



FCC Test Report

Equipment : Wireless Cable Modem
Brand Name : Pegatron
Model No. : DPC3939
FCC ID : VUIUPWL6580
Standard : 47 CFR FCC Part 15.407
Operating Band : 5250 MHz – 5350 MHz
5470 MHz – 5725 MHz
FCC Classification : NII
Applicant : PEGATRON CORPORATION
Manufacturer : 5F., NO. 76, Ligong ST., Beitou district,
Taipei City 112 Taiwan (R.O.C.)
Operate Mode : Master

The product sample received on Feb. 18, 2013 and completely tested on Jun. 13, 2013. We, SPORTON, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.10-2009 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by:

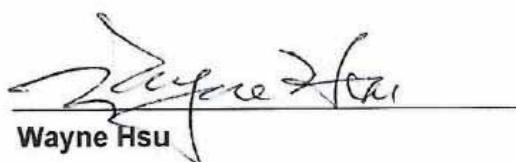

Wayne Hsu





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APPENDIX A. TEST PHOTOS

APPENDIX B. PHOTOGRAPHS OF EUT



Summary of Test Result

| Conformance Test Specifications | | | | | |
|---------------------------------|------------------|--|--|--|----------|
| Report Clause | Ref. Std. Clause | Description | Measured | Limit | Result |
| 1.1.2 | 15.203 | Antenna Requirement | Antenna connector mechanism complied | FCC 15.203 | Complied |
| 3.1 | 15.207 | AC Power-line Conducted Emissions | [dBuV]: 0.3464610MHz 35.76 (Margin 13.29dB) - AV 40.00 (Margin 19.05dB) - QP | FCC 15.207 | Complied |
| 3.2 | 15.407(a) | Emission Bandwidth | Bandwidth [MHz] 20M:23.92 / 40M:45.44 | Information only | Complied |
| 3.3 | 15.407(a) | RF Output Power (Maximum Conducted Output Power) | Power [dBm] 5250-5350MHz:23.91 5470-5725MHz:23.92 | Power [dBm] 5150-5250MHz:17 5250-5350MHz:24 5470-5725MHz:24 | Complied |
| 3.4 | 15.407(a) | Peak Power Spectral Density | PPSD [dBm/MHz] 5250-5350MHz:10.93 5470-5725MHz:10.92 | PPSD [dBm/MHz] 5150-5250MHz:4 5250-5350MHz:11 5470-5725MHz:11 | Complied |
| 3.5 | 15.407(a) | Peak Excursion | 9.15 dB | 13 dB | Complied |
| 3.6 | 15.407(b) | Transmitter Bandedge Emissions | Restricted Bands [dBuV/m at 1.5m]: 5351.020MHz 78.37 (Margin 5.17dB) - PK 62.06 (Margin 1.48dB) - AV | Non-Restricted Bands: ≤ -27dBm (68.3dBuV/m@3m) Restricted Bands: FCC 15.209 | Complied |
| 3.7 | 15.407(b) | Transmitter Unwanted Emissions | Restricted Bands [dBuV/m at 1.5m]: 86.260MHz 39.91(Margin 0.09dB) - QP | Non-Restricted Bands: ≤ -27dBm (68.3dBuV/m@3m) Restricted Bands: FCC 15.209 | Complied |
| 3.8 | 15.407(g) | Frequency Stability | 13.7623 ppm | Signal shall remain in-band | Complied |



Revision History



1 General Description

1.1 Information

1.1.1 RF General Information

| RF General Information | | | | | | |
|------------------------|------------------|-----------------|----------------|------------------------------------|-----------------------|-------------|
| Frequency Range (MHz) | IEEE Std. 802.11 | Ch. Freq. (MHz) | Channel Number | Transmit Chains (N _{TX}) | RF Output Power (dBm) | Co-location |
| 5250-5350 | a | 5260-5320 | 52-64 [4] | 1 | 21.92 | N/A |
| 5470-5725 | | 5500-5700 | 100-140 [8] | 1 | 21.88 | |
| 5250-5350 | n (HT20) | 5260-5320 | 52-64 [4] | 1 / 3 | 21.99 / 21.05 | N/A |
| 5470-5725 | | 5500-5700 | 100-140 [8] | 1 / 3 | 22.03 / 21.25 | |
| 5250-5350 | n (HT40) | 5270-5310 | 54-62 [2] | 1 / 3 | 23.24 / 23.91 | N/A |
| 5470-5725 | | 5510-5670 | 102-134 [3] | 1 / 3 | 23.28 / 23.92 | |

Note 1: RF output power specifies that Maximum Conducted Output Power.
Note 2: 802.11a/n uses a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM modulation.
Note 4: Co-location, Co-location is generally defined as simultaneously transmitting (co-transmitting) antennas within 20 cm of each other. (i.e., EUT has simultaneously co-transmitting that operating 2.4GHz and 5GHz.)



1.1.2 Antenna Information

| Antenna Category | |
|-------------------------------------|---|
| <input type="checkbox"/> | Equipment placed on the market without antennas |
| <input checked="" type="checkbox"/> | Integral antenna (antenna permanently attached) |
| <input type="checkbox"/> | <input type="checkbox"/> Temporary RF connector provided |
| | <input checked="" type="checkbox"/> No temporary RF connector provided Transmit chains bypass antenna and soldered temporary RF connector provided for connected measurement. In case of conducted measurements the transmitter shall be connected to the measuring equipment via a suitable attenuator and correct for all losses in the RF path. |

| Antenna General Information | | | | | |
|-----------------------------|-----------|-----------|---------|------------|------------|
| No. | Ant. Cat. | Ant. Type | Brand | Model | Gain (dBi) |
| 1 | Integral | PCB | Wanshih | UC3WFI0090 | 2.03 |
| 2 | Integral | PCB | Wanshih | UC3WFI0058 | 2.08 |
| 3 | Integral | PCB | Wanshih | UC3WFI0057 | 1.99 |

Reminder: The EUT was pre-tested Antenna Port 1, Antenna Port 2 and Antenna Port 3 for single chain, the worst case was Antenna Port 2. Therefore only the test data recorded in this report.

1.1.3 Type of EUT

| Identify EUT | |
|-------------------------------------|---|
| EUT Serial Number | N/A |
| Presentation of Equipment | <input type="checkbox"/> Production ; <input checked="" type="checkbox"/> Pre-Production ; <input type="checkbox"/> Prototype |
| Type of EUT | |
| <input checked="" type="checkbox"/> | Stand-alone |
| <input type="checkbox"/> | Combined (EUT where the radio part is fully integrated within another device) Combined Equipment - Brand Name / Model No.: ... |
| <input type="checkbox"/> | Plug-in radio (EUT intended for a variety of host systems) Host System - Brand Name / Model No.: ... |
| <input type="checkbox"/> | Other: |



1.1.4 Test Signal Duty Cycle

| Operated Mode for Worst Duty Cycle | |
|---|---------------------------------------|
| <input type="checkbox"/> Operated normally mode for worst duty cycle | |
| <input checked="" type="checkbox"/> Operated test mode for worst duty cycle | |
| Test Signal Duty Cycle (x) | Power Duty Factor [dB] – (10 log 1/x) |
| <input checked="" type="checkbox"/> 98.97% - IEEE 802.11a | 0.05 |
| <input checked="" type="checkbox"/> 98.90% - IEEE 802.11n (HT20) | 0.05 |
| <input checked="" type="checkbox"/> 97.83% - IEEE 802.11n (HT40) | 0.10 |

1.1.5 EUT Operational Condition

| | | | |
|-------------------|--|---|---|
| Supply Voltage | <input checked="" type="checkbox"/> AC mains | <input checked="" type="checkbox"/> DC | |
| Type of DC Source | <input type="checkbox"/> Internal DC supply | <input checked="" type="checkbox"/> External DC adapter | <input checked="" type="checkbox"/> Battery |

1.1.6 DFS and TPC Information

| The DFS Related Operating Mode(s) of the Equipment | | | |
|--|---|--------------------------------------|-------------|
| <input checked="" type="checkbox"/> Master | | | |
| <input type="checkbox"/> Slave with radar detection | | | |
| <input type="checkbox"/> Slave without radar detection | | | |
| Software / Firmware Version | Dpc3939.bin | | |
| Power-on Cycle. (Master) | 38.45 sec | | |
| Communication Mode | <input checked="" type="checkbox"/> IP Based | <input type="checkbox"/> Frame Based | |
| IEEE Std. 802.11 | Frequency Range (MHz) | TPC (Transmit Power Control) | Active Scan |
| a / n (HT20) n (HT40) | <input checked="" type="checkbox"/> 5250-5350 | Yes | Yes |
| | <input checked="" type="checkbox"/> 5470-5725 | Yes | Yes |
| | <input type="checkbox"/> 5600-5650 | - | - |



1.2 Accessories

| Accessories Information | | | | |
|-------------------------|--------------|--------------------------|------------|--------|
| Battery | Brand Name | PEGATRON | Model Name | PB013 |
| | Power Rating | 10.8Vdc, 2600mAh,28Wh | Type | Li-ion |

Reminder: Regarding to more detail and other information, please refer to user manual.

1.3 Support Equipment

The EUT was tested alone.

1.4 Testing Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ 47 CFR FCC Part 15
- ♦ ANSI C63.10-2009
- ♦ FCC KDB 789033
- ♦ FCC KDB 644545 D01
- ♦ FCC KDB 662911
- ♦ FCC KDB 412172

1.5 Testing Location Information

| Testing Location | | | | |
|-------------------------------------|---------------|--|------------------|------------------------------|
| <input checked="" type="checkbox"/> | HWA YA | ADD : No. 52, Hwa Ya 1 st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. | | |
| Test Condition | Test Site No. | Test Engineer | Test Environment | Test Date |
| AC Conduction | CO04-HY | Zeus | 24.4°C / 50% | Jun. 13, 2013 |
| RF Conducted | TH01-HY | Wei | 22.1C / 61% | May 28, 2013 |
| Radiated Emission | 03CH02-HY | Eddie | 24°C / 54% | Jun. 04, 2013~ Jun. 11, 2013 |



1.6 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2)

| Measurement Uncertainty | | | |
|-----------------------------------|---------------|-------------|-------|
| Test Item | | Uncertainty | Limit |
| AC power-line conducted emissions | | ±2.26 dB | N/A |
| Emission bandwidth | | ±1.42 % | N/A |
| RF output power, conducted | | ±0.63 dB | N/A |
| Power density, conducted | | ±0.81 dB | N/A |
| Unwanted emissions, conducted | 30 – 1000 MHz | ±0.51 dB | N/A |
| | 1 – 18 GHz | ±0.67 dB | N/A |
| | 18 – 40 GHz | ±0.83 dB | N/A |
| | 40 – 200 GHz | N/A | N/A |
| All emissions, radiated | 30 – 1000 MHz | ±2.56 dB | N/A |
| | 1 – 18 GHz | ±3.59 dB | N/A |
| | 18 – 40 GHz | ±3.82 dB | N/A |
| | 40 – 200 GHz | N/A | N/A |
| Temperature | | ±0.8 °C | N/A |
| Humidity | | ±3 % | N/A |
| DC and low frequency voltages | | ±3 % | N/A |
| Time | | ±1.42 % | N/A |
| Duty Cycle | | ±1.42 % | N/A |



2 Test Configuration of EUT

2.1 The Worst Case Modulation Configuration

| Worst Modulation Used for Conformance Testing | | | |
|---|------------------------------------|-----------------|-----------------------|
| Modulation Mode | Transmit Chains (N _{TX}) | Data Rate / MCS | Worst Data Rate / MCS |
| 11a,6-54Mbps | 1 | 6-54Mbps | 6 Mbps |
| HT20,M0-7 | 1 | M0-7 | M0 |
| HT20,M0-23 | 3 | M0-23 | M0 |
| HT40, M0-7 | 1 | M0-7 | M0 |
| HT40, M0-23 | 3 | M0-23 | M0 |

2.2 The Worst Case Power Setting Parameter

| The Worst Case Power Setting Parameter (5250-5350MHz band) | | | | | | | | | |
|--|-------------------------------|----------------------|------|------|------------|------|---|---|--|
| Test Software Version | Atheros Radio Test2(ART2-GUI) | | | | | | | | |
| Modulation Mode | N _{TX} | Test Frequency (MHz) | | | | | | - | |
| | | NCB: 20MHz | | | NCB: 40MHz | | | | |
| | | 5260 | 5300 | 5320 | 5270 | 5310 | | | |
| 11a,6-54Mbps | 1 | 21.5 | 22.5 | 22.5 | - | - | - | - | |
| HT20,M0-M7 | 1 | 22 | 22.5 | 22.5 | - | - | - | - | |
| HT20,M0-M23 | 3 | 17 | 17.5 | 17.5 | - | - | - | - | |
| HT40,M0-M7 | 1 | - | - | - | 22.5 | 23 | - | - | |
| HT40,M0-M23 | 3 | - | - | - | 19.5 | 20 | - | - | |

| The Worst Case Power Setting Parameter (5470-5725MHz band) | | | | | | | | | |
|--|-------------------------------|----------------------|------|------|------------|------|------|---|--|
| Test Software Version | Atheros Radio Test2(ART2-GUI) | | | | | | | | |
| Modulation Mode | N _{TX} | Test Frequency (MHz) | | | | | | - | |
| | | NCB: 20MHz | | | NCB: 40MHz | | | | |
| | | 5500 | 5580 | 5700 | 5510 | 5550 | 5670 | | |
| 11a,6-54Mbps | 1 | 23 | 23.5 | 23.5 | - | - | - | - | |
| HT20,M0-M7 | 1 | 23.5 | 23.5 | 24 | - | - | - | - | |
| HT20,M0-M23 | 3 | 17.5 | 17.5 | 17.5 | - | - | - | - | |
| HT40,M0-M7 | 1 | - | - | - | 24.5 | 24.5 | 24.5 | - | |
| HT40,M0-M23 | 3 | - | - | - | 20.5 | 20 | 20 | - | |



2.3 The Worst Case Measurement Configuration

| The Worst Case Mode for Following Conformance Tests | |
|---|---|
| Tests Item | AC power-line conducted emissions |
| Condition | AC power-line conducted measurement for line and neutral Test Voltage: 120Vac / 60Hz |
| Operating Mode | Operating Mode Description |
| 1 | Transmitter Mode |

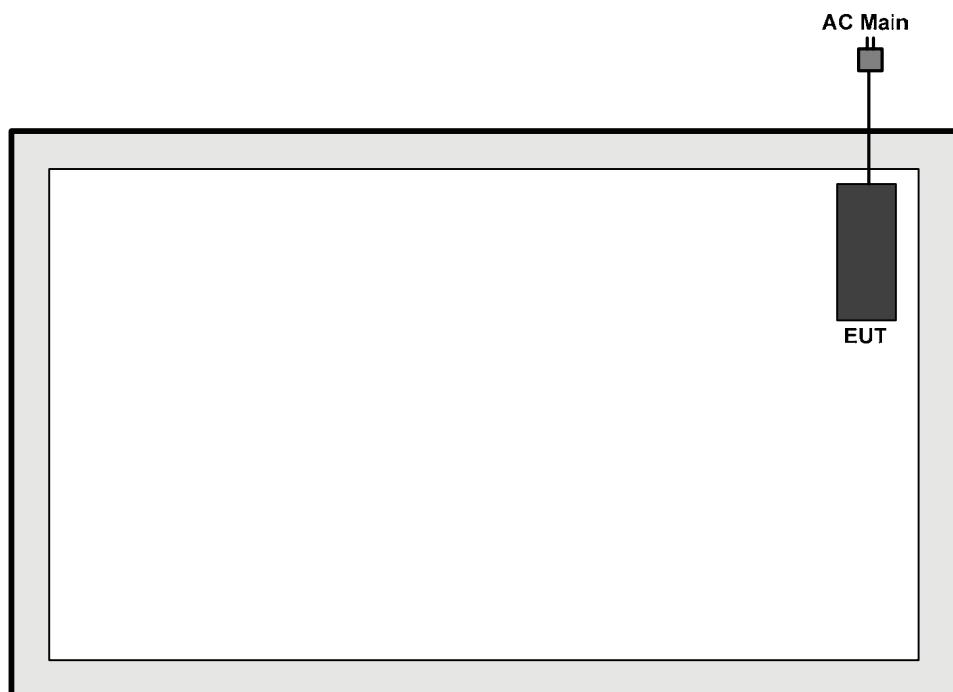
| The Worst Case Mode for Following Conformance Tests | |
|---|--|
| Tests Item | RF Output Power, Peak Power Spectral Density, Emission Bandwidth, Peak Excursion |
| Test Condition | Conducted measurement at transmit chains |
| Modulation Mode | 11a, HT20, HT40 |

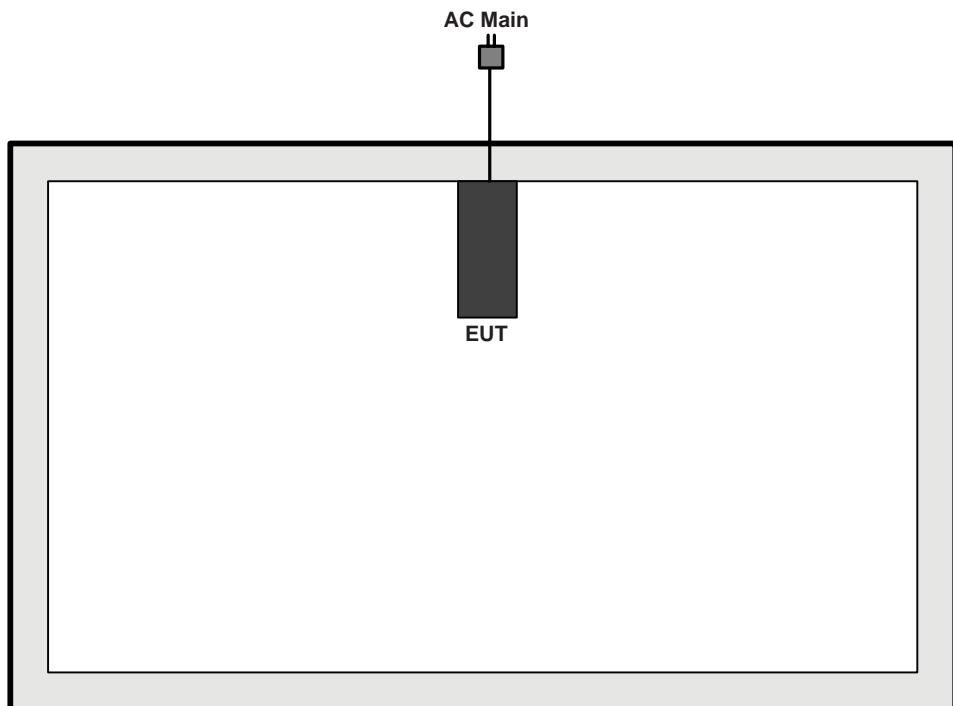
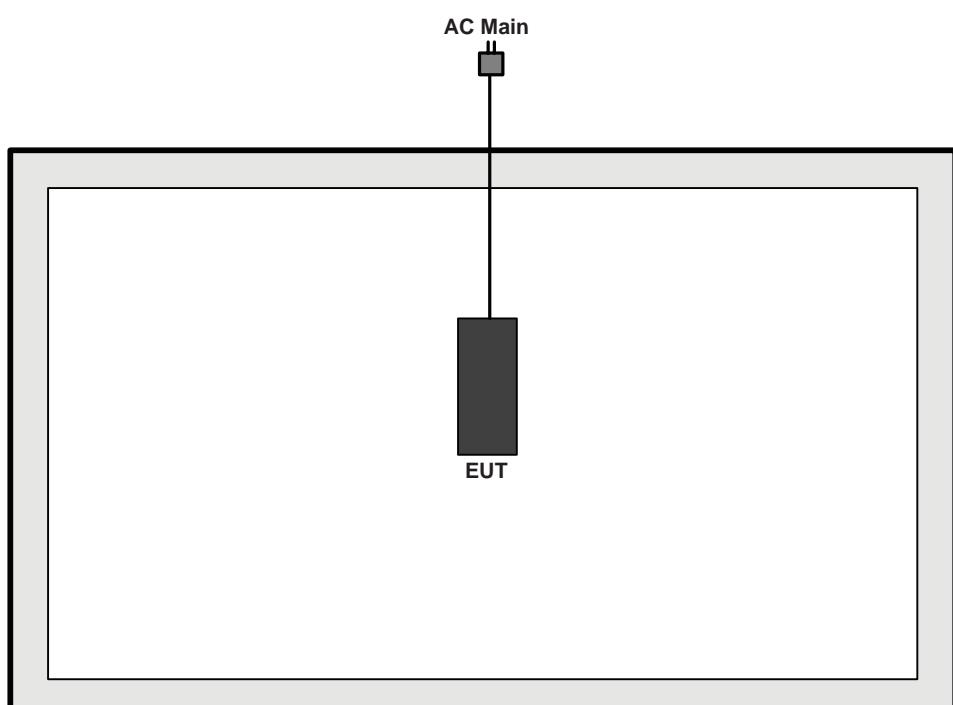
| The Worst Case Mode for Following Conformance Tests | | | | | | | |
|---|--|---------|---------|---------|--|--|--|
| Tests Item | Transmitter Radiated Unwanted Emissions Transmitter Radiated Bandedge Emissions | | | | | | |
| Test Condition | Radiated measurement If EUT consist of multiple antenna assembly (multiple antenna are used in EUT regardless of spatial multiplexing MIMO configuration), the radiated test should be performed with highest antenna gain of each antenna type. | | | | | | |
| User Position | <input checked="" type="checkbox"/> EUT will be placed in fixed position. The worst planes is Y. <input type="checkbox"/> EUT will be placed in mobile position and operating multiple positions. EUT shall be performed two orthogonal planes. <input type="checkbox"/> EUT will be a hand-held or body-worn battery-powered devices and operating multiple positions. EUT shall be performed two or three orthogonal planes. | | | | | | |
| Operating Mode < 1GHz | <input checked="" type="checkbox"/> 1. Transmitter Mode | | | | | | |
| Modulation Mode | 11a, HT20, HT40 | | | | | | |
| Orthogonal Planes of EUT | <table><thead><tr><th>X Plane</th><th>Y Plane</th><th>Z Plane</th></tr></thead><tbody><tr><td></td><td></td><td></td></tr></tbody></table> | X Plane | Y Plane | Z Plane | | | |
| X Plane | Y Plane | Z Plane | | | | | |
| | | | | | | | |



2.4 Test Setup Diagram

Test Setup Diagram – AC Line Conducted Emission Test



**Test Setup Diagram – Radiated Below 1GHz Test****Operating Mode 1** | **Transmitter Mode****Test Setup Diagram - Radiated Above 1GHz Test****Operating Mode 1** | **Transmitter Mode**

3 Transmitter Test Result

3.1 AC Power-line Conducted Emissions

3.1.1 AC Power-line Conducted Emissions Limit

| AC Power-line Conducted Emissions Limit | | |
|---|------------|-----------|
| Frequency Emission (MHz) | Quasi-Peak | Average |
| 0.15-0.5 | 66 - 56 * | 56 - 46 * |
| 0.5-5 | 56 | 46 |
| 5-30 | 60 | 50 |

Note 1: * Decreases with the logarithm of the frequency.

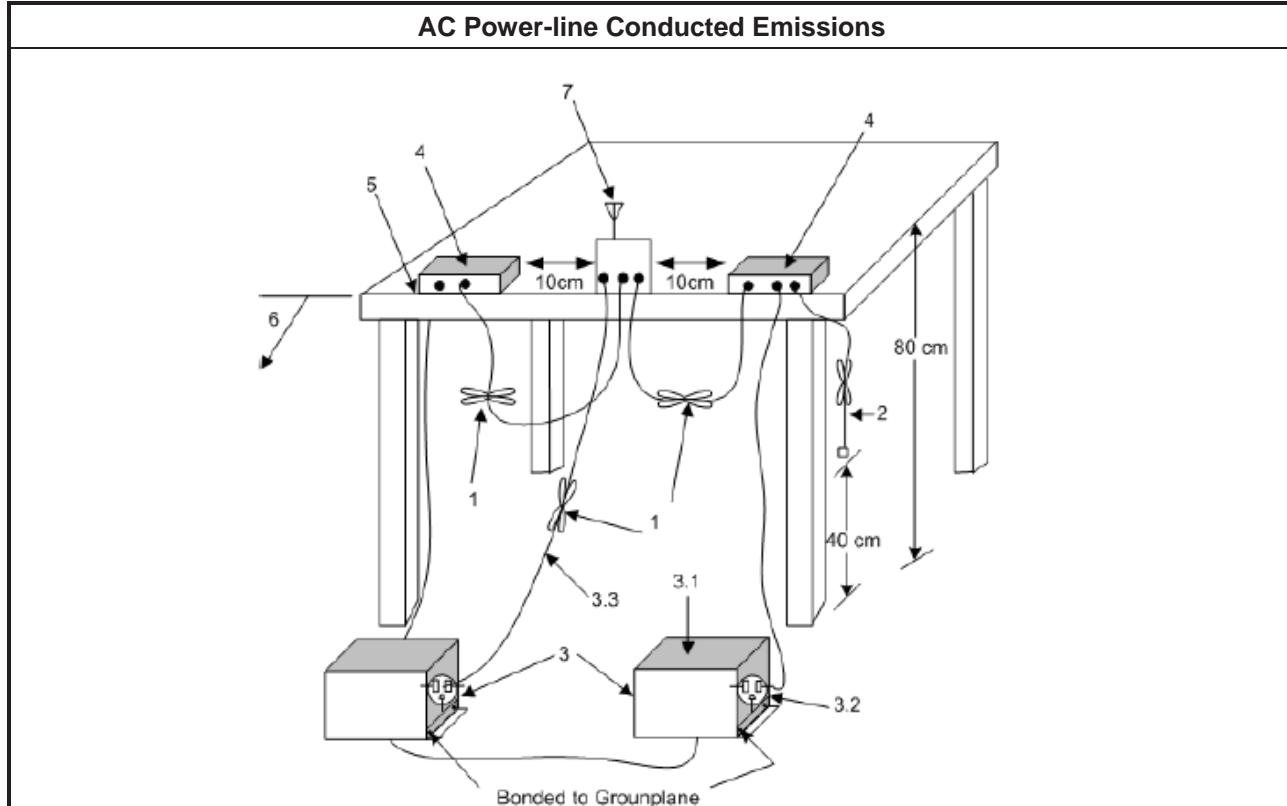
3.1.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.1.3 Test Procedures

| Test Method |
|--|
| <input checked="" type="checkbox"/> Refer as ANSI C63.10-2009, clause 6.2 for AC power-line conducted emissions. |

3.1.4 Test Setup





3.1.5 Test Result of AC Power-line Conducted Emissions

| AC Power-line Conducted Emissions Result | | | | | | | | | | | | | | | | |
|--|------------------|-------------|--------|-----------|-------|-------|--------------|------------------|--|--|--|--|--|--|--|--|
| Operating Mode | 1 | Power Phase | | Neutral | | | | | | | | | | | | |
| Operating Function | Transmitter Mode | | | | | | | | | | | | | | | |
| Level (dBuV) | | | | | | | | Date: 2013-06-13 | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| Freq | Level | Over Limit | Limit | Read Line | LISN | Cable | Remark | | | | | | | | | |
| MHz | | | | | | | | | | | | | | | | |
| dBuV | | | | | | | | | | | | | | | | |
| 1 | 0.1540270 | 51.90 | -13.88 | 65.78 | 51.41 | 0.24 | 0.25 QP | | | | | | | | | |
| 2 | 0.1540270 | 39.79 | -15.99 | 55.78 | 39.30 | 0.24 | 0.25 Average | | | | | | | | | |
| 3 | 0.1893810 | 46.81 | -17.25 | 64.06 | 46.45 | 0.23 | 0.13 QP | | | | | | | | | |
| 4 | 0.1893810 | 34.67 | -19.39 | 54.06 | 34.31 | 0.23 | 0.13 Average | | | | | | | | | |
| 5 | 0.3791160 | 40.36 | -17.94 | 58.30 | 40.04 | 0.22 | 0.10 QP | | | | | | | | | |
| 6 | 0.3791160 | 32.11 | -16.19 | 48.30 | 31.79 | 0.22 | 0.10 Average | | | | | | | | | |
| 7 | 0.4761190 | 38.95 | -17.46 | 56.41 | 38.61 | 0.22 | 0.12 QP | | | | | | | | | |
| 8 | 0.4761190 | 32.59 | -13.82 | 46.41 | 32.25 | 0.22 | 0.12 Average | | | | | | | | | |
| 9 | 13.560 | 30.31 | -29.69 | 60.00 | 29.66 | 0.48 | 0.17 QP | | | | | | | | | |
| 10 | 13.560 | 25.28 | -24.72 | 50.00 | 24.63 | 0.48 | 0.17 Average | | | | | | | | | |
| 11 | 15.970 | 29.73 | -20.27 | 50.00 | 29.02 | 0.51 | 0.20 Average | | | | | | | | | |
| 12 | 15.970 | 35.60 | -24.40 | 60.00 | 34.89 | 0.51 | 0.20 QP | | | | | | | | | |
| 13 | 29.530 | 38.87 | -21.13 | 60.00 | 38.07 | 0.71 | 0.09 QP | | | | | | | | | |
| 14 | 29.530 | 31.84 | -18.16 | 50.00 | 31.04 | 0.71 | 0.09 Average | | | | | | | | | |

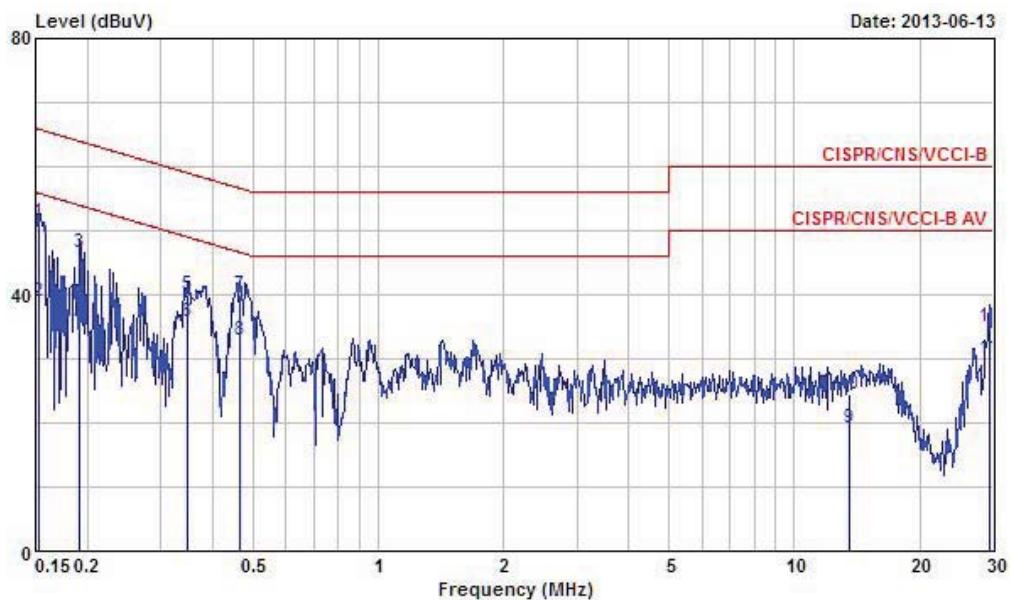
Note 1: ">20dB" means emission levels that exceed the level of 20 dB below the applicable limit.

Note 2: "N/F" means Nothing Found emissions (No emissions were detected.)



AC Power-line Conducted Emissions Result

| | | | |
|---------------------------|------------------|--------------------|------|
| Operating Mode | 1 | Power Phase | Line |
| Operating Function | Transmitter Mode | | |



| Freq | Level | Over | Limit | Read | LISN | Cable |
|-------------|-------|--------|-------|-------|--------|--------------|
| | | Limit | Line | Level | Factor | Loss Remark |
| MHz | dBuV | dB | dBuV | dBuV | dB | dB |
| 1 0.1524030 | 51.21 | -14.66 | 65.87 | 50.84 | 0.11 | 0.26 QP |
| 2 0.1524030 | 38.91 | -16.96 | 55.87 | 38.54 | 0.11 | 0.26 Average |
| 3 0.1903870 | 46.57 | -17.45 | 64.02 | 46.33 | 0.11 | 0.13 QP |
| 4 0.1903870 | 35.29 | -18.73 | 54.02 | 35.05 | 0.11 | 0.13 Average |
| 5 0.3464610 | 40.00 | -19.05 | 59.05 | 39.80 | 0.10 | 0.10 QP |
| 6 0.3464610 | 35.76 | -13.29 | 49.05 | 35.56 | 0.10 | 0.10 Average |
| 7 0.4661350 | 40.10 | -16.48 | 56.58 | 39.88 | 0.10 | 0.12 QP |
| 8 0.4661350 | 32.90 | -13.68 | 46.58 | 32.68 | 0.10 | 0.12 Average |
| 9 13.560 | 19.15 | -30.85 | 50.00 | 18.71 | 0.27 | 0.17 Average |
| 10 13.560 | 24.56 | -35.44 | 60.00 | 24.12 | 0.27 | 0.17 QP |
| 11 29.370 | 30.01 | -19.99 | 50.00 | 29.55 | 0.37 | 0.09 Average |
| 12 29.370 | 35.09 | -24.91 | 60.00 | 34.63 | 0.37 | 0.09 QP |

Note 1: ">20dB" means emission levels that exceed the level of 20 dB below the applicable limit.
Note 2: "N/F" means Nothing Found emissions (No emissions were detected.)



3.2 Emission Bandwidth

3.2.1 Emission Bandwidth (EBW) Limit

| Emission Bandwidth (EBW) Limit | |
|-------------------------------------|---|
| UNII Devices | |
| <input type="checkbox"/> | For the 5.15-5.25 GHz band, the maximum conducted output power shall not exceed the lesser of 50 mW or 4 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. |
| <input checked="" type="checkbox"/> | For the 5.25-5.35 GHz band, the maximum conducted output power shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. |
| <input checked="" type="checkbox"/> | For the 5.47-5.725 GHz band, the maximum conducted output power shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. |
| <input type="checkbox"/> | For the 5.725-5.825 GHz band, the maximum conducted output power shall not exceed the lesser of 1 W or 17 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz |
| LE-LAN Devices | |
| <input type="checkbox"/> | For the band 5.15-5.25 GHz, the maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. |
| <input checked="" type="checkbox"/> | For the 5.25-5.35 GHz band, the maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz |
| <input checked="" type="checkbox"/> | For the 5.47-5.6 GHz band and 5.65-5.725 GHz band, the maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz |
| <input type="checkbox"/> | For the 5.725-5.825 GHz band, the maximum e.i.r.p. shall not exceed 4.0 W or 23 + 10 log B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. |

3.2.2 Measuring Instruments

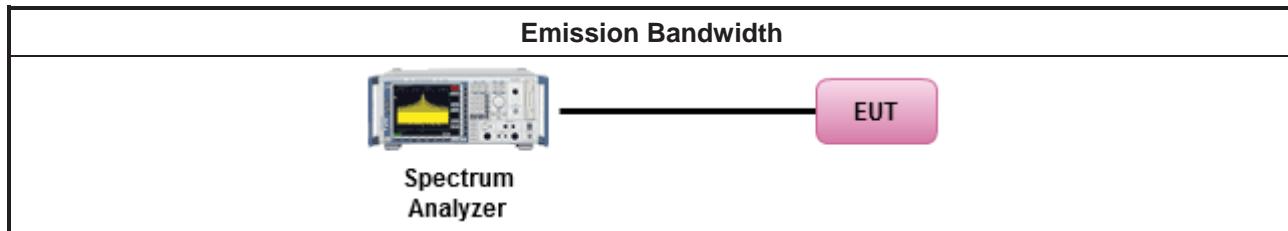
Refer a test equipment and calibration data table in this test report.

3.2.3 Test Procedures

| Test Method | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | For the emission bandwidth shall be measured using one of the options below: |
| <input checked="" type="checkbox"/> | Refer as FCC KDB 789033, clause C for EBW and clause D for OBW measurement. |
| <input type="checkbox"/> | Refer as ANSI C63.10, clause 6.9.1 for occupied bandwidth testing. |
| <input checked="" type="checkbox"/> | Refer as IC RSS-Gen, clause 4.6 for bandwidth testing. |
| <input checked="" type="checkbox"/> | For conducted measurement. |
| | <input checked="" type="checkbox"/> The EUT supports single transmit chain and measurements performed on this transmit chain. |
| | <input checked="" type="checkbox"/> The EUT supports diversity transmitting and the results on transmit chain port 2 is the worst case. |
| | <input checked="" type="checkbox"/> The EUT supports multiple transmit chains using options given below: |
| | <input type="checkbox"/> Option 1: Multiple transmit chains measurements need to be performed on one of the active transmit chains (antenna outputs). All measurement had be performed on transmit chains 2. |
| | <input checked="" type="checkbox"/> Option 2: Multiple transmit chains measurements need to be performed on each transmit chains individually (antenna outputs). All measurement had be performed on all transmit chains. |



3.2.4 Test Setup

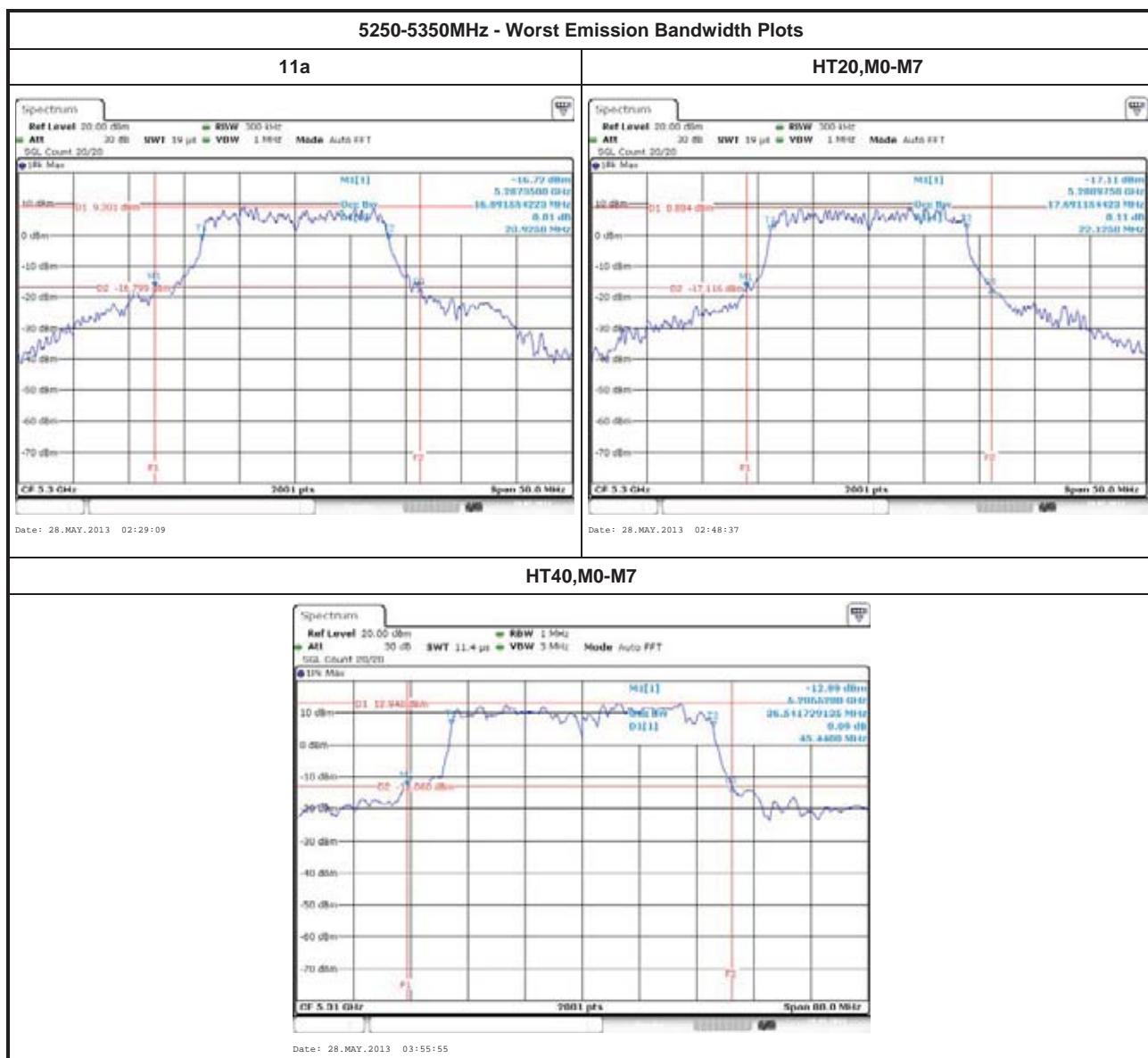


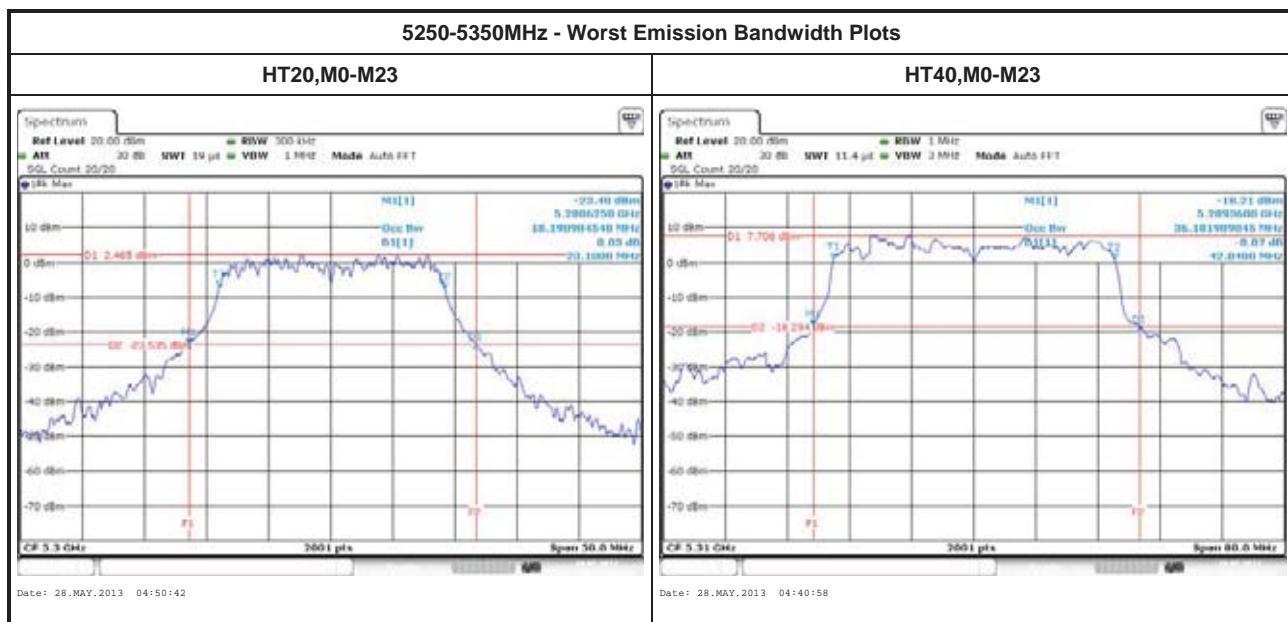
3.2.5 Test Result of Emission Bandwidth

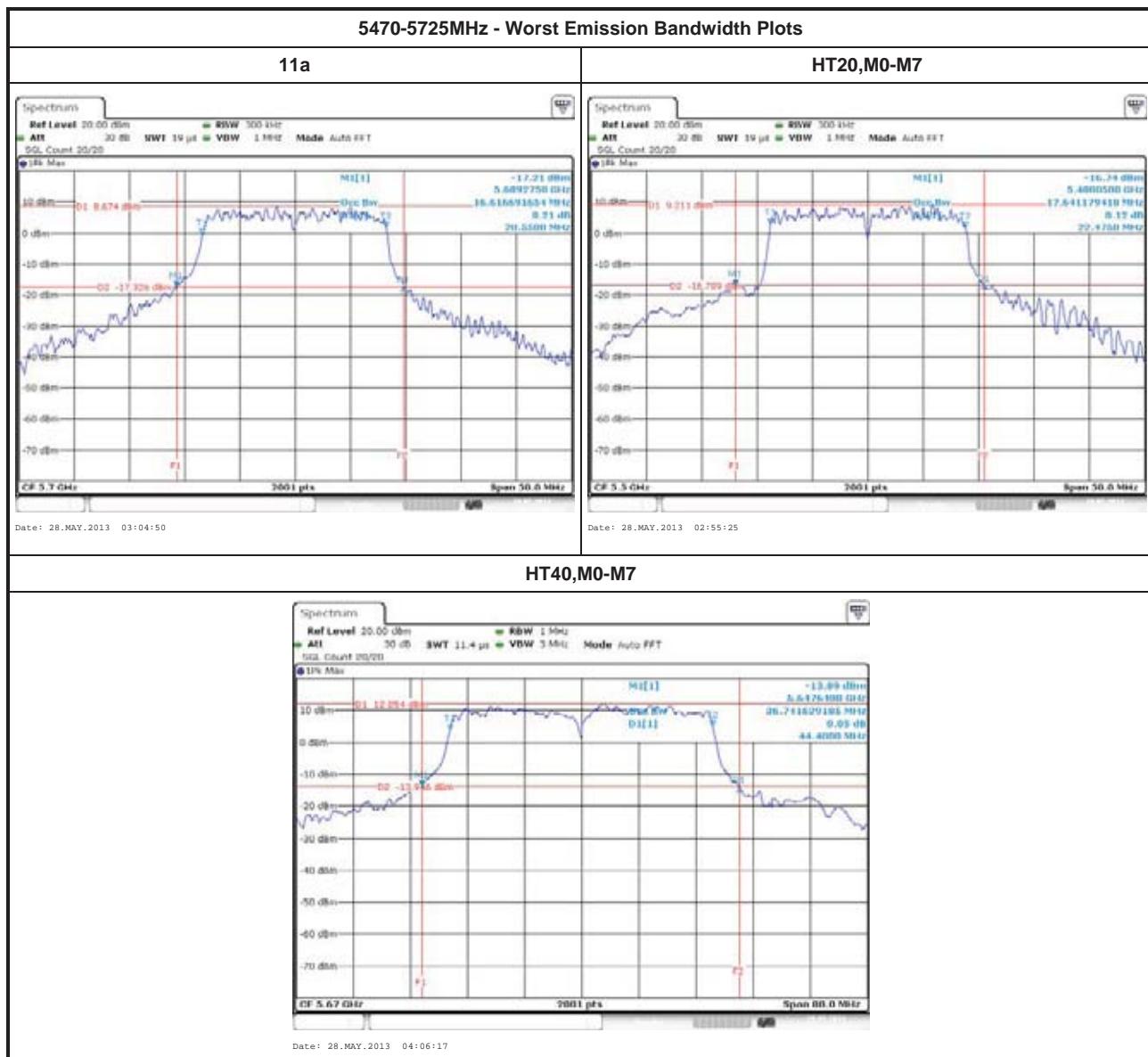
| UNII Emission Bandwidth Result (5250-5350MHz band) | | | | | | | | | | |
|--|-----------------|-------------|--------------------------|--------------|--------------|----------------|--------------|--------------|-------------|---------|
| Condition | | | Emission Bandwidth (MHz) | | | | | | | |
| Modulation Mode | N _{TX} | Freq. (MHz) | 99% Bandwidth | | | 26dB Bandwidth | | | Power Limit | |
| | | | Chain-Port 1 | Chain-Port 2 | Chain-Port 3 | Chain-Port 1 | Chain-Port 2 | Chain-Port 3 | 99% BW | 26dB BW |
| 11a,6-54Mbps | 1 | 5260 | - | 16.81 | - | - | 21.12 | - | 23.26 | 24.25 |
| 11a,6-54Mbps | 1 | 5300 | - | 16.89 | - | - | 23.92 | - | 23.28 | 24.79 |
| 11a,6-54Mbps | 1 | 5320 | - | 16.96 | - | - | 22.37 | - | 23.29 | 24.50 |
| HT20,M0-M7 | 1 | 5260 | - | 17.64 | - | - | 21.50 | - | 23.46 | 24.32 |
| HT20,M0-M7 | 1 | 5300 | - | 17.69 | - | - | 22.12 | - | 23.48 | 24.45 |
| HT20,M0-M7 | 1 | 5320 | - | 17.69 | - | - | 21.92 | - | 23.48 | 24.41 |
| HT20,M0-M23 | 3 | 5260 | 17.81 | 17.61 | 17.94 | 22.00 | 21.20 | 22.10 | 23.46 | 24.26 |
| HT20,M0-M23 | 3 | 5300 | 18.19 | 18.19 | 17.86 | 23.10 | 22.82 | 21.57 | 23.52 | 24.34 |
| HT20,M0-M23 | 3 | 5320 | 17.59 | 17.69 | 17.79 | 21.10 | 20.50 | 22.75 | 23.45 | 24.12 |
| HT40,M0-M7 | 1 | 5270 | - | 36.82 | - | - | 44.40 | - | 26.66 | 27.47 |
| HT40,M0-M7 | 1 | 5310 | - | 36.54 | - | - | 45.44 | - | 26.63 | 27.57 |
| HT40,M0-M23 | 3 | 5270 | 36.30 | 36.34 | 36.26 | 41.96 | 40.56 | 40.60 | 26.59 | 27.08 |
| HT40,M0-M23 | 3 | 5310 | 36.14 | 36.46 | 36.18 | 40.96 | 41.80 | 42.04 | 26.58 | 27.12 |
| Result | | | Complied | | | | | | | |

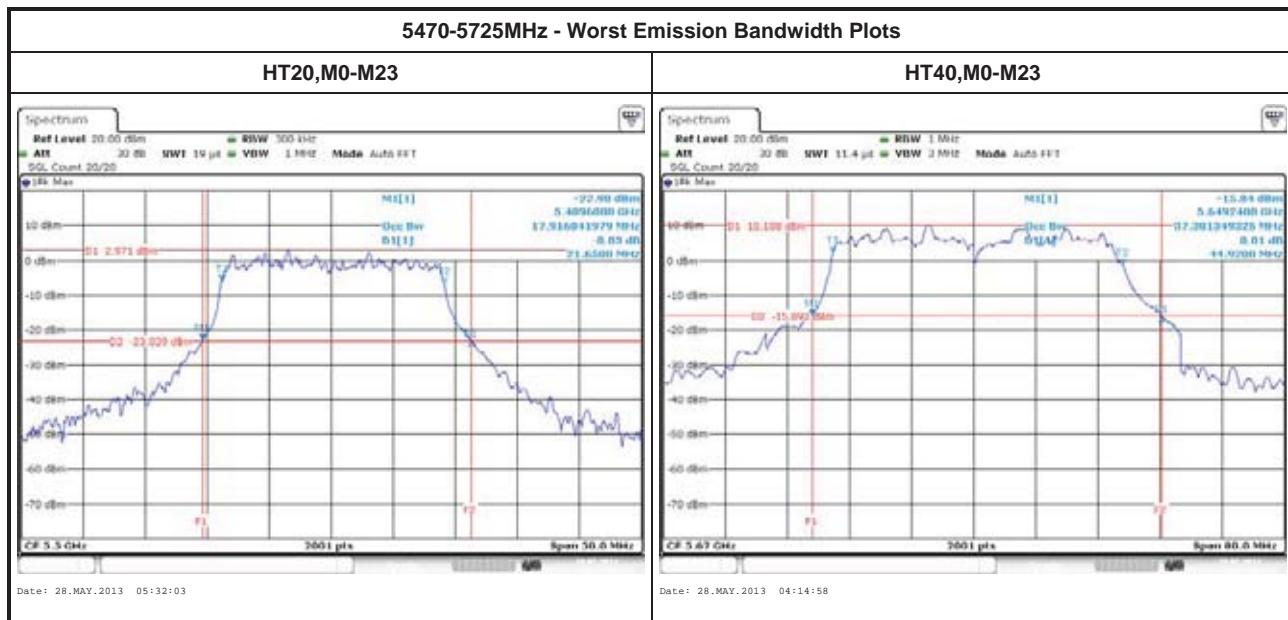


| UNII Emission Bandwidth Result (5470-5725MHz band) | | | | | | | | | | |
|--|-----------------|-------------|--------------------------|--------------|--------------|----------------|--------------|--------------|-------------|---------|
| Condition | | | Emission Bandwidth (MHz) | | | | | | | |
| Modulation Mode | N _{TX} | Freq. (MHz) | 99% Bandwidth | | | 26dB Bandwidth | | | Power Limit | |
| | | | Chain-Port 1 | Chain-Port 2 | Chain-Port 3 | Chain-Port 1 | Chain-Port 2 | Chain-Port 3 | 99% BW | 26dB BW |
| 11a,6-54Mbps | 1 | 5500 | - | 16.66 | - | - | 20.22 | - | 23.22 | 24.06 |
| 11a,6-54Mbps | 1 | 5580 | - | 16.46 | - | - | 20.10 | - | 23.16 | 24.03 |
| 11a,6-54Mbps | 1 | 5700 | - | 16.61 | - | - | 20.55 | - | 23.20 | 24.13 |
| HT20,M0-M7 | 1 | 5500 | - | 17.64 | - | - | 22.47 | - | 23.46 | 24.52 |
| HT20,M0-M7 | 1 | 5580 | - | 17.74 | - | - | 21.10 | - | 23.49 | 24.24 |
| HT20,M0-M7 | 1 | 5700 | - | 17.84 | - | - | 21.52 | - | 23.51 | 24.33 |
| HT20,M0-M23 | 3 | 5500 | 17.54 | 17.84 | 17.91 | 21.12 | 21.32 | 21.65 | 23.44 | 24.25 |
| HT20,M0-M23 | 3 | 5580 | 17.56 | 17.74 | 17.76 | 19.87 | 21.02 | 20.82 | 23.45 | 23.98 |
| HT20,M0-M23 | 3 | 5700 | 17.61 | 17.76 | 17.64 | 20.72 | 21.55 | 20.10 | 23.46 | 24.03 |
| HT40,M0-M7 | 1 | 5510 | - | 36.42 | - | - | 40.92 | - | 26.61 | 27.12 |
| HT40,M0-M7 | 1 | 5550 | - | 36.82 | - | - | 43.36 | - | 26.66 | 27.37 |
| HT40,M0-M7 | 1 | 5550 | | 36.74 | | | 44.40 | | 26.65 | 27.47 |
| HT40,M0-M23 | 3 | 5510 | 36.26 | 36.22 | 36.50 | 41.84 | 39.24 | 43.72 | 26.59 | 26.94 |
| HT40,M0-M23 | 3 | 5510 | 36.42 | 36.70 | 36.54 | 42.56 | 43.08 | 43.00 | 26.61 | 27.29 |
| HT40,M0-M23 | 3 | 5670 | 36.98 | 37.30 | 36.62 | 43.76 | 44.92 | 43.52 | 26.64 | 27.39 |
| Result | | | Complied | | | | | | | |











3.3 RF Output Power

3.3.1 RF Output Power Limit

| Maximum Conducted Output Power Limit | |
|--------------------------------------|--|
| UNII Devices | |
| <input type="checkbox"/> | For the 5.15-5.25 GHz band, the maximum conducted output power (P_{Out}) shall not exceed the lesser of 50 mW or $4 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in MHz. If $G_{TX} > 6 \text{ dBi}$, then $P_{Out} = 17 - (G_{TX} - 6)$. |
| <input checked="" type="checkbox"/> | For the 5.25-5.35 GHz band, the maximum conducted output power (P_{Out}) shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in MHz. If $G_{TX} > 6 \text{ dBi}$, then $P_{Out} = 24 - (G_{TX} - 6)$. |
| <input checked="" type="checkbox"/> | For the 5.47-5.725 GHz band, the maximum conducted output power (P_{Out}) shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in MHz. If $G_{TX} > 6 \text{ dBi}$, then $P_{Out} = 24 - (G_{TX} - 6)$. |
| <input type="checkbox"/> | For the 5.725-5.825 GHz band: |
| <input type="checkbox"/> | <input type="checkbox"/> Point-to-multipoint systems (P2M): the maximum conducted output power (P_{Out}) shall not exceed the lesser of 1 W or $17 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in MHz. If $G_{TX} > 6 \text{ dBi}$, then $P_{Out} = 30 - (G_{TX} - 6)$. |
| <input type="checkbox"/> | <input type="checkbox"/> Point-to-point systems (P2P): the maximum conducted output power (P_{Out}) shall not exceed the lesser of 1 W or $17 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in MHz. If $G_{TX} > 23 \text{ dBi}$, then $P_{Out} = 30 - (G_{TX} - 23)$. |
| LE-LAN Devices | |
| <input type="checkbox"/> | For the 5.15-5.25 GHz band, the maximum e.i.r.p. shall not exceed 200 mW or $10 + 10 \log B$, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. |
| <input checked="" type="checkbox"/> | For the 5.25-5.35 GHz band, the maximum e.i.r.p. shall not exceed 1.0 W or $17 + 10 \log B$, dBm, whichever power is less. B is the 99% emission bandwidth in MHz |
| <input checked="" type="checkbox"/> | For the 5.47-5.6 GHz band and 5.65-5.725 GHz band, the maximum e.i.r.p. shall not exceed 1.0 W or $17 + 10 \log B$, dBm, whichever power is less. B is the 99% emission bandwidth in MHz |
| <input type="checkbox"/> | For the 5.725-5.825 GHz band, the maximum e.i.r.p. shall not exceed 4.0 W or $23 + 10 \log B$, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. |
| <input type="checkbox"/> | <input type="checkbox"/> Point-to-multipoint systems (P2M): the maximum e.i.r.p. shall not exceed 4.0 W or $23 + 10 \log B$, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. |
| <input type="checkbox"/> | <input type="checkbox"/> Point-to-point systems (P2P): the maximum e.i.r.p. shall not exceed 4.0 W or $23 + 10 \log B$, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. If e.i.r.p. > 36 dBm, $G_{TX} \leq P_{Out}$ |

P_{Out} = maximum conducted output power in dBm,

G_{TX} = the maximum transmitting antenna directional gain in dBi.

3.3.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.3.3 Test Procedures

| Test Method | |
|--|--|
| <input checked="" type="checkbox"/> Maximum Conducted Output Power | |
| | [duty cycle \geq 98% or external video / power trigger] |
| | <input checked="" type="checkbox"/> Refer as FCC KDB 789033, clause E Method SA-1 (spectral trace averaging). |
| | <input type="checkbox"/> Refer as FCC KDB 789033, clause E Method SA-1 Alt. (RMS detection with slow sweep speed) |
| | duty cycle $<$ 98% and average over on/off periods with duty factor |
| | <input type="checkbox"/> Refer as FCC KDB 789033, clause E Method SA-2 (spectral trace averaging). |
| | <input type="checkbox"/> Refer as FCC KDB 789033, clause E Method SA-2 Alt. (RMS detection with slow sweep speed) |
| | Wideband RF power meter and average over on/off periods with duty factor |
| | <input type="checkbox"/> Refer as FCC KDB 789033, clause E Method PM (using an RF average power meter). |
| <input checked="" type="checkbox"/> For conducted measurement. | |
| | <input checked="" type="checkbox"/> The EUT supports single transmit chain and measurements performed on this transmit chain. |
| | <input checked="" type="checkbox"/> The EUT supports diversity transmitting and the results on transmit chain port 2 is the worst case. |
| | <input checked="" type="checkbox"/> The EUT supports multiple transmit chains using options given below: Refer as FCC KDB 662911, In-band power measurements. Using the measure-and-sum approach, measured all transmit ports individually. Sum the power (in linear power units e.g., mW) of all ports for each individual sample and save them. |
| | <input checked="" type="checkbox"/> If multiple transmit chains, EIRP calculation could be following as methods: $P_{total} = P_1 + P_2 + \dots + P_n$ (calculated in linear unit [mW] and transfer to log unit [dBm]) $EIRP_{total} = P_{total} + DG$ |

3.3.4 Test Setup

| RF Output Power (Spectrum Analyzer) |
|---|
|  Spectrum Analyzer |
| RF Output Power (Power Meter) |
|  Power Meter |



3.3.5 Directional Gain for Power Measurement

| Directional Gain (DG) Result | | | | | |
|------------------------------|----------|----------|-----------------|------|-----------------|
| Transmit Chains No. | | 1 | 2 | 3 | |
| Maximum G_{ANT} (dBi) | | 2.08 | 2.08 | 2.08 | |
| Modulation Mode | DG (dBi) | N_{TX} | N_{SS} (Min.) | STBC | Array Gain (dB) |
| 11a,6-54Mbps | 2.08 | 1 | 1 | - | - |
| HT20,M0-M7 | 2.08 | 1 | 1 | - | - |
| HT20,M0-M23 | 2.08 | 3 | 1 | - | - |
| HT40,M0-M7 | 2.08 | 1 | 1 | - | - |
| HT40,M0-M23 | 2.08 | 3 | 1 | - | - |

Note 1: For all transmitter outputs with equal antenna gains, directional gain is to be computed as follows:
 Any transmit signals are correlated, Directional Gain = $G_{ANT} + 10 \log(N_{TX})$
 All transmit signals are completely uncorrelated, Directional Gain = G_{ANT}

Note 2: For all transmitter outputs with unequal antenna gains, directional gain is to be computed as follows:
 Any transmit signals are correlated, Directional Gain = $10 \log[(10^{G1/20} + \dots + 10^{GN/20})^2 / N_{TX}]$
 All transmit signals are completely uncorrelated, Directional Gain = $10 \log[(10^{G1/10} + \dots + 10^{GN/10}) / N_{TX}]$

Note 3: For Spatial Multiplexing, Directional Gain (DG) = $G_{ANT} + 10 \log(N_{TX}/N_{SS})$,
 where N_{SS} = the number of independent spatial streams data.

Note 4: For CDD transmissions, directional gain is calculated as power measurements:
 Directional Gain (DG) = $G_{ANT} + \text{Array Gain}$, where Array Gain is as follows:
 Array Gain = 0 dB (i.e., no array gain) for $N_{TX} \leq 4$;
 Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{TX} ;

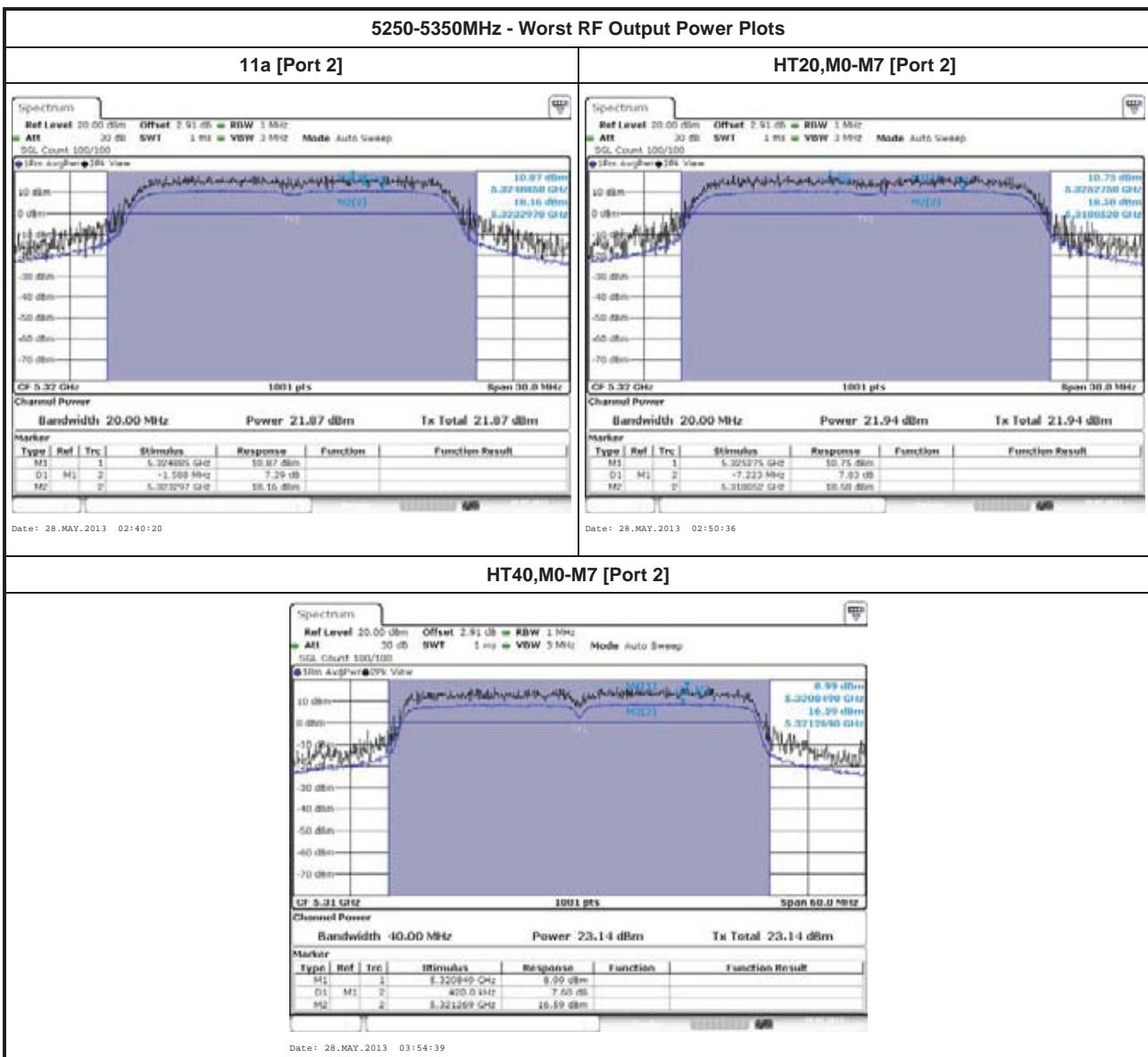


3.3.6 Test Result of Maximum Conducted Output Power

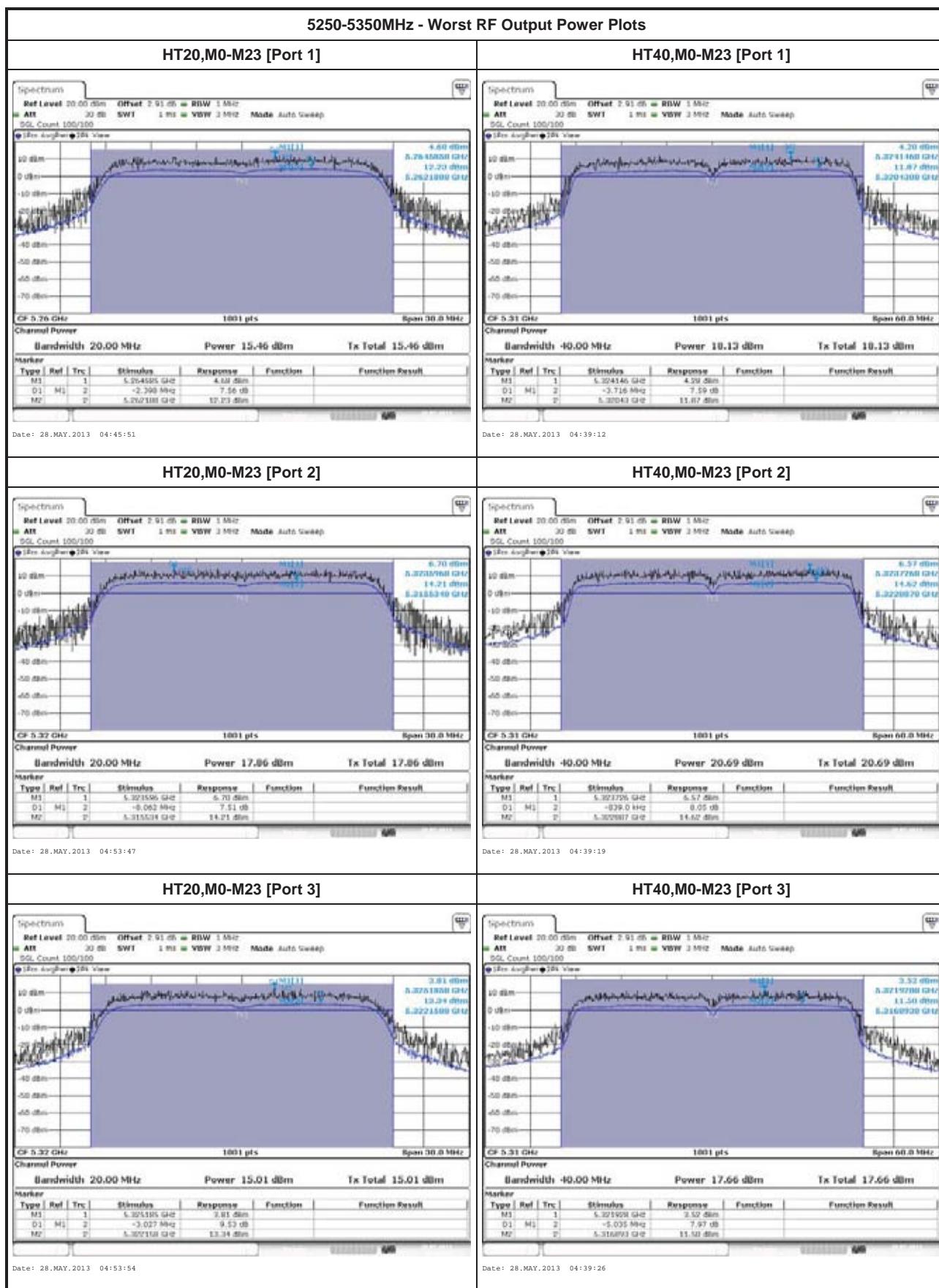
| Maximum Conducted Output Power (5250-5350MHz band) | | | | | | | | | | |
|--|-----------------|-------------|-----------------------|--------------|--------------|-----------|-------------|----------|------------|------------|
| Condition | | | RF Output Power (dBm) | | | | | | | |
| Modulation Mode | N _{TX} | Freq. (MHz) | Chain Port 1 | Chain Port 2 | Chain Port 3 | Sum Chain | Power Limit | DG (dBi) | EIRP Power | EIRP Limit |
| 11a,6-54Mbps | 1 | 5260 | - | 21.77 | - | 21.77 | 24.0 | 2.08 | 23.85 | 30.0 |
| 11a,6-54Mbps | 1 | 5300 | - | 21.83 | - | 21.83 | 24.0 | 2.08 | 23.91 | 30.0 |
| 11a,6-54Mbps | 1 | 5320 | - | 21.92 | - | 21.92 | 24.0 | 2.08 | 24.00 | 30.0 |
| HT20,M0-M7 | 1 | 5260 | - | 21.95 | - | 21.95 | 24.0 | 2.08 | 24.03 | 30.0 |
| HT20,M0-M7 | 1 | 5300 | - | 21.91 | - | 21.91 | 24.0 | 2.08 | 23.99 | 30.0 |
| HT20,M0-M7 | 1 | 5320 | - | 21.99 | - | 21.99 | 24.0 | 2.08 | 24.07 | 30.0 |
| HT20,M0-M23 | 3 | 5260 | 15.51 | 17.65 | 14.55 | 20.87 | 24.0 | 2.08 | 22.95 | 30.0 |
| HT20,M0-M23 | 3 | 5300 | 15.35 | 17.84 | 14.73 | 20.96 | 24.0 | 2.08 | 23.04 | 30.0 |
| HT20,M0-M23 | 3 | 5320 | 15.27 | 17.91 | 15.06 | 21.05 | 24.0 | 2.08 | 23.13 | 30.0 |
| HT40,M0-M7 | 1 | 5270 | - | 23.13 | - | 23.13 | 24.0 | 2.08 | 25.21 | 30.0 |
| HT40,M0-M7 | 1 | 5310 | - | 23.24 | - | 23.24 | 24.0 | 2.08 | 25.32 | 30.0 |
| HT40,M0-M23 | 3 | 5270 | 18.11 | 20.49 | 17.51 | 23.67 | 24.0 | 2.08 | 25.75 | 30.0 |
| HT40,M0-M23 | 3 | 5310 | 18.23 | 20.79 | 17.76 | 23.91 | 24.0 | 2.08 | 25.99 | 30.0 |
| Result | | | Complied | | | | | | | |



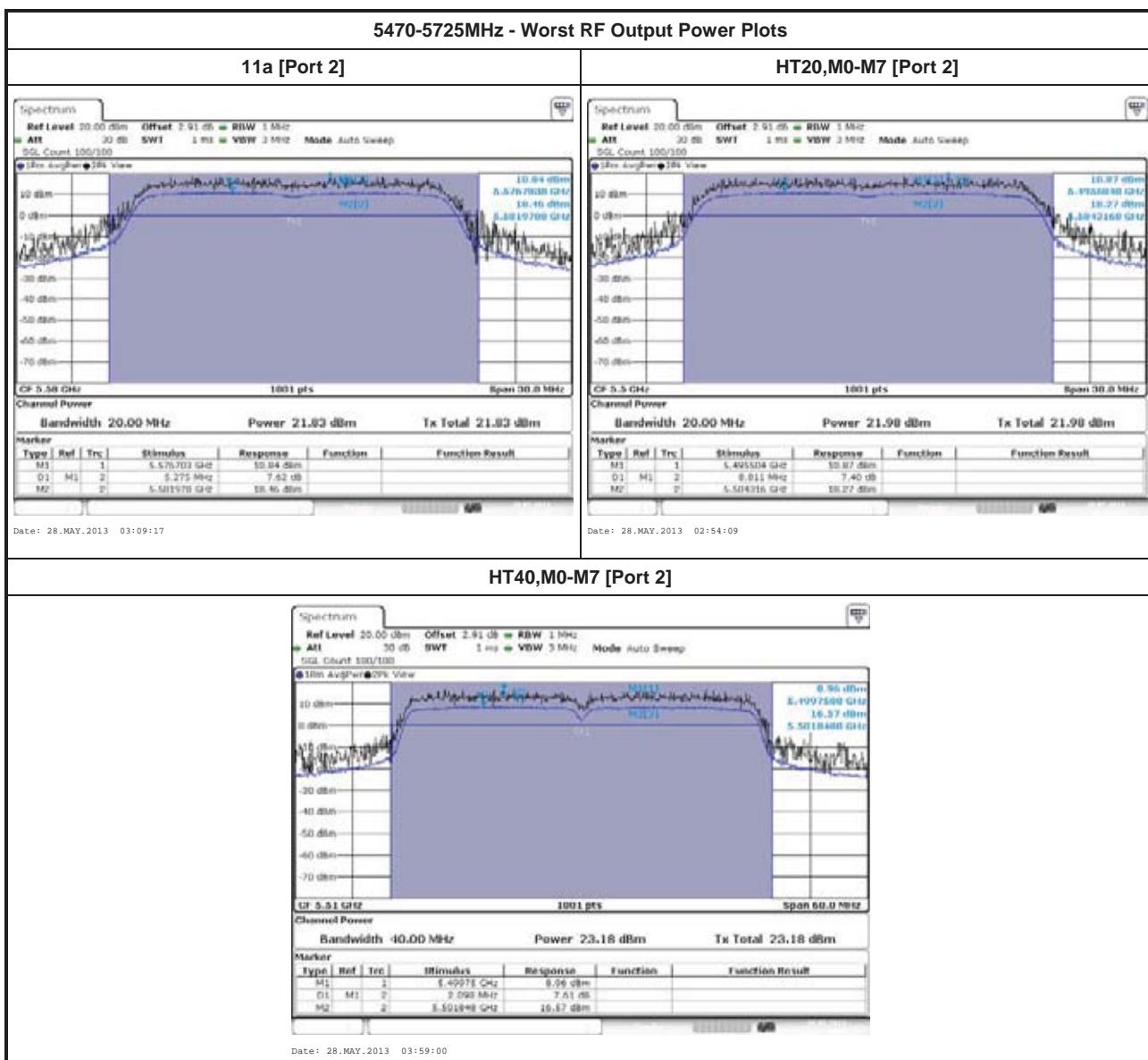
| Maximum Conducted Output Power (5470-5725MHz band) | | | | | | | | | | |
|--|-----------------|-------------|-----------------------|--------------|--------------|-----------|-------------|----------|------------|------------|
| Condition | | | RF Output Power (dBm) | | | | | | | |
| Modulation Mode | N _{TX} | Freq. (MHz) | Chain Port 1 | Chain Port 2 | Chain Port 3 | Sum Chain | Power Limit | DG (dBi) | EIRP Power | EIRP Limit |
| 11a,6-54Mbps | 1 | 5500 | - | 21.66 | - | 21.66 | 24.0 | 2.08 | 23.74 | 30.0 |
| 11a,6-54Mbps | 1 | 5580 | - | 21.88 | - | 21.88 | 24.0 | 2.08 | 23.96 | 30.0 |
| 11a,6-54Mbps | 1 | 5700 | - | 21.70 | - | 21.70 | 24.0 | 2.08 | 23.78 | 30.0 |
| HT20,M0-M7 | 1 | 5500 | - | 22.03 | - | 22.03 | 24.0 | 2.08 | 24.11 | 30.0 |
| HT20,M0-M7 | 1 | 5580 | - | 21.79 | - | 21.79 | 24.0 | 2.08 | 23.87 | 30.0 |
| HT20,M0-M7 | 1 | 5700 | - | 22.03 | - | 22.03 | 24.0 | 2.08 | 24.11 | 30.0 |
| HT20,M0-M23 | 3 | 5500 | 16.49 | 16.79 | 15.34 | 21.02 | 24.0 | 2.08 | 23.10 | 30.0 |
| HT20,M0-M23 | 3 | 5580 | 16.59 | 16.96 | 15.43 | 21.14 | 24.0 | 2.08 | 23.22 | 30.0 |
| HT20,M0-M23 | 3 | 5700 | 16.46 | 16.55 | 16.42 | 21.25 | 24.0 | 2.08 | 23.33 | 30.0 |
| HT40,M0-M7 | 1 | 5510 | - | 23.28 | - | 23.28 | 24.0 | 2.08 | 25.36 | 30.0 |
| HT40,M0-M7 | 1 | 5550 | - | 23.22 | - | 23.22 | 24.0 | 2.08 | 25.30 | 30.0 |
| HT40,M0-M7 | 1 | 5670 | - | 23.26 | - | 23.26 | 24.0 | 2.08 | 25.34 | 30.0 |
| HT40,M0-M23 | 3 | 5510 | 18.98 | 19.91 | 18.31 | 23.88 | 24.0 | 2.08 | 25.96 | 30.0 |
| HT40,M0-M23 | 3 | 5550 | 19.08 | 19.74 | 18.57 | 23.92 | 24.0 | 2.08 | 26.00 | 30.0 |
| HT40,M0-M23 | 3 | 5670 | 19.33 | 19.14 | 18.67 | 23.82 | 24.0 | 2.08 | 25.90 | 30.0 |
| Result | | | Complied | | | | | | | |



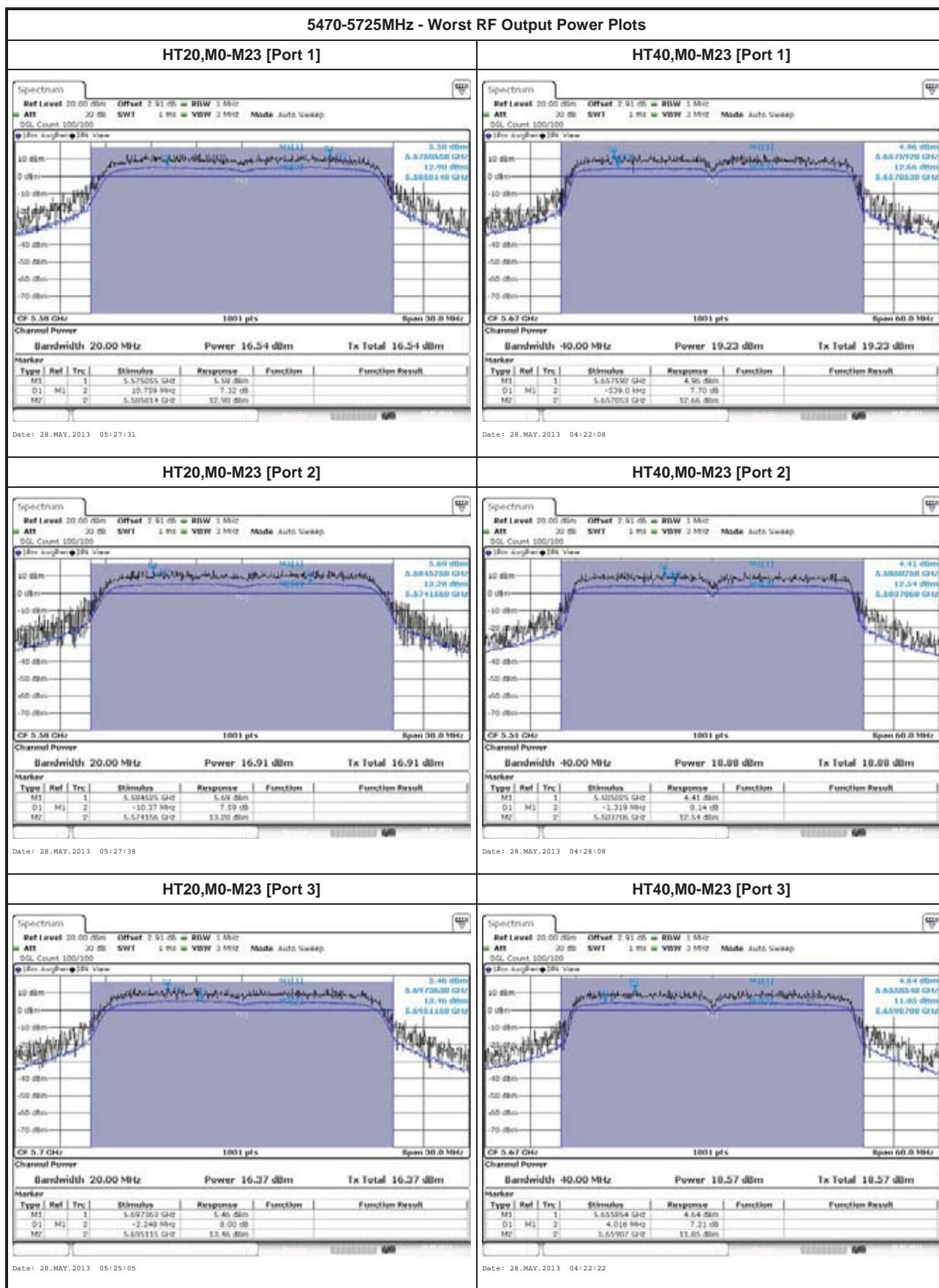
Note 1: RF Output Power Plots w/o Duty Factor



Note 1: RF Output Power Plots w/o Duty Factor



Note 1: RF Output Power Plots w/o Duty Factor



Note 1: RF Output Power Plots w/o Duty Factor



3.4 Peak Power Spectral Density

3.4.1 Peak Power Spectral Density Limit

| Peak Power Spectral Density Limit | |
|--|--|
| UNII Devices | |
| <input type="checkbox"/> | For the 5.15-5.25 GHz band, the peak power spectral density (PPSD) ≤ 4 dBm/MHz. If $G_{TX} > 6$ dBi, then $PPSD = 4 - (G_{TX} - 6)$. |
| <input checked="" type="checkbox"/> | For the 5.25-5.35 GHz band, the peak power spectral density (PPSD) ≤ 11 dBm/MHz. If $G_{TX} > 6$ dBi, then $PPSD = 11 - (G_{TX} - 6)$. |
| <input checked="" type="checkbox"/> | For the 5.47-5.725 GHz band, the peak power spectral density (PPSD) ≤ 11 dBm/MHz. If $G_{TX} > 6$ dBi, then $PPSD = 11 - (G_{TX} - 6)$. |
| <input type="checkbox"/> | For the 5.725-5.825 GHz band: <ul style="list-style-type: none"><input type="checkbox"/> Point-to-multipoint systems (P2M): the peak power spectral density (PPSD) ≤ 17 dBm/MHz. If $G_{TX} > 6$ dBi, then $PPSD = 17 - (G_{TX} - 6)$.<input type="checkbox"/> Point-to-point systems (P2P): the peak power spectral density (PPSD) ≤ 17 dBm/MHz. If $G_{TX} > 23$ dBi, then $PPSD = 17 - (G_{TX} - 23)$. |
| LE-LAN Devices | |
| <input type="checkbox"/> | For the 5.15-5.25 GHz band, the peak power spectral density (PPSD) ≤ 4 dBm/MHz and the e.i.r.p. peak power spectral density (PPSD) ≤ 10 dBm/MHz. |
| <input checked="" type="checkbox"/> | For the 5.25-5.35 GHz band, the peak power spectral density (PPSD) ≤ 11 dBm/MHz and the e.i.r.p. peak power spectral density (PPSD) ≤ 17 dBm/MHz. |
| <input checked="" type="checkbox"/> | For the 5.47-5.6 GHz band and 5.65-5.725 GHz band, the peak power spectral density (PPSD) ≤ 11 dBm/MHz and the e.i.r.p. peak power spectral density (PPSD) ≤ 17 dBm/MHz. |
| <input type="checkbox"/> | For the 5.725-5.825 GHz band, the peak power spectral density (PPSD) ≤ 17 dBm/MHz and the e.i.r.p. peak power spectral density (PPSD) ≤ 23 dBm/MHz. |
| PPSD = peak power spectral density that the same method as used to determine the conducted output power shall be used to determine the power spectral density. And power spectral density in dBm/MHz G_{TX} = the maximum transmitting antenna directional gain in dBi. | |

3.4.2 Measuring Instruments

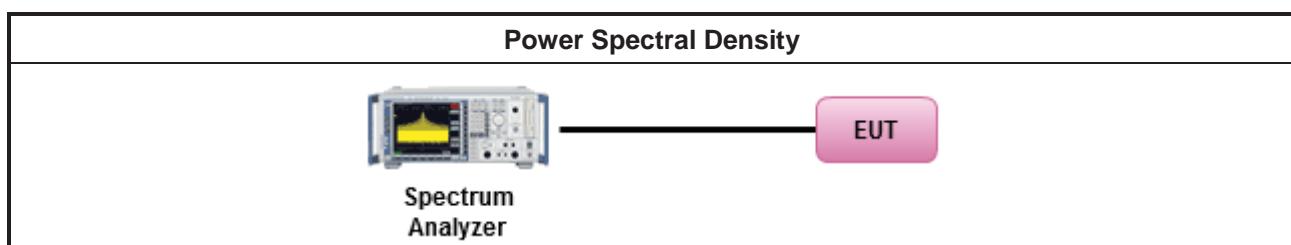
Refer a test equipment and calibration data table in this test report.



3.4.3 Test Procedures

| Test Method |
|--|
| <input checked="" type="checkbox"/> Peak power spectral density procedures that the same method as used to determine the conducted output power shall be used to determine the peak power spectral density and use the peak search function on the spectrum analyzer to find the peak of the spectrum. For the peak power spectral density shall be measured using below options: |
| <input type="checkbox"/> Refer as FCC KDB 789033, F5) power spectral density can be measured using resolution bandwidths < 1 MHz provided that the results are integrated over 1 MHz bandwidth |
| [duty cycle \geq 98% or external video / power trigger] |
| <input checked="" type="checkbox"/> Refer as FCC KDB 789033, clause E Method SA-1 (spectral trace averaging). |
| <input type="checkbox"/> Refer as FCC KDB 789033, clause E Method SA-1 Alt. (RMS detection with slow sweep speed) |
| duty cycle < 98% and average over on/off periods with duty factor |
| <input type="checkbox"/> Refer as FCC KDB 789033, clause E Method SA-2 (spectral trace averaging). |
| <input type="checkbox"/> Refer as FCC KDB 789033, clause E Method SA-2 Alt. (RMS detection with slow sweep speed) |
| <input checked="" type="checkbox"/> For conducted measurement. |
| <input checked="" type="checkbox"/> The EUT supports single transmit chain and measurements performed on this transmit chain. |
| <input checked="" type="checkbox"/> The EUT supports diversity transmitting and the results on transmit chain port 2 is the worst case. |
| <input checked="" type="checkbox"/> The EUT supports multiple transmit chains using options given below: |
| <input checked="" type="checkbox"/> Option 1: Measure and sum the spectra across the outputs. Refer as FCC KDB 662911, In-band power measurements. Using the measure-and-sum approach, measured all transmit ports individually. Sum the power (in linear power units e.g., mW) of all ports for each individual sample and save them. |
| <input type="checkbox"/> Option 2: Measure and add $10 \log(N)$ dB, where N is the number of transmit chains. Refer as FCC KDB 662911, In-band power spectral density (PSD). Performed at each transmit chains and each transmit chains shall be compared with the limit have been reduced with $10 \log(N)$. Or each transmit chains shall be add $10 \log(N)$ to compared with the limit. |
| <input checked="" type="checkbox"/> If multiple transmit chains, EIRP PPSD calculation could be following as methods: $PPSD_{total} = PPSD_1 + PPSD_2 + \dots + PPSD_n$ (calculated in linear unit [mW] and transfer to log unit [dBm]) $EIRP_{total} = PPSD_{total} + DG$ |
| <input checked="" type="checkbox"/> Each individually PPSD plots refer as test report clause 3.3.5 with each individually PPSD plots. |

3.4.4 Test Setup





3.4.5 Directional Gain for Power Spectral Density Measurement

| Directional Gain (DG) Result | | | | | |
|------------------------------|----------|----------|-----------------|------|-----------------|
| Transmit Chains No. | | 1 | 2 | 3 | |
| Maximum G_{ANT} (dBi) | | 2.08 | 2.08 | 2.08 | |
| Modulation Mode | DG (dBi) | N_{TX} | N_{SS} (Min.) | STBC | Array Gain (dB) |
| 11a,6-54Mbps | 2.08 | 1 | 1 | - | 0 |
| HT20,M0-M7 | 2.08 | 1 | 1 | - | 0 |
| HT20,M0-M23 | 6.85 | 3 | 1 | | 3 |
| HT40,M0-M7 | 2.08 | 3 | 1 | | 0 |
| HT40,M0-M23 | 6.85 | 1 | 1 | - | 3 |

Note 1: For all transmitter outputs with equal antenna gains, directional gain is to be computed as follows:
Any transmit signals are correlated, Directional Gain = $G_{ANT} + 10 \log(N_{TX})$
All transmit signals are completely uncorrelated, Directional Gain = G_{ANT}

Note 2: For all transmitter outputs with unequal antenna gains, directional gain is to be computed as follows:
Any transmit signals are correlated, Directional Gain = $10 \log[(10^{G1/20} + \dots + 10^{GN/20})^2 / N_{TX}]$
All transmit signals are completely uncorrelated, Directional Gain = $10 \log[(10^{G1/10} + \dots + 10^{GN/10}) / N_{TX}]$

Note 3: For Spatial Multiplexing, Directional Gain (DG) = $G_{ANT} + 10 \log(N_{TX}/N_{SS})$,
where N_{SS} = the number of independent spatial streams data.

Note 4: For CDD transmissions, directional gain is calculated as power spectral density measurements:
Directional Gain (DG) = $G_{ANT} + \text{Array Gain}$, where Array Gain is as follows:
Array Gain = $10 \log(N_{TX}/N_{SS})$;

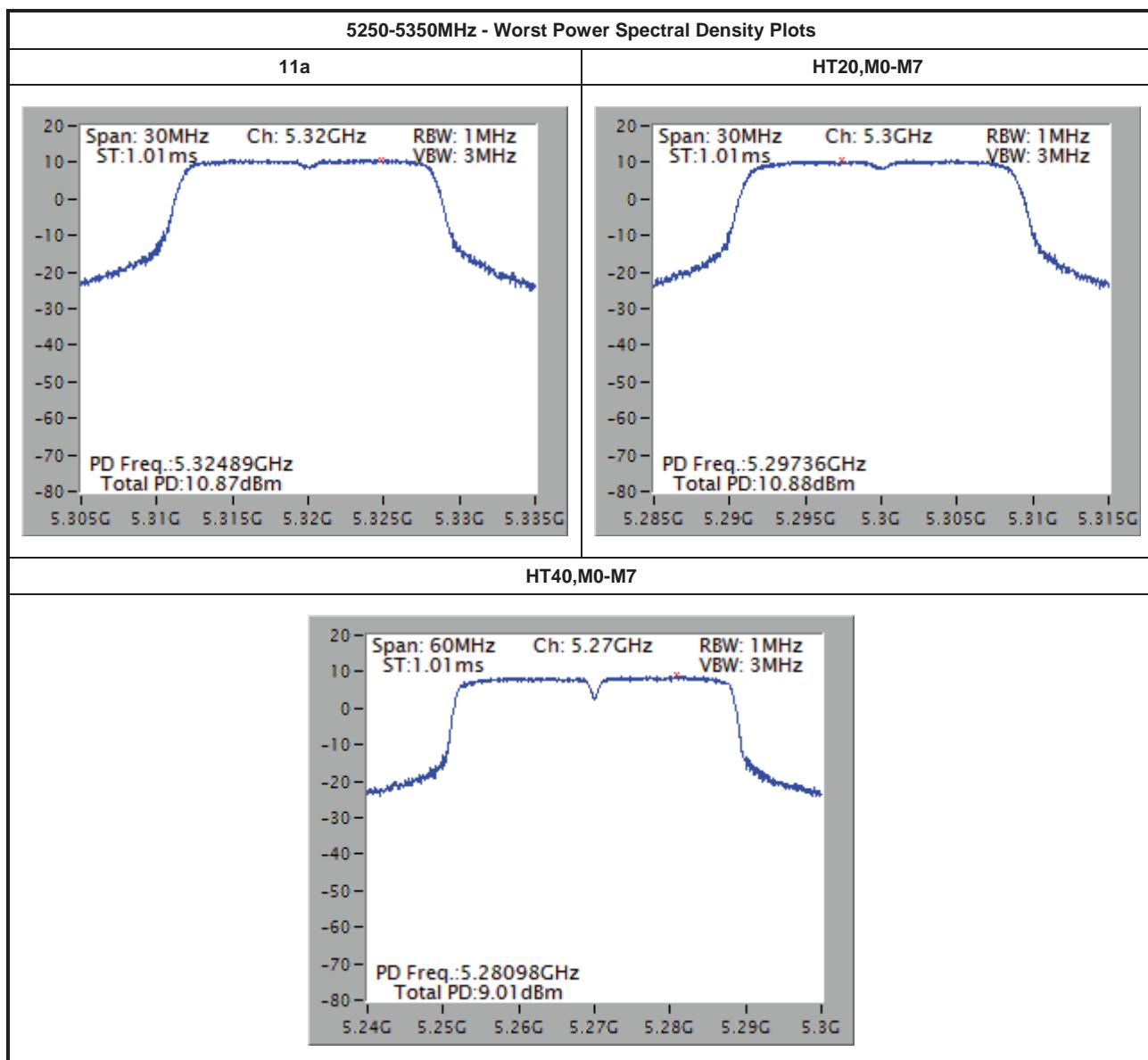


3.4.6 Test Result of Peak Power Spectral Density

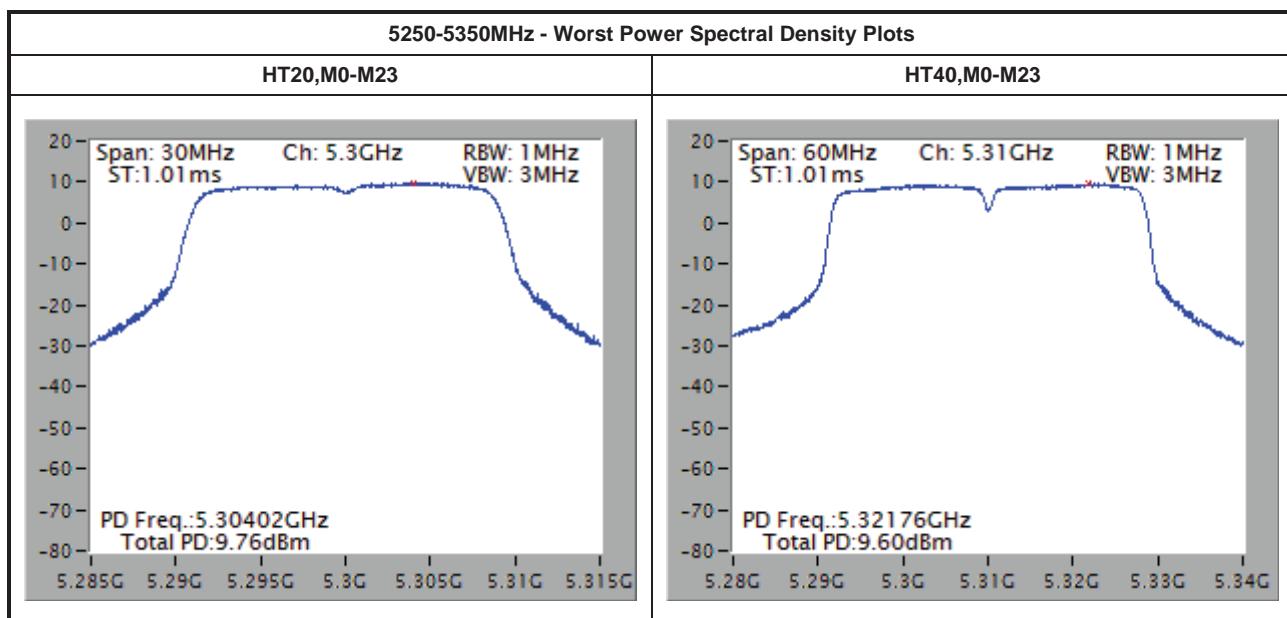
| Peak Power Spectral Density Result (5250-5350MHz band) | | | | | | | |
|--|-----------------|-------------|---------------------------------------|-----------|----------|----------|------------|
| Condition | | | Peak Power Spectral Density (dBm/MHz) | | | | |
| Modulation Mode | N _{TX} | Freq. (MHz) | Sum Chain | PSD Limit | DG (dBi) | EIRP PSD | EIRP Limit |
| 11a,6-54Mbps | 1 | 5260 | 10.85 | 11.00 | 2.08 | 12.93 | 17.00 |
| 11a,6-54Mbps | 1 | 5300 | 10.87 | 11.00 | 2.08 | 12.95 | 17.00 |
| 11a,6-54Mbps | 1 | 5320 | 10.92 | 11.00 | 2.08 | 13.00 | 17.00 |
| HT20,M0-M7 | 1 | 5260 | 10.79 | 11.00 | 2.08 | 12.87 | 17.00 |
| HT20,M0-M7 | 1 | 5300 | 10.93 | 11.00 | 2.08 | 13.01 | 17.00 |
| HT20,M0-M7 | 1 | 5320 | 10.80 | 11.00 | 2.08 | 12.88 | 17.00 |
| HT20,M0-M23 | 3 | 5260 | 9.78 | 10.15 | 6.85 | 16.63 | 17.00 |
| HT20,M0-M23 | 3 | 5300 | 9.81 | 10.15 | 6.85 | 16.66 | 17.00 |
| HT20,M0-M23 | 3 | 5320 | 9.64 | 10.15 | 6.85 | 16.49 | 17.00 |
| HT40,M0-M7 | 1 | 5270 | 9.11 | 11.00 | 2.08 | 11.19 | 17.00 |
| HT40,M0-M7 | 1 | 5310 | 9.09 | 11.00 | 2.08 | 11.17 | 17.00 |
| HT40,M0-M23 | 3 | 5270 | 9.22 | 10.15 | 6.85 | 16.07 | 17.00 |
| HT40,M0-M23 | 3 | 5310 | 9.70 | 10.15 | 6.85 | 16.55 | 17.00 |
| Result | | | Complied | | | | |



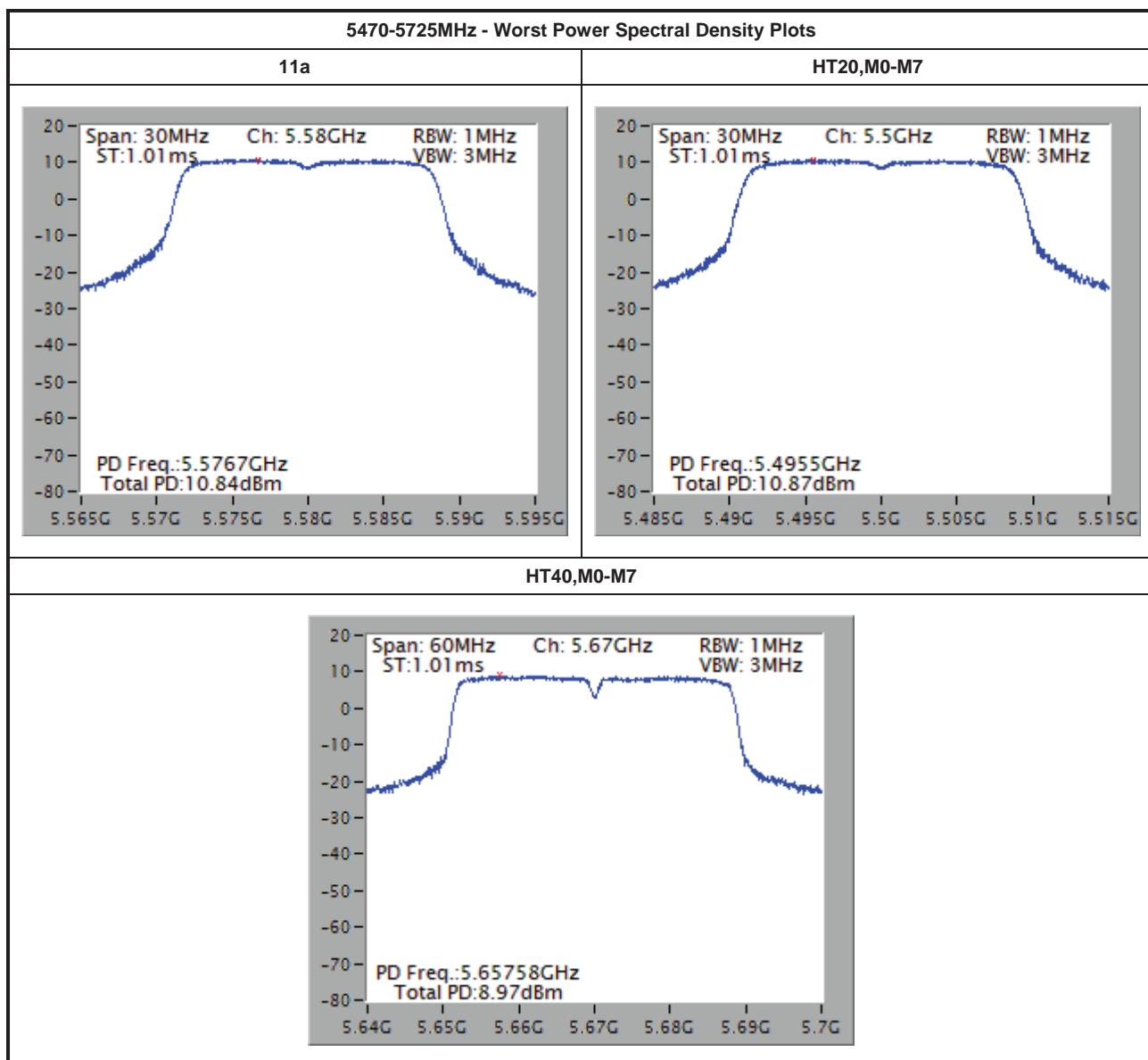
| Peak Power Spectral Density Result (5470-5725MHz band) | | | | | | | |
|--|-----------------|-------------|---------------------------------------|-----------|----------|----------|------------|
| Condition | | | Peak Power Spectral Density (dBm/MHz) | | | | |
| Modulation Mode | N _{TX} | Freq. (MHz) | Sum Chain | PSD Limit | DG (dBi) | EIRP PSD | EIRP Limit |
| 11a,6-54Mbps | 1 | 5500 | 10.78 | 11.00 | 2.08 | 12.86 | 17.00 |
| 11a,6-54Mbps | 1 | 5580 | 10.89 | 11.00 | 2.08 | 12.97 | 17.00 |
| 11a,6-54Mbps | 1 | 5700 | 10.78 | 11.00 | 2.08 | 12.86 | 17.00 |
| HT20,M0-M7 | 1 | 5500 | 10.92 | 11.00 | 2.08 | 13.00 | 17.00 |
| HT20,M0-M7 | 1 | 5580 | 10.86 | 11.00 | 2.08 | 12.94 | 17.00 |
| HT20,M0-M7 | 1 | 5700 | 10.87 | 11.00 | 2.08 | 12.95 | 17.00 |
| HT20,M0-M23 | 3 | 5500 | 9.64 | 10.15 | 6.85 | 16.49 | 17.00 |
| HT20,M0-M23 | 3 | 5580 | 9.67 | 10.15 | 6.85 | 16.52 | 17.00 |
| HT20,M0-M23 | 3 | 5700 | 9.77 | 10.15 | 6.85 | 16.62 | 17.00 |
| HT40,M0-M7 | 1 | 5510 | 9.06 | 11.00 | 2.08 | 11.14 | 17.00 |
| HT40,M0-M7 | 1 | 5550 | 8.86 | 11.00 | 2.08 | 10.94 | 17.00 |
| HT40,M0-M7 | 1 | 5670 | 9.07 | 11.00 | 2.08 | 11.15 | 17.00 |
| HT40,M0-M23 | 3 | 5510 | 9.32 | 10.15 | 6.85 | 16.17 | 17.00 |
| HT40,M0-M23 | 3 | 5550 | 9.47 | 10.15 | 6.85 | 16.32 | 17.00 |
| HT40,M0-M23 | 3 | 5670 | 9.43 | 10.15 | 6.85 | 16.28 | 17.00 |
| Result | | | Complied | | | | |



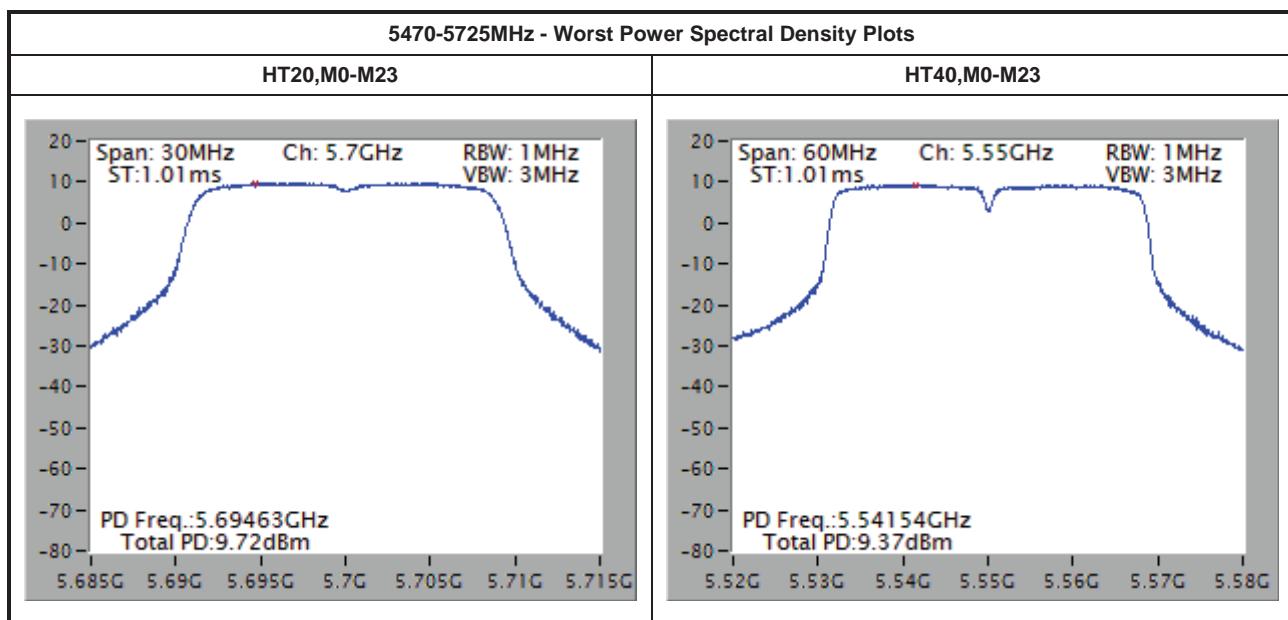
Note 1: Power Density Plots w/o Duty Factor



Note 1: Power Density Plots w/o Duty Factor



Note 1: Power Density Plots w/o Duty Factor



Note 1: Power Density Plots w/o Duty Factor



3.5 Peak Excursion

3.5.1 Peak Excursion Limit

| Peak Excursion Limit | |
|-------------------------------------|---|
| UNII Devices | |
| <input checked="" type="checkbox"/> | Peak excursion \leq 13 dB. The ratio of the maximum of the peak-max-hold spectrum to the maximum of the average spectrum for continuous transmission does not exceed 13 dB. (Earlier procedures that required computing the ratio of the two spectra at each frequency across the emission bandwidth can lead to unintended failures at band edges and will no longer be required.) |
| LE-LAN Devices | |
| <input checked="" type="checkbox"/> | N/A |

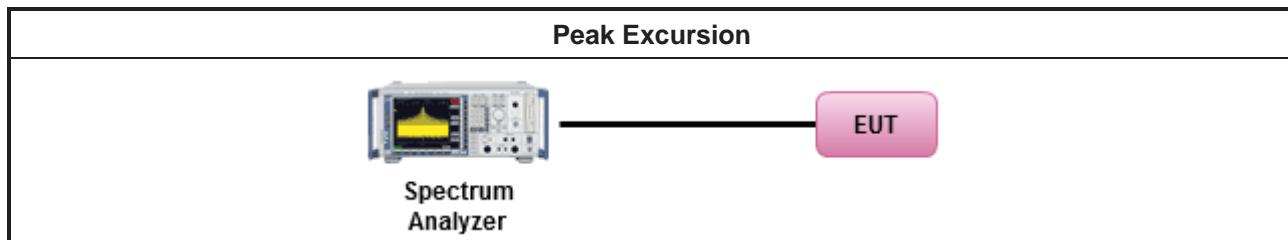
3.5.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.5.3 Test Procedures

| Test Method | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | Refer as FCC KDB 789033, clause G peak excursion method. |
| <input checked="" type="checkbox"/> | Testing each modulation mode on a single channel is sufficient to demonstrate compliance with the peak excursion requirement |
| <input checked="" type="checkbox"/> | For conducted measurement. |
| <input checked="" type="checkbox"/> | Testing a single output port is sufficient to demonstrate compliance with the peak excursion. |

3.5.4 Test Setup





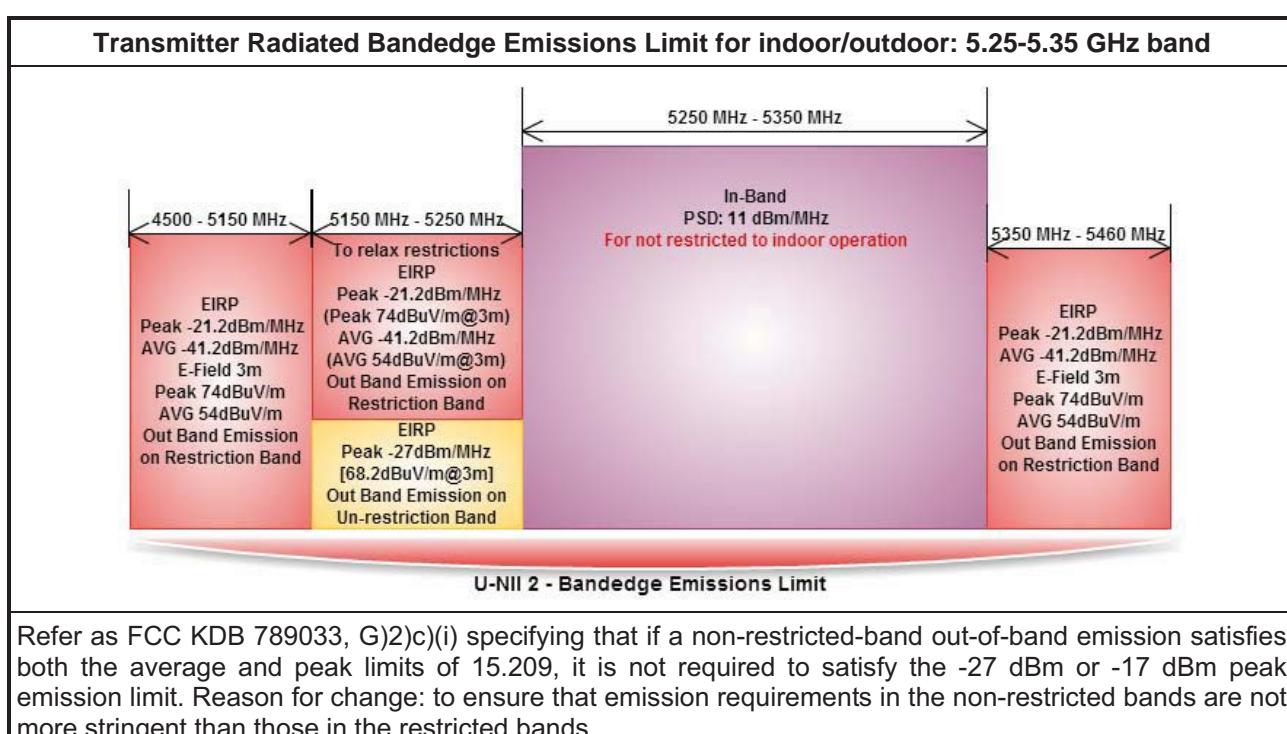
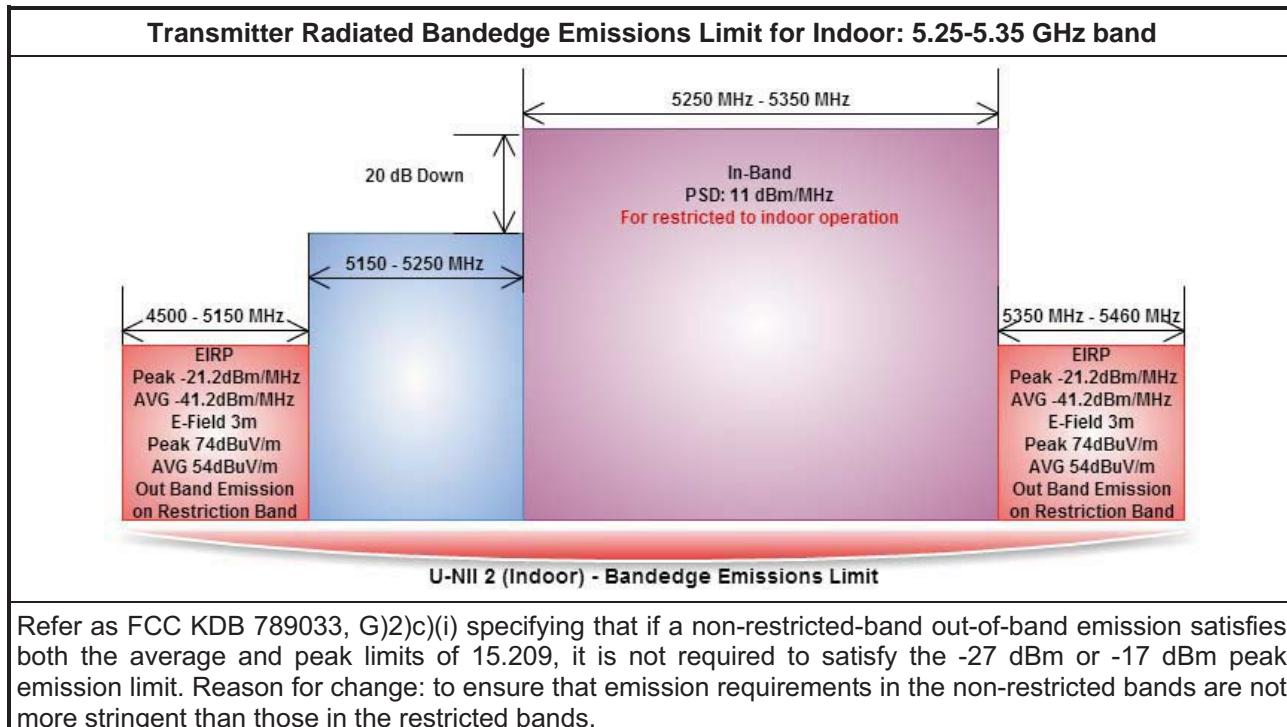
3.5.5 Test Result of Peak Excursion

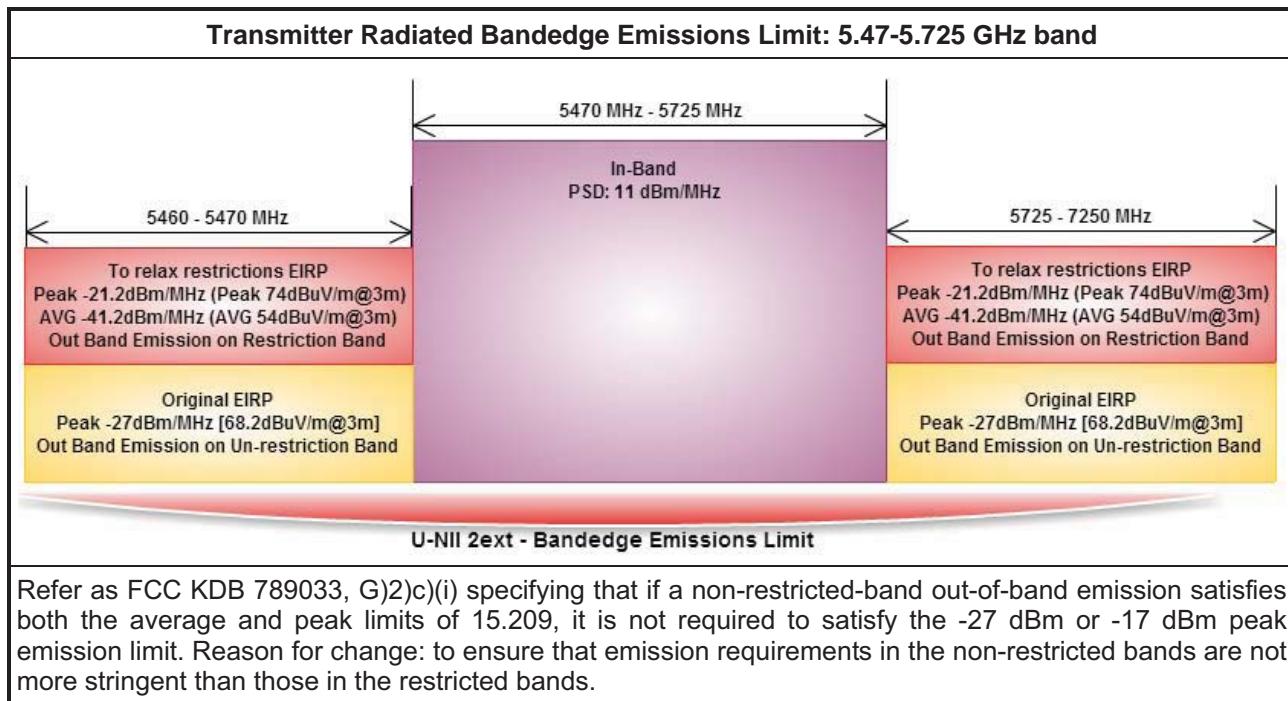
| UNII Peak Excursion Result | | | | | | | |
|----------------------------|-----------------|-------------|---------------------|------|-------|-------|-------|
| Condition | | | Peak Excursion (dB) | | | | |
| Modulation Mode | N _{TX} | Freq. (MHz) | BPSK | QPSK | 16QAM | 64QAM | Limit |
| 11a,6-54Mbps | 1 | 5260 | 7.49 | 6.97 | 7.76 | 8.90 | 13.0 |
| HT20,M0-M7 | 1 | 5260 | 7.48 | 7.66 | 8.10 | 8.36 | 13.0 |
| HT40,M0-M7 | 3 | 5270 | 7.71 | 7.42 | 8.73 | 9.15 | 13.0 |
| Result | | | Complied | | | | |



3.6 Transmitter Radiated Bandedge Emissions

3.6.1 Transmitter Radiated Bandedge Emissions Limit





3.6.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

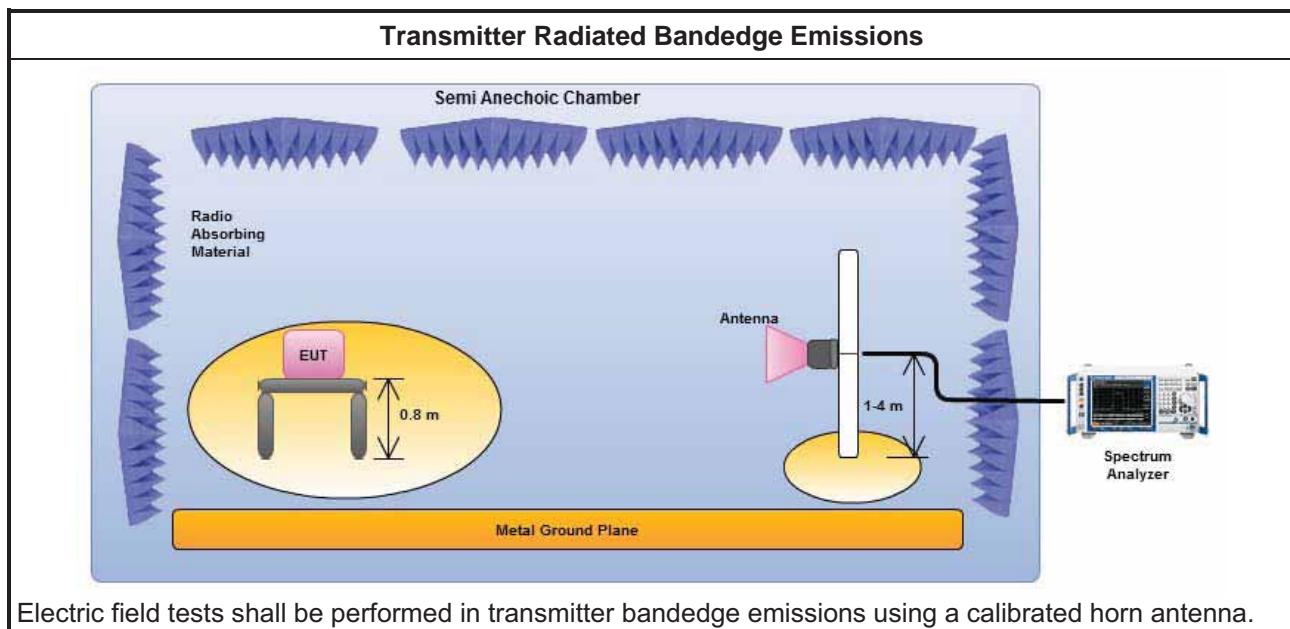


3.6.3 Test Procedures

| Test Method | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | Measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements). Measurements in the bandedge are typically made at a closer distance 1.5m, because the instrumentation noise floor is typically close to the radiated emission limit. |
| <input checked="" type="checkbox"/> | The average emission levels shall be measured in [duty cycle \geq 98 or duty factor]. |
| <input checked="" type="checkbox"/> | Refer as ANSI C63.10, clause 6.9.2.2 bandedge testing shall be performed at the lowest frequency channel and highest frequency channel within the allowed operating band. |
| <input type="checkbox"/> | If EUT operate in adjacent contiguous bands, bandedge testing performed at the lowest frequency channel at lower-band and highest frequency channel at higher-band. Transmitter in-band emissions will consist of adjacent contiguous bands (e.g., IEEE 802.11ac VHT160 The lowest frequency channel at lower-band and highest frequency channel at higher-band in-band emissions will consist of two adjacent contiguous bands.) |
| <input type="checkbox"/> | <input type="checkbox"/> Operating in 5.15-5.25 GHz band (lower-band) and 5.25-5.35 GHz band (higher-band). |
| <input type="checkbox"/> | <input type="checkbox"/> Operating in 5.47-5.725 GHz band (lower-band) and 5.725-5.825 GHz band (higher-band). |
| <input type="checkbox"/> | If EUT operate in individual non-contiguous bands, bandedge testing performed at the lowest frequency channel and highest frequency channel within lower-band and higher-band. (e.g., (e.g., IEEE 802.11ac VHT160) |
| <input type="checkbox"/> | <input type="checkbox"/> Operating in 5.25-5.35 GHz band (lower-band) and 5.47-5.725 GHz band (higher-band). |
| <input type="checkbox"/> | <input type="checkbox"/> Operating in 5.15-5.25 GHz band (lower-band) and 5.725-5.825 GHz band (higher-band). |
| <input checked="" type="checkbox"/> | For the transmitter unwanted emissions shall be measured using following options below: |
| <input checked="" type="checkbox"/> | Refer as FCC KDB 789033, clause H)2) for unwanted emissions into non-restricted bands. |
| <input checked="" type="checkbox"/> | Refer as FCC KDB 789033, clause H)1) for unwanted emissions into restricted bands. |
| <input type="checkbox"/> | <input type="checkbox"/> Refer as FCC KDB 789033, H)6) Method AD (Trace Averaging). |
| <input type="checkbox"/> | <input type="checkbox"/> Refer as FCC KDB 789033, H)6) Method VB (Reduced VBW). |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> Refer as ANSI C63.10, clause 4.2.3.2.3 (Reduced VBW). $VBW \geq 1/T$, where T is pulse time. |
| <input type="checkbox"/> | <input type="checkbox"/> Refer as ANSI C63.10, clause 4.2.3.2.4 average value of pulsed emissions. |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> Refer as FCC KDB 789033, clause H)5) measurement procedure peak limit. |
| <input type="checkbox"/> | <input type="checkbox"/> Refer as ANSI C63.10, clause 4.2.3.2.2 measurement procedure peak limit. |
| <input checked="" type="checkbox"/> | For the transmitter bandedge emissions shall be measured using following options below: |
| <input type="checkbox"/> | <input type="checkbox"/> Refer as FCC KDB 789033, clause H)3)d) for narrower resolution bandwidth (100kHz) using the band power and summing the spectral levels (i.e., 1 MHz). |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> Refer as ANSI C63.10, clause 6.9.2 for band-edge testing. |
| <input type="checkbox"/> | <input type="checkbox"/> Refer as ANSI C63.10, clause 6.9.3 for marker-delta method for band-edge measurements. |
| <input checked="" type="checkbox"/> | For radiated measurement, refer as ANSI C63.10, clause 6.5 for radiated emissions from above 1 GHz. |

| Test Method | |
|--------------------------|--|
| <input type="checkbox"/> | For conducted and cabinet radiation measurement, refer as FCC KDB 789033, clause H)3). |
| <input type="checkbox"/> | For conducted unwanted emissions into non-restricted bands (relative emission limits). Devices with multiple transmit chains: Refer as FCC KDB 662911, when testing out-of-band and spurious emissions against relative emission limits, tests may be performed on each output individually without summing or adding $10 \log(N)$ if the measurements are made relative to the in-band emissions on the individual outputs. |
| <input type="checkbox"/> | For conducted unwanted emissions into restricted bands (absolute emission limits). Devices with multiple transmit chains using options given below: (1) Measure and sum the spectra across the outputs or (2) Measure and add $10 \log(N)$ dB |
| <input type="checkbox"/> | For FCC KDB 662911 The methodology described here may overestimate array gain, thereby resulting in apparent failures to satisfy the out-of-band limits even if the device is actually compliant. In such cases, compliance may be demonstrated by performing radiated tests around the frequencies at which the apparent failures occurred. |

3.6.4 Test Setup





3.6.5 Transmitter Radiated Bandedge Emissions (with Antenna)

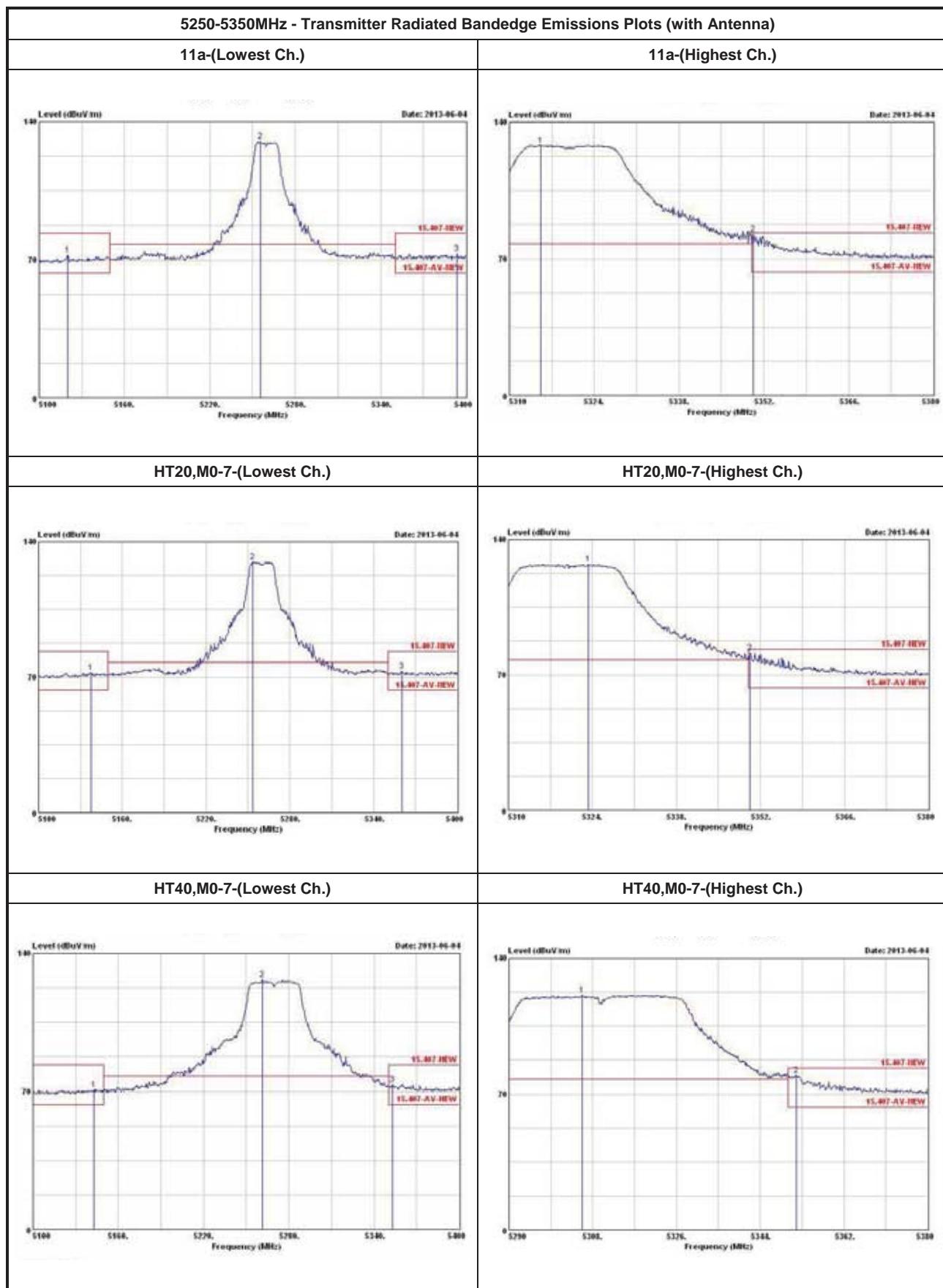
| U-NII 5250-5350MHz Transmitter Radiated Bandedge (with Antenna) | | | | | | | | | | |
|---|-----------------|-------------|----------------------|----------------|-------------------|-------------------|----------------|-------------------|-------------------|------|
| Modulation Mode | N _{TX} | Freq. (MHz) | Measure Distance (m) | Freq. (MHz) PK | Level (dBuV/m) PK | Limit (dBuV/m) PK | Freq. (MHz) AV | Level (dBuV/m) AV | Limit (dBuV/m) AV | Pol. |
| 11a | 1 | 5320 | 1 | 5350.250 | 82.53 | 83.54 | 5350.180 | 61.98 | 63.54 | H |
| HT20,M0-7 | 1 | 5320 | 1 | 5350.250 | 81.58 | 83.54 | 5350.180 | 61.48 | 63.54 | H |
| HT20,M0-23 | 3 | 5320 | 1 | 5351.650 | 76.40 | 83.54 | 5350.000 | 60.76 | 63.54 | H |
| HT40,M0-7 | 1 | 5310 | 1 | 5351.740 | 79.69 | 83.54 | 5350.030 | 61.67 | 63.54 | H |
| HT40,M0-23 | 3 | 5310 | 1 | 5352.190 | 78.37 | 83.54 | 5351.020 | 62.06 | 63.54 | H |

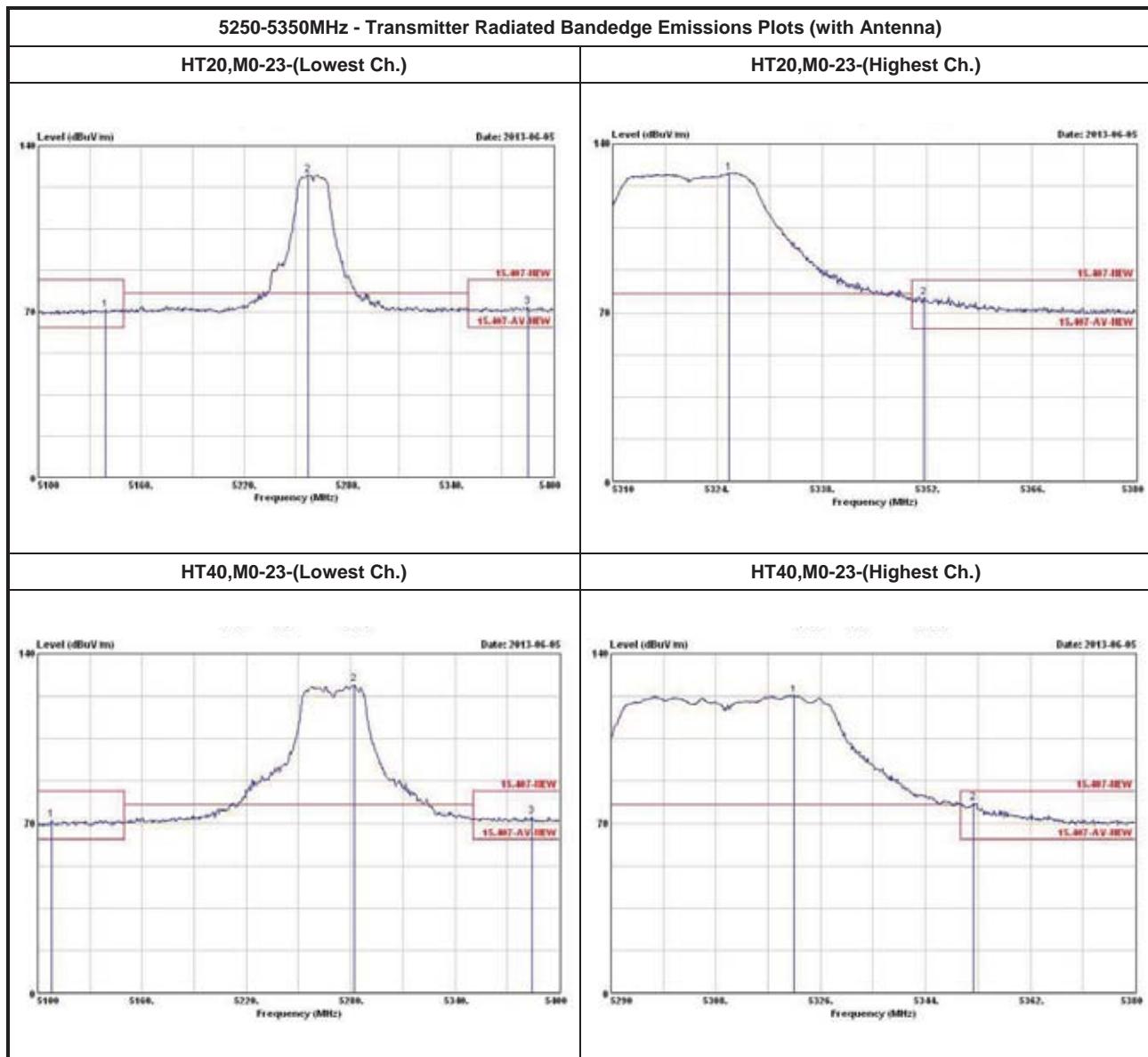
Note 1: Measurement worst emissions of receive antenna polarization.

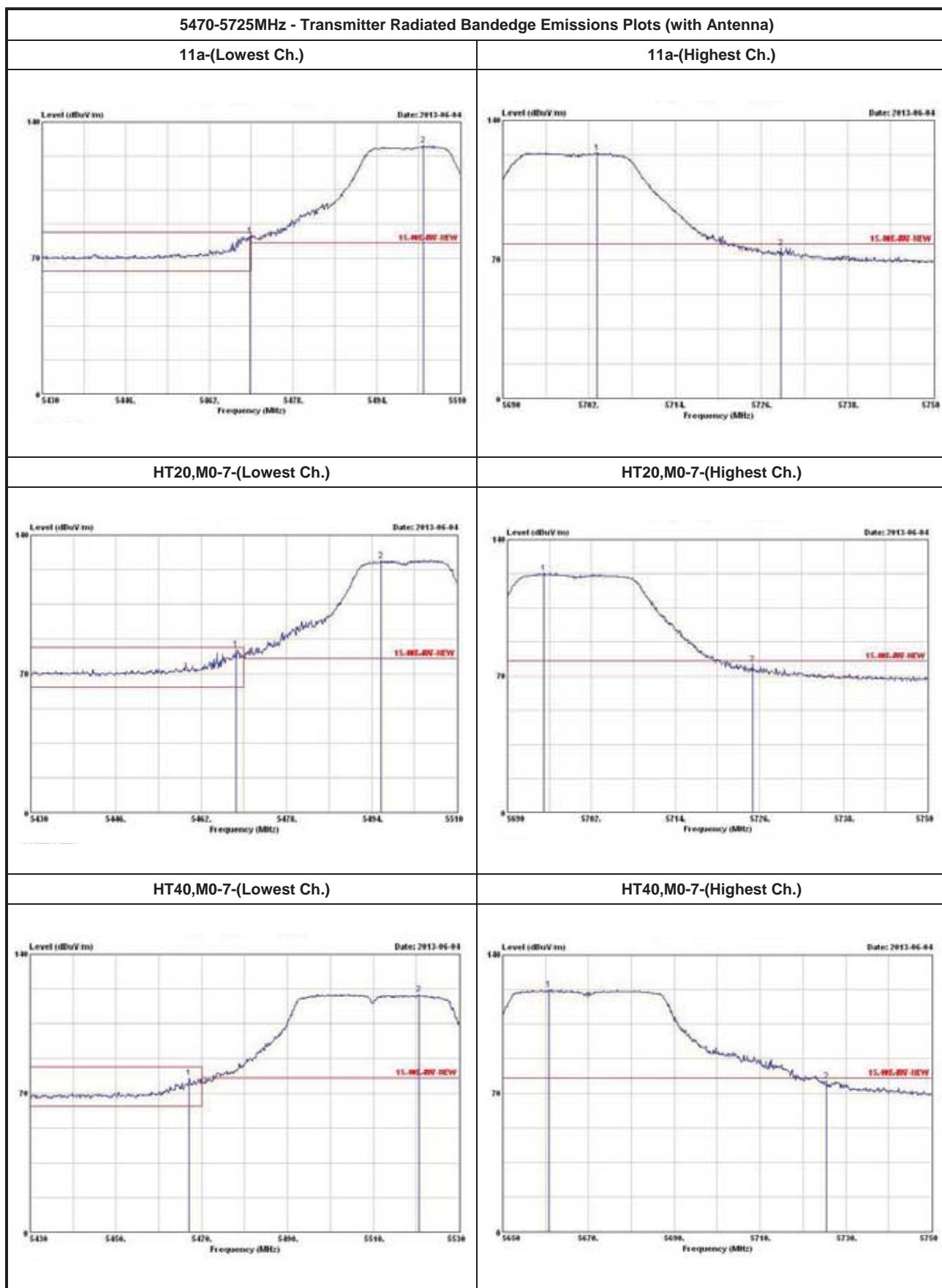
| U-NII 5470-5725MHz Transmitter Radiated Bandedge (with Antenna) | | | | | | | | | | |
|---|-----------------|-------------|----------------------|----------------|-------------------|-------------------|----------------|-------------------|-------------------|------|
| Modulation Mode | N _{TX} | Freq. (MHz) | Measure Distance (m) | Freq. (MHz) PK | Level (dBuV/m) PK | Limit (dBuV/m) PK | Freq. (MHz) AV | Level (dBuV/m) AV | Limit (dBuV/m) AV | Pol. |
| 11a | 1 | 5500 | 1 | 5469.840 | 81.69 | 83.54 | 5469.600 | 59.91 | 63.54 | H |
| 11a | 1 | 5700 | 1 | 5728.760 | 75.96 | 83.54 | 5725.220 | 59.36 | 63.54 | H |
| HT20,M0-7 | 1 | 5500 | 1 | 5468.560 | 82.30 | 83.54 | 5470.000 | 60.33 | 63.54 | H |
| HT20,M0-7 | 1 | 5700 | 1 | 5725.000 | 76.29 | 83.54 | 5725.000 | 59.34 | 63.54 | H |
| HT20,M0-23 | 3 | 5500 | 1 | 5468.000 | 74.41 | 83.54 | 5468.560 | 59.51 | 63.54 | H |
| HT20,M0-23 | 3 | 5700 | 1 | 5728.520 | 75.89 | 83.54 | 5727.140 | 61.11 | 63.54 | H |
| HT40,M0-7 | 1 | 5510 | 1 | 5467.100 | 77.72 | 83.54 | 5470.000 | 61.39 | 63.54 | H |
| HT40,M0-7 | 1 | 5670 | 1 | 5725.400 | 76.15 | 83.54 | 5725.400 | 58.85 | 63.54 | H |
| HT40,M0-23 | 3 | 5510 | 1 | 5469.400 | 78.89 | 83.54 | 5468.200 | 61.67 | 63.54 | H |
| HT40,M0-23 | 3 | 5670 | 1 | 5726.700 | 76.39 | 83.54 | 5726.600 | 60.84 | 63.54 | H |

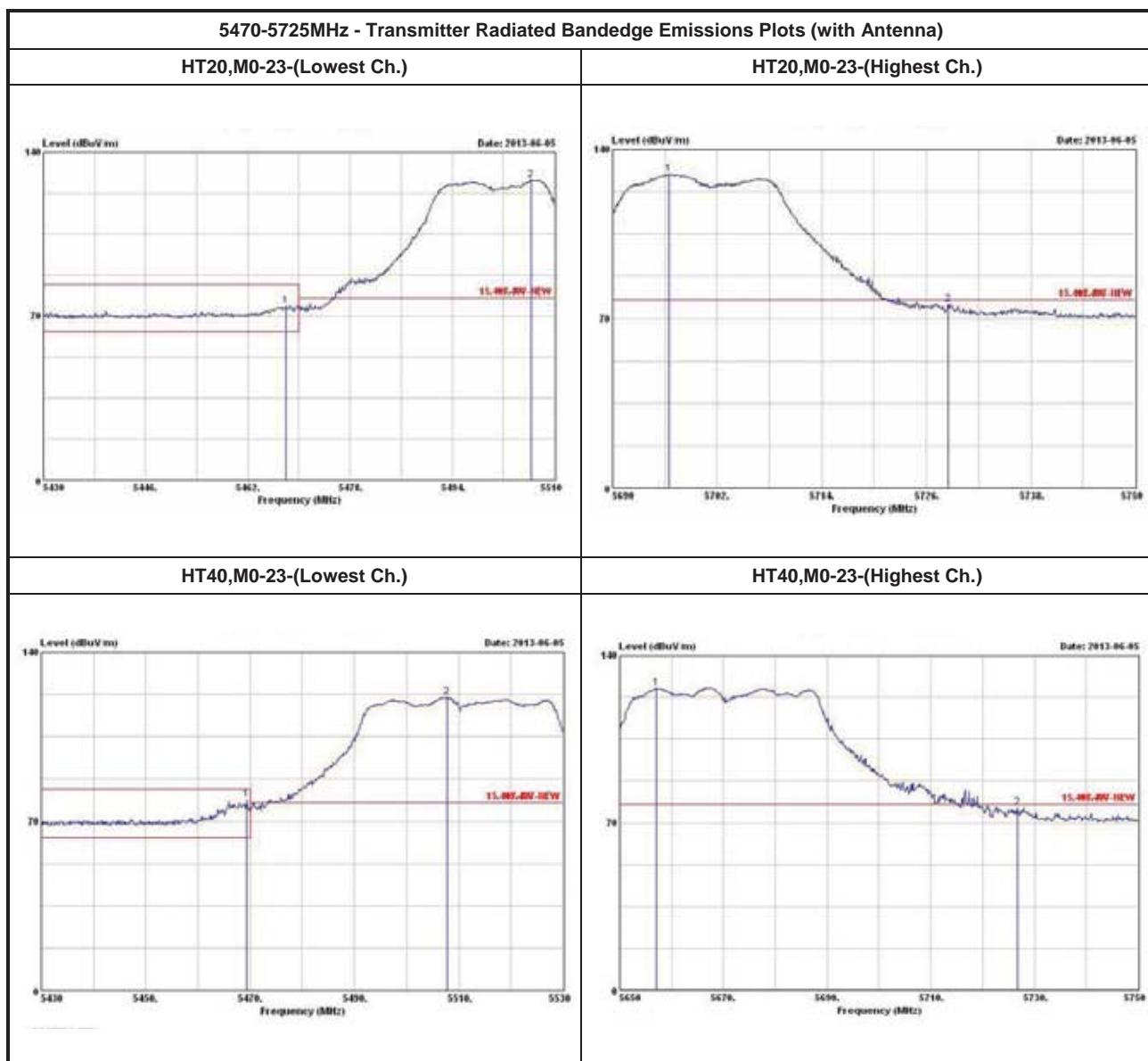
Note 1: Measurement worst emissions of receive antenna polarization.

3m->1m=9.54dB; 3m->1.5m=6.02dB











3.7 Transmitter Radiated Unwanted Emissions

3.7.1 Transmitter Radiated Unwanted Emissions Limit

| Unwanted emissions below 1 GHz and restricted band emissions above 1GHz limit | | | |
|---|-----------------------|-------------------------|----------------------|
| Frequency Range (MHz) | Field Strength (uV/m) | Field Strength (dBuV/m) | Measure Distance (m) |
| 0.009~0.490 | 2400/F(kHz) | 48.5 - 13.8 | 300 |
| 0.490~1.705 | 24000/F(kHz) | 33.8 - 23 | 30 |
| 1.705~30.0 | 30 | 29 | 30 |
| 30~88 | 100 | 40 | 3 |
| 88~216 | 150 | 43.5 | 3 |
| 216~960 | 200 | 46 | 3 |
| Above 960 | 500 | 54 | 3 |

Note 1: Test distance for frequencies at or above 30 MHz, measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).

Note 2: Test distance for frequencies at below 30 MHz, measurements may be performed at a distance closer than the EUT limit distance; however, an attempt should be made to avoid making measurements in the near field. When performing measurements below 30 MHz at a closer distance than the limit distance, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two or more distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade). The test report shall specify the extrapolation method used to determine compliance of the EUT.

| Un-restricted band emissions above 1GHz Limit | |
|---|---|
| Operating Band | Limit |
| 5.15 - 5.25 GHz | e.i.r.p. -27 dBm [68.2 dBuV/m@3m] |
| 5.25 - 5.35 GHz | e.i.r.p. -27 dBm [68.2 dBuV/m@3m] |
| 5.47 - 5.725 GHz | e.i.r.p. -27 dBm [68.2 dBuV/m@3m] |
| 5.725 - 5.825 GHz | 5.715 5.725 GHz: e.i.r.p. -17 dBm [78.2 dBuV/m@3m] 5.825 5.835 GHz: e.i.r.p. -17 dBm [78.2 dBuV/m@3m] Other un-restricted band: e.i.r.p. -27 dBm [68.2 dBuV/m@3m] |

Note 1: Measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).

3.7.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

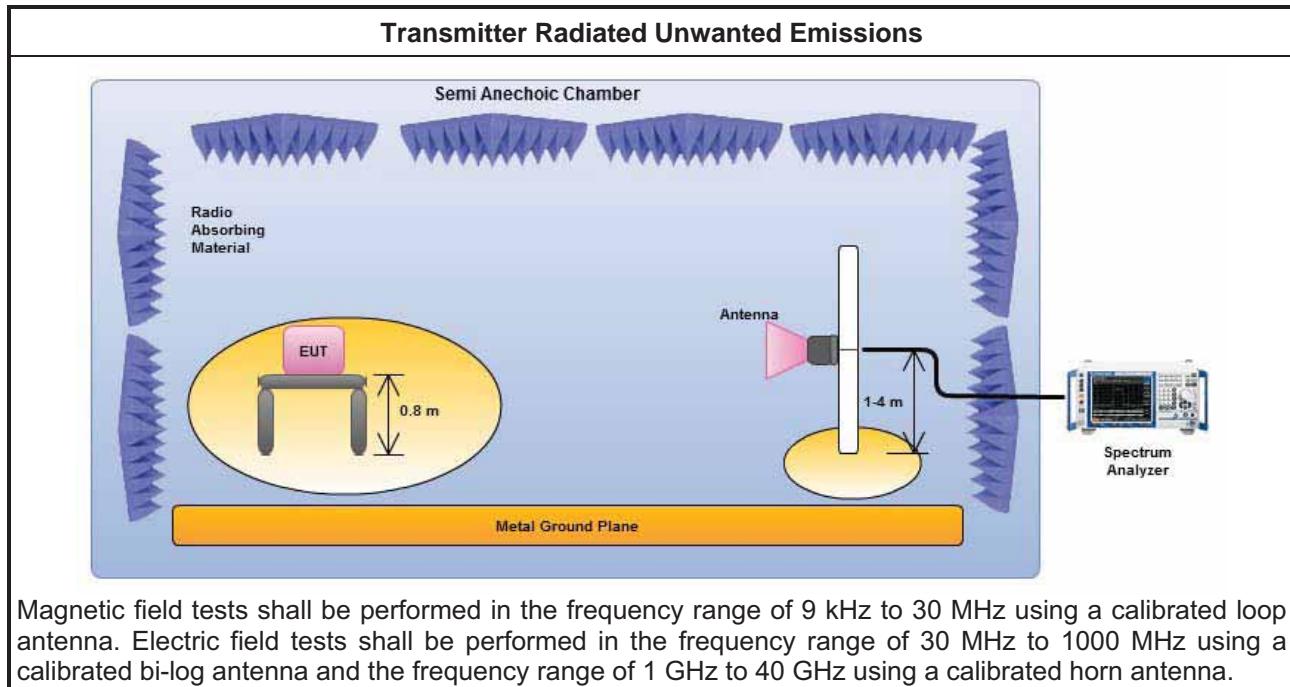


3.7.3 Test Procedures

| Test Method |
|--|
| <input checked="" type="checkbox"/> Measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. Measurements shall not be performed at a distance greater than 30 m for frequencies above 30 MHz, unless it can be further demonstrated that measurements at a distance of 30 m or less are impractical. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements). |
| <input checked="" type="checkbox"/> Measurements in the frequency range 5 GHz - 10GHz are typically made at a closer distance 1.5m, because the instrumentation noise floor is typically close to the radiated emission limit. |
| <input checked="" type="checkbox"/> Measurements in the frequency range 10 GHz - 18GHz are typically made at a closer distance 1m, because the instrumentation noise floor is typically close to the radiated emission limit. |
| <input checked="" type="checkbox"/> Measurements in the frequency range above 18 GHz - 40GHz are typically made at a closer distance 0.5m, because the instrumentation noise floor is typically close to the radiated emission limit. |
| <input checked="" type="checkbox"/> The average emission levels shall be measured in [duty cycle \geq 98 or duty factor]. |
| <input checked="" type="checkbox"/> For the transmitter unwanted emissions shall be measured using following options below: |
| <input checked="" type="checkbox"/> Refer as FCC KDB 789033, clause H)2) for unwanted emissions into non-restricted bands. |
| <input checked="" type="checkbox"/> Refer as FCC KDB 789033, clause H)1) for unwanted emissions into restricted bands. |
| <input type="checkbox"/> Refer as FCC KDB 789033, H)6) Method AD (Trace Averaging). |
| <input type="checkbox"/> Refer as FCC KDB 789033, H)6) Method VB (Reduced VBW). |
| <input checked="" type="checkbox"/> Refer as ANSI C63.10, clause 4.2.3.2.3 (Reduced VBW). VBW \geq 1/T, where T is pulse time. |
| <input type="checkbox"/> Refer as ANSI C63.10, clause 4.2.3.2.4 average value of pulsed emissions. |
| <input checked="" type="checkbox"/> Refer as FCC KDB 789033, clause H)5) measurement procedure peak limit. |
| <input type="checkbox"/> Refer as ANSI C63.10, clause 4.2.3.2.2 measurement procedure peak limit. |
| <input checked="" type="checkbox"/> For radiated measurement. |
| <input checked="" type="checkbox"/> Refer as ANSI C63.10, clause 6.4 for radiated emissions from below 30 MHz. |
| <input checked="" type="checkbox"/> Refer as ANSI C63.10, clause 6.5 for radiated emissions from 30 MHz to 1000 MHz. |
| <input checked="" type="checkbox"/> Refer as ANSI C63.10, clause 6.6 for radiated emissions from above 1 GHz. |

| Test Method | |
|---|--|
| <input type="checkbox"/> For conducted and cabinet radiation measurement, refer as FCC KDB 789033, clause H)3). | |
| <input type="checkbox"/> | For conducted unwanted emissions into non-restricted bands (relative emission limits). Devices with multiple transmit chains: Refer as FCC KDB 662911, when testing out-of-band and spurious emissions against relative emission limits, tests may be performed on each output individually without summing or adding $10 \log(N)$ if the measurements are made relative to the in-band emissions on the individual outputs. |
| <input type="checkbox"/> | For conducted unwanted emissions into restricted bands (absolute emission limits). Devices with multiple transmit chains using options given below: (1) Measure and sum the spectra across the outputs or (2) Measure and add $10 \log(N)$ dB |
| <input type="checkbox"/> | For FCC KDB 662911 The methodology described here may overestimate array gain, thereby resulting in apparent failures to satisfy the out-of-band limits even if the device is actually compliant. In such cases, compliance may be demonstrated by performing radiated tests around the frequencies at which the apparent failures occurred. |

3.7.4 Test Setup

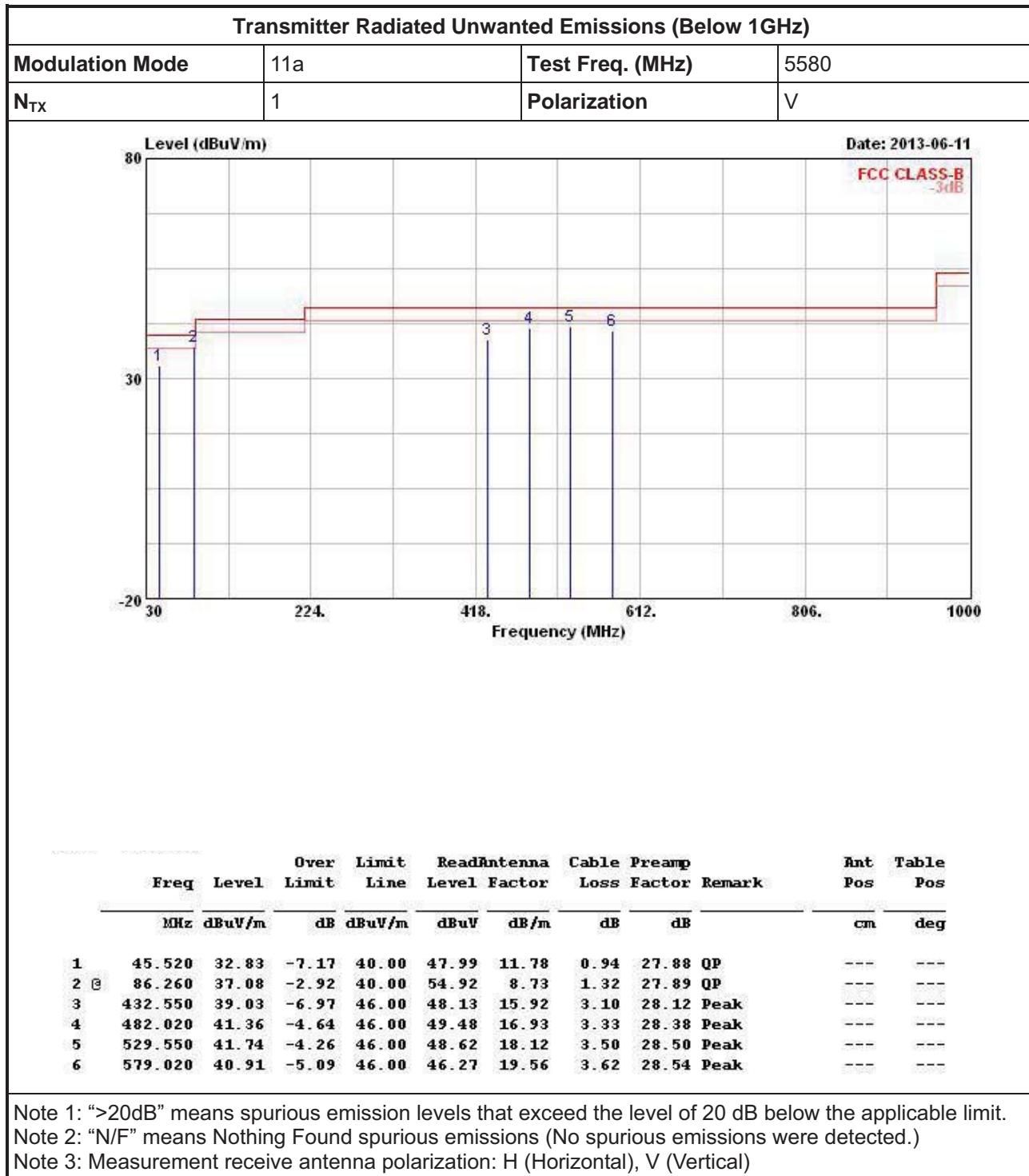


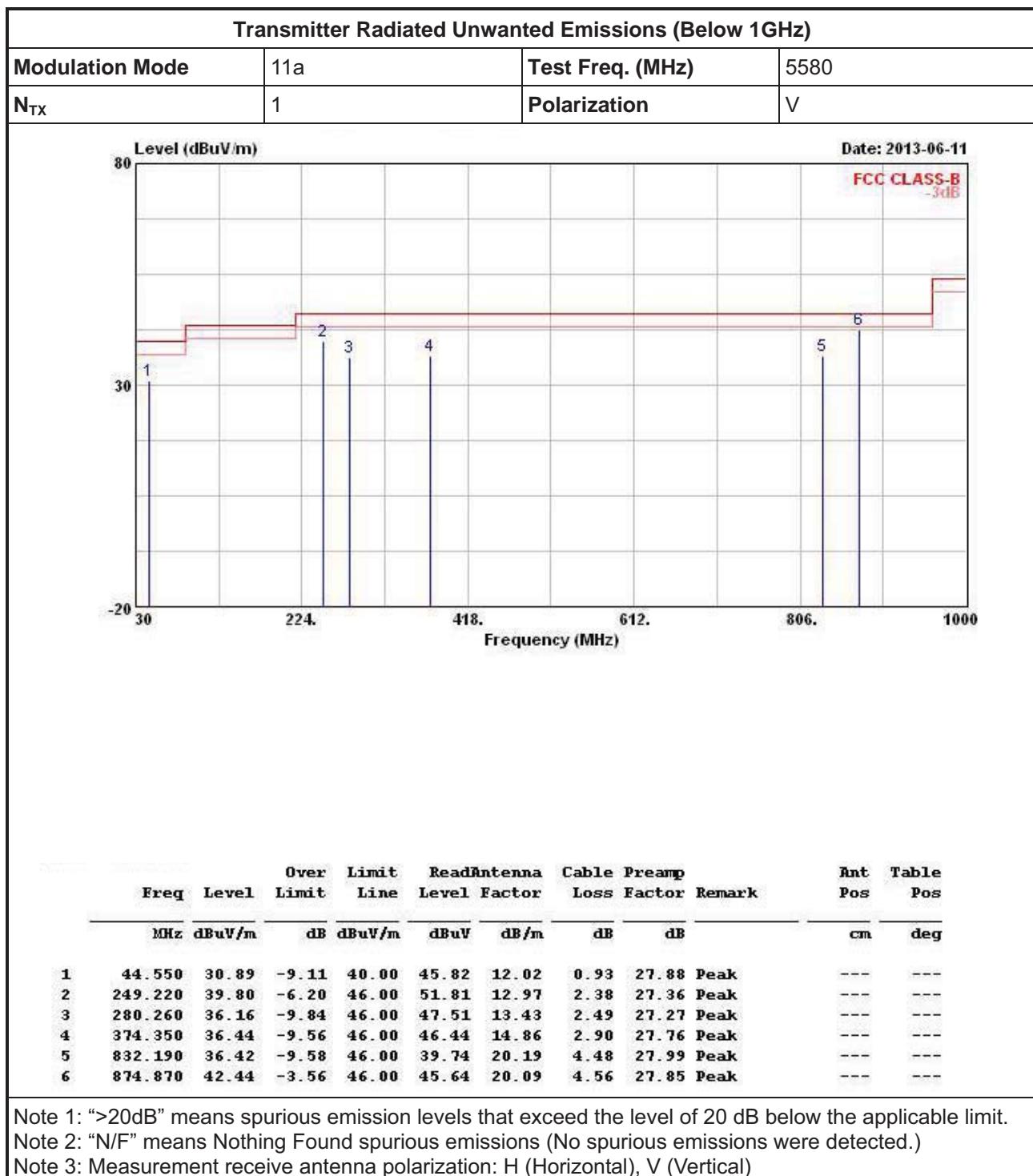
3.7.5 Transmitter Radiated Unwanted Emissions (Below 30MHz)

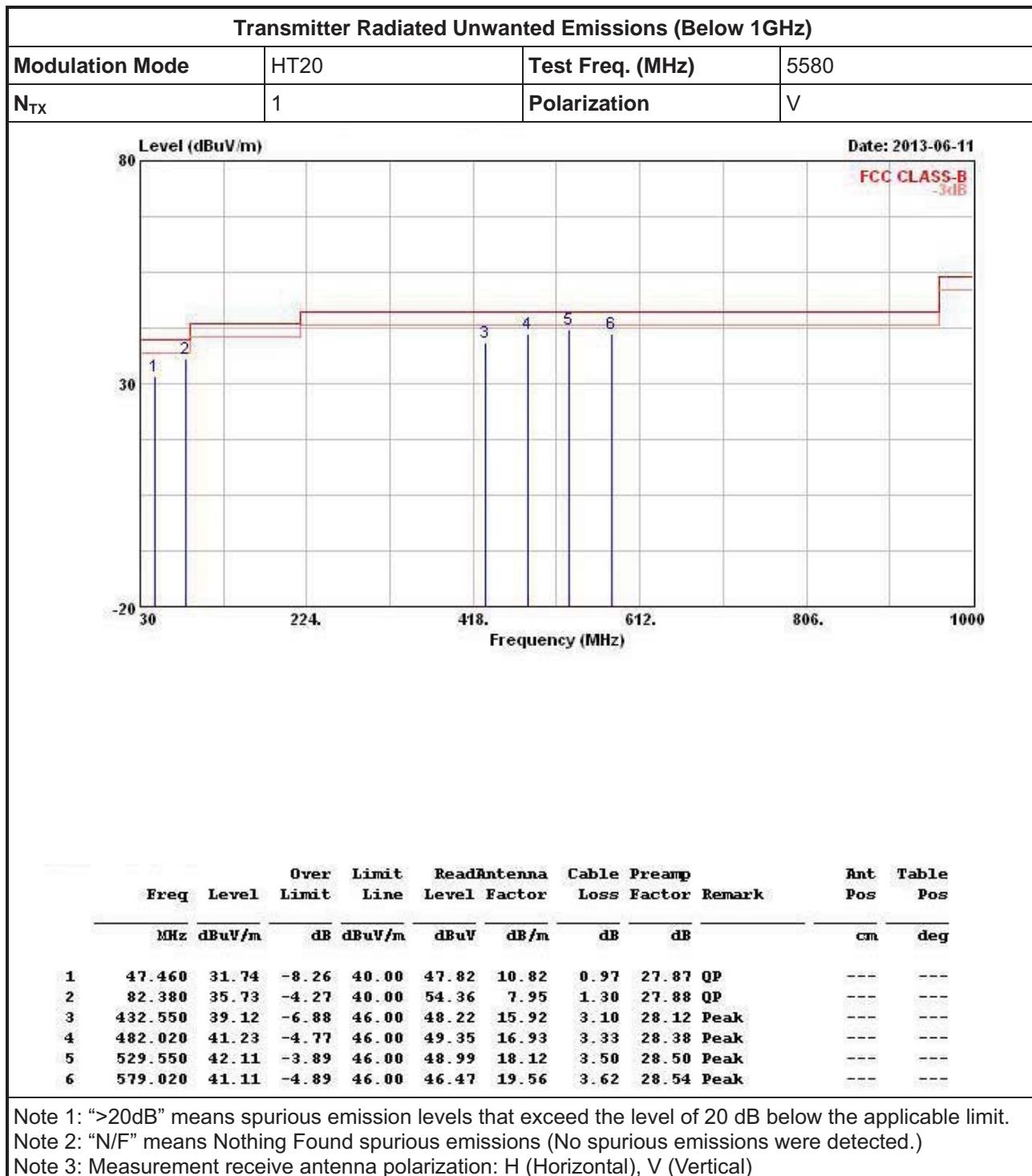
All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

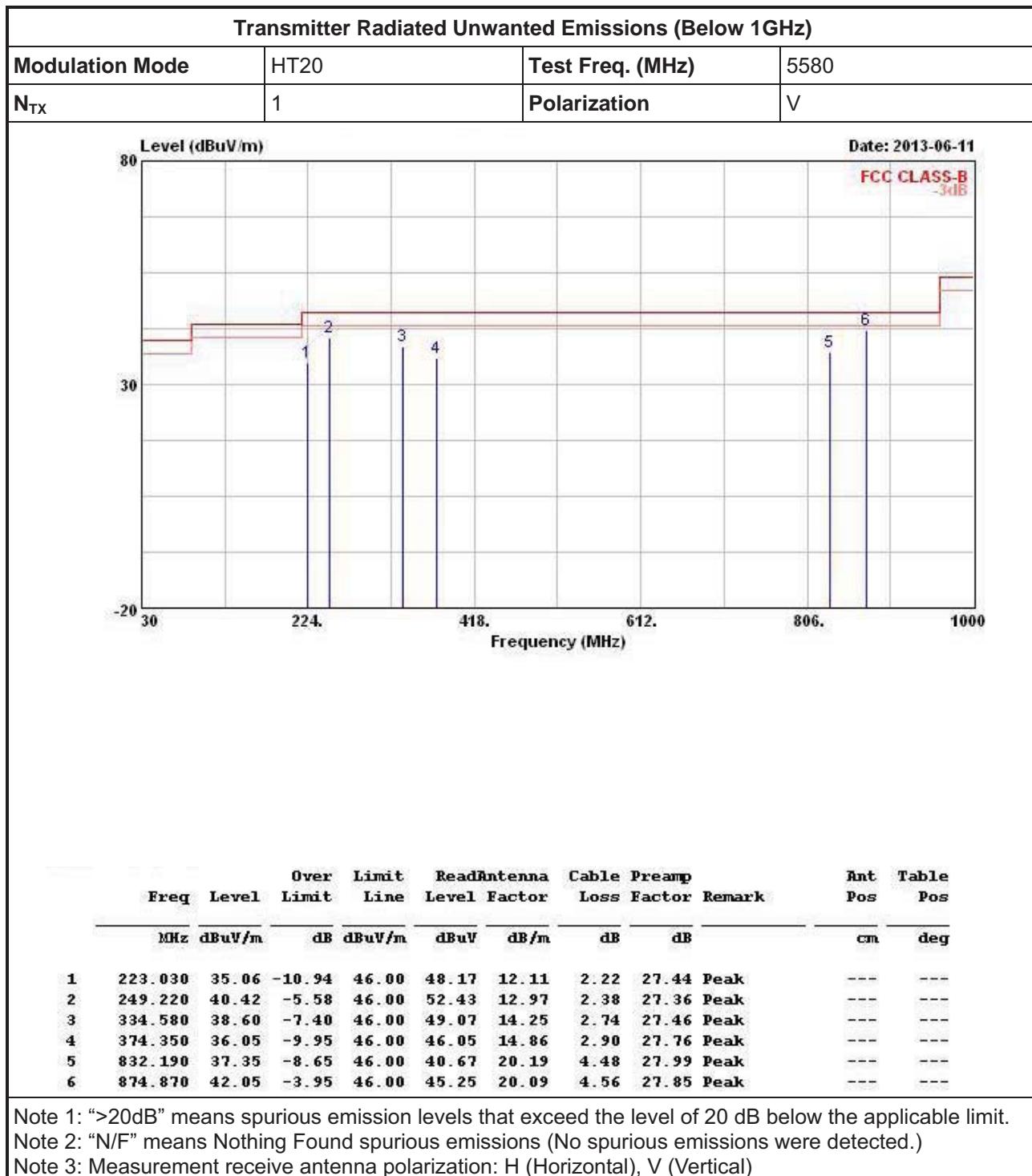


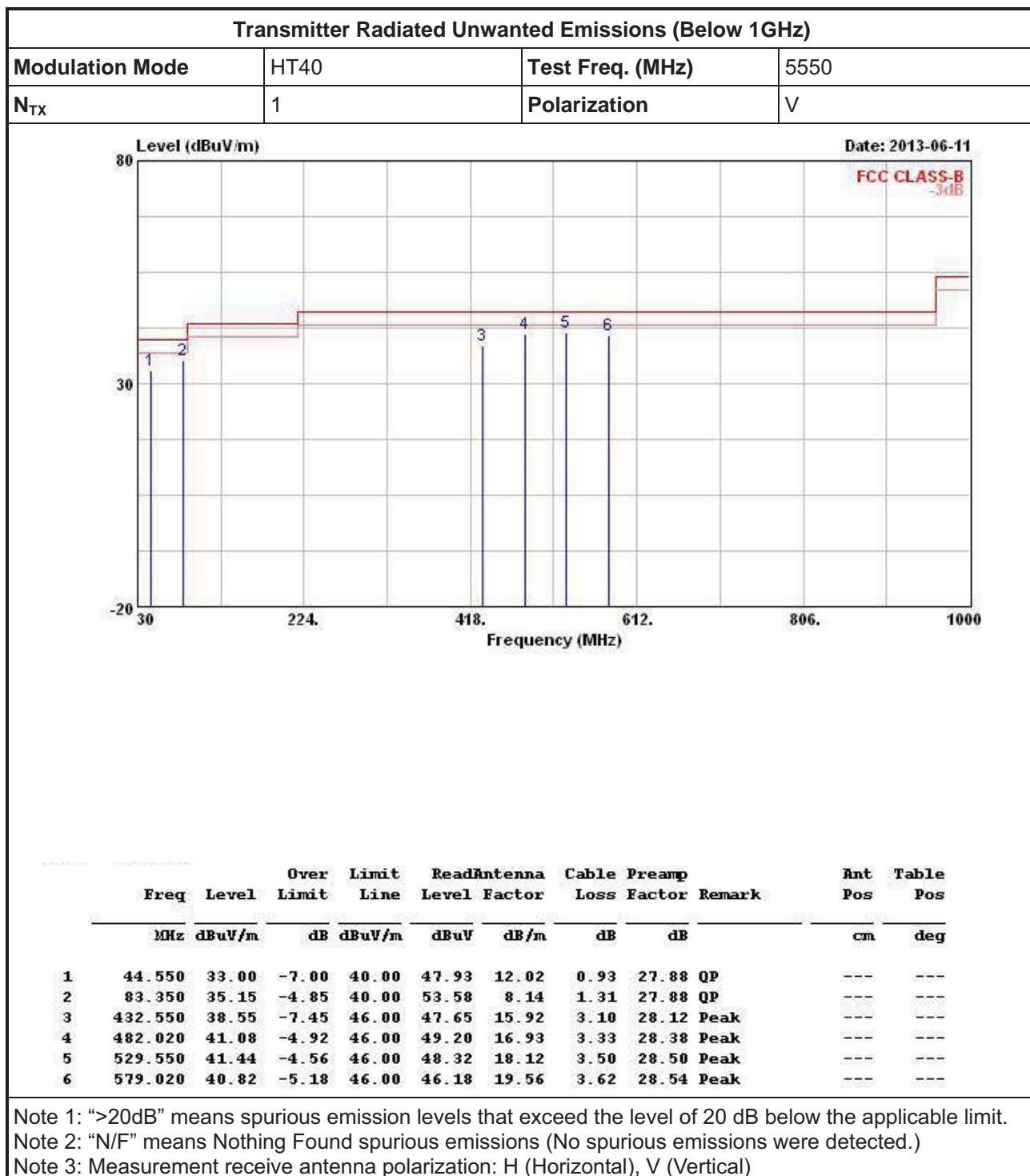
3.7.6 Transmitter Radiated Unwanted Emissions (Below 1GHz)

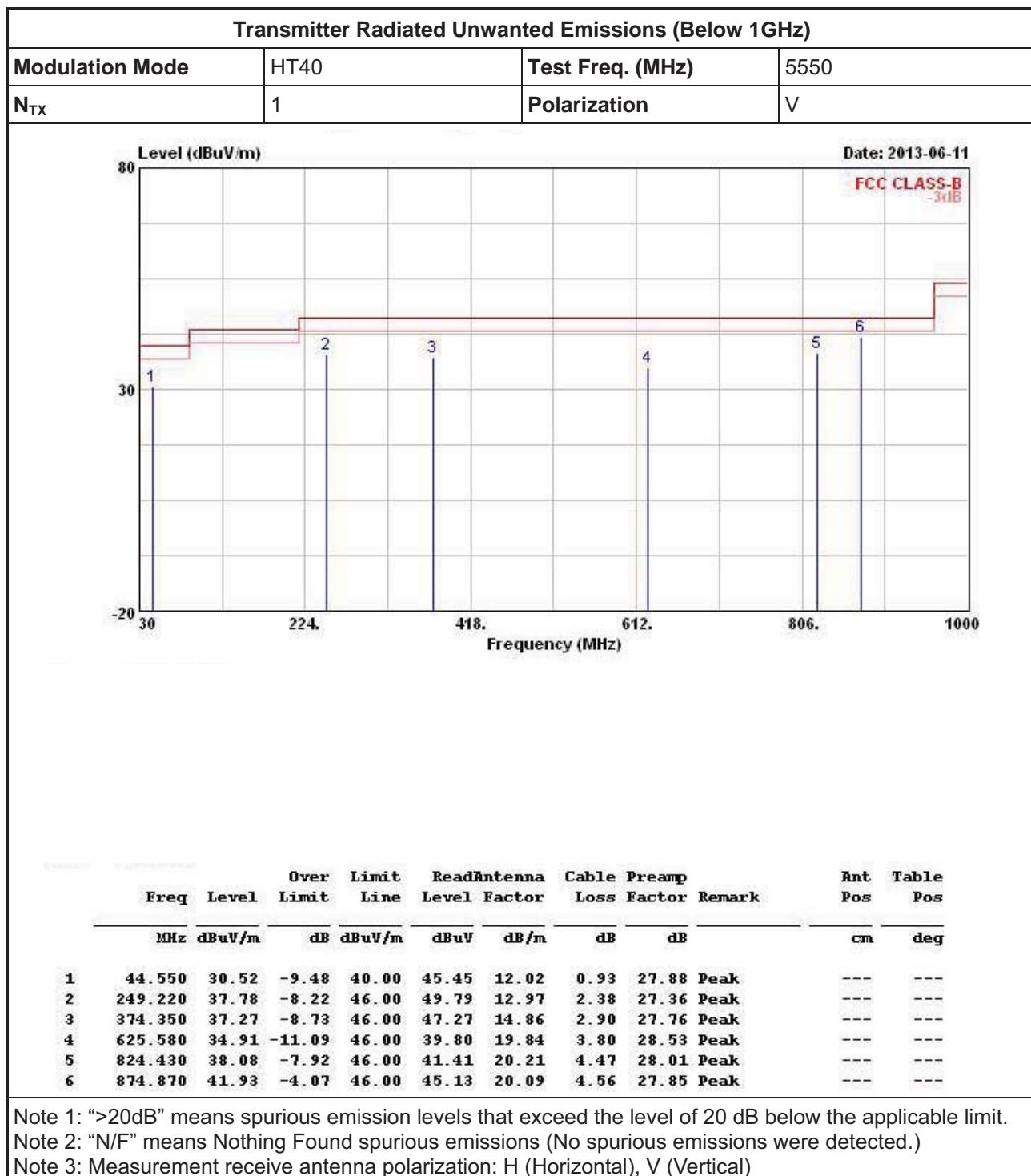










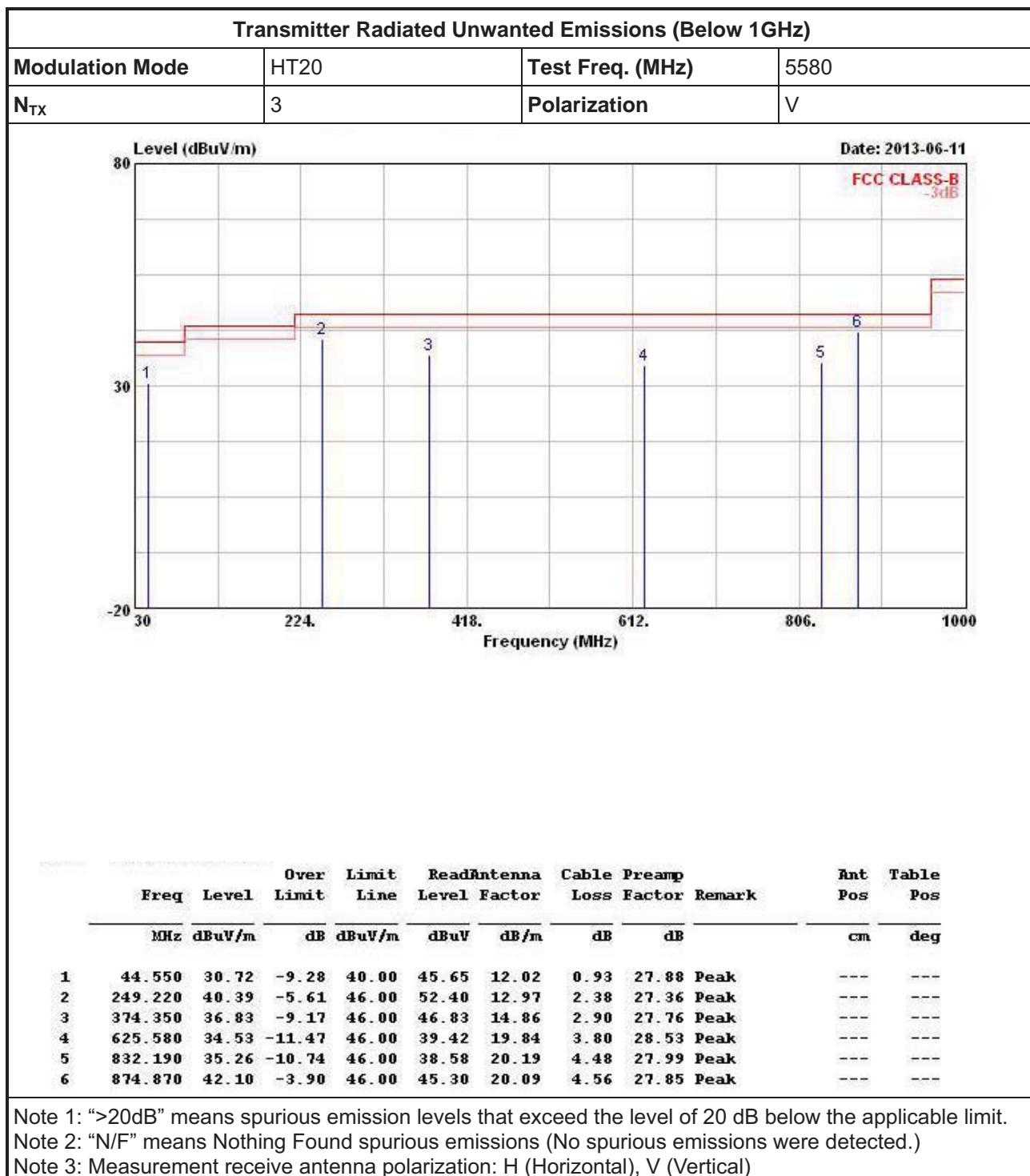


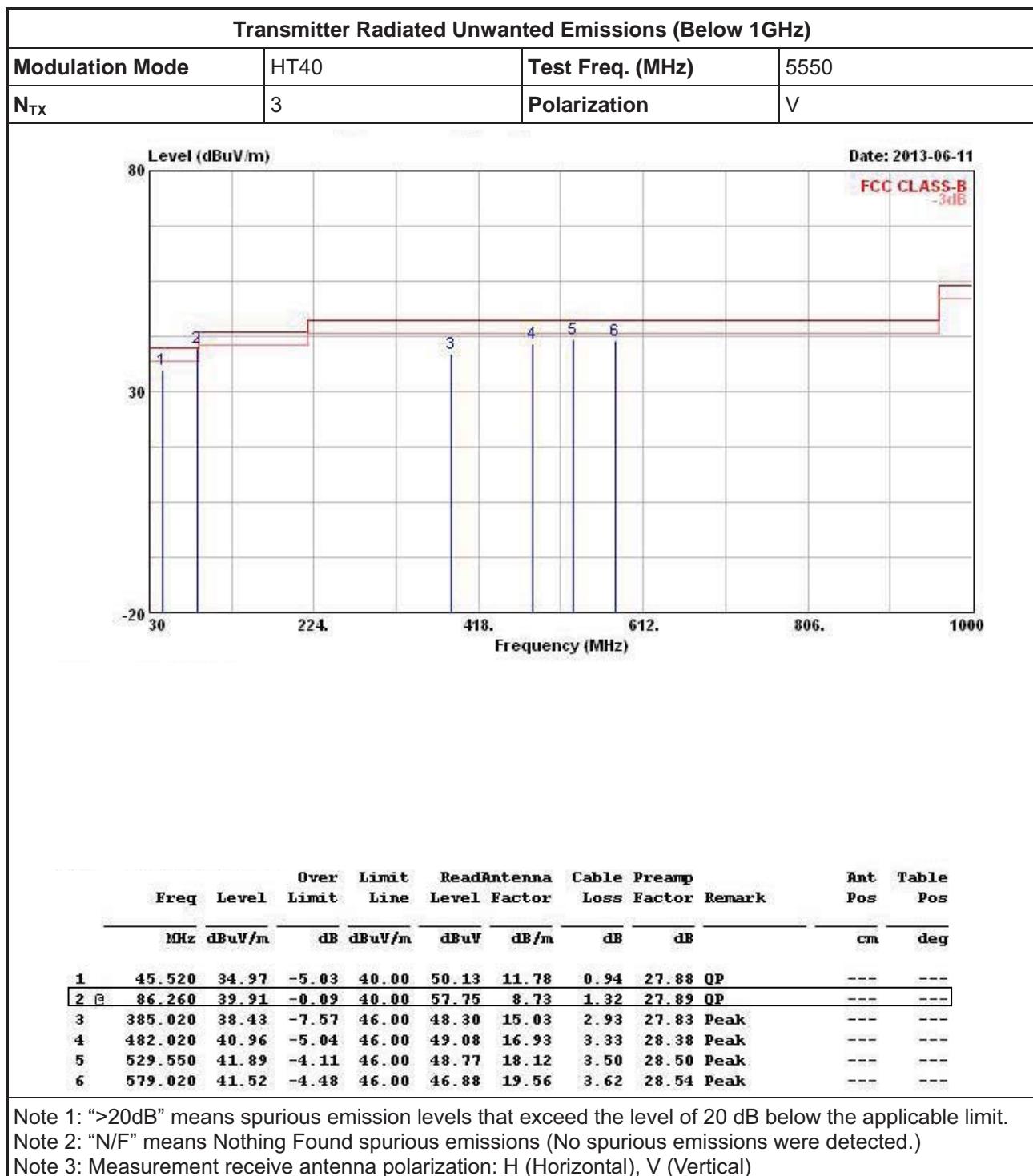


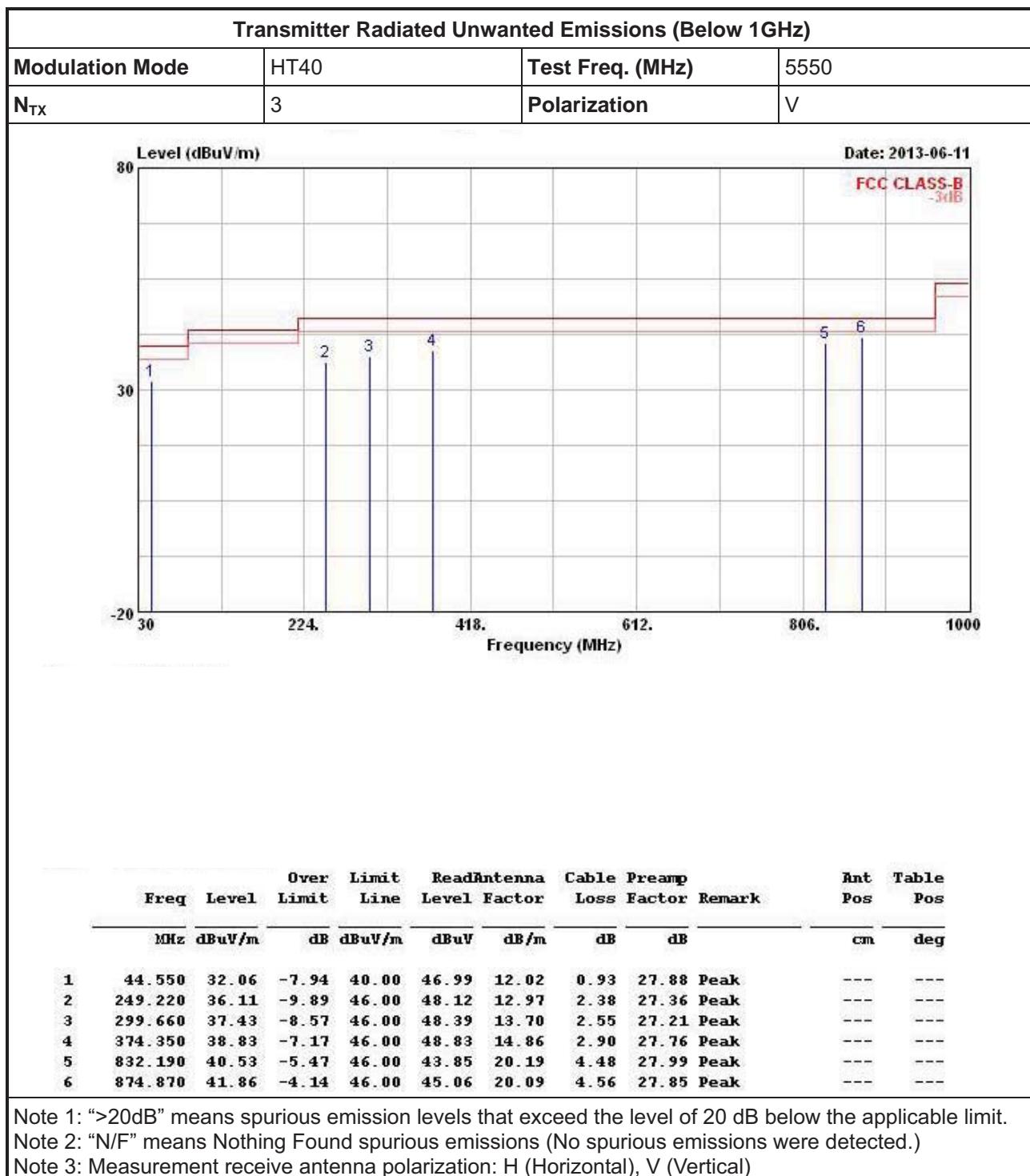
Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

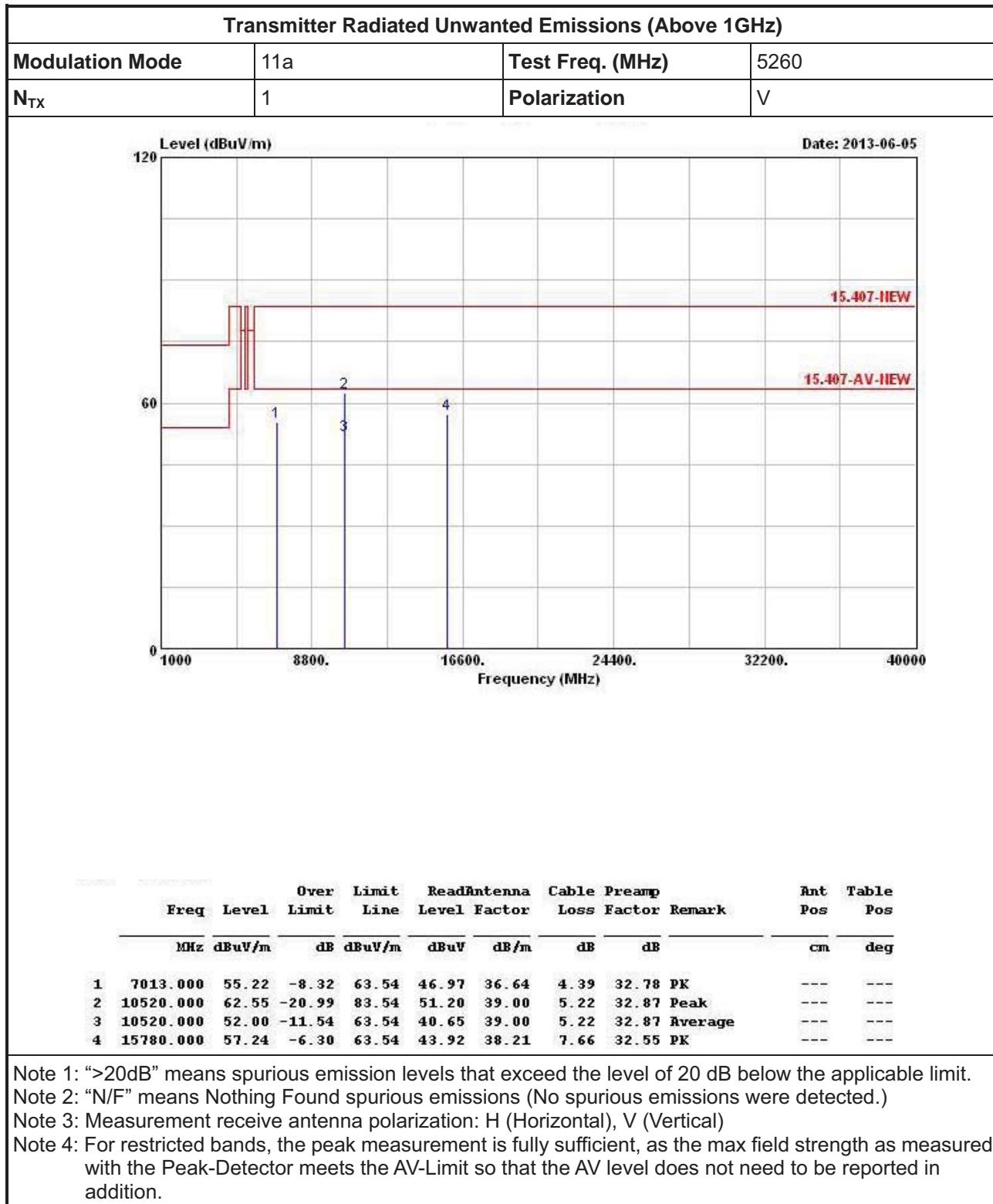


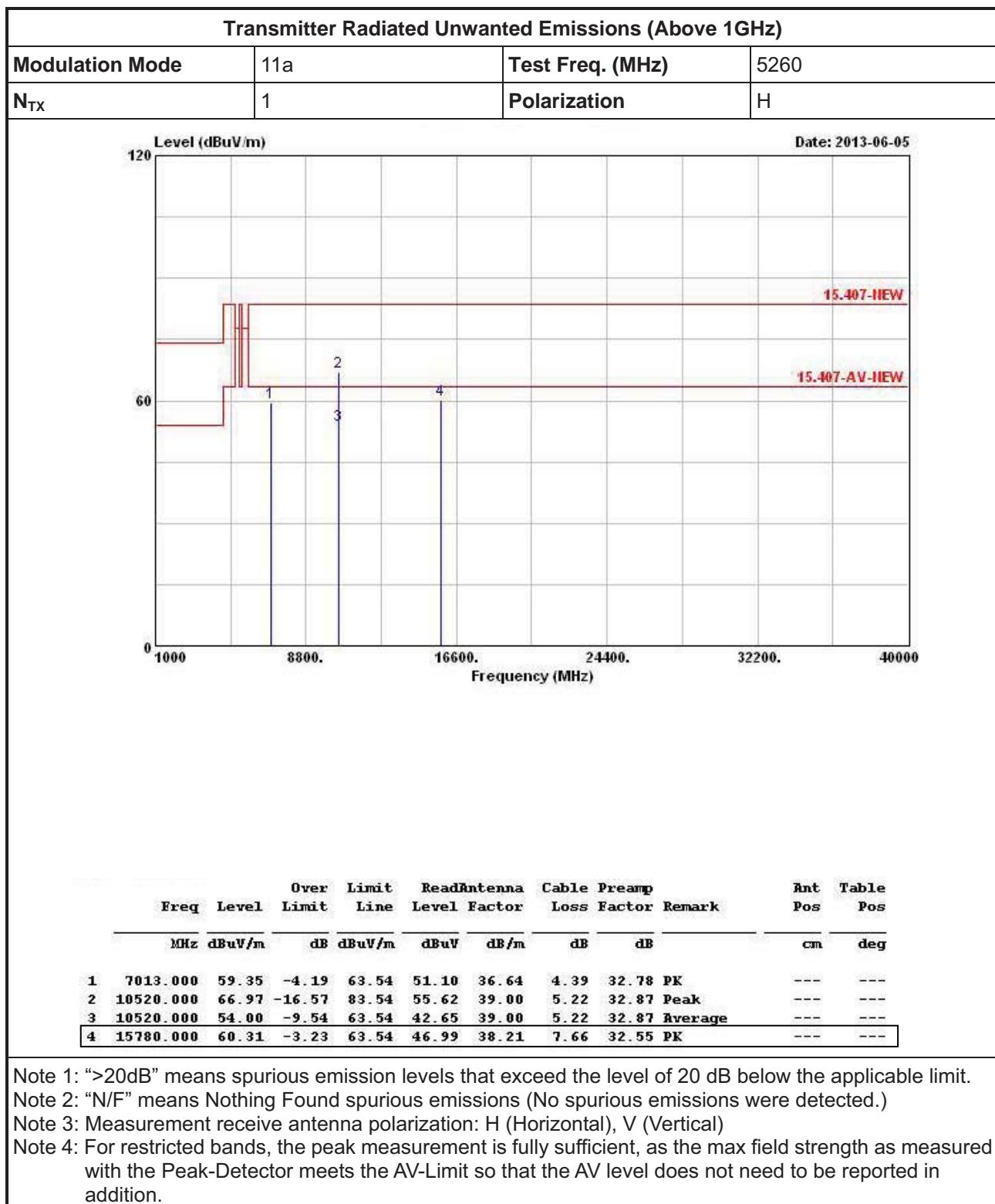


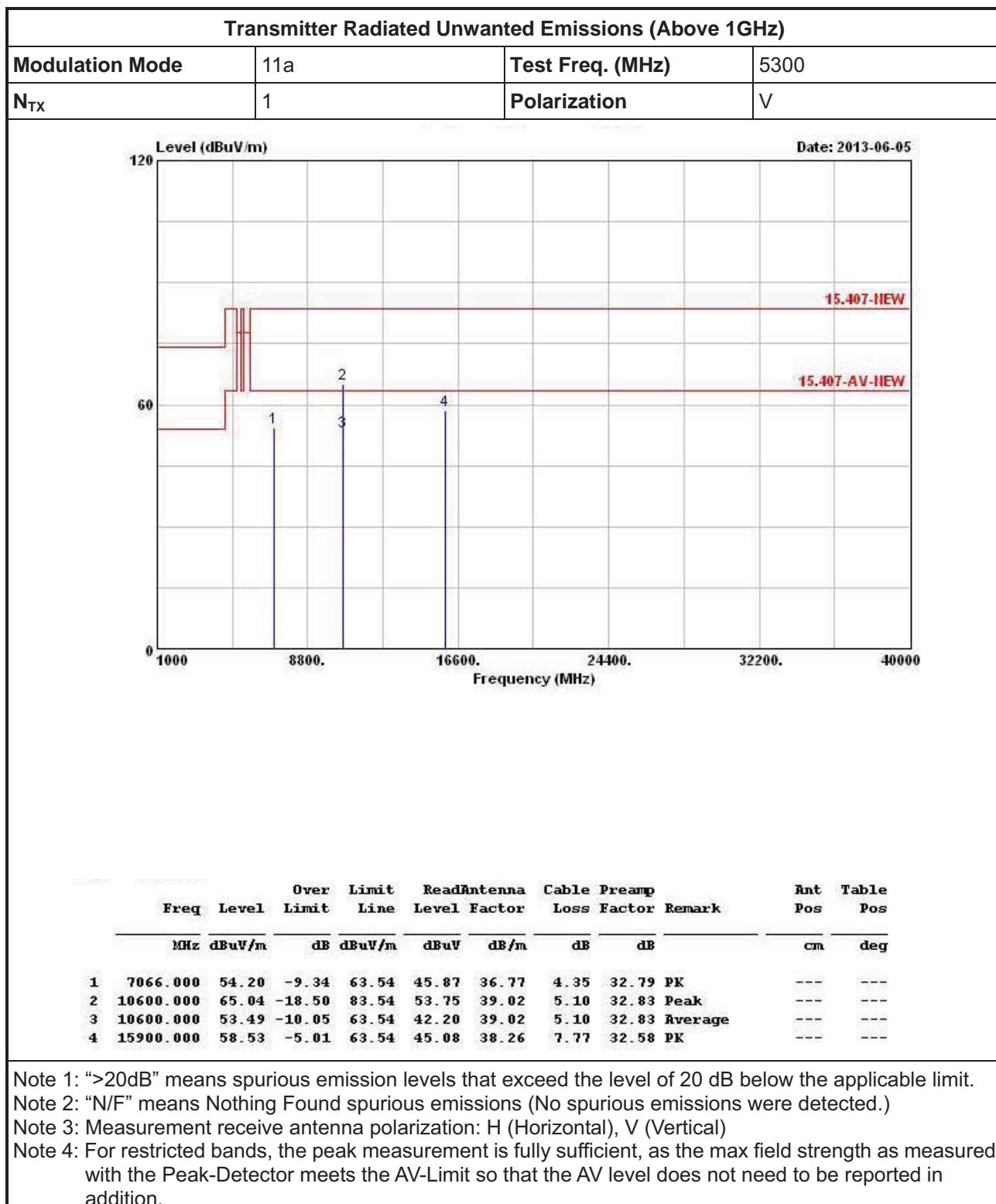


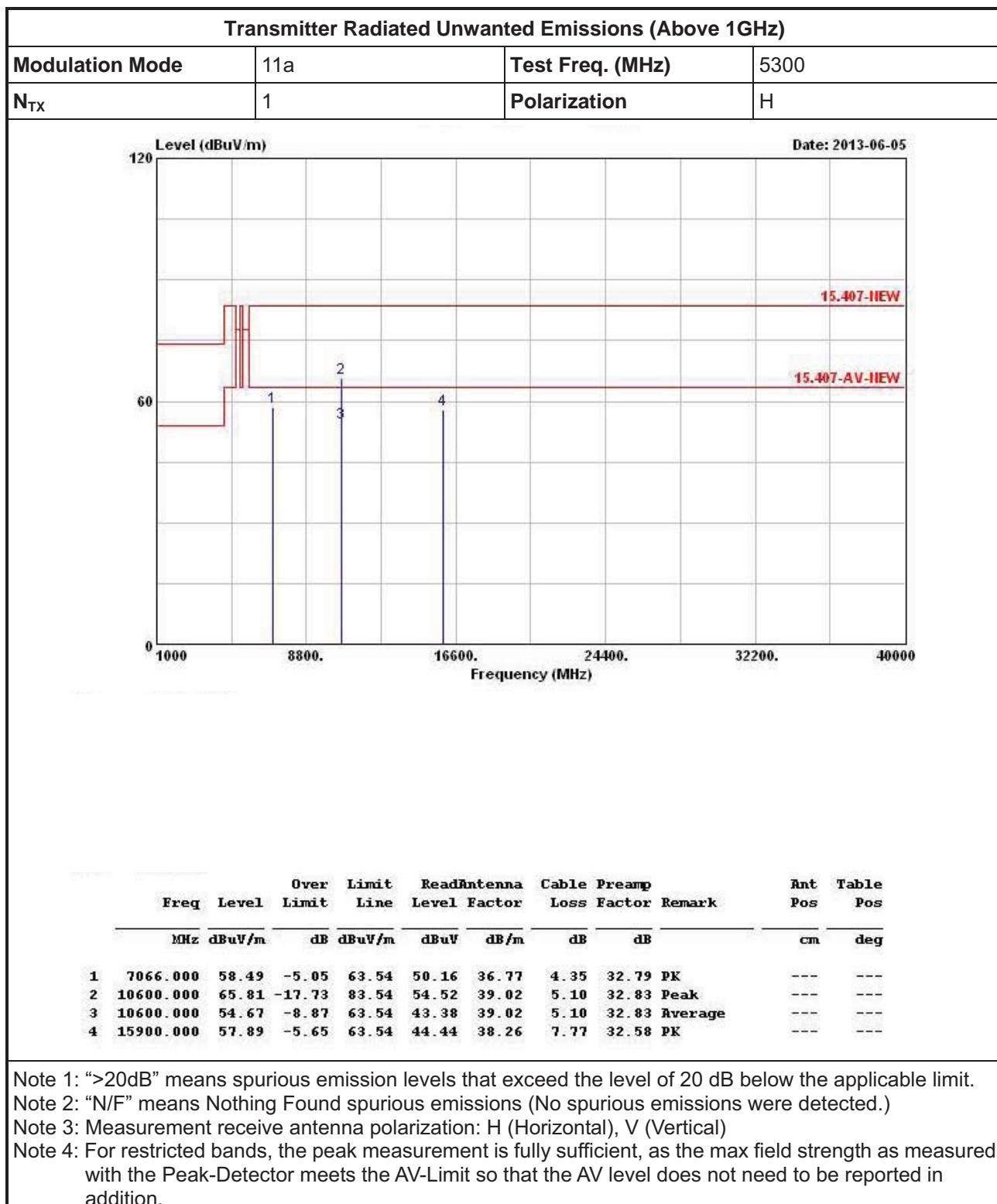


3.7.7 Transmitter Radiated Unwanted Emissions (Above 1GHz) for 5250-5350MHz





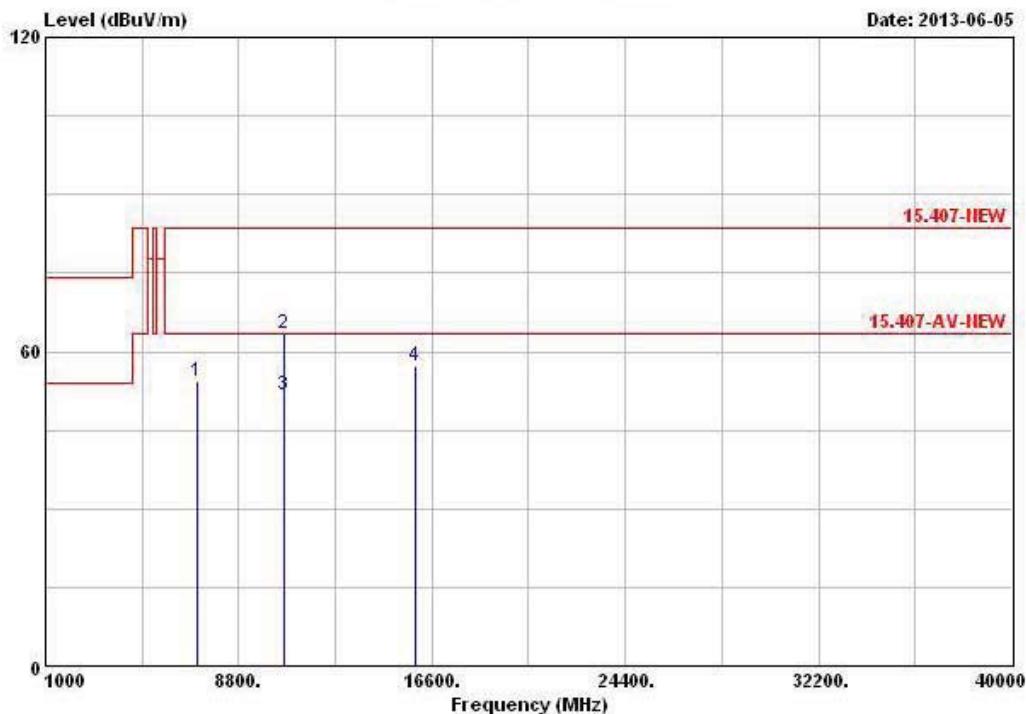






Transmitter Radiated Unwanted Emissions (Above 1GHz)

| | | | |
|-----------------|-----|------------------|------|
| Modulation Mode | 11a | Test Freq. (MHz) | 5320 |
| N _{TX} | 1 | Polarization | V |



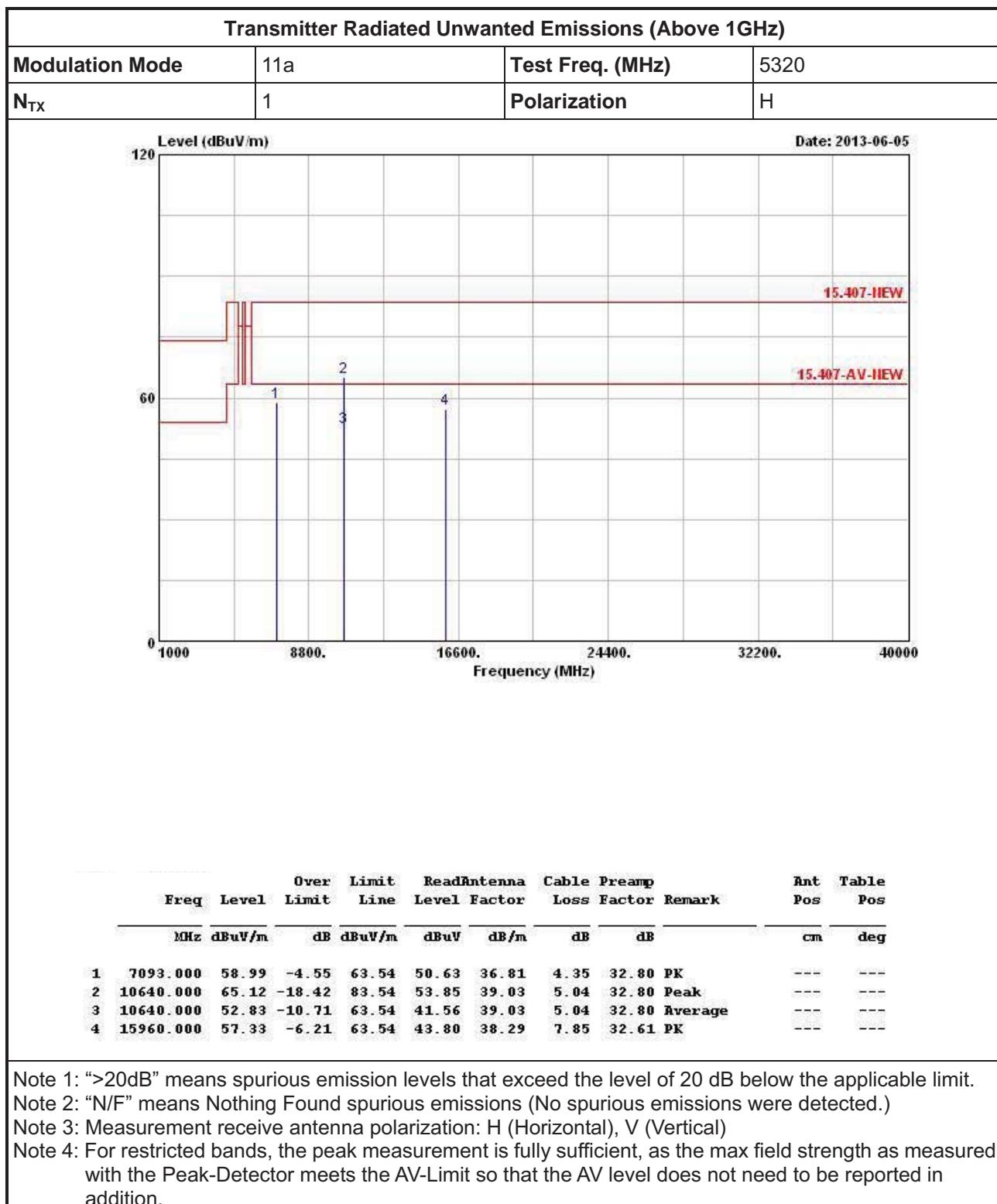
| Freq | Level | Over Limit | Line | Read | Antenna | Cable Preamp | | | Ant | Table |
|-------------|--------|------------|--------|-------|---------|--------------|-------|---------|-----|-------|
| | | | | | | Antenna | Cable | Preamp | | |
| MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | dB | cm | deg |
| 1 7093.000 | 54.45 | -9.09 | 63.54 | 46.09 | 36.81 | 4.35 | 32.80 | PK | --- | --- |
| 2 10640.000 | 63.26 | -20.28 | 83.54 | 51.99 | 39.03 | 5.04 | 32.80 | Peak | --- | --- |
| 3 10640.000 | 51.63 | -11.91 | 63.54 | 40.36 | 39.03 | 5.04 | 32.80 | Average | --- | --- |
| 4 15960.000 | 57.22 | -6.32 | 63.54 | 43.69 | 38.29 | 7.85 | 32.61 | PK | --- | --- |

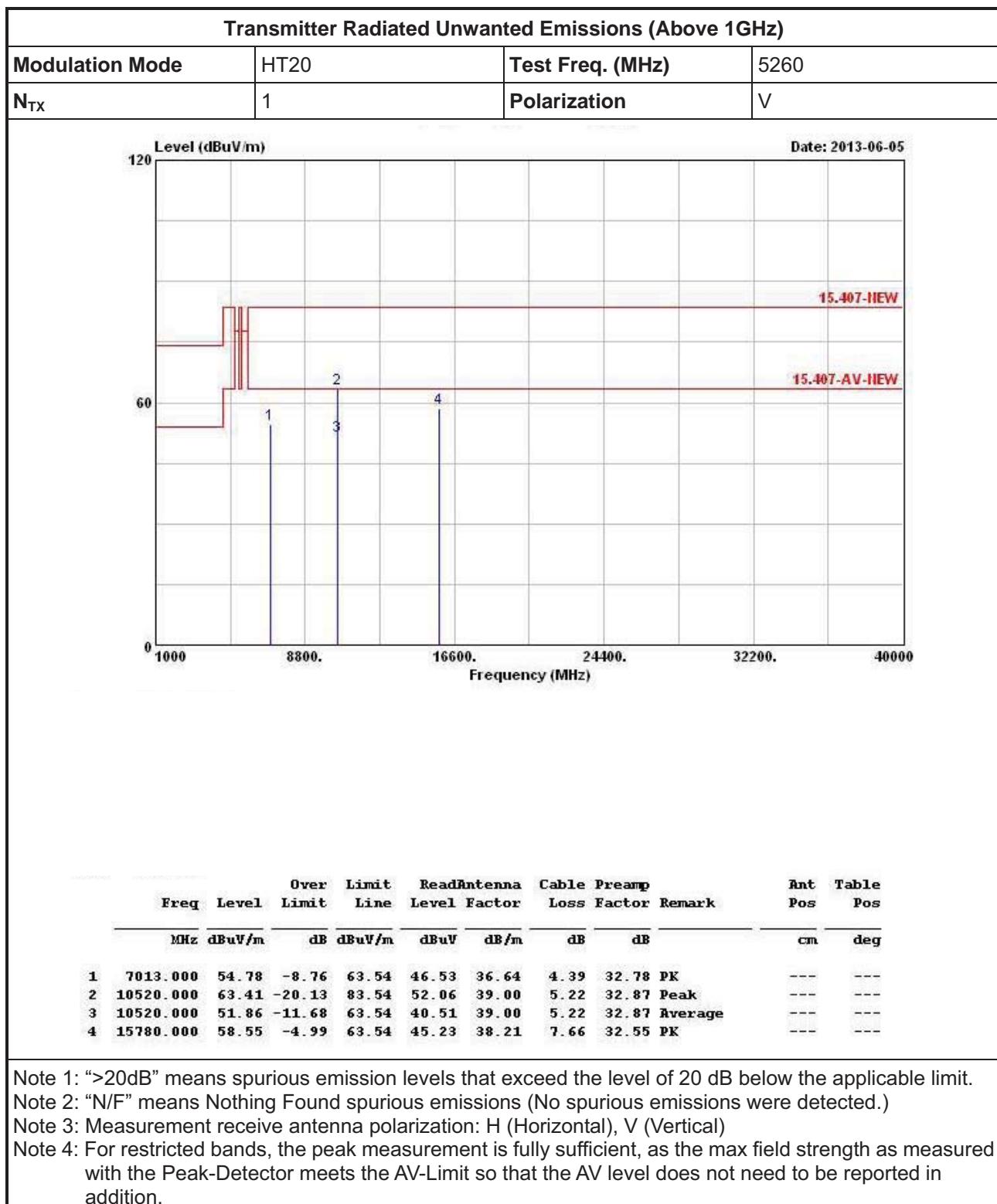
Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

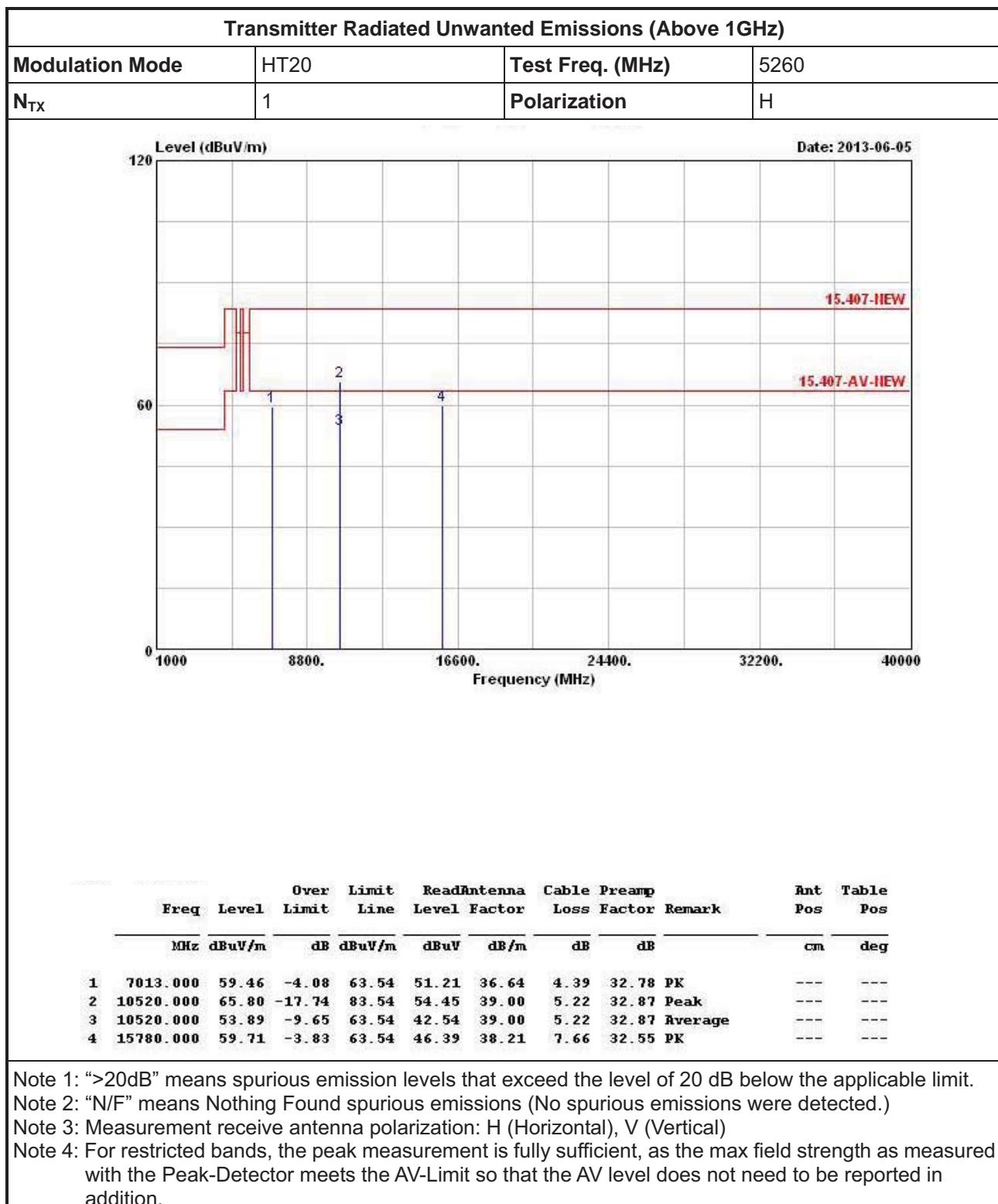
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

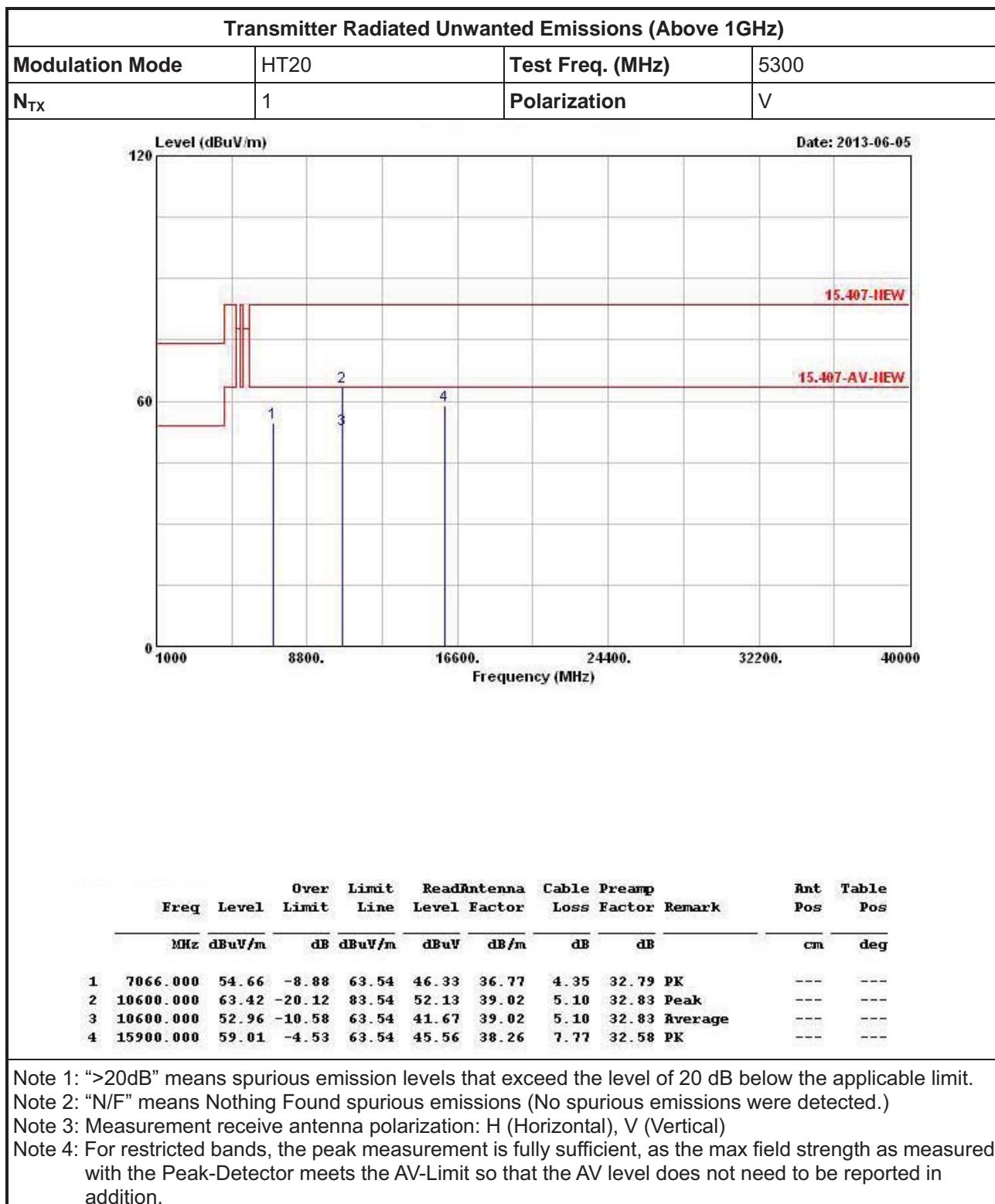
Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

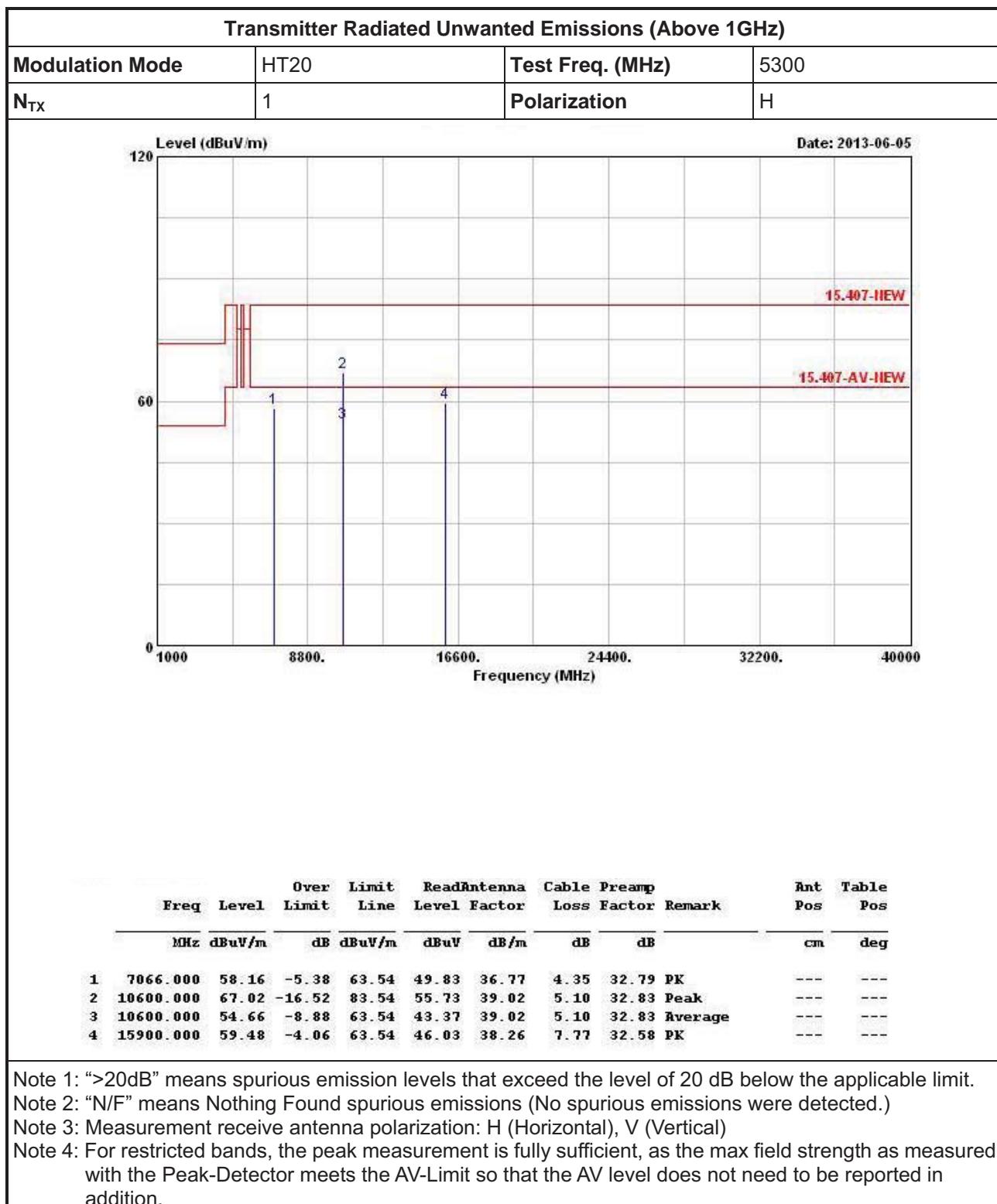
Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.











Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

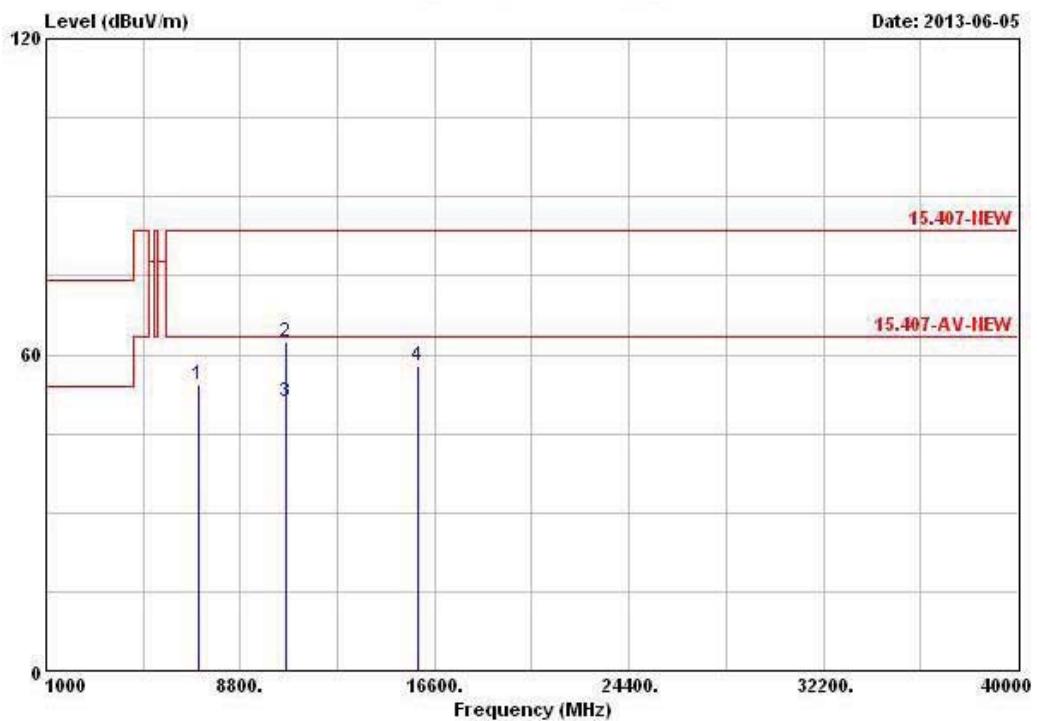
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.



| Transmitter Radiated Unwanted Emissions (Above 1GHz) | | | |
|--|------|------------------|------|
| Modulation Mode | HT20 | Test Freq. (MHz) | 5320 |
| N _{TX} | 1 | Polarization | V |



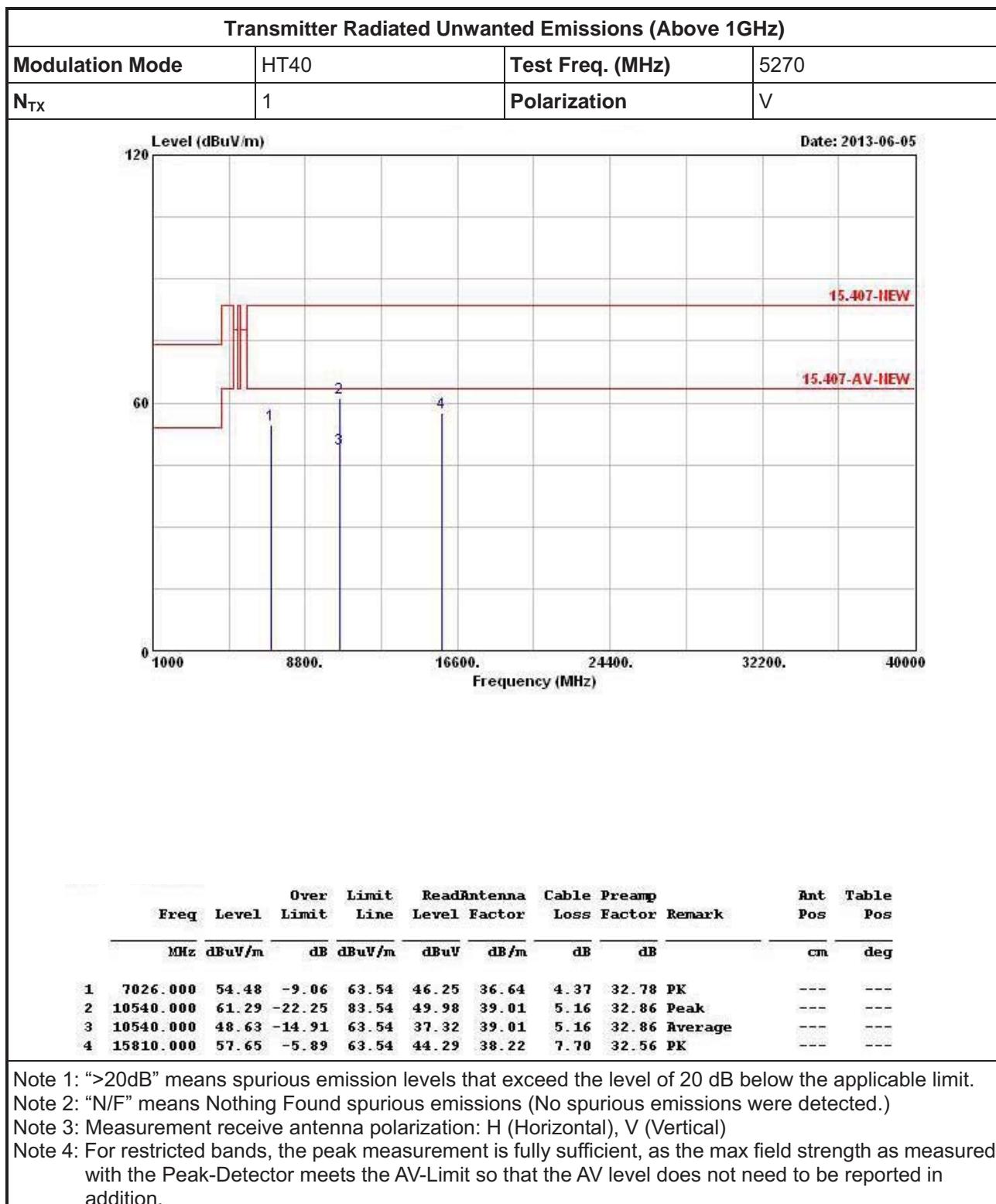
| Freq | Level | Over | Limit | Read | | Antenna | Cable | Preamp | Remark | Ant | Table |
|-------------|--------|--------|--------|-------|--------|---------|--------|---------|--------|-----|-------|
| | | Limit | Line | Level | Factor | Loss | Factor | Pos | | | |
| MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | cm | deg | | |
| 1 7093.000 | 54.19 | -9.35 | 63.54 | 45.83 | 36.81 | 4.35 | 32.80 | PK | --- | --- | --- |
| 2 10640.000 | 62.55 | -20.99 | 83.54 | 51.28 | 39.03 | 5.04 | 32.80 | Peak | --- | --- | --- |
| 3 10640.000 | 51.01 | -12.53 | 63.54 | 39.74 | 39.03 | 5.04 | 32.80 | Average | --- | --- | --- |
| 4 15960.000 | 57.97 | -5.57 | 63.54 | 44.44 | 38.29 | 7.85 | 32.61 | PK | --- | --- | --- |

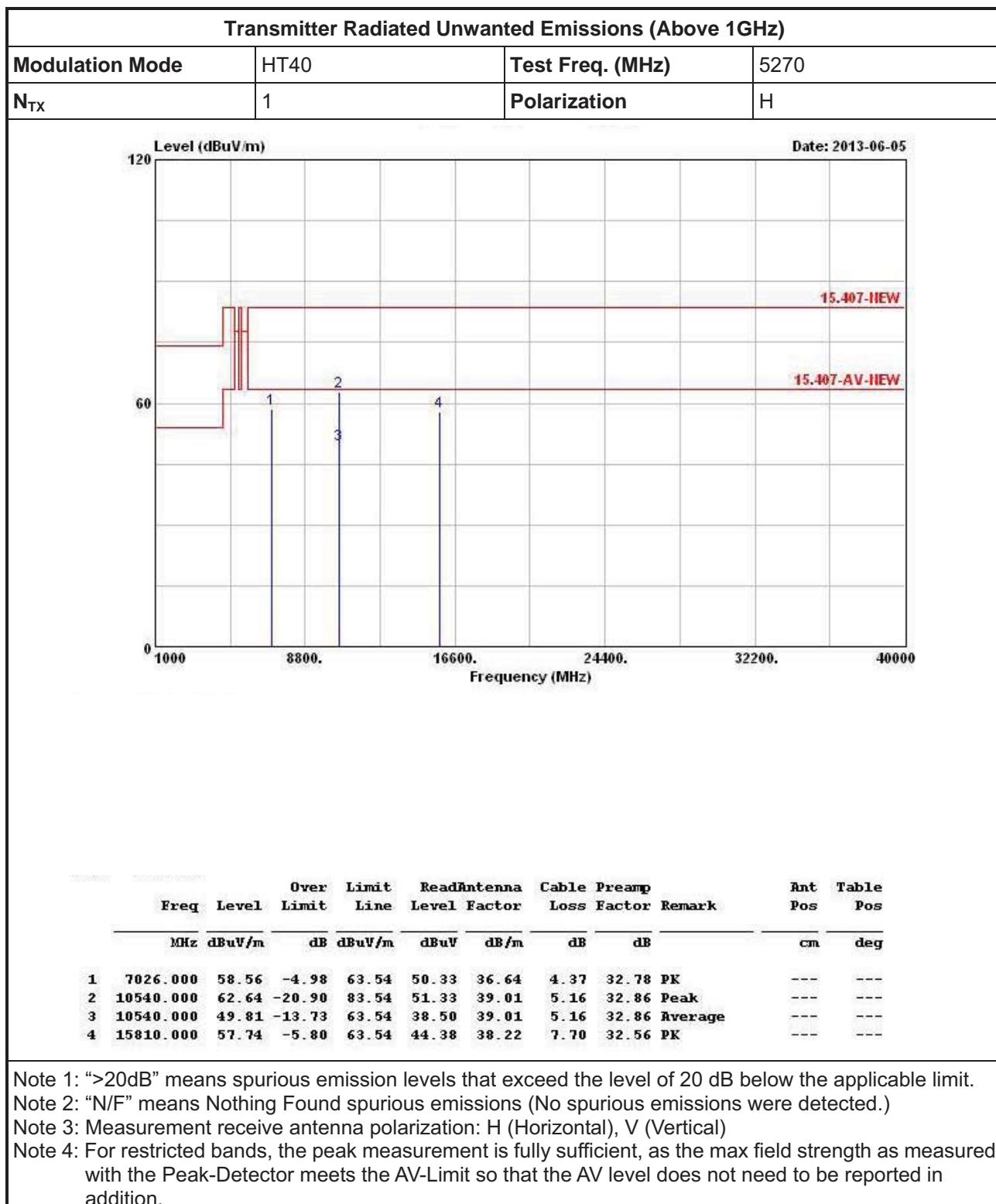
Note 1: “>20dB” means spurious emission levels that exceed the level of 20 dB below the applicable limit.

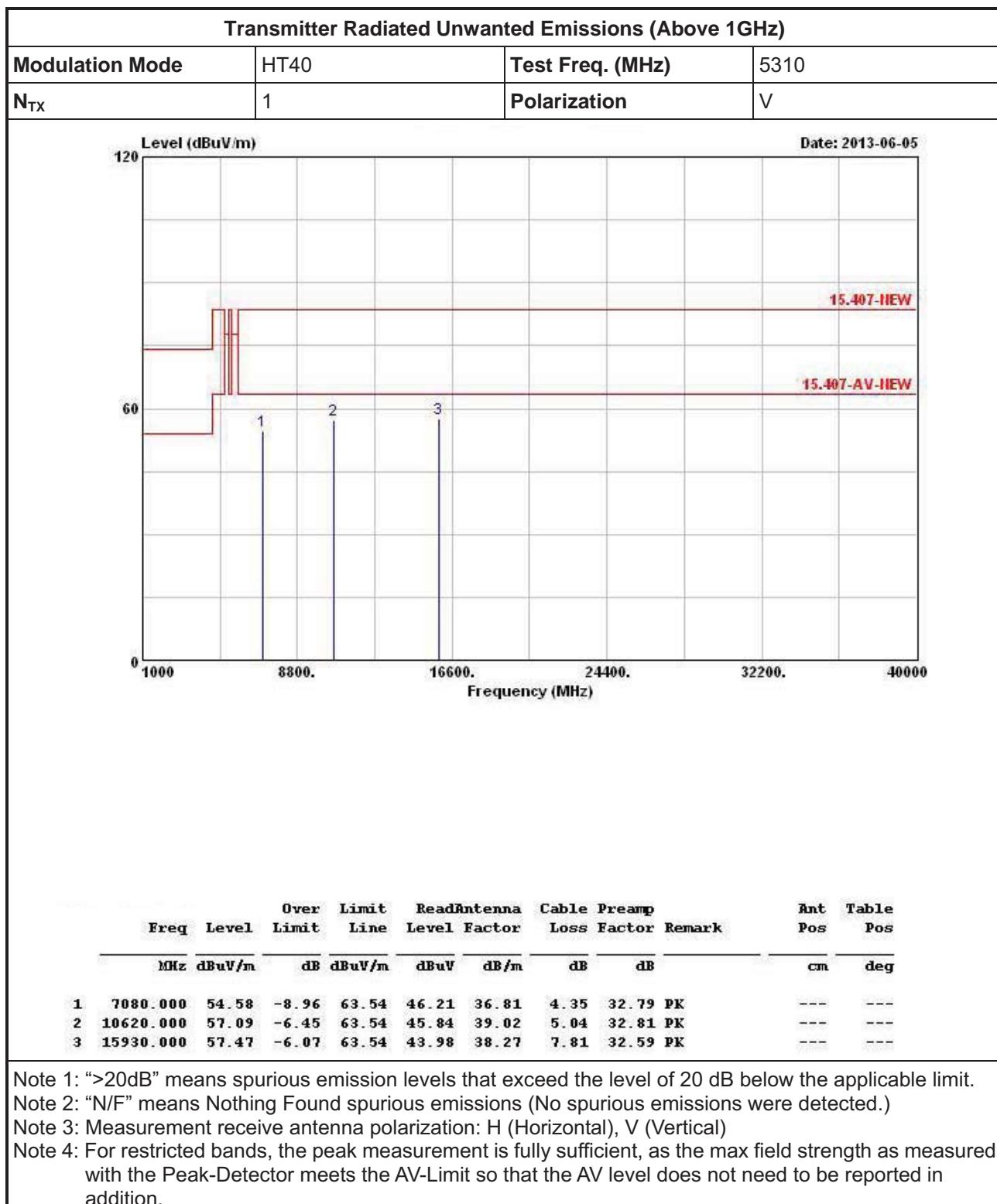
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

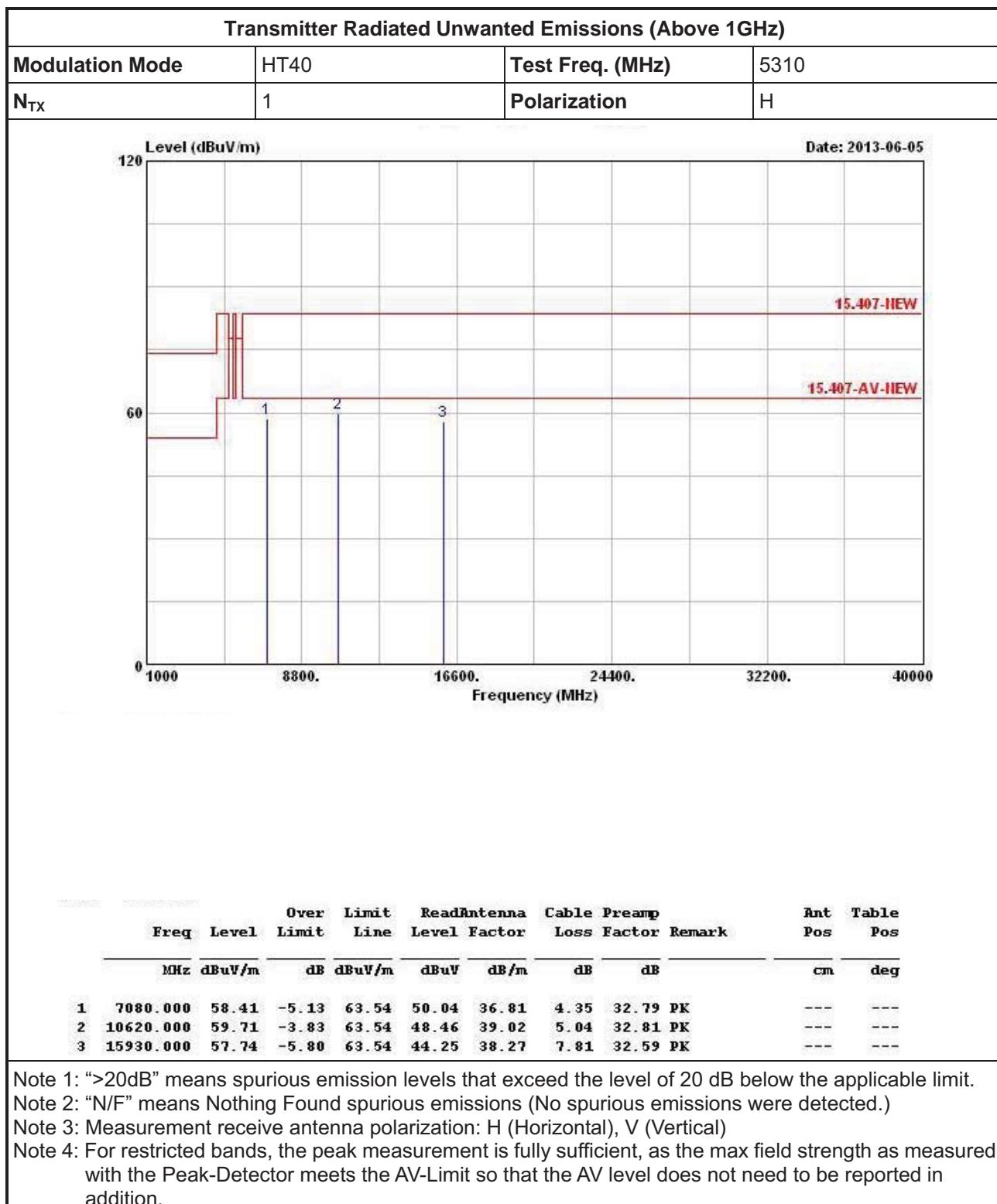
Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

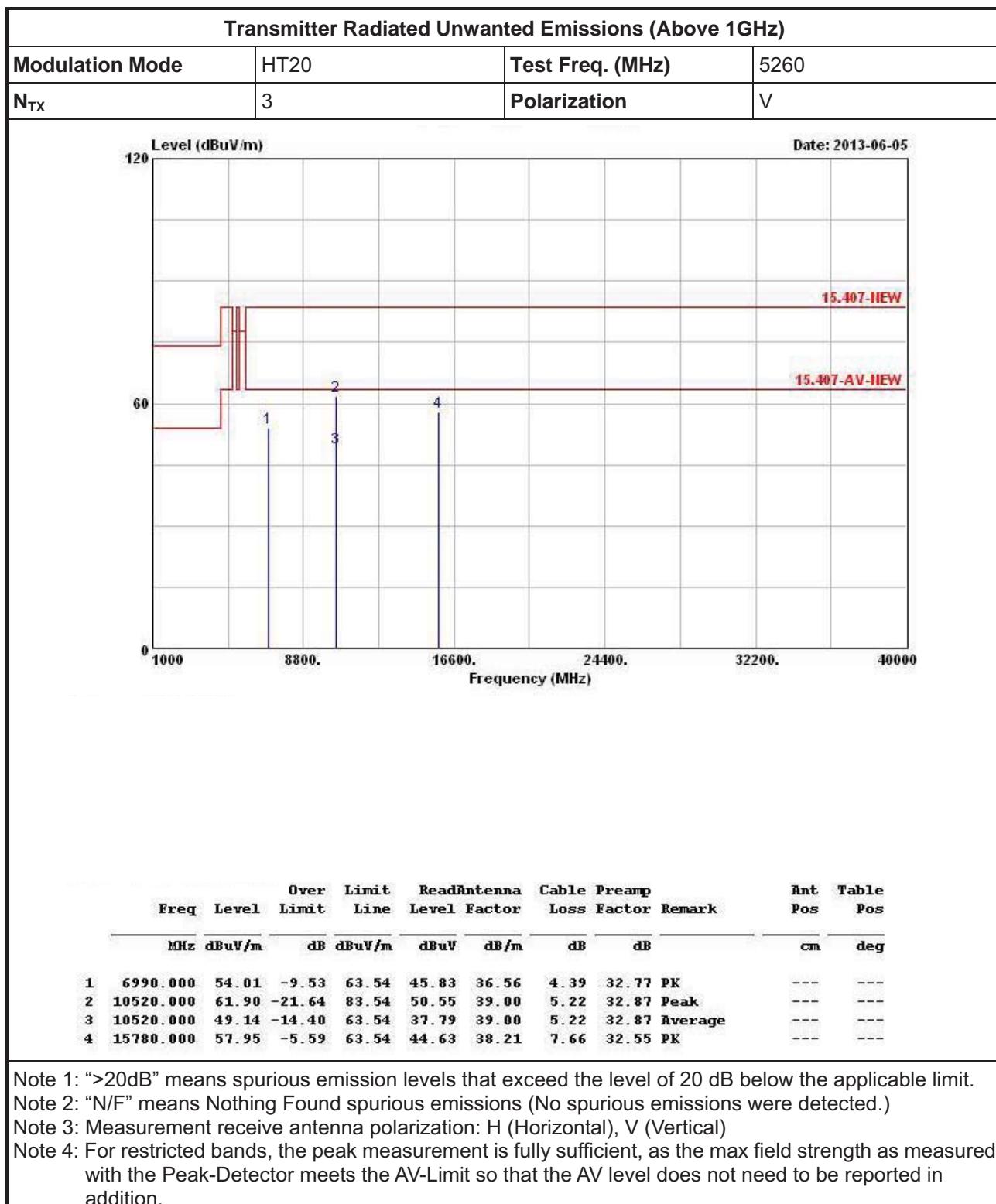
Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.

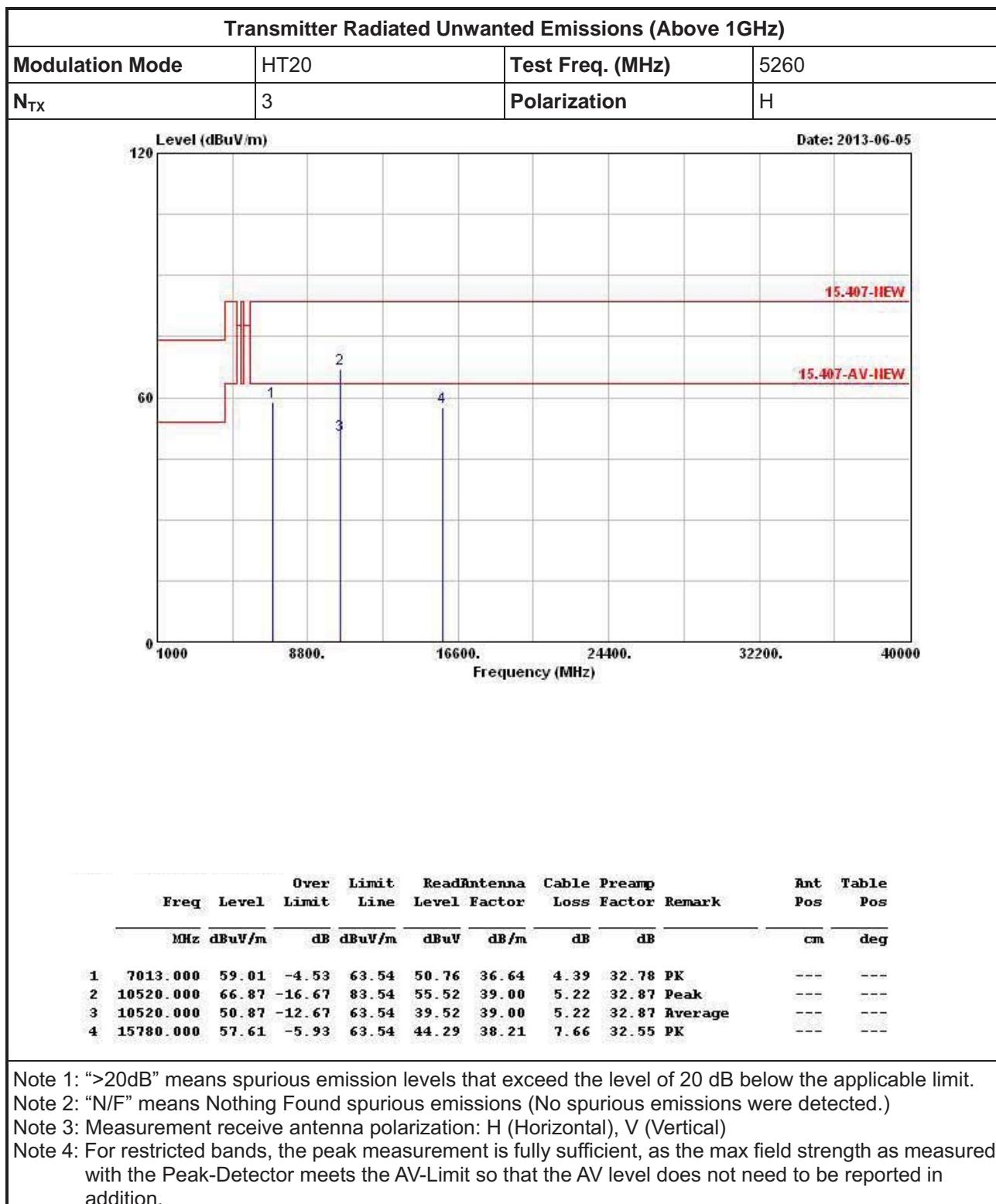








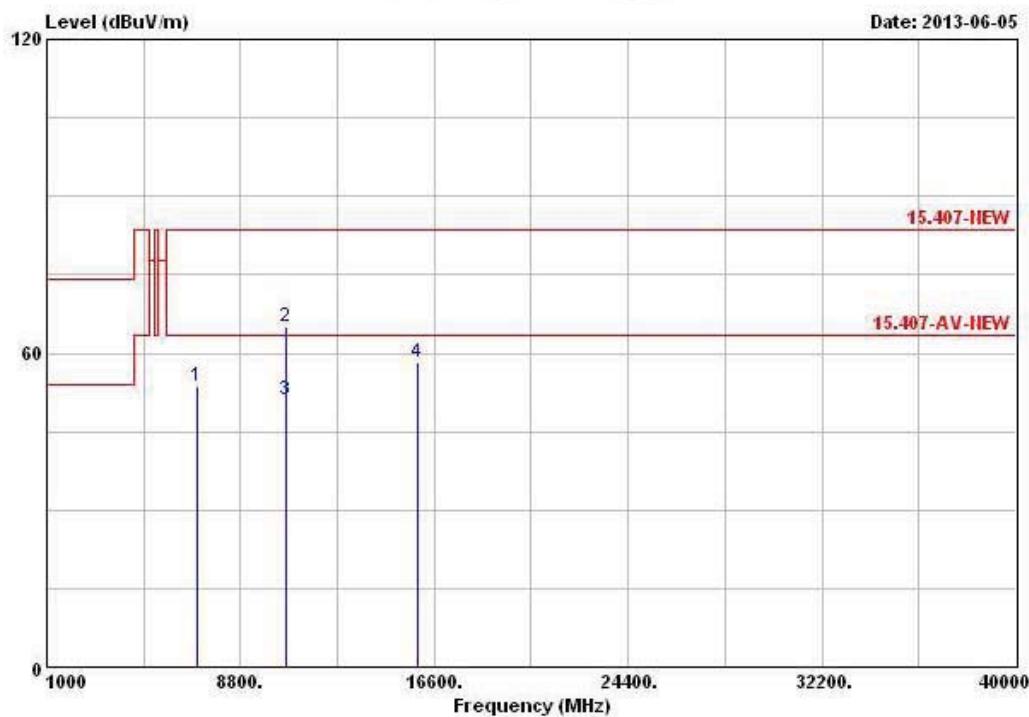






Transmitter Radiated Unwanted Emissions (Above 1GHz)

| | | | |
|-----------------|------|------------------|------|
| Modulation Mode | HT20 | Test Freq. (MHz) | 5300 |
| N _{TX} | 3 | Polarization | V |



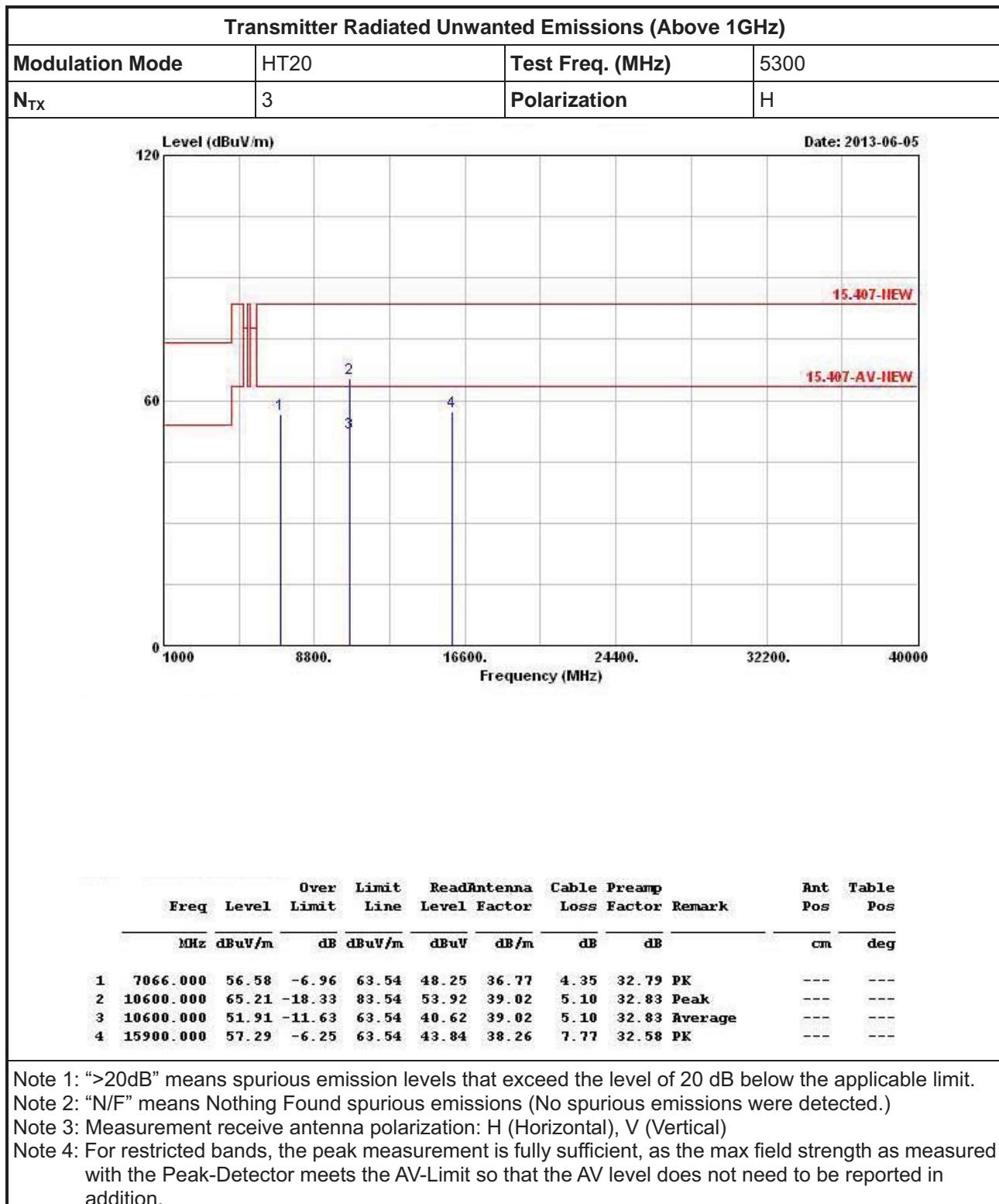
| Freq | Level | Over Limit | Line | Read | Antenna | Cable | Preamp | Remark | Ant | Table |
|-------------|--------|------------|-------|--------|---------|-------|--------|---------|-----|-------|
| | | | | | | | | | Pos | Pos |
| MHz | dBuV/m | | dB | dBuV/m | dBuV | dB/m | dB | dB | cm | deg |
| 1 7066.000 | 53.71 | -9.83 | 63.54 | 45.38 | 36.77 | 4.35 | 32.79 | PK | --- | --- |
| 2 10600.000 | 65.06 | -18.48 | 83.54 | 53.77 | 39.02 | 5.10 | 32.83 | Peak | --- | --- |
| 3 10600.000 | 50.97 | -12.57 | 63.54 | 39.68 | 39.02 | 5.10 | 32.83 | Average | --- | --- |
| 4 15900.000 | 58.21 | -5.33 | 63.54 | 44.76 | 38.26 | 7.77 | 32.58 | PK | --- | --- |

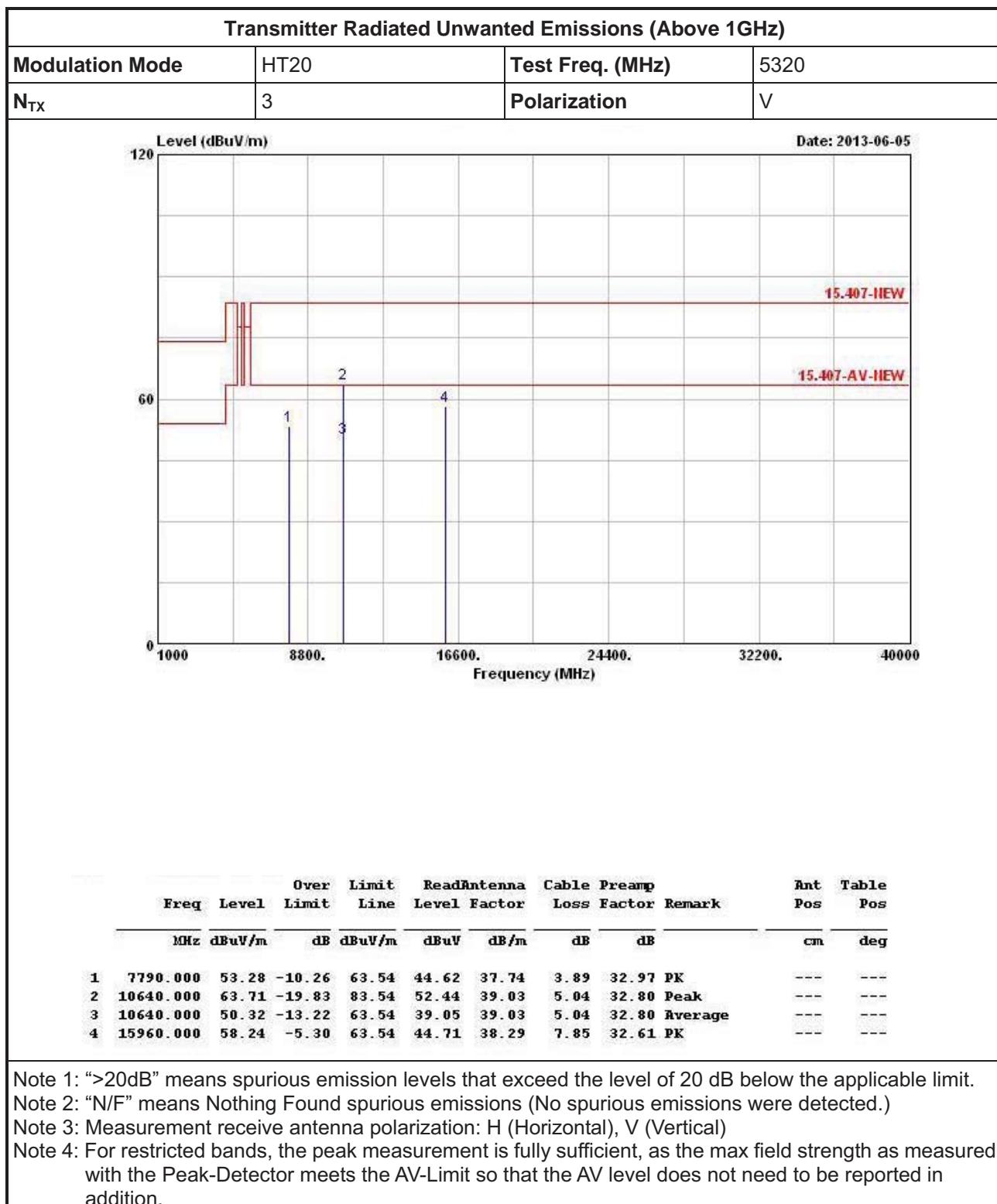
Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

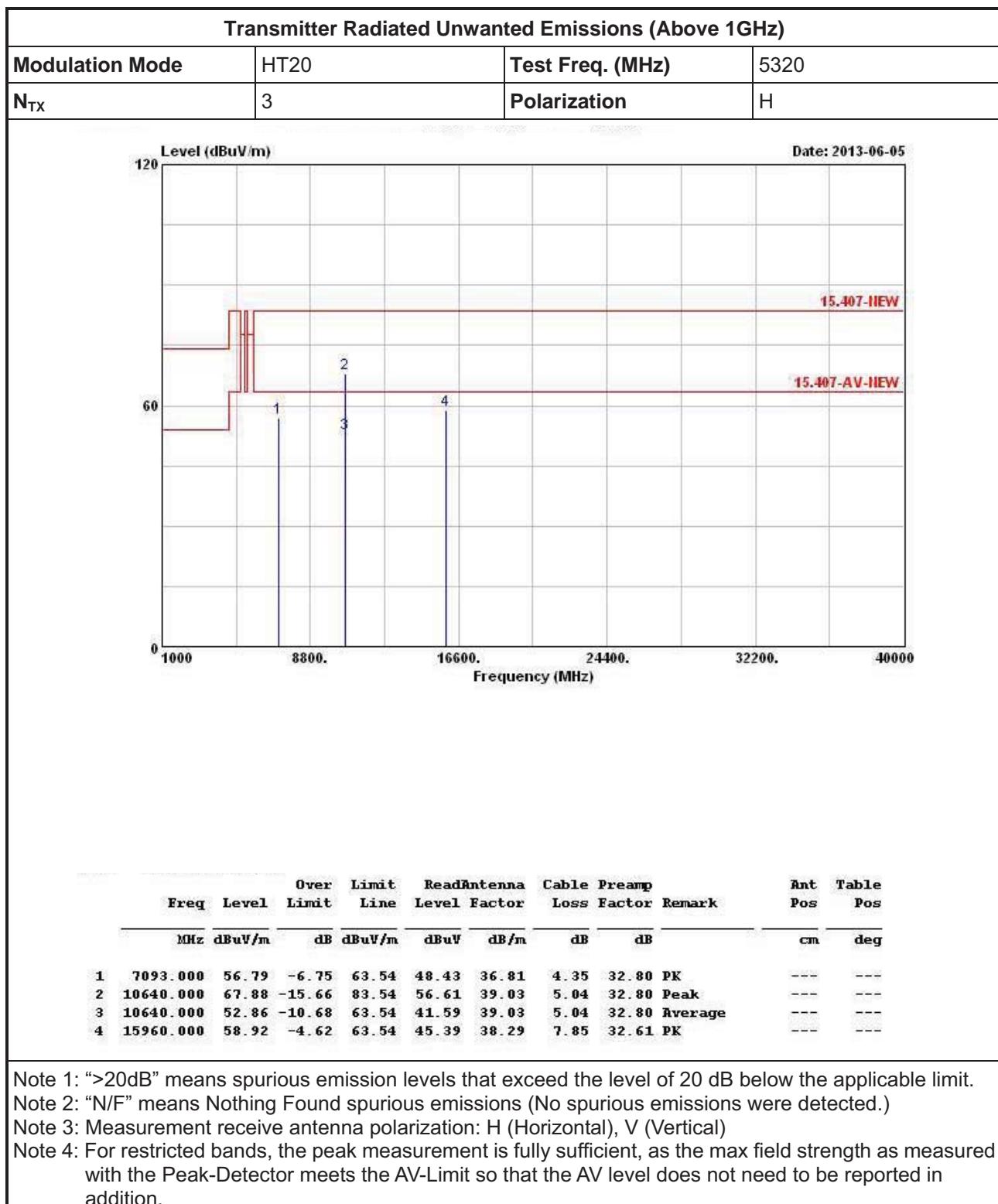
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

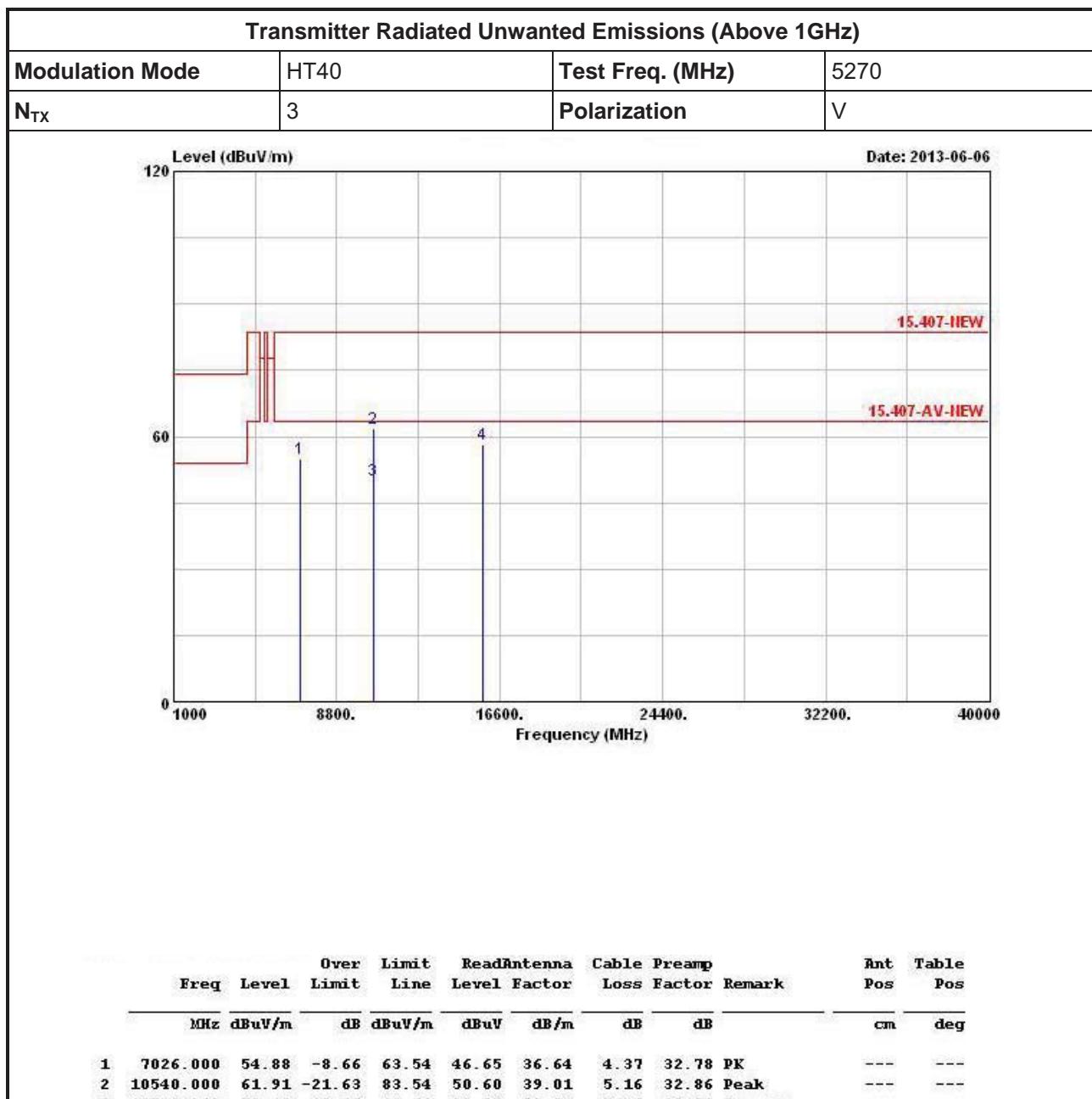
Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.







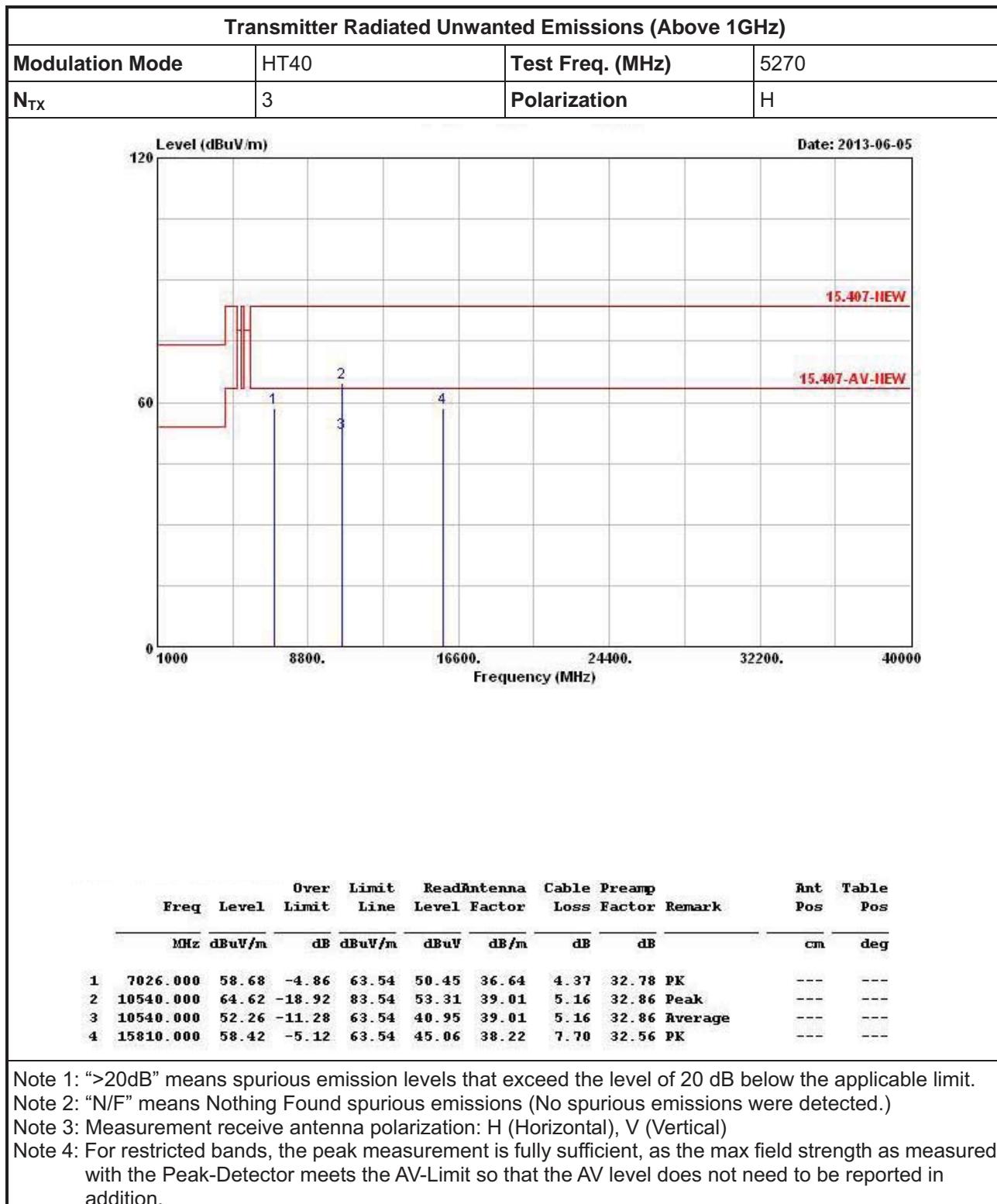


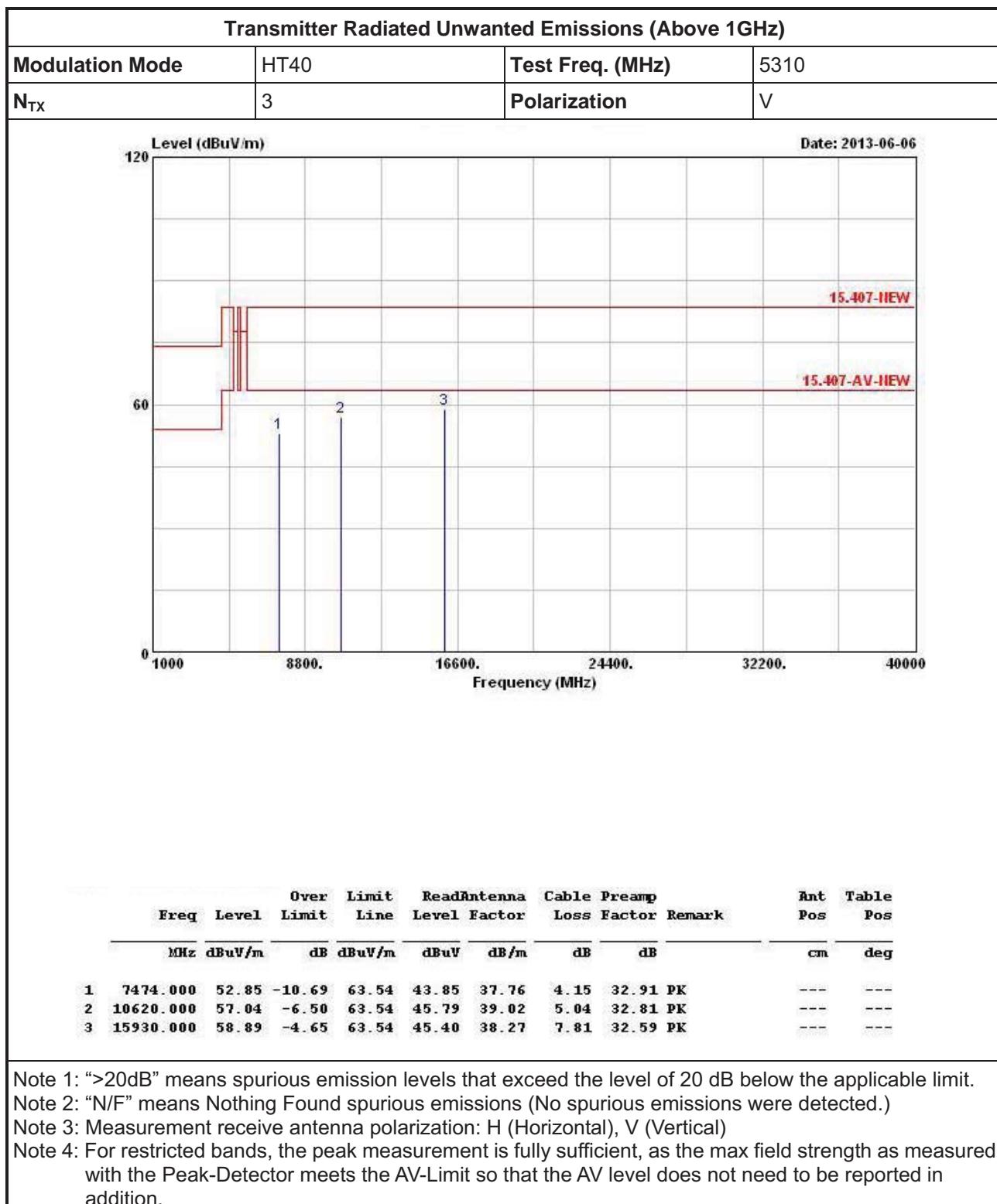
Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

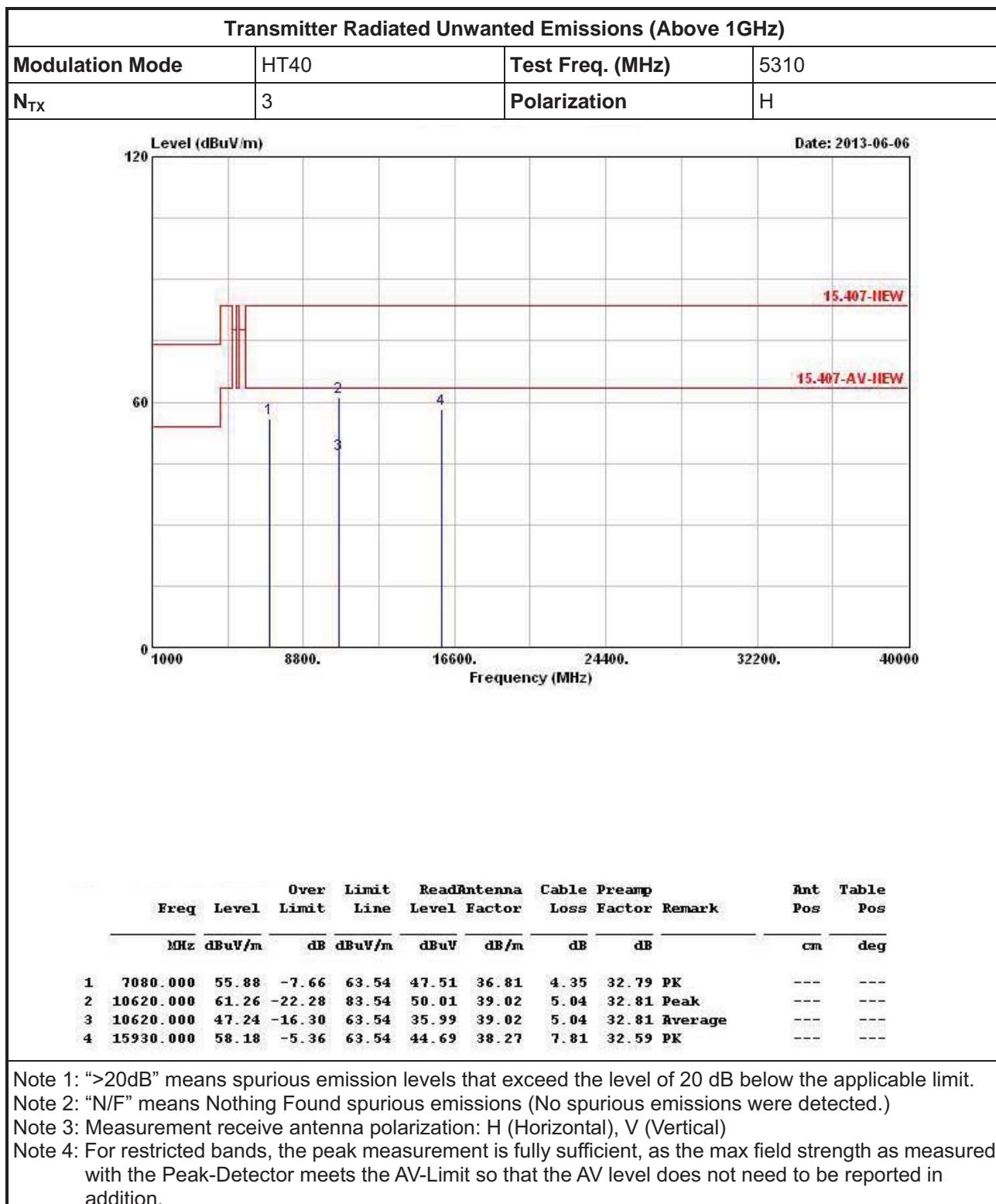
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.

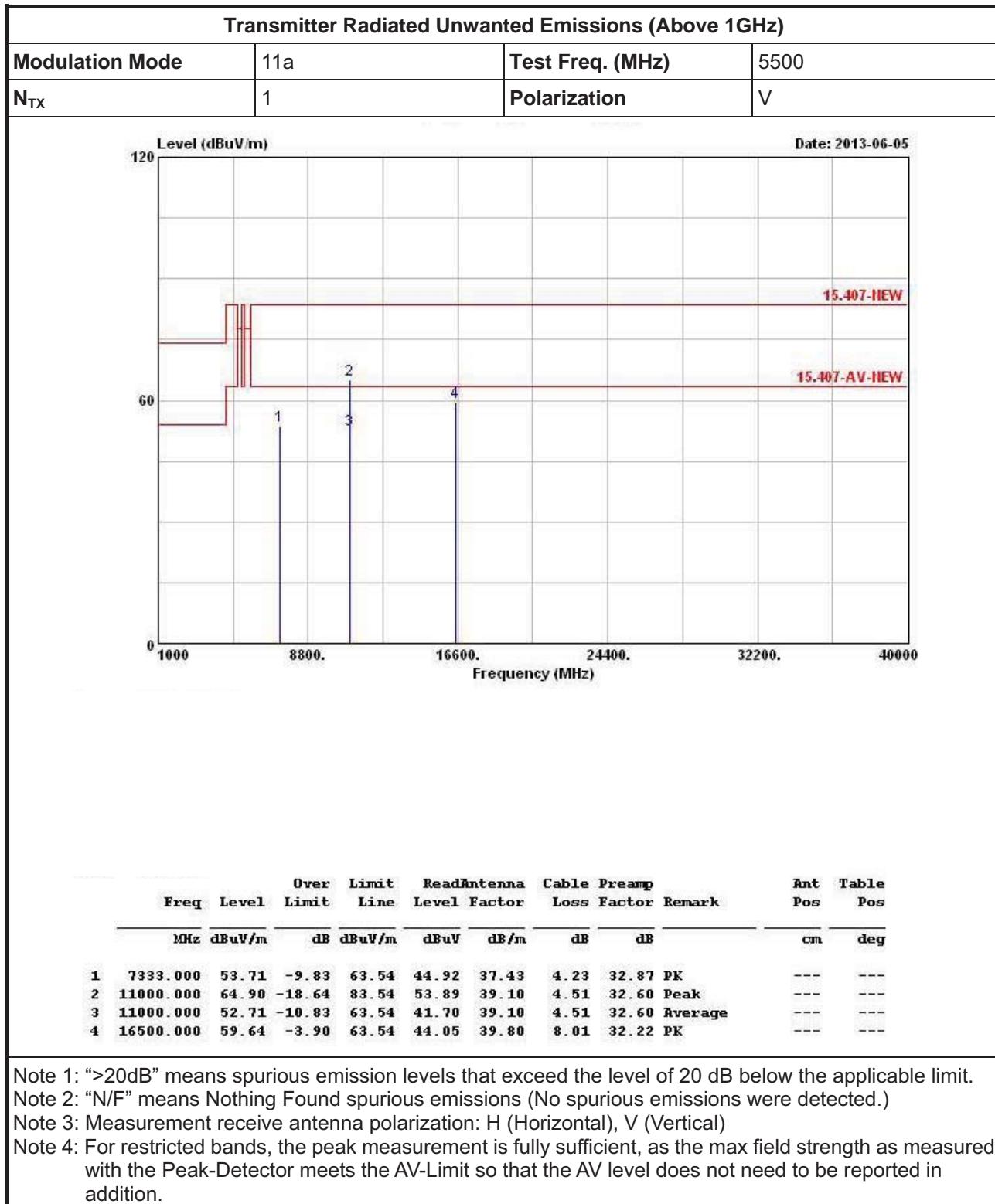


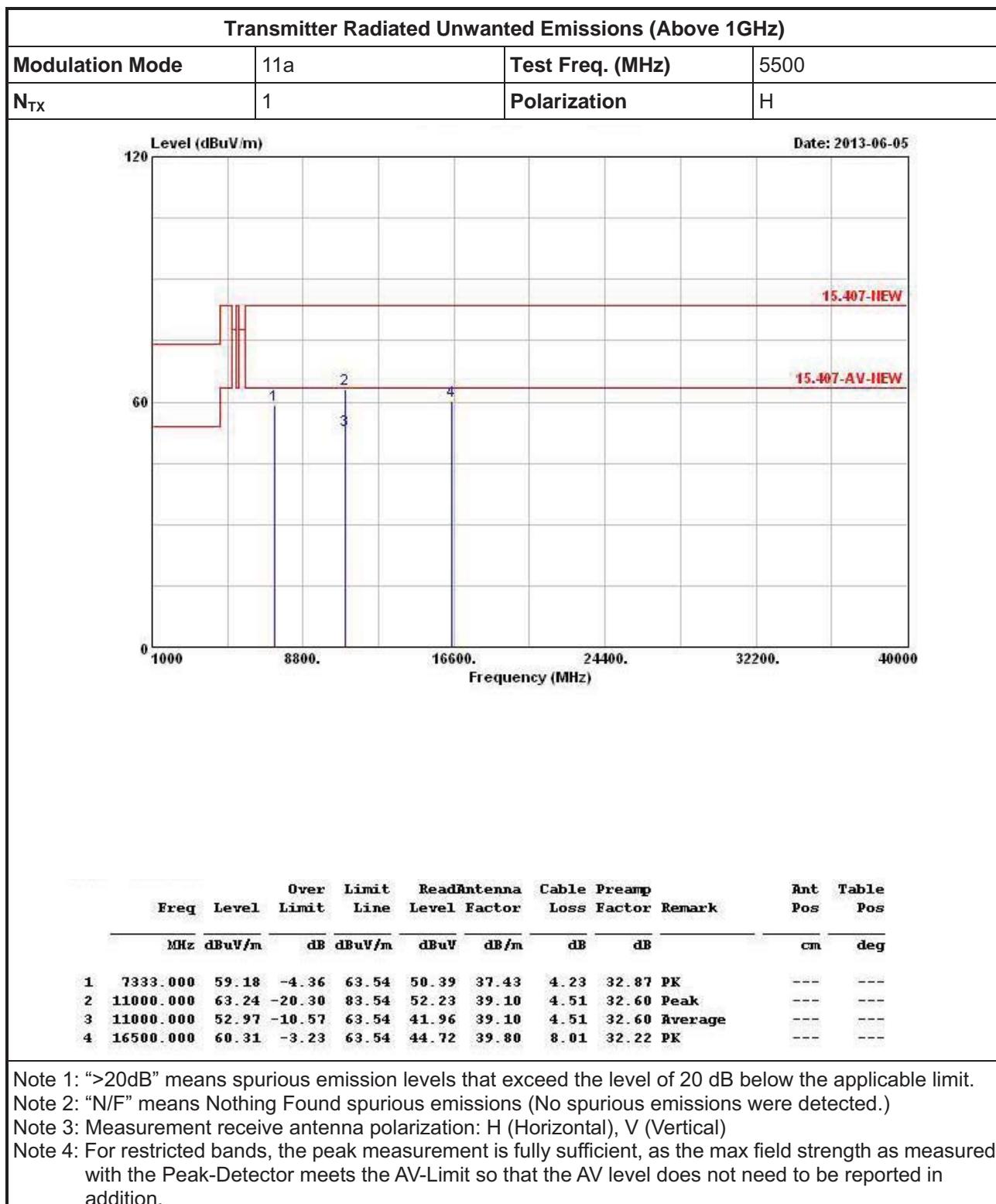


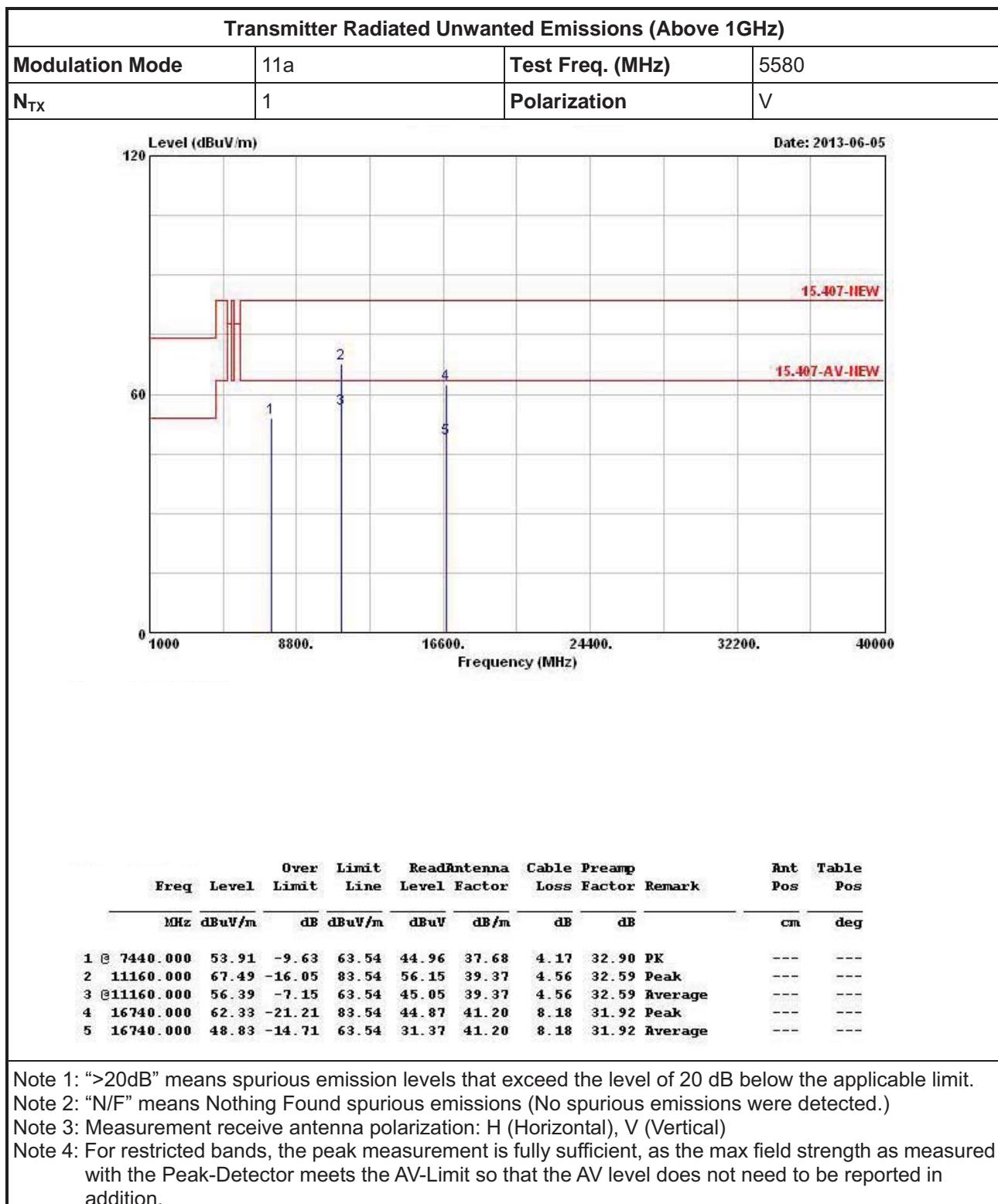


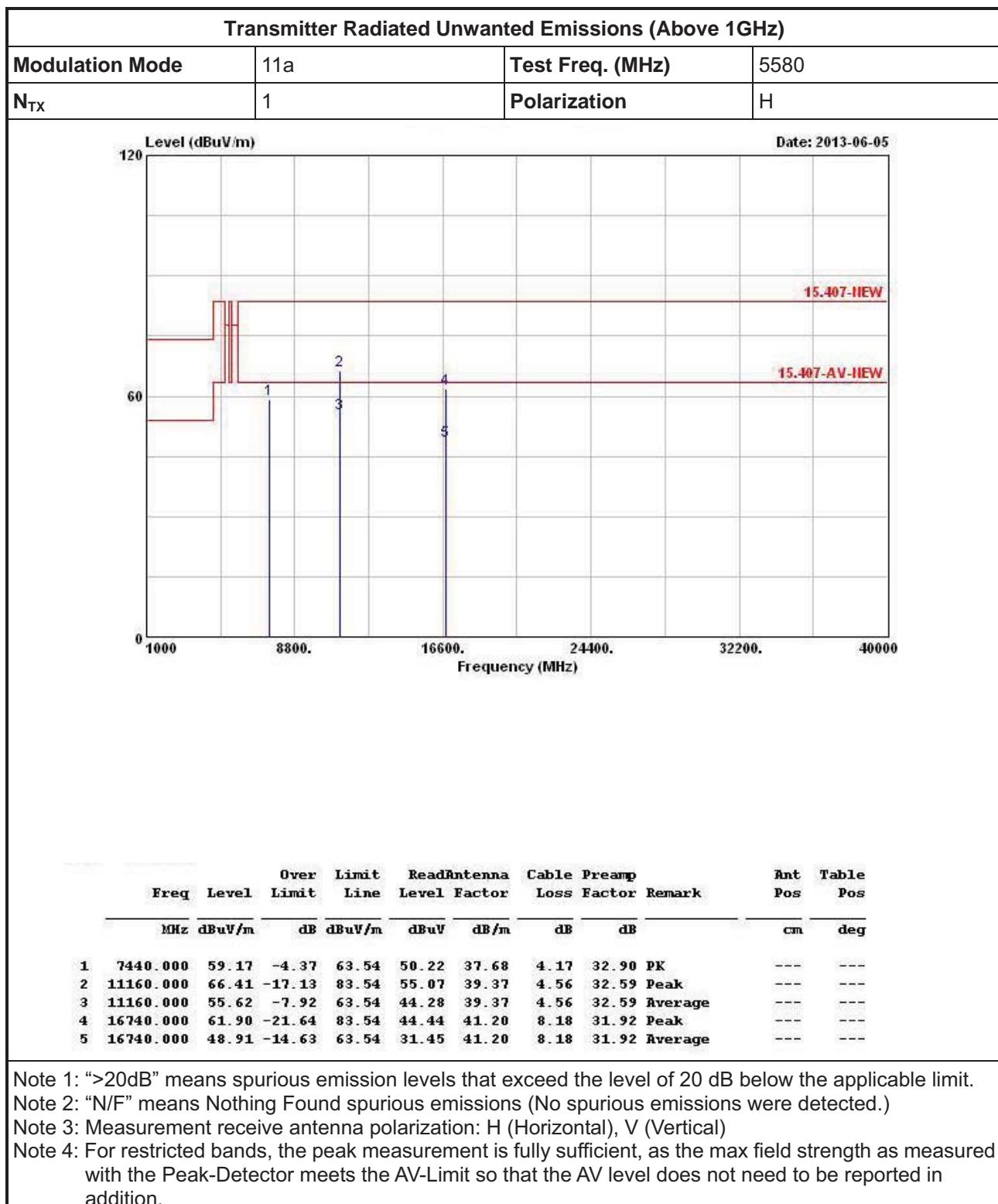


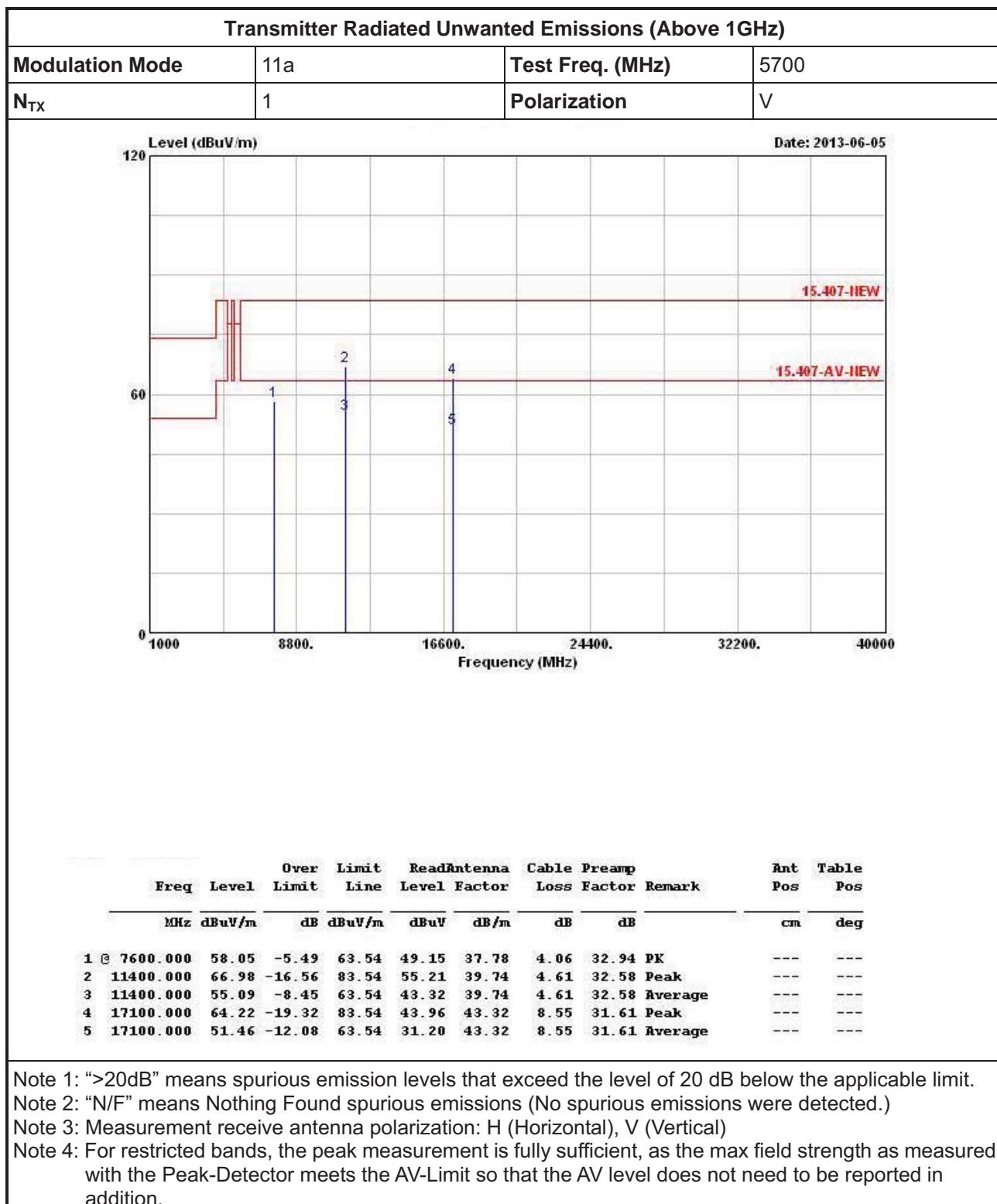
3.7.8 Transmitter Radiated Unwanted Emissions (Above 1GHz) for 5470-5725MHz

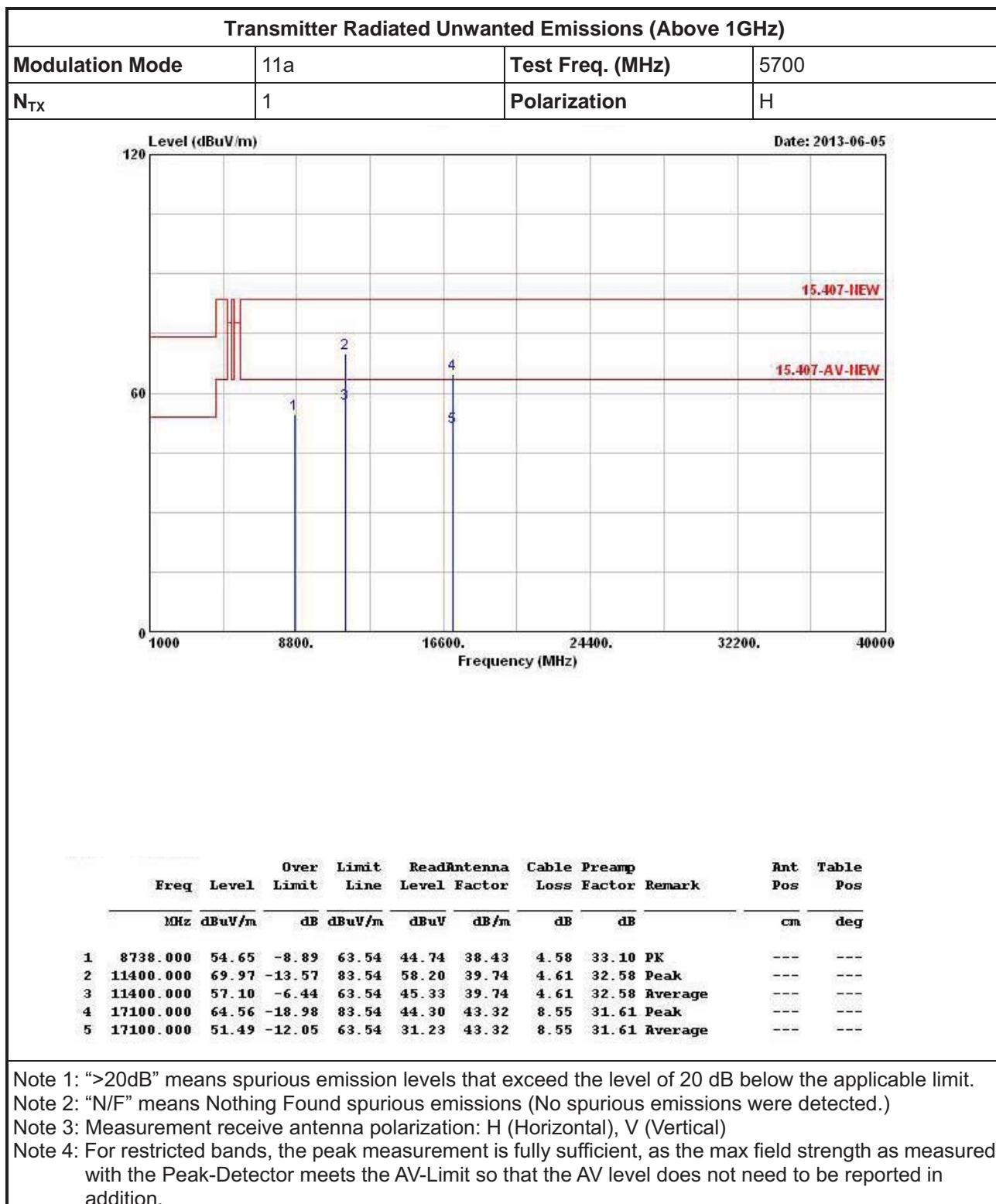


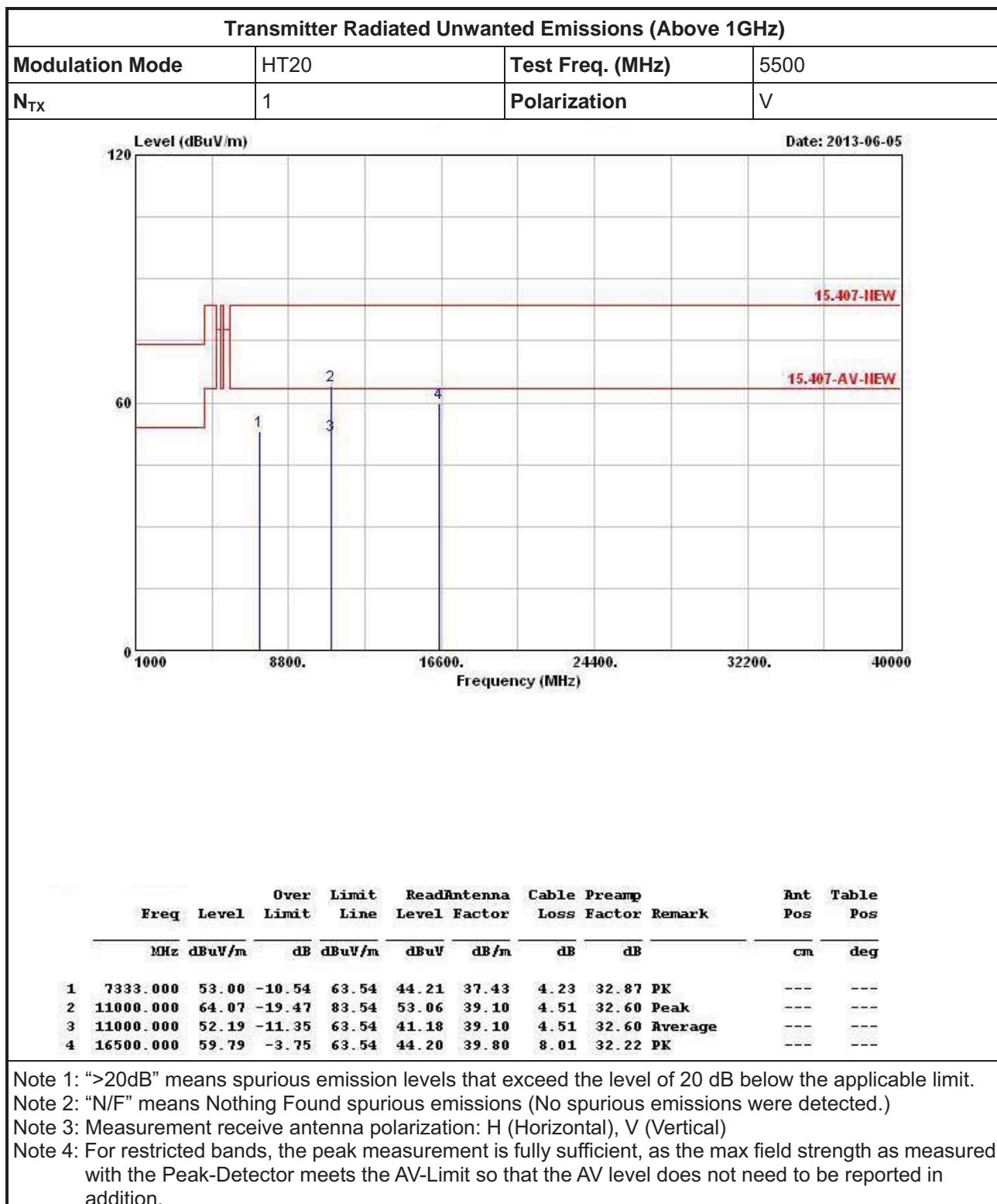


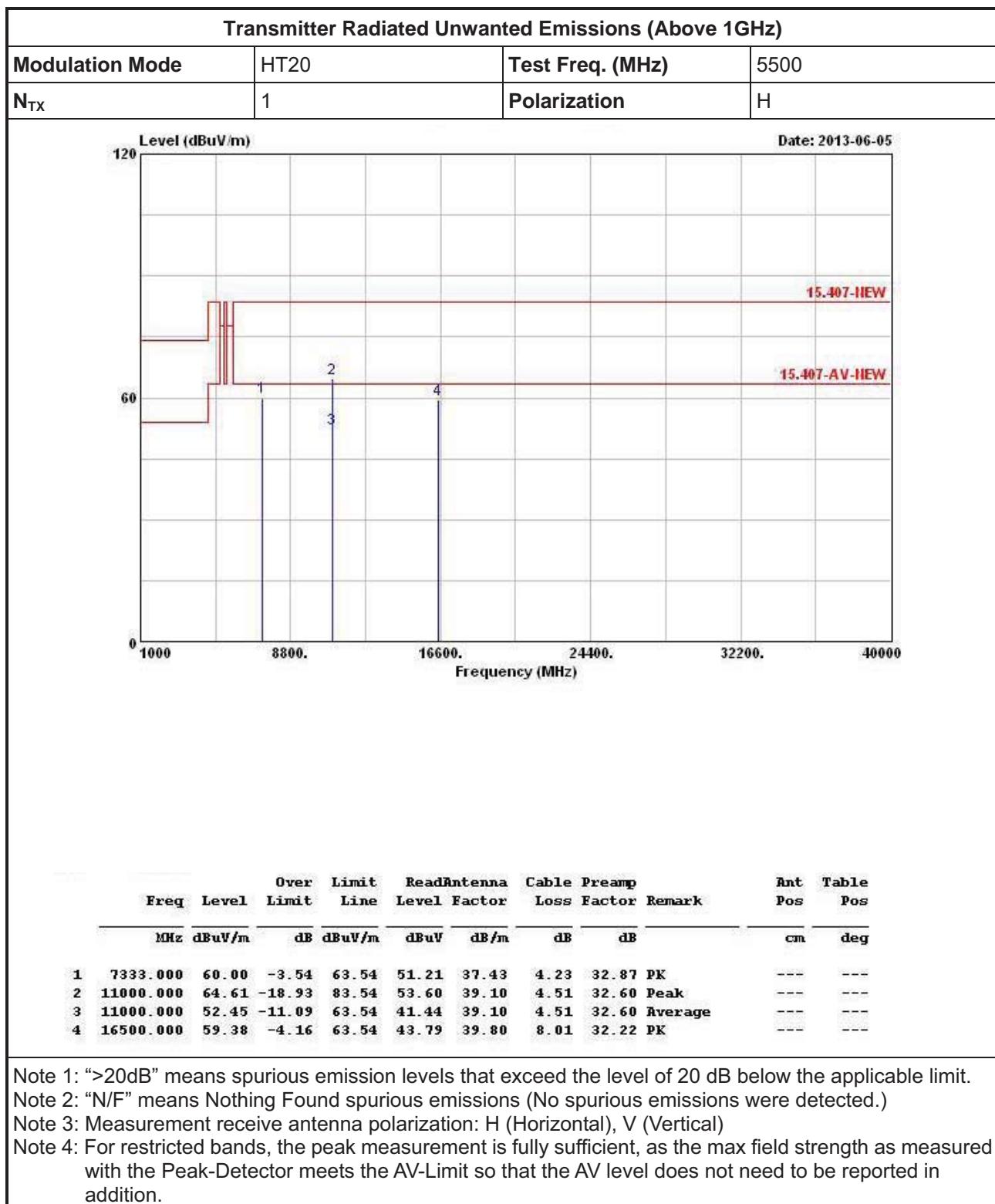


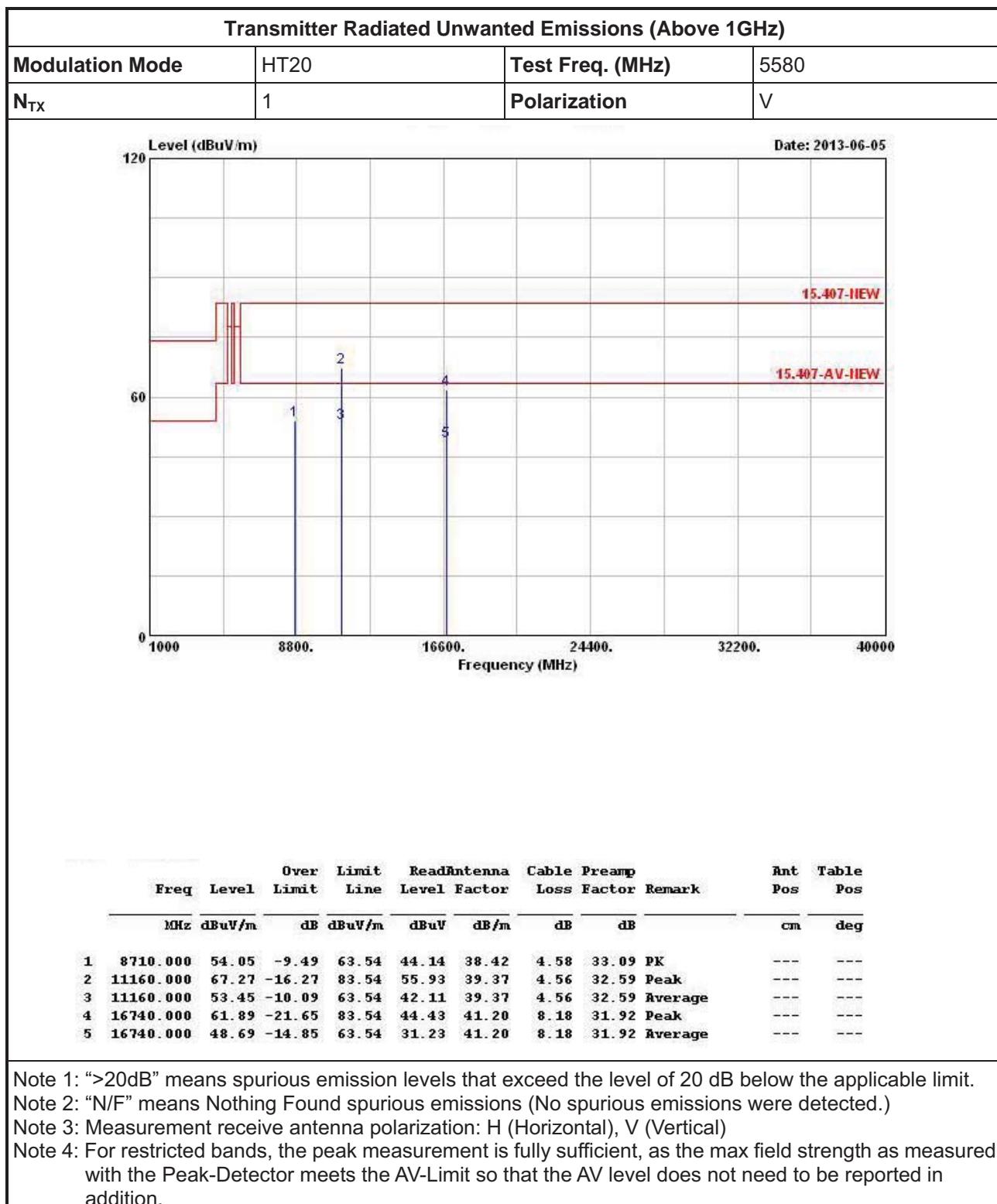










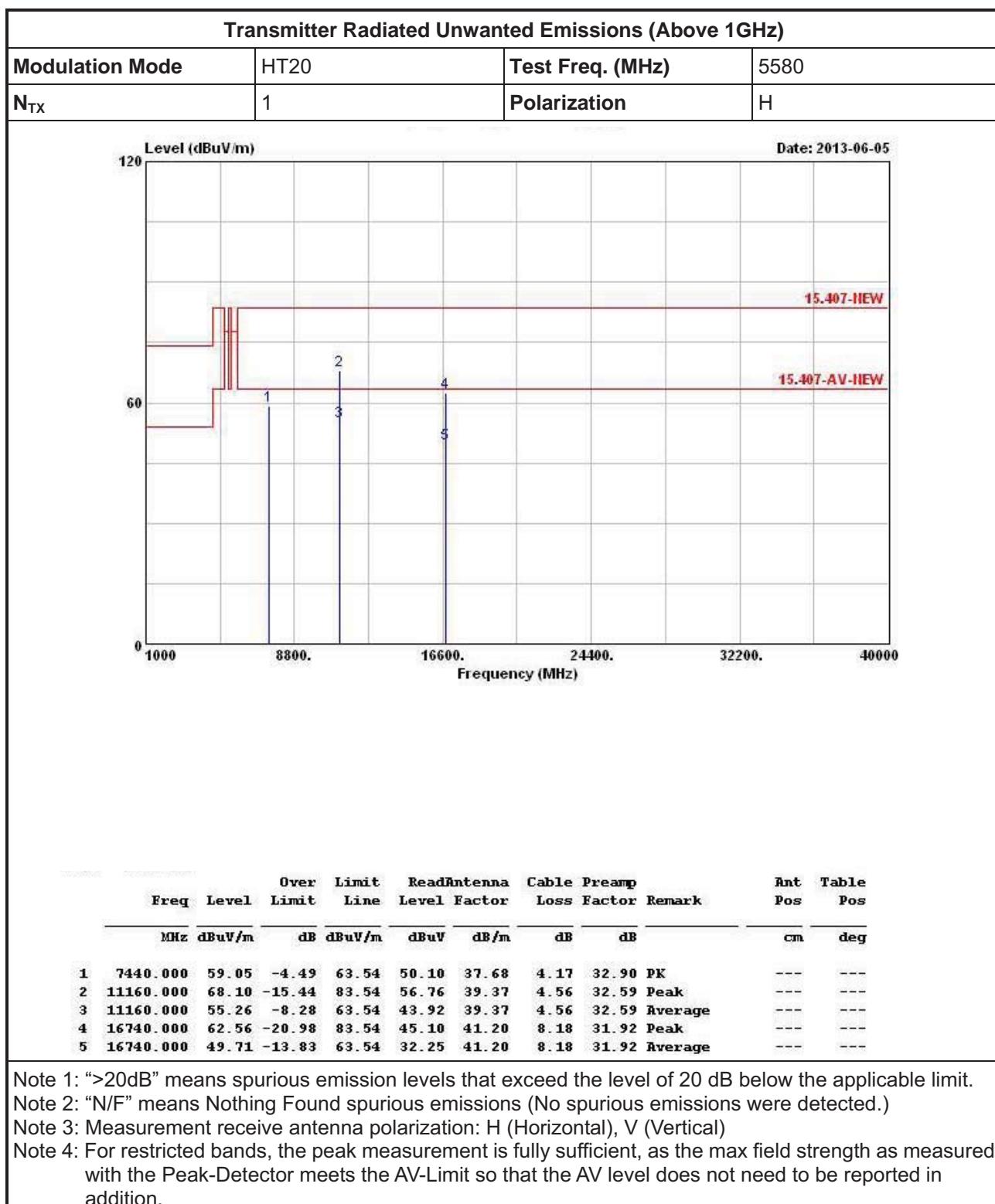


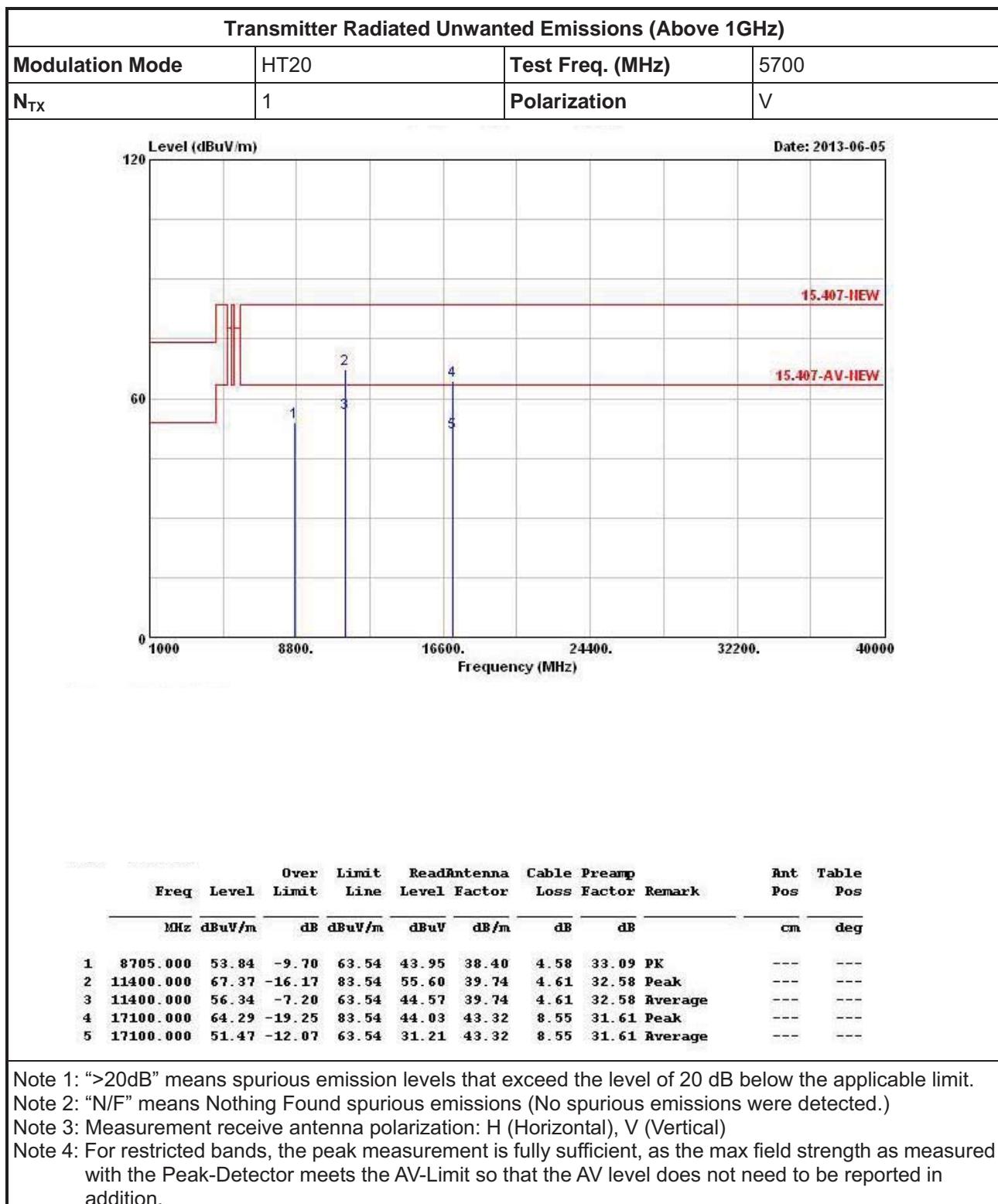
Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

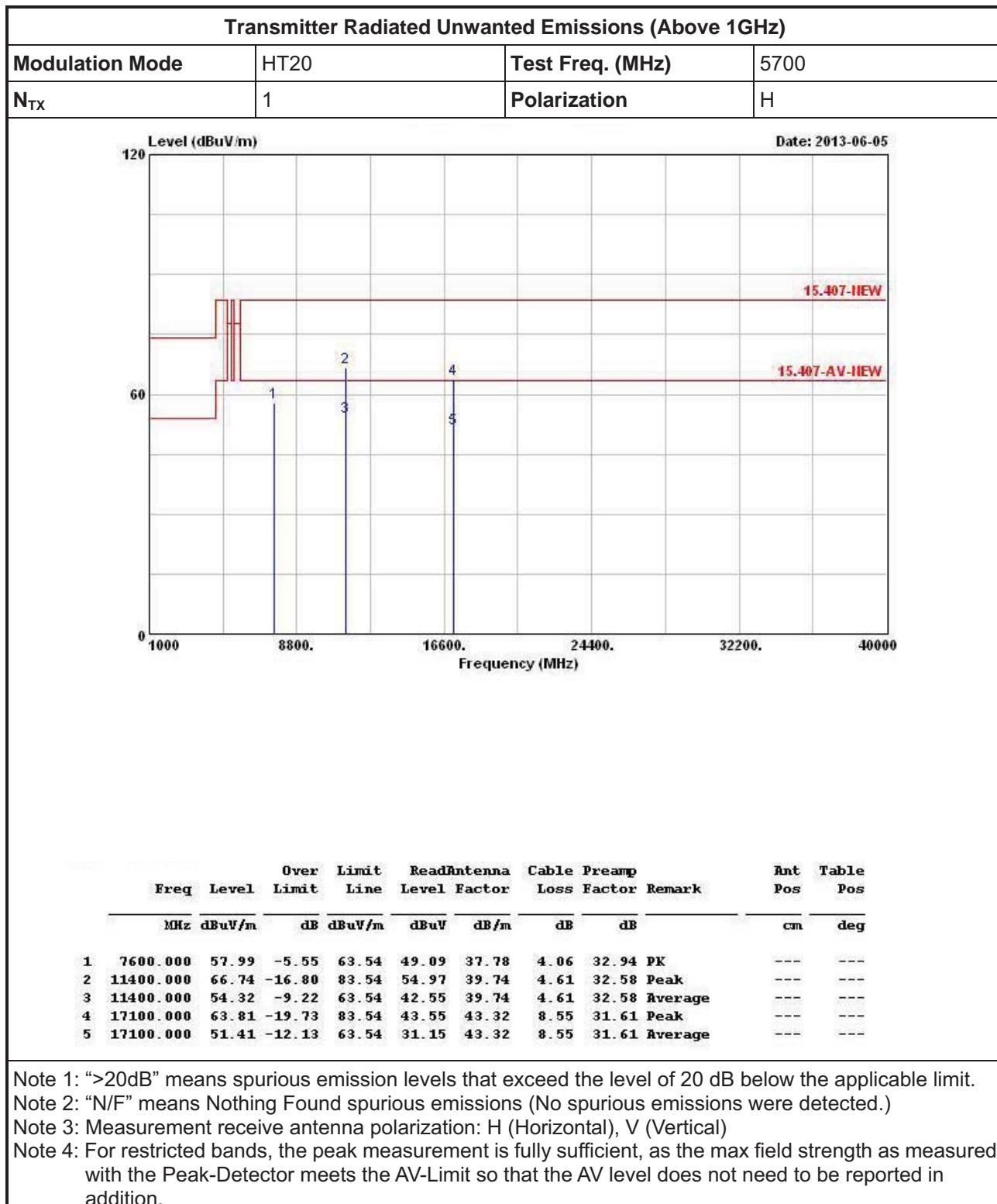
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

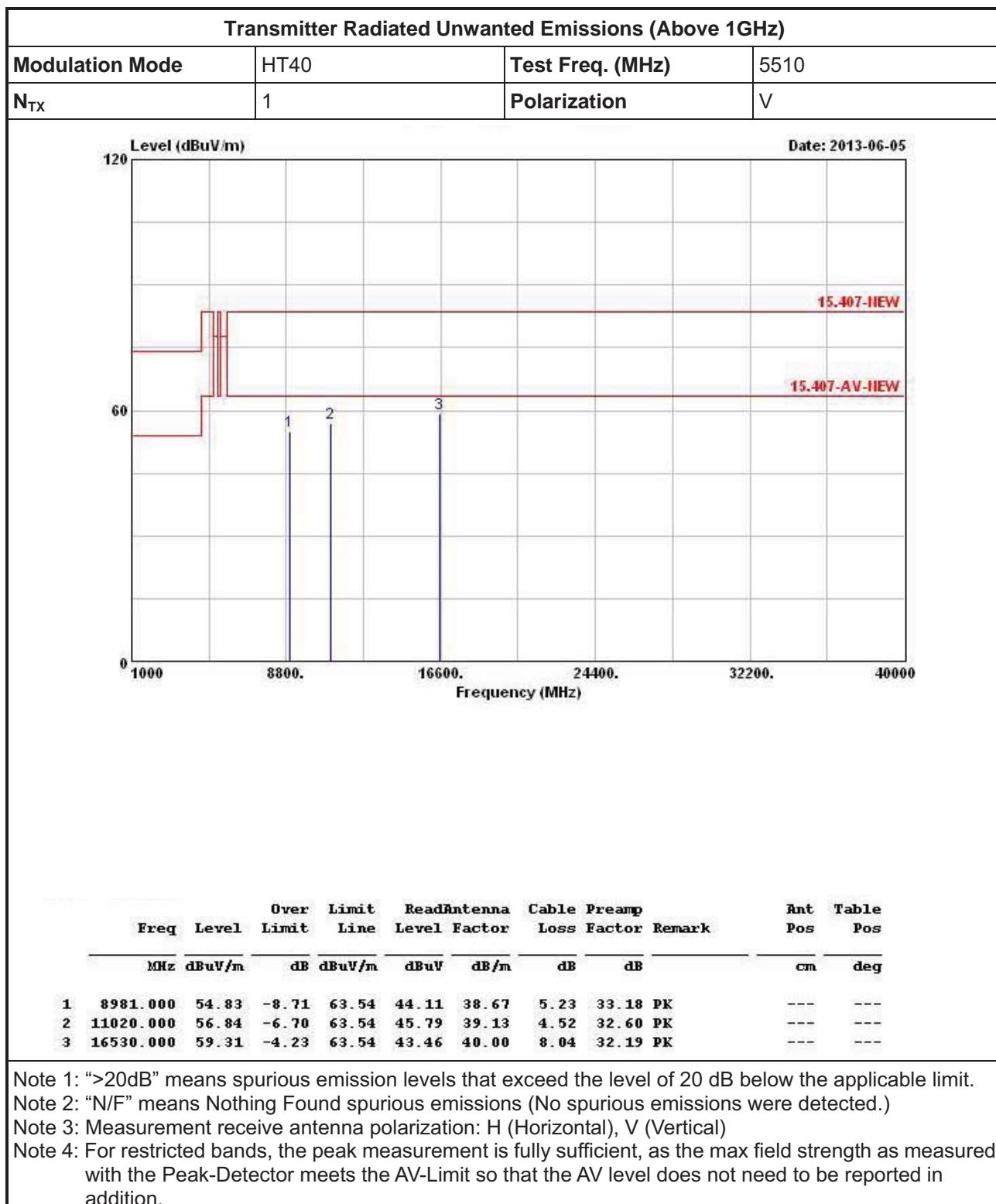
Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

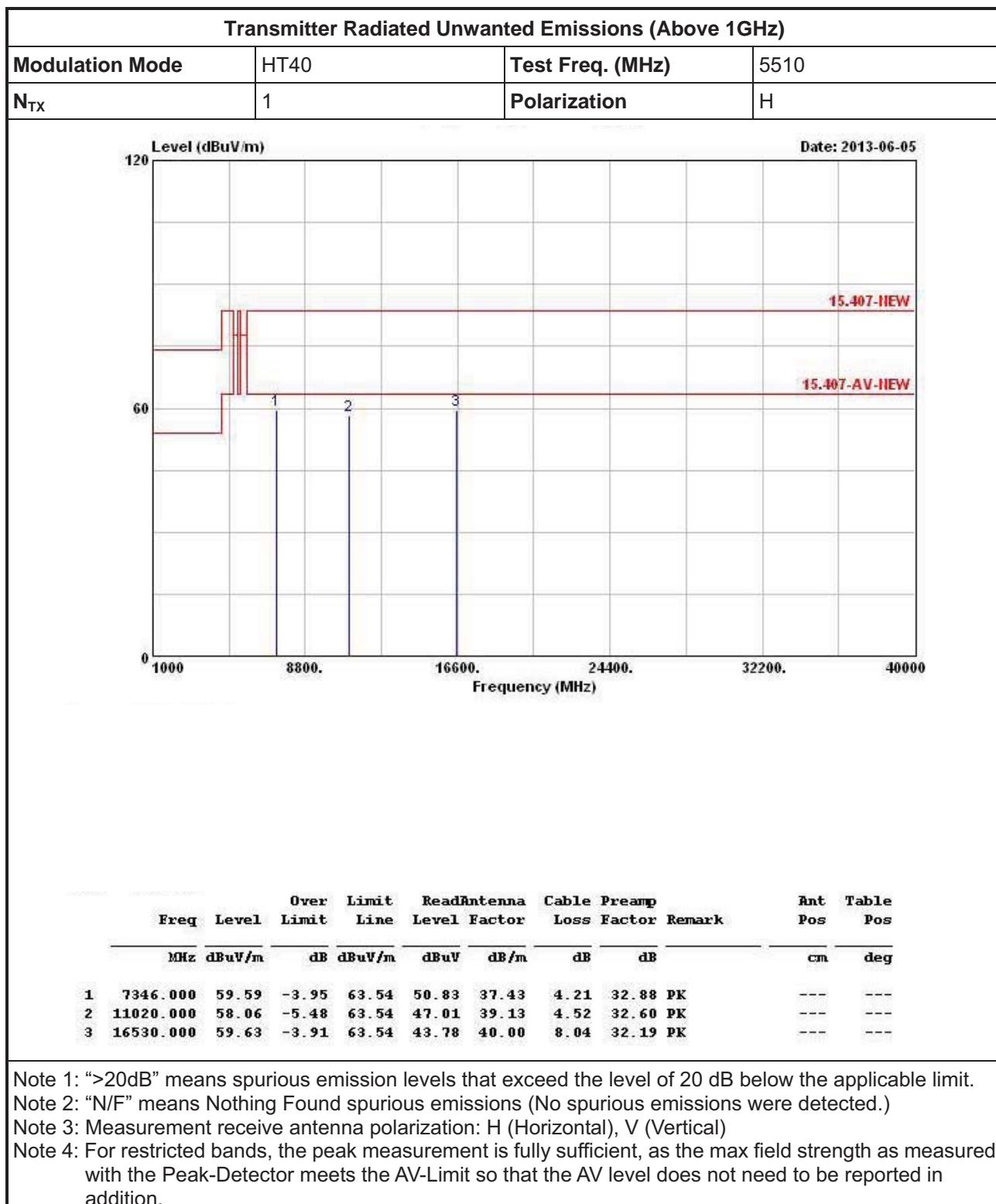
Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.

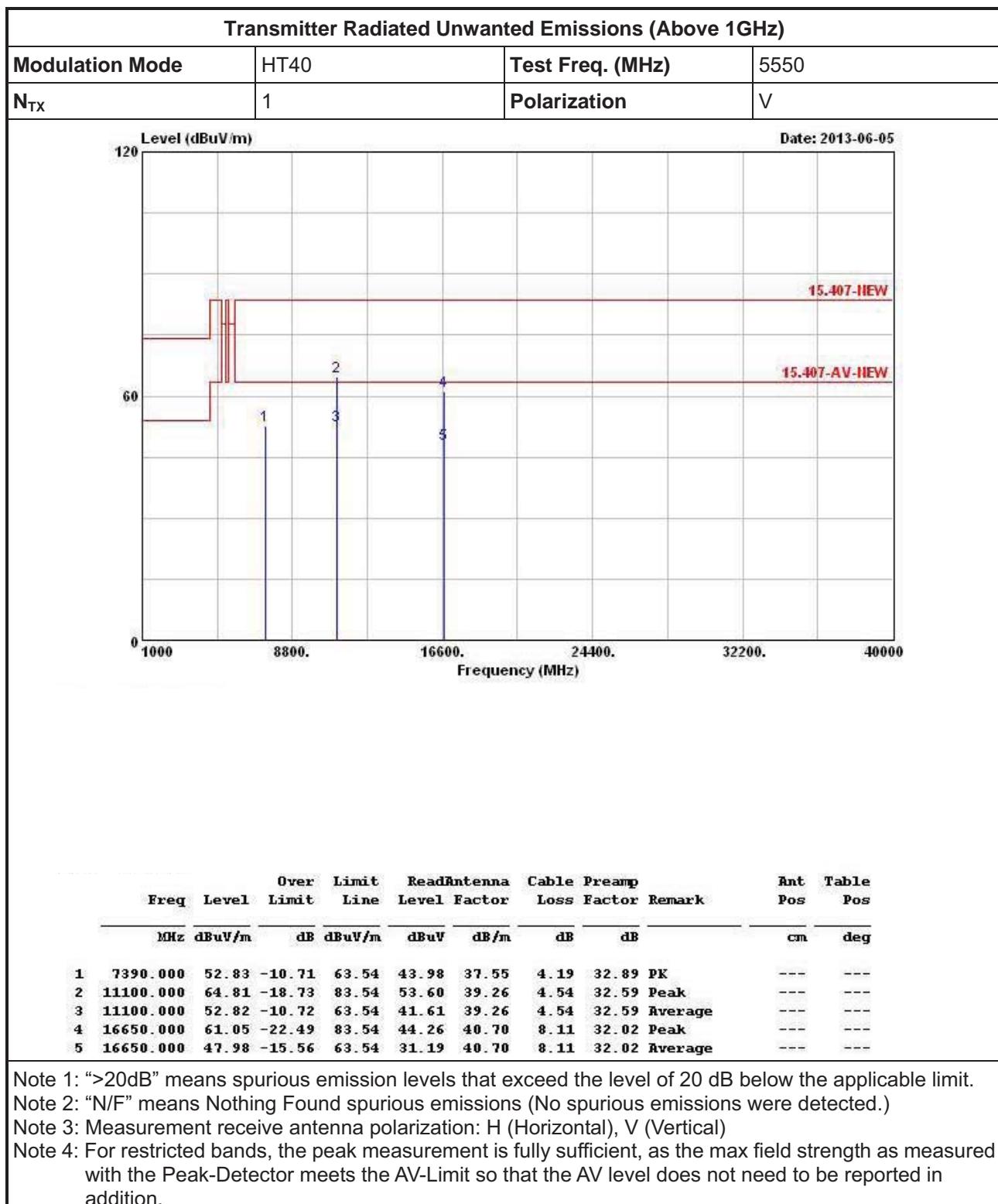


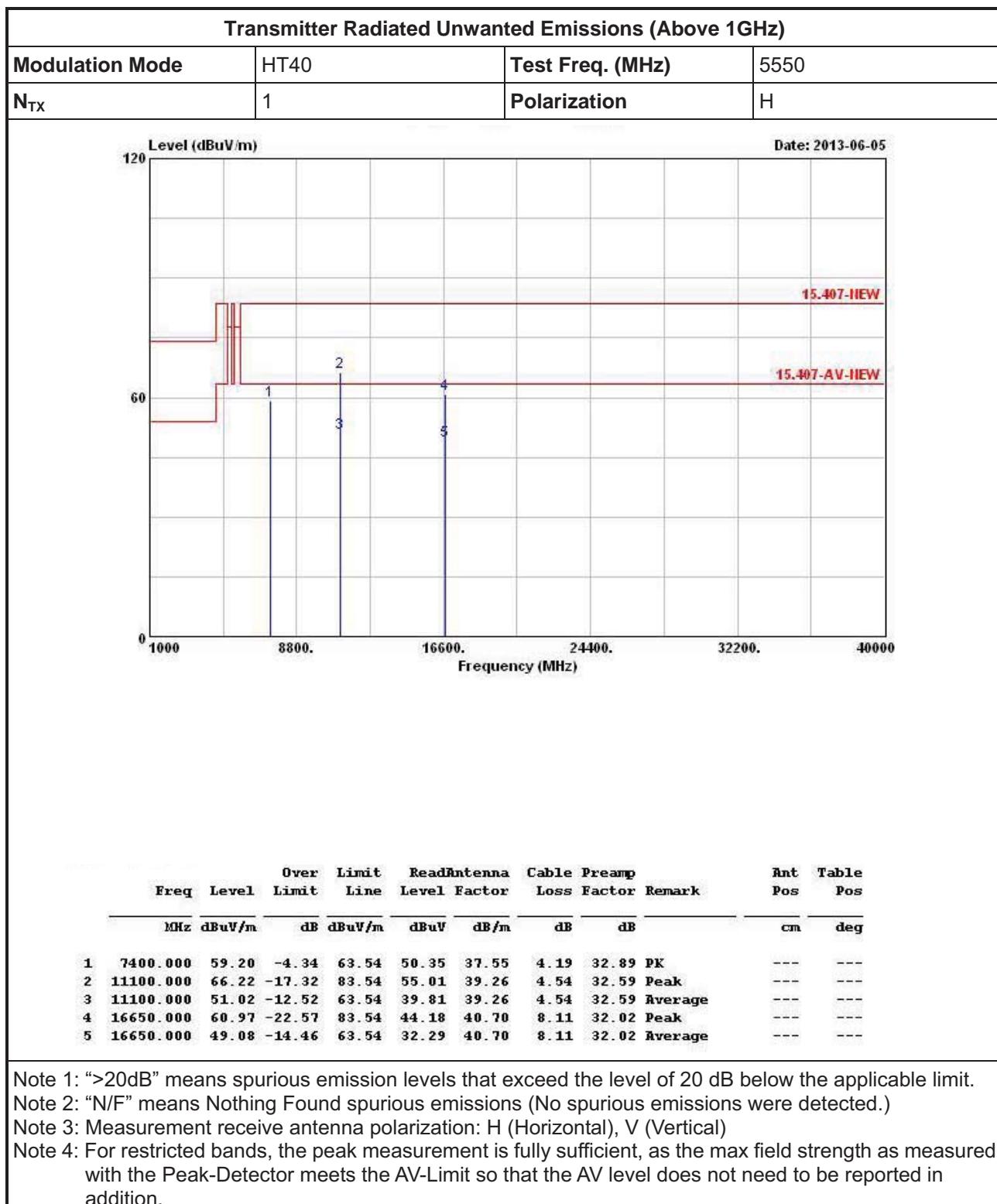


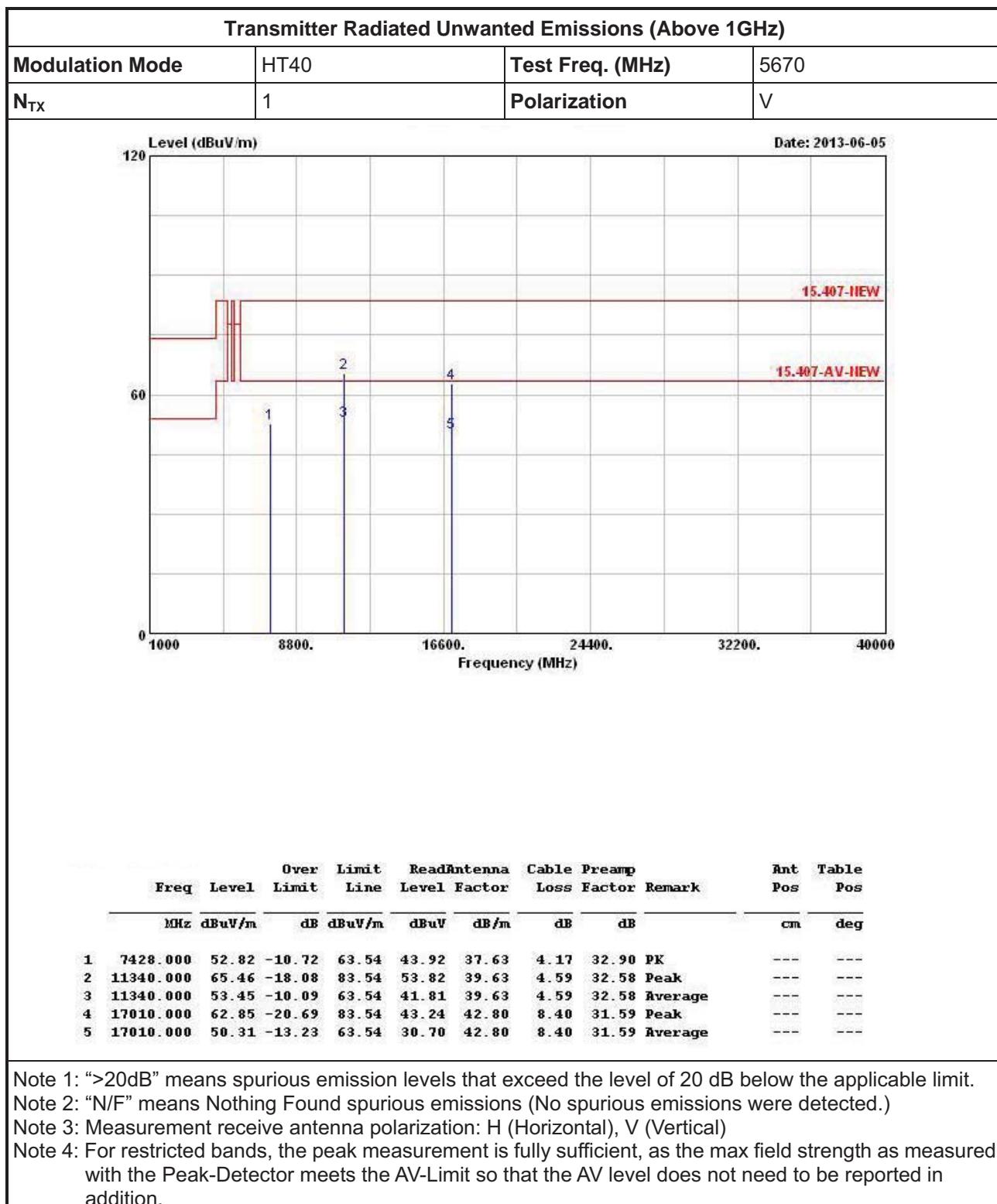


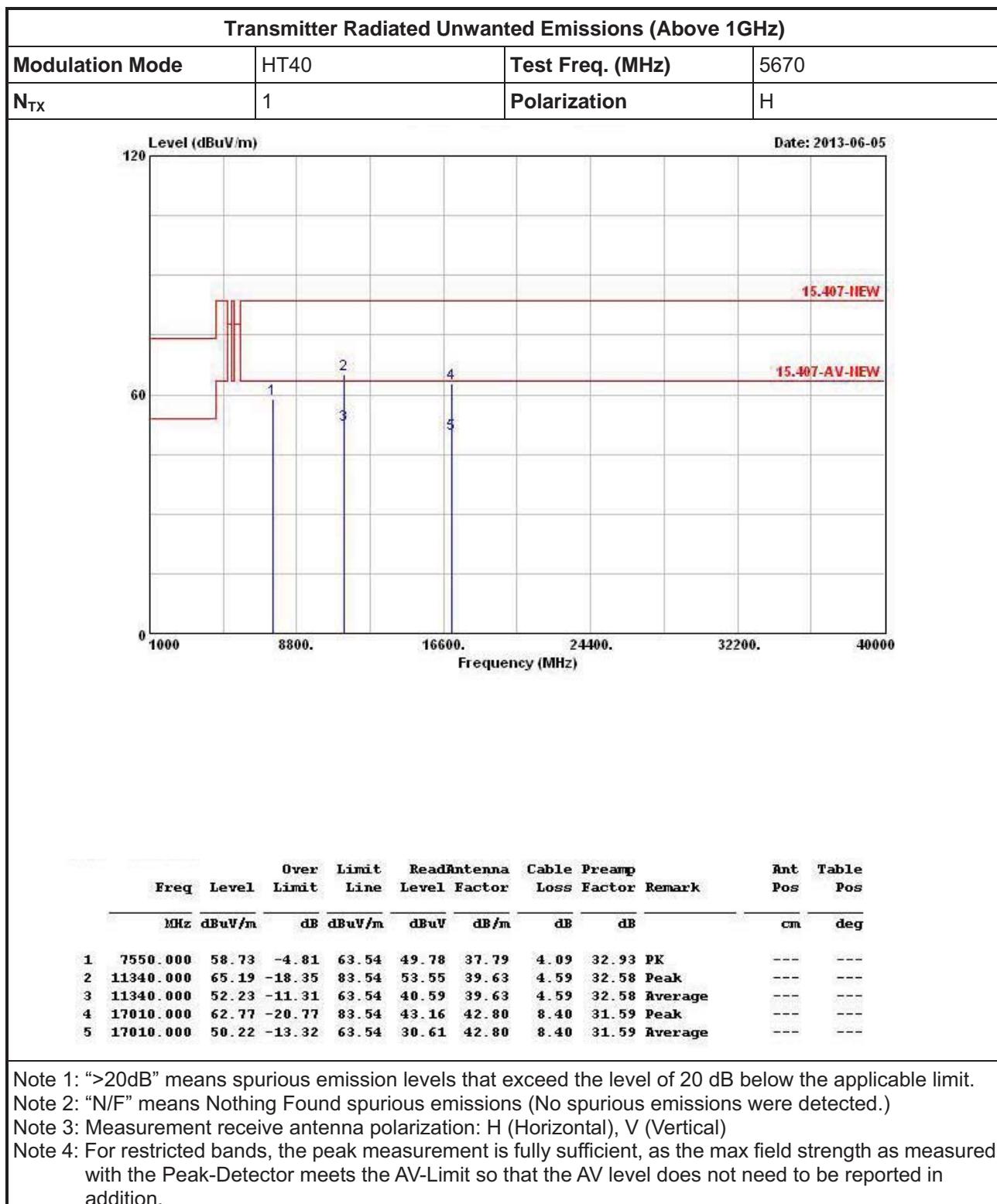


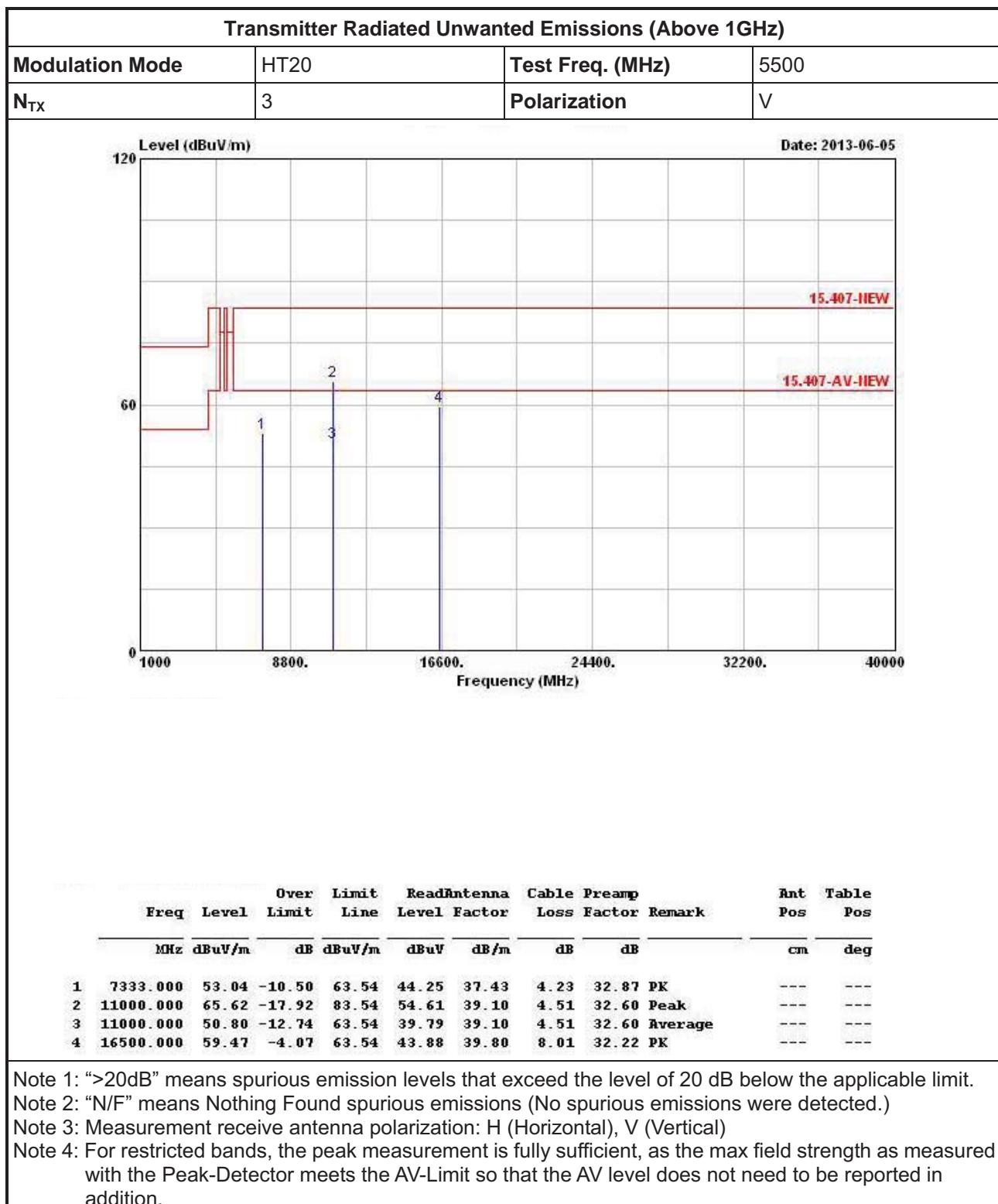


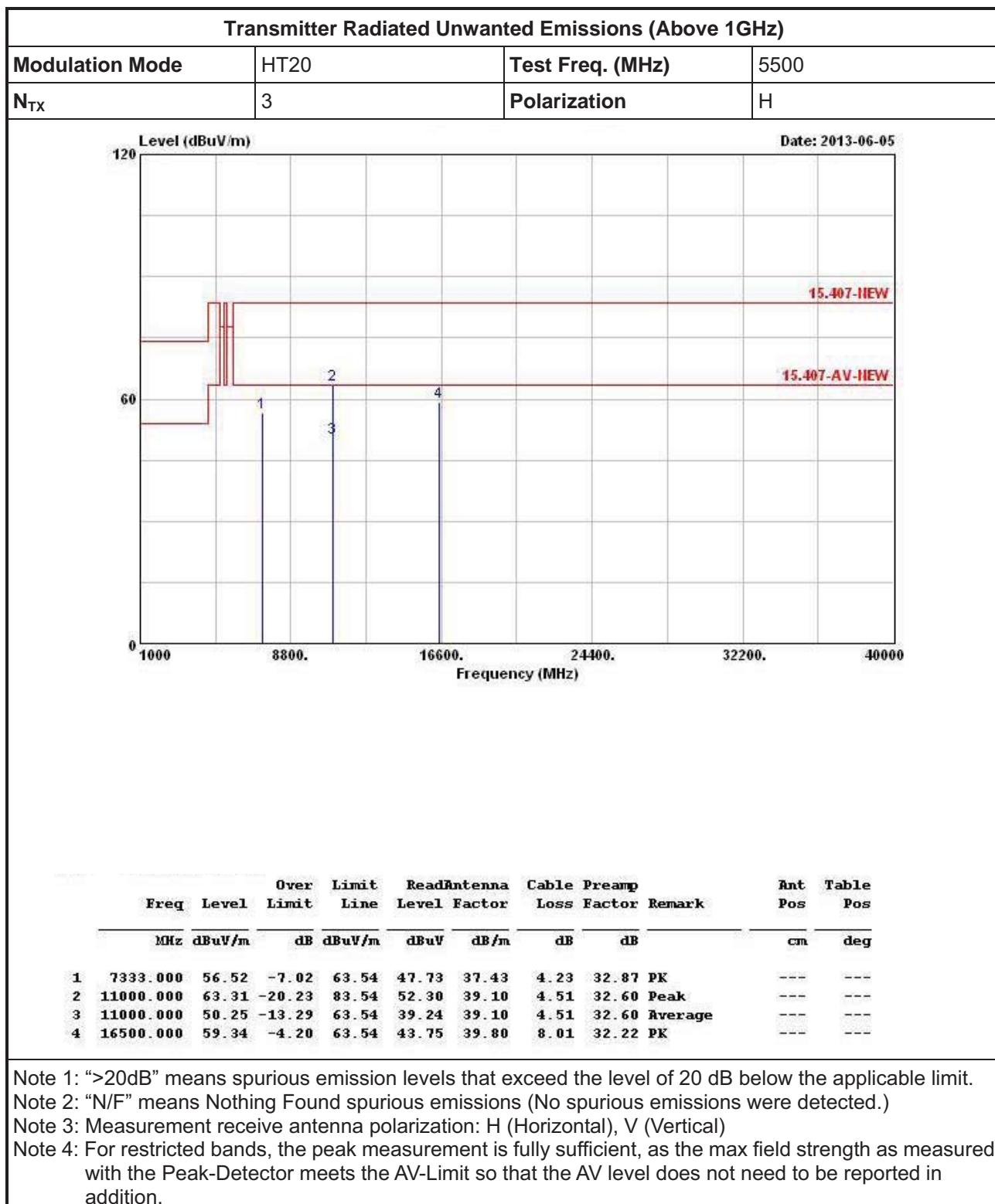


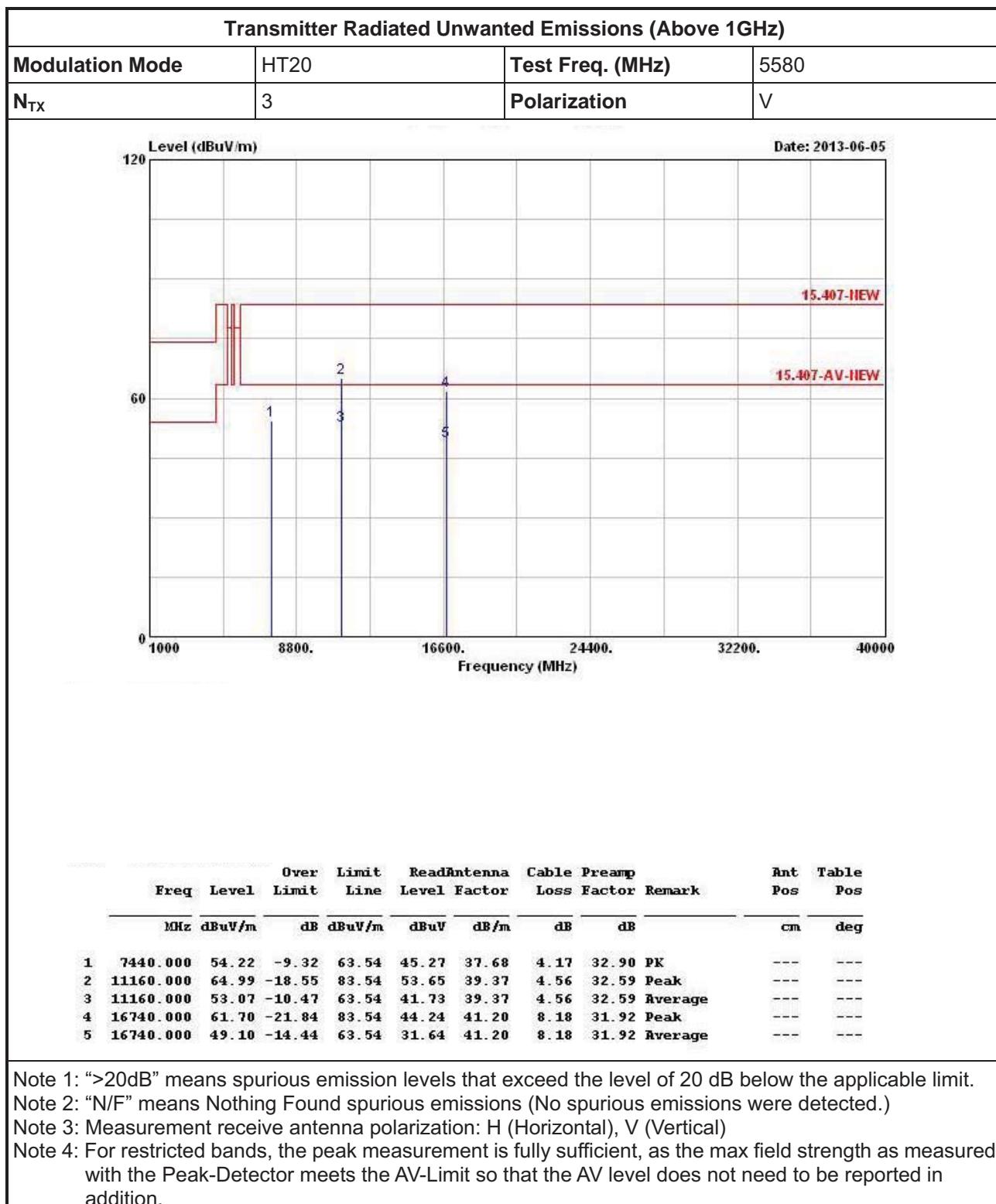


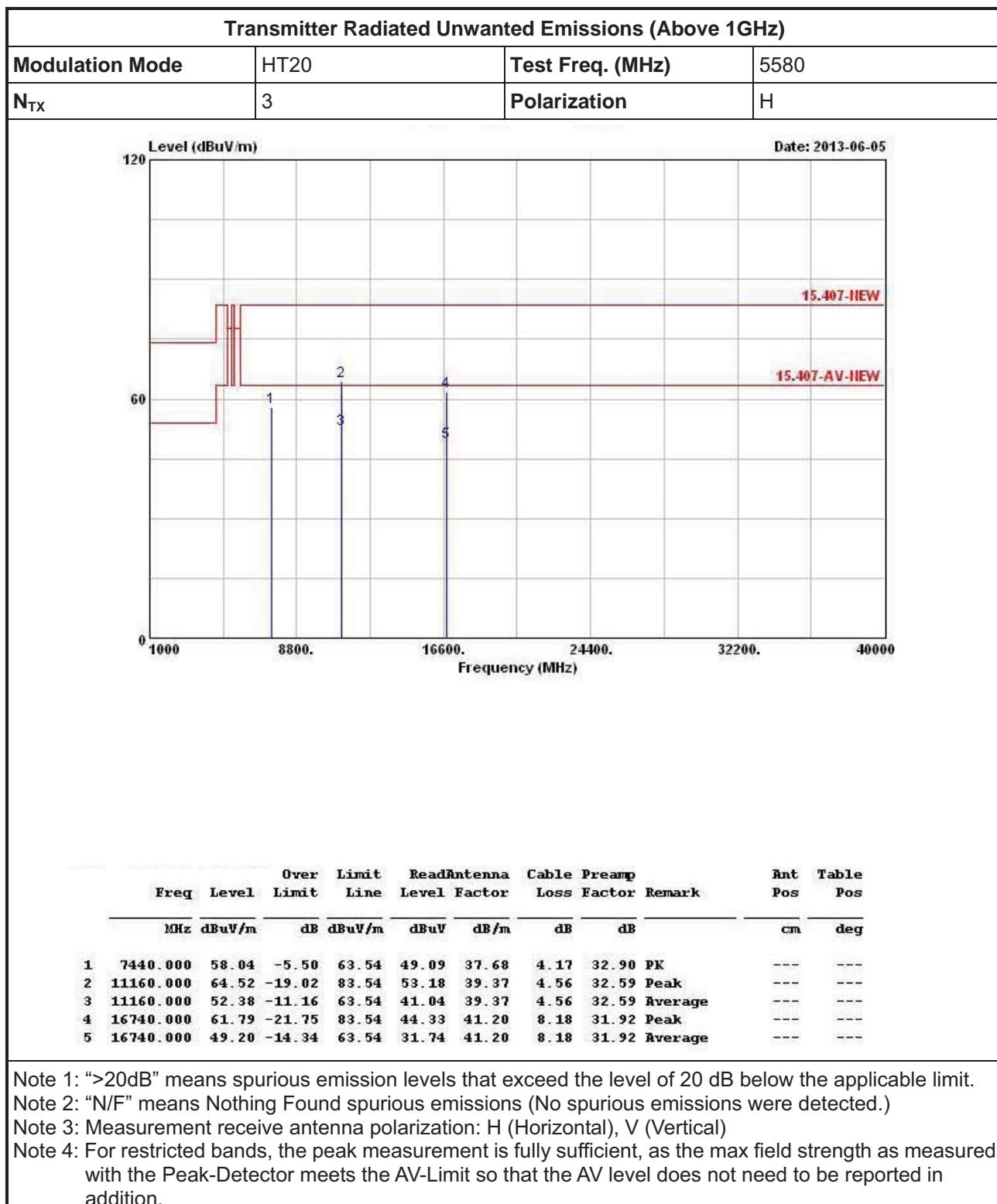


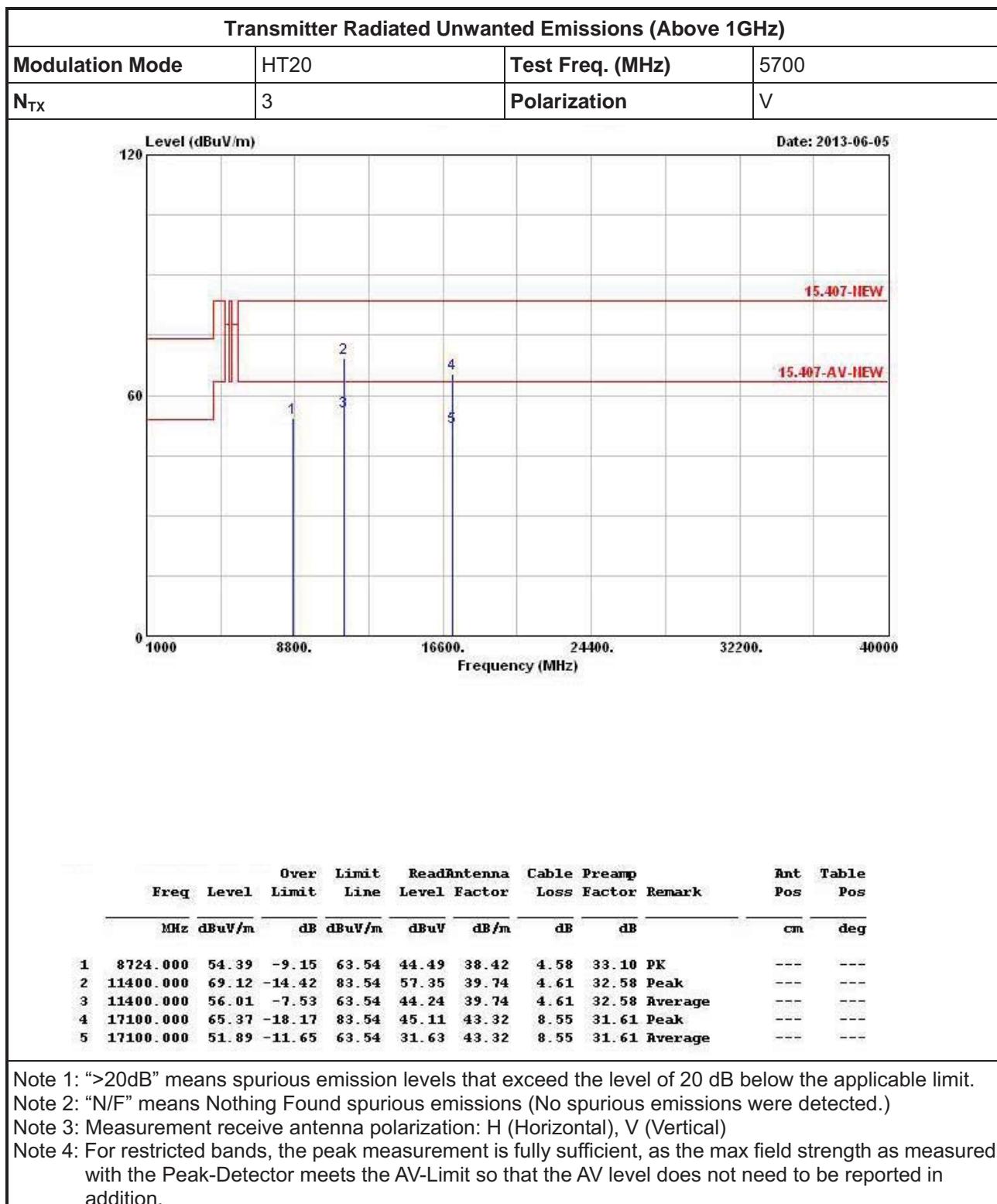


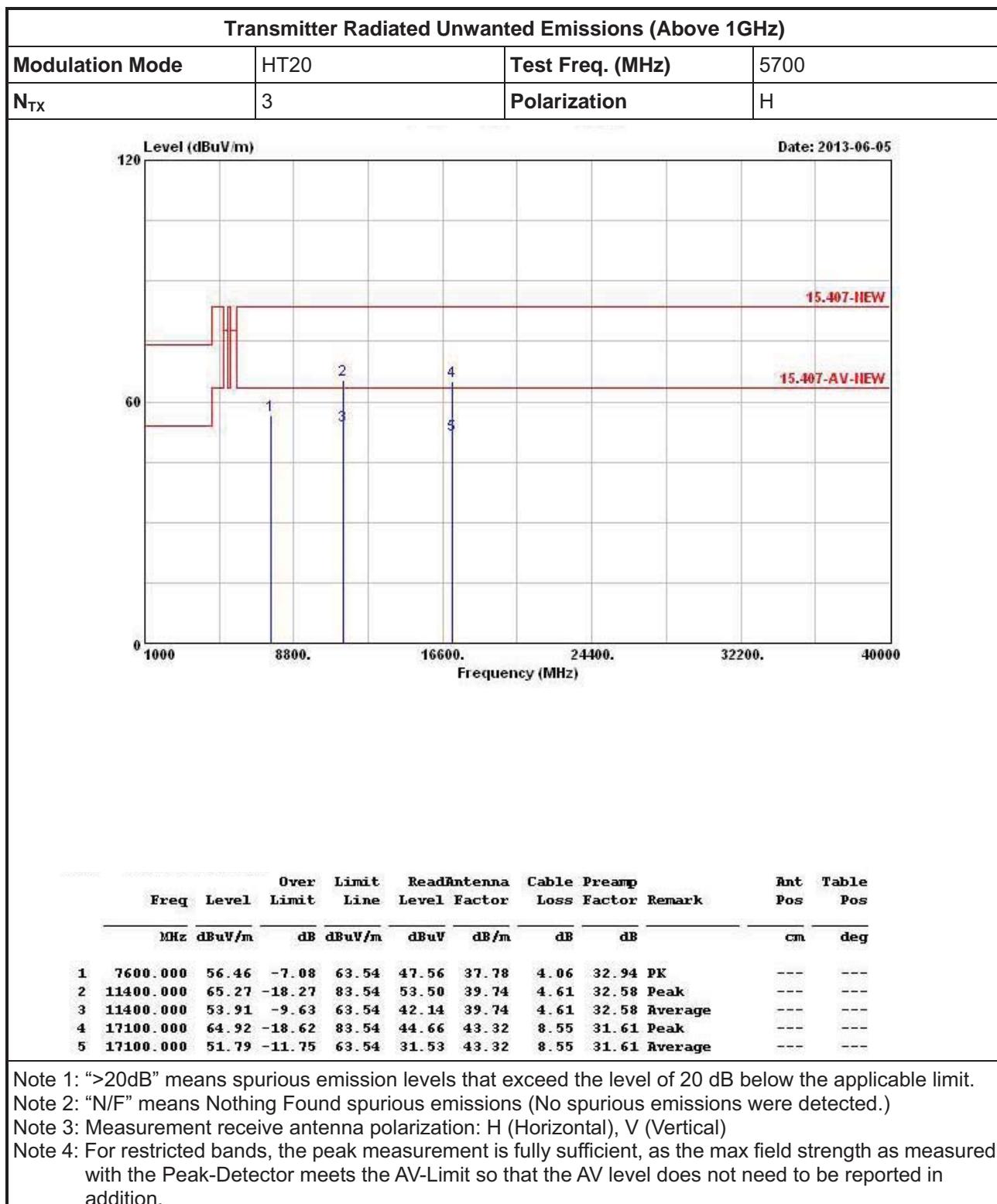


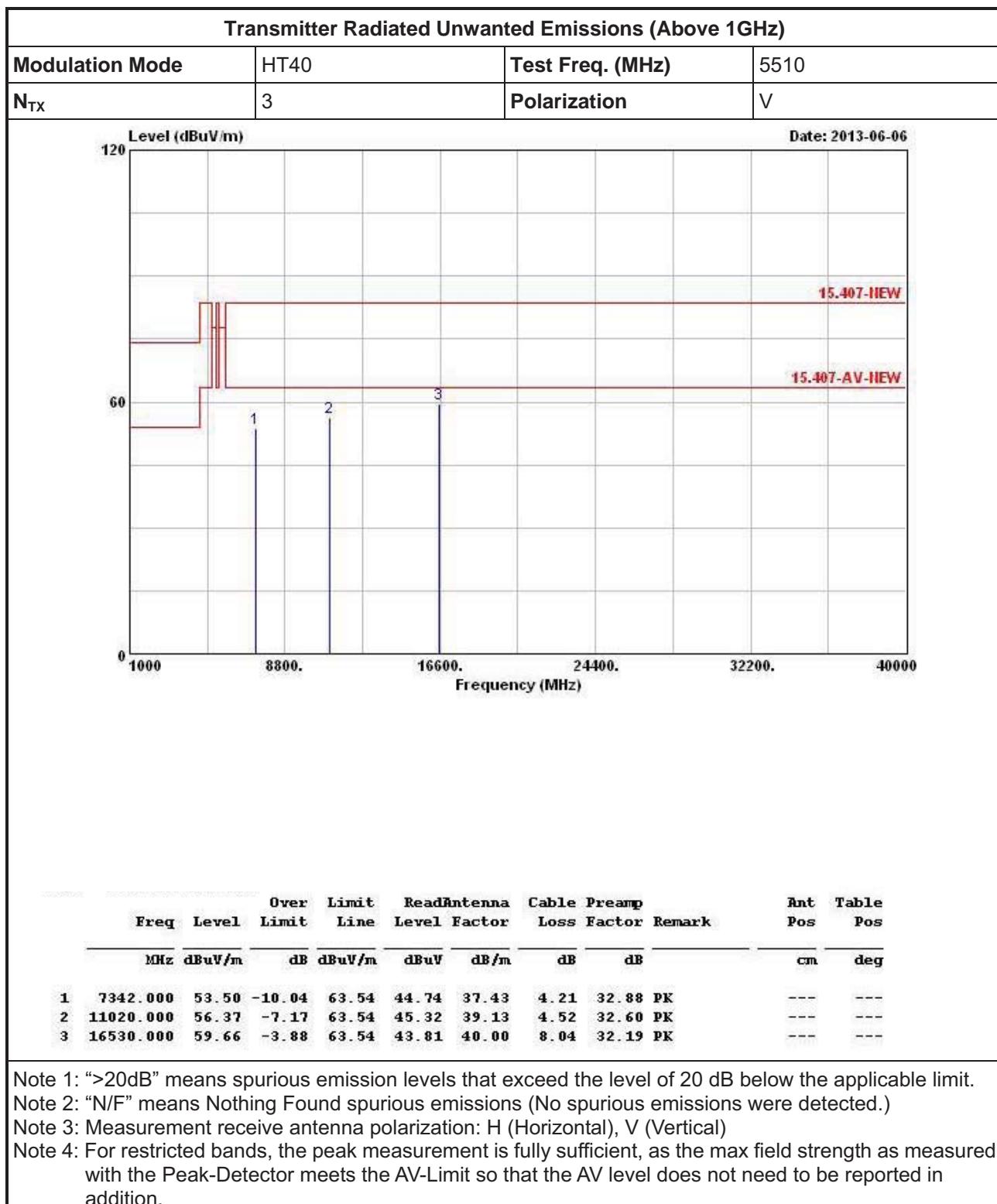


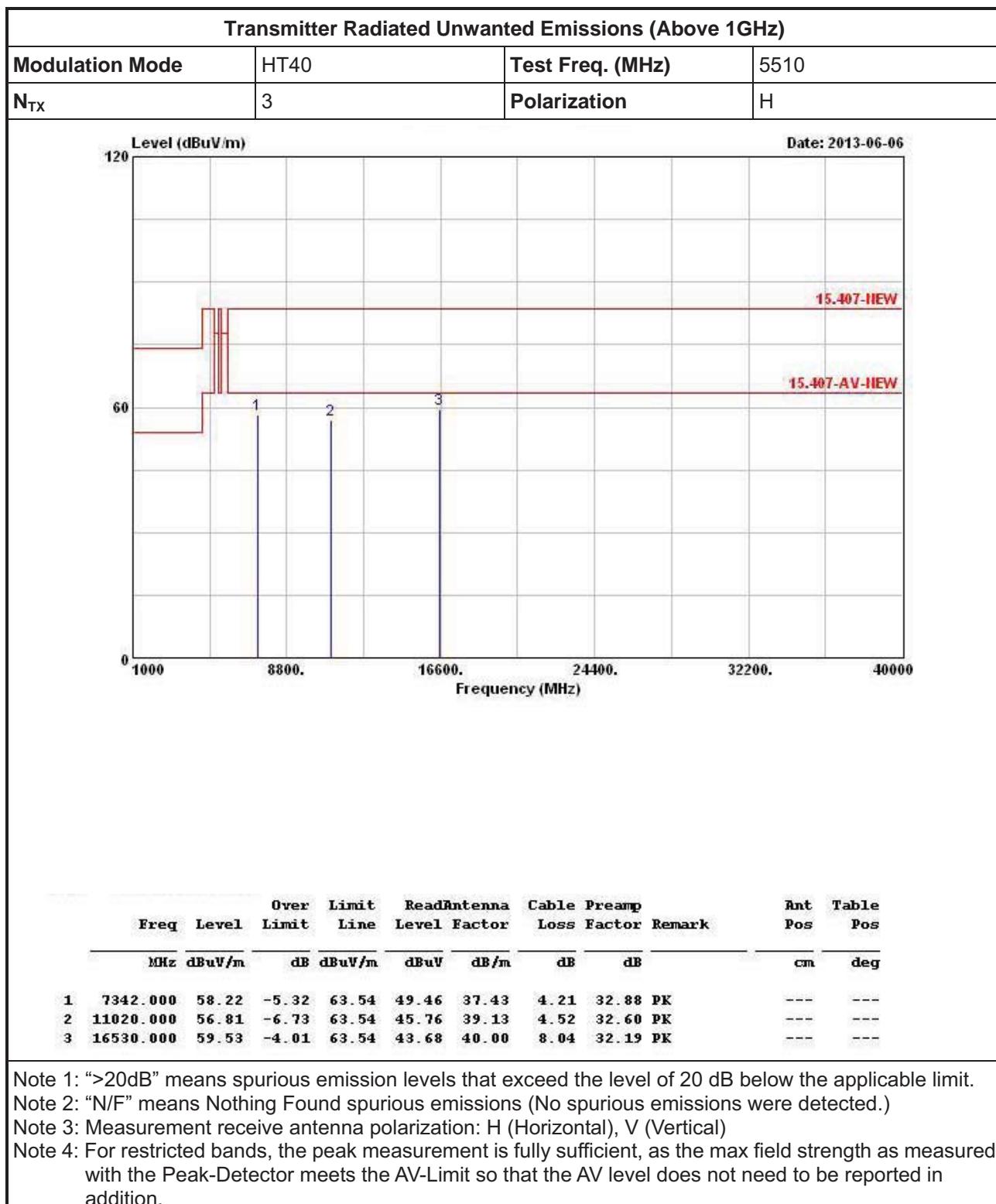


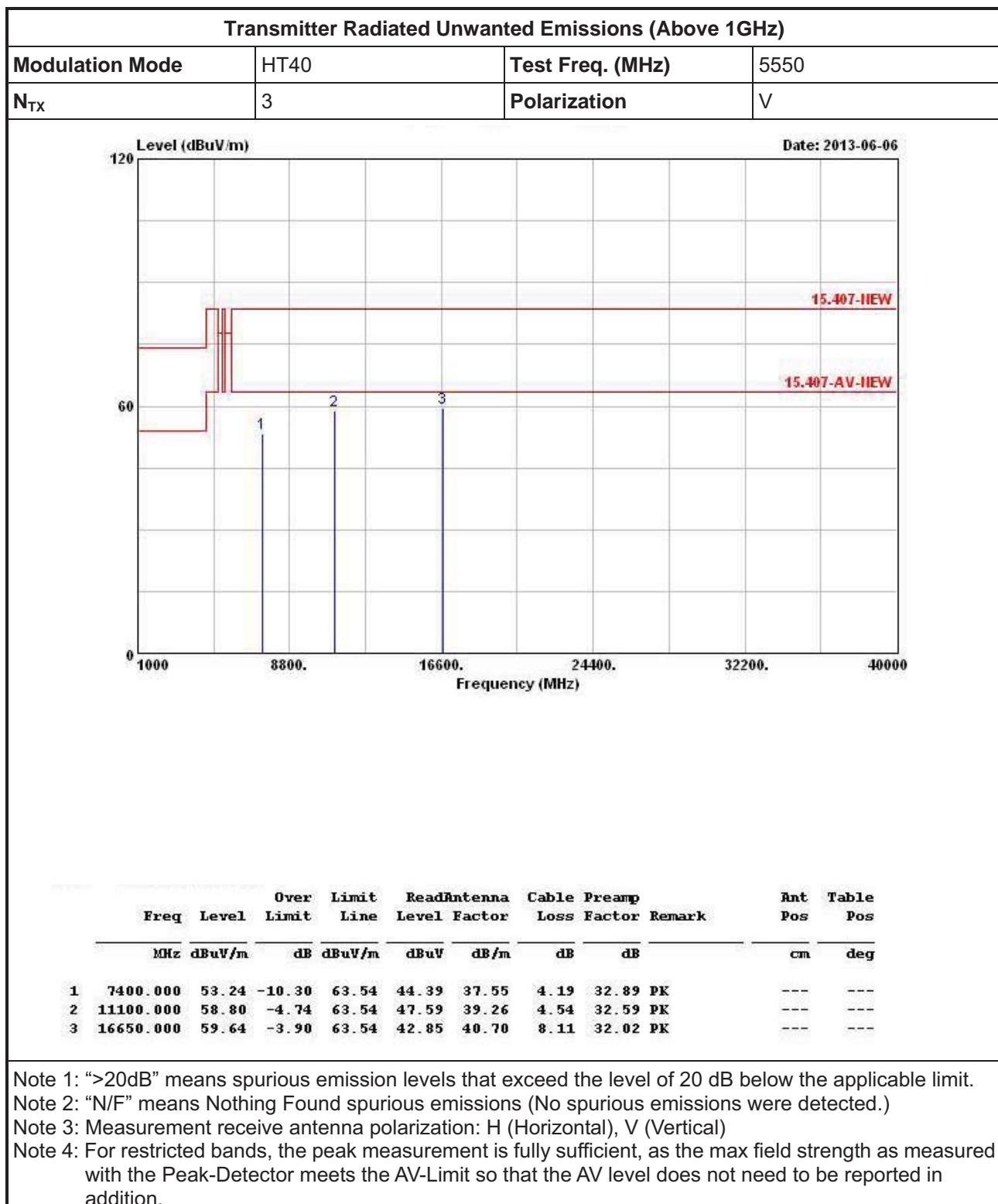


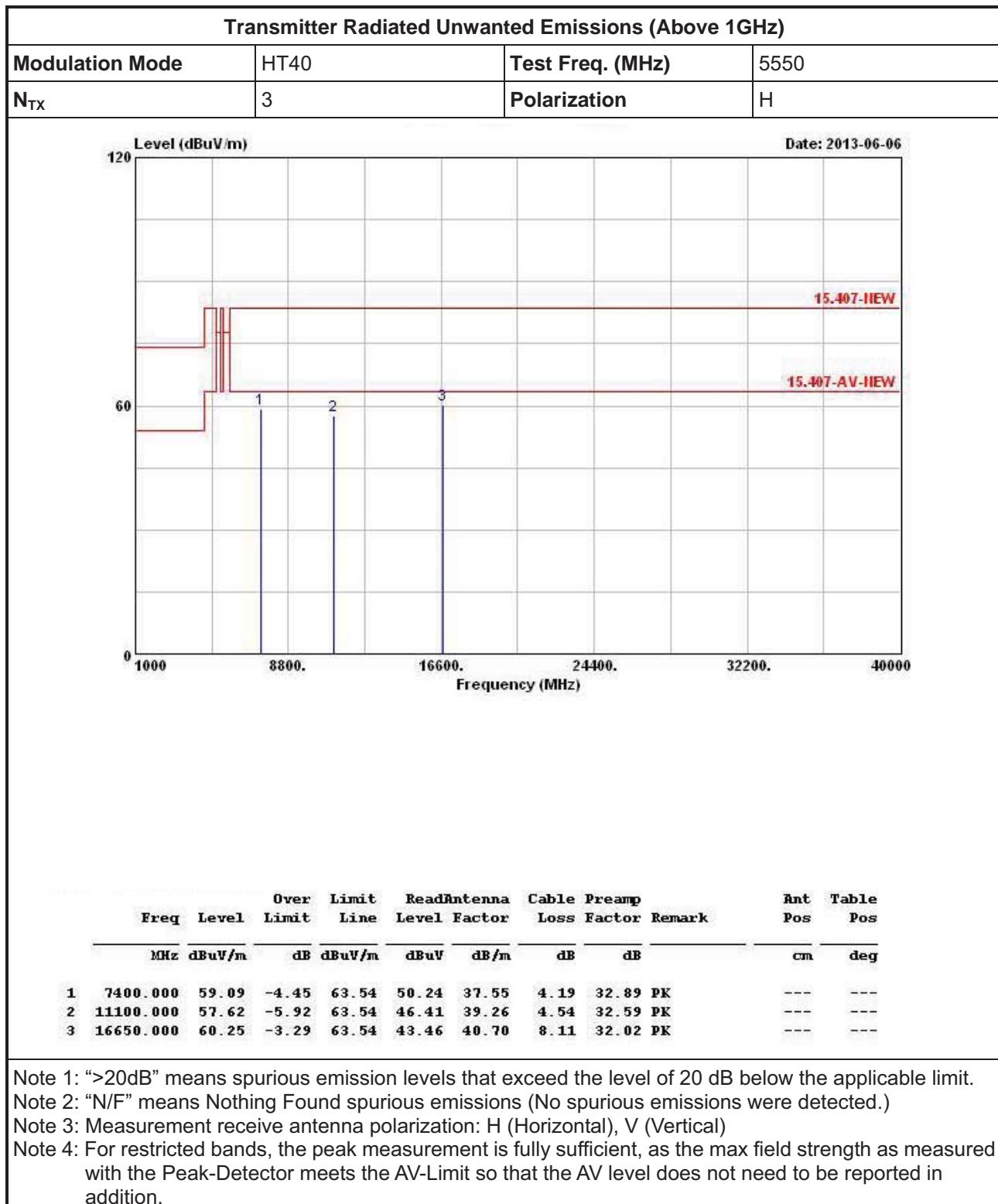


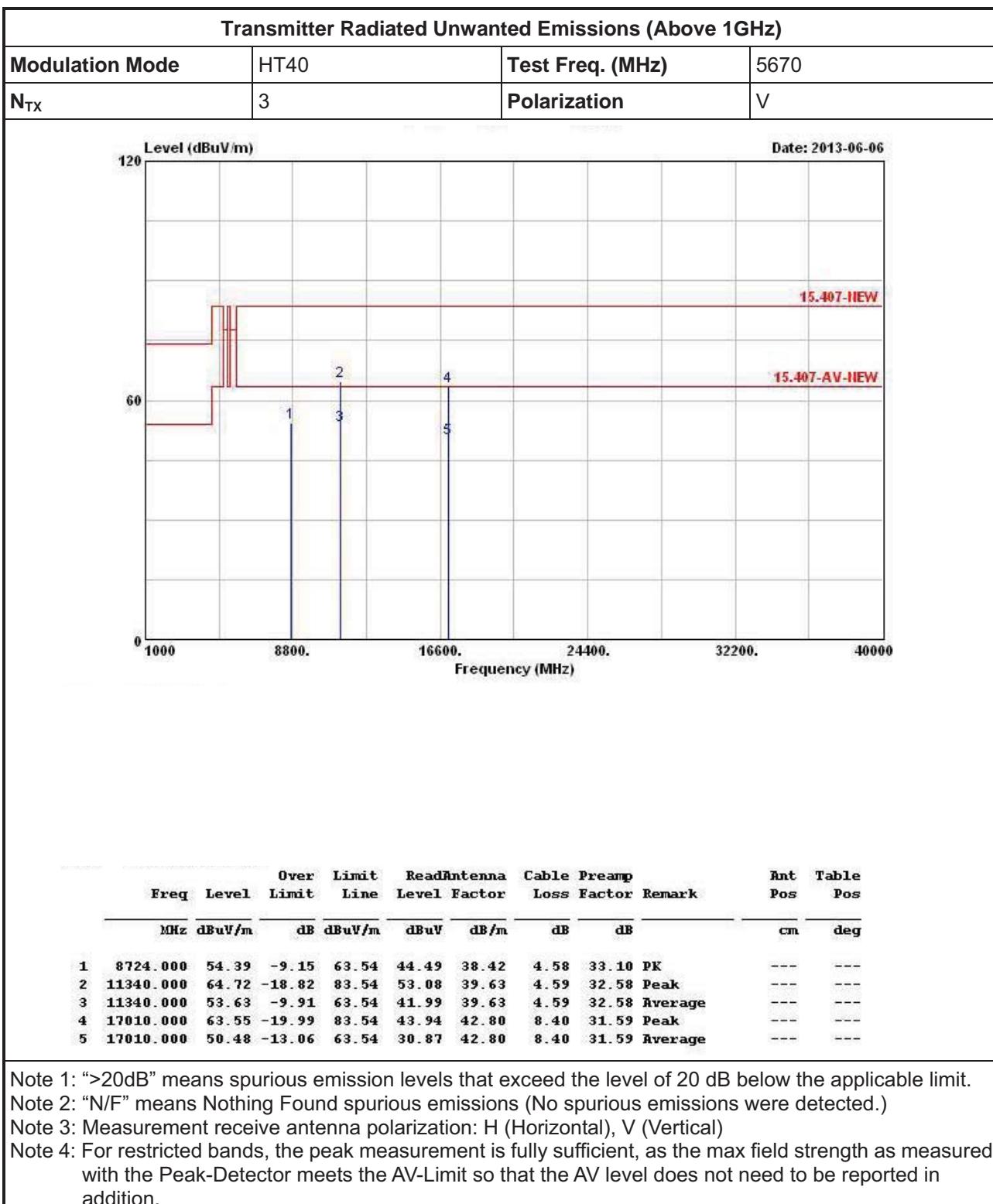


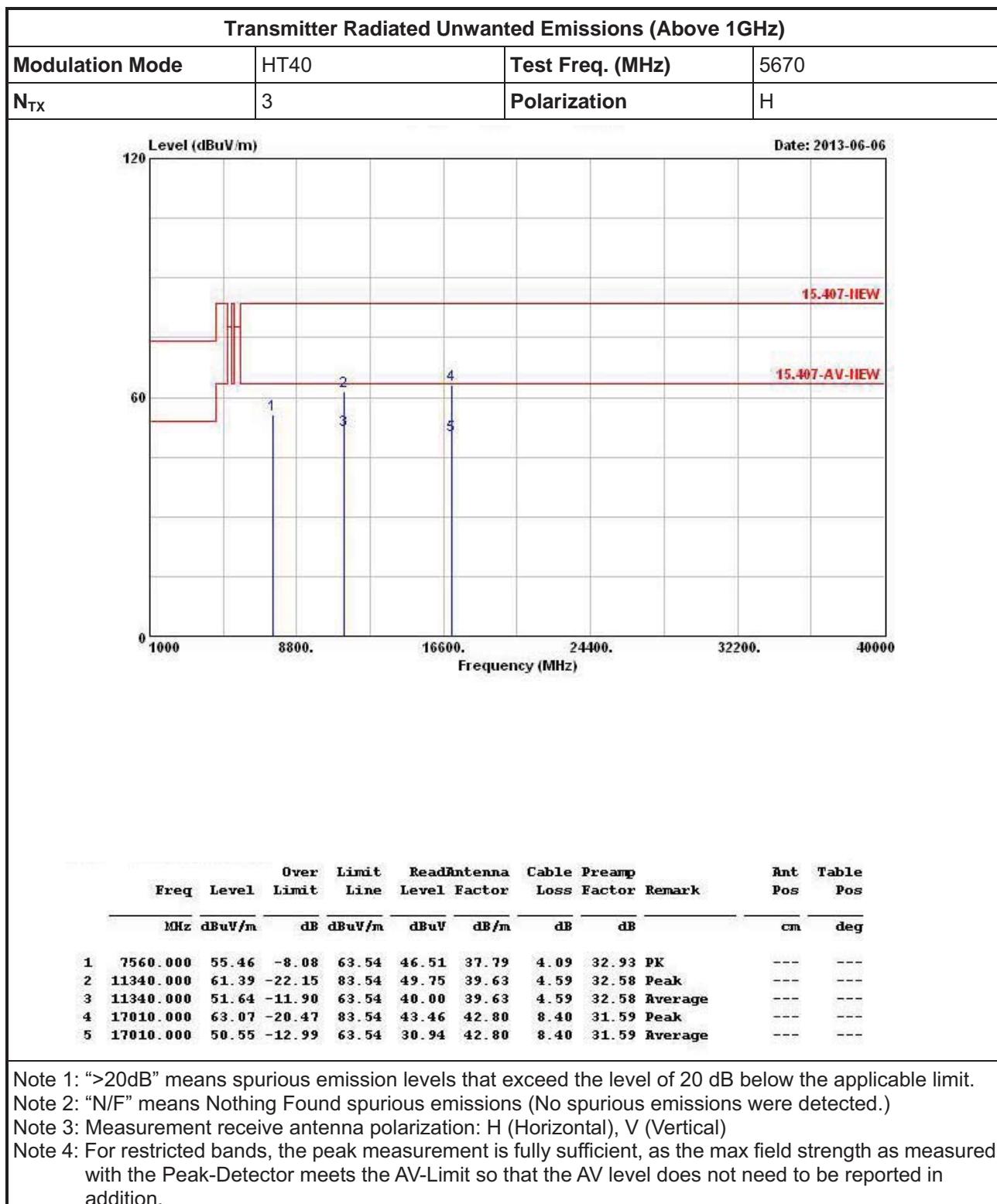














3.8 Frequency Stability

3.8.1 Frequency Stability Limit

| Frequency Stability Limit | |
|--|--|
| UNII Devices | |
| <input checked="" type="checkbox"/> In-band emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual. | |
| LE-LAN Devices | |
| <input checked="" type="checkbox"/> N/A | |
| IEEE Std. 802.11n-2009 | |
| <input checked="" type="checkbox"/> The transmitter center frequency tolerance shall be ± 20 ppm maximum for the 5 GHz band and ± 25 ppm maximum for the 2.4 GHz band. | |

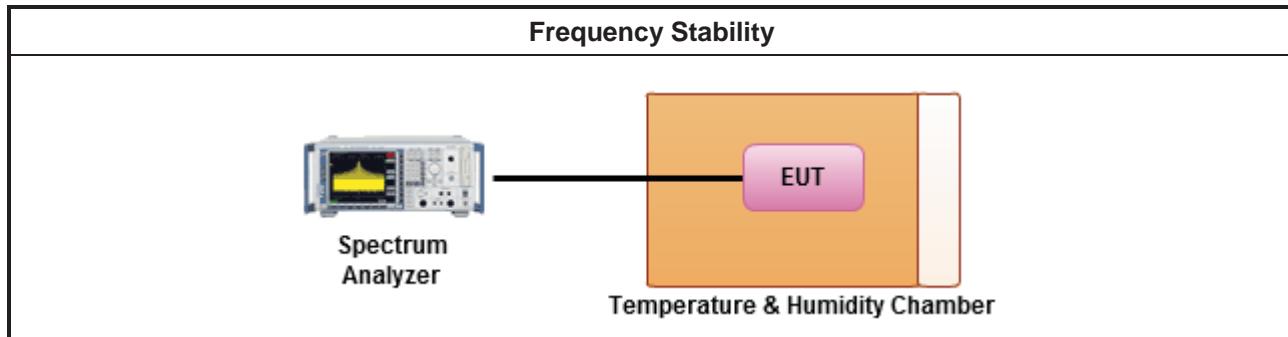
3.8.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.8.3 Test Procedures

| Test Method | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | Refer as ANSI C63.10, clause 6.8 for frequency stability tests |
| <input checked="" type="checkbox"/> | Frequency stability with respect to ambient temperature |
| <input checked="" type="checkbox"/> | Frequency stability when varying supply voltage |
| <input checked="" type="checkbox"/> | For conducted measurement. |
| <input checked="" type="checkbox"/> | For conducted measurements on devices with multiple transmit chains: Measurements need only to be performed on one of the active transmit chains (antenna outputs) |
| <input type="checkbox"/> | For radiated measurement. The equipment to be measured and the test antenna shall be oriented to obtain the maximum emitted power level. |

3.8.4 Test Setup





3.8.5 Test Result of Frequency Stability

| Frequency Stability Result | | | |
|----------------------------|-------------|---------------------------|---------------------------|
| Mode | | Frequency Stability (ppm) | |
| Condition | Freq. (MHz) | Test Frequency (MHz) | Frequency Stability (ppm) |
| T _{20°C} Vmax | 5300 | 5299.99479 | -0.9830 |
| T _{20°C} Vmin | 5300 | 5299.99479 | -0.9830 |
| T _{50°C} Vnom | 5300 | 5300.07294 | 13.7623 |
| T _{40°C} Vnom | 5300 | 5300.03603 | 6.7981 |
| T _{30°C} Vnom | 5300 | 5300.00955 | 1.8019 |
| T _{20°C} Vnom | 5300 | 5299.99479 | -0.9830 |
| T _{10°C} Vnom | 5300 | 5299.98567 | -2.7038 |
| T _{0°C} Vnom | 5300 | 5299.98394 | -3.0302 |
| T _{-10°C} Vnom | 5300 | 5299.98611 | -2.6208 |
| T _{-20°C} Vnom | 5300 | 5299.99175 | -1.5566 |
| Limit (ppm) | | 20 | |
| Result | | Complied | |

Note 1: Measure at 85 % [Vmin] and 115 % [Vmax] of the nominal voltage [Vnom].
Note 2: The nominal voltage refer test report clause 1.1.5 for EUT operational condition.



4 Test Equipment and Calibration Data

| Instrument | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Remark |
|---------------------|-----------------------------|-----------|-----------------|-----------------|------------------|----------------------|
| EMC Receiver | R&S | ESCS 30 | 100174 | 9kHz ~ 2.75GHz | Mar. 26, 2013 | Conduction (CO04-HY) |
| LISN | SCHWARZBECK MESS-ELEKTRONIK | NSLK 8127 | 8127-477 | 9kHz ~ 30MHz | Jan. 21, 2013 | Conduction (CO04-HY) |
| LISN (Support Unit) | EMCO | 3810/2NM | 9703-1839 | 9kHz ~ 30MHz | Apr. 18, 2013 | Conduction (CO04-HY) |
| RF Cable-CON | HUBER+SUHNER | RG213/U | 7.61183201e+012 | 9kHz ~ 30MHz | Nov. 09, 2012 | Conduction (CO04-HY) |

Note: Calibration Interval of instruments listed above is one year.

| Instrument | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Remark |
|----------------------------|--------------|------------------|-------------|-----------------|------------------|---------------------|
| Spectrum Analyzer | R&S | FSP 40 | 100305 | 9KHz~40GHz | Mar. 20, 2013 | Conducted (TH01-HY) |
| AC Power Source | G.W | APS-9102 | EL920581 | AC 0V ~ 300V | Jul. 02, 2012 | Conducted (TH01-HY) |
| Temp. and Humidity Chamber | Giant Force | GTH-225-20-SP-SD | MAA1112-007 | -20 ~ 100°C | Nov. 21, 2012 | Conducted (TH01-HY) |
| Signal Generator | R&S | SMR40 | 100116 | 10MHz ~ 40GHz | Jun. 26, 2012 | Conducted (TH01-HY) |
| Power Sensor | Anritsu | MA2411B | 0917017 | 300MHz ~ 40GHz | Feb. 02, 2013 | Conducted (TH01-HY) |
| Power Meter | Anritsu | ML2495A | 0949003 | 300MHz ~ 40GHz | Feb. 02, 2013 | Conducted (TH01-HY) |
| RF Cable-2m | HUBER+SUHNER | SUCOFLEX_104 | SN 345675/4 | 1GHz ~ 26.5GHz | NA | Conducted (TH01-HY) |
| RF Cable-3m | HUBER+SUHNER | SUCOFLEX_104 | SN 345669/4 | 1GHz ~ 26.5GHz | NA | Conducted (TH01-HY) |

Note: Calibration Interval of instruments listed above is one year.



| Instrument | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Remark |
|--------------------------|----------------|-------------|-------------|--------------------|------------------|-----------------------|
| Spectrum Analyzer | R&S | FSP40 | 100593 | 9kHz ~ 40GHz | Sep. 14, 2012 | Radiation (03CH02-HY) |
| 3m Semi Anechoic Chamber | SIDT FRANKONIA | SAC-3M | 03CH02-HY | 30MHz ~ 1GHz 3m | May 9, 2013 | Radiation (03CH02-HY) |
| Amplifier | Agilent | 8447D | 2944A11146 | 100kHz ~ 1.3GHz | Jul. 23, 2012 | Radiation (03CH02-HY) |
| Amplifier | Agilent | 8449B | 3008A02373 | 1GHz ~ 26.5GHz | Aug. 10, 2012 | Radiation (03CH02-HY) |
| Horn Antenna | ETS-LINDGREN | 3117 | 00091920 | 1GHz ~ 18GHz | Nov. 16, 2012 | Radiation (03CH02-HY) |
| Horn Antenna | SCHWARZBECK | BBHA9170 | BBHA9170154 | 15GHz ~ 40GHz | Jan. 08, 2013 | Radiation (03CH02-HY) |
| RF Cable-R03m | Jye Bao | RG142 | CB021 | 9kHz ~ 1GHz | Nov. 10, 2012 | Radiation (03CH02-HY) |
| RF Cable-high | SUHNER | SUCOFLEX106 | 03CH02-HY | 1GHz ~ 40GHz | Mar. 05, 2013 | Radiation (03CH02-HY) |
| Bilog Antenna | SCHAFFNER | CBL61128 | 2723 | 30MHz ~ 2GHz | Oct. 22, 2012 | Radiation (03CH02-HY) |
| Turn Table | HD | DS 420 | 420/649/00 | 0~ 360 degree | N/A | Radiation (03CH02-HY) |
| Antenna Mast | HD | MA 240 | 240/559/00 | 1 ~ 4 m | N/A | Radiation (03CH02-HY) |

Note: Calibration Interval of instruments listed above is one year.

| Instrument | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Remark |
|--------------|--------------|-----------|------------|-----------------|------------------|-----------------------|
| Loop Antenna | TESEQ | HLA 6120 | 31244 | 9 kHz - 30 MHz | Dec. 02, 2012 | Radiation (03CH02-HY) |

Note: Calibration Interval of instruments listed above is two year.