TEST REPORT

of

FCC PART 15 SUBPART E AND CANADA RSS-247

☐ New Application; ☐ Class I PC; ☒ Class II PC

Product :	**J129 IP Deskphone**
Brand:	**Avaya**
Model:	**J129**
Model Difference:	**N/A**
FCC ID:	**TYM-J129**
IC:	**3794-J129**
FCC Rule Part:	**§15.407, Cat:NII**
IC Rule Part:	**RSS-247 issue 2: 2017** **RSS-Gen issue 5: 2018**
Applicant:	**AVAYA**
Address:	**250 Sidney Street, Belleville, Ontario k8P 3Z3, Canada**

Test Performed by:
International Standards Laboratory Corp.
<LT Lab.>
*Site Registration No.
BSMI: SL2-IN-E-0013; MRA TW0997; TAF: 0997; IC: IC4067B-4;
*Address:
No. 120, Lane 180, Hsin Ho Rd., Lung-Tan Dist., Tao Yuan City 325, Taiwan
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Report No.: **ISL-16LR194FE-R1**
Issue Date : **2019/04/22**

Testing laboratory
0997

Test results given in this report apply only to the specific sample(s) tested and are traceable to national or international standard through calibration of the equipment and evaluating measurement uncertainty herein.
This report MUST not be used to claim product endorsement by TAF, NVLAP or any agency of the Government.
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VERIFICATION OF COMPLIANCE

Applicant:	AVAYA
Product Description:	J129 IP Deskphone
Brand Name:	Avaya
Model No.:	J129
Model Difference:	N/A
FCC ID:	TYM-J129
IC:	3794C-J129
Date of test:	2019/03/28 ~ 2019/04/19
Date of EUT Received:	2019/03/28

We hereby certify that:

All the tests in this report have been performed and recorded in accordance with the standards described above and performed by an independent electromagnetic compatibility consultant, International Standards Laboratory Corp.

The test results contained in this report accurately represent the measurements of the characteristics and the energy generated by sample equipment under test at the time of the test. The sample equipment tested as described in this report is in compliance with the limits of above standards.

Test By:	Barry Lee	***Date:***	2019/04/22
	Barry Lee / Senior Engineer		
Prepared By:	Gigi yeh	***Date:***	2019/04/22
	Gigi Yeh / Senior Engineer		
Approved By:	Jerry Liu	***Date:***	2019/04/22
	Jerry Liu / Technical Manager		

Version

Version No.	Date	Description
00	2019/04/16	Initial creation of document
02	2019/04/22	1. Replacement of some non-RF parts on the main board. 2. A DC jack is added.

Uncertainty of Measurement

Description Of Test	Uncertainty
Conducted Emission (AC power line)	2.586 dB
Field Strength of Spurious Radiation	≤30MHz: 2.96dB 30-1GHz: 4.22 dB 1-40 GHz: 4.08 dB
Conducted Power	2.412 GHz: 1.30 dB 5.805 GHz: 1.55 dB
Power Density	2.412 GHz:1.30 dB 5.805 GHz: 1.67 dB
Frequency	0.0032%
Time	0.01%
DC Voltage	1%

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1. General Information

1.1. Product Description

Product Name:	J129 IP Deskphone
Brand Name:	Avaya
Model Name:	J129
Model Difference:	N/A
Operation Environment	Indoor used
TPC	No
DFS	No
Power Supply:	1. 48Vdc by AC Adapter, Model No.: POE 2. 5Vdc by AC/DC Adapter; Model No.:PSAC12R-050

IC RSS-Gen:

Product SW version	FW_S_J129_R2_0_0_0_0b248
Product HW version	14124-1
Radio SW version	FW_S_J129_R2_0_0_0_0b248
Radio HW version	15329-1A

	FCC	IC
RF power setting in TEST SoftWare	2.4G : b mode : low(17) mid(17) high(16) g mode : low(13) mid(13) high(13) n20 mode : low(13) mid(13) high(12) n40 mode : low(13) mid(13) high(12) 5G : B1 a mode : low(17) mid(17) high(17) n20 mode : low(13) mid(13) high(13) n40 mode : low(13) high(13) ac mode : CH 42 5210MHz(12) B3 a mode : low(17) mid(17) high(17) n20 mode : low(13) mid(13) high(13) n40 mode : low(13) high(13) ac mode : CH 155 5775MHz(12)	2.4G : b mode : low(17) mid(17) high(16) g mode : low(13) mid(13) high(13) n20 mode : low(13) mid(13) high(12) n40 mode : low(13) mid(13) high(12) 5G : **B1** **a mode : low(14) mid(14) high(14)** **n20 mode : low(11) mid(11) high(11)** **n40 mode : low(11) high(11)** **ac mode : CH 42 5210MHz(11)** B3 a mode : low(17) mid(17) high(17) n20 mode : low(13) mid(13) high(13) n40 mode : low(13) high(13) ac mode : CH 155 5775MHz(12)

Power Tolerance: +/- 1 dB

WLAN: 1TX/1RX

Wi-Fi	Frequency Range (MHz)	Channels	Peak / Average Rated Power	Modulation Technology
802.11b	2412 – 2462(DTS)	11	19.43dBm (PK)	DSSS
802.11g	2412 – 2462(DTS)	11	22.02dBm (PK)	OFDM
802.11n (2.4G)	HT20 2412 – 2462(DTS)	11	21.85dBm (PK)	
	HT40 2422 – 2452(DTS)	7	21.94dBm (PK)	
802.11a	5180 – 5240(NII)	4	17.31dBm (AV)	
	5745 – 5825(NII)	5	13.14dBm (AV)	
802.11n(5G)	HT20, 5180 – 5240(NII)	4	16.57dBm (AV)	
	HT20, 5745 – 5825(NII)	5	12.10dBm (AV)	
	HT40, 5190 – 5230(NII)	2	15.13dBm (AV)	
	HT40, 5755 – 5815(NII)	2	13.65dBm (AV)	
802.11ac	HT80, 5210(NII)	1	19.53dBm (AV)	
	HT80, 5775(NII)	1	18.75dBm (AV)	
Modulation type		CCK, DQPSK, DBPSK for DSSS 256QAM.64QAM. 16QAM, QPSK, BPSK for OFDM		
Antenna Designation		Fixed Chip Antenna WiFi 2.4G Antenna : 2.1 dBi WiFi 5G Antenna : 2.4 dBi		

The devices can be installed inside the EUT are listed below:

Component	Vendor	Description
Wireless module	Avaya	Vender Model: J100 / K100 Wireless module

The EUT is compliance with IEEE 802.11 a/n/ac Standard.
This report applies for Wifi frequency band 5150 MHz– 5250 MHz, 5725 MHz– 5850 MHz
Remark: The above DUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.2. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for **FCC ID: TYM-J129** filing to comply with Section 15.407 of the FCC Part 15, Subpart E Rules. Subpart C Rules and **IC: 3794C-J129** filing to comply with Industry Canada RSS-247 issue 2.

1.3. Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.10: 2013. Radiated testing was performed at an antenna to EUT distance 3 meters.

KDB Document: 789033 D02 General UNII Test Procedures New Rules v02r01

FCC 14-30 Revision UNII

594280 D02 U-NII Device Security v01r03

1.4. Test Facility

The measurement facilities used to collect the 3m Radiated Emission and AC power line conducted data are located on the address of International Standards Laboratory Corp. <LT Lab.> No. 120, Lane 180, Hsin Ho Rd., Lung-Tan Dist., Tao Yuan City 325, Taiwan which are constructed and calibrated to meet the FCC requirements in documents ANSI C63.10: 2013. FCC Registration Number is: 487532; Designation Number is: TW0997, Canada Registration Number: 4067B-4.

1.5. Special Accessories

Not available for this EUT intended for grant.

1.6. Equipment Modifications

Not available for this EUT intended for grant.

2. System Test Configuration

2.1. EUT Configuration

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

2.2. EUT Exercise

The EUT (Transmitter) was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements.

2.3. Test Procedure

2.3.1 Conducted Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. According to the requirements in Section 6 of ANSI C63.10: 2013. Con-ducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR 16-1-1 Quasi-Peak and Average detector mode.

2.3.2 Radiated Emissions

The EUT is a placed on as turn table which is 0.8 m/1.5m (Frequency above 1GHz) above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m 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 and measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made “while keeping the antenna in the ‘cone of radiation’ from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response.” is still within the 3dB illumination BW of the measurement antenna according to the requirements in Section 6 and 11 of ANSI C63.10: 2013

2.4. Configuration of Tested System

Fig. 2-1 Configuration of Tested System

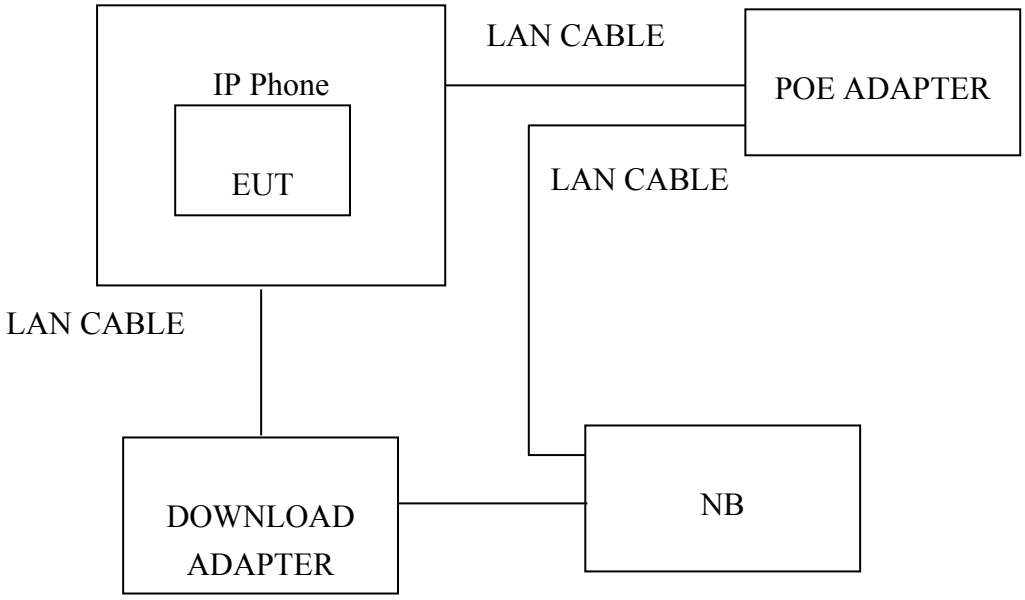


Table 1-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/ Type No.	Series No.	Data Cable	Power Cord
1	NB	Dell	LATITUDE 3340	481.06F01.0003	NA	Non-shielded
2	IP Phone	AVAYA	J129	16WZ2620003T	Non-shielded	Non-shielded
3	DOWNLOAD ADAPTER	AVAYA	FWADPT1A-003	09WZ30551803	Non-shielded	Non-shielded
4	POE adaptor	AVAYA	POE	C153166400000 00210	Non-shielded	Non-shielded

3. Summary of Test Results

FCC Rules	Description Of Test	Result
§15.207 RSS-Gen §7.2.4	AC Power Line Conducted Emission	N/A
§15.407(a)(2) RSS-247, 6.2	Output Power/ EIRP/ Spectral Density Measurement	Compliant
§15.407(a) RSS-247, 6.2 RSS-Gen §4.6.3	26dB/99% Emission Bandwidth	N/A
§15.407(e) RSS-247, 6.2.4 RSS-Gen §4.6.3	6dB Emission Bandwidth	N/A
§15.407(b) RSS-247, 6.2	Undesirable Emission – Radiated Measurement	Compliant
§15.407(c) RSS-247, 6.4(2)	Transmission in case of Absence of In-formation	N/A
§15.407(g)	Frequency Stability	N/A
§15.407(a) RSS-GEN 7.1.2, RSS-247 issue 8,§A8.4	Antenna Requirement	Compliant
§15.407(d) RSS-247, 6.3	TPC and DFS Measurement	N/A
§15.407(i) RSS-247, 6.4(4)	Device Security	N/A

This is a Class II Permission Change case with the replacement of some non-RF parts on the main board, and a DC jack is added

Note: Test item list below has been re-verify:

1. RF Output power
2. Transmitter spurious emissions above 1GHz
3. Receiver spurious emissions above 1GHz

4. Description of Test Modes

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

5150MHz-5250MHz:
a mode: Channel lowest (5180MHz)、Mid (5220MHz) and Highest (5240MHz) with 6Mbps data rate are chosen for full testing.

n HT 20 mode: Channel lowest (5180MHz)、Mid (5220MHz) and Highest (5240MHz) with 6.5Mbps data rate are chosen for full testing

n HT 40 mode: Channel lowest (5190MHz) and Highest (5230MHz) with 13.5Mbps data rate are chosen for full testing

802.11 ac HT80: Channel (5210MHz) with lowest data rate is chosen for full testing

The worst case Band 1, 802.11ac HT80 (5GHz) was reported for Radiated Emission.

5725-5850MHz:
802.11a mode: Channel low (5745MHz)、mid (5785MHz) and high (5825MHz) with 6Mbps lowest data rate are chosen for pre-test testing of radiated emissions.

802.11 n HT20: Channel low (5745MHz)、mid (5785MHz) and high (5825MHz) with 6.5Mbps lowest data rate are chosen for pre-test testing of radiated emissions.

802.11 n HT40: Channel low (5755MHz) and high (5795MHz) with 13.5Mbps lowest data rate are chosen for pre-test testing of radiated emissions.

802.11 ac HT80: Channel (5775MHz) with lowest data rate is chosen for full testing

The worst case Band 3, 802.11ac HT80 was reported for Radiated Emission.

5. Output Power / EIRP /Spectral Density Measurement

5.1. Standard Applicable

According to §15.407(a) Power limits:

(1) For the band 5.15 - 5.25 GHz.

(i) For an outdoor access point operating in the band 5.15 - 5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15 - 5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15 - 5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For mobile and portable client devices in the 5.15 - 5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(2) For the 5.25 - 5.35 GHz and 5.47 - 5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBiare used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(3) For the band 5.725 - 5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500 kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

According to RSS-247

6.2.1 Frequency Band 5150-5250 MHz

The maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log10B, dBm, whichever power is less. B is the 99% emission bandwidth in megahertz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

6.2.2 Frequency Band 5250-5350 MHz

The maximum conducted output power shall not exceed 250 mW or 11 + 10 log10B, dBm, whichever is less. The power spectral density shall not exceed 11 dBm in any 1.0 MHz band.

The maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log10B, dBm, whichever is less. B is the 99% emission bandwidth in megahertz. Note that devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.

6.2.3 Frequency Bands 5470-5600 MHz and 5650-5725 MHz

The maximum conducted output power shall not exceed 250 mW or 11 + 10 log10B, dBm, whichever is less. The power spectral density shall not exceed 11 dBm in any 1.0 MHz band.

The maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log10B, dBm, whichever is less. B is the 99% emission bandwidth in megahertz. Note that devices with a maximum e.i.r.p. greater than
500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W

6.2.4 Frequency Band 5725-5850 MHz

The maximum conducted output power shall not exceed 1 W.

The power spectral density shall not exceed 30 dBm in any 500 kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed point-to-point operations exclude the use of point-to-multipoint3 systems, omnidirectional applications and multiple collocated transmitters transmitting the same information.

5.2. Measurement Procedure

For Output Power

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power meter
3. Record the max. reading.
4. Repeat above procedures until all frequency measured were complete.

For Power Spectral Density

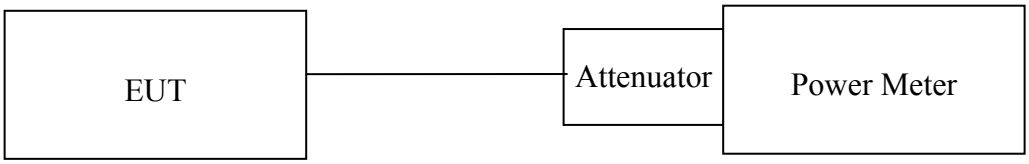
1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to Spectrum.
3. Set RBW=1MHz,VBW=3MHz, Span=50MHz (Base Mode), Sweep time = Auto, traces 100 sweeps of video averaging for 5150-5725MHz;
4. Set RBW=500kHz,VBW=1.5MHz, Span=60MHz (Base Mode), Sweep time = Auto, traces 100 sweeps of video averaging for 5725-5850MHz;
5. Record the max. reading.
6. Repeat above procedures until all frequency measured were complete.

Refer to section E3 of KDB Document: KDB 789033 D02 General UNII Test Procedures New Rules v02r01

5.3. Measurement Equipment Used:

Conducted Emission Test Site					
Equipment Type	**MFR**	**Model Number**	**Serial Number**	**Last Cal.**	**Cal Due.**
Power Meter 05	Anritsu	ML2495A	1116010	10/28/2018	10/27/2019
Power Sensor 05	Anritsu	MA2411B	34NKF50	10/28/2018	10/27/2019
Power Sensor 06	DARE	RPR3006W	13I00030SNO33	01/11/2019	01/10/2020
Power Sensor 07	DARE	RPR3006W	13I00030SNO34	01/11/2019	01/10/2020
Temperature Chamber	KSON	THS-B4H100	2287	02/19/2019	02/18/2020
DC Power supply	ABM	8185D	N/A	01/10/2019	01/09/2020
AC Power supply	EXTECH	CFC105W	NA	12/25/2018	12/24/2019
Attenuator	Woken	Watt-65m3502	11051601	NA	NA
Splitter	MCLI	PS4-199	12465	12/26/2017	12/25/2019
Spectrum analyzer	keysight	N9010A	MY56070257	10/15/2018	10/14/2019
Test Sofware	DARE	Radimation Ver:2013.1.23	NA	NA	NA

5.4. Measurement Equipment Used:



5.5. Measurement Result

Average Power Measurement:

802.11a

Channel	power (dBm)	limit(dBm)	result
5180	16.94	23.97	pass
5220	17.03	23.97	pass
5240	17.31	23.97	pass
5745	13.02	30	pass
5785	13.14	30	pass
5825	13.07	30	pass

802.11n HT20

Freq(MHz)	power (dBm)	limit(dBm)	result
5180	16.27	23.97	pass
5220	16.57	23.97	pass
5240	16.22	23.97	pass
5745	12.04	30	pass
5785	12.10	30	pass
5825	11.94	30	pass

802.11n HT40

Freq(MHz)	power (dBm)	limit(dBm)	result
5190	15.04	23.97	pass
5230	15.13	23.97	pass
5755	13.65	30	pass
5795	13.37	30	pass

802.11ac HT80

Freq(MHz)	power (dBm)	limit(dBm)	result
5210	19.53	23.97	pass
5775	18.75	30	pass

6. Undesirable Emission – Radiated Measurement

6.1. Standard Applicable

According to §15.407(b), Undesirable Emission Limits: Except as shown in Paragraph (b)(7) of this section, the peak emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

(1) For transmitters operating in the 5.15-5.25 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

(2) For transmitters operating in the 5.25-5.35 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

(3) For transmitters operating in the 5.47-5.725 GHz band: all emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

(4) For transmitters operating in the 5.725-5.85 GHz band: all emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of -17dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of -27 dBm/MHz.

(5) The above emission measurements shall be performed using a minimum resolution bandwidth of 1 MHz. A lower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 1 MHz.

(6) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in Section 15.209. Further, any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in Section 15.207.

(7) The provisions of Section 15.205 of this part apply to intentional radiators operating under this section.

(8) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the upper and lower frequency band edges as the design of the equipment permits.

According to RSS-247, 6.2

6.2.1 Frequency Band 5150-5250 MHz

For transmitters operating in the band 5150-5250 MHz, all emissions outside the band 5150-5350 MHz shall not exceed -27 dBm/MHz e.i.r.p. However, any unwanted emissions that fall into the band 5250-5350 MHz must be 26 dBc, when measured using a resolution bandwidth between 1 and 5% of the occupied bandwidth, above 5.25 GHz. Otherwise, the transmission is considered as intentional and the devices shall implement dynamic frequency selection (DFS) and transmitter power control (TPC) as per the requirements for the band 5250-5350 MHz.

6.2.2 Frequency Band 5250-5350 MHz

i) For devices with both operating frequencies and channel bandwidths contained within the band 5250-5350 MHz, the device shall comply with the following:

a. All emissions outside the band 5250-5350 MHz shall not exceed -27 dBm/MHz e.i.r.p. if the equipment is intended for outdoor use; or

b. All emissions outside the band 5150-5350 MHz shall not exceed -27 dBm/MHz e.i.r.p. and any emissions within the band 5150-5250 MHz shall meet the power spectral density limits of Section 6.2.1. The device shall be labelled "for indoor use only."

ii) For devices with operating frequencies in the band 5250-5350 MHz but having a channel bandwidth that overlaps the band 5150-5250 MHz, the devices' unwanted emission shall not exceed -27 dBm/MHz e.i.r.p. outside the band 5150-5350 MHz and its power shall comply with the spectral power density for operation within the band 5150-5250 MHz. The device shall be labelled "for indoor use only."

(3) Additional requirements

In addition to the above requirements, devices operating in the band 5250-5350 MHz with a maximum e.i.r.p. greater than 200 mW shall comply with the following e.i.r.p. at different elevations, where θ is the angle above the local horizontal plane (of the Earth) as shown below:

(i) -13 dBW/MHz for $0^o \leq \theta < 8^o$

(ii) (ii) $-13 - 0.716\ (\theta - 8)$ dBW/MHz for $8^o \leq \theta < 40^o$

(iii) (iii) $-35.9 - 1.22\ (\theta - 40)$ dBW/MHz for $40^o \leq \theta \leq 45^o$

(iv) (iv) -42 dBW/MHz for $\theta > 45^o$

The measurement procedure defined in Annex A of this document shall be used to verify the compliance to the e.i.r.p. at different elevations.

6.2.3 Frequency Bands 5470-5600 MHz and 5650-5725 MHz

Emissions outside the band 5470-5725 MHz shall not exceed -27 dBm/MHz e.i.r.p.

6.2.4 Frequency Band 5725-5850 MHz

For the band 5725-5850 MHz, emissions at frequencies from the band edges to 10 MHz above or below the band edges shall not exceed -17 dBm/MHz e.i.r.p.

For emissions at frequencies more than 10 MHz above or below the band edges, the emissions power shall not exceed -27 dBm/MHz.

§15.205- RESTRICTED BANDS OF OPERATIONS

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 -	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.52525	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	156.7 - 156.9	3260 - 3267	23.6 - 24.0
12.29 - 12.293	162.0125 - 167.17	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	167.72 - 173.2	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	240 - 285	3600 - 4400	([2])
13.36 - 13.41	322 - 335.4		

[1] Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

[2] Above 38.6

(b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

§15.209- RADIATED EMISSION LIMITS: GENERAL REQUIREMENTS

FCC PART 15.209

MEASURING DISTANCE OF 3 METER		
FREQUENCY RANGE (MHz)	FIELD STRENGTH (Microvolts/m)	FIELD STRENGTH (dBuV/m)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

6.2. EUT Setup

1. The radiated emission tests were performed in the 3 meter open-test site, using the setup in accordance with the ANSI C63.10: 2013
2. The EUT was put in the front of the test table. The host PC system was placed on the center of the back edge on the test table. The peripherals like modem, monitor printer, K/B, and mouse were placed on the side of the host PC system. The rear of the EUT and peripherals were placed flushed with the rear of the tabletop.
3. The keyboard was placed directly in the front of the monitor, flushed with the front tabletop. The mouse was placed next to the Keyboard, flushed with the back of keyboard.
4. The spacing between the peripherals was 10 centimeters.
5. External I/O cables were draped along the edge of the test table and bundle when necessary.
6. The host PC system was connected with 120Vac/60Hz power source.

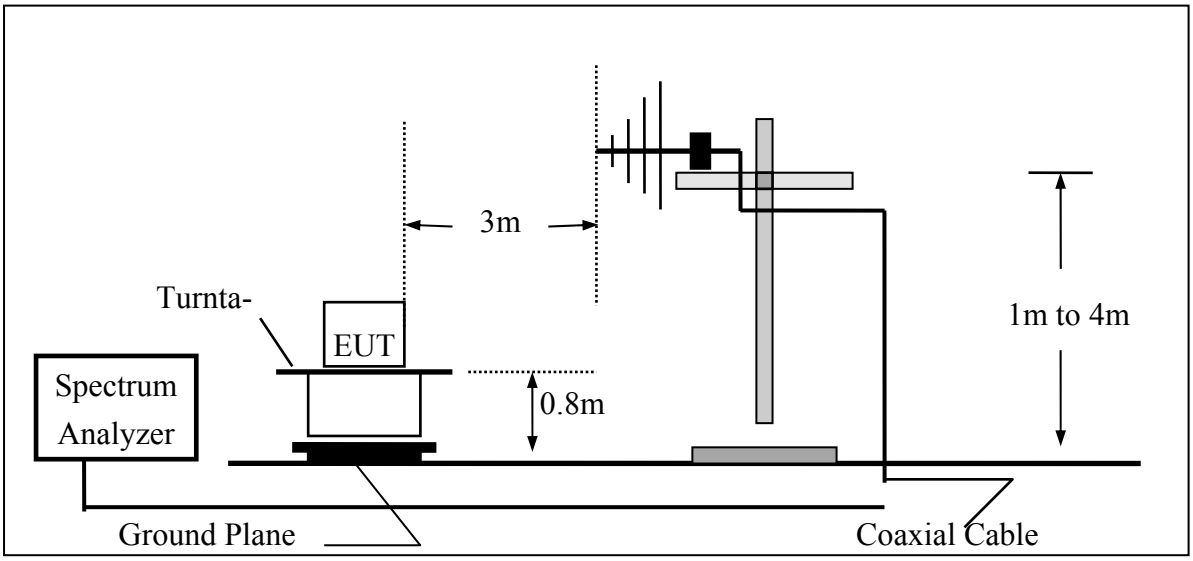
6.3. Measurement Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until all frequency measured were complete.

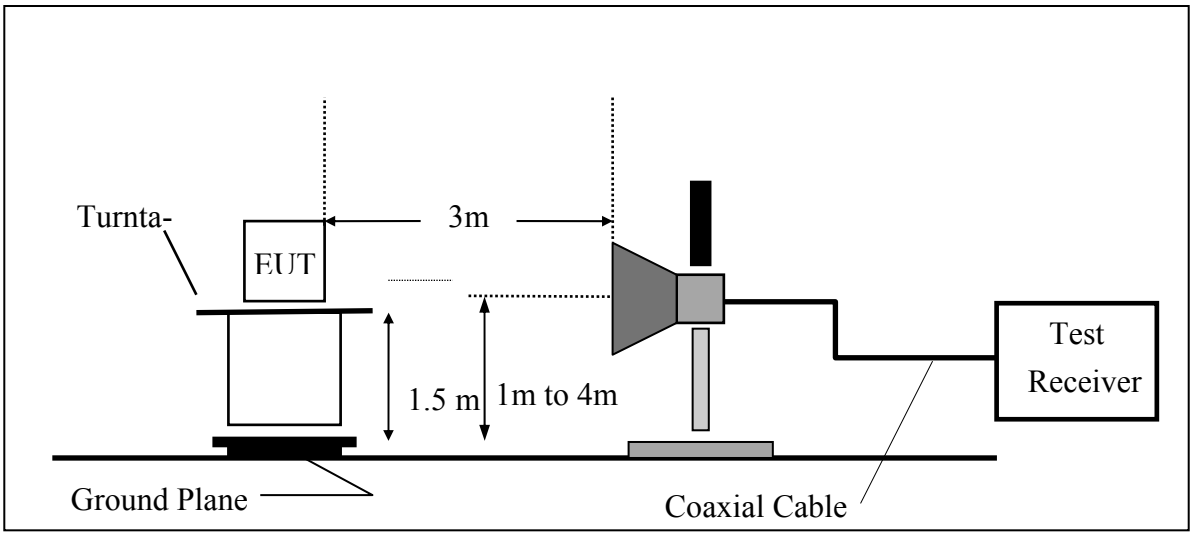
Refer to section F of KDB Document: KDB 789033 D02 General UNII Test Procedures New Rules v02r01

6.4. Test SET-UP (Block Diagram of Configuration)

(A) Radiated Emission Test Setup, Frequency below 1000MHz



(B) Radiated Emission Test Setup Frequency above 1 GHz



6.5. Measurement Equipment Used:

Chamber 19(966)					
Equipment Type	**MFR**	**Model Number**	**Serial Number**	**Last Cal.**	**Cal Due.**
966 Chamber	Chance Most	Chamber 19	N/A	08/13/2018	08/12/2019
Spectrum analyzer	R&S	FSP40	100116	01/10/2019	01/09/2020
EMI Receiver	R&S	ESR3	102461	08/08/2018	08/07/2019
Loop Antenna(9K-30M)	EM	EM-6879	271	06/06/2018	06/05/2020
Bilog Antenna (30M-1G)	SCHWARZBECK	VULB9168 w 5dB Att	736	01/29/2019	01/28/2020
Horn antenna (1G-18G)	SCHWARZBECK	9120D	9120D-1627	11/27/2017	11/26/2019
Horn antenna (18G-26G)	Com-power	AH-826	081001	11/21/2017	11/20/2019
Horn antenna (26G-40G)	Com-power	AH-640	100A	03/29/2019	03/28/2021
Preamplifier (9k-1000M)	HP	8447F	3113A06362	01/14/2019	01/13/2020
Preamplifier(1G-26G)	Agilent	8449B	3008A02471	10/29/2018	10/28/2019
Preamplifier (26G-40G)	MITEQ	JS4-26004000-27-5A	818471	11/20/2017	07/21/2019
RF Cable (9k-18G)	HUBER SUHNER	SUCOFLEX 104A	MY1397/4A	01/17/2019	01/16/2020
RF cable (18G~40G)	HUBER SUHNER	Sucoflex 102	27963/2&37421/2	11/12/2018	11/11/2019
Turn Table	MF	Turn Table-19	Turn Table-19	N/A	N/A
Mast Tower	MF	JSDES-15A	1308283	N/A	N/A
Controller	MF	MF-7802BS	MF780208460	N/A	N/A
AC power source	T-Power	TFC-1005	40006471	N/A	N/A
Signal Generator	Anritsu	MG3692A	20311	01/09/2019	01/08/2020
2.4G Filter	Micro-Tronics	Brm50702	76	12/25/2018	12/24/2019
5G Filter	Micro-Tronics	Brm50716	005	12/25/2018	12/24/2019
Test Software	Audix	E3 Ver:6.12023	N/A	N/A	N/A

6.6. Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL - AG

Where	FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

6.7. Measurement Result

Refer to attach tabular data sheets.

NOTE:

The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 100kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz. And RBW 1MHz for frequency above 1GHz.

Radiated Spurious Emission Measurement Result (above 1GHz)

(Band 1, 802.11a mode)

Operation Mode	TX MODE	Test Date	2019/04/19
Channel Number	CH Low	Test By	Barry
Temperature	25 ℃	Humidity	60 %

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	10360.00	40.74	4.29	45.03	68.20	-23.17	Peak	VERTICAL
2	14730.00	43.13	9.50	52.63	68.20	-15.57	Peak	VERTICAL
1	10360.00	41.31	4.29	45.60	68.20	-22.60	Peak	HORIZONTAL
2	14920.00	43.49	9.47	52.96	68.20	-15.24	Peak	HORIZONTAL

Remark:

1 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.

2 Measurement of data within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

3 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.

4 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Radiated Spurious Emission Measurement Result (above 1GHz)

(Band 1, 802.11a mode)

Operation Mode	TX MODE	Test Date	2019/04/19
Channel Number	CH Mid	Test By	Barry
Temperature	25 ℃	Humidity	60 %

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	10400.00	41.65	4.41	46.06	68.20	-22.14	Peak	VERTICAL
2	12110.00	44.89	6.89	51.78	74.00	-22.22	Peak	VERTICAL
1	10400.00	42.63	4.41	47.04	68.20	-21.16	Peak	HORIZONTAL
2	14040.00	48.39	9.82	58.21	68.20	-9.99	Peak	HORIZONTAL

Remark:

1 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.

2 Measurement of data within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

3 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.

4 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Radiated Spurious Emission Measurement Result (above 1GHz)

(Band 1, 802.11a mode)

Operation Mode	TX MODE	Test Date	2019/04/19
Channel Number	CH High	Test By	Barry
Temperature	25 ℃	Humidity	60 %

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	10480.00	42.94	4.63	47.57	68.20	-20.63	Peak	VERTICAL
2	14010.00	48.81	9.83	58.64	68.20	-9.56	Peak	VERTICAL
1	10480.00	43.39	4.63	48.02	68.20	-20.18	Peak	HORIZONTAL
2	14010.00	49.28	9.83	59.11	68.20	-9.09	Peak	HORIZONTAL

Remark:

1 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.

2 Measurement of data within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

3 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.

4 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Radiated Spurious Emission Measurement Result (above 1GHz)

(Band 3 802.11a mode)

Operation Mode	TX MODE	Test Date	2019/04/19
Channel Number	CH Low	Test By	Barry
Temperature	25 ℃	Humidity	60 %

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	11550.00	40.90	6.73	47.63	74.00	-26.37	Peak	VERTICAL
2	14780.00	43.65	9.49	53.14	68.20	-15.06	Peak	VERTICAL
1	11550.00	40.47	6.73	47.20	74.00	-26.80	Peak	HORIZONTAL
2	13690.00	43.67	9.07	52.74	68.20	-15.46	Peak	HORIZONTAL

Remark:

1 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.

2 Measurement of data within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

3 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.

4 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Radiated Spurious Emission Measurement Result (above 1GHz)

(Band 3 802.11a mode)

Operation Mode	TX MODE	Test Date	2019/04/19
Channel Number	CH Mid	Test By	Barry
Temperature	25 ℃	Humidity	60 %

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	11570.00	41.63	6.74	48.37	74.00	-25.63	Peak	VERTICAL
2	14030.00	48.80	9.82	58.62	68.20	-9.58	Peak	VERTICAL
1	11570.00	42.71	6.74	49.45	74.00	-24.55	Peak	HORIZONTAL
2	14030.00	50.11	9.82	59.93	68.20	-8.27	Peak	HORIZONTAL

Remark:

1 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.

2 Measurement of data within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

3 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.

4 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Radiated Spurious Emission Measurement Result (above 1GHz)

(Band 3 802.11a mode)

Operation Mode	TX MODE	Test Date	2019/04/19
Channel Number	CH High	Test By	Barry
Temperature	25 ℃	Humidity	60 %

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	11650.00	41.79	6.75	48.54	74.00	-25.46	Peak	VERTICAL
2	14040.00	48.37	9.82	58.19	68.20	-10.01	Peak	VERTICAL
1	11650.00	43.42	6.75	50.17	74.00	-23.83	Peak	HORIZONTAL
2	14040.00	51.50	9.82	61.32	68.20	-6.88	Peak	HORIZONTAL

Remark:

1 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.

2 Measurement of data within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

3 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.

4 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Band Edges test (Band 1, 802.11ac 80 mode) -Radiated

Operation Mode	TX CH Low	Test Date	2019/04/19
Channel Number	5210 MHz	Test By	Barry
Temperature	25 ℃	Humidity	65 %

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	5139.00	35.53	-8.42	27.11	54.00	-26.89	Average	VERTICAL
2	5139.00	80.11	-8.42	71.69	74.00	-2.31	Peak	VERTICAL
3	5150.00	34.11	-8.39	25.72	54.00	-28.28	Average	VERTICAL
4	5150.00	75.33	-8.39	66.94	68.20	-1.26	Peak	VERTICAL
1	5144.25	36.32	-8.42	27.90	54.00	-26.10	Average	HORIZONTAL
2	5144.25	78.01	-8.42	69.59	74.00	-4.41	Peak	HORIZONTAL
3	5150.00	37.28	-8.39	28.89	54.00	-25.11	Average	HORIZONTAL
4	5150.00	73.00	-8.39	64.61	68.20	-3.59	Peak	HORIZONTAL

Operation Mode	TX CH High	Test Date	2019/04/19
Channel Number	5290MHz	Test By	Barry
Temperature	25 ℃	Humidity	65 %

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	5350.00	57.57	-7.98	49.59	68.20	-18.61	Peak	VERTICAL
1	5350.00	56.78	-7.98	48.80	68.20	-19.40	Peak	HORIZONTAL

Remark:

1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency

2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.

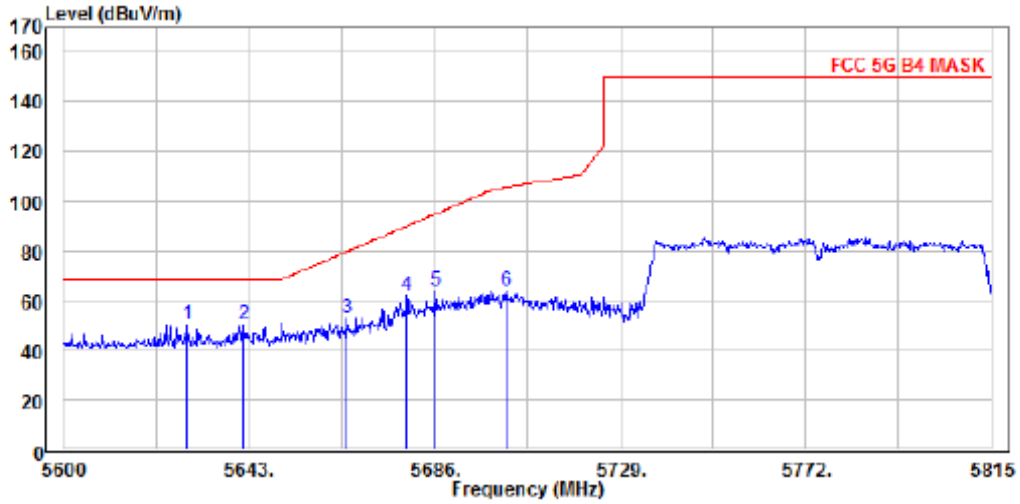
3 Measurement of data within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

4 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.

5 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

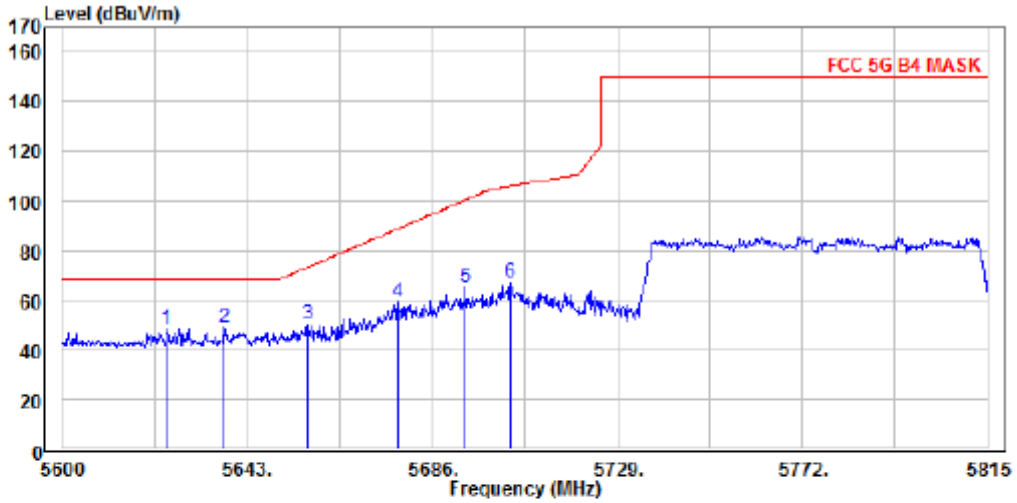
Band Edges test (Band 3, 802.11ac HT80 mode) –Radiated

Operation Mode	TX CH Low	Test Date	2019/04/19
Channel Number	5775 MHz	Test By	Barry
Temperature	25 ℃	Humidity	65 %



Condition: limit\FCC\FCC 5G B4 MASK.csv 3m Vertical
: RBW:1000kHz VBW:3000kHz SWT:Auto DET:Positive
EUT : WISTRON IP phone
Mode : Wifi 5G Mask B4 802.11AC80
Note :

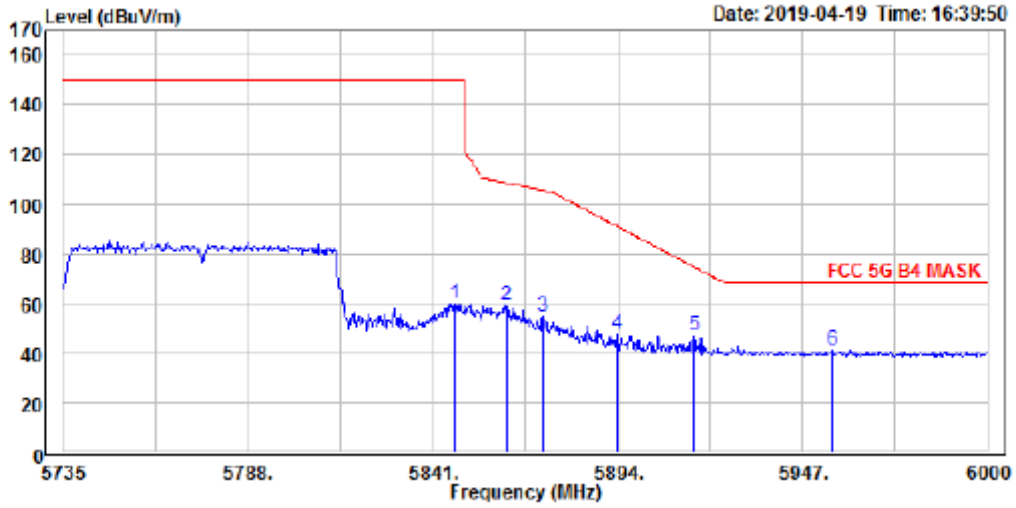
		Freq	Read Level	Factor	Level	Limit Line	Over Limit	Pol/Phase
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	
1	PP	5628.595	63.76	-13.17	50.59	68.20	-17.61	Vertical
2		5641.710	63.55	-13.19	50.36	68.20	-17.84	Vertical
3		5665.790	66.53	-13.23	53.30	79.92	-26.62	Vertical
4		5679.550	75.10	-13.26	61.84	90.11	-28.27	Vertical
5		5686.215	76.97	-13.27	63.70	95.03	-31.33	Vertical
6		5702.770	77.44	-13.29	64.15	105.98	-41.83	Vertical



Condition: limit\FCC\FCC 5G B4 MASK.csv 3m Horizontal
: RBW:1000kHz VBW:3000kHz SWT:Auto DET:Positive
EUT : WISTRON IP phone
Mode : Wifi 5G Mask B4 802.11AC80
Note :

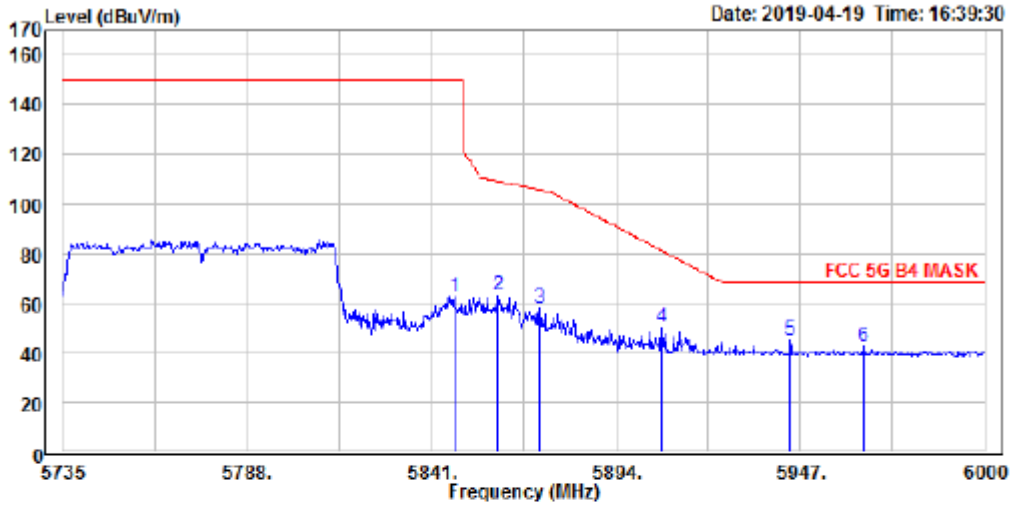
		Freq	Read Level	Factor	Level	Limit Line	Over Limit	Pol/Phase
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	
1		5624.295	61.49	-13.11	48.38	68.20	-19.82	Horizontal
2	PP	5637.410	62.07	-13.14	48.93	68.20	-19.27	Horizontal
3		5657.190	63.41	-13.17	50.24	73.54	-23.30	Horizontal
4		5677.830	72.97	-13.21	59.76	88.83	-29.07	Horizontal
5		5693.740	78.63	-13.24	65.39	100.59	-35.20	Horizontal
6		5704.275	80.78	-13.26	67.52	106.40	-38.88	Horizontal

Operation Mode	TX CH High	Test Date	2019/04/19
Channel Number	5755MHz	Test By	Barry
Temperature	25 ℃	Humidity	65 %



Condition: limit\FCC\FCC 5G B4 MASK.csv 3m Vertical
: RBW:1000kHz VBW:3000kHz SWT:Auto DET:Positive
EUT : WISTRON IP phone
Mode : Wifi 5G Mask B4 802.11AC80
Note :

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Pol/Phase
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	
1	5847.360	73.70	-13.54	60.16	150.00	-89.84	Vertical
2	5862.200	72.73	-13.56	59.17	108.78	-49.61	Vertical
3	5872.535	68.70	-13.58	55.12	105.89	-50.77	Vertical
4	5893.735	61.57	-13.61	47.96	91.30	-43.34	Vertical
5	5915.995	61.15	-13.65	47.50	74.84	-27.34	Vertical
6 PP	5955.745	54.79	-13.71	41.08	68.20	-27.12	Vertical



Condition: limit\FCC\FCC 5G B4 MASK.csv 3m Horizontal
: RBW:1000kHz VBW:3000kHz SWT:Auto DET:Positive
EUT : WISTRON IP phone
Mode : Wifi 5G Mask B4 802.11AC80
Note :

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Pol/Phase
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	
1	5847.625	76.14	-13.50	62.64	150.00	-87.36	Horizontal
2	5860.080	77.11	-13.52	63.59	109.38	-45.79	Horizontal
3	5872.270	71.68	-13.54	58.14	105.96	-47.82	Horizontal
4	5907.250	63.89	-13.60	50.29	81.30	-31.01	Horizontal
5 PP	5944.085	58.67	-13.66	45.01	68.20	-23.19	Horizontal
6	5965.020	56.07	-13.70	42.37	68.20	-25.83	Horizontal

7. Antenna Requirement

7.1. Standard Applicable

According to §15.203, Antenna requirement.

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall 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 manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with Section 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded.

According to RSS-GEN 7.1.2, a transmitter can only be sold or operated with antennas with which it was certified. A transmitter may be certified with multiple antenna types. An antenna type comprises antennas having similar in-band and out-of-band radiation patterns. Testing shall be performed using the highest-gain antenna of each combination of transmitter and antenna type for which certification is being sought, with the transmitter output power set at the maximum level. Any antenna of the same type and having equal or lesser gain as an antenna that had been successfully tested for certification with the transmitter, will also be considered certified with the transmitter, and may be used and marketed with the transmitter. The manufacturer shall include with the application for certification a list of acceptable antenna types to be used with the transmitter.

When a measurement at the antenna connector is used to determine RF output power, the effective gain of the device's antenna shall be stated, based on measurement or on data from the antenna manufacturer. Any antenna gain in excess of 6 dBi (6 dB above isotropic gain) shall be added to the measured RF output power before using the power limits specified in RSS-247 or RSS-310 for devices of RF output powers of 10 milliwatts or less. For devices of output powers greater than 10 milliwatts, except devices subject to RSS-247 Annex 8 (Frequency Hopping and Digital Modulation Systems Operating in the 902-928 MHz, 2400-2483.5 MHz, and 5745-5850 MHz Bands) or RSS-247 Annex 9 (Local Area Network Devices), the total antenna gain shall be added to the measured RF output power before using the specified power limits. For devices subject to RSS-247 Annex 8 or Annex 9, the antenna gain shall not be added.

7.2. Antenna Connected Construction

The directional gins of antenna used for transmitting is 4.5dBi, which is revised PCB antenna and no consideration of replacement by user. Please see EUT photo and antenna spec. for details.

Antenna Designation:

	P/N	**Type**	**Gain (2.4GHz)**	**Gain (5GHz)**
Ant	AH 104N2450D1	Fixed Chip Antenna	2.1dBi	2.4dBi