TEST REPORT

FCC BT LE Test for SC-54E
Certification

APPLICANT
SAMSUNG Electronics Co., Ltd.

REPORT NO.
HCT-RF-2405-FC044

DATE OF ISSUE
May 24, 2024

Tested by
Kyung Jun Woo

Technical Manager
Jong Seok Lee

HCT CO., LTD.
BongJai Huh / CEO

HCT CO., LTD. 2-6, 73, 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383 KOREA Tel. +82 31 645 6300 Fax. +82 31 645 6401

HCT CO.,LTD.
2-6, 73, 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383 KOREA
Tel. +82 31 645 6300 Fax. +82 31 645 6401

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Additional Model
SCG29

Applicant	**SAMSUNG Electronics Co., Ltd.** 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
Product Name Model Name	Mobile Phone SC-54E
FCC ID	A3LSMF741JPN
Average Output Power	Ant.1: 17.25 dBm (53.14 mW) Ant.2: 15.17 dBm (32.92 mW) Dual Ant.1+ Ant.2: 15.61 dBm (36.38 mW)
Date of Test	February 23, 2024 ~ April 26, 2024
FCC Classification	Digital Transmission System(DTS)
Test Standard Used	FCC Rule Part(s): Part 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)

REVISION HISTORY

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

Revision No.	Date of Issue	Description
0	May 24, 2024	Initial Release

Notice

Content
According to the Evaluation report, all of the data contained herein is reused from the reference FCC ID : A3LSMF741U report.
Engineering Statement: The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of the FCC Rules under normal use and maintenance.
The results shown in this test report only apply to the sample(s), as received, provided by the applicant, unless otherwise stated. The test results have only been applied with the test methods required by the standard(s).
The laboratory is not accredited for the test results marked *. Information provided by the applicant is marked **. Test results provided by external providers are marked ***.
When confirmation of authenticity of this test report is required, please contact www.hct.co.kr
The test results in this test report are not associated with the ((KS Q) ISO/IEC 17025) accreditation by KOLAS (Korea Laboratory Accreditation Scheme) / A2LA (American Association for Laboratory Accreditation) that are under the ILAC (International Laboratory Accreditation Cooperation) Mutual Recognition Agreement (MRA).

CONTENTS

1. EUT DESCRIPTION

Model	SC-54E			
Additional Model	SCG29			
EUT Type	Mobile Phone			
Power Supply	DC 3.88 V			
Frequency Range	125k, 500k, 1M Bit/s : 2402 - 2480 MHz 2M Bit/s : 2404 - 2478 MHz (Except for 2426 MHz)			
Number of Channels	125k, 500k, 1M Bit/s : 40 Channels 2M Bit/s : 37 Channels			
Max. RF Output Power (Normal)	Ant.1	Peak (For information only)	1 M Bit/s: 2 M Bit/s: 125 k Bit/s : 500 k Bit/s :	17.900 dBm (61.66 mW) 18.321 dBm (67.94 mW) 7.783 dBm (6.00 mW) 7.864 dBm (6.12 mW)
		Average	1 M Bit/s: 2 M Bit/s: 125 k Bit/s : 500 k Bit/s :	16.96 dBm (49.71 mW) 17.25 dBm (53.14 mW) 7.62 dBm (5.79 mW) 7.62 dBm (5.79 mW)
	Ant.2	Peak (For information only)	1 M Bit/s: 2 M Bit/s: 125 k Bit/s : 500 k Bit/s :	15.988 dBm (39.70 mW) 16.214 dBm (41.82 mW) 9.226 dBm (8.37 mW) 9.233 dBm (8.38 mW)
		Average	1 M Bit/s: 2 M Bit/s: 125 k Bit/s : 500 k Bit/s :	15.17 dBm (32.92 mW) 14.94 dBm (31.22 mW) 8.92 dBm (7.81 mW) 8.90 dBm (7.76 mW)
	Dual Ant.1 + Ant.2	Peak (For information only)	1 M Bit/s: 2 M Bit/s:	15.812 dBm (38.12 mW) 15.992 dBm (39.73 mW)
		Average	1 M Bit/s: 2 M Bit/s:	15.61 dBm (36.38 mW) 15.38 dBm (34.49 mW)
Modulation Type	GFSK			
Bluetooth Version	5.3			
Antenna Specification	Type: Metal ANT.1 Peak Gain: -5.28 dBi, ANT.2 Peak Gain: -6.95 dBi			
Serial number	Conducted : R3CX30BD5YB Radiated : R3CX20KJSLK			

ANTENNA CONFIGURATIONS

1. Below Tables are the possible configurations.

Amp.	SISO		Dual BT
	Ant1(Core-0)	Ant2(Core-1)	Ant1 & Ant2
ePA Mode	O	O	X
iPA Mode	X	X	O

Note:

1) O = Support, X = Not Support

2) BLE 1M/2Mbps Mode support Dual BT, But 125k/500kbps do not support Dual BT.

2. TEST METHODOLOGY

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

EUT CONFIGURATION

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

EUT EXERCISE

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

GENERAL TEST PROCEDURES

Conducted Emissions

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

Radiated Emissions

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

DESCRIPTION OF TEST MODES

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

3. INSTRUMENT CALIBRATION

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

4. FACILITIES AND ACCREDITATIONS

FACILITIES

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

EQUIPMENT

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

5. ANTENNA REQUIREMENTS

According to FCC 47 CFR § 15.203

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

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

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

6. MEASUREMENT UNCERTAINTY

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

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

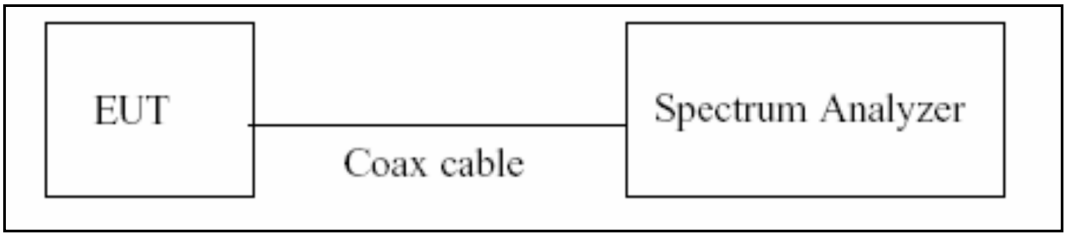
The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

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

7. DESCRIPTION OF TESTS

7.1. Duty Cycle

Test Configuration



Test Procedure

The transmitter output is connected to the Spectrum Analyzer.

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

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

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

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

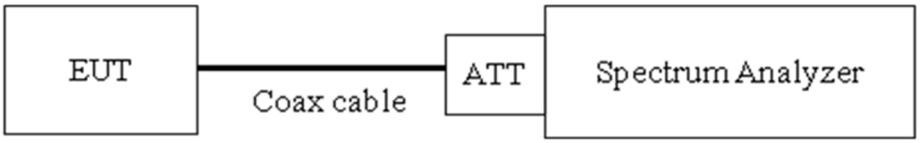
1. RBW = 8 MHz (the largest available value)
2. VBW = 8 MHz (≥ RBW)
3. SPAN = 0 Hz
4. Detector = Peak
5. Number of points in sweep > 100
6. Trace mode = Clear write
7. Measure T_{total} and T_{on}
8. Calculate Duty Cycle = T_{on}/ T_{total} and Duty Cycle Factor = 10log(1/Duty Cycle)

7.2. 6 dB Bandwidth

Limit

The minimum permissible 6 dB bandwidth is 500 kHz.

Test Configuration



Test Procedure

The transmitter output is connected to the Spectrum Analyzer.

The Spectrum Analyzer is set to

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

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

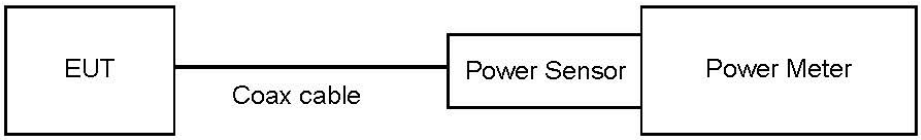
Note : We tested OBW using the automatic bandwidth measurement capability of a spectrum analyzer.

7.3. Output Power

Limit

The maximum permissible conducted output power is 1 Watt.

Test Configuration



Test Procedure

The transmitter output is connected to the Power Meter.

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

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

Sample Calculation

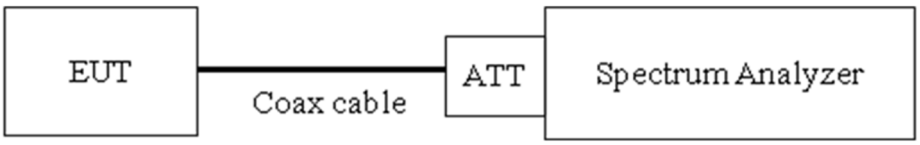
- Conducted Output Power(Peak) = Measured Value + ATT loss + Cable loss
- Conducted Output Power(Average) = Measured Value + ATT loss + Cable loss + Duty Cycle Factor

7.4. Power Spectral Density

Limit

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

Test Configuration



Test Procedure

The transmitter output is connected to the Spectrum Analyzer.

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

The spectrum analyzer is set to :

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

Sample Calculation

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

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

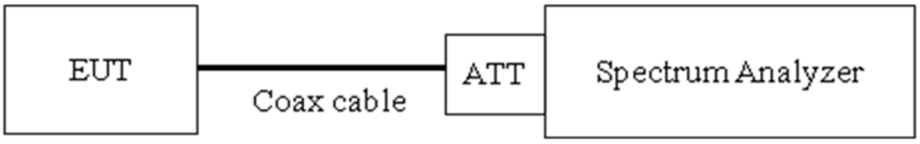
Limit

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

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

[Conducted > 30 dBc]

Test Configuration



Test Procedure

The transmitter output is connected to the spectrum analyzer.

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

1) RBW = 100 kHz
2) VBW ≥ 3 x RBW
3) Set span to encompass the spectrum to be examined
4) Detector = Peak
5) Trace Mode = max hold
6) Sweep time = auto couple
7) 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)	
	Ant.1	Ant.2
30	10.33	10.04
100	10.43	10.12
200	10.56	10.18
300	10.61	10.22
400	10.64	10.23
500	10.70	10.31
600	10.81	10.34
700	10.92	10.48
800	11.02	10.50
900	11.06	10.47
1 000	11.01	10.61
2 000	11.08	10.64
2 400	**11.12**	**10.74**
2 500	**11.12**	**10.74**
3 000	11.33	10.89
4 000	11.32	10.88
5 000	11.39	10.91
6 000	11.46	10.94
7 000	11.58	11.23
8 000	11.62	11.31
9 000	11.72	11.32
10 000	11.75	11.42
11 000	11.87	11.41
12 000	11.88	11.26
13 000	11.90	11.46
14 000	11.92	11.59
15 000	12.02	11.62
16 000	12.14	11.67
17 000	12.19	11.62
18 000	12.21	11.74
19 000	12.34	11.69
20 000	12.38	11.78
21 000	12.46	11.80
22 000	12.49	11.84
23 000	12.50	11.91
24 000	12.48	11.95
25 000	12.60	11.96
26 000	12.58	11.98

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

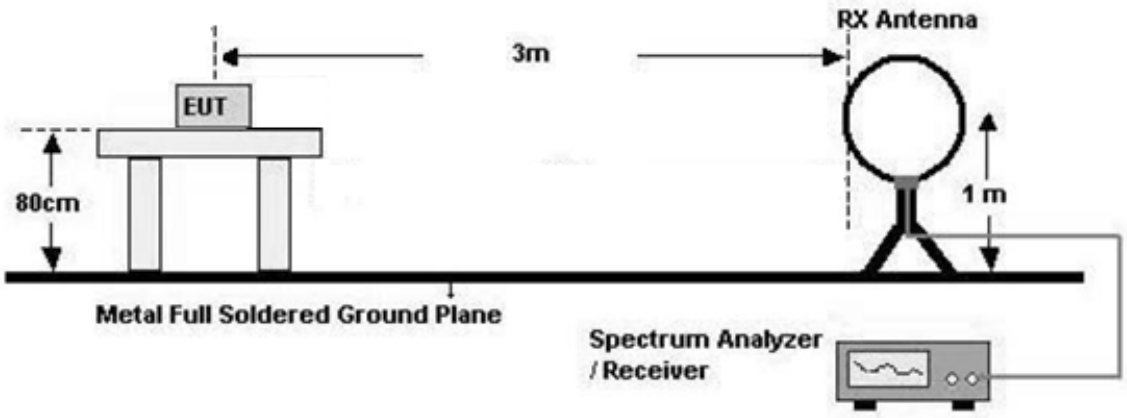
7.6. Radiated Test

Limit

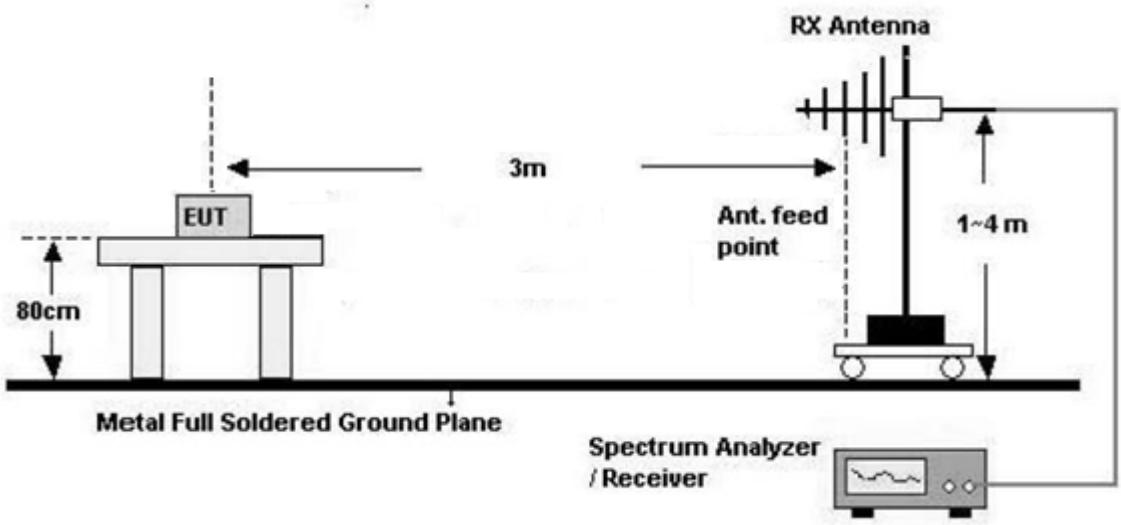
Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Configuration

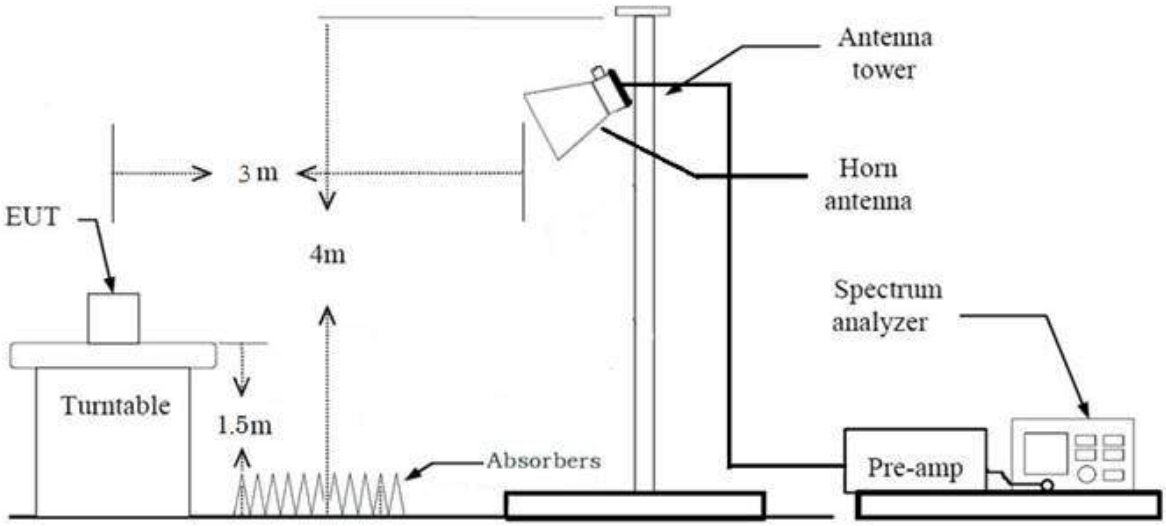
Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz



Test Procedure of Radiated spurious emissions(Below 30 MHz)

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

KDB 414788 OFS and Chamber Correlation Justification

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

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

Test Procedure of Radiated spurious emissions(Below 1 GHz)

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

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

Test Procedure of Radiated spurious emissions (Above 1 GHz)

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

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

9. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
10. Distance extrapolation factor = 20log (test distance / specific distance) (dB)

11. Total (Measurement Type : Peak)

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

Total (Measurement Type : Average)
= Average Measured Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(A.G)
+ Distance Factor(D.F)

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

Test Procedure of Radiated Restricted Band Edge

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

   (2) Measurement Type(Average):
   - Duty cycle < 98 %, duty cycle variations are less than ±2 %
   - Measured Frequency Range : 2310 MHz ~ 2390 MHz/ 2483.5 MHz ~ 2500 MHz
   - Detector = RMS
   - Averaging type = power (*i.e.*, RMS)
   - RBW = 1 MHz
   - VBW ≥ 3 x RBW
   - Sweep time = auto.
   - Trace mode = average (at least 100 traces).
   - Correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100 percent duty cycle.
   - Duty Cycle Factor (dB) : Please refer to the please refer to section 9.1.

9. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
10. Distance extrapolation factor = 20log (test distance / specific distance) (dB)
11.Total
(1)Measurement(Peak)
= Measured Value(Peak)
(2)Measurement(Avg)
= Measured Value(Avg)
- We apply to the offset in range 1 GHz - 18 GHz
- The offset = Antenna Factor(A.F) + Cable Loss(C.L) + 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 μH/50 ohms line impedance stabilization network (LISN).

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

[a]Decreases with the logarithm of the frequency.

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

Test Configuration

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

Test Procedure

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

Sample Calculation

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

7.8. Worst case configuration and mode

Radiated Test

1. All modes of operation were investigated and the worst case configuration results are reported.
   - Mode : Stand alone, Stand alone + External accessories(Earphone etc)
   - Worstcase : Stand alone
2. EUT Axis
   (1) Ant.1
      - Radiated Spurious Emissions : Y
      - Radiated Restricted Band Edge : X
   (2) Ant.2
      - Radiated Spurious Emissions : Y
      - Radiated Restricted Band Edge : Z
   (3) Dual Ant.1+ Ant.2
      - Radiated Spurious Emissions : X
      - Radiated Restricted Band Edge : X
3. All packet length of operation were investigated and the test results are worst case in lowest packet length.
   (Worst case :1M Bit/s 37 Byte, 2M Bit/s 37 Byte)
   (125k, 500k, 1M Bit/s all have the same 1 MHz 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
6. The EUT was tested in three modes(Open, Half-open, Closed), the worst case configuration results are reported.
   (1) Ant.1
      - Radiated Spurious Emissions : Open Mode
      - Radiated Restricted Band Edge : Open Mode
   (2) Ant.2
      - Radiated Spurious Emissions : Half-Open Mode
      - Radiated Restricted Band Edge : Half-Open Mode
   (3) Dual Ant.1+ Ant.2
      - Radiated Spurious Emissions : Half-Open Mode
      - Radiated Restricted Band Edge : Open Mode
7. SC-54E, SCG29 were tested and the worst case results are reported.
(Worst case: SC-54E)

AC Power line Conducted Emissions

1. All modes of operation were investigated and the worst case configuration results are reported.
   - Mode : Stand alone+ External accessories(Earphone, etc)+Travel Adapter
            Stand alone + Travel Adapter
   - Worstcase : Stand alone + Travel Adapter
2. SC-54E, SCG29 were tested and the worst case results are reported.
(Worst case: SC-54E)

Conducted test

1. The EUT was configured with packet length of highest power.
   - ALL supported mode tested.
   - Worst Results refer to Notes for each test item
2. SC-54E, SCG29 were tested and the worst case results are reported.
(Worst case: SC-54E)

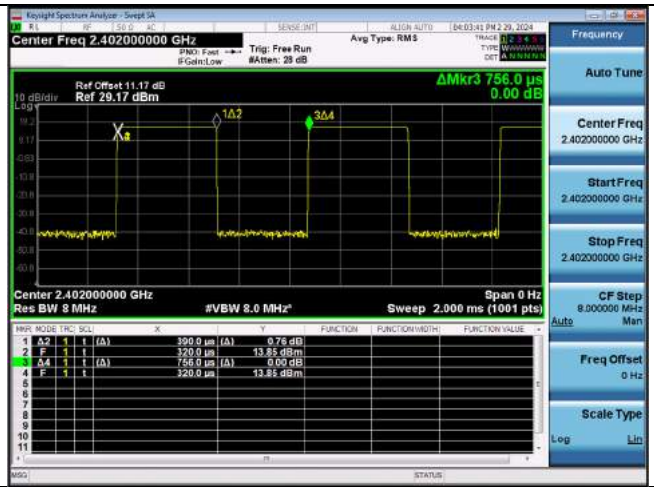
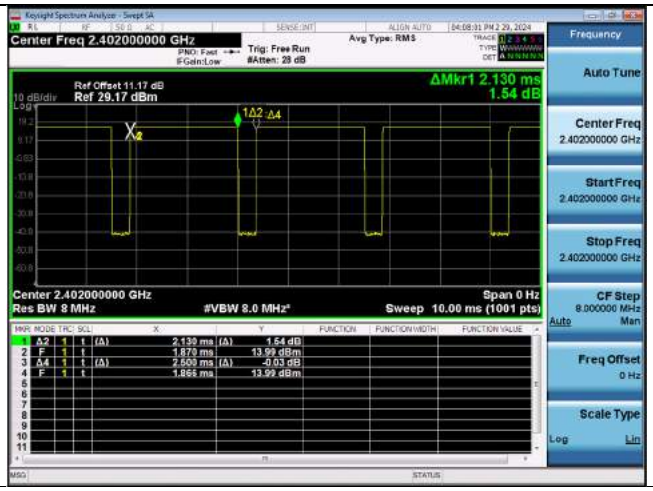
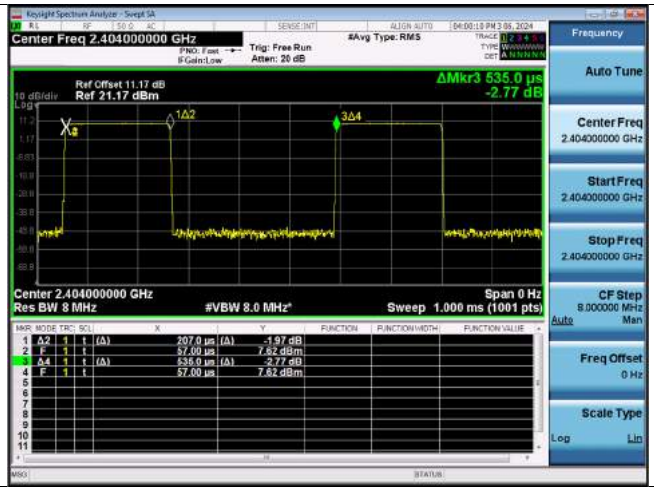
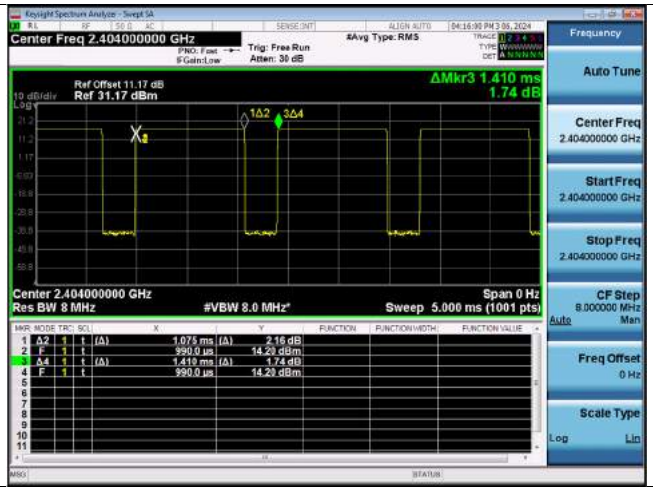
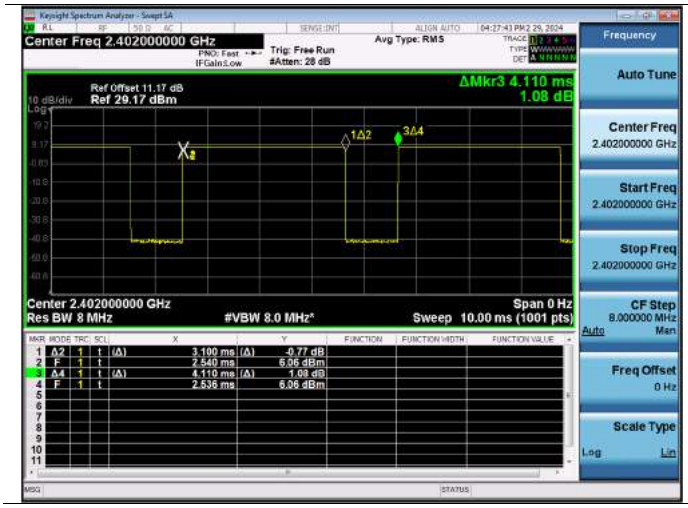
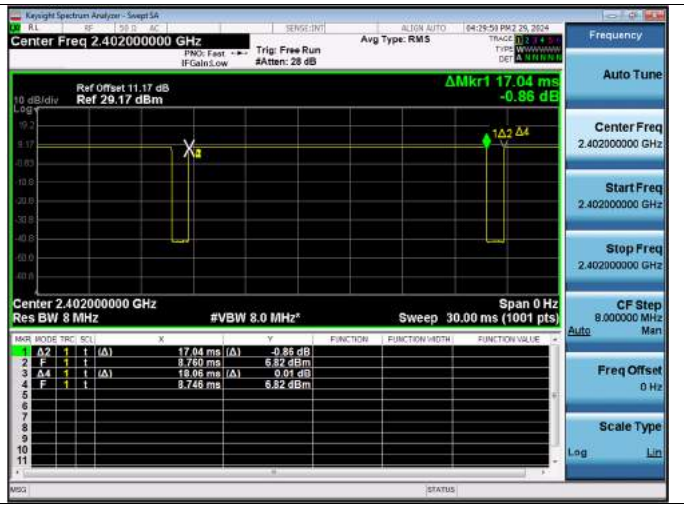
8. SUMMARY TEST OF RESULTS

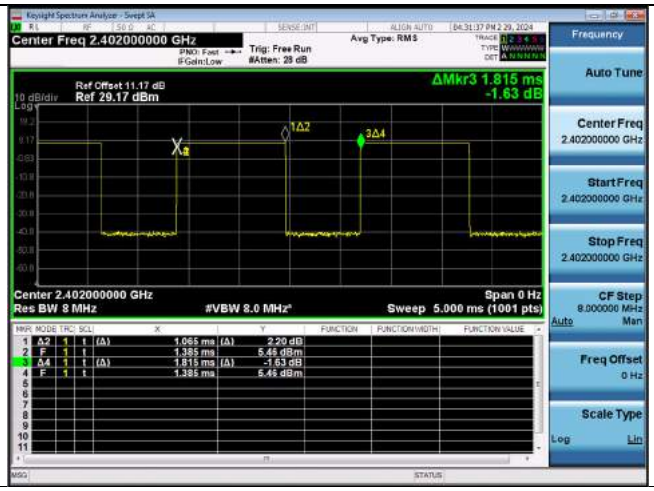
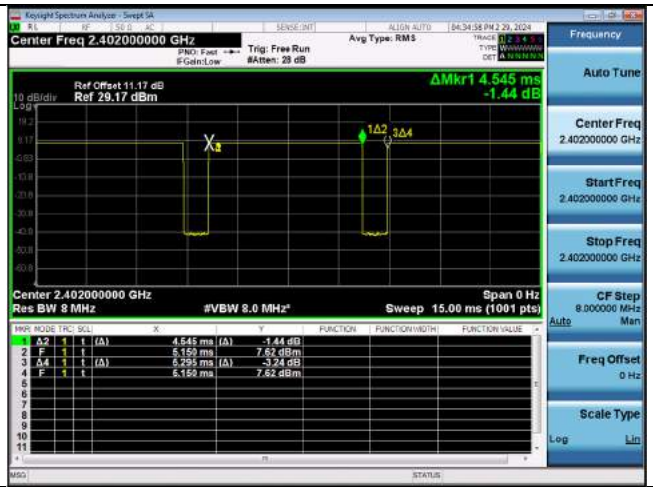
Test Description	FCC Part Section(s)	Test Limit	Test Condition	Test Result
6 dB Bandwidth	§ 15.247(a)(2)	> 500 kHz	Conducted	PASS
Conducted Maximum Output Power	§ 15.247(b)(3)	< 1 Watt		PASS
Power Spectral Density	§ 15.247(e)	< 8 dBm / 3 kHz Band		PASS
Band Edge (Out of Band Emissions)	§ 15.247(d)	Conducted > 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	0.390	0.756	0.516	2.875
	255	2.130	2.500	0.852	0.696
2M	37	0.207	0.535	0.387	4.124
	255	1.075	1.410	0.762	1.178
125k	37	3.100	4.110	0.754	1.225
	255	17.040	18.060	0.944	0.252
500k	37	1.065	1.815	0.586	2.315
	255	4.545	5.295	0.858	0.663

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

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

9.2 6 dB BANDWIDTH

[Ant. 1]

Mode (Bit/s)	Channel	6 dB Bandwidth (kHz)	Limit (kHz)
1M(37)	37	684.1	> 500
	17	688.4	
	39	683.0	
1M(255)	37	664.4	> 500
	17	668.4	
	39	667.6	
2M(37)	0	1150	> 500
	17	1155	
	36	1156	
2M(255)	0	1159	> 500
	17	1156	
	36	1157	
125k(37)	37	612.7	> 500
	17	613.4	
	39	614.1	
125k(255)	37	610.7	> 500
	17	611.3	
	39	612.9	
500k(37)	37	665.0	> 500
	17	666.0	
	39	665.3	
500k(255)	37	664.9	> 500
	17	665.7	
	39	665.5	

Note:

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

1M Bit/s: 255 Byte

2M Bit/s: 37 Byte

125k Bit/s: 255 Byte

500k Bit/s: 255 Byte

[Ant. 2]

Mode (Bit/s)	Channel	6 dB Bandwidth (kHz)	Limit (kHz)
1M(37)	37	680.8	> 500
	17	686.3	
	39	682.9	
1M(255)	37	666.6	> 500
	17	668.5	
	39	671.1	
2M(37)	0	1150	> 500
	17	1152	
	36	1151	
2M(255)	0	1147	> 500
	17	1146	
	36	1143	
125k(37)	37	611.2	> 500
	17	611.5	
	39	613.5	
125k(255)	37	624.2	> 500
	17	609.3	
	39	619.9	
500k(37)	37	665.0	> 500
	17	664.9	
	39	664.9	
500k(255)	37	665.0	> 500
	17	667.4	
	39	664.7	

Note:

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

1M Bit/s: 255 Byte

2M Bit/s: 255 Byte

125k Bit/s: 255 Byte

500k Bit/s: 255 Byte

[Dual Ant. 1]

Mode (Bit/s)	Channel	6 dB Bandwidth (kHz)	Limit (kHz)
1M(37)	37	693.0	> 500
	17	689.1	
	39	679.5	
1M(255)	37	669.2	> 500
	17	665.3	
	39	665.6	
2M(37)	0	1160	> 500
	17	1154	
	36	1153	
2M(255)	0	1161	> 500
	17	1159	
	36	1160	

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

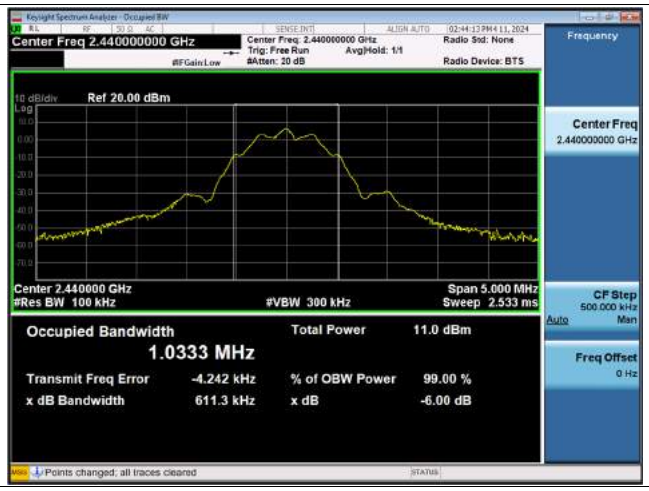
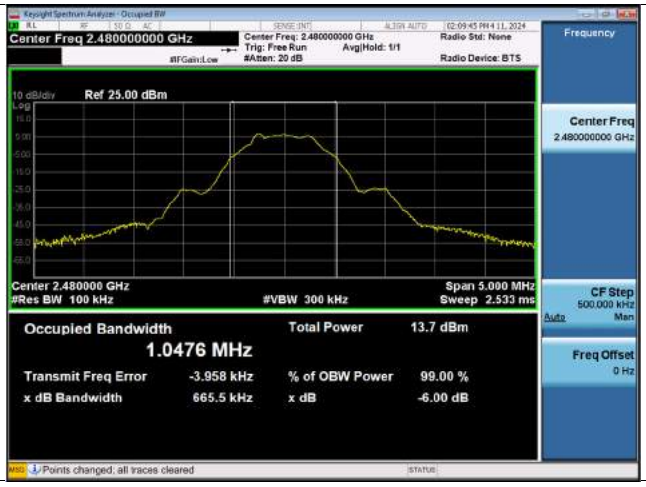
[Dual Ant. 2]

Mode (Bit/s)	Channel	6 dB Bandwidth (kHz)	Limit (kHz)
1M(37)	37	679.8	> 500
	17	673.5	
	39	670.8	
1M(255)	37	668.5	> 500
	17	665.3	
	39	666.0	
2M(37)	0	1154	> 500
	17	1146	
	36	1142	
2M(255)	0	1146	> 500
	17	1154	
	36	1149	

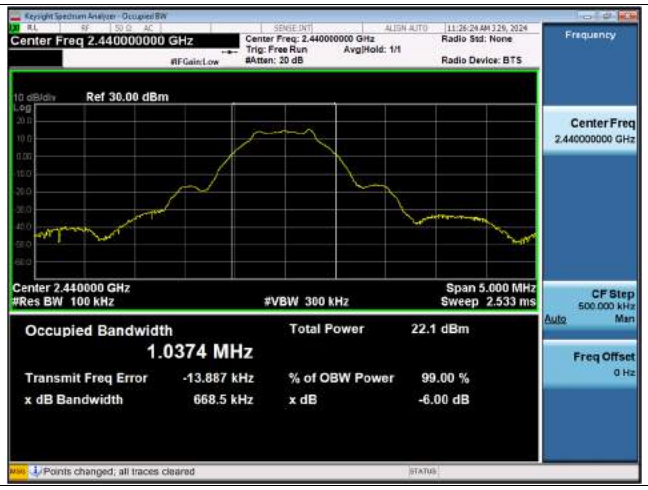
Note:
In order to simplify the report, attached plots were only the narrowest 6 dB BW Channel
1M Bit/s: 255 Byte
2M Bit/s: 37 Byte

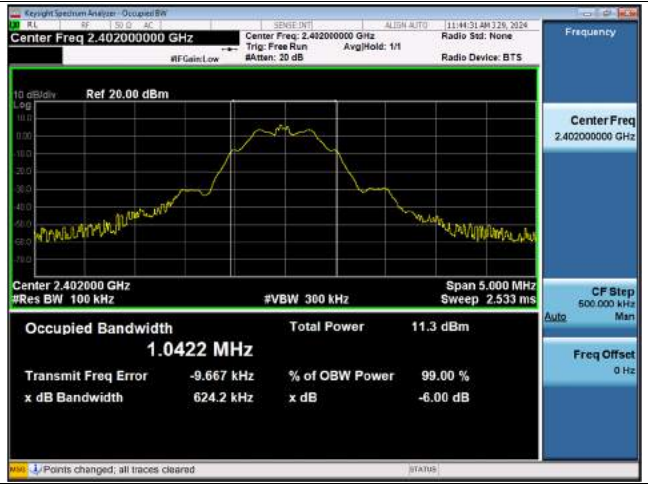
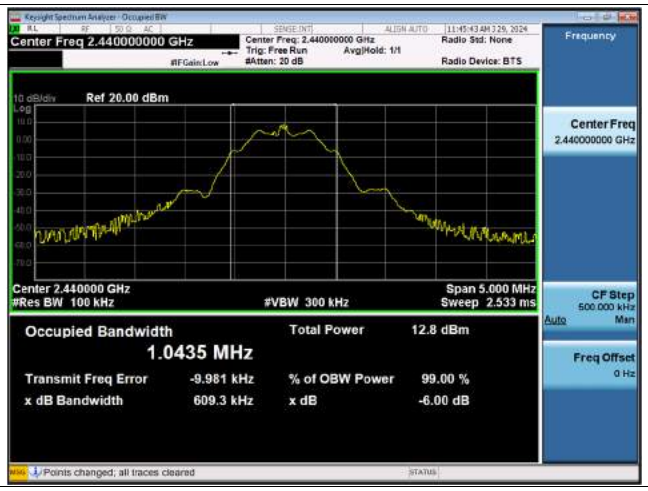
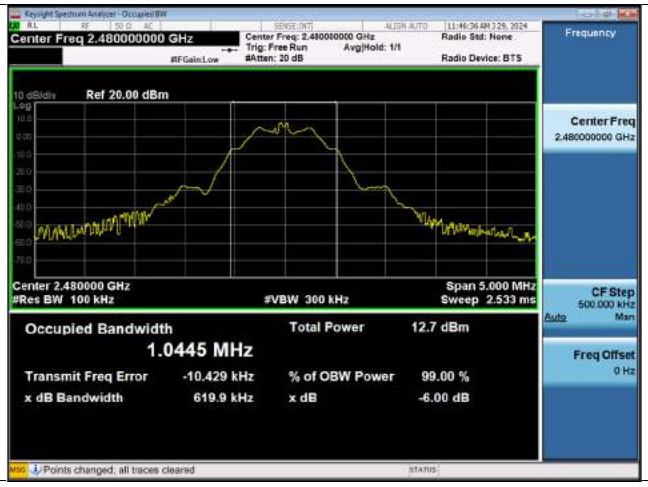
[Ant.1]

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

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

[Ant.2]

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

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

[Dual Ant.1]

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

[Dual Ant.2]

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

9.3 OUTPUT POWER

Peak Power

[Ant.1]

Data rate	Packet length	LE Mode		Peak Power (dBm)	Limit (dBm)
(Bit/s)	(Byte)	Frequency [MHz]	Channel		
1M	37	2402	37	17.900	30
		2440	17	17.256	
		2480	39	17.235	
	255	2402	37	17.882	
		2440	17	17.456	
		2480	39	17.633	
2M	37	2404	0	18.248	
		2440	17	17.880	
		2478	36	17.804	
	255	2404	0	18.321	
		2440	17	17.207	
		2478	36	17.031	
125k	37	2402	37	7.783	
		2440	17	7.518	
		2480	39	7.217	
	255	2402	37	7.652	
		2440	17	7.331	
		2480	39	7.218	
500k	37	2402	37	7.864	
		2440	17	7.568	
		2480	39	7.295	
	255	2402	37	7.684	
		2440	17	7.558	
		2480	39	7.149	

[Ant.2]

Data rate	Packet length	LE Mode		Peak Power (dBm)	Limit (dBm)
(Bit/s)	(Byte)	Frequency [MHz]	Channel		
1M	37	2402	37	15.360	30
		2440	17	15.988	
		2480	39	14.437	
	255	2402	37	15.073	
		2440	17	15.559	
		2480	39	13.817	
2M	37	2404	0	15.629	
		2440	17	16.214	
		2478	36	15.016	
	255	2404	0	15.583	
		2440	17	15.891	
		2478	36	14.422	
125k	37	2402	37	7.722	
		2440	17	9.226	
		2480	39	9.135	
	255	2402	37	7.822	
		2440	17	9.223	
		2480	39	9.119	
500k	37	2402	37	7.857	
		2440	17	9.233	
		2480	39	9.212	
	255	2402	37	7.762	
		2440	17	9.221	
		2480	39	9.171	

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

Data rate	Packet length	LE Mode		Dual Ant.1 Power(dBm)	Dual Ant.2 Power(dBm)	Dual (Ant. 1 + Ant. 2) Power(dBm)	Limit (dBm)
(Bit/s)	(Byte)	Frequency [MHz]	Channel				
1M	37	2402	37	13.551	11.101	15.507	30
		2440	17	13.068	12.518	15.812	
		2480	39	13.171	12.289	15.708	
	255	2402	37	13.430	10.989	15.389	
		2440	17	12.940	12.279	15.679	
		2480	39	12.918	12.095	15.536	
2M	37	2404	0	13.552	11.154	15.515	
		2440	17	12.781	12.514	15.609	
		2478	36	13.353	12.607	15.992	
	255	2404	0	13.416	11.017	15.390	
		2440	17	12.628	12.341	15.497	
		2478	36	12.914	12.416	15.682	

Average Power

Note :

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

[Ant.1]

Data rate	Packet length	LE Mode		Measured Power (dBm)	Duty Cycle Factor	Result	Limit (dBm)
(Bit/s)	(Byte)	Frequency [MHz]	Channel		(dB)	(dBm)	
1M	37	2402	37	14.09	2.87	16.96	30
		2440	17	13.47	2.87	16.34	
		2480	39	13.55	2.87	16.42	
	255	2402	37	16.24	0.70	16.94	
		2440	17	15.60	0.70	16.30	
		2480	39	15.62	0.70	16.32	
2M	37	2404	0	13.13	4.12	17.25	
		2440	17	12.37	4.12	16.49	
		2478	36	12.80	4.12	16.92	
	255	2404	0	16.05	1.18	17.23	
		2440	17	15.27	1.18	16.45	
		2478	36	15.40	1.18	16.58	
125k	37	2402	37	6.40	1.22	7.62	
		2440	17	6.13	1.22	7.35	
		2480	39	5.80	1.22	7.02	
	255	2402	37	7.24	0.25	7.49	
		2440	17	6.96	0.25	7.21	
		2480	39	6.78	0.25	7.03	
500k	37	2402	37	5.30	2.32	7.62	
		2440	17	5.07	2.32	7.39	
		2480	39	4.67	2.32	6.99	
	255	2402	37	6.88	0.66	7.54	
		2440	17	6.72	0.66	7.38	
		2480	39	6.38	0.66	7.04	

[Ant.2]

Data rate	Packet length	LE Mode		Measured Power (dBm)	Duty Cycle Factor	Result	Limit (dBm)
(Bit/s)	(Byte)	Frequency [MHz]	Channel		(dB)	(dBm)	
1M	37	2402	37	11.75	2.87	14.62	30
		2440	17	12.30	2.87	15.17	
		2480	39	10.73	2.87	13.60	
	255	2402	37	13.87	0.70	14.57	
		2440	17	14.20	0.70	14.90	
		2480	39	12.45	0.70	13.15	
2M	37	2404	0	10.58	4.12	14.70	
		2440	17	10.82	4.12	14.94	
		2478	36	9.58	4.12	13.70	
	255	2404	0	13.50	1.18	14.68	
		2440	17	13.72	1.18	14.90	
		2478	36	12.44	1.18	13.62	
125k	37	2402	37	6.40	1.22	7.62	
		2440	17	7.70	1.22	8.92	
		2480	39	7.56	1.22	8.78	
	255	2402	37	7.45	0.25	7.70	
		2440	17	8.65	0.25	8.90	
		2480	39	8.52	0.25	8.77	
500k	37	2402	37	5.38	2.32	7.70	
		2440	17	6.55	2.32	8.87	
		2480	39	6.40	2.32	8.72	
	255	2402	37	6.91	0.66	7.57	
		2440	17	8.24	0.66	8.90	
		2480	39	8.02	0.66	8.68	

[Dual Ant.1]

Data rate	Packet length	LE Mode		Measured Power	Duty Cycle Factor	Result	Limit
(Bit/s)	(Byte)	Frequency [MHz]	Channel	(dBm)	(dB)	(dBm)	(dBm)
1M	37	2402	37	10.29	2.87	13.16	30
		2440	17	9.59	2.87	12.46	
		2480	39	10.15	2.87	13.02	
	255	2402	37	12.63	0.70	13.33	
		2440	17	11.90	0.70	12.60	
		2480	39	12.02	0.70	12.72	
2M	37	2404	0	9.21	4.12	13.33	
		2440	17	8.51	4.12	12.63	
		2478	36	8.62	4.12	12.74	
	255	2404	0	11.99	1.18	13.17	
		2440	17	11.34	1.18	12.52	
		2478	36	11.45	1.18	12.63	

[Dual Ant.2]

Data rate	Packet length	LE Mode		Measured Power	Duty Cycle Factor	Result	Limit
(Bit/s)	(Byte)	Frequency [MHz]	Channel	(dBm)	(dB)	(dBm)	(dBm)
1M	37	2402	37	8.07	2.87	10.94	30
		2440	17	9.48	2.87	12.35	
		2480	39	9.25	2.87	12.12	
	255	2402	37	10.17	0.70	10.87	
		2440	17	11.51	0.70	12.21	
		2480	39	11.22	0.70	11.92	
2M	37	2404	0	6.86	4.12	10.98	
		2440	17	7.95	4.12	12.07	
		2478	36	7.83	4.12	11.95	
	255	2404	0	9.56	1.18	10.74	
		2440	17	10.98	1.18	12.16	
		2478	36	10.82	1.18	12.00	

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

Data rate	Packet length	LE Mode		Dual Ant.1 Power	Dual Ant.2 Power	Dual (Ant. 1 + Ant. 2) Power (dBm)	Limit (dBm)
(Bit/s)	(Byte)	Frequency [MHz]	Channel	(dBm)	(dBm)		
1M	37	2402	37	13.16	10.94	15.21	30
		2440	17	12.46	12.35	15.42	
		2480	39	13.02	12.12	15.61	
	255	2402	37	13.33	10.87	15.28	
		2440	17	12.60	12.21	15.42	
		2480	39	12.72	11.92	15.34	
2M	37	2404	0	13.33	10.98	15.33	
		2440	17	12.63	12.07	15.37	
		2478	36	12.74	11.95	15.38	
	255	2404	0	13.17	10.74	15.13	
		2440	17	12.52	12.16	15.35	
		2478	36	12.63	12.00	15.33	

9.4 POWER SPECTRAL DENSITY

[Ant.1]

Frequency (MHz)	Channel No.	Mode	Test Result			Limit
			Measured PSD (dBm)	Duty Cycle Factor(dB)	Total PSD (dBm)	
2402	37	1 MBit/s 37 Byte	3.872	2.87	6.747	8 dBm / 3 kHz
2440	17		4.066	2.87	6.941	
2480	39		3.761	2.87	6.636	
2402	37	1 MBit/s 255 Byte	5.681	0.70	6.377	
2440	17		5.170	0.70	5.866	
2480	39		5.311	0.70	6.007	
2404	0	2 MBit/s 37 Byte	2.309	4.12	6.433	
2440	17		2.681	4.12	6.805	
2478	36		1.487	4.12	5.611	
2404	0	2 MBit/s 255 Byte	2.503	1.18	3.681	
2440	17		2.358	1.18	3.536	
2478	36		1.644	1.18	2.822	
2402	37	125k 37 Byte	-0.575	1.22	0.650	
2440	17		-0.547	1.22	0.678	
2480	39		-0.468	1.22	0.757	
2402	37	125k 255 Byte	0.448	0.25	0.700	
2440	17		0.444	0.25	0.696	
2480	39		0.472	0.25	0.724	
2402	37	500k 37 Byte	-3.980	2.32	-1.665	
2440	17		-4.230	2.32	-1.915	
2480	39		-4.057	2.32	-1.742	
2402	37	500k 255 Byte	-5.744	0.66	-5.081	
2440	17		-5.975	0.66	-5.312	
2480	39		-5.365	0.66	-4.702	

Note :

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

[Ant.2]

Frequency (MHz)	Channel No.	Mode	Test Result			Limit
			Measured PSD (dBm)	Duty Cycle Factor(dB)	Total PSD (dBm)	
2402	37	1 MBit/s 37 Byte	1.765	2.87	4.640	8 dBm / 3 kHz
2440	17		2.392	2.87	5.267	
2480	39		0.771	2.87	3.646	
2402	37	1 MBit/s 255 Byte	2.536	0.70	3.232	
2440	17		2.777	0.70	3.473	
2480	39		0.860	0.70	1.556	
2404	0	2 MBit/s 37 Byte	-0.582	4.12	3.542	
2440	17		0.153	4.12	4.277	
2478	36		-1.849	4.12	2.275	
2404	0	2 MBit/s 255 Byte	0.543	1.18	1.721	
2440	17		0.372	1.18	1.550	
2478	36		-1.456	1.18	-0.278	
2402	37	125k 37 Byte	0.248	1.22	1.473	
2440	17		1.605	1.22	2.830	
2480	39		1.597	1.22	2.822	
2402	37	125k 255 Byte	1.211	0.25	1.463	
2440	17		2.600	0.25	2.852	
2480	39		2.512	0.25	2.764	
2402	37	500k 37 Byte	-3.547	2.32	-1.232	
2440	17		-2.881	2.32	-0.566	
2480	39		-2.425	2.32	-0.110	
2402	37	500k 255 Byte	-5.040	0.66	-4.377	
2440	17		-3.165	0.66	-2.502	
2480	39		-3.520	0.66	-2.857	

Note :

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

[Dual Ant.1]

Frequency (MHz)	Channel No.	Mode	Test Result			
			Measured PSD (dBm)	Duty Cycle Factor(dB)	Total PSD (dBm)	Limit
2402	37	1M Bit/s 37 Byte	0.059	2.87	2.934	8dBm/3kHz
2440	17		-0.441	2.87	2.434	
2480	39		-0.688	2.87	2.187	
2402	37	1M Bit/s 255 Byte	0.758	0.70	1.454	
2440	17		-0.117	0.70	0.579	
2480	39		0.218	0.70	0.914	
2404	0	2M Bit/s 37 Byte	-2.407	4.12	1.717	
2440	17		-2.383	4.12	1.741	
2478	36		-2.643	4.12	1.481	
2404	0	2M Bit/s 255 Byte	-2.178	1.18	-1.000	
2440	17		-2.732	1.18	-1.554	
2478	36		-2.268	1.18	-1.090	

[Dual Ant.2]

Frequency (MHz)	Channel No.	Mode	Test Result			
			Measured PSD (dBm)	Duty Cycle Factor(dB)	Total PSD (dBm)	Limit
2402	37	1M Bit/s 37 Byte	-3.834	2.87	-0.959	8dBm/3kHz
2440	17		-1.404	2.87	1.471	
2480	39		-1.648	2.87	1.227	
2402	37	1M Bit/s 255 Byte	-1.494	0.70	-0.798	
2440	17		-0.608	0.70	0.088	
2480	39		-0.938	0.70	-0.242	
2404	0	2M Bit/s 37 Byte	-4.990	4.12	-0.866	
2440	17		-2.957	4.12	1.167	
2478	36		-4.114	4.12	0.010	
2404	0	2M Bit/s 255 Byte	-4.662	1.18	-3.484	
2440	17		-3.584	1.18	-2.406	
2478	36		-3.101	1.18	-1.923	

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

Frequency (MHz)	Channel No.	Mode	Test Result			
			Dual Ant. 1 PSD (dBm)	Dual Ant. 2 PSD (dBm)	Dual (Ant.1 + Ant.2) PSD (dBm)	Limit
2402	37	1 MBit/s 37 Byte	2.934	-0.959	4.420	8 dBm / 3 kHz
2440	17		2.434	1.471	4.989	
2480	39		2.187	1.227	4.743	
2402	37	1 MBit/s 255 Byte	1.454	-0.798	3.482	
2440	17		0.579	0.088	3.350	
2480	39		0.914	-0.242	3.384	
2404	0	2 MBit/s 37 Byte	1.717	-0.866	3.625	
2440	17		1.741	1.167	4.474	
2478	36		1.481	0.010	3.818	
2404	0	2 MBit/s 255 Byte	-1.000	-3.484	0.944	
2440	17		-1.554	-2.406	1.051	
2478	36		-1.090	-1.923	1.524	

Note :

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

▣ Test Plots

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

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

9.5 BAND EDGE/ CONDUCTED SPURIOUS EMISSIONS

[BAND EDGE]

[Ant. 1]

Frequency (MHz)	Mode	Channel No.	Position	Test Result	
				Measured Level (dB)	Limit (dBc)
2402	1M Bit/s 37 Byte	37	Lower	55.475	30
2480		39	Upper	59.702	30
2402	1M Bit/s 255 Byte	37	Lower	55.834	30
2480		39	Upper	59.220	30
2404	2M Bit/s 37 Byte	0	Lower	60.416	30
2478		36	Upper	61.003	30
2404	2M Bit/s 255 Byte	0	Lower	60.928	30
2478		36	Upper	59.353	30
2402	125k Bit/s 37 Byte	37	Lower	57.094	30
2480		39	Upper	64.362	30
2402	125k Bit/s 255 Byte	37	Lower	57.276	30
2480		39	Upper	61.018	30
2402	500k Bit/s 37 Byte	37	Lower	57.484	30
2480		39	Upper	61.059	30
2402	500k Bit/s 255 Byte	37	Lower	56.499	30
2480		39	Upper	60.525	30

Note :

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

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

[Ant. 2]

Frequency (MHz)	Mode	Channel No.	Position	Test Result	
				Measured Level (dB)	Limit (dBc)
2402	1M Bit/s 37 Byte	37	Lower	55.090	30
2480		39	Upper	59.376	30
2402	1M Bit/s 255 Byte	37	Lower	54.277	30
2480		39	Upper	60.445	30
2404	2M Bit/s 37 Byte	0	Lower	59.833	30
2478		36	Upper	61.053	30
2404	2M Bit/s 255 Byte	0	Lower	62.264	30
2478		36	Upper	62.272	30
2402	125k Bit/s 37 Byte	37	Lower	57.021	30
2480		39	Upper	66.095	30
2402	125k Bit/s 255 Byte	37	Lower	55.906	30
2480		39	Upper	65.649	30
2402	500k Bit/s 37 Byte	37	Lower	56.075	30
2480		39	Upper	59.616	30
2402	500k Bit/s 255 Byte	37	Lower	56.238	30
2480		39	Upper	60.881	30

Note :

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

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

[Dual Ant. 1]

Frequency (MHz)	Mode	Channel No.	Position	Test Result	
				Measured Level (dB)	Limit (dBc)
2402	1M Bit/s 37 Byte	37	Lower	54.083	30
2480		39	Upper	59.769	30
2402	1M Bit/s 255 Byte	37	Lower	55.173	30
2480		39	Upper	59.488	30
2404	2M Bit/s 37 Byte	0	Lower	58.750	30
2478		36	Upper	59.640	30
2404	2M Bit/s 255 Byte	0	Lower	59.796	30
2478		36	Upper	59.443	30

Note :

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

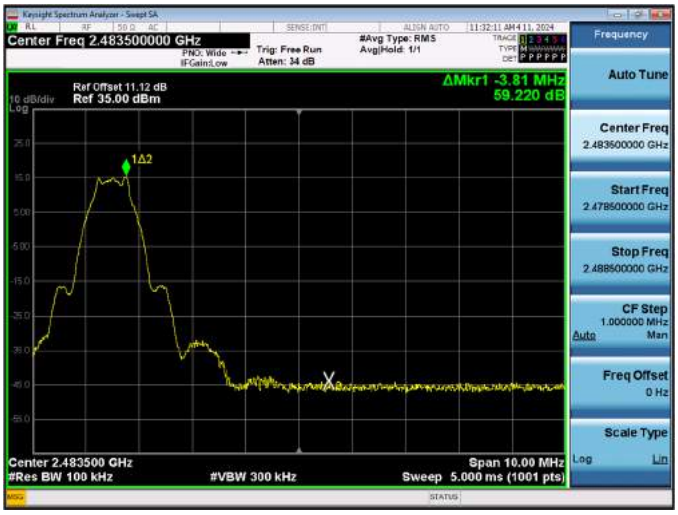
[Dual Ant. 2]

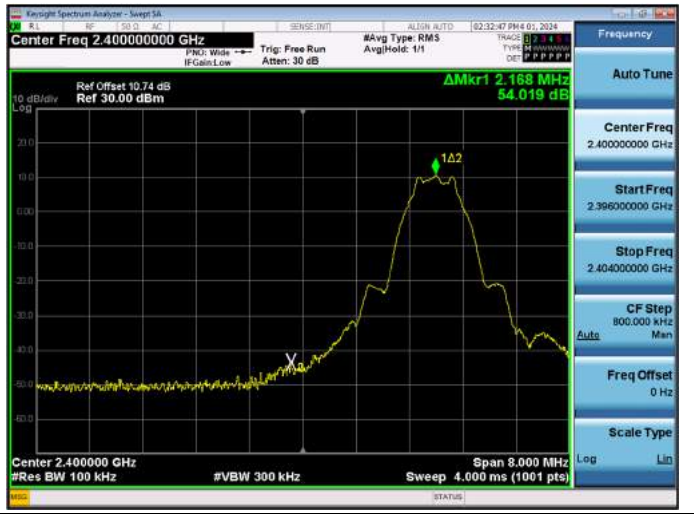
Frequency (MHz)	Mode	Channel No.	Position	Test Result	
				Measured Level (dB)	Limit (dBc)
2402	1M Bit/s 37 Byte	37	Lower	54.019	30
2480		39	Upper	59.395	30
2402	1M Bit/s 255 Byte	37	Lower	54.470	30
2480		39	Upper	58.677	30
2404	2M Bit/s 37 Byte	0	Lower	57.979	30
2478		36	Upper	60.235	30
2404	2M Bit/s 255 Byte	0	Lower	61.459	30
2478		36	Upper	63.687	30

Note :

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

▣ Test Plot(Band Edge)

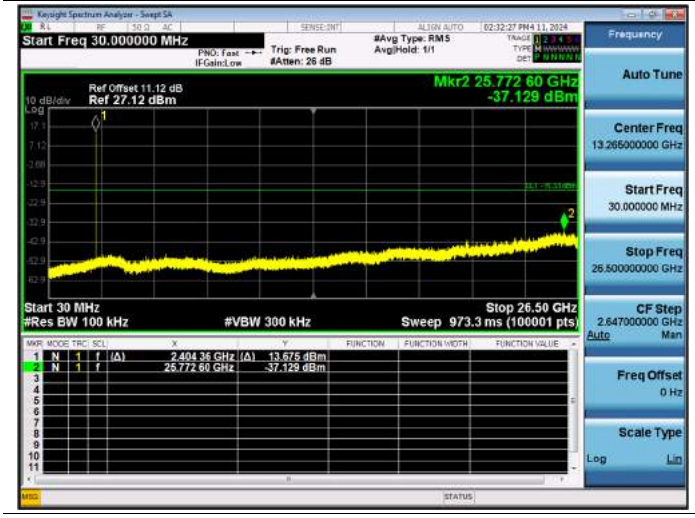
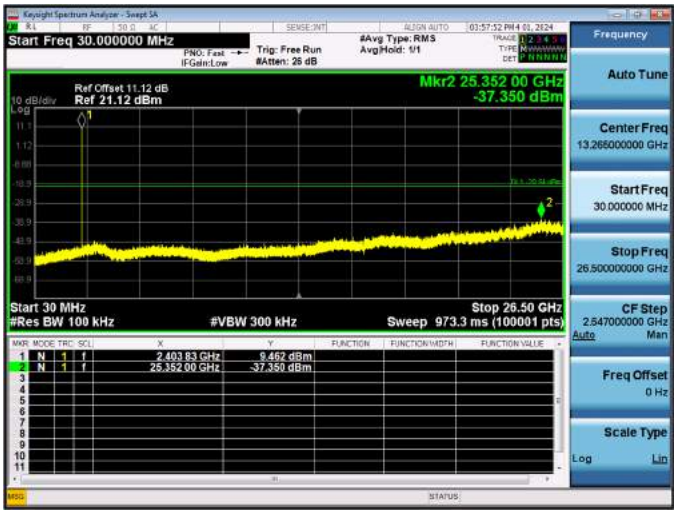
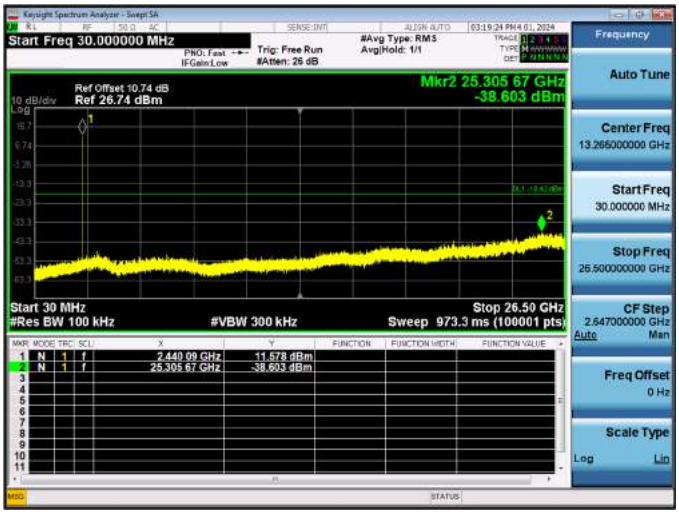
Ant. 1	Ant. 2
1M Bit/s (37 Byte) Low-CH 37	1M Bit/s (255 Byte) Low-CH 37
	
1M Bit/s (255 Byte) High-CH 39	1M Bit/s (37 Byte) High-CH 39
	

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

[CONDUCTED SPURIOUS EMISSIONS]

In order to simplify the report, attached plots were only the worst case channel and data rate.
- Worst case
  Ant. 1 : 2M Bit/s 37 Byte Ch. 0(2 404 MHz)
  Ant. 2 : 1M Bit/s 37 Byte Ch. 37(2 402 MHz)
  Dual Ant. 1 : 2M Bit/s 37 Byte Ch. 0(2 404 MHz)
  Dual Ant. 2 : 1M Bit/s 37 Byte Ch. 17(2 440 MHz)

▣ Test Plots(Conducted Spurious Emission (30 MHz – 26.5 GHz))

Ant. 1 Conducted Spurious Emission	Ant. 2 Conducted Spurious Emission
	
Dual BT Ant. 1 Conducted Spurious Emission	**Dual BT Ant. 2 Conducted Spurious Emission**
	

9.6 RADIATED SPURIOUS EMISSIONS

Frequency Range : 9 kHz – 30 MHz

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

Note:

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

Frequency Range : Below 1 GHz

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

Note:

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

Frequency Range : Above 1 GHz

[Ant.1]

Operation Mode	1 M Bit/s (37 Bytes)
Operating Frequency	2402 MHz
Channel No	CH 37

Frequency	Measured Value	AF+CL-AG	Pol.	Total	Limit	Margin	Measurement Type
[MHz]	[dBµV]	[dB/m]	[H/V]	[dBµV/m]	[dBµV/m]	[dB]	
4804	45.28	2.94	V	48.22	73.98	25.76	PK
4804	32.55	2.94	V	35.49	53.98	18.49	AV
7206	42.16	9.79	V	51.95	73.98	22.03	PK
7206	31.18	9.79	V	40.97	53.98	13.01	AV
4804	45.43	2.94	H	48.37	73.98	25.61	PK
4804	32.70	2.94	H	35.64	53.98	18.34	AV
7206	42.27	9.79	H	52.06	73.98	21.92	PK
7206	31.26	9.79	H	41.05	53.98	12.93	AV

Operation Mode	1 M Bit/s (37 Bytes)
Operating Frequency	2440 MHz
Channel No	CH 17

Frequency	Measured Value	AF+CL-AG	Pol.	Total	Limit	Margin	Measurement Type
[MHz]	[dBµV]	[dB/m]	[H/V]	[dBµV/m]	[dBµV/m]	[dB]	
4880	45.05	3.59	V	48.64	73.98	25.34	PK
4880	30.68	3.59	V	34.27	53.98	19.71	AV
7320	42.24	10.28	V	52.52	73.98	21.46	PK
7320	30.59	10.28	V	40.87	53.98	13.11	AV
4880	45.15	3.59	H	48.74	73.98	25.24	PK
4880	31.72	3.59	H	35.31	53.98	18.67	AV
7320	42.58	10.28	H	52.86	73.98	21.12	PK
7320	31.02	10.28	H	41.30	53.98	12.68	AV

Operation Mode	1 M Bit/s (37 Bytes)
Operating Frequency	2480 MHz
Channel No	CH 39

Frequency	Measured Value	AF+CL-AG	Pol.	Total	Limit	Margin	Measurement Type
[MHz]	[dBµV]	[dB/m]	[H/V]	[dBµV/m]	[dBµV/m]	[dB]	
4960	44.02	2.96	V	46.98	73.98	27.00	PK
4960	33.14	2.96	V	36.10	53.98	17.88	AV
7440	42.16	10.60	V	52.76	73.98	21.22	PK
7440	30.58	10.60	V	41.18	53.98	12.80	AV
4960	44.03	2.96	H	46.99	73.98	26.99	PK
4960	33.25	2.96	H	36.21	53.98	17.77	AV
7440	42.58	10.60	H	53.18	73.98	20.80	PK
7440	30.87	10.60	H	41.47	53.98	12.51	AV

Operation Mode	2 M Bit/s (37 Bytes)
Operating Frequency	2404 MHz
Channel No	CH 0

Frequency	Measured Value	AF+CL-AG	Pol.	Total	Limit	Margin	Measurement Type
[MHz]	[dBµV]	[dB/m]	[H/V]	[dBµV/m]	[dBµV/m]	[dB]	
4808	44.18	2.94	V	47.12	73.98	26.86	PK
4808	33.02	2.94	V	35.96	53.98	18.02	AV
7212	42.02	9.73	V	51.75	73.98	22.23	PK
7212	30.86	9.73	V	40.59	53.98	13.39	AV
4808	45.08	2.94	H	48.02	73.98	25.96	PK
4808	33.05	2.94	H	35.99	53.98	17.99	AV
7212	42.18	9.73	H	51.91	73.98	22.07	PK
7212	31.16	9.73	H	40.89	53.98	13.09	AV

Operation Mode	2 M Bit/s (37 Bytes)
Operating Frequency	2440 MHz
Channel No	CH 17

Frequency	Measured Value	AF+CL-AG	Pol.	Total	Limit	Margin	Measurement Type
[MHz]	[dBµV]	[dB/m]	[H/V]	[dBµV/m]	[dBµV/m]	[dB]	
4880	43.85	3.59	V	47.44	73.98	26.54	PK
4880	31.97	3.59	V	35.55	53.98	18.43	AV
7320	42.18	10.28	V	52.46	73.98	21.52	PK
7320	31.06	10.28	V	41.34	53.98	12.64	AV
4880	44.88	3.59	H	48.47	73.98	25.51	PK
4880	33.10	3.59	H	36.69	53.98	17.29	AV
7320	42.81	10.28	H	53.09	73.98	20.89	PK
7320	31.13	10.28	H	41.41	53.98	12.57	AV

Operation Mode	2 M Bit/s (37 Bytes)
Operating Frequency	2478 MHz
Channel No	CH 36

Frequency	Measured Value	AF+CL-AG	Pol.	Total	Limit	Margin	Measurement Type
[MHz]	[dBµV]	[dB/m]	[H/V]	[dBµV/m]	[dBµV/m]	[dB]	
4956	45.06	2.67	V	47.73	73.98	26.25	PK
4956	33.28	2.67	V	35.95	53.98	18.03	AV
7434	42.11	10.91	V	53.02	73.98	20.96	PK
7434	30.31	10.91	V	41.22	53.98	12.76	AV
4956	45.27	2.67	H	47.94	73.98	26.04	PK
4956	33.39	2.67	H	36.06	53.98	17.92	AV
7434	42.39	10.91	H	53.30	73.98	20.68	PK
7434	30.45	10.91	H	41.36	53.98	12.62	AV

[Ant.2]

Operation Mode	1 M Bit/s (37 Bytes)
Operating Frequency	2402 MHz
Channel No	CH 37

Frequency	Measured Value	AF+CL-AG	Pol.	Total	Limit	Margin	Measurement Type
[MHz]	[dBµV]	[dB/m]	[H/V]	[dBµV/m]	[dBµV/m]	[dB]	
4804	44.28	2.94	V	47.22	73.98	26.76	PK
4804	31.69	2.94	V	34.63	53.98	19.35	AV
7206	41.37	9.79	V	51.16	73.98	22.82	PK
7206	29.48	9.79	V	39.27	53.98	14.71	AV
4804	44.39	2.94	H	47.33	73.98	26.65	PK
4804	31.85	2.94	H	34.79	53.98	19.19	AV
7206	41.30	9.79	H	51.09	73.98	22.89	PK
7206	29.44	9.79	H	39.23	53.98	14.75	AV

Operation Mode	1 M Bit/s (37 Bytes)
Operating Frequency	2440 MHz
Channel No	CH 17

Frequency	Measured Value	AF+CL-AG	Pol.	Total	Limit	Margin	Measurement Type
[MHz]	[dBµV]	[dB/m]	[H/V]	[dBµV/m]	[dBµV/m]	[dB]	
4880	43.02	3.59	V	46.61	73.98	27.37	PK
4880	30.72	3.59	V	34.31	53.98	19.67	AV
7320	41.59	10.28	V	51.87	73.98	22.11	PK
7320	29.46	10.28	V	39.74	53.98	14.24	AV
4880	42.85	3.59	H	46.44	73.98	27.54	PK
4880	30.69	3.59	H	34.28	53.98	19.70	AV
7320	41.74	10.28	H	52.02	73.98	21.96	PK
7320	29.52	10.28	H	39.80	53.98	14.18	AV

Operation Mode	1 M Bit/s (37 Bytes)
Operating Frequency	2480 MHz
Channel No	CH 39

Frequency	Measured Value	AF+CL-AG	Pol.	Total	Limit	Margin	Measurement Type
[MHz]	[dBµV]	[dB/m]	[H/V]	[dBµV/m]	[dBµV/m]	[dB]	
4960	43.50	2.96	V	46.46	73.98	27.52	PK
4960	30.75	2.96	V	33.71	53.98	20.27	AV
7440	41.52	10.60	V	52.12	73.98	21.86	PK
7440	29.58	10.60	V	40.18	53.98	13.80	AV
4960	43.22	2.96	H	46.18	73.98	27.80	PK
4960	30.69	2.96	H	33.65	53.98	20.33	AV
7440	41.65	10.60	H	52.25	73.98	21.73	PK
7440	29.62	10.60	H	40.22	53.98	13.76	AV

Operation Mode	2 M Bit/s (37 Bytes)
Operating Frequency	2404 MHz
Channel No	CH 0

Frequency	Measured Value	AF+CL-AG	Pol.	Total	Limit	Margin	Measurement Type
[MHz]	[dBµV]	[dB/m]	[H/V]	[dBµV/m]	[dBµV/m]	[dB]	
4808	44.08	2.94	V	47.02	73.98	26.96	PK
4808	31.58	2.94	V	34.52	53.98	19.46	AV
7212	40.93	9.73	V	50.66	73.98	23.32	PK
7212	28.88	9.73	V	38.61	53.98	15.37	AV
4808	44.12	2.94	H	47.06	73.98	26.92	PK
4808	31.69	2.94	H	34.63	53.98	19.35	AV
7212	40.79	9.73	H	50.52	73.98	23.46	PK
7212	28.70	9.73	H	38.43	53.98	15.55	AV

Operation Mode	2 M Bit/s (37 Bytes)
Operating Frequency	2440 MHz
Channel No	CH 17

Frequency	Measured Value	AF+CL-AG	Pol.	Total	Limit	Margin	Measurement Type
[MHz]	[dBµV]	[dB/m]	[H/V]	[dBµV/m]	[dBµV/m]	[dB]	
4880	41.94	3.59	V	45.53	73.98	28.45	PK
4880	30.33	3.59	V	33.92	53.98	20.06	AV
7320	41.26	10.28	V	51.54	73.98	22.44	PK
7320	29.68	10.28	V	39.96	53.98	14.02	AV
4880	41.69	3.59	H	45.28	73.98	28.70	PK
4880	30.22	3.59	H	33.81	53.98	20.17	AV
7320	41.46	10.28	H	51.74	73.98	22.24	PK
7320	29.75	10.28	H	40.03	53.98	13.95	AV

Operation Mode	2 M Bit/s (37 Bytes)
Operating Frequency	2478 MHz
Channel No	CH 36

Frequency	Measured Value	AF+CL-AG	Pol.	Total	Limit	Margin	Measurement Type
[MHz]	[dBµV]	[dB/m]	[H/V]	[dBµV/m]	[dBµV/m]	[dB]	
4956	42.34	2.67	V	45.01	73.98	28.97	PK
4956	30.32	2.67	V	32.99	53.98	20.99	AV
7434	41.62	10.91	V	52.53	73.98	21.45	PK
7434	29.48	10.91	V	40.39	53.98	13.59	AV
4956	41.69	2.67	H	44.36	73.98	29.62	PK
4956	30.28	2.67	H	32.95	53.98	21.03	AV
7434	41.67	10.91	H	52.58	73.98	21.40	PK
7434	29.54	10.91	H	40.45	53.98	13.53	AV

[Dual Ant.1+ Ant.2]

Operation Mode	1 M Bit/s (37 Bytes)
Operating Frequency	2402 MHz
Channel No	CH 37

Frequency	Measured Value	AF+CL-AG	Pol.	Total	Limit	Margin	Measurement Type
[MHz]	[dBµV]	[dB/m]	[H/V]	[dBµV/m]	[dBµV/m]	[dB]	
4804	42.80	2.94	V	45.74	73.98	28.24	PK
4804	31.49	2.94	V	34.43	53.98	19.55	AV
7206	41.18	9.79	V	50.97	73.98	23.01	PK
7206	28.91	9.79	V	38.70	53.98	15.28	AV
4804	43.82	2.94	H	46.76	73.98	27.22	PK
4804	31.52	2.94	H	34.46	53.98	19.52	AV
7206	41.25	9.79	H	51.04	73.98	22.94	PK
7206	29.00	9.79	H	38.79	53.98	15.19	AV

Operation Mode	1 M Bit/s (37 Bytes)
Operating Frequency	2440 MHz
Channel No	CH 17

Frequency	Measured Value	AF+CL-AG	Pol.	Total	Limit	Margin	Measurement Type
[MHz]	[dBµV]	[dB/m]	[H/V]	[dBµV/m]	[dBµV/m]	[dB]	
4880	41.59	3.59	V	45.18	73.98	28.80	PK
4880	30.11	3.59	V	33.70	53.98	20.28	AV
7320	41.56	10.28	V	51.84	73.98	22.14	PK
7320	29.48	10.28	V	39.76	53.98	14.22	AV
4880	41.97	3.59	H	45.56	73.98	28.42	PK
4880	30.14	3.59	H	33.73	53.98	20.25	AV
7320	41.63	10.28	H	51.91	73.98	22.07	PK
7320	29.54	10.28	H	39.82	53.98	14.16	AV

Operation Mode	1 M Bit/s (37 Bytes)
Operating Frequency	2480 MHz
Channel No	CH 39

Frequency	Measured Value	AF+CL-AG	Pol.	Total	Limit	Margin	Measurement Type
[MHz]	[dBµV]	[dB/m]	[H/V]	[dBµV/m]	[dBµV/m]	[dB]	
4960	42.18	2.96	V	45.14	73.98	28.84	PK
4960	30.19	2.96	V	33.15	53.98	20.83	AV
7440	41.27	10.60	V	51.87	73.98	22.11	PK
7440	29.44	10.60	V	40.04	53.98	13.94	AV
4960	42.23	2.96	H	45.19	73.98	28.79	PK
4960	30.28	2.96	H	33.24	53.98	20.74	AV
7440	41.45	10.60	H	52.05	73.98	21.93	PK
7440	29.54	10.60	H	40.14	53.98	13.84	AV

Operation Mode	2 M Bit/s (37 Bytes)
Operating Frequency	2404 MHz
Channel No	CH 0

Frequency	Measured Value	AF+CL-AG	Pol.	Total	Limit	Margin	Measurement Type
[MHz]	[dBµV]	[dB/m]	[H/V]	[dBµV/m]	[dBµV/m]	[dB]	
4808	43.48	2.94	V	46.42	73.98	27.56	PK
4808	31.69	2.94	V	34.63	53.98	19.35	AV
7212	40.58	9.73	V	50.31	73.98	23.67	PK
7212	28.89	9.73	V	38.62	53.98	15.36	AV
4808	43.85	2.94	H	46.79	73.98	27.19	PK
4808	31.75	2.94	H	34.69	53.98	19.29	AV
7212	40.94	9.73	H	50.67	73.98	23.31	PK
7212	28.99	9.73	H	38.72	53.98	15.26	AV

Operation Mode	2 M Bit/s (37 Bytes)
Operating Frequency	2440 MHz
Channel No	CH 17

Frequency	Measured Value	AF+CL-AG	Pol.	Total	Limit	Margin	Measurement Type
[MHz]	[dBµV]	[dB/m]	[H/V]	[dBµV/m]	[dBµV/m]	[dB]	
4880	42.18	3.59	V	45.77	73.98	28.21	PK
4880	30.11	3.59	V	33.70	53.98	20.28	AV
7320	41.57	10.28	V	51.85	73.98	22.13	PK
7320	29.46	10.28	V	39.74	53.98	14.24	AV
4880	42.26	3.59	H	45.85	73.98	28.13	PK
4880	30.19	3.59	H	33.78	53.98	20.20	AV
7320	41.61	10.28	H	51.89	73.98	22.09	PK
7320	29.49	10.28	H	39.77	53.98	14.21	AV

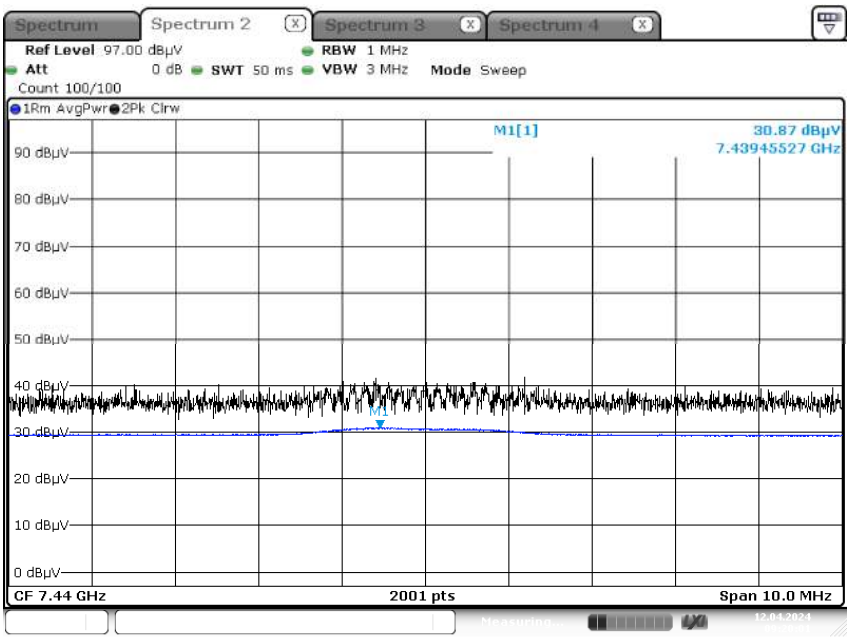
Operation Mode	2 M Bit/s (37 Bytes)
Operating Frequency	2478 MHz
Channel No	CH 36

Frequency	Measured Value	AF+CL-AG	Pol.	Total	Limit	Margin	Measurement Type
[MHz]	[dBµV]	[dB/m]	[H/V]	[dBµV/m]	[dBµV/m]	[dB]	
4956	42.69	2.67	V	45.36	73.98	28.62	PK
4956	30.08	2.67	V	32.75	53.98	21.23	AV
7434	41.08	10.91	V	51.99	73.98	21.99	PK
7434	29.34	10.91	V	40.25	53.98	13.73	AV
4956	42.76	2.67	H	45.43	73.98	28.55	PK
4956	30.11	2.67	H	32.78	53.98	21.20	AV
7434	41.12	10.91	H	52.03	73.98	21.95	PK
7434	29.46	10.91	H	40.37	53.98	13.61	AV

[Ant.1]

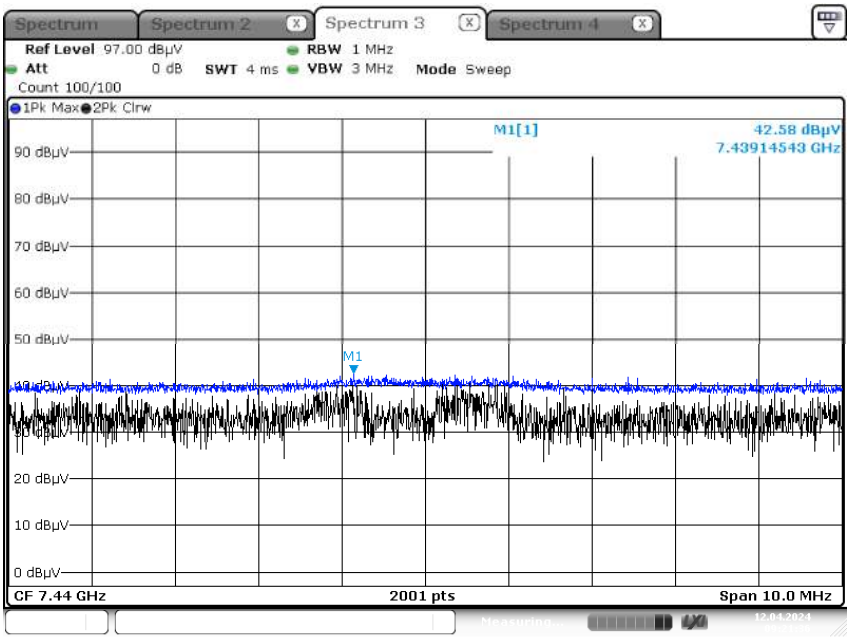
▣ 1 M Bit/s 37 Bytes Test Plots (Worst case : Y-H)

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



Date: 12.APR.2024 09:20:01

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



Date: 12.APR.2024 09:21:36

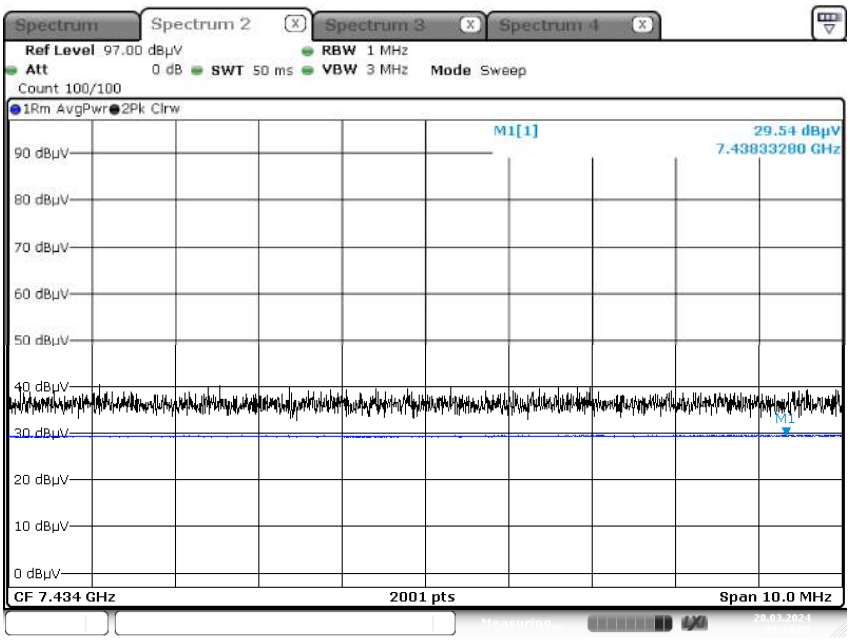
Note:

Plots of worst case are only reported.

[Ant.2]

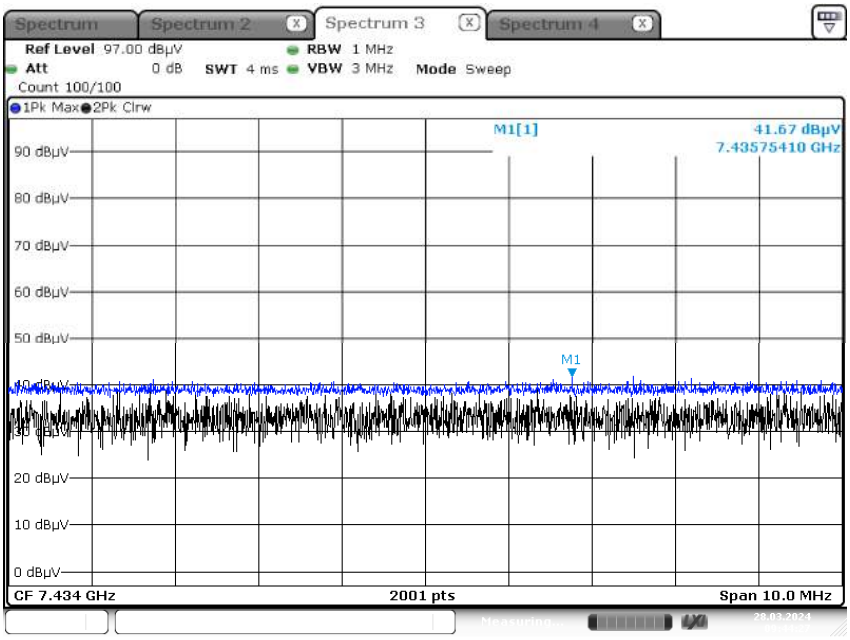
▣ 2 M Bit/s 37 Bytes Test Plots (Worst case : Y-H)

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



Date: 28.MAR.2024 09:44:05

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



Date: 28.MAR.2024 09:44:27

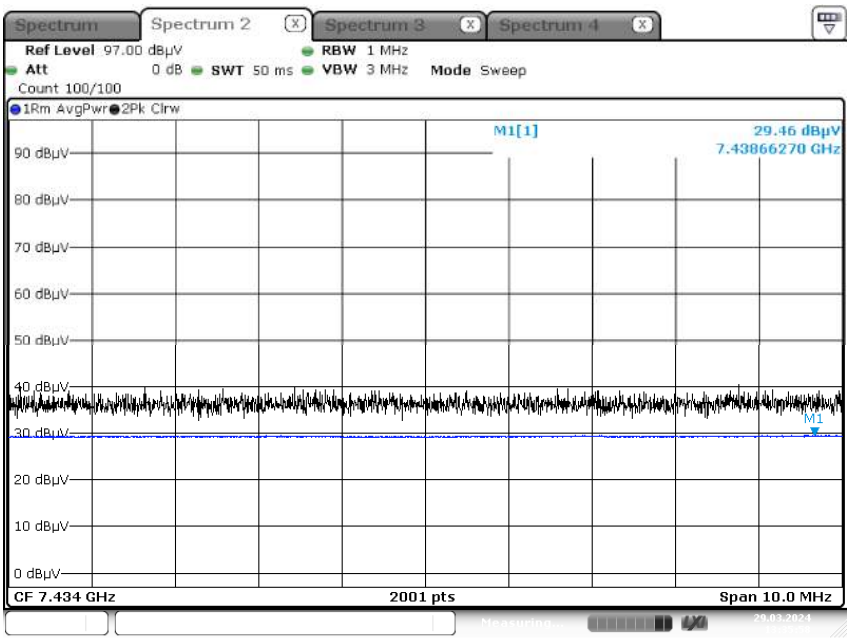
Note:

Plots of worst case are only reported.

[Dual Ant.1+ Ant.2]

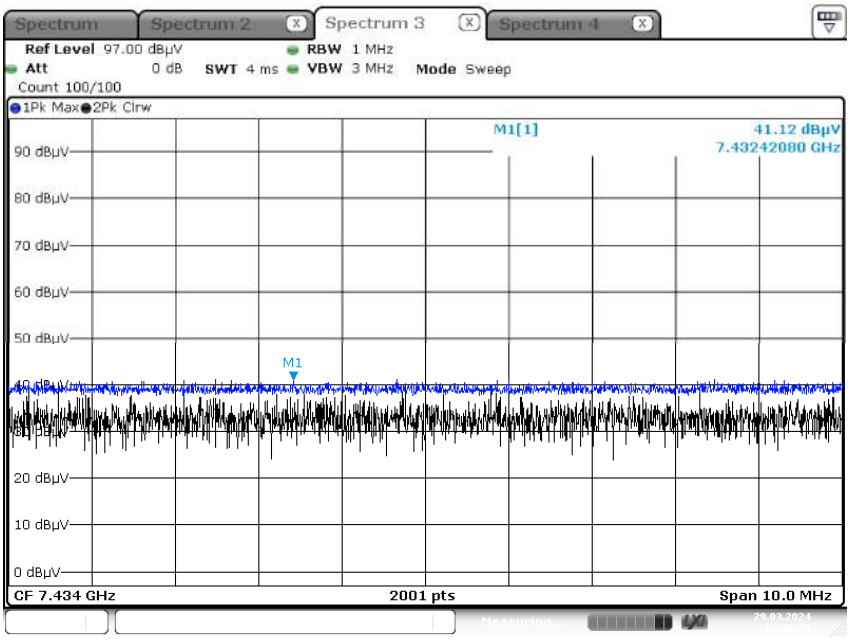
▣ 2 M Bit/s 37 Bytes Test Plots (Worst case : X-H)

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



Date: 29.MAR.2024 13:35:59

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



Date: 29.MAR.2024 13:36:24

Note:

Plots of worst case are only reported.

9.7 RADIATED RESTRICTED BAND EDGES

[Ant.1]

Operation Mode	1 M Bit/s (37 Bytes)
Operating Frequency	2402 MHz, 2480 MHz
Channel No.	37 CH, 39 CH

Frequency	Measured Value	Ant. Pol.	Total	Limit	Margin	Measurement Type
[MHz]	[dBµV]	[H/V]	[dBµV/m]	[dBµV/m]	[dB]	
2390.0	55.04	H	55.04	73.98	18.94	PK
2390.0	43.23	H	43.23	53.98	10.75	AV
2390.0	54.85	V	54.85	73.98	19.13	PK
2390.0	43.16	V	43.16	53.98	10.82	AV
2483.5	63.82	H	63.82	73.98	10.16	PK
2483.5	44.11	H	44.11	53.98	9.87	AV
2483.5	61.57	V	61.57	73.98	12.41	PK
2483.5	43.68	V	43.68	53.98	10.30	AV

Operation Mode	2 M Bit/s (37 Bytes)
Operating Frequency	2404 MHz, 2478 MHz
Channel No.	0 CH, 36 CH

Frequency	Measured Value	Ant. Pol.	Total	Limit	Margin	Measurement Type
[MHz]	[dBµV]	[H/V]	[dBµV/m]	[dBµV/m]	[dB]	
2390.0	55.32	H	55.32	73.98	18.66	PK
2390.0	43.20	H	43.20	53.98	10.78	AV
2390.0	55.18	V	55.18	73.98	18.80	PK
2390.0	43.18	V	43.18	53.98	10.80	AV
2483.5	58.90	H	58.90	73.98	15.08	PK
2483.5	43.18	H	43.18	53.98	10.80	AV
2483.5	58.16	V	58.16	73.98	15.82	PK
2483.5	43.09	V	43.09	53.98	10.89	AV

[Ant.2]

Operation Mode	1 M Bit/s (37 Bytes)
Operating Frequency	2402 MHz, 2480 MHz
Channel No.	37 CH, 39 CH

Frequency	Measured Value	Ant. Pol.	Total	Limit	Margin	Measurement Type
[MHz]	[dBµV]	[H/V]	[dBµV/m]	[dBµV/m]	[dB]	
2390.0	55.18	H	55.18	73.98	18.80	PK
2390.0	42.62	H	42.62	53.98	11.36	AV
2390.0	55.53	V	55.53	73.98	18.45	PK
2390.0	43.19	V	43.19	53.98	10.79	AV
2483.5	56.95	H	56.95	73.98	17.03	PK
2483.5	42.19	H	42.19	53.98	11.79	AV
2483.5	57.63	V	57.63	73.98	16.35	PK
2483.5	42.76	V	42.76	53.98	11.22	AV

Operation Mode	2 M Bit/s (37 Bytes)
Operating Frequency	2404 MHz, 2478 MHz
Channel No.	0 CH, 36 CH

Frequency	Measured Value	Ant. Pol.	Total	Limit	Margin	Measurement Type
[MHz]	[dBµV]	[H/V]	[dBµV/m]	[dBµV/m]	[dB]	
2390.0	55.06	H	55.06	73.98	18.92	PK
2390.0	43.11	H	43.11	53.98	10.87	AV
2390.0	55.14	V	55.14	73.98	18.84	PK
2390.0	43.25	V	43.25	53.98	10.73	AV
2483.5	55.18	H	55.18	73.98	18.80	PK
2483.5	42.46	H	42.46	53.98	11.52	AV
2483.5	55.26	V	55.26	73.98	18.72	PK
2483.5	42.68	V	42.68	53.98	11.30	AV

[Dual Ant.1+ Ant.2]

Operation Mode	1 M Bit/s (37 Bytes)
Operating Frequency	2402 MHz, 2480 MHz
Channel No.	37 CH, 39 CH

Frequency	Measured Value	Ant. Pol.	Total	Limit	Margin	Measurement Type
[MHz]	[dBµV]	[H/V]	[dBµV/m]	[dBµV/m]	[dB]	
2390.0	55.19	H	55.19	73.98	18.79	PK
2390.0	43.18	H	43.18	53.98	10.80	AV
2390.0	55.08	V	55.08	73.98	18.90	PK
2390.0	43.11	V	43.11	53.98	10.87	AV
2483.5	55.16	H	55.16	73.98	18.82	PK
2483.5	42.68	H	42.68	53.98	11.30	AV
2483.5	55.03	V	55.03	73.98	18.95	PK
2483.5	42.59	V	42.59	53.98	11.39	AV

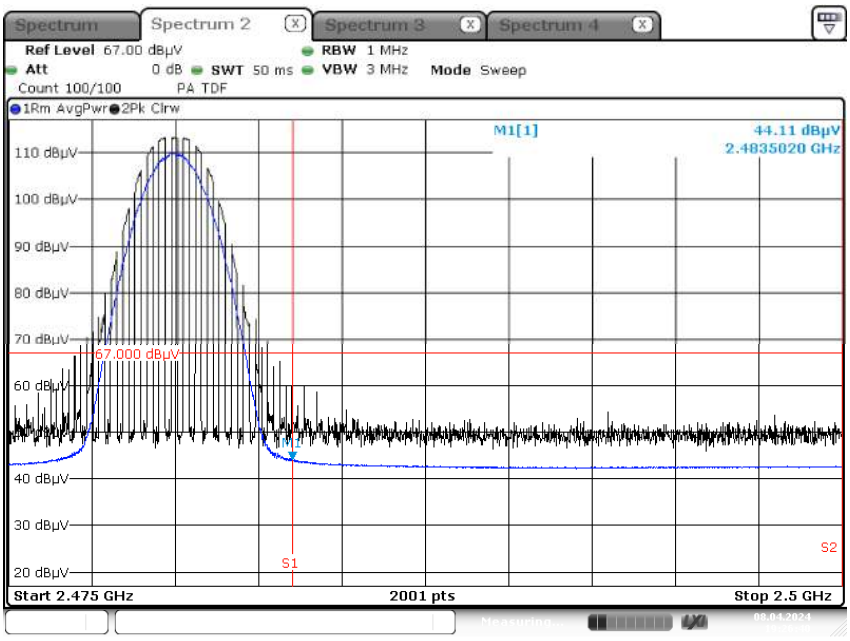
Operation Mode	2 M Bit/s (37 Bytes)
Operating Frequency	2404 MHz, 2478 MHz
Channel No.	0 CH, 36 CH

Frequency	Measured Value	Ant. Pol.	Total	Limit	Margin	Measurement Type
[MHz]	[dBµV]	[H/V]	[dBµV/m]	[dBµV/m]	[dB]	
2390.0	55.19	H	55.19	73.98	18.79	PK
2390.0	43.24	H	43.24	53.98	10.74	AV
2390.0	55.10	V	55.10	73.98	18.88	PK
2390.0	43.18	V	43.18	53.98	10.80	AV
2483.5	54.83	H	54.83	73.98	19.15	PK
2483.5	42.66	H	42.66	53.98	11.32	AV
2483.5	54.80	V	54.80	73.98	19.18	PK
2483.5	42.58	V	42.58	53.98	11.40	AV

[Ant.1]

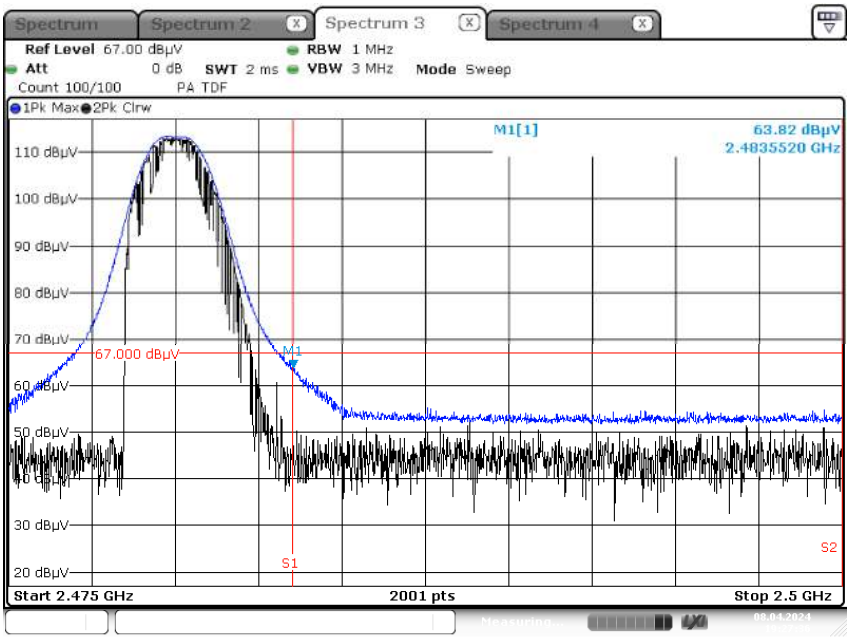
▣ Mode : 1 M Bit/s (37 Bytes) Test Plots

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



Date: 8.APR.2024 19:26:40

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



Date: 8.APR.2024 19:27:36

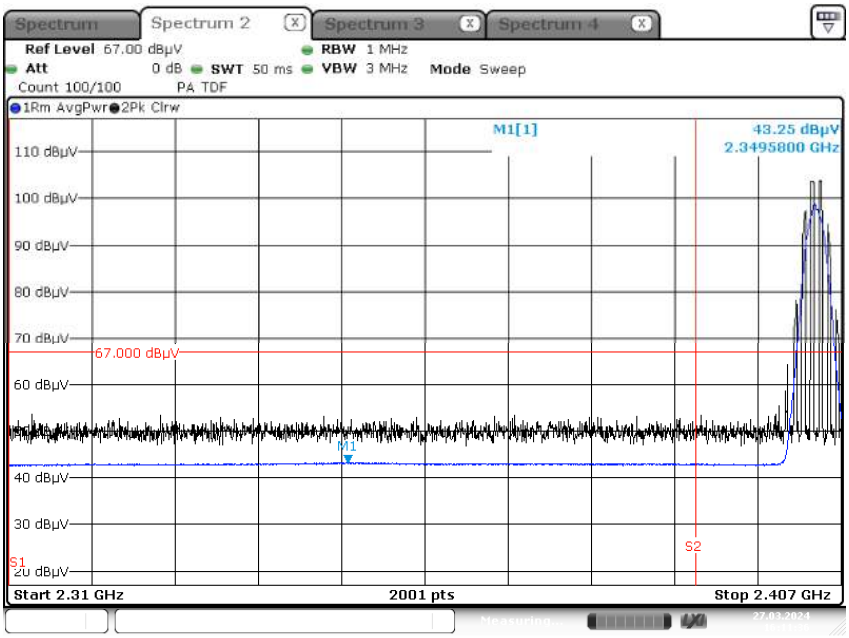
Note:

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

[Ant.2]

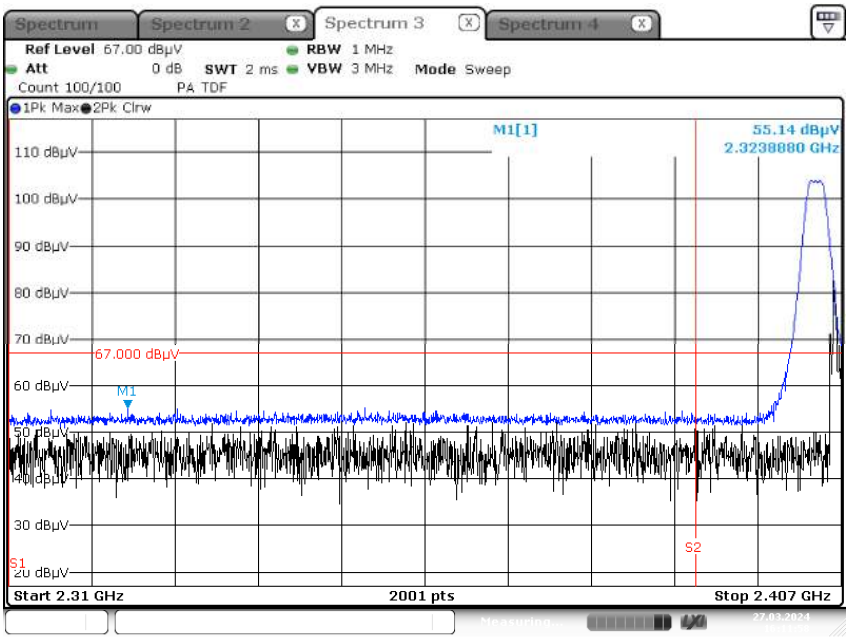
▣ Mode : 2 M Bit/s (37 Bytes) Test Plots

Radiated Restricted Band Edges plot – Average Result (Ch.0, Z-V)



Date: 27.MAR.2024 16:11:36

Radiated Restricted Band Edges plot – Peak Result (Ch.0, Z-V)



Date: 27.MAR.2024 16:11:58

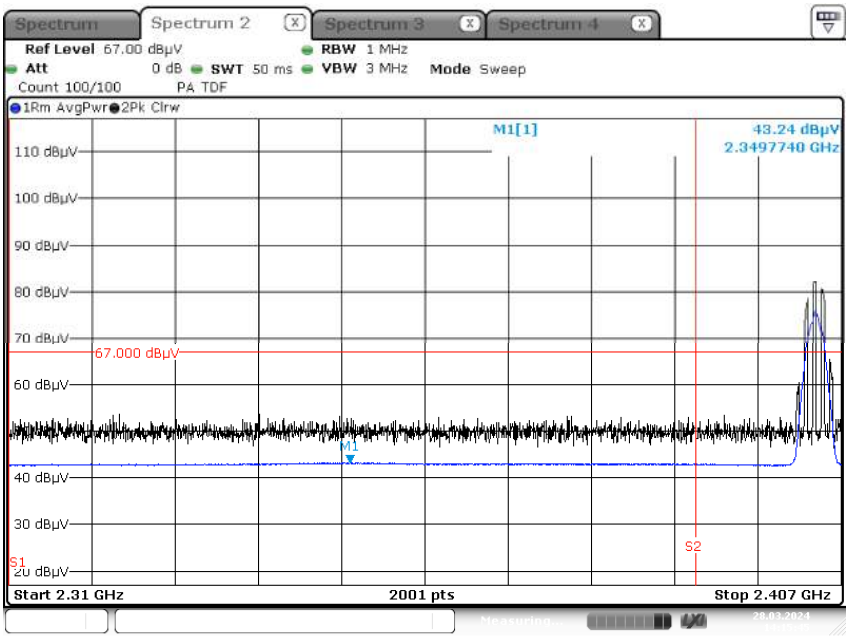
Note:

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

[Dual Ant.1+ Ant.2]

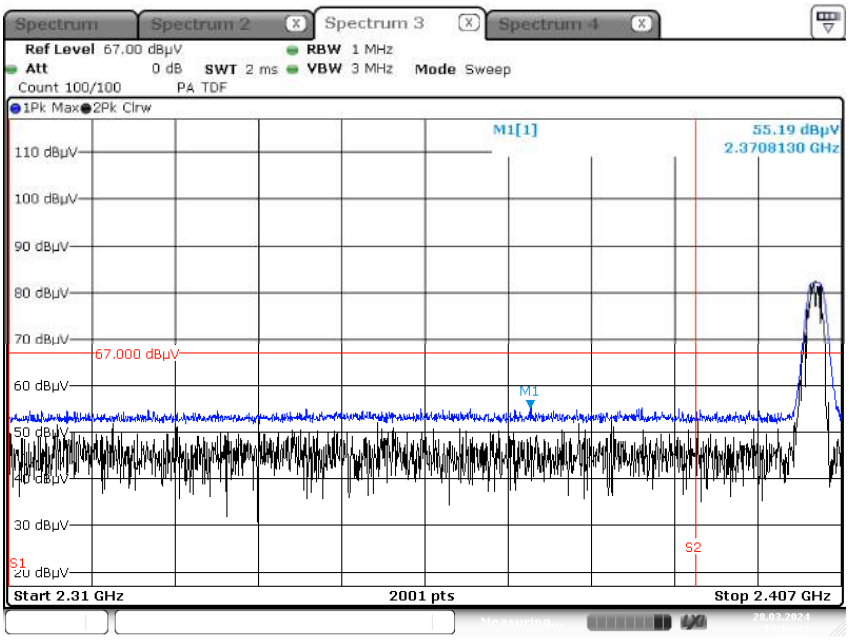
▣ Mode : 2 M Bit/s (37 Bytes) Test Plots

Radiated Restricted Band Edges plot – Average Result (Ch.0, X-H)



Date: 28.MAR.2024 14:15:45

Radiated Restricted Band Edges plot – Peak Result (Ch.0, X-H)



Date: 28.MAR.2024 14:16:22

Note:

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

9.8 POWERLINE CONDUCTED EMISSIONS

Conducted Emissions

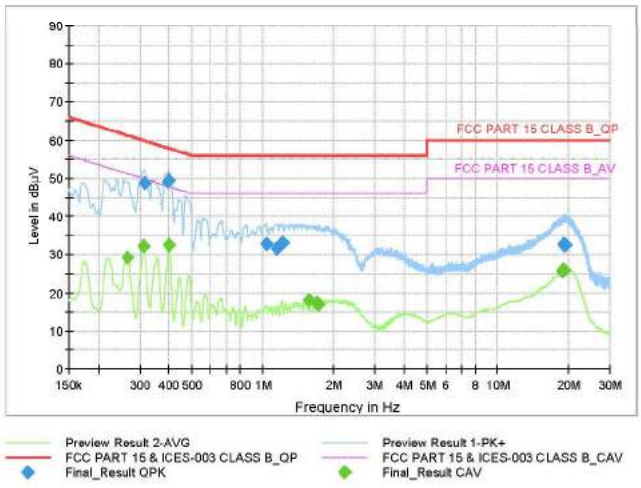
Test 1 / 2

Test Report

Common Information

EUT : SM-F741U
Operating Conditions : BLE Mode
Comment :

Full Spectrum



Final_Result_QPK

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.3143	48.74	59.86	11.11	9.000	N	9.6
0.3953	48.94	57.95	9.02	9.000	N	9.6
0.3998	49.45	57.86	8.40	9.000	N	9.6
1.0333	32.69	56.00	23.31	9.000	N	9.7
1.1548	31.72	56.00	24.28	9.000	N	9.7
1.2133	33.07	56.00	22.93	9.000	N	9.7
19.1413	32.70	60.00	27.30	9.000	L1	10.4
19.1818	32.45	60.00	27.55	9.000	L1	10.4
19.3550	32.57	60.00	27.43	9.000	L1	10.4

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Final_Result_CAV

Frequency (MHz)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.2648	29.22	51.28	22.06	9.000	L1	9.6
0.3120	32.15	49.92	17.77	9.000	N	9.6
0.3998	32.66	47.86	15.20	9.000	L1	9.6
1.5710	17.96	46.00	28.04	9.000	L1	9.7
1.7038	17.32	46.00	28.68	9.000	L1	9.7
1.7308	16.96	46.00	29.04	9.000	L1	9.7
18.8780	25.65	50.00	24.35	9.000	L1	10.4
19.0085	25.84	50.00	24.16	9.000	L1	10.4
19.1413	25.95	50.00	24.05	9.000	L1	10.4

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10. LIST OF TEST EQUIPMENT

Conducted Test

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
LISN	ENV216	Rohde & Schwarz	102245	08/02/2024	Annual
EMI Test Receiver	ESR	Rohde & Schwarz	101910	05/26/2024	Annual
Temperature Chamber	SU-642	ESPEC	93008124	02/19/2025	Annual
Signal Analyzer	N9030A	Keysight	MY55410508	09/04/2024	Annual
Power Meter	N1911A	Agilent	MY45100523	02/28/2025	Annual
Power Sensor	N1921A	Agilent	MY57820067	02/22/2025	Annual
Directional Coupler	87300B	Agilent	3116A03621	10/30/2024	Annual
Power Splitter	11667B	Hewlett Packard	10545	02/06/2025	Annual
DC Power Supply	E3632A	Agilent	KR75305528	01/02/2025	Annual
Attenuator(10 dB)(DC-26.5 GHz)	8493C-010	Agilent	08285	06/02/2024	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	100808	02/15/2025	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(Antenna mast)	CO3000	Innco system	CO3000-4p	N/A	N/A
Antenna Position Tower	MA4640/800-XP-EP	Innco system	S3AM	08/03/2025	Biennial
Controller	EM2090	Emco	060520	N/A	N/A
Turn Table	N/A	Ets	N/A	N/A	N/A
Loop Antenna	FMZB 1513	Rohde & Schwarz	1513-333	03/07/2026	Biennial
Hybrid Antenna	VULB 9168	Schwarzbeck	9168-0895	08/16/2024	Biennial
Horn Antenna	BBHA 9120D	Schwarzbeck	9120D-1191	11/07/2025	Biennial
Horn Antenna(15 GHz ~ 40 GHz)	BBHA9170	Schwarzbeck	BBHA9170124	03/28/2025	Biennial
Amp & Filter Bank Switch Controller	FBSM-01A	TNM system	0	N/A	N/A
Band Reject Filter	WRCJV2400/2483.5-2370/2520-60/12SS	Wainwright Instruments	2	01/02/2025	Annual
Band Reject Filter	WRCJV12-4900-5100-5900-6100-50SS	Wainwright Instruments	5	06/12/2024	Annual
Band Reject Filter	WRCJV12-4900-5100-5900-6100-50SS	Wainwright Instruments	6	06/12/2024	Annual
Band Reject Filter	WRCJV5100/5850-40/50-8EEK	Wainwright Instruments	1	02/14/2025	Annual
RF Switching System	FBSR-03A (3G HPF+LNA)	T&M SYSTEM	S3L1	11/17/2024	Annual
RF Switching System	FBSR-03A (10dB ATT+LNA)	T&M SYSTEM	S3L2	11/17/2024	Annual
RF Switching System	FBSR-03A (7G HPF+LNA)	T&M SYSTEM	S3L3	11/17/2024	Annual
RF Switching System	FBSR-03A (3dB ATT+LNA)	T&M SYSTEM	S3L4	11/17/2024	Annual
Power Amplifier	CBL18265035	CERNEX	22966	11/17/2024	Annual
Power Amplifier	CBL26405040	CERNEX	25956	02/26/2025	Annual
Bluetooth Tester	TC-3000C	TESCOM	3000C000175	03/19/2025	Annual
Spectrum Analyzer	FSV40 (9 kHz ~ 40 GHz)	Rohde & Schwarz	100900	12/06/2024	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-2405-FC044-P