



# FCC Test Report

**Equipment** : 5GHz WiFi  
**Brand Name** : Entone  
**Model No.** : CL-120  
**FCC ID** : S4A50-0100-CL-01  
**Standard** : 47 CFR FCC Part 15.407  
**Operating Band** : 5150 MHz – 5250 MHz  
5725 MHz – 5850 MHz  
**FCC Classification** : NII  
**Applicant** : Entone Technologies (HK) Limited  
Level 28, Saxon Tower, 7 Cheung Shun Street,  
Lai Chi Kok, HongKong  
**Manufacturer** : XAVi Technologies Corporation  
9F, No.129, Hsing Te Rd., Sanchung Dist.,  
New Taipei City 241, Taiwan, R.O.C.  
**Function** :  Outdoor AP;  Indoor AP;  Fixed P2P AP  
 Portable Client

The product sample received on Aug. 30, 2014 and completely tested on Sep. 27, 2014. 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:

Vic Hsiao / Supervisor





## Table of Contents

<b>1</b>	<b>GENERAL DESCRIPTION .....</b>	<b>5</b>
1.1	Information.....	5
1.2	Support Equipment.....	8
1.3	Testing Applied Standards .....	9
1.4	Testing Location Information .....	9
1.5	Measurement Uncertainty .....	10
<b>2</b>	<b>TEST CONFIGURATION OF EUT .....</b>	<b>11</b>
2.1	The Worst Case Modulation Configuration .....	11
2.2	The Worst Case Power Setting Parameter.....	11
2.3	The Worst Case Measurement Configuration.....	12
2.4	Test Setup Diagram .....	13
<b>3</b>	<b>TRANSMITTER TEST RESULT .....</b>	<b>15</b>
3.1	AC Power-line Conducted Emissions .....	15
3.2	Emission Bandwidth .....	18
3.3	RF Output Power.....	22
3.4	Peak Power Spectral Density.....	27
3.5	Transmitter Bandedge Emissions .....	31
3.6	Transmitter Unwanted Emissions.....	36
3.7	Frequency Stability .....	125
<b>4</b>	<b>TEST EQUIPMENT AND CALIBRATION DATA .....</b>	<b>127</b>

### APPENDIX A. TEST PHOTOS

### APPENDIX B. PHOTOGRAPHS OF EUT



## Summary of Test Result

Conformance Test Specifications			
Report Clause	Ref. Std. Clause	Description	Result
1.1.2	15.203	Antenna Requirement	Complied
3.1	15.207	AC Power-line Conducted Emissions	Complied
3.2	15.407(a)	Emission Bandwidth	Complied
3.3	15.407(a)	RF Output Power (Maximum Conducted Output Power)	Complied
3.4	15.407(a)	Peak Power Spectral Density	Complied
3.5	15.407(b)	Transmitter Bandedge Emissions	Complied
3.6	15.407(b)	Transmitter Unwanted Emissions	Complied
3.7	15.407(g)	Frequency Stability	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 <sub>TX</sub> )	RF Output Power (dBm)
5150-5250	a	5180-5240	36-48 [4]	1	21.87
5725-5850		5745-5825	149-165 [5]	1	25.02
5150-5250	n (HT20)	5180-5240	36-48 [4]	1	22.10
5150-5250		5180-5240	36-48 [4]	3	17.91
5725-5850		5745-5825	149-165 [5]	1	24.91
5725-5850		5745-5825	149-165 [5]	3	24.87
5150-5250	n (HT40)	5190-5230	38-46 [2]	1	23.62
5150-5250		5190-5230	38-46 [2]	3	20.72
5725-5850		5755-5795	151-159 [2]	1	23.35
5725-5850		5755-5795	151-159 [2]	3	25.24

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.



### 1.1.2 Antenna Information

Antenna Category	
<input checked="" type="checkbox"/>	External antenna (dedicated antennas)
	<input checked="" type="checkbox"/> RF connector provided
	<input checked="" type="checkbox"/> Unique antenna connector. (e.g., MMCX, U.FL, IPX, and RP-SMA, RP-N type...)
	<input type="checkbox"/> Standard antenna connector. (e.g., SMA, N, BNC, and TNC type...)

Antenna General Information				
Port No.	Ant. Cat.	Ant. Type	Model Name	Gain (dB)
1	External	Dipole	RFA-05-C55-B70	3.50
2		PIFA	GRF1503	2.80
3			GRF1502	4.40

Remark:

1. For the 1Tx Mode, the EUT was pre-tested Antenna Port 2 and Antenna Port 3 for single chain, the worst case was Antenna Port 3.
2. For the 3Tx Mode, the EUT has CDD function.
3. The ANT cable has long and short, when Radiated Emission test with above 1GHz used short ANT cable and below 1GHz used long ANT cable.

### 1.1.3 Type of EUT

Identify EUT	
EUT Serial Number	N/A
Presentation of Equipment	<input checked="" type="checkbox"/> Production ; <input 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		
Test Signal Duty Cycle (x)	N <sub>TX</sub>	Power Duty Factor [dB] – (10 log 1/x)
<input type="checkbox"/> Operated normally mode for worst duty cycle		
<input checked="" type="checkbox"/> Operated test mode for worst duty cycle		
<input checked="" type="checkbox"/> 100% - IEEE 802.11a	1	0
<input checked="" type="checkbox"/> 100% - IEEE 802.11n (HT20)	1	0
<input checked="" type="checkbox"/> 100% - IEEE 802.11n (HT40)	1	0
<input checked="" type="checkbox"/> 100% - IEEE 802.11n (HT20)	3	0
<input checked="" type="checkbox"/> 100% - IEEE 802.11n (HT40)	3	0

### 1.1.5 EUT Operational Condition

Supply Voltage	<input checked="" type="checkbox"/> AC mains	<input checked="" type="checkbox"/> DC	<input checked="" type="checkbox"/> System
Type of DC Source	<input type="checkbox"/> Internal DC supply	<input checked="" type="checkbox"/> From System	<input checked="" type="checkbox"/> External adapter
Test Voltage	<input checked="" type="checkbox"/> V <sub>nom</sub> (110 V)	<input checked="" type="checkbox"/> V <sub>max</sub> (126.5 V)	<input checked="" type="checkbox"/> V <sub>min</sub> (93.5 V)
Test Climatic	<input checked="" type="checkbox"/> T <sub>nom</sub> (20°C)	<input checked="" type="checkbox"/> T <sub>max</sub> (50°C)	<input checked="" type="checkbox"/> T <sub>min</sub> (-20°C)



## 1.2 Support Equipment

Support Equipment - AC Conducted				
No.	Equipment	Brand Name	Model Name	FCC ID
1	Notebook	DELL	M1130	DoC
2	Test Fixture	-	-	-

Support Equipment - RF Conducted				
No.	Equipment	Brand Name	Model Name	FCC ID
1	Notebook	DELL	E5500	-

Support Equipment - Radiated Emission				
No.	Equipment	Brand Name	Model Name	FCC ID
1	Notebook	DELL	PP25L	DoC
2	Test Fixture	-	-	-



### 1.3 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 D02 v01
- ♦ FCC KDB 644545 D03 v01
- ♦ FCC KDB 662911 v02r01
- ♦ FCC-14-30A1-UNII

### 1.4 Testing Location Information

Testing Location			
	HWA YA	ADD	
<input checked="" type="checkbox"/>	HWA YA	ADD : No. 52, Hwa Ya 1 <sup>st</sup> Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.	
	TEL : 886-3-327-3456	FAX : 886-3-327-0973	
Test Condition	Test Site No.	Test Engineer	Test Environment
AC Conduction	CO04-HY	Zeus	24°C / 43%
RF Conducted	TH01-HY	Cain	22.1°C / 61%
Radiated Emission	03CH02-HY	Daniel	24.6°C / 61%



## 1.5 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	
AC power-line conducted emissions	±2.3 dB	
Emission bandwidth, 26dB bandwidth	±1.4 %	
RF output power, conducted	±0.6 dB	
Power density, conducted	±0.8 dB	
Unwanted emissions, conducted	9 – 150 kHz	±0.4 dB
	0.15 – 30 MHz	±0.4 dB
	30 – 1000 MHz	±0.5 dB
	1 – 18 GHz	±0.7 dB
	18 – 40 GHz	±0.8 dB
	40 – 200 GHz	N/A
All emissions, radiated	9 – 150 kHz	±2.5 dB
	0.15 – 30 MHz	±2.3 dB
	30 – 1000 MHz	±2.6 dB
	1 – 18 GHz	±3.6 dB
	18 – 40 GHz	±3.8 dB
	40 – 200 GHz	N/A
Temperature	±0.8 °C	
Humidity	±3 %	
DC and low frequency voltages	±3 %	
Time	±1.4 %	
Duty Cycle	±1.4 %	



## 2 Test Configuration of EUT

### 2.1 The Worst Case Modulation Configuration

Worst Modulation Used for Conformance Testing			
Modulation Mode	Transmit Chains (N <sub>TX</sub> )	Data Rate / MCS	Worst Data Rate / MCS
11a	1	6-54Mbps	6 Mbps
HT20	1	MCS 0-7	MCS 0
HT40	1	MCS 0-7	MCS 0
HT20	3	MCS 0-23	MCS 0
HT40	3	MCS 0-23	MCS 0

### 2.2 The Worst Case Power Setting Parameter

The Worst Case Power Setting Parameter (5150-5250MHz band)						
Test Software Version	Ralink RF3593 QA Tool_V1.0.4.2					
Modulation Mode	N <sub>TX</sub>	Test Frequency (MHz)				
		NCB: 20MHz			NCB: 40MHz	
		5180	5200	5240	5190	5230
11a	1	11	10	13	-	-
HT20	1	12	12	17	-	-
HT40	1	-	-	-	01	18
VHT20	3	02,08,09	02,02,08	05,0A,0A	-	-
VHT40	3	-	-	-	01,01,01	0A,10,10

The Worst Case Power Setting Parameter (5725-5850MHz band)						
Test Software Version	Ralink RF3593 QA Tool_V1.0.4.2					
Modulation Mode	N <sub>TX</sub>	Test Frequency (MHz)				
		NCB: 20MHz			NCB: 40MHz	
		5745	5785	5825	5755	5795
11a	1	16	1F	1F	-	-
HT20	1	11	1F	17	-	-
HT40	1	-	-	-	0B	18
HT20	3	14,14,14	18,18,18	1A,1A,1A	-	-
HT40	3	-	-	-	0A,0A,0A	1A,1A,1A



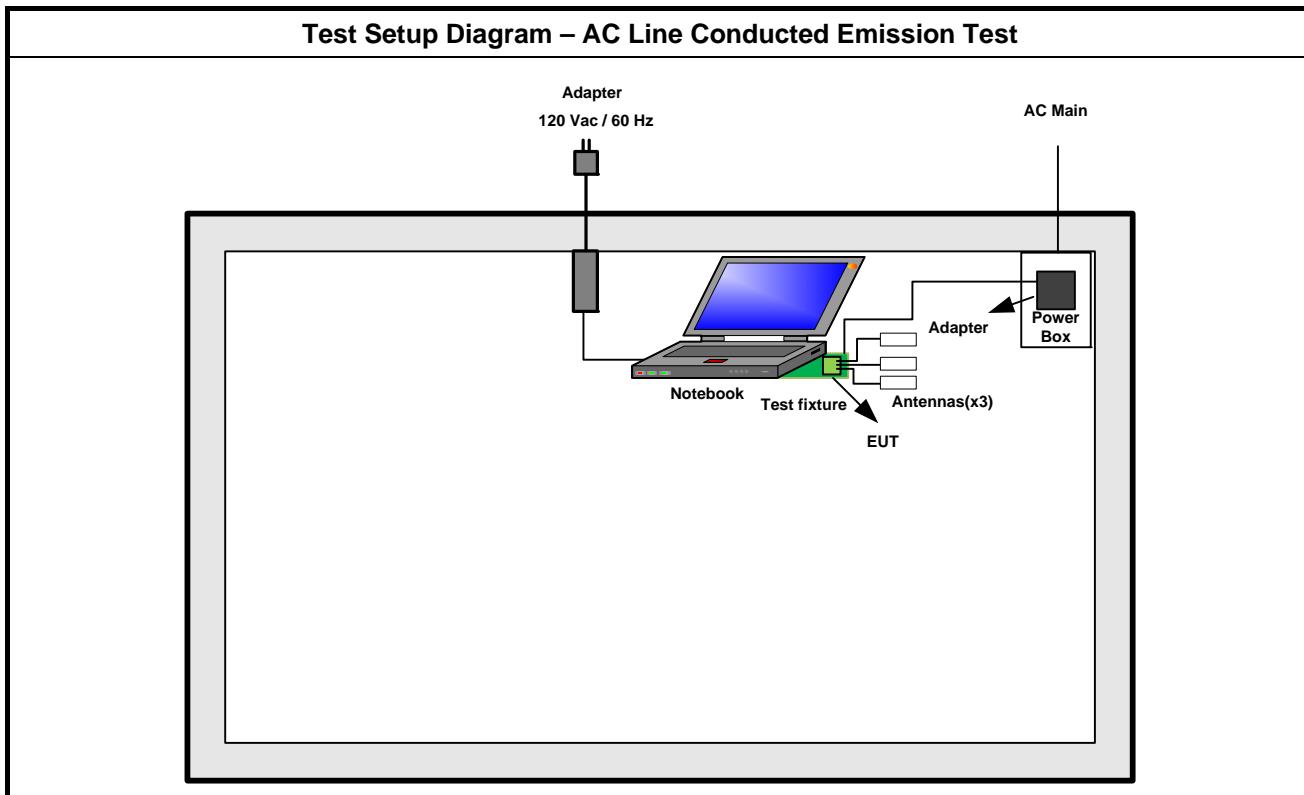
## 2.3 The Worst Case Measurement Configuration

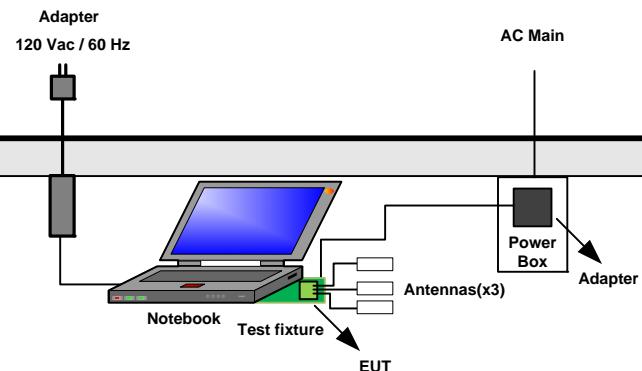
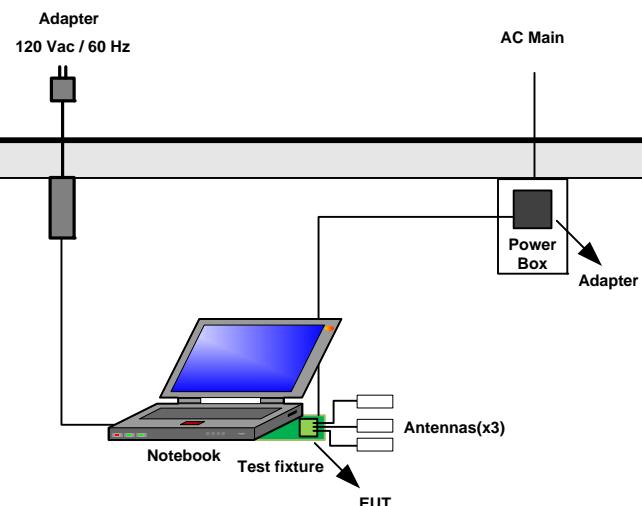
The Worst Case Mode for Following Conformance Tests	
<b>Tests Item</b>	AC power-line conducted emissions
<b>Condition</b>	AC power-line conducted measurement for line and neutral Test Voltage: 120Vac / 60Hz
<b>Operating Mode</b>	Operating Mode Description
1	Transmitter

The Worst Case Mode for Following Conformance Tests	
<b>Tests Item</b>	RF Output Power, Peak Power Spectral Density, Emission Bandwidth, Transmitter Conducted Unwanted Emissions Transmitter Conducted Bandedge Emissions
<b>Test Condition</b>	Conducted measurement at transmit chains
<b>Modulation Mode</b>	11a, HT20, HT40

The Worst Case Mode for Following Conformance Tests	
<b>Tests Item</b>	Transmitter Radiated Unwanted Emissions Transmitter Radiated Bandedge Emissions
<b>Test Condition</b>	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.
<b>User Position</b>	<input type="checkbox"/> EUT will be placed in fixed position. <input checked="" type="checkbox"/> EUT will be placed in mobile position and operating multiple positions. The worst planes is X. <input type="checkbox"/> EUT will be a hand-held or body-worn battery-powered devices and operating multiple positions.
<b>Operating Mode</b>	Operating Mode Description
1	Transmitter
<b>Modulation Mode</b>	11a, HT20, HT40
<b>Orthogonal Planes of EUT</b>	<p style="text-align: center;"><b>X Plane</b></p> 

## 2.4 Test Setup Diagram



**Test Setup Diagram - Radiated Test (Below 1GHz)****Test Setup Diagram - Radiated Test (Above 1GHz)**

### 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.

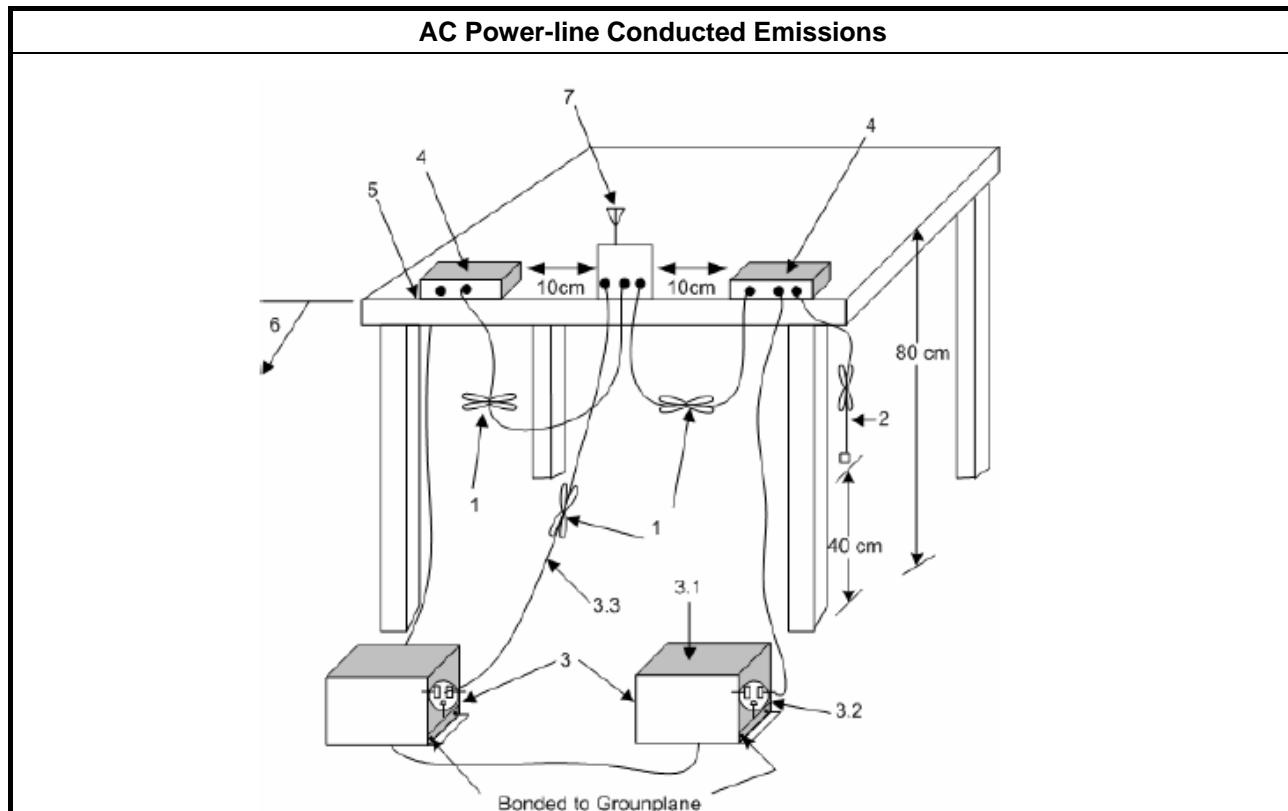
##### 3.1.2 Measuring Instruments

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

##### 3.1.3 Test Procedures

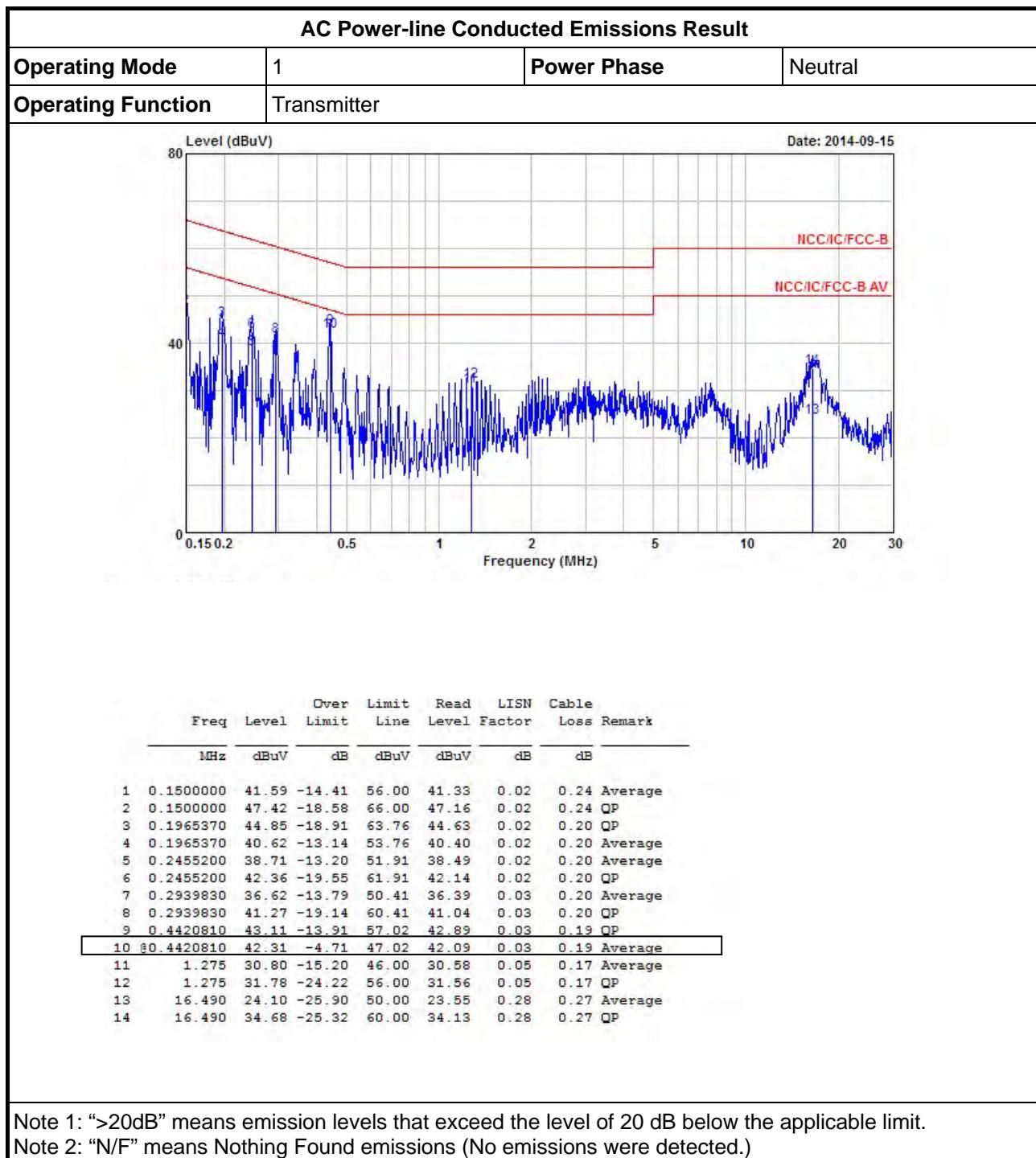
Test Method
<input checked="" type="checkbox"/> Refer as ANSI C63.10-2009, clause 6.2 for AC power-line conducted emissions.

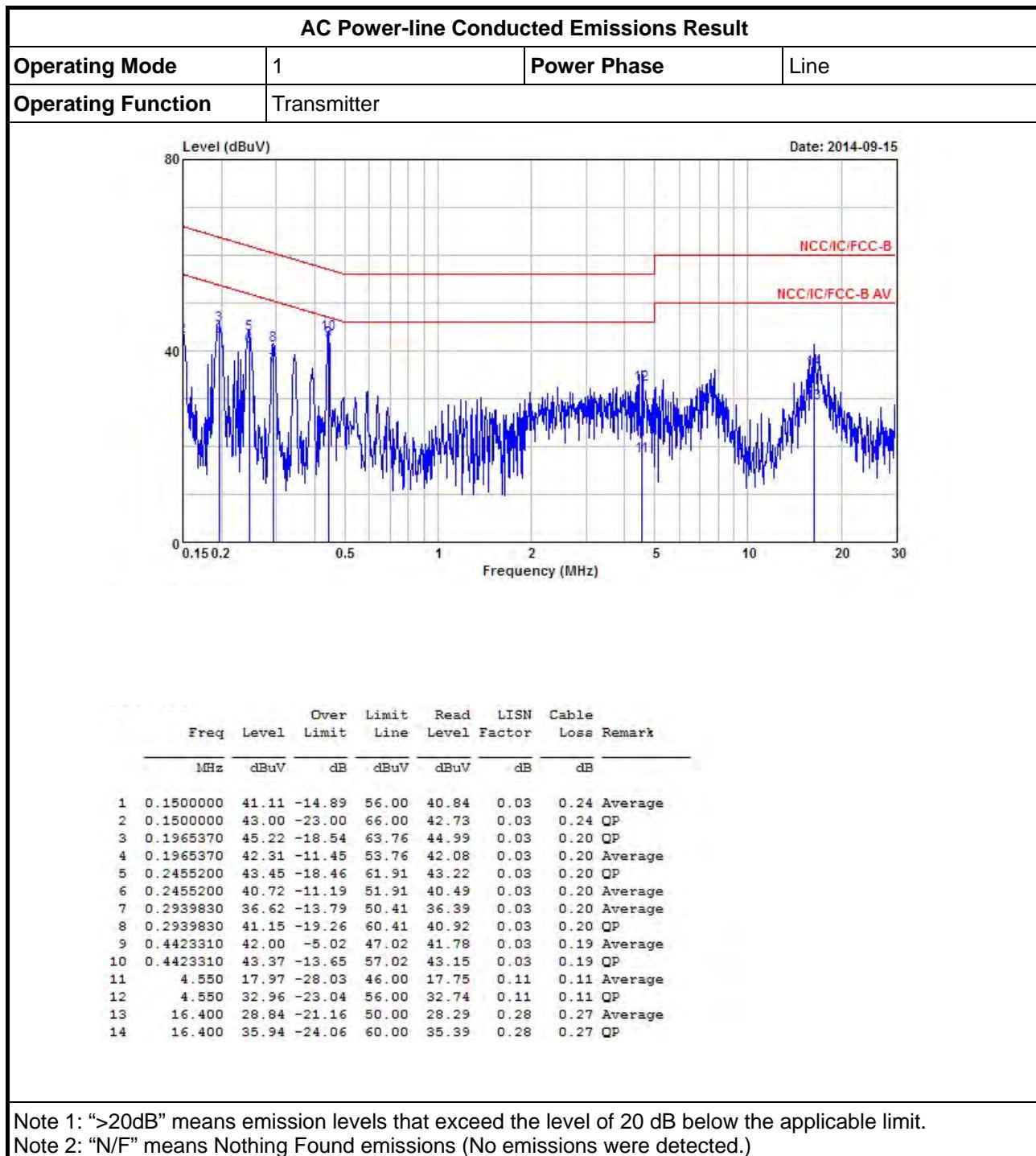
##### 3.1.4 Test Setup





## 3.1.5 Test Result of AC Power-line Conducted Emissions







## 3.2 Emission Bandwidth

### 3.2.1 Emission Bandwidth Limit

Emission Bandwidth Limit	
<b>UNII Devices</b>	
<input checked="" type="checkbox"/>	For the 5.15-5.25 GHz band, N/A
<input 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 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 checked="" type="checkbox"/>	For the 5.725-5.85 GHz band, 6 dB emission bandwidth $\geq$ 500kHz.

### 3.2.2 Measuring Instruments

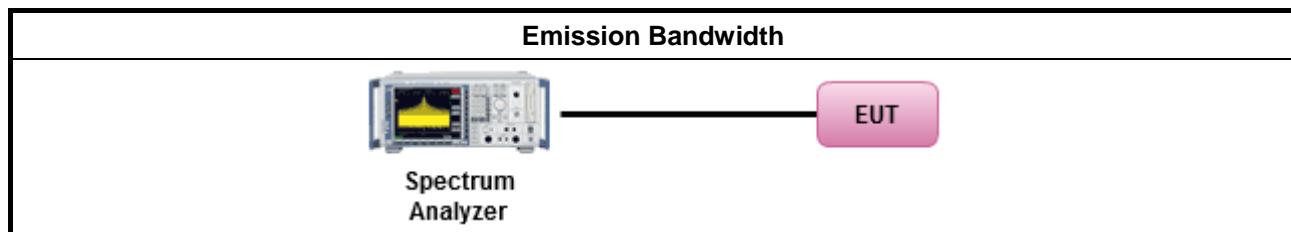
Refer a test equipment and calibration data table in this test report.

### 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 D02 v01, 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 type="checkbox"/> Refer as IC RSS-Gen, clause 4.6 for bandwidth testing.
<input checked="" type="checkbox"/>	For conducted measurement.
	<input type="checkbox"/> The EUT supports single transmit chain and measurements performed on this transmit chain port 1.
	<input checked="" type="checkbox"/> The EUT supports diversity transmitting and the results on transmit chain port 1 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 1.
	<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

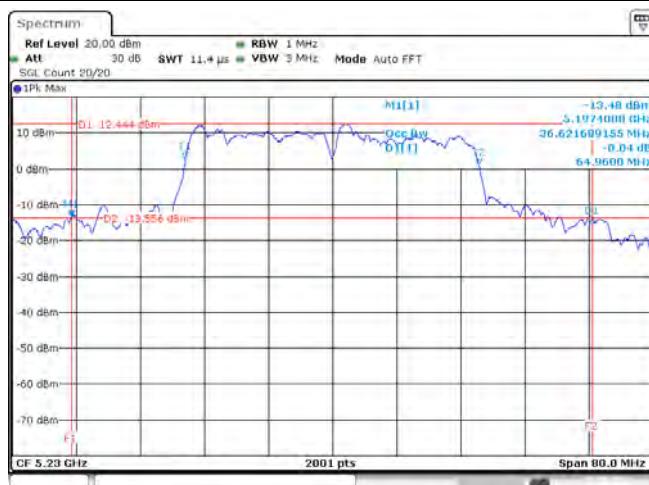
Date:	Sep. 27, 2014			UNII Emission Bandwidth Result (5150-5250MHz band)					
Condition			Emission Bandwidth (MHz)						
Modulation Mode	N <sub>TX</sub>	Freq. (MHz)	99% Bandwidth			26dB Bandwidth			
			Chain- Port 1	Chain- Port 2	Chain- Port 3	Chain- Port 1	Chain- Port 2	Chain- Port 3	
11a	1	5180	16.46	-	-	23.35	-	-	
11a	1	5200	16.46	-	-	20.22	-	-	
11a	1	5240	16.51	-	-	26.02	-	-	
HT20	1	5180	17.69	-	-	21.27	-	-	
HT20	1	5200	17.66	-	-	21.80	-	-	
HT20	1	5240	17.84	-	-	30.15	-	-	
HT40	1	5190	36.02	-	-	39.68	-	-	
HT40	1	5230	36.62	-	-	64.96	-	-	
HT20	3	5180	17.41	17.44	17.51	19.25	19.17	19.40	
HT20	3	5200	17.51	17.49	17.36	19.80	19.32	19.17	
HT20	3	5240	17.54	17.44	17.56	19.37	19.20	19.75	
HT40	3	5190	36.30	35.98	35.86	40.44	40.04	39.24	
HT40	3	5230	35.90	35.78	35.98	39.40	38.68	38.44	
Result			Complied						



Date:	Sep. 27, 2014		UNII Emission Bandwidth Result (5725-5850MHz band)					
Condition			Emission Bandwidth (MHz)					
Modulation Mode	N <sub>TX</sub>	Freq. (MHz)	99% Bandwidth			6dB Bandwidth		
			Chain- Port 1	Chain- Port 2	Chain- Port 3	Chain- Port 1	Chain- Port 2	Chain- Port 3
11a	1	5745	16.44	-	-	16.50	-	-
11a	1	5785	18.69	-	-	16.41	-	-
11a	1	5825	17.03	-	-	16.39	-	-
HT20	1	5745	17.54	-	-	17.56	-	-
HT20	1	5785	20.16	-	-	17.58	-	-
HT20	1	5825	17.52	-	-	17.59	-	-
HT40	1	5755	35.82	-	-	36.32	-	-
HT40	1	5795	36.14	-	-	36.28	-	-
HT20	3	5745	17.48	17.55	17.48	17.28	17.59	17.32
HT20	3	5785	17.58	17.55	17.51	17.58	17.61	17.58
HT20	3	5825	17.52	17.49	17.55	17.58	17.58	17.62
HT40	3	5755	35.78	35.78	35.78	36.32	35.92	36.28
HT40	3	5795	35.86	35.82	35.82	36.08	35.72	36.32
Limit			-			≥ 500 kHz		
Result			Complied					

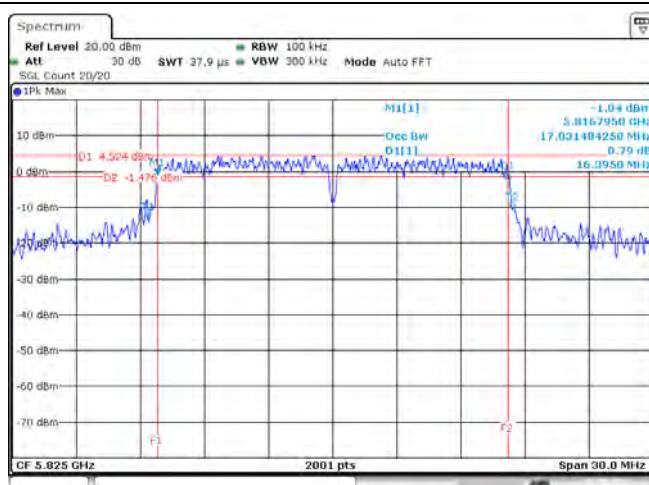


## 5150-5250MHz - Worst Emission 26Bandwidth Plots



Date: 27.SEP.2014 04:51:41

## 5725-5850MHz - Worst Emission 6Bandwidth Plots



Date: 27.SEP.2014 02:33:31



### 3.3 RF Output Power

#### 3.3.1 RF Output Power Limit

Maximum Conducted Output Power Limit	
<b>UNII Devices</b>	
<input checked="" type="checkbox"/> For the 5.15-5.25 GHz band:	
<input type="checkbox"/> Outdoor AP: the maximum conducted output power ( $P_{Out}$ ) shall not exceed the lesser of 1 W. If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)$ . e.i.r.p. at any elevation angle above 30 degrees $\leq 125$ mW [21 dBm]	
<input type="checkbox"/> Indoor AP: the maximum conducted output power ( $P_{Out}$ ) shall not exceed the lesser of 1 W. If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)$	
<input type="checkbox"/> Point-to-point AP: the maximum conducted output power ( $P_{Out}$ ) shall not exceed the lesser of 1 W. If $G_{TX} > 23$ dBi, then $P_{Out} = 30 - (G_{TX} - 23)$ .	
<input checked="" type="checkbox"/> Mobile or Portable Client: the maximum conducted output power ( $P_{Out}$ ) shall not exceed the lesser of 250 mW. If $G_{TX} > 6$ dBi, then $P_{Out} = 24 - (G_{TX} - 6)$ .	
<input 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 $11$ dBm + $10 \log B$ , where B is the 26 dB emission bandwidth in MHz. If $G_{TX} > 6$ dBi, then $P_{Out} = 24 - (G_{TX} - 6)$ .	
<input 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 $11$ dBm + $10 \log B$ , where B is the 26 dB emission bandwidth in MHz. If $G_{TX} > 6$ dBi, then $P_{Out} = 24 - (G_{TX} - 6)$ .	
<input checked="" type="checkbox"/> For the 5.725-5.85 GHz band:	
<input checked="" type="checkbox"/> Point-to-multipoint systems (P2M): the maximum conducted output power ( $P_{Out}$ ) shall not exceed the lesser of 1 W. If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)$ .	
<input type="checkbox"/> Point-to-point systems (P2P): the maximum conducted output power ( $P_{Out}$ ) shall not exceed the lesser of 1 W.	
$P_{Out}$ = maximum conducted output power in dBm, $G_{TX}$ = the maximum transmitting antenna directional gain in dBi.	

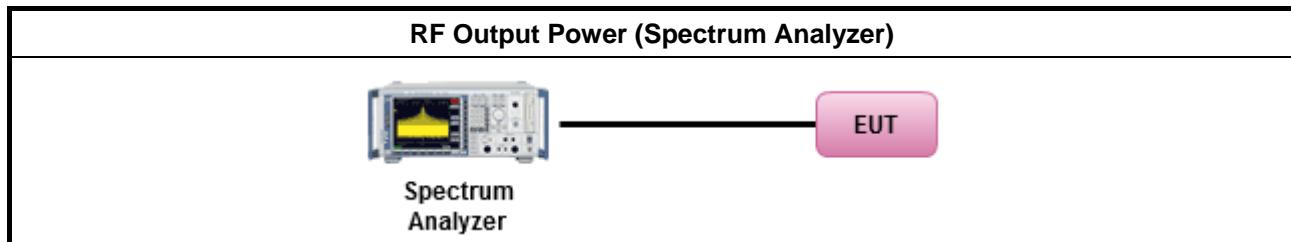
#### 3.3.2 Measuring Instruments

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 D02 v01, clause E Method SA-1 (spectral trace averaging).
<input type="checkbox"/>	Refer as FCC KDB 789033 D02 v01, 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 D02 v01, clause E Method SA-2 (spectral trace averaging).
<input type="checkbox"/>	Refer as FCC KDB 789033 D02 v01, 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 D02 v01, clause E Method PM (using an RF average power meter).
<input checked="" type="checkbox"/> For conducted measurement.	
<input 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 1 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





### 3.3.5 Directional Gain for Power Measurement

Directional Gain (DG) Result					
Transmit Chains No.		1	2	3	-
Maximum $G_{ANT}$ (dBi)		3.50	2.80	4.40	-
Modulation Mode	DG (dBi)	$N_{TX}$	$N_{SS}$ (Min.)	STBC	Array Gain (dB)
11a	3.50	1	1	-	-
HT20	3.50	1	1	-	-
HT40	3.50	1	1	-	-
HT20	3.62	3	1 / 2 / 3	-	-
HT40	3.62	3	1 / 2 / 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 =  $10 \log[(10^{G_{1/20}} + \dots + 10^{G_{N/20}})^2 / N_{TX}]$   
All transmit signals are completely uncorrelated, Directional Gain =  $10 \log[(10^{G_{1/10}} + \dots + 10^{G_{N/10}}) / N_{TX}]$

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  $\geq 40$  MHz for any  $N_{TX}$ ;



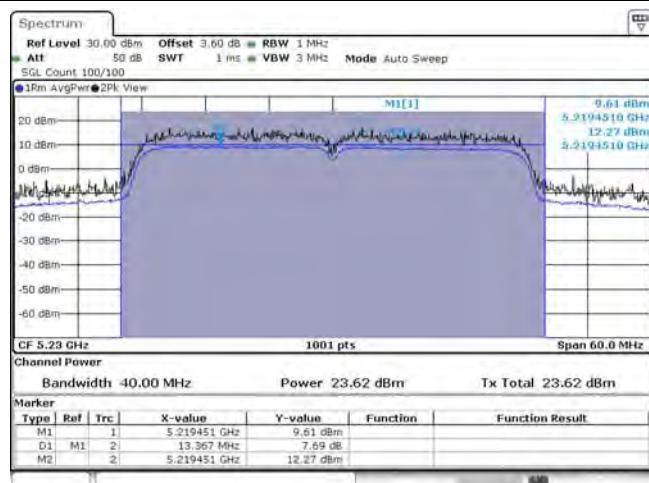
## 3.3.6 Test Result of Maximum Conducted Output Power

Date:	Sep. 27, 2014		Maximum Conducted Output Power (5150-5250MHz band)						
Modulation Mode	N <sub>TX</sub>	Freq. (MHz)	Output Power (dBm)				Antenna Gain (dBi)	Power Limit	
			Chain Port 1	Chain Port 2	Chain Port 3	Sum Chain			
11a	1	5180	21.87	-	-	21.87	3.50	24.00	
11a	1	5200	21.67	-	-	21.67	3.50	24.00	
11a	1	5240	21.77	-	-	21.77	3.50	24.00	
HT20	1	5180	22.09	-	-	22.09	3.50	24.00	
HT20	1	5200	21.95	-	-	21.95	3.50	24.00	
HT20	1	5240	22.10	-	-	22.10	3.50	24.00	
HT40	1	5190	15.92	-	-	15.92	3.50	24.00	
HT40	1	5230	23.62	-	-	23.62	3.50	24.00	
HT20	3	5180	13.17	13.15	13.11	17.91	3.62	24.00	
HT20	3	5200	13.12	12.96	12.85	17.75	3.62	24.00	
HT20	3	5240	12.95	13.00	13.35	17.87	3.62	24.00	
HT40	3	5190	14.94	11.83	11.22	17.76	3.62	24.00	
HT40	3	5230	15.55	16.05	16.22	20.72	3.62	24.00	
Result			Complied						

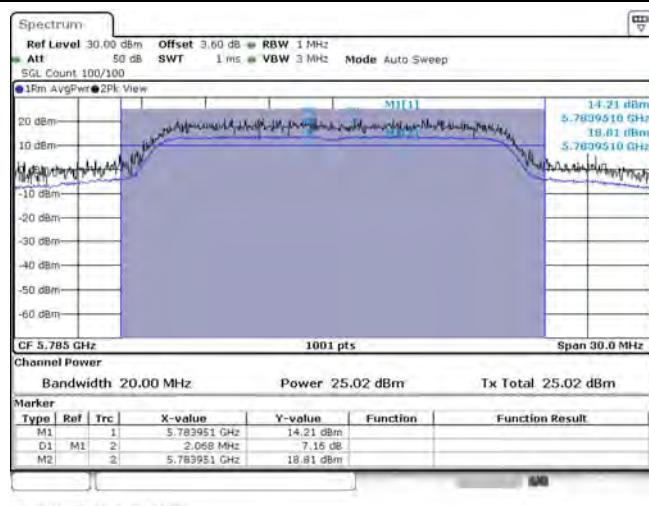
Date:	Sep. 27, 2014		Maximum Conducted Output Power (5725-5850MHz band)						
Modulation Mode	N <sub>TX</sub>	Freq. (MHz)	Output Power (dBm)				Antenna Gain (dBi)	Power Limit	
			Chain Port 1	Chain Port 2	Chain Port 3	Sum Chain			
11a	1	5745	22.43	-	-	22.43	3.50	30.00	
11a	1	5785	25.02	-	-	25.02	3.50	30.00	
11a	1	5825	24.65	-	-	24.65	3.50	30.00	
HT20	1	5745	19.83	-	-	19.83	3.50	30.00	
HT20	1	5785	24.91	-	-	24.91	3.50	30.00	
HT20	1	5825	21.42	-	-	21.42	3.50	30.00	
HT40	1	5755	17.71	-	-	17.71	3.50	30.00	
HT40	1	5795	23.35	-	-	23.35	3.50	30.00	
HT20	1	5745	19.52	19.81	16.62	23.64	3.62	30.00	
HT20	3	5785	20.94	20.02	17.79	24.54	3.62	30.00	
HT20	3	5825	21.51	19.88	18.33	24.87	3.62	30.00	
HT40	3	5755	16.69	16.94	13.59	20.75	3.62	30.00	
HT40	3	5795	21.69	20.65	18.46	25.24	3.62	30.00	
Result			Complied						



## 5150-5250MHz - Worst RF Output Power Plots



## 5725-5850MHz - Worst RF Output Power Plots





## 3.4 Peak Power Spectral Density

### 3.4.1 Peak Power Spectral Density Limit

Peak Power Spectral Density Limit	
<b>UNII Devices</b>	
<input checked="" type="checkbox"/> For the 5.15-5.25 GHz band:	
<input type="checkbox"/> Outdoor AP: the peak power spectral density (PPSD) shall not exceed the lesser of 17dBm/MHz. If $G_{TX} > 6$ dBi, then $P_{Out} = 17 - (G_{TX} - 6)$ .	
<input type="checkbox"/> Indoor AP: the peak power spectral density (PPSD) shall not exceed the lesser of 17dBm/MHz. If $G_{TX} > 6$ dBi, then $P_{Out} = 17 - (G_{TX} - 6)$ .	
<input type="checkbox"/> Point-to-point AP: the peak power spectral density (PPSD) shall not exceed the lesser of 17dBm/MHz. If $G_{TX} > 23$ dBi, then $P_{Out} = 17 - (G_{TX} - 23)$ .	
<input checked="" type="checkbox"/> Mobile or Portable Client: the peak power spectral density (PPSD) $\leq 11$ dBm/MHz. If $G_{TX} > 6$ dBi, then PPSD= $11 - (G_{TX} - 6)$ ..	
<input type="checkbox"/> For the 5.25-5.35 GHz band, the peak power spectral density (PPSD) $\leq 11$ dBm/MHz. If $G_{TX} > 6$ dBi, then PPSD= $11 - (G_{TX} - 6)$ .	
<input type="checkbox"/> For the 5.47-5.725 GHz band, the peak power spectral density (PPSD) $\leq 11$ dBm/MHz. If $G_{TX} > 6$ dBi, then PPSD= $11 - (G_{TX} - 6)$ .	
<input checked="" type="checkbox"/> For the 5.725-5.85 GHz band:	
<input checked="" type="checkbox"/> Point-to-multipoint systems (P2M): the peak power spectral density (PPSD) $\leq 30$ dBm/500kHz. If $G_{TX} > 6$ dBi, then PPSD= $30 - (G_{TX} - 6)$ .	
<input type="checkbox"/> Point-to-point systems (P2P): the peak power spectral density (PPSD) $\leq 30$ dBm/500kHz.	
<b>PPSD</b> = 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 <b>G<sub>TX</sub></b> = the maximum transmitting antenna directional gain in dBi.	

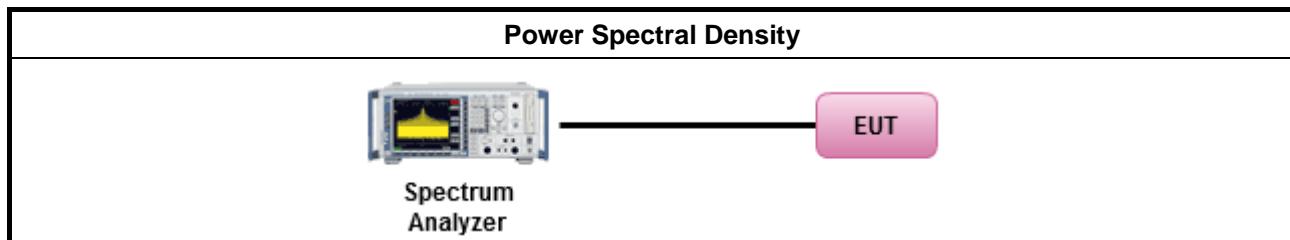
### 3.4.2 Measuring Instruments

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 checked="" type="checkbox"/> Refer as FCC KDB 789033 D02 v01, 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 D02 v01, clause E Method SA-1 (spectral trace averaging).	
<input type="checkbox"/> Refer as FCC KDB 789033 D02 v01, 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 D02 v01, clause E Method SA-2 (spectral trace averaging).	
<input type="checkbox"/> Refer as FCC KDB 789033 D02 v01, clause E Method SA-2 Alt. (RMS detection with slow sweep speed)	
<input checked="" type="checkbox"/> For conducted measurement.	
<input type="checkbox"/> The EUT supports single transmit chain and measurements performed on this transmit chain port 1.	
<input checked="" type="checkbox"/> The EUT supports diversity transmitting and the results on transmit chain port 1 is the worst case.	
<input checked="" type="checkbox"/> The EUT supports multiple transmit chains using options given below:	
	<input 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 checked="" 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 type="checkbox"/>	Each individually PPSD plots refer as test report clause 3.3.5 with each individually PPSD plots.

### 3.4.4 Test Setup



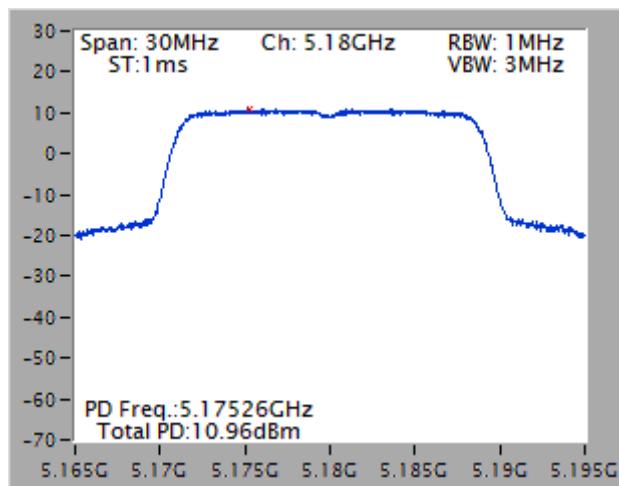


### 3.4.5 Test Result of Peak Power Spectral Density

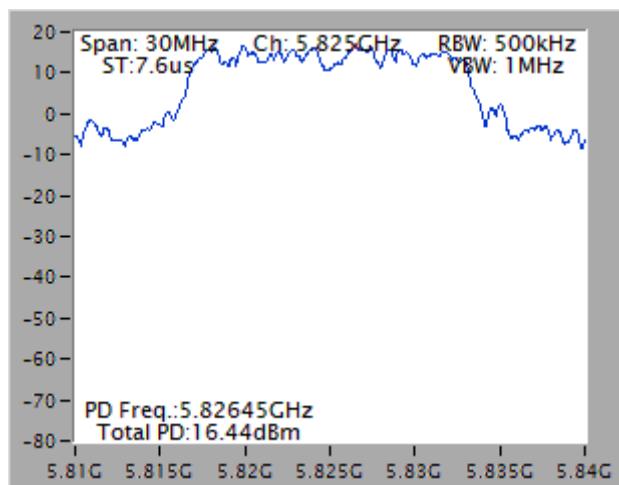
Date:	Sep. 27, 2014		Peak Power Spectral Density Result (5150-5250MHz band)		
Modulation Mode	N <sub>TX</sub>	Freq. (MHz)	Peak Power Spectral Density (dBm)	PSD Limit	Antenna Gain (dBi)
11a	1	5180	10.80	11.00	3.50
11a	1	5200	10.70	11.00	3.50
11a	1	5240	10.80	11.00	3.50
HT20	1	5180	10.96	11.00	3.50
HT20	1	5200	10.70	11.00	3.50
HT20	1	5240	10.85	11.00	3.50
HT40	1	5190	1.93	11.00	3.50
HT40	1	5230	9.61	11.00	3.50
HT20	3	5180	6.65	8.61	8.39
HT20	3	5200	6.68	8.61	8.39
HT20	3	5240	6.70	8.61	8.39
HT40	3	5190	3.62	8.61	8.39
HT40	3	5230	6.56	8.61	8.39
Result		Complied			

Date:	Sep. 27, 2014		Peak Power Spectral Density Result (5725-5850MHz band)		
Modulation Mode	N <sub>TX</sub>	Freq. (MHz)	Peak Power Spectral Density (dBm)	PSD Limit (500kHz)	Antenna Gain (dBi)
11a	1	5745	13.60	30.00	3.50
11a	1	5785	15.85	30.00	3.50
11a	1	5825	16.44	30.00	3.50
HT20	1	5745	11.22	30.00	3.50
HT20	1	5785	15.91	30.00	3.50
HT20	1	5825	13.40	30.00	3.50
HT40	1	5755	5.94	30.00	3.50
HT40	1	5795	12.94	30.00	3.50
HT20	3	5745	14.97	27.61	8.39
HT20	3	5785	15.58	27.61	8.39
HT20	3	5825	15.85	27.61	8.39
HT40	3	5755	8.09	27.61	8.39
HT40	3	5795	12.95	27.61	8.39
Result		Complied			

## 5150-5250MHz - Worst Power Spectral Density Plots

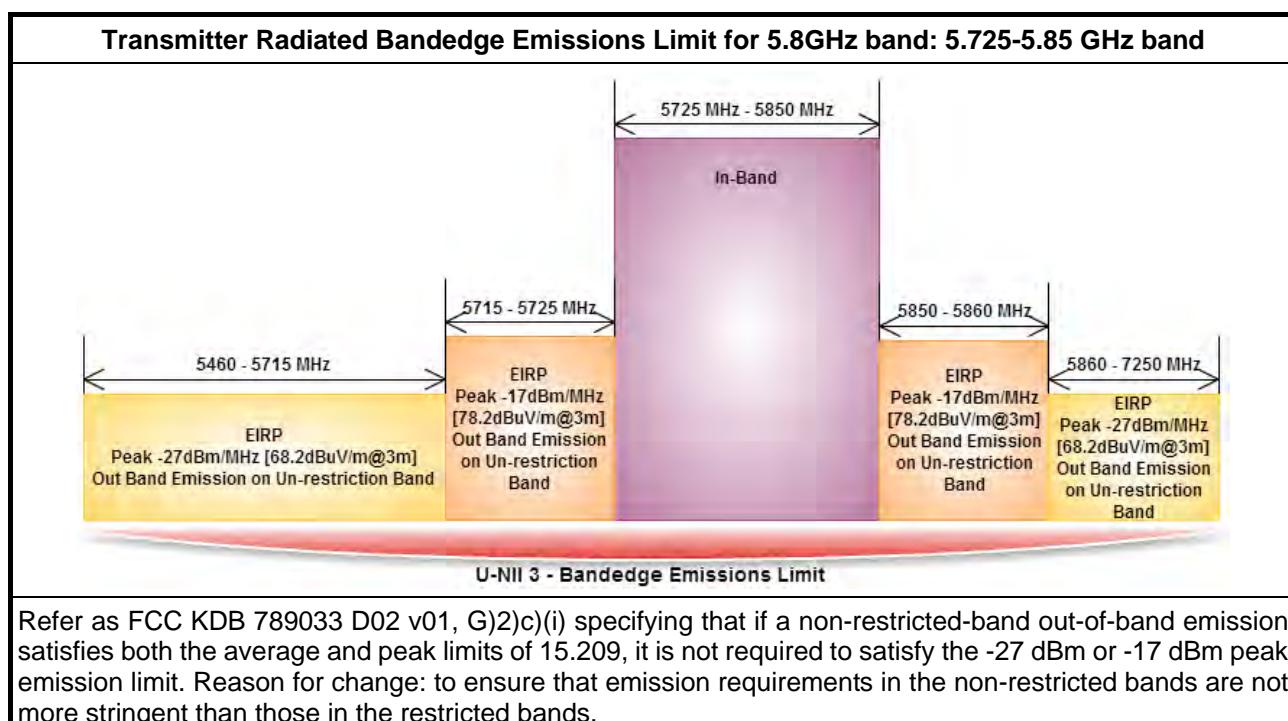
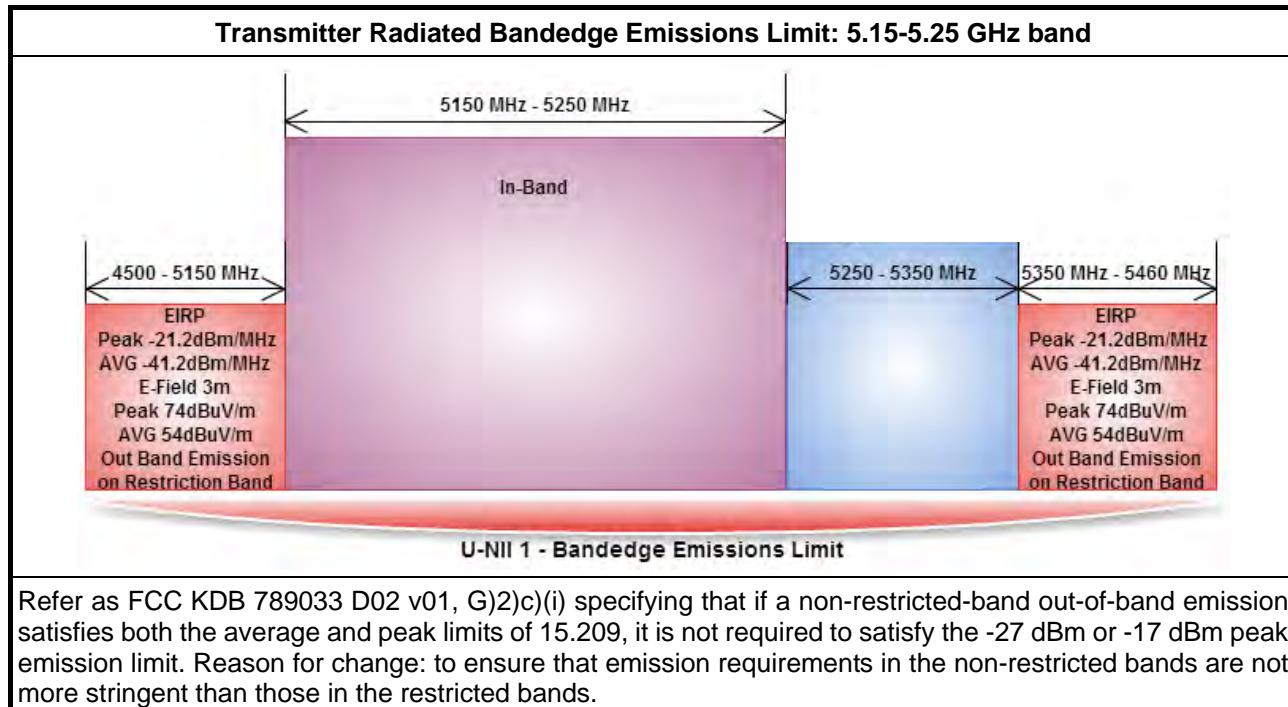


## 5725-5850MHz - Worst Power Spectral Density Plots



## 3.5 Transmitter Bandedge Emissions

### 3.5.1 Transmitter Radiated Bandedge Emissions Limit



### 3.5.2 Measuring Instruments

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

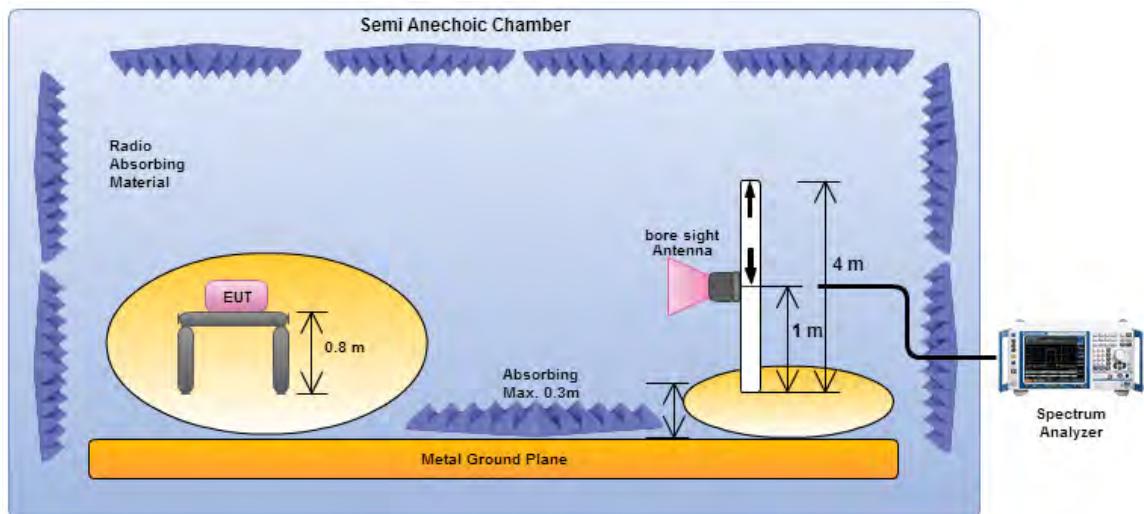


### 3.5.3 Test Procedures

Test Method
<input checked="" type="checkbox"/> 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.) <ul style="list-style-type: none"><li><input type="checkbox"/> Operating in 5.15-5.25 GHz band (lower-band) and 5.25-5.35 GHz band (higher-band).</li><li><input type="checkbox"/> Operating in 5.47-5.725 GHz band (lower-band) and 5.725-5.85 GHz band (higher-band).</li></ul>
<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) <ul style="list-style-type: none"><li><input type="checkbox"/> Operating in 5.25-5.35 GHz band (lower-band) and 5.47-5.725 GHz band (higher-band).</li><li><input type="checkbox"/> Operating in 5.15-5.25 GHz band (lower-band) and 5.725-5.85 GHz band (higher-band).</li></ul>
<input checked="" type="checkbox"/> For the transmitter unwanted emissions shall be measured using following options below: <ul style="list-style-type: none"><li><input checked="" type="checkbox"/> Refer as FCC KDB 789033 D02 v01, clause G)2) for unwanted emissions into non-restricted bands.</li><li><input checked="" type="checkbox"/> Refer as FCC KDB 789033 D02 v01, clause G)1) for unwanted emissions into restricted bands.<ul style="list-style-type: none"><li><input type="checkbox"/> Refer as FCC KDB 789033 D02 v01, G)6) Method AD (Trace Averaging).</li><li><input type="checkbox"/> Refer as FCC KDB 789033 D02 v01, G)6) Method VB (Reduced VBW).</li><li><input checked="" type="checkbox"/> Refer as ANSI C63.10, clause 4.2.3.2.3 (Reduced VBW). <math>VBW \geq 1/T</math>, where T is pulse time.</li><li><input type="checkbox"/> Refer as ANSI C63.10, clause 4.2.3.2.4 average value of pulsed emissions.</li><li><input checked="" type="checkbox"/> Refer as FCC KDB 789033 D02 v01, clause G)5) measurement procedure peak limit.</li><li><input type="checkbox"/> Refer as ANSI C63.10, clause 4.2.3.2.2 measurement procedure peak limit.</li></ul></li></ul>
<input checked="" type="checkbox"/> For the transmitter bandedge emissions shall be measured using following options below: <ul style="list-style-type: none"><li><input type="checkbox"/> Refer as FCC KDB 789033 D02 v01, clause G)3)d) for narrower resolution bandwidth (100kHz) using the band power and summing the spectral levels (i.e., 1 MHz).</li><li><input checked="" type="checkbox"/> Refer as ANSI C63.10, clause 6.9.2 for band-edge testing.</li><li><input type="checkbox"/> Refer as ANSI C63.10, clause 6.9.3 for marker-delta method for band-edge measurements.</li></ul>
<input checked="" type="checkbox"/> For radiated measurement, refer as ANSI C63.10, clause 6.6. Test distance is 3m.
<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 3m, because the instrumentation noise floor is typically close to the radiated emission limit.

### 3.5.4 Test Setup

#### Transmitter Radiated Bandedge Emissions



Electric field tests shall be performed in transmitter bandedge emissions using a calibrated horn antenna.



### 3.5.5 Transmitter Radiated Bandedge Emissions (with Antenna)

U-NII 5150-5250MHz Transmitter Radiated Bandedge (with Antenna)										
Modulation Mode	N <sub>TX</sub>	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 (port 1)	1	5180	3	5147.20	68.11	74	5149.95	52.92	54	V
11a (port 1)	1	5240	3	5395.80	63.15	74	5398.80	51.87	54	V
HT20 (port 1)	1	5180	3	5147.42	68.61	74	5149.95	52.47	54	V
HT20 (port 1)	1	5240	3	5394.60	63.19	74	5394.60	52.18	54	V
HT40 (port 1)	1	5190	3	5149.94	66.60	74	5149.94	52.14	54	V
HT40 (port 1)	1	5230	3	5400.00	60.97	74	5394.90	48.44	54	V
11a (port 3)	1	5180	3	5149.18	66.83	74	5149.95	52.40	54	V
11a (port 3)	1	5240	3	5378.40	57.43	74	5398.80	44.48	54	V
HT20 (port 3)	1	5180	3	5149.84	68.17	74	5149.95	52.49	54	V
HT20 (port 3)	1	5240	3	5360.40	58.99	74	5392.80	45.74	54	V
HT40 (port 3)	1	5190	3	5149.72	65.94	74	5149.94	52.54	54	V
HT40 (port 3)	1	5230	3	5388.00	59.01	74	5382.60	45.68	54	V
HT20	3	5180	3	5148.30	67.28	74	5148.08	52.46	54	V
HT20	3	5240	3	5395.12	63.33	74	5396.36	52.10	54	V
HT40	3	5190	3	5150.05	67.97	74	5148.40	52.98	54	V
HT40	3	5230	3	5353.20	60.05	74	5386.20	47.48	54	V

Note 1: Measurement worst emissions of receive antenna polarization.



U-NII 5725-5850MHz Transmitter Radiated Bandedge (with Antenna)							
Modulation Mode	N <sub>TX</sub>	Freq. (MHz)	Measure Distance (m)	Freq. (MHz) PK	Level (dBuV/m) PK	Limit (dBuV/m) PK	Pol.
11a (port 1)	1	5745	3	5724.55	76.63	78.2	V
11a (port 1)	1	5825	3	5851.12	75.30	78.2	V
HT20 (port 1)	1	5745	3	5724.76	76.98	78.2	V
HT20 (port 1)	1	5825	3	5850.07	75.69	78.2	V
HT40 (port 1)	1	5755	3	5723.84	71.68	78.2	V
HT40 (port 1)	1	5795	3	5850.10	68.29	78.2	V
11a (port 3)	1	5745	3	5724.55	76.65	78.2	V
11a (port 3)	1	5825	3	5850.07	72.83	78.2	V
HT20 (port 3)	1	5745	3	5724.97	76.96	78.2	V
HT20 (port 3)	1	5825	3	5850.07	76.57	78.2	V
HT40 (port 3)	1	5755	3	5721.76	70.56	78.2	V
HT40 (port 3)	1	5795	3	5850.10	68.29	78.2	V
HT20	3	5745	3	5724.76	76.73	78.2	V
HT20	3	5825	3	5850.18	74.59	78.2	V
HT40	3	5755	3	5724.88	76.38	78.2	V
HT40	3	5795	3	5855.20	66.95	78.2	V

Note 1: Measurement worst emissions of receive antenna polarization.



## 3.6 Transmitter Unwanted Emissions

### 3.6.1 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]
5.725 - 5.85 GHz	5.715 5.725 GHz: e.i.r.p. -17 dBm [78.2 dBuV/m@3m] 5.85 5.86 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).

### 3.6.2 Measuring Instruments

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

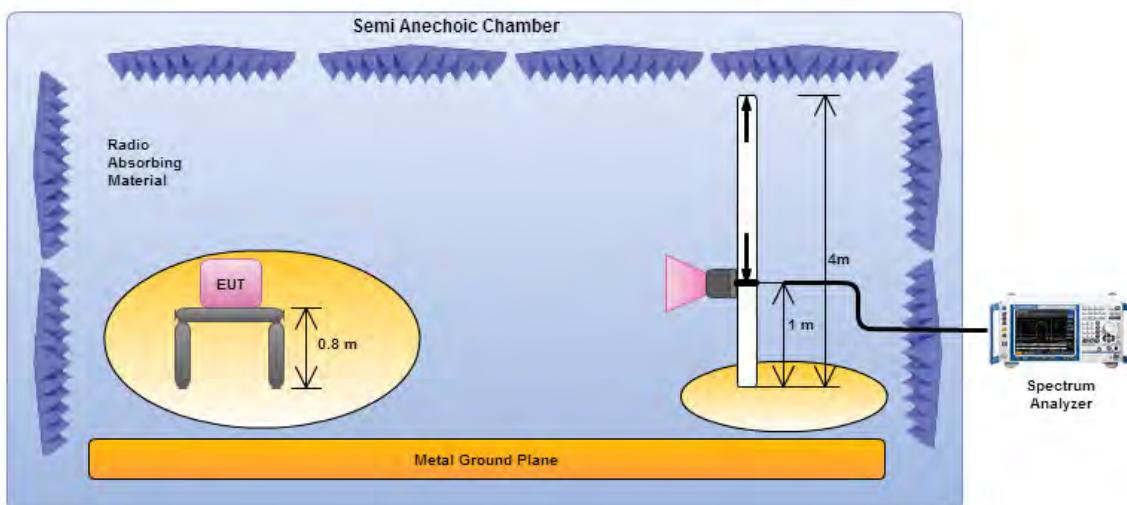


### 3.6.3 Test Procedures

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. 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"/> 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 D02 v01, clause G2) for unwanted emissions into non-restricted bands.
<input checked="" type="checkbox"/> Refer as FCC KDB 789033 D02 v01, clause G1) for unwanted emissions into restricted bands.
<input type="checkbox"/> Refer as FCC KDB 789033 D02 v01, G6) Method AD (Trace Averaging).
<input type="checkbox"/> Refer as FCC KDB 789033 D02 v01, G6) 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 D02 v01, clause G5) 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 below 30 MHz and test distance is 3m.
<input checked="" type="checkbox"/> Refer as ANSI C63.10, clause 6.5 for radiated emissions 30 MHz to 1 GHz and test distance is 3m.
<input checked="" type="checkbox"/> Refer as ANSI C63.10, clause 6.6 for radiated emissions above 1GHz. For 1 GHz to 5 GHz, test distance is 3m; For 5 GHz to 40 GHz, test distance is 3m.
<input checked="" type="checkbox"/> The any unwanted emissions level shall not exceed the fundamental emission level.
<input checked="" type="checkbox"/> All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

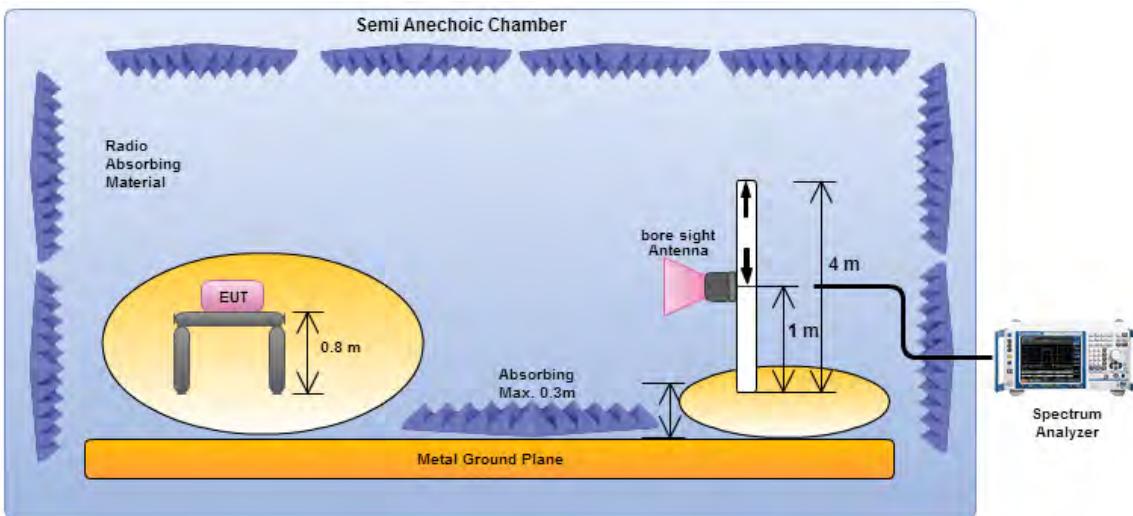
### 3.6.4 Test Setup

#### Transmitter Radiated Unwanted Emissions Below 1GHz



Magnetic field tests shall be performed in the frequency range of 9 kHz to 30 MHz using a calibrated loop antenna. Electric field tests shall be performed in the frequency range of 30 MHz to 1000 MHz using a calibrated bi-log antenna.

#### Transmitter Radiated Unwanted Emissions Above 1GHz



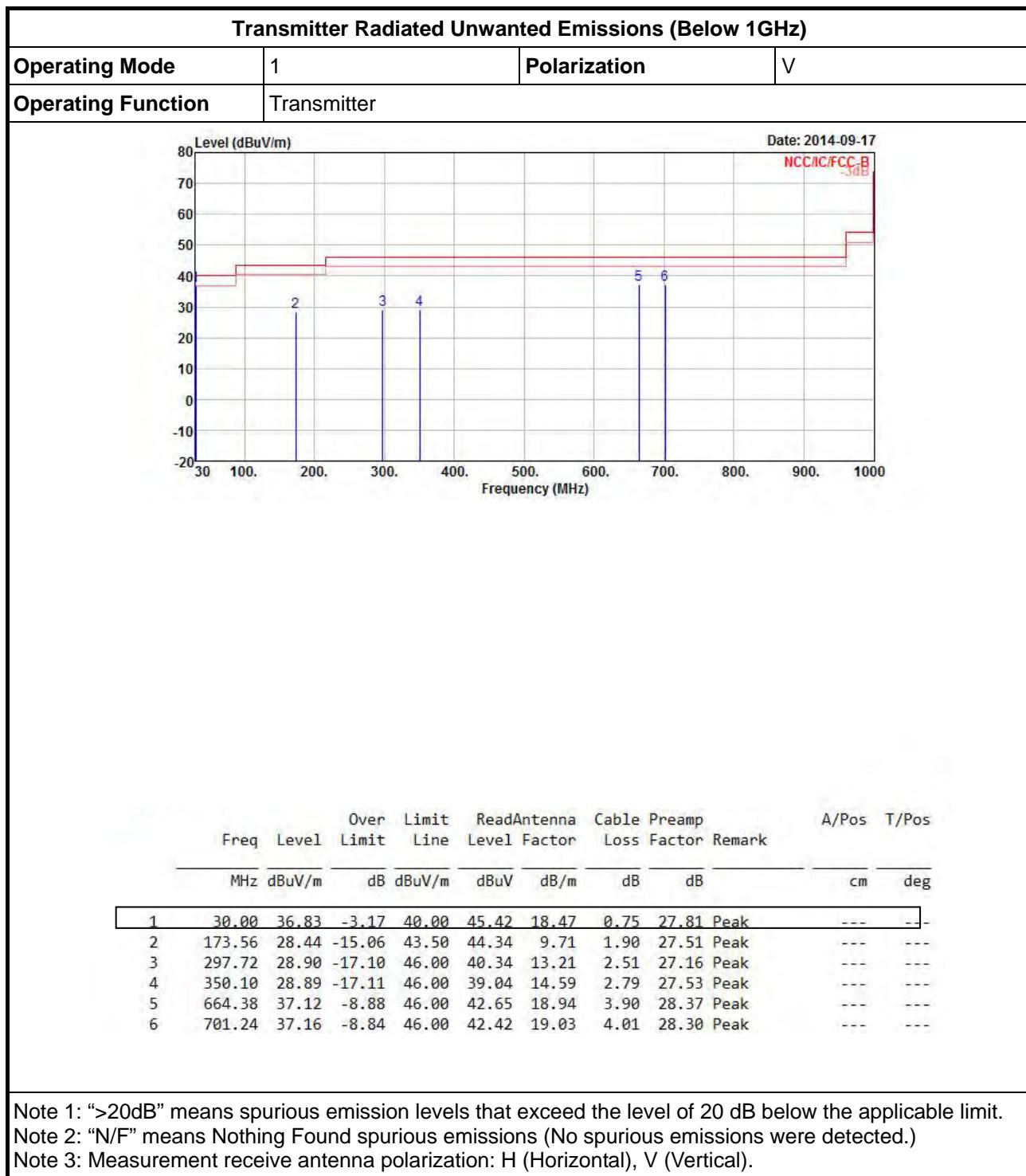
Electric field tests shall be performed in the frequency range of 1 GHz to 10<sup>th</sup> harmonic of highest fundamental frequency or 40 GHz using a calibrated horn antenna.

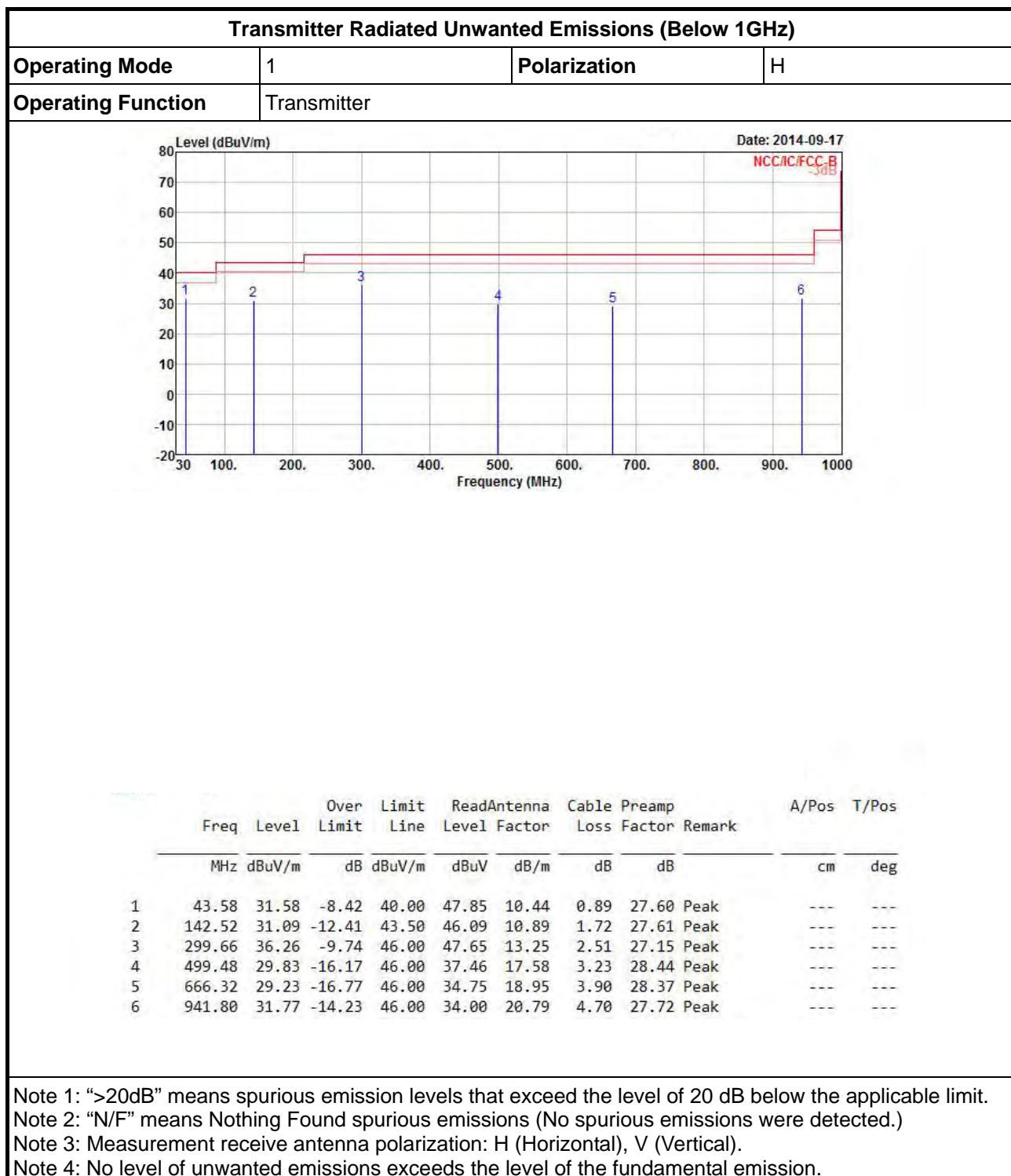
### 3.6.5 Transmitter Radiated Unwanted Emissions-with Antenna (Below 30MHz)

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



## 3.6.6 Transmitter Radiated Unwanted Emissions (Below 1GHz)







### 3.6.7 Transmitter Radiated Unwanted Emissions (Above 1GHz) for 5150-5250MHz

**Transmitter Radiated Unwanted Emissions (Above 1GHz)**

Modulation Mode	11a	Test Freq. (MHz)	5180
N <sub>TX</sub>	1 (port 1)	Polarization	V

Date: 2014-09-11

Level (dBuV/m)

Frequency (MHz)

UNINTENDED-BY-LIMIT

Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	A/Pos	T/Pos		
		Line	Limit	Antenna	Factor	Loss	Factor				
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg		
1	8130.00	34.08	-19.92	54.00	28.11	35.75	5.36	35.14	Average	---	---
2	8130.00	47.65	-26.35	74.00	41.68	35.75	5.36	35.14	Peak	---	---
3	10360.00	54.27	-13.93	68.20	45.79	37.15	6.38	35.05	Peak	---	---
4	15540.00	43.87	-10.13	54.00	30.55	40.16	7.99	34.83	Average	---	---
5	15540.00	56.82	-17.18	74.00	43.50	40.16	7.99	34.83	Peak	---	---

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

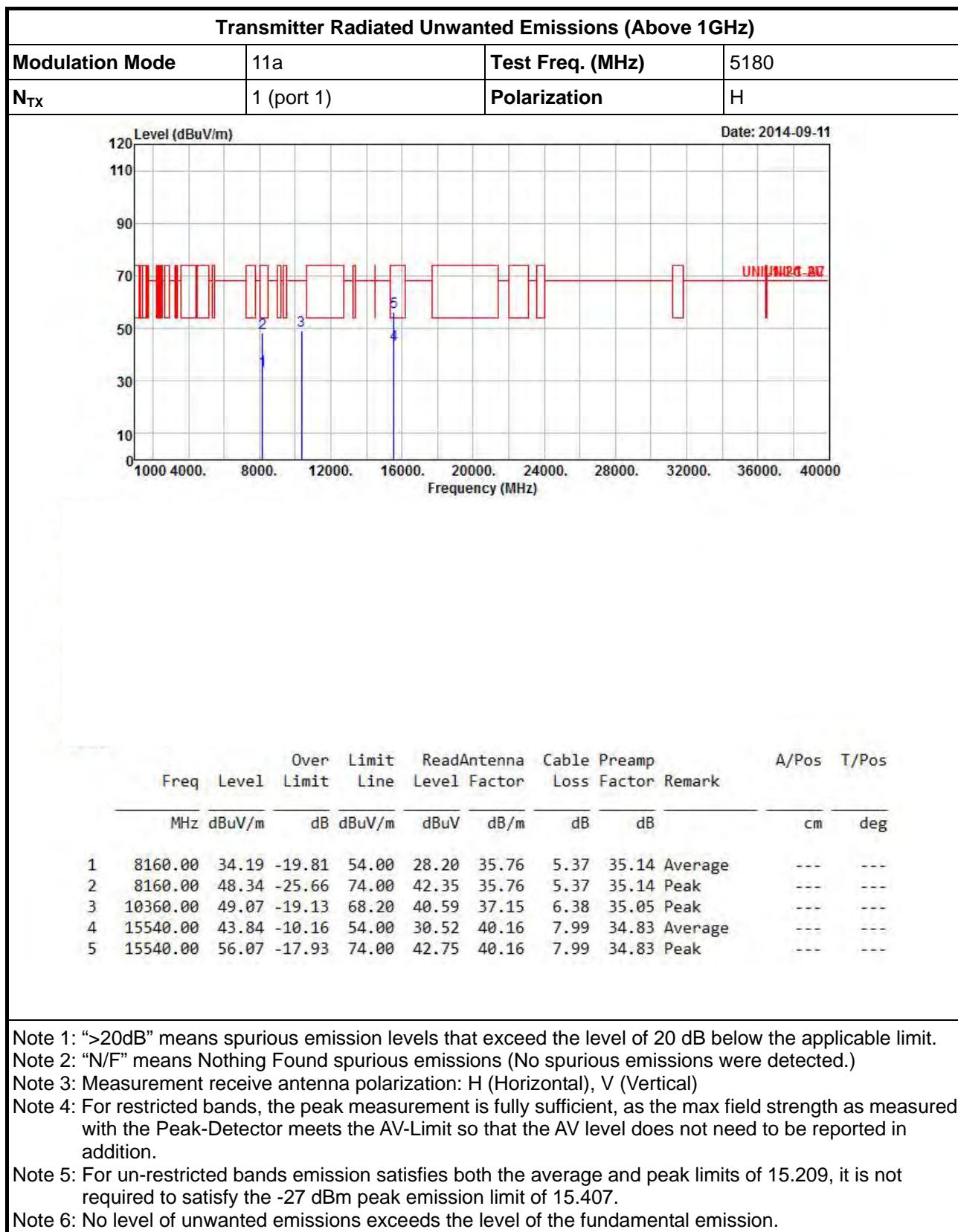
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

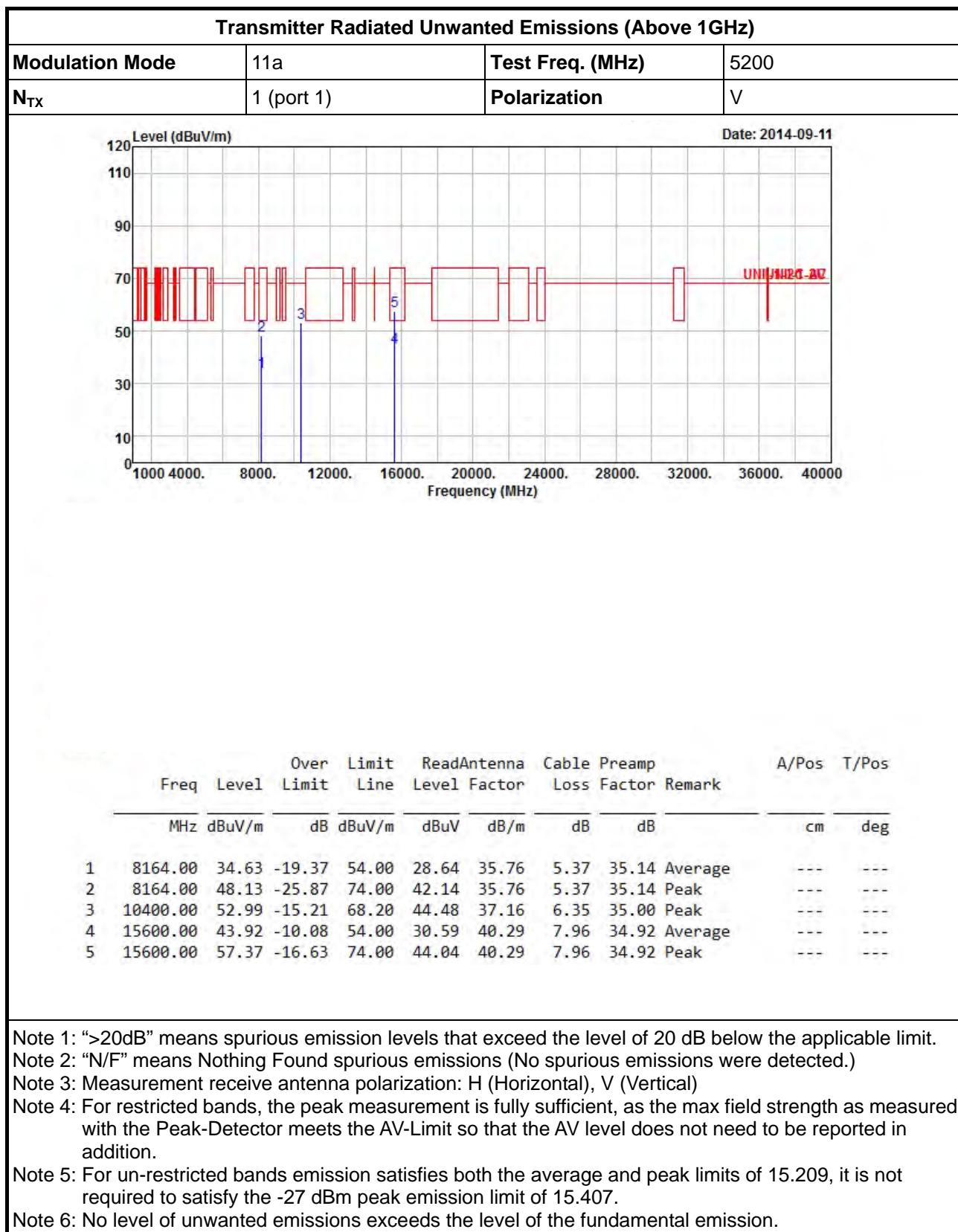
Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

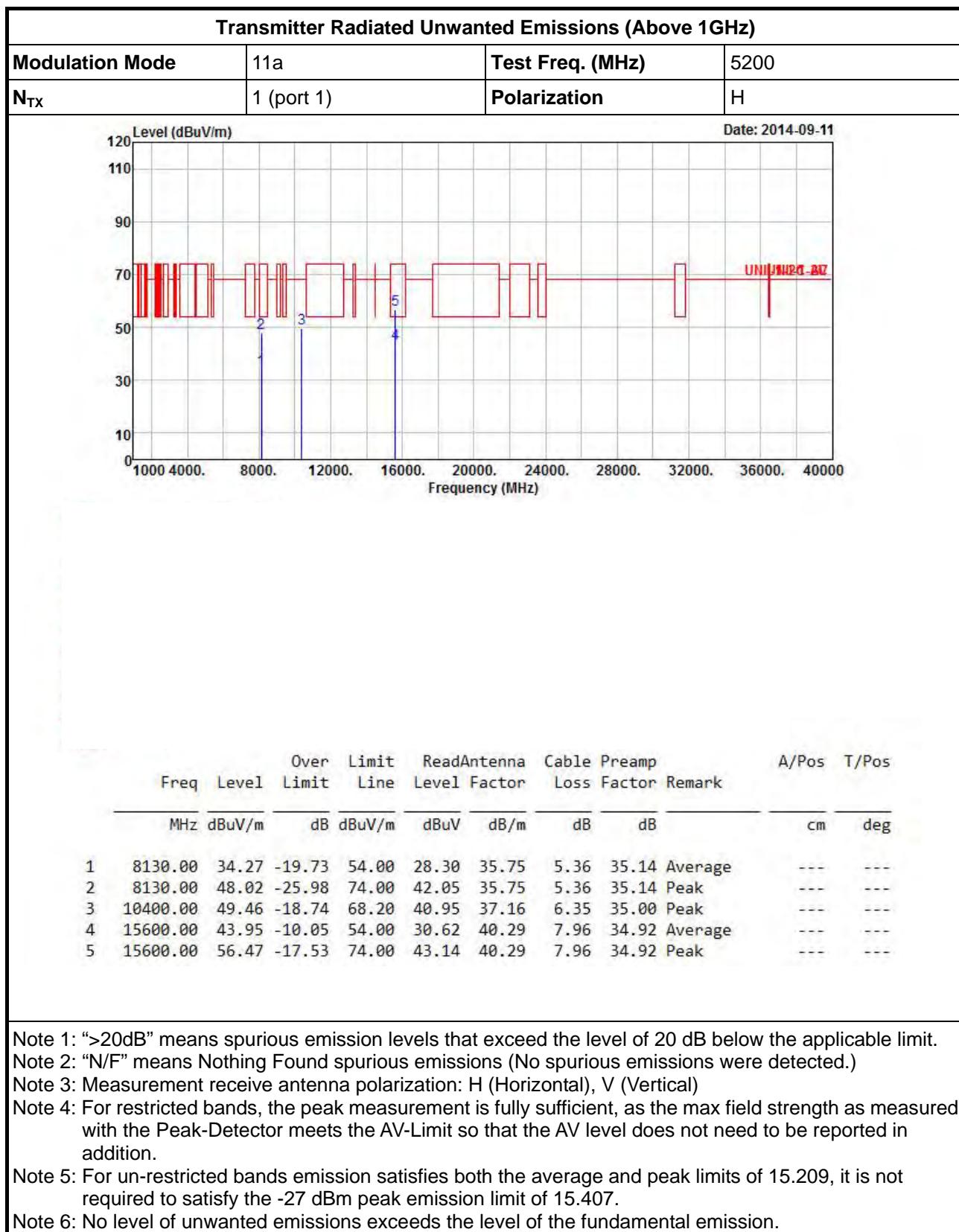
Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.

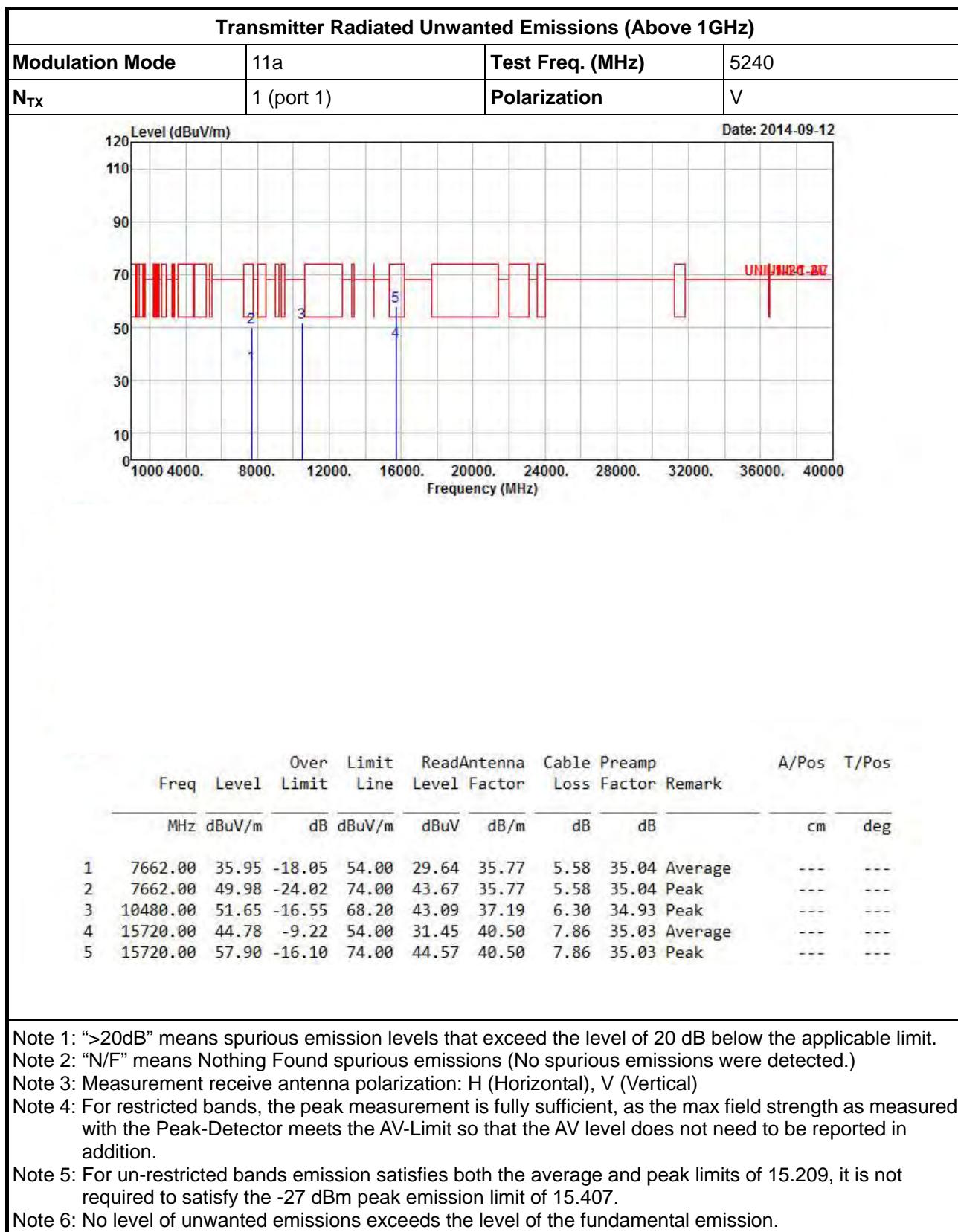
Note 5: For un-restricted bands emission satisfies both the average and peak limits of 15.209, it is not required to satisfy the -27 dBm peak emission limit of 15.407.

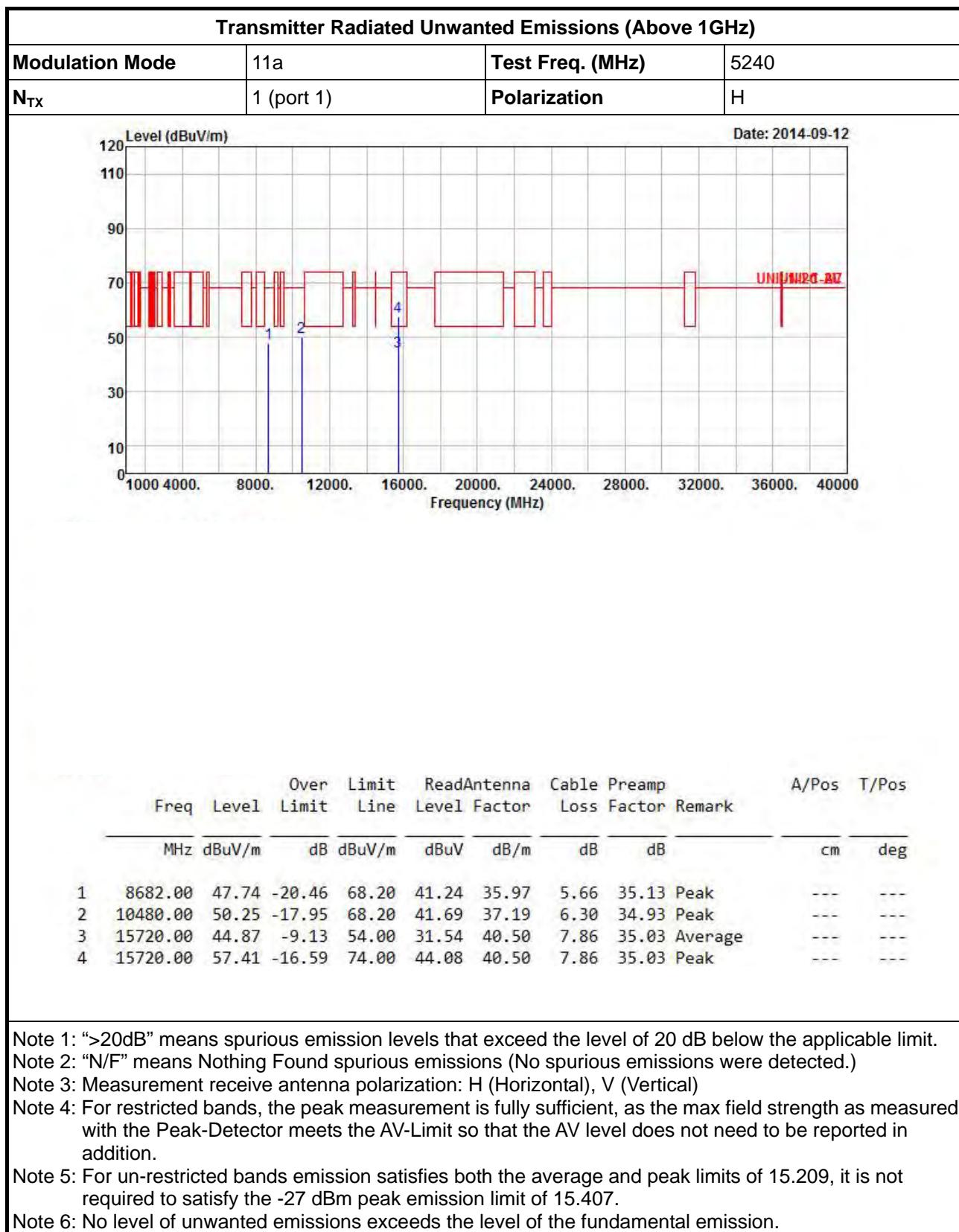
Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.

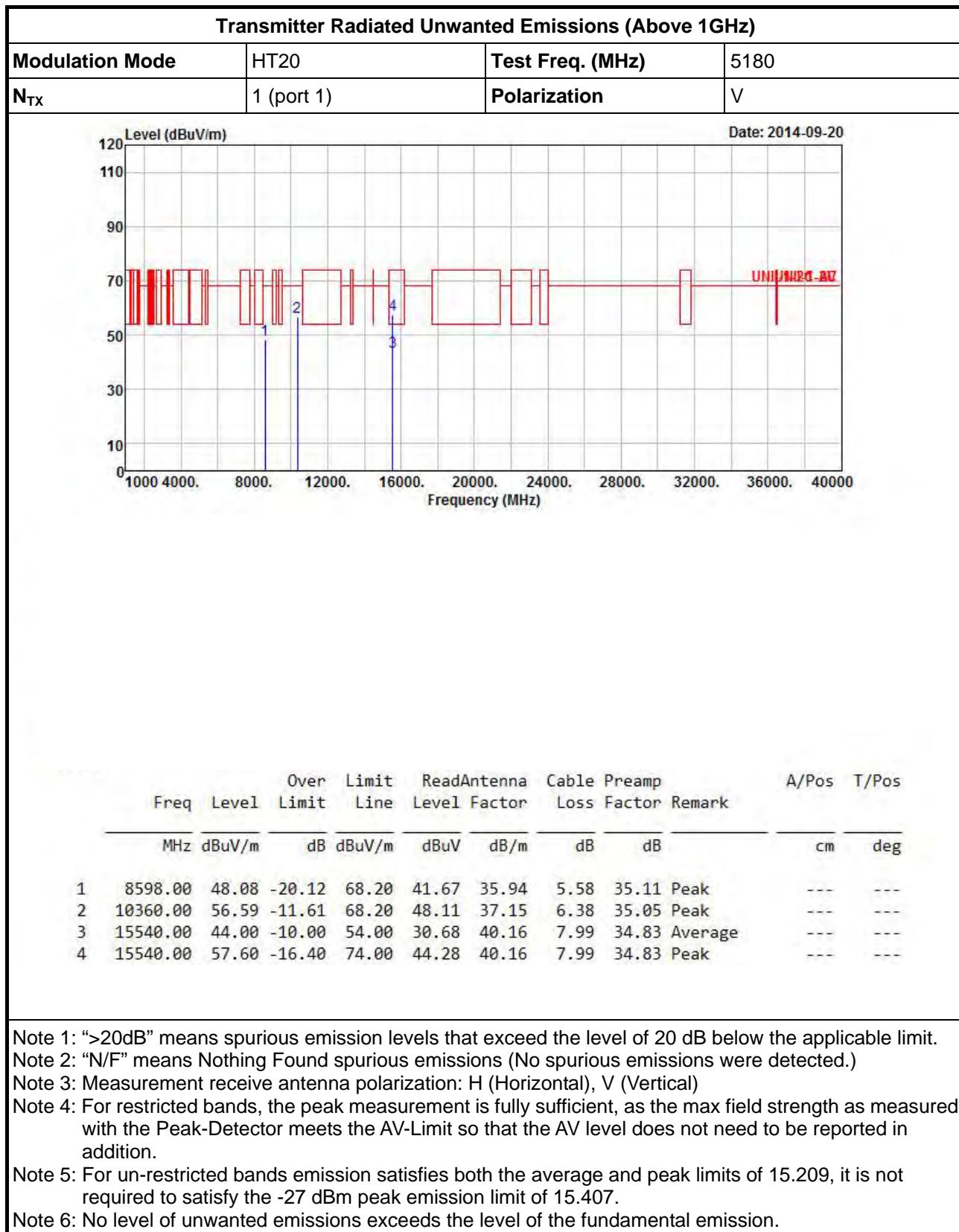


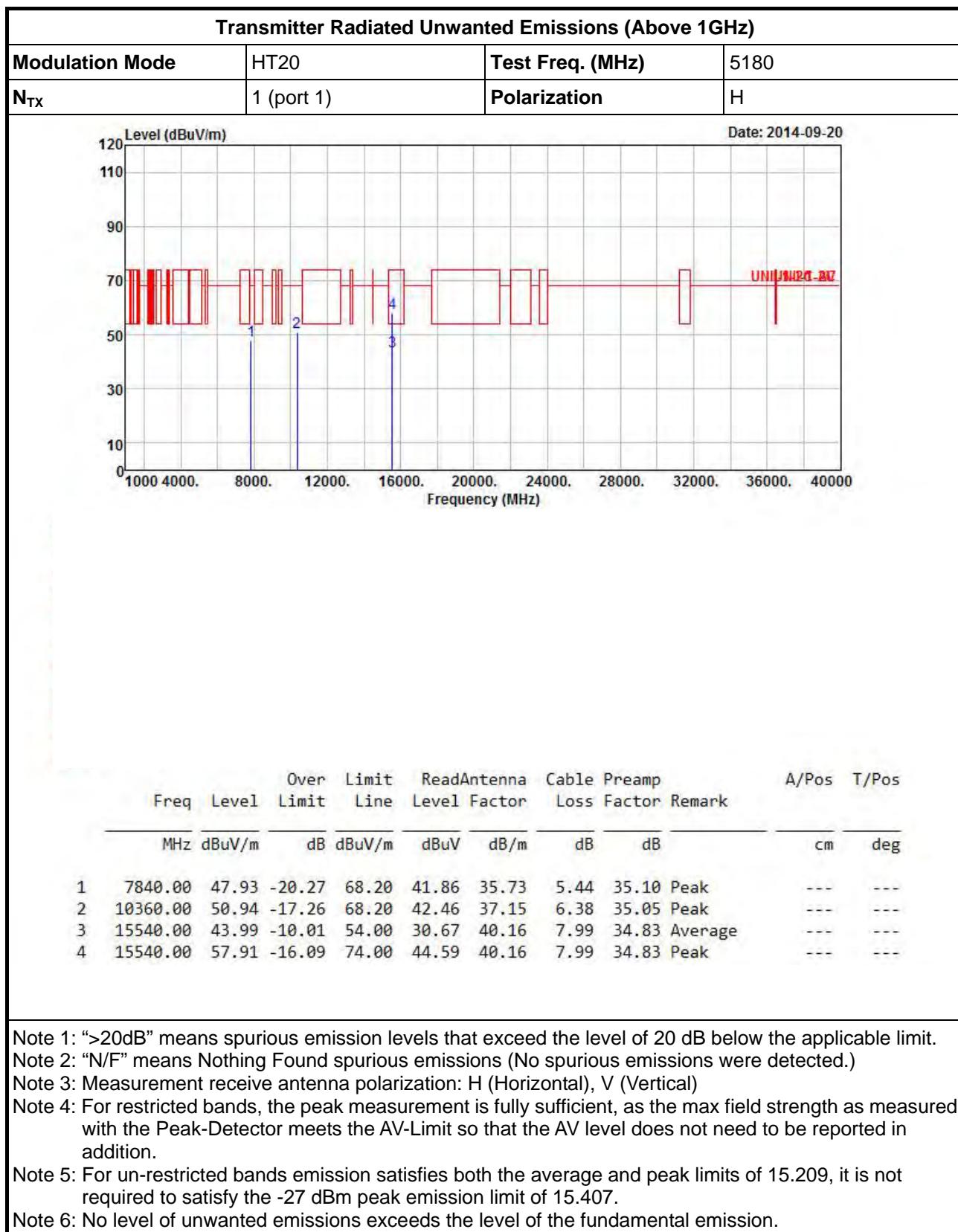


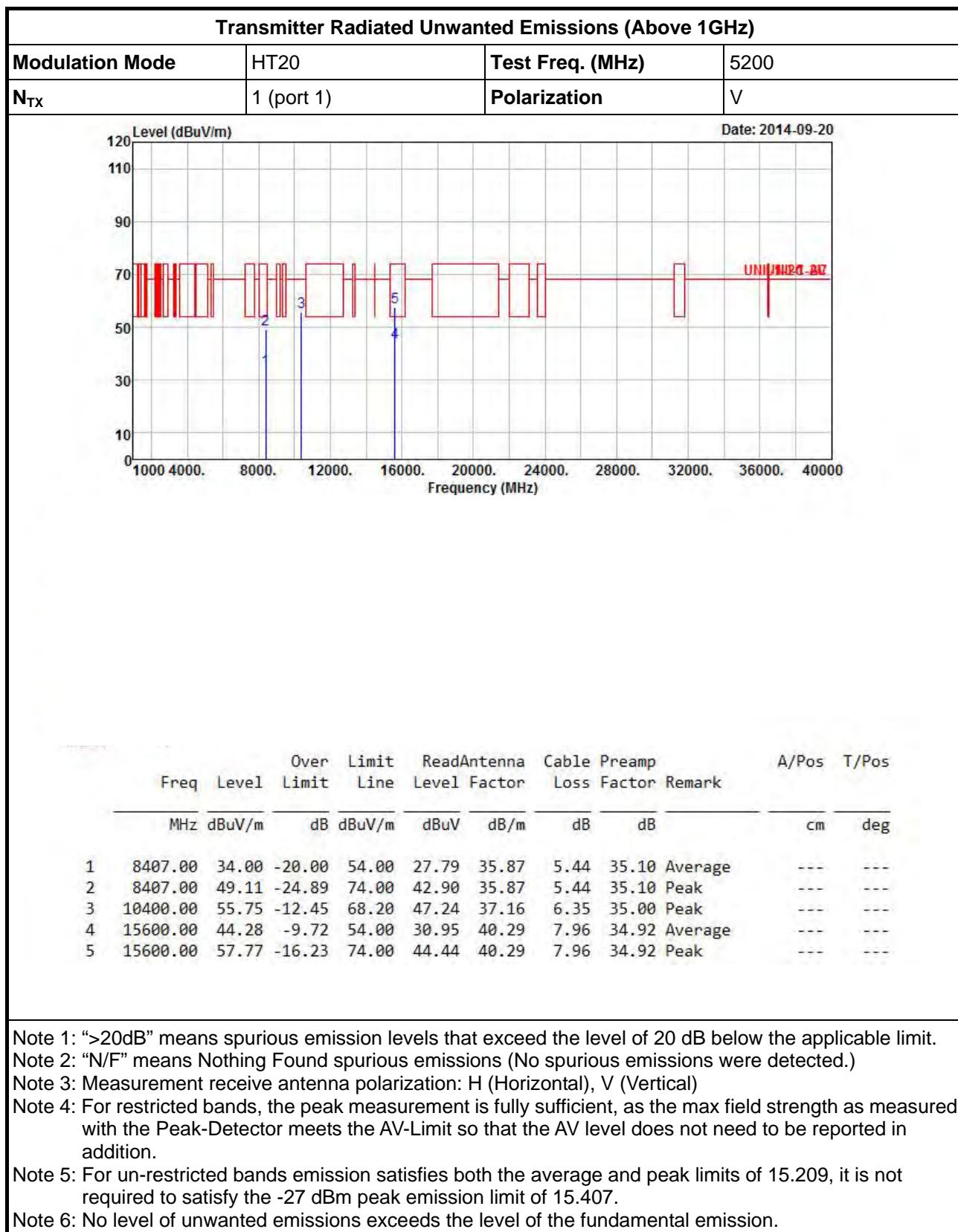


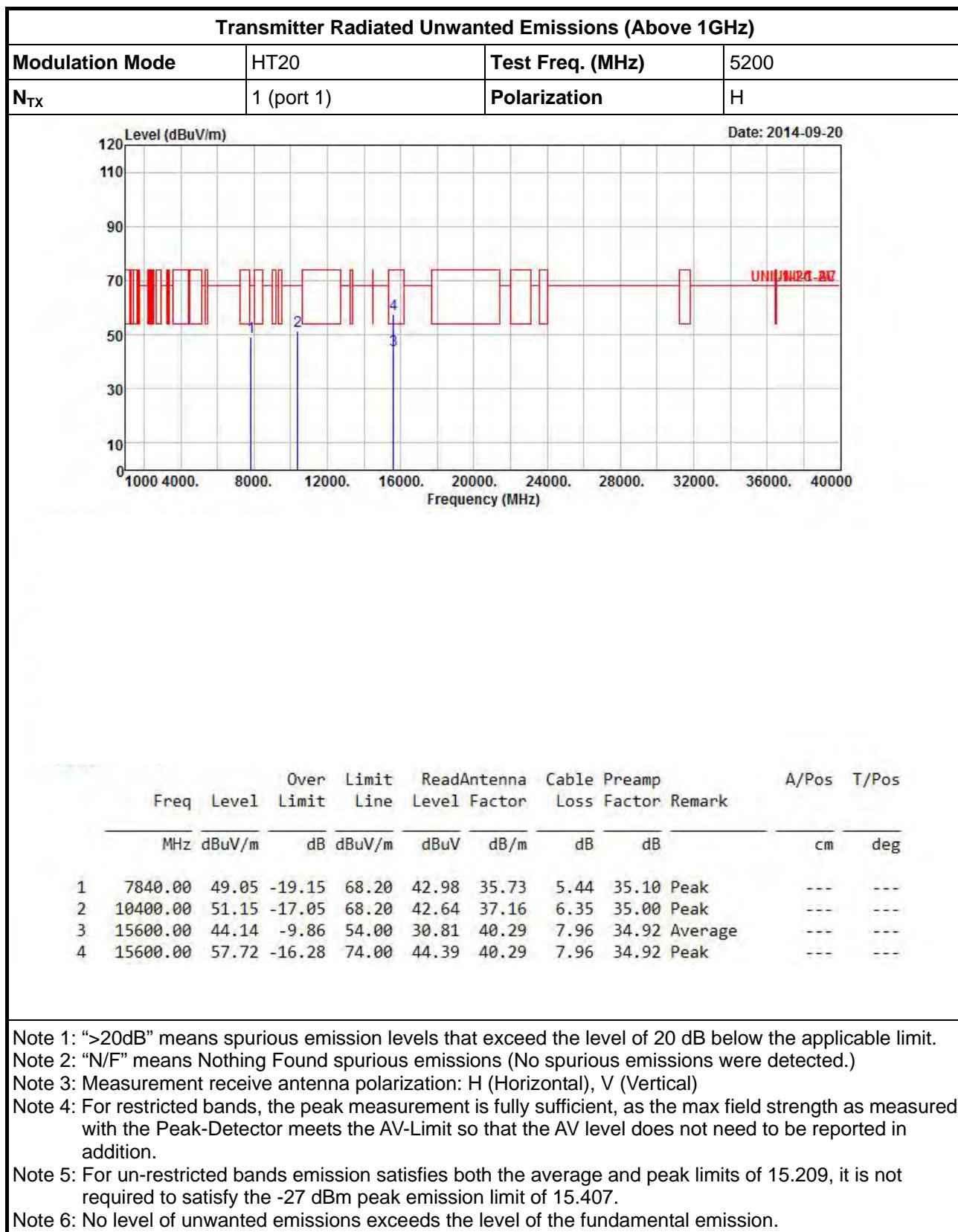


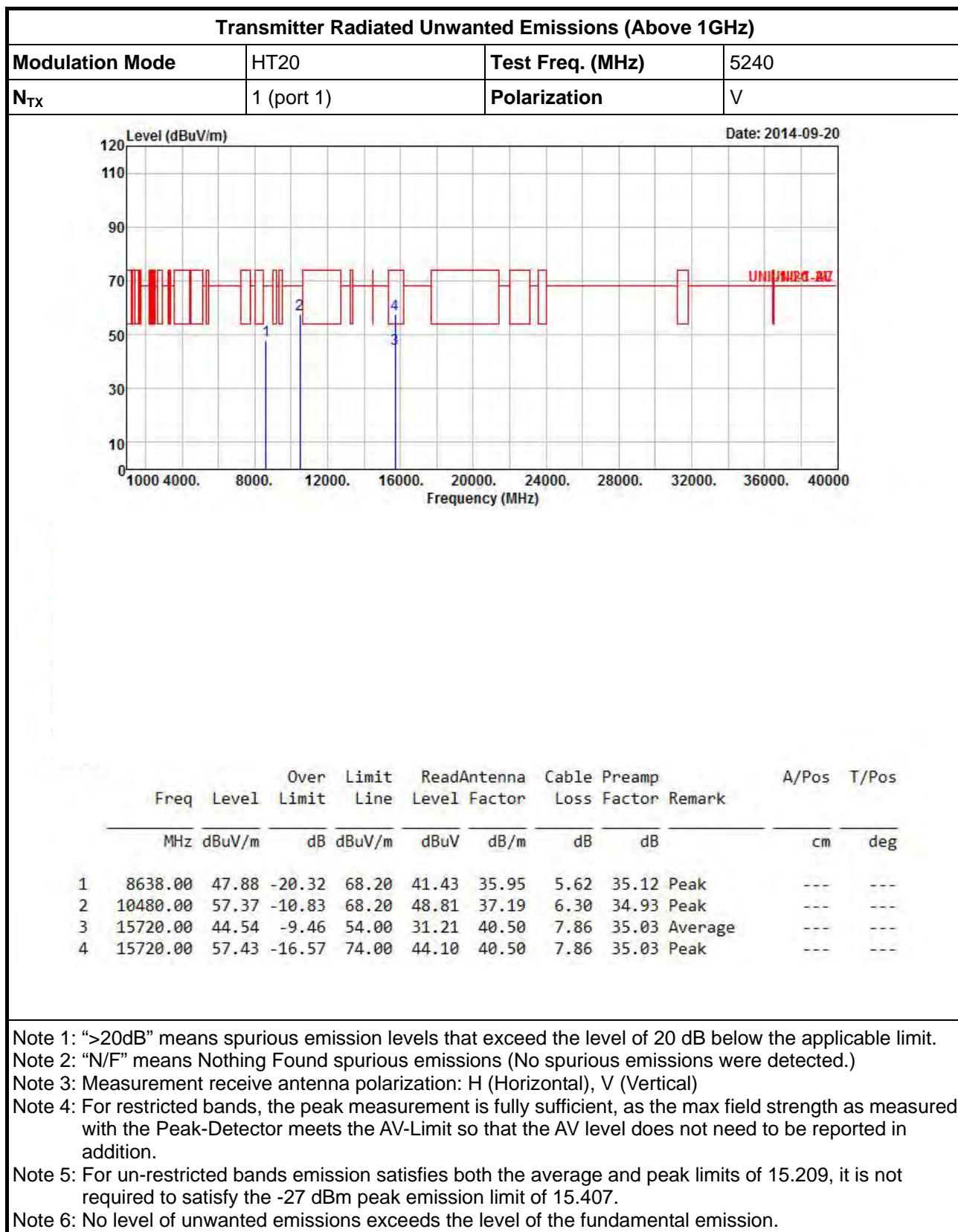


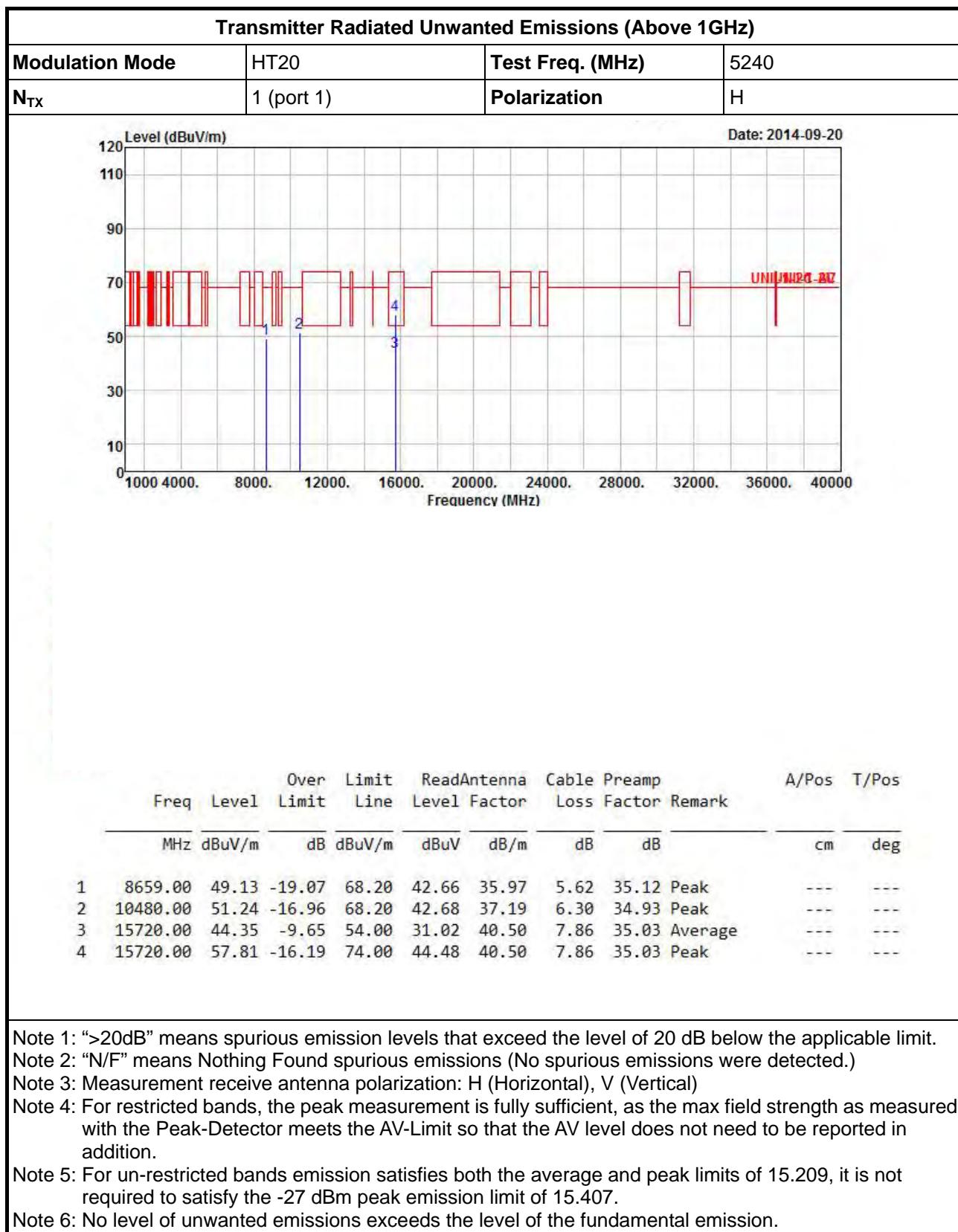


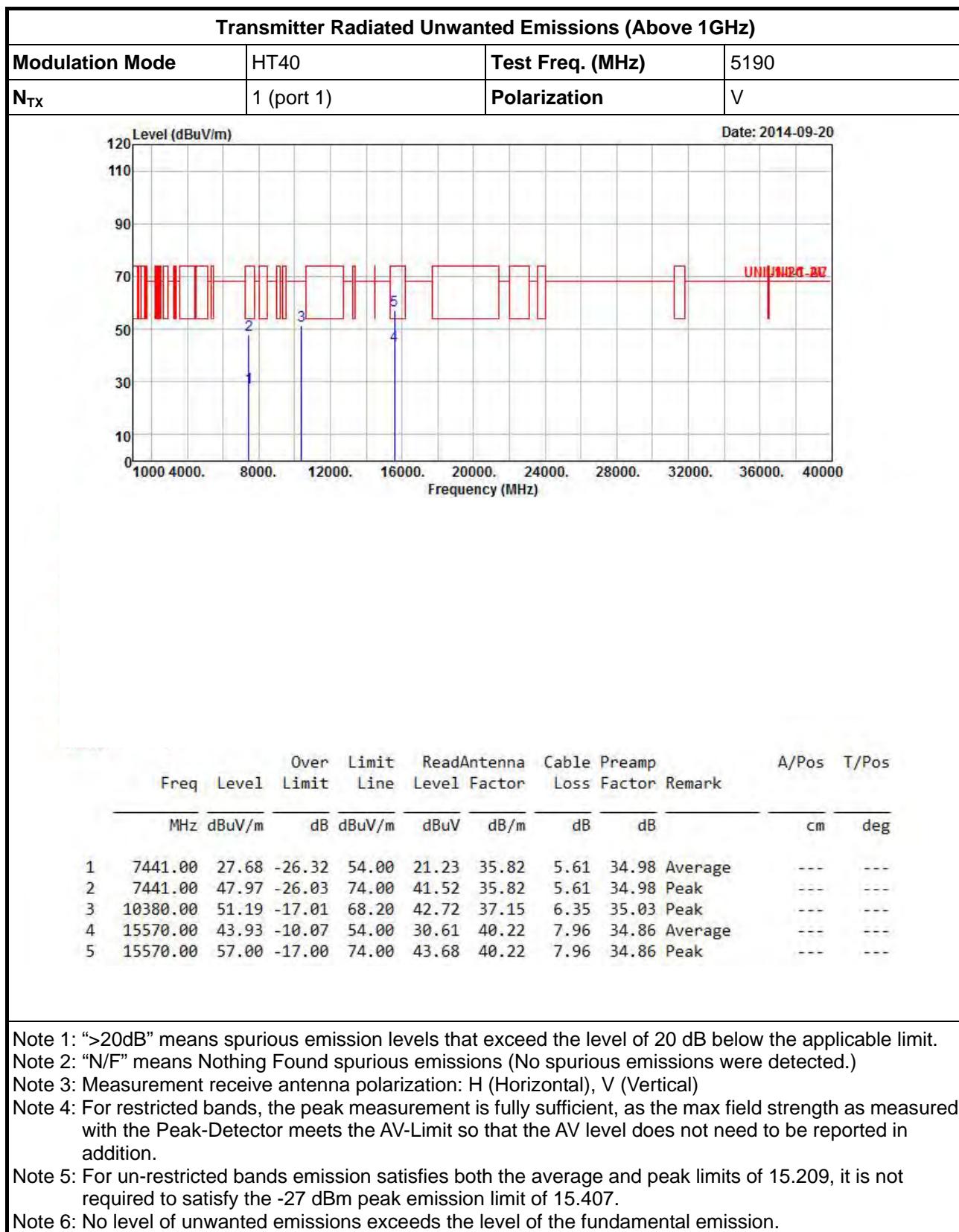


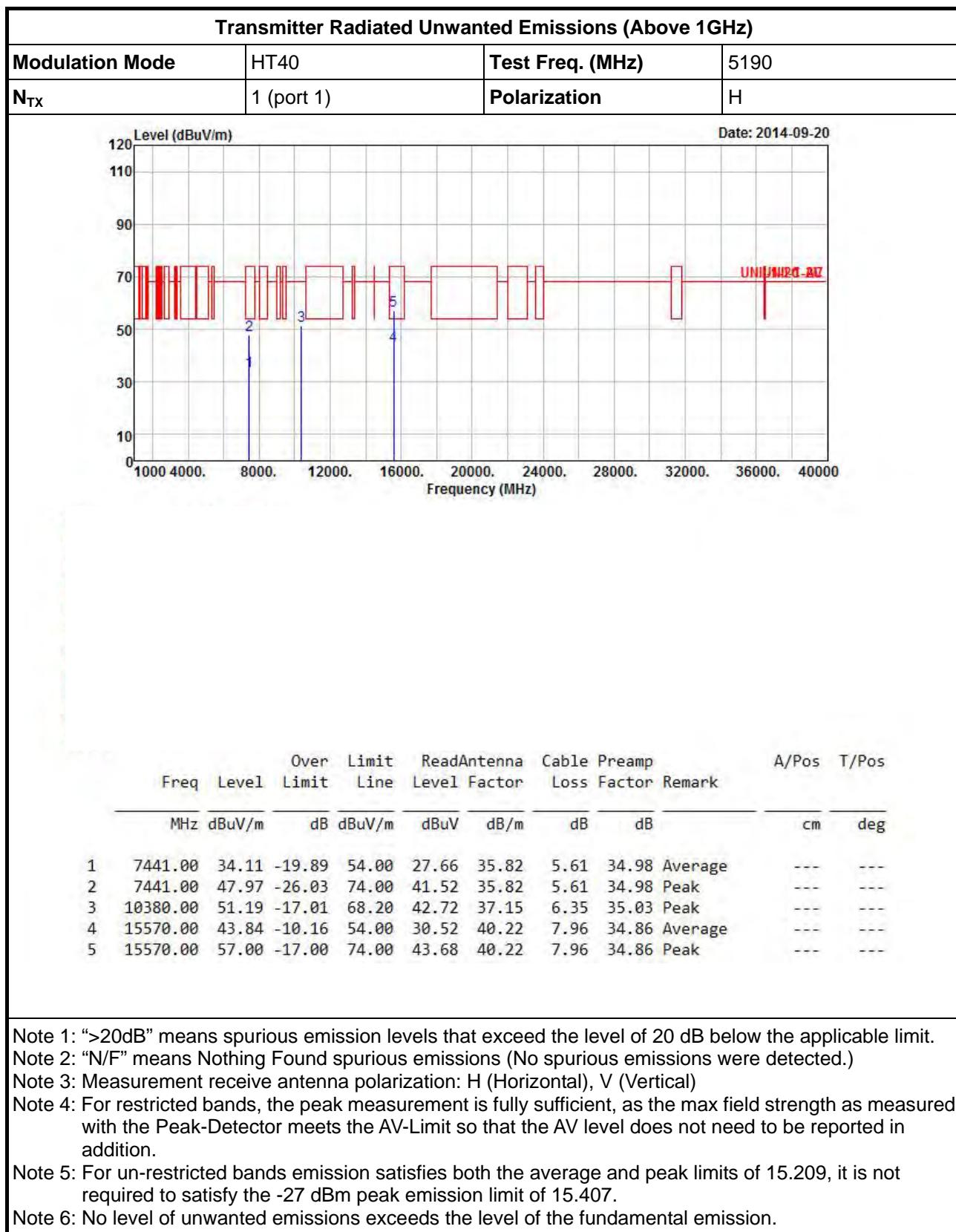


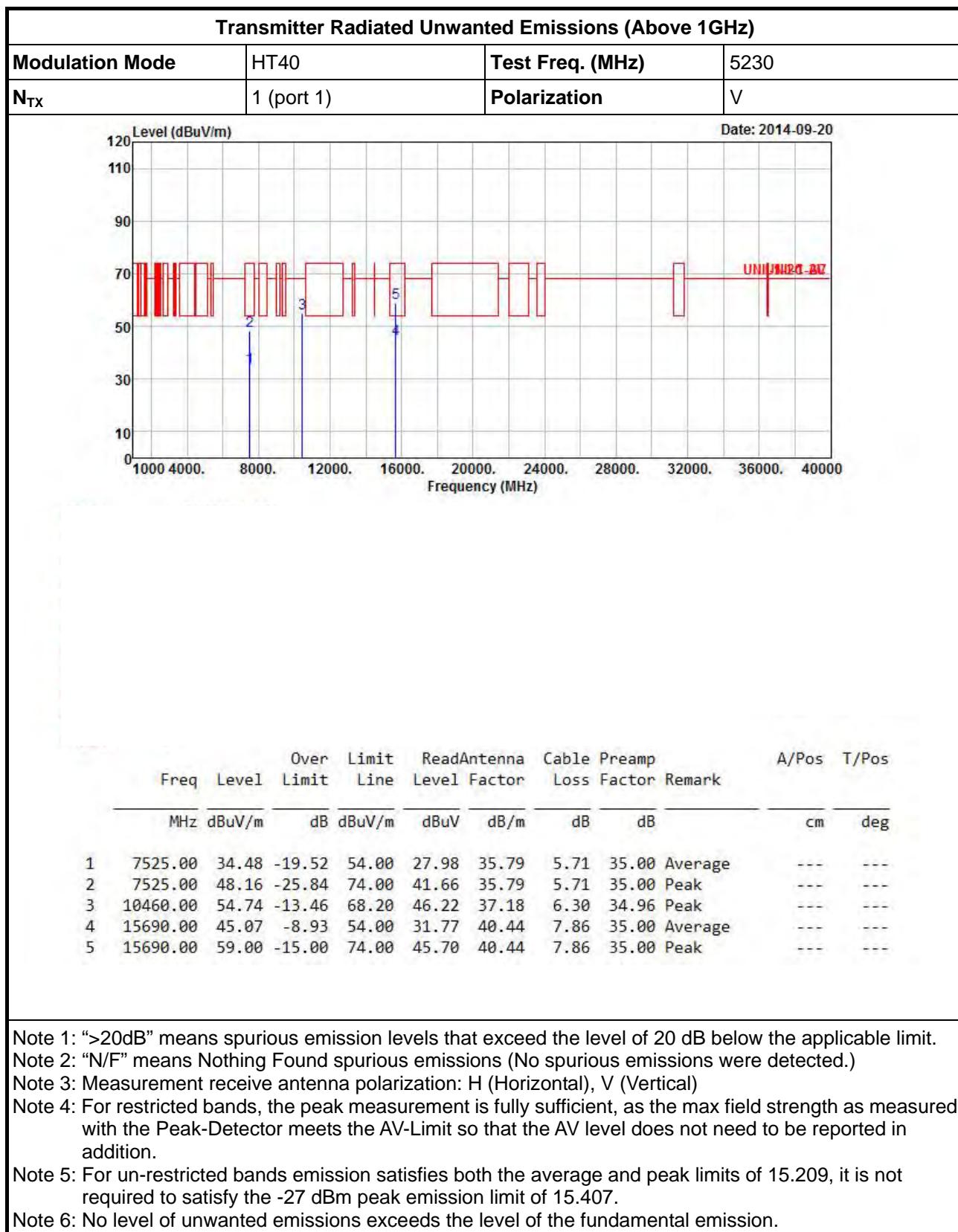












Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

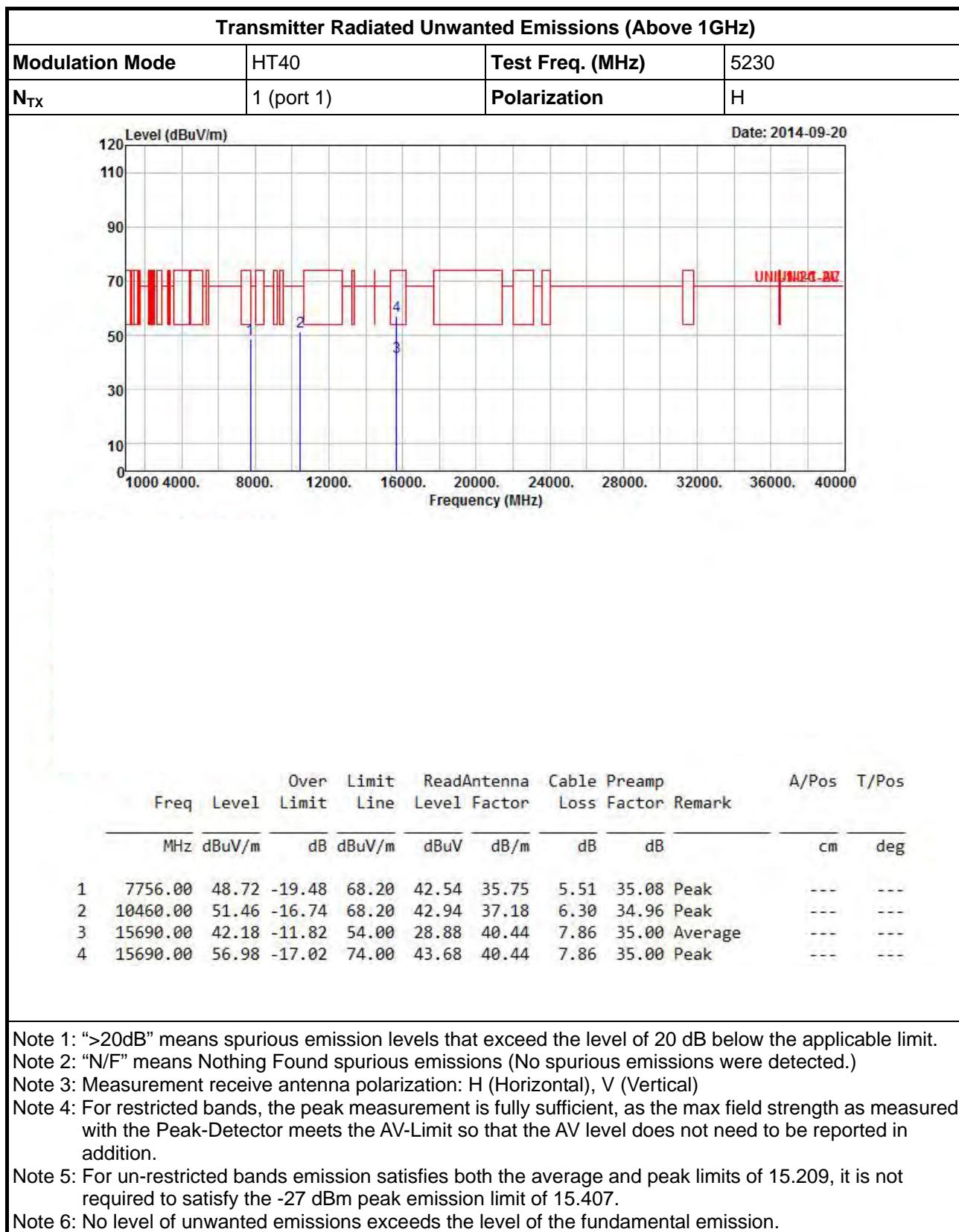
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

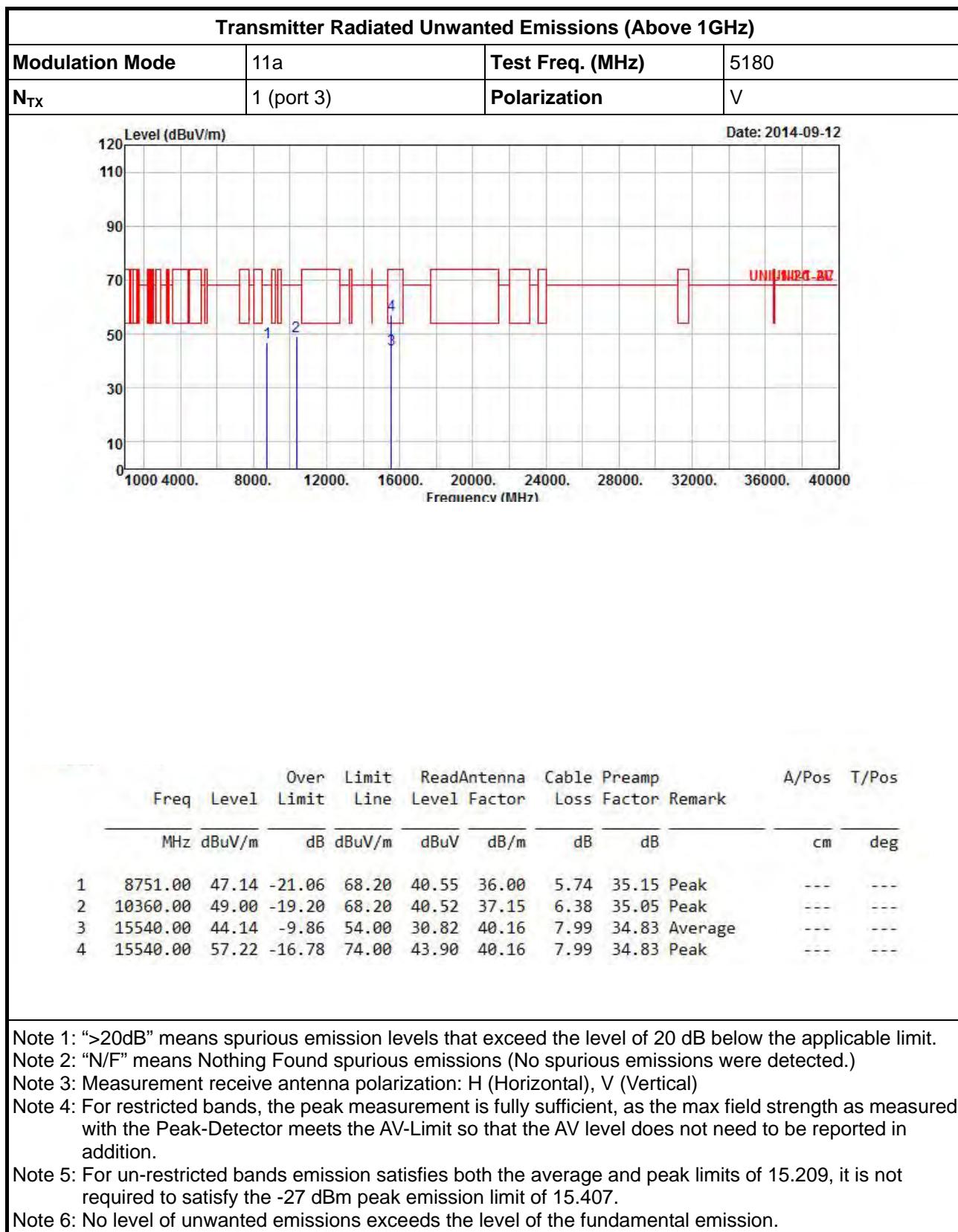
Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

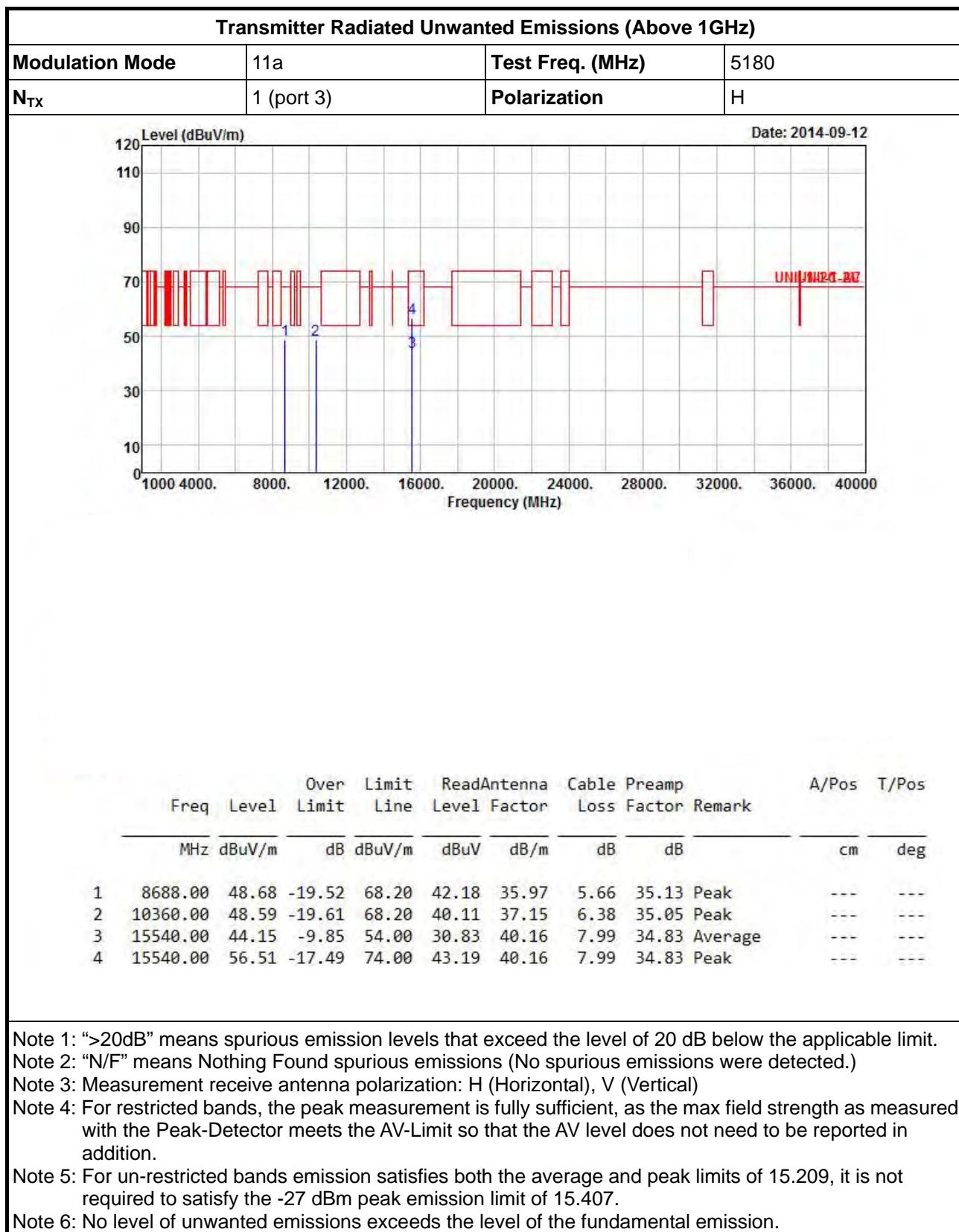
Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.

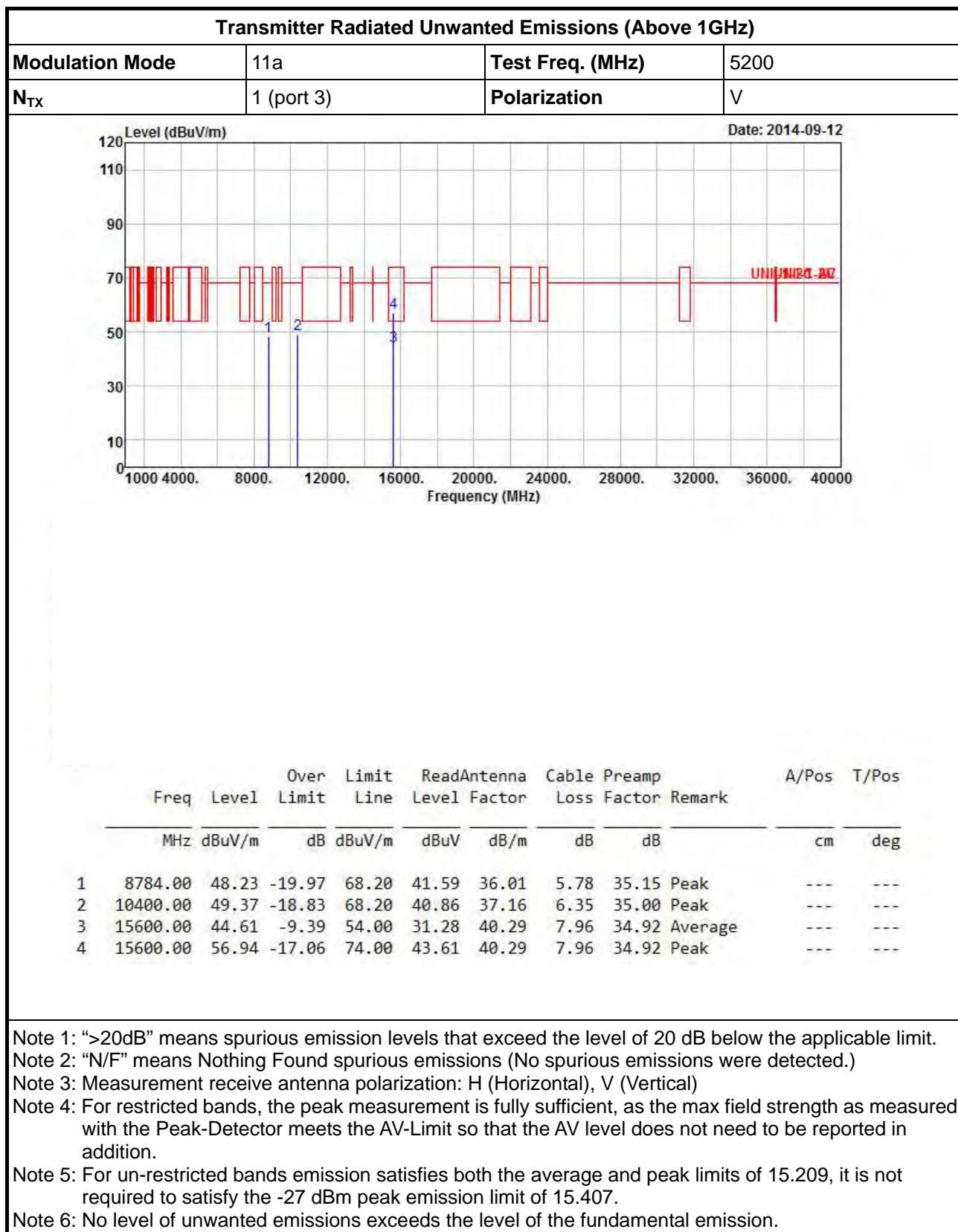
Note 5: For un-restricted bands emission satisfies both the average and peak limits of 15.209, it is not required to satisfy the -27 dBm peak emission limit of 15.407.

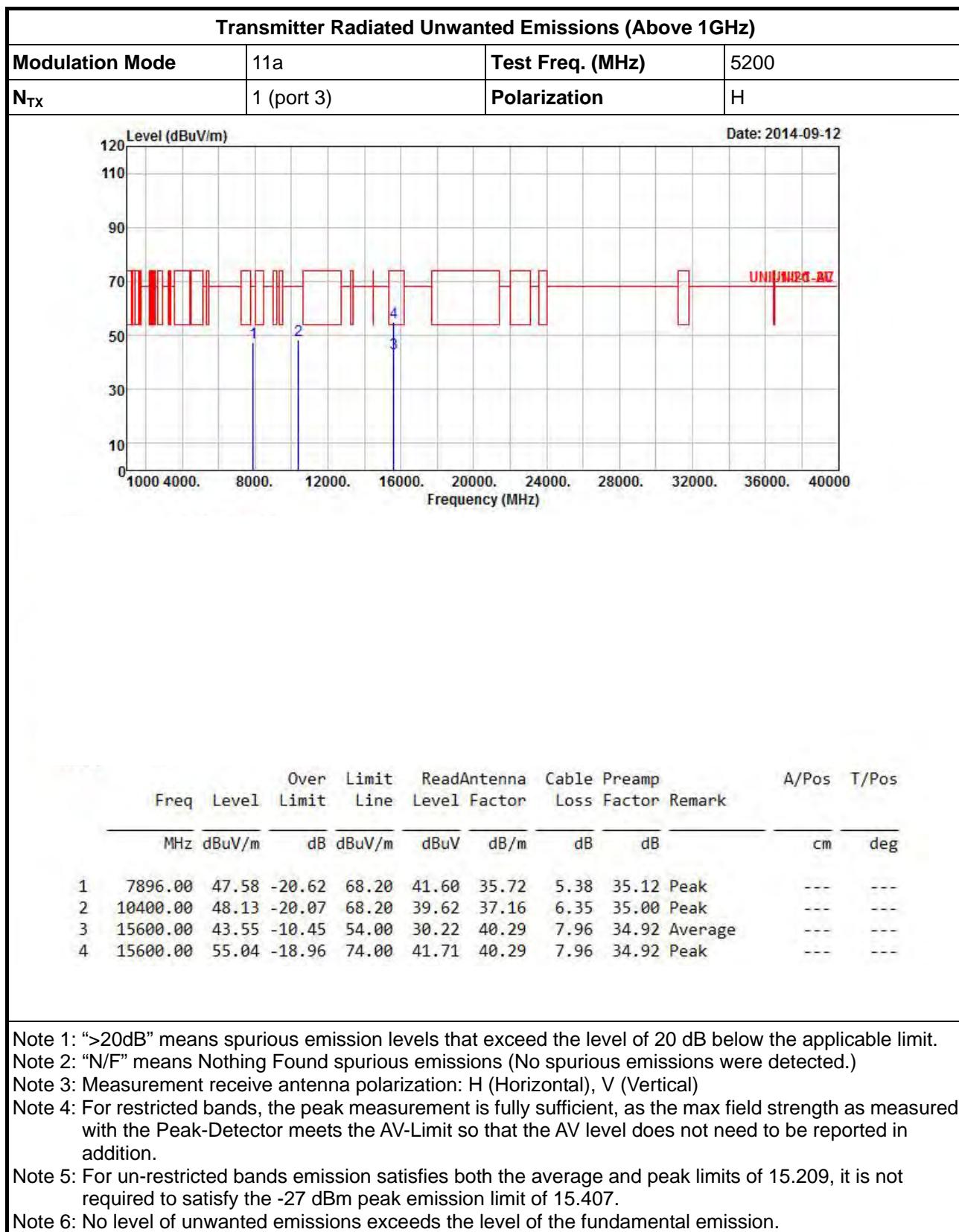
Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.

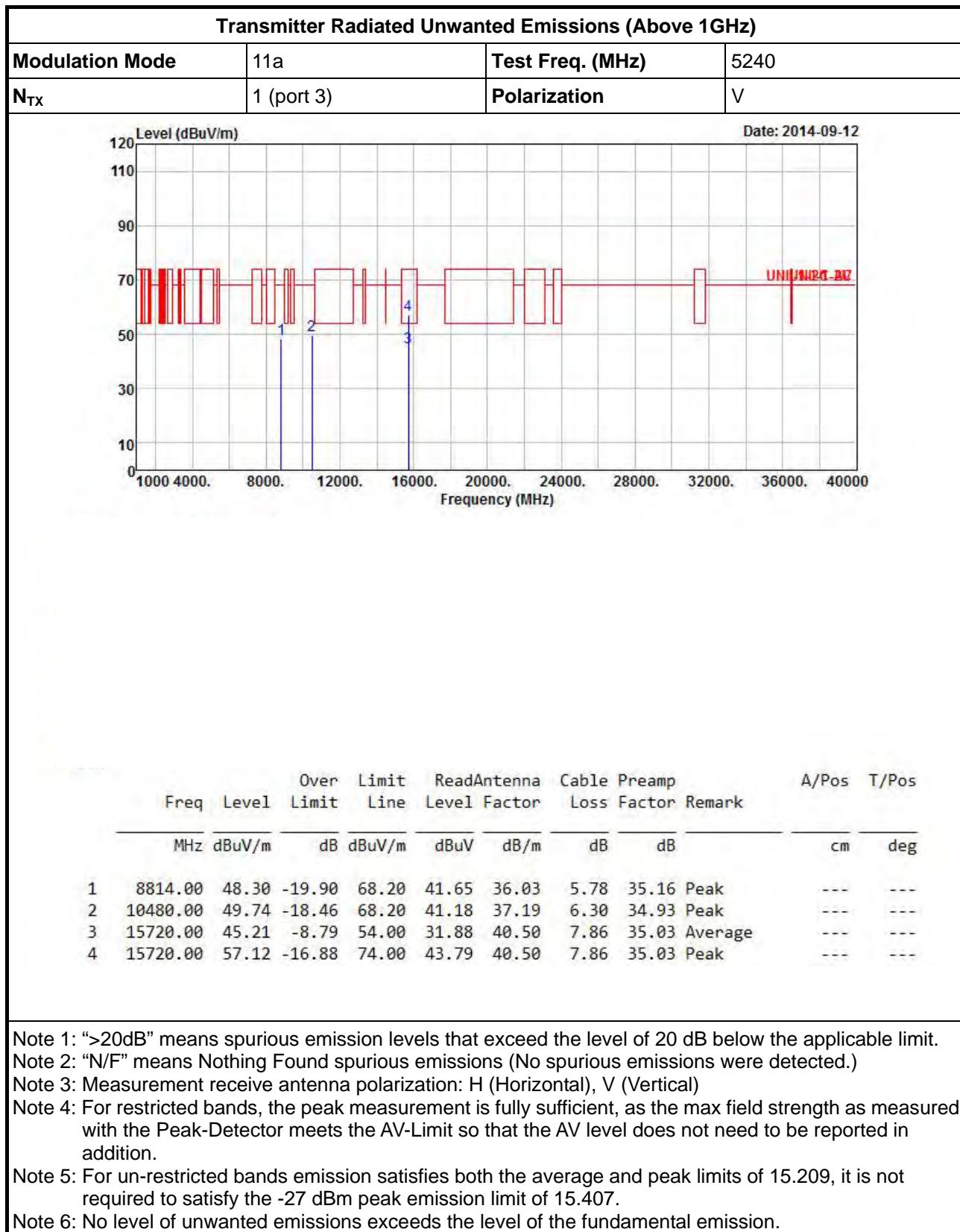


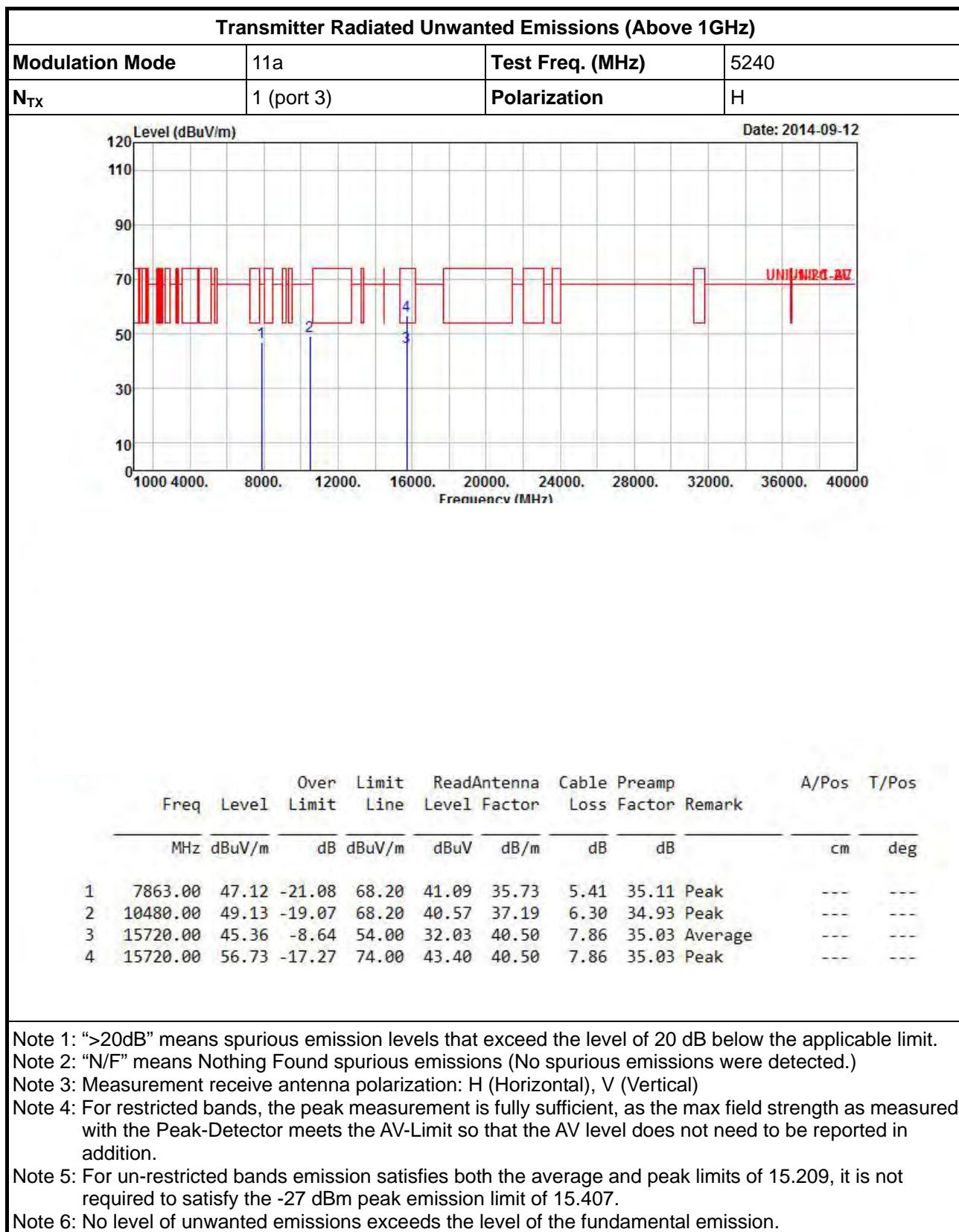




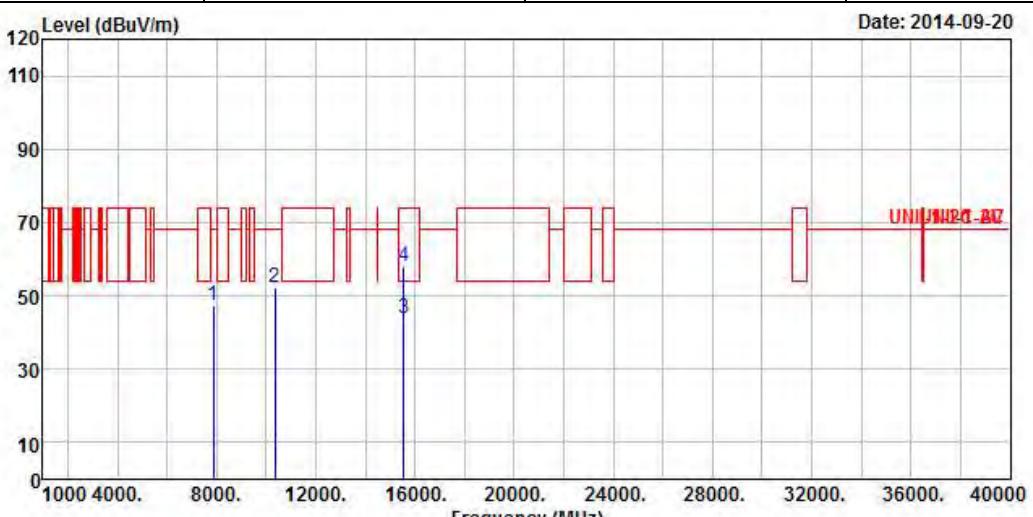
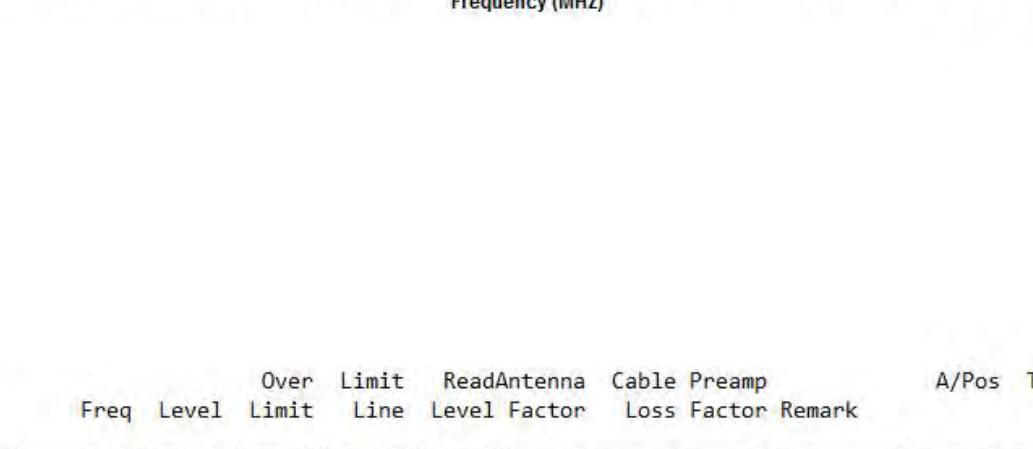




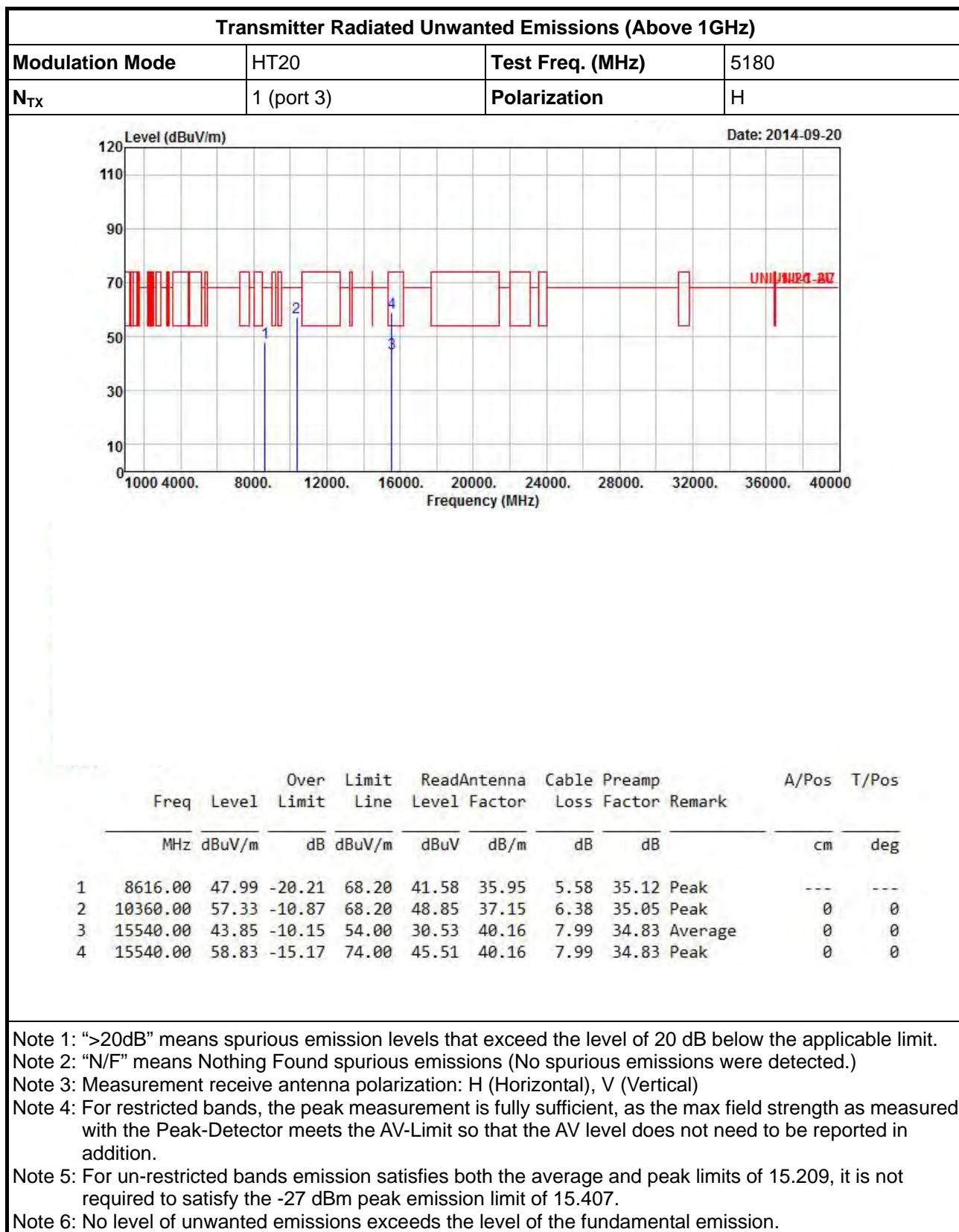


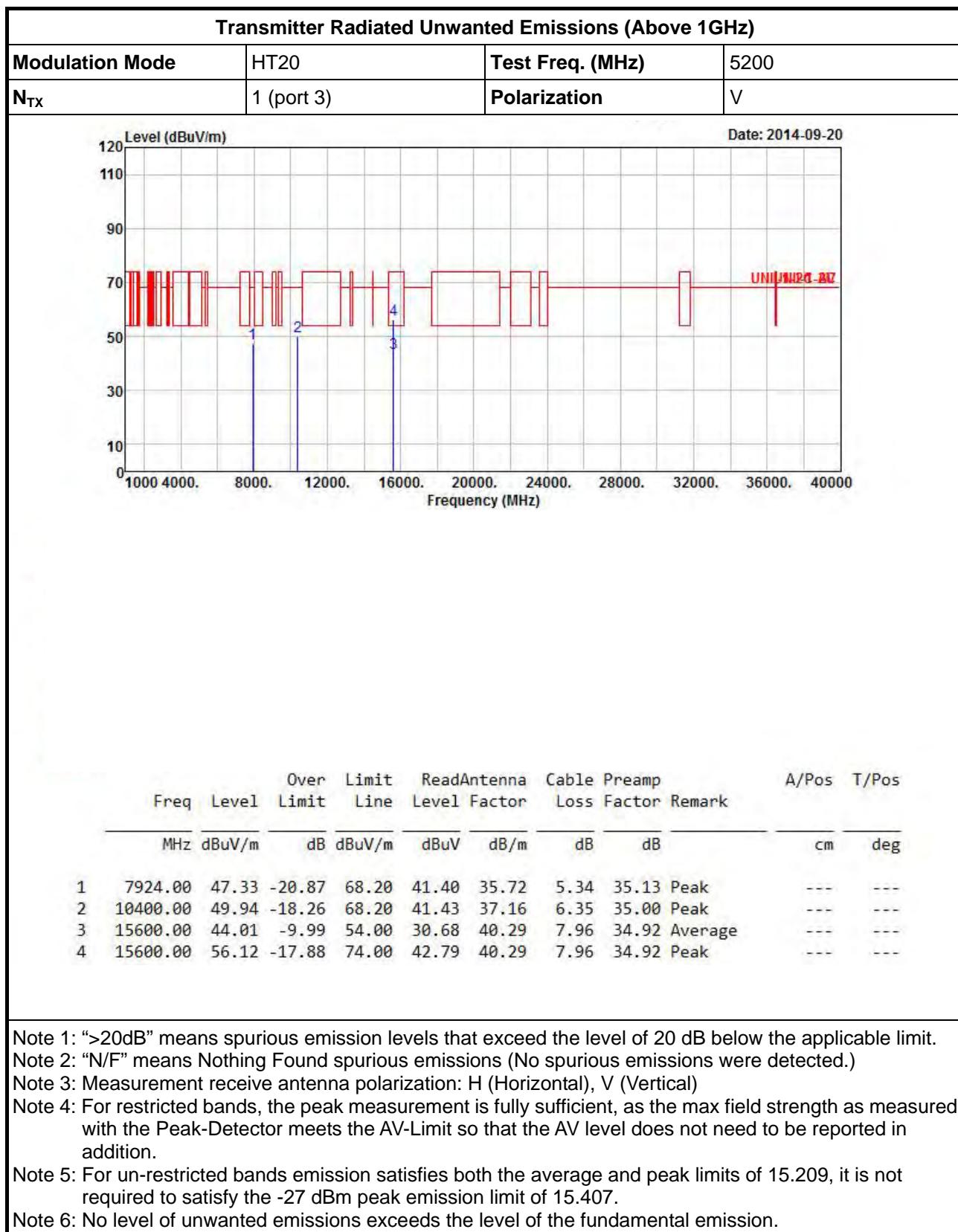


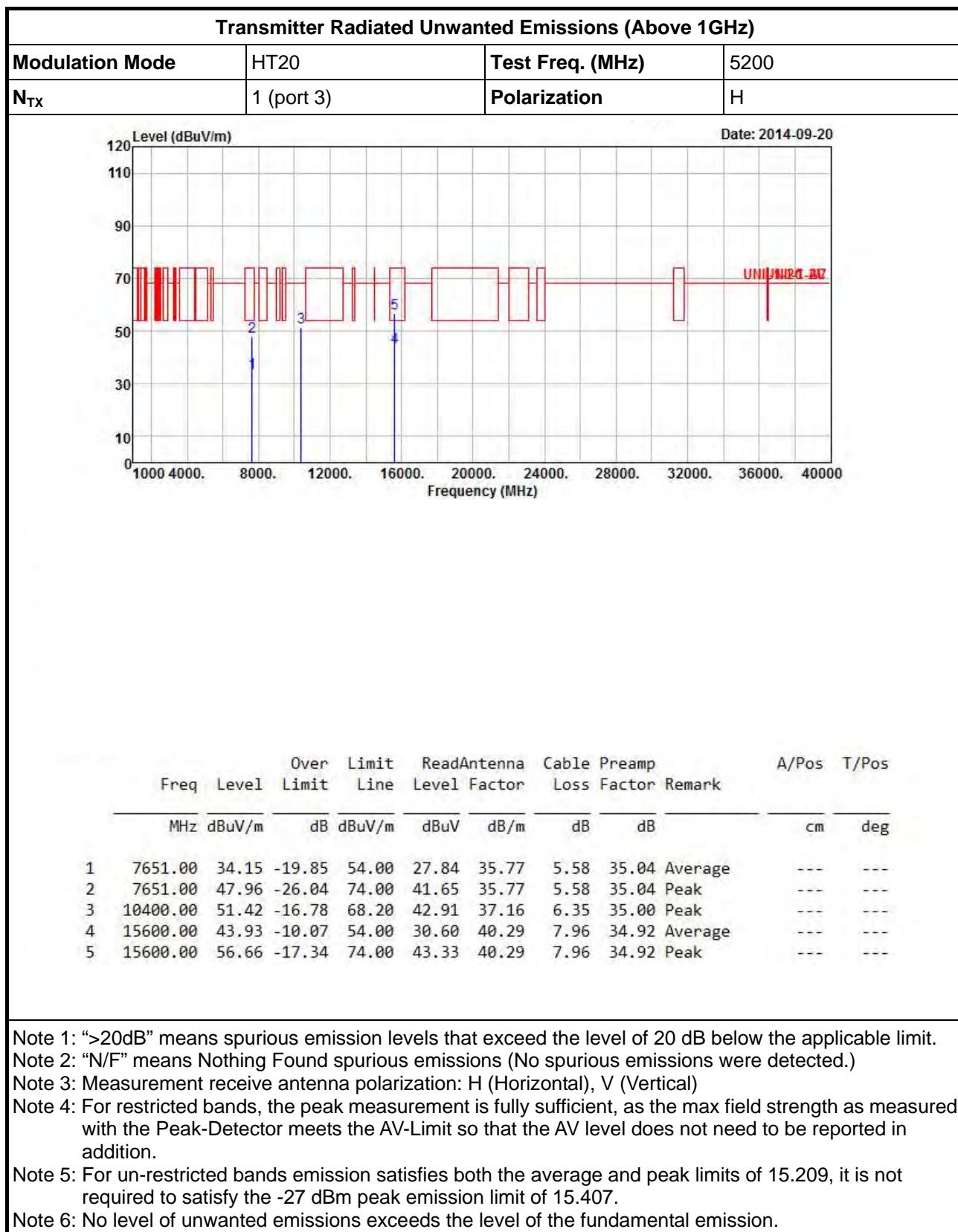


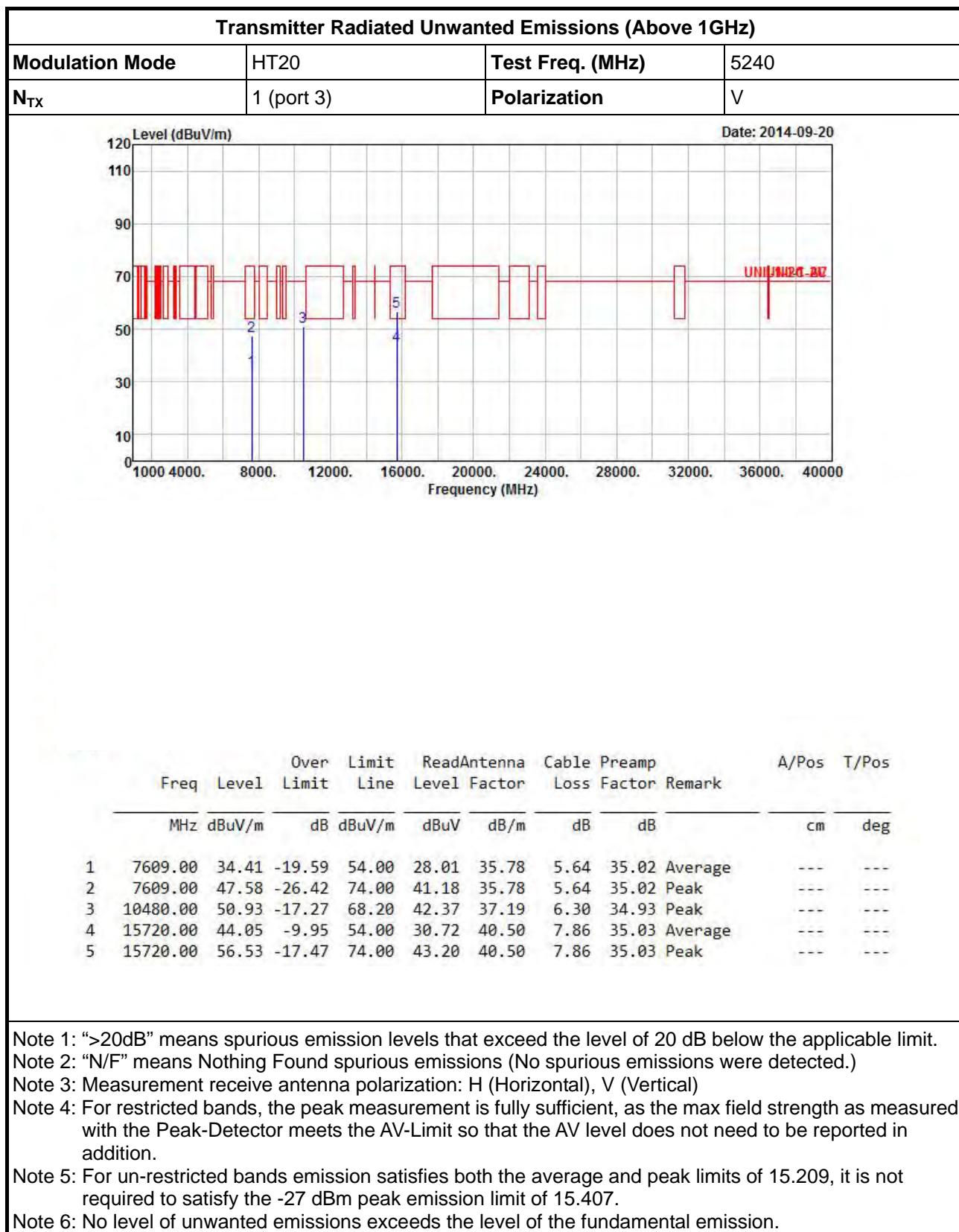
<b>Modulation Mode</b>	HT20	<b>Test Freq. (MHz)</b>	5180																																																																										
<b>N<sub>TX</sub></b>	1 (port 3)	<b>Polarization</b>	V																																																																										
			Date: 2014-09-20																																																																										
			UNINTENDED-BAND																																																																										
<table border="1"> <thead> <tr> <th rowspan="2">Freq</th> <th rowspan="2">Level</th> <th>Over</th> <th>Limit</th> <th>Read</th> <th>Antenna</th> <th>Cable</th> <th>Preamp</th> <th rowspan="2">A/Pos</th> <th rowspan="2">T/Pos</th> </tr> <tr> <th>Limit</th> <th>Line</th> <th>Level</th> <th>Factor</th> <th>Loss</th> <th>Factor</th> </tr> </thead> <tbody> <tr> <td>MHz</td> <td>dBuV/m</td> <td>dB</td> <td>dBuV/m</td> <td>dBuV</td> <td>dB/m</td> <td>dB</td> <td>dB</td> <td>cm</td> <td>deg</td> </tr> <tr> <td>1</td> <td>7878.00</td> <td>47.39</td> <td>-20.81</td> <td>68.20</td> <td>41.38</td> <td>35.72</td> <td>5.41</td> <td>35.12</td> <td>Peak</td> <td>---</td> <td>---</td> </tr> <tr> <td>2</td> <td>10360.00</td> <td>52.36</td> <td>-15.84</td> <td>68.20</td> <td>43.88</td> <td>37.15</td> <td>6.38</td> <td>35.05</td> <td>Peak</td> <td>0</td> <td>0</td> </tr> <tr> <td>3</td> <td>15540.00</td> <td>43.81</td> <td>-10.19</td> <td>54.00</td> <td>30.49</td> <td>40.16</td> <td>7.99</td> <td>34.83</td> <td>Average</td> <td>0</td> <td>0</td> </tr> <tr> <td>4</td> <td>15540.00</td> <td>58.08</td> <td>-15.92</td> <td>74.00</td> <td>44.76</td> <td>40.16</td> <td>7.99</td> <td>34.83</td> <td>Peak</td> <td>0</td> <td>0</td> </tr> </tbody> </table>			Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	A/Pos	T/Pos	Limit	Line	Level	Factor	Loss	Factor	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	1	7878.00	47.39	-20.81	68.20	41.38	35.72	5.41	35.12	Peak	---	---	2	10360.00	52.36	-15.84	68.20	43.88	37.15	6.38	35.05	Peak	0	0	3	15540.00	43.81	-10.19	54.00	30.49	40.16	7.99	34.83	Average	0	0	4	15540.00	58.08	-15.92	74.00	44.76	40.16	7.99	34.83	Peak	0	0	
Freq	Level	Over			Limit	Read	Antenna	Cable	Preamp	A/Pos			T/Pos																																																																
		Limit	Line	Level	Factor	Loss	Factor																																																																						
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg																																																																				
1	7878.00	47.39	-20.81	68.20	41.38	35.72	5.41	35.12	Peak	---	---																																																																		
2	10360.00	52.36	-15.84	68.20	43.88	37.15	6.38	35.05	Peak	0	0																																																																		
3	15540.00	43.81	-10.19	54.00	30.49	40.16	7.99	34.83	Average	0	0																																																																		
4	15540.00	58.08	-15.92	74.00	44.76	40.16	7.99	34.83	Peak	0	0																																																																		

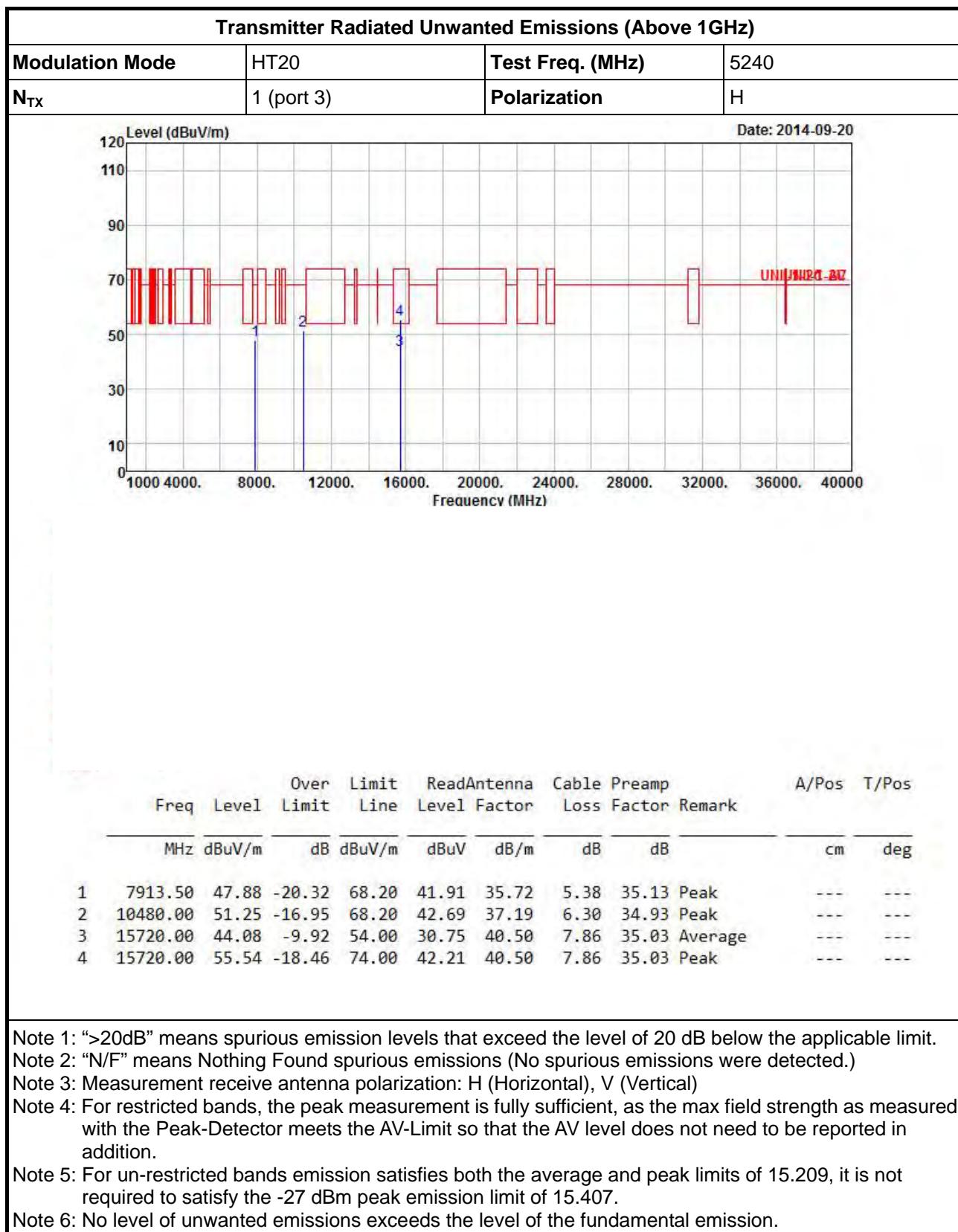
Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.  
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)  
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)  
 Note 4: For restricted 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 5: For un-restricted bands emission satisfies both the average and peak limits of 15.209, it is not required to satisfy the -27 dBm peak emission limit of 15.407.  
 Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.

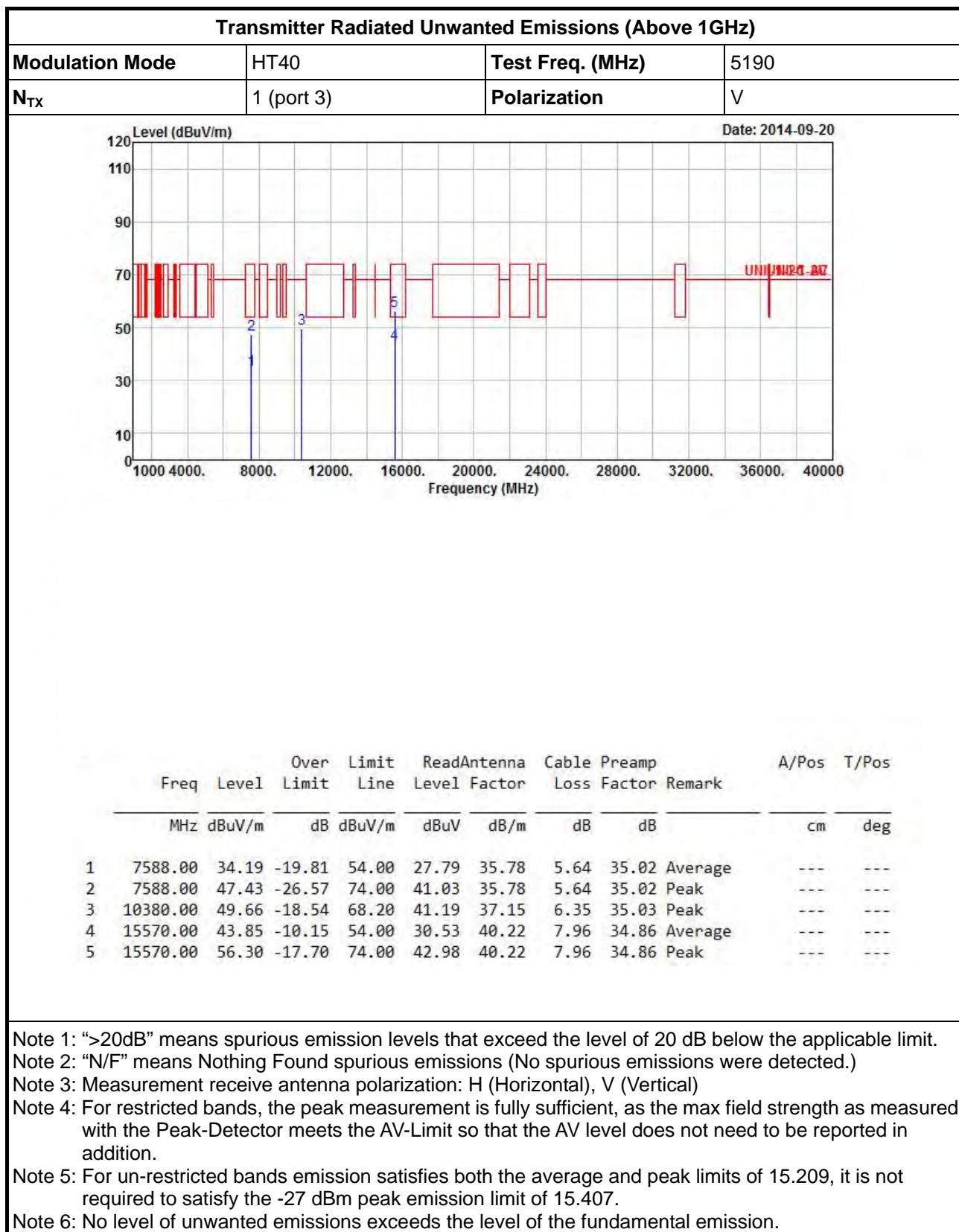


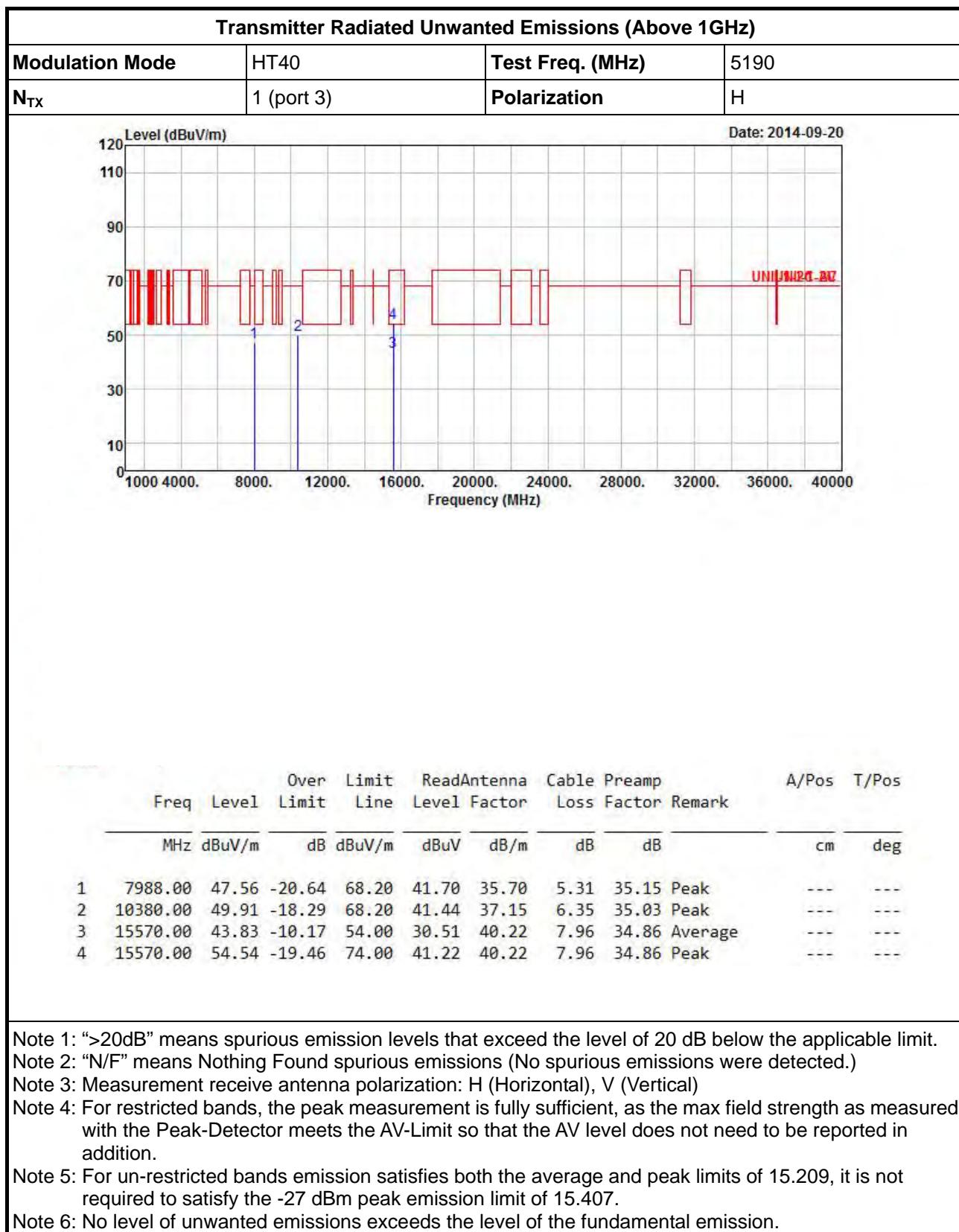


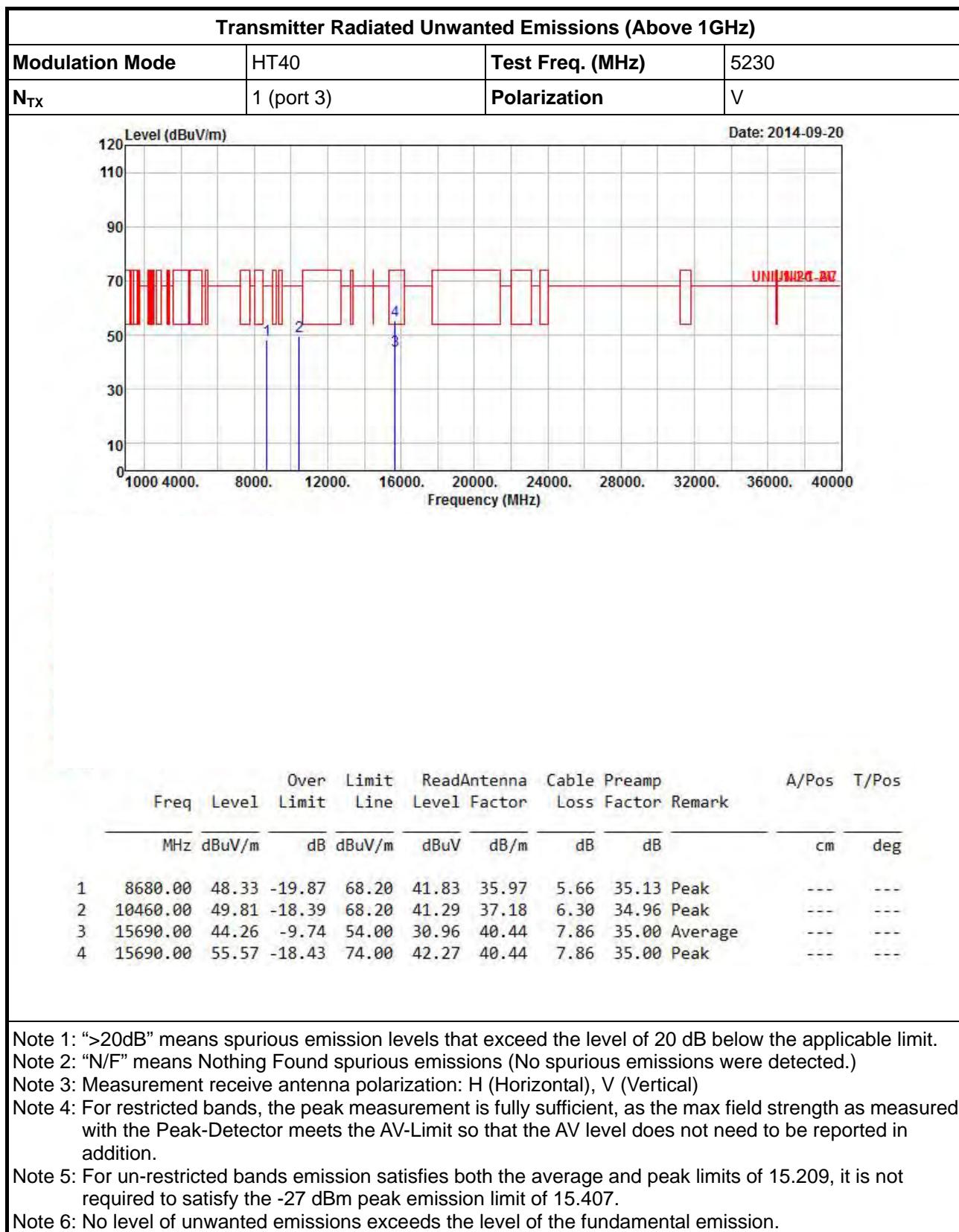


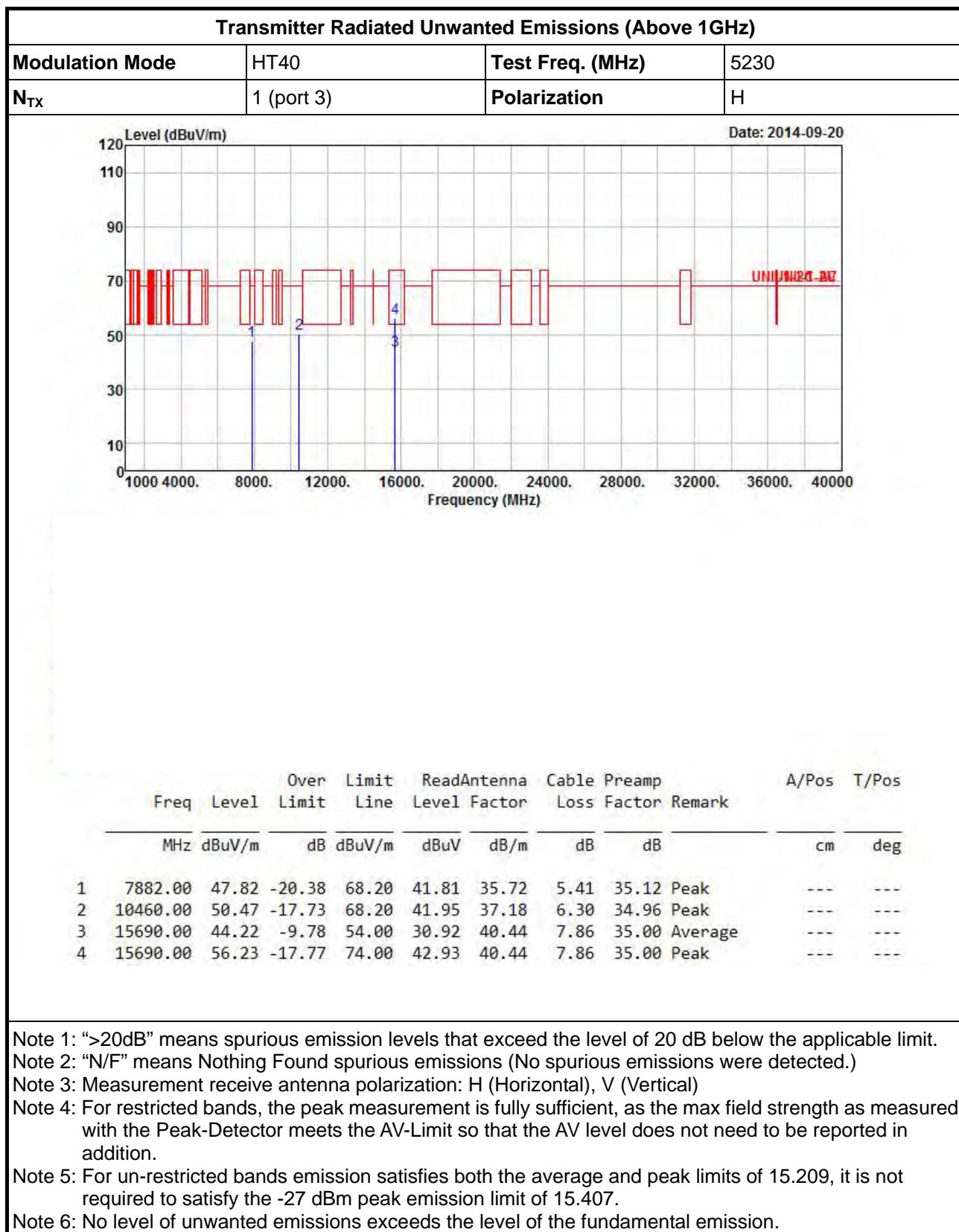


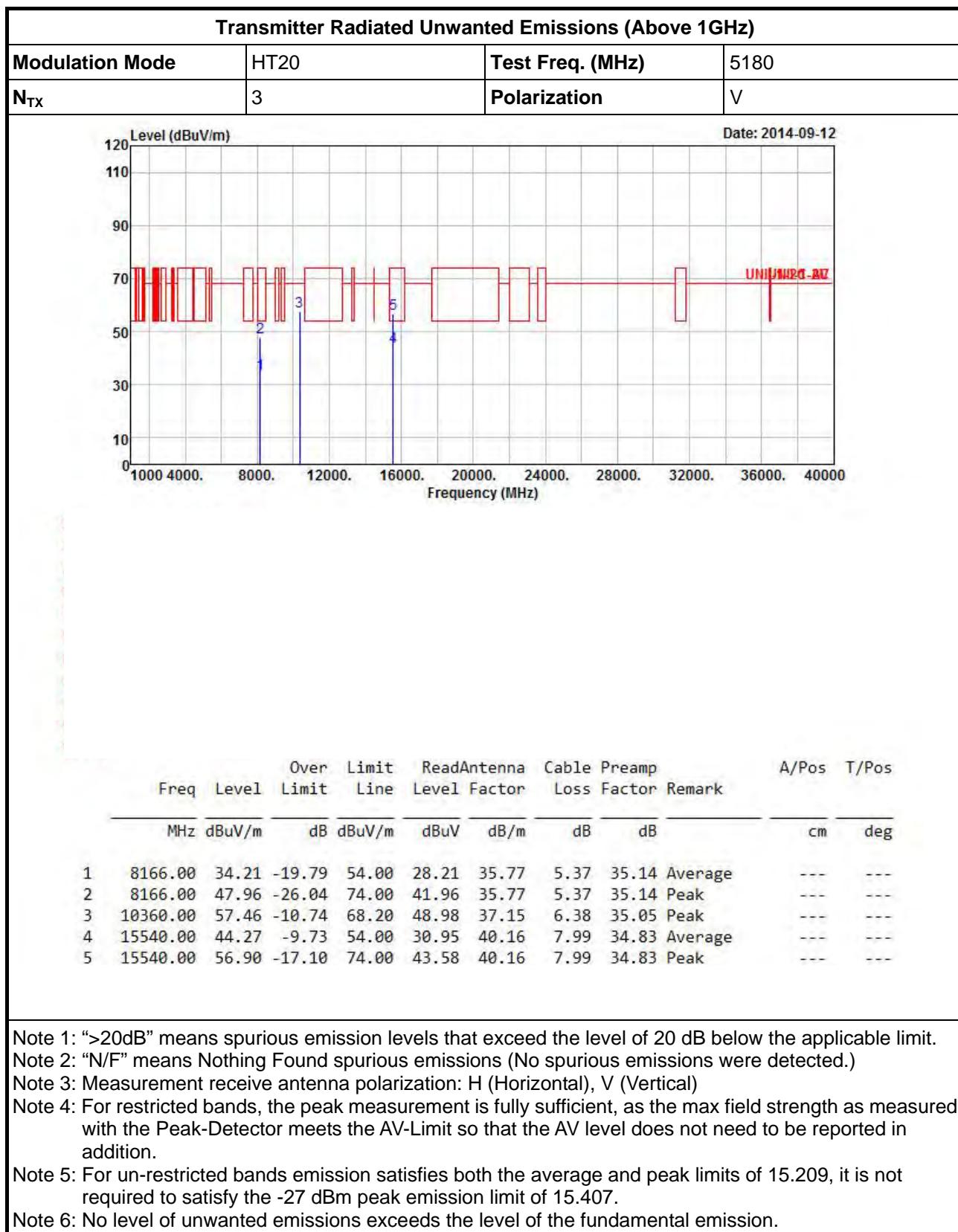


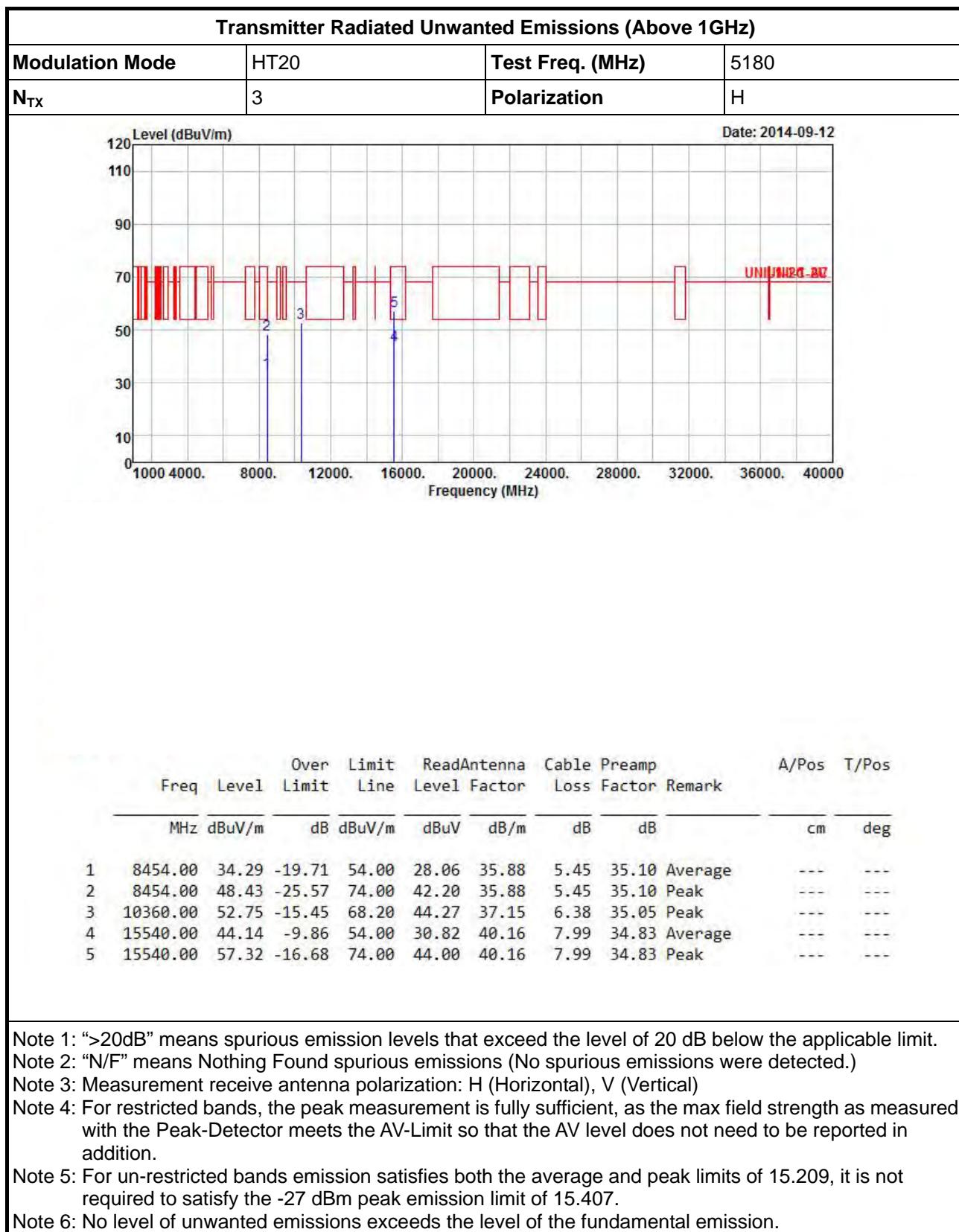


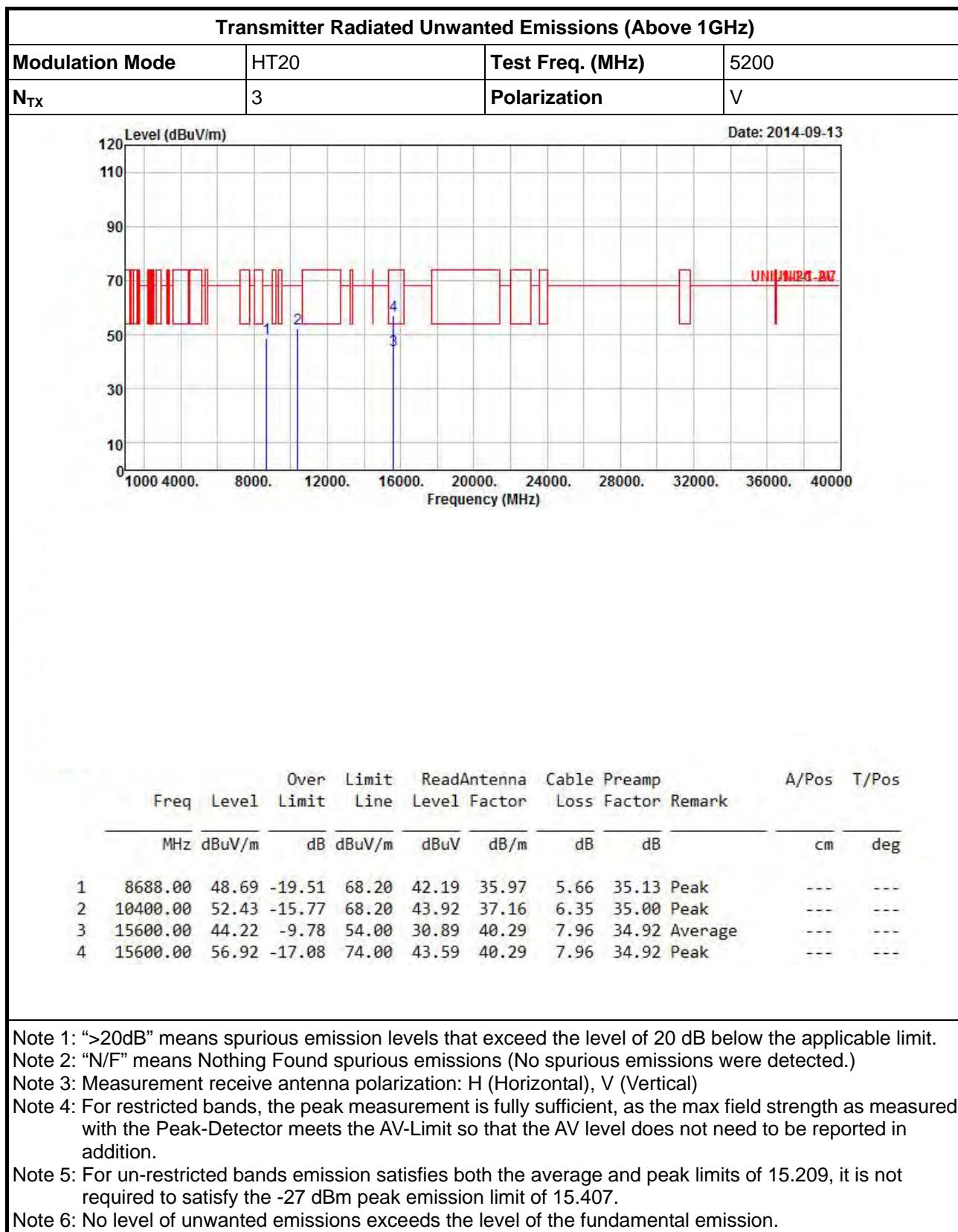


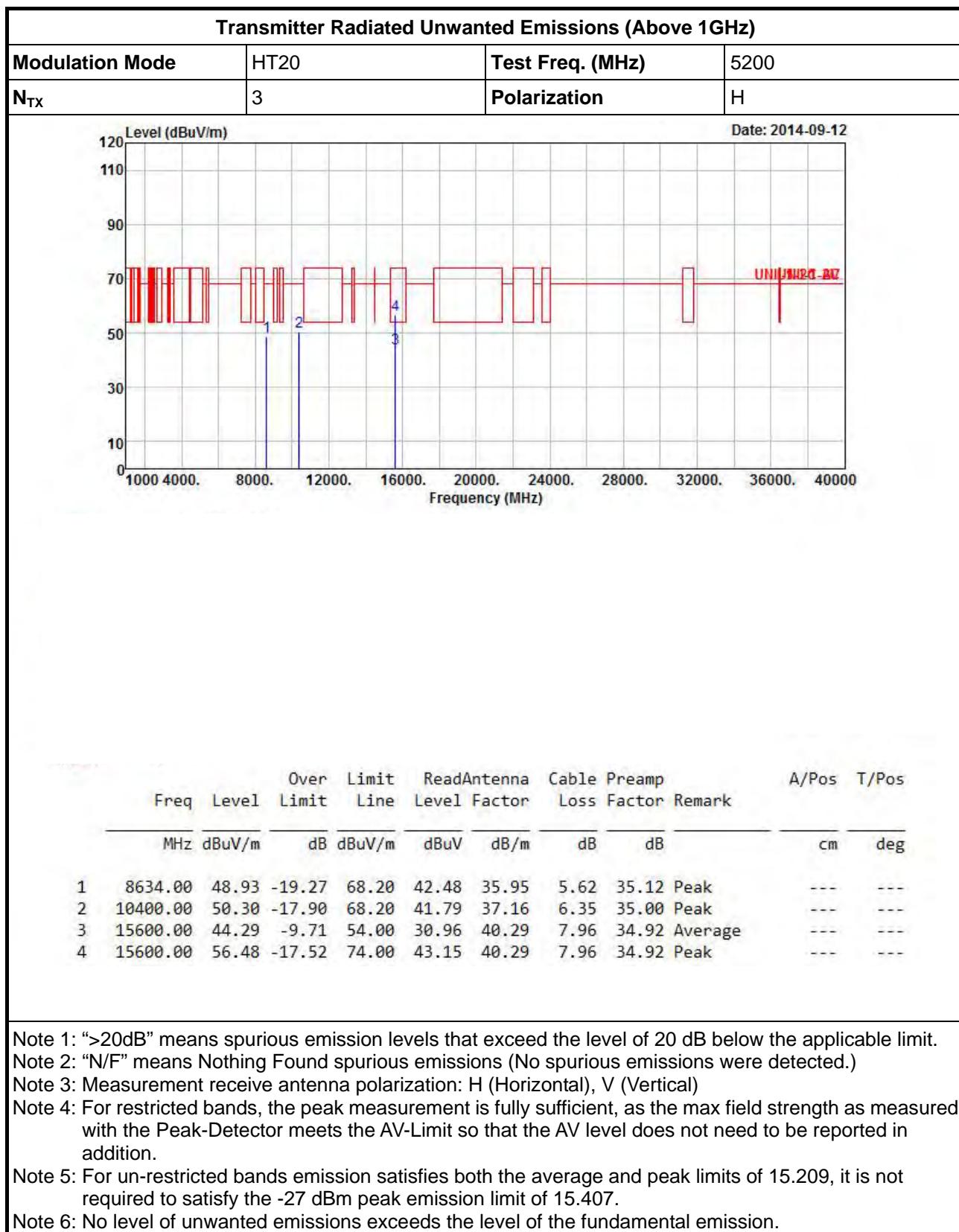


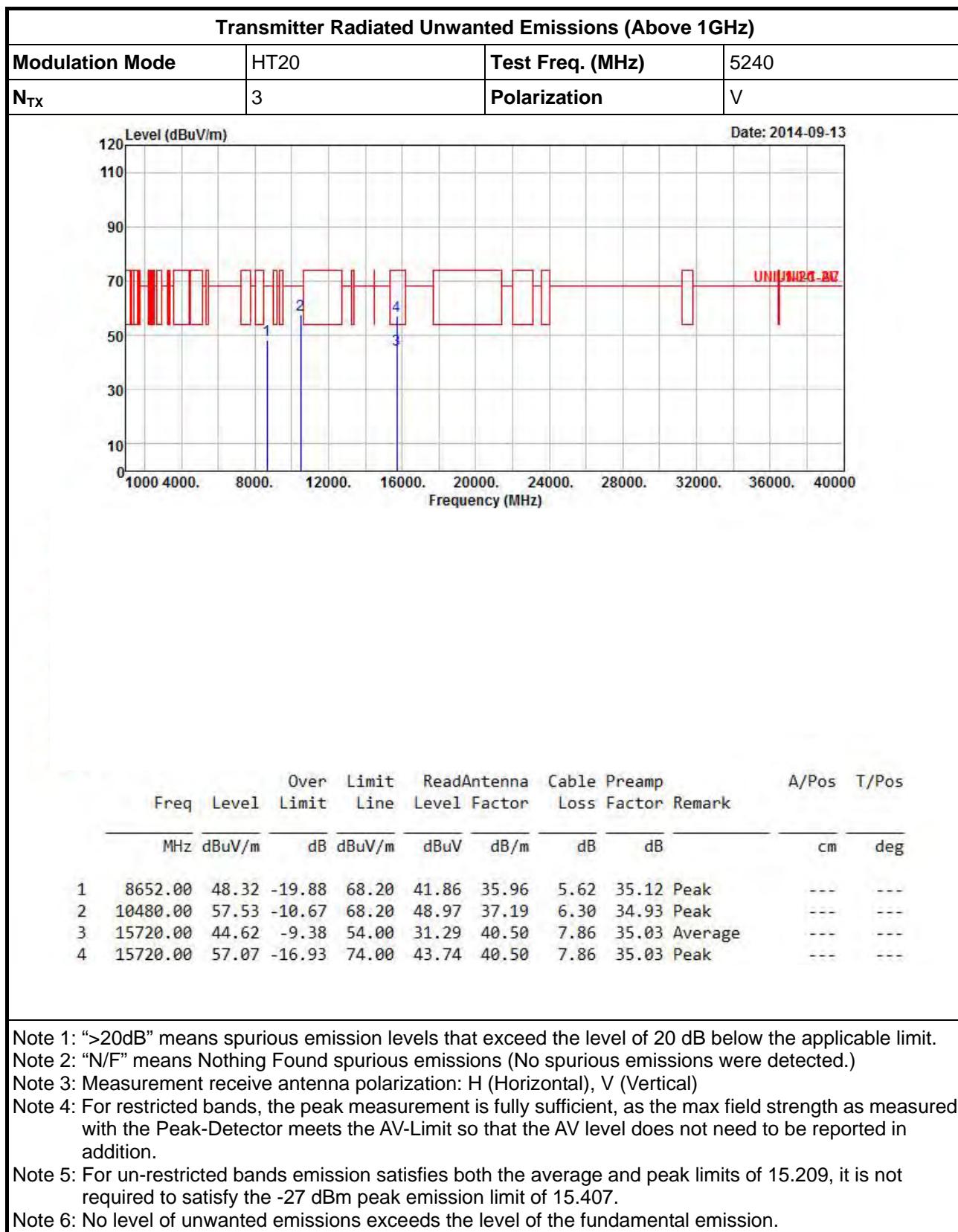


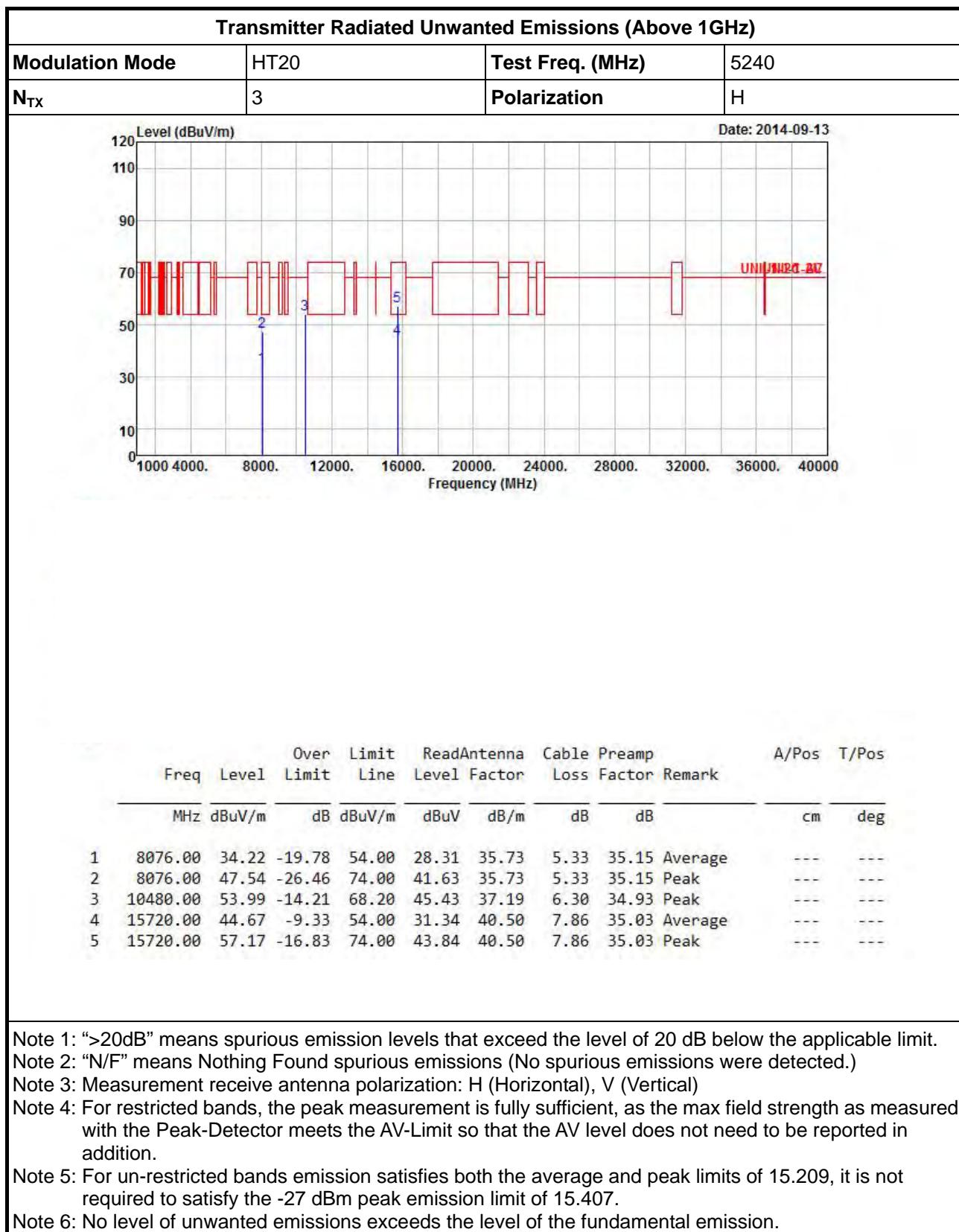


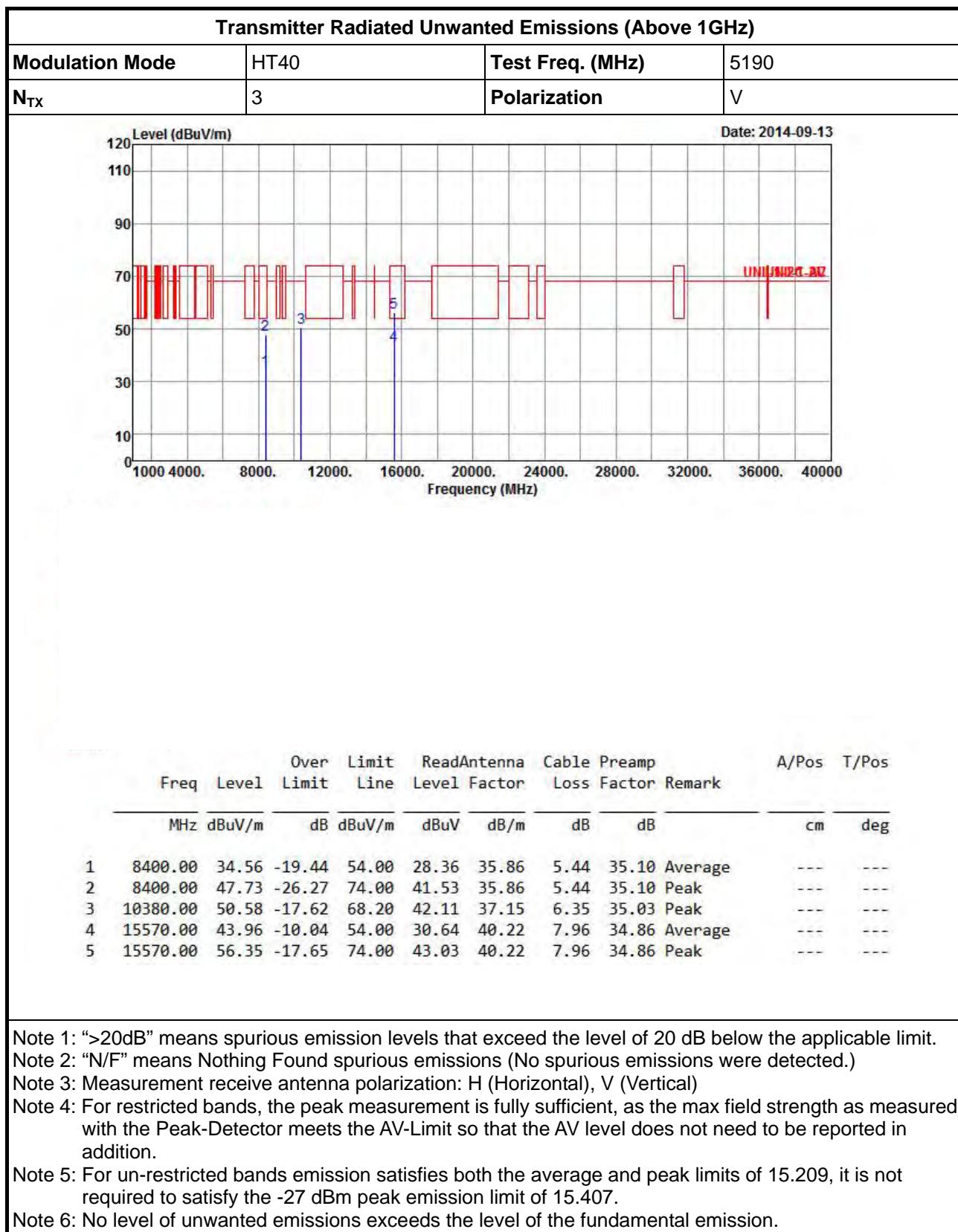


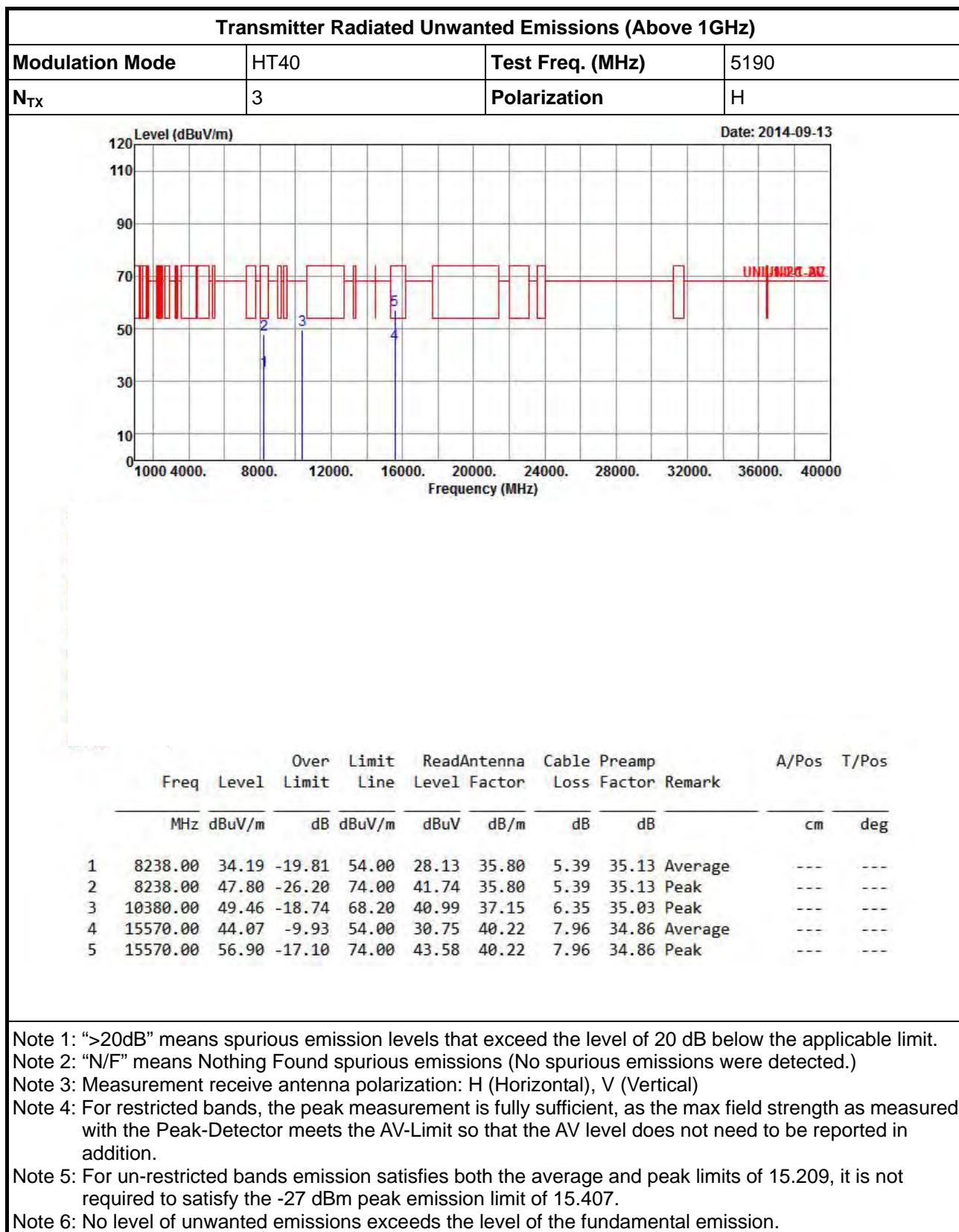


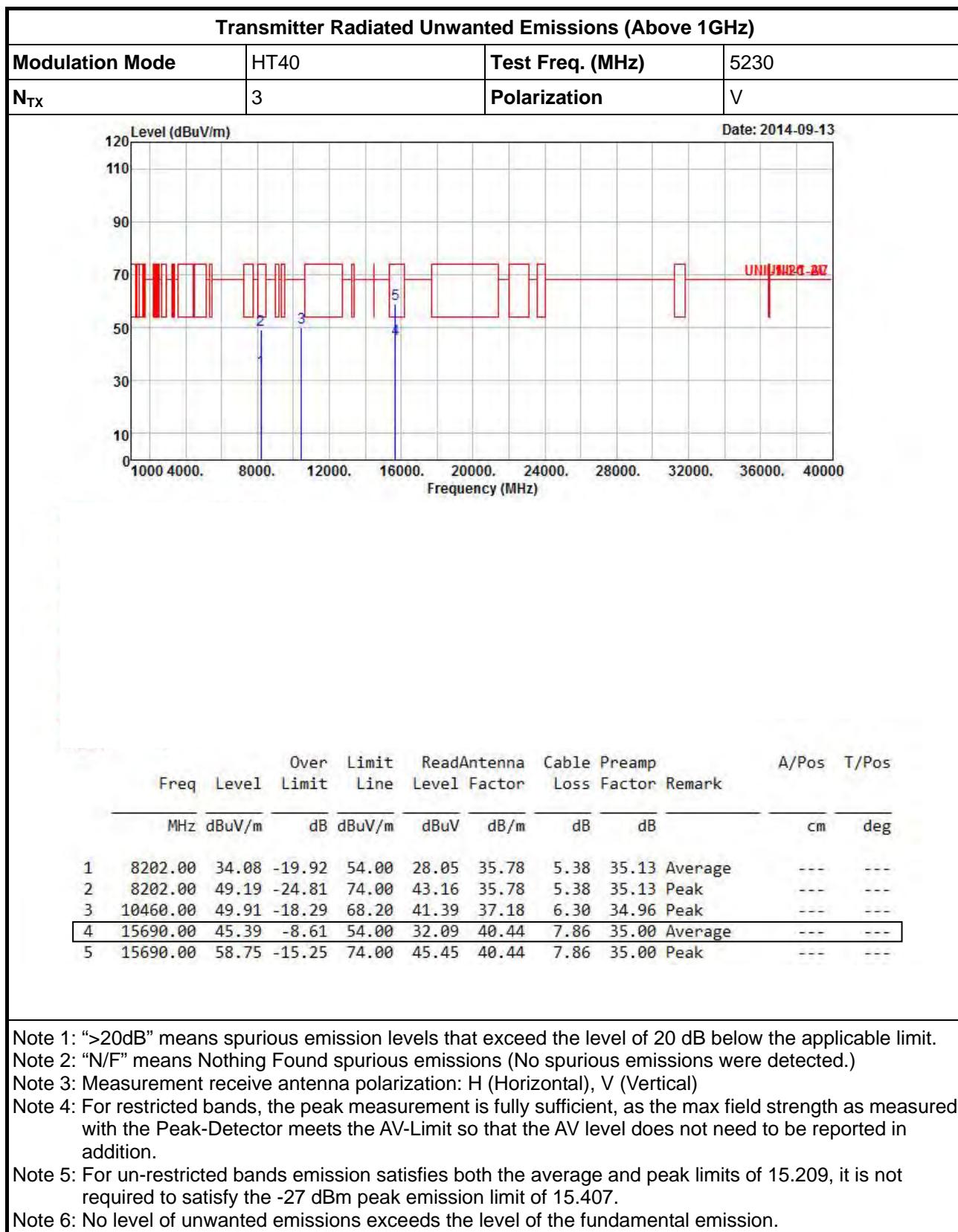


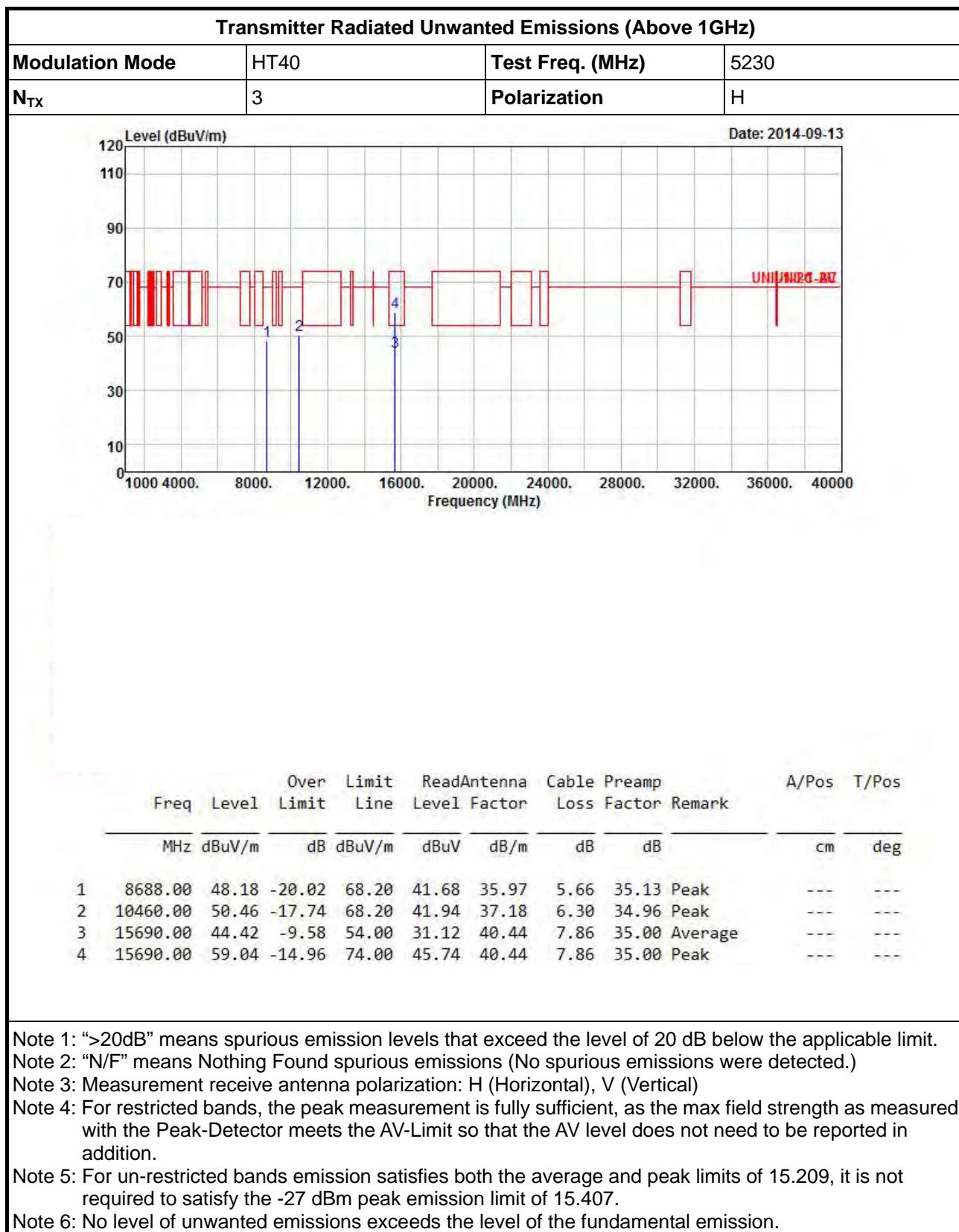






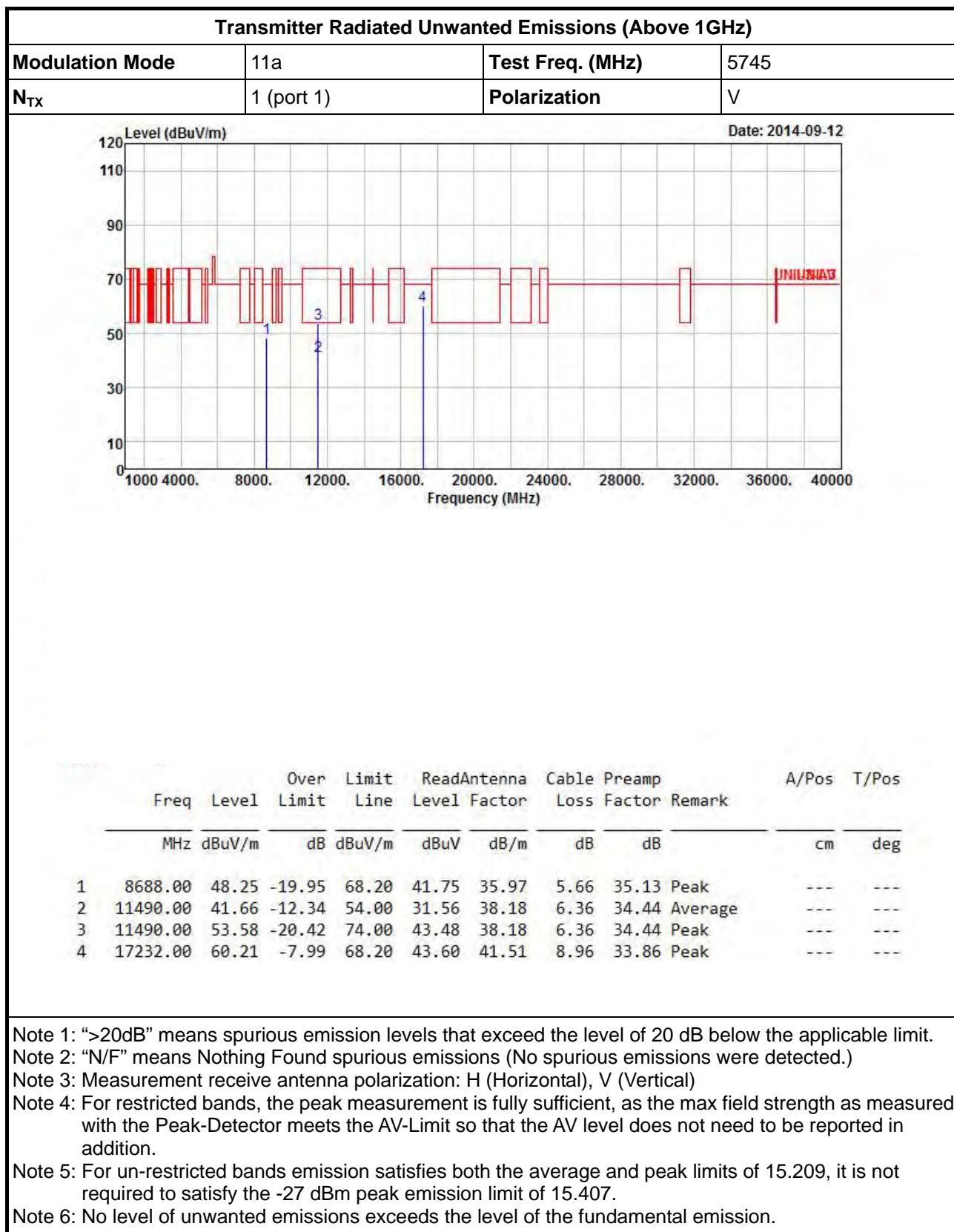








## 3.6.8 Transmitter Radiated Unwanted Emissions (Above 1GHz) for 5725-5850MHz



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 5: For un-restricted bands emission satisfies both the average and peak limits of 15.209, it is not required to satisfy the -27 dBm peak emission limit of 15.407.

Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.



## Transmitter Radiated Unwanted Emissions (Above 1GHz)

Modulation Mode	11a	Test Freq. (MHz)	5745																															
N <sub>TX</sub>	1 (port 1)	Polarization	H																															
			Date: 2014-09-12																															
<table border="1"> <thead> <tr> <th rowspan="2">Freq</th> <th rowspan="2">Level</th> <th>Over</th> <th>Limit</th> <th>Read</th> <th>Antenna</th> <th>Cable</th> <th>Preamp</th> <th rowspan="2">A/Pos</th> <th rowspan="2">T/Pos</th> </tr> <tr> <th>Limit</th> <th>Line</th> <th>Level</th> <th>Factor</th> <th>Loss</th> <th>Factor</th> </tr> </thead> <tbody> <tr> <td>MHz</td> <td>dBuV/m</td> <td>dB</td> <td>dBuV/m</td> <td>dBuV</td> <td>dB/m</td> <td>dB</td> <td>dB</td> <td>cm</td> <td>deg</td> </tr> </tbody> </table>									Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	A/Pos	T/Pos	Limit	Line	Level	Factor	Loss	Factor	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	A/Pos			T/Pos																							
		Limit	Line	Level	Factor	Loss	Factor																											
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg																									
1	7590.00	35.20	-18.80	54.00	28.80	35.78	5.64	35.02	Average																									
2	7590.00	48.76	-25.24	74.00	42.36	35.78	5.64	35.02	Peak																									
3	11490.00	41.61	-12.39	54.00	31.51	38.18	6.36	34.44	Average																									
4	11490.00	51.15	-22.85	74.00	41.05	38.18	6.36	34.44	Peak																									
5	17235.00	59.77	-8.43	68.20	43.16	41.51	8.96	33.86	Peak																									

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

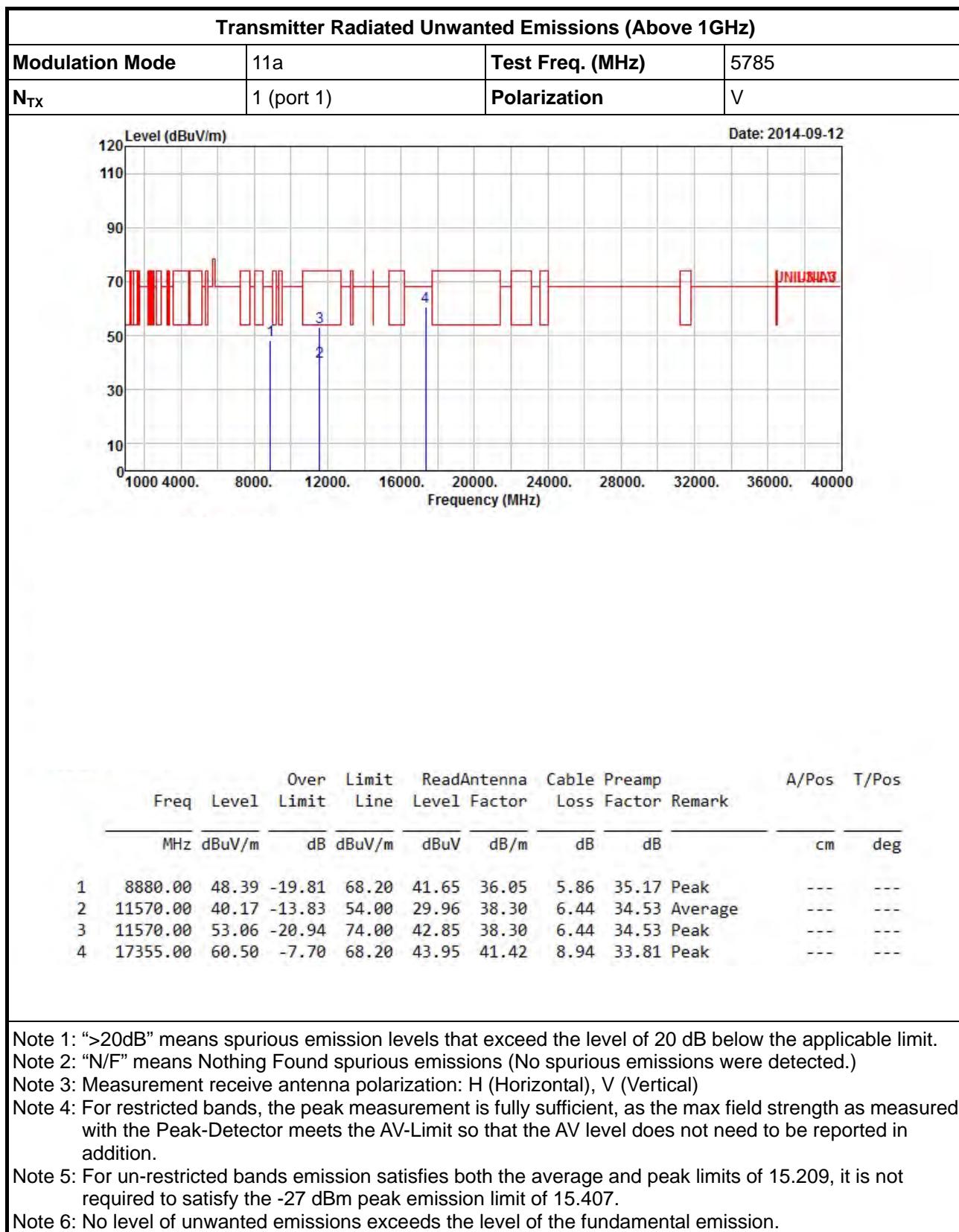
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

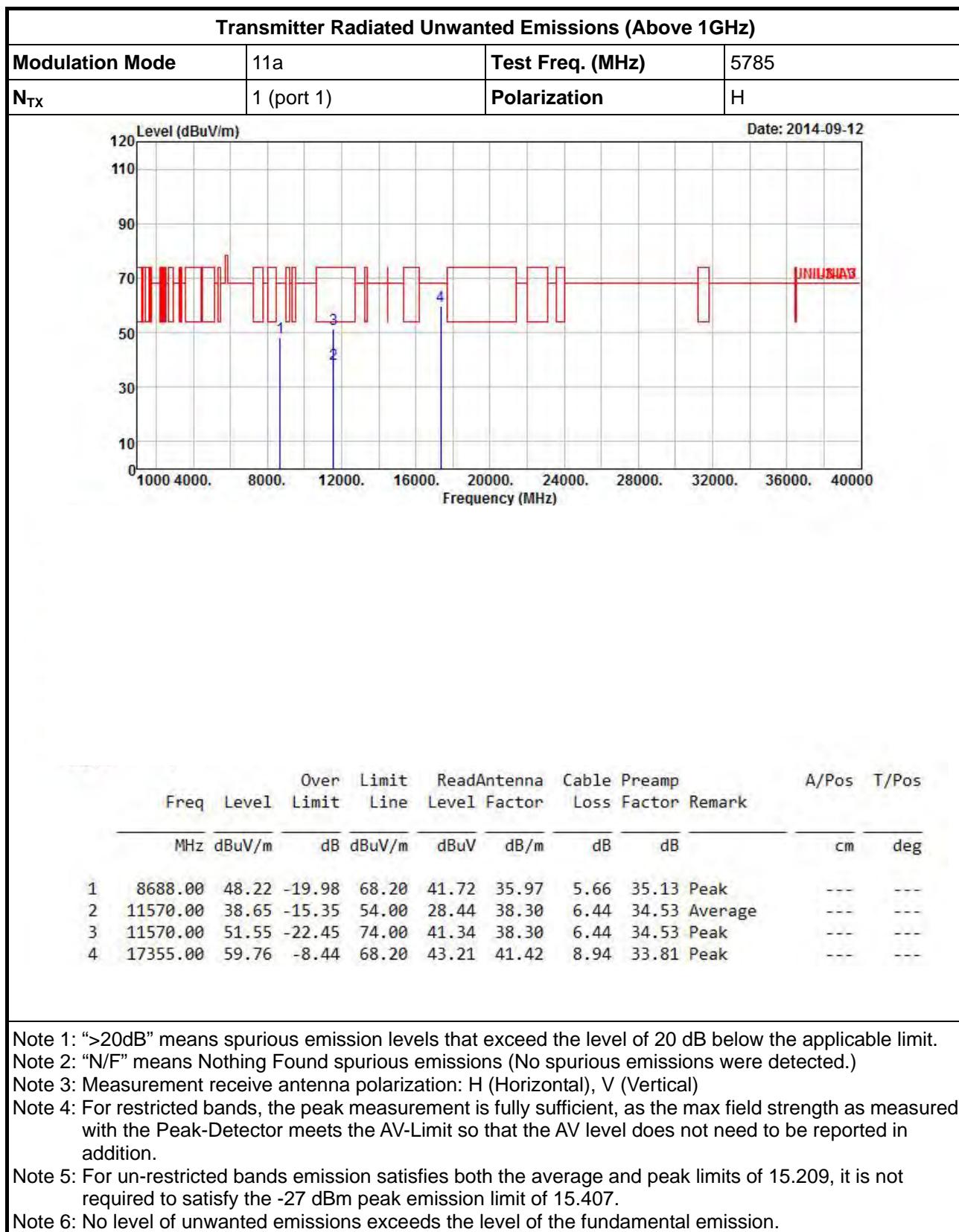
Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

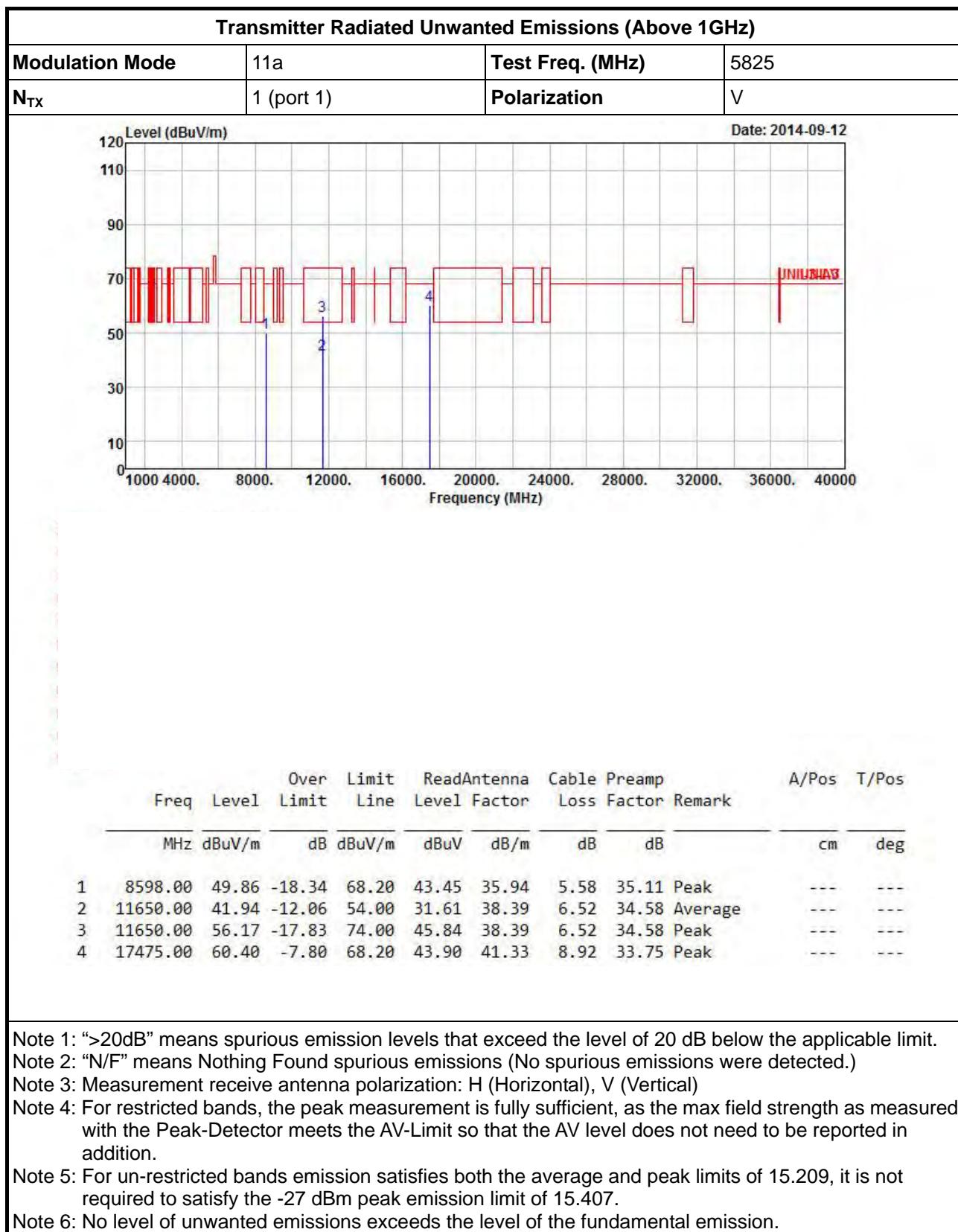
Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.

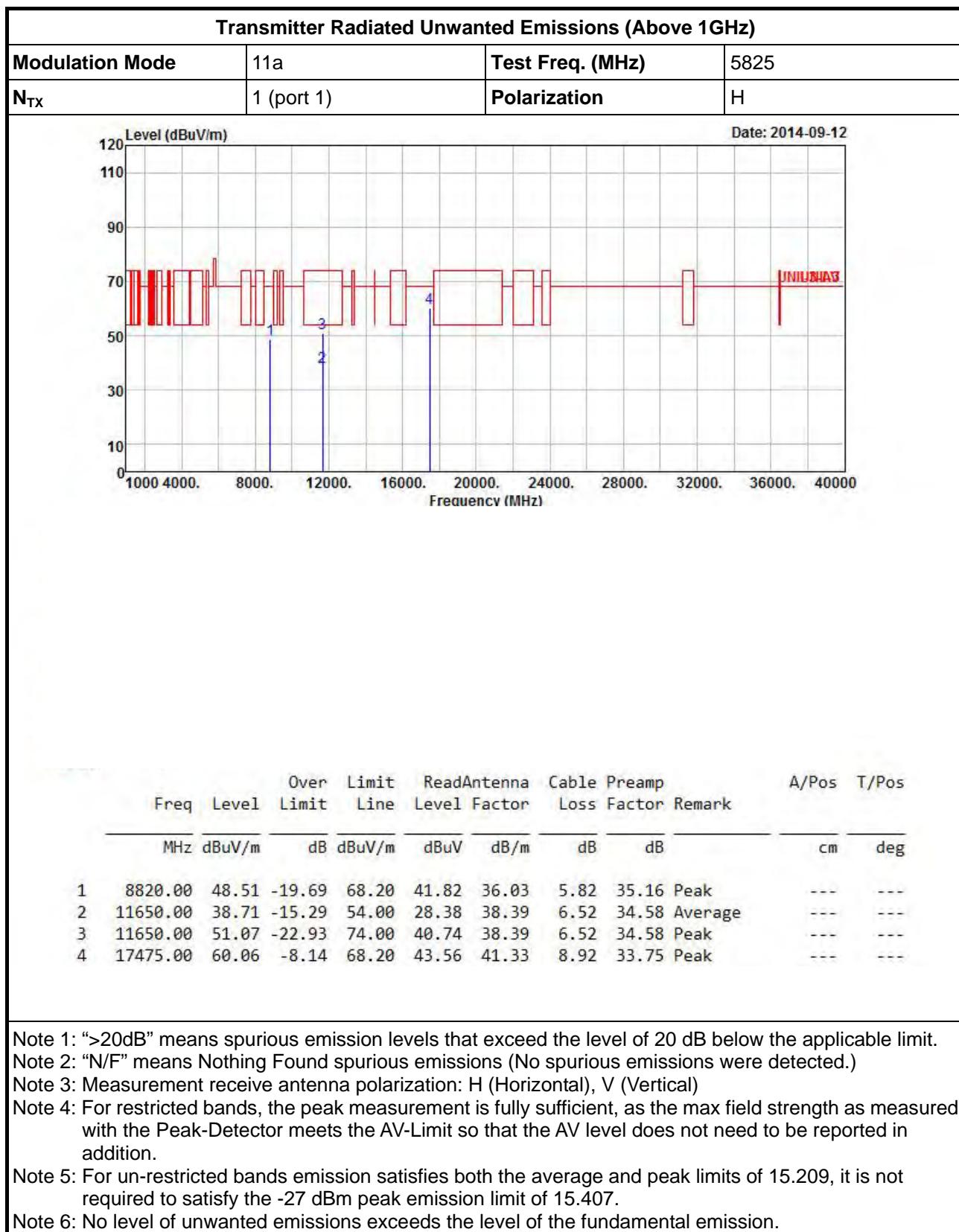
Note 5: For un-restricted bands emission satisfies both the average and peak limits of 15.209, it is not required to satisfy the -27 dBm peak emission limit of 15.407.

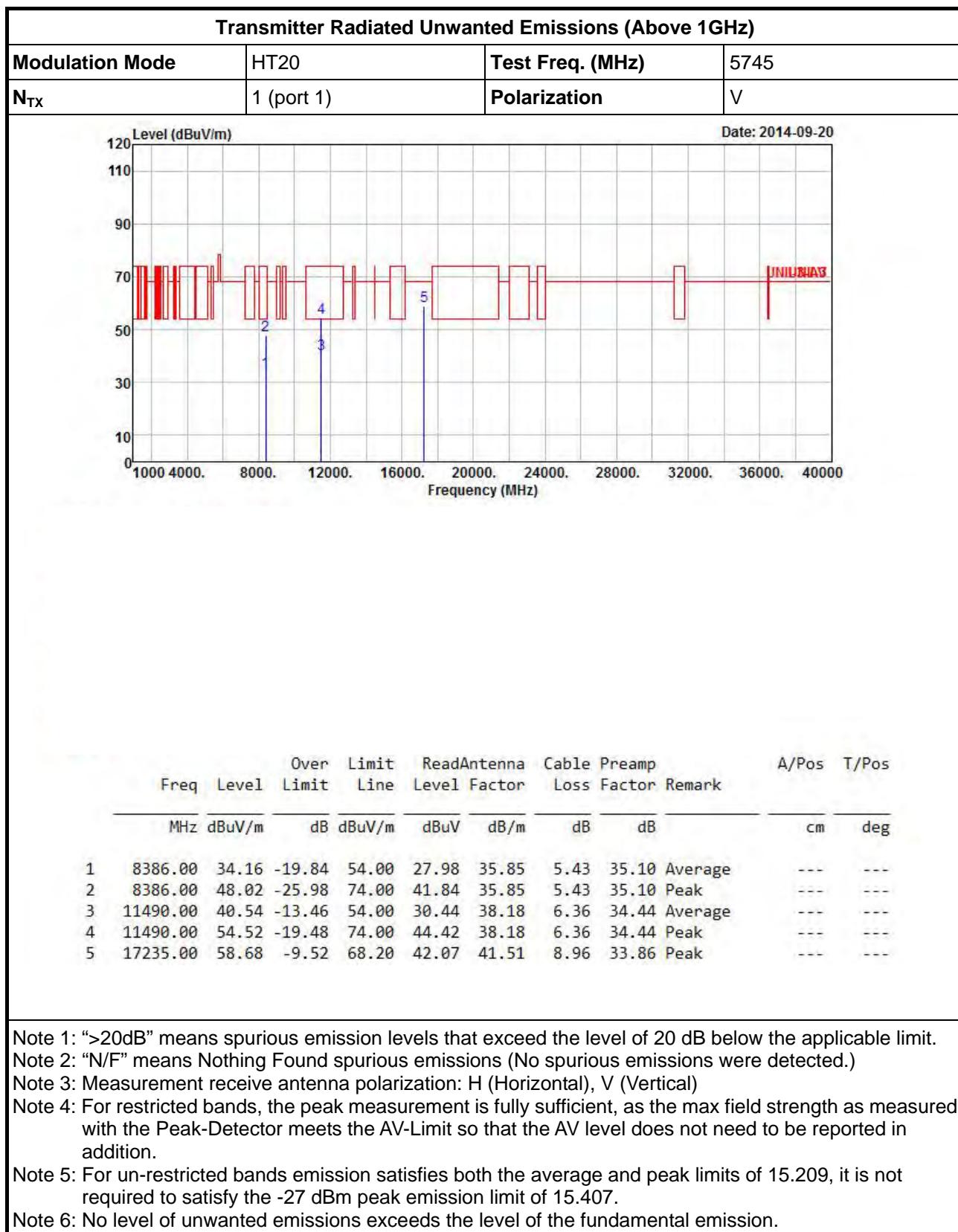
Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.

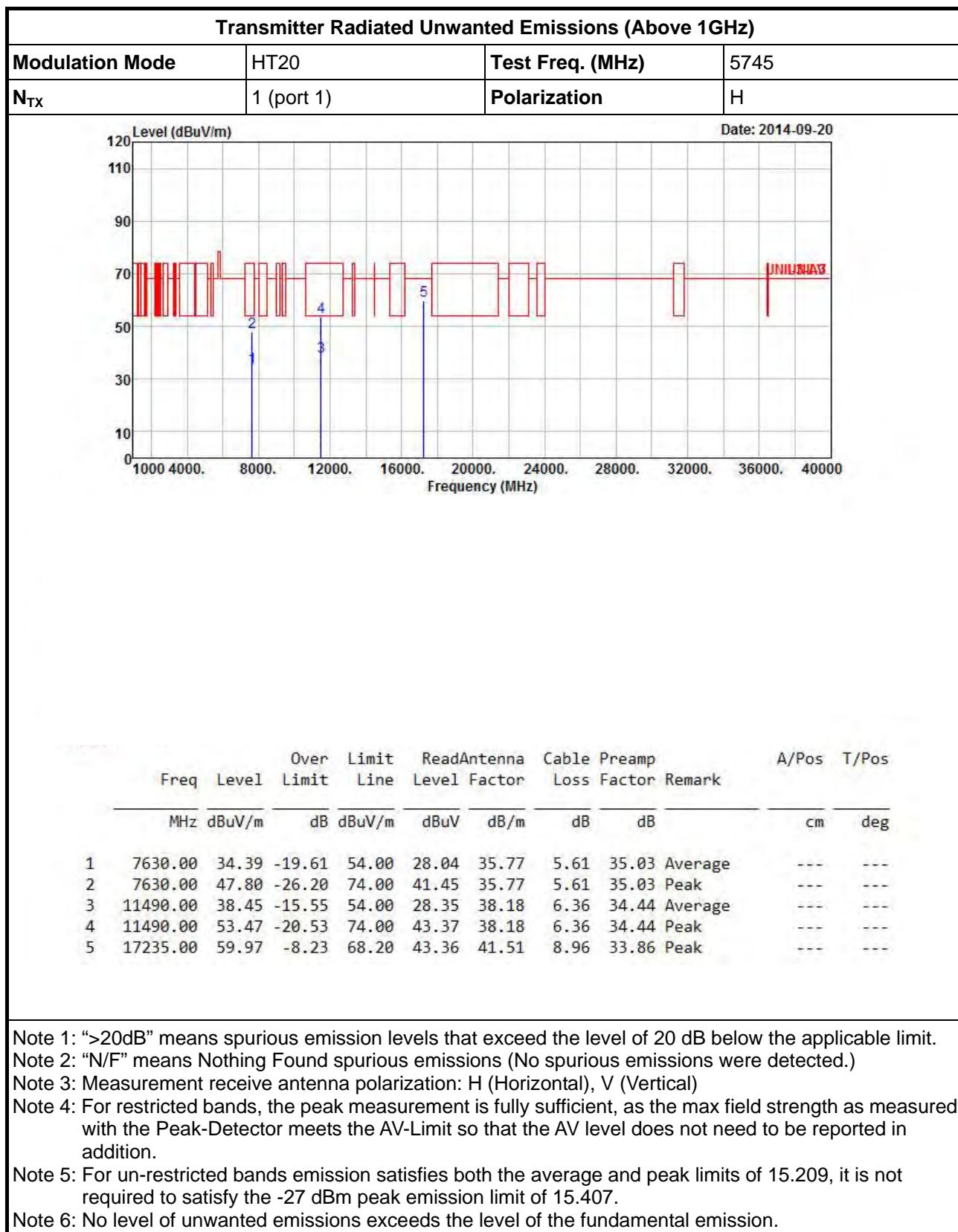












Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

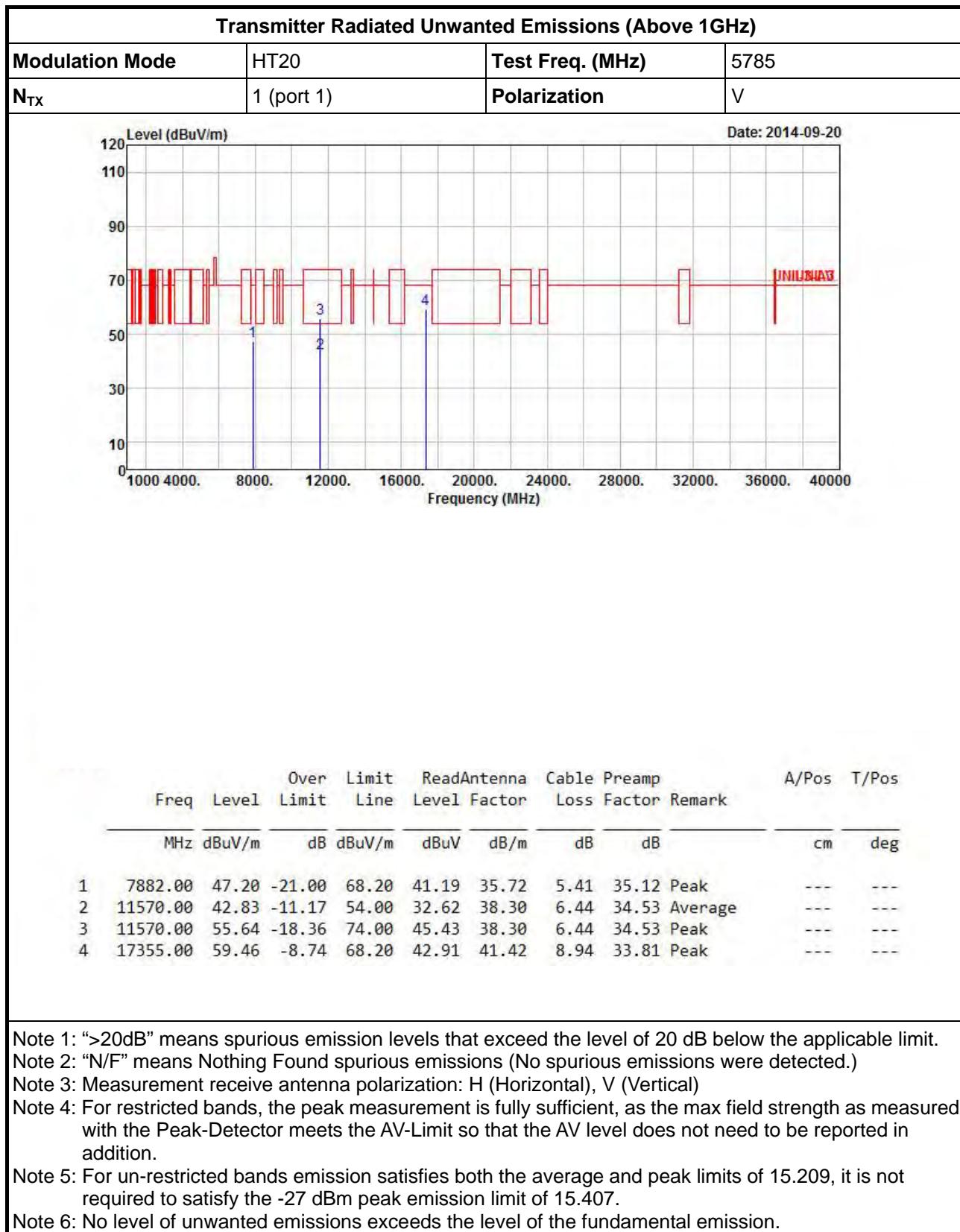
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

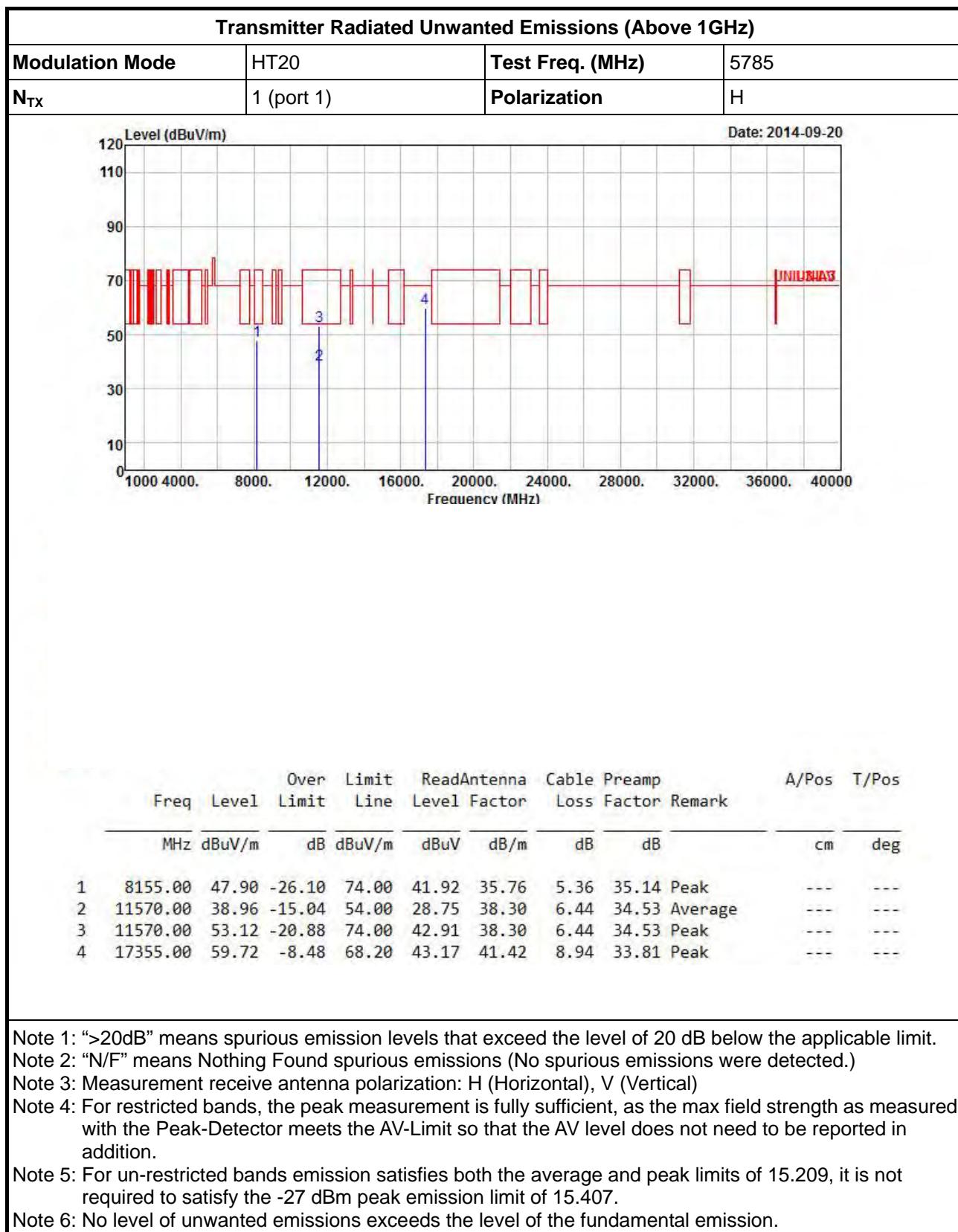
Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

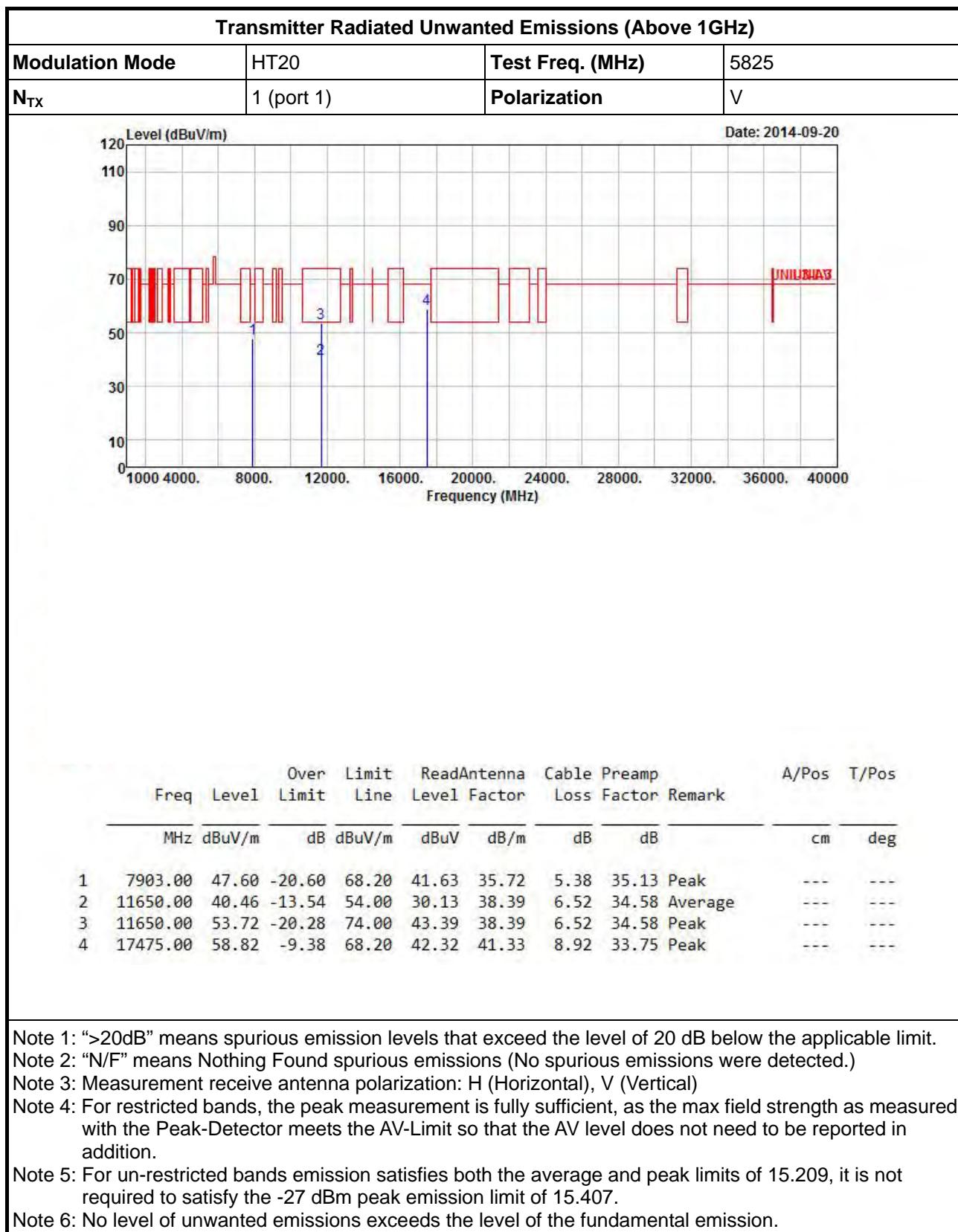
Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.

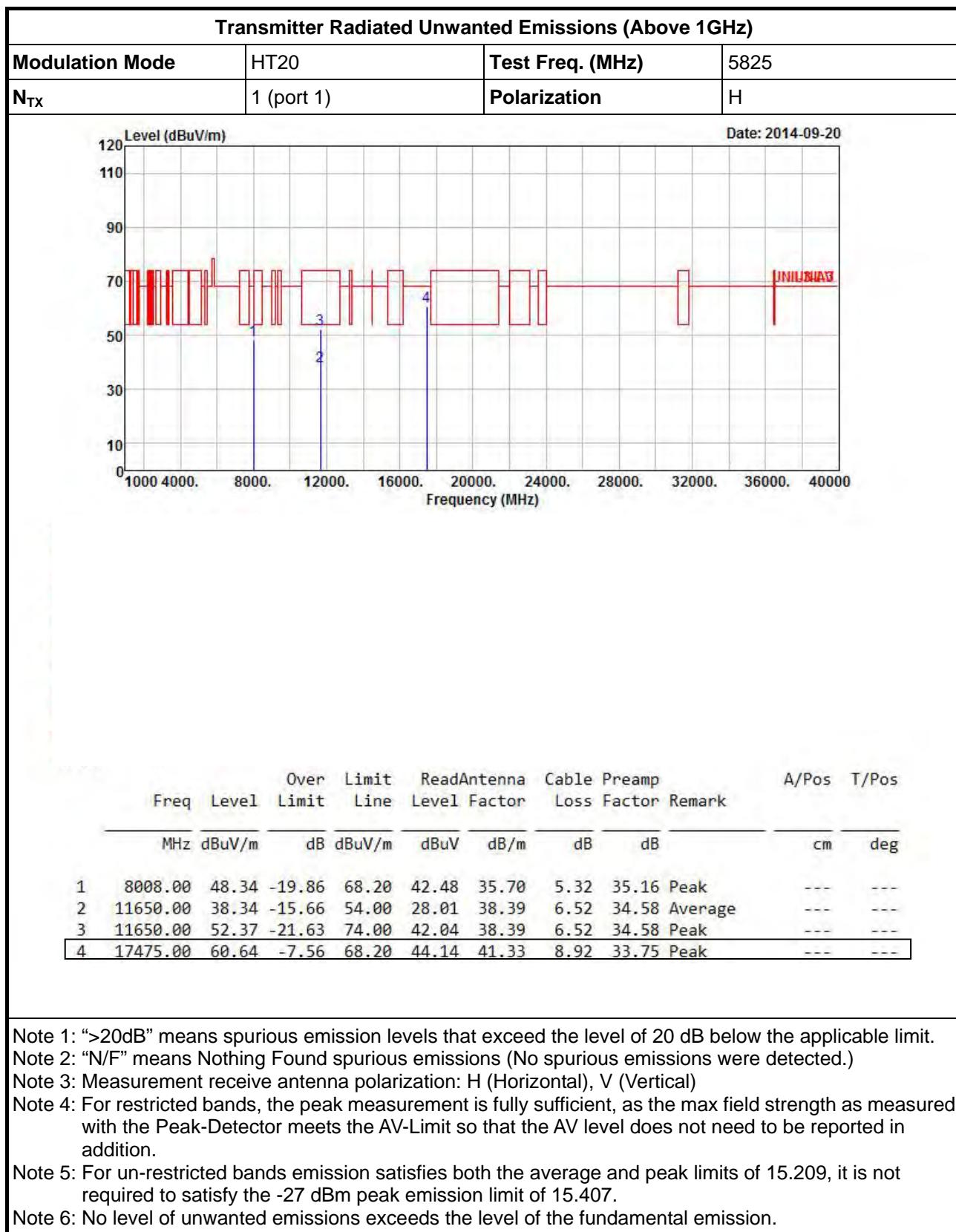
Note 5: For un-restricted bands emission satisfies both the average and peak limits of 15.209, it is not required to satisfy the -27 dBm peak emission limit of 15.407.

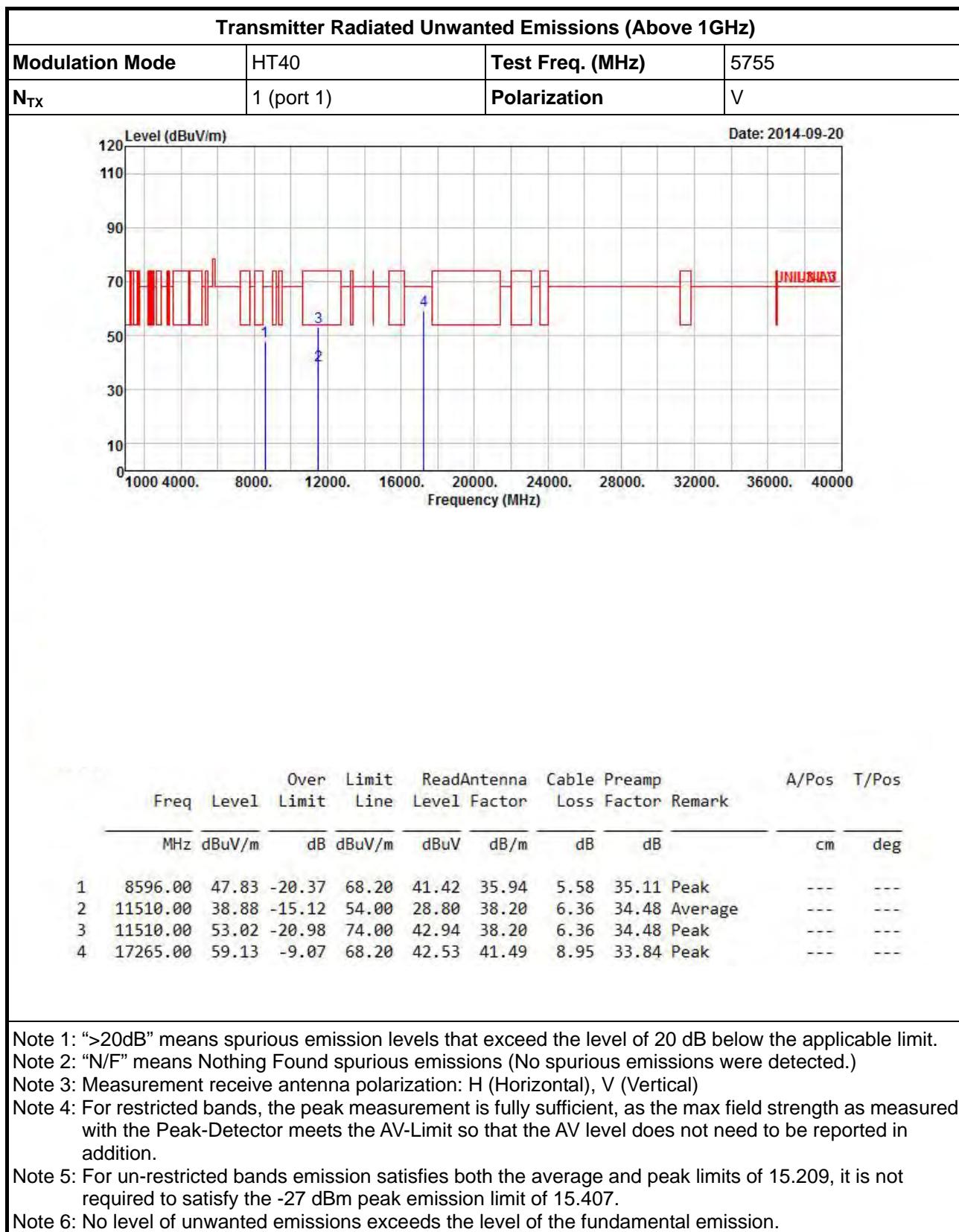
Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.











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

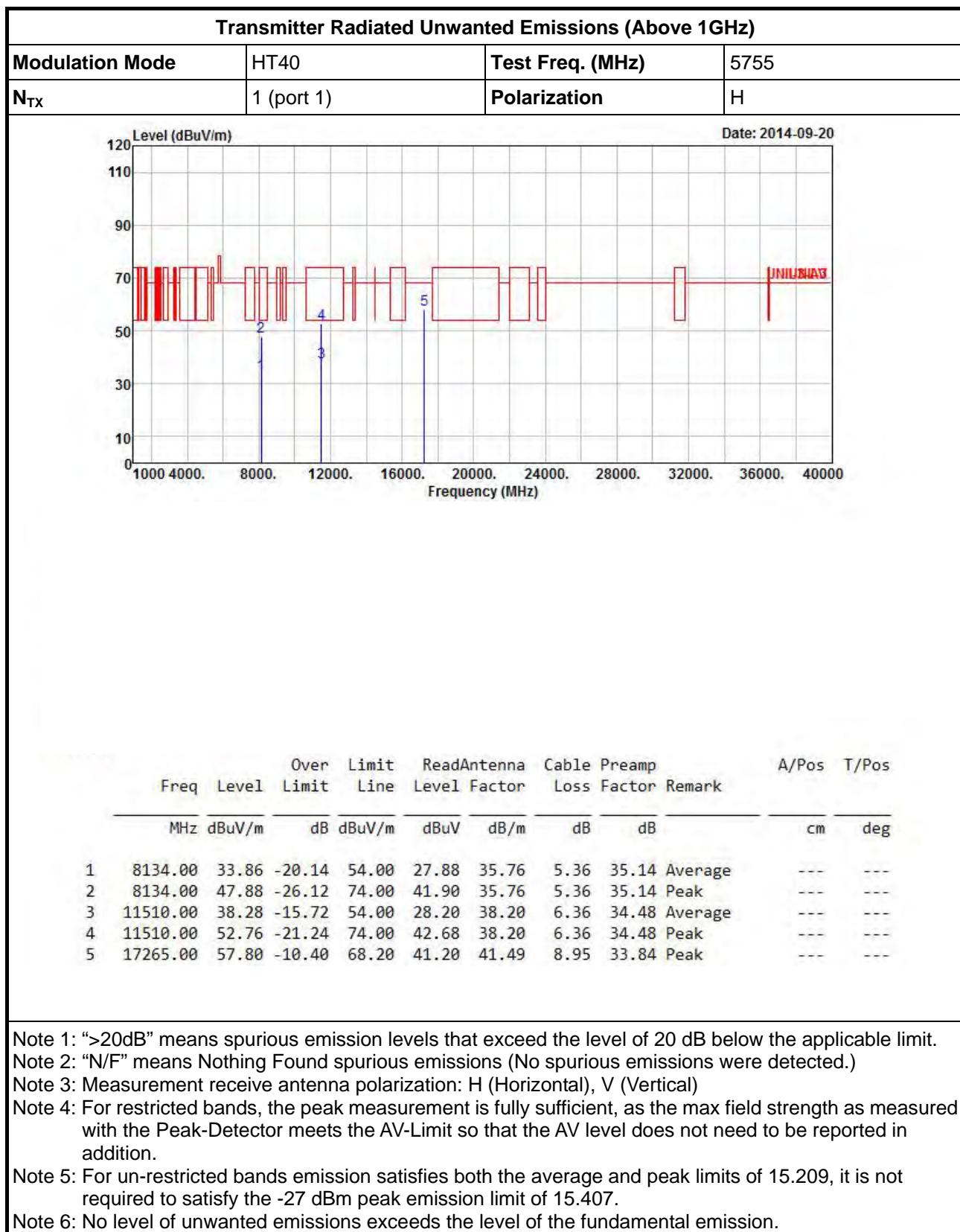
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

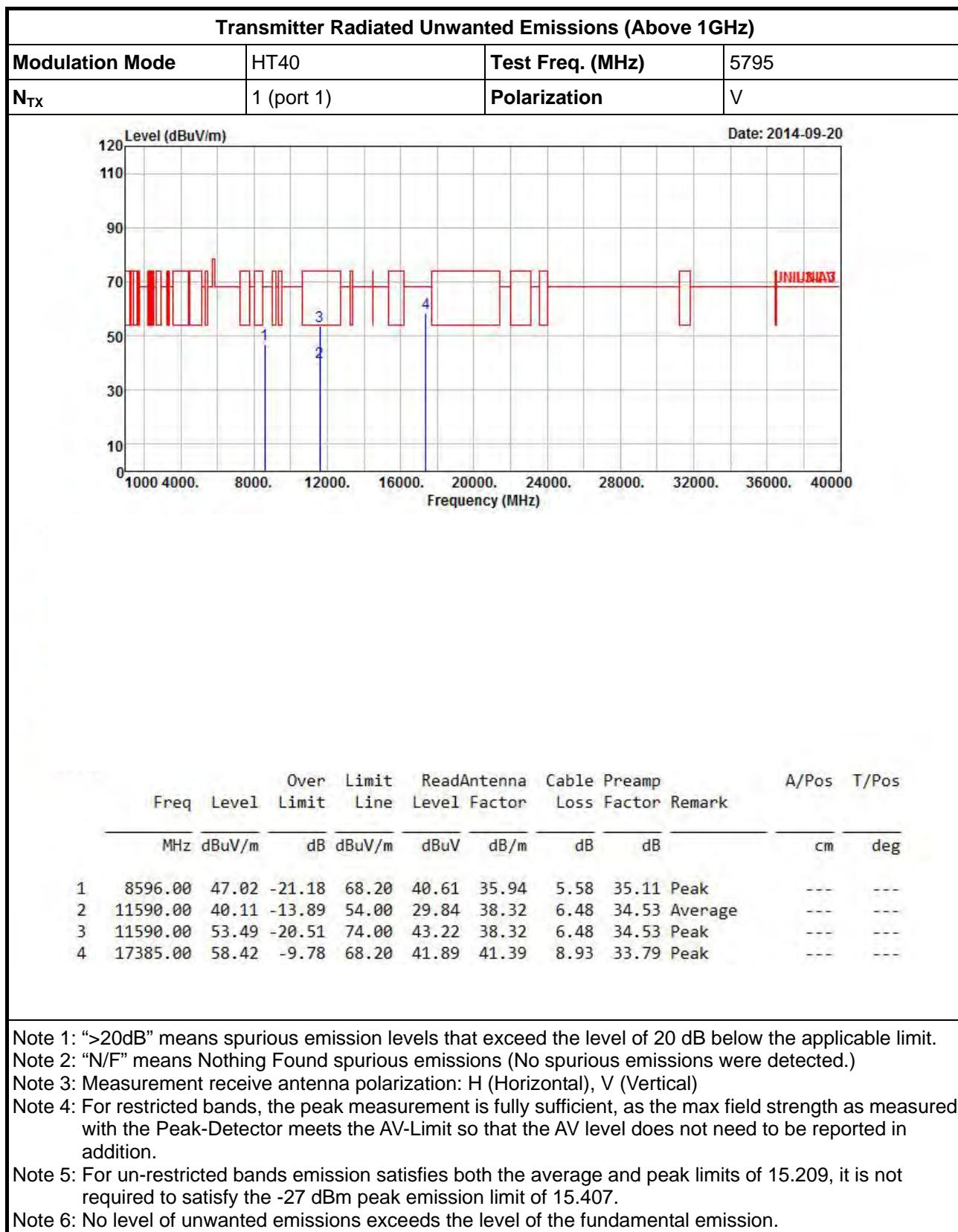
Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

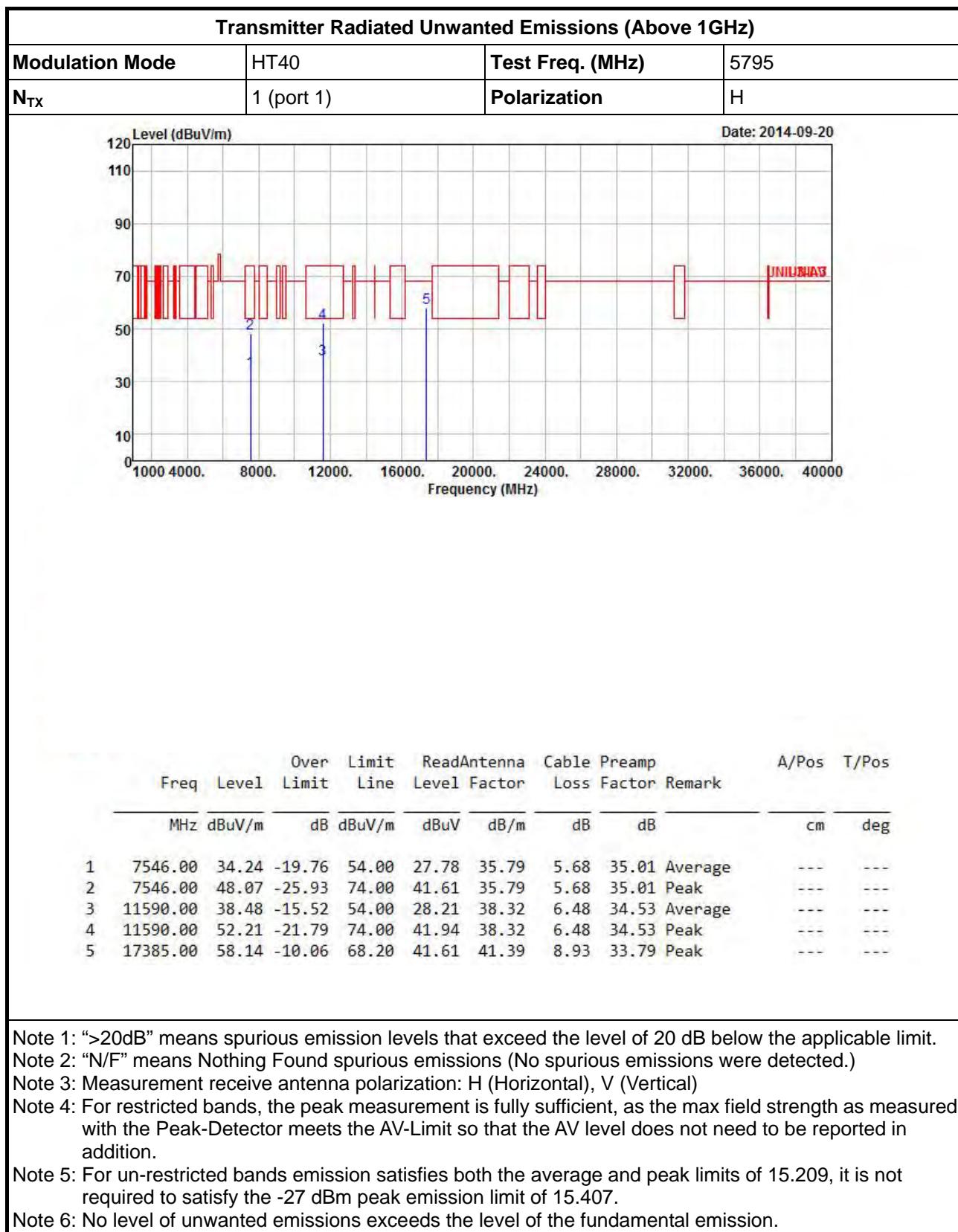
Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.

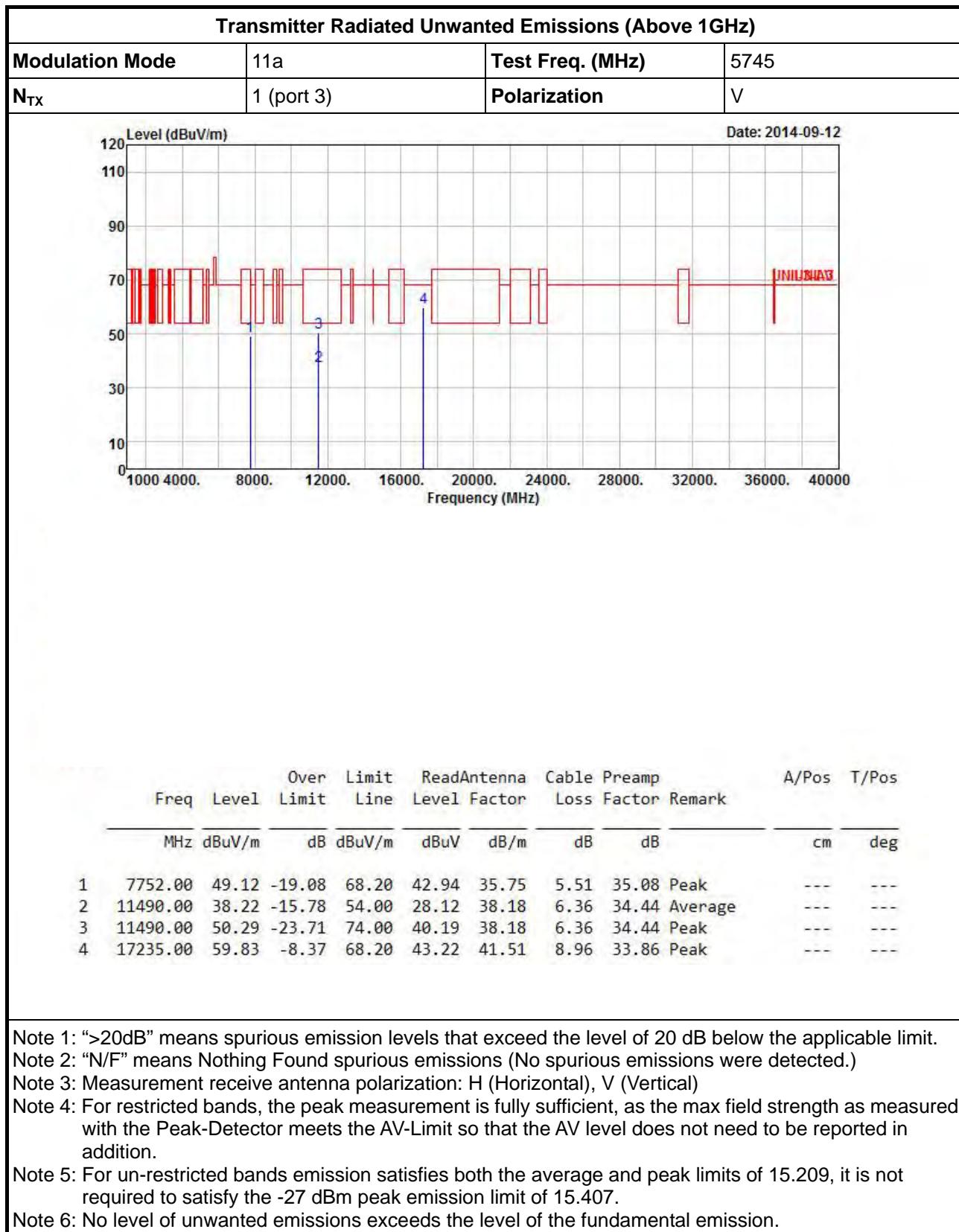
Note 5: For un-restricted bands emission satisfies both the average and peak limits of 15.209, it is not required to satisfy the -27 dBm peak emission limit of 15.407.

Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.









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 5: For un-restricted bands emission satisfies both the average and peak limits of 15.209, it is not required to satisfy the -27 dBm peak emission limit of 15.407.

Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.



## Transmitter Radiated Unwanted Emissions (Above 1GHz)

Modulation Mode	11a	Test Freq. (MHz)	5745																																		
N <sub>TX</sub>	1 (port 3)	Polarization	H																																		
Level (dB <sub>u</sub> V/m)			Date: 2014-09-12																																		
<table border="1"> <thead> <tr> <th rowspan="2">Freq</th> <th rowspan="2">Level</th> <th>Over</th> <th>Limit</th> <th>Read</th> <th>Antenna</th> <th>Cable</th> <th>Preamp</th> <th>A/Pos</th> <th>T/Pos</th> </tr> <tr> <th>Limit</th> <th>Line</th> <th>Level</th> <th>Factor</th> <th>Loss</th> <th>Factor</th> <th>Remark</th> <th></th> <th></th> </tr> </thead> <tbody> <tr> <td>MHz</td> <td>dB<sub>u</sub>V/m</td> <td>dB</td> <td>dB<sub>u</sub>V/m</td> <td>dB<sub>u</sub>V</td> <td>dB/m</td> <td>dB</td> <td>dB</td> <td>cm</td> <td>deg</td> </tr> </tbody> </table>									Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	A/Pos	T/Pos	Limit	Line	Level	Factor	Loss	Factor	Remark			MHz	dB <sub>u</sub> V/m	dB	dB <sub>u</sub> V/m	dB <sub>u</sub> V	dB/m	dB	dB	cm	deg
Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	A/Pos			T/Pos																										
		Limit	Line	Level	Factor	Loss	Factor	Remark																													
MHz	dB <sub>u</sub> V/m	dB	dB <sub>u</sub> V/m	dB <sub>u</sub> V	dB/m	dB	dB	cm	deg																												
1	8532.00	50.37	-17.83	68.20	44.06	35.91	5.50	35.10	Peak																												
2	11490.00	38.39	-15.61	54.00	28.29	38.18	6.36	34.44	Average																												
3	11490.00	50.38	-23.62	74.00	40.28	38.18	6.36	34.44	Peak																												
4	17235.00	59.65	-8.55	68.20	43.04	41.51	8.96	33.86	Peak																												

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

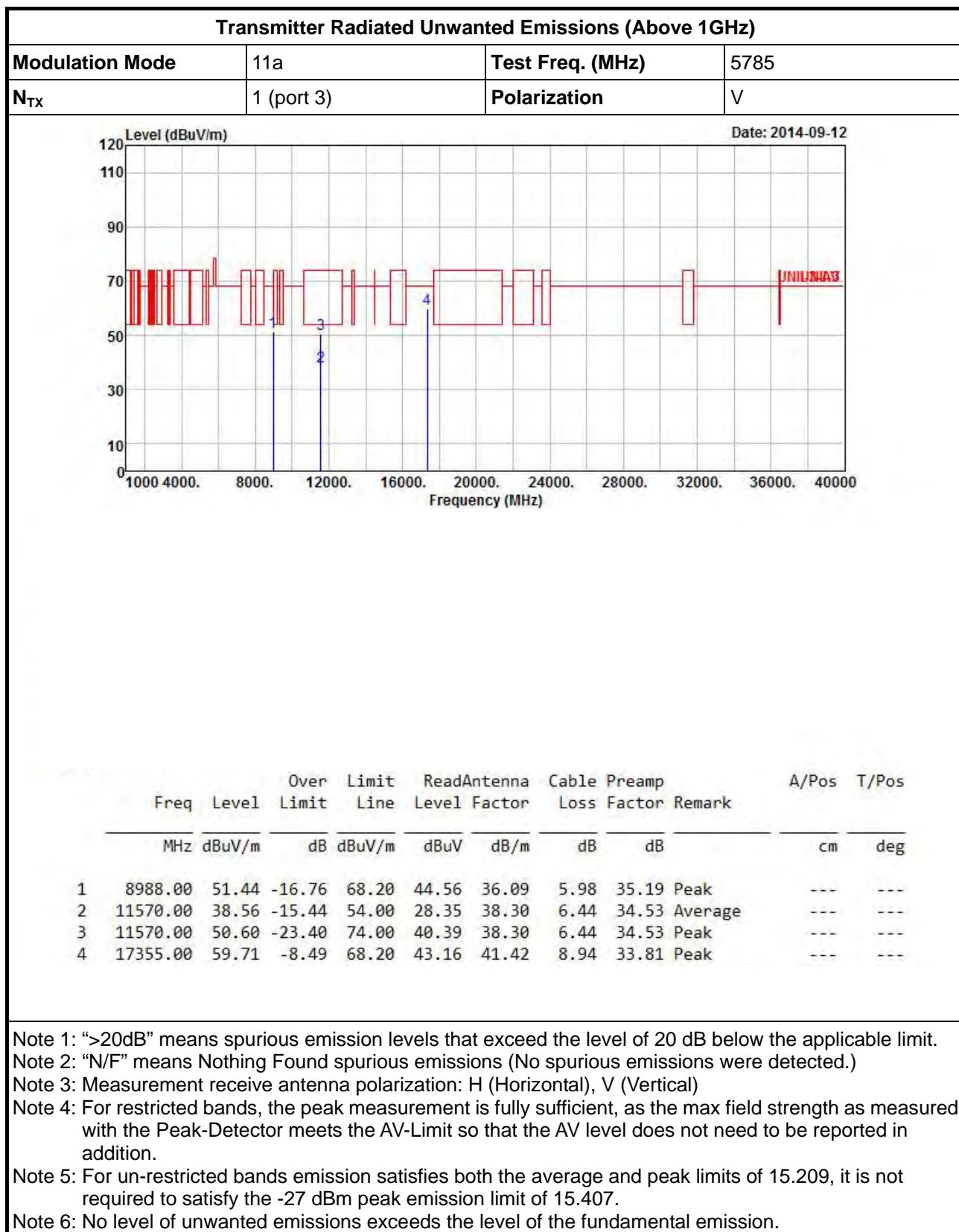
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

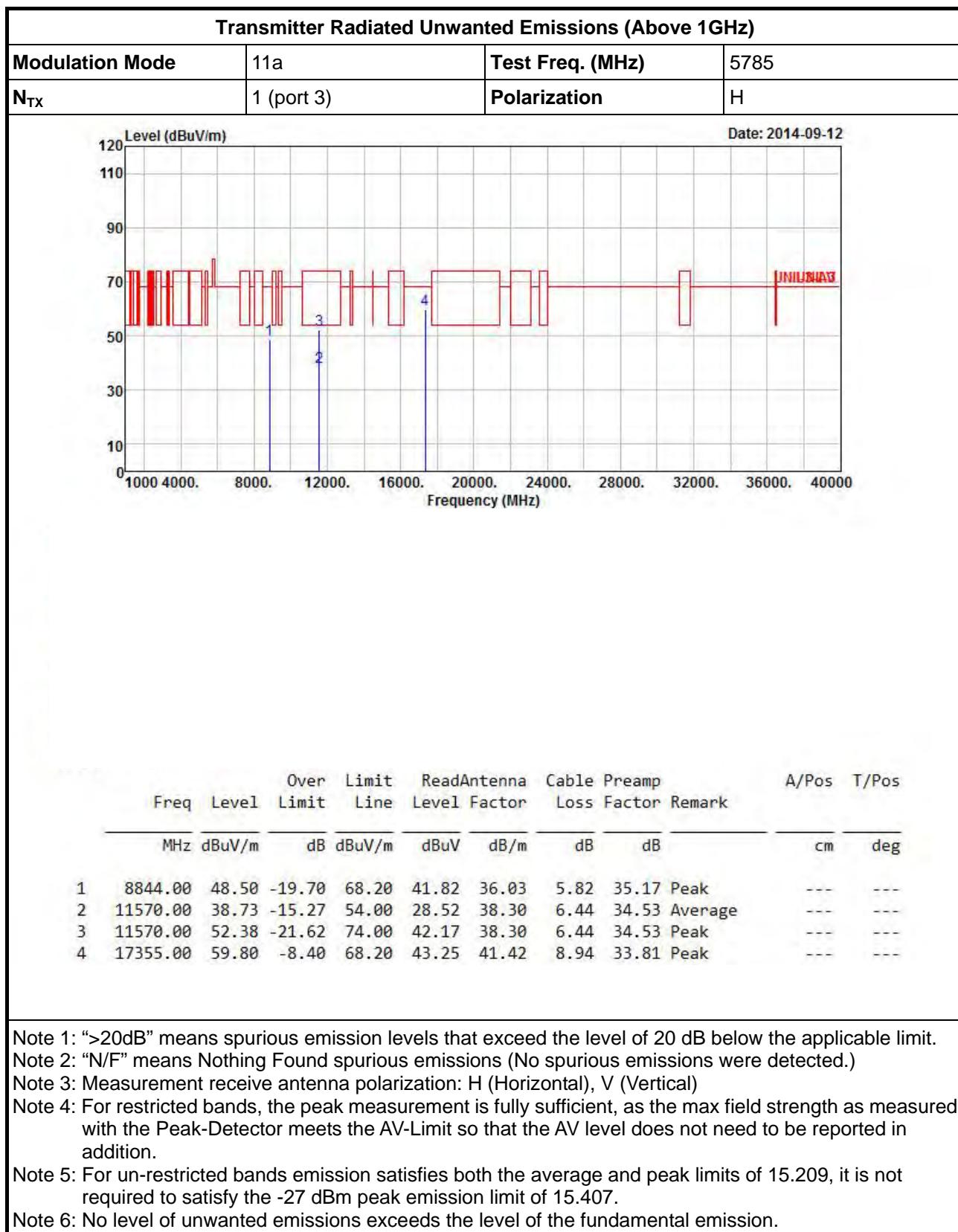
Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

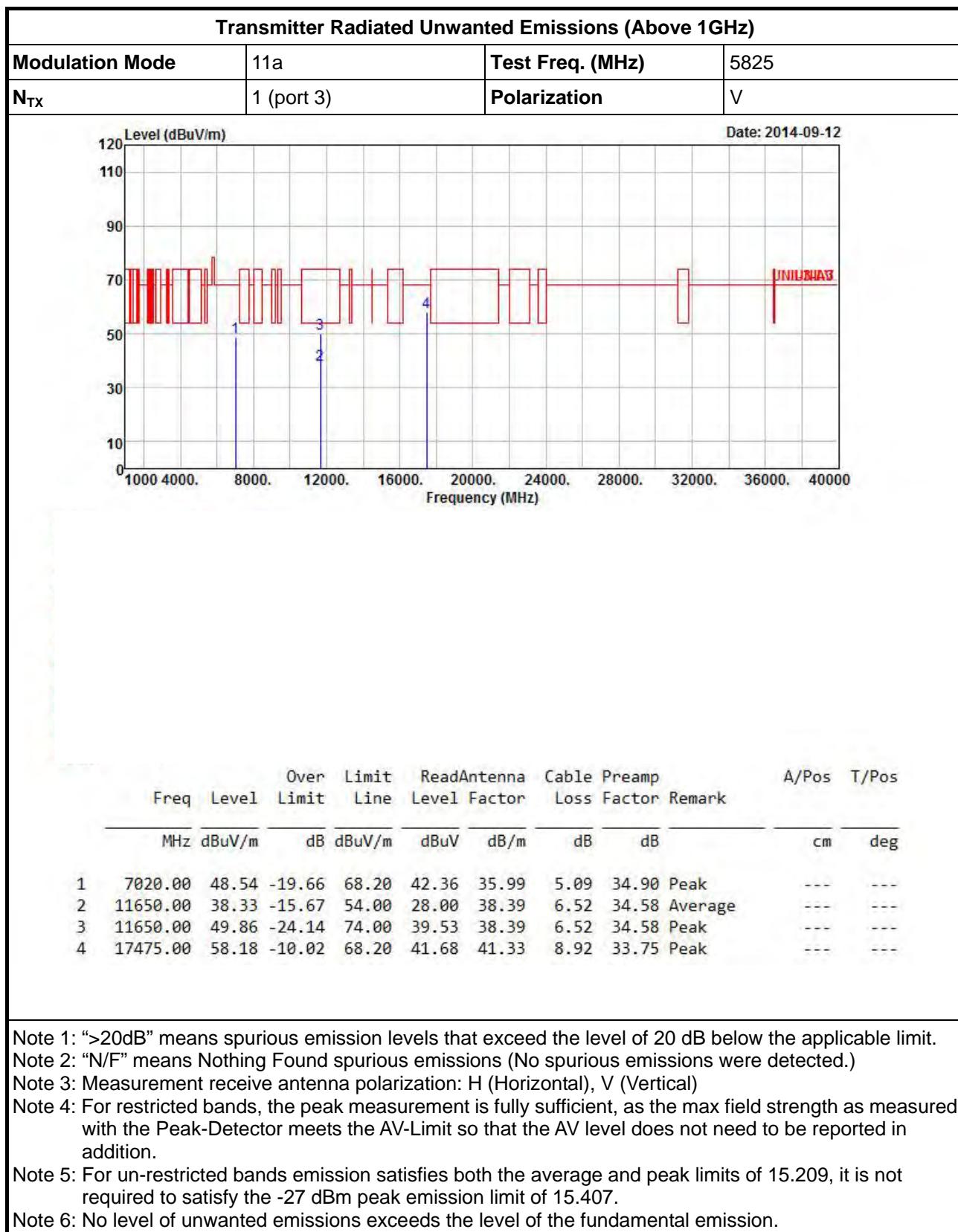
Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.

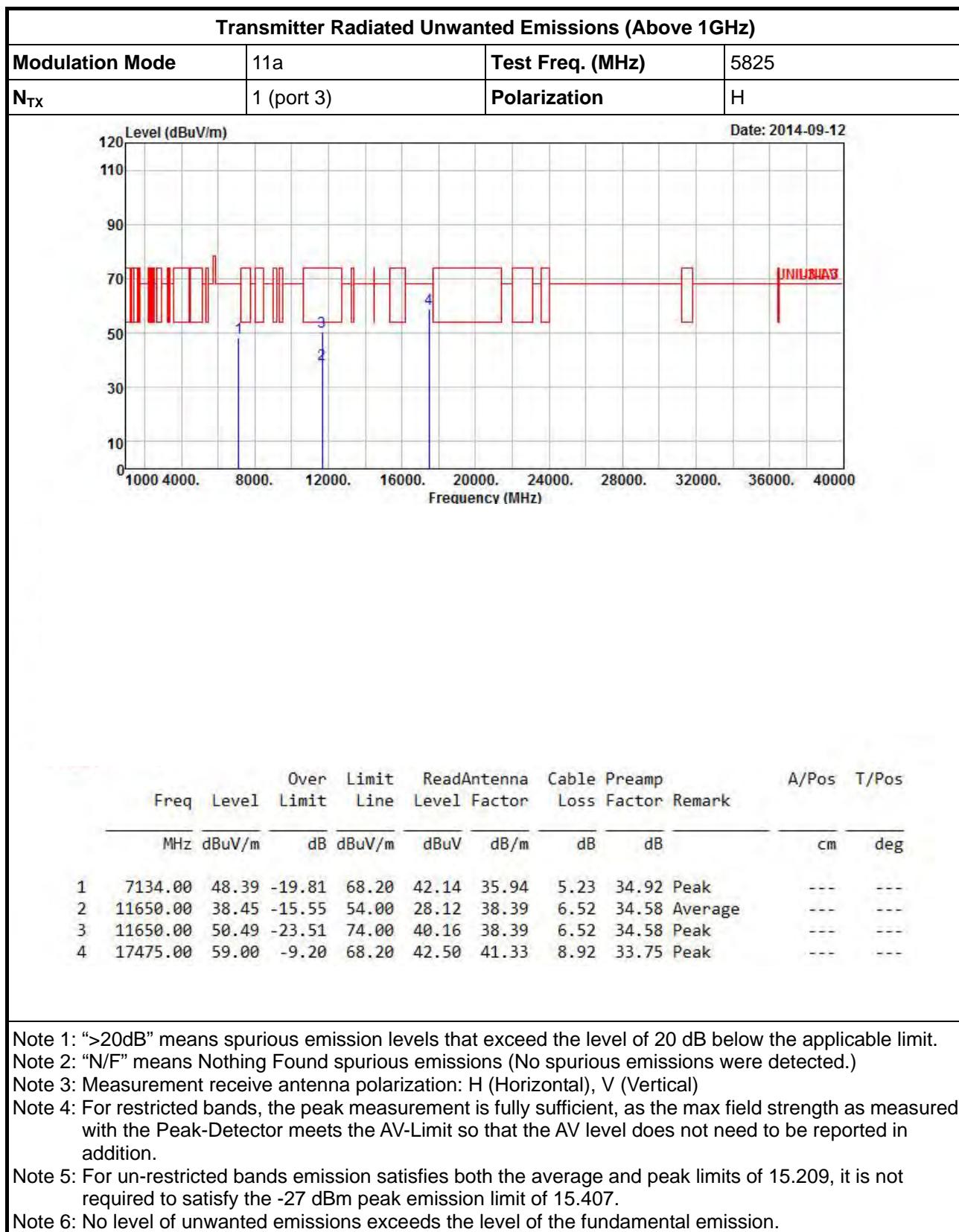
Note 5: For un-restricted bands emission satisfies both the average and peak limits of 15.209, it is not required to satisfy the -27 dBm peak emission limit of 15.407.

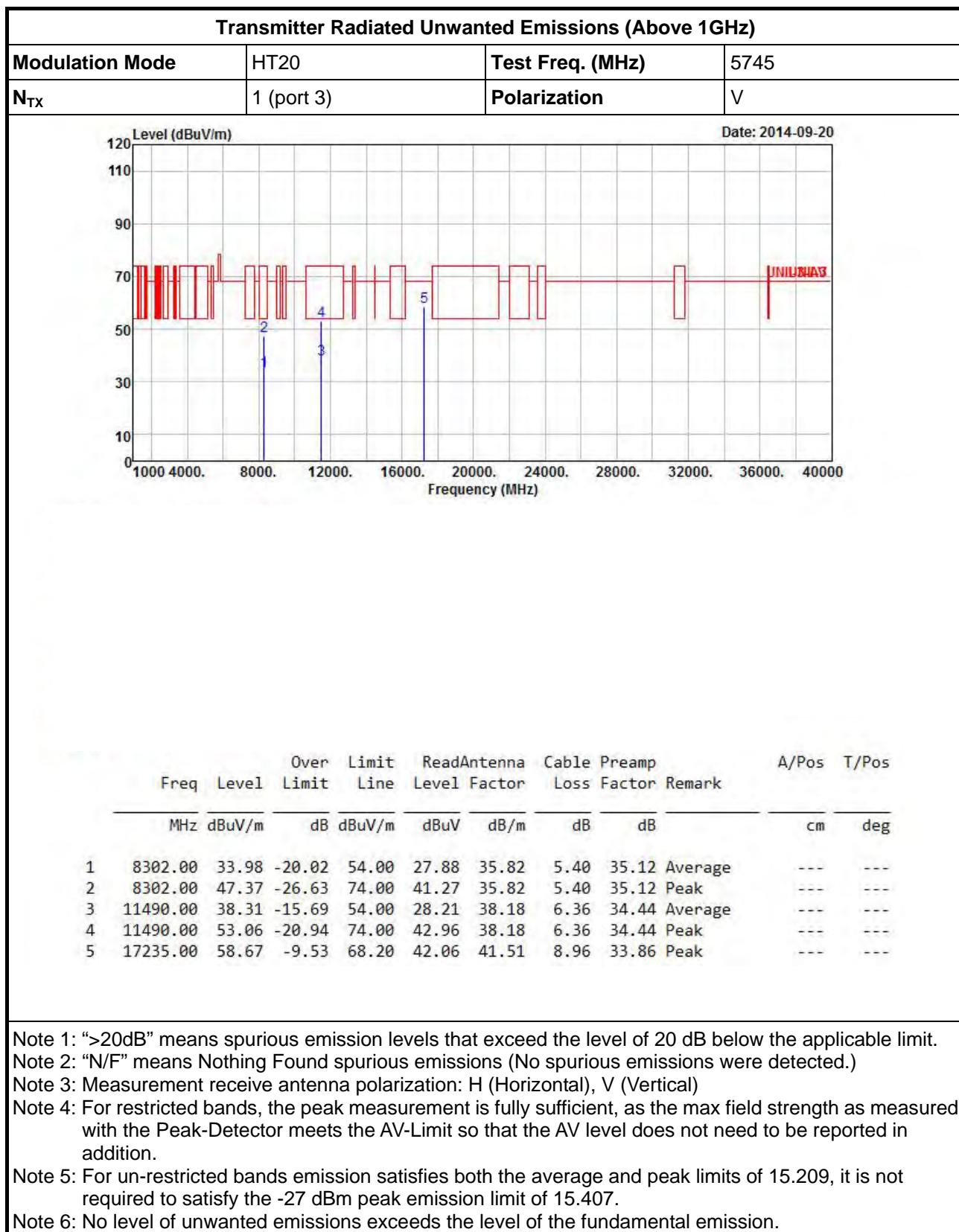
Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.

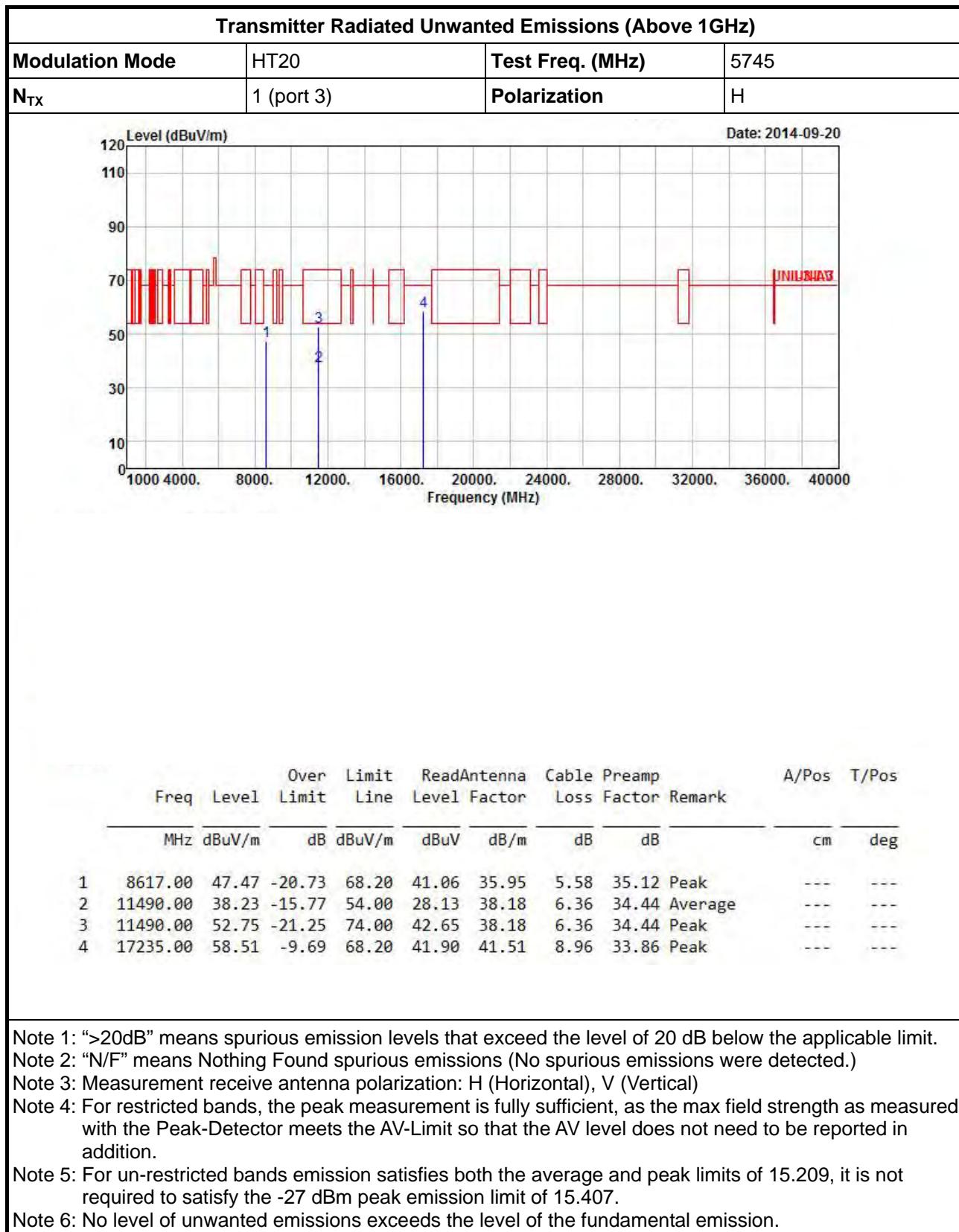


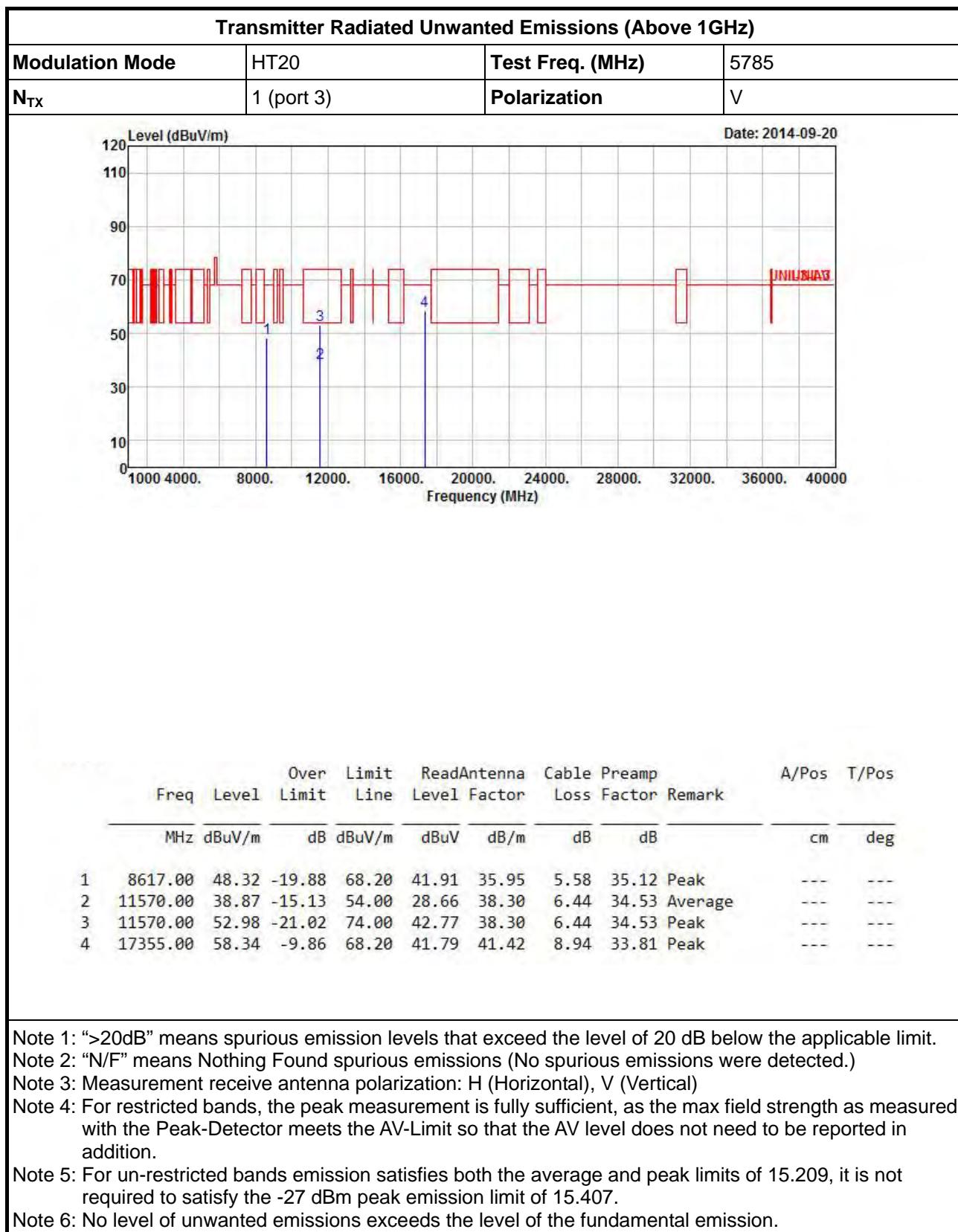


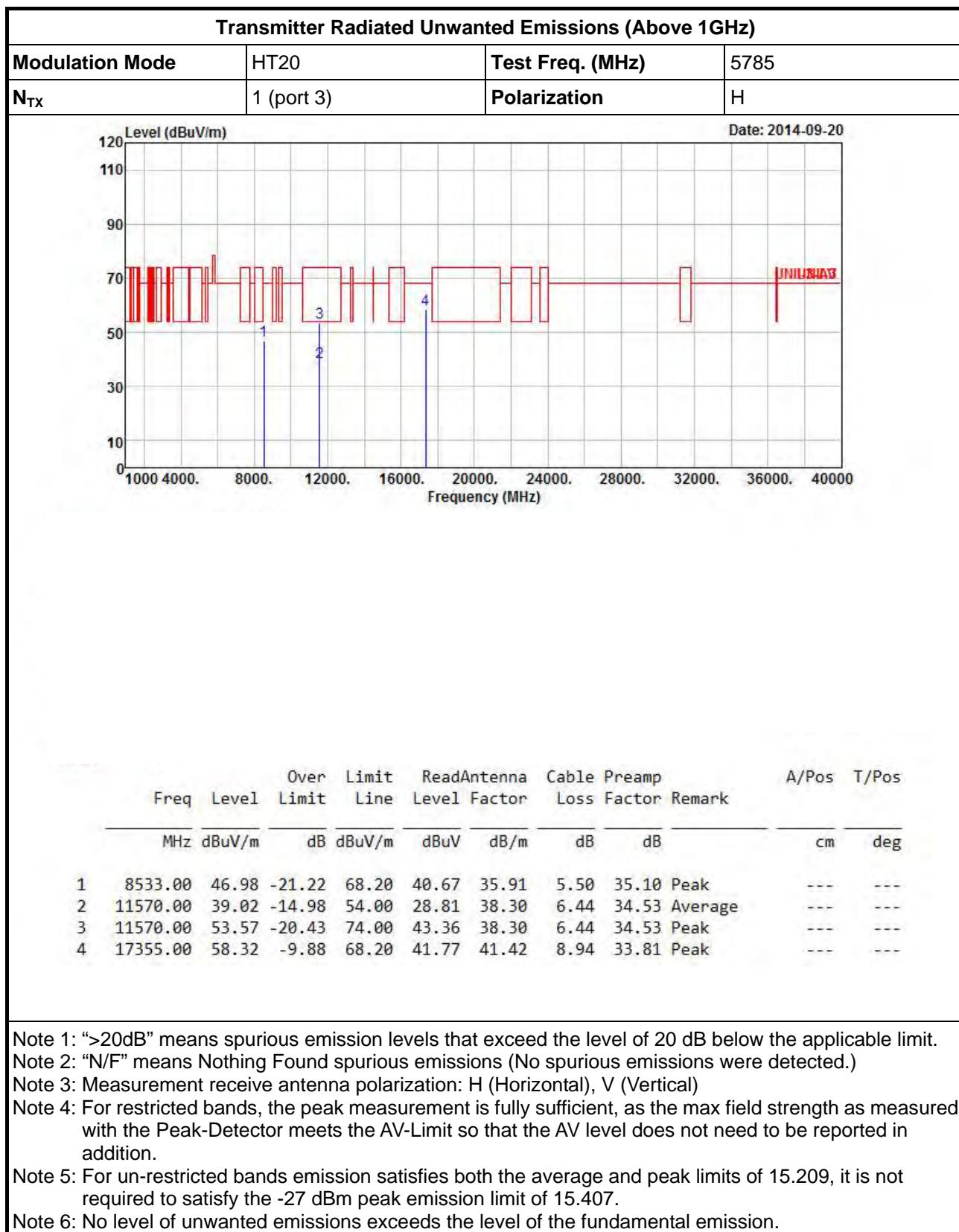


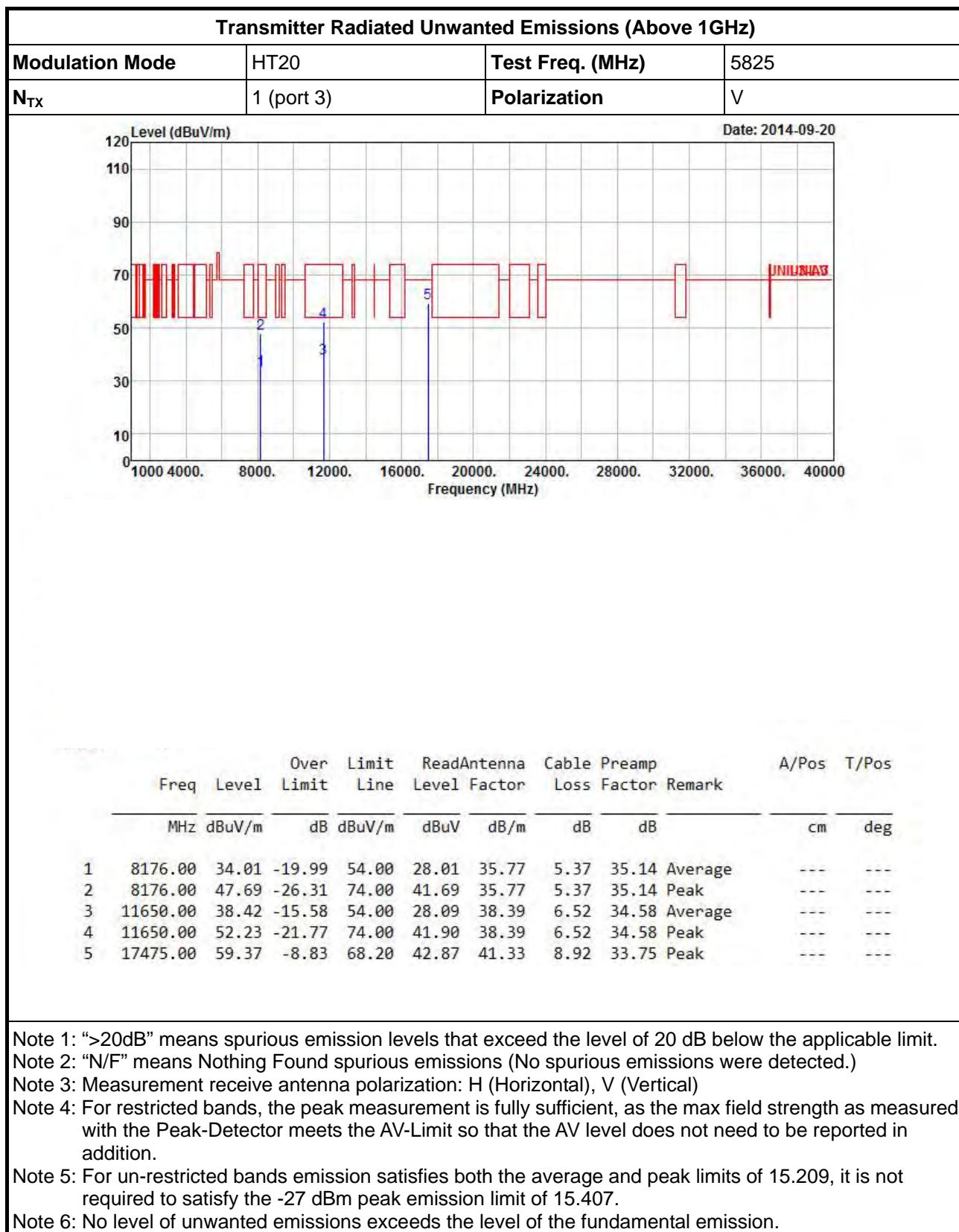












Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

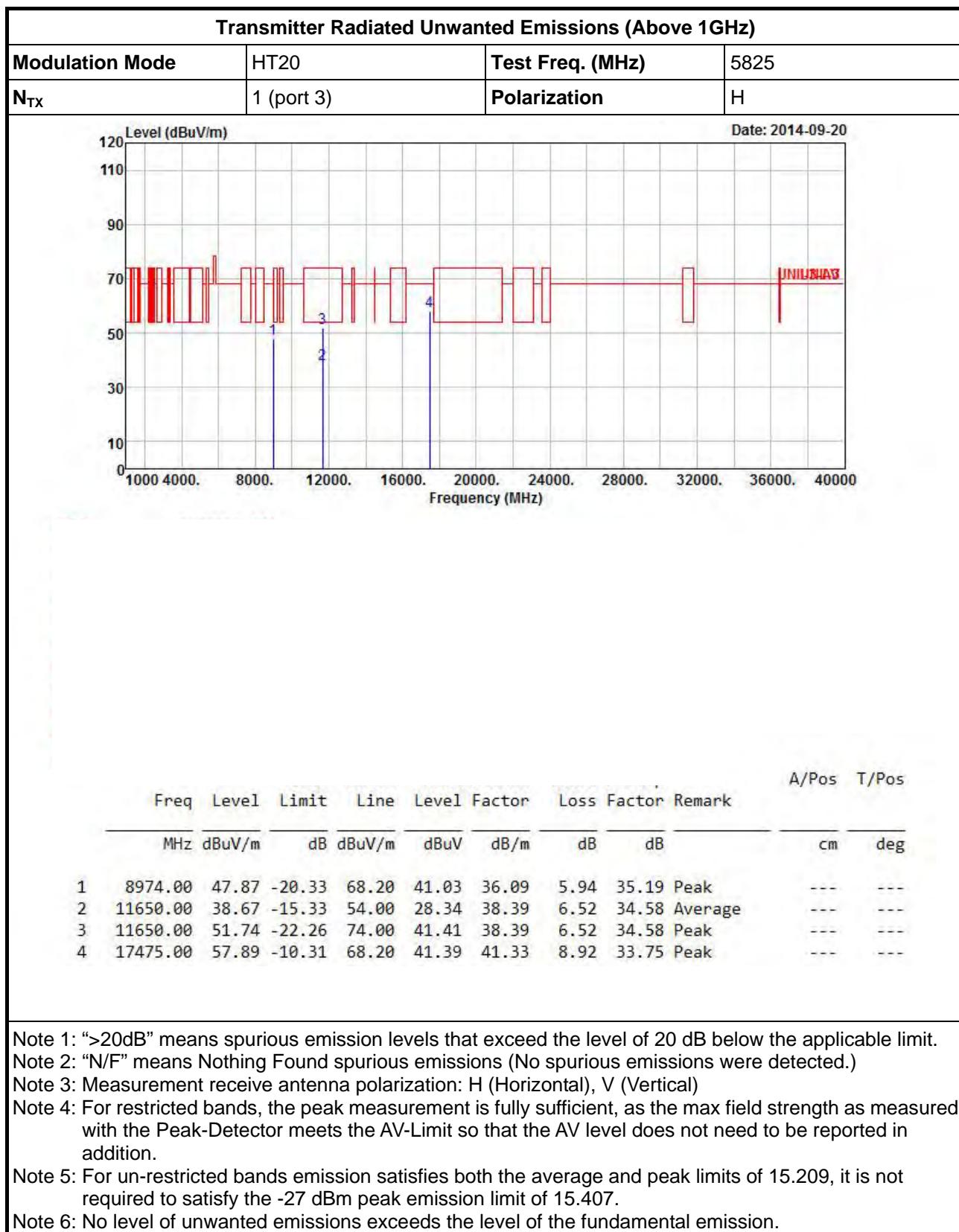
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

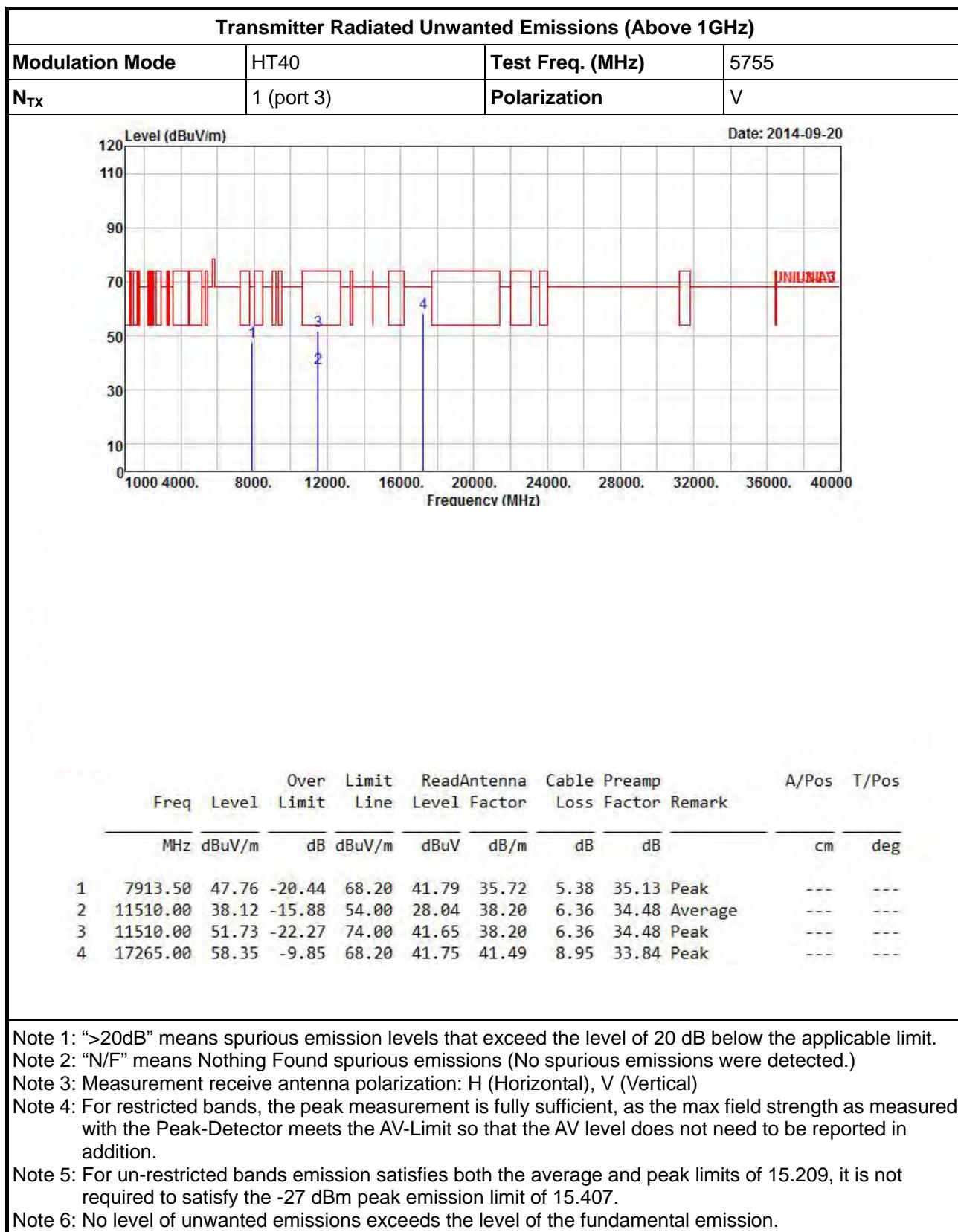
Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

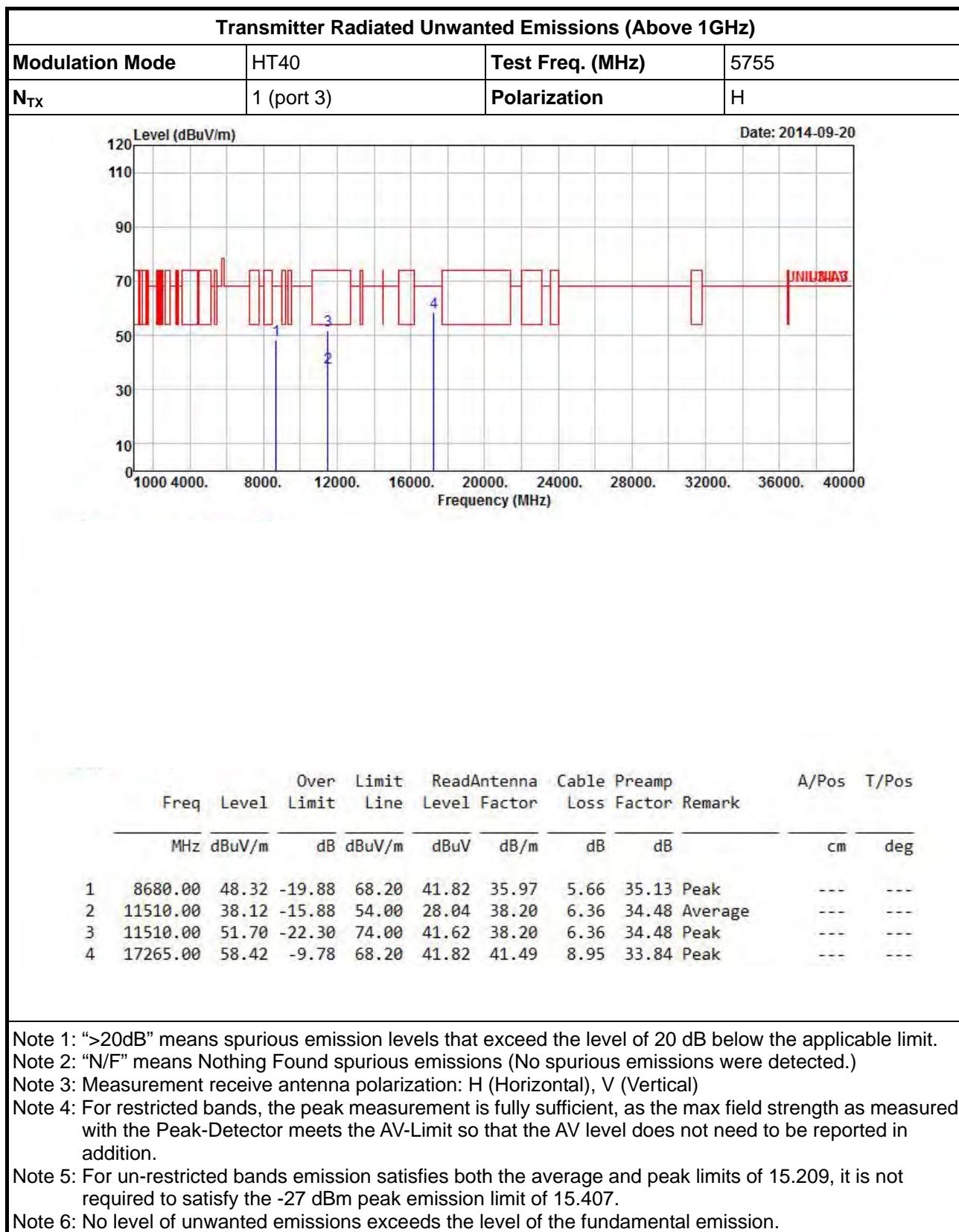
Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.

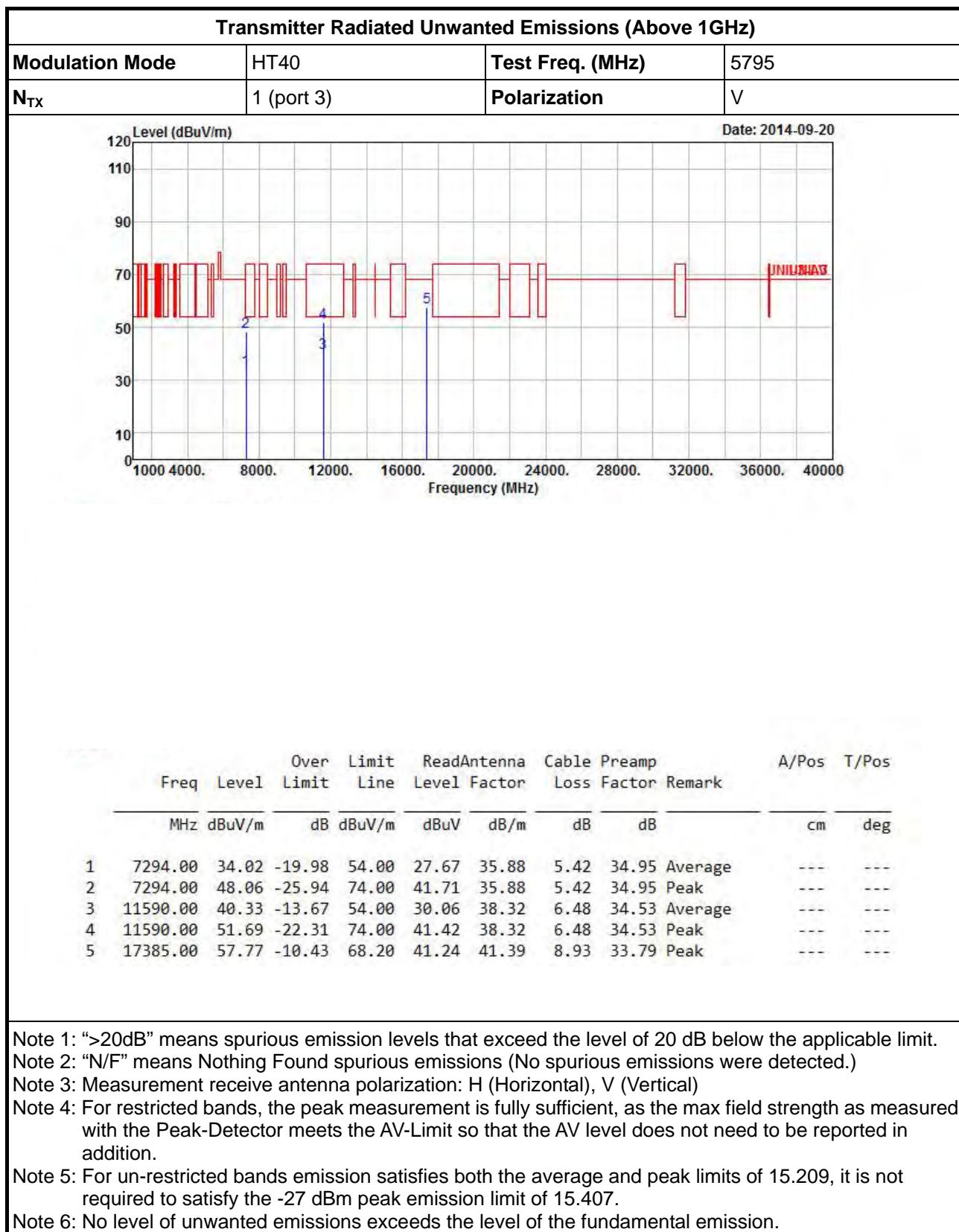
Note 5: For un-restricted bands emission satisfies both the average and peak limits of 15.209, it is not required to satisfy the -27 dBm peak emission limit of 15.407.

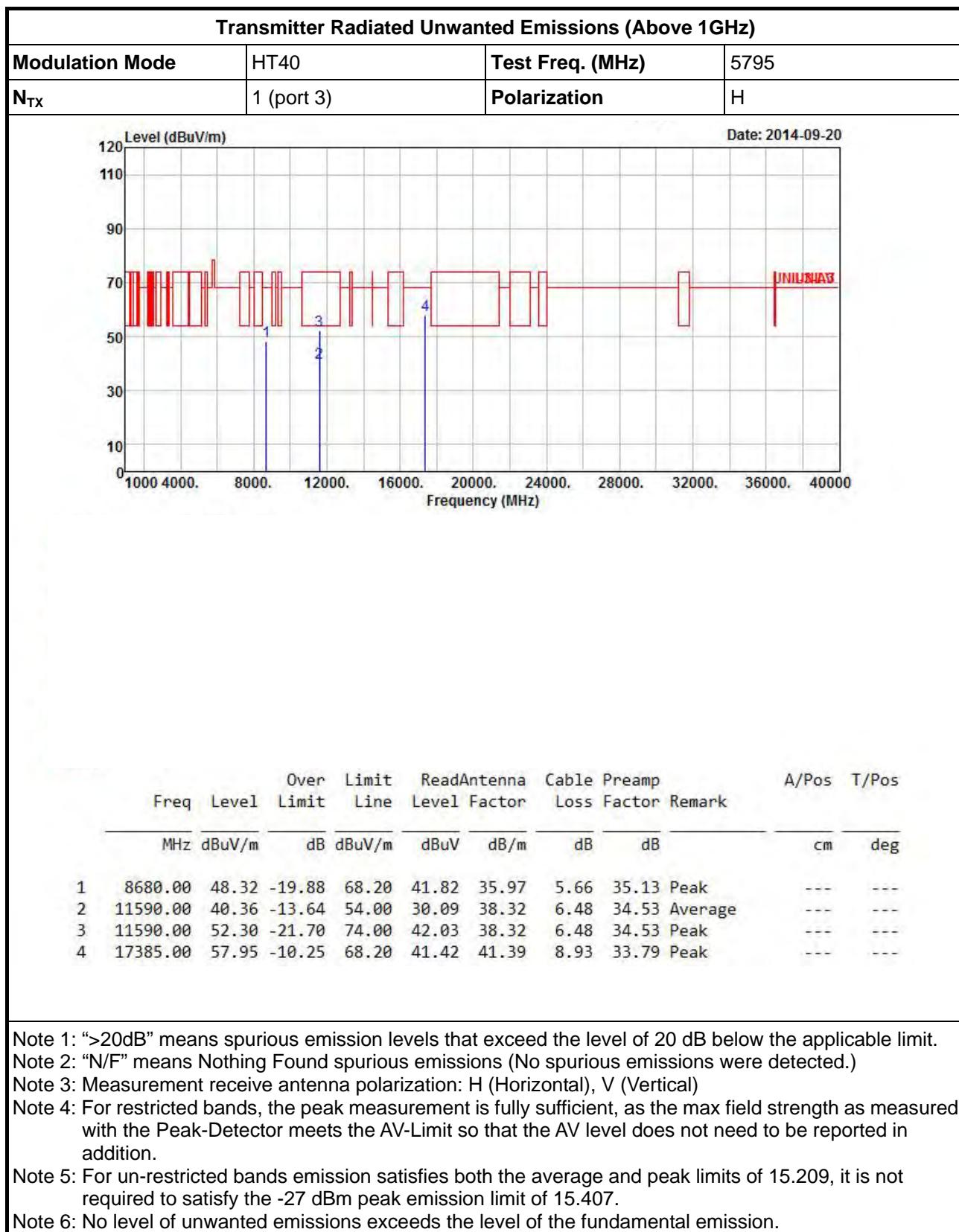
Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.











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.

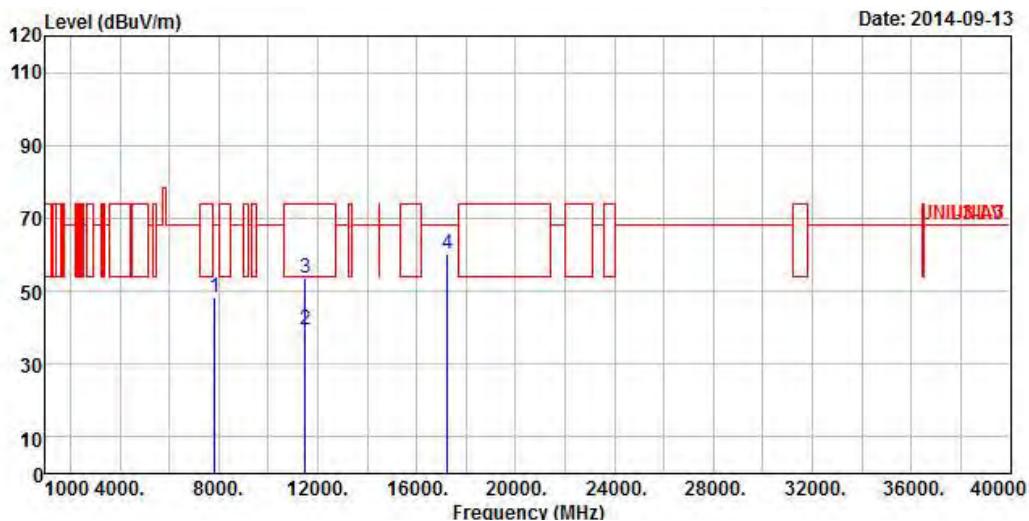
Note 5: For un-restricted bands emission satisfies both the average and peak limits of 15.209, it is not required to satisfy the -27 dBm peak emission limit of 15.407.

Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.



## Transmitter Radiated Unwanted Emissions (Above 1GHz)

Modulation Mode	HT20	Test Freq. (MHz)	5745
N <sub>TX</sub>	1 (port 3)	Polarization	V



Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	A/Pos	T/Pos
		Limit	Line	Level	Factor	Loss	Factor		
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1 7830.00	48.25	-19.95	68.20	42.18	35.73	5.44	35.10	Peak	---
2 11490.00	39.58	-14.42	54.00	29.48	38.18	6.36	34.44	Average	---
3 11490.00	53.49	-20.51	74.00	43.39	38.18	6.36	34.44	Peak	---
4 17235.00	60.16	-8.04	68.20	43.55	41.51	8.96	33.86	Peak	---

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

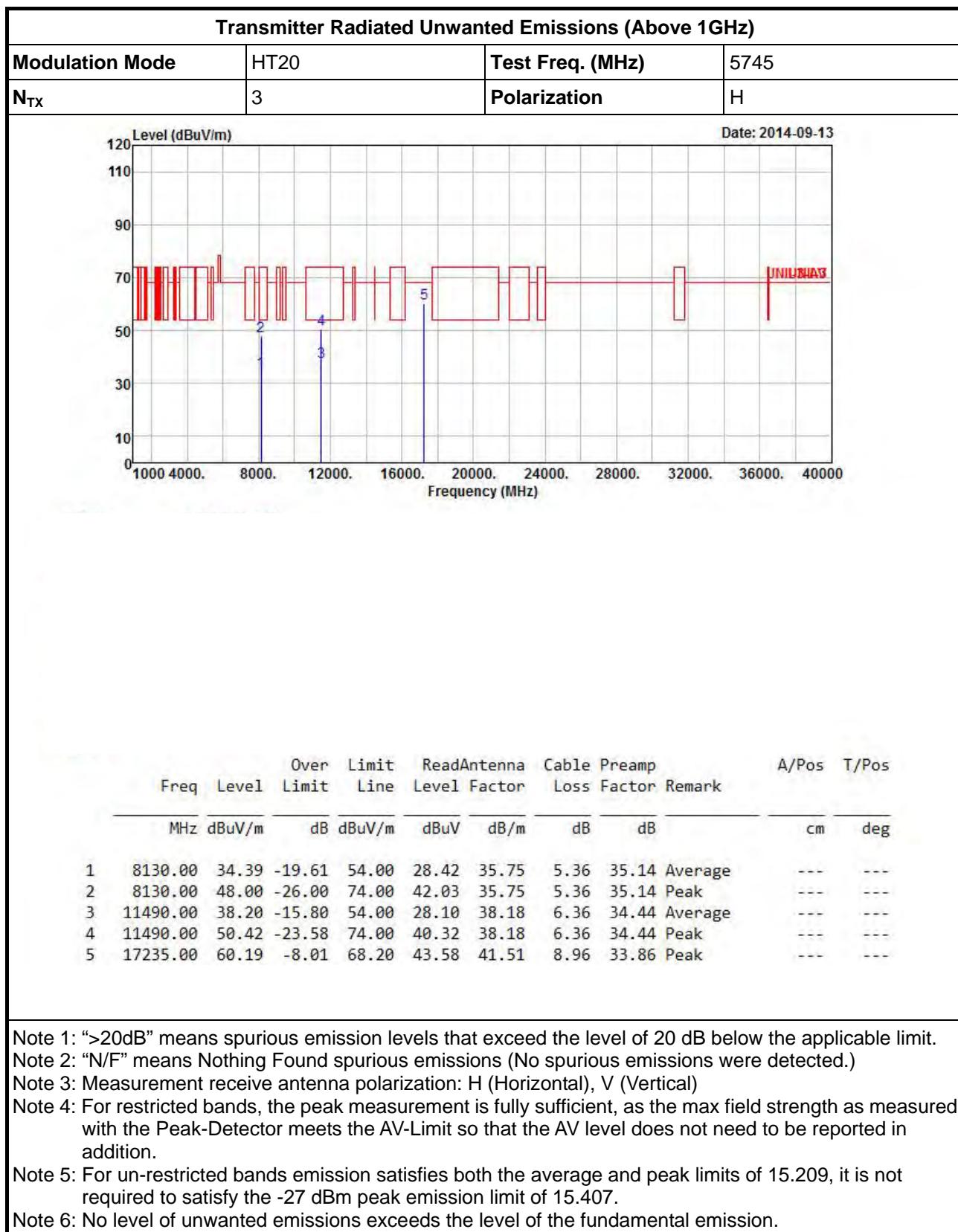
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

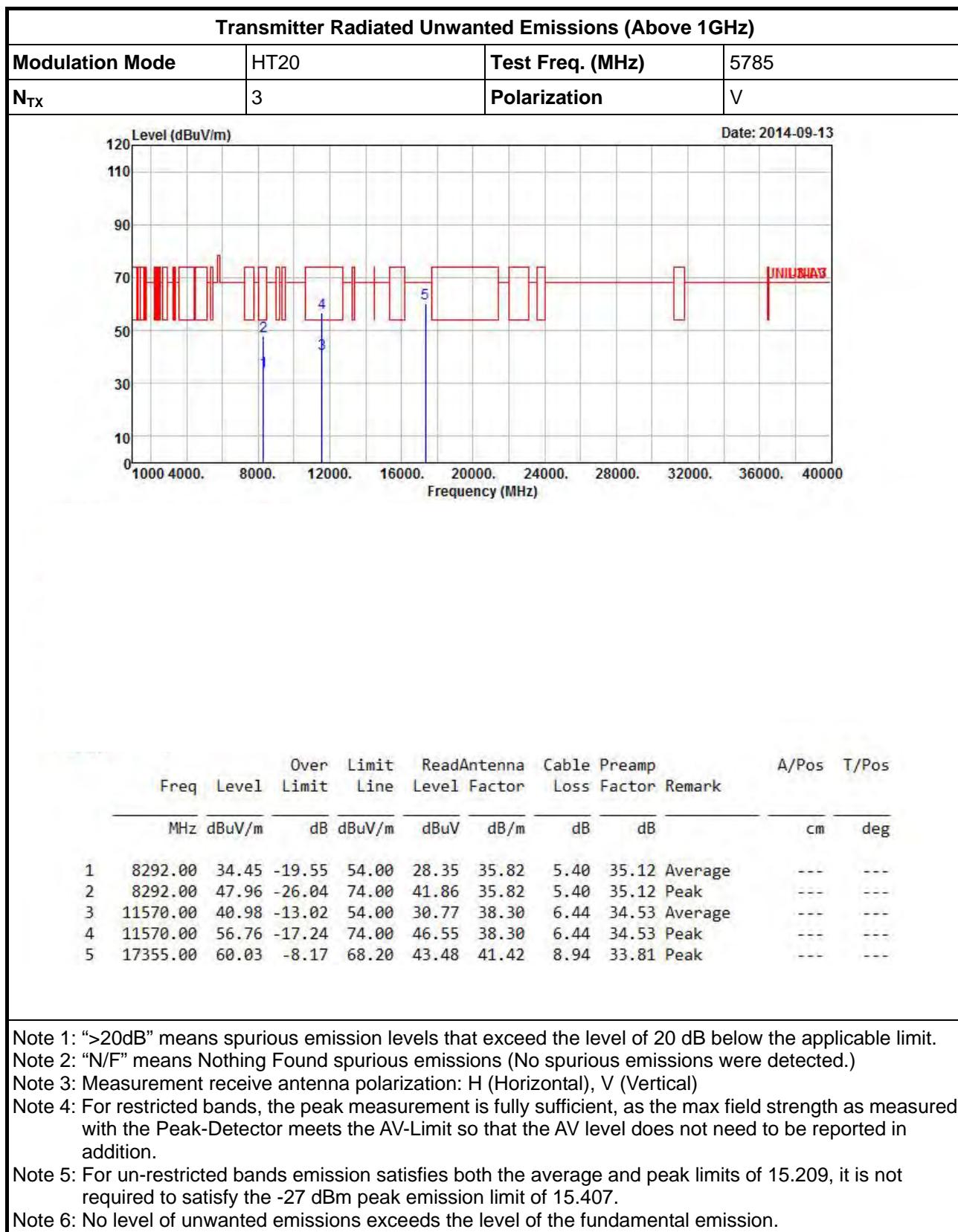
Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

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 5: For un-restricted bands emission satisfies both the average and peak limits of 15.209, it is not required to satisfy the -27 dBm peak emission limit of 15.407.

Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.





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.)

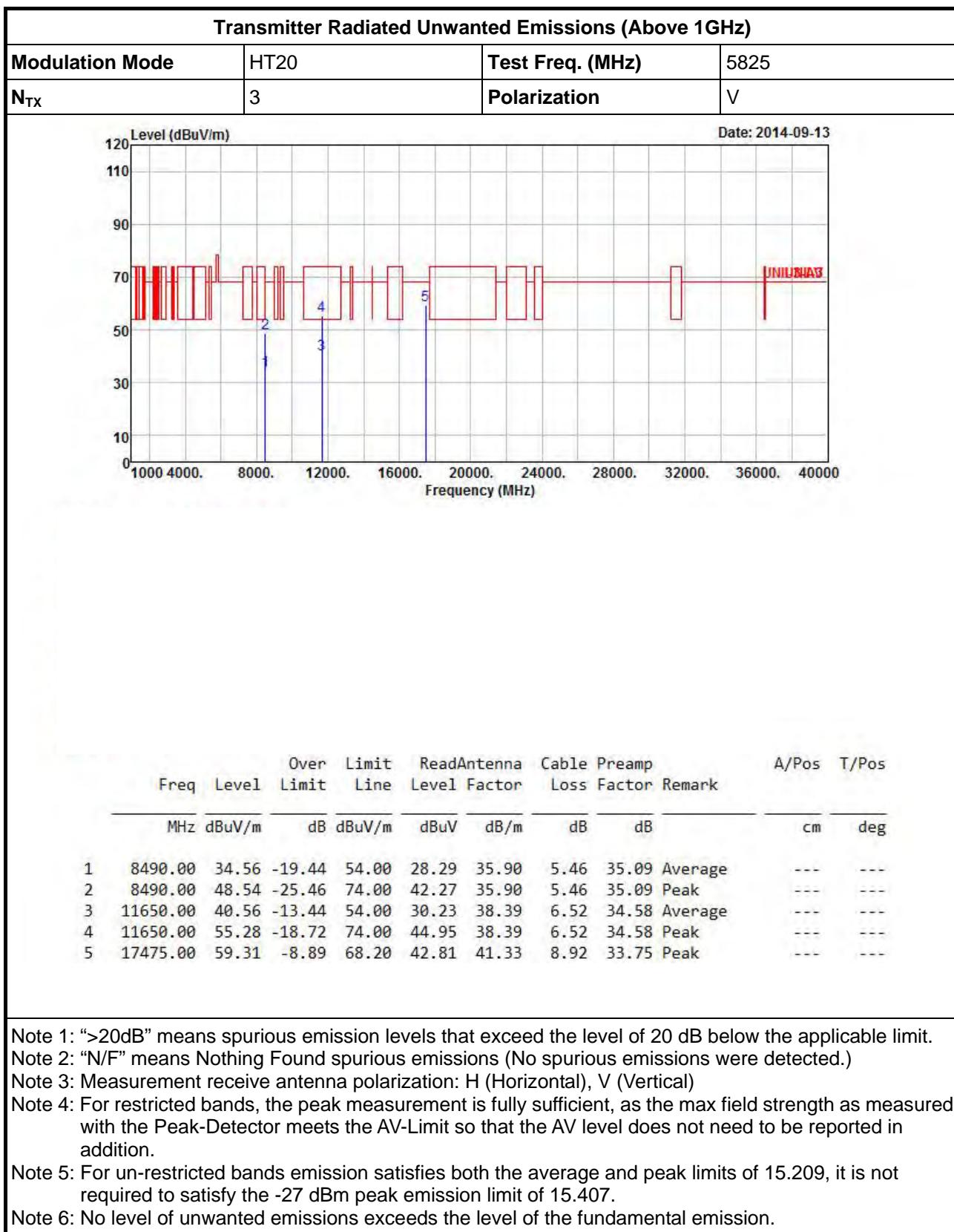
Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

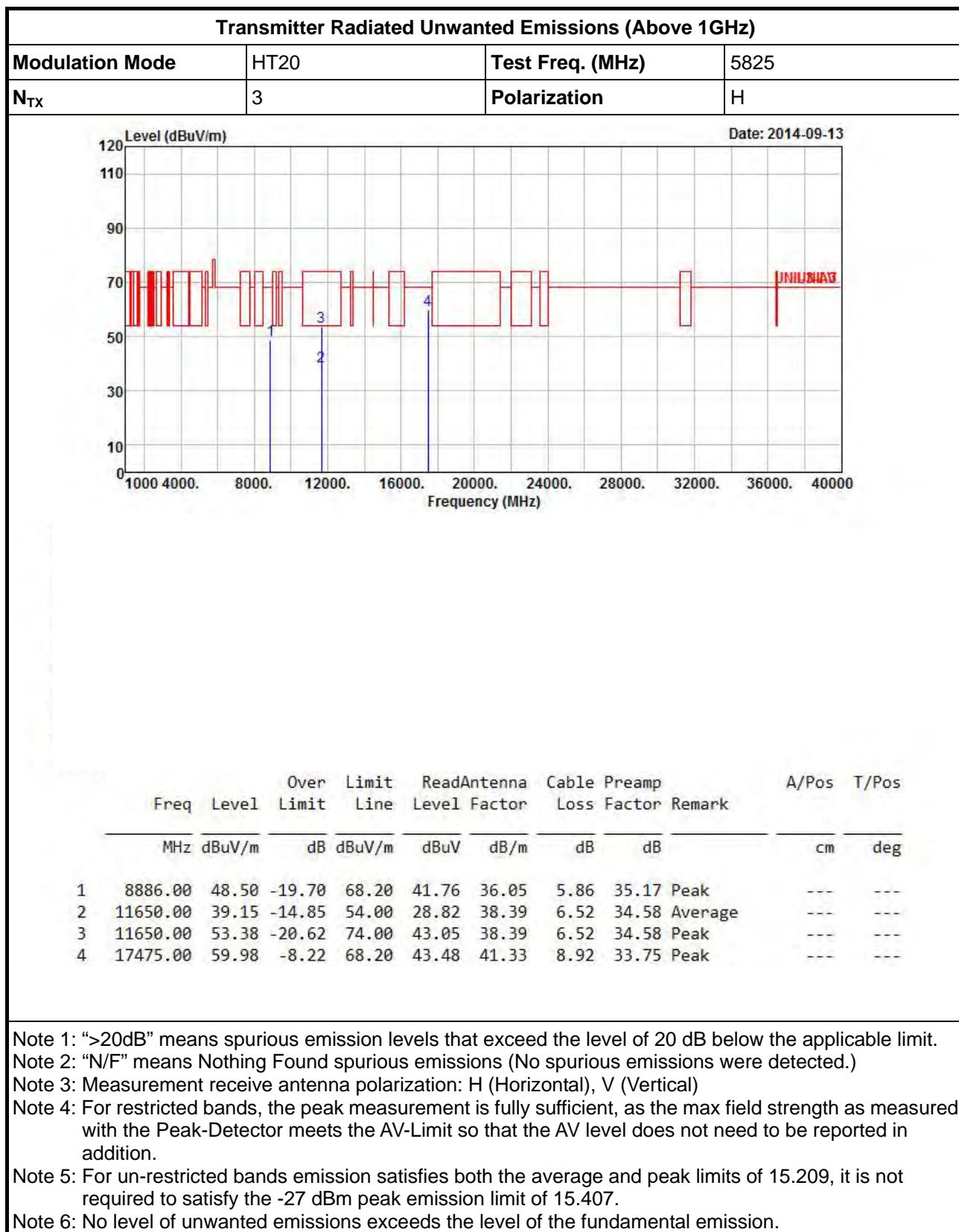
Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.

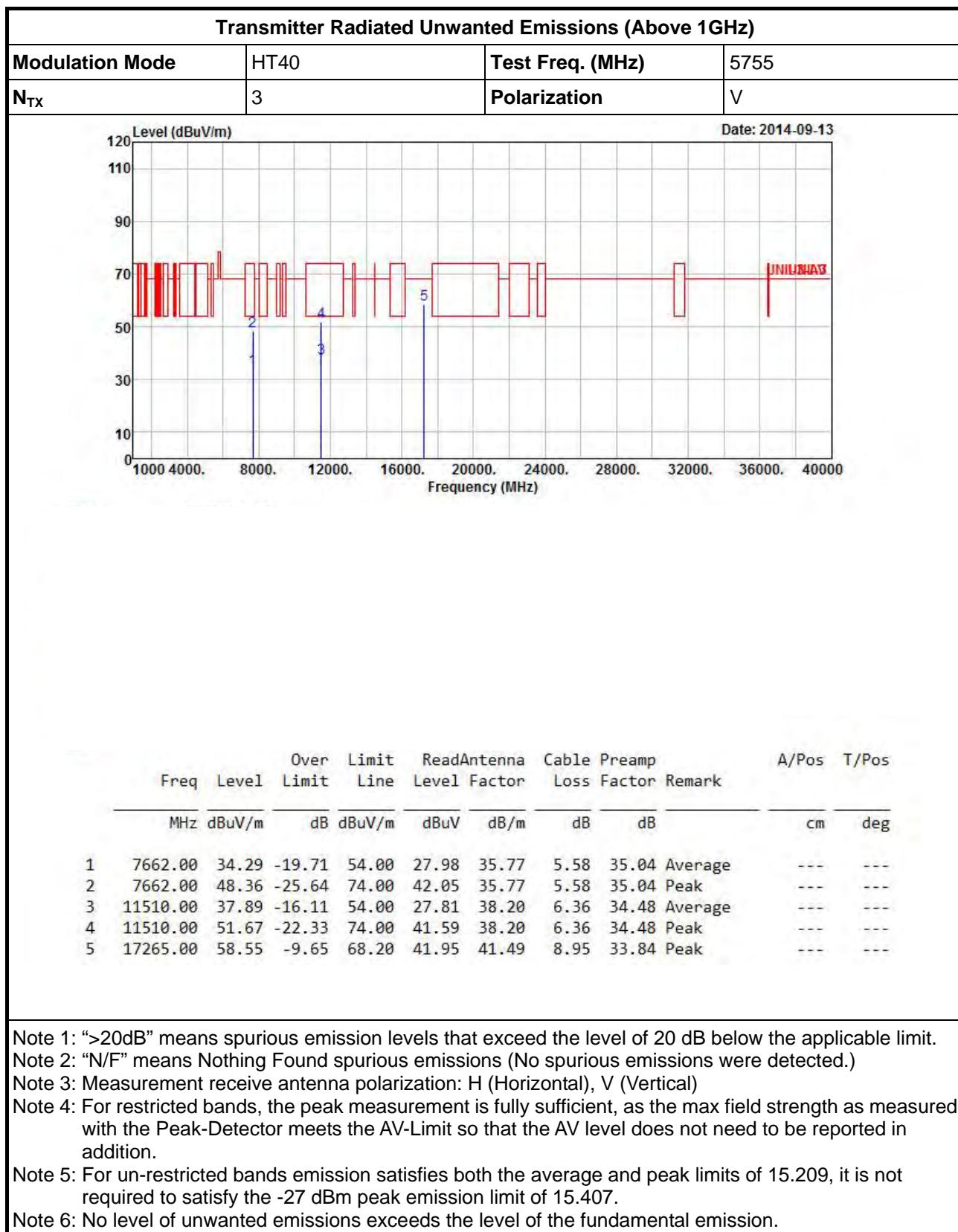
Note 5: For un-restricted bands emission satisfies both the average and peak limits of 15.209, it is not required to satisfy the -27 dBm peak emission limit of 15.407.

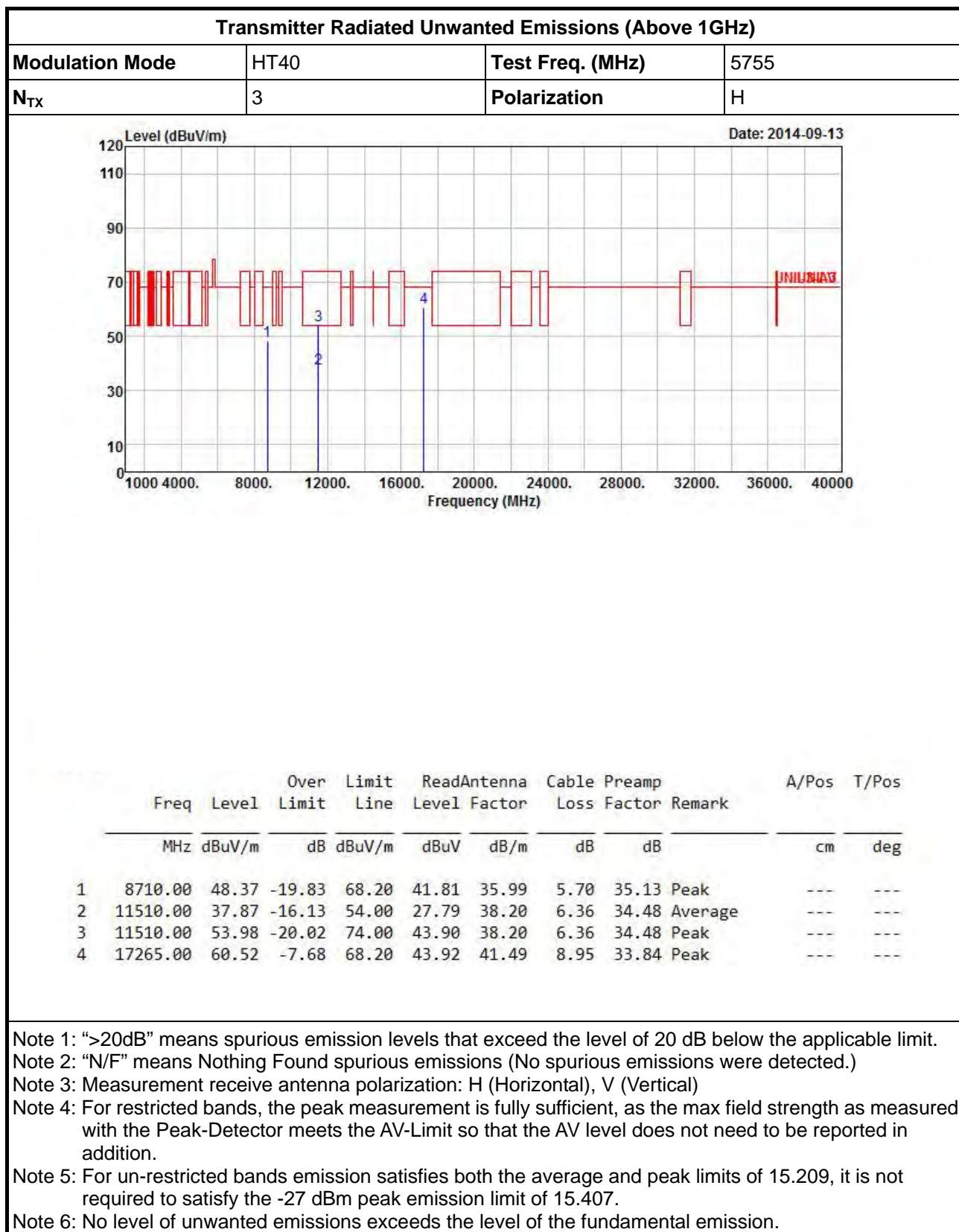
Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.













**Transmitter Radiated Unwanted Emissions (Above 1GHz)**

Modulation Mode	HT40	Test Freq. (MHz)	5795
N <sub>TX</sub>	3	Polarization	V

Date: 2014-09-13

Frequency (MHz)

Level (dBuV/m)

UNIUSHAT

Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	A/Pos	T/Pos		
		Limit	Line	Level	Factor	Loss	Factor				
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg		
1	8864.00	48.41	-19.79	68.20	41.67	36.05	5.86	35.17	Peak	---	---
2	11590.00	41.43	-12.57	54.00	31.16	38.32	6.48	34.53	Average	---	---
3	11590.00	53.92	-20.08	74.00	43.65	38.32	6.48	34.53	Peak	---	---
4	17385.00	59.42	-8.78	68.20	42.89	41.39	8.93	33.79	Peak	---	---

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

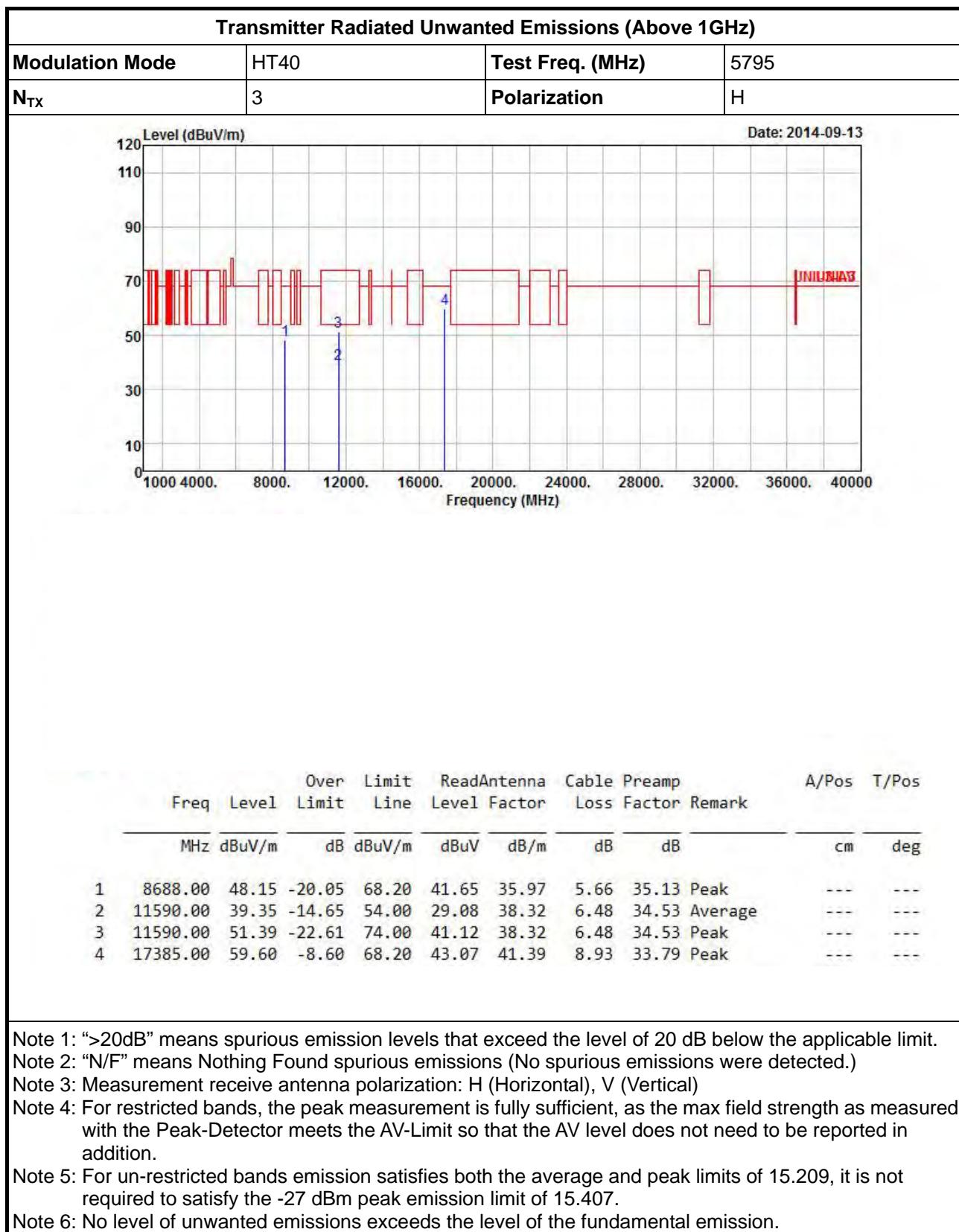
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

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 5: For un-restricted bands emission satisfies both the average and peak limits of 15.209, it is not required to satisfy the -27 dBm peak emission limit of 15.407.

Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.



## 3.7 Frequency Stability

### 3.7.1 Frequency Stability Limit

Frequency Stability Limit	
<b>UNII Devices</b>	
<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.	
<b>IEEE Std. 802.11n-2009</b>	
<input checked="" type="checkbox"/> The transmitter center frequency tolerance shall be $\pm 20$ ppm maximum for the 5 GHz band and $\pm 25$ ppm maximum for the 2.4 GHz band.	

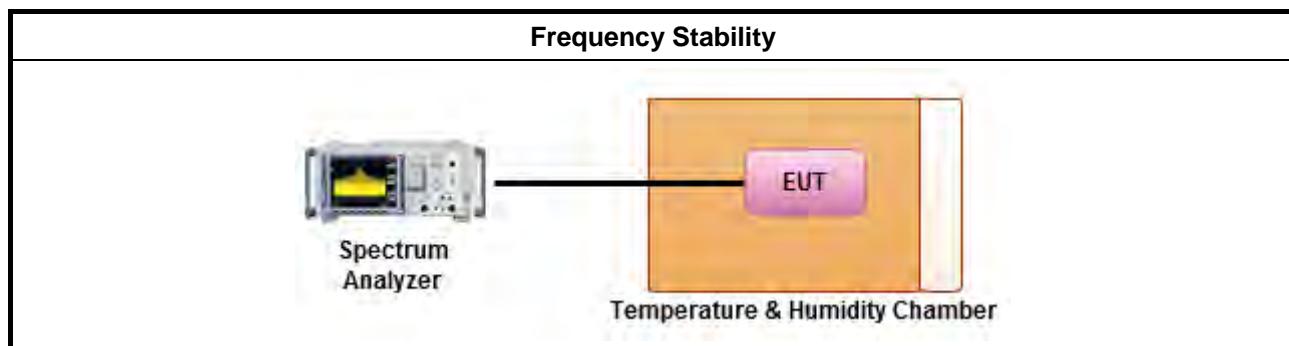
### 3.7.2 Measuring Instruments

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

### 3.7.3 Test Procedures

Test Method	
<input checked="" type="checkbox"/>	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.

### 3.7.4 Test Setup





### 3.7.5 Test Result of Frequency Stability

Frequency Stability Result			
Mode		Frequency Stability (ppm)	
Condition	Freq. (MHz)	Test Frequency (MHz)	Frequency Stability (ppm)
T <sub>20°C</sub> Vmax	5180	5179.93104	-13.3127
T <sub>20°C</sub> Vmin	5180	5179.93100	-13.3205
T <sub>50°C</sub> Vnom	5180	5179.98680	-2.5483
T <sub>40°C</sub> Vnom	5180	5179.95500	-8.6873
T <sub>30°C</sub> Vnom	5180	5179.93700	-12.1622
T <sub>20°C</sub> Vnom	5180	5179.93100	-13.3205
T <sub>10°C</sub> Vnom	5180	5179.93220	-13.0888
T <sub>0°C</sub> Vnom	5180	5179.93040	-13.4363
T <sub>-10°C</sub> Vnom	5180	5179.93400	-12.7413
T <sub>-20°C</sub> Vnom	5180	5179.94180	-11.2355
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 0 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, 2014	AC Conduction
LISN	SCHWARZBECK MESS-ELEKTRONIK	NSLK 8127	8127-477	9kHz ~ 30MHz	JAN. 21, 2014	AC Conduction
RF Cable-CON	HUBER+SUHNER	RG213/U	7.61183201e+012	9kHz ~ 30MHz	Oct. 30, 2013	AC Conduction
EMI Filter	LINDGREN	LRE-2030	2651	< 450 Hz	N/A	AC Conduction

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

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Spectrum Analyzer	R&S	FSV 40	101013	9KHz~40GHz	Jan. 25, 2014	RF Conducted
AC Power Source	G.W	APS-9102	EL920581	AC 0V ~ 300V	Jul. 15, 2014	RF Conducted
Temp. and Humidity Chamber	Giant Force	GTH-225-20-SP-SD	MAA1112-007	-20 ~ 100°C	Nov. 20, 2013	RF Conducted
Signal Generator	R&S	SMR40	100116	10MHz ~ 40GHz	Jul. 31, 2014	RF Conducted

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	Oct. 03, 2013	Radiation
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH02-HY	30MHz ~ 1GHz 3m	May 11, 2014	Radiation
Amplifier	Agilent	8447D	2944A11149	100kHz ~ 1.3GHz	Jul. 22, 2014	Radiation
Amplifier	Agilent	8449B	3008A02373	1GHz ~ 26.5GHz	Aug. 28, 2014	Radiation
Horn Antenna	ETS-LINDGREN	3117	00091920	1GHz ~ 18GHz	Nov. 25, 2013	Radiation
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170154	15GHz ~ 40GHz	Jan. 10, 2014	Radiation
RF Cable-R03m	Jye Bao	RG142	CB021	9kHz ~ 1GHz	Nov. 09, 2013	Radiation
RF Cable-high	SUHNER	SUCOFLEX106	03CH02-HY	1GHz ~ 40GHz	Mar. 05, 2014	Radiation
Bilog Antenna	SCHAFFNER	CBL61128	2723	30MHz ~ 2GHz	Oct. 10, 2013	Radiation
Turn Table	Chaintek Instruments	3000	MF7802058	0~ 360 degree	N/A	Radiation
Antenna Mast	MF	MF7802	MF780208205	1 ~ 4 m	N/A	Radiation

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

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Amplifier	EM	EM18G40G	060572	18GHz ~ 40GHz	Jun.20.2013	Radiation
Loop Antenna	TESEQ	HLA 6120	31244	9 kHz - 30 MHz	Dec. 02, 2012	Radiation

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