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FCC BT REPORT

Applicant Name: SAMSUNG Electronics Co., Ltd.

Address:

FCC ID:

129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea Date of Issue: 31 October 2019

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

Report No.: HCT-RF-1910-FC006

APPLICANT: SAMSUNG Electronics Co., Ltd.

Model:	SM-G770F/DS
Additional Model:	SM-G770F/DSM, SM-G770F
EUT Type:	Mobile Phone
Max. RF Output Power:	13.156 dBm (20.68 mW)
Frequency Range:	2402 MHz - 2480 MHz (Bluetooth)
Modulation type	GFSK(Normal), π /4DQPSK and 8DPSK(EDR)
FCC Classification:	FCC Part 15 Spread Spectrum Transmitter
FCC Rule Part(s):	Part 15 subpart C 15.247

A3LSMG770F

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.



Report prepared by : Jeong Ho Kim Engineer of Telecommunication testing center

A A

Approved by : Kwon Jeong Manager of Telecommunication testing center

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<u>Version</u>

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-1910-FC006	31 October 2019	- First Approval Report

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 KOLAS(Korea Laboratory Accreditation Scheme), which signed the ILAC-MRA. (HCT Accreditation No.: KT197)



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1. EUT DESCRIPTION

Model	SM-G770F/DS
Additional Model	SM-G770F/DSM, SM-G770F
ЕИТ Туре	Mobile Phone
Power Supply	DC 3.85 V
Battery Information	Model: EB-BA907ABY L
	Type: Li-ion Battery
Travel Adapter Information	Model : EP-TA845
Traver Adapter information	Manufacture: SOLUM
Data Cable Information	Model : EP-DN975BBE
Data Cable mormation	Manufacture: RF TECH
For iook Information	Model : GHSS028-W9
Ear-jack Information	Manufacture: BUJEON
Frequency Range	2402 MHz - 2480 MHz
Max. RF Output Power	13.156 dBm (20.68 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)
Antonno Specification	Antenna type: LDS
Antenna Specification	Peak Gain : -3.57 dBi
Date(s) of Tests	September 16, 2019 ~ October 29, 2019



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.

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 3.75 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

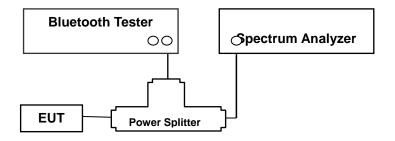
8.1. Conducted Maximum Peak Output Power

<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

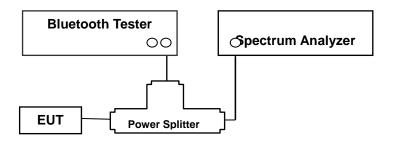


8.2. Conducted Band Edge(Out of Band Emissions)

<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

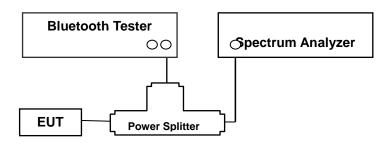


8.3. Frequency Separation & 20 dB Bandwidth

<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 \geq 3 x RBW
- 4) Sweep: Auto
- 5) Detector: Peak
- 6) Trace: Max hold
- 7) All the trace to stabilize.

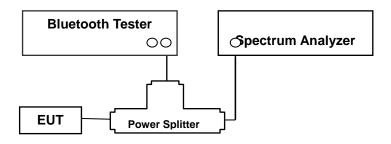


8.4. Number of Hopping Frequencies

<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.

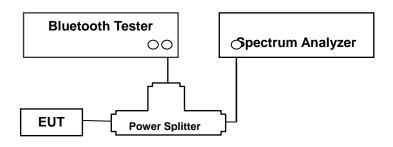


8.5. Time of Occupancy

<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)

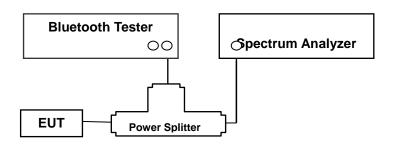


8.6. Conducted Spurious Emissions

<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	26.14
100	26.22
200	26.30
300	26.40
400	26.46
500	26.49
600	26.49
700	26.53
800	26.55
900	26.59
1000	26.61
2000	26.88
2400	26.97
2500	26.99
3000	27.09
4000	27.25
5000	27.44
6000	27.51
7000	27.66
8000	27.78
9000	27.90
10000	28.04
11000	28.12
12000	28.28
13000	28.47
14000	28.41
15000	28.51
16000	28.56
17000	28.63
18000	28.75
19000	28.81
20000	28.89
21000	29.18
22000	29.24
23000	29.27
24000	29.35
25000	29.48
26000	29.58

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

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



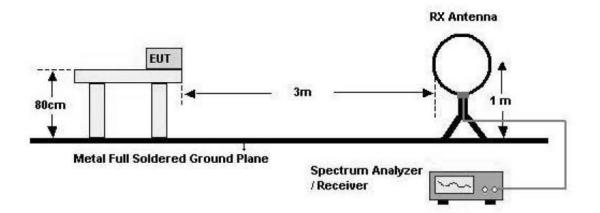
8.7. Radiated Test

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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

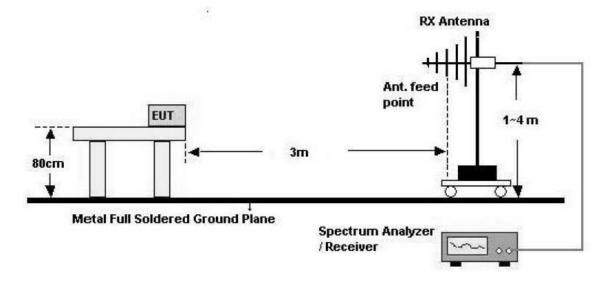
Test Configuration

Below 30 MHz

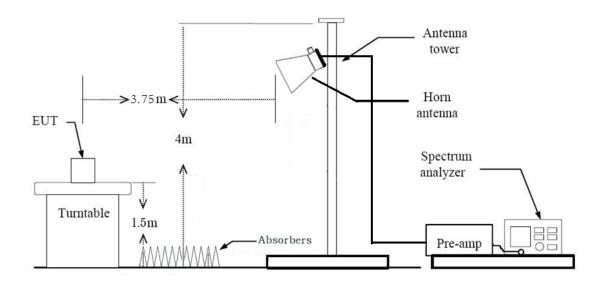




30 MHz - 1 GHz



Above 1 GHz





Test Procedure of Radiated spurious emissions(Below 30 MHz)

- 1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
- 2. The loop antenna was placed at a location 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.
- 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 \ge 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.



Test Procedure of Radiated spurious emissions(Below 1GHz)

- 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. 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. 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
- 6. Total = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L)

7. 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 3.75 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
- 6. According to SVSWR requirement in ANSI 63.4-2014, We performed the radiated test at 3.75 m distance from center of turn table. So, we applied the distance factor(reference distance : 3 m).
 - Distance extrapolation factor = 20log (test distance / specific distance) (dB)
- 7. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
- 8. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
- 9. The unit was tested with its standard battery.
- 10. 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
- 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.
- 12. Total = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) Amp Gain(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 3.75 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
- 6. According to SVSWR requirement in ANSI 63.4-2014, We performed the radiated test at 3.75 m distance from center of turn table. So, we applied the distance factor(reference distance : 3 m).
 - Distance extrapolation factor = 20log (test distance / specific distance) (dB)
- 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):
 - 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. 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).

	Limits (dBµV)		
Frequency Range (MHz)	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 : Y
 - Radiated Restricted Band Edge : Y

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. SM-G770F/DSM, SM-G770F, SM-G770F/DS were tested and the worst case results are reported. (Worst case : SM-G770F/DS)

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-G770F/DSM, SM-G770F, SM-G770F/DS were tested and the worst case results are reported.

(Worst case : SM-G770F/DS)

Conducted test

- 1. The EUT was configured with data rate of highest power.
 - GFSK : DH5
 - $\pi/4DQPSK$: 2-DH5
 - 8DPSK : 3-DH5
- 2. AFH & Non-AFH were tested and the worst case results are reported.
 - (Worst case : Non-AFH)
- 3. SM-G770F/DSM, SM-G770F, SM-G770F/DS were tested and the worst case results are reported.

(Worst case : SM-G770F/DS)



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	§15.247(b)(1)	< 0.125 W		PASS
Peak Output Power	§13.247(b)(1)	< 0.125 W		FAGO
Carrier Frequency	§15.247(a)(1)	> 25 kHz or		PASS
Separation	§15.247 (a)(1)	>2/3 of the 20dB BW		FAGO
Number of Hopping	§15.247(a)(1)(iii)	≥ 15	Originalization	PASS
Frequencies		400	Conducted	D 4.00
Time of Occupancy	§15.247(a)(1)(iii) < 400 ms			PASS
Conducted Spurious	§15.247(d)	> 20 dB for		PASS
Emissions		all out-of band emissions	1	
Band Edge	815 047(d)	> 20 dB for		PASS
(Out of Band Emissions)	§15.247(d)	all out-of band emissions		PASS
AC Power line Conducted	§15.207(a)	cf. Section 8.8		PASS
Emissions	§15.207(a)			FA33
Dedicted Courieurs	§15.247(d),			
Radiated Spurious	15.205, cf. Section 8.7			PASS
Emissions	15.209		Dedicted	
Dedicted Destricted Dest	§15.247(d),		Radiated	
Radiated Restricted Band	15.205,	cf. Section 8.7		PASS
Edge	15.209			



10. TEST RESULT

10.1 PEAK POWER

Channel	Frequency (MHz)	Output Power (GFSK)		Limit (mW)
	(101112)	(dBm)	(mW)	(11144)
Low	2402	11.294	13.47	
Mid	2441	10.932	12.39	125
High	2480	11.763	15.01	

Channel	Frequency	Output Power (8DPSK)		Limit
(MHz)		(dBm)	(mW)	(mW)
Low	2402	12.897	19.48	
Mid	2441	12.740	18.79	125
High	2480	13.156	20.68	

Channel	Frequency	Outpu (π/4D	Limit	
	(MHz)	(dBm)	(mW)	(mW)
Low	2402	12.684	18.55	
Mid	2441	12.486	17.73	125
High	2480	12.974	19.83	

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.

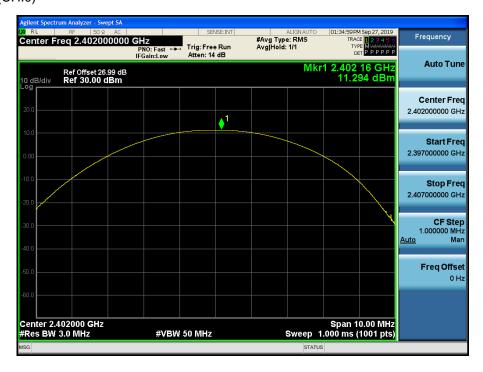
2. We apply to the offset in the 2.4 GHz range that was rounded off to the closest tenth dB.

Actual value of loss for the splitter and cable combination is 26.97 dB at 2400 MHz and is 26.99 dB at 2500 MHz.

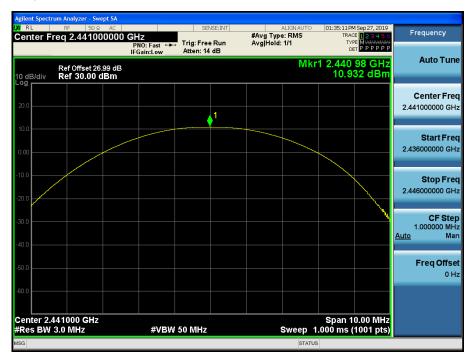
So, 26.99 dB is offset. And the offset gap in the 2.4 GHz range do not affect the conducted peak power final result.



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



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

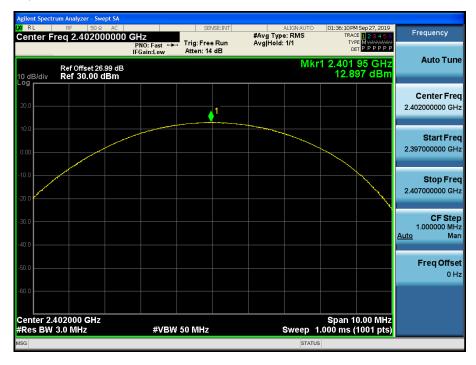




Test Plots (GFSK) Peak Power (CH.78)



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





Test Plots (8DPSK)

Peak Power (CH.39)

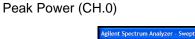


Test Plots (8DPSK) Peak Power (CH.78)





Test Plots (π /4DQPSK)





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





Test Plots (π/4DQPSK) Peak Power (CH.78)

set 26.99 dB	FGain:Low	Trig: Free Run Atten: 14 dB	Avg Hold>	1/1	TYP	E 123456 E M WWWWWW T P P P P P P		ncy
0.00 dBm	IFGain:Low Atten: 14 dB			Mkr1 2.479 84 GHz 12.974 dBm			Auto Tur	
		1						
								p Fr 00 GI
							1.0000	F Sto 00 M M
							Freq	Offs 0
GHz z	#\/B\A	50 MHz		ween 1	Span 1	0.00 MHz		
	GHz z					z #VBW 50 MHz Sweep 1.000 ms (GHz Span 10.00 MHz z #VBW 50 MHz Sweep 1.000 ms (1001 pts)	GHz #VBW 50 MHz Span 10.00 MHz z #VBW 50 MHz Sweep 1.000 ms (1001 pts)



10.2 BAND EDGES

Without hopping

Outside Frequency Pond	GFSK	8DPSK	π/4DQPSK	Limit	
Outside Frequency Band	(dB)	(dB)	(dB)	(dBc)	
Lower	55.836	55.649	56.439	20	
Upper	60.578	61.646	62.057		

With hopping

Outside Frequency Pand	GFSK	8DPSK	π/4DQPSK	Limit	
Outside Frequency Band	(dB)	(dB)	(dB)	(dBc)	
Lower	61.195	59.672	56.840	00	
Upper	61.851	62.391	61.665	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. We apply to the offset in the 2.4 GHz range that was rounded off to the closest tenth dB.

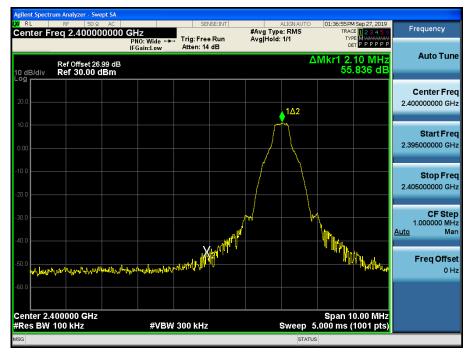
Actual value of loss for the splitter and cable combination is 26.97 dB at 2400 MHz and is 26.99 dB at 2500 MHz.

So, 26.99 dB is offset. And the offset gap in the 2.4 GHz range do not affect the conducted peak power final result.

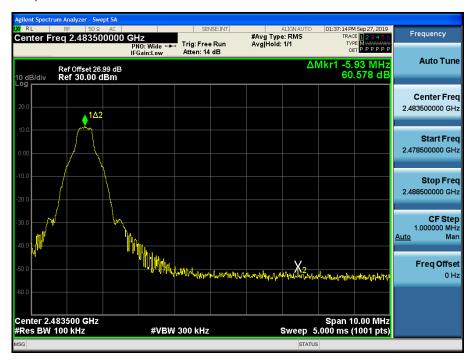


Test Plots without hopping (GFSK)

Band Edges (CH.0)



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



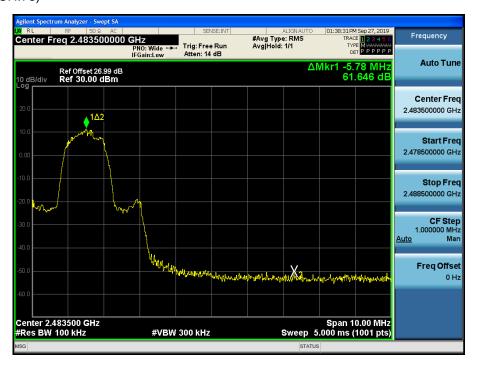


Test Plots without hopping (8DPSK)

Band Edges (CH.0)



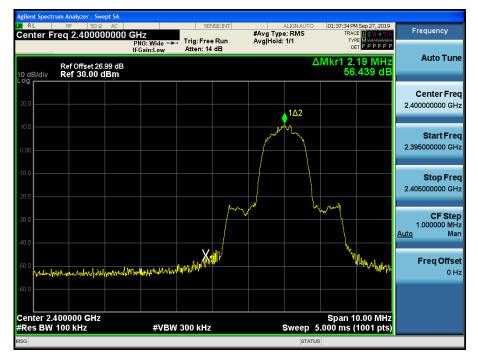
Test Plots without hopping (8DPSK) Band Edges (CH.78)



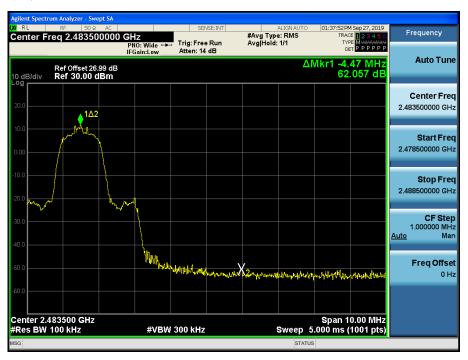


Test Plots without hopping (π /4DQPSK)

Band Edges (CH.0)



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





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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	857.56	1185.2	1179.6							
CH.39	854.99	1184.8	1171.9							
CH.78	857.90	1196.4	1185.3							

20dB BW (kHz)										
Channel	GFSK	8DPSK	π/4DQPSK							
CH.0	954.6	1305	1290							
CH.39	949.6	1305	1289							
CH.78	952.5	1305	1287							

	Limit		
GFSK	(kHz)		
			>25 kHz
978	991	974	or
			>2/3 of the 20dB BW



Test Plots (GFSK)

Channel Separation

Agilent Spectrum Analyzer - So	wept SA Ω AC	SENSE:INT	ALIGN AUTO	01:42:57 PM Sep 27, 2019	
Center Freq 2.4410	PNO: Wide 🔸	. Trig: Free Run #Atten: 20 dB	#Avg Type: RMS Avg Hold: 1/1	TRACE 123456 TYPE MINNIMUM DET PPPPP	Frequency
Ref Offset 2 10 dB/div Ref 30.00		#Atten: 20 dB		ΔMkr3 978 kHz 0.614 dB	Auto Tune
20.0 10.0 0.00		1Δ2		3∆4	Center Freq 2.441000000 GHz
-10.0					Start Freq 2.439500000 GHz
-40.0					Stop Freq 2.442500000 GHz
Center 2.441000 GH #Res BW 30 kHz	#VBW	100 kHz		Span 3.000 MHz 3.176 ms (900 pts)	CF Step 300.000 kHz Auto Man
MKR MODE TRC SCL 1 Δ2 1 f (Δ) 2 F 1 f - 3 Δ4 1 f (Δ) 4 F 1 f - 5 - - - - 6 - - - -	× 994 kHz (Δ) 2.440 014 GHz 978 kHz (Δ) 2.441 008 GHz	Y FL -0.001 dB 8.683 dBm 0.614 dB 8.681 dBm	FUNCTION FUNCTION WIDTH	FUNCTION VALUE	Freq Offset 0 Hz
7 8 9 10 11				~	
MSG			STATU		

Test Plots (8DPSK) Channel Separation





Test Plots (π/4DQPSK)

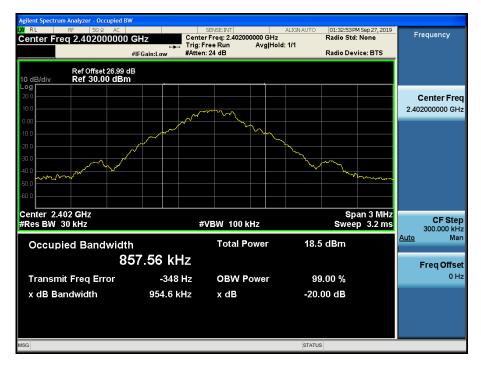
Channel Separation

	Analyzer - Swept SA							
Center Free	RF 50 Ω AC q 2.44100000		SENSE:II	#Avg	ALIGN AUTO Type: RMS	TRAC	4 Sep 27, 2019 26 1 2 3 4 5 6 26 M 444444	Frequency
		PNO: Wide ↔ IFGain:Low	Trig: Free Ru #Atten: 20 dB	n Avgin	lold: 1/1	DE	PPPPP	
10 dB/div	Ref Offset 26.99 d Ref 30.00 dBm					∆Mkr3 9 -0.	974 kHz 329 dB	Auto Tune
20.0 10.0 0.00	m X2m	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	10 ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	2 ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	3∆4	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Center Freq 2.441000000 GHz
-10.0 -20.0 -30.0								Start Freq 2.439500000 GHz
-40.0 -50.0 -60.0								Stop Freq 2.442500000 GHz
Center 2.44 #Res BW 30		#VBW	100 kHz		Sweep	Span 3 3.176 ms	.000 MHz (900 pts)	CF Step 300.000 kHz
MKR MODE TRC	scl × f (Δ)	1.001 MHz (Δ)	⊻ -0.296 dB	FUNCTION	FUNCTION WIDTH	FUNCTIO	IN VALUE	<u>Auto</u> Man
2 F 1 3 Δ4 1 4 F 1 5	f 2.4 f (Δ)	139 991 GHz 974 kHz (Δ) 140 992 GHz	8.517 dBm -0.329 dB 8.221 dBm					Freq Offset 0 Hz
6 7 8 9 10								
11 			Ш				>	
MSG					STATUS	3		

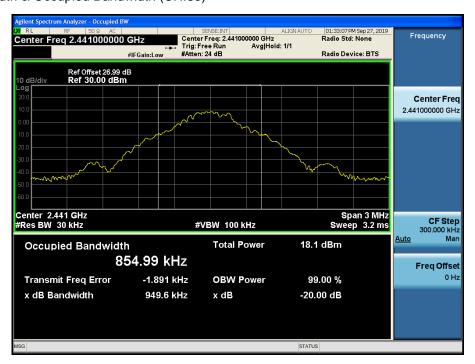


Test Plots (GFSK)

20 dB Bandwidth & Occupied Bandwidth (CH.0)



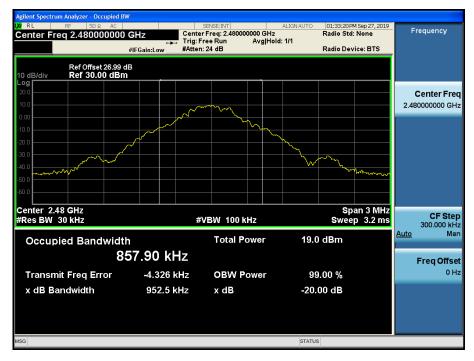
Test Plots (GFSK) 20 dB Bandwidth & Occupied Bandwidth (CH.39)



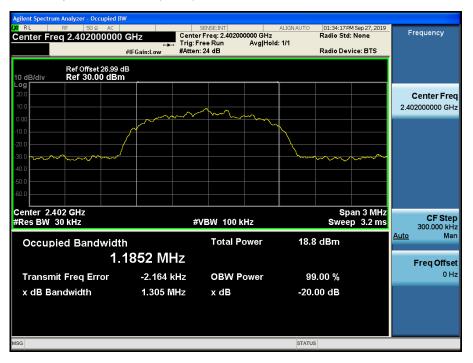


Test Plots (GFSK)

20 dB Bandwidth & Occupied Bandwidth (CH.78)



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





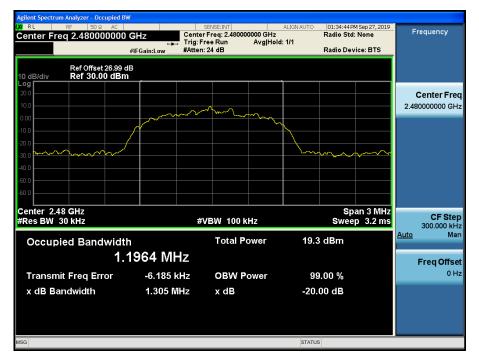
Test Plots (8DPSK)

20 dB Bandwidth & Occupied Bandwidth (CH.39)



Test Plots (8DPSK)

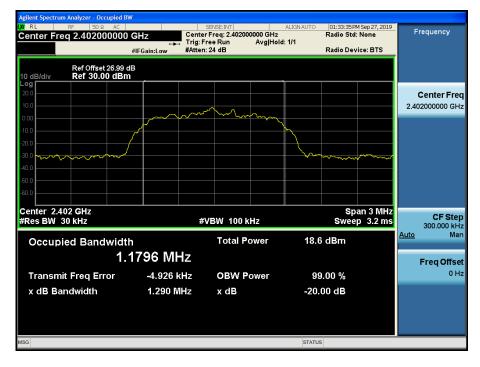
20 dB Bandwidth & Occupied Bandwidth (CH.78)





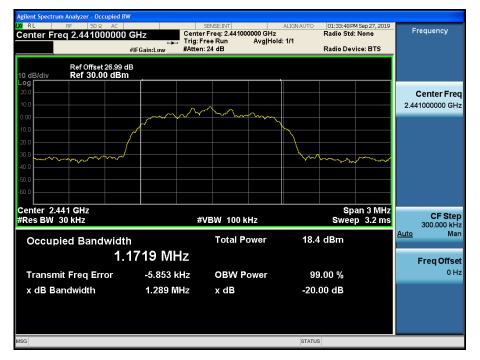
Test Plots (π/4DQPSK)

20 dB Bandwidth & Occupied Bandwidth (CH.0)



Test Plots (π/4DQPSK)

20 dB Bandwidth & Occupied Bandwidth (CH.39)





FCC ID: A3LSMG770F

Test Plots (π /4DQPSK)

20 dB Bandwidth & Occupied Bandwidth (CH.78)





10.4 NUMBER OF HOPPING FREQUENCY

GFSK	Limit		
79	79	79	>15

Note :

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



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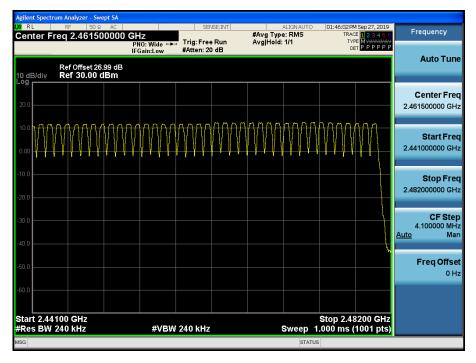
Test Plots (GFSK)

Number of Channels (2.4 GHz - 2.441 GHz)



Test Plots (GFSK)

Number of Channels (2.441 GHz - 2.4835 GHz)





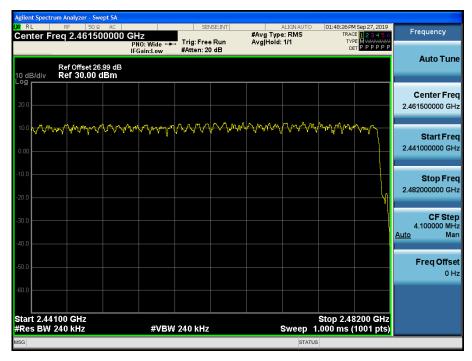
Test Plots (8DPSK)

Number of Channels (2.4 GHz - 2.441 GHz)

LXI RL	rum Analyzer - Swe RF 50 Ω Feq 2.42050	AC 0000 GH	Z 0:Wide ↔	. Trig: Free		#Avg Type Avg Hold:		TRAC	1 Sep 27, 2019 E 1 2 3 4 5 6 M WWWWWW T P P P P P P	Frequency
10 dB/div	Ref Offset 26.9 Ref 30.00 d	99 dB	Gain:Low	#Atten: 20) dB			DE	ШББББББ	Auto Tune
20.0										Center Fred 2.420500000 GHz
10.0	ᡃᡗᡎᢉᡃᠰᠰ᠕	ᡃᡏᡃᡳᠰ᠋᠉ᠰᢑᠬ	ᢧᠬ᠕ᡔᠬᠬ	v V V M	ᡟᠯᢆᢦᠬᢦ᠕ᢧᡘ	mm	ᡊ᠕ᠧᡘ	ᡝ᠕ᠰᠰᡟ	᠂᠋᠂ᠰᡳ	Start Fred 2.400000000 GHz
-10.0										Stop Fred 2.441000000 GH;
-30.0										CF Step 4.100000 MH <u>Auto</u> Mar
-50.0										Freq Offse 0 H
-60.0	0000 GHz							Stop 2.44	100 GHz	
#Res BW			#VBW	240 kHz				.000 ms (1001 pts)	

Test Plots (8DPSK)

Number of Channels (2.441 GHz - 2.4835 GHz)





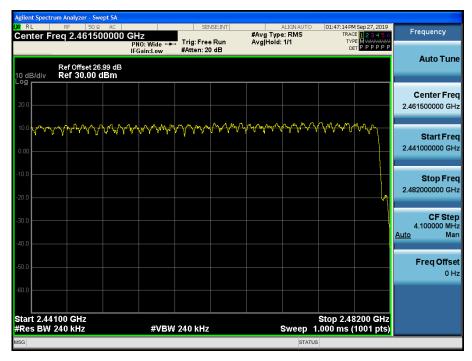
Test Plots (π/4DQPSK)

Number of Channels (2.4 GHz - 2.441 GHz)

Agilent Spectrum Analyzer - Swe W RL RF ସେହ Center Freq 2.42050	AC	SENSE:INT	ALIGN AUTO	01:46:39PM Sep 27, 2019 TRACE 123456	Frequency
Ref Offset 26	PNO: Wide +++ 1 IFGain:Low # 99 dB	rig: Free Run Atten: 20 dB	AvgjHold: 1/1		Auto Tune
10 dB/div Ref 30.00 c	IBm				Center Freq 2.420500000 GHz
10.0 prompto p	ᢣᠬᠬᢦᡊᠡ᠋ᡎᡐᢕᠰᡗ᠇ᡇ᠋	ᡗᡊᠠᠰᡙᡨᡨ	ᠰ᠋ᢩ᠋ᡢᠰᡇᡟᠧᡒᠧᡘᡃᡗᢇᠬᠬᡨ	ᠰᡃᠰᡳᠯᠷᠰᢧᠬᠬ᠇᠈ᡝ	Start Freq 2.400000000 GHz
-10.0					Stop Fred 2.441000000 GHz
-30.0					CF Step 4.100000 MH <u>Auto</u> Mar
-50.0					Freq Offse 0 Hi
-60.0 Start 2.40000 GHz #Res BW 240 kHz	#VBW 24	10 kHz	Sween 1	Stop 2.44100 GHz .000 ms (1001 pts)	
	#VBW 24	10 MH2	Sweep		

Test Plots (π /4DQPSK)

Number of Channels (2.441 GHz - 2.4835 GHz)





10.5 TIME OF OCCUPANCY (DWELL TIME)

	Channel	GFSK	8DPSK	π/4DQPSK
Pulse Time	Low	2.885	2.890	2.890
(ms)	Mid	2.885	2.890	2.890
	High	2.890	2.890	2.890

Non-AFH Mode

	Channel	GFSK	8DPSK	π/4DQPSK	Period Time (s)	Limit (ms)
Total of Dwell	Low	307.73	308.27	308.27	31.6	
(ms)	Mid	307.73	308.27	308.27	31.6	400
	High	308.27	308.27	308.27	31.6	

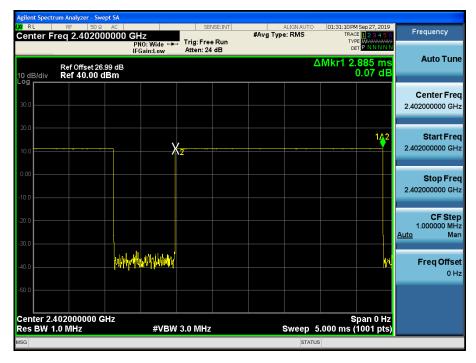
AFH Mode

	Channel	GFSK	8DPSK	π/4DQPSK	Period Time (s)	Limit (ms)
Total of Dwell	Low	153.87	154.13	154.13	8.0	
(ms)	Mid	153.87	154.13	154.13	8.0	400
	High	154.13	154.13	154.13	8.0	



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



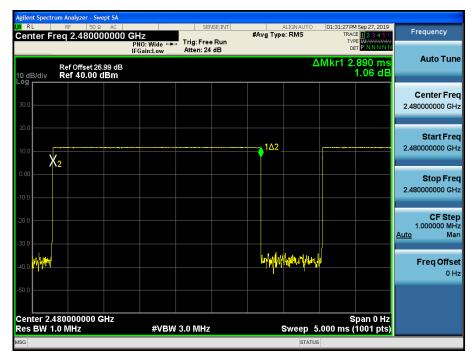
Test Plots (GFSK) Dwell Time (CH.39)



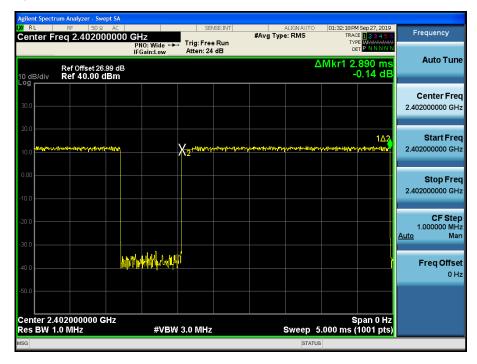


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Test Plots (GFSK) Dwell Time (CH.78)



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



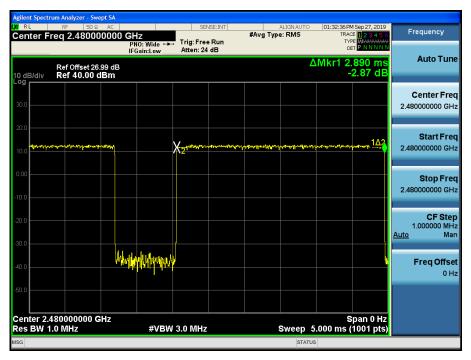


Test Plots (8DPSK)

Dwell Time (CH.39)



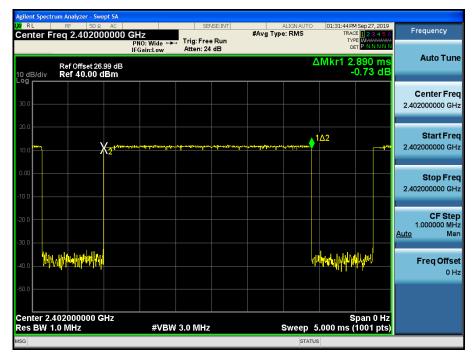
Test Plots (8DPSK) Dwell Time (CH.78)



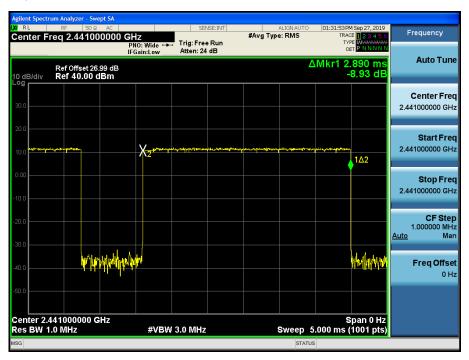


Test Plots (π/4DQPSK)

Dwell Time (CH.0)



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





Test Plots (π /4DQPSK)

Dwell Time (CH.78)

Center Fre		PNO: Wide +	SENSE:INT Trig: Free Run Atten: 24 dB	ALIGN AUTO #Avg Type: RMS	01:32:05 PM Sep 27, 2019 TRACE 2 3 4 5 6 TYPE WWWWWW DET P N N N N N	Frequency
I0 dB/div	Ref Offset 26.99 dB Ref 40.00 dBm	IFGain:Low	Atten: 24 dB	Ĺ	Mkr1 2.890 ms 10.41 dB	Auto Tun
30.0						Center Fre 2.480000000 GH
10.0			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	******	1Δ2	Start Fre 2.480000000 GH
0.00		X2				Stop Fre 2.48000000 GF
20.0						CF Ste 1.000000 MH <u>Auto</u> Ma
40.0	Hurothe front which				When he with the	Freq Offs 0 ⊦
50.0						
Center 2.48 Res BW 1.0	0000000 GHz MHz	#VB	W 3.0 MHz	Sweep 5	Span 0 Hz 5.000 ms (1001 pts)	



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 (8DPSK)- 30 MHz - 1 GHz

Spurious Emission (CH.78)

RL	RF 50 Ω A	C	SE	NSE:INT		ALIGN AUTO	01:48:55 PM		F
tart Fre	q 30.000000 N	IHZ PNO: Fas IFGain:Lo			#Avg Type Avg Hold:		TRACE TYPE DET	123456 Mwwwww PPPPPP	Frequency
0 dB/div	Ref Offset 26.99 Ref 20.00 dBr	dB	W Atten. 0			Mł	(r1 787.7		Auto Tur
og								2 →	Center Fre 515.000000 MH
10.0								-10.48 dBm	Start Fre 30.000000 Mi
io.o									Stop Fre 1.000000000 GF
0.0									CF Ste 97.000000 M Auto M
	shiplari data su nakipi wasayaa	n ki kapangaki kapangaki kapanga	ll on tolki biolytika sek	ihiyadı <mark>n bada ga</mark>				terre surgilizes services	Freq Offs 0
'0.0	n an	i de forme de la constanti de l	and herein a second	والد فطاعت وطالعك والأ	er en estatui atti erectine fannoù.	helte free states of the			
tart 30.0 Res BW) MHz 100 kHz	#\	/BW 300 kHz		s	weep 93	Stop 1.0 .33 ms (20	000 GHz 1000 pts)	
G						STATUS			

Test Plots (8DPSK)- 1 GHz – 3 GHz Spurious Emission (CH.78)

Agilent S	pectrur	n Ana	ılyzer - Sv	wept SA											
LXI RL		RF	50 9	Ω AC			SEN	VSE:INT			LIGN AUTO		M Sep 27, 2019	-	
Start	Freq	1.0	00000	0000 GI			-			g Type:		TRA	CE 123456 PE M WWWWW	F	requency
					PNO: Fast		Trig: Free Atten: 6 d		Avg	Hold: 1	111	1 Y	ET P P P P P P		_
_					IFGain:Lov	w	Atten. o c	40							Auto Tune
		Ref	Offset 2	6.99 dB							Mkr		20 GHz		Autorune
10 dB/			20.00									57.2	10 dBm		
											2				
10.0											Y				Center Freq
0.00														2.00	0000000 GHz
-10.0													-10.48 dBm		
-20.0															Start Freq
-30.0											ļ			1.00	00000000 GHz
-40.0														1.00	0000000 GH2
-50.0															
-60.0			and an ask		an a	and second	Compare the state of	and the state of the second		den all and	Intel Surdivates	and a strange of the	and the Antiper Contractor		Stop Freq
70.0					. Andrea a la come de la c	and the second second	in a human line state state	Start In State		and the second second	in the second second	1 All and a second	and an any state of the	3.00	0000000 GHz
-70.0															
Start	1 000	CH	7									Stop 3	.000 GHz		
#Res					#\	BW 3	300 kHz			Sta			0001 pts)	20	CF Step 0.000000 MHz
			A112									· ·		Auto	0.000000 MHZ Man
MKR MO				×			Y		UNCTION	FUNC	TION WIDTH	FUNCTI	ON VALUE 🔥 🔺	Auto	Mail
	1 1	f f			37 20 GHz 79 95 GHz		57.210 dE 9.524 dE								
2 N 3				2.41	9 95 GHZ		9.524 ai	зm							Freq Offset
4															0 Hz
5													H		0112
6															
s s															
9															
10															
<													~		
MSG											STATU	2			
mod											SIATO	5			

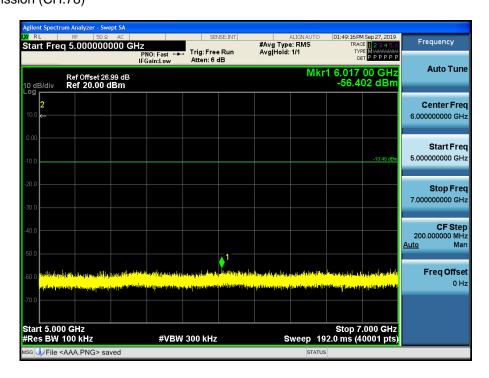


Test Plots(8DPSK)- 3 GHz - 5 GHz

Spurious Emission (CH.78)

RI	-	RF	50 Ω			SEI	VSE:INT		ALIGN AUTO		4 Sep 27, 2019	Engen	
itar	rt Fred	3.00	00000	000 GH	Z PNO: Fast ↔ IFGain:Low	, Trig: Free Atten: 6		#Avg Type Avg Hold:		TRAC TYF DE	^{2E} <mark>1 2 3 4 5 6</mark> РЕ Милинин ЕТ Р Р Р Р Р Р Р	Freque	ency
	B/div		fset 26. 0.00 d	99 dB					Mkr		30 GHz 22 dBm	Aut	o Tun
og 10.0	2 ←											Cent 4.000000	e r Fre 000 GH
											-10.48 dBm	St a 3.000000	art Fre 000 G⊢
												Sto 5.000000	o p Fre 000 GH
					. 1							(200.000 <u>Auto</u>	CF Ste 000 MH Ma
				til andreis		indans, taking		u da mada ang ang ang ang ang ang ang ang ang an	wydd y Maraw			Free	Offs 0 H
	- Sameling In	L 1 old by C B.	in the second	1.6.1.comhatala		and the second	- Indiana	k piter senten for de d		an tanàna amin'ny fi			
	t 3.000 s BW 1		z		#VBW	v 300 kHz		S	weep <u>1</u> 9		.000 GHz 0001 pts)		
G									STATUS				

Test Plots (8DPSK)- 5 GHz - 7 GHz Spurious Emission (CH.78)



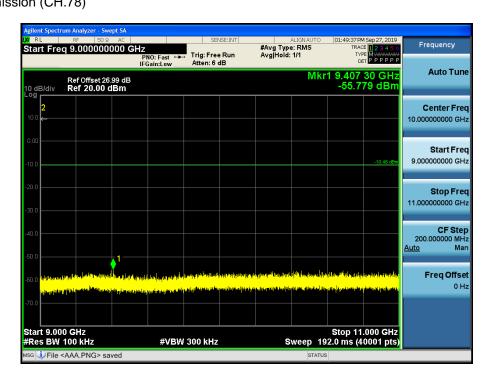


Test Plots(8DPSK)- 7 GHz - 9 GHz

Spurious Emission (CH.78)

RL	RF 50 Ω A		SENS	E:INT	ALIGN AUTO	01:49:26 PM Sep 27, 3	
Start Fre	q 7.00000000	UGHZ PNO: Fast ↔ IFGain:Low	Trig: Free Atten: 6 di	Run AvgjH	old: 1/1	TRACE 123 TYPE MWW DET P P P	AAAAAA
0 dB/div	Ref Offset 26.99 Ref 20.00 dBi				Mkr	1 7.379 95 G -55.351 dl	
-09 2 10.0 ←							Center Fre 8.000000000 GH
10.00						-10.4	Start Fre 7.000000000 GH
20.0 30.0 							Stop Fre 9.000000000 GH
40.0							CF Ste 200.000000 MH <u>Auto</u> Ma
60.0	the formation of the state of the			n paka daka dan saka sa da sa da Taga sa da sa d			Freq Offs O H
70.0						Stop 9.000 C	
Res BW		#VB\	V 300 kHz		Sweep 19	2.0 ms (40001	pts)

Test Plots(8DPSK)- 9 GHz - 11 GHz Spurious Emission (CH.78)



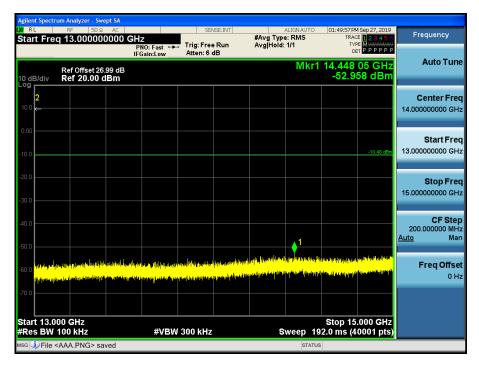


Test Plots(8DPSK) 11 GHz - 13 GHz

Spurious Emission (CH.78)

		AC AC		SEI	VSE:INT		ALIGN AUTO		4 Sep 27, 2019	Frequency
Start Fre	q 11.00000		HZ PNO: Fast ↔ FGain:Low	. Trig: Free Atten: 6		#Avg Type Avg Hold:		TY	^ж 1 2 3 4 5 6 Ж Милинин Т Р Р Р Р Р Р Р	Frequency
I0 dB/div	Ref Offset 26 Ref 20.00	6.99 dB					Mkr1		65 GHz 55 dBm	Auto Tune
-0g 2 10.0 ←										Center Fred 12.000000000 GH
10.00									-10.48 dBm	Start Free 11.000000000 GH
30.0										Stop Fre 13.000000000 GH
40.0							1			CF Ste 200.000000 MH <u>Auto</u> Ma
en n <mark>. Nada adı</mark>	<mark>hanna dan baran ang sana sana sana sana sana sana san</mark>	Destructure (na line				planta state de la deservación Angenesis de la deservación		<mark>alistanan kunan ku</mark>	a second second	Freq Offse 0 H
5tart 11.0	000 GHz 100 kHz		#)/B)4	/ 300 kHz			weep 19	Stop 13	.000 GHz	

Test Plots (8DPSK)- 13 GHz – 15 GHz



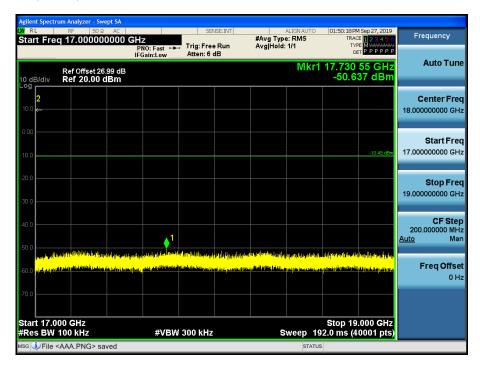


Test Plots(8DPSK)- 15 GHz - 17 GHz

Spurious Emission (CH.78)

RL	RF 50Ω A		SEN	JSE:INT		ALIGN AUTO		Sep 27, 2019	Frequency
start Fre	q 15.0000000	DU GHZ PNO: Fast ↔ IFGain:Low	Trig: Free Atten: 6 d		#Avg Type Avg Hold:	1/1 1/1	TYP	E 1 2 3 4 5 6 E M WWWWWW T P P P P P P	
0 dB/div	Ref Offset 26.99 Ref 20.00 dBr					Mkr1	15.047 -51.64	90 GHz 47 dBm	Auto Tur
.og 2 10.0									Center Fre 16.000000000 GF
10.0								-10,48 dBm	Start Fr 15.000000000 Gi
20.0									Stop Fr 17.00000000 G
0.0									CF St e 200.000000 M <u>Auto</u> M
50.0 <mark></mark>	Harren al konstant fan Skonstander af fan skinster segender de genere fan skinster f	landgalari ulidalari angip-termining ka	katilakalahistora	lashualig) kalada Kasarkashasiya	hidas dalam pultan d Turi papaka kara dan	lalijelisetelilije Antoinesen jaas		<mark>dipersonal de la la com</mark> Al personal de la comunicación de la Al personal de la comunicación de la	Freq Offs 0 I
70.0			N 200 HU-				Stop 17.	000 GHz	
	<pre>400 kHz <aaa.png> saved</aaa.png></pre>		V 300 kHz		5	status	2.0 ms (4	ooo r pisj	

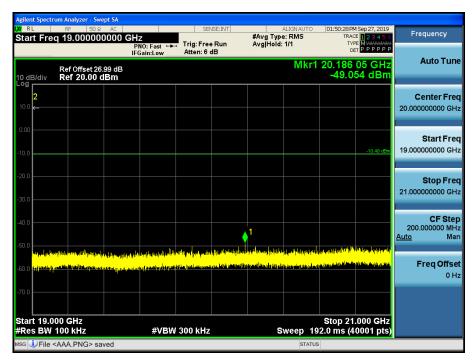
Test Plots(8DPSK)- 17 GHz - 19 GHz



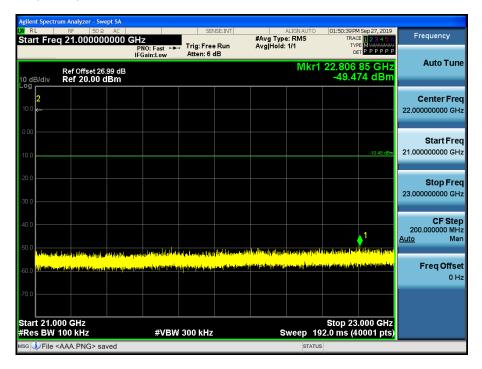


Test Plots (8DPSK)- 19 GHz - 21 GHz

Spurious Emission (CH.78)



Test Plots (8DPSK)- 21 GHz - 23 GHz





Test Plots (8DPSK)- 23 GHz - 25 GHz

RL	RF 50 Ω A	.C	SEN	ISE:INT		ALIGN AUTO	01:50:49 PM		F
Start Fre	q 23.0000000	DO GHz PNO: Fast IFGain:Low	→ Trig: Free Atten: 6 c	Run	#Avg Type Avg Hold:	e: RMS 1/1	TYPE	123456 Mwwwww PPPPPP	Frequency
0 dB/div	Ref Offset 26.99 Ref 20.00 dBr	dB	TREET. 0 0			Mkr1	24.972 -45.12	00 GHz 23 dBm	Auto Tune
.og 2 10.0									Center Fre 24.000000000 GH
0.00								-10.48 dBm	Start Fre 23.000000000 G⊦
20.0									Stop Fre 25.000000000 GF
40.0	Harrison and the state of the state of the		r Josland, Jack	المالد من ا	a dia di Mata anda anda	ley Made or patient of leis, co			CF Ste 200.000000 Mi <u>Auto</u> Mi
50.0 1917-994 60.0	i ling an again far an an ar an an an Nganan again tan an a	er de la server de la desta de la desta de la desta de la server de la desta de la server de la desta de la de La server de la server de la server de la desta de l La server de la desta de la	nin yan ingin ganga a	a a line of the set of a line of the set of	<mark>Lateration Later</mark>	a na kata mang na pang	the part of a straight of a	an a	Freq Offs 0 I
70.0									
Start 23.0	100 GHz 100 kHz	#VB	W 300 kHz		6	ween 10	Stop 25. 2.0 ms (40		
	<aaa.png> saved</aaa.png>		W 500 KHZ		3	STATUS		, oo 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 p	beaks 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 p	beaks found			

Note:

2. Radiated test is performed with hopping off.

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



Frequency Range : Above 1 GHz

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	50.35	1.83	V	52.18	73.98	21.80	PK
4804	37.34	1.83	V	39.17	53.98	14.81	AV
7206	49.25	9.65	V	58.9	73.98	15.08	PK
7206	36.02	9.65	V	45.67	53.98	8.31	AV
4804	51.24	1.83	Н	53.07	73.98	20.91	PK
4804	38.04	1.83	Н	39.87	53.98	14.11	AV
7206	50.15	9.65	Н	59.8	73.98	14.18	PK
7206	36.31	9.65	Н	45.96	53.98	8.02	AV

Operation Mode: CH Mid(GFSK)

Frequency	Reading	A.F + C.L - A.G + D.F	Pol.	Total	Limit	Margin	Measurement Type
[MHz]	[dBuV]	[dB]	[H/V]	[dBuV/m]	[dBuV/m]	[dB]	.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
4882	50.05	2.31	V	52.36	73.98	21.62	PK
4882	37.05	2.31	V	39.36	53.98	14.62	AV
7323	49.57	9.96	V	59.53	73.98	14.45	PK
7323	36.30	9.96	V	46.26	53.98	7.72	AV
4882	51.93	2.31	Н	54.24	73.98	19.74	PK
4882	37.61	2.31	Н	39.92	53.98	14.06	AV
7323	50.12	9.96	Н	60.08	73.98	13.90	PK
7323	36.35	9.96	Н	46.31	53.98	7.67	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	50.23	2.26	V	52.49	73.98	21.49	PK
4960	36.91	2.26	V	39.17	53.98	14.81	AV
7440	49.05	9.78	V	58.83	73.98	15.15	PK
7440	35.82	9.78	V	45.6	53.98	8.38	AV
4960	50.76	2.26	Н	53.02	73.98	20.96	PK
4960	37.99	2.26	н	40.25	53.98	13.73	AV
7440	50.20	9.78	Н	59.98	73.98	14.00	PK
7440	36.23	9.78	Н	46.01	53.98	7.97	AV



Report No.: HCT-RF-1910-FC006

Operation Mode: CH Low(π /4DQPSK)

Frequency	Reading	A.F + C.L - A.G + D.F	Pol.	Total	Limit	Margin	Measurement Type
[MHz]	[dBuV]	[dB]	[H/V]	[dBuV/m]	[dBuV/m]	[dB]	
4804	50.88	1.83	V	52.71	73.98	21.27	PK
4804	36.55	1.83	V	38.38	53.98	15.60	AV
7206	49.44	9.65	V	59.09	73.98	14.89	PK
7206	36.13	9.65	V	45.78	53.98	8.20	AV
4804	51.08	1.83	Н	52.91	73.98	21.07	PK
4804	37.68	1.83	Н	39.51	53.98	14.47	AV
7206	50.14	9.65	Н	59.79	73.98	14.19	PK
7206	36.19	9.65	Н	45.84	53.98	8.14	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	50.17	2.31	V	52.48	73.98	21.50	PK
4882	37.02	2.31	V	39.33	53.98	14.65	AV
7323	49.21	9.96	V	59.17	73.98	14.81	PK
7323	36.16	9.96	V	46.12	53.98	7.86	AV
4882	50.73	2.31	Н	53.04	73.98	20.94	PK
4882	37.30	2.31	Н	39.61	53.98	14.37	AV
7323	50.36	9.96	Н	60.32	73.98	13.66	PK
7323	36.30	9.96	Н	46.26	53.98	7.72	AV

Operation Mode: CH High(π /4DQPSK)

Frequency	Reading	A.F + C.L - A.G + D.F	Pol.	Total	Limit	Margin	Measurement Type
[MHz]	[dBuV]	[dB]	[H/V]	[dBuV/m]	[dBuV/m]	[dB]	.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
4960	50.95	2.26	V	53.21	73.98	20.77	PK
4960	37.52	2.26	V	39.78	53.98	14.20	AV
7440	49.54	9.78	V	59.32	73.98	14.66	PK
7440	36.02	9.78	V	45.8	53.98	8.18	AV
4960	51.65	2.26	Н	53.91	73.98	20.07	PK
4960	37.68	2.26	Н	39.94	53.98	14.04	AV
7440	49.77	9.78	Н	59.55	73.98	14.43	PK
7440	36.17	9.78	Н	45.95	53.98	8.03	AV



Report No.: HCT-RF-1910-FC006

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	49.82	1.83	V	51.65	73.98	22.33	PK
4804	37.20	1.83	V	39.03	53.98	14.95	AV
7206	49.17	9.65	V	58.82	73.98	15.16	PK
7206	36.14	9.65	V	45.79	53.98	8.19	AV
4804	50.91	1.83	Н	52.74	73.98	21.24	PK
4804	37.66	1.83	Н	39.49	53.98	14.49	AV
7206	50.37	9.65	Н	60.02	73.98	13.96	PK
7206	36.29	9.65	Н	45.94	53.98	8.04	AV

Operation Mode: CH Mid(8DPSK)

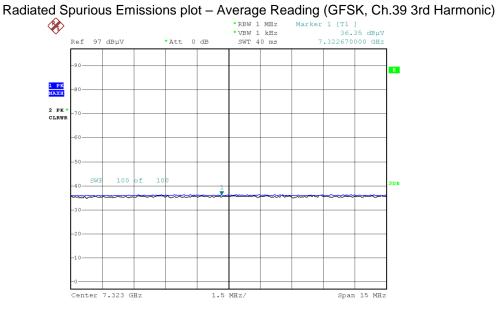
Frequency	Reading	A.F + C.L - A.G + D.F	Pol.	Total	Limit	Margin	Measurement
[MHz]	[dBuV]	[dB]	[H/V]	[dBuV/m]	[dBuV/m]	[dB]	Туре
4882	49.90	2.31	V	52.21	73.98	21.77	PK
4882	36.25	2.31	V	38.56	53.98	15.42	AV
7323	49.47	9.96	V	59.43	73.98	14.55	РК
7323	36.02	9.96	V	45.98	53.98	8.00	AV
4882	51.61	2.31	Н	53.92	73.98	20.06	PK
4882	37.32	2.31	Н	39.63	53.98	14.35	AV
7323	50.04	9.96	Н	60	73.98	13.98	РК
7323	36.21	9.96	Н	46.17	53.98	7.81	AV

Operation Mode: CH High(8DPSK)

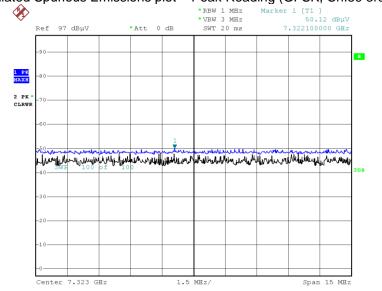
Frequency	Reading	A.F + C.L - A.G + D.F	Pol.	Total	Limit	Margin	Measurement Type
[MHz]	[dBuV]	[dB]	[H/V]	[dBuV/m]	[dBuV/m]	[dB]	
4960	50.60	2.26	V	52.86	73.98	21.12	PK
4960	38.01	2.26	V	40.27	53.98	13.71	AV
7440	49.22	9.78	V	59	73.98	14.98	PK
7440	35.60	9.78	V	45.38	53.98	8.60	AV
4960	51.11	2.26	Н	53.37	73.98	20.61	PK
4960	38.18	2.26	н	40.44	53.98	13.54	AV
7440	50.14	9.78	Н	59.92	73.98	14.06	PK
7440	35.98	9.78	Н	45.76	53.98	8.22	AV



RESULT PLOTS (Worst case : Y-H)



Date: 26.SEP.2019 15:16:25



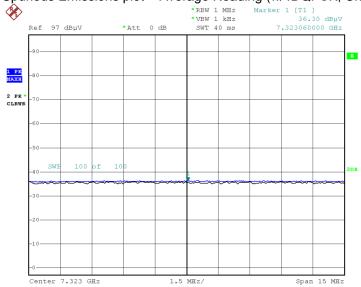
Radiated Spurious Emissions plot – Peak Reading (GFSK, Ch.39 3rd Harmonic)

Date: 26.SEP.2019 15:17:57



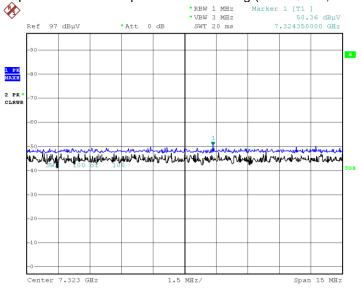
Report No.: HCT-RF-1910-FC006

Radiated Spurious Emissions plot – Average Reading (π/4DQPSK, Ch.39 3rd Harmonic)



Date: 26.SEP.2019 15:19:50

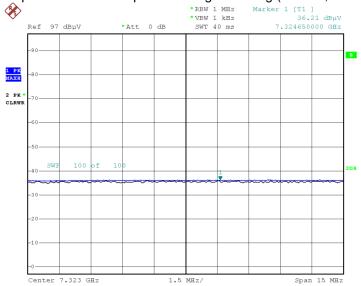




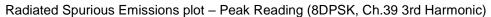
Date: 26.SEP.2019 15:20:59

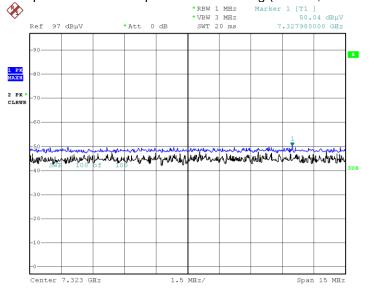


Radiated Spurious Emissions plot – Average Reading (8DPSK, Ch.39 3rd Harmonic)



Date: 26.SEP.2019 15:25:28





Date: 26.SEP.2019 15:24:48

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 -AMP+ATT	Pol.	Duty Cycle Correction		Limit	Margin	Measurement Type
[MHz]	[dBuV]	[dB]	[H/V]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
2390.0	53.70	0.85	Н	0	54.55	73.98	19.43	PK
2390.0	53.70	0.85	Н	-24.73	29.82	53.98	24.16	AV
2390.0	52.62	0.85	V	0	53.47	73.98	20.51	PK
2390.0	52.62	0.85	V	-24.73	28.74	53.98	25.24	AV
2483.5	64.89	1.13	Н	0	66.02	73.98	7.96	PK
2483.5	64.89	1.13	Н	-24.73	41.29	53.98	12.69	AV
2483.5	64.72	1.13	V	0	65.85	73.98	8.13	PK
2483.5	64.72	1.13	V	-24.73	41.12	53.98	12.86	AV

Operation Mode

EDR(8DPSK)

2402 MHz, 2480 MHz

Operating Frequency

Channel No

CH 0, CH 78

Frequency [MHz]	Reading [dBuV]	A.F + C.L + D.F -AMP+ATT [dB]	Pol. [H/V]	Duty Cycle Correction [dB]	Total	Limit [dBuV/m]	Margin [dB]	Measurement Type
								DK
2390.0	53.22	0.85	Н	0	54.07	73.98	19.91	PK
2390.0	53.22	0.85	Н	-24.73	29.34	53.98	24.64	AV
2390.0	52.71	0.85	V	0	53.56	73.98	20.42	PK
2390.0	52.71	0.85	V	-24.73	28.83	53.98	25.15	AV
2483.5	66.83	1.13	Н	0	67.96	73.98	6.02	PK
2483.5	66.83	1.13	Н	-24.73	43.23	53.98	10.75	AV
2483.5	65.84	1.13	V	0	66.97	73.98	7.01	PK
2483.5	65.84	1.13	V	-24.73	42.24	53.98	11.74	AV



Operation Mode

Channel No

Operating Frequency

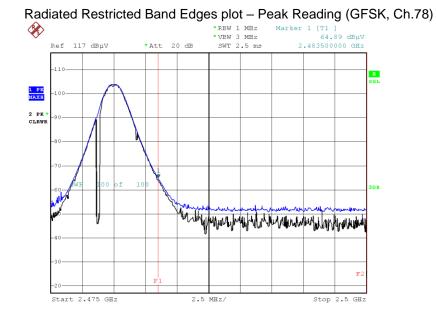
EDR(π/4DQPSK) 2402 MHz, 2480 MHz

CH 0, CH 78

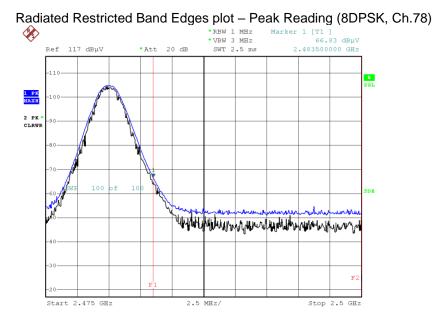
Frequency	Reading	A.F + C.L + D.F -AMP+ATT	Pol.	Duty Cycle Correction		Limit	Margin	Measurement
[MHz]	[dBuV]	[dB]	[H/V]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	Туре
2390.0	53.57	0.85	Н	0	54.42	73.98	19.56	PK
2390.0	53.57	0.85	Н	-24.73	29.69	53.98	24.29	AV
2390.0	52.51	0.85	V	0	53.36	73.98	20.62	PK
2390.0	52.51	0.85	V	-24.73	28.63	53.98	25.35	AV
2483.5	66.98	1.13	н	0	68.11	73.98	5.87	PK
2483.5	66.98	1.13	н	-24.73	43.38	53.98	10.60	AV
2483.5	65.95	1.13	V	0	67.08	73.98	6.90	PK
2483.5	65.95	1.13	V	-24.73	42.35	53.98	11.63	AV



RESULT PLOTS (Worst case : X-H)



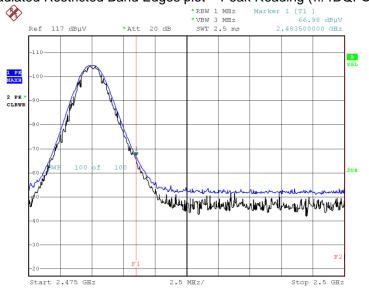
Date: 26.SEP.2019 15:05:16



Date: 26.SEP.2019 15:07:36



Radiated Restricted Band Edges plot – Peak Reading (π/4DQPSK, Ch.78)



Date: 26.SEP.2019 15:06:32

Note:

Plot of worst case are only reported.



10.7 POWERLINE CONDUCTED EMISSIONS

Conducted Emissions (Line 1)

Test

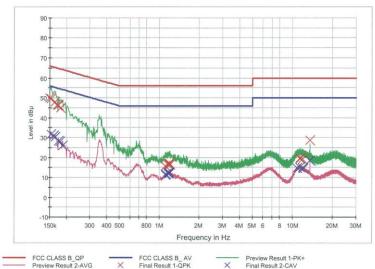
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HCT TEST Report

Common Information

EUT: Manufacturer: Test Site: Operating Conditions: SM-G770F/DS SAMSUNG SHIELD ROOM SM-G770F/DS_BT_L1





Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	50.1	9.000	Off	L1	9.8	15.9	66.0
0.154000	49.8	9.000	Off	L1	9.8	16.0	65.8
0.164000	47.9	9.000	Off	L1	9.8	17.3	65.3
0.170000	46.4	9.000	Off	L1	9.8	18.6	65.0
0.174000	46.2	9.000	Off	L1	9.8	18.6	64.8
0.180000	44.8	9.000	Off	L1	9.8	19.7	64.5
1.112000	15.9	9.000	Off	L1	9.9	40.1	56.0
1.158000	16.5	9.000	Off	L1	9.9	39.5	56.0
1.170000	>16.6	9.000	Off	L1	9.9	39.4	56.0
1.186000	16.8	9.000	Off	L1	9.9	39.2	56.0
1.190000	17.0	9.000	Off	L1	9.9	39.0	56.0
1.206000	16.5	9.000	Off	L1	9.9	39.5	56.0
11.326000	19.5	9.000	Off	L1	10.4	40.5	60.0
11.340000	19.5	9.000	Off	L1	10.4	40.5	60.0
11.442000	19.5	9.000	Off	L1	10.4	40.5	60.0
11.882000	19.1	9.000	Off	L1	10.4	41.0	60.0
11.936000	19.0	9.000	Off	L1	10.4	41.0	60.0
13.558000	28.7	9.000	Off	L1	10.4	31.3	60.0

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Test

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Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.154000	31.8	9.000	Off	L1	9.8	24.0	55.8
0.160000	30.9	9.000	Off	L1	9.8	24.6	55.5
0.164000	30.2	9.000	Off	L1	9.8	25.0	55.3
0.174000	28.3	9.000	Off	L1	9.8	26.5	54.8
0.178000	27.9	9.000	Off	L1	9.8	26.7	54.6
0.188000	26.0	9.000	Off	L1	9.8	28.1	54.1
1.112000	11.4	9.000	Off	L1	9.9	34.6	46.0
1.126000	11.6	9.000	Off	L1	9.9	34.4	46.0
1.158000	11.9	9.000	Off	L1	9.9	34.1	46.0
1.170000	12.3	9.000	Off	L1	9.9	33.7	46.0
1.184000	12.2	9.000	Off	L1	9.9	33.8	46.0
1.190000	12.4	9.000	Off	L1	9.9	33.6	46.0
10.846000	14.7	9.000	Off	L1	10.3	35.3	50.0
11.340000	15.2	9.000	Off	L1	10.4	34.8	50.0
11.882000	14.7	9.000	Off	L1	10.4	35.3	50.0
11.936000	14.7	9.000	Off	L1	10.4	35.3	50.0
12.074000	14.5	9.000	Off	L1	10.4	35.5	50.0
13.560000	18.5	9.000	Off	L1	10.4	31.5	50.0

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Conducted Emissions (Line 2)

Test

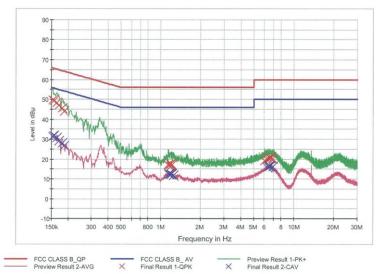
1/2

HCT TEST Report

Common Information

EUT: Manufacturer: Test Site: Operating Conditions: SM-G770F/DS SAMSUNG SHIELD ROOM SM-G770F/DS_BT_N

FCC CLASS B_Exten Cable



Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.154000	49.7	9.000	Off	N	9.8	16.1	65.8
0.158000	49.5	9.000	Off	N	9.8	16.1	65.6
0.164000	48.3	9.000	Off	N	9.8	17.0	65.3
0.170000	46.9	9.000	Off	N	9.8	18.1	65.0
0.180000	45.4	9.000	Off	N	9.8	19.1	64.5
0.188000	43.8	9.000	Off	N	9.8	20.4	64.1
1.140000	17.1	9.000	Off	N	9.9	38.9	56.0
1.146000	16.7	9.000	Off	N	9.9	39.3	56.0
1.184000	16.6	9.000	Off	N	9.9	39.4	56.0
1.192000	17.5	9.000	Off	N	9.9	38.5	56.0
1.206000	16.8	9.000	Off	N	9.9	39.2	56.0
1.222000	17.1	9.000	Off	N	9.9	38.9	56.0
6.046000	19.3	9.000	Off	N	10.1	40.7	60.0
6.306000	20.0	9.000	Off	N	10.2	40.0	60.0
6.492000	20.3	9.000	Off	N	10.2	39.7	60.0
6.626000	20.5	9.000	Off	N	10.2	39.5	60.0
6.742000	20.4	9.000	Off	N	10.2	39.6	60.0
6.924000	20.3	9.000	Off	N	10.2	39.7	60.0

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Test

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Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.154000	31.5	9.000	Off	N	9.8	24.3	55.8
0.158000	31.5	9.000	Off	N	9.8	24.0	55.6
0.164000	30.5	9.000	Off	N	9.8	24.7	55.3
0.170000	29.0	9.000	Off	N	9.8	26.0	55.0
0.180000	28.1	9.000	Off	N	9.8	26.4	54.5
0.188000	26.5	9.000	Off	N	9.8	27.6	54.1
1.146000	12.3	9.000	Off	N	9.9	33.7	46.0
1.158000	12.4	9.000	Off	N	9.9	33.6	46.0
1.184000	12.3	9.000	Off	N	9.9	33.7	46.0
1.192000	12.3	9.000	Off	N	9.9	33.7	46.0
1.206000	12.3	9.000	Off	N	9.9	33.7	46.0
1.246000	11.8	9.000	Off	N	9.9	34.2	46.0
6.306000	15.8	9.000	Off	N	10.2	34.2	50.0
6.456000	16.2	9.000	Off	N	10.2	33.8	50.0
6.492000	16.1	9.000	Off	N	10.2	33.9	50.0
6.548000	16.3	9.000	Off	N	10.2	33.7	50.0
6.626000	16.3	9.000	Off	N	10.2	33.7	50.0
6.924000	16.0	9.000	Off	N	10.2	34.0	50.0

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HCT CO.,LTD.



11. LIST OF TEST EQUIPMENT

Conducted Test

Manufacturer	Model / Equipment	Calibration	Calibration	Serial No.
		Date	Interval	
Rohde & Schwarz	ENV216 / LISN	12/12/2018	Annual	102245
Rohde & Schwarz	ESCI / Test Receiver	06/18/2019	Annual	100584
ESPAC	SU-642 /Temperature Chamber	03/12/2019	Annual	0093008124
Agilent	N9020A / Signal Analyzer	05/23/2019	Annual	MY51110085
Agilent	N9030A / Signal Analyzer	11/20/2018	Annual	MY49431210
Agilent	N1911A / Power Meter	04/10/2019	Annual	MY45100523
Agilent	N1921A / Power Sensor	04/10/2019	Annual	MY52260025
Agilent	87300B / Directional Coupler	11/20/2018	Annual	3116A03621
Hewlett Packard	11667B / Power Splitter	05/24/2019	Annual	05001
Hewlett Packard	E3632A / DC Power Supply	06/18/2019	Annual	KR75303960
Agilent	8493C / Attenuator(10 dB)	07/02/2019	Annual	07560
Rohde & Schwarz	EMC32 / Software	N/A	N/A	N/A
	FCC WLAN&BT&BLE Conducted Test Software	N/A	N/A	N/A
HCT CO., LTD.	v3.0	IN/A	IN/A	N/A
Rohde & Schwarz	CBT / Bluetooth Tester	05/16/2019	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

		Calibration	Calibration	
Manufacturer	Model / Equipment	Date	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	08/23/2018	Biennial	1513-175
Schwarzbeck	VULB 9168 / Hybrid Antenna	08/31/2018	Biennial	00895
Schwarzbeck	VULB 9168 / Hybrid Antenna	08/09/2018	Annual	3368
Schwarzbeck	BBHA 9120D / Horn Antenna	06/28/2019	Biennial	1300
Schwarzbeck	BBHA9170 / Horn Antenna(15 GHz ~ 40 GHz)	12/04/2017	Biennial	BBHA9170541
Rohde & Schwarz	FSP(9 kHz ~ 40 GHz) / Spectrum Analyzer	07/16/2019	Annual	100843
Wainwright Instruments	WHK3.0/18G-10EF / High Pass Filter	01/03/2019	Annual	F6
Wainwright Instruments	WHFX7.0/18G-8SS / High Pass Filter	05/03/2019	Annual	29
Wainwright Instruments	WRCJV2400/2483.5-2370/2520-60/12SS / Band Reject Filter	06/19/2019	Annual	2
Wainwright Instruments	WRCJV5100/5850-40/50-8EEK / Band Reject Filter	01/03/2019	Annual	2
Api tech.	18B-03 / Attenuator (3 dB)	06/04/2019	Annual	1
H+S	5910-N-50-010 / Attenuator(10 dB)	11/08/2018	Annual	801
CERNEX	CBLU1183540B-01 / Power Amplifier	12/21/2018	Annual	25540
CERNEX	CBL06185030 / Power Amplifier	03/26/2019	Annual	28550
CERNEX	CBL18265035 / Power Amplifier	01/03/2019	Annual	22966
CERNEX	CBL26405040 / Power Amplifier	06/18/2019	Annual	25956
TESCOM	TC-3000C / Bluetooth Tester	03/26/2019	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;

No.	Description
1	HCT-RF-1910-FC006-P