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FCC BT LE REPORT

Certification

Applicant Name:
SAMSUNG Electronics Co., Ltd.

Address:
129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea

Date of Issue:
December 14, 2021

Test Site/Location:
74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383 KOREA

Report No.: HCT-RF-2112-FC009-R1

FCC ID:	**A3LSMX700**
APPLICANT:	**SAMSUNG Electronics Co., Ltd.**

According to the Evaluation report, all of the data contained herein is reused from the reference FCC ID : A3LSMX706B report.

Model: SM-X700

EUT Type: Tablet

Average Output Power:

Normal	**Ant.1**	8.34 dBm (6.82 mW)
	Ant.2	8.09 dBm (6.44 mW)
High Power	**Ant.1**	15.92 dBm (39.09 mW)
	Ant.2	15.79 dBm (37.93 mW)

Frequency Range: 2 402 MHz ~ 2 480 MHz

Modulation type GFSK

FCC Classification: Digital Transmission System(DTS)

FCC Rule Part(s): Part 15.247

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.

REVIEWED BY

Report prepared by : Sang Hoon Lee
Engineer of Telecommunication Testing Center

Report approved by : Jong Seok Lee
Manager of Telecommunication Testing Center

This test results were applied only to the test methods required by the standard.

This laboratory is not accredited for the test results marked *.
The above Test Report is the accredited test result by (KS Q) ISO/IEC 17025 and KOLAS(Korea Laboratory Accreditation Scheme), which signed the ILAC-MRA. (HCT Accreditation No.: KT197)

Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-2112-FC009	December 01, 2021	- First Approval Report
HCT-RF-2112-FC009-R1	December 14, 2021	- Page.6 : Antenna configurations revised - Page.23 : Radiated Worst case revised

Table of Contents

1. EUT DESCRIPTION

Model	SM-X700		
Additional Model	-		
EUT Type	Tablet		
Power Supply	DC 3.86 V		
Frequency Range	2 402 MHz ~ 2 480 MHz		
Max. RF Output Power (Normal)	Ant.1	Peak (For information only)	125k Bit/s : 8.310 dBm (6.78 mW) 500k Bit/s : 8.453 dBm (7.00 mW) 1M Bit/s : 8.346 dBm (6.83 mW) 2M Bit/s : 8.545 dBm (7.15 mW)
		Average	125k Bit/s : 8.24 dBm (6.67 mW) 500k Bit/s : 8.34 dBm (6.82 mW) 1M Bit/s : 8.28 dBm (6.72 mW) 2M Bit/s : 8.30 dBm (6.76 mW)
	Ant.2	Peak (For information only)	125k Bit/s : 8.086 dBm (6.44 mW) 500k Bit/s : 8.145 dBm (6.52 mW) 1M Bit/s : 8.227 dBm (6.65 mW) 2M Bit/s : 8.392 dBm (6.91 mW)
		Average	125k Bit/s : 8.00 dBm (6.30 mW) 500k Bit/s : 7.98 dBm (6.28 mW) 1M Bit/s : 8.09 dBm (6.44 mW) 2M Bit/s : 8.08 dBm (6.43 mW)
Max. RF Output Power (High Power)	Ant.1	Peak (For information only)	1M Bit/s : 15.748 dBm (37.57 mW) 2M Bit/s : 16.441 dBm (44.07 mW)
		Average	1M Bit/s : 15.56 dBm (35.95 mW) 2M Bit/s : 15.92 dBm (39.09 mW)
	Ant.2	Peak (For information only)	1M Bit/s : 15.522 dBm (35.66 mW) 2M Bit/s : 16.204 dBm (41.73 mW)
		Average	1M Bit/s : 15.29 dBm (33.78 mW) 2M Bit/s : 15.79 dBm (37.93 mW)
Modulation Type	GFSK		
Bluetooth Version	5.2		
Number of Channels	40 Channels		
Date(s) of Tests	October 28, 2021 ~ November 24, 2021		
Serial number	Radiated: R32R8005JJT Conducted : R32R80056RR		

ANTENNA CONFIGURATIONS BT(LE)

Configurations	SISO	
	Ant1(core-0)	Ant2(Core-1)
Bluetooth Low Energy	O	O

Note:

1. O = Support, X = Not Support
2. SISO = Single Input Single Output

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 April 02, 2018 (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.

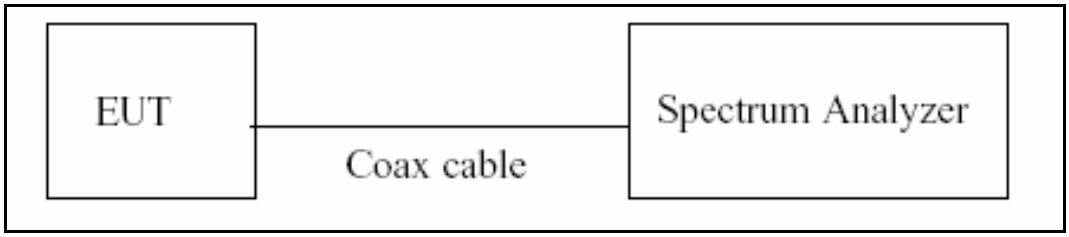
The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Parameter	Expanded Uncertainty (dB)
Conducted Disturbance (150 kHz ~ 30 MHz)	1.82 (Confidence level about 95 %, k=2)
Radiated Disturbance (9 kHz ~ 30 MHz)	3.40 (Confidence level about 95 %, k=2)
Radiated Disturbance (30 MHz ~ 1 GHz)	4.80 (Confidence level about 95 %, k=2)
Radiated Disturbance (1 GHz ~ 18 GHz)	5.70 (Confidence level about 95 %, k=2)
Radiated Disturbance (18 GHz ~ 40 GHz)	5.05 (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*.

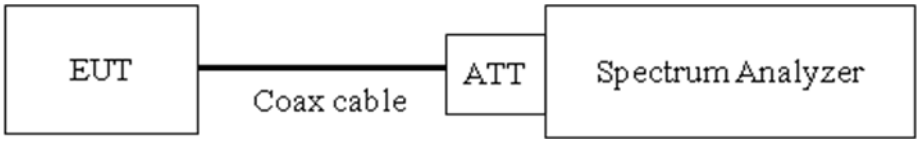
1. RBW = 8 MHz (the largest available value)
2. VBW = 8 MHz (≥ RBW)
3. SPAN = 0 Hz
4. Detector = Peak
5. Number of points in sweep > 100
6. Trace mode = Clear write
7. Measure T_{total} and T_{on}
8. Calculate Duty Cycle = T_{on}/ T_{total} and Duty Cycle Factor = 10log(1/Duty Cycle)

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.

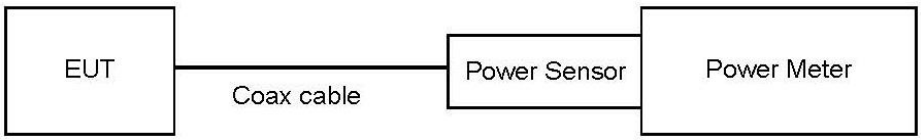
Note : We tested OBW using the automatic bandwidth measurement capability of a spectrum analyzer.

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

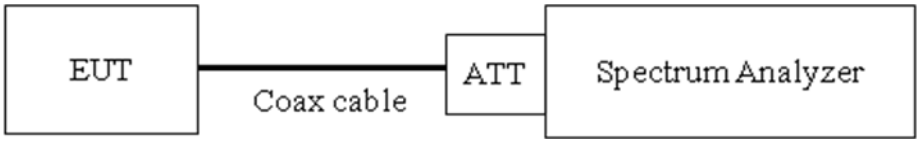
▪ Conducted Output Power(Average) = Measured Value + ATT loss + Cable loss + Duty Cycle Factor

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

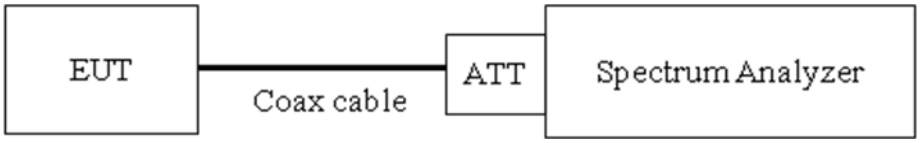
7.5. Conducted Band Edge(Out of Band Emissions) & Conducted Spurious Emissions

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) Ensure that the number of measurement points ≥ 2 x Span/VBW
8) Allow trace to fully stabilize.
9) 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	20.21
100	20.26
200	20.30
300	20.36
400	20.39
500	20.40
600	20.40
700	20.44
800	20.46
900	20.55
1000	20.59
2000	20.77
2400	20.84
2480	**20.87**
2500	20.87
3000	20.99
4000	21.14
5000	21.28
5150	21.32
5850	21.43
6000	21.43
7000	21.49
8000	21.57
9000	21.64
10 000	21.74
11 000	21.88
12 000	22.06
13 000	22.14
14 000	22.21
15 000	22.27
16 000	22.32
17 000	22.42
18 000	22.52
19 000	22.58
20 000	22.65
21 000	22.89
22 000	22.90
23 000	23.12
24 000	22.99
25 000	23.10
26 000	23.14

Note : 1. 2 400 ~ 2 500 MHz is fundamental frequency range.

2. Factor = Attenuator loss(20 dB) + Cable loss(1ea) + EUT Cable loss

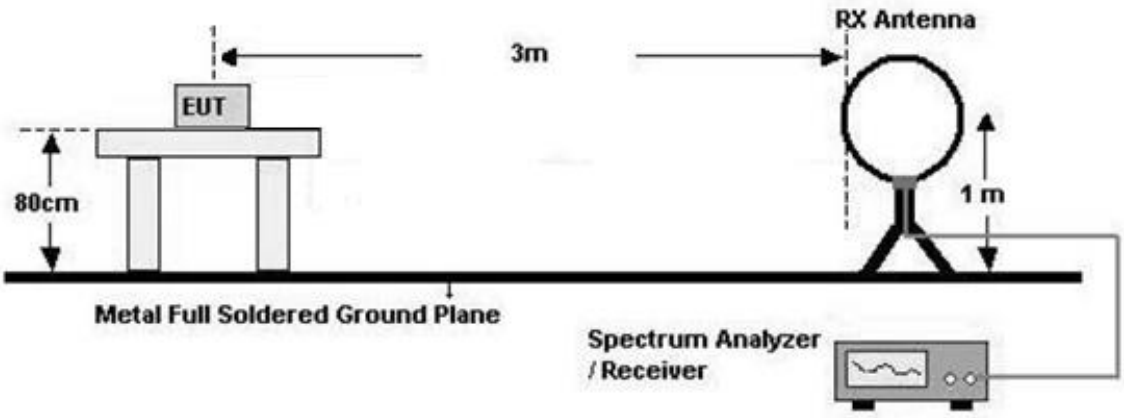
7.6. Radiated Test

Limit

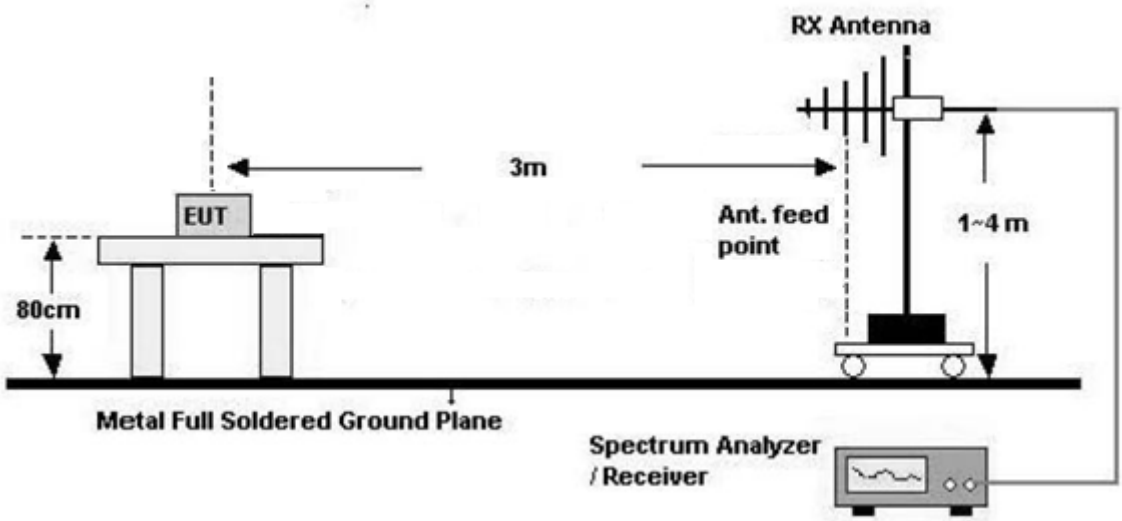
Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Configuration

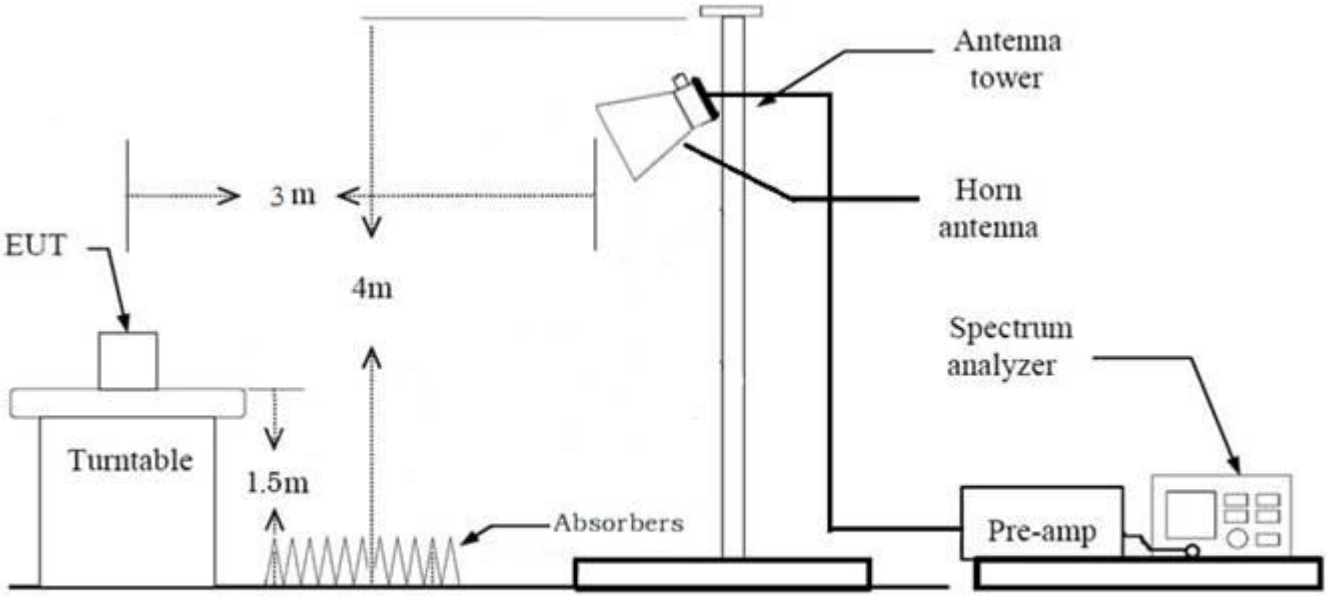
Below 30 MHz



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 = Maxhold
   - 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 = Maxhold
      - 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

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) + Distance Factor(D.F)

Total(Measurement Type : Average)

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

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, Keyboard, etc)
   - Worstcase : Stand alone
2. EUT Axis:
   - Radiated Spurious Emissions : Z
   - Radiated Restricted Band Edge : Z
3. All packet length of operation were investigated and the test results are worst case in lowest packet length.
   (Worst case :1M Bit/s 37 Byte, 2M Bit/s 37 Byte) (high Power)
   (125k, 500k, 1M Bit/s all have the same 1MHz Band width and only Worst result is attached.)
4. All datarate of operation were investigated and the worst case configuration results are reported.
   - Worst case : 1M, 2M (high Power)
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

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, Keyboard, etc)+Travel Adapter, Stand alone + Travel Adapter
   - Worstcase : Stand alone + Travel Adapter

Conducted test

1. The EUT was configured with packet length of highest power.
   - ALL supported mode tested.
   - Worst Results Notes for each test item

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

[Normal]

Data rate (Bit/s)	Packet length (Byte)	T_{on} (ms)	T_{total} (ms)	Duty Cycle	Duty Cycle Factor (dB)
125k	37	3.100	3.750	0.827	0.83
	255	17.07	17.50	0.975	0.11
500k	37	1.067	1.874	0.569	2.45
	255	4.560	5.000	0.912	0.40
1M	37	0.389	0.626	0.621	2.07
	255	2.130	2.500	0.852	0.70
2M	37	0.205	0.626	0.328	4.84
	255	1.078	1.874	0.575	2.40

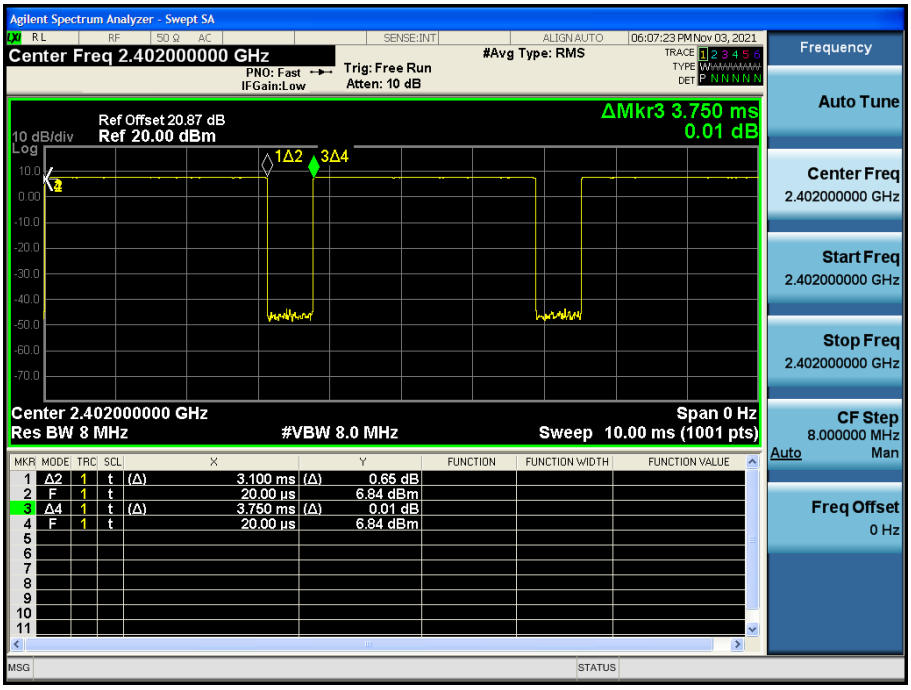
[High Power]

Data rate (Bit/s)	Packet length (Byte)	T_{on} (ms)	T_{total} (ms)	Duty Cycle	Duty Cycle Factor (dB)
1M	37	0.389	0.624	0.623	2.06
	255	2.135	2.500	0.854	0.69
2M	37	0.204	0.624	0.327	4.86
	255	1.074	1.874	0.573	2.42

[Normal]

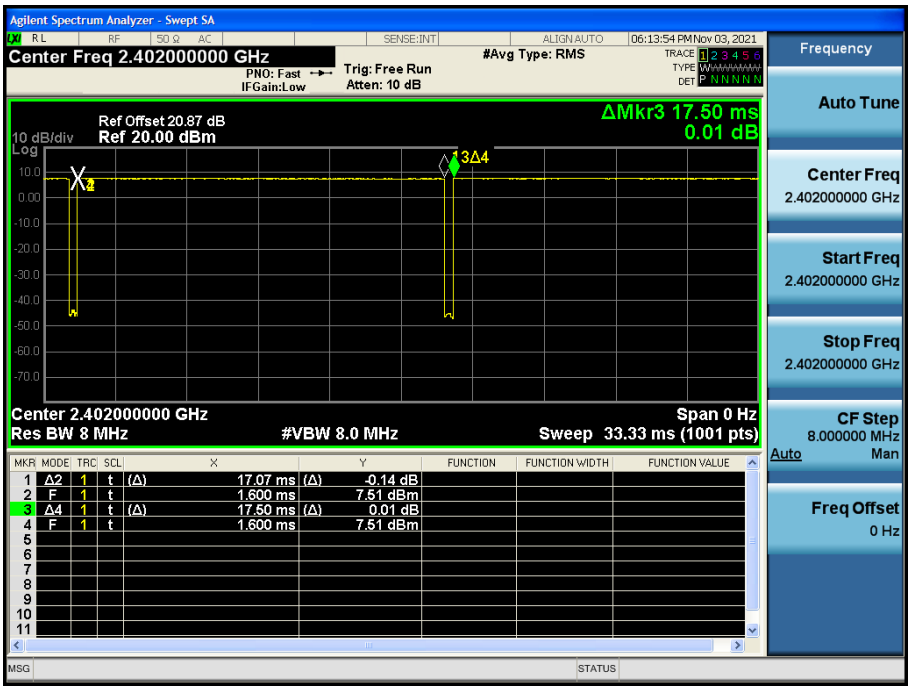
▣ 125k Bit/s(37 Byte) Test Plots

Duty Cycle (Low-CH 0)



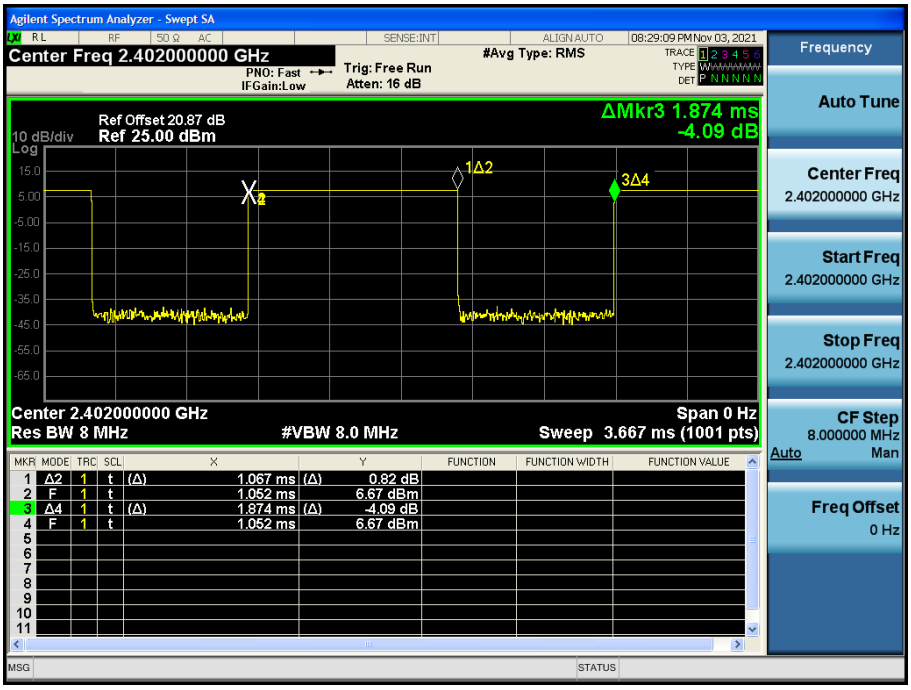
▣ 125k Bit/s(255 Byte) Test Plots

Duty Cycle (Low-CH 0)



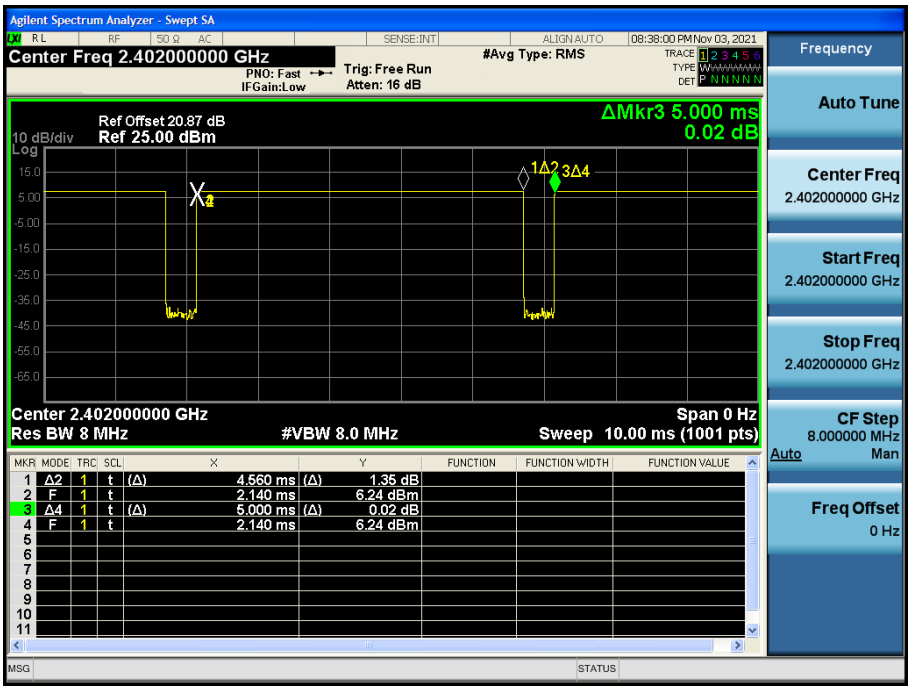
▣ 500k Bit/s(37 Byte) Test Plots

Duty Cycle (Low-CH 0)



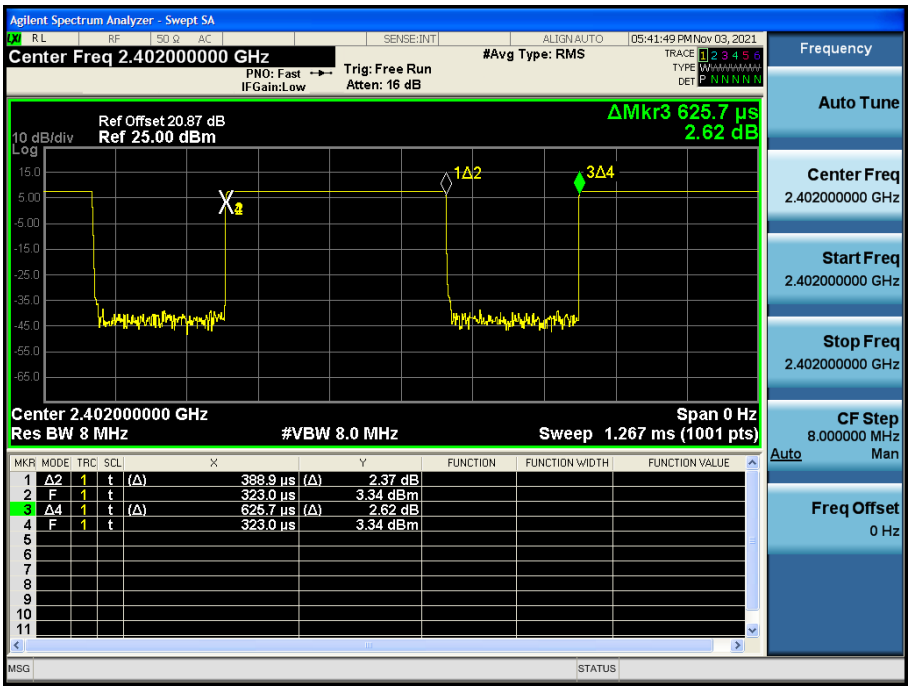
▣ 500k Bit/s(255 Byte) Test Plots

Duty Cycle (Low-CH 0)



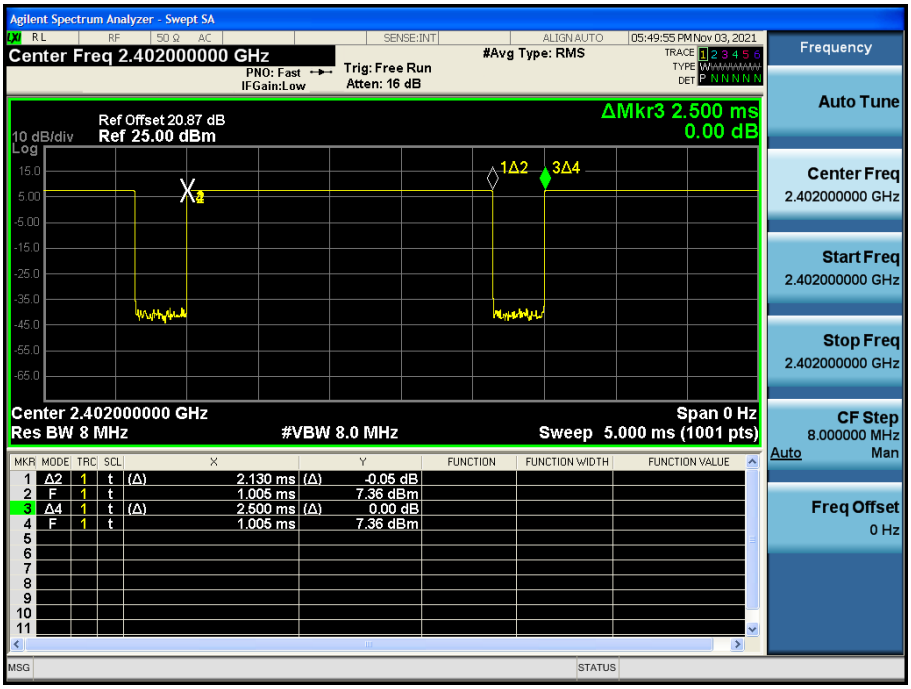
▣ 1M Bit/s (37 Byte) Test Plots

Duty Cycle (Low-CH 0)



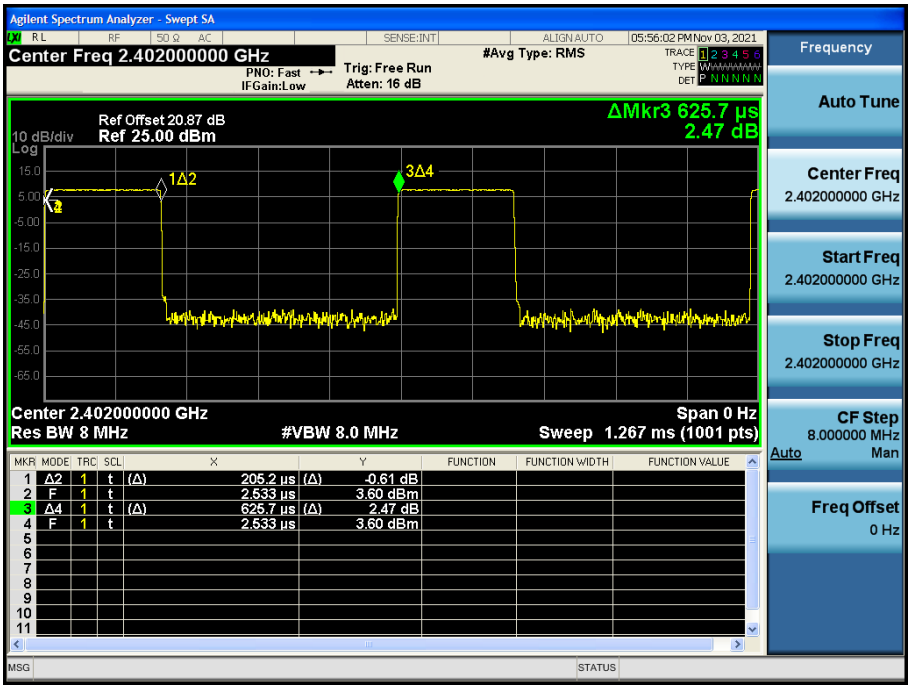
▣ 1M Bit/s (255 Byte) Test Plots

Duty Cycle (Low-CH 0)



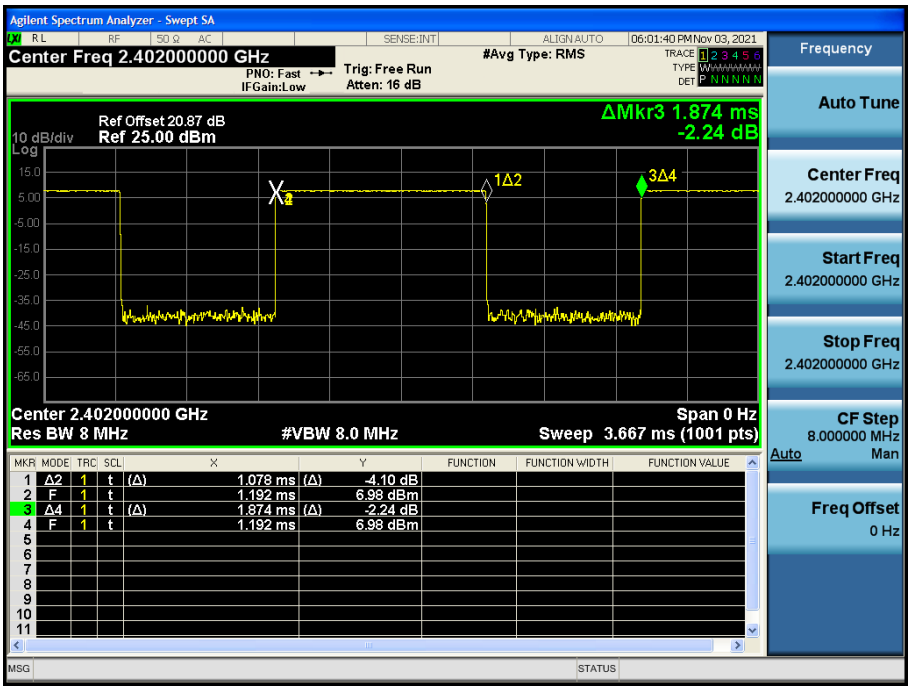
▣ 2M Bit/s (37 Byte) Test Plots

Duty Cycle (Low-CH 0)



▣ 2M Bit/s (255 Byte) Test Plots

Duty Cycle (Low-CH 0)

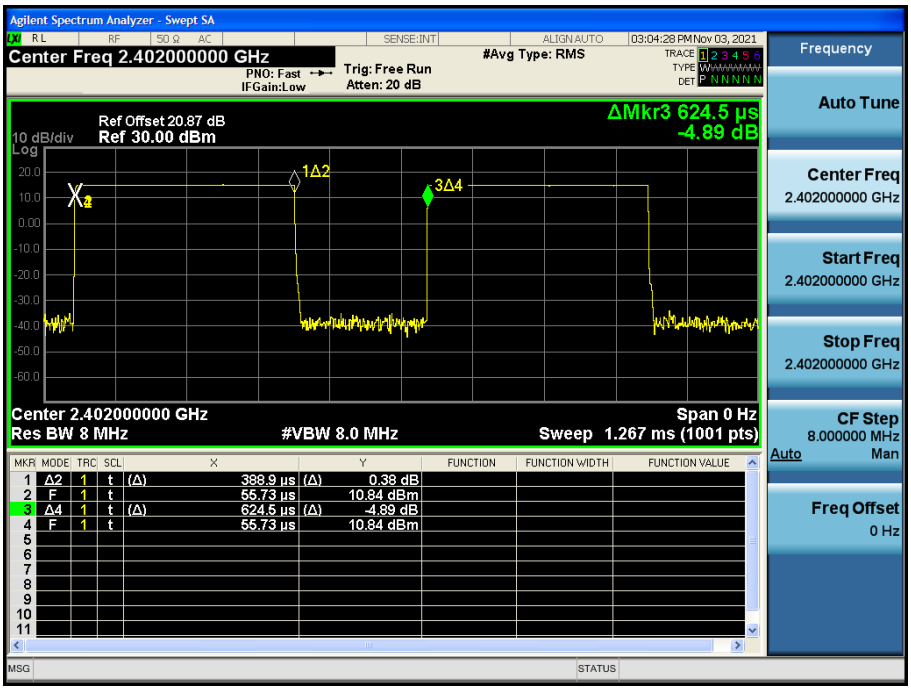


[High Power]

[Ant.1]

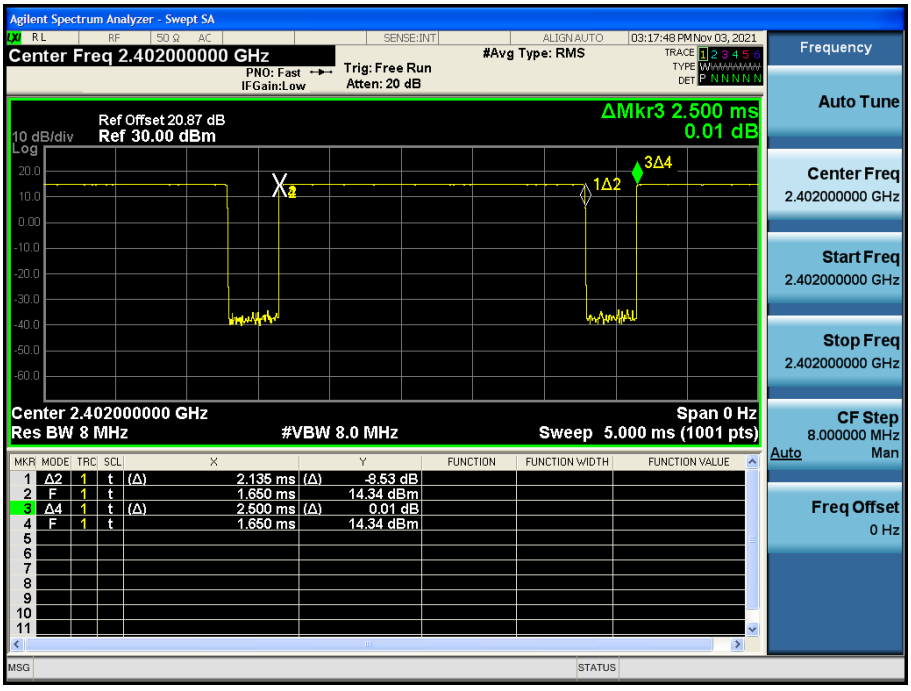
▣ 1M Bit/s (37 Byte) Test Plots

Duty Cycle (Low-CH 0)



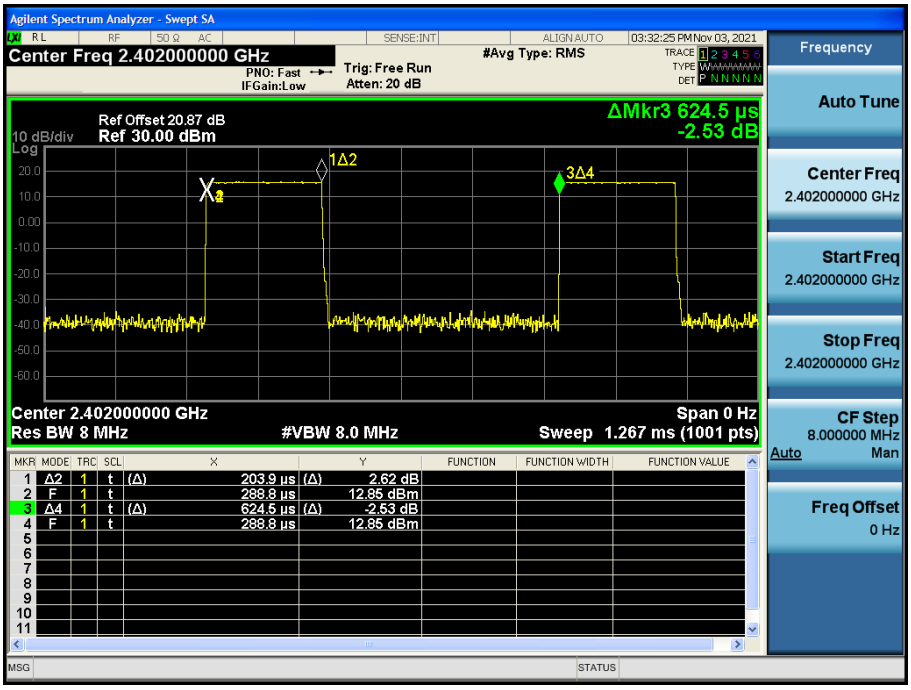
▣ 1M Bit/s (255 Byte) Test Plots

Duty Cycle (Low-CH 0)



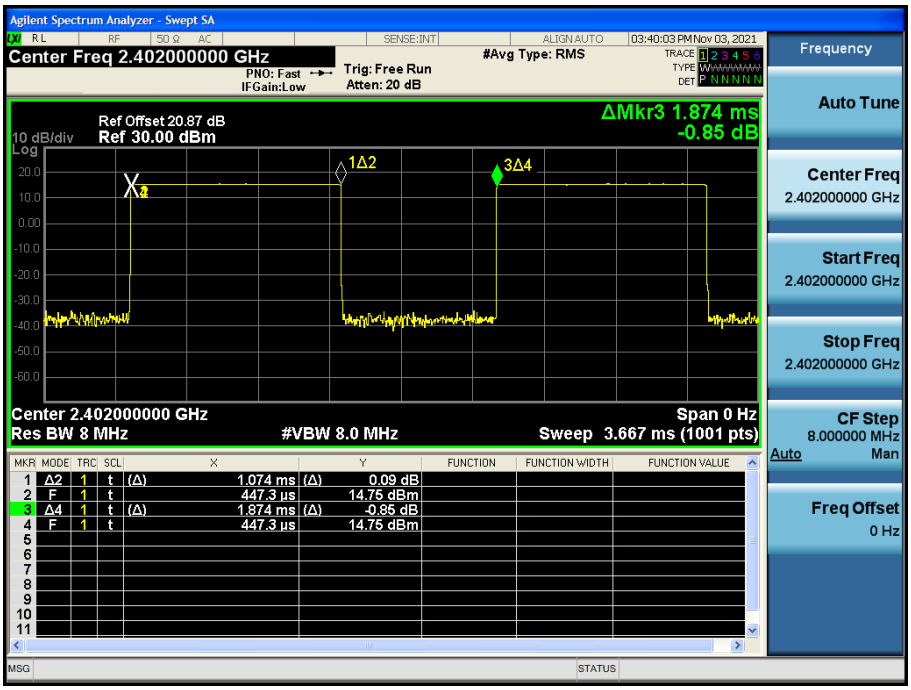
▣ 2M Bit/s (37 Byte) Test Plots

Duty Cycle (Low-CH 0)



▣ 2M Bit/s (255 Byte) Test Plots

Duty Cycle (Low-CH 0)



9.2 6 dB BANDWIDTH

[Ant.1]

Mode (Bit/s)	Channel	6 dB Bandwidth (kHz)	Limit (kHz)
125k(37)	0	628.1	> 500
	19	629.2	
	39	629.3	
125k(255)	0	628.5	> 500
	19	663.9	
	39	633.4	
500k(37)	0	668.2	> 500
	19	664.8	
	39	669.0	
500k(255)	0	671.2	> 500
	19	668.3	
	39	663.7	
1M(37)	0	670.6	> 500
	19	669.1	
	39	668.6	
1M(255)	0	666.6	> 500
	19	665.6	
	39	665.2	
2M(37)	0	1140	> 500
	19	1143	
	39	1139	
2M(255)	0	1141	> 500
	19	1145	
	39	1150	
1M(37) High Power	0	672.2	> 500
	19	669.2	
	39	671.0	
1M(255) High Power	0	668.6	> 500
	19	669.6	
	39	667.8	
2M(37) High Power	0	1139	> 500
	19	1139	
	39	1144	
2M(255) High Power	0	1139	> 500
	19	1140	
	39	1152	

Note:

Worst case test Plot Only 125k: 37 Byte, 500k Bit/s, 1M Bit/s: 255 Byte, 2M Bit/s: 37 Byte

[Ant.2]

Mode (Bit/s)	Channel	6 dB Bandwidth (kHz)	Limit (kHz)
125k(37)	0	625.5	> 500
	19	630.4	
	39	627.6	
125k(255)	0	650.6	> 500
	19	633.7	
	39	627.6	
500k(37)	0	666.2	> 500
	19	667.9	
	39	663.4	
500k(255)	0	666.7	> 500
	19	666.9	
	39	670.3	
1M(37)	0	669.9	> 500
	19	668.5	
	39	666.7	
1M(255)	0	668.7	> 500
	19	664.0	
	39	666.3	
2M(37)	0	1140	> 500
	19	1138	
	39	1140	
2M(255)	0	1147	> 500
	19	1149	
	39	1131	
1M(37) High Power	0	670.8	> 500
	19	671.3	
	39	669.2	
1M(255) High Power	0	666.1	> 500
	19	666.5	
	39	667.5	
2M(37) High Power	0	1138	> 500
	19	1138	
	39	1143	
2M(255) High Power	0	1153	> 500
	19	1142	
	39	1144	

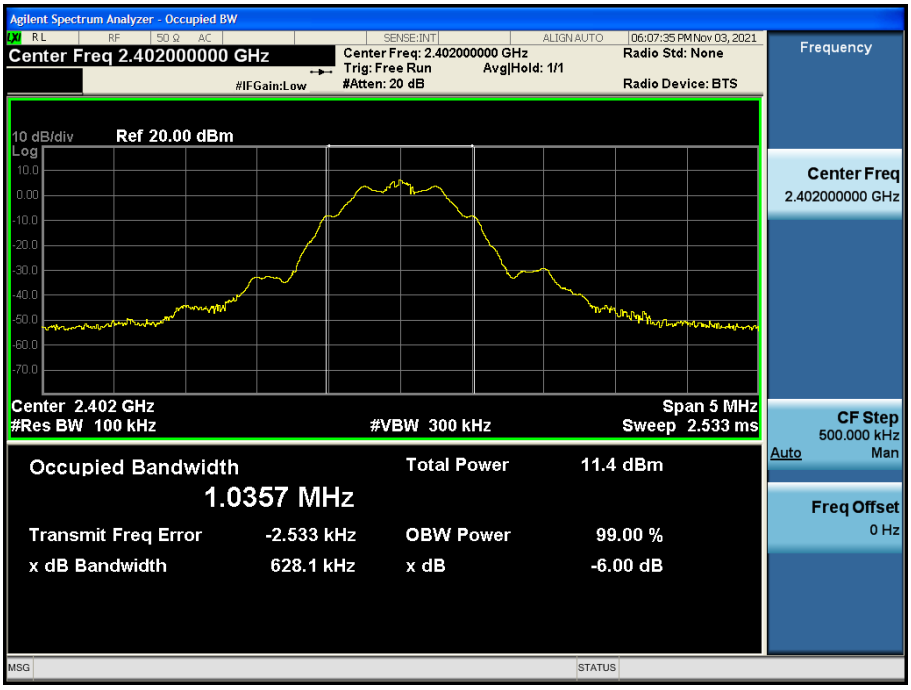
Note:

Worst case test Plot Only 125k, 500k **Bit/s:** 37 Byte, 1M, 2M **Bit/s:** 255 Byte

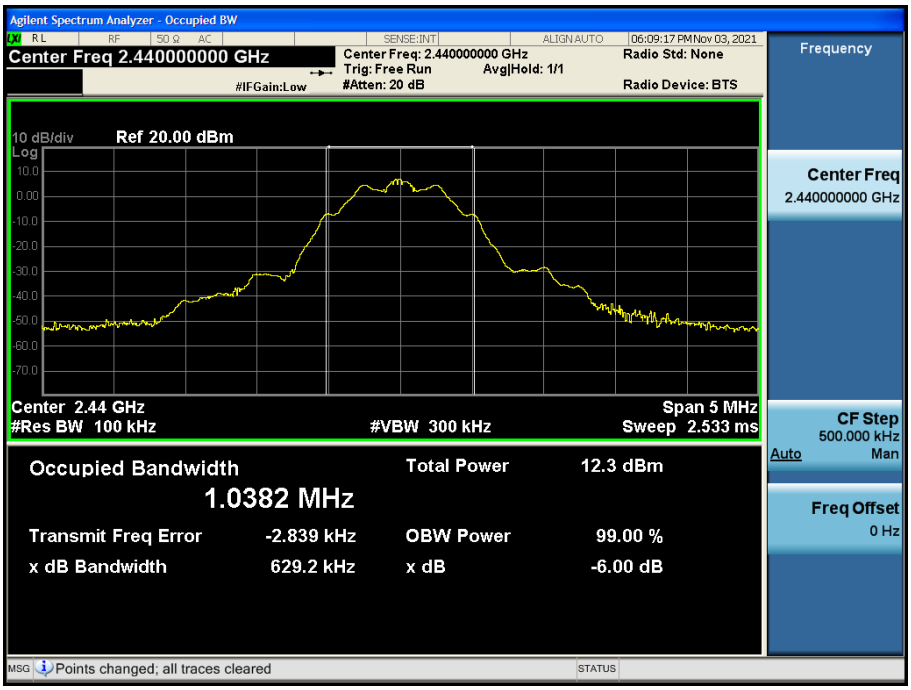
[Ant.1]

▣ 125k Bit/s(37 Byte) Test Plots

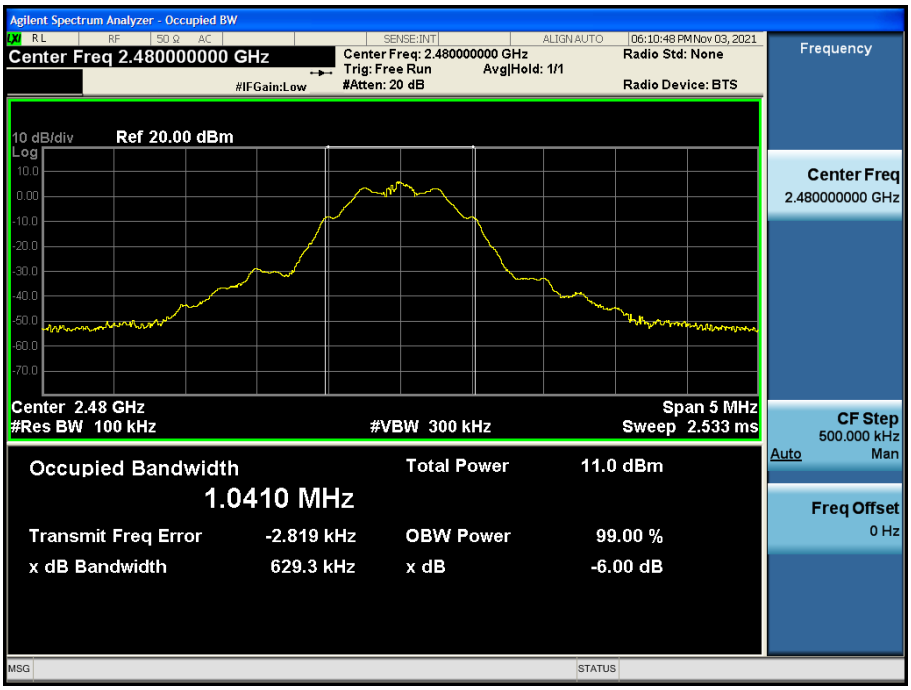
6 dB Bandwidth plot (Low-CH 0)



6 dB Bandwidth plot (Mid-CH 19)

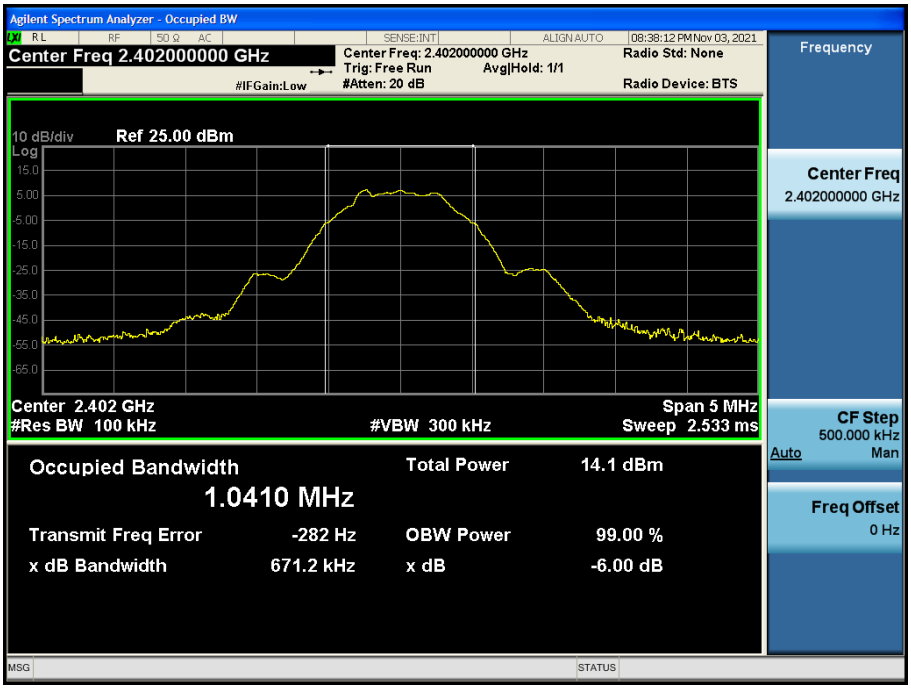


6 dB Bandwidth plot (High-CH 39)

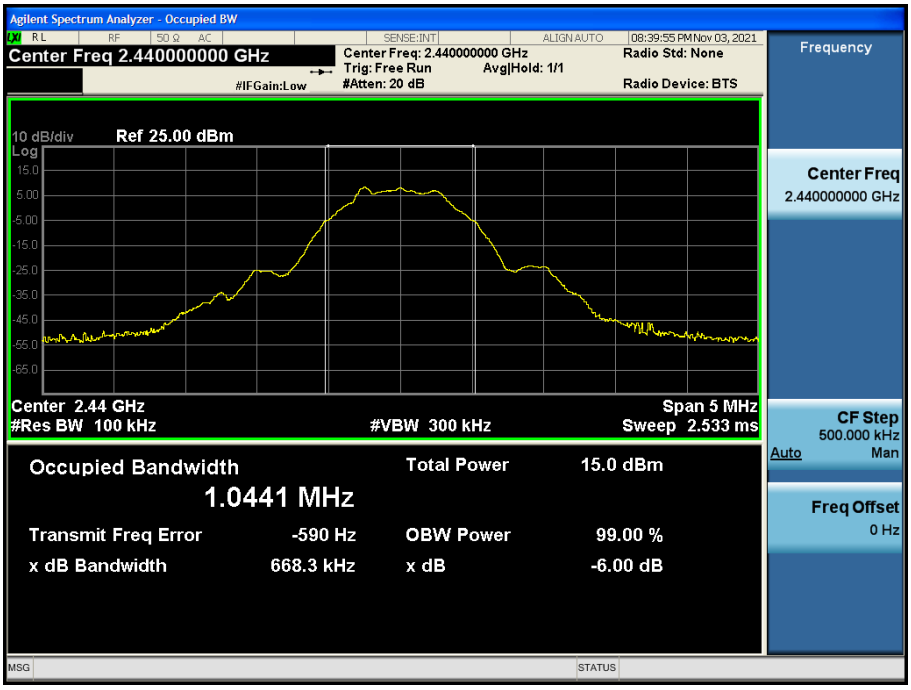


▣ 500k Bit/s(255 Byte) Test Plots

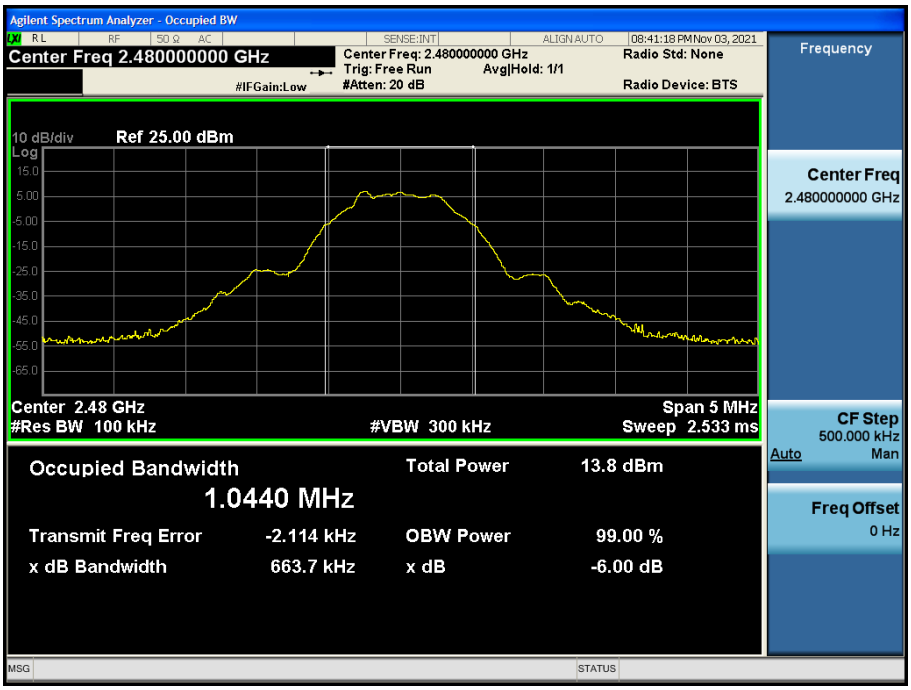
6 dB Bandwidth plot (Low-CH 0)



6 dB Bandwidth plot (Mid-CH 19)

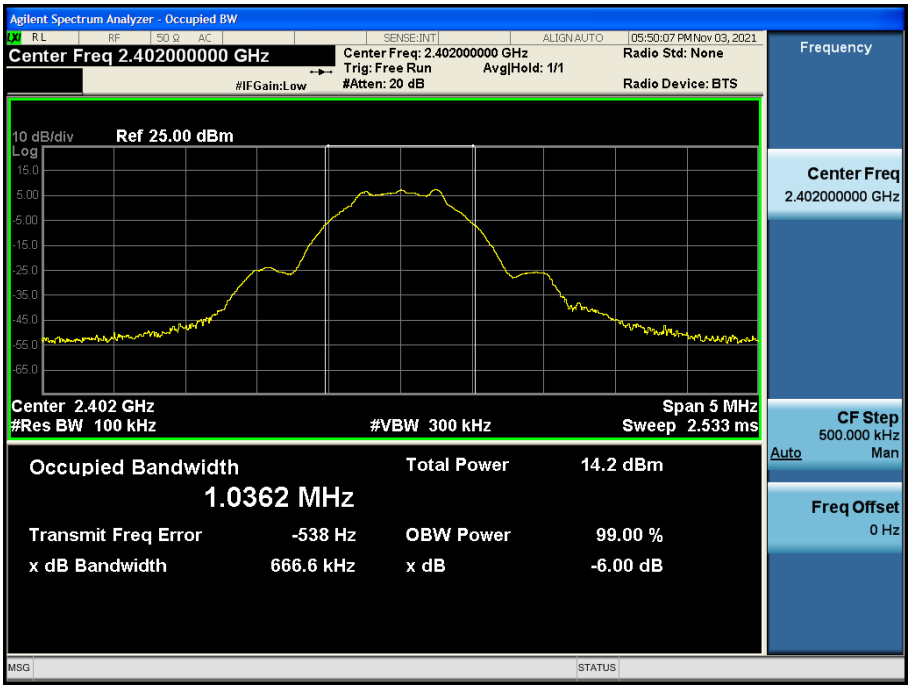


6 dB Bandwidth plot (High-CH 39)

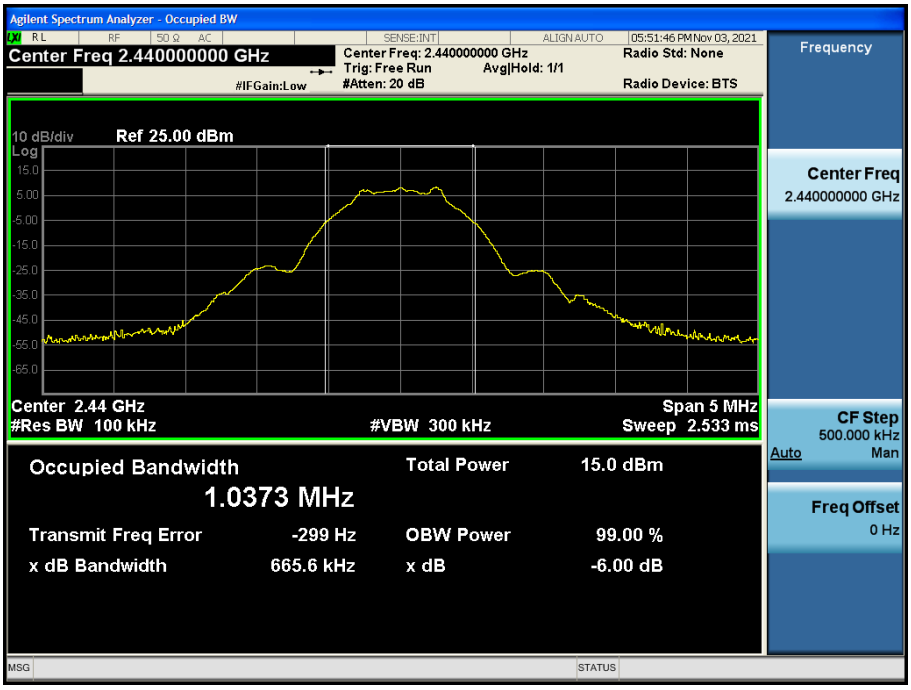


▣ 1 MBit/s (255 Byte) Test Plots

6 dB Bandwidth plot (Low-CH 0)



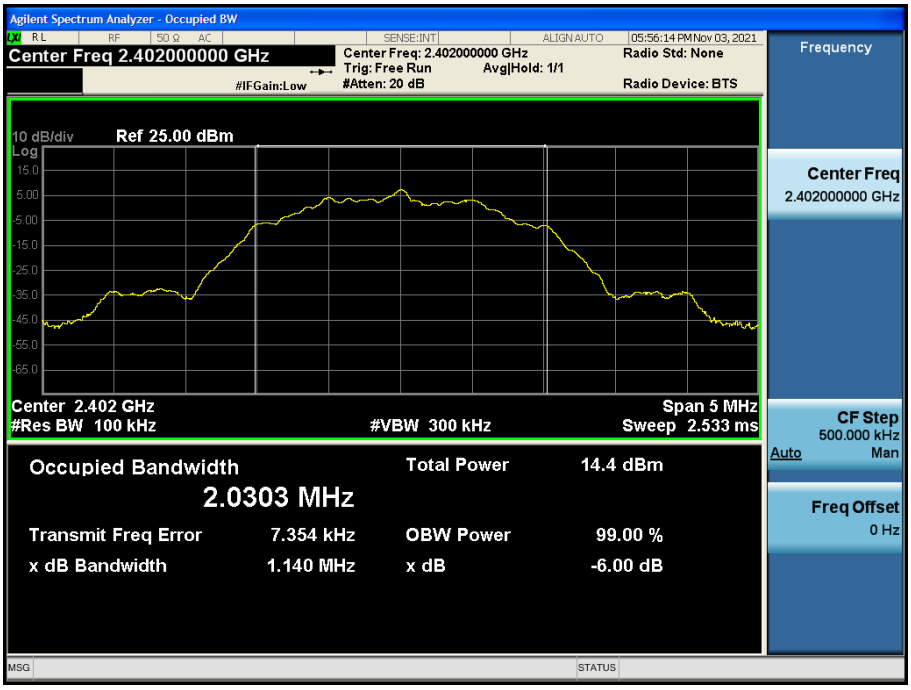
6 dB Bandwidth plot (Mid-CH 19)



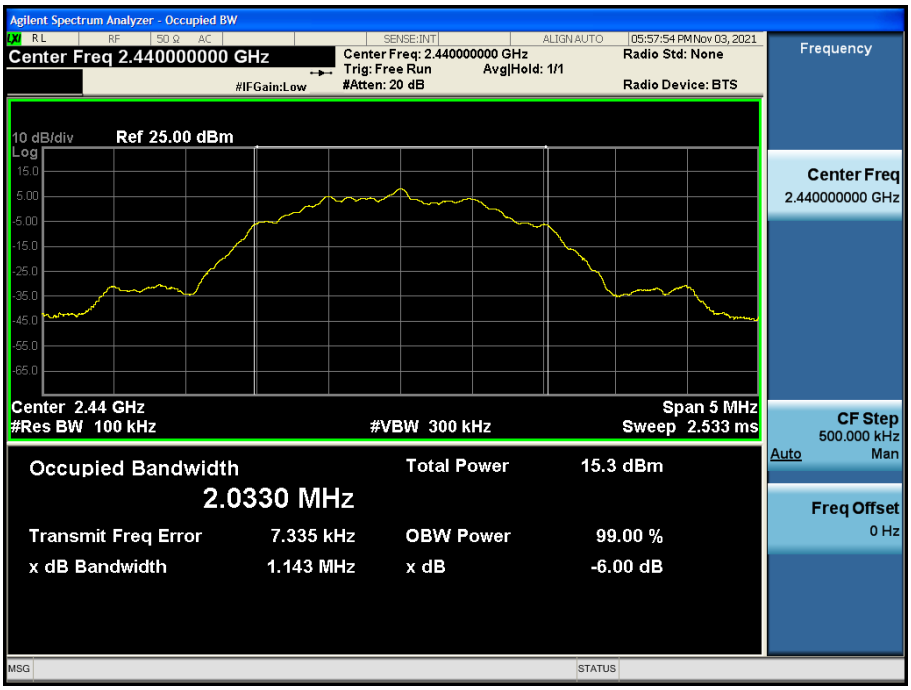
6 dB Bandwidth plot (High-CH 39)

▣ 2 MBit/s (37 Byte) Test Plots

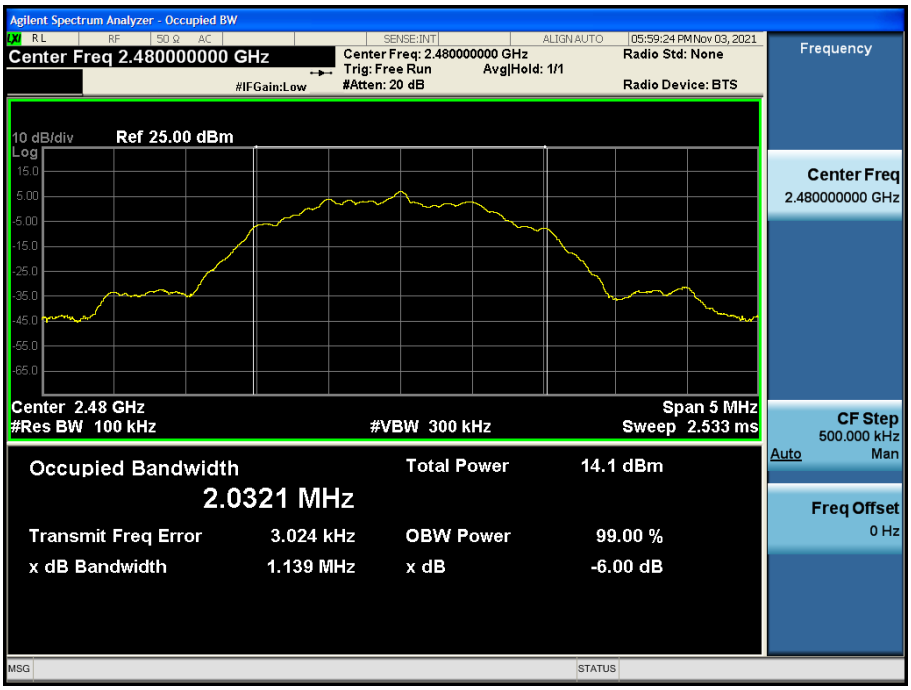
6 dB Bandwidth plot (Low-CH 0)



6 dB Bandwidth plot (Mid-CH 19)



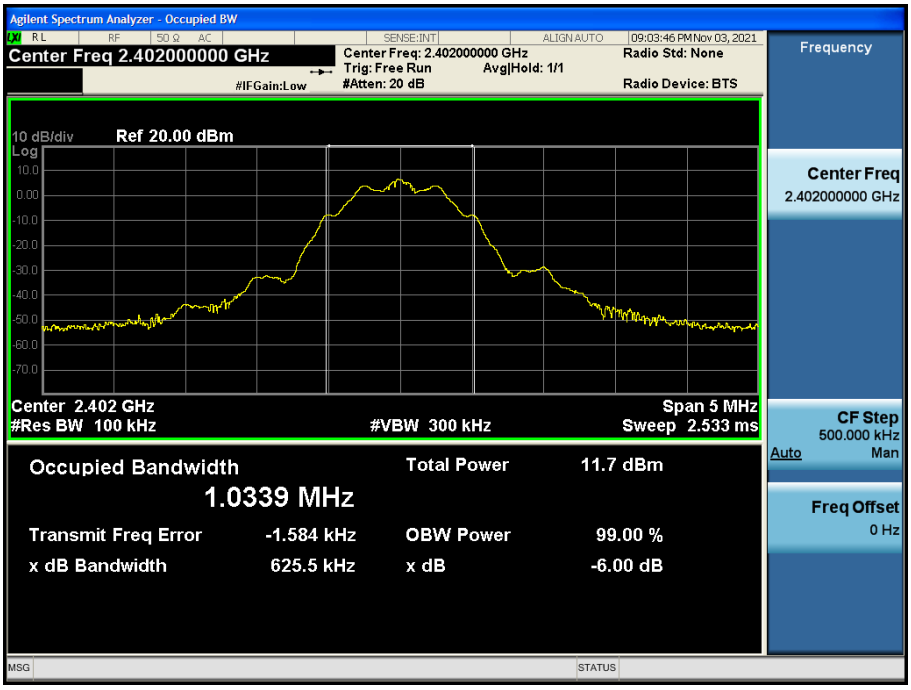
6 dB Bandwidth plot (High-CH 39)



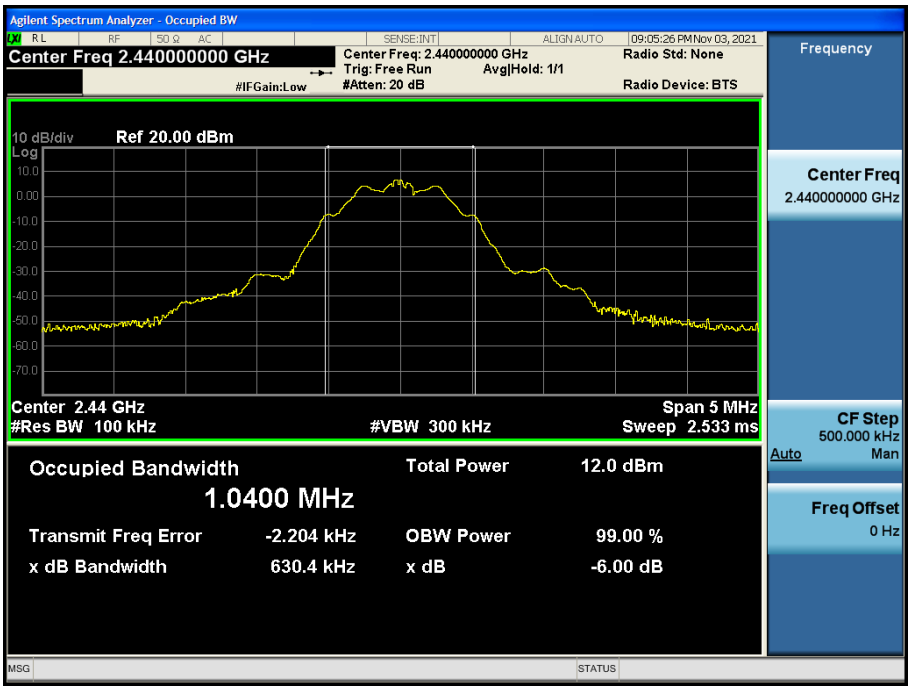
[Ant.2]

▣ 125k Bit/s(37 Byte) Test Plots

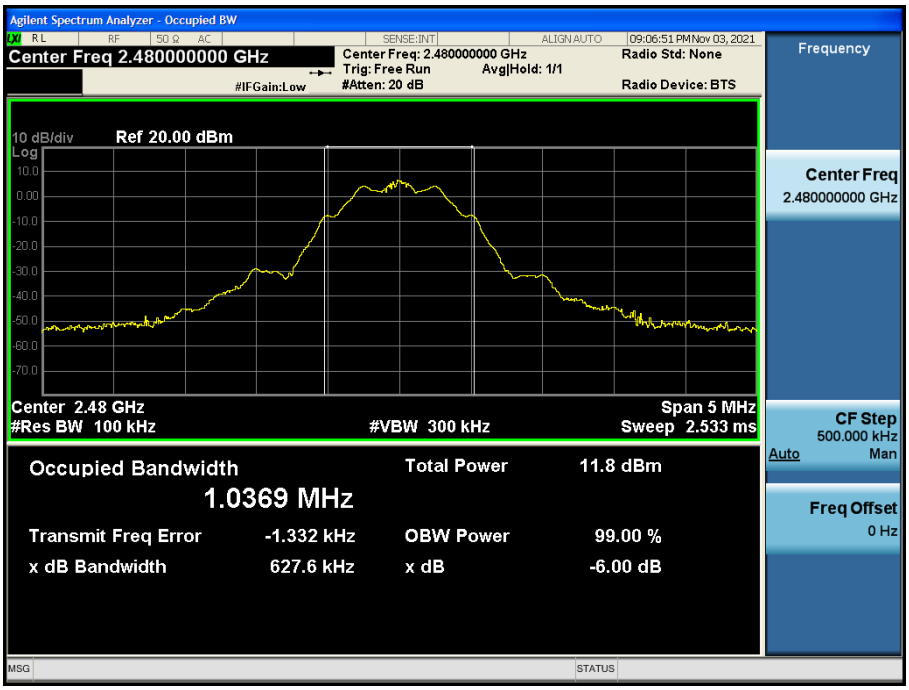
6 dB Bandwidth plot (Low-CH 0)



6 dB Bandwidth plot (Mid-CH 19)

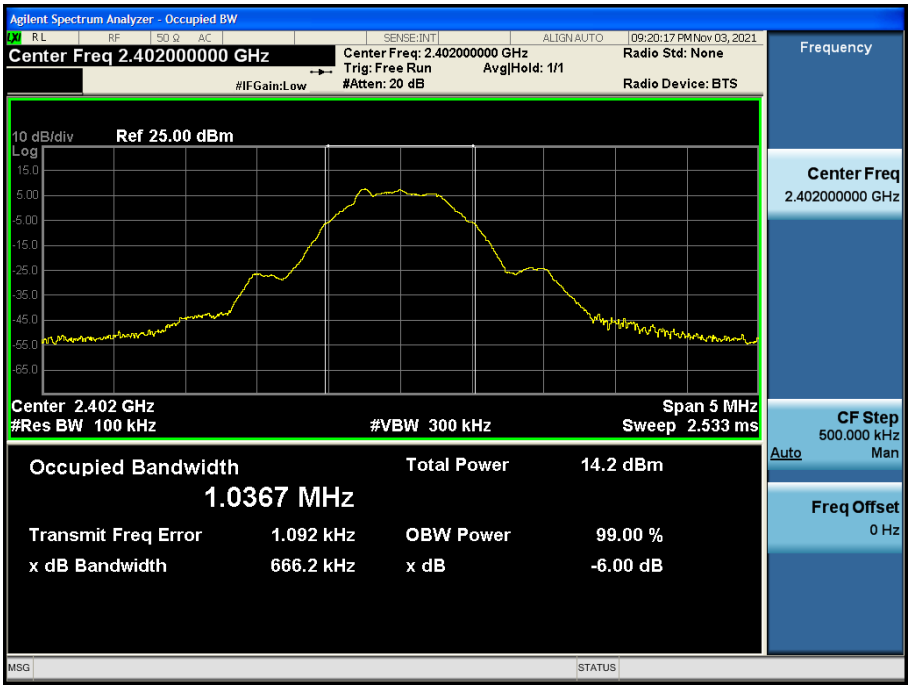


6 dB Bandwidth plot (High-CH 39)

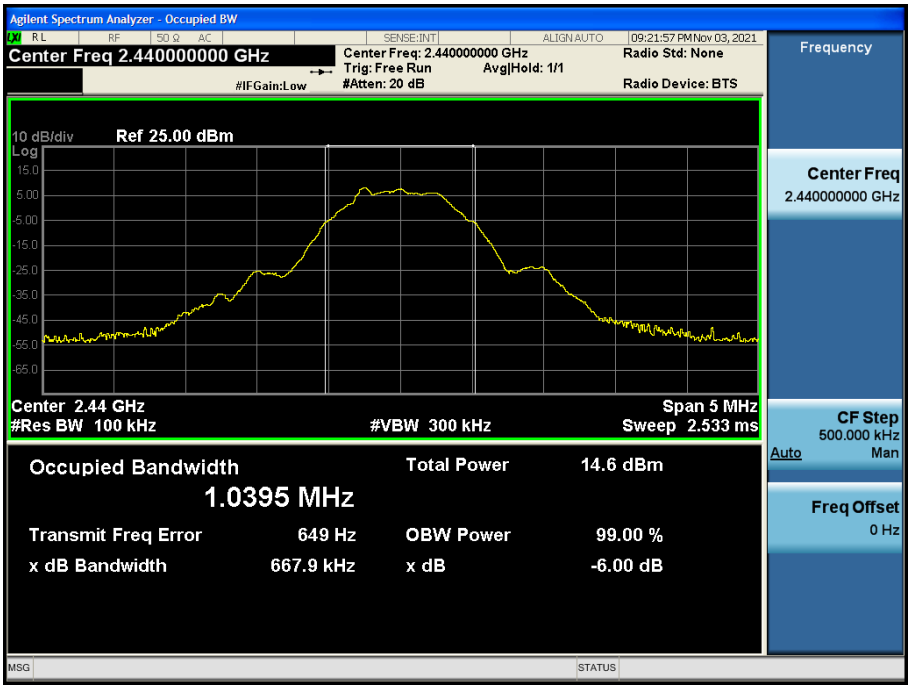


▣ 500k Bit/s(37 Byte) Test Plots

6 dB Bandwidth plot (Low-CH 0)



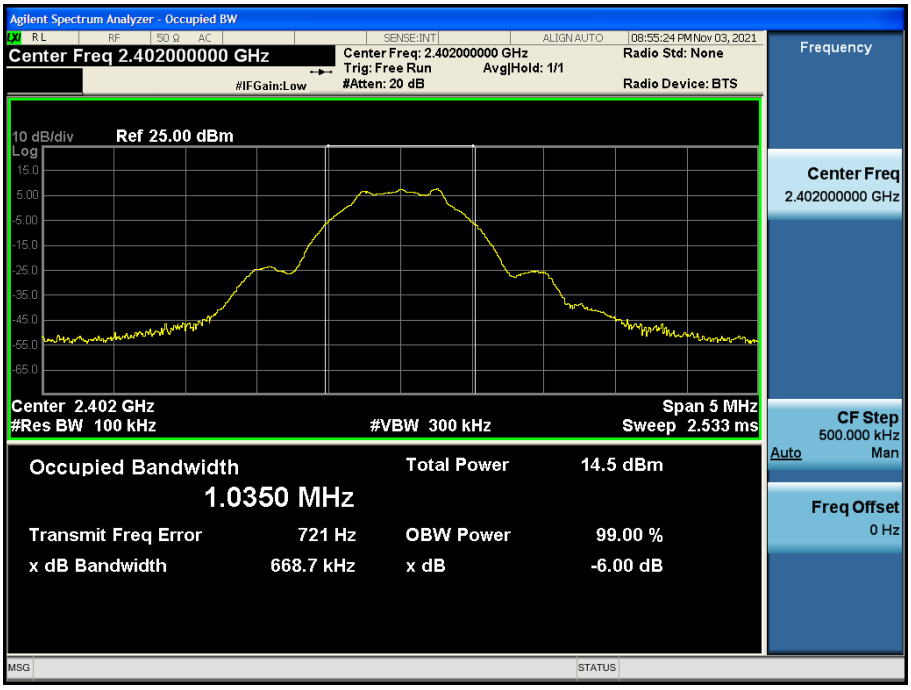
6 dB Bandwidth plot (Mid-CH 19)



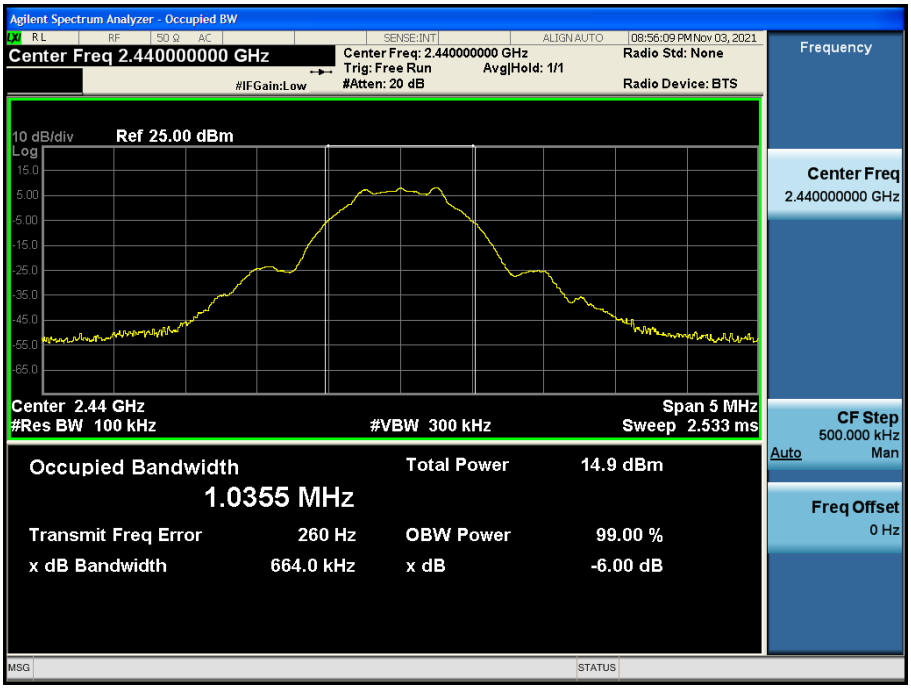
6 dB Bandwidth plot (High-CH 39)

▣ 1 MBit/s (255 Byte) Test Plots

6 dB Bandwidth plot (Low-CH 0)



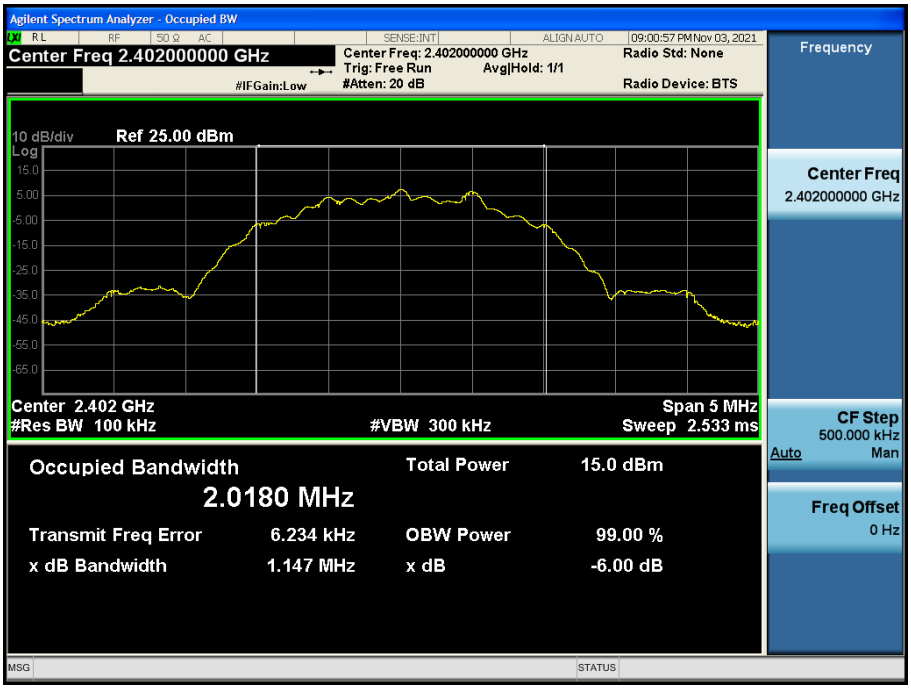
6 dB Bandwidth plot (Mid-CH 19)



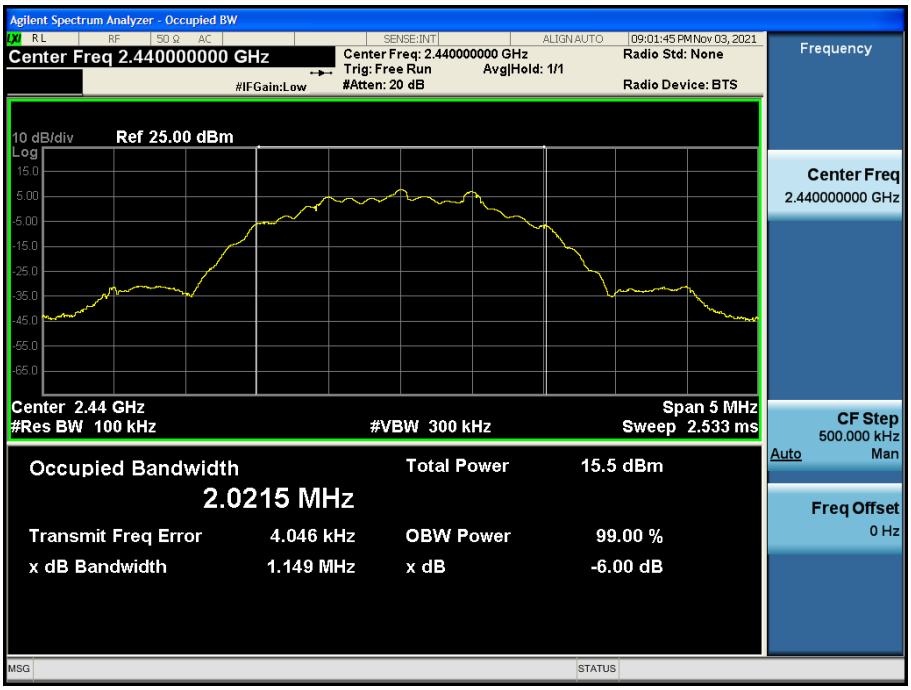
6 dB Bandwidth plot (High-CH 39)

▣ 2 MBit/s (255 Byte) Test Plots

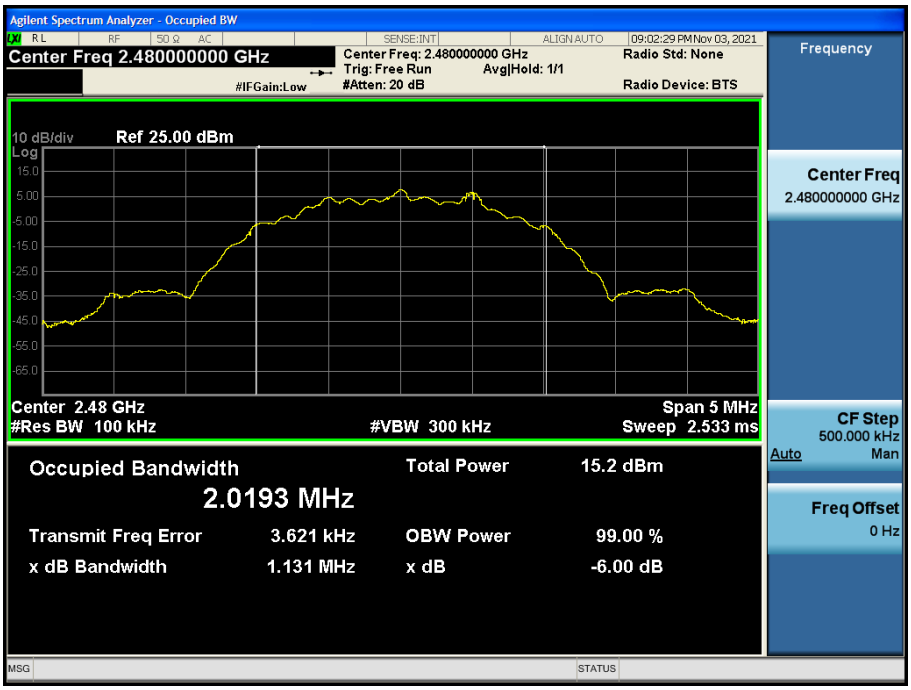
6 dB Bandwidth plot (Low-CH 0)



6 dB Bandwidth plot (Mid-CH 19)



6 dB Bandwidth plot (High-CH 39)



9.3 OUTPUT POWER

Peak Power(Normal)

[Ant.1]

Data rate (Bit/s)	Packet length (Byte)	LE Mode		Measured Power(dBm)	Limit (dBm)
		Frequency [MHz]	Channel		
125k	37	2402	0	7.488	30
		2440	19	8.307	
		2480	39	7.129	
	255	2402	0	7.447	
		2440	19	8.310	
		2480	39	7.124	
500k	37	2402	0	7.602	
		2440	19	8.453	
		2480	39	7.305	
	255	2402	0	7.601	
		2440	19	8.416	
		2480	39	7.266	
1M	37	2402	0	7.546	
		2440	19	8.346	
		2480	39	7.187	
	255	2402	0	7.515	
		2440	19	8.310	
		2480	39	7.167	
2M	37	2402	0	7.724	
		2440	19	8.545	
		2480	39	7.381	
	255	2402	0	7.698	
		2440	19	8.499	
		2480	39	7.325	

Note :

1. Power meter offset = Attenuator loss + Cable loss + EUT Cable loss
2. We apply to the offset in the 2.4 GHz range that was rounded off to the closest tenth dB.
   So, 20.87 dB is offset for 2.4 GHz Band.

[Ant.2]

Data rate (Bit/s)	Packet length (Byte)	LE Mode		Measured Power(dBm)	Limit (dBm)
		Frequency [MHz]	Channel		
125k	37	2402	0	7.709	30
		2440	19	8.086	
		2480	39	7.864	
	255	2402	0	7.697	
		2440	19	8.071	
		2480	39	7.818	
500k	37	2402	0	7.753	
		2440	19	8.145	
		2480	39	7.914	
	255	2402	0	7.726	
		2440	19	8.105	
		2480	39	7.880	
1M	37	2402	0	7.823	
		2440	19	8.227	
		2480	39	7.993	
	255	2402	0	7.801	
		2440	19	8.179	
		2480	39	7.969	
2M	37	2402	0	8.008	
		2440	19	8.392	
		2480	39	8.205	
	255	2402	0	7.903	
		2440	19	8.285	
		2480	39	8.118	

Note :

1. Power meter offset = Attenuator loss + Cable loss + EUT Cable loss
2. We apply to the offset in the 2.4 GHz range that was rounded off to the closest tenth dB.
   So, 20.87 dB is offset for 2.4 GHz Band.

Peak Power(High Power)

[Ant.1]

Data rate (Bit/s)	Packet length (Byte)	LE Mode		Measured Power(dBm)	Limit (dBm)
		Frequency [MHz]	Channel		
1M	37	2402	0	14.997	30
		2440	19	15.748	
		2480	39	14.584	
	255	2402	0	14.763	
		2440	19	15.448	
		2480	39	14.214	
2M	37	2402	0	15.683	
		2440	19	16.441	
		2480	39	15.329	
	255	2402	0	15.341	
		2440	19	16.072	
		2480	39	14.867	

Note :

1. Power meter offset = Attenuator loss + Cable loss + EUT Cable loss
2. We apply to the offset in the 2.4 GHz range that was rounded off to the closest tenth dB.
   So, 20.87 dB is offset for 2.4 GHz Band.

[Ant.2]

Data rate (Bit/s)	Packet length (Byte)	LE Mode		Measured Power(dBm)	Limit (dBm)
		Frequency [MHz]	Channel		
1M	37	2402	0	14.659	30
		2440	19	15.493	
		2480	39	15.522	
	255	2402	0	14.407	
		2440	19	15.234	
		2480	39	15.252	
2M	37	2402	0	15.257	
		2440	19	16.136	
		2480	39	16.204	
	255	2402	0	14.968	
		2440	19	15.798	
		2480	39	15.852	

Note :

1. Power meter offset = Attenuator loss + Cable loss + EUT Cable loss
2. We apply to the offset in the 2.4 GHz range that was rounded off to the closest tenth dB.
   So, 20.87 dB is offset for 2.4 GHz Band.

Average Power(Normal)

[Ant.1]

Data rate (Bit/s)	Packet length (Byte)	LE Mode		Measured Power (dBm)	Duty Cycle Factor (dB)	Result (dBm)	Limit (dBm)
		Frequency [MHz]	Channel				
125k	37	2402	0	6.53	0.83	7.36	30
		2440	19	7.34	0.83	8.17	
		2480	39	6.15	0.83	6.98	
	255	2402	0	7.28	0.11	7.39	
		2440	19	8.13	0.11	8.24	
		2480	39	6.94	0.11	7.05	
500k	37	2402	0	4.98	2.45	7.43	
		2440	19	5.87	2.45	8.32	
		2480	39	4.65	2.45	7.10	
	255	2402	0	7.10	0.40	7.50	
		2440	19	7.94	0.40	8.34	
		2480	39	6.64	0.40	7.04	
1M	37	2402	0	5.34	2.07	7.41	
		2440	19	6.21	2.07	8.28	
		2480	39	4.97	2.07	7.04	
	255	2402	0	6.57	0.70	7.27	
		2440	19	7.45	0.70	8.15	
		2480	39	6.23	0.70	6.93	
2M	37	2402	0	2.56	4.84	7.40	
		2440	19	3.46	4.84	8.30	
		2480	39	2.20	4.84	7.04	
	255	2402	0	4.90	2.40	7.30	
		2440	19	5.77	2.40	8.17	
		2480	39	4.66	2.40	7.06	

Note :

1. Power meter offset = Attenuator loss + Cable loss
2. We apply to the offset in the 2.4 GHz range that was rounded off to the closest tenth dB.
   So, 20.87 dB is offset for 2.4 GHz Band.

[Ant.2]

Data rate (Bit/s)	Packet length (Byte)	LE Mode		Measured Power (dBm)	Duty Cycle Factor (dB)	Result (dBm)	Limit (dBm)
		Frequency [MHz]	Channel				
125k	37	2402	0	6.76	0.83	7.59	30
		2440	19	7.17	0.83	8.00	
		2480	39	6.93	0.83	7.76	
	255	2402	0	7.45	0.11	7.56	
		2440	19	7.87	0.11	7.98	
		2480	39	7.64	0.11	7.75	
500k	37	2402	0	5.19	2.45	7.64	
		2440	19	5.50	2.45	7.95	
		2480	39	5.32	2.45	7.77	
	255	2402	0	7.23	0.40	7.63	
		2440	19	7.58	0.40	7.98	
		2480	39	7.39	0.40	7.79	
1M	37	2402	0	5.58	2.07	7.65	
		2440	19	5.99	2.07	8.06	
		2480	39	5.74	2.07	7.81	
	255	2402	0	7.03	0.70	7.73	
		2440	19	7.39	0.70	8.09	
		2480	39	7.17	0.70	7.87	
2M	37	2402	0	2.96	4.84	7.80	
		2440	19	3.24	4.84	8.08	
		2480	39	3.07	4.84	7.91	
	255	2402	0	5.25	2.40	7.65	
		2440	19	5.61	2.40	8.01	
		2480	39	5.31	2.40	7.71	

Note :

1. Power meter offset = Attenuator loss + Cable loss
2. We apply to the offset in the 2.4 GHz range that was rounded off to the closest tenth dB.
   So, 20.87 dB is offset for 2.4 GHz Band.

Average Power(High Power)

[Ant.1]

Data rate (Bit/s)	Packet length (Byte)	LE Mode		Measured Power (dBm)	Duty Cycle Factor (dB)	Result (dBm)	Limit (dBm)
		Frequency [MHz]	Channel				
1M	37	2402	0	12.77	2.06	14.83	30
		2440	19	13.50	2.06	15.56	
		2480	39	12.25	2.06	14.31	
	255	2402	0	13.81	0.69	14.50	
		2440	19	14.62	0.69	15.31	
		2480	39	13.25	0.69	13.94	
2M	37	2402	0	10.42	4.86	15.28	
		2440	19	11.06	4.86	15.92	
		2480	39	10.00	4.86	14.86	
	255	2402	0	12.43	2.42	14.85	
		2440	19	13.18	2.42	15.60	
		2480	39	11.91	2.42	14.33	

Note :

1. Power meter offset = Attenuator loss + Cable loss + EUT Cable loss
2. We apply to the offset in the 2.4 GHz range that was rounded off to the closest tenth dB.
   So, 20.87 dB is offset for 2.4 GHz Band.

[Ant.2]

Data rate (Bit/s)	Packet length (Byte)	LE Mode		Measured Power (dBm)	Duty Cycle Factor (dB)	Result (dBm)	Limit (dBm)
		Frequency [MHz]	Channel				
1M	37	2402	0	12.36	2.06	14.42	30
		2440	19	13.13	2.06	15.19	
		2480	39	13.23	2.06	15.29	
	255	2402	0	13.46	0.69	14.15	
		2440	19	14.29	0.69	14.98	
		2480	39	14.35	0.69	15.04	
2M	37	2402	0	9.79	4.86	14.65	
		2440	19	10.84	4.86	15.70	
		2480	39	10.93	4.86	15.79	
	255	2402	0	11.95	2.42	14.37	
		2440	19	12.99	2.42	15.41	
		2480	39	13.00	2.42	15.42	

Note :

1. Power meter offset = Attenuator loss + Cable loss + EUT Cable loss
2. We apply to the offset in the 2.4 GHz range that was rounded off to the closest tenth dB.
   So, 20.87 dB is offset for 2.4 GHz Band.

9.4 POWER SPECTRAL DENSITY

[Ant.1]

Frequency (MHz)	Channel No.	Mode	Test Result			
			Measured Power(dBm)	Duty Cycle Factor(dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
2402	0	125k 37 Byte	0.109	0.83	0.936	8 dBm / 3 kHz
2440	19		0.158	0.83	0.985	
2480	39		-0.230	0.83	0.597	
2402	0	125k 255 Byte	0.821	0.11	0.930	
2440	19		1.687	0.11	1.796	
2480	39		0.490	0.11	0.599	
2402	0	500k 37 Byte	-6.438	2.45	-3.993	
2440	19		-6.698	2.45	-4.253	
2480	39		-5.833	0.40	-5.433	
2402	0	500k 255 Byte	-7.969	0.40	-7.569	
2440	19		-6.344	0.40	-5.944	
2480	39		-8.305	0.40	-7.905	
2402	0	1 MBit/s 37 Byte	-7.283	2.07	-5.217	
2440	19		-5.820	2.07	-3.754	
2480	39		-9.125	2.07	-7.059	
2402	0	1 MBit/s 255 Byte	-7.664	0.70	-6.968	
2440	19		-6.947	0.70	-6.251	
2480	39		-10.128	0.70	-9.432	
2402	0	2 MBit/s 37 Byte	-12.664	4.84	-7.822	
2440	19		-12.039	4.84	-7.197	
2480	39		-13.099	4.84	-8.257	
2402	0	2 MBit/s 255 Byte	-13.518	2.40	-11.117	
2440	19		-12.350	2.40	-9.949	
2480	39		-13.530	2.40	-11.129	
2402	**0**	**1 MBit/s**	**1.497**	**2.06**	**3.554**	
2440	**19**	**37 Byte**	**1.802**	**2.06**	**3.859**	
2480	**39**	**High Power**	**-1.926**	**2.06**	**0.131**	
2402	0	1 MBit/s 255 Byte High Power	-0.650	0.69	0.035	
2440	19		-0.382	0.69	0.303	
2480	39		-3.232	0.69	-2.547	
2402	0	2 MBit/s 37 Byte High Power	-4.381	4.86	0.479	
2440	19		-4.332	4.86	0.528	
2480	39		-5.536	4.86	-0.676	
2402	0	2 MBit/s 255 Byte High Power	-5.950	2.42	-3.534	
2440	19		-4.764	2.42	-2.348	
2480	39		-6.669	2.42	-4.253	

Note :

1. Spectrum measured Value not plot data.
   The PSD results in plot is already including the actual values of loss for the attenuator and cable combination.
2. Spectrum offset = Attenuator loss + Cable loss + EUT Cable loss
3. We apply to the offset in the 2.4 GHz range that was rounded off to the closest tenth dB.
   So, 20.87 dB is offset for 2.4 GHz Band.
4. Worst case test Plot Only : High Power 1 MBit/s (37 Byte)

[Ant.2]

Frequency (MHz)	Channel No.	Mode	Test Result			
			Measured Power(dBm)	Duty Cycle Factor(dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
2402	0	125k 37 Byte	1.027	0.83	1.854	8 dBm / 3 kHz
2440	19		1.320	0.83	2.147	
2480	39		0.362	0.83	1.189	
2402	0	125k 255 Byte	0.789	0.11	0.898	
2440	19		1.483	0.11	1.592	
2480	39		1.145	0.11	1.254	
2402	0	500k 37 Byte	-3.655	2.45	-1.210	
2440	19		-3.289	2.45	-0.844	
2480	39		-5.759	0.40	-5.359	
2402	0	500k 255 Byte	-5.114	0.40	-4.714	
2440	19		-7.730	0.40	-7.330	
2480	39		-8.248	0.40	-7.848	
2402	0	1 MBit/s 37 Byte	-6.397	2.07	-4.331	
2440	19		-6.283	2.07	-4.217	
2480	39		-8.124	2.07	-6.058	
2402	0	1 MBit/s 255 Byte	-8.616	0.70	-7.920	
2440	19		-7.779	0.70	-7.083	
2480	39		-9.292	0.70	-8.596	
2402	0	2 MBit/s 37 Byte	-9.893	4.84	-5.051	
2440	19		-9.237	4.84	-4.395	
2480	39		-12.759	4.84	-7.917	
2402	0	2 MBit/s 255 Byte	-13.417	2.40	-11.016	
2440	19		-12.957	2.40	-10.556	
2480	39		-13.029	2.40	-10.628	
2402	**0**	**1 MBit/s 37 Byte High Power**	**0.345**	**2.06**	**2.402**	
2440	**19**		**1.444**	**2.06**	**3.501**	
2480	**39**		**-1.397**	**2.06**	**0.660**	
2402	0	1 MBit/s 255 Byte High Power	-1.395	0.69	-0.710	
2440	19		-0.766	0.69	-0.081	
2480	39		-2.167	0.69	-1.482	
2402	0	2 MBit/s 37 Byte High Power	-5.005	4.86	-0.145	
2440	19		-4.843	4.86	0.017	
2480	39		-4.307	4.86	0.553	
2402	0	2 MBit/s 255 Byte High Power	-6.786	2.42	-4.370	
2440	19		-5.543	2.42	-3.127	
2480	39		-5.641	2.42	-3.225	

Note :

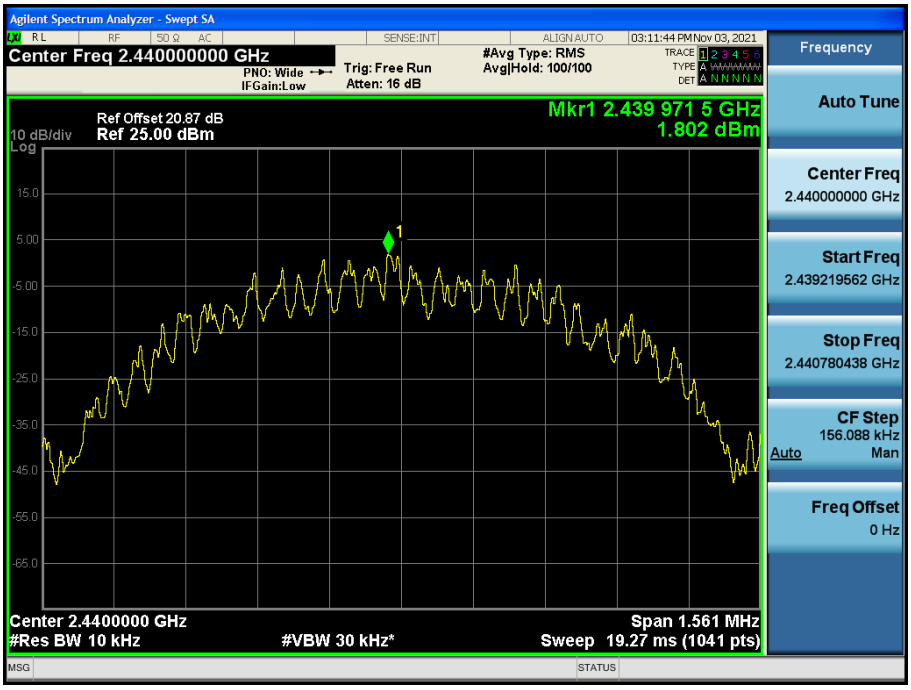
1. Spectrum measured Value not plot data.
   The PSD results in plot is already including the actual values of loss for the attenuator and cable combination.
2. Spectrum offset = Attenuator loss + Cable loss + EUT Cable loss
3. We apply to the offset in the 2.4 GHz range that was rounded off to the closest tenth dB.
   So, 20.87dB is offset for 2.4 GHz Band.
4. Worst case test Plot Only : High Power 1 MBit/s (37 Byte)

[Ant.1]

▣ 1M Bit/s (37 Byte) Test Plots_High Power

Power Spectral Density (Low-CH 0)

Power Spectral Density (Mid-CH 19)



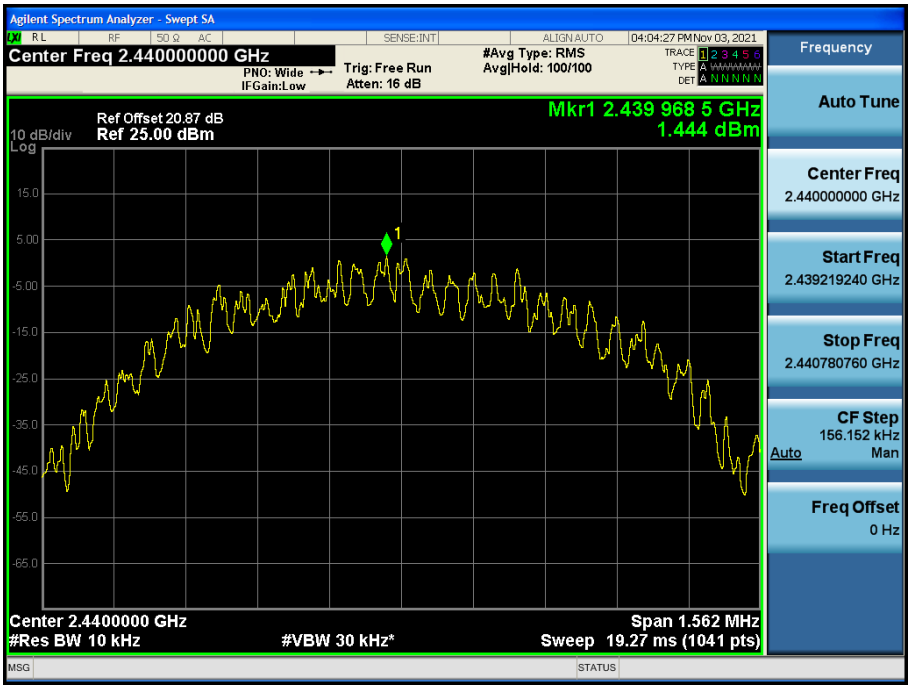
Power Spectral Density (High-CH 39)

[Ant.2]

▣ 1M Bit/s (37 Byte) Test Plots_High Power

Power Spectral Density (Low-CH 0)

Power Spectral Density (Mid-CH 19)



Power Spectral Density (High-CH 39)

9.5 BAND EDGE/ CONDUCTED SPURIOUS EMISSIONS

Test Result : please refer to the plot below.
In order to simplify the report, attached plots were only the worst case channel and data rate.

[Ant.1]

▣ 2 MBit/s (37 Byte) Test Plots –Band Edge(High Power)

Low-CH 0

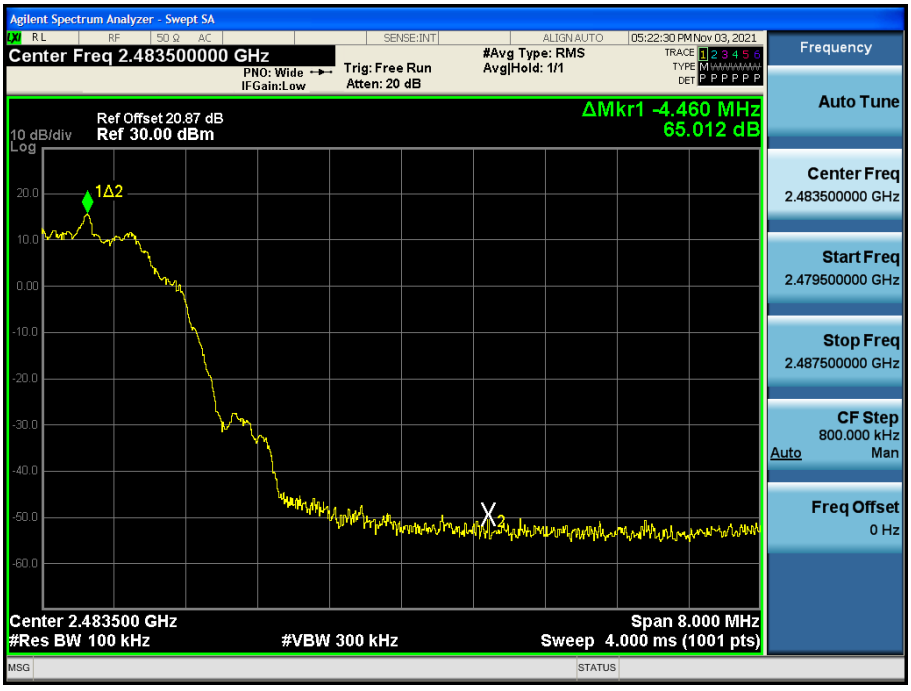
High-CH 39

[Ant.2]

▣ 2 MBit/s (37 Byte) Test Plots –Band Edge(High Power)

Low-CH 0

High-CH 39

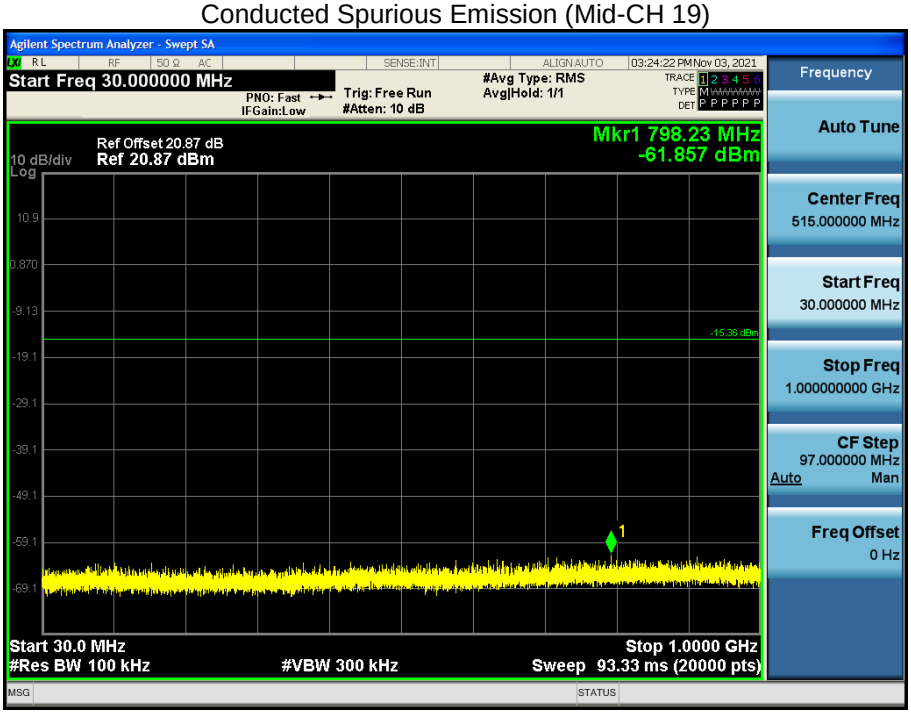


[Ant.1]

▣ 1 MBit/s (37 Byte) Test Plots -Conducted Spurious Emission(High Power)

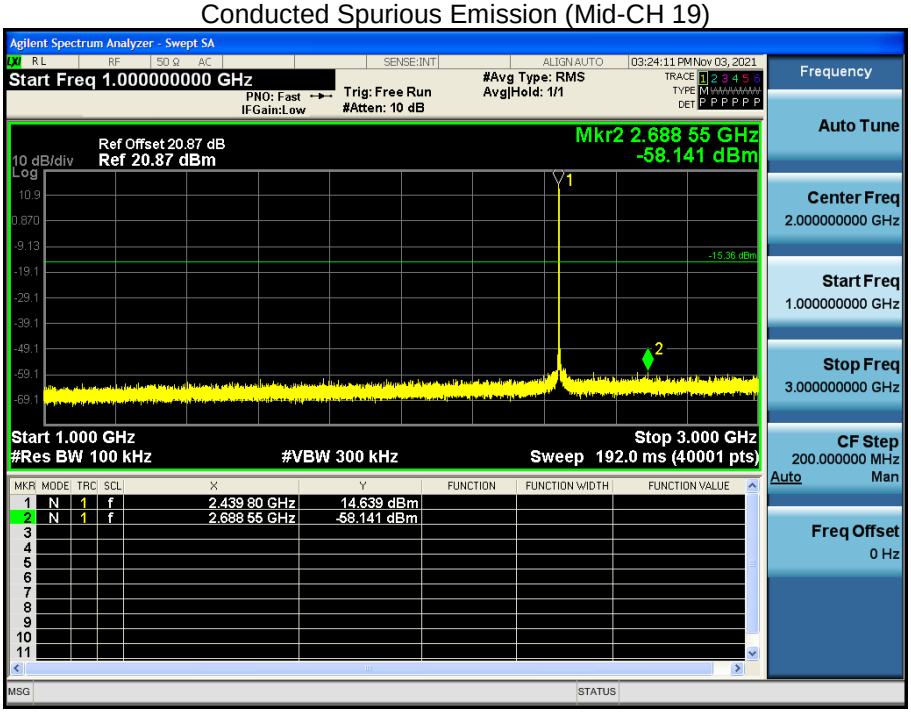
30 MHz ~ 1 GHz

Conducted Spurious Emission (Mid-CH 19)



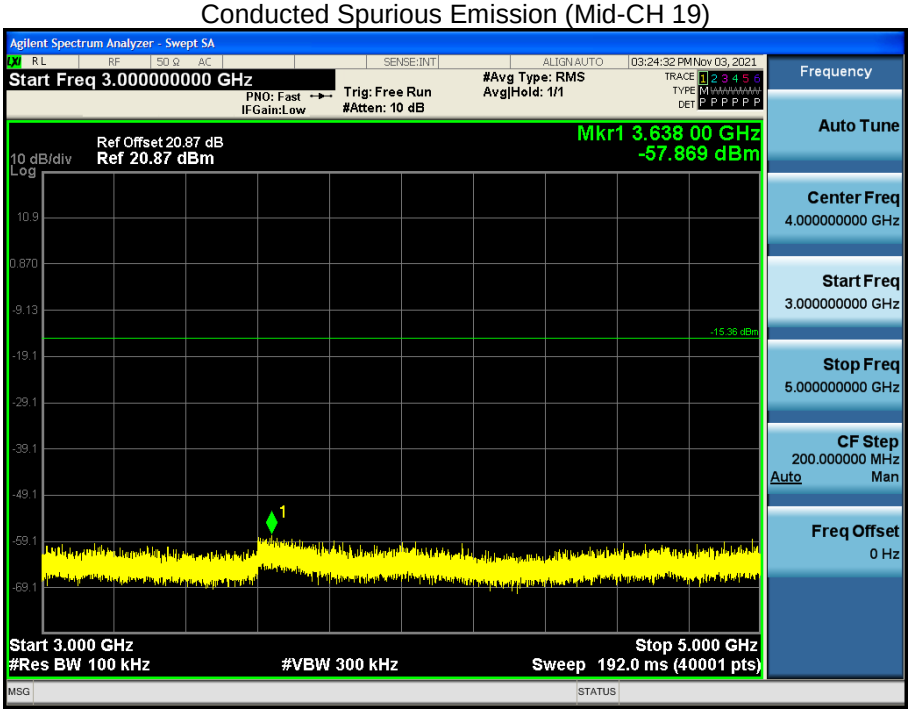
1 GHz ~ 3 GHz

Conducted Spurious Emission (Mid-CH 19)



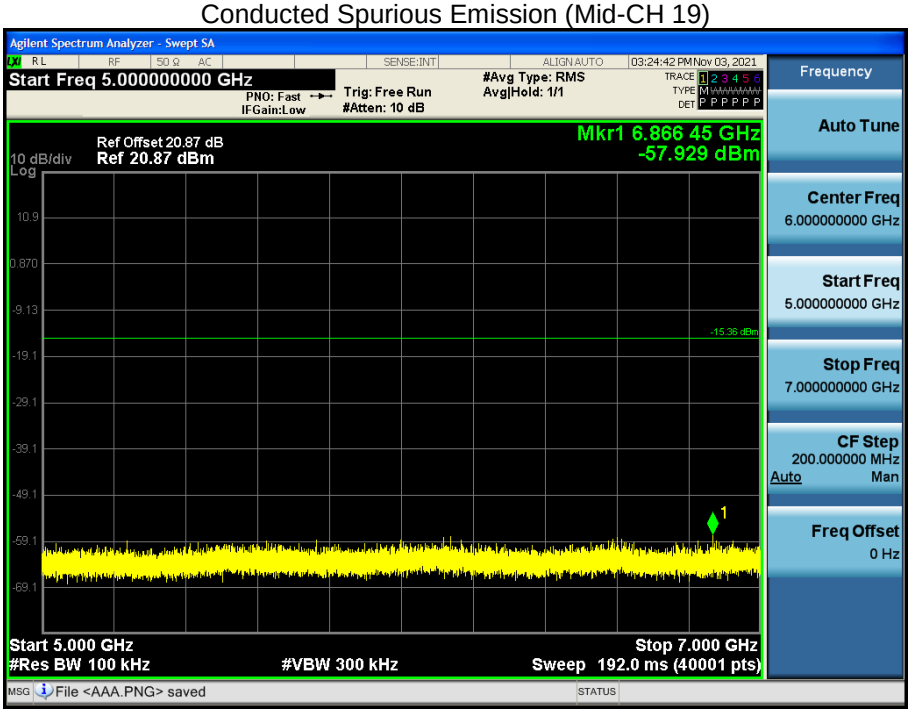
3 GHz ~ 5 GHz

Conducted Spurious Emission (Mid-CH 19)



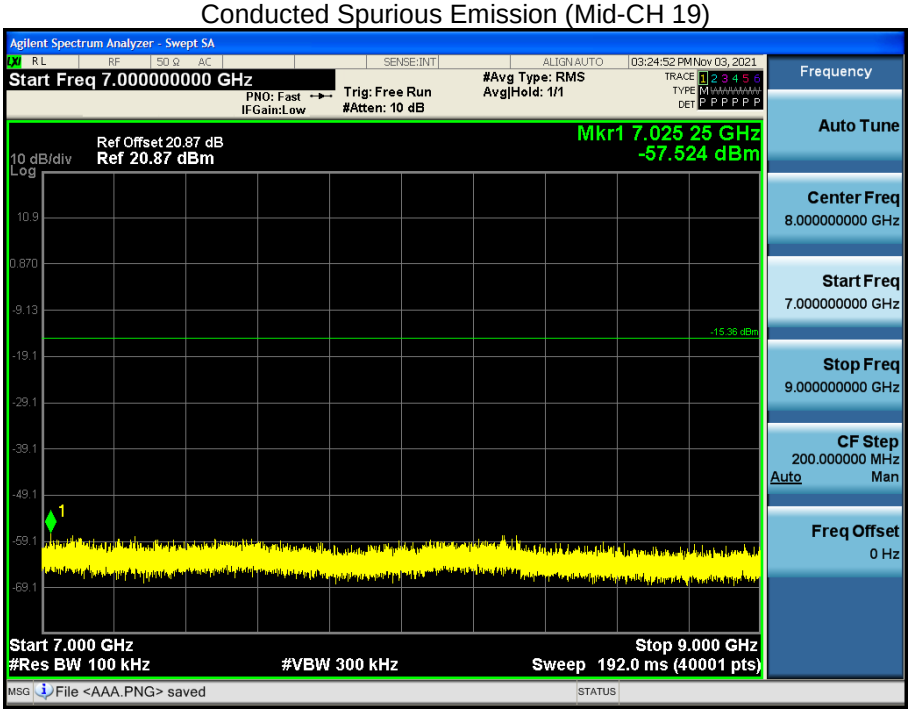
5 GHz ~ 7 GHz

Conducted Spurious Emission (Mid-CH 19)



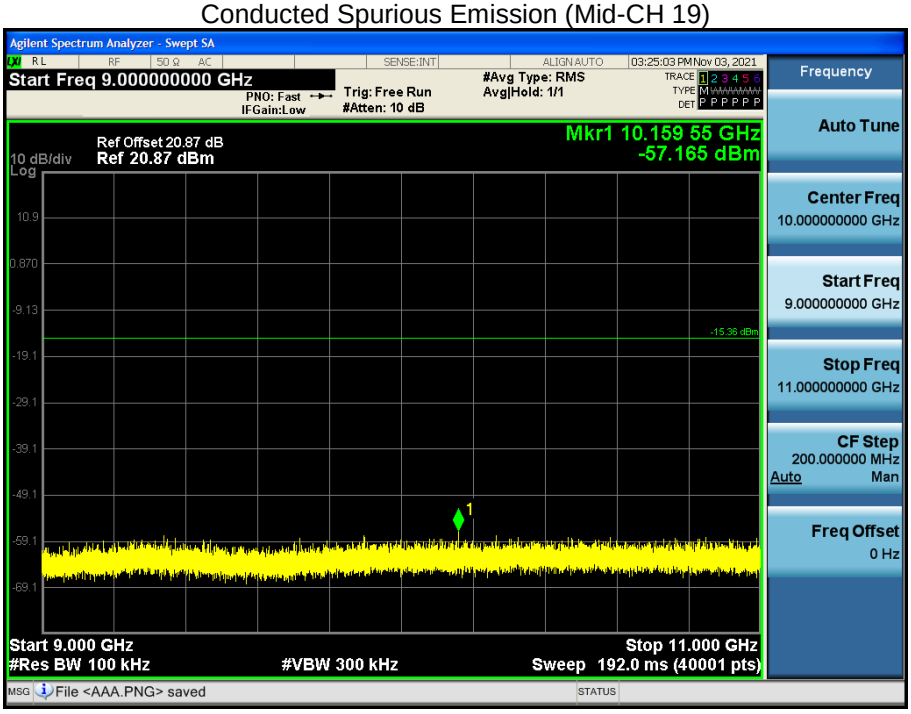
7 GHz ~ 9 GHz

Conducted Spurious Emission (Mid-CH 19)



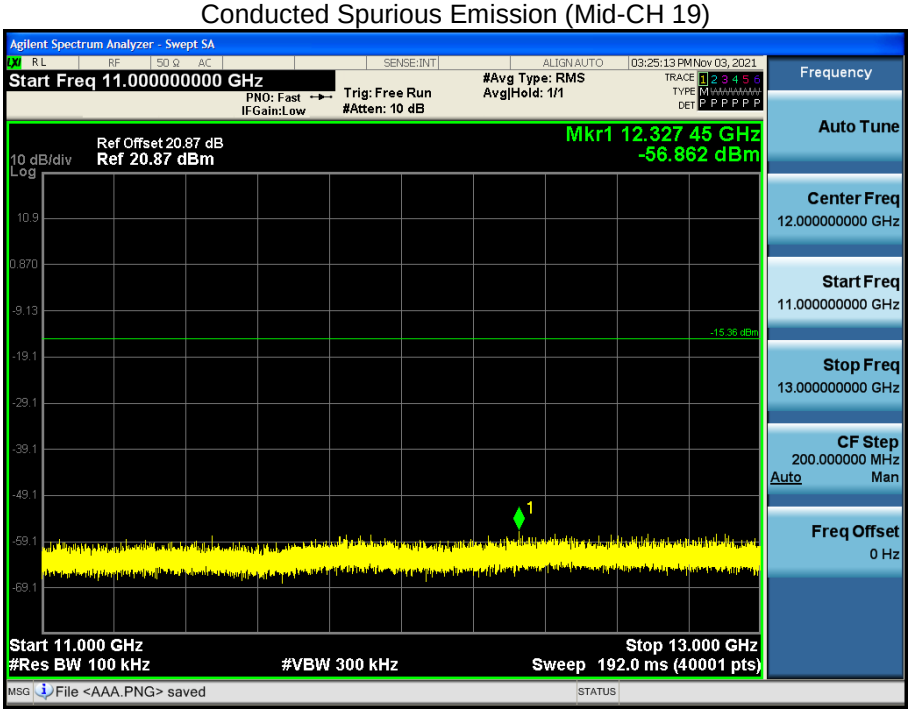
9 GHz ~ 11 GHz

Conducted Spurious Emission (Mid-CH 19)



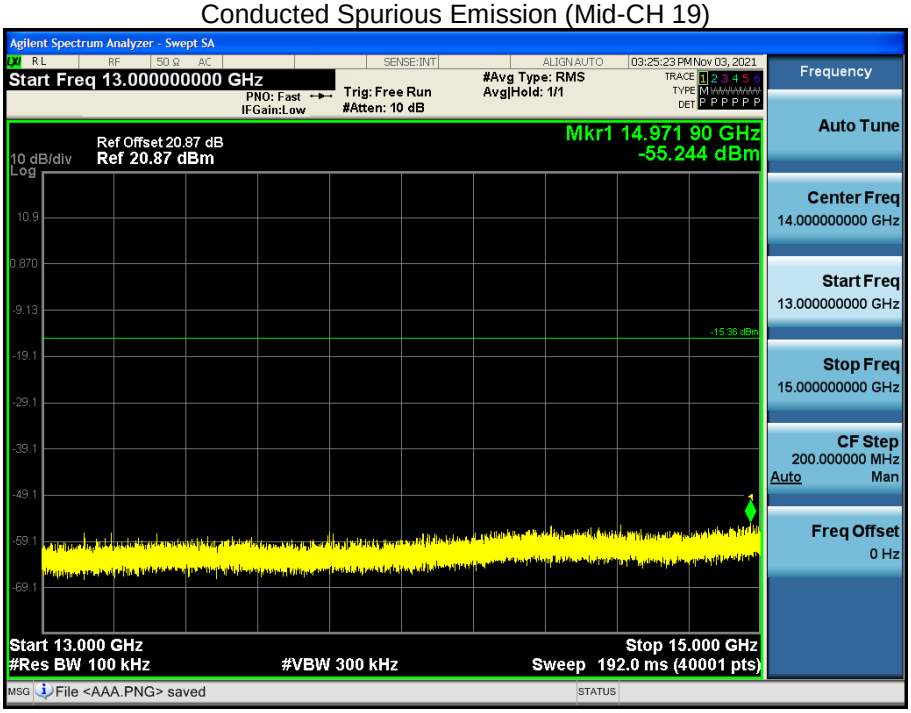
11 GHz ~ 13 GHz

Conducted Spurious Emission (Mid-CH 19)



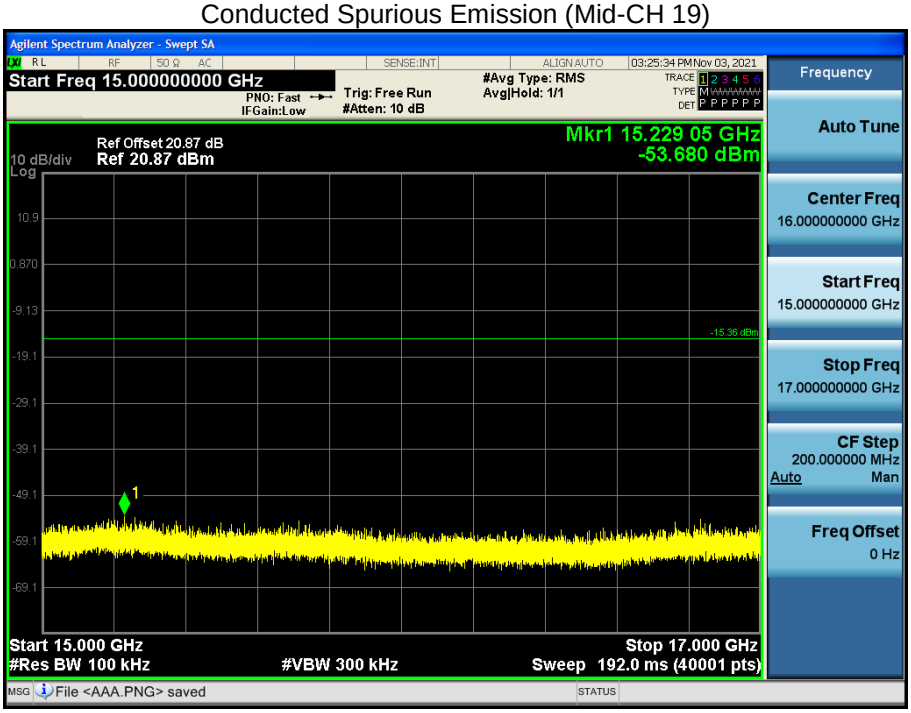
13 GHz ~ 15 GHz

Conducted Spurious Emission (Mid-CH 19)



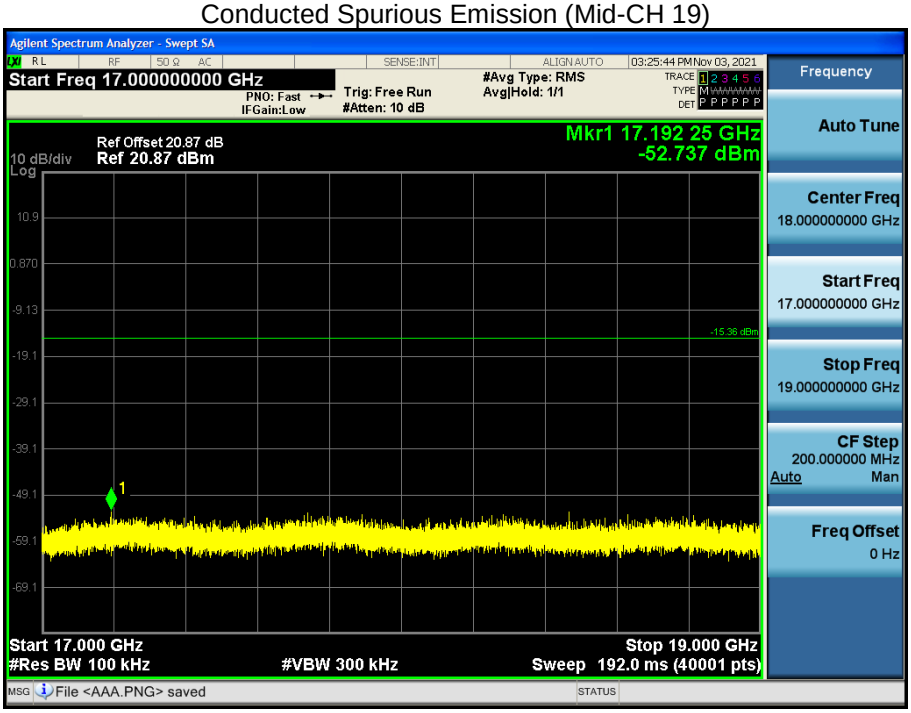
15 GHz ~ 17 GHz

Conducted Spurious Emission (Mid-CH 19)



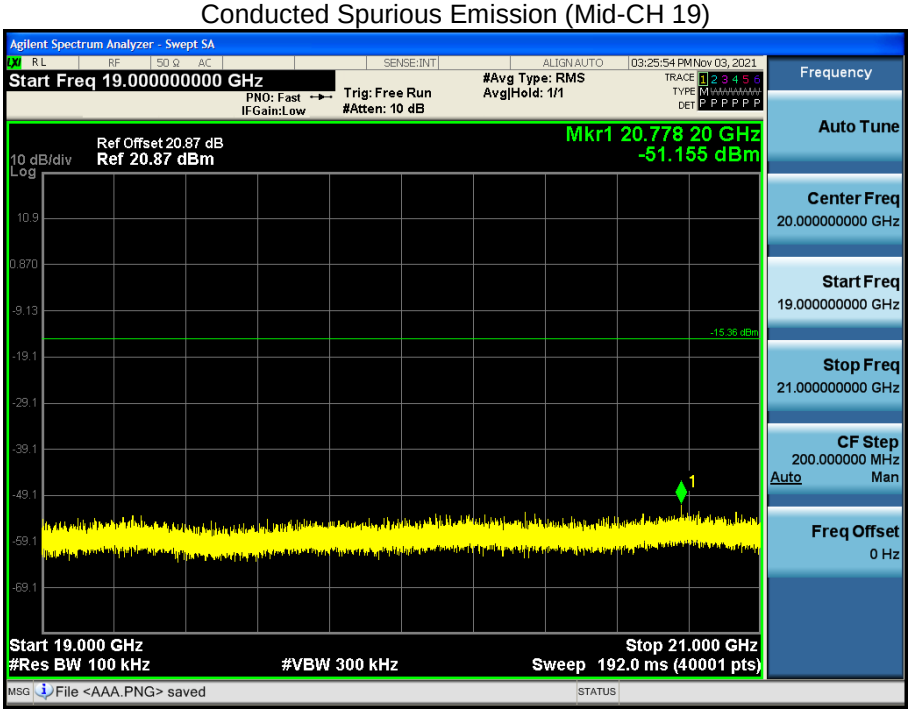
17 GHz ~ 19 GHz

Conducted Spurious Emission (Mid-CH 19)



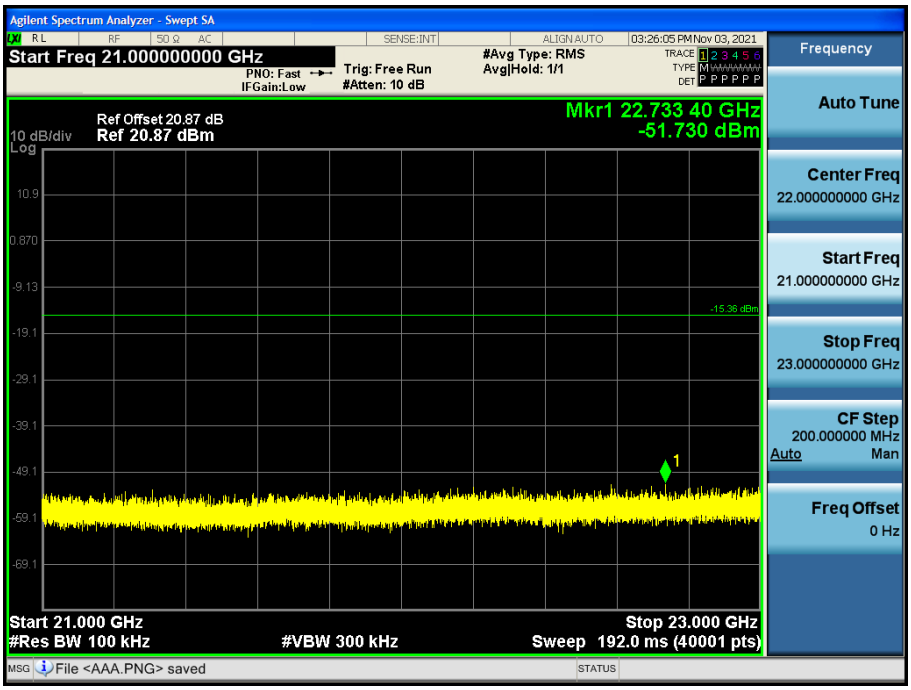
19 GHz ~ 21 GHz

Conducted Spurious Emission (Mid-CH 19)



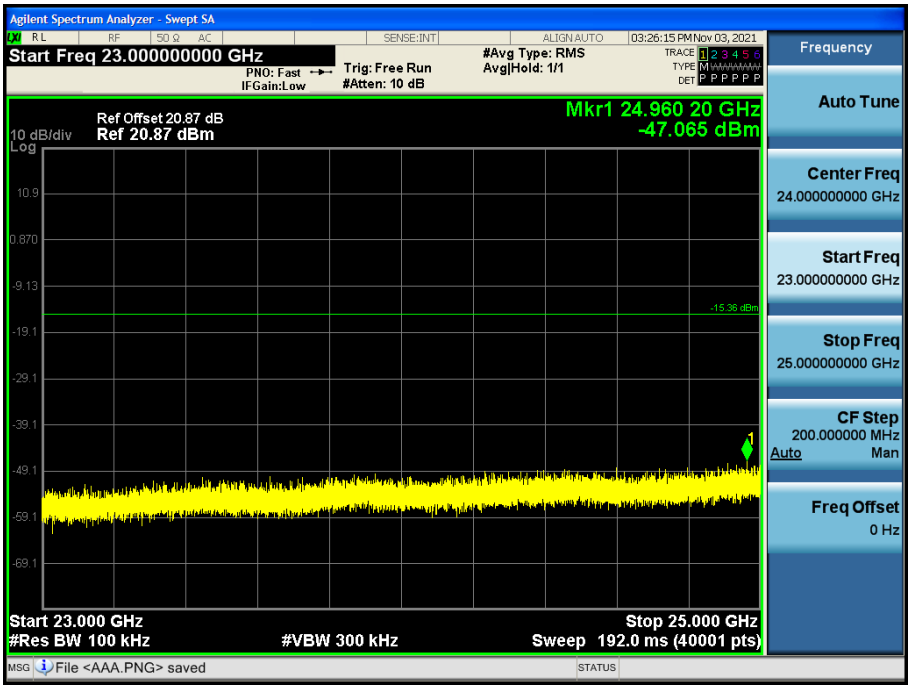
21 GHz ~ 23 GHz

Conducted Spurious Emission (Mid-CH 19)



23 GHz ~ 25 GHz

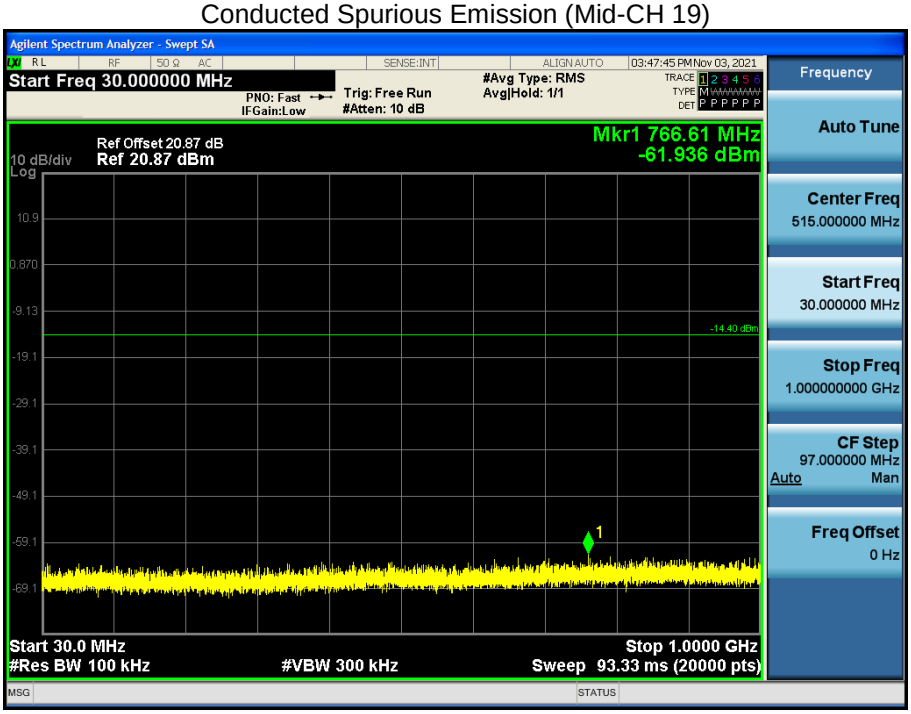
Conducted Spurious Emission (Mid-CH 19)



▣ 2 MBit/s (37 Byte) Test Plots -Conducted Spurious Emission(High Power)

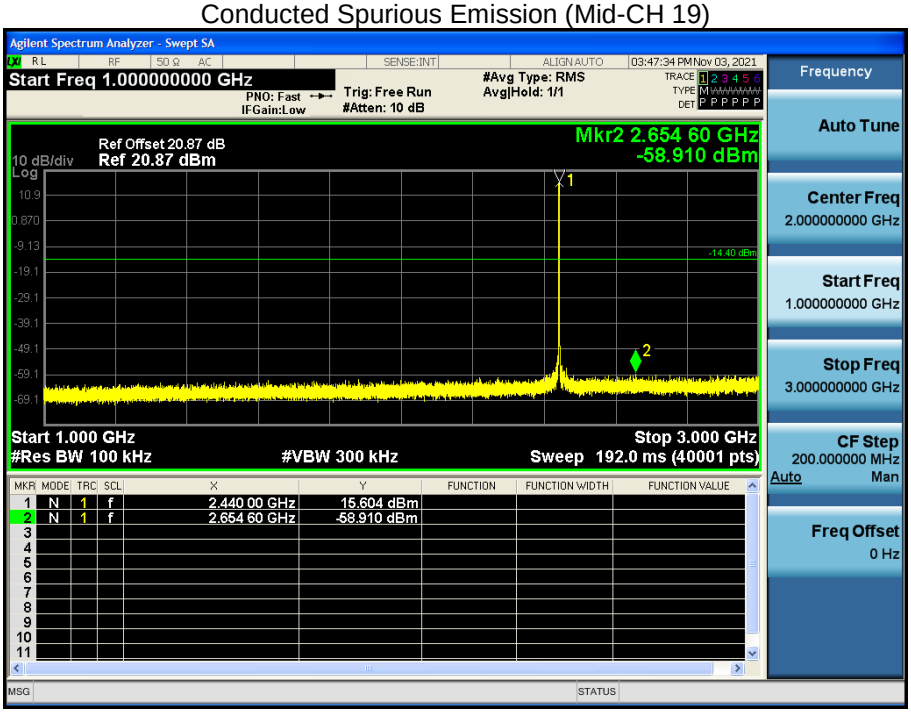
30 MHz ~ 1 GHz

Conducted Spurious Emission (Mid-CH 19)



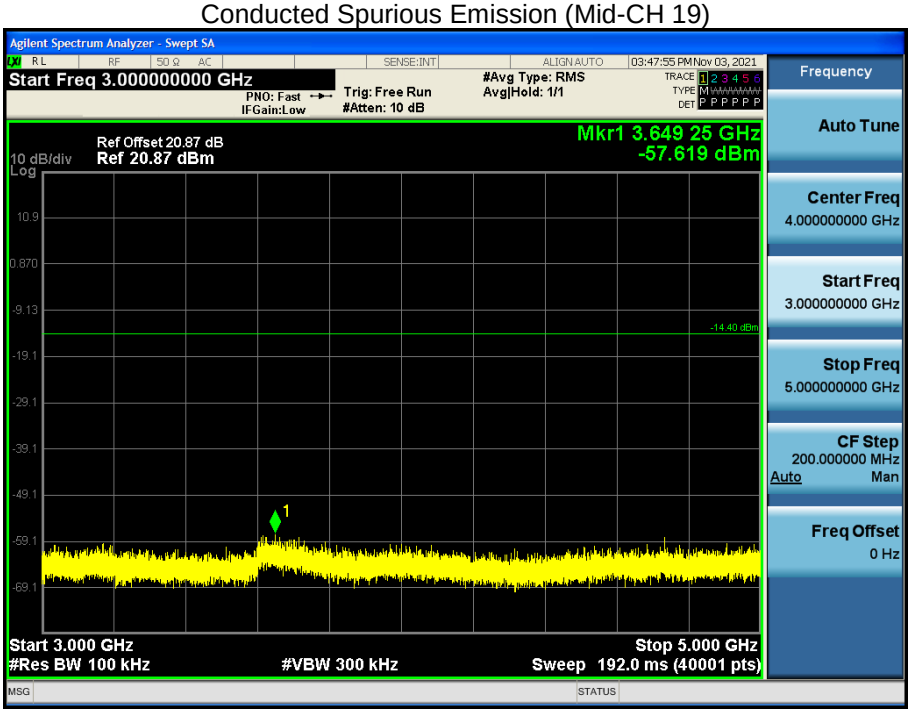
1 GHz ~ 3 GHz

Conducted Spurious Emission (Mid-CH 19)



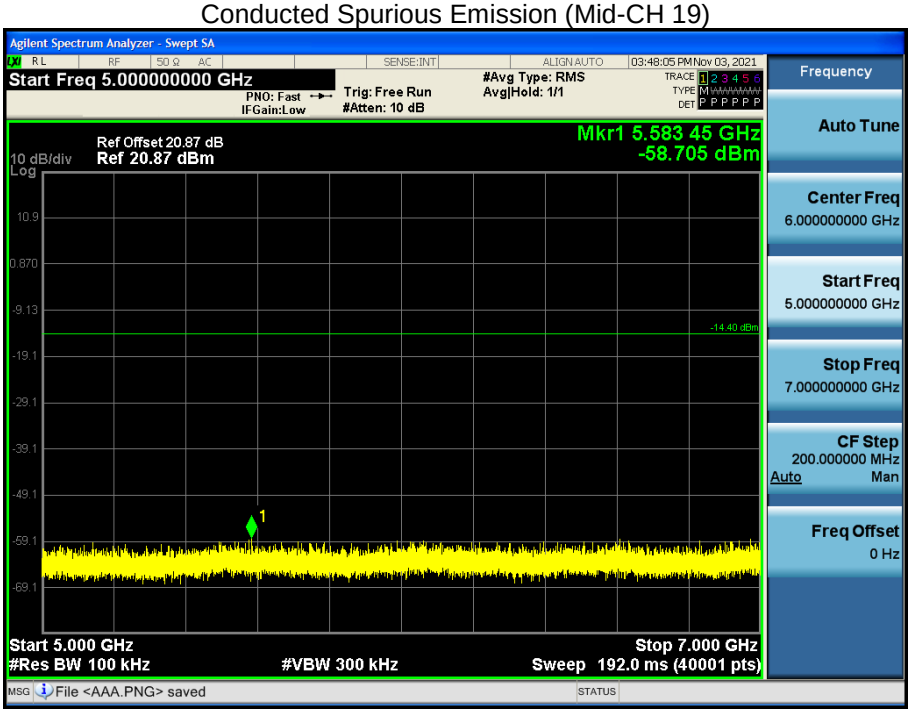
3 GHz ~ 5 GHz

Conducted Spurious Emission (Mid-CH 19)



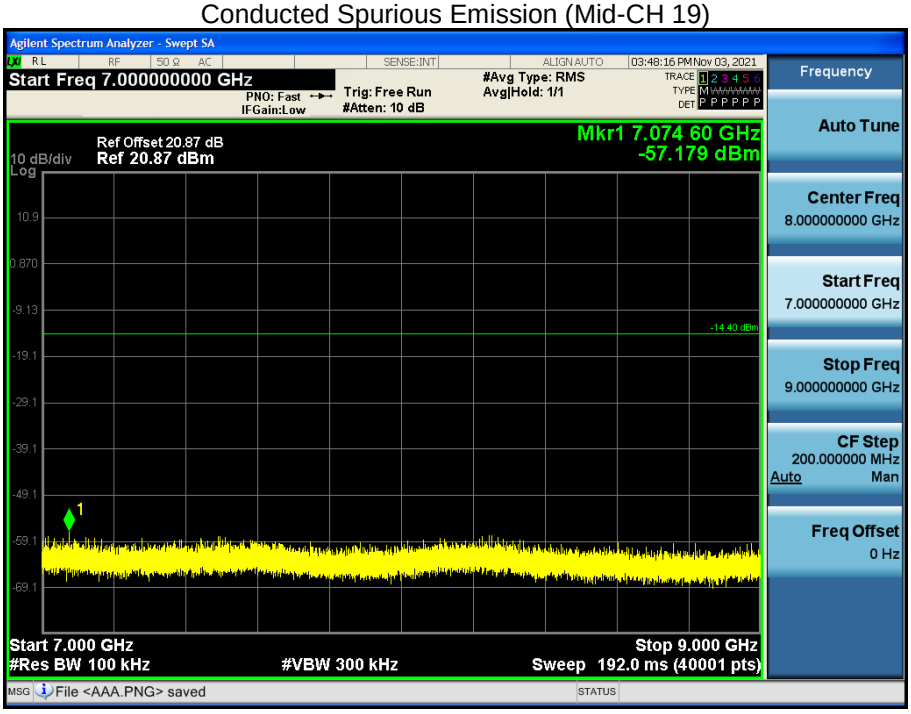
5 GHz ~ 7 GHz

Conducted Spurious Emission (Mid-CH 19)



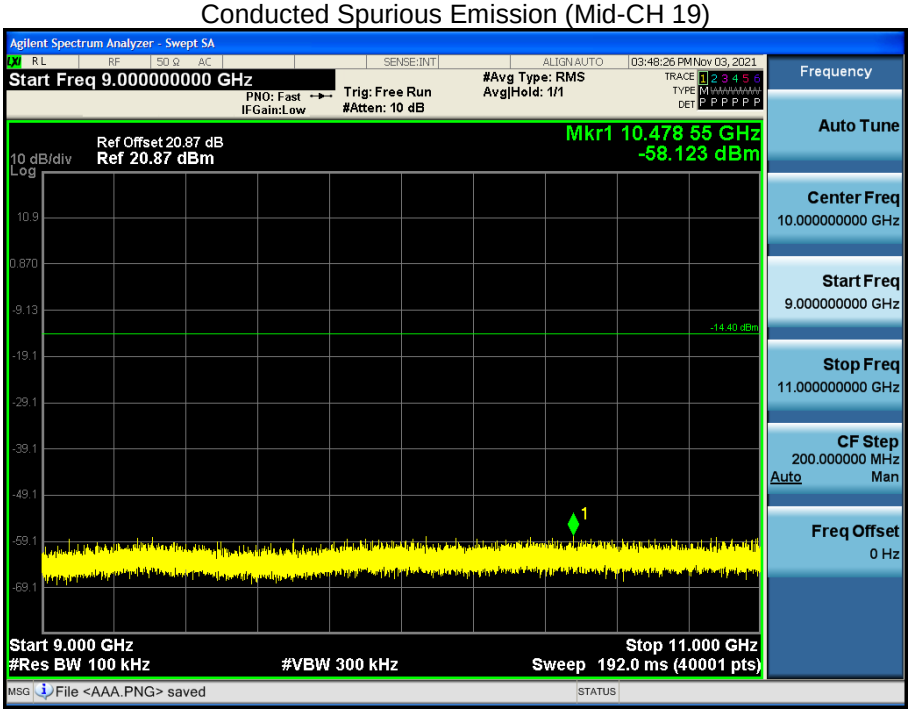
7 GHz ~ 9 GHz

Conducted Spurious Emission (Mid-CH 19)



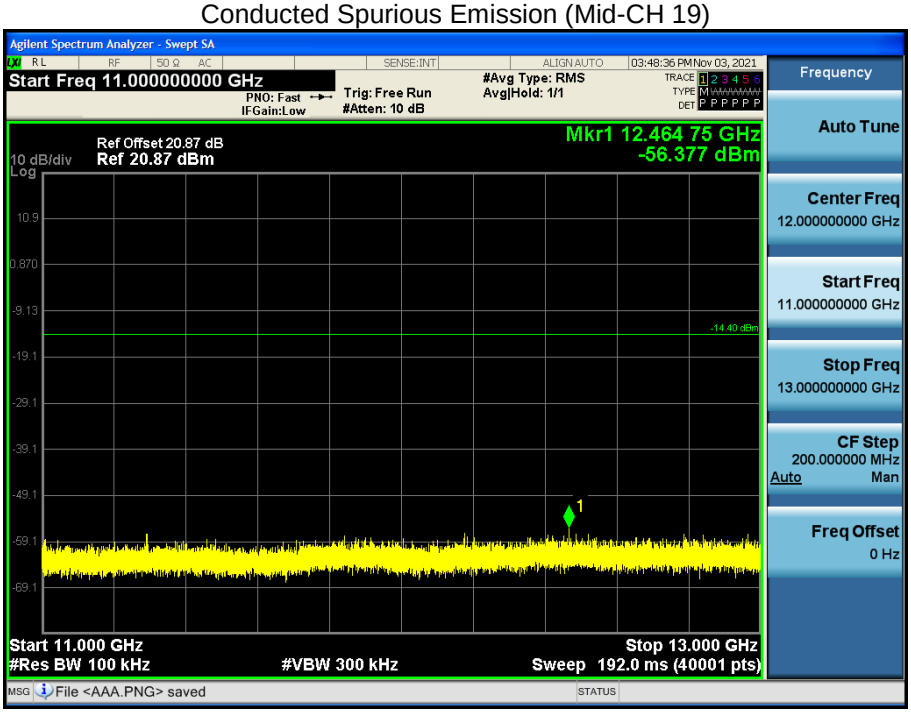
9 GHz ~ 11 GHz

Conducted Spurious Emission (Mid-CH 19)



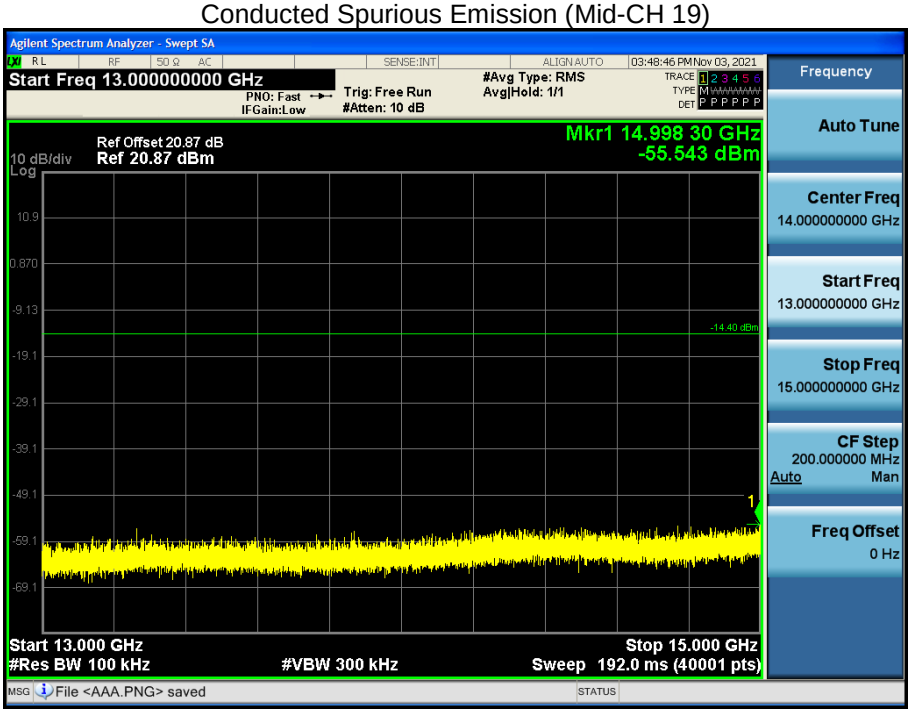
11 GHz ~ 13 GHz

Conducted Spurious Emission (Mid-CH 19)



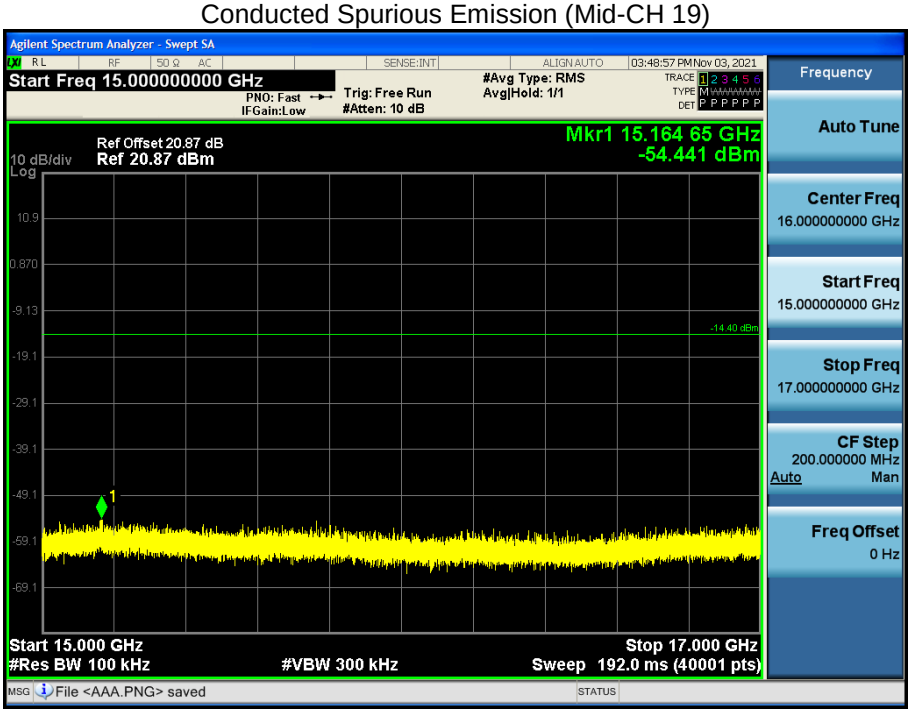
13 GHz ~ 15 GHz

Conducted Spurious Emission (Mid-CH 19)



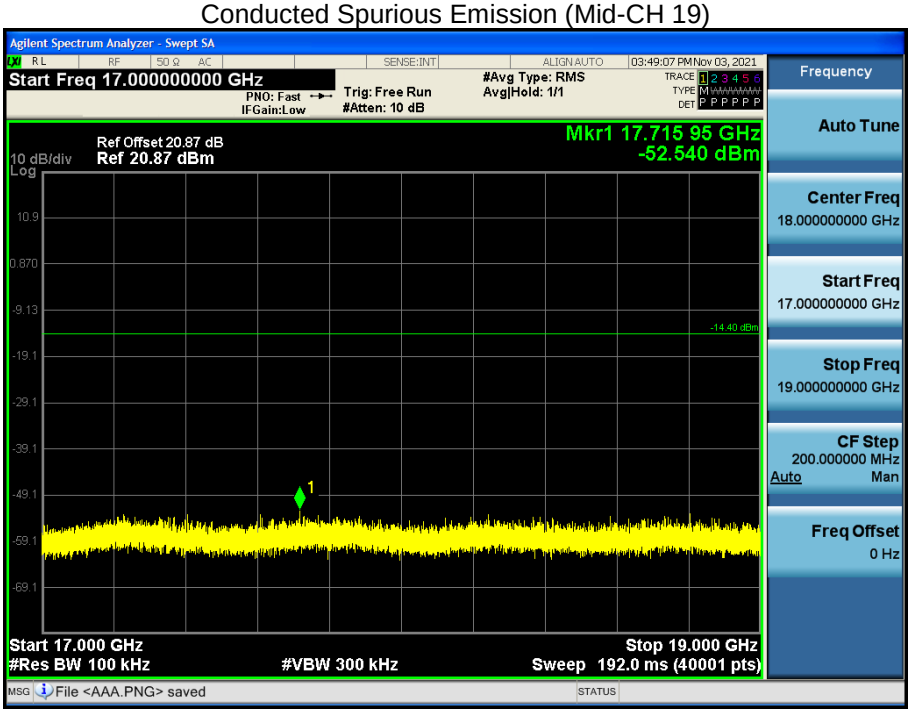
15 GHz ~ 17 GHz

Conducted Spurious Emission (Mid-CH 19)



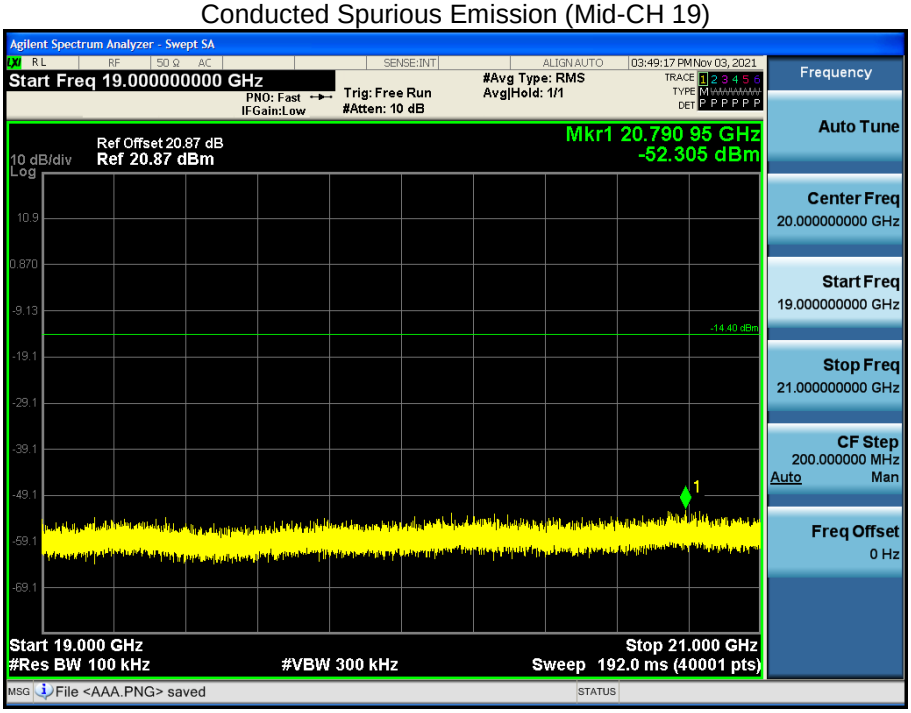
17 GHz ~ 19 GHz

Conducted Spurious Emission (Mid-CH 19)



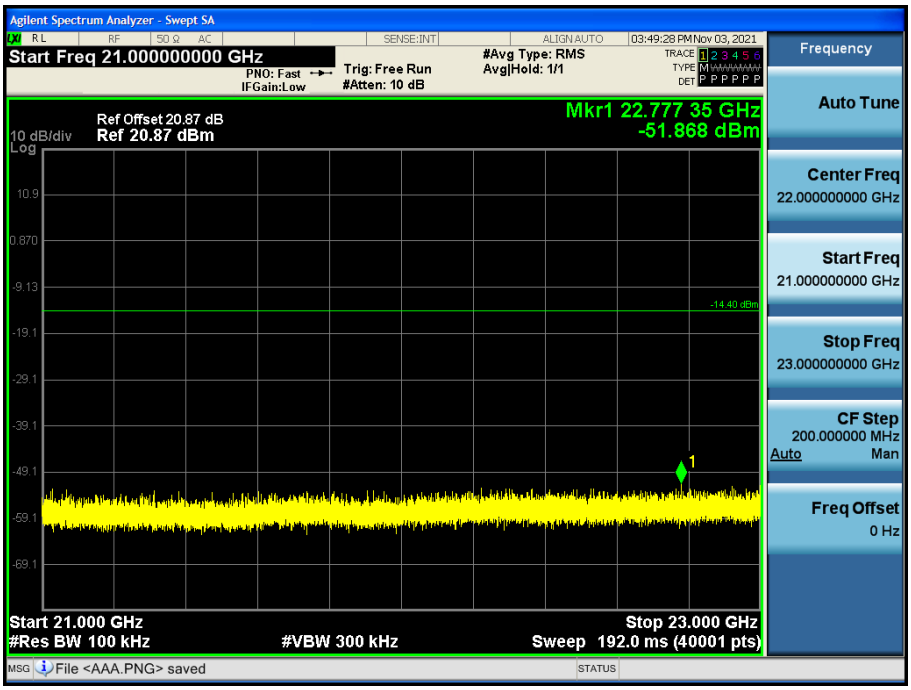
19 GHz ~ 21 GHz

Conducted Spurious Emission (Mid-CH 19)



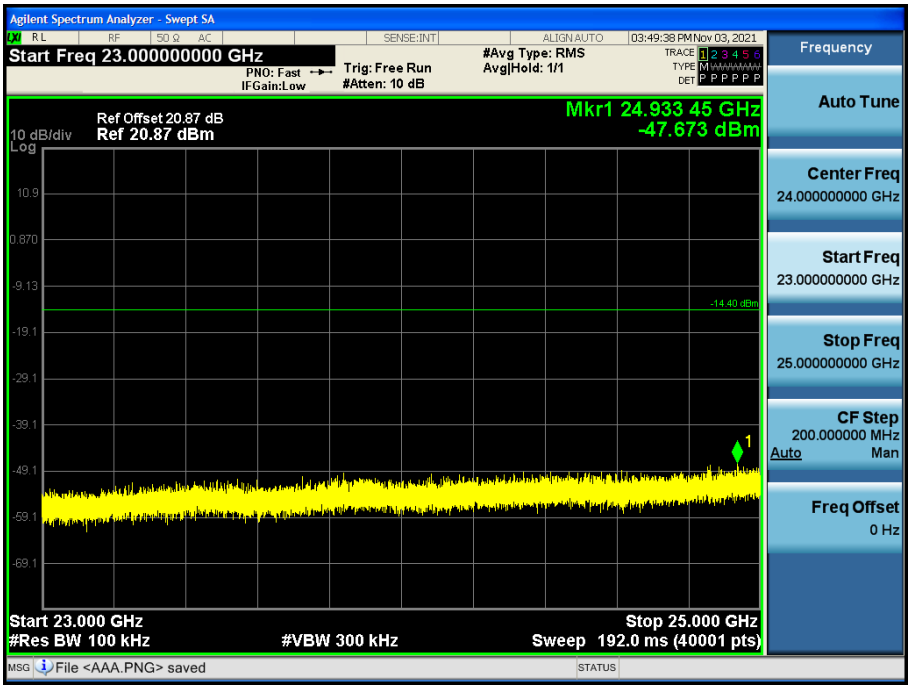
21 GHz ~ 23 GHz

Conducted Spurious Emission (Mid-CH 19)



23 GHz ~ 25 GHz

Conducted Spurious Emission (Mid-CH 19)

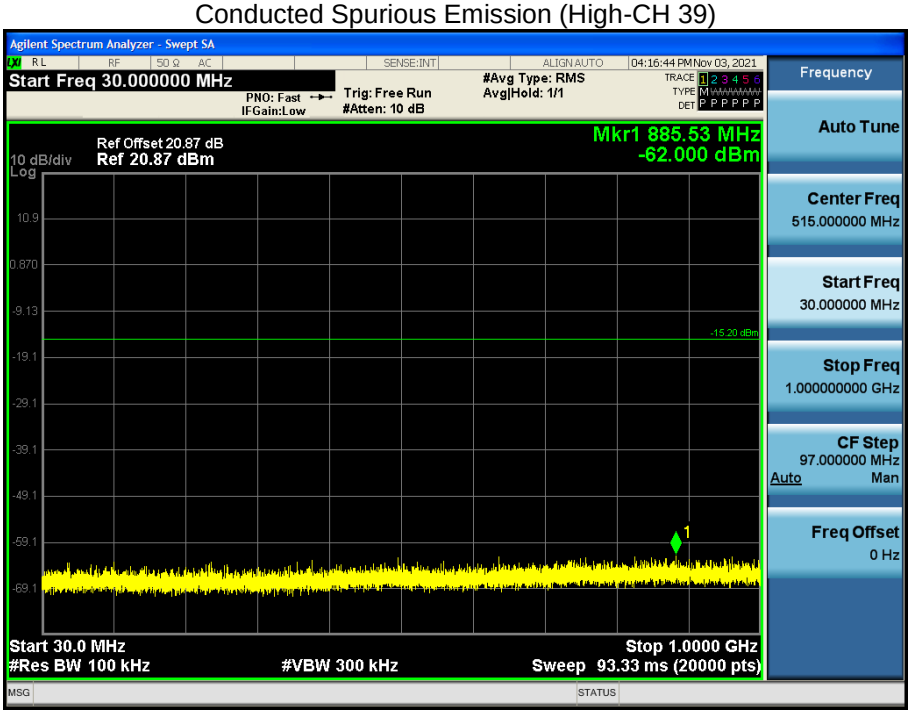


[Ant.2]

▣ 1 MBit/s (37 Byte) Test Plots -Conducted Spurious Emission(High Power)

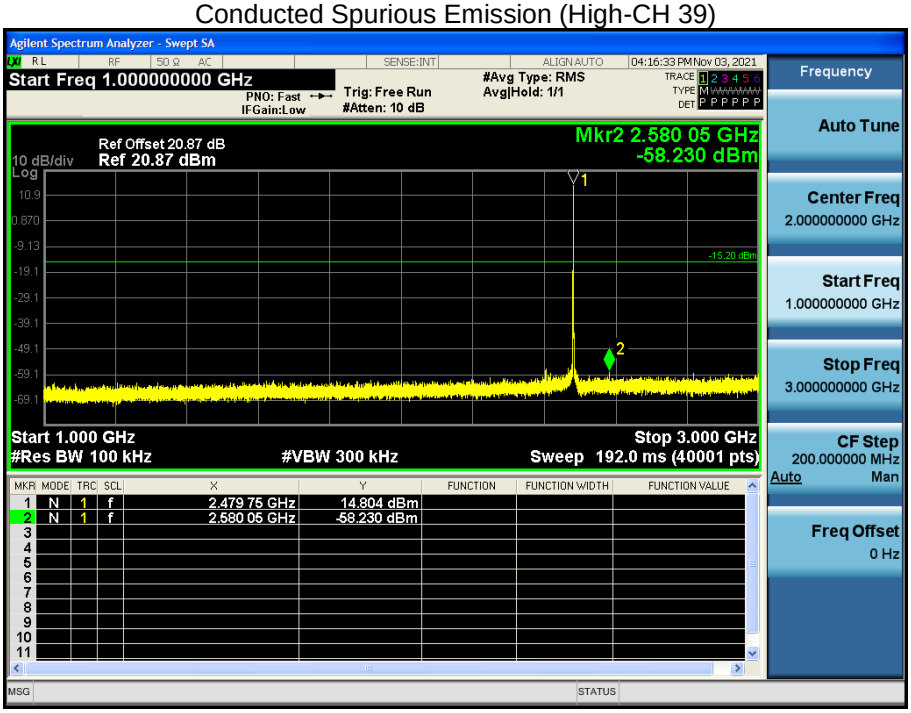
30 MHz ~ 1 GHz

Conducted Spurious Emission (High-CH 39)



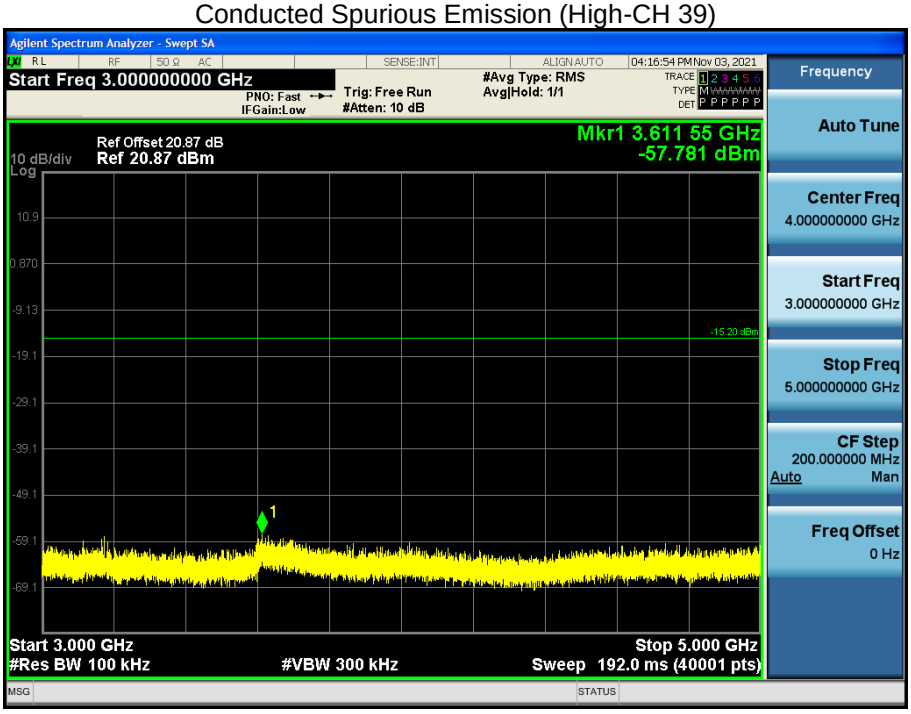
1 GHz ~ 3 GHz

Conducted Spurious Emission (High-CH 39)



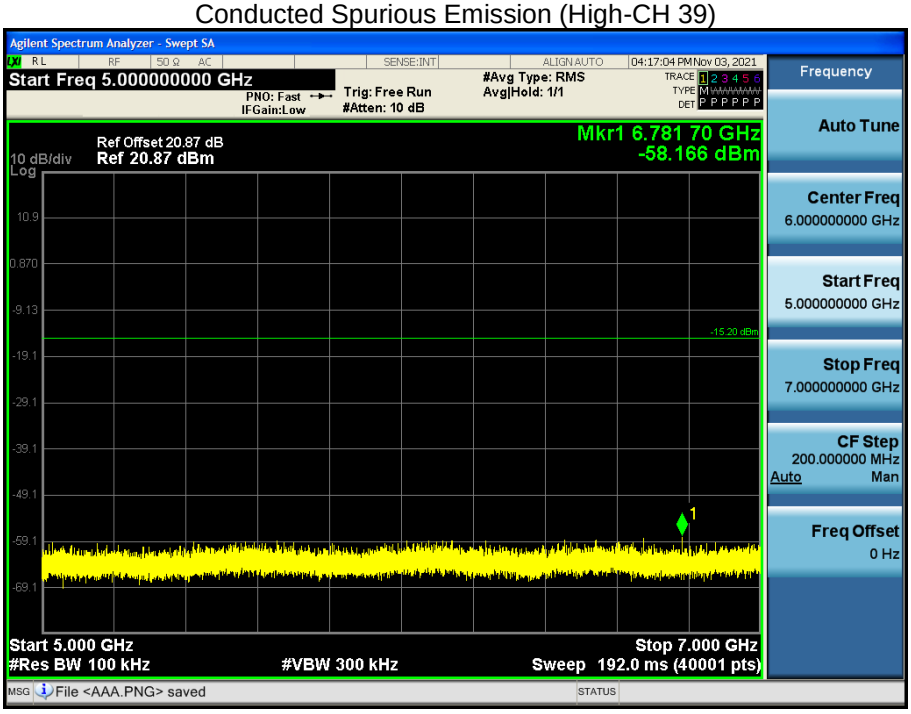
3 GHz ~ 5 GHz

Conducted Spurious Emission (High-CH 39)



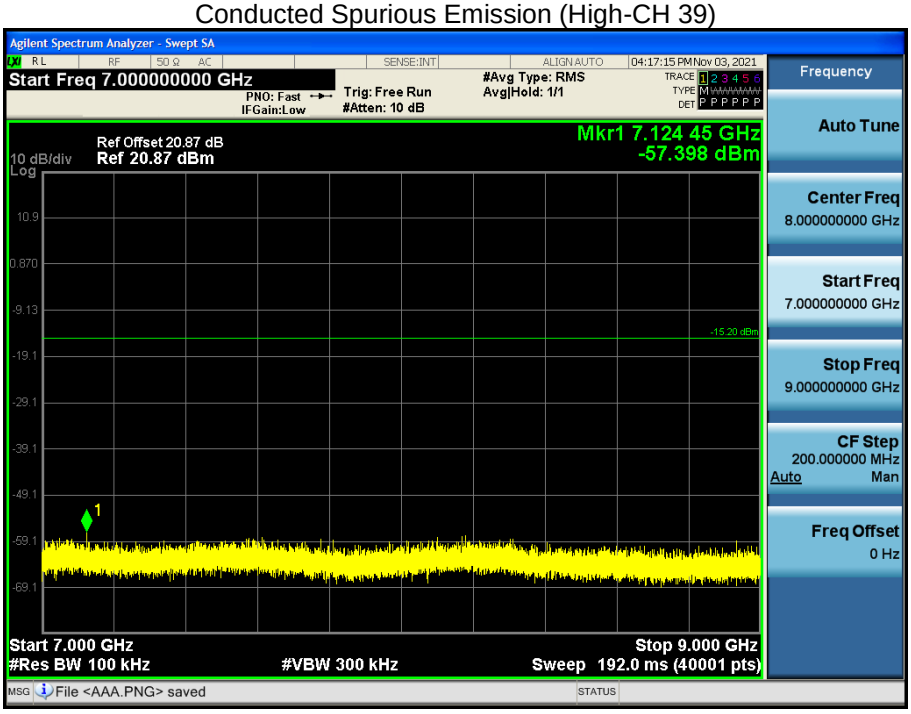
5 GHz ~ 7 GHz

Conducted Spurious Emission (High-CH 39)



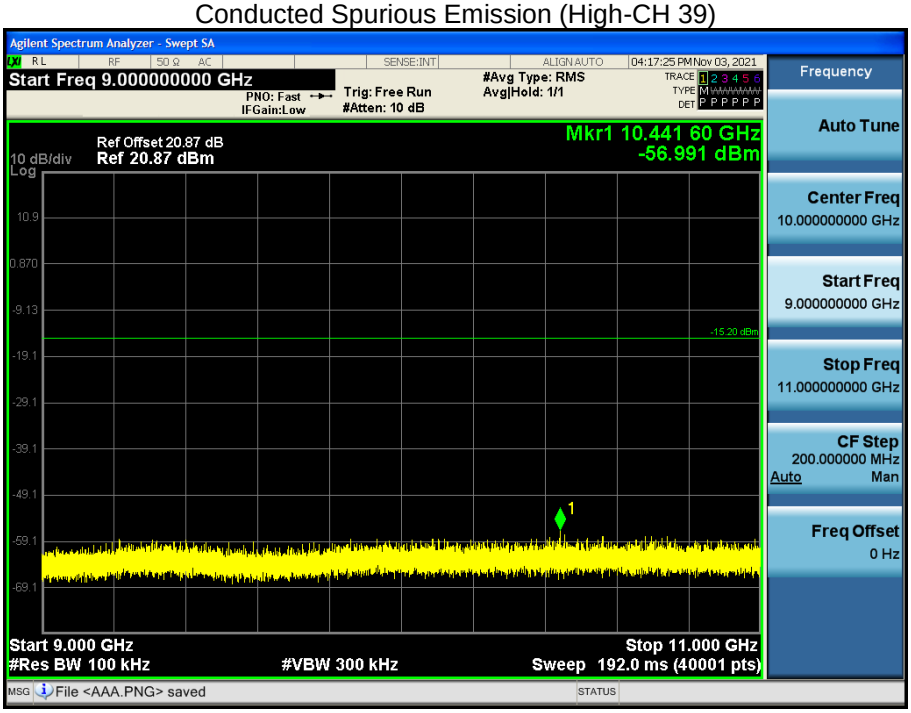
7 GHz ~ 9 GHz

Conducted Spurious Emission (High-CH 39)



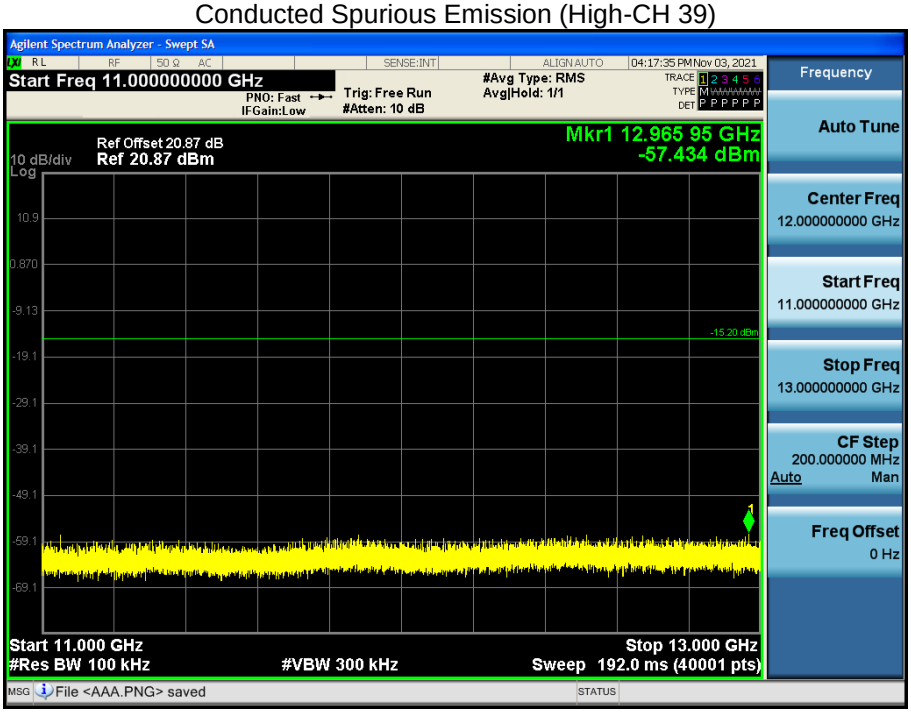
9 GHz ~ 11 GHz

Conducted Spurious Emission (High-CH 39)



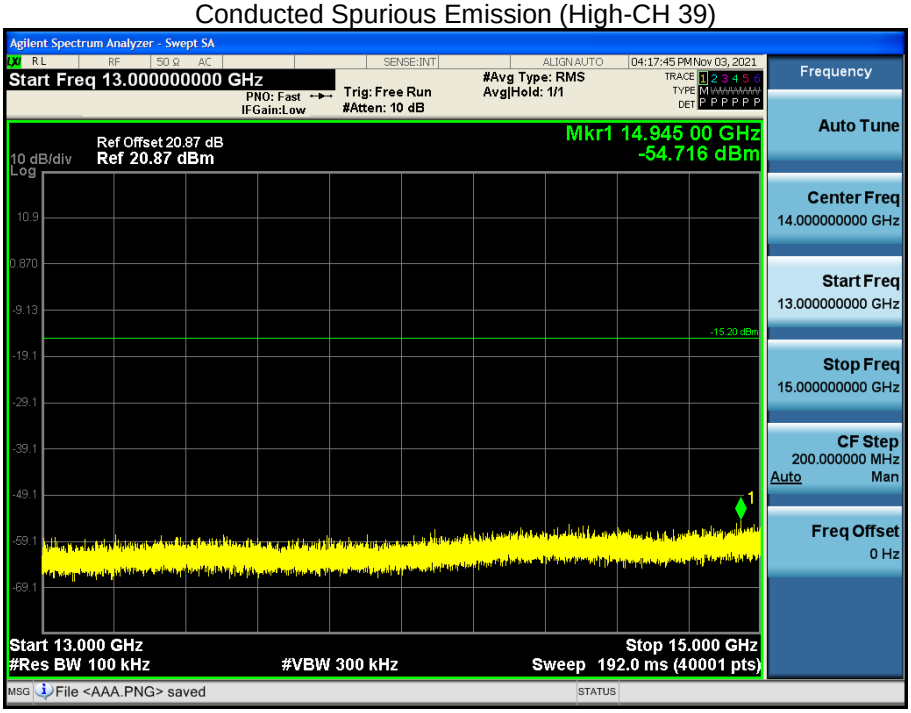
11 GHz ~ 13 GHz

Conducted Spurious Emission (High-CH 39)



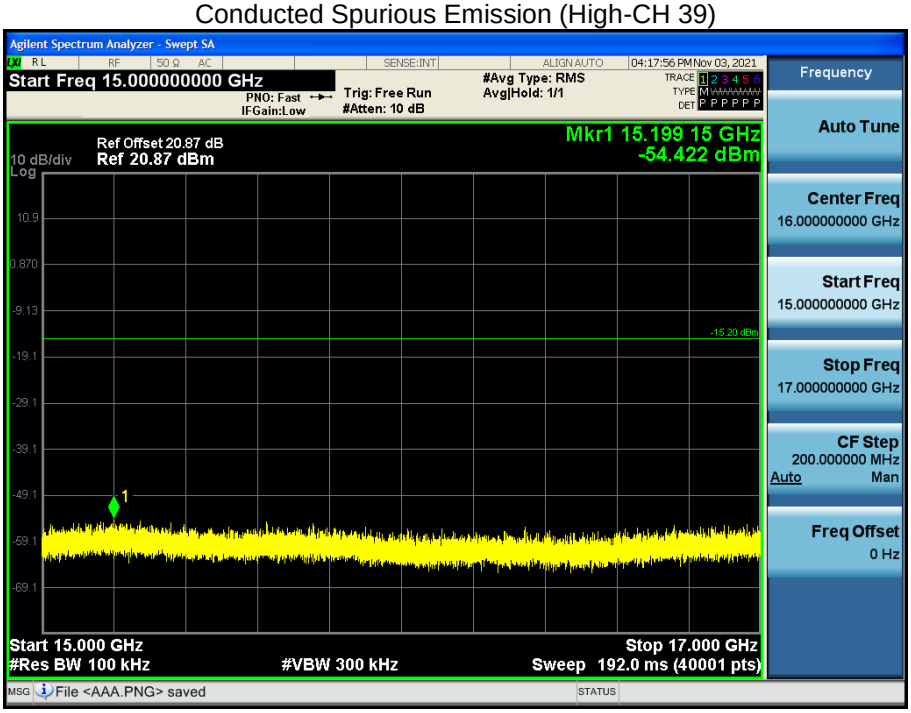
13 GHz ~ 15 GHz

Conducted Spurious Emission (High-CH 39)



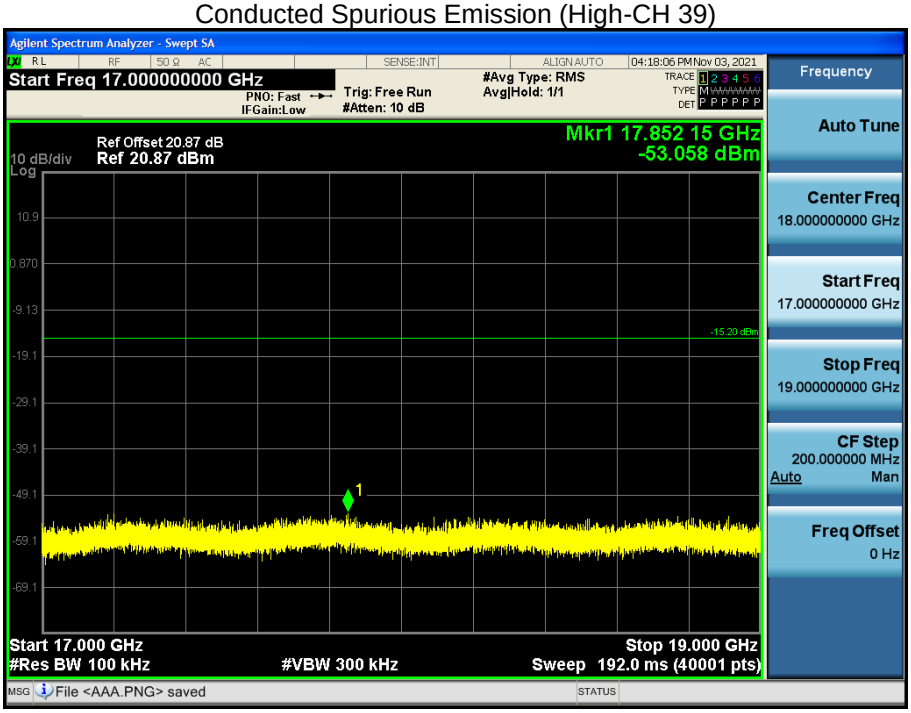
15 GHz ~ 17 GHz

Conducted Spurious Emission (High-CH 39)



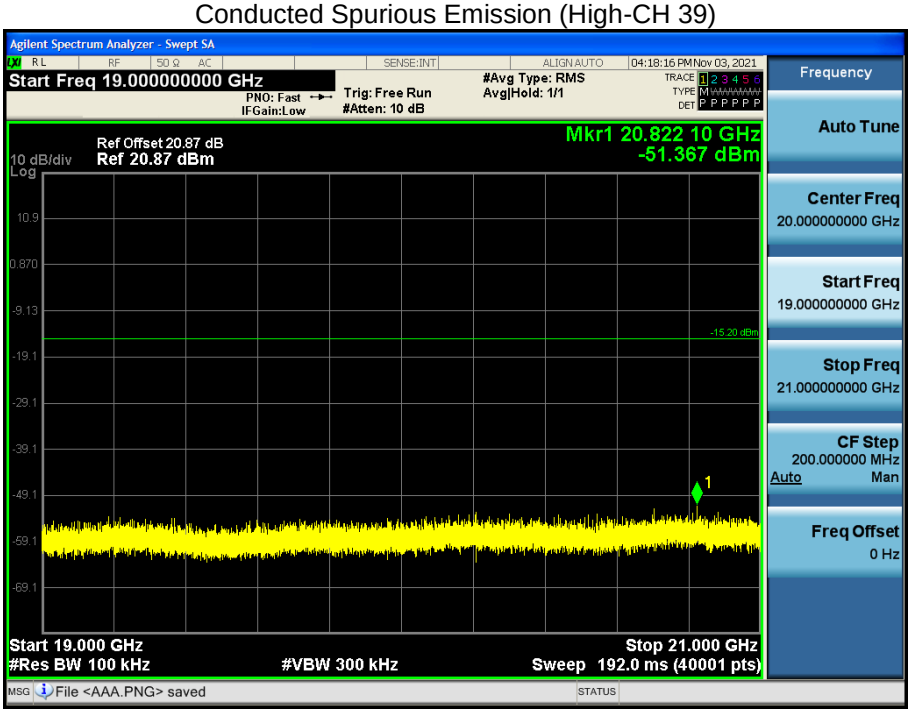
17 GHz ~ 19 GHz

Conducted Spurious Emission (High-CH 39)



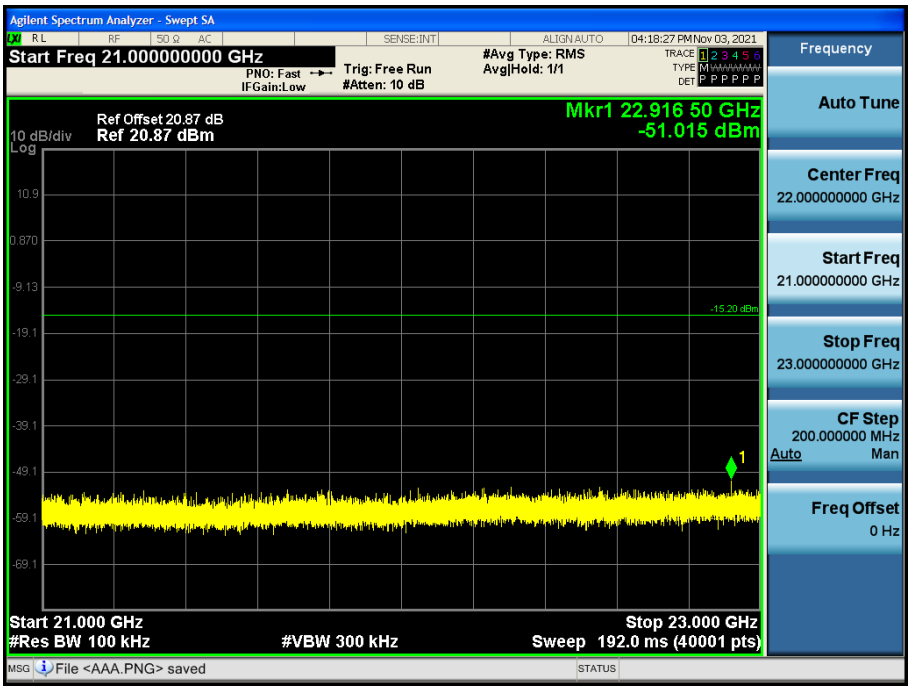
19 GHz ~ 21 GHz

Conducted Spurious Emission (High-CH 39)



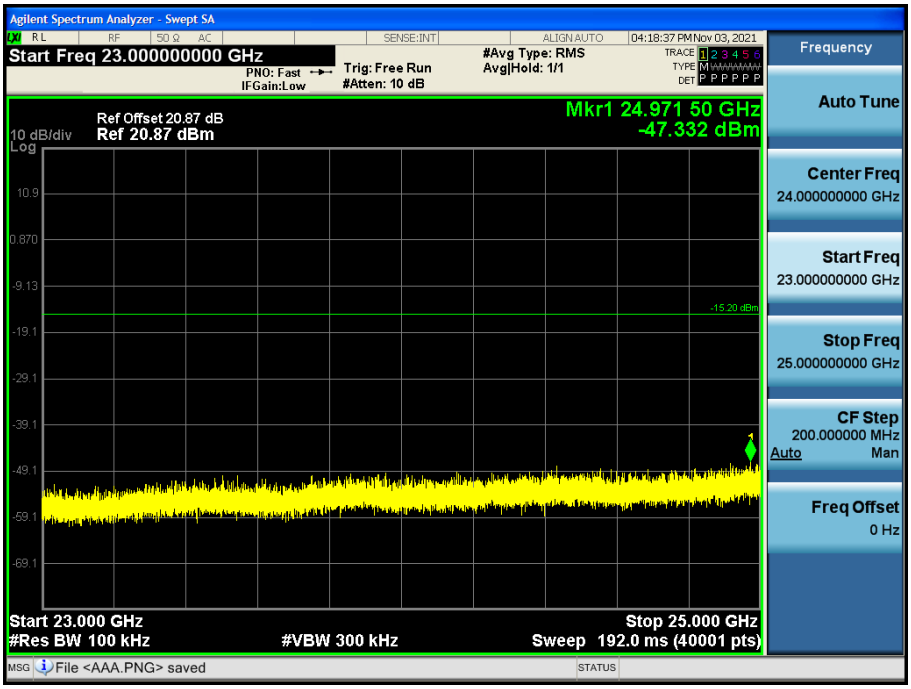
21 GHz ~ 23 GHz

Conducted Spurious Emission (High-CH 39)



23 GHz ~ 25 GHz

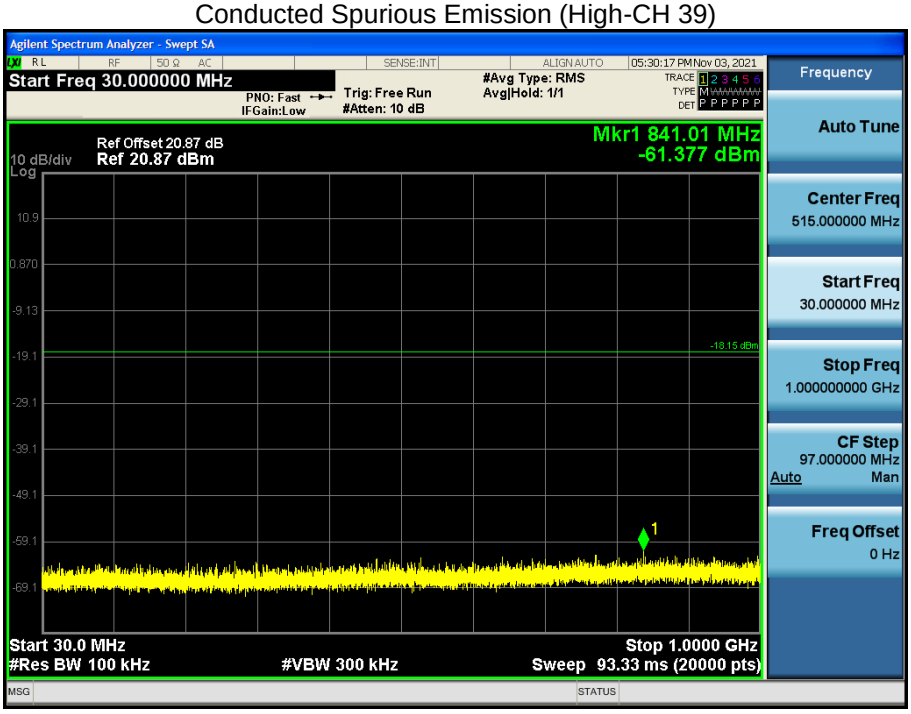
Conducted Spurious Emission (High-CH 39)



▣ 2 MBit/s (37 Byte) Test Plots -Conducted Spurious Emission(High Power)

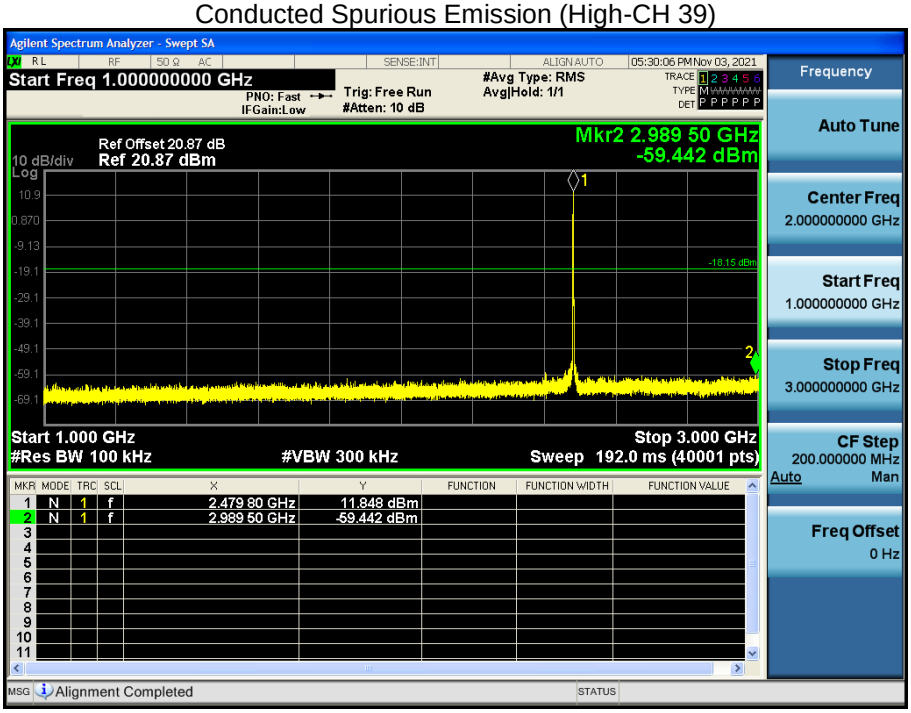
30 MHz ~ 1 GHz

Conducted Spurious Emission (High-CH 39)



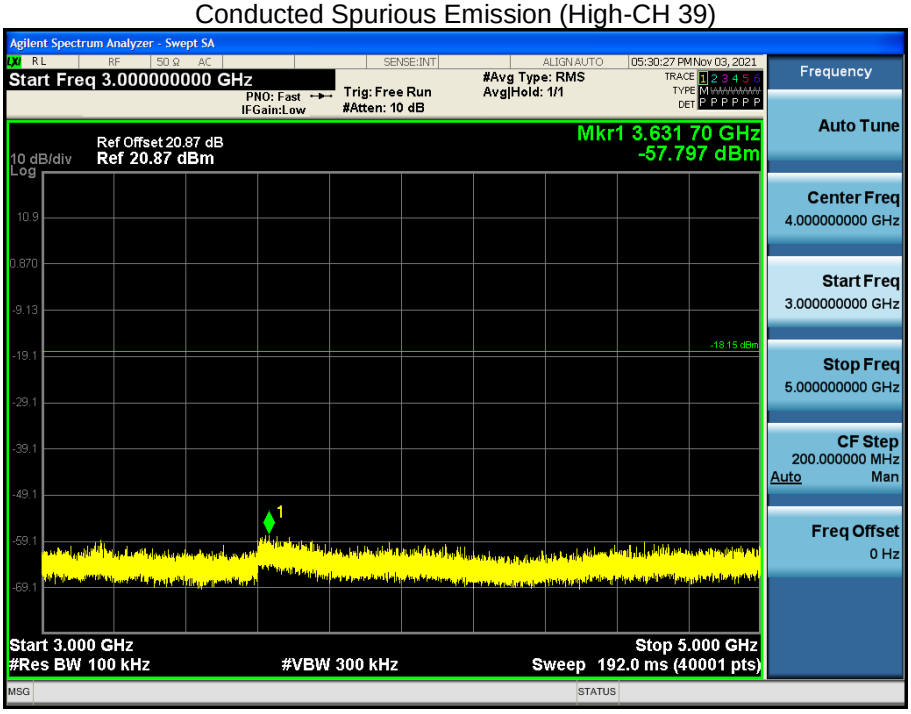
1 GHz ~ 3 GHz

Conducted Spurious Emission (High-CH 39)



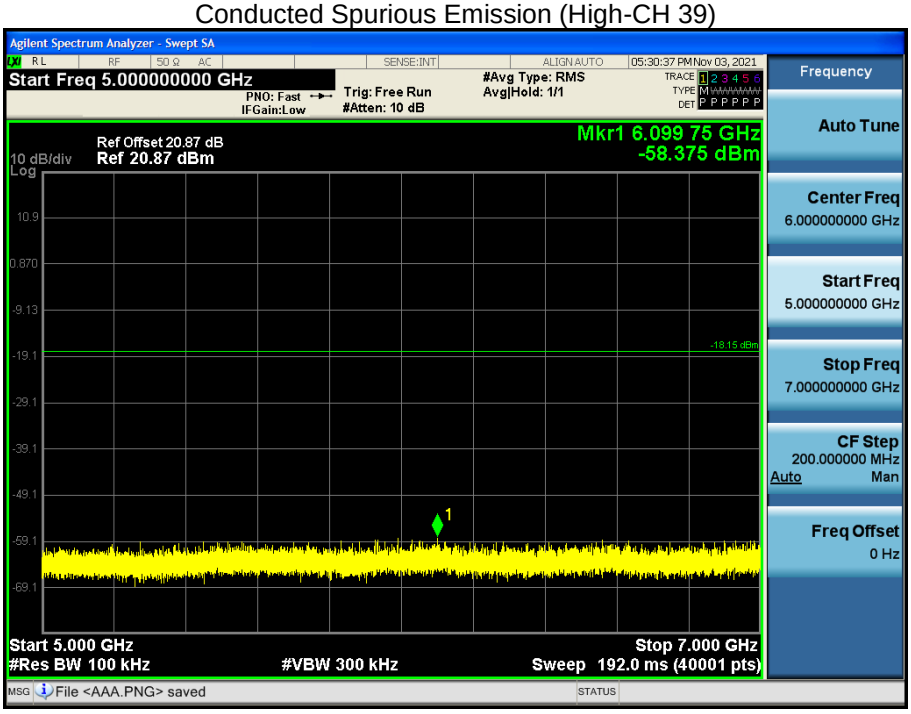
3 GHz ~ 5 GHz

Conducted Spurious Emission (High-CH 39)



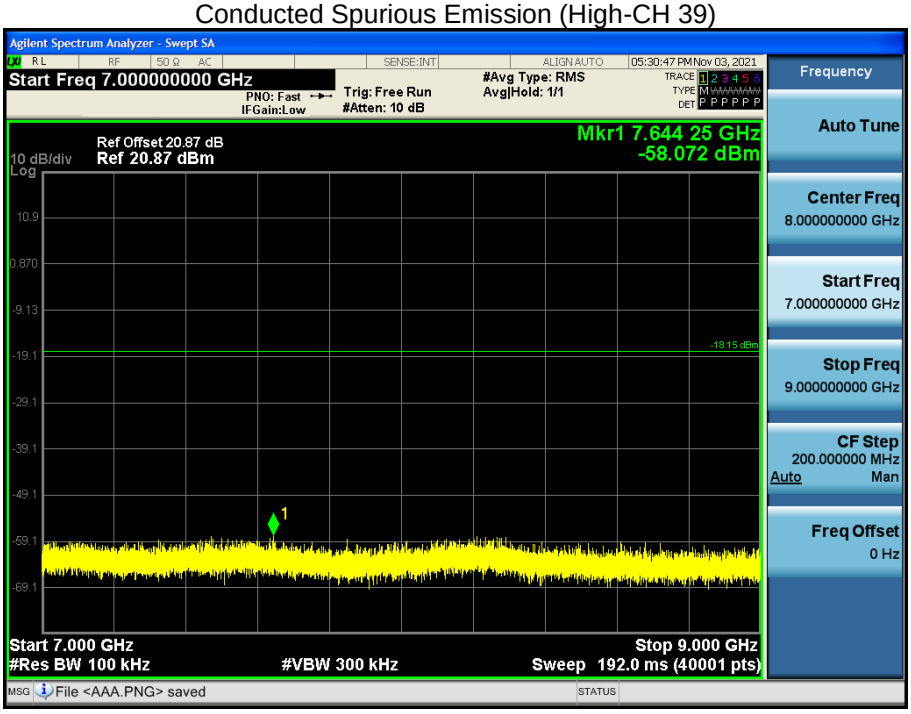
5 GHz ~ 7 GHz

Conducted Spurious Emission (High-CH 39)



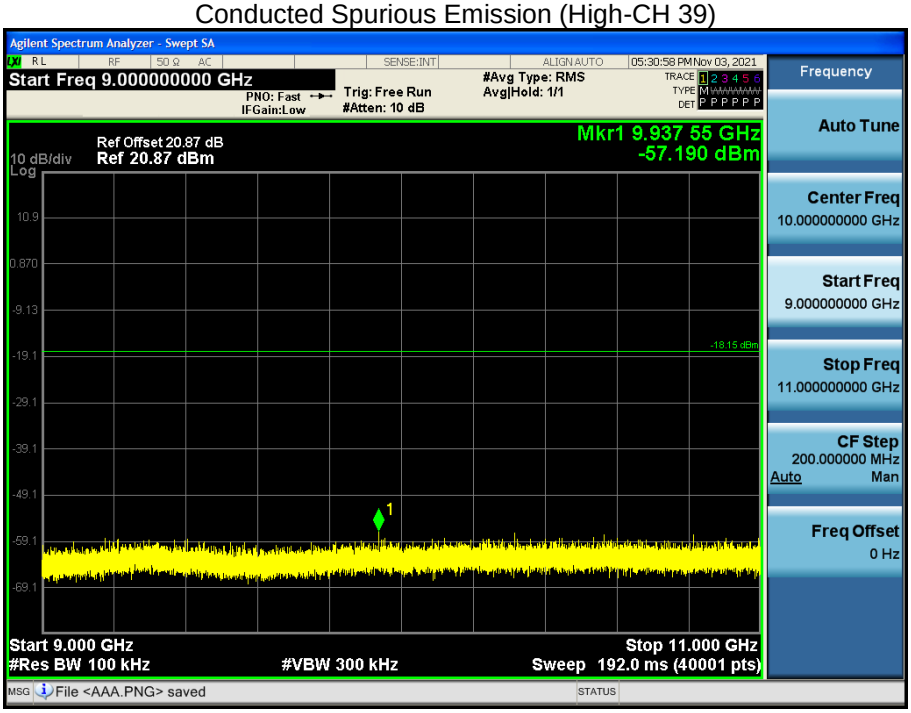
7 GHz ~ 9 GHz

Conducted Spurious Emission (High-CH 39)



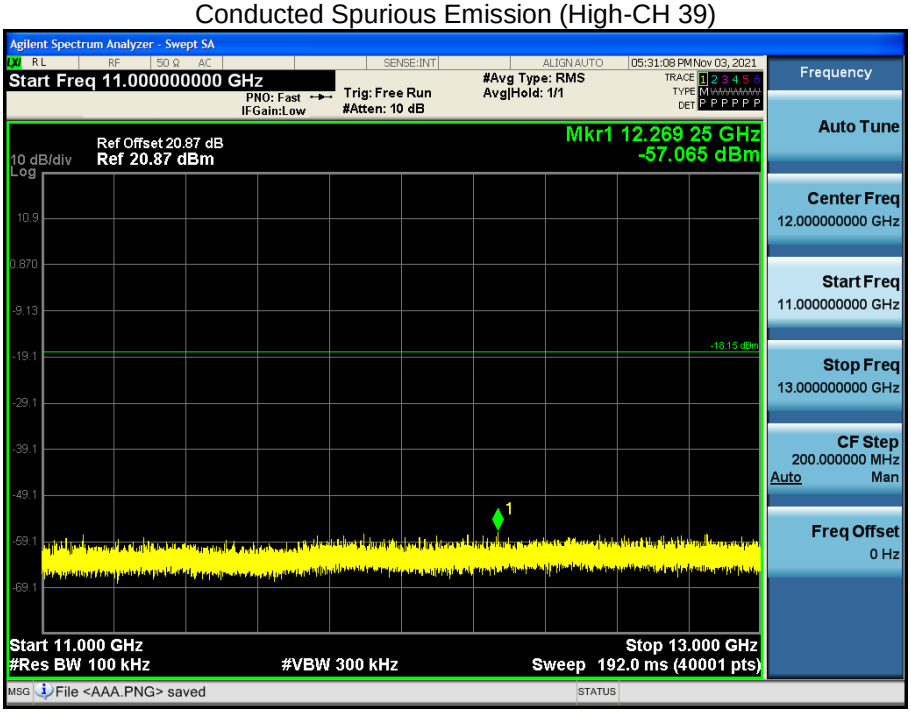
9 GHz ~ 11 GHz

Conducted Spurious Emission (High-CH 39)



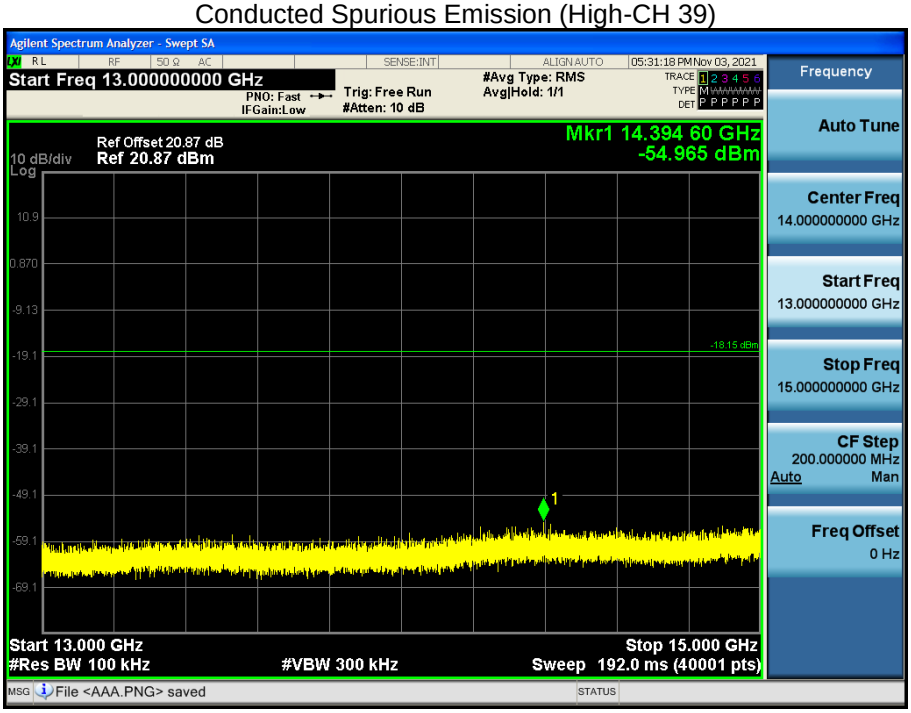
11 GHz ~ 13 GHz

Conducted Spurious Emission (High-CH 39)



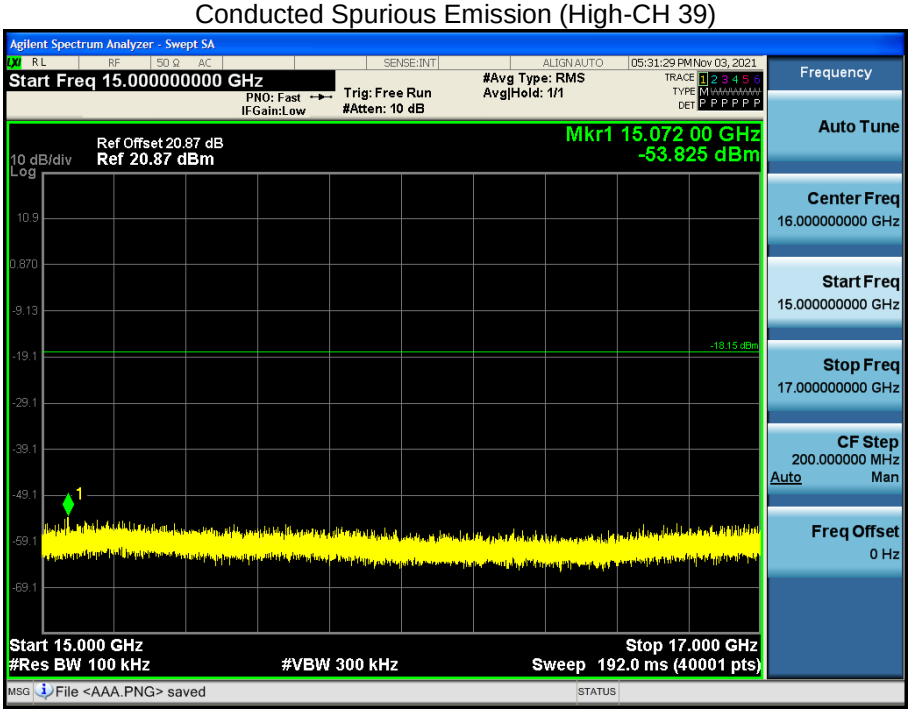
13 GHz ~ 15 GHz

Conducted Spurious Emission (High-CH 39)



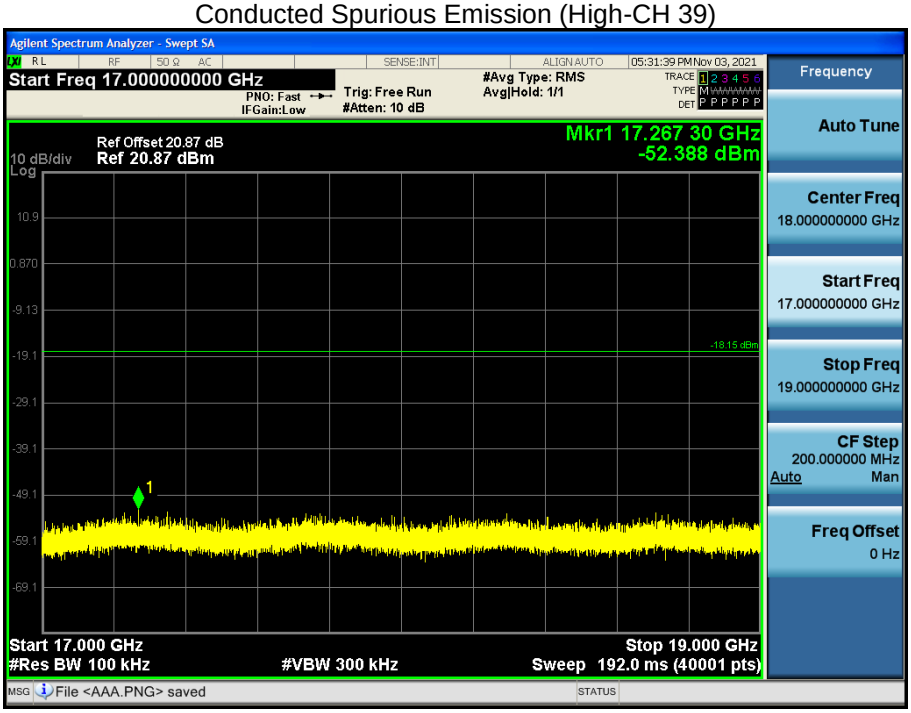
15 GHz ~ 17 GHz

Conducted Spurious Emission (High-CH 39)



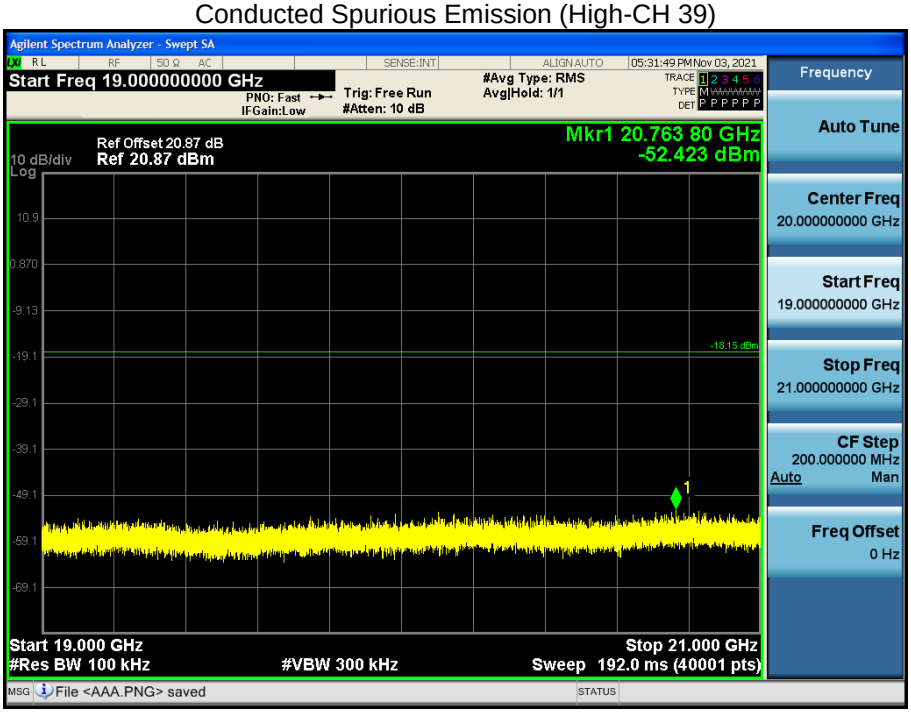
17 GHz ~ 19 GHz

Conducted Spurious Emission (High-CH 39)



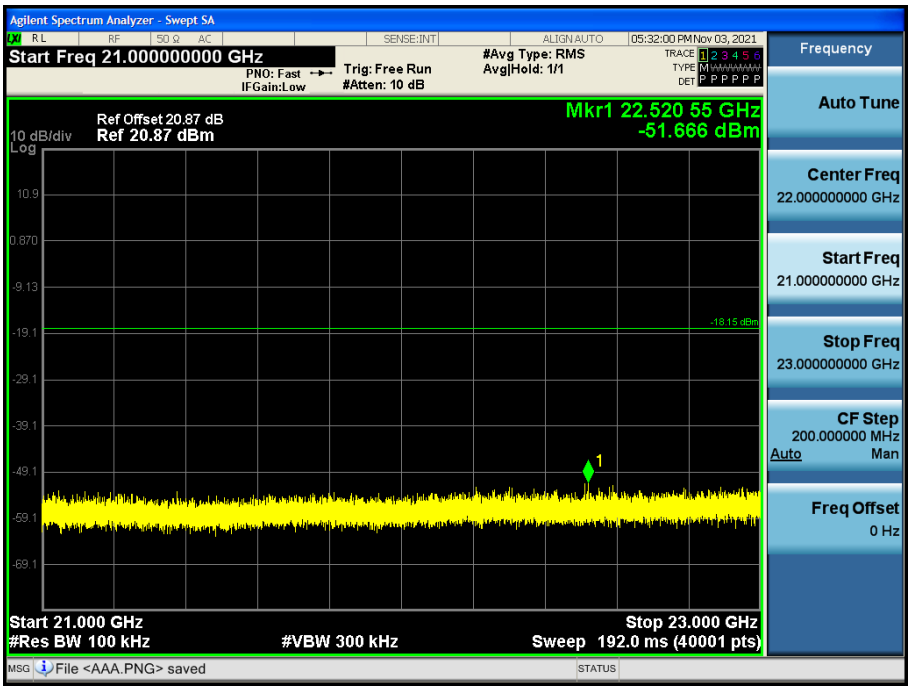
19 GHz ~ 21 GHz

Conducted Spurious Emission (High-CH 39)



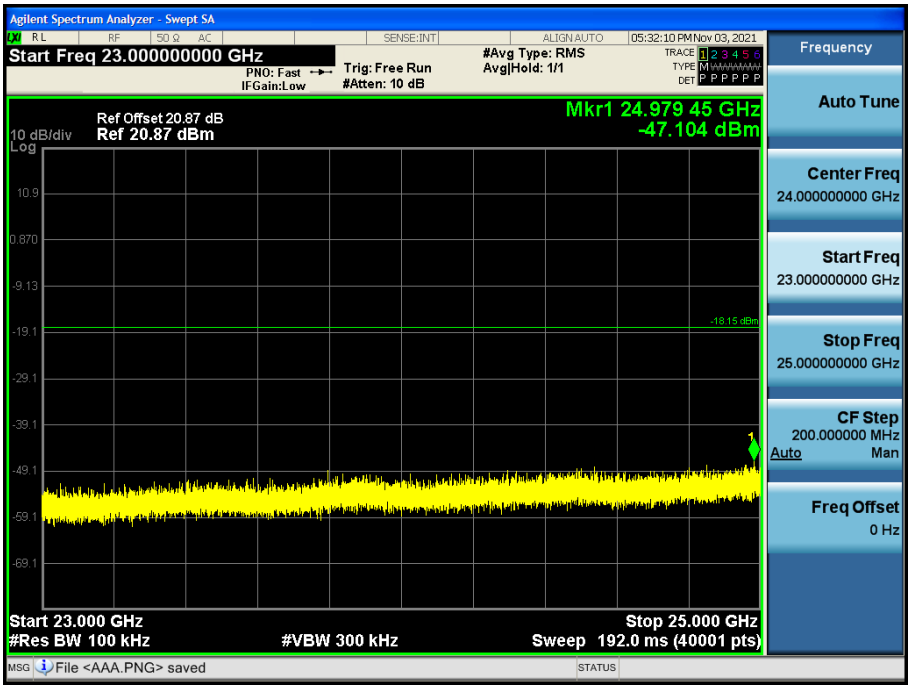
21 GHz ~ 23 GHz

Conducted Spurious Emission (High-CH 39)



23 GHz ~ 25 GHz

Conducted Spurious Emission (High-CH 39)



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
4. Radiated test is performed with hopping off.

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.
2. Radiated test is performed with hopping off.

Frequency Range : Above 1 GHz

[Ant.1]

Mode : 1 MBit/s (37 Byte)

Operation Mode: CH Low

Frequency [MHz]	Measured Value [dBµV]	Duty Cycle Factor [dB]	A.F + C.L - A.G + D.F [dB/m]	Pol. [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4804	41.44	0.00	5.14	V	46.58	73.98	27.40	PK
4804	29.07	2.06	5.14	V	36.27	53.98	17.71	AV
7206	37.89	0.00	12.89	V	50.78	73.98	23.20	PK
7206	25.94	2.06	12.89	V	40.89	53.98	13.09	AV
4804	41.69	0.00	5.14	H	46.83	73.98	27.15	PK
4804	29.19	2.06	5.14	H	36.39	53.98	17.59	AV
7206	38.03	0.00	12.89	H	50.92	73.98	23.06	PK
7206	26.05	2.06	12.89	H	41.00	53.98	12.98	AV

Operation Mode: CH Mid

Frequency [MHz]	Measured Value [dBµV]	Duty Cycle Factor [dB]	A.F + C.L - A.G + D.F [dB/m]	Pol. [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4880	40.95	0.00	5.44	V	46.39	73.98	27.59	PK
4880	28.96	2.06	5.44	V	36.46	53.98	17.52	AV
7320	38.42	0.00	12.98	V	51.40	73.98	22.58	PK
7320	26.03	2.06	12.98	V	41.07	53.98	12.91	AV
4880	41.08	0.00	5.44	H	46.52	73.98	27.46	PK
4880	29.01	2.06	5.44	H	36.51	53.98	17.47	AV
7320	38.63	0.00	12.98	H	51.61	73.98	22.37	PK
7320	26.09	2.06	12.98	H	41.13	53.98	12.85	AV

Operation Mode: CH High

Frequency [MHz]	Measured Value [dBµV]	Duty Cycle Factor [dB]	A.F + C.L - A.G + D.F [dB/m]	Pol. [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4960	41.65	0.00	6.25	V	47.90	73.98	26.08	PK
4960	28.97	2.06	6.25	V	37.28	53.98	16.70	AV
7440	39.06	0.00	12.61	V	51.67	73.98	22.31	PK
7440	26.27	2.06	12.61	V	40.94	53.98	13.04	AV
4960	41.73	0.00	6.25	H	47.98	73.98	26.00	PK
4960	29.11	2.06	6.25	H	37.42	53.98	16.56	AV
7440	39.14	0.00	12.61	H	51.75	73.98	22.23	PK
7440	26.31	2.06	12.61	H	40.98	53.98	13.00	AV

Mode : 2 MBit/s (37 Byte)_Normal

Operation Mode: CH Low

Frequency [MHz]	Measured Value [dBµV]	Duty Cycle Factor [dB]	A.F + C.L - A.G + D.F [dB/m]	Pol. [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4804	41.39	0.00	5.14	V	46.53	73.98	27.45	PK
4804	29.05	4.86	5.14	V	39.05	53.98	14.93	AV
7206	37.97	0.00	12.89	V	50.86	73.98	23.12	PK
7206	25.87	4.86	12.89	V	43.62	53.98	10.36	AV
4804	41.56	0.00	5.14	H	46.70	73.98	27.28	PK
4804	29.15	4.86	5.14	H	39.15	53.98	14.83	AV
7206	38.16	0.00	12.89	H	51.05	73.98	22.93	PK
7206	25.95	4.86	12.89	H	43.70	53.98	10.28	AV

Operation Mode: CH Mid

Frequency [MHz]	Measured Value [dBµV]	Duty Cycle Factor [dB]	A.F + C.L - A.G + D.F [dB/m]	Pol. [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4880	40.75	0.00	5.44	V	46.19	73.98	27.79	PK
4880	28.62	4.86	5.44	V	38.92	53.98	15.06	AV
7320	38.67	0.00	12.98	V	51.65	73.98	22.33	PK
7320	25.89	4.86	12.98	V	43.73	53.98	10.25	AV
4880	41.01	0.00	5.44	H	46.45	73.98	27.53	PK
4880	28.74	4.86	5.44	H	39.04	53.98	14.94	AV
7320	**38.70**	**0.00**	**12.98**	**H**	**51.68**	**73.98**	**22.30**	**PK**
7320	**26.06**	**4.86**	**12.98**	**H**	**43.90**	**53.98**	**10.08**	**AV**

Operation Mode: CH High

Frequency [MHz]	Measured Value [dBµV]	Duty Cycle Factor [dB]	A.F + C.L - A.G + D.F [dB/m]	Pol. [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4960	41.42	0.00	6.25	V	47.67	73.98	26.31	PK
4960	29.05	4.86	6.25	V	40.16	53.98	13.82	AV
7440	38.64	0.00	12.61	V	51.25	73.98	22.73	PK
7440	26.24	4.86	12.61	V	43.71	53.98	10.27	AV
4960	41.55	0.00	6.25	H	47.80	73.98	26.18	PK
4960	29.17	4.86	6.25	H	40.28	53.98	13.70	AV
7440	38.97	0.00	12.61	H	51.58	73.98	22.40	PK
7440	26.31	4.86	12.61	H	43.78	53.98	10.20	AV

[Ant.2]

Mode : 1 MBit/s (37 Byte)

Operation Mode: CH Low

Frequency [MHz]	Measured Value [dBµV]	Duty Cycle Factor [dB]	A.F + C.L - A.G + D.F [dB/m]	Pol. [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4804	41.11	0.00	5.14	V	46.25	73.98	27.73	PK
4804	29.09	2.06	5.14	V	36.29	53.98	17.69	AV
7206	38.56	0.00	12.89	V	51.45	73.98	22.53	PK
7206	25.95	2.06	12.89	V	40.90	53.98	13.08	AV
4804	41.52	0.00	5.14	H	46.66	73.98	27.32	PK
4804	29.13	2.06	5.14	H	36.33	53.98	17.65	AV
7206	38.78	0.00	12.89	H	51.67	73.98	22.31	PK
7206	26.02	2.06	12.89	H	40.97	53.98	13.01	AV

Operation Mode: CH Mid

Frequency [MHz]	Measured Value [dBµV]	Duty Cycle Factor [dB]	A.F + C.L - A.G + D.F [dB/m]	Pol. [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4880	40.74	0.00	5.44	V	46.18	73.98	27.80	PK
4880	28.61	2.06	5.44	V	36.11	53.98	17.87	AV
7320	38.43	0.00	12.98	V	51.41	73.98	22.57	PK
7320	25.91	2.06	12.98	V	40.95	53.98	13.03	AV
4880	40.91	0.00	5.44	H	46.35	73.98	27.63	PK
4880	28.70	2.06	5.44	H	36.20	53.98	17.78	AV
7320	38.58	0.00	12.98	H	51.56	73.98	22.42	PK
7320	25.98	2.06	12.98	H	41.02	53.98	12.96	AV

Operation Mode: CH High

Frequency [MHz]	Measured Value [dBµV]	Duty Cycle Factor [dB]	A.F + C.L - A.G + D.F [dB/m]	Pol. [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4960	41.15	0.00	6.25	V	47.40	73.98	26.58	PK
4960	29.02	2.06	6.25	V	37.33	53.98	16.65	AV
7440	38.20	0.00	12.61	V	50.81	73.98	23.17	PK
7440	26.21	2.06	12.61	V	40.88	53.98	13.10	AV
4960	42.11	0.00	6.25	H	48.36	73.98	25.62	PK
4960	29.14	2.06	6.25	H	37.45	53.98	16.53	AV
7440	38.49	0.00	12.61	H	51.10	73.98	22.88	PK
7440	26.30	2.06	12.61	H	40.97	53.98	13.01	AV

Mode : 2 MBit/s (37 Byte)_ High Power

Operation Mode: CH Low

Frequency [MHz]	Measured Value [dBµV]	Duty Cycle Factor [dB]	A.F + C.L - A.G + D.F [dB/m]	Pol. [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4804	41.62	0.00	5.14	V	46.76	73.98	27.22	PK
4804	29.02	4.86	5.14	V	39.02	53.98	14.96	AV
7206	37.86	0.00	12.89	V	50.75	73.98	23.23	PK
7206	25.97	4.86	12.89	V	43.72	53.98	10.26	AV
4804	41.60	0.00	5.14	H	46.74	73.98	27.24	PK
4804	29.07	4.86	5.14	H	39.07	53.98	14.91	AV
7206	38.35	0.00	12.89	H	51.24	73.98	22.74	PK
7206	26.04	4.86	12.89	H	43.79	53.98	10.19	AV

Operation Mode: CH Mid

Frequency [MHz]	Measured Value [dBµV]	Duty Cycle Factor [dB]	A.F + C.L - A.G + D.F [dB/m]	Pol. [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4880	40.84	0.00	5.44	V	46.28	73.98	27.70	PK
4880	28.59	4.86	5.44	V	38.89	53.98	15.09	AV
7320	38.28	0.00	12.98	V	51.26	73.98	22.72	PK
7320	25.87	4.86	12.98	V	43.71	53.98	10.27	AV
4880	41.00	0.00	5.44	H	46.44	73.98	27.54	PK
4880	28.67	4.86	5.44	H	38.97	53.98	15.01	AV
7320	**38.49**	**0.00**	**12.98**	**H**	**51.47**	**73.98**	**22.51**	**PK**
7320	**25.97**	**4.86**	**12.98**	**H**	**43.81**	**53.98**	**10.17**	**AV**

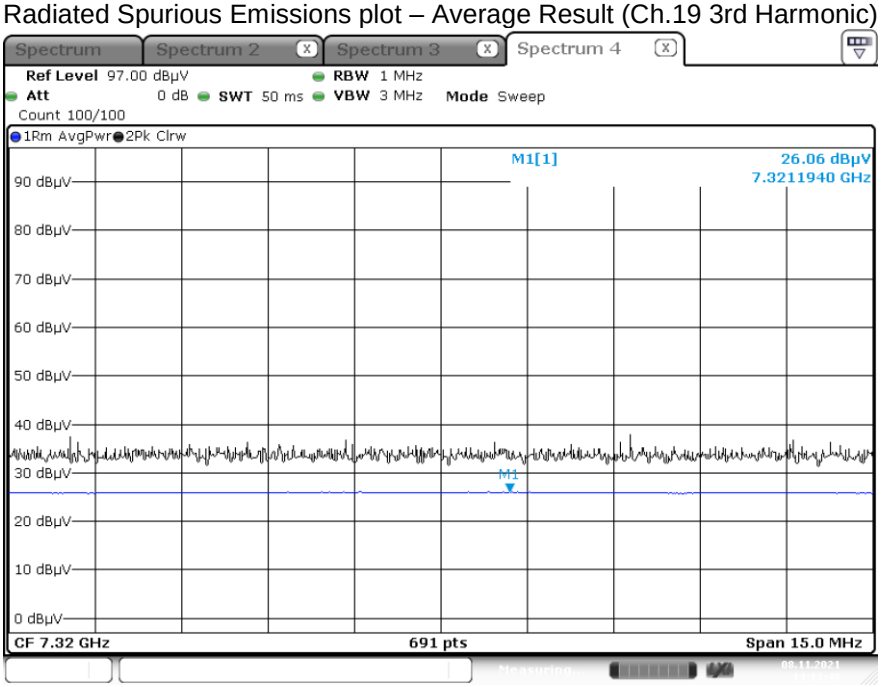
Operation Mode: CH High

Frequency [MHz]	Measured Value [dBµV]	Duty Cycle Factor [dB]	A.F + C.L - A.G + D.F [dB/m]	Pol. [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4960	41.49	0.00	6.25	V	47.74	73.98	26.24	PK
4960	29.11	4.86	6.25	V	40.22	53.98	13.76	AV
7440	38.44	0.00	12.61	V	51.05	73.98	22.93	PK
7440	26.24	4.86	12.61	V	43.71	53.98	10.27	AV
4960	41.53	0.00	6.25	H	47.78	73.98	26.20	PK
4960	29.15	4.86	6.25	H	40.26	53.98	13.72	AV
7440	39.00	0.00	12.61	H	51.61	73.98	22.37	PK
7440	26.28	4.86	12.61	H	43.75	53.98	10.23	AV

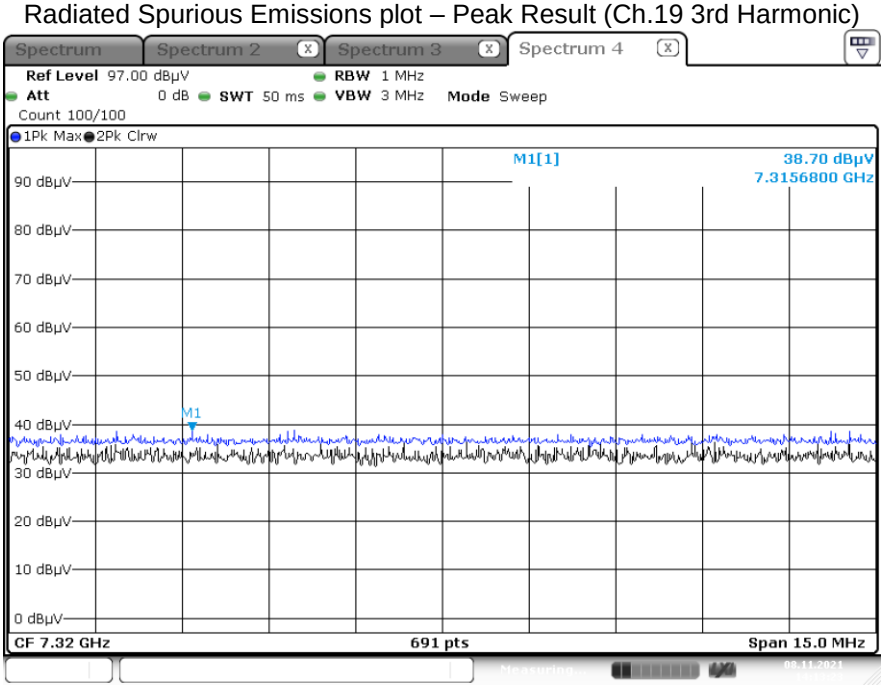
[Ant.1]

▣ 2 MBit/s 37 Byte Test Plots (Worst case : Y-H)

Radiated Spurious Emissions plot – Average Result (Ch.19 3rd Harmonic)



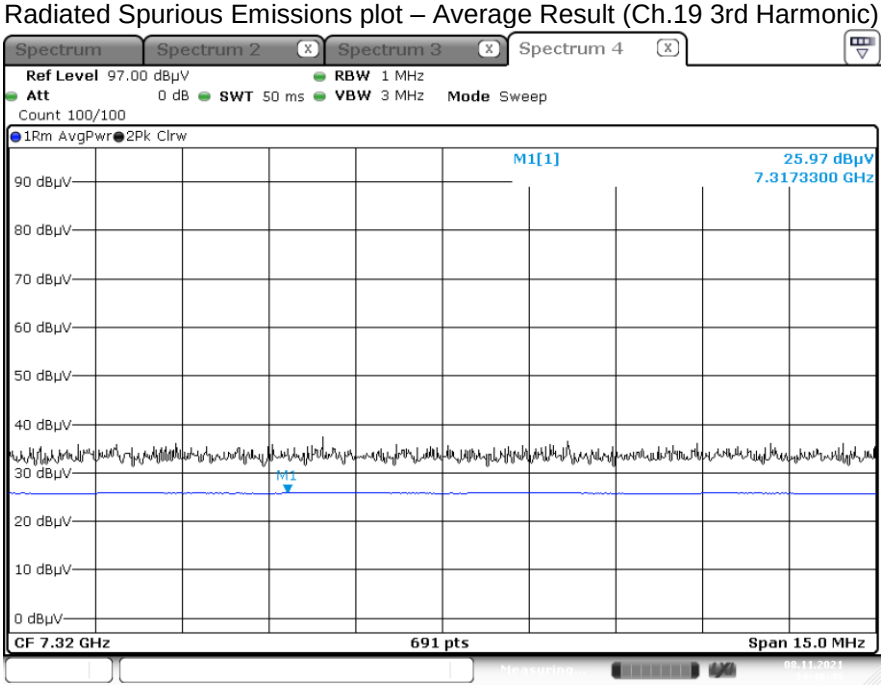
Radiated Spurious Emissions plot – Peak Result (Ch.19 3rd Harmonic)



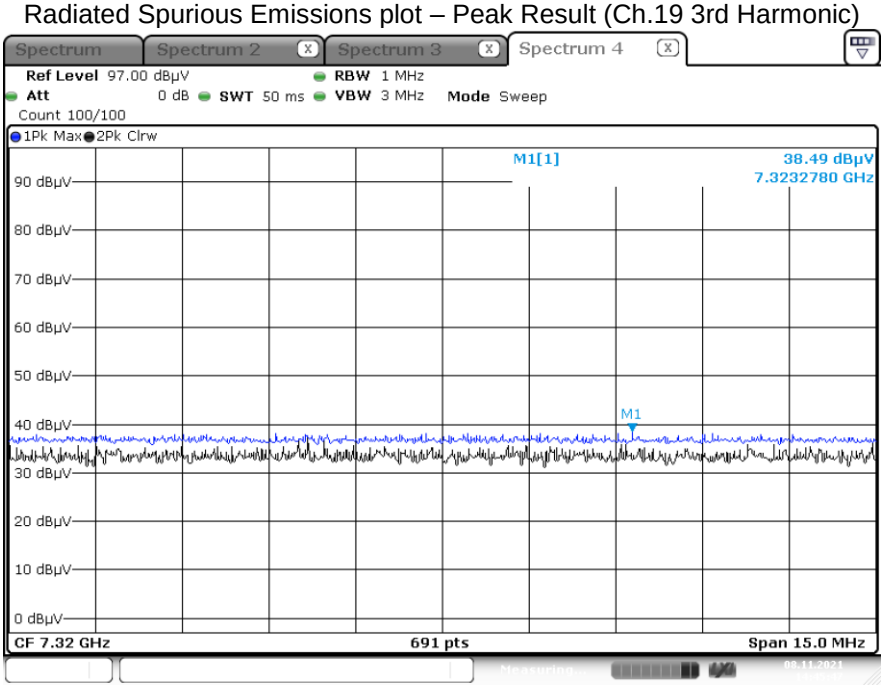
[Ant.2]

▣ 1 MBit/s 37 Byte Test Plots (Worst case : Y-H)

Radiated Spurious Emissions plot – Average Result (Ch.19 3rd Harmonic)



Radiated Spurious Emissions plot – Peak Result (Ch.19 3rd Harmonic)



Note:

Plot of worst case are only reported.

9.7 RADIATED RESTRICTED BAND EDGES

[Ant.1]

Mode : 1 MBit/s (37 Byte)

Operating Frequency 2402 MHz, 2480 MHz

Channel No. 0 CH, 39 CH

Frequency [MHz]	Measured Value [dBµV]	Duty Cycle Factor [dB]	A.F+C.L+ATT -A.G+D.F [dB/m]	Ant. Pol. [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
2390.0	49.22	0.00	2.99	H	52.21	73.98	21.77	PK
2390.0	37.25	2.06	2.99	H	42.30	53.98	11.68	AV
2390.0	48.88	0.00	2.99	V	51.87	73.98	22.11	PK
2390.0	37.08	2.06	2.99	V	42.13	53.98	11.85	AV
2483.5	54.97	0.00	4.20	H	59.17	73.98	14.81	PK
2483.5	38.41	2.06	4.20	H	44.67	53.98	9.31	AV
2483.5	54.36	0.00	4.20	V	58.56	73.98	15.42	PK
2483.5	37.96	2.06	4.20	V	44.22	53.98	9.76	AV

Mode : 1 MBit/s (255 Byte)

Operating Frequency 2402 MHz, 2480 MHz

Channel No. 0 CH, 39 CH

Frequency [MHz]	Measured Value [dBµV]	Duty Cycle Factor [dB]	A.F+C.L+ATT -A.G+D.F [dB/m]	Ant. Pol. [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
2390.0	49.20	0.00	2.99	H	52.19	73.98	21.79	PK
2390.0	37.51	0.69	2.99	H	41.19	53.98	12.79	AV
2390.0	48.94	0.00	2.99	V	51.93	73.98	22.05	PK
2390.0	37.35	0.69	2.99	V	41.03	53.98	12.95	AV
2483.5	54.79	0.00	4.20	H	58.99	73.98	14.99	PK
2483.5	38.55	0.69	4.20	H	43.44	53.98	10.54	AV
2483.5	54.13	0.00	4.20	V	58.33	73.98	15.65	PK
2483.5	38.02	0.69	4.20	V	42.91	53.98	11.07	AV

Mode : 2 MBit/s (37 Byte)

Operating Frequency 2402 MHz, 2480 MHz

Channel No. 0 CH, 39 CH

Frequency [MHz]	Measured Value [dBµV]	Duty Cycle Factor [dB]	A.F+C.L+ATT -A.G+D.F [dB/m]	Ant. Pol. [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
2390.0	49.37	0.00	2.99	H	52.36	73.98	21.62	PK
2390.0	37.10	4.86	2.99	H	44.95	53.98	9.03	AV
2390.0	49.23	0.00	2.99	V	52.22	73.98	21.76	PK
2390.0	36.86	4.86	2.99	V	44.71	53.98	9.27	AV
2483.5	**57.28**	**0.00**	**4.20**	**H**	**61.48**	**73.98**	**12.50**	**PK**
2483.5	**38.62**	**4.86**	**4.20**	**H**	**47.68**	**53.98**	**6.30**	**AV**
2483.5	56.50	0.00	4.20	V	60.70	73.98	13.28	PK
2483.5	38.02	4.86	4.20	V	47.08	53.98	6.90	AV

Mode : 2 MBit/s (255 Byte)

Operating Frequency 2402 MHz, 2480 MHz

Channel No. 0 CH, 39 CH

Frequency [MHz]	Measured Value [dBµV]	Duty Cycle Factor [dB]	A.F+C.L+ATT -A.G+D.F [dB/m]	Ant. Pol. [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
2390.0	49.22	0.00	2.99	H	52.21	73.98	21.77	PK
2390.0	37.32	2.42	2.99	H	42.73	53.98	11.25	AV
2390.0	49.03	0.00	2.99	V	52.02	73.98	21.96	PK
2390.0	37.15	2.42	2.99	V	42.56	53.98	11.42	AV
2483.5	56.30	0.00	4.20	H	60.50	73.98	13.48	PK
2483.5	39.09	2.42	4.20	H	45.71	53.98	8.27	AV
2483.5	55.72	0.00	4.20	V	59.92	73.98	14.06	PK
2483.5	38.67	2.42	4.20	V	45.29	53.98	8.69	AV

[Ant.2]

Mode : 1 MBit/s (37 Byte)

Operating Frequency 2402 MHz, 2480 MHz

Channel No. 0 CH, 39 CH

Frequency [MHz]	Measured Value [dBµV]	Duty Cycle Factor [dB]	A.F+C.L+ATT -A.G+D.F [dB/m]	Ant. Pol. [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
2390.0	48.91	0.00	2.99	H	51.90	73.98	22.08	PK
2390.0	37.12	2.06	2.99	H	42.17	53.98	11.81	AV
2390.0	48.70	0.00	2.99	V	51.69	73.98	22.29	PK
2390.0	36.94	2.06	2.99	V	41.99	53.98	11.99	AV
2483.5	56.35	0.00	4.20	H	60.55	73.98	13.43	PK
2483.5	38.90	2.06	4.20	H	45.16	53.98	8.82	AV
2483.5	55.48	0.00	4.20	V	59.68	73.98	14.30	PK
2483.5	37.87	2.06	4.20	V	44.13	53.98	9.85	AV

Mode : 1 MBit/s (255 Byte)

Operating Frequency 2402 MHz, 2480 MHz

Channel No. 0 CH, 39 CH

Frequency [MHz]	Measured Value [dBµV]	Duty Cycle Factor [dB]	A.F+C.L+ATT -A.G+D.F [dB/m]	Ant. Pol. [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
2390.0	49.10	0.00	2.99	H	52.09	73.98	21.89	PK
2390.0	37.30	0.69	2.99	H	40.98	53.98	13.00	AV
2390.0	48.97	0.00	2.99	V	51.96	73.98	22.02	PK
2390.0	37.05	0.69	2.99	V	40.73	53.98	13.25	AV
2483.5	56.45	0.00	4.20	H	60.65	73.98	13.33	PK
2483.5	39.15	0.69	4.20	H	44.04	53.98	9.94	AV
2483.5	55.26	0.00	4.20	V	59.46	73.98	14.52	PK
2483.5	38.18	0.69	4.20	V	43.07	53.98	10.91	AV

Mode : 2 MBit/s (37 Byte)

Operating Frequency 2402 MHz, 2480 MHz

Channel No. 0 CH, 39 CH

Frequency [MHz]	Measured Value [dBµV]	Duty Cycle Factor [dB]	A.F+C.L+ATT -A.G+D.F [dB/m]	Ant. Pol. [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
2390.0	49.23	0.00	2.99	H	52.22	73.98	21.76	PK
2390.0	36.91	4.86	2.99	H	44.76	53.98	9.22	AV
2390.0	48.96	0.00	2.99	V	51.95	73.98	22.03	PK
2390.0	36.78	4.86	2.99	V	44.63	53.98	9.35	AV
2483.5	**58.28**	**0.00**	**4.20**	**H**	**62.48**	**73.98**	**11.50**	**PK**
2483.5	**39.08**	**4.86**	**4.20**	**H**	**48.14**	**53.98**	**5.84**	**AV**
2483.5	55.85	0.00	4.20	V	60.05	73.98	13.93	PK
2483.5	37.75	4.86	4.20	V	46.81	53.98	7.17	AV

Mode : 2 MBit/s (255 Byte)

Operating Frequency 2402 MHz, 2480 MHz

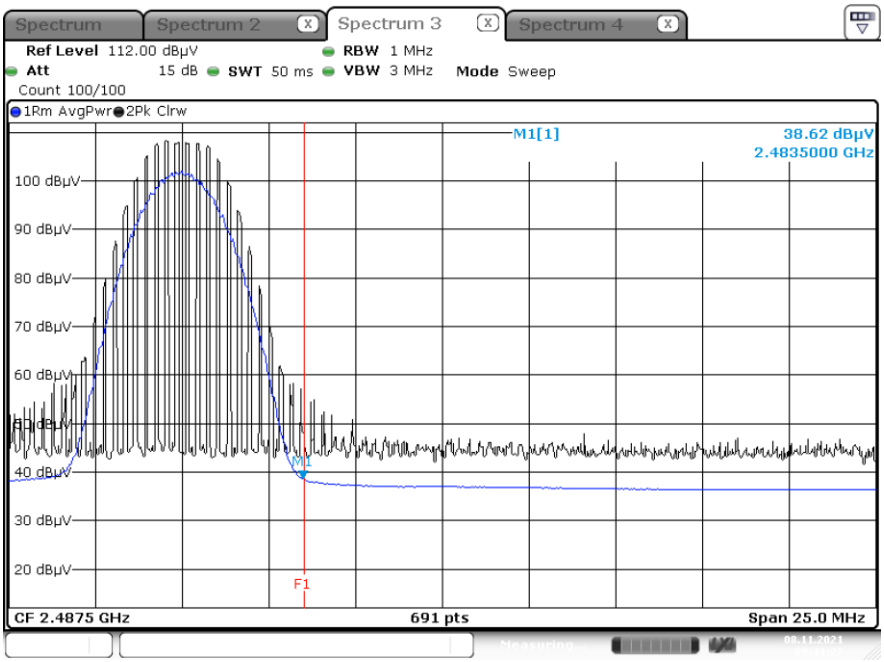
Channel No. 0 CH, 39 CH

Frequency [MHz]	Measured Value [dBµV]	Duty Cycle Factor [dB]	A.F+C.L+ATT -A.G+D.F [dB/m]	Ant. Pol. [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
2390.0	49.29	0.00	2.99	H	52.28	73.98	21.70	PK
2390.0	37.15	2.42	2.99	H	42.56	53.98	11.42	AV
2390.0	49.09	0.00	2.99	V	52.08	73.98	21.90	PK
2390.0	36.81	2.42	2.99	V	42.22	53.98	11.76	AV
2483.5	58.00	0.00	4.20	H	62.20	73.98	11.78	PK
2483.5	39.62	2.42	4.20	H	46.24	53.98	7.74	AV
2483.5	56.36	0.00	4.20	V	60.56	73.98	13.42	PK
2483.5	38.45	2.42	4.20	V	45.07	53.98	8.91	AV

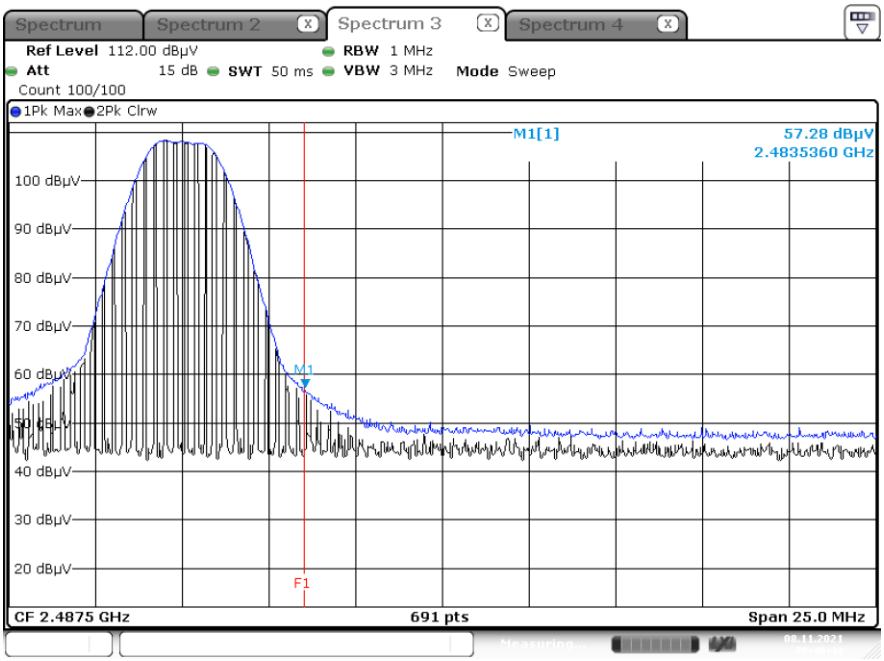
[Ant.1]

▣ Mode : 2 MBit/s (37 Byte) Test Plots

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



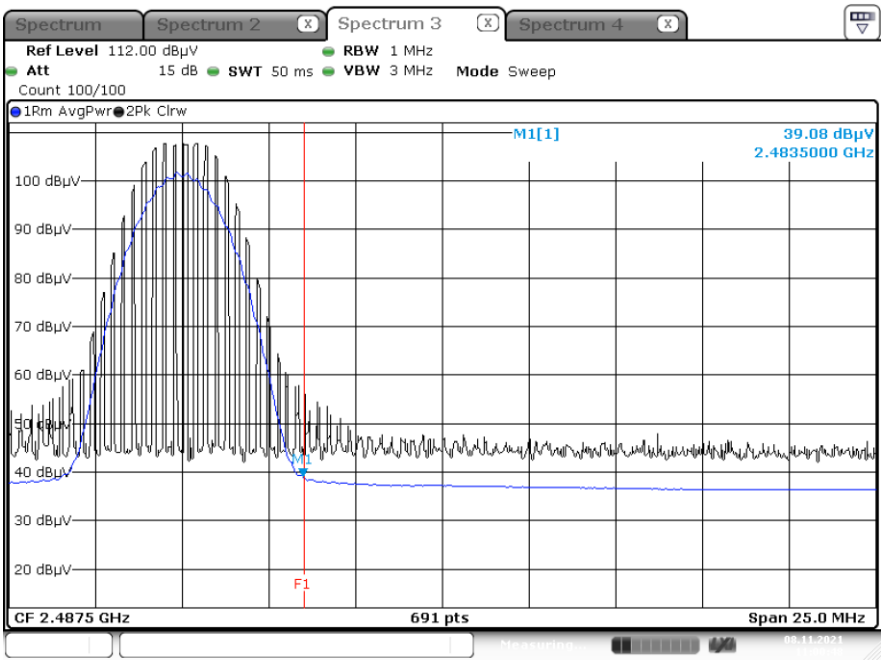
Radiated Restricted Band Edges plot – Peak Result (Ch.39, X-H)



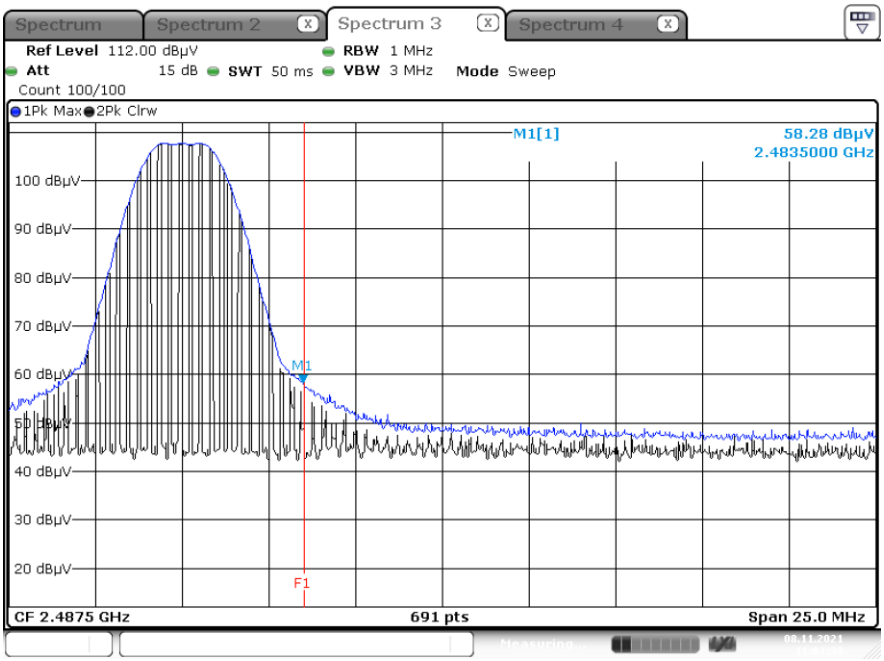
[Ant.2]

▣ Mode : 2 MBit/s (37 Byte) 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:

Plot of worst case are only reported.

9.8 POWERLINE CONDUCTED EMISSIONS

Conducted Emissions (Line 1)

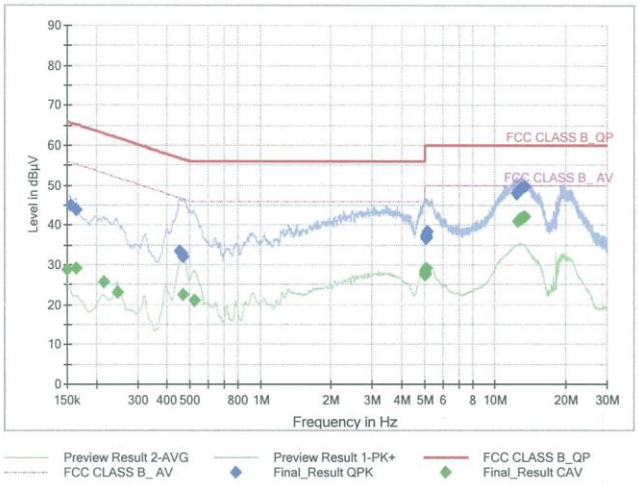
BTLE MODE_L1 1 / 2

Test Report

Common Information

EUT :	SM-X706B
Manufacturer :	SAMSUNG
Test Site:	SHIELD ROOM
Operating Conditions :	BTLE MODE_L1

Full Spectrum



Final_Result_QPK

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1545	44.98	65.75	20.77	9.000	L1	OFF	9.6
0.1635	43.81	65.28	21.48	9.000	L1	OFF	9.6
0.4493	33.41	56.89	23.48	9.000	L1	OFF	9.6
0.4560	33.07	56.77	23.69	9.000	L1	OFF	9.6
0.4605	32.76	56.68	23.93	9.000	L1	OFF	9.6
0.4695	31.97	56.52	24.55	9.000	L1	OFF	9.6
5.0518	36.56	60.00	23.44	9.000	L1	OFF	9.9
5.0563	36.95	60.00	23.05	9.000	L1	OFF	9.9
5.0653	36.98	60.00	23.02	9.000	L1	OFF	9.9
5.0720	37.32	60.00	22.68	9.000	L1	OFF	9.9
5.0923	37.49	60.00	22.51	9.000	L1	OFF	9.9
5.1395	38.24	60.00	21.76	9.000	L1	OFF	9.9
12.3508	48.01	60.00	11.99	9.000	L1	OFF	10.1
12.3935	48.25	60.00	11.75	9.000	L1	OFF	10.1
12.7648	49.06	60.00	10.94	9.000	L1	OFF	10.2
12.9628	49.21	60.00	10.79	9.000	L1	OFF	10.2
13.3565	49.74	60.00	10.26	9.000	L1	OFF	10.2
13.3633	49.58	60.00	10.42	9.000	L1	OFF	10.2

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BTLE MODE_L1 2 / 2

Final_Result_CAV

Frequency (MHz)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1500	28.87	56.00	27.13	9.000	L1	OFF	9.6
0.1635	29.08	55.28	26.21	9.000	L1	OFF	9.6
0.2153	25.76	53.00	27.24	9.000	L1	OFF	9.6
0.2468	23.20	51.87	28.67	9.000	L1	OFF	9.6
0.4650	22.59	46.60	24.01	9.000	L1	OFF	9.6
0.5203	20.93	46.00	25.07	9.000	L1	OFF	9.7
5.0000	27.27	46.00	18.73	9.000	L1	OFF	9.9
5.0113	27.46	50.00	22.54	9.000	L1	OFF	9.9
5.0158	27.81	50.00	22.19	9.000	L1	OFF	9.9
5.0293	28.09	50.00	21.91	9.000	L1	OFF	9.9
5.0428	28.42	50.00	21.58	9.000	L1	OFF	9.9
5.0788	29.17	50.00	20.83	9.000	L1	OFF	9.9
12.5240	40.85	50.00	9.15	9.000	L1	OFF	10.1
12.7198	41.45	50.00	8.55	9.000	L1	OFF	10.2
12.7648	41.50	50.00	8.50	9.000	L1	OFF	10.2
12.9628	41.64	50.00	8.36	9.000	L1	OFF	10.2
13.0235	41.84	50.00	8.16	9.000	L1	OFF	10.2
13.3385	42.17	50.00	7.83	9.000	L1	OFF	10.2

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Conducted Emissions (Line 2)

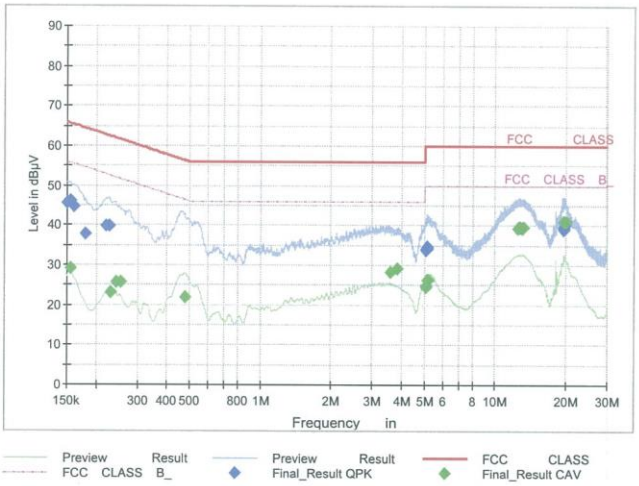
BTLE MODE_N 1 / 2

Test Report

Common Information

EUT :	SM-X706B
Manufacturer :	SAMSUNG
Test Site:	SHIELD ROOM
Operating Conditions :	BTLE MODE_N

Full Spectrum



Final_Result_QPK

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1500	45.47	66.00	20.53	9.000	N	OFF	9.6
0.1545	46.08	65.75	19.68	9.000	N	OFF	9.6
0.1613	44.79	65.40	20.61	9.000	N	OFF	9.6
0.1793	37.90	64.52	26.62	9.000	N	OFF	9.6
0.2198	39.78	62.83	23.05	9.000	N	OFF	9.6
0.2265	39.73	62.58	22.85	9.000	N	OFF	9.6
5.0653	33.83	60.00	26.17	9.000	N	OFF	9.9
5.0698	34.03	60.00	25.97	9.000	N	OFF	9.9
5.0810	33.78	60.00	26.22	9.000	N	OFF	9.9
5.1013	34.07	60.00	25.93	9.000	N	OFF	9.9
5.1193	34.47	60.00	25.53	9.000	N	OFF	9.9
5.1283	34.58	60.00	25.42	9.000	N	OFF	9.9
12.7355	39.44	60.00	20.56	9.000	N	OFF	10.2
19.5935	38.83	60.00	21.17	9.000	N	OFF	10.4
19.5980	39.04	60.00	20.96	9.000	N	OFF	10.4
19.6070	39.36	60.00	20.64	9.000	N	OFF	10.4
19.6723	39.49	60.00	20.51	9.000	N	OFF	10.4
19.7668	40.12	60.00	19.88	9.000	N	OFF	10.5

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Final_Result_CAV

Frequency (MHz)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1545	29.15	55.75	26.61	9.000	N	OFF	9.6
0.2288	23.09	52.50	29.40	9.000	N	OFF	9.6
0.2423	25.60	52.02	26.42	9.000	N	OFF	9.6
0.2535	25.69	51.64	25.95	9.000	N	OFF	9.6
0.4763	21.79	46.40	24.61	9.000	N	OFF	9.6
3.5735	28.36	46.00	17.64	9.000	N	OFF	9.8
3.8345	29.12	46.00	16.88	9.000	N	OFF	9.8
5.0675	24.42	50.00	25.58	9.000	N	OFF	9.9
5.0855	24.77	50.00	25.23	9.000	N	OFF	9.9
5.1485	26.12	50.00	23.88	9.000	N	OFF	9.9
5.1598	26.29	50.00	23.71	9.000	N	OFF	9.9
12.4205	39.23	50.00	10.77	9.000	N	OFF	10.2
12.6208	39.48	50.00	10.52	9.000	N	OFF	10.2
13.1203	39.28	50.00	10.72	9.000	N	OFF	10.2
13.2238	39.39	50.00	10.61	9.000	N	OFF	10.2
19.5958	40.95	50.00	9.05	9.000	N	OFF	10.4
19.6678	41.04	50.00	8.96	9.000	N	OFF	10.4
19.9175	40.87	50.00	9.13	9.000	N	OFF	10.5

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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	08/23/2022	Annual
EMI Test Receiver	ESR	Rohde & Schwarz	101910	06/17/2022	Annual
Temperature Chamber	SU-642	ESPEC	0093008124	03/15/2022	Annual
Signal Analyzer	N9030A	Agilent	MY49432108	03/09/2022	Annual
Power Meter	N1911A	Agilent	MY45100523	04/08/2022	Annual
Power Sensor	N1921A	Agilent	MY57820067	04/08/2022	Annual
Power Splitter	11667B	Hewlett Packard	10545	02/09/2022	Annual
DC Power Supply	E3632A	HP	MY50360067	02/26/2022	Annual
Attenuator(10 dB)(DC-26.5 GHz)	8493C	HP	07560	06/18/2022	Annual
Attenuator(10 dB)(DC-26.5 GHz)	8493C	HP	08285	06/28/2022	Annual
Attenuator(20 dB)	18N-20dB	Rohde & Schwarz	8	03/08/2022	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

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(Antenna mast)	CO3000	Innco system	CO3000-4p	N/A	N/A
Antenna Position Tower	MA4640/800-XP-EP	Innco system	N/A	N/A	N/A
Controller	EM1000	Audix	060520	N/A	N/A
Turn Table	N/A	Audix	N/A	N/A	N/A
Amp & Filter Bank Switch Controller	FBSM-01B	TNM system	TM19050002	N/A	N/A
Loop Antenna	1513	Schwarzbeck	1513-333	03/19/2022	Biennial
Hybrid Antenna	VULB 9168	Schwarzbeck	9168-0895	09/04/2022	Biennial
Horn Antenna	BBHA 9120D	Schwarzbeck	02296	05/19/2022	Biennial
Horn Antenna(15 GHz ~ 40 GHz)	BBHA9170	Schwarzbeck	BBHA9170124	04/12/2023	Biennial
Spectrum Analyzer	FSV(10 Hz ~ 40 GHz)	Rohde & Schwarz	101055	05/14/2022	Annual
Band Reject Filter	WRCJV2400/2483.5-2370/2520-60/12SS	Wainwright Instruments	2	01/06/2022	Annual
Band Reject Filter	WRCJV12-4900-5100-5900-6100-50SS	Wainwright Instruments	5	06/24/2022	Annual
Band Reject Filter	WRCJV12-4900-5100-5900-6100-50SS	Wainwright Instruments	6	06/24/2022	Annual
High Pass Filter(7 GHz ~ 18 GHz)	WHKX10-7150-8000-18000-50SS	Wainwright Instruments	1	04/02/2022	Annual
Power Amplifier	CBL18265035	CERNEX	22966	12/04/2021	Annual
Power Amplifier	CBL26405040	CERNEX	25956	03/23/2022	Annual
HPF(3~18GHz) + LNA1(1~18GHz)	FMSR-05B	TNM system	F6	01/20/2022	Annual
ATT(10dB) + LNA1(1~18GHz)	FMSR -05B	TNM system	None	01/20/2022	Annual
ATT(3dB) + LNA1(1~18GHz)	FMSR -05B	TNM system	None	01/20/2022	Annual
LNA1(1~18GHz)	FMSR -05B	TNM system	25540	01/20/2022	Annual
HPF(7~18GHz) + LNA2(6~18GHz)	FMSR -05B	TNM system	28550	01/20/2022	Annual
Thru(30MHz ~ 18GHz)	FMSR -05B	TNM system	None	01/20/2022	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-2112-FC009-P