

FCC BT LE REPORT

Certification

Applicant Name:
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Date of Issue:
April 22, 2022

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

Report No.: HCT-RF-2204-FC018

FCC ID:	A3LSMM135M
APPLICANT:	SAMSUNG Electronics Co., Ltd.

Model: SM-M135M/DS
Additional Model: -
EUT Type: Mobile Phone
Peak Output Power: 6.654 dBm (4.63 mW)
Frequency Range: 2 402 MHz ~ 2 480 MHz
Modulation type GFSK
FCC Classification: Digital Transmission System(DTS)
FCC Rule Part(s): Part 15.247

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 No.: HCT-RF-2204-FC018

REVIEWED BY



Report prepared by : Jin Gwan Lee
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)

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Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-2204-FC018	April 22, 2022	- First Approval Report

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1. EUT DESCRIPTION

Model	SM-M135M/DS	
Additional Model	-	
EUT Type	Mobile Phone	
Power Supply	DC 3.85 V	
Frequency Range	2 402 MHz ~ 2 480 MHz	
Max. RF Output Power	Peak	1M Bit/s : 6.359 dBm (4.32 mW) 2M Bit/s : 6.413 dBm (4.38 mW) 125k Bit/s : 6.204 dBm (4.17 mW) 500k Bit/s : 6.295 dBm (4.26 mW)
	Average	1M Bit/s : 5.82 dBm (3.82 mW) 2M Bit/s : 5.97 dBm (3.95 mW) 125k Bit/s : 5.73 dBm (3.74 mW) 500k Bit/s : 5.68 dBm (3.70 mW)
Modulation Type	GFSK	
Bluetooth Version	5.0	
Number of Channels	40 Channels	
Date(s) of Tests	March 18, 2022~ April 21, 2022	
Serial number	Radiated: R38T20053EJ Conducted: R38T20056NK	

2. TEST METHODOLOGY

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

EUT CONFIGURATION

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

EUT EXERCISE

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

GENERAL TEST PROCEDURES

Conducted Emissions

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

Radiated Emissions

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

DESCRIPTION OF TEST MODES

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

3. INSTRUMENT CALIBRATION

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

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

4. FACILITIES AND ACCREDITATIONS

FACILITIES

The SAC(Semi-Anechoic Chamber) and conducted measurement facility used to collect the radiated data are located at the 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA.

The site is constructed in conformance with the requirements of ANSI C63.4. (Version :2014) and CISPR Publication 22.

Detailed description of test facility was submitted to the Commission and accepted dated 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."

5. ANTENNA REQUIREMENTS

According to FCC 47 CFR §15.203

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

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

6. MEASUREMENT UNCERTAINTY

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

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

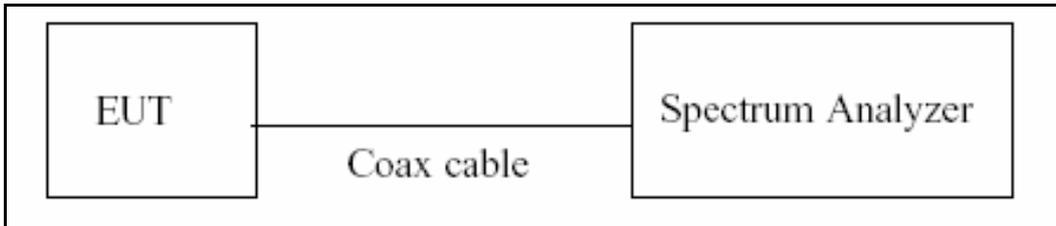
The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Parameter	Expanded Uncertainty (dB)
Conducted Disturbance (150 kHz ~ 30 MHz)	2.00 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (9 kHz ~ 30 MHz)	4.40 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (30 MHz ~ 1 GHz)	5.74 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (1 GHz ~ 18 GHz)	5.51 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (18 GHz ~ 40 GHz)	5.92 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (Above 40 GHz)	5.48 (Confidence level about 95 %, $k=2$)

7. DESCRIPTION OF TESTS

7.1. Duty Cycle

Test Configuration



Test Procedure

The transmitter output is connected to the Spectrum Analyzer.

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

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

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

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

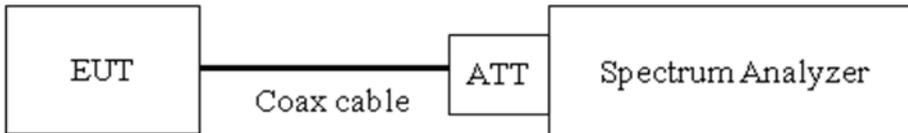
1. RBW = 8 MHz (the largest available value)
2. VBW = 8 MHz (\geq RBW)
3. SPAN = 0 Hz
4. Detector = Peak
5. Number of points in sweep > 100
6. Trace mode = Clear write
7. Measure T_{total} and T_{on}
8. Calculate Duty Cycle = T_{on} / T_{total} and Duty Cycle Factor = $10\log(1/\text{Duty Cycle})$

7.2. 6 dB Bandwidth

Limit

The minimum permissible 6 dB bandwidth is 500 kHz.

Test Configuration



Test Procedure

The transmitter output is connected to the Spectrum Analyzer.

The Spectrum Analyzer is set to

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

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

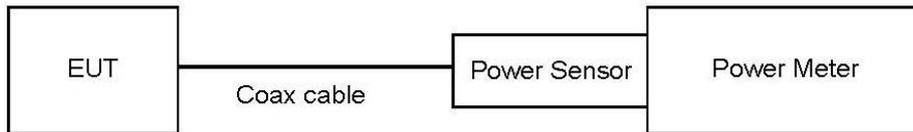
Note : We tested OBW using the automatic bandwidth measurement capability of a spectrum analyzer.

7.3. Output Power

Limit

The maximum permissible conducted output power is 1 Watt.

Test Configuration



Test Procedure

The transmitter output is connected to the Power Meter.

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

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

Sample Calculation

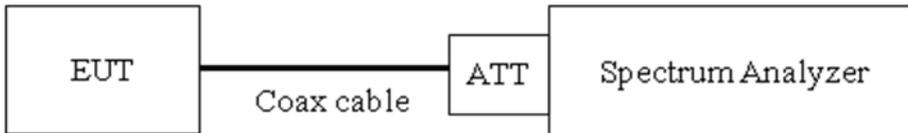
- Conducted Output Power(Peak) = Measured Value + ATT loss + Cable loss
- Conducted Output Power(Average) = Measured Value + ATT loss + Cable loss + Duty Cycle Factor

7.4. Power Spectral Density

Limit

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

Test Configuration



Test Procedure

The transmitter output is connected to the Spectrum Analyzer.

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

The spectrum analyzer is set to :

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

Sample Calculation

- Power Spectral Density = Measured Value + ATT loss + Cable loss

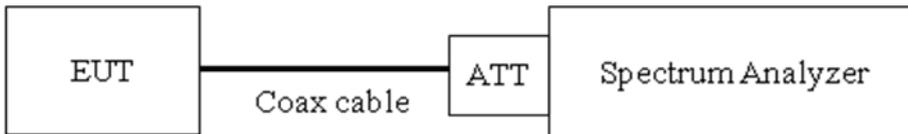
7.5. Conducted Band Edge(Out of Band Emissions) & Conducted Spurious Emissions

Limit

The maximum conducted (Peak) output power was used to demonstrate compliance, then the peak power in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz.

[Conducted > 20 dBc]

Test Configuration



Test Procedure

The transmitter output is connected to the spectrum analyzer.

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

- 1) RBW = 100 kHz
- 2) VBW $\geq 3 \times$ RBW
- 3) Set span to encompass the spectrum to be examined
- 4) Detector = Peak
- 5) Trace Mode = max hold
- 6) Sweep time = auto couple
- 7) Ensure that the number of measurement points $\geq 2 \times$ Span/VBW
- 8) Allow trace to fully stabilize.
- 9) Use peak marker function to determine the maximum amplitude level.

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

Factors for frequency

Freq(MHz)	Factor(dB)
30	10.40
100	10.44
200	10.49
300	10.53
400	10.59
500	10.59
600	10.59
700	10.62
800	10.63
900	10.64
1 000	10.69
2 000	10.84
2 400	10.90
2 480	10.90
2 500	10.88
3 000	11.00
4 000	11.06
5 000	11.15
5 150	11.15
5 850	11.22
6 000	11.23
7 000	11.35
8 000	11.34
9 000	11.43
10 000	11.53
11 000	11.62
12 000	11.71
13 000	11.72
14 000	11.76
15 000	11.85
16 000	11.94
17 000	12.13
18 000	12.27
19 000	12.19
20 000	11.86
21 000	11.99
22 000	11.98
23 000	11.95
24 000	12.00

Note : 1. 2 400 ~ 2 500 MHz is fundamental frequency range.

2. Factor = Attenuator loss(10 dB) + Cable loss(1ea)

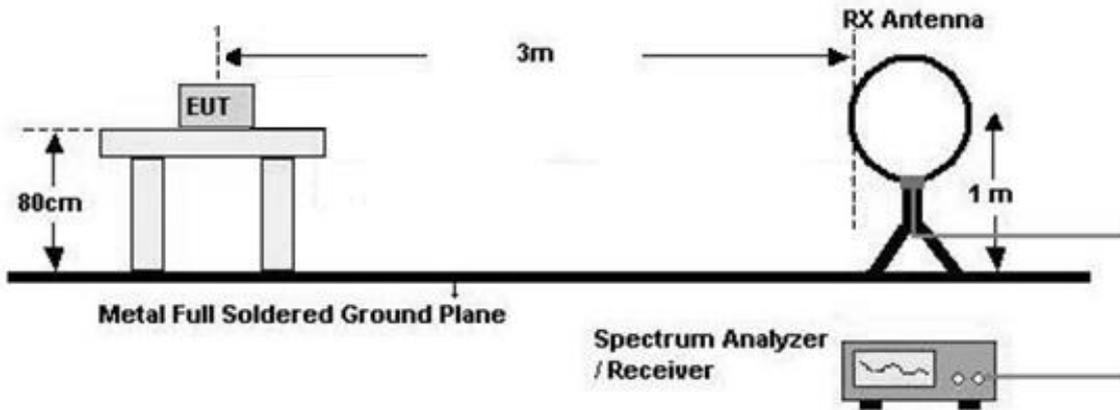
7.6. Radiated Test

Limit

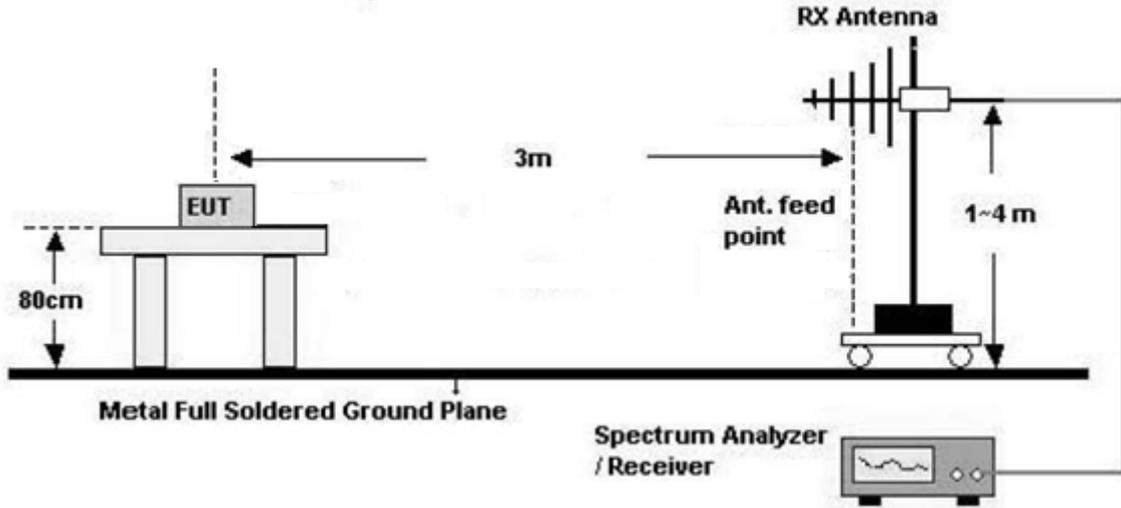
Frequency (MHz)	Field Strength ($\mu\text{V/m}$)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Configuration

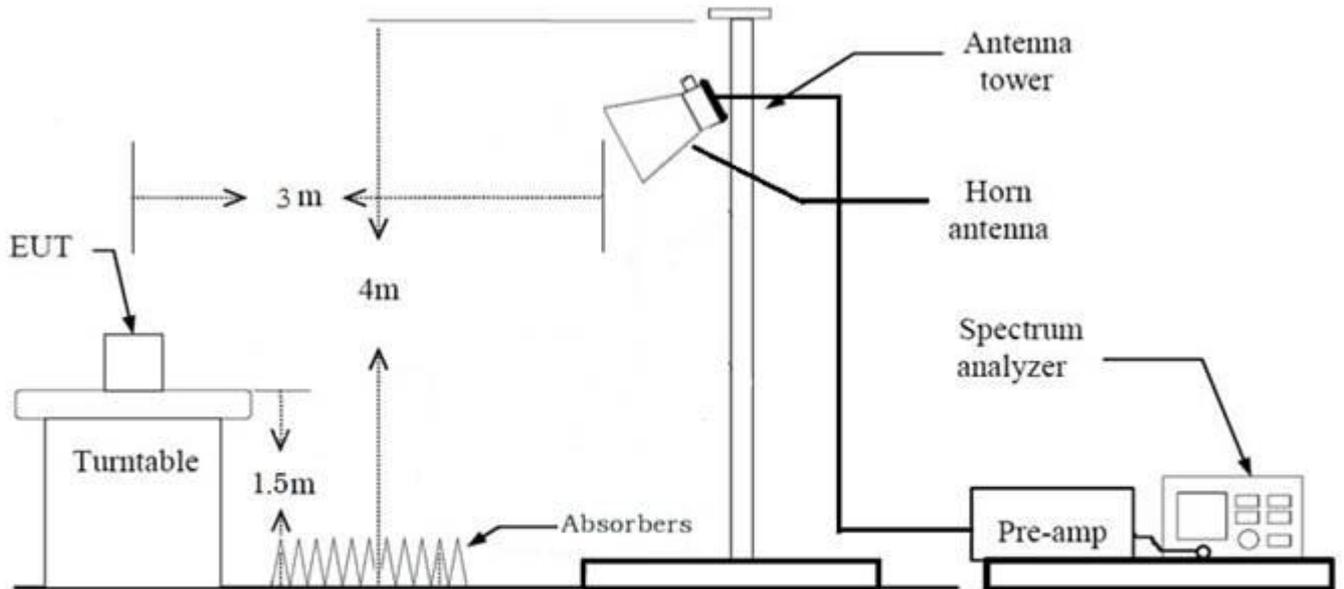
Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz



Test Procedure of Radiated spurious emissions(Below 30 MHz)

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

KDB 414788 OFS and Chamber Correlation Justification

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

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

Test Procedure of Radiated spurious emissions(Below 1 GHz)

1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The EUT is placed on a turntable, which is 0.8 m above ground plane.
3. The Hybrid antenna was placed at a location 3 m from the EUT, which is varied from 1m to 4 m to find out the highest emissions.
4. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
5. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
6. Spectrum Setting

(1) Measurement Type(Peak):

- Measured Frequency Range : 30 MHz – 1 GHz
- Detector = Peak
- Trace = Maxhold
- RBW = 100 kHz
- VBW \geq 3 x RBW

(2) Measurement Type(Quasi-peak):

- Measured Frequency Range : 30 MHz – 1 GHz
- Detector = Quasi-Peak
- RBW = 120 kHz

In general, (1) is used mainly

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

Test Procedure of Radiated spurious emissions (Above 1 GHz)

1. The EUT is placed on a turntable, which is 1.5 m above ground plane.
2. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
3. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
4. EUT is set 3 m away from the receiving antenna, which is varied from 1 m to 4 m to find out the highest emissions.
5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
6. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. The unit was tested with its standard battery.
8. Spectrum Setting (Method 8.6 in KDB 558074 v05r02, Procedure 11.12 in ANSI 63.10-2013)
 - (1) Measurement Type(Peak):
 - Measured Frequency Range : 1 GHz – 25 GHz
 - Detector = Peak
 - Trace = Max hold
 - RBW = 1 MHz
 - VBW $\geq 3 \times$ RBW
 - (2) Measurement Type(Average):
 - Duty cycle < 98 %, duty cycle variations are less than ± 2 %
 - Measured Frequency Range : 1 GHz – 25 GHz
 - Detector = RMS
 - Averaging type = power (*i.e.*, RMS)
 - RBW = 1 MHz
 - VBW $\geq 3 \times$ RBW
 - Sweep time = auto.
 - Trace mode = average (at least 100 traces).
 - Correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100 percent duty cycle.
- Duty Cycle Factor (dB) : Please refer to the please refer to section 9.1
9. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
10. Distance extrapolation factor = $20 \log$ (test distance / specific distance) (dB)
11. Total (Measurement Type : Peak)
 - = Peak Measured Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(A.G)
 - + Distance Factor(D.F)

Total (Measurement Type : Average)

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

Test Procedure of Radiated Restricted Band Edge

1. The EUT is placed on a turntable, which is 1.5 m above ground plane.
2. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
3. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
4. EUT is set 3 m away from the receiving antenna, which is varied from 1 m to 4 m to find out the highest emissions.
5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
6. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. The unit was tested with its standard battery.
8. Spectrum Setting
 - (1) Measurement Type(Peak):
 - Measured Frequency Range : 2310 MHz ~ 2390 MHz/ 2483.5 MHz ~ 2500 MHz
 - Detector = Peak
 - Trace = Max hold
 - RBW = 1 MHz
 - VBW \geq 3 x RBW
 - (2) Measurement Type(Average):
 - Duty cycle < 98 %, duty cycle variations are less than ± 2 %
 - Measured Frequency Range : 2310 MHz ~ 2390 MHz/ 2483.5 MHz ~ 2500 MHz
 - Detector = RMS
 - Averaging type = power (*i.e.*, RMS)
 - RBW = 1 MHz
 - VBW \geq 3 x RBW
 - Sweep time = auto.
 - Trace mode = average (at least 100 traces).
 - Correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100 percent duty cycle.
 - Duty Cycle Factor (dB) : Please refer to the please refer to section 9.1.
9. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.

10. Distance extrapolation factor = $20\log$ (test distance / specific distance) (dB)

11. Total(Measurement Type : Peak)

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

Total(Measurement Type : Average)

= Average Measured Value + Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F)

+ Duty Cycle Factor

7.7. AC Power line Conducted Emissions

Limit

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

Frequency Range (MHz)	Limits (dB μ V)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56 ^(a)	56 to 46 ^(a)
0.50 to 5	56	46
5 to 30	60	50

^(a)Decreases with the logarithm of the frequency.

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

Test Configuration

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

Test Procedure

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

Sample Calculation

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

7.8. Worst case configuration and mode

Radiated Test

1. All modes of operation were investigated and the worst case configuration results are reported.
 - Mode : Stand alone, Stand alone + External accessories(Earphone, etc)
 - Worstcase : Stand alone
2. EUT Axis:
 - Radiated Spurious Emissions : X
 - Radiated Restricted Band Edge : X
3. All packet length of operation were investigated and the test results are worst case in lowest packet length.
(Worst case :1M Bit/s 37 Byte, 2M Bit/s 255 Byte)
(125k, 500k, 1M Bit/s all have the same 1MHz Band width and only Worst result is attached.)
4. All datarate of operation were investigated and the worst case configuration results are reported.
 - Worst case : 1 M, 2 M
5. All position of loop antenna were investigated and the test result is a no critical peak found at all positions.
 - Position : Horizontal, Vertical, Parallel to the ground plane

AC Power line Conducted Emissions

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

Conducted test

1. The EUT was configured with packet length of highest power.
 - ALL supported mode tested.
 - Worst Results refer to Notes for each test item

8. SUMMARY TEST OF RESULTS

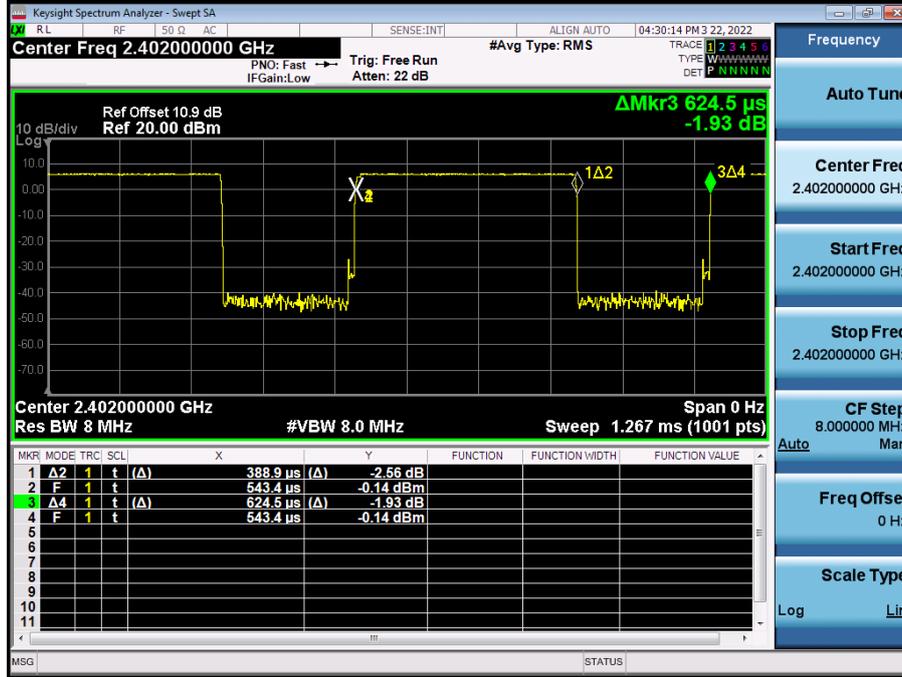
Test Description	FCC Part Section(s)	Test Limit	Test Condition	Test Result
6 dB Bandwidth	§15.247(a)(2)	> 500 kHz	Conducted	PASS
Conducted Maximum Output Power	§15.247(b)(3)	< 1 Watt		PASS
Power Spectral Density	§15.247(e)	< 8 dBm / 3 kHz Band		PASS
Band Edge (Out of Band Emissions)	§15.247(d)	Conducted > 20 dBc		PASS
AC Power line Conducted Emissions	§15.207	cf. Section 7.7		PASS
Radiated Spurious Emissions	§15.247(d), 15.205, 15.209	cf. Section 7.6	Radiated	PASS
Radiated Restricted Band Edge	§15.247(d), 15.205, 15.209	cf. Section 7.6		PASS

9. TEST RESULT**9.1 DUTY CYCLE**

Data rate (Bit/s)	Packet length (Byte)	T _{on} (ms)	T _{total} (ms)	Duty Cycle	Duty Cycle Factor (dB)
1M	37	0.389	0.624	0.6227	2.06
	255	2.135	2.500	0.8540	0.69
2M	37	0.203	0.624	0.3245	4.89
	255	1.074	1.874	0.5734	2.42
125k	37	3.100	3.750	0.8267	0.83
	255	17.033	17.500	0.9733	0.12
500k	37	1.067	1.874	0.5695	2.45
	255	4.550	5.000	0.9100	0.41

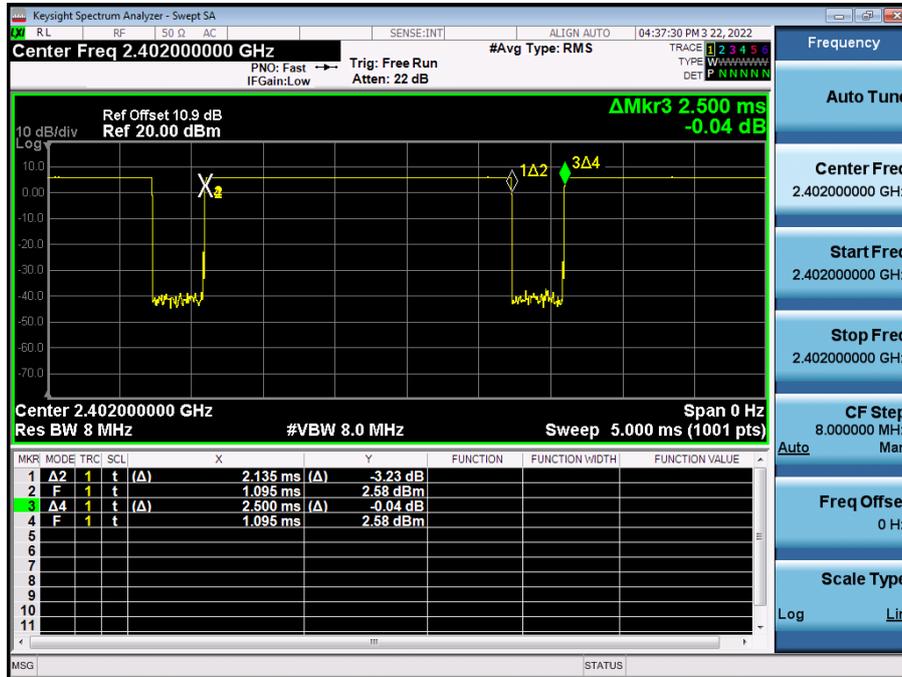
1M Bit/s (37 Byte) Test Plots

Duty Cycle (Low-CH 0)



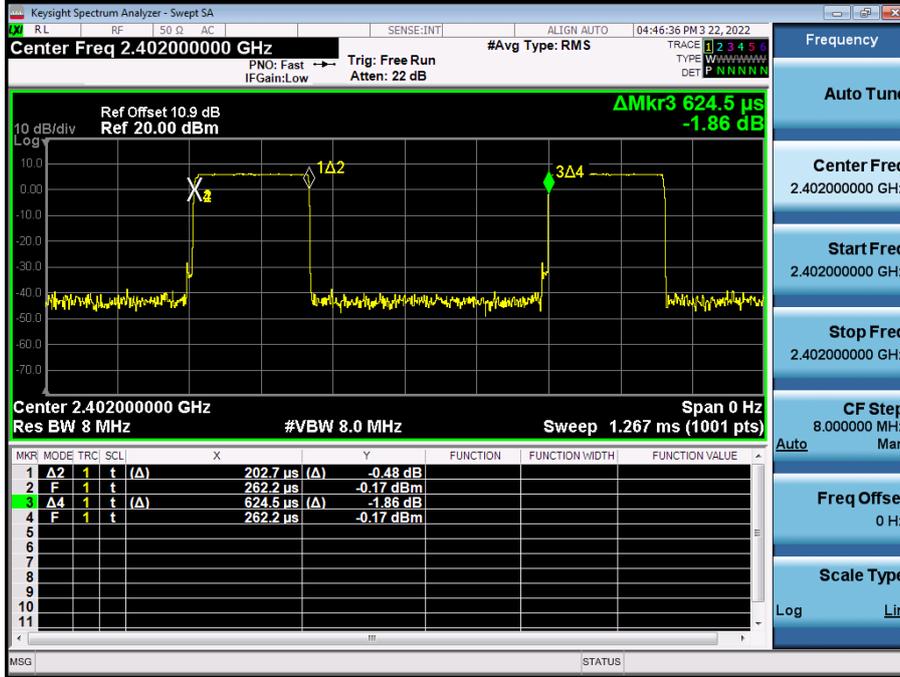
1M Bit/s (255 Byte) Test Plots

Duty Cycle (Low-CH 0)



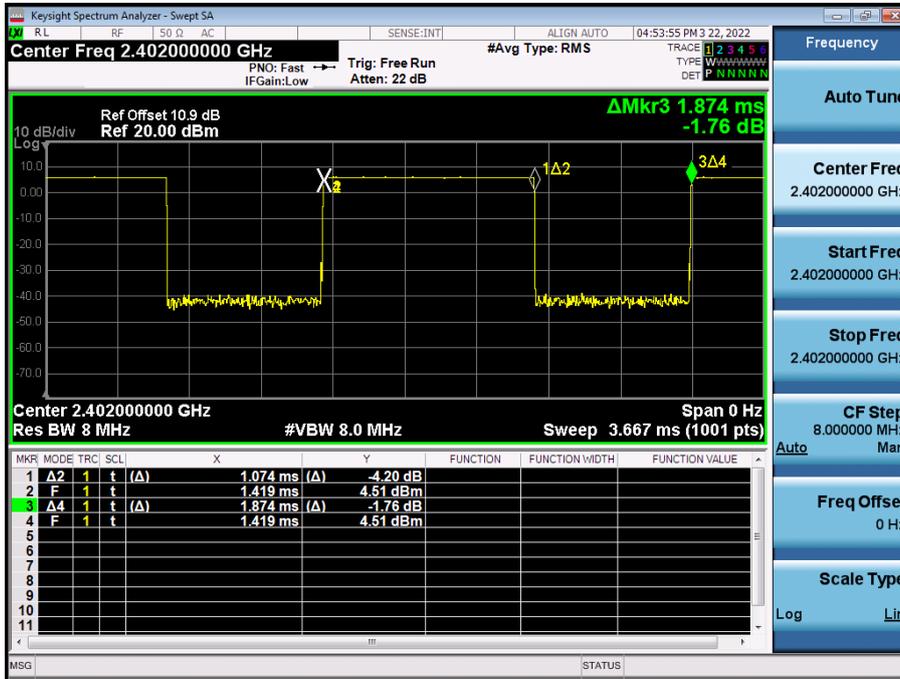
2M Bit/s (37 Byte) Test Plots

Duty Cycle (Low-CH 0)



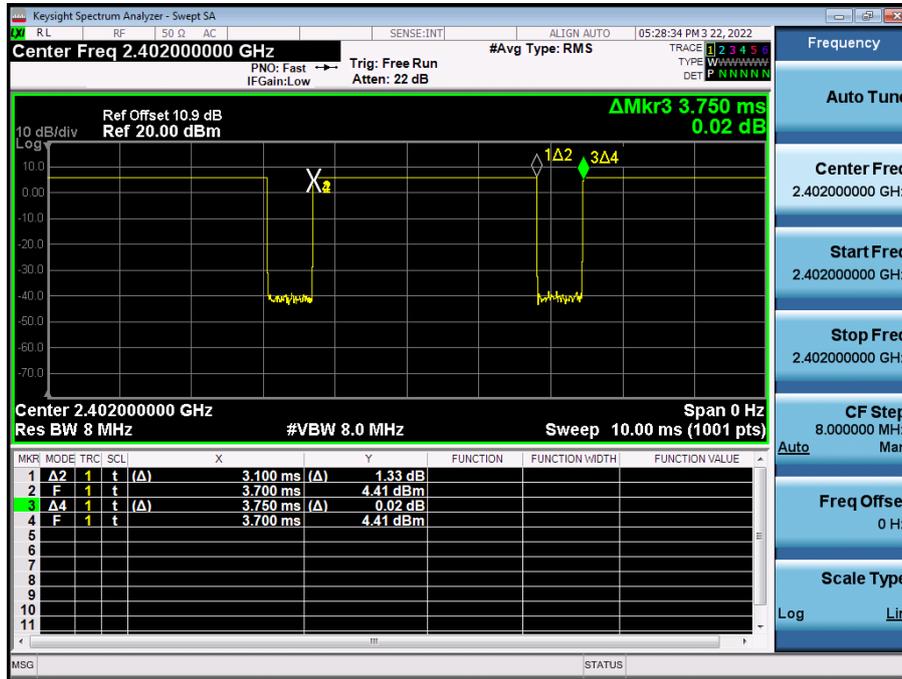
2M Bit/s (255 Byte) Test Plots

Duty Cycle (Low-CH 0)



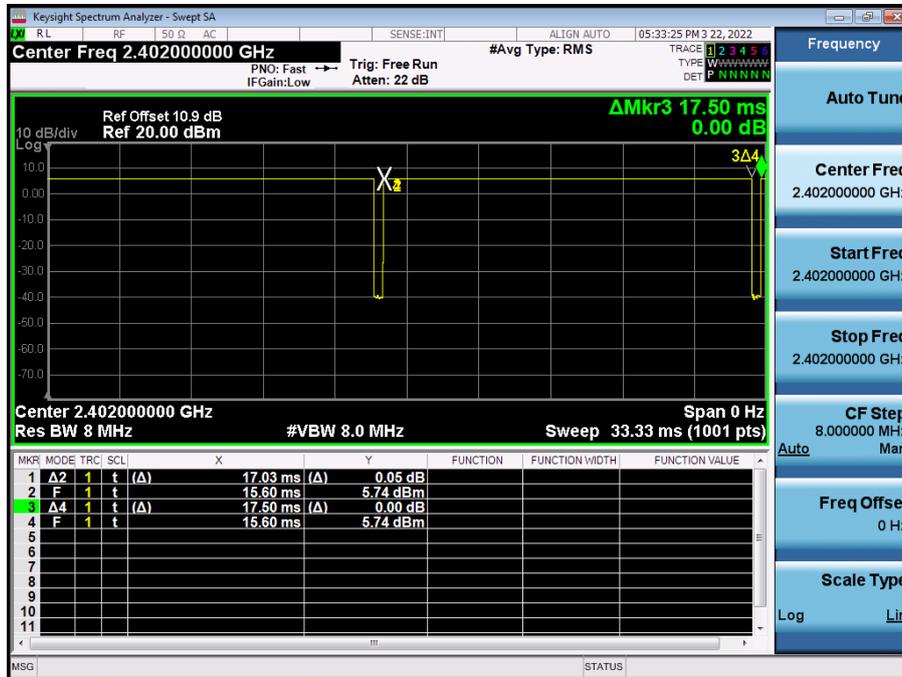
125k Bit/s(37 Byte) Test Plots

Duty Cycle (Low-CH 0)



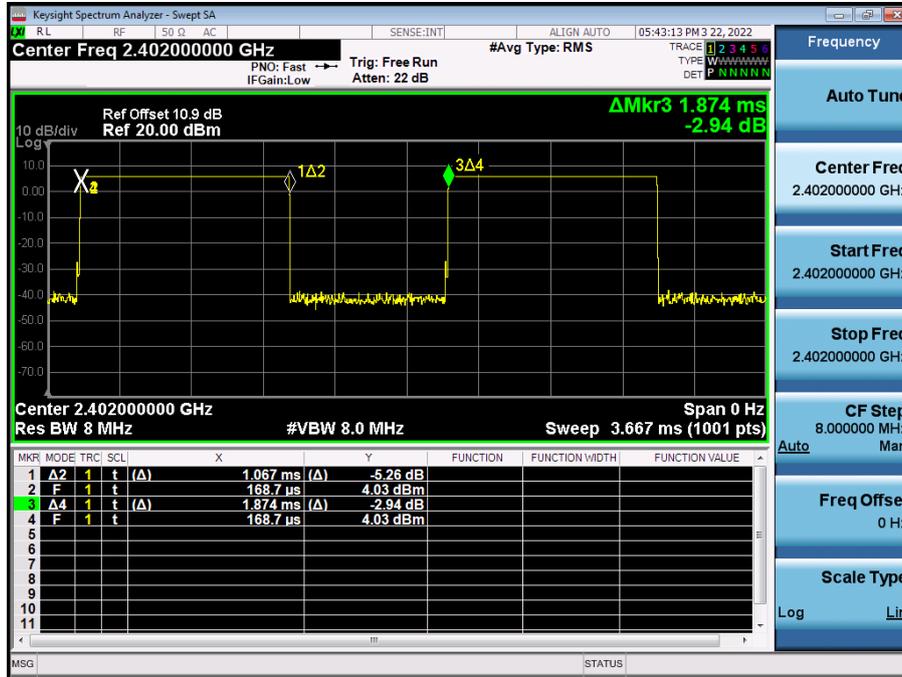
125k Bit/s(255 Byte) Test Plots

Duty Cycle (Low-CH 0)



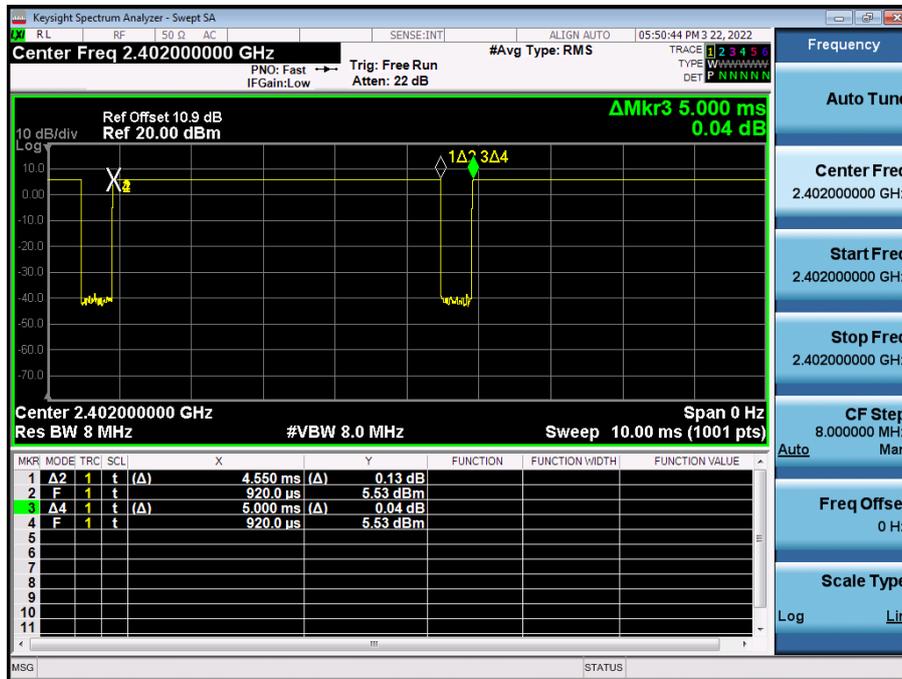
500k Bit/s(37 Byte) Test Plots

Duty Cycle (Low-CH 0)



500k Bit/s(255 Byte) Test Plots

Duty Cycle (Low-CH 0)



9.2 6 dB BANDWIDTH

Mode (Bit/s)	Channel	6 dB Bandwidth (kHz)	Limit (kHz)
1M(37)	0	745.3	> 500
	19	743.3	
	39	740.8	
1M(255)	0	705.3	> 500
	19	705.0	
	39	707.1	
2M(37)	0	1267	> 500
	19	1276	
	39	1277	
2M(255)	0	1276	> 500
	19	1278	
	39	1280	
125k(37)	0	666.4	> 500
	19	666.3	
	39	666.6	
125k(255)	0	712.6	> 500
	19	665.9	
	39	694.1	
500k(37)	0	708.2	> 500
	19	720.7	
	39	722.9	
500k(255)	0	713.7	> 500
	19	715.3	
	39	718.6	

Note:

Worst case test Plot Only

1M Bit/s: 255 Byte

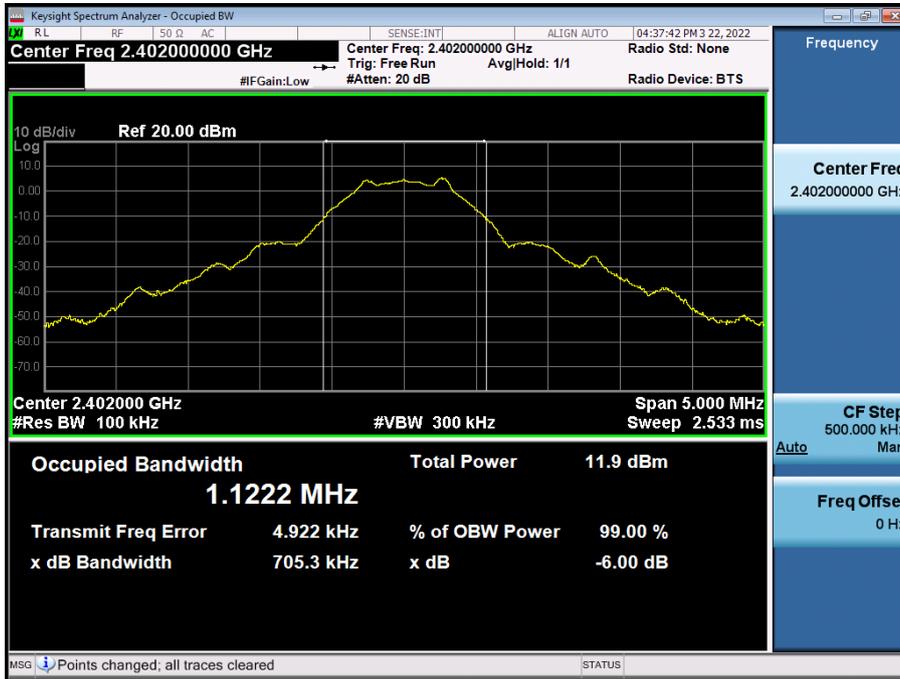
2M Bit/s: 37 Byte

125k Bit/s: 255 Byte

500k Bit/s: 37 Byte

1 MBit/s (255 Byte) Test Plots

6 dB Bandwidth plot (Low-CH 0)



6 dB Bandwidth plot (Mid-CH 19)

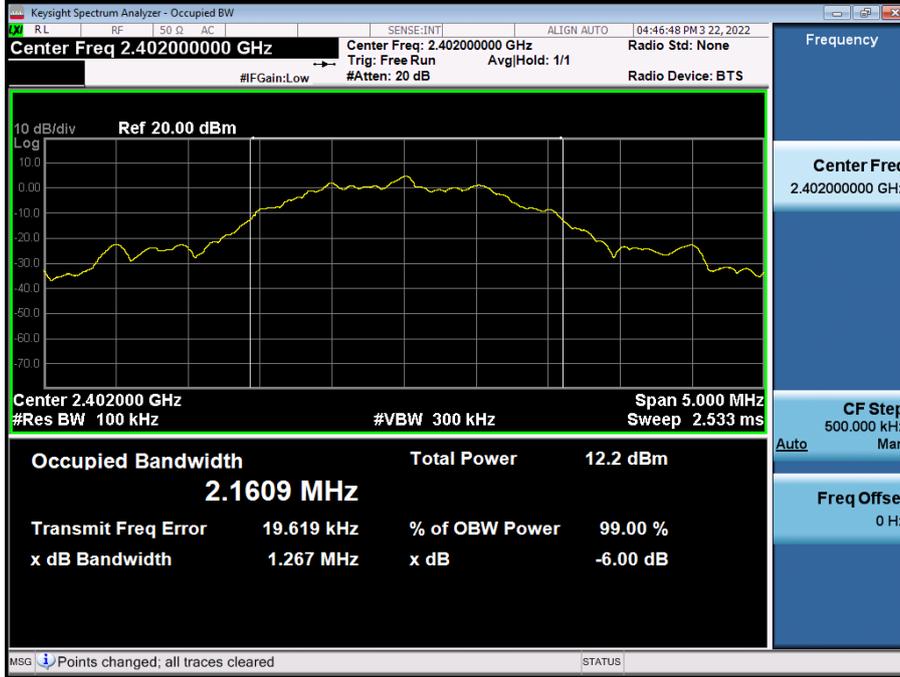


6 dB Bandwidth plot (High-CH 39)

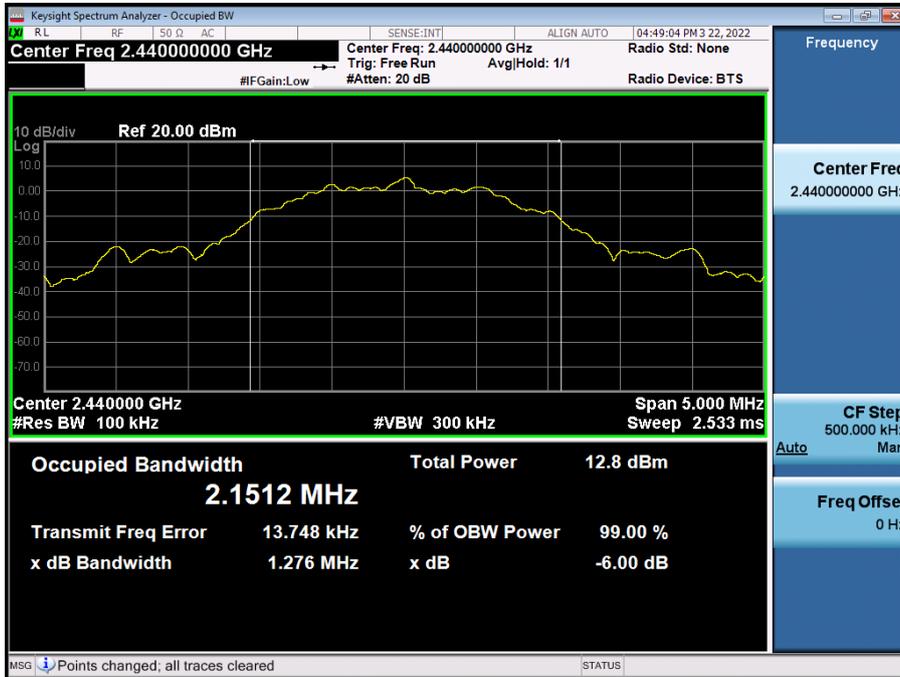


2 MBit/s (37 Byte) Test Plots

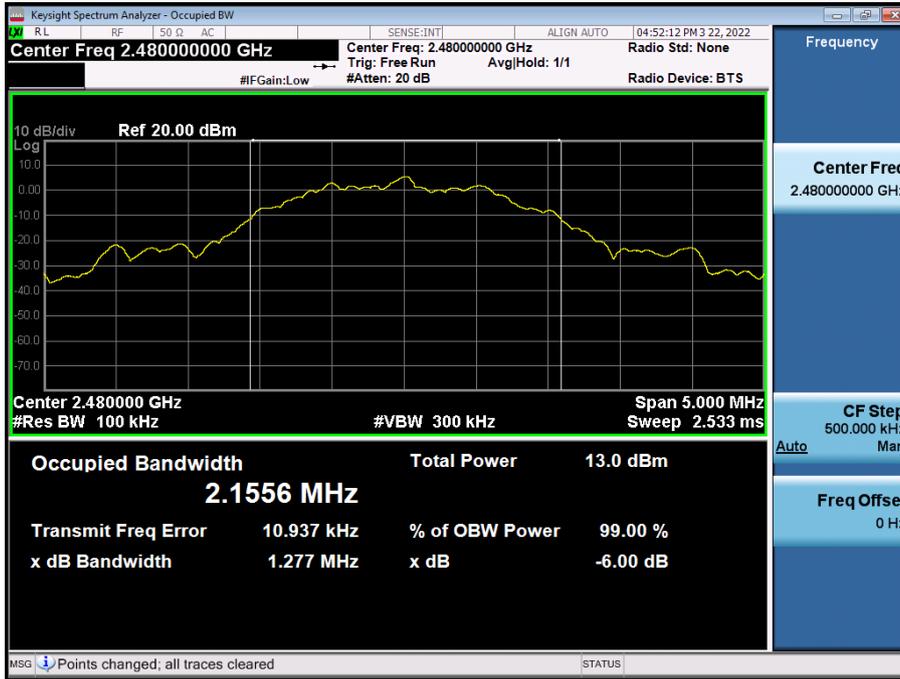
6 dB Bandwidth plot (Low-CH 0)



6 dB Bandwidth plot (Mid-CH 19)

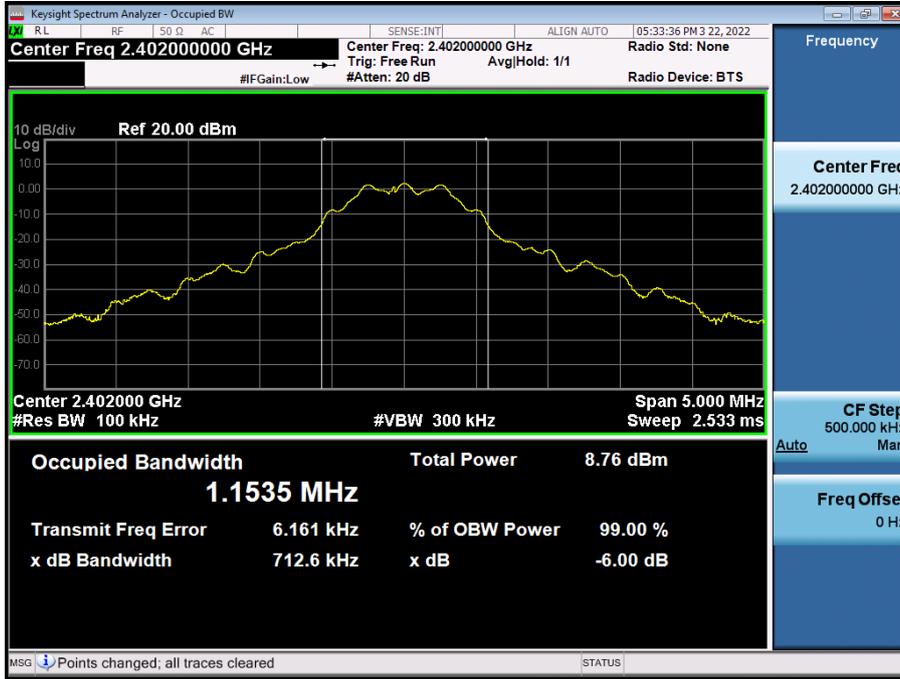


6 dB Bandwidth plot (High-CH 39)



125k Bit/s(255 Byte) Test Plots

6 dB Bandwidth plot (Low-CH 0)



6 dB Bandwidth plot (Mid-CH 19)

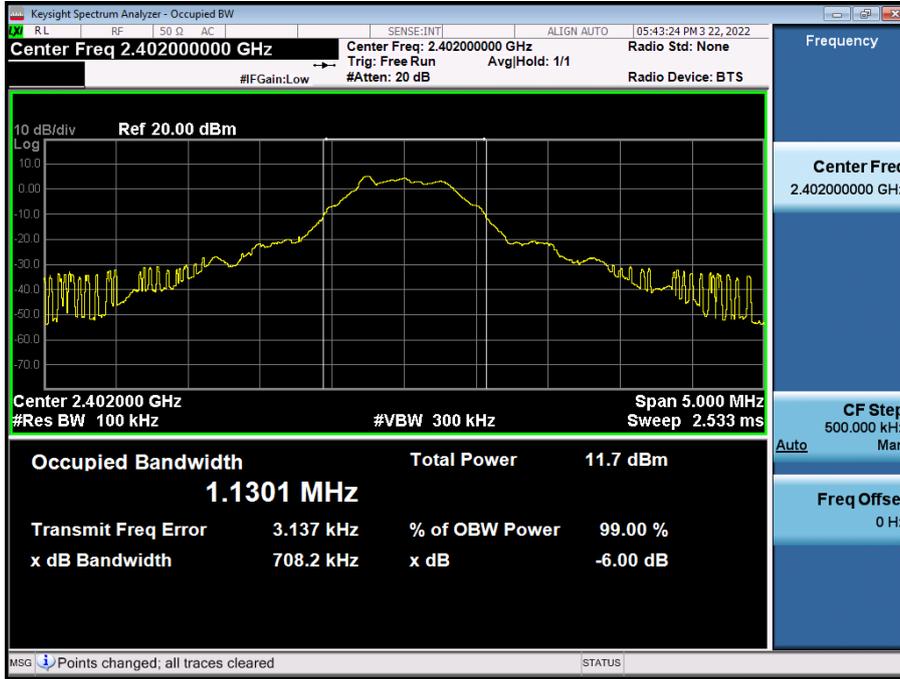


6 dB Bandwidth plot (High-CH 39)

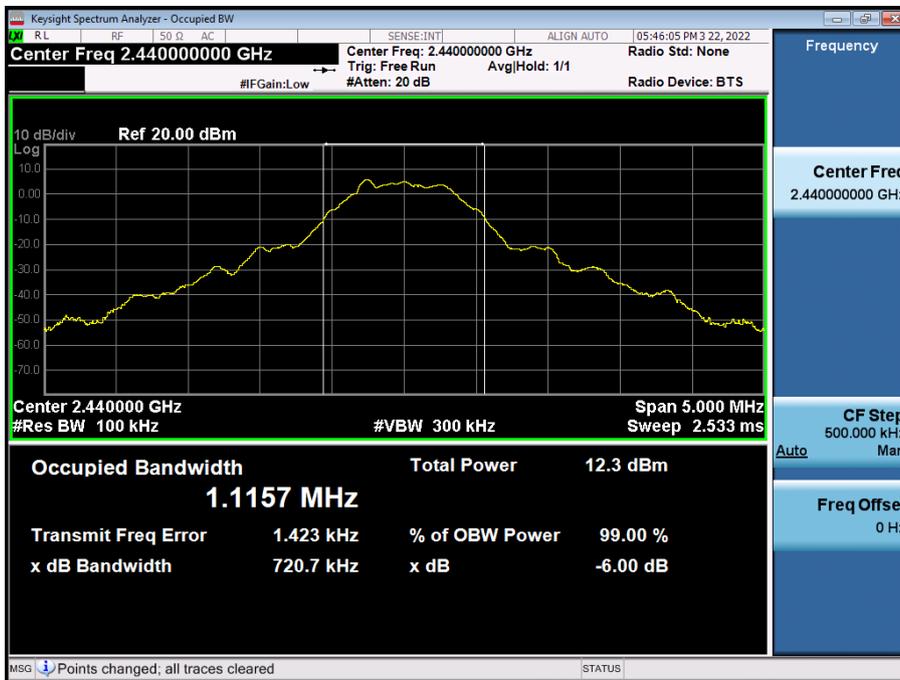


500k Bit/s(37 Byte) Test Plots

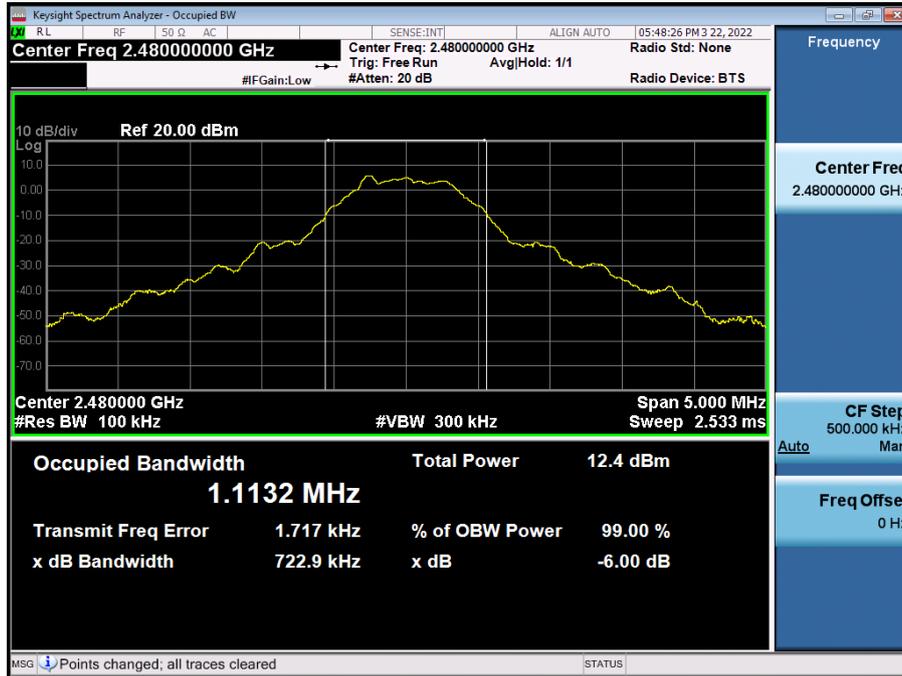
6 dB Bandwidth plot (Low-CH 0)



6 dB Bandwidth plot (Mid-CH 19)



6 dB Bandwidth plot (High-CH 39)



9.3 OUTPUT POWER

Peak Power

Data rate (Bit/s)	Packet length (Byte)	LE Mode		Measured Power(dBm)	Limit (dBm)
		Frequency [MHz]	Channel		
1M	37	2402	0	5.771	30
		2440	19	6.303	
		2480	39	6.359	
	255	2402	0	5.668	
		2440	19	6.222	
		2480	39	6.277	
2M	37	2402	0	5.848	
		2440	19	6.349	
		2480	39	6.354	
	255	2402	0	5.812	
		2440	19	6.402	
		2480	39	6.413	
125k	37	2402	0	5.585	
		2440	19	6.187	
		2480	39	6.204	
	255	2402	0	5.547	
		2440	19	6.162	
		2480	39	6.177	
500k	37	2402	0	5.650	
		2440	19	6.295	
		2480	39	6.194	
	255	2402	0	5.521	
		2440	19	6.137	
		2480	39	6.128	

Note :

1. Power meter offset = Attenuator loss + Cable loss
2. We apply to the offset in the 2.4 GHz range that was rounded off to the closest tenth dB.
So, 10.90 dB is offset for 2.4 GHz Band.

Average Power

Data rate (Bit/s)	Packet length (Byte)	LE Mode		Measured Power (dBm)	Duty Cycle Factor (dB)	Result (dBm)	Limit (dBm)
		Frequency [MHz]	Channel				
1M	37	2402	0	3.06	2.06	5.12	30
		2440	19	3.72	2.06	5.78	
		2480	39	3.76	2.06	5.82	
	255	2402	0	4.45	0.69	5.14	
		2440	19	5.10	0.69	5.79	
		2480	39	5.03	0.69	5.72	
2M	37	2402	0	-0.03	4.89	4.86	
		2440	19	0.85	4.89	5.74	
		2480	39	0.87	4.89	5.76	
	255	2402	0	2.61	2.42	5.03	
		2440	19	3.31	2.42	5.73	
		2480	39	3.55	2.42	5.97	
125k	37	2402	0	4.26	0.83	5.09	
		2440	19	4.90	0.83	5.73	
		2480	39	4.89	0.83	5.72	
	255	2402	0	4.87	0.12	4.99	
		2440	19	5.58	0.12	5.70	
		2480	39	5.56	0.12	5.68	
500k	37	2402	0	2.60	2.45	5.05	
		2440	19	3.22	2.45	5.67	
		2480	39	3.25	0.41	3.66	
	255	2402	0	4.58	0.41	4.99	
		2440	19	5.27	0.41	5.68	
		2480	39	5.05	0.41	5.46	

Note :

1. Power meter offset = Attenuator loss + Cable loss
2. We apply to the offset in the 2.4 GHz range that was rounded off to the closest tenth dB.
So, 10.90 dB is offset for 2.4 GHz Band.

9.4 POWER SPECTRAL DENSITY

Frequency (MHz)	Channel No.	Mode	Test Result	
			Measured Power(dBm)	Limit (dBm)
2402	0	1 MBit/s 37 Byte	3.990	8 dBm / 3 kHz
2440	19		4.929	
2480	39		4.794	
2402	0	1 MBit/s 255 Byte	4.533	
2440	19		5.413	
2480	39		5.231	
2402	0	2 MBit/s 37 Byte	3.978	
2440	19		4.908	
2480	39		4.767	
2402	0	2 MBit/s 255 Byte	3.919	
2440	19		4.845	
2480	39		4.711	
2402	0	125k 37 Byte	2.316	
2440	19		3.335	
2480	39		3.171	
2402	0	125k 255 Byte	2.281	
2440	19		3.165	
2480	39		3.136	
2402	0	500k 37 Byte	5.269	
2440	19		6.152	
2480	39		6.009	
2402	0	500k 255 Byte	5.237	
2440	19		6.102	
2480	39		5.795	

Note :

1. Spectrum measured Value not plot data.

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

2. Spectrum offset = Attenuator loss + Cable loss

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

So, 10.90 dB is offset for 2.4 GHz Band.

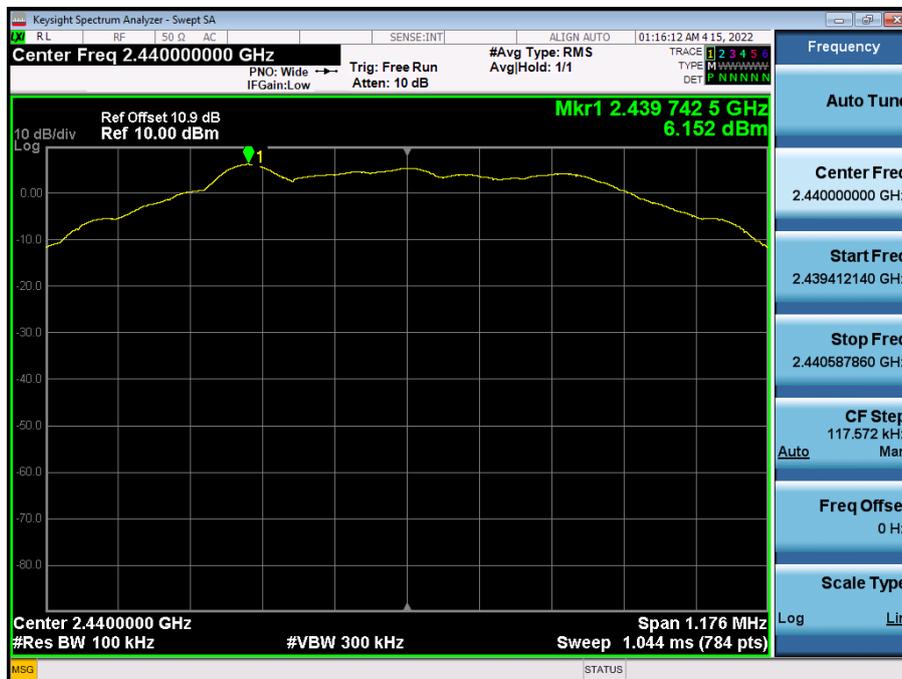
4. Worst case test Plot Only : 500k Bit/s (37 Byte)

500k Bit/s (37 Byte) Test Plots

Power Spectral Density (Low-CH 0)



Power Spectral Density (Mid-CH 19)



Power Spectral Density (High-CH 39)



9.5 BAND EDGE/ CONDUCTED SPURIOUS EMISSIONS

Test Result : please refer to the plot below.

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

[BAND EDGE]

Frequency (MHz)	Mode	Channel No.	Position	Test Result	
				Measured Level (dB)	Limit (dBc)
2402	1M Bit/s 37 Byte	0	Lower	51.246	20
2480		39	Upper	59.165	20
2402	1M Bit/s 255 Byte	0	Lower	51.297	20
2480		39	Upper	58.911	20
2402	2M Bit/s 37 Byte	0	Lower	26.953	20
2480		39	Upper	48.326	20
2402	2M Bit/s 255 Byte	0	Lower	27.906	20
2480		39	Upper	47.928	20
2402	125k Bit/s 37 Byte	0	Lower	48.470	20
2480		39	Upper	57.849	20
2402	125k Bit/s 255 Byte	0	Lower	46.685	20
2480		39	Upper	55.728	20
2402	500k Bit/s 37 Byte	0	Lower	49.877	20
2480		39	Upper	58.884	20
2402	500k Bit/s 255 Byte	0	Lower	50.607	20
2480		39	Upper	59.843	20

Note :

1. Worst case test Plot
 - (1) Lower 2M Bit/s (37 Byte)
 - (2) Upper 2M Bit/s (255 Byte)

[CONDUCTED SPURIOUS EMISSIONS]

Note :

1. Worst case test Plot
2M Bit/s (37 Byte)

2M Bit/s (37 Byte) Test Plots –Band Edge

Low-CH 0



2M Bit/s (255 Byte) Test Plots –Band Edge

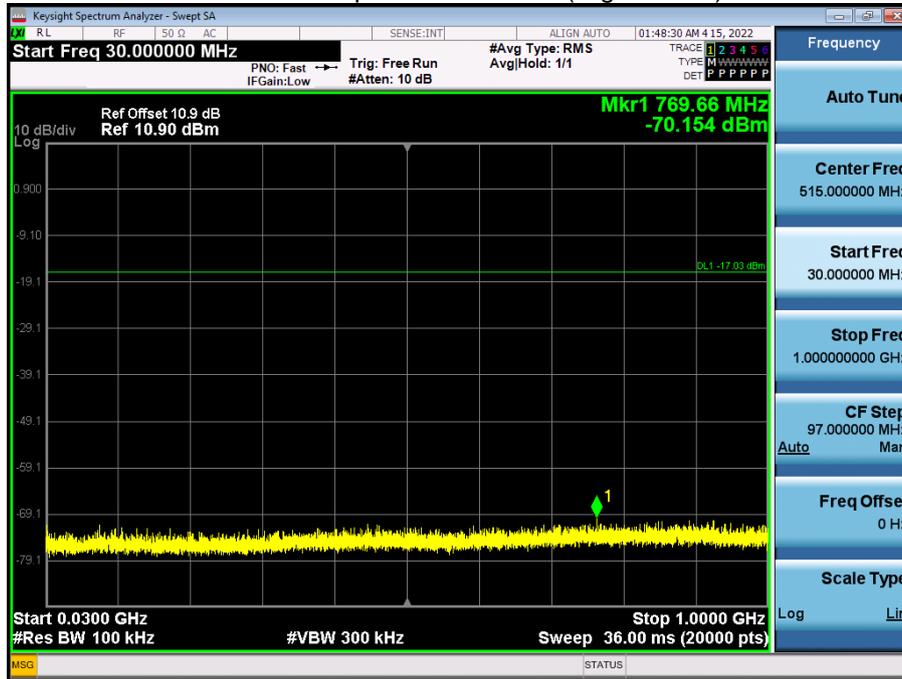
High-CH 39



2M Bit/s (255 Byte) Test Plots -Conducted Spurious Emission

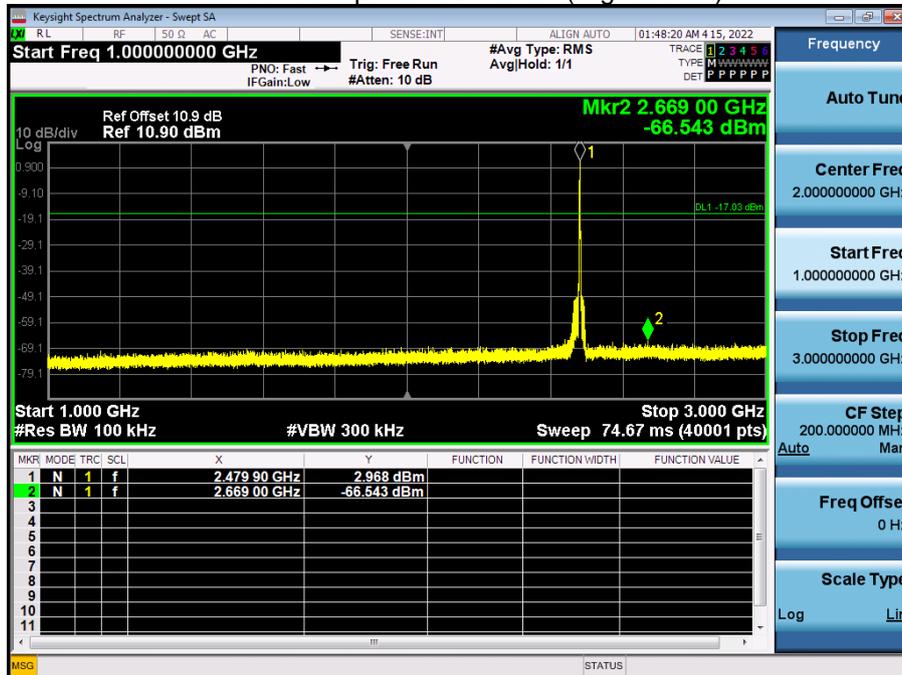
30 MHz ~ 1 GHz

Conducted Spurious Emission (High-CH 39)



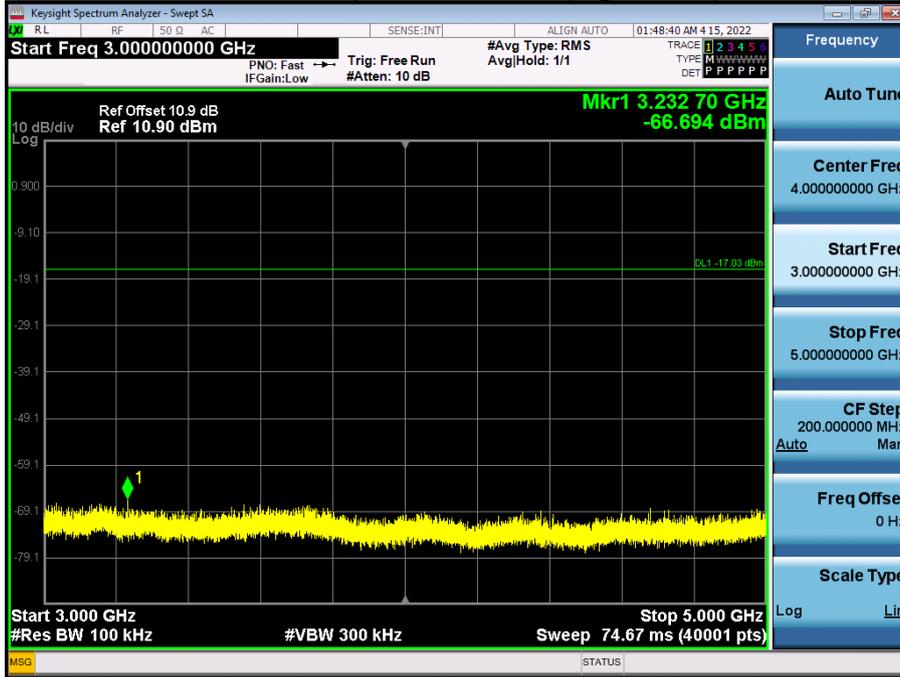
1 GHz ~ 3 GHz

Conducted Spurious Emission (High-CH 39)



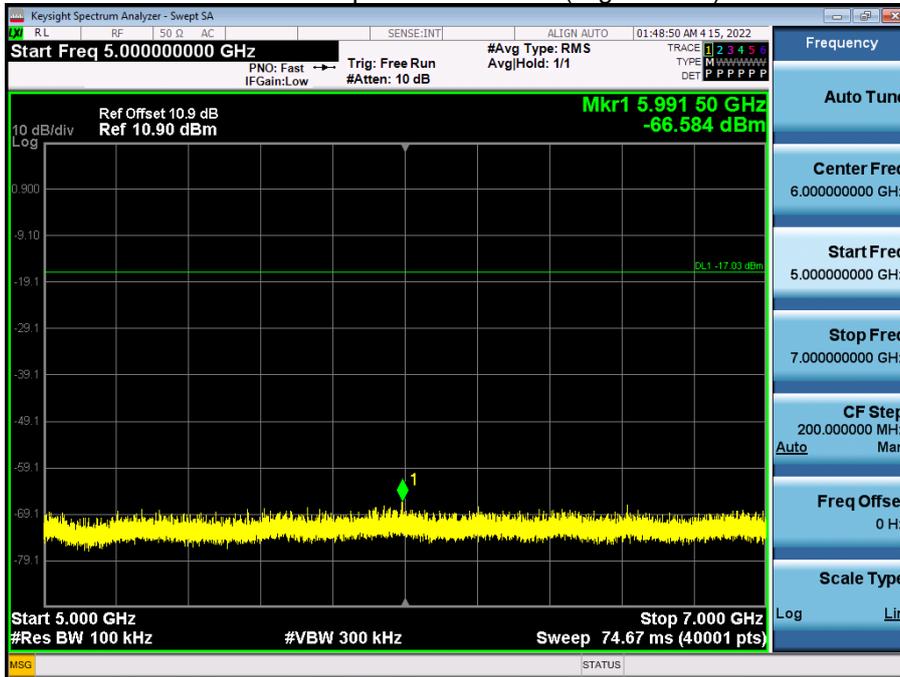
3 GHz ~ 5 GHz

Conducted Spurious Emission (High-CH 39)



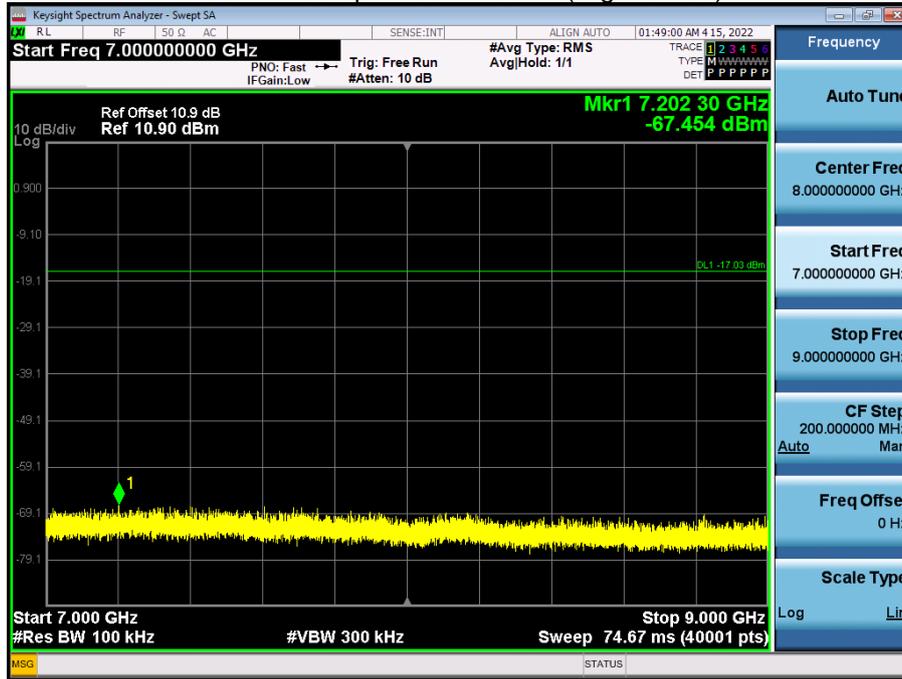
5 GHz ~ 7 GHz

Conducted Spurious Emission (High-CH 39)



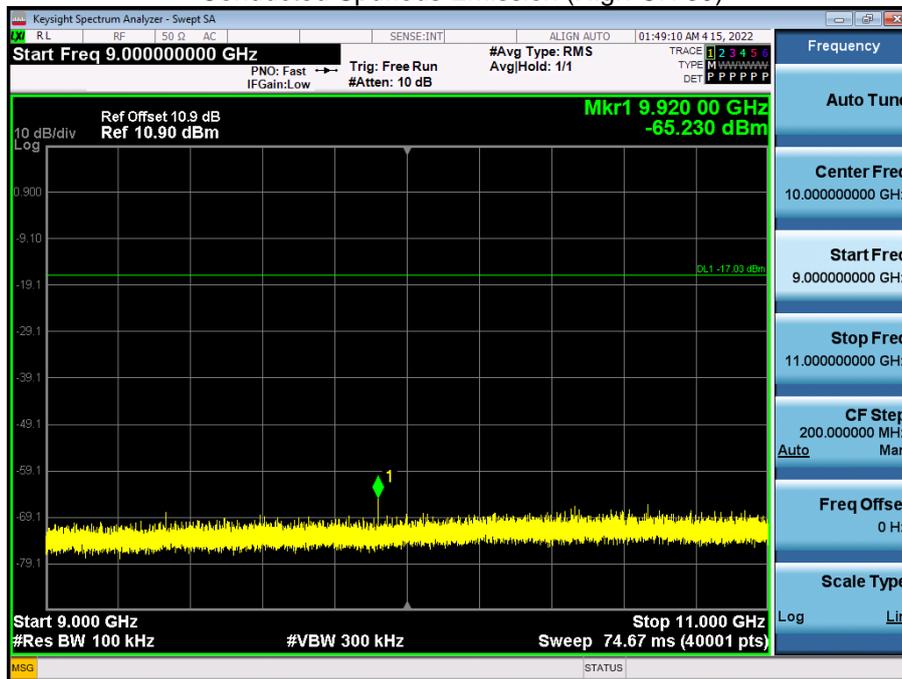
7 GHz ~ 9 GHz

Conducted Spurious Emission (High-CH 39)



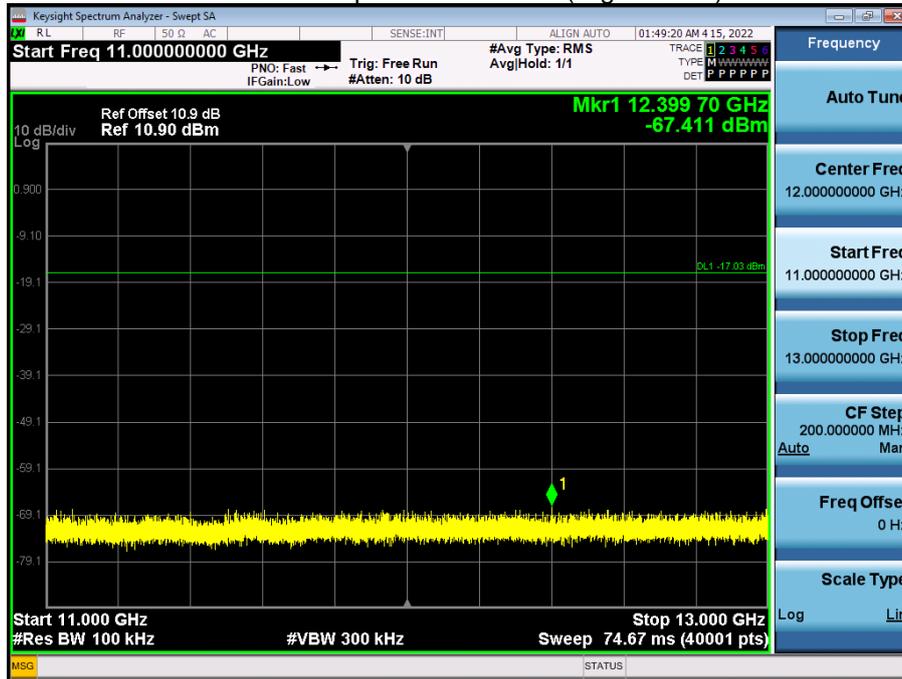
9 GHz ~ 11 GHz

Conducted Spurious Emission (High-CH 39)



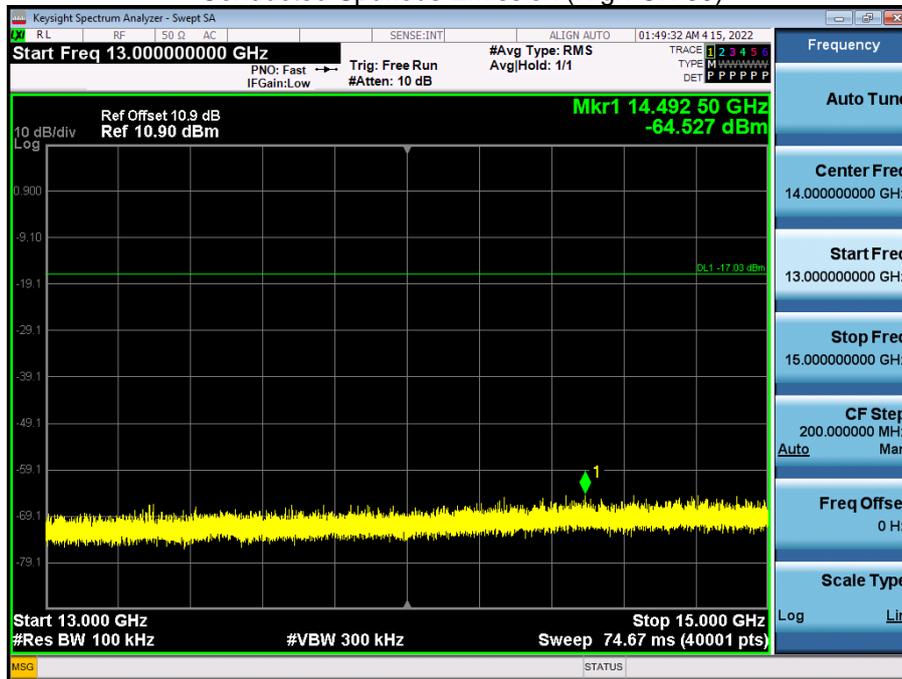
11 GHz ~ 13 GHz

Conducted Spurious Emission (High-CH 39)



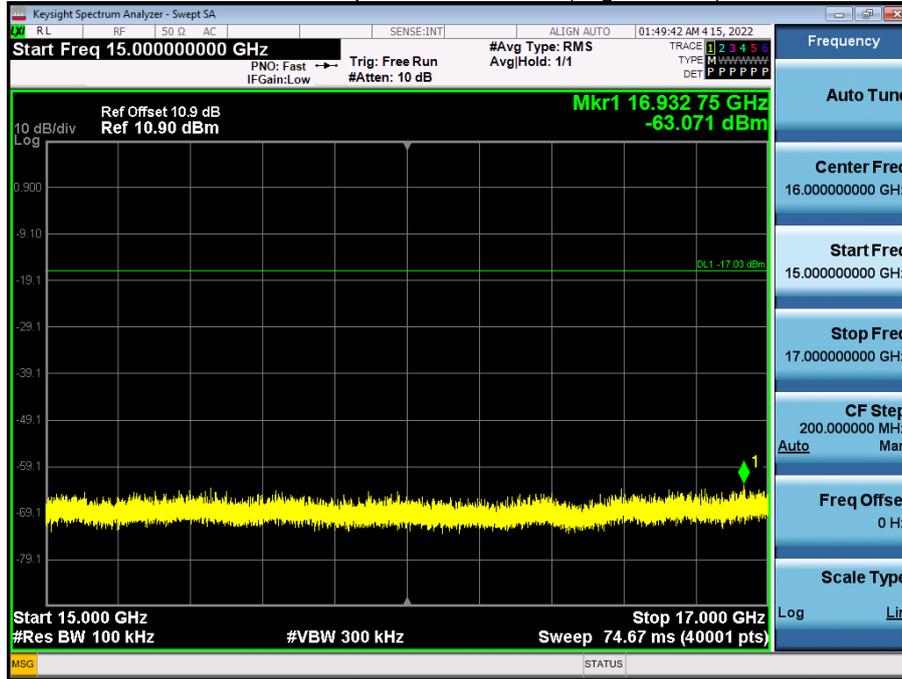
13 GHz ~ 15 GHz

Conducted Spurious Emission (High-CH 39)



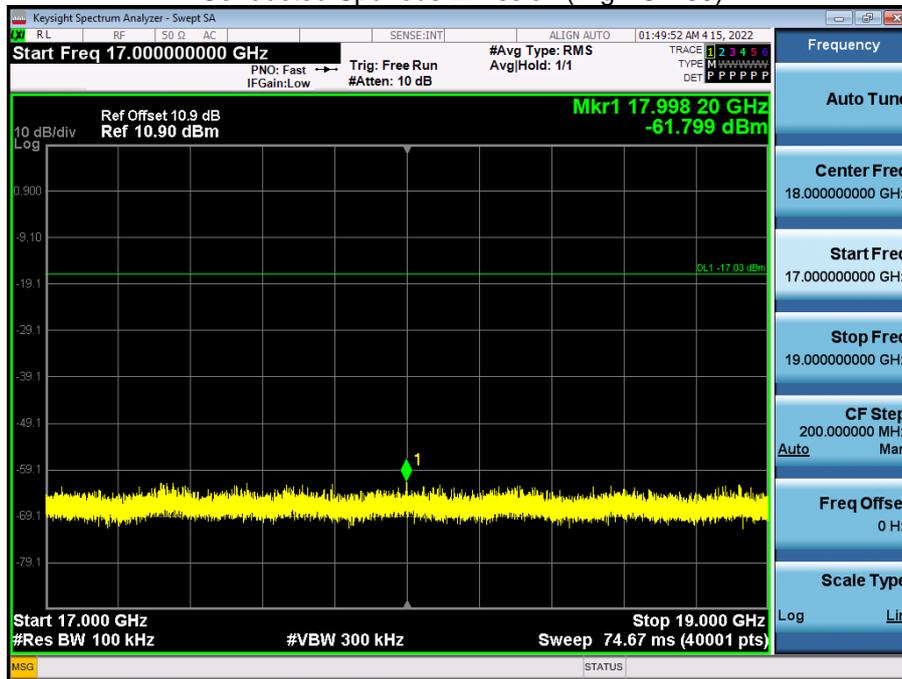
15 GHz ~ 17 GHz

Conducted Spurious Emission (High-CH 39)



17 GHz ~ 19 GHz

Conducted Spurious Emission (High-CH 39)



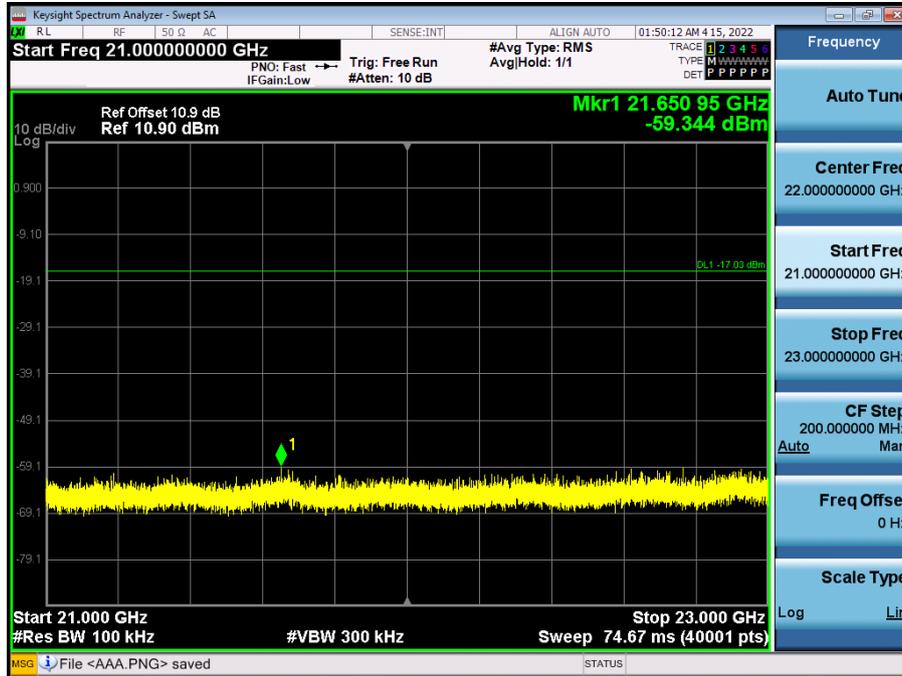
19 GHz ~ 21 GHz

Conducted Spurious Emission (High-CH 39)



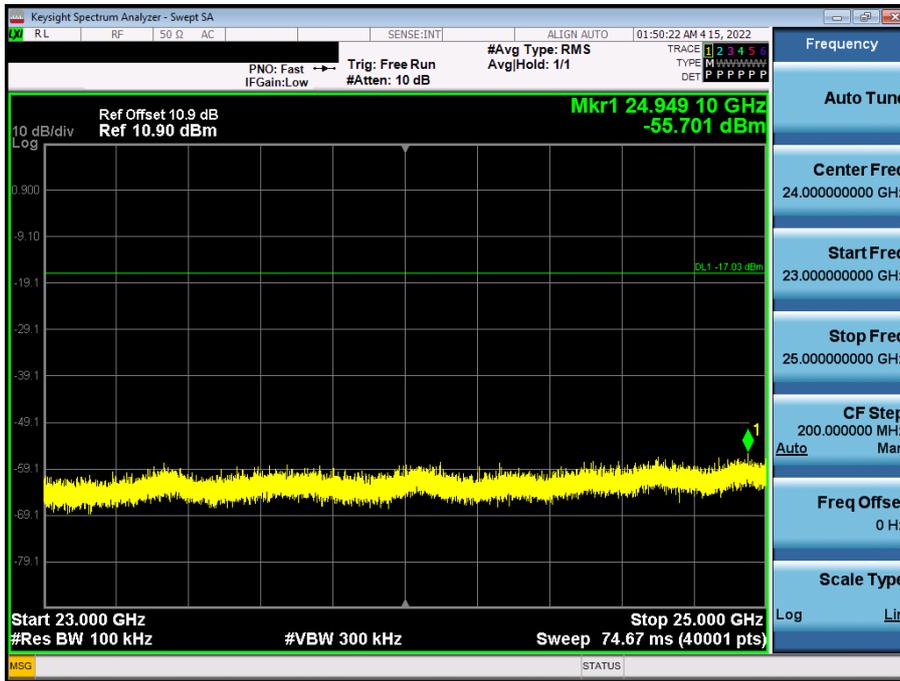
21 GHz ~ 23 GHz

Conducted Spurious Emission (High-CH 39)



23 GHz ~ 25 GHz

Conducted Spurious Emission (High-CH 39)



9.6 RADIATED SPURIOUS EMISSIONS

Frequency Range : 9 kHz – 30 MHz

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

Note:

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

Frequency Range : Below 1 GHz

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

Note:

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

Frequency Range : Above 1 GHz
Mode : 1 MBit/s (37 Byte)

Operation Mode: CH Low

Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor [dB]	A.F + C.L - A.G + D.F [dB/m]	Pol. [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
4804	42.01	0.00	2.76	V	44.77	73.98	29.21	PK
4804	30.02	2.06	2.76	V	34.83	53.98	19.15	AV
7206	39.95	0.00	8.96	V	48.91	73.98	25.07	PK
7206	27.52	2.06	8.96	V	38.53	53.98	15.45	AV
4804	43.81	0.00	2.76	H	46.57	73.98	27.41	PK
4804	31.37	2.06	2.76	H	36.18	53.98	17.80	AV
7206	40.16	0.00	8.96	H	49.12	73.98	24.86	PK
7206	27.70	2.06	8.96	H	38.71	53.98	15.27	AV

Operation Mode: CH Mid

Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor [dB]	A.F + C.L - A.G + D.F [dB/m]	Pol. [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
4880	41.96	0.00	3.15	V	45.11	73.98	28.87	PK
4880	28.16	2.06	3.15	V	33.36	53.98	20.62	AV
7320	40.84	0.00	9.45	V	50.29	73.98	23.69	PK
7320	28.14	2.06	9.45	V	39.65	53.98	14.33	AV
4880	42.95	0.00	3.15	H	46.10	73.98	27.88	PK
4880	30.11	2.06	3.15	H	35.31	53.98	18.67	AV
7320	41.09	0.00	9.45	H	50.54	73.98	23.44	PK
7320	28.58	2.06	9.45	H	40.09	53.98	13.89	AV

Operation Mode: CH High

Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor [dB]	A.F + C.L - A.G + D.F [dB/m]	Pol. [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
4960	41.95	0.00	2.23	V	44.18	73.98	29.80	PK
4960	29.96	2.06	2.23	V	34.24	53.98	19.74	AV
7440	39.88	0.00	10.35	V	50.23	73.98	23.75	PK
7440	26.82	2.06	10.35	V	39.23	53.98	14.75	AV
4960	42.92	0.00	2.23	H	45.15	73.98	28.83	PK
4960	30.48	2.06	2.23	H	34.76	53.98	19.22	AV
7440	40.04	0.00	10.35	H	50.39	73.98	23.59	PK
7440	27.98	2.06	10.35	H	40.39	53.98	13.59	AV

Mode : 2 MBit/s (255 Byte)

Operation Mode: CH Low

Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor [dB]	A.F + C.L - A.G + D.F [dB/m]	Pol. [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
4804	42.95	0.00	2.76	V	45.71	73.98	28.27	PK
4804	30.06	2.42	2.76	V	35.23	53.98	18.75	AV
7206	38.99	0.00	8.96	V	47.95	73.98	26.03	PK
7206	27.18	2.42	8.96	V	38.56	53.98	15.42	AV
4804	43.51	0.00	2.76	H	46.27	73.98	27.71	PK
4804	31.10	2.42	2.76	H	36.27	53.98	17.71	AV
7206	39.57	0.00	8.96	H	48.53	73.98	25.45	PK
7206	27.68	2.42	8.96	H	39.06	53.98	14.92	AV

Operation Mode: CH Mid

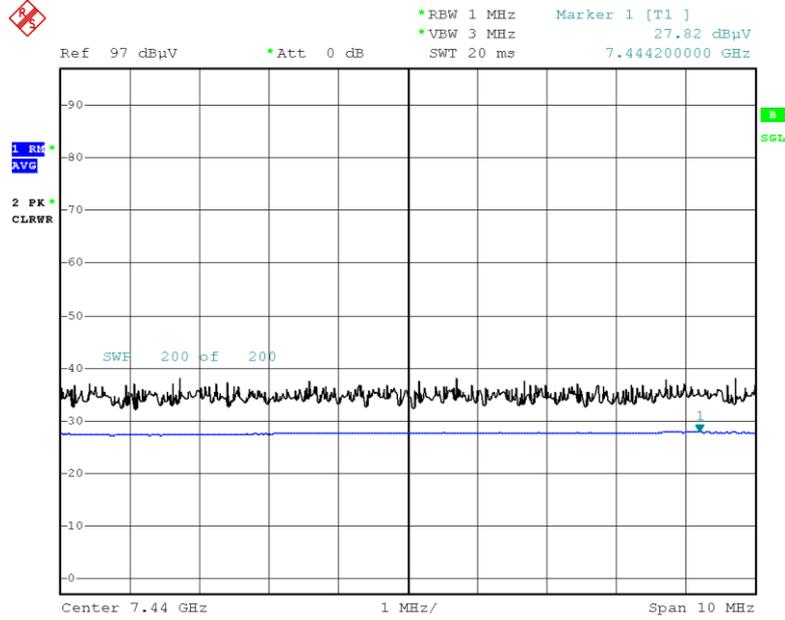
Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor [dB]	A.F + C.L - A.G + D.F [dB/m]	Pol. [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
4880	41.37	0.00	3.15	V	44.52	73.98	29.46	PK
4880	28.95	2.42	3.15	V	34.51	53.98	19.47	AV
7320	40.22	0.00	9.45	V	49.67	73.98	24.31	PK
7320	28.01	2.42	9.45	V	39.88	53.98	14.10	AV
4880	41.73	0.00	3.15	H	44.88	73.98	29.10	PK
4880	29.69	2.42	3.15	H	35.25	53.98	18.73	AV
7320	40.54	0.00	9.45	H	49.99	73.98	23.99	PK
7320	28.13	2.42	9.45	H	40.00	53.98	13.98	AV

Operation Mode: CH High

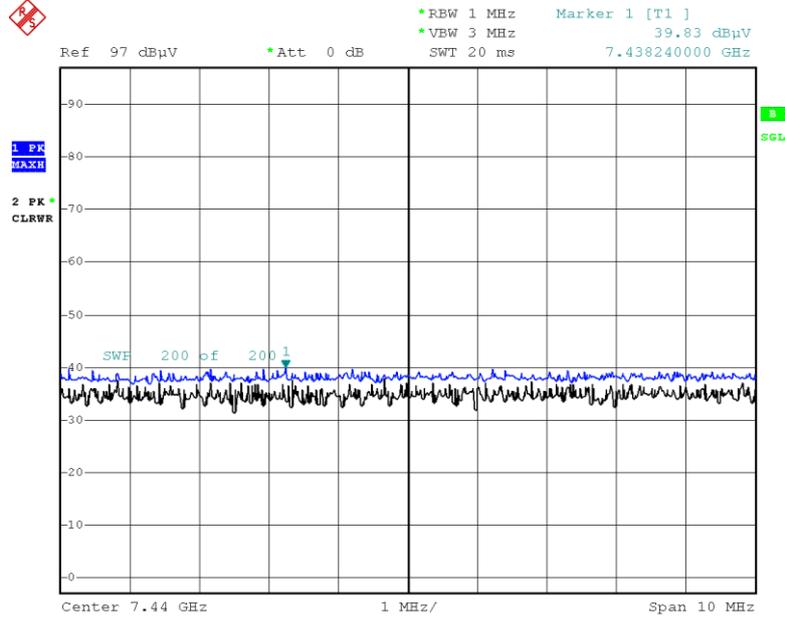
Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor [dB]	A.F + C.L - A.G + D.F [dB/m]	Pol. [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
4960	41.81	0.00	2.23	V	44.04	73.98	29.94	PK
4960	29.16	2.42	2.23	V	33.80	53.98	20.18	AV
7440	39.52	0.00	10.35	V	49.87	73.98	24.11	PK
7440	27.66	2.42	10.35	V	40.43	53.98	13.55	AV
4960	42.01	0.00	2.23	H	44.24	73.98	29.74	PK
4960	29.48	2.42	2.23	H	34.12	53.98	19.86	AV
7440	39.83	0.00	10.35	H	50.18	73.98	23.80	PK
7440	27.82	2.42	10.35	H	40.59	53.98	13.39	AV

☑ 2 MBit/s 255 Byte Test Plots (Worst case : X-H)

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



Date: 29.MAR.2022 14:46:10
Radiated Spurious Emissions plot – Peak Result (Ch.39 3rd Harmonic)



Date: 29.MAR.2022 14:46:22

9.7 RADIATED RESTRICTED BAND EDGES

Mode : 1 MBit/s (37 Byte)

Operating Frequency

2402 MHz, 2480 MHz

Channel No.

0 CH, 39 CH

Frequency [MHz]	Measured Value [dB μ V]	Duty Cycle Factor [dB]	A.F+C.L +D.F [dB/m]	Ant. Pol. [H/V]	Total [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]	Measurement Type
2390.0	21.75	0.00	33.78	H	55.53	73.98	18.45	PK
2390.0	10.19	2.06	33.78	H	46.03	53.98	7.95	AV
2390.0	20.65	0.00	33.78	V	54.43	73.98	19.55	PK
2390.0	9.97	2.06	33.78	V	45.80	53.98	8.18	AV
2483.5	22.13	0.00	34.10	H	56.23	73.98	17.75	PK
2483.5	10.69	2.06	34.10	H	46.84	53.98	7.14	AV
2483.5	21.02	0.00	34.10	V	55.12	73.98	18.86	PK
2483.5	9.92	2.06	34.10	V	46.08	53.98	7.90	AV

Mode : 2 MBit/s (255 Byte)

Operating Frequency

2402 MHz, 2480 MHz

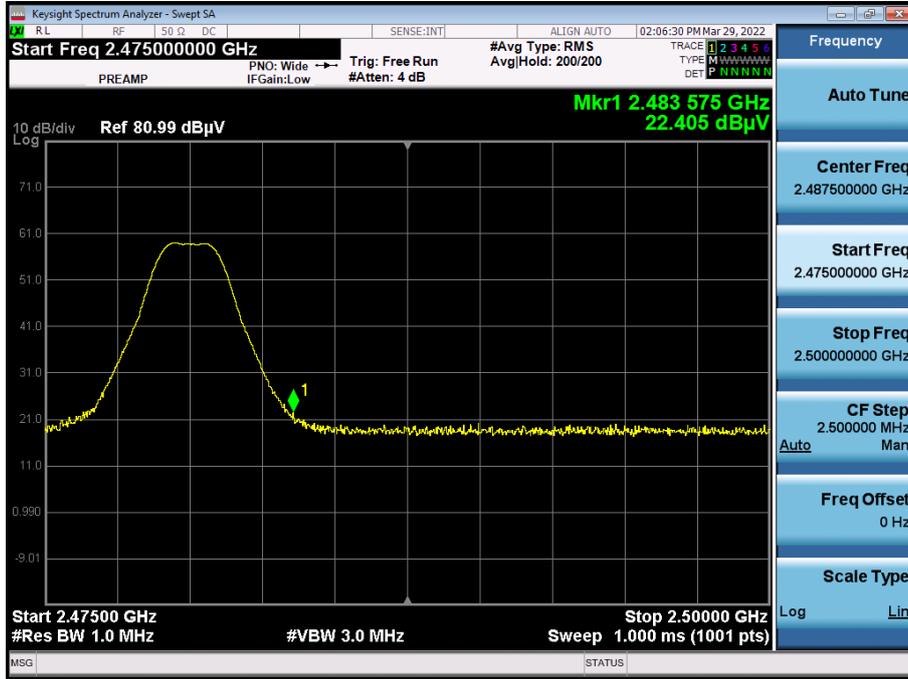
Channel No.

0 CH, 39 CH

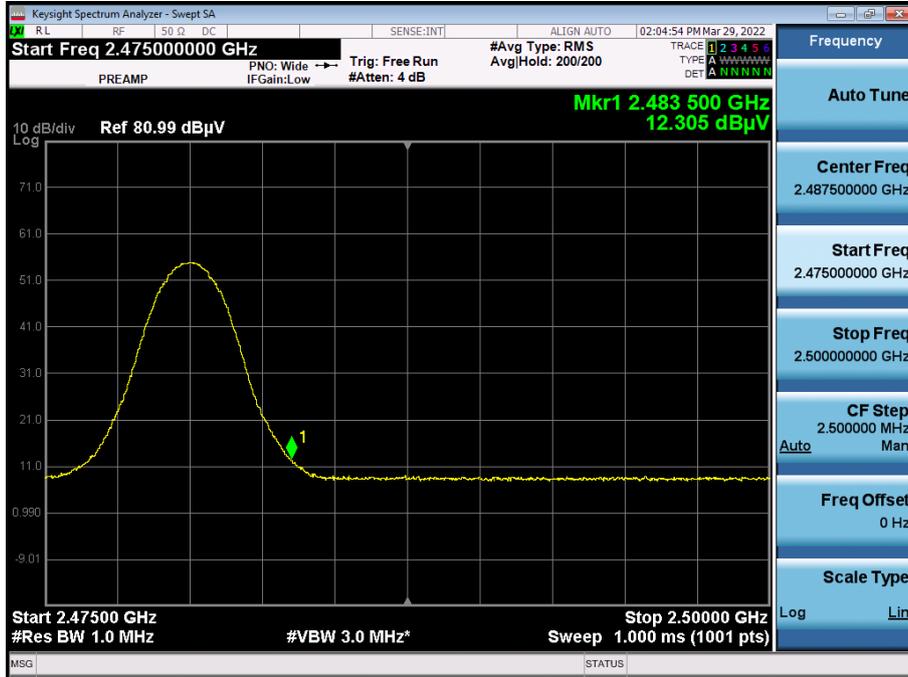
Frequency [MHz]	Measured Value [dB μ V]	Duty Cycle Factor [dB]	A.F+C.L +D.F [dB/m]	Ant. Pol. [H/V]	Total [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]	Measurement Type
2390.0	18.78	0.00	33.78	H	52.56	73.98	21.42	PK
2390.0	8.16	2.42	33.78	H	44.36	53.98	9.62	AV
2390.0	17.80	0.00	33.78	V	51.57	73.98	22.41	PK
2390.0	8.01	2.42	33.78	V	44.21	53.98	9.77	AV
2483.5	22.41	0.00	34.10	H	56.50	73.98	17.48	PK
2483.5	12.31	2.42	34.10	H	48.82	53.98	5.16	AV
2483.5	21.06	0.00	34.10	V	55.16	73.98	18.82	PK
2483.5	11.86	2.42	34.10	V	48.38	53.98	5.60	AV

Mode : 2 MBit/s (255 Byte) Test Plots

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



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



Note:

Plot of worst case are only reported.

9.8 POWERLINE CONDUCTED EMISSIONS

Conducted Emissions (Line 1)

Test

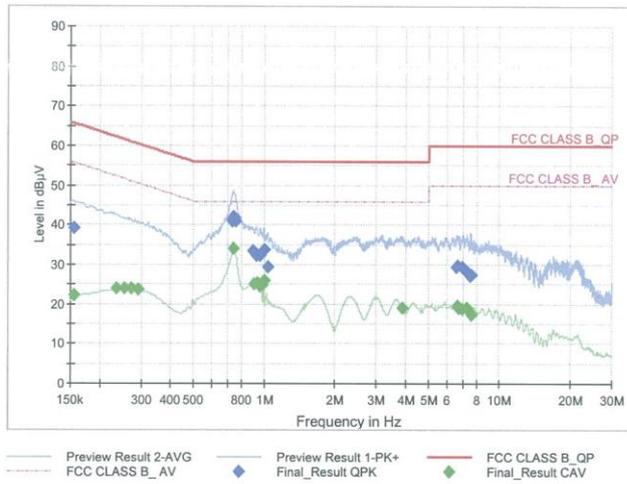
1 / 2

Test Report

Common Information

EUT : SM-M135M/DS
 Manufacturer : SAMSUNG
 Test Site: SHIELD ROOM
 Operating Conditions : BLE_L1
 Operator Name:
 Comment:

Full Spectrum



Final Result QPK

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1545	39.35	65.75	26.41	9.000	L1	OFF	9.6
0.7295	40.91	56.00	15.09	9.000	L1	OFF	9.7
0.7363	41.62	56.00	14.38	9.000	L1	OFF	9.7
0.7408	42.07	56.00	13.93	9.000	L1	OFF	9.7
0.7453	41.85	56.00	14.15	9.000	L1	OFF	9.7
0.7565	40.95	56.00	15.05	9.000	L1	OFF	9.7
0.9005	33.48	56.00	22.52	9.000	L1	OFF	9.7
0.9230	32.44	56.00	23.56	9.000	L1	OFF	9.7
0.9275	32.63	56.00	23.37	9.000	L1	OFF	9.7
0.9613	32.45	56.00	23.55	9.000	L1	OFF	9.7
0.9995	33.81	56.00	22.19	9.000	L1	OFF	9.7
1.0400	29.56	56.00	26.44	9.000	L1	OFF	9.7
6.5863	29.53	60.00	30.47	9.000	L1	OFF	9.9
6.6245	29.74	60.00	30.26	9.000	L1	OFF	9.9
6.9755	29.42	60.00	30.58	9.000	L1	OFF	9.9
7.2455	28.36	60.00	31.64	9.000	L1	OFF	9.9
7.5335	27.15	60.00	32.85	9.000	L1	OFF	10.0
7.5763	27.27	60.00	32.73	9.000	L1	OFF	10.0

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Test

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Final Result CAV

Frequency (MHz)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1545	22.28	55.75	33.47	9.000	L1	OFF	9.6
0.2355	23.94	52.25	28.31	9.000	L1	OFF	9.6
0.2535	24.00	51.64	27.65	9.000	L1	OFF	9.6
0.2715	23.89	51.07	27.18	9.000	L1	OFF	9.6
0.2918	23.71	50.47	26.76	9.000	L1	OFF	9.6
0.7430	34.15	46.00	11.85	9.000	L1	OFF	9.7
0.9073	25.24	46.00	20.76	9.000	L1	OFF	9.7
0.9343	25.37	46.00	20.63	9.000	L1	OFF	9.7
0.9568	24.44	46.00	21.56	9.000	L1	OFF	9.7
0.9770	24.78	46.00	21.22	9.000	L1	OFF	9.7
1.0018	25.92	46.00	20.08	9.000	L1	OFF	9.7
3.8818	19.01	46.00	26.99	9.000	L1	OFF	9.8
6.6133	19.74	50.00	30.26	9.000	L1	OFF	9.9
6.6448	19.21	50.00	30.79	9.000	L1	OFF	9.9
6.7100	19.00	50.00	31.00	9.000	L1	OFF	9.9
6.9215	18.78	50.00	31.22	9.000	L1	OFF	9.9
7.2478	18.95	50.00	31.05	9.000	L1	OFF	9.9
7.5785	17.36	50.00	32.64	9.000	L1	OFF	10.0

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Conducted Emissions (Line 2)

Test

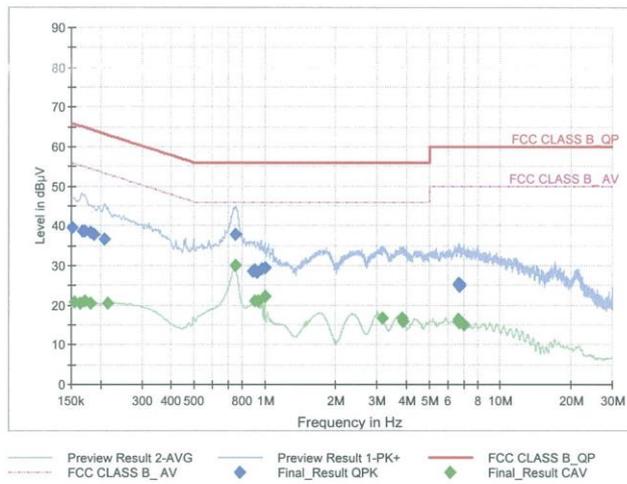
1 / 2

Test Report

Common Information

EUT : SM-M135M/DS
 Manufacturer : SAMSUNG
 Test Site: SHIELD ROOM
 Operating Conditions : BLE_N
 Operator Name:
 Comment:

Full Spectrum



Final Result QPK

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1523	39.43	65.88	26.45	9.000	N	OFF	9.6
0.1680	38.77	65.06	26.29	9.000	N	OFF	9.6
0.1725	38.69	64.84	26.15	9.000	N	OFF	9.6
0.1815	38.38	64.42	26.04	9.000	N	OFF	9.6
0.1883	37.75	64.11	26.37	9.000	N	OFF	9.6
0.2085	36.72	63.27	26.55	9.000	N	OFF	9.6
0.7498	37.80	56.00	18.20	9.000	N	OFF	9.7
0.8915	28.51	56.00	27.49	9.000	N	OFF	9.7
0.8983	28.63	56.00	27.37	9.000	N	OFF	9.7
0.9028	28.93	56.00	27.07	9.000	N	OFF	9.7
0.9275	28.34	56.00	27.66	9.000	N	OFF	9.7
0.9658	29.07	56.00	26.93	9.000	N	OFF	9.7
1.0018	29.39	56.00	26.61	9.000	N	OFF	9.7
6.6740	25.09	60.00	34.91	9.000	N	OFF	9.9
6.6808	25.39	60.00	34.61	9.000	N	OFF	9.9
6.7123	25.26	60.00	34.74	9.000	N	OFF	9.9
6.7190	24.98	60.00	35.02	9.000	N	OFF	9.9
6.7505	24.95	60.00	35.05	9.000	N	OFF	9.9

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Test

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Final Result CAV

Frequency (MHz)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1545	20.66	55.75	35.10	9.000	N	OFF	9.6
0.1635	20.43	55.28	34.85	9.000	N	OFF	9.6
0.1725	21.11	54.84	33.73	9.000	N	OFF	9.6
0.1815	20.56	54.42	33.86	9.000	N	OFF	9.6
0.2153	20.61	53.00	32.39	9.000	N	OFF	9.6
0.7453	29.86	46.00	16.14	9.000	N	OFF	9.7
0.9073	20.95	46.00	25.05	9.000	N	OFF	9.7
0.9365	21.00	46.00	25.00	9.000	N	OFF	9.7
1.0018	22.16	46.00	23.84	9.000	N	OFF	9.7
3.1573	16.79	46.00	29.21	9.000	N	OFF	9.8
3.8368	16.70	46.00	29.30	9.000	N	OFF	9.8
3.8750	15.90	46.00	30.10	9.000	N	OFF	9.8
6.6223	16.35	50.00	33.65	9.000	N	OFF	9.9
6.6583	15.85	50.00	34.15	9.000	N	OFF	9.9
6.6628	15.85	50.00	34.15	9.000	N	OFF	9.9
6.6718	16.00	50.00	34.00	9.000	N	OFF	9.9
6.6920	15.45	50.00	34.55	9.000	N	OFF	9.9
7.0205	14.97	50.00	35.03	9.000	N	OFF	9.9

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10. LIST OF TEST EQUIPMENT

Conducted Test

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
LISN	ENV216	Rohde & Schwarz	102245	08/23/2022	Annual
Test Receiver	ESCI	Rohde & Schwarz	100033	06/15/2022	Annual
Temperature Chamber	SU-642	ESPAC	0093008124	03/04/2023	Annual
Signal Analyzer	N9020A	Agilent	MY52440870	09/02/2022	Annual
Signal Analyzer	N9030A	Agilent	MY49431210	01/11/2023	Annual
Power Meter	N1911A	Agilent	MY45100523	03/23/2023	Annual
Power Sensor	N1921A	Agilent	MY57820067	03/23/2023	Annual
Directional Coupler	87300B	Agilent	3116A03621	11/02/2022	Annual
Power Splitter	11667B	Hewlett Packard	05001	05/20/2022	Annual
DC Power Supply	E3632A	Hewlett Packard	KR75303960	06/10/2022	Annual
Attenuator (10 dB)	5910-N-50-010	H+S	00801	10/29/2022	Annual
Software	EMC32	Rohde & Schwarz	N/A	N/A	N/A
FCC WLAN&BT&BLE Conducted Test Software v3.0	FCC WLAN&BT&BLE Conducted Test Software v3.0	HCT CO., LTD.	N/A	N/A	N/A

Note:

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

Radiated Test

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
Controller (Antenna mast)	CO3000	Innco system	CO3000-4p	N/A	N/A
Antenna Position Tower	MA4640/800-XP-EP	Innco system	N/A	N/A	N/A
Controller	2090	Emco	060520	N/A	N/A
Turn Table	Turn Table	Ets	N/A	N/A	N/A
Loop Antenna	Loop Antenna	Rohde & Schwarz	1513-333	03/17/2024	Biennial
Hybrid Antenna	VULB 9168	Schwarzbeck	9168-0895	09/04/2022	Biennial
Horn Antenna	BBHA 9120D	Schwarzbeck	9120D-1191	11/18/2023	Biennial
Horn Antenna (15 GHz ~ 40 GHz)	BBHA9170	Schwarzbeck	BBHA9170124	04/12/2023	Biennial
Spectrum Analyzer	FSP (9 kHz ~ 30 GHz)	Rohde & Schwarz	836650/016	09/13/2022	Annual
Spectrum Analyzer	FSV40-N	Rohde & Schwarz	101068-SZ	09/15/2022	Annual
Band Reject Filter	WRCJV2400/2483.5-2370/2520-60/12SS	Wainwright Instruments	2	01/06/2023	Annual
Band Reject Filter	WRCJV5100/5850-40/50-8EEK	Wainwright Instruments	1	02/07/2023	Annual
Attenuator (10 dB) 56-10	CBLU1183540B-01 56-10	CERNE X WEINSCH EL	N/A	12/22/2022	Annual
Broadband Low Noise Amplifier	CBL06185030	CERNE X	N/A	12/22/2022	Annual
Attenuator (3 dB)	18B-03	Api tech.			
High Pass Filter	WHKX10-2700-3000-18000-40SS	Wainwright Instruments	N/A	12/22/2022	Annual
High Pass Filter	WHKX8-6090-7000-18000-40SS	Wainwright Instruments	N/A	12/22/2022	Annual
High Pass Filter	WHKX10-7150-8000-18000-50SS	Wainwright Instruments	1	03/11/2023	Annual
Thru	COAXIAL ATTENUATOR	T&M SYSTEM	N/A	12/22/2022	Annual
Power Amplifier	CBL18265035	CERNE X	22966	12/02/2022	Annual
Power Amplifier	CBL26405040	CERNE X	25956	03/11/2023	Annual

Note:

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

11. ANNEX A_ TEST SETUP PHOTO

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

No.	Description
1	HCT-RF-2204-FC018-P