

## FCC TEST REPORT

Test report No.: EMC- FCC- R0201  
FCC ID: TOUC1004W  
Type of equipment: 10G GEAPON ONU  
Model Name: C1004W  
Applicant: CommScope, Inc. of North Carolina  
Max.RF Output Power: 19.38 dBm  
FCC Rule Part(s): FCC Part 15 Subpart E 15.407  
Frequency Range: 5 150 MHz ~ 5 250 MHz  
5 725 MHz ~ 5 850 MHz  
Test result: Complied

The above equipment was tested by EMC compliance Testing Laboratory for compliance with the requirements of FCC Rules and Regulations.

The results of testing in this report apply to the product/system which was tested only. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Date of receipt: 2014. 10. 24

Date of test: 2014. 11. 11 ~ 11. 30

Issued date: 2014. 12. 10

Tested by:

SON, MIN GI

Approved by:

YU, SANG HOON

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## 1. Client information

**Applicant:** CommScope, Inc. of North Carolina  
**Address:** 1100 CommScope Place SE Hickory NC 28602, USA  
**Telephone number:** +1-828-431-2563  
**Facsimile number:** +1-828-431-2563  
**Contact person:** J. Roberto Mazariegos / Rmazariegos@commscope.com

**Manufacturer:** ubiquoss Inc.  
**Address:** 24F Millennium Building, 467-12 Dogok-Dong, Gangnam-Gu  
Seoul, Korea

## 2. Laboratory information

### Address

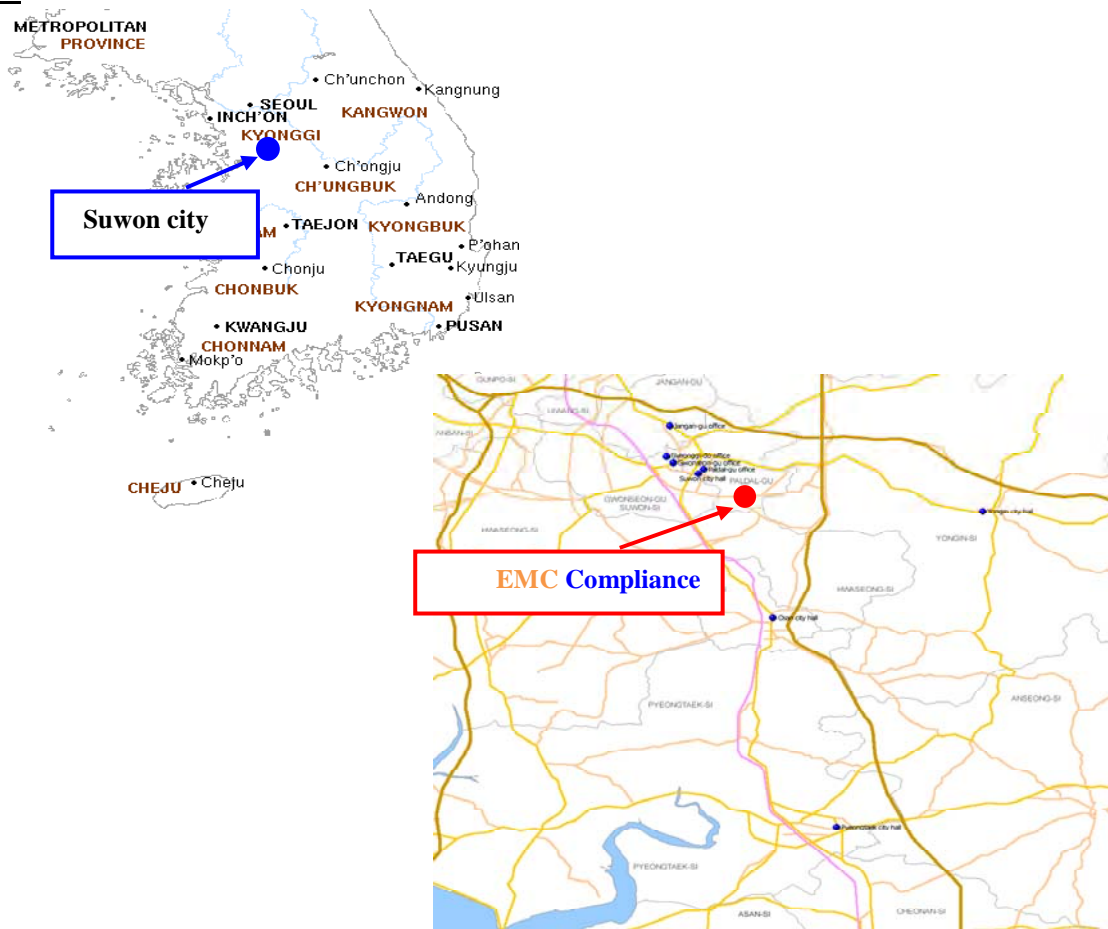
#### **EMC compliance Ltd.**

480-5, Sin-dong, Yeongtong-gu, Suwon-si, Gyeonggi-do, Korea  
Telephone Number: 82-31-336-9919 Facsimile Number: 82-505-299-8311

### Certificate

KOLAS No.: 231  
FCC Site Designation No: KR0040  
FCC Site Registration No: 687132  
VCCI Site Registration No.: R-3327, G-198, C-3706, T-1849  
IC Site Registration No.:8035A-2

### SITE MAP



### 3. Description of E.U.T.

#### 3.1 Basic description

Applicant:	CommScope, Inc. of North Carolina
Address of Applicant	1100 CommScope Place SE Hickory NC 28602, USA
Manufacturer	ubiquoss Inc.
Address of Manufacturer	24F Millennium Building, 467-12 Dogok-Dong, Gangnam-Gu Seoul, Korea
Type of equipment	10G GEAPON ONU
Basic Model	C1004W
Serial number	N/A

#### 3.2 General description

Frequency Range	5 180 MHz ~ 5 240 MHz / 5 745 MHz ~ 5 825 MHz (802.11a/ac/n_HT20) 5 190 MHz ~ 5 230 MHz / 5 755 MHz ~ 5 795 MHz (802.11a/ac/n_HT40) 5 210 MHz / 5 755 MHz (802.11ac_HT80)
Communication	IEEE 802.11a/b/g/n
Type of Modulation	CCK, OFDM
Number of Channels	4 ch (11a/n_HT20,VHT20): 5 150 MHz Band 5 ch (11a/n_HT20,VHT20): 5 725 MHz Band 2 ch (11a/n_HT40,VHT20): 5 150 MHz Band 2 ch (11a/n_HT40,VHT20): 5 725 MHz Band 1 ch (11a/n_HT80,VHT20): 5 150 MHz Band 1 ch (11a/n_HT80,VHT20): 5 725 MHz Band
Type of Antenna	Dipole antenna
Antenna Gain	Ant1 : 4.648 dBi (5 150 MHz Band), 3.596 dBi (5 725 MHz Band) Ant2 : 4.441 dBi (5 150 MHz Band), 4.640 dBi (5 725 MHz Band) Ant3 : 4.488 dBi (5 150 MHz Band), 4.252 dBi (5 725 MHz Band)
Transmit Power	19.38 dBm
Power supply	DC 12 V
Adaptor Model	BP4012N3M, 2ABP-40MB

### 3.3 Available channel list and frequency

For all test items, the low, middle and high channels of the modes were tested with above worst case data rate.

\* 802.11a/ac/n\_HT20

	BAND 1	BAND 4
Low frequency	5 180	5 745
Middle frequency	5 200	5 785
High frequency	5 240	5 825

\* 802.11a/ac/n\_HT40

	BAND 1	BAND 4
Low frequency	5 190	5 755
Middle frequency	5 230	5 795

\* 802.11ac\_HT80

	BAND 1	BAND 4
Low frequency	5 210	5 775

### 3.4 Test Voltage

mode	Voltage
Normal voltage	DC 12 V

### 3.5 Duty Factor

#### - 5 150MHz band

802.11a 1Tx : Duty cycle = 0.9568, Duty cycle factor =  $10\log(1/\text{Duty cycle}) = 0.19$  dB  
802.11an20 1Tx : Duty cycle = 0.9576, Duty cycle factor =  $10\log(1/\text{Duty cycle}) = 0.19$  dB  
802.11an20 2Tx : Duty cycle = 0.8838, Duty cycle factor =  $10\log(1/\text{Duty cycle}) = 0.54$  dB  
802.11an20 3Tx : Duty cycle = 0.8814, Duty cycle factor =  $10\log(1/\text{Duty cycle}) = 0.55$  dB  
802.11an40 1Tx : Duty cycle = 0.9163, Duty cycle factor =  $10\log(1/\text{Duty cycle}) = 0.38$  dB  
802.11an40 2Tx : Duty cycle = 0.7965, Duty cycle factor =  $10\log(1/\text{Duty cycle}) = 0.99$  dB  
802.11an40 3Tx : Duty cycle = 0.7911, Duty cycle factor =  $10\log(1/\text{Duty cycle}) = 1.02$  dB  
802.11ac20 1Tx : Duty cycle = 0.9933, Duty cycle factor =  $10\log(1/\text{Duty cycle}) = 0.03$  dB  
802.11ac20 2Tx : Duty cycle = 0.8866, Duty cycle factor =  $10\log(1/\text{Duty cycle}) = 0.51$  dB  
802.11ac20 3Tx : Duty cycle = 0.9718, Duty cycle factor =  $10\log(1/\text{Duty cycle}) = 0.12$  dB  
802.11ac40 1Tx : Duty cycle = 0.9797, Duty cycle factor =  $10\log(1/\text{Duty cycle}) = 0.09$  dB  
802.11ac40 2Tx : Duty cycle = 0.7991, Duty cycle factor =  $10\log(1/\text{Duty cycle}) = 0.97$  dB  
802.11ac40 3Tx : Duty cycle = 0.9323, Duty cycle factor =  $10\log(1/\text{Duty cycle}) = 0.30$  dB  
802.11ac80 1Tx : Duty cycle = 0.9547, Duty cycle factor =  $10\log(1/\text{Duty cycle}) = 0.20$  dB  
802.11ac80 2Tx : Duty cycle = 0.6724, Duty cycle factor =  $10\log(1/\text{Duty cycle}) = 1.72$  dB  
802.11ac80 3Tx : Duty cycle = 0.8818, Duty cycle factor =  $10\log(1/\text{Duty cycle}) = 0.55$  dB

#### - 5 725MHz band

802.11a 1Tx : Duty cycle = 0.9600, Duty cycle factor =  $10\log(1/\text{Duty cycle}) = 0.18$  dB  
802.11an20 1Tx : Duty cycle = 0.9615, Duty cycle factor =  $10\log(1/\text{Duty cycle}) = 0.17$  dB  
802.11an20 2Tx : Duty cycle = 0.8855, Duty cycle factor =  $10\log(1/\text{Duty cycle}) = 0.53$  dB  
802.11an20 3Tx : Duty cycle = 0.8821, Duty cycle factor =  $10\log(1/\text{Duty cycle}) = 0.54$  dB  
802.11an40 1Tx : Duty cycle = 0.9144, Duty cycle factor =  $10\log(1/\text{Duty cycle}) = 0.39$  dB  
802.11an40 2Tx : Duty cycle = 0.7965, Duty cycle factor =  $10\log(1/\text{Duty cycle}) = 0.99$  dB  
802.11an40 3Tx : Duty cycle = 0.7871, Duty cycle factor =  $10\log(1/\text{Duty cycle}) = 1.04$  dB  
802.11ac20 1Tx : Duty cycle = 0.9964, Duty cycle factor =  $10\log(1/\text{Duty cycle}) = 0.02$  dB  
802.11ac20 2Tx : Duty cycle = 0.8910, Duty cycle factor =  $10\log(1/\text{Duty cycle}) = 0.50$  dB  
802.11ac20 3Tx : Duty cycle = 0.9718, Duty cycle factor =  $10\log(1/\text{Duty cycle}) = 0.12$  dB  
802.11ac40 1Tx : Duty cycle = 0.9847, Duty cycle factor =  $10\log(1/\text{Duty cycle}) = 0.07$  dB  
802.11ac40 2Tx : Duty cycle = 0.7961, Duty cycle factor =  $10\log(1/\text{Duty cycle}) = 0.99$  dB  
802.11ac40 3Tx : Duty cycle = 0.9426, Duty cycle factor =  $10\log(1/\text{Duty cycle}) = 0.26$  dB  
802.11ac80 1Tx : Duty cycle = 0.9509, Duty cycle factor =  $10\log(1/\text{Duty cycle}) = 0.22$  dB  
802.11ac80 2Tx : Duty cycle = 0.6771, Duty cycle factor =  $10\log(1/\text{Duty cycle}) = 1.69$  dB  
802.11ac80 3Tx : Duty cycle = 0.8945, Duty cycle factor =  $10\log(1/\text{Duty cycle}) = 0.48$  dB



## 4. Summary of test results

### 4.1 Standards & results

FCC Rule	IC Rule (RSS-GEN)	Parameter	Report Section	Test Result
15.203 15.407(a)(1)(2)(3)	N/A	Antenna Requirement	5.1	C
15.403(i),15.407(e)	4.6	Bandwidth Measurement	5.2	C
15.407(a)(1)(2)	4.8	Maximum Conducted Output Power	5.3	C
15.407(a)(1)(2)(5)	N/A	Peak Power Spectral Density	5.4	C
15.205(a), 15.209(a), 15.407(b)(1), 15.407(b)(2), 15.407(b)(3)	4.9	Spurious Emission, Band Edge and Restricted bands	5.6	C
15.407(g)	4.7	Frequency Stability	5.7	C
15.207(a)	N/A	Conducted Emissions	5.8	C
15.407(h)	N/A	Dynamic Frequency Selection	5.9	N/A
15.407(f), 1.1307(b)(1)	N/A	RF Exposure	5.10	C

Note: C = complies  
NC = Not complies  
NT = Not tested  
NA = Not Applicable

### 4.2 Uncertainty

Measurement Item	Expanded Uncertainty $U = KUc (K = 2)$	
Conducted RF power	$\pm 1.36$ dB	
Conducted Spurious Emissions	$\pm 1.52$ dB	
Radiated Spurious Emissions	30 MHz ~ 300 MHz:	+ 4.94 dB, - 5.06 dB
		+ 4.93 dB, - 5.05 dB
	300 MHz ~ 1 000 MHz:	+ 4.97 dB, - 5.08 dB
		+ 4.84 dB, - 4.96 dB
1 GHz ~ 40 GHz:	+ 6.03 dB, - 6.05 dB	
Conducted Emissions	9 kHz ~ 150 kHz:	$\pm 3.75$ dB
	150 kHz ~ 30 MHz:	$\pm 3.36$ dB



## 5. Test results

### 5.1 Antenna Requirement

#### 5.1.1 Regulation

According to §15.203, 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.

And according to §15.407(a)(1)(2)(3), If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

#### 5.1.2 Result

##### -Complied

The transmitter has an integral PCB antenna.

The total directional peak gain of the antenna does not exceed 6.0 dBi

	5 150 MHz Band	5 725 MHz Band
ANT 1	4.648 dBi	3.596 dBi
ANT 2	4.441 dBi	4.640 dBi
ANT 3	4.488 dBi	4.252 dBi

According to KDB 662911 D01 Multiple Transmitter Output v02r01

- Directional gain =  $G_{ANT} + \text{Array Gain}$ , where Array Gain is as follows.

For power spectral density (PSD) measurements on all devices,

$$\text{Array Gain} = 10 \log(N_{ANT}/N_{SS}) \text{ dB.}$$

5 150 MHz band

$$2\text{Tx mimo Total gain} = 7.658 \text{ dBi (individual gain(4.648 dBi) + Array gain(3.01 dBi) )}$$

$$3\text{Tx mimo Total gain} = 9.418 \text{ dBi (individual gain(4.648 dBi) + Array gain(4.77 dBi) )}$$

5 725 MHz band

$$2\text{Tx mimo Total gain} = 7.650 \text{ dBi (individual gain(4.640 dBi) + Array gain(3.01 dBi) )}$$

$$3\text{Tx mimo Total gain} = 9.410 \text{ dBi (individual gain(4.640 dBi) + Array gain(4.77 dBi) )}$$

- It was calculated by the most highest antenna gain.

For power measurements on IEEE 802.11 devices

Array Gain = 0 dB (i.e., no array gain) for  $N_{ANT} \leq 4$ ;

Array Gain = 0 dB (i.e., no array gain) for channel widths  $\geq 40$  MHz for any  $N_{ANT}$ ;

Array Gain =  $5 \log(N_{ANT}/N_{SS})$  dB or 3 dB, whichever is less, for 20-MHz channel widths with  $N_{ANT} \geq 5$ .

5 150 MHz band

2Tx mimo Total gain = 4.648 dBi (individual gain(4.648 dBi) + Array gain(0 dBi) )

3Tx mimo Total gain = 4.648 dBi (individual gain(4.648 dBi) + Array gain(0 dBi) )

5 725 MHz band

2Tx mimo Total gain = 4.640 dBi (individual gain(4.640 dBi) + Array gain(0 dBi) )

3Tx mimo Total gain = 4.640 dBi (individual gain(4.640 dBi) + Array gain(0 dBi) )

- It was calculated by the most highest antenna gain.

## 5.2 Maximum Conducted Output Power

### 5.2.1 Regulation

According to §15.407(a) (1) (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.

According to §15.407(a) (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 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.

According to §15.407(a) (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.

### 5.2.2 Measurement Procedure

These test measurement settings are specified in section C of 789033 D02 General UNII Test Procedures.

#### **5.2.2.1 Method PM (Measurement using an RF average power meter):**

- (i) Measurements may be performed using a wideband RF power meter with a thermocouple detector or equivalent if all of the conditions listed below are satisfied.
  - The EUT is configured to transmit continuously or to transmit with a constant duty cycle.
  - At all times when the EUT is transmitting, it must be transmitting at its maximum power control level.
  - The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five.
- (ii) If the transmitter does not transmit continuously, measure the duty cycle,  $x$ , of the transmitter output signal as described in section II.B.
- (iii) Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.
- (iv) Adjust the measurement in dBm by adding  $10 \log(1/x)$  where  $x$  is the duty cycle (e.g.,  $10 \log(1/0.25)$  if the duty cycle is 25 percent).

## 5.2.4 Test Result

-Complied

### 5 150 Band

\*802.11a\_Ant1

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 180	15.11	-	-	0.19	15.30	30.00	14.70
5 200	15.07	-	-	0.19	15.26	30.00	14.74
5 240	15.04	-	-	0.19	15.23	30.00	14.77

\*802.11a\_Ant2

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 180	-	15.12	-	0.19	15.31	30.00	14.69
5 200	-	15.08	-	0.19	15.27	30.00	14.73
5 240	-	14.97	-	0.19	15.16	30.00	14.84

\*802.11a\_Ant3

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 180	-	-	15.18	0.19	15.37	30.00	14.63
5 200	-	-	15.16	0.19	15.35	30.00	14.65
5 240	-	-	15.05	0.19	15.24	30.00	14.76

\*802.11an20\_Ant1

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 180	15.22	-	-	0.19	15.41	30.00	14.59
5 200	15.18	-	-	0.19	15.37	30.00	14.63
5 240	15.13	-	-	0.19	15.32	30.00	14.68

\*802.11an20\_Ant2

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 180	-	15.38	-	0.19	15.57	30.00	14.43
5 200	-	15.33	-	0.19	15.52	30.00	14.48
5 240	-	15.25	-	0.19	15.44	30.00	14.56

\*802.11an20\_Ant3

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 180	-	-	15.14	0.19	15.33	30.00	14.67
5 200	-	-	15.07	0.19	15.26	30.00	14.74
5 240	-	-	14.88	0.19	15.07	30.00	14.93

\*802.11an20\_Ant1+2

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 180	11.86	11.75	-	0.54	14.89	30.00	15.11
5 200	11.91	11.88	-	0.54	14.98	30.00	15.02
5 240	11.75	11.71	-	0.54	14.82	30.00	15.18

\*802.11an20\_Ant2+3

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 180	-	11.72	11.85	0.54	14.87	30.00	15.13
5 200	-	11.81	11.67	0.54	14.83	30.00	15.17
5 240	-	11.74	11.83	0.54	14.87	30.00	15.13

\*802.11an20\_Ant1+3

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 180	11.61	-	11.81	0.54	14.80	30.00	15.20
5 200	11.80	-	11.95	0.54	14.96	30.00	15.04
5 240	11.63	-	11.89	0.54	14.85	30.00	15.15

\*802.11an20\_Ant1+2+3

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 180	13.04	13.12	13.02	0.55	18.38	30.00	11.62
5 200	12.89	13.02	13.06	0.55	18.31	30.00	11.69
5 240	13.13	12.82	12.76	0.55	18.23	30.00	11.77

\*802.11an40\_Ant1

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 190	14.69	-	-	0.38	15.07	30.00	14.93
5 230	14.47	-	-	0.38	14.85	30.00	15.15

\*802.11an40\_Ant2

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 190	-	14.88	-	0.38	15.26	30.00	14.74
5 230	-	14.62	-	0.38	15.00	30.00	15.00

\*802.11an40\_Ant3

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 190	-	-	14.61	0.38	14.99	30.00	15.01
5 230	-	-	14.56	0.38	14.94	30.00	15.06



\*802.11an40\_Ant1+2

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 190	11.77	11.44	-	0.99	14.76	30.00	15.24
5 230	11.87	11.91	-	0.99	15.04	30.00	14.96

\*802.11an40\_Ant2+3

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 190	-	11.97	11.86	0.99	15.06	30.00	14.94
5 230	-	11.84	12.03	0.99	15.08	30.00	14.92

\*802.11an40\_Ant1+3

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 190	11.74	-	11.91	0.99	14.97	30.00	15.03
5 230	11.69	-	11.90	0.99	14.95	30.00	15.05

\*802.11an40\_Ant1+2+3

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 190	12.36	12.31	12.64	1.02	18.23	30.00	11.77
5 230	12.23	12.26	12.31	1.02	18.06	30.00	11.94

\*802.11ac20\_Ant1

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 180	14.92	-	-	0.03	14.95	30.00	15.05
5 200	14.94	-	-	0.03	14.97	30.00	15.03
5 240	14.97	-	-	0.03	15.00	30.00	15.00

\*802.11ac20\_Ant2

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 180	-	15.26	-	0.03	15.29	30.00	14.71
5 200	-	15.21	-	0.03	15.24	30.00	14.76
5 240	-	14.96	-	0.03	14.99	30.00	15.01

\*802.11ac20\_Ant3

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 180	-	-	14.96	0.03	14.99	30.00	15.01
5 200	-	-	15.11	0.03	15.14	30.00	14.86
5 240	-	-	14.83	0.03	14.86	30.00	15.14

\*802.11ac20\_Ant1+2

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 180	10.95	10.28	-	0.51	13.73	30.00	16.27
5 200	11.07	11.00	-	0.51	14.13	30.00	15.87
5 240	10.90	10.72	-	0.51	13.91	30.00	16.09

\*802.11ac20\_Ant2+3

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 180	-	10.96	10.81	0.51	13.99	30.00	16.01
5 200	-	10.71	10.92	0.51	13.92	30.00	16.08
5 240	-	10.85	10.77	0.51	13.91	30.00	16.09

\*802.11ac20\_Ant1+3

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 180	10.85	-	10.87	0.51	13.96	30.00	16.04
5 200	10.98	-	10.89	0.51	14.03	30.00	15.97
5 240	11.03	-	10.88	0.51	14.05	30.00	15.95

\*802.11ac20\_Ant1+2+3

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 180	12.11	11.87	11.99	0.12	15.64	30.00	14.36
5 200	11.96	11.91	12.16	0.12	15.60	30.00	14.40
5 240	12.02	11.76	11.71	0.12	15.54	30.00	14.46

\*802.11ac40\_Ant1

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 190	15.82	-	-	0.09	15.91	30.00	14.09
5 320	15.91	-	-	0.09	16.00	30.00	14.00

\*802.11ac40\_Ant2

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 190	-	16.11	-	0.09	16.20	30.00	13.80
5 320	-	16.01	-	0.09	16.10	30.00	13.90

\*802.11ac40\_Ant3

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 190	-	-	15.82	0.09	15.91	30.00	14.09
5 320	-	-	15.59	0.09	15.68	30.00	14.32

\*802.11ac40\_Ant1+2

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 190	10.48	10.06	-	0.97	13.48	30.00	16.52
5 320	10.59	10.44	-	0.97	13.71	30.00	16.29

\*802.11ac40\_Ant2+3

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 190	-	12.22	11.98	0.97	15.24	30.00	14.76
5 320	-	12.06	11.91	0.97	15.13	30.00	14.87

\*802.11ac40\_Ant1+3

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 190	11.93	-	11.99	0.97	15.10	30.00	14.90
5 320	11.95	-	11.87	0.97	15.05	30.00	14.95

\*802.11ac40\_Ant1+2+3

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 190	11.48	11.25	11.71	0.30	16.56	30.00	13.44
5 320	11.39	11.33	11.54	0.30	16.50	30.00	13.50

\*802.11ac80\_Ant1

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 210	12.69	-	-	0.20	12.89	30.00	17.11

\*802.11ac80\_Ant2

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 210	-	12.93	-	0.20	13.13	30.00	16.87

\*802.11ac80\_Ant3

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 210	-	-	12.93	0.20	13.13	30.00	16.87

\*802.11ac80\_Ant1+2

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 210	10.05	9.96	-	1.72	13.37	30.00	16.63

\*802.11ac80\_Ant2+3

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 210	-	10.07	10.08	1.72	13.44	30.00	16.56

\*802.11ac80\_Ant1+3

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 210	10.21	-	10.27	1.72	13.59	30.00	16.41

\*802.11ac80\_Ant1+2+3

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 210	10.27	9.98	11.11	0.55	15.80	30.00	14.20

**5 725 Band**

\*802.11a\_Ant 1

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 745	15.36	-	-	0.18	15.54	30.00	14.46
5 785	15.42	-	-	0.18	15.60	30.00	14.40
5 825	15.56	-	-	0.18	15.74	30.00	14.26

\*802.11a\_Ant 2

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 745	-	15.40	-	0.18	15.58	30.00	14.42
5 785	-	15.36	-	0.18	15.54	30.00	14.46
5 825	-	15.64	-	0.18	15.82	30.00	14.18

\*802.11a\_Ant 3

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 745	-	-	15.41	0.18	15.59	30.00	14.41
5 785	-	-	15.51	0.18	15.69	30.00	14.31
5 825	-	-	15.65	0.18	15.83	30.00	14.17



\*802.11an20\_Ant 1

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 745	15.31	-	-	0.17	15.48	30.00	14.52
5 785	15.39	-	-	0.17	15.56	30.00	14.44
5 825	15.59	-	-	0.17	15.76	30.00	14.24

\*802.11an20\_Ant 2

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 745	-	15.51	-	0.17	15.68	30.00	14.32
5 785	-	15.47	-	0.17	15.64	30.00	14.36
5 825	-	15.51	-	0.17	15.68	30.00	14.32

\*802.11an20\_Ant 3

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 745	-	-	15.20	0.17	15.37	30.00	14.63
5 785	-	-	15.31	0.17	15.48	30.00	14.52
5 825	-	-	15.42	0.17	15.59	30.00	14.41

\*802.11an20\_Ant 1+2

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 745	12.39	12.57	-	0.53	15.56	30.00	14.44
5 785	12.61	12.82	-	0.53	15.79	30.00	14.21
5 825	12.89	12.96	-	0.53	15.99	30.00	14.01

\*802.11an20\_Ant2+3

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 745	-	12.84	12.69	0.53	15.84	30.00	14.16
5 785	-	12.71	12.80	0.53	15.83	30.00	14.17
5 825	-	12.70	12.50	0.53	15.67	30.00	14.33

\*802.11an20\_Ant1+3

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 745	12.59	-	12.33	0.53	15.54	30.00	14.46
5 785	12.69	-	12.49	0.53	15.66	30.00	14.34
5 825	12.76	-	12.73	0.53	15.82	30.00	14.18

\*802.11an20\_Ant1+2+3

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 745	10.82	10.83	10.95	0.54	15.70	30.00	14.30
5 785	10.73	11.02	10.87	0.54	15.71	30.00	14.29
5 825	11.10	11.02	10.95	0.54	15.86	30.00	14.14

\*802.11an40\_Ant1

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 755	10.96	-	-	0.39	11.35	30.00	18.65
5 795	11.22	-	-	0.39	11.61	30.00	18.39

\*802.11an40\_Ant2

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 755	-	11.19	-	0.39	11.58	30.00	18.42
5 795	-	11.24	-	0.39	11.63	30.00	18.37

\*802.11an40\_Ant3

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 755	-	-	10.96	0.39	11.35	30.00	18.65
5 795	-	-	11.31	0.39	11.70	30.00	18.30

\*802.11an40\_Ant1+2

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 755	7.83	8.02	-	0.99	11.27	30.00	18.73
5 795	7.92	8.44	-	0.99	11.51	30.00	18.49

\*802.11an40\_Ant2+3

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 755	-	8.03	7.56	0.99	11.15	30.00	18.85
5 795	-	8.02	8.38	0.99	11.53	30.00	18.47

\*802.11an40\_Ant1+3

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 755	7.68	-	8.22	0.99	11.30	30.00	18.70
5 795	7.96	-	7.95	0.99	11.30	30.00	18.70

\*802.11an40\_Ant1+2+3

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 755	8.44	8.53	8.52	1.04	13.48	30.00	16.52
5 795	8.53	8.55	8.72	1.04	13.57	30.00	16.43

\*802.11ac20\_Ant1

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 745	14.45	-	-	0.02	14.47	30.00	15.53
5 785	14.61	-	-	0.02	14.63	30.00	15.37
5 825	14.69	-	-	0.02	14.71	30.00	15.29

\*802.11ac20\_Ant2

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 745	-	14.69	-	0.02	14.71	30.00	15.29
5 785	-	14.75	-	0.02	14.77	30.00	15.23
5 825	-	14.67	-	0.02	14.69	30.00	15.31

\*802.11ac20\_Ant3

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 745	-	-	14.14	0.02	14.16	30.00	15.84
5 785	-	-	14.27	0.02	14.29	30.00	15.71
5 825	-	-	14.68	0.02	14.70	30.00	15.30

\*802.11ac20\_Ant1+2

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 745	11.58	11.35	-	0.50	14.55	30.00	15.45
5 785	11.78	12.09	-	0.50	15.02	30.00	14.98
5 825	11.94	12.07	-	0.50	15.08	30.00	14.92

\*802.11ac20\_Ant2+3

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 745	-	11.78	11.58	0.50	14.76	30.00	15.24
5 785	-	11.95	11.84	0.50	14.98	30.00	15.02
5 825	-	12.10	11.99	0.50	15.12	30.00	14.88

\*802.11ac20\_Ant1+3

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 745	11.73	-	11.74	0.50	14.82	30.00	15.18
5 785	11.67	-	11.64	0.50	14.74	30.00	15.26
5 825	11.91	-	11.77	0.50	14.92	30.00	15.08

\*802.11ac20\_Ant1+2+3

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 745	10.55	10.02	10.16	0.12	15.04	30.00	14.96
5 785	10.15	10.01	10.42	0.12	14.99	30.00	15.01
5 825	10.26	10.18	10.12	0.12	14.98	30.00	15.02

\*802.11ac40\_Ant1

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 755	12.06	-	-	0.07	12.13	30.00	17.87
5 795	12.27	-	-	0.07	12.34	30.00	17.66

\*802.11ac40\_Ant2

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 755	-	12.51	-	0.07	12.58	30.00	17.42
5 795	-	12.56	-	0.07	12.63	30.00	17.37

\*802.11ac40\_Ant3

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 755	-	-	12.07	0.07	12.14	30.00	17.86
5 795	-	-	12.41	0.07	12.48	30.00	17.52

\*802.11ac40\_Ant1+2

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 755	8.92	8.81	-	0.99	12.15	30.00	17.85
5 795	9.34	9.21	-	0.99	12.53	30.00	17.47

\*802.11ac40\_Ant2+3

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 755	-	9.23	9.21	0.99	12.48	30.00	17.52
5 795	-	9.39	9.51	0.99	12.70	30.00	17.30

\*802.11ac40\_Ant1+3

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 755	9.11	-	8.88	0.99	12.27	30.00	17.73
5 795	9.35	-	9.21	0.99	12.54	30.00	17.46

\*802.11ac40\_Ant1+2+3

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 755	8.41	8.21	8.71	0.26	13.27	30.00	16.73
5 795	8.81	8.96	9.36	0.26	13.87	30.00	16.13

\*802.11ac80\_Ant1

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 775	11.17	-	-	0.22	11.39	30.00	18.61

\*802.11ac80\_Ant2

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 775	-	11.62	-	0.22	11.84	30.00	18.16

\*802.11ac80\_Ant3

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 775	-	-	11.00	0.22	11.22	30.00	18.78



\*802.11ac80\_Ant1+2

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 775	5.93	6.95	-	1.69	10.24	30.00	19.76

\*802.11ac80\_Ant2+3

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 775	-	7.25	6.86	1.69	10.74	30.00	19.26

\*802.11ac80\_Ant1+3

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 775	12.44	-	10.35	1.69	9.63	30.00	20.37

\*802.11ac80\_Ant1+2+3

Freq [MHz]	Result [dBm] Ant1	Result [dBm] Ant2	Result [dBm] Ant3	Duty Factor	Result	Limit [dBm]	Margin [dBm]
5 775	8.47	9.02	8.94	0.48	13.68	30.00	16.32

-NOTE:

- 2Tx Total power calculation =  $10 \log(10^{(Ant1 \text{ power}/10)} + 10^{(Ant2 \text{ power}/10)})$ .  
3Tx Total power calculation =  $10 \log(10^{(Ant1 \text{ power}/10)} + 10^{(Ant2 \text{ power}/10)} + 10^{(Ant3 \text{ power}/10)})$ .
- Duty Factor : refer to 3.5
- Result = Total power calculation + Duty Factor