TEST REPORT

FCC DTS Test for IL7FF Certification

APPLICANT LG Electronics Inc.

REPORT NO. HCT-RF-2101-FC122

DATE OF ISSUE January 28, 2021

> Tested by Jin Gwan Lee

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TEST REPORT FCC DTS Test for IL7FF	REPORT NO. HCT-RF-2101-FC122 DATE OF ISSUE January 28, 2021 Additional Model	
Applicant	LG Electronics Inc. 222, LG-ro, Jinwi-myeon, Pyeongtaek-si, Gyeonggi-do, 451-713, Korea	
Eut Type Model Name	Faceplate RADIO ASM-RECEIVER IL7FF	
FCC ID	BEJIL7FF2	
Modulation type	CCK/DSSS/OFDM	
FCC Classification	Digital Transmission System(DTS)	
FCC Rule Part(s)	Part 15.247	
	The result shown in this test report refer only to the sample(s) tested unless otherwise stated.	

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



REVISION HISTORY

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

Revision No.	Date of Issue	Description
0	January 28, 2021	Initial Release

Engineering Statement:

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

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

According to the Evaluation report, all of the data contained herein is reused from the reference FCC ID : BEJIL7FB2 report.



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1. EUT DESCRIPTION

Model	IL7FF			
Additional Model	-			
EUT Type	Faceplate RADIO ASM-RECEIVER			
Power Supply	DC 12.0 V			
Frequency Range	2412 MHz - 2462 MHz			
	Peak Power	Internal Ant. (SISO) External Ant. (SISO) Internal Ant.	802.11b: 21.01 dBm 802.11g: 25.29 dBm 802.11n(HT20): 25.71 dBm 802.11b: 22.09 dBm 802.11g: 24.22 dBm 802.11n(HT20): 24.55 dBm	
		External Ant. (MIMO)	802.11n(HT20): 27.83 dBm	
Max. RF Output Power		Internal Ant. (SISO)	802.11b: 14.99 dBm 802.11g: 17.40 dBm 802.11n(HT20): 17.38 dBm	
	Average Power	External Ant. (SISO) Internal Ant. + External Ant.	802.11b: 16.19 dBm 802.11g: 16.40 dBm 802.11n(HT20): 16.33 dBm 802.11n(HT20): 19.74 dBm	
Modulation Type	(MIMO) DSSS/CCK : 802.11b OFDM : 802.11g, 802.11n(HT20)			
Number of Channels	11 Channels			
Antenna Peak Gain	Internal Antenna - Peak Gain : 4.80 dBi External Antenna - Peak Gain : 1.20 dBi			
Date(s) of Tests	December 11, 2020 ~ January 22, 2021			
Support for datarate	- 802.11b(Mbps) : 1, 2, 5.5, 11 - 802.11g(Mbps) : 6, 9, 12, 18, 24, 36, 48, 54 - [SISO] 802.11n : MCS0 ~ MCS7 - [MIMO] 802.11n : MCS8 ~ MCS15			
Multiple Outputs in Same Band	 - 802.11n is only supported. - Multiple spatial streams : Supported. 			





	- Cyclic Delay Diversity : Not supported.
Directional gain	4.80 dBi
EUT serial numbers	Conduction : 012023413 Radiation : 012023422



2. TEST METHODOLOGY

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

EUT CONFIGURATION

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

EUT EXERCISE

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

GENERAL TEST PROCEDURES

Conducted Emissions

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

Radiated Emissions

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



DESCRIPTION OF TEST MODES

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

3. INSTRUMENT CALIBRATION

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

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

4. FACILITIES AND ACCREDITATIONS

FACILITIES

The SAC(Semi-Anechoic Chamber) and conducted measurement facility used to collect the radiated data are located at the 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA. The site is constructed in conformance with the requirements of ANSI C63.4. (Version :2014) and CISPR Publication 22.

Detailed description of test facility was submitted to the Commission and accepted dated April 02, 2018 (Registration Number: KR0032).

EQUIPMENT

Radiated emissions are measured with one or more of the following types of Linearly polarized antennas: tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements. Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers. Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

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





5. ANTENNA REQUIREMENTS

According to FCC 47 CFR § 15.203:

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

(1) The antennas of this E.U.T are permanently attached.

(2) The E.U.T Complies with the requirement of § 15.203

6. MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of

ANSI C63.10-2013.

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

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

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



7. DESCRIPTION OF TESTS

7.1. Duty Cycle

Test Configuration

EUT]	Spectrum Analyzer	
	Coax cable		

Test Procedure

The transmitter output is connected to the Spectrum Analyzer.

We tested according to the zero-span measurement method.

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

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

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

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



7.2. 6dB Bandwidth

Limit

The minimum permissible 6 dB bandwidth is 500 kHz.

Test Configuration



Test Procedure

The transmitter output is connected to the Spectrum Analyzer.

The Spectrum Analyzer is set to (Procedure 11.8.1 in ANSI 63.10-2013)

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

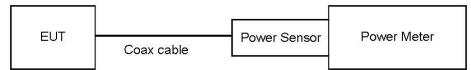


7.3. Output Power

Limit

The maximum permissible conducted output power is 1 Watt.

Test Configuration



Test Procedure

The transmitter output is connected to the Power Meter.

- Peak Power (Procedure 11.9.1.3 in ANSI 63.10-2013)
- : Measure the peak power of the transmitter.
- Average Power (Procedure 11.9.2.3 in ANSI 63.10-2013)
 - 1) Measure the duty cycle.
 - 2) Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.
 - 3) Add 10 log (1/x), where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times.

Sample Calculation

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

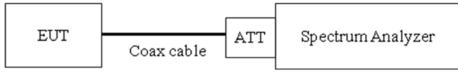


7.4. Power Spectral Density

<u>Limit</u>

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

Test Configuration



Test Procedure

The transmitter output is connected to the Spectrum Analyzer.

We tested according to Procedure 8.4 in KDB 558074 v05r02, Procedure 11.10.2 in ANSI 63.10-2013.

The spectrum analyzer is set to :

- 1) Set analyzer center frequency to DTS channel center frequency.
- 2) Span = 1.5 times the DTS channel bandwidth.
- 3) RBW = 3 kHz \leq RBW \leq 100 kHz.
- 4) VBW \geq 3 x RBW.
- 5) Sweep = auto couple
- 6) Detector = peak
- 7) Trace Mode = max hold
- 8) Allow trace to fully stabilize.
- Use the peak marker function to determine the maximum amplitude level within the RBW.
 If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

Sample Calculation

Power Spectral Density = Reading Value + ATT loss + Cable loss

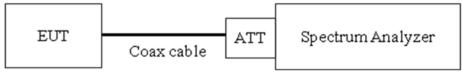


7.5. Conducted Band Edge(Out of Band Emissions) & Conducted Spurious Emissions

Limit

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

Test Configuration



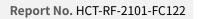
Test Procedure

The transmitter output is connected to the spectrum analyzer.

(Procedure 11.11 in ANSI 63.10-2013)

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

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





Freq(MHz)	Internal Ant. Port Factor(dB)	External Ant. Port Factor(dB
30	20.55	21.75
100	20.59	21.79
200	20.64	21.84
300	20.68	21.88
400	20.74	21.94
500	20.74	21.94
600	20.74	21.94
700	20.77	21.97
800	20.78	21.98
900	20.79	21.99
1000	20.84	22.04
2000	20.99	22.19
2400	21.05	22.25
2412	21.05	22.25
2437	21.04	22.24
2462	21.03	22.23
2500	21.03	22.23
3000	21.15	22.35
4000	21.21	22.41
5000	21.30	22.50
5700	21.77	24.07
5800	21.97	26.27
6000	21.98	26.28
7000	22.10	26.40
8000	22.09	26.39
9000	22.18	26.48
10000	22.28	26.58
11000	22.37	26.67
12000	22.46	26.76
13000	22.47	26.77
14000	22.51	26.81
15000	22.60	26.90
16000	22.69	26.99



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17000	22.88	27.18
18000	23.02	27.32
19000	22.94	27.24
20000	22.61	26.91
21000	22.74	27.04
22000	22.73	27.03
23000	22.70	27.00
24000	22.75	27.05
25000	22.86	27.16

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

2. Factor = Attenuator loss + Cable loss + EUT Cable Loss



7.6. Radiated Test

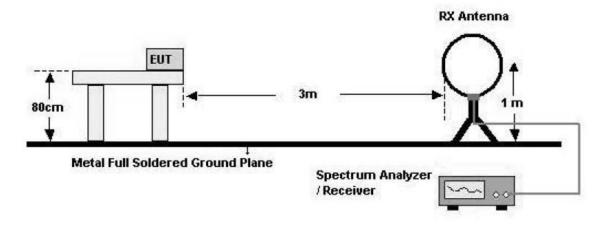
Limit

Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 – 30	30	30

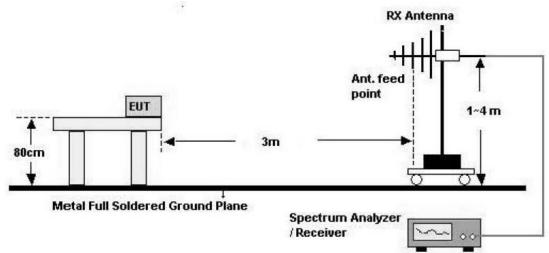


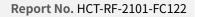
Test Configuration

Below 30 MHz



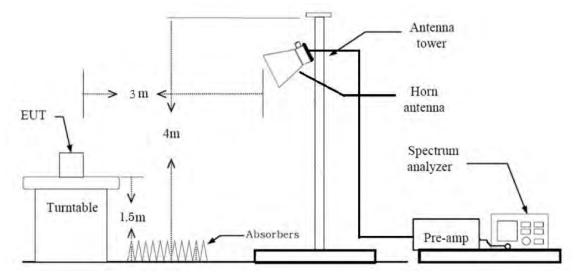








Above 1 GHz



Test Procedure of Radiated spurious emissions(Below 30 MHz)

- 1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
- 2. The loop antenna was placed at a location 3m from the EUT
- 3. The EUT is placed on a turntable, which is 0.8m above ground plane.
- 4. We have done x, y, z planes in EUT and horizontal and vertical polarization and Parallel to the ground plane in detecting antenna.

5. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.

6. Distance Correction Factor(0.009 MHz - 0.490 MHz) = 40log(3 m/300 m) = - 80 dB

Measurement Distance : 3 m

7. Distance Correction Factor(0.490 MHz - 30 MHz) = 40log(3 m/30 m) = -40 dB

Measurement Distance : 3 m

- 8. Spectrum Setting
 - Frequency Range = 9 kHz ~ 30 MHz
 - Detector = Peak
 - Trace = Maxhold
 - RBW = 9 kHz
 - VBW \geq 3 x RBW
- 9. Total = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F)

10. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered





that's already beyond the background noise floor.

KDB 414788 OFS and Chamber Correlation Justification

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

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



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Test Procedure of Radiated spurious emissions(Below 1GHz)

- 1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
- 2. The EUT is placed on a turntable, which is 0.8m above ground plane.
- 3. The Hybrid antenna was placed at a location 3m from the EUT, which is varied from 1m to 4m to find out the highest emissions.
- 4. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

5. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.

- 6. Spectrum Setting
 - (1) Measurement Type(Peak):
 - Measured Frequency Range : 30 MHz 1 GHz
 - Detector = Peak
 - Trace = Maxhold
 - RBW = 100 kHz
 - VBW \geq 3 x RBW
 - (2) Measurement Type(Quasi-peak):
 - Measured Frequency Range : 30 MHz 1 GHz
 - Detector = Quasi-Peak
 - RBW = 120 kHz
 - %In general, (1) is used mainly
- 7. Total = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L)
- 8. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.

Test Procedure of Radiated spurious emissions (Above 1 GHz)

- 1. The EUT is placed on a turntable, which is 1.5 m above ground plane.
- 2. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
- 3. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
- 4. EUT is set 3 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
- 5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
- 6. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
- 7. The unit was tested with its standard battery.



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- 8. Spectrum Setting (Method 8.6 in KDB 558074 v05r02, Procedure 11.12 in ANSI 63.10-2013)
 - (1) Measurement Type(Peak):
 - Measured Frequency Range : 1 GHz $\,$ $\,$ 25 GHz $\,$
 - Detector = Peak
 - Trace = Maxhold
 - RBW = 1 MHz
 - VBW \geq 3 x RBW
 - (2) Measurement Type(Average): Duty cycle \geq 98%
 - Measured Frequency Range : 1 GHz 25 GHz
 - Detector = RMS
 - Averaging type = power (*i.e.*, RMS)
 - RBW = 1 MHz
 - $-VBW \ge 3 \times RBW$
 - Sweep time = auto.
 - Trace mode = average (at least 100 traces).

(3) Measurement Type(Average): Duty cycle < 98%, duty cycle variations are less than $\pm 2\%$

- Measured Frequency Range : 1 GHz 25 GHz
- Detector = RMS
- Averaging type = power (*i.e.*, RMS)
- RBW = 1 MHz
- VBW \geq 3 x RBW
- Sweep time = auto.
- Trace mode = average (at least 100 traces).
- Correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100 percent duty cycle.
- Duty Cycle Factor (dB) : Please refer to the please refer to section 9.1.
- 9. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
- 10. Distance extrapolation factor = 20log (test distance / specific distance) (dB)
- 11. Total(Measurement Type : Peak)
 - = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) Amp Gain(G) + Distance Factor(D.F)



- Total (Measurement Type : Average, Duty cycle \geq 98%)
- = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) Amp Gain(G) + Distance Factor(D.F)

Total(Measurement Type : Average, Duty cycle < 98%)

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

Test Procedure of Radiated Restricted Band Edge

1. The EUT is placed on a turntable, which is 1.5 m above ground plane.

- 2. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
- 3. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
- 4. EUT is set 3 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
- 5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
- 6. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
- 7. The unit was tested with its standard battery.
- 8. Spectrum Setting
 - (1) Measurement Type(Peak):
 - Measured Frequency Range : 2310 MHz \sim 2390 MHz/ 2483.5 MHz \sim 2500 MHz
 - Detector = Peak
 - Trace = Maxhold
 - RBW = 1 MHz
 - VBW \geq 3 x RBW
 - (2) Measurement Type(Average): Duty cycle \geq 98%,
 - Measured Frequency Range : 2310 MHz \sim 2390 MHz/ 2483.5 MHz \sim 2500 MHz
 - Detector = RMS
 - Averaging type = power (*i.e.*, RMS)
 - RBW = 1 MHz
 - $-VBW \ge 3 \times RBW$
 - Sweep time = auto.
 - Trace mode = average (at least 100 traces).
 - (3) Measurement Type(Average): Duty cycle < 98%, duty cycle variations are less than $\pm 2\%$



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- Measured Frequency Range : 2310 MHz ~ 2390 MHz/ 2483.5 MHz ~ 2500 MHz
- Detector = RMS
- Averaging type = power (*i.e.*, RMS)
- RBW = 1 MHz
- $-VBW \ge 3 \times RBW$
- Sweep time = auto.
- Trace mode = average (at least 100 traces).
- Correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100 percent duty cycle.
- Duty Cycle Factor (dB) : Please refer to the please refer to section 9.1.
- 9. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
- 10. Distance extrapolation factor = 20log (test distance / specific distance) (dB)
- 11. Total(Measurement Type : Peak)
 - = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) Amp Gain(G) + Distance Factor(D.F)

Total(Measurement Type : Average, Duty cycle \geq 98%)

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

Total(Measurement Type : Average, Duty cycle < 98%)

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





7.7. AC Power line Conducted Emissions

Limit

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

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

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

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

Test Configuration

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

Test Procedure

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

Sample Calculation

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



7.8. Worst case configuration and mode

Radiated test

1. All modes of operation were investigated and the worst case configuration results are reported.

2. All configurations of antenna were investigated and the worst case configuration results are reported.

- Mode : Internal Ant(SISO), External Ant(SISO), Internal Ant+ External Ant(MIMO SDM)
- Worstcase : Internal Ant(SISO)
- 3. EUT Axis
 - Radiated Spurious Emissions : X
 - Radiated Restricted Band Edge : X
- 4. Duty cycle factor applies only 802.11g/n (Duty cycle < 98%).
- 5. All datarate of operation were investigated and the worst case datarate results are reported
 - 802.11b : 1Mbps
 - 802.11g : 6Mbps
 - 802.11n : MCS0
- 6. All position of loop antenna were investigated and the test result is a no critical peak found at all positions.
- Position : Horizontal, Vertical, Parallel to the ground plane

AC Power line Conducted Emissions

1. We don't perform powerline conducted emission test. Because this EUT is used with vehicle.

Conducted test

- 1. The EUT was configured with data rate of highest power.
- 2. SISO & MIMO were tested and the all case results are reported.
 - Mode : Internal Ant(SISO), External Ant(SISO), Internal Ant+ External Ant(SDM)



8. SUMMARY TEST OF RESULTS

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

#Note: Not Tested.

9. TEST RESULT

9.1 DUTY CYCLE

Mada	Data Rate	Ton	T _{total}	Duty Cycle	Duty Cycle Facto
Mode	(Mbps)	(ms)	(ms)	Duty Cycle	(dB)
	1	12.400	12.500	0.992	0.035
802.11b	2	6.210	6.300	0.986	0.062
802.110	5.5	2.310	2.400	0.963	0.166
	11	1.213	1.303	0.931	0.311
	6	2.064	2.162	0.955	0.201
	9	1.386	1.492	0.929	0.320
	12	1.047	1.145	0.914	0.389
902 11g	18	0.701	0.806	0.869	0.609
802.11g	24	0.532	0.634	0.839	0.762
	36	0.362	0.466	0.777	1.097
	48	0.276	0.378	0.730	1.366
	54	0.248	0.350	0.709	1.496
	6.5 (MCS0)	1.913	2.019	0.947	0.234
	13 (MCS1)	0.981	1.083	0.906	0.430
	19.5 (MCS2)	0.666	0.768	0.867	0.619
802.11n	26 (MCS3)	0.507	0.609	0.833	0.796
(HT20)	39 (MCS4)	0.353	0.454	0.777	1.096
	52 (MCS5)	0.271	0.373	0.728	1.376
	58.5 (MCS6)	0.248	0.350	0.711	1.484
	65 (MCS7)	0.227	0.328	0.692	1.602
	MCS8	0.984	1.086	0.906	0.428
	MCS9	0.510	0.610	0.836	0.778
002 11-	MCS10	0.354	0.456	0.776	1.100
802.11n	MCS11	0.276	0.379	0.729	1.374
(HT20) MIMO	MCS12	0.199	0.302	0.660	1.806
UNINO	MCS13	0.160	0.261	0.612	2.134
	MCS14	0.149	0.250	0.595	2.255
	MCS15	0.135	0.238	0.568	2.460

고 객 비 밀 CUSTOMER SECRET

6 8

Test Plots

Keysight Spectrum Analyzer - Swept SA

Frequency	08:49:30 PM Jan 07, 2021 TRACE 2 3 4 5 0 TYPE WWWWWWW DET P NNNN N	ALIGN AUTO Type: RMS	#Avg	SENSE:IN Trig: Free Run Atten: 20 dB	PNO: Fast	50 0 AC		ter Fre
Auto Tur	kr3 12.50 ms 0.34 dB	Δ				et 21.05 dB 05 dBm		Bidiv
Center Fre 2.412000000 GH	<u>3∆4</u>					Xa		
Start Fre 2.412000000 GH								
Stop Fre 2.412000000 GH								
CF Ste 8.000000 MH Auto Ma	Span 0 Hz 10 ms (1001 pts)	Sweep 20.	FUNCTION	.0 MHz	VBW	00 GHz	MHz	ter 2.4 BW 81
Freq Offs 0 F	FORCIONVALUE	PORCHONING	PORCION	0.37 dB 17.01 dBm 0.34 dB 17.01 dBm	2.40 ms (Δ) .580 ms 2.50 ms (Δ) .580 ms		t (Δ) t t (Δ)	Δ2 1 F 1 Δ4 1 F 1
Scale Typ								
		STATUS		(III)			_	

Duty cycle plot (802.11b(1Mbps))

Duty cycle plot (802.11g(6Mbps))

RL RF 50	Swept SA	SENSE:INT		08:51:00 PM Jan 07, 2021	
enter Freq 2.412	PNO: Fast	Trig: Free Run	Avg Type: RMS	TRACE 1 2 3 4 5 5 TYPE WWWWWWW DET P NNNNN	Frequency
Ref Offset	21.05 dB	Atten: 20 dB	ΔΜ	kr1 2.064 ms 0.51 dB	Auto Tun
097 21.1 Junip and a star 4974		neuroporter 102	t nenengationenten tetenente	erfere frequenting	Center Fre 2.412000000 GH
9.05 .95 .90					Start Fre 2.412000000 GF
9.0 <mark>**</mark> 9.0		Ų		W	Stop Fre 2.412000000 G
enter 2.412000000 es BW 8 MHz	GHz VBW 8.0	MHz Y FUNCTIO		Span 0 Hz 3 ms (1001 pts)	CF Ste 8.000000 Mi Auto M
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2.064 ms (Δ) 2.275 ms 2.162 ms (Δ) 2.277 ms	0.51 dB 15.77 dBm 0.65 dB 15.77 dBm		E	Freq Offs 01
6 7 8 9 0				-	Scale Typ

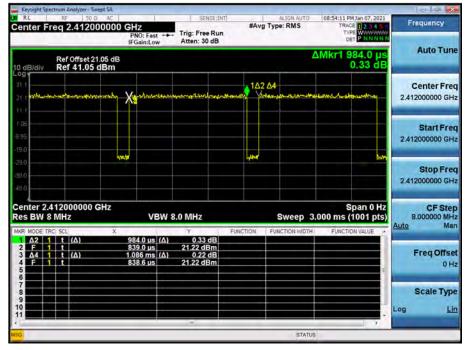




		dB		DET P NNNN N	
fset 21.05 dB 1.05 dBm			ΔM	Akr3 2.019 ms -0.28 dB	Auto Tune
No handrongayo	Xa	angler of the second	134	steamentains have	Center Fre 2.412000000 GH
					Start Free 2.412000000 GH
					Stop Fre 2.412000000 GH
000 GHz ×	VBW 8.0 MHz	FUNCTION	Sweep 7.5	Span 0 Hz 33 ms (1001 pts)	CF Ste 8.000000 MH Auto Ma
3.2	35 ms 21.10 dB 19 ms (Δ) -0.28 c	lm JB			Freq Offse 0 H
					Scale Typ
	a) <u>1.9</u> <u>3.2</u> a) 2.0	000 GHz VBW 8.0 MHz X 1.913 ms (A) 1.73 of 3285 ms 2.1.00 df (A) -0.28	000 GHz VBW 8.0 MHz	N Y FUNCTION FUNCTION 1.913 ms (Δ) 1.73 dB FUNCTION FUNCTION 3.285 ms 21.10 dBm 0.028 dB 0.028 dB 0.028 dB 0.028 dB 3.287 ms 21.10 dBm 0.028 dB 0.028 d	000 GHz Span 0 Hz VBW 8.0 MHz Sweep 7.533 ms (1001 pts) X Y FUNCTION FUNCTION WIDTH FUNCTION VALUE 3.285 ms 21.10 dBm 3.287 ms 21.10 dBm 3.287 ms 21.10 dBm

Duty cycle plot (802.11n(MCS0))

Duty cycle plot (802.11n MIMO(MCS8))



Note:

In order to simplify the report, attached plots were only the most lowest data rate.



9.2 6dB BANDWIDTH

[Internal ANT_SISO]

802.11b Mode		Massured Dandwidth [MU]	Minimum Pandwidth [MHz]
Frequency [MHz]	Channel No.	Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]
2412	1	7.095	> 0.5
2437	6	7.087	> 0.5
2462	11	7.098	> 0.5

802.11g Mode		Massured Dandwidth [MU]	Minimum Dandwidth [MU-]
Frequency [MHz]	Channel No.	Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]
2412	1	16.31	> 0.5
2437	6	16.30	> 0.5
2462	11	16.31	> 0.5

802.11n(HT20) Mode		Measured Bandwidth [MHz]	Minimum Pandwidth [MU-]
Frequency [MHz]	Channel No.	Measured Bandwidth [MHZ]	Minimum Bandwidth [MHz]
2412	1	17.32	> 0.5
2437	6	17.29	> 0.5
2462	11	17.56	> 0.5



Report No. HCT-RF-2101-FC122

[External ANT_SISO]

802.11b Mode		Massured Danduidth [MU]	Minimum Dandwidth [MU]	
Frequency [MHz]	Channel No.	Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	
2412	1	7.096	> 0.5	
2437	6	7.096	> 0.5	
2462	11	7.103	> 0.5	

802.11g Mode		Measured Bandwidth [MHz]	Minimum Dandwidth [MU]
Frequency [MHz]	Channel No.	Measured Bandwidth [MH2]	Minimum Bandwidth [MHz]
2412	1	16.33	> 0.5
2437	6	16.06	> 0.5
2462	11	16.32	> 0.5

802.11n(HT20) Mode		Massured Danduidth [MU-]	Minimum Dougluidth [MI I-]	
Frequency [MHz]	Channel No.	Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	
2412	1	17.31	> 0.5	
2437	6	17.14	> 0.5	
2462	11	17.55	> 0.5	



[Internal ANT_MIMO]

802.11n(HT20) Mode		Massured Danduidth [MU-]	Minimum Donducidth [MI I-]
Frequency [MHz]	Channel No.	Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]
2412	1	17.23	> 0.5
2437	6	16.96	> 0.5
2462	11	17.20	> 0.5

[External ANT_MIMO]

802.11n(HT20) Mode		Massured Pandwidth [MU7]	Minimum Dandwidth [MI I=]
Frequency [MHz]	Channel No.	Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]
2412	1	17.53	> 0.5
2437	6	16.96	> 0.5
2462	11	16.96	> 0.5



[Internal ANT_SISO]

Test Plots



6dB Bandwidth plot (802.11b-CH 6)

6dB Bandwidth plot (802.11g-CH 6)





Keysight Spectrum Analyzer - Occupied BW RL RF 50 Q AC		SENSE:INT		30:59 PM Jan 07, 2021	0 0 0
enter Freq 2.437000000 Gi		Freq: 2.437000000 GHz ree Run Avg Hold : 20 dB	1:>1/1	io Std: None io Device: BTS	Frequency
Ref Offset 21.05 dB					
500 500	- And have been been a more that	man man and man and man and			Center Fre 2.437000000 GF
50 50 50 50			Inder margared	mmmmmmm	
5.0 5.0 5.0					
enter 2.43700 GHz Res BW 100 kHz	oan 40.00 MHz eep 3.867 ms				
Occupied Bandwidth 17.6	Total Power	24.2 dB	m	Auto Mi	
	-15.351 kHz 17.29 MHz	% of OBW Pow x dB	er 99.00 -6.00 d		OF

6dB Bandwidth plot (802.11n_HT20-CH 6)



[External ANT_SISO]

Test Plots



6dB Bandwidth plot (802.11b-CH 1)

6dB Bandwidth plot (802.11g-CH 6)

Reysight Spectrum Analyzer - Occupied BV R.L. RF 50 Q. AC Center Freq 2.4370000000		SENSE-II Center Freq: 2 Trig: Free Rur #Atten: 20 dB	2.437000000 GH	ALIGN AUTO Iz Iold: 1/1	02:37:06 / Radio Sto Radio De		Frequency
10 dB/div Ref Offset 22.25 d							
Log 10.0 .0.00	muladad	head want	manhab	why			Center Fred 2.437000000 GHz
20,0 30,0 40,0	1797			Martin	mann	in white	
-50,0 							
Center 2.43700 GHz #Res BW 100 kHz		#VBW	300 kHz			10.00 MHz 3.867 ms	CF Step 4.000000 MHz
Occupied Bandwidth Total Power 23.2 dBm 16.526 MHz							Auto Mar Freg Offse
Transmit Freq Error x dB Bandwidth	-23.724 k 16.06 M		of OBW Po IB		9.00 % .00 dB		0 Hz
150			_	STATU	5		



Reyaight Spectrum Analyzer - Occupied BW RL RF 50 Q AC Center Freq 2.437000000 GH	Z Center Trig: F	SENSE-INT Freq: 2.437000000 GHz ree Run Avg Ho : 20 dB		03:10:42 AMJa Radio Std: N Radio Device	one	Frequency
Ref Offset 22,25 dB Ref 25.00 dBm						
Log 15.0 5.00 5.00	heatration	mpmenantunkantunka	hing			Center Fre 2.437000000 GH
150 250 350 Samuel Weber With Street Provide 450			- Wednesdown	malummun	-man	
55.0 Center 2.43700 GHz				Span 40.		CF Ste
Res BW 100 kHz	#	VBW 300 kHz	22 1	Sweep 3.		4.000000 MH
Occupied Bandwidth 17.7	27 MHz	Total Power	23.	O OBIN		Freq Offs
Transmit Freq Error · x dB Bandwidth	22.095 kHz 17.14 MHz	% of OBW Por x dB		9.00 % 00 dB		OH
97			STATU	5		

6dB Bandwidth plot (802.11n_HT20-CH 6)



[Internal ANT_MIMO]

Test Plots

Keysight RL SENSE:INT ALIGN AUTO Center Freq: 2.437000000 GHz Trig: Free Run Avg|Hold: 1/1 #Atten: 20 dB 12:26:17 AM Jan 08, 2021 Radio Std: None Center Freq 2.437000000 GHz Frequency #IFGain:Low Radio Device: BTS Ref Offset 21.05 dB Ref 25.00 dBm 0 dB/d og Center Freq 2.437000000 GHz Inderof ...Λ munowell MA. Center 2.43700 GHz #Res BW 100 kHz Span 40.00 MHz Sweep 3.867 ms CF Step 4.000000 MHz Man #VBW 300 kHz Auto Total Power 24.3 dBm **Occupied Bandwidth** 17.678 MHz Freq Offset 0 Hz -23.423 kHz **Transmit Freq Error** % of OBW Power 99.00 % 16.96 MHz x dB Bandwidth x dB -6.00 dB

6dB Bandwidth plot (802.11n_HT20-CH 6)



[External ANT_MIMO]

Test Plots

Reysight Spectrum Analyzer - Occupied B RL RF 50 D AC Center Freq 2.437000000	GHz Cente	SENSE INT r Freq: 2.437000000 GHz Free Run Avg Hold:	Radio St	AM Jan 08, 2021 d: None	Frequency
		n: 20 dB		evice: BTS	
Ref Offset 22.25 Ref 20.00 dB					
-og 100	month when have the and when	mpronument	~		Center Free 2.437000000 GH:
10.0 20.0	1		Marrier Wenn		
30.0 WW1947kwww.hundiliteraulitera					
50,0 50 0					
70.0 Center 2.43700 GHz			Span	40.00 MHz	CF Ster
Res BW 100 kHz	#	VBW 300 kHz	Sweep	3.867 ms	4.000000 MH
Occupied Bandwid		Total Power	23.2 dBm	-	<u>Auto</u> Mar
	7.684 MHz				Freq Offse
Transmit Freq Error	-28.639 kHz	% of OBW Powe	r 99.00 %		UH
x dB Bandwidth	16.96 MHz	x dB	-6.00 dB		
sg			STATUS		

6dB Bandwidth plot (802.11n_HT20-CH 6)

Note:

In order to simplify the report, attached plots were only the most narrow 6 dB BW channel.



9.3 OUTPUT POWER

Peak Power

1. Power Meter offset = Attenuator loss+ Cable loss

2. We apply to the offset in the 2.4 GHz range that was rounded off to the closest tenth dB. So, Internal port 21.05 dB & External port 22.25 is offset for 2.4 GHz Band

[Internal ANT_SISO]

802.11 Frequency [MHz]	b Mode Channel No.	Rate (Mbps)	Measured Power (dBm)	Limit (dBm)	Power Level Setting	
		1	17.12	30		
2412	1	2	17.34	30	14	
2412	L	5.5	18.82	30	14	
		11	20.63	30		
		1	16.79	30		
2437	6	2	17.06	30	14	
2437	0	5.5	18.54	30	14	
		11	20.36	30		
		1	17.49	30		
2462	11	2	17.74	30	15	
2402	11	5.5	19.18	30	15	
		11	21.01	30		



	g Mode	Rate	Measured	Limit	Power
Frequency [MHz]	Channel No.	(Mbps)	Power (dBm)	(dBm)	Level Setting
		6	20.02	30	
		9	19.94	30	10 10 17
	-	12	19.86	30	
2412	-	18	19.50	30	Level Setting
2412	1	24	19.72	30	
		36	19.79	30	
		48	19.80	30	
		54	19.76	30	
		6	25.29	30	
		9	25.22	30	
		12	25.07	30	
2427		18	24.71	30	17
2437	6	24	25.23	30	
		36	25.28	30	
		48	25.13	30	17
		54	25.17	30	
		6	23.00	30	
		9	22.70	30	
		12	22.60	30	
2462	11	18	22.28	30	
	11	24	22.64	30	17
		36	22.45	30	
		48	22.56	30	
		54	22.43	30	



802.11n(F	IT20) Mode		Measured	Limit	Power
Frequency [MHz]	Channel No.	MCS Index	Power (dBm)	(dBm)	Level Setting
		0	18.13	30	
		1	18.14	30	
		2	18.20	30	
2412		3	18.49	30	Level
2412	1	4	18.32	30	
		5	18.24	30	
		6	18.36	30	
		7	18.18	30	
		0	25.08	30	
		1	25.23	30	
		2	25.26	30	
2427	6	3	25.71	30	17
2437	6	4	25.62	30	11
		5	25.62	30	
		6	25.68	30	
		7	25.57	30	
		0	22.26	30	
		1	22.34	30	
		2	22.16	30	
2462	11	3	22.27	30	10
	11	4	22.24	30	
		5	22.24	30	
		6	22.33	30	
		7	21.99	30	



[External ANT_SISO]

802.111 Frequency [MHz]	o Mode Channel No.	Rate (Mbps)	Measured Power (dBm)	Limit (dBm)	Power Level Setting
		1	18.47	30	
2412	2412 1	2	18.71	30	18
2412		5.5	20.18	30	10
		11	21.85	30	
		1	18.39	30	
2437	6	2	18.62	30	18
2437	0	5.5	20.09	30	10
		11	21.83	30	
		1	18.78	30	
2462	11	2	18.66	30	18
2402	11	5.5	20.21	30	10
		11	22.09	30	



	.g Mode	Rate	Measured	Limit	Power
Frequency [MHz]	Channel No.	(Mbps)	Power (dBm)	(dBm)	Level Setting
		6	19.58	30	
		9	19.53	30	
		12	19.40	30	=
2412	1	18	19.09	30	
2412	1	24	19.41	30	- 12
		36	19.50	30	-
		48	19.27	30	
		54	19.22	30	
		6	24.22	30	
		9	24.19	30	
		12	24.04	30	
2427	6	18	23.52	30	10
2437	6	24	24.10	30	- 18
		36	24.14	30	
		48	24.14	30	
		54	24.11	30	
		6	20.59	30	
		9	20.48	30	
		12	20.36	30	
2462	11	18	20.01	30	10
	11 -	24	20.13	30	- 13
		36	20.20	30	
		48	20.27	30	
		54	20.23	30	



802.11n(H	IT20) Mode		Measured	1:	Power
Frequency [MHz]	Channel No.	MCS Index	Power (dBm)	Limit (dBm)	Level Setting
		0	19.52	30	
		1	19.63	30	-
		2	19.58	30	-
2412		3	19.82	30	Level
2412	1	4	19.67	30	
		5	19.71	30	18
		6	19.67	30	
		7	19.65	30	
		0	24.19	30	
		1	24.24	30	- 18
		2	24.12	30	-
2427	6	3	24.51	30	10
2437	6	4	24.40	30	18
		5	24.53	30	-
		6	24.55	30	-
		7	24.50	30	-
		0	19.62	30	
		1	19.83	30	
		2	19.75	30	
2462	1.1	3	19.91	30	
	11	4	19.69	30	18
		5	19.72	30	
		6	19.67	30	
		7	19.69	30	

[MIMO]

HCT

802.11n(20N	/Hz) Mode		Result	Result	Sum	Limit	Power
Frequency [MHz]	Channel No.	Index	Internal (dBm)	External (dBm)	(dBm)	(dBm)	Level Setting
		MCS8	18.21	16.87	20.60	30	
		MCS9	18.30	16.11	20.35	30	
		MCS10	18.31	16.21	20.40	30	_
2412	2412 1	MCS11	18.40	16.38	20.52	30	
2412		MCS12	18.26	16.38	20.43	30	- 8
		MCS13	18.49	16.23	20.52	30	
		MCS14	18.03	16.20	20.22	30	
		MCS15	18.29	16.23	20.39	30	
		MCS8	25.16	24.25	27.74	30	17
		MCS9	25.27	23.60	27.53	30	
		MCS10	25.32	23.61	27.56	30	
2427	c	MCS11	25.53	23.97	27.83	30	
2437	6	MCS12	25.49	23.70	27.70	30	
		MCS13	25.48	23.69	27.68	30	-
		MCS14	25.48	23.77	27.72	30	_
		MCS15	24.66	23.72	27.22	30	_
		MCS8	21.34	20.14	23.79	30	
		MCS9	21.28	19.57	23.52	30	-
		MCS10	21.25	19.47	23.46	30	
2462		MCS11	21.26	19.67	23.55	30	- 12
2462	2462 11	MCS12	21.22	19.66	23.52	30	
		MCS13	21.17	19.68	23.50	30	
		MCS14	21.16	19.63	23.47	30	
		MCS15	22.01	19.47	23.94	30	



Average Power

- 1. Power Meter offset = Attenuator loss + Cable loss
- 2. We apply to the offset in the 2.4 GHz range that was rounded off to the closest tenth dB. So, Internal port 21.05 dB & External port 22.25 is offset for 2.4 GHz Band

[Internal ANT_SISO]

802.11	o Mode		Measured	Duty			Power
Frequency [MHz]	Channel No.	Rate (Mbps)	Power (dBm)	Cycle Factor (dB)	Result (dBm)	Limit (dBm)	Level Setting
	1	1	14.64	0.035	14.68	30	
2412		2	14.40	0.062	14.46	30	14
2412		5.5	14.29	0.166	14.46	30	14
		11	14.08	0.311	14.39	30	
		1	14.35	0.035	14.38	30	
2427	C	2	14.11	0.062	14.17	30	14
2437	6	5.5	14.00	0.166	14.17	30	14
		11	13.98	0.311	14.29	30	
		1	14.96	0.035	14.99	30	
2462	2462 11	2	14.83	0.062	14.90	30	
2462		5.5	14.77	0.166	14.94	30	15
		11	14.45	0.311	14.76	30	



802.11g	gMode		Measured	Duty			Power
Frequency [MHz]	Channel No.	Rate (Mbps)	Power (dBm)	Cycle Factor (dB)	Result (dBm)	Limit (dBm)	Level Setting
		6	11.90	0.201	12.10	30	
		9	11.86	0.320	12.18	30	
		12	11.81	0.389	12.20	30	
2412	1	18	11.17	0.609	11.78	30	10
2412	1	24	10.99	0.762	11.76	30	10
		36	10.72	1.097	11.81	30	
		48	10.48	1.366	11.84	30	
		54	10.27	1.496	11.76	30	
	6	17.19	0.201	17.40	30		
		9	17.08	0.320	17.40	30	- 17
		12	17.01	0.389	17.40	30	
2437	6	18	16.47	0.609	17.08	30	
2437	0	24	16.53	0.762	17.29	30	
		36	16.17	1.097	17.27	30	
		48	15.88	1.366	17.25	30	
		54	15.67	1.496	17.16	30	
		6	14.93	0.201	15.13	30	
		9	14.62	0.320	14.94	30	
		12	14.56	0.389	14.95	30	
2462	11	18	13.96	0.609	14.57	30	- 14
	11	24	13.92	0.762	14.68	30	14
		36	13.36	1.097	14.46	30]
		48	13.24	1.366	14.60	30	
		54	12.98	1.496	14.48	30	



802.11n(H ⁻ Frequency	Channel	MCS Index	Measured Power	Duty Cycle	Result	Limit	Power Level
[MHz]	No.		(dBm)	Factor (dB)	(dBm)	(dBm)	Setting
		0	9.90	0.234	10.13	30	
		1	9.69	0.430	10.12	30	
		2	9.62	0.619	10.24	30	
2412	1	3	9.06	0.796	9.86	30	- 8
2412	T	4	8.80	1.096	9.89	30	0
		5	8.46	1.376	9.83	30	
		6	8.29	1.484	9.77	30	
		7	8.35	1.602	9.95	30	
	0	16.94	0.234	17.18	30		
		1	16.89	0.430	17.32	30	
		2	16.76	0.619	17.38	30	
2437	6	3	16.39	0.796	17.19	30	- 17
2431	0	4	16.16	1.096	17.26	30	±1
		5 15.77 1.376	17.15	30			
		6	15.70	1.484	17.18	30	
		7	15.43	1.602	17.03	30	
		0	14.05	0.234	14.28	30	
		1	13.76	0.430	14.19	30	
		2	13.62	0.619	14.24	30	
2462	11	3	12.97	0.796	13.77	30	- 13
	11	4	12.59	1.096	13.68	30	
		5	12.43	1.376	13.81	30	
		6	12.28	1.484	13.77	30	
		7	12.18	1.602	13.78	30	



[External ANT_SISO]

802.11b	Mode		Measured	Duty			Power
Frequency [MHz]	Channel No.	Rate (Mbps)	Power (dBm)	Cycle Factor (dB)	Result (dBm)	Limit (dBm)	Level Setting
		1	15.96	0.035	15.99	30	
2412	2412 1	2	15.71	0.062	15.78	30	18
2412		5.5	15.58	0.166	15.75	30	18
		11	15.35	0.311	15.66	30	
	6	1	15.71	0.035	0.035 15.74 30		
2437		2	15.69	0.062	15.75	30	18
2437	0	5.5	15.52	0.166	15.68	30	18
		11	15.34	0.311	15.65	30	
		1	16.15	0.035	16.19	30	
2462	11	2	15.86	0.062	15.93	30	10
2462	11	5.5	15.79	0.166	15.96	30	18
		11	15.58	0.311	15.89	30	



802.11g	gMode		Measured	Duty			Power
Frequency [MHz]	Channel No.	Rate (Mbps)	Power (dBm)	Cycle Factor (dB)	Result (dBm)	Limit (dBm)	Level Setting
		6	11.48	0.201	11.68	30	
		9	11.40	0.320	11.72	30	
		12	11.39	0.389	11.78	30	
2412	1	18	10.74	0.609	11.35	30	12
2412	T	24	10.60	0.762	11.36	30	12
		36	10.28	1.097	11.38	30	
		48	9.97	1.366	11.33	30	
		54	9.68	1.496	11.18	30	
	6	6	16.17	0.201	16.37	30	
		9	16.02	0.320	16.34	30	-
		12	16.01	0.389	16.40	30	
2437		18	15.52	0.609	16.13	30	- 18
2437		24	15.43	0.762	16.20	30	10
		36	15.11	1.097	16.21	30	
		48	14.92	1.366	16.29	30	
		54	14.74	1.496	16.24	30	
		6	12.52	0.201	12.72	30	
		9	12.27	0.320	12.59	30	
		12	12.20	0.389	12.59	30	
2462	11	18	11.58	0.609	12.19	30	- 13
2402	11	24	11.38	0.762	12.14	30	
		36	10.99	1.097	12.08	30	
		48	10.84	1.366	12.20	30	-
		54	10.63	1.496	12.13	30	



802.11n(H ⁻ Frequency	Channel	MCS Index	Measured Power	Duty Cycle Factor	Result (dBm)	Limit (dBm)	Power Level
[MHz]	No.		(dBm)	(dB)	(dDill)	(dbiii)	Setting
		0	11.38	0.234	11.61	30	
		1	11.19	0.430	11.62	30	
		2	10.99	0.619	11.61	30	
2412	1	3	10.44	0.796	11.24	30	11
2412	T	4	10.15	1.096	11.25	30	11
		5	9.84	1.376	11.21	30	
		6	9.70	1.484	11.18	30	
		7	9.61	1.602	11.21	30	
		0	16.06	0.234	16.29	30	
		1	15.90	0.430	16.33	30	_
	6	2	15.67	0.619	16.29	30	
2437		3	15.27	0.796	16.07	30	- 18
2437		4	14.97	1.096	16.07	30	10
		5	14.78	1.376	16.16	30	
		6	14.62	1.484	16.11	30	
		7	14.63	1.602	16.23	30	
		0	11.42	0.234	11.66	30	
		1	11.27	0.430	11.70	30	
		2	11.10	0.619	11.72	30	
2462	11	3	10.53	0.796	11.33	30	10
2402	ΤŢ	4	10.14	1.096	11.23	30	- 12
		5	9.79	1.376	11.17	30	
		6	9.72	1.484	11.21	30	
		7	9.62	1.602	11.23	30	

[MIMO]

HCT

802.11n(20M	IHz) Mode		Duty	Measured	Measured	Total	Total			Power
Frequency	Channel	Rate (Mbps)	Cycle Factor	Power Internal	Power External	Power Internal	Power External	Sum (dBm)	Limit (dBm)	Level
[MHz]	No.		(dB)	(dBm)	(dBm)	(dBm)	(dBm)			Setting
		MCS8	0.428	9.83	7.77	10.26	8.19	12.36	30	
		MCS9	0.778	9.51	7.38	10.29	8.16	12.37	30	
		MCS10	1.100	9.27	7.14	10.37	8.24	12.45	30	
2412	1	MCS11	1.374	8.67	6.50	10.05	7.87	12.10	30	- 8
2412	1 M0	MCS12	1.806	8.19	6.53	10.00	8.33	12.26	30	0
		MCS13	2.134	8.03	6.00	10.16	8.14	12.28	30	
		MCS14	2.255	7.47	5.58	9.73	7.83	11.89	30	
		MCS15	2.460	7.44	5.46	9.90	7.92	12.03	30	
		MCS8	0.428	16.99	15.36	17.42	15.79	19.69	30	
		MCS9	0.778	16.72	14.89	17.49	15.67	19.69	30	
		MCS10	1.100	16.42	14.66	17.52	15.76	19.74	30	
2437	6	MCS11	1.374	15.85	14.10	17.23	15.47	19.45	30	- 17
2437	0	MCS12	1.806	15.47	13.68	17.28	15.49	19.48	30	11
		MCS13	2.134	15.10	13.26	17.24	15.39	19.42	30	
		MCS14	2.255	15.02	13.18	17.27	15.43	19.46	30	
		MCS15	2.460	14.88	13.08	17.34	15.54	19.55	30	
		MCS8	0.428	12.96	11.19	13.39	11.61	15.60	30	
		MCS9	0.778	12.51	10.87	13.29	11.65	15.55	30	
		MCS10	1.100	12.15	10.49	13.25	11.59	15.51	30	
2462	11	MCS11	1.374	11.50	10.03	12.88	11.40	15.21	30	10
2462	11	MCS12	1.806	11.16	9.42	12.97	11.23	15.19	30	- 12
		MCS13	2.134	10.72	9.13	12.85	11.26	15.14	30	
		MCS14	2.255	10.64	9.00	12.89	11.26	15.16	30	_
		MCS15	2.460	10.56	8.79	13.02	11.25	15.23	30	



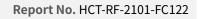
9.4 POWER SPECTRAL DENSITY

[Internal ANT_SISO]

			Test	Result
Mode	Frequency (MHz)	Channel No.	Measured PSD (dBm)	Limit (dBm)
	2412	1	-6.887	
802.11b	2437	6	-6.590	
	2462	11	-6.323	
	2412	1	-14.727	
802.11g	2437	6	-5.449	8
	2462	11	-7.847	
	2412	1	-15.502	
802.11n(HT20)	2437	6	-7.999	
	2462	11	-11.670	

[External ANT_SISO]

	_		Test	Result
Mode	Frequency (MHz)	Channel No.	Measured PSD (dBm)	Limit (dBm)
	2412	1	-5.664	
802.11b	2437	6	-5.405	
	2462	11	-5.929	
	2412	1	-15.625	
802.11g	2437	6	-6.177	8
	2462	11	-10.115	
	2412	1	-12.217	
802.11n(HT20)	2437	6	-9.108	
	2462	11	-11.689	



[MIMO]

HCT

			Test Result					
Mode	Frequency (MHz)	Channel No.	Result Internal	Result External	Sum Data	Limit (dBm)		
			(dBm)	(dBm)	(dBm)	(3.511)		
	2412	1	-16.799	-15.557	-13.123			
802.11n(HT20)	2437	6	-9.828	-8.342	-6.011	8		
	2462	11	-13.049	-11.005	-8.898			

Note :

1. Spectrum reading values are not plot data.

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

- 2. Spectrum offset = Attenuator loss(20 dB) + Cable loss(1ea) + EUT Cable loss
- 3. Internal port 21.05 dB & External port 22.25 is offset for 2.4 GHz Band



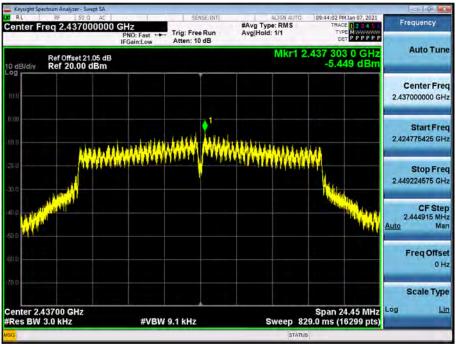
[Internal ANT_SISO]

Test Plots

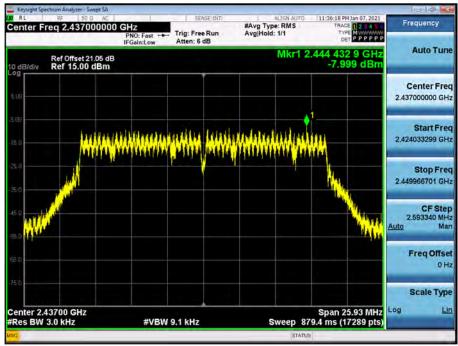


Power Spectral Density (802.11b-CH 114)

Power Spectral Density (802.11g-CH 6)







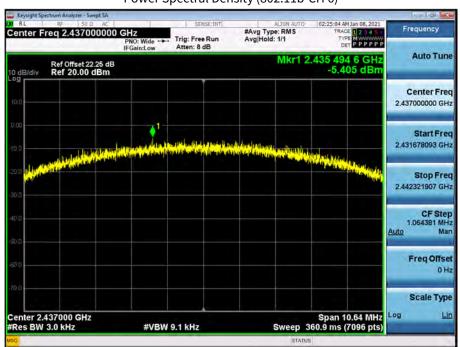
Power Spectral Density (802.11n_HT20 -CH 6)

Note :

In order to simplify the report, attached plots were only the worstcase PSD channel.

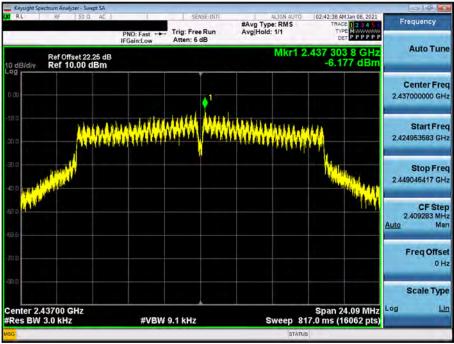
[External ANT_SISO]

Test Plots

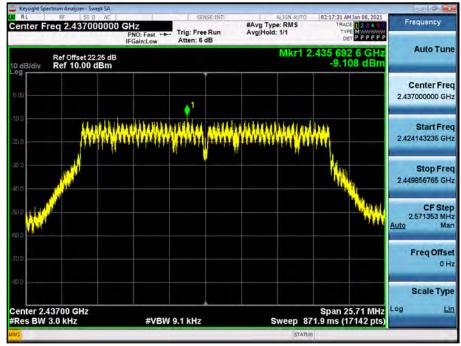


Power Spectral Density (802.11b-CH 6)

Power Spectral Density (802.11g-CH 6)







Power Spectral Density (802.11n_HT20 -CH 6)

Note :

In order to simplify the report, attached plots were only the worstcase PSD channel.



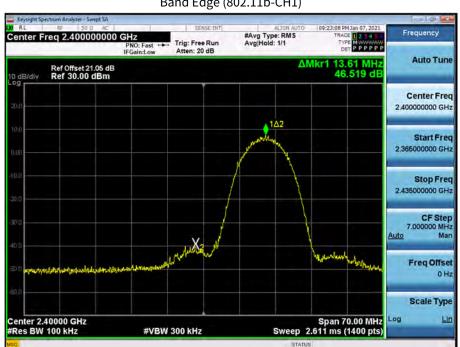


9.5 BAND EDGE/ CONDUCTED SPURIOUS EMISSIONS

Test Result : please refer to the plot below. In order to simplify the report, attached plots were only the worst case channel and data rate.

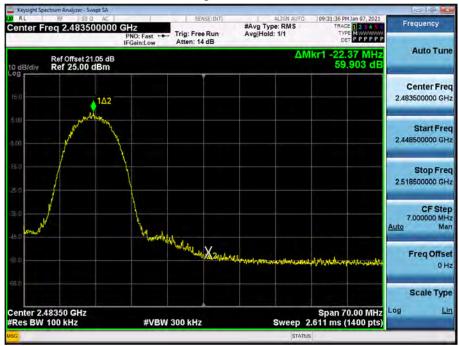


[Internal ANT_SISO] Test Plots(BandEdge)



Band Edge (802.11b-CH1)

Band Edge (802.11b-CH11)

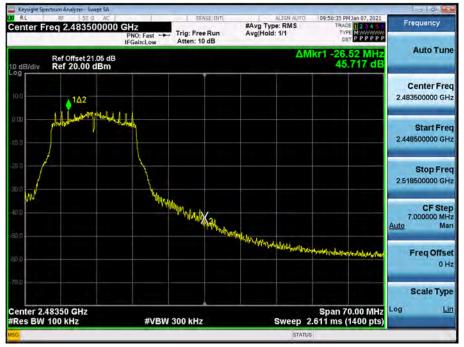




RL RF 50 Q AC Center Freq 2.400000000		ee Run Avg	ALIGN AUTO Type: RMS Hold: 1/1	09:38:07 PM Jan 07, 202 TRACE 2 3 4 TYPE MWWWW DET P P P P P	Frequency
Ref Offset 21.05 dB			Δ	Wkr1 5.70 MH 43.509 d	Auto Tuni B
£an		162	at ta ta a		Center Fre 2.400000000 GH
5.03 (5.0		and white the	wheeler week		Start Fre 2.365000000 GH
35.0					Stop Fre 2.435000000 GH
450	adrolandilloungapphylon	X2		ter annound	CF Ste 7.000000 Mi Auto Ma
65 D					Freq Offs 0 H
2 40000 CH2				Spap 70.00 M	Scale Typ
Center 2.40000 GHz #Res BW 100 kHz	#VBW 300 kH	z	Sweep 2.	Span 70.00 MH 611 ms (1400 pt	5)

Band Edge (802.11g-CH1)

Band Edge (802.11g-CH11)

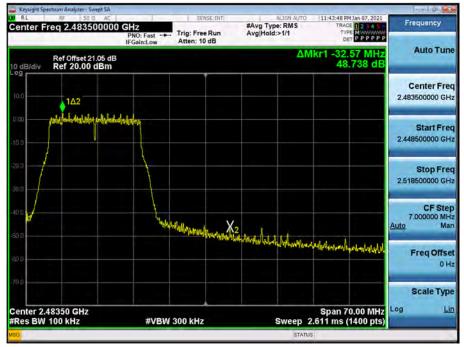




Frequency	MJan 07, 2021 CE 2345 PE MWWWWWW ET P P P P P P	TRAC		#Avg Typ Avg Hold			GHz PNO: Fast	RF 50.0 AC 1 eq 2.400000000	Center Fr
Auto Tur	Ref Offset 21.05 dB ΔMkr1 5.70 MHz 0 dB/div Ref 15.00 dBm 42.522 dB								
Center Fre 2.400000000 GF				142					E.cin
Start Fre 2.365000000 GF			alo-tholocladage	alantarilativy poly	denta fi				-5.00
Stop Fre 2.435000000 GH					1				-25.0
CF Ste 7.000000 MH Auto Ma	logophersmalilit	- Urunin			<2	inde-advert	geby lealingly and a	onijinati manifologi dani t	450 55.0 /
Freq Offse 0 F									65.0
Scale Typ	0.00 MHz	Span 7						0000 GHz	Center 2.4
	(1400 pts)	.611 ms (Sweep 2			300 kHz	#VBW		#Res BW

Band Edge (802.11n_HT20 -CH1)

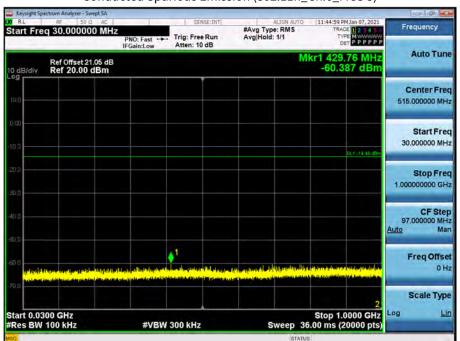
Band Edge (802.11n_HT20 -CH11)





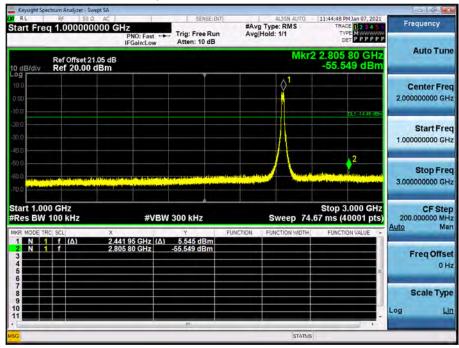
Test Plots(Conducted Spurious Emission)

30 MHz ~ 1 GHz



Conducted Spurious Emission (802.11n_Ch.6_MCS 3)

1 GHz ~ 3 GHz





3 GHz ~ 5 GHz



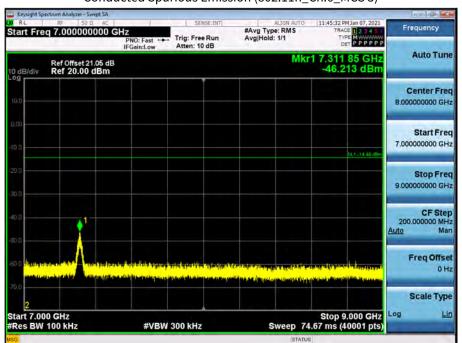
Conducted Spurious Emission (802.11n_Ch.6_MCS 3)

5 GHz ~ 7 GHz

Keysight Spectrum Analyzer - Swept SA RL RF S0 Ω AC tart Freq 5.000000000 G			ALIGN AUTO #Avg Type: RMS Avg[Hold: 1/1	11:45:21 PM Jan 07, 2021 TRACE 1 2 3 4 5 TYPE M	Frequency
Ref Offset 21.05 dB 0 dB/div Ref 20.00 dBm	T SUTTER		Mki	1 5.354 70 GHz -58.022 dBm	Auto Tun
18.0					Center Fre 6.000000000 GH
0.0				DL1 -14 45 dBm	Start Fre 5.000000000 GH
аў Бр					Stop Fre 7.00000000 G
0.0					CF Sto 200.000000 M Auto M
an and a survey of the last survey of	ng na ha bha bha ann an trach an sinn bha An da a' na bha ann an ann an ann an trach				Freq Offs 0
2 tart 5.000 GHz Res BW 100 kHz	#VBW 300 kH	7	Sweep 7/	Stop 7.000 GHz I.67 ms (40001 pts)	Scale Typ Log L

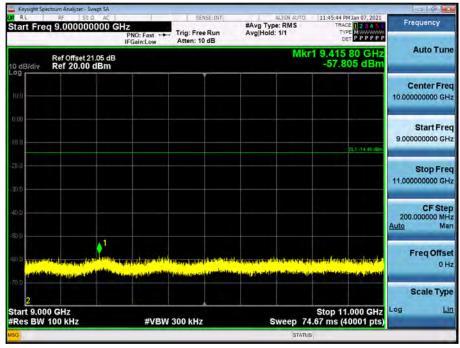


7 GHz ~ 9 GHz

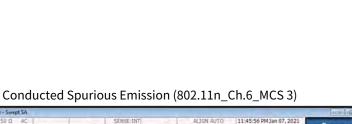


Conducted Spurious Emission (802.11n_Ch.6_MCS 3)

9 GHz ~ 11 GHz



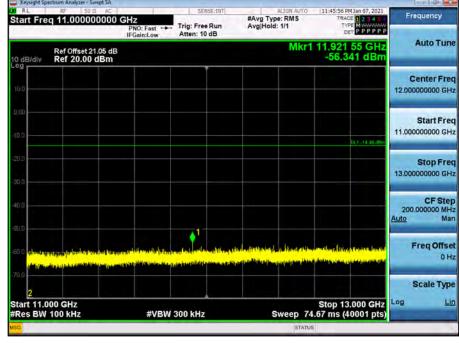
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Report No. HCT-RF-2101-FC122

11 GHz ~ 13 GHz C



13 GHz ~ 15 GHz

Conducted Spurious Emission (802.11n_Ch.6_MCS 3)

Keysight Spectr rum Analyzer - Swept SA 11:46:07 PM Jan 07, 2021 TRACE 12 3 4 5 TYPE MUSEUM DET P P P P P P Frequency Start Freq 13.000000000 GHz PNO: Fast +---IFGain:Low Trig: Free Run Atten: 10 dB #Avg Type: RMS Avg Hold: 1/1 Auto Tune 14.381 30 GHz -55.041 dBm Mkr Ref Offset 21.05 dB Ref 20.00 dBm 0 dB/ Center Freq 14.00000000 GHz Start Freq 13.00000000 GHz CL1-14.45 d Stop Freq 15.00000000 GHz CF Step 200.000000 MHz <u>to</u> Man Auto Freq Offset 0 Hz Scale Type Start 13.000 GHz #Res BW 100 kHz Stop 15.000 GHz Sweep 74.67 ms (40001 pts) Log Lin #VBW 300 kHz



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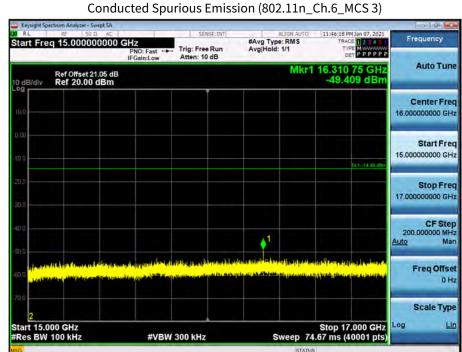
15 GHz ~ 17 GHz



17 GHz ~ 19 GHz



			1		estrum Analyzer - Swept SA	
Frequency	11:46:29 PM Jan 07, 2021 TRACE 1 2 3 4 5 TYPE MUSER DET P P P P P	#Avg Type: RMS Avg Hold: 1/1	SENSE:INT Trig: Free Run Atten: 10 dB	PNO: Fast	q 17.000000000 (RL tart Fre
Auto Tune	18.915 35 GHz -50.791 dBm	Mkr1			Ref Offset 21.05 dB Ref 20.00 dBm	0 dB/div
Center Freq 18.000000000 GHz						10.0
Start Freq 17.000000000 GHz	(L.1 - 14.45 dBm)					0.00
Stop Freq 19.000000000 GHz						3.j
CF Step 200.000000 MHz Auto Man						0.0 50.0
Freq Offset 0 Hz	a na spisol a balan ta baran da balantan. Ang balan panahan si akan da makinan.	ning self of post title in the self of the self Frank is a new self of the sel	andriftin for bas tractist Standard and standard	lan deriviteinder and <mark>Heine - Heine Heiner andere</mark>	lad generational difficult and an and a strategy of the second second second second second second second second	
Scale Type	atop 13.000 anz					2 tart 17.0
	.67 ms (40001 pts)	Sweep 74	SOU KHZ	#VBW :	100 KHZ	Res BW





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40 PM Jan 07, 2021 TRACE 1 2 3 4 5

Mkr1 20.869 90 GHz -49.170 dBm

TYPE MWWWWWW

1.14.452

0

Stop 21.000 GHz Sweep 74.67 ms (40001 pts)

Frequency

Auto Tune

Center Freq 20.000000000 GHz

Start Freq 19.00000000 GHz

Stop Freq 21.00000000 GHz

CF Step 200.000000 MHz <u>ito</u> Man

Freq Offset 0 Hz

Scale Type

Lin

Auto

Log



Ref Offset 21.05 dB Ref 20.00 dBm

Start Freq 19.000000000 GHz PNO: Fast ++ IFGain:Low Trig: Free Run Atten: 10 dB

Conducted Spurious Emission (802.11n_Ch.6_MCS 3)

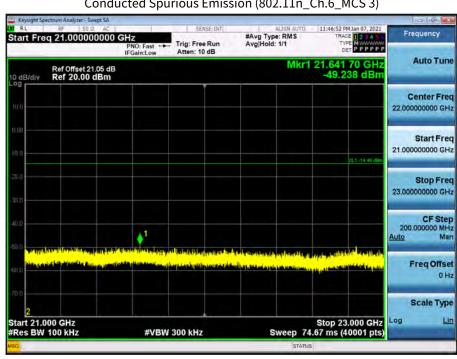
#Avg Type: RMS Avg|Hold: 1/1

21 GHz ~ 23 GHz

Start 19.000 GHz #Res BW 100 kHz

Conducted Spurious Emission (802.11n_Ch.6_MCS 3)

#VBW 300 kHz



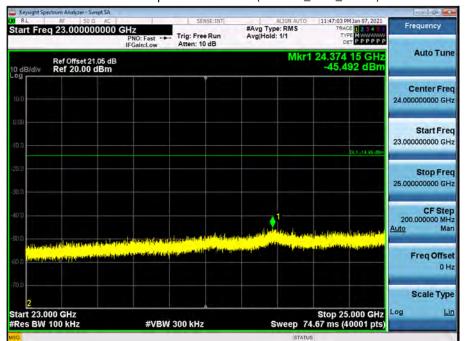


19 GHz ~ 21 GHz

- Key R

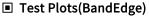


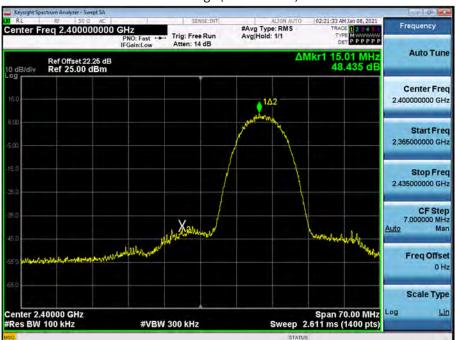
23 GHz ~ 25 GHz





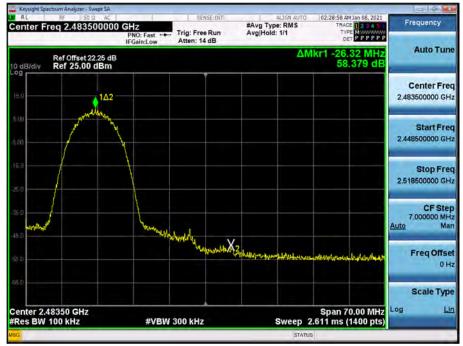
[External ANT_SISO]





Band Edge (802.11b-CH1)

Band Edge (802.11b-CH11)





Center Freq 2.400000	DOOD GHZ	Free Run	#Avg Type: RMS Avg Hold:>1/1	02:35:46 AM Jan 08, 2021 TRACE 1 2 3 4 5 TYPE M WWWWW DET P P P P P	Frequency
Ref Offset 22.2 0 dB/div Ref 15.00 dE	Auto Tune				
£ án			162		Center Free 2.400000000 GH
s#J			ingitalingu Dischictorianite		Start Free 2.365000000 GH
30		1			Stop Free 2.435000000 GH
450	whether and a failed and a start and a	×2		halalahahathanna	CF Ste 7.000000 MH Auto Ma
\$5.0					Freq Offse 0 H
750				Strop 70 00 Mills	Scale Type
Center 2.40000 GHz #Res BW 100 kHz	#VBW 300 k	Hz	Sweep State	Span 70.00 MHz 2.611 ms (1400 pts)	and the second

Band Edge (802.11g-CH1)

Band Edge (802.11g-CH11)





Frequency	1 Jan 08, 2021 E 1 2 3 4 5 E M W W P P P P	TRAC		#Avg Typ Avg Hold			CHZ PNO: Fast ↔	50 Ω AC 00000000	req 2.4		c R Cen
Auto Tun	51 MHz 049 dB	lkr1 17. 37.	ΔM				I GUILLOW	set 22.25 dB 0.00 dBm		B/div	0 di
Center Fre 2.400000000 GH											20.0
Start Fre 2.365000000 GF				alutati							
Stop Fre 2.435000000 GH					ſ						10.0 20.0
CF Ste 7.000000 MH Auto Ma		A Maria			1/2	Xan					30 D
Freq Offs 0 F	WWW HINNA					and the second sec	www.manduland	phthetaphypull	(asservations)	martin	-40 D
Scale Typ											68.0
Log L	0.00 MHz 1400 pts)	Span 7 611 ms (Sweep 2.			/ 300 kHz	#VBW		10000 C		

Band Edge (802.11n_HT20 -CH1)

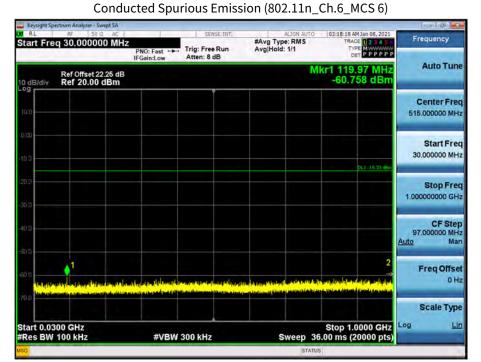
Band Edge (802.11n_HT20 -CH11)



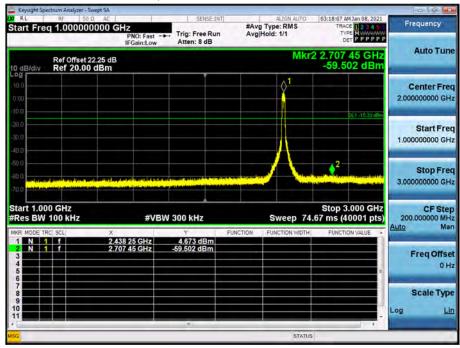


Test Plots(Conducted Spurious Emission)

30 MHz ~ 1 GHz



1 GHz ~ 3 GHz





3 GHz ~ 5 GHz



Conducted Spurious Emission (802.11n_Ch.6_MCS 6)

5 GHz ~ 7 GHz

RL RF 50 Ω AC tart Freq 5.000000000 G	PNO: Fast ++ Trig:	SENSE:INT	#Avg Type: RMS Avg[Hold: 1/1	03:18:41 AM Jan 08, 2021 TRACE 1 2 3 4 5 TYPE M DET P P P P P P	Frequency
Ref Offset 22.25 dB D dB/div Ref 20.00 dBm			Mk	r1 6.201 25 GHz -59.169 dBm	Auto Tun
00					Center Fre 6.000000000 GH
00				0(1.153)(@1	Start Fre 5.000000000 GF
s.)					Stop Fr 7.000000000 G
00					CF Sto 200.000000 M Auto M
2 A D Antoning the second states and the sec			1 Participanti at ja rani at atta santa yang sang badasa		Freq Offs 0
tart 5.000 GHz Res BW 100 kHz	#VBW 3001			Stop 7.000 GHz 4.67 ms (40001 pts)	Scale Typ



7 GHz ~ 9 GHz



Conducted Spurious Emission (802.11n_Ch.6_MCS 6)

9 GHz ~ 11 GHz

RL RF 50 Ω AC tart Freq 9.000000000 G	Hz PNO: Fast	SENSE:INT Trig: Free Run Atten: 8 dB	#Avg Type: RMS Avg[Hold: 1/1	03:19:04 AM Jan 08, 2021 TRACE 2 3 4 TYPE MWWWWW DET P P P P P P	Frequency
Ref Offset 22.25 dB dB/div Ref 20.00 dBm			Mkr	1 9.437 40 GHz -58.507 dBm	Auto Tun
80					Center Fre 10.000000000 GF
0.0				0.1 .1533 ages	Start Fre 9.000000000 GR
50					Stop Fr 11.000000000 G
0.0 0.0					CF St 200.000000 M <u>Auto</u> M
2 1	an of the part of	and all and a			Freq Offs 0
tart 9.000 GHz Res BW 100 kHz		300 kHz			Scale Typ

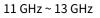
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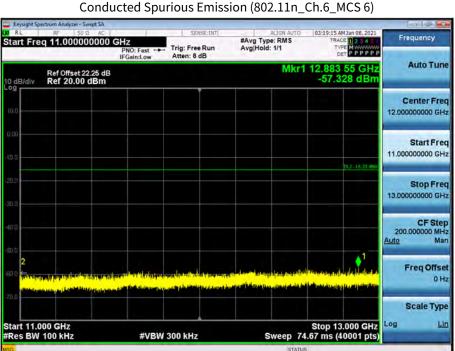
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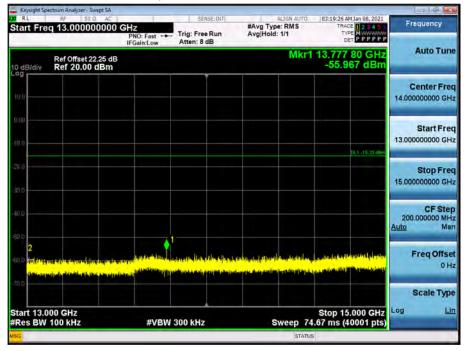
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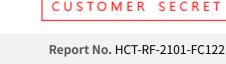
HCT



13 GHz ~ 15 GHz



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15 GHz ~ 17 GHz

Conducted Spurious Emission (802.11n_Ch.6_MCS 6)

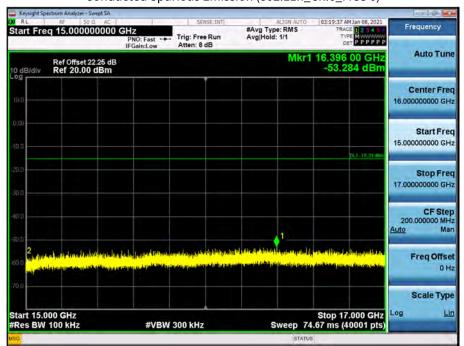
17 GHz ~ 19 GHz

um Analyzer - Swept SA

Conducted Spurious Emission (802.11n_Ch.6_MCS 6)

Keysight Spect 03:19:49 AM Jan 08, 2021 Frequency #Avg Type: RMS Avg Hold: 1/1 Start Freg 17.000000000 GHz PNO: Fast ++-IFGain:Low Atten: 8 dB TYPE MUSER PPPPP Auto Tune 18.922 90 GHz -50.921 dBm Mkr1 Ref Offset 22.25 dB Ref 20.00 dBm 0 dB/c Center Freq 18.00000000 GHz Start Freq 17.00000000 GHz Stop Freq 19.00000000 GHz CF Step 200.000000 MHz Ito Man Auto Freq Offset 0 Hz Scale Type Start 17.000 GHz #Res BW 100 kHz Stop 19.000 GHz Sweep 74.67 ms (40001 pts) Log Lin

#VBW 300 kHz





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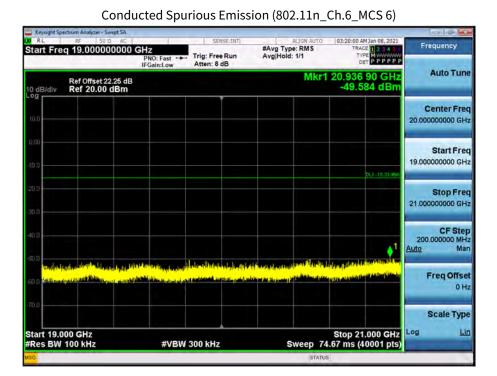
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19 GHz ~ 21 GHz



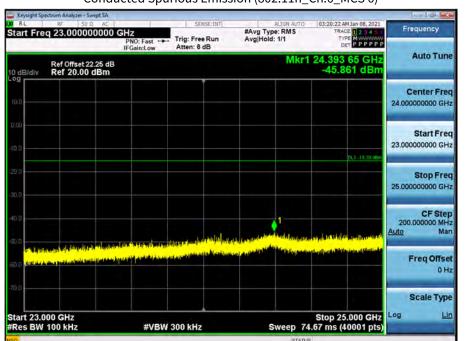
21 GHz ~ 23 GHz

Frequency	03:20:11 AM Jan 08, 2021 TRACE 2 3 4 5 TYPE M DET P P P P P	ALIGN AUTO Type: RMS old: 1/1	rig: Free Run Atten: 8 dB	HZ PNO: Fast +++ IFGain:Low		RF 501 21.00000		R Sta	
Auto Tur	21.215 45 GHz -49.338 dBm	Mkr1			Ref Offset 22.25 dB 10 dB/div Ref 20.00 dBm				
Center Fre 22,000000000 GF								10.0	
Start Fre 21.000000000 GF	0(1,153).@=								
Stop Fre 23.00000000 GH									
CF Ste 200.000000 MH Auto Ma						↓ ¹			
Freq Offs 0 F	i jan daha teta ti ang pangangan Panang pangangan teta tang pangangangan Panang pangangangan teta tang panganganganganganganganganganganganganga		staan fallen die Bereiken Verband van die Serekanders	Di la lin Hinkopla Tarvin Dana ja avat	aile à chine Recordered	andra differ Herry New York New Jones	Ny barba <u>N</u> isampon		
Scale Typ	otop 23.000 GHZ					00 GHz			
_og [.67 ms (40001 pts)	Sweep 74	00 kHz	#VBW :		00 GHz 100 kHz			



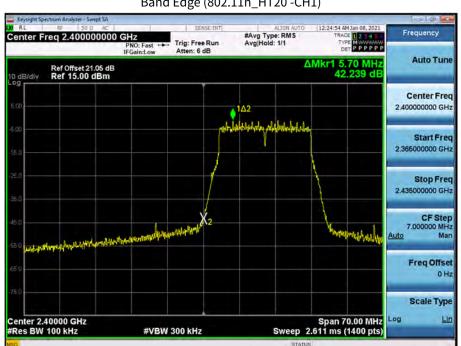
23 GHz ~ 25 GHz

HCT



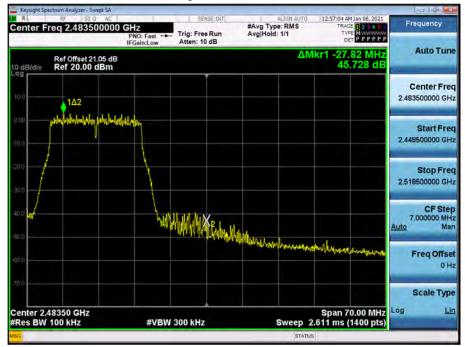


[Internal ANT_MIMO] Test Plots(BandEdge)



Band Edge (802.11n_HT20 -CH1)

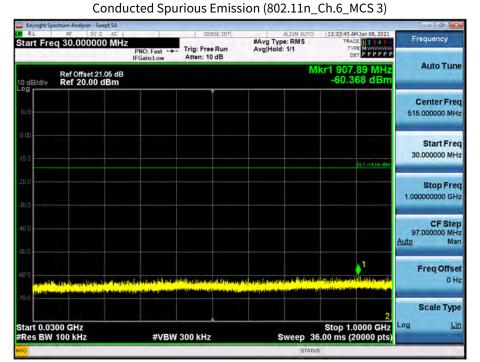
Band Edge (802.11n_HT20 -CH11)



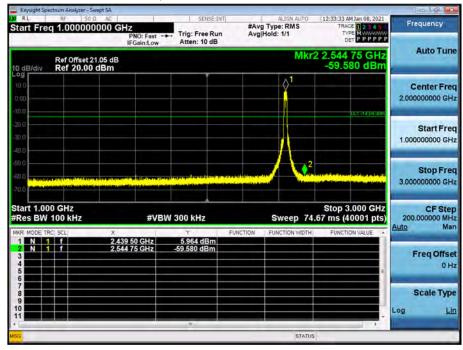


Test Plots(Conducted Spurious Emission)

30 MHz ~ 1 GHz

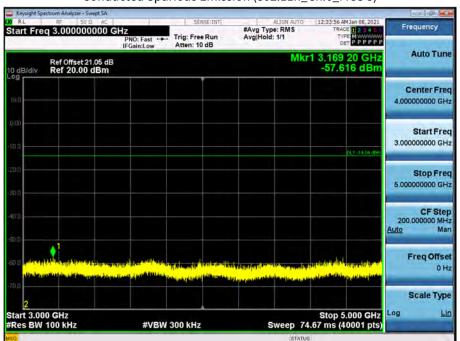


1 GHz ~ 3 GHz



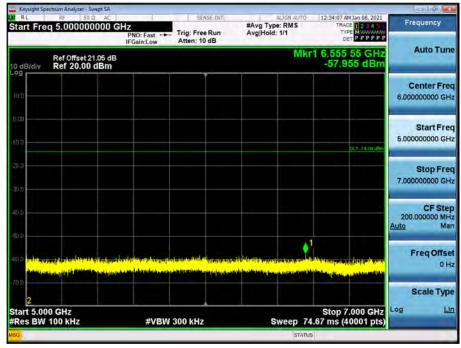


3 GHz ~ 5 GHz



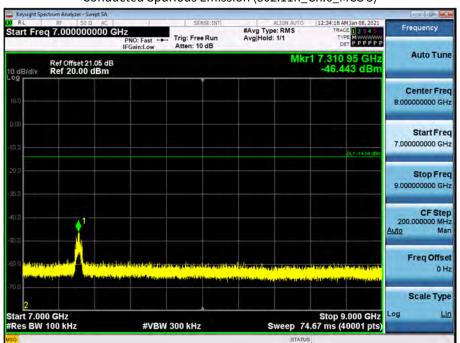
Conducted Spurious Emission (802.11n_Ch.6_MCS 3)

5 GHz ~ 7 GHz



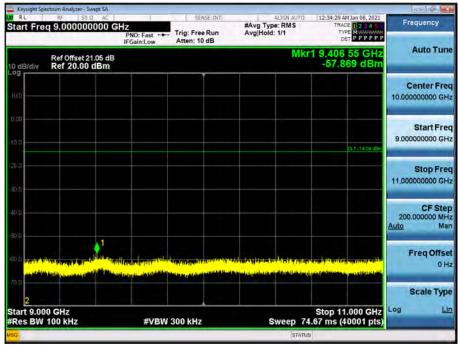


7 GHz ~ 9 GHz



Conducted Spurious Emission (802.11n_Ch.6_MCS 3)

9 GHz ~ 11 GHz



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Report No. HCT-RF-2101-FC122

Frequency







Key

R

Start Freq 11.000000000 GHz PNO: Fast ++ IFGain:Low Trig: Free Run Atten: 10 dB Auto Tune Ref Offset 21.05 dB Ref 20.00 dBm Center Freq 12.000000000 GHz Start Freq 11.00000000 GHz Stop Freq 13.00000000 GHz CF Step 200.000000 MHz <u>ito</u> Man Auto 1 Freq Offset 0 Hz Scale Type Start 11.000 GHz #Res BW 100 kHz Stop 13.000 GHz Sweep 74.67 ms (40001 pts) Log Lin #VBW 300 kHz

13 GHz ~ 15 GHz

Conducted Spurious Emission (802.11n_Ch.6_MCS 3)

Keysight Spect um Analyzer - Swept SA 12:34:51 AM Jan 08, 2021 TRACE 0 Frequency #Avg Type: RMS Avg Hold: 1/1 Start Freg 13.000000000 GHz PNO: Fast ++-IFGain:Low Atten: 10 dB TYPE M Auto Tune 13.619 35 GHz -55.907 dBm Mkr Ref Offset 21.05 dB Ref 20.00 dBm 0 dB/ Center Freq 14.00000000 GHz Start Freq 13.00000000 GHz DL1-14/04 (8 Stop Freq 15.00000000 GHz CF Step 200.000000 MHz Ito Man Auto Freq Offset 0 Hz Scale Type Start 13.000 GHz #Res BW 100 kHz Stop 15.000 GHz Sweep 74.67 ms (40001 pts) Log Lin #VBW 300 kHz



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Frequency

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15 GHz ~ 17 GHz

Key

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03 AM Jan 08, 2021 TRACE 1 2 3 4 5 TYPE M 0000000 DET P P P P P P Start Freq 15.000000000 GHz PNO: Fast ++ IFGain:Low Trig: Free Run Atten: 10 dB Auto Tune Mkr1 16.244 35 GHz -52.171 dBm Ref Offset 21.05 dB Ref 20.00 dBm Center Freq 16.000000000 GHz Start Freq 15.00000000 GHz Stop Freq 17.00000000 GHz CF Step 200.000000 MHz <u>ito</u> Man Auto 1 Freq Offset 0 Hz Scale Type Start 15.000 GHz #Res BW 100 kHz Stop 17.000 GHz Sweep 74.67 ms (40001 pts) Log Lin #VBW 300 kHz

Conducted Spurious Emission (802.11n_Ch.6_MCS 3)

#Avg Type: RMS Avg|Hold: 1/1

17 GHz ~ 19 GHz

Conducted Spurious Emission (802.11n_Ch.6_MCS 3)

um Analyzer - Swept SA Keysight Spect 12:35:14 AM Jan 08, 2021 TRACE Frequency #Avg Type: RMS Avg Hold: 1/1 Start Freg 17.000000000 GHz PNO: Fast ++-IFGain:Low Atten: 10 dB TYPE M Auto Tune 18.925 10 GHz -50.153 dBm Mkr1 Ref Offset 21.05 dB Ref 20.00 dBm 0 dB/ Center Freq 18.00000000 GHz Start Freq 17.00000000 GHz DL1-14:04 d Stop Freq 19.00000000 GHz CF Step 200.000000 MHz Ito Man Auto Freq Offset 0 Hz Scale Type Start 17.000 GHz #Res BW 100 kHz Stop 19.000 GHz Sweep 74.67 ms (40001 pts) Log Lin #VBW 300 kHz





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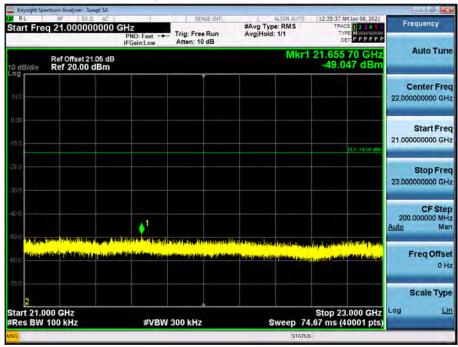


19 GHz ~ 21 GHz



Conducted Spurious Emission (802.11n_Ch.6_MCS 3)

21 GHz ~ 23 GHz



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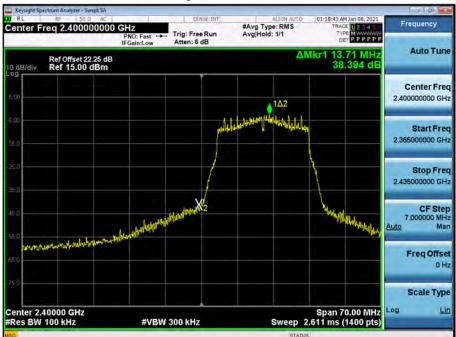
23 GHz ~ 25 GHz

		1				RL RF			
Frequency	12:35:48 AM Jan 08, 2021 TRACE 1 2 3 4 5 TYPE M	#Avg Type: RMS Avg Hold: 1/1	ig: Free Run	PNO: Fast		RL RF tart Freq 23.0			
Auto Tune	24.346 15 GHz -45.026 dBm	Mkr1		Gan.LOw	Ref Offset 21.05 dB				
Center Free 24.000000000 GH						ė.0			
Start Free 23.000000000 GH	ČL1-14.04 dBir.					ai			
Stop Fre 25.000000000 GH						op			
CF Step 200.000000 MH Auto Mar	h an de fan de de sjoer anteres	1	1. Alexand 30 States	1. Alt M. 1	a p. i No. 201 March and Mar	op			
Freq Offse 0 H	aniddeffed faander 103	n a star a s	Lessing and the story		an an an an Andreas an Andreas An Antonia an Angrae an Angrae an Angrae an Angrae an Angrae an Angrae an Angrae Angrae an Angrae an An	on the second			
Scale Type	Stop 25.000 GHz	Sweep 74		#VBW 3		2 tart 23.000 GH Res BW 100 kl			



[External ANT_MIMO]

Test Plots(BandEdge)



Band Edge (802.11n_HT20 -CH1)

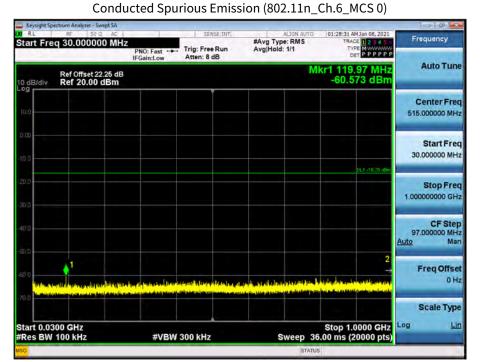
Band Edge (802.11n_HT20 -CH11)



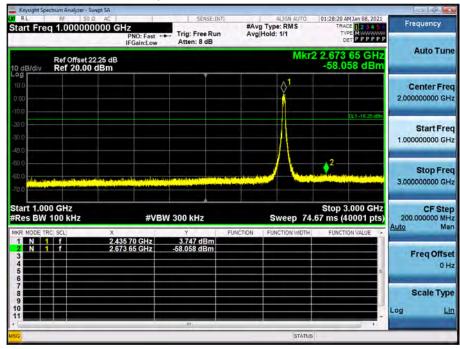


Test Plots(Conducted Spurious Emission)

30 MHz ~ 1 GHz

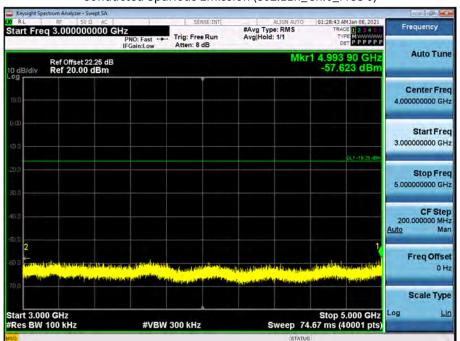


1 GHz ~ 3 GHz





3 GHz ~ 5 GHz



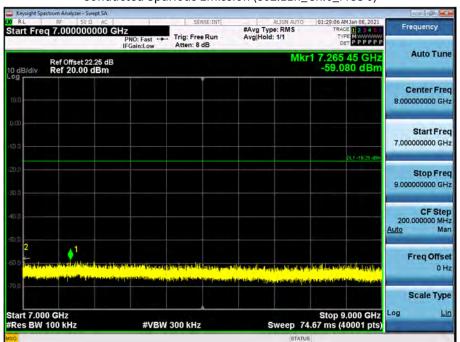
Conducted Spurious Emission (802.11n_Ch.6_MCS 0)

5 GHz ~ 7 GHz

RL RF 50 Ω AC tart Freq 5.000000000 G	Hz PNO: Fast	SENSE:INT Trig: Free Run Atten: 8 dB	#Avg Type: RMS Avg[Hold: 1/1		
Ref Offset 22.25 dB dB/div Ref 20.00 dBm			N	1kr1 5.944 50 GHz -58.543 dBm	Auto Tun
α <u>α</u>					Center Fre 6.000000000 GH
0.0				OLT HE 25 GBG	Start Fre 5.00000000 G
5.0 00				DU 41625 (56	Stop Fre 7.000000000 G
op					CF St 200.000000 M Auto M
2 ¹⁰			ne ann a tha a' Marainn an an an an ta	Contraction of the contract	Freq Offs 0
tart 5.000 GHz Res BW 100 kHz		300 kHz		Stop 7.000 GHz 74.67 ms (40001 pts)	Scale Tyj Log <u>L</u>

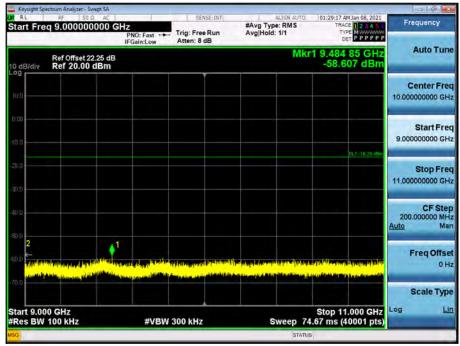


7 GHz ~ 9 GHz



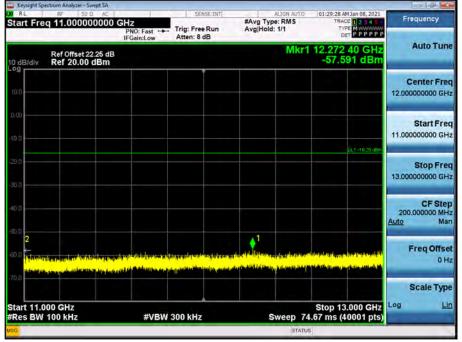
Conducted Spurious Emission (802.11n_Ch.6_MCS 0)

9 GHz ~ 11 GHz



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11 GHz ~ 13 GHz



Conducted Spurious Emission (802.11n_Ch.6_MCS 0)

13 GHz ~ 15 GHz

Conducted Spurious Emission (802.11n_Ch.6_MCS 0)

Keysight Spect um Analyzer - Swept SA 01:29:39 AM Jan 08, 2021 TRACE 1 2 3 4 5 TYPE MUSEUM DET P P P P P P Frequency #Avg Type: RMS Avg Hold: 1/1 Start Freg 13.000000000 GHz PNO: Fast ++-IFGain:Low Atten: 8 dB Auto Tune 14.966 15 GHz -56.249 dBm Mkr1 Ref Offset 22.25 dB Ref 20.00 dBm 0 dB/c Center Freq 14.00000000 GHz Start Freq 13.00000000 GHz Stop Freq 15.00000000 GHz CF Step 200.000000 MHz Ito Man Auto Freq Offset 0 Hz Scale Type Start 13.000 GHz #Res BW 100 kHz Stop 15.000 GHz Sweep 74.67 ms (40001 pts) Log Lin #VBW 300 kHz



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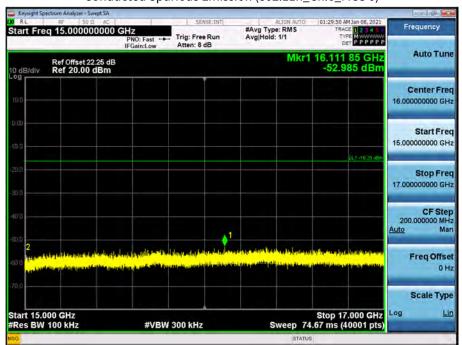
15 GHz ~ 17 GHz

Conducted Spurious Emission (802.11n_Ch.6_MCS 0)

17 GHz ~ 19 GHz

Conducted Spurious Emission (802.11n_Ch.6_MCS 0)

um Analyzer - Swept SA Keysight Spects 01:30:01 AM Jan 08, 2021 TRACE 1 2 3 4 5 TYPE MUSEUM DET P P P P P P Frequency #Avg Type: RMS Avg Hold: 1/1 Start Freg 17.000000000 GHz PNO: Fast ++-IFGain:Low Atten: 8 dB Auto Tune 18.914 05 GHz -49.822 dBm Mkr1 Ref Offset 22.25 dB Ref 20.00 dBm 0 dB/d Center Freq 18.00000000 GHz Start Freq 17.00000000 GHz Stop Freq 19.00000000 GHz CF Step 200.000000 MHz Ito Man Auto Freq Offset 0 Hz Scale Type Start 17.000 GHz #Res BW 100 kHz Stop 19.000 GHz Sweep 74.67 ms (40001 pts) Log Lin #VBW 300 kHz

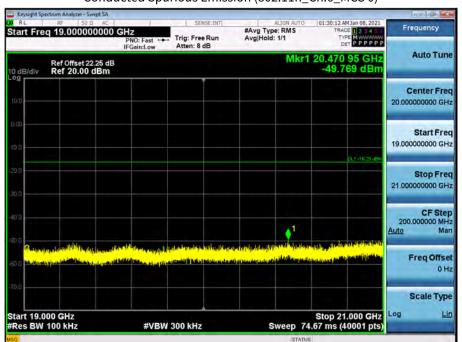




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19 GHz ~ 21 GHz



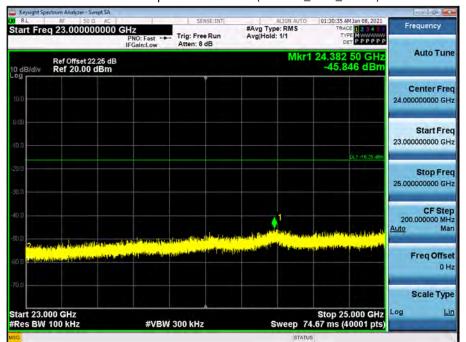
Conducted Spurious Emission (802.11n_Ch.6_MCS 0)

21 GHz ~ 23 GHz

Frequency	01:30:24 AM Jan 08, 2021 TRACE 2 3 4 5 TYPE M DET P P P P P	ALIGN AUTO Type: RMS fold: 1/1	SEN Trig: Free Atten: 8 d	PNO: Fast	DA AC	RF 5	RL		
Auto Tur	21.248 15 GHz -49.271 dBm	Mkr1			Ref Offset 22.25 dB 10 dB/div Ref 20.00 dBm				
Center Fre 22.000000000 GR							10.0		
Start Fre 21.00000000 GF							0.00		
Stop Fre 23.00000000 GR	DL1 -18.25 dBn						30 0		
CF Ste 200.000000 Mi Auto Mi							40.0		
Freq Offs 01	, and a loss of the loss of th						50.0 27447 60.0 60.0		
Scale Typ	04 00 000 011-					00.011-	70.0		
	.67 ms (40001 pts)	Sweep 74	300 kHz	#VBW :		00 GH2 100 kHz	Start 21. Res BW		



23 GHz ~ 25 GHz





9.6 RADIATED SPURIOUS EMISSIONS

Frequency Range : 9 kHz – 30MHz

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

Note:

1. The reading of emissions are attenuated more than 20 dB below the permissible limits or the field strength is too small to be measured.

2. Distance extrapolation factor = 40log (specific distance / test distance) (dB)

3. Limit line = specific Limits (dBuV) + Distance extrapolation factor

Frequency Range : Below 1 GHz

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

Note:

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



[Internal Ant SISO]

Frequency Range : Above 1 GHz

Operation Mode:	802.11b
Transfer Rate:	1 Mbps
Operating Frequency	2412
Channel No.	01 Ch

Frequency	Reading	AN.+CL-AMP G	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dBuV]	[dB]	[H/V]	[dBuV/m]	[dBuV/m]	[dB]	Туре
4824	40.96	3.62	V	44.58	73.98	29.40	PK
4824	29.55	3.62	V	33.17	53.98	20.81	AV
7236	46.99	9.26	V	56.25	73.98	17.73	PK
7236	40.65	9.26	V	49.91	53.98	4.07	AV
4824	41.29	3.62	Н	44.91	73.98	29.07	PK
4824	29.64	3.62	Н	33.26	53.98	20.72	AV
7236	45.39	9.26	Н	54.65	73.98	19.33	PK
7236	39.58	9.26	Н	48.84	53.98	5.14	AV

Operation Mode:	802.11g
Transfer Rate:	6 Mbps
Operating Frequency	2412
Channel No.	01 Ch

Frequency	Reading	Duty Cycle Factor	AN.+CL	ANT.	Total	Limit	Margin	Maaauramant
riequency	Reauling	Duty Cycle Pactor	-AMP G	POL	TOLAL	LIIIIIL	Margin	Measurement Type
[MHz]	[dBuV]	[dB]	[dB]	[H/V]	[dBuV/m]	[dBuV/m]	[dB]	Турс
4824	40.68	0.000	3.62	V	44.30	73.98	29.68	PK
4824	29.22	0.201	3.62	V	33.04	53.98	20.94	AV
7236	45.14	0.000	9.26	V	54.40	73.98	19.58	PK
7236	31.72	0.201	9.26	V	41.18	53.98	12.80	AV
4824	41.61	0.000	3.62	Н	45.23	73.98	28.75	PK
4824	29.52	0.201	3.62	Н	33.34	53.98	20.64	AV
7236	44.98	0.000	9.26	Н	54.24	73.98	19.74	PK
7236	30.57	0.201	9.26	Н	40.03	53.98	13.95	AV



Operation Mode:	802.11n (HT20)		
Transfer MCS Index:	0		
Operating Frequency	2412		
Channel No.	01 Ch		

Frequency	Reading	Duty Cycle Factor	AN.+CL	ANT.	Total	Limit	Margin Measuremen	Measurement
	Redding	Buty Cycle Puctor	-AMP G	POL	Totat	Liint		Туре
[MHz]	[dBuV]	[dB]	[dB]	[H/V]	[dBuV/m]	[dBuV/m]	[dB]	туре
4824	40.89	0.000	3.62	V	44.51	73.98	29.47	PK
4824	29.27	0.234	3.62	V	33.12	53.98	20.86	AV
7236	44.65	0.000	9.26	V	53.91	73.98	20.07	PK
7236	29.31	0.234	9.26	V	38.80	53.98	15.18	AV
4824	41.49	0.000	3.62	Н	45.11	73.98	28.87	PK
4824	29.47	0.234	3.62	Н	33.32	53.98	20.66	AV
7236	42.96	0.000	9.26	Н	52.22	73.98	21.76	PK
7236	29.28	0.234	9.26	Н	38.77	53.98	15.21	AV



Operation Mode:	802.11b
Transfer Rate:	1 Mbps
Operating Frequency	2437
Channel No.	06 Ch

Frequency	Reading	AN.+CL-AMP G	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dBuV]	[dB]	[H/V]	[dBuV/m]	[dBuV/m]	[dB]	Туре
4874	40.43	3.36	V	43.79	73.98	30.19	PK
4874	29.11	3.36	V	32.47	53.98	21.51	AV
7311	45.23	10.27	V	55.50	73.98	18.48	PK
7311	38.32	10.27	V	48.59	53.98	5.39	AV
4874	41.15	3.36	Н	44.51	73.98	29.47	PK
4874	29.15	3.36	Н	32.51	53.98	21.47	AV
7311	45.18	10.27	Н	55.45	73.98	18.53	PK
7311	37.96	10.27	Н	48.23	53.98	5.75	AV

Operation Mode:	802.11g
Transfer Rate:	6 Mbps
Operating Frequency	2437
Channel No.	06 Ch

Frequency	Reading	Duty Cycle Factor	AN.+CL	ANT.	Total	Limit	Margin	Maaaaat
Frequency	Reduing	Duty Cycle Factor	-AMP G	POL	TOLAL	LIIIIIL	Margin	Measurement Type
[MHz]	[dBuV]	[dB]	[dB]	[H/V]	[dBuV/m]	[dBuV/m]	[dB]	
4874	40.17	0.000	3.36	V	43.53	73.98	30.45	PK
4874	28.33	0.201	3.36	V	31.89	53.98	22.09	AV
7311	50.60	0.000	10.27	V	60.87	73.98	13.11	PK
7311	37.52	0.201	10.27	V	47.99	53.98	5.99	AV
4874	40.88	0.000	3.36	Н	44.24	73.98	29.74	PK
4874	28.45	0.201	3.36	Н	32.01	53.98	21.97	AV
7311	49.35	0.000	10.27	Н	59.62	73.98	14.36	PK
7311	35.87	0.201	10.27	Н	46.34	53.98	7.64	AV



Operation Mode:	802.11n (HT20)			
Transfer MCS Index:	0			
Operating Frequency	2437			
Channel No.	06 Ch			

Frequency	Reading	Duty Cycle Factor	AN.+CL -AMP G	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dBuV]	[dB]	[dB]	[H/V]	[dBuV/m]	[dBuV/m]	[dB]	Туре
4874	39.98	0.000	3.36	V	43.34	73.98	30.64	PK
4874	28.27	0.234	3.36	V	31.86	53.98	22.12	AV
7311	51.10	0.000	10.27	V	61.37	73.98	12.61	PK
7311	37.20	0.234	10.27	V	47.70	53.98	6.28	AV
4874	40.03	0.000	3.36	Н	43.39	73.98	30.59	PK
4874	28.33	0.234	3.36	Н	31.92	53.98	22.06	AV
7311	50.93	0.000	10.27	Н	61.20	73.98	12.78	PK
7311	35.32	0.234	10.27	Н	45.82	53.98	8.16	AV



Operation Mode:	802.11b	
Transfer Rate:	1 Mbps	
Operating Frequency	2462	
Channel No.	11 Ch	

Frequency	Reading	AN.+CL-AMP G	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dBuV]	[dB]	[H/V]	[dBuV/m]	[dBuV/m]	[dB]	Туре
4924	40.89	2.80	V	43.69	73.98	30.29	PK
4924	30.03	2.80	V	32.83	53.98	21.15	AV
7386	44.11	11.07	V	55.18	73.98	18.80	PK
7386	36.45	11.07	V	47.52	53.98	6.46	AV
4924	39.78	2.80	Н	42.58	73.98	31.40	PK
4924	29.77	2.80	Н	32.57	53.98	21.41	AV
7386	43.96	11.07	Н	55.03	73.98	18.95	PK
7386	35.69	11.07	Н	46.76	53.98	7.22	AV

Operation Mode:	802.11g
Transfer Rate:	6 Mbps
Operating Frequency	2462
Channel No.	11 Ch

Frequency	Reading	Duty Cycle Factor	AN.+CL	ANT.	Total	Limit	Margin	Maaaaaa
Frequency	Reduing	Duty Cycle Factor	-AMP G	POL	TOLAL		Margin - [dB]	Measurement Type
[MHz]	[dBuV]	[dB]	[dB]	[H/V]	[dBuV/m]	[dBuV/m]	[UD]	Type
4924	39.84	0.000	2.80	V	42.64	73.98	31.34	PK
4924	28.01	0.201	2.80	V	31.01	53.98	22.97	AV
7386	44.06	0.000	11.07	V	55.13	73.98	18.85	PK
7386	31.13	0.201	11.07	V	42.40	53.98	11.58	AV
4924	39.45	0.000	2.80	Н	42.25	73.98	31.73	PK
4924	28.00	0.201	2.80	Н	31.00	53.98	22.98	AV
7386	43.64	0.000	11.07	Н	54.71	73.98	19.27	PK
7386	30.58	0.201	11.07	Н	41.85	53.98	12.13	AV



Operation Mode:	802.11n (HT20)
Transfer MCS Index:	0
Operating Frequency	2462
Channel No.	11 Ch

Frequency	Reading	Duty Cycle Factor	AN.+CL	ANT.	Total Limit		Margin	Measurement
			-AMP G	POL			[dB]	Туре
[MHz]	[dBuV]	[dB]	[dB]	[H/V]	[dBuV/m]	[dBuV/m]	[UD]	Type
4924	39.62	0.000	2.80	V	42.42	73.98	31.56	PK
4924	28.00	0.234	2.80	V	31.04	53.98	22.94	AV
7386	43.39	0.000	11.07	V	54.46	73.98	19.52	PK
7386	30.03	0.234	11.07	V	41.34	53.98	12.64	AV
4924	39.58	0.000	2.80	Н	42.38	73.98	31.60	PK
4924	27.98	0.234	2.80	Н	31.02	53.98	22.96	AV
7386	42.68	0.000	11.07	Н	53.75	73.98	20.23	PK
7386	29.68	0.234	11.07	Н	40.99	53.98	12.99	AV

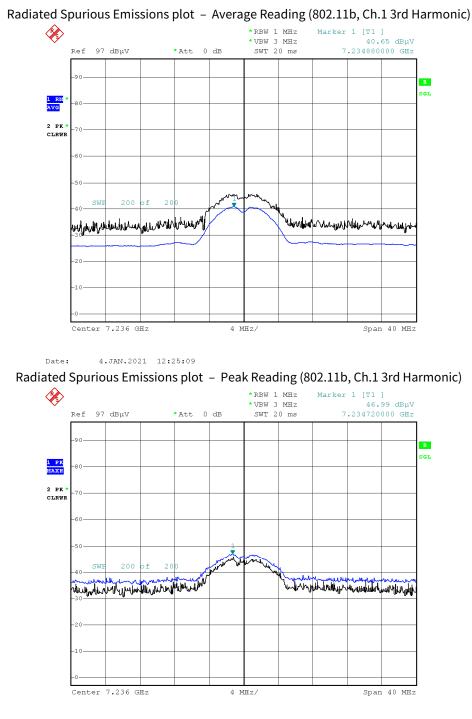
Note:

All configurations of antenna were investigated and the worst case(Internal Ant SISO) configuration results are reported.





Test Plots (Worst case : X-V)



Date: 4.JAN.2021 12:25:22

Note:

Plot of worst case are only reported.



9.7 RADIATED RESTRICTED BAND EDGES

[Internal Ant SISO]					
Operation Mode:	802.11b				
Transfer Rate:	1 Mbps				
Operating Frequency	2412 MHz, 2462 MHz				
Channel No.	01 Ch, 11 Ch				

Frequency	Reading	AN.+CL -AMP G	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dBuV]	[dB]	[H/V]	[dBuV/m]	[dBuV/m]	[dB]	Туре
2390.0	49.27	0.94	Н	50.21	73.98	23.77	PK
2390.0	40.07	0.94	Н	41.01	53.98	12.97	AV
2390.0	50.38	0.94	V	51.32	73.98	22.66	PK
2390.0	40.99	0.94	V	41.93	53.98	12.05	AV
2483.5	47.69	1.20	Н	48.89	73.98	25.09	PK
2483.5	38.28	1.20	Н	39.48	53.98	14.50	AV
2483.5	48.43	1.20	V	49.63	73.98	24.35	PK
2483.5	38.73	1.20	V	39.93	53.98	14.05	AV

Operation Mode:	802.11g		
Transfer Rate:	6 Mbps		
Operating Frequency	2412 MHz, 2462 MHz		
Channel No.	01 Ch, 11 Ch		

Frequency	Reading	Duty Cycle	AN.+CL -AMP G	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dBuV]	Factor [dB]	[dB]	[H/V]	[dBuV/m]	[dBuV/m]	[dB]	Туре
2390.0	61.55	0.000	0.94	Н	62.49	73.98	11.49	PK
2390.0	47.01	0.201	0.94	Н	48.15	53.98	5.83	AV
2390.0	62.31	0.000	0.94	V	63.25	73.98	10.73	PK
2390.0	47.66	0.201	0.94	V	48.80	53.98	5.18	AV
2483.5	63.58	0.000	1.20	Н	64.78	73.98	9.20	PK
2483.5	47.91	0.201	1.20	Н	49.31	53.98	4.67	AV
2483.5	64.84	0.000	1.20	V	66.04	73.98	7.94	PK
2483.5	48.86	0.201	1.20	V	50.26	53.98	3.72	AV



Operation Mode:	802.11n (HT20)
Transfer Rate:	0
Operating Frequency	2412 MHz, 2462 MHz
Channel No.	01 Ch, 11 Ch

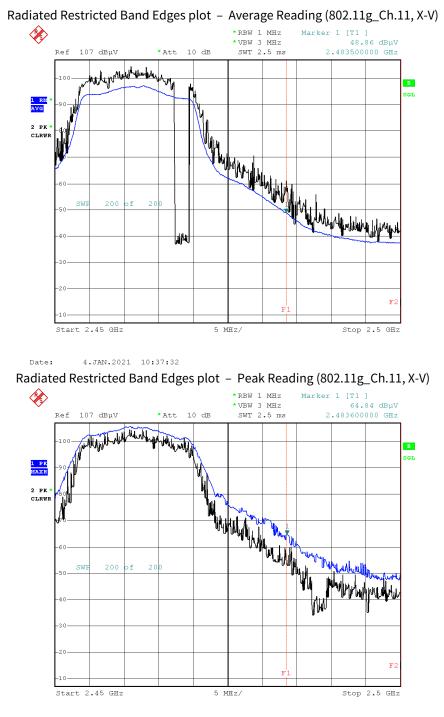
Frequency	Reading	Duty Cycle	AN.+CL -AMP G	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dBuV]	Factor [dB]	[dB]	[H/V]	[dBuV/m]	[dBuV/m]	[dB]	Туре
2390.0	63.17	0.000	0.94	Н	64.11	73.98	9.87	PK
2390.0	46.20	0.234	0.94	Н	47.38	53.98	6.60	AV
2390.0	64.96	0.000	0.94	V	65.90	73.98	8.08	PK
2390.0	47.06	0.234	0.94	V	48.24	53.98	5.74	AV
2483.5	64.47	0.000	1.20	Н	65.67	73.98	8.31	PK
2483.5	47.29	0.234	1.20	Н	48.72	53.98	5.26	AV
2483.5	65.21	0.000	1.20	V	66.41	73.98	7.57	PK
2483.5	48.01	0.234	1.20	V	49.44	53.98	4.54	AV

Note:

All configurations of antenna were investigated and the worst case(Internal Ant SISO) configuration results are reported.

Test Plots

HCT



Date: 4.JAN.2021 10:37:48

Note:

Plot of worst case are only reported.



10. LIST OF TEST EQUIPMENT

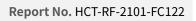
Conducted Test

		Calibratio	Calibratio		
Manufacturer	Model / Equipment	n	n	Serial No.	
		Date	Interval		
Rohde &	ENV216 / LISN	00/04/2020	Annual	102245	
Schwarz		09/04/2020	Annual	102245	
Rohde &	ESCI / Test Dessiver	06/10/2020	Annual	100584	
Schwarz	ESCI / Test Receiver	06/10/2020	Annual	100564	
ESPAC	SU-642 /Temperature Chamber	03/18/2020	Annual	0093008124	
Agilent	N9030A / Signal Analyzer	01/11/2021	Annual	MY49431210	
Rohde &	OCD 120 / Deuver Massaurement Cat	07/02/2020	امريم	101001	
Schwarz	OSP 120 / Power Measurement Set	07/02/2020	Annual	101231	
Agilent	N1911A / Power Meter	04/07/2020	Annual	MY45100523	
Keysight	N1921A / Power Sensor	06/08/2020	Annual	MY57820067	
Agilent	87300B / Directional Coupler	11/10/2020	Annual	3116A03621	
Hewlett	11007D / Dower Colittor	05/25/2020	امريم	05001	
Packard	11667B / Power Splitter	05/25/2020	Annual	05001	
Hewlett	E3632A / DC Power Supply	06/12/2020	Annual	KD22202060	
Packard	ES652A/ DC Power Supply	y 06/12/2020		KR75303960	
Agilent	8493C / Attenuator(10 dB)	06/26/2020	Annual	07560	
Rohde &	EMC32 / Software	N/A	N/A	N/A	
Schwarz	EMICSZ/ SUILWAIE	N/A	IN/A	IN/A	
HCT CO., LTD.	FCC WLAN&BT&BLE Conducted Test	N/A	N/A	N/A	
nci co., Li D.	Software v3.0	IN/A	IN/#	IN/ <i>I</i> N	
Rohde &	CBT / Bluetooth Tester	05/12/2020	Annual	100422	
Schwarz		03/12/2020	Annual	100422	
Agilent	11636A / Power Divider	07/24/2020	Annual	9109	
Agilent	N5182A / Vector Signal Generator	08/26/2020	Annual	MY50140312	

Note:

1. Equipment listed above that calibrated during the testing period was set for test after the calibration.

2. Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.





Radiated Test

Manufacturer	Model / Equipment	Calibration Date	Calibration Interval	Serial No.
Innco system	CO3000 / Controller(Antenna mast)	N/A	N/A	CO3000-4p
Innco system	MA4640/800-XP-EP / Antenna Position Tower	N/A	N/A	N/A
Emco	2090 / Controller	N/A	N/A	060520
Ets	Turn Table	N/A	N/A	N/A
Rohde & Schwarz	Loop Antenna	05/18/2020	Biennial	1513-175
Schwarzbeck	VULB 9160 / Hybrid Antenna	08/19/2020	Biennial	9160-3368
Schwarzbeck	VULB 9168 / Hybrid Antenna	09/04/2020	Biennial	9168-0895
Schwarzbeck	BBHA 9120D / Horn Antenna	11/18/2019	Biennial	9120D-1191
Schwarzbeck	BBHA9170 / Horn Antenna(15 GHz ~ 40 GHz)	11/29/2019	Biennial	BBHA9170541
Rohde & Schwarz	FSP(9 kHz ~ 30 GHz) / Spectrum Analyzer	09/14/2020	Annual	836650/016
Rohde & Schwarz	FSV40-N / Spectrum Analyzer	09/22/2020	Annual	101068-SZ
Wainwright Instruments	WRCJV2400/2483.5-2370/2520- 60/12SS / Band Reject Filter	01/06/2021	Annual	2
Wainwright Instruments	WRCJV5100/5850-40/50-8EEK / Band Reject Filter	02/10/2020	Annual	1
CERNEX	CBLU1183540B-01/Broadband Bench Top LNA 56-10 / Attenuator(10 dB)	12/23/2020	Annual	N/A
CERNEX Api tech.	CBL06185030 / Broadband Low Noise Amplifier 18B-03 / Attenuator (3 dB)	12/23/2020	Annual	N/A
Wainwright Instruments	WHKX10-2700-3000-18000-40SS / High Pass Filter	12/23/2020	Annual	N/A
Wainwright Instruments	WHKX8-6090-7000-18000-40SS / High Pass Filter	12/23/2020	Annual	N/A
T&M SYSTEM	COAXIAL ATTENUATOR / Thru	12/23/2020	Annual	N/A
CERNEX	CBL18265035 / Power Amplifier	12/04/2020	Annual	22966
CERNEX	CBL26405040 / Power Amplifier	03/23/2020	Annual	25956
TESCOM	TC-3000C / Bluetooth Tester	03/18/2020	Annual	3000C000276

Note:

1. Equipment listed above that calibrated during the testing period was set for test after the calibration.

2. Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.

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





11. ANNEX A_ TEST SETUP PHOTO

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

No.	Description	
1	HCT-RF-2101-FC112-P	