TEST REPORT

FCC BT LE Test for SM-S931B/DS
Certification

APPLICANT
SAMSUNG Electronics Co., Ltd.

REPORT NO.
HCT-RF-2410-FC066-R1

DATE OF ISSUE
November 12, 2024

Tested by
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Additional Model
SM-S931B

Applicant	**SAMSUNG Electronics Co., Ltd.** 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
Product Name Model Name	Mobile Phone SM-S931B/DS
FCC ID	A3LSMS931B
Date of Test	September 04, 2024 ~ October 29, 2024
FCC Classification	Digital Transmission System(DTS)
Test Standard Used	FCC Rule Part(s): Part 15.247
Test Results	PASS
Location of Test	■ Permanent Testing Lab ☐ On Site Testing Lab (Address: 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Republic of Korea)

REVISION HISTORY

The revision history for this test report is shown in table.

Revision No.	Date of Issue	Description
0	October 29, 2024	Initial Release
1	November 12, 2024	Revised the Bluetooth Version.

Notice

Content
Engineering Statement: The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of the FCC Rules under normal use and maintenance. The results shown in this test report only apply to the sample(s), as received, provided by the applicant, unless otherwise stated. The test results have only been applied with the test methods required by the standard(s). The laboratory is not accredited for the test results marked *. Information provided by the applicant is marked **. Test results provided by external providers are marked ***. When confirmation of authenticity of this test report is required, please contact www.hct.co.kr The test results in this test report are not associated with the ((KS Q) ISO/IEC 17025) accreditation by KOLAS (Korea Laboratory Accreditation Scheme) / A2LA (American Association for Laboratory Accreditation) that are under the ILAC (International Laboratory Accreditation Cooperation) Mutual Recognition Agreement (MRA).

CONTENTS

1. EUT DESCRIPTION

Model	SM-S931B/DS			
Additional Model	SM-S931B			
EUT Type	Mobile Phone			
Power Supply	DC 3.88 V			
Frequency Range	125k, 500k, 1M Bit/s : 2402 - 2480 MHz 2M Bit/s : 2404 - 2478 MHz (Except for 2426 MHz)			
Number of Channels	125k, 500k, 1M Bit/s : 40 Channels 2M Bit/s : 37 Channels			
Max. RF Output Power (Normal)	Ant.1	Peak (For information only)	1 M Bit/s: 2 M Bit/s: 125 k Bit/s : 500 k Bit/s :	17.359 dBm (54.44 mW) 17.585 dBm (57.35 mW) 8.808 dBm (7.60 mW) 8.790 dBm (7.57 mW)
		Average	1 M Bit/s: 2 M Bit/s: 125 k Bit/s : 500 k Bit/s :	17.07 dBm (50.88 mW) 16.98 dBm (49.94 mW) 8.68 dBm (7.39 mW) 8.65 dBm (7.33 mW)
	Ant.2	Peak (For information only)	1 M Bit/s: 2 M Bit/s: 125 k Bit/s : 500 k Bit/s :	15.776 dBm (37.81 mW) 16.262 dBm (42.29 mW) 8.466 dBm (7.02 mW) 8.443 dBm (6.99 mW)
		Average	1 M Bit/s: 2 M Bit/s: 125 k Bit/s : 500 k Bit/s :	15.42 dBm (34.80 mW) 15.65 dBm (36.75 mW) 8.35 dBm (6.83 mW) 8.33 dBm (6.81 mW)
	Dual Ant.1 + Ant.2	Peak (For information only)	1 M Bit/s: 2 M Bit/s:	14.558 dBm (28.56 mW) 14.806 dBm (30.24 mW)
		Average	1 M Bit/s: 2 M Bit/s:	14.42 dBm (27.64 mW) 14.58 dBm (28.72 mW)
Modulation Type	GFSK			
Bluetooth Version	5.4			
Antenna Specification	Type: Metal ANT.1 Peak Gain: -2.43 dBi, ANT.2 Peak Gain: -4.74 dBi			
Serial number	Radiated : R3CX80PTC3H Conducted : R3CX80PTC0K			

ANTENNA CONFIGURATIONS

1. Below Tables are the possible configurations.

Configurations	SISO		Dual BT
	Ant1(Core-0)	Ant2(Core-1)	Ant1 & Ant2
Bluetooth Low Energy	O	O	O

Note:

1) O = Support, X = Not Support
2) SISO = Single Input Single Output
3) BLE 1M/2Mbps Mode support Dual BT, But 125k/500kbps do not support Dual BT.

2. TEST METHODOLOGY

FCC KDB 558074 D01 15.247 Meas Guidance v05r02 dated April 02, 2019 entitled “guidance for compliance measurements on digital transmission system, frequency hopping spread spectrum system, and hybrid system devices and the measurement procedure described in ANSI C63.10(Version : 2013) ‘the American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices’.

EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

EUT EXERCISE

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. According to its specifications, the EUT must comply with the requirements of the Section 15.207, 15.209 and 15.247 under the FCC Rules Part 15 Subpart C.

GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 6.2 of ANSI C63.10. (Version :2013) Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane below 1 GHz. Above 1 GHz with 1.5 m using absorbers between the EUT and receive antenna. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3 m away from the receiving antenna, which varied from 1 m to 4 m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes according to the requirements in Section 6.6.5 of ANSI C63.10. (Version: 2013)

DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition. Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

3. INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment's, which is traceable to recognized national standards.
Especially, all antenna for measurement is calibrated in accordance with the requirements of C63.5 (Version : 2017).

4. FACILITIES AND ACCREDITATIONS

FACILITIES

The SAC(Semi-Anechoic Chamber) and conducted measurement facility used to collect the radiated data are located at the 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA. The site is constructed in conformance with the requirements of ANSI C63.4. (Version :2014) and CISPR Publication 22.
Detailed description of test facility was submitted to the Commission and accepted dated March 11, 2024 (Registration Number: KR0032).

EQUIPMENT

Radiated emissions are measured with one or more of the following types of Linearly polarized antennas: tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements. Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers. Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.
All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

5. ANTENNA REQUIREMENTS

According to FCC 47 CFR § 15.203

"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."

(1) The antennas of this E.U.T are permanently attached.

(2) The E.U.T Complies with the requirement of § 15.203

6. MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2013.

All measurement uncertainty values are shown with a coverage factor of $k = 2$ to indicate a 95 % level of confidence.

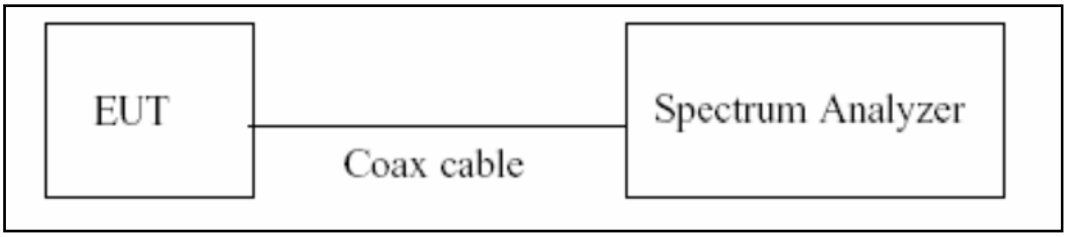
The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Parameter	Expanded Uncertainty (dB)
Conducted Disturbance (150 kHz ~ 30 MHz)	1.98 (Confidence level about 95 %, k=2)
Radiated Disturbance (9 kHz ~ 30 MHz)	4.36 (Confidence level about 95 %, k=2)
Radiated Disturbance (30 MHz ~ 1 GHz)	5.70 (Confidence level about 95 %, k=2)
Radiated Disturbance (1 GHz ~ 18 GHz)	5.52 (Confidence level about 95 %, k=2)
Radiated Disturbance (18 GHz ~ 40 GHz)	5.66 (Confidence level about 95 %, k=2)
Radiated Disturbance (Above 40 GHz)	5.58 (Confidence level about 95 %, k=2)

7. DESCRIPTION OF TESTS

7.1. Duty Cycle

Test Configuration



Test Procedure

The transmitter output is connected to the Spectrum Analyzer.

We tested according to the zero-span measurement method, 6.0)b) in KDB 558074 v05r02.

The largest available value of RBW is 8 MHz and VBW is 50 MHz.

The zero-span method of measuring duty cycle shall not be used if T ≤ 6.25 microseconds. (50/6.25 = 8)

The zero-span method was used because all measured T data are > 6.25 microseconds and both RBW and VBW are > 50/ *T*.

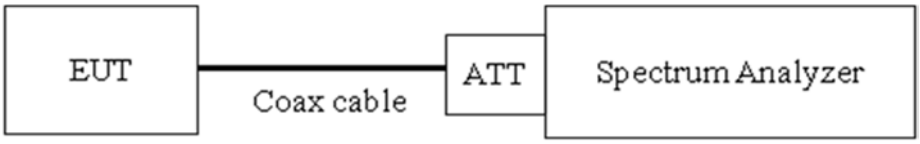
1. RBW = 8 MHz (the largest available value)
2. VBW = 8 MHz (≥ RBW)
3. SPAN = 0 Hz
4. Detector = Peak
5. Number of points in sweep > 100
6. Trace mode = Clear write
7. Measure T_{total} and T_{on}
8. Calculate Duty Cycle = T_{on}/ T_{total} and Duty Cycle Factor = 10log(1/Duty Cycle)

7.2. 6 dB Bandwidth

Limit

The minimum permissible 6 dB bandwidth is 500 kHz.

Test Configuration



Test Procedure

The transmitter output is connected to the Spectrum Analyzer.

The Spectrum Analyzer is set to

(Procedure 8.2 in KDB 558074 v05r02, Procedure 11.8.1 in ANSI 63.10-2013)

1) RBW = 100 kHz
2) VBW ≥ 3 x RBW
3) Detector = Peak
4) Trace mode = max hold
5) Sweep = auto couple
6) Allow the trace to stabilize
7) We tested 6 dB bandwidth using the automatic bandwidth measurement capability of a spectrum analyzer. X dB is set 6 dB.

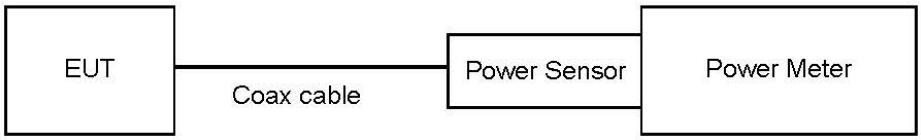
Note : We tested OBW using the automatic bandwidth measurement capability of a spectrum analyzer.

7.3. Output Power

Limit

The maximum permissible conducted output power is 1 Watt.

Test Configuration



Test Procedure

The transmitter output is connected to the Power Meter.

- Peak Power (Procedure 11.9.1.3 in ANSI 63.10-2013)
  : Measure the peak power of the transmitter.

- Average Power (Procedure 8.3.2.3 in KDB 558074 v05r02, Procedure 11.9.2.3 in ANSI 63.10-2013)
  1) Measure the duty cycle.
  2) Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.
  3) Add 10 log (1/x), where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times.

Sample Calculation

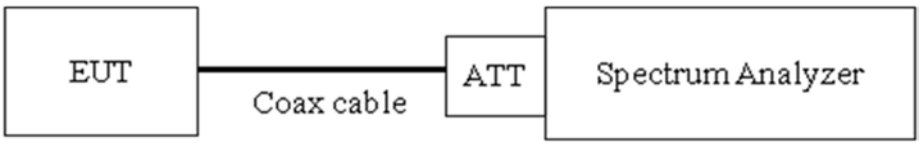
- Conducted Output Power(Peak) = Measured Value + ATT loss + Cable loss
- Conducted Output Power(Average) = Measured Value + ATT loss + Cable loss + Duty Cycle Factor

7.4. Power Spectral Density

Limit

The transmitter power density average over 1-second interval shall not be greater than 8 dBm in any 3 kHz BW.

Test Configuration



Test Procedure

The transmitter output is connected to the Spectrum Analyzer.

We tested according to Procedure 8.4 in KDB 558074 v05r02, Procedure 11.10 in ANSI 63.10-2013.

The spectrum analyzer is set to :

1) Set analyzer center frequency to DTS channel center frequency.
2) Set span to at least 1.5 times the OBW.
3) RBW = 3 kHz ≤ RBW ≤ 100 kHz.
4) VBW ≥ 3 x RBW.
5) Sweep = auto couple
6) Detector = power averaging (rms) or sample detector (when rms not available).
7) Ensure that the number of measurement points in the sweep ≥ [2 ×span / RBW].
8) Employ trace averaging (rms) mode over a minimum of 100 traces
9) Use the peak marker function to determine the maximum amplitude level.
10) Use the peak marker function to determine the maximum amplitude level within the RBW.
    If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.
11) if then duty factor shall be added to adjust the result if the duty cycle is less than 98 %

Sample Calculation

- Power Spectral Density = Measured Value + ATT loss + Cable loss + Duty Cycle Factor

7.5. Conducted Band Edge(Out of Band Emissions) & Conducted Spurious Emissions

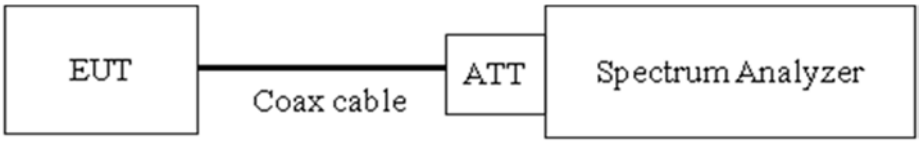
Limit

The maximum conducted (average) output power was used to demonstrate compliance, then the peak power in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least

30 dB relative to the maximum in-band peak PSD level in 100 kHz.

[Conducted > 30 dBc]

Test Configuration



Test Procedure

The transmitter output is connected to the spectrum analyzer.

(Procedure 8.5 in KDB 558074 v05r02, Procedure 11.11 in ANSI 63.10-2013)

1) RBW = 100 kHz
2) VBW ≥ 3 x RBW
3) Set span to encompass the spectrum to be examined
4) Detector = Peak
5) Trace Mode = max hold
6) Sweep time = auto couple
7) Allow trace to fully stabilize.
8) Use peak marker function to determine the maximum amplitude level.

Measurements are made over the 30 MHz to 25 GHz range with the transmitter set to the lowest, middle, and highest channels.

Factors for frequency

Freq(MHz)	Factor(dB)
30	20.06
100	20.14
200	20.17
300	20.21
400	20.28
500	20.28
600	20.28
700	20.28
800	20.30
900	20.31
1 000	20.35
2 000	20.55
2 400	20.62
2 500	20.62
3 000	20.67
4 000	20.74
5 000	20.86
6 000	20.83
7 000	20.93
8 000	20.97
9 000	21.09
10 000	21.18
11 000	21.27
12 000	21.33
13 000	21.33
14 000	21.40
15 000	21.49
16 000	21.52
17 000	21.55
18 000	21.63
19 000	21.65
20 000	21.66
21 000	21.76
22 000	21.82
23 000	21.86
24 000	21.90
25 000	21.92
26 000	22.04

Note : 1. 2400 ~ 2500 MHz is fundamental frequency range.

2. Factor = Attenuator loss + Cable loss

3. Ant.1&2 Total Port offset = Attenuator loss + Cable loss + EUT cable loss(0.54 dB) = 21.16 dB

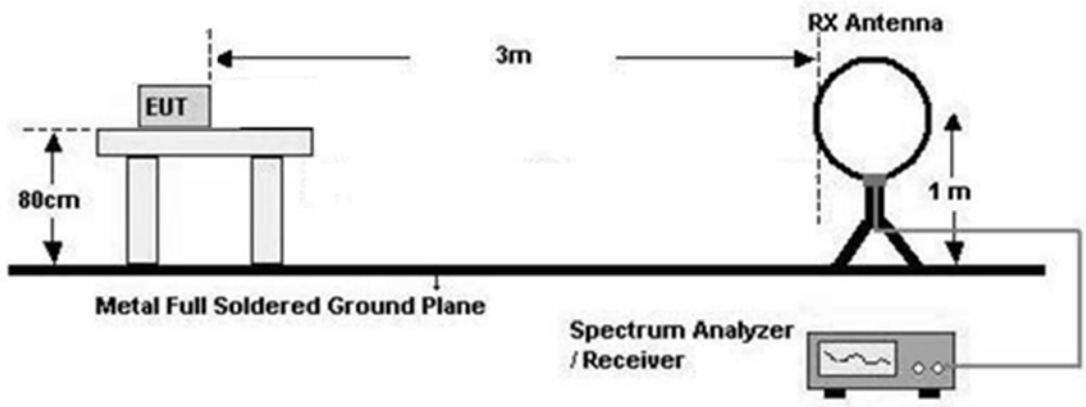
7.6. Radiated Test

Limit

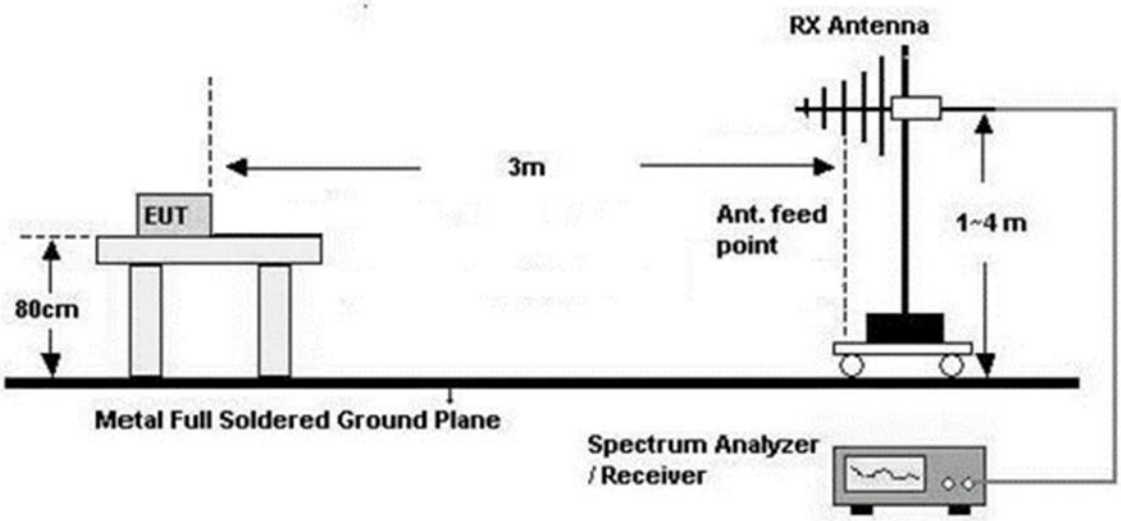
Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Configuration

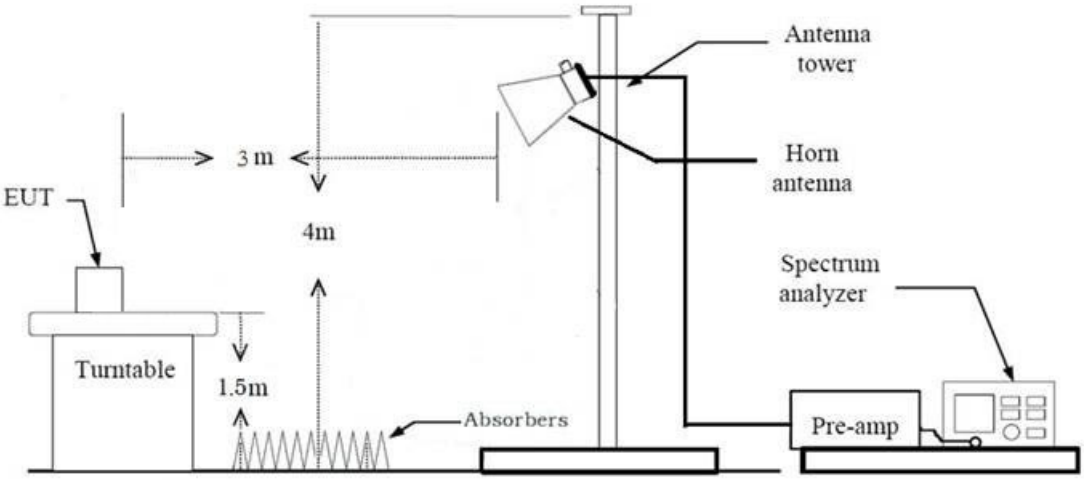
Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz



Test Procedure of Radiated spurious emissions(Below 30 MHz)

1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The loop antenna was placed at a location 3 m from the EUT
3. The EUT is placed on a turntable, which is 0.8 m above ground plane.
4. We have done x, y, z planes in EUT and horizontal and vertical polarization and Parallel to the ground plane in detecting antenna.
5. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
6. Distance Correction Factor(0.009 MHz – 0.490 MHz) = 40log(3 m/300 m) = - 80 dB
   Measurement Distance : 3 m
7. Distance Correction Factor(0.490 MHz – 30 MHz) = 40log(3 m/30 m) = - 40 dB
   Measurement Distance : 3 m
8. Spectrum Setting
   - Frequency Range = 9 kHz ~ 30 MHz
   - Detector = Peak
   - Trace = Max hold
   - RBW = 9 kHz
   - VBW ≥ 3 x RBW
9. Total = Measured Value + Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F)
10. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.

KDB 414788 OFS and Chamber Correlation Justification

Base on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field.

OFS and chamber correlation testing had been performed and chamber measured test result is the worst case test result.

Test Procedure of Radiated spurious emissions(Below 1 GHz)

1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The EUT is placed on a turntable, which is 0.8 m above ground plane.
3. The Hybrid antenna was placed at a location 3 m from the EUT, which is varied from 1m to 4 m to find out the highest emissions.
4. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
5. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
6. Spectrum Setting
   (1) Measurement Type(Peak):
      - Measured Frequency Range : 30 MHz – 1 GHz
      - Detector = Peak
      - Trace = Max hold
      - RBW = 100 kHz
      - VBW ≥ 3 x RBW
   (2) Measurement Type(Quasi-peak):
      - Measured Frequency Range : 30 MHz – 1 GHz
      - Detector = Quasi-Peak
      - RBW = 120 kHz

   In general, (1) is used mainly
7. Total = Measured Value + Antenna Factor(A.F) + Cable Loss(C.L)
8. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.

Test Procedure of Radiated spurious emissions (Above 1 GHz)

1. The EUT is placed on a turntable, which is 1.5 m above ground plane.
2. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
3. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
4. EUT is set 3 m away from the receiving antenna, which is varied from 1 m to 4 m to find out the highest emissions.
5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
6. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. The unit was tested with its standard battery.
8. Spectrum Setting (Method 8.6 in KDB 558074 v05r02, Procedure 11.12 in ANSI 63.10-2013)
   (1) Measurement Type(Peak):
      - Measured Frequency Range : 1 GHz – 25 GHz
      - Detector = Peak
      - Trace = Max hold
      - RBW = 1 MHz
      - VBW ≥ 3 x RBW
   (2) Measurement Type(Average):
      - Duty cycle < 98 %, duty cycle variations are less than ±2 %
      - Measured Frequency Range : 1 GHz – 25 GHz
      - Detector = RMS
      - Averaging type = power (*i.e.*, RMS)
      - RBW = 1 MHz
      - VBW ≥ 3 x RBW
      - Sweep time = auto.
      - Trace mode = average (at least 100 traces).
      - Correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100 percent duty cycle.

- Duty Cycle Factor (dB) : Please refer to the please refer to section 9.1

9. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
10. Distance extrapolation factor = 20log (test distance / specific distance) (dB)
11. Total (Measurement Type : Peak)
    = Peak Measured Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(A.G) + Distance Factor(D.F)

Total (Measurement Type : Average)

= Average Measured Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(A.G) + Distance Factor(D.F) + Duty Cycle Factor

#Note : Used Average measurement method according to KDB 558074 Section11 Q3

Test Procedure of Radiated Restricted Band Edge

1. The EUT is placed on a turntable, which is 1.5 m above ground plane.
2. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
3. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
4. EUT is set 3 m away from the receiving antenna, which is varied from 1 m to 4 m to find out the highest emissions.
5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
6. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. The unit was tested with its standard battery.
8. Spectrum Setting
   (1) Measurement Type(Peak):
   - Measured Frequency Range : 2310 MHz ~ 2390 MHz/ 2483.5 MHz ~ 2500 MHz
   - Detector = Peak
   - Trace = Max hold
   - RBW = 1 MHz
   - VBW ≥ 3 x RBW

   (2) Measurement Type(Average):
   - Duty cycle < 98 %, duty cycle variations are less than ±2 %
   - Measured Frequency Range : 2310 MHz ~ 2390 MHz/ 2483.5 MHz ~ 2500 MHz
   - Detector = RMS
   - Averaging type = power (*i.e.*, RMS)
   - RBW = 1 MHz
   - VBW ≥ 3 x RBW
   - Sweep time = auto.
   - Trace mode = average (at least 100 traces).
   - Correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100 percent duty cycle.
   - Duty Cycle Factor (dB) : Please refer to the please refer to section 9.1.
9. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific

emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.

10. Distance extrapolation factor = 20log (test distance / specific distance) (dB)

11. Total(Measurement Type : Peak)

= Peak Measured Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(A.G) + Attenuator(ATT) + Distance Factor(D.F)

Total(Measurement Type : Average)

= Average Measured Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(A.G) + Attenuator(ATT) + Distance Factor(D.F) + Duty Cycle Factor

#Note : Used Average measurement method according to KDB 558074 Section11 Q3

7.7. AC Power line Conducted Emissions

Limit

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN).

Frequency Range (MHz)	Limits (dBμV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56[a]	56 to 46[a]
0.50 to 5	56	46
5 to 30	60	50

[a]Decreases with the logarithm of the frequency.

Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

Test Configuration

See test photographs attached in Annex A for the actual connections between EUT and support equipment.

Test Procedure

1. The EUT is placed on a wooden table 80 cm above the reference ground plane.
2. The EUT is connected via LISN to a test power supply.
3. The measurement results are obtained as described below:
4. Detectors : Quasi Peak and Average Detector.

Sample Calculation

Quasi-peak(Final Result) = Measured Value + Correction Factor

7.8. Worst case configuration and mode

Radiated Test

1. All modes of operation were investigated and the worst case configuration results are reported.
   - Mode : Stand alone, Stand alone + External accessories(Earphone etc)
   - Worstcase : Stand alone
2. EUT Axis
   (1) Ant.1
      - Radiated Spurious Emissions : Z
      - Radiated Restricted Band Edge : X
   (2) Ant.2
      - Radiated Spurious Emissions : Y
      - Radiated Restricted Band Edge : Y
   (3) Dual Ant.1+ Ant.2
      - Radiated Spurious Emissions : Y
      - Radiated Restricted Band Edge : Y
3. All packet length of operation were investigated and the test results are worst case.
   (125k, 500k, 1M Bit/s all have the same 1 MHz Band width and only Worst result is attached.)
4. All data rate of operation were investigated and the worst case configuration results are reported.
   - Worst case : 1 M, 2 M
5. All position of loop antenna were investigated and the test result is a no critical peak found at all positions.
   - Position : Horizontal, Vertical, Parallel to the ground plane
9. SM-S931B/DS, SM-S931B were tested and the worst case results are reported.
(Worst case: SM-S931B/DS)

AC Power line Conducted Emissions

1. All modes of operation were investigated and the worst case configuration results are reported.
   - Mode : Stand alone + External accessories(Earphone, etc) + Travel Adapter,
     Stand alone + Travel Adapter
   - Worstcase : Stand alone + Travel Adapter
2. SM-S931B/DS, SM-S931B were tested and the worst case results are reported.
(Worst case: SM-S931B/DS)

Conducted test

1. The EUT was configured with packet length of highest power.
   - ALL supported mode tested.
   - Worst Results refer to Notes for each test item
2. SM-S931B/DS, SM-S931B were tested and the worst case results are reported.
(Worst case: SM-S931B/DS)

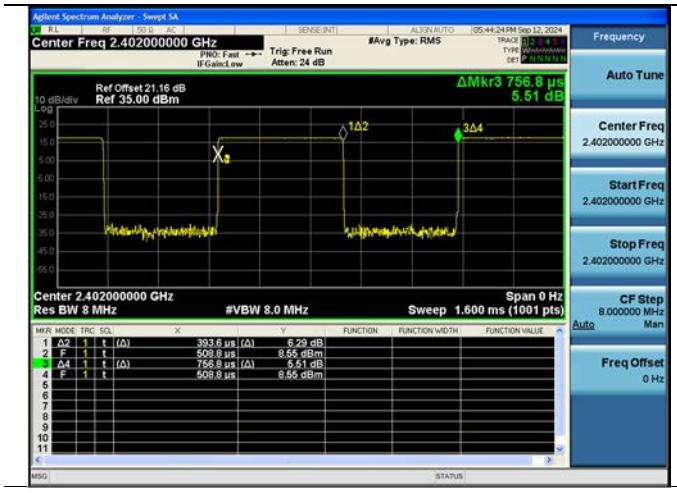
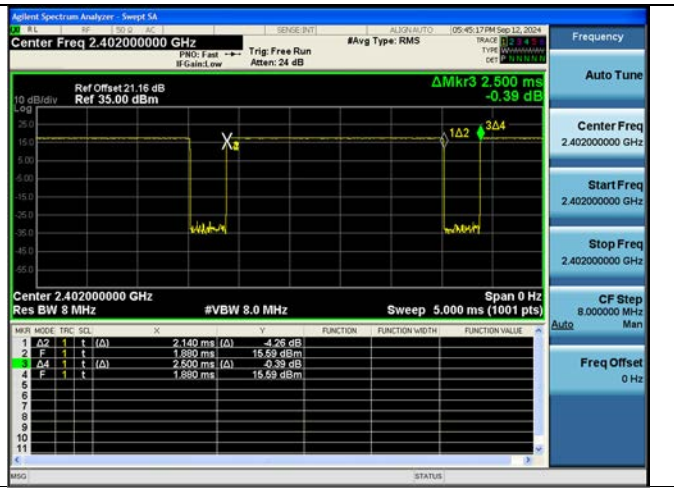
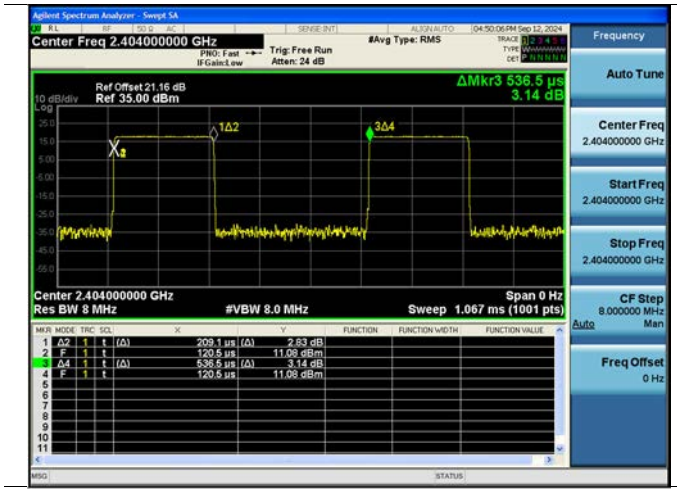
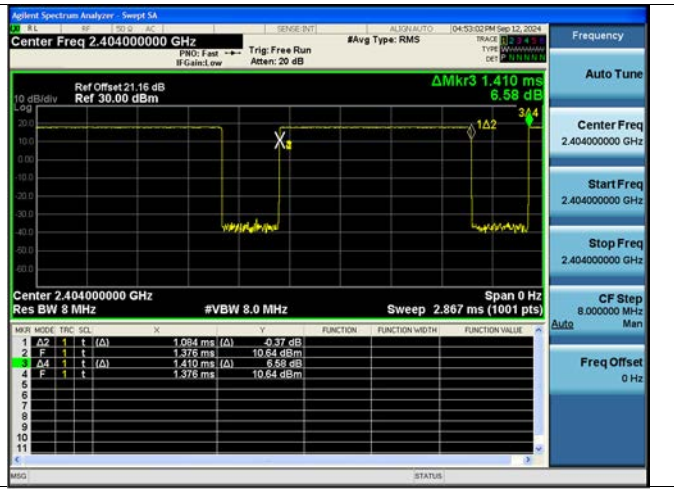
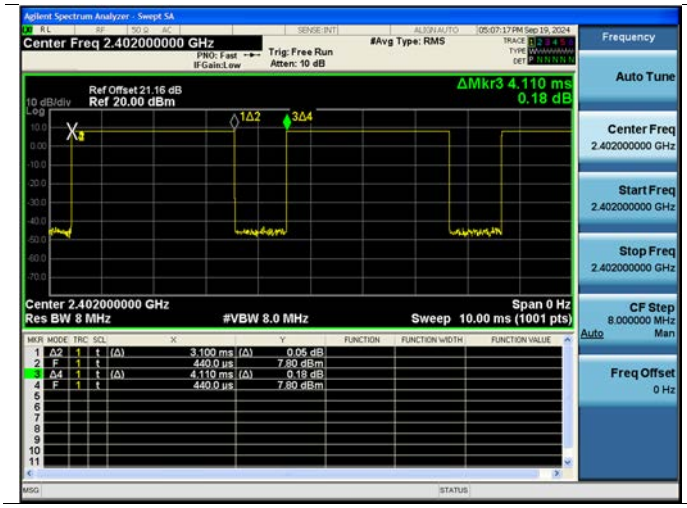
8. SUMMARY TEST OF RESULTS

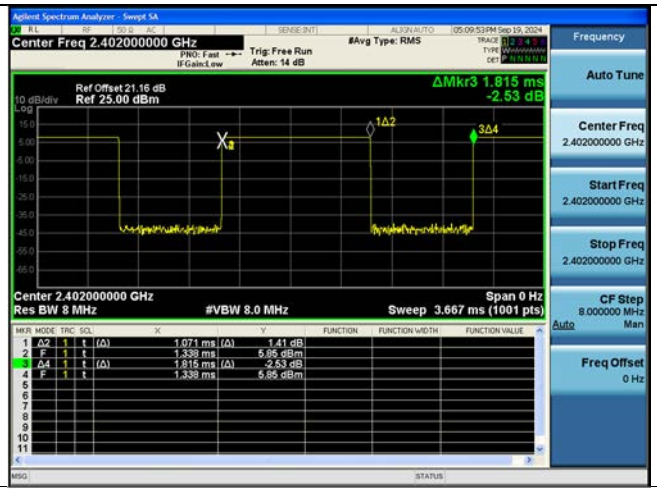
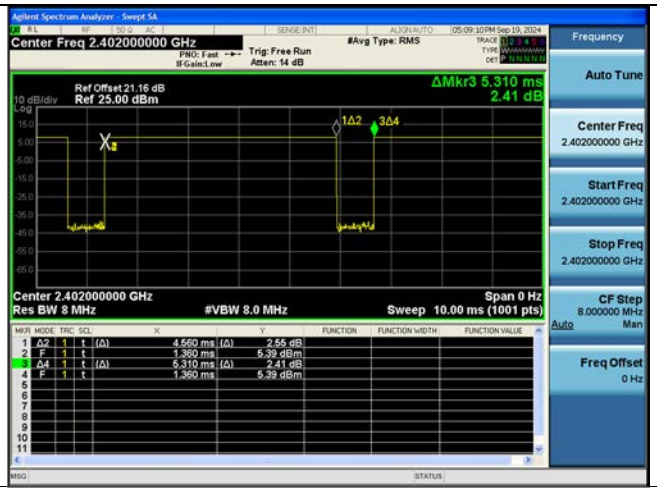
Test Description	FCC Part Section(s)	Test Limit	Test Condition	Test Result
6 dB Bandwidth	§ 15.247(a)(2)	> 500 kHz	Conducted	PASS
Conducted Maximum Output Power	§ 15.247(b)(3)	< 1 Watt		PASS
Power Spectral Density	§ 15.247(e)	< 8 dBm / 3 kHz Band		PASS
Band Edge (Out of Band Emissions)	§ 15.247(d)	Conducted > 30 dBc		PASS
AC Power line Conducted Emissions	§ 15.207	cf. Section 7.7		PASS
Radiated Spurious Emissions	§ 15.247(d), 15.205, 15.209	cf. Section 7.6	Radiated	PASS
Radiated Restricted Band Edge	§ 15.247(d), 15.205, 15.209	cf. Section 7.6		PASS

9. TEST RESULT

9.1 DUTY CYCLE

Data rate (Bit/s)	Packet length (Byte)	T_{on} (ms)	T_{total} (ms)	Duty Cycle	Duty Cycle Factor (dB)
1M	37	0.394	0.757	0.520	2.839
	255	2.140	2.500	0.856	0.675
2M	37	0.209	0.537	0.390	4.093
	255	1.084	1.410	0.768	1.145
125k	37	3.100	4.110	0.754	1.225
	255	17.067	18.067	0.945	0.247
500k	37	1.071	1.815	0.590	2.292
	255	4.560	5.310	0.859	0.661

1 M Bit/s (37 Byte)	1 M Bit/s (255 Byte)
	
2 M Bit/s (37 Byte)	**2 M Bit/s (255 Byte)**
	
125 k Bit/s(37 Byte)	**125 k Bit/s(255 Byte)**
	

500 k Bit/s(37 Byte)	500 k Bit/s(255 Byte)
	

9.2 6 dB BANDWIDTH

[Ant. 1]

Mode (Bit/s)	Channel	6 dB Bandwidth (kHz)	Limit (kHz)
1M(37)	37	687.5	> 500
	17	686.5	
	39	690.9	
1M(255)	37	666.5	> 500
	17	665.8	
	39	666.5	
2M(37)	0	1154	> 500
	17	1160	
	36	1159	
2M(255)	0	1163	> 500
	17	1155	
	36	1159	
125k(37)	37	611.6	> 500
	17	610.2	
	39	610.8	
125k(255)	37	610.0	> 500
	17	608.4	
	39	683.1	
500k(37)	37	663.6	> 500
	17	664.7	
	39	658.7	
500k(255)	37	664.2	> 500
	17	665.0	
	39	658.3	

Note:

In order to simplify the report, attached plots were only the narrowest 6 dB BW Channel.

1M Bit/s: 255 Byte

2M Bit/s: 37 Byte

125k Bit/s: 255 Byte

500k Bit/s: 255 Byte

[Ant. 2]

Mode (Bit/s)	Channel	6 dB Bandwidth (kHz)	Limit (kHz)
1M(37)	37	681.3	> 500
	17	678.9	
	39	680.5	
1M(255)	37	664.9	> 500
	17	666.5	
	39	664.0	
2M(37)	0	1159	> 500
	17	1155	
	36	1157	
2M(255)	0	1152	> 500
	17	1157	
	36	1146	
125k(37)	37	610.7	> 500
	17	613.1	
	39	612.4	
125k(255)	37	643.3	> 500
	17	611.1	
	39	673.1	
500k(37)	37	664.7	> 500
	17	661.6	
	39	664.4	
500k(255)	37	665.2	> 500
	17	668.7	
	39	663.5	

Note:

In order to simplify the report, attached plots were only the narrowest 6 dB BW Channel.

1M Bit/s: 255 Byte

2M Bit/s: 255 Byte

125k Bit/s: 37 Byte

500k Bit/s: 37 Byte

[Dual Ant. 1]

Mode (Bit/s)	Channel	6 dB Bandwidth (kHz)	Limit (kHz)
1M(37)	37	670.0	> 500
	17	672.6	
	39	678.3	
1M(255)	37	663.3	> 500
	17	663.5	
	39	668.0	
2M(37)	0	1142	> 500
	17	1140	
	36	1143	
2M(255)	0	1145	> 500
	17	1149	
	36	1148	

Note:
In order to simplify the report, attached plots were only the narrowest 6 dB BW Channel.
1M Bit/s: 255 Byte
2M Bit/s: 37 Byte

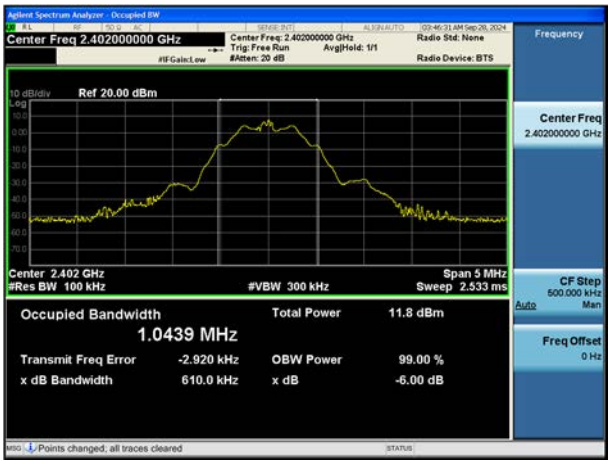
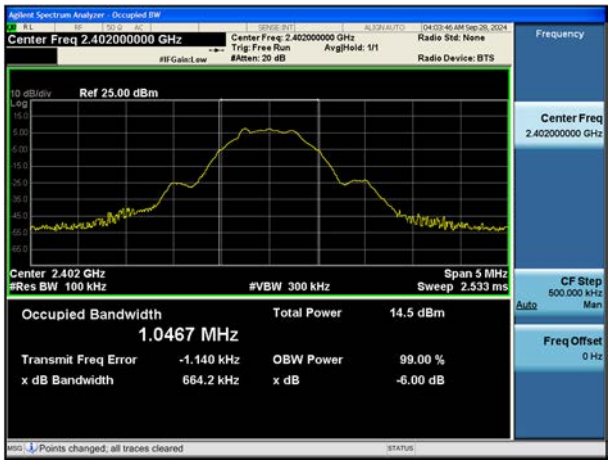
[Dual Ant. 2]

Mode (Bit/s)	Channel	6 dB Bandwidth (kHz)	Limit (kHz)
1M(37)	37	667.2	> 500
	17	675.3	
	39	689.3	
1M(255)	37	661.8	> 500
	17	667.3	
	39	671.3	
2M(37)	0	1138	> 500
	17	1143	
	36	1150	
2M(255)	0	1152	> 500
	17	1153	
	36	1154	

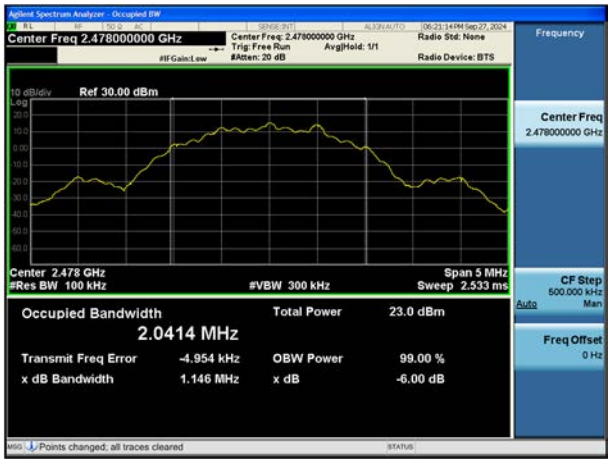
Note:
In order to simplify the report, attached plots were only the narrowest 6 dB BW Channel
1M Bit/s: 255 Byte
2M Bit/s: 37 Byte

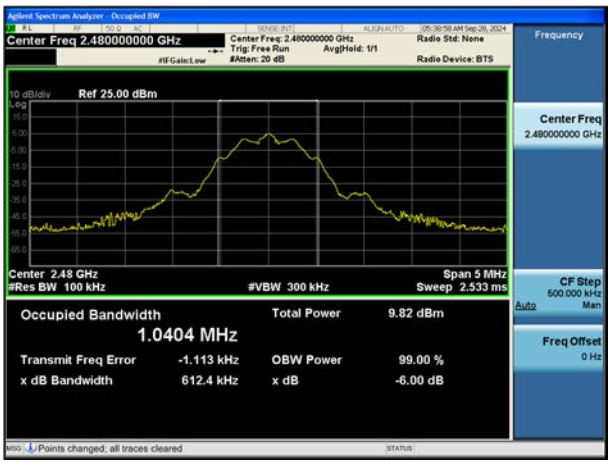
[Ant.1]

1 MBit/s (255 Byte) Test Plots	2 MBit/s (37 Byte) Test Plots
6 dB Bandwidth plot (Low-CH 37)	6 dB Bandwidth plot (Low-CH 0)
	
6 dB Bandwidth plot (Mid-CH 17)	6 dB Bandwidth plot (Mid-CH 17)
	
6 dB Bandwidth plot (High-CH 39)	6 dB Bandwidth plot (High-CH 36)
	

125k Bit/s(255 Byte) Test Plots	500k Bit/s(255 Byte) Test Plots
6 dB Bandwidth plot (Low-CH 37)	6 dB Bandwidth plot (Low-CH 37)
	
6 dB Bandwidth plot (Mid-CH 17)	6 dB Bandwidth plot (Mid-CH 17)
	
6 dB Bandwidth plot (High-CH 39)	6 dB Bandwidth plot (High-CH 39)
	

[Ant.2]

1 MBit/s (255 Byte) Test Plots	2 MBit/s (255 Byte) Test Plots
6 dB Bandwidth plot (Low-CH 37)	6 dB Bandwidth plot (Low-CH 0)
	
6 dB Bandwidth plot (Mid-CH 17)	6 dB Bandwidth plot (Mid-CH 17)
	
6 dB Bandwidth plot (High-CH 39)	6 dB Bandwidth plot (High-CH 36)
	

125k Bit/s(37 Byte) Test Plots	500k Bit/s(37 Byte) Test Plots
6 dB Bandwidth plot (Low-CH 37)	6 dB Bandwidth plot (Low-CH 37)
	
6 dB Bandwidth plot (Mid-CH 17)	6 dB Bandwidth plot (Mid-CH 17)
	
6 dB Bandwidth plot (High-CH 39)	6 dB Bandwidth plot (High-CH 39)
	

[Dual Ant.1]

1 MBit/s (255 Byte) Test Plots	2 MBit/s (37 Byte) Test Plots
6 dB Bandwidth plot (Low-CH 37)	6 dB Bandwidth plot (Low-CH 0)
	
6 dB Bandwidth plot (Mid-CH 17)	6 dB Bandwidth plot (Mid-CH 17)
	
6 dB Bandwidth plot (High-CH 39)	6 dB Bandwidth plot (High-CH 36)
	

[Dual Ant.2]

1 MBit/s (255 Byte) Test Plots	2 MBit/s (37 Byte) Test Plots
6 dB Bandwidth plot (Low-CH 37)	6 dB Bandwidth plot (Low-CH 0)
	
6 dB Bandwidth plot (Mid-CH 17)	6 dB Bandwidth plot (Mid-CH 17)
	
6 dB Bandwidth plot (High-CH 39)	6 dB Bandwidth plot (High-CH 36)
	

9.3 OUTPUT POWER

Peak Power

[Ant.1]

Data rate	Packet length	LE Mode		Peak Power	Limit
(Bit/s)	(Byte)	Frequency [MHz]	Channel	(dBm)	(dBm)
1M	37	2402	37	16.949	30
		2440	17	17.167	
		2480	39	16.177	
	255	2402	37	17.050	
		2440	17	17.359	
		2480	39	16.301	
2M	37	2404	0	17.585	
		2440	17	17.494	
		2478	36	16.616	
	255	2404	0	17.497	
		2440	17	17.339	
		2478	36	16.396	
125k	37	2402	37	8.118	
		2440	17	8.808	
		2480	39	6.469	
	255	2402	37	8.112	
		2440	17	8.747	
		2480	39	6.561	
500k	37	2402	37	7.977	
		2440	17	8.790	
		2480	39	6.499	
	255	2402	37	7.910	
		2440	17	8.737	
		2480	39	6.558	

[Ant.2]

Data rate	Packet length	LE Mode		Peak Power (dBm)	Limit (dBm)
(Bit/s)	(Byte)	Frequency [MHz]	Channel		
1M	37	2402	37	15.776	30
		2440	17	15.689	
		2480	39	15.425	
	255	2402	37	15.697	
		2440	17	15.578	
		2480	39	15.358	
2M	37	2404	0	16.185	
		2440	17	15.684	
		2478	36	16.262	
	255	2404	0	16.160	
		2440	17	15.836	
		2478	36	16.096	
125k	37	2402	37	8.459	
		2440	17	7.668	
		2480	39	5.771	
	255	2402	37	8.466	
		2440	17	7.667	
		2480	39	5.735	
500k	37	2402	37	8.443	
		2440	17	7.651	
		2480	39	5.751	
	255	2402	37	8.418	
		2440	17	7.612	
		2480	39	5.717	

[Dual (Ant. 1 + Ant .2)]

Data rate	Packet length	LE Mode		Dual Ant.1	Dual Ant.2	Dual (Ant. 1 + Ant. 2)	Limit (dBm)
(Bit/s)	(Byte)	Frequency [MHz]	Channel	Power(dBm)	Power(dBm)	Power(dBm)	
1M	37	2402	37	11.890	11.176	14.558	30
		2440	17	11.488	11.268	14.390	
		2480	39	11.243	10.036	13.692	
	255	2402	37	11.828	11.140	14.508	
		2440	17	11.350	11.220	14.296	
		2480	39	11.260	10.081	13.721	
2M	37	2404	0	12.210	11.338	14.806	
		2440	17	11.628	11.509	14.579	
		2478	36	11.556	10.720	14.168	
	255	2404	0	12.151	11.223	14.722	
		2440	17	11.543	11.328	14.447	
		2478	36	11.474	10.540	14.042	

Average Power

Note :

1. Total Power [dBm] = Measured Power [dBm] + Duty Cycle Factor [dB]

[Ant.1]

Data rate	Packet length	LE Mode		Measured Power (dBm)	Duty Cycle Factor	Result	Limit (dBm)
(Bit/s)	(Byte)	Frequency [MHz]	Channel		(dB)	(dBm)	
1M	37	2402	37	13.78	2.84	16.62	30
		2440	17	13.98	2.84	16.82	
		2480	39	13.04	2.84	15.88	
	255	2402	37	16.00	0.68	16.68	
		2440	17	16.39	0.68	17.07	
		2480	39	15.30	0.68	15.98	
2M	37	2404	0	12.80	4.09	16.89	
		2440	17	12.77	4.09	16.86	
		2478	36	11.88	4.09	15.97	
	255	2404	0	15.84	1.14	16.98	
		2440	17	15.72	1.14	16.86	
		2478	36	14.75	1.14	15.89	
125k	37	2402	37	6.80	1.22	8.02	
		2440	17	7.46	1.22	8.68	
		2480	39	5.05	1.22	6.27	
	255	2402	37	7.71	0.25	7.96	
		2440	17	8.34	0.25	8.59	
		2480	39	6.20	0.25	6.45	
500k	37	2402	37	5.56	2.29	7.85	
		2440	17	6.36	2.29	8.65	
		2480	39	3.94	2.29	6.23	
	255	2402	37	7.18	0.66	7.84	
		2440	17	7.89	0.66	8.55	
		2480	39	5.62	0.66	6.28	

[Ant.2]

Data rate	Packet length	LE Mode		Measured Power (dBm)	Duty Cycle Factor	Result	Limit (dBm)
(Bit/s)	(Byte)	Frequency [MHz]	Channel		(dB)	(dBm)	
1M	37	2402	37	12.55	2.84	15.39	30
		2440	17	12.50	2.84	15.34	
		2480	39	12.22	2.84	15.06	
	255	2402	37	14.74	0.68	15.42	
		2440	17	14.66	0.68	15.34	
		2480	39	14.30	0.68	14.98	
2M	37	2404	0	11.56	4.09	15.65	
		2440	17	11.07	4.09	15.16	
		2478	36	11.40	4.09	15.49	
	255	2404	0	14.48	1.14	15.62	
		2440	17	14.20	1.14	15.34	
		2478	36	14.26	1.14	15.40	
125k	37	2402	37	7.09	1.22	8.31	
		2440	17	6.11	1.22	7.33	
		2480	39	4.34	1.22	5.56	
	255	2402	37	8.10	0.25	8.35	
		2440	17	7.27	0.25	7.52	
		2480	39	5.26	0.25	5.51	
500k	37	2402	37	6.04	2.29	8.33	
		2440	17	5.11	2.29	7.40	
		2480	39	3.18	2.29	5.47	
	255	2402	37	7.62	0.66	8.28	
		2440	17	6.80	0.66	7.46	
		2480	39	4.88	0.66	5.54	

[Dual Ant.1]

Data rate	Packet length	LE Mode		Measured Power	Duty Cycle Factor	Result	Limit
(Bit/s)	(Byte)	Frequency [MHz]	Channel	(dBm)	(dB)	(dBm)	(dBm)
1M	37	2402	37	8.93	2.84	11.77	30
		2440	17	8.53	2.84	11.37	
		2480	39	8.26	2.84	11.10	
	255	2402	37	10.94	0.68	11.62	
		2440	17	10.61	0.68	11.29	
		2480	39	10.51	0.68	11.19	
2M	37	2404	0	7.90	4.09	11.99	
		2440	17	7.35	4.09	11.44	
		2478	36	7.34	4.09	11.43	
	255	2404	0	10.83	1.14	11.97	
		2440	17	10.19	1.14	11.33	
		2478	36	10.09	1.14	11.23	

[Dual Ant.2]

Data rate	Packet length	LE Mode		Measured Power	Duty Cycle Factor	Result	Limit
(Bit/s)	(Byte)	Frequency [MHz]	Channel	(dBm)	(dB)	(dBm)	(dBm)
1M	37	2402	37	8.17	2.84	11.01	30
		2440	17	8.27	2.84	11.11	
		2480	39	6.98	2.84	9.82	
	255	2402	37	10.29	0.68	10.97	
		2440	17	10.38	0.68	11.06	
		2480	39	9.18	0.68	9.86	
2M	37	2404	0	7.01	4.09	11.10	
		2440	17	7.14	4.09	11.23	
		2478	36	6.32	4.09	10.41	
	255	2404	0	9.95	1.14	11.09	
		2440	17	9.96	1.14	11.10	
		2478	36	9.18	1.14	10.32	

[Dual (Ant. 1 + Ant .2)]

Data rate	Packet length	LE Mode		Dual Ant.1 Power	Dual Ant.2 Power	Dual (Ant. 1 + Ant. 2) Power (dBm)	Limit (dBm)
(Bit/s)	(Byte)	Frequency [MHz]	Channel	(dBm)	(dBm)		
1M	37	2402	37	11.77	11.01	14.42	30
		2440	17	11.37	11.11	14.25	
		2480	39	11.10	9.82	13.52	
	255	2402	37	11.62	10.97	14.31	
		2440	17	11.29	11.06	14.18	
		2480	39	11.19	9.86	13.58	
2M	37	2404	0	11.99	11.10	14.58	
		2440	17	11.44	11.23	14.35	
		2478	36	11.43	10.41	13.96	
	255	2404	0	11.97	11.09	14.57	
		2440	17	11.33	11.10	14.23	
		2478	36	11.23	10.32	13.81	

9.4 POWER SPECTRAL DENSITY

[Ant.1]

Frequency (MHz)	Channel No.	Mode	Test Result			Limit
			Measured PSD (dBm)	Duty Cycle Factor(dB)	Total PSD (dBm)	
2402	37	1 MBit/s 37 Byte	3.058	2.84	5.897	8 dBm / 3 kHz
2440	17		3.280	2.84	6.119	
2480	39		2.848	2.84	5.687	
2402	37	1 MBit/s 255 Byte	4.264	0.68	4.939	
2440	17		4.561	0.68	5.236	
2480	39		3.639	0.68	4.314	
2404	0	2 MBit/s 37 Byte	0.810	4.09	4.903	
2440	17		1.126	4.09	5.219	
2478	36		0.011	4.09	4.104	
2404	0	2 MBit/s 255 Byte	1.850	1.14	2.995	
2440	17		1.891	1.14	3.036	
2478	36		1.092	1.14	2.237	
2402	37	125k 37 Byte	0.538	1.22	1.763	
2440	17		1.335	1.22	2.560	
2480	39		-1.421	1.22	-0.196	
2402	37	125k 255 Byte	1.333	0.25	1.580	
2440	17		1.843	0.25	2.090	
2480	39		-0.331	0.25	-0.084	
2402	37	500k 37 Byte	-3.378	2.29	-1.086	
2440	17		-3.020	2.29	-0.728	
2480	39		-5.590	2.29	-3.298	
2402	37	500k 255 Byte	-4.685	0.66	-4.024	
2440	17		-3.646	0.66	-2.985	
2480	39		-6.139	0.66	-5.478	

Note :

1. Total PSD = Measured PSD + Duty Cycle Factor
2. In order to simplify the report, The plots were attached with the highest PSD Mode.
   Worst case : 1M Bit/s (37 Byte)

[Ant.2]

Frequency (MHz)	Channel No.	Mode	Test Result			
			Measured PSD (dBm)	Duty Cycle Factor(dB)	Total PSD (dBm)	Limit
2402	37	1 MBit/s 37 Byte	1.508	2.84	4.347	8 dBm / 3 kHz
2440	17		1.150	2.84	3.989	
2480	39		1.647	2.84	4.486	
2402	37	1 MBit/s 255 Byte	2.887	0.68	3.562	
2440	17		2.546	0.68	3.221	
2480	39		3.057	0.68	3.732	
2404	0	2 MBit/s 37 Byte	-0.195	4.09	3.898	
2440	17		-0.649	4.09	3.444	
2478	36		-0.489	4.09	3.604	
2404	0	2 MBit/s 255 Byte	0.306	1.14	1.451	
2440	17		0.174	1.14	1.319	
2478	36		0.697	1.14	1.842	
2402	37	125k 37 Byte	0.433	1.22	1.658	
2440	17		-0.415	1.22	0.810	
2480	39		-2.244	1.22	-1.019	
2402	37	125k 255 Byte	1.692	0.25	1.939	
2440	17		0.820	0.25	1.067	
2480	39		-1.222	0.25	-0.975	
2402	37	500k 37 Byte	-4.212	2.29	-1.920	
2440	17		-4.741	2.29	-2.449	
2480	39		-6.513	2.29	-4.221	
2402	37	500k 255 Byte	-4.138	0.66	-3.477	
2440	17		-4.850	0.66	-4.189	
2480	39		-7.151	0.66	-6.490	

Note :

1. Total PSD = Measured PSD + Duty Cycle Factor
2. In order to simplify the report, The plots were attached with the highest PSD Mode.
   Worst case : 1M Bit/s (37 Byte)

[Dual Ant.1]

Frequency (MHz)	Channel No.	Mode	Test Result			
			Measured PSD (dBm)	Duty Cycle Factor(dB)	Total PSD (dBm)	Limit
2402	37	1M Bit/s 37 Byte	-2.059	2.84	0.780	8dBm/3kHz
2440	17		-1.476	2.84	1.363	
2480	39		-2.466	2.84	0.373	
2402	37	1M Bit/s 255 Byte	-0.541	0.68	0.134	
2440	17		-0.894	0.68	-0.219	
2480	39		-1.115	0.68	-0.440	
2404	0	2M Bit/s 37 Byte	-4.026	4.09	0.067	
2440	17		-4.734	4.09	-0.641	
2478	36		-4.454	4.09	-0.361	
2404	0	2M Bit/s 255 Byte	-3.124	1.14	-1.979	
2440	17		-3.507	1.14	-2.362	
2478	36		-3.185	1.14	-2.040	

[Dual Ant.2]

Frequency (MHz)	Channel No.	Mode	Test Result			
			Measured PSD (dBm)	Duty Cycle Factor(dB)	Total PSD (dBm)	Limit
2402	37	1M Bit/s 37 Byte	-1.327	2.84	1.512	8dBm/3kHz
2440	17		-2.105	2.84	0.734	
2480	39		-3.096	2.84	-0.257	
2402	37	1M Bit/s 255 Byte	-0.773	0.68	-0.098	
2440	17		-0.938	0.68	-0.263	
2480	39		-2.027	0.68	-1.352	
2404	0	2M Bit/s 37 Byte	-4.104	4.09	-0.011	
2440	17		-4.665	4.09	-0.572	
2478	36		-5.575	4.09	-1.482	
2404	0	2M Bit/s 255 Byte	-3.573	1.14	-2.428	
2440	17		-3.415	1.14	-2.270	
2478	36		-4.137	1.14	-2.992	

[Dual (Ant.1+ Ant.2)]

Frequency (MHz)	Channel No.	Mode	Test Result			
			Dual Ant. 1 PSD (dBm)	Dual Ant. 2 PSD (dBm)	Dual (Ant.1 + Ant.2) PSD (dBm)	Limit
2402	37	1 MBit/s 37 Byte	0.780	1.512	4.172	8 dBm / 3 kHz
2440	17		1.363	0.734	4.070	
2480	39		0.373	-0.257	3.080	
2402	37	1 MBit/s 255 Byte	0.134	-0.098	3.030	
2440	17		-0.219	-0.263	2.770	
2480	39		-0.440	-1.352	2.138	
2404	0	2 MBit/s 37 Byte	0.067	-0.011	3.039	
2440	17		-0.641	-0.572	2.404	
2478	36		-0.361	-1.482	2.125	
2404	0	2 MBit/s 255 Byte	-1.979	-2.428	0.812	
2440	17		-2.362	-2.270	0.694	
2478	36		-2.040	-2.992	0.520	

Note :

1. Total PSD = Measured PSD + Duty Cycle Factor
2. In order to simplify the report, The plots were attached with the highest PSD Mode.
   Worst case : 1M Bit/s (37 Byte)

▣ Test Plots

Ant.1 (1 MBit/s (37 Byte))	Ant.2 (1 MBit/s (37 Byte))
Power Spectral Density (Low-CH 37)	Power Spectral Density (Low-CH 37)
	
Power Spectral Density (Mid-CH 17)	Power Spectral Density (Mid-CH 17)
	
Power Spectral Density (High-CH 39)	Power Spectral Density (High-CH 39)
	

Dual Ant.1 (1 MBit/s (37 Byte))	Dual Ant.2 (1 MBit/s (37 Byte))
Power Spectral Density (Low-CH 37)	Power Spectral Density (Low-CH 37)
	
Power Spectral Density (Mid-CH 17)	Power Spectral Density (Mid-CH 17)
	
Power Spectral Density (High-CH 39)	Power Spectral Density (High-CH 39)
	

9.5 BAND EDGE/ CONDUCTED SPURIOUS EMISSIONS

[BAND EDGE]

[Ant. 1]

Frequency (MHz)	Mode	Channel No.	Position	Test Result	
				Measured Level (dB)	Limit (dBc)
2402	1M Bit/s 37 Byte	37	Lower	56.147	30
2480		39	Upper	61.848	30
2402	1M Bit/s 255 Byte	37	Lower	57.001	30
2480		39	Upper	61.833	30
2404	2M Bit/s 37 Byte	0	Lower	62.773	30
2478		36	Upper	65.982	30
2404	2M Bit/s 255 Byte	0	Lower	61.373	30
2478		36	Upper	61.028	30
2402	125k Bit/s 37 Byte	37	Lower	58.025	30
2480		39	Upper	62.922	30
2402	125k Bit/s 255 Byte	37	Lower	56.731	30
2480		39	Upper	62.956	30
2402	500k Bit/s 37 Byte	37	Lower	57.370	30
2480		39	Upper	62.682	30
2402	500k Bit/s 255 Byte	37	Lower	57.781	30
2480		39	Upper	62.188	30

Note :

In order to simplify the report, attached plots were only the worst case channel and data rate.

- Lower Band Edge: 1M Bit/s (37 Byte)
- Upper Band Edge: 2M Bit/s (255 Byte)

[Ant. 2]

Frequency (MHz)	Mode	Channel No.	Position	Test Result	
				Measured Level (dB)	Limit (dBc)
2402	1M Bit/s 37 Byte	37	Lower	55.822	30
2480		39	Upper	64.339	30
2402	1M Bit/s 255 Byte	37	Lower	54.412	30
2480		39	Upper	63.339	30
2404	2M Bit/s 37 Byte	0	Lower	61.281	30
2478		36	Upper	64.859	30
2404	2M Bit/s 255 Byte	0	Lower	60.530	30
2478		36	Upper	64.369	30
2402	125k Bit/s 37 Byte	37	Lower	55.244	30
2480		39	Upper	60.342	30
2402	125k Bit/s 255 Byte	37	Lower	54.982	30
2480		39	Upper	59.411	30
2402	500k Bit/s 37 Byte	37	Lower	55.495	30
2480		39	Upper	61.929	30
2402	500k Bit/s 255 Byte	37	Lower	55.287	30
2480		39	Upper	61.951	30

Note :

In order to simplify the report, attached plots were only the worst case channel and data rate.

- Lower Band Edge: 1M Bit/s (255 Byte)
- Upper Band Edge: 125k Bit/s (255 Byte)

[Dual Ant. 1]

Frequency (MHz)	Mode	Channel No.	Position	Test Result	
				Measured Level (dB)	Limit (dBc)
2402	1M Bit/s 37 Byte	37	Lower	55.588	30
2480		39	Upper	60.949	30
2402	1M Bit/s 255 Byte	37	Lower	56.237	30
2480		39	Upper	62.005	30
2404	2M Bit/s 37 Byte	0	Lower	60.610	30
2478		36	Upper	61.636	30
2404	2M Bit/s 255 Byte	0	Lower	60.423	30
2478		36	Upper	60.454	30

Note :

In order to simplify the report, attached plots were only the worst case channel and data rate.
- Lower Band Edge: 1M Bit/s (37 Byte)
- Upper Band Edge: 2M Bit/s (255 Byte)

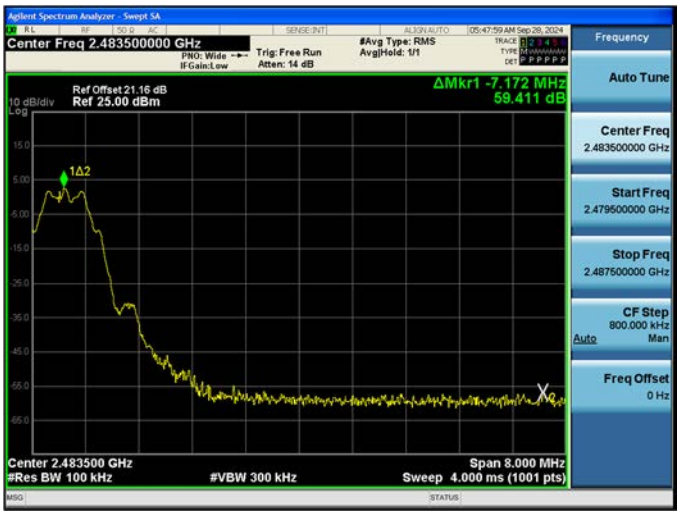
[Dual Ant. 2]

Frequency (MHz)	Mode	Channel No.	Position	Test Result	
				Measured Level (dB)	Limit (dBc)
2402	1M Bit/s 37 Byte	37	Lower	53.663	30
2480		39	Upper	58.682	30
2402	1M Bit/s 255 Byte	37	Lower	54.849	30
2480		39	Upper	60.478	30
2404	2M Bit/s 37 Byte	0	Lower	54.432	30
2478		36	Upper	60.800	30
2404	2M Bit/s 255 Byte	0	Lower	54.544	30
2478		36	Upper	66.645	30

Note :

In order to simplify the report, attached plots were only the worst case channel and data rate.
- Lower Band Edge: 1M Bit/s (37 Byte)
- Upper Band Edge: 1M Bit/s (37 Byte)

▣ Test Plot(Band Edge)

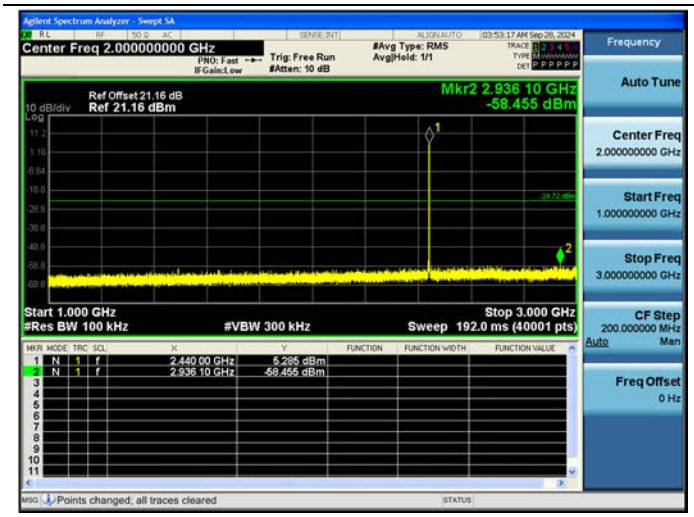
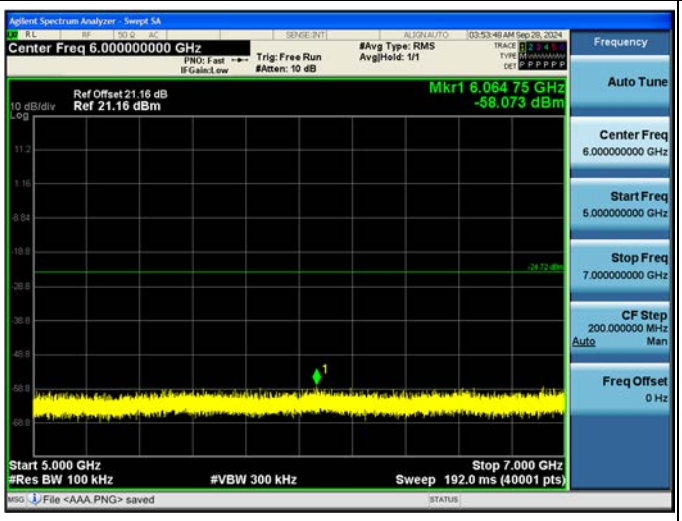
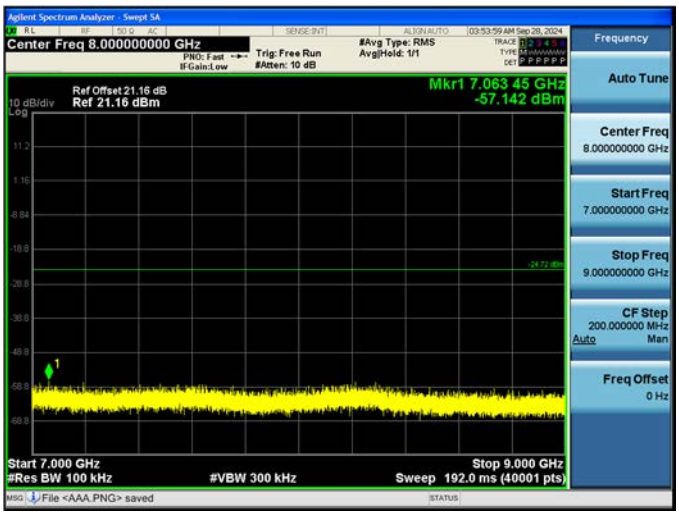
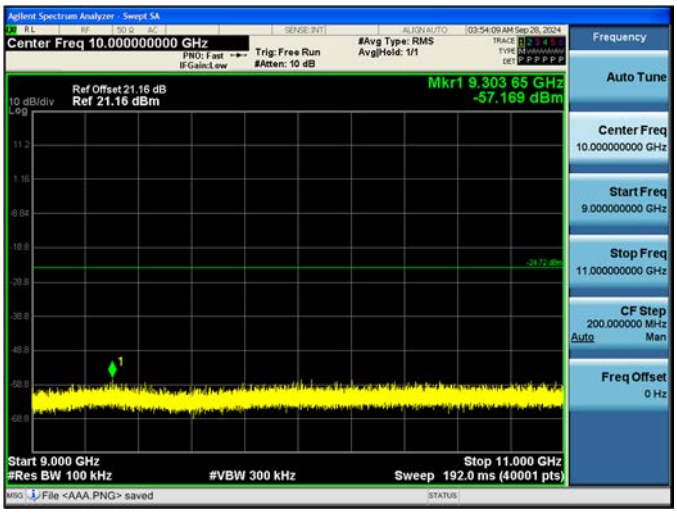
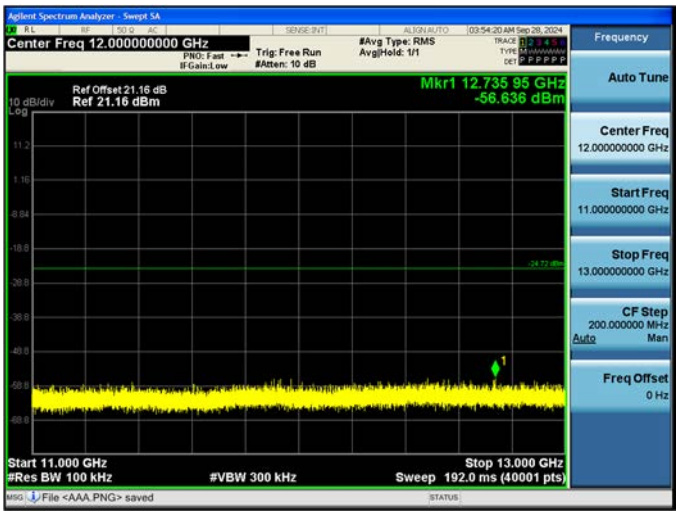
Ant. 1	Ant. 2
1M Bit/s (37 Byte) Low-CH 37	1M Bit/s (255 Byte) Low-CH 37
	
2M Bit/s (255 Byte) High-CH 36	125k Bit/s (255 Byte) High-CH 39
	

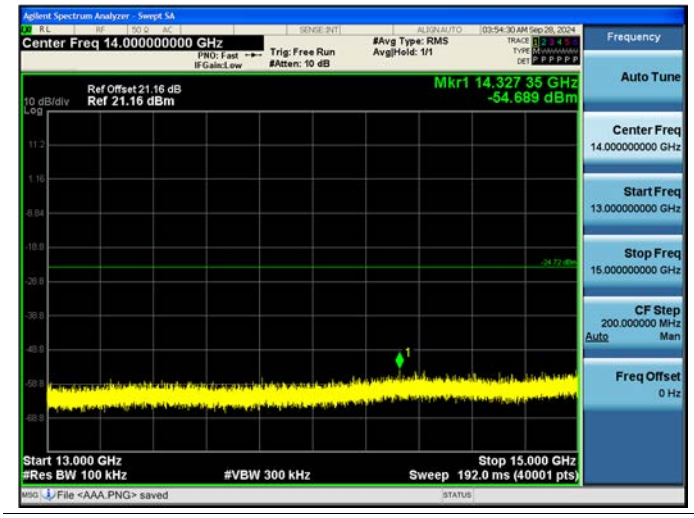
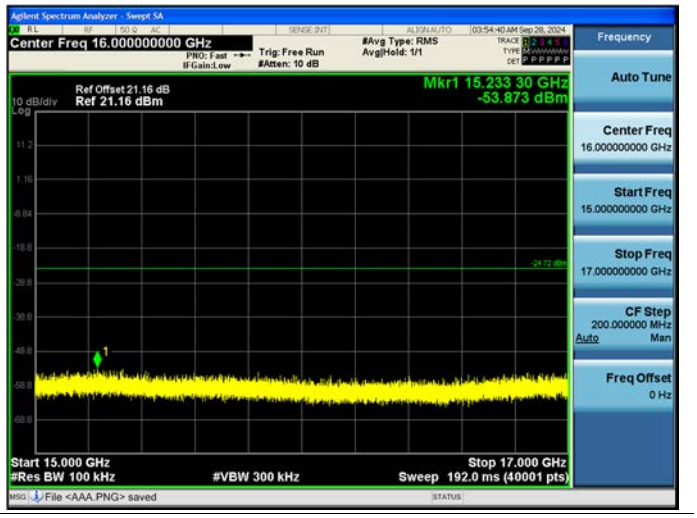
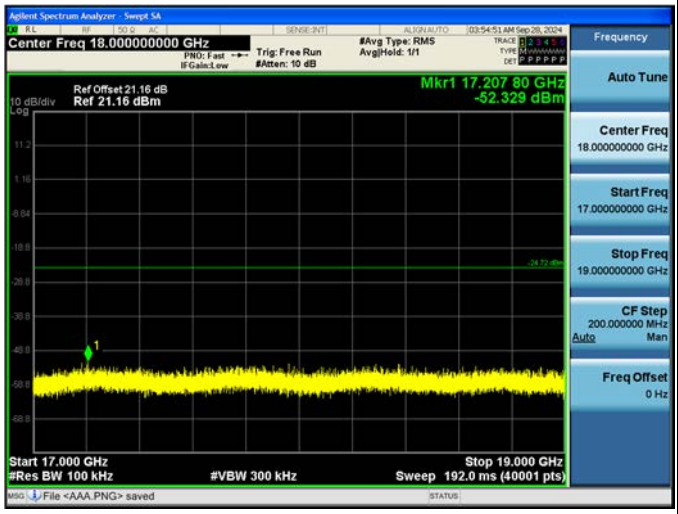
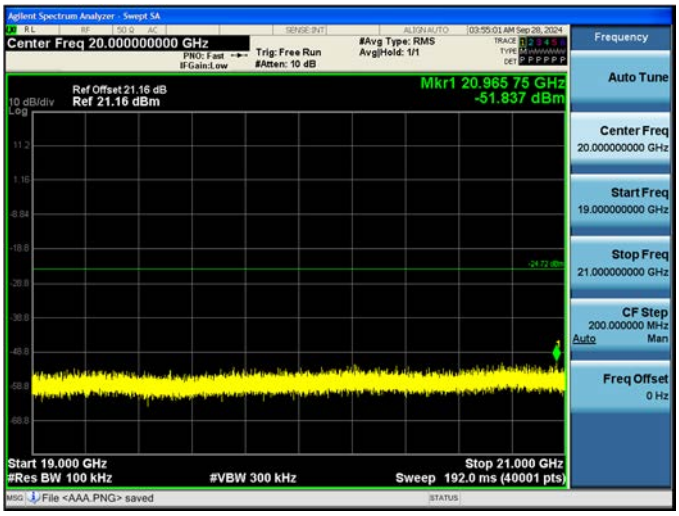
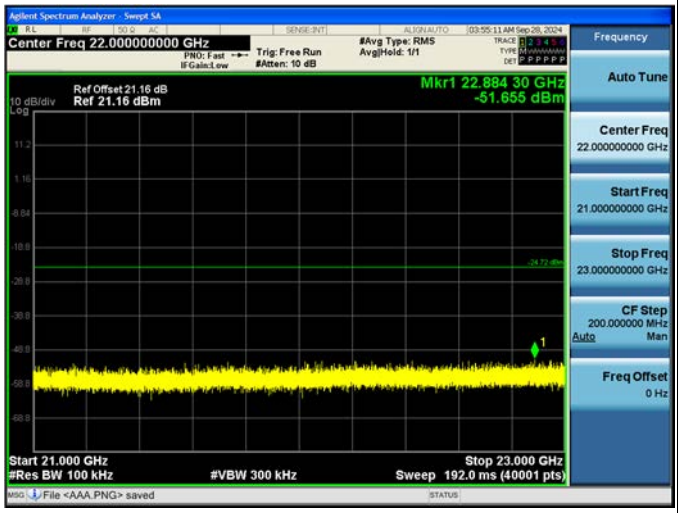
Dual Ant.1	Dual Ant.2
1M Bit/s (37 Byte) Low-CH 37	1M Bit/s (37 Byte) Low-CH 37
	
2M Bit/s (255 Byte) High-CH 39	1M Bit/s (37 Byte) High-CH 39
	

[CONDUCTED SPURIOUS EMISSIONS]

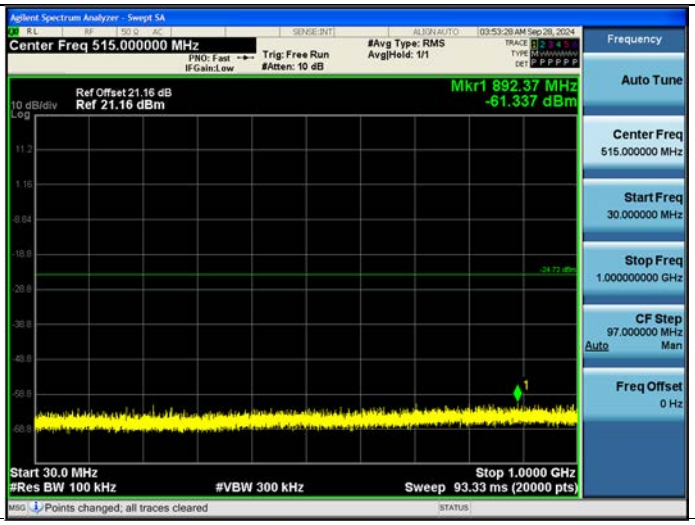
In order to simplify the report, attached plots were only the worst case channel and data rate.

▣ **Test Plots(Conducted Spurious Emission) -** Ant. 1 : 125k Bit/s 37 Byte Ch. 17(2 440 MHz)

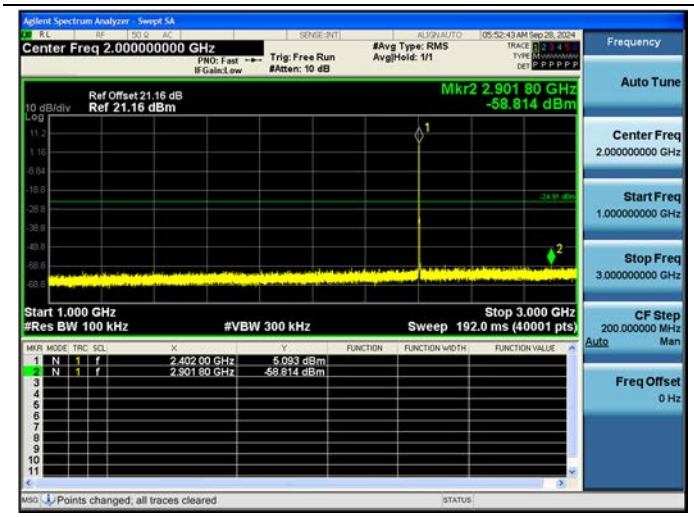
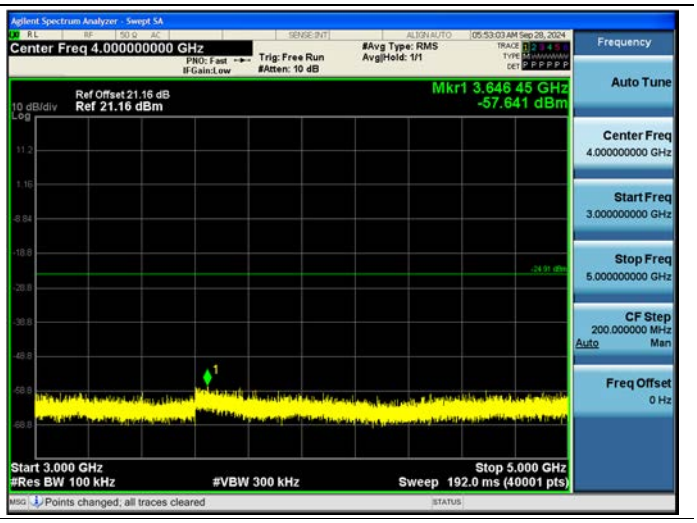
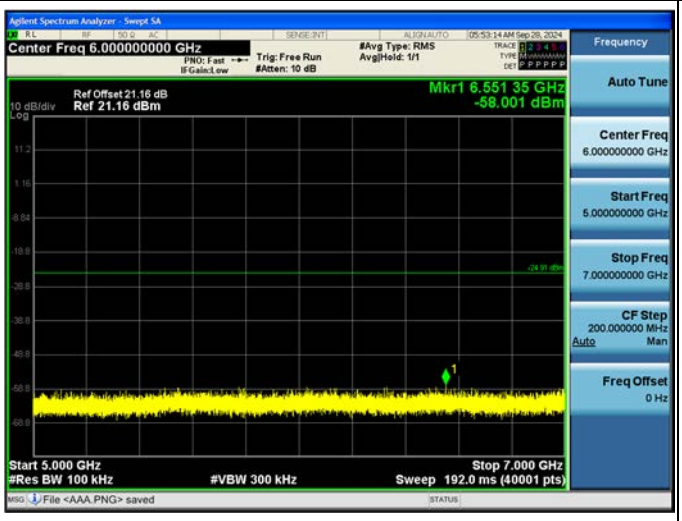
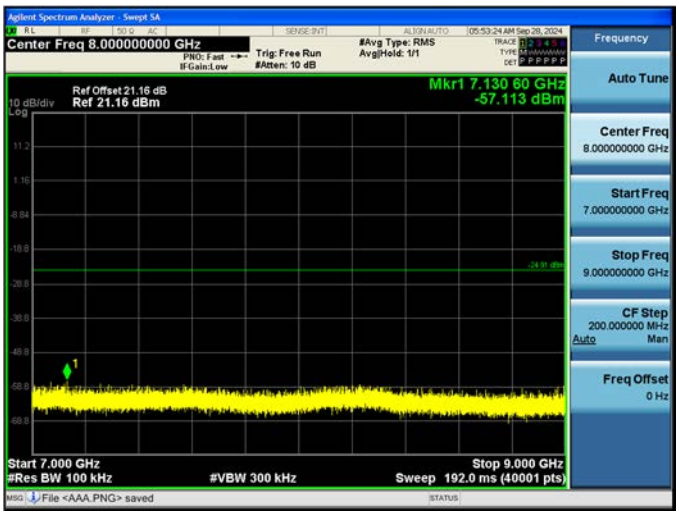
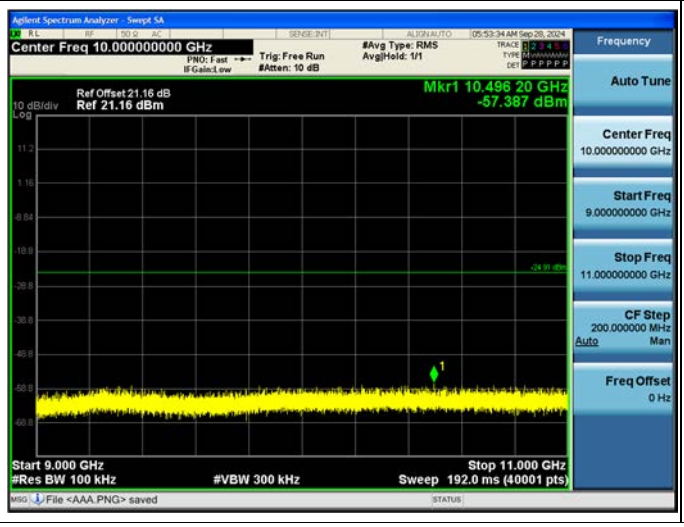
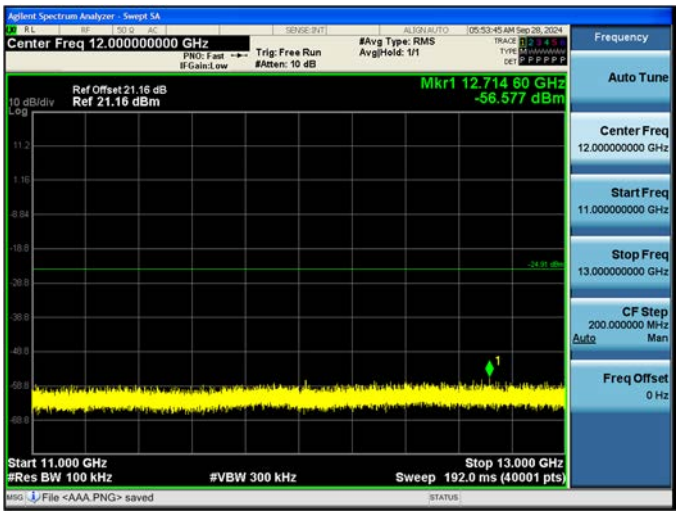
1 GHz ~ 3 GHz	3 GHz ~ 5 GHz
	
5 GHz ~ 7 GHz	**7 GHz ~ 9 GHz**
	
9 GHz ~ 11 GHz	**11 GHz ~ 13 GHz**
	

13 GHz ~ 15 GHz	15 GHz ~ 17 GHz
	
17 GHz ~ 19 GHz	**19 GHz ~ 21 GHz**
	
21 GHz ~ 23 GHz	**23 GHz ~ 25 GHz**
	

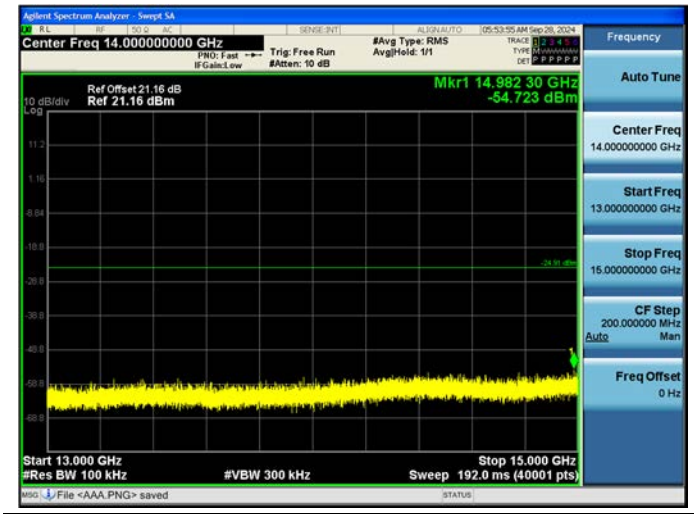
30 MHz ~ 1 GHz



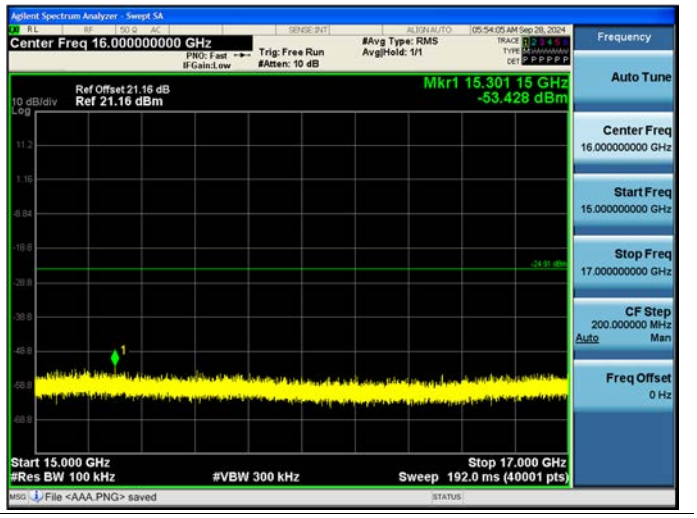
Ant. 2 : 125k Bit/s 255 Byte Ch. 37(2 402 MHz)

1 GHz ~ 3 GHz	3 GHz ~ 5 GHz
	
5 GHz ~ 7 GHz	**7 GHz ~ 9 GHz**
	
9 GHz ~ 11 GHz	**11 GHz ~ 13 GHz**
	

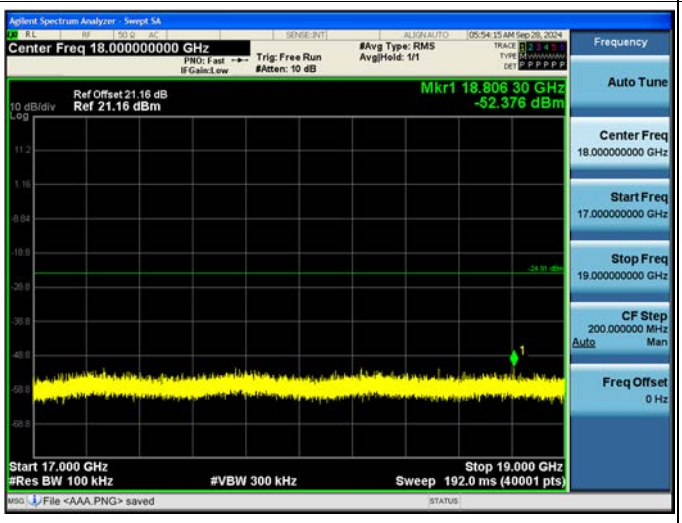
13 GHz ~ 15 GHz



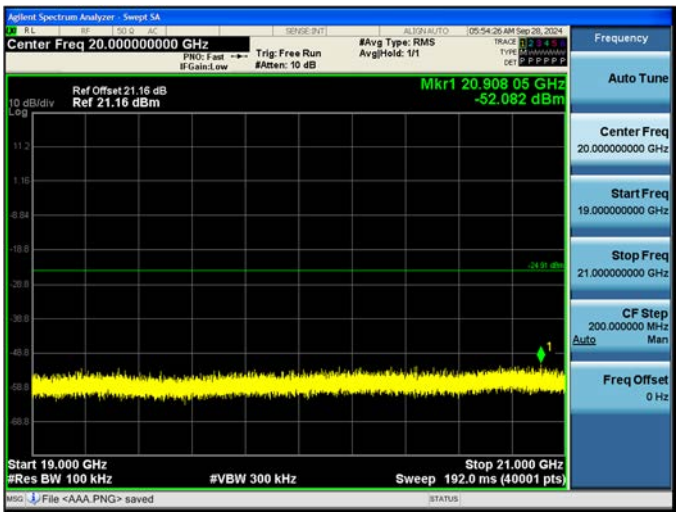
15 GHz ~ 17 GHz



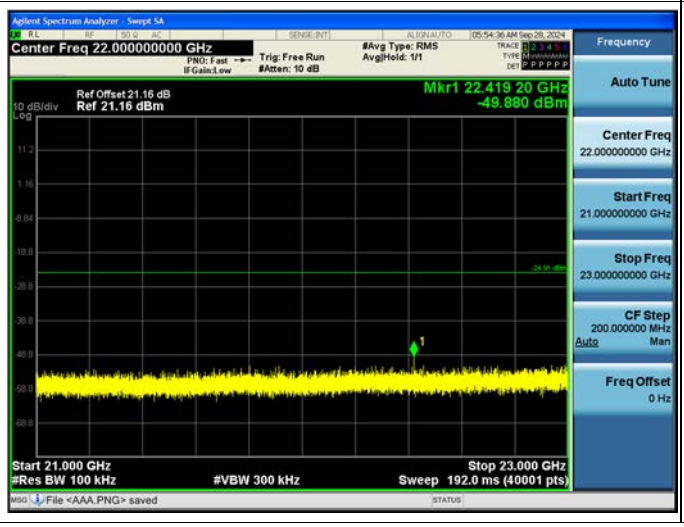
17 GHz ~ 19 GHz



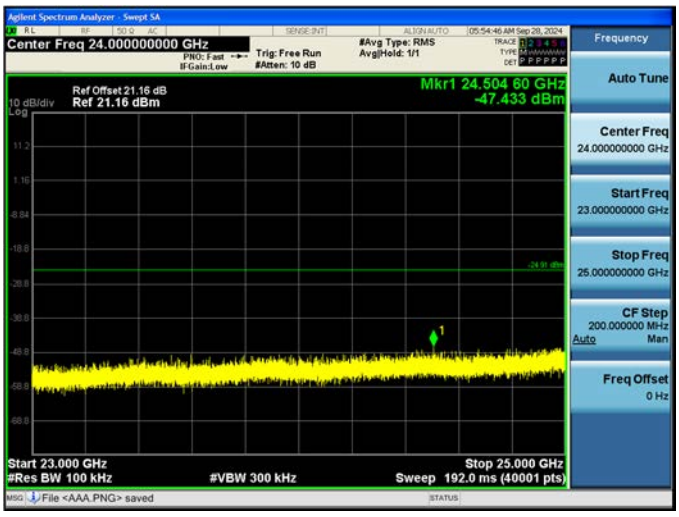
19 GHz ~ 21 GHz

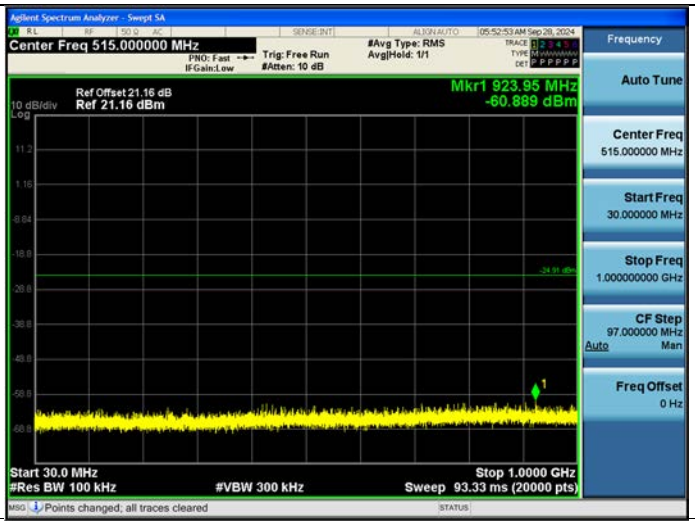


21 GHz ~ 23 GHz

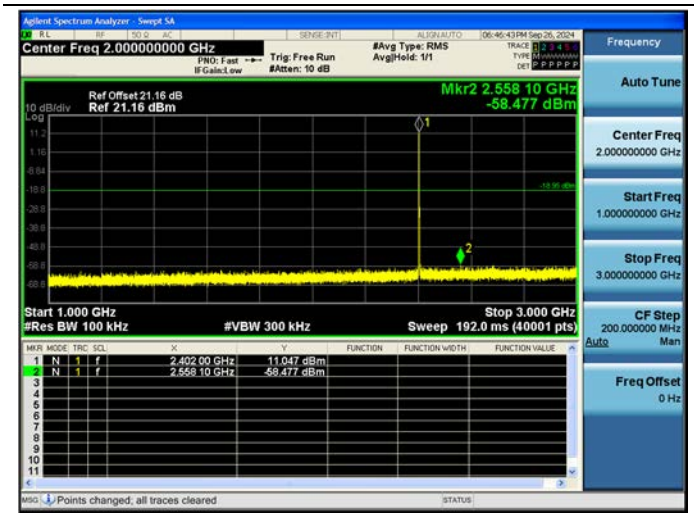
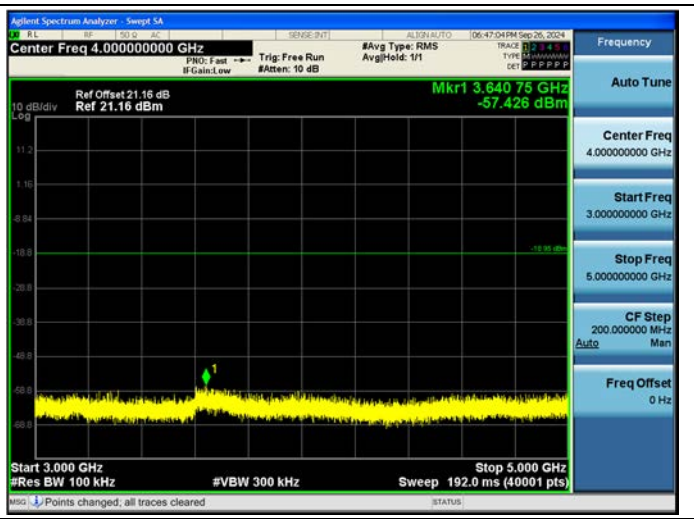
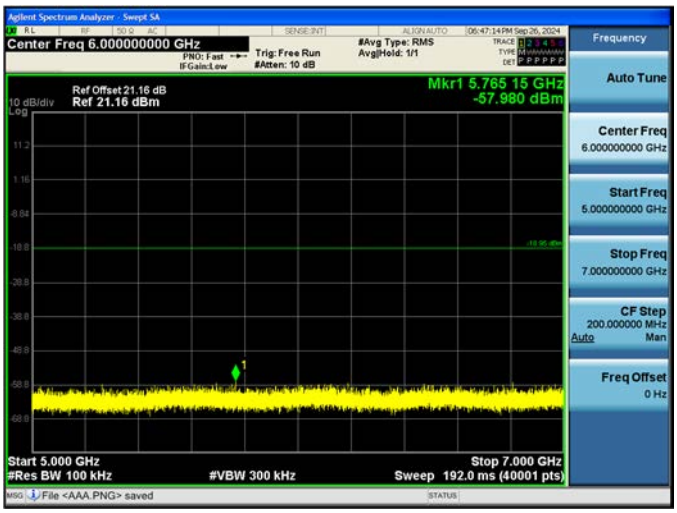
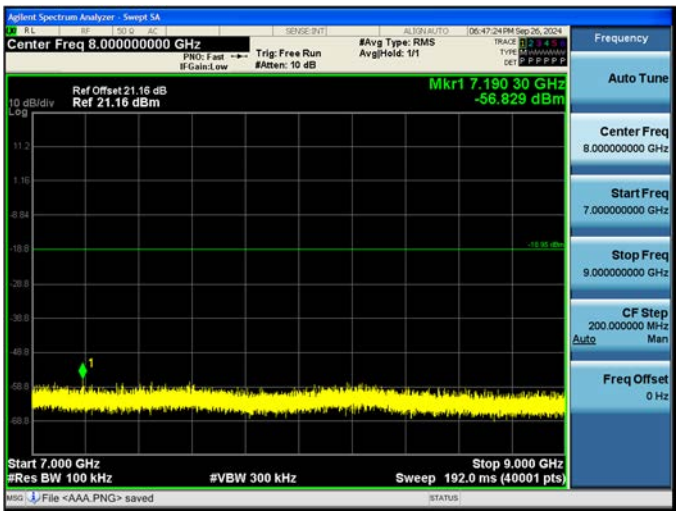
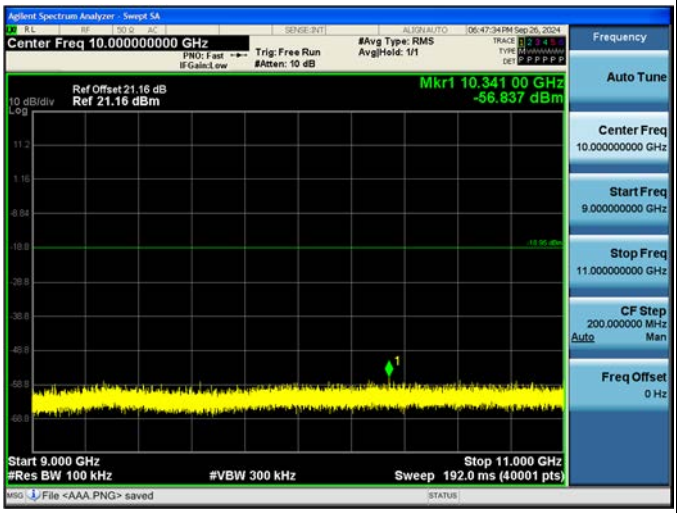
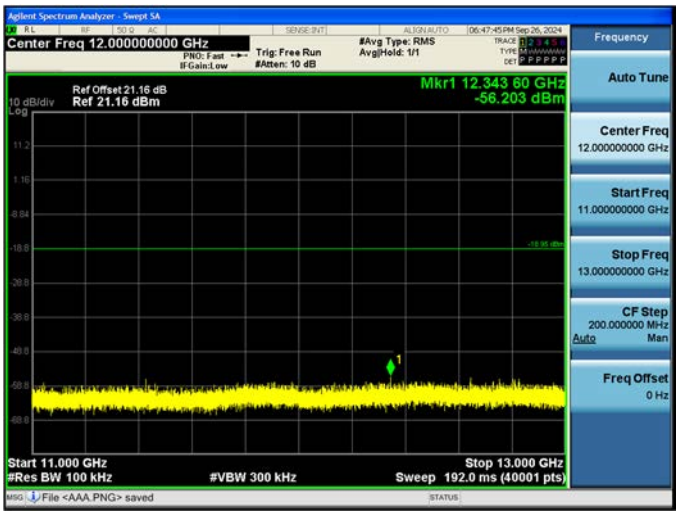


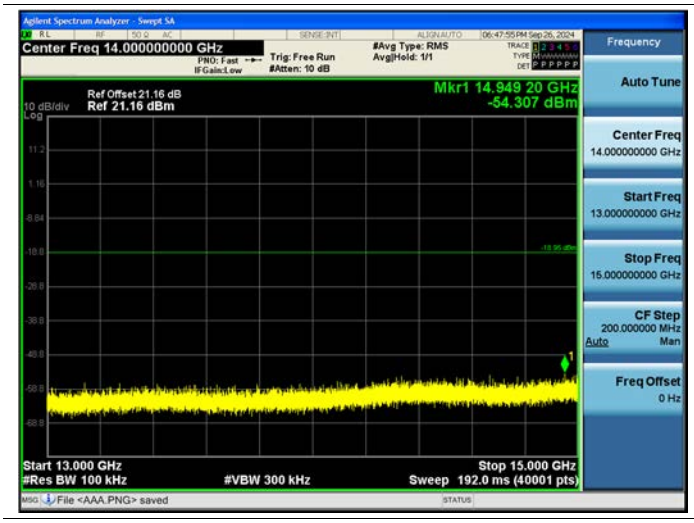
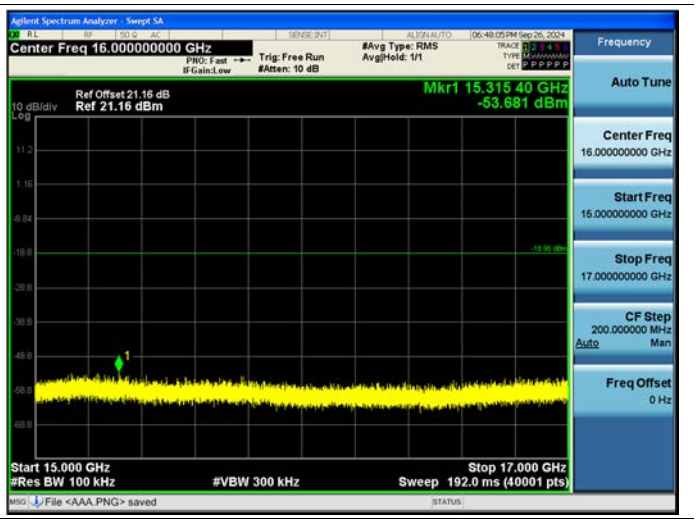
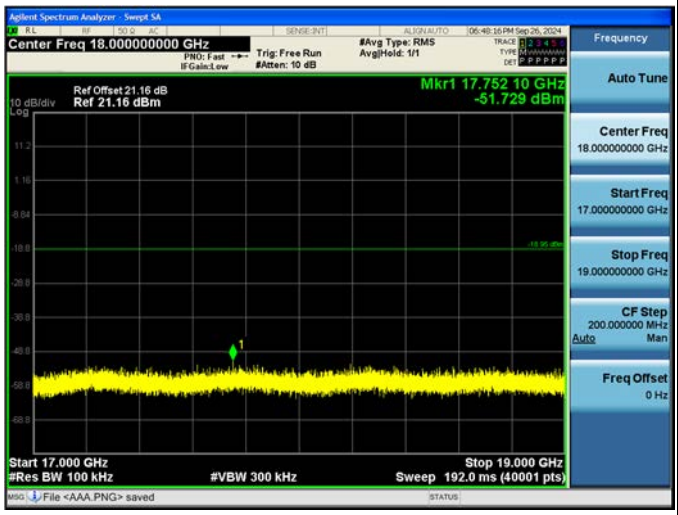
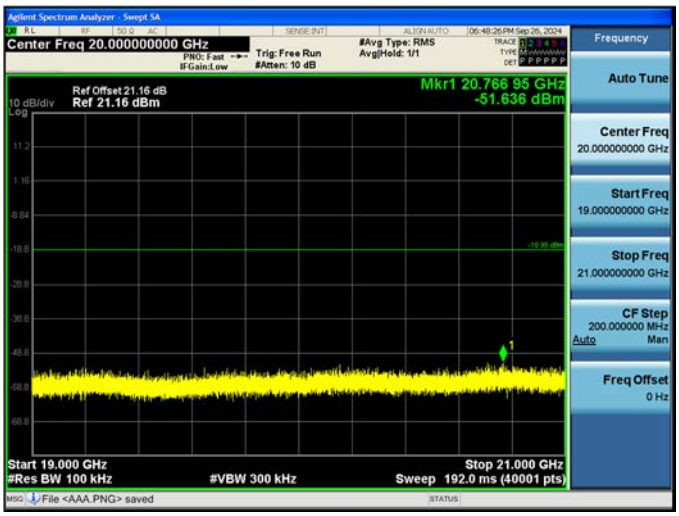
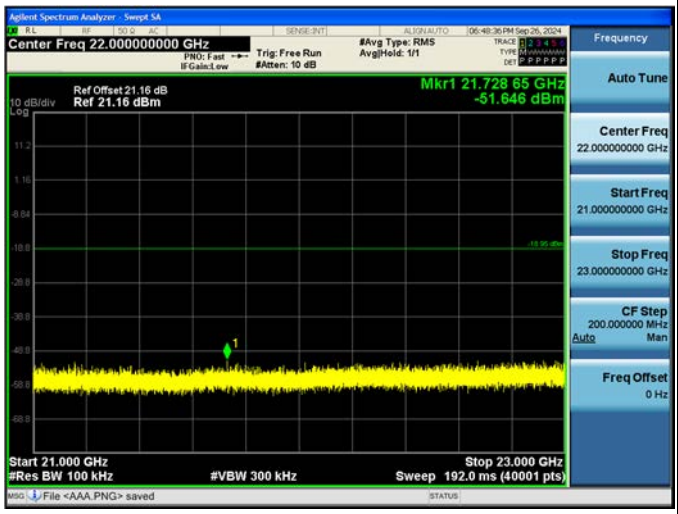
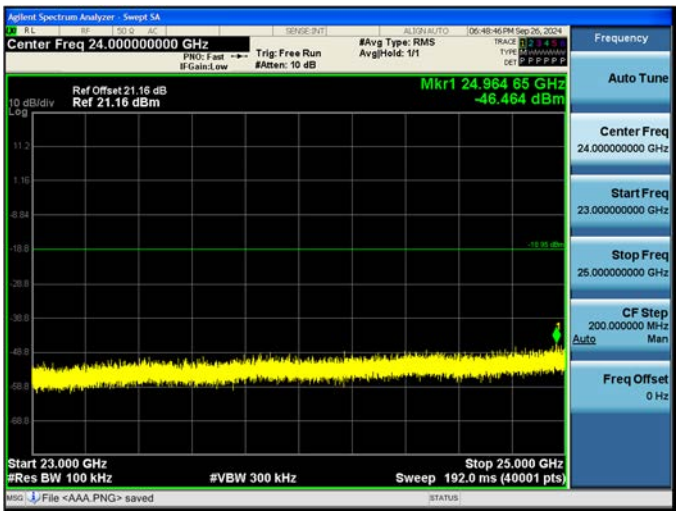
23 GHz ~ 25 GHz

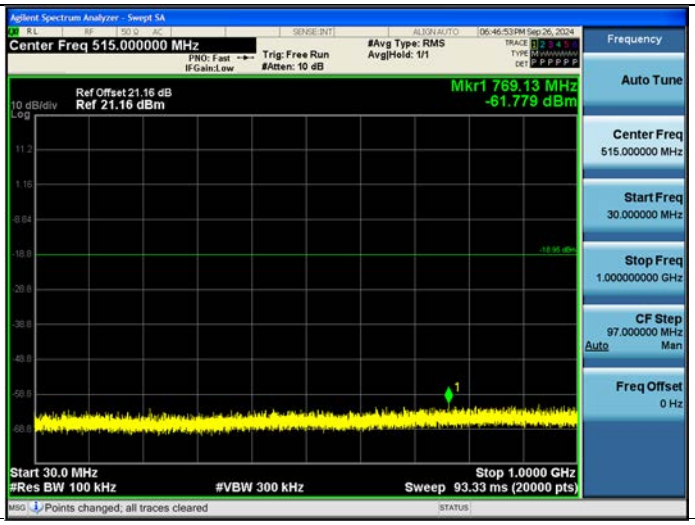


30 MHz ~ 1 GHz		
		

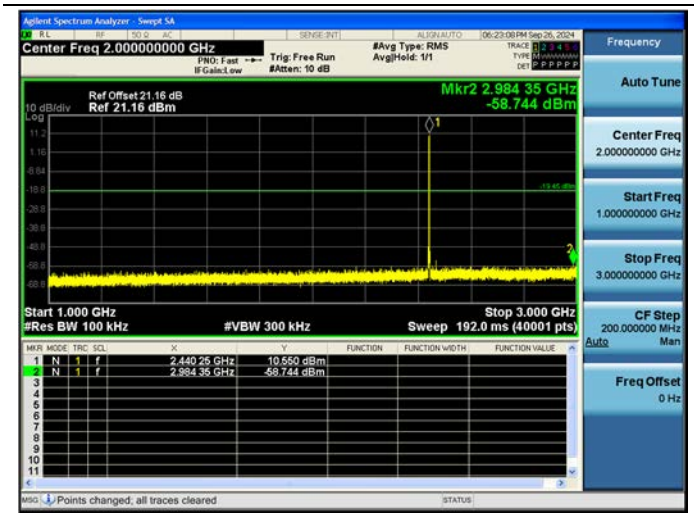
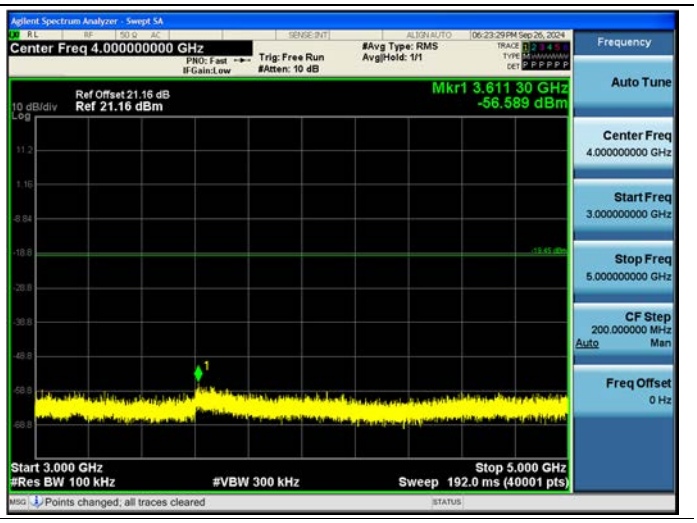
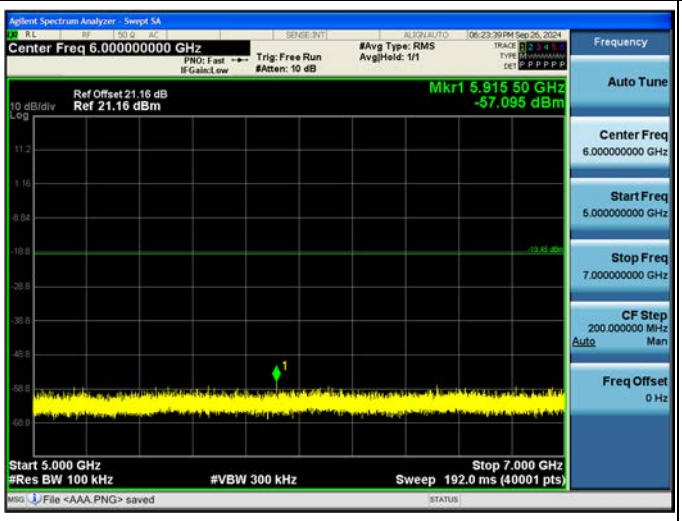
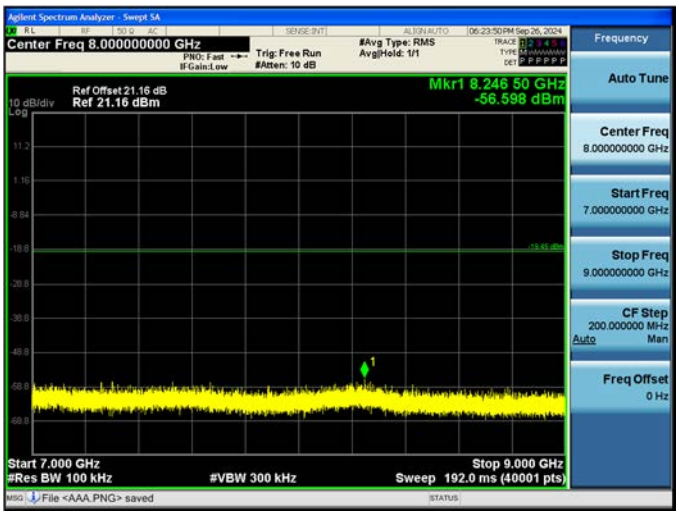
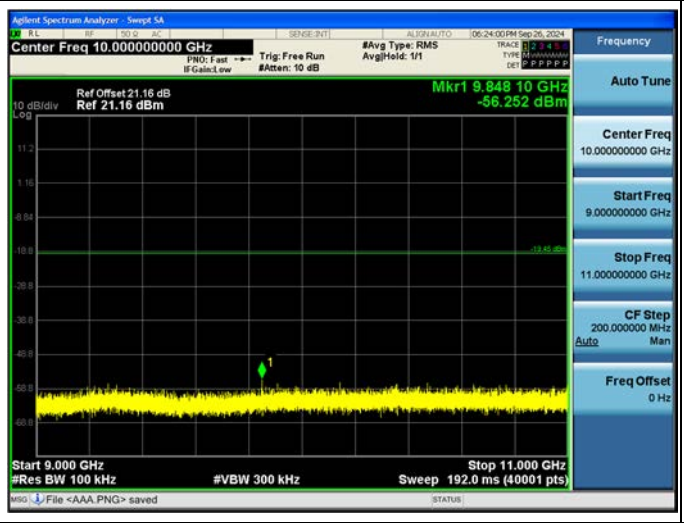
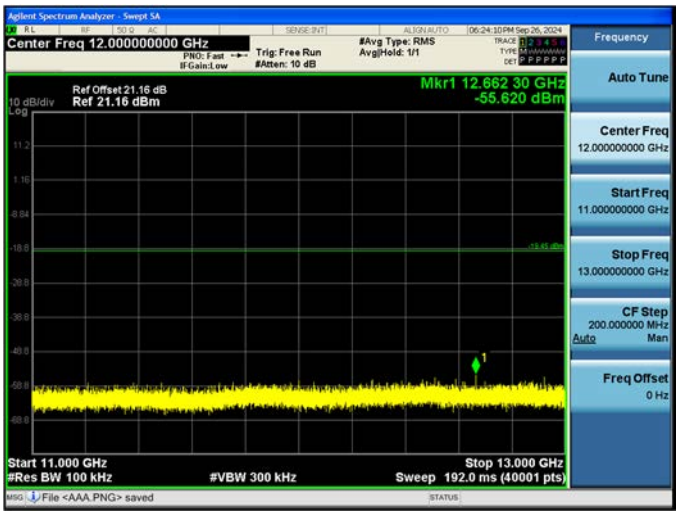
Dual Ant. 1: 1M Bit/s 37 Byte Ch. 37(2 402 MHz)

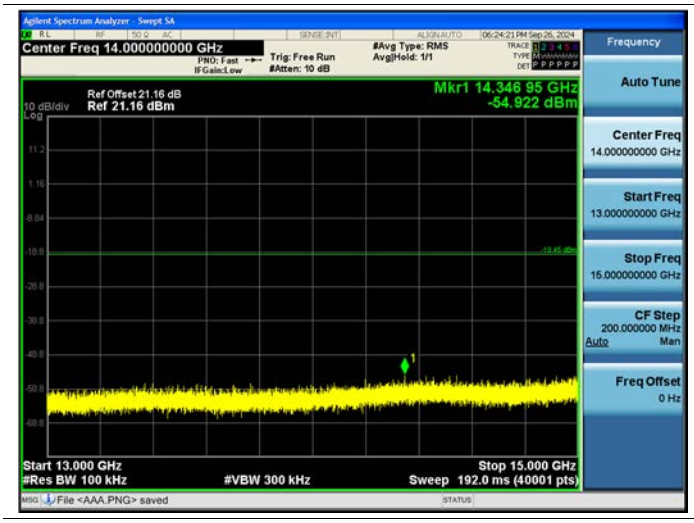
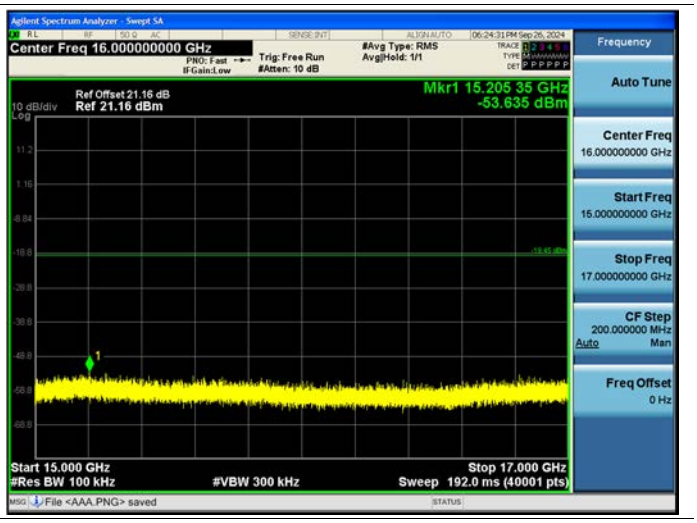
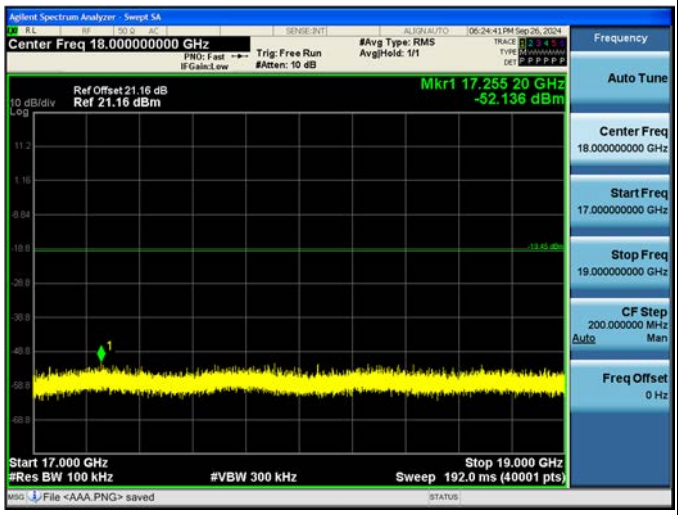
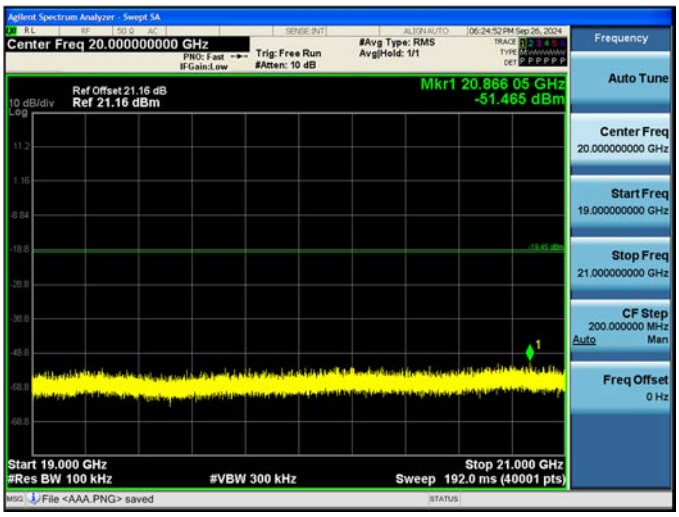
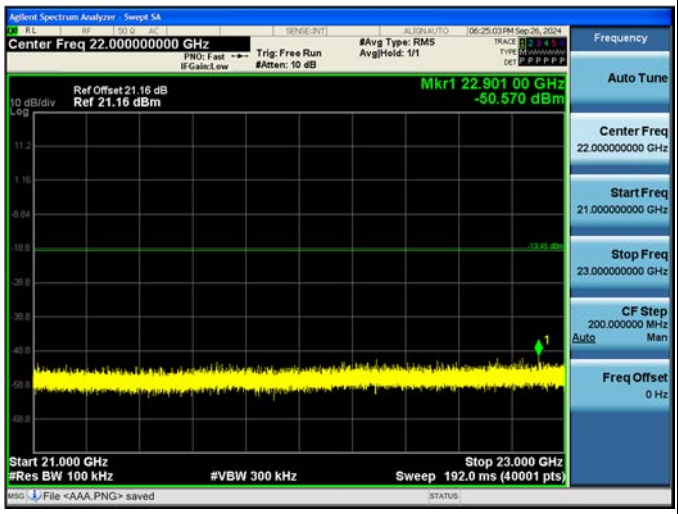
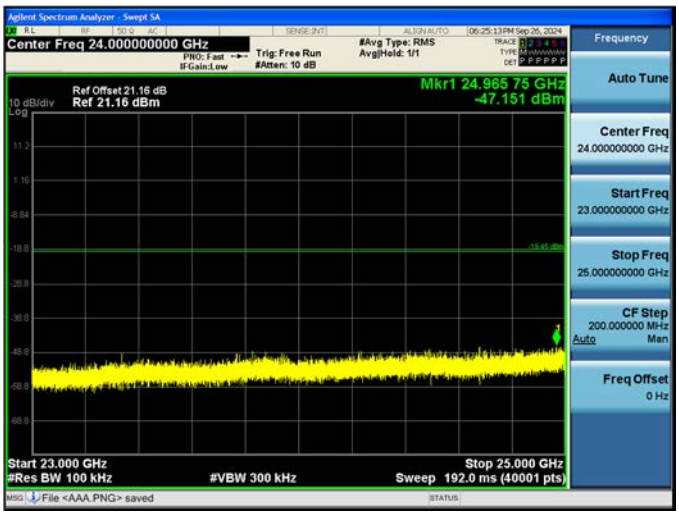
1 GHz ~ 3 GHz	3 GHz ~ 5 GHz
	
5 GHz ~ 7 GHz	**7 GHz ~ 9 GHz**
	
9 GHz ~ 11 GHz	**11 GHz ~ 13 GHz**
	

13 GHz ~ 15 GHz	15 GHz ~ 17 GHz
	
17 GHz ~ 19 GHz	**19 GHz ~ 21 GHz**
	
21 GHz ~ 23 GHz	**23 GHz ~ 25 GHz**
	

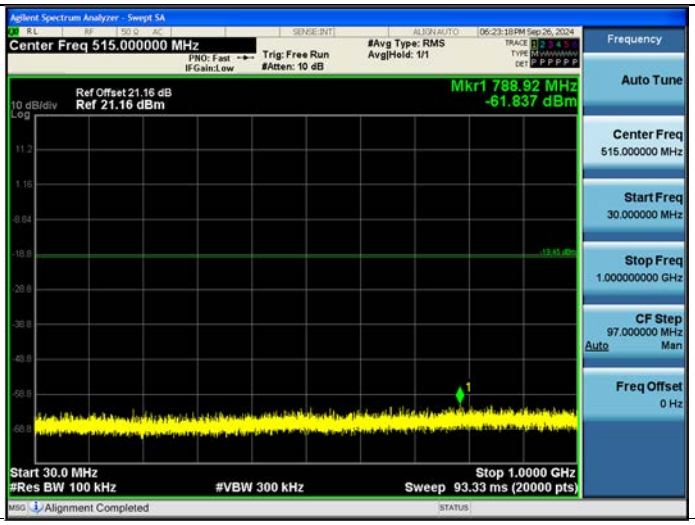
30 MHz ~ 1 GHz		
		

Dual Ant. 2 : 1M Bit/s 37 Byte Ch. 17(2 440 MHz)

1 GHz ~ 3 GHz	3 GHz ~ 5 GHz
	
5 GHz ~ 7 GHz	**7 GHz ~ 9 GHz**
	
9 GHz ~ 11 GHz	**11 GHz ~ 13 GHz**
	

13 GHz ~ 15 GHz	15 GHz ~ 17 GHz
	
17 GHz ~ 19 GHz	**19 GHz ~ 21 GHz**
	
21 GHz ~ 23 GHz	**23 GHz ~ 25 GHz**
	

30 MHz ~ 1 GHz



9.6 RADIATED SPURIOUS EMISSIONS

Frequency Range : 9 kHz – 30 MHz

Frequency	Measured Value	A.F+C.L+D.F	POL	Total	Limit	Margin
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]
No Critical peaks found						

Note:

1. The Measured of emissions are attenuated more than 20 dB below the permissible limits or the field strength is too small to be measured.
2. Distance extrapolation factor = 40log (specific distance / test distance) (dB)
3. Limit line = specific Limits (dBμV) + Distance extrapolation factor

Frequency Range : Below 1 GHz

Frequency	Measured Value	A.F+C.L	POL	Total	Limit	Margin
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]
No Critical peaks found						

Note:

1. Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Quasi peak detector mode.

Frequency Range : Above 1 GHz

[Ant.1]

CH 37	2402	MHz	Mode :		1 M Bit/s (37 Bytes)		
Frequency	Measured value	A.F+C.L-A.G+D.F	Pol.	Total	Limit	Margin	Measurement Type
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	
4804	41.28	4.82	V	46.10	73.98	27.88	PK
4804	30.05	4.82	V	34.87	53.98	19.11	AV
7206	38.73	12.62	V	51.35	73.98	22.63	PK
7206	26.46	12.62	V	39.08	53.98	14.90	AV
4804	41.81	4.82	H	46.63	73.98	27.35	PK
4804	30.16	4.82	H	34.98	53.98	19.00	AV
7206	39.06	12.62	H	51.68	73.98	22.30	PK
7206	26.51	12.62	H	39.13	53.98	14.85	AV

CH 17	2440	MHz	Mode :		1 M Bit/s (37 Bytes)		
Frequency	Measured value	A.F+C.L-A.G+D.F	Pol.	Total	Limit	Margin	Measurement Type
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	
4880	41.03	5.29	V	46.32	73.98	27.66	PK
4880	29.28	5.29	V	34.57	53.98	19.41	AV
7320	39.41	12.70	V	52.11	73.98	21.87	PK
7320	26.16	12.70	V	38.86	53.98	15.12	AV
4880	41.17	5.29	H	46.46	73.98	27.52	PK
4880	29.52	5.29	H	34.81	53.98	19.17	AV
7320	39.45	12.70	H	52.15	73.98	21.83	PK
7320	26.54	12.70	H	39.24	53.98	14.74	AV

CH 39	2480	MHz	Mode :		1 M Bit/s (37 Bytes)		
Frequency	Measured value	A.F+C.L-A.G+D.F	Pol.	Total	Limit	Margin	Measurement Type
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	
4960	41.93	5.79	V	47.72	73.98	26.26	PK
4960	30.28	5.79	V	36.07	53.98	17.91	AV
7440	39.16	12.54	V	51.70	73.98	22.28	PK
7440	26.70	12.54	V	39.24	53.98	14.74	AV
4960	42.12	5.79	H	47.91	73.98	26.07	PK
4960	30.31	5.79	H	36.10	53.98	17.88	AV
7440	39.34	12.54	H	51.88	73.98	22.10	PK
7440	26.81	12.54	H	39.35	53.98	14.63	AV

CH 0	2404	MHz	Mode :		2 M Bit/s (37 Bytes)		
Frequency	Measured value	A.F+C.L-A.G+D.F	Pol.	Total	Limit	Margin	Measurement Type
[MHz]	[dBµV]	[dB/m]	[H/V]	[dBµV/m]	[dBµV/m]	[dB]	
4808	41.96	4.90	V	46.86	73.98	27.12	PK
4808	29.51	4.90	V	34.41	53.98	19.57	AV
7212	38.56	12.67	V	51.23	73.98	22.75	PK
7212	26.24	12.67	V	38.91	53.98	15.07	AV
4808	42.35	4.90	H	47.25	73.98	26.73	PK
4808	29.54	4.90	H	34.44	53.98	19.54	AV
7212	39.02	12.67	H	51.69	73.98	22.29	PK
7212	26.48	12.67	H	39.15	53.98	14.83	AV

CH 17	2440	MHz	Mode :		2 M Bit/s (37 Bytes)		
Frequency	Measured value	A.F+C.L-A.G+D.F	Pol.	Total	Limit	Margin	Measurement Type
[MHz]	[dBµV]	[dB/m]	[H/V]	[dBµV/m]	[dBµV/m]	[dB]	
4880	41.02	5.29	V	46.31	73.98	27.67	PK
4880	29.05	5.29	V	34.34	53.98	19.64	AV
7320	39.14	12.70	V	51.84	73.98	22.14	PK
7320	26.18	12.70	V	38.88	53.98	15.10	AV
4880	41.14	5.29	H	46.43	73.98	27.55	PK
4880	29.17	5.29	H	34.46	53.98	19.52	AV
7320	39.35	12.70	H	52.05	73.98	21.93	PK
7320	26.51	12.70	H	39.21	53.98	14.77	AV

CH 36	2478	MHz	Mode :		2 M Bit/s (37 Bytes)		
Frequency	Measured value	A.F+C.L-A.G+D.F	Pol.	Total	Limit	Margin	Measurement Type
[MHz]	[dBµV]	[dB/m]	[H/V]	[dBµV/m]	[dBµV/m]	[dB]	
4956	41.16	5.76	V	46.92	73.98	27.06	PK
4956	29.27	5.76	V	35.03	53.98	18.95	AV
7434	38.53	12.55	V	51.08	73.98	22.90	PK
7434	26.17	12.55	V	38.72	53.98	15.26	AV
4956	41.75	5.76	H	47.51	73.98	26.47	PK
4956	29.78	5.76	H	35.54	53.98	18.44	AV
7434	39.01	12.55	H	51.56	73.98	22.42	PK
7434	26.78	12.55	H	39.33	53.98	14.65	AV

[Ant.2]

CH 37	2402	MHz	Mode :		1 M Bit/s (37 Bytes)		
Frequency	Measured value	A.F+C.L-A.G+D.F	Pol.	Total	Limit	Margin	Measurement Type
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	
4804	43.17	4.82	V	47.99	73.98	25.99	PK
4804	30.43	4.82	V	35.25	53.98	18.73	AV
7206	38.46	12.62	V	51.08	73.98	22.90	PK
7206	26.50	12.62	V	39.12	53.98	14.86	AV
4804	42.88	4.82	H	47.70	73.98	26.28	PK
4804	30.16	4.82	H	34.98	53.98	19.00	AV
7206	38.95	12.62	H	51.57	73.98	22.41	PK
7206	26.61	12.62	H	39.23	53.98	14.75	AV

CH 17	2440	MHz	Mode :		1 M Bit/s (37 Bytes)		
Frequency	Measured value	A.F+C.L-A.G+D.F	Pol.	Total	Limit	Margin	Measurement Type
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	
4880	41.64	5.29	V	46.93	73.98	27.05	PK
4880	30.13	5.29	V	35.42	53.98	18.56	AV
7320	39.12	12.70	V	51.82	73.98	22.16	PK
7320	26.16	12.70	V	38.86	53.98	15.12	AV
4880	41.11	5.29	H	46.40	73.98	27.58	PK
4880	29.95	5.29	H	35.24	53.98	18.74	AV
7320	39.35	12.70	H	52.05	73.98	21.93	PK
7320	26.51	12.70	H	39.21	53.98	14.77	AV

CH 39	2480	MHz	Mode :		1 M Bit/s (37 Bytes)		
Frequency	Measured value	A.F+C.L-A.G+D.F	Pol.	Total	Limit	Margin	Measurement Type
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	
4960	43.18	5.79	V	48.97	73.98	25.01	PK
4960	31.46	5.79	V	37.25	53.98	16.73	AV
7440	39.46	12.54	V	52.00	73.98	21.98	PK
7440	26.53	12.54	V	39.07	53.98	14.91	AV
4960	42.85	5.79	H	48.64	73.98	25.34	PK
4960	31.10	5.79	H	36.89	53.98	17.09	AV
7440	39.73	12.54	H	52.27	73.98	21.71	PK
7440	26.72	12.54	H	39.26	53.98	14.72	AV

CH 0	2404	MHz	Mode :		2 M Bit/s (37 Bytes)		
Frequency	Measured value	A.F+C.L-A.G+D.F	Pol.	Total	Limit	Margin	Measurement Type
[MHz]	[dBµV]	[dB/m]	[H/V]	[dBµV/m]	[dBµV/m]	[dB]	
4808	42.70	4.90	V	47.60	73.98	26.38	PK
4808	29.75	4.90	V	34.65	53.98	19.33	AV
7212	38.53	12.67	V	51.20	73.98	22.78	PK
7212	26.13	12.67	V	38.80	53.98	15.18	AV
4808	42.28	4.90	H	47.18	73.98	26.80	PK
4808	29.53	4.90	H	34.43	53.98	19.55	AV
7212	39.10	12.67	H	51.77	73.98	22.21	PK
7212	26.66	12.67	H	39.33	53.98	14.65	AV

CH 17	2440	MHz	Mode :		2 M Bit/s (37 Bytes)		
Frequency	Measured value	A.F+C.L-A.G+D.F	Pol.	Total	Limit	Margin	Measurement Type
[MHz]	[dBµV]	[dB/m]	[H/V]	[dBµV/m]	[dBµV/m]	[dB]	
4880	41.42	5.29	V	46.71	73.98	27.27	PK
4880	29.41	5.29	V	34.70	53.98	19.28	AV
7320	39.10	12.70	V	51.80	73.98	22.18	PK
7320	26.23	12.70	V	38.93	53.98	15.05	AV
4880	41.18	5.29	H	46.47	73.98	27.51	PK
4880	29.13	5.29	H	34.42	53.98	19.56	AV
7320	39.22	12.70	H	51.92	73.98	22.06	PK
7320	26.48	12.70	H	39.18	53.98	14.80	AV

CH 36	2478	MHz	Mode :		2 M Bit/s (37 Bytes)		
Frequency	Measured value	A.F+C.L-A.G+D.F	Pol.	Total	Limit	Margin	Measurement Type
[MHz]	[dBµV]	[dB/m]	[H/V]	[dBµV/m]	[dBµV/m]	[dB]	
4956	42.84	5.76	V	48.60	73.98	25.38	PK
4956	30.42	5.76	V	36.18	53.98	17.80	AV
7434	38.26	12.55	V	50.81	73.98	23.17	PK
7434	26.53	12.55	V	39.08	53.98	14.90	AV
4956	42.29	5.76	H	48.05	73.98	25.93	PK
4956	30.22	5.76	H	35.98	53.98	18.00	AV
7434	38.83	12.55	H	51.38	73.98	22.60	PK
7434	26.78	12.55	H	39.33	53.98	14.65	AV

[Dual Ant.1+ Ant.2]

CH 37	2402	MHz	Mode :		1 M Bit/s (37 Bytes)		
Frequency	Measured value	A.F+C.L-A.G+D.F	Pol.	Total	Limit	Margin	Measurement Type
[MHz]	[dBµV]	[dB/m]	[H/V]	[dBµV/m]	[dBµV/m]	[dB]	
4808	41.13	4.82	V	45.95	73.98	28.03	PK
4808	29.06	4.82	V	33.88	53.98	20.10	AV
7212	38.90	12.62	V	51.52	73.98	22.46	PK
7212	27.14	12.62	V	39.76	53.98	14.22	AV
4808	41.32	4.82	H	46.14	73.98	27.84	PK
4808	29.22	4.82	H	34.04	53.98	19.94	AV
7212	39.17	12.62	H	51.79	73.98	22.19	PK
7212	27.40	12.62	H	40.02	53.98	13.96	AV

CH 17	2440	MHz	Mode :		1 M Bit/s (37 Bytes)		
Frequency	Measured value	A.F+C.L-A.G+D.F	Pol.	Total	Limit	Margin	Measurement Type
[MHz]	[dBµV]	[dB/m]	[H/V]	[dBµV/m]	[dBµV/m]	[dB]	
4880	41.28	5.29	V	46.57	73.98	27.41	PK
4880	29.03	5.29	V	34.32	53.98	19.66	AV
7320	39.22	12.70	V	51.92	73.98	22.06	PK
7320	27.91	12.70	V	40.61	53.98	13.37	AV
4880	41.40	5.29	H	46.69	73.98	27.29	PK
4880	29.15	5.29	H	34.44	53.98	19.54	AV
7320	39.70	12.70	H	52.40	73.98	21.58	PK
7320	28.19	12.70	H	40.89	53.98	13.09	AV

CH 39	2480	MHz	Mode :		1 M Bit/s (37 Bytes)		
Frequency	Measured value	A.F+C.L-A.G+D.F	Pol.	Total	Limit	Margin	Measurement Type
[MHz]	[dBµV]	[dB/m]	[H/V]	[dBµV/m]	[dBµV/m]	[dB]	
4956	41.10	5.79	V	46.89	73.98	27.09	PK
4956	28.66	5.79	V	34.45	53.98	19.53	AV
7434	38.86	12.54	V	51.40	73.98	22.58	PK
7434	27.54	12.54	V	40.08	53.98	13.90	AV
4956	41.59	5.79	H	47.38	73.98	26.60	PK
4956	29.18	5.79	H	34.97	53.98	19.01	AV
7434	39.33	12.54	H	51.87	73.98	22.11	PK
7434	27.99	12.54	H	40.53	53.98	13.45	AV

CH 0	2404	MHz	Mode :		2 M Bit/s (37 Bytes)		
Frequency	Measured value	A.F+C.L-A.G+D.F	Pol.	Total	Limit	Margin	Measurement Type
[MHz]	[dBµV]	[dB/m]	[H/V]	[dBµV/m]	[dBµV/m]	[dB]	
4808	41.12	4.90	V	46.02	73.98	27.96	PK
4808	29.01	4.90	V	33.91	53.98	20.07	AV
7212	38.71	12.67	V	51.38	73.98	22.60	PK
7212	26.57	12.67	V	39.24	53.98	14.74	AV
4808	41.29	4.90	H	46.19	73.98	27.79	PK
4808	29.15	4.90	H	34.05	53.98	19.93	AV
7212	39.02	12.67	H	51.69	73.98	22.29	PK
7212	26.85	12.67	H	39.52	53.98	14.46	AV

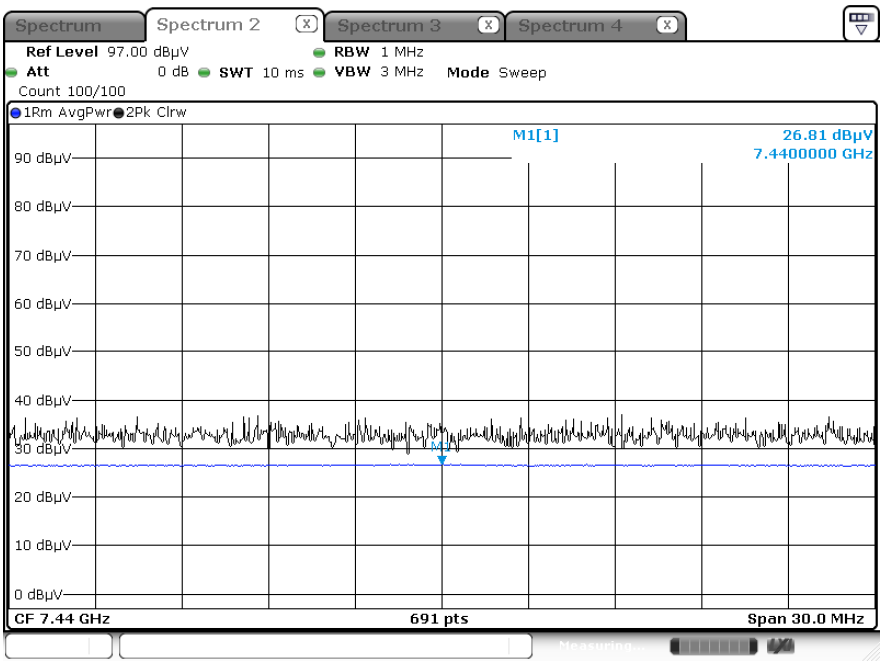
CH 17	2440	MHz	Mode :		2 M Bit/s (37 Bytes)		
Frequency	Measured value	A.F+C.L-A.G+D.F	Pol.	Total	Limit	Margin	Measurement Type
[MHz]	[dBµV]	[dB/m]	[H/V]	[dBµV/m]	[dBµV/m]	[dB]	
4880	41.19	5.29	V	46.48	73.98	27.50	PK
4880	28.73	5.29	V	34.02	53.98	19.96	AV
7320	39.50	12.70	V	52.20	73.98	21.78	PK
7320	27.08	12.70	V	39.78	53.98	14.20	AV
4880	41.42	5.29	H	46.71	73.98	27.27	PK
4880	29.11	5.29	H	34.40	53.98	19.58	AV
7320	39.72	12.70	H	52.42	73.98	21.56	PK
7320	27.32	12.70	H	40.02	53.98	13.96	AV

CH 36	2478	MHz	Mode :		2 M Bit/s (37 Bytes)		
Frequency	Measured value	A.F+C.L-A.G+D.F	Pol.	Total	Limit	Margin	Measurement Type
[MHz]	[dBµV]	[dB/m]	[H/V]	[dBµV/m]	[dBµV/m]	[dB]	
4956	41.16	5.76	V	46.92	73.98	27.06	PK
4956	28.93	5.76	V	34.69	53.98	19.29	AV
7434	38.57	12.55	V	51.12	73.98	22.86	PK
7434	26.95	12.55	V	39.50	53.98	14.48	AV
4956	41.48	5.76	H	47.24	73.98	26.74	PK
4956	29.15	5.76	H	34.91	53.98	19.07	AV
7434	39.06	12.55	H	51.61	73.98	22.37	PK
7434	27.22	12.55	H	39.77	53.98	14.21	AV

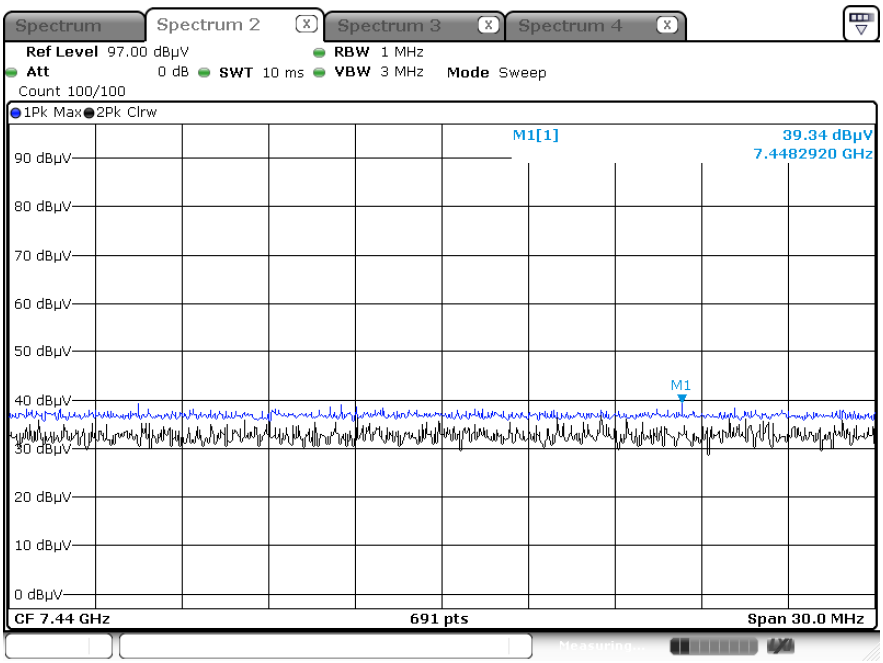
[Ant.1]

▣ 1 M Bit/s 37 Bytes Test Plots (Worst case : Y-H)

Radiated Spurious Emissions plot – Average Result (Ch.39 3rd Harmonic)



Radiated Spurious Emissions plot – Peak Result (Ch.39 3rd Harmonic)



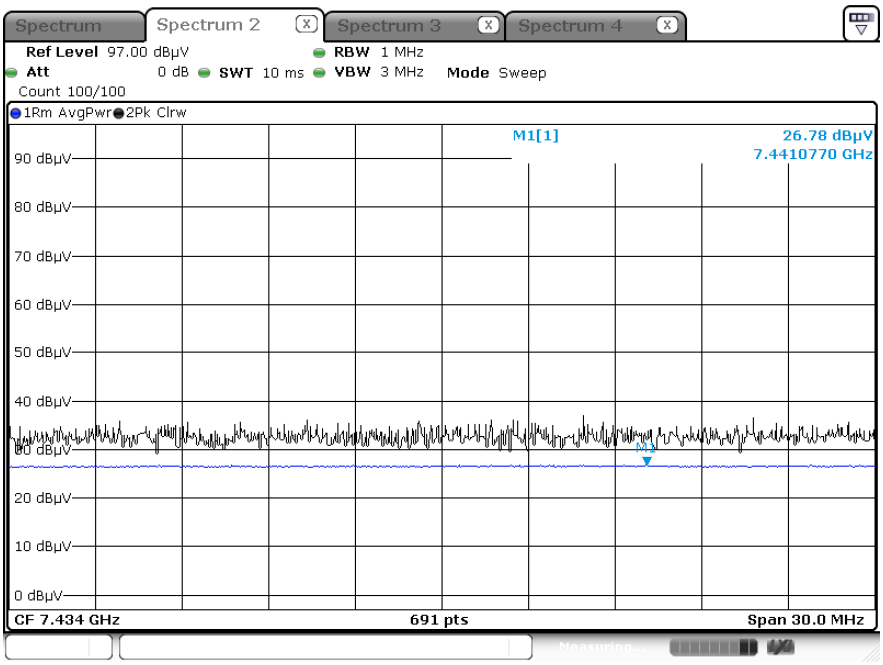
Note:

Plots of worst case are only reported.

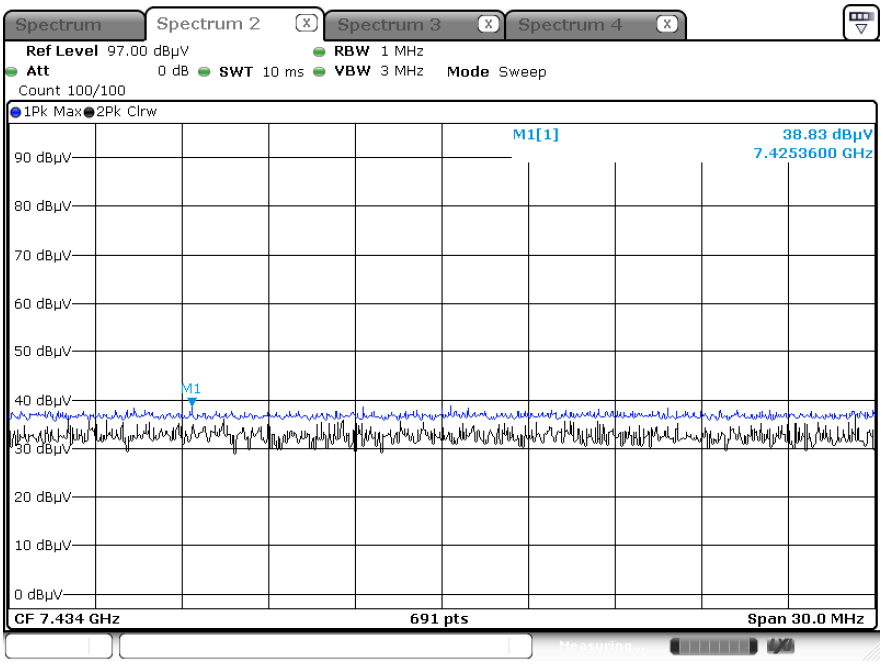
[Ant.2]

▣ 2 M Bit/s 37 Bytes Test Plots (Worst case : Y-H)

Radiated Spurious Emissions plot – Average Result (Ch.36 3rd Harmonic)



Radiated Spurious Emissions plot – Peak Result (Ch.36 3rd Harmonic)



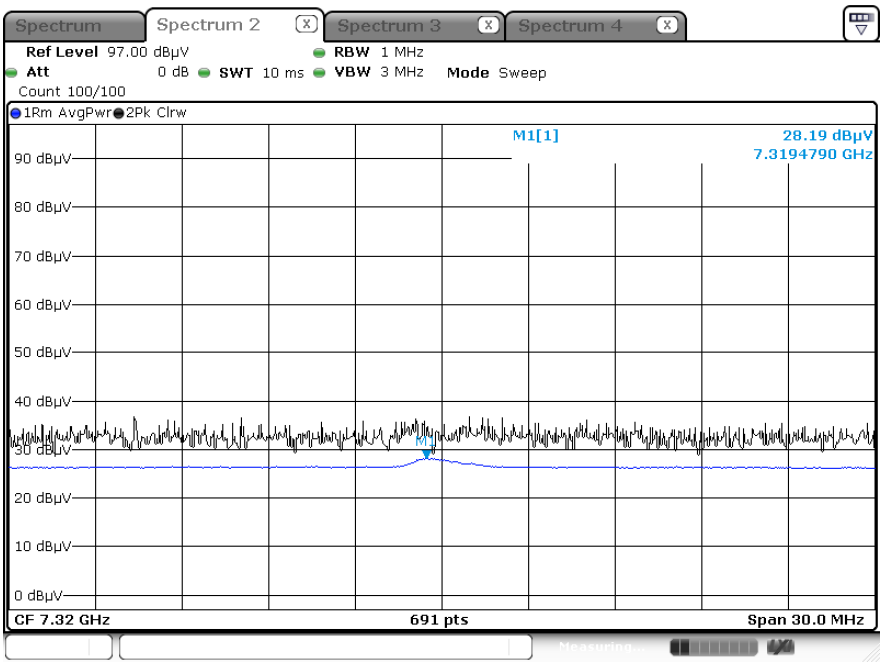
Note:

Plots of worst case are only reported.

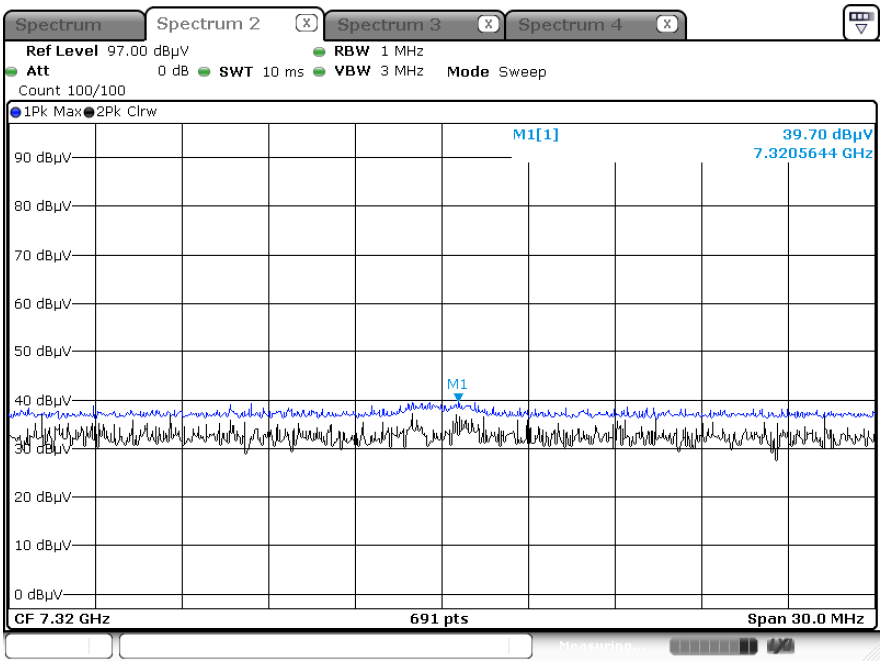
[Dual Ant.1+ Ant.2]

▣ 1 M Bit/s 37 Bytes Test Plots (Worst case : Y-H)

Radiated Spurious Emissions plot – Average Result (Ch.17 3rd Harmonic)



Radiated Spurious Emissions plot – Peak Result (Ch.17 3rd Harmonic)



Note:

Plots of worst case are only reported.

9.7 RADIATED RESTRICTED BAND EDGES

[Ant.1]

1 M Bit/s (37 Bytes)							
Channel	37 CH, 39 CH	Channel No	2402 MHz, 2480 MHz				
Frequency	Measured Value	A.F+C.L+Att-A.G+D.F	Ant. Pol.	Total	Limit	Margin	Measurement
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	Type
2390.0	48.12	2.47	H	50.59	73.98	23.39	PK
2390.0	35.33	2.47	H	37.80	53.98	16.18	AV
2483.5	60.19	3.45	H	63.64	73.98	10.34	PK
2483.5	38.12	3.45	H	41.57	53.98	12.41	AV

1 M Bit/s (255 Bytes)							
Channel	37 CH, 39 CH	Channel No	2402 MHz, 2480 MHz				
Frequency	Measured Value	A.F+C.L+Att-A.G+D.F	Ant. Pol.	Total	Limit	Margin	Measurement
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	Type
2390.0	48.05	2.47	H	50.52	73.98	23.46	PK
2390.0	35.31	2.47	H	37.78	53.98	16.20	AV
2483.5	60.69	3.45	H	64.14	73.98	9.84	PK
2483.5	38.48	3.45	H	41.93	53.98	12.05	AV

2 M Bit/s (37 Bytes)							
Channel	0 CH, 36 CH	Channel No	2404 MHz, 2478 MHz				
Frequency	Measured Value	A.F+C.L+Att-A.G+D.F	Ant. Pol.	Total	Limit	Margin	Measurement
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	Type
2390.0	48.01	2.47	H	50.48	73.98	23.50	PK
2390.0	35.29	2.47	H	37.76	53.98	16.22	AV
2483.5	55.32	3.45	H	58.77	73.98	15.21	PK
2483.5	36.28	3.45	H	39.73	53.98	14.25	AV

2 M Bit/s (255 Bytes)							
Channel	0 CH, 36 CH	Channel No	2404 MHz, 2478 MHz				
Frequency	Measured Value	A.F+C.L+Att-A.G+D.F	Ant. Pol.	Total	Limit	Margin	Measurement
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	Type
2390.0	47.99	2.47	H	50.46	73.98	23.52	PK
2390.0	35.33	2.47	H	37.80	53.98	16.18	AV
2483.5	56.45	3.45	H	59.90	73.98	14.08	PK
2483.5	36.98	3.45	H	40.43	53.98	13.55	AV

[Ant.2]

1 M Bit/s (37 Bytes)							
Channel	37 CH, 39 CH	Channel No	2402 MHz, 2480 MHz				
Frequency	Measured Value	A.F+C.L+Att-A.G+D.F	Ant. Pol.	Total	Limit	Margin	Measurement
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	Type
2390.0	48.29	2.47	H	50.76	73.98	23.22	PK
2390.0	35.32	2.47	H	37.79	53.98	16.19	AV
2483.5	58.72	3.45	H	62.17	73.98	11.81	PK
2483.5	37.58	3.45	H	41.03	53.98	12.95	AV

1 M Bit/s (255 Bytes)							
Channel	37 CH, 39 CH	Channel No	2402 MHz, 2480 MHz				
Frequency	Measured Value	A.F+C.L+Att-A.G+D.F	Ant. Pol.	Total	Limit	Margin	Measurement
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	Type
2390.0	47.95	2.47	H	50.42	73.98	23.56	PK
2390.0	35.05	2.47	H	37.52	53.98	16.46	AV
2483.5	61.65	3.45	H	65.10	73.98	8.88	PK
2483.5	37.81	3.45	H	41.26	53.98	12.72	AV

2 M Bit/s (37 Bytes)							
Channel	0 CH, 36 CH	Channel No	2404 MHz, 2478 MHz				
Frequency	Measured Value	A.F+C.L+Att-A.G+D.F	Ant. Pol.	Total	Limit	Margin	Measurement
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	Type
2390.0	48.12	2.47	H	50.59	73.98	23.39	PK
2390.0	35.22	2.47	H	37.69	53.98	16.29	AV
2483.5	52.25	3.45	H	55.70	73.98	18.28	PK
2483.5	35.46	3.45	H	38.91	53.98	15.07	AV

2 M Bit/s (255 Bytes)							
Channel	0 CH, 36 CH	Channel No	2404 MHz, 2478 MHz				
Frequency	Measured Value	A.F+C.L+Att-A.G+D.F	Ant. Pol.	Total	Limit	Margin	Measurement
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	Type
2390.0	48.05	2.47	H	50.52	73.98	23.46	PK
2390.0	35.12	2.47	H	37.59	53.98	16.39	AV
2483.5	54.78	3.45	H	58.23	73.98	15.75	PK
2483.5	36.06	3.45	H	39.51	53.98	14.47	AV

[Dual Ant.1+ Ant.2]

1 M Bit/s (37 Bytes)							
Channel	37 CH, 39 CH	Channel No	2402 MHz, 2480 MHz				
Frequency	Measured Value	A.F+C.L+Att-A.G+D.F	Ant. Pol.	Total	Limit	Margin	Measurement
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	Type
2390.0	47.66	2.47	H	50.13	73.98	23.85	PK
2390.0	35.32	2.47	H	37.79	53.98	16.19	AV
2483.5	54.51	3.45	H	57.96	73.98	16.02	PK
2483.5	35.03	3.45	H	38.48	53.98	15.50	AV

1 M Bit/s (255 Bytes)							
Channel	37 CH, 39 CH	Channel No	2402 MHz, 2480 MHz				
Frequency	Measured Value	A.F+C.L+Att-A.G+D.F	Ant. Pol.	Total	Limit	Margin	Measurement
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	Type
2390.0	47.55	2.47	H	50.02	73.98	23.96	PK
2390.0	35.42	2.47	H	37.89	53.98	16.09	AV
2483.5	54.02	3.45	H	57.47	73.98	16.51	PK
2483.5	34.78	3.45	H	38.23	53.98	15.75	AV

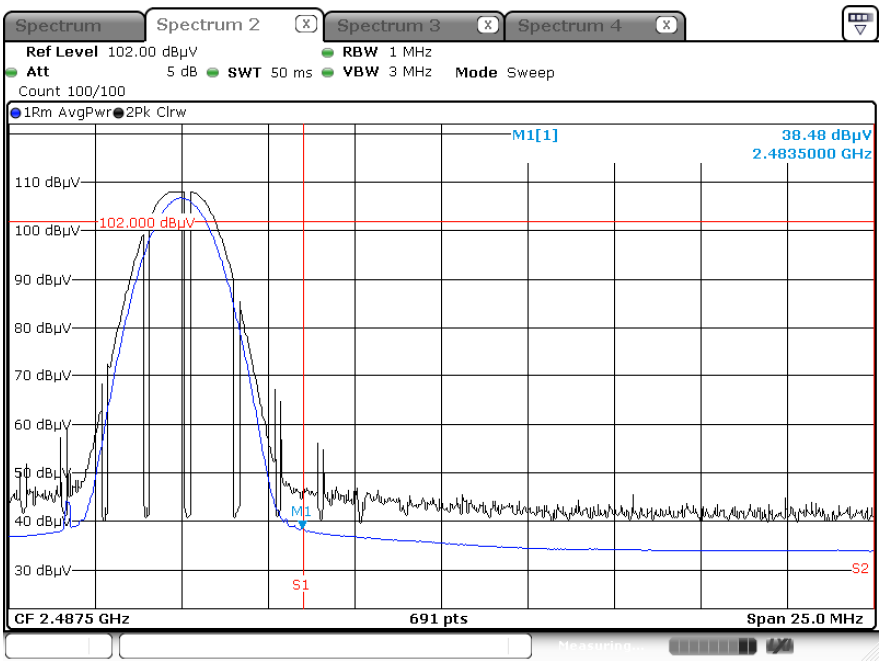
2 M Bit/s (37 Bytes)							
Channel	0 CH, 36 CH	Channel No	2404 MHz, 2478 MHz				
Frequency	Measured Value	A.F+C.L+Att-A.G+D.F	Ant. Pol.	Total	Limit	Margin	Measurement
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	Type
2390.0	47.38	2.47	H	49.85	73.98	24.13	PK
2390.0	35.22	2.47	H	37.69	53.98	16.29	AV
2483.5	49.88	3.45	H	53.33	73.98	20.65	PK
2483.5	34.31	3.45	H	37.76	53.98	16.22	AV

2 M Bit/s (255 Bytes)							
Channel	0 CH, 36 CH	Channel No	2404 MHz, 2478 MHz				
Frequency	Measured Value	A.F+C.L+Att-A.G+D.F	Ant. Pol.	Total	Limit	Margin	Measurement
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	Type
2390.0	47.25	2.47	H	49.72	73.98	24.26	PK
2390.0	35.26	2.47	H	37.73	53.98	16.25	AV
2483.5	50.35	3.45	H	53.80	73.98	20.18	PK
2483.5	34.33	3.45	H	37.78	53.98	16.20	AV

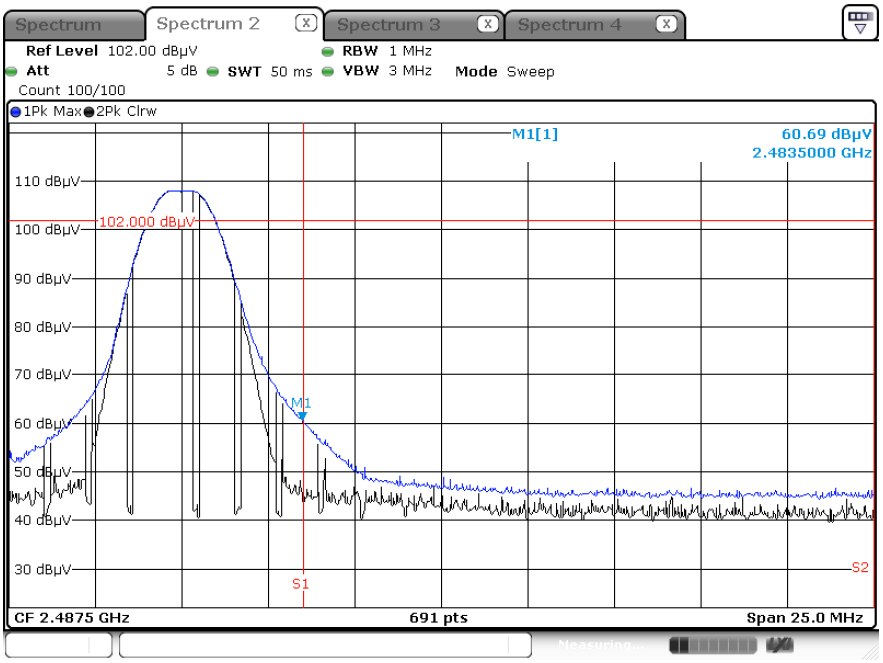
[Ant.1]

▣ Mode : 1 M Bit/s (255 Bytes) Test Plots

Radiated Restricted Band Edges plot – Average Result (Ch.39, X-H)



Radiated Restricted Band Edges plot – Peak Result (Ch.39, X-H)



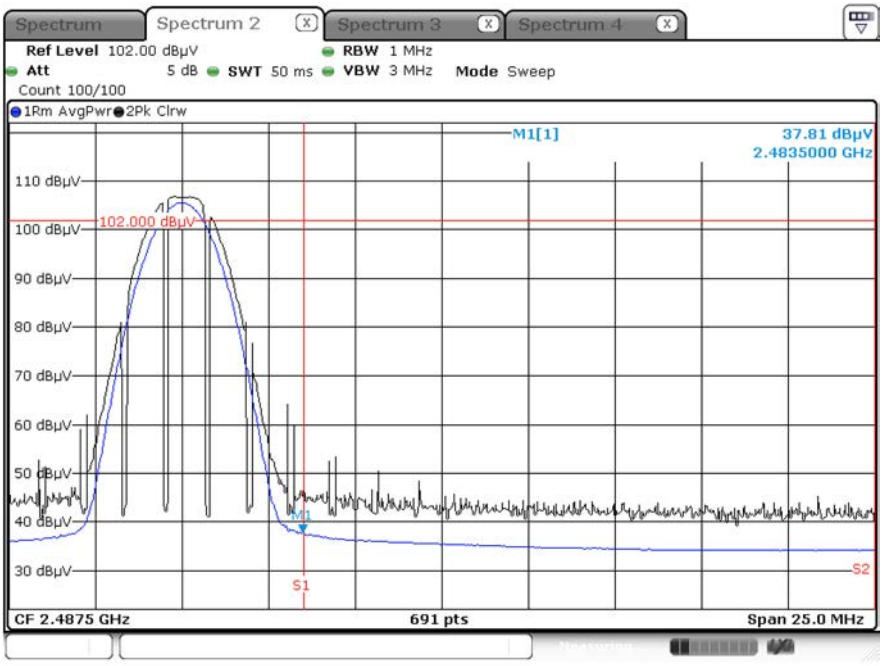
Note:

In order to simplify the report, Plot of worst case are only reported.

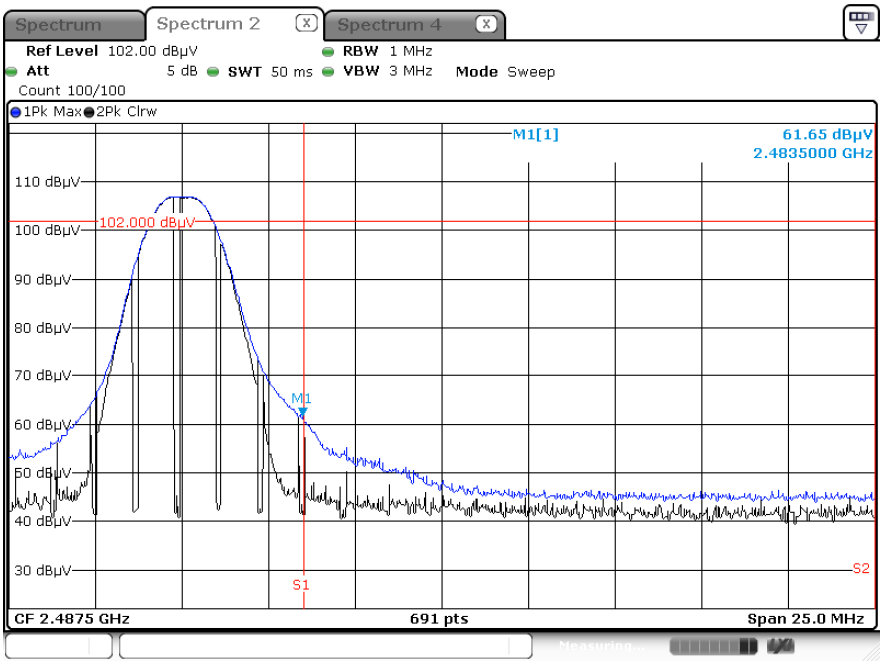
[Ant.2]

▣ Mode : 1 M Bit/s (255 Bytes) Test Plots

Radiated Restricted Band Edges plot – Average Result (Ch.39, Y-H)



Radiated Restricted Band Edges plot – Peak Result (Ch.39, Y-H)



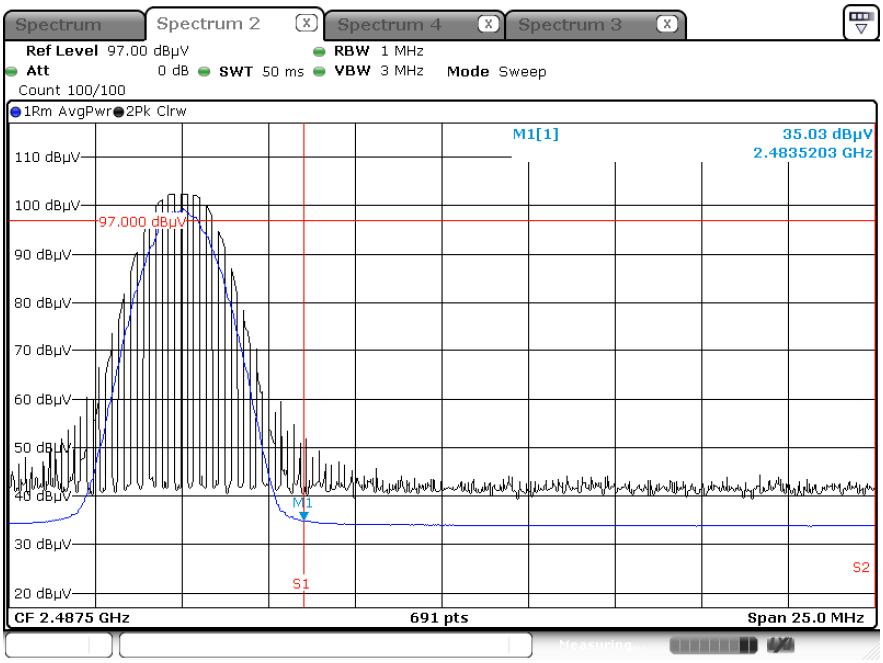
Note:

In order to simplify the report, Plot of worst case are only reported.

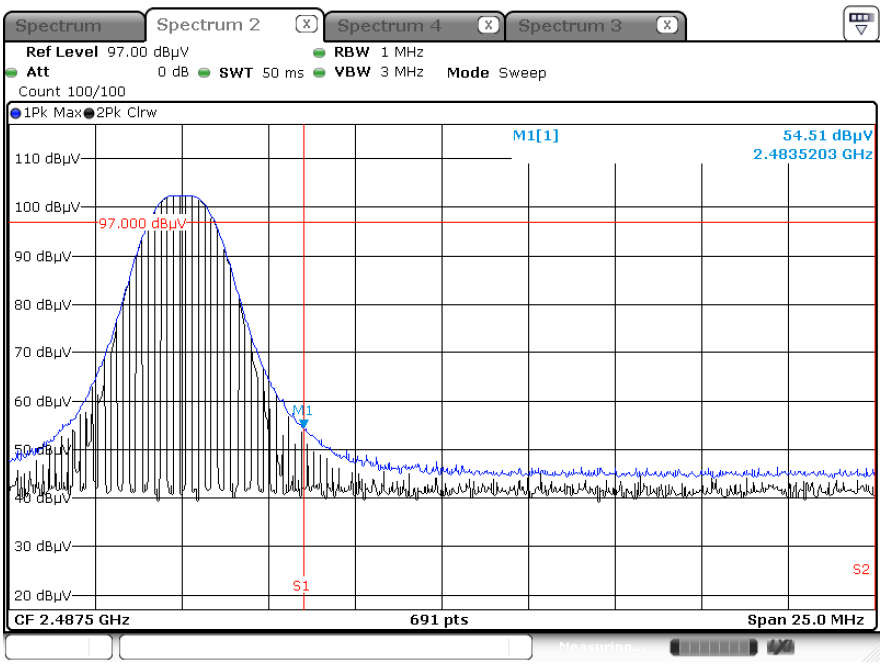
[Dual Ant.1+ Ant.2]

▣ Mode : 1 M Bit/s (37 Bytes) Test Plots

Radiated Restricted Band Edges plot – Average Result (Ch.39, Y-H)



Radiated Restricted Band Edges plot – Peak Result (Ch.39, Y-H)



Note:

In order to simplify the report, Plot of worst case are only reported.

9.8 POWERLINE CONDUCTED EMISSIONS

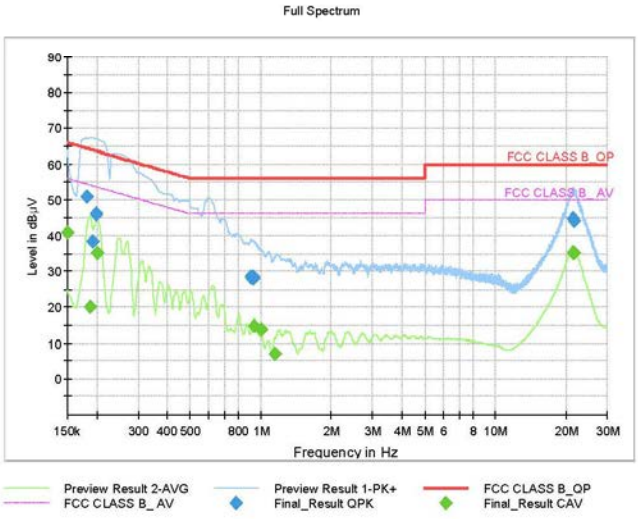
Conducted Emissions

Test 1 / 1

Test Report

Common Information

EUT : SM-S931B/DS
Operating Conditions : BTLE Mode
Comment :



Final_Result_QPK

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.1815	50.96	64.42	13.46	9.000	N	9.6
0.1928	38.43	63.92	25.48	9.000	N	9.6
0.1995	46.03	63.63	17.60	9.000	N	9.6
0.9118	28.30	56.00	27.70	9.000	L1	9.7
0.9230	28.12	56.00	27.88	9.000	L1	9.7
0.9275	28.49	56.00	27.51	9.000	L1	9.7
21.4408	44.80	60.00	15.20	9.000	N	10.6
21.5195	44.72	60.00	15.28	9.000	N	10.6
21.5825	44.29	60.00	15.71	9.000	N	10.6

Final_Result_CAV

Frequency (MHz)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.1500	40.87	56.00	15.13	9.000	N	9.6
0.1883	20.24	54.11	33.87	9.000	L1	9.6
0.2018	35.15	53.54	18.39	9.000	N	9.6
0.9388	14.72	46.00	31.28	9.000	N	9.7
1.0018	13.85	46.00	32.15	9.000	N	9.7
1.1525	6.87	46.00	39.13	9.000	N	9.7
21.4543	35.24	50.00	14.76	9.000	N	10.6
21.5173	35.08	50.00	14.92	9.000	N	10.6
21.5510	35.14	50.00	14.86	9.000	N	10.6

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10. LIST OF TEST EQUIPMENT

Conducted Test

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
LISN	ENV216	Rohde & Schwarz	102245	07/17/2025	Annual
EMI Test Receiver	ESR	Rohde & Schwarz	101910	07/02/2025	Annual
Temperature Chamber	SU-642	ESPEC	0093008124	02/19/2025	Annual
Signal Analyzer	N9030A	Agilent	MY49432108	02/20/2025	Annual
Power Measurement Set	OSP 120	Rohde & Schwarz	100935	08/01/2025	Annual
Power Meter	N1911A	Agilent	MY45100523	02/28/2025	Annual
Power Sensor	N1921A	Agilent	MY57820067	02/22/2025	Annual
Directional Coupler	87300B	Agilent	3116A03621	10/21/2025	Annual
Power Splitter	11667B	Hewlett Packard	10545	02/06/2025	Annual
DC Power Supply	E3632A	Agilent	KR75303243	04/19/2025	Annual
Attenuator(10 dB)(DC-26.5 GHz)	8493C	HP	07560	06/05/2025	Annual
Attenuator(10 dB)(DC-26.5 GHz)	8493C	HP	08285	05/28/2025	Annual
Attenuator(20 dB)	18N-20dB	Rohde & Schwarz	8	02/20/2025	Annual
Software	EMC32	Rohde & Schwarz	N/A	N/A	N/A
FCC WLAN&BT&BLE Conducted Test Software v3.0	N/A	HCT CO., LTD.	N/A	N/A	N/A
Bluetooth Tester	CBT	Rohde & Schwarz	100752	01/03/2025	Annual

Note:

1. Equipment listed above that calibrated during the testing period was set for test after the calibration.
2. Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.

Radiated Test

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
Controller	CO3000	Innco system	CO3000-4p	N/A	N/A
Antenna Position Tower	MA4640/800-XP-EP	Innco system	S1AM	07/30/2025	Annual
Turn Table	DS2000-S-1t	Innco system	DS2000/572/54610422/P	N/A	N/A
Amp & Filter Bank Switch Controller	FBSM-01B	T&M system	TM19050002	N/A	N/A
Loop Antenna	1513	Schwarzbeck	1513-333	03/07/2026	Biennial
Hybrid Antenna	VULB 9168	Schwarzbeck	9168-0895	08/28/2026	Biennial
Horn Antenna	BBHA 9120D	Schwarzbeck	9120D-1300	01/03/2026	Biennial
Horn Antenna	BBHA 9120D	Schwarzbeck	9120D-2296	05/16/2026	Biennial
Horn Antenna(15 GHz ~ 40 GHz)	BBHA9170	Schwarzbeck	BBHA9170342	09/20/2026	Biennial
Spectrum Analyzer	FSV(10 Hz ~ 40 GHz)	Rohde & Schwarz	101055	05/09/2025	Annual
Band Reject Filter	WRCJV2400/2483.5-2370/2520-60/12SS	Wainwright Instruments	2	01/02/2025	Annual
Band Reject Filter	WRCJV12-4900-5100-5900-6100-50SS	Wainwright Instruments	5	06/04/2025	Annual
Band Reject Filter	WRCJV12-4900-5100-5900-6100-50SS	Wainwright Instruments	6	06/04/2025	Annual
High Pass Filter(7 GHz ~ 18 GHz)	WHKX10-7150-8000-18000-50SS	Wainwright Instruments	1	02/28/2025	Annual
Power Amplifier	CBL18265035	CERNEX	22966	11/17/2024	Annual
Power Amplifier	CBL26405040	CERNEX	25956	02/26/2025	Annual
Bluetooth Tester	TC-3000C	TESCOM	3000C000175	03/19/2025	Annual
RF Switching System	FMSR-05B (HPF(3~18GHz) + LNA1(1~18GHz))	T&M system	S1L1	01/02/2025	Annual
RF Switching System	FMSR -05B (ATT(10dB) + LNA1(1~18GHz))	T&M system	S1L2	01/02/2025	Annual
RF Switching System	FMSR -05B (ATT(3dB) + LNA1(1~18GHz))	T&M system	S1L3	01/02/2025	Annual
RF Switching System	FMSR -05B (LNA1(1~18GHz))	T&M system	S1L4	01/02/2025	Annual
RF Switching System	FMSR -05B (HPF(7~18GHz) + LNA2(6~18GHz))	T&M system	S1L5	01/02/2025	Annual
RF Switching System	FMSR -05B (Thru(30MHz ~ 18GHz))	T&M system	S1L6	01/02/2025	Annual

Note:

1. Equipment listed above that calibrated during the testing period was set for test after the calibration.
2. Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.
3. Especially, all antenna for measurement is calibrated in accordance with the requirements of C63.5(Version : 2017).

11. ANNEX A_ TEST SETUP PHOTO

Please refer to test setup photo file no. as follows;

No.	Description
1	HCT-RF-2410-FC066-P