

PCTEST ENGINEERING LABORATORY, INC.

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# MEASUREMENT REPORT FCC PART 15.247 WLAN 802.11b/g/n

#### **Applicant Name:**

Samsung Electronics Co., Ltd. 129, Samsung-ro, Yeongtong-gu, Suwon-si Gyeonggi-do, 16677, Korea Date of Testing: 6/7 – 07/22/2019 Test Site/Location: PCTEST Lab. Columbia, MD, USA Test Report Serial No.: 1M1907300131-05.A3L

# FCC ID:

# A3LSMT867U

APPLICANT:

# Samsung Electronics Co., Ltd.

Application Type: Model: Additional Model(s): EUT Type: Frequency Range: FCC Classification: FCC Rule Part(s): Test Procedure(s): Certification SM-T867U SM-T867R4 Portable Tablet 2412 – 2472MHz Digital Transmission System (DTS) Part 15 Subpart C (15.247) ANSI C63.10-2013, KDB 558074 D01 v05r02, KDB 662911 D01 v02r01

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.10-2013 and KDB 558074 D01 v05r02. Test results reported herein relate only to the item(s) tested.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

Randy Ortanez President



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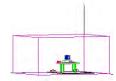


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# **MEASUREMENT REPORT**



		ANT1			ANT2			MIMO					
Mode Tx Frequency (MHz)		Avg Cor	nducted	Peak Co	nducted	Avg Cor	nducted	Peak Co	nducted	Avg Cor	nducted	Peak Co	onducted
	Max.	Max.	Max.	Max.	Max.	Max.	Max.	Max.	Max.	Max.	Max.	Max.	
	(	Power											
		(mW)	(dBm)										
802.11b	2412 - 2472	92.683	19.67	144.544	21.60	96.828	19.86	151.356	21.80		N	/A	
802.11g	2412 - 2472	58.345	17.66	174.582	22.42	57.810	17.62	185.780	22.69	116.145	20.65	358.922	25.55
802.11n	2412 - 2472	77.625	18.90	252.348	24.02	78.524	18.95	250.611	23.99	156.315	21.94	503.501	27.02

**EUT Overview** 

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# 1.0 INTRODUCTION

# 1.1 Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Innovation, Science and Economic Development Canada.

# 1.2 PCTEST Test Location

These measurement tests were conducted at the PCTEST Engineering Laboratory, Inc. facility located at 7185 Oakland Mills Road, Columbia, MD 21046. The measurement facility is compliant with the test site requirements specified in ANSI C63.4-2014.

# 1.3 Test Facility / Accreditations

Measurements were performed at PCTEST Engineering Lab located in Columbia, MD 21046, U.S.A.

- PCTEST is an ISO 17025-2005 accredited test facility under the American Association for Laboratory Accreditation (A2LA) with Certificate number 2041.01 for Specific Absorption Rate (SAR), Hearing Aid Compatibility (HAC) testing, where applicable, and Electromagnetic Compatibility (EMC) testing for FCC and Innovation, Science, and Economic Development Canada rules.
- PCTEST TCB is a Telecommunication Certification Body (TCB) accredited to ISO/IEC 17065-2012 by A2LA (Certificate number 2041.03) in all scopes of FCC Rules and ISED Standards (RSS).
- PCTEST facility is a registered (2451B) test laboratory with the site description on file with ISED.

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# 2.0 **PRODUCT INFORMATION**

# 2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Portable Tablet FCC ID: A3LSMT867U**. The test data contained in this report pertains only to the emissions due to the EUT's WLAN (DTS) transmitter.

Test Device Serial No.: 04682, 04765, 04740, 04732, 09000, 11388

### 2.2 Device Capabilities

This device contains the following capabilities:

850/1700/1900 WCDMA, Multi-band LTE, 802.11b/g/n WLAN, 802.11a/n/ac UNII, Bluetooth (1x, EDR, LE), ANT+, Wirelss Power Transfer

Ch.	Frequency (MHz)	Ch.	Frequency (MHz)
1	2412	8	2447
2	2417	9	2452
3	2422	10	2457
4	2427	11	2462
5	2432	12	2467
6	2437	13	2472
7	2442		

 Table 2-1. Frequency/ Channel Operations

**Note:** The maximum achievable duty cycles for all modes were determined based on measurements performed on a spectrum analyzer in zero-span mode with RBW = 8MHz, VBW = 50MHz, and detector = peak per the guidance of Section 6.0 b) of ANSI C63.10-2013 and KDB 558074 D01 v05r02. The RBW and VBW were both greater than 50/T, where T is the minimum transmission duration, and the number of sweep points across T was greater than 100. The duty cycles are as follows:

Maximum Achievable Duty Cycles							
902 11 M	odo/Band	D	Duty Cycle [%]				
802.11 Mode/Band		ANT1	ANT2	ΜΙΜΟ			
	b	99.1	99.0	N/A			
2.4GHz	g	98.8	98.7	97.5			
	n	98.7	98.6	97.4			

Table 2-2. Measured Duty Cycles

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The device employs MIMO technology. Below are the possible configurations.

WiFi Configurations		SISO		SDM		CDD	
		ANT1	ANT2	ANT1	ANT2	ANT1	ANT2
	11b	~	~	×	×	×	×
5GHz	11g	✓	$\checkmark$	×	×	✓	$\checkmark$
	11n	✓	$\checkmark$	✓	✓	✓	$\checkmark$
	Table 0.0		and / Cham	al On a rati			

Table 2-3. Frequency / Channel Operations

 $\checkmark$  = Support ; \* = NOT Support

**SISO** = Single Input Single Output

**SDM** = Spatial Diversity Multiplexing – MIMO function

**CDD** = Cyclic Delay Diversity – 2Tx function

Data Rates Supported: 1Mbps, 2Mbps, 5.5Mbps, 11Mbps (b) 6Mbps, 9Mbps, 12Mbps, 18Mbps, 24Mbps, 36Mbps, 48Mbps, 54Mbps (g) 6.5/7.2Mbps, 13/14.4Mbps, 19.5/21.7Mbps, 26/28.9Mbps, 39/43.3Mbps, 52/57.8Mbps, 58.5/65Mbps, 65/72.2Mbps (n) 13/14.4Mbps, 26/28.9Mbps, 39/43.3Mbps, 52/57.8Mbps, 78/86.7Mbps, 104/115.6Mbps, 117/130Mbps, 130/144.4Mbps (MIMO n)

# 2.3 Test Configuration

The EUT was tested per the guidance of KDB 558074 D01 v05r02. ANSI C63.10-2013 was used to reference the appropriate EUT setup for radiated spurious emissions testing and AC line conducted testing. See Sections 3.2 for AC line conducted emissions test setups, 3.3 for radiated emissions test setups, and 7.2, 7.3, 7.4, 7.5, and 7.6 for antenna port conducted emissions test setups.

# 2.4 EMI Suppression Device(s)/Modifications

No EMI suppression device(s) were added and/or no modifications were made during testing.

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# 3.0 DESCRIPTION OF TESTS

# 3.1 Evaluation Procedure

The measurement procedures described in the American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices (ANSI C63.10-2013) and the guidance provided in KDB 558074 D01 v05r02 were used in the measurement of the EUT.

Deviation from measurement procedure.....None

# 3.2 AC Line Conducted Emissions

The line-conducted facility is located inside a 10'x16'x9' shielded enclosure. The shielded enclosure is manufactured by ETS Lindgren RF Enclosures. The shielding effectiveness of the shielded room is in accordance with MIL-Std-285 or NSA 65-5. A 1m x 1.5m wooden table 80cm high is placed 40cm away from the vertical wall and 80cm away from the sidewall of the shielded room. Two 10kHz-30MHz,  $50\Omega/50\mu$ H Line-Impedance Stabilization Networks (LISNs) are bonded to the shielded room floor. Power to the LISNs is filtered by external high-current high-insertion loss power line filters. The external power line filter is an ETS Lindgren Model LPRX-4X30 (100dB Attenuation, 14kHz-18GHz) and the two EMI/RFI filters are ETS Lindgren Model LRW-2030-S1 (100dB Minimum Insertion Loss, 14kHz – 10GHz). These filters attenuate ambient signal noise from entering the measurement lines. These filters are also bonded to the shielded enclosure.

The EUT is powered from one LISN and the support equipment is powered from the second LISN. If the EUT is a DC-powered device, power will be derived from the source power supply it normally will be powered from and this supply line(s) will be connected to the second LISN. All interconnecting cables more than 1 meter were shortened to a 1 meter length by non-inductive bundling (serpentine fashion) and draped over the back edge of the test table. All cables were at least 40cm above the horizontal reference groundplane. Power cables for support equipment were routed down to the second LISN while ensuring that that cables were not draped over the second LISN.

Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the spectrum analyzer and exploratory measurements were made to determine the frequencies producing the maximum emission from the EUT. The spectrum was scanned from 150kHz to 30MHz with a spectrum analyzer. The detector function was set to peak mode for exploratory measurements while the bandwidth of the analyzer was set to 10kHz. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Once the worst case emissions have been identified, the one EUT cable configuration/arrangement and mode of operation that produced these emissions is used for final measurements on the same test site. The analyzer is set to CISPR quasi-peak and average detectors with a 9kHz resolution bandwidth for final measurements.

Line conducted emissions test results are shown in Section 7.9. The EMI Receiver mode of the Agilent MXE was used to perform AC line conducted emissions testing.

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# 3.3 Radiated Emissions

The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. The test site inside the chamber is a 6m x 5.2m elliptical, obstruction-free area in accordance with Figure 5.7 of Clause 5 in ANSI C63.4-2014. Absorbers are arranged on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections for measurements above 1GHz. An 80cm tall test table made of Styrodur is placed on top of the turn table. For measurements above 1GHz, an additional Styrodur pedestal is placed on top of the test table to bring the total table height to 1.5m.

For all measurements, the spectrum was scanned through all EUT azimuths and from 1 to 4 meter receive antenna height using a broadband antenna from 30MHz up to the upper frequency shown in 15.33 depending on the highest frequency generated or used in the device or on which the device operates or tunes. For frequencies above 1GHz, linearly polarized double ridge horn antennas were used. For frequencies below 30MHz, a calibrated loop antenna was used. When exploratory measurements were necessary, they were performed at 1 meter test distance inside the semi-anechoic chamber using broadband antennas, broadband amplifiers, and spectrum analyzers to determine the frequencies and modes producing the maximum emissions. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The test set-up was placed on top of the 1 x 1.5 meter table. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Appropriate precaution was taken to ensure that all emissions from the EUT were maximized and investigated. The system configuration, mode of operation, turntable azimuth, and receive antenna height was noted for each frequency found.

Final measurements were made in the semi-anechoic chamber using calibrated, linearly polarized broadband and horn antennas. The test setup was configured to the setup that produced the worst case emissions. The spectrum analyzer was set to investigate all frequencies required for testing to compare the highest radiated disturbances with respect to the specified limits. The turntable containing the EUT was rotated through 360 degrees and the height of the receive antenna was varied 1 to 4 meters and stopped at the azimuth and height producing the maximum emission. Each emission was maximized by changing the orientation of the EUT through three orthogonal planes and changing the polarity of the receive antenna, whichever produced the worst-case emissions.

All radiated measurements are performed in a chamber that meets the site requirements per ANSI C63.4-2014. Additionally, radiated emissions below 30MHz are also validated on an Open Area Test Site to assert correlation with the chamber measurements per the requirements of KDB 474788 D01.

# 3.4 Environmental Conditions

The temperature is controlled within range of 15°C to 35°C. The relative humidity is controlled within range of 10% to 75%. The atmospheric pressure is monitored within the range 86-106kPa (860-1060mbar).

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# 4.0 ANTENNA REQUIREMENTS

#### Excerpt from §15.203 of the FCC Rules/Regulations:

"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."

- The antennas of the EUT are **permanently attached**.
- There are no provisions for connections to an external antenna.

#### Conclusion:

The EUT unit complies with the requirement of §15.203.

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# 5.0 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 uncertainty shown below meets or exceeds the  $U_{\text{CISPR}}$  measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Contribution	Expanded Uncertainty (±dB)
Conducted Bench Top Measurements	1.13
Line Conducted Disturbance	3.09
Radiated Disturbance (<1GHz)	4.98
Radiated Disturbance (>1GHz)	5.07
Radiated Disturbance (>18GHz)	5.09

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# 6.0 TEST EQUIPMENT CALIBRATION DATA

Test Equipment Calibration is traceable to the National Institute of Standards and Technology (NIST). Measurements antennas used during testing were calibrated in accordance to the requirements of ANSI C63.5-2017.

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
-	WL25-1	Conducted Cable Set (25GHz)	6/5/2019	Annual	6/5/2020	WL25-1
Agilent	N9020A	MXA Signal Analyzer	4/20/2019	Annual	4/20/2020	US46470561
Agilent	N9030A	PXA Signal Analyzer (44GHz)	6/12/2019	Annual	6/12/2020	MY52350166
Anritsu	ML2495A	Power Meter	10/5/2018	Annual	10/5/2019	1328004
Anritsu	MA2411B	Pulse Power Sensor	9/27/2018	Annual	9/27/2019	1339026
Com-Power	AL-130	9kHz - 30MHz Loop Antenna	10/10/2017	Biennial	10/10/2019	121034
Com-Power	PAM-103	Pre-Amplifier (1-1000MHz)	5/10/2019	Annual	5/10/2020	441112
Emco	3115	Horn Antenna (1-18GHz)	3/28/2018	Biennial	3/28/2020	9704-5182
Emco	3116	Horn Antenna (18 - 40GHz)	6/7/2018	Triennial	6/7/2021	9203-2178
Emco	3160-09	Small Horn (18 - 26.5GHz)	8/9/2018	Biennial	8/9/2020	00135427
ETS-Lindgren	3816/2NM	Line Impedance Stabilization Network	6/18/2018	Biennial	6/18/2020	114451
Huber + Suhner	Sucoflex 102A	40GHz Radiated Cable Set	8/23/2018	Annual	8/23/2019	251425001
Pasternack	NMLC-2	Line Conducted Emissions Cable (NM)	6/3/2019	Annual	6/3/2020	NMLC-2
Rohde & Schwarz	TS-PR26	18-26.5 GHz Pre-Amplifier	9/19/2018	Annual	9/19/2019	100040
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	6/5/2019	Annual	6/5/2020	100342
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	9/19/2018	Annual	9/19/2019	100348
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	9/18/2018	Annual	9/18/2019	102134
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	4/19/2018	Biennial	4/19/2020	A051107
Keysight Technologies	N9020A	MXA Signal Analyzer	4/29/2019	Annual	4/29/2020	MY54500644

Table 6-1. Annual Test Equipment Calibration Schedule

#### Note:

For equipment listed above that has a calibration date or calibration due date that falls within the test date range, care was taken to ensure that this equipment was used after the calibration date and before the calibration due date.

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# 7.0 TEST RESULTS

# 7.1 Summary

Company Name:	Samsung Electronics Co., Ltd.

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FCC Classification: Digital Transmission System (DTS)

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
15.247(a)(2)	6dB Bandwidth	> 500kHz		PASS	Section 7.2
15.247(b)(3)	Transmitter Output Power	< 1 Watt	1 Watt		Sections 7.3
15.247(e)	Transmitter Power Spectral Density	< 8dBm / 3kHz Band	CONDUCTED	PASS	Section 7.4
15.247(d)	Band Edge / Out-of-Band Emissions	≥ 20dBc		PASS	Sections 7.5, 7.6
15.205 15.209	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	hits (Restricted Bands bands must meet the radiated Emission R		PASS	Sections 7.7, 7.8
15.207	AC Conducted Emissions 150kHz – 30MHz	< FCC 15.207 limits (RSS-Gen[8.8])	LINE CONDUCTED	PASS	Section 7.9

Table 7-1. Summary of Test Results

#### Notes:

- 1) All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.
- 2) The analyzer plots shown in this section were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables and attenuators used as part of the system to connect the EUT to the analyzer at all frequencies of interest.
- 3) All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables and attenuators.
- 4) For conducted spurious emissions, automated test software was used to measure emissions and capture the corresponding plots necessary to show compliance. The measurement software utilized is PCTEST "WLAN Automation," Version 3.5.
- 5) For radiated band edge, automated test software was used to measure emissions and capture the corresponding plots necessary to show compliance. The measurement software utilized is PCTEST "Chamber Automation," Version 0.2.16.

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### 7.2 6dB Bandwidth Measurement §15.247(a.2); RSS-247 [5.2]

#### **Test Overview and Limit**

The bandwidth at 6dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the transmitter antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates were investigated and the worst case configuration results are reported in this section.

#### The minimum permissible 6dB bandwidth is 500 kHz.

#### Test Procedure Used

ANSI C63.10-2013 – Section 11.8.2 Option 2 KDB 558074 D01 v05r02 – Section 8.2

#### **Test Settings**

- 1. The signal analyzer's automatic bandwidth measurement capability was used to perform the 6dB bandwidth measurement. The "X" dB bandwidth parameter was set to X = 6. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
- 2. RBW = 100kHz
- 3. VBW  $\geq$  3 x RBW
- 4. Detector = Peak
- 5. Trace mode = max hold
- 6. Sweep = auto couple
- 7. The trace was allowed to stabilize

#### Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.



Figure 7-1. Test Instrument & Measurement Setup

#### Test Notes

#### None

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### SISO Antenna-1 6 dB Bandwidth Measurements

Frequency [MHz]	Channel No.	802.11 Mode	Data Rate [Mbps]	Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]
2412	1	b	1	9.09	0.500
2437	6	b	1	9.56	0.500
2462	11	b	1	9.60	0.500
2412	1	g	6	13.85	0.500
2437	6	g	6	13.86	0.500
2462	11	g	6	13.76	0.500
2412	1	n	6.5/7.2 (MCS0)	13.86	0.500
2437	6	n	6.5/7.2 (MCS0)	13.85	0.500
2462	11	n	6.5/7.2 (MCS0)	15.07	0.500

Table 7-2. Conducted Bandwidth Measurements SISO ANT1



Plot 7-1. 6dB Bandwidth Plot SISO ANT1 (802.11b - Ch. 1)

FCC ID: A3LSMT867U		CTEST MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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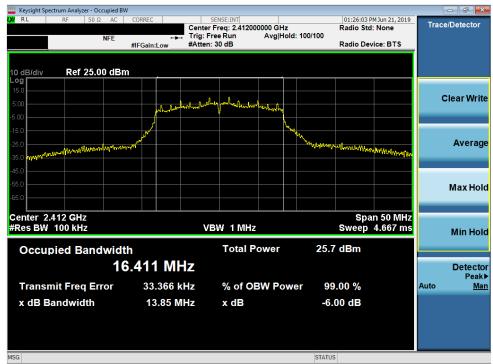




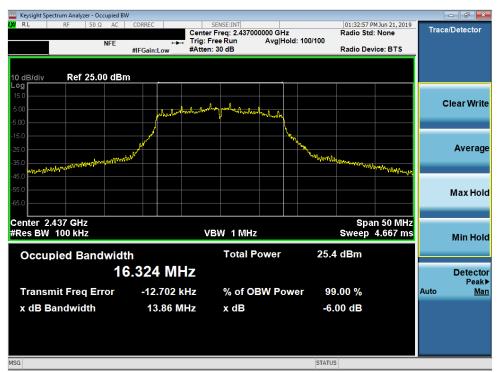
Plot 7-3. 6dB Bandwidth Plot SISO ANT1 (802.11b - Ch. 11)

FCC ID: A3LSMT867U		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 15 of 106	
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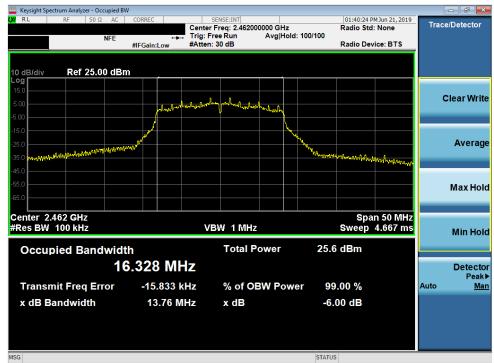




Plot 7-5. 6dB Bandwidth Plot SISO ANT1 (802.11g - Ch. 6)

FCC ID: A3LSMT867U		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Plot 7-7. 6dB Bandwidth Plot SISO ANT1 (802.11n (2.4GHz) - Ch. 1)

FCC ID: A3LSMT867U		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Plot 7-8. 6dB Bandwidth Plot SISO ANT1 (802.11n (2.4GHz) - Ch. 6)



Plot 7-9. 6dB Bandwidth Plot SISO ANT1 (802.11n (2.4GHz) - Ch. 11)

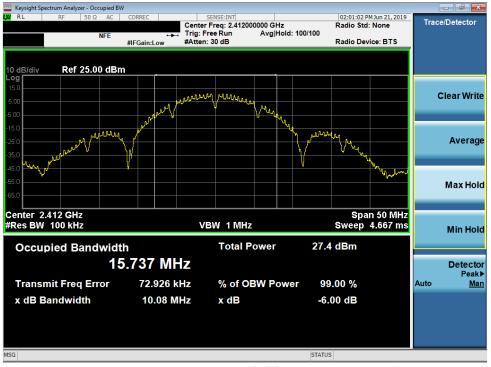
FCC ID: A3LSMT867U		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 19 of 106
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### SISO Antenna-2 6 dB Bandwidth Measurements

Frequency [MHz]	Channel No.	802.11		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]
2412	1	b	1	10.08	0.500
2437	6	b 1 9.10		9.10	0.500
2462	11	b	1	9.58	0.500
2412	1	g	6	15.05	0.500
2437	6	g	6	15.09	0.500
2462	11	g	6	15.07	0.500
2412	1	n	6.5/7.2 (MCS0)	13.83	0.500
2437	6	n	6.5/7.2 (MCS0)	15.03	0.500
2462	11	n	6.5/7.2 (MCS0)	15.03	0.500

Table 7-3. Conducted Bandwidth Measurements SISO ANT2



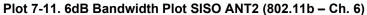
Plot 7-10. 6dB Bandwidth Plot SISO ANT2 (802.11b - Ch. 1)

FCC ID: A3LSMT867U		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 10 of 100
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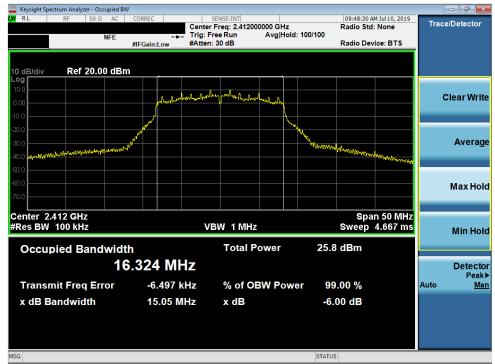




Plot 7-12. 6dB Bandwidth Plot SISO ANT2 (802.11b - Ch. 11)

FCC ID: A3LSMT867U		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 20 of 100
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Plot 7-14. 6dB Bandwidth Plot SISO ANT2 (802.11g - Ch. 6)

FCC ID: A3LSMT867U		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Plot 7-16. 6dB Bandwidth Plot SISO ANT2 (802.11n (2.4GHz) - Ch. 1)

FCC ID: A3LSMT867U		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 22 of 106	
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Plot 7-18. 6dB Bandwidth Plot SISO ANT2 (802.11n (2.4GHz) - Ch. 11)

FCC ID: A3LSMT867U		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 22 of 106
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### 7.3 Output Power Measurement §15.247(b.3); RSS-247 [5.4]

#### Test Overview and Limits

A transmitter antenna terminal of EUT is connected to the input of an RF power sensor. Measurement is made using a broadband power meter capable of making peak and average measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

#### The maximum permissible conducted output power is 1 Watt.

#### **Test Procedure Used**

ANSI C63.10-2013 – Section 11.9.1.3 PKPM1 Peak Power Method KDB 558074 D01 v05r02 – Section 8.3.1.3 PKPM1 Peak-reading Power Meter Method ANSI C63.10-2013 – Section 11.9.2.3.2 Method AVGPM-G KDB 558074 D01 v05r02 – Section 8.3.2.3 Measurement using a Power Meter (PM) ANSI C63.10-2013 – Section 14.2 Measure-and-Sum Technique KDB 662911 D01 v02r01 – Section E)1) Measure-and-Sum Technique

#### **Test Settings**

#### Method PKPM1 (Peak Power Measurement)

Peak power measurements were performed only when the EUT was transmitting at its maximum power control level using a broadband power meter with a pulse sensor. The pulse sensor employs a VBW = 50MHz so this method was only used for signals whose DTS bandwidth was less than or equal to 50MHz.

#### Method AVGPM-G (Average Power Measurement)

Average power measurements were performed only when the EUT was transmitting at its maximum power control level using a broadband power meter with a pulse sensor. The power meter implemented triggering and gating capabilities which were set up such that power measurements were recorded only during the ON time of the transmitter. The trace was averaged over 100 traces to obtain the final measured average power.

#### Test Setup

The EUT and measurement equipment were set up as shown in the diagrams below.



#### Figure 7-2. Test Instrument & Measurement Setup for Power Meter Measurements

#### Test Notes

None

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	Freq [MHz]		Freq [MHz] Channe		Detector	IEEE Transmission Mode		
				802.11b	802.11g	802.11n		
	2412	1	AVG	17.84	14.75	12.35		
			PEAK	20.08	19.84	17.35		
	2417	2	AVG	19.22	16.27	17.42		
			PEAK	21.25	20.73	20.98		
	2422	3	AVG		17.34	18.84		
N			PEAK		22.12	23.78		
2.4GHz	2437	6	AVG	19.67	17.66	18.90		
Ģ			PEAK	21.60	22.42	24.02		
4	2452	9	AVG		17.43	16.57		
			PEAK		22.21	20.54		
	2457	10	AVG	19.53	15.58	16.28		
			PEAK	21.54	20.84	20.08		
	2462	11	AVG	18.12	14.12	13.25		
			PEAK	20.35	18.94	18.18		
	2467	12	AVG	5.90	5.62	5.41		
			PEAK	8.11	10.51	10.42		
	2472	13	AVG	5.90	3.37	1.88		
			PEAK	8.31	8.48	6.54		

Table 7-4. Conducted Output Power Measurements SISO ANT1

	Freq [MHz]	Channel	Detector	IEEE Transmission Mode		Mode
				802.11b	802.11g	802.11n
	2412	1	AVG	18.49	14.96	12.82
			PEAK	20.51	19.98	20.93
	2417	2	AVG	19.73	16.37	17.32
			PEAK	21.64	21.30	21.10
	2422	3	AVG		17.51	18.81
N			PEAK		22.45	23.37
2.4GHz	2437	6	AVG	19.65	17.62	18.95
Q			PEAK	21.80	22.65	23.99
4	2452	9	AVG		17.54	16.64
			PEAK		22.69	20.61
	2457	10	AVG	19.86	15.79	16.44
			PEAK	21.76	20.63	20.48
	2462	11	AVG	18.25	13.75	13.28
			PEAK	20.24	18.54	18.25
	2467	12	AVG	5.70	5.43	5.53
			PEAK	7.90	10.26	10.39
	2472	13	AVG	5.66	3.04	1.42
			PEAK	7.81	7.88	6.41

Table 7-5. Conducted Output Power Measurements SISO ANT2

FCC ID: A3LSMT867U		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
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	Freq [MHz]	Channel	Detector	Conducted Power [dl		dBm]
				ANT1	ANT2	MIMO
	2412	1	AVG	14.75	14.96	17.87
			PEAK	19.84	19.98	22.92
	2417	2	AVG	16.27	16.37	19.33
			PEAK	20.73	21.30	24.03
	2422	3	AVG	17.34	17.51	20.44
N			PEAK	22.12	22.45	25.30
2.4GHz	2437	6	AVG	17.66	17.62	20.65
Q			PEAK	22.42	22.65	25.55
4	2452	9	AVG	17.43	17.54	20.50
••			PEAK	22.21	22.69	25.47
	2457	10	AVG	15.58	15.79	18.70
			PEAK	20.84	20.63	23.75
	2462	11	AVG	14.12	13.75	16.95
			PEAK	18.94	18.54	21.75
	2467	12	AVG	5.62	5.43	8.54
			PEAK	10.51	10.26	13.40
	2472	13	AVG	3.37	3.04	6.22
			PEAK	8.48	7.88	11.20

Table 7-6. Conducted Output Power Measurements MIMO (802.11g)

	Freq [MHz]	Channel	Channel Detector	Conducted Power [dBm]		
				ANT1	ANT2	MIMO
	2412	1	AVG	12.35	12.82	15.60
			PEAK	17.35	20.93	22.51
	2417	2	AVG	17.42	17.32	20.38
			PEAK	20.98	21.10	24.05
	2422	3	AVG	18.84	18.81	21.84
N			PEAK	23.78	23.37	26.59
Î	2437	6	AVG	18.90	18.95	21.94
2.4GHz			PEAK	24.02	23.99	27.02
4	2452	9	AVG	16.57	16.64	19.62
			PEAK	20.54	20.61	23.59
	2457	10	AVG	16.28	16.44	19.37
			PEAK	20.08	20.48	23.29
	2462	11	AVG	13.25	13.28	16.28
			PEAK	18.18	18.25	21.23
	2467	12	AVG	5.41	5.53	8.48
			PEAK	10.42	10.39	13.42
	2472	13	AVG	1.88	1.42	4.67
			PEAK	6.54	6.41	9.49

Table 7-7. Conducted Output Power Measurements MIMO (802.11n)

FCC ID: A3LSMT867U		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dama 26 of 106	
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	1 1			110 0 00/04/00 40	



#### Note:

Per ANSI C63.10-2013 and KDB 662911 D01 v02r01 Section E)1), the conducted powers at Antenna 1 and Antenna 2 were first measured separately during MIMO transmission as shown in the section above. The measured values were then summed in linear power units then converted back to dBm.

#### Sample MIMO Calculation:

At 2412MHz the average conducted output power was measured to be 18.90 dBm for Antenna-1 and 18.95 dBm for Antenna-2.

Antenna 1 + Antenna 2 = MIMO

(18.90 dBm + 18.95 dBm) = (77.62 mW + 78.52 mW) = 156.14 mW = 21.94 dBm

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### 7.4 Power Spectral Density §15.247(e); RSS-247 [5.2]

#### **Test Overview and Limit**

The peak power density is measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates were investigated and the worst case configuration results are reported in this section.

#### The maximum permissible power spectral density is 8 dBm in any 3 kHz band.

#### **Test Procedure Used**

ANSI C63.10-2013 – Section 11.10.2 Method PKPSD KDB 558074 D01 v05r02 – Section 8.4 DTS Maximum Power Spectral Density level in the fundamental emission ANSI C63.10-2013 – Section 14.3.2.2 Measure-and-Sum Technique KDB 662911 D01 v02r01 – Section E)2) Measure-and-Sum Technique

#### **Test Settings**

- 1. Analyzer was set to the center frequency of the DTS channel under investigation
- 2. Span = 1.5 times the DTS channel bandwidth
- 3. RBW = 10kHz
- 4. VBW = 1MHz
- 5. Detector = peak
- 6. Sweep time = auto couple
- 7. Trace mode = max hold
- 8. Trace was allowed to stabilize

#### Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.



Figure 7-3. Test Instrument & Measurement Setup

#### Test Notes

#### None

FCC ID: A3LSMT867U		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Frequency [MHz]	Channel No.	802.11 Mode	Data Rate [Mbps]	Measured Power Spectral Density [dBm]	Maximum Permissible Power Density [dBm / 3kHz]	Margin [dB]	Pass / Fail
2412	1	b	1	0.93	8.00	-7.07	Pass
2437	6	b	1	2.65	8.00	-5.35	Pass
2462	11	b	1	2.79	8.00	-5.21	Pass
2412	1	g	6	1.66	8.00	-6.34	Pass
2437	6	g	6	1.25	8.00	-6.75	Pass
2462	11	g	6	1.28	8.00	-6.72	Pass
2412	1	n	6.5/7.2 (MCS0)	-0.47	8.00	-8.47	Pass
2437	6	n	6.5/7.2 (MCS0)	1.64	8.00	-6.36	Pass
2462	11	n	6.5/7.2 (MCS0)	-2.10	8.00	-10.10	Pass

### SISO Antenna-1 Power Spectral Density Measurements

Table 7-8. Conducted Power Density Measurements SISO ANT1



Plot 7-19. Power Spectral Density Plot SISO ANT1 (802.11b - Ch. 1)

FCC ID: A3LSMT867U		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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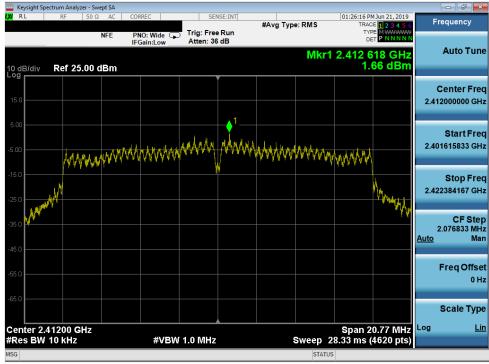
Plot 7-20. Power Spectral Density Plot SISO ANT1 (802.11b - Ch. 6)



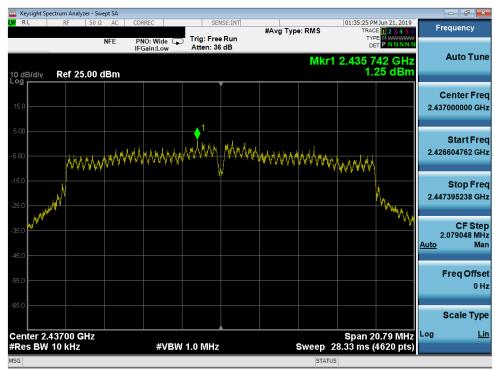
Plot 7-21. Power Spectral Density Plot SISO ANT1 (802.11b – Ch. 11)

FCC ID: A3LSMT867U		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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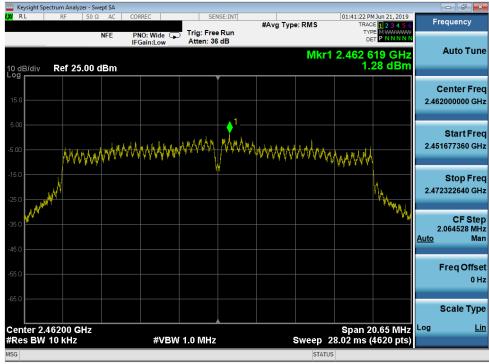
Plot 7-22. Power Spectral Density Plot SISO ANT1 (802.11g - Ch. 1)



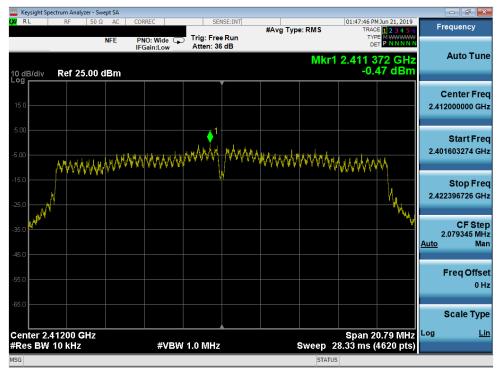
Plot 7-23. Power Spectral Density Plot SISO ANT1 (802.11g - Ch. 6)

FCC ID: A3LSMT867U		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
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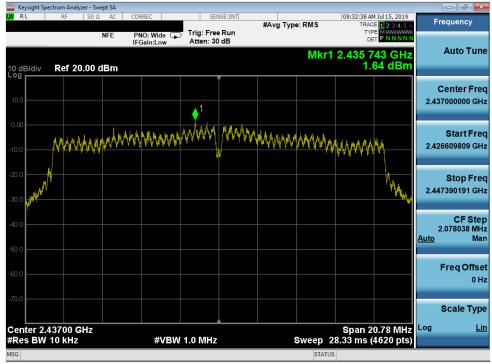
Plot 7-24. Power Spectral Density Plot SISO ANT1 (802.11g - Ch. 11)



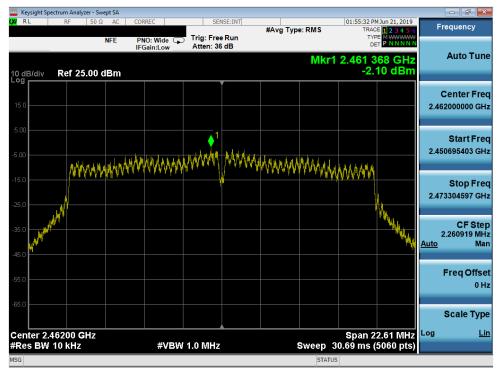
Plot 7-25. Power Spectral Density Plot SISO ANT1 (802.11n (2.4GHz) – Ch. 1)

FCC ID: A3LSMT867U		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Plot 7-27. Power Spectral Density Plot SISO ANT1 (802.11n (2.4GHz) - Ch. 11)

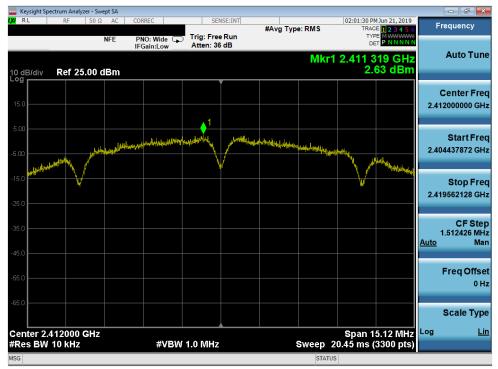
FCC ID: A3LSMT867U		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dama 22 of 106
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Frequency [MHz]	Channel No.	802.11 Mode	Data Rate [Mbps]	Measured Power Spectral Density [dBm]	Maximum Permissible Power Density [dBm / 3kHz]	Margin [dB]	Pass / Fail
2412	1	b	1	2.63	8.00	-5.37	Pass
2437	6	b	1	3.13	8.00	-4.87	Pass
2462	11	b	1	2.63	8.00	-5.37	Pass
2412	1	g	6	-0.42	8.00	-8.42	Pass
2437	6	g	6	0.75	8.00	-7.25	Pass
2462	11	g	6	-0.44	8.00	-8.44	Pass
2412	1	n	6.5/7.2 (MCS0)	-1.84	8.00	-9.84	Pass
2437	6	n	6.5/7.2 (MCS0)	-3.23	8.00	-11.23	Pass
2462	11	n	6.5/7.2 (MCS0)	-1.63	8.00	-9.63	Pass

# SISO Antenna-2 Power Spectral Density Measurements

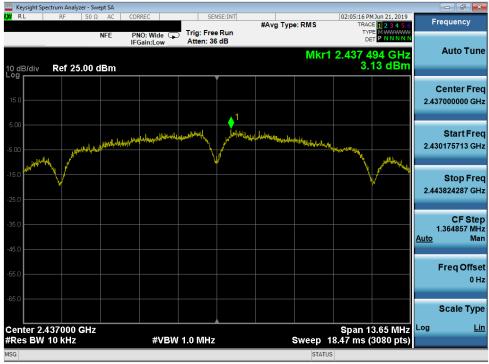
Table 7-9. Conducted Power Density Measurements SISO ANT2



Plot 7-28. Power Spectral Density Plot SISO ANT2 (802.11b - Ch. 1)

FCC ID: A3LSMT867U		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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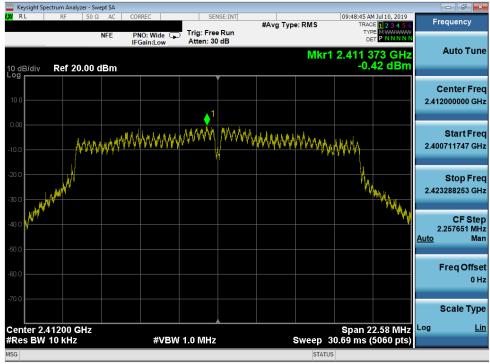
Plot 7-29. Power Spectral Density Plot SISO ANT2 (802.11b - Ch. 6)



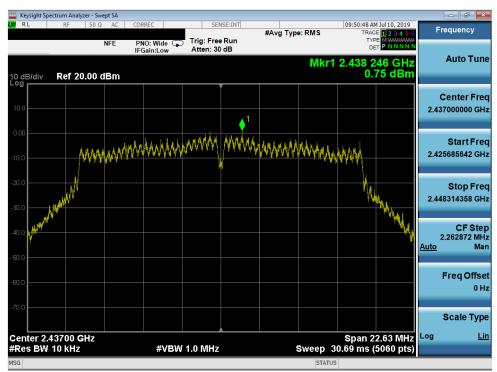
Plot 7-30. Power Spectral Density Plot SISO ANT2 (802.11b - Ch. 11)

FCC ID: A3LSMT867U		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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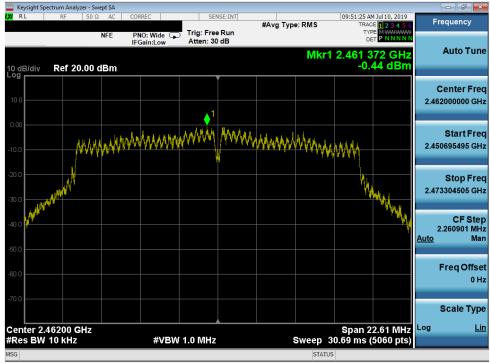
Plot 7-31. Power Spectral Density Plot SISO ANT2 (802.11g - Ch. 1)



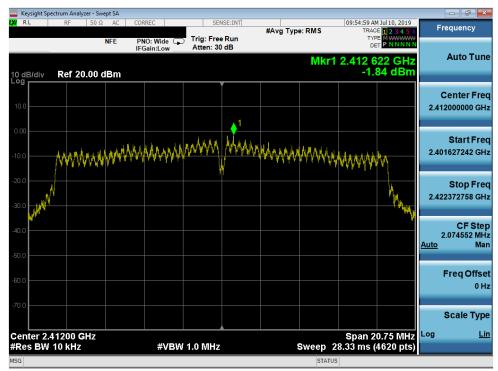
Plot 7-32. Power Spectral Density Plot SISO ANT2 (802.11g - Ch. 6)

FCC ID: A3LSMT867U		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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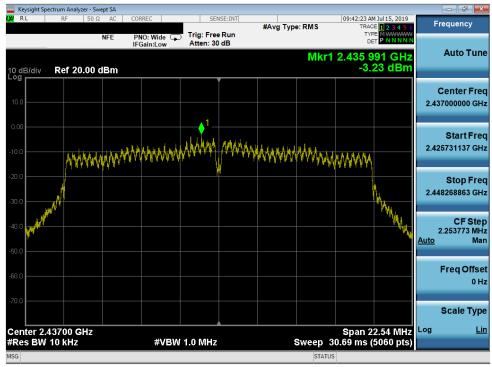
Plot 7-33. Power Spectral Density Plot SISO ANT2 (802.11g - Ch. 11)



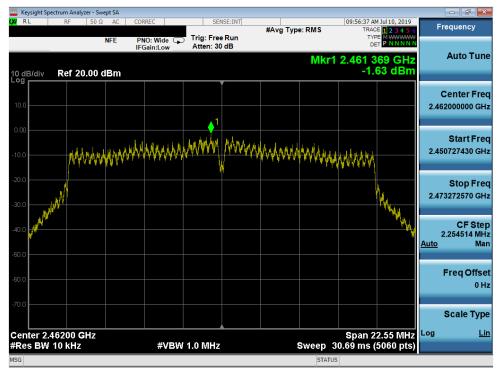
Plot 7-34. Power Spectral Density Plot SISO ANT2 (802.11n (2.4GHz) – Ch. 1)

FCC ID: A3LSMT867U		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 37 of 106
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Plot 7-36. Power Spectral Density Plot SISO ANT2 (802.11n (2.4GHz) - Ch. 11)

FCC ID: A3LSMT867U		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Frequency [MHz]	Channel No.	802.11 Mode	Data Rate [Mbps]	ANT 1 Power Spectral Density [dBm]	ANT 2 Power Spectral Density [dBm]	Summed MIMO Power Spectral Density [dBm]	Maximum Permissible Power Density [dBm / 3kHz]	Margin [dB]	Pass / Fail
2412	1	g	6	1.66	-0.42	3.75	8.00	-4.25	Pass
2437	6	g	6	1.25	0.75	4.01	8.00	-3.99	Pass
2462	11	g	6	1.28	-0.44	3.52	8.00	-4.48	Pass
2412	1	n	6.5/7.2 (MCS0)	-0.47	-1.84	1.91	8.00	-6.09	Pass
2437	6	n	6.5/7.2 (MCS0)	1.64	-3.23	2.87	8.00	-5.13	Pass
2462	11	n	6.5/7.2 (MCS0)	-2.10	-1.63	1.15	8.00	-6.85	Pass

#### **MIMO Power Spectral Density Measurements**

**Table 7-10.MIMO Conducted Power Density Measurements** 

#### Note:

Per ANSI C63.10-2013 Section 14.3.2.2 and KDB 662911 D01 v02r01 Section E)2), the power spectral density at Antenna 1 and Antenna 2 were first measured separately as shown in the section above. The measured values were then summed in linear power units then converted back to dBm.

#### Sample MIMO Calculation:

At 2412MHz the average conducted power spectral density was measured to be -0.47 dBm for Antenna-1 and -1.84 dBm for Antenna-2.

Antenna 1 + Antenna 2 = MIMO

(-0.47 dBm + -1.84 dBm) = (0.90 mW + 0.65 mW) = 1.55 mW = 1.91 dBm

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# 7.5 Conducted Emissions at the Band Edge §15.247(d); RSS-247 [5.5]

#### Test Overview and Limit

All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. For the following out of band conducted spurious emissions plots at the band edge, the EUT was set at a data rate of 1Mbps for "b" mode, 6 Mbps for "g" mode, 6.5/7.2Mbps for "n" mode, and 8.6Mbps for "ax" mode as these settings produced the worst-case emissions.

The limit for out-of-band spurious emissions at the band edge is 20dB below the fundamental emission level, as determined from the in-band power measurement of the DTS channel performed in a 100kHz bandwidth per the PSD procedure (Section 7.4).

#### Test Procedure Used

ANSI C63.10-2013 – Section 11.11.3 KDB 558074 D01 v05r02 – Section 8.7.2

#### **Test Settings**

- 1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
- 2. Span was set large enough so as to capture all out of band emissions near the band edge
- 3. RBW = 100kHz
- 4. VBW = 1MHz
- 5. Detector = Peak
- 6. Number of sweep points  $\geq 2 \times \text{Span/RBW}$
- 7. Trace mode = max hold
- 8. Sweep time = auto couple
- 9. The trace was allowed to stabilize

#### Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.



Figure 7-4. Test Instrument & Measurement Setup

#### **Test Notes**

#### None

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#### Keysight Spectrum Analyzer - Swept SA - -01:07:41 PM Jun 21, 2019 TRACE 1 2 3 4 5 6 TYPE M WWWWW RI Frequency #Avg Type: RMS Trig: Free Run Atten: 36 dB PNO: Fast IFGain:Low NFF ..... Auto Tune ΔMkr1 15.015 MHz 41.33 dB Ref 25.00 dBm I0 dB/div **Center Freq** 2.400000000 GHz LANN H Start Freq 2.365000000 GHz Stop Freq 2.435000000 GHz H HNX2 h.H. CF Step 7.000000 MHz <u>Auto</u> Man Mupordimpind whether and advalues of **Freq Offset** 0 Hz Scale Type Center 2.40000 GHz #Res BW 100 kHz Span 70.00 MHz Sweep 2.000 ms (2001 pts) Log Lin #VBW 1.0 MHz

# SISO Antenna-1 Conducted Emissions at the Band Edge

Plot 7-37. Band Edge Plot SISO ANT1 (802.11b - Ch. 1)



	Plot 7-38. Band Edge Plot SISO ANT1 (802.116 – Ch. 2)									
FCC ID: A3LSMT867U		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager						
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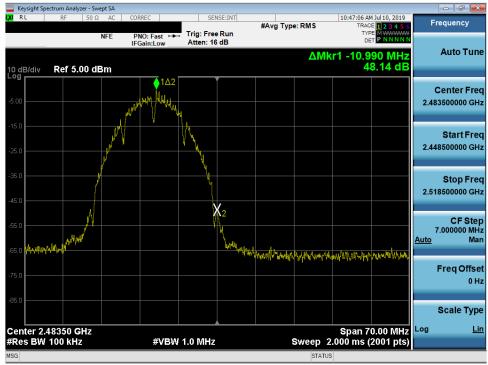
Plot 7-39. Band Edge Plot SISO ANT1 (802.11b - Ch. 11)



Plot 7-40. Band Edge Plot SISO ANT1 (802.11b - Ch. 12)

FCC ID: A3LSMT867U		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Plot 7-41. Band Edge Plot SISO ANT1 (802.11b - Ch. 13)



Plot 7-42. Band Edge Plot SISO ANT1 (802.11g- Ch. 1)

FCC ID: A3LSMT867U		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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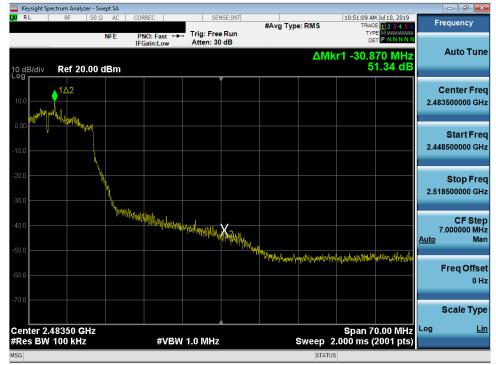
Plot 7-43. Band Edge Plot SISO ANT1 (802.11g- Ch. 2)



Plot 7-44. Band Edge Plot SISO ANT1 (802.11g- Ch. 3)

FCC ID: A3LSMT867U		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Plot 7-46. Band Edge Plot SISO ANT1 (802.11g - Ch. 10)

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	pectrum Analy	zer - Swej	pt SA											
RL	RF	50 Ω	AC NFE		ast ↔	. Trig: Fre		#Avg	Type: RMS	5	TR	PM Jun 21, 2019 ACE 1 2 3 4 5 6 YPE MWWWWWW DET P NNNN	i	Frequency
0 dB/div	Ref 25	i.00 d	Bm	IFGain:	Low	Atten: 36	αB		Δ	Mkr	1 -20.	615 MHz 46.41 dB		Auto Tur
15.0			1∆2 <sup>-</sup>										2.4	Center Fre 83500000 GI
5.00	muladad /		rly <sub>budy</sub> n										2.4	<b>Start Fr</b> 48500000 G
25.0				h									2.5	Stop Fr 18500000 G
5.0					Th <sub>bent</sub>	<sup>nut</sup> nyinyinyi		wah				1	<u>Auto</u>	CF St 7.000000 M N
5.0								1. 000 0.1	kretiwiedteAN	UNU	papelypetypetypetype	htteeninger forthette		Freq Offs 0
enter 2	.48350 G	HZ									Snan	70.00 MHz	Log	Scale Ty
	V 100 kHz				#VBW	1.0 MHz			Swee	p 2.0	000 ms	(2001 pts)		

Plot 7-47. Band Edge Plot SISO ANT1 (802.11g - Ch. 11)



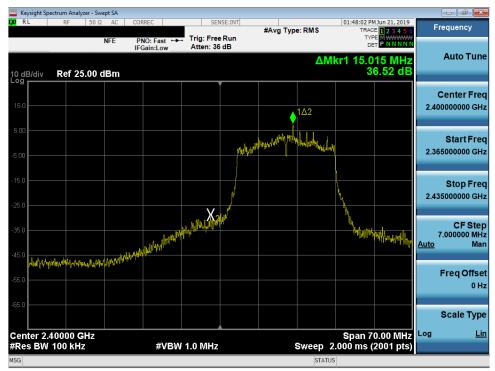
Plot 7-48. Band Edge Plot SISO ANT1 (802.11g - Ch. 12)

FCC ID: A3LSMT867U		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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	pectrum Analyz										_	
<mark>X/</mark> RL	RF	50 Ω A				NSE:INT	#Avg Ty	pe: RMS	TRA	M Jul 10, 2019 DE <b>1 2 3 4 5 6</b> PE M	Fr	equency
	_	NFE		:Fast ↔ n:Low	Atten: 10				D			
10 dB/div Log	Ref 0.0	00 dBm	1					ΔM	kr1 -10.2 4	255 MHz 4.99 dB		Auto Tune
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-20.0												Start Free
-30.0		/			- Hy						2.44	8500000 GH
-40.0		ļí										Stop Free
-50.0						Χ					2.51	8500000 GH
						22 						CF Ste
-60.0 MUMP	nnvr441141mun <sup>nyr</sup>	¥				WHUN	MI4.				7 <u>Auto</u>	.000000 MH Ma
-70.0							WAR WINNIN	www.hipmanny	Workington	- Anapathan la		
-80.0												Freq Offse 0 H
-90.0												
												Scale Type
	.48350 G 100 kHz			#\/R\	v 1.0 MHz			Sweep	Span 7 2.000 ms (	(2001 pts)	Log	<u>Li</u>
FRES DW				#VDV	v 1.0 10/11/2			Sweep		(200 F pts)		

Plot 7-49. Band Edge Plot SISO ANT1 (802.11g - Ch. 13)



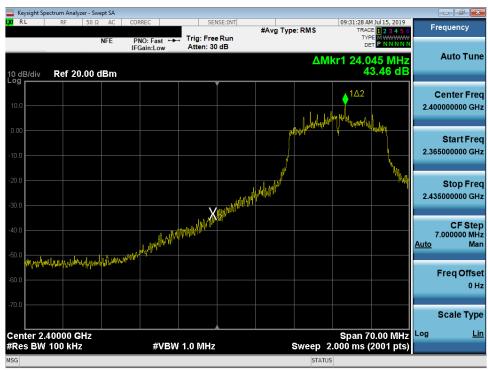
Plot 7-50. Band Edge Plot SISO ANT1 (802.11n (2.4GHz) – Ch. 1)

FCC ID: A3LSMT867U		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
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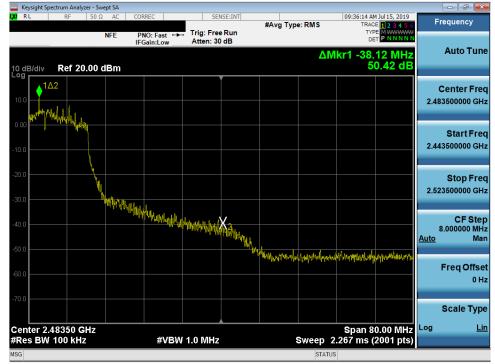
Plot 7-51. Band Edge Plot SISO ANT1 (802.11n (2.4GHz) - Ch. 2)



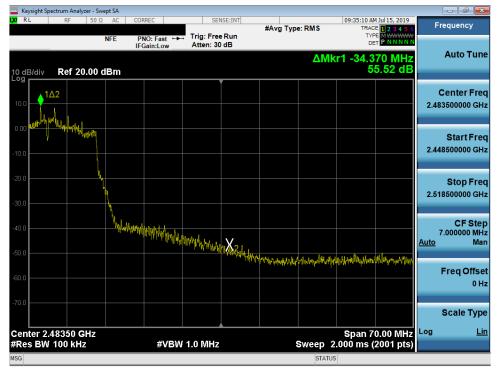
Plot 7-52. Band Edge Plot SISO ANT1 (802.11n (2.4GHz) – Ch. 3)

FCC ID: A3LSMT867U		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
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Plot 7-54. Band Edge Plot SISO ANT1 (802.11n (2.4GHz) – Ch. 9)

FCC ID: A3LSMT867U	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Baga 40 of 106	
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	Spectrum An											_	
RL	RF	50 Ω	AC NFE		C :Fast ↔ n:Low			#Avg Ty	vpe: RMS	TRA T	AM Jul 15, 2019 ACE 1 2 3 4 5 6 APE M ANN N N N DET P N N N N N	F	requency
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og	1 1	∆2 #%a											Center Fre 3500000 Gi
0.00 <mark>Maji <sup>ja</sup></mark>		<u> </u>										2.44	<b>Start Fr</b> 8500000 Gi
80.0												2.51	Stop Fr 8500000 G
10.0 50.0				<sup>In</sup> ya	whithawlift	NLMN124A4	N. A. M. MARINA	ulle Lat				Auto	CF Sto 7.000000 M M
0.0								ng/aitthig.dlfhaay	hhall the although a start	nitijihilumusint	hall hall a share of the second s		Freq Offs 0
	2.48350									Span		Log	Scale Tyj <u>I</u>
Res BV	V 100 k	HZ			#VBN	/ 1.0 MHz			Sweep	2.000 ms	(2001 pts)		

Plot 7-55. Band Edge Plot SISO ANT1 (802.11n (2.4GHz) - Ch. 10)



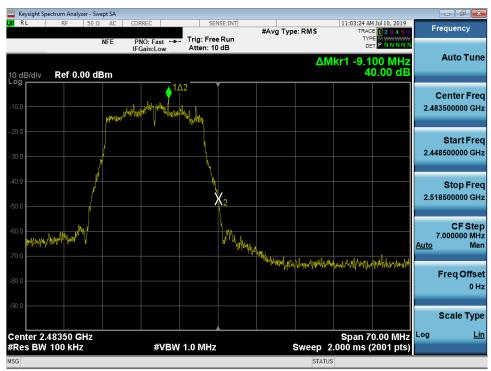
Plot 7-56. Band Edge Plot SISO ANT1 (802.11n (2.4GHz) - Ch. 11)

FCC ID: A3LSMT867U		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 50 of 106
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	pectrum Analyzer										
X/ RL	RF	50 Ω AC	CORREC		NSE:INT	#Avg Typ	e: RMS		M Jul 10, 2019 E <b>1 2 3 4 5 6</b> E M W W W	Fre	equency
10 dB/div	Ref 5.00	NFE dBm	PNO: Fast 🔸	Atten: 16			ΔMk	(r1 -11.8	65 MHz 3.20 dB		Auto Tun
-5.00	p.p.	had some hard									enter Fre 500000 GH
-15.0				ų.						2.448	Start Fre
-35.0	, f									2.518	Stop Fre
-55.0 mm/f	µ <sup>µµ</sup> <sup>µ</sup> ₩₩			- Josh - Josh		Multively used as a	Col duna	Hand L. L. on .	an hu dau a	7. <u>Auto</u>	CF Ste 000000 M⊦ Ma
-75.0						a la Modela de la	*\w\*\ <sub>*</sub> \*\*	aller Provinsky New	(#104_044p4)(*147*3)	F	req Offse 0 H
-85.0											Scale Typ
	2.48350 GH V 100 kHz	z	#VBW	1.0 MHz			Sweep 2	Span 7 .000 m <u>s (</u>	0.00 MHz 2001 pts)	Log	Li
/ISG							STATUS				

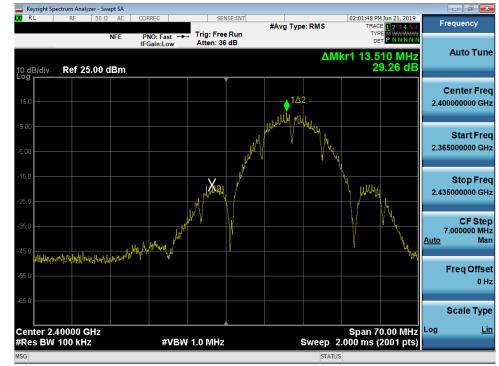
Plot 7-57. Band Edge Plot SISO ANT1 (802.11n (2.4GHz) - Ch. 12)



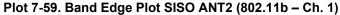
Plot 7-58. Band Edge Plot SISO ANT1 (802.11n (2.4GHz) - Ch. 13)

FCC ID: A3LSMT867U		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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#### SISO Antenna-2 Conducted Emissions at the Band Edge





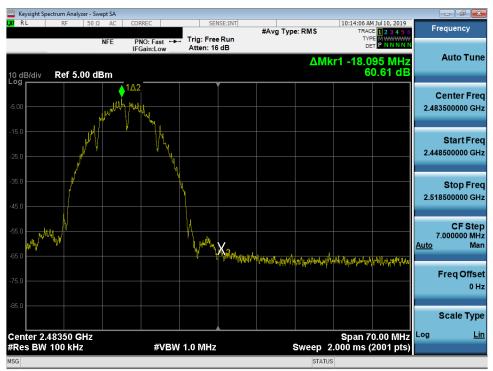
Plot 7-60. Band Edge Plot SISO ANT2 (802.11b - Ch. 10)

FCC ID: A3LSMT867U		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
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Plot 7-61. Band Edge Plot SISO ANT2 (802.11b - Ch. 11)



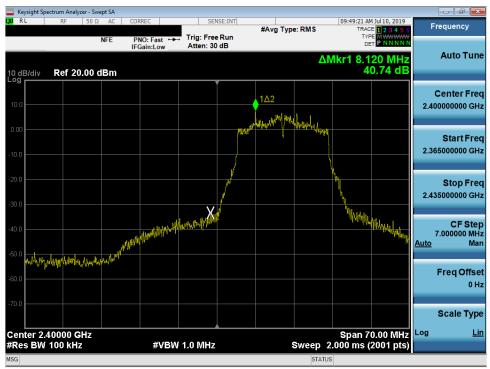
Plot 7-62. Band Edge Plot SISO ANT2 (802.11b - Ch. 12)

FCC ID: A3LSMT867U		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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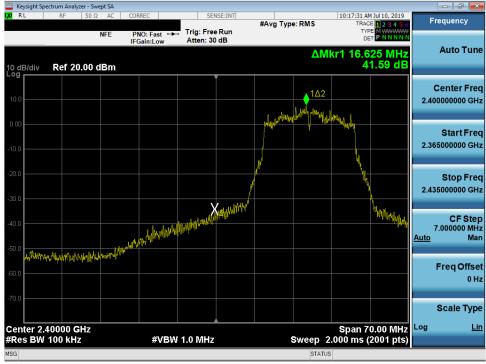
Plot 7-63. Band Edge Plot SISO ANT2 (802.11b - Ch. 13)



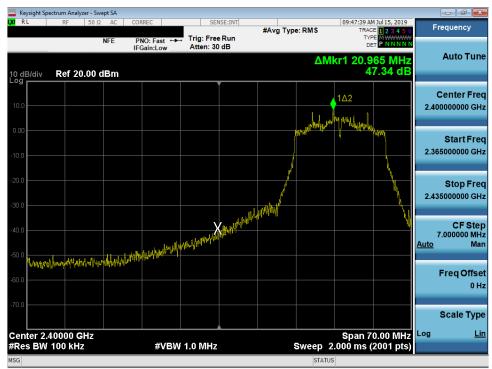
Plot 7-64. Band Edge Plot SISO ANT2 (802.11g- Ch. 1)

FCC ID: A3LSMT867U		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Plot 7-65. Band Edge Plot SISO ANT2 (802.11g- Ch. 2)



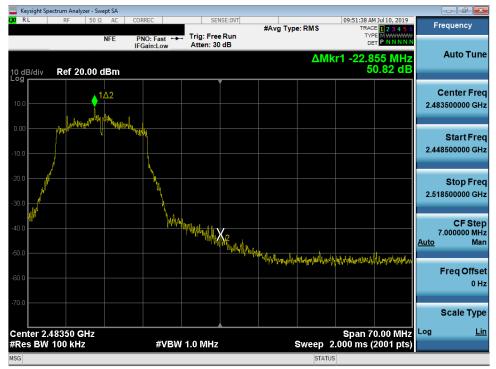
Plot 7-66. Band Edge Plot SISO ANT2 (802.11g- Ch. 3)

FCC ID: A3LSMT867U		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage FE of 106
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Plot 7-68. Band Edge Plot SISO ANT2 (802.11g - Ch. 11)

FCC ID: A3LSMT867U		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Deep EC of 100
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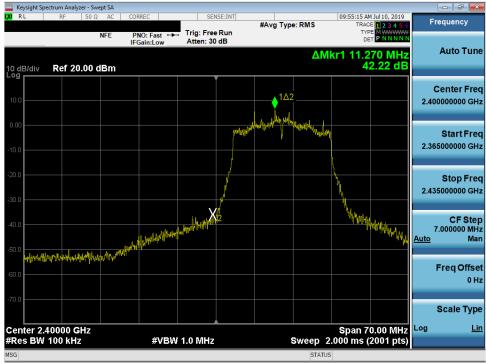
Plot 7-69. Band Edge Plot SISO ANT2 (802.11g - Ch. 12)



Plot 7-70. Band Edge Plot SISO ANT2 (802.11g - Ch. 13)

FCC ID: A3LSMT867U		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dere EZ ef 100
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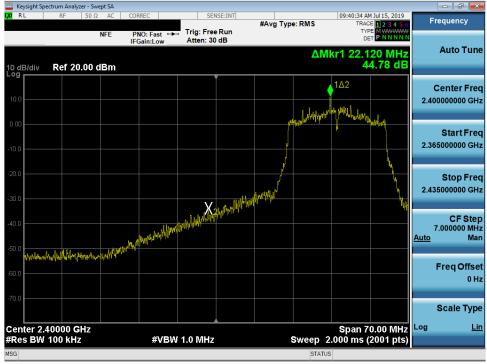
Plot 7-71. Band Edge Plot SISO ANT2 (802.11n (2.4GHz) - Ch. 1)



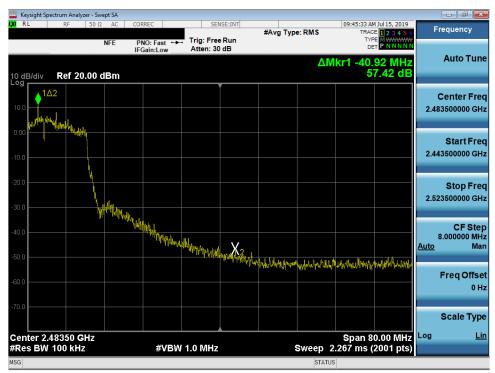
Plot 7-72. Band Edge Plot SISO ANT2 (802.11n (2.4GHz) – Ch. 2)

FCC ID: A3LSMT867U		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Plot 7-73. Band Edge Plot SISO ANT2 (802.11n (2.4GHz) - Ch. 3)



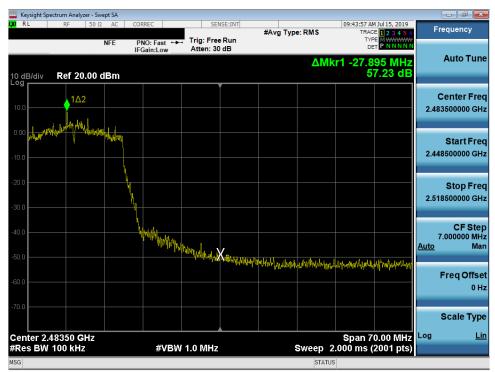
Plot 7-74. Band Edge Plot SISO ANT2 (802.11n (2.4GHz) - Ch. 8)

FCC ID: A3LSMT867U		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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		-		1100000000000000



	Spectrum Analyz												
RL	RF	50 Ω	AC	PNO: F	ast ↔			#Avg Ty	pe: RMS	TRA	M Jul 15, 2019 DE <b>1 2 3 4 5</b> 6 PE M <del>WWWWW</del> ET <b>P N N N N N</b>	Fi	requency
0 dB/div	Ref 20.	.00 d	Bm	IF Galli.	LOW	7.4.61.1.0			ΔM	kr1 -27.3 5	335 MHz 4.09 dB		Auto Tur
og	12 hrilat n.l	\2											Center Fre 3500000 Gi
0.00 <b></b>												2.44	Start Fre 8500000 GI
80.0		Å	( 									2.51	Stop Fr 8500000 G
0.0			Hillinga Millinga	WIII WAA	MANA MA	hallen and	X211A ur	n				Auto	CF Sto 7.000000 M M
0.0							1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	washutani <sub>k</sub> a (k		whether that Nut	nt of the second se		Freq Offs 0
	2.48350 GI	47								Spop 7	0.00 MHz		Scale Tyj L
	2.48350 GI N 100 kHz				#VBW	1.0 MHz			Sweep	2.000 ms	(2001 pts)	9	
G									STATU	JS			

Plot 7-75. Band Edge Plot SISO ANT2 (802.11n (2.4GHz) - Ch. 9)



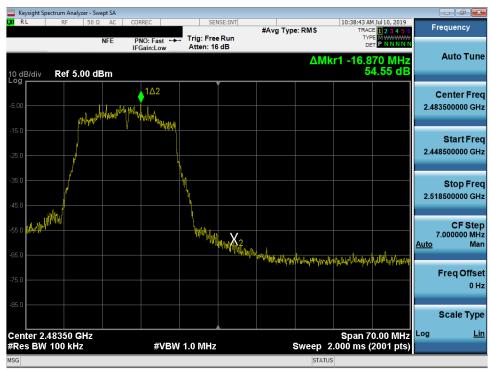
Plot 7-76. Band Edge Plot SISO ANT2 (802.11n (2.4GHz) - Ch. 10)

FCC ID: A3LSMT867U		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Keysight Spectrum Analyzer - Swe	pt SA				
🗙 RL RF 50 Ω	AC CORREC	SENSE:INT	#Avg Type: RMS	09:56:48 AM Jul 10, 2019 TRACE 1 2 3 4 5 6 TYPE M MAAMAAAAA	Frequency
10 dB/div Ref 20.00 d	NFE PNO: Fast +++ IFGain:Low	Atten: 30 dB	ΔΜ	r1 -20.615 MHz 52.37 dB	Auto Tune
10.0	- 1 <u>A2</u>				Center Fred 2.483500000 GH:
0.00	"" " " Hadwell have				Start Free 2.448500000 GH
-20.0					Stop Free 2.518500000 GH
-40.0 <b>///</b>	W.	hill walal water water	Mirelanau Jahonsi upuhri belani udik		CF Stej 7.000000 MH <u>Auto</u> Ma
-60.0			an alalasi ta diska t	a de la contra de la	Freq Offse 0 H
Center 2.48350 GHz					Scale Type Log <u>Lir</u>
#Res BW 100 kHz	#VBW	1.0 MHz	Sweep 2	.000 ms (2001 pts)	

Plot 7-77. Band Edge Plot SISO ANT2 (802.11n (2.4GHz) - Ch. 11)



Plot 7-78. Band Edge Plot SISO ANT2 (802.11n (2.4GHz) - Ch. 12)

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	pectrum Analyzer	- Swept	t SA										
XI RL	RF		AC FE	CORREC PNO: F	ast ↔			#Avg Typ	e: RMS	TRA	M Jul 10, 2019 CE 1 2 3 4 5 6 PE M ET P NNNN	Fr	equency
10 dB/div	Ref 0.00	dBr	n	I Guill					ΔN	1kr1 -12.8 4	345 MHz 15.44 dB		Auto Tune
-10.0			vigne MP	1 Mart 1		Maluntun M							Center Fred 3500000 GH
-20.0		1										2.44	Start Free 8500000 GH
-40.0							< <mark>2</mark>					2.51	Stop Free 8500000 GH
-60.0 <b>WMW</b>	hand the state of						WHAT WAR	N <sub>MALL</sub>				7 <u>Auto</u>	CF Ste 000000 MH Ma
80.0									holle, hirarb	Yf freddoningddyneg	4		Freq Offse 0 H
	48350 GH	z								Span 7	70.00 MHz	Log	Scale Typ <u>Li</u>
#Res BW	100 kHz				#VBW	1.0 MHz			Sweep	2.000 ms	(2001 pts)		

Plot 7-79. Band Edge Plot SISO ANT2 (802.11n (2.4GHz) - Ch. 13)

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#### 7.6 Conducted Spurious Emissions §15.247(d); RSS-247 [5.5]

#### **Test Overview and Limit**

All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. For the following out of band conducted spurious emissions plots, the EUT was investigated in all available data rates for "b", "g", "n", "ax" modes. The worst case spurious emissions for the 2.4GHz band were found while transmitting in "b" mode at 1 Mbps and are shown in the plots below.

The limit for out-of-band spurious emissions at the band edge is 20dB below the fundamental emission level, as determined from the in-band power measurement of the DTS channel performed in a 100kHz bandwidth per the procedure in Section 11.1 of ANSI C63.10-2013 and KDB 558074 D01 v05r02.

#### Test Procedure Used

ANSI C63.10-2013 – Section 11.11.3 KDB 558074 D01 v05r02 – Section 8.5 ANSI C63.10-2013 – Section 14.3.3 KDB 662911 D01 v02r01 – Section E)3)b)

#### **Test Settings**

- 1. Start frequency was set to 30MHz and stop frequency was set to 25GHz (separated into two plots per channel)
- 2. RBW = 1MHz
- 3. VBW = 3MHz
- 4. Detector = Peak
- 5. Trace mode = max hold
- 6. Sweep time = auto couple
- 7. The trace was allowed to stabilize

#### Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.



Figure 7-5. Test Instrument & Measurement Setup

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#### Test Notes

- 1. RBW was set to 1MHz rather than 100kHz in order to increase the measurement speed.
- 2. The display line shown in the following plots denotes the limit at 20dB below the fundamental emission level measured in a 100kHz bandwidth. However, since the traces in the following plots are measured with a 1MHz RBW, the display line may not necessarily appear to be 20dB below the level of the fundamental in a 1MHz bandwidth.
- 3. For plots showing conducted spurious emissions near the limit, the frequencies were investigated with a reduced RBW to ensure that no emissions were present.
- 4. The conducted spurious emissions were measured to relative limits. Therefore, in accordance with ANSI C63.10-2013 and KDB 662911 D01 v02r01 Section E)3)b), it was unnecessary to show compliance through the summation of test results of the individual outputs.

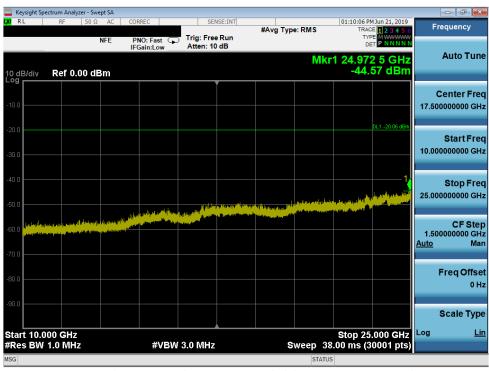
FCC ID: A3LSMT867U		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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#### Keysight Spectrum Analyzer - Swept SA - - - - - X 01:09:45 PM Jun 21, 2019 TRACE 1 2 3 4 5 6 TYPE DET P N N N N Frequency #Avg Type: RMS Trig: Free Run Atten: 36 dB NFF PNO: Fast IFGain:Low Auto Tune Mkr1 3.273 2 GHz -29.42 dBm Ref 25.00 dBm 10 dB/div **Center Freq** 5.015000000 GHz Start Freq 30.000000 MHz Stop Freq 10.00000000 GHz 1 CF Step 997.000000 MHz Man <u>Auto</u> **Freq Offset** 0 Hz Scale Type Start 30 MHz #Res BW 1.0 MHz Stop 10.000 GHz Sweep 18.00 ms (30001 pts) Log Lin #VBW 3.0 MHz sc 😳 Points changed; all traces cleared

## SISO Antenna-1 Conducted Spurious Emission

Plot 7-80. Conducted Spurious Plot SISO ANT1 (802.11b - Ch. 1)



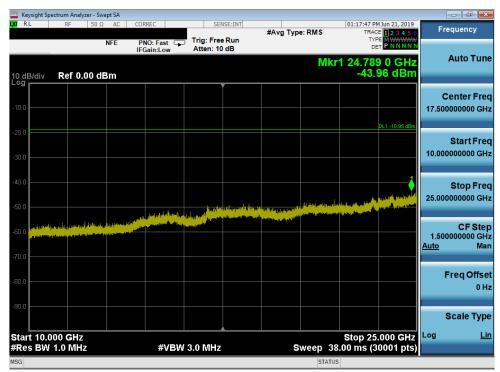
#### Plot 7-81. Conducted Spurious Plot SISO ANT1 (802.11b – Ch. 1)

FCC ID: A3LSMT867U		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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	pectrum Analy											- 6 ×
L <mark>XI</mark> RL	RF	50 Ω AC		RREC		NSE:INT	#Avg Typ	e: RMS	TR	PM Jun 21, 2019 ACE 1 2 3 4 5 6 YPE M WWWWW	Fre	equency
10 dB/div	Ref 25	NFE	IF	NO: Fast ( Gain:Low	Atten: 36				Mkr1 6.62	22 8 GHz 33 dBm		Auto Tune
15.0												enter Freq 000000 GHz
-5.00											30.	Start Freq 000000 MHz
-15.0							1-			DL1 -18.95 dBm	10.000	Stop Freq
-35.0											997. <u>Auto</u>	CF Step 000000 MHz Man
-55.0											F	Freq Offset 0 Hz
Start 30 I	MHz								Stop 1	0.000 GHz		Scale Type <u>Lin</u>
#Res BW	1.0 MHz				W 3.0 MHz		S	weep	18.00 ms (	30001 pts)		
мsg 🔱 Poir	nts change	d; all trace	es clear	ed				ST/	ATUS			

Plot 7-82. Conducted Spurious Plot SISO ANT1 (802.11b - Ch. 6)



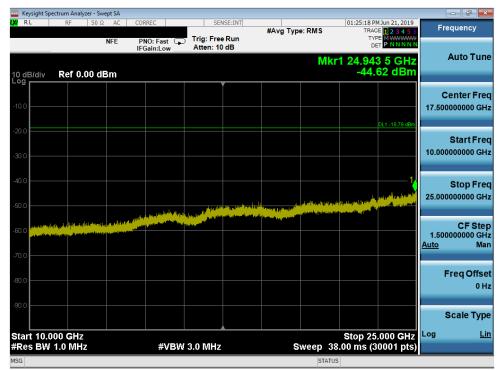
Plot 7-83. Conducted Spurious Plot SISO ANT1 (802.11b - Ch. 6)

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O GOLO DOTEOTE :				



	ctrum Analyzer - Sw									
X/RL	RF 50 Ω	NFE	CORREC	Trig: Free		#Avg Typ	e: RMS	TR/	PM Jun 21, 2019 ACE 1 2 3 4 5 6 APE M WWWWWW DET P N N N N N	Frequency
10 dB/div	Ref 25.00	dBm	IFGain:Low	Atten: 36	6 dB		N	lkr1 3.59	4 6 GHz .33 dBm	Auto Tun
15.0										Center Fre 5.015000000 GH
5.00										Start Fre 30.000000 MH
25.0			1-						DL1 -18.79 dBm	Stop Fre 10.000000000 GH
35.0 adapted hyper	paldipalitins are see			dagi yana ba La Dalah Tang mang saraha ani		all opticities publications all upon costs all care of the	anderligen Alfred Million de Leon	a charal Millinghama	an allen an	CF Ste 997.000000 Mi <u>Auto</u> Ma
55.0										Freq Offs 0 I
65.0										Scale Typ
Start 30 M Res BW			#VBW	/ 3.0 MHz		S	weep	Stop 1 18.00 ms (	0.000 GHz 30001 pts)	Log <u>L</u>
ISG							STAT	rus		

Plot 7-84. Conducted Spurious Plot SISO ANT1 (802.11b - Ch. 11)



Plot 7-85. Conducted Spurious Plot SISO ANT1 (802.11b - Ch. 11)

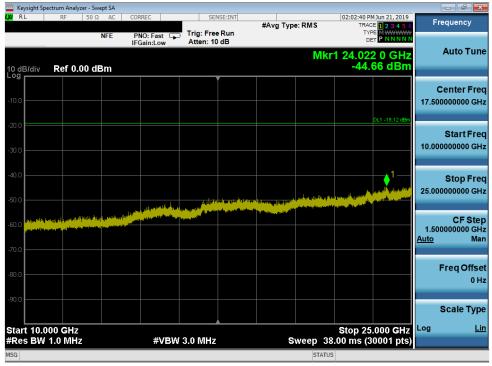
FCC ID: A3LSMT867U		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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#### Keysight Spectrum Analyzer - Swept SA RL RF 50 Ω AC SENSE:INT 02:02:19 PM Jun 21, 2019 Frequency #Avg Type: RMS TRACE Trig: Free Run Atten: 36 dB TYPE DET NFE PNO: Fast IFGain:Low Auto Tune Mkr1 3.107 4 GHz -30.27 dBm Ref 25.00 dBm 0 dB/div Center Freq 5.015000000 GHz Start Fred 30.000000 MHz Stop Freq 10.00000000 GHz CF Step 997.000000 MHz <u>Auto</u> Man **Freq Offset** 0 Hz Scale Type Start 30 MHz #Res BW 1.0 MHz Stop 10.000 GHz Log <u>Lin</u> #VBW 3.0 MHz Sweep 18.00 ms (30001 pts) ISG 🔱 Points changed; all traces cleared

## SISO Antenna-2 Conducted Spurious Emissions

Plot 7-86. Conducted Spurious Plot SISO ANT2 (802.11b - Ch. 1)



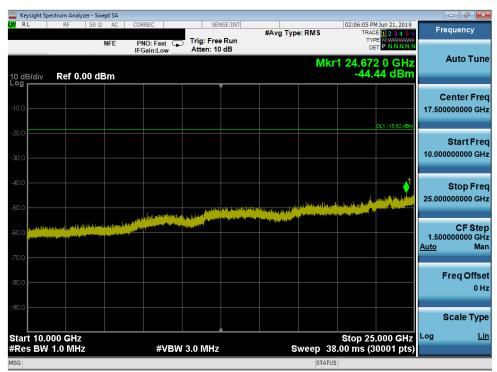
Plot 7-87. Conducted Spurious Plot SISO ANT2 (802.11b - Ch. 1)

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	pectrum Analy											d x
X/RL	RF			ORREC		NSE:INT	#Avg Ty	e: RMS		4 PM Jun 21, 2019 RACE 1 2 3 4 5 6 TYPE MWWWW	Frequ	ency
		NF	IF	PNO: Fast ⊂ Gain:Low	Atten: 36	dB			Mkr1 3.2	247 7 GHz	Au	ito Tun
10 dB/div <sup>Log</sup> r	Ref 2	5.00 dB	m			<b>Y</b>			-3	0.91 dBm		
15.0											Cen 5.01500	ter Fre 0000 GH
5.00												art Fre 0000 M⊦
-15.0										DL1 -18.52 dBm	S1 10.00000	top Fre
-25.0			and some of		الما ماندانين باندر براماند	and the second	salar (yyyatragool yatal) baro	el Miragarett	and the sound of the second	in synthesides.		CF Ste
45.0			ر <del>ان</del> خاصاً الد <sub>ري</sub>				neith is a sin i de sa lles, dith ( ) sa bh				997.00 <u>Auto</u>	0000 MI Ma
55.0											Fre	q Offs 0 I
65.0												ale Typ
Start 30 #Res BW	MHz / 1.0 MH	z		#VB	N 3.0 MHz			Sweep	Stop 18.00 ms	10.000 GHz (30001 pts)	Log	Li
ISG								ST	ATUS			

Plot 7-88. Conducted Spurious Plot SISO ANT2 (802.11b - Ch. 6)



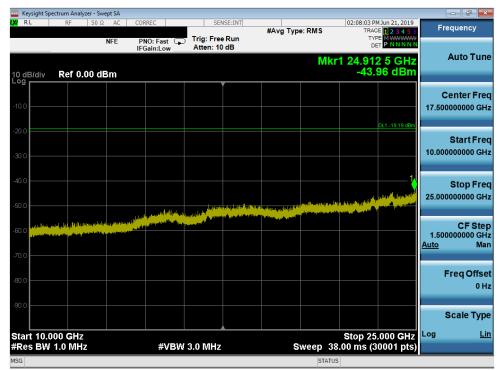
Plot 7-89. Conducted Spurious Plot SISO ANT2 (802.11b - Ch. 6)

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Keysight Spectrum Analyzer						- # ×
🗶 RL RF S	NFE		SENSE:INT	#Avg Type: RMS	02:07:42 PM Jun 21, 2019 TRACE 1 2 3 4 5 6 TYPE MWWWW DET P NNNNN	Frequency
10 dB/div Ref 25.0		IFGain:Low	Atten: 36 dB		Mkr1 6.601 9 GHz -30.91 dBm	Auto Tune
15.0						Center Free 5.015000000 GH
-5.00						Start Fre 30.000000 MH
-15.0				1	DL1 -19.19 dBm	Stop Fre 10.000000000 GH
-35.0		periodical des des superiodicas en presidentes de la compania de la compania de la compania de la compania de l Companya de la companya de la company Companya de la companya de la company		n (Leastan page (Stage ta callege project) The barry and place of the stage project	felder og fransensken sok og provinsjon for det sok nære sok for en sok og sok nære sok og s	CF Ste 997.000000 MH <u>Auto</u> Ma
55.0						Freq Offse 0 F
-65.0						Scale Typ
Start 30 MHz #Res BW 1.0 MHz		#VBW 3	.0 MHz	Sweep	Stop 10.000 GHz 18.00 ms (30001 pts)	Log <u>Li</u>
MSG				S	TATUS	

Plot 7-90. Conducted Spurious Plot SISO ANT2 (802.11b - Ch. 11)



Plot 7-91. Conducted Spurious Plot SISO ANT2 (802.11b - Ch. 11)

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#### 7.7 Radiated Spurious Emission Measurements – Above 1 GHz §15.247(d) §15.205 & §15.209; RSS-Gen [8.9]

#### Test Overview and Limit

All out of band radiated spurious emissions are measured with a spectrum analyzer connected to a receive antenna while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates and modes were investigated for radiated spurious emissions. Only the radiated emissions of the configuration that produced the worst case emissions are reported in this section.

# All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR and Table 6 of RSS-Gen (8.10) must not exceed the limits shown in Table 7-11 per Section 15.209 and RSS-Gen (8.9).

Frequency	Field Strength [μV/m]	Measured Distance [Meters]				
Above 960.0 MHz	500	3				
Table 7.44 Dadiated Limits						

Table 7-11. Radiated Limits

#### Test Procedures Used

ANSI C63.10-2013 – Section 6.6.4.3 KDB 558074 D01 v05r02 – Sections 8.6, 8.7

#### **Test Settings**

#### Average Field Strength Measurements

- 1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
- 2. RBW = 1MHz
- 3. VBW = 3MHz
- 4. Detector = power average (RMS)
- 5. Number of measurement points = 1001 (Number of points must be  $\geq$  2 x span/RBW)
- 6. Sweep time = auto
- 7. Trace (RMS) averaging was performed over at least 100 traces

#### Peak Field Strength Measurements

- 1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
- 2. RBW = 1MHz
- 3. VBW = 3MHz
- 4. Detector = peak
- 5. Sweep time = auto couple
- 6. Trace mode = max hold
- 7. Trace was allowed to stabilize

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#### Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

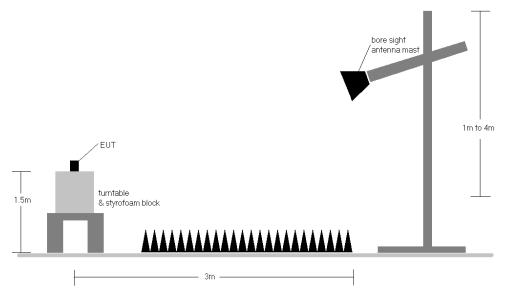


Figure 7-6. Test Instrument & Measurement Setup

#### Test Notes

- The optional test procedures for antenna port conducted measurements of unwanted emissions per the guidance of KDB 558074 D01 v05r02 were not used to evaluate this device for compliance to radiated limits. All radiated spurious emissions levels were measured in a radiated test setup.
- 2. All emissions lying in restricted bands specified in Section 15.205 and Section 8.10 of RSS-Gen are below the limit shown in Table 7-11.
- 3. The antenna is manipulated through typical positions, polarity and length during the tests. The EUT is manipulated through three orthogonal planes.
- 4. This unit was tested with its standard battery.
- 5. The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter using CISPR quasi peak detector below 1GHz. Above 1 GHz, average and peak measurements were taken using linearly polarized horn antennas. The worst-case emissions are reported however emissions whose levels were not within 20dB of the respective limits were not reported.
- 6. Emissions below 18GHz were measured at a 3 meter test distance while emissions above 18GHz were measured at a 1 meter test distance with the application of a distance correction factor.
- 7. Radiated spurious emissions were investigated while operating in MIMO mode, however, it was determined that single antenna operation produced the worst case emissions. Since the emissions

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produced from MIMO operation were found to be more than 20dB below the limit, the MIMO emissions are not reported.

- 8. The wide spectrum spurious emissions plots shown on the following pages are used only for the purpose of emission identification. Any emissions found to be within 20dB of the limit are fully investigated and the results are shown in this section.
- 9. The "-" shown in the following RSE tables are used to denote a noise floor measurement.

#### **Sample Calculations**

#### **Determining Spurious Emissions Levels**

- ο Field Strength Level [dB<sub>μ</sub>V/m] = Analyzer Level [dBm] + 107 + AFCL [dB/m]
- o AFCL [dB/m] = Antenna Factor [dB/m] + Cable Loss [dB]
- ο Margin [dB] = Field Strength Level [dBμV/m] Limit [dBμV/m]

#### Radiated Band Edge Measurement Offset

• The amplitude offset shown in the radiated restricted band edge plots in Section 7.7 was calculated using the formula:

Offset (dB) = (Antenna Factor + Cable Loss + Attenuator) – Preamplifier Gain

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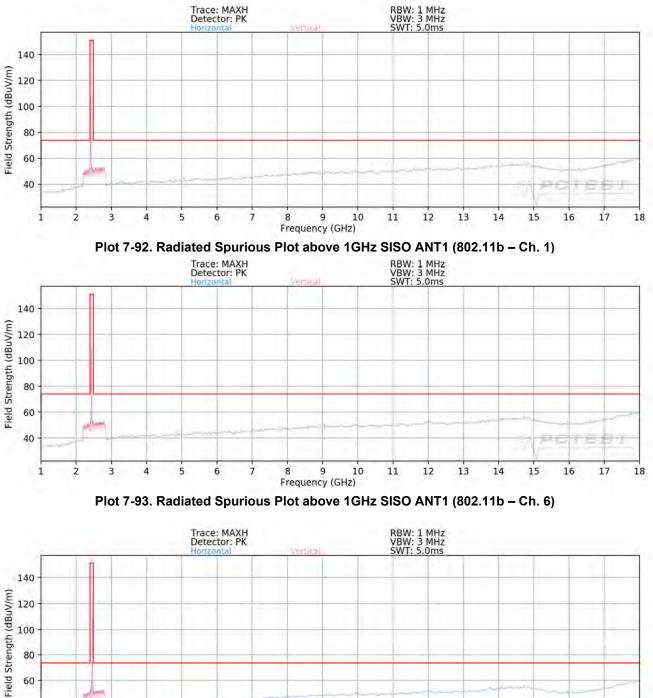
6

7

EUT Type:

Portable Tablet

8



# 7.7.1 SISO Antenna-1 Radiated Spurious Emission Measurements §15.247(d) §15.205 & §15.209; RSS-Gen [8.9]

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9

MEASUREMENT REPORT

(CERTIFICATION)

Frequency (GHz) Plot 7-94. Radiated Spurious Plot above 1GHz SISO ANT1 (802.11b - Ch. 11)

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Quality Manager

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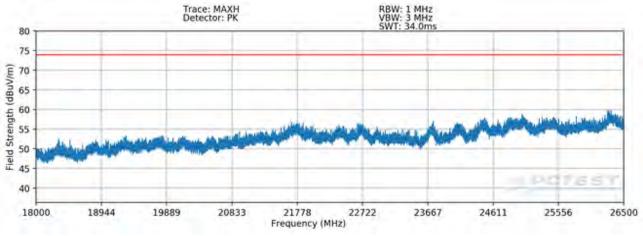
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# SISO Antenna-1 Radiated Spurious Emissions Measurements (Above 18GHz) §15.209; RSS-Gen [8.9]



Plot 7-95. Radiated Spurious Plot above 18GHz SISO ANT1

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# SISO Antenna-1 Radiated Spurious Emission Measurements §15.247(d) §15.205 & §15.209; RSS-Gen [8.9]

Worst Case Mode:	802.11b
Worst Case Transfer Rate:	1 Mbps
Distance of Measurements:	3 Meters
Operating Frequency:	2412MHz
Channel:	01

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
4824.00	Avg	Н	114	288	-71.21	7.06	42.85	53.98	-11.13
4824.00	Peak	Н	114	288	-64.77	7.06	49.29	73.98	-24.69
12060.00	Avg	Н	-	-	-81.23	17.99	43.76	53.98	-10.22
12060.00	Peak	Н	-	-	-69.88	17.99	55.11	73.98	-18.87

Table 7-12. Radiated Measurements SISO ANT1

Worst Case Mode: Worst Case Transfer Rate: Distance of Measurements: Operating Frequency: Channel:

802.11b	
1 Mbps	
3 Meters	
2437MHz	
06	

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
4874.00	Avg	Н	111	287	-72.50	7.46	41.96	53.98	-12.02
4874.00	Peak	Н	111	287	-64.52	7.46	49.94	73.98	-24.04
7311.00	Avg	н	-	-	-80.10	12.07	38.97	53.98	-15.01
7311.00	Peak	н	-	-	-68.41	12.07	50.66	73.98	-23.32
12185.00	Avg	Н	-	-	-81.35	18.70	44.35	53.98	-9.63
12185.00	Peak	H	-	-	-69.82	18.70	55.88	73.98	-18.10

Table 7-13. Radiated Measurements SISO ANT1

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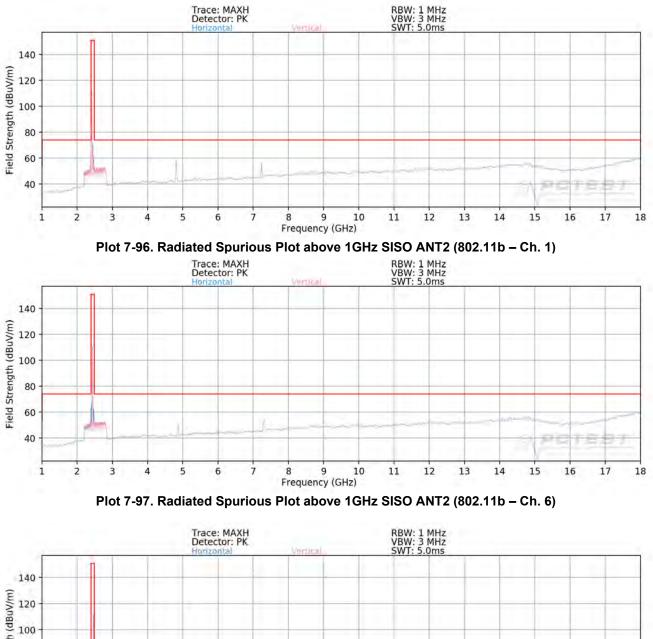
Worst Case Mode:	802.11b
Worst Case Transfer Rate:	1 Mbps
Distance of Measurements:	3 Meters
Operating Frequency:	2462MHz
Channel:	11

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
4924.00	Avg	Н	114	298	-70.49	7.08	43.59	53.98	-10.39
4924.00	Peak	Н	114	298	-62.54	7.08	51.54	73.98	-22.44
7386.00	Avg	Н	-	-	-78.03	11.90	40.87	53.98	-13.11
7386.00	Peak	Н	-	-	-67.80	11.90	51.10	73.98	-22.88
12310.00	Avg	Н	-	-	-81.17	18.75	44.58	53.98	-9.40
12310.00	Peak	Н	-	-	-70.13	18.75	55.62	73.98	-18.36

Table 7-14. Radiated Measurements SISO ANT1

FCC ID: A3LSMT867U	PCTEST.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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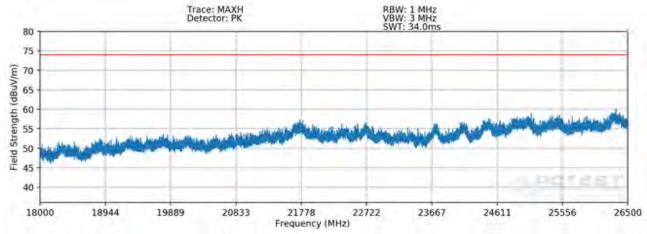


# 7.7.2 SISO Antenna-2 Radiated Spurious Emission Measurements §15.247(d) §15.205 & §15.209; RSS-Gen [8.9]

Field Strength (dBuV/m) -PCTEST Frequency (GHz) Plot 7-98. Radiated Spurious Plot above 1GHz SISO ANT2 (802.11b - Ch. 11)

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# SISO Antenna-2 Radiated Spurious Emissions Measurements (Above 18GHz) §15.209; RSS-Gen [8.9]



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# SISO Antenna-2 Radiated Spurious Emission Measurements §15.247(d) §15.205 & §15.209; RSS-Gen [8.9]

Worst Case Mode:	802.11b
Worst Case Transfer Rate:	1 Mbps
Distance of Measurements:	3 Meters
Operating Frequency:	2412MHz
Channel:	01

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
4824.00	Avg	Н	182	251	-68.41	7.06	45.65	53.98	-8.33
4824.00	Peak	Н	182	251	-61.66	7.06	52.40	73.98	-21.58
12060.00	Avg	Н	-	-	-81.13	17.99	43.86	53.98	-10.12
12060.00	Peak	Н	-	-	-70.20	17.99	54.79	73.98	-19.19

Table 7-15. Radiated Measurements SISO ANT2

Worst Case Mode: Worst Case Transfer Rate: Distance of Measurements: Operating Frequency: Channel: 802.11b 1 Mbps 3 Meters 2437MHz 06

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
4874.00	Avg	Н	184	244	-68.53	7.46	45.93	53.98	-8.05
4874.00	Peak	Н	184	244	-65.25	7.46	49.21	73.98	-24.77
7311.00	Avg	Н	117	283	-71.82	12.07	47.25	53.98	-6.73
7311.00	Peak	Н	117	283	-65.96	12.07	53.11	73.98	-20.87
12185.00	Avg	Н	-	-	-81.42	18.70	44.28	53.98	-9.70
12185.00	Peak	Н	-	-	-70.51	18.70	55.19	73.98	-18.79

Table 7-16. Radiated Measurements SISO ANT2

FCC ID: A3LSMT867U		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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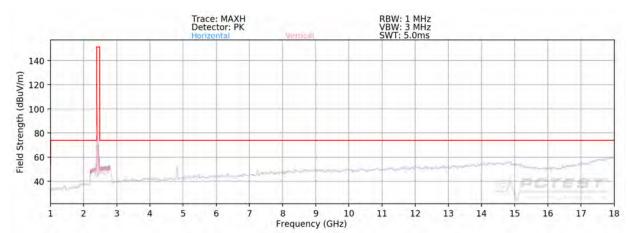
Worst Case Mode:	802.11b
Worst Case Transfer Rate:	1 Mbps
Distance of Measurements:	3 Meters
Operating Frequency:	2462MHz
Channel:	11

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
4924.00	Avg	Н	214	243	-69.25	7.08	44.83	53.98	-9.15
4924.00	Peak	Н	214	243	-67.27	7.08	46.81	73.98	-27.17
7386.00	Avg	Н	112	284	-71.28	11.90	47.62	53.98	-6.36
7386.00	Peak	Н	112	284	-65.35	11.90	53.55	73.98	-20.43
12310.00	Avg	Н	-	-	-81.34	18.75	44.41	53.98	-9.57
12310.00	Peak	Н	-	-	-70.75	18.75	55.00	73.98	-18.98

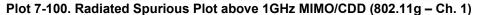
Table 7-17. Radiated Measurements SISO ANT2

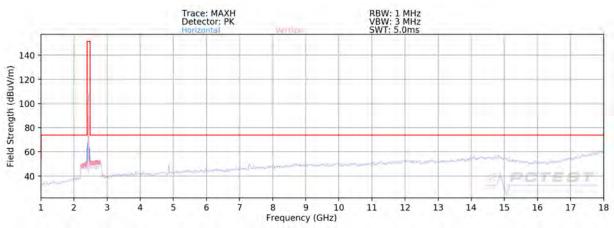
FCC ID: A3LSMT867U		MEASUREMENT REPORT (CERTIFICATION)	SUNG	Approved by: Quality Manager
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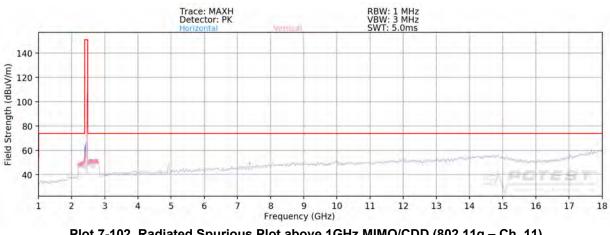


# 7.7.3 MIMO/CDD Radiated Spurious Emission Measurements §15.247(d) §15.205 & §15.209; RSS-Gen [8.9]





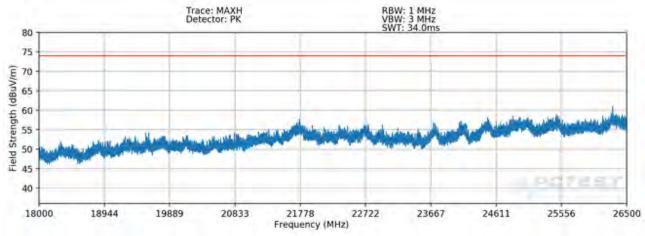






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# MIMO/CDD Radiated Spurious Emissions Measurements (Above 18GHz) §15.209; RSS-Gen [8.9]



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## MIMO Radiated Spurious Emission Measurements §15.247(d) §15.205 & §15.209; RSS-Gen [8.9]

Worst Case Mode:	802.11g
Worst Case Transfer Rate:	6 Mbps
Distance of Measurements:	3 Meters
Operating Frequency:	2412MHz
Channel:	01

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
4824.00	Avg	н	201	245	-66.38	7.06	47.68	53.98	-6.30
4824.00	Peak	Н	201	245	-52.02	7.06	62.04	73.98	-11.94
12060.00	Avg	н	-	-	-85.22	17.99	39.77	53.98	-14.21
12060.00	Peak	н	-	-	-72.53	17.99	52.46	73.98	-21.52

# Table 7-18. Radiated Measurements MIMO

Worst Case Mode:	802.11g
Worst Case Transfer Rate:	6 Mbps
Distance of Measurements:	3 Meters
Operating Frequency:	2437MHz
Channel:	06

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
4874.00	Avg	Н	179	243	-72.17	7.46	42.29	53.98	-11.69
4874.00	Peak	н	179	243	-57.13	7.46	57.33	73.98	-16.65
7311.00	Avg	н	113	285	-72.61	12.07	46.46	53.98	-7.52
7311.00	Peak	н	113	285	-57.06	12.07	62.01	73.98	-11.97
12185.00	Avg	Н	-	-	-85.42	18.70	40.28	53.98	-13.70
12185.00	Peak	Н	-	-	-71.90	18.70	53.80	73.98	-20.18

#### Table 7-19. Radiated Measurements MIMO

FCC ID: A3LSMT867U		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Worst Case Mode:	802.11g
Worst Case Transfer Rate:	6 Mbps
Distance of Measurements:	3 Meters
Operating Frequency:	2462MHz
Channel:	11

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
4924.00	Avg	Н	193	243	-67.76	7.08	46.32	53.98	-7.66
4924.00	Peak	н	193	243	-53.01	7.08	61.07	73.98	-12.91
7386.00	Avg	н	115	285	-71.46	11.90	47.44	53.98	-6.54
7386.00	Peak	н	115	285	-55.29	11.90	63.61	73.98	-10.37
12310.00	Avg	Н	-	-	-85.52	18.75	40.23	53.98	-13.75
12310.00	Peak	Н	-	-	-72.57	18.75	53.18	73.98	-20.80

Table 7-20. Radiated Measurements MIMO

FCC ID: A3LSMT867U	PCTEST.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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## 7.7.4 SISO Antenna-1 Radiated Restricted Band Edge Measurements §15.205 §15.209; RSS-Gen [8.9]

The radiated restricted band edge measurements are measured with an EMI test receiver connected to the receive antenna while the EUT is transmitting.

Worst Case Mode: Worst Case Transfer Rate: Distance of Measurements: Operating Frequency: Channel:

EUI	is dansmitting.
	802.11n
<b>:</b> :	MCS0
s:	3 Meters
	2412MHz
	1



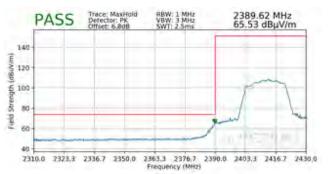
Plot 7-104. Radiated Restricted Lower Band Edge Measurement SISO ANT1 (Average)

Worst Case Mode: Worst Case Transfer Rate: Distance of Measurements: Operating Frequency: Channel:

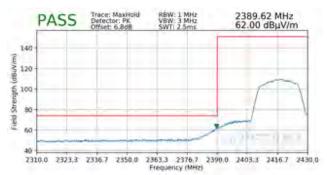
	802.11n
ate:	MCS0
ents:	3 Meters
	2417MHz
	2



Plot 7-106. Radiated Restricted Lower Band Edge Measurement SISO ANT1 (Average)



Plot 7-105. Radiated Restricted Lower Band Edge Measurement SISO ANT1 (Peak)



Plot 7-107. Radiated Restricted Lower Band Edge Measurement SISO ANT1 (Peak)

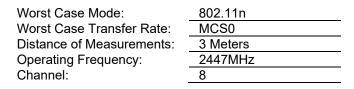
FCC ID: A3LSMT867U		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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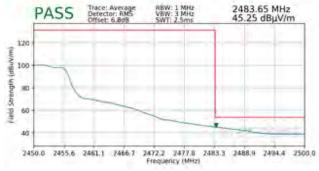


Worst Case Mode:802.11nWorst Case Transfer Rate:MCS0Distance of Measurements:3 MetersOperating Frequency:2422MHzChannel:3

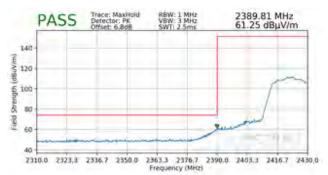


Plot 7-108. Radiated Restricted Lower Band Edge Measurement SISO ANT1 (Average)









Plot 7-109. Radiated Restricted Lower Band Edge Measurement SISO ANT1 (Peak)



Plot 7-111. Radiated Restricted Upper Band Edge Measurement SISO ANT1 (Peak)

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Worst Case Mode:802.11nWorst Case Transfer Rate:MCS0Distance of Measurements:3 MetersOperating Frequency:2452MHzChannel:9

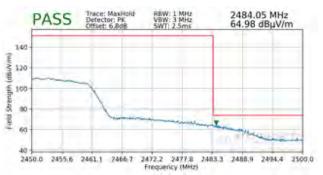


Plot 7-112. Radiated Restricted Upper Band Edge Measurement SISO ANT1 (Average)

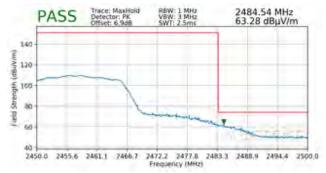
Worst Case Mode:	802.11n
Worst Case Transfer Rate:	MCS0
Distance of Measurements:	3 Meters
Operating Frequency:	2457MHz
Channel:	10



Plot 7-114. Radiated Restricted Upper Band Edge Measurement SISO ANT1 (Average)



Plot 7-113. Radiated Restricted Upper Band Edge Measurement SISO ANT1 (Peak)



Plot 7-115. Radiated Restricted Upper Band Edge Measurement SISO ANT1 (Peak)

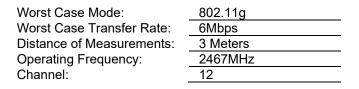
FCC ID: A3LSMT867U		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Worst Case Mode:802.11gWorst Case Transfer Rate:6MbpsDistance of Measurements:3 MetersOperating Frequency:2462MHzChannel:11



Plot 7-116. Radiated Restricted Upper Band Edge Measurement SISO ANT1 (Average)





Plot 7-118. Radiated Restricted Upper Band Edge Measurement SISO ANT1 (Average)



Plot 7-117. Radiated Restricted Upper Band Edge Measurement SISO ANT1 (Peak)



Plot 7-119. Radiated Restricted Upper Band Edge Measurement SISO ANT1 (Peak)

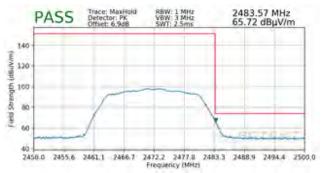
FCC ID: A3LSMT867U		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		De
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Worst Case Mode:802.11nWorst Case Transfer Rate:MCS0Distance of Measurements:3 MetersOperating Frequency:2472MHzChannel:13



Plot 7-120. Radiated Restricted Upper Band Edge Measurement SISO ANT1 (Average)



Plot 7-121. Radiated Restricted Upper Band Edge Measurement SISO ANT1 (Peak)

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# 7.7.5 SISO Antenna-2 Radiated Restricted Band Edge Measurements §15.205 §15.209; RSS-Gen [8.9]

The radiated restricted band edge measurements are measured with an EMI test receiver connected to the receive antenna while the EUT is transmitting.

Worst Case Mode:	802.11g
Worst Case Transfer Rate:	6Mbps
Distance of Measurements:	3 Meters
Operating Frequency:	2412MHz
Channel:	1

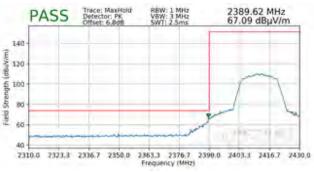


Plot 7-122. Radiated Restricted Lower Band Edge Measurement SISO ANT2 (Average)

Worst Case Mode:	802.11g
Worst Case Transfer Rate:	6Mbps
Distance of Measurements:	3 Meters
Operating Frequency:	2417MHz
Channel:	2







Plot 7-123. Radiated Restricted Lower Band Edge Measurement SISO ANT2 (Peak)

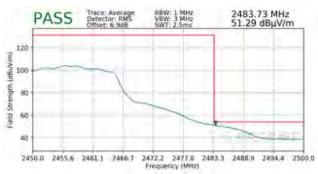


Plot 7-125. Radiated Restricted Lower Band Edge Measurement SISO ANT2 (Peak)

FCC ID: A3LSMT867U		MEASUREMENT REPORT (CERTIFICATION)	UNG	Approved by: Quality Manager
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Worst Case Mode:802.11gWorst Case Transfer Rate:6MbpsDistance of Measurements:3 MetersOperating Frequency:2457MHzChannel:10

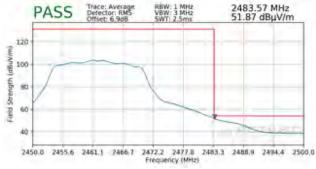


Plot 7-126. Radiated Restricted Upper Band Edge Measurement SISO ANT2 (Average)

Worst Case Mode:	802.11g
Worst Case Transfer Rate:	6Mbps
Distance of Measurements:	3 Meters
Operating Frequency:	2462MHz
Channel:	11



Plot 7-127. Radiated Restricted Upper Band Edge Measurement SISO ANT2 (Peak)



Plot 7-128. Radiated Restricted Upper Band Edge Measurement SISO ANT2 (Average)



Plot 7-129. Radiated Restricted Upper Band Edge Measurement SISO ANT2 (Peak)

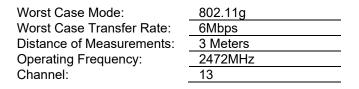
FCC ID: A3LSMT867U		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Worst Case Mode:802.11nWorst Case Transfer Rate:MCS0Distance of Measurements:3 MetersOperating Frequency:2467MHzChannel:12



Plot 7-130. Radiated Restricted Upper Band Edge Measurement SISO ANT2 (Average)

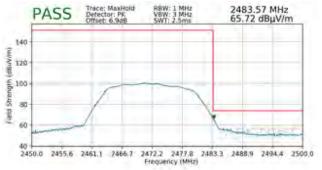




Plot 7-132. Radiated Restricted Upper Band Edge Measurement SISO ANT2 (Average)



Plot 7-131. Radiated Restricted Upper Band Edge Measurement SISO ANT2 (Peak)



Plot 7-133. Radiated Restricted Upper Band Edge Measurement SISO ANT2 (Peak)

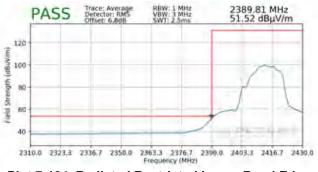
FCC ID: A3LSMT867U		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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## 7.7.6 MIMO Radiated Restricted Band Edge Measurements §15.205 §15.209; RSS-Gen [8.9]

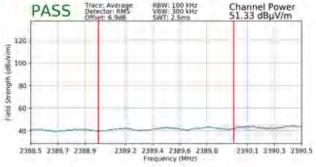
The radiated restricted band edge measurements are measured with an EMI test receiver connected to the receive antenna while the EUT is transmitting.

Worst Case Mode:	802.11n
Worst Case Transfer Rate:	MCS8
Distance of Measurements:	3 Meters
Operating Frequency:	2412MHz
Channel:	1

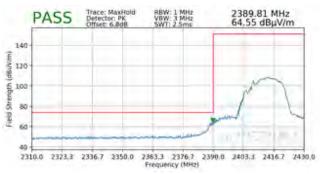


Plot 7-134. Radiated Restricted Lower Band Edge Measurement MIMO (Average)

Worst Case Mode:	802.11n
Worst Case Transfer Rate:	MCS8
Distance of Measurements:	3 Meters
Operating Frequency:	2417MHz
Channel:	2







Plot 7-135. Radiated Restricted Lower Band Edge Measurement MIMO (Peak)



Plot 7-137. Radiated Restricted Lower Band Edge Measurement MIMO (Peak)

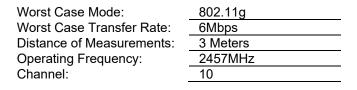
FCC ID: A3LSMT867U		MEASUREMENT REPORT (CERTIFICATION)	SUNG	Approved by: Quality Manager
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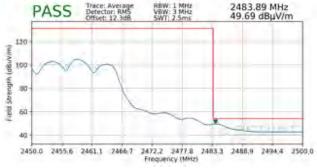


Worst Case Mode:802.11nWorst Case Transfer Rate:MCS8Distance of Measurements:3 MetersOperating Frequency:2452MHzChannel:9



Plot 7-138. Radiated Restricted Upper Band Edge Measurement MIMO (Average)





Plot 7-140. Radiated Restricted Upper Band Edge Measurement MIMO (Average)



Plot 7-139. Radiated Restricted Upper Band Edge Measurement MIMO (Peak)



Plot 7-141. Radiated Restricted Upper Band Edge Measurement MIMO (Peak)

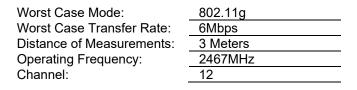
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Worst Case Mode:802.11gWorst Case Transfer Rate:6MbpsDistance of Measurements:3 MetersOperating Frequency:2462MHzChannel:11

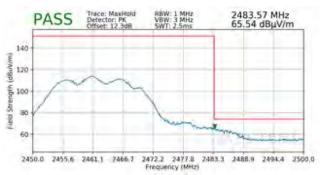


Plot 7-142. Radiated Restricted Upper Band Edge Measurement MIMO (Average)





Plot 7-144. Radiated Restricted Upper Band Edge Measurement MIMO (Average)



Plot 7-143. Radiated Restricted Upper Band Edge Measurement MIMO (Peak)



Plot 7-145. Radiated Restricted Upper Band Edge Measurement MIMO (Peak)

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Worst Case Mode:802.11gWorst Case Transfer Rate:6MbpsDistance of Measurements:3 MetersOperating Frequency:2472MHzChannel:13



Plot 7-146. Radiated Restricted Upper Band Edge Measurement MIMO (Average)



Plot 7-147. Radiated Restricted Upper Band Edge Measurement MIMO (Peak)

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## 7.8 Radiated Spurious Emissions Measurements – Below 1GHz §15.209; RSS-Gen [8.9]

#### **Test Overview and Limit**

All out of band radiated spurious emissions are measured with a spectrum analyzer connected to a receive antenna while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates and modes were investigated for radiated spurious emissions. Only the radiated emissions of the configuration that produced the worst case emissions are reported in this section.

# All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR and Table 6 of RSS-Gen (8.10) must not exceed the limits shown in Table 7-21 per Section 15.209 and RSS-Gen (8.9).

Frequency	Field Strength [µV/m]	Measured Distance [Meters]
0.009 – 0.490 MHz	2400/F (kHz)	300
0.490 – 1.705 MHz	24000/F (kHz)	30
1.705 – 30.00 MHz	30	30
30.00 – 88.00 MHz	100	3
88.00 – 216.0 MHz	150	3
216.0 – 960.0 MHz	200	3
Above 960.0 MHz	500	3

Table 7-21. Radiated Limits

#### **Test Procedures Used**

ANSI C63.10-2013

#### **Test Settings**

#### **Quasi-Peak Field Strength Measurements**

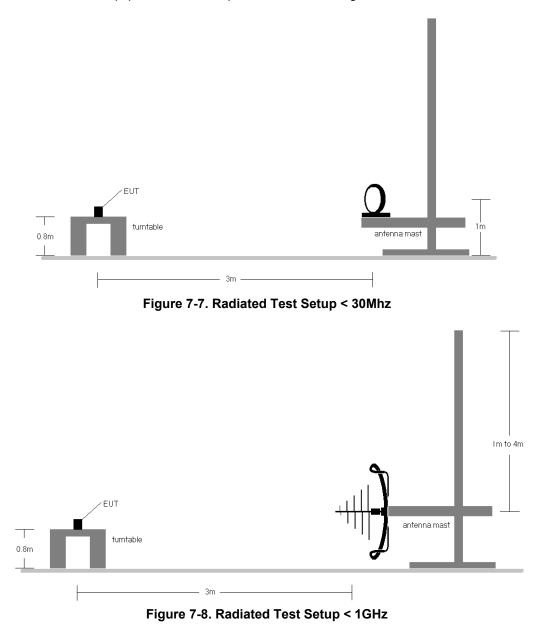
- 1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
- 2. RBW = 120kHz (for emissions from 30MHz 1GHz)
- 3. Detector = quasi-peak
- 4. Sweep time = auto couple
- 5. Trace mode = max hold
- 6. Trace was allowed to stabilize

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# <u>Test Setup</u>

The EUT and measurement equipment were set up as shown in the diagrams below.



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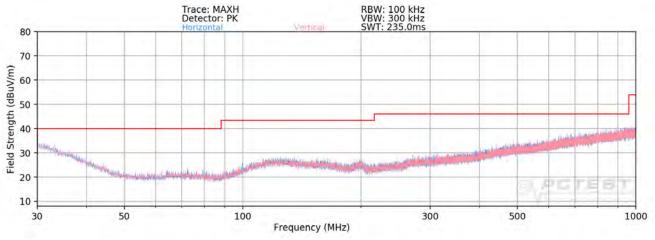
#### Test Notes

- 1. All emissions lying in restricted bands specified in §15.205 and RSS-Gen(8.10) are below the limit shown in Table 7-21.
- 2. The broadband receive antenna is manipulated through vertical and horizontal polarizations during the tests. The EUT is manipulated through three orthogonal planes.
- 3. This unit was tested with its standard battery.
- 4. The spectrum is investigated using a peak detector and final measurements are recorded using CISPR quasi peak detector. The worst-case emissions are reported however emissions whose levels were not within 20dB of the respective limits were not reported.
- 5. Emissions were measured at a 3 meter test distance.
- 6. Emissions are investigated while operating on the center channel of the mode, band, and modulation that produced the worst case results during the transmitter spurious emissions testing.
- 7. No spurious emissions were detected within 20dB of the limit below 30MHz.
- 8. The results recorded using the broadband antenna is known to correlate with the results obtained by using a tuned dipole with an acceptable degree of accuracy. The VSWR for the measurement antenna was found to be less than 2:1.
- The wide spectrum spurious emissions plots shown on the following pages are used only for the purpose of emission identification. There were no emissions detected in the 30MHz – 1GHz frequency range, as shown in the subsequent plots.

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# SISO Antenna-1 Radiated Spurious Emissions Measurements (Below 1GHz) §15.209; RSS-Gen [8.9]

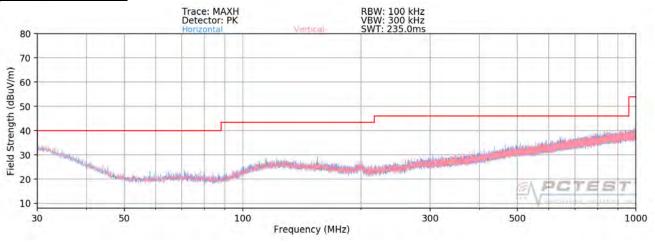




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# SISO Antenna-2 Radiated Spurious Emissions Measurements (Below 1GHz) §15.209; RSS-Gen [8.9]





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## 7.9 Line-Conducted Test Data §15.207; RSS-Gen [8.8]

#### Test Overview and Limit

All AC line conducted spurious emissions are measured with a receiver connected to a grounded LISN while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates and modes were investigated for conducted spurious emissions. Only the conducted emissions of the configuration that produced the worst case emissions are reported in this section.

# All conducted emissions must not exceed the limits shown in the table below, per Section 15.207 and RSS-Gen (8.8).

Frequency of emission	Conducted	Limit (dBµV)
(MHz)	Quasi-peak	Average
0.15 – 0.5	66 to 56*	56 to 46*
0.5 – 5	56	46
5 – 30	60	50

Table 7-22. Conducted Limits

\*Decreases with the logarithm of the frequency.

#### **Test Procedures Used**

ANSI C63.10-2013, Section 6.2

#### **Test Settings**

#### **Quasi-Peak Field Strength Measurements**

- 1. Analyzer center frequency was set to the frequency of the spurious emission of interest
- 2. RBW = 9kHz (for emissions from 150kHz 30MHz)
- 3. Detector = quasi-peak
- 4. Sweep time = auto couple
- 5. Trace mode = max hold
- 6. Trace was allowed to stabilize

#### Average Field Strength Measurements

- 1. Analyzer center frequency was set to the frequency of the spurious emission of interest
- 2. RBW = 9kHz (for emissions from 150kHz 30MHz)
- 3. Detector = RMS
- 4. Sweep time = auto couple
- 5. Trace mode = max hold
- 6. Trace was allowed to stabilize

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#### Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

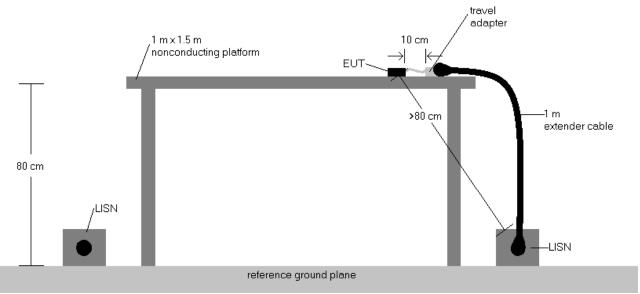


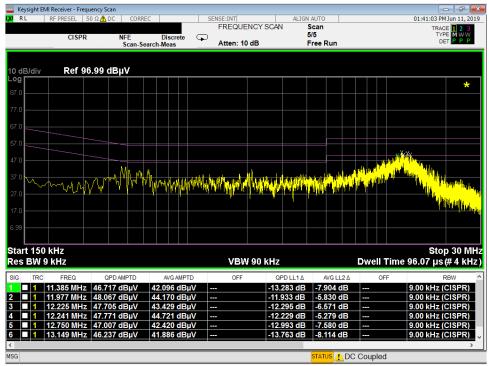
Figure 7-9. Test Instrument & Measurement Setup

#### Test Notes

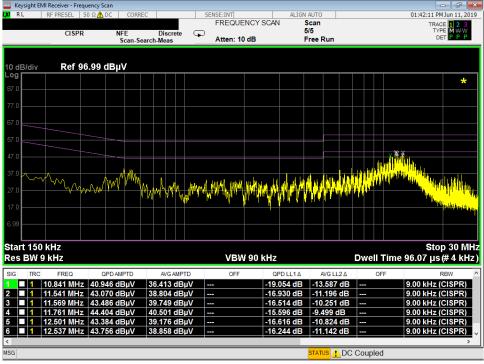
- 1. All modes of operation were investigated and the worst-case emissions are reported using mid channel. The emissions found were not affected by the choice of channel used during testing.
- 2. The limit for an intentional radiator from 150kHz to 30MHz are specified in Part 15.207 and RSS-Gen(8.8).
- 3. Corr. (dB) = Cable loss (dB) + LISN insertion factor (dB)
- 4. QP/AV Level (dB $\mu$ V) = QP/AV Analyzer/Receiver Level (dB $\mu$ V) + Corr. (dB)
- 5. Margin (dB) = QP/AV Limit (dB $\mu$ V) QP/AV Level (dB $\mu$ V)
- 6. Traces shown in plot are made using a peak detector.
- 7. Deviations to the Specifications: None.

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Plot 7-150. Line Conducted Plot with 802.11b (L1)



Plot 7-151. Line Conducted Plot with 802.11b (N)

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# 8.0 CONCLUSION

The data collected relate only the item(s) tested and show that the **Samsung Portable Tablet FCC ID: A3LSMT867U** is in compliance with Part 15 Subpart C (15.247) of the FCC Rules.

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