

FCC BT REPORT Certification

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Date of Issue: February 22, 2021

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FCC ID: A3LSMA326U

Report No.: HCT-RF-2102-FC006-R1

APPLICANT: SAMSUNG Electronics Co., Ltd. Model: SM-A326U **Additional Model:** SM-A326U1/DS, SM-S326DL Mobile Phone EUT Type: Max. RF Output Power: 10.114 dBm (10.27 mW) **Frequency Range:** 2 402 MHz - 2 480 MHz (Bluetooth) GFSK(Normal), π/4DQPSK and 8DPSK(EDR) Modulation type **FCC Classification:** FCC Part 15 Spread Spectrum Transmitter (DSS)

Part 15 subpart C 15.247

Engineering Statement:

FCC Rule Part(s):

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



REVIEWED BY

Report prepared by : Woong Jin Kim Engineer of Telecommunication Testing Center

Report approved by : Jong Seok Lee Manager of Telecommunication Testing Center

This test results were applied only to the test methods required by the standard.

This laboratory is not accredited for the test results marked *. The above Test Report is the accredited test result by (KS Q) ISO/IEC 17025 and KOLAS(Korea Laboratory Accreditation Scheme), which signed the ILAC-MRA. (HCT Accreditation No.: KT197)

* The report shall not be reproduced except in full(only partly) without approval of the laboratory.



<u>Version</u>

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-2102-FC006	February 10, 2021	- First Approval Report
HCT-RF-2102-FC006-R1	February 22, 2021	- Added Note on page 27.



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1. EUT DESCRIPTION

Model	SM-A326U	
Additional Model	SM-A326U1/DS, SM-S326DL	
ЕИТ Туре	Mobile Phone	
Power Supply	DC 3.86 V	
Frequency Range	2 402 MHz ~ 2 480 MHz	
Max. RF Output Power	10.114 dBm (10.27 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)	
Date(s) of Tests	December 22, 2020 ~ February 04, 2021	
Serial number	Radiated: R3CNC01K89M Conducted: 4C19CDC0BB1C7ECE	



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 Device (ANSI C63.10-2013, 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 :2013) Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz 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 1GHz. Above 1GHz with 1.5m 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). 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 with a reduced VBW setting(RBW = 1 MHz, VBW = 1/T Hz, where T = Pulse width).

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 equipments, which is traceable to recognized national standards.

Espectially, 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 April 02, 2018 (Registration Number: KR0032).

EQUIPMENT

Radiated emissions are measured with one or more of the following types of Linearly polarized antennas: tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers. Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

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

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 C63.10-2013.

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

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

Parameter	Expanded Uncertainty (dB)
Conducted Disturbance (150 kHz ~ 30 MHz)	1.82
Radiated Disturbance (9 kHz ~ 30 MHz)	3.40
Radiated Disturbance (30 MHz ~ 1 GHz)	4.80
Radiated Disturbance (1 GHz ~ 18 GHz)	5.70
Radiated Disturbance (18 GHz ~ 40 GHz)	5.05



8. DESCRIPTION OF TESTS

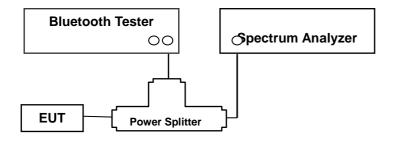
8.1. Conducted Maximum Peak Output Power

<u>Limit</u>

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 nonoverlapping 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

The transmitter output is connected to the Spectrum Analyzer. The Spectrum Analyzer is set to the peak detector mode. This test is performed with hopping off.

The Spectrum Analyzer is set to (7.8.5 in ANSI 63.10-2013 & Procedure 10(b)(6)(i) in KDB 558074 v05r02)

- 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 = Auto
- 5) Detector = Peak
- 6) Trace = Max hold

Sample Calculation

Output Power = Spectrum Reading Power + Power Splitter loss + Cable loss(2 ea)

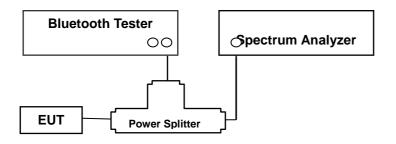
= 10 dBm + 6 dB + 1.5 dB = 17.5 dBm

8.2. Conducted Band Edge(Out of Band Emissions)

<u>Limit</u>

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

This test is performed with hopping off and hopping on.

The Spectrum Analyzer is set to (6.10.4 in ANSI 63.10-2013 & Procedure 8.5 and 8.6 in KDB 558074 v05r02)

- 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
- 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: Coupled.
- 5) RBW: 100 kHz
- 6) VBW: 300 kHz
- 7) Detector: Peak
- 8) Trace: Max hold

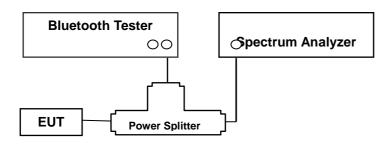


8.3. Frequency Separation & 20 dB Bandwidth

<u>Limit</u>

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)

The Channel Separation test is performed with hopping on. And the 20 dB Bandwidth test is performed with hopping off.

The Spectrum Analyzer is set to (7.8.2 in ANSI 63.10-2013 & Procedure 10(b)(6)(iii) in KDB 558074 v05r02)

- 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: Auto
- 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)

And the 20 dB Bandwidth test is performed with hopping off.

The Spectrum Analyzer is set to (6.9.2 in ANSI 63.10-2013)

- 1) Span: Set between two times and five times the OBW
- 2) RBW: 1% to 5% of the OBW.
- 3) VBW \ge 3 x RBW
- 4) Sweep: Auto
- 5) Detector: Peak
- 6) Trace: Max hold
- 7) All the trace to stabilize.

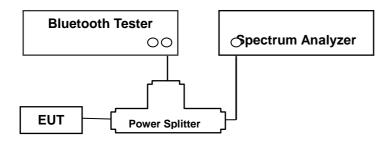


8.4. Number of Hopping Frequencies

<u>Limit</u>

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 frequencies.

Test Configuration



Test Procedure

The Bluetooth frequency hopping function of the EUT was enabled.

The Spectrum Analyzer is set to (7.8.3 in ANSI 63.10-2013 & Procedure 10(b)(4) in KDB 558074 v05r02)

- 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: Auto
- 5) Detector: Peak
- 6) Trace: Max hold
- 7) Allow the trace to stabilize.

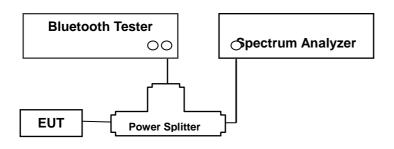


8.5. Time of Occupancy

<u>Limit</u>

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

This test is performed with hopping off.

The Spectrum Analyzer is set to (7.8.4 in ANSI 63.10-2013 & Procedure 10(b)(6)(iv) in KDB 558074 v05r02)

- 1) Span: Zero span, centered on a hopping channel
- RBW shall be ≤ channel spacing and where possible RBW should be set >> 1 / T, where T is the expected dwell time per channel.
- 3) Sweep = as necessary to capture the entire dwell time per hopping channel
- 4) Detector: Peak
- 5) Trace: Max hold

The marker-delta function was used to determine the dwell time.



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)

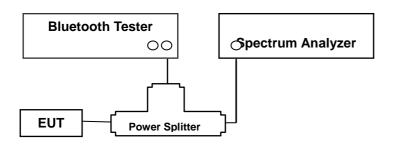


8.6. Conducted Spurious Emissions

<u>Limit</u>

Conducted > 20 dBc

Test Configuration



Test Procedure

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 transmitter output is connected to the spectrum analyzer.

The Spectrum Analyzer is set to (7.8.8 in ANSI 63.10-2013 & Procedure 8.5 and 8.6 in KDB 558074 v05r02)

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

This test is performed with hopping off.



Factors for frequency

Freq(MHz)	Factor(dB)
30	6.14
100	6.22
200	6.30
300	6.40
400	6.46
500	6.49
600	6.49
700	6.53
800	6.55
900	6.59
1000	6.61
2000	6.88
2400	6.97
2500	6.99
3000	7.09
4000	7.25
5000	7.44
6000	7.51
7000	7.66
8000	7.78
9000	7.90
10000	8.04
11000	8.12
12000	8.28
13000	8.47
14000	8.41
15000	8.51
16000	8.56
17000	8.63
18000	8.75
19000	8.81
20000	8.89
21000	9.18
22000	9.24
23000	9.27
24000	9.35
25000	9.48
26000	9.58

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

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



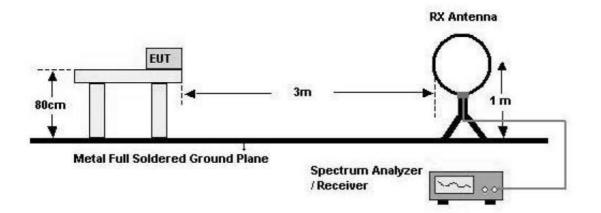
8.7. Radiated Test

<u>Limit</u>

Frequency (MHz)	Field Strength (uV/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

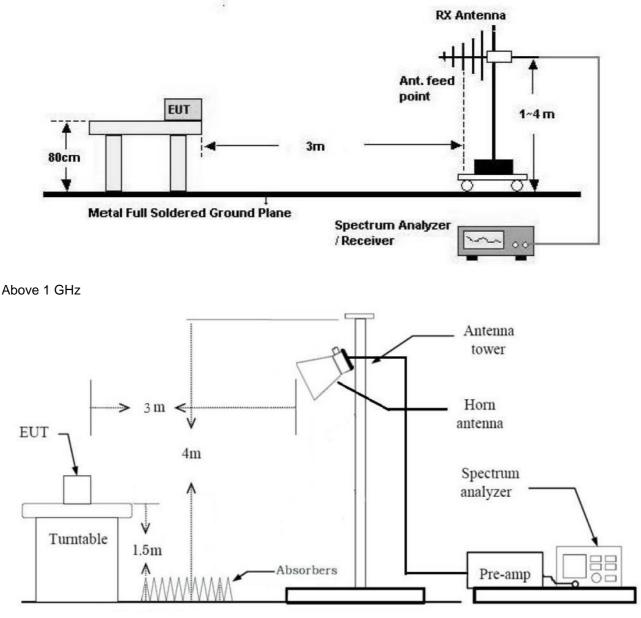
Test Configuration

Below 30 MHz





30 MHz - 1 GHz



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 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
- Distance Correction Factor(0.490 MHz 30 MHz) = 40log(3 m/30 m) = 40 dB Measurement Distance : 3 m
- 8. Spectrum Setting



- Frequency Range = 9 kHz ~ 30 MHz
- Detector = Peak
- Trace = Maxhold
- RBW = 9 kHz
- VBW ≥ 3 x RBW
- 9. Total = Reading 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.

- <u>Test Procedure of Radiated spurious emissions(Below 1GHz)</u> 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 = Maxhold
 - RBW = 100 kHz
 - VBW ≥ 3 x RBW
 - (2) Measurement Type(Quasi-peak):
 - Measured Frequency Range : 30 MHz 1 GHz
 - Detector = Quasi-Peak
 - RBW = 120 kHz
 - % In general, (1) is used mainly
- 7. Total = Reading 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. 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 = Maxhold
 - RBW = 1 MHz
 - VBW \ge 3 x RBW
 - (2) Measurement Type(Average):
 - We performed using a reduced video BW method was done with the analyzer in linear mode
 - Measured Frequency Range : 1 GHz 25 GHz
 - Detector = Peak
 - Trace = Maxhold
 - RBW = 1 MHz
 - VBW \ge 1/T Hz, where T = pulse width in seconds

The actual setting value of VBW = 1 kHz

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



Test Procedure of Radiated Restricted Band Edge

- 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 = Maxhold
 - RBW = 1 MHz
 - VBW \ge 3 x RBW
 - (2) Measurement Type(Average):
 - Detector = Peak
 - Trace = Maxhold
 - RBW = 1 MHz
 - VBW \ge 1/T Hz, where T = pulse width in seconds

The actual setting value of VBW = 1 kHz

- 9. Distance extrapolation factor = 20log (test distance / specific distance) (dB)
- 10. Total = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F)
- 11. 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.



8.8. AC Power line Conducted Emissions

<u>Limit</u>

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

Frequency Range (MHz)	Limits (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.
- 5. The EUT is the device operating below 30 MHz.
 - 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) = Reading 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, Stand alone + External accessories (Earphone, etc)
 - Worstcase : Stand alone
- 2. EUT Axis
 - Radiated Spurious Emissions : X, Y
 - 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
- $\pi/4DQPSK$: 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. SM-A326U, SM-A326U1/DS, SM-S326DL were tested and the worst case results are reported.
 - Worst case : SM-A326U
- 6. We were performed the RSE test in condition of co-location. There has no significant emission raised.
 - WWAN+WLAN 5GHz+BT

Radiated test(DBS)

- 1. All modes of operation were investigated and the worst case configuration results are reported.
 - Mode : Stand alone, Stand alone + External accessories(Earphone, etc)
 - Worstcase : Stand alone
- 2. EUT Axis
 - Radiated Spurious Emissions : X, Y
- 3. The following tables show the worst case configurations determined during testing.

Description	Bluetooth Emission	5 GHz Emission
Antenna	WIFI/BT	WIFI/BT
Channel	0	60
Data Rate	1 Mbps	6 Mbps
Mode	GFSK : DH5	802.11a

AC Power line Conducted Emissions

- 1. All modes of operation were investigated and the worst case configuration results are reported.
 - Mode : Stand alone + External accessories(Earphone, etc)+Travel Adapter, Stand alone+Travel Adapter
 - Worstcase : Stand alone + Travel Adapter
- 2. SM-A326U, SM-A326U1/DS, SM-S326DL were tested and the worst case results are reported.
 - Worst case : SM-A326U



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
- 3. SM-A326U, SM-A326U1/DS, SM-S326DL were tested and the worst case results are reported.
 - Worst case : SM-A326U



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		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 20dB BW		PASS
Number of Hopping Frequencies	§15.247(a)(1)(iii) ≥ 15 §15.247(a)(1)(iii) < 400 ms		Conducted	PASS
Time of Occupancy				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
§15.247(d),Radiated Spurious Emissions15.205,15.20915.209		cf. Section 8.7	Dedition in	PASS
Radiated Restricted Band Edge	§15.247(d), 15.205, 15.209	cf. Section 8.7	- Radiated	PASS

Note: Average Power data refer to SAR report



10. TEST RESULT

10.1 PEAK POWER

Channel	Frequency	-	t Power FSK)	Limit
	(MHz)	(dBm)	(mW)	(mW)
Low	2402	10.114	10.27	
Mid	2441	9.232	8.38	125
High	2480	8.301	6.76	

Channel	Frequency (MHz)	-	t Power PSK)	Limit
		(dBm)	(mW)	(mW)
Low	2402	9.262	8.44	
Mid	2441	8.271	6.72	125
High	2480	7.847	6.09	

Channel	Frequency (MHz)	Output Power (π/4DQPSK)		Limit
		(dBm)	(mW)	(mW)
Low	2402	9.414	8.74	
Mid	2441	8.432	6.97	125
High	2480	7.942	6.23	

Note:

1. Spectrum reading values are not plot data.

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

2. Actual value of loss for the splitter and cable combination is 6.97 dB at 2400 MHz and is 6.99 dB at 2500 MHz.

So, 6.99 dB is offset. And the offset gap in the 2.4 GHz range do not affect the conducted peak power final result.



Test Plots (GFSK) Peak Power (CH.0)

enter Fi	RF 50 Ω AC req 2.402000000	OHZ PN0: Fast ↔ IFGain:Low	SENSE:INT Trig: Free Run Atten: 24 dB	ALIGN AUTO #Avg Type: RMS Avg Hold: 1/1	01:41:31 PM Jan 26, 2021 TRACE 1 2 3 4 5 6 TYPE M WWWWW DET P P P P P P	Frequency
0 dB/div	Ref Offset 6.99 dB Ref 20.00 dBm			Mkr	1 2.402 030 GHz 10.114 dBm	Auto Tur
10.0			↓ 1			Center Fre 2.402000000 GF
0.00						Start Fre 2.399891820 Gi
20.0						Stop Fr 2.404108180 Gi
40.0						CF Ste 421.636 kl <u>Auto</u> M
50.0 						Freq Offs
70.0						
enter 2.4 Res BW	402000 GHz 3.0 MHz	#VB\	V 50 MHz	Sweep	Span 4.216 MHz 1.000 ms (1001 pts)	

Test Plots (GFSK) Peak Power (CH.39)

enter Freq 2.44100000	OGHz PNO: Fast ↔ IFGain:Low	Trig: Free Run Atten: 24 dB	#Avg Type: RMS Avg Hold: 1/1	TRACE 123456 TYPE MWWWW DET P P P P P P	Frequency
Ref Offset 6.99 dB dB/div Ref 20.00 dBm			Mkr1	2.441 029 GHz 9.232 dBm	Auto Tur
0.0		¹			Center Fre 2.441000000 Gi
0.0					Start Fr 2.438954588 G
0.0					Stop Fr 2.443045412 G
0.0					CF St 409.082 k
0.0					Auto M
0.0					Freq Offs 0
enter 2.441000 GHz Res BW 3.0 MHz		V 50 MHz		Span 4.091 MHz .000 ms (1001 pts)	



Test Plots (GFSK) Peak Power (CH.78)

LXI RL F	nalyzer - Swept SA ☞ 50 Ω AC 2.4800000000	GHz PNO: Fast ↔	SENSE:INT	ALIGNAUTO #Avg Type: RMS Avg Hold: 1/1	01:42:04 PM Jan 26, 2021 TRACE 1 2 3 4 5 6 TYPE M WWWWW DET P P P P P	Frequency
10 dB/div R	ef Offset 6.99 dB ef 20.00 dBm	PNU: Fast IFGain:Low	Atten: 24 dB		2.480 078 GHz 8.301 dBm	Auto Tune
10.0			1			Center Free 2.480000000 GH:
-10.0						Start Fre 2.477705210 GH
-20.0						Stop Fre 2.482294790 GH
40.0						CF Ste 458.958 kH <u>Auto</u> Ma
60.0						Freq Offso 0 ⊦
-70.0 Center 2.480		40 (B14)	50 MUL-		Span 4.590 MHz	
#Res BW 3.0	WHZ	#VBW	50 MHz	Sweep	1.000 ms (1001 pts) s	

Test Plots (8DPSK) Peak Power (CH.0)





Test Plots (8DPSK)

Peak Power (CH.39)

LXI RL	m Analyzer - Swept SA RF 50 Ω AC eq 2.441000000	GHz PNO: Fast ↔ IFGain:Low	SENSE:INT Trig: Free Run Atten: 24 dB	ALIGNAUTO #Avg Type: RMS Avg Hold: 1/1	01:43:14 PM Jan 26, 2021 TRACE 1 2 3 4 5 6 TYPE M WWWWW DET P P P P P P	Frequency
10 dB/div	Ref Offset 6.99 dB Ref 20.00 dBm	II Gam.Low		Mkr1	2.440 994 GHz 8.271 dBm	Auto Tune
10.0			1			Center Fred 2.441000000 GHz
-10.0						Start Fred 2.437807500 GH;
-20.0						Stop Free 2.444192500 GH:
-40.0						CF Stej 638.500 kH <u>Auto</u> Ma
-60.0						Freq Offse 0 H
	41000 GHz	#VBM	(50 MHz	Sween	Span 6.385 MHz	
#Res BW 3		#VBW	50 MHz	Sweep '	1.000 ms (1001 pts)	

Test Plots (8DPSK) Peak Power (CH.78)





Test Plots (π/4DQPSK) Peak Power (CH.0)

OV RL RF | 500 RL Center Freq 2.402000000 GHz PN0: Fast →→ IFGain:Low Atten: 24 dB Frequency #Avg Type: RMS Avg|Hold: 1/1 DET P P P P P P Auto Tune Mkr1 2.402 038 GHz 9.414 dBm Ref Offset 6.99 dB Ref 20.00 dBm 10 dB/div **Center Freq ≜**1 2,402000000 GHz Start Freq 2.398827500 GHz Stop Freq 2.405172500 GHz CF Step 634.500 kHz Man Auto Freq Offset 0 Hz Center 2.402000 GHz #Res BW 3.0 MHz Span 6.345 MHz Sweep 1.000 ms (1001 pts) #VBW 50 MHz

Test Plots (π/4DQPSK) Peak Power (CH.39)





Test Plots (π /4DQPSK)

Peak Power (CH.78)

XI RL	um Analyzer - Swept SA RF 50 Ω AC req 2.480000000	GHz PNO: Fast ↔	SENSE:INT Trig: Free Run Atten: 24 dB	#Avg Type Avg Hold:		01:42:50 PM TRACE TYPE DE	Jan 26, 2021 1 2 3 4 5 6 M WWWWWW P P P P P P	Frequency
10 dB/div	Ref Offset 6.99 dB Ref 20.00 dBm	II Gam.Low		Ν	/kr1 2.4	79 917 7.94	32 GHz 2 dBm	Auto Tune
10.0			1					Center Fred 2.480000000 GH
-10.00								Start Fre 2.476820000 GH
20.0								Stop Fre 2.483180000 G⊦
40.0								CF Ste 636.000 kH <u>Auto</u> Ma
60.0								Freq Offso 0 ⊦
	180000 GHz						360 MHz	
Res BW	3.0 MHZ	#VBW	50 MHz		Sweep 1. STATUS	.000 ms (1	001 pts)	



10.2 BAND EDGES

Without hopping

Outside Frequency Pand	GFSK	8DPSK	π/4DQPSK	Limit	
Outside Frequency Band	(dB)	(dB)	(dB)	(dBc)	
Lower	66.107	57.307	56.742	20	
Upper	66.445	66.410	66.641	20	

With hopping

Outoido Eroguenev Pand	GFSK	8DPSK	π/4DQPSK	Limit
Outside Frequency Band	(dB)	(dB)	(dB)	(dBc)
Lower	67.645	57.172	58.059	20
Upper	67.459	64.946	63.540	20

Note :

1. Spectrum reading values are not plot data.

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

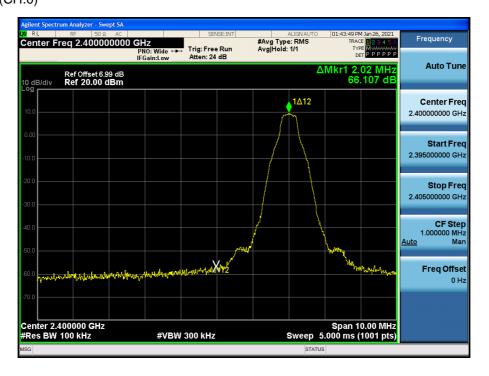
2. Actual value of loss for the splitter and cable combination is 6.97 dB at 2400 MHz

and is 6.99 dB at 2500 MHz.

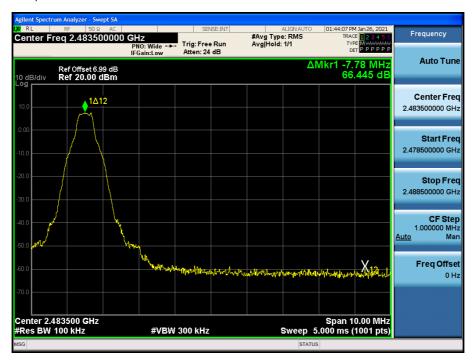
So, 6.99 dB is offset. And the offset gap in the 2.4 GHz range do not affect the conducted peak power final result.



Test Plots without hopping (GFSK) Band Edges (CH.0)



Test Plots without hopping (GFSK) Band Edges (CH.78)



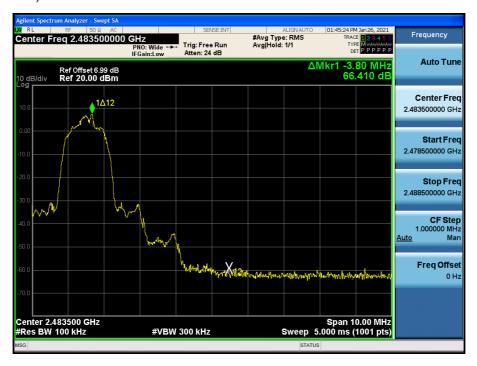


Test Plots without hopping (8DPSK)

Band Edges (CH.0)



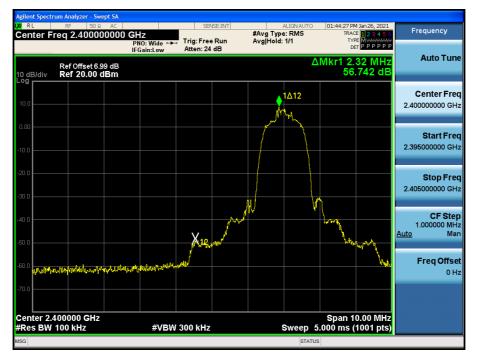
Test Plots without hopping (8DPSK) Band Edges (CH.78)



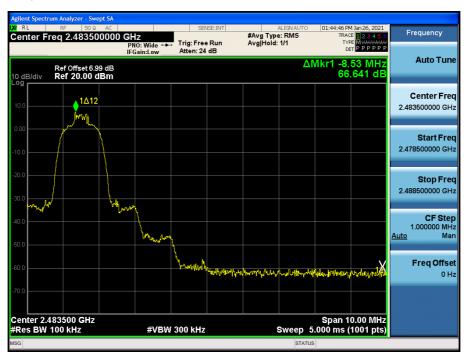


Test Plots without hopping (π /4DQPSK)

Band Edges (CH.0)

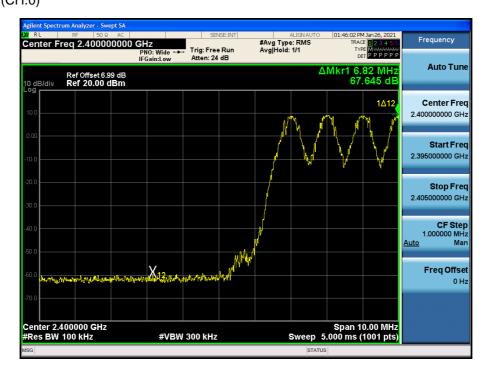


Test Plots without hopping (π /4DQPSK) Band Edges (CH.78)

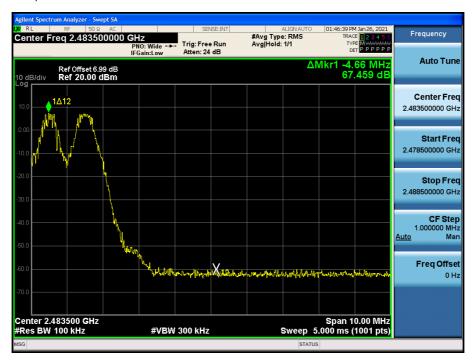




Test Plots with hopping (GFSK) Band Edges (CH.0)



Test Plots with hopping (GFSK) Band Edges (CH.78)





Test Plots with hopping (8DPSK)

Band Edges (CH.0)



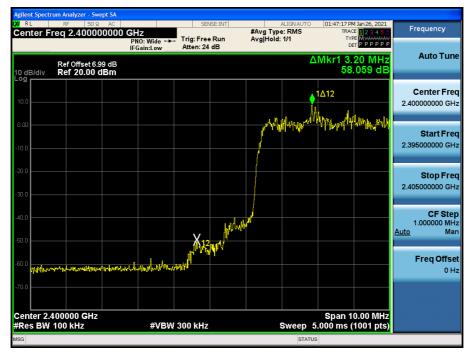
Test Plots with hopping (8DPSK) Band Edges (CH.78)





Test Plots with hopping (π /4DQPSK)

Band Edges (CH.0)



Test Plots with hopping (π /4DQPSK) Band Edges (CH.78)





10.3 FREQUENCY SEPARATION / OCCUPIED BANDWIDTH (99% BW)

99% BW (kHz)										
Channel GFSK 8DPSK π/4DQPSK										
CH.0	758.96	1154.0	1153.2							
CH.39	754.50	1154.0	1145.9							
CH.78	772.19	1165.4	1157.7							

20dB BW (kHz)										
ChannelGFSK8DPSKπ/4DQPSK										
CH.0	843.3	1276	1269							
CH.39	818.2	1277	1258							
CH.78	917.9	1284	1272							

	Channel Separation(kHz)						
GFSK	8DPSK	π/4DQPSK	(kHz)				
			>25 kHz				
958	1044	1014	or				
			>2/3 of the 20dB BW				



Test Plots (GFSK)

Channel Separation

RL	RF	er - Swept SA 50 ฉ AC 41000000				#Avg Typ Avg Hold		TRAC	4 Jan 26, 2021 E <mark>1 2 3 4 5 6</mark> E M WWWWWW	Frequency
0 dB/div		set 6.99 dB 6 .99 dBm	PNO: Wide IFGain:Low					DE 1kr3 1.0	TPPPPP	Auto Tun
6.99 3.01 13.0	~~~	~X12	man -		\1∆12 \4\	m.	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	304		Center Fre 2.441000000 GH
23.0 33.0 43.0										Start Fre 2.439500000 GH
53.0 63.0 73.0										Stop Fre 2.442500000 GF
enter 2.4 Res BW	30 kHz		#V	BW 100 KH				3.176 ms	<u> </u>	CF Ste 300.000 kł Auto Ma
		×	958 kHz	γ (Δ) 0.10(ICTION FU	NCTION WIDTH	FUNCTIO	IN VALUE	
2 3 Δ4 1 4 F 1 5	f (A)		1.038 MHz 10 978 GHz	(Δ) 0.173 6.379 c						Freq Offs 0 F
6 7 8 9 9										
				Ш					>	
G 🕕 Point	s change	ed; all traces	cleared				STATUS	6		

Test Plots (8DPSK) Channel Separation





Test Plots (π/4DQPSK)

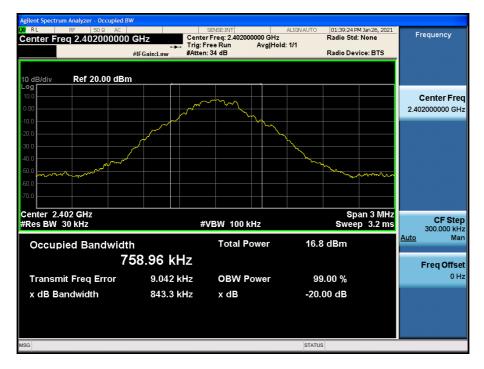
Channel Separation

		nalyzer - Swept									
Center F	Ri	50 Ω / 2.4410000		SE	VSE:INT	#Avg Type	ALIGN AUTO		1 Jan 26, 2021 E <mark>1 2 3 4 5 6</mark>	Frequency	
Gentern	req	2.4410000	PNO: Wide			Avg Hold:		TYP	E MWWWWW T P P P P P P		
			IFGain:Lov	w whiteh. 2			A 8	alera 4 0		Auto Tu	ine
10 dB/div		f Offset 6.99 f 16.99 dB						1kr3 1.0 -0.	720 dB		
Log 6.99		v——			1Δ12			3∆4		Center Fr	ner
-3.01	$\sim \alpha$	Alenhar	Longer	mon	Am	~	\sim	mm	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	2.441000000 G	•
-13.0	<i>4 1</i>						· · · ·				=
-23.0										01. I F	
-33.0										Start Fr 2.439500000 G	
-43.0										2.439500000 G	ΠZ
-53.0											
-63.0										Stop Fr	
-73.0										2.442500000 G	Hz
Center 2. #Res BW			#V	'BW 100 kHz			Sweep	Span 3. 3.176 ms	.000 MHz (900 pts)	CF St 300.000 k	кНz
MKR MODE T			Х	Y	FUNC	TION FUN	CTION WIDTH	FUNCTIO	IN VALUE	Auto M	lan
1 <u>Δ12</u>	1 f	(Δ)	1.151 MHz								
3 Δ4 ·		(Δ)	1.014 MHz 2.440 988 GHz	(∆) -0.720 5.499 d						Freq Offs	
5			2.440 300 0112	0.400 0	5111				=	0	Hz
6											
8	+-										
10											
<				Ш					>		
<mark>мsg</mark> i Poin	its cha	anged; all trad	ces cleared				STATUS	5			



Test Plots (GFSK)

20 dB Bandwidth & Occupied Bandwidth (CH.0)



Test Plots (GFSK)

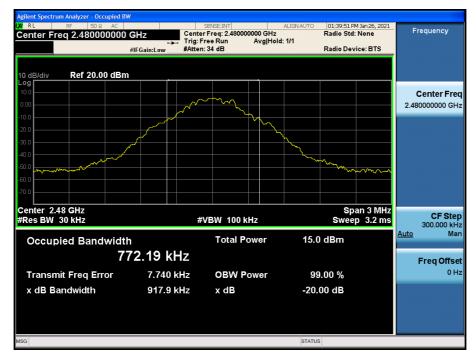
20 dB Bandwidth & Occupied Bandwidth (CH.39)





Test Plots (GFSK)

20 dB Bandwidth & Occupied Bandwidth (CH.78)



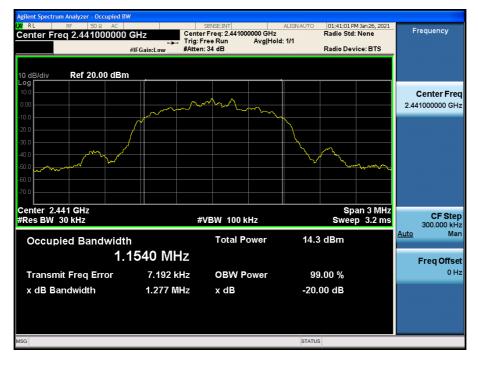
Test Plots (8DPSK) 20 dB Bandwidth & Occupied Bandwidth (CH.0)





Test Plots (8DPSK)

20 dB Bandwidth & Occupied Bandwidth (CH.39)



Test Plots (8DPSK)

20 dB Bandwidth & Occupied Bandwidth (CH.78)





Test Plots (π /4DQPSK)

20 dB Bandwidth & Occupied Bandwidth (CH.0)



Test Plots (π/4DQPSK)

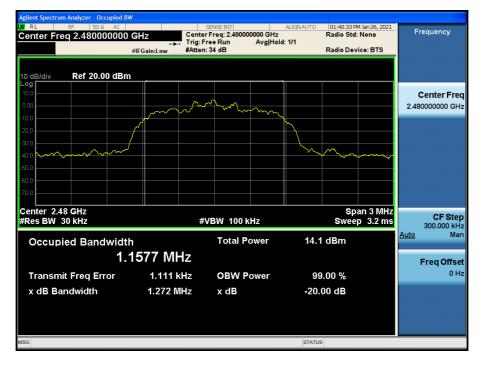
20 dB Bandwidth & Occupied Bandwidth (CH.39)





Test Plots (π/4DQPSK)

20 dB Bandwidth & Occupied Bandwidth (CH.78)





10.4 NUMBER OF HOPPING FREQUENCY

	Result (No. of CH)		
GFSK	8DPSK	Limit	
79	79	79	>15

Note :

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



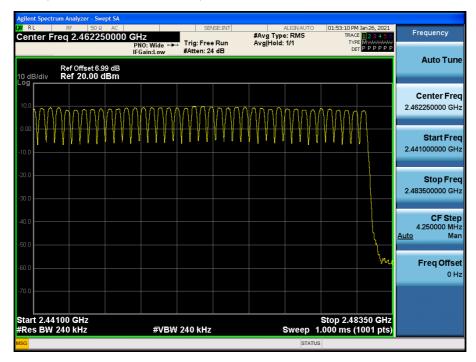
Test Plots (GFSK)

Number of Channels (2.4 GHz - 2.441 GHz)



Test Plots (GFSK)

Number of Channels (2.441 GHz - 2.483.5 GHz)





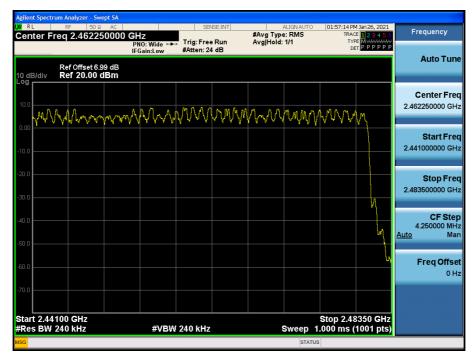
Test Plots (8DPSK)

Number of Channels (2.4 GHz - 2.441 GHz)

XIRL	rum Analyzer - Swe RF 50 Ω Teq 2.42050	AC 0000 GI	Hz NO: Wide ↔	. Trig: Free		#Avg Type Avg Hold:		TRAC	1 Jan 26, 2021 E 1 2 3 4 5 6 E M WWWWWWW	Frequency
10 dB/div	Ref Offset 6.9 Ref 20.00 d	9 dB	Gain:Low	#Atten: 24	l dB			De	17 F F F F F	Auto Tune
10.0	vvvvv	VVVV	WW		ww		ΛΛΛΛ		WW	Center Fred 2.420500000 GH:
-10.0										Start Free 2.400000000 GH
-20.0										Stop Fre 2.441000000 GH
40.0 + d 50.0 + d 50.0										CF Ste 4.100000 MH <u>Auto</u> Ma
70.0										Freq Offse 0 H
	0000 GHz 240 kHz		#VBW	240 kHz			Sweep 1	Stop 2.44 .000 ms (100 GHz 1001 pts)	
ISG							STATUS	``````````````````````````````````````		

Test Plots (8DPSK)

Number of Channels (2.441 GHz - 2.483.5 GHz)





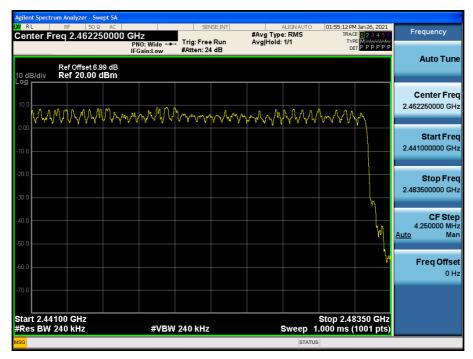
Test Plots (π/4DQPSK)

Number of Channels (2.4 GHz - 2.441 GHz)

LXI RL	rum Analyzer - Swe RF 50 Ω req 2.42050	AC	7	SEI	ISE:INT	#Avg Type	ALIGN AUTO	TRAC	4 Jan 26, 2021 E 1 2 3 4 5 6	Frequency
	Ref Offset 6.9	PN IFC 9 dB	IC: Wide ↔ Gain:Low	. Trig: Free #Atten: 24		Avg Hold:		TYF	TPPPPP	Auto Tune
10 dB/div Log 10.0	Ref 20.00 d				MM	nnn	ሊጠሏል	ለአለሴ	ากกุล	Center Freq 2.420500000 GHz
-10.0									V * T U	Start Fred 2.400000000 GHz
-20.0										Stop Fred 2.441000000 GH:
-40.0										CF Step 4.100000 MH <u>Auto</u> Ma
-60.0										Freq Offse 0 H
-70.0 Start 2.40 #Res BW	0000 GHz		#VBW	240 kHz					100 GHz 1001 pts)	
<mark>//SG</mark>							STATUS			

Test Plots (π/4DQPSK)

Number of Channels (2.441 GHz - 2.483.5 GHz)





10.5 TIME OF OCCUPANCY (DWELL TIME)

	Channel	GFSK	8DPSK	π/4DQPSK	
Pulse Time	Low	2.880	2.885	2.885	
(ms)	Mid	2.880	2.885	2.880	
	High	2.880	2.885	2.885	

Non-AFH Mode

	Channel	GFSK	8DPSK	π/4DQPSK	Period Time (s)	Limit (ms)
Total of Dwell	Low	307.20	307.73	307.73	31.6	
(ms)	Mid	307.20	307.73	307.20	31.6	400
	High	307.20	307.73	307.73	31.6	

AFH Mode

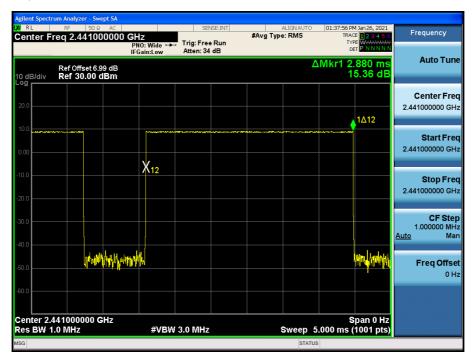
	Channel	GFSK	8DPSK π/4DQPSK		Period Time (s)	Limit (ms)
Total of Dwell	Low	153.60	153.87	153.87	8.0	
(ms)	Mid	153.60	153.87	153.60	8.0	400
	High	153.60	153.87	153.87	8.0	



Test Plots (GFSK) Dwell Time (CH.0)



Test Plots (GFSK) Dwell Time (CH.39)

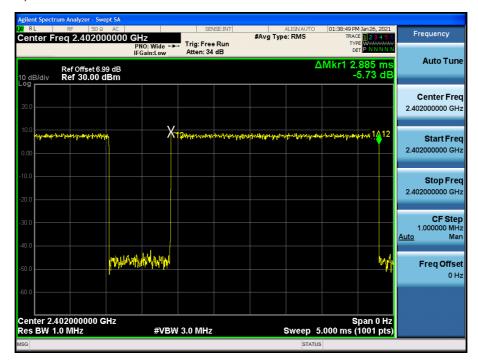




Test Plots (GFSK) Dwell Time (CH.78)

RL	RF 50 Ω AC		SENSE:INT		ALIGN AUTO	01:38:05 PM Jan 26, 2021	
enter F	req 2.480000000	GH ₇	ree Run	#Avg Typ	e: RMS	TRACE 123456 TYPE WWWWWW DET PNNNNN	Frequency
0 dB/div	Ref Offset 6.99 dB Ref 30.00 dBm				1	∆Mkr1 2.880 ms -7.84 dB	Auto Tune
20.0							Center Fred 2.480000000 GH;
10.0 <mark>X 12 ~</mark> 0.00				1∆12			Start Free 2.480000000 GH:
20.0							Stop Fre 2.480000000 GH
0.0							CF Ste 1.000000 M⊦ <u>Auto</u> Ma
50.0				ywellyndegod	with MA		Freq Offse 0 H
50.0							
enter 2.4 tes BW 1	480000000 GHz .0 MHz	#VBW 3.0 MH	Iz		Sweep	Span 0 Hz 5.000 ms (1001 pts)	
SG					STATU	s	

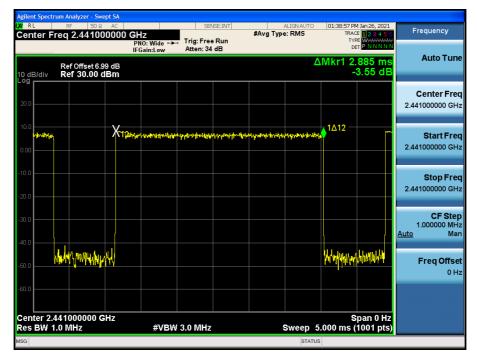
Test Plots (8DPSK) Dwell Time (CH.0)



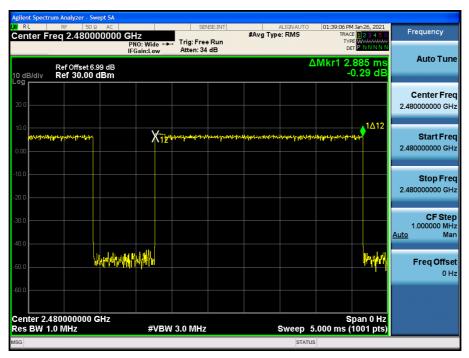


Test Plots (8DPSK)

Dwell Time (CH.39)



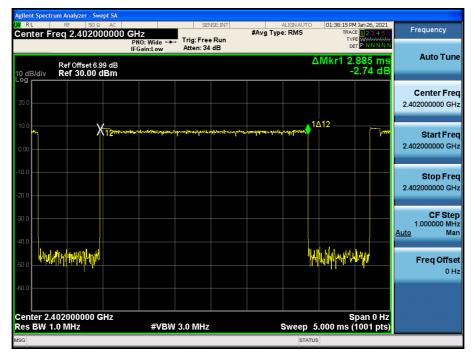
Test Plots (8DPSK) Dwell Time (CH.78)





Test Plots (π/4DQPSK)

Dwell Time (CH.0)



Test Plots (π/4DQPSK) Dwell Time (CH.39)





Test Plots (π /4DQPSK)

Dwell Time (CH.78)

Ref offset 6 39 dB LINIK T 2.880 mis 10 dB/div Ref 30.00 dBm 1.77 dB 200 1.77 dB 2.480000 100 1.12 1.412 100 1.12 1.412 100 1.12 1.412 200 1.12 1.412 200 1.12 1.412 200 1.12 1.412 2.480000 1.100 2.00 1.100 2.00 1.12 2.00 1.100 2.00 1.100 2.00 1.100 2.00 1.100 2.00 1.100 2.00 1.100	X RL Center Fr	RF 50 Ω AC req 2.4800000		SENSE:INT Trig: Free Run Atten: 34 dB	A #Avg Type	LIGN AUTO : RMS	TRAC	4 Jan 26, 2021 E <mark>1 2 3 4 5 6</mark> WWWWWWWW T P NNNNN	Frequency
20.0						Δ	Mkr1 2.	885 ms 1.77 dB	Auto Tu
0.00 12 <									Center Fr 2.480000000 G
		X12	hengentetterkapsan hanna	างกรุงสายสายสายสายสายสายสายสายสายสายสายสายสายส	ynnin sylwerten te	1Δ12		j~~~jorodor-special	Start Fr 2.480000000 G
									Stop Fr 2.480000000 G
									CF St 1.000000 M <u>Auto</u> M
						whith	lunte hererty		Freq Offs 0
Center 2.480000000 GHz Span 0 Hz Res BW 1.0 MHz #VBW 3.0 MHz Sweep 5.000 ms (1001 pts)	Center 2.4		#VBM	3.0 MHz		Sween 5	S 000 ms (pan 0 Hz	



10.6 SPURIOUS EMISSIONS

10.6.1 CONDUCTED SPURIOUS EMISSIONS

Test Result : please refer to the plot below.

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

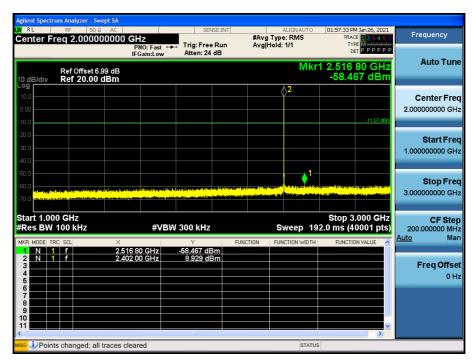


Test Plots (GFSK)- 30 MHz - 1 GHz

Spurious Emission (CH.0)

Agilent Spectr	r <mark>um Analyzer - Swe</mark> RF 50 Ω			SEN	ISE:INT		ALIGNAUTO	01:57:44 PM	4 Jan 26, 2021	_
Center F	req 515.000		z NO:Fast ↔	. Trig: Free		#Avg Type Avg Hold:		TYP	^ж 123456 е М илили т Р Р Р Р Р Р	Frequency
			Gain:Low	Atten: 24	dB		M		49 MHz	Auto Tune
10 dB/div Log	Ref Offset 6.9 Ref 20.00 d						IVI		44 dBm	
										Center Fred
10.0										515.000000 MHz
0.00										
-10.0									-11.07 dBm	Start Freq 30.000000 MHz
- 10,0										
-20.0										Stop Fred
-30.0										1.000000000 GHz
										CF Step
-40.0										97.000000 MH: Auto Mar
-50.0										Auto Man
-60.0						1				Freq Offset
and and an	thing below the state	յուսը երել ելի	, it is the second second	alamendudet.e	aldalata kat	a line of the state	, succession of the	n phoneson (0 Hz
يسليلارين، 70.0-	, Madada Marata Marija (Marata Marata (Marata (Marata (Marata (Marata (Marata (Marata (Marata (Marata (Marata (ىل <mark>ەر تارىزىلەر بېرىز بەرك</mark>	. ar an tao kan yang paking katakan sa	n nan finanti ni inan	i dinang kalakas di dinang p	. A la Brid Bill a la Andre a la Andre	المتراقلة التقارير 			
Start 30.0								Stop 4 (2 0000 GHz	
#Res BW			#VBW	300 kHz		s	weep 93	33 ms (2	0000 GH2 0000 pts)	
usg 🗼 Point	ts changed; all t	races clear	ed				STATUS			

Test Plots (GFSK)- 1 GHz – 3 GHz



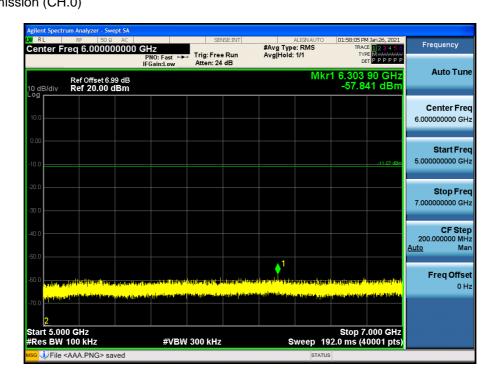


Test Plots(GFSK)- 3 GHz - 5 GHz

Spurious Emission (CH.0)

U RL	rum Analyzer - Swept S RF 50 Ω A(req 4.0000000		SENSE:INT Trig: Free Run Atten: 24 dB	ALIGNAUTO #Avg Type: RMS Avg Hold: 1/1	01:57:54 PM Jan 26, 2021 TRACE 1 2 3 4 5 6 TYPE MWWWW DET P P P P P P	Frequency
I0 dB/div	Ref Offset 6.99 dl Ref 20.00 dBn	8		Mkr	1 3.621 85 GHz -56.631 dBm	Auto Tune
10.0						Center Free 4.000000000 GH
10.0					-11.07 dBm	Start Fre 3.000000000 GH
20.0						Stop Fre 5.000000000 GF
40.0						CF Ste 200.000000 M⊦ <u>Auto</u> Ma
60.0 <mark>jinaraju</mark> i	an a			verzen in independentationen af sammer af	an ar an an an ar an	Freq Offs 0 F
70.0 2 Start 3.00	A GHZ	gehoodie and the	den file del por file and transfer	روی اور	Stop 5.000 GHz	
Res BW			300 kHz	Sweep 19	92.0 ms (40001 pts)	

Test Plots (GFSK)- 5 GHz - 7 GHz Spurious Emission (CH.0)



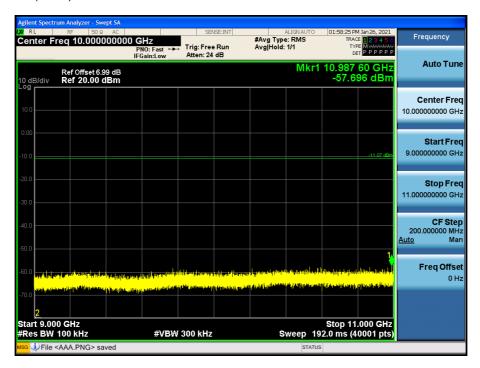


Test Plots(GFSK)- 7 GHz - 9 GHz

Spurious Emission (CH.0)

XI RL	rum Analyzer - Swept S/ RF 50 Q AC req 8.0000000		. Trig: Free		#Avg Type Avg Hold:		TRAC	I Jan 26, 2021 E 1 2 3 4 5 6 E M WWWWWW T P P P P P P	Frequency
10 dB/div	Ref Offset 6.99 dB Ref 20.00 dBm		Atten: 24	dB		Mkr	1 7.554		Auto Tune
10.0									Center Fre 8.000000000 GH
10.00								-11.07 dBm	Start Fre 7.000000000 G⊦
20.0 30.0									Stop Fre 9.00000000 GF
40.0									CF Ste 200.000000 Mł <u>Auto</u> Mł
and the second	alya hadala ya kasana ya kata da ana ya kasa	1 (anatotile skihi) and there are anatotic space (the top as poster							Freq Offs 0 H
^{70.0} 2 Start 7.00 #Res BW	10 GHz		300 kHz					000 GHz	
	<aaa.png> saved</aaa.png>	#VDV	JUU KHZ			status		000 T pts)	

Test Plots(GFSK)- 9 GHz - 11 GHz



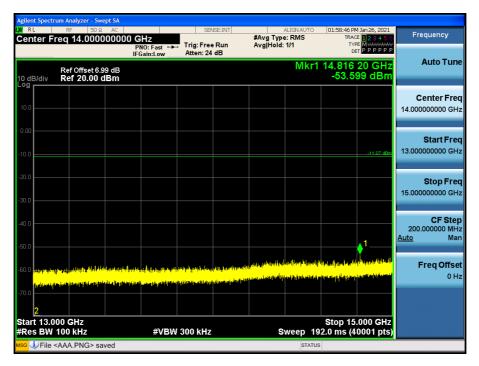


Test Plots(GFSK) 11 GHz - 13 GHz

Spurious Emission (CH.0)

XIRL	rum Analyzer - Swept SA RF 50 Ω AC req 12.0000000		SENSE:INT	ALIGNAUTO #Avg Type: RMS Avg[Hold: 1/1	01:58:36 PM Jan 26, 2021 TRACE 1 2 3 4 5 6 TVPE M WWWWW DET P P P P P	Frequency
10 dB/div	Ref Offset 6.99 dB Ref 20.00 dBm	IFGain:Low	Atten: 24 dB		оет Р Р Р Р Р Р 11.695 70 GHz -57.676 dBm	Auto Tune
10.0						Center Fre 12.000000000 GH
10.00					-11.07 dBm	Start Fre 11.000000000 GH
-20.0						Stop Fre 13.000000000 GH
40.0						CF Ste 200.000000 MH <u>Auto</u> Ma
60.0 <mark>герійник</mark>				us de della politica esta sedit for esta d 10 - guarde de la completa de la comp		Freq Offse 0 ⊢
^{.70.0} 2 Start 11.0	000 GHz				Stop 13.000 GHz	
Res BW	<pre>400 kHz 400 kHz 400 kHz</pre>	#VBW	300 kHz	Sweep 19	2.0 ms (40001 pts)	

Test Plots (GFSK)- 13 GHz – 15 GHz



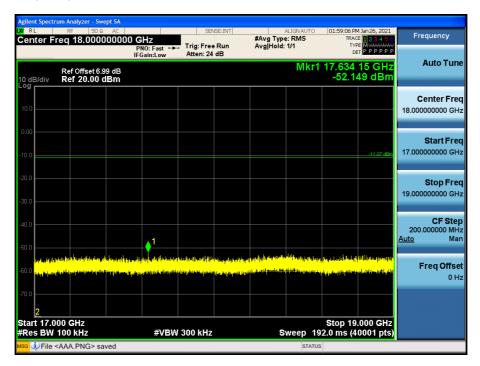


Test Plots(GFSK)- 15 GHz - 17 GHz

Spurious Emission (CH.0)

URL	um Analyzer - Swept S RF 50 Q A(req 16.000000	<u> </u>	SENSE:INT	ALIGN #Avg Type: RM Avg Hold: 1/1	IS TRACI	Jan 26, 2021 1 2 3 4 5 6 M WWWWWW P P P P P P	Frequency
I0 dB/div	Ref Offset 6.99 dl Ref 20.00 dBn		Atten: 24 dB	N	/kr1 15.178		Auto Tuno
- og 10.0							Center Free 16.000000000 GH
10.0							Start Fre 15.00000000 GH
30.0							Stop Fre 17.00000000 G⊢
40.0	1						CF Ste 200.000000 MH Auto Ma
60.0 <mark>44104999</mark>			kanting bilang baga pang ng bina bala Independeng bana pang ng bina baga		and the second	<mark>Hadrodin Hodro</mark> Manistan Media	Freq Offs 0 ⊦
70.0 2 Start 15.0 #Res BW		#) (P)A(300 kHz	Swoo	Stop 17. p 192.0 ms (40	000 GHz	
_	<pre><aaa.png> saved</aaa.png></pre>	#VDVV	500 KHZ	Swee	STATUS	oo rptsj	

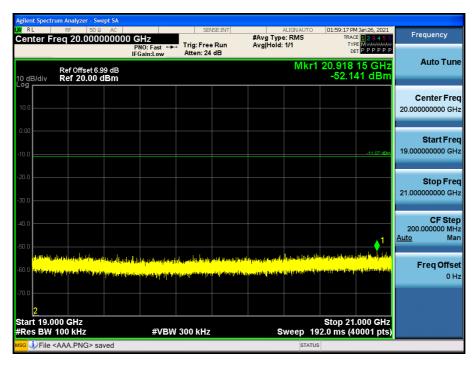
Test Plots(GFSK)- 17 GHz - 19 GHz



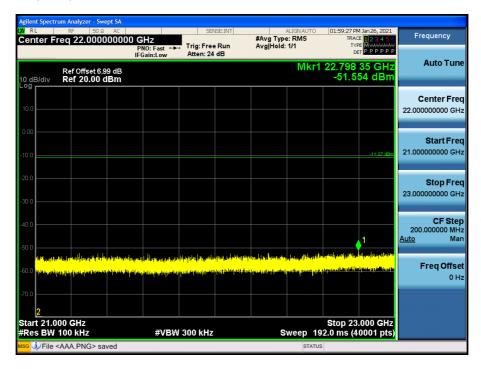


Test Plots (GFSK)- 19 GHz - 21 GHz

Spurious Emission (CH.0)



Test Plots (GFSK)- 21 GHz - 23 GHz





Test Plots (GFSK)- 23 GHz - 25 GHz

URL	RF 50 Ω			SEN	VSE:INT		ALIGN AUTO		1 Jan 26, 2021	
Center F	req 24.00000		GHz PNO: Fast ↔ FGain:Low	Trig: Free Atten: 24		#Avg Type Avg Hold:		TYP	E 123456 E M WWWWW T P P P P P P	Frequency
0 dB/div	Ref Offset 6.99 Ref 20.00 di	dB					Mkr1	24.216 -46.7	00 GHz 84 dBm	Auto Tur
- og 10.0										Center Fre 24.00000000 GF
10.00										Start Fre 23.000000000 GH
20.0										Stop Fr 25.00000000 G
40.0					and by	1	L		the set for a	CF Ste 200.000000 Mi <u>Auto</u> Mi
50.0 (1999) 60.0 (1999)	en sala ka talata yana talah ka ka sa Ang bayatan yana na kana talah talah s	an de faction de la composition de la c Na composition de la c	la a piang pananan Talang panananan	ing a second s		a second second	and the second second			Freq Offs
70.0 2										
Start 23.0	000 GHz 100 kHz		#\/B\A	/ 300 kHz			ween 10	Stop 25 2.0 ms (4	.000 GHz	
	<pre><aaa.png> save</aaa.png></pre>		#VDV	500 KHZ			status	2.0 115 (4	ooo i pisj	



10.6.2 RADIATED SPURIOUS EMISSIONS

Frequency Range : 9 kHz – 30MHz

Frequency	Reading	Ant. factor	Cable loss	Ant. POL	Total	Limit	Margin	
MHz	dBuV/m	dBm/m	dBm	(H/V)	dBuV/m	dBuV/m	dB	
No Critical peaks found								

Note:

1. The reading 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 (dBuV) + Distance extrapolation factor
- 4. Radiated test is performed with hopping off.

Frequency Range : Below 1 GHz

Frequency	Reading	Ant. factor	Cable loss	Ant. POL	Total	Limit	Margin		
MHz	dBuV/m	dBm/m	dBm	(H/V)	dBuV/m	dBuV/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

Operation Mode: CH Low(GFSK)

Frequency [MHz]	Reading [dBuV]	A.F+C.L-A.G+D.F [dB]	Pol. [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4804	42.45	2.30	V	44.75	73.98	29.23	PK
4804	31.51	2.30	V	33.81	53.98	20.17	AV
7206	38.12	12.07	V	50.19	73.98	23.79	PK
7206	25.11	12.07	V	37.18	53.98	16.80	AV
4804	42.88	2.30	Н	45.18	73.98	28.80	PK
4804	31.88	2.30	Н	34.18	53.98	19.80	AV
7206	38.46	12.07	Н	50.53	73.98	23.45	PK
7206	25.55	12.07	Н	37.62	53.98	16.36	AV

Operation Mode: CH Mid(GFSK)

Frequency	Reading	A.F+C.L-A.G+D.F	Pol.	Total	Limit	Margin	Measurement
[MHz]	[dBuV]	[dB]	[H/V]	[dBuV/m]	[dBuV/m]	[dB]	Туре
4882	42.52	1.83	V	44.35	73.98	29.63	PK
4882	30.94	1.83	V	32.77	53.98	21.21	AV
7323	38.45	11.05	V	49.50	73.98	24.48	PK
7323	25.39	11.05	V	36.44	53.98	17.54	AV
4882	43.42	1.83	н	45.25	73.98	28.73	PK
4882	31.57	1.83	Н	33.40	53.98	20.58	AV
7323	38.94	11.05	Н	49.99	73.98	23.99	PK
7323	25.74	11.05	Н	36.79	53.98	17.19	AV

Operation Mode: CH High(GFSK)

Frequency	Reading	A.F+C.L-A.G+D.F	Pol.	Total	Limit	Margin	Measurement
[MHz]	[dBuV]	[dB]	[H/V]	[dBuV/m]	[dBuV/m]	[dB]	Туре
4960	42.35	2.59	V	44.94	73.98	29.04	PK
4960	30.19	2.59	V	32.78	53.98	21.20	AV
7440	37.58	11.91	V	49.49	73.98	24.49	PK
7440	24.55	11.91	V	36.46	53.98	17.52	AV
4960	42.92	2.59	Н	45.51	73.98	28.47	PK
4960	31.02	2.59	Н	33.61	53.98	20.37	AV
7440	38.02	11.91	Н	49.93	73.98	24.05	PK
7440	24.94	11.91	н	36.85	53.98	17.13	AV



Operation Mode: CH Low(π/4DQPSK)

Frequency [MHz]	Reading [dBuV]	A.F+C.L-A.G+D.F [dB]	Pol. [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4804	42.12	2.30	V	44.42	73.98	29.56	PK
4804	29.58	2.30	V	31.88	53.98	22.10	AV
7206	38.55	12.07	V	50.62	73.98	23.36	PK
7206	24.42	12.07	V	36.49	53.98	17.49	AV
4804	42.48	2.30	н	44.78	73.98	29.20	PK
4804	29.88	2.30	Н	32.18	53.98	21.80	AV
7206	38.92	12.07	н	50.99	73.98	22.99	PK
7206	24.81	12.07	Н	36.88	53.98	17.10	AV

Operation Mode: CH Mid(π/4DQPSK)

Frequency	Reading	A.F+C.L-A.G+D.F	Pol.	Total	Limit	Margin	Measurement
[MHz]	[dBuV]	[dB]	[H/V]	[dBuV/m]	[dBuV/m]	[dB]	Туре
4882	42.22	1.83	V	44.05	73.98	29.93	PK
4882	29.25	1.83	V	31.08	53.98	22.90	AV
7323	39.12	11.05	V	50.17	73.98	23.81	PK
7323	25.33	11.05	V	36.38	53.98	17.60	AV
4882	42.71	1.83	н	44.54	73.98	29.44	PK
4882	29.71	1.83	н	31.54	53.98	22.44	AV
7323	39.26	11.05	н	50.31	73.98	23.67	PK
7323	25.53	11.05	Н	36.58	53.98	17.40	AV

Operation Mode: CH High(π /4DQPSK)

Frequency [MHz]	Reading [dBuV]	A.F+C.L-A.G+D.F [dB]	Pol. [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4960	41.71	2.59	V	44.30	73.98	29.68	PK
4960	28.98	2.59	V	31.57	53.98	22.41	AV
7440	37.95	11.91	V	49.86	73.98	24.12	PK
7440	24.12	11.91	V	36.03	53.98	17.95	AV
4960	42.58	2.59	Н	45.17	73.98	28.81	PK
4960	29.51	2.59	н	32.10	53.98	21.88	AV
7440	38.33	11.91	н	50.24	73.98	23.74	PK
7440	24.68	11.91	Н	36.59	53.98	17.39	AV



Operation Mode: CH Low(8DPSK)

Frequency [MHz]	Reading [dBuV]	A.F+C.L-A.G+D.F [dB]	Pol. [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4804	42.11	2.30	V	44.41	73.98	29.57	PK
4804	29.48	2.30	V	31.78	53.98	22.20	AV
7206	38.42	12.07	V	50.49	73.98	23.49	PK
7206	24.38	12.07	V	36.45	53.98	17.53	AV
4804	42.40	2.30	Н	44.70	73.98	29.28	PK
4804	29.84	2.30	н	32.14	53.98	21.84	AV
7206	38.69	12.07	Н	50.76	73.98	23.22	PK
7206	24.88	12.07	Н	36.95	53.98	17.03	AV

Operation Mode: CH Mid(8DPSK)

Frequency	Reading	A.F+C.L-A.G+D.F	Pol.	Total	Limit	Margin	Measurement
[MHz]	[dBuV]	[dB]	[H/V]	[dBuV/m]	[dBuV/m]	[dB]	Туре
4882	42.35	1.83	V	44.18	73.98	29.80	PK
4882	29.32	1.83	V	31.15	53.98	22.83	AV
7323	39.10	11.05	V	50.15	73.98	23.83	PK
7323	25.22	11.05	V	36.27	53.98	17.71	AV
4882	42.83	1.83	Н	44.66	73.98	29.32	PK
4882	29.67	1.83	Н	31.50	53.98	22.48	AV
7323	39.27	11.05	Н	50.32	73.98	23.66	PK
7323	25.55	11.05	Н	36.60	53.98	17.38	AV

Operation Mode: CH High(8DPSK)

Frequency [MHz]	Reading [dBuV]	A.F+C.L-A.G+D.F [dB]	Pol. [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4960	41.75	2.59	V	44.34	73.98	29.64	PK
4960	28.88	2.59	V	31.47	53.98	22.51	AV
7440	38.12	11.91	V	50.03	73.98	23.95	PK
7440	24.12	11.91	V	36.03	53.98	17.95	AV
4960	42.31	2.59	Н	44.90	73.98	29.08	PK
4960	29.55	2.59	н	32.14	53.98	21.84	AV
7440	38.41	11.91	н	50.32	73.98	23.66	PK
7440	24.64	11.91	Н	36.55	53.98	17.43	AV



[DBS Mode]

WLAN/BT Ant : 802.11a_ch 60 & Bluetooth_Ch 0 (GFSK)

Operation Mode:	802.11a & GFSK
Transfer Rate (MCS Index):	6 Mbps & 1 Mbps
Operating Frequency	5300 & 2402 MHz
Channel No.	60 Ch & 0 Ch

Frequency [MHz]	Reading [dBuV]	A.F+C.L-A.G+D.F [dB]	Pol. [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4804	42.13	2.30	V	44.43	73.98	29.55	PK
4804	31.48	2.30	V	33.78	53.98	20.20	AV
7206	37.85	12.07	V	49.92	73.98	24.06	PK
7206	24.85	12.07	V	36.92	53.98	17.06	AV
4804	42.52	2.30	Н	44.82	73.98	29.16	PK
4804	31.62	2.30	Н	33.92	53.98	20.06	AV
7206	38.35	12.07	Н	50.42	73.98	23.56	PK
7206	25.32	12.07	Н	37.39	53.98	16.59	AV

Note : WLAN DBS Data refer to UNII Test Report.



RESULT PLOTS

Radiated Spurious Emissions plot – Average Reading (GFSK, Ch.0 3rd Harmonic, X-H)

Spectrum Spectrum 2	\odot		
Ref Level 67.00 dBµV	● RBW 1 MHz		
	👄 VBW 1 kHz 🛛 Mode	s Sweep	
Count 200/200			
●1Pk Max●2Pk Clrw			
		M1[1]	25.55 dBµV 7.2061302 GHz
60 dBµV		T	7.2001302 GH2
50 dBµV			
40 dBµV			
30 dBµV			
50 00 pv	M1		
20 dBµV			
10 dBµV			
0 dвµV			
-10 dBµV			
-20 dBµV			
-30 dBµV			
CF 7.206 GHz	601 ata		Comp. 10.0 Mills
GF 7.200 GHZ	691 pts		Span 10.0 MHz

Radiated Spurious Emissions plot –Peak Reading (GFSK, Ch.0 3rd Harmonic, X-H)

Spectrum	Spec	ctrum 2	∞						
Ref Level 67.	00 dBµV		. RBW	1 MHz					
Att	0 dB	SWT 4	ms 👄 VBW	3 MHz 🛛 🕅	lode Sweep	D			
Count 200/200									
●1Pk Max●2Pk	Clrw					0000			
					M	1[1]			38.46 dBµV
60 dBµV						ř.	r i	7.20	63760 GHz
50 dBµV									
40 dBµV					M1				
mounderman	munde	warehow	andurundurun	wound	wert translage	mound	unnamen	melheurrent	mounder
which which a first of the second	huuu	he Adriation	and the build be the	Madada ku	where the first where the	بالما سامات المان	while he deallest	LL ALLANA	h h k bur a start
utha aggina (h. 111. fh i	I . Almit Ib	ԱՄ Բաս Ո Ո	alle Mon alle Ava	արի չչ չզիքերին։	n - Alter a st - Alflind	head and drove	h di al la	halan a Albha	and the set of the
20 dBµV									
10 dBµV									
о авил									
-10 dBµV									
-10 0000									
-20 dBµV									
5574594 - 53142 - 80220									
-30 dBµV									
CF 7.206 GHz				691	pts			Span	10.0 MHz

Note:

Plot of worst case are only reported.

10.6.3 RADIATED RESTRICTED BAND EDGES

Operation Mode	Normal(GFSK)
Operating Frequency	2402 MHz, 2480 MHz
Channel No	CH 0, CH 78

Frequency	Reading	A.F+C.L+D.F	Pol.	Total	Limit	Margin	Measurement
[MHz]	[dBuV]	[dB]	[H/V]	[dBuV/m]	[dBuV/m]	[dB]	Туре
2390.0	19.284	34.77	н	54.05	73.98	19.93	PK
2390.0	8.399	34.77	н	43.17	53.98	10.81	AV
2390.0	19.125	34.77	V	53.90	73.98	20.09	PK
2390.0	8.381	34.77	V	43.15	53.98	10.83	AV
2483.5	19.529	34.25	н	53.78	73.98	20.20	PK
2483.5	10.413	34.25	н	44.66	53.98	9.32	AV
2483.5	19.425	34.25	V	53.68	73.98	20.31	PK
2483.5	10.333	34.25	V	44.58	53.98	9.40	AV

Operation Mode

EDR(π/4DQPSK)

Operating Frequency

Channel No

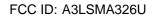
2402 MHz, 2480 MHz CH 0, CH 78

Frequency	Reading	A.F+C.L+D.F	Pol.	Total	Limit	Margin	Measurement
[MHz]	[dBuV]	[dB]	[H/V]	[dBuV/m]	[dBuV/m]	[dB]	Туре
2390.0	19.424	34.77	н	54.19	73.98	19.79	PK
2390.0	8.349	34.77	н	43.12	53.98	10.86	AV
2390.0	19.363	34.77	V	54.13	73.98	19.85	PK
2390.0	8.336	34.77	V	43.11	53.98	10.87	AV
2483.5	19.796	34.25	Н	54.05	73.98	19.93	PK
2483.5	11.252	34.25	н	45.50	53.98	8.48	AV
2483.5	19.555	34.25	V	53.81	73.98	20.18	PK
2483.5	11.002	34.25	V	45.25	53.98	8.73	AV



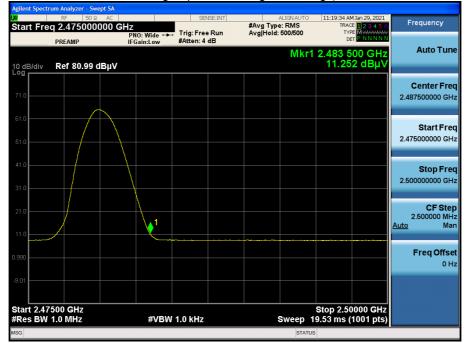
Operation Mode	EDR(8DPSK)			
Operating Frequency	2402 MHz, 2480 MHz			
Channel No	CH 0, CH 78			

Frequency [MHz]	Reading [dBuV]	A.F+C.L+D.F [dB]	Pol. [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
2390.0	19.352	34.77	Н	54.12	73.98	19.86	PK
2390.0	8.355	34.77	Н	43.13	53.98	10.86	AV
2390.0	19.302	34.77	V	54.07	73.98	19.91	PK
2390.0	8.336	34.77	V	43.11	53.98	10.87	AV
2483.5	19.562	34.25	н	53.81	73.98	20.17	PK
2483.5	11.125	34.25	Н	45.38	53.98	8.61	AV
2483.5	19.425	34.25	V	53.68	73.98	20.31	PK
2483.5	10.967	34.25	V	45.22	53.98	8.76	AV



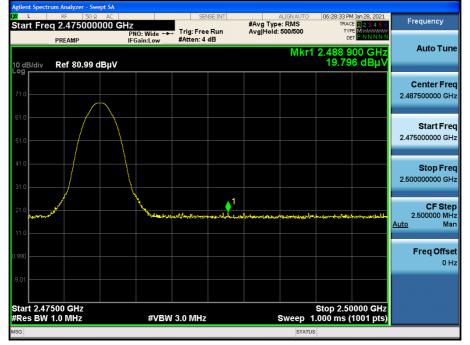


RESULT PLOTS



Radiated Restricted Band Edges plot – Average Reading (π /4DQPSK, Ch.78, X-H)

Radiated Restricted Band Edges plot -Peak Reading (m/4DQPSK, Ch.78, X-H)



Note:

Plot of worst case are only reported.



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10.7 POWERLINE CONDUCTED EMISSIONS

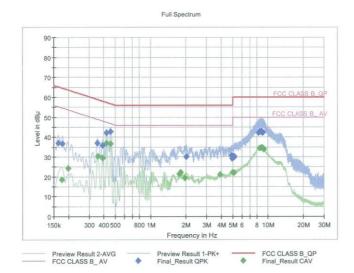
Conducted Emissions (Line 1)

BT L1

Test Report



Test Site: Operating Conditions : Operator Name: Comment: SM-A326U SAMSUNG SHIELD ROOM BT L1



Final_Result_QPK

Frequency (MHz)	QuasiPea k	Limit (dBuV	Margi n	Bandwidt h	Line	Filter	Corr. (dB)
0.163500	37.02	65.28	28.27	9.000	L1	OFF	9.6
0.177000	36.57	64.63	28.06	9.000	L1	OFF	9.6
0.352500	36.94	58.90	21.96	9.000	L1	OFF	9.6
0.388500	35.91	58.10	22.18	9.000	L1	OFF	9.6
0.422250	42.17	57.40	15.23	9.000	L1	OFF	9.6
0.456000	42.71	56.77	14.06	9.000	L1	OFF	9.6
2.014250	29.89	56.00	26.11	9.000	L1	OFF	9.7
4.878500	30.57	56.00	25.43	9.000	L1	OFF	9.9
4.970750	29.20	56.00	26.80	9.000	L1	OFF	9.9
5.067500	30.01	60.00	29.99	9.000	L1	OFF	9.9
5.105750	29.74	60.00	30.26	9.000	L1	OFF	9.9
5.121500	30.41	60.00	29.59	9.000	L1	OFF	9.9
8.300750	42.14	60.00	17.86	9.000	L1	OFF	10.0
8.528000	42.63	60.00	17.37	9.000	L1	OFF	10.0
8.753000	42.57	60.00	17.43	9.000	L1	OFF	10.0
8.791250	43.04	60.00	16.96	9.000	L1	OFF	10.0
8.892500	42.72	60.00	17.28	9.000	L1	OFF	10.0
8.978000	42.19	60.00	17.81	9.000	L1	OFF	10.0

Final_Result_CAV

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BT L1

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Frequency (MHz)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.174750	18.46	54.73	36.27	9.000	L1	OFF	9.6
0.199500	24.26	53.63	29.37	9.000	L1	OFF	9.6
0.357000	30.15	48.80	18.65	9.000	L1	OFF	9.6
0.390750	29.32	48.05	18.73	9.000	L1	OFF	9.6
0.424500	36.91	47.36	10.45	9.000	L1	OFF	9.6
0.458250	36.70	46.72	10.03	9.000	L1	OFF	9.6
1.766750	21.46	46.00	24.54	9.000	L1	OFF	9.7
1.802750	22.19	46.00	23.81	9.000	L1	OFF	9.7
1.973750	19.42	46.00	26.58	9.000	L1	OFF	9.7
3.924500	21.07	46.00	24.93	9.000	L1	OFF	9.8
5.031500	22.24	50.00	27.76	9.000	L1	OFF	9.9
5.119250	21.95	50.00	28.05	9.000	L1	OFF	9.9
8.528000	34.41	50.00	15.59	9.000	L1	OFF	10.0
8.755250	34.61	50.00	15.39	9.000	L1	OFF	10.0
8.930750	34.64	50.00	15.36	9.000	L1	OFF	10.0
9.052250	34.45	50.00	15.55	9.000	L1	OFF	10.0
9.119750	34.28	50.00	15.72	9.000	L1	OFF	10.0
9.205250	33.88	50.00	16.12	9.000	L1	OFF	10.0

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Conducted Emissions (Line 2)

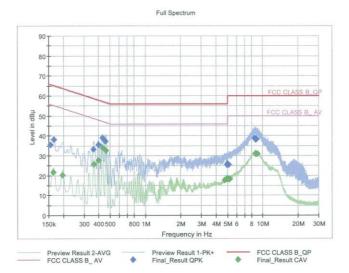
BT N

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Test Report

Common Information

EUT : Manufacturer : Test Site: Operating Conditions : Operator Name: Comment: SM-A326U SAMSUNG SHIELD ROOM BT N



Final_Result_QPK

Frequency (MHz)	QuasiPea k	Limit (dBuV	Margi n	Bandwidt h	Line	Filter	Corr. (dB)
0.154500	35.47	65.75	30.29	9.000	N	OFF	9.6
0.165750	38.07	65.17	27.10	9.000	N	OFF	9.6
0.361500	33.12	58.69	25.57	9.000	N	OFF	9.6
0.399750	35.38	57.86	22.48	9.000	N	OFF	9.6
0.433500	39.03	57.19	18.15	9.000	N	OFF	9.6
0.458250	37.30	56.72	19.43	9.000	N	OFF	9.6
4.941500	25.52	56.00	30.48	9.000	N	OFF	9.9
5.000000	25.77	56.00	30.23	9.000	N	OFF	9.9
5.027000	26.01	60.00	33.99	9.000	N	OFF	9.9
5.031500	26.05	60.00	33.95	9.000	N	OFF	9.9
5.103500	25.27	60.00	34.73	9.000	N	OFF	9.9
5.135000	25.32	60.00	34.68	9.000	N	OFF	9.9
8.537000	38.57	60.00	21.43	9.000	N	OFF	10.0
8.570750	38.24	60.00	21.76	9.000	N	OFF	10.0
8.717000	38.19	60.00	21.81	9.000	N	OFF	10.0
8.750750	38.15	60.00	21.85	9.000	N	OFF	10.0
8.804750	37.99	60.00	22.01	9.000	N	OFF	10.1
8.838500	38.25	60.00	21.75	9.000	N	OFF	10.1

Final_Result_CAV

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BT N

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Frequency (MHz)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.163500	21.72	55.28	33.57	9.000	N	OFF	9.6
0.197250	20.26	53.73	33.47	9.000	N	OFF	9.6
0.363750	25.76	48.64	22.88	9.000	N	OFF	9.6
0.397500	27.80	47.91	20.10	9.000	N	OFF	9.6
0.431250	34.07	47.23	13.16	9.000	N	OFF	9.6
0.462750	32.68	46.64	13.97	9.000	N	OFF	9.6
4.716500	17.50	46.00	28.50	9.000	N	OFF	9.9
4.948250	18.40	46.00	27.60	9.000	N	OFF	9.9
5.000000	18.05	46.00	27.95	9.000	N	OFF	9.9
5.103500	18.04	50.00	31.96	9.000	N	OFF	9.9
5.137250	18.12	50.00	31.88	9.000	N	OFF	9.9
5.243000	18.28	50.00	31.72	9.000	N	OFF	9.9
8.717000	30.97	50.00	19.03	9.000	N	OFF	10.0
8.737250	31.05	50.00	18.95	9.000	N	OFF	10.0
8.748500	31.00	50.00	19.00	9.000	N	OFF	10.0
8.804750	30.85	50.00	19.15	9.000	N	OFF	10.1
8.836250	30.94	50.00	19.06	9.000	N	OFF	10.1
9.009500	30.75	50.00	19.25	9.000	N	OFF	10.1

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FCC ID: A3LSMA326U

11. LIST OF TEST EQUIPMENT

Conducted Test

Manufacturer	Model / Environment	Calibration	Calibration	Serial No.
Manufacturer	Model / Equipment	Date	Interval	Senai No.
Rohde & Schwarz	ENV216 / LISN	09/04/2020	Annual	102245
Rohde & Schwarz	ESR / EMI Test Receiver	09/16/2020	Annual	101910
ESPAC	SU-642 /Temperature Chamber	03/18/2020	Annual	0093008124
Agilent	N9030A / Signal Analyzer	01/11/2021	Annual	MY49431210
Rohde & Schwarz	OSP 120 / Power Measurement Set	07/02/2020	Annual	101231
Agilent	N1911A / Power Meter	04/07/2020	Annual	MY45100523
Keysight	N1921A / Power Sensor	06/08/2020	Annual	MY57820067
Agilent	87300B / Directional Coupler	11/10/2020	Annual	3116A03621
Hewlett Packard	11667B / Power Splitter	05/25/2020	Annual	05001
Hewlett Packard	E3632A / DC Power Supply	06/12/2020	Annual	KR75303960
Agilent	8493C / Attenuator(10 dB)	06/26/2020	Annual	07560
Rohde & Schwarz	EMC32 / Software	N/A	N/A	N/A
	FCC WLAN&BT&BLE Conducted Test Software	N1/A	N/A	N1/A
HCT CO., LTD.	v3.0	N/A	N/A	N/A
Rohde & Schwarz	CBT / Bluetooth Tester	05/12/2020	Annual	100422

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

Manufacturer	Model / Equipment	Calibration Date	Calibration Interval	Serial No.
Innco system	CO3000 / Controller(Antenna mast)	N/A	N/A	CO3000-4p
Innco system	MA4640/800-XP-EP / Antenna Position Tower	N/A	N/A	N/A
Audix	EM1000 / Controller	N/A	N/A	060520
Audix	Turn Table	N/A	N/A	N/A
Rohde & Schwarz	Loop Antenna	05/18/2020	Biennial	1513-175
Schwarzbeck	VULB 9168 / Hybrid Antenna	03/22/2019	Biennial	760
Schwarzbeck	BBHA 9120D / Horn Antenna	04/29/2019	Biennial	9120D-937
Schwarzbeck	BBHA9170 / Horn Antenna(15 GHz ~ 40 GHz)	11/29/2019	Biennial	BBHA9170541
Rohde & Schwarz	FSV40-N / Spectrum Analyzer	07/28/2020	Annual	102168
Agilent	N9030A / Signal Analyzer	01/11/2021	Annual	MY49431210
Wainwright Instruments	WRCJV2400/2483.5-2370/2520-60/12SS / Band Reject Filter	01/06/2021	Annual	2
Wainwright Instruments	WRCJV5100/5850-40/50-8EEK / Band Reject Filter	02/08/2021	Annual	1
Wainwright Instruments	WHK3.0/18G-10EF / High Pass Filter	03/02/2020	Annual	8
Wainwright Instruments	WHKX8-6090-7000-18000-40SS/ High Pass Filter	03/02/2020	Annual	25
Api tech.	18B-03 / Attenuator (3 dB)	03/02/2020	Annual	1
Agilent	8493C-10 / Attenuator(10 dB)	03/02/2020	Annual	08285
CERNEX	CBLU1183540 / Power Amplifier	03/02/2020	Annual	22964
CERNEX	CBL06185030 / Power Amplifier	03/02/2020	Annual	22965
CERNEX	CBL18265035 / Power Amplifier	12/04/2020	Annual	22966
CERNEX	CBL26405040 / Power Amplifier	03/23/2020	Annual	25956
TESCOM	TC-3000C / Bluetooth Tester	03/18/2020	Annual	3000C000276

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. Espectially, 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;

N	о.	Description
	1	HCT-RF-2102-FC006-P