



## 4.6 BAND EDGES MEASUREMENT

### 4.6.1 LIMITS OF BAND EDGES MEASUREMENT

Below -20dB of the highest emission level of operating band (in 100KHz Resolution Bandwidth).

### 4.6.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP	1093.4495.30	Dec. 19, 2004

**NOTE:**

- 1.The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
- 2.The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

### 4.6.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer via a low loss cable. Set both RBW and VBW of spectrum analyzer to 100 kHz with suitable frequency span including 100 kHz bandwidth from band edge. The band edges was measured and recorded.

### 4.6.4 DEVIATION FROM TEST STANDARD

No deviation



#### 4.6.5 EUT OPERATING CONDITION

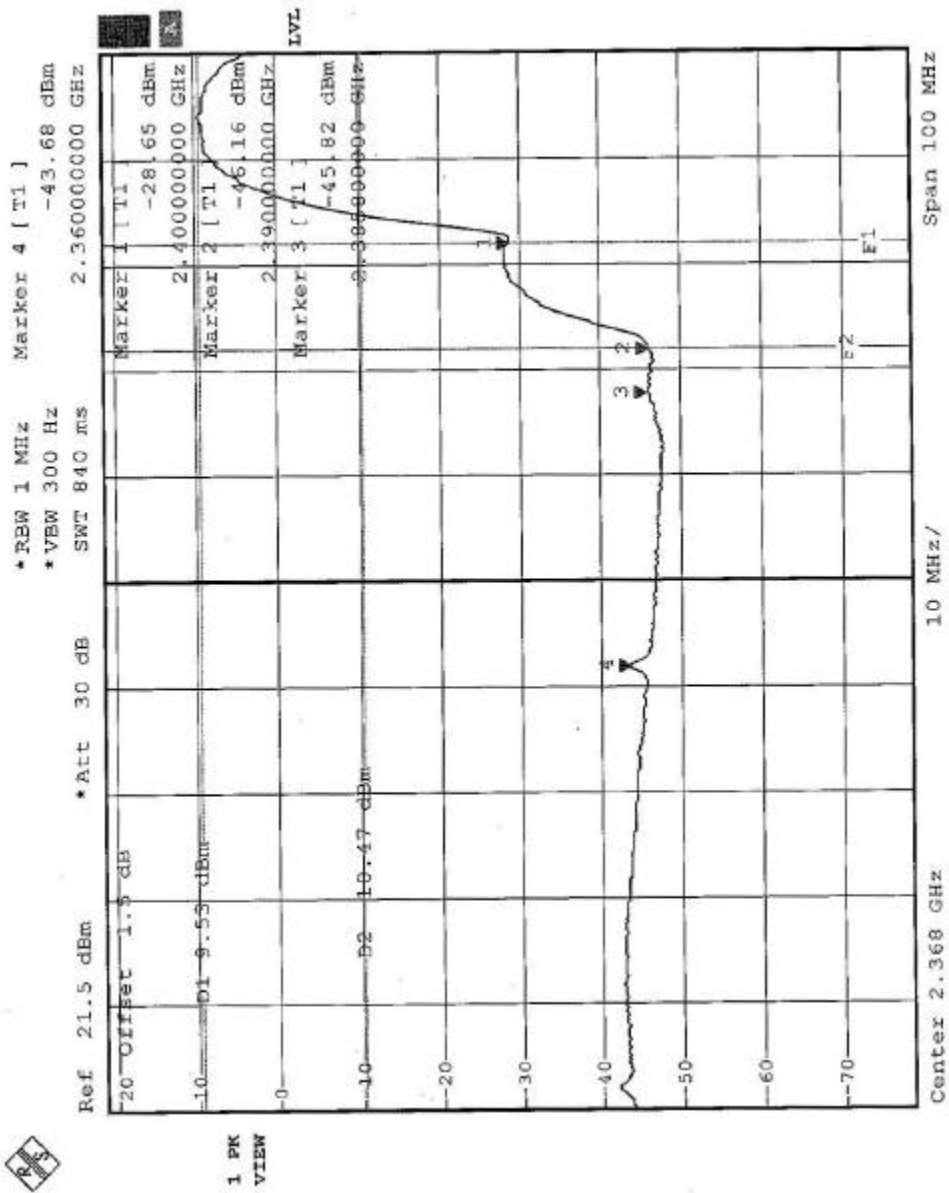
Same as Item 4.3.6

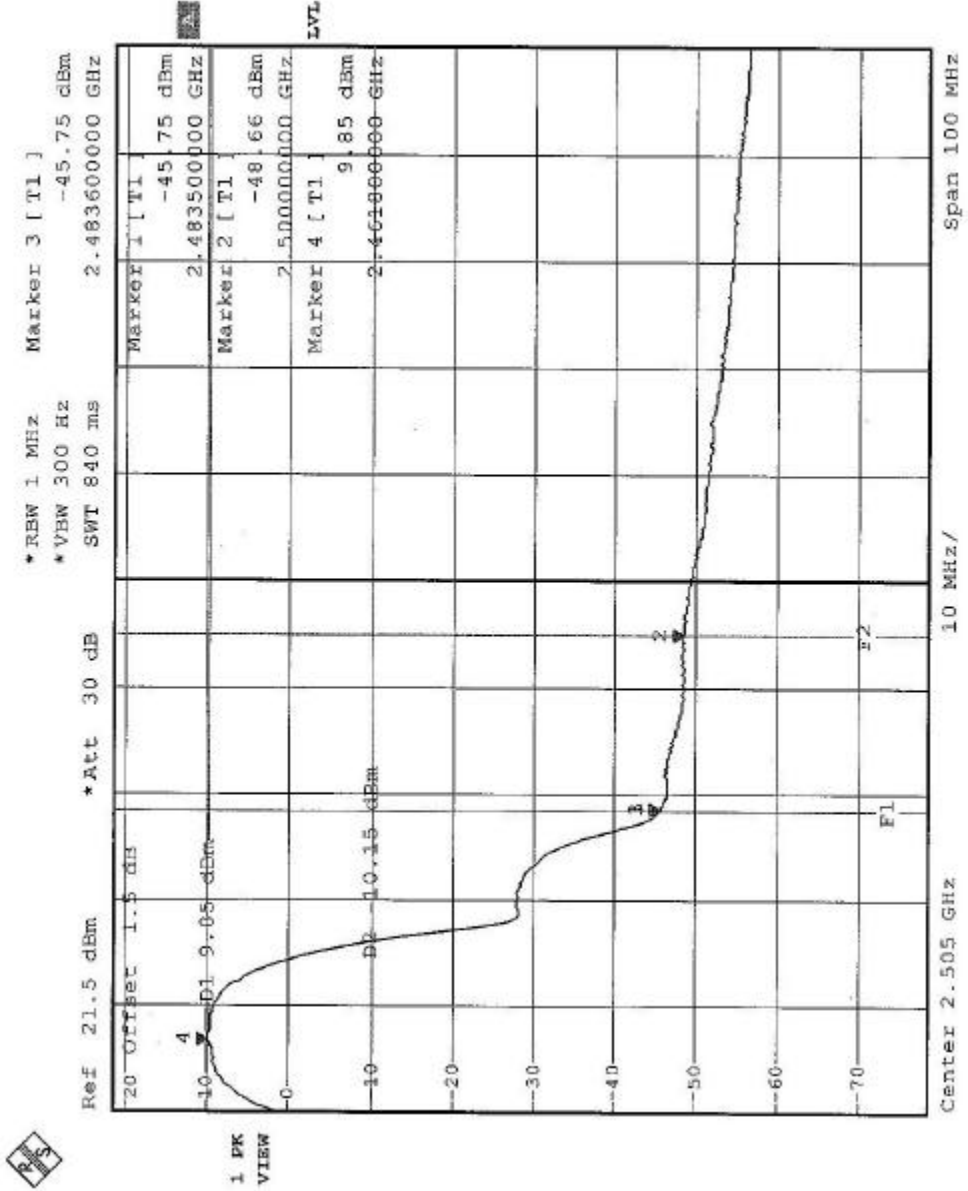
#### 4.6.6 TEST RESULTS –DSSS (Antenna 1)

The spectrum plots are attached on the following 2 pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D2. It shows compliance with the requirement in part 15.247(C).

**NOTE (1):** The band edge emission plot on the following first page shows 55.69dB delta between carrier maximum power and local maximum emission in restrict band (2.3900GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2 is 107.0dBuV/m, so the maximum field strength in restrict band is  $107.0 - 55.69 = 51.31$  dBuV/m which is under 54 dBuV/m limit.

**NOTE (2):** The band edge emission plot on the following second page shows 55.60 dB delta between carrier maximum power and local maximum emission in restrict band (2.4835GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2 is 109.4dBuV/m, so the maximum field strength in restrict band is  $109.4 - 55.60 = 53.80$  dBuV/m which is under 54 dBuV/m limit.





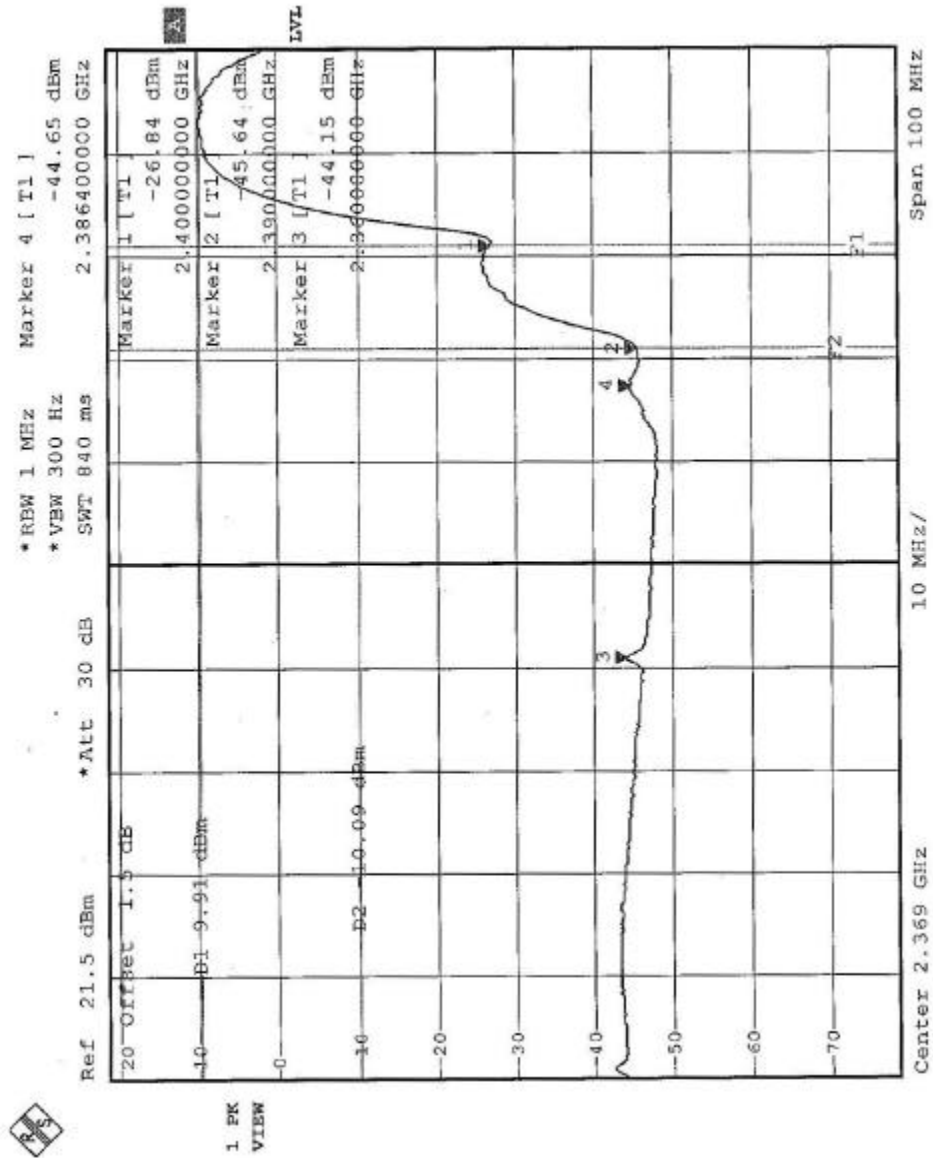


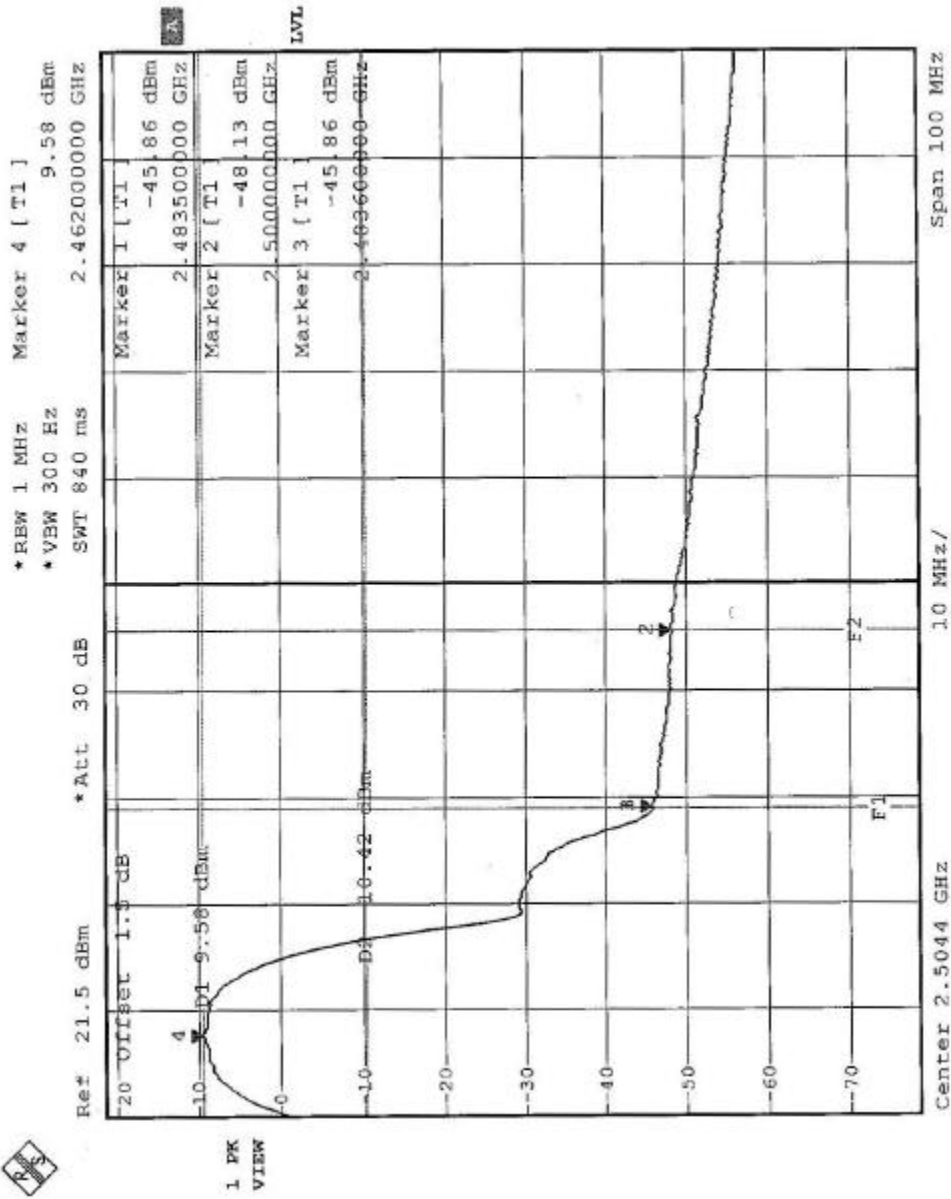
#### 4.6.7 TEST RESULTS –DSSS (Antenna 2)

The spectrum plots are attached on the following 2 pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement in part 15.247(C).

**NOTE (1):** The band edge emission plot on the following first page shows 55.55dB delta between carrier maximum power and local maximum emission in restrict band (2.3900GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2 is 105.5dBuV/m, so the maximum field strength in restrict band is  $105.5-55.55=49.95$ dBuV/m which is under 54 dBuV/m limit.

**NOTE (2):** The band edge emission plot on the following second page shows 55.44 dB delta between carrier maximum power and local maximum emission in restrict band (2.4835GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2 is 104.8dBuV/m, so the maximum field strength in restrict band is  $104.8-55.44=49.36$ dBuV/m which is under 54 dBuV/m limit.







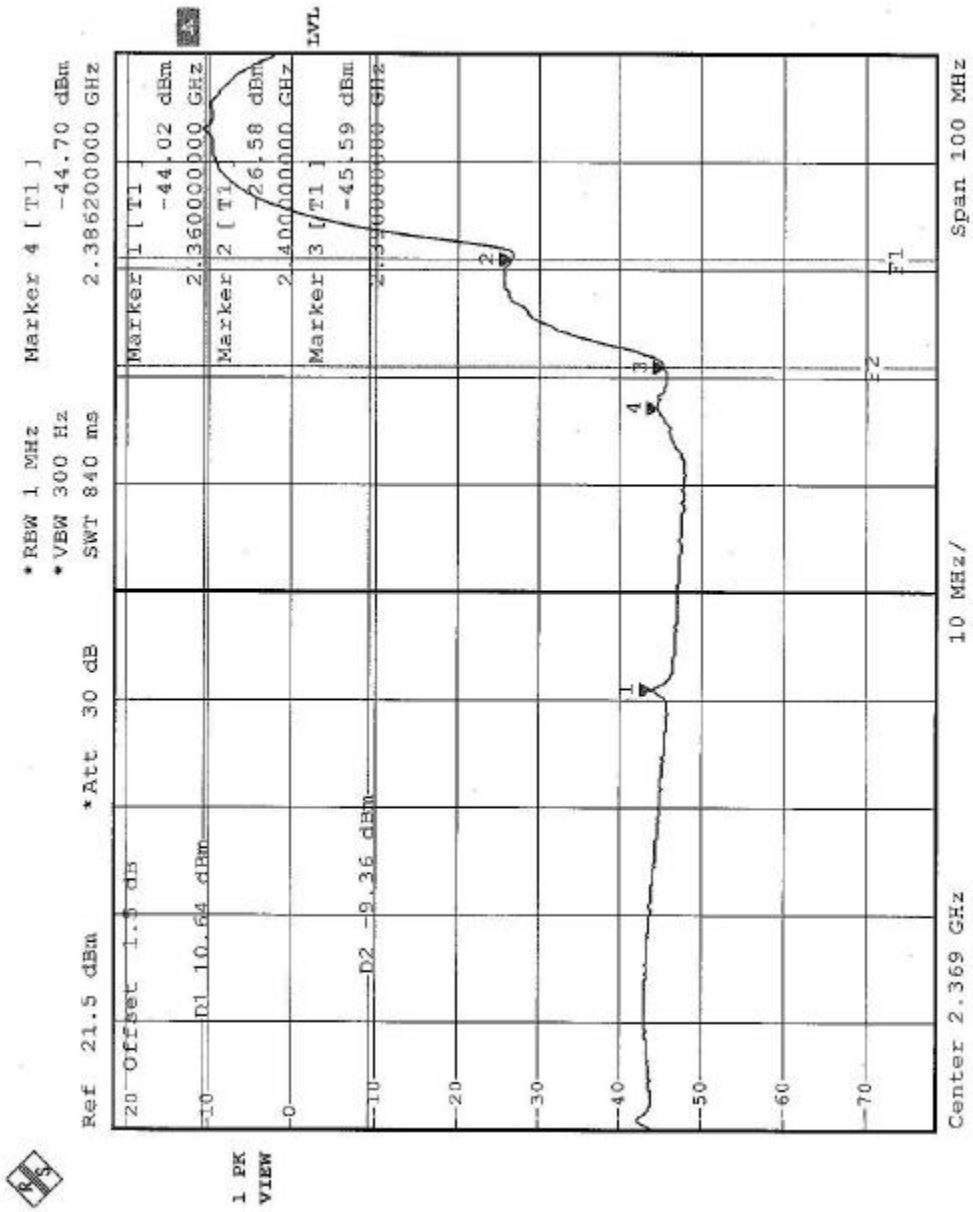
#### 4.6.8 TEST RESULTS –DSSS (Antenna 3)

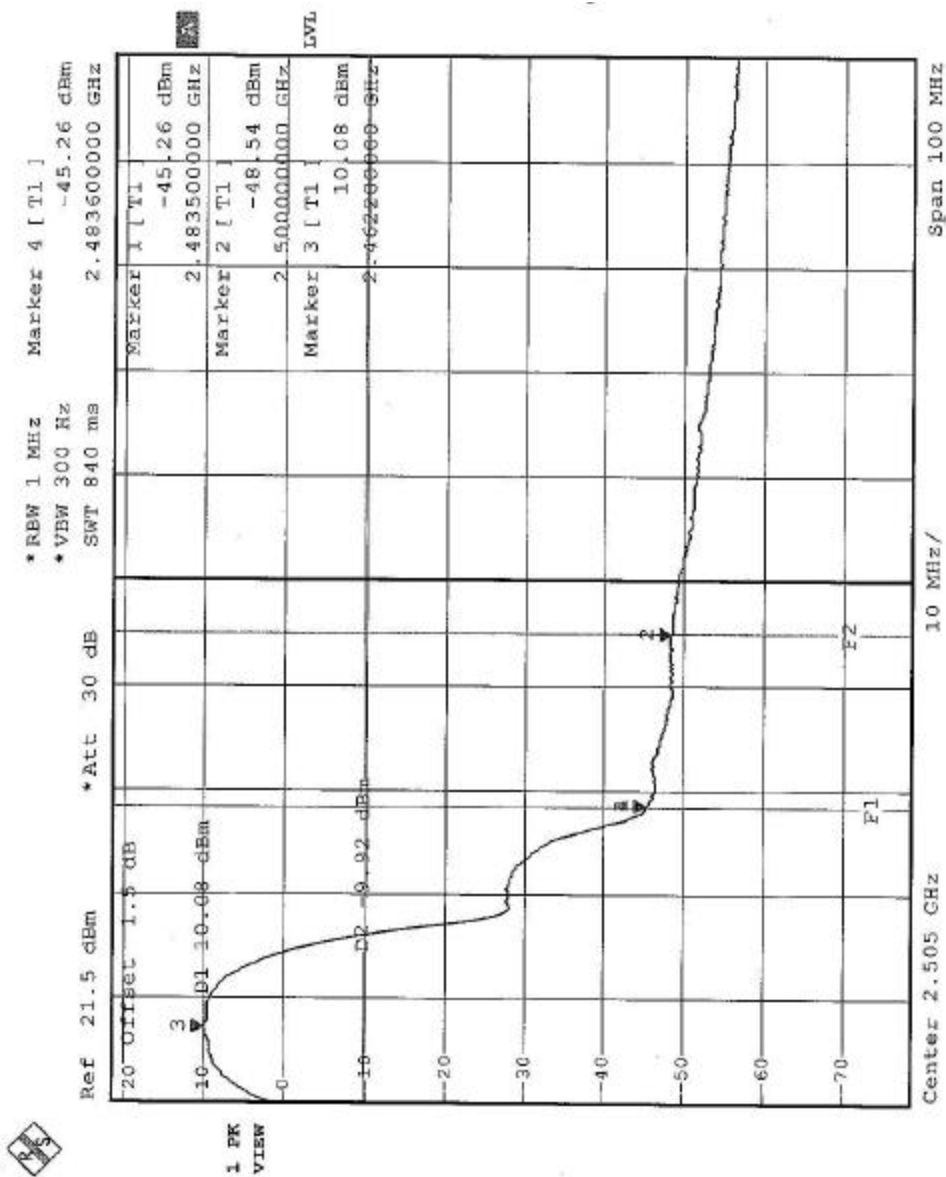
The spectrum plots are attached on the following 2 pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement in part 15.247(C).

**NOTE (1):** The band edge emission plot on the following first page shows 56.23dB delta between carrier maximum power and local maximum emission in restrict band (2.3900GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2 is 99.4dBuV/m, so the maximum field strength in restrict band is  $99.4-56.23=43.17$ dBuV/m which is under 54 dBuV/m limit.

**NOTE (2):** The band edge emission plot on the following second page shows 55.34 dB delta between carrier maximum power and local maximum emission in restrict band (2.4836GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2 is 100.8dBuV/m, so the maximum field strength in restrict band is  $100.8-55.34=45.46$ dBuV/m which is under 54 dBuV/m limit.







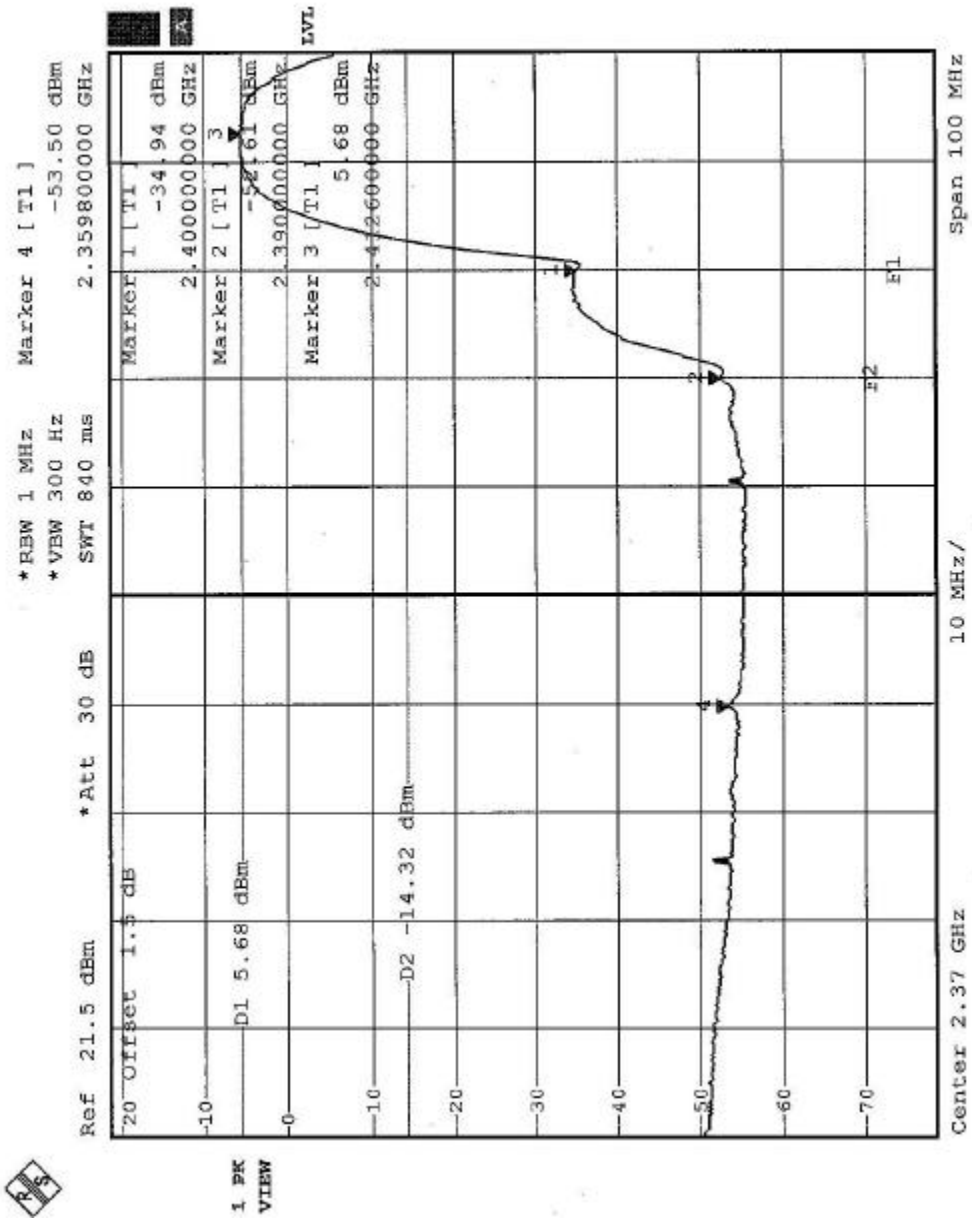


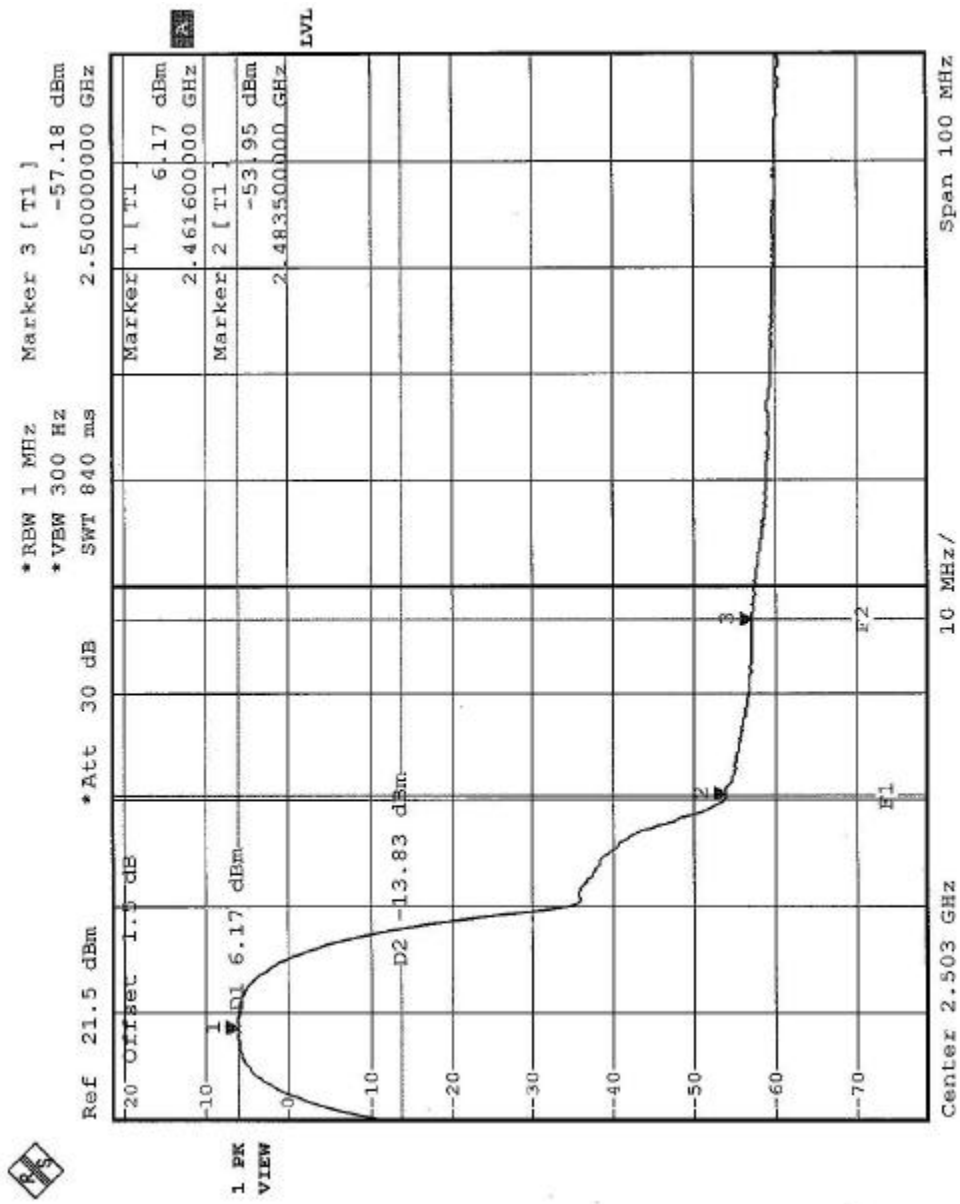
#### 4.6.9 TEST RESULTS –DSSS (Antenna 4)

The spectrum plots are attached on the following 2 pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement in part 15.247(C).

**NOTE (1):** The band edge emission plot on the following first page shows 58.29dB delta between carrier maximum power and local maximum emission in restrict band (2.3900GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2 is 107.8dBuV/m, so the maximum field strength in restrict band is  $107.8-58.29=49.51$ dBuV/m which is under 54 dBuV/m limit.

**NOTE (2):** The band edge emission plot on the following second page shows 60.12 dB delta between carrier maximum power and local maximum emission in restrict band (2.4835GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2 is 109.7dBuV/m, so the maximum field strength in restrict band is  $109.7-60.12=49.58$ dBuV/m which is under 54 dBuV/m limit.





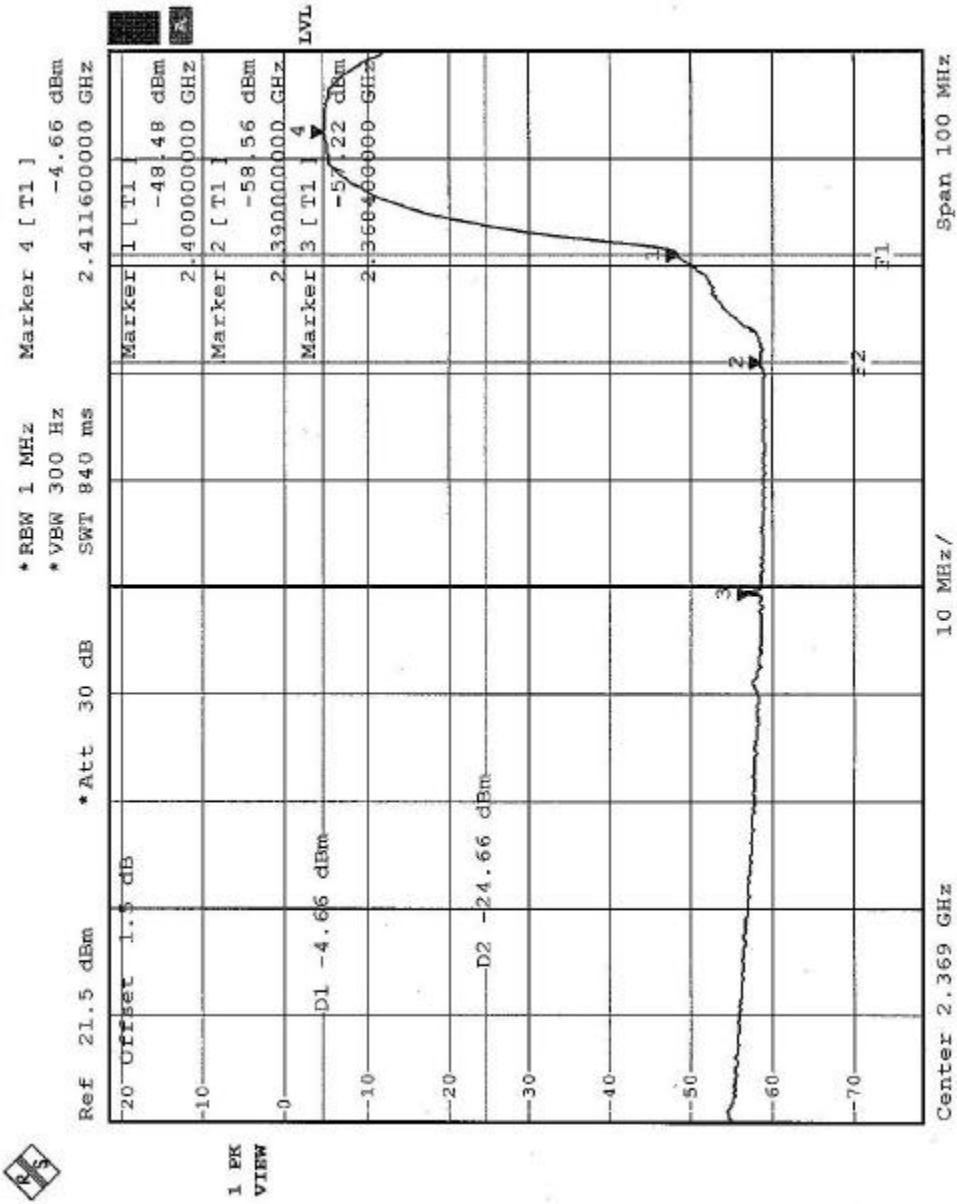


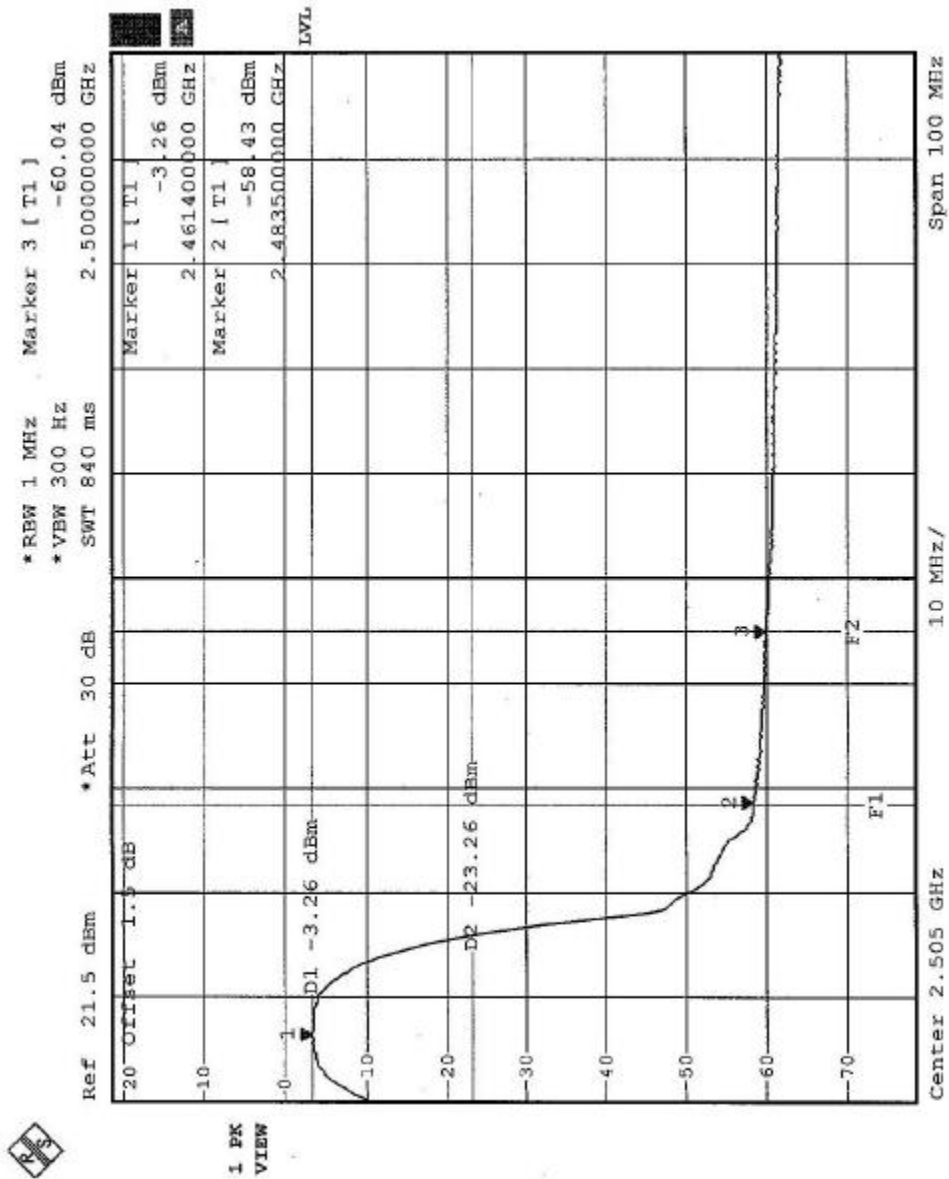
#### 4.6.10 TEST RESULTS –DSSS (Antenna 5)

The spectrum plots are attached on the following 2 pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement in part 15.247(C).

**NOTE (1):** The band edge emission plot on the following first page shows 52.56dB delta between carrier maximum power and local maximum emission in restrict band (2.3684GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2 is 102.9dBuV/m, so the maximum field strength in restrict band is  $102.9 - 52.56 = 50.34$  dBuV/m which is under 54 dBuV/m limit.

**NOTE (2):** The band edge emission plot on the following second page shows 55.17 dB delta between carrier maximum power and local maximum emission in restrict band (2.4835GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2 is 105.3dBuV/m, so the maximum field strength in restrict band is  $105.3 - 55.17 = 50.13$  dBuV/m which is under 54 dBuV/m limit.







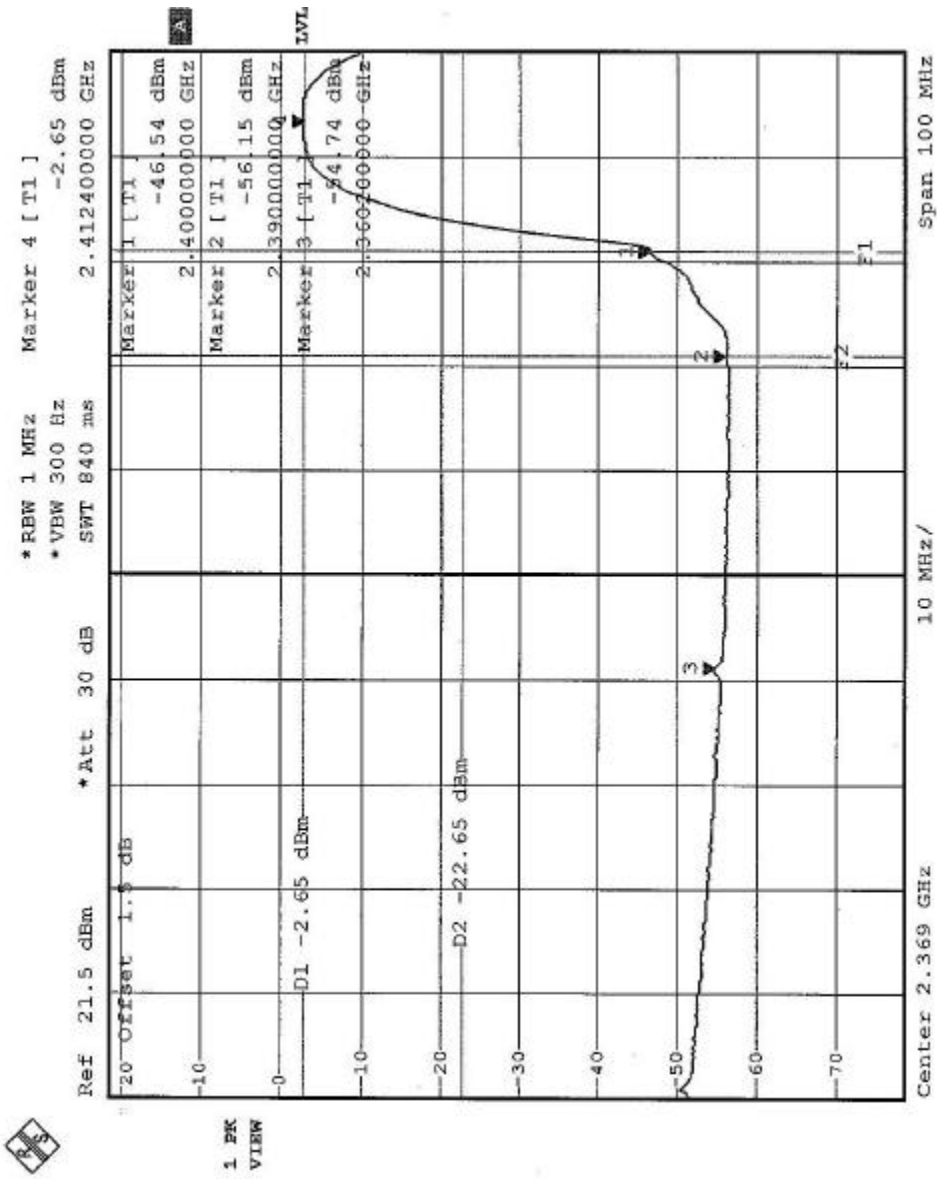


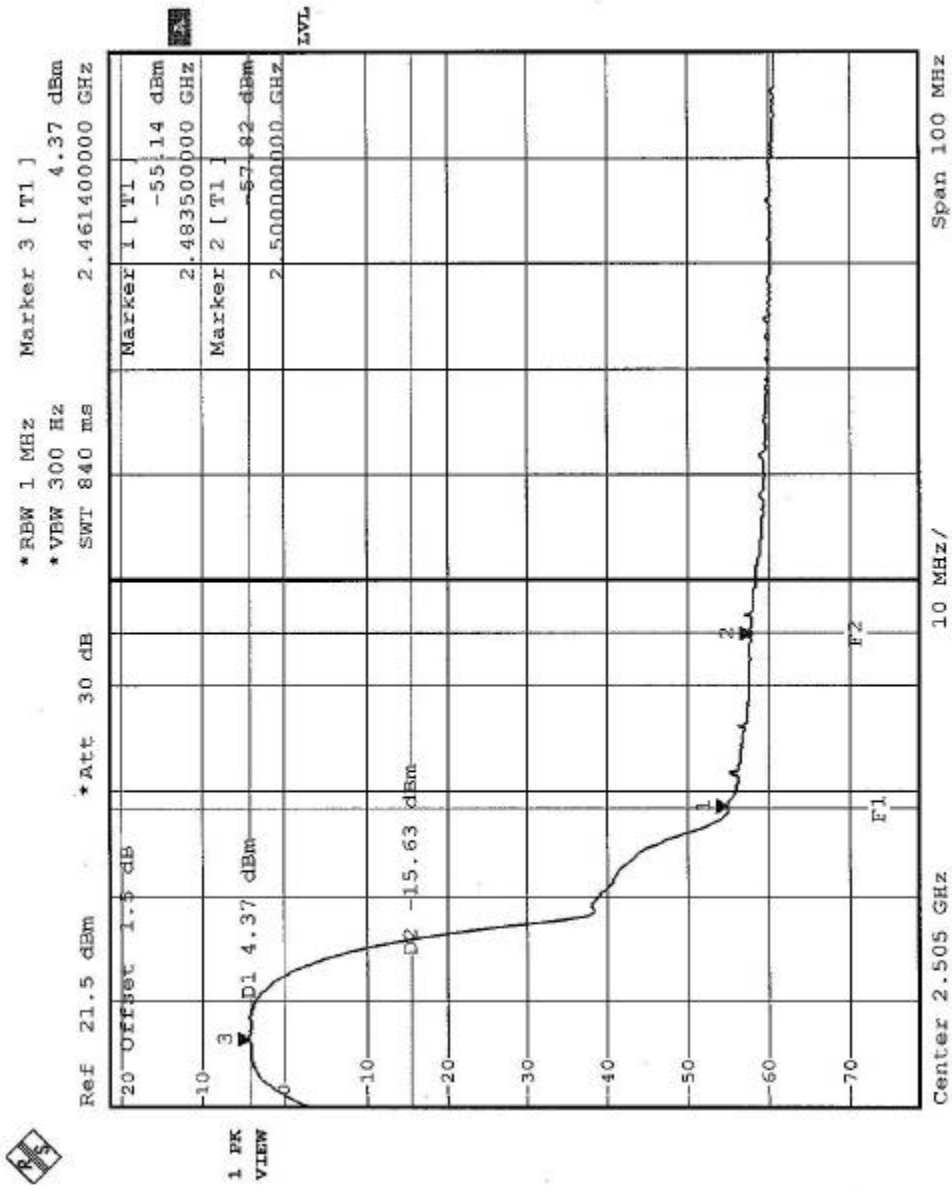
#### 4.6.11 TEST RESULTS –DSSS (Antenna 6)

The spectrum plots are attached on the following 2 pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement in part 15.247(C).

**NOTE (1):** The band edge emission plot on the following first page shows 52.09dB delta between carrier maximum power and local maximum emission in restrict band (2.3602GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2 is 101.9dBuV/m, so the maximum field strength in restrict band is  $101.9-52.09=49.81$ dBuV/m which is under 54 dBuV/m limit.

**NOTE (2):** The band edge emission plot on the following second page shows 59.51 dB delta between carrier maximum power and local maximum emission in restrict band (2.4835GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2 is 108.8dBuV/m, so the maximum field strength in restrict band is  $108.8-59.51=49.29$ dBuV/m which is under 54 dBuV/m limit.





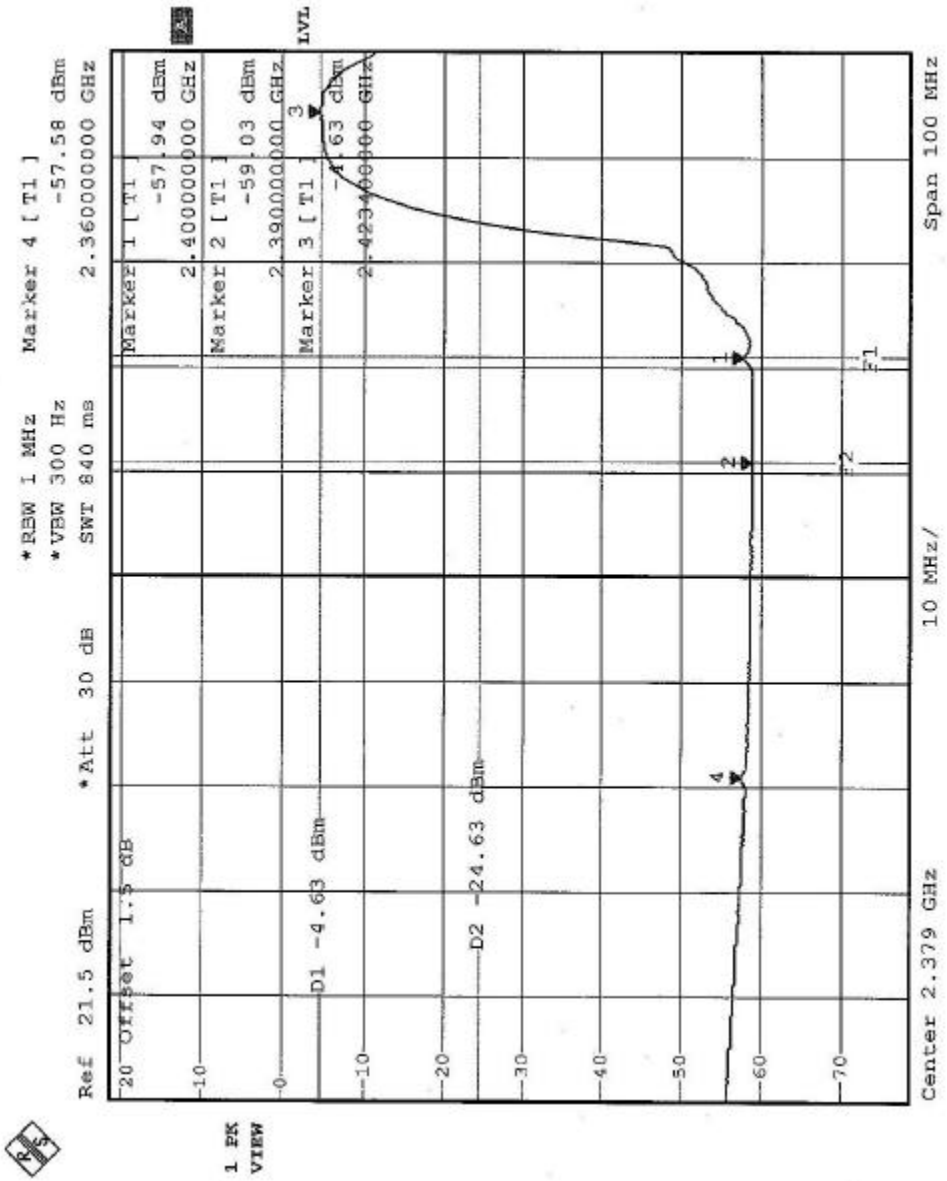


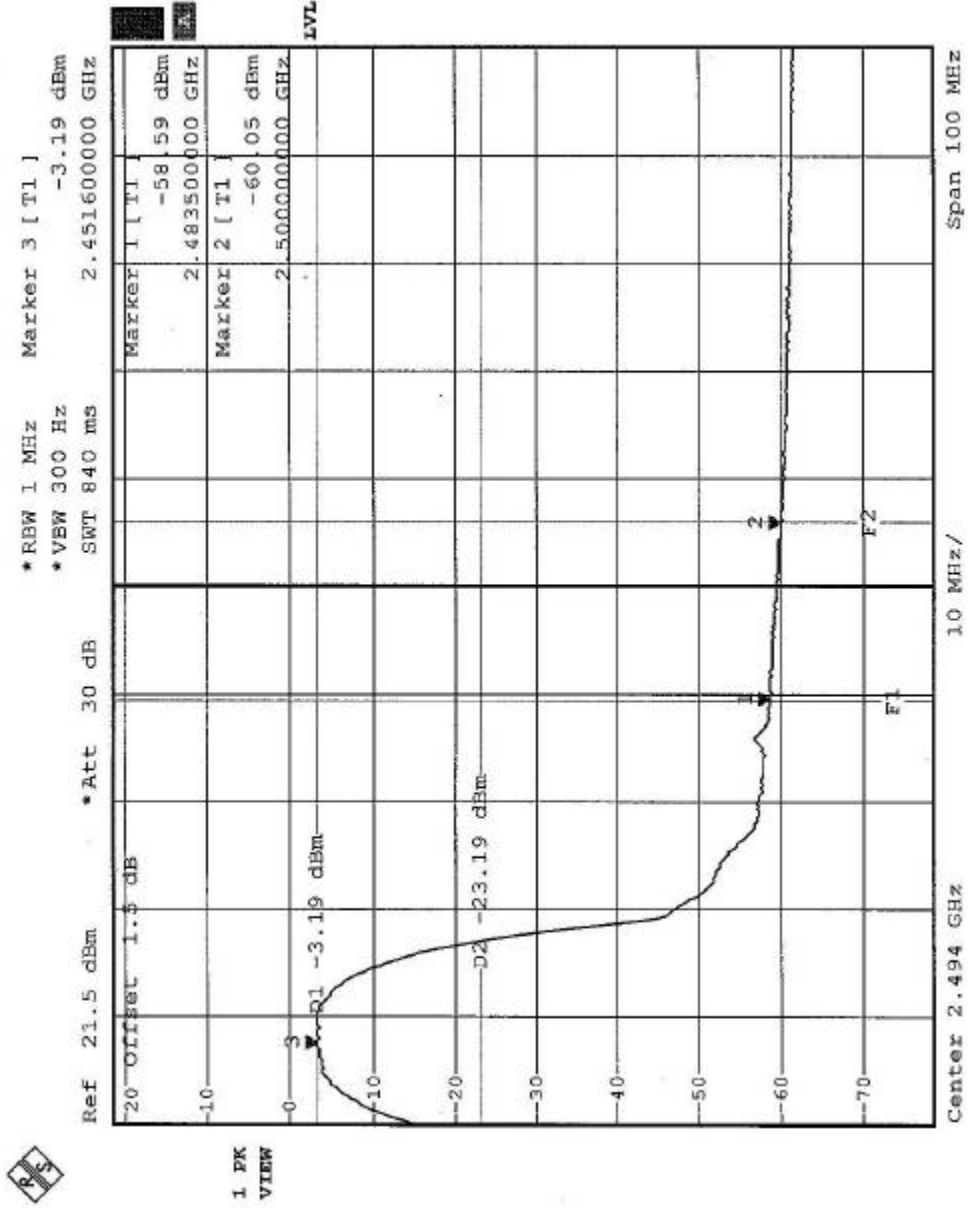
#### 4.6.12 TEST RESULTS –DSSS (Antenna 7)

The spectrum plots are attached on the following 2 pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement in part 15.247(C).

**NOTE (1):** The band edge emission plot on the following first page shows 52.95dB delta between carrier maximum power and local maximum emission in restrict band (2.3600GHz). The emission of carrier strength list in the test result of channel 3 at the item 4.2 is 102.9dBuV/m, so the maximum field strength in restrict band is  $102.9-52.95=49.95$ dBuV/m which is under 54 dBuV/m limit.

**NOTE (2):** The band edge emission plot on the following second page shows 55.40 dB delta between carrier maximum power and local maximum emission in restrict band (2.4835GHz). The emission of carrier strength list in the test result of channel 9 at the item 4.2 is 104.4dBuV/m, so the maximum field strength in restrict band is  $104.4-55.40=49.00$ dBuV/m which is under 54 dBuV/m limit.





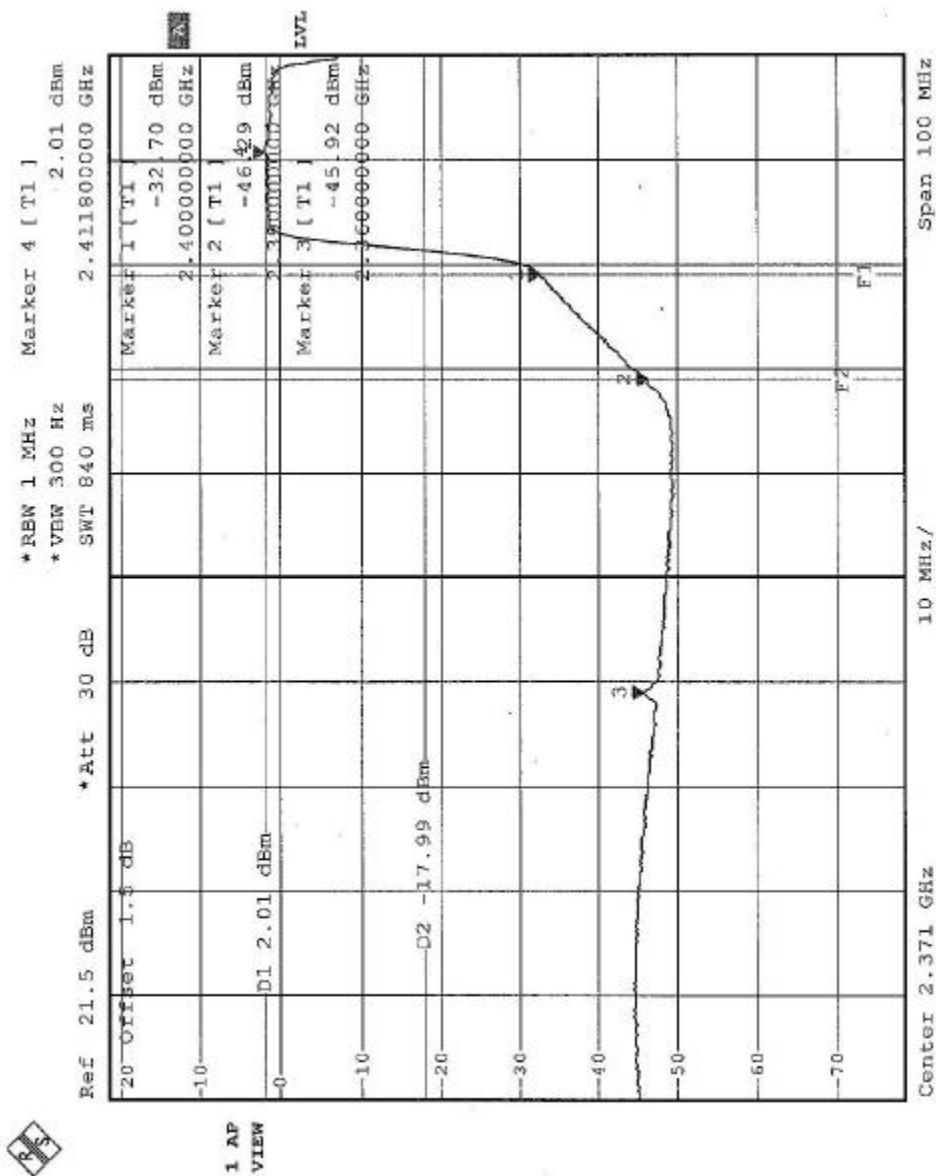


#### 4.6.13 TEST RESULTS –OFDM (Antenna 1)

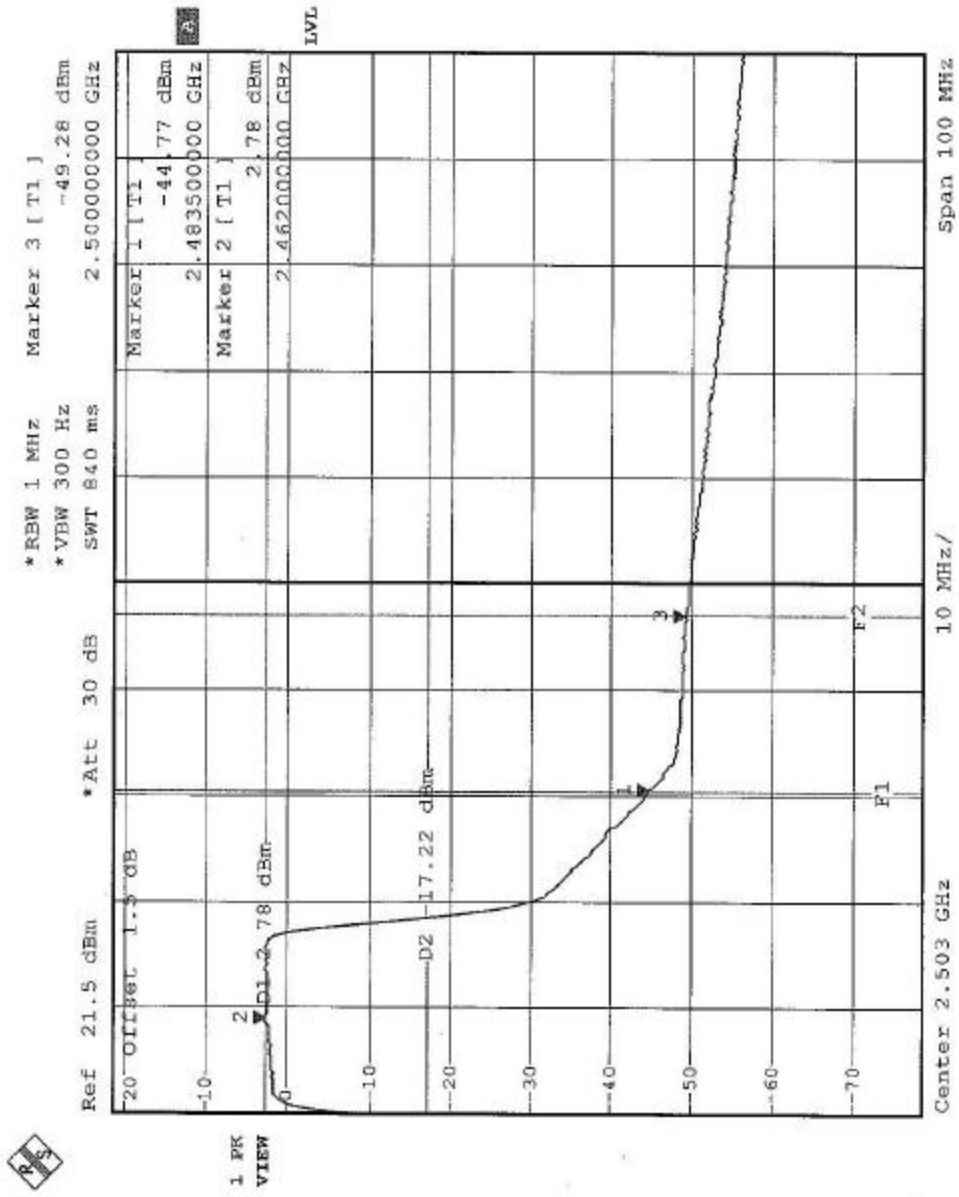
The spectrum plots are attached on the following 2 pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D2. It shows compliance with the requirement in part 15.247(C).

**NOTE (1):** The band edge emission plot on the following first page shows 48.30dB delta between carrier maximum power and local maximum emission in restrict band (2.3900GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2 is 101.5dBuV/m, so the maximum field strength in restrict band is  $101.5-48.30=53.20$ dBuV/m which is under 54 dBuV/m limit.

**NOTE (2):** The band edge emission plot on the following second page shows 47.55 dB delta between carrier maximum power and local maximum emission in restrict band (2.4835GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2 is 101.0dBuV/m, so the maximum field strength in restrict band is  $101.0-47.55=53.45$  dBuV/m which is under 54 dBuV/m limit.







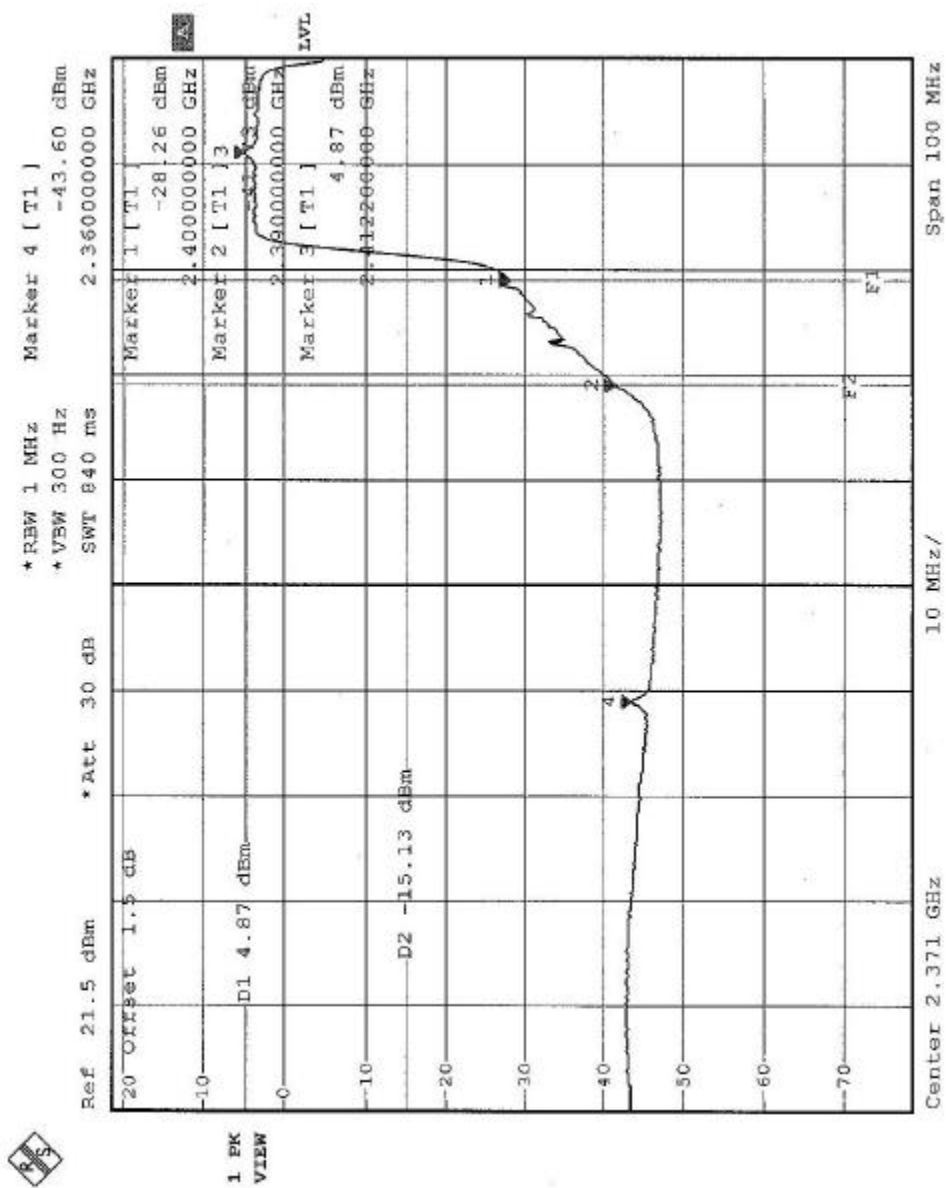


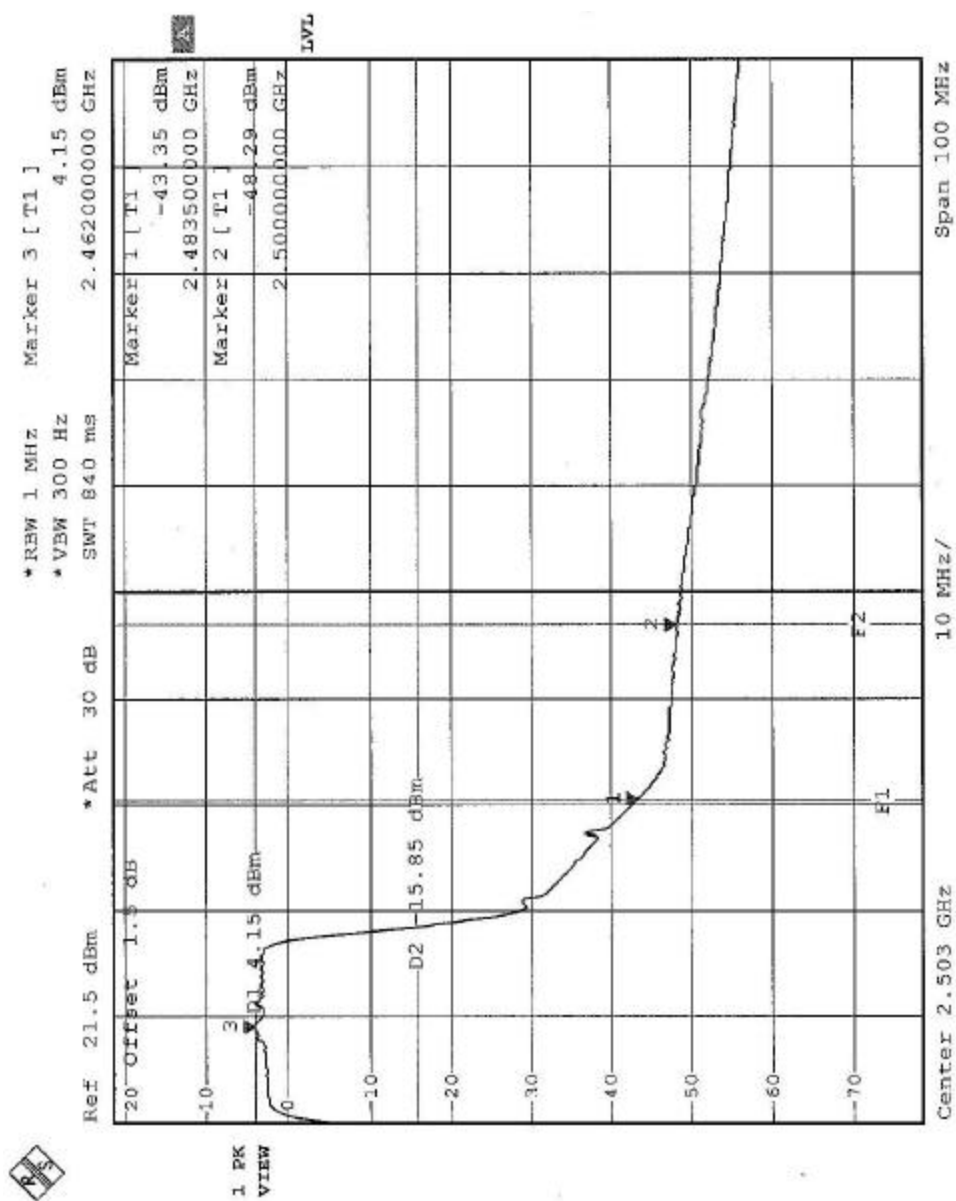
#### 4.6.14 TEST RESULTS –OFDM (Antenna 2)

The spectrum plots are attached on the following 2 pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement in part 15.247(C).

**NOTE (1):** The band edge emission plot on the following first page shows 46.60dB delta between carrier maximum power and local maximum emission in restrict band (2.3900GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2 is 99.70dBuV/m, so the maximum field strength in restrict band is  $99.70-46.60=53.10$ dBuV/m which is under 54 dBuV/m limit.

**NOTE (2):** The band edge emission plot on the following second page shows 47.50 dB delta between carrier maximum power and local maximum emission in restrict band (2.4835GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2 is 100.5dBuV/m, so the maximum field strength in restrict band is  $100.5-47.50=53.00$  dBuV/m which is under 54 dBuV/m limit.





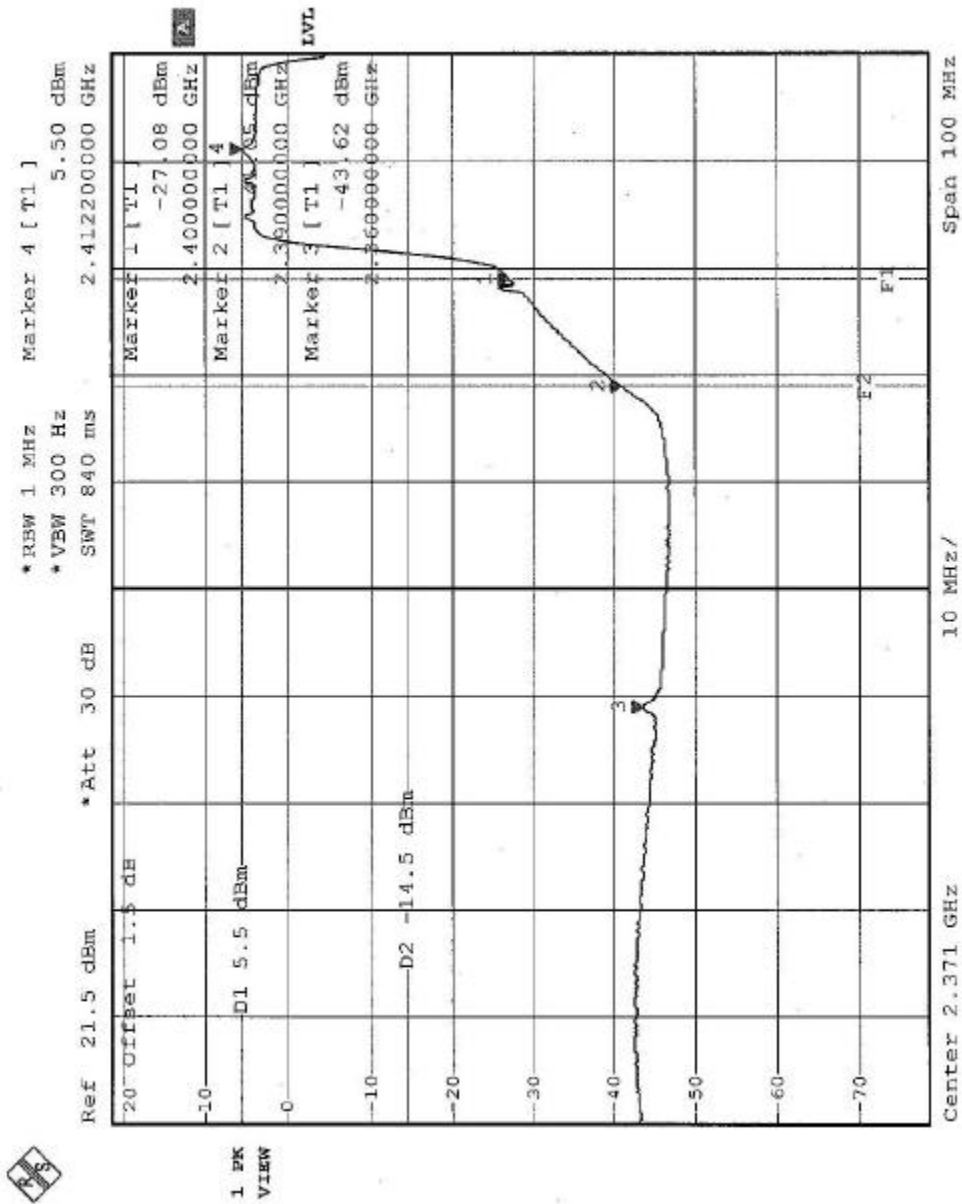


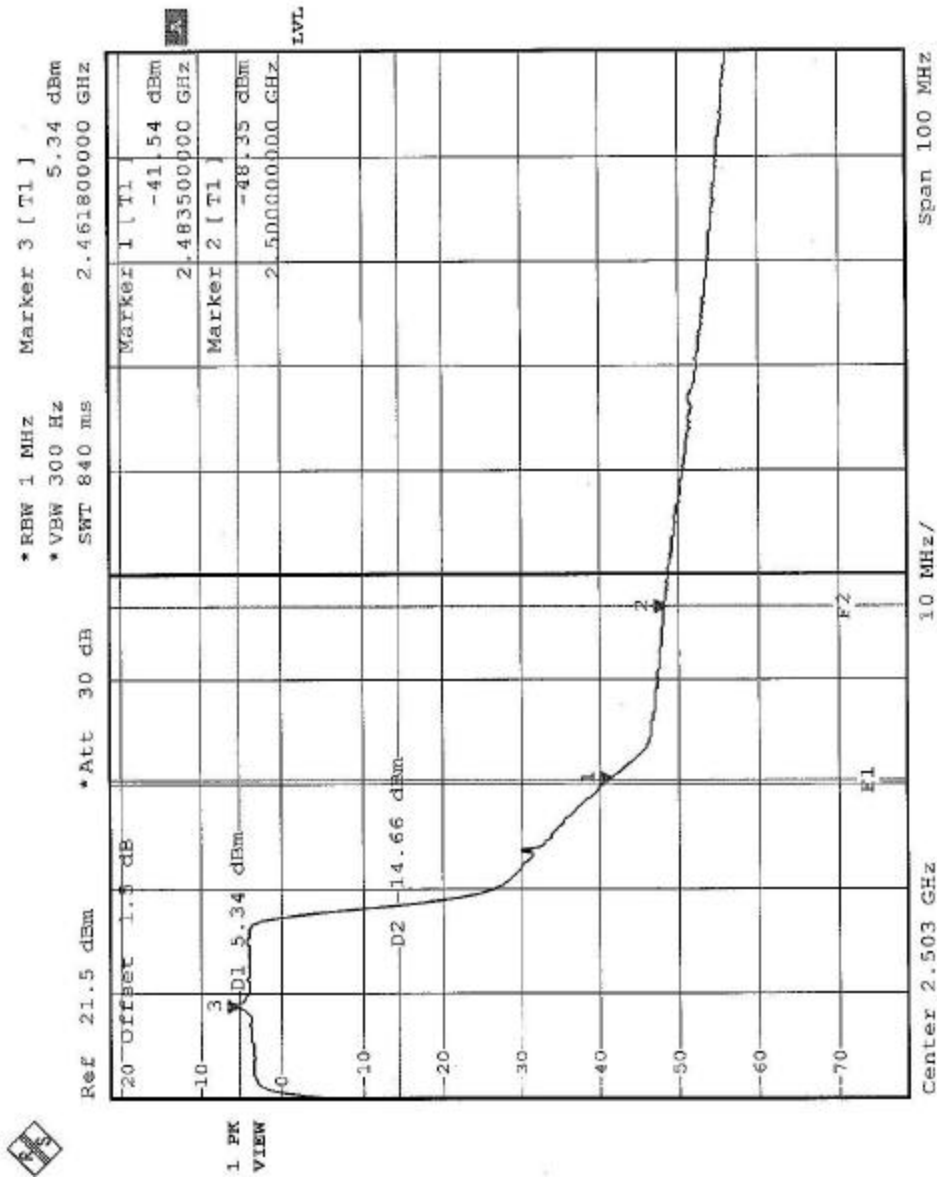
#### 4.6.15 TEST RESULTS –OFDM (Antenna 3)

The spectrum plots are attached on the following 2 pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement in part 15.247(C).

**NOTE (1):** The band edge emission plot on the following first page shows 46.55dB delta between carrier maximum power and local maximum emission in restrict band (2.3900GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2 is 98.3dBuV/m, so the maximum field strength in restrict band is  $98.3-46.55=51.75$ dBuV/m which is under 54 dBuV/m limit.

**NOTE (2):** The band edge emission plot on the following second page shows 46.88 dB delta between carrier maximum power and local maximum emission in restrict band (2.4835GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2 is 98.4dBuV/m, so the maximum field strength in restrict band is  $98.4-46.88=51.52$  dBuV/m which is under 54 dBuV/m limit.







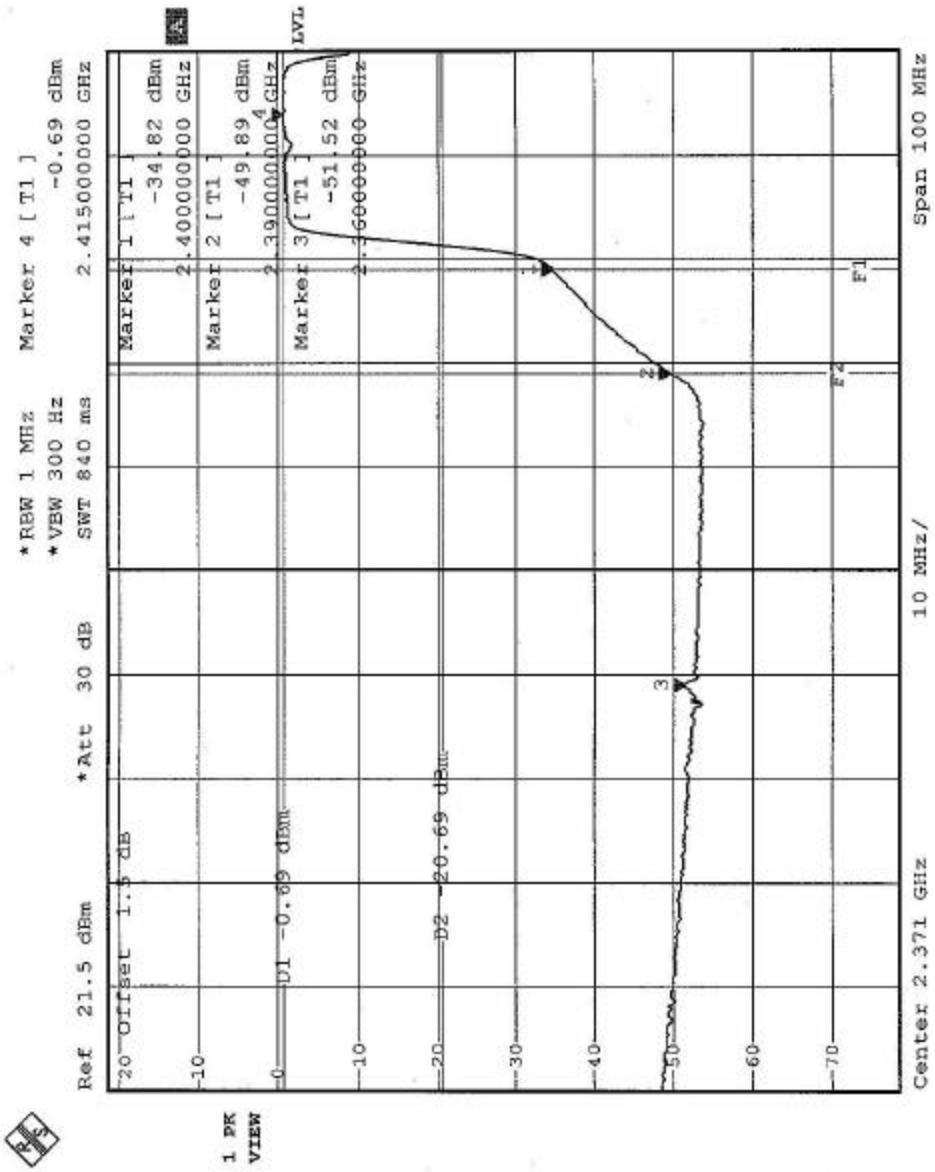
#### 4.6.16 TEST RESULTS –OFDM (Antenna 4)

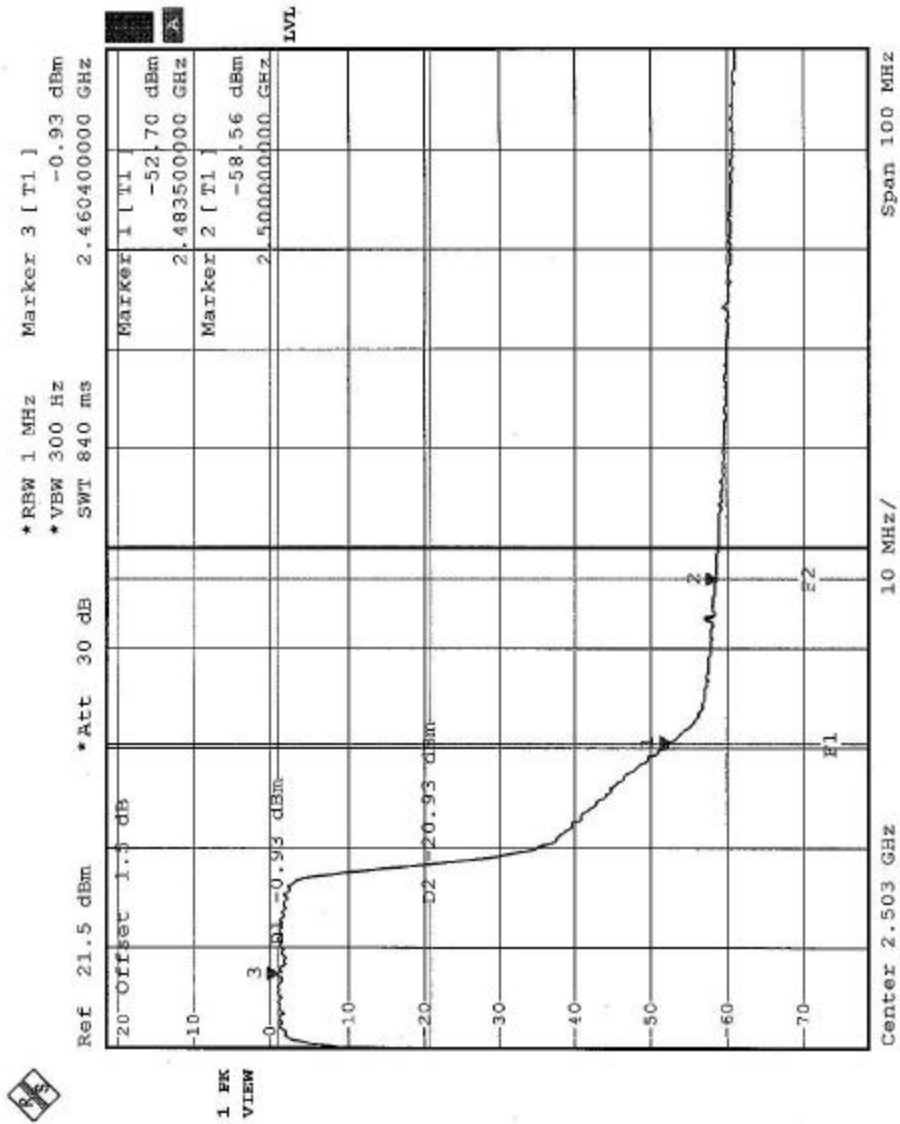
The spectrum plots are attached on the following 2 pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement in part 15.247(C).

**NOTE (1):** The band edge emission plot on the following first page shows 49.20dB delta between carrier maximum power and local maximum emission in restrict band (2.3900GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2 is 100.7dBuV/m, so the maximum field strength in restrict band is  $100.7 - 49.20 = 51.50$  dBuV/m which is under 54 dBuV/m limit.

**NOTE (2):** The band edge emission plot on the following second page shows 51.77 dB delta between carrier maximum power and local maximum emission in restrict band (2.4835GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2 is 102.1dBuV/m, so the maximum field strength in restrict band is  $102.1 - 51.77 = 50.33$  dBuV/m which is under 54 dBuV/m limit.







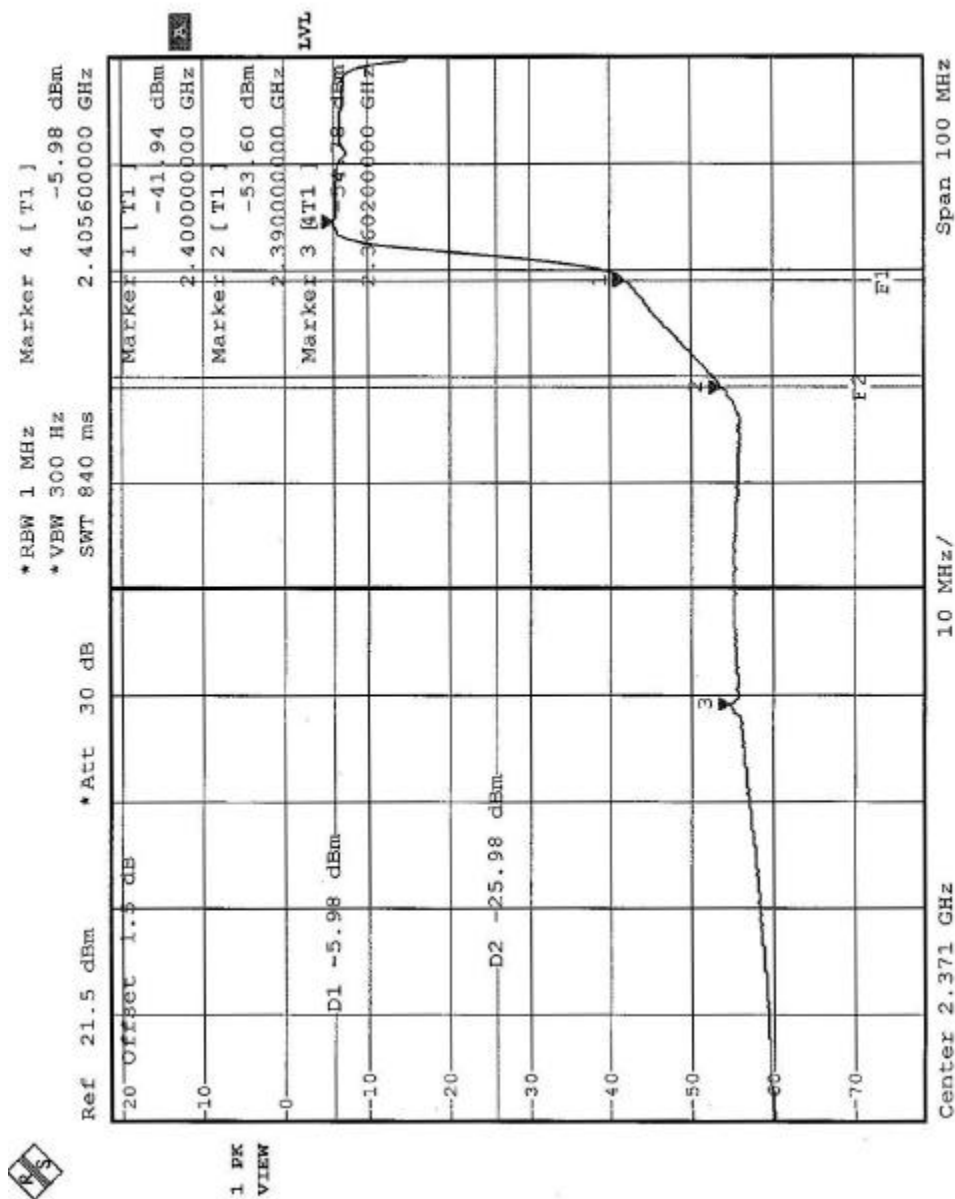


#### 4.6.17 TEST RESULTS –OFDM (Antenna 5)

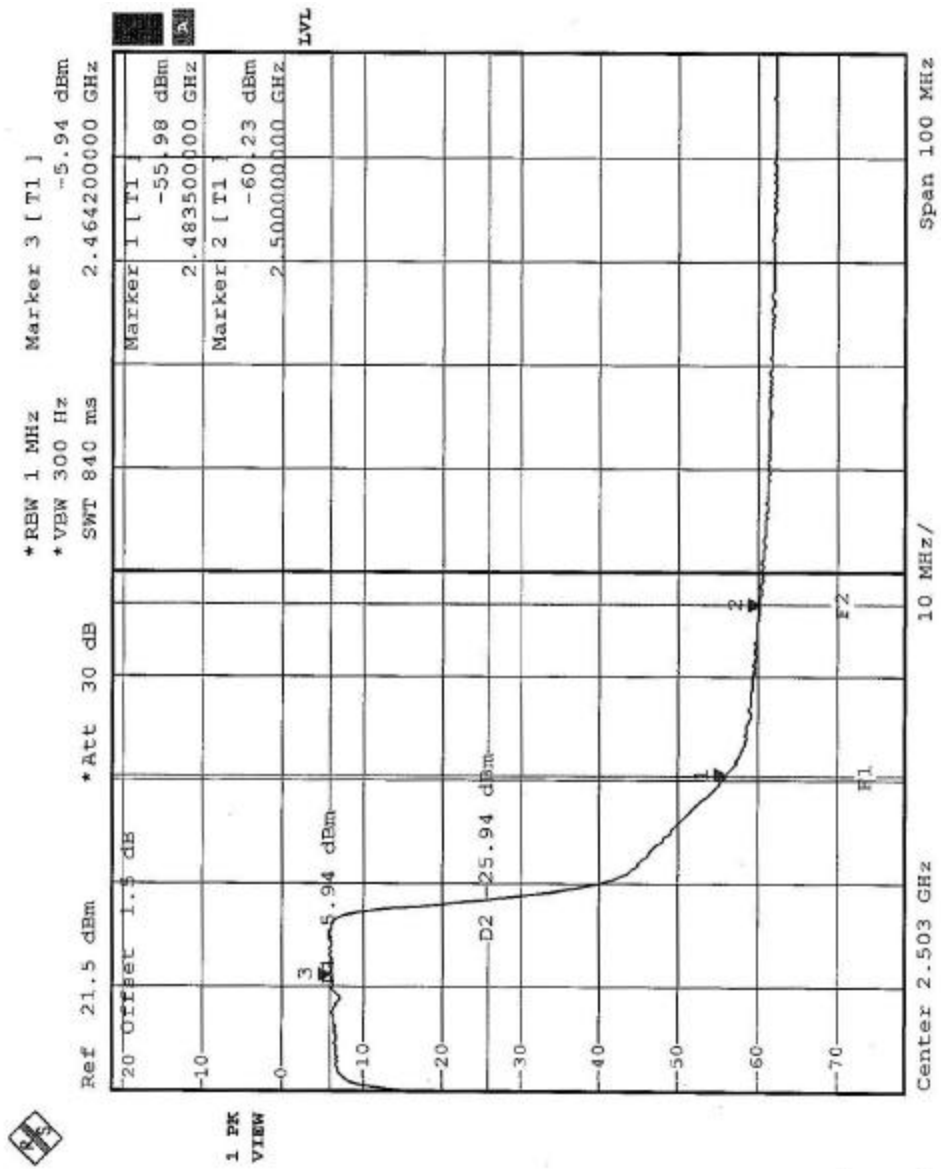
The spectrum plots are attached on the following 2 pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement in part 15.247(C).

**NOTE (1):** The band edge emission plot on the following first page shows 47.62dB delta between carrier maximum power and local maximum emission in restrict band (2.3900GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2 is 100.9dBuV/m, so the maximum field strength in restrict band is  $100.9 - 47.62 = 53.28$  dBuV/m which is under 54 dBuV/m limit.

**NOTE (2):** The band edge emission plot on the following second page shows 50.04 dB delta between carrier maximum power and local maximum emission in restrict band (2.4835GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2 is 103.0dBuV/m, so the maximum field strength in restrict band is  $103.0 - 50.04 = 52.96$  dBuV/m which is under 54 dBuV/m limit.



1 PK VIEW



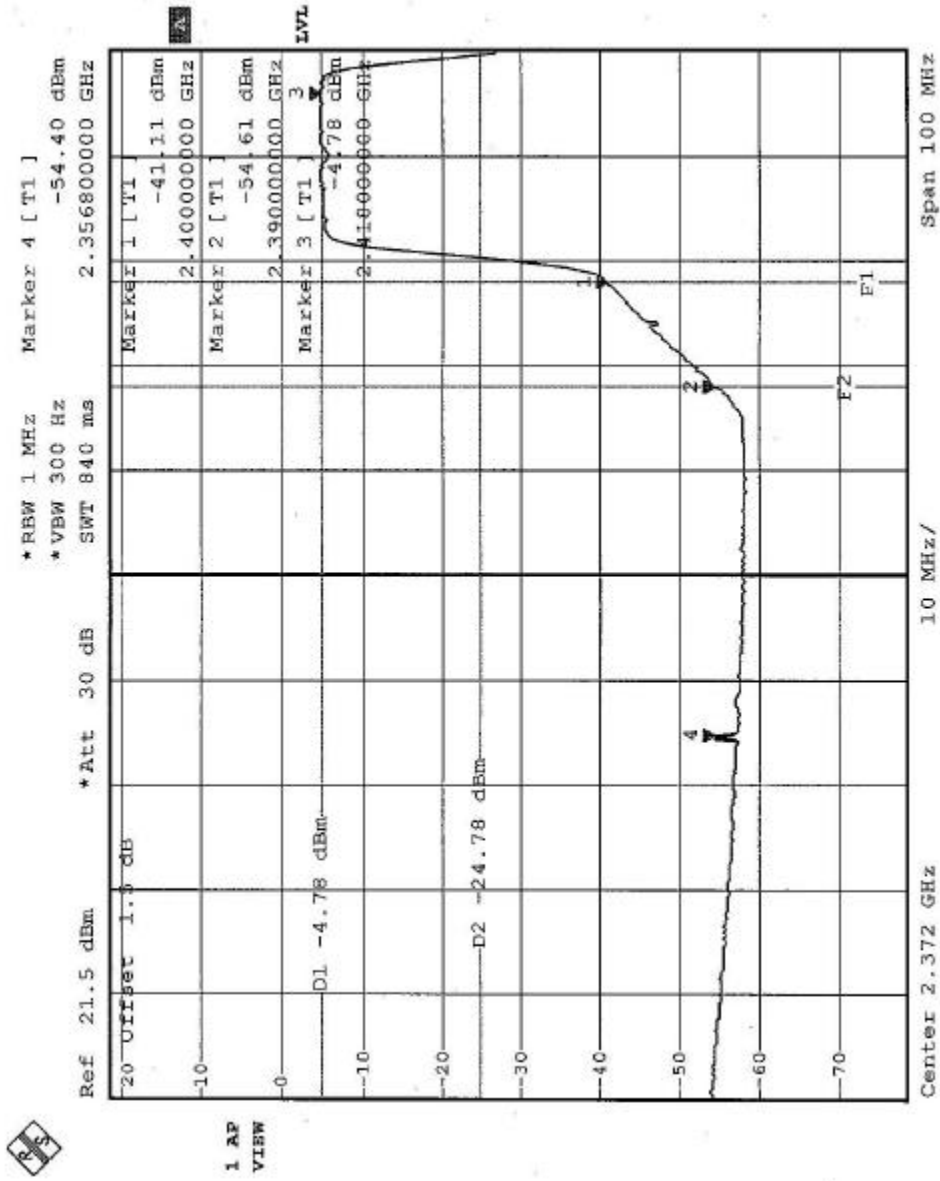


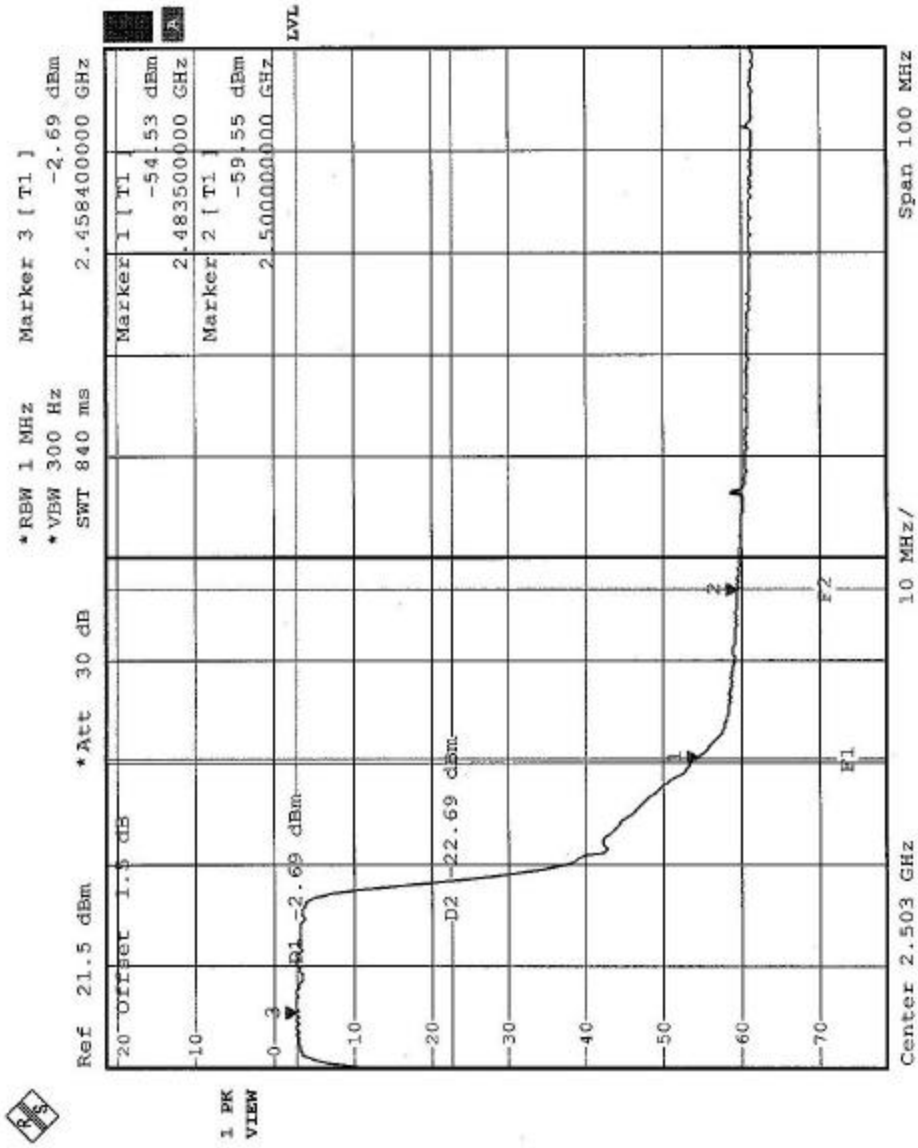
#### 4.6.18 TEST RESULTS –OFDM (Antenna 6)

The spectrum plots are attached on the following 2 pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D2. It shows compliance with the requirement in part 15.247(C).

**NOTE (1):** The band edge emission plot on the following first page shows 49.62dB delta between carrier maximum power and local maximum emission in restrict band (2.3568GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2 is 101.8dBuV/m, so the maximum field strength in restrict band is  $101.8-49.62=52.18$ dBuV/m which is under 54 dBuV/m limit.

**NOTE (2):** The band edge emission plot on the following second page shows 51.84 dB delta between carrier maximum power and local maximum emission in restrict band (2.4835GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2 is 103.6dBuV/m, so the maximum field strength in restrict band is  $103.6-51.84=51.76$  dBuV/m which is under 54 dBuV/m limit.







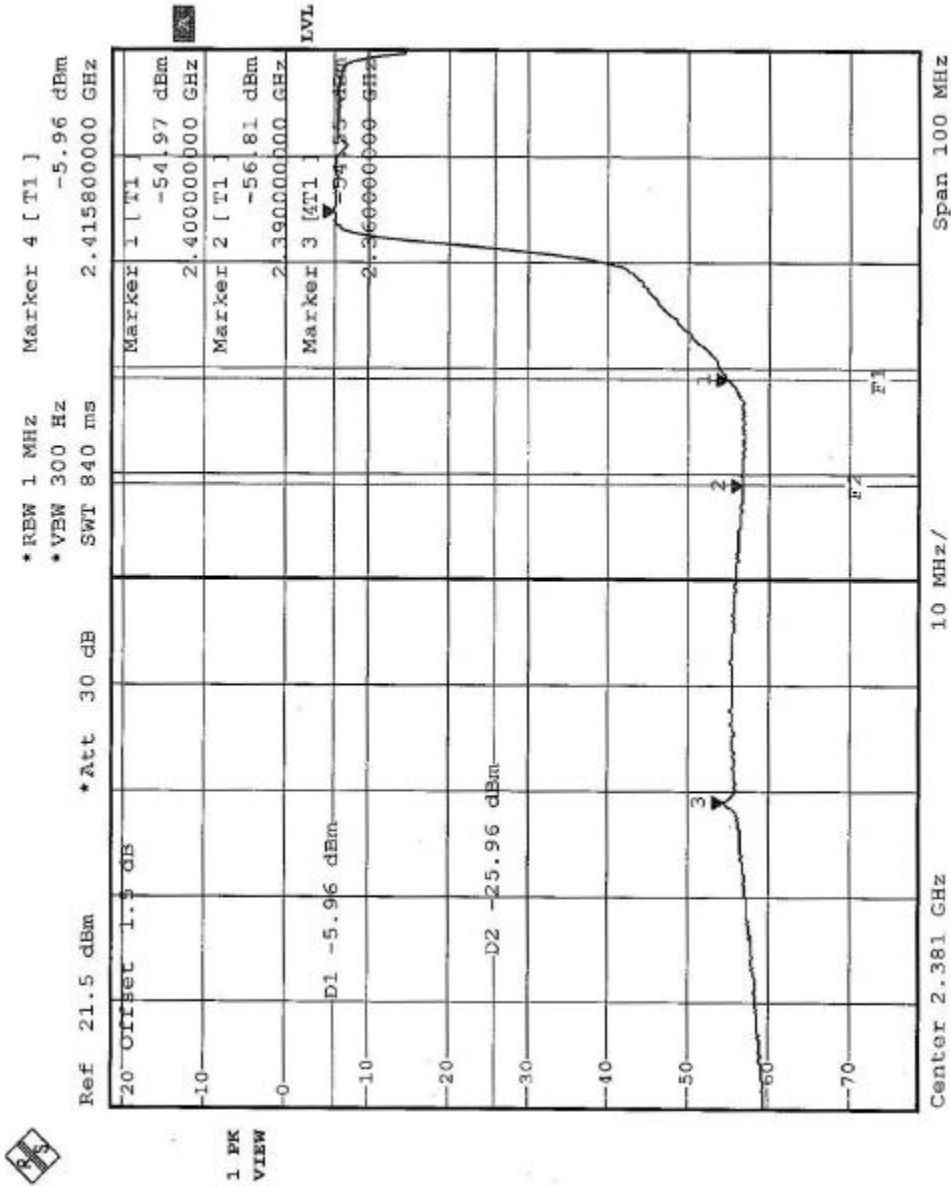


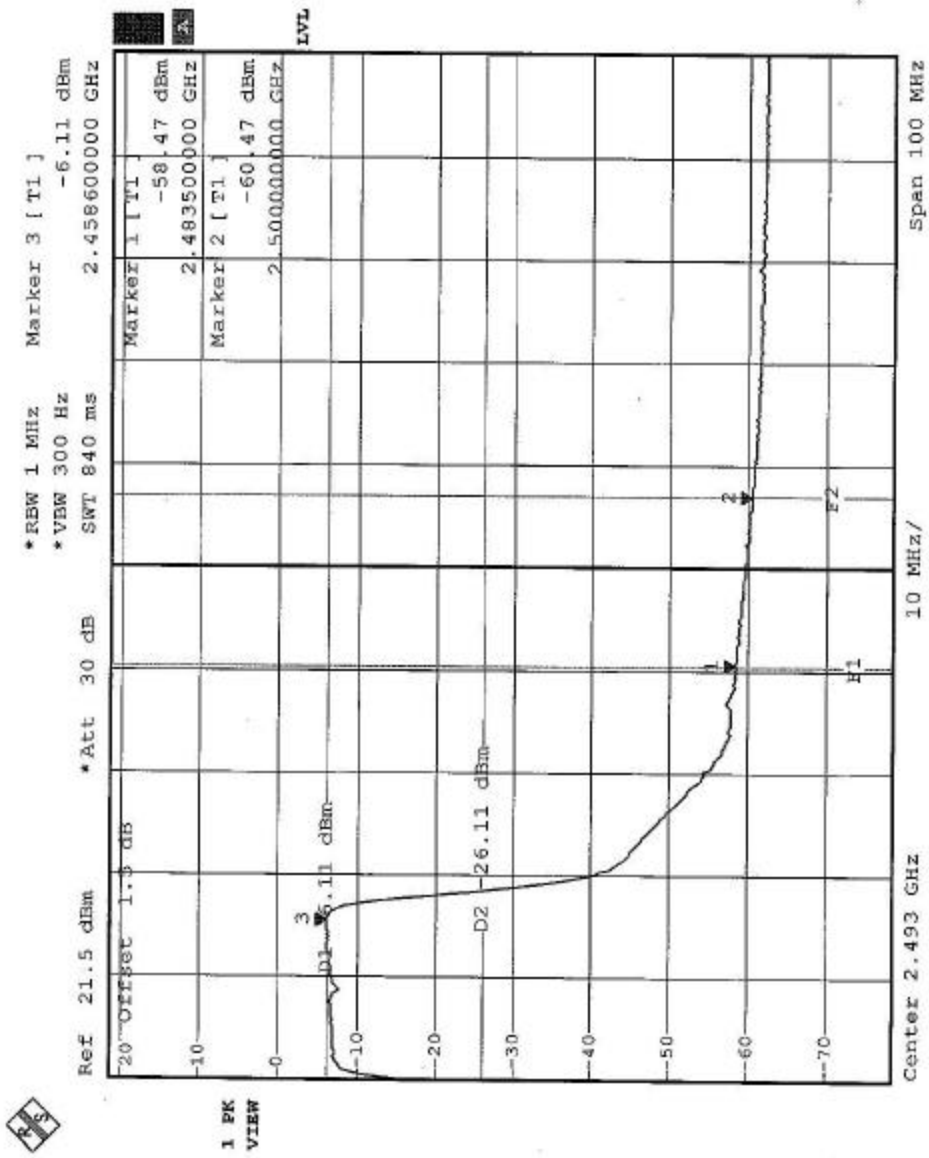
#### 4.6.19 TEST RESULTS –OFDM (Antenna 7)

The spectrum plots are attached on the following 2 pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement in part 15.247(C).

**NOTE (1):** The band edge emission plot on the following first page shows 48.59dB delta between carrier maximum power and local maximum emission in restrict band (2.3600GHz). The emission of carrier strength list in the test result of channel 3 at the item 4.2 is 101.0dBuV/m, so the maximum field strength in restrict band is  $101.0 - 48.59 = 52.41$  dBuV/m which is under 54 dBuV/m limit.

**NOTE (2):** The band edge emission plot on the following second page shows 52.36 dB delta between carrier maximum power and local maximum emission in restrict band (2.4835GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2 is 102.1 dBuV/m, so the maximum field strength in restrict band is  $102.1 - 52.36 = 49.74$  dBuV/m which is under 54 dBuV/m limit.







## **4.7 ANTENNA REQUIREMENT**

### **4.7.1 STANDARD APPLICABLE**

For intentional device, according to FCC 47 CFR Section 15.203 and RSS-210 section 6.2.2(o)(e2), 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. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

### **4.7.2 ANTENNA CONNECTED CONSTRUCTION**

The antennas used in this product are Dual-Band Omni-Directional Antenna with Aliner 31-401A R/A plug connector and Chip Antenna without connector and Omni, Panel, Yagi, Parabol Antennas with female N-type connectors.

Antenna 1: The maximum Gain of the antenna is 2.5dBi.

Antenna 2: The maximum Gain of the antenna is 2.0dBi.

Antenna 3: The maximum Gain of the antenna is 3.0dBi.

Antenna 4: The maximum Gain of the antenna is 10.0dBi.

Antenna 5: The maximum Gain of the antenna is 14.0dBi.

Antenna 6: The maximum Gain of the antenna is 14.0dBi.

Antenna 7: The maximum Gain of the antenna is 24.0dBi.