



# FCC RADIO TEST REPORT

FCC ID		XIA-IFWA40
Equipment	;	Wireless Home Internet
Brand Name	8 8	Netcomm
Model Name		IFWA-40
Applicant	4	NetComm Wireless Limited 18-20 Orion Road Lane Cove NSW 2066 Australia
Manufacturer		NetComm Wireless Limited 18-20 Orion Road Lane Cove NSW 2066 Australia
Standard		47 CER ECC Part 15,407

The product was received on Oct. 22, 2018, and testing was started from Dec. 24, 2018 and completed on Mar. 18, 2019. We, SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.10-2013 and shown compliance with the applicable technical standards.

The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Approved by: Sam Chen

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)



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## History of this test report

Report No.	Version	Description	Issued Date
FR801751AB	01	Initial issue of report	Apr. 02, 2019



## Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
1.1.2	15.203	Antenna Requirement	PASS	-
3.1	15.207	AC Power-line Conducted Emissions	PASS	-
3.2	15.407(a)	Emission Bandwidth	PASS	-
3.3	15.407(a)	Maximum Conducted Output Power	PASS	-
3.4	15.407(a)	Peak Power Spectral Density	PASS	-
3.5	15.407(b)	Unwanted Emissions	PASS	-

### **Declaration of Conformity:**

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

### **Comments and Explanations:**

1. The test configuration, test mode and test software were written in this test report are declared by the manufacturer.

2. The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

Reviewed by: Sam Chen

Report Producer: Viola Huang



## **1** General Description

## 1.1 Information

### 1.1.1 **RF General Information**

Frequency Range (MHz)	equency Range (MHz) IEEE Std. 802.11		Channel Number
5150-5250	a, n (HT20), ac (VHT20)	5180-5240	36-48 [4]
5725-5850		5745-5825	149-165 [5]
5150-5250	n (HT40), ac (VHT40)	5190-5230	38-46 [2]
5725-5850		5755-5795	151-159 [2]
5150-5250	ac (VHT80)	5210	42 [1]
5725-5850		5775	155 [1]

Band	Mode	BWch (MHz)	Nant
5.15-5.25GHz	802.11a	20	2TX
5.15-5.25GHz	802.11n HT20	20	2TX
5.15-5.25GHz	802.11ac VHT20	20	2TX
5.15-5.25GHz	802.11n HT40	40	2TX
5.15-5.25GHz	802.11ac VHT40	40	2TX
5.15-5.25GHz	802.11ac VHT80	80	2TX
5.725-5.85GHz	802.11a	20	2TX
5.725-5.85GHz	802.11n HT20	20	2TX
5.725-5.85GHz	802.11ac VHT20	20	2TX
5.725-5.85GHz	802.11n HT40	40	2TX
5.725-5.85GHz	802.11ac VHT40	40	2TX
5.725-5.85GHz	802.11ac VHT80	80	2TX

Note:

• 11a, HT20 and HT40 use a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM modulation.

 VHT20, VHT40, VHT80 use a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM, 256QAM modulation.

• BWch is the nominal channel bandwidth.

Nss-Min is the minimum number of spatial streams.

Nant is the number of outputs. e.g., 2(2,3) means have 2 outputs for port 2 and port 3. 2 means have 2 outputs for port 1 and port 2.



### 1.1.2 Antenna Information

					Gain (dBi)			
Ant.	Port	Brand	Model Name	Antenna Type	Connector	2.40	5G	5G
						2.40	Band 1	Band 4
1	1	Netcomm	-	Printed PIFA Antenna	N/A	5.17	-	-
2	2	Netcomm	-	Printed PIFA Antenna	N/A	3.9	-	-
3	1	Netcomm	-	Printed PIFA Antenna	N/A	-	5	4.45
4	2	Netcomm	-	Printed PIFA Antenna	N/A	-	5.79	5.1

Note: The above information was declared by manufacturer.

Note: The EUT has four WLAN antennas.

### For WLAN 2.4GHz (2TX/2RX):

Ant. 1 (Port 1) and Ant. 2 (Port 2) could transmit/receive simultaneously.

### For WLAN 5GHz (2TX/2RX):

Ant. 3 (Port 1) and Ant. 4 (Port 2) could transmit/receive simultaneously.

### 1.1.3 Mode Test Duty Cycle

Mode	DC	DCF(dB)	T(s)	VBW(Hz) ≥ 1/T
802.11a	0.968	0.141	2.065m	1k
802.11ac VHT20	0.872	0.595	5.015m	300
802.11ac VHT40	0.775	1.107	2.437m	1k
802.11ac VHT80	0.839	0.762	3.355m	300

Note:

DC is Duty Cycle.

DCF is Duty Cycle Factor.

### 1.1.4 EUT Operational Condition

EUT Power Type	From Power Adapter or Lithium-ion Battery Pack (For backup purposes only during a power outage)				
Beamforming Function	□ With beamforming □ Without beamforming				
Function		Outdoor P2M	$\boxtimes$	Indoor P2M	
		Fixed P2P		Client	
Test Software Version	QRCT-4.0.00088				

Note: The above information was declared by manufacturer.



## **1.2 Testing Applied Standards**

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- 47 CFR FCC Part 15
- ANSI C63.10-2013
- FCC KDB 789033 D02 v02r01
- FCC KDB 662911 D01 v02r01
- FCC KDB 412172 D01 v01r01

## **1.3 Testing Location Information**

	Testing Location							
	HWA YA	ADD	:	lo. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)				
		TEL	:	886-3-327-3456 FAX : 886-3-327-0973				
$\boxtimes$	JHUBEI	ADD	:	lo.8, Lane 724, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C.				
		TEL	:	886-3-656-9065 FAX : 886-3-656-9085				

Test Condition	Test Site No.	Test Engineer	Test Environment	Test Date
RF Conducted	TH01-CB	Welson Chen	21°C~23°C / 53%~55%	Feb. 14, 2019 ~ Feb. 26, 2019
Radiated (For below 1GHz)	03CH01-CB	Eason Chen	21°C~23°C / 53%~55%	Feb. 16, 2019 ~ Mar. 18, 2019
Radiated (For above 1GHz)	03CH01-CB	Eason Chen	21°C~23°C / 53%~55%	Jan. 26, 2019 ~ Feb. 26, 2019
AC Conduction	CO02-CB	Max Lin	23°C / 55%	Dec. 24, 2018

Test site Designation No. TW0006 with FCC

Test site registered number IC 4086B with Industry Canada.

## **1.4 Measurement Uncertainty**

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2)

Test Items	Uncertainty	Remark
Conducted Emission (150kHz ~ 30MHz)	2.0 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	3.6 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	3.7 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	3.5 dB	Confidence levels of 95%
Conducted Emission	1.7 dB	Confidence levels of 95%
Output Power Measurement	1.33 dB	Confidence levels of 95%
Power Density Measurement	1.27 dB	Confidence levels of 95%
Bandwidth Measurement	9.74 x10 <sup>-8</sup>	Confidence levels of 95%



## 2 Test Configuration of EUT

## 2.1 Test Channel Mode

Mode	PowerSetting
802.11a_Nss1,(6Mbps)_2TX	-
5180MHz	16.5
5200MHz	17
5240MHz	17
5745MHz	16
5785MHz	16
5825MHz	16
802.11ac VHT20_Nss1,(MCS0)_2TX	-
5180MHz	16.5
5200MHz	17
5240MHz	17
5745MHz	16
5785MHz	16
5825MHz	16
802.11ac VHT40_Nss1,(MCS0)_2TX	-
5190MHz	14
5230MHz	17
5755MHz	16
5795MHz	16
802.11ac VHT80_Nss1,(MCS0)_2TX	-
5210MHz	13.5
5775MHz	16.5

Note:

VHT20/VHT40 covers HT20/HT40, due to same modulation. The power setting for 802.11n HT20 and HT40 are the same or lower than 802.11ac VHT20 and VHT40.



## 2.2 The Worst Case Measurement Configuration

The Worst Case Mode for Following Conformance Tests		
Tests Item	Tests Item         AC power-line conducted emissions	
Condition AC power-line conducted measurement for line and neutral		
Operating Mode Normal Link		
1 EUT + WCDMA Band 2 + WLAN + Adapter		
2	EUT + LTE Band 5 + WLAN + Adapter	
For operating mode 2 is the worst case and it was record in this test report.		

The Worst Case Mode for Following Conformance Tests	
Tests Item	Emission Bandwidth Maximum Conducted Output Power Peak Power Spectral Density
Test Condition	Conducted measurement at transmit chains

Tests ItemUnwanted EmissionsTest ConditionRadiated measurement If EUT consist of multiple antenna assembly (multiple antenna are used in El regardless of spatial multiplexing MIMO configuration), the radiated test show be performed with highest antenna gain of each antenna type.Operating Mode < 1GHz		
Test ConditionRadiated measurement If EUT consist of multiple antenna assembly (multiple antenna are used in E regardless of spatial multiplexing MIMO configuration), the radiated test shou be performed with highest antenna gain of each antenna type.Operating Mode < 1GHz		
Operating Mode < 1GHz		
1EUT in Z axis + LTE Band 5 + WLAN + Adapter2EUT in Y axis + LTE Band 5 + WLAN + AdapterMode 1 has been evaluated to be the worst case between Mode 1~2, thus measurement for Mode 3 will follow this same test mode.3EUT in Z axis + WCDMA Band 2 + WLAN + Adapter		
2       EUT in Y axis + LTE Band 5 + WLAN + Adapter         Mode 1 has been evaluated to be the worst case between Mode 1~2, thus measurement for Mode 3 will follow this same test mode.         3       EUT in Z axis + WCDMA Band 2 + WLAN + Adapter		
Mode 1 has been evaluated to be the worst case between Mode 1~2, thus measurement for Mode 3 will follow this same test mode.         3       EUT in Z axis + WCDMA Band 2 + WLAN + Adapter		
3 EUT in Z axis + WCDMA Band 2 + WLAN + Adapter		
Mode 3 has been evaluated to be the worst case between Mode 1~3, thus measurement for Mode 4 w follow this same test mode.		
4 EUT in Z axis + WCDMA Band 2 + WLAN + Battery		
For operating mode 3 is the worst case and it was record in this test report.		
CTX		
<b>Operating Mode &gt; 1GHz</b> The EUT was performed at Y axis and Z axis position for Radiated emissi above 1GHz test, and the worst case was found at Z axis. So the measurement will follow this same test configuration.		
1 EUT in Z axis		

Note: The USB function was not evaluated by manufacturer request.



## 2.3 EUT Operation during Test

For CTX Mode:

The EUT was programmed to be in continuously transmitting mode.

For Normal Link:

During the test, the EUT operation to normal function.

## 2.4 Accessories

	Accessories				
No.	Equipment Name	Brand Name	Model Name	Rating	
1	Adapter	DVE/CUI	DSA-18PFR-12 FUS 090200	Input: 100-240V~50/60Hz, 0.6A Output: +9V, 2A	
2	Lithium-ion Battery	NetComm	BAT-40	3.7VDC, 3000mAh, 11.1Wh	

## 2.5 Support Equipment

For Test Site No: CO02-CB

Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID
А	NB	DELL	E6430	N/A
В	NB	DELL	E6430	N/A
С	NB	DELL	E6430	N/A
D	LTE Base station	Anritsu	MT8820C	N/A
Е	Phone	SAMPO	HT-B 907WL	N/A
F	Phone	SAMPO	HT-B 907WL	N/A
G	SIM card	N/A	N/A	N/A



	Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID	
А	NB	DELL	E4300	N/A	
В	NB	DELL	E4300	N/A	
С	NB	DELL	E4300	N/A	
D	LTE base station	Anritsu	MT8820C	N/A	
Е	Phone	H-T-T	F-689	N/A	
F	Phone	H-T-T	F-689	N/A	
G	SIM card	N/A	N/A	N/A	

### For Test Site No: 03CH01-CB (below 1GHz)

### For Test Site No: 03CH01-CB (above 1GHz) and TH01-CB

Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID
А	NB	Lenovo	TP00048A	N/A



## 2.6 Test Setup Diagram













## 3 Transmitter Test Result

## 3.1 AC Power-line Conducted Emissions

## 3.1.1 AC Power-line Conducted Emissions Limit

AC Power-line Conducted Emissions Limit			
Frequency Emission (MHz)	Quasi-Peak	Average	
0.15-0.5	66 - 56 *	56 - 46 *	
0.5-5	56	46	
5-30	60	50	
Note 1: * Decreases with the logarithm of the frequency.			

## 3.1.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

## 3.1.3 Test Procedures

**Test Method** 

Refer as ANSI C63.10-2013, clause 6.2 for AC power-line conducted emissions.

### 3.1.4 Test Setup



## 3.1.5 Test Result of AC Power-line Conducted Emissions

Refer as Appendix A



## 3.2 Emission Bandwidth

### 3.2.1 Emission Bandwidth Limit

	Emission Bandwidth Limit
UN	I Devices
$\boxtimes$	For the 5.15-5.25 GHz band, N/A
	For the 5.25-5.35 GHz band, the maximum conducted output power shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz.
	For the 5.47-5.725 GHz band, the maximum conducted output power shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz.
$\boxtimes$	For the 5.725-5.85 GHz band, 6 dB emission bandwidth $\geq$ 500kHz.
LE-	LAN Devices
	For the band 5.15-5.25 GHz, the maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz.
	For the 5.25-5.35 GHz band, the maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz
	For the 5.47-5.6 GHz band and 5.65-5.725 GHz band, the maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz
	For the 5.725-5.85 GHz band, 6 dB emission bandwidth $\geq$ 500kHz.

## 3.2.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

### 3.2.3 Test Procedures

	Test Method
-	For the emission bandwidth shall be measured using one of the options below:
	Refer as FCC KDB 789033, clause C for EBW and clause D for OBW measurement.
	Refer as ANSI C63.10, clause 6.9.1 for occupied bandwidth testing.
	Refer as IC RSS-Gen, clause 4.6 for bandwidth testing.

### 3.2.4 Test Setup



## 3.2.5 Test Result of Emission Bandwidth

### Refer as Appendix B



## 3.3 Maximum Conducted Output Power

## 3.3.1 Maximum Conducted Output Power Limit

	Maximum Conducted Output Power Limit
UNI	Devices
$\boxtimes$	For the 5.15-5.25 GHz band:
	<ul> <li>Outdoor AP: the maximum conducted output power (P<sub>Out</sub>) shall not exceed the lesser of 1 W. If G<sub>TX</sub> &gt; 6 dBi, then P<sub>Out</sub> = 30 - (G<sub>TX</sub> - 6). e.i.r.p. at any elevation angle above 30 degrees ≤ 125mW [21dBm]</li> </ul>
-	• Indoor AP: the maximum conducted output power ( $P_{Out}$ ) shall not exceed the lesser of 1 W. If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)$
	<ul> <li>Point-to-point AP: the maximum conducted output power (P<sub>Out</sub>) shall not exceed the lesser of 1 W If G<sub>TX</sub> &gt; 23 dBi, then P<sub>Out</sub> = 30 - (G<sub>TX</sub> - 23).</li> </ul>
	<ul> <li>Mobile or Portable Client: the maximum conducted output power (P<sub>Out</sub>) shall not exceed the lesser of 250 mW. If G<sub>TX</sub> &gt; 6 dBi, then P<sub>Out</sub> = 24 - (G<sub>TX</sub> - 6).</li> </ul>
	For the 5.25-5.35 GHz band, the maximum conducted output power ( $P_{Out}$ ) shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. If $G_{TX} > 6$ dBi, then $P_{Out} = 24 - (G_{TX} - 6)$ .
	For the 5.47-5.725 GHz band, the maximum conducted output power ( $P_{Out}$ ) shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. If $G_{TX} > 6$ dBi, then $P_{Out} = 24 - (G_{TX} - 6)$ .
$\square$	For the 5.725-5.85 GHz band:
	<ul> <li>Point-to-multipoint systems (P2M): the maximum conducted output power (P<sub>Out</sub>) shall not exceed the lesser of 1 W. If G<sub>TX</sub> &gt; 6 dBi, then P<sub>Out</sub> = 30 - (G<sub>TX</sub> - 6).</li> </ul>
-	<ul> <li>Point-to-point systems (P2P): the maximum conducted output power (P<sub>Out</sub>) shall not exceed the lesser of 1 W.</li> </ul>
LE-I	AN Devices
	For the 5.15-5.25 GHz band, the maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz.
	For the 5.25-5.35 GHz band, the maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz
	For the 5.47-5.6 GHz band and 5.65-5.725 GHz band, the maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz
	For the 5.725-5.85 GHz band:
	<ul> <li>Point-to-multipoint systems (P2M): the maximum conducted output power (P<sub>Out</sub>) shall not exceed the lesser of 1 W. If G<sub>TX</sub> &gt; 6 dBi, then P<sub>Out</sub> = 30 - (G<sub>TX</sub> - 6).</li> </ul>
	<ul> <li>Point-to-point systems (P2P): the maximum conducted output power (P<sub>Out</sub>) shall not exceed the lesser of 1 W.</li> </ul>
P <sub>Out</sub> G <sub>TX</sub>	<ul> <li>maximum conducted output power in dBm,</li> <li>the maximum transmitting antenna directional gain in dBi.</li> </ul>



## 3.3.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

### 3.3.3 Test Procedures

	Test Method							
-	Maximum Conducted Output Power							
	Average over on/off periods with duty factor							
	Refer as FCC KDB 789033, clause E Method SA-2 (spectral trace averaging).							
	Refer as FCC KDB 789033, clause E Method SA-2 Alt. (RMS detection with slow sweep speed)							
	Wideband RF power meter and average over on/off periods with duty factor							
	Refer as FCC KDB 789033, clause E Method PM-G (using an RF average power meter).							
-	For conducted measurement.							
	<ul> <li>If the EUT supports multiple transmit chains using options given below: Refer as FCC KDB 662911, In-band power measurements. Using the measure-and-sum approach, measured all transmit ports individually. Sum the power (in linear power units e.g., mW) of all ports for each individual sample and save them.</li> </ul>							
	<ul> <li>If multiple transmit chains, EIRP calculation could be following as methods:</li> <li>P<sub>total</sub> = P<sub>1</sub> + P<sub>2</sub> + + P<sub>n</sub> (calculated in linear unit [mW] and transfer to log unit [dBm]) EIRP<sub>total</sub> = P<sub>total</sub> + DG</li> </ul>							

## 3.3.4 Test Setup

RF Output Power (Power Meter)					
	EUT Power Meter				

## 3.3.5 Test Result of Maximum Conducted Output Power

Refer as Appendix C



## 3.4 Peak Power Spectral Density

## 3.4.1 Peak Power Spectral Density Limit

	Peak Power Spectral Density Limit
UN	II Devices
$\boxtimes$	For the 5.15-5.25 GHz band:
	<ul> <li>Outdoor AP: the peak power spectral density (PPSD) shall not exceed the lesser of 17dBm/MHz. If G<sub>TX</sub> &gt; 6 dBi, then P<sub>Out</sub> = 17 - (G<sub>TX</sub> - 6).</li> </ul>
	<ul> <li>Indoor AP: the peak power spectral density (PPSD) shall not exceed the lesser of 17dBm/MHz. If G<sub>TX</sub> &gt; 6 dBi, then P<sub>Out</sub> = 17 - (G<sub>TX</sub> - 6).</li> </ul>
	<ul> <li>Point-to-point AP: the peak power spectral density (PPSD) shall not exceed the lesser of 17dBm/MHz. If G<sub>TX</sub> &gt; 23 dBi, then P<sub>Out</sub> = 17 – (G<sub>TX</sub> – 23).</li> </ul>
	<ul> <li>Mobile or Portable Client: the peak power spectral density (PPSD) ≤ 11 dBm/MHz. If G<sub>TX</sub> &gt; 6 dBi, then PPSD= 11 – (G<sub>TX</sub> – 6)</li> </ul>
	For the 5.25-5.35 GHz band, the peak power spectral density (PPSD) $\leq$ 11 dBm/MHz. If G <sub>TX</sub> > 6 dBi, then PPSD= 11 - (G <sub>TX</sub> - 6).
	For the 5.47-5.725 GHz band, the peak power spectral density (PPSD) $\leq$ 11 dBm/MHz. If G <sub>TX</sub> > 6 dBi, then PPSD= 11 - (G <sub>TX</sub> - 6).
$\boxtimes$	For the 5.725-5.85 GHz band:
	<ul> <li>Point-to-multipoint systems (P2M): the peak power spectral density (PPSD) ≤ 30 dBm/500kHz. If G<sub>TX</sub> &gt; 6 dBi, then PPSD= 30 - (G<sub>TX</sub> - 6).</li> </ul>
	<ul> <li>Point-to-point systems (P2P): the peak power spectral density (PPSD) ≤ 30 dBm/500kHz.</li> </ul>
LE-	LAN Devices
	For the 5.15-5.25 GHz band, the e.i.r.p. peak power spectral density (PPSD) $\leq$ 10 dBm/MHz.
	For the 5.25-5.35 GHz band, the peak power spectral density (PPSD) $\leq$ 11 dBm/MHz.
	<ul> <li>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:</li> <li>-13 dBW/MHz for 0° ≤ θ &lt; 8°; -13 - 0.716 (θ-8) dBW/MHz for 8° ≤ θ &lt; 40°</li> <li>-35.9 - 1.22 (θ-40) dBW/MHz for 40° ≤ θ ≤ 45°; -42 dBW/MHz for θ &gt; 45°</li> </ul>
	For the 5.47-5.6 GHz band and 5.65-5.725 GHz band, the peak power spectral density (PPSD) $\leq$ 11 dBm/MHz.
	For the 5.725-5.85 GHz band:
	• Point-to-multipoint systems (P2M): the peak power spectral density (PPSD) $\leq$ 30 dBm/500kHz. If $G_{TX} > 6$ dBi, then PPSD= 30 - ( $G_{TX} - 6$ ).
	■ Point-to-point systems (P2P): the peak power spectral density (PPSD) ≤ 30 dBm/500kHz.
РР ром G <sub>тх</sub>	<b>SD</b> = peak power spectral density that he same method as used to determine the conducted output ver shall be used to determine the power spectral density. And power spectral density in dBm/MHz = the maximum transmitting antenna directional gain in dBi.

## 3.4.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.



## 3.4.3 Test Procedures

	Test Method							
•	Peak power spectral density procedures that the same method as used to determine the conducted output power shall be used to determine the peak power spectral density and use the peak search function on the spectrum analyzer to find the peak of the spectrum. For the peak power spectral density shall be measured using below options:							
	Refer as FCC KDB 789033, F)5) power spectral density can be measured using resolution bandwidths < 1 MHz provided that the results are integrated over 1 MHz bandwidth							
	[duty	y cycle ≥ 98% or external video / power trigger]						
	$\square$	Refer as FCC KDB 789033, clause E Method SA-1 (spectral trace averaging).						
		Refer as FCC KDB 789033, clause E Method SA-1 Alt. (RMS detection with slow sweep speed)						
	duty	cycle < 98% and average over on/off periods with duty factor						
	$\boxtimes$	Refer as FCC KDB 789033, clause E Method SA-2 (spectral trace averaging).						
		Refer as FCC KDB 789033, clause E Method SA-2 Alt. (RMS detection with slow sweep speed)						
-	For	conducted measurement.						
		If the EUT supports multiple transmit chains using options given below:						
		☑ Option 1: Measure and sum the spectra across the outputs. Refer as FCC KDB 662911, In-band power spectral density (PSD). Sample all transmit ports simultaneously using a spectrum analyzer for each transmit port. Where the trace bin-by-bin of each transmit port summing can be performed. (i.e., in the first spectral bin of output 1 is summed with that in the first spectral bin of output 2 and that from the first spectral bin of output 3, and so on up to the NTX output to obtain the value for the first frequency bin of the summed spectrum.). Add up the amplitude (power) values for the different transmit chains and use this as the new data trace.						
		Option 2: Measure and sum spectral maxima across the outputs. With this technique, spectra are measured at each output of the device at the required resolution bandwidth. The maximum value (peak) of each spectrum is determined. These maximum values are then summed mathematically in linear power units across the outputs. These operations shall be performed separately over frequency spans that have different out-of-band or spurious emission limits,						
		Option 3: Measure and add 10 log(N) dB, where N is the number of transmit chains. Refer as FCC KDB 662911, In-band power spectral density (PSD). Performed at each transmit chains and each transmit chains shall be compared with the limit have been reduced with 10 log(N). Or each transmit chains shall be add 10 log(N) to compared with the limit.						
		If multiple transmit chains, EIRP PPSD calculation could be following as methods: $PPSD_{total} = PPSD_1 + PPSD_2 + + PPSD_n$ (calculated in linear unit [mW] and transfer to log unit [dBm]) $EIRP_{total} = PPSD_{total} + DG$						



## 3.4.4 Test Setup



## 3.4.5 Test Result of Peak Power Spectral Density

Refer as Appendix D



## 3.5 Unwanted Emissions

## 3.5.1 Transmitter Unwanted Emissions Limit

Unwanted emissions below 1 GHz and restricted band emissions above 1GHz limit								
Frequency Range (MHz)	Field Strength (uV/m)	Field Strength (dBuV/m)	Measure Distance (m)					
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300					
0.490~1.705	24000/F(kHz)	33.8 - 23	30					
1.705~30.0	30	29	30					
30~88	100	40	3					
88~216	150	43.5	3					
216~960	200	46	3					
Above 960	500	54	3					

Note 1: Test distance for frequencies at or above 30 MHz, measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).

Note 2: Test distance for frequencies at below 30 MHz, measurements may be performed at a distance closer than the EUT limit distance; however, an attempt should be made to avoid making measurements in the near field. When performing measurements below 30 MHz at a closer distance than the limit distance, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two or more distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade). The test report shall specify the extrapolation method used to determine compliance of the EUT.

Note 3: Using the distance of 1m during the test for above 18 GHz, and the test value to correct for the distance factor at 3m.

Un-restricted band emissions above 1GHz Limit						
Operating Band	Limit					
🔀 5.15 - 5.25 GHz	e.i.r.p27 dBm [68.2 dBuV/m@3m]					
🔲 5.25 - 5.35 GHz	e.i.r.p27 dBm [68.2 dBuV/m@3m]					
🗌 5.47 - 5.725 GHz	e.i.r.p27 dBm [68.2 dBuV/m@3m]					
⊠ 5.725 - 5.85 GHz	all emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.					
Note 1: Measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of						

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linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).

#### 3.5.2 **Measuring Instruments**

Refer a test equipment and calibration data table in this test report.

#### 3.5.3 **Test Procedures**

		Test Method						
•	Measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. Measurements shall not be performed at a distance greater than 30 m for frequencies above 30 MHz, unless it can be further demonstrated that measurements at a distance of 30 m or less are impractical. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).							
	The	average emission levels shall be measured in [duty cycle $\geq$ 98 or duty factor].						
•	For	the transmitter unwanted emissions shall be measured using following options below:						
	•	Refer as FCC KDB 789033, clause G)2) for unwanted emissions into non-restricted bands.						
	•	Refer as FCC KDB 789033, clause G)1) for unwanted emissions into restricted bands.						
		Refer as FCC KDB 789033, G)6) Method AD (Trace Averaging).						
		Refer as FCC KDB 789033, G)6) Method VB (Reduced VBW).						
		☐ Refer as ANSI C63.10, clause 11.12.2.5.3 (Reduced VBW). VBW ≥ 1/T, where T is pulse time.						
		Refer as ANSI C63.10, clause 7.5 average value of pulsed emissions.						
		Refer as FCC KDB 789033, clause G)5) measurement procedure peak limit.						
		Refer as ANSI C63.10, clause 4.1.4.2.2 measurement procedure peak limit.						
•	For	radiated measurement.						
	•	Refer as ANSI C63.10, clause 6.4 for radiated emissions below 30 MHz and test distance is 3m.						
	•	Refer as ANSI C63.10, clause 6.5 for radiated emissions 30 MHz to 1 GHz and test distance is 3m.						
	•	Refer as ANSI C63.10, clause 6.6 for radiated emissions above 1GHz.						
•	The	any unwanted emissions level shall not exceed the fundamental emission level.						
•	All a has	amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value no need to be reported.						



## 3.5.4 Test Setup







## 3.5.5 Transmitter Unwanted Emissions (Below 30MHz)

All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

The radiated emissions were investigated from 9 kHz or the lowest frequency generated within the device, up to the 10 harmonic or 40 GHz, whichever is appropriate.

## 3.5.6 Test Result of Transmitter Unwanted Emissions

Refer as Appendix E



## 4 Test Equipment and Calibration Data

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
LISN	Schwarzbeck	NSLK 8127	8127650	9kHz ~ 30MHz	Nov. 21, 2018	Nov. 20, 2019	Conduction (CO02-CB)
LISN	Schwarzbeck	NSLK 8127	8127478	9kHz ~ 30MHz	Nov. 05, 2018	Nov. 04, 2019	Conduction (CO02-CB)
EMI Receiver	Agilent	N9038A	MY52260140	9kHz ~ 8.4GHz	Jan. 17, 2018	Jan. 16, 2019	Conduction (CO02-CB)
COND Cable	Woken	Cable	2	0.15MHz ~ 30MHz	Nov. 06, 2018	Nov. 05, 2019	Conduction (CO02-CB)
Software	Audix	E3	6.120210n	-	N.C.R.	N.C.R.	Conduction (CO02-CB)
BILOG ANTENNA with 6dB Attenuator	TESEQ & EMCI	CBL6112D & N-6-06	37880 & AT-N0609	20MHz ~ 2GHz	Aug. 27, 2018	Aug. 26, 2019	Radiation (03CH01-CB)
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	Mar. 16, 2018	Mar. 15, 2019	Radiation (03CH01-CB)
Loop Antenna	Teseq	HLA 6120	31244	9kHz - 30 MHz	Mar. 18, 2019*	Mar. 17, 2021*	Radiation (03CH01-CB)
Horn Antenna	EMCO	3115	00075790	750MHz ~ 18GHz	Nov. 13, 2018	Nov. 12, 2019	Radiation (03CH01-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Jun. 28, 2018	Jun. 27, 2019	Radiation (03CH01-CB)
Pre-Amplifier	EMCI	EMC330N	980332	20MHz ~ 3GHz	May 02, 2018	May 01, 2019	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02310	1GHz ~ 26.5GHz	Jan. 08, 2019	Jan. 07, 2020	Radiation (03CH01-CB)
Pre-Amplifier	MITEQ	TTA1840-35- HG	1864479	18GHz ~ 40GHz	Jul. 04, 2018	Jul. 03, 2019	Radiation (03CH01-CB)
Spectrum anal yzer	R&S	FSP40	100080	9kHz~40GHz	Oct. 03, 2018	Oct. 02, 2019	Radiation (03CH01-CB)
EMI Test Receiver	R&S	ESCS	100359	9kHz ~ 2.75GHz	Jul. 03, 2018	Jul. 02, 2019	Radiation (03CH01-CB)
RF Cable-low	Woken	Low Cable-16+17	N/A	30 MHz ~ 1 GHz	Oct. 08, 2018	Oct. 07, 2019	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-16	N/A	1 GHz ~ 18 GHz	Oct. 08, 2018	Oct. 07, 2019	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-16+17	N/A	1 GHz ~ 18 GHz	Oct. 08, 2018	Oct. 07, 2019	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G#1	N/A	18GHz ~ 40 GHz	Jul. 27, 2018	Jul. 26, 2019	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G#2	N/A	18GHz ~ 40 GHz	Jul. 27, 2018	Jul. 26, 2019	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSV40	101027	9kHz~40GHz	Jun. 22, 2018	Jun. 21, 2019	Conducted (TH01-CB)
Temp. and Humidity Chamber	Ten Billion	TTH-D3SP	TBN-931011	-30~100 degree	Jun. 01, 2018	May 31, 2019	Conducted (TH01-CB)

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Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
RF Cable-high	Woken	RG402	High Cable-06	1 GHz – 26.5 GHz	Oct. 08, 2018	Oct. 07, 2019	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-07	1 GHz –26.5 GHz	Oct. 08, 2018	Oct. 07, 2019	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-08	1 GHz –26.5 GHz	Oct. 08, 2018	Oct. 07, 2019	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-09	1 GHz –26.5 GHz	Oct. 08, 2018	Oct. 07, 2019	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-10	1 GHz –26.5 GHz	Oct. 08, 2018	Oct. 07, 2019	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-28	1 GHz –26.5 GHz	Nov. 19, 2018	Nov. 18, 2019	Conducted (TH01-CB)
Power Sensor	Agilent	U2021XA	MY53410001	50MHz~18GHz	Nov. 05, 2018	Nov. 04, 2019	Conducted (TH01-CB)

Note: Calibration Interval of instruments listed above is one year.

"\*" Calibration Interval of instruments listed above is two years.

N.C.R. means Non-Calibration required.











#### Summary

Mode	Max-N dB	Max-OBW	ITU-Code	Min-N dB	Min-OBW
	(Hz)	(Hz)		(Hz)	(Hz)
5.15-5.25GHz	-	-	-	-	-
802.11a_Nss1,(6Mbps)_2TX	30.8M	16.717M	16M7D1D	24.35M	16.517M
802.11ac VHT20_Nss1,(MCS0)_2TX	30.975M	17.866M	17M9D1D	23.75M	17.741M
802.11ac VHT40_Nss1,(MCS0)_2TX	69.05M	36.332M	36M3D1D	44.55M	36.182M
802.11ac VHT80_Nss1,(MCS0)_2TX	90.2M	76.062M	76M1D1D	88.4M	75.962M
5.725-5.85GHz	-	-	-	-	-
802.11a_Nss1,(6Mbps)_2TX	16.325M	16.717M	16M7D1D	16.275M	16.542M
802.11ac VHT20_Nss1,(MCS0)_2TX	17.575M	17.891M	17M9D1D	17.15M	17.766M
802.11ac VHT40_Nss1,(MCS0)_2TX	36.3M	36.432M	36M4D1D	35.9M	36.382M
802.11ac VHT80_Nss1,(MCS0)_2TX	76.3M	76.162M	76M2D1D	76M	76.062M

Max-N dB = Maximum 6dB down bandwidth for 5.725-5.85GHz band / Maximum 26dB down bandwidth for other band; Max-OBW = Maximum 99% occupied bandwidth; Min-N dB = Minimum 6dB down bandwidth for 5.725-5.85GHz band / Maximum 26dB down bandwidth for other band; Min-OBW = Minimum 99% occupied bandwidth;



#### Result

Mode	Result	Limit	Port 1-N dB	Port 1-OBW	Port 2-N dB	Port 2-OBW
		(Hz)	(Hz)	(Hz)	(Hz)	(Hz)
802.11a_Nss1,(6Mbps)_2TX	-	-	-	-	-	-
5180MHz	Pass	Inf	25.775M	16.592M	24.35M	16.517M
5200MHz	Pass	Inf	28.625M	16.667M	25.525M	16.517M
5240MHz	Pass	Inf	30.8M	16.717M	25.725M	16.542M
5745MHz	Pass	500k	16.325M	16.642M	16.3M	16.542M
5785MHz	Pass	500k	16.275M	16.717M	16.325M	16.617M
5825MHz	Pass	500k	16.3M	16.642M	16.3M	16.617M
802.11ac VHT20_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5180MHz	Pass	Inf	28.275M	17.791M	23.75M	17.741M
5200MHz	Pass	Inf	30.975M	17.866M	23.9M	17.791M
5240MHz	Pass	Inf	30.925M	17.791M	26.4M	17.766M
5745MHz	Pass	500k	17.575M	17.841M	17.55M	17.766M
5785MHz	Pass	500k	17.55M	17.891M	17.15M	17.866M
5825MHz	Pass	500k	17.575M	17.841M	17.525M	17.791M
802.11ac VHT40_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5190MHz	Pass	Inf	44.55M	36.182M	44.55M	36.232M
5230MHz	Pass	Inf	69.05M	36.282M	59.8M	36.332M
5755MHz	Pass	500k	36.3M	36.432M	35.9M	36.382M
5795MHz	Pass	500k	36.05M	36.382M	36M	36.432M
802.11ac VHT80_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5210MHz	Pass	Inf	90.2M	76.062M	88.4M	75.962M
5775MHz	Pass	500k	76M	76.062M	76.3M	76.162M

**Port X-N dB** = Port **X** 6dB down bandwidth for 5.725-5.85GHz band / 26dB down bandwidth for other band **Port X-OBW** = Port **X** 99% occupied bandwidth;


























#### Summary

Mode	Total Power	Total Power		
	(dBm)	(W)		
5.15-5.25GHz	-	-		
802.11a_Nss1,(6Mbps)_2TX	20.26	0.10617		
802.11ac VHT20_Nss1,(MCS0)_2TX	20.34	0.10814		
802.11ac VHT40_Nss1,(MCS0)_2TX	20.27	0.10641		
802.11ac VHT80_Nss1,(MCS0)_2TX	16.62	0.04592		
5.725-5.85GHz	-	-		
802.11a_Nss1,(6Mbps)_2TX	20.38	0.10914		
802.11ac VHT20_Nss1,(MCS0)_2TX	20.47	0.11143		
802.11ac VHT40_Nss1,(MCS0)_2TX	20.27	0.10641		
802.11ac VHT80_Nss1,(MCS0)_2TX	19.31	0.08531		



#### Result

Mode	Result	DG	Port 1	Port 2	Total Power	Power Limit	
		(dBi)	(dBm)	(dBm)	(dBm)	(dBm)	
802.11a_Nss1,(6Mbps)_2TX	-	-	-	-	-	-	
5180MHz	Pass	5.79	16.76	16.68	19.73	30.00	
5200MHz	Pass	5.79	17.18	17.23	20.22	30.00	
5240MHz	Pass	5.79	17.23	17.26	20.26	30.00	
5745MHz	Pass	5.10	17.44	16.44	19.98	30.00	
5785MHz	Pass	5.10	17.81	16.70	20.30	30.00	
5825MHz	Pass	5.10	17.69	17.03	20.38	30.00	
802.11ac VHT20_Nss1,(MCS0)_2TX	-	-	-	-	-	-	
5180MHz	Pass	5.79	16.75	16.82	19.80	30.00	
5200MHz	Pass	5.79	17.23	17.29	20.27	30.00	
5240MHz	Pass	5.79	17.34	17.31	20.34	30.00	
5745MHz	Pass	5.10	17.46	16.45	19.99	30.00	
5785MHz	Pass	5.10	17.84	16.79	20.36	30.00	
5825MHz	Pass	5.10	17.75	17.15	20.47	30.00	
802.11ac VHT40_Nss1,(MCS0)_2TX	-	-	-	-	-	-	
5190MHz	Pass	5.79	14.22	14.10	17.17	30.00	
5230MHz	Pass	5.79	17.22	17.30	20.27	30.00	
5755MHz	Pass	5.10	17.15	16.39	19.80	30.00	
5795MHz	Pass	5.10	17.72	16.75	20.27	30.00	
802.11ac VHT80_Nss1,(MCS0)_2TX	-	-	-	-	-	-	
5210MHz	Pass	5.79	13.64	13.58	16.62	30.00	
5775MHz	Pass	5.10	16.72	15.84	19.31	30.00	

**DG** = Directional Gain;**Port X** = Port X output power



#### Summary

Mode	PD
	(dBm/RBW)
5.15-5.25GHz	-
802.11a_Nss1,(6Mbps)_2TX	7.14
802.11ac VHT20_Nss1,(MCS0)_2TX	7.03
802.11ac VHT40_Nss1,(MCS0)_2TX	4.04
802.11ac VHT80_Nss1,(MCS0)_2TX	-3.08
5.725-5.85GHz	-
802.11a_Nss1,(6Mbps)_2TX	5.72
802.11ac VHT20_Nss1,(MCS0)_2TX	5.74
802.11ac VHT40_Nss1,(MCS0)_2TX	2.56
802.11ac VHT80_Nss1,(MCS0)_2TX	-1.77

**RBW** = 500kHz for 5.725-5.85GHz band / 1MHz for other band;



#### Result

Mode	Result	DG	Port 1	Port 2	PD	PD Limit	
		(dBi)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	
802.11a_Nss1,(6Mbps)_2TX	-	-	-	-	-	-	
5180MHz	Pass	8.41	3.73	3.73	6.68	14.59	
5200MHz	Pass	8.41	4.26	4.36	7.14	14.59	
5240MHz	Pass	8.41	4.05	4.41	7.08	14.59	
5745MHz	Pass	7.79	2.75	1.84	5.27	28.21	
5785MHz	Pass	7.79	2.98	2.12	5.51	28.21	
5825MHz	Pass	7.79	2.99	2.52	5.72	28.21	
802.11ac VHT20_Nss1,(MCS0)_2TX	-	-	-	-	-	-	
5180MHz	Pass	8.41	3.51	3.58	6.48	14.59	
5200MHz	Pass	8.41	3.96	4.16	7.03	14.59	
5240MHz	Pass	8.41	3.97	4.06	6.94	14.59	
5745MHz	Pass	7.79	2.66	1.82	5.18	28.21	
5785MHz	Pass	7.79	2.84	2.07	5.41	28.21	
5825MHz	Pass	7.79	3.05	2.50	5.74	28.21	
802.11ac VHT40_Nss1,(MCS0)_2TX	-	-	-	-	-	-	
5190MHz	Pass	8.41	-1.81	-1.89	1.07	14.59	
5230MHz	Pass	8.41	0.97	1.23	4.04	14.59	
5755MHz	Pass	7.79	-0.57	-1.14	2.14	28.21	
5795MHz	Pass	7.79	0.07	-0.96	2.56	28.21	
802.11ac VHT80_Nss1,(MCS0)_2TX	-	-	-	-	-	-	
5210MHz	Pass	8.41	-5.99	-6.07	-3.08	14.59	
5775MHz	Pass	7.79	-4.37	-4.96	-1.77	28.21	

**DG** = Directional Gain; **RBW** = 500kHz for 5.725-5.85GHz band / 1MHz for other band; **PD** = trace bin-by-bin of each transmits port summing can be performed maximum power density; **Port X** = Port Xpower density;



































# RSE TX above 1GHz Result

#### Summary

Mode	Result	Туре	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
5.725-5.85GHz	-	-	-	-	-	-	-	-	-	-	-	-
802.11ac VHT40_Nss1,(MCS0)_2TX	Pass	PK	5.6495G	67.19	68.20	-1.01	6.37	3	Horizontal	334	1.01	-





























































































































































































































































































