



FCC Test Report

Equipment : AC450 WLAN Band Extender
Brand Name : EDIMAX
Model No. : EW-7288AC / GAP-288AC
FCC ID : NDD9572881411
Standard : 47 CFR FCC Part 15.407
Operating Band : 5250 MHz – 5350 MHz
5470 MHz – 5725 MHz
FCC Classification : NII
Applicant : EDIMAX TECHNOLOGY CO., LTD.
Manufacturer : No.3,Wu-Chuan 3rd Road,Wu-Ku Industrial Park,
New Taipei City, Taiwan
Function : Outdoor AP; Indoor AP;
 Fixed P2P AP Portable Client

The product sample received on Nov. 20, 2015 and completely tested on Dec. 04, 2015. We, SPORTON, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.10-2013 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:



Kevin Liang / Assistant Manager





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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	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 (5250-5350)					
Frequency Range (MHz)	IEEE Std. 802.11	Ch. Freq. (MHz)	Channel Number	Transmit Chains (N _{TX})	RF Output Power (dBm)
5250-5350	a	5260-5320	52-64 [4]	1	19.19
5250-5350	n (HT20)	5260-5320	52-64 [4]	1	18.91
5250-5350	n (HT40)	5270-5310	54-62 [2]	1	19.28
5250-5350	ac (VHT20)	5260-5320	52-64 [4]	1	18.73
5250-5350	ac (VHT40)	5270-5310	54-62 [2]	1	18.94
5250-5350	ac (VHT80)	5290	58 [1]	1	16.47

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 3: 802.11ac uses a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM, 256QAM modulation.

RF General Information (5470-5725)					
Frequency Range (MHz)	IEEE Std. 802.11	Ch. Freq. (MHz)	Channel Number	Transmit Chains (N _{TX})	RF Output Power (dBm)
5470-5725	a	5500-5700	100-140 [11]	1	19.31
5470-5725	n (HT20)	5500-5700	100-140 [11]	1	18.67
5470-5725	n (HT40)	5510-5670	102-134 [3]	1	19.21
5470-5725	ac (VHT20)	5500-5700	100-140 [11]	1	18.47
5470-5725	ac (VHT40)	5510-5670	102-134 [3]	1	19.42
5470-5725	ac (VHT80)	5530	106 [2]	1	17.08

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 3: 802.11ac uses a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM, 256QAM modulation.



1.1.2 Antenna Information

Antenna Category	
<input checked="" type="checkbox"/>	External antenna (dedicated antennas)
	<input checked="" type="checkbox"/> Single power level with corresponding antenna(s).
	<input type="checkbox"/> Multiple power level and corresponding antenna(s).

Antenna General Information				
No.	Ant. Cat.	Ant. Type	Ant. Connector	Gain (dBi)
1	External	Dipole	RP-SMA	2.80

1.1.3 Type of EUT

Identify EUT	
EUT Serial Number	N/A
Presentation of Equipment	<input type="checkbox"/> Production ; <input type="checkbox"/> Pre-Production ; <input checked="" 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"/> 100.00% - IEEE 802.11a	0.00
<input checked="" type="checkbox"/> 100.00% - IEEE 802.11n (HT20)	0.00
<input checked="" type="checkbox"/> 100.00% - IEEE 802.11n (HT40)	0.00
<input checked="" type="checkbox"/> 100.00% - IEEE 802.11ac (VHT20)	0.00
<input checked="" type="checkbox"/> 100.00% - IEEE 802.11ac (VHT40)	0.00
<input checked="" type="checkbox"/> 100.00% - IEEE 802.11ac (VHT80)	0.00

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

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"/> External DC supply	<input checked="" type="checkbox"/> From Host System	<input checked="" type="checkbox"/> From Adapter
Test Voltage	<input checked="" type="checkbox"/> V _{nom} (5 V)	<input checked="" type="checkbox"/> V _{max} (5.75 V)	<input checked="" type="checkbox"/> V _{min} (4.25 V)
Test Climatic	<input checked="" type="checkbox"/> T _{nom} (20°C)	<input checked="" type="checkbox"/> T _{max} (50°C)	<input checked="" type="checkbox"/> T _{min} (-20°C)

1.1.6 DFS and TPC Information

The DFS Related Operating Mode(s) of the Equipment			
<input type="checkbox"/> Master			
<input type="checkbox"/> Slave with radar detection			
<input checked="" type="checkbox"/> Slave without radar detection			
Software / Firmware Version	1.06		
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) / ac (VHT20) n (HT40) / ac (VHT40) ac (VHT80)	<input checked="" type="checkbox"/> 5250-5350	No	Yes
	<input checked="" type="checkbox"/> 5470-5725	No	Yes
	<input type="checkbox"/> 5600-5650	-	-



1.2 Accessories and Support Equipment

Accessories Information				
Adapter	Brand Name	LUCENT TRANS	Model Name	1A81
	Power Rating	I/P: 100 - 240 Vac, 50/60Hz, 0.2A, O/P: 5 Vdc, 1A		
USB Cable	Brand Name	EXTENDING	Model Name	-
	Signal Line	0.9 meter, shielded cable, w/o ferrite core		

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

Support Equipment - AC Conduction				
No.	Equipment	Brand Name	Model Name	FCC ID
1	Notebook	DELL	E5540	DoC
2	Adapter	DELL	HA65NM130	DoC

Support Equipment - RF Conducted and Radiated Emission				
No.	Equipment	Brand Name	Model Name	FCC ID
1	Notebook	DELL	E5530	DoC
2	Adapter	DELL	LA65NS2-01	DoC

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 C63.10-2013
- 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	FAX : 886-3-327-0973	
<input checked="" type="checkbox"/>		No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C.		
		TEL : 886-3-327-3456		
Test Condition		Test Site No.	Test Engineer	Test Environment
AC Conduction		CO04-HY	Anthong	23°C / 58%
RF Conducted		TH01-HY	Jason	23°C / 63%
Radiated Emission		03CH03-HY	Joe	24°C / 60%



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	±0.5%	
RF output power, conducted	±0.1 dB	
Power density, conducted	±0.5 dB	
Unwanted emissions, conducted	9 – 150 kHz	±0.4 dB
	0.15 – 30 MHz	±0.4 dB
	30 – 1000 MHz	±0.6 dB
	1 – 18 GHz	±0.5 dB
	18 – 40 GHz	±0.5 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	±5 %	
DC and low frequency voltages	±0.9%	
Time	±1.4 %	
Duty Cycle	±0.5 %	



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	1	6-54Mbps	6 Mbps
HT20	1	MCS 0-7	MCS 0
HT40	1	MCS 0-7	MCS 0
VHT20	1	MCS 0-8	MCS 0
VHT40	1	MCS 0-9	MCS 0
VHT80	1	MCS 0-9	MCS 0

2.2 The Worst Case Power Setting Parameter

The Worst Case Power Setting Parameter (5250-5350MHz band)							
Test Software Version	MP_Test_RTL819x 2.3						
Modulation Mode	N _{TX}	Test Frequency (MHz)					
		NCB: 20MHz		NCB: 40MHz		NCB: 80MHz	
		5260	5300	5320	5270	5310	5290
11a	1	57	63	61	-	-	-
HT20	1	57	63	61	-	-	-
HT40	1	-	-	-	63	56	-
VHT20	1	57	63	61	-	-	-
VHT40	1	-	-	-	63	56	-
VHT80	1	-	-	-	-	-	52

The Worst Case Power Setting Parameter (5470-5725MHz band)							
Test Software Version	MP_Test_RTL819x 2.3						
Modulation Mode	N _{TX}	Test Frequency (MHz)					
		NCB: 20MHz		NCB: 40MHz		NCB: 80MHz	
		5500	5580	5700	5510	5550	5670
11a	1	45	44	29	-	-	-
HT20	1	41	43	31	-	-	-
HT40	1	-	-	-	41	45	34
VHT20	1	41	43	31	-	-	-
VHT40	1	-	-	-	41	48	34
VHT80	1	-	-	-	-	-	39



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	Adapter Mode & Transmitter
2	USB Mode & Transmitter

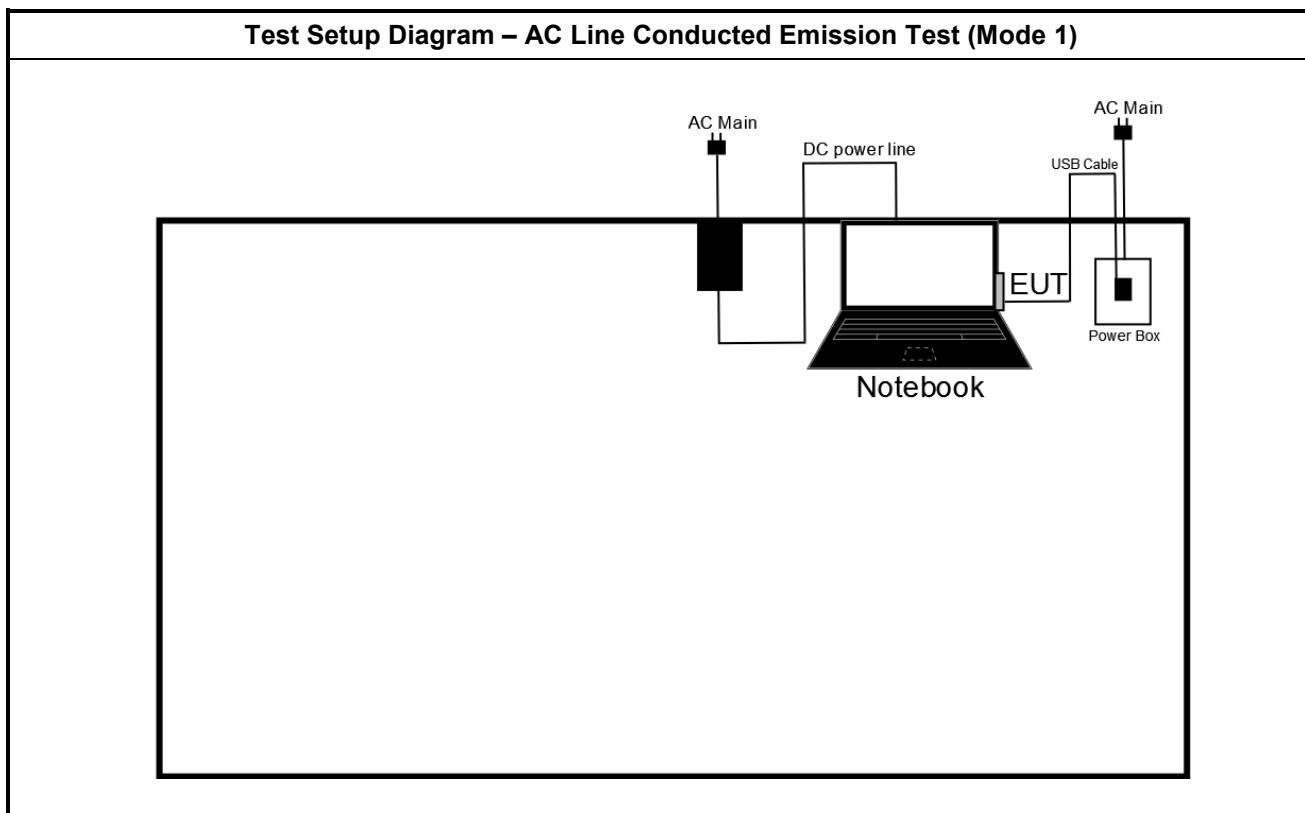
For operating mode 1 is the worst case and it was record in this test report.

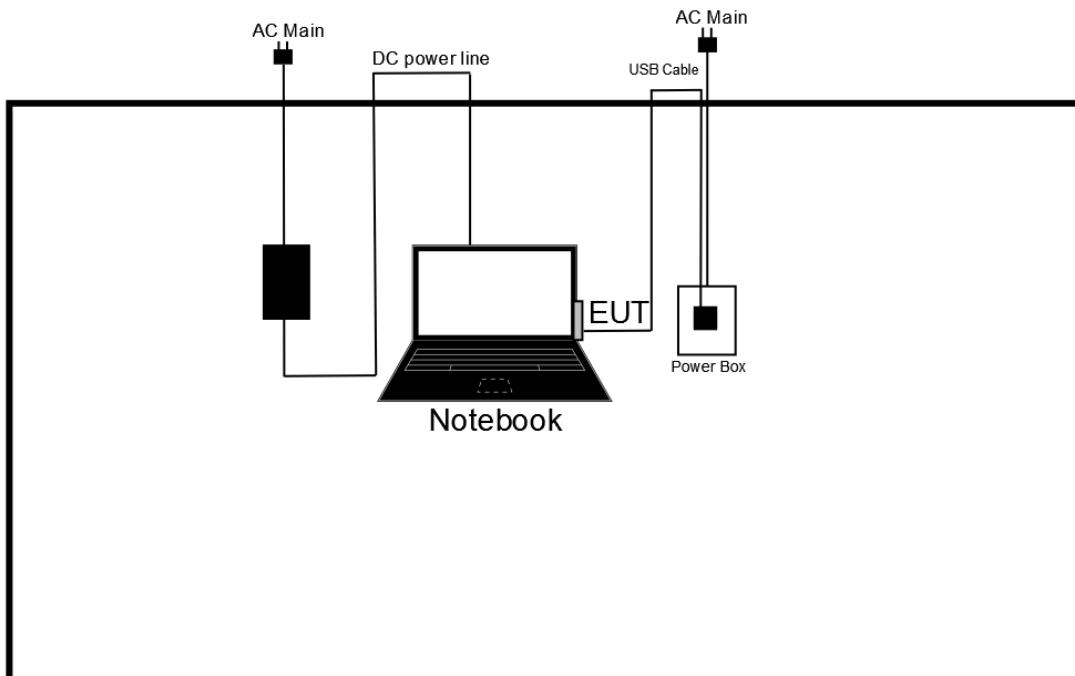
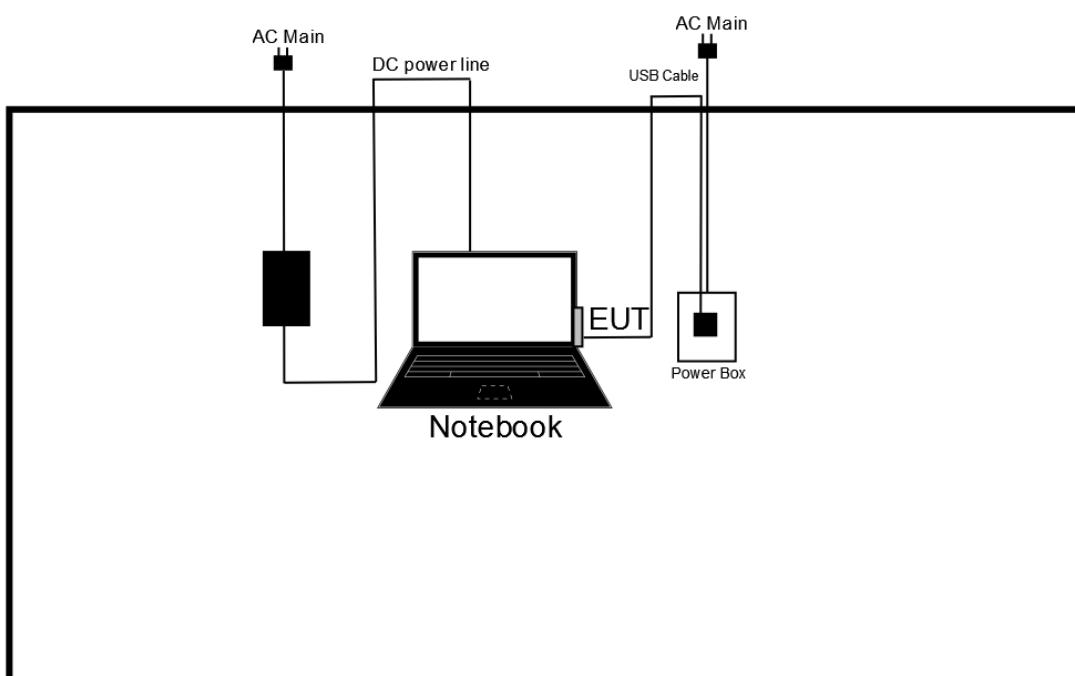
The Worst Case Mode for Following Conformance Tests	
Tests Item	RF Output Power, Peak Power Spectral Density, Emission Bandwidth, Transmitter Conducted Unwanted Emissions Transmitter Conducted Bandedge Emissions
Test Condition	Conducted measurement at transmit chains
Modulation Mode	11a, HT20, HT40, VHT20, VHT40, VHT80



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. <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.
Operating Mode < 1GHz	Operating Mode Description
1	Adapter Mode & Transmitter
2	USB Mode & Transmitter
For operating mode 1 is the worst case and it was record in this test report.	
Operating Mode > 1GHz	Adapter Mode & Transmitter
Modulation Mode	11a, HT20, HT40, VHT20, VHT40, VHT80
Orthogonal Planes of EUT	Z Plane 

2.4 Test Setup Diagram



Test Setup Diagram - Radiated Emission (Below 1GHz) - Mode 1**Test Setup Diagram - Radiated Emission (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.

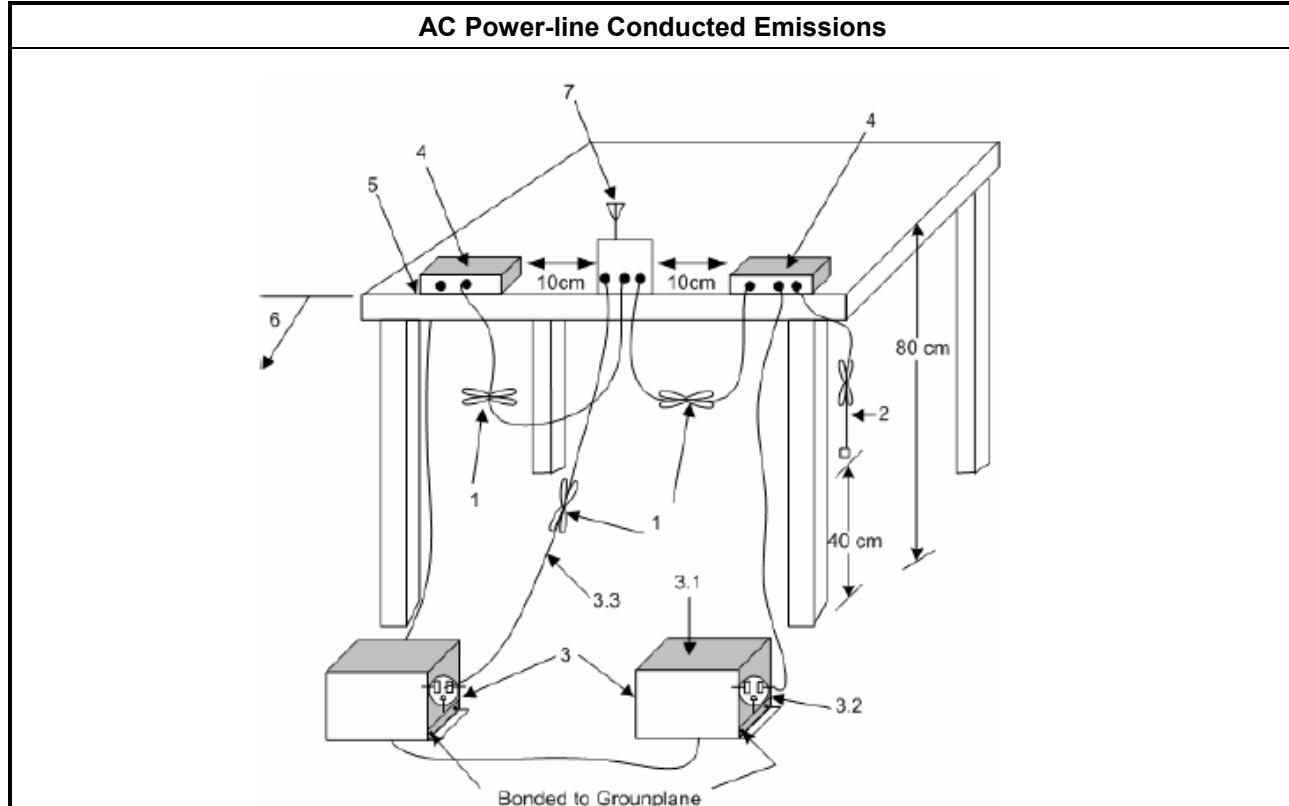
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

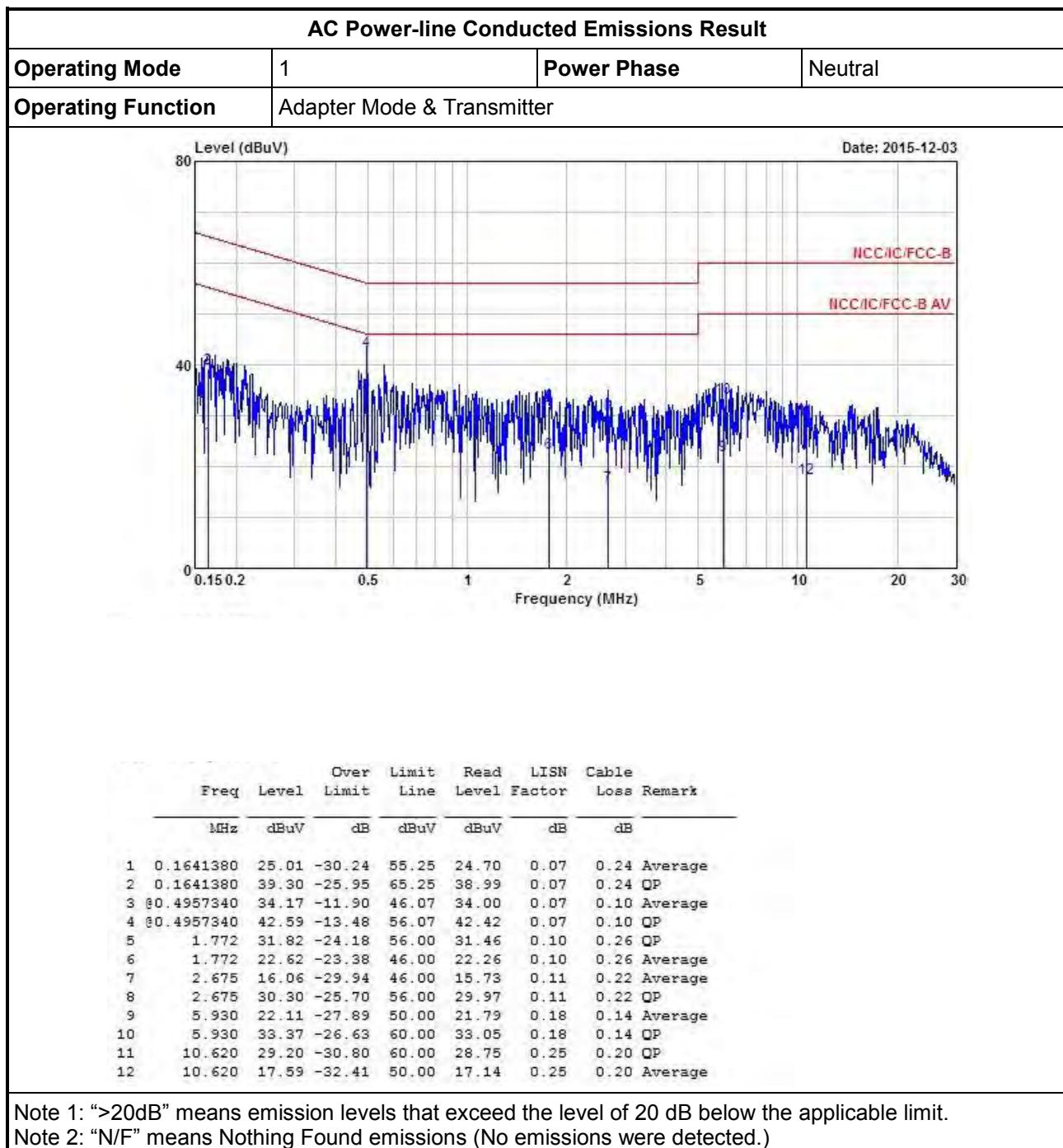
Test Method
<input checked="" type="checkbox"/> Refer as ANSI C63.10-2013, clause 6.2 for AC power-line conducted emissions.

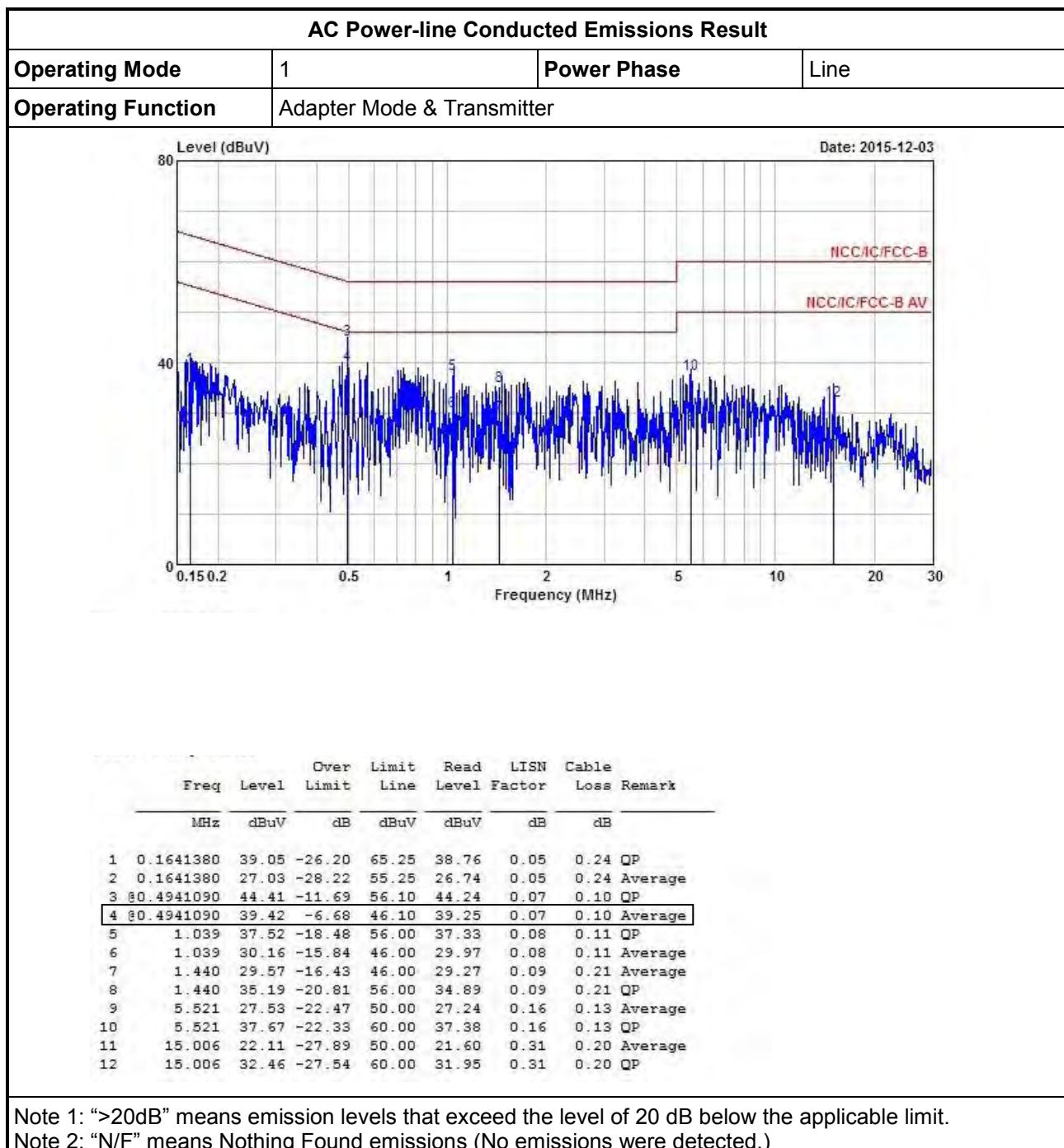
3.1.4 Test Setup





3.1.5 Test Result of AC Power-line Conducted Emissions





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 Limit

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

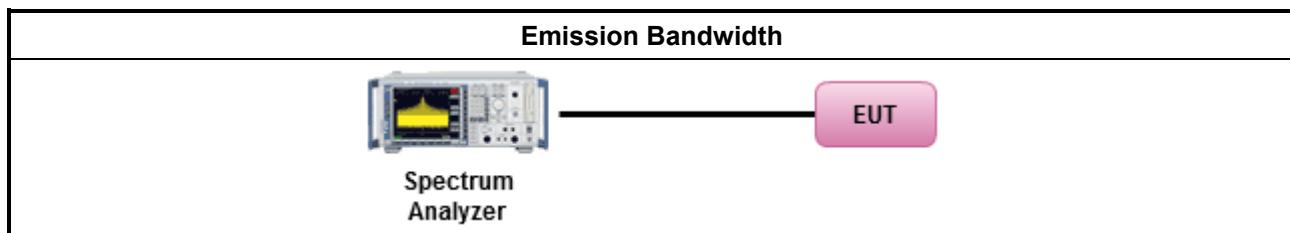
3.2.2 Measuring Instruments

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, 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 6.6 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 port 1.
<input type="checkbox"/>	The EUT supports diversity transmitting and the results on transmit chain port 1 is the worst case.
<input 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 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.

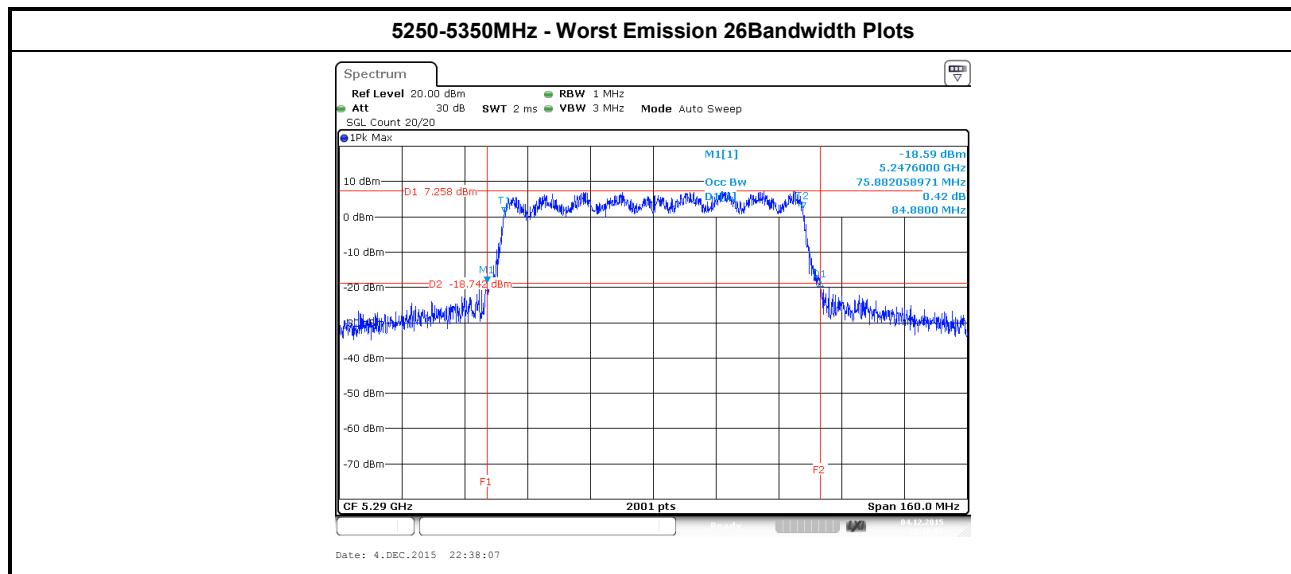
3.2.4 Test Setup





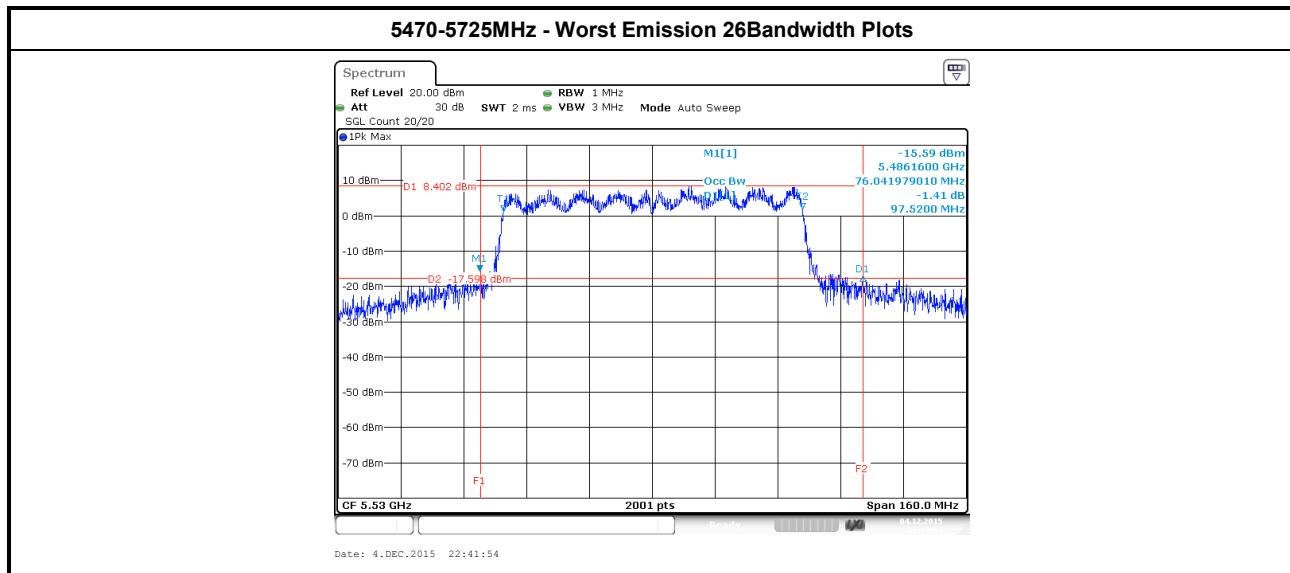
3.2.5 Test Result of Emission Bandwidth

UNII Emission Bandwidth Result (5250-5350MHz band)				
Condition			Emission Bandwidth (MHz)	
Modulation Mode	N _{TX}	Freq. (MHz)	99% Bandwidth	26dB Bandwidth
11a	1	5260	16.59	20.30
11a	1	5300	17.26	31.95
11a	1	5320	16.94	28.00
HT20	1	5260	17.79	20.62
HT20	1	5300	18.06	28.12
HT20	1	5320	18.09	28.07
HT40	1	5270	37.18	69.96
HT40	1	5310	36.82	51.64
VHT20	1	5260	17.91	20.97
VHT20	1	5300	18.21	29.15
VHT20	1	5320	17.96	28.90
VHT40	1	5270	37.10	69.20
VHT40	1	5310	36.86	51.40
VHT80	1	5290	75.88	84.88
Result			Complied	





UNII Emission Bandwidth Result (5470-5725MHz band)				
Condition		Emission Bandwidth (MHz)		
Modulation Mode	N _{TX}	Freq. (MHz)	99% Bandwidth	26dB Bandwidth
11a	1	5500	17.06	28.67
11a	1	5580	19.81	34.25
11a	1	5700	16.76	20.40
HT20	1	5500	17.64	21.22
HT20	1	5580	19.84	32.82
HT20	1	5700	17.79	20.97
HT40	1	5510	36.78	49.64
HT40	1	5550	38.90	79.36
HT40	1	5670	37.22	69.68
VHT20	1	5500	17.76	20.75
VHT20	1	5580	19.99	35.90
VHT20	1	5700	17.66	20.30
VHT40	1	5510	36.90	51.52
VHT40	1	5550	39.86	79.56
VHT40	1	5670	36.98	72.12
VHT80	1	5530	76.04	97.52
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:	
<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 ≤ 125 mW [21dBm]	
<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 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 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 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 5.47-5.725 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 type="checkbox"/> For the 5.725-5.85 GHz band:	
<input 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.	

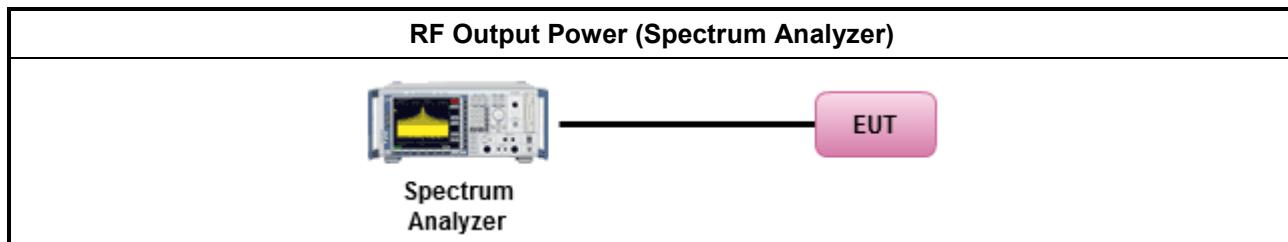
3.3.2 Measuring Instruments

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

3.3.3 Test Procedures

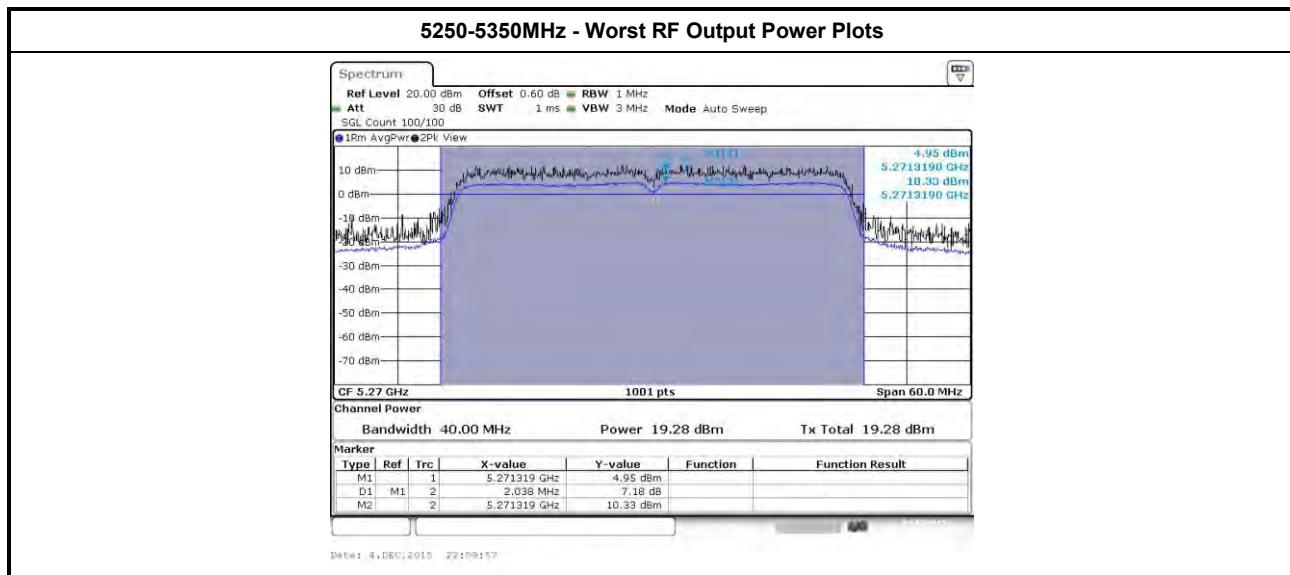
Test Method	
<input checked="" type="checkbox"/> Maximum Conducted Output Power	
	[duty cycle \geq 98% or external video / power trigger]
<input checked="" type="checkbox"/>	Refer as FCC KDB 789033, clause E Method SA-1 (spectral trace averaging).
<input type="checkbox"/>	Refer as FCC KDB 789033, clause E Method SA-1 Alt. (RMS detection with slow sweep speed)
	duty cycle $<$ 98% and average over on/off periods with duty factor
<input checked="" 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 port.
<input type="checkbox"/>	The EUT supports diversity transmitting and the results on transmit chain port 1 is the worst case.
<input 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 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 Test Result of Maximum Conducted Output Power

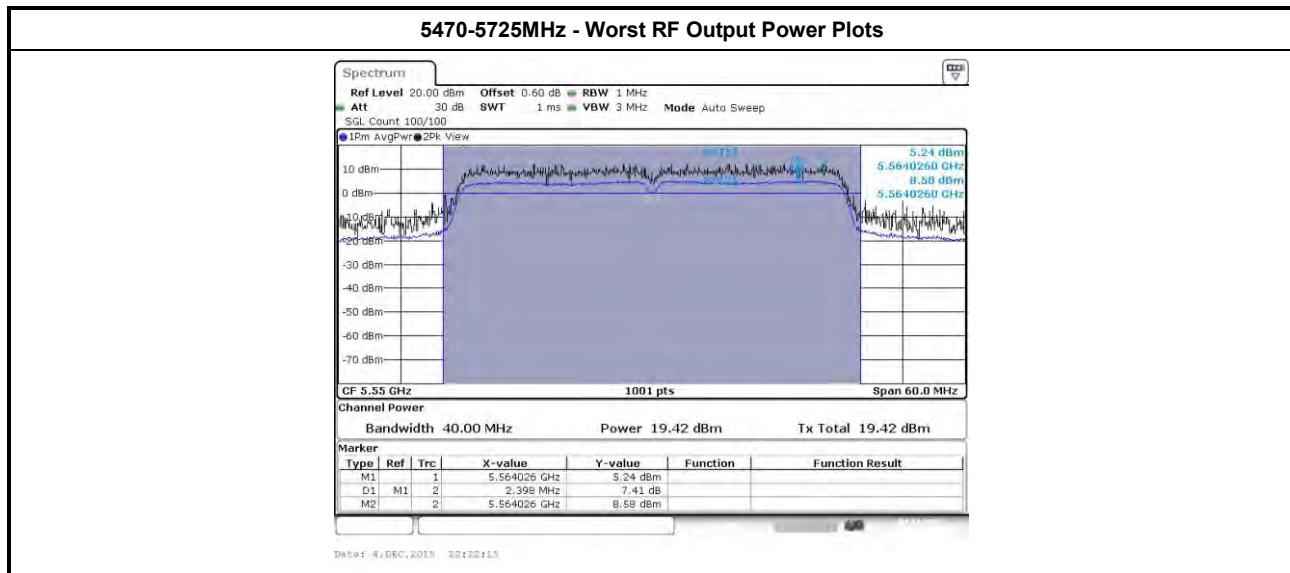
Maximum Conducted Output Power (5250-5350MHz band)					
Modulation Mode	N _{TX}	Freq. (MHz)	Output Power (dBm)	Antenna Gain (dBi)	EIRP Power
11a	1	5260	18.36	2.80	21.16
11a	1	5300	19.19	2.80	21.99
11a	1	5320	18.72	2.80	21.52
HT20	1	5260	17.83	2.80	20.63
HT20	1	5300	18.72	2.80	21.52
HT20	1	5320	18.91	2.80	21.71
HT40	1	5270	19.28	2.80	22.08
HT40	1	5310	17.79	2.80	20.59
VHT20	1	5260	17.58	2.80	20.38
VHT20	1	5300	18.73	2.80	21.53
VHT20	1	5320	18.36	2.80	21.16
VHT40	1	5270	18.94	2.80	21.74
VHT40	1	5310	17.63	2.80	20.43
VHT80	1	5290	16.47	2.80	19.27
Result		Complied			



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



Maximum Conducted Output Power (5250-5350MHz band)					
Modulation Mode	N _{TX}	Freq. (MHz)	Output Power (dBm)	Antenna Gain (dBi)	EIRP Power
11a	1	5500	17.95	2.80	20.75
11a	1	5580	19.31	2.80	22.11
11a	1	5700	15.76	2.80	18.56
HT20	1	5500	16.65	2.80	19.45
HT20	1	5580	18.67	2.80	21.47
HT20	1	5700	17.07	2.80	19.87
HT40	1	5510	16.87	2.80	19.67
HT40	1	5550	19.21	2.80	22.01
HT40	1	5670	17.81	2.80	20.61
VHT20	1	5500	16.61	2.80	19.41
VHT20	1	5580	18.47	2.80	21.27
VHT20	1	5700	16.88	2.80	19.68
VHT40	1	5510	16.96	2.80	19.76
VHT40	1	5550	19.42	2.80	22.22
VHT40,	1	5670	17.56	2.80	20.36
VHT80	1	5530	17.08	2.80	19.88
VHT80	1	5530	17.95	2.80	20.75
Result		Complied			



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:	
<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 type="checkbox"/> Mobile or Portable Client: 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 5.25-5.35 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 5.725-5.85 GHz band:	
<input type="checkbox"/> Point-to-multipoint systems (P2M): the peak power spectral density (PPSD) ≤ 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) ≤ 30 dBm/500kHz.	
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.	

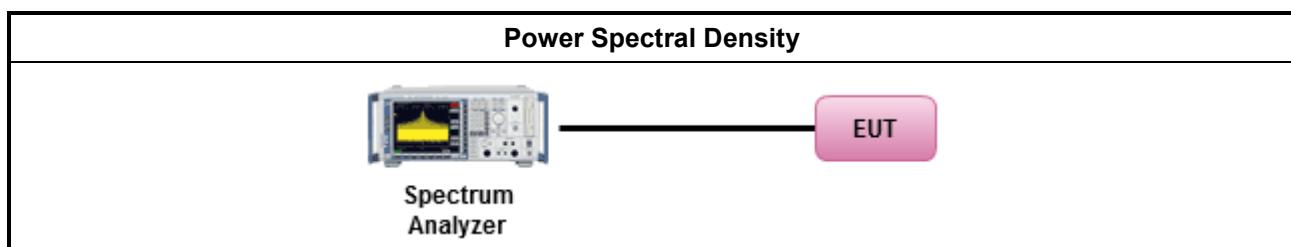
3.4.2 Measuring Instruments

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, F)5) 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 checked="" 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 port.
<input type="checkbox"/> The EUT supports diversity transmitting and the results on transmit chain port 1 is the worst case.
<input 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 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 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.

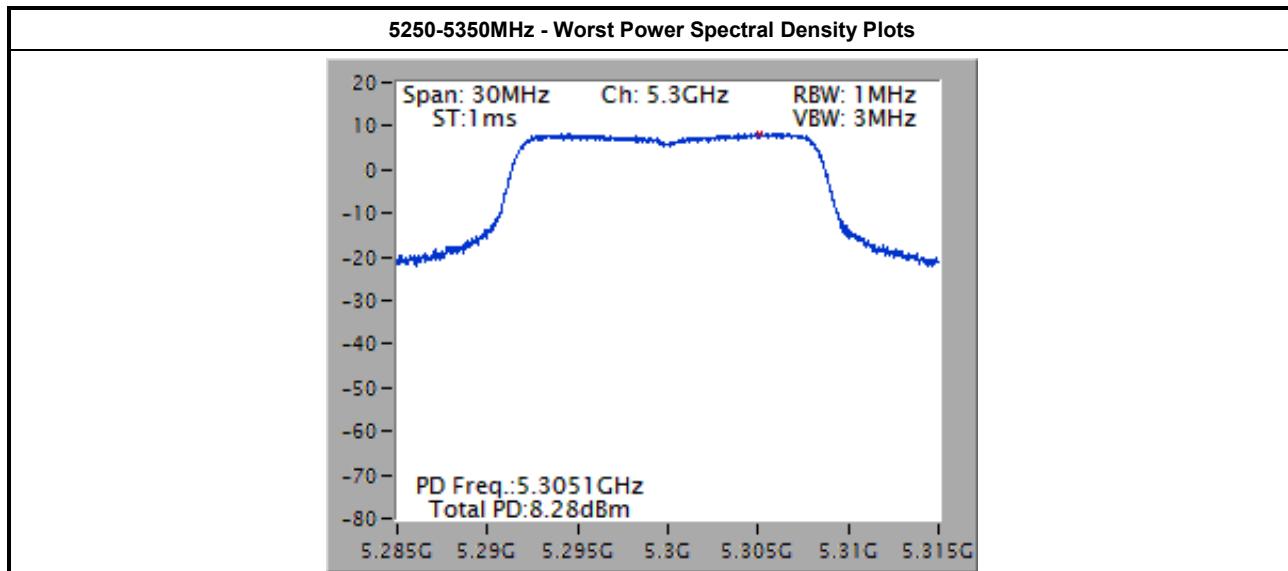
3.4.4 Test Setup





3.4.5 Test Result of Peak Power Spectral Density

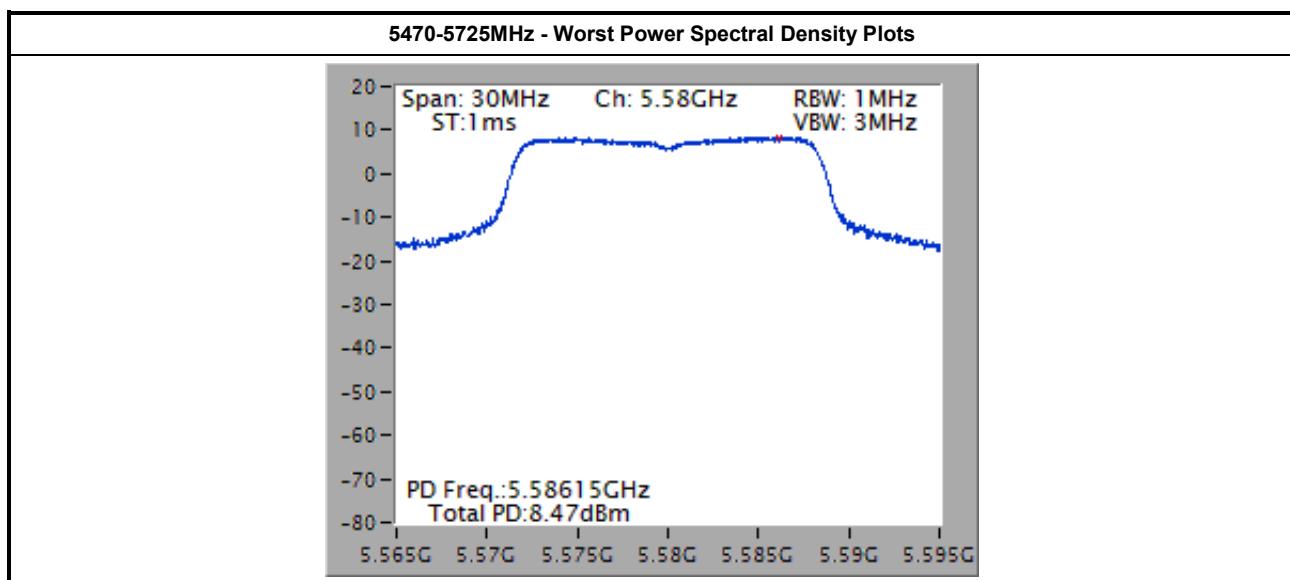
Peak Power Spectral Density Result (5250-5350MHz band)					
Modulation Mode	N _{TX}	Freq. (MHz)	Peak Power Spectral Density (dBm)	PSD Limit	Antenna Gain (dBi)
11a	1	5260	7.45	11.00	2.58
11a	1	5300	8.28	11.00	2.58
11a	1	5320	7.94	11.00	2.58
HT20	1	5260	6.63	11.00	2.58
HT20	1	5300	7.60	11.00	2.58
HT20	1	5320	7.79	11.00	2.58
HT40	1	5270	4.95	11.00	2.58
HT40	1	5310	3.60	11.00	2.58
VHT20	1	5260	6.50	11.00	2.58
VHT20	1	5300	7.62	11.00	2.58
VHT20	1	5320	7.51	11.00	2.58
VHT40	1	5270	4.70	11.00	2.58
VHT40	1	5310	3.65	11.00	2.58
VHT80	1	5290	0.23	11.00	2.58
Result		Complied			



Note 1: Power Density Plots w/o Duty Factor.

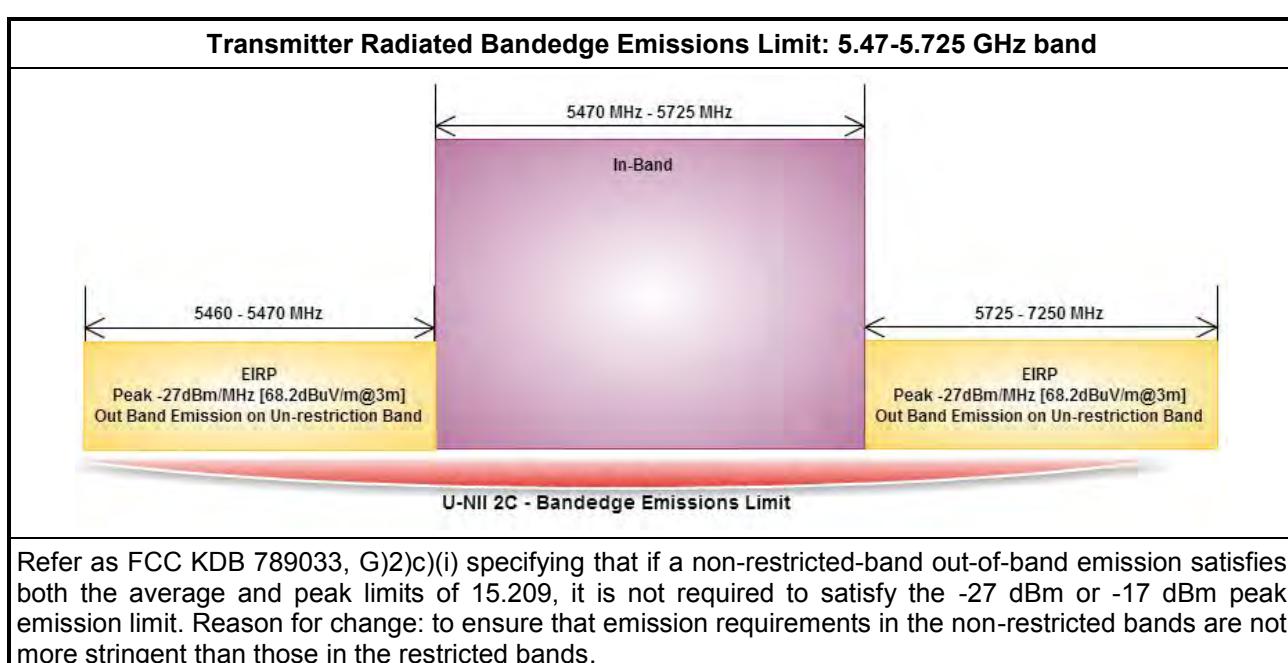
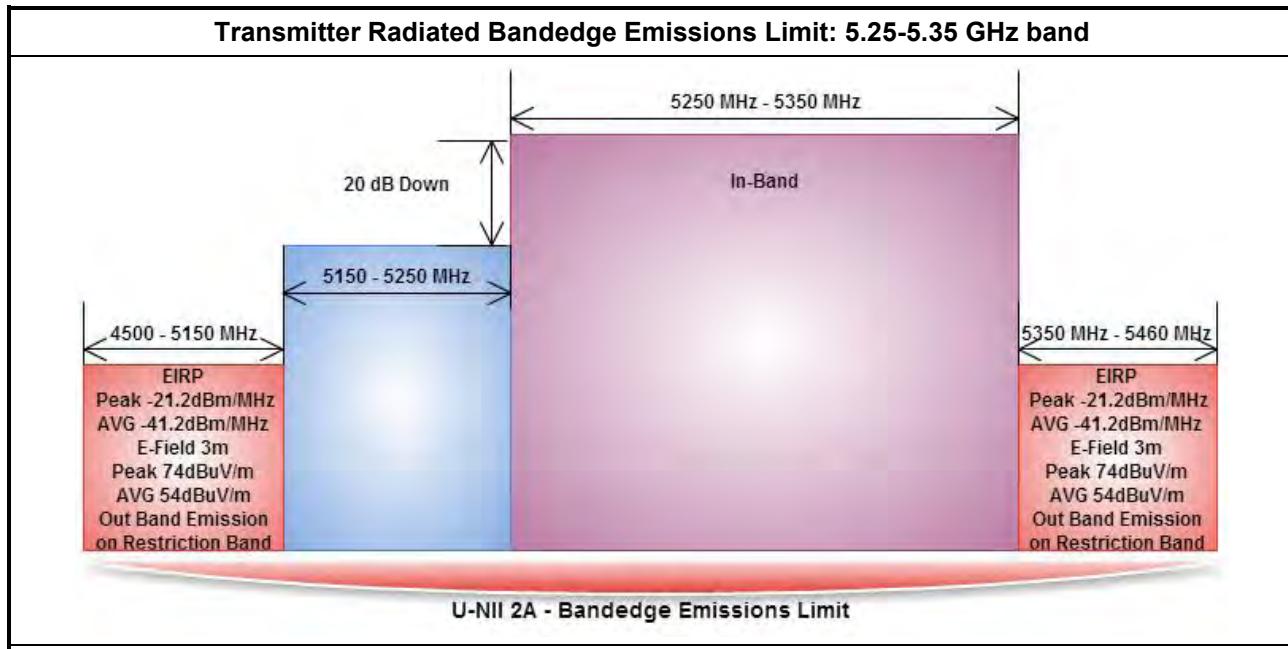


Peak Power Spectral Density Result (5470-5725MHz band)					
Modulation Mode	N _{TX}	Freq. (MHz)	Peak Power Spectral Density (dBm)	PSD Limit	Antenna Gain (dBi)
11a	1	5500	7.34	11.00	2.58
11a	1	5580	8.47	11.00	2.58
11a	1	5700	4.82	11.00	2.58
HT20	1	5500	5.78	11.00	2.58
HT20	1	5580	7.66	11.00	2.58
HT20	1	5700	5.98	11.00	2.58
HT40	1	5510	2.72	11.00	2.58
HT40	1	5550	4.88	11.00	2.58
HT40	1	5670	3.74	11.00	2.58
VHT20	1	5500	5.46	11.00	2.58
VHT20	1	5580	7.46	11.00	2.58
VHT20	1	5700	5.77	11.00	2.58
VHT40	1	5510	2.69	11.00	2.58
VHT40	1	5550	5.24	11.00	2.58
VHT40	1	5670	3.70	11.00	2.58
VHT80	1	5530	1.11	11.00	2.58
Result		Complied			



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.

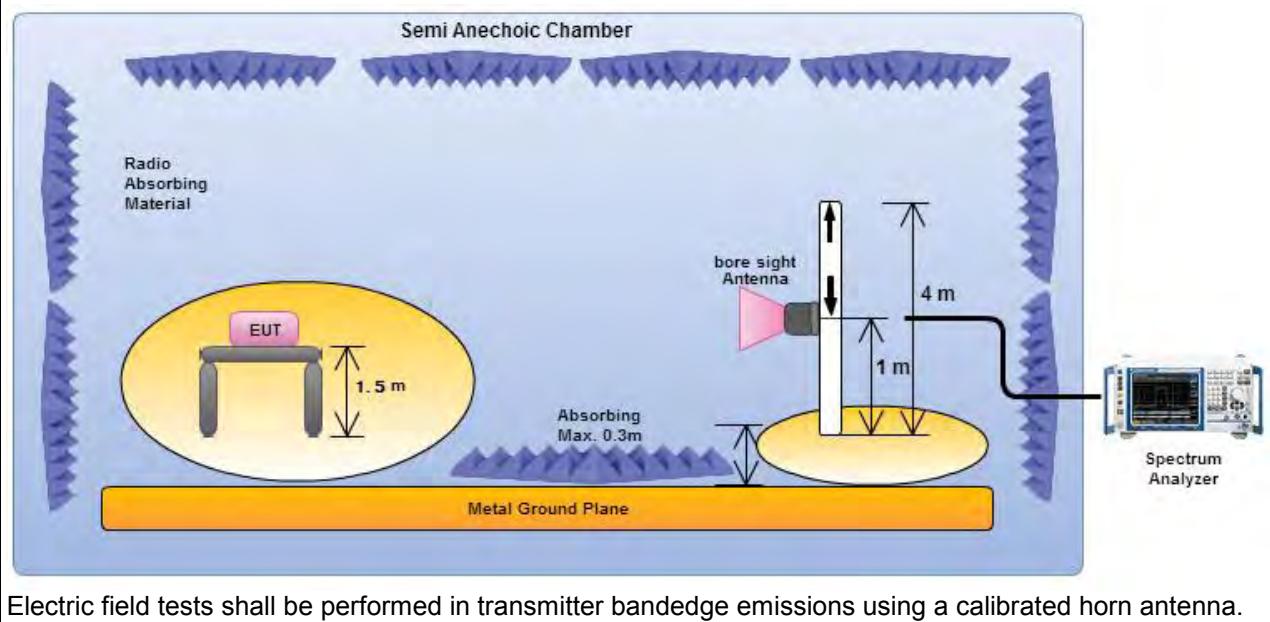


3.5.3 Test Procedures

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 6.10 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"><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"/> Operating in 5.47-5.725 GHz band (lower-band) and 5.725-5.85 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) <ul style="list-style-type: none"><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"/> Operating in 5.15-5.25 GHz band (lower-band) and 5.725-5.85 GHz band (higher-band).
<input checked="" type="checkbox"/> For the transmitter unwanted emissions shall be measured using following options below: <ul style="list-style-type: none"><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.<ul style="list-style-type: none"><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 4.1.4.2.3 (Reduced VBW). $VBW \geq 1/T$, where T is pulse time.<input type="checkbox"/> Refer as ANSI C63.10, clause 4.1.4.2.4 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 4.1.4.2.2 measurement procedure peak limit.
<input checked="" type="checkbox"/> For the transmitter bandedge emissions shall be measured using following options below: <ul style="list-style-type: none"><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"/> Refer as ANSI C63.10, clause 6.10 for band-edge testing.<input type="checkbox"/> Refer as ANSI C63.10, clause 6.10.6.2 for marker-delta method for band-edge measurements.
<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 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	5260	3	5140.200	62.65	74	5139.600	50.58	54	V
11a	1	5320	3	5353.400	68.55	74	5350.180	52.88	54	V
HT20	1	5260	3	5100.000	62.13	74	5139.600	50.37	54	V
HT20	1	5320	3	5353.540	69.98	74	5350.040	52.65	54	V
HT40	1	5270	3	5121.600	62.08	74	5109.600	50.52	54	V
HT40	1	5310	3	5351.560	67.71	74	5350.000	52.98	54	V
VHT20	1	5260	3	5140.800	62.32	74	5140.200	50.42	54	V
VHT20	1	5320	3	5353.540	69.42	74	5350.320	52.65	54	V
VHT40	1	5270	3	5136.600	62.55	74	5109.600	50.36	54	V
VHT40	1	5310	3	5351.560	68.29	74	5350.000	52.35	54	V
VHT80	1	5290	3	5105.400	61.95	74	5130.000	49.89	54	V
VHT80	1	5290	3	5351.400	65.87	74	5350.800	52.96	54	V

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	Pol.
11a	1	5500	3	5467.280	66.97	68.2	V
11a	1	5700	3	5725.280	67.14	68.2	V
HT20	1	5500	3	5468.240	66.60	68.2	V
HT20	1	5700	3	5726.960	66.60	68.2	V
HT40	1	5510	3	5467.200	66.50	68.2	V
HT40	1	5670	3	5725.400	66.47	68.2	V
VHT20	1	5500	3	5465.200	66.23	68.2	V
VHT20	1	5700	3	5725.040	66.43	68.2	V
VHT40	1	5510	3	5466.800	67.15	68.2	V
VHT40	1	5670	3	5725.400	65.95	68.2	V
VHT80	1	5530	3	5469.680	66.54	68.2	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]
5.25 - 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 - 5.85 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.

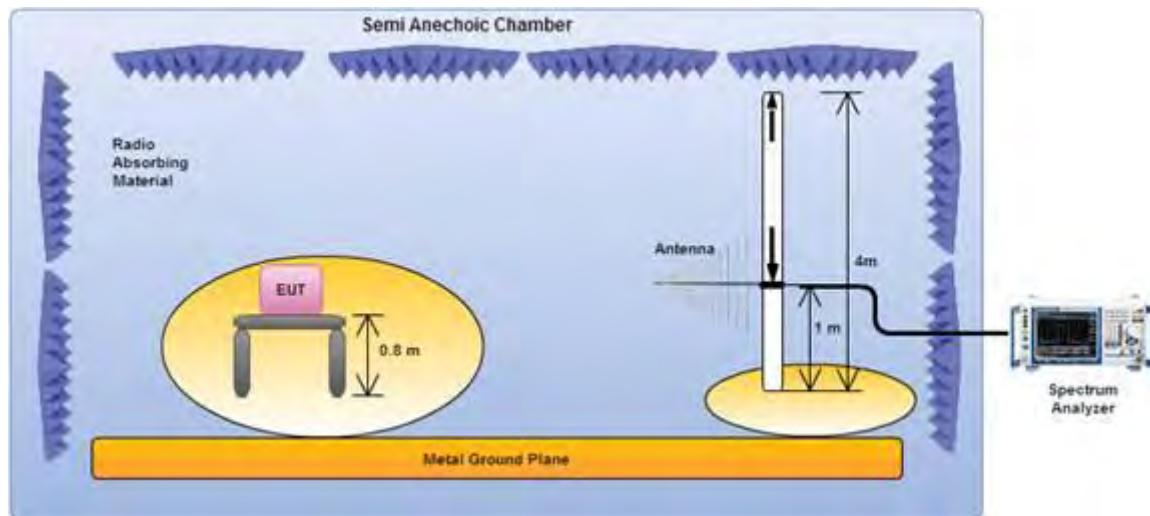


3.6.3 Test Procedures

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, clause G)2) for unwanted emissions into non-restricted bands.
<input checked="" type="checkbox"/> Refer as FCC KDB 789033, clause G)1) for unwanted emissions into restricted bands.
<input type="checkbox"/> Refer as FCC KDB 789033, G)6) Method AD (Trace Averaging).
<input type="checkbox"/> Refer as FCC KDB 789033, G)6) Method VB (Reduced VBW).
<input checked="" type="checkbox"/> Refer as ANSI C63.10, clause 4.1.4.2.3 (Reduced VBW). VBW \geq 1/T, where T is pulse time.
<input type="checkbox"/> Refer as ANSI C63.10, clause 4.1.4.2.4 average value of pulsed emissions.
<input checked="" type="checkbox"/> Refer as FCC KDB 789033, clause G)5) measurement procedure peak limit.
<input type="checkbox"/> Refer as ANSI C63.10, clause 4.1.4.2.2 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.

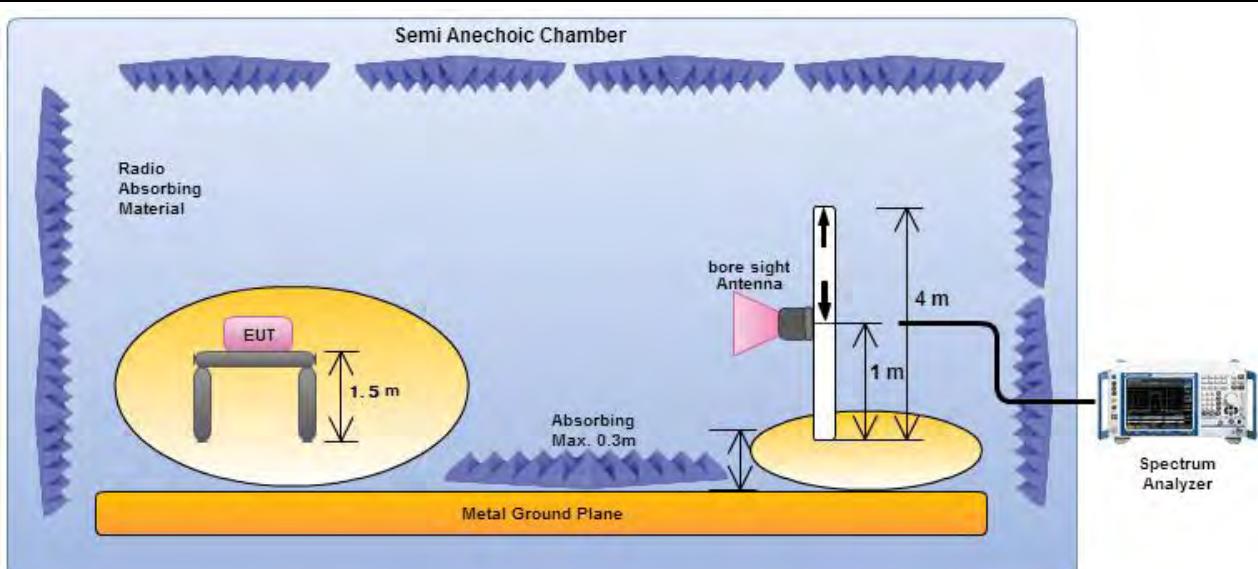
3.6.4 Test Setup

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



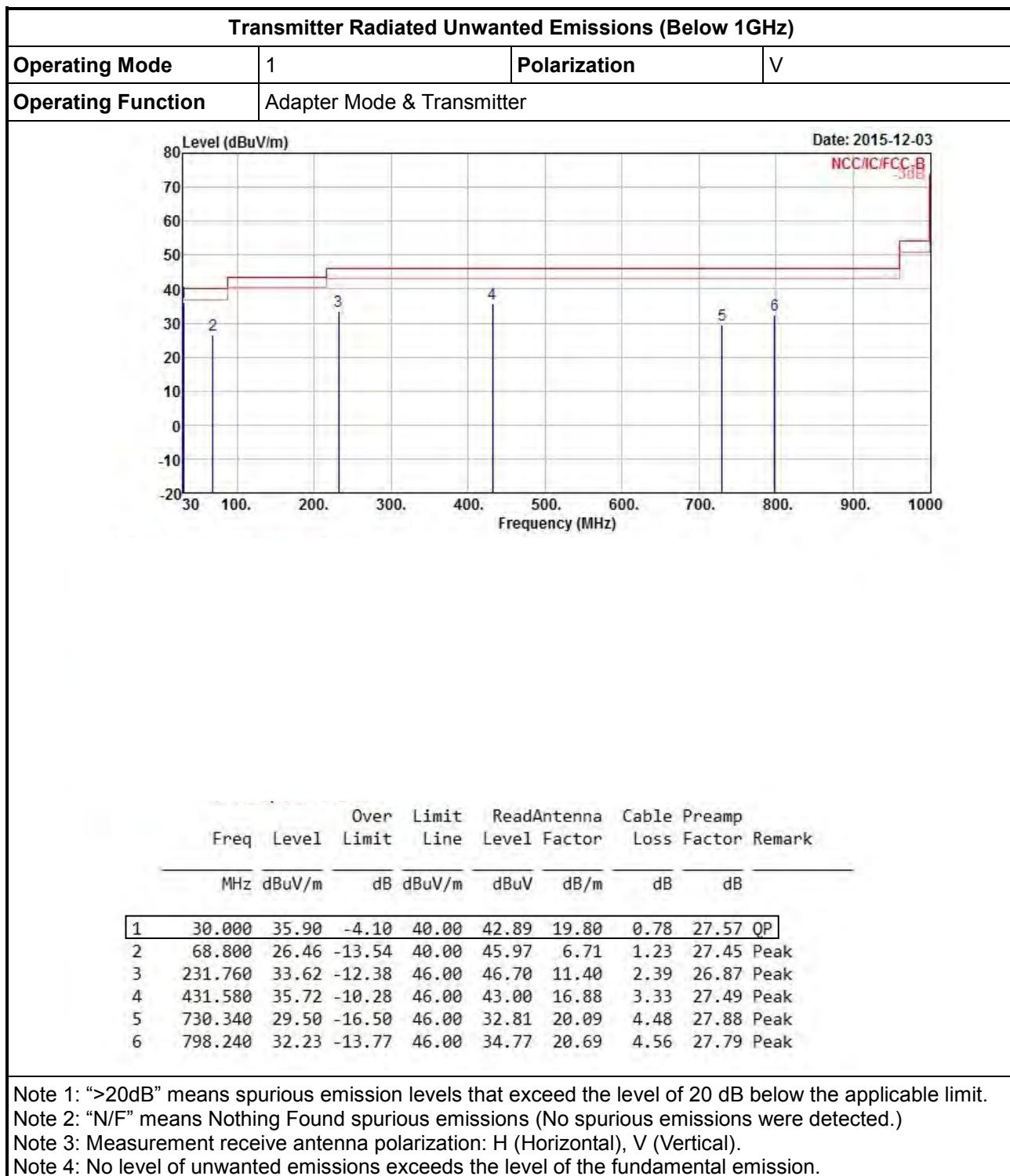
The frequency range of 1 GHz to 40 GHz using a calibrated horn antenna.

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.

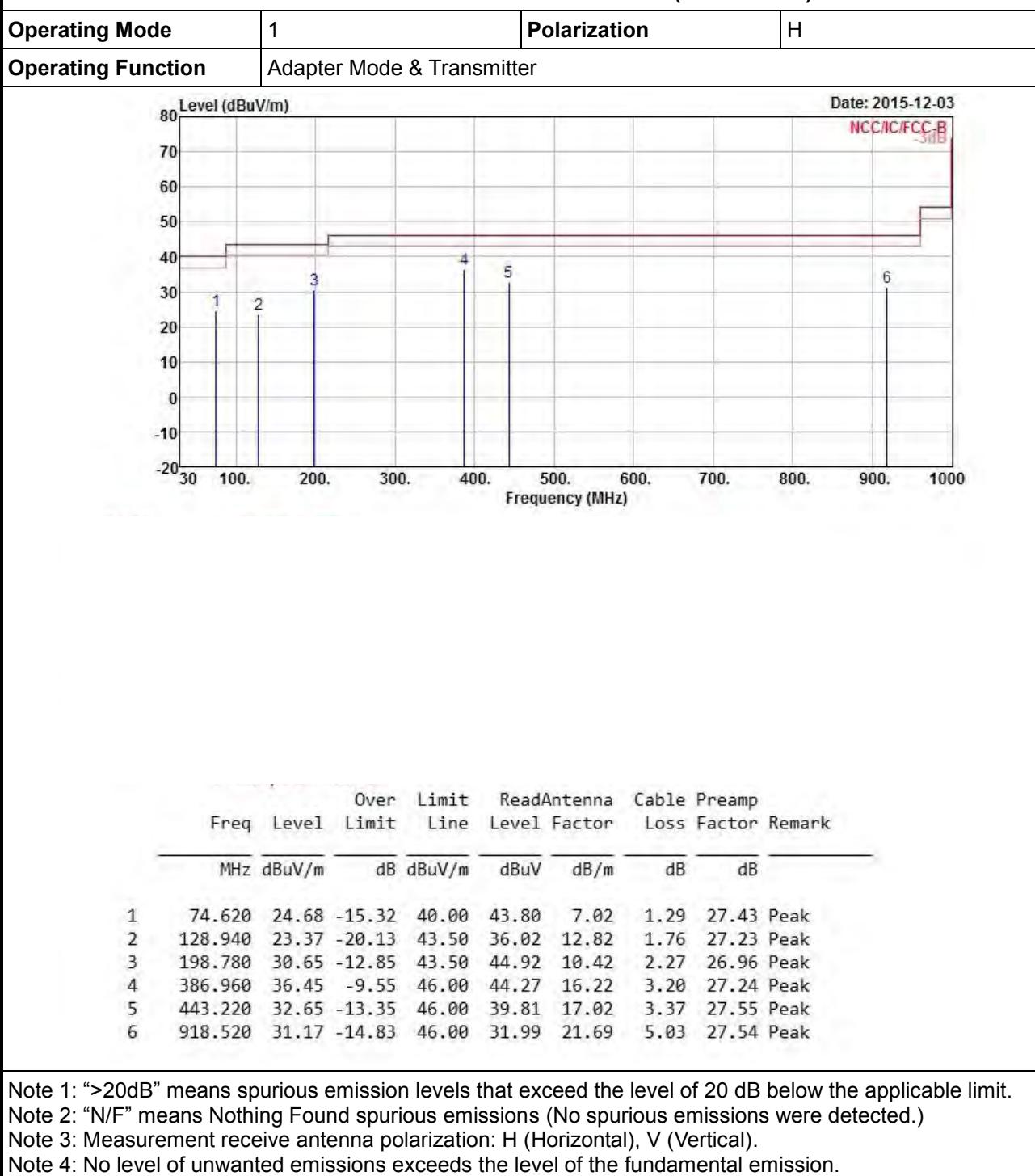


3.6.6 Transmitter Radiated Unwanted Emissions (Below 1GHz)





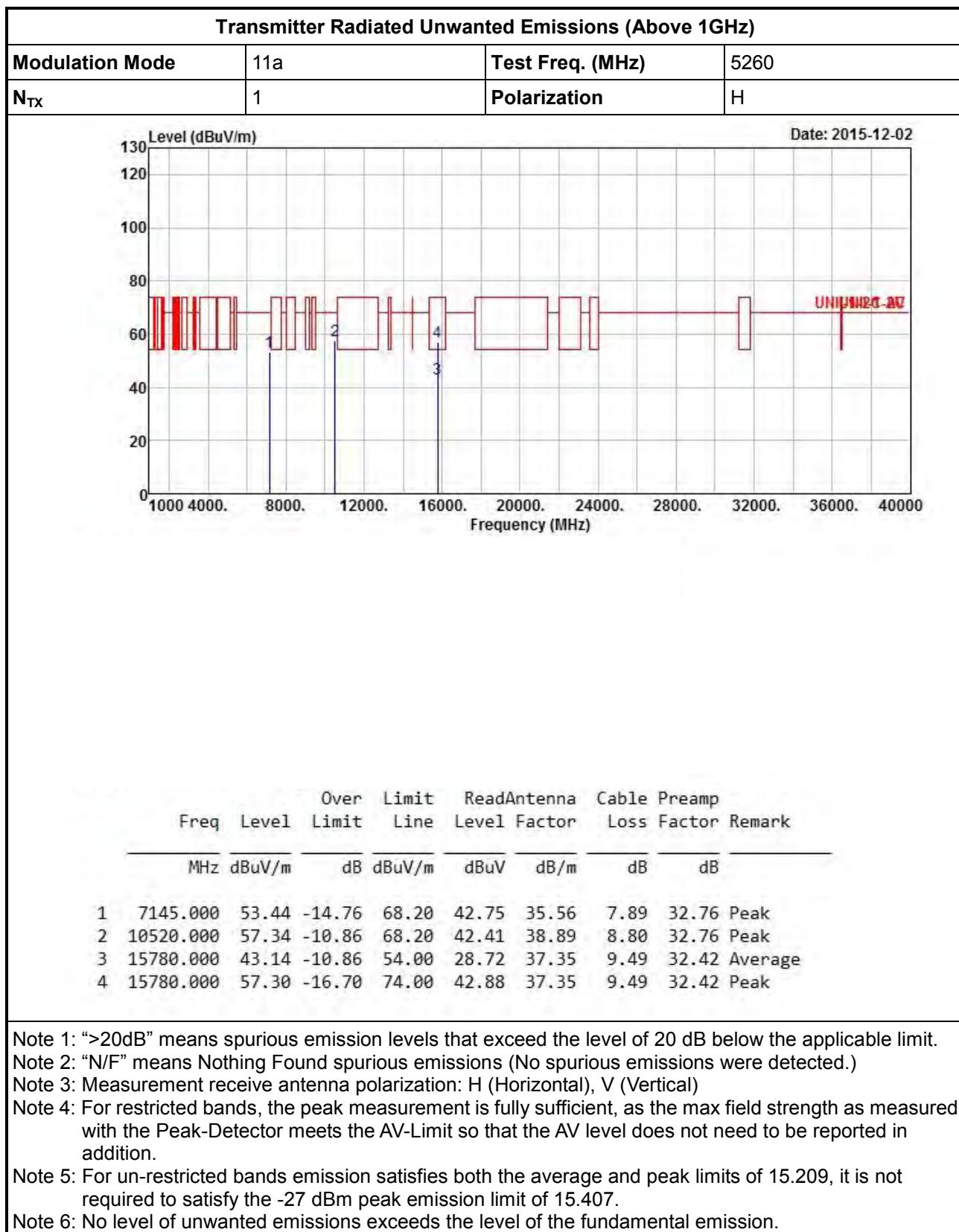
Transmitter Radiated Unwanted Emissions (Below 1GHz)





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

Transmitter Radiated Unwanted Emissions (Above 1GHz)																																																																							
Modulation Mode	11a		Test Freq. (MHz)	5260																																																																			
N _{TX}	1		Polarization	V																																																																			
Level (dBuV/m)								Date: 2015-12-02																																																															
1	1000	4000.	8000.	12000.	16000.	20000.	24000.	32000.																																																															
2	7641.000	42.19	-11.81	54.00	30.41	36.68	7.98	32.88																																																															
3	7641.000	54.63	-19.37	74.00	42.85	36.68	7.98	32.88																																																															
4	10520.000	56.78	-11.42	68.20	41.85	38.89	8.80	32.76																																																															
5	15780.000	43.16	-10.84	54.00	28.74	37.35	9.49	32.42																																																															
								Average																																																															
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								Average																																																															
								Peak																																																															
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Freq</th> <th style="text-align: center;">Level</th> <th style="text-align: center;">Over Limit</th> <th style="text-align: center;">Limit</th> <th style="text-align: center;">Read</th> <th style="text-align: center;">Antenna</th> <th style="text-align: center;">Cable</th> <th style="text-align: center;">Preamp</th> <th></th> </tr> <tr> <th style="text-align: center;">MHz</th> <th style="text-align: center;">dBuV/m</th> <th style="text-align: center;">dB</th> <th style="text-align: center;">dBuV/m</th> <th style="text-align: center;">dBuV</th> <th style="text-align: center;">dB/m</th> <th style="text-align: center;">dB</th> <th style="text-align: center;">dB</th> <th>Remark</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>7641.000</td> <td>42.19</td> <td>-11.81</td> <td>54.00</td> <td>30.41</td> <td>36.68</td> <td>7.98</td> <td>32.88 Average</td> </tr> <tr> <td>2</td> <td>7641.000</td> <td>54.63</td> <td>-19.37</td> <td>74.00</td> <td>42.85</td> <td>36.68</td> <td>7.98</td> <td>32.88 Peak</td> </tr> <tr> <td>3</td> <td>10520.000</td> <td>56.78</td> <td>-11.42</td> <td>68.20</td> <td>41.85</td> <td>38.89</td> <td>8.80</td> <td>32.76 Peak</td> </tr> <tr> <td>4</td> <td>15780.000</td> <td>43.16</td> <td>-10.84</td> <td>54.00</td> <td>28.74</td> <td>37.35</td> <td>9.49</td> <td>32.42 Average</td> </tr> <tr> <td>5</td> <td>15780.000</td> <td>57.42</td> <td>-16.58</td> <td>74.00</td> <td>43.00</td> <td>37.35</td> <td>9.49</td> <td>32.42 Peak</td> </tr> </tbody> </table>									Freq	Level	Over Limit	Limit	Read	Antenna	Cable	Preamp		MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	Remark	1	7641.000	42.19	-11.81	54.00	30.41	36.68	7.98	32.88 Average	2	7641.000	54.63	-19.37	74.00	42.85	36.68	7.98	32.88 Peak	3	10520.000	56.78	-11.42	68.20	41.85	38.89	8.80	32.76 Peak	4	15780.000	43.16	-10.84	54.00	28.74	37.35	9.49	32.42 Average	5	15780.000	57.42	-16.58	74.00	43.00	37.35	9.49	32.42 Peak
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Transmitter Radiated Unwanted Emissions (Above 1GHz)

Modulation Mode	11a	Test Freq. (MHz)	5300																																																								
N _{TX}	1	Polarization	V																																																								
Level (dBuV/m)			Date: 2015-12-02																																																								
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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)	5300																																																																								
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Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

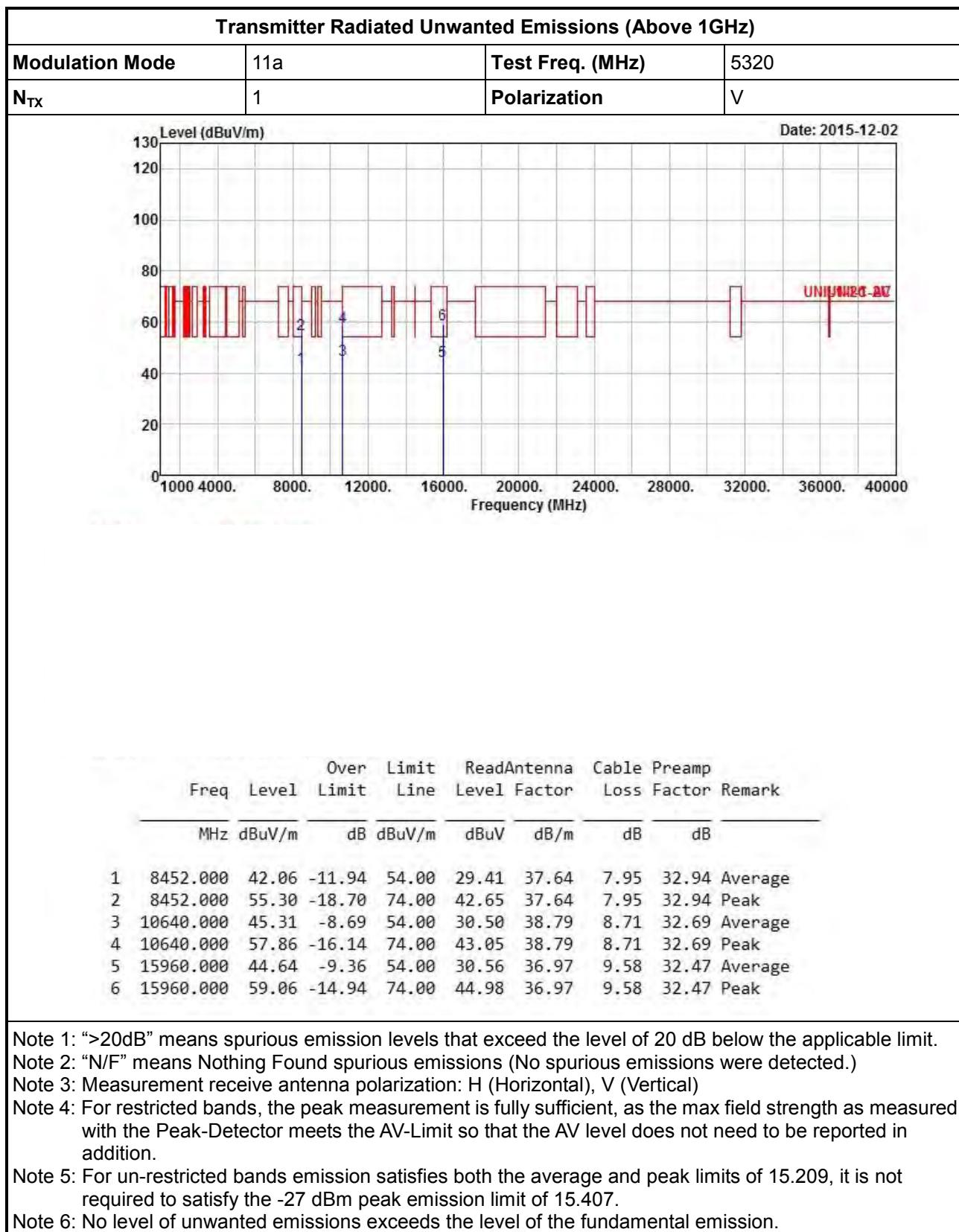
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

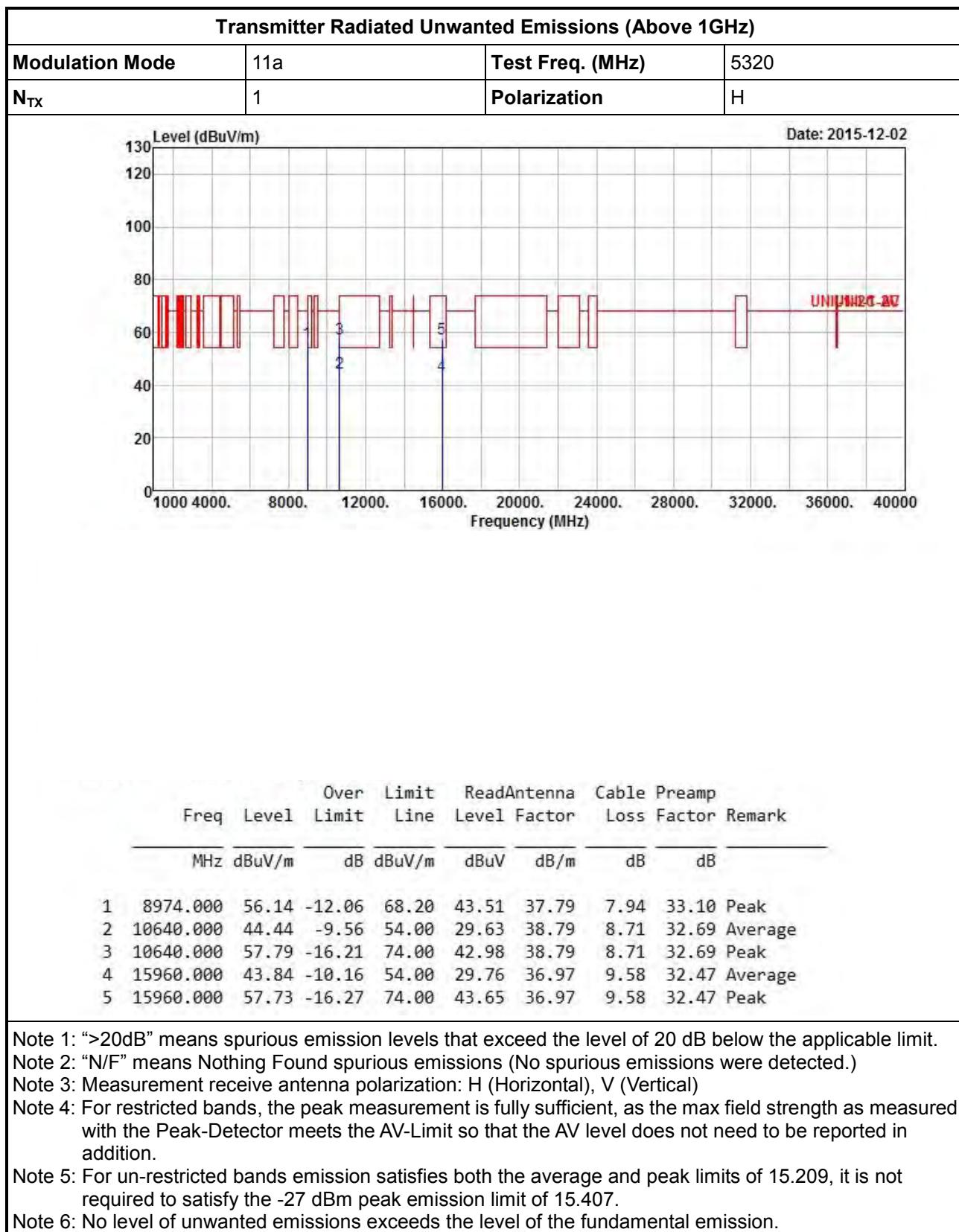
Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

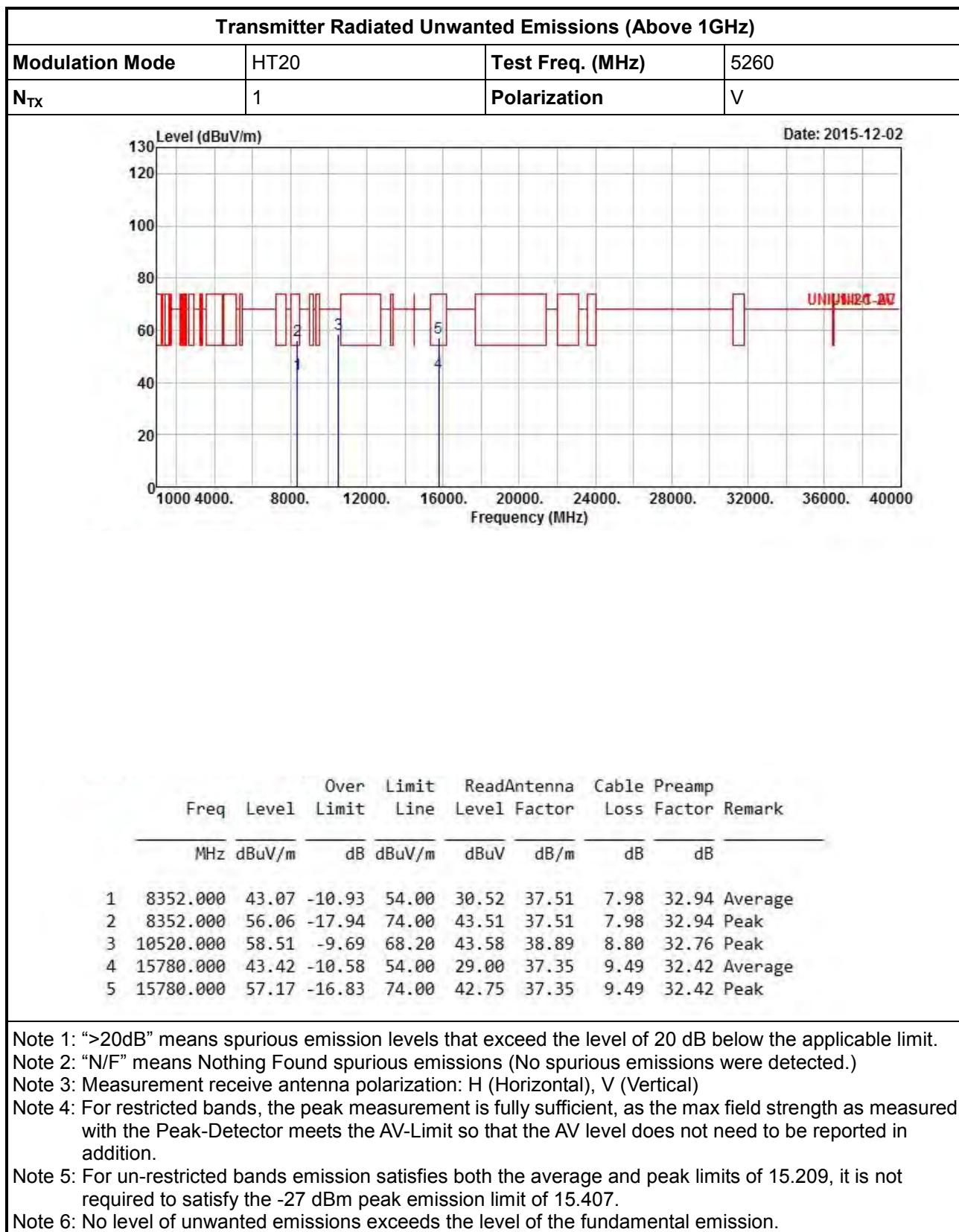
Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.

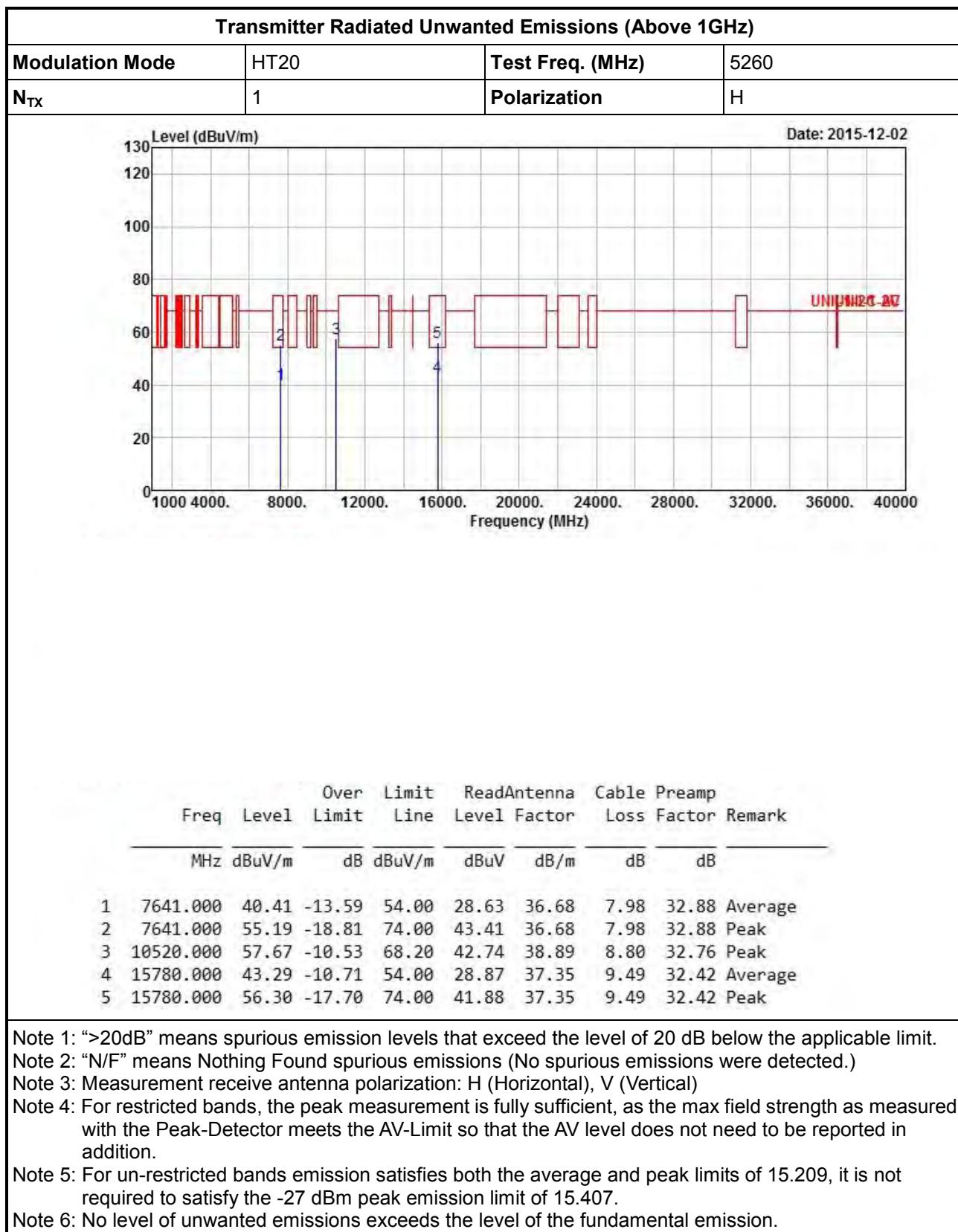
Note 5: For un-restricted bands emission satisfies both the average and peak limits of 15.209, it is not required to satisfy the -27 dBm peak emission limit of 15.407.

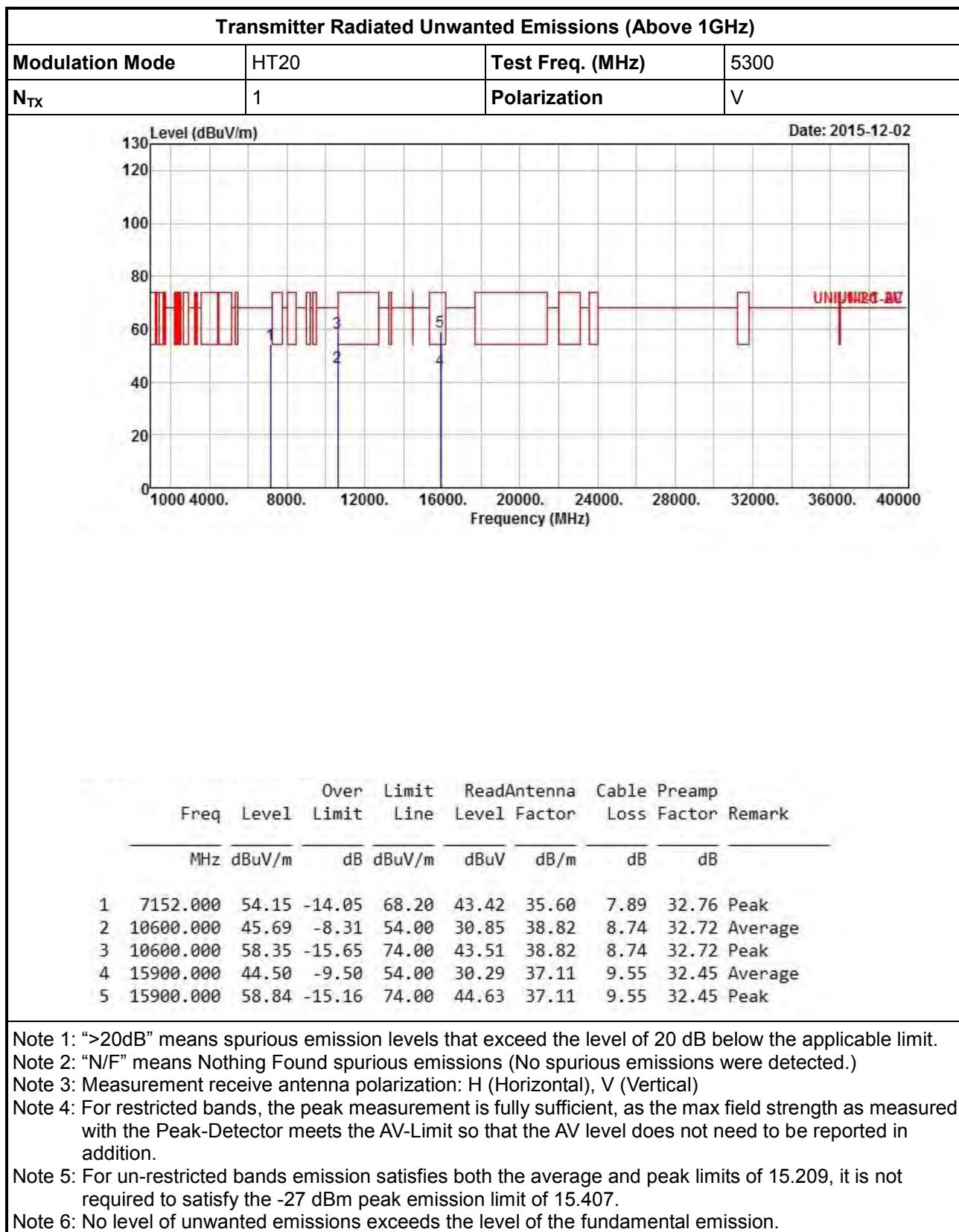
Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.

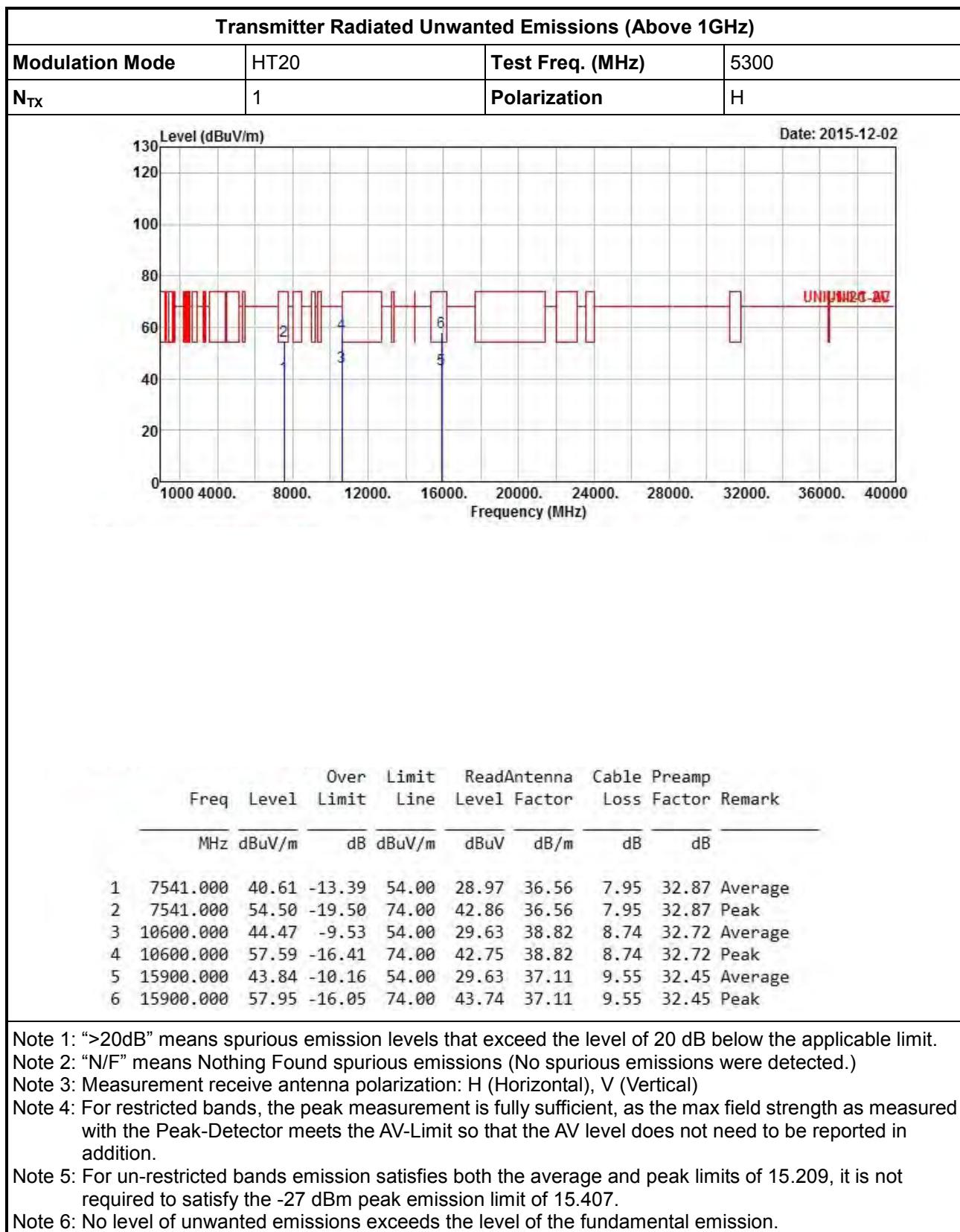


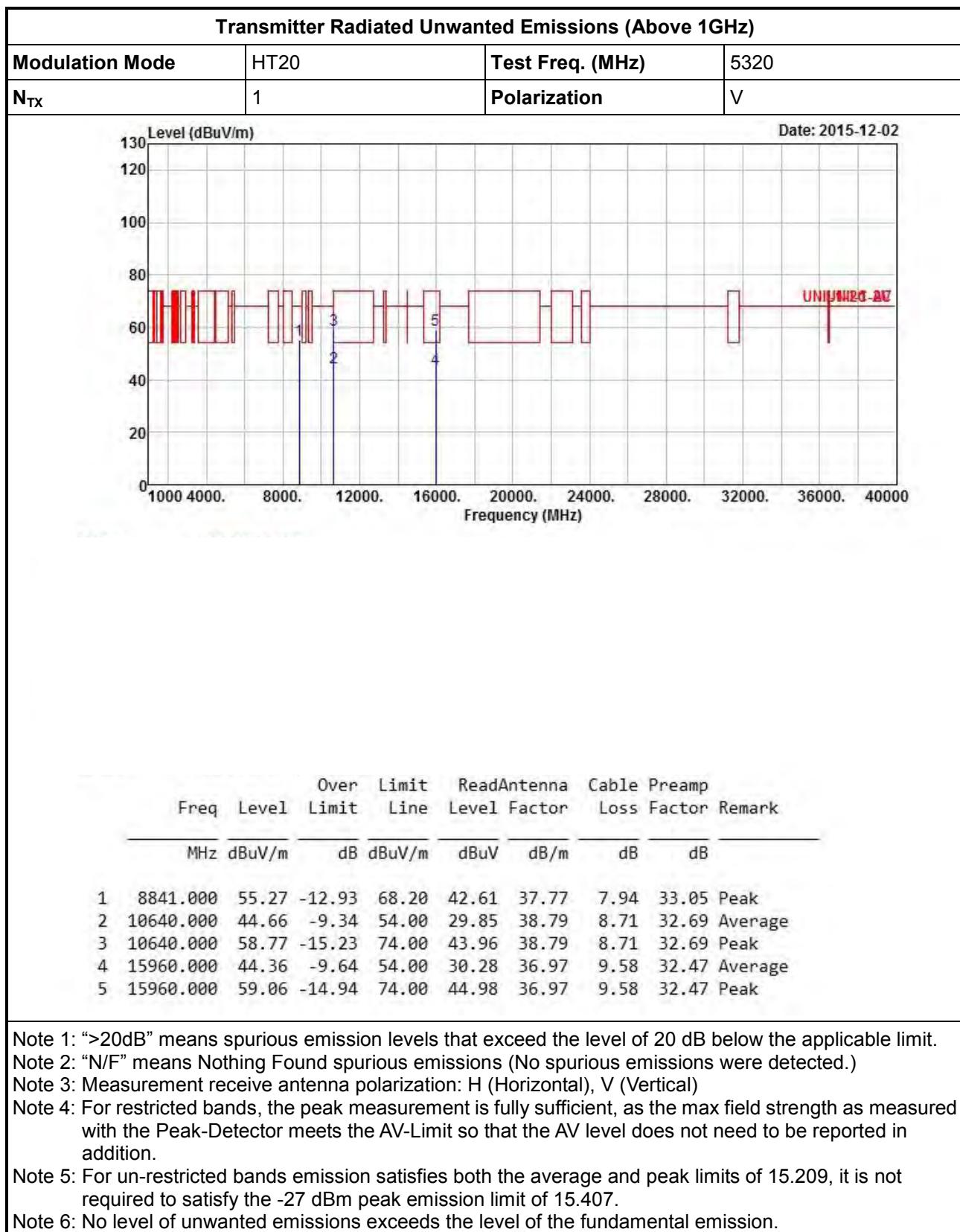


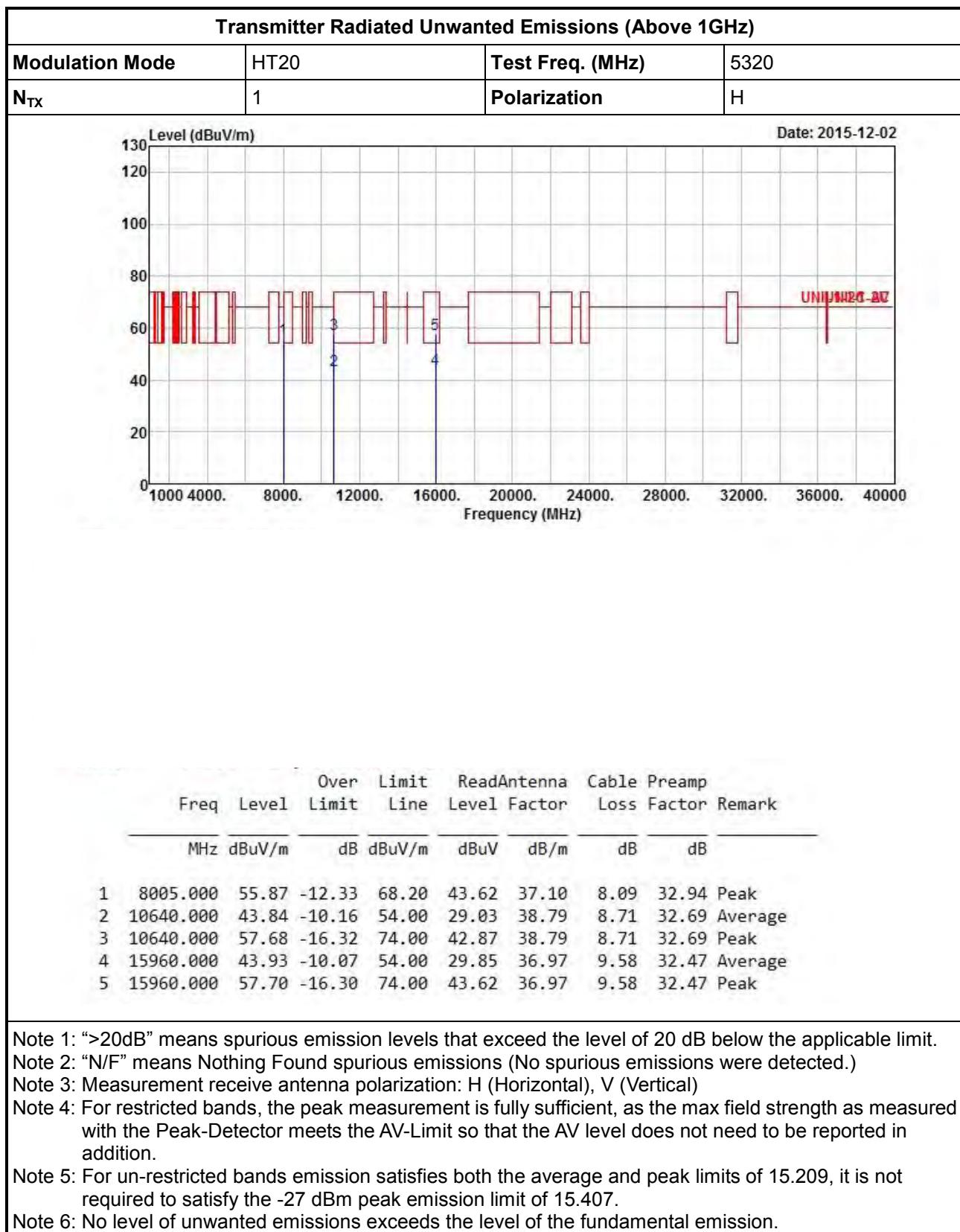


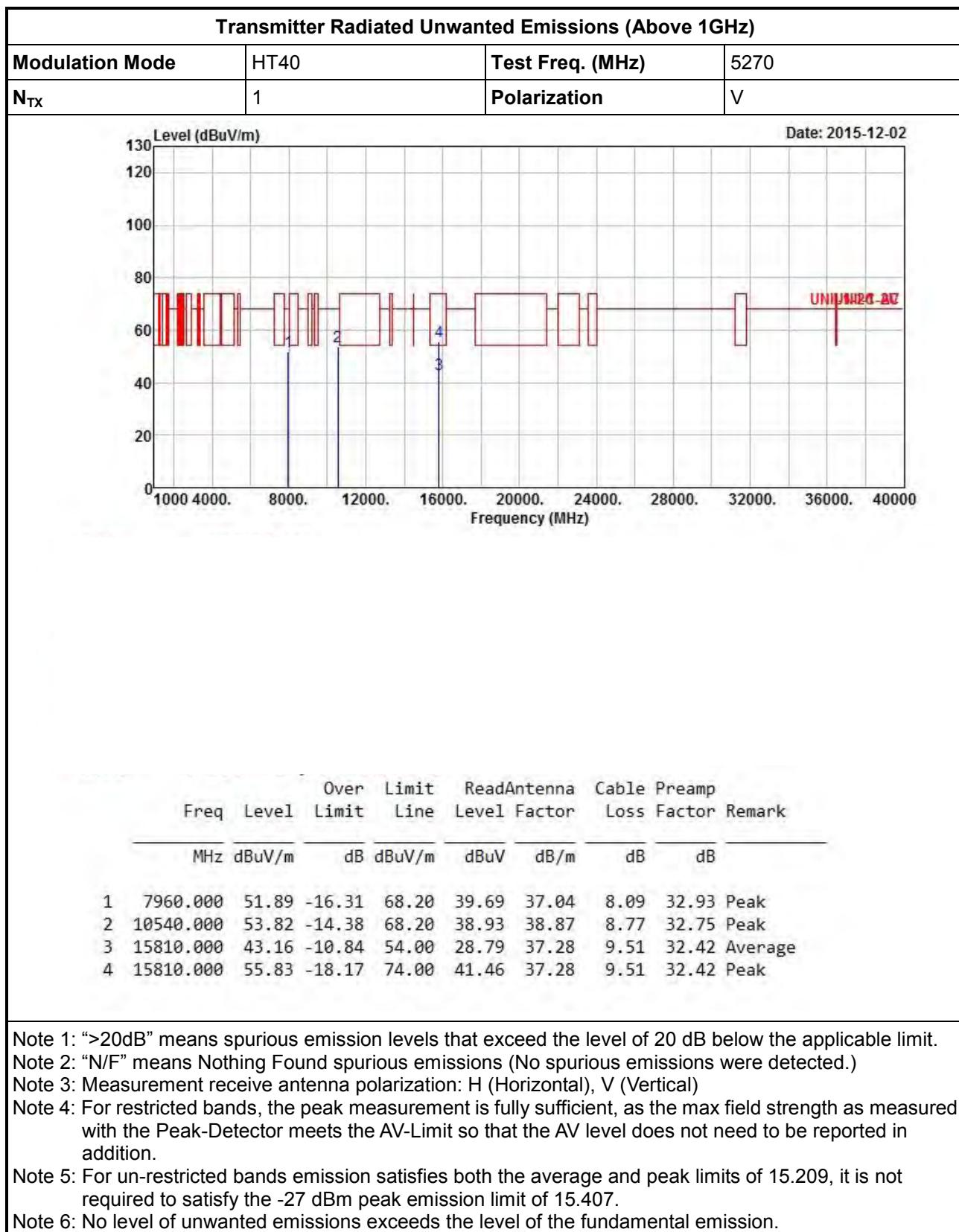


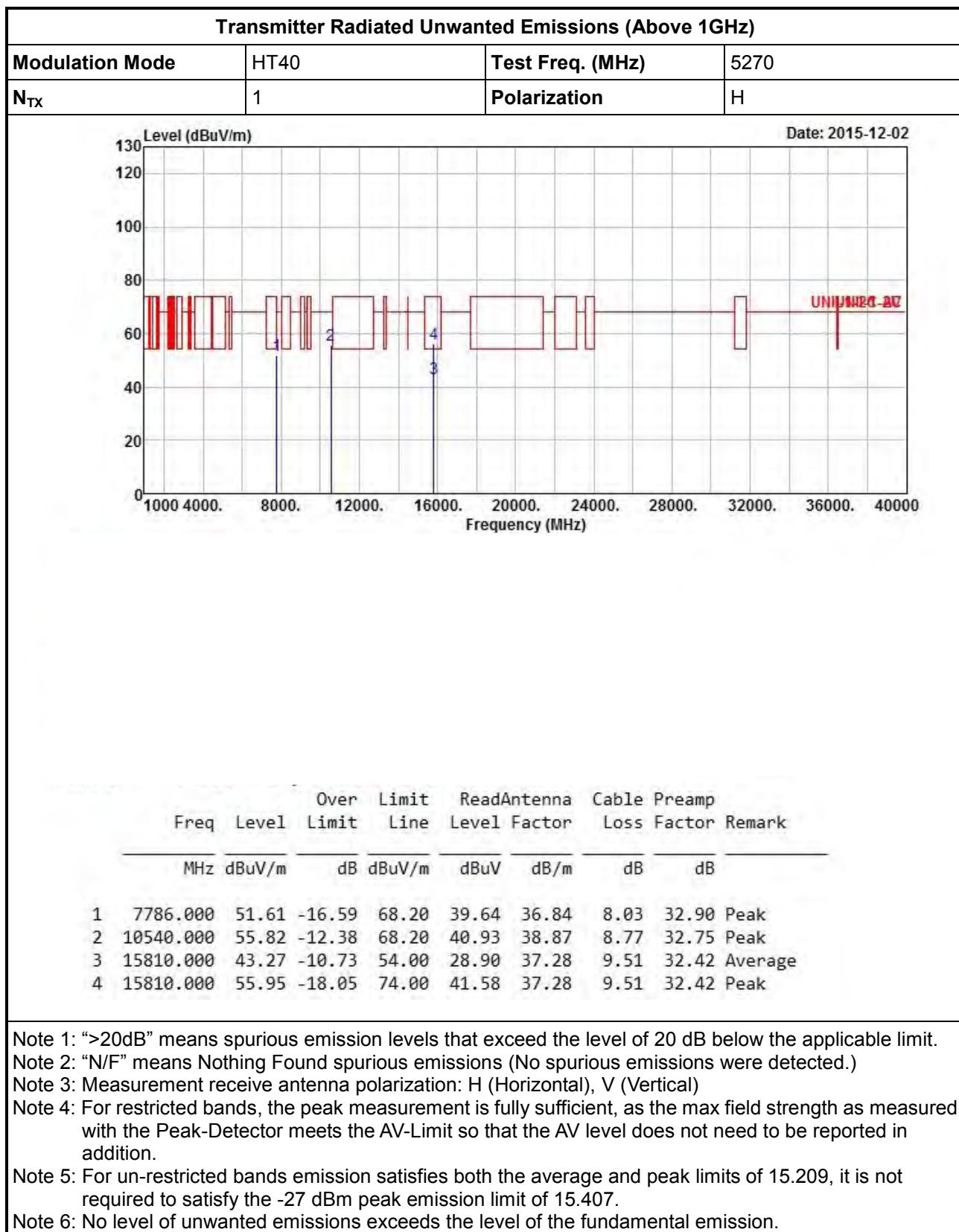


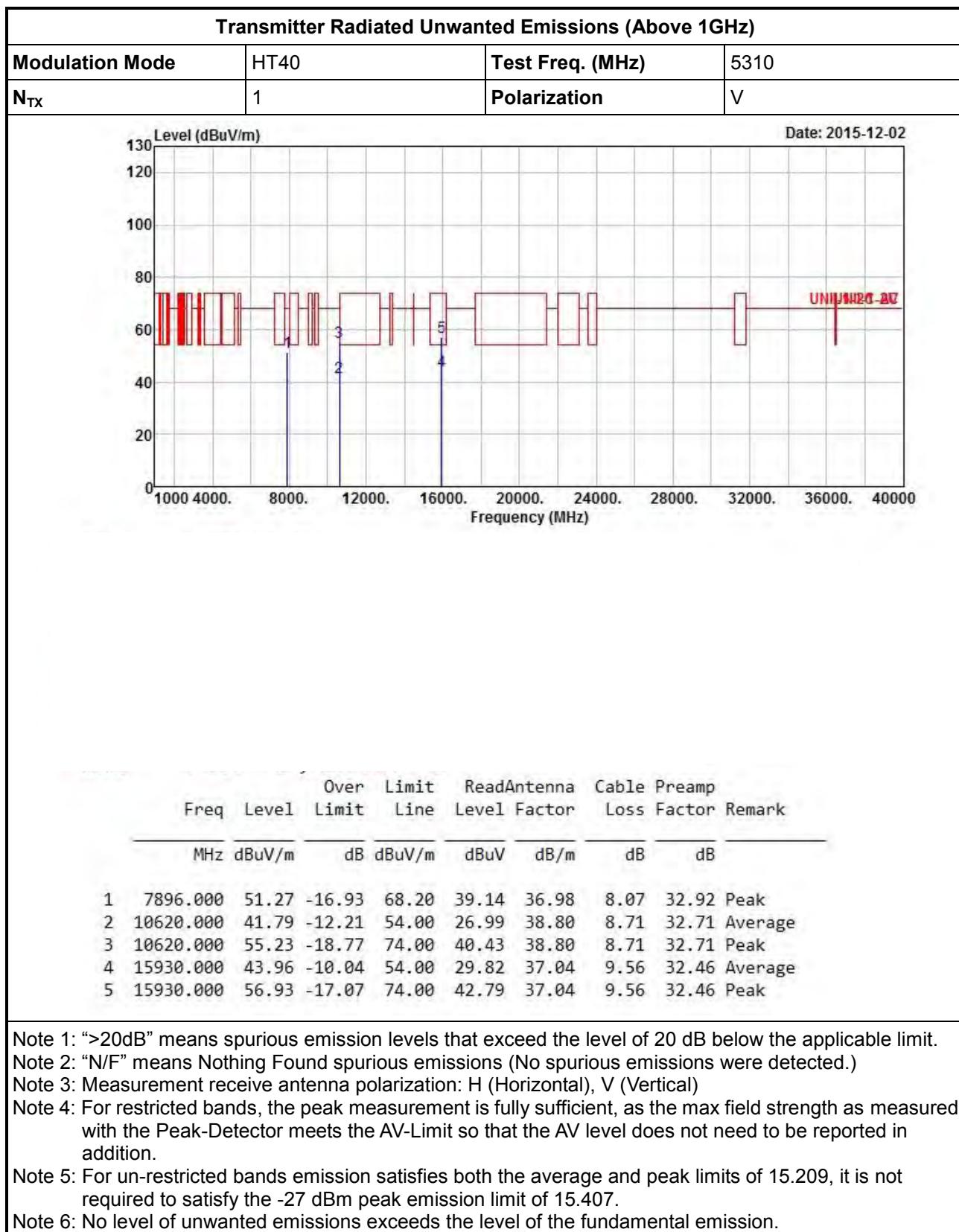


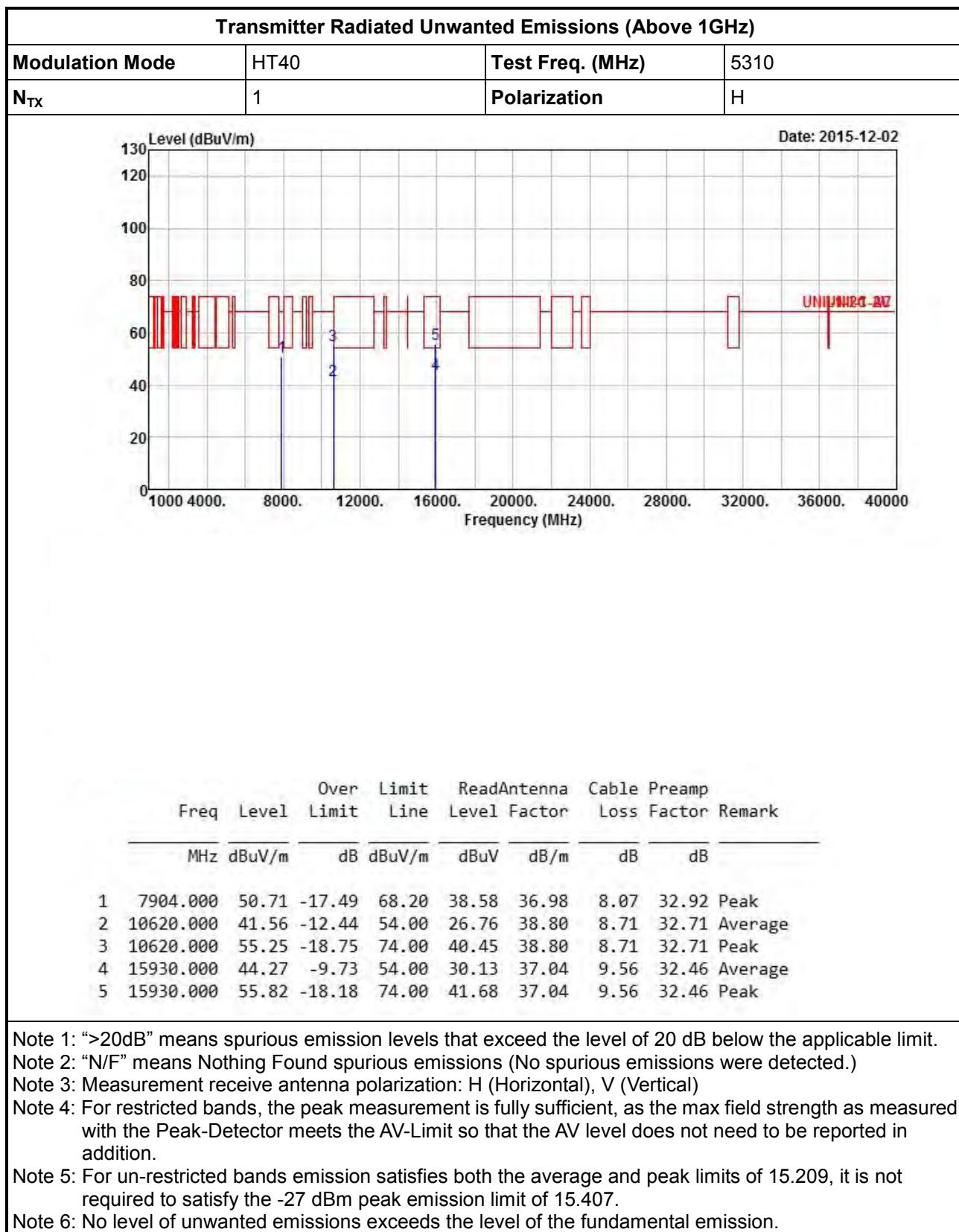


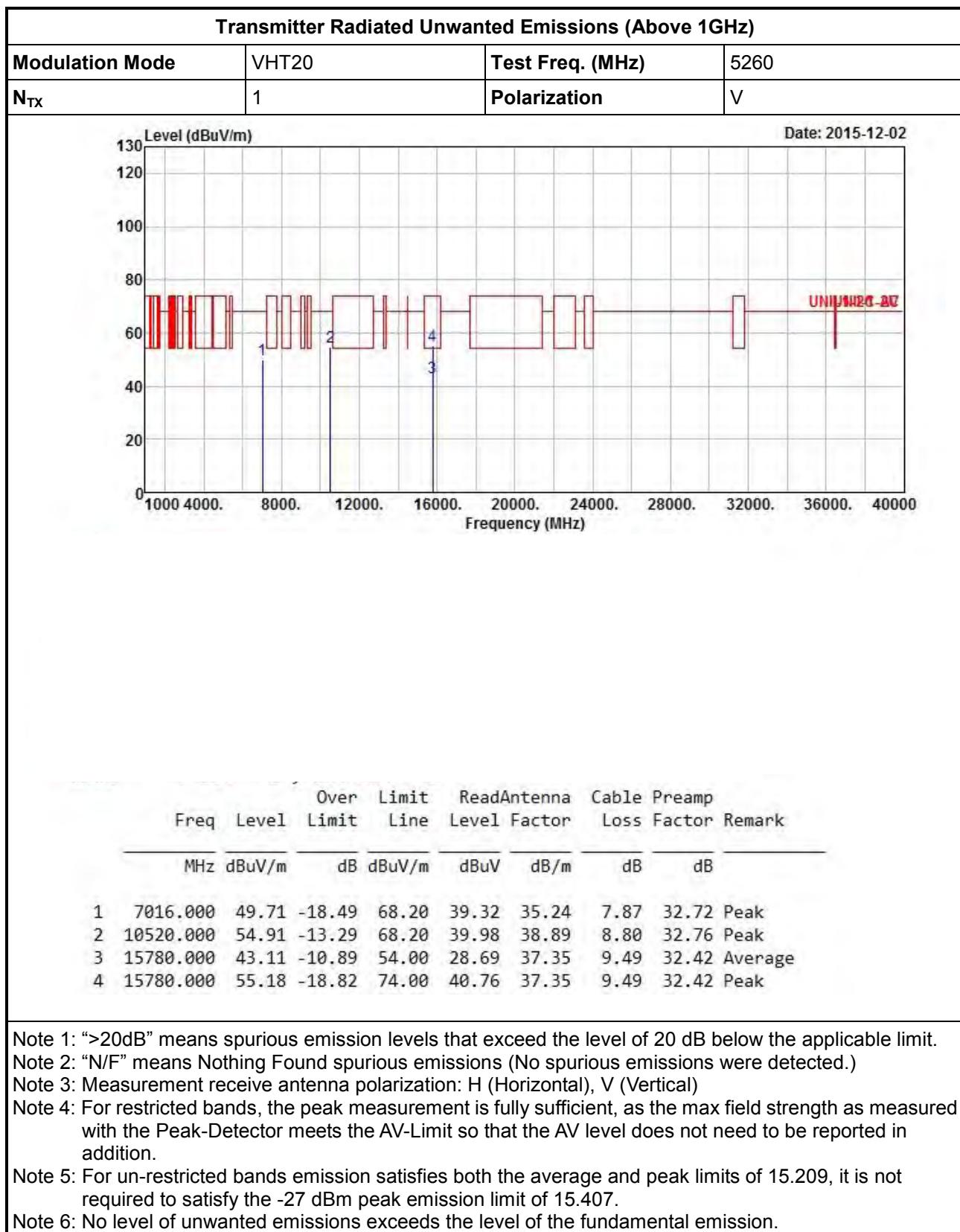


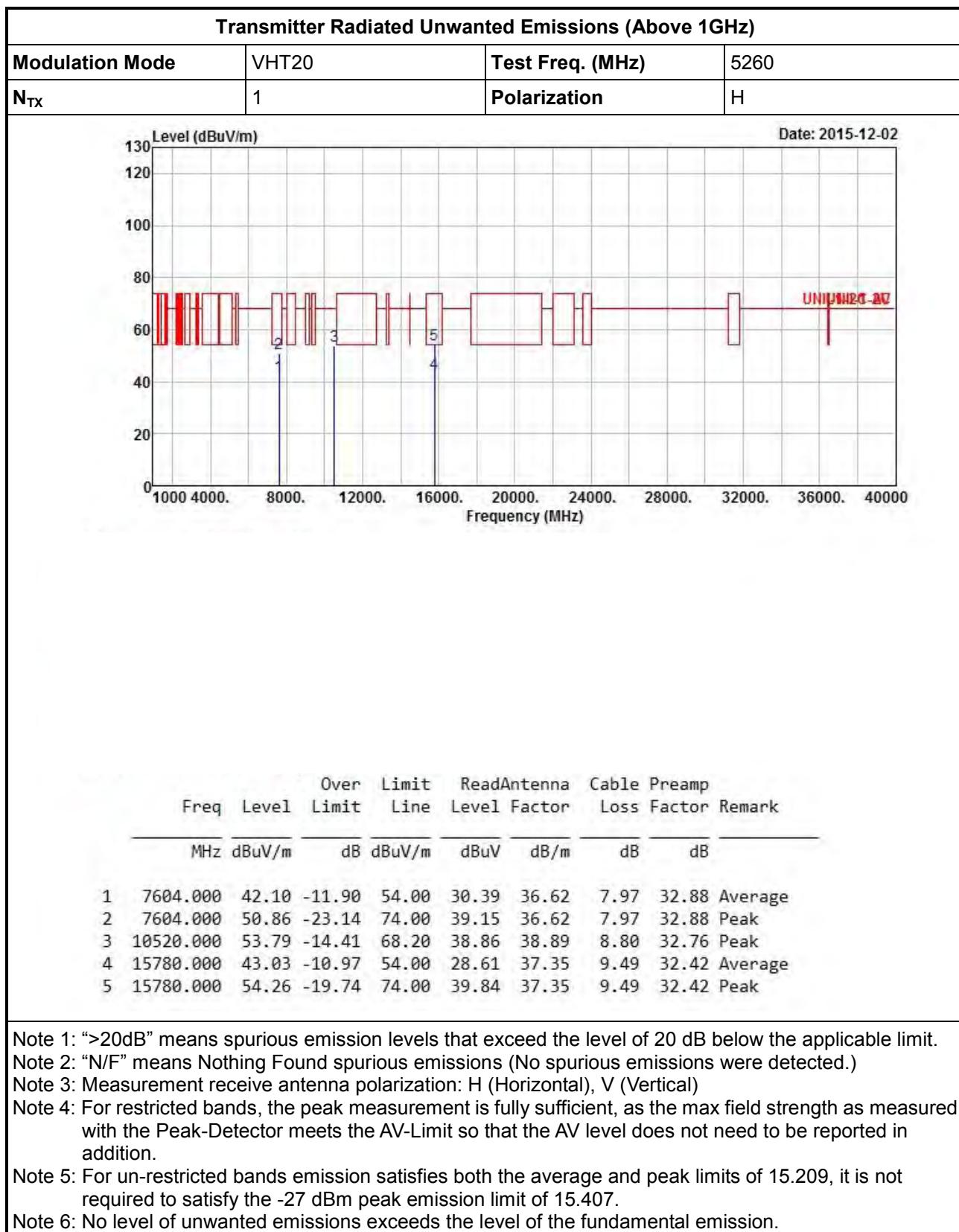


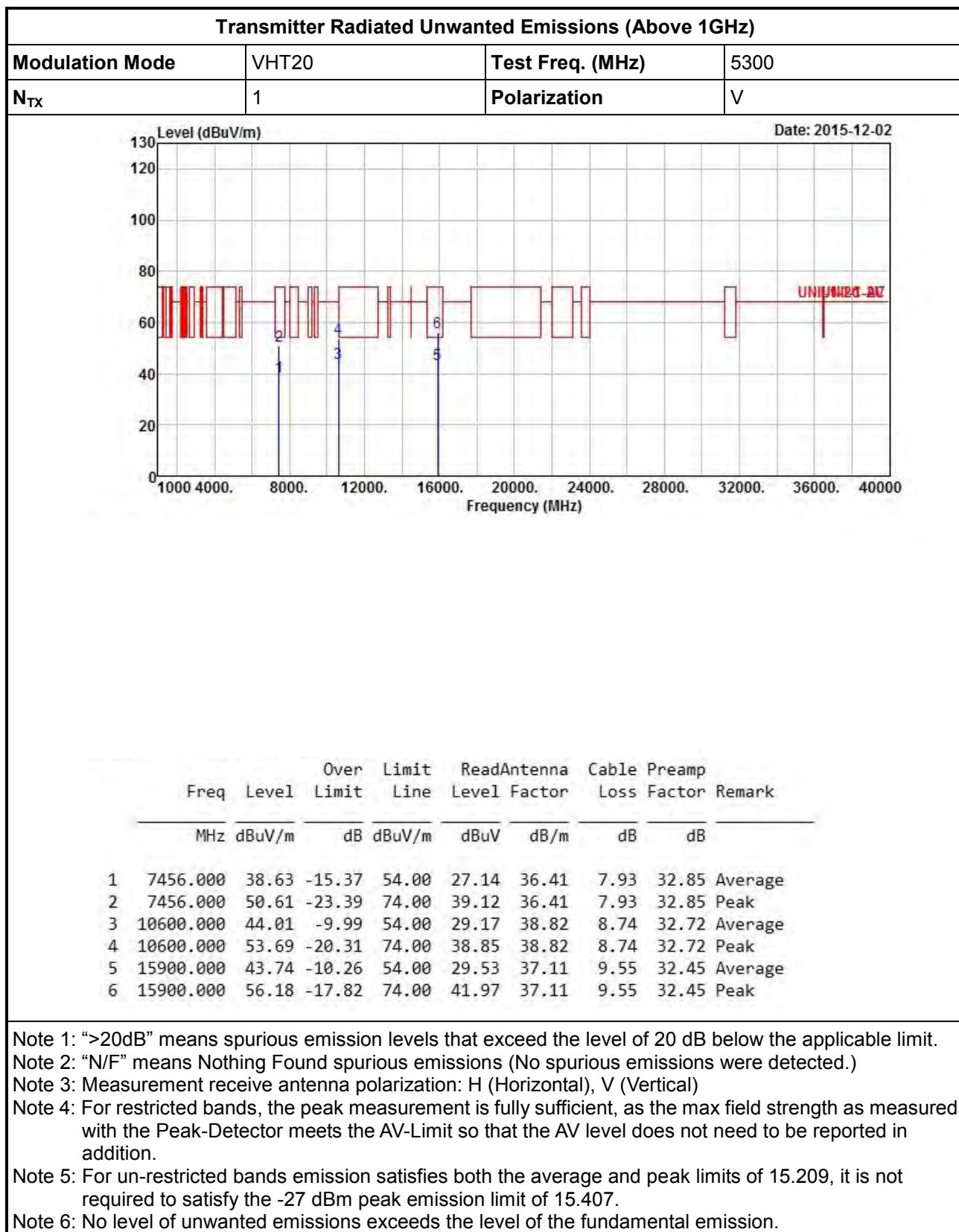


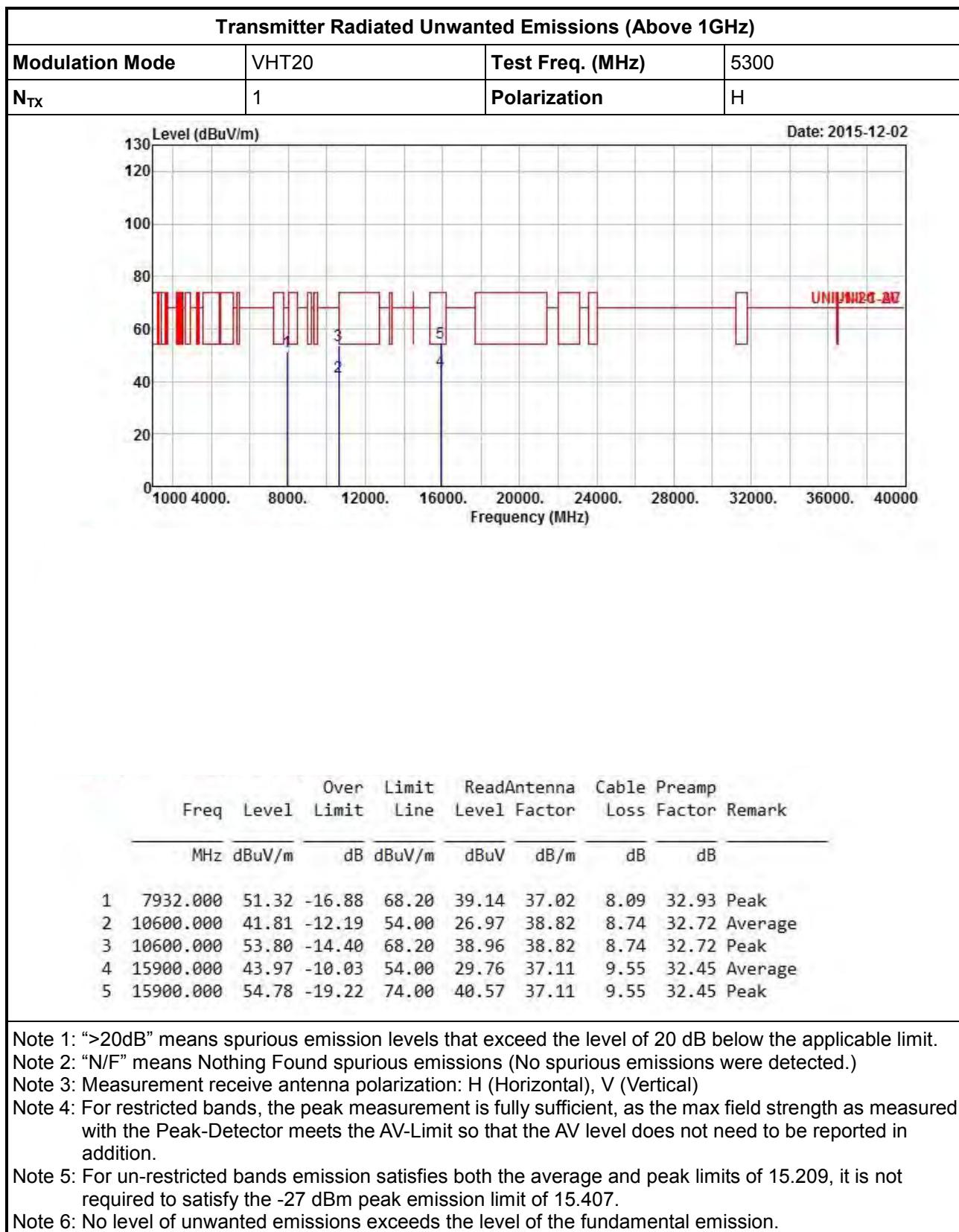


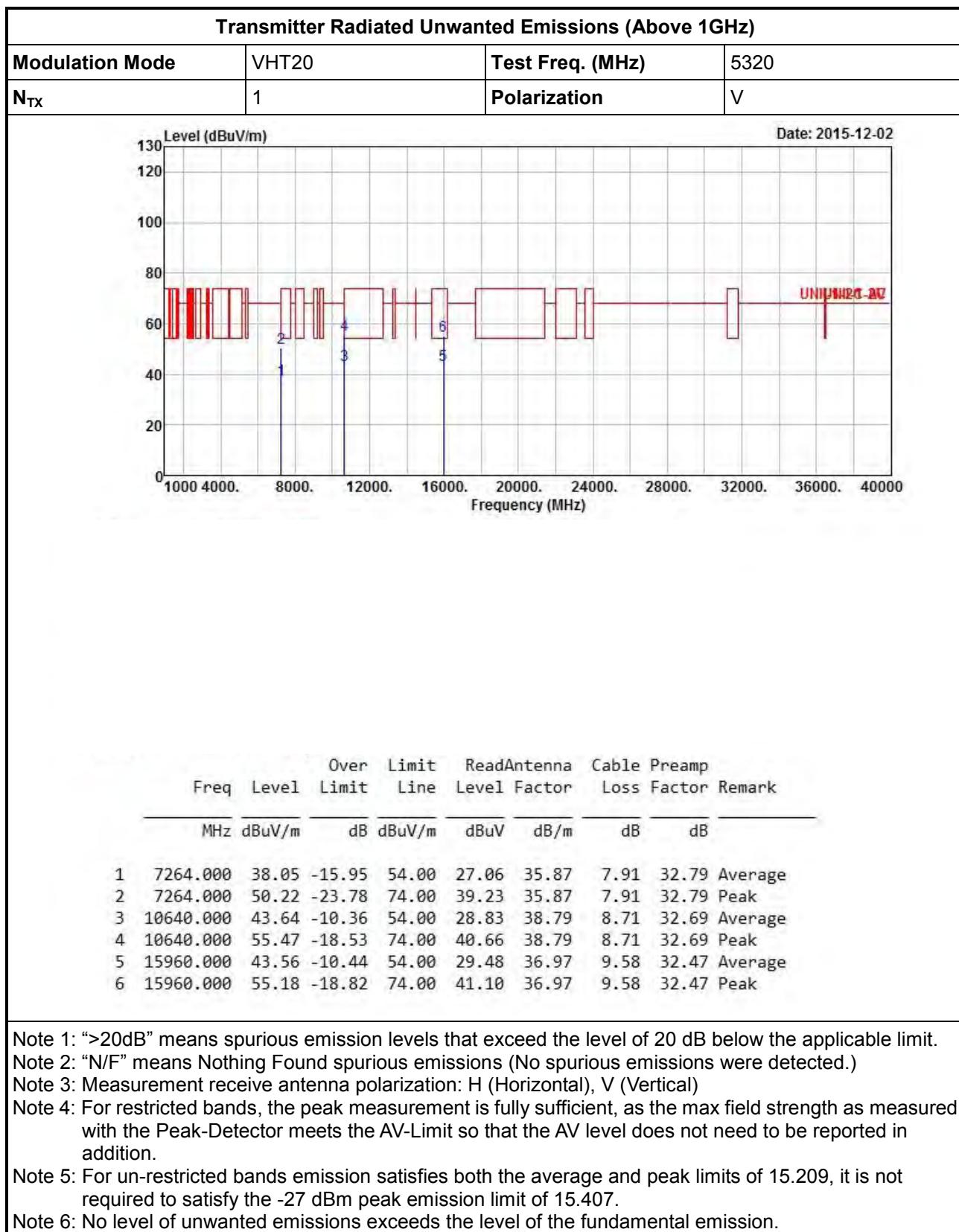


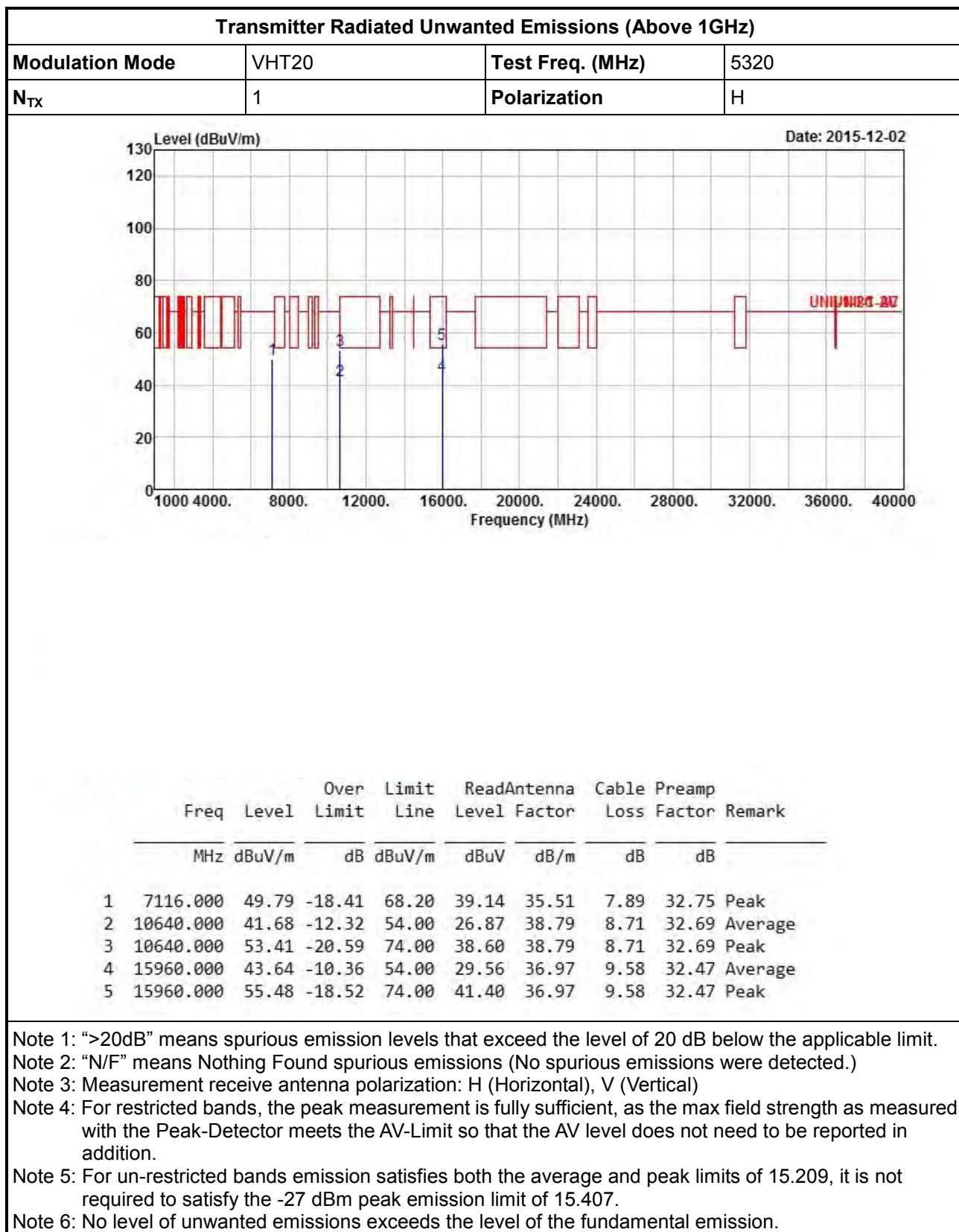


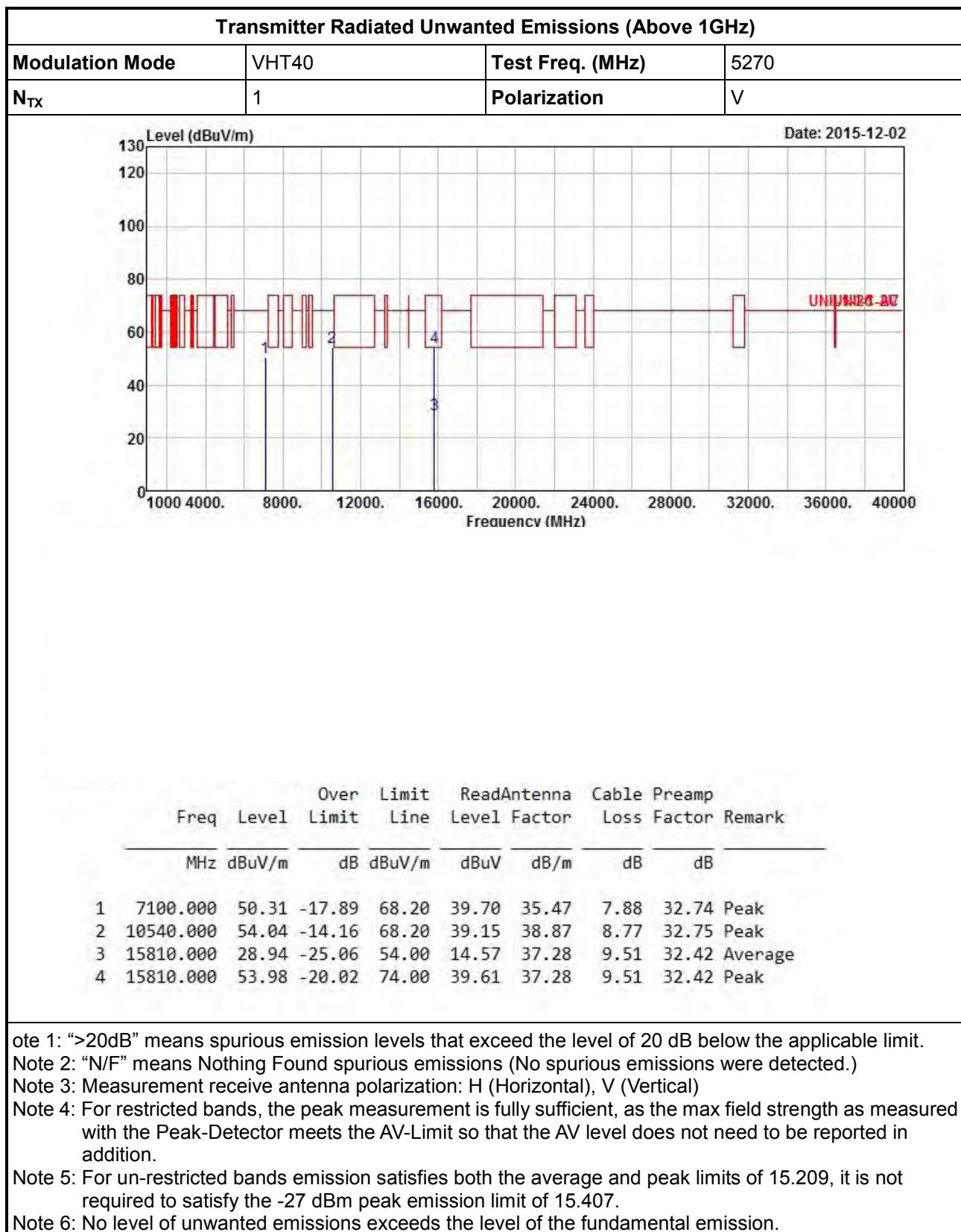


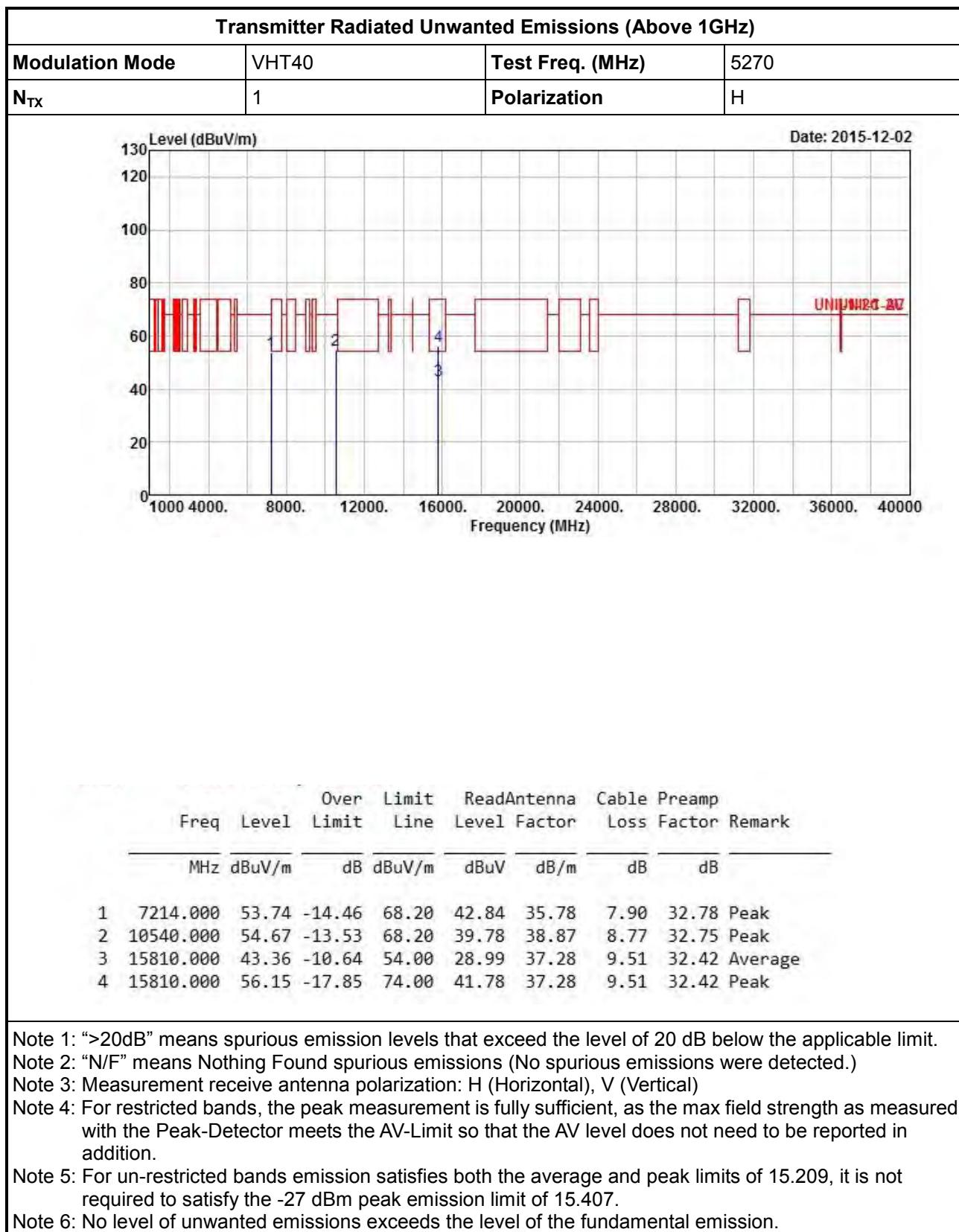


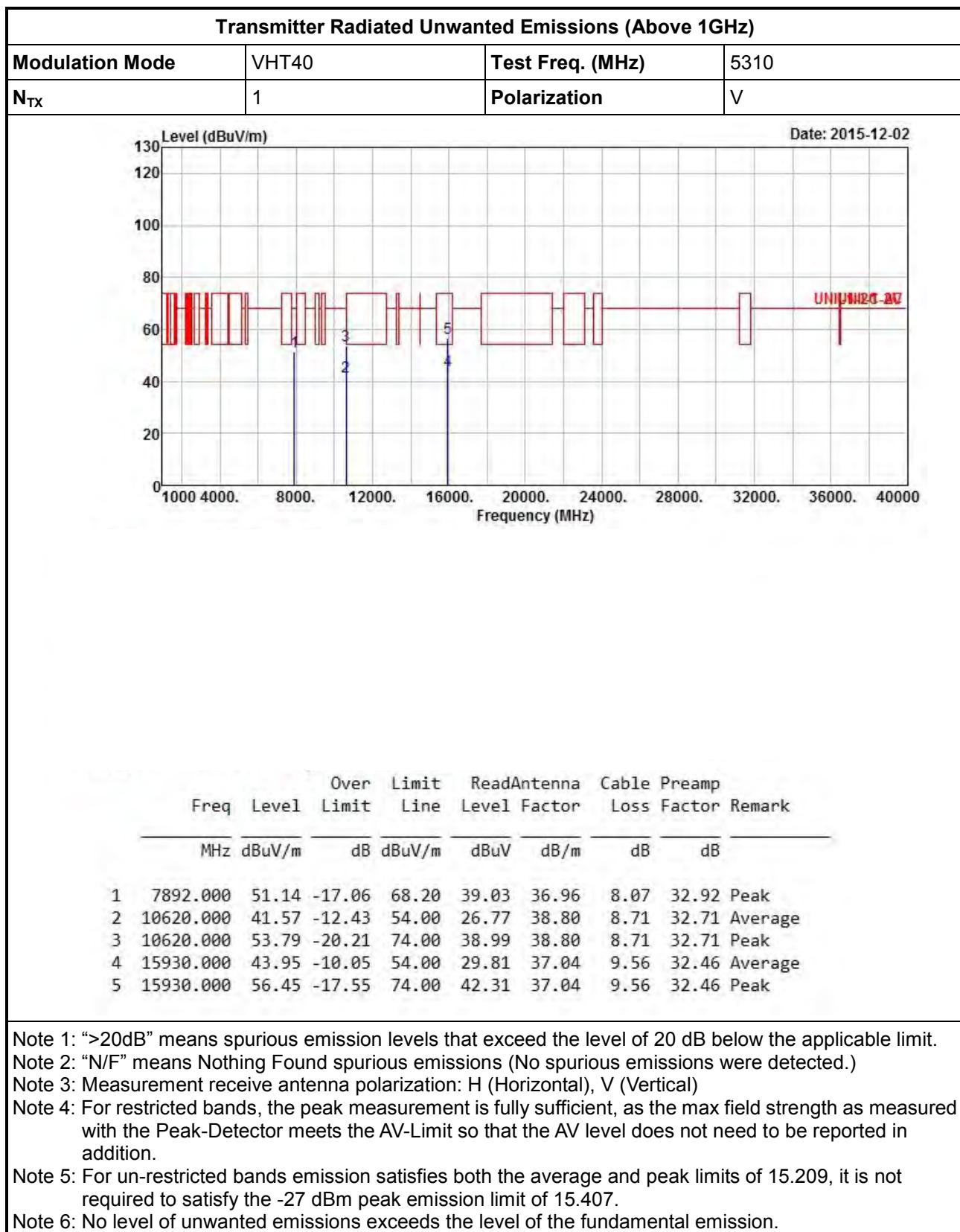


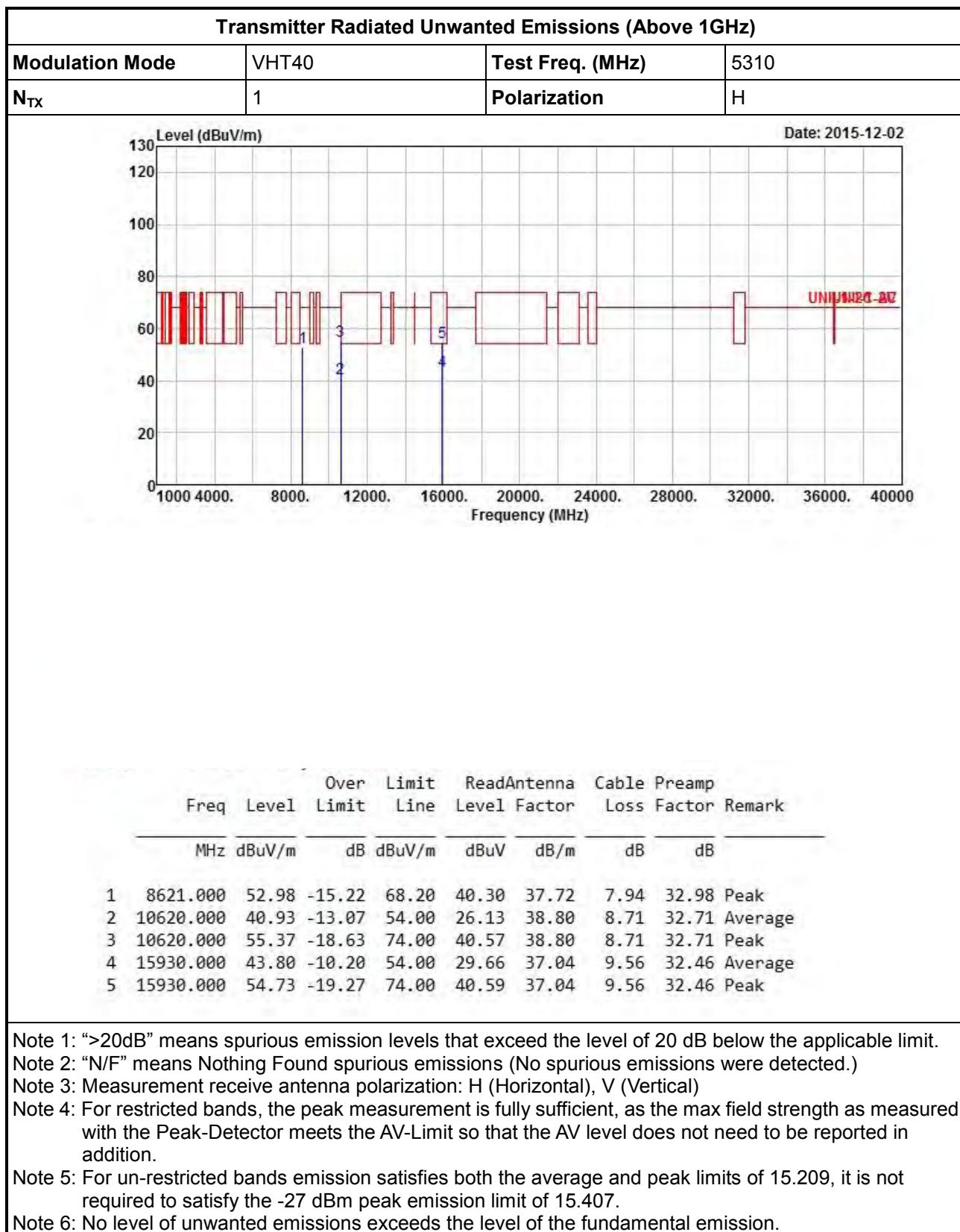


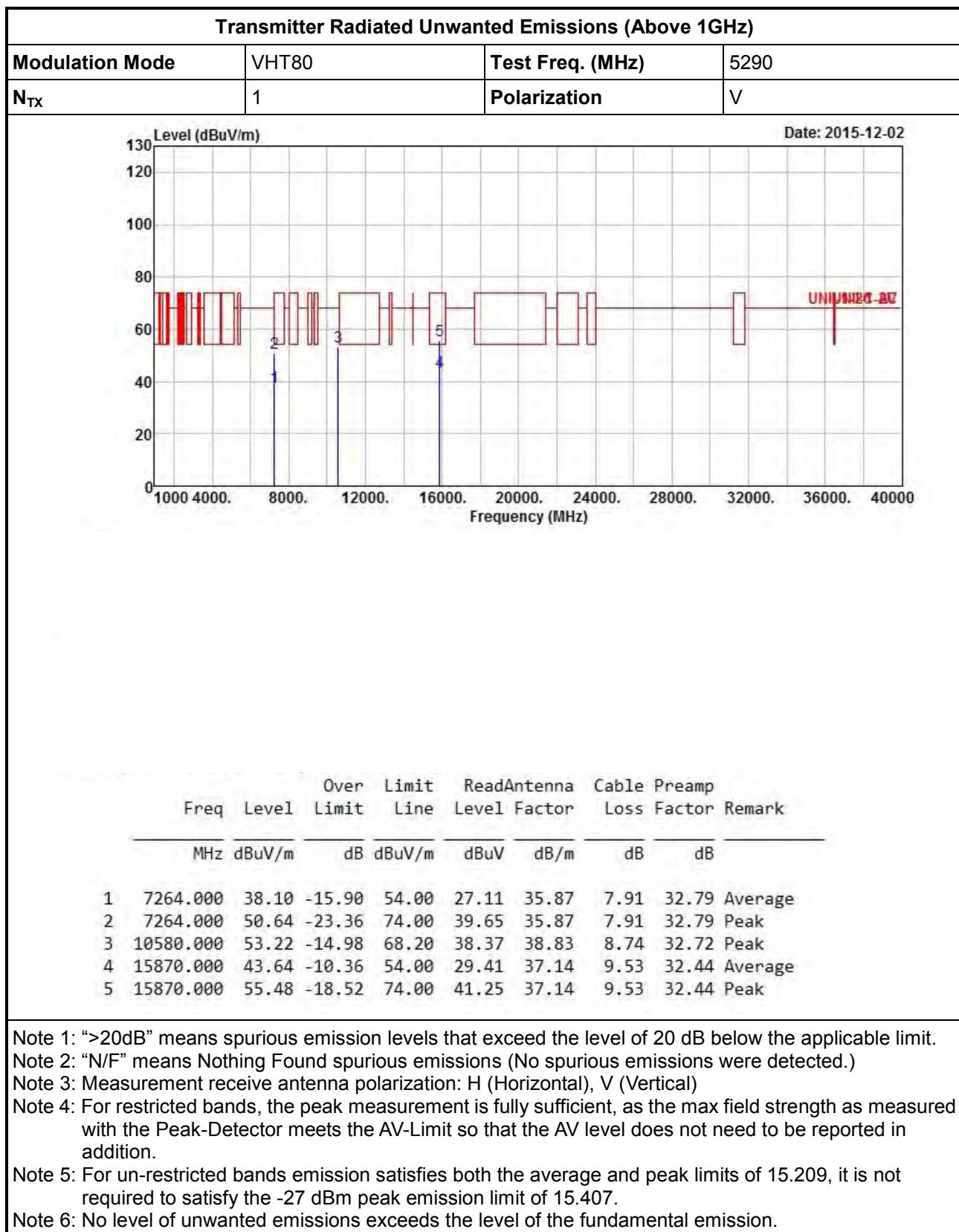


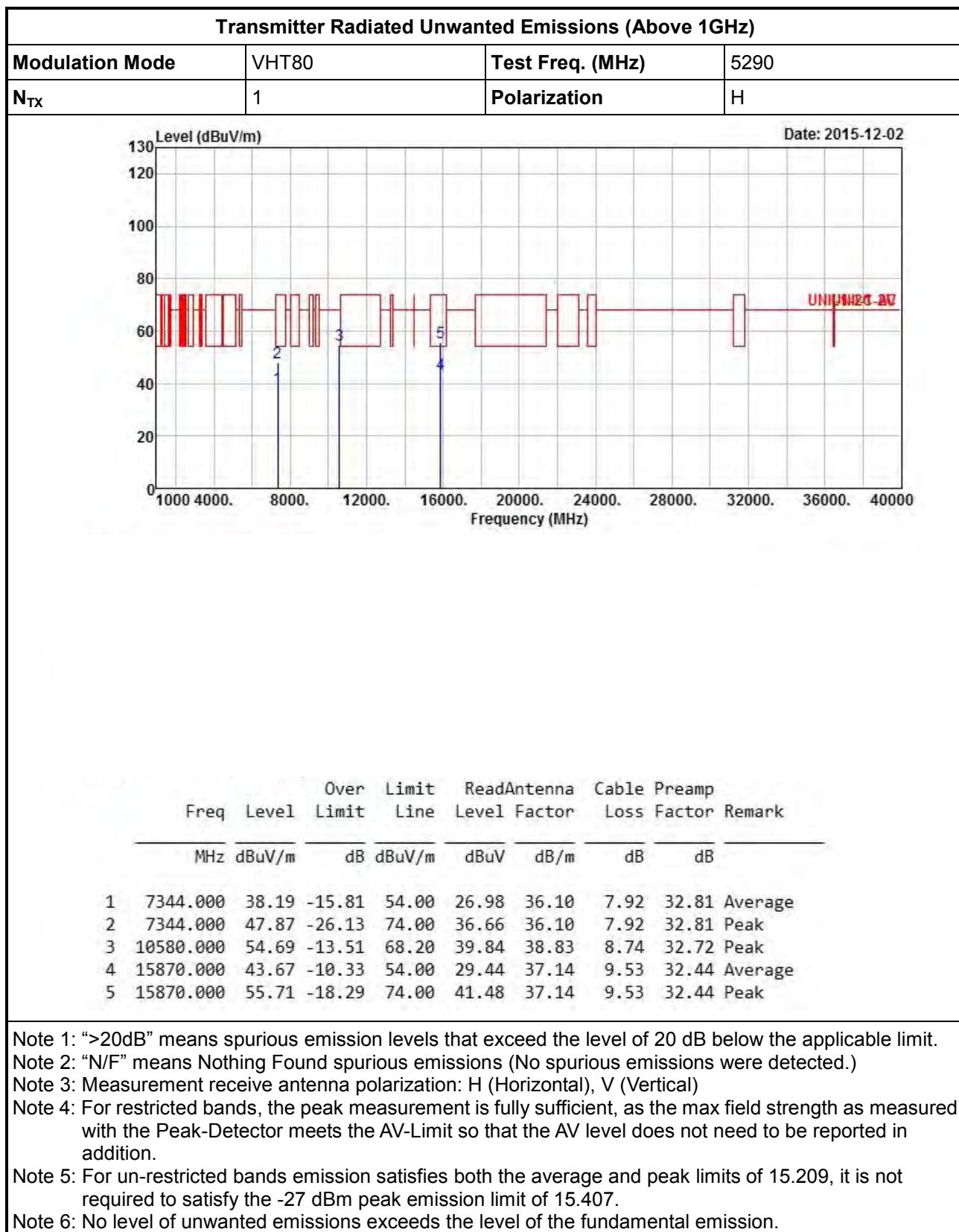














3.6.8 Transmitter Radiated Unwanted Emissions (Above 1GHz) for 5470-5725MHz

Transmitter Radiated Unwanted Emissions (Above 1GHz)									
Modulation Mode	11a		Test Freq. (MHz)		5500				
N _{TX}	1		Polarization		V				
Level (dB _{uV/m})									Date: 2015-12-03
1000	4000.	8000.	12000.	16000.	20000.	24000.	28000.	32000.	36000. 40000
0	20	40	60	80	100	120	130		
Freq	Over Limit	Limit	Read	Antenna	Cable	Preamp			
Level	Level	Line	Line	Level	Factor	Loss	Factor	Remark	
MHz	dB _{uV/m}	dB	dB _{uV/m}	dB _{uV}	dB/m	dB	dB		
1 7152.000	54.36	-13.84	68.20	43.63	35.60	7.89	32.76	Peak	
2 11000.000	42.06	-11.94	54.00	27.62	38.50	8.44	32.50	Average	
3 11000.000	55.86	-18.14	74.00	41.42	38.50	8.44	32.50	Peak	
4 16500.000	59.31	-8.89	68.20	43.99	37.90	9.51	32.09	Peak	

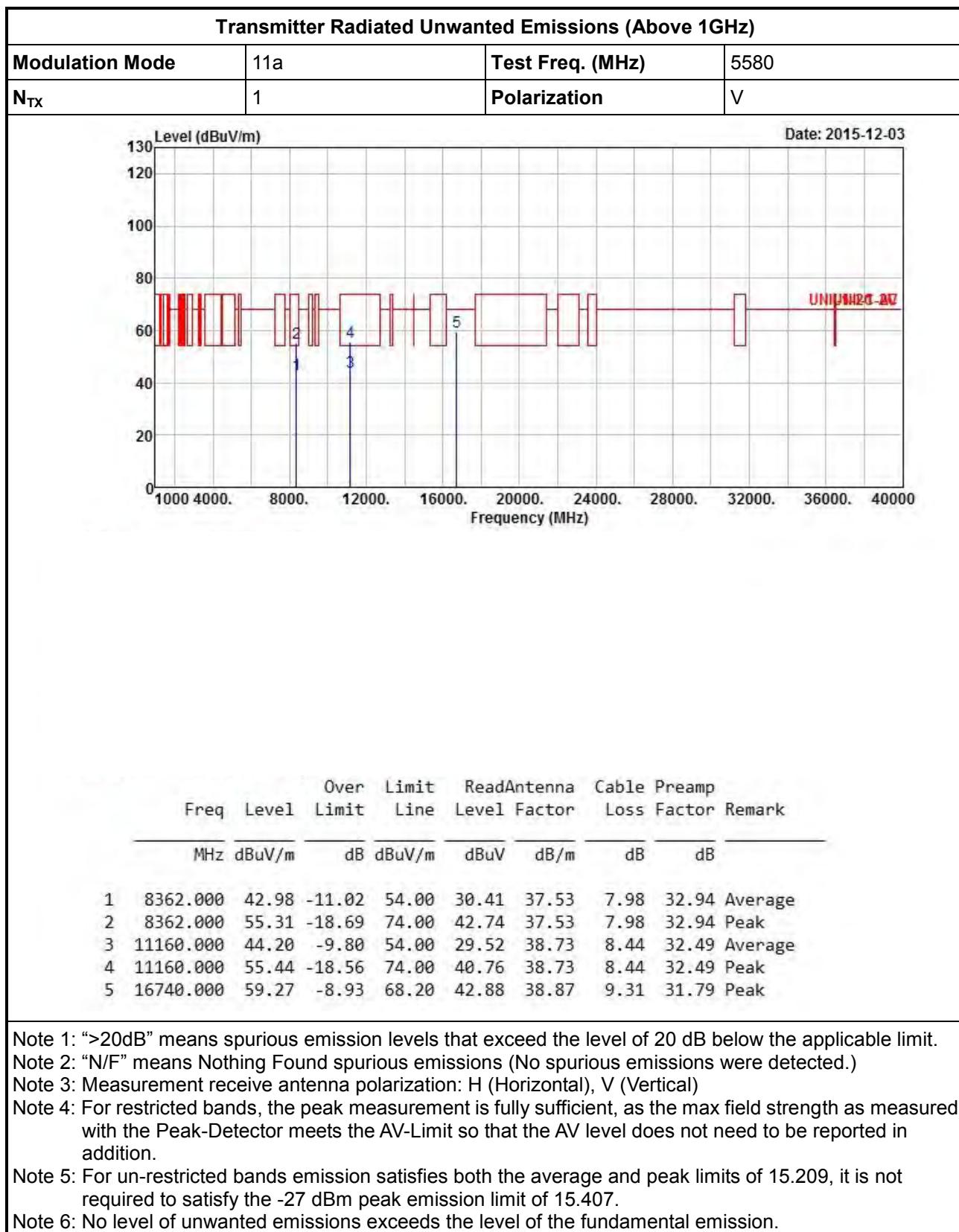
Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)
 Note 4: For restricted 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.

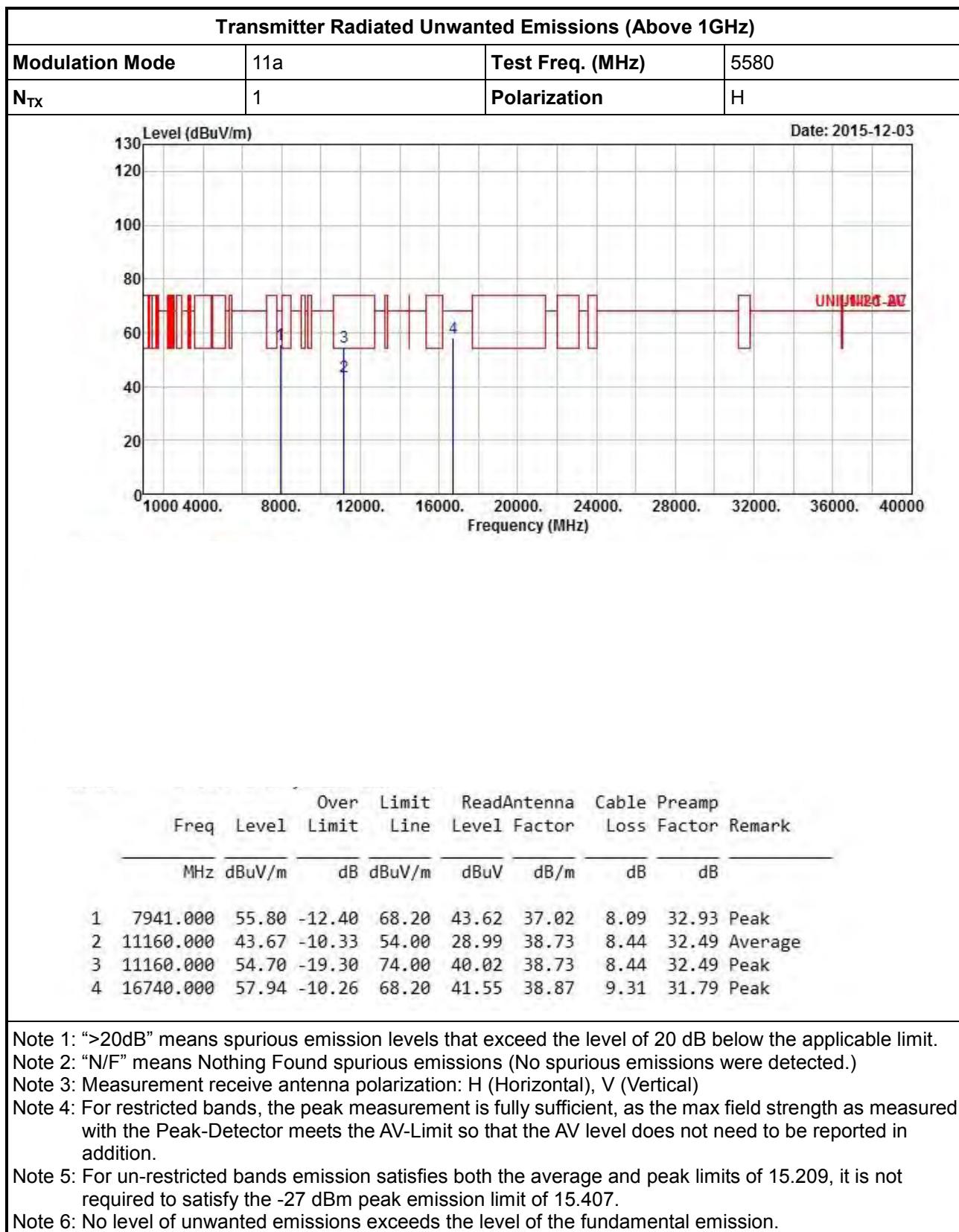


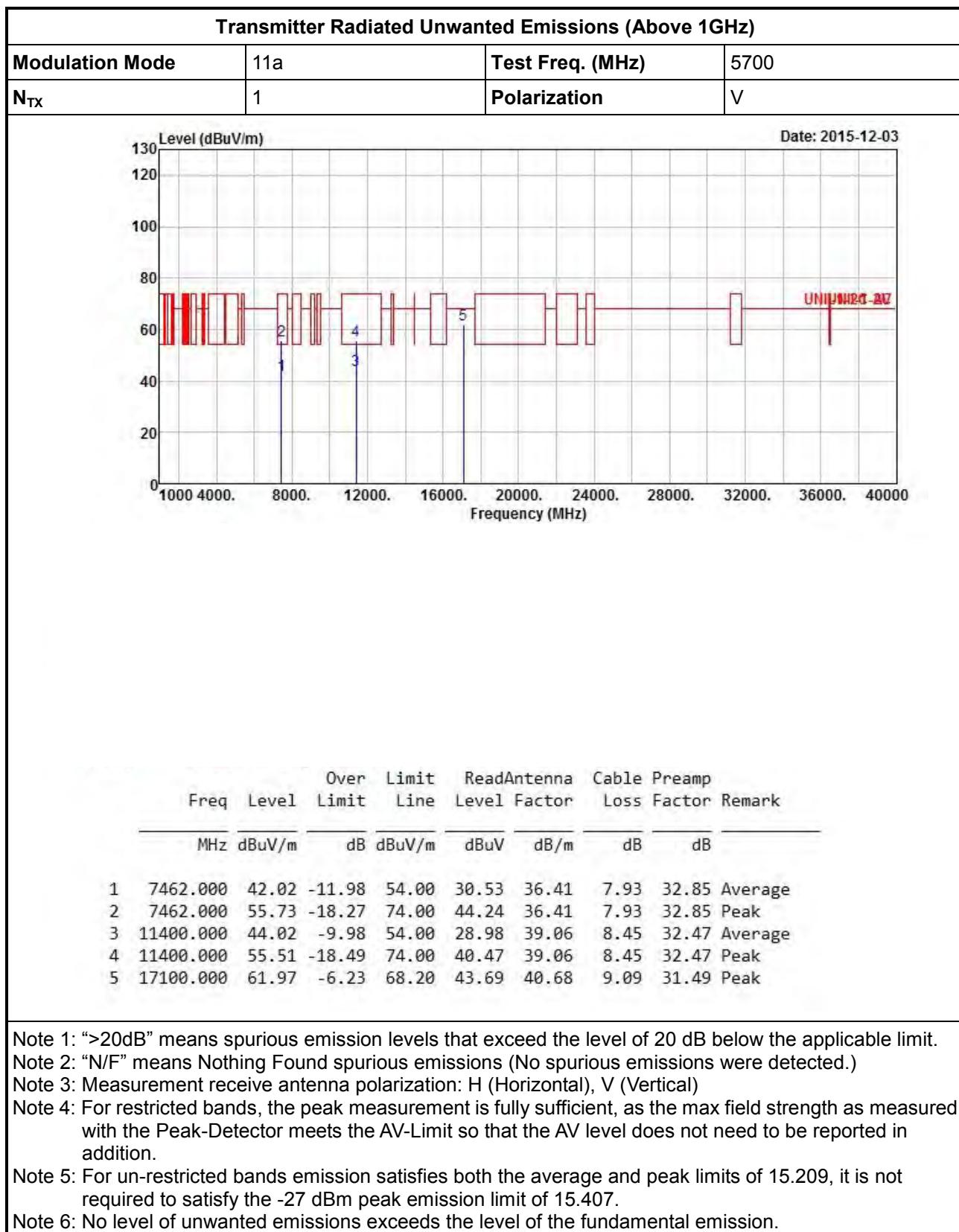
Transmitter Radiated Unwanted Emissions (Above 1GHz)

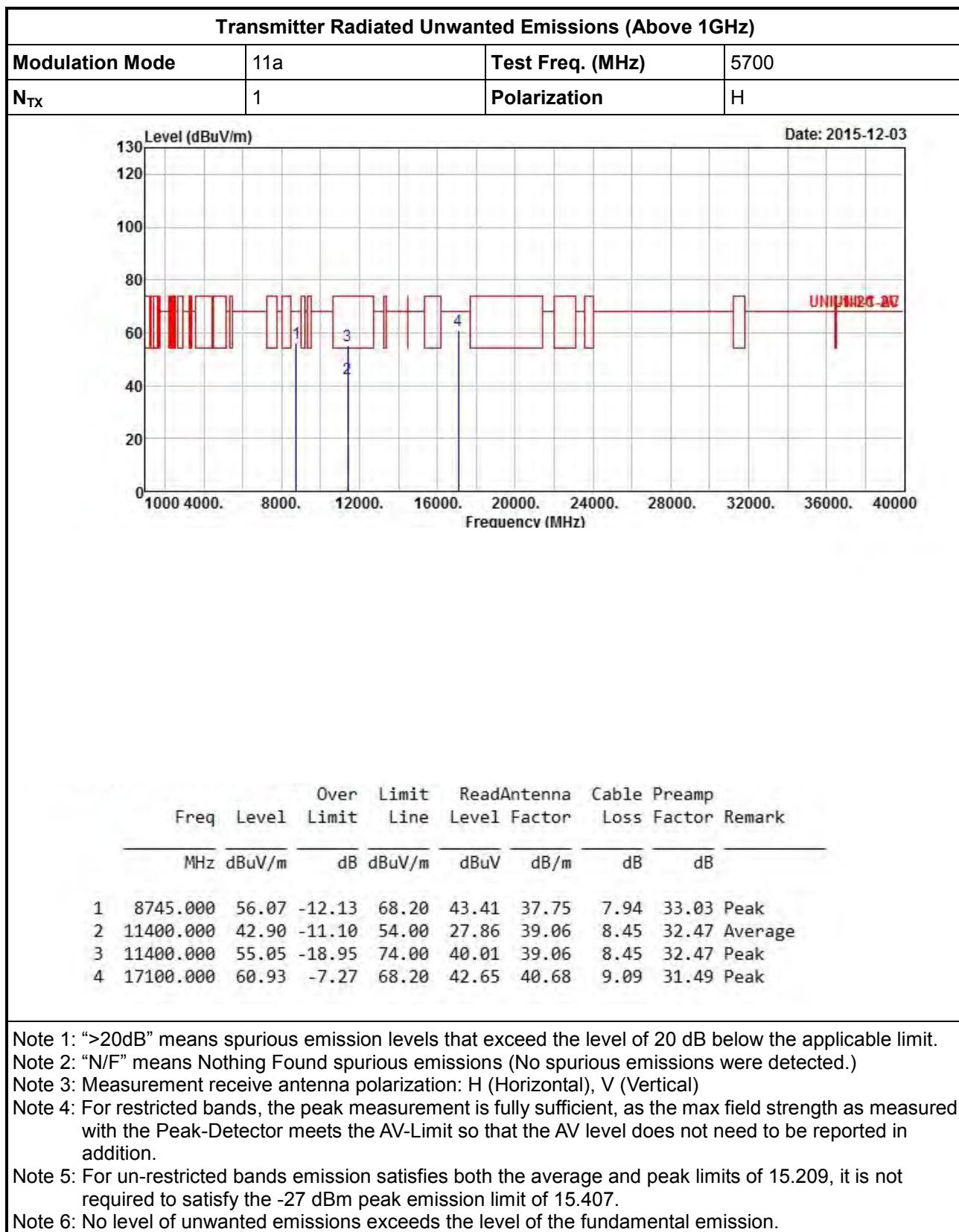
Modulation Mode	11a	Test Freq. (MHz)	5500								
N _{TX}	1	Polarization	H								
Level (dBuV/m)			Date: 2015-12-03								
<table border="1"> <thead> <tr> <th>Freq</th> <th>Level</th> <th>Over Limit</th> <th>Line</th> </tr> </thead> <tbody> <tr> <td>MHz</td> <td>dBuV/m</td> <td>dB</td> <td>dBuV/m</td> </tr> </tbody> </table>				Freq	Level	Over Limit	Line	MHz	dBuV/m	dB	dBuV/m
Freq	Level	Over Limit	Line								
MHz	dBuV/m	dB	dBuV/m								
1	8145.000	42.00	-12.00	54.00	29.62	37.27	8.05	32.94	Average		
2	8145.000	55.00	-19.00	74.00	42.62	37.27	8.05	32.94	Peak		
3	11000.000	41.43	-12.57	54.00	26.99	38.50	8.44	32.50	Average		
4	11000.000	55.07	-18.93	74.00	40.63	38.50	8.44	32.50	Peak		
5	16500.000	58.10	-10.10	68.20	42.78	37.90	9.51	32.09	Peak		

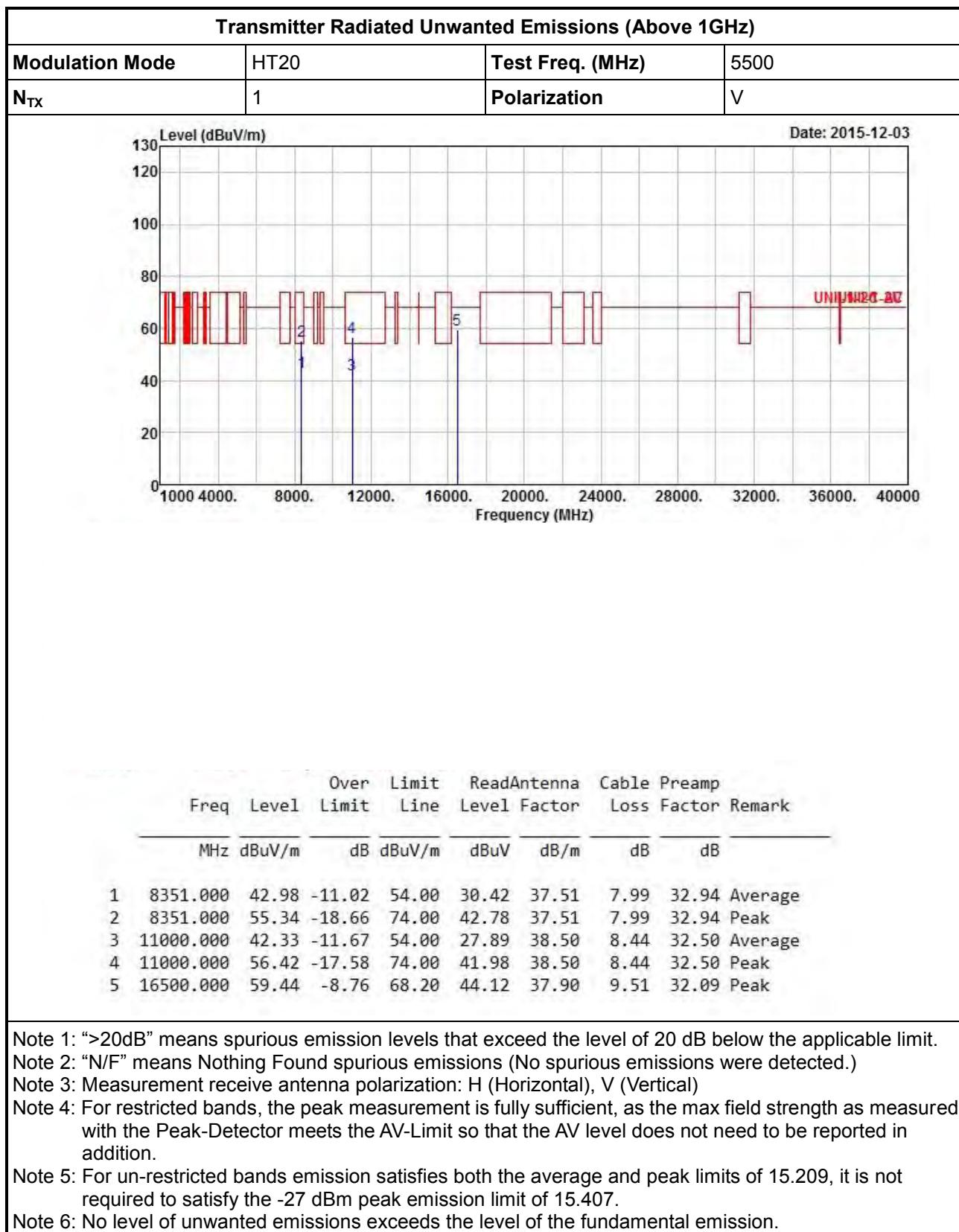
 | | || Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit. Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.) Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical) Note 4: For restricted 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. | | | | | | | | | |

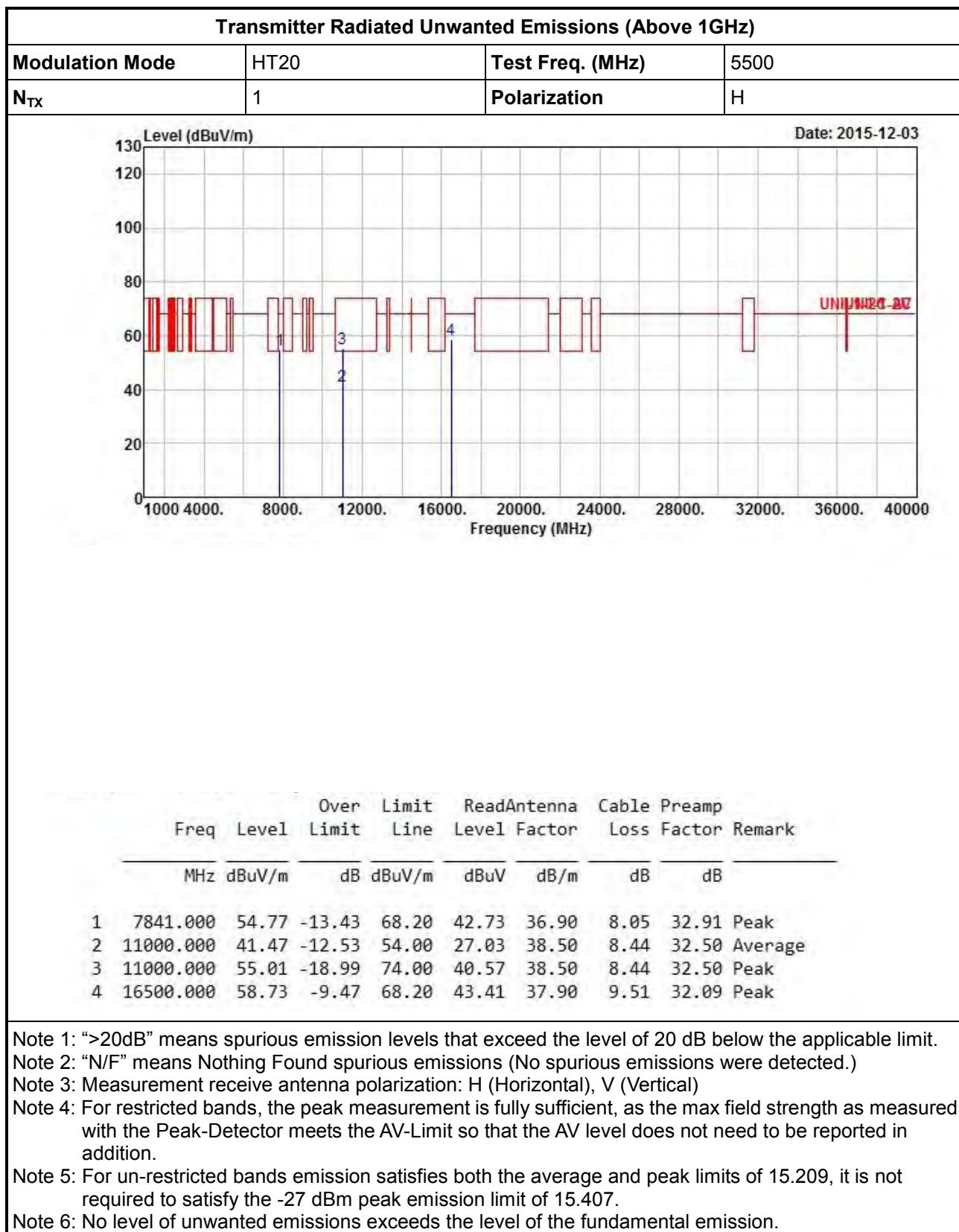


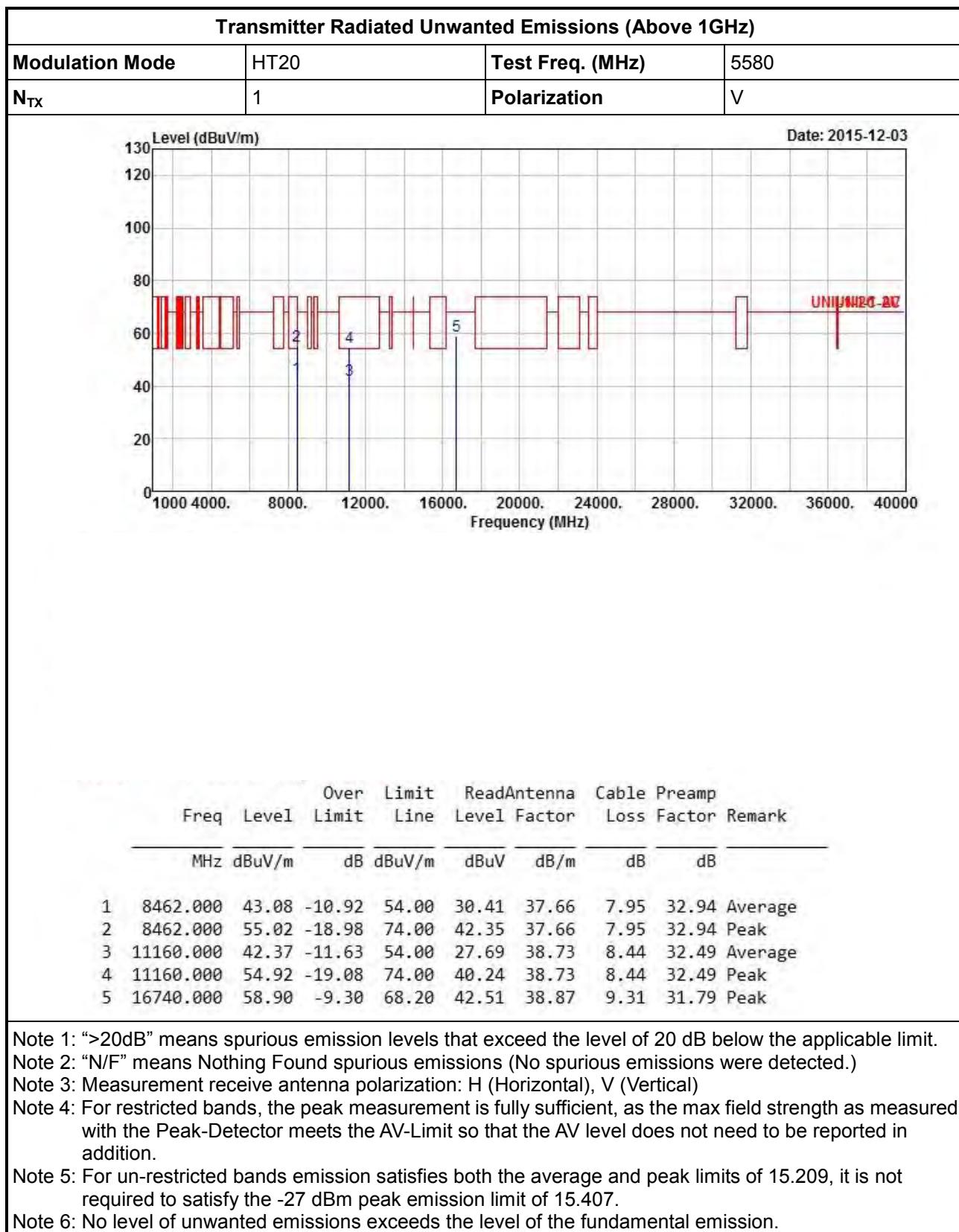


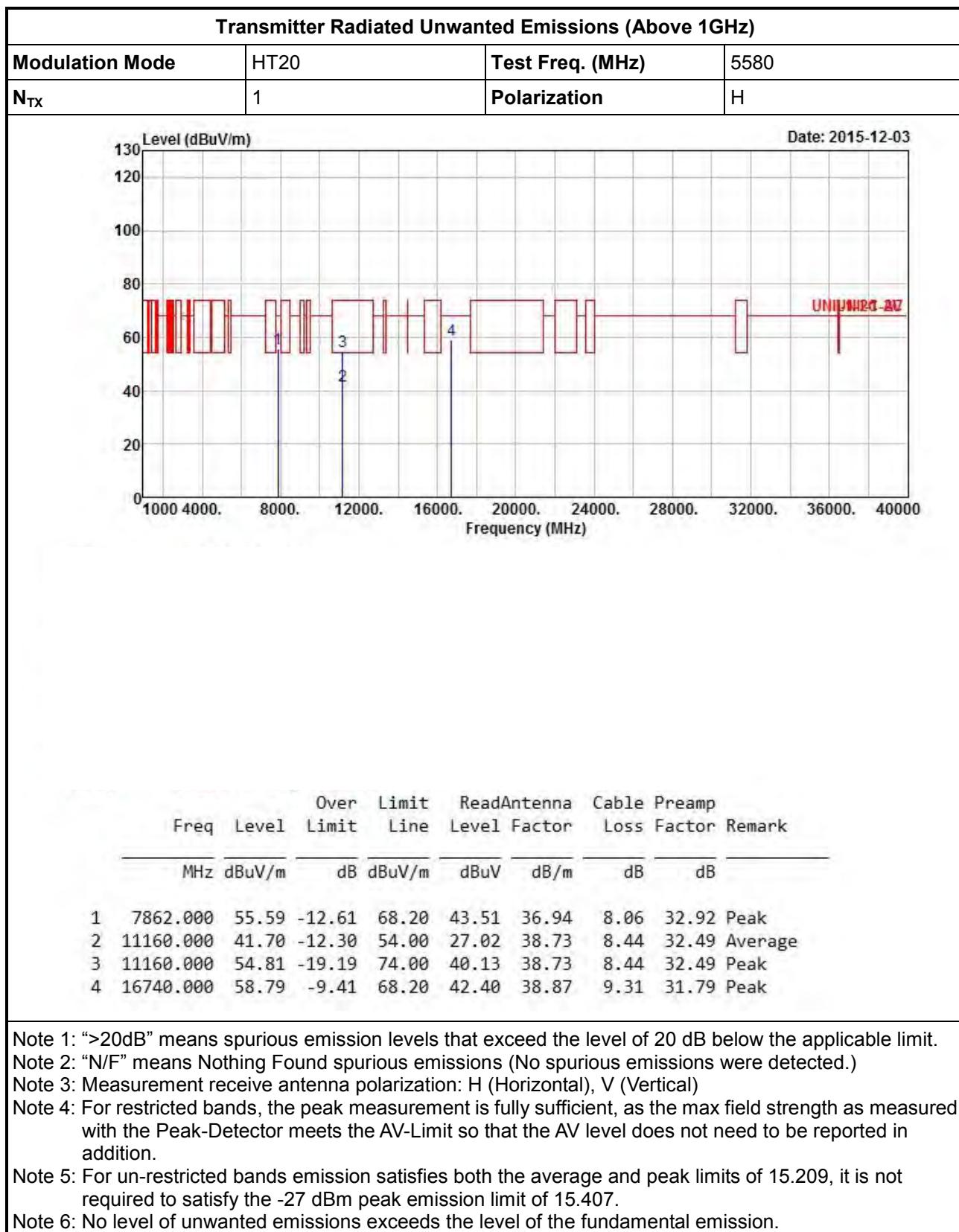


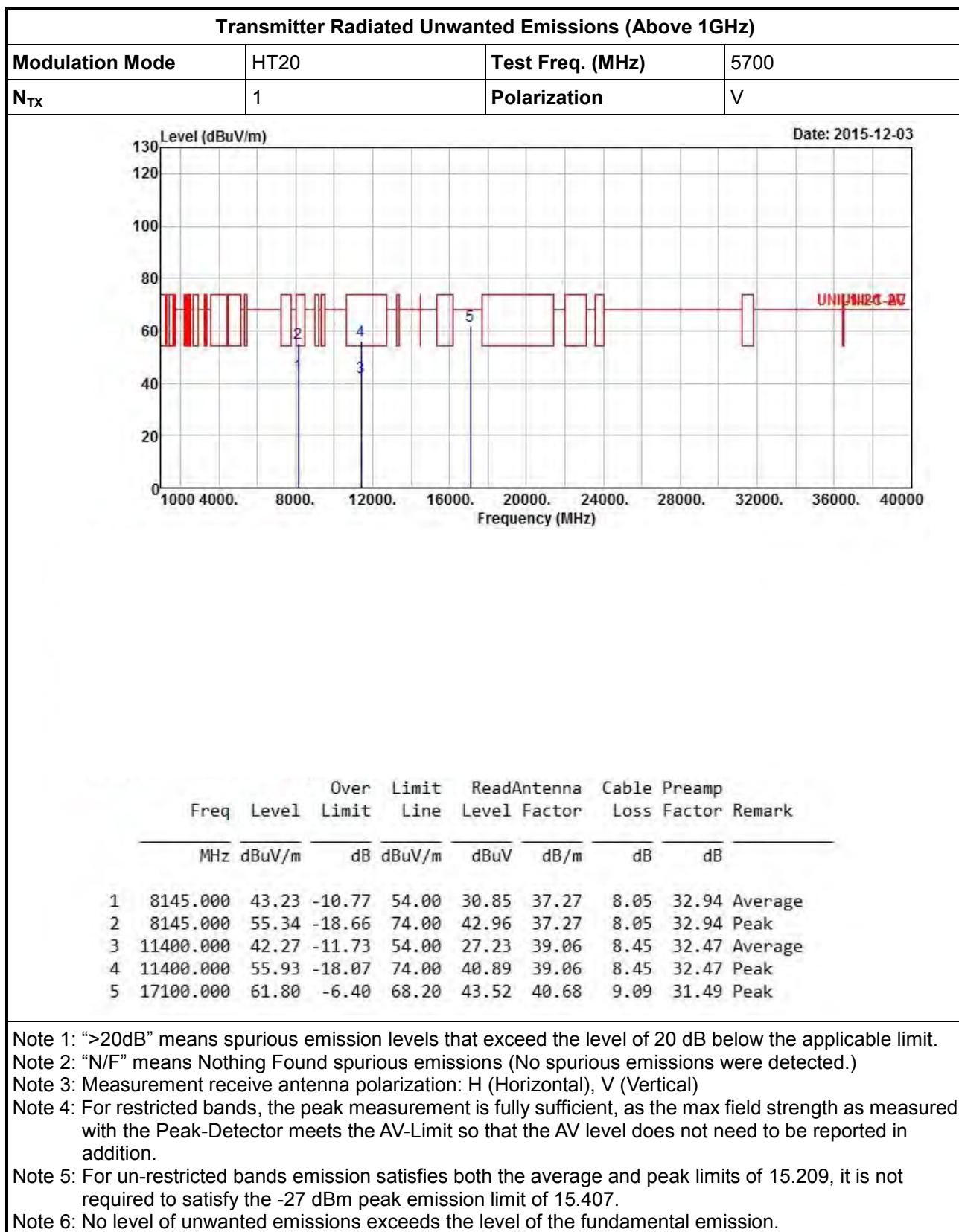


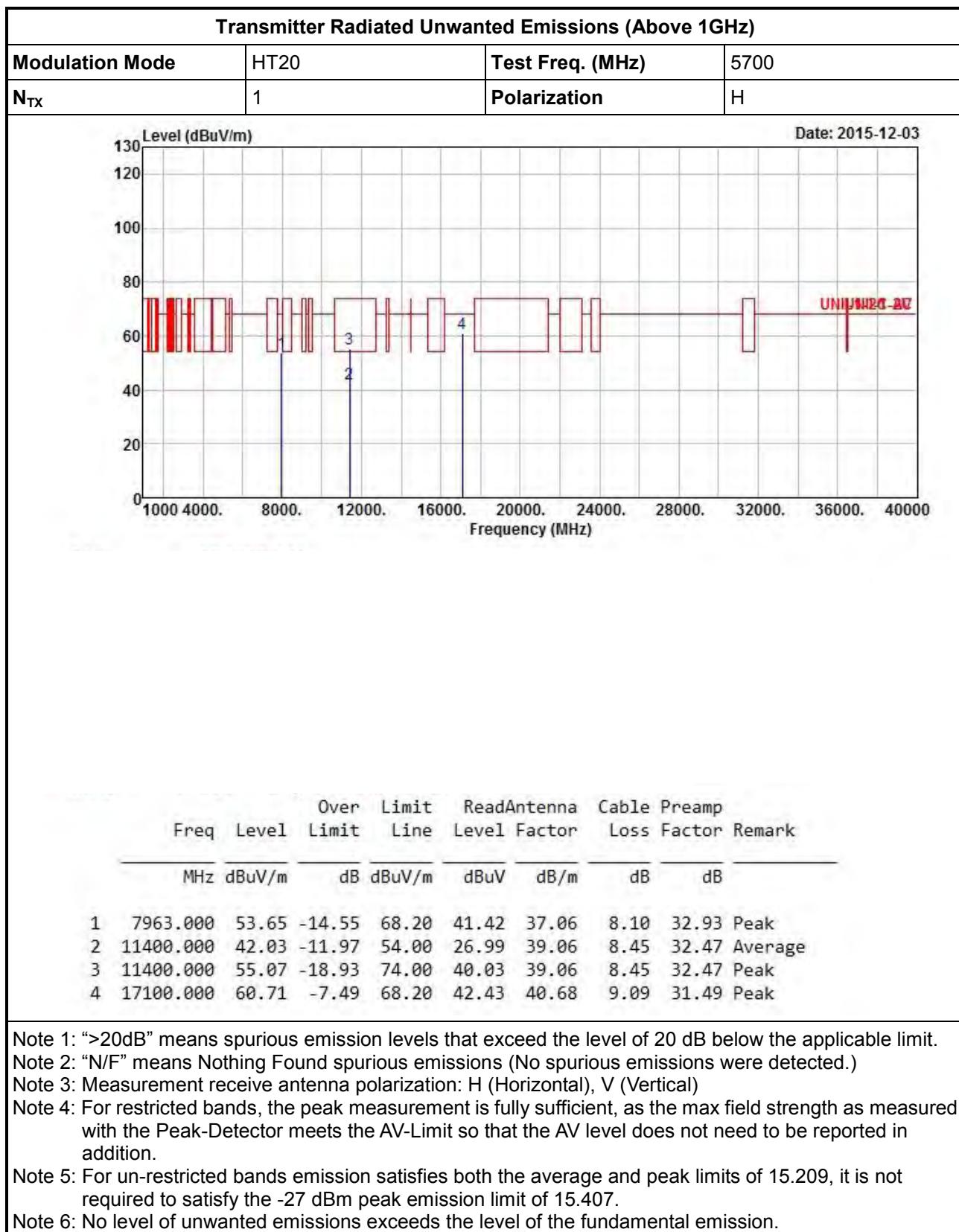


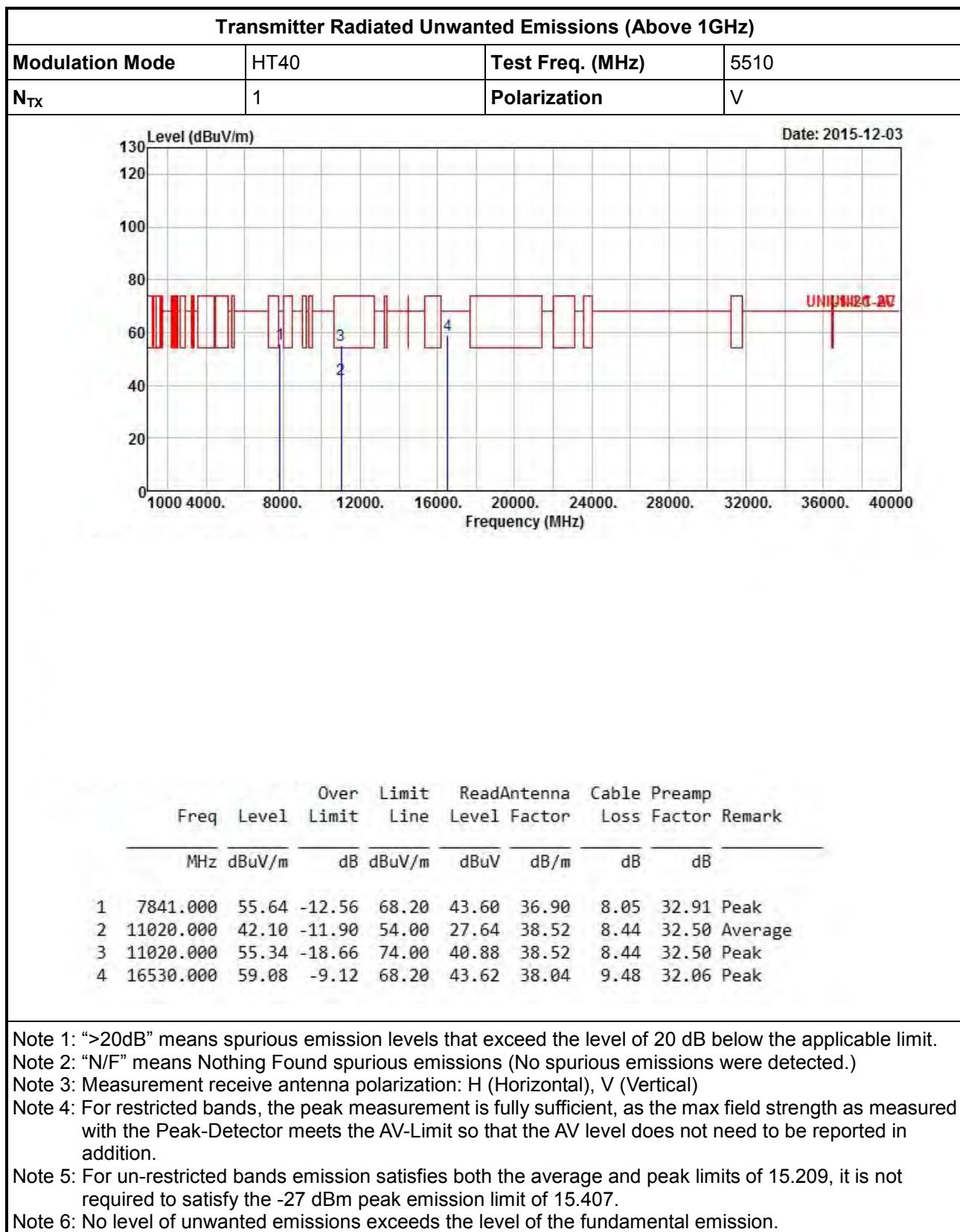


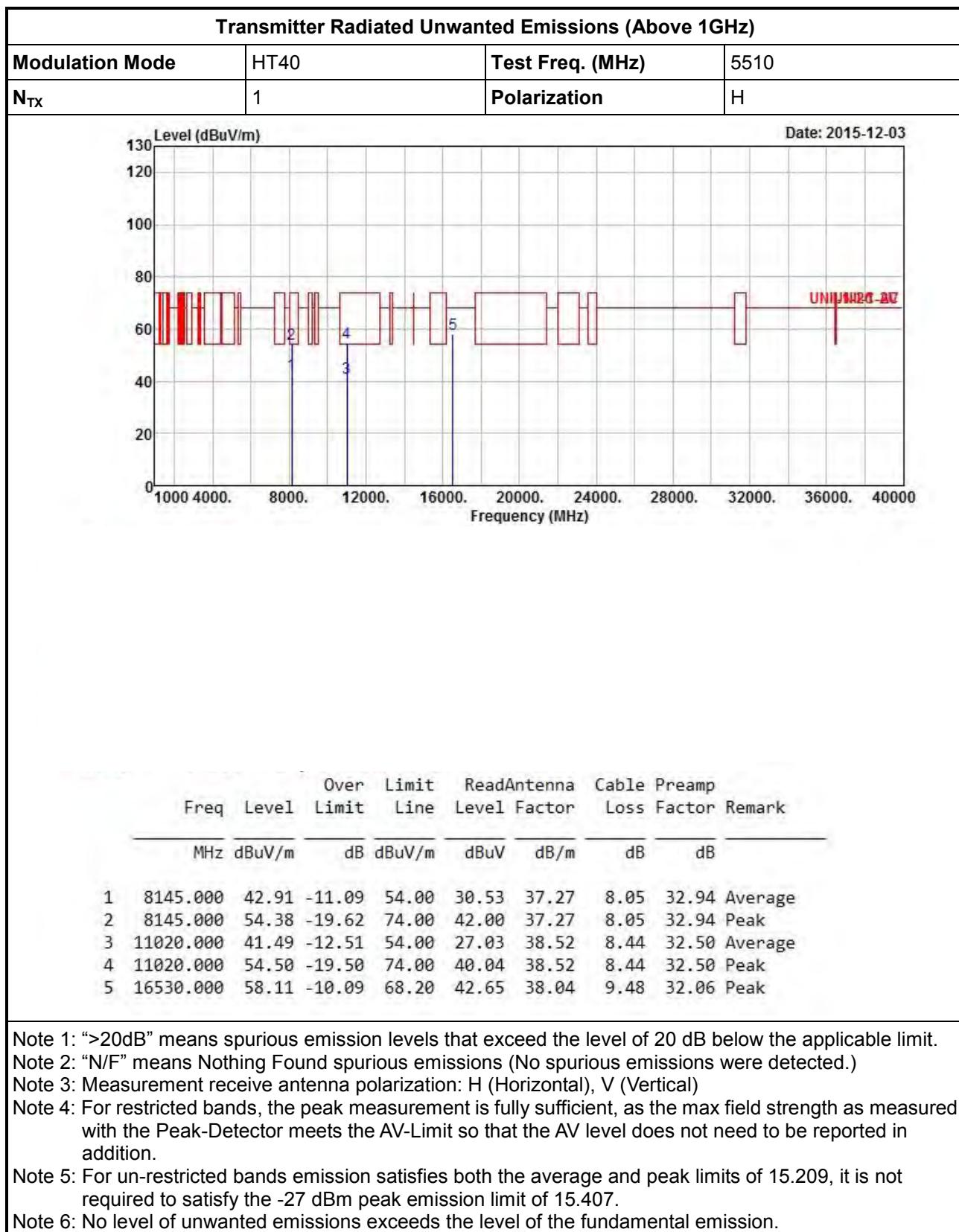


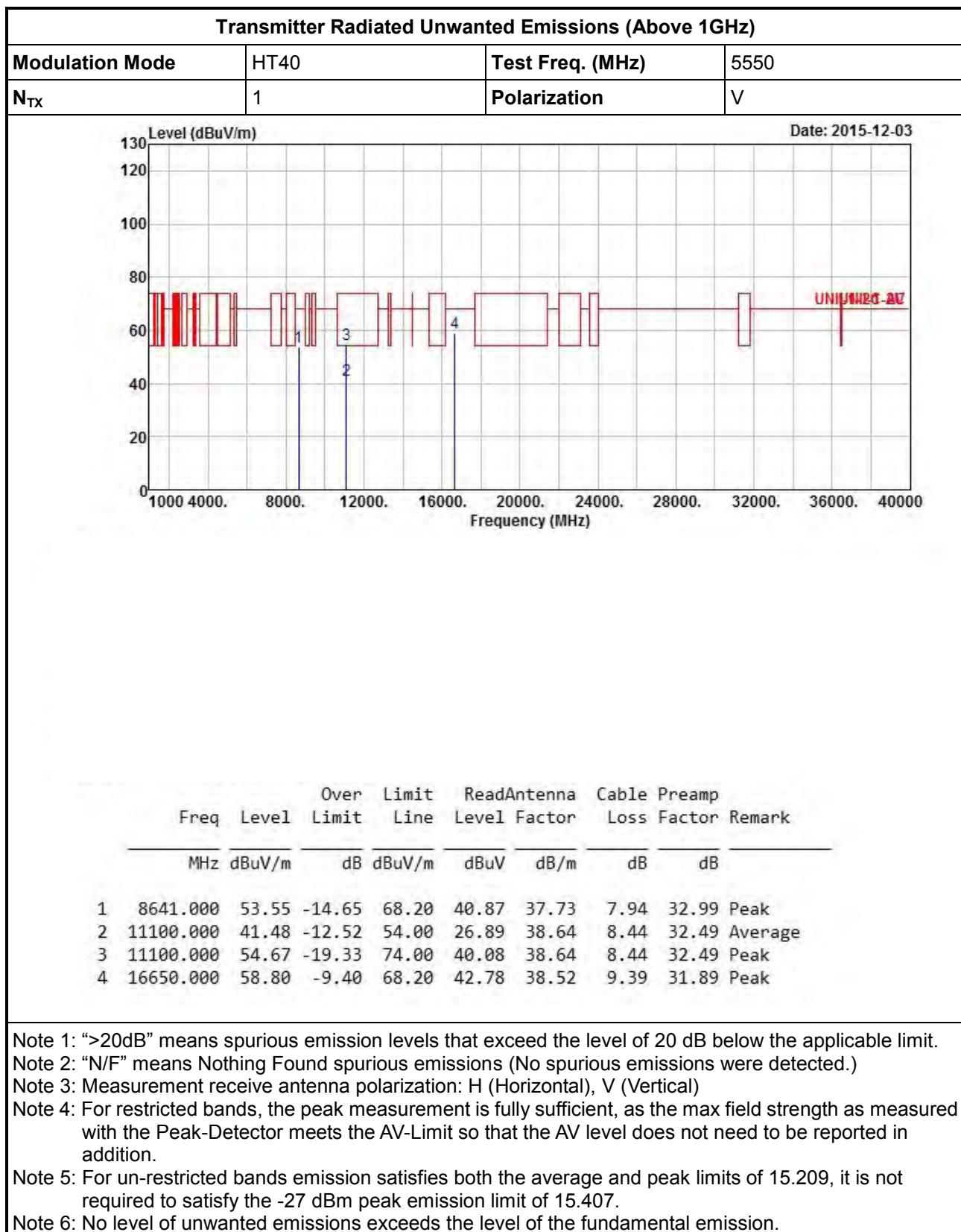


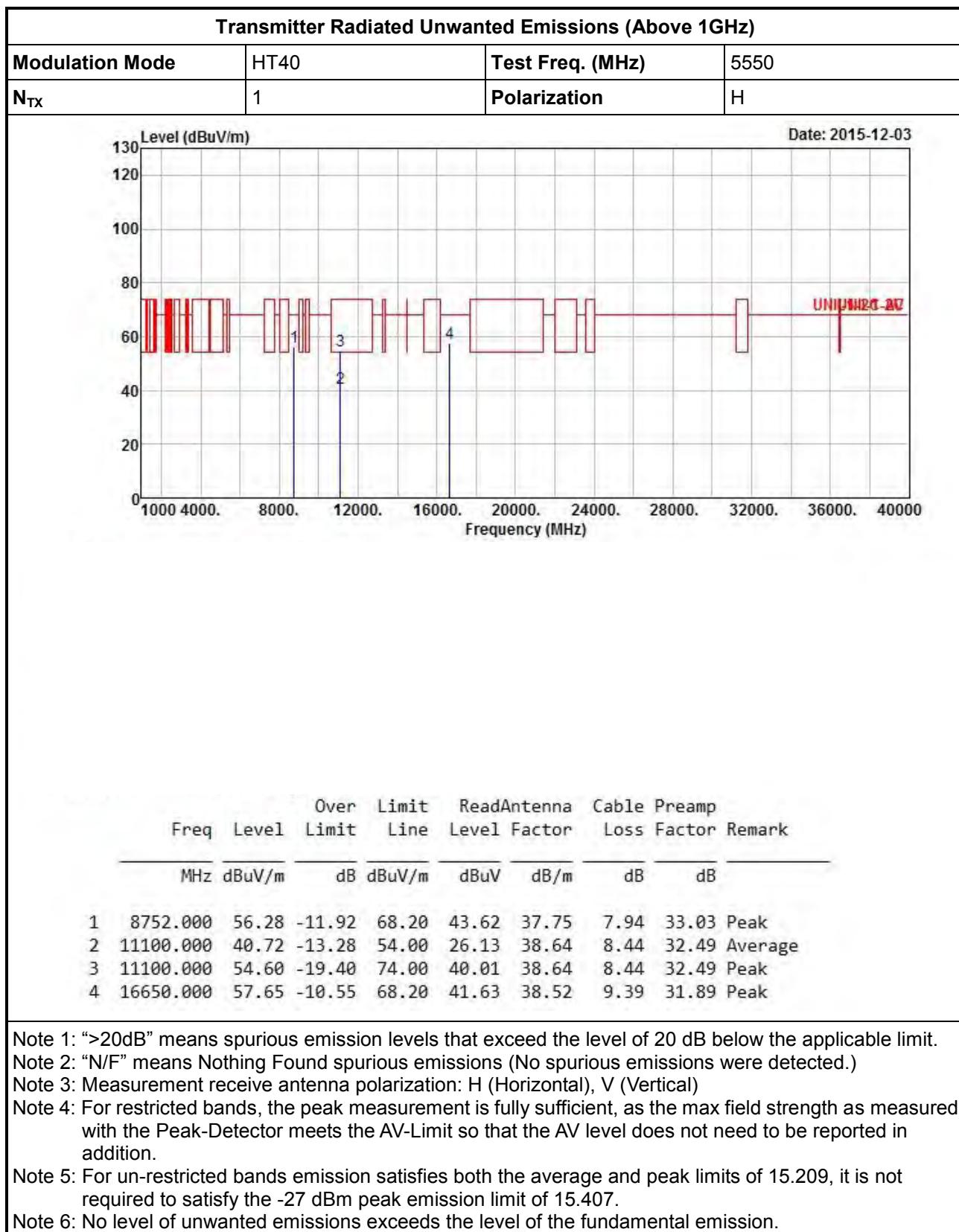


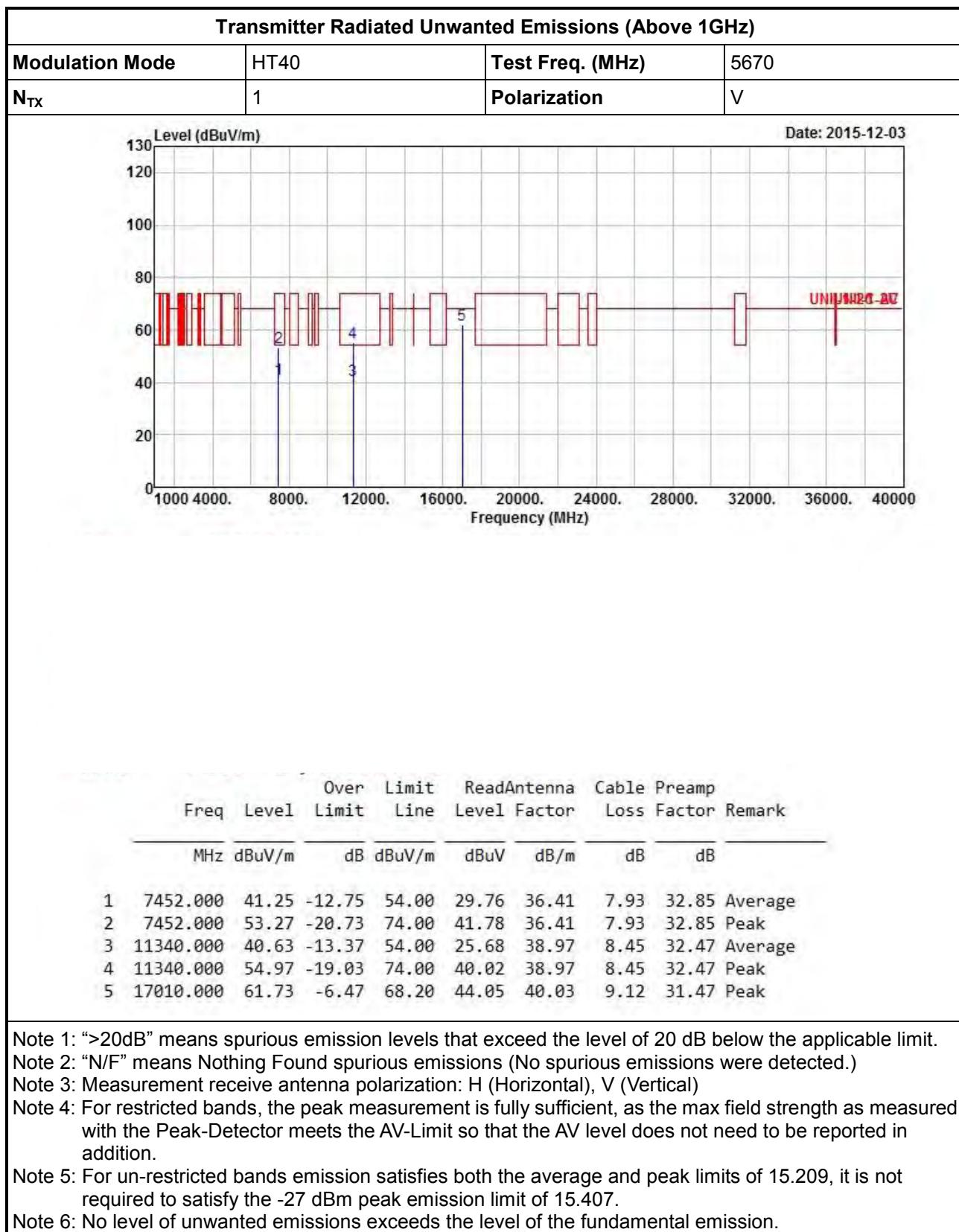


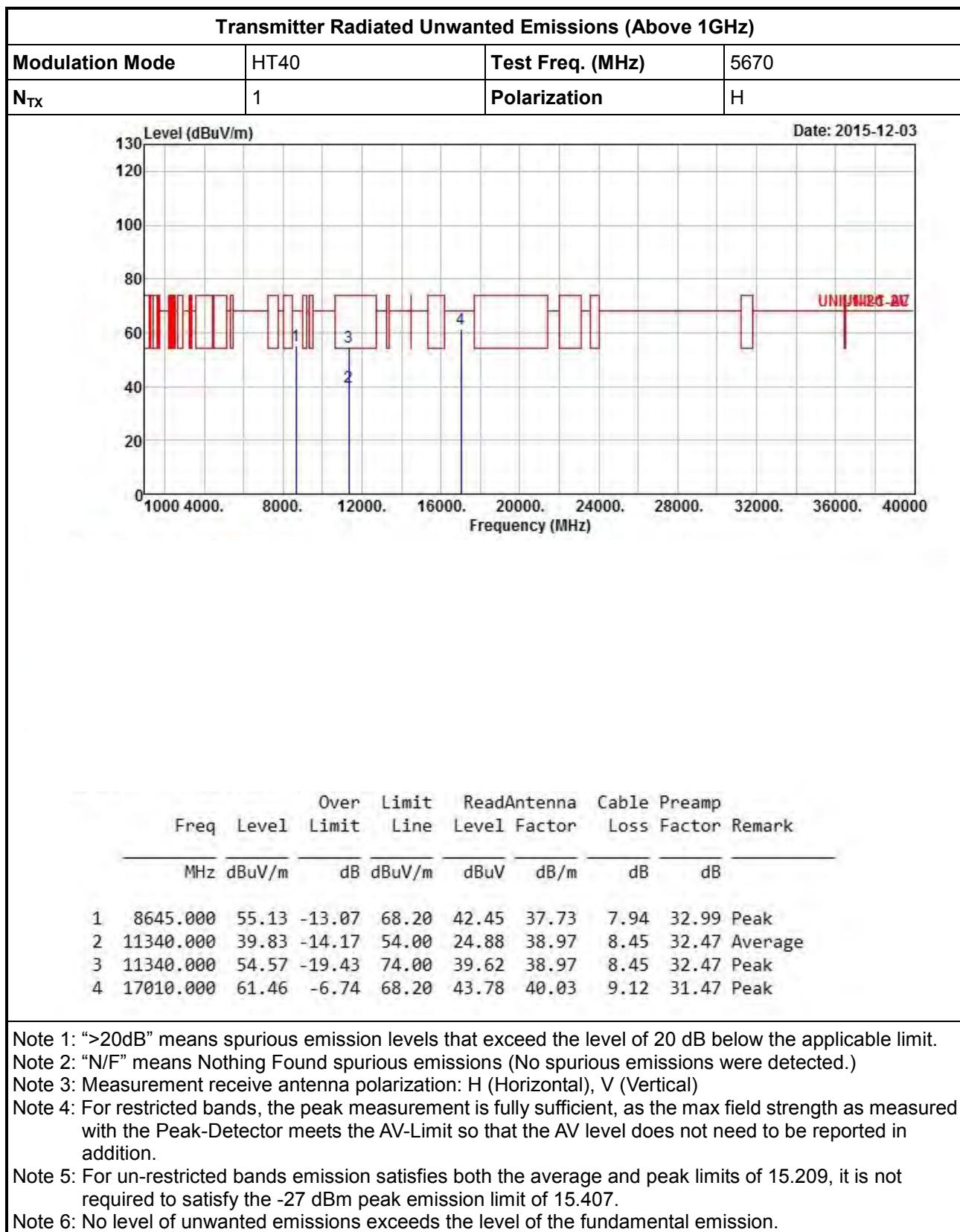


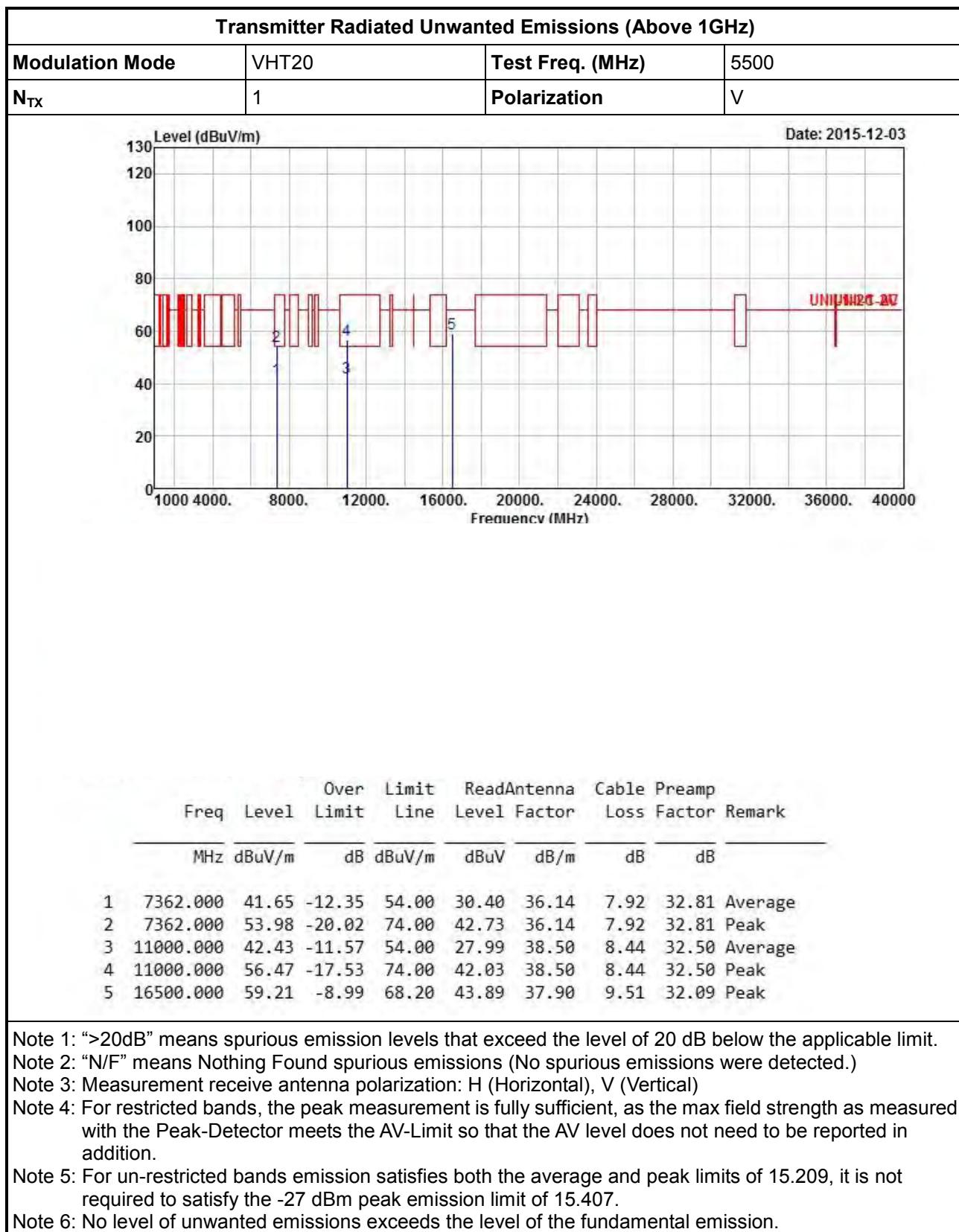


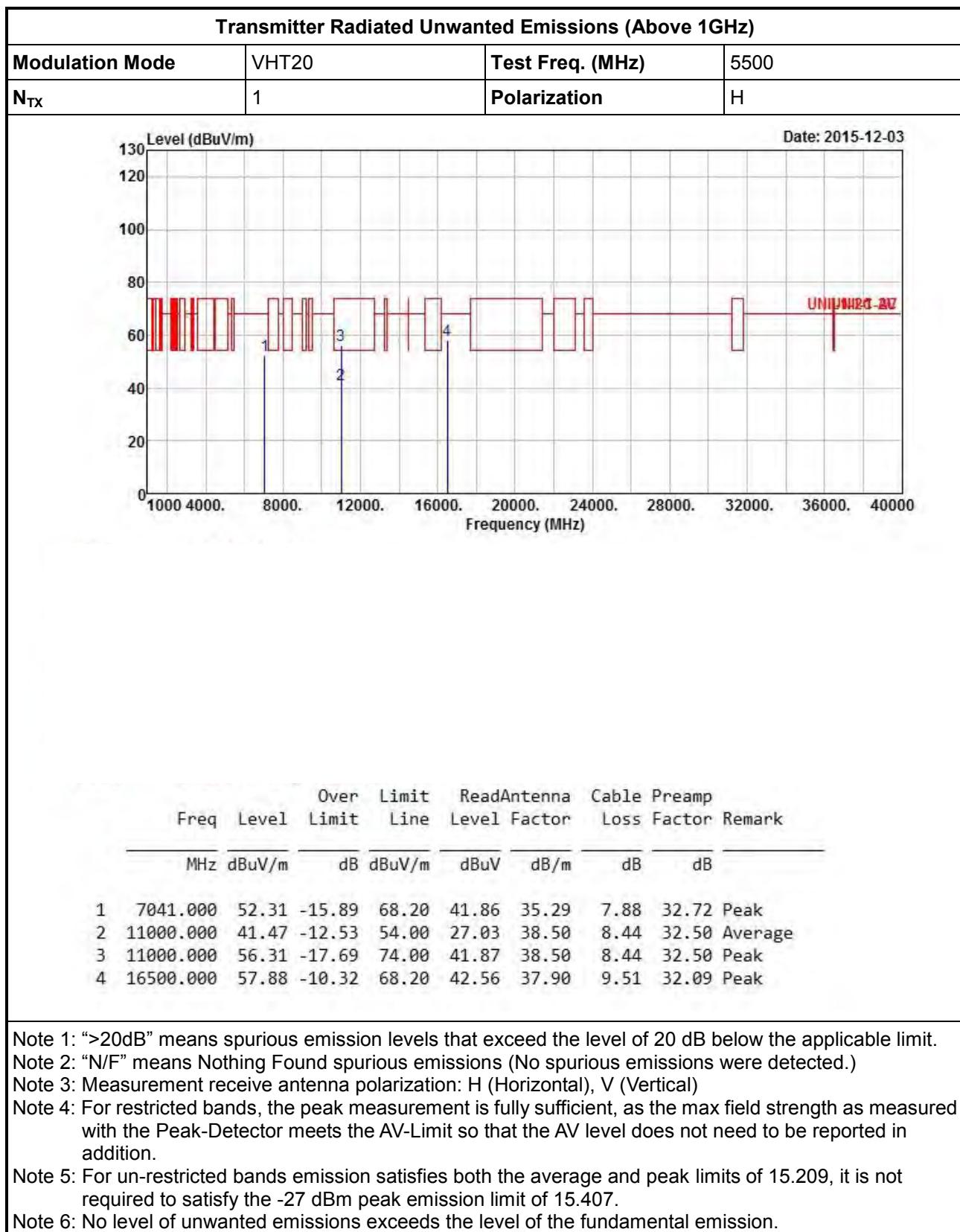


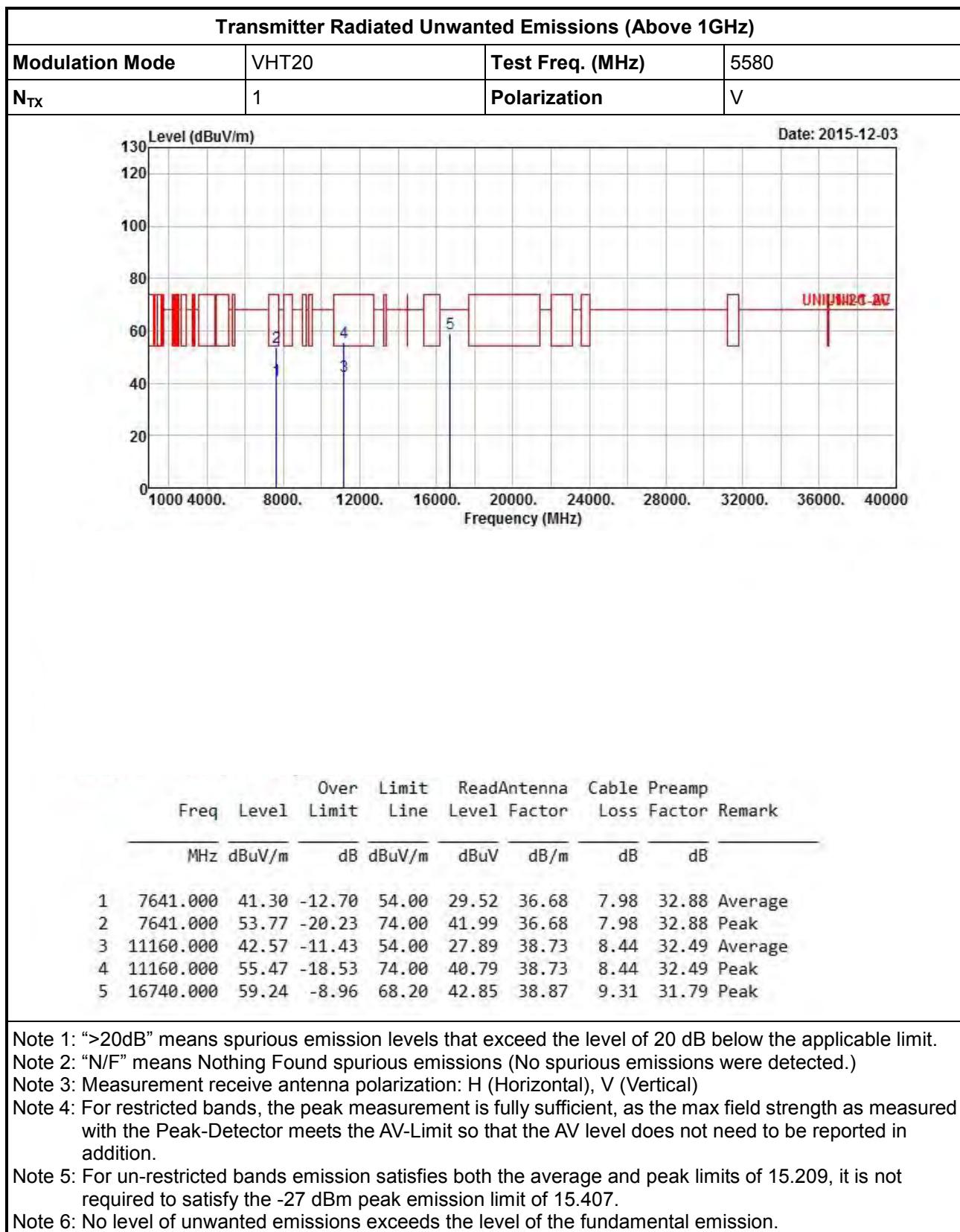


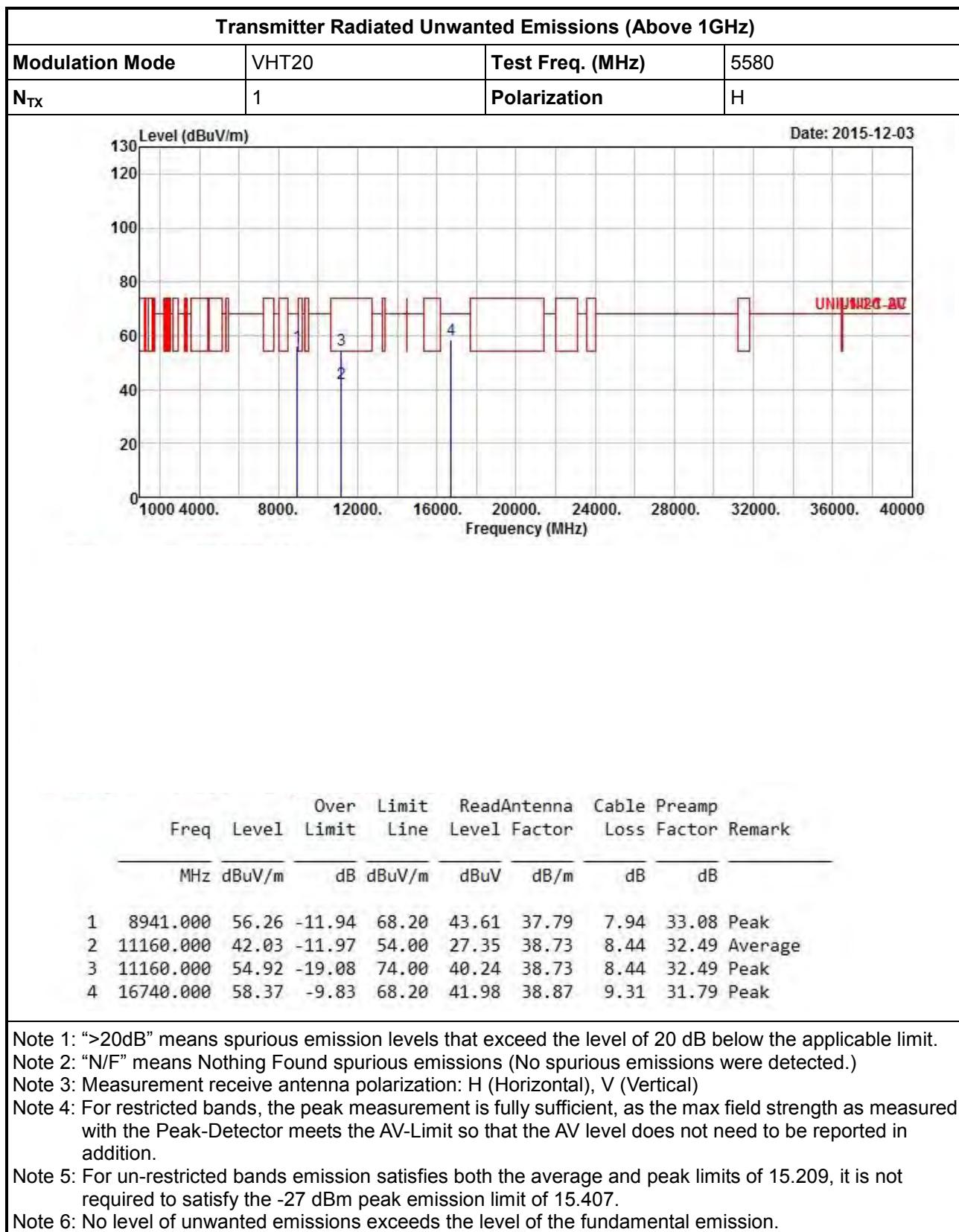


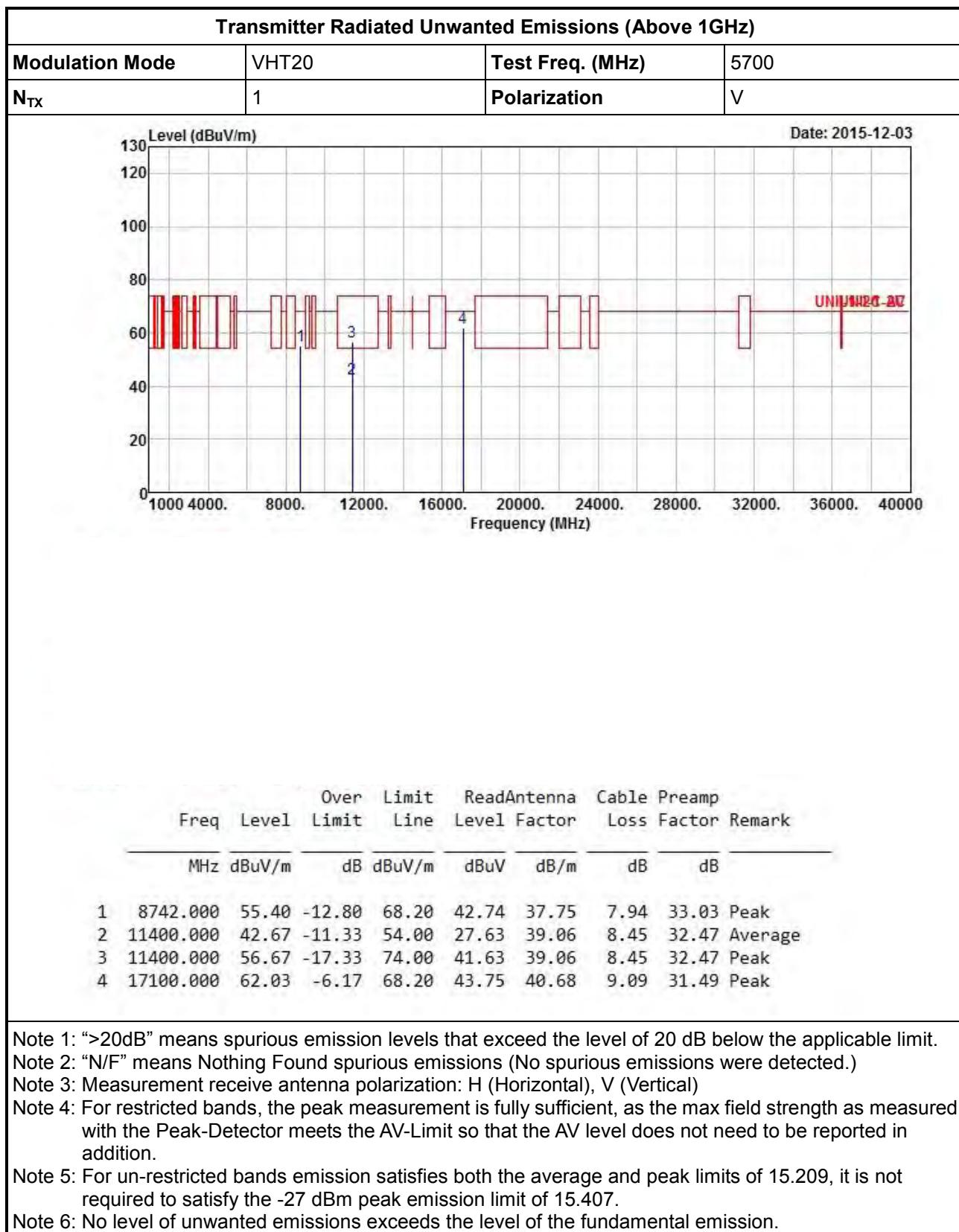


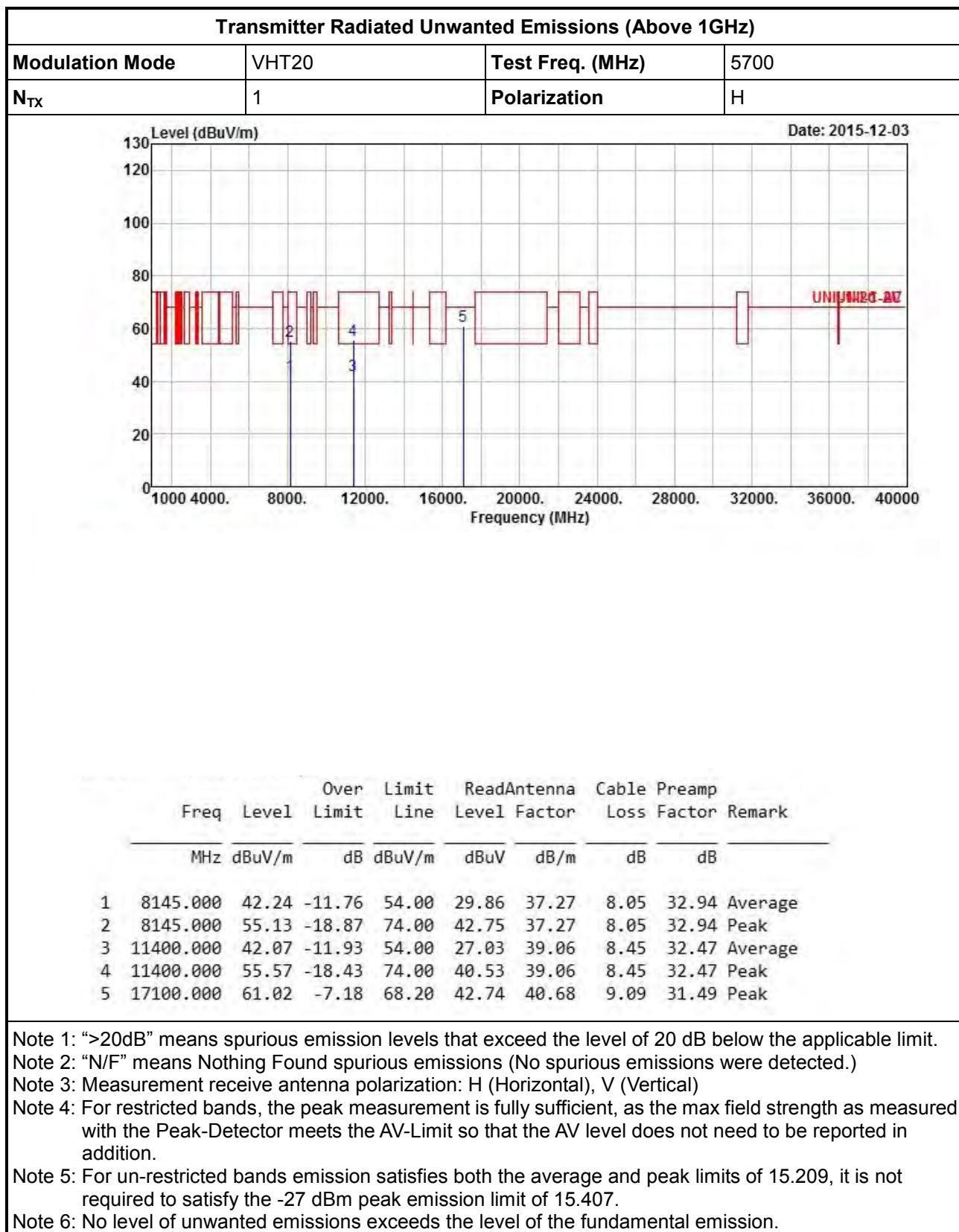


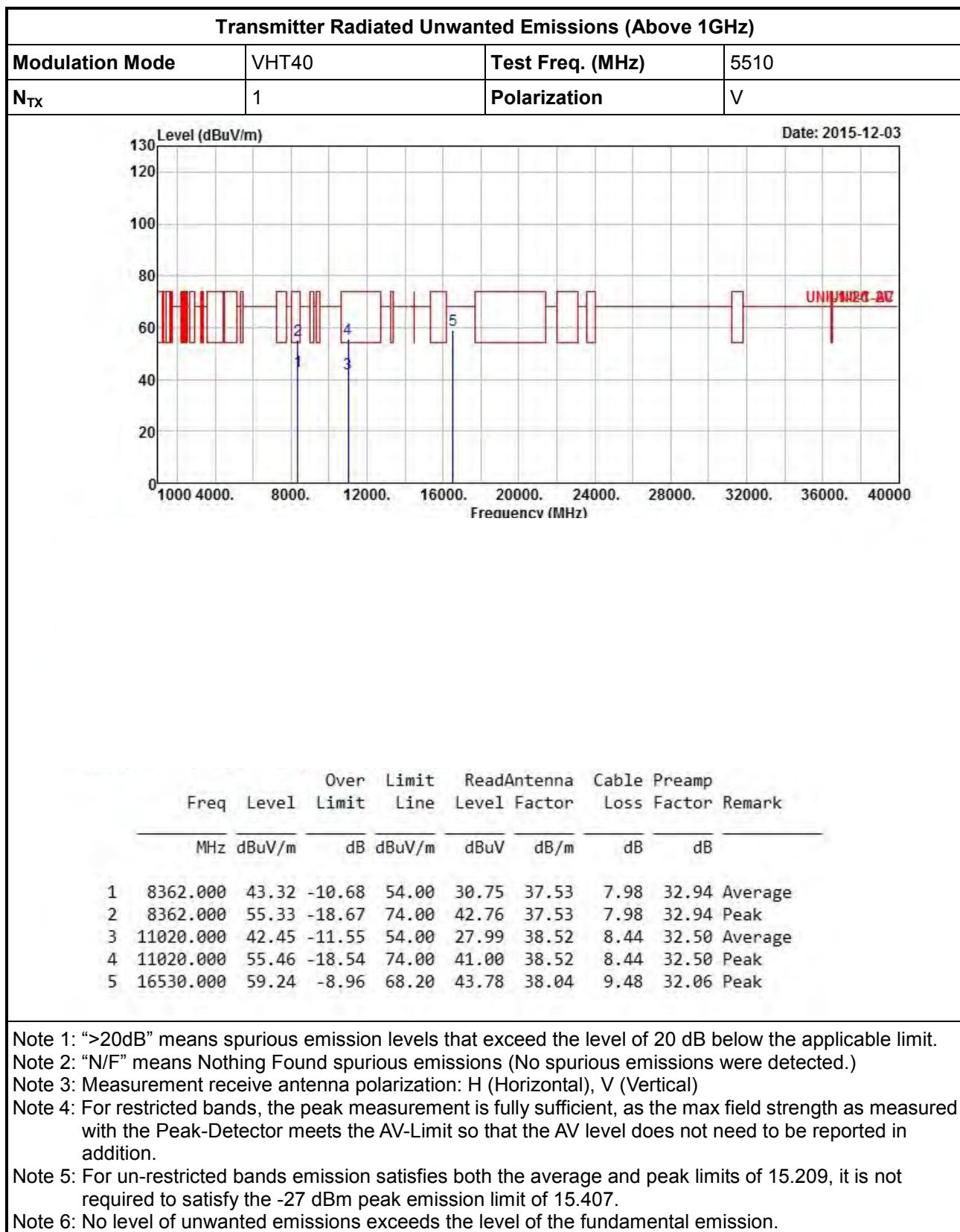


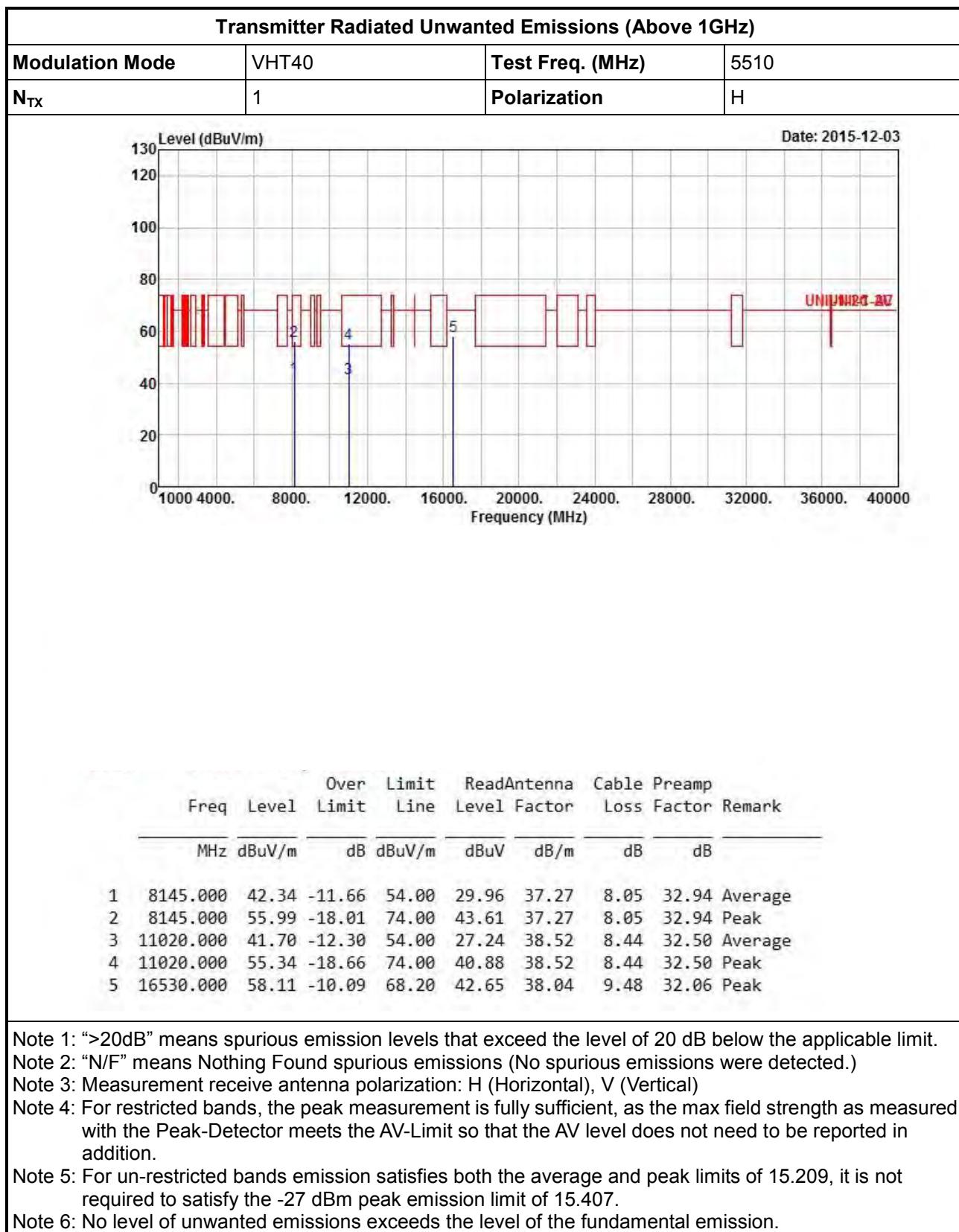


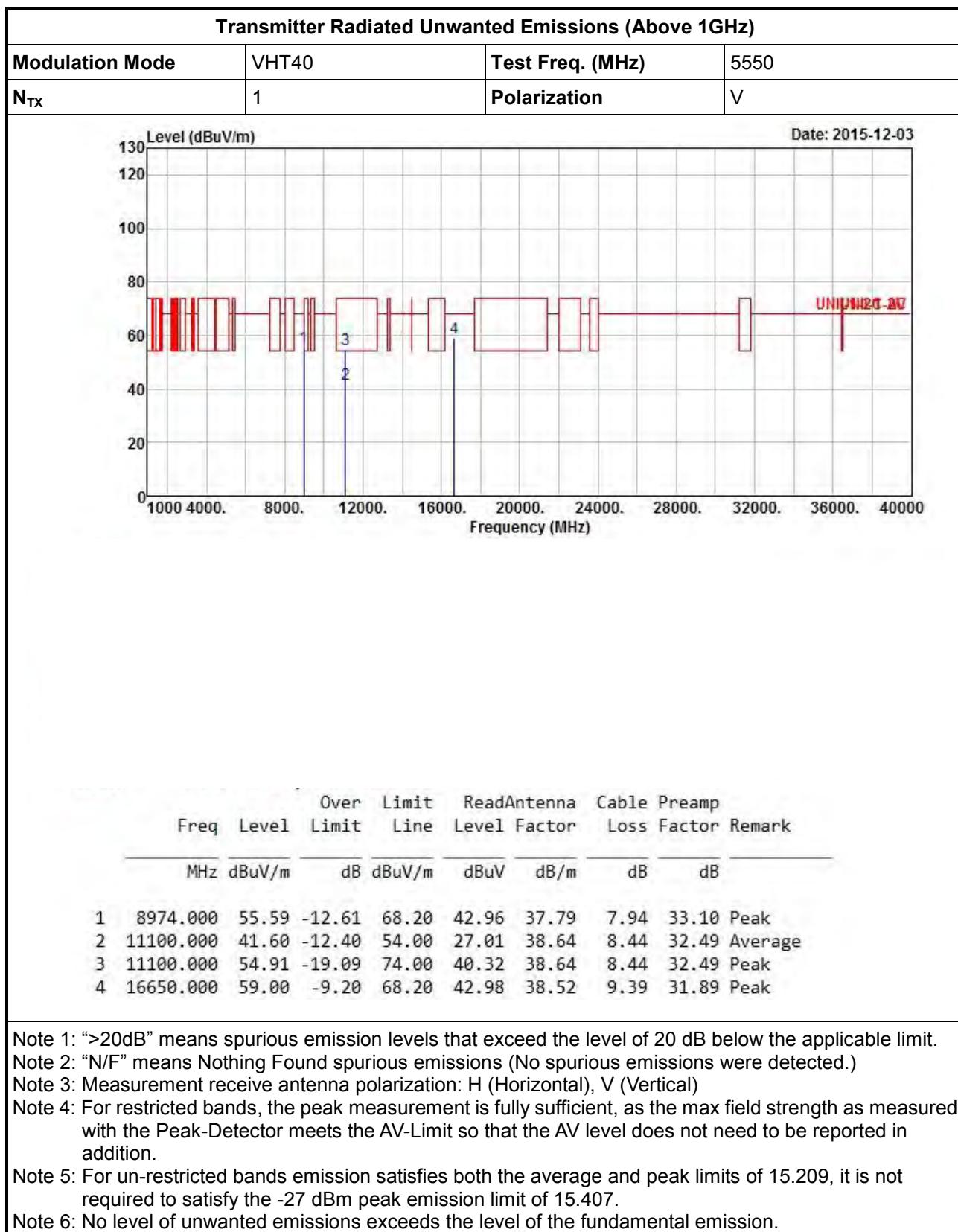


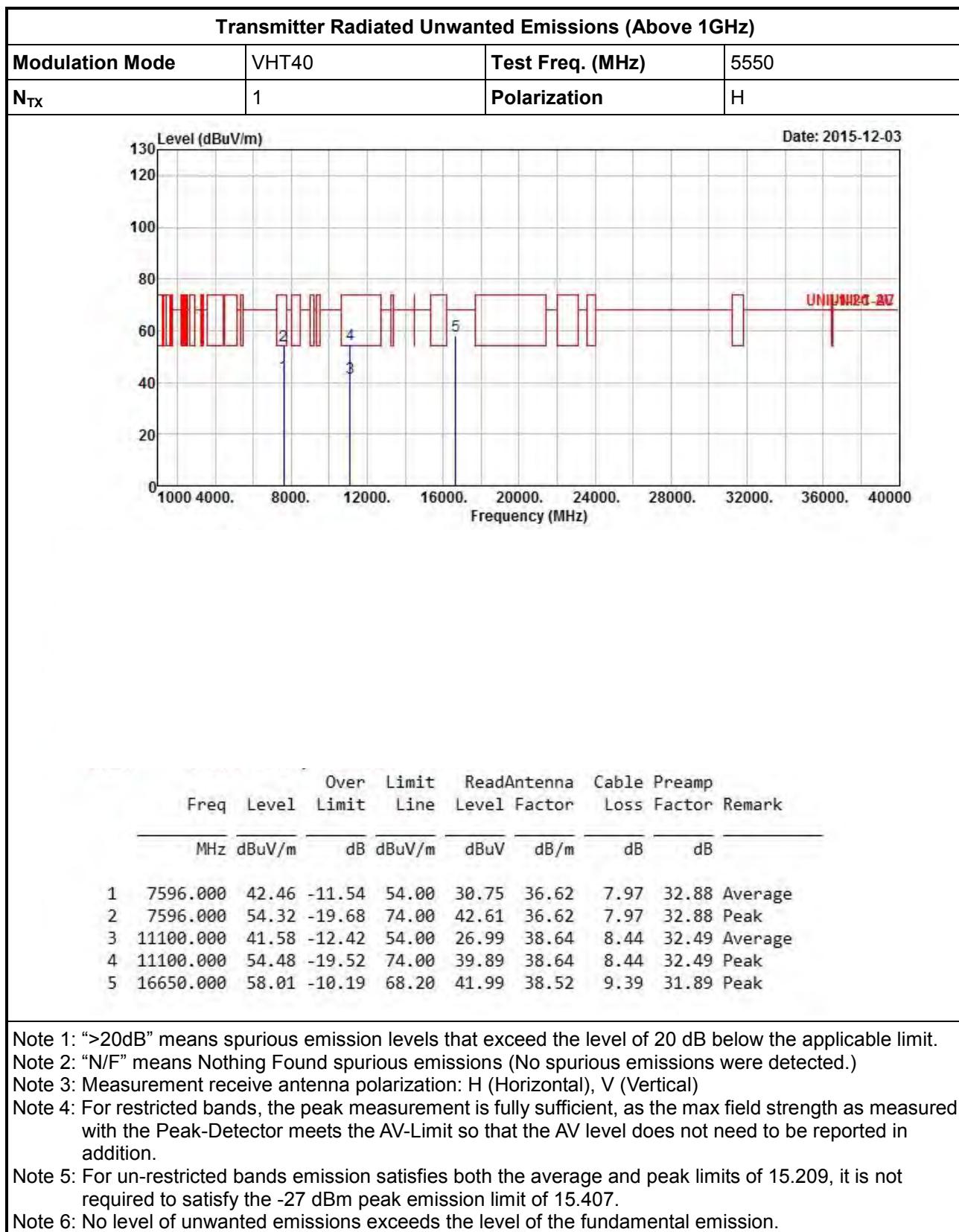


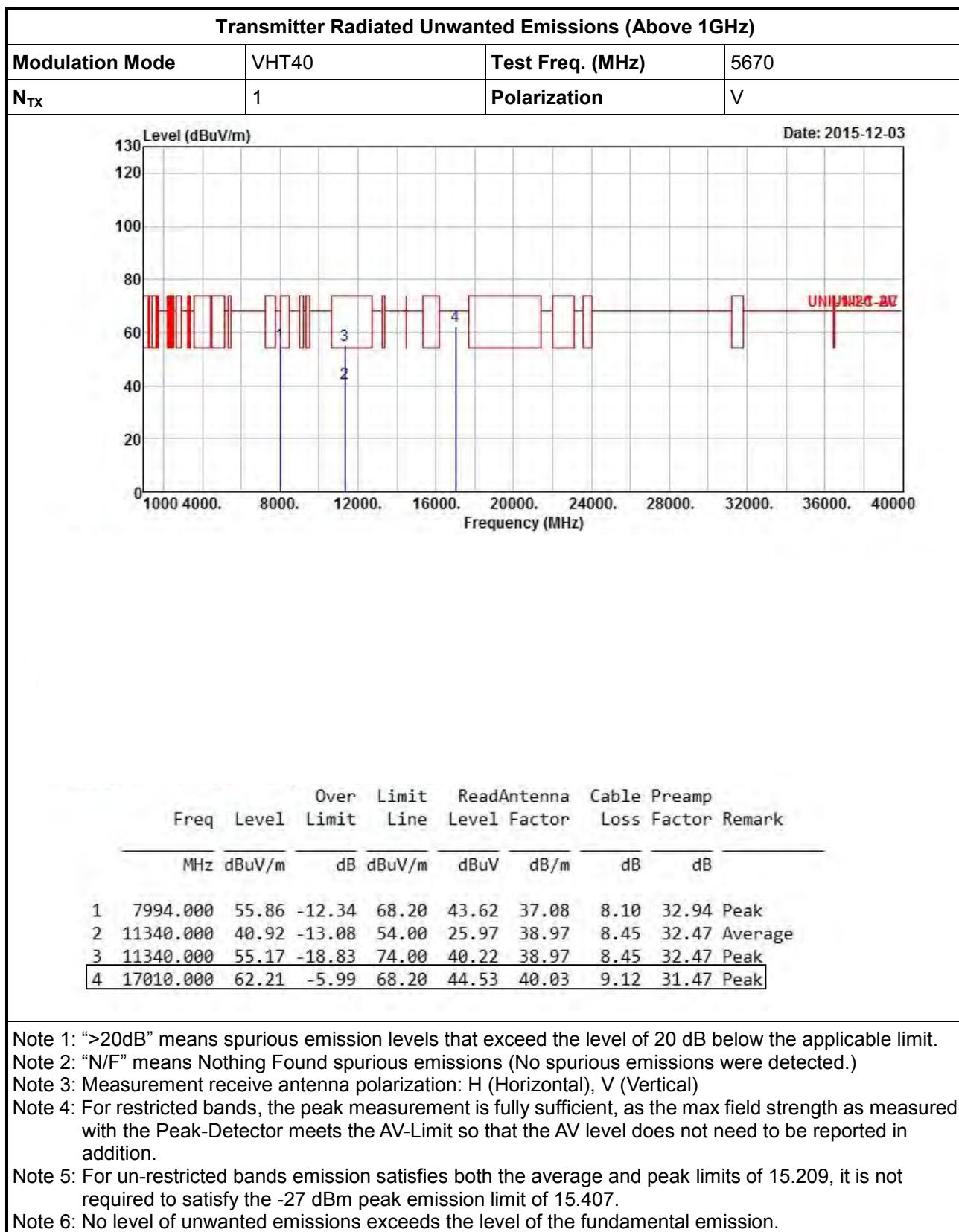


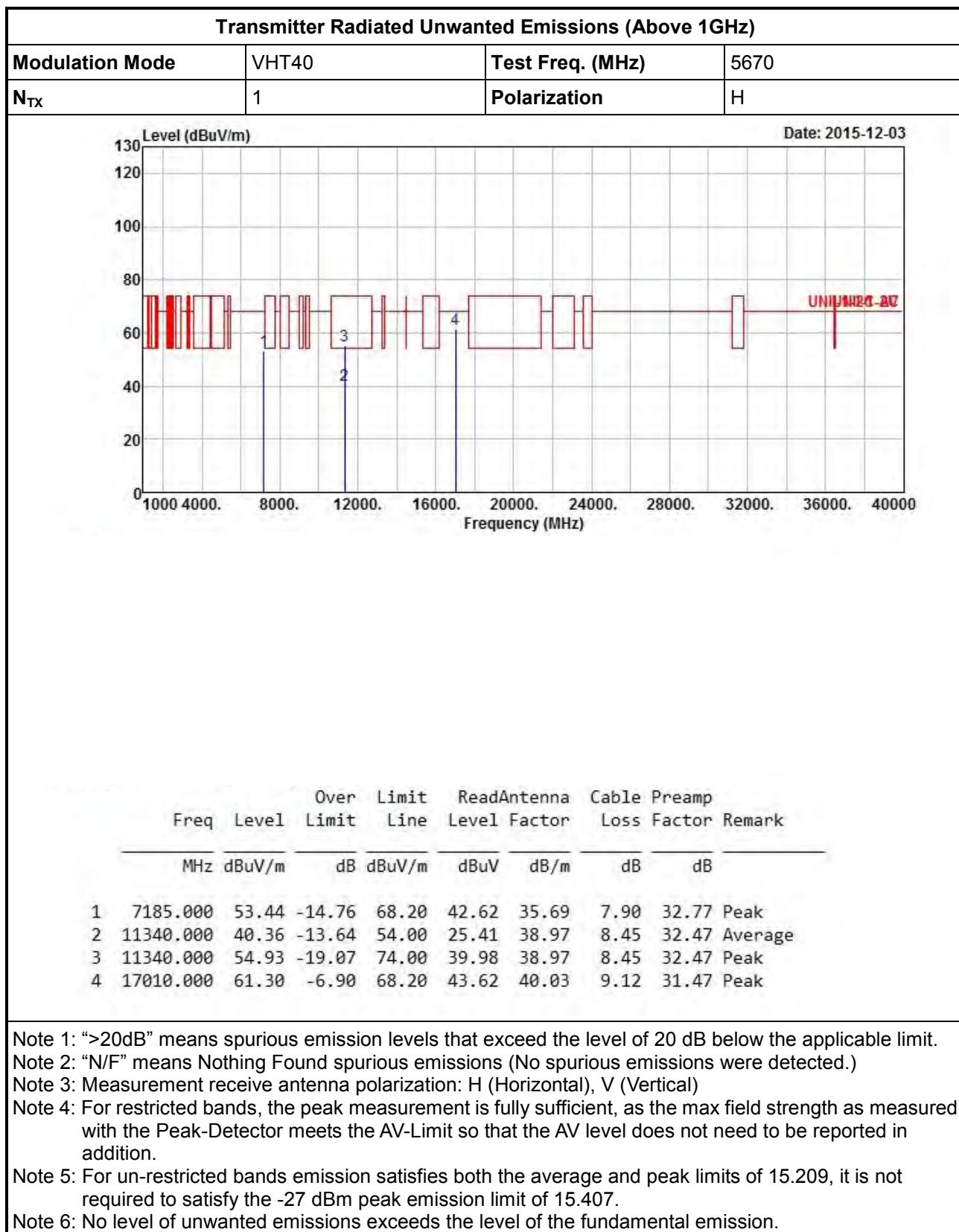


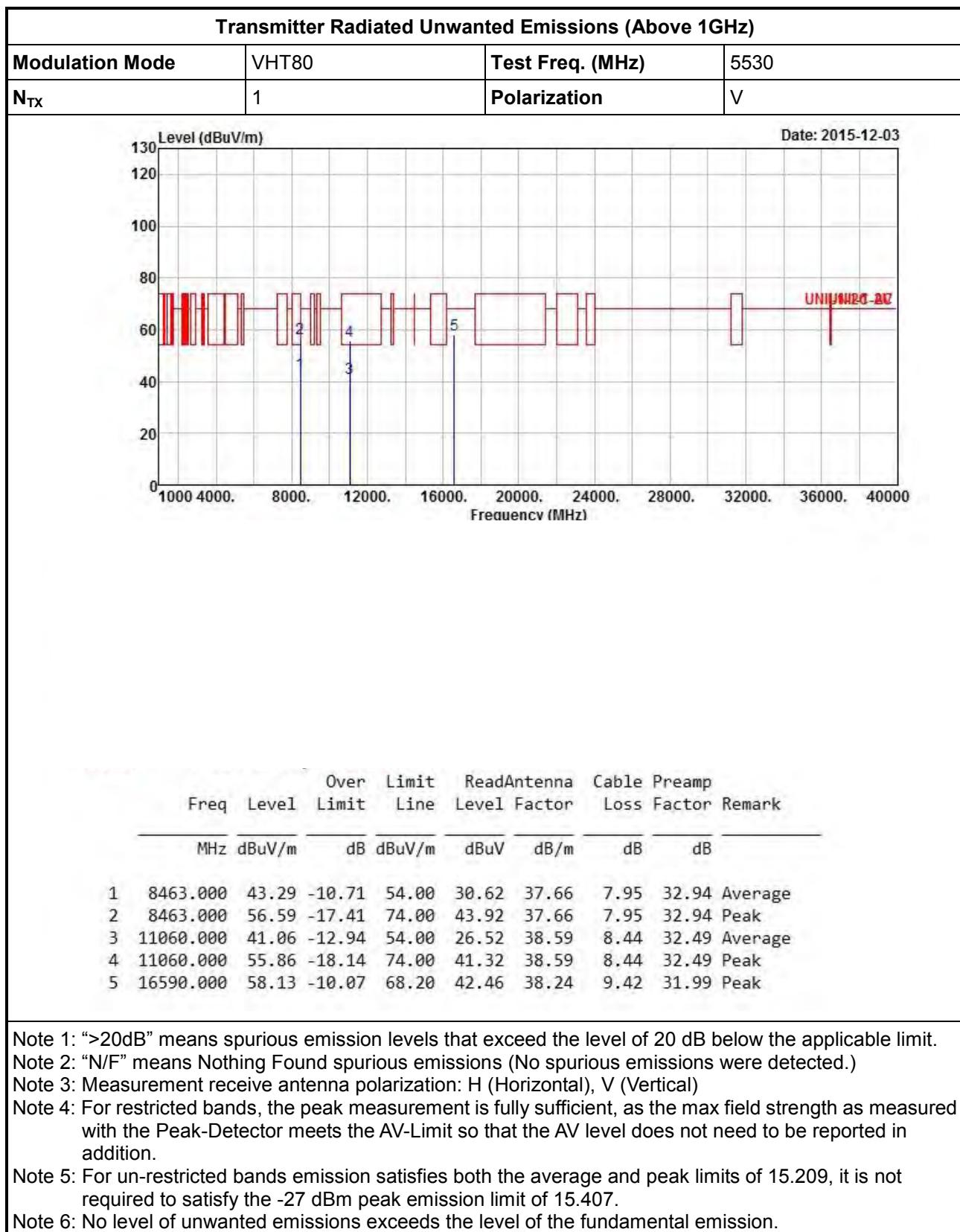


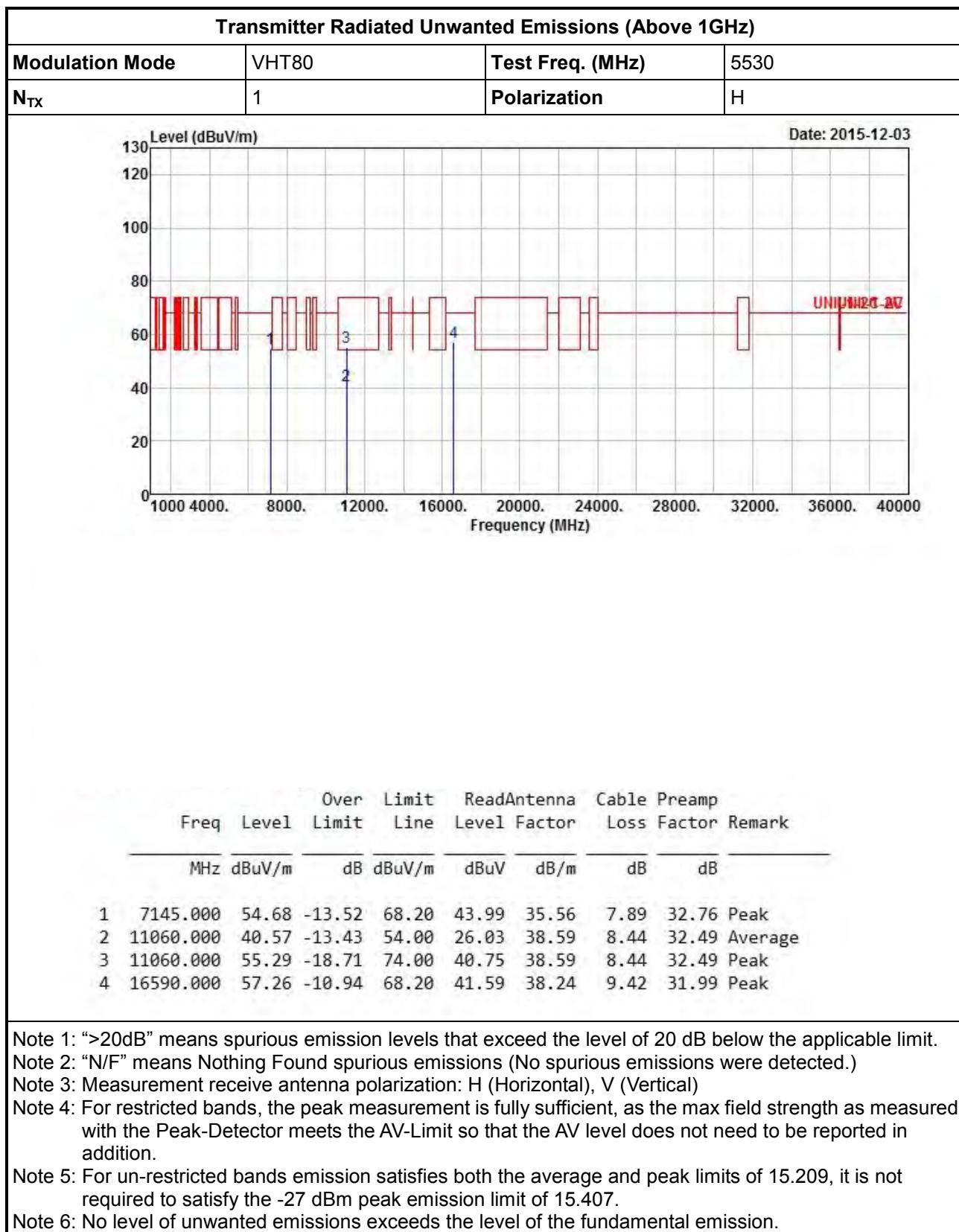












3.7 Frequency Stability

3.7.1 Frequency Stability Limit

Frequency Stability Limit	
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.	

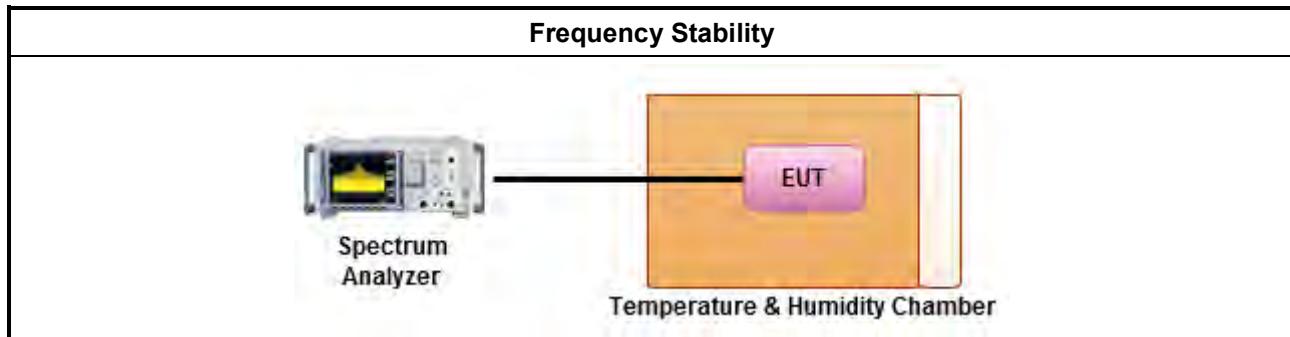
3.7.2 Measuring Instruments

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)	0 min	2 min	5 min	10 min
T _{20°C} Vmax	5300	-4.5868	-4.8340	-4.9962	-4.9151
T _{20°C} Vmin	5300	-4.6698	-4.7509	-4.9151	-4.9962
T _{50°C} Vnom	5300	-0.4094	0.0000	0.2453	0.4094
T _{40°C} Vnom	5300	-3.7679	-3.7679	-3.6868	-3.5226
T _{30°C} Vnom	5300	-4.9151	-4.9962	-4.9962	-4.9962
T _{20°C} Vnom	5300	-4.5868	-4.7509	-4.8340	-4.9962
T _{10°C} Vnom	5300	-2.9491	-3.1943	-3.2774	-3.3585
T _{0°C} Vnom	5300	0.8113	-0.1642	-0.2453	-0.5736
T _{-10°C} Vnom	5300	2.2679	2.3755	2.2943	2.0472
T _{-20°C} Vnom	5300	4.0132	4.2604	4.5057	4.6698
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	Apr. 15. 2015	AC Conduction
LISN	SCHWARZBECK MESS-ELEKTRONIK	NSLK 8127	8127-477	9kHz ~ 30MHz	Jan. 22, 2015	AC Conduction
LISN (Support Unit)	EMCO	3810/2NM	9703-1839	9kHz ~ 30MHz	Apr. 28, 2015	AC Conduction
RF Cable-CON	HUBER+SUHNER	RG213/U	07611832020001	9kHz ~ 30MHz	Oct. 30, 2015	AC Conduction
EMI Filter	LINDGREN	LRE-2030	2651	< 450 Hz	NCR	AC Conduction

Note: Calibration Interval of instruments listed above is one year. NCR: No calibration request.

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Spectrum Analyzer	R&S	FSV 40	101500	9KHz~40GHz	May 05, 2015	RF Conducted
Temp. and Humidity Chamber	Giant Force	GTH-225-20-SP-SD	MAA1112-007	-20 ~ 100°C	Apr. 07, 2015	RF Conducted
Power Sensor	Anritsu	MA2411B	0917017	300MHz ~ 40GHz	Feb. 17, 2015	RF Conducted
Power Meter	Anritsu	ML2495A	0949003	300MHz ~ 40GHz	Feb. 17, 2015	RF Conducted
Signal Generator	R&S	SMR40	100116	10MHz ~ 40GHz	Jul. 28, 2015	RF Conducted

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



Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30MHz ~ 1GHz 3m	Nov. 28, 2015	Radiated Emission
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	1GHz ~ 18GHz 3m	Dec. 17, 2014	Radiated Emission
Amplifier	HP	8447D	2944A08033	10kHz ~ 1.3GHz	May 11, 2015	Radiated Emission
Amplifier	Agilent	8449B	3008A02120	1GHz ~ 26.5GHz	Sep. 02, 2015	Radiated Emission
Spectrum	R&S	FSP40	100004	9kHz ~ 40GHz	Apr. 02, 2015	Radiated Emission
Bilog Antenna	SCHAFFNER	CBL 6112D	22237	30MHz ~ 1GHz	Sep. 18, 2015	Radiated Emission
Horn Antenna	ETS • LINDGREN	3115	6741	1GHz ~ 18GHz	Jul. 15, 2015	Radiated Emission
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170154	18GHz ~ 40GHz	Jan. 27, 2015	Radiated Emission
RF Cable-R03m	Jye Bao	RG142	CB021	9kHz ~ 1GHz	Oct. 28, 2015	Radiated Emission
RF Cable-high	SUHNER	SUCOFLEX 106	03CH03-HY	1GHz ~ 40GHz	Oct. 29, 2015	Radiated Emission
Turn Table	EM Electronics	EM Electronics	060615	0 ~ 360 degree	N/A	Radiated Emission
Antenna Mast	MF	MF-7802	MF780208179	1 ~ 4 m	N/A	Radiated Emission

Note: Calibration Interval of instruments listed above is one year. NCR: No calibration request.

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Amplifier	MITEQ	JS44-18004000-33-8P	1840917	18GHz ~ 40GHz	Jun. 02, 2015	Radiated Emission
Loop Antenna	R&S	HFH2-Z2	100330	9 kHz~30 MHz	Nov.16.2015	Radiated Emission

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