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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:
July 13, 2023

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

Report No.: HCT-RF-2307-FC016

FCC ID:	**A3LSMX616B**
APPLICANT:	**SAMSUNG Electronics Co., Ltd.**

Model:	SM-X616B
Additional Model:	-
EUT Type:	Tablet
Average Output Power:	9.67 dBm (9.27 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 : Chang Hee Hwang
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-2307-FC016	July 13, 2023	- First Approval Report

Table of Contents

1. EUT DESCRIPTION

Model	SM-X616B		
Additional Model	-		
EUT Type	Tablet		
Power Supply	DC 3.85 V		
Frequency Range	2 402 MHz ~ 2 480 MHz		
Max. RF Output Power (Normal)	Peak (For information only)	1 M Bit/s: 2 M Bit/s: 125 k Bit/s : 500 k Bit/s :	9.891 dBm (9.75 mW) 9.979 dBm (9.95 mW) 9.825 dBm (9.61 mW) 9.844 dBm (9.65 mW)
	Average	1 M Bit/s: 2 M Bit/s: 125 k Bit/s : 500 k Bit/s :	9.63 dBm (9.17 mW) 9.67 dBm (9.27 mW) 9.61 dBm (9.15 mW) 9.52 dBm (8.96 mW)
Modulation Type	GFSK		
Bluetooth Version	5.3		
Number of Channels	40 Channels		
Date(s) of Tests	May 24, 2023 ~ July 13, 2023		
Serial number	Radiated: R32W500WXYD Conducted : R32W500WYVV		

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.

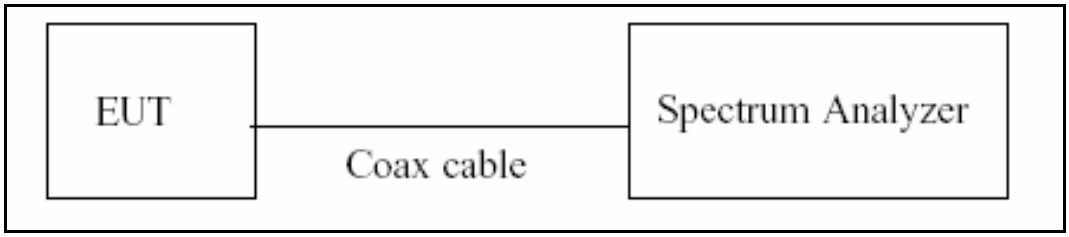
The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Parameter	Expanded Uncertainty (dB)
Conducted Disturbance (150 kHz ~ 30 MHz)	1.90 (Confidence level about 95 %, k=2)
Radiated Disturbance (9 kHz ~ 30 MHz)	4.14 (Confidence level about 95 %, k=2)
Radiated Disturbance (30 MHz ~ 1 GHz)	5.82 (Confidence level about 95 %, k=2)
Radiated Disturbance (1 GHz ~ 18 GHz)	5.74 (Confidence level about 95 %, k=2)
Radiated Disturbance (18 GHz ~ 40 GHz)	5.76 (Confidence level about 95 %, k=2)
Radiated Disturbance (Above 40 GHz)	5.52 (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 8 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*.

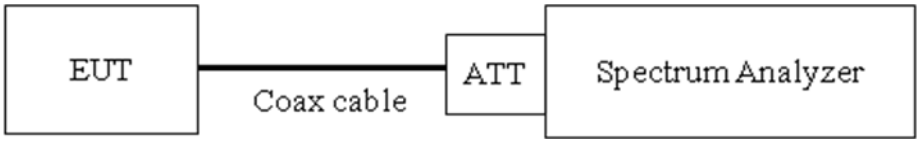
1. RBW = 8 MHz (the largest available value)
2. VBW = 8 MHz (≥ RBW)
3. SPAN = 0 Hz
4. Detector = Peak
5. Number of points in sweep > 100
6. Trace mode = Clear write
7. Measure T_{total} and T_{on}
8. Calculate Duty Cycle = T_{on}/ T_{total} and Duty Cycle Factor = 10log(1/Duty Cycle)

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.

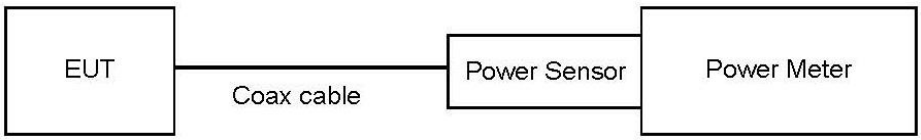
Note : We tested OBW using the automatic bandwidth measurement capability of a spectrum analyzer.

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

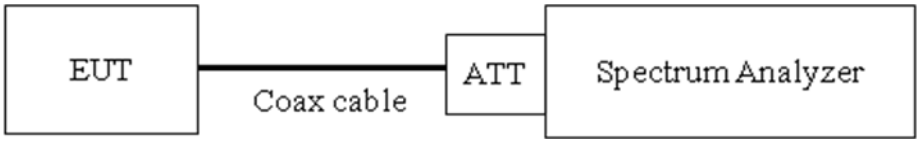
▪ Conducted Output Power(Average) = Measured Value + ATT loss + Cable loss + Duty Cycle Factor

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 %

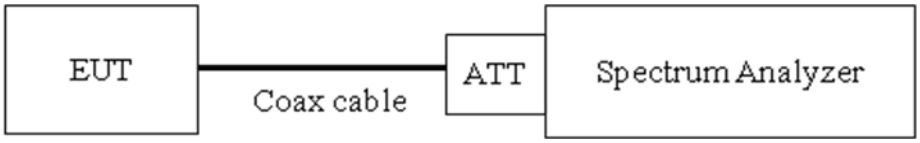
7.5. Conducted Band Edge(Out of Band Emissions) & Conducted Spurious Emissions

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	10.04
100	10.07
200	10.12
300	10.17
400	10.20
500	10.21
600	10.21
700	10.23
800	10.24
900	10.26
1000	10.27
2000	10.41
2400	10.43
2500	10.45
3000	10.52
4000	10.60
5000	10.71
6000	10.73
7000	10.80
8000	10.85
9000	10.91
10000	10.97
11000	11.02
12000	11.10
13000	11.19
14000	11.16
15000	11.21
16000	11.22
17000	11.25
18000	11.30
19000	11.32
20000	11.36
21000	11.48
22000	11.55
23000	11.55
24000	11.59
25000	11.68

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

2. Factor = Attenuator loss + Cable loss

3. EUT cable loss = 0.68 dB

4. Total Port offest = 11.13 dB

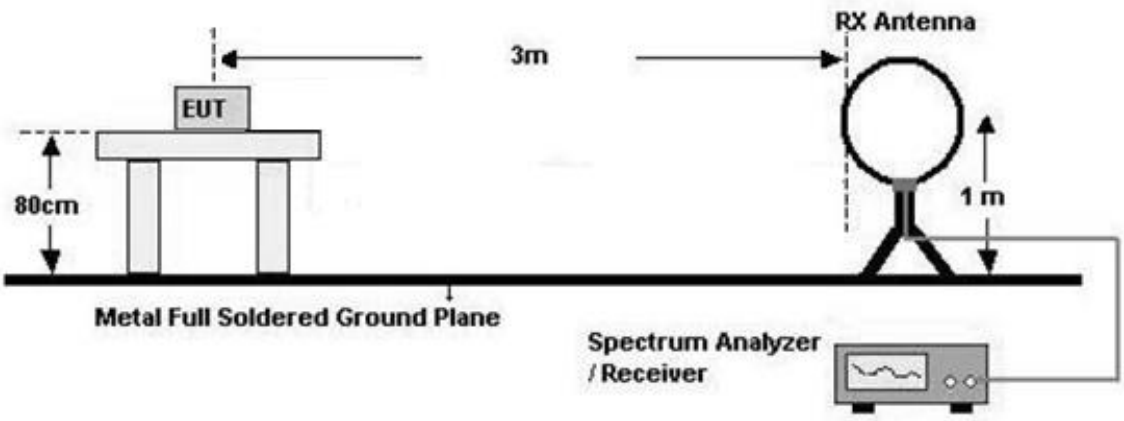
7.6. Radiated Test

Limit

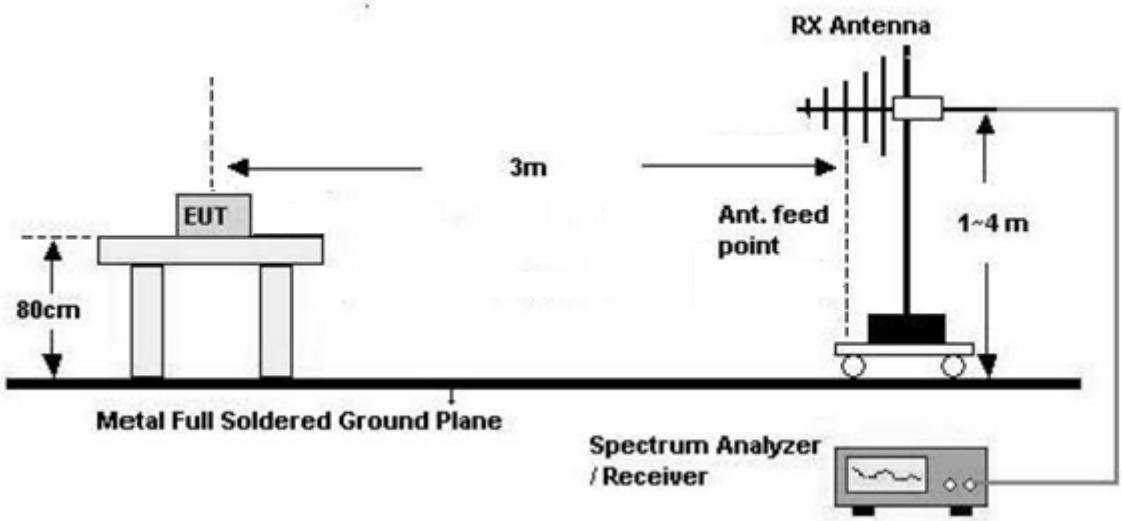
Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Configuration

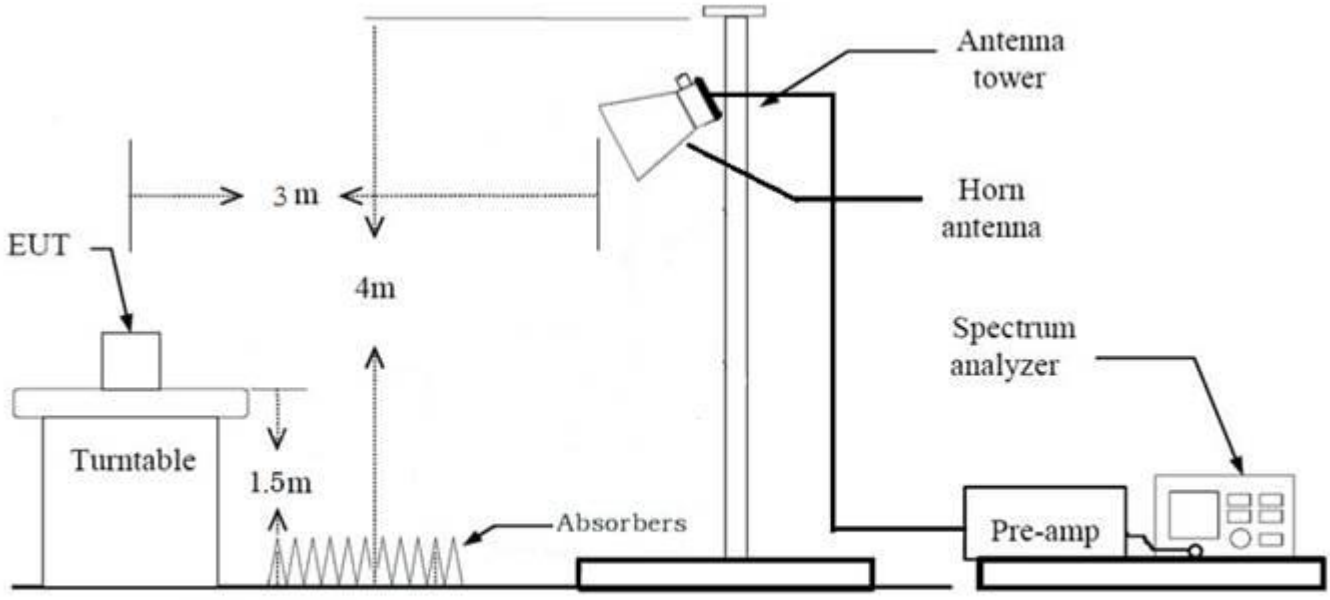
Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz



Test Procedure of Radiated spurious emissions(Below 30 MHz)

1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The loop antenna was placed at a location 3 m from the EUT
3. The EUT is placed on a turntable, which is 0.8 m above ground plane.
4. We have done x, y, z planes in EUT and horizontal and vertical polarization and Parallel to the ground plane in detecting antenna.
5. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
6. Distance Correction Factor(0.009 MHz – 0.490 MHz) = 40log(3 m/300 m) = - 80 dB
   Measurement Distance : 3 m
7. Distance Correction Factor(0.490 MHz – 30 MHz) = 40log(3 m/30 m) = - 40 dB
   Measurement Distance : 3 m
8. Spectrum Setting
   - Frequency Range = 9 kHz ~ 30 MHz
   - Detector = Peak
   - Trace = 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)

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

Test Procedure of Radiated Restricted Band Edge

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

   (2) Measurement Type(Average):
   - Duty cycle < 98 %, duty cycle variations are less than ±2 %
   - Measured Frequency Range : 2310 MHz ~ 2390 MHz/ 2483.5 MHz ~ 2500 MHz
   - Detector = RMS
   - Averaging type = power (*i.e.*, RMS)
   - RBW = 1 MHz
   - VBW ≥ 3 x RBW
   - Sweep time = auto.
   - Trace mode = average (at least 100 traces).
   - Correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100 percent duty cycle.
   - Duty Cycle Factor (dB) : Please refer to the please refer to section 9.1.
9. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already

beyond the background noise floor.

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

11. Total(Measurement Type : Peak)

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

Total(Measurement Type : Average)

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

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

7.7. AC Power line Conducted Emissions

Limit

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

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

[a]Decreases with the logarithm of the frequency.

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

Test Configuration

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

Test Procedure

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

Sample Calculation

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

7.8. Worst case configuration and mode

Radiated Test

1. All modes of operation were investigated and the worst case configuration results are reported.
   - Mode : Stand alone, Stand alone + External accessories(Earphone etc)
   - Worstcase : Stand alone
2. EUT Axis:
   - Radiated Spurious Emissions : Y
   - 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 : 1 M, 2 M)
   (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
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 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 refer to 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

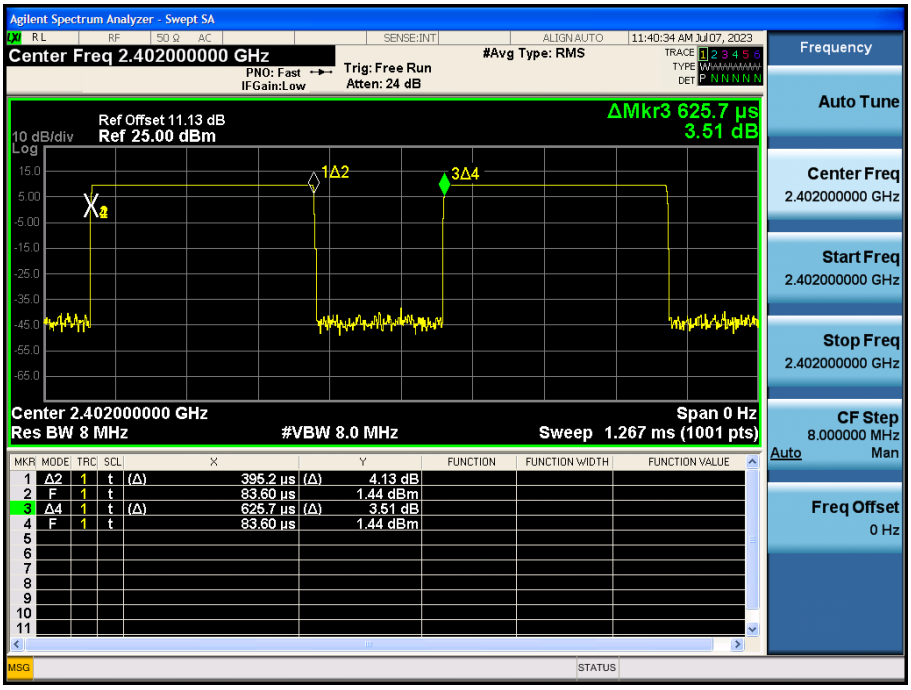
9. TEST RESULT

9.1 DUTY CYCLE

Data rate (Bit/s)	Packet length (Byte)	T_{on} (ms)	T_{total} (ms)	Duty Cycle	Duty Cycle Factor (dB)
1M	37	0.395	0.626	0.632	1.996
	255	2.140	2.500	0.856	0.675
2M	37	0.209	0.626	0.334	4.762
	255	1.082	1.874	0.577	2.386
125k	37	3.110	3.750	0.829	0.813
	255	17.067	17.500	0.975	0.109
500k	37	1.072	1.872	0.573	2.421
	255	4.560	5.000	0.912	0.400

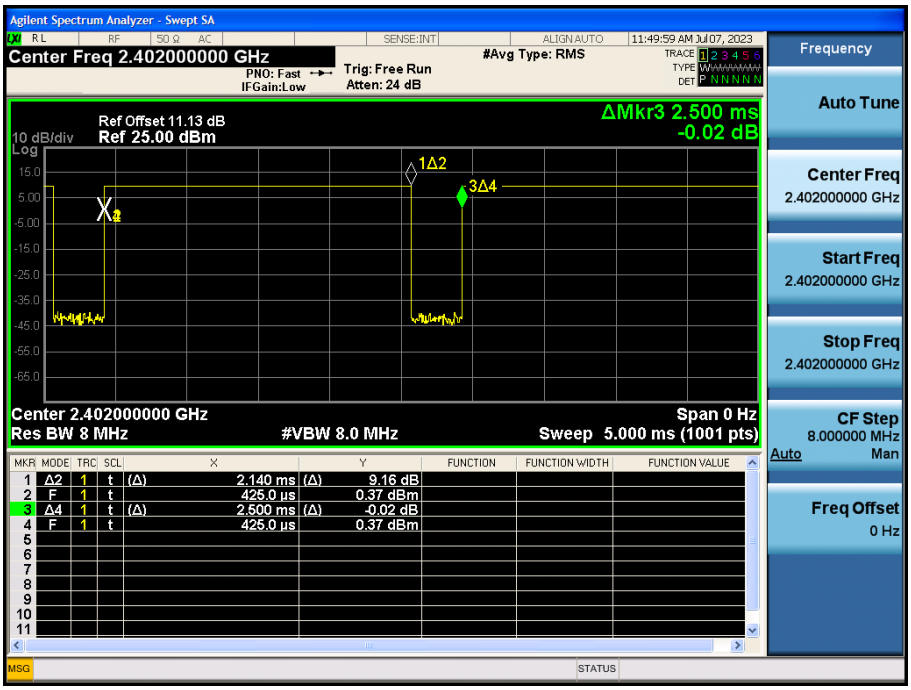
▣ 1 M Bit/s (37 Byte) Test Plots

Duty Cycle (Low-CH 0)



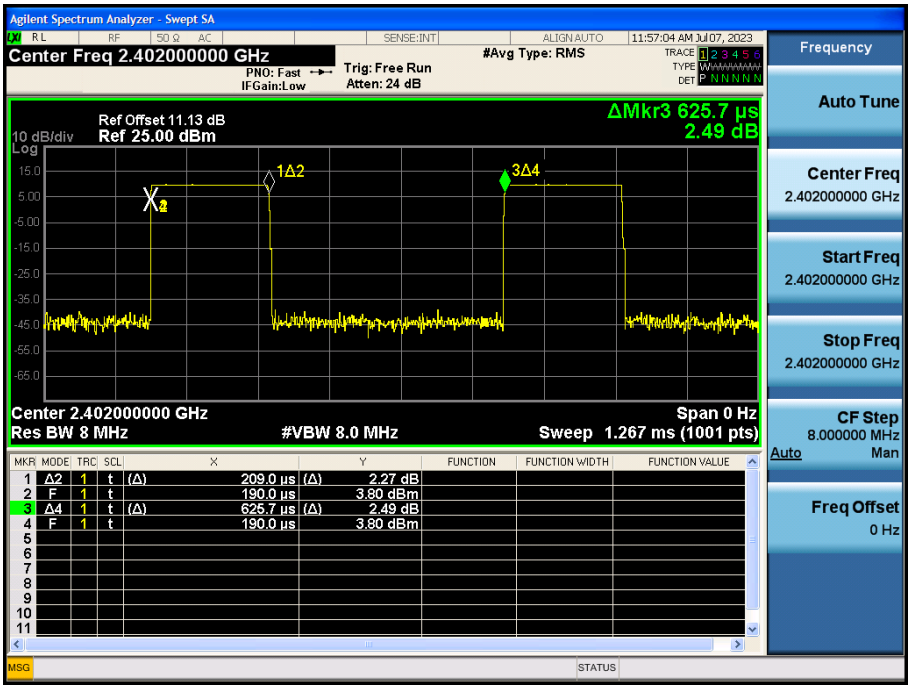
▣ 1 M Bit/s (255 Byte) Test Plots

Duty Cycle (Low-CH 0)



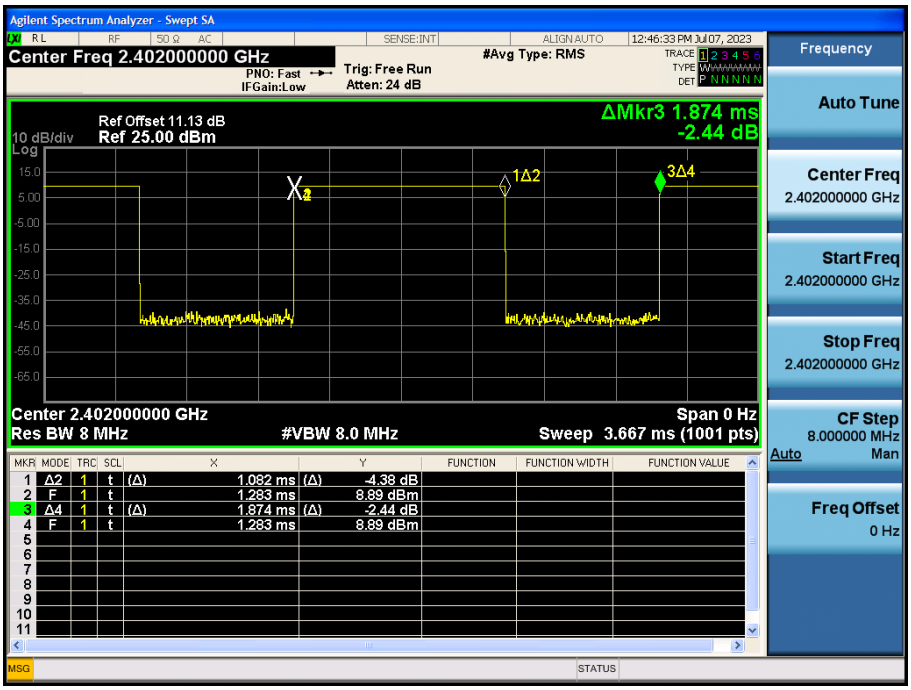
▣ 2 M Bit/s (37 Byte) Test Plots

Duty Cycle (Low-CH 0)



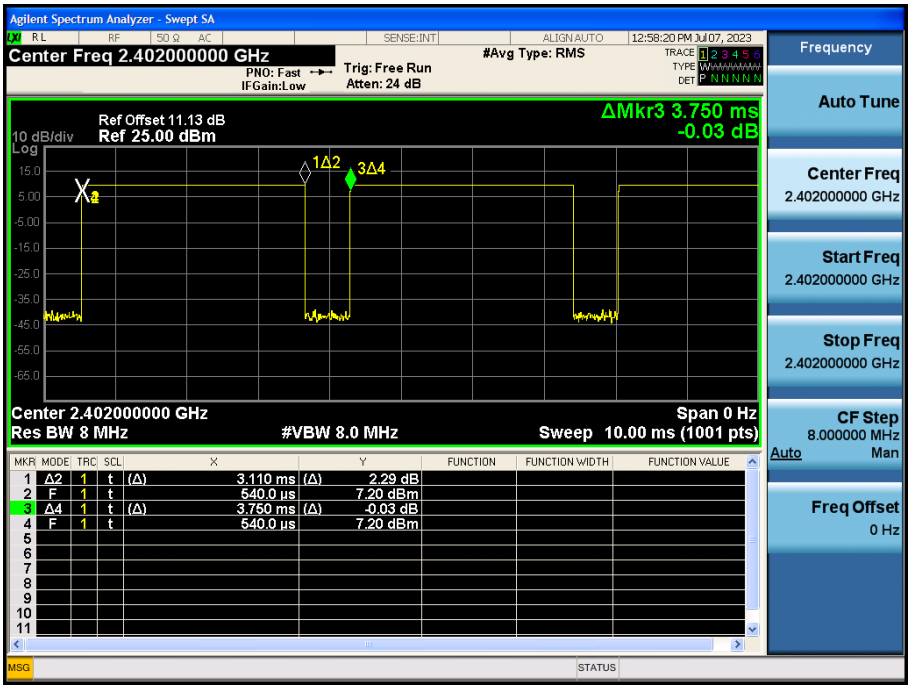
▣ 2 M Bit/s (255 Byte) Test Plots

Duty Cycle (Low-CH 0)



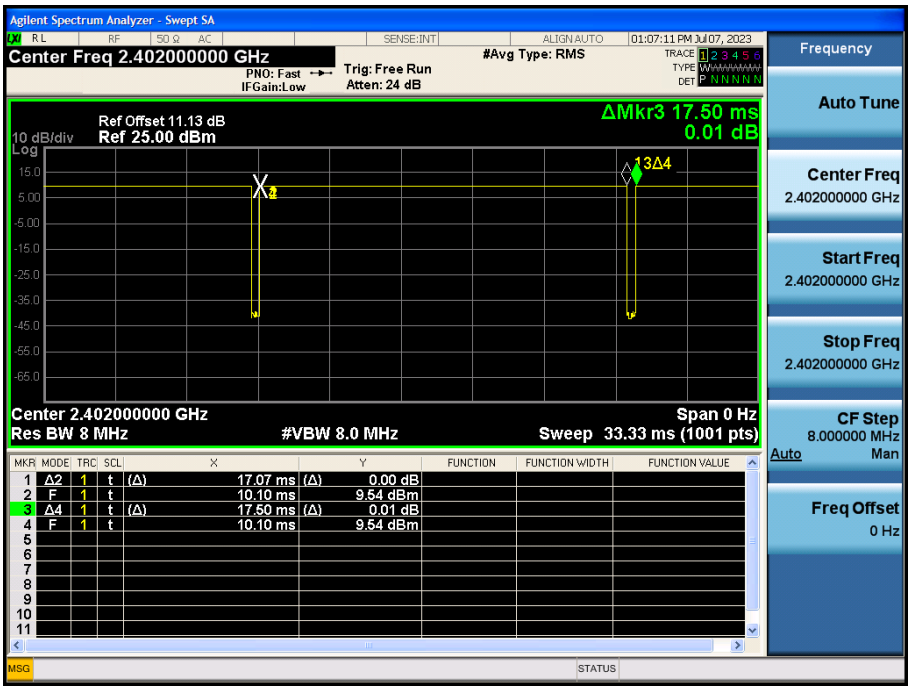
▣ 125 k Bit/s(37 Byte) Test Plots

Duty Cycle (Low-CH 0)



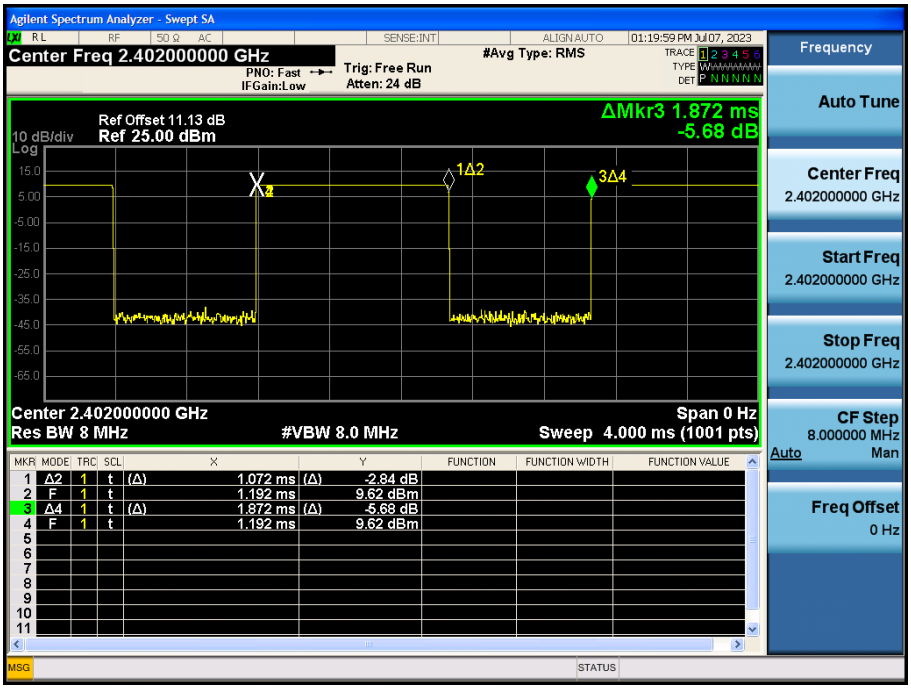
▣ 125 k Bit/s(255 Byte) Test Plots

Duty Cycle (Low-CH 0)



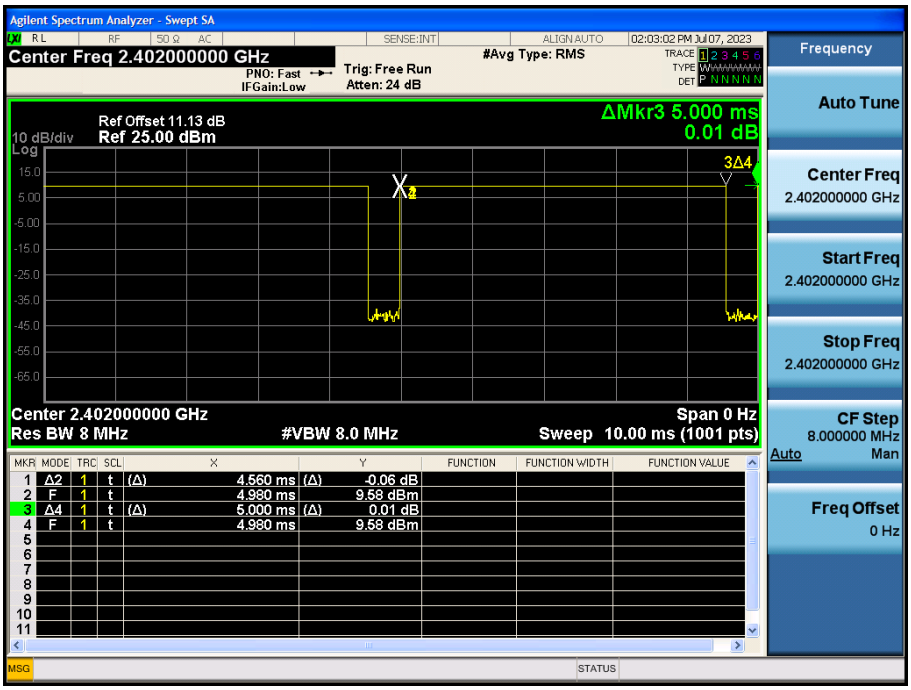
▣ 500 k Bit/s(37 Byte) Test Plots

Duty Cycle (Low-CH 0)



▣ 500 k 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	665.8	> 500
	19	666.8	
	39	667.0	
1M(255)	0	669.9	> 500
	19	669.0	
	39	679.1	
2M(37)	0	1113	> 500
	19	1113	
	39	1115	
2M(255)	0	1120	> 500
	19	1123	
	39	1120	
125k(37)	0	612.2	> 500
	19	626.7	
	39	655.5	
125k(255)	0	607.6	> 500
	19	613.6	
	39	643.1	
500k(37)	0	669.2	> 500
	19	668.8	
	39	672.0	
500k(255)	0	677.1	> 500
	19	666.4	
	39	690.8	

Note:

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

1M Bit/s: 37 Byte

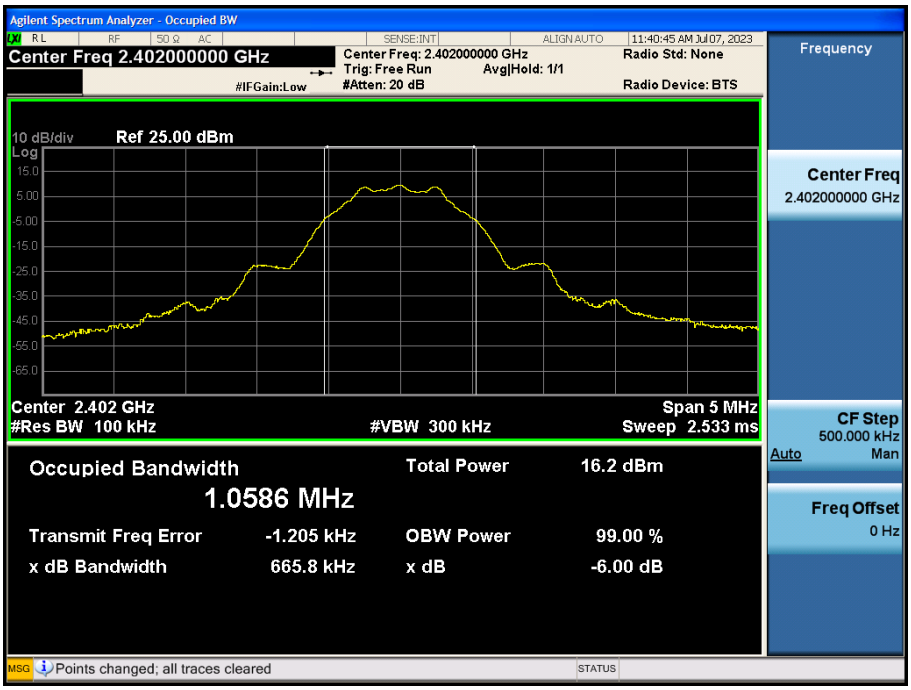
2M Bit/s: 37 Byte

125k Bit/s: 255 Byte

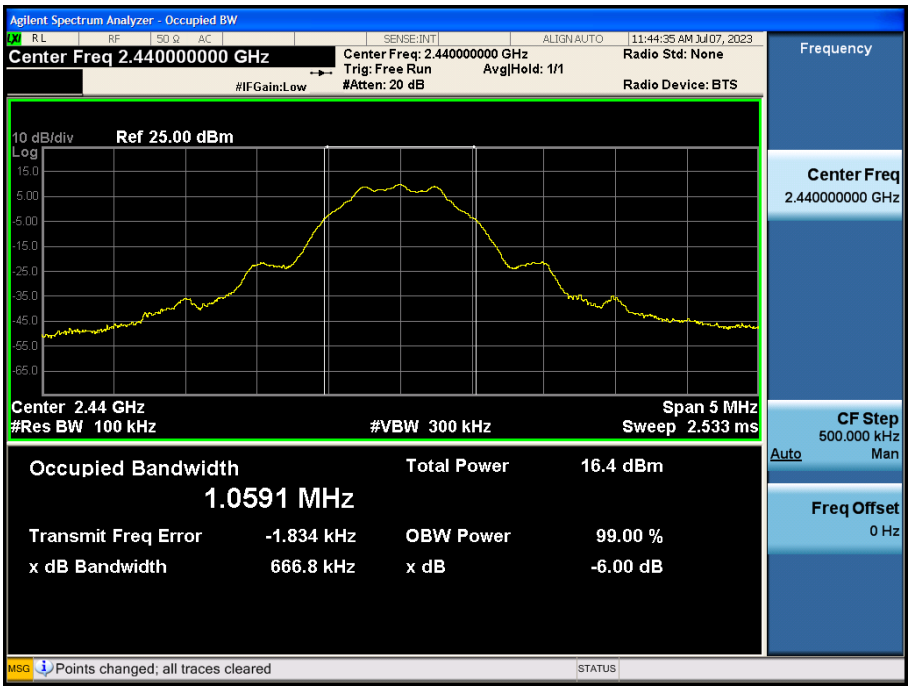
500k Bit/s: 255 Byte

▣ 1 MBit/s (37 Byte) Test Plots

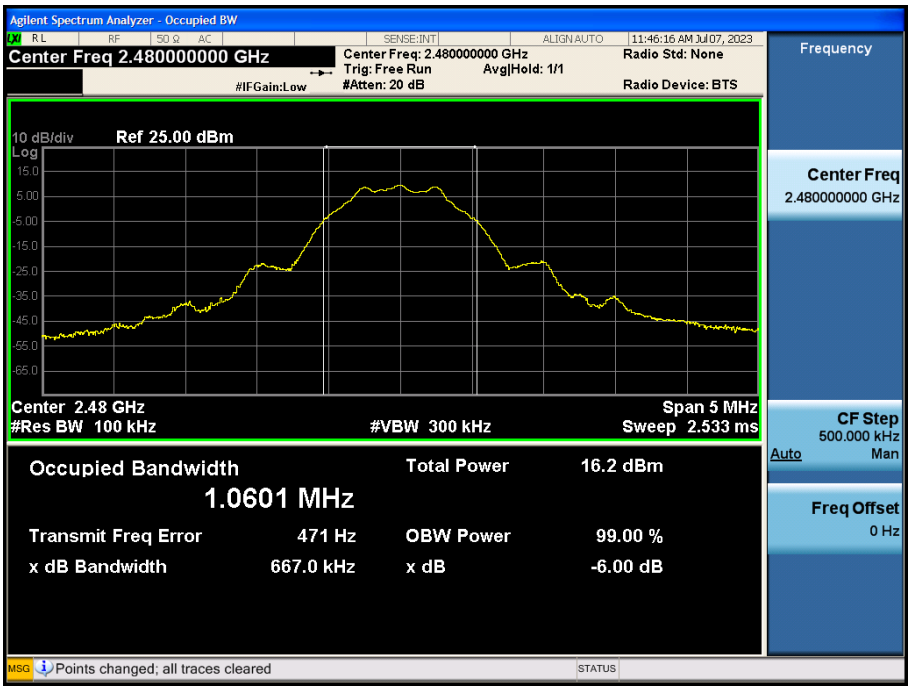
6 dB Bandwidth plot (Low-CH 0)



6 dB Bandwidth plot (Mid-CH 19)

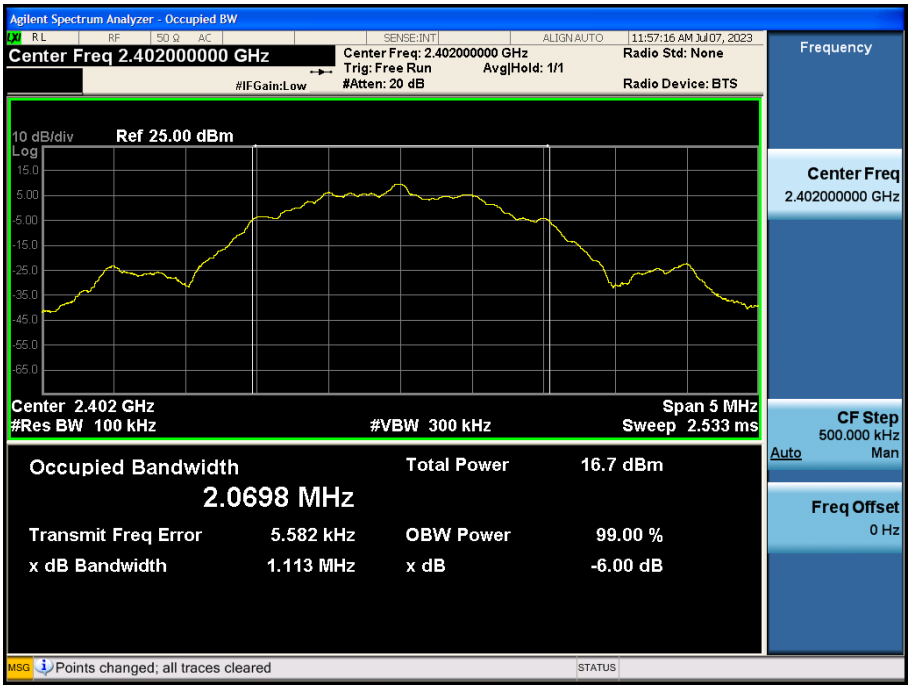


6 dB Bandwidth plot (High-CH 39)

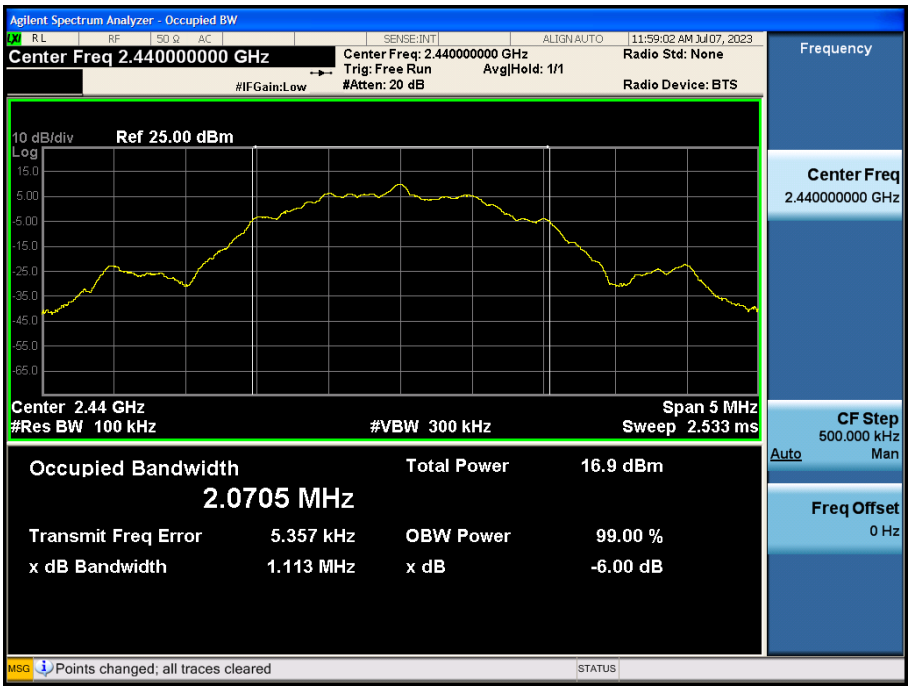


▣ 2 MBit/s (37 Byte) Test Plots

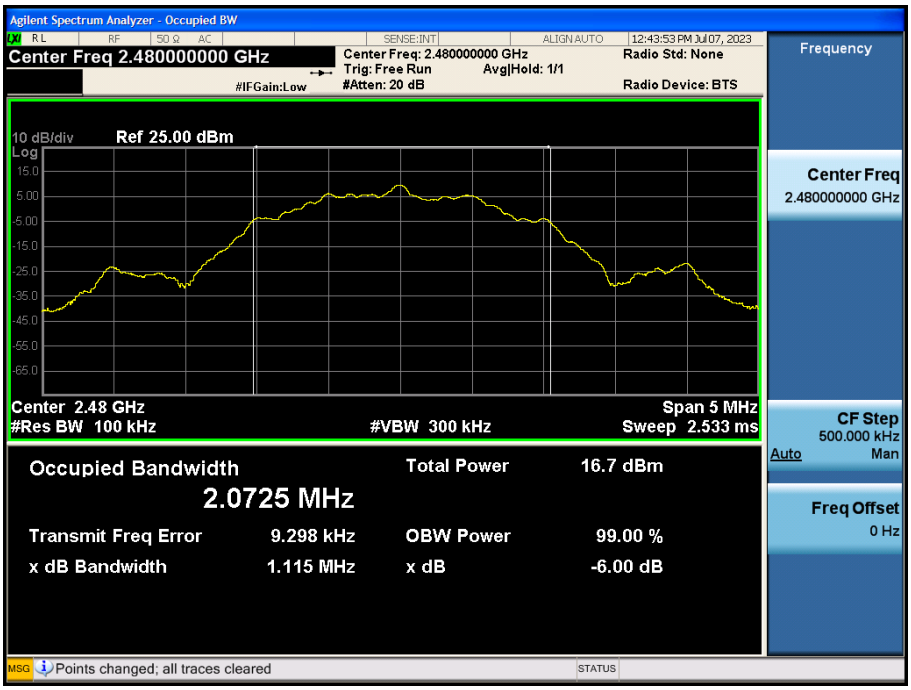
6 dB Bandwidth plot (Low-CH 0)



6 dB Bandwidth plot (Mid-CH 19)

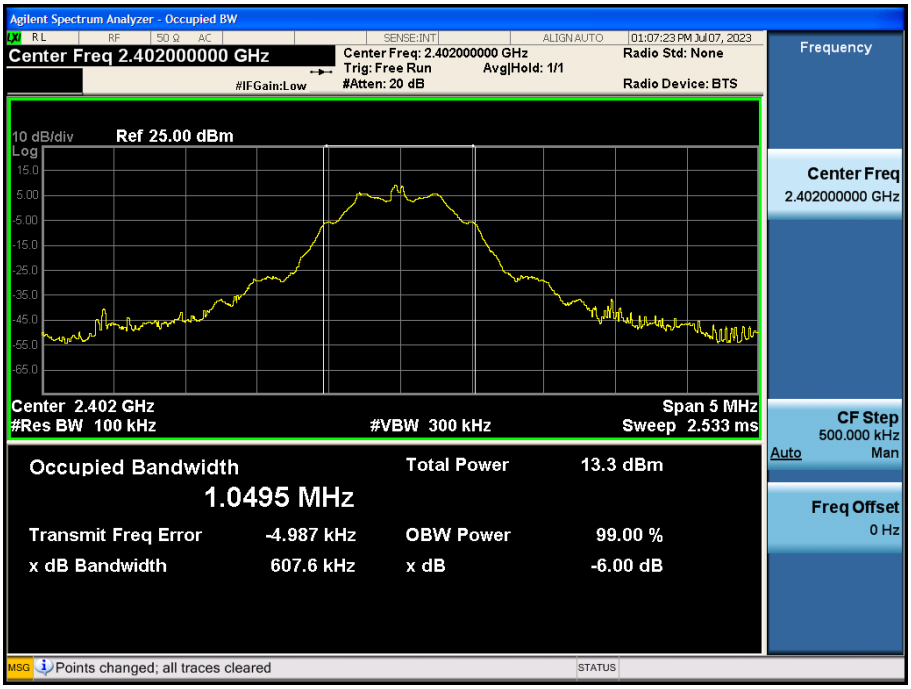


6 dB Bandwidth plot (High-CH 39)

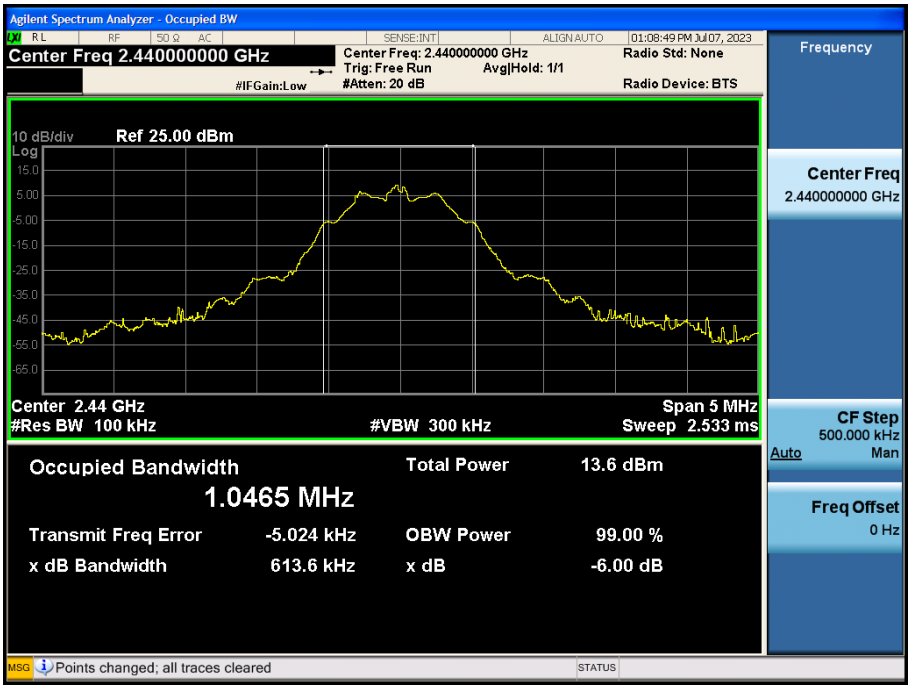


▣ 125k Bit/s(255 Byte) Test Plots

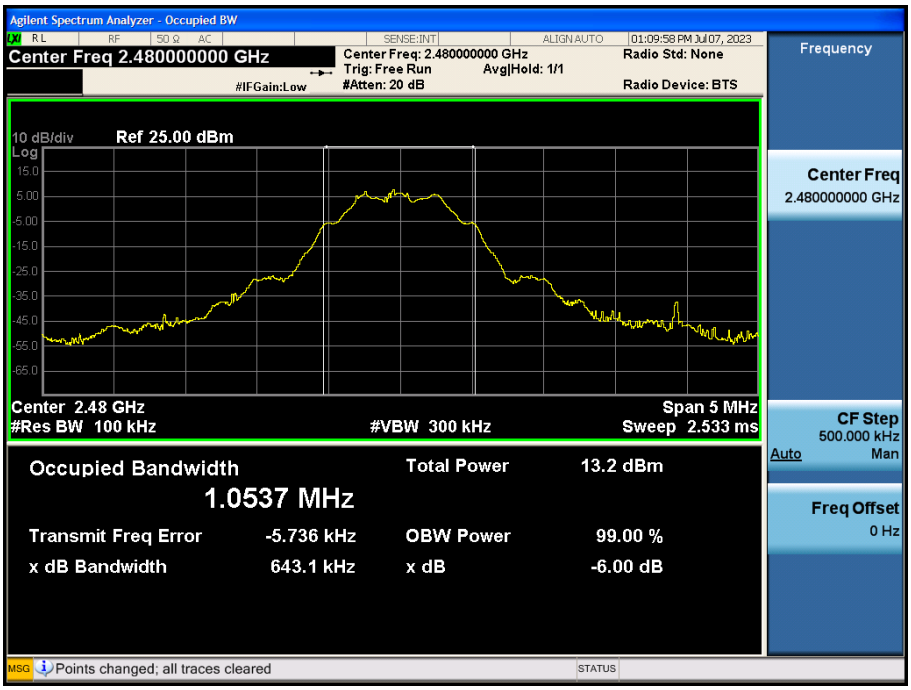
6 dB Bandwidth plot (Low-CH 0)



6 dB Bandwidth plot (Mid-CH 19)

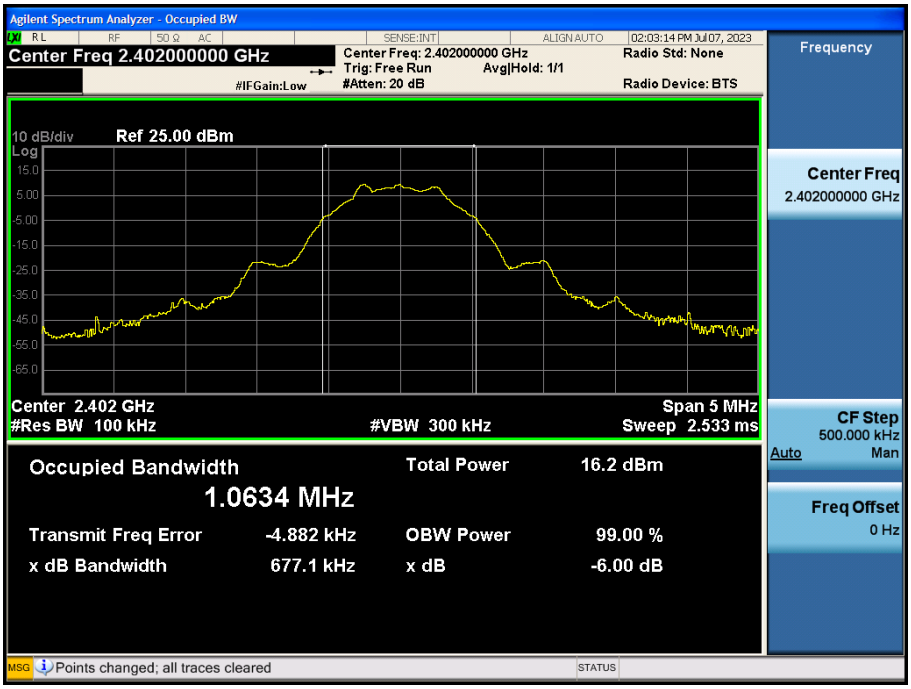


6 dB Bandwidth plot (High-CH 39)

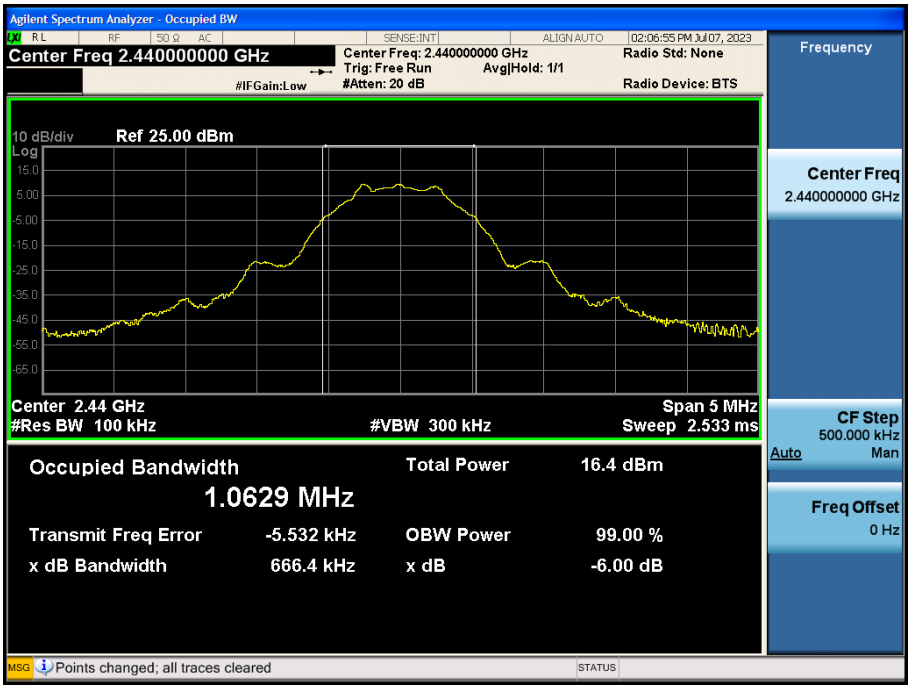


▣ 500k Bit/s(255 Byte) Test Plots

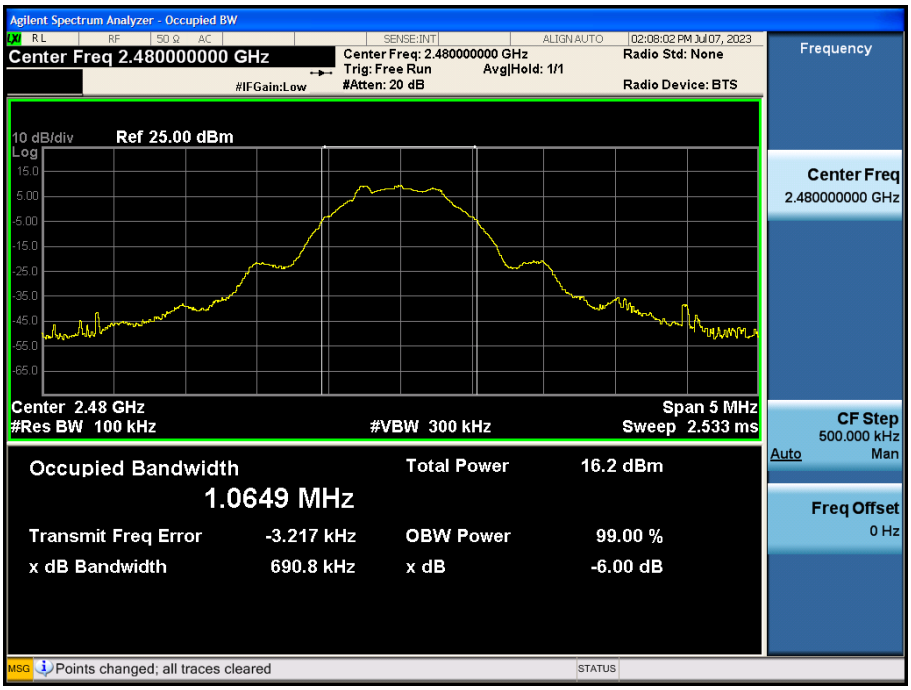
6 dB Bandwidth plot (Low-CH 0)



6 dB Bandwidth plot (Mid-CH 19)



6 dB Bandwidth plot (High-CH 39)



9.3 OUTPUT POWER

Peak Power

Data rate	Packet length	LE Mode		Measured Power(dBm)	Limit (dBm)
(Bit/s)	(Byte)	Frequency [MHz]	Channel		
1M	37	2402	0	9.702	30
		2440	19	9.891	
		2480	39	9.705	
	255	2402	0	9.627	
		2440	19	9.814	
		2480	39	9.654	
2M	37	2402	0	9.780	
		2440	19	9.979	
		2480	39	9.834	
	255	2402	0	9.723	
		2440	19	9.899	
		2480	39	9.782	
125k	37	2402	0	9.620	
		2440	19	9.825	
		2480	39	9.693	
	255	2402	0	9.557	
		2440	19	9.716	
		2480	39	9.628	
500k	37	2402	0	9.670	
		2440	19	9.844	
		2480	39	9.744	
	255	2402	0	9.602	
		2440	19	9.775	
		2480	39	9.641	

Average 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	7.41	2.00	9.41	30
		2440	19	7.63	2.00	9.63	
		2480	39	7.52	2.00	9.52	
	255	2402	0	8.76	0.68	9.44	
		2440	19	8.89	0.68	9.57	
		2480	39	8.75	0.68	9.43	
2M	37	2402	0	4.83	4.76	9.59	
		2440	19	4.91	4.76	9.67	
		2480	39	4.67	4.76	9.43	
	255	2402	0	6.97	2.39	9.36	
		2440	19	7.23	2.39	9.62	
		2480	39	7.11	2.39	9.50	
125k	37	2402	0	8.59	0.81	9.40	
		2440	19	8.80	0.81	9.61	
		2480	39	8.57	0.81	9.38	
	255	2402	0	9.26	0.11	9.37	
		2440	19	9.39	0.11	9.50	
		2480	39	9.31	0.11	9.42	
500k	37	2402	0	7.07	2.42	9.49	
		2440	19	7.10	2.42	9.52	
		2480	39	7.01	2.42	9.43	
	255	2402	0	8.97	0.40	9.37	
		2440	19	9.11	0.40	9.51	
		2480	39	8.99	0.40	9.39	

9.4 POWER SPECTRAL DENSITY

Frequency (MHz)	Channel No.	Mode	Test Result			
			Measured PSD (dBm)	Duty Cycle Factor (dB)	Total PSD (dBm)	Limit
2402	0	1 MBit/s 37 Byte	-1.540	2.00	0.456	8 dBm / 3 kHz
2440	19		-2.108	2.00	-0.112	
2480	39		-2.183	2.00	-0.187	
2402	0	1 MBit/s 255 Byte	-2.668	0.68	-1.993	
2440	19		-2.301	0.68	-1.626	
2480	39		-3.156	0.68	-2.481	
2402	0	2 MBit/s 37 Byte	-5.332	4.76	-0.570	
2440	19		-6.405	4.76	-1.643	
2480	39		-5.729	4.76	-0.967	
2402	0	2 MBit/s 255 Byte	-5.513	2.39	-3.127	
2440	19		-5.966	2.39	-3.580	
2480	39		-6.216	2.39	-3.830	
2402	**0**	**125k 37 Byte**	**2.274**	**0.81**	**3.087**	
2440	**19**		**2.481**	**0.81**	**3.294**	
2480	**39**		**2.227**	**0.81**	**3.040**	
2402	0	125k 255 Byte	2.817	0.11	2.926	
2440	19		2.883	0.11	2.992	
2480	39		2.863	0.11	2.972	
2402	0	500k 37 Byte	-2.898	2.42	-0.477	
2440	19		-2.224	2.42	0.197	
2480	39		-2.864	2.42	-0.443	
2402	0	500k 255 Byte	-2.500	0.40	-2.100	
2440	19		-2.701	0.40	-2.301	
2480	39		-2.662	0.40	-2.262	

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. Total PSD = Measured PSD + Duty Cycle Factor
4. Worst case test plot was attached. (Worstcase : 125k Bit/s 37 Byte)

▣ 125k Bit/s (37 Byte) Test Plots

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.

[BAND EDGE]

Frequency (MHz)	Mode	Channel No.	Position	Test Result	
				Measured Level (dB)	Limit (dBc)
2402	1M Bit/s 37 Byte	0	Lower	56.846	30
2480		39	Upper	61.419	30
2402	1M Bit/s 255 Byte	0	Lower	56.380	30
2480		39	Upper	60.231	30
2402	2M Bit/s 37 Byte	0	Lower	33.006	30
2480		39	Upper	56.352	30
2402	2M Bit/s 255 Byte	0	Lower	33.012	30
2480		39	Upper	55.664	30
2402	125k Bit/s 37 Byte	0	Lower	55.913	30
2480		39	Upper	61.923	30
2402	125k Bit/s 255 Byte	0	Lower	54.724	30
2480		39	Upper	62.040	30
2402	500k Bit/s 37 Byte	0	Lower	48.223	30
2480		39	Upper	61.139	30
2402	500k Bit/s 255 Byte	0	Lower	45.057	30
2480		39	Upper	61.951	30

Note :

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

[CONDUCTED SPURIOUS EMISSIONS]

Note :

1. In order to simplify the report, attached plots were only the worst case channel and data rate.
   Worst case 2M Bit/s (37 Byte)

▣ 2M Bit/s (37 Byte) Test Plots –Band Edge

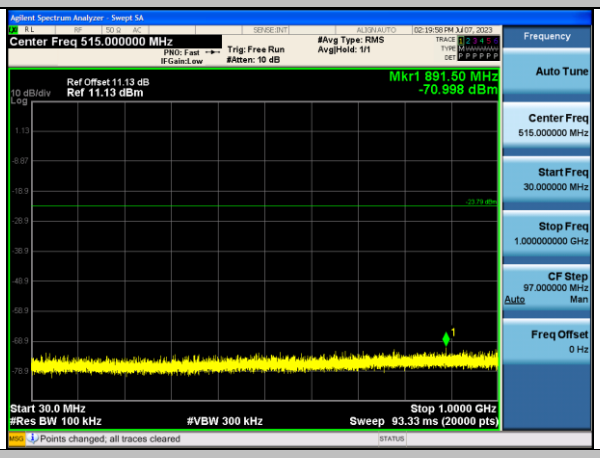
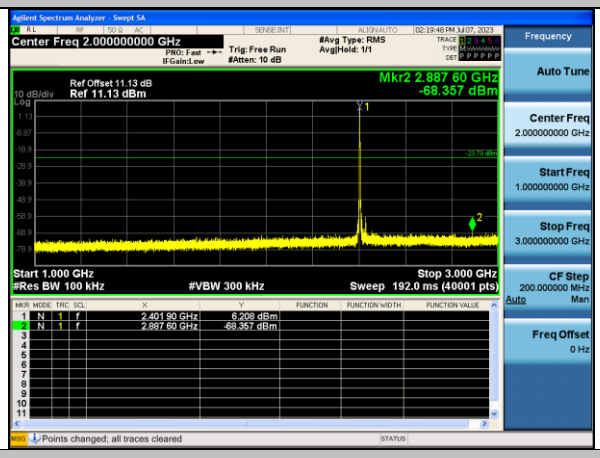
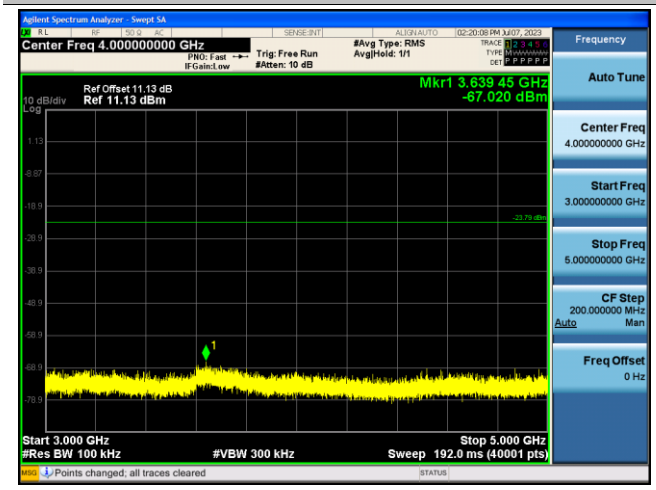
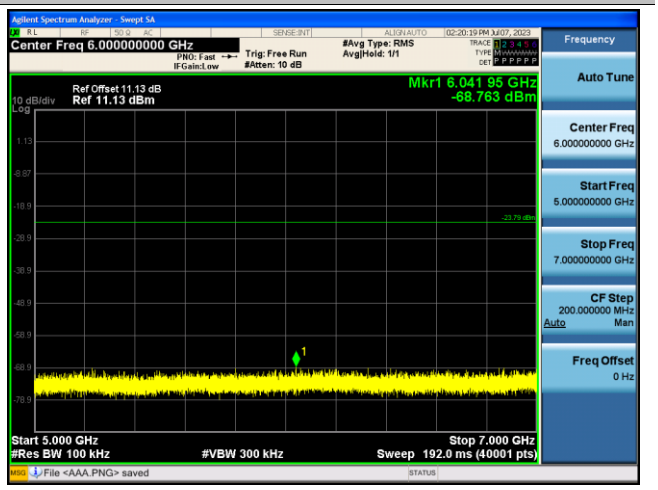
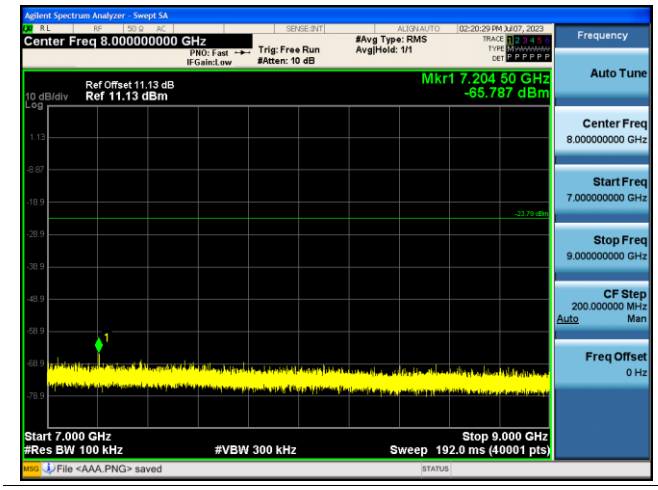
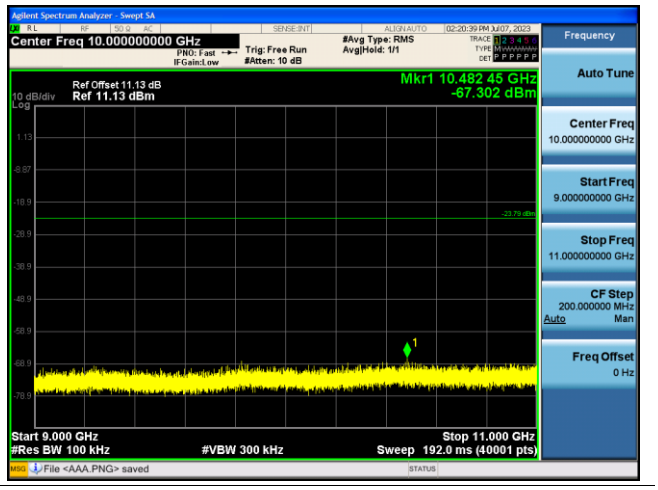
Low-CH 0

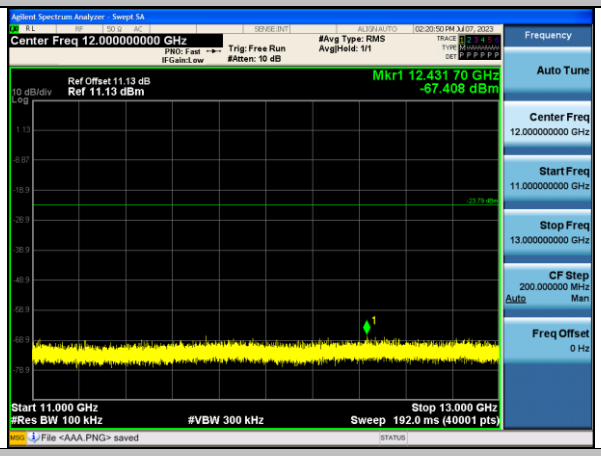
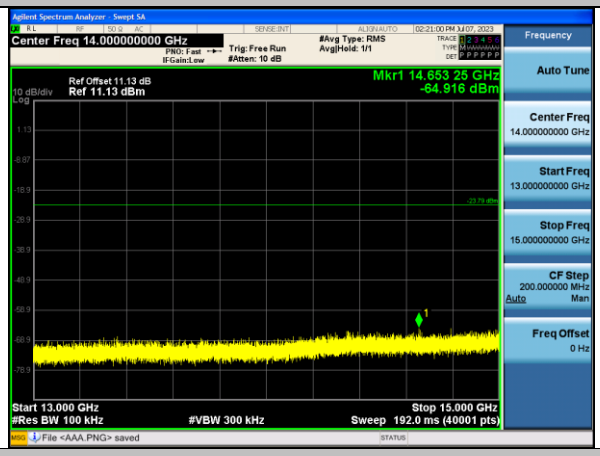
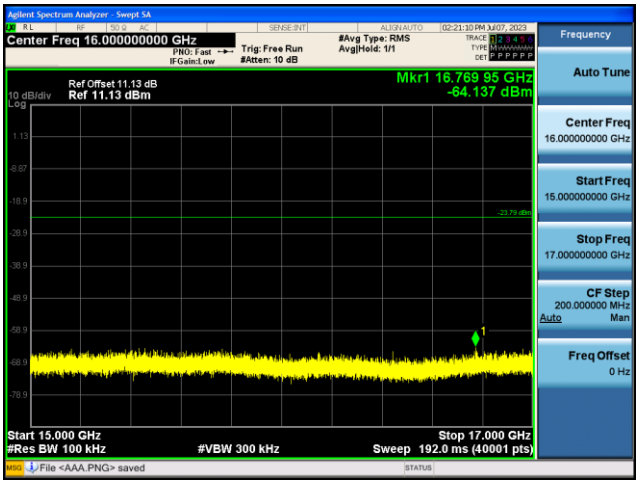
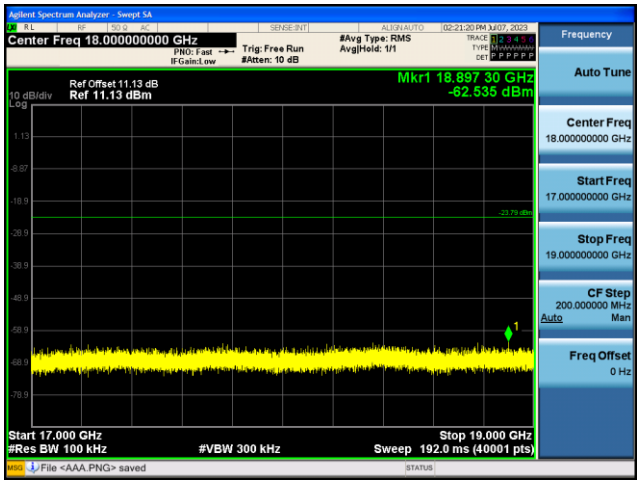
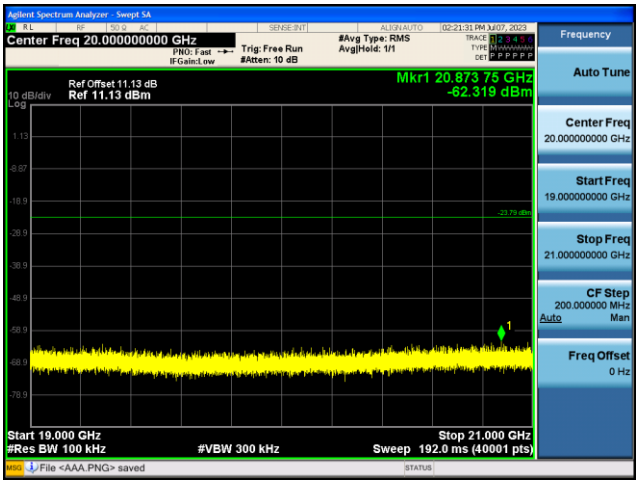
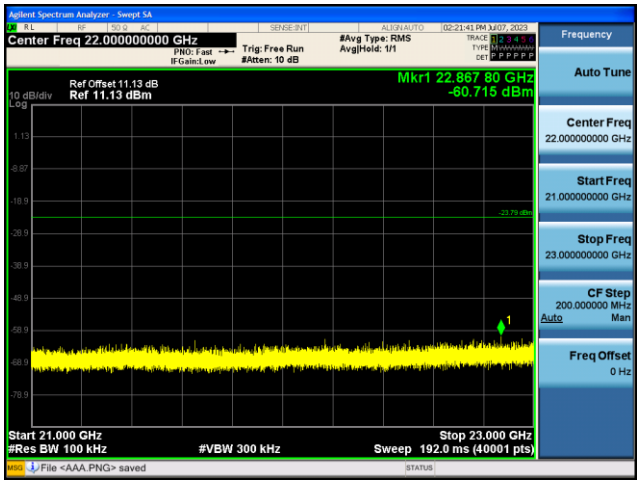
▣ 2M Bit/s (255 Byte) Test Plots –Band Edge

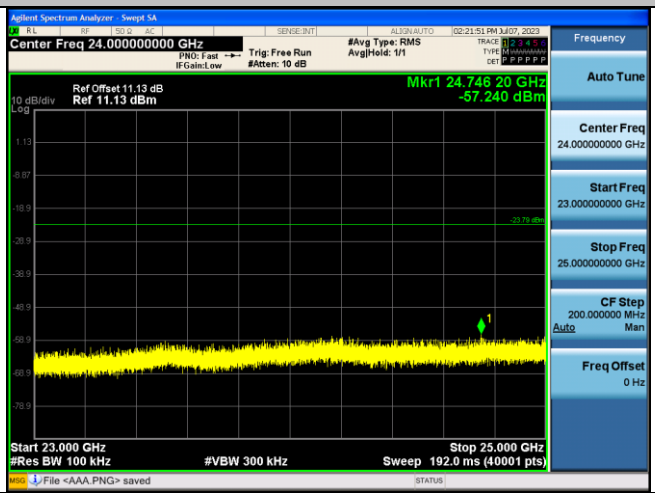
High-CH 39

▣ 2M Bit/s (37 Byte) Test Plots -Conducted Spurious Emission

(Worst case : Low-CH 0)

Spurious Emission (30 MHz – 1 GHz)	Spurious Emission (1 GHz – 3 GHz)
	
Spurious Emission (3 GHz – 5 GHz)	**Spurious Emission (5 GHz – 7 GHz)**
	
Spurious Emission (7 GHz – 9 GHz)	**Spurious Emission (9 GHz – 11 GHz)**
	

Spurious Emission (11 GHz – 13 GHz)	Spurious Emission (13 GHz – 15 GHz)
	
Spurious Emission (15 GHz – 17 GHz)	**Spurious Emission (17 GHz – 19 GHz)**
	
Spurious Emission (19 GHz – 21 GHz)	**Spurious Emission (21 GHz – 23 GHz)**
	

Spurious Emission (23 GHz – 25 GHz)


9.6 RADIATED SPURIOUS EMISSIONS

Frequency Range : 9 kHz – 30 MHz

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

Note:

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

Frequency Range : Below 1 GHz

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

Note:

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

Frequency Range : Above 1 GHz

Mode : 1 M Bit/s (37 Bytes)

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	3.94	V	45.56	73.98	28.42	PK
4804	31.05	0.00	3.94	V	34.99	53.98	18.99	AV
7206	36.90	0.00	13.09	V	49.99	73.98	23.99	PK
7206	25.11	0.00	13.09	V	38.20	53.98	15.78	AV
4804	42.94	0.00	3.94	H	46.88	73.98	27.10	PK
4804	31.36	0.00	3.94	H	35.30	53.98	18.68	AV
7206	37.29	0.00	13.09	H	50.38	73.98	23.60	PK
7206	25.38	0.00	13.09	H	38.47	53.98	15.51	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	42.78	0.00	3.98	V	46.76	73.98	27.22	PK
4880	31.14	0.00	3.98	V	35.12	53.98	18.86	AV
7320	38.29	0.00	12.01	V	50.30	73.98	23.69	PK
7320	26.31	0.00	12.01	V	38.32	53.98	15.67	AV
4880	44.06	0.00	3.98	H	48.04	73.98	25.94	PK
4880	31.62	0.00	3.98	H	35.60	53.98	18.38	AV
7320	38.65	0.00	12.01	H	50.66	73.98	23.33	PK
7320	26.44	0.00	12.01	H	38.45	53.98	15.54	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	42.79	0.00	4.80	V	47.59	73.98	26.39	PK
4960	30.61	0.00	4.80	V	35.41	53.98	18.57	AV
7440	38.78	0.00	12.33	V	51.11	73.98	22.87	PK
7440	26.74	0.00	12.33	V	39.07	53.98	14.91	AV
4960	43.46	0.00	4.80	H	48.26	73.98	25.72	PK
4960	30.84	0.00	4.80	H	35.64	53.98	18.34	AV
7440	**39.43**	**0.00**	**12.33**	**H**	**51.76**	**73.98**	**22.22**	**PK**
7440	**26.97**	**0.00**	**12.33**	**H**	**39.30**	**53.98**	**14.68**	**AV**

Mode : 2 M Bit/s (37 Bytes)

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	41.88	0.00	3.94	V	45.82	73.98	28.16	PK
4804	30.05	0.00	3.94	V	33.99	53.98	19.99	AV
7206	36.89	0.00	13.09	V	49.98	73.98	24.00	PK
7206	25.09	0.00	13.09	V	38.18	53.98	15.80	AV
4804	42.26	0.00	3.94	H	46.20	73.98	27.78	PK
4804	30.13	0.00	3.94	H	34.07	53.98	19.91	AV
7206	37.36	0.00	13.09	H	50.45	73.98	23.53	PK
7206	25.36	0.00	13.09	H	38.45	53.98	15.53	AV

Operation Mode: CH Mid

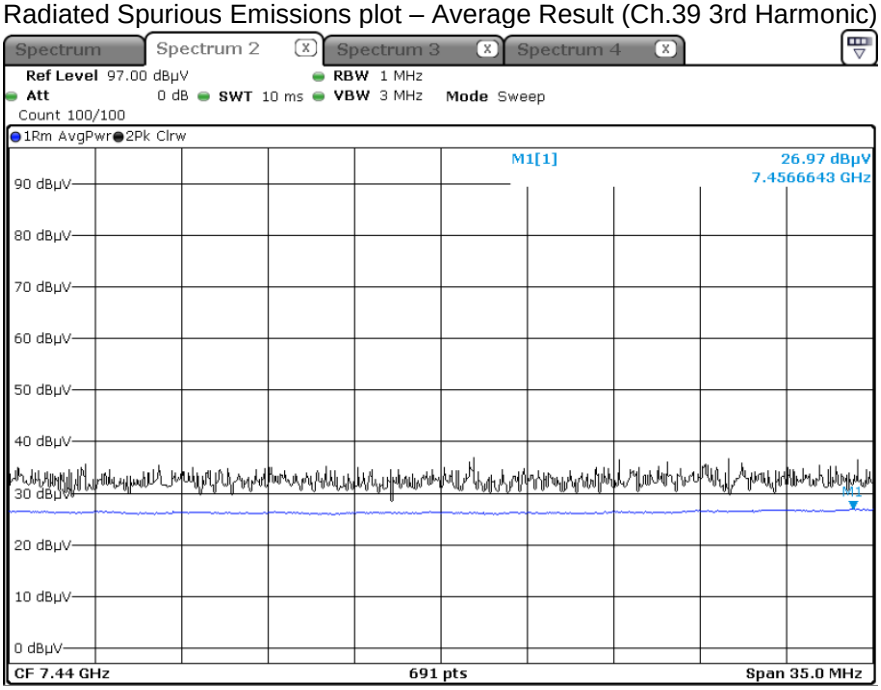
Frequency [MHz]	Measured Value [dBµV]	Duty Cycle Factor [dB]	A.F + C.L - A.G + D.F [dB/m]	Pol. [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4880	43.50	0.00	3.98	V	47.48	73.98	26.50	PK
4880	31.32	0.00	3.98	V	35.30	53.98	18.68	AV
7320	38.53	0.00	12.01	V	50.54	73.98	23.45	PK
7320	26.34	0.00	12.01	V	38.35	53.98	15.64	AV
4880	43.62	0.00	3.98	H	47.60	73.98	26.38	PK
4880	31.37	0.00	3.98	H	35.35	53.98	18.63	AV
7320	38.87	0.00	12.01	H	50.88	73.98	23.11	PK
7320	26.46	0.00	12.01	H	38.47	53.98	15.52	AV

Operation Mode: CH High

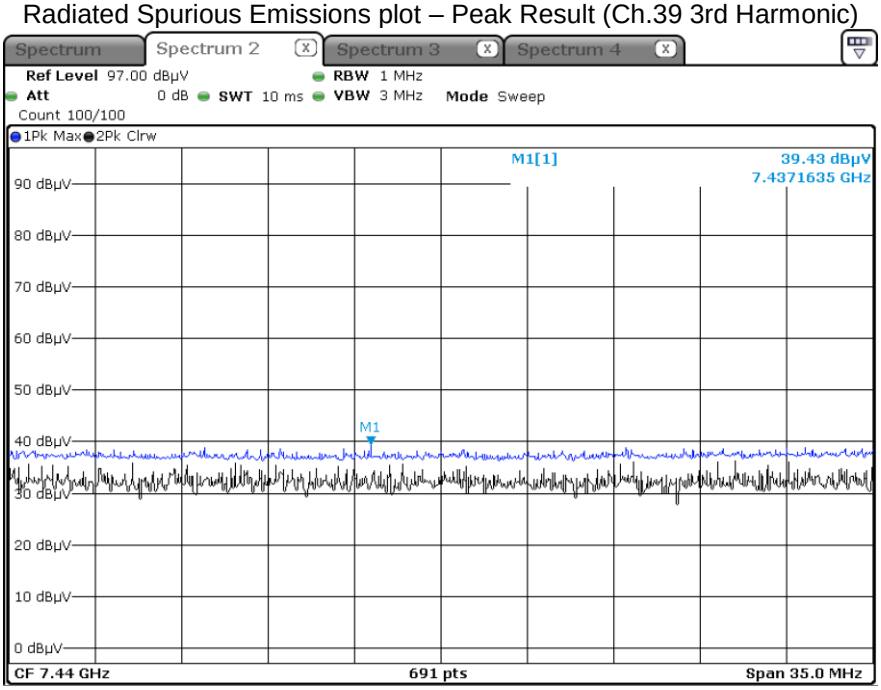
Frequency [MHz]	Measured Value [dBµV]	Duty Cycle Factor [dB]	A.F + C.L - A.G + D.F [dB/m]	Pol. [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4960	42.69	0.00	4.80	V	47.49	73.98	26.49	PK
4960	30.44	0.00	4.80	V	35.24	53.98	18.74	AV
7440	38.26	0.00	12.33	V	50.59	73.98	23.39	PK
7440	26.81	0.00	12.33	V	39.14	53.98	14.84	AV
4960	43.08	0.00	4.80	H	47.88	73.98	26.10	PK
4960	30.51	0.00	4.80	H	35.31	53.98	18.67	AV
7440	**39.09**	**0.00**	**12.33**	**H**	**51.42**	**73.98**	**22.56**	**PK**
7440	**26.90**	**0.00**	**12.33**	**H**	**39.23**	**53.98**	**14.75**	**AV**

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

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

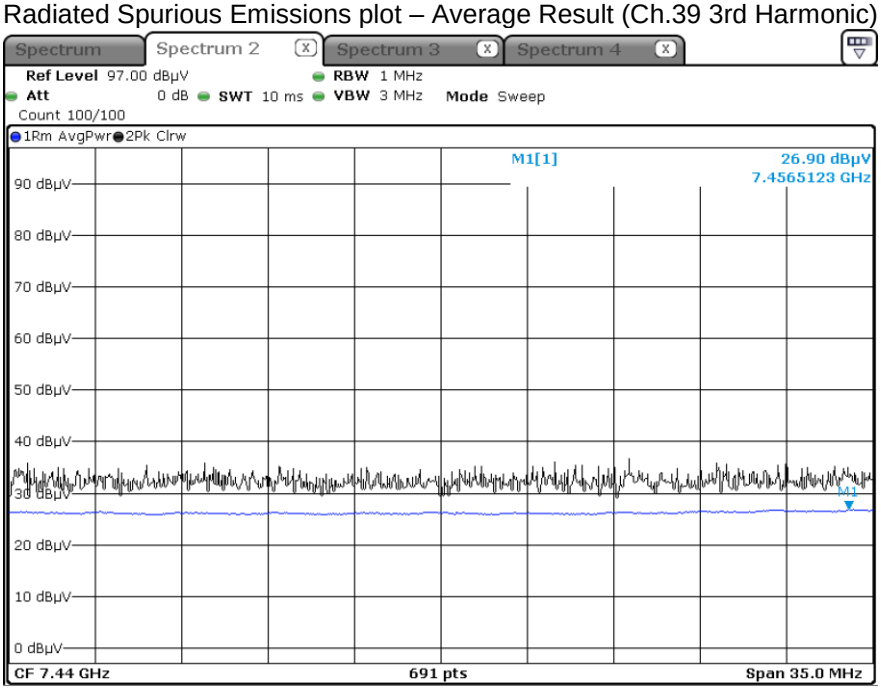


Radiated Spurious Emissions plot – Peak Result (Ch.39 3rd Harmonic)

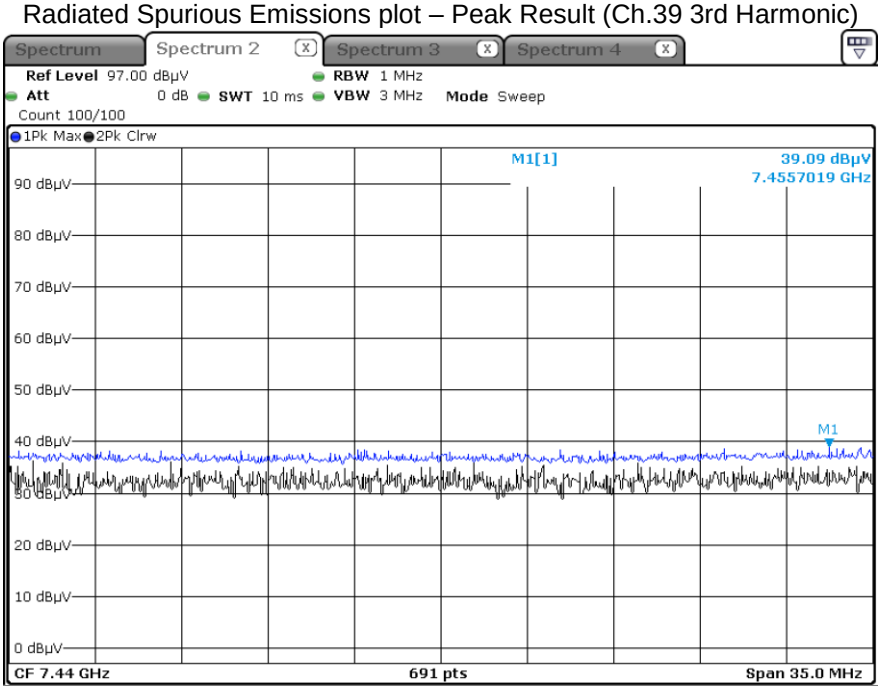


▣ 2 M Bit/s 37 Bytes Test Plots (Worst case : Y-H)

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



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



Note:

Plot of worst case are only reported.

9.7 RADIATED RESTRICTED BAND EDGES

Mode : 1 M Bit/s (37 Bytes)

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	54.42	0.00	2.15	H	56.57	73.98	17.41	PK
2390.0	41.69	0.00	2.15	H	43.84	53.98	10.14	AV
2390.0	53.62	0.00	2.15	V	55.77	73.98	18.21	PK
2390.0	41.52	0.00	2.15	V	43.67	53.98	10.31	AV
2483.5	61.11	0.00	2.47	H	63.58	73.98	10.41	PK
2483.5	42.53	0.00	2.47	H	45.00	53.98	8.98	AV
2483.5	60.88	0.00	2.47	V	63.35	73.98	10.64	PK
2483.5	41.99	0.00	2.47	V	44.46	53.98	9.52	AV

Mode : 1 M Bit/s (255 Bytes)

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	53.32	0.00	2.15	H	55.47	73.98	18.51	PK
2390.0	41.68	0.00	2.15	H	43.83	53.98	10.15	AV
2390.0	52.95	0.00	2.15	V	55.10	73.98	18.88	PK
2390.0	41.52	0.00	2.15	V	43.67	53.98	10.31	AV
2483.5	60.58	0.00	2.47	H	63.05	73.98	10.94	PK
2483.5	42.68	0.00	2.47	H	45.15	53.98	8.83	AV
2483.5	59.24	0.00	2.47	V	61.71	73.98	12.28	PK
2483.5	41.21	0.00	2.47	V	43.68	53.98	10.31	AV

Mode : 2 M Bit/s (37 Bytes)

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	53.82	0.00	2.15	H	55.97	73.98	18.01	PK
2390.0	41.64	0.00	2.15	H	43.79	53.98	10.19	AV
2390.0	53.59	0.00	2.15	V	55.74	73.98	18.24	PK
2390.0	41.49	0.00	2.15	V	43.64	53.98	10.34	AV
2483.5	67.53	0.00	2.47	H	70.00	73.98	3.99	PK
2483.5	48.26	0.00	2.47	H	50.73	53.98	3.26	AV
2483.5	65.35	0.00	2.47	V	67.82	73.98	6.17	PK
2483.5	47.16	0.00	2.47	V	49.63	53.98	4.36	AV

Mode : 2 M Bit/s (255 Bytes)

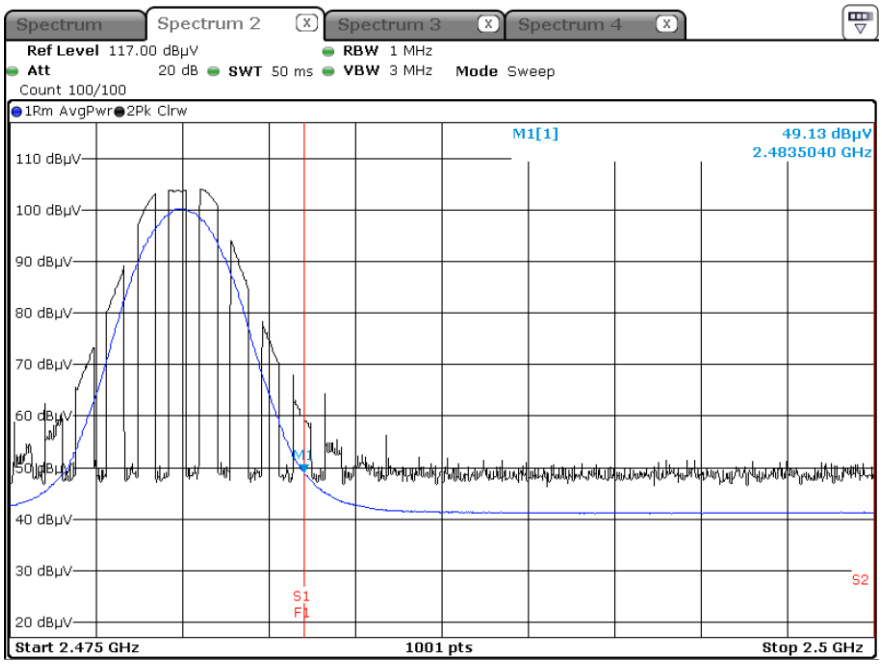
Operating Frequency 2402 MHz, 2480 MHz

Channel No. 0 CH, 39 CH

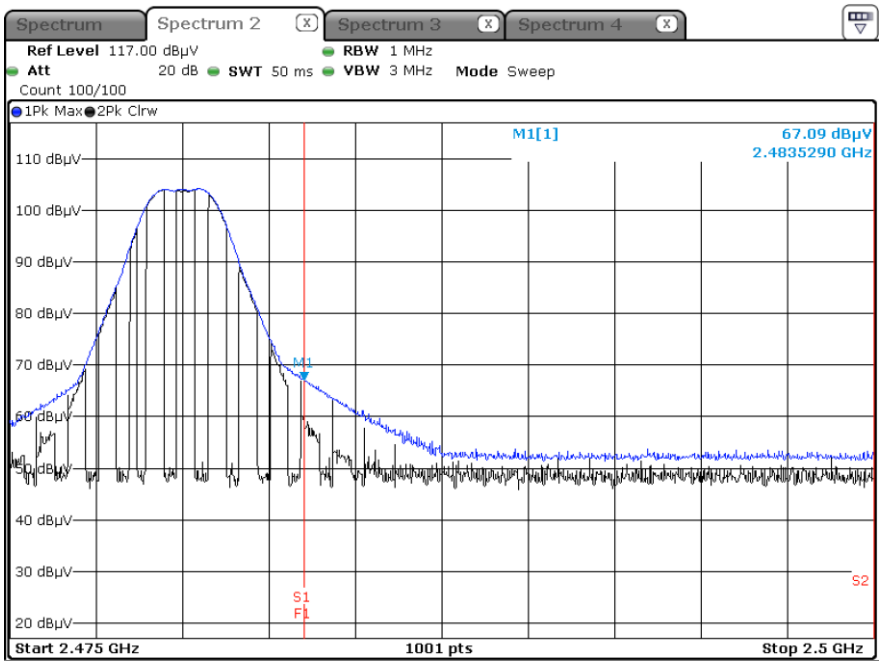
Frequency [MHz]	Measured Value [dBµV]	Duty Cycle Factor [dB]	A.F+C.L+ATT -A.G+D.F [dB/m]	Ant. Pol. [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
2390.0	54.43	0.00	2.15	H	56.58	73.98	17.40	PK
2390.0	41.77	0.00	2.15	H	43.92	53.98	10.06	AV
2390.0	53.05	0.00	2.15	V	55.20	73.98	18.78	PK
2390.0	41.62	0.00	2.15	V	43.77	53.98	10.21	AV
2483.5	**67.09**	**0.00**	**2.47**	**H**	**69.56**	**73.98**	**4.43**	**PK**
2483.5	**49.13**	**0.00**	**2.47**	**H**	**51.60**	**53.98**	**2.38**	**AV**
2483.5	66.59	0.00	2.47	V	69.06	73.98	4.93	PK
2483.5	48.49	0.00	2.47	V	50.96	53.98	3.02	AV

▣ Mode : 2 M Bit/s (255 Bytes) Test Plots

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



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



Note:

Plot of worst case are only reported.

9.8 POWERLINE CONDUCTED EMISSIONS

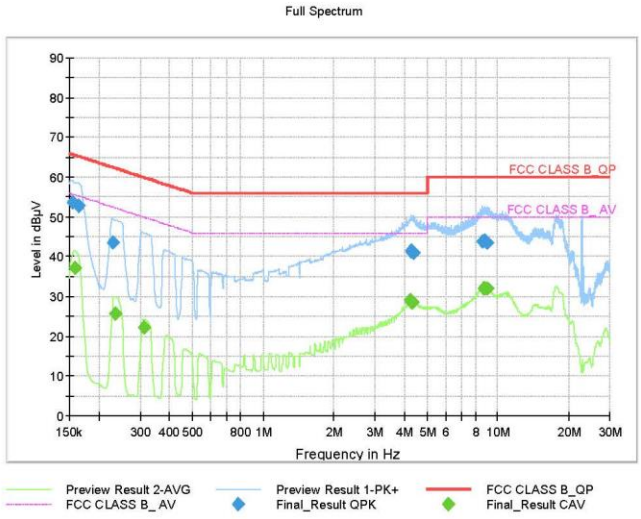
Conducted Emissions

Test 1 / 1

Test Report

Common Information

EUT : SM-X616B
Operating Conditions : BLE
Comment :



Final_Result_QPK

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1545	53.68	65.75	12.08	1000.0	9.000	N	OFF	9.6
0.1635	52.91	65.28	12.38	1000.0	9.000	N	OFF	9.6
0.2288	43.67	62.50	18.82	1000.0	9.000	N	OFF	9.6
4.2710	41.50	56.00	14.50	1000.0	9.000	L1	OFF	9.8
4.2778	41.37	56.00	14.63	1000.0	9.000	L1	OFF	9.8
4.3588	41.03	56.00	14.97	1000.0	9.000	L1	OFF	9.8
8.6450	43.96	60.00	16.04	1000.0	9.000	L1	OFF	10.0
8.8115	44.00	60.00	16.00	1000.0	9.000	L1	OFF	10.0
8.9668	43.55	60.00	16.45	1000.0	9.000	L1	OFF	10.0

Final_Result_CAV

Frequency (MHz)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1590	37.25	55.52	18.26	1000.0	9.000	N	OFF	9.6
0.2355	25.77	52.25	26.48	1000.0	9.000	N	OFF	9.6
0.3120	22.31	49.92	27.61	1000.0	9.000	L1	OFF	9.7
4.2553	29.02	46.00	16.98	1000.0	9.000	L1	OFF	9.8
4.2733	28.46	46.00	17.54	1000.0	9.000	L1	OFF	9.8
4.3565	28.50	46.00	17.50	1000.0	9.000	L1	OFF	9.8
8.7148	32.12	50.00	17.88	1000.0	9.000	L1	OFF	10.0
8.7980	32.04	50.00	17.96	1000.0	9.000	L1	OFF	10.0
8.9668	32.07	50.00	17.93	1000.0	9.000	L1	OFF	10.0

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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	08/22/2023	Annual
EMI Test Receiver	ESR	Rohde & Schwarz	101910	05/26/2024	Annual
Temperature Chamber	SU-642	ESPEC	0093008124	02/22/2024	Annual
Signal Analyzer	N9030A	Keysight	MY49431210	12/29/2023	Annual
Power Meter	N1911A	Agilent	MY45100523	03/06/2024	Annual
Power Sensor	N1921A	Agilent	MY57820067	03/06/2024	Annual
Directional Coupler	87300B	Agilent	3116A03621	11/02/2023	Annual
Power Splitter	11667B	Hewlett Packard	10545	02/06/2024	Annual
DC Power Supply	E3632A	Agilent	KR75305528	01/03/2024	Annual
Attenuator(10 dB)	8493C	Hewlett Packard	07560	06/12/2024	Annual
Software	EMC32	Rohde & Schwarz	N/A	N/A	N/A
FCC WLAN&BT&BLE Conducted Test Software v3.0	N/A	HCT CO., LTD.	N/A	N/A	N/A
Bluetooth Tester	CBT	Rohde & Schwarz	100808	02/16/2024	Annual

Note:

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

Radiated Test

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
Controller(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
Loop Antenna	FMZB 1513	Rohde & Schwarz	1513-333	03/17/2024	Biennial
Hybrid Antenna	VULB 9168	Schwarzbeck	760	02/24/2025	Biennial
Horn Antenna	BBHA 9120D	Schwarzbeck	02299	03/24/2024	Biennial
Horn Antenna (15GHz ~ 40 GHz)	BBHA9170	Schwarzbeck	BBHA9170342	09/29/2024	Biennial
Spectrum Analyzer	FSV40	Rohde & Schwarz	100901	03/27/2024	Annual
Signal Analyzer	N9030A	Agilent	MY52350879	01/02/2024	Annual
Band Reject Filter	WRCJV12-4900-5100-5900-6100-50SS	Wainwright Instruments	5	06/12/2024	Annual
Band Reject Filter	WRCJV12-4900-5100-5900-6100-50SS	Wainwright Instruments	6	06/12/2024	Annual
Band Reject Filter	WRCJV2400/2483.5-2370/2520-60/12SS	Wainwright Instruments	2	01/05/2024	Annual
Band Reject Filter	WRCJV5100/5850-40/50-8EEK	Wainwright Instruments	1	02/09/2024	Annual
RF Switching System	FMSR-04B (3G HPF+LNA)	T&M SYSTEM	S2L1	16/01/2024	Annual
RF Switching System	FMSR-04B (10dB ATT+LNA)	T&M SYSTEM	S2L2	16/01/2024	Annual
RF Switching System	FMSR-04B (3dB ATT+LNA)	T&M SYSTEM	S2L3	16/01/2024	Annual
RF Switching System	FMSR-04B (LNA)	T&M SYSTEM	S2L4	16/01/2024	Annual
RF Switching System	FMSR-04B (7G HPF+LNA)	T&M SYSTEM	S2L5	16/01/2024	Annual
Power Amplifier	CBL18265035	CERNEX	22966	12/01/2023	Annual
Power Amplifier	CBL26405040	CERNEX	25956	03/02/2024	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-2307-FC016-P