

## 6 Spurious Emissions at Antenna Terminals

### 6.1 Test Specification

FCC Part 27, Subpart C, Sections 27.53(a)(1)

### 6.2 Test Procedure

(Temperature (24°C)/ Humidity (35%RH))

The E.U.T. antenna terminal was connected to the spectrum analyzer through an external attenuator and an appropriate coaxial cable.

The evaluation was performed in the frequency band from 9.0kHz-24.0GHz without band edges tests, and for each modulation separately

### 6.3 Test Limit

The power of any emission outside of the authorized operating frequency ranges (2345-2360 MHz) must be attenuated below the transmitting power (P) by a factor of at least as specified in this section.

| Frequency Band<br>(MHz)                   | Calculated<br>Factor (dBc)       |
|-------------------------------------------|----------------------------------|
| $f < 2285.0$                              | $75 + 10 \cdot \log(0.1) = 65.0$ |
| $2285.0\text{MHz} < f < 2287.5\text{MHz}$ | $72 + 10 \cdot \log(0.1) = 62.0$ |
| $2287.5\text{MHz} < f < 2300.0\text{MHz}$ | $70 + 10 \cdot \log(0.1) = 60.0$ |
| $2300.0\text{MHz} < f < 2305.0\text{MHz}$ | $43 + 10 \cdot \log(0.1) = 33.0$ |
| $2305.0\text{MHz} < f < 2320.0\text{MHz}$ | $43 + 10 \cdot \log(0.1) = 33.0$ |
| $2320.0\text{MHz} < f < 2345.0\text{MHz}$ | $75 + 10 \cdot \log(0.1) = 65.0$ |
| $2345.0\text{MHz} < f < 2360.0\text{MHz}$ | $43 + 10 \cdot \log(0.1) = 33.0$ |
| $2360.0\text{MHz} < f < 2362.5\text{MHz}$ | $43 + 10 \cdot \log(0.1) = 33.0$ |
| $2362.5\text{MHz} < f < 2365.0\text{MHz}$ | $55 + 10 \cdot \log(0.1) = 45.0$ |
| $2365.0\text{MHz} < f < 2367.5\text{MHz}$ | $70 + 10 \cdot \log(0.1) = 60.0$ |
| $2367.5\text{MHz} < f < 2370.0\text{MHz}$ | $72 + 10 \cdot \log(0.1) = 62.0$ |
| $2370.0 < f$                              | $75 + 10 \cdot \log(0.1) = 65.0$ |

Figure 88 Mask Limit Table

### 6.4 Test Results

JUDGEMENT: Passed

See additional information in Figure 89 to Figure 184.

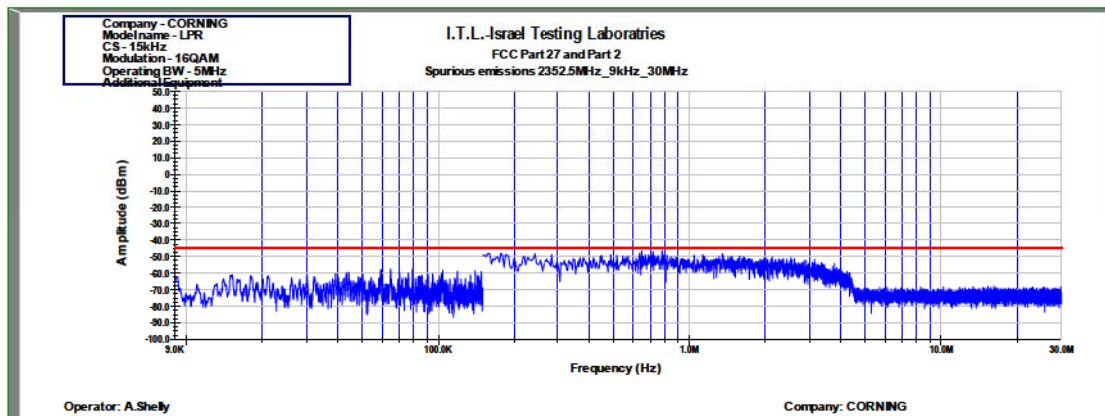


Figure 89: Spurious Emissions at Antenna Terminal 16QAM, 2352.5MHz, B.W. 5MHz, Sub Carrier 15 kHz

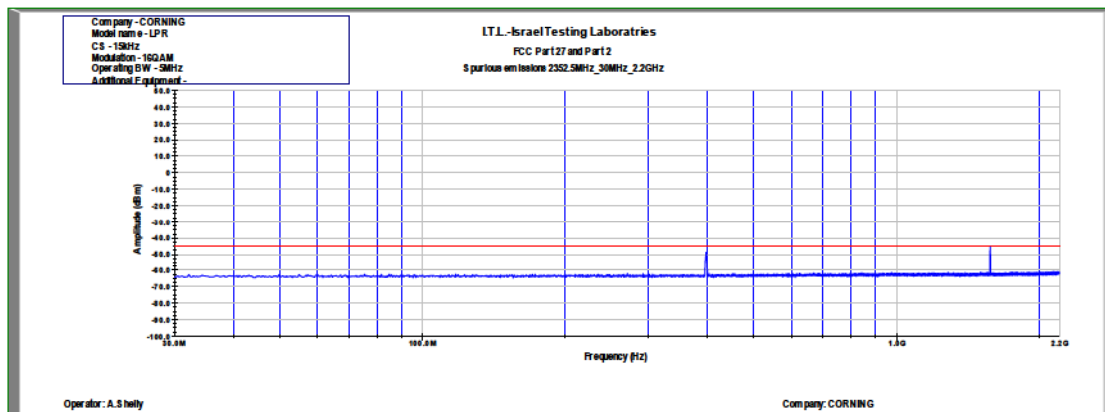


Figure 90: Spurious Emissions at Antenna Terminal 16QAM, 2352.5MHz, B.W. 5MHz, Sub Carrier 15 kHz

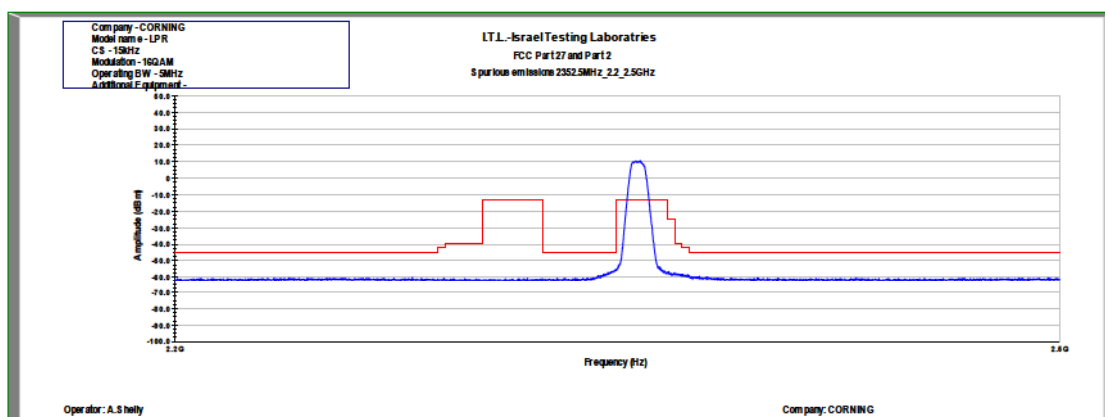


Figure 91: Spurious Emissions at Antenna Terminal 16QAM, 2352.5MHz, B.W. 5MHz, Sub Carrier 15 kHz

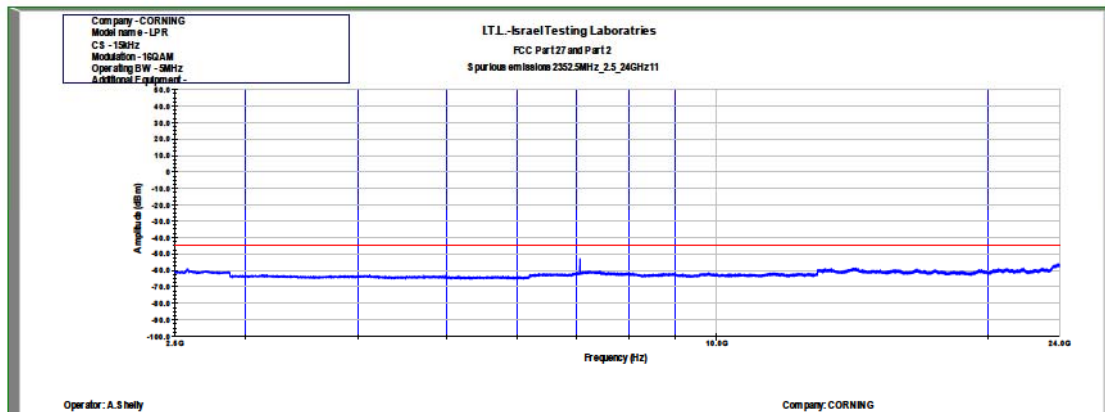


Figure 92: Spurious Emissions at Antenna Terminal 16QAM, 2352.5MHz, B.W. 5MHz, Sub Carrier 15 kHz

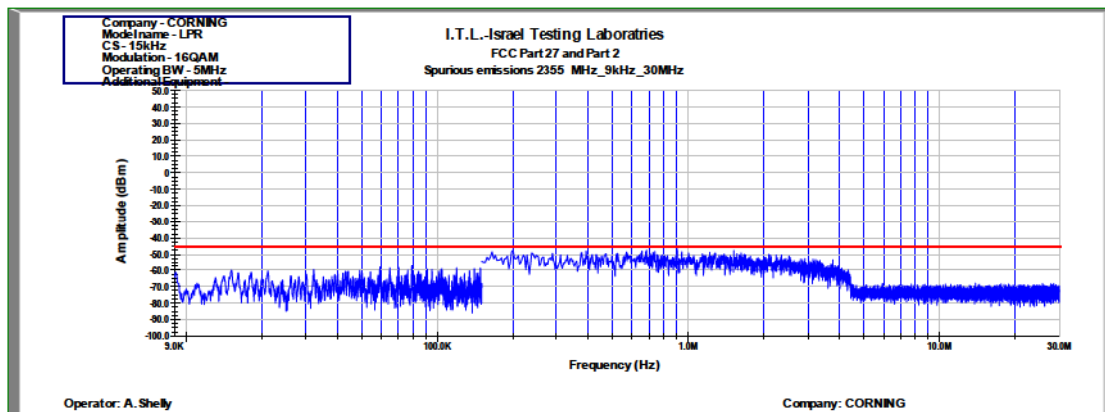


Figure 93: Spurious Emissions at Antenna Terminal 16QAM, 2355.0MHz, B.W. 5MHz, Sub Carrier 15 kHz

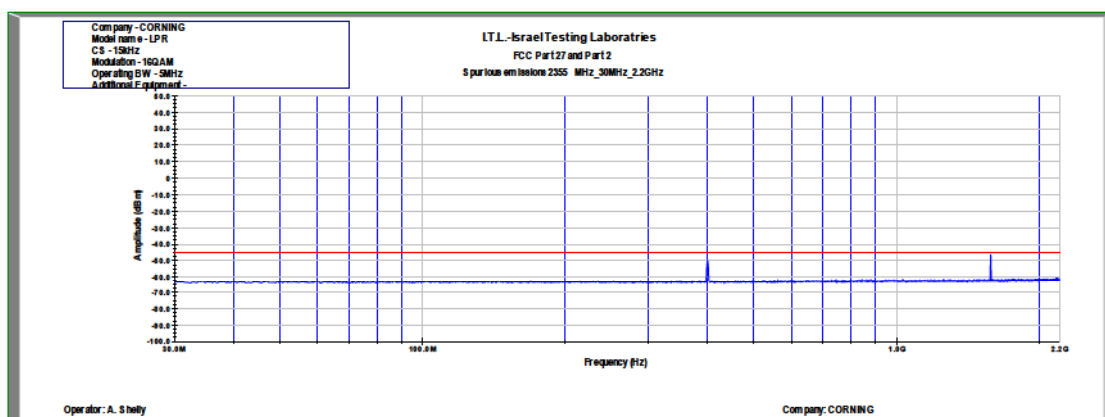


Figure 94: Spurious Emissions at Antenna Terminal 16QAM, 2355.0MHz, B.W. 5MHz, Sub Carrier 15 kHz

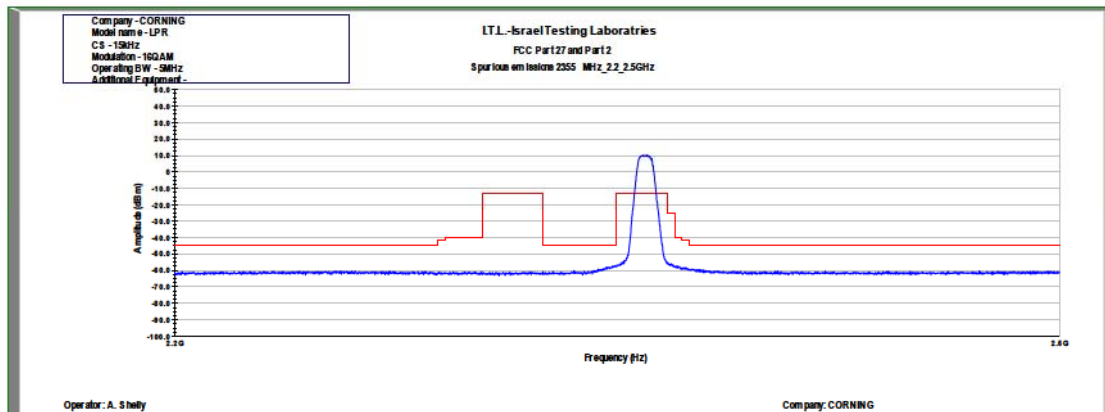


Figure 95: Spurious Emissions at Antenna Terminal 16QAM, 2355.0MHz, B.W. 5MHz, Sub Carrier 15 kHz

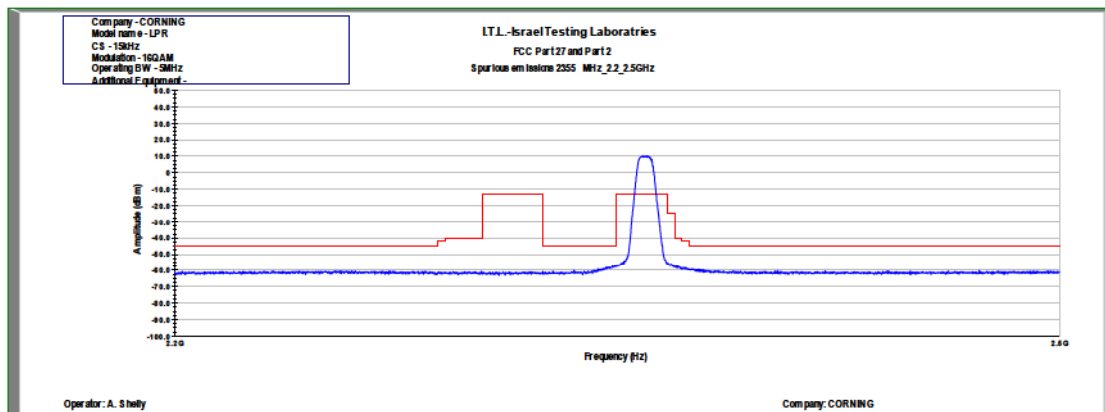


Figure 96: Spurious Emissions at Antenna Terminal 16QAM, 2355.0MHz, B.W. 5MHz, Sub Carrier 15 kHz

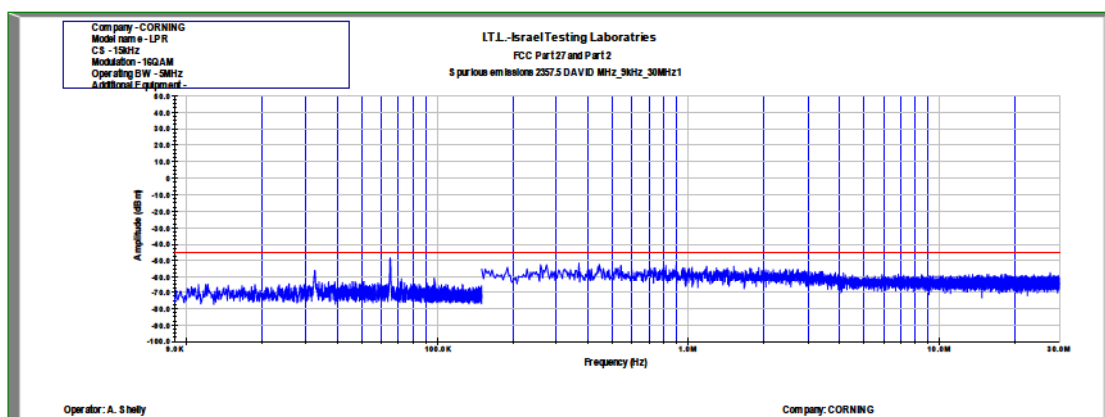


Figure 97: Spurious Emissions at Antenna Terminal 16QAM, 2357.5MHz, B.W. 5MHz, Sub Carrier 15 kHz

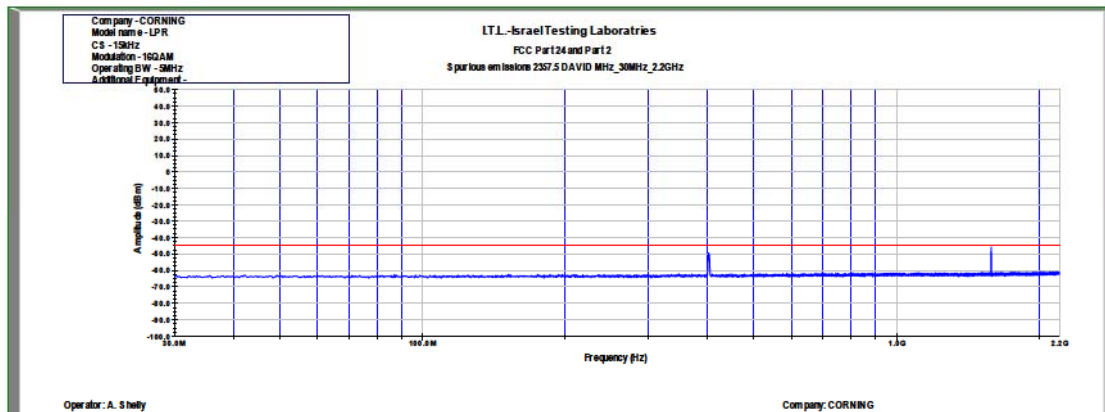


Figure 98: Spurious Emissions at Antenna Terminal 16QAM, 2357.5MHz, B.W. 5MHz, Sub Carrier 15 kHz

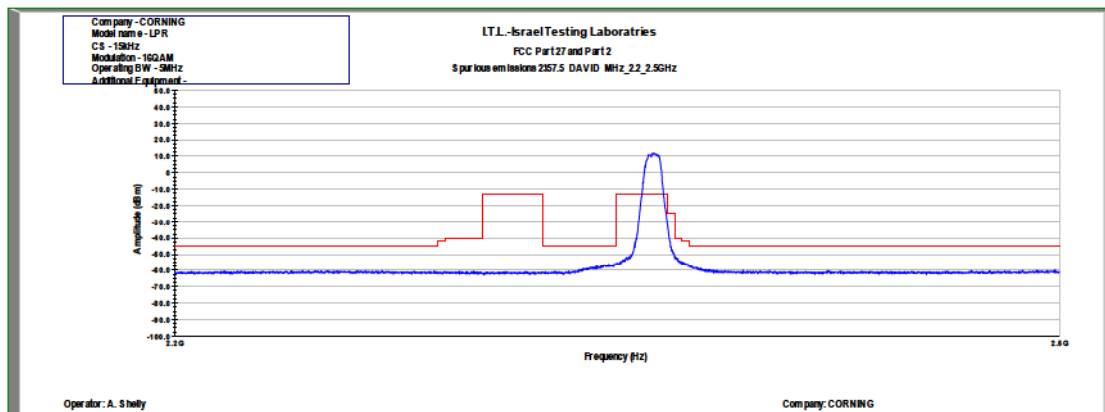


Figure 99: Spurious Emissions at Antenna Terminal 16QAM, 2357.5MHz, B.W. 5MHz, Sub Carrier 15 kHz

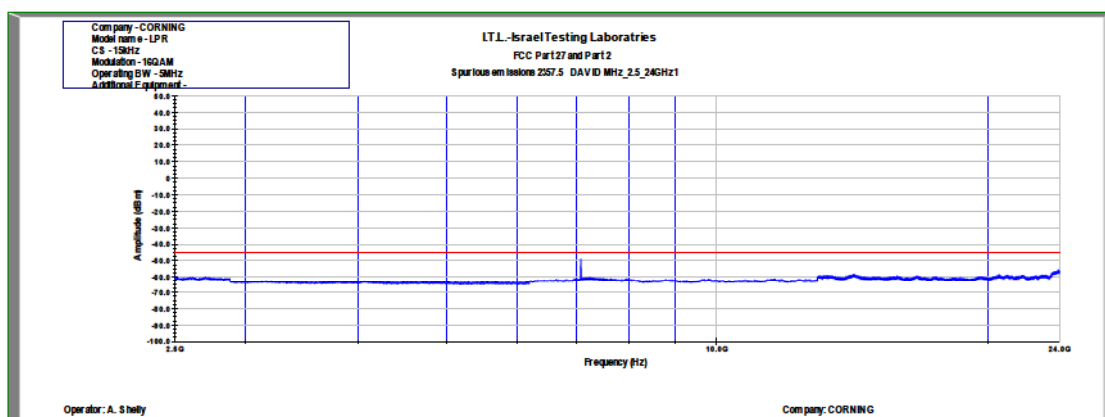


Figure 100: Spurious Emissions at Antenna Terminal 16QAM, 2357.5MHz, B.W. 5MHz, Sub Carrier 15 kHz

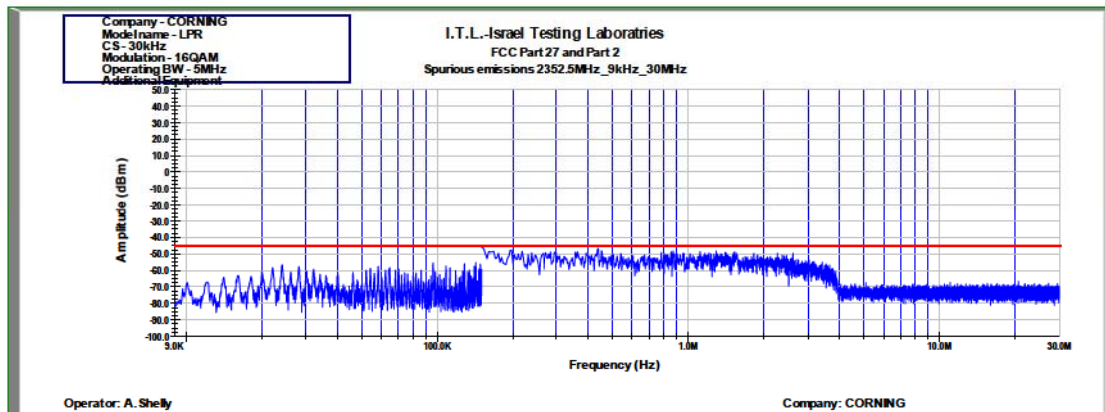


Figure 101: Spurious Emissions at Antenna Terminal 16QAM, 2352.5MHz, B.W. 5MHz, Sub Carrier 30 kHz

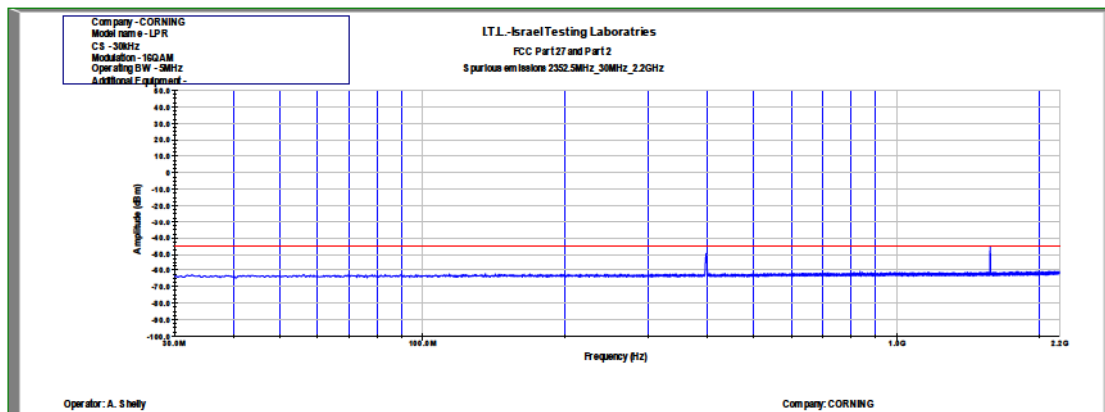


Figure 102: Spurious Emissions at Antenna Terminal 16QAM, 2532.5MHz, B.W. 5MHz, Sub Carrier 30 kHz

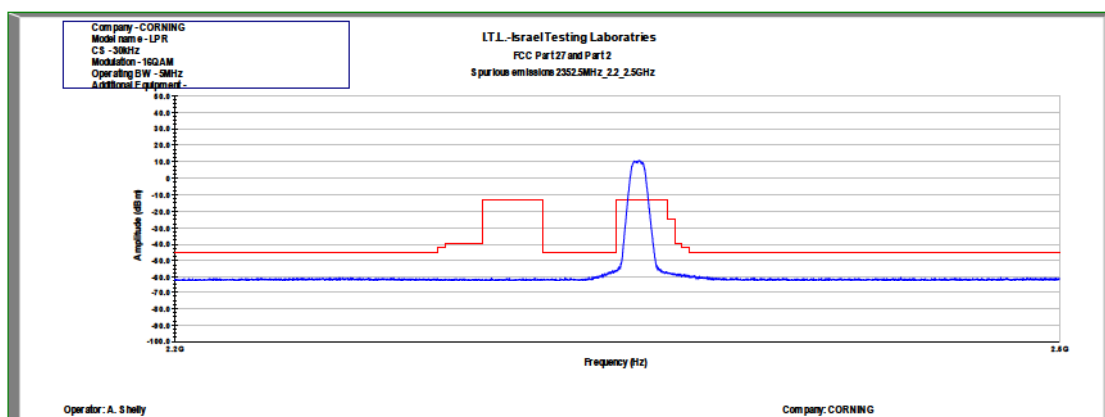


Figure 103: Spurious Emissions at Antenna Terminal 16QAM, 2532.5MHz, B.W. 5MHz, Sub Carrier 30 kHz

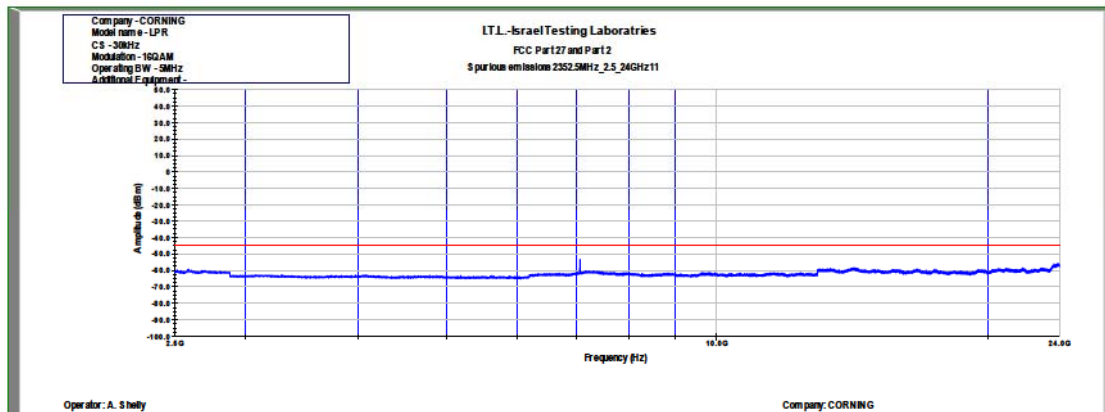


Figure 104: Spurious Emissions at Antenna Terminal 16QAM, 2532.5MHz, B.W. 5MHz, Sub Carrier 30 kHz

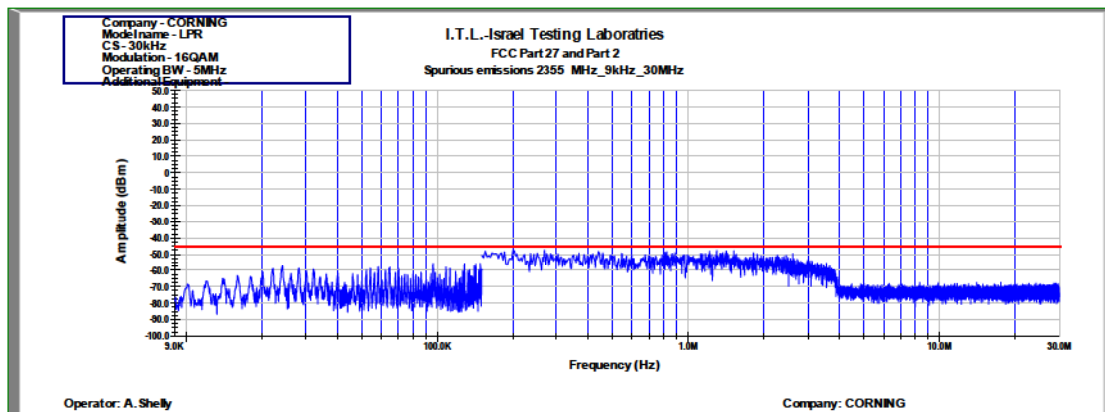


Figure 105: Spurious Emissions at Antenna Terminal 16QAM, 2355.0MHz, B.W. 5MHz, Sub Carrier 30 kHz

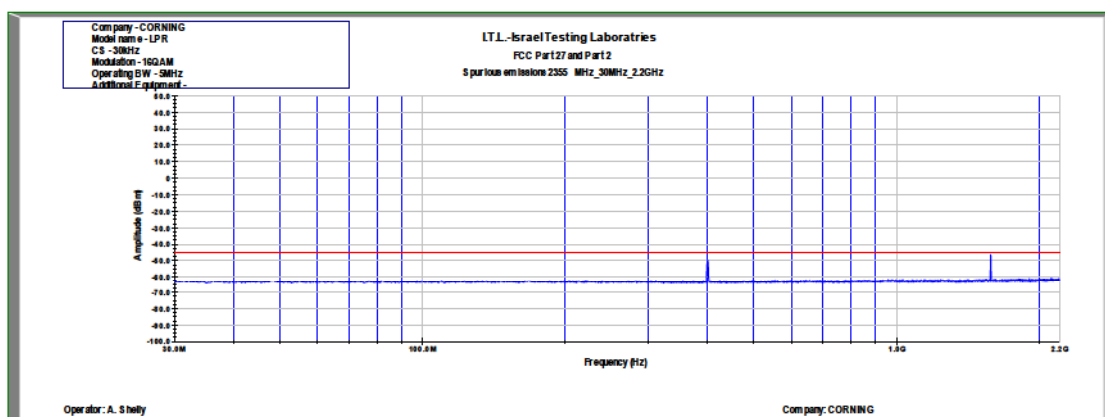


Figure 106: Spurious Emissions at Antenna Terminal 16QAM, 2355.0MHz, B.W. 5MHz, Sub Carrier 30 kHz

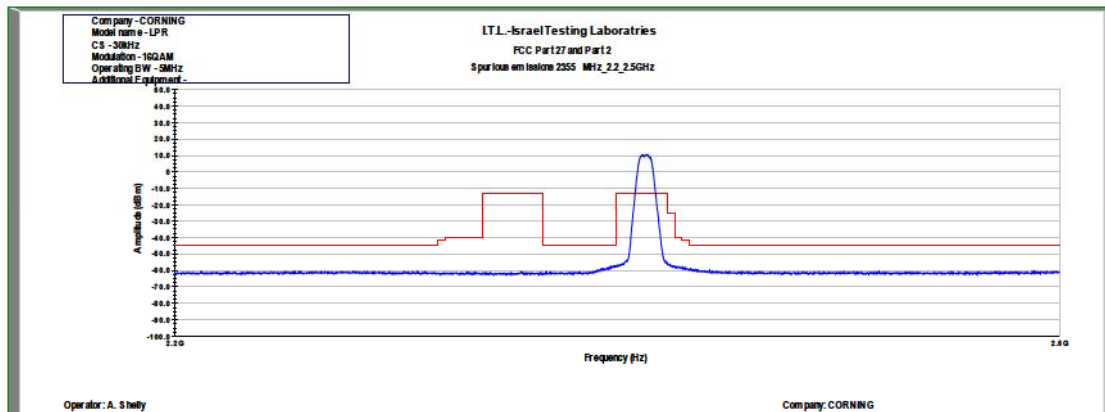


Figure 107: Spurious Emissions at Antenna Terminal 16QAM, 2355.0MHz, B.W. 5MHz, Sub Carrier 30 kHz

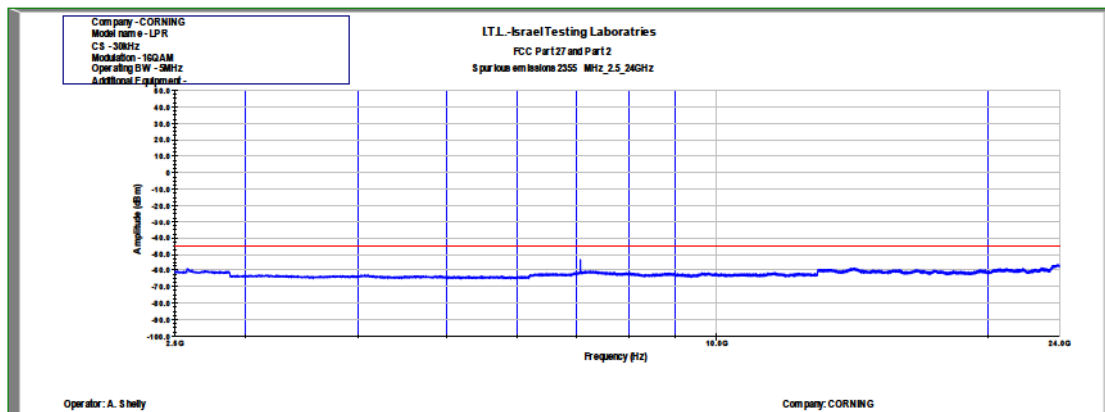


Figure 108: Spurious Emissions at Antenna Terminal 16QAM, 23550.0MHz, B.W. 5MHz, Sub Carrier 30 kHz

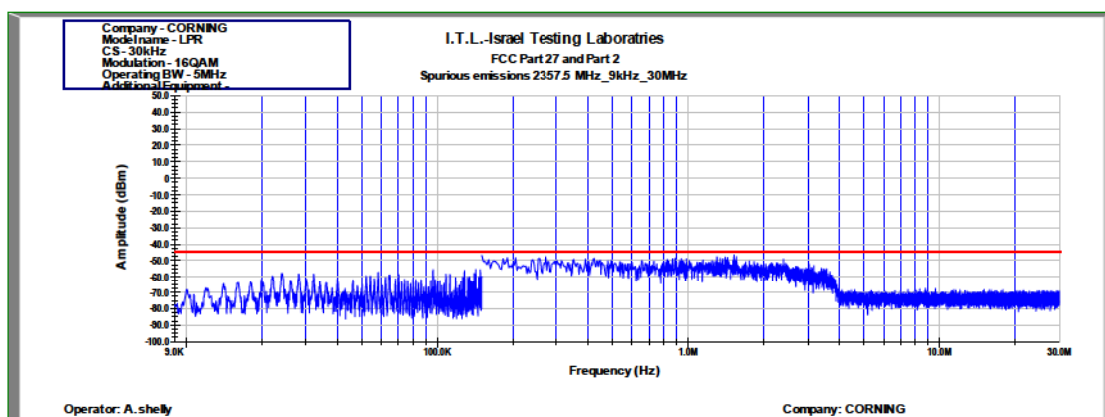


Figure 109: Spurious Emissions at Antenna Terminal 16QAM, 2357.5MHz, B.W. 5MHz, Sub Carrier 30 kHz



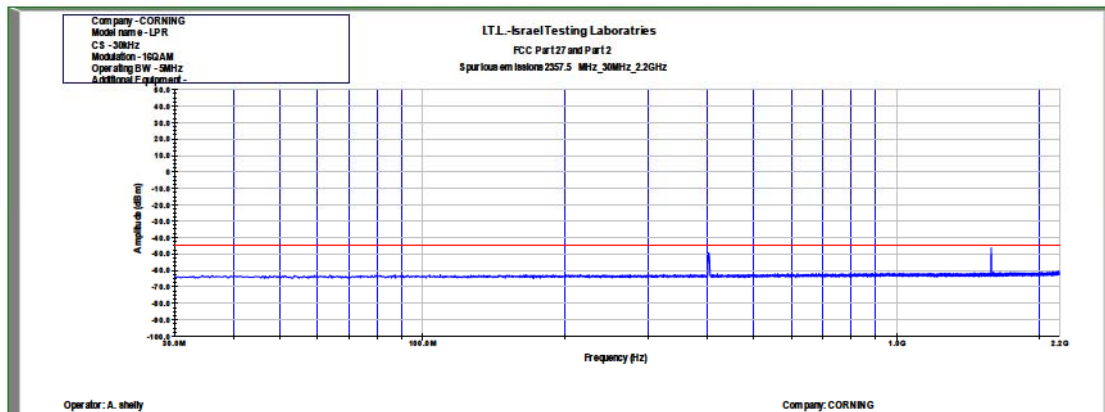


Figure 110: Spurious Emissions at Antenna Terminal 16QAM, 2357.5MHz, B.W. 5MHz, Sub Carrier 30 kHz

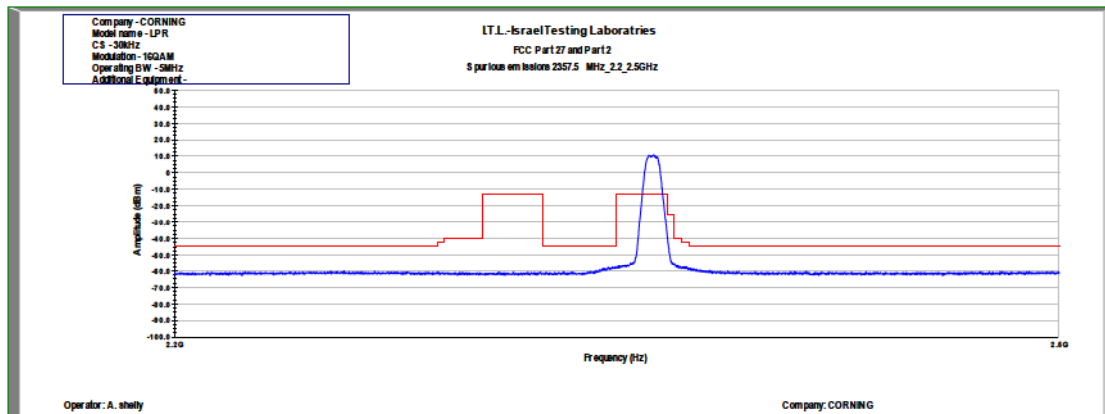


Figure 111: Spurious Emissions at Antenna Terminal 16QAM, 2357.5MHz, B.W. 5MHz, Sub Carrier 30 kHz

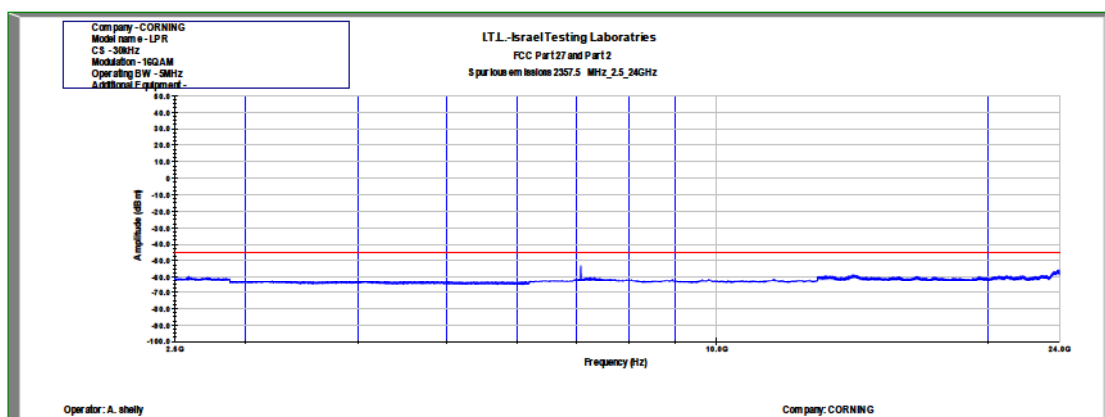


Figure 112: Spurious Emissions at Antenna Terminal 16QAM, 2357.5MHz, B.W. 5MHz, Sub Carrier 30 kHz

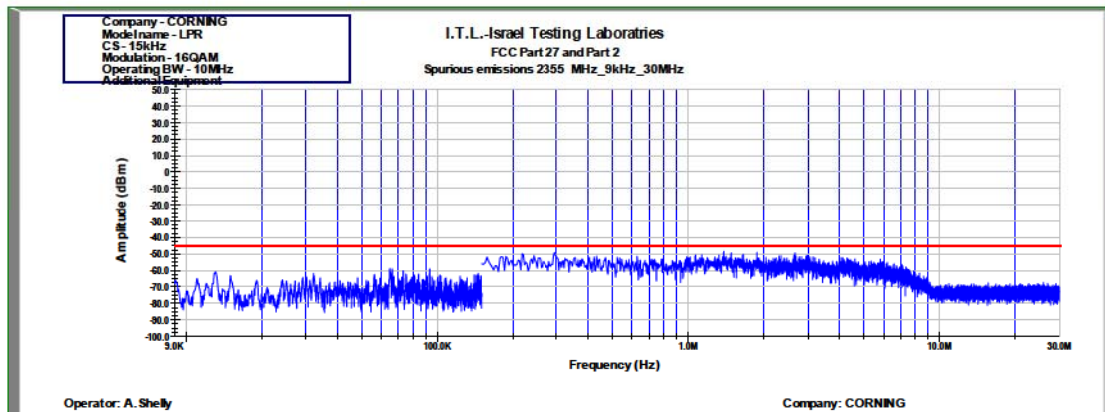


Figure 113: Spurious Emissions at Antenna Terminal 16QAM, 2355.0MHz, B.W. 10MHz, Sub Carrier 15 kHz

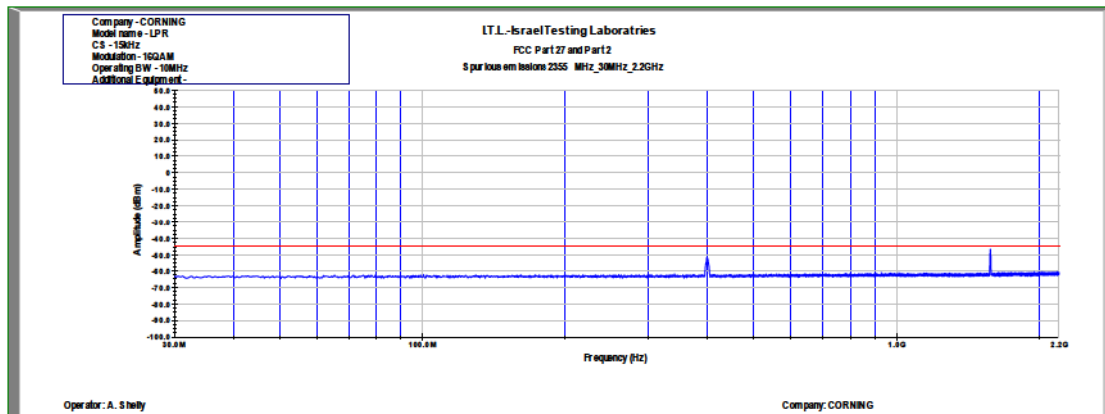


Figure 114: Spurious Emissions at Antenna Terminal 16QAM, 2355.0MHz, B.W. 10MHz, Sub Carrier 15 kHz

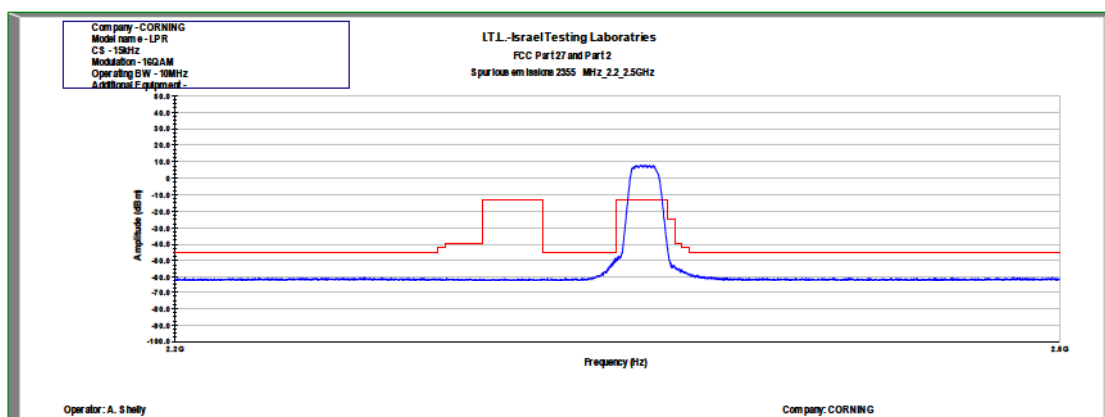


Figure 115: Spurious Emissions at Antenna Terminal 16QAM, 2355.0MHz, B.W. 10MHz, Sub Carrier 15 kHz

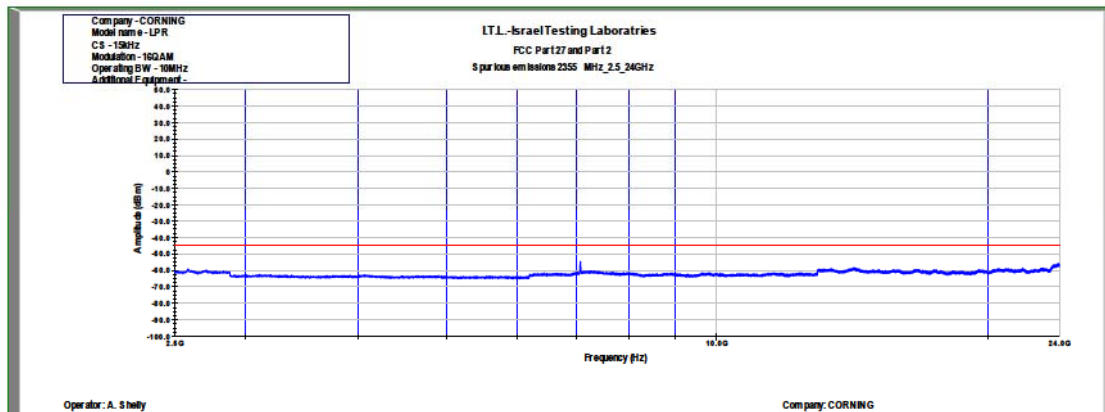


Figure 116: Spurious Emissions at Antenna Terminal 16QAM, 2355.0MHz, B.W. 10MHz, Sub Carrier 15 kHz

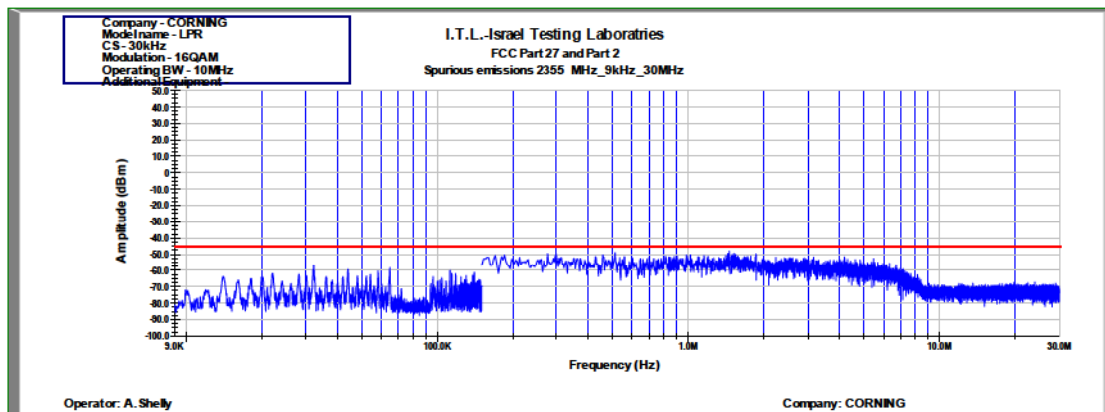


Figure 117: Spurious Emissions at Antenna Terminal 16QAM, 2355.0MHz, B.W. 10MHz, Sub Carrier 30 kHz

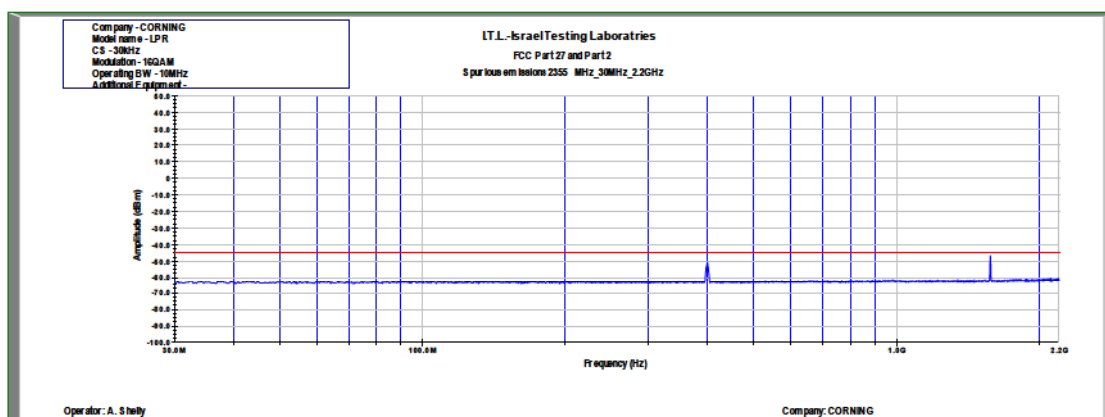


Figure 118: Spurious Emissions at Antenna Terminal 16QAM, 2355.0MHz, B.W. 10MHz, Sub Carrier 30 kHz

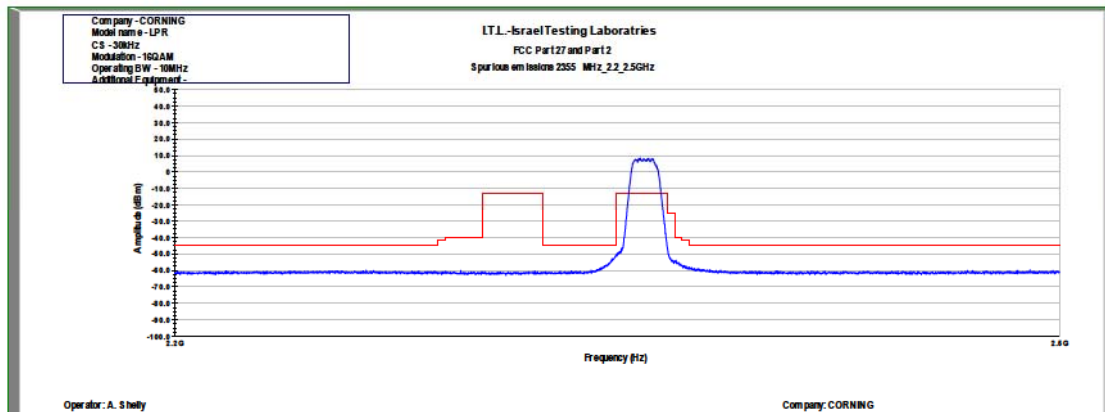


Figure 119: Spurious Emissions at Antenna Terminal 16QAM, 2355.0MHz, B.W. 10MHz, Sub Carrier 30 kHz

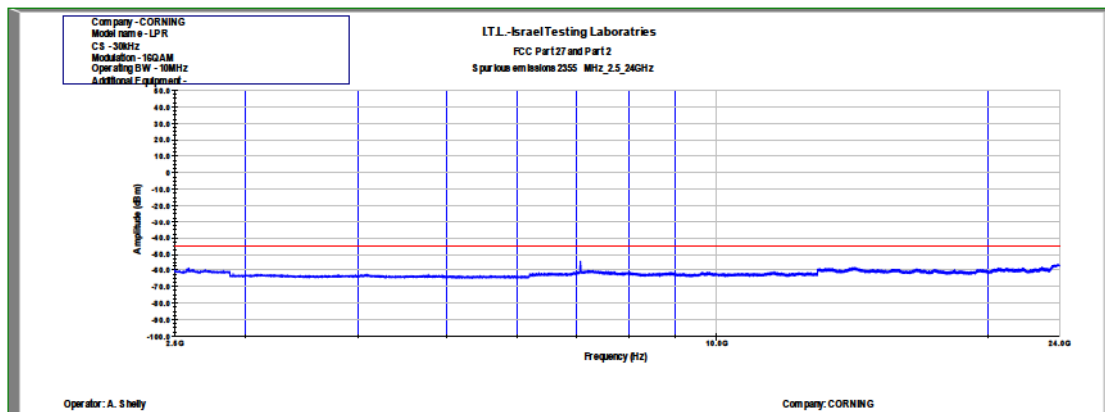


Figure 120: Spurious Emissions at Antenna Terminal 16QAM, 2355.0MHz, B.W. 10MHz, Sub Carrier 30 kHz

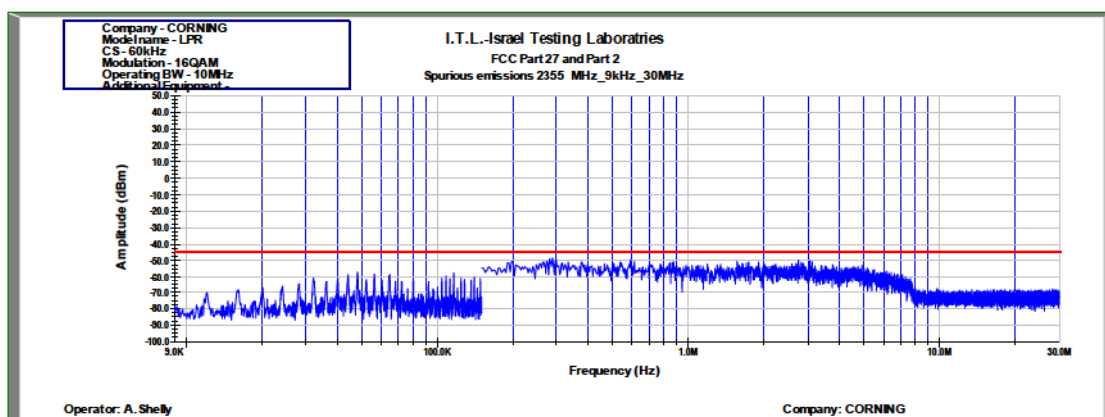


Figure 121: Spurious Emissions at Antenna Terminal 16QAM, 2355.0MHz, B.W. 10MHz, Sub Carrier 60 kHz

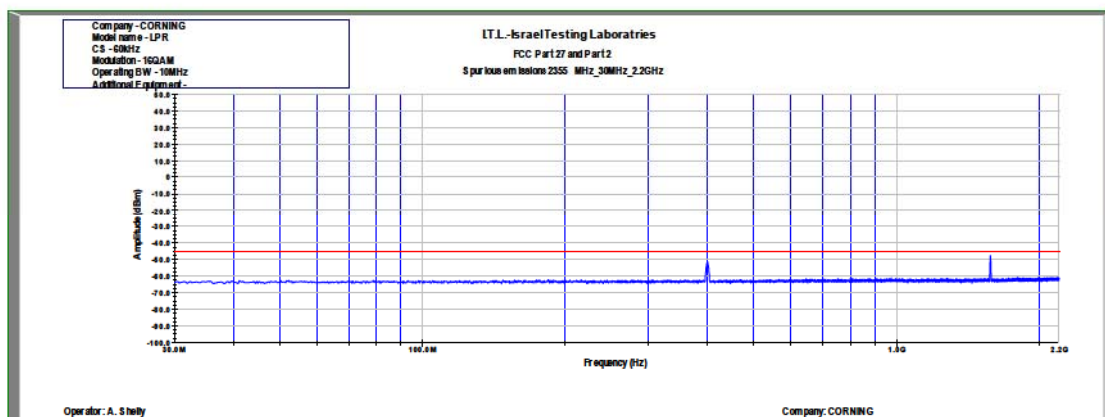


Figure 122: Spurious Emissions at Antenna Terminal 16QAM, 2355.0MHz, B.W. 10MHz, Sub Carrier 60 kHz

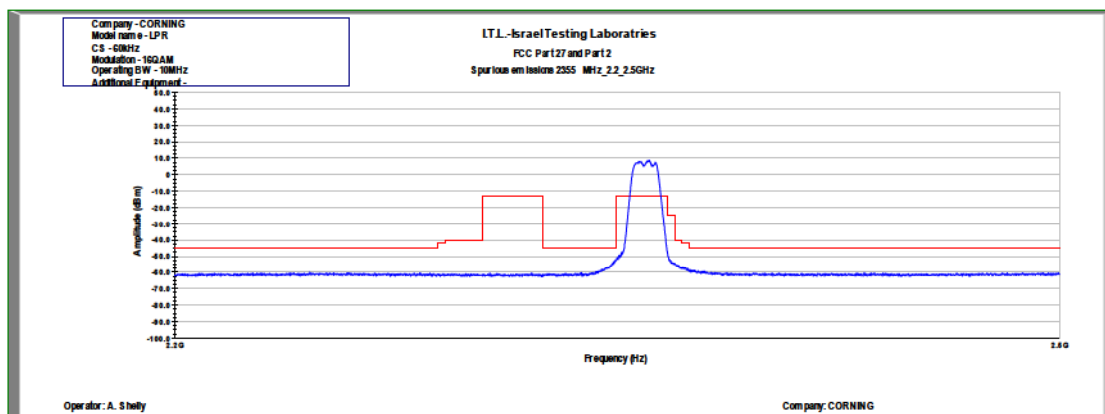


Figure 123: Spurious Emissions at Antenna Terminal 16QAM, 2355.0MHz, B.W. 10MHz, Sub Carrier 60 kHz

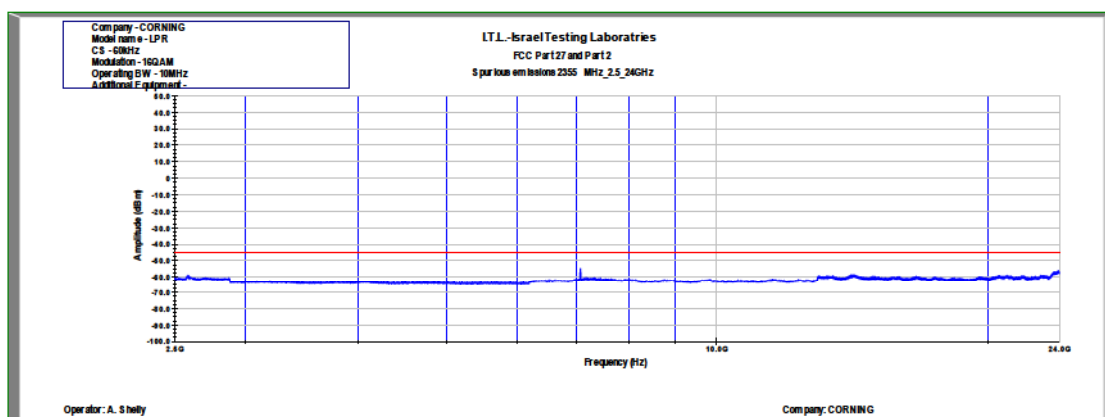


Figure 124: Spurious Emissions at Antenna Terminal 16QAM, 2355.0MHz, B.W. 10MHz, Sub Carrier 60 kHz

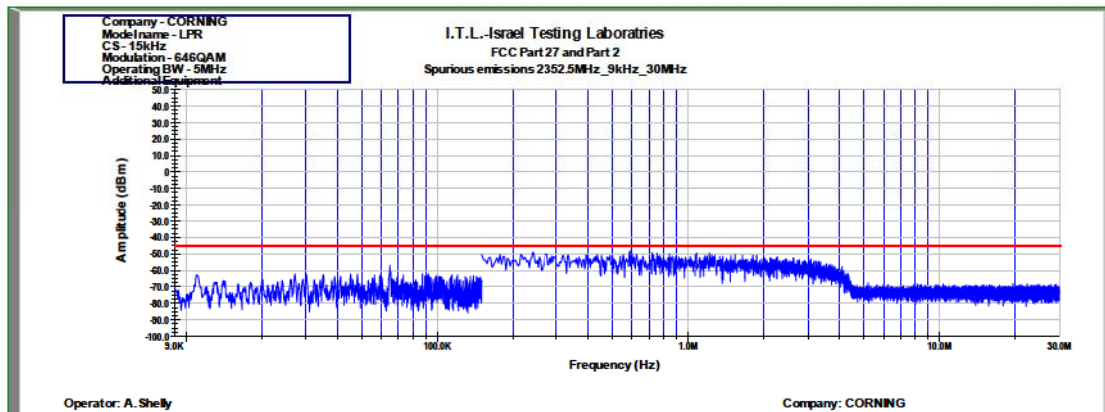


Figure 125: Spurious Emissions at Antenna Terminal 64QAM, 2352.5MHz, B.W. 5MHz, Sub Carrier 15 kHz

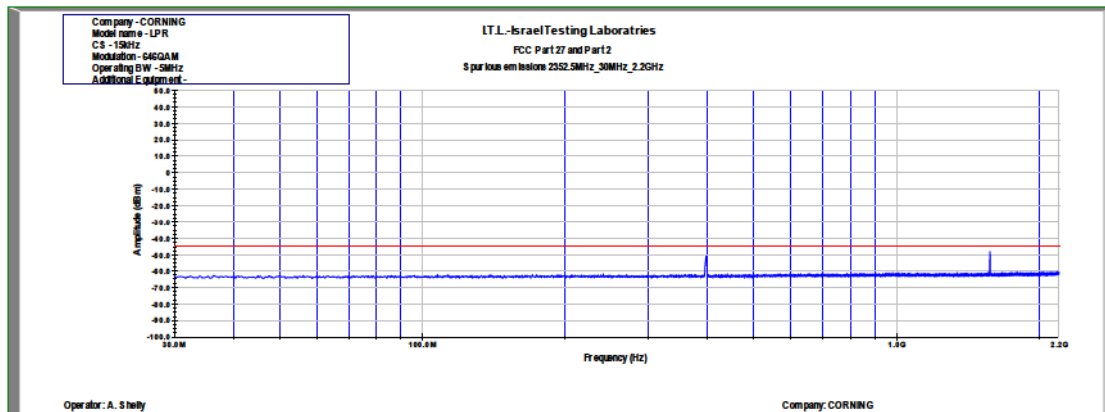


Figure 126: Spurious Emissions at Antenna Terminal 64QAM, 2352.5MHz, B.W. 5MHz, Sub Carrier 15 kHz

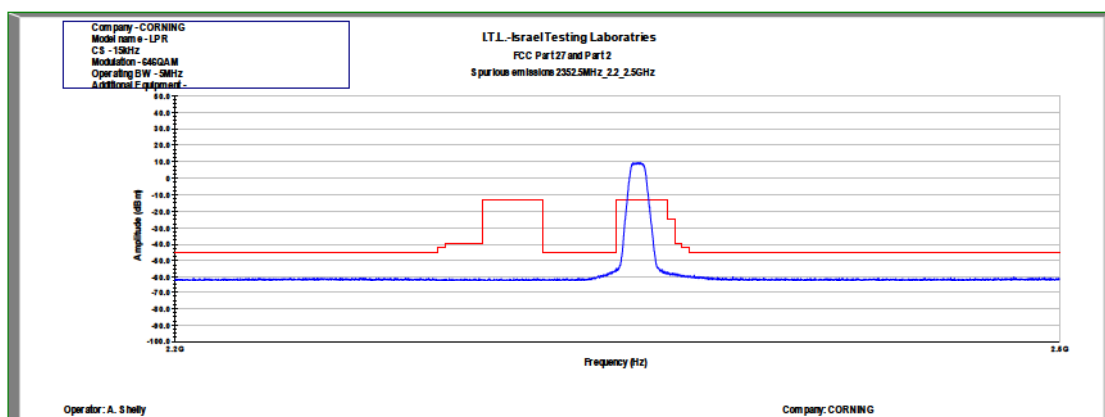


Figure 127: Spurious Emissions at Antenna Terminal 64QAM, 2352.5MHz, B.W. 5MHz, Sub Carrier 15 kHz

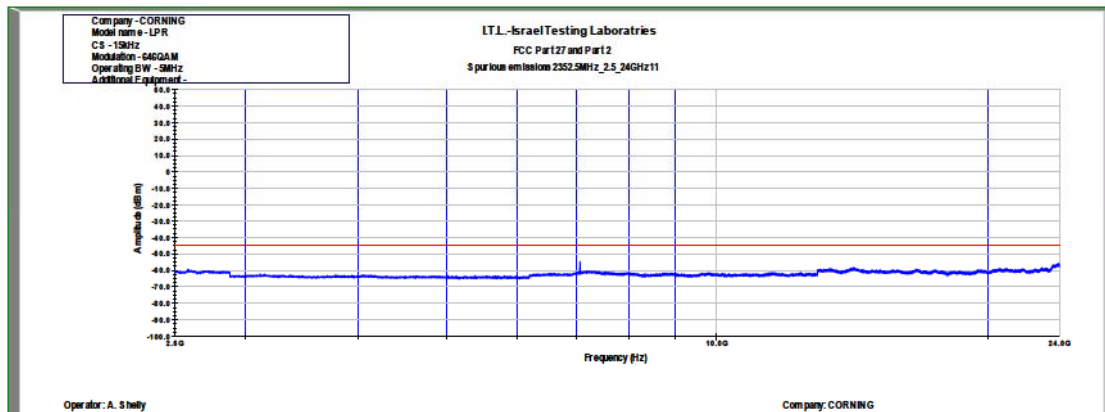


Figure 128: Spurious Emissions at Antenna Terminal 64QAM, 2352.5MHz, B.W. 5MHz, Sub Carrier 15 kHz

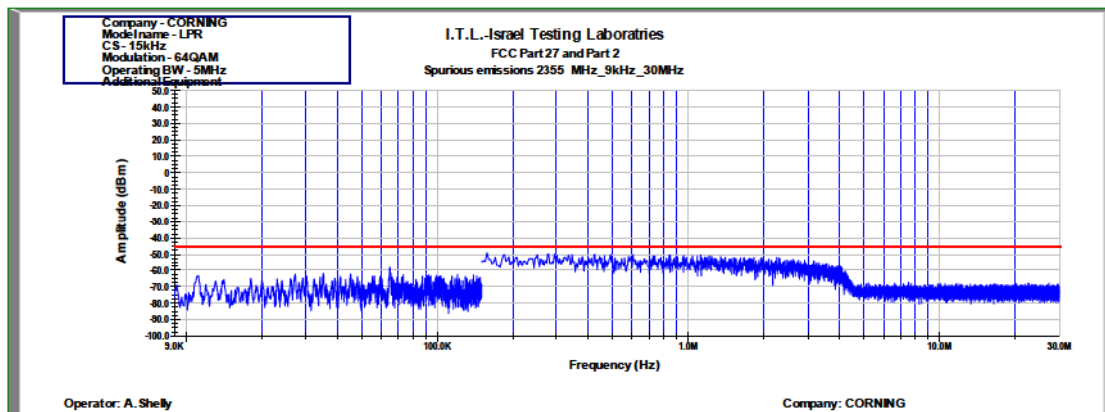


Figure 129: Spurious Emissions at Antenna Terminal 64QAM, 2355.0MHz, B.W. 5MHz, Sub Carrier 15 kHz

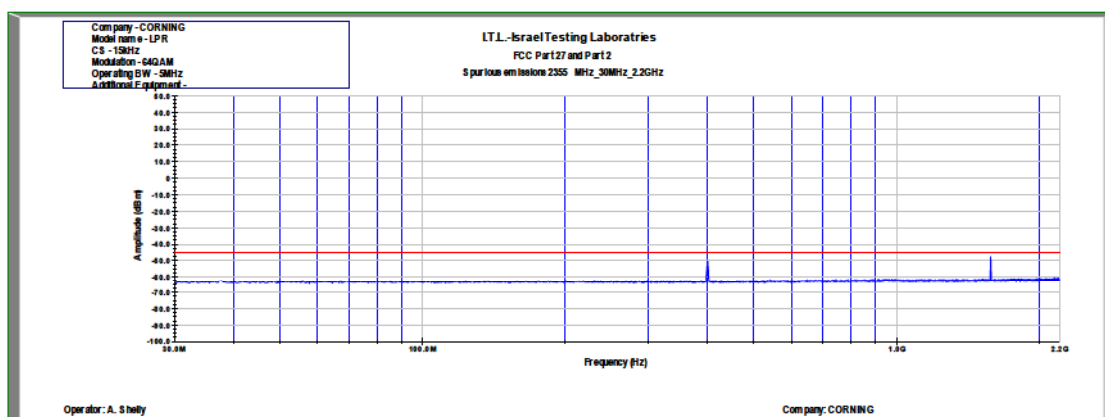


Figure 130: Spurious Emissions at Antenna Terminal 64QAM, 2355.0MHz, B.W. 5MHz, Sub Carrier 15 kHz

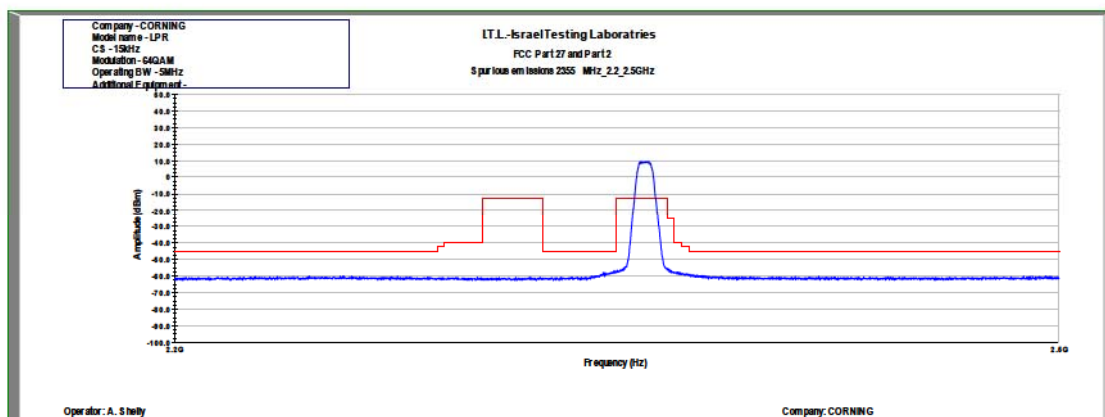


Figure 131: Spurious Emissions at Antenna Terminal 64QAM, 2355.0MHz, B.W. 5MHz, Sub Carrier 15 kHz

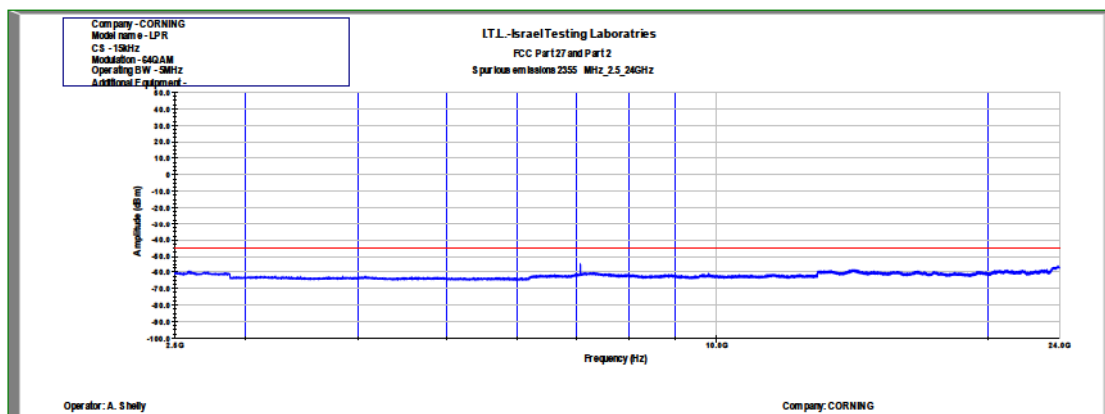


Figure 132: Spurious Emissions at Antenna Terminal 64QAM, 2355.0MHz, B.W. 5MHz, Sub Carrier 15 kHz

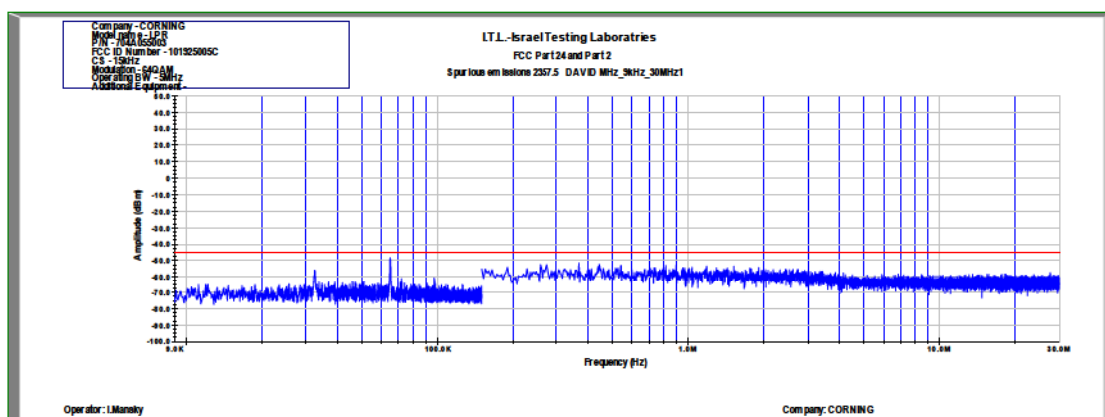


Figure 133: Spurious Emissions at Antenna Terminal 64QAM, 2357.5MHz, B.W. 5MHz, Sub Carrier 15 kHz



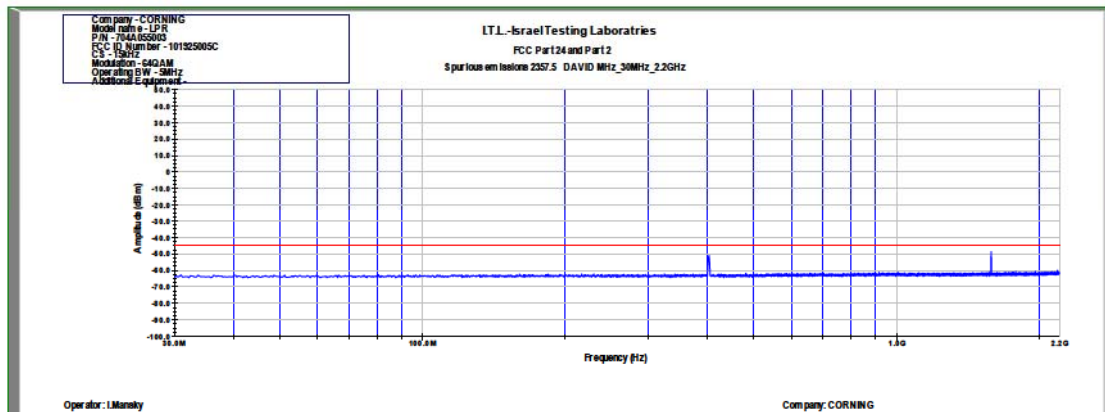


Figure 134: Spurious Emissions at Antenna Terminal 64QAM, 2357.5MHz, B.W. 5MHz, Sub Carrier 15 kHz

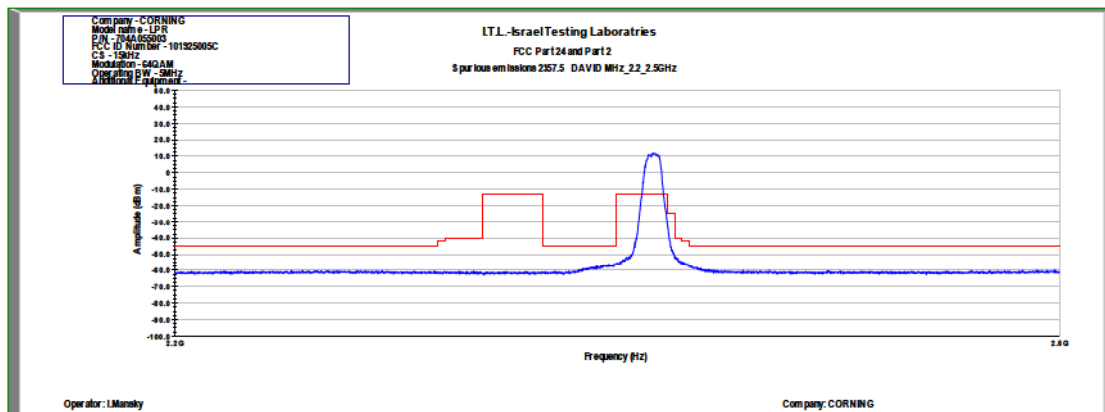


Figure 135: Spurious Emissions at Antenna Terminal 64QAM, 2357.5MHz, B.W. 5MHz, Sub Carrier 15 kHz

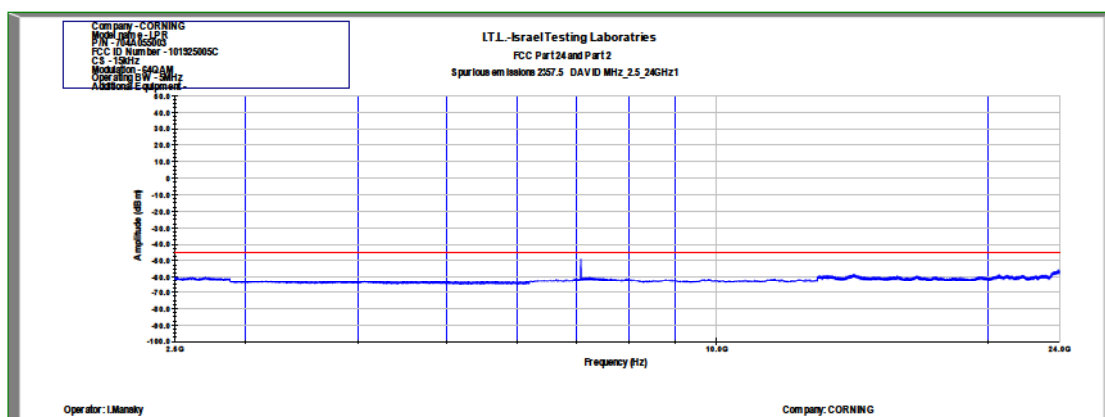


Figure 136: Spurious Emissions at Antenna Terminal 64QAM, 2357.5MHz, B.W. 5MHz, Sub Carrier 15 kHz

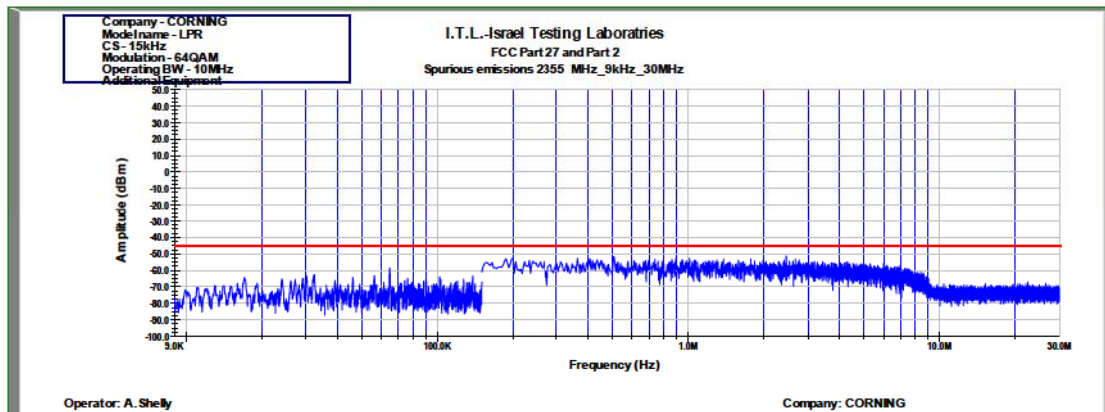


Figure 137: Spurious Emissions at Antenna Terminal 64QAM, 2355.0MHz, B.W. 10MHz, Sub Carrier 15 kHz

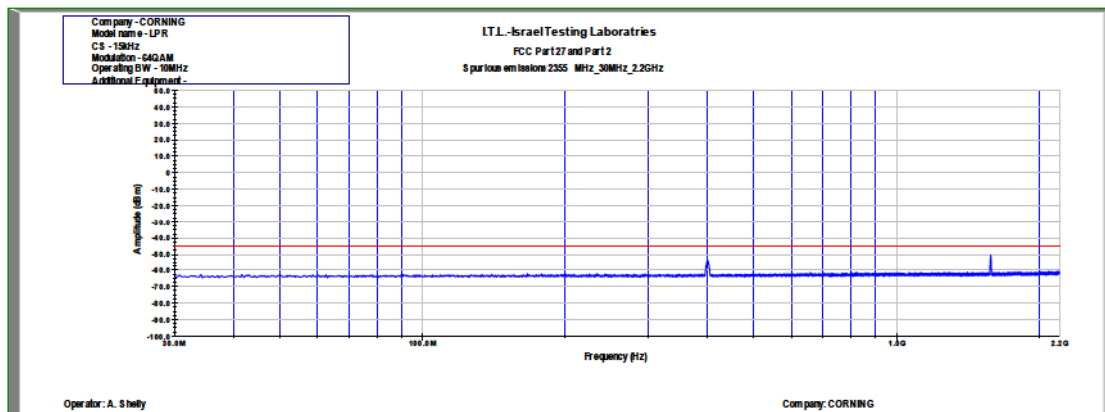


Figure 138: Spurious Emissions at Antenna Terminal 64QAM, 2355.0MHz, B.W. 10MHz, Sub Carrier 15 kHz

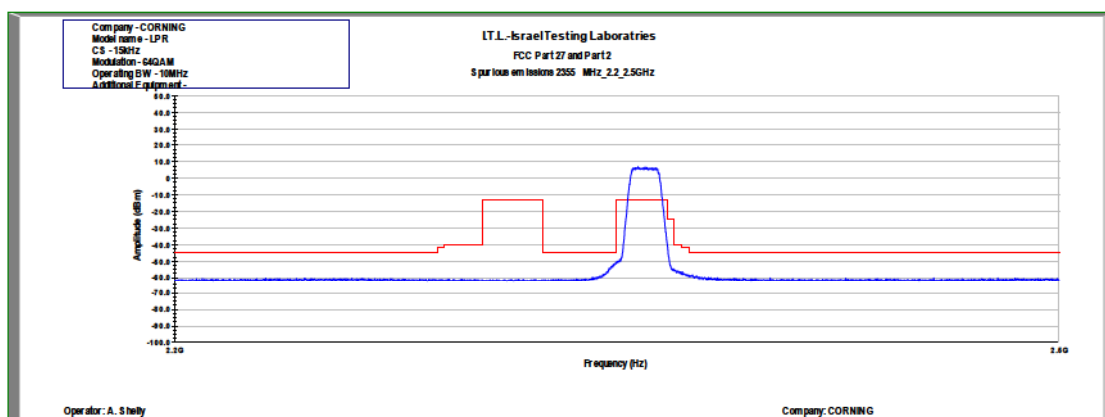


Figure 139: Spurious Emissions at Antenna Terminal 64QAM, 2355.0MHz, B.W. 10MHz, Sub Carrier 15 kHz

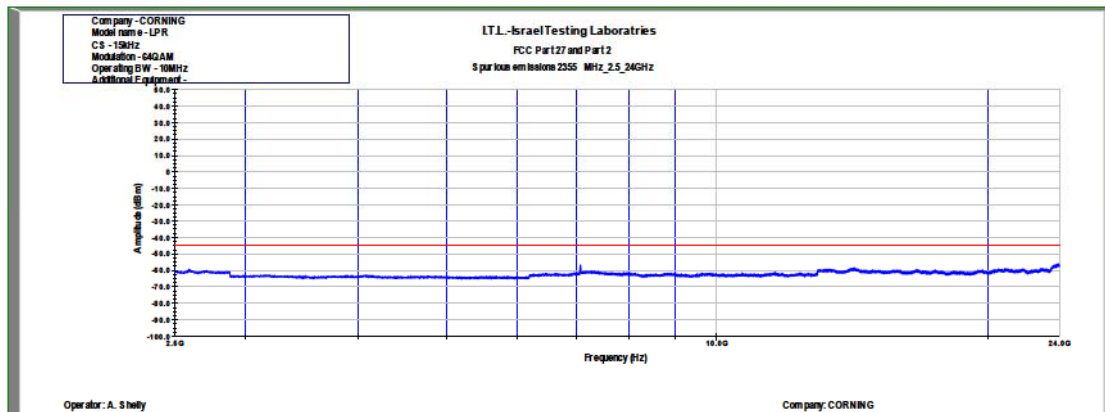


Figure 140: Spurious Emissions at Antenna Terminal 64QAM, 2355.0MHz, B.W. 10MHz, Sub Carrier 15 kHz

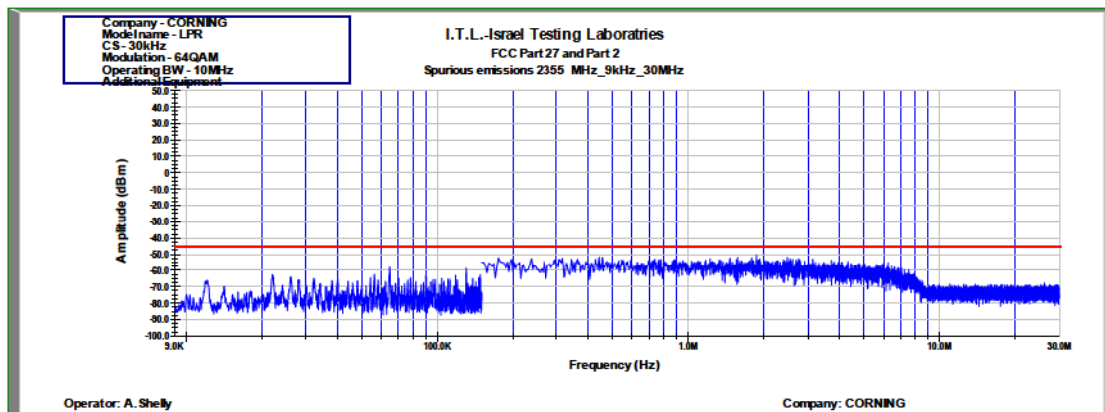


Figure 141: Spurious Emissions at Antenna Terminal 64QAM, 2355.0MHz, B.W. 10MHz, Sub Carrier 30 kHz

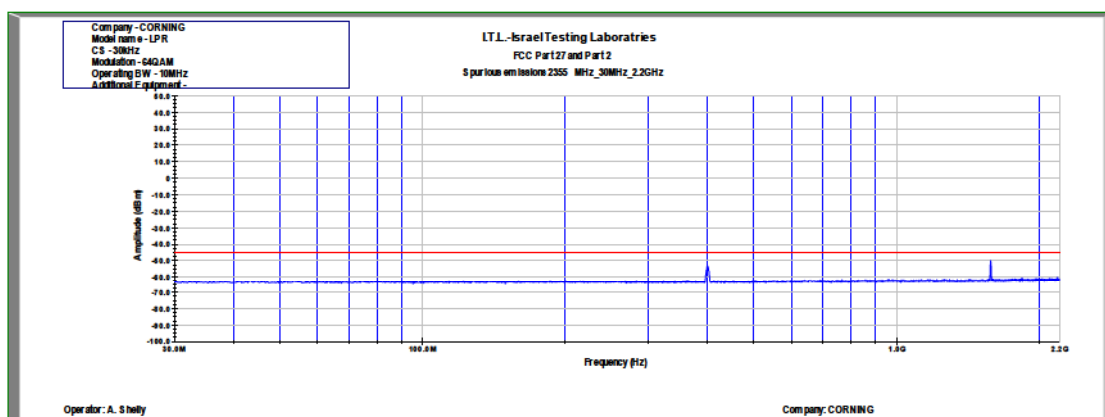


Figure 142: Spurious Emissions at Antenna Terminal 64QAM, 2355.0MHz, B.W. 10MHz, Sub Carrier 30 kHz

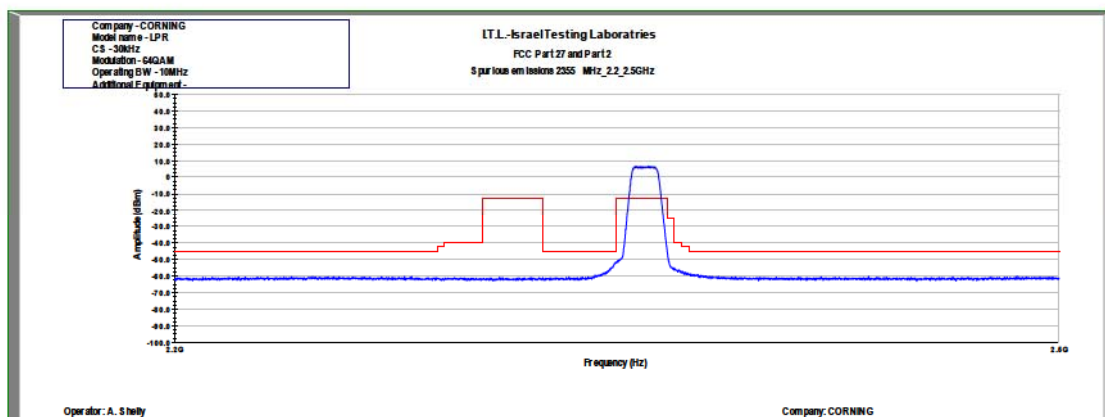


Figure 143: Spurious Emissions at Antenna Terminal 64QAM, 2355.0MHz, B.W. 10MHz, Sub Carrier 30 kHz

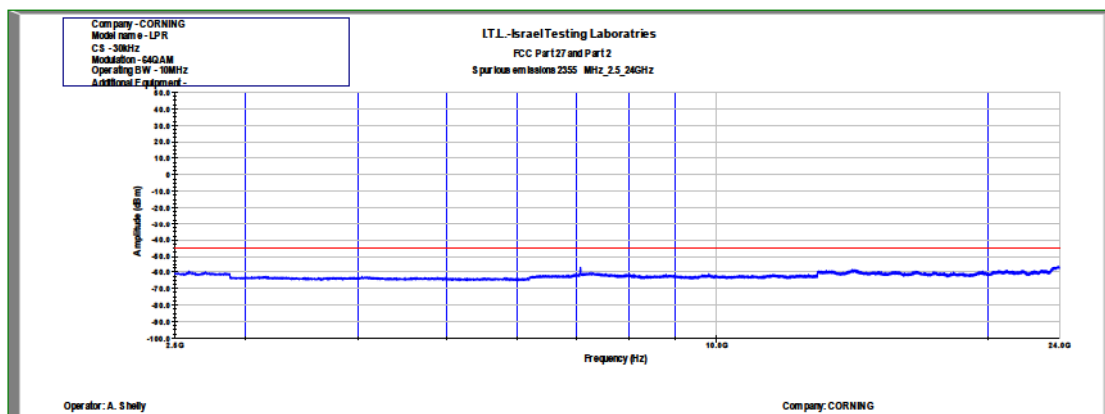


Figure 144: Spurious Emissions at Antenna Terminal 64QAM, 2355.0MHz, B.W. 10MHz, Sub Carrier 30 kHz

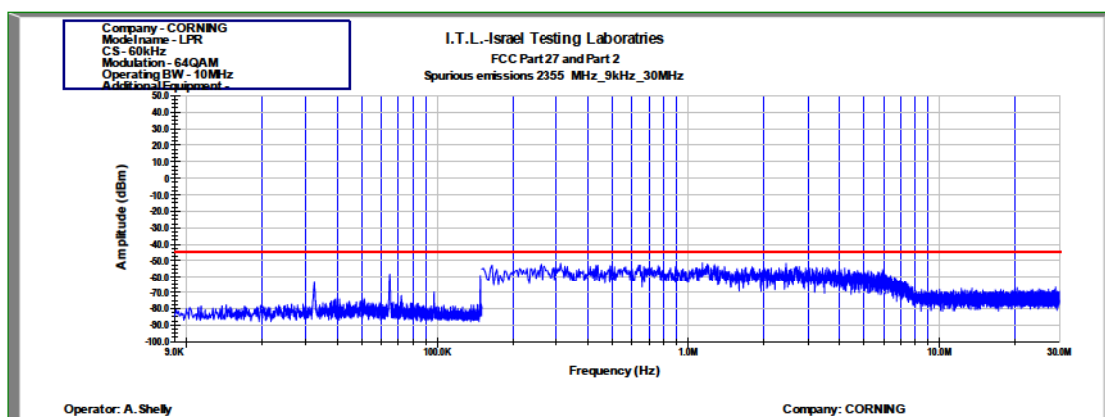


Figure 145: Spurious Emissions at Antenna Terminal 64QAM, 2355.0MHz, B.W. 10MHz, Sub Carrier 60 kHz

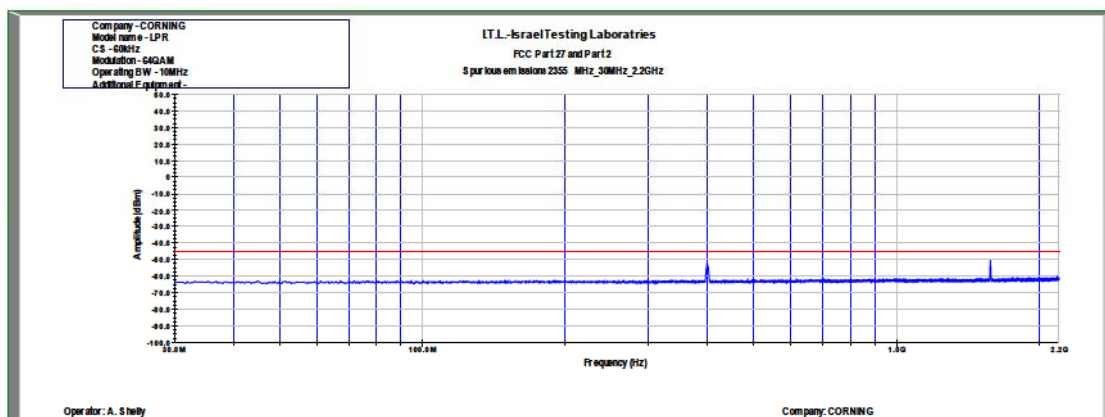


Figure 146: Spurious Emissions at Antenna Terminal 64QAM, 2355.0MHz, B.W. 10MHz, Sub Carrier 60 kHz

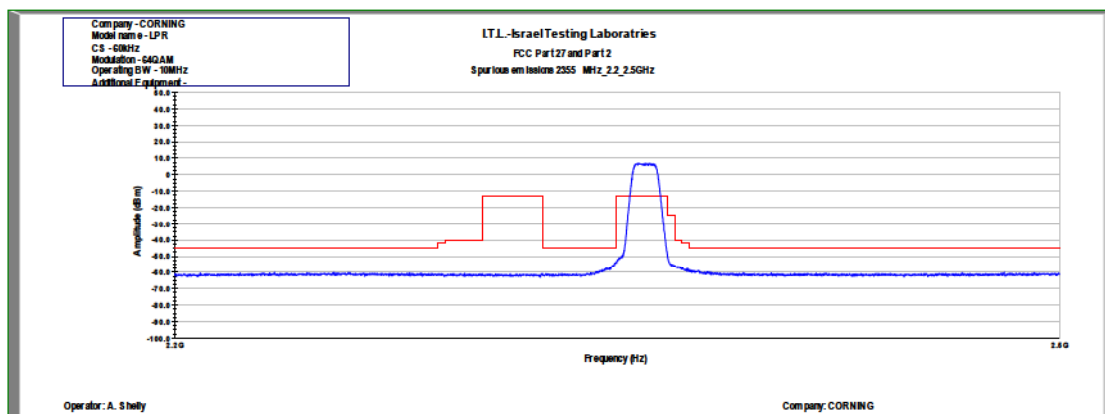


Figure 147: Spurious Emissions at Antenna Terminal 64QAM, 2355.0MHz, B.W. 10MHz, Sub Carrier 60 kHz

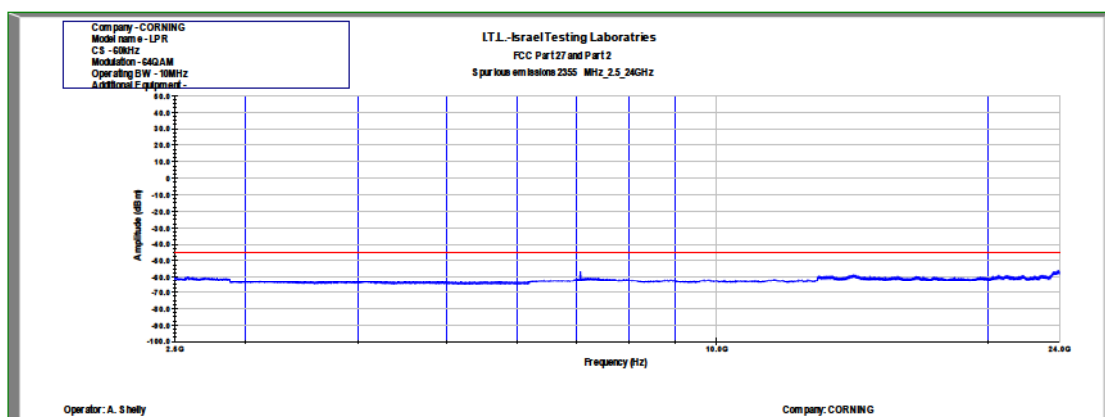


Figure 148: Spurious Emissions at Antenna Terminal 64QAM, 2355.0MHz, B.W. 10MHz, Sub Carrier 60 kHz

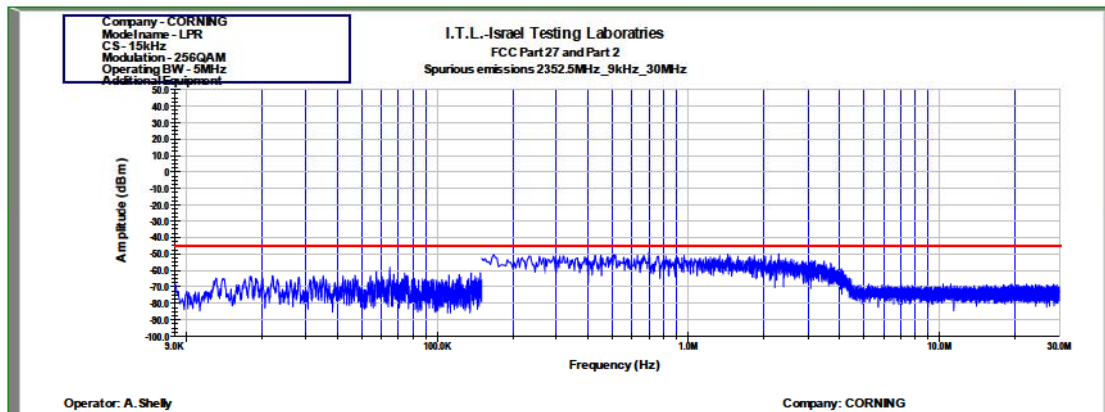


Figure 149: Spurious Emissions at Antenna Terminal 256QAM, 2352.5MHz, B.W. 5MHz, Sub Carrier 15 kHz

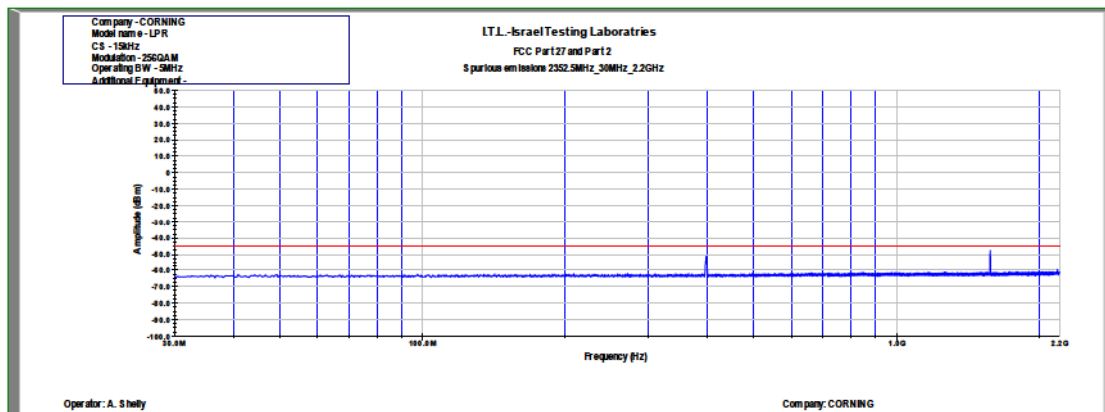


Figure 150: Spurious Emissions at Antenna Terminal 256QAM, 2352.5MHz, B.W. 5MHz, Sub Carrier 15 kHz

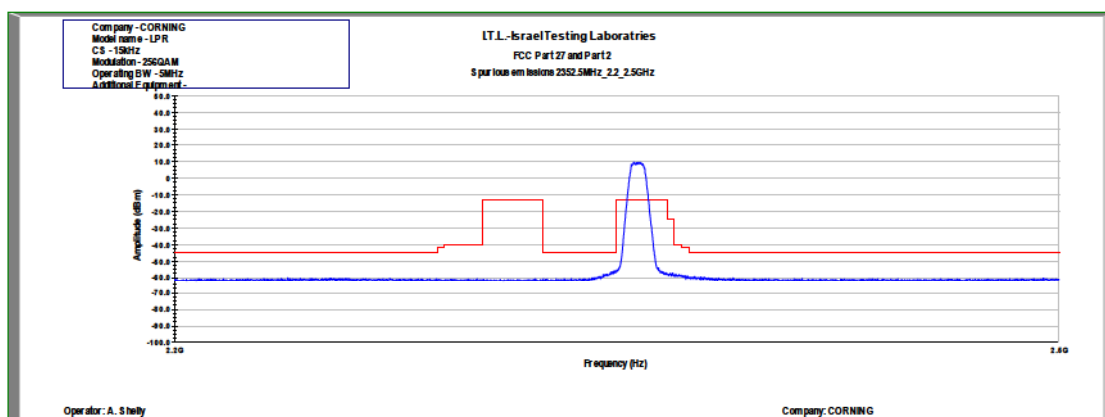


Figure 151: Spurious Emissions at Antenna Terminal 256QAM, 2352.5MHz, B.W. 5MHz, Sub Carrier 15 kHz

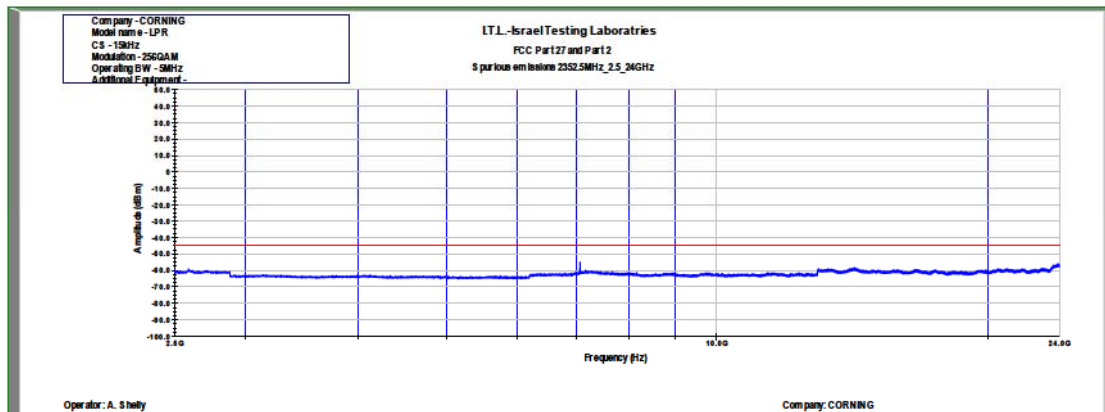


Figure 152: Spurious Emissions at Antenna Terminal 256QAM, 2352.5MHz, B.W. 5MHz, Sub Carrier 15 kHz

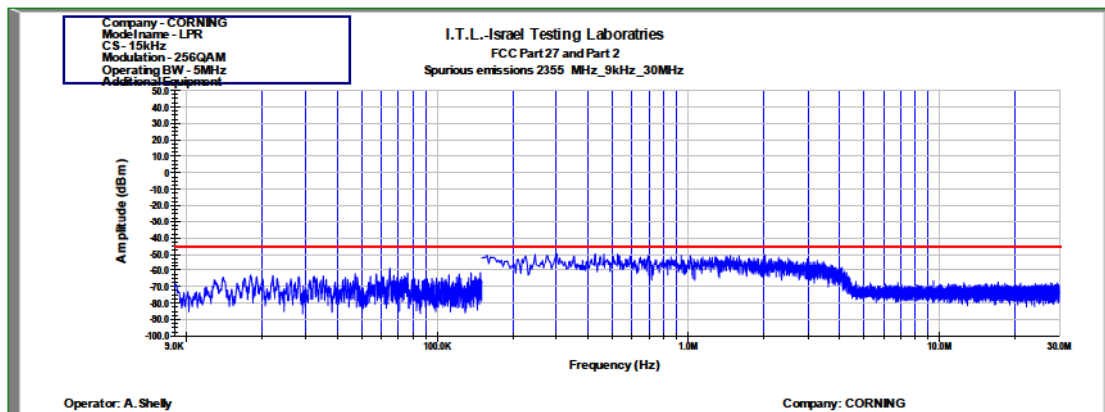


Figure 153: Spurious Emissions at Antenna Terminal 256QAM, 2355.0MHz, B.W. 5MHz, Sub Carrier 15 kHz

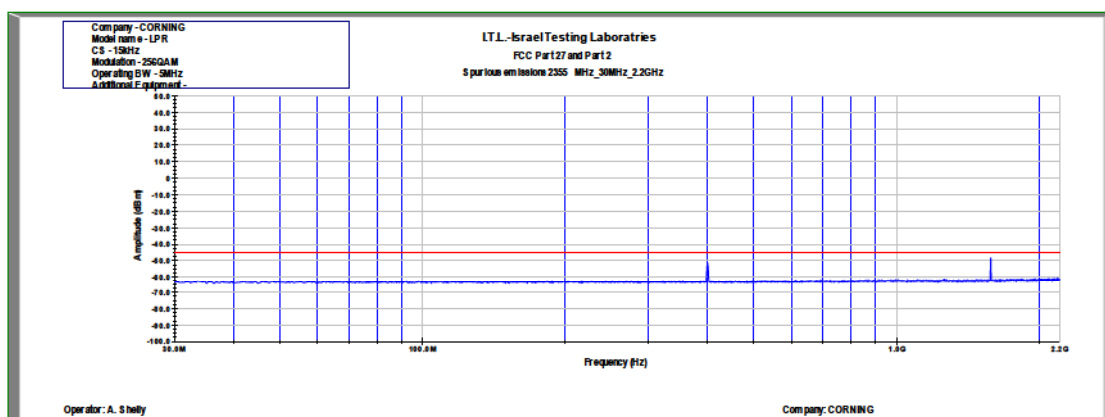


Figure 154: Spurious Emissions at Antenna Terminal 256QAM, 2355.0MHz, B.W. 5MHz, Sub Carrier 15 kHz

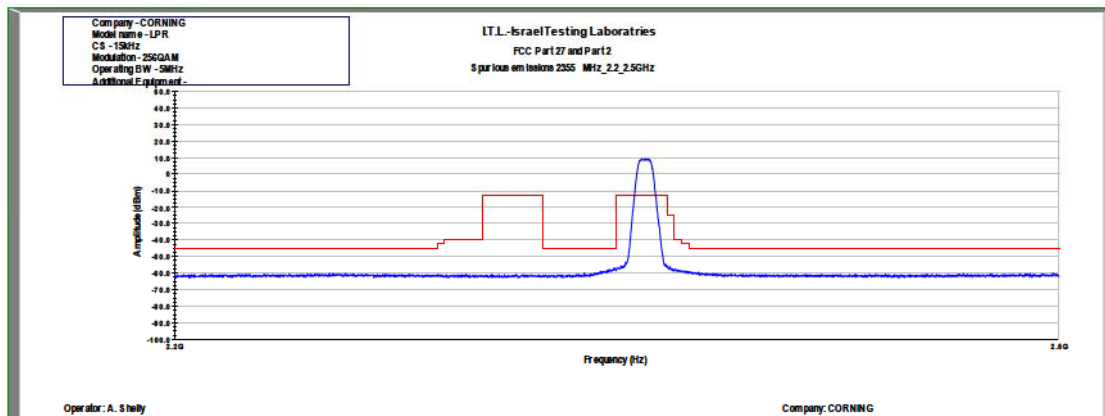


Figure 155: Spurious Emissions at Antenna Terminal 256QAM, 2355.0MHz, B.W. 5MHz, Sub Carrier 15 kHz

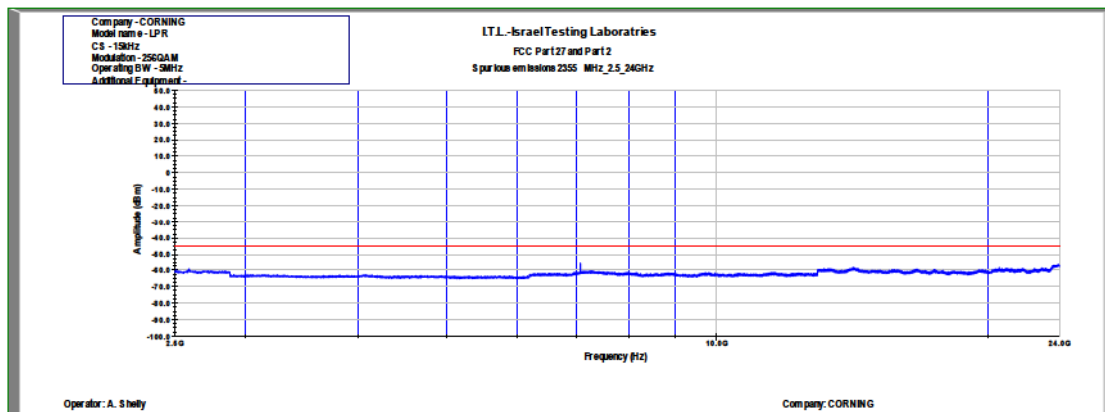


Figure 156: Spurious Emissions at Antenna Terminal 256QAM, 2355.0MHz, B.W. 5MHz, Sub Carrier 15 kHz

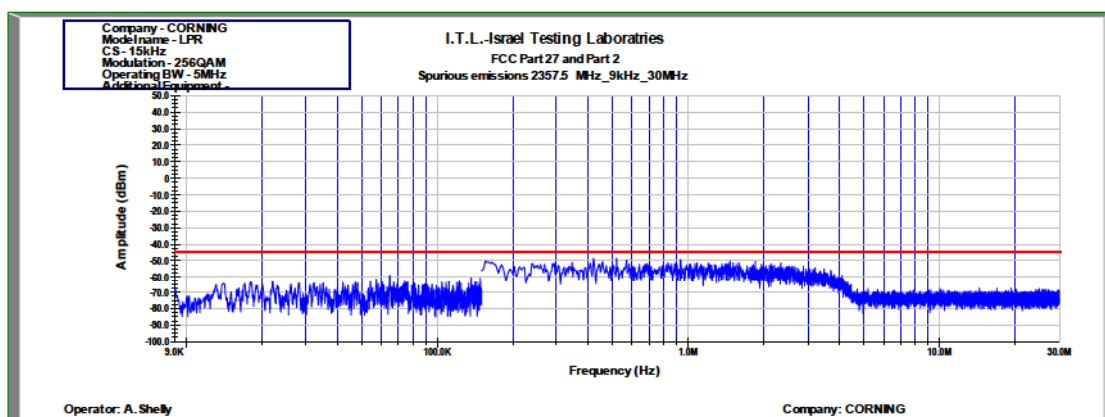


Figure 157: Spurious Emissions at Antenna Terminal 256QAM, 2357.5MHz, B.W. 5MHz, Sub Carrier 15 kHz



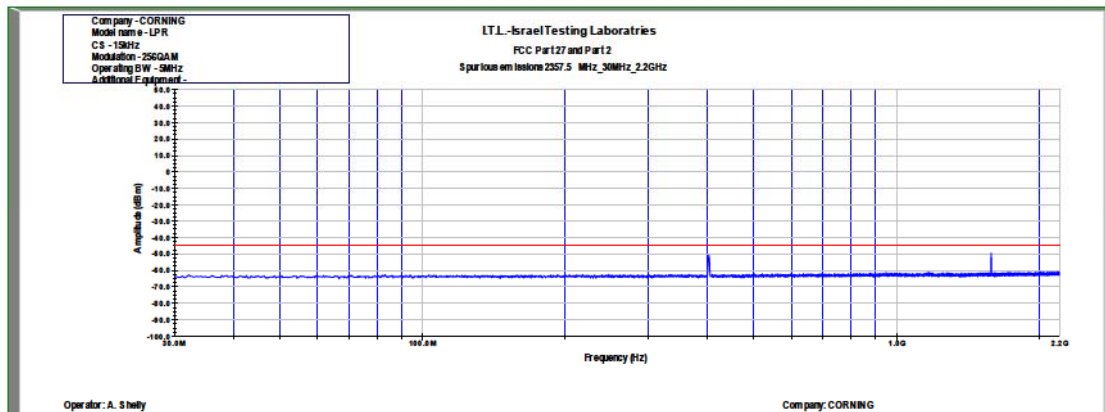


Figure 158: Spurious Emissions at Antenna Terminal 256QAM, 2357.5MHz, B.W. 5MHz, Sub Carrier 15 kHz

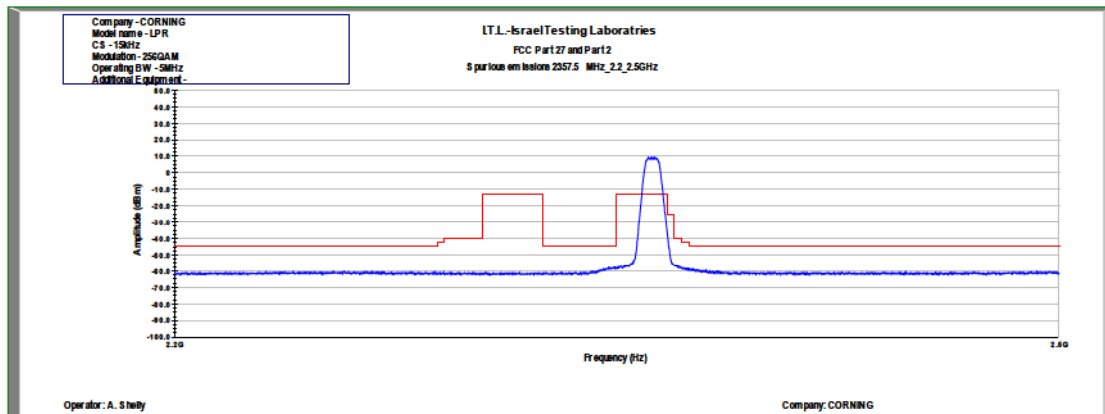


Figure 159: Spurious Emissions at Antenna Terminal 256QAM, 2357.5MHz, B.W. 5MHz, Sub Carrier 15 kHz

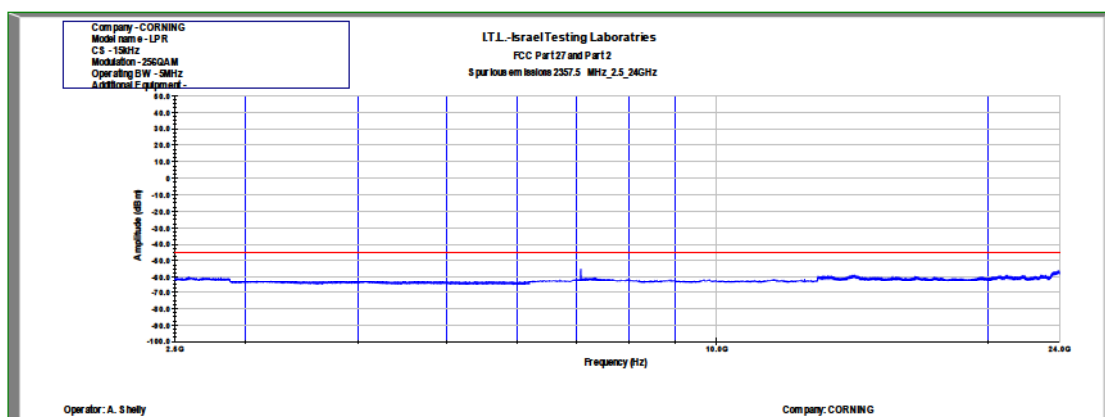


Figure 160: Spurious Emissions at Antenna Terminal 256QAM, 2357.5MHz, B.W. 5MHz, Sub Carrier 15 kHz

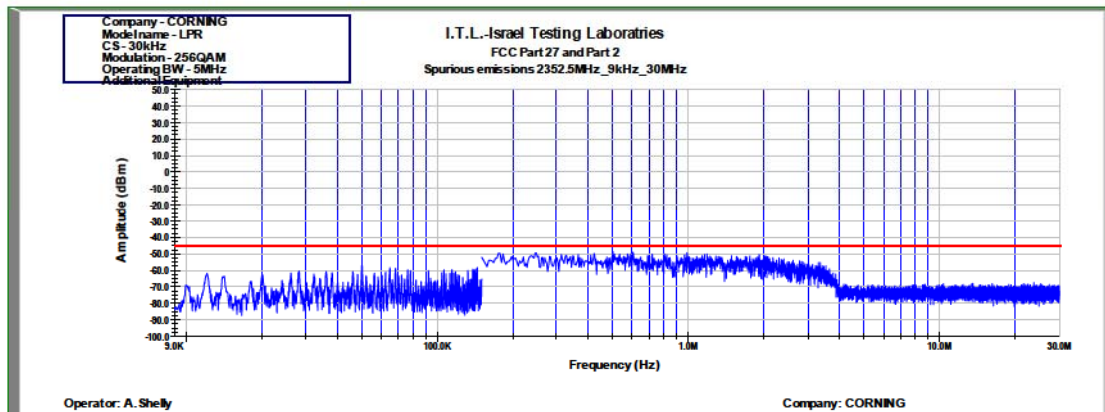


Figure 161: Spurious Emissions at Antenna Terminal 256QAM, 2352.5MHz, B.W. 5MHz, Sub Carrier 30 kHz

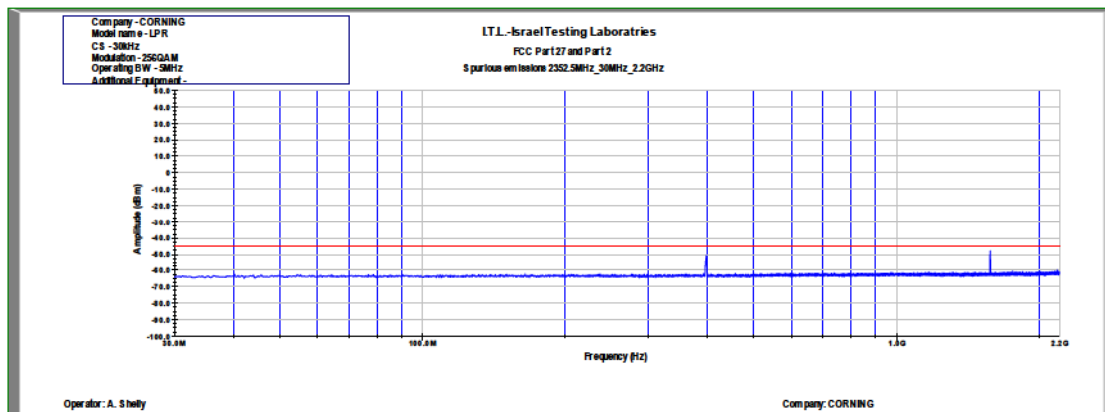


Figure 162: Spurious Emissions at Antenna Terminal 256QAM, 2352.5MHz, B.W. 5MHz, Sub Carrier 30 kHz

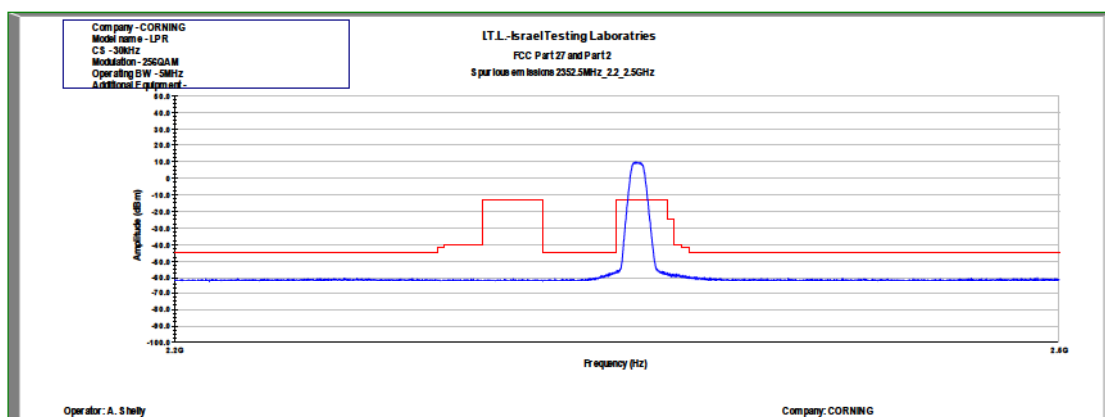


Figure 163: Spurious Emissions at Antenna Terminal 256QAM, 2352.5MHz, B.W. 5MHz, Sub Carrier 30 kHz

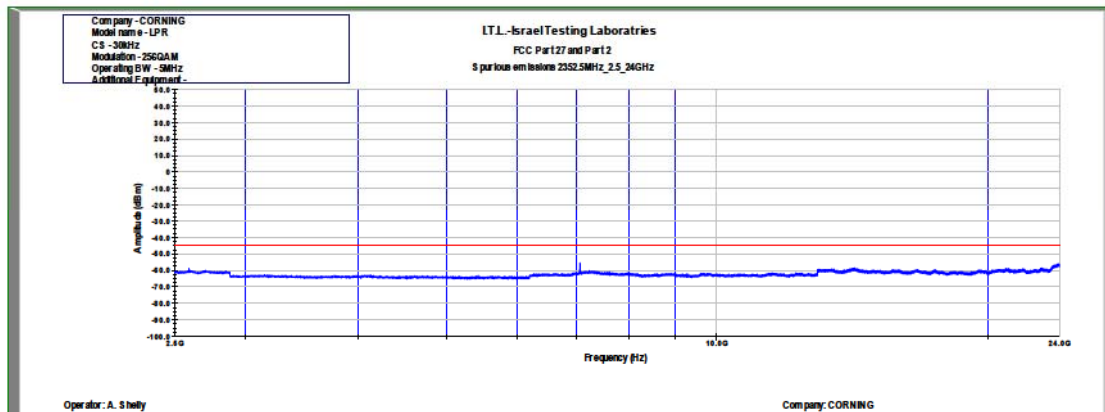


Figure 164: Spurious Emissions at Antenna Terminal 256QAM, 2352.5MHz, B.W. 5MHz, Sub Carrier 30 kHz

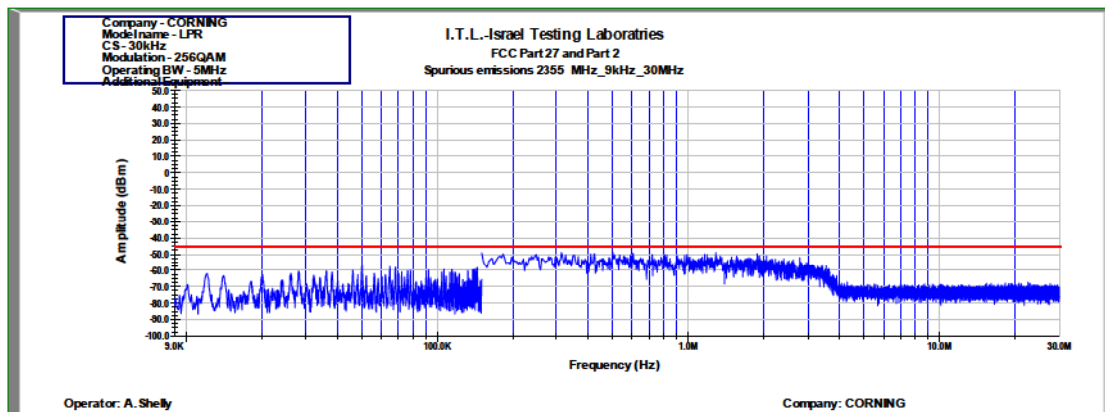


Figure 165: Spurious Emissions at Antenna Terminal 256QAM, 2355.0MHz, B.W. 5MHz, Sub Carrier 30 kHz

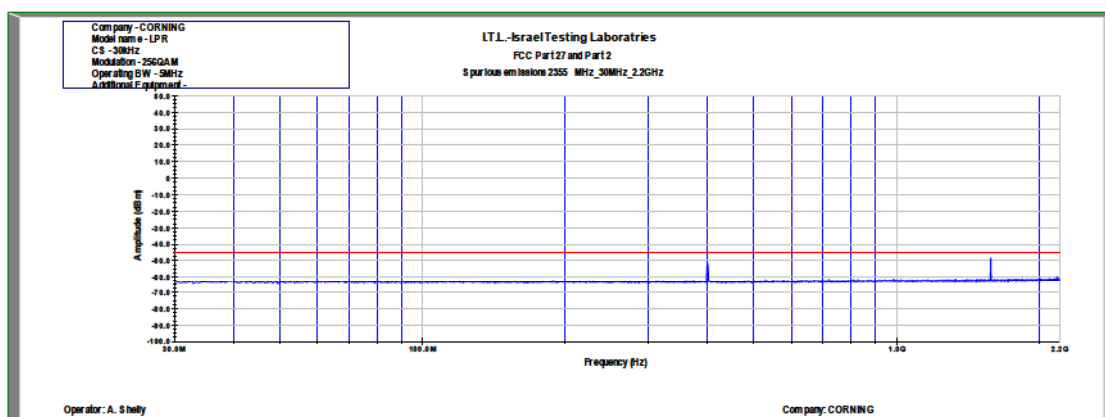


Figure 166: Spurious Emissions at Antenna Terminal 256QAM, 2355.0MHz, B.W. 5MHz, Sub Carrier 30 kHz

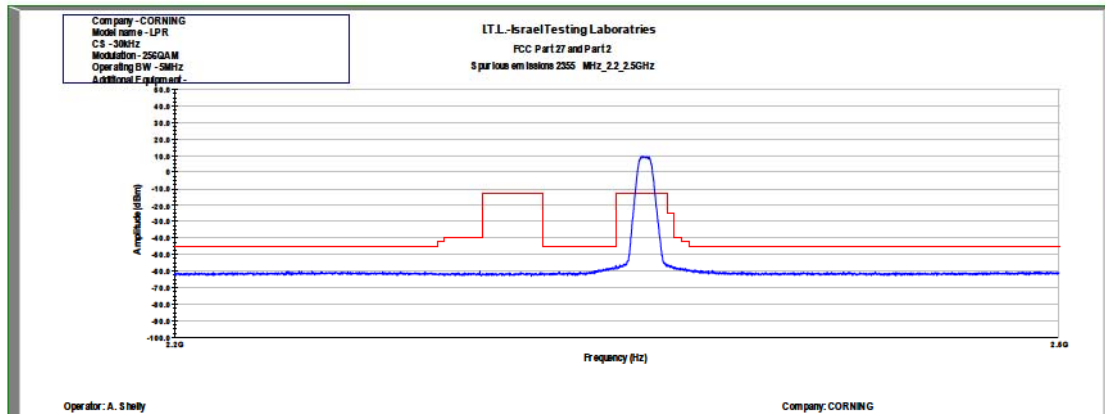


Figure 167: Spurious Emissions at Antenna Terminal 256QAM, 2355.0MHz, B.W. 5MHz, Sub Carrier 30 kHz

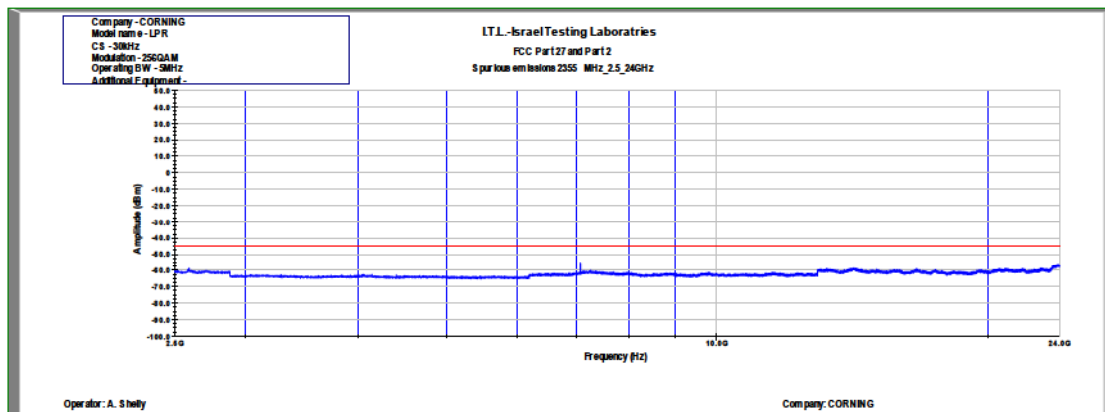


Figure 168: Spurious Emissions at Antenna Terminal 256QAM, 2355.0MHz, B.W. 5MHz, Sub Carrier 30 kHz

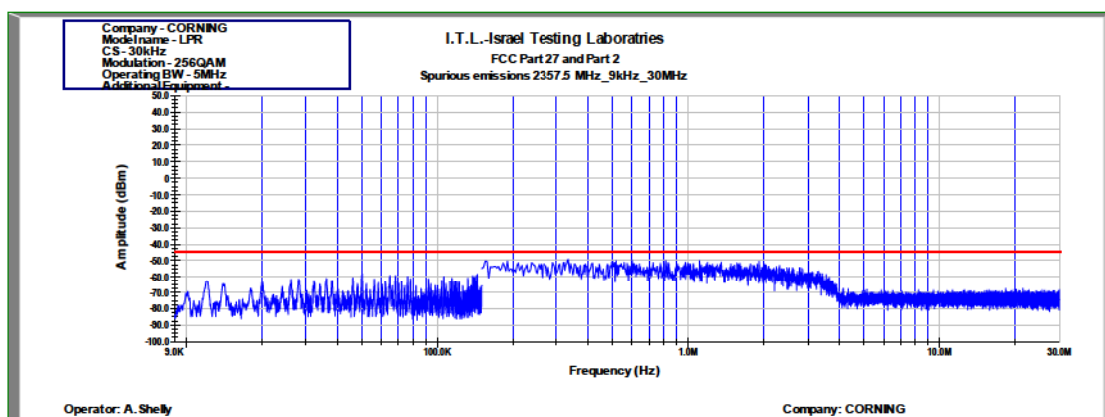


Figure 169: Spurious Emissions at Antenna Terminal 256QAM, 2357.5MHz, B.W. 5MHz, Sub Carrier 30 kHz

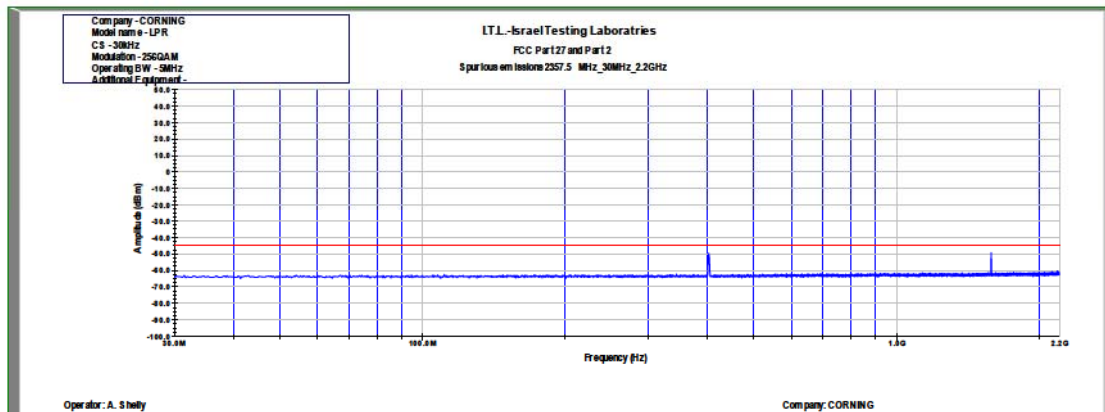


Figure 170: Spurious Emissions at Antenna Terminal 256QAM, 2357.5MHz, B.W. 5MHz, Sub Carrier 30 kHz

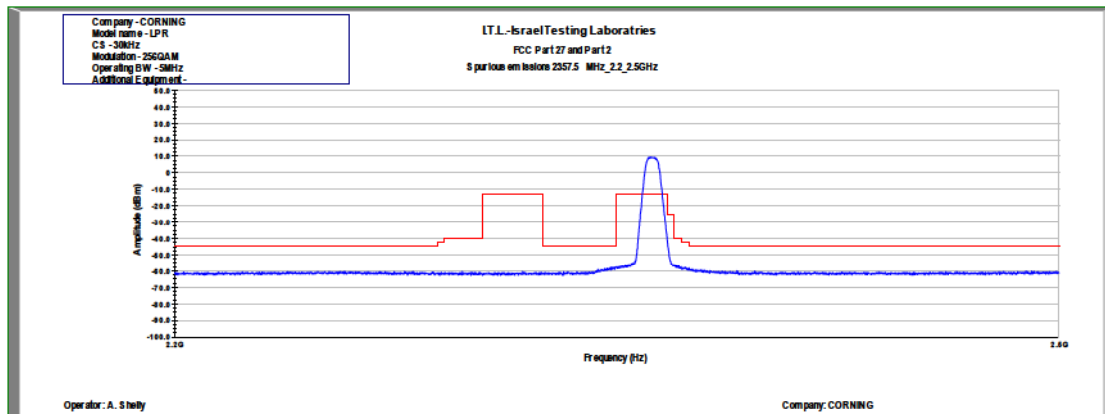


Figure 171: Spurious Emissions at Antenna Terminal 256QAM, 2357.5MHz, B.W. 5MHz, Sub Carrier 30 kHz

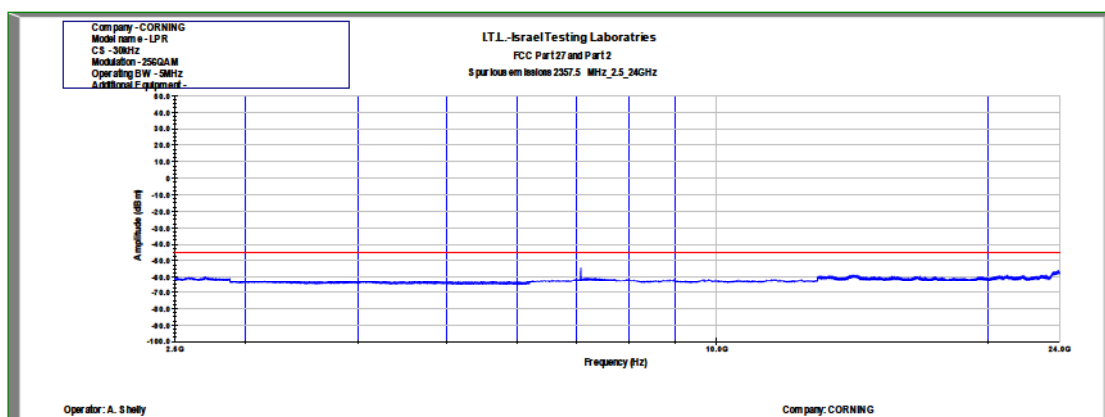


Figure 172: Spurious Emissions at Antenna Terminal 256QAM, 2357.5MHz, B.W. 5MHz, Sub Carrier 30 kHz

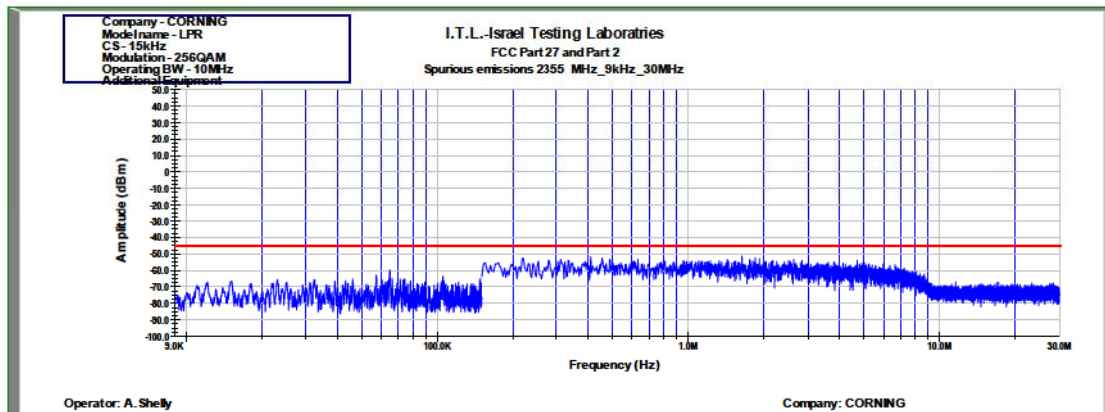


Figure 173: Spurious Emissions at Antenna Terminal 256QAM, 2355.0MHz, B.W. 10MHz, Sub Carrier 15 kHz

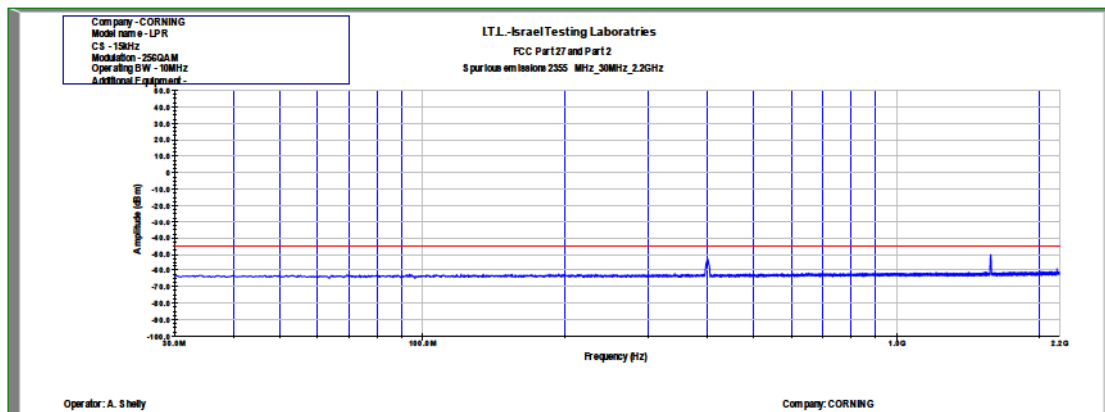


Figure 174: Spurious Emissions at Antenna Terminal 256QAM, 2355.0MHz, B.W. 10MHz, Sub Carrier 15 kHz

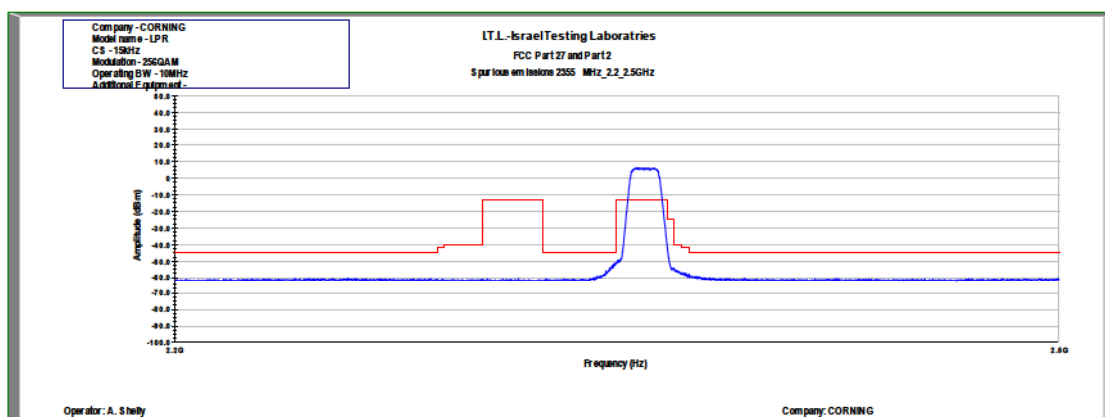


Figure 175: Spurious Emissions at Antenna Terminal 256QAM, 2355.0MHz, B.W. 10MHz, Sub Carrier 15 kHz

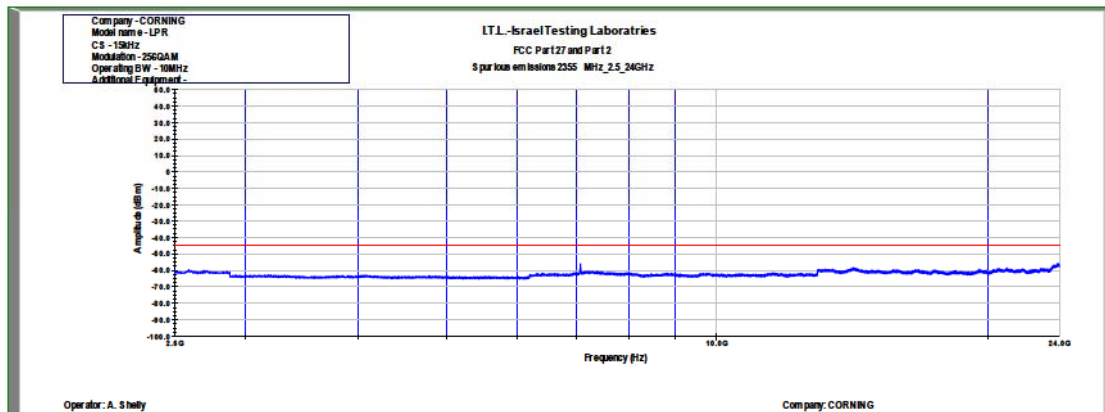


Figure 176: Spurious Emissions at Antenna Terminal 256QAM, 2355.0MHz, B.W. 10MHz, Sub Carrier 15 kHz

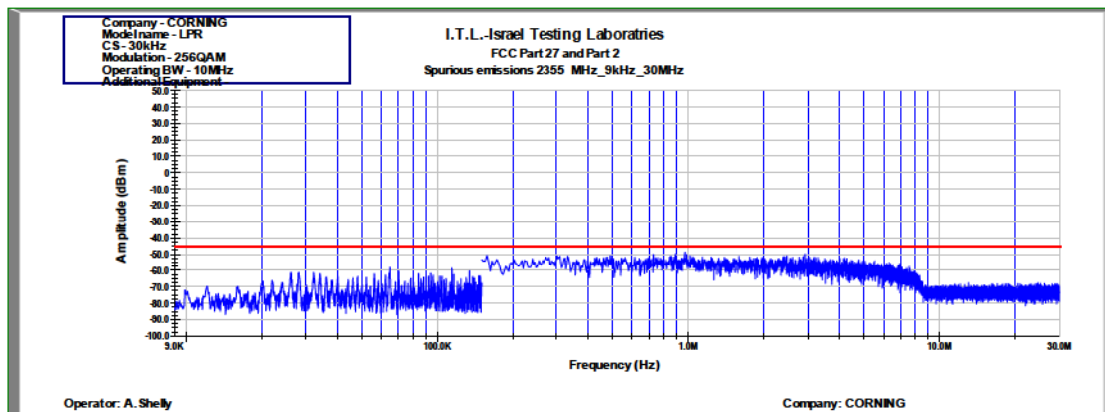


Figure 177: Spurious Emissions at Antenna Terminal 256QAM, 2355.0MHz, B.W. 10MHz, Sub Carrier 30 kHz

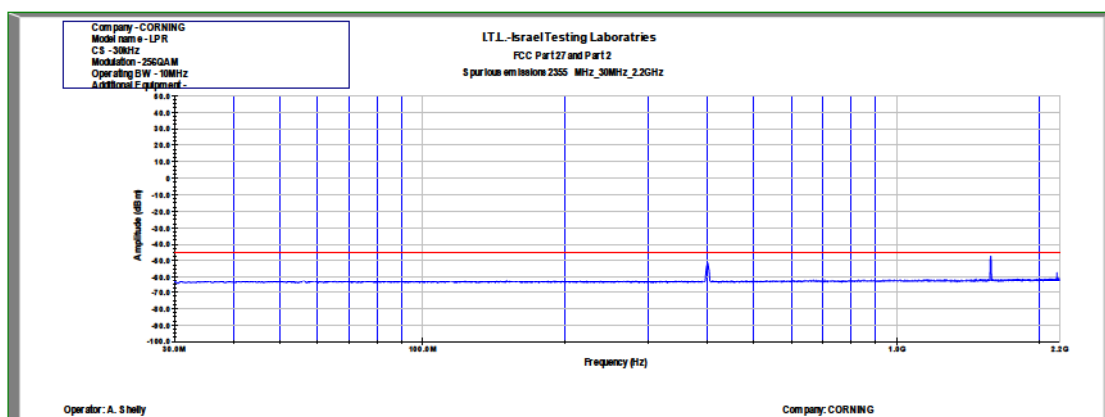


Figure 178: Spurious Emissions at Antenna Terminal 256QAM, 2355.0MHz, B.W. 10MHz, Sub Carrier 30 kHz

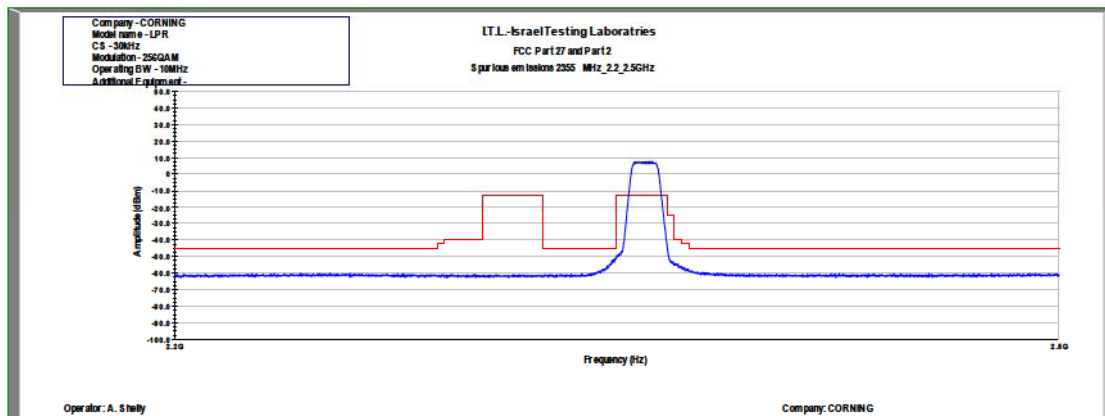


Figure 179: Spurious Emissions at Antenna Terminal 256QAM, 2355.0MHz, B.W. 10MHz, Sub Carrier 30 kHz

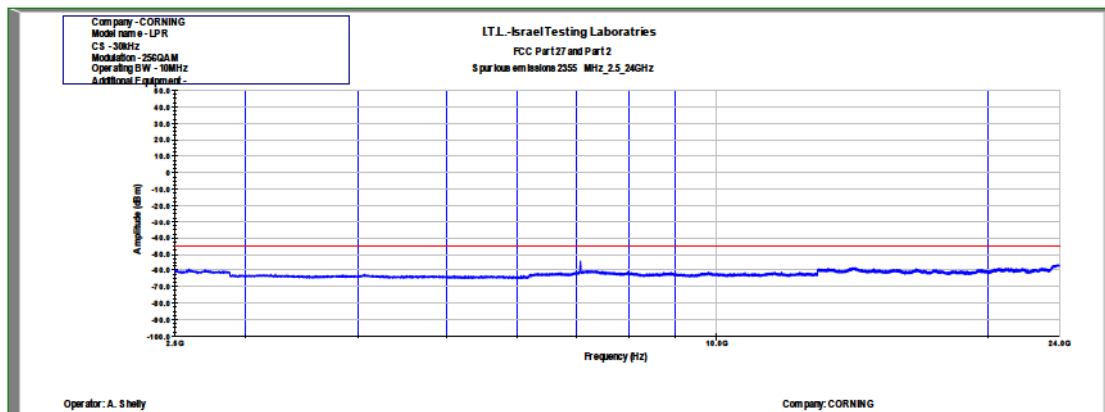


Figure 180: Spurious Emissions at Antenna Terminal 256QAM, 2355.0MHz, B.W. 10MHz, Sub Carrier 30 kHz

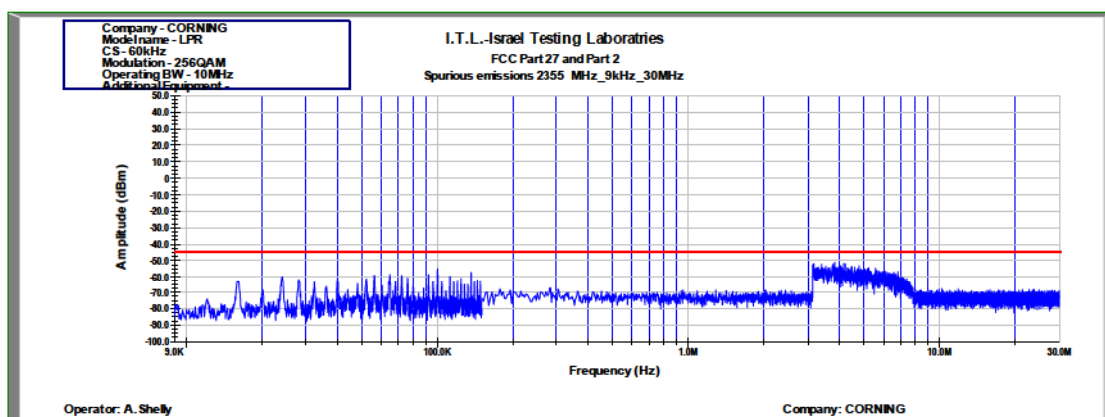


Figure 181: Spurious Emissions at Antenna Terminal 256QAM, 2355.0MHz, B.W. 10MHz, Sub Carrier 60 kHz



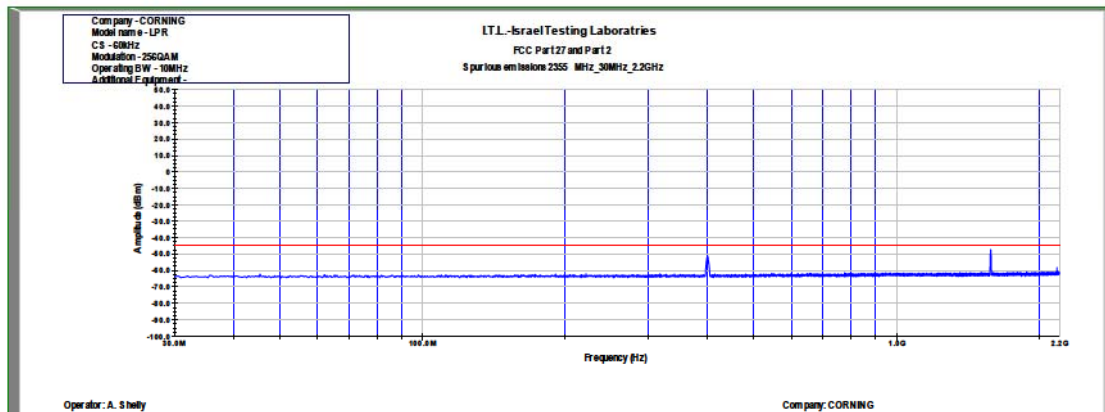


Figure 182: Spurious Emissions at Antenna Terminal 256QAM, 2355.0MHz, B.W. 10MHz, Sub Carrier 60 kHz

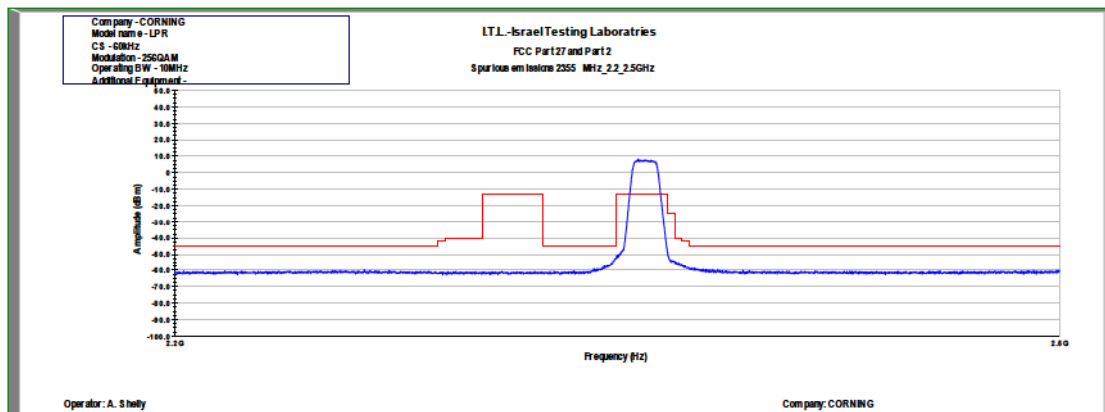


Figure 183: Spurious Emissions at Antenna Terminal 256QAM, 2355.0MHz, B.W. 10MHz, Sub Carrier 60 kHz

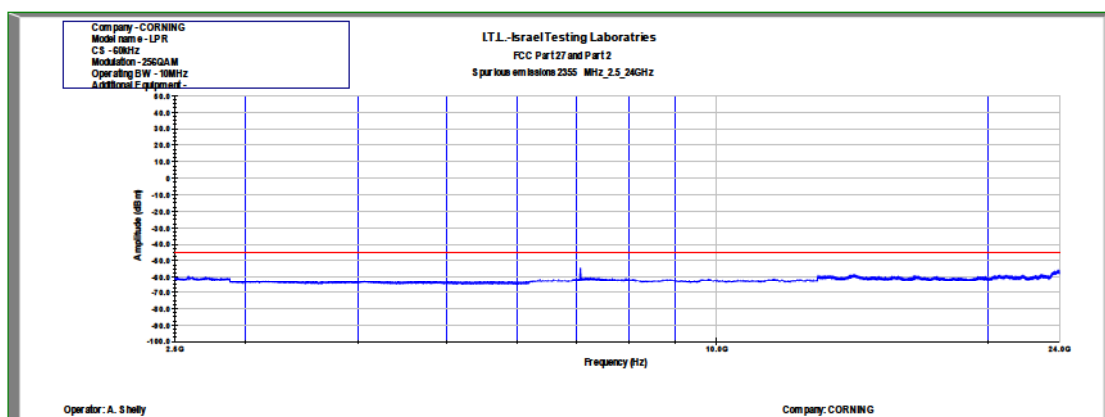


Figure 184: Spurious Emissions at Antenna Terminal 256QAM, 2355.0MHz, B.W. 10MHz, Sub Carrier 60 kHz

**6.5 Test Equipment Used; Spurious Emissions at Antenna Terminals**

| Instrument               | Manufacturer                    | Model    | Serial Number | Calibration           |                      |
|--------------------------|---------------------------------|----------|---------------|-----------------------|----------------------|
|                          |                                 |          |               | Last Calibration Date | Next Calibration Due |
| EXA signal Analyzer      | Agilent Technologies            | N9010A   | MY52220686    | 28 November 2018      | 28 November 2020     |
| Sarokal Signal Generator | Mentor®<br>(A Siemens Business) | X-Step-V | 1904008       | *                     | *                    |
| 30 dB Attenuator         | MCL                             | BW-S30W5 | 533           | 24 December 2019      | 24 December 2020     |

**Table 8 Test Equipment Used**

\* New test equipment, purchased during January 2020.

## 7 Spurious Radiated Emission

### 7.1 Test Specification

FCC, Part 27, Subpart C, Section 27.53 (g)

### 7.2 Test Procedure

(Temperature (23°C)/ Humidity (47%RH))

The test method was based on ANSI/TIA-603-D: 2010, Section 2.2.12 Unwanted Emissions: Radiated Spurious.

#### **For measurements between 0.009MHz-30MHz:**

The E.U.T was tested inside the shielded room at a distance of 3 meters and the E.U.T was placed on a non-metallic table, 1.5 meters above the ground. The frequency range 0.009MHz-30MHz was scanned. The readings were maximized by the turntable azimuth between 0-360°, and the antenna polarization. The emissions were measured at a distance of 3 meters.

#### **For measurements between 30.0MHz-1.0GHz:**

A preliminary measurement to characterize the E.U.T was performed inside the shielded room at a distance of 3 meters, using peak detection mode and broadband antennas. The preliminary measurements produced a list of the highest emissions. The E.U.T was then transferred to the open site, and placed on a remote-controlled turntable. The E.U.T was placed on a non-metallic table, 0.8 meters above the ground. The frequency range 30.0MHz -1.0GHz was scanned and the list of the highest emissions was verified and updated accordingly.

The readings were maximized by adjusting the antenna height between 1-4 meters, the turntable azimuth between 0-360°, and the antenna polarization.

The emissions were measured at a distance of 3 meters.

#### **For measurements between 1.0GHz-24.0GHz:**

The E.U.T was tested inside the shielded room at a distance of 3 meters and the E.U.T was placed on a non-metallic table, 1.5 meters above the ground. The frequency range 1.0GHz -24.0GHz was scanned. The readings were maximized by the turntable azimuth between 0-360°, and the antenna polarization.

The emissions were measured at a distance of 3 meters.

The E.U.T. was replaced by a substitution antenna (dipole 30MHz-1GHz, Horn Antenna above 1GHz) driven by a signal generator.

The height was readjusted for maximum reading. The signal generator level was adjusted to obtain the same reading on the EMI receiver as in step (a).

The signals observed in step (a) were converted to radiated power using:

$$P_d(\text{dBm}) = P_g(\text{dBm}) - \text{Cable Loss (dB)} + \text{Substitution Antenna Gain (dBd)}$$

$P_d$  = Dipole equivalent power (result).

$P_g$  = Signal generator output level.

A Peak detector was used for this test.

Testing was performed when the RF port was connected to 50  $\Omega$  termination.

Evaluation was performed for all possible modulations, bandwidths, and sub carriers.

### 7.3 Test Limit

The power of any emission outside of the authorized operating frequency ranges (2345-2360 MHz) must be attenuated below the transmitting power (P) by a factor of at least as specified in this section.

| Frequency Band<br>(MHz)                       | Calculated<br>Factor (dBc)       |
|-----------------------------------------------|----------------------------------|
| $f < 2285.0$                                  | $75 + 10 \cdot \log(0.1) = 65.0$ |
| $2285.0 \text{ MHz} < f < 2287.5 \text{ MHz}$ | $72 + 10 \cdot \log(0.1) = 62.0$ |
| $2287.5 \text{ MHz} < f < 2300.0 \text{ MHz}$ | $70 + 10 \cdot \log(0.1) = 60.0$ |
| $2300.0 \text{ MHz} < f < 2305.0 \text{ MHz}$ | $43 + 10 \cdot \log(0.1) = 33.0$ |
| $2305.0 \text{ MHz} < f < 2320.0 \text{ MHz}$ | $43 + 10 \cdot \log(0.1) = 33.0$ |
| $2320.0 \text{ MHz} < f < 2345.0 \text{ MHz}$ | $75 + 10 \cdot \log(0.1) = 65.0$ |
| $2345.0 \text{ MHz} < f < 2360.0 \text{ MHz}$ | $43 + 10 \cdot \log(0.1) = 33.0$ |
| $2360.0 \text{ MHz} < f < 2362.5 \text{ MHz}$ | $43 + 10 \cdot \log(0.1) = 33.0$ |
| $2362.5 \text{ MHz} < f < 2365.0 \text{ MHz}$ | $55 + 10 \cdot \log(0.1) = 45.0$ |
| $2365.0 \text{ MHz} < f < 2367.5 \text{ MHz}$ | $70 + 10 \cdot \log(0.1) = 60.0$ |
| $2367.5 \text{ MHz} < f < 2370.0 \text{ MHz}$ | $72 + 10 \cdot \log(0.1) = 62.0$ |
| $2370.0 < f$                                  | $75 + 10 \cdot \log(0.1) = 65.0$ |

Figure 185 Mask Limit Table

### 7.4 Test Results

No emissions were detected above the EMI receiver noise level which is at least 10 dB margin below the limit.

Judgement: Passed

## 7.5 Test Instrumentation Used; Radiated Measurements

| Instrument                  | Manufacturer    | Model            | Serial Number  | Calibration           |                      |
|-----------------------------|-----------------|------------------|----------------|-----------------------|----------------------|
|                             |                 |                  |                | Last Calibration Date | Next Calibration Due |
| EMI Receiver                | HP              | 8542E            | 3906A00276     | March 03, 2020        | March 03, 2021       |
| RF Filter Section           | HP              | 85420E           | 3705A00248     | March 03, 2020        | March 03, 2021       |
| Spectrum Analyzer           | HP              | 8593EM           | 3536A00120ADI  | March 10, 2020        | March 10, 2021       |
| Active Loop Antenna         | EMCO            | 6502             | 9506-2950      | February 5, 2019      | February 28, 2021    |
| Antenna Biconical           | EMCO            | 3110B            | 9912-3337      | May 21, 2020          | May 31, 2021         |
| Antenna Log Periodic        | EMCO            | 3146             | 9505-4081      | May 31, 2020          | May 31, 2022         |
| Horn Antenna 1G-18G         | ETS             | 3115             | 29845          | May 31, 2018          | May 31, 2021         |
| Horn Antenna 18G-26.5G      | ARA             | SWH-28           | 1007           | December 13, 2017     | December 31, 2020    |
| Low Noise Amplifier         | Narda           | LNA-DBS-0411N313 | 013            | December 24, 2019     | December 31, 2020    |
| Low Noise Amplifier         | Sophia Wireless | LNA 28-B         | 232            | December 24, 2019     | December 31, 2020    |
| Vector Signal Generator     | VIAVI           | MTS 5800         | WMNK0071690263 | July 1, 2018          | July 1, 2021         |
| Semi Anechoic Civil Chamber | ETS             | S81              | SL 11643       | NCR                   | NCR                  |
| Antenna Mast                | ETS             | 2070-2           | -              | NCR                   | NCR                  |
| Turntable                   | ETS             | 2087             | -              | NCR                   | NCR                  |
| Mast & Table Controller     | ETS/EMCO        | 2090             | 9608-1456      | NCR                   | NCR                  |

**Table 9 Test Equipment Used**

## 8 APPENDIX A - CORRECTION FACTORS

### 8.1 *Correction factors for RF OATS Cable 35m* *ITL #1784*

| Frequency ( MHz) | Cable loss (dB) |
|------------------|-----------------|
| 10.0             | 0.3             |
| 20.0             | 0.2             |
| 50.0             | -0.1            |
| 100.0            | -0.6            |
| 200.0            | -1.2            |
| 500.0            | -2.3            |
| 1000.0           | -3.6            |

**8.2      Correction factors for RF OATS Cable 10m**  
**ITL #1794**

| Frequency(MHz) | Cable loss(dB) |
|----------------|----------------|
| 10.0           | -0.3           |
| 20.0           | -0.3           |
| 50.0           | -0.5           |
| 100.0          | -0.7           |
| 200.0          | -1.1           |
| 500.0          | -1.8           |
| 1000.0         | -2.7           |

**8.3 Correction factors for Horn Antenna**  
**Model: SWH-28**  
**at 1 meter range.**

| <b>FREQUENCY</b><br>(GHz) | <b>AFE</b><br>(dB /m) | <b>Gain</b><br>(dB1) |
|---------------------------|-----------------------|----------------------|
| 18.0                      | 40.3                  | 16.1                 |
| 19.0                      | 40.3                  | 16.3                 |
| 20.0                      | 40.3                  | 16.1                 |
| 21.0                      | 40.3                  | 16.3                 |
| 22.0                      | 40.4                  | 16.8                 |
| 23.0                      | 40.5                  | 16.4                 |
| 24.0                      | 40.5                  | 16.6                 |
| 25.0                      | 40.5                  | 16.7                 |
| 26.0                      | 40.6                  | 16.4                 |



#### 8.4 Correction factors for Horn Antenna

Model: 3115

Antenna serial number: 29845

3 meter range

| f(GHz) | AF(dB/m) | GA(dB) |
|--------|----------|--------|
| 0.75   | 25       | 3      |
| 1G     | 23.5     | 7      |
| 1.5G   | 26       | 8      |
| 2G     | 29       | 7      |
| 2.5G   | 27.5     | 10     |
| 3G     | 30       | 10     |
| 3.5G   | 31.5     | 10     |
| 4G     | 32.5     | 9.5    |
| 4.5G   | 32.5     | 10.5   |
| 5G     | 33       | 10.5   |
| 5.5G   | 35       | 10.5   |
| 6G     | 36.5     | 9.5    |
| 6.5G   | 36.5     | 10     |
| 7G     | 37.5     | 10     |
| 7.5G   | 37.5     | 10     |
| 8G     | 37.5     | 11     |
| 8.5G   | 38       | 11     |
| 9G     | 37.5     | 11.5   |
| 9.5G   | 38       | 11.5   |
| 10G    | 38.5     | 11.5   |
| 10.5G  | 38.5     | 12     |
| 11G    | 38.5     | 12.5   |
| 11.5G  | 38.5     | 13     |
| 12G    | 38       | 13.5   |
| 12.5G  | 38.5     | 13     |
| 13G    | 40       | 12     |
| 13.5G  | 41       | 12     |
| 14G    | 40       | 13     |
| 14.5G  | 39       | 14     |
| 15G    | 38       | 15.5   |
| 15.5G  | 37.5     | 16     |
| 16G    | 37.5     | 16     |
| 16.5G  | 39       | 15     |
| 17G    | 40       | 15     |
| 17.5G  | 42       | 13.5   |
| 18G    | 42.5     | 13     |

**8.5      Correction factors for   Log Periodic Antenna**  
**EMCO, Model 3146,**  
**Serial #9505-4081**

| Frequency [MHz] | AF<br>[dB/m] |
|-----------------|--------------|
| 200.0           | 11.47        |
| 250.0           | 12.06        |
| 300.0           | 14.77        |
| 400.0           | 15.77        |
| 500.0           | 18.01        |
| 600.0           | 18.84        |
| 700.0           | 20.93        |
| 800.0           | 21.27        |
| 900.0           | 22.44        |
| 1000.0          | 24.10        |

**8.6 Correction factors for Biconical Antenna**  
**EMCO, Model 3110B,**  
**Serial #9912-3337**

| Frequency [MHz] | AF<br>[dB/m] |
|-----------------|--------------|
| 30.0            | 14.18        |
| 35.0            | 13.95        |
| 40.0            | 12.84        |
| 45.0            | 11.23        |
| 50.0            | 11.10        |
| 60.0            | 10.39        |
| 70.0            | 9.34         |
| 80.0            | 9.02         |
| 90.0            | 9.31         |
| 100.0           | 8.95         |
| 120.0           | 11.53        |
| 140.0           | 12.20        |
| 160.0           | 12.56        |
| 180.0           | 13.49        |
| 200.0           | 15.27        |

**8.7 Correction factors for ACTIVE LOOP ANTENNA**  
**Model 6502**  
**S/N 9506-2950**

| f(MHz) | MAF(dBs/m) | AF(dB/m) |
|--------|------------|----------|
| 0.01   | -33.1      | 18.4     |
| 0.02   | -37.2      | 14.3     |
| 0.03   | -38.2      | 13.3     |
| 0.05   | -39.8      | 11.7     |
| 0.1    | -40.1      | 11.4     |
| 0.2    | -40.3      | 11.2     |
| 0.3    | -40.3      | 11.2     |
| 0.5    | -40.3      | 11.2     |
| 0.7    | -40.3      | 11.2     |
| 1      | -40.1      | 11.4     |
| 2      | -40        | 11.5     |
| 3      | -40        | 11.5     |
| 4      | -40.1      | 11.4     |
| 5      | -40.2      | 11.3     |
| 6      | -40.4      | 11.1     |
| 7      | -40.4      | 11.1     |
| 8      | -40.4      | 11.1     |
| 9      | -40.5      | 11       |
| 10     | -40.5      | 11       |
| 20     | -41.5      | 10       |
| 30     | -43.5      | 8        |