

Q) TCB is not clear regarding the scope of the changes being made to this device. Please confirm that the following is correct.

The **Original filing** covered use of the module with the following PIFA antennas on the WiFi antenna ports:

Band (GHz)	Chain 0 Gain dBi	Chain 1 Gain dBi	Chain 2 Gain dBi	Uncorrelated Gain dBi	Correlated Gain dBi
2.4	4.32	4.77	3.72	4.29	9.1
5.2	4.83	2.84	1.18	3.21	7.9
5.3	4.52	3.21	1.48	3.24	7.9
5.6	4.72	2.09	2.85	3.36	8.1
5.8	4.86	1.95	3.09	3.47	8.2

This Class 2 Change is adding two new sets of PIFA antennas for the WiFi antenna ports. There is no change to the Bluetooth antenna so the DSS grants remain unaffected and the DTS line item for Bluetooth LE mode is not affected. Similarly the proposed change does not affect the original JBP grant.

Set #1: This antenna set has higher gain PIFA antennas for all chains in all bands (see table below):

Band (GHz)	Chain 0 Gain dBi	Chain 1 Gain dBi	Chain 2 Gain dBi	Uncorrelated Gain dBi	Correlated Gain dBi
2.4	6.6	4.8	5.5	5.7	10.4
5.2	7.8	6.0	5.9	6.7	11.4
5.3	6.5	7.7	7.0	7.1	11.9
5.6	6.5	6.8	7.2	6.8	11.6
5.8	7.8	7.4	5.9	7.1	11.8

When using these antennas the output power for the module is reduced for some operating modes from the power levels covered by the original submittal. The DTS report also covers operations on channels 12 and 13. The output power for these new channels is the power setting used for all antennas with equal or lower gain to the antennas used in this application.

Antenna Set #2

PIFA antennas with higher gain on some chains in the 5.3GHz and 5.6GHz bands (as highlighted in red below).

Band (GHz)	Chain 0 Gain dBi	Chain 1 Gain dBi	Chain 2 Gain dBi	Uncorrelated Gain dBi	Correlated Gain dBi
2.4	3.05	2.64	4.47	3.46	8.19
5.2	4.28	1.47	2.13	2.80	7.48
5.3	5.53	1.34	1.93	3.35	7.91
5.6	5.53	2.68	1.26	3.53	8.11
5.8	3.56	1.96	0.81	2.26	6.95

Please explain if the output power when using these antennas in these bands has a reduced output power for any of the operating modes relative to the power levels covered by the original submittal.

Response:

The TCB's understanding is correct.

JBP and Bluetooth-related grant line items *DSS and DTS) are not affected by this proposed change.

For antenna set #1 output powers have to be reduced for some modes in all bands to comply with output power and/or radiated spurious emissions requirements. DTS and NII reports are provided to cover output power and radiated spurious emissions for this new antenna set.

For antenna set #2 only 5.3 and 5.6GHz bands were affected so only NII test reports are provided for this antenna set. For both bands, the 1TX antenna port testing and power were not affected since the antenna gain is less than 6 dBi and therefore the power limits are not affected by these new antennas. For MIMO modes the margins from original testing were sufficient to comply with these new antennas with slightly higher gain. Power reduction was not required to comply with spurious emissions levels. .