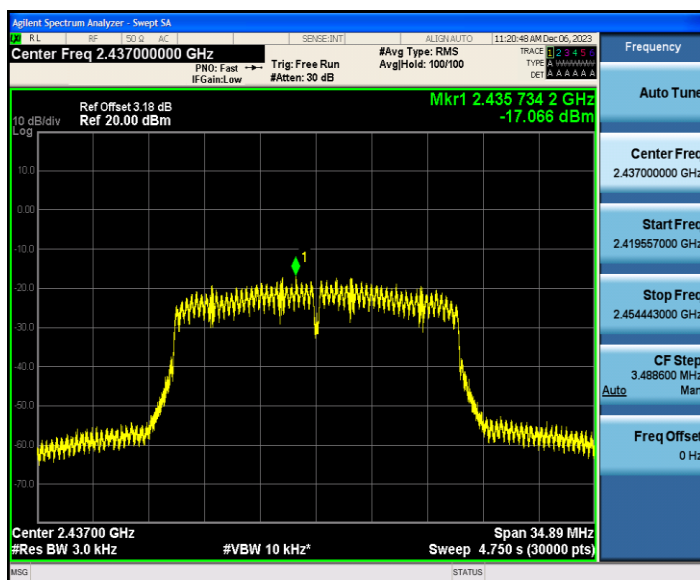
11G\_Ant1\_2462



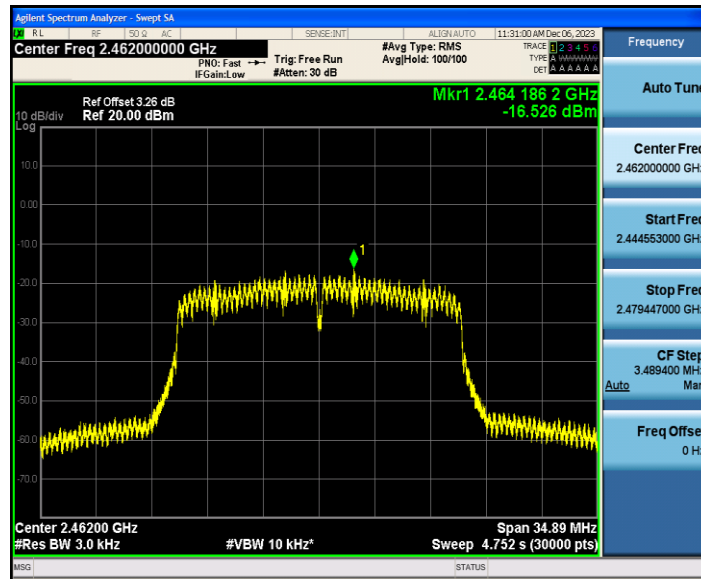
11N20SISO\_Ant1\_2412



11N20SISO\_Ant1\_2437



11N20SISO\_Ant1\_2462





## 7.5. Conducted Band Edge and Out-of-Band Emissions

### 7.5.1. Test Limit

The limit for out-of-band spurious emissions at the band edge is 30dB below the fundamental emission level, as determined from the in-band power measurement of the DTS channel performed in a 100 kHz bandwidth per the PSD procedure.

### 7.5.2. Test Procedure Used

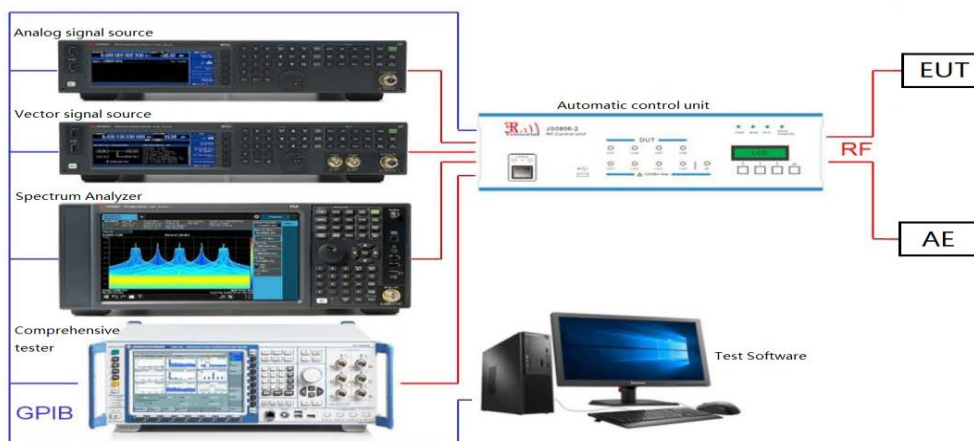
KDB 558074 D01 v05r02 - Section 8.5 & Section 8.6

ANSI C63.10 – Section 11.11&11.12

### 7.5.3. Test Setting

- (a) Set the center frequency and span to encompass frequency range to be measured
- (b) RBW = 100kHz
- (c) VBW = 300kHz
- (d) Detector = RMS
- (e) Trace mode = max hold
- (f) Sweep time = auto couple
- (g) The trace was allowed to stabilize

### 7.5.4. Test Setup

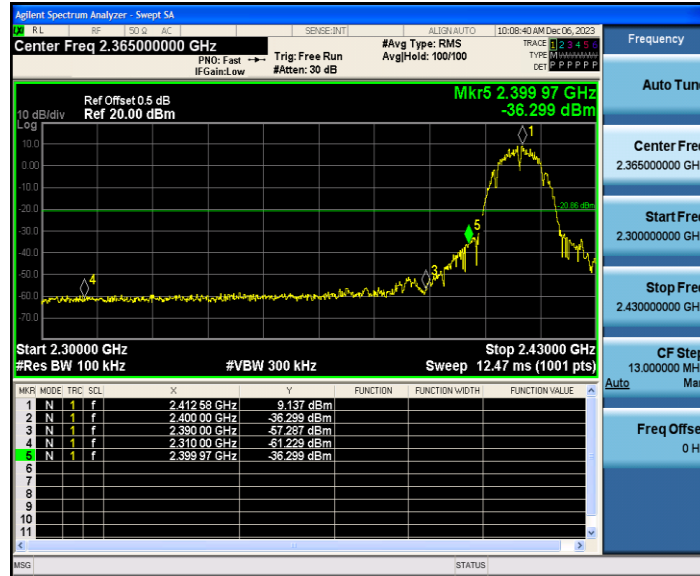


### 7.5.5. Test Result

Test Mode	Antenna	Frequency[MHz]	FreqRange [Mhz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
11B	Ant1	2412	Reference	7.65	7.65	---	PASS
			30~1000	7.65	-69.49	≤-22.35	PASS
			1000~26500	7.65	-42.28	≤-22.35	PASS
		2437	Reference	7.30	7.30	---	PASS
			30~1000	7.30	-69.29	≤-22.7	PASS
			1000~26500	7.30	-41.8	≤-22.7	PASS
		2462	Reference	8.31	8.31	---	PASS
			30~1000	8.31	-68.98	≤-21.69	PASS
			1000~26500	8.31	-42.14	≤-21.69	PASS
11G	Ant1	2412	Reference	0.82	0.82	---	PASS
			30~1000	0.82	-65.44	≤-29.18	PASS
			1000~26500	0.82	-55.8	≤-29.18	PASS
		2437	Reference	3.88	3.88	---	PASS
			30~1000	3.88	-65.03	≤-26.12	PASS
			1000~26500	3.88	-55.79	≤-26.12	PASS
		2462	Reference	3.10	3.10	---	PASS
			30~1000	3.10	-61.08	≤-26.9	PASS
			1000~26500	3.10	-53.91	≤-26.9	PASS
11N20SISO	Ant1	2412	Reference	2.04	2.04	---	PASS
			30~1000	2.04	-63.77	≤-27.96	PASS
			1000~26500	2.04	-56.57	≤-27.96	PASS
		2437	Reference	1.94	1.94	---	PASS
			30~1000	1.94	-66.1	≤-28.06	PASS
			1000~26500	1.94	-55.99	≤-28.06	PASS
		2462	Reference	2.97	2.97	---	PASS
			30~1000	2.97	-63.65	≤-27.03	PASS
			1000~26500	2.97	-55.44	≤-27.03	PASS

## Test Graphs of Band Edge

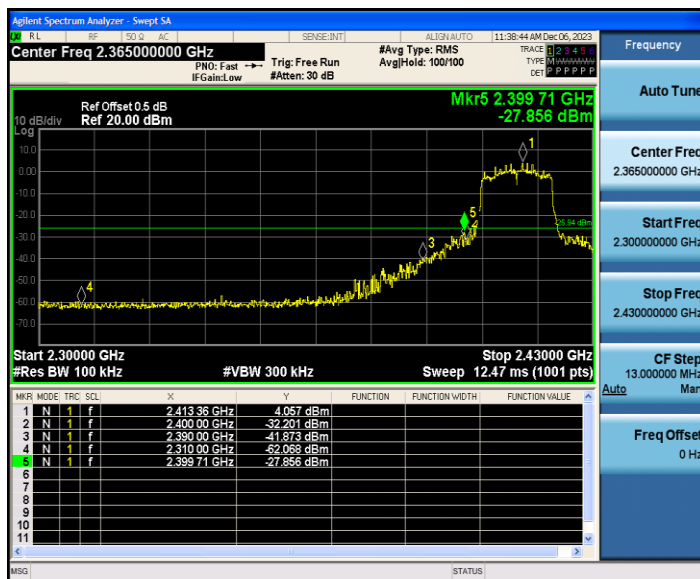
11B\_Ant1\_Low\_2412



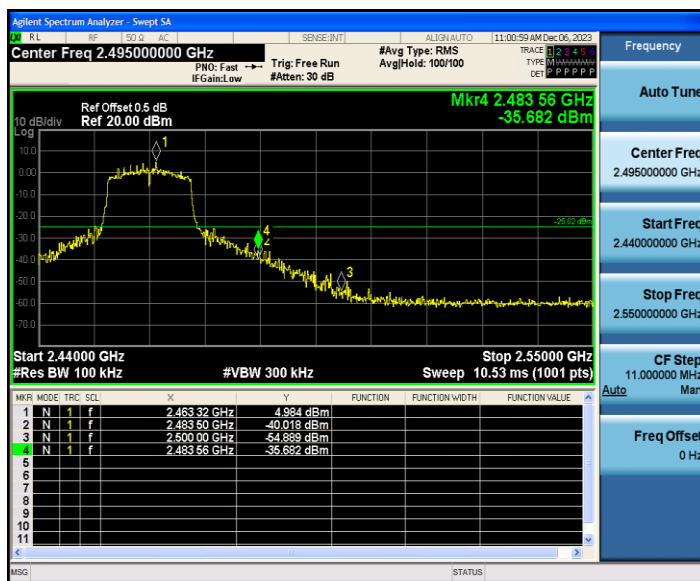
11B\_Ant1\_High\_2462



## 11G\_Ant1\_Low\_2412



## 11G\_Ant1\_High\_2462

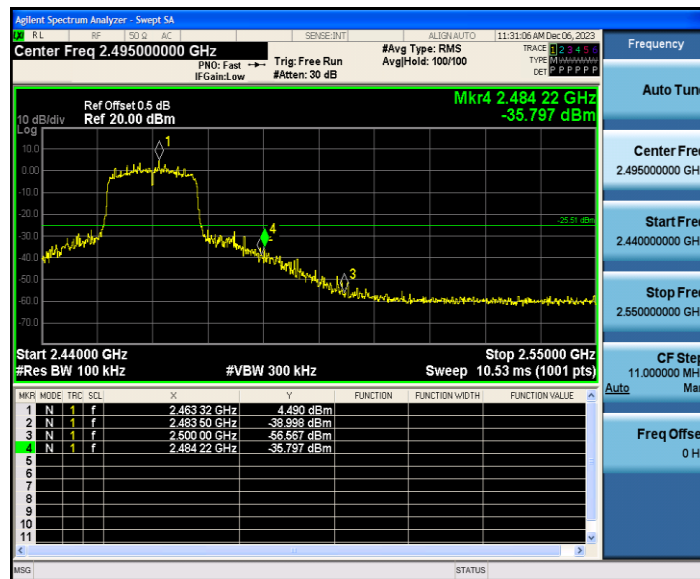




## 11N20SISO\_Ant1\_Low\_2412



## 11N20SISO\_Ant1\_High\_2462

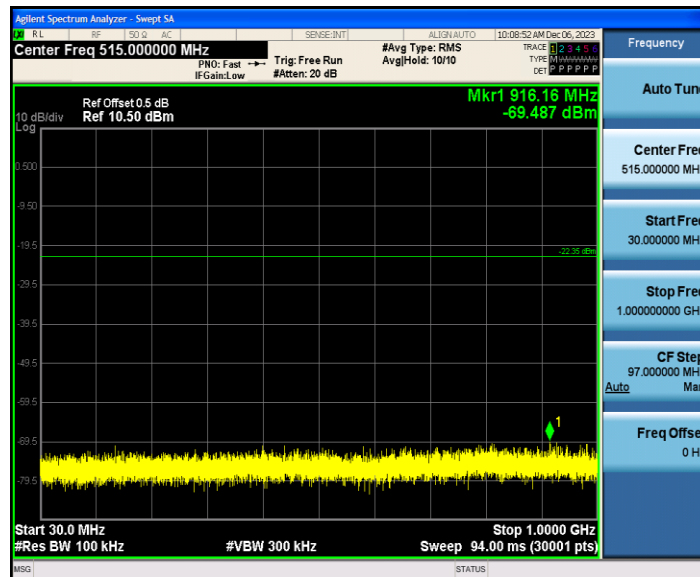


## Test Graphs of Out-of-Band Emissions

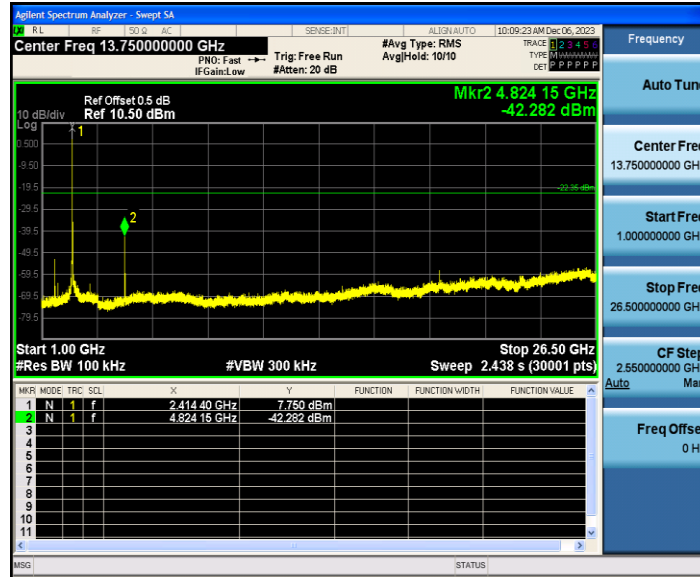
11B\_Ant1\_2412\_0~Reference



11B\_Ant1\_2412\_30~1000



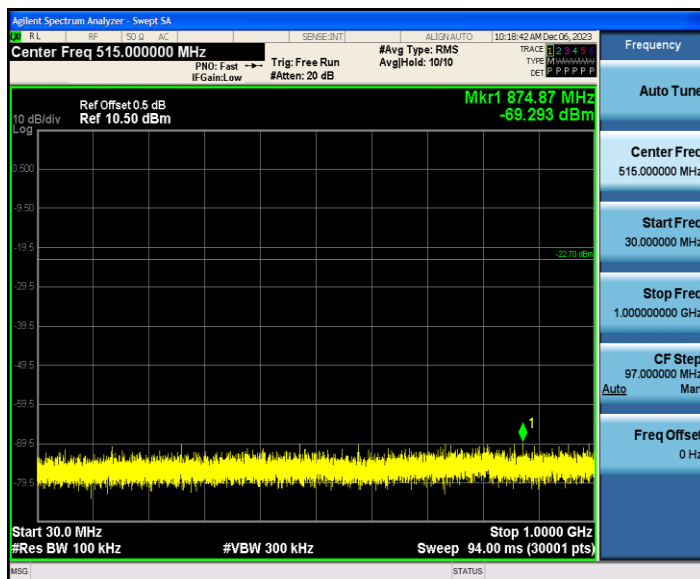
## 11B\_Ant1\_2412\_1000~26500



## 11B\_Ant1\_2437\_0~Reference



## 11B\_Ant1\_2437\_30~1000



## 11B\_Ant1\_2437\_1000~26500

