

TEST REPORT

FCC BT LE Test for SM-X520
Certification

APPLICANT
SAMSUNG Electronics Co., Ltd.

REPORT NO.
HCT-RF-2502-FC064

DATE OF ISSUE
February 20, 2025

Tested by
Se Wook Park



Technical Manager
Jong Seok Lee



HCT CO., LTD.
Bongjai Huh
BongJai Huh / CEO

**HCT CO.,LTD.**

2-6, 73, 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Republic of Korea
Tel. +82 31 645 6300 Fax. +82 31 645 6401

TEST REPORT

REPORT NO.

HCT-RF-2502-FC064

DATE OF ISSUE

February 20, 2025

Applicant

SAMSUNG Electronics Co., Ltd.

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

Product Name

Tablet

Model Name

SM-X520

FCC ID

A3LSMX520

FCC Classification

Digital Transmission System(DTS)

Date of Test

December 23, 2024 ~ February 13, 2025

Test Standard Used

Part 15 subpart C 15.247

Location of Test

☒ Permanent Testing Lab ☐ On Site Testing Lab

(Address: 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Republic of Korea)

Test Results

PASS

REVISION HISTORY

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

Revision No.	Date of Issue	Description
0	February 20, 2025	Initial Release

Notice

Content

Engineering Statement:

The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of the FCC Rules under normal use and maintenance.

The results shown in this test report only apply to the sample(s), as received, provided by the applicant, unless otherwise stated.

The test results have only been applied with the test methods required by the standard(s).

The laboratory is not accredited for the test results marked *.

Information provided by the applicant is marked **.

Test results provided by external providers are marked ***.

When confirmation of authenticity of this test report is required, please contact www.hct.co.kr

The test results in this test report are not associated with the ((KS Q) ISO/IEC 17025) accreditation by KOLAS (Korea Laboratory Accreditation Scheme) / A2LA (American Association for Laboratory Accreditation) that are under the ILAC (International Laboratory Accreditation Cooperation) Mutual Recognition Agreement (MRA).

Data referencing : BT LE Report (FCC ID: A3LSMX528U, Report No. HCT-RF-2502-FC029)

CONTENTS

1. EUT DESCRIPTION	5
2. TEST METHODOLOGY	6
EUT CONFIGURATION	6
EUT EXERCISE	6
GENERAL TEST PROCEDURES	6
DESCRIPTION OF TEST MODES	7
3. INSTRUMENT CALIBRATION	7
4. FACILITIES AND ACCREDITATIONS	7
FACILITIES	7
EQUIPMENT	7
5. ANTENNA REQUIREMENTS	8
6. MEASUREMENT UNCERTAINTY	8
7. DESCRIPTION OF TESTS	9
8. SUMMARY OF TEST RESULTS & DATA REFERENCING	24
9. TEST RESULT	26
9.1 DUTY CYCLE	26
9.2 6 dB BANDWIDTH	29
9.3 OUTPUT POWER	32
9.4 POWER SPECTRAL DENSITY	34
9.5 BAND EDGE/ CONDUCTED SPURIOUS EMISSIONS	36
9.6 RADIATED SPURIOUS EMISSIONS	39
9.7 RADIATED RESTRICTED BAND EDGES	43
9.8 POWERLINE CONDUCTED EMISSIONS	46
10. LIST OF TEST EQUIPMENT	47
11. ANNEX A_ TEST SETUP PHOTO	49

1. EUT DESCRIPTION

Model	SM-X520		
Additional Model	-		
EUT Type	Tablet		
Power Supply	DC 3.86 V		
Frequency Range	125k, 500k, 1M Bit/s : 2402 - 2480 MHz 2M Bit/s : 2404 - 2478 MHz (Except for 2426 MHz)		
Number of Channels	125k, 500k, 1M Bit/s : 40 Channels 2M Bit/s : 37 Channels		
Max. RF Output Power (Normal)	Peak (For information only)	1 M Bit/s: 2 M Bit/s: 125 k Bit/s : 500 k Bit/s :	15.293 dBm (33.83 mW) 15.397 dBm (34.65 mW) 15.173 dBm (32.91 mW) 15.289 dBm (33.80 mW)
	Average	1 M Bit/s: 2 M Bit/s: 125 k Bit/s : 500 k Bit/s :	14.98 dBm (31.48 mW) 14.99 dBm (31.54 mW) 14.98 dBm (31.50 mW) 14.98 dBm (31.48 mW)
Modulation Type	GFSK		
Bluetooth Version	5.3		
Antenna Specification	Type: Metal Peak Gain: -4.5 dBi		
Serial number	Conducted : R32XC00A9HK Radiated : R32XC00A7FA		

2. TEST METHODOLOGY

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

EUT CONFIGURATION

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

EUT EXERCISE

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

GENERAL TEST PROCEDURES

Conducted Emissions

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

Radiated Emissions

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

DESCRIPTION OF TEST MODES

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

3. INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment's, which is traceable to recognized national standards.

Especially, all antenna for measurement is calibrated in accordance with the requirements of C63.5 (Version : 2017).

4. FACILITIES AND ACCREDITATIONS

FACILITIES

The SAC(Semi-Anechoic Chamber) and conducted measurement facility used to collect the radiated data are located at the 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA. The site is constructed in conformance with the requirements of ANSI C63.4. (Version :2014) and CISPR Publication 22.

Detailed description of test facility was submitted to the Commission and accepted dated March 11, 2024 (Registration Number: KR0032).

EQUIPMENT

Radiated emissions are measured with one or more of the following types of Linearly polarized antennas: tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements. Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers. Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

5. ANTENNA REQUIREMENTS

According to FCC 47 CFR § 15.203

“An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.”

- (1) The antennas of this E.U.T are permanently attached.
- (2) The E.U.T Complies with the requirement of § 15.203

6. MEASUREMENT UNCERTAINTY

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

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

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

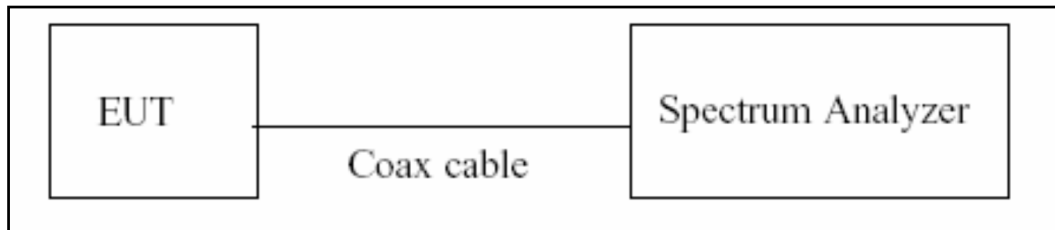
Parameter	Expanded Uncertainty ($\pm$ kHz)
X dB, 99% Bandwidth	95 (Confidence level about 95 %, $k=2$)
Frequency stability	28 (Confidence level about 95 %, $k=2$)

Parameter	Expanded Uncertainty ($\pm$ dB)
Conducted Disturbance (150 kHz ~ 30 MHz)	1.98 (Confidence level about 95 %, $k=2$)
Conducted Output Power(Power Meter)	0.54 (Confidence level about 95 %, $k=2$)
Conducted Output Power(Signal Analyzer)	0.68 (Confidence level about 95 %, $k=2$)
Power Spectral Density	1.03 (Confidence level about 95 %, $k=2$)
Band Edge (Out of Band Emissions)	0.70 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (9 kHz ~ 30 MHz)	4.36 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (30 MHz ~ 1 GHz)	5.70 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (1 GHz ~ 18 GHz)	5.52 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (18 GHz ~ 40 GHz)	5.66 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (Above 40 GHz)	5.58 (Confidence level about 95 %, $k=2$)

7. DESCRIPTION OF TESTS

7.1. Duty Cycle

Test Configuration



Test Procedure

The transmitter output is connected to the Spectrum Analyzer.

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

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

The zero-span method of measuring duty cycle shall not be used if $T \leq 6.25$ 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 $> 50/T$.

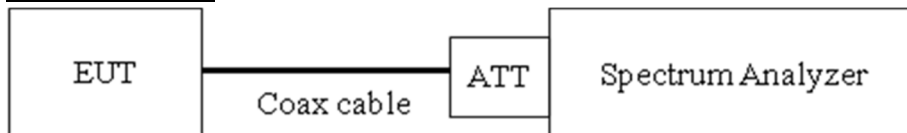
1. RBW = 8 MHz (the largest available value)
2. VBW = 8 MHz ($\geq$ RBW)
3. SPAN = 0 Hz
4. Detector = Peak
5. Number of points in sweep > 100
6. Trace mode = Clear write
7. Measure T_{total} and T_{on}
8. Calculate Duty Cycle = T_{on}/T_{total} and Duty Cycle Factor = $10\log(1/\text{Duty Cycle})$

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.

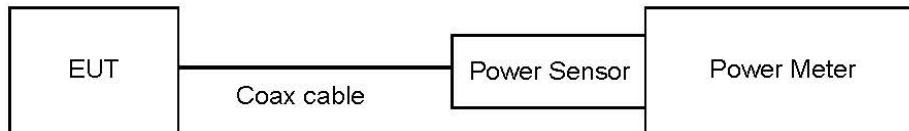
Note : We tested OBW using the automatic bandwidth measurement capability of a spectrum analyzer.

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

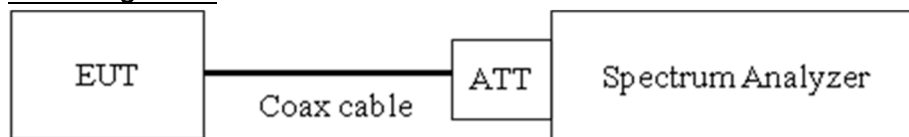
- Conducted Output Power(Peak) = Measured Value + ATT loss + Cable loss
- Conducted Output Power(Average) = Measured Value + ATT loss + Cable loss + Duty Cycle Factor

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 + Duty Cycle Factor

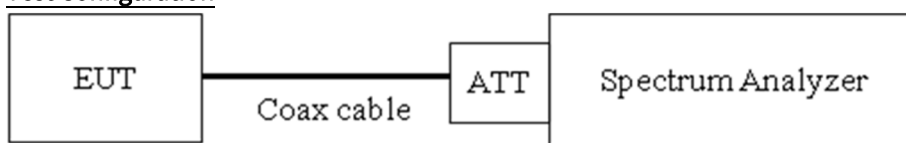
7.5. Conducted Band Edge(Out of Band Emissions) & Conducted Spurious Emissions

Limit

The maximum conducted (average) output power was used to demonstrate compliance, then the peak power in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum in-band peak PSD level in 100 kHz.

[Conducted > 30 dBc]

Test Configuration



Test Procedure

The transmitter output is connected to the spectrum analyzer.

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

- 1) RBW = 100 kHz
- 2) VBW $\geq 3 \times$ 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) Allow trace to fully stabilize.
- 8) Use peak marker function to determine the maximum amplitude level.

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

Factors for frequency

Freq(MHz)	Factor(dB)
30	20.06
100	20.14
200	20.17
300	20.21
400	20.28
500	20.28
600	20.28
700	20.28
800	20.30
900	20.31
1 000	20.35
2 000	20.55
2 400	20.62
3 000	20.67
4 000	20.74
5 000	20.86
5 850	20.84
6 000	20.83
7 000	20.93
8 000	20.97
9 000	21.09
10 000	21.18
11 000	21.27
12 000	21.33
13 000	21.33
14 000	21.40
15 000	21.49
16 000	21.52
17 000	21.55
18 000	21.63
19 000	21.65
20 000	21.66
21 000	21.76
22 000	21.82
23 000	21.86
24 000	21.90
25 000	21.92

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

2. Factor = Attenuator loss + Cable loss

3. EUT cable loss = 0.92 dB

4. Total Port offset = Attenuator loss + Cable loss + EUT cable loss(0.92 dB) = 21.54 dB

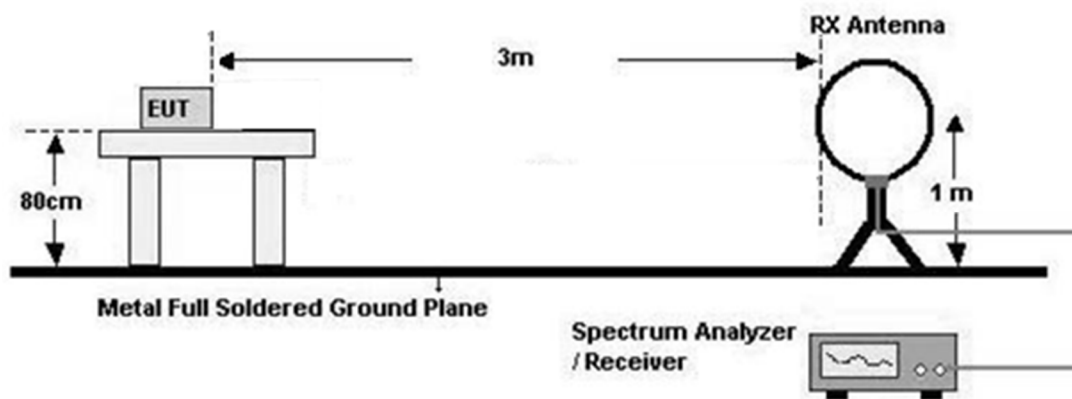
7.6. Radiated Test

Limit

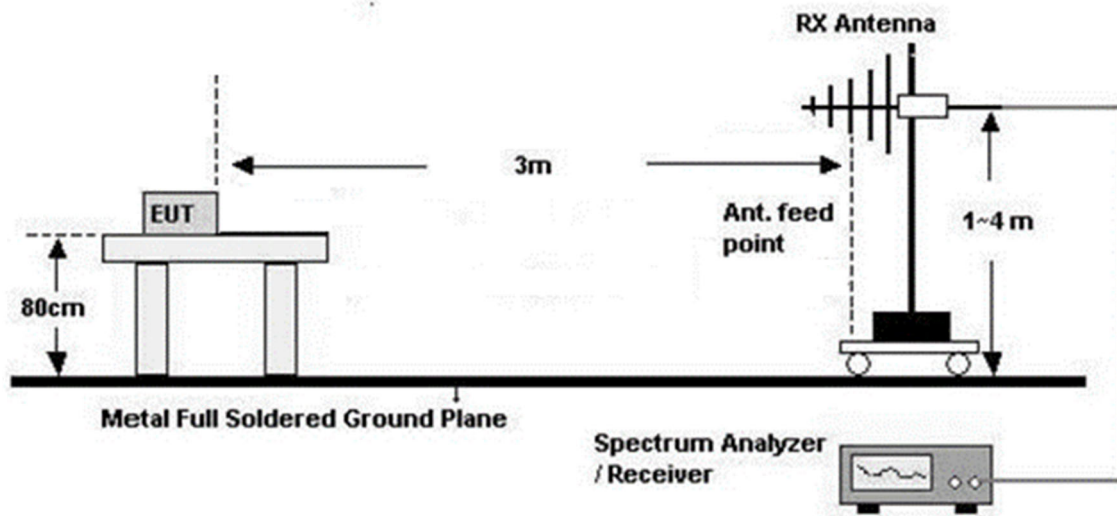
Frequency (MHz)	Field Strength ($\mu\text{V/m}$)	Measurement Distance (m)
0.009 – 0.490	$2400/F(\text{kHz})$	300
0.490 – 1.705	$24000/F(\text{kHz})$	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Configuration

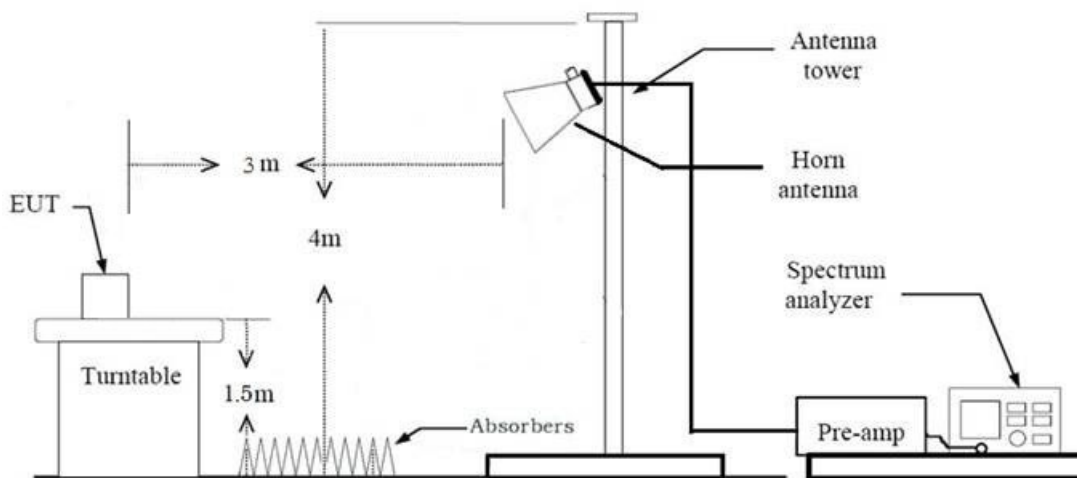
Below 30 MHz



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 = Max hold
 - 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 = Max hold
 - 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 kHzIn 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 $\geq 3 \times$ 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 $\geq 3 \times$ 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) - 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 according to KDB 558074 Section11 Q3

Test Procedure of Radiated Restricted Band Edge

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

Total(Measurement Type : Average)

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

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

7.7. AC Power line Conducted Emissions

Limit

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 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 : Z
 - Radiated Restricted Band Edge : X
3. All packet length of operation were investigated and the test results are worst case in lowest packet length.
(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 OF TEST RESULTS & DATA REFERENCING

8.1. Test result

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

8.2. Data Referencing

Equipment Class	Rule Part	Test item	Data Referencing	Comments
DTS	15.247(a)(2)	6 dB Bandwidth	Y	-
	15.247(b)(3)	Conducted Maximum output power	Y	Spot-check
	15.247(e).	Power Spectral Density	Y	-
	15.247(d)	Band Edge (Out of Band Emissions)	Y	-
	15.207	AC Power line conducted Emissions	Y	Spot-check
	15.247(d) 15.205 15.209	Radiated Spurious Emissions	Y	Spot-check
	15.247(d) 15.205 15.209	Radiated Restricted Band Edge	Y	Spot-check

Spot-Check Result

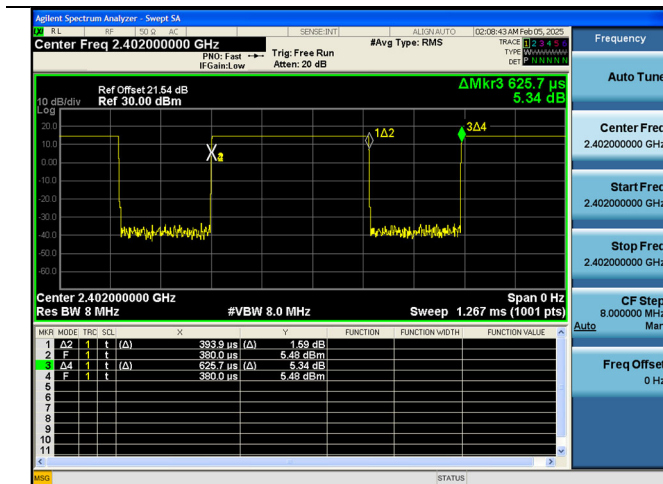
1. Data was leveraged from model SM-X528U for the certification of SM-X520.
2. Please refer to the [FCC Evaluation] Report.

9. TEST RESULT

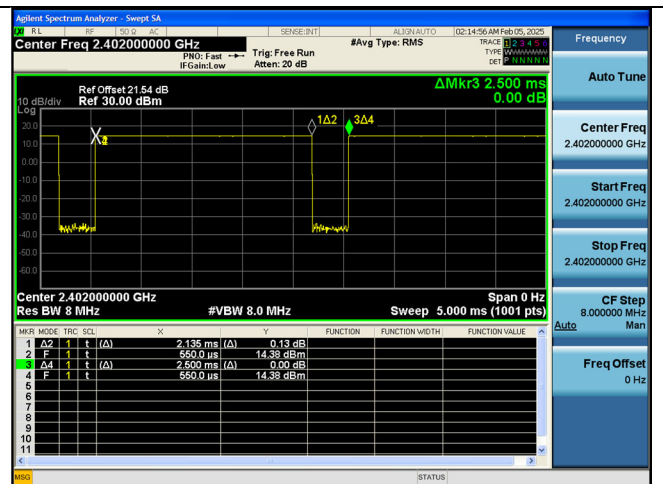
9.1 DUTY CYCLE

Data rate (Bit/s)	Packet length (Byte)	T _{on} (ms)	T _{total} (ms)	Duty Cycle	Duty Cycle Factor (dB)
1M	37	0.394	0.626	0.630	2.010
	255	2.135	2.500	0.854	0.685
2M	37	0.208	0.626	0.332	4.789
	255	1.078	1.874	0.575	2.401
125k	37	3.107	3.747	0.829	0.814
	255	17.067	17.500	0.975	0.109
500k	37	1.071	1.874	0.571	2.430
	255	4.560	5.000	0.912	0.400

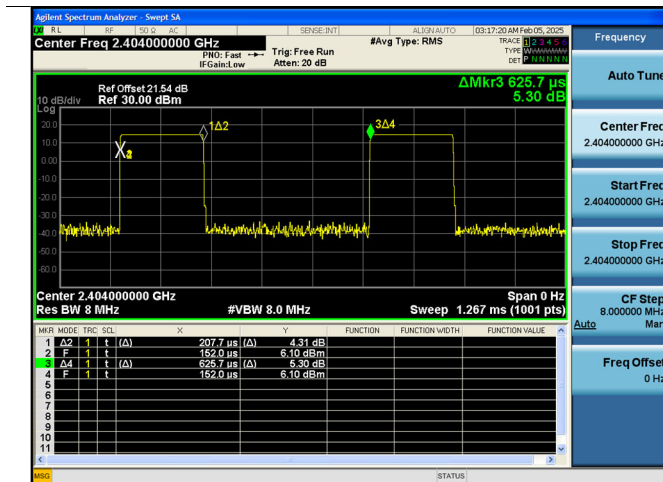
1 M Bit/s (37 Byte) Duty Cycle (Low-CH 0)



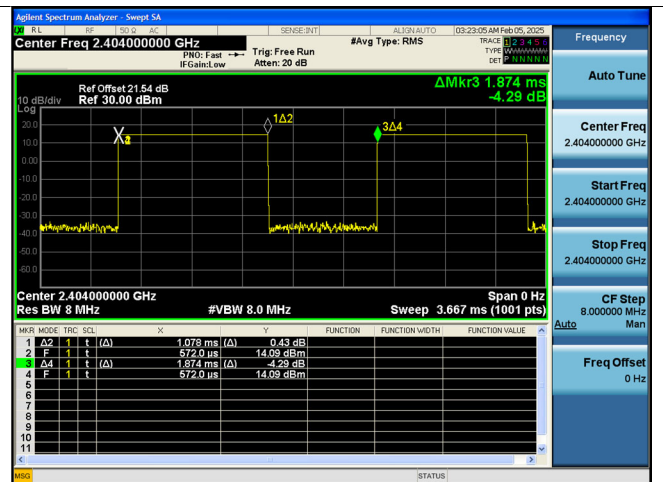
1 M Bit/s (255 Byte) Duty Cycle (Low-CH 0)



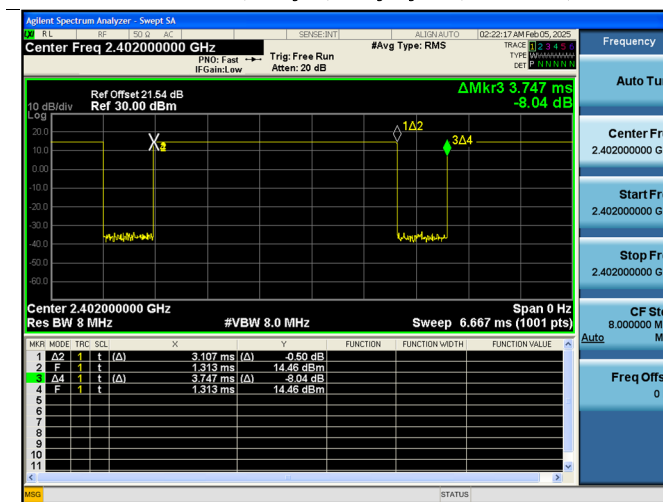
2 M Bit/s (37 Byte) Duty Cycle (Low-CH 0)



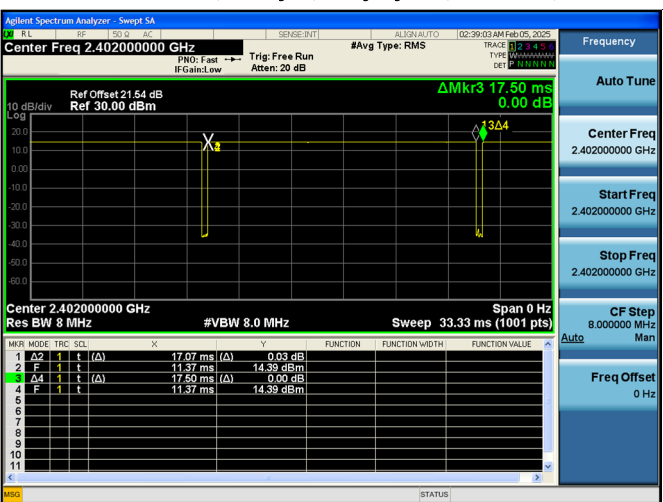
2 M Bit/s (255 Byte) Duty Cycle (Low-CH 0)



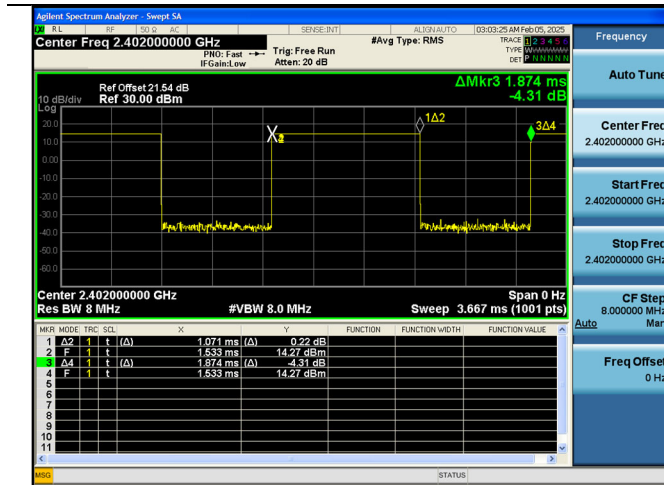
125 k Bit/s(37 Byte) Duty Cycle (Low-CH 0)



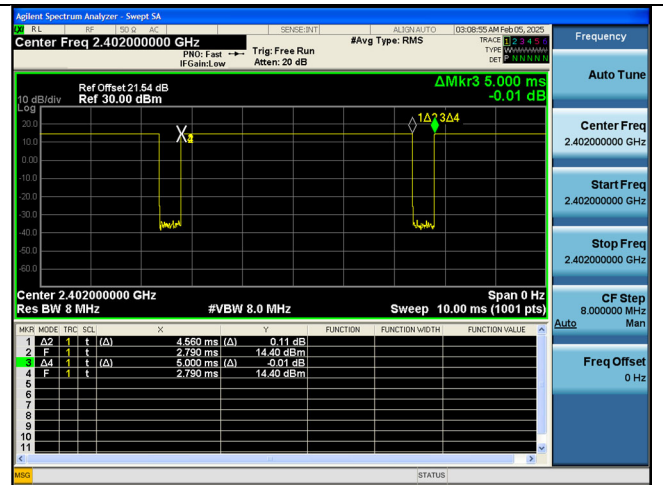
125 k Bit/s(255 Byte) Duty Cycle (Low-CH 0)



500 k Bit/s(37 Byte) Duty Cycle (Low-CH 0)



500 k Bit/s(255 Byte) Duty Cycle (Low-CH 0)



9.2 6 dB BANDWIDTH

Mode (Bit/s)	Channel	6 dB Bandwidth (kHz)	Limit (kHz)
1M(37)	37	678.9	> 500
	17	675.9	
	39	668.8	
1M(255)	37	680.5	> 500
	17	676.5	
	39	675.9	
2M(37)	0	1119	> 500
	17	1118	
	36	1120	
2M(255)	0	1122	> 500
	17	1122	
	36	1124	
125k(37)	37	635.8	> 500
	17	645.9	
	39	629.9	
125k(255)	37	651.3	> 500
	17	628.6	
	39	624.3	
500k(37)	37	678.1	> 500
	17	676.8	
	39	672.9	
500k(255)	37	681.2	> 500
	17	679.9	
	39	673.9	

Note:

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

1M Bit/s: 37 Byte

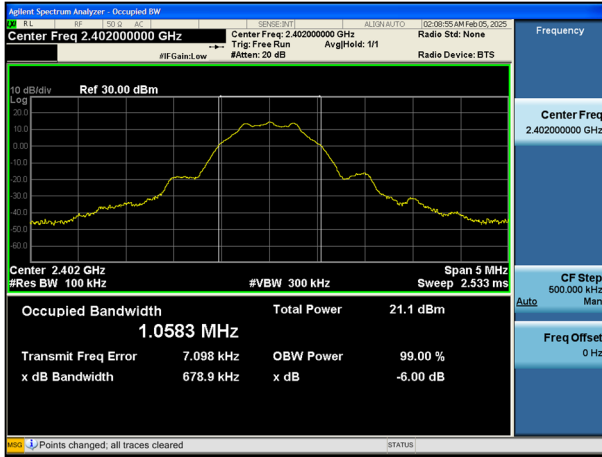
2M Bit/s: 37 Byte

125k Bit/s: 255 Byte

500k Bit/s: 37 Byte

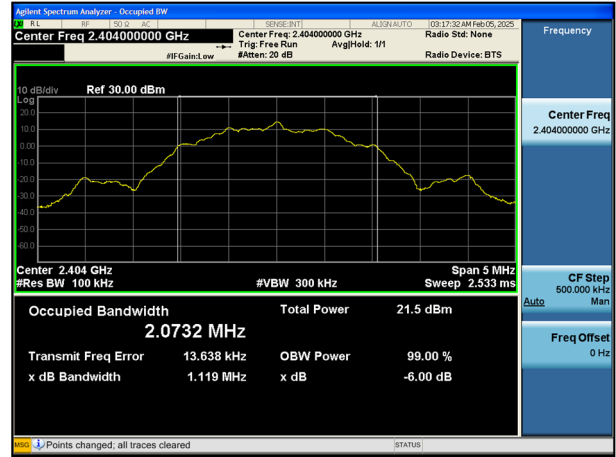
1 MBit/s (37 Byte) Test Plots

6 dB Bandwidth plot (Low-CH 37)

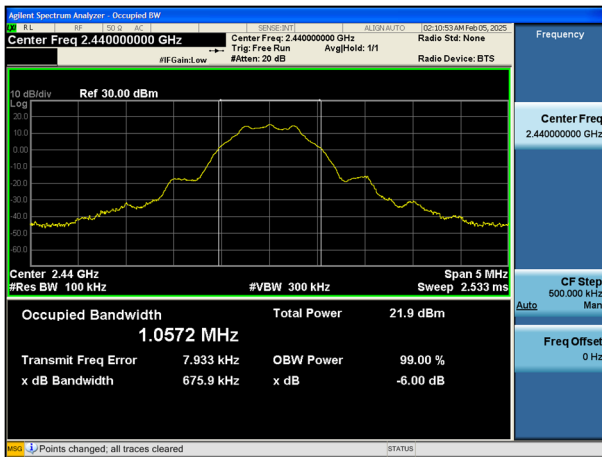


2 MBit/s (37 Byte) Test Plots

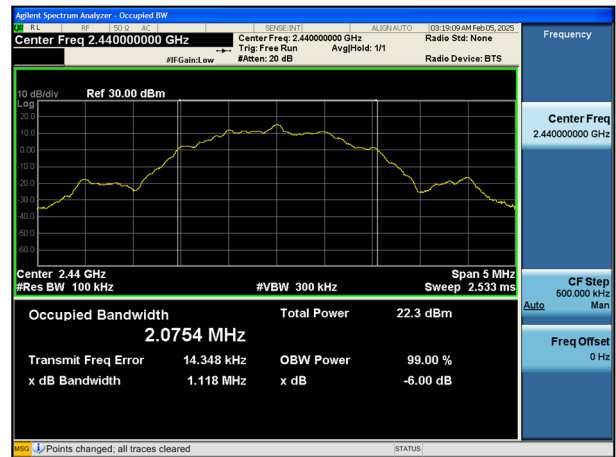
6 dB Bandwidth plot (Low-CH 0)



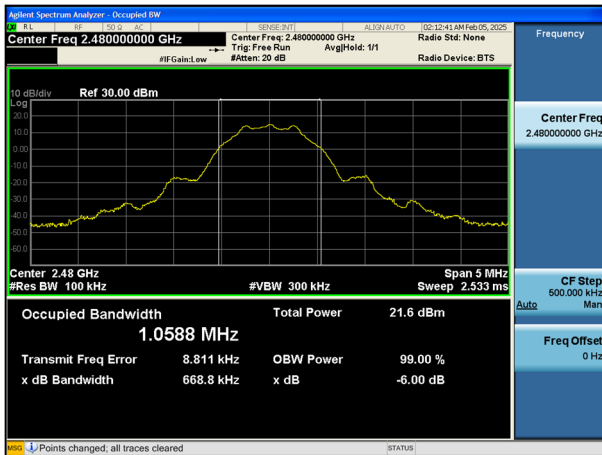
6 dB Bandwidth plot (Mid-CH 17)



6 dB Bandwidth plot (Mid-CH 17)



6 dB Bandwidth plot (High-CH 39)

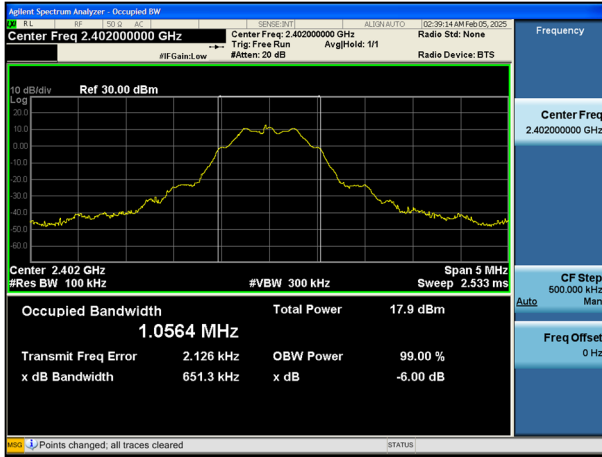


6 dB Bandwidth plot (High-CH 36)



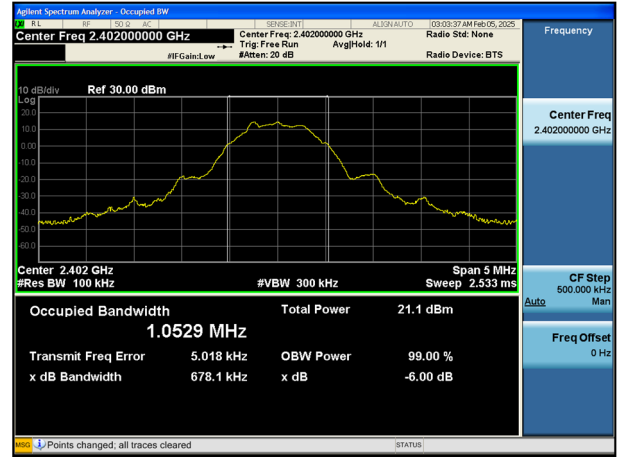
125k Bit/s(255 Byte) Test Plots

6 dB Bandwidth plot (Low-CH 37)

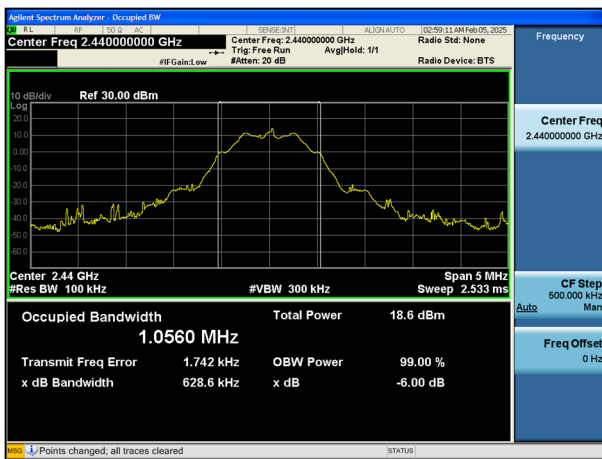


500k Bit/s(37 Byte) Test Plots

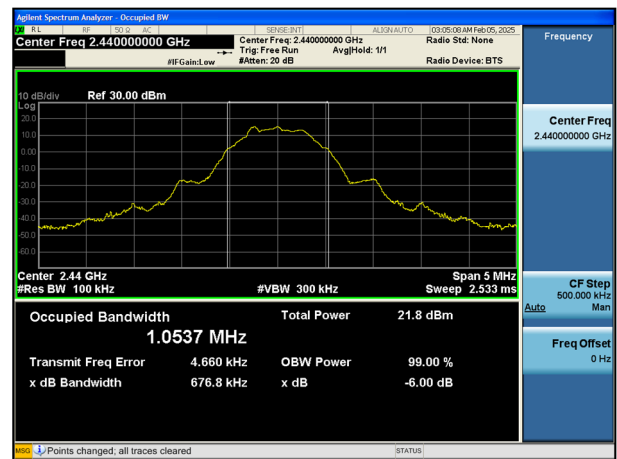
6 dB Bandwidth plot (Low-CH 37)



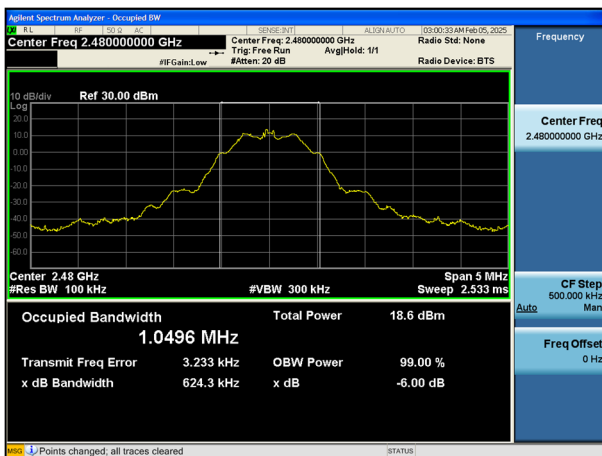
6 dB Bandwidth plot (Mid-CH 17)



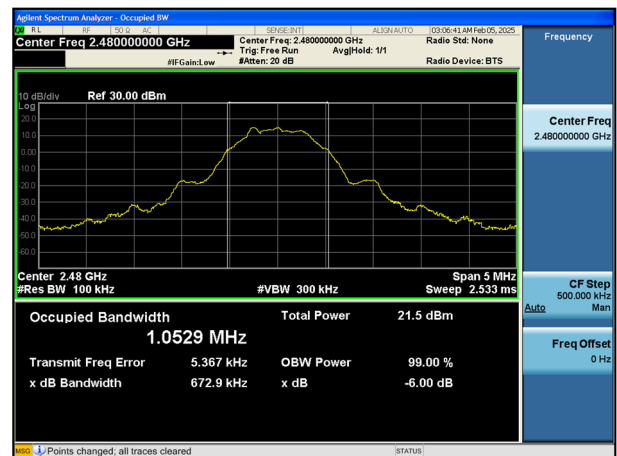
6 dB Bandwidth plot (Mid-CH 17)



6 dB Bandwidth plot (High-CH 39)



6 dB Bandwidth plot (High-CH 39)



9.3 OUTPUT POWER

Peak Power

Data rate (Bit/s)	Packet length (Byte)	LE Mode		Measured Power(dBm)	Limit (dBm)
		Frequency [MHz]	Channel		
1M	37	2402	37	14.589	30
		2440	17	15.293	
		2480	39	14.972	
	255	2402	37	14.469	
		2440	17	15.219	
		2480	39	14.925	
2M	37	2404	0	14.615	
		2440	17	15.397	
		2478	36	15.186	
	255	2404	0	14.526	
		2440	17	15.308	
		2478	36	15.090	
125k	37	2402	37	14.553	
		2440	17	15.155	
		2480	39	14.920	
	255	2402	37	14.433	
		2440	17	15.173	
		2480	39	14.879	
500k	37	2402	37	14.648	
		2440	17	15.289	
		2480	39	15.032	
	255	2402	37	14.514	
		2440	17	15.166	
		2480	39	14.921	

Average Power

Data rate	Packet length	LE Mode		Measured Power (dBm)	Duty Cycle Factor	Result	Limit (dBm)
(Bit/s)	(Byte)	Frequency [MHz]	Channel		(dB)	(dBm)	
1M	37	2402	37	12.33	2.01	14.34	30
		2440	17	12.97	2.01	14.98	
		2480	39	12.72	2.01	14.73	
	255	2402	37	13.61	0.69	14.30	
		2440	17	14.27	0.69	14.96	
		2480	39	14.05	0.69	14.74	
2M	37	2404	0	9.53	4.79	14.32	
		2440	17	10.20	4.79	14.99	
		2478	36	10.18	4.79	14.97	
	255	2404	0	11.89	2.40	14.29	
		2440	17	12.56	2.40	14.96	
		2478	36	12.51	2.40	14.91	
125k	37	2402	37	13.45	0.81	14.26	
		2440	17	14.17	0.81	14.98	
		2480	39	13.98	0.81	14.79	
	255	2402	37	14.09	0.11	14.20	
		2440	17	14.79	0.11	14.90	
		2480	39	14.54	0.11	14.65	
500k	37	2402	37	11.98	2.43	14.41	
		2440	17	12.55	2.43	14.98	
		2480	39	12.28	2.43	14.71	
	255	2402	37	13.93	0.40	14.33	
		2440	17	14.50	0.40	14.90	
		2480	39	14.29	0.40	14.69	

9.4 POWER SPECTRAL DENSITY

Frequency (MHz)	Channel No.	Mode	Test Result			
			Measured PSD (dBm/kHz)	Duty Cycle Factor (dB)	Total PSD (dBm/kHz)	Limit
2402	37	1M Bit/s 37 Byte	-4.319	2.01	-2.309	8 dBm / 3 kHz
2440	17		-3.237	2.01	-1.227	
2480	39		-3.755	2.01	-1.745	
2402	37	1M Bit/s 255 Byte	-6.240	0.69	-5.555	
2440	17		-5.031	0.69	-4.346	
2480	39		-6.547	0.69	-5.862	
2404	0	2M Bit/s 37 Byte	-6.902	4.79	-2.113	
2440	17		-7.190	4.79	-2.401	
2478	36		-6.114	4.79	-1.325	
2404	0	2M Bit/s 255 Byte	-8.799	2.40	-6.398	
2440	17		-7.328	2.40	-4.927	
2478	36		-7.799	2.40	-5.398	
2402	37	125k Bit/s 37 Byte	6.051	0.81	6.865	
2440	17		6.587	0.81	7.401	
2480	39		5.663	0.81	6.477	
2402	37	125k Bit/s 255 Byte	7.099	0.11	7.208	
2440	17		7.678	0.11	7.787	
2480	39		7.629	0.11	7.738	
2402	37	500k Bit/s 37 Byte	0.013	2.43	2.443	
2440	17		0.299	2.43	2.729	
2480	39		0.260	2.43	2.690	
2402	37	500k Bit/s 255 Byte	-2.231	0.40	-1.831	
2440	17		-2.628	0.40	-2.228	
2480	39		-2.479	0.40	-2.079	

Note :

1. Spectrum measured Value not plot data.

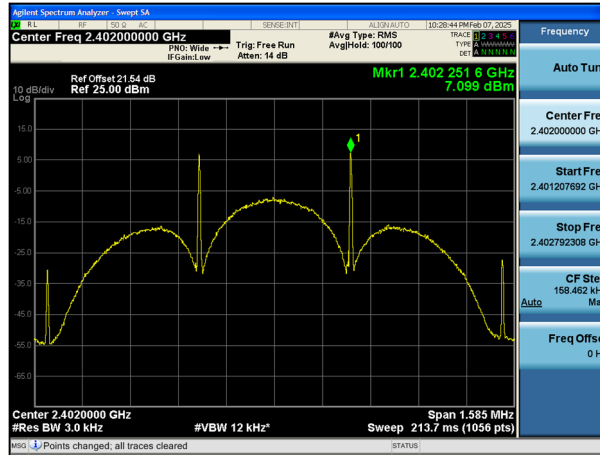
The PSD results in plot is already including the actual values of loss for the attenuator and cable combination.

2. Total PSD = Measured PSD + Duty Cycle Factor

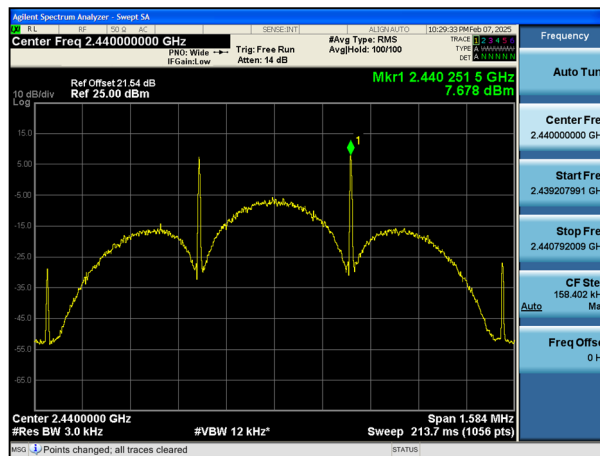
3. Worst case test plot was attached. (Worstcase : 125k Bit/s 255 Byte)

125k Bit/s (255 Byte) Test Plots

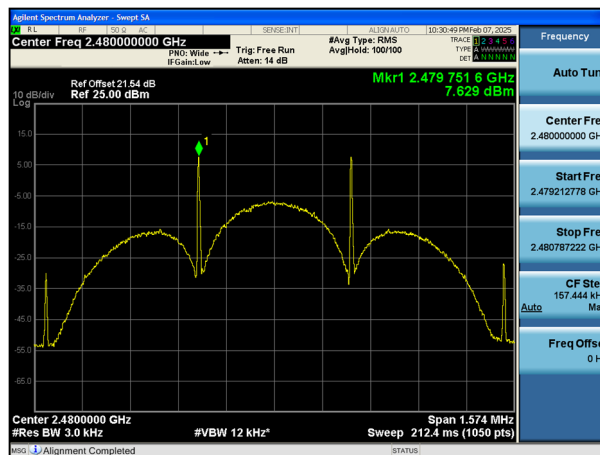
Power Spectral Density (Low-CH 37)



Power Spectral Density (Mid-CH 17)



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	37	Lower	56.553	30
2480		39	Upper	62.742	30
2402	1M Bit/s 255 Byte	37	Lower	57.204	30
2480		39	Upper	62.899	30
2404	2M Bit/s 37 Byte	0	Lower	60.297	30
2478		36	Upper	61.915	30
2404	2M Bit/s 255 Byte	0	Lower	59.363	30
2478		36	Upper	63.138	30
2402	125k Bit/s 37 Byte	37	Lower	55.273	30
2480		39	Upper	63.145	30
2402	125k Bit/s 255 Byte	37	Lower	54.391	30
2480		39	Upper	61.216	30
2402	500k Bit/s 37 Byte	37	Lower	55.234	30
2480		39	Upper	63.350	30
2402	500k Bit/s 255 Byte	37	Lower	56.141	30
2480		39	Upper	62.176	30

Note :

- In order to simplify the report, attached plots were only the worst case channel and data rate.
[Lower: Worst case : 125k Bit/s (255 Byte)]
[Upper: Worst case : 125k Bit/s (255 Byte)]

[CONDUCTED SPURIOUS EMISSIONS]

Note :

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

Test Plots - Band Edge

125k Bit/s (255 Byte) Low-CH 37

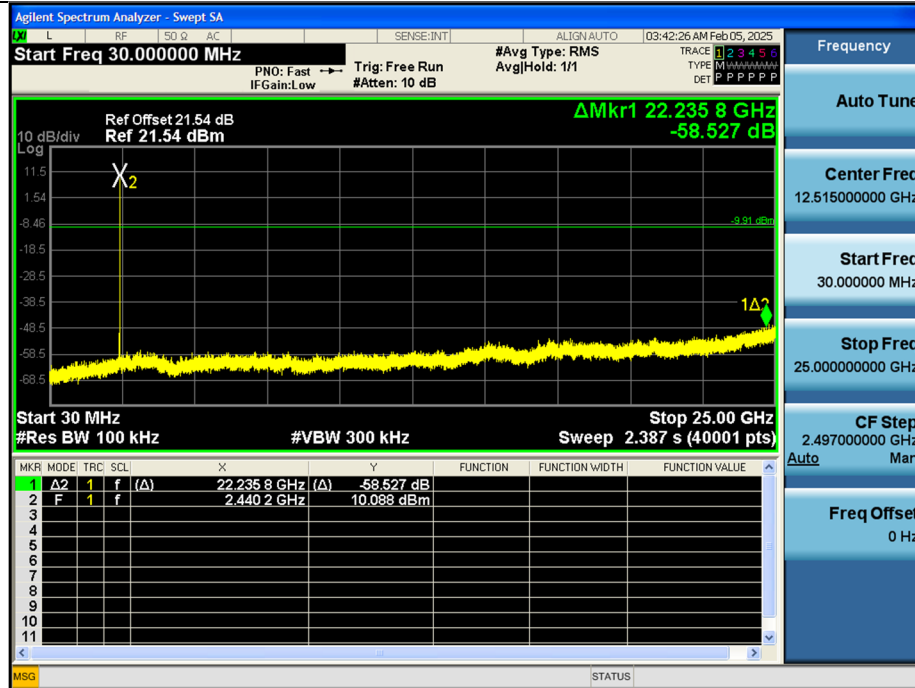


125k Bit/s (255 Byte) High-CH 39



Test Plots - Conducted Spurious Emission (Worst case : 2M Bit/s (37 Byte)_CH.17)

Spurious Emission (30 MHz – 26.5 GHz)



Note:

1. In order to simplify the report, attached plots were only the worst case channel and data rate.
2. Limit: -9.91 dBm

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

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

CH 37	2402	MHz	Mode :		1 M Bit/s (37 Bytes)		
Frequency	Measured value	A.F+C.L-A.G+D.F	Pol.	Total	Limit	Margin	Measurement
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	Type
4804	44.53	4.82	V	49.35	73.98	24.63	PK
4804	33.45	4.82	V	38.27	53.98	15.71	AV
7206	38.61	12.62	V	51.23	73.98	22.75	PK
7206	26.07	12.62	V	38.69	53.98	15.29	AV
4804	44.66	4.82	H	49.48	73.98	24.50	PK
4804	33.62	4.82	H	38.44	53.98	15.54	AV
7206	38.69	12.62	H	51.31	73.98	22.67	PK
7206	26.11	12.62	H	38.73	53.98	15.25	AV

CH 17	2440	MHz	Mode :		1 M Bit/s (37 Bytes)		
Frequency	Measured value	A.F+C.L-A.G+D.F	Pol.	Total	Limit	Margin	Measurement
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	Type
4880	43.42	5.29	V	48.71	73.98	25.27	PK
4880	33.01	5.29	V	38.30	53.98	15.68	AV
7320	37.97	12.70	V	50.67	73.98	23.31	PK
7320	25.82	12.70	V	38.52	53.98	15.46	AV
4880	43.25	5.29	H	48.54	73.98	25.44	PK
4880	32.84	5.29	H	38.13	53.98	15.85	AV
7320	38.07	12.70	H	50.77	73.98	23.21	PK
7320	25.96	12.70	H	38.66	53.98	15.32	AV

CH 39	2480	MHz	Mode :		1 M Bit/s (37 Bytes)		
Frequency	Measured value	A.F+C.L-A.G+D.F	Pol.	Total	Limit	Margin	Measurement
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	Type
4960	44.02	5.79	V	49.81	73.98	24.17	PK
4960	33.67	5.79	V	39.46	53.98	14.52	AV
7440	38.74	12.54	V	51.28	73.98	22.70	PK
7440	26.25	12.54	V	38.79	53.98	15.19	AV
4960	44.24	5.79	H	50.03	73.98	23.95	PK
4960	33.91	5.79	H	39.70	53.98	14.28	AV
7440	38.89	12.54	H	51.43	73.98	22.55	PK
7440	26.37	12.54	H	38.91	53.98	15.07	AV

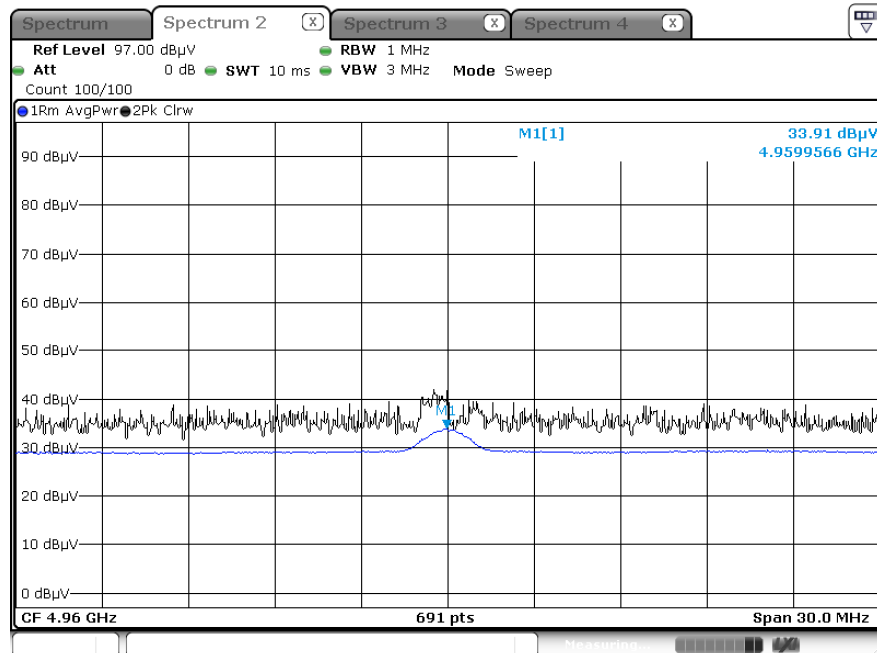
CH 0	2404	MHz	Mode :		2 M Bit/s (37 Bytes)		
Frequency	Measured value	A.F+C.L-A.G+D.F	Pol.	Total	Limit	Margin	Measurement
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	Type
4808	43.51	4.90	V	48.41	73.98	25.57	PK
4808	31.34	4.90	V	36.24	53.98	17.74	AV
7212	38.19	12.67	V	50.86	73.98	23.12	PK
7212	25.96	12.67	V	38.63	53.98	15.35	AV
4808	43.75	4.90	H	48.65	73.98	25.33	PK
4808	31.55	4.90	H	36.45	53.98	17.53	AV
7212	38.23	12.67	H	50.90	73.98	23.08	PK
7212	26.00	12.67	H	38.67	53.98	15.31	AV

CH 17	2440	MHz	Mode :		2 M Bit/s (37 Bytes)		
Frequency	Measured value	A.F+C.L-A.G+D.F	Pol.	Total	Limit	Margin	Measurement
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	Type
4880	43.37	5.29	V	48.66	73.98	25.32	PK
4880	30.63	5.29	V	35.92	53.98	18.06	AV
7320	38.39	12.70	V	51.09	73.98	22.89	PK
7320	25.83	12.70	V	38.53	53.98	15.45	AV
4880	43.11	5.29	H	48.40	73.98	25.58	PK
4880	30.49	5.29	H	35.78	53.98	18.20	AV
7320	38.68	12.70	H	51.38	73.98	22.60	PK
7320	25.93	12.70	H	38.63	53.98	15.35	AV

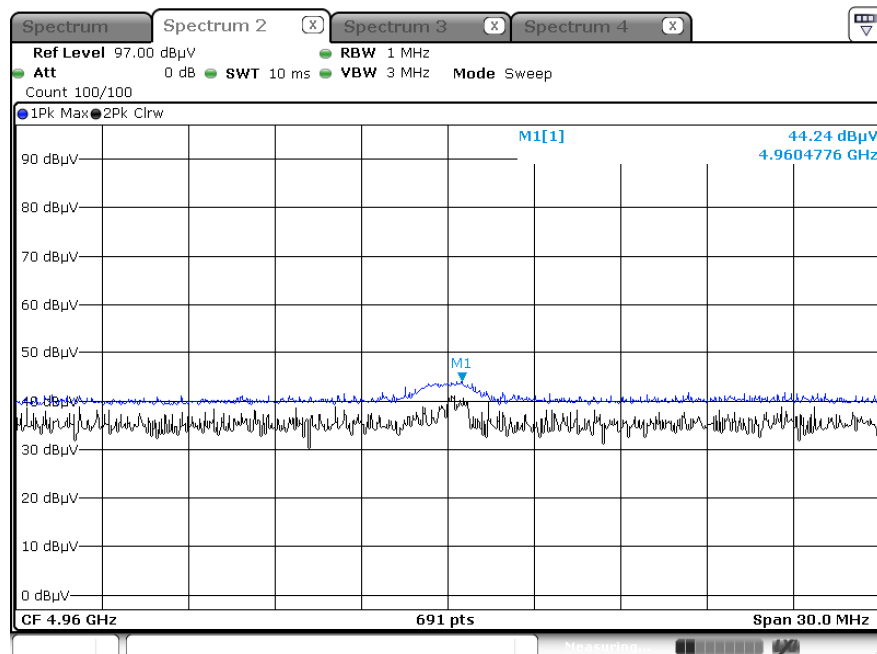
CH 36	2478	MHz	Mode :		2 M Bit/s (37 Bytes)		
Frequency	Measured value	A.F+C.L-A.G+D.F	Pol.	Total	Limit	Margin	Measurement
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	Type
4956	43.14	5.76	V	48.90	73.98	25.08	PK
4956	30.78	5.76	V	36.54	53.98	17.44	AV
7434	38.23	12.55	V	50.78	73.98	23.20	PK
7434	26.24	12.55	V	38.79	53.98	15.19	AV
4956	43.65	5.76	H	49.41	73.98	24.57	PK
4956	31.11	5.76	H	36.87	53.98	17.11	AV
7434	38.42	12.55	H	50.97	73.98	23.01	PK
7434	26.31	12.55	H	38.86	53.98	15.12	AV

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

Radiated Spurious Emissions plot – Average Result (Ch.39 2nd Harmonic)



Radiated Spurious Emissions plot – Peak Result (Ch.39 2nd Harmonic)



Note:

Plots of worst case are only reported.

9.7 RADIATED RESTRICTED BAND EDGES

1 M Bit/s (37 Bytes)							
Channel	37 CH, 39 CH	Channel Frequency	2402 MHz, 2480 MHz				
Frequency	Measured Value	A.F+C.L+Att-A.G+D.F	Ant. Pol.	Total	Limit	Margin	Measurement
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	Type
2390.0	48.70	2.47	H	51.17	73.98	22.81	PK
2390.0	35.53	2.47	H	38.00	53.98	15.98	AV
2483.5	56.11	3.45	H	59.56	73.98	14.42	PK
2483.5	40.39	3.45	H	43.84	53.98	10.14	AV
1 M Bit/s (255 Bytes)							
Channel	37 CH, 39 CH	Channel Frequency	2402 MHz, 2480 MHz				
Frequency	Measured Value	A.F+C.L+Att-A.G+D.F	Ant. Pol.	Total	Limit	Margin	Measurement
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	Type
2390.0	48.21	2.47	H	50.68	73.98	23.30	PK
2390.0	35.51	2.47	H	37.98	53.98	16.00	AV
2483.5	56.29	3.45	H	59.74	73.98	14.24	PK
2483.5	41.28	3.45	H	44.73	53.98	9.25	AV
2 M Bit/s (37 Bytes)							
Channel	0 CH, 36 CH	Channel Frequency	2404 MHz, 2478 MHz				
Frequency	Measured Value	A.F+C.L+Att-A.G+D.F	Ant. Pol.	Total	Limit	Margin	Measurement
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	Type
2390.0	48.49	2.47	H	50.96	73.98	23.02	PK
2390.0	35.52	2.47	H	37.99	53.98	15.99	AV
2483.5	59.53	3.45	H	62.98	73.98	11.00	PK
2483.5	38.45	3.45	H	41.90	53.98	12.08	AV
2 M Bit/s (255 Bytes)							
Channel	0 CH, 36 CH	Channel Frequency	2404 MHz, 2478 MHz				
Frequency	Measured Value	A.F+C.L+Att-A.G+D.F	Ant. Pol.	Total	Limit	Margin	Measurement
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	Type
2390.0	48.39	2.47	H	50.86	73.98	23.12	PK
2390.0	35.51	2.47	H	37.98	53.98	16.00	AV
2483.5	58.93	3.45	H	62.38	73.98	11.60	PK
2483.5	39.32	3.45	H	42.77	53.98	11.21	AV

500k Bit/s (37 Bytes)							
Channel	37 CH, 39 CH	Channel Frequency	2402 MHz, 2480 MHz				
Frequency	Measured Value	A.F+C.L+Att-A.G+D.F	Ant. Pol.	Total	Limit	Margin	Measurement
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	Type
2390.0	48.35	2.47	H	50.82	73.98	23.16	PK
2390.0	35.48	2.47	H	37.95	53.98	16.03	AV
2483.5	57.31	3.45	H	60.76	73.98	13.22	PK
2483.5	40.18	3.45	H	43.63	53.98	10.35	AV

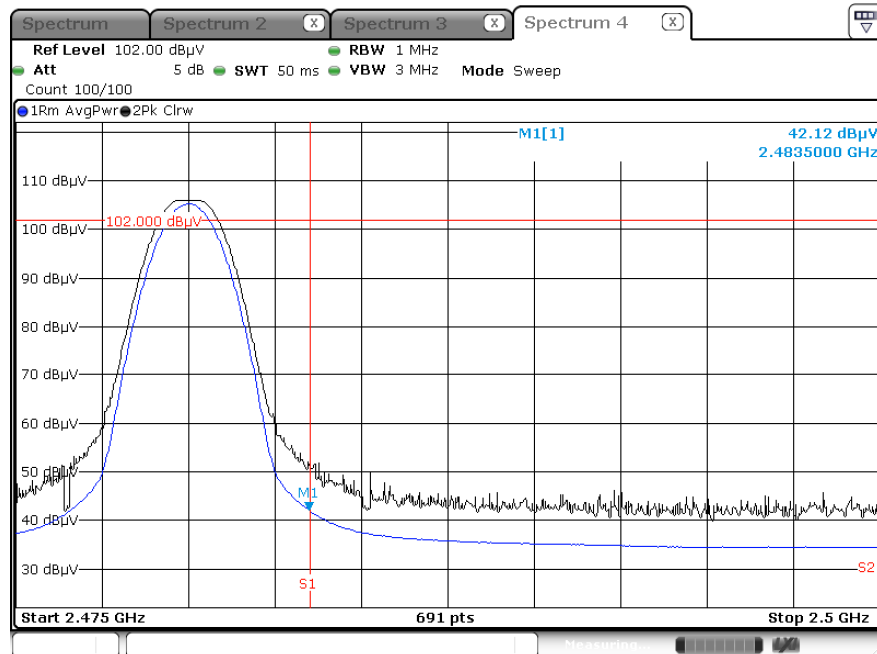
500k Bit/s (255 Bytes)							
Channel	37 CH, 39 CH	Channel Frequency	2402 MHz, 2480 MHz				
Frequency	Measured Value	A.F+C.L+Att-A.G+D.F	Ant. Pol.	Total	Limit	Margin	Measurement
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	Type
2390.0	48.29	2.47	H	50.76	73.98	23.22	PK
2390.0	35.49	2.47	H	37.96	53.98	16.02	AV
2483.5	56.39	3.45	H	59.84	73.98	14.14	PK
2483.5	41.78	3.45	H	45.23	53.98	8.75	AV

125k Bit/s (37 Bytes)							
Channel	0 CH, 36 CH	Channel Frequency	2404 MHz, 2478 MHz				
Frequency	Measured Value	A.F+C.L+Att-A.G+D.F	Ant. Pol.	Total	Limit	Margin	Measurement
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	Type
2390.0	47.82	2.47	H	50.29	73.98	23.69	PK
2390.0	35.48	2.47	H	37.95	53.98	16.03	AV
2483.5	57.05	3.45	H	60.50	73.98	13.48	PK
2483.5	41.86	3.45	H	45.31	53.98	8.67	AV

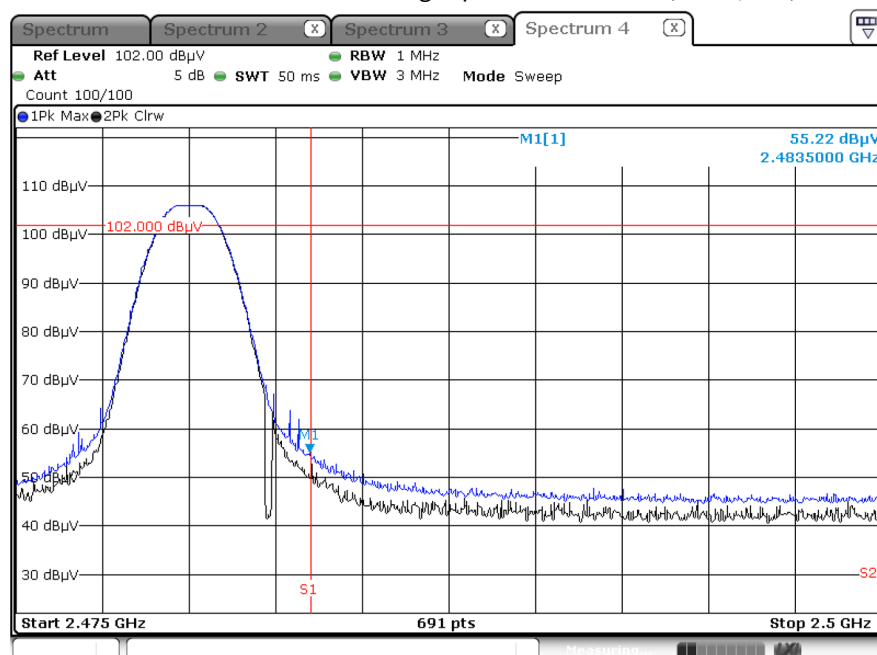
125k Bit/s (255 Bytes)							
Channel	0 CH, 36 CH	Channel Frequency	2404 MHz, 2478 MHz				
Frequency	Measured Value	A.F+C.L+Att-A.G+D.F	Ant. Pol.	Total	Limit	Margin	Measurement
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	Type
2390.0	47.90	2.47	H	50.37	73.98	23.61	PK
2390.0	35.46	2.47	H	37.93	53.98	16.05	AV
2483.5	55.22	3.45	H	58.67	73.98	15.31	PK
2483.5	42.12	3.45	H	45.57	53.98	8.41	AV

Mode : 125k Bit/s (255 Bytes) Test Plots

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



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



Note:

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

9.8 POWERLINE CONDUCTED EMISSIONS

Conducted Emissions

Test

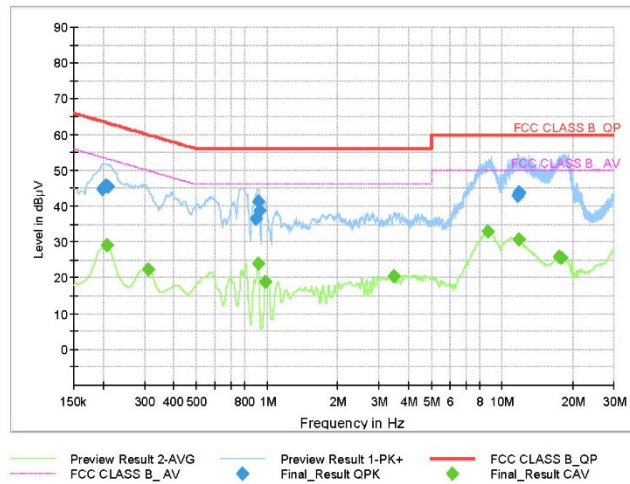
1 / 1

Test Report

Common Information

EUT : SM-X528U
Operating Conditions : BTLE Mode
Comment :

Full Spectrum



Final Result QPK

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.1995	44.67	63.63	18.96	9.000	N	9.6
0.2063	45.73	63.36	17.62	9.000	L1	9.7
0.2108	45.60	63.18	17.58	9.000	L1	9.7
0.8938	36.33	56.00	19.67	9.000	N	9.7
0.9140	41.17	56.00	14.83	9.000	N	9.7
0.9275	38.80	56.00	17.20	9.000	N	9.7
11.6758	42.79	60.00	17.21	9.000	L1	10.1
11.7365	43.52	60.00	16.48	9.000	L1	10.1
11.7410	43.92	60.00	16.08	9.000	L1	10.1

Final Result CAV

Frequency (MHz)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.2085	29.06	53.27	24.21	9.000	L1	9.7
0.3120	22.26	49.92	27.66	9.000	L1	9.7
0.9185	24.06	46.00	21.94	9.000	N	9.7
0.9860	18.99	46.00	27.01	9.000	L1	9.7
3.4700	20.56	46.00	25.44	9.000	N	9.8
8.7260	32.88	50.00	17.12	9.000	L1	10.0
11.7343	30.83	50.00	19.17	9.000	L1	10.1
17.5483	26.02	50.00	23.98	9.000	L1	10.3
17.9398	25.60	50.00	24.40	9.000	L1	10.3

2025-02-05

오전 10:13:18

10. LIST OF TEST EQUIPMENT

Conducted Test

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
LISN	ENV216	Rohde & Schwarz	102245	07/17/2025	Annual
EMI Test Receiver	ESR	Rohde & Schwarz	101910	08/27/2025	Annual
Temperature Chamber	SU-642	ESPEC	0093008124	02/19/2025	Annual
Signal Analyzer	N9030A	Agilent	MY49432108	02/20/2025	Annual
Power Measurement Set	OSP 120	Rohde & Schwarz	100935	08/01/2025	Annual
Power Meter	N1911A	Agilent	MY45100523	02/28/2025	Annual
Power Sensor	N1921A	Agilent	MY57820067	02/22/2025	Annual
Directional Coupler	87300B	Agilent	3116A03621	10/21/2025	Annual
Power Splitter	11667B	Hewlett Packard	10545	01/23/2026	Annual
DC Power Supply	E3632A	Agilent	KR75303243	04/19/2025	Annual
Attenuator(10 dB)(DC-26.5 GHz)	8493C	HP	07560	06/05/2025	Annual
Attenuator(10 dB)(DC-26.5 GHz)	8493C	HP	08285	05/28/2025	Annual
Attenuator(20 dB)	18N-20dB	Rohde & Schwarz	8	02/20/2025	Annual
Software	EMC32	Rohde & Schwarz	N/A	N/A	N/A
FCC WLAN&BT&BLE Conducted Test Software v3.0	N/A	HCT CO., LTD.	N/A	N/A	N/A
Bluetooth Tester	CBT	Rohde & Schwarz	100752	12/27/2025	Annual

Note:

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

Radiated Test

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
Controller	CO3000	Innco system	CO3000-4p	N/A	N/A
Antenna Position Tower	MA4640/800-XP-EP	Innco system	S1AM	07/30/2025	Annual
Turn Table	DS2000-S-1t	Innco system	DS2000/572/54610422/P	N/A	N/A
Amp & Filter Bank Switch Controller	FBSM-01B	T&M system	TM19050002	N/A	N/A
Loop Antenna	FMZB 1513	Schwarzbeck	1513-175	01/06/2027	Biennial
Hybrid Antenna	VULB 9168	Schwarzbeck	9168-0895	08/28/2026	Biennial
Horn Antenna	BBHA 9120D	Schwarzbeck	9120D-1300	01/03/2026	Biennial
Horn Antenna	BBHA 9120D	Schwarzbeck	9120D-2296	05/16/2026	Biennial
Horn Antenna(15 GHz ~ 40 GHz)	BBHA9170	Schwarzbeck	BBHA9170342	09/20/2026	Biennial
Spectrum Analyzer	FSV(10 Hz ~ 40 GHz)	Rohde & Schwarz	101055	05/09/2025	Annual
Band Reject Filter	WRCJV2400/2483.5-2370/2520-60/12SS	Wainwright Instruments	2	12/26/2025	Annual
Band Reject Filter	WRCJV12-4900-5100-5900-6100-50SS	Wainwright Instruments	5	06/04/2025	Annual
Band Reject Filter	WRCJV12-4900-5100-5900-6100-50SS	Wainwright Instruments	6	06/04/2025	Annual
High Pass Filter(7 GHz ~ 18 GHz)	WHKX10-7150-8000-18000-50SS	Wainwright Instruments	1	02/28/2025	Annual
Power Amplifier	CBL18265035	CERNEX	22966	11/07/2025	Annual
Power Amplifier	CBL26405040	CERNEX	25956	02/26/2025	Annual
Bluetooth Tester	TC-3000C	TESCOM	3000C000175	03/19/2025	Annual
RF Switching System	FMSR-05B (HPF(3~18GHz) + LNA1(1~18GHz))	T&M system	S1L1	12/23/2025	Annual
RF Switching System	FMSR-05B (ATT(10dB) + LNA1(1~18GHz))	T&M system	S1L2	12/23/2025	Annual
RF Switching System	FMSR-05B (ATT(3dB) + LNA1(1~18GHz))	T&M system	S1L3	12/23/2025	Annual
RF Switching System	FMSR-05B (LNA1(1~18GHz))	T&M system	S1L4	12/23/2025	Annual
RF Switching System	FMSR-05B (HPF(7~18GHz) + LNA2(6~18GHz))	T&M system	S1L5	12/23/2025	Annual
RF Switching System	FMSR-05B (Thru(30MHz ~ 18GHz))	T&M system	S1L6	12/23/2025	Annual

Note:

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

11. ANNEX A_ TEST SETUP PHOTO

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

No.	Description
1	HCT-RF-2502-FC064-P