

Product Family Overview

TV Whitespace wireless solution with industry leading throughput and range to meet the most demanding of deployment challenges. The GWS5000 family is the most advanced TV whitespace solution available and is the 5th generation of TV Whitespace radio developed by 6Harmonics. The radios can operate in a point-to-point or point-to-multi-point mode.

Based upon the globally accepted robust WiFi protocol, the GWS5000 radios are able to maintain NLOS data links in the most challenging of TVWS deployments when faced with in-band noise & interference, multipath fade, trees or other obstructions.

With integrated GPS geolocation and the FCC approved Nominet TV Whitespace database, the radios are fully compliant for use in the USA under FCC Part 15 Sub-part H. For Canada, the radios meet the requirements of RSS-222 and RSS-Gen.

This document describes the theory of operation for the GWS-5002 model and the GWS-5002E model variant that have been designed for the US and Canadian markets.

The GWS-5002 is a dual stream transmit radio which can operate as a base station or a client station, a variation that is software defined.

The GWS-5002E is a single stream transmit radio which can only operate as a client station. The radio in the GWS-5002E is the same as the GWS-5002. The only difference between the RF transmissions is that the GWS-5002E has one of the power amplifiers removed and the second transmit chain is internally terminated. The GWS-5002E is therefore a sub-model variant of the GWS-5002. Because of the foot-print reduction by removing one of the power amplifiers the GWS-5002E utilizes a smaller enclosure.

Both model variants use;

- exactly the same power supply module,
- exactly the same radio card,
- exactly the same power amplifier,
- operate over the same frequency range,
- operate with exactly the same transmissions on each transmission chain,
- operate with the same range of occupied bandwidths.

Within measurement and manufacturing tolerances, transmissions from either transmit chain of the GWS-5002 and the single transmit chain of the GWS-5002E are all identical.



All transmit chains meet the conducted power limits, the PSD/100kHz limits and the ACLR limits. Because the GWS-5002E can only have a transmit chain which is configured the same as one of either of the two transmit chains of the GWS-5002 then conducted measurements on both transmit chains of the GWS5002 (i.e. either transmit chain 0 or 1) encompasses the single transmit chain of the GWS-5002E.

As the GWS-5002E has a different enclosure than the GWS-5002 additional over the air spurious emissions with approved antennas were performed.

As the GWS-5002E has a different enclosure than the GWS-5002 additional conducted emissions tests were performed.

Table 1 summarises the differences.

Radio Model (Variant)	Radio Card	Power Amplifier(s)	DTT Maximum Bandwidth ¹	Maximum RF Power ²	Enclosure
GWS-5002	GWS5K2_03	NTS Super WiFi PA (x2)	24MHz	27.8dBm per port	MTI MT-900043
GWS-5002E	GWS5K2_03	NTS Super WiFi PA (x1)	24MHz	27.8dBm per port	6Harmonics custom

Table 1: Maximum RF Power & Maximum DTT Bandwidth Radio Model GWS-5002 and Model Variant GWS-5002E

¹ Table 8.6-3 in Test Report

² Table 8.6-3 in Test Report

