

FCC BT LE REPORT

Certification

Applicant Name: SAMSUNG Electronics Co., Ltd.	Date of Issue: January 06, 2022
Address: 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea	Test Site/Location: 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383 KOREA
	Report No.: HCT-RF-2201-FC037

FCC ID:	A3LSMA336M
APPLICANT:	SAMSUNG Electronics Co., Ltd.

Model:	SM-A336M/DSN
Additional Model:	SM-A336M
EUT Type:	Mobile Phone
Average Output Power:	Normal : 5.70 dBm (3.71 mW) High Power : 15.63 dBm (36.54 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.

Report No.: HCT-RF-2201-FC037

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)

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Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-2201-FC037	January 06, 2022	- First Approval Report

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1. EUT DESCRIPTION

Model	SM-A336M/DSN	
Additional Model	SM-A336M	
EUT Type	Mobile Phone	
Power Supply	DC 3.86 V	
Frequency Range	2 402 MHz ~ 2 480 MHz	
Max. RF Output Power (Normal)	Peak (For information only)	1M Bit/s : 5.880 dBm (3.87 mW) 2M Bit/s : 5.957 dBm (3.94 mW) 125k Bit/s : 5.779 dBm (3.78 mW) 500k Bit/s : 5.843 dBm (3.84 mW)
	Average	1M Bit/s : 5.65 dBm (3.67 mW) 2M Bit/s : 5.67 dBm (3.69 mW) 125k Bit/s : 5.64 dBm (3.66 mW) 500k Bit/s : 5.70 dBm (3.71 mW)
Max. RF Output Power (High Power)	Peak (For information only)	1M Bit/s : 15.567 dBm (36.03 mW) 2M Bit/s : 16.019 dBm (39.99 mW)
	Average	1M Bit/s : 15.25 dBm (33.46 mW) 2M Bit/s : 15.63 dBm (36.54 mW)
Modulation Type	GFSK	
Bluetooth Version	5.1	
Number of Channels	40 Channels	
Date(s) of Tests	December 08, 2021 ~ January 06, 2022	
Serial number	Radiated: R3CRA0TYEFE Conducted (High Power) : 5b225620bb337ece Conducted (Normal) : 5b225620bb337ece	

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.

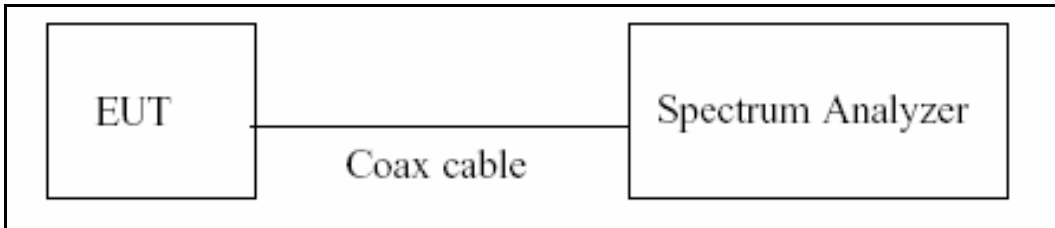
The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

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 $T \leq 6.25$ 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 $> 50/T$.

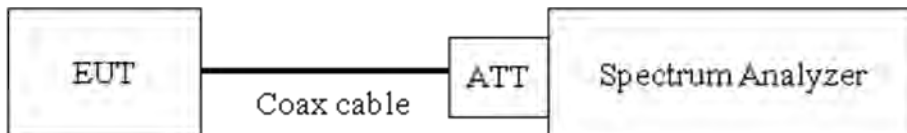
1. RBW = 8 MHz (the largest available value)
2. VBW = 8 MHz (\geq RBW)
3. SPAN = 0 Hz
4. Detector = Peak
5. Number of points in sweep > 100
6. Trace mode = Clear write
7. Measure T_{total} and T_{on}
8. Calculate Duty Cycle = T_{on} / T_{total} and Duty Cycle Factor = $10\log(1/\text{Duty Cycle})$

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 $\geq 3 \times$ 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.

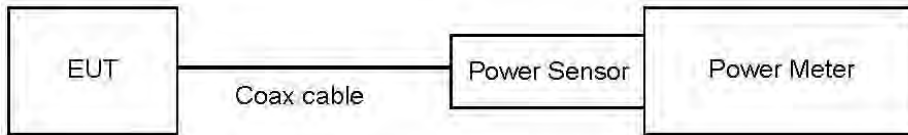
Note : We tested OBW using the automatic bandwidth measurement capability of a spectrum analyzer.

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

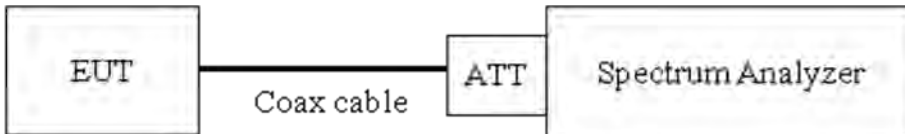
- Conducted Output Power(Peak) = Measured Value + ATT loss + Cable loss
- Conducted Output Power(Average) = Measured Value + ATT loss + Cable loss + Duty Cycle Factor

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) $RBW = 3 \text{ kHz} \leq RBW \leq 100 \text{ kHz}$.
- 4) $VBW \geq 3 \times RBW$.
- 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 $\geq [2 \times \text{span} / RBW]$.
- 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

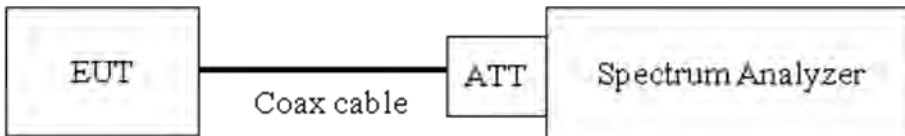
7.5. Conducted Band Edge(Out of Band Emissions) & Conducted Spurious Emissions

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 $\geq 3 \times$ 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 $\geq 2 \times$ 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	20.04
100	20.09
200	20.13
300	20.19
400	20.22
500	20.23
600	20.23
700	20.25
800	20.27
900	20.29
1000	20.31
2000	20.46
2400	20.52
2480	20.52
2500	20.52
3000	20.57
4000	20.67
5000	20.75
5150	20.77
5850	20.82
6000	20.82
7000	20.91
8000	20.98
9000	21.05
10 000	21.12
11 000	21.16
12 000	21.24
13 000	21.32
14 000	21.30
15 000	21.32
16 000	21.37
17 000	21.41
18 000	21.47
19 000	21.50
20 000	21.56
21 000	21.77
22 000	21.74
23 000	21.94
24 000	21.77

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

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

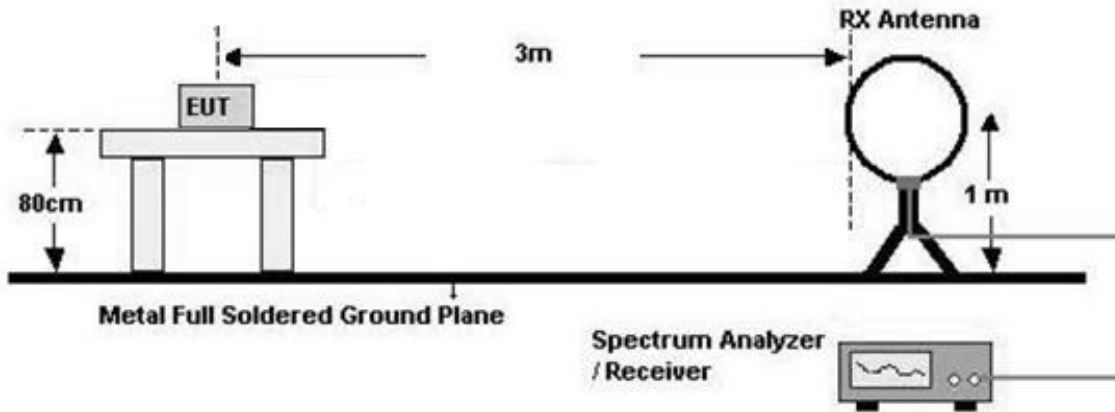
7.6. Radiated Test

Limit

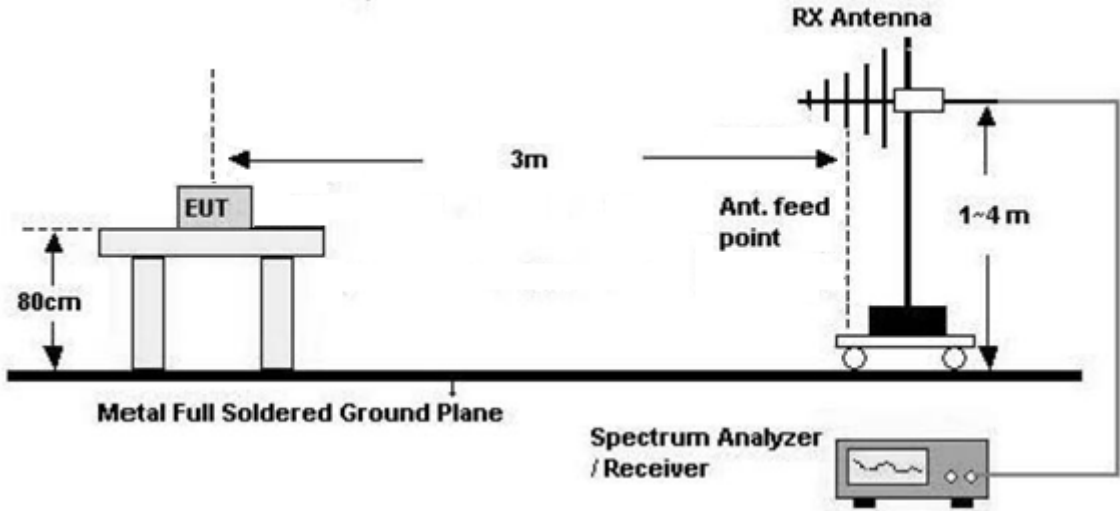
Frequency (MHz)	Field Strength ($\mu\text{V/m}$)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Configuration

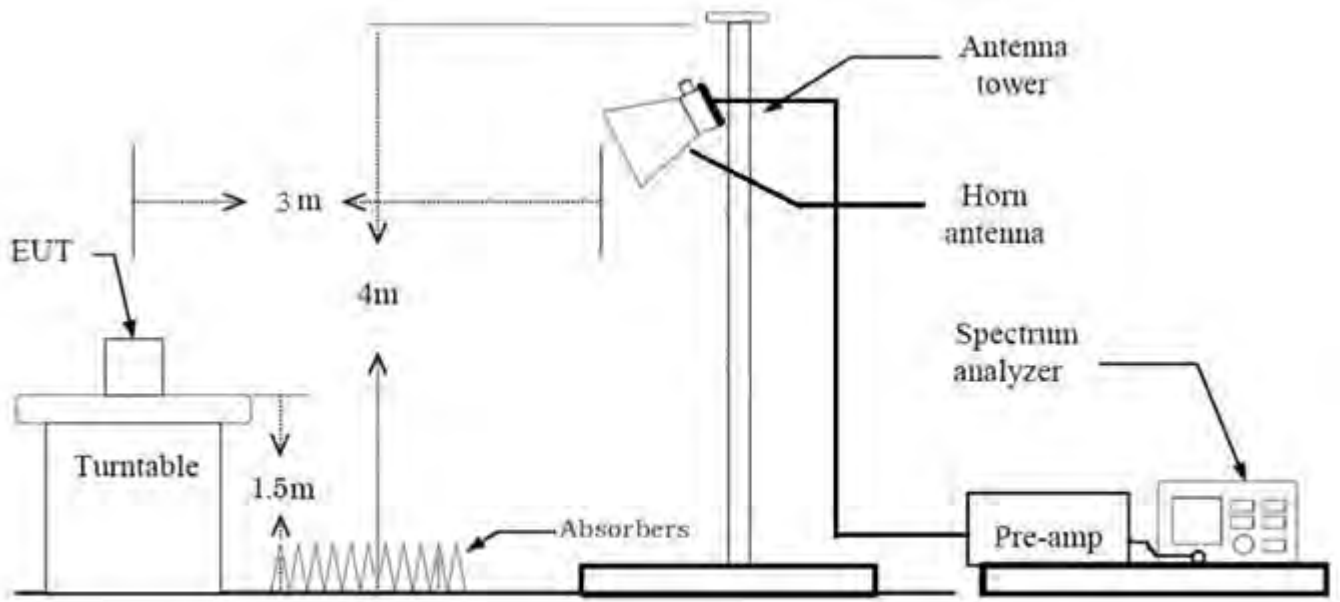
Below 30 MHz



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) = $40\log(3\text{ m}/300\text{ m}) = - 80\text{ dB}$
Measurement Distance : 3 m
7. Distance Correction Factor(0.490 MHz – 30 MHz) = $40\log(3\text{ m}/30\text{ m}) = - 40\text{ dB}$
Measurement Distance : 3 m
8. Spectrum Setting
 - Frequency Range = 9 kHz ~ 30 MHz
 - Detector = Peak
 - Trace = Maxhold
 - RBW = 9 kHz
 - VBW $\geq 3 \times$ 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 \geq 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 \geq 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 \geq 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 = $20\log$ (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 \geq 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 \geq 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 = $20\log(\text{test distance} / \text{specific distance})$ (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 μ H/50 ohms line impedance stabilization network (LISN).

Frequency Range (MHz)	Limits (dB μ V)	
	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:
 - Radiated Spurious Emissions : X
 - Radiated Restricted Band Edge : X
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)
(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 : 1 M, 2 M (Normal & 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
6. SM-A336M/DSN, SM-A336M were tested and the worst case results are reported.
(Worst case : SM-A336M/DSN)

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-A336M/DSN, SM-A336M were tested and the worst case results are reported.
(Worst case : SM-A336M/DSN)

Conducted test

1. The EUT was configured with packet length of highest power.
 - ALL supported mode tested.
 - Worst Results Notes for each test item
2. SM-A336M/DSN, SM-A336M were tested and the worst case results are reported.
(Worst case : SM-A336M/DSN)

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)
1M	37	0.389	0.626	0.621	2.07
	255	2.135	2.500	0.854	0.69
2M	37	0.203	0.624	0.325	4.89
	255	1.078	1.877	0.574	2.41
125k	37	3.100	3.750	0.827	0.83
	255	17.067	17.500	0.975	0.11
500k	37	1.068	1.876	0.569	2.45
	255	4.550	5.000	0.910	0.41

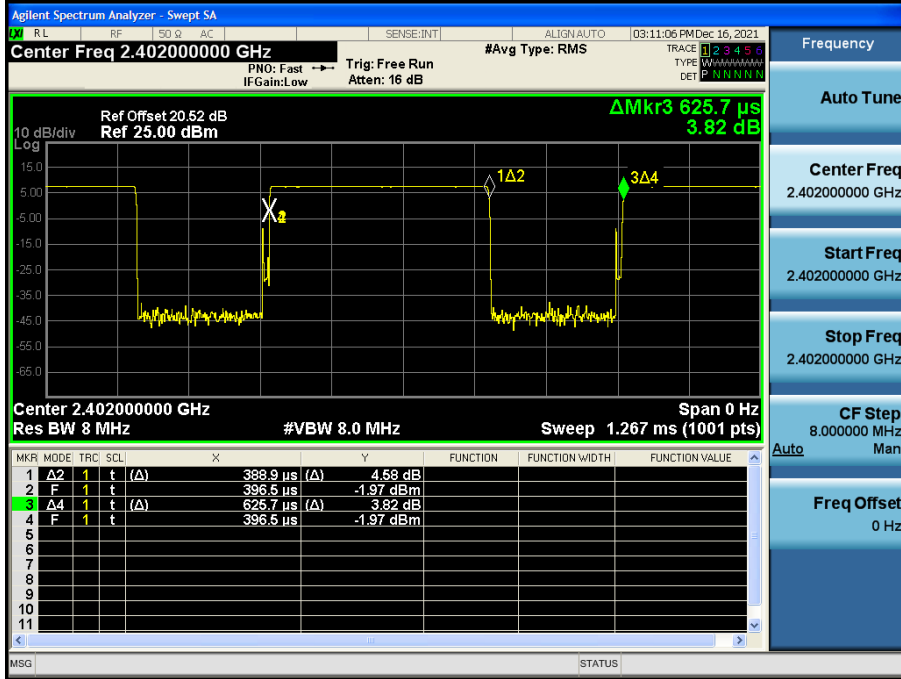
[High Power]

Data rate (Bit/s)	Packet length (Byte)	T _{on} (ms)	T _{total} (ms)	Duty Cycle	Duty Cycle Factor (dB)
1M	37	0.389	0.626	0.6215	2.07
	255	2.135	2.500	0.8540	0.69
2M	37	0.203	0.624	0.3245	4.89
	255	1.074	1.874	0.5734	2.42

[Normal]

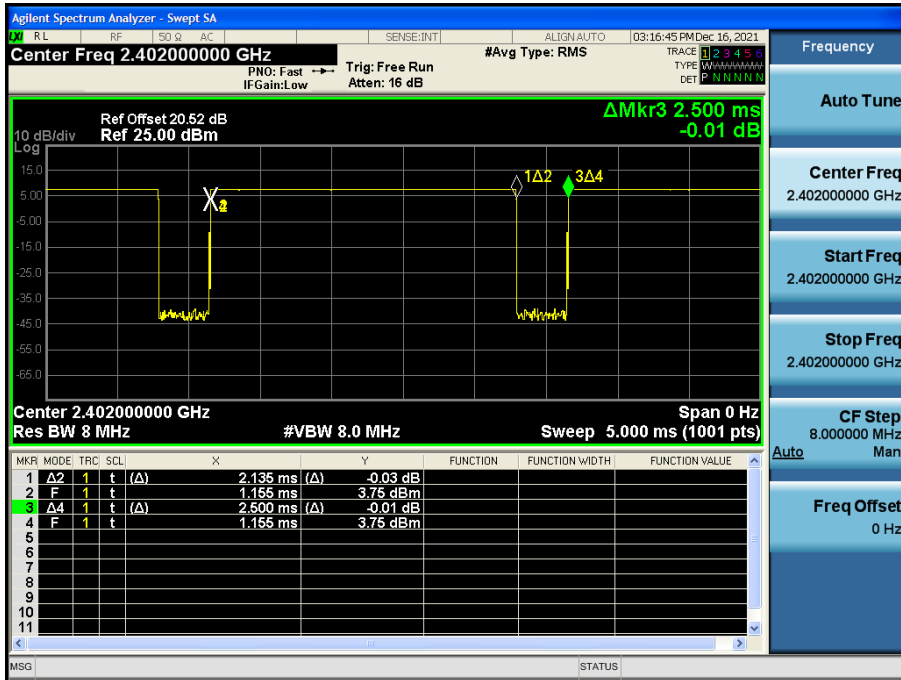
1M Bit/s (37 Byte) Test Plots

Duty Cycle (Low-CH 0)



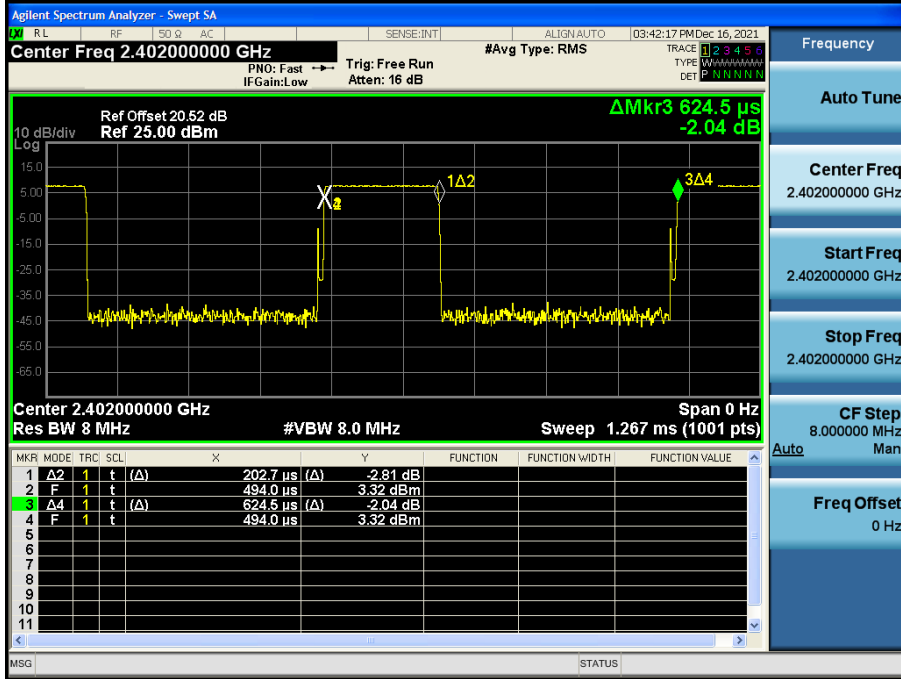
1M Bit/s (255 Byte) Test Plots

Duty Cycle (Low-CH 0)



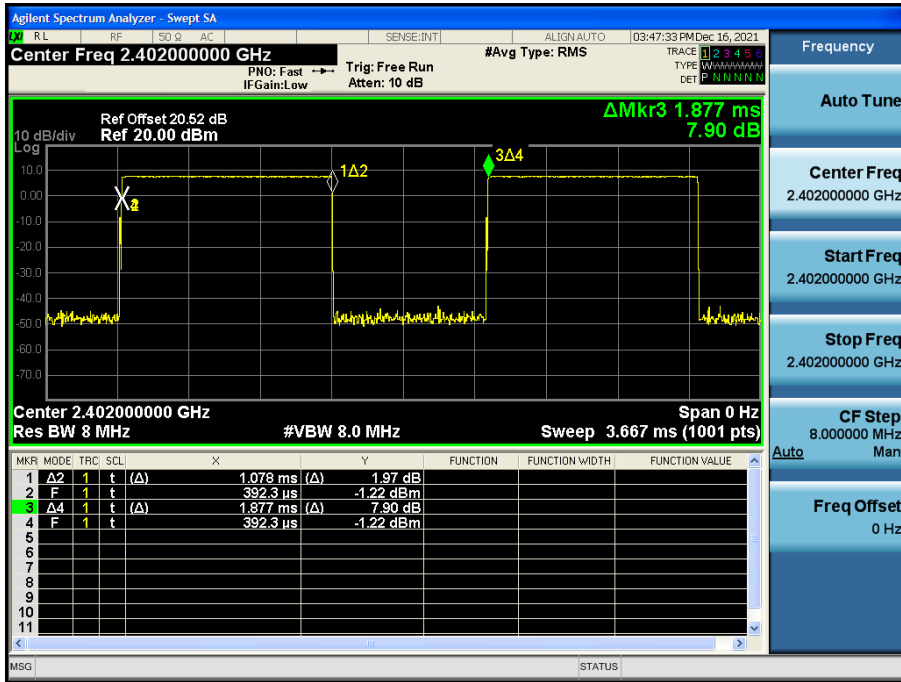
2M Bit/s (37 Byte) Test Plots

Duty Cycle (Low-CH 0)



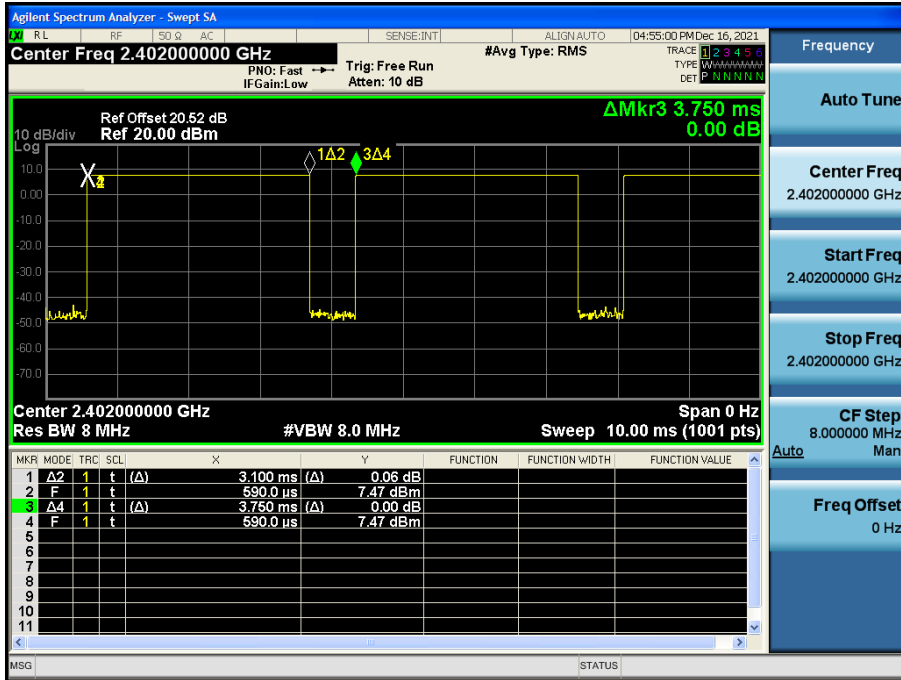
2M Bit/s (255 Byte) Test Plots

Duty Cycle (Low-CH 0)



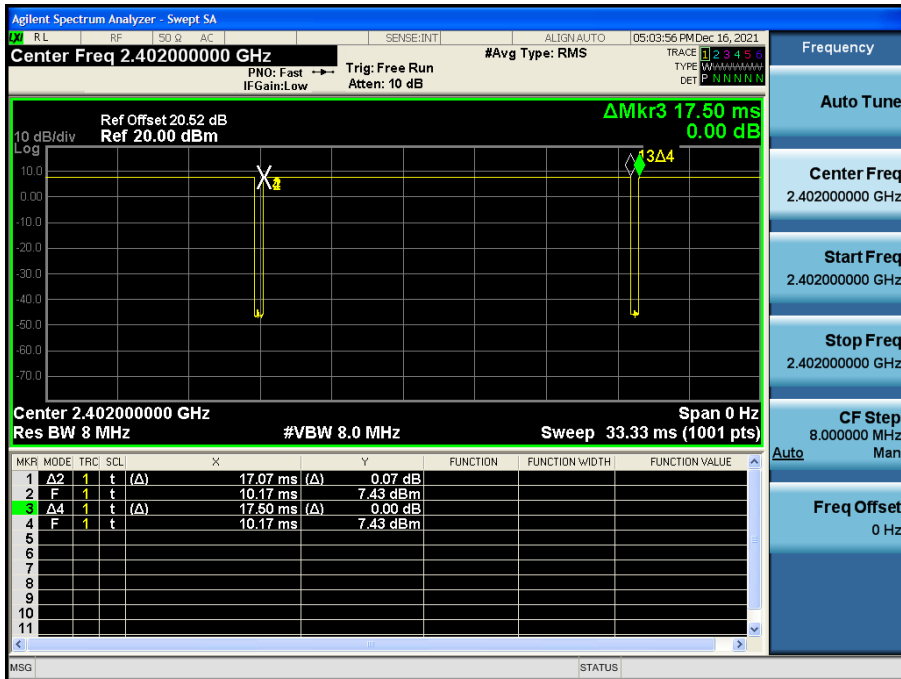
▣ 125k Bit/s(37 Byte) Test Plots

Duty Cycle (Low-CH 0)



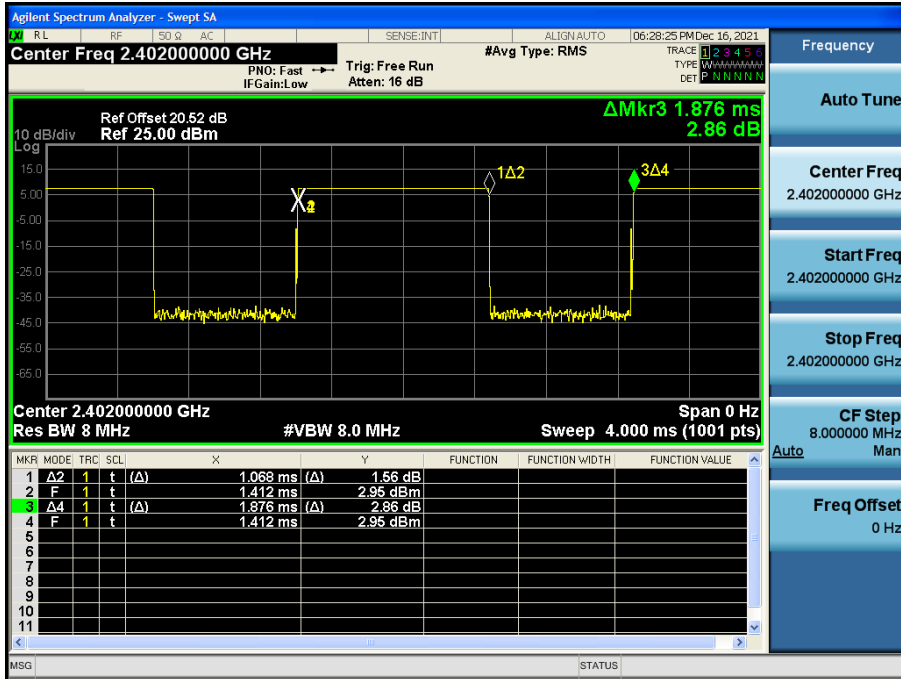
▣ 125k Bit/s(255 Byte) Test Plots

Duty Cycle (Low-CH 0)



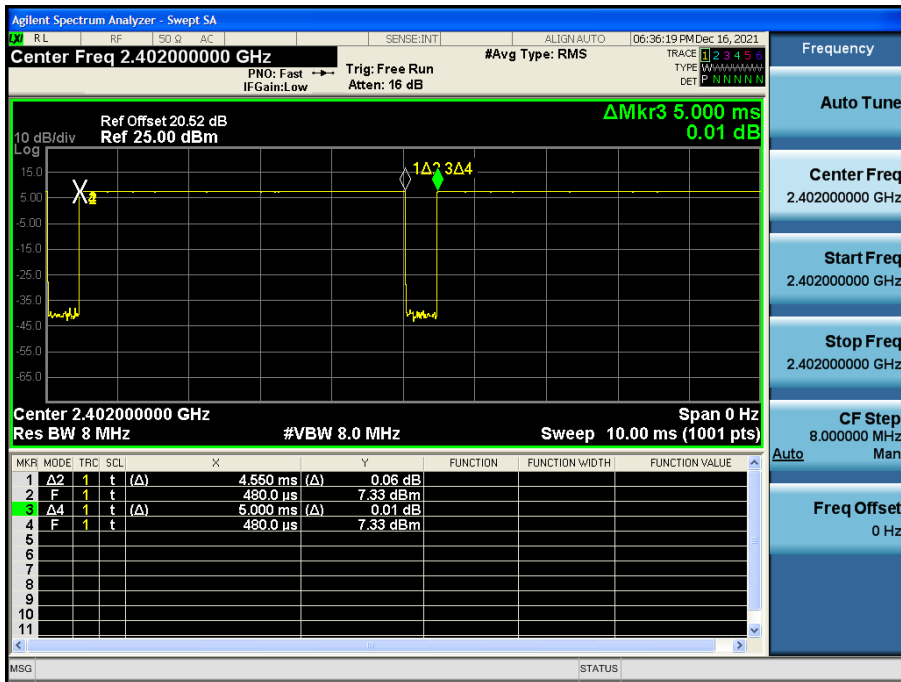
500k Bit/s(37 Byte) Test Plots

Duty Cycle (Low-CH 0)



500k Bit/s(255 Byte) Test Plots

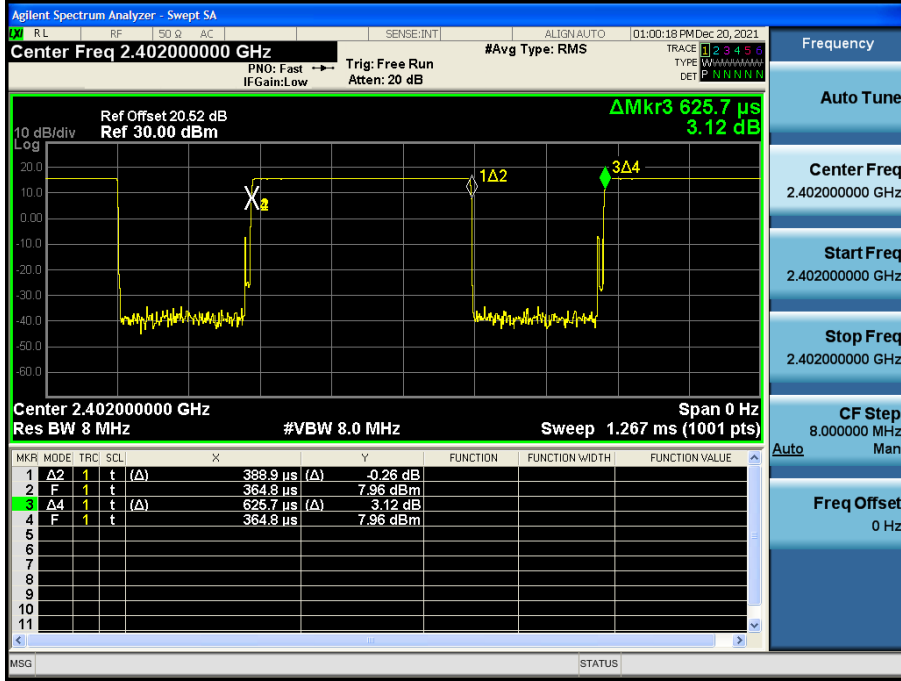
Duty Cycle (Low-CH 0)



[High Power]

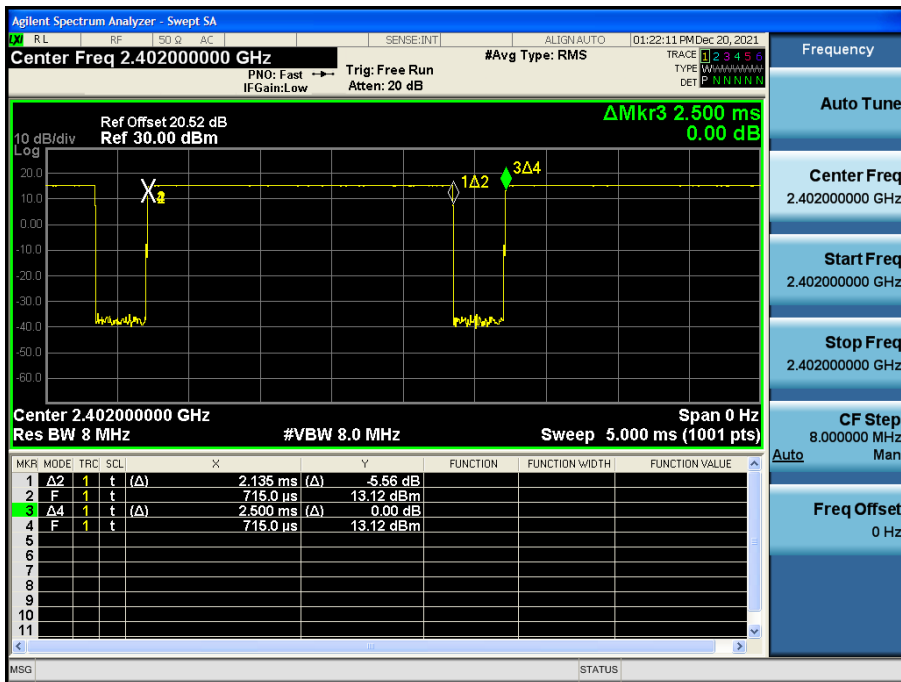
▣ 1M Bit/s (37 Byte) Test Plots

Duty Cycle (Low-CH 0)



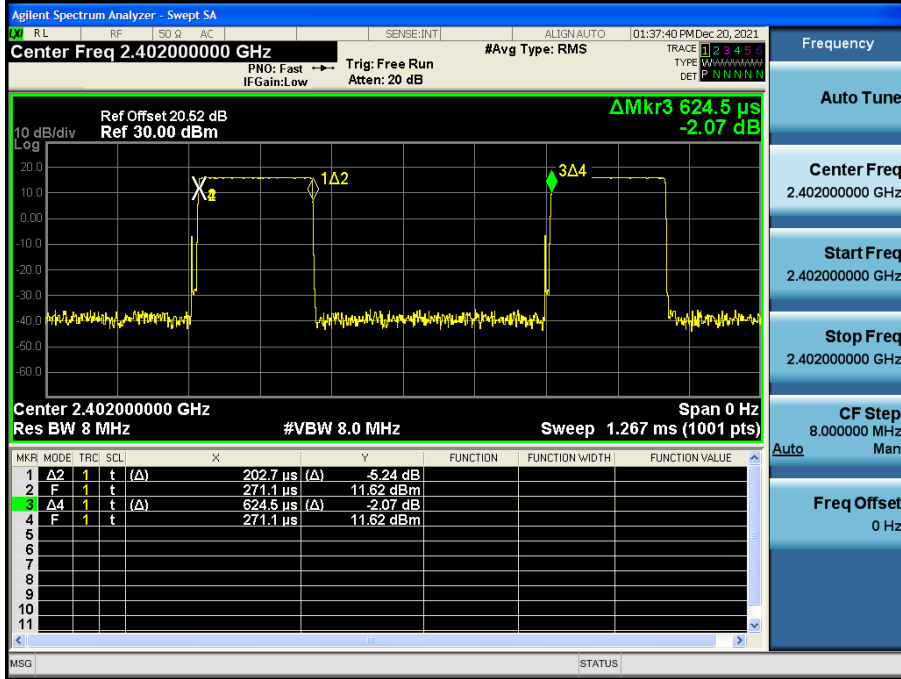
▣ 1M Bit/s (255 Byte) Test Plots

Duty Cycle (Low-CH 0)



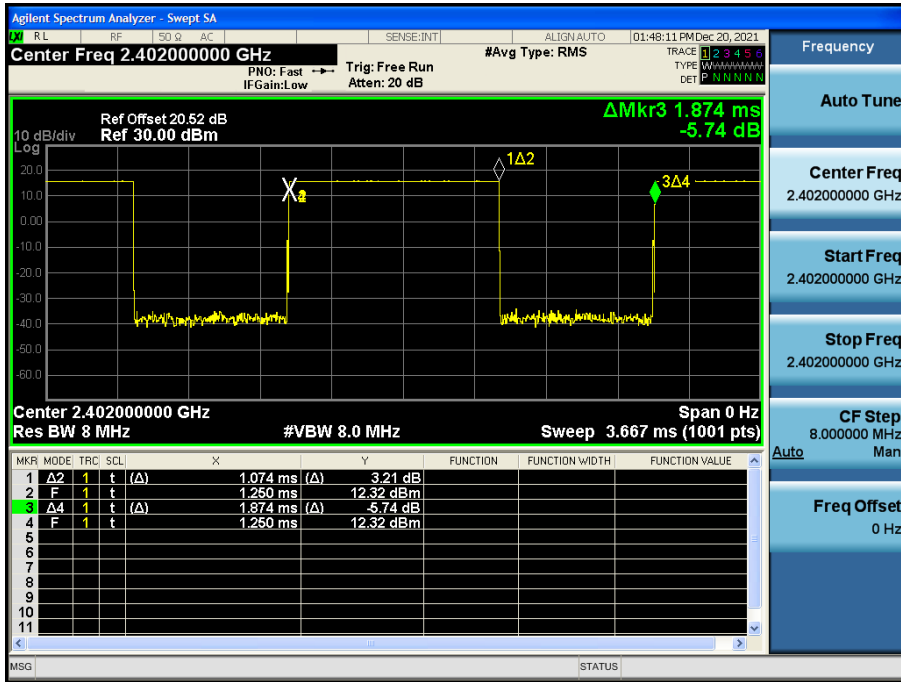
2M Bit/s (37 Byte) Test Plots

Duty Cycle (Low-CH 0)



2M Bit/s (255 Byte) Test Plots

Duty Cycle (Low-CH 0)



9.2 6 dB BANDWIDTH

Mode (Bit/s)	Channel	6 dB Bandwidth (kHz)	Limit (kHz)
1M(37)	0	691.7	> 500
	19	712.2	
	39	690.2	
1M(255)	0	671.5	> 500
	19	672.7	
	39	671.9	
2M(37)	0	1156	> 500
	19	1152	
	39	1158	
2M(255)	0	1153	> 500
	19	1171	
	39	1164	
125k(37)	0	655.7	> 500
	19	650.1	
	39	665.1	
125k(255)	0	639.2	> 500
	19	634.1	
	39	639.2	
500k(37)	0	672.3	> 500
	19	671.3	
	39	668.3	
500k(255)	0	686.1	> 500
	19	670.7	
	39	669.3	
1M(37) High Power	0	703.5	> 500
	19	698.5	
	39	710.3	
1M(255) High Power	0	672.9	> 500
	19	675.6	
	39	675.9	
2M(37) High Power	0	1175	> 500
	19	1146	
	39	1179	
2M(255) High Power	0	1180	> 500
	19	1150	
	39	1234	

Note:

Worst case test Plot Only

1M **Bit/s(Normal Power):** 255 Byte

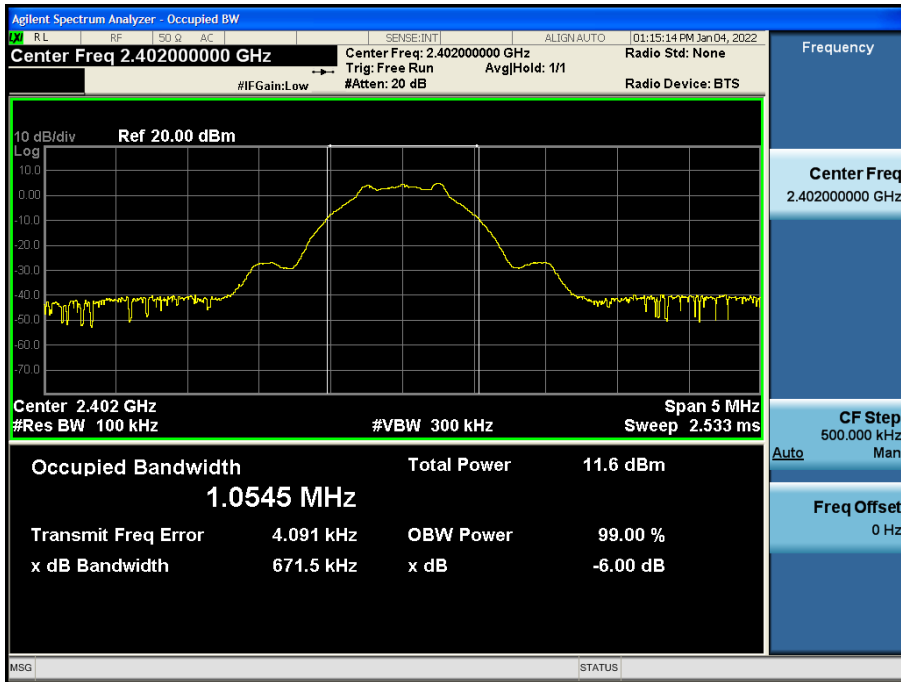
2M **Bit/s(High Power):** 37 Byte

125k **Bit/s:** 225 Byte

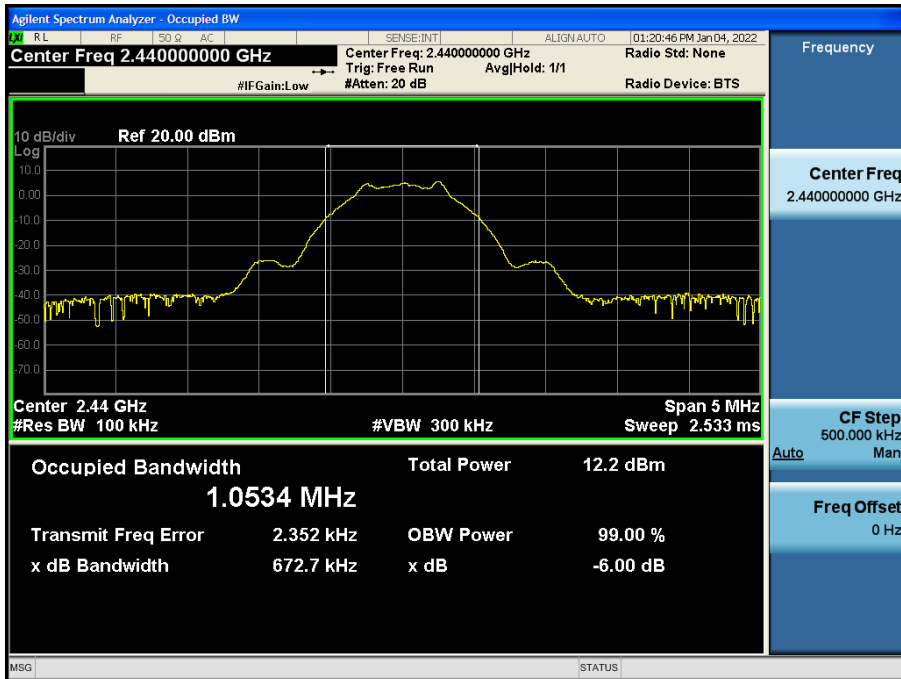
500k **Bit/s:** 37 Byte

1 MBit/s (255 Byte) Test Plots_Normal Power

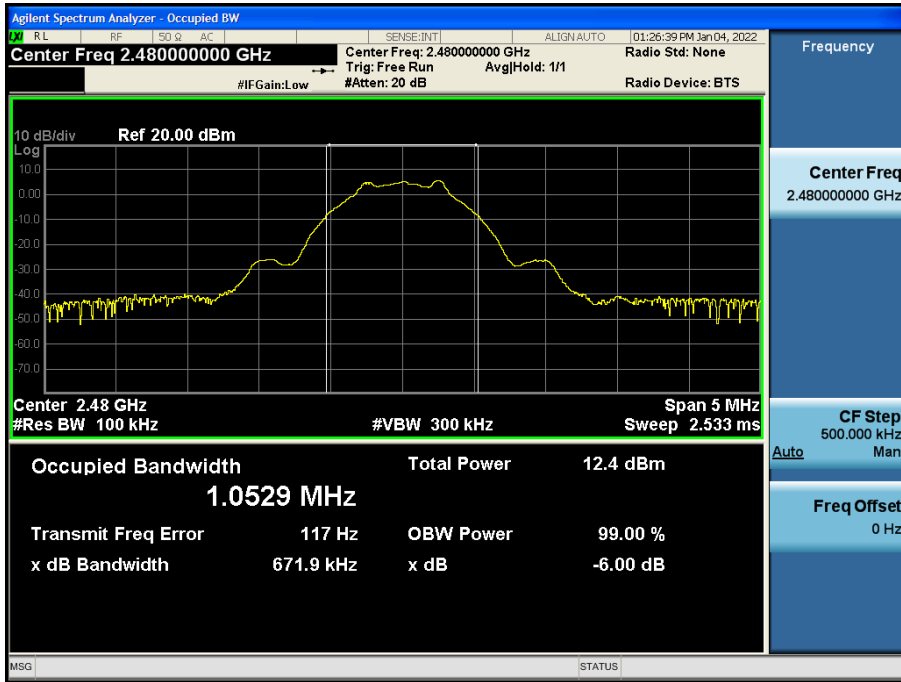
6 dB Bandwidth plot (Low-CH 0)



6 dB Bandwidth plot (Mid-CH 19)

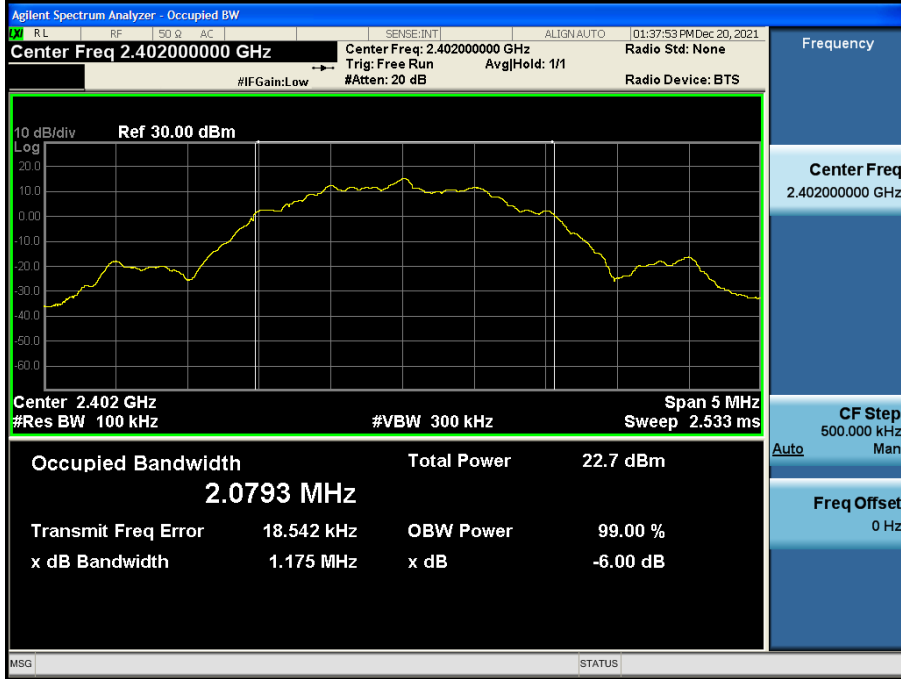


6 dB Bandwidth plot (High-CH 39)

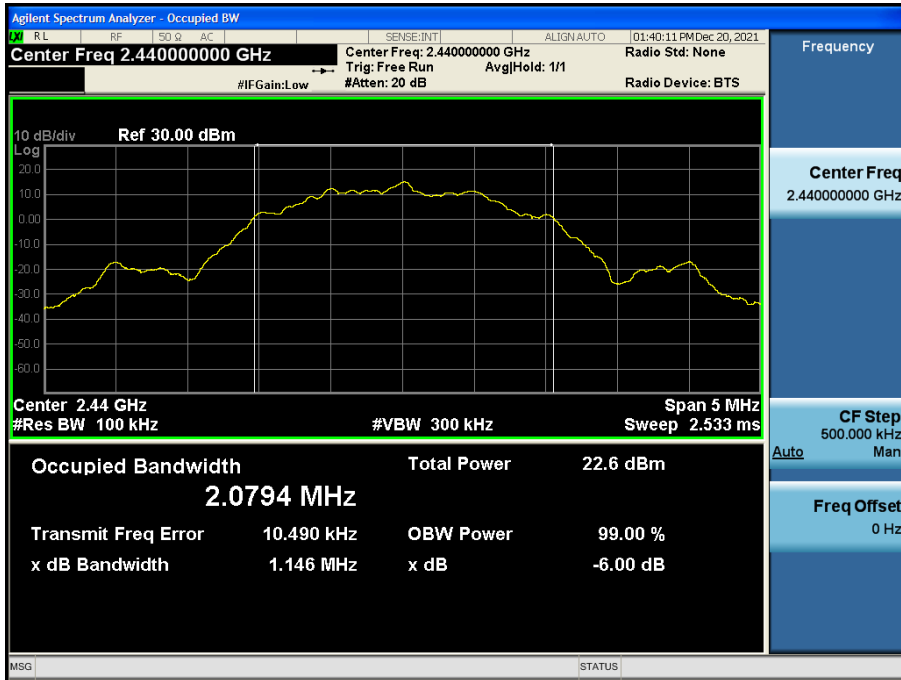


▣ 2 MBit/s (37 Byte) Test Plots_High Power

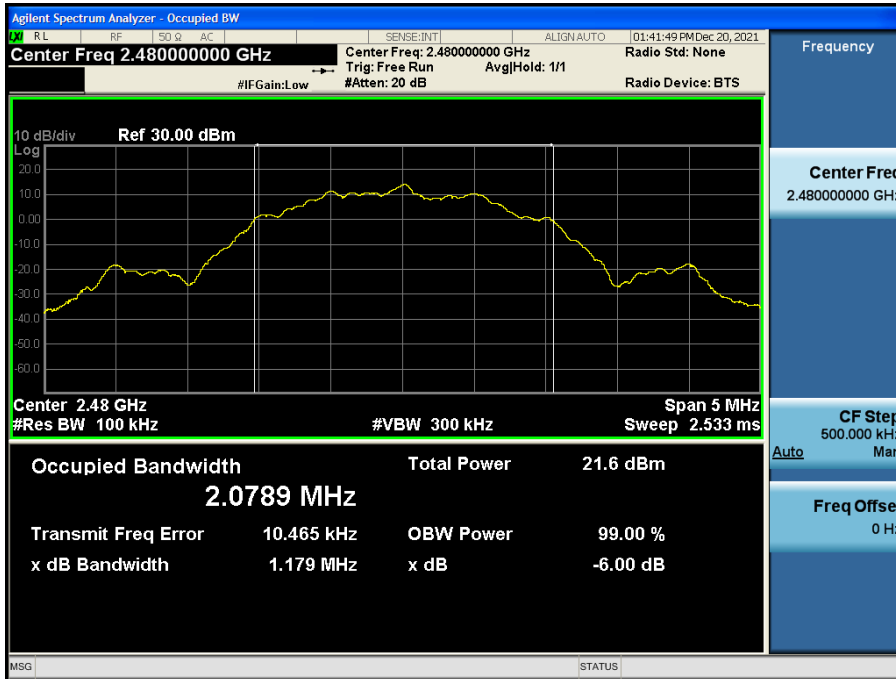
6 dB Bandwidth plot (Low-CH 0)



6 dB Bandwidth plot (Mid-CH 19)

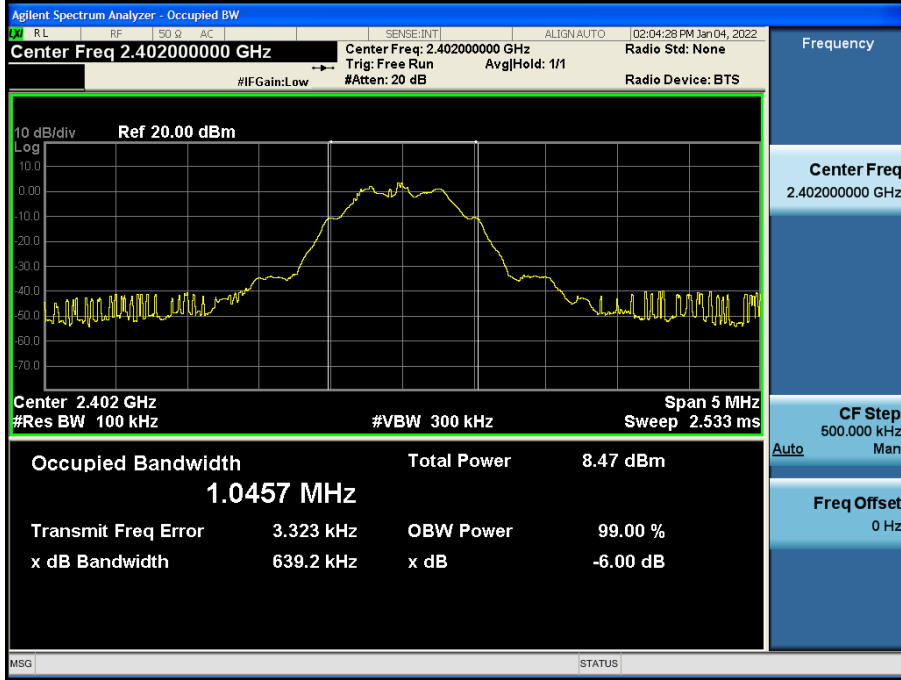


6 dB Bandwidth plot (High-CH 39)

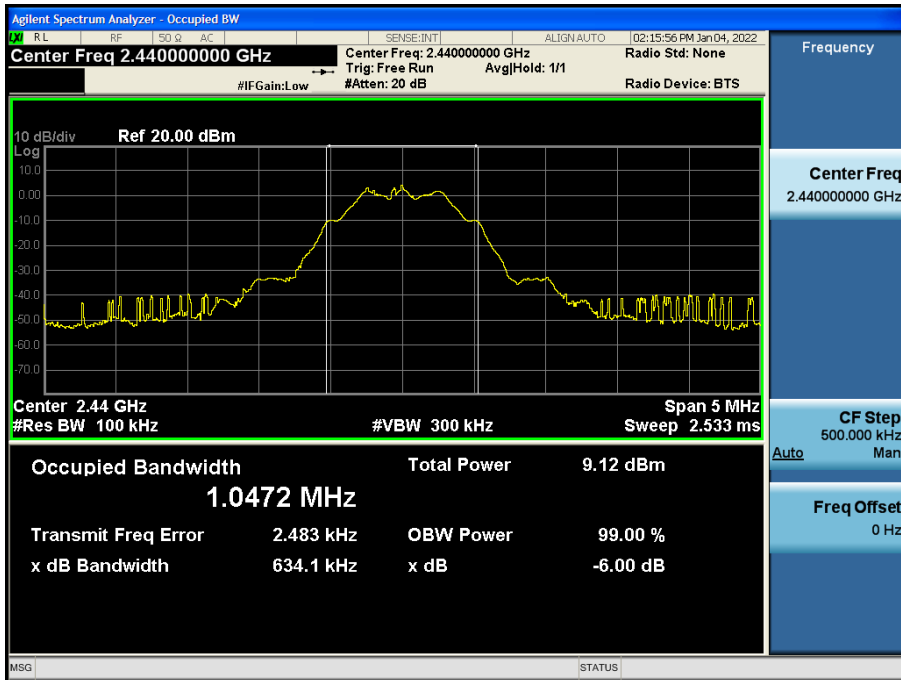


125k Bit/s(255 Byte) Test Plots

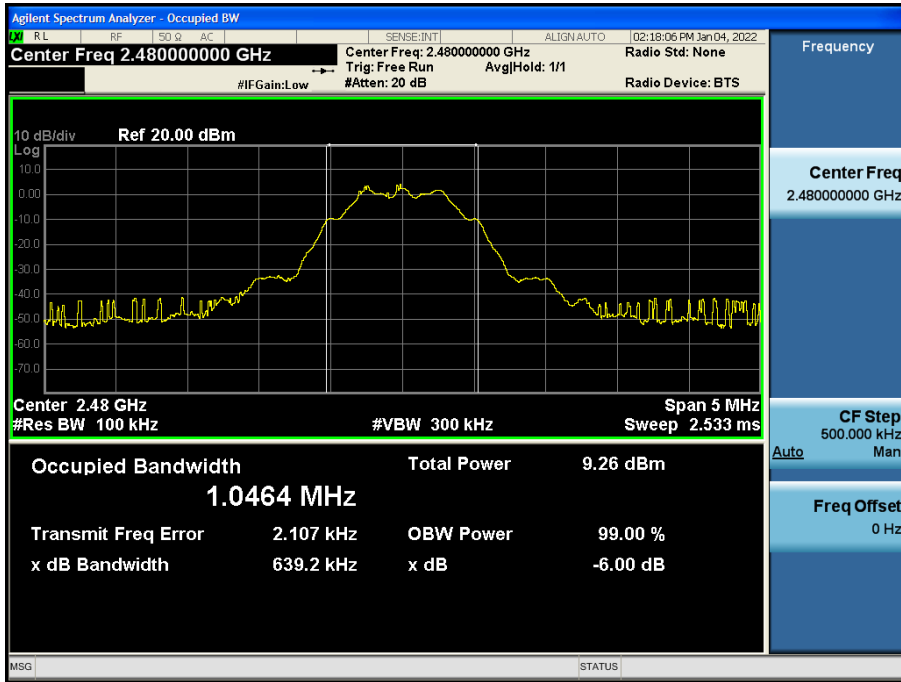
6 dB Bandwidth plot (Low-CH 0)



6 dB Bandwidth plot (Mid-CH 19)

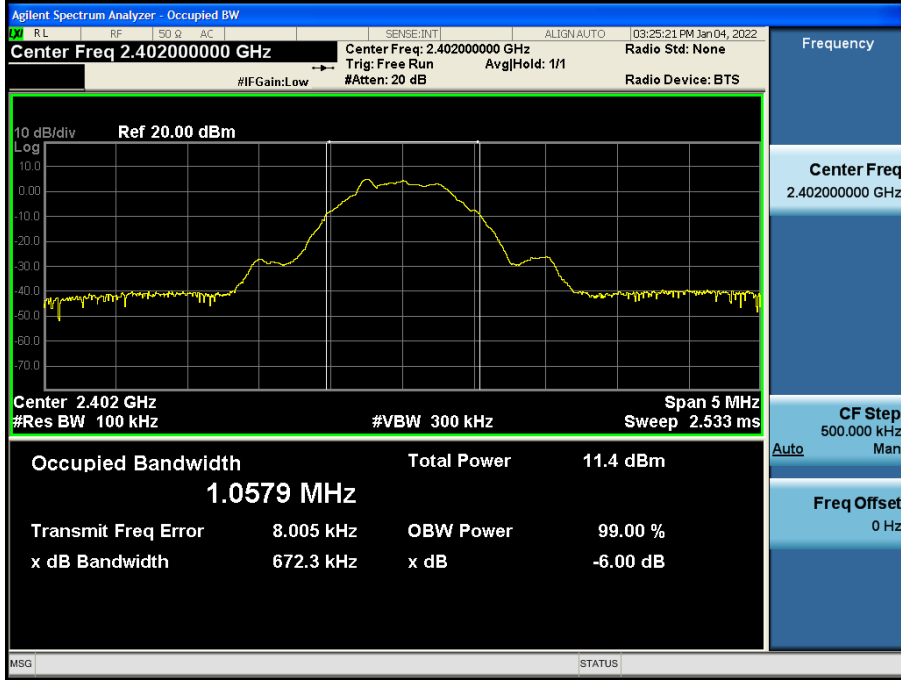


6 dB Bandwidth plot (High-CH 39)

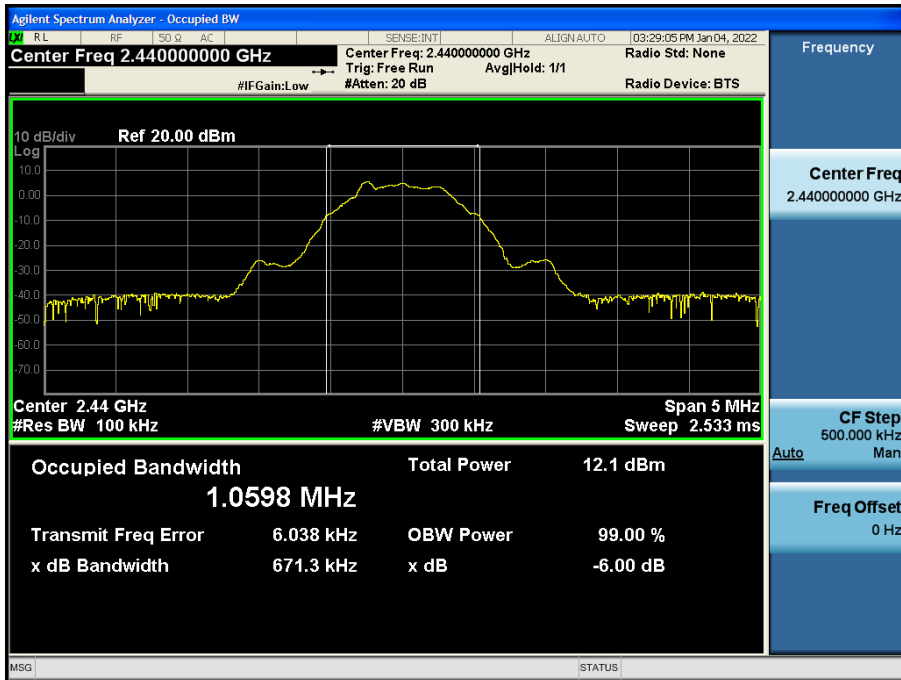


500k Bit/s(37 Byte) Test Plots

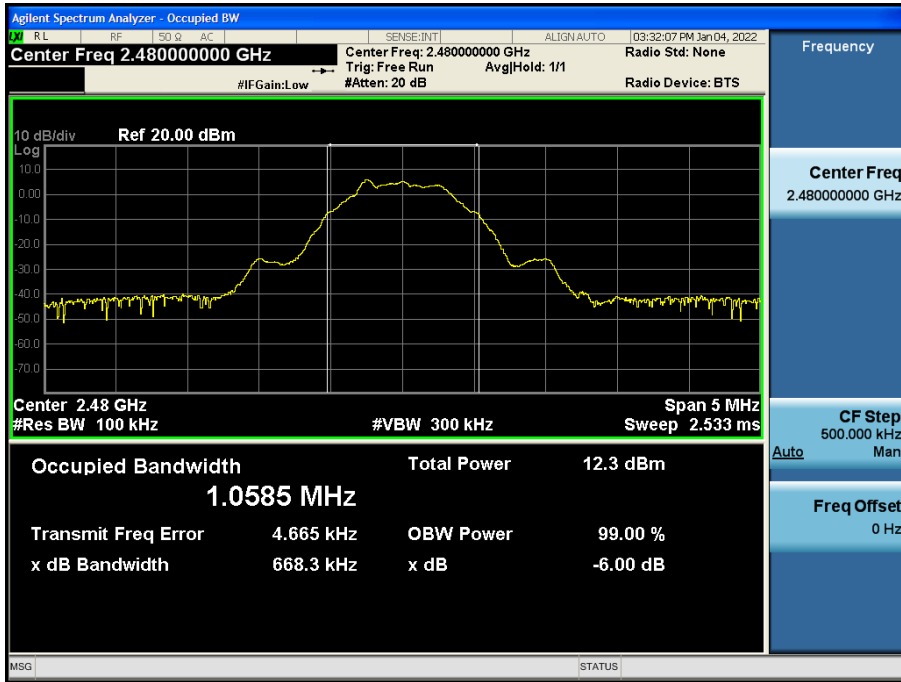
6 dB Bandwidth plot (Low-CH 0)



6 dB Bandwidth plot (Mid-CH 19)



6 dB Bandwidth plot (High-CH 39)



9.3 OUTPUT POWER

Peak Power(Normal)

Data rate (Bit/s)	Packet length (Byte)	LE Mode		Measured Power(dBm)	Limit (dBm)
		Frequency [MHz]	Channel		
1M	37	2402	0	4.949	30
		2440	19	5.617	
		2480	39	5.880	
	255	2402	0	4.996	
		2440	19	5.520	
		2480	39	5.790	
2M	37	2402	0	5.144	
		2440	19	5.653	
		2480	39	5.957	
	255	2402	0	5.123	
		2440	19	5.609	
		2480	39	5.909	
125k	37	2402	0	5.013	
		2440	19	5.529	
		2480	39	5.779	
	255	2402	0	4.962	
		2440	19	5.608	
		2480	39	5.773	
500k	37	2402	0	5.064	
		2440	19	5.584	
		2480	39	5.843	
	255	2402	0	4.842	
		2440	19	5.502	
		2480	39	5.765	

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, 20.52 dB is offset for 2.4 GHz Band.

Peak Power(High Power)

Data rate (Bit/s)	Packet length (Byte)	LE Mode		Measured Power(dBm)	Limit (dBm)
		Frequency [MHz]	Channel		
1M	37	2402	0	15.567	30
		2440	19	15.411	
		2480	39	14.412	
	255	2402	0	15.241	
		2440	19	15.064	
		2480	39	13.849	
2M	37	2402	0	16.019	
		2440	19	15.850	
		2480	39	14.810	
	255	2402	0	15.818	
		2440	19	15.515	
		2480	39	14.503	

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, 20.52 dB is offset for 2.4 GHz Band.

Average Power(Normal)

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	2.63	2.07	4.70	30
		2440	19	3.37	2.07	5.44	
		2480	39	3.58	2.07	5.65	
	255	2402	0	4.10	0.69	4.79	
		2440	19	4.59	0.69	5.28	
		2480	39	4.89	0.69	5.58	
2M	37	2402	0	-0.22	4.89	4.67	
		2440	19	0.40	4.89	5.29	
		2480	39	0.69	4.89	5.58	
	255	2402	0	2.41	2.41	4.82	
		2440	19	3.08	2.41	5.49	
		2480	39	3.26	2.41	5.67	
125k	37	2402	0	3.89	0.83	4.72	
		2440	19	4.55	0.83	5.38	
		2480	39	4.81	0.83	5.64	
	255	2402	0	4.58	0.11	4.69	
		2440	19	5.32	0.11	5.43	
		2480	39	5.49	0.11	5.60	
500k	37	2402	0	2.38	2.45	4.83	
		2440	19	3.00	2.45	5.45	
		2480	39	3.25	2.45	5.70	
	255	2402	0	4.24	0.41	4.65	
		2440	19	4.95	0.41	5.36	
		2480	39	5.16	0.41	5.57	

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, 20.52 dB is offset for 2.4 GHz Band.

Average Power(High Power)

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	13.18	2.07	15.25	30
		2440	19	13.14	2.07	15.21	
		2480	39	11.99	2.07	14.06	
	255	2402	0	14.24	0.69	14.93	
		2440	19	14.01	0.69	14.70	
		2480	39	12.85	0.69	13.54	
2M	37	2402	0	10.74	4.89	15.63	
		2440	19	10.48	4.89	15.37	
		2480	39	9.57	4.89	14.46	
	255	2402	0	12.97	2.42	15.39	
		2440	19	12.76	2.42	15.18	
		2480	39	11.69	2.42	14.11	

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, 20.52 dB is offset for 2.4 GHz Band.

9.4 POWER SPECTRAL DENSITY

Frequency (MHz)	Channel No.	Mode	Test Result			Limit (dBm)
			Measured Power(dBm)	Duty Cycle Factor(dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	
2402	0	1 MBit/s 37 Byte	-14.138	2.07	-12.072	8 dBm / 3 kHz
2440	19		-13.736	2.07	-11.670	
2480	39		-13.111	2.07	-11.045	
2402	0	1 MBit/s 255 Byte	-16.056	0.69	-15.371	
2440	19		-15.271	0.69	-14.586	
2480	39		-15.524	0.69	-14.839	
2402	0	2 MBit/s 37 Byte	-18.052	4.89	-13.165	
2440	19		-18.050	4.89	-13.163	
2480	39		-17.288	4.89	-12.401	
2402	0	2 MBit/s 255 Byte	-19.246	2.41	-16.837	
2440	19		-19.435	2.41	-17.026	
2480	39		-17.896	2.41	-15.487	
2402	0	125k 37 Byte	-3.510	0.83	-2.683	
2440	19		-2.723	0.83	-1.896	
2480	39		-2.401	0.83	-1.574	
2402	0	125k 255 Byte	-2.783	0.11	-2.674	
2440	19		-1.780	0.11	-1.671	
2480	39		-1.821	0.11	-1.712	
2402	0	500k 37 Byte	-10.234	2.45	-7.787	
2440	19		-8.752	2.45	-6.305	
2480	39		-8.725	2.45	-6.278	
2402	0	500k 255 Byte	-13.320	0.41	-12.910	
2440	19		-12.850	0.41	-12.440	
2480	39		-12.976	0.41	-12.566	
2402	0	1 MBit/s 37 Byte High Power	-3.401	2.07	-1.335	
2440	19		-3.335	2.07	-1.269	
2480	39		-4.796	2.07	-2.730	
2402	0	1 MBit/s 255 Byte High Power	-5.929	0.69	-5.244	
2440	19		-6.249	0.69	-5.564	
2480	39		-7.291	0.69	-6.606	
2402	0	2 MBit/s 37 Byte High Power	-7.138	4.89	-2.251	
2440	19		-7.800	4.89	-2.913	
2480	39		-8.889	4.89	-4.002	
2402	0	2 MBit/s 255 Byte High Power	-8.554	2.42	-6.138	
2440	19		-8.856	2.42	-6.440	
2480	39		-9.981	2.42	-7.565	

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

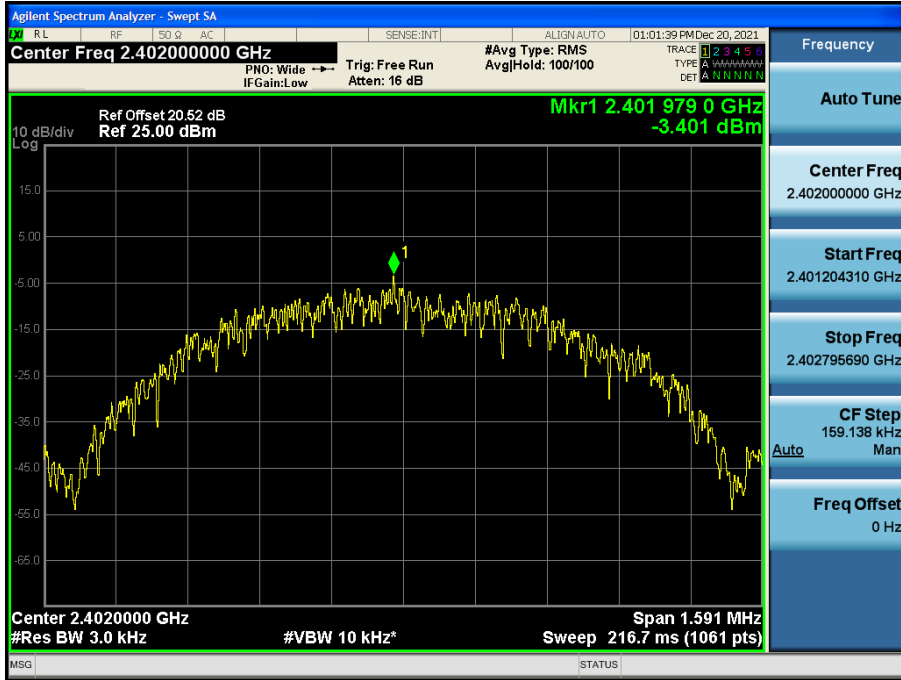
3. We apply to the offset in the 2.4 GHz range that was rounded off to the closest tenth dB.

So, 20.52 dB is offset for 2.4 GHz Band.

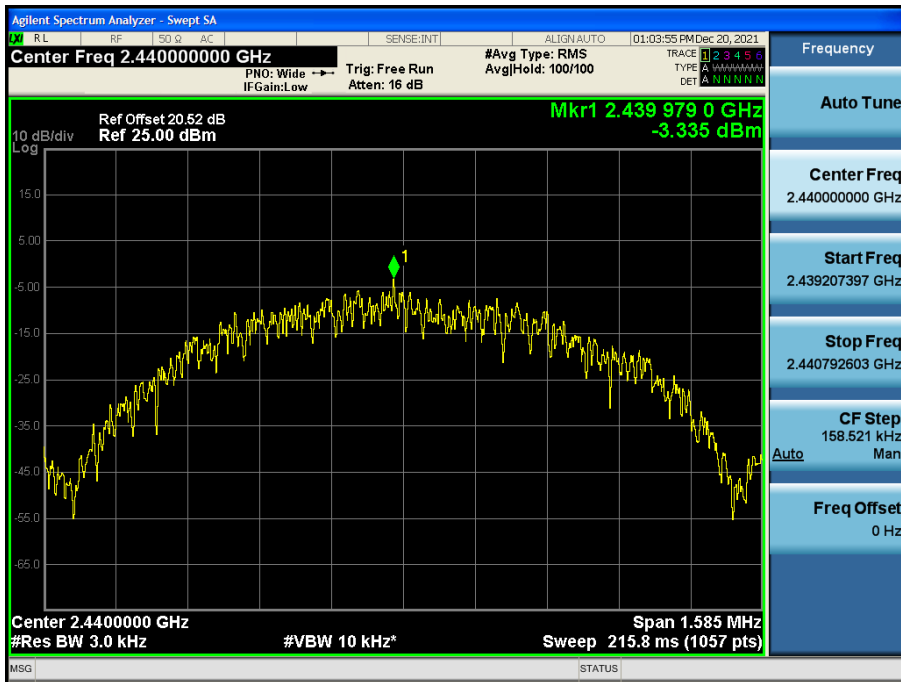
4. Worst case test Plot Only : High Power 1 MBit/s (37 Byte)

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

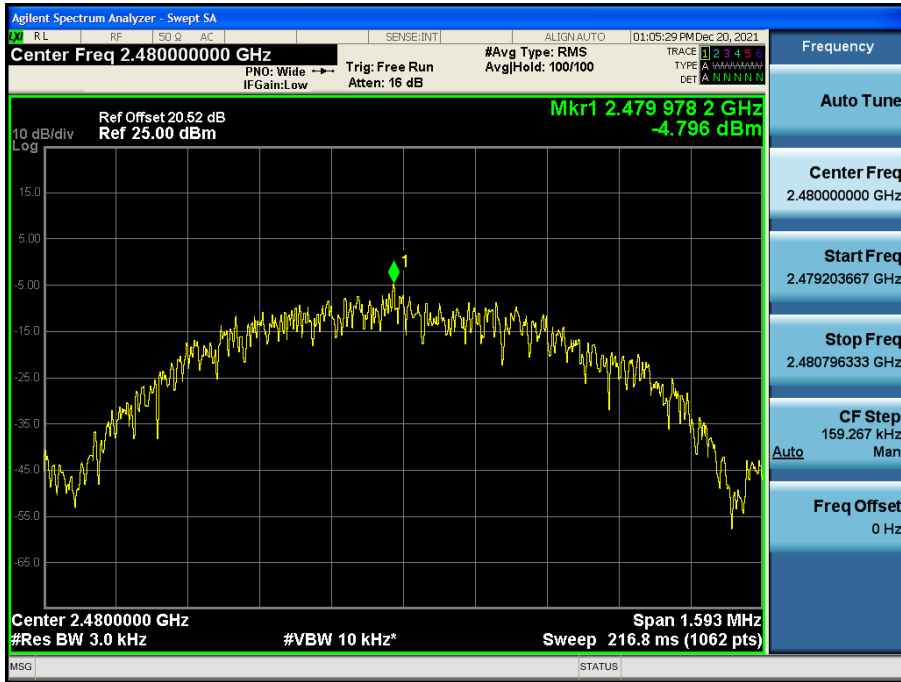
Power Spectral Density (Low-CH 0)



Power Spectral Density (Mid-CH 19)



Power Spectral Density (High-CH 39)



9.5 BAND EDGE/ CONDUCTED SPURIOUS EMISSIONS

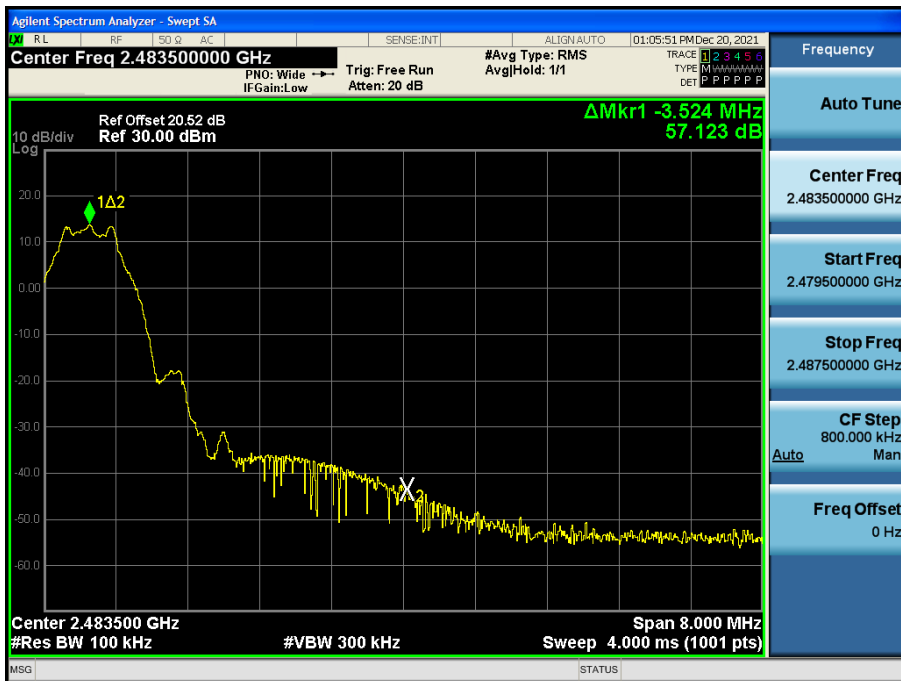
Test Result : please refer to the plot below.

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

1 MBit/s (37 Byte) Test Plots –Band Edge(High Power)
Low-CH 0



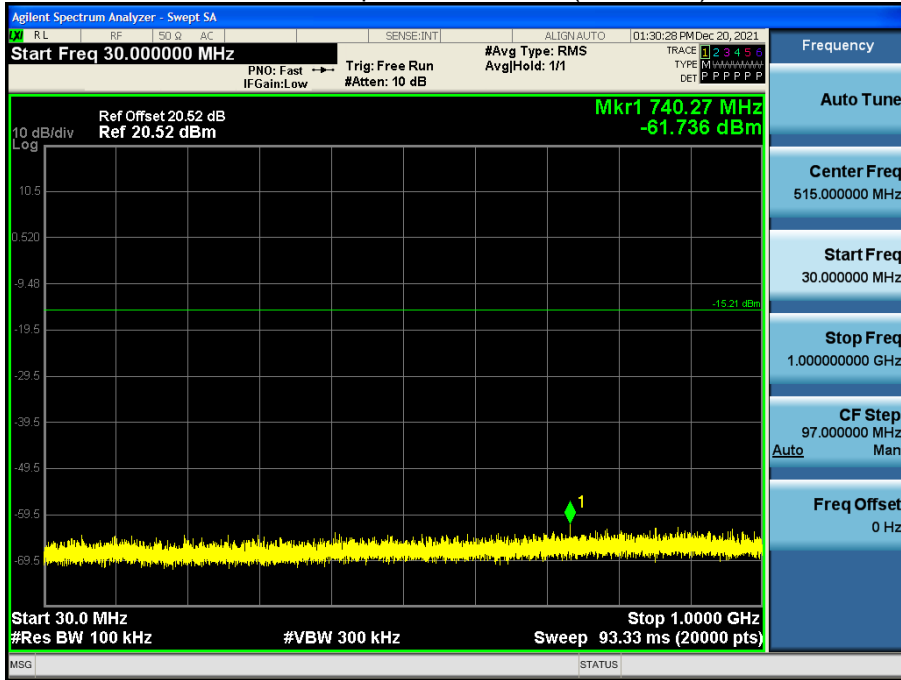
High-CH 39



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

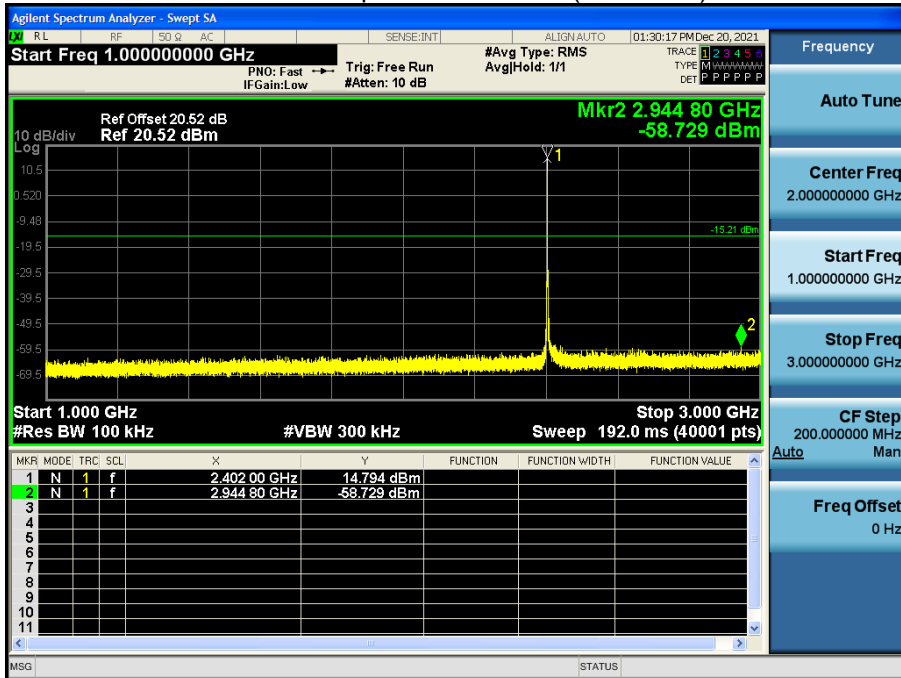
30 MHz ~ 1 GHz

Conducted Spurious Emission (Low-CH 0)



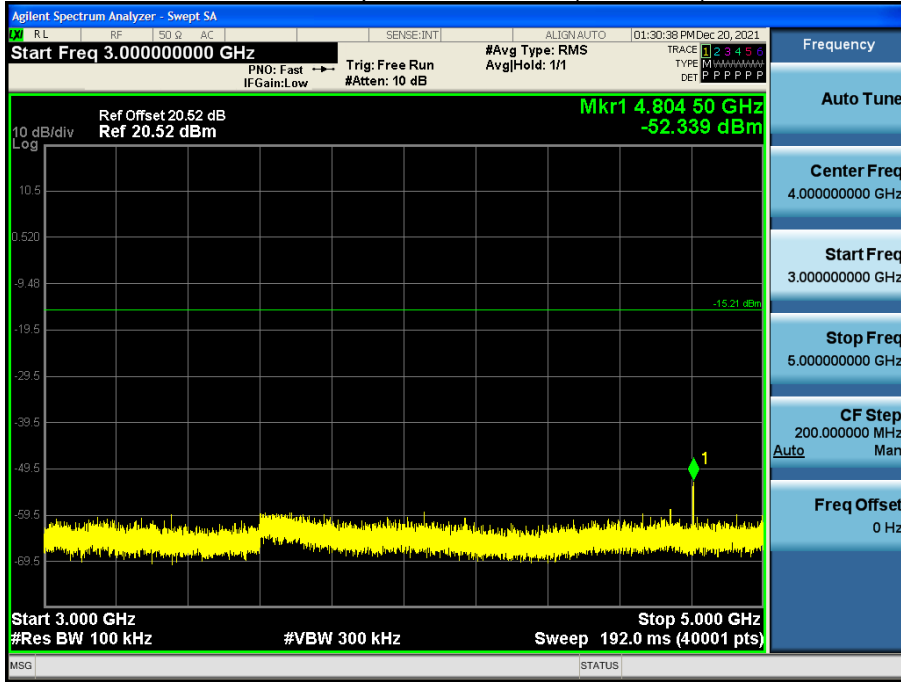
1 GHz ~ 3 GHz

Conducted Spurious Emission (Low-CH 0)



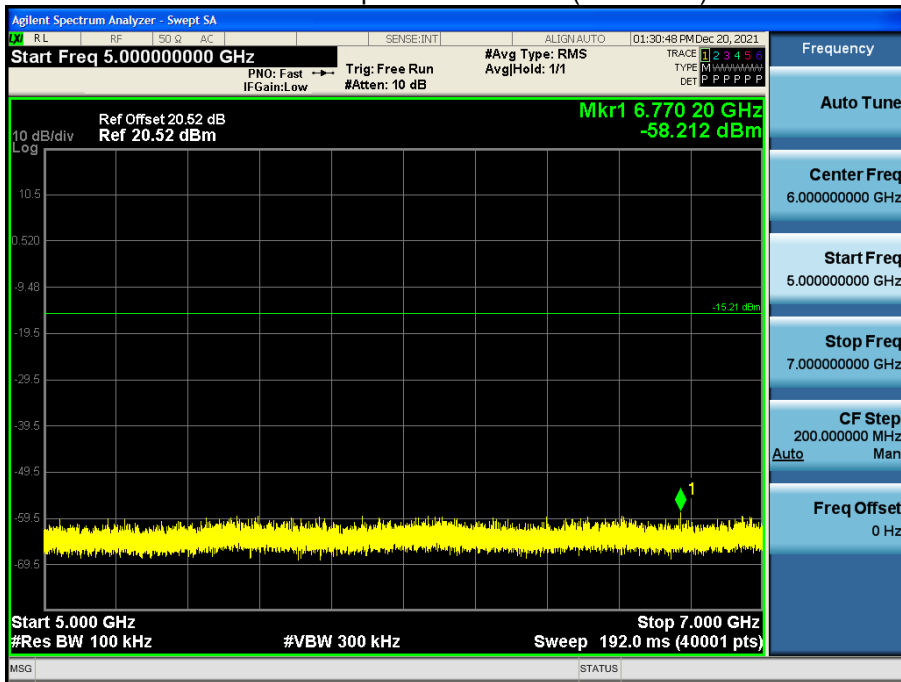
3 GHz ~ 5 GHz

Conducted Spurious Emission (Low-CH 0)



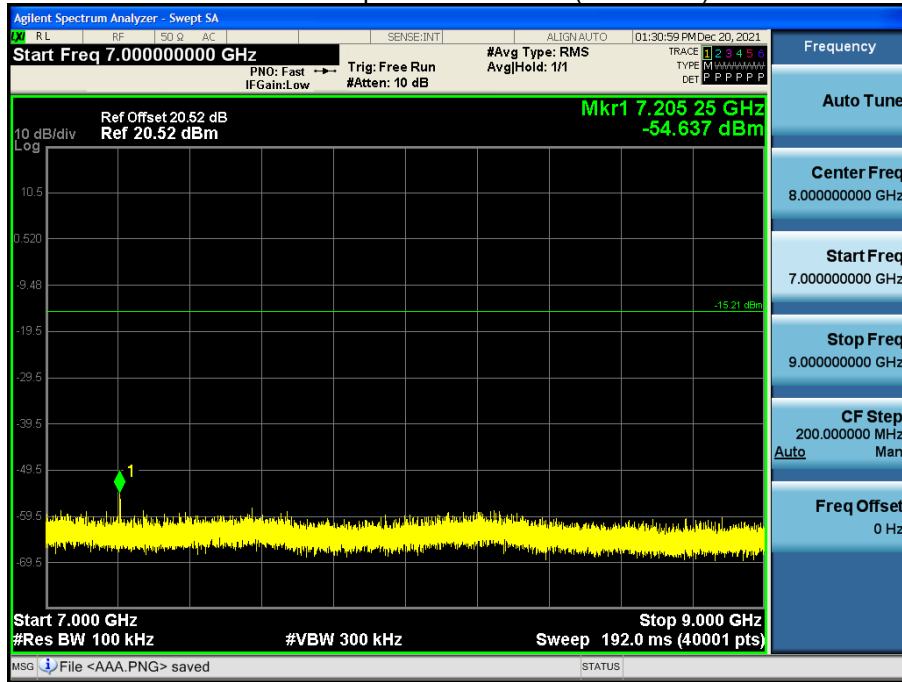
5 GHz ~ 7 GHz

Conducted Spurious Emission (Low-CH 0)



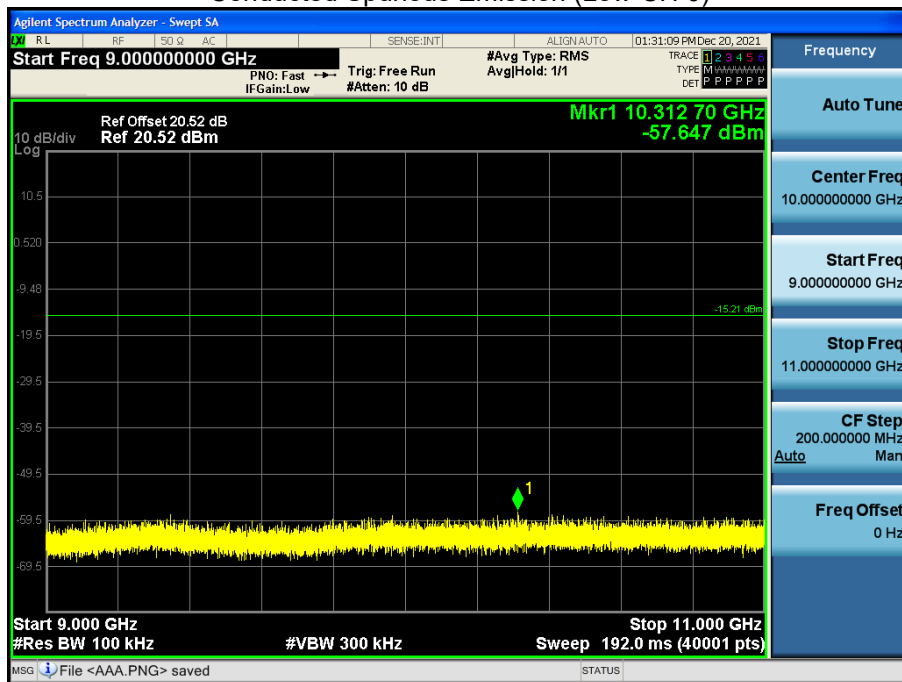
7 GHz ~ 9 GHz

Conducted Spurious Emission (Low-CH 0)



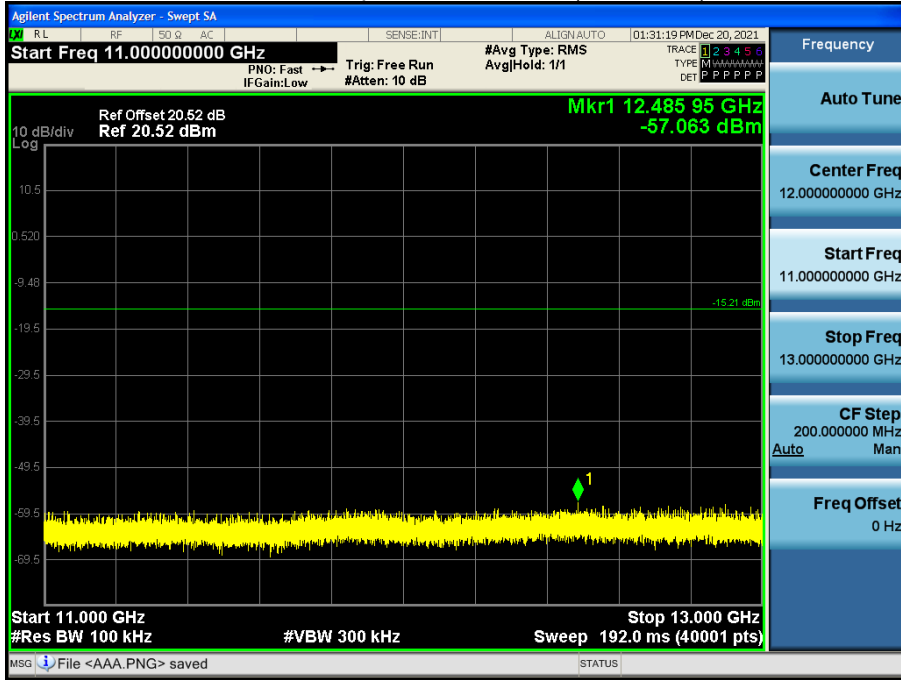
9 GHz ~ 11 GHz

Conducted Spurious Emission (Low-CH 0)



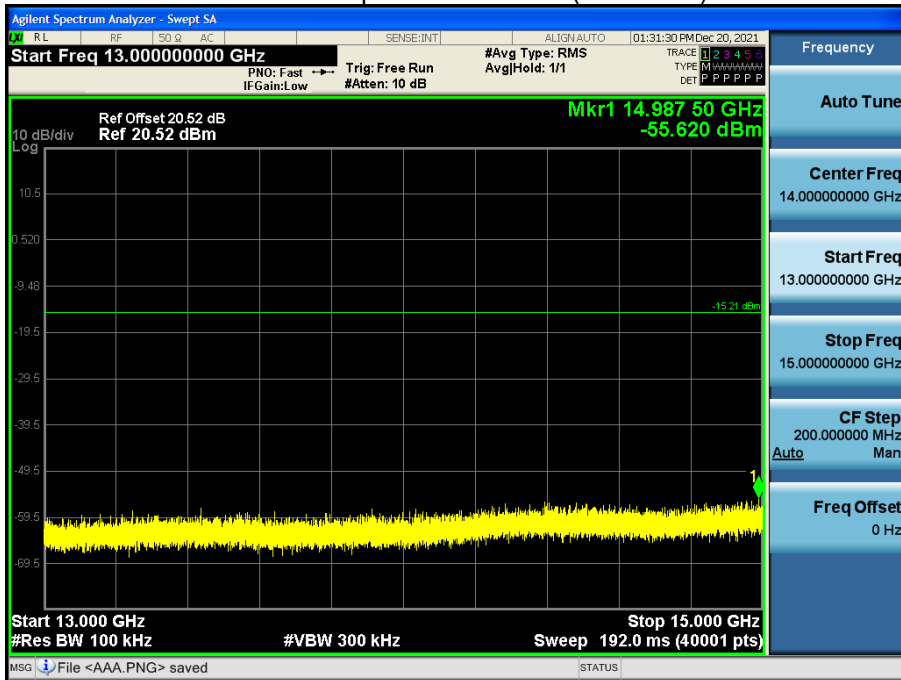
11 GHz ~ 13 GHz

Conducted Spurious Emission (Low-CH 0)



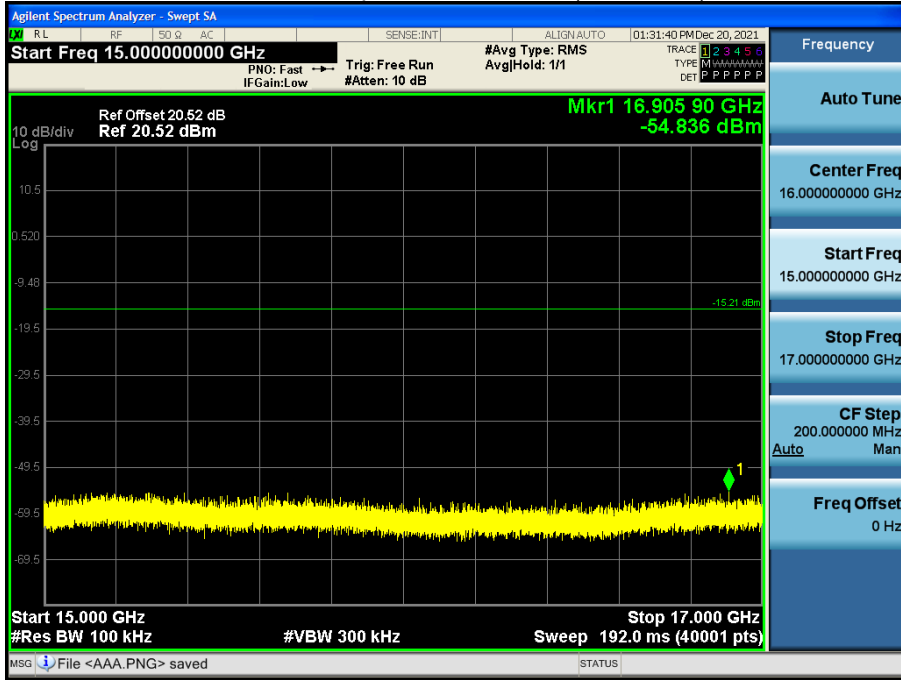
13 GHz ~ 15 GHz

Conducted Spurious Emission (Low-CH 0)



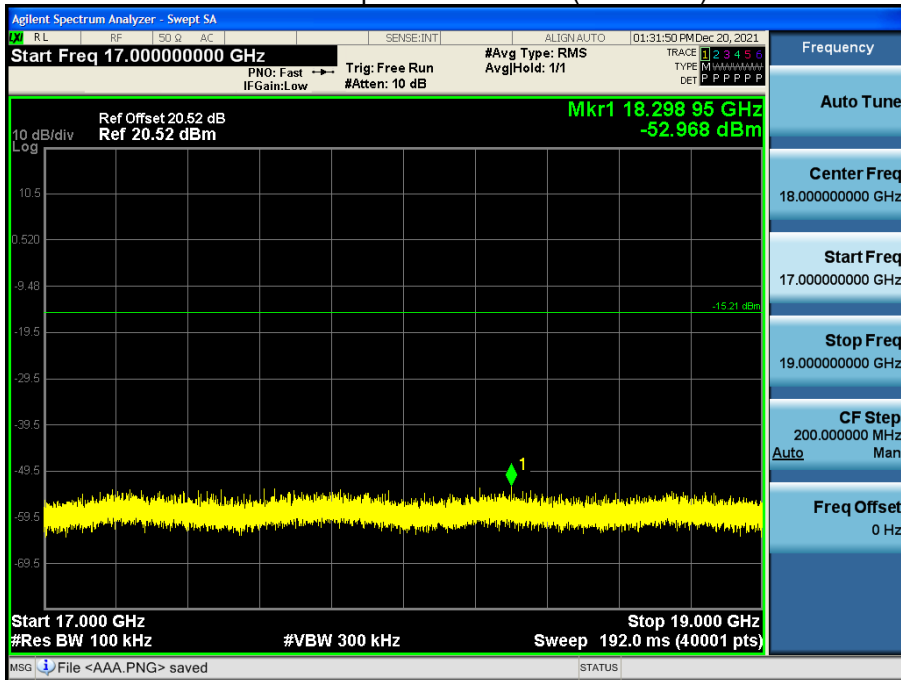
15 GHz ~ 17 GHz

Conducted Spurious Emission (Low-CH 0)



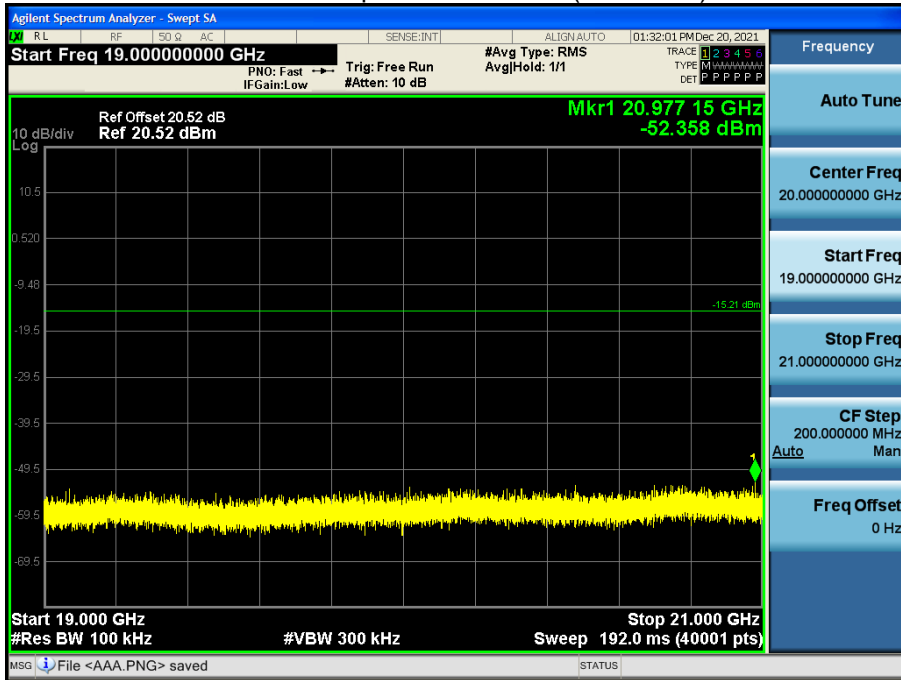
17 GHz ~ 19 GHz

Conducted Spurious Emission (Low-CH 0)



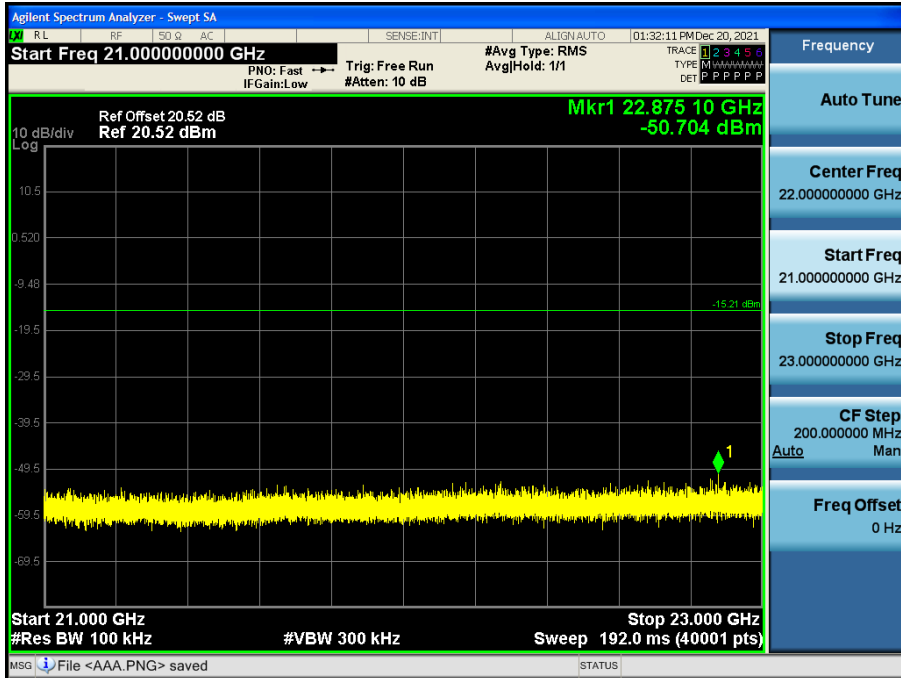
19 GHz ~ 21 GHz

Conducted Spurious Emission (Low-CH 0)



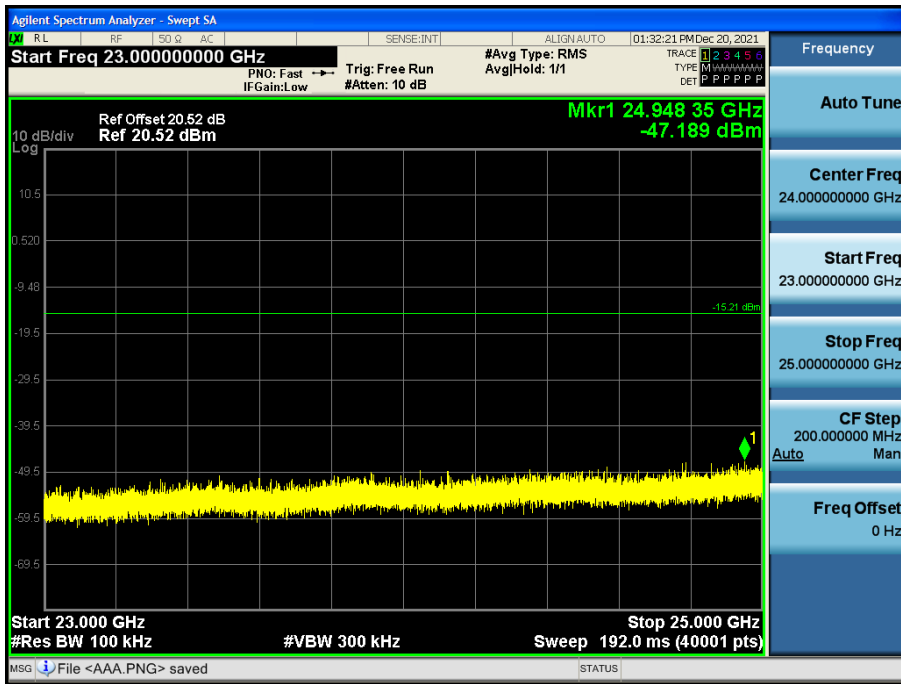
21 GHz ~ 23 GHz

Conducted Spurious Emission (Low-CH 0)



23 GHz ~ 25 GHz

Conducted Spurious Emission (Low-CH 0)



2 MBit/s (37 Byte) Test Plots –BandEdge(High Power)
Low-CH 0



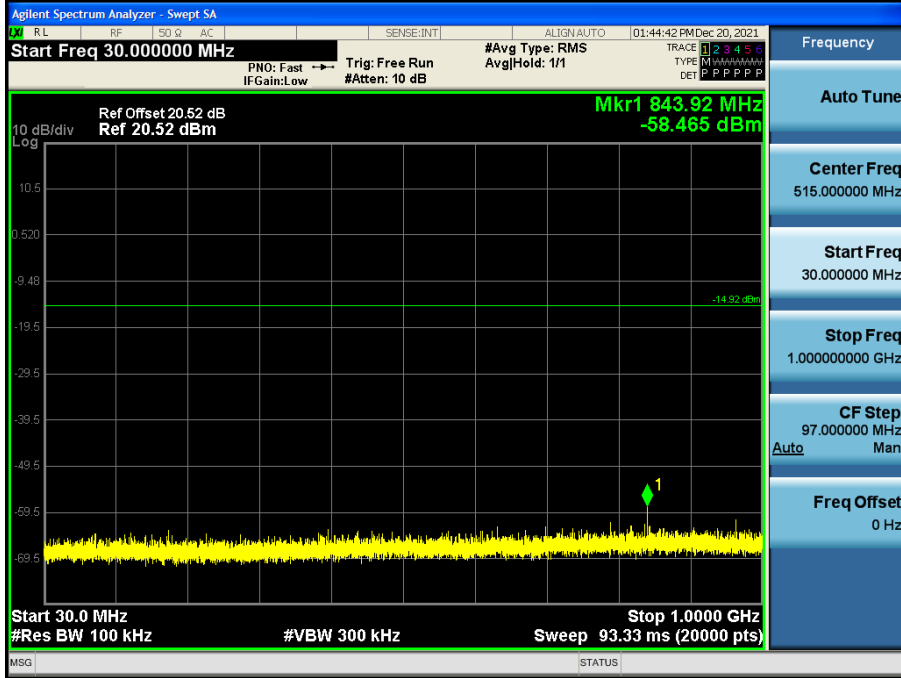
High-CH 39



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

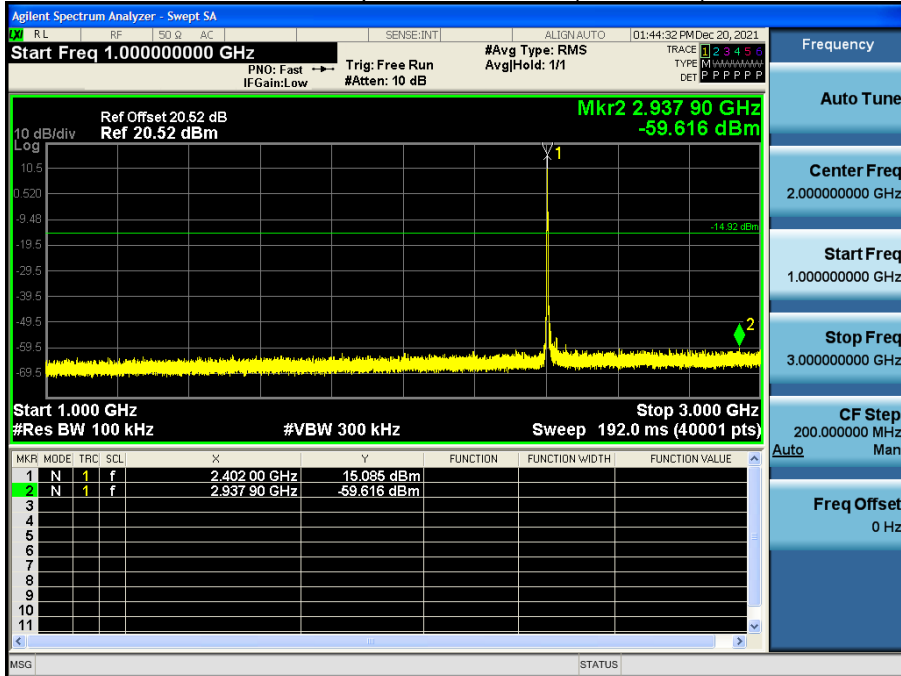
30 MHz ~ 1 GHz

Conducted Spurious Emission (Low-CH 0)



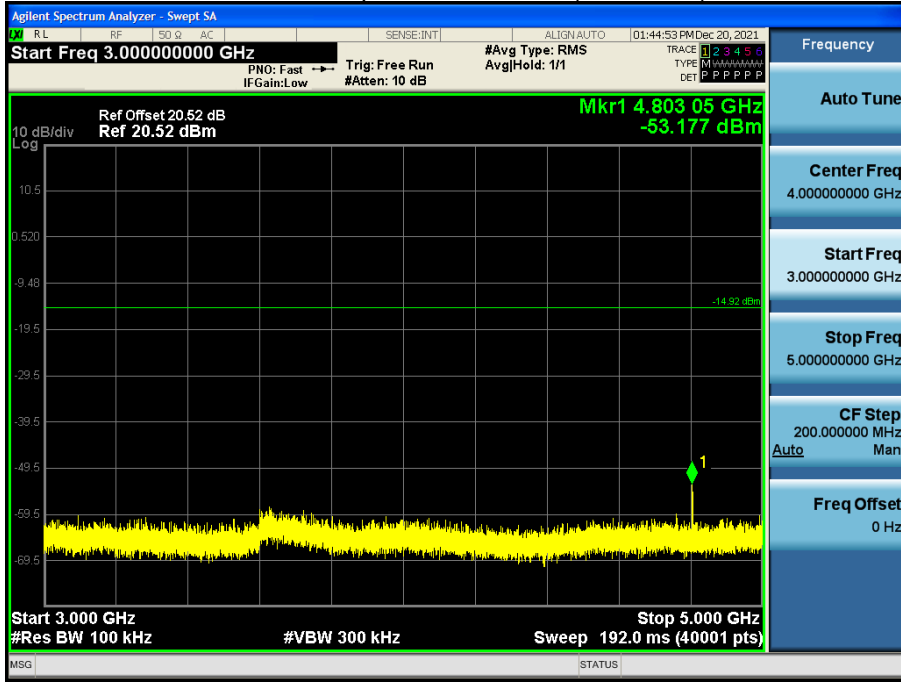
1 GHz ~ 3 GHz

Conducted Spurious Emission (Low-CH 0)



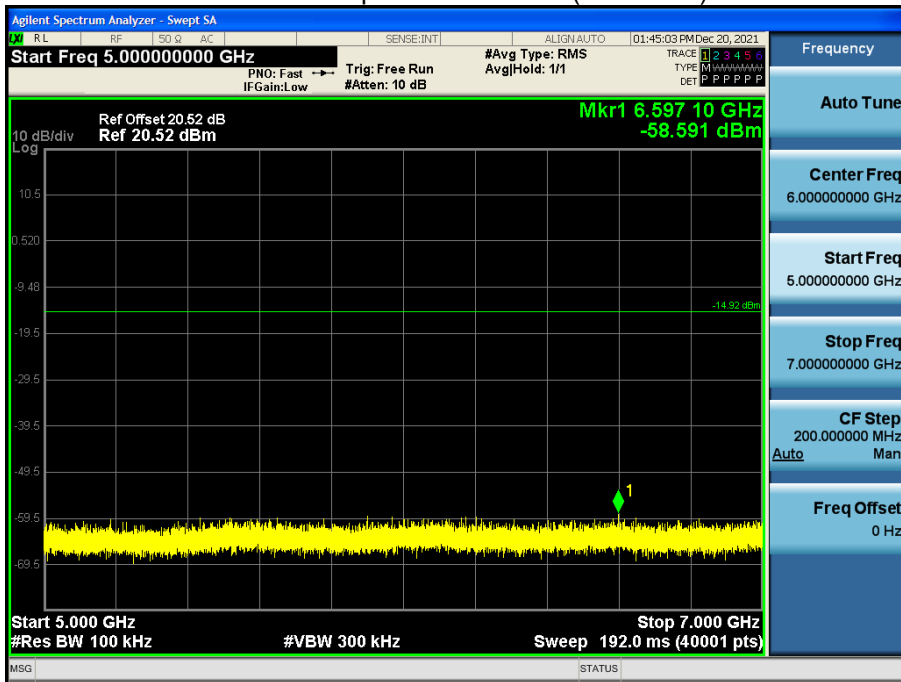
3 GHz ~ 5 GHz

Conducted Spurious Emission (Low-CH 0)



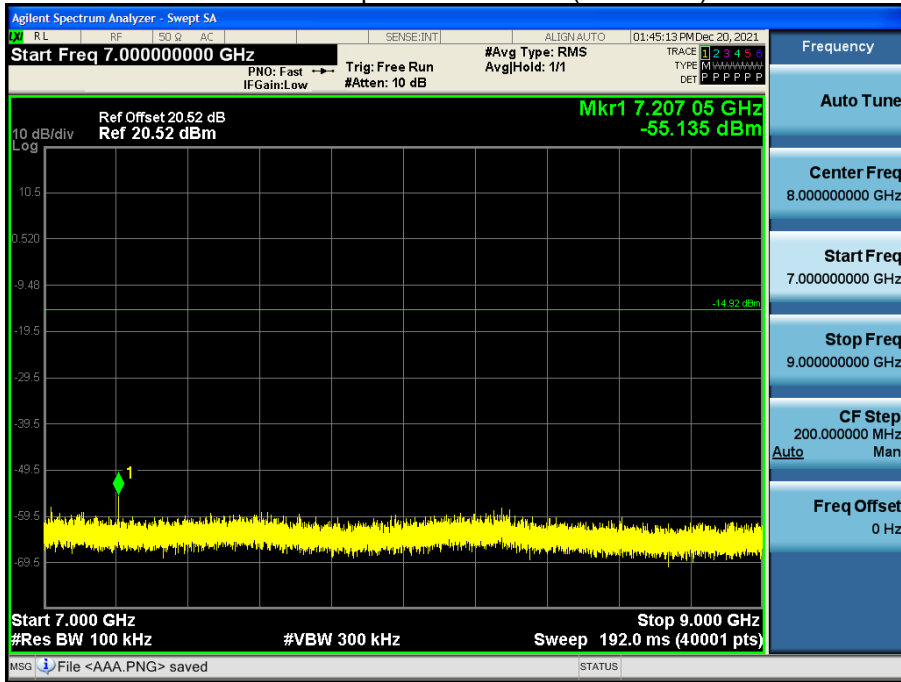
5 GHz ~ 7 GHz

Conducted Spurious Emission (Low-CH 0)



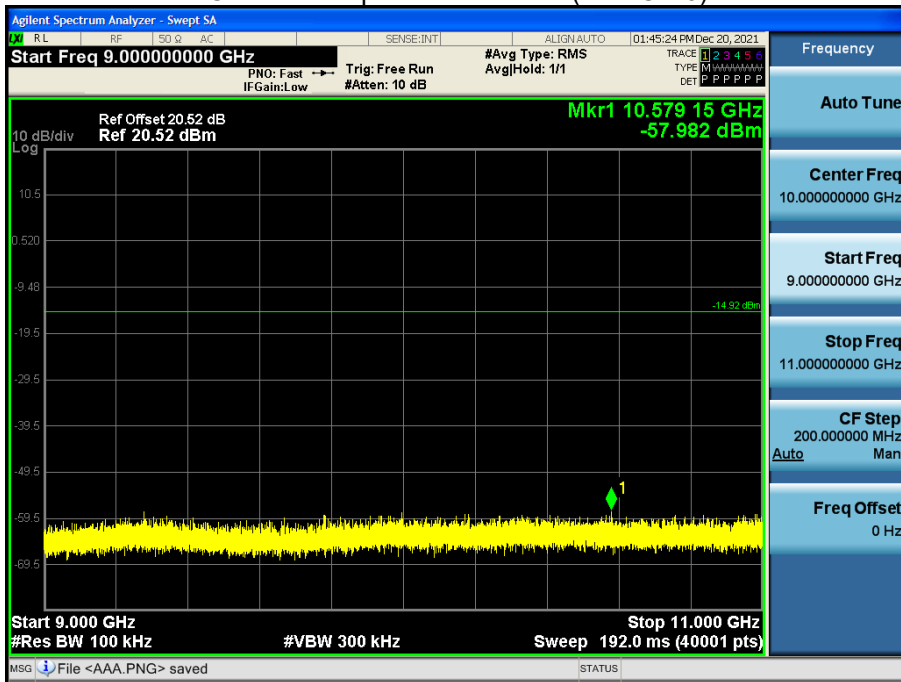
7 GHz ~ 9 GHz

Conducted Spurious Emission (Low-CH 0)



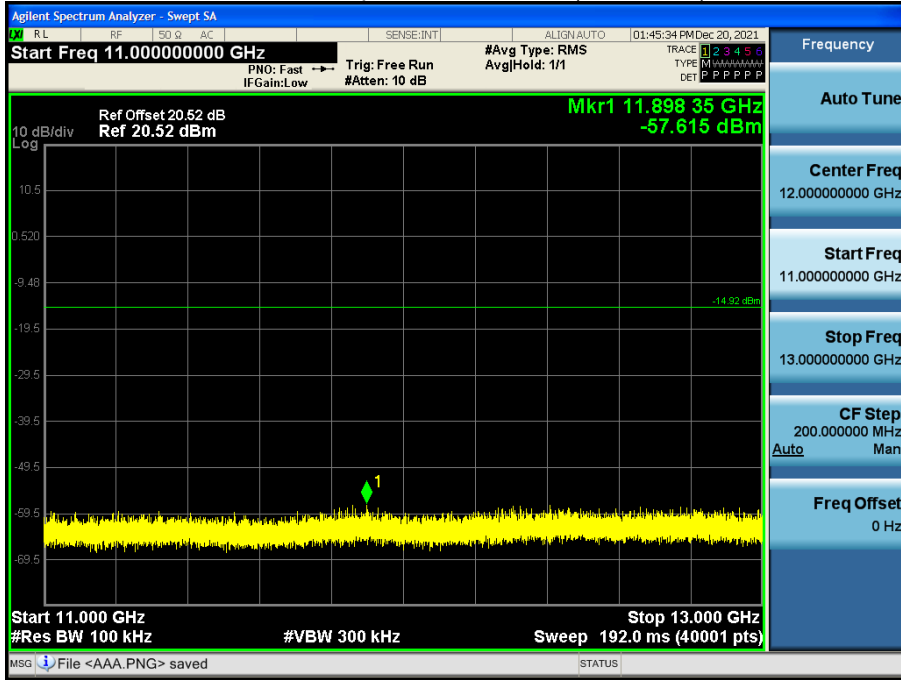
9 GHz ~ 11 GHz

Conducted Spurious Emission (Low-CH 0)



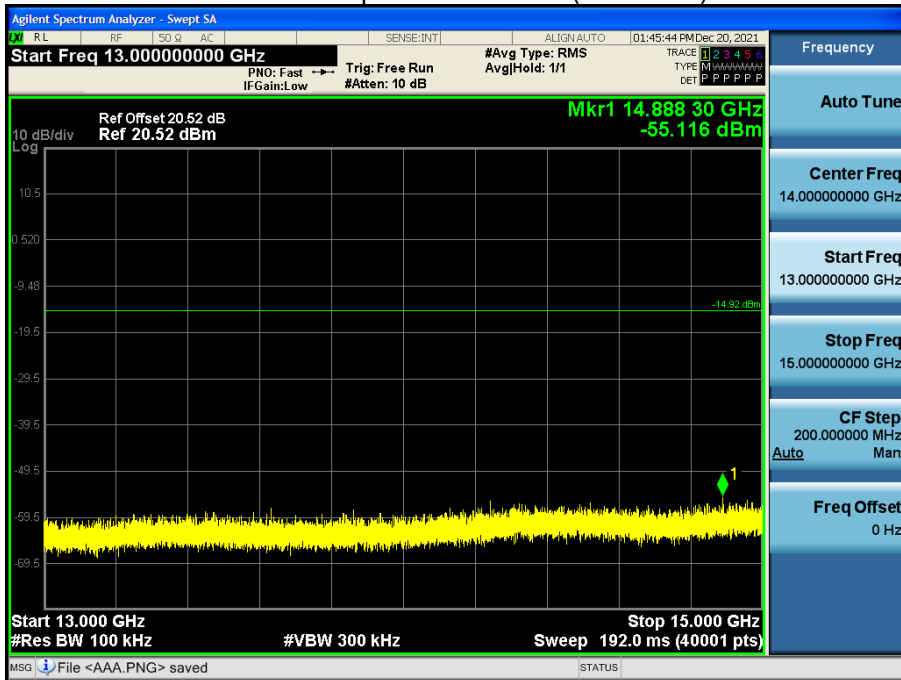
11 GHz ~ 13 GHz

Conducted Spurious Emission (Low-CH 0)



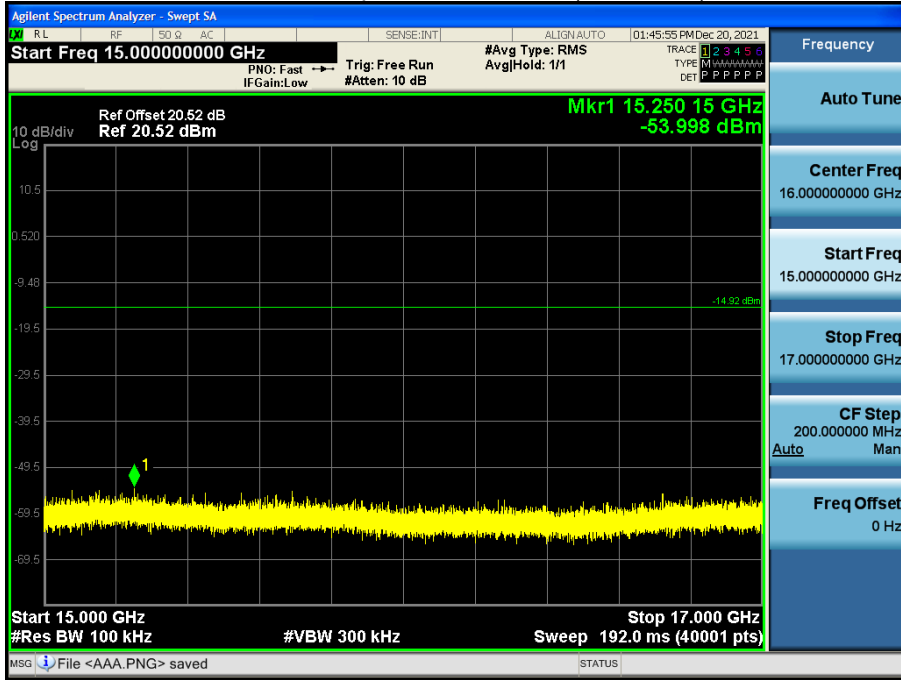
13 GHz ~ 15 GHz

Conducted Spurious Emission (Low-CH 0)



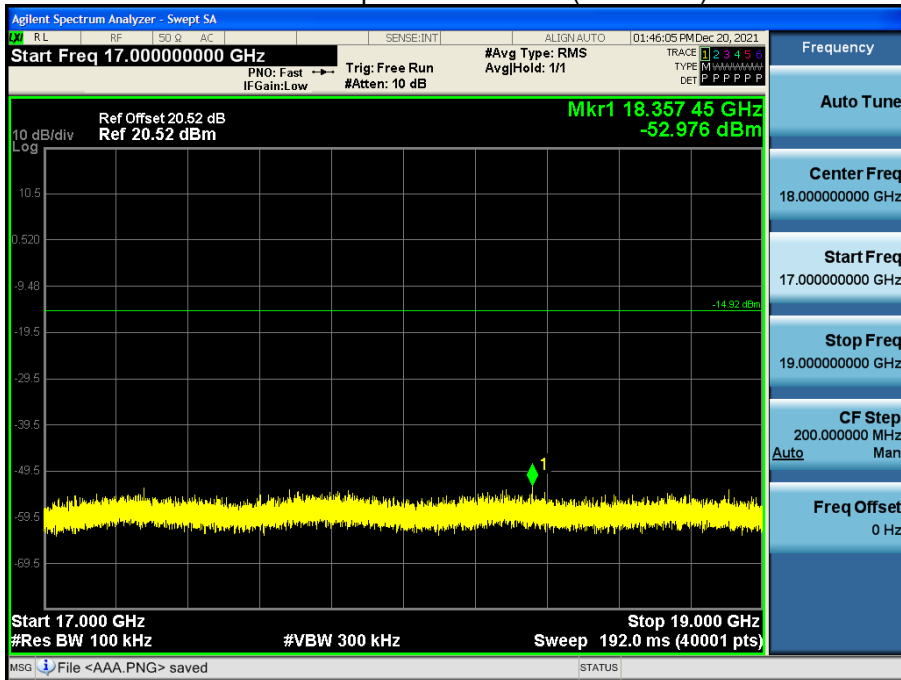
15 GHz ~ 17 GHz

Conducted Spurious Emission (Low-CH 0)



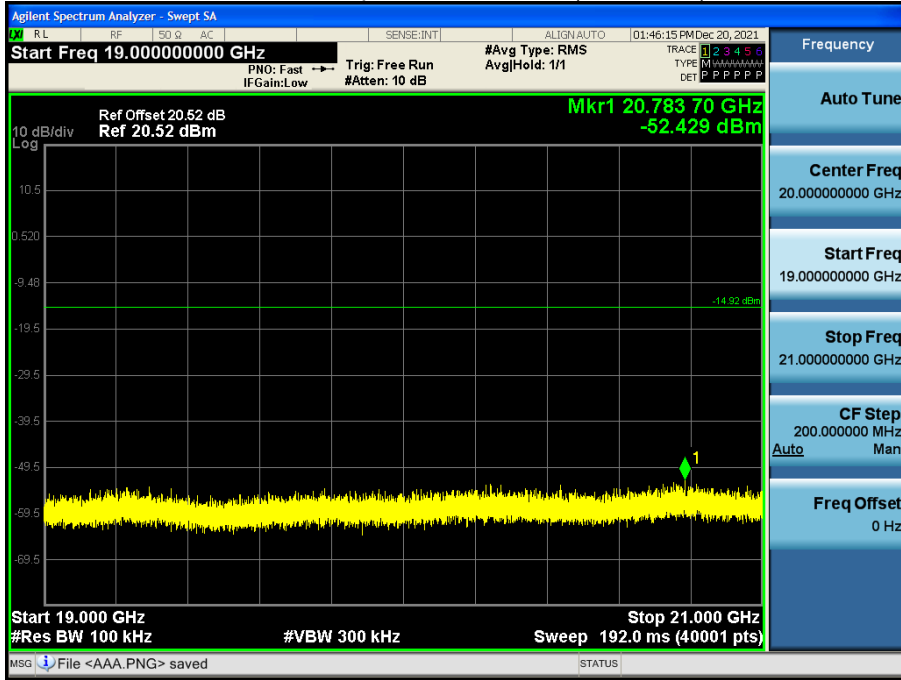
17 GHz ~ 19 GHz

Conducted Spurious Emission (Low-CH 0)



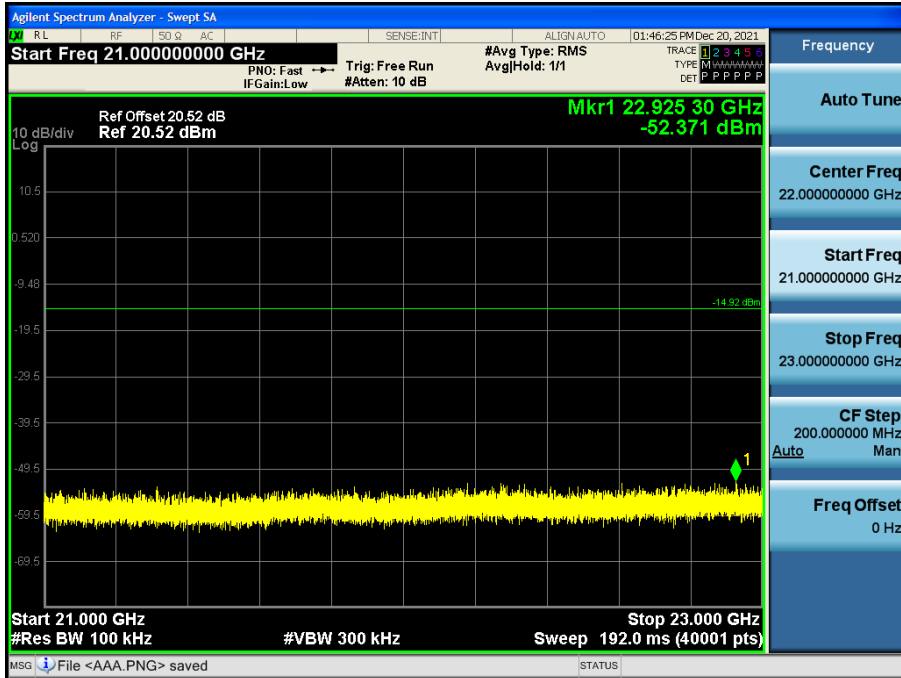
19 GHz ~ 21 GHz

Conducted Spurious Emission (Low-CH 0)



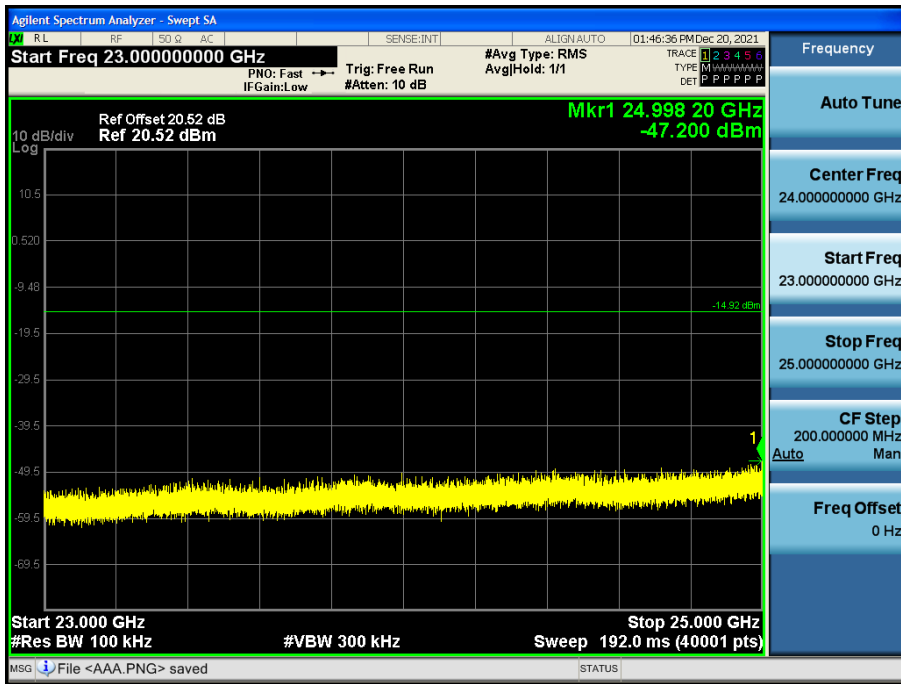
21 GHz ~ 23 GHz

Conducted Spurious Emission (Low-CH 0)



23 GHz ~ 25 GHz

Conducted Spurious Emission (Low-CH 0)



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 = $40\log(\text{specific distance} / \text{test distance})$ (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

Mode : 1 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	41.22	0.00	5.14	V	46.36	73.98	27.62	PK
4804	28.98	2.07	5.14	V	36.19	53.98	17.79	AV
7206	43.41	0.00	12.89	V	56.30	73.98	17.68	PK
7206	34.24	2.07	12.89	V	49.20	53.98	4.78	AV
4804	41.69	0.00	5.14	H	46.83	73.98	27.15	PK
4804	29.00	2.07	5.14	H	36.21	53.98	17.77	AV
7206	44.71	0.00	12.89	H	57.60	73.98	16.38	PK
7206	35.81	2.07	12.89	H	50.77	53.98	3.21	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	40.81	0.00	5.44	V	46.25	73.98	27.73	PK
4880	28.54	2.07	5.44	V	36.05	53.98	17.93	AV
7320	41.07	0.00	12.98	V	54.05	73.98	19.93	PK
7320	30.83	2.07	12.98	V	45.88	53.98	8.10	AV
4880	41.06	0.00	5.44	H	46.50	73.98	27.48	PK
4880	28.56	2.07	5.44	H	36.07	53.98	17.91	AV
7320	42.32	0.00	12.98	H	55.30	73.98	18.68	PK
7320	32.18	2.07	12.98	H	47.23	53.98	6.75	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	41.12	0.00	6.25	V	47.37	73.98	26.61	PK
4960	29.04	2.07	6.25	V	37.36	53.98	16.62	AV
7440	40.18	0.00	12.61	V	52.79	73.98	21.19	PK
7440	28.39	2.07	12.61	V	43.07	53.98	10.91	AV
4960	41.47	0.00	6.25	H	47.72	73.98	26.26	PK
4960	29.06	2.07	6.25	H	37.38	53.98	16.60	AV
7440	41.29	0.00	12.61	H	53.90	73.98	20.08	PK
7440	29.56	2.07	12.61	H	44.24	53.98	9.74	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	40.74	0.00	5.14	V	45.88	73.98	28.10	PK
4804	28.93	4.89	5.14	V	38.96	53.98	15.02	AV
7206	43.25	0.00	12.89	V	56.14	73.98	17.84	PK
7206	31.36	4.89	12.89	V	49.14	53.98	4.84	AV
4804	41.17	0.00	5.14	H	46.31	73.98	27.67	PK
4804	28.95	4.89	5.14	H	38.98	53.98	15.00	AV
7206	44.69	0.00	12.89	H	57.58	73.98	16.40	PK
7206	32.98	4.89	12.89	H	50.76	53.98	3.22	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	40.41	0.00	5.44	V	45.85	73.98	28.13	PK
4880	28.50	4.89	5.44	V	38.83	53.98	15.15	AV
7320	41.12	0.00	12.98	V	54.10	73.98	19.88	PK
7320	28.56	4.89	12.98	V	46.43	53.98	7.55	AV
4880	40.55	0.00	5.44	H	45.99	73.98	27.99	PK
4880	28.52	4.89	5.44	H	38.85	53.98	15.13	AV
7320	42.39	0.00	12.98	H	55.37	73.98	18.61	PK
7320	29.71	4.89	12.98	H	47.58	53.98	6.40	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	41.19	0.00	6.25	V	47.44	73.98	26.54	PK
4960	29.00	4.89	6.25	V	40.14	53.98	13.84	AV
7440	39.33	0.00	12.61	V	51.94	73.98	22.04	PK
7440	26.94	4.89	12.61	V	44.44	53.98	9.54	AV
4960	41.35	0.00	6.25	H	47.60	73.98	26.38	PK
4960	29.01	4.89	6.25	H	40.15	53.98	13.83	AV
7440	40.67	0.00	12.61	H	53.28	73.98	20.70	PK
7440	28.12	4.89	12.61	H	45.62	53.98	8.36	AV

Mode : 1 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	40.42	0.00	5.14	V	45.56	73.98	28.42	PK
4804	28.43	2.07	5.14	V	35.64	53.98	18.34	AV
7206	38.88	0.00	12.89	V	51.77	73.98	22.21	PK
7206	26.87	2.07	12.89	V	41.83	53.98	12.15	AV
4804	40.85	0.00	5.14	H	45.99	73.98	27.99	PK
4804	28.74	2.07	5.14	H	35.95	53.98	18.03	AV
7206	39.09	0.00	12.89	H	51.98	73.98	22.00	PK
7206	26.91	2.07	12.89	H	41.87	53.98	12.11	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	40.22	0.00	5.44	V	45.66	73.98	28.32	PK
4880	28.28	2.07	5.44	V	35.79	53.98	18.19	AV
7320	38.15	0.00	12.98	V	51.13	73.98	22.85	PK
7320	26.13	2.07	12.98	V	41.18	53.98	12.80	AV
4880	40.36	0.00	5.44	H	45.80	73.98	28.18	PK
4880	28.44	2.07	5.44	H	35.95	53.98	18.03	AV
7320	38.48	0.00	12.98	H	51.46	73.98	22.52	PK
7320	26.22	2.07	12.98	H	41.27	53.98	12.71	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	41.26	0.00	6.25	V	47.51	73.98	26.47	PK
4960	28.81	2.07	6.25	V	37.13	53.98	16.85	AV
7440	38.66	0.00	12.61	V	51.27	73.98	22.71	PK
7440	26.65	2.07	12.61	V	41.33	53.98	12.65	AV
4960	41.18	0.00	6.25	H	47.43	73.98	26.55	PK
4960	28.76	2.07	6.25	H	37.08	53.98	16.90	AV
7440	38.74	0.00	12.61	H	51.35	73.98	22.63	PK
7440	26.74	2.07	12.61	H	41.42	53.98	12.56	AV

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

Operation Mode: CH Low

Frequency [MHz]	Measured Value [dB μ V]	Duty Cycle Factor [dB]	A.F + C.L - A.G + D.F [dB/m]	Pol. [H/V]	Total [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]	Measurement Type
4804	41.69	0.00	5.14	V	46.83	73.98	27.15	PK
4804	28.73	4.89	5.14	V	38.76	53.98	15.22	AV
7206	38.58	0.00	12.89	V	51.47	73.98	22.51	PK
7206	26.42	4.89	12.89	V	44.20	53.98	9.78	AV
4804	41.72	0.00	5.14	H	46.86	73.98	27.12	PK
4804	28.82	4.89	5.14	H	38.85	53.98	15.13	AV
7206	38.69	0.00	12.89	H	51.58	73.98	22.40	PK
7206	26.54	4.89	12.89	H	44.32	53.98	9.66	AV

Operation Mode: CH Mid

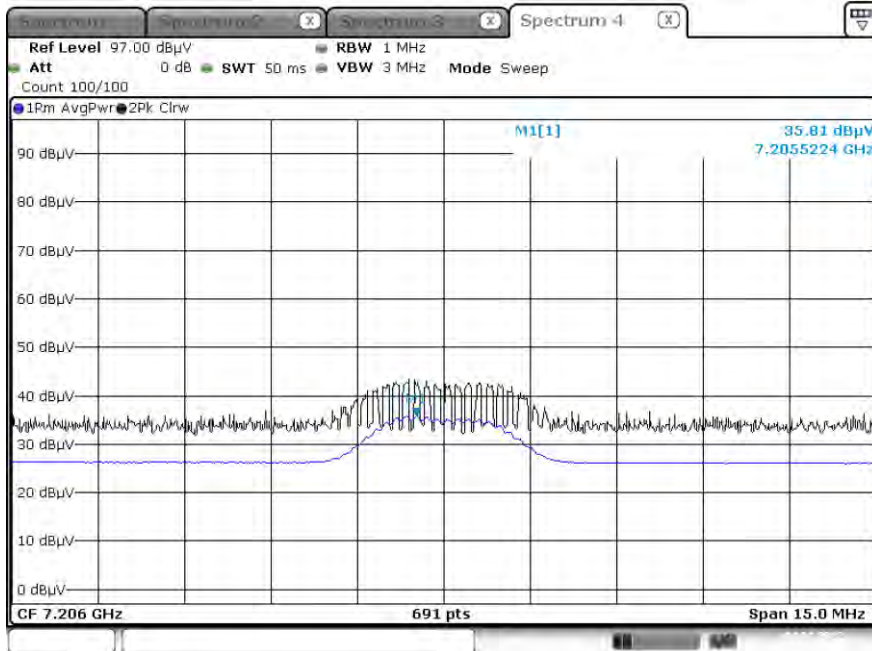
Frequency [MHz]	Measured Value [dB μ V]	Duty Cycle Factor [dB]	A.F + C.L - A.G + D.F [dB/m]	Pol. [H/V]	Total [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]	Measurement Type
4880	40.18	0.00	5.44	V	45.62	73.98	28.36	PK
4880	28.19	4.89	5.44	V	38.52	53.98	15.46	AV
7320	38.36	0.00	12.98	V	51.34	73.98	22.64	PK
7320	26.08	4.89	12.98	V	43.95	53.98	10.03	AV
4880	40.34	0.00	5.44	H	45.78	73.98	28.20	PK
4880	28.23	4.89	5.44	H	38.56	53.98	15.42	AV
7320	38.47	0.00	12.98	H	51.45	73.98	22.53	PK
7320	26.13	4.89	12.98	H	44.00	53.98	9.98	AV

Operation Mode: CH High

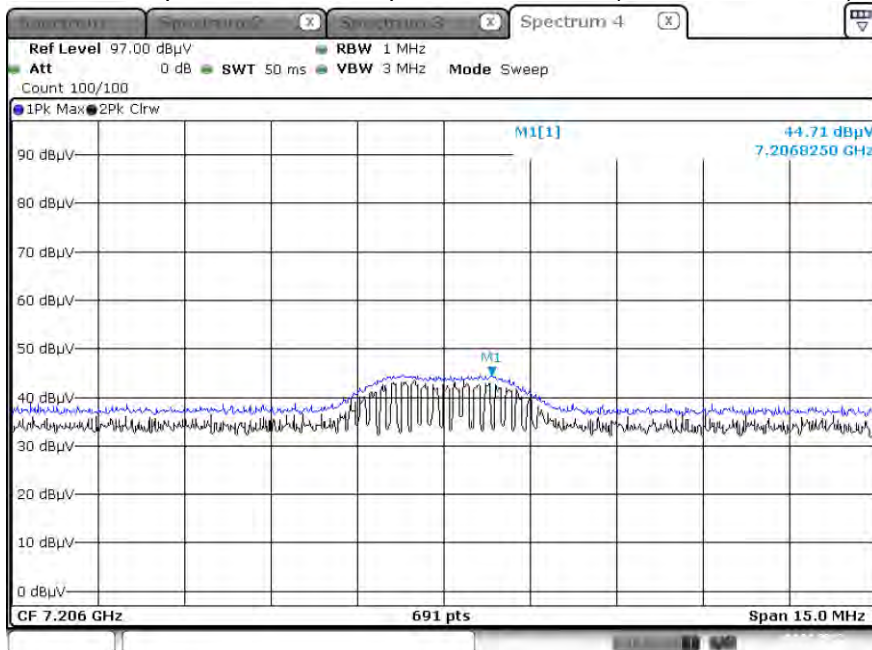
Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor [dB]	A.F + C.L - A.G + D.F [dB/m]	Pol. [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
4960	41.49	0.00	6.25	V	47.74	73.98	26.24	PK
4960	28.73	4.89	6.25	V	39.87	53.98	14.11	AV
7440	38.62	0.00	12.61	V	51.23	73.98	22.75	PK
7440	26.52	4.89	12.61	V	44.02	53.98	9.96	AV
4960	41.08	0.00	6.25	H	47.33	73.98	26.65	PK
4960	28.69	4.89	6.25	H	39.83	53.98	14.15	AV
7440	38.75	0.00	12.61	H	51.36	73.98	22.62	PK
7440	26.62	4.89	12.61	H	44.12	53.98	9.86	AV

1 MBit/s 37 Byte Test Plots (Worst case : X-H) Normal

Radiated Spurious Emissions plot – Average Result (Ch.0 3rd Harmonic)

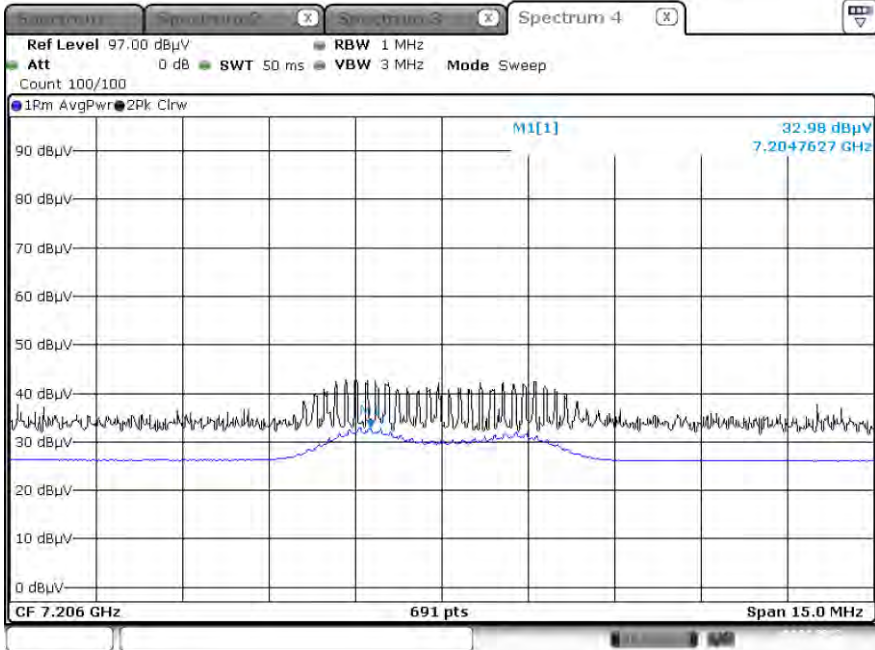


Radiated Spurious Emissions plot – Peak Result (Ch.0 3rd Harmonic)

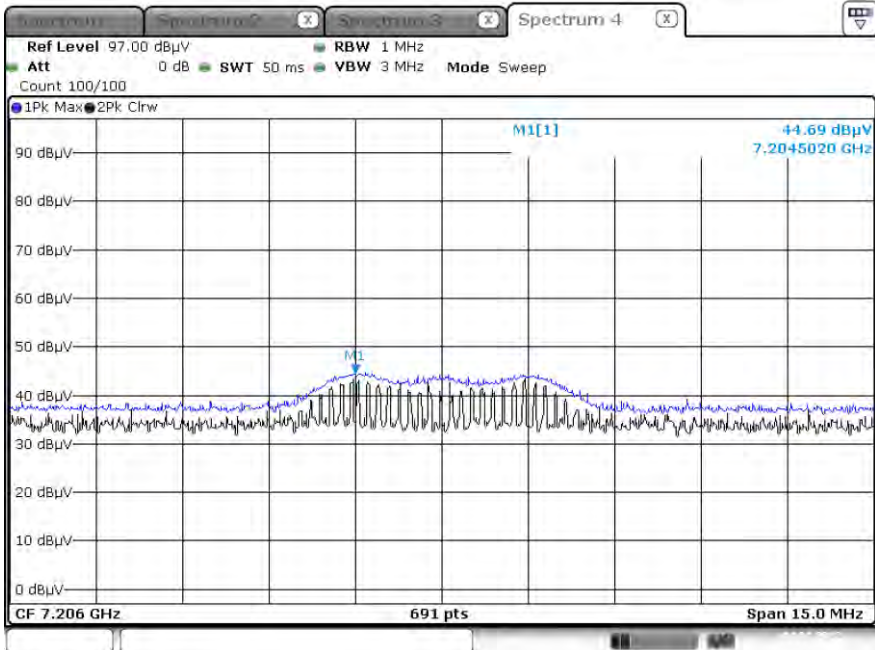


2 MBit/s 37 Byte Test Plots (Worst case : X-H)_Normal

Radiated Spurious Emissions plot – Average Result (Ch.0 3rd Harmonic)

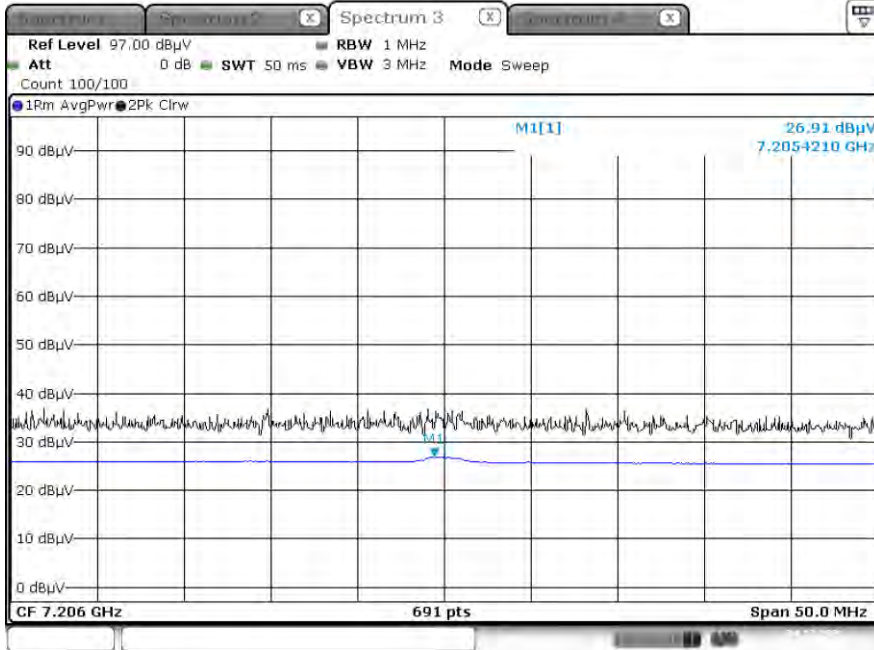


Radiated Spurious Emissions plot – Peak Result (Ch.0 3rd Harmonic)

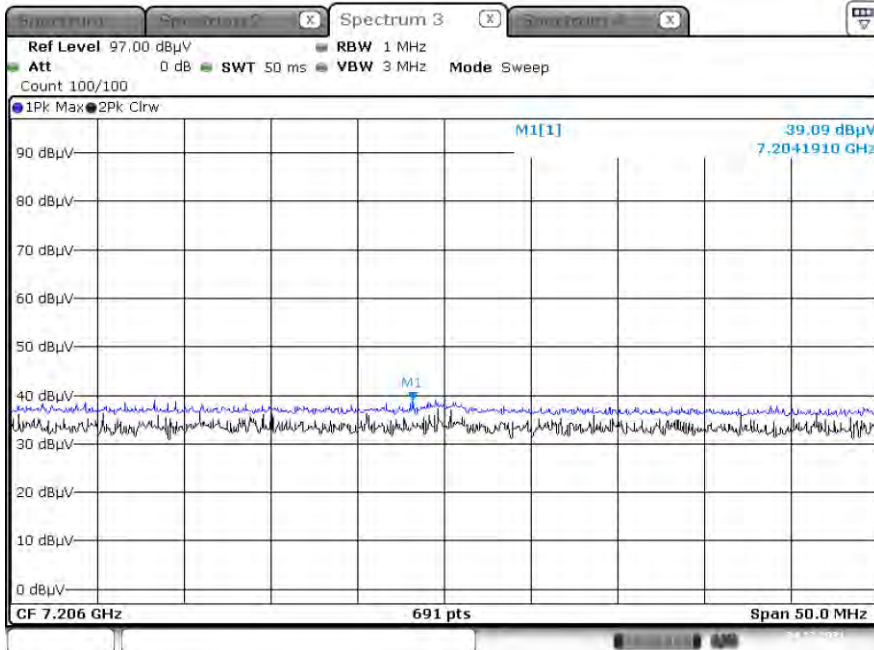


☐ 1 MBit/s 37 Byte Test Plots (Worst case : X-H)_ High Power

Radiated Spurious Emissions plot – Average Result (Ch.0 3rd Harmonic)

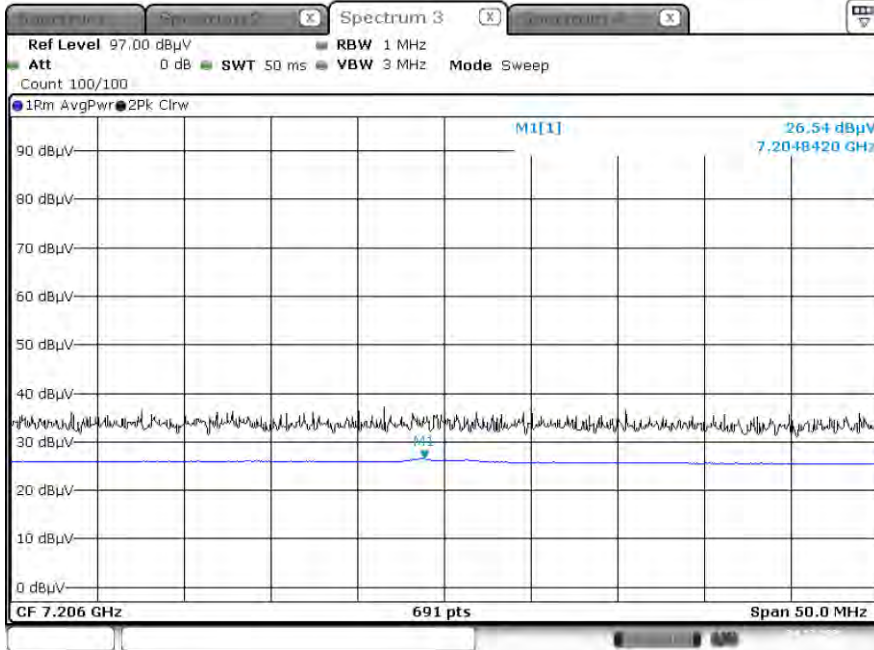


Radiated Spurious Emissions plot – Peak Result (Ch.0 3rd Harmonic)

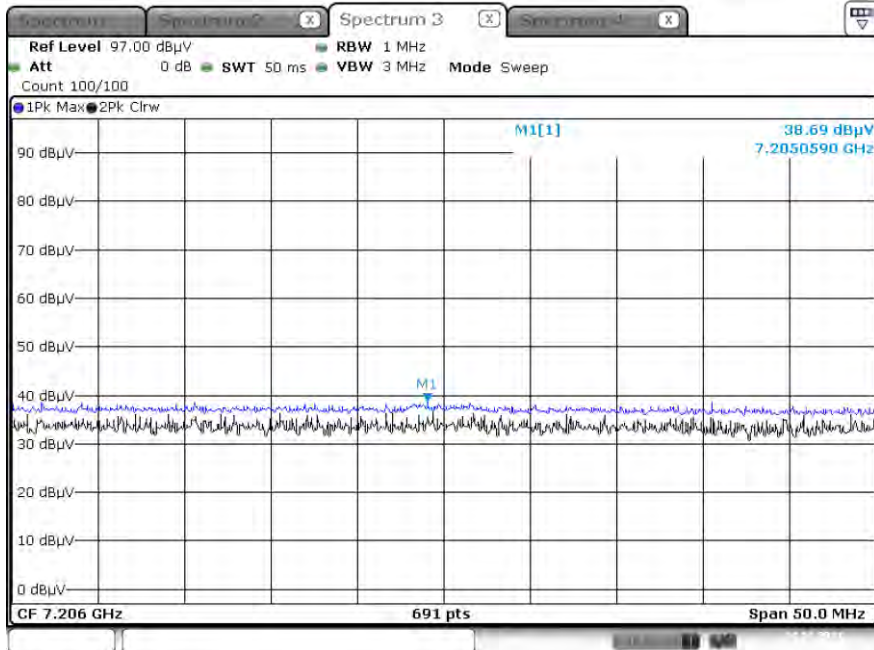


2 MBit/s 37 Byte Test Plots (Worst case : X-H)_ High Power

Radiated Spurious Emissions plot – Average Result (Ch.0 3rd Harmonic)



Radiated Spurious Emissions plot – Peak Result (Ch.0 3rd Harmonic)



Note:

Plot of worst case are only reported.

9.7 RADIATED RESTRICTED BAND EDGES

Mode : 125k Bit/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	48.86	0.00	2.99	H	51.85	73.98	22.13	PK
2390.0	36.90	0.83	2.99	H	40.72	53.98	13.26	AV
2390.0	48.78	0.00	2.99	V	51.77	73.98	22.21	PK
2390.0	36.86	0.83	2.99	V	40.68	53.98	13.30	AV
2483.5	56.79	0.00	4.20	H	60.99	73.98	12.99	PK
2483.5	37.12	0.83	4.20	H	42.15	53.98	11.83	AV
2483.5	55.87	0.00	4.20	V	60.07	73.98	13.91	PK
2483.5	36.78	0.83	4.20	V	41.81	53.98	12.17	AV

Mode : 125k Bit/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	50.08	0.00	2.99	H	53.07	73.98	20.91	PK
2390.0	36.91	0.11	2.99	H	40.01	53.98	13.97	AV
2390.0	49.89	0.00	2.99	V	52.88	73.98	21.10	PK
2390.0	36.87	0.11	2.99	V	39.97	53.98	14.01	AV
2483.5	55.98	0.00	4.20	H	60.18	73.98	13.80	PK
2483.5	37.27	0.11	4.20	H	41.58	53.98	12.40	AV
2483.5	55.02	0.00	4.20	V	59.22	73.98	14.76	PK
2483.5	36.96	0.11	4.20	V	41.27	53.98	12.71	AV

Mode : 500k Bit/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	49.14	0.00	2.99	H	52.13	73.98	21.85	PK
2390.0	36.91	2.45	2.99	H	42.35	53.98	11.63	AV
2390.0	48.90	0.00	2.99	V	51.89	73.98	22.09	PK
2390.0	36.89	2.45	2.99	V	42.33	53.98	11.65	AV
2483.5	56.56	0.00	4.20	H	60.76	73.98	13.22	PK
2483.5	37.07	2.45	4.20	H	43.72	53.98	10.26	AV
2483.5	55.87	0.00	4.20	V	60.07	73.98	13.91	PK
2483.5	36.84	2.45	4.20	V	43.49	53.98	10.49	AV

Mode : 500k Bit/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	49.12	0.00	2.99	H	52.11	73.98	21.87	PK
2390.0	36.90	0.41	2.99	H	40.30	53.98	13.68	AV
2390.0	48.98	0.00	2.99	V	51.97	73.98	22.01	PK
2390.0	36.88	0.41	2.99	V	40.28	53.98	13.70	AV
2483.5	56.49	0.00	4.20	H	60.69	73.98	13.29	PK
2483.5	37.12	0.41	4.20	H	41.73	53.98	12.25	AV
2483.5	56.07	0.00	4.20	V	60.27	73.98	13.71	PK
2483.5	36.99	0.41	4.20	V	41.60	53.98	12.38	AV

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	49.24	0.00	2.99	H	52.23	73.98	21.75	PK
2390.0	36.91	2.07	2.99	H	41.97	53.98	12.01	AV
2390.0	48.82	0.00	2.99	V	51.81	73.98	22.17	PK
2390.0	36.87	2.07	2.99	V	41.93	53.98	12.05	AV
2483.5	57.37	0.00	4.20	H	61.57	73.98	12.41	PK
2483.5	37.20	2.07	4.20	H	43.47	53.98	10.51	AV
2483.5	56.46	0.00	4.20	V	60.66	73.98	13.32	PK
2483.5	36.94	2.07	4.20	V	43.21	53.98	10.77	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	49.56	0.00	2.99	H	52.55	73.98	21.43	PK
2390.0	36.89	0.69	2.99	H	40.57	53.98	13.41	AV
2390.0	49.35	0.00	2.99	V	52.34	73.98	21.64	PK
2390.0	36.86	0.69	2.99	V	40.54	53.98	13.44	AV
2483.5	57.17	0.00	4.20	H	61.37	73.98	12.61	PK
2483.5	37.14	0.69	4.20	H	42.03	53.98	11.95	AV
2483.5	56.28	0.00	4.20	V	60.48	73.98	13.50	PK
2483.5	36.83	0.69	4.20	V	41.72	53.98	12.26	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	49.15	0.00	2.99	H	52.14	73.98	21.84	PK
2390.0	36.90	4.89	2.99	H	44.78	53.98	9.20	AV
2390.0	49.10	0.00	2.99	V	52.09	73.98	21.89	PK
2390.0	36.88	4.89	2.99	V	44.76	53.98	9.22	AV
2483.5	58.12	0.00	4.20	H	62.32	73.98	11.66	PK
2483.5	40.17	4.89	4.20	H	49.26	53.98	4.72	AV
2483.5	57.36	0.00	4.20	V	61.56	73.98	12.42	PK
2483.5	39.43	4.89	4.20	V	48.52	53.98	5.46	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	49.16	0.00	2.99	H	52.15	73.98	21.83	PK
2390.0	36.93	2.41	2.99	H	42.33	53.98	11.65	AV
2390.0	49.03	0.00	2.99	V	52.02	73.98	21.96	PK
2390.0	36.88	2.41	2.99	V	42.28	53.98	11.70	AV
2483.5	57.44	0.00	4.20	H	61.64	73.98	12.34	PK
2483.5	41.39	2.41	4.20	H	48.00	53.98	5.98	AV
2483.5	56.58	0.00	4.20	V	60.78	73.98	13.20	PK
2483.5	40.51	2.41	4.20	V	47.12	53.98	6.86	AV

High Power

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	49.65	0.00	2.99	H	52.64	73.98	21.34	PK
2390.0	37.03	2.07	2.99	H	42.09	53.98	11.89	AV
2390.0	49.42	0.00	2.99	V	52.41	73.98	21.57	PK
2390.0	36.90	2.07	2.99	V	41.96	53.98	12.02	AV
2483.5	61.79	0.00	4.20	H	65.99	73.98	7.99	PK
2483.5	40.10	2.07	4.20	H	46.37	53.98	7.61	AV
2483.5	61.43	0.00	4.20	V	65.63	73.98	8.35	PK
2483.5	39.77	2.07	4.20	V	46.04	53.98	7.94	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	49.39	0.00	2.99	H	52.38	73.98	21.60	PK
2390.0	36.96	0.69	2.99	H	40.64	53.98	13.34	AV
2390.0	48.84	0.00	2.99	V	51.83	73.98	22.15	PK
2390.0	36.87	0.69	2.99	V	40.55	53.98	13.43	AV
2483.5	61.23	0.00	4.20	H	65.43	73.98	8.55	PK
2483.5	40.14	0.69	4.20	H	45.03	53.98	8.95	AV
2483.5	60.87	0.00	4.20	V	65.07	73.98	8.91	PK
2483.5	39.86	0.69	4.20	V	44.75	53.98	9.23	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	49.27	0.00	2.99	H	52.26	73.98	21.72	PK
2390.0	37.05	4.89	2.99	H	44.93	53.98	9.05	AV
2390.0	49.04	0.00	2.99	V	52.03	73.98	21.95	PK
2390.0	36.87	4.89	2.99	V	44.75	53.98	9.23	AV
#2484.0	52.46	0.00	4.20	H	56.66	73.98	17.32	PK
#2484.0	41.52	4.89	4.20	H	50.61	53.98	3.37	AV
#2485.0	49.54	0.00	4.20	H	53.74	73.98	20.24	PK
#2485.0	38.27	4.89	4.20	H	47.36	53.98	6.62	AV
#2485.5~2500	49.61	0.00	4.20	H	53.81	73.98	20.17	PK
#2485.5~2500	37.90	4.89	4.20	H	46.99	53.98	6.99	AV

#Note : Integration method Used (ANSI C63.10 Section11.13.3)

Mode : 2 MBit/s (255 Byte)

Operating Frequency

2402 MHz, 2480 MHz

Channel No.

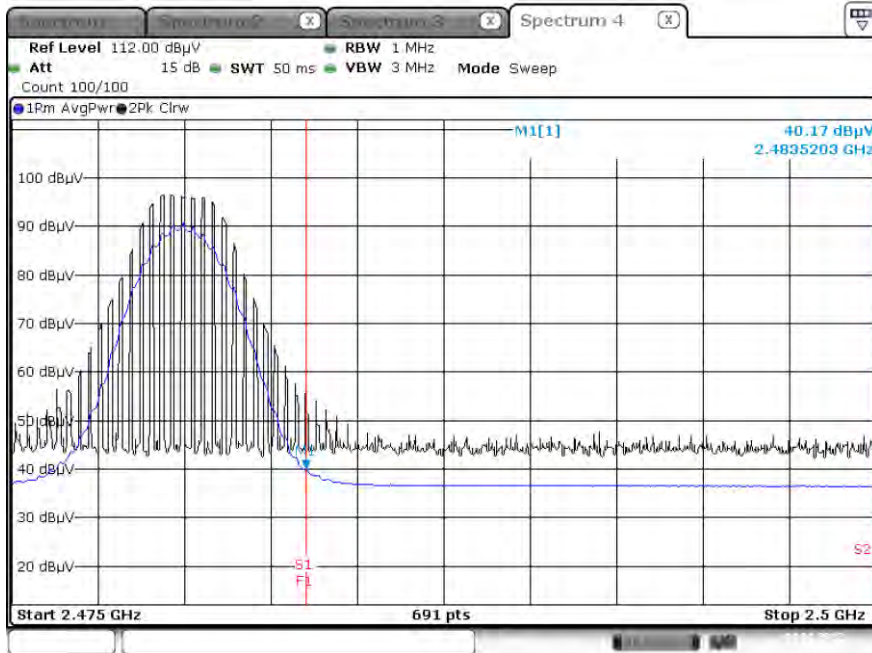
0 CH, 39 CH

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	49.42	0.00	2.99	H	52.41	73.98	21.57	PK
2390.0	36.99	2.42	2.99	H	42.40	53.98	11.58	AV
2390.0	49.38	0.00	2.99	V	52.37	73.98	21.61	PK
2390.0	36.89	2.42	2.99	V	42.30	53.98	11.68	AV
#2484.0	52.34	0.00	4.20	H	56.54	73.98	17.44	PK
#2484.0	42.68	2.42	4.20	H	49.30	53.98	4.68	AV
#2485.0	49.64	0.00	4.20	H	53.84	73.98	20.14	PK
#2485.0	38.94	2.42	4.20	H	45.56	53.98	8.42	AV
#2485.5~2500	49.33	0.00	4.20	H	53.53	73.98	20.45	PK
#2485.5~2500	38.03	2.42	4.20	H	44.65	53.98	9.33	AV

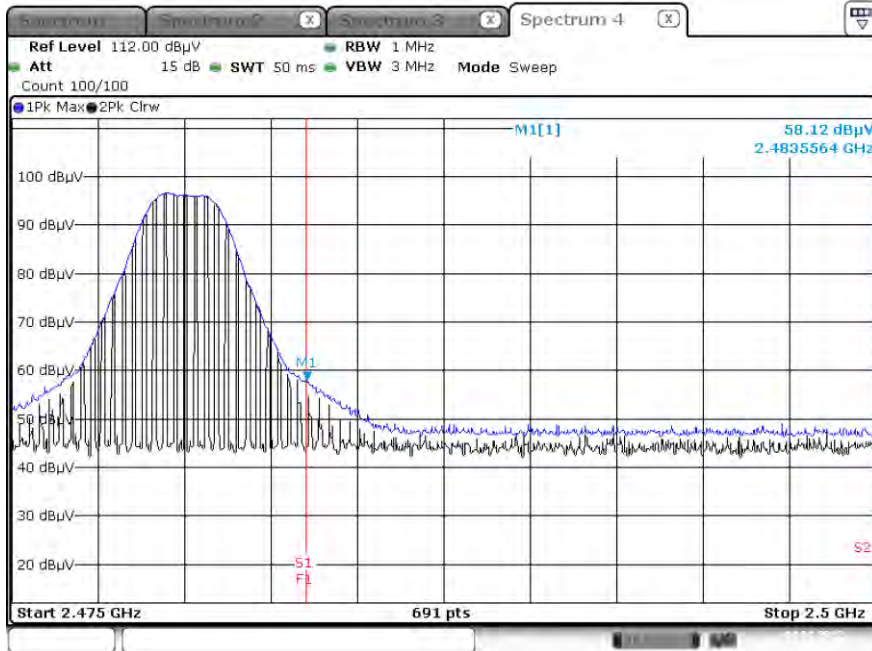
#Note : Integration method Used (ANSI C63.10 Section11.13.3)

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

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



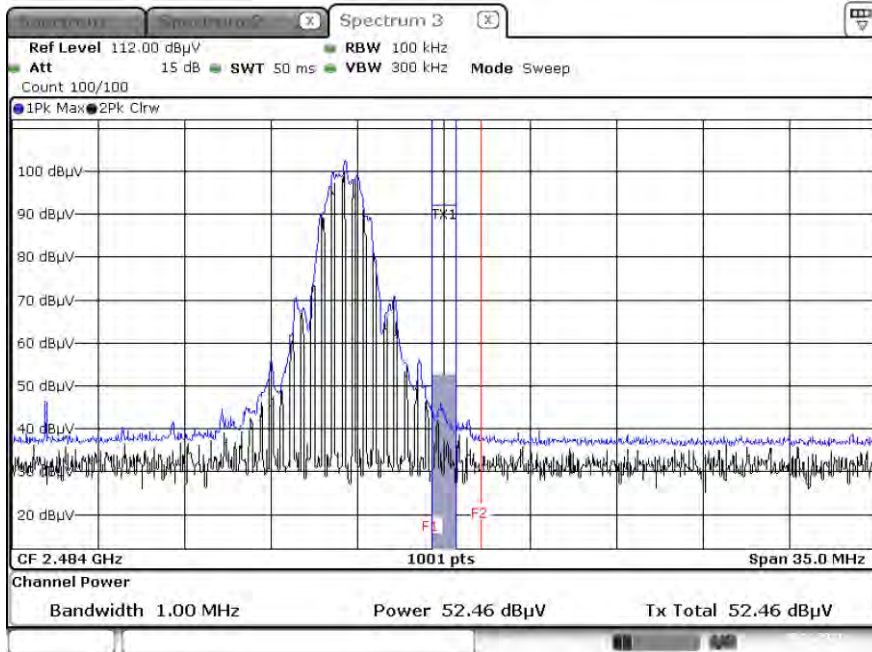
Radiated Restricted Band Edges plot – Peak Result (Ch.39, X-H)



Mode : 2 MBit/s (37 Byte) Test Plots_High Power

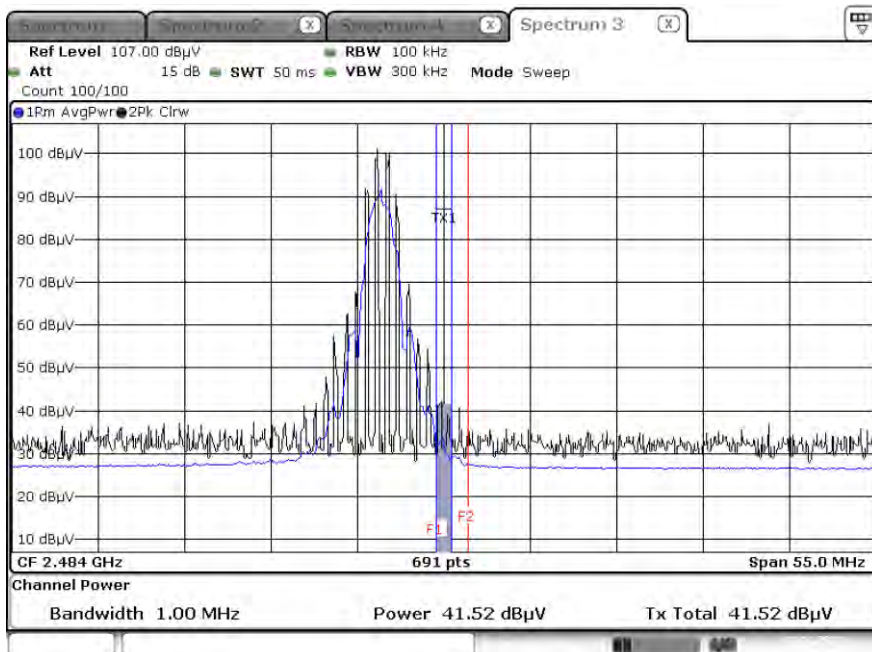
Radiated Restricted Band Edges plot – Peak Result (Ch.39, X-H)

Integration method Used 2 484 MHz



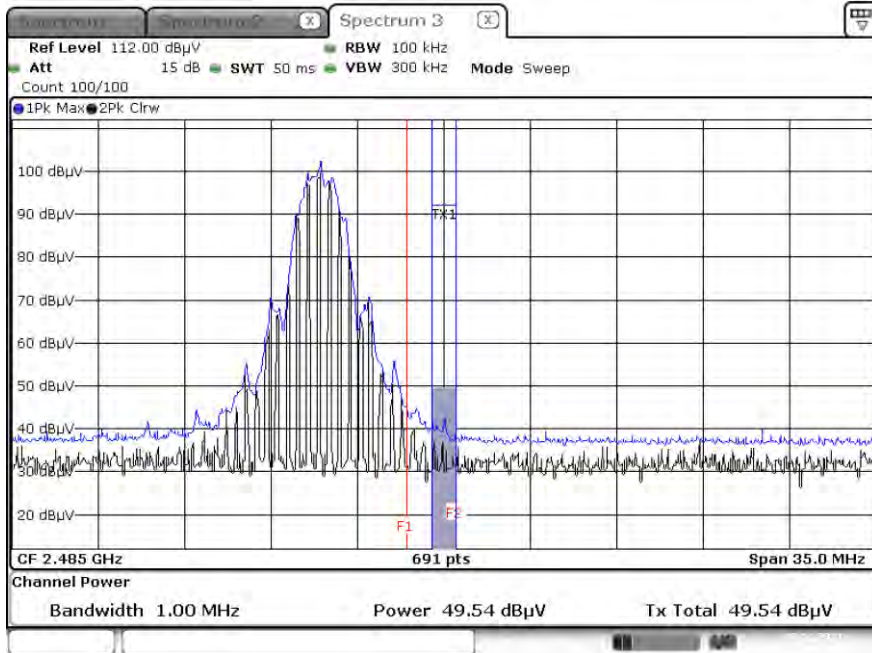
Radiated Restricted Band Edges plot – Average Result (Ch.39, X-H)

Integration method Used 2 484 MHz



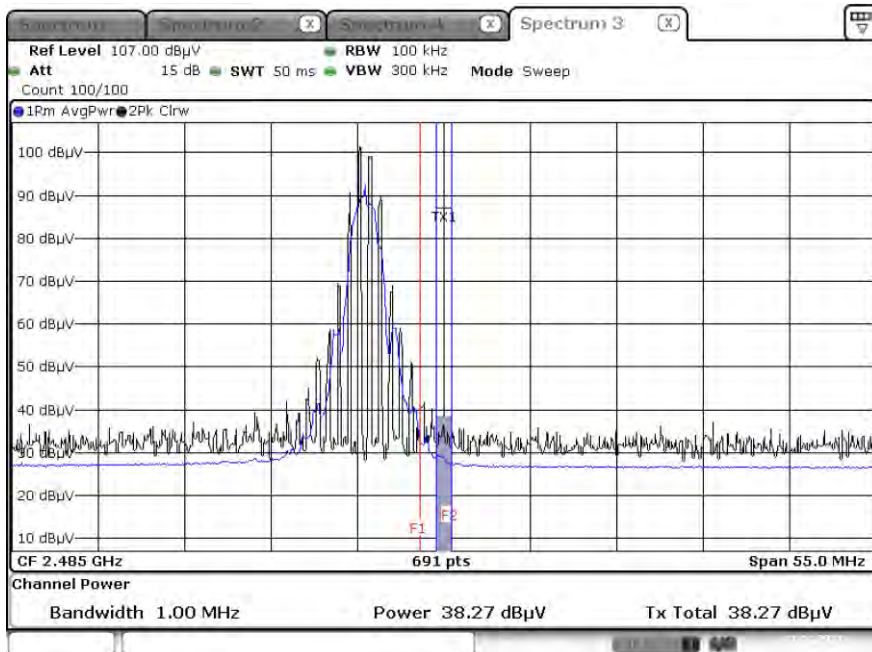
Radiated Restricted Band Edges plot – Peak Result (Ch.39, X-H)

Integration method Used 2 485 MHz



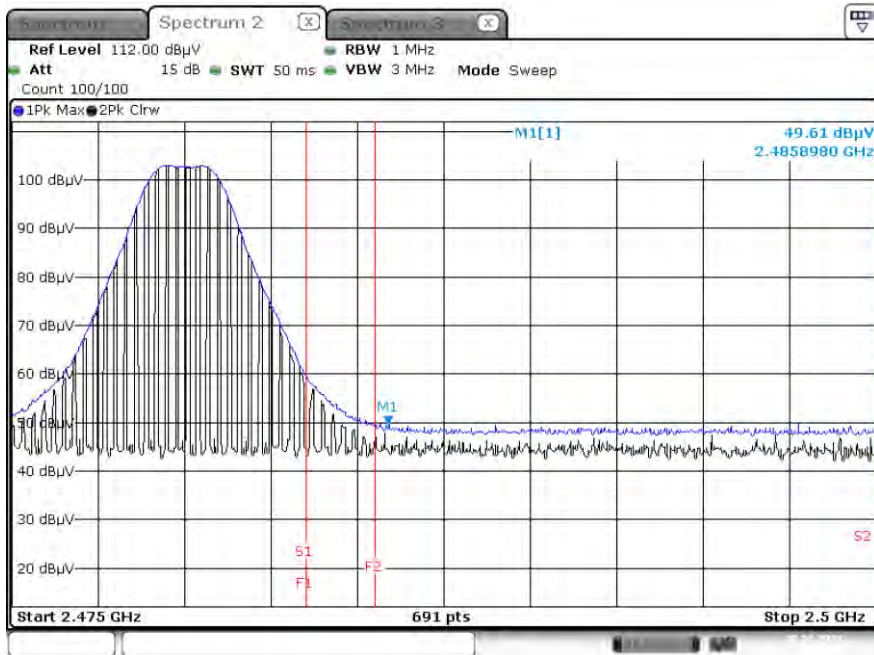
Radiated Restricted Band Edges plot – Average Result (Ch.39, X-H)

Integration method Used 2 485 MHz



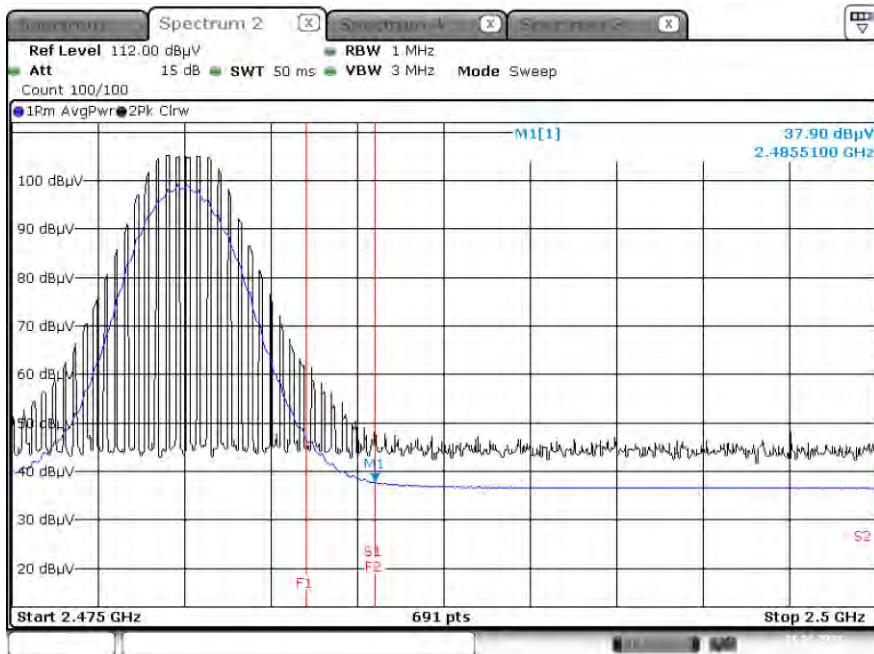
Radiated Restricted Band Edges plot – Peak Result (Ch.39, X-H)

Integration method Used 2 485.5 MHz ~ 2 500 MHz



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

Integration method Used 2 485.5 MHz ~ 2 500 MHz



Note:

Plot of worst case are only reported.

9.8 POWERLINE CONDUCTED EMISSIONS

Conducted Emissions (Line 1)

BTLE MODE_L1

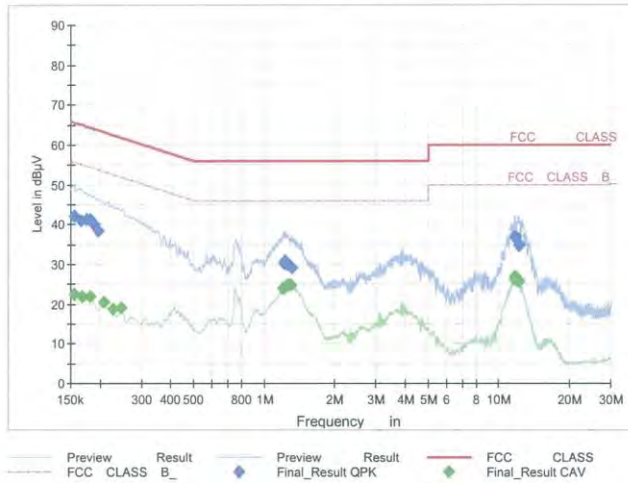
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Test Report

Common Information

EUT : SM-A336M/DSN
 Manufacturer : SAMSUNG
 Test Site: SHIELD ROOM
 Operating Conditions : BTLE MODE_L1

Full Spectrum



Final Result QPK

Frequency (MHz)	QuasiPeak (dBuV)	Limit (dBuV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1545	42.02	65.75	23.73	9.000	L1	OFF	9.6
0.1658	40.84	65.17	24.33	9.000	L1	OFF	9.6
0.1748	41.20	64.73	23.53	9.000	L1	OFF	9.6
0.1815	41.27	64.42	23.14	9.000	L1	OFF	9.6
0.1883	39.96	64.11	24.15	9.000	L1	OFF	9.6
0.1973	38.37	63.73	25.36	9.000	L1	OFF	9.6
1.2088	30.28	56.00	25.72	9.000	L1	OFF	9.7
1.2268	30.25	56.00	25.75	9.000	L1	OFF	9.7
1.2313	30.74	56.00	25.26	9.000	L1	OFF	9.7
1.2380	30.27	56.00	25.74	9.000	L1	OFF	9.7
1.2583	29.90	56.00	26.10	9.000	L1	OFF	9.7
1.3190	29.26	56.00	26.74	9.000	L1	OFF	9.7
11.7140	36.89	60.00	23.11	9.000	L1	OFF	10.1
11.7208	36.87	60.00	23.13	9.000	L1	OFF	10.1
11.7523	36.84	60.00	23.16	9.000	L1	OFF	10.1
12.2000	34.96	60.00	25.04	9.000	L1	OFF	10.1
12.2090	34.69	60.00	25.31	9.000	L1	OFF	10.1
12.2540	34.48	60.00	25.52	9.000	L1	OFF	10.1

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BTLE MODE_L1

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Final Result CAV

Frequency (MHz)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1545	22.51	55.75	33.25	9.000	L1	OFF	9.6
0.1680	22.03	55.06	33.03	9.000	L1	OFF	9.6
0.1815	22.02	54.42	32.39	9.000	L1	OFF	9.6
0.2085	20.52	53.27	32.75	9.000	L1	OFF	9.6
0.2265	18.70	52.58	33.88	9.000	L1	OFF	9.6
0.2468	18.94	51.87	32.93	9.000	L1	OFF	9.6
1.2065	23.87	46.00	22.13	9.000	L1	OFF	9.7
1.2178	24.04	46.00	21.96	9.000	L1	OFF	9.7
1.2403	24.45	46.00	21.55	9.000	L1	OFF	9.7
1.2538	24.49	46.00	21.51	9.000	L1	OFF	9.7
1.2650	24.76	46.00	21.24	9.000	L1	OFF	9.7
1.3033	24.71	46.00	21.29	9.000	L1	OFF	9.7
11.6803	26.34	50.00	23.66	9.000	L1	OFF	10.1
11.7163	26.81	50.00	23.19	9.000	L1	OFF	10.1
11.7523	26.87	50.00	23.13	9.000	L1	OFF	10.1
11.7883	26.74	50.00	23.26	9.000	L1	OFF	10.1
12.1280	25.59	50.00	24.41	9.000	L1	OFF	10.1
12.2045	25.62	50.00	24.38	9.000	L1	OFF	10.1

2021-12-18

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BTLE 45W MODE_L1

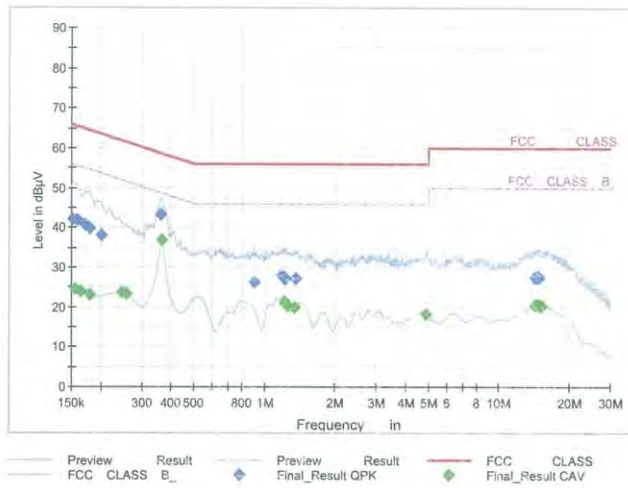
1 / 2

Test Report

Common Information

EUT : SM-A336M/DSN
 Manufacturer : SAMSUNG
 Test Site: SHIELD ROOM
 Operating Conditions : BTLE 45W MODE_L1

Full Spectrum



Final Result QPK

Frequency (MHz)	QuasiPeak (dBuV)	Limit (dBuV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1523	42.18	65.88	23.69	9.000	L1	OFF	9.6
0.1590	41.74	65.52	23.78	9.000	L1	OFF	9.6
0.1725	40.61	64.84	24.23	9.000	L1	OFF	9.6
0.1793	39.87	64.52	24.65	9.000	L1	OFF	9.6
0.2018	37.95	63.54	25.59	9.000	L1	OFF	9.6
0.3615	43.26	58.69	15.44	9.000	L1	OFF	9.6
0.9050	26.20	56.00	29.80	9.000	L1	OFF	9.7
1.1863	27.91	56.00	28.09	9.000	L1	OFF	9.7
1.2088	27.46	56.00	28.54	9.000	L1	OFF	9.7
1.2223	27.05	56.00	28.95	9.000	L1	OFF	9.7
1.2313	27.11	56.00	28.89	9.000	L1	OFF	9.7
1.3595	27.04	56.00	28.96	9.000	L1	OFF	9.7
14.2768	27.48	60.00	32.52	9.000	L1	OFF	10.2
14.3645	27.39	60.00	32.61	9.000	L1	OFF	10.2
14.5918	27.67	60.00	32.33	9.000	L1	OFF	10.2
14.7313	27.51	60.00	32.49	9.000	L1	OFF	10.2
14.7403	27.66	60.00	32.34	9.000	L1	OFF	10.2
14.9315	27.39	60.00	32.61	9.000	L1	OFF	10.2

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BTLE 45W MODE_L1

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Final Result CAV

Frequency (MHz)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1545	24.57	55.75	31.18	9.000	L1	OFF	9.6
0.1635	24.03	55.28	31.25	9.000	L1	OFF	9.6
0.1793	22.96	54.52	31.56	9.000	L1	OFF	9.6
0.2468	23.67	51.87	28.19	9.000	L1	OFF	9.6
0.2580	23.28	51.50	28.21	9.000	L1	OFF	9.6
0.3660	36.96	48.59	11.63	9.000	L1	OFF	9.6
1.2155	21.23	46.00	24.77	9.000	L1	OFF	9.7
1.2290	20.88	46.00	25.12	9.000	L1	OFF	9.7
1.2403	20.42	46.00	25.58	9.000	L1	OFF	9.7
1.2538	20.06	46.00	25.94	9.000	L1	OFF	9.7
1.3505	19.87	46.00	26.13	9.000	L1	OFF	9.7
4.9055	18.08	46.00	27.92	9.000	L1	OFF	9.9
14.2768	20.40	50.00	29.60	9.000	L1	OFF	10.2
14.4500	20.37	50.00	29.63	9.000	L1	OFF	10.2
14.4635	20.45	50.00	29.55	9.000	L1	OFF	10.2
14.5918	20.44	50.00	29.56	9.000	L1	OFF	10.2
14.9518	20.38	50.00	29.62	9.000	L1	OFF	10.2
15.2330	20.18	50.00	29.82	9.000	L1	OFF	10.2

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Conducted Emissions (Line 2)

BTLE MODE_N

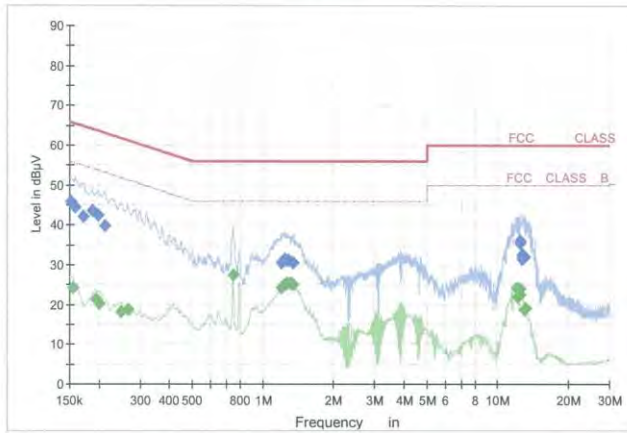
1 / 2

Test Report

Common Information

EUT : SM-A336M/DSN
 Manufacturer : SAMSUNG
 Test Site: SHIELD ROOM
 Operating Conditions : BTLE MODE_N

Full Spectrum



— Preview Result — Preview Result — FCC CLASS
 — FCC CLASS B_ — Final_Result QPK — Final_Result CAV

Final Result QPK

Frequency (MHz)	QuasiPeak (dBuV)	Limit (dBuV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1523	45.91	65.88	19.97	9.000	N	OFF	9.6
0.1590	44.56	65.52	20.96	9.000	N	OFF	9.6
0.1725	41.98	64.84	22.86	9.000	N	OFF	9.6
0.1883	43.62	64.11	20.50	9.000	N	OFF	9.6
0.1995	42.45	63.63	21.18	9.000	N	OFF	9.6
0.2130	39.79	63.09	23.30	9.000	N	OFF	9.6
1.1975	30.62	56.00	25.38	9.000	N	OFF	9.7
1.2380	31.54	56.00	24.46	9.000	N	OFF	9.7
1.2425	31.59	56.00	24.41	9.000	N	OFF	9.7
1.2538	31.25	56.00	24.75	9.000	N	OFF	9.7
1.2875	31.14	56.00	24.86	9.000	N	OFF	9.7
1.3505	30.69	56.00	25.31	9.000	N	OFF	9.7
12.4205	35.43	60.00	24.57	9.000	N	OFF	10.2
12.4273	35.99	60.00	24.01	9.000	N	OFF	10.2
12.7175	31.46	60.00	28.54	9.000	N	OFF	10.2
12.7535	31.95	60.00	28.05	9.000	N	OFF	10.2
12.7940	32.73	60.00	27.27	9.000	N	OFF	10.2
13.0348	32.09	60.00	27.91	9.000	N	OFF	10.2

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Final Result CAV

Frequency (MHz)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1545	24.28	55.75	31.48	9.000	N	OFF	9.6
0.1950	21.39	53.82	32.43	9.000	N	OFF	9.6
0.2018	20.33	53.54	33.21	9.000	N	OFF	9.6
0.2490	18.18	51.79	33.62	9.000	N	OFF	9.6
0.2648	18.69	51.28	32.59	9.000	N	OFF	9.6
0.7475	27.30	46.00	18.70	9.000	N	OFF	9.7
1.1953	24.14	46.00	21.86	9.000	N	OFF	9.7
1.2403	24.98	46.00	21.02	9.000	N	OFF	9.7
1.2538	25.19	46.00	20.81	9.000	N	OFF	9.7
1.2785	25.39	46.00	20.61	9.000	N	OFF	9.7
1.3145	25.45	46.00	20.55	9.000	N	OFF	9.7
1.3505	25.07	46.00	20.93	9.000	N	OFF	9.7
12.0065	24.25	50.00	25.75	9.000	N	OFF	10.2
12.2248	22.05	50.00	27.95	9.000	N	OFF	10.2
12.4250	23.85	50.00	26.15	9.000	N	OFF	10.2
12.4745	22.57	50.00	27.43	9.000	N	OFF	10.2
13.0258	18.79	50.00	31.21	9.000	N	OFF	10.2
13.2103	19.03	50.00	30.97	9.000	N	OFF	10.2

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BTLE 45W MODE_N

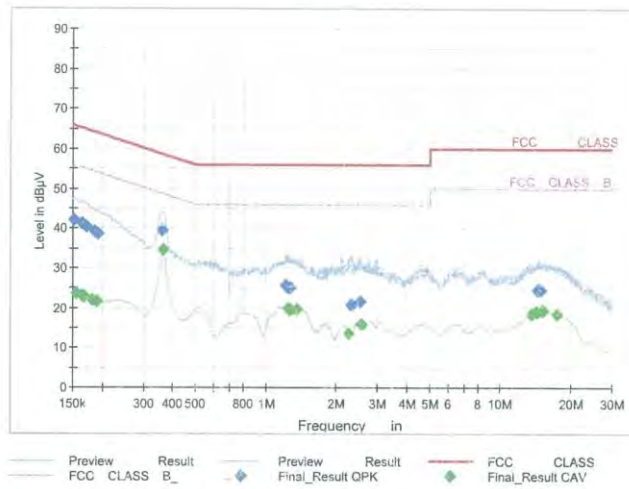
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Test Report

Common Information

EUT : SM-A336M/DSN
 Manufacturer : SAMSUNG
 Test Site: SHIELD ROOM
 Operating Conditions : BTLE 45W MODE_N

Full Spectrum



Final Result QPK

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1523	42.10	65.88	23.78	9.000	N	OFF	9.6
0.1635	41.30	65.28	23.98	9.000	N	OFF	9.6
0.1725	40.44	64.84	24.40	9.000	N	OFF	9.6
0.1860	39.17	64.21	25.04	9.000	N	OFF	9.6
0.1928	38.58	63.92	25.33	9.000	N	OFF	9.6
0.3615	39.65	58.69	19.04	9.000	N	OFF	9.6
1.2200	25.69	56.00	30.31	9.000	N	OFF	9.7
1.2380	25.13	56.00	30.87	9.000	N	OFF	9.7
1.2650	24.97	56.00	31.03	9.000	N	OFF	9.7
2.3180	20.68	56.00	35.32	9.000	N	OFF	9.7
2.3428	20.82	56.00	35.18	9.000	N	OFF	9.7
2.5385	21.75	56.00	34.25	9.000	N	OFF	9.8
14.3915	24.45	60.00	35.55	9.000	N	OFF	10.3
14.4343	24.43	60.00	35.57	9.000	N	OFF	10.3
14.6300	24.53	60.00	35.47	9.000	N	OFF	10.3
14.6660	24.62	60.00	35.38	9.000	N	OFF	10.3
14.8348	24.66	60.00	35.34	9.000	N	OFF	10.3
14.8775	24.48	60.00	35.52	9.000	N	OFF	10.3

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BTLE 45W MODE_N

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Final Result CAV

Frequency (MHz)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1545	23.76	55.75	32.00	9.000	N	OFF	9.6
0.1635	23.09	55.28	32.19	9.000	N	OFF	9.6
0.1680	22.88	55.06	32.18	9.000	N	OFF	9.6
0.1815	21.92	54.42	32.50	9.000	N	OFF	9.6
0.1905	21.56	54.02	32.46	9.000	N	OFF	9.6
0.3660	34.51	48.59	14.08	9.000	N	OFF	9.6
1.2403	19.81	46.00	26.19	9.000	N	OFF	9.7
1.2538	19.54	46.00	26.46	9.000	N	OFF	9.7
1.2650	19.49	46.00	26.51	9.000	N	OFF	9.7
1.3618	19.53	46.00	26.47	9.000	N	OFF	9.7
2.2685	13.59	46.00	32.41	9.000	N	OFF	9.7
2.5633	15.74	46.00	30.26	9.000	N	OFF	9.8
13.5950	18.32	50.00	31.68	9.000	N	OFF	10.2
14.2543	18.95	50.00	31.05	9.000	N	OFF	10.2
14.4410	19.03	50.00	30.97	9.000	N	OFF	10.3
15.0215	19.26	50.00	30.74	9.000	N	OFF	10.3
15.3118	19.18	50.00	30.82	9.000	N	OFF	10.3
17.5055	18.47	50.00	31.53	9.000	N	OFF	10.4

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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
Power Amplifier	CBL18265035	CERNEX	22966	12/02/2022	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-2201-FC037-P