TEST REPORT

FCC BT Test for LGSWNAX61
Certification

APPLICANT
LG Electronics Inc.

REPORT NO.
HCT-RF-2509-FC002

DATE OF ISSUE
September 3, 2025

Tested by
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Accredited by KOLAS, Republic of KOREA

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Applicant	LG Electronics Inc. 222, LG-ro, Jinwi-myeon, Pyeongtaek-si, Gyeonggi-do 17709, Republic of Korea
Product Name Model Name	RF Module LGSWNAX61
FCC ID	2BO3LLGSWNAX61
Date of Test	July 21, 2025 ~ August 29, 2025
Test Results	PASS
FCC Classification	FCC Part 15 Spread Spectrum Transmitter
Test Standard Used	FCC Rule Part(s): 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)
Brand	LG

REVISION HISTORY

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

Revision No.	Date of Issue	Description
0	September 03, 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 This test report provides test result(s) under the scope accredited by the Korea Laboratory Accreditation Scheme (KOLAS), which signed the ILAC-MRA. (KOLAS (KS Q ISO/IEC 17025) Accreditation No. KT197)

CONTENTS

1. EUT DESCRIPTION 5
ANTENNA CONFIGURATIONS 6
2. Requirements for Bluetooth transmitter(15.247) 7
3. TEST METHODOLOGY 7
EUT CONFIGURATION 7
EUT EXERCISE 8
GENERAL TEST PROCEDURES 8
DESCRIPTION OF TEST MODES 8
4. INSTRUMENT CALIBRATION 9
5. FACILITIES AND ACCREDITATIONS 9
FACILITIES 9
EQUIPMENT 9
6. ANTENNA REQUIREMENTS 10
7. MEASUREMENT UNCERTAINTY 11
8. DESCRIPTION OF TESTS 12
9. SUMMARY OF TEST RESULTS 30
10. TEST RESULT 31
10.1 PEAK POWER 31
10.2 BAND EDGES 33
10.3 FREQUENCY SEPARATION / 20dB & 99% OCCUPIED BANDWIDTH 35
10.4 NUMBER OF HOPPING FREQUENCY 38
10.5 TIME OF OCCUPANCY (DWELL TIME) 39
10.6 SPURIOUS EMISSIONS 41
10.6.1 CONDUCTED SPURIOUS EMISSIONS 41
10.6.2 RADIATED SPURIOUS EMISSIONS 42
10.6.3 RADIATED RESTRICTED BAND EDGES 47
10.7 POWERLINE CONDUCTED EMISSIONS 49
11. LIST OF TEST EQUIPMENT 50
12. ANNEX A_ TEST SETUP PHOTO 52

1. EUT DESCRIPTION

Model	LGSWNAX61
Additional Model	-
EUT Type	RF Module
Power Supply	DC 3.30 V
Frequency Range	2 402 MHz - 2 480 MHz
Max. RF Output Power	12.833 dBm (19.20 mW)
BT Operating Mode	Normal, EDR, AFH
Modulation Type	GFSK(Normal), π/4DQPSK and 8DPSK(EDR)
Modulation Technique	FHSS
Number of Channels	79 Channels, Minimum 20 Channels(AFH)
Antenna Specification	Type: Metal Press Peak Gain: -2.73 dBi
Serial number	Conducted : 6C15DB1726F0 Radiated : 0827A8A35ED2

ANTENNA CONFIGURATIONS

1. Below Tables are the possible configurations.

Configurations	SISO		Dual BT
	Ant1	Ant2	Ant1 & Ant2
Bluetooth	O	X	X

Note:

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

2.This device supports simultaneous transmission operation, which allows for two channels to operate independent of one another in the 2.4 GHz and 5 GHz or 6GHz Bands simultaneously on each antenna.

Simultaneous transmission Scenario	2.4 GHz WiFi Ant.1	2.4 GHz WiFi Ant.2	5 GHz WiFi Ant.1	5 GHz WiFi Ant.2	6 GHz WiFi Ant.1	6 GHz WiFi Ant.2	Bluetooth	Test Case
Bluetooth + 2.4 GHz WiFi MIMO	on	on	-	-	-	-	on	
Bluetooth + 5 GHz WiFi MIMO	-	-	on	on	-	-	on	Scenario 1
Bluetooth + 6 GHz WiFi MIMO	-	-			on	on	on	
2.4 GHz WiFi SISO + 5 GHz WiFi SISO	-	on	on	-	-	-	-	
2.4 GHz WiFi SISO + 6 GHz WiFi SISO	-	on	-	-	on	-	-	
Bluetooth + 2.4 GHz WiFi SISO + 6 GHz WiFi SISO	-	on	-	-	on	-	on	
Bluetooth + 2.4 GHz WiFi SISO + 5 GHz WiFi SISO	-	on	on	-	-	-	on	Scenario 2

2. Requirements for Bluetooth transmitter(15.247)

This Bluetooth module has been tested by a Bluetooth Qualification Lab, and we confirm the following:

1) This system is hopping pseudo-randomly.
2) Each frequency is used equally on the average by each transmitter.
3) The receiver input bandwidths that match the hopping channel bandwidths of their corresponding transmitters
4) The receiver shifts frequencies in synchronization with the transmitted signals.
    - 15.247(g): The system, consisting of both the transmitter and the receiver, must be designed to comply with all of the regulations in this Section 15.247 should the transmitter be presented with a continuous data (or information) stream.
    - 15.247(h): The coordination of frequency hopping systems in any other manner for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters is not permitted.

3. TEST METHODOLOGY

The measurement procedure described in the American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices(ANSI C63.10-2020, KDB 558074) is used in the measurement of the test device.

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 : 2020) 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

According to the requirements in Section 6.3 ~ Section 6.6 of ANSI C63.10. (Version: 2020),
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. To record the final measurements, the analyzer detector function was set to CISPR quasi-peak mode and the bandwidth of the spectrum analyzer was set to 120 kHz for frequencies below 1 GHz or 1 MHz for frequencies above 1 GHz. For average measurements above 1 GHz, the analyzer was set to peak detector and add the DCCF calculations.

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.

4. 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).

5. 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."

6. 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

7. MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2020.

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 (±kHz)
X dB, 99% Bandwidth	95 (Confidence level about 95 %, *k=2*)
Frequency stability	28 (Confidence level about 95 %, *k=2*)
Carrier Frequency Separation Number of Hopping Frequencies Time of Occupancy	49 (Confidence level about 95 %, *k=2*)

Parameter	Expanded Uncertainty (±dB)
Conducted Disturbance (150 kHz ~ 30 MHz)	1.54 (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)
Conducted Spurious 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)	5.68 (Confidence level about 95 %, *k*=2)
Radiated Disturbance (1 GHz ~ 18 GHz)	5.75 (Confidence level about 95 %, *k*=2)
Radiated Disturbance (18 GHz ~ 40 GHz)	5.82 (Confidence level about 95 %, *k*=2)

8. DESCRIPTION OF TESTS

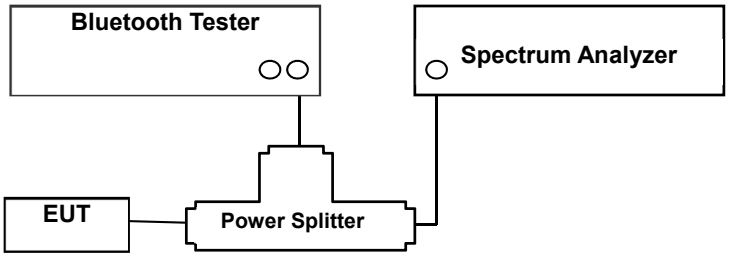
8.1. Conducted Maximum Peak Output Power

Limit

The maximum peak output power of the intentional radiator shall not exceed the following:

1. For frequency hopping systems operating in the 2400–2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725–5850 MHz band: 1 W. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 W.
2. The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi.

Test Configuration



Test Procedure

Test Standard Used : Section 7.8.5 in ANSI C63.10-2020

The EUT was tested with hopping disabled.

The transmitter output is connected to the Spectrum Analyzer.
The Spectrum Analyzer is set to

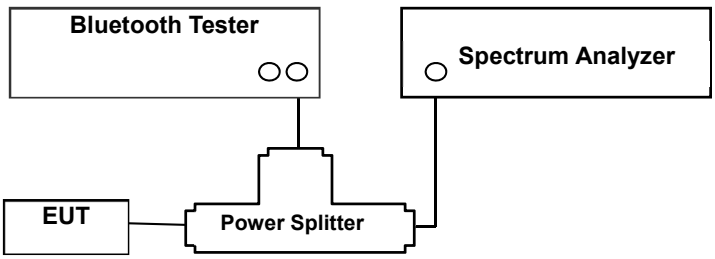
1) Span: approximately 5 times the 20 dB bandwidth, centered on a hopping channel
2) RBW > the 20 dB bandwidth of the emission being measured
3) VBW ≥ RBW
4) Sweep = No faster than coupled (auto) time
5) Detector = Peak
6) Trace = Max hold
7) Allow trace to stabilize.
8) Use the marker-to-peak function to set the marker to the peak of the emission.

8.2. Conducted Band Edge(Out of Band Emissions)

Limit

According to § 15.247(d), in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

Test Configuration



Test Procedure

Test Standard Used : Section 7.8.7 in ANSI C63.10-2020

The EUT was tested with hopping enabled and hopping disabled.

The transmitter output is connected to the Spectrum Analyzer.
The Spectrum Analyzer is set to

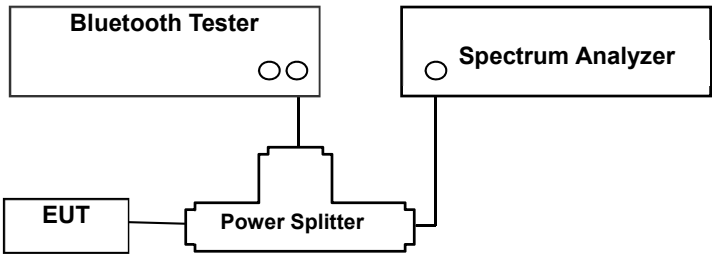
1) Span: Wide enough to capture the peak level of the emission operating on the channel closest to the band edge, as well as any modulation products which fall outside of the authorized band of operation
2) Reference level: As required to keep the signal from exceeding the maximum instrument input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than [10 log (OBW/RBW)] below the reference level.
3) Attenuation: Auto (at least 10 dB preferred).
4) Sweep time: No faster than coupled (auto) time.
5) RBW: 100 kHz
6) VBW: 300 kHz
7) Detector: Peak
8) Trace: Max hold

8.3. Frequency Separation & 20 dB Bandwidth & 99% Occupied Bandwidth

Limit

According to § 15.247(a)(1), Frequency hopping systems operating in the 2400–2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater.

Test Configuration



Test Procedure(Frequency Separation)

Test Standard Used : Section 7.8.2 in ANSI C63.10-2020

The EUT was tested with hopping enabled.

The transmitter output is connected to the Spectrum Analyzer.
The Spectrum Analyzer is set to

1) Span: Wide enough to capture the peaks of two adjacent channels
2) RBW: Start with the RBW set to approximately 30 % of the channel spacing; adjust as necessary to best identify the center of each individual channel.
3) VBW ≥ RBW
4) Sweep: No faster than coupled (auto) time
5) Detector: Peak
6) Trace: Max hold
7) All the trace to stabilize
8) Use the marker-delta function to determine the separation between the peaks of the adjacent channels. Compliance of an EUT with the appropriate regulatory limit shall be determined. A plot of the data shall be included in the test report.

Test Procedure (20 dB Bandwidth)

Test Standard Used : Section 6.9.2 in ANSI C63.10-2020

The EUT was tested with hopping disabled.

The transmitter output is connected to the Spectrum Analyzer.
The Spectrum Analyzer is set to

1) Span: Set between two times and five times the OBW
2) RBW: 1 % to 5 % of the OBW.
3) VBW ≥ 3 x RBW
4) Sweep: Auto
5) Detector: Peak
6) Trace: Max hold
7) All the trace to stabilize
8) We tested 20 dB bandwidth using the automatic bandwidth measurement capability of a spectrum analyzer. X dB is set to 20 dB.

Test Procedure (99% Occupied Bandwidth)

Test Standard Used : Section 6.9.3 in ANSI C63.10-2020

The EUT was tested with hopping disabled.

The transmitter output is connected to the Spectrum Analyzer.
The Spectrum Analyzer is set to

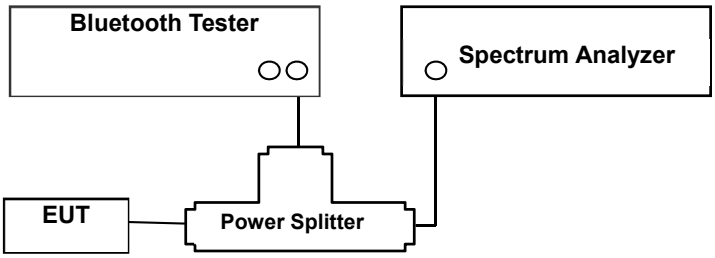
1) Span: Set between 1.5 times and 5.0 times the OBW
2) RBW: 1 % to 5 % of the OBW.
3) VBW ≥ 3 x RBW
4) Sweep: Auto
5) Detector: Peak
6) Trace: Max hold
7) All the trace to stabilize
8) Use the 99% power bandwidth function of the instrument

8.4. Number of Hopping Frequencies

Limit

According to § 15.247(a)(1)(iii), Frequency hopping systems operating in the 2400 MHz ~ 2483.5 MHz bands shall use at least 15 hopping channels.

Test Configuration



Test Procedure

Test Standard Used : Section 7.8.3 in ANSI C63.10-2020

The EUT was tested with hopping enabled.

The transmitter output is connected to the Spectrum Analyzer.
The Spectrum Analyzer is set to

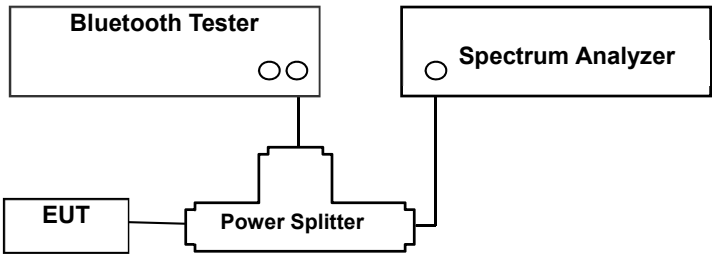
1) Span: The frequency band of operation
2) RBW: To identify clearly the individual channels, set the RBW to less than 30 % of the channel spacing or the 20 dB bandwidth, whichever is smaller.
3) VBW ≥ RBW
4) Sweep: No faster than coupled (auto) time
5) Detector: Peak
6) Trace: Max hold
7) Allow the trace to stabilize.

8.5. Time of Occupancy

Limit

According to § 15.247(a)(1)(iii), Frequency hopping systems operating in the 2400 MHz ~ 2483.5 MHz bands. The average time of occupancy on any channels shall not greater than 0.4 s within a period 0.4 s multiplied by the number of hopping channels employed.

Test Configuration



Test Procedure

Test Standard Used : Section 7.8.4 in ANSI C63.10-2020

The EUT was tested with hopping enabled.

The transmitter output is connected to the Spectrum Analyzer.
The Spectrum Analyzer is set to

1) Span: Zero span, centered on a hopping channel
2) RBW shall be ≤ channel spacing and where possible RBW should be set >> 1 / T, where T is the expected transmission time per hop.
3) Sweep time: Set so that the start of the first transmission and end of the last transmission for the hop are clearly captured.(To be slightly longer than the hopping period per channel)
4) The video trigger is set with trigger delay, and the trigger level is adjusted as needed to clearly capture the start of transmission and reduce false triggers caused by adjacent channels.
5) Detector: Peak
6) Trace: Clear-write, single sweep.
7) Place markers at the start of the first transmission on the channel and at the end of the last transmission. The dwell time per hop is the time between these two markers.

Sample Calculation

The following calculation process is not relevant to our measurement results. It is just an example.

(1) Non-AFH Mode

- DH 5 (GFSK) : 2.890 x (1600/6)/79 x 31.6 = 308.27 (ms)
- 2-DH 5 (π/4DQPSK) : 2.890 x (1600/6)/79 x 31.6 = 308.27 (ms)
- 3-DH 5 (8DPSK) : 2.890 x (1600/6)/79 x 31.6 = 308.27 (ms)

(2) AFH Mode

- DH 5 (GFSK) : 2.890 x (800/6)/20 x 8.0 = 154.13 (ms)
- 2-DH 5 (π/4DQPSK) : 2.890 x (800/6)/20 x 8.0 = 154.13 (ms)
- 3-DH 5 (8DPSK) : 2.890 x (800/6)/20 x 8.0 = 154.13 (ms)

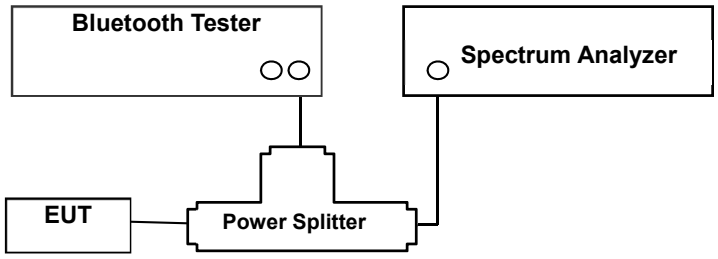
Note :
DH5 Packet need 5 time slot for transmitting and 1 time slot for receiving.
Then the system makes worst case 1600/6 hops per second with 79 channels. So the system have each channel 3.3755 times per second and so for 31.6 seconds the system have 106.667 times of appearance.
Each tx-time per appearance of DH5 is 2.890 ms.
Dwell time = Tx-time x 106.667 = 308.27 (ms)

8.6. Conducted Spurious Emissions

Limit

Conducted > 20 dBc

Test Configuration



Test Procedure

Test Standard Used : Section 7.8.7 in ANSI C63.10-2020

Conducted RF measurements of the transmitter output were made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

The EUT was tested with hopping disabled.

The transmitter output is connected to the spectrum analyzer.
The Spectrum Analyzer is set to

1) Span: 30 MHz to 10 times the operating frequency in GHz.
2) RBW: 100 kHz
3) VBW: 300 kHz
4) Sweep time : Coupled
5) Detector: Peak

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	6.19
100	6.22
200	6.30
300	6.36
400	6.39
500	6.52
600	6.49
700	6.56
800	6.58
900	6.60
1000	6.60
2000	7.04
2400	7.20
2500	7.20
3000	7.24
4000	7.34
5000	7.60
6000	7.80
7000	7.80
8000	7.88
9000	8.09
10000	8.28
11000	8.35
12000	8.43
13000	8.55
14000	8.71
15000	8.89
16000	8.98
17000	9.06
18000	9.15
19000	9.25
20000	9.36
21000	9.42
22000	9.59
23000	9.64
24000	9.86
25000	9.90
26000	9.97

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

2. Factor = Cable loss(2 EA) + Splitter loss(6 dB)

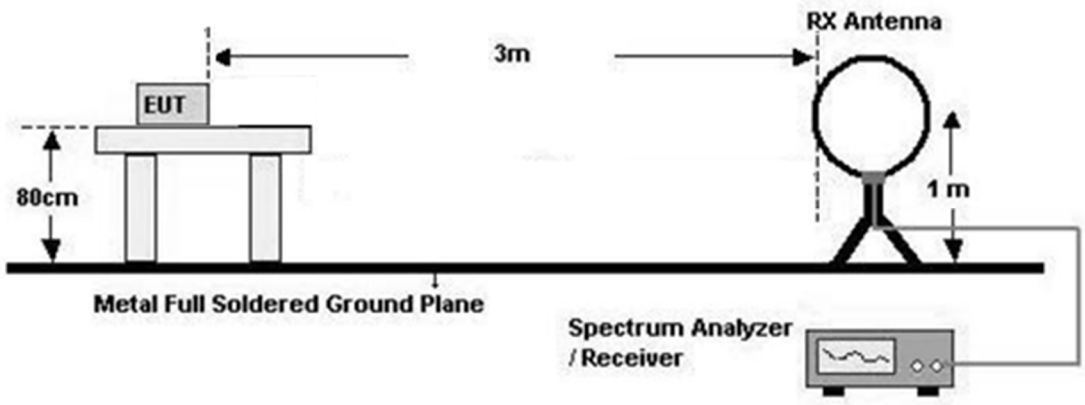
8.7. Radiated Test

Limit

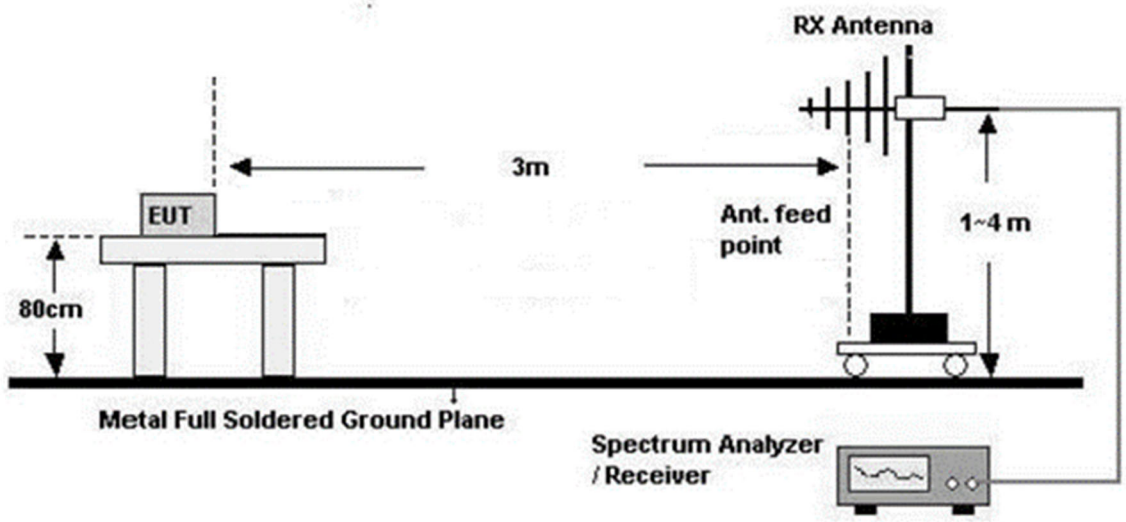
Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Configuration

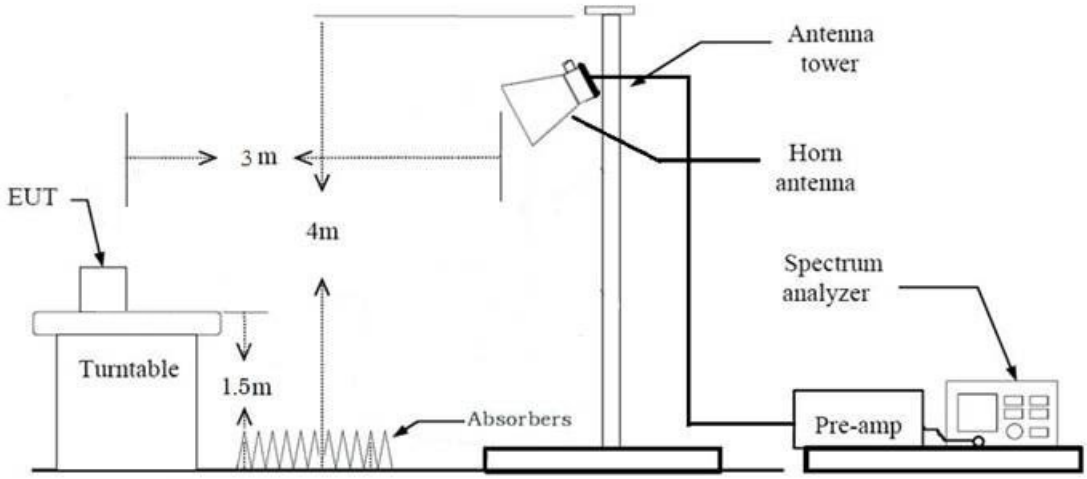
Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz



Test Procedure of Radiated spurious emissions(Below30 MHz)

Test Standard Used : Section 6.4 in ANSI C63.10-2020

1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The loop antenna was placed at a location 3m from the EUT
3. The EUT is placed on a turntable, which is 0.8m 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)

Test Standard Used : Section 6.5 in ANSI C63.10-2020

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 0.8m above ground plane.
3. The Hybrid antenna was placed at a location 3m from the EUT, which is varied from 1m to 4m 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)

Test Standard Used : Section 6.6 & 7.8.8 in ANSI C63.10-2020

1. Radiated test is performed with hopping off.
2. The EUT is placed on a turntable, which is 1.5 m above ground plane.
3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
4. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
5. EUT is set 3 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
6. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
7. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
8. The unit was tested with its standard battery.
9. Spectrum Setting
   (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):
      - Average value of pulsed emissions
      - From the peak value of the emission : The measured peak value in dBuV/m is corrected by 20log(maximum dwell time in 100 ms / 100).
      - ◆ DH5 = 20log (Maximum dwell time / 100ms) dB = -24.731 dB
      - ◆ 2-DH5, 3-DH5 = 20log (Maximum dwell time / 100ms) dB = -18.711 dB

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.
11. Distance extrapolation factor = 20log (test distance / specific distance) (dB)
12. Total(Measurement Type : Peak)
    = Measured Value(Peak) + Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F) – Amp Gain(A.G)
    Total(Measurement Type : Average)
    = Measured Value(Peak) + Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F) - Amp Gain(A.G)

+ D.C.C.F(AFH)

13. Duty Cycle Correction Factor (79 channel hopping)

a. Time to cycle through all channels= Δ t= τ [ms] x 79 channels = 229.100 ms, where τ = pulse width

b. 100 ms/ Δt [ms] = H → Round up to next highest integer, H ' =1

c. Worst Case Dwell Time = τ [ms] x H ' = 2.9 ms

d. Channel separation correction = 1 (DH5, 2-DH5, 3-DH5)

e. Overlapping channel correction

(1) DH5 : = 0

(2) 2-DH5, 3-DH5 = 1

f. Maximum dwell time

(1) DH5 = 2.9ms X (1 + 0) = 2.9 ms

(2) 2-DH5, 3-DH5 = 2.9ms X (1 + 1) = 5.8 ms

g. Duty Cycle Correction

(1) DH5 = 20log (Maximum dwell time / 100ms) dB = -30.752 dB

(2) 2-DH5, 3-DH5 = 20log (Maximum dwell time / 100ms) dB = -24.731 dB

14. Duty Cycle Correction Factor(AFH mode – minimum channel number case - 20 channels)

a. Time to cycle through all channels= Δ t= τ [ms] x 20 channels = 58.00 ms, where τ = pulse width

b. 100 ms/ Δt [ms] = H → Round up to next highest integer, H ' = 2

c. Worst Case Dwell Time = τ [ms] x H ' = 5.8 ms

d. Channel separation correction = 1 (DH5, 2DH5, 3DH5)

e. Overlapping channel correction

(1) DH5 : = 0

(2) 2DH5, 3DH5 = 1

f. Maximum dwell time

(1) DH5 = 5.8 ms X (1 + 0) = 5.8 ms

(2) 2-DH5, 3-DH5 = 5.8 ms X (1 + 1) = 11.6 ms

g. Duty Cycle Correction

(1) DH5 = 20log (Maximum dwell time / 100ms) dB = -24.731 dB

(2) 2-DH5, 3-DH5 = 20log (Maximum dwell time / 100ms) dB = -18.711 dB

Test Procedure of Radiated Restricted Band Edge

Test Standard Used : Section 6.10 & 7.8.8 in ANSI C63.10-2020

1. Radiated test is performed with hopping off.
2. The EUT is placed on a turntable, which is 1.5 m above ground plane.
3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
4. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
5. EUT is set 3 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.

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):
      - Detector = Peak
      - Trace = Max hold
      - RBW = 1 MHz
      - VBW ≥ 3 x RBW
   (2) Measurement Type(Average):
      - Average value of pulsed emissions
      - From the peak value of the emission: The measured peak value in dBuV/m is corrected by 20log(maximum dwell time in 100 ms / 100).
      - DH5 = 20log (Maximum dwell time / 100ms) dB = -24.731 dB
      - 2-DH5, 3-DH5 = 20log (Maximum dwell time / 100ms) dB = -18.711 dB
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) = Measured Value(Peak)
    Total(Measurement Type : Average) = Measured Value(Peak) + D.C.C.F(AFH)
      - We apply to the offset in range 1 GHz - 18 GHz
      - The offset = Antenna Factor(A.F) + Cable Loss(C.L)
12. Duty Cycle Correction Factor (79 channel hopping)
    a. Time to cycle through all channels= Δ t= τ [ms] x 79 channels = 229.100 ms, where τ = pulse width
    b. 100 ms/ Δt [ms] = H → Round up to next highest integer, H ' =1
    c. Worst Case Dwell Time = τ [ms] x H ' = 2.9 ms
    d. Channel separation correction = 1 (DH5, 2DH5, 3DH5)
    e. Overlapping channel correction
      (1) DH5 : = 0
      (2) 2-DH5, 3-DH5 = 1
    f. Maximum dwell time
      (1) DH5 = 2.9ms X (1 + 0) = 2.9 ms
      (2) 2-DH5, 3-DH5 = 2.9ms X (1 + 1) = 5.8 ms
    g. Duty Cycle Correction
      (1) DH5 = 20log (Maximum dwell time / 100ms) dB = -30.752 dB
      (2) 2-DH5, 3-DH5 = 20log (Maximum dwell time / 100ms) dB = -24.731 dB
13. Duty Cycle Correction Factor(AFH mode – minimum channel number case - 20 channels)

a. Time to cycle through all channels= Δ t= τ [ms] x 20 channels = 58.00 ms, where τ = pulse width

b. 100 ms/ Δt [ms] = H → Round up to next highest integer, H ' = 2

c. Worst Case Dwell Time = τ [ms] x H ' = 5.8 ms

d. Channel separation correction = 1 (DH5, 2DH5, 3DH5)

e. Overlapping channel correction

(1) DH5 : = 0

(2) 2-DH5, 3-DH5 = 1

f. Maximum dwell time

(1) DH5 = 5.8 ms X (1 + 0) = 5.8 ms

(2) 2-DH5, 3-DH5 = 5.8 ms X (1 + 1) = 11.6 ms

g. Duty Cycle Correction

(1) DH5 = 20log (Maximum dwell time / 100ms) dB = -24.731 dB

(2) 2-DH5, 3-DH5 = 20log (Maximum dwell time / 100ms) dB = -18.711 dB

8.8. AC Power line Conducted Emissions

Test Procedure : 6.2 in ANSI C63.10-2020

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

Test Standard Used : Section 6.2 in ANSI C63.10-2020

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.
5. The EUT is the device operating below 30MHz.
   - For unterminated the Antenna, the AC line conducted tests are performed with the antenna connected
   - For terminated the Antenna, the AC line conducted tests are performed with a dummy load connected to the EUT antenna output terminal.

Sample Calculation

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

8.9. 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(Connector Type FFC / HW ver.1.0), Stand alone(Connector Type Harness / HW ver.1.1)
   - Worstcase : Stand alone(Connector Type FFC / HW ver.1.0)
2. EUT Axis
   - Radiated Spurious Emissions : Z
   - Radiated Restricted Band Edge : X
3. All data rate of operation were investigated and the test results are worst case in highest datarate of each mode.
   - GFSK : DH5
   - π/4DQPSK : 2-DH5
   - 8DPSK : 3-DH5
4. 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
5. Radiated Spurious Emission
   - All mode of operation were investigated and the worst case results are reported.
   - GFSK : DH5
   - π/4DQPSK : 2-DH5
   - 8DPSK : 3-DH5

AC Power line Conducted Emissions

1. All modes of operation were investigated and the worst case configuration results are reported.
- Mode : Stand alone + Notebook
- Worstcase : Stand alone + Notebook
2. Harness Cable Type, FFC Cable Type were tested and the worst case results are reported.
(Worst case : FFC Cable Type)

Conducted test

1. The EUT was configured with data rate of highest power.
   - GFSK : DH5
   - π/4DQPSK : 2-DH5
   - 8DPSK : 3-DH5
2. AFH & Non-AFH were tested and the worst case results are reported.
   (Worst case : Non-AFH)

Radiated test(Simultaneous transmission Scenario)

1. Please refer to the [DTS], [BT LE], [UNII] Test Report.

9. SUMMARY OF TEST RESULTS

Test Description	FCC Part Section(s)	Test Limit	Test Condition	Test Result
20 dB Bandwidth	§ 15.247(a)(1)	N/A	Conducted	PASS
Occupied Bandwidth	N/A	N/A		N/A
Conducted Maximum Peak Output Power	§ 15.247(b)(1)	<0.125 W		PASS
Carrier Frequency Separation	§ 15.247(a)(1)	>25 kHz or >2/3 of the 20 dB BW		PASS
Number of Hopping Frequencies	§ 15.247(a)(1)(iii)	≥ 15		PASS
Time of Occupancy	§ 15.247(a)(1)(iii)	<400 ms		PASS
Conducted Spurious Emissions	§ 15.247(d)	> 20 dB for all out-of band emissions		PASS
Band Edge (Out of Band Emissions)	§ 15.247(d)	> 20 dB for all out-of band emissions		PASS
AC Power line Conducted Emissions	§ 15.207(a)	cf. Section 8.8		PASS
Radiated Spurious Emissions	§ 15.247(d), 15.205, 15.209	cf. Section 8.7	Radiated	PASS
Radiated Restricted Band Edge	§ 15.247(d), 15.205, 15.209	cf. Section 8.7		PASS

Note:

1. The decision rule applies 'simple acceptance'

10. TEST RESULT

10.1 PEAK POWER

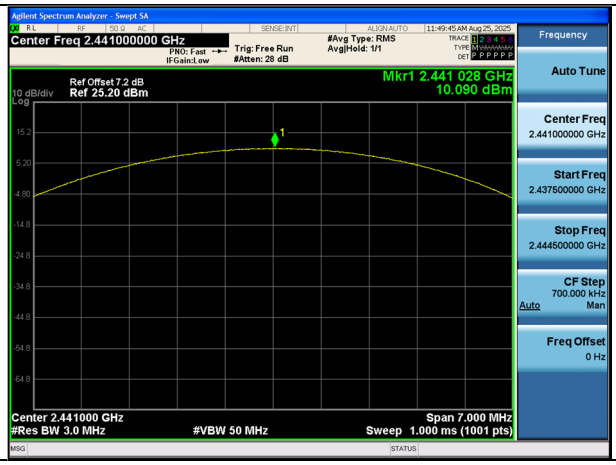
Mode	Channel	Frequency [MHz]	Peak Power		Limit [mW]
			[dBm]	[mW]	
GFSK	0	2402	10.085	10.20	125
	39	2441	10.090	10.21	
	78	2480	9.852	9.66	
π/4DQPSK	0	2402	12.348	17.17	
	39	2441	12.357	17.21	
	78	2480	12.223	16.68	
8DPSK	0	2402	12.833	19.20	
	39	2441	12.806	19.08	
	78	2480	12.572	18.08	

▣ TEST PLOTS(Peak Power)

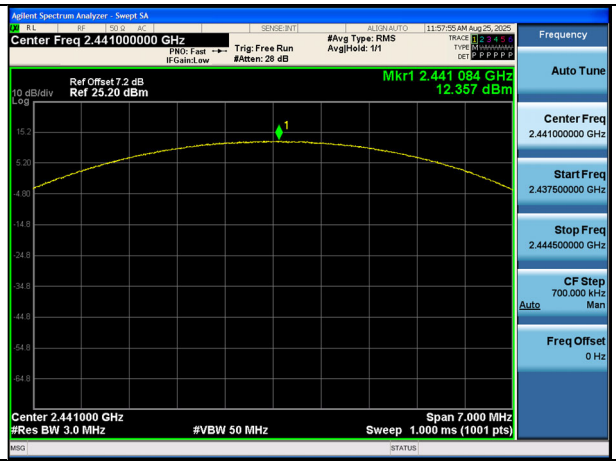
Note :

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

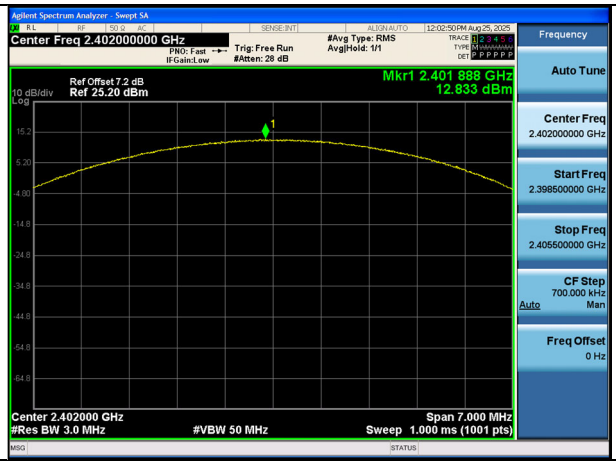
GFSK : Peak Power (Ch. 39)



π/4DQPSK : Peak Power (Ch. 39)



8DPSK : Peak Power (Ch. 0)



10.2 BAND EDGES

Without hopping

Mode	Channel	Frequency [MHz]	Position	Band Edge [dB]	Limit [dBc]
GFSK	0	2402	Lower	61.242	20
	78	2480	Upper	63.833	
π/4DQPSK	0	2402	Lower	62.883	
	78	2480	Upper	62.987	
8DPSK	0	2402	Lower	62.901	
	78	2480	Upper	63.995	

With hopping

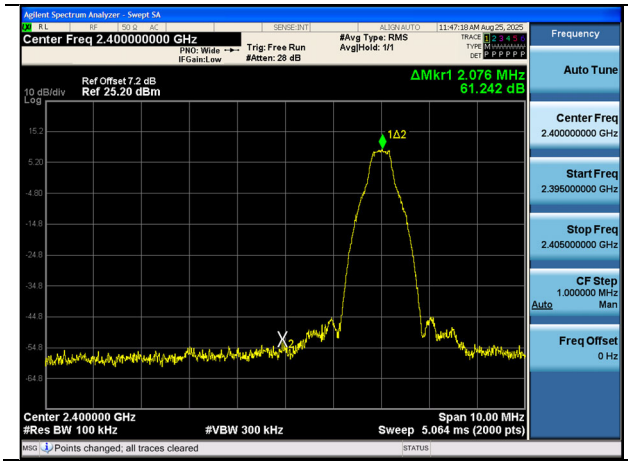
Mode	Channel	Frequency [MHz]	Position	Band Edge [dB]	Limit [dBc]
GFSK	0	2402	Lower	64.901	20
	78	2480	Upper	64.564	
π/4DQPSK	0	2402	Lower	64.962	
	78	2480	Upper	62.319	
8DPSK	0	2402	Lower	63.044	
	78	2480	Upper	62.005	

▣ TEST PLOTS(BAND EDGES)

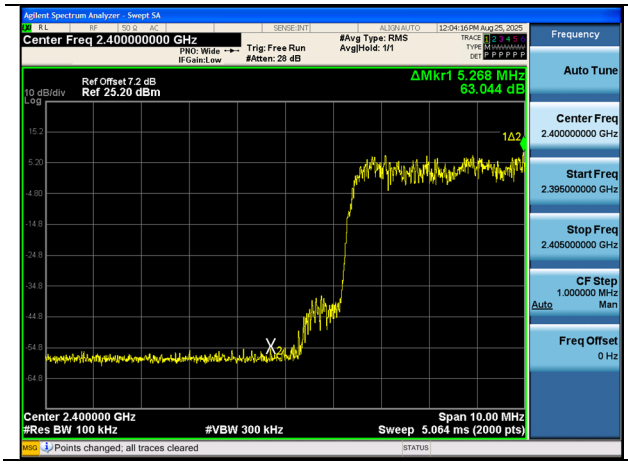
Note :

In order to simplify the report, attached plots were only the worst case mode.

-Without hopping

GFSK Band Edge(Ch. 0)	π/4DQPSK Band Edge(Ch. 78)
	

-With hopping

8DPSK Band Edge(Ch. 0)	8DPSK Band Edge(Ch. 78)
	

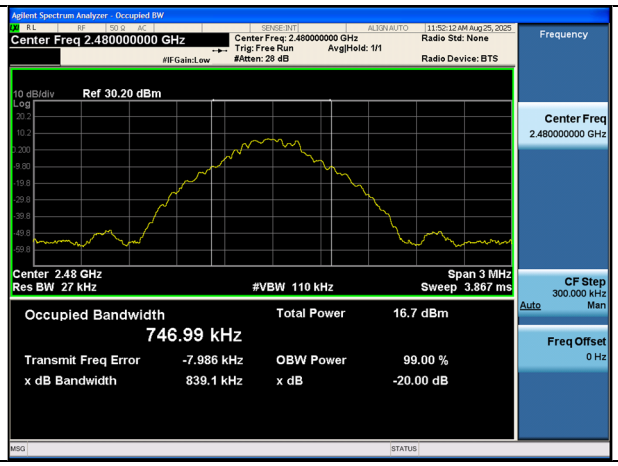
10.3 FREQUENCY SEPARATION / 20dB & 99% OCCUPIED BANDWIDTH

Mode	Channel	Frequency [MHz]	20dB BW [kHz]	99% BW [kHz]	Minimum Channel Separation [kHz]
GFSK	0	2402	813.8	746.64	542.5
	39	2441	814.4	747.16	542.9
	78	2480	839.1	746.99	559.4
π/4DQPSK	0	2402	1312	1176.5	874.9
	39	2441	1289	1173.7	859.1
	78	2480	1312	1176.4	874.6
8DPSK	0	2402	1300	1179.7	866.7
	39	2441	1305	1180.3	869.8
	78	2480	1304	1179.5	869.3

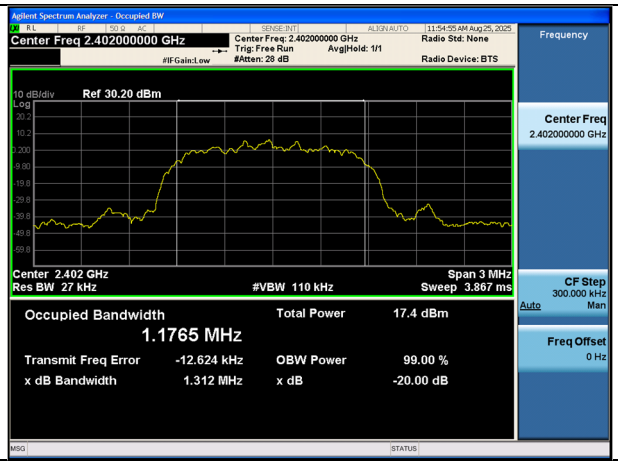
▣ TEST PLOTS(20 dB Bandwidth & 99% OBW)

Note:
In order to simplify the report, attached plots were only the widest 20 dB BW channel.

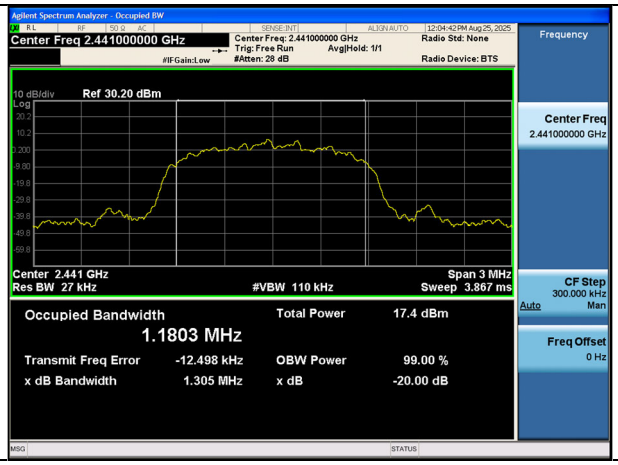
GFSK 20 dB BW & 99% OBW (Ch. 78)



π/4DQPSK 20 dB BW & 99% OBW (Ch. 0)

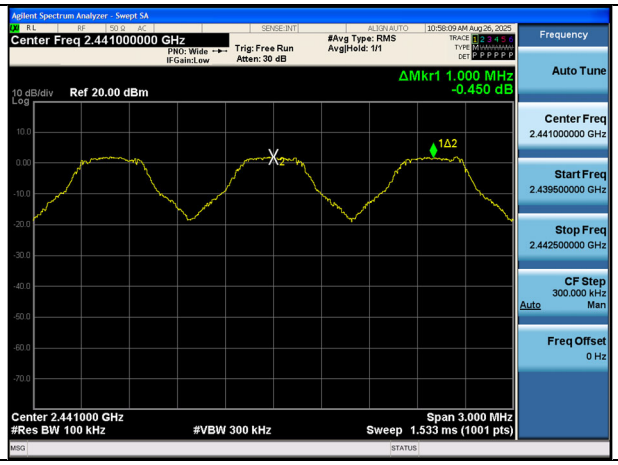


8DPSK 20 dB BW & 99% OBW (Ch. 39)



▣ TEST PLOTS(Channel Separation)

GFSK : Channel Separation



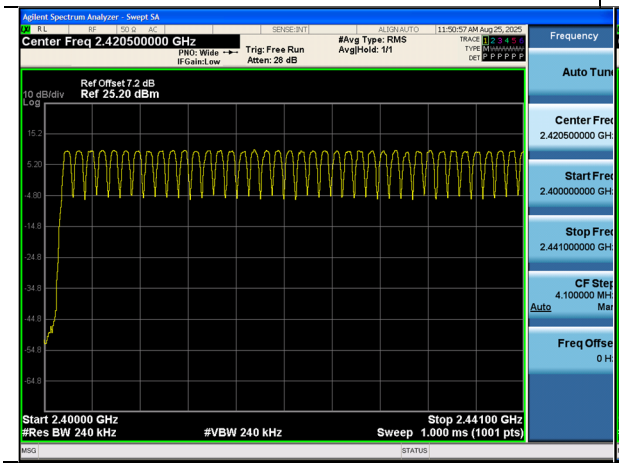
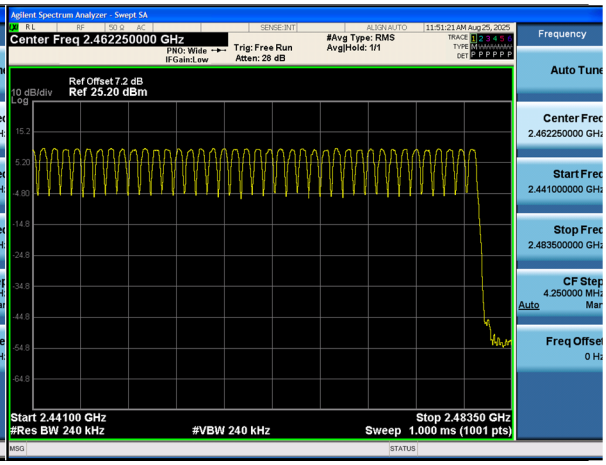
10.4 NUMBER OF HOPPING FREQUENCY

Mode	Number of hopping Frequency	Limit
GFSK	79	> 15
π/4DQPSK	79	
8DPSK	79	

Note :

In case of AFH mode, minimum number of hopping channels is 20.

▣ TEST PLOTS(NUMBER OF HOPPING FREQUENCY)

GFSK (2.4 GHz - 2.441 GHz)	GFSK (2.441 GHz - 2.483.5 GHz)
	

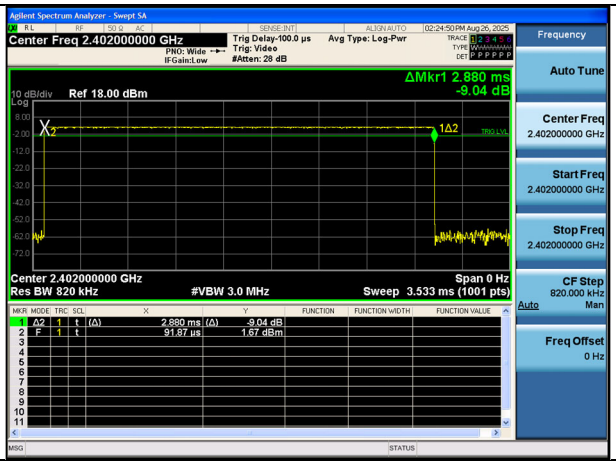
10.5 TIME OF OCCUPANCY (DWELL TIME)

Mode	Channel	Frequency [MHz]	Dwell Time [ms]	Time Occupancy [ms]	Time Occupancy with AFH [ms]	Limit [ms]
GFSK	0	2402	2.880	307.16	153.58	400
	39	2441	2.880	307.16	153.58	
	78	2480	2.880	307.16	153.58	
π/4DQPSK	0	2402	2.883	307.54	153.77	
	39	2441	2.883	307.54	153.77	
	78	2480	2.883	307.54	153.77	
8DPSK	0	2402	2.887	307.92	153.96	
	39	2441	2.887	307.92	153.96	
	78	2480	2.887	307.92	153.96	

▣ TEST PLOTS(Dwell Time)

Note:
In order to simplify the report, attached plots were only the lowest channel.

GFSK : Dwell Time(Ch. 0)



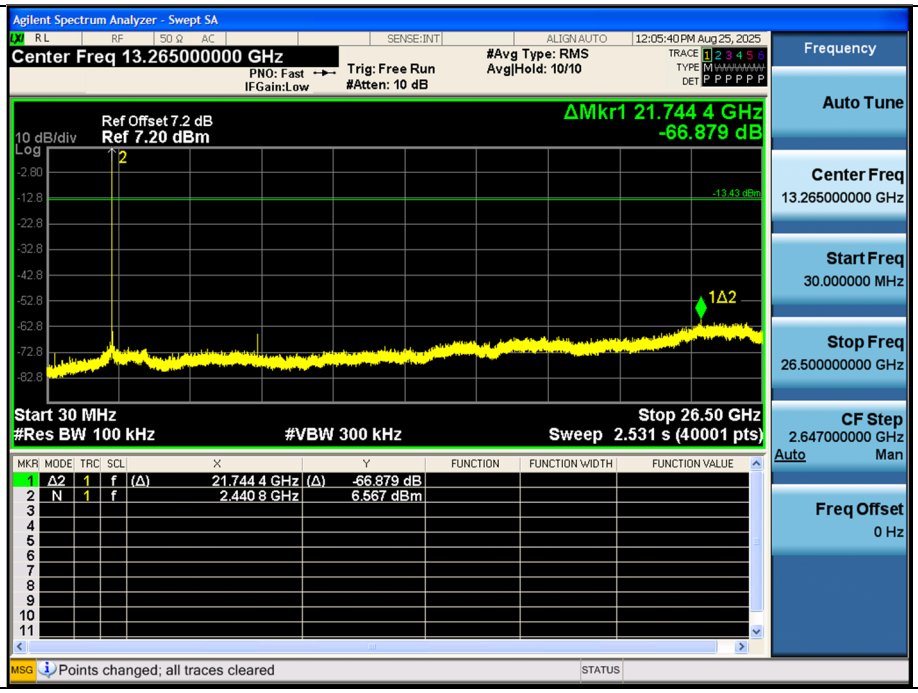
10.6 SPURIOUS EMISSIONS

10.6.1 CONDUCTED SPURIOUS EMISSIONS

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

▣ TEST PLOTS(CONDUCTED SPURIOUS EMISSIONS)

Spurious Emissions (30 MHz - 26.50 GHz) 8DPSK Ch. 39



Note

1. Limit (dBm): -13.433

10.6.2 RADIATED SPURIOUS EMISSIONS

Frequency Range : 9 kHz – 30 MHz

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

Note:

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

Frequency Range : Below 1 GHz

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

Note:

1. Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Quasi peak detector mode.
2. Radiated test is performed with hopping off.

Frequency Range : Above 1 GHz

CH 0	2402	MHz	Mode :			Normal(GFSK)		
Frequency	Measured value	A.F+C.L-A.G+D.F	ANT. POL	Duty Cycle Correction	Total	Limit	Margin	Measurement Type
[MHz]	[dBμV]	[dB/m]	[H/V]	[dB]	[dBμV/m]	[dBμV/m]	[dB]	
4804	43.93	4.78	V	0.00	48.71	73.98	25.27	PK
4804	43.93	4.78	V	-24.73	23.98	53.98	30.00	AV
7206	39.34	12.53	V	0.00	51.87	73.98	22.11	PK
7206	39.34	12.53	V	-24.73	27.13	53.98	26.85	AV
4804	45.12	4.78	H	0.00	49.90	73.98	24.08	PK
4804	45.12	4.78	H	-24.73	25.17	53.98	28.81	AV
7206	39.62	12.53	H	0.00	52.15	73.98	21.83	PK
7206	39.62	12.53	H	-24.73	27.41	53.98	26.57	AV

CH 39	2441	MHz	Mode :			Normal(GFSK)		
Frequency	Measured value	A.F+C.L-A.G+D.F	ANT. POL	Duty Cycle Correction	Total	Limit	Margin	Measurement Type
[MHz]	[dBμV]	[dB/m]	[H/V]	[dB]	[dBμV/m]	[dBμV/m]	[dB]	
4882	45.16	5.26	V	0.00	50.42	73.98	23.56	PK
4882	45.16	5.26	V	-24.73	25.69	53.98	28.29	AV
7323	39.44	12.51	V	0.00	51.95	73.98	22.03	PK
7323	39.44	12.51	V	-24.73	27.22	53.98	26.76	AV
4882	46.22	5.26	H	0.00	51.48	73.98	22.50	PK
4882	46.22	5.26	H	-24.73	26.75	53.98	27.23	AV
7323	39.21	12.51	H	0.00	51.72	73.98	22.26	PK
7323	39.21	12.51	H	-24.73	26.99	53.98	26.99	AV

CH 78	2480	MHz	Mode :			Normal(GFSK)		
Frequency	Measured value	A.F+C.L-A.G+D.F	ANT. POL	Duty Cycle Correction	Total	Limit	Margin	Measurement Type
[MHz]	[dBμV]	[dB/m]	[H/V]	[dB]	[dBμV/m]	[dBμV/m]	[dB]	
4960	46.62	5.77	V	0.00	52.39	73.98	21.59	PK
4960	46.62	5.77	V	-24.73	27.66	53.98	26.32	AV
7440	39.53	12.40	V	0.00	51.93	73.98	22.05	PK
7440	39.53	12.40	V	-24.73	27.20	53.98	26.78	AV
4960	46.85	5.77	H	0.00	52.62	73.98	21.36	PK
4960	46.85	5.77	H	-24.73	27.89	53.98	26.09	AV
7440	39.38	12.40	H	0.00	51.78	73.98	22.20	PK
7440	39.38	12.40	H	-24.73	27.05	53.98	26.93	AV

CH 0	2402	MHz	Mode :			EDR (π/4DQPSK)		
Frequency	Measured value	A.F+C.L-A.G+D.F	ANT. POL	Duty Cycle Correction	Total	Limit	Margin	Measurement Type
[MHz]	[dBμV]	[dB/m]	[H/V]	[dB]	[dBμV/m]	[dBμV/m]	[dB]	
4804	44.66	4.78	V	0.00	49.44	73.98	24.54	PK
4804	44.66	4.78	V	-18.71	30.73	53.98	23.25	AV
7206	38.57	12.53	V	0.00	51.10	73.98	22.88	PK
7206	38.57	12.53	V	-18.71	32.38	53.98	21.60	AV
4804	45.43	4.78	H	0.00	50.21	73.98	23.77	PK
4804	45.43	4.78	H	-18.71	31.50	53.98	22.48	AV
7206	38.79	12.53	H	0.00	51.32	73.98	22.66	PK
7206	38.79	12.53	H	-18.71	32.60	53.98	21.38	AV

CH 39	2441	MHz	Mode :			EDR (π/4DQPSK)		
Frequency	Measured value	A.F+C.L-A.G+D.F	ANT. POL	Duty Cycle Correction	Total	Limit	Margin	Measurement Type
[MHz]	[dBμV]	[dB/m]	[H/V]	[dB]	[dBμV/m]	[dBμV/m]	[dB]	
4882	46.54	5.26	V	0.00	51.80	73.98	22.18	PK
4882	46.54	5.26	V	-18.71	33.09	53.98	20.89	AV
7323	39.19	12.51	V	0.00	51.70	73.98	22.28	PK
7323	39.19	12.51	V	-18.71	32.99	53.98	20.99	AV
4882	47.43	5.26	H	0.00	52.69	73.98	21.29	PK
4882	47.43	5.26	H	-18.71	33.98	53.98	20.00	AV
7323	38.88	12.51	H	0.00	51.39	73.98	22.59	PK
7323	38.88	12.51	H	-18.71	32.68	53.98	21.30	AV

CH 78	2480	MHz	Mode :			EDR (π/4DQPSK)		
Frequency	Measured value	A.F+C.L-A.G+D.F	ANT. POL	Duty Cycle Correction	Total	Limit	Margin	Measurement Type
[MHz]	[dBμV]	[dB/m]	[H/V]	[dB]	[dBμV/m]	[dBμV/m]	[dB]	
4960	47.90	5.77	V	0.00	53.67	73.98	20.31	PK
4960	47.90	5.77	V	-18.71	34.96	53.98	19.02	AV
7440	39.21	12.40	V	0.00	51.61	73.98	22.37	PK
7440	39.21	12.40	V	-18.71	32.90	53.98	21.08	AV
4960	48.17	5.77	H	0.00	53.94	73.98	20.04	PK
4960	48.17	5.77	H	-18.71	35.23	53.98	18.75	AV
7440	38.93	12.40	H	0.00	51.33	73.98	22.65	PK
7440	38.93	12.40	H	-18.71	32.62	53.98	21.36	AV

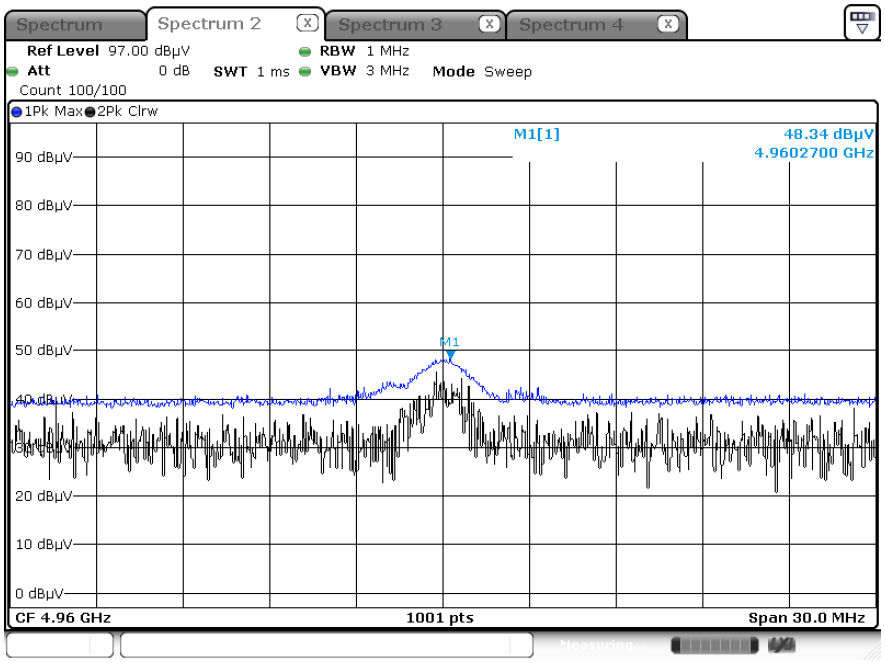
CH 0	2402	MHz	Mode :			EDR (8DPSK)		
Frequency	Measured value	A.F+C.L-A.G+D.F	ANT. POL	Duty Cycle Correction	Total	Limit	Margin	Measurement Type
[MHz]	[dBμV]	[dB/m]	[H/V]	[dB]	[dBμV/m]	[dBμV/m]	[dB]	
4804	44.36	4.78	V	0.00	49.14	73.98	24.84	PK
4804	44.36	4.78	V	-18.71	30.43	53.98	23.55	AV
7206	38.74	12.53	V	0.00	51.27	73.98	22.71	PK
7206	38.74	12.53	V	-18.71	32.55	53.98	21.43	AV
4804	45.17	4.78	H	0.00	49.95	73.98	24.03	PK
4804	45.17	4.78	H	-18.71	31.24	53.98	22.74	AV
7206	38.98	12.53	H	0.00	51.51	73.98	22.47	PK
7206	38.98	12.53	H	-18.71	32.79	53.98	21.19	AV

CH 39	2441	MHz	Mode :			EDR (8DPSK)		
Frequency	Measured value	A.F+C.L-A.G+D.F	ANT. POL	Duty Cycle Correction	Total	Limit	Margin	Measurement Type
[MHz]	[dBμV]	[dB/m]	[H/V]	[dB]	[dBμV/m]	[dBμV/m]	[dB]	
4882	46.42	5.26	V	0.00	51.68	73.98	22.30	PK
4882	46.42	5.26	V	-18.71	32.97	53.98	21.01	AV
7323	39.23	12.51	V	0.00	51.74	73.98	22.24	PK
7323	39.23	12.51	V	-18.71	33.03	53.98	20.95	AV
4882	47.39	5.26	H	0.00	52.65	73.98	21.33	PK
4882	47.39	5.26	H	-18.71	33.94	53.98	20.04	AV
7323	39.01	12.51	H	0.00	51.52	73.98	22.46	PK
7323	39.01	12.51	H	-18.71	32.81	53.98	21.17	AV

CH 78	2480	MHz	Mode :			EDR (8DPSK)		
Frequency	Measured value	A.F+C.L-A.G+D.F	ANT. POL	Duty Cycle Correction	Total	Limit	Margin	Measurement Type
[MHz]	[dBμV]	[dB/m]	[H/V]	[dB]	[dBμV/m]	[dBμV/m]	[dB]	
4960	48.03	5.77	V	0.00	53.80	73.98	20.18	PK
4960	48.03	5.77	V	-18.71	35.09	53.98	18.89	AV
7440	39.42	12.40	V	0.00	51.82	73.98	22.16	PK
7440	39.42	12.40	V	-18.71	33.11	53.98	20.87	AV
4960	48.34	5.77	H	0.00	54.11	73.98	19.87	PK
4960	48.34	5.77	H	-18.71	35.40	53.98	18.58	AV
7440	39.11	12.40	H	0.00	51.51	73.98	22.47	PK
7440	39.11	12.40	H	-18.71	32.80	53.98	21.18	AV

▣ Test Plots

Radiated Spurious Emissions plot – Peak & Average Result (8DPSK, Ch. 78 2nd Harmonic, Z-H)



Note: Plots of worst case are only reported.

10.6.3 RADIATED RESTRICTED BAND EDGES

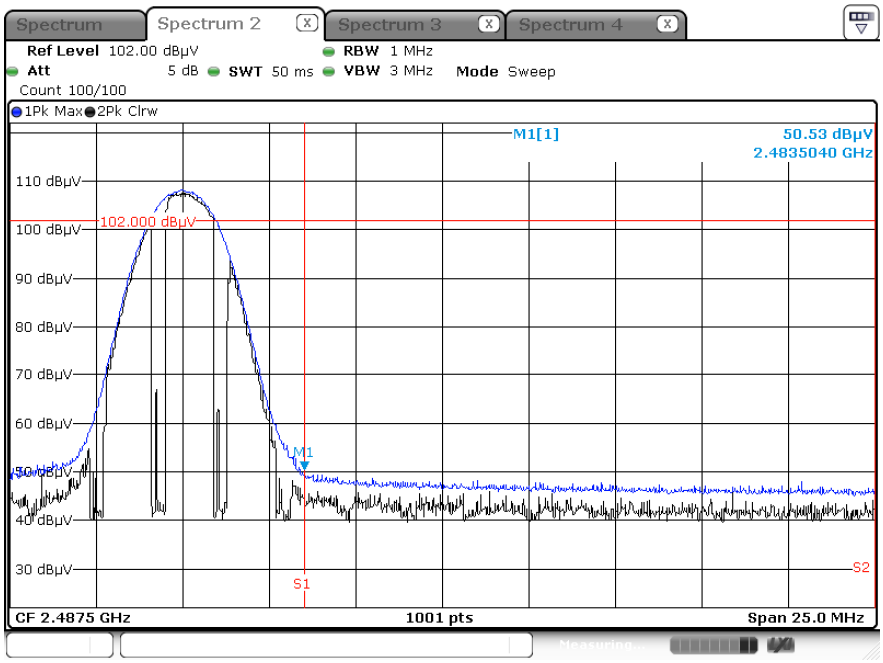
Normal(GFSK)	Channel	CH. 0, CH. 78		Channel Frequency		2402 MHz, 2480 MHz		
Frequency	Measured Value	A.F+C.L-A.G+ ATT+D.F	ANT. POL	Duty Cycle Correction	Total	Limit	Margin	Measurement Type
[MHz]	[dBµV]	[dB/m]	[H/V]	[dB]	[dBµV/m]	[dBµV/m]	[dB]	
2390.0	48.00	2.59	H	0	50.59	73.98	23.39	PK
2390.0	48.00	2.59	H	-24.73	25.86	53.98	28.12	AV
2483.5	49.36	3.34	H	0	52.70	73.98	21.28	PK
2483.5	49.36	3.34	H	-24.73	27.97	53.98	26.01	AV

EDR(π/4DQPSK)	Channel	CH. 0, CH. 78		Channel Frequency		2402 MHz, 2480 MHz		
Frequency	Measured Value	A.F+C.L-A.G+ ATT+D.F	ANT. POL	Duty Cycle Correction	Total	Limit	Margin	Measurement Type
[MHz]	[dBµV]	[dB/m]	[H/V]	[dB]	[dBµV/m]	[dBµV/m]	[dB]	
2390.0	48.60	2.59	H	0	51.19	73.98	22.79	PK
2390.0	48.60	2.59	H	-18.71	32.48	53.98	21.50	AV
2483.5	49.68	3.34	H	0	53.02	73.98	20.96	PK
2483.5	49.68	3.34	H	-18.71	34.31	53.98	19.67	AV

EDR(8DPSK)	Channel	CH. 0, CH. 78		Channel Frequency		2402 MHz, 2480 MHz		
Frequency	Measured Value	A.F+C.L-A.G+ ATT+D.F	ANT. POL	Duty Cycle Correction	Total	Limit	Margin	Measurement Type
[MHz]	[dBµV]	[dB/m]	[H/V]	[dB]	[dBµV/m]	[dBµV/m]	[dB]	
2390.0	47.64	2.59	H	0	50.23	73.98	23.75	PK
2390.0	47.64	2.59	H	-18.71	31.52	53.98	22.46	AV
2483.5	50.53	3.34	H	0	53.87	73.98	20.11	PK
2483.5	50.53	3.34	H	-18.71	35.16	53.98	18.82	AV

▣ Test Plots

Radiated Restricted Band Edges plot – Average & Peak Result (8DPSK, Ch. 78, X-H)



Note:

Plots of worst case are only reported.

10.7 POWERLINE CONDUCTED EMISSIONS

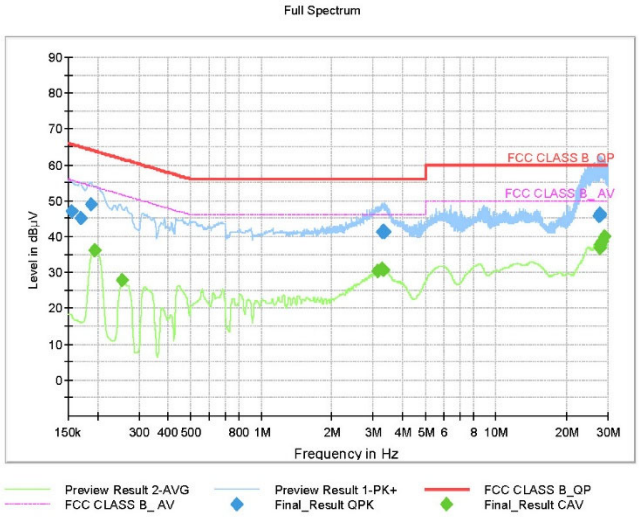
Conducted Emissions

Test 1 / 1

Test Report

Common Information

EUT : LGSWNAX61
Operating Conditions : BT Mode
Comment :



Final_Result_QPK

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.1545	47.20	65.75	18.55	9.000	N	9.6
0.1703	45.09	64.95	19.86	9.000	N	9.6
0.1883	49.08	64.11	15.04	9.000	L1	9.6
3.2833	41.42	56.00	14.58	9.000	N	9.7
3.3215	41.59	56.00	14.41	9.000	N	9.7
3.3598	41.33	56.00	14.67	9.000	N	9.7
27.5090	45.90	60.00	14.10	9.000	L1	10.0
27.5833	45.93	60.00	14.07	9.000	L1	10.0
27.6980	46.25	60.00	13.75	9.000	L1	10.0

Final_Result_CAV

Frequency (MHz)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.1950	36.28	53.82	17.54	9.000	L1	9.6
0.2558	27.66	51.57	23.90	9.000	N	9.6
3.1415	30.49	46.00	15.51	9.000	N	9.7
3.2765	31.06	46.00	14.94	9.000	N	9.7
3.3103	30.62	46.00	15.38	9.000	N	9.7
27.5833	37.74	50.00	12.26	9.000	L1	10.0
27.6980	36.71	50.00	13.29	9.000	L1	10.0
28.3640	38.63	50.00	11.37	9.000	L1	10.0
28.8613	39.90	50.00	10.10	9.000	L1	10.0

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11. LIST OF TEST EQUIPMENT

Conducted Test

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
LISN	ENV216	Rohde & Schwarz	102245	07/15/2026	Annual
EMI Test Receiver	ESR	Rohde & Schwarz	101910	08/20/2026	Annual
Temperature Chamber	SU-642	ESPEC	0093008124	02/11/2026	Annual
Signal Analyzer	N9030A	Agilent	MY49431210	12/12/2025	Annual
Power Measurement Set	OSP 120	Rohde & Schwarz	101231	10/17/2025	Annual
Power Meter	N1911A	Agilent	MY45100523	02/21/2026	Annual
Power Sensor	N1921A	Agilent	MY57820067	02/04/2026	Annual
Directional Coupler	87300B	Agilent	3116A03621	10/21/2025	Annual
Power Splitter	11667B	Hewlett Packard	5001	04/10/2026	Annual
DC Power Supply	E3632A	H.P	KR75303243	04/16/2026	Annual
Attenuator(10 dB)	8493C	Hewlett Packard	07560	05/27/2026	Annual
Bluetooth Tester	CBT	Rohde & Schwarz	100752	12/27/2025	Annual
Software	EMC32	Rohde & Schwarz	N/A	N/A	N/A
Automation Software	FCC WLAN Conducted	HCT CO., LTD	-	-	-
Automation Software	FCC Bluetooth Conducted	HCT CO., LTD	-	-	-

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	07/25/2026	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	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	05/07/2026	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	05/27/2026	Annual
Band Reject Filter	WRCJV12-4900-5100-5900-6100-50SS	Wainwright Instruments	6	05/27/2026	Annual
High Pass Filter(7 GHz ~ 18 GHz)	WHKX10-7150-8000-18000-50SS	Wainwright Instruments	1	02/21/2026	Annual
Power Amplifier	CBL18265035	CERNEX	22966	11/07/2025	Annual
Power Amplifier	CBL26405040	CERNEX	25956	02/19/2026	Annual
Bluetooth Tester	TC-3000C	TESCOM	3000C000175	03/12/2026	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
Automation Software	FCC WLAN Radiated	HCT CO., LTD	N/A	N/A	N/A
Attenuator(3 dB)	18B-03	Api tech.	1	04/21/2026	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).

12. ANNEX A_ TEST SETUP PHOTO

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

No.	Description
1	HCT-RF-2509-FC002-P