



# FCC Test Report

**Equipment** : Wireless AC750 Range Extender  
**Brand Name** : ZyXEL  
**Model No.** : WRE6505  
**FCC ID** : I88WRE6505  
**Standard** : 47 CFR FCC Part 15.407  
**Operating Band** : 5150 MHz – 5250 MHz  
**FCC Classification** : NII  
**Applicant** : ZyXEL Communications Corporation  
**Manufacturer** : No. 2, Gongye E. 9th Road  
Hsinchu Science Park, Hsinchu, Taiwan

The product sample received on Apr. 23, 2014 and completely tested on May 02, 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:

  
Wayne Hsu / 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	Measured	Limit	Result
1.1.2	15.203	Antenna Requirement	Antenna connector mechanism complied	FCC 15.203	Complied
3.1	15.207	AC Power-line Conducted Emissions	[dBuV]: 0.54068MHz 22.71 (Margin 23.29dB) - AV 33.85 (Margin 22.15dB) - QP	FCC 15.207	Complied
3.2	15.407(a)	Emission Bandwidth	Bandwidth [MHz] 20M:20.14 / 40M:52.72 80M: 104.96	Information only	Complied
3.3	15.407(a)	RF Output Power (Maximum Conducted Output Power)	Power [dBm] 5150-5250MHz:16.92	Power [dBm] 5150-5250MHz:17	Complied
3.4	15.407(a)	Peak Power Spectral Density	PPSD [dBm/MHz] 5150-5250MHz:4.00	PPSD [dBm/MHz] 5150-5250MHz:4	Complied
3.5	15.407(a)	Peak Excursion	8.96 dB	13 dB	Complied
3.6	15.407(b)	Transmitter Bandedge Emissions	Restricted Bands [dBuV/m at 3m]: 5150.00MHz 72.66 (Margin 1.34dB) - PK 52.96 (Margin 1.04dB) - AV	Non-Restricted Bands: ≤ -27dBm (68.3dBuV/m@3m) Restricted Bands: FCC 15.209	Complied
3.7	15.407(b)	Transmitter Unwanted Emissions	Restricted Bands [dBuV/m at 3m]: 10400MHz 58.83 (Margin 15.17dB) – PK 48.32 (Margin 5.68dB) - AV	Non-Restricted Bands: ≤ -27dBm (68.3dBuV/m@3m) Restricted Bands: FCC 15.209	Complied
3.8	15.407(g)	Frequency Stability	5.6158 ppm	Signal shall remain in-band	Complied



## Revision History



## 1 General Description

### 1.1 Information

#### 1.1.1 RF General Information

RF General Information						
Frequency Range (MHz)	IEEE Std. 802.11	Ch. Freq. (MHz)	Channel Number	Transmit Chains (N <sub>TX</sub> )	RF Output Power (dBm)	Co-location
5150-5250	a	5180-5240	36-48 [4]	1	14.68	Yes
5150-5250	n (HT20)	5180-5240	36-48 [4]	1	14.67	Yes
5150-5250	n (HT40)	5190-5230	38-46 [2]	1	16.71	Yes
5150-5250	ac (VHT20)	5180-5240	36-48 [4]	1	15.02	Yes
5150-5250	ac (VHT40)	5190-5230	38-46 [2]	1	16.69	Yes
5150-5250	ac (VHT80)	5210	42 [1]	1	16.92	Yes

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: Co-location, Co-location is generally defined as simultaneously transmitting (co-transmitting) antennas within 20 cm of each other. (i.e., EUT has simultaneously co-transmitting that operating 2.4GHz and 5GHz.)



### 1.1.2 Antenna Information

Antenna Category	
<input checked="" type="checkbox"/>	Integral antenna (antenna permanently attached)
	<input type="checkbox"/> Temporary RF connector provided
	<input checked="" type="checkbox"/> No temporary RF connector provided Transmit chains bypass antenna and soldered temporary RF connector provided for connected measurement. In case of conducted measurements the transmitter shall be connected to the measuring equipment via a suitable attenuator and correct for all losses in the RF path.
<input type="checkbox"/>	External antenna (dedicated antennas)
	<input 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	Model Name	Gain (dBi)
1	Integral	PIFA	C059-510275-A	4.44
Remark: 11a/n/ac only include 1TX and Port1 for emission.				

### 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

#### 1.1.5 EUT Operational Condition

Supply Voltage	<input checked="" type="checkbox"/> AC mains	<input type="checkbox"/> DC	<input type="checkbox"/> System
Type of DC Source	<input checked="" type="checkbox"/> Internal DC supply	<input type="checkbox"/> External DC from USB cable	<input type="checkbox"/> External DC adapter



## 1.2 Accessories And Support Equipment

Accessories				
CPU and Module	Brand Name	Mediatek	Model Name	MT7620A + MT7610EN

Note: For more detail and other information, please refer to user manual.

Support Equipment - RF Conducted				
No.	Equipment	Brand Name	Model Name	FCC ID
1	Notebook	DELL	E5520	-

## 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
- FCC KDB 644545 D01
- FCC KDB 662911

## 1.4 Testing Location Information

Testing Location				
<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	25°C / 53%
RF Conducted		TH01-HY	Cain	22.1°C / 61%
Radiated Emission		03CH02-HY	Hunter	25°C / 53%



## 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,6-54Mbps	1	6-54Mbps	6 Mbps
HT20,M0-7	1	M0-7	M0
HT40,M0-7	1	M0-7	M0
VHT20,M0-8	1	M0-8	M0
VHT40,M0-9	1	M0-9	M0
VHT80,M0-9	1	M0-9	M0

### 2.2 The Worst Case Power Setting Parameter

The Worst Case Power Setting Parameter (5150-5250MHz band)							
Test Software/Version	MT76XXE QA_V2.0.10.0						
Modulation Mode	N <sub>TX</sub>	Test Frequency (MHz)					
		NCB: 20MHz			NCB: 40MHz	NCB: 80MHz	
		5180	5200	5240	5190	5230	5210
11a,6-54Mbps	1	0D	0D	0D	-	-	-
HT20,M0-7	1	0E	0E	0E	-	-	-
HT40,M0-7	1	-	-	-	13	13	-
VHT20,M0-8	1	13	13	13	-	-	-
VHT40,M0-9	1	-	-	-	17	17	-
VHT80,M0-9	1	-	-	-	-	-	19



## 2.3 The Worst Case Measurement Configuration

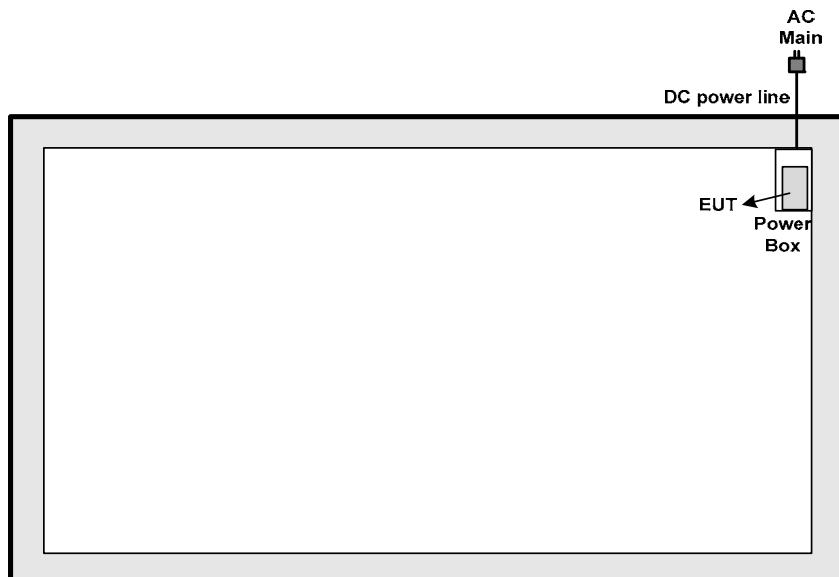
The Worst Case Mode for Following Conformance Tests	
Tests Item	AC power-line conducted emissions
Condition	AC power-line conducted measurement for line and neutral Test Voltage: 120Vac / 60Hz
Operating Mode	Operating Mode Description
1	AC power & Radio link

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

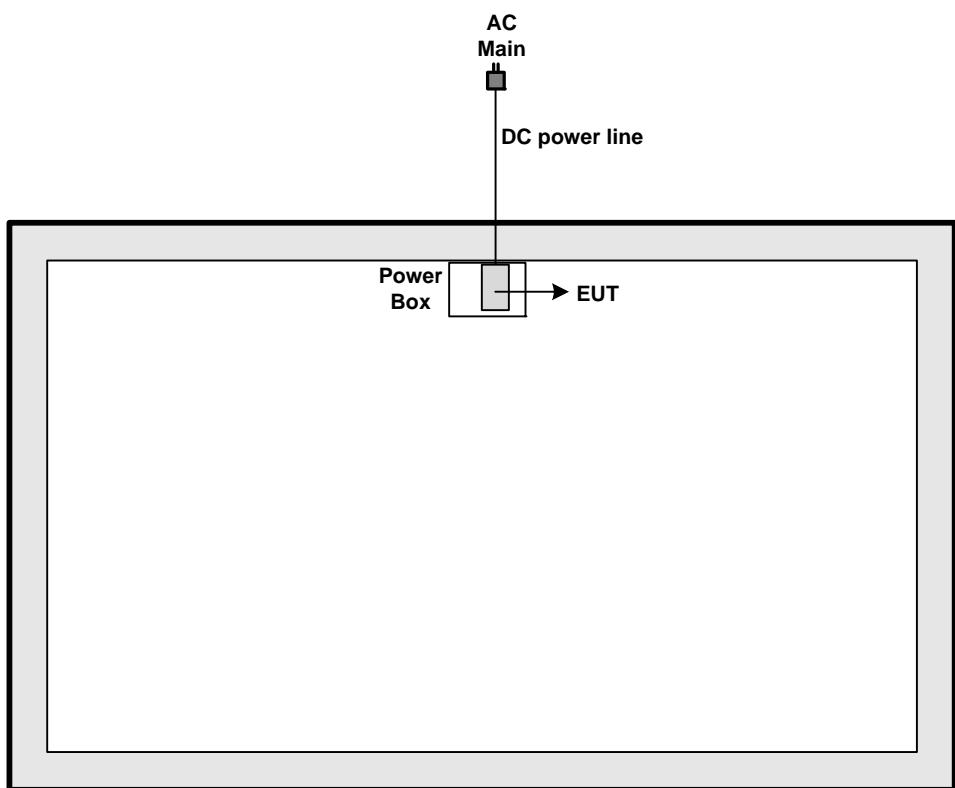
The Worst Case Mode for Following Conformance Tests							
Tests Item	Transmitter Radiated Unwanted Emissions Transmitter Radiated Bandedge Emissions						
Test Condition	Radiated measurement If EUT consist of multiple antenna assembly (multiple antenna are used in EUT regardless of spatial multiplexing MIMO configuration), the radiated test should be performed with highest antenna gain of each antenna type.						
User Position	<input type="checkbox"/> EUT will be placed in fixed position. <input checked="" type="checkbox"/> EUT will be placed in mobile position and operating multiple positions. EUT shall be performed three orthogonal planes. The worst plane is Z. <input type="checkbox"/> EUT will be a hand-held or body-worn battery-powered devices and operating multiple positions. EUT shall be performed three orthogonal planes.						
Operating Mode	<input checked="" type="checkbox"/> 2. AC power & Transmitter						
Modulation Mode	11a, HT20, HT40, VHT20, VHT40, VHT80						
Orthogonal Planes of EUT	<table><thead><tr><th>X Plane</th><th>Y Plane</th><th>Z Plane</th></tr></thead><tbody><tr><td></td><td></td><td></td></tr></tbody></table>	X Plane	Y Plane	Z Plane			
X Plane	Y Plane	Z Plane					

## 2.4 Test Setup Diagram

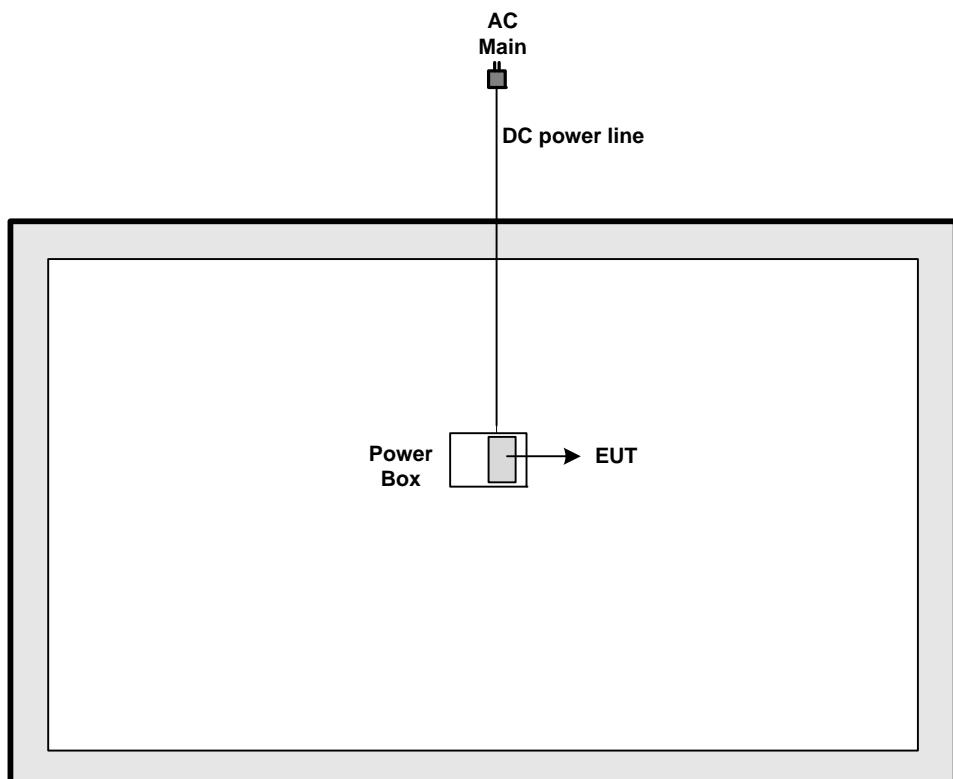
Test Setup Diagram – AC Line Conducted Emission Test



Test Setup Diagram - Radiated Emission Below 1GHz



## 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.

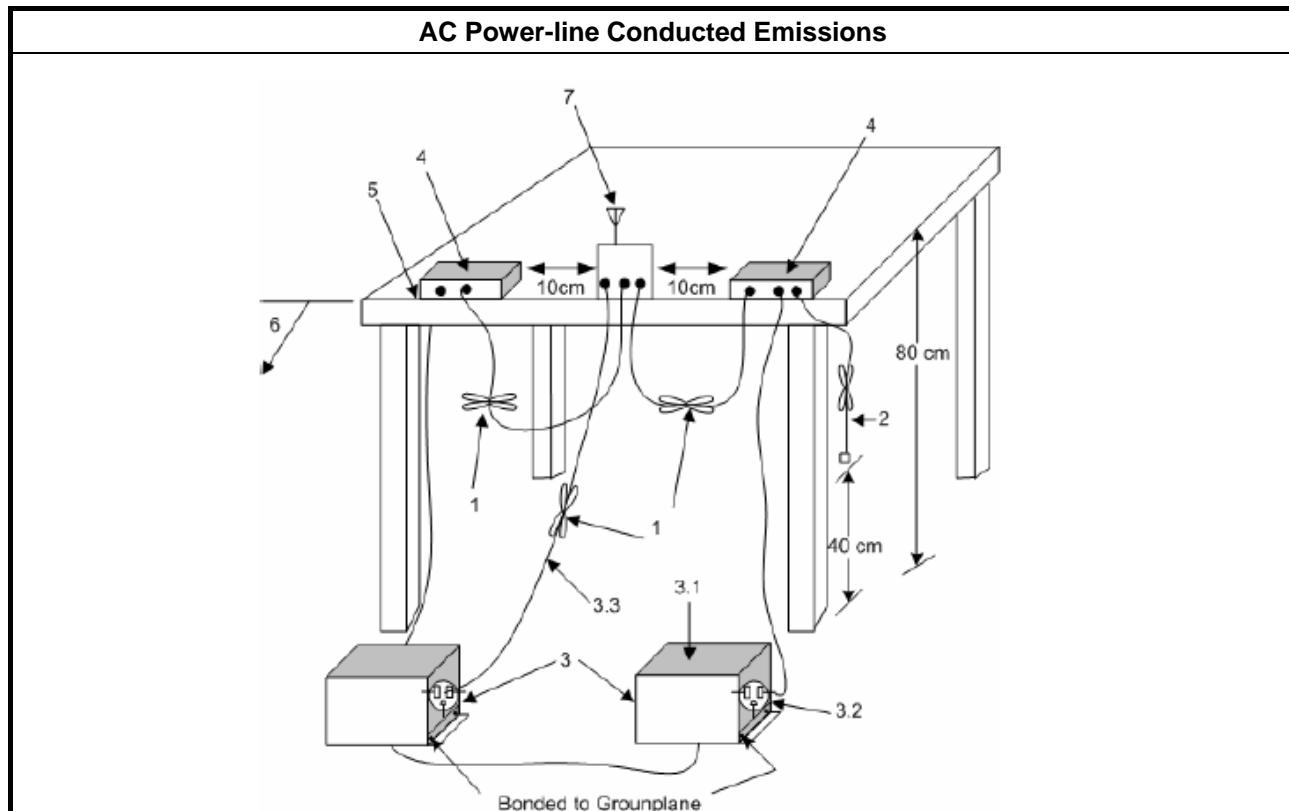
##### 3.1.2 Measuring Instruments

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

##### 3.1.3 Test Procedures

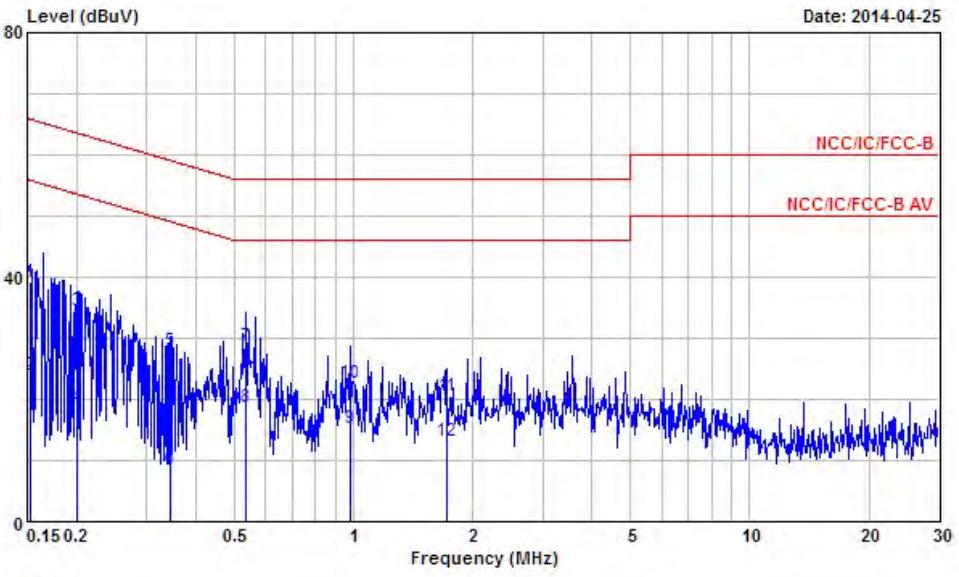
Test Method
<input checked="" type="checkbox"/> Refer as ANSI C63.10-2009, clause 6.2 for AC power-line conducted emissions.

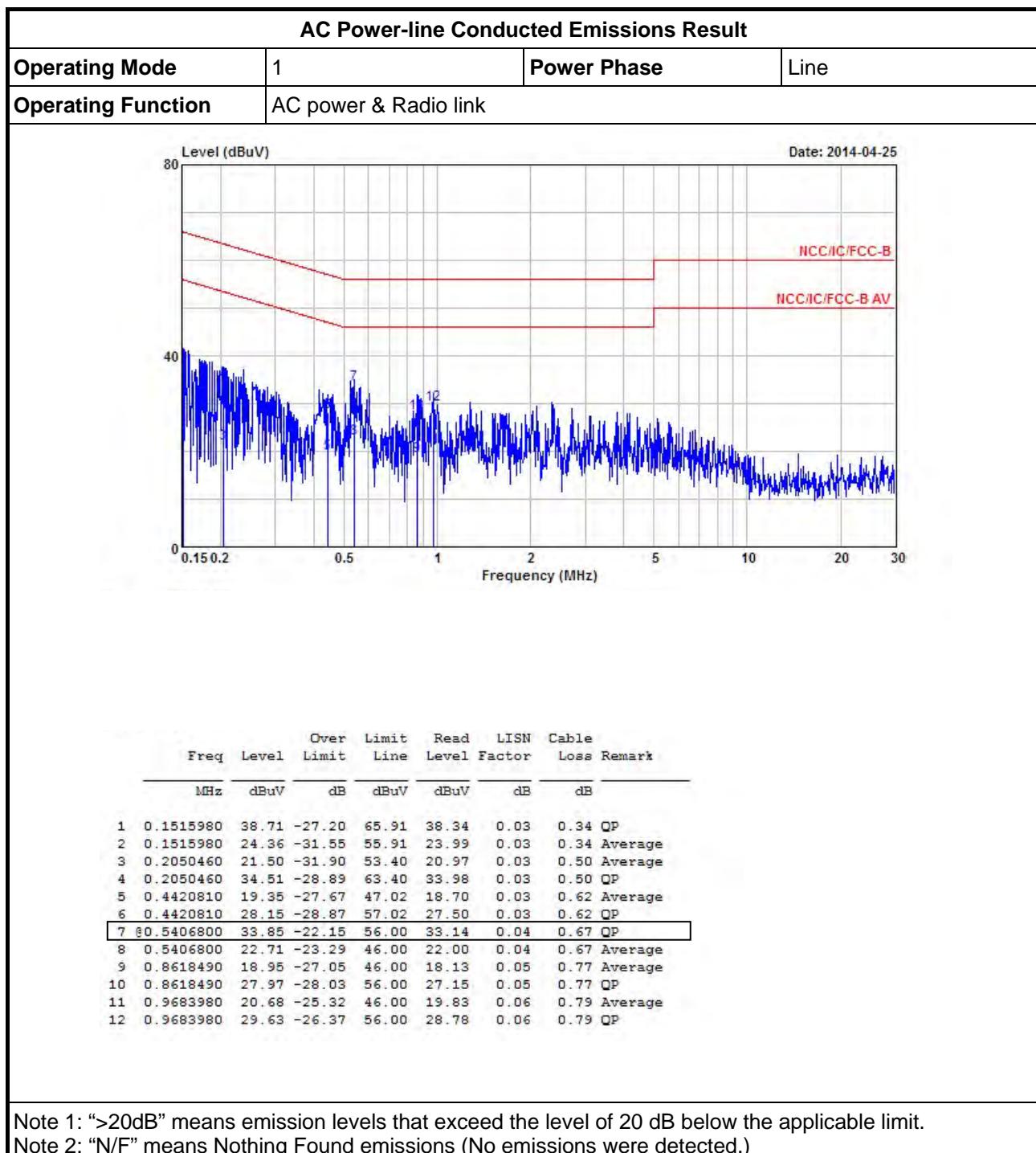
##### 3.1.4 Test Setup





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

AC Power-line Conducted Emissions Result																																																																																																																							
Operating Mode	1	Power Phase	Neutral																																																																																																																				
Operating Function	AC power & Radio link																																																																																																																						
							Date: 2014-04-25																																																																																																																
<table><thead><tr><th>Freq</th><th>Level</th><th>Over Limit</th><th>Limit</th><th>Read Line</th><th>LISN</th><th>Cable</th><th>Remark</th></tr><tr><th>MHz</th><th>dBuV</th><th>dB</th><th>dBuV</th><th>dBuV</th><th>dB</th><th>dB</th><th></th></tr></thead><tbody><tr><td>1</td><td>0.1524030</td><td>39.16</td><td>-26.71</td><td>65.87</td><td>38.80</td><td>0.02</td><td>0.34 QP</td></tr><tr><td>2</td><td>0.1524030</td><td>23.84</td><td>-32.03</td><td>55.87</td><td>23.48</td><td>0.02</td><td>0.34 Average</td></tr><tr><td>3</td><td>0.2007470</td><td>34.56</td><td>-29.02</td><td>63.58</td><td>34.04</td><td>0.02</td><td>0.50 QP</td></tr><tr><td>4</td><td>0.2007470</td><td>18.66</td><td>-34.92</td><td>53.58</td><td>18.14</td><td>0.02</td><td>0.50 Average</td></tr><tr><td>5</td><td>0.3446300</td><td>27.89</td><td>-31.20</td><td>59.09</td><td>27.28</td><td>0.03</td><td>0.58 QP</td></tr><tr><td>6</td><td>0.3446300</td><td>8.56</td><td>-40.53</td><td>49.09</td><td>7.95</td><td>0.03</td><td>0.58 Average</td></tr><tr><td>7</td><td>0.5349810</td><td>28.64</td><td>-27.36</td><td>56.00</td><td>27.94</td><td>0.04</td><td>0.66 QP</td></tr><tr><td>8</td><td>0.5349810</td><td>18.77</td><td>-27.23</td><td>46.00</td><td>18.07</td><td>0.04</td><td>0.66 Average</td></tr><tr><td>9</td><td>0.9787140</td><td>15.22</td><td>-30.78</td><td>46.00</td><td>14.38</td><td>0.05</td><td>0.79 Average</td></tr><tr><td>10</td><td>0.9787140</td><td>22.64</td><td>-33.36</td><td>56.00</td><td>21.80</td><td>0.05</td><td>0.79 QP</td></tr><tr><td>11</td><td>1.720</td><td>20.48</td><td>-35.52</td><td>56.00</td><td>19.62</td><td>0.06</td><td>0.80 QP</td></tr><tr><td>12</td><td>1.720</td><td>13.10</td><td>-32.90</td><td>46.00</td><td>12.24</td><td>0.06</td><td>0.80 Average</td></tr></tbody></table>							Freq	Level	Over Limit	Limit	Read Line	LISN	Cable	Remark	MHz	dBuV	dB	dBuV	dBuV	dB	dB		1	0.1524030	39.16	-26.71	65.87	38.80	0.02	0.34 QP	2	0.1524030	23.84	-32.03	55.87	23.48	0.02	0.34 Average	3	0.2007470	34.56	-29.02	63.58	34.04	0.02	0.50 QP	4	0.2007470	18.66	-34.92	53.58	18.14	0.02	0.50 Average	5	0.3446300	27.89	-31.20	59.09	27.28	0.03	0.58 QP	6	0.3446300	8.56	-40.53	49.09	7.95	0.03	0.58 Average	7	0.5349810	28.64	-27.36	56.00	27.94	0.04	0.66 QP	8	0.5349810	18.77	-27.23	46.00	18.07	0.04	0.66 Average	9	0.9787140	15.22	-30.78	46.00	14.38	0.05	0.79 Average	10	0.9787140	22.64	-33.36	56.00	21.80	0.05	0.79 QP	11	1.720	20.48	-35.52	56.00	19.62	0.06	0.80 QP	12	1.720	13.10	-32.90	46.00	12.24	0.06	0.80 Average	
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Note 1: ">20dB" means emission levels that exceed the level of 20 dB below the applicable limit. Note 2: "N/F" means Nothing Found emissions (No emissions were detected.)																																																																																																																							





## 3.2 Emission Bandwidth

### 3.2.1 Emission Bandwidth (EBW) Limit

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

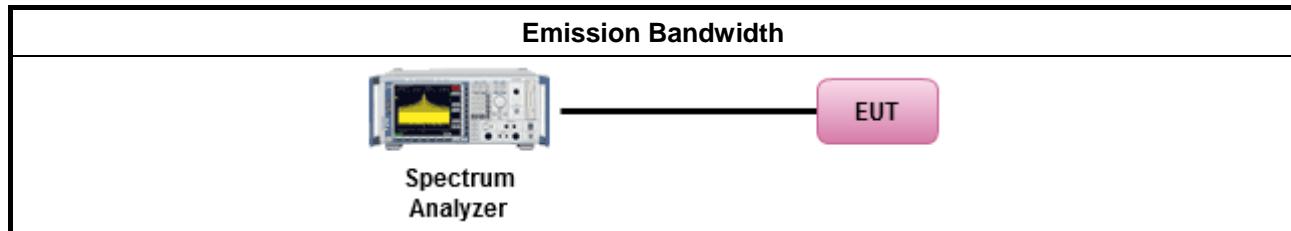
### 3.2.2 Measuring Instruments

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

### 3.2.3 Test Procedures

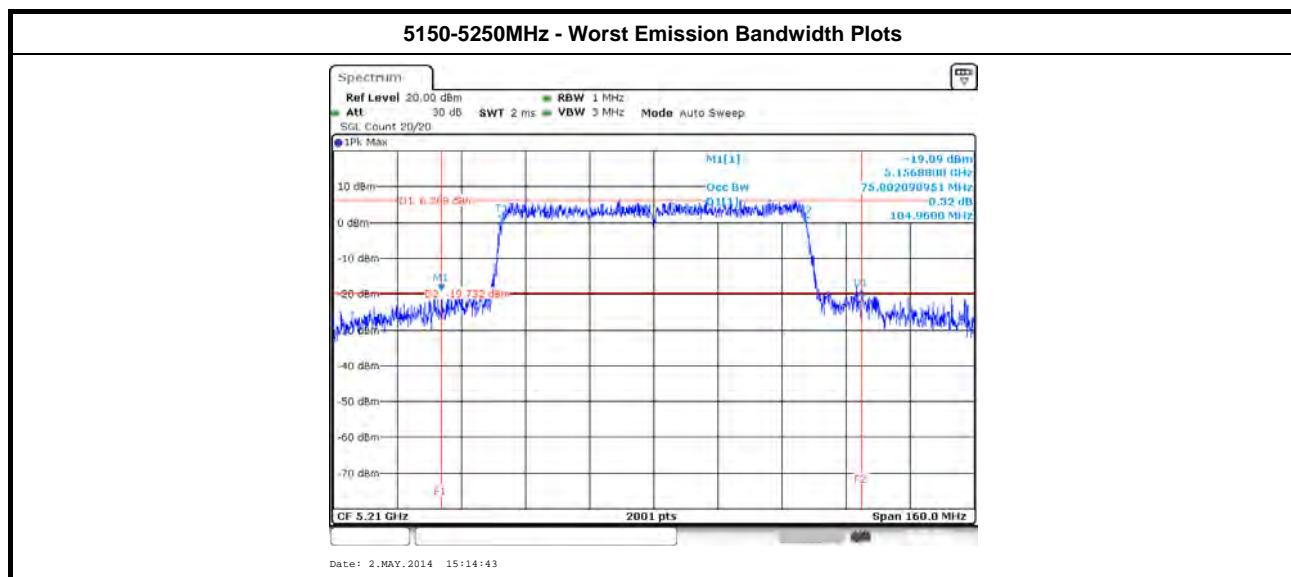
Test Method	
<input checked="" type="checkbox"/>	For the emission bandwidth shall be measured using one of the options below:
<input checked="" type="checkbox"/>	Refer as FCC KDB 789033, clause C for EBW and clause D for OBW measurement.
<input type="checkbox"/>	Refer as ANSI C63.10, clause 6.9.1 for occupied bandwidth testing.
<input type="checkbox"/>	Refer as IC RSS-Gen, clause 4.6 for bandwidth testing.
<input checked="" type="checkbox"/>	For conducted measurement.
	<input checked="" type="checkbox"/> The EUT supports single transmit chain and measurements performed on this transmit chain.
	<input 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 (5150-5250MHz band)						
Condition			Emission Bandwidth (MHz)			Power Limit
Modulation Mode	N <sub>TX</sub>	Freq. (MHz)	99% Bandwidth	26dB Bandwidth	99% BW	26dB BW
11a	1	5180	16.47	19.05	16.17	16.80
11a	1	5200	16.61	19.06	16.20	16.80
11a	1	5240	16.58	19.30	16.20	16.86
HT20	1	5180	17.54	19.45	16.44	16.89
HT20	1	5200	17.48	19.57	16.43	16.92
HT20	1	5240	17.55	19.51	16.44	16.90
HT40	1	5190	36.38	52.20	17.00	17.00
HT40	1	5230	36.46	52.28	17.00	17.00
VHT20	1	5180	17.57	20.14	16.45	17.00
VHT20	1	5200	17.60	19.80	16.46	16.97
VHT20	1	5240	17.57	19.71	16.45	16.95
VHT40	1	5190	36.42	41.20	17.00	17.00
VHT40	1	5230	36.54	52.72	17.00	17.00
VHT80	1	5210	75.80	104.96	17.00	17.00
<b>Result</b>			<b>Complied</b>			





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

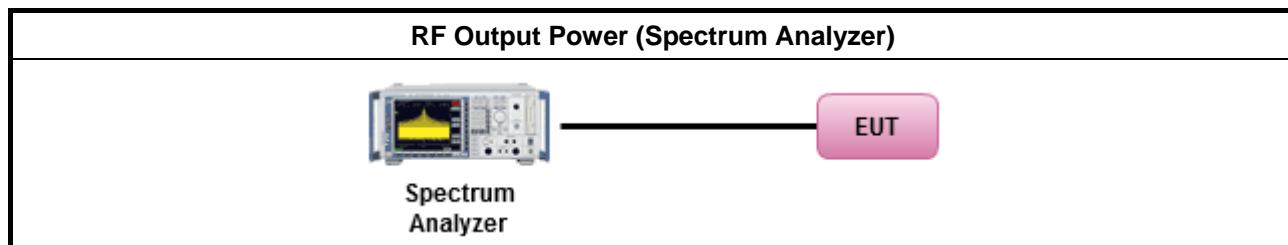
#### 3.3.2 Measuring Instruments

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

### 3.3.3 Test Procedures

Test Method	
<input checked="" type="checkbox"/> Maximum Conducted Output Power	
	[duty cycle $\geq$ 98% or external video / power trigger]
<input checked="" type="checkbox"/>	Refer as FCC KDB 789033, clause E Method SA-1 (spectral trace averaging).
<input type="checkbox"/>	Refer as FCC KDB 789033, clause E Method SA-1 Alt. (RMS detection with slow sweep speed)
	duty cycle $<$ 98% and average over on/off periods with duty factor
<input type="checkbox"/>	Refer as FCC KDB 789033, clause E Method SA-2 (spectral trace averaging).
<input type="checkbox"/>	Refer as FCC KDB 789033, clause E Method SA-2 Alt. (RMS detection with slow sweep speed)
	Wideband RF power meter and average over on/off periods with duty factor
<input type="checkbox"/>	Refer as FCC KDB 789033, clause E Method PM (using an RF average power meter).
<input checked="" type="checkbox"/> For conducted measurement.	
<input checked="" type="checkbox"/>	The EUT supports single transmit chain and measurements performed on this transmit chain.
<input 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

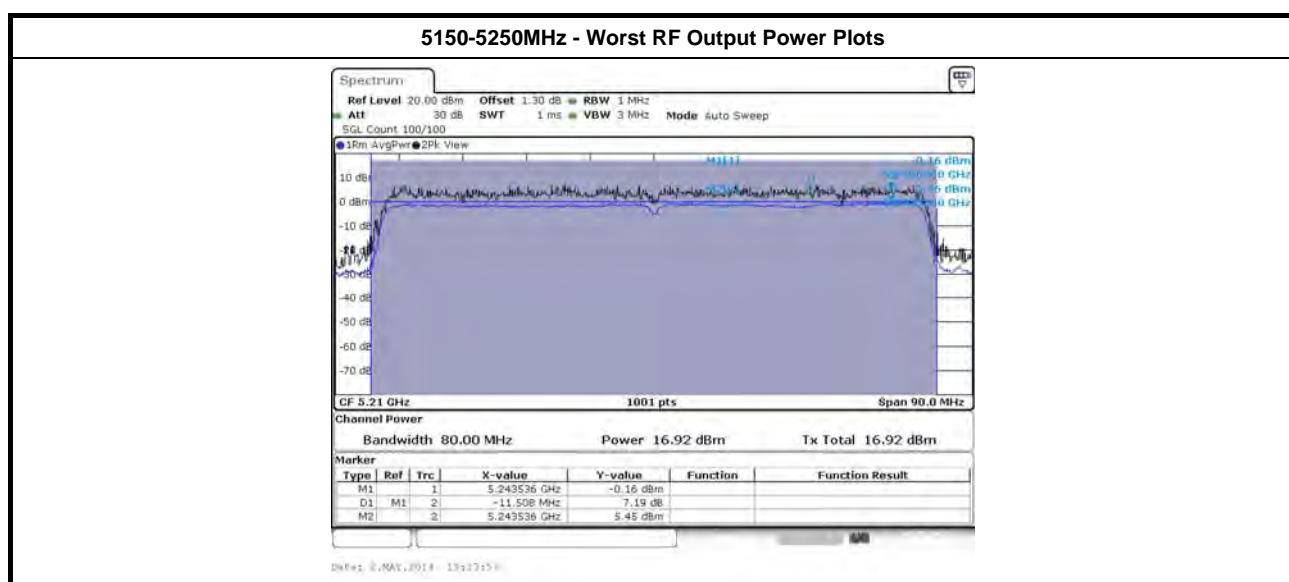




## 3.3.5 Test Result of Maximum Conducted Output Power

Maximum Conducted Output Power (5150-5250MHz band)							
Condition			RF Output Power (dBm)				
Modulation Mode	N <sub>TX</sub>	Freq. (MHz)	RF Output Power	Power Limit	Ant. Gain (dBi)	EIRP Power	EIRP Limit
11a	1	5180	14.68	16.80	4.44	19.12	22.17
11a	1	5200	14.43	16.80	4.44	18.87	22.20
11a	1	5240	14.45	16.86	4.44	18.89	22.20
HT20	1	5180	14.65	16.89	4.44	19.09	22.44
HT20	1	5200	14.67	16.92	4.44	19.11	22.43
HT20	1	5240	14.62	16.90	4.44	19.06	22.44
HT40	1	5190	16.70	17.00	4.44	21.14	23.00
HT40	1	5230	16.71	17.00	4.44	21.15	23.00
VHT20	1	5180	15.02	17.00	4.44	19.46	22.45
VHT20	1	5200	15.00	16.97	4.44	19.44	22.46
VHT20	1	5240	14.97	16.95	4.44	19.41	22.45
VHT40	1	5190	16.64	17.00	4.44	21.08	23.00
VHT40	1	5230	16.69	17.00	4.44	21.13	23.00
VHT80	1	5210	16.92	17.00	4.44	21.36	23.00
Result			Complied				

Remark: 11a/n/ac only include 1TX and Port1 for emission.





## 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, the peak power spectral density (PPSD) $\leq 4$ dBm/MHz. If $G_{TX} > 6$ dBi, then $PPSD = 4 - (G_{TX} - 6)$ .
<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 type="checkbox"/>	For the 5.725-5.825 GHz band: <ul style="list-style-type: none"><li><input type="checkbox"/> Point-to-multipoint systems (P2M): the peak power spectral density (PPSD) <math>\leq 17</math> dBm/MHz. If <math>G_{TX} &gt; 6</math> dBi, then <math>PPSD = 17 - (G_{TX} - 6)</math>.</li><li><input type="checkbox"/> Point-to-point systems (P2P): the peak power spectral density (PPSD) <math>\leq 17</math> dBm/MHz. If <math>G_{TX} &gt; 23</math> dBi, then <math>PPSD = 17 - (G_{TX} - 23)</math>.</li></ul>
<b>LE-LAN Devices</b>	
<input checked="" type="checkbox"/>	For the 5.15-5.25 GHz band, the peak power spectral density (PPSD) $\leq 4$ dBm/MHz and the e.i.r.p. peak power spectral density (PPSD) $\leq 10$ dBm/MHz.
<input type="checkbox"/>	For the 5.25-5.35 GHz band, the peak power spectral density (PPSD) $\leq 11$ dBm/MHz and the e.i.r.p. peak power spectral density (PPSD) $\leq 17$ dBm/MHz.
<input type="checkbox"/>	For the 5.47-5.6 GHz band and 5.65-5.725 GHz band, the peak power spectral density (PPSD) $\leq 11$ dBm/MHz and the e.i.r.p. peak power spectral density (PPSD) $\leq 17$ dBm/MHz.
<input type="checkbox"/>	For the 5.725-5.825 GHz band, the peak power spectral density (PPSD) $\leq 17$ dBm/MHz and the e.i.r.p. peak power spectral density (PPSD) $\leq 23$ dBm/MHz.
<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.	

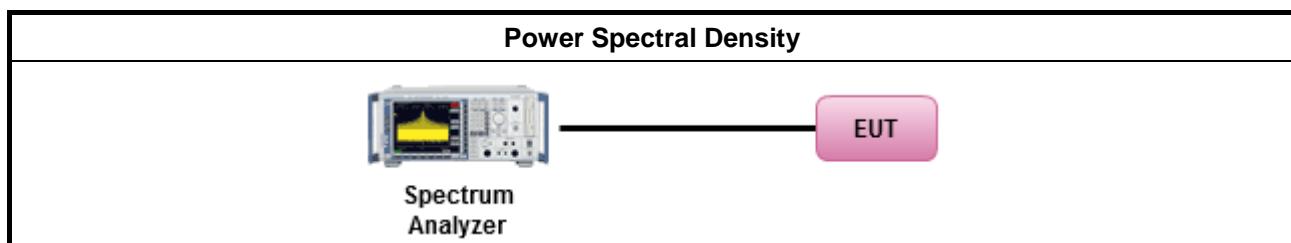
### 3.4.2 Measuring Instruments

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 type="checkbox"/> Refer as FCC KDB 789033, F5) power spectral density can be measured using resolution bandwidths < 1 MHz provided that the results are integrated over 1 MHz bandwidth [duty cycle $\geq$ 98% or external video / power trigger]
<input checked="" type="checkbox"/> Refer as FCC KDB 789033, clause E Method SA-1 (spectral trace averaging).
<input type="checkbox"/> Refer as FCC KDB 789033, clause E Method SA-1 Alt. (RMS detection with slow sweep speed) duty cycle < 98% and average over on/off periods with duty factor
<input type="checkbox"/> Refer as FCC KDB 789033, clause E Method SA-2 (spectral trace averaging).
<input type="checkbox"/> Refer as FCC KDB 789033, clause E Method SA-2 Alt. (RMS detection with slow sweep speed)
<input checked="" type="checkbox"/> For conducted measurement.
<input checked="" type="checkbox"/> The EUT supports single transmit chain and measurements performed on this transmit chain.
<input 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.

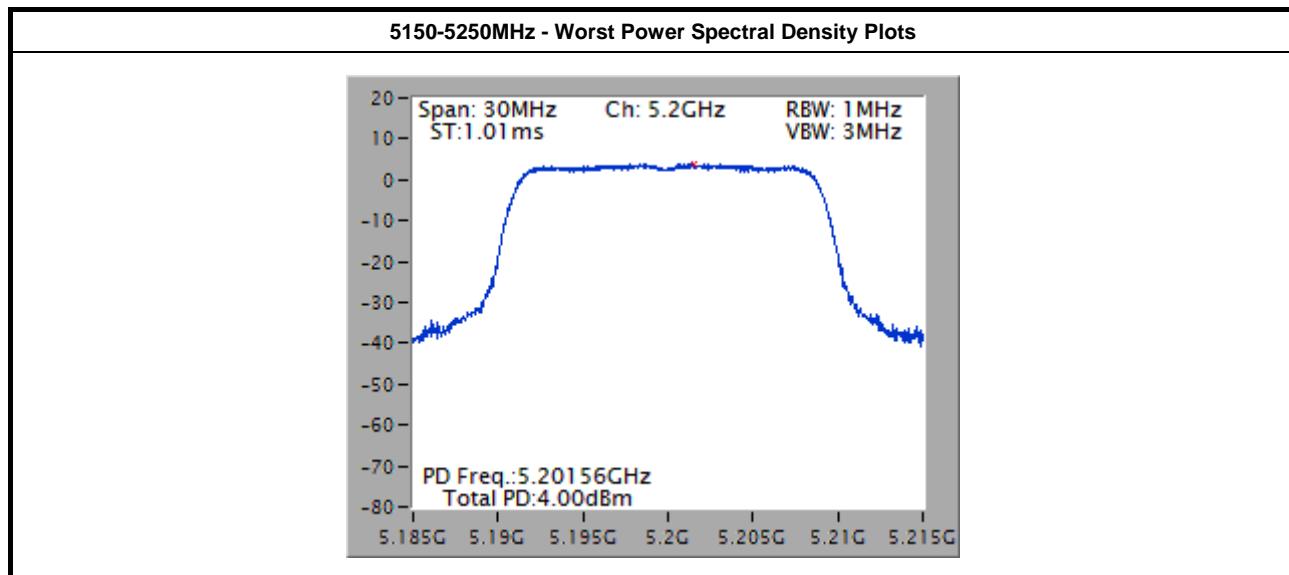
### 3.4.4 Test Setup





## 3.4.5 Test Result of Peak Power Spectral Density

Peak Power Spectral Density Result (5150-5250MHz band)							
Condition			Peak Power Spectral Density (dBm/MHz)				
Modulation Mode	N <sub>TX</sub>	Freq. (MHz)	Peak Power Spectral Density	PSD Limit	Ant. Gain (dBi)	EIRP PSD	EIRP Limit
11a	1	5180	3.92	4.00	4.44	8.36	10.00
11a	1	5200	3.60	4.00	4.44	8.04	10.00
11a	1	5240	3.52	4.00	4.44	7.96	10.00
HT20	1	5180	3.79	4.00	4.44	8.23	10.00
HT20	1	5200	3.73	4.00	4.44	8.17	10.00
HT20	1	5240	3.56	4.00	4.44	8.00	10.00
HT40	1	5190	2.36	4.00	4.44	6.80	10.00
HT40	1	5230	2.53	4.00	4.44	6.97	10.00
VHT20	1	5180	3.92	4.00	4.44	8.36	10.00
VHT20	1	5200	4.00	4.00	4.44	8.44	10.00
VHT20	1	5240	3.81	4.00	4.44	8.25	10.00
VHT40	1	5190	2.46	4.00	4.44	6.90	10.00
VHT40	1	5230	2.51	4.00	4.44	6.95	10.00
VHT80	1	5210	-0.16	4.00	4.44	4.28	10.00
Result			Complied				



### 3.5 Peak Excursion

#### 3.5.1 Peak Excursion Limit

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

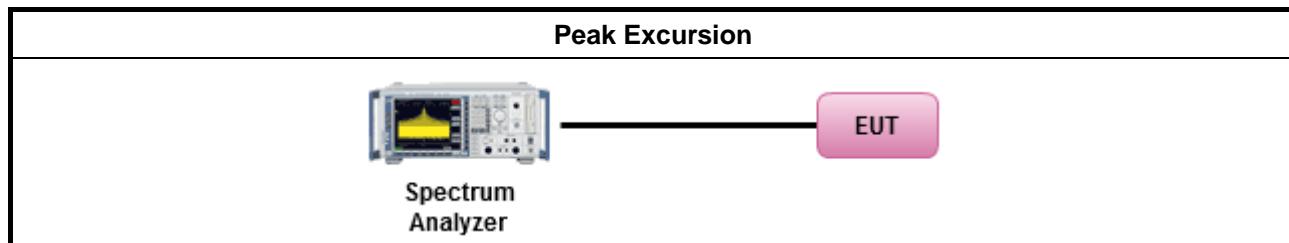
#### 3.5.2 Measuring Instruments

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

#### 3.5.3 Test Procedures

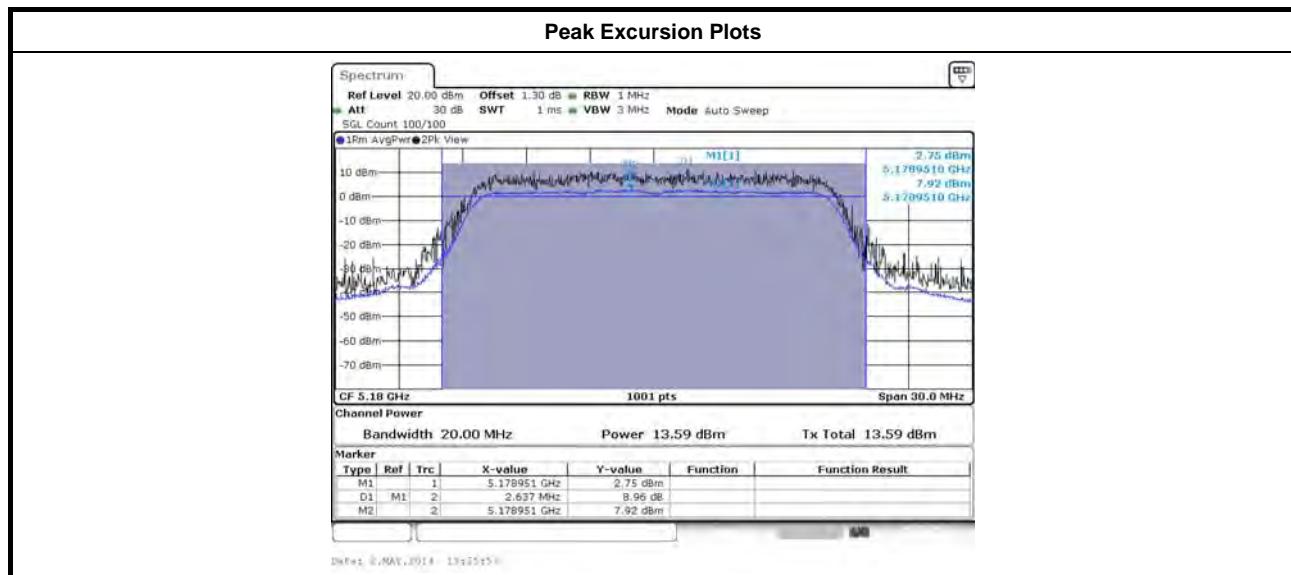
Test Method	
<input checked="" type="checkbox"/>	Refer as FCC KDB 789033, clause G peak excursion method.
<input checked="" type="checkbox"/>	Testing each modulation mode on a single channel is sufficient to demonstrate compliance with the peak excursion requirement
<input checked="" type="checkbox"/>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

#### 3.5.4 Test Setup



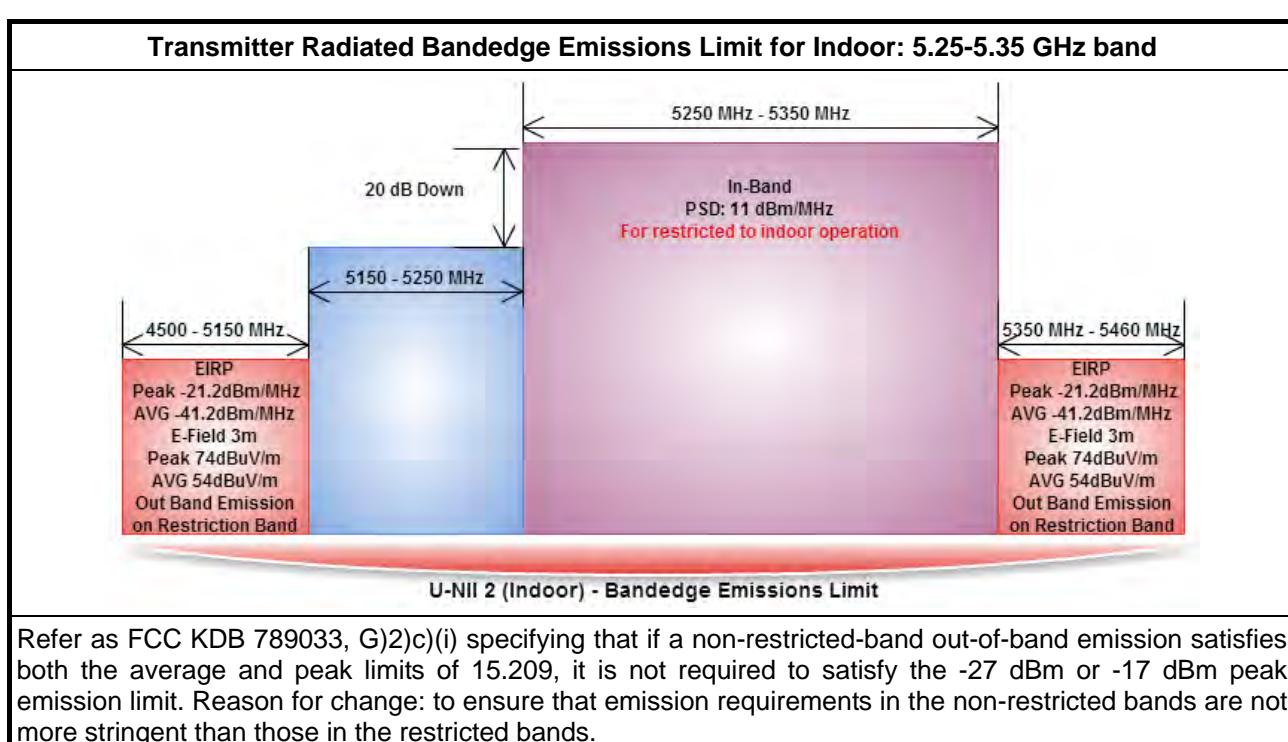
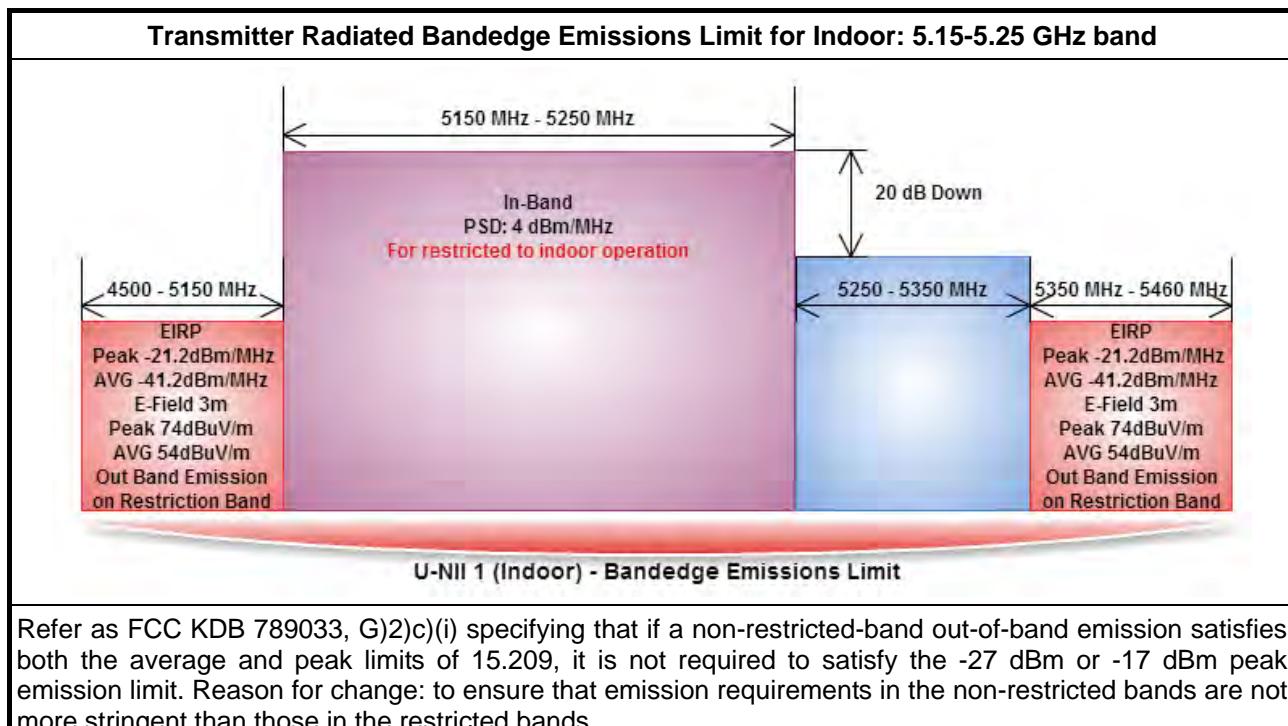
### 3.5.5 Test Result of Peak Excursion

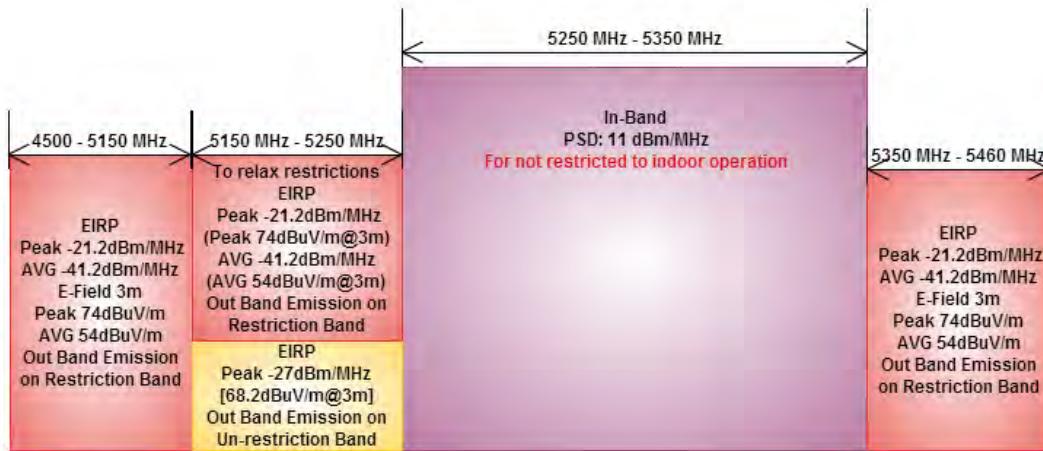
UNII Peak Excursion Result								
Condition			Peak Excursion (dB)					
Modulation Mode	N <sub>TX</sub>	Freq. (MHz)	BPSK	QPSK	16QAM	64QAM	256QAM	Limit
11a	1	5180	7.56	7.32	7.02	8.96	-	13
HT20	1	5180	7.23	7.30	7.61	8.02	-	13
HT40	1	5190	7.36	7.06	7.87	7.90	-	13
VHT20	1	5180	7.65	7.76	7.81	8.51	8.37	13
VHT40	1	5190	7.65	6.95	8.80	8.64	8.84	13
VHT80	1	5210	8.92	7.37	7.73	8.24	8.61	13
<b>Result</b>			<b>Complied</b>					



## 3.6 Transmitter Radiated Bandedge Emissions

### 3.6.1 Transmitter Radiated Bandedge Emissions Limit



**Transmitter Radiated Bandedge Emissions Limit for indoor/outdoor: 5.25-5.35 GHz band**

**U-NII 2 - Bandedge Emissions Limit**

Refer as FCC KDB 789033, G)2)c)(i) specifying that if a non-restricted-band out-of-band emission satisfies both the average and peak limits of 15.209, it is not required to satisfy the -27 dBm or -17 dBm peak emission limit. Reason for change: to ensure that emission requirements in the non-restricted bands are not more stringent than those in the restricted bands.

**Transmitter Radiated Bandedge Emissions Limit: 5.47-5.725 GHz band**

**U-NII 2ext - Bandedge Emissions Limit**

Refer as FCC KDB 789033, G)2)c)(i) specifying that if a non-restricted-band out-of-band emission satisfies both the average and peak limits of 15.209, it is not required to satisfy the -27 dBm or -17 dBm peak emission limit. Reason for change: to ensure that emission requirements in the non-restricted bands are not more stringent than those in the restricted bands.

**3.6.2 Measuring Instruments**

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

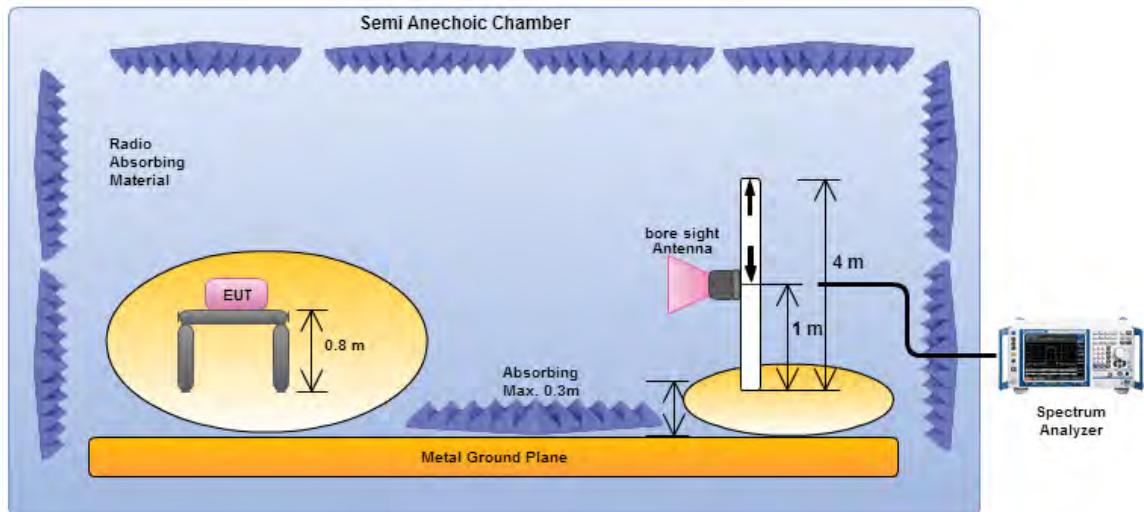


### 3.6.3 Test Procedures

Test Method
<input checked="" type="checkbox"/> 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 5.725-5.825 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 5.725-5.825 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, clause H)2) for unwanted emissions into non-restricted bands.</li><li><input checked="" type="checkbox"/> Refer as FCC KDB 789033, clause H)1) for unwanted emissions into restricted bands.<ul style="list-style-type: none"><li><input type="checkbox"/> Refer as FCC KDB 789033, H)6) Method AD (Trace Averaging).</li><li><input type="checkbox"/> Refer as FCC KDB 789033, H)6) Method VB (Reduced VBW).</li><li><input checked="" type="checkbox"/> Refer as ANSI C63.10, clause 4.2.3.2.3 (Reduced VBW). VBW <math>\geq</math> 1/T, 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, clause H)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, clause H)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 1m, because the instrumentation noise floor is typically close to the radiated emission limit.

### 3.6.4 Test Setup

#### Transmitter Radiated Bandedge Emissions



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



### 3.6.5 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	1	5180	3	5149.00	70.72	74	5150.00	52.40	54	V
11a	1	5240	3	5388.90	57.39	74	5352.60	43.69	54	V
HT20	1	5180	3	5149.90	72.66	74	5150.00	52.96	54	V
HT20	1	5240	3	5354.10	59.39	74	5367.30	44.34	54	V
HT40	1	5190	3	5149.17	72.63	74	5150.00	52.37	54	V
HT40	1	5230	3	5356.50	65.05	74	5356.50	48.01	54	V
VHT20	1	5180	3	5149.90	71.34	74	5150.00	52.67	54	V
VHT20	1	5240	3	5380.50	58.00	74	5368.50	44.55	54	V
VHT40	1	5190	3	5149.61	70.82	74	5150.00	52.47	54	V
VHT40	1	5230	3	5357.40	61.45	74	5358.90	46.14	54	V
VHT80	1	5210	3	5148.60	72.67	74	5150.80	52.63	54	V
VHT80	1	5210	3	5387.70	57.74	74	5375.40	43.96	54	V

Note 1: Measurement worst emissions of receive antenna polarization.



### 3.7 Transmitter Radiated Unwanted Emissions

#### 3.7.1 Transmitter Radiated Unwanted Emissions Limit

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

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

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

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

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

#### 3.7.2 Measuring Instruments

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



### 3.7.3 Test Procedures

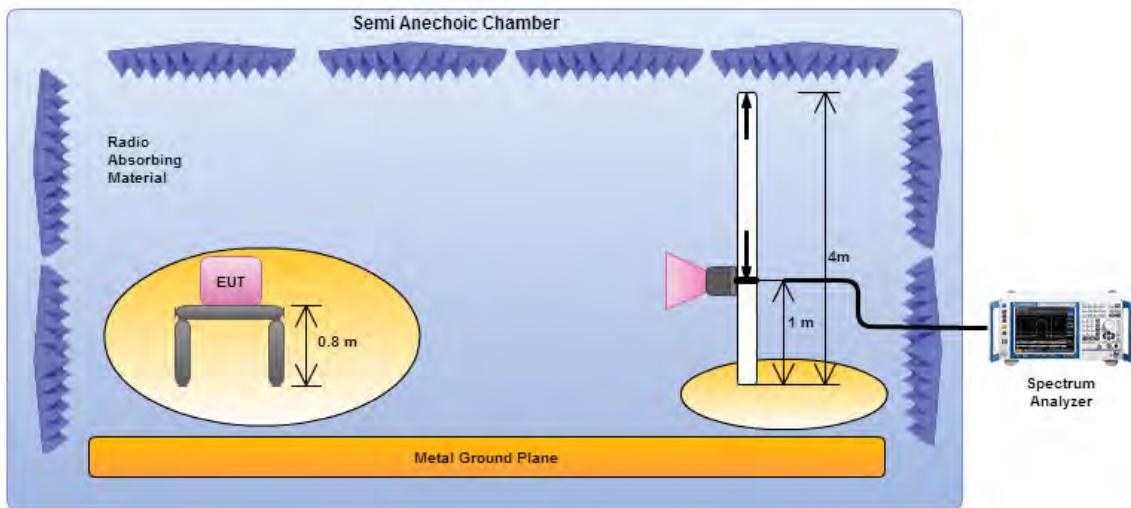
Test Method
<input checked="" type="checkbox"/> Measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. Measurements shall not be performed at a distance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



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

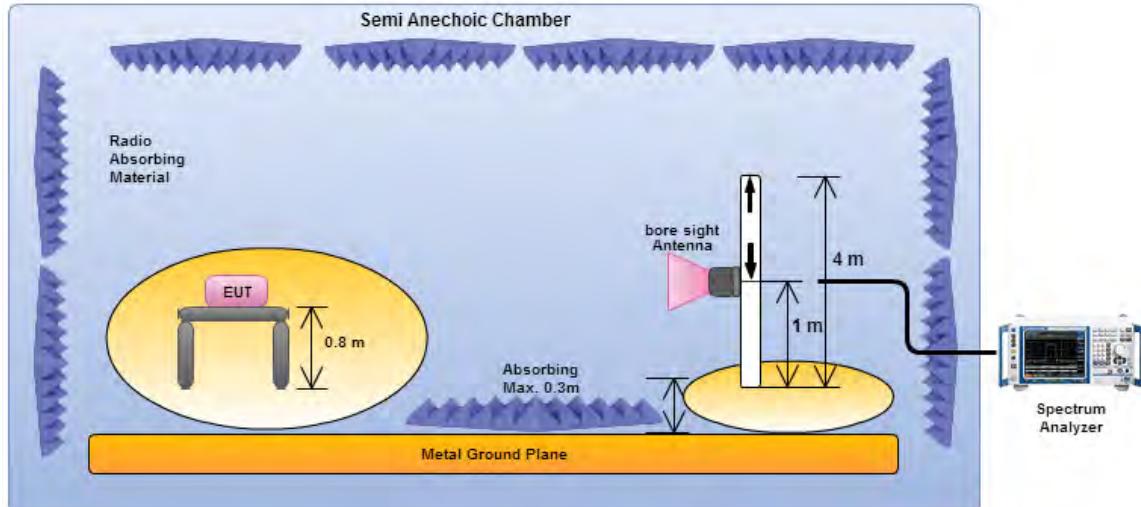
### 3.7.4 Test Setup

#### 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.

### 3.7.5 Transmitter Radiated Unwanted Emissions (Below 30MHz)

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



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

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

Modulation Mode	VHT80	Test Freq. (MHz)	5210
N <sub>TX</sub>	1	Polarization	V

Level (dBuV/m)

Date: 2014-04-24

IC:IC/FCC-B

Frequency (MHz)

Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant Pos	Table Pos
		Limit	Line	Level	Factor	Loss	Factor		
1. 40.670	25.05	-14.95	40.00	39.40	12.43	0.86	27.64 Peak	---	---
2. 44.550	24.35	-15.65	40.00	41.26	9.77	0.90	27.58 Peak	---	---
3. 164.830	29.51	-13.99	43.50	45.25	9.95	1.85	27.54 Peak	---	---
4. 338.460	34.13	-11.87	46.00	44.84	14.00	2.73	27.44 Peak	---	---
5. 448.070	29.28	-16.72	46.00	37.47	16.85	3.12	28.16 Peak	---	---
6. 463.590	28.61	-17.39	46.00	36.42	17.27	3.16	28.24 Peak	---	---

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

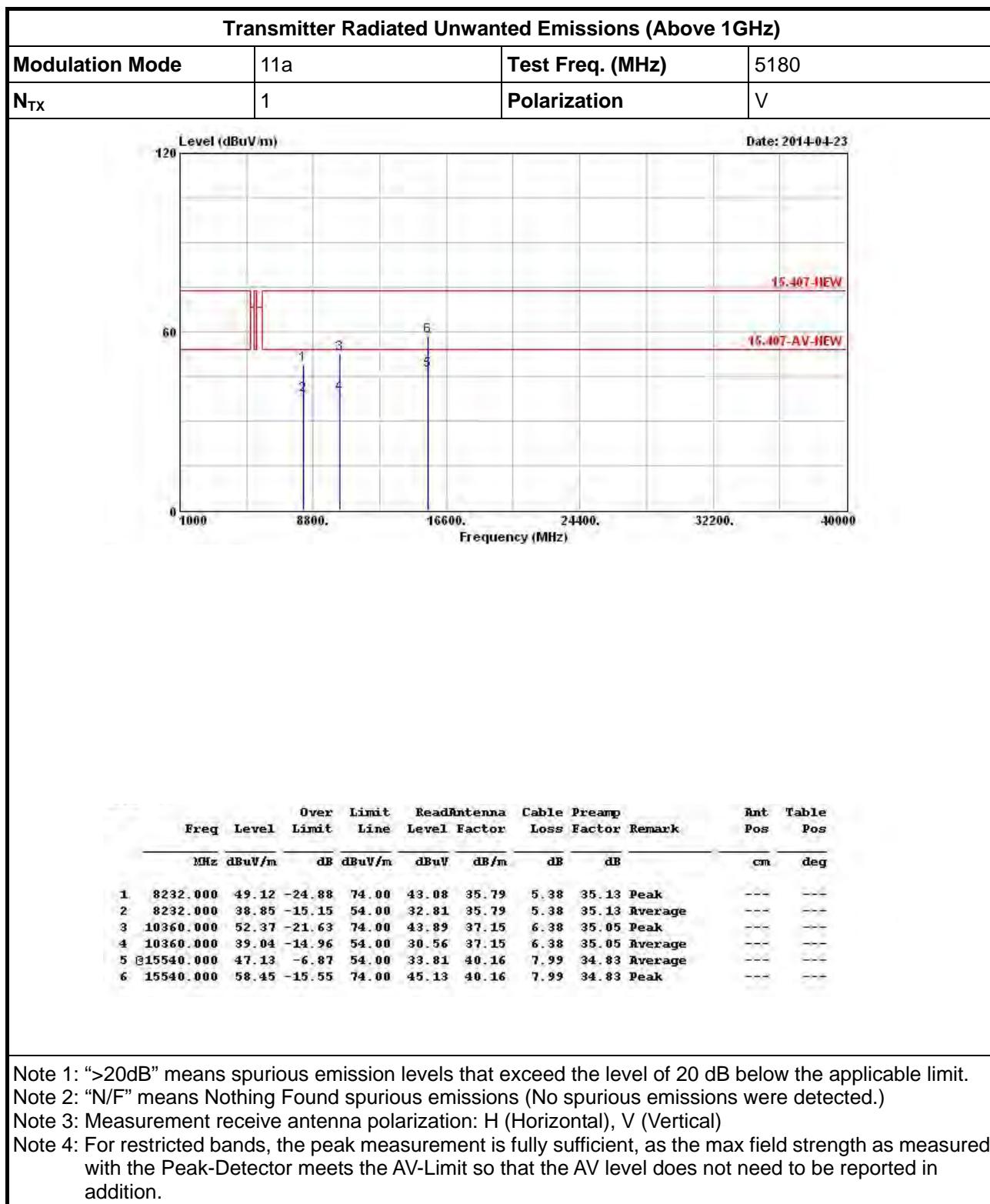
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

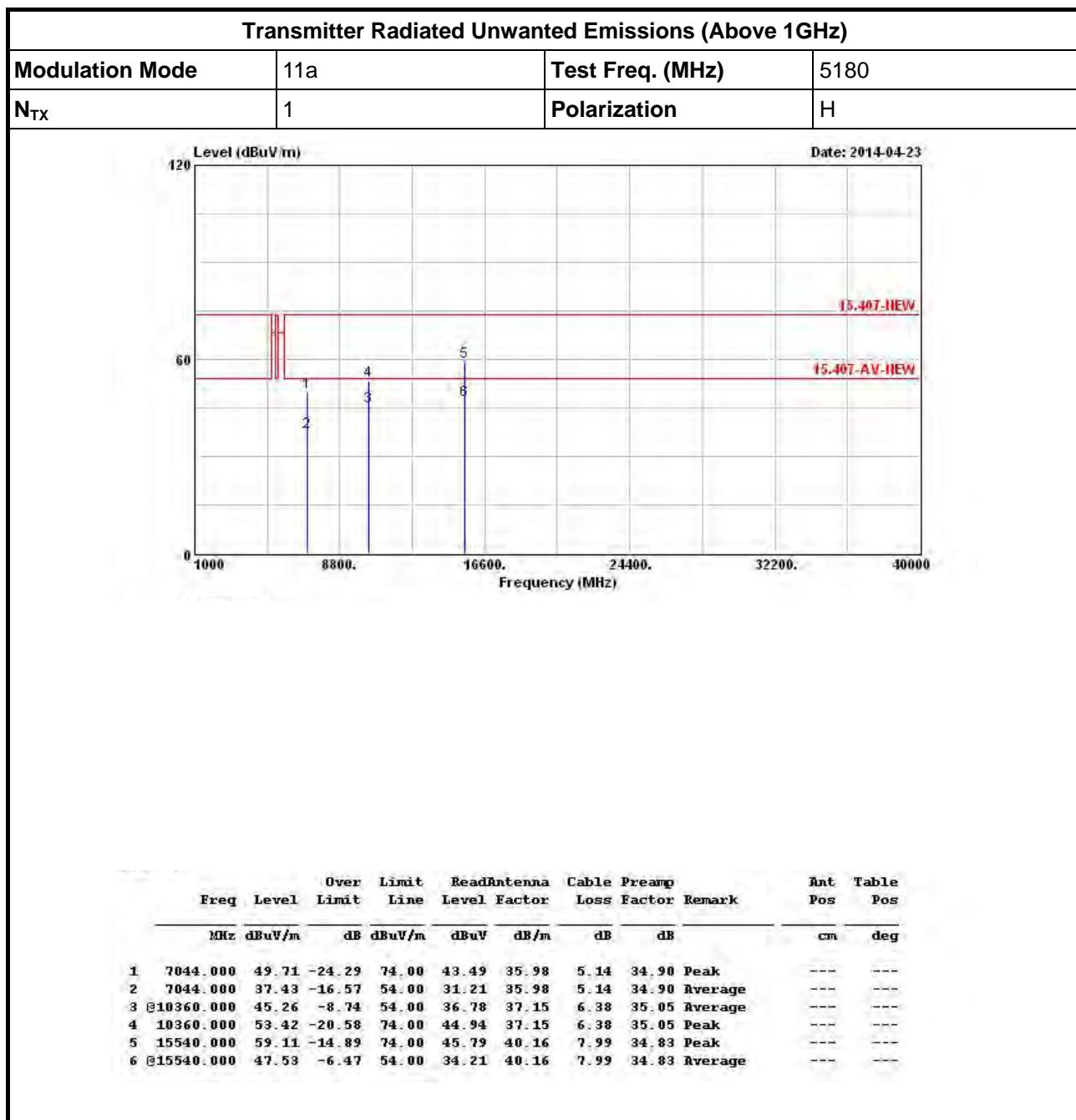
Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)





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



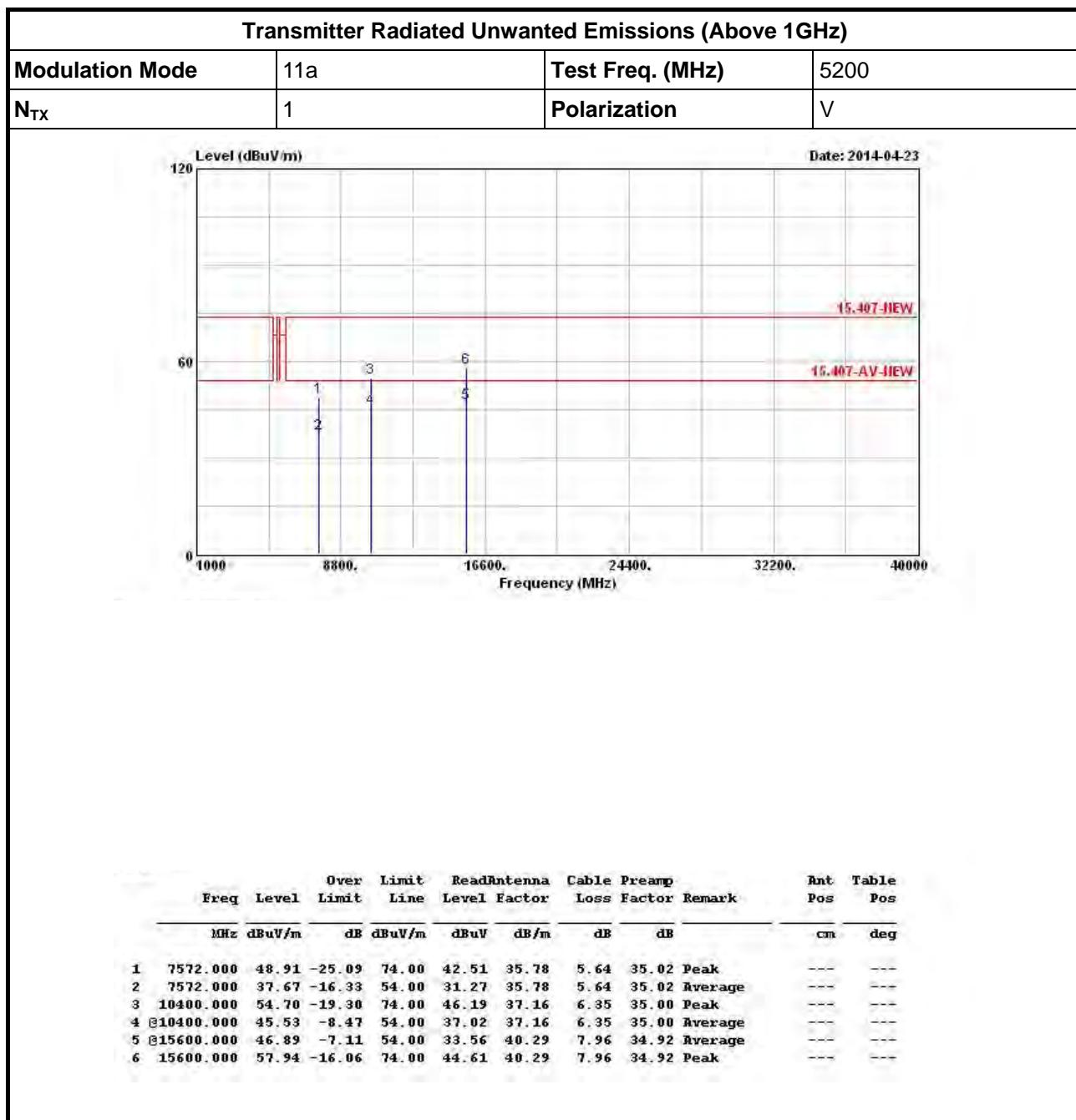


Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

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

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

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

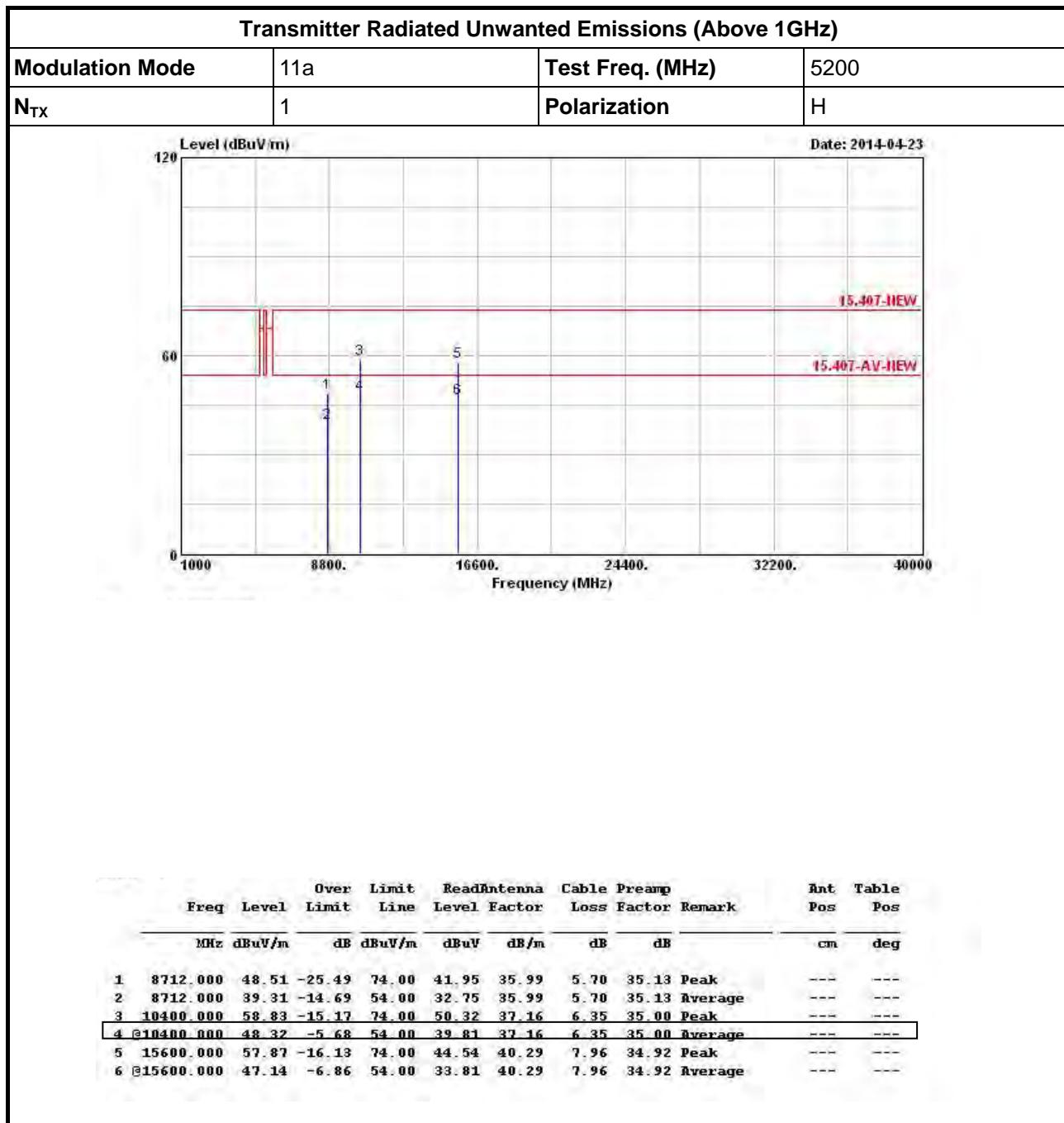


Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

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

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

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

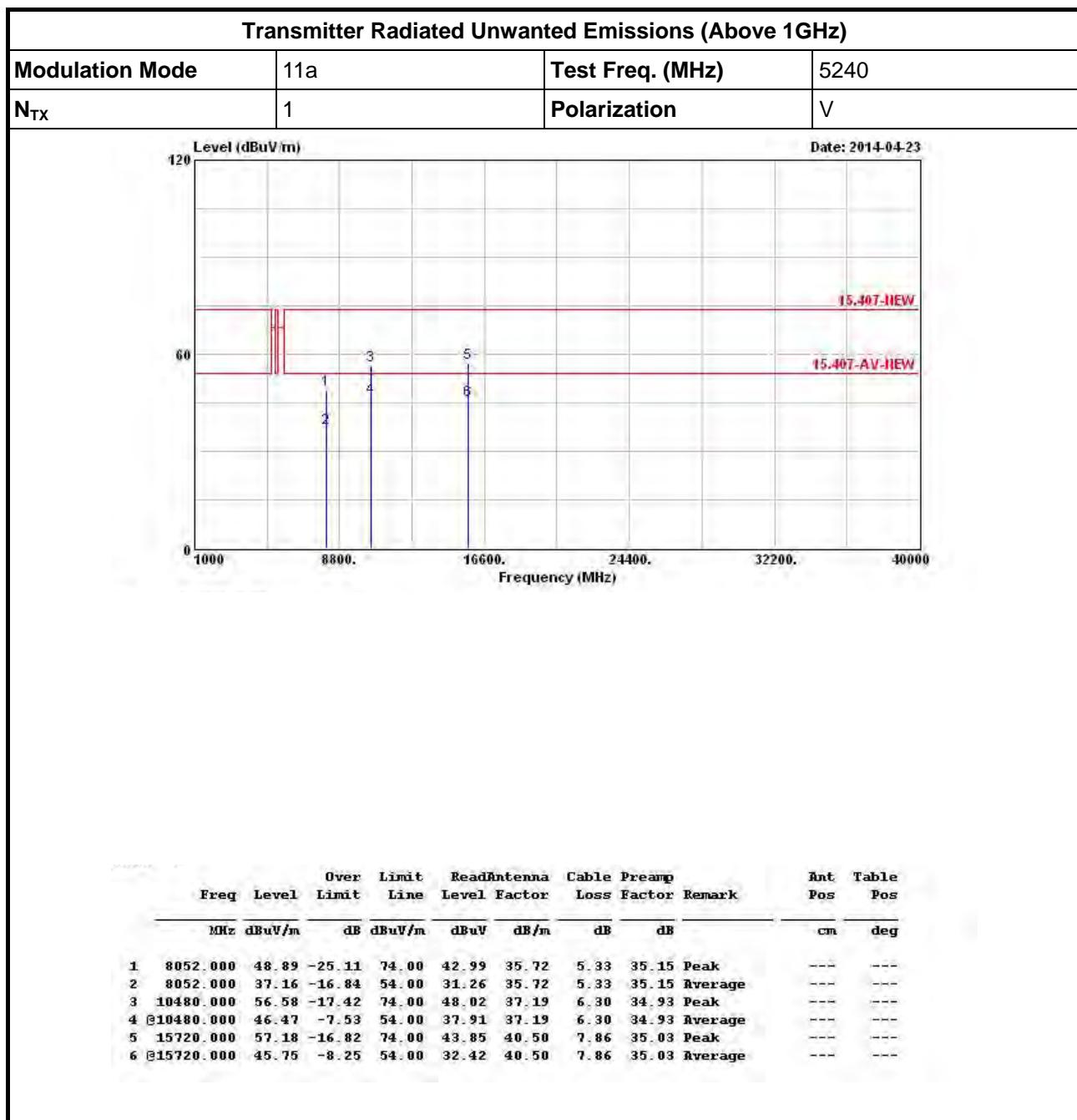


Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

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

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

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

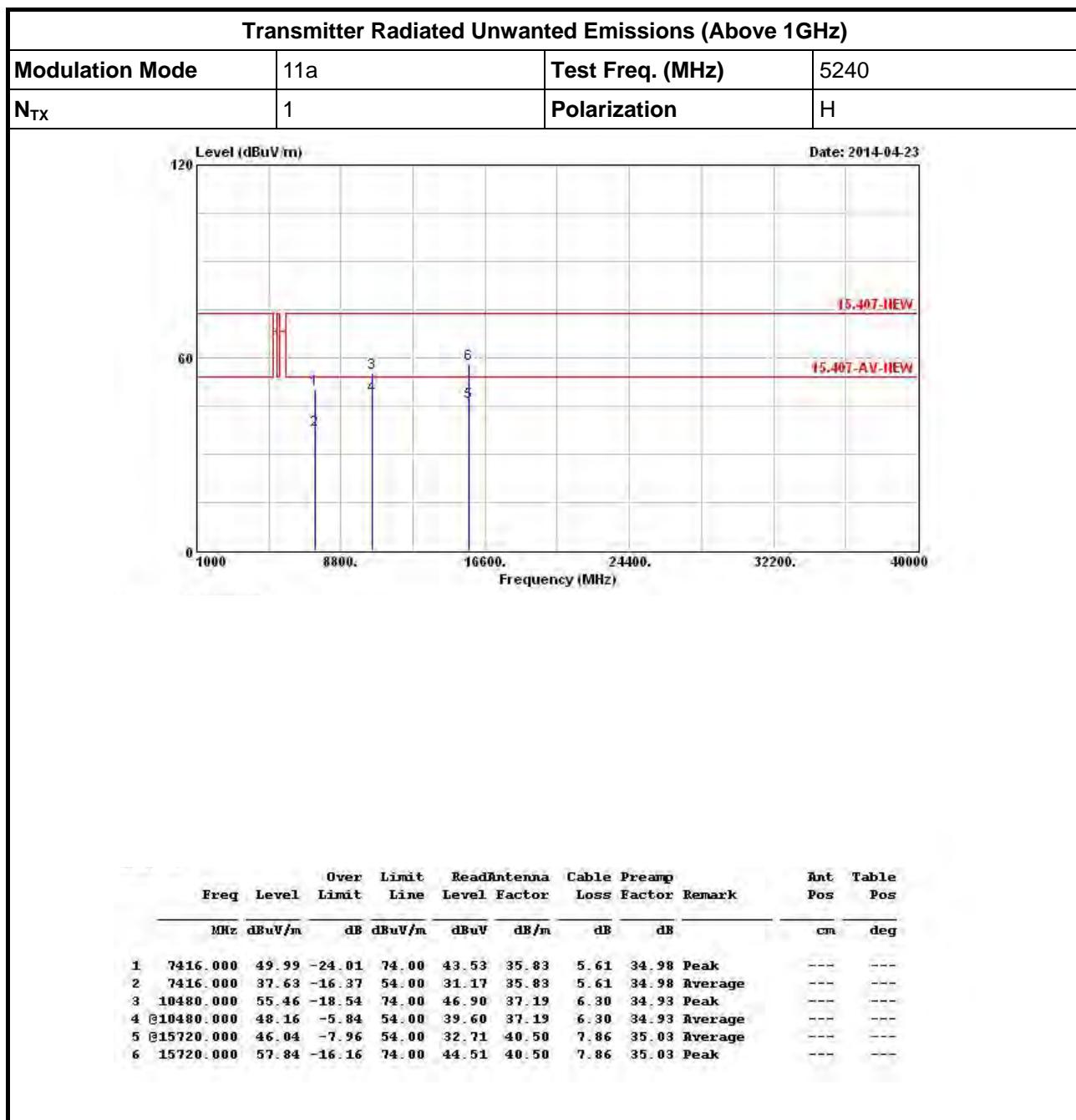


Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

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

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

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



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

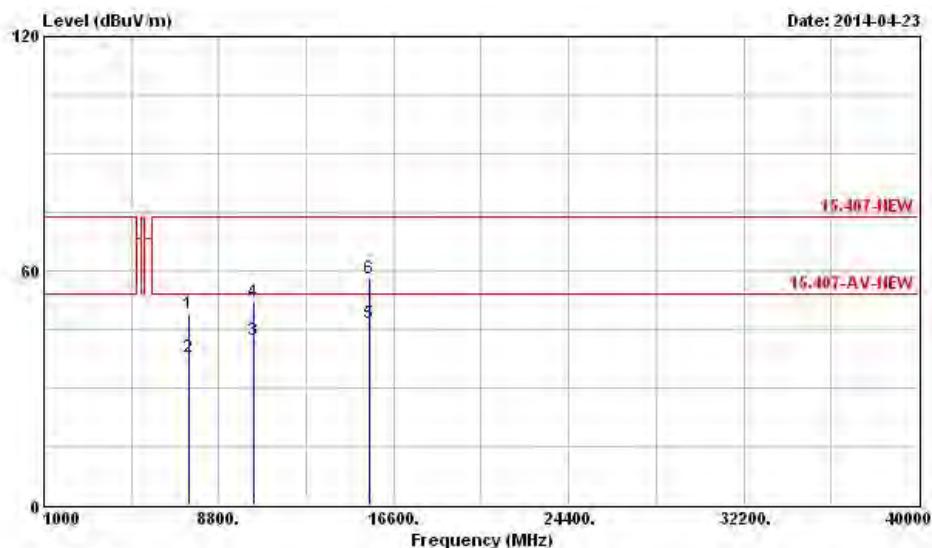
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

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

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



Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	HT20	Test Freq. (MHz)	5180
N <sub>TX</sub>	1	Polarization	V



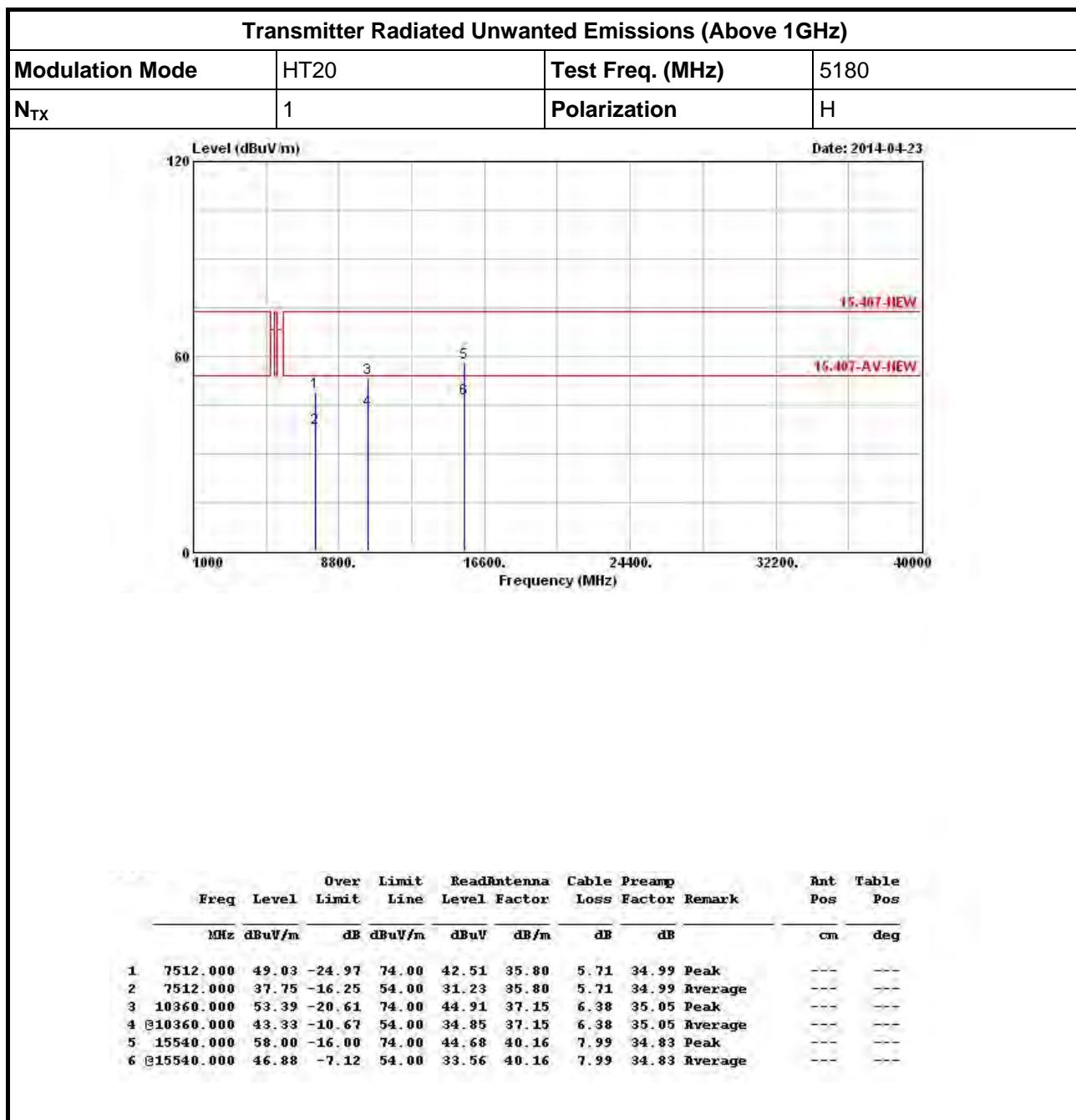
Freq	Level	Over Limit		ReadAntenna		Cable Preamp		Ant Pos	Table Pos
		Limit	Line	Level	Factor	Loss	Factor		
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1 7464.000	49.04	-24.96	74.00	42.55	35.81	5.66	34.98	Peak	---
2 7464.000	37.76	-16.24	54.00	31.27	35.81	5.66	34.98	Average	---
3 @10360.000	42.39	-11.61	54.00	33.91	37.15	6.38	35.05	Average	---
4 10360.000	51.97	-22.03	74.00	43.49	37.15	6.38	35.05	Peak	---
5 @15540.000	46.74	-7.26	54.00	33.42	40.16	7.99	34.83	Average	---
6 15540.000	58.00	-16.00	74.00	44.68	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.

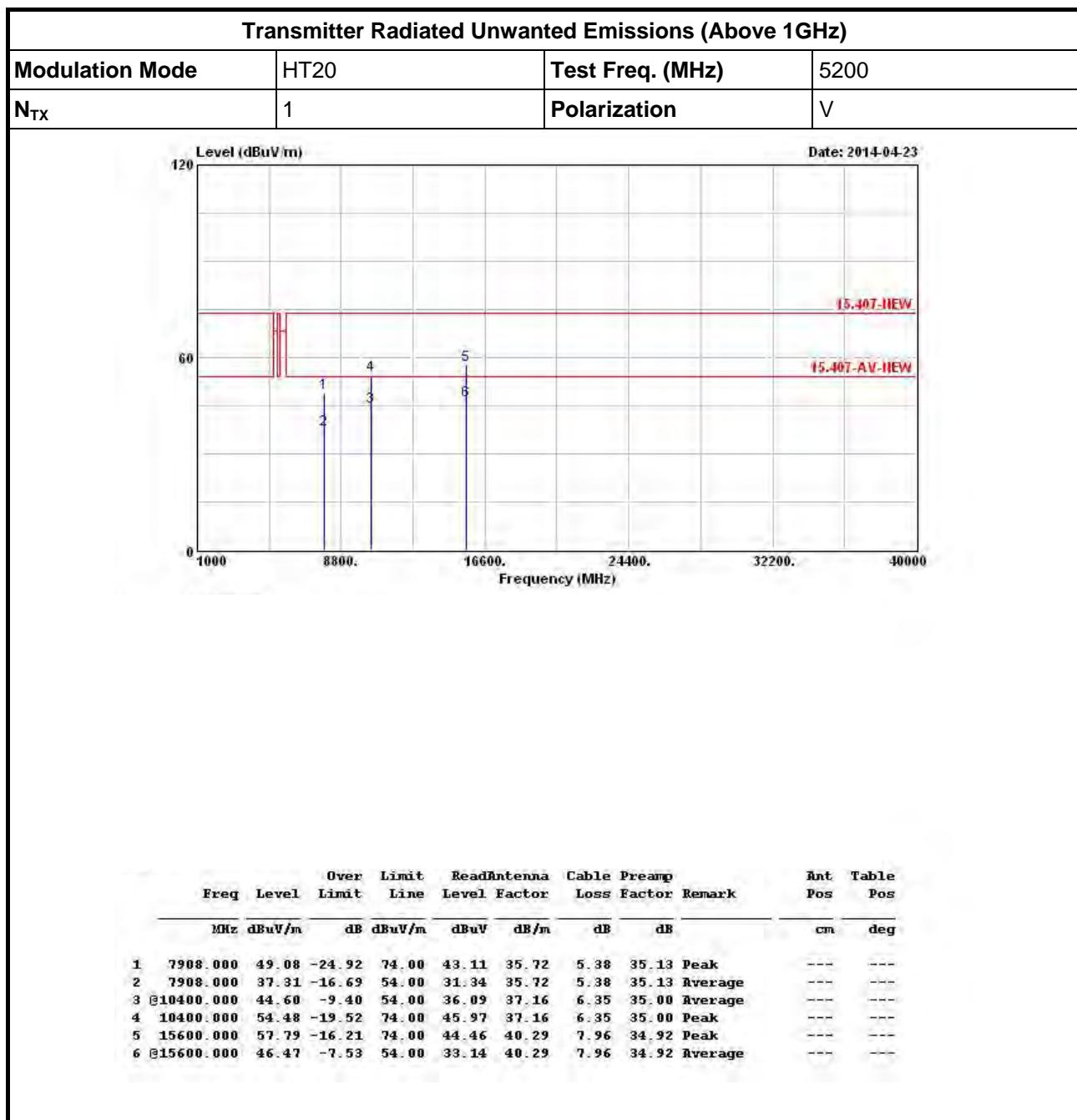


Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

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

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

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

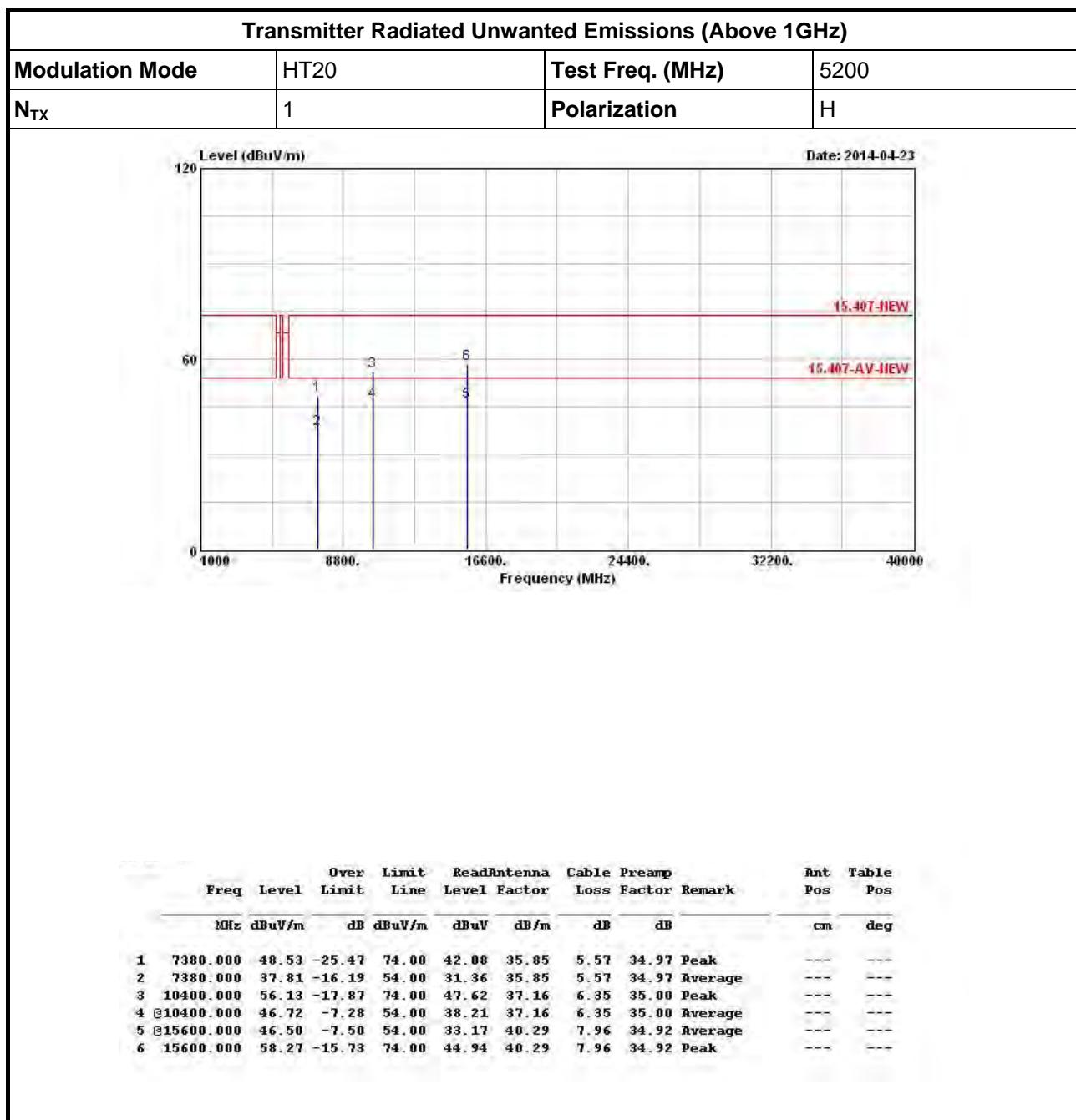


Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

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

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

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

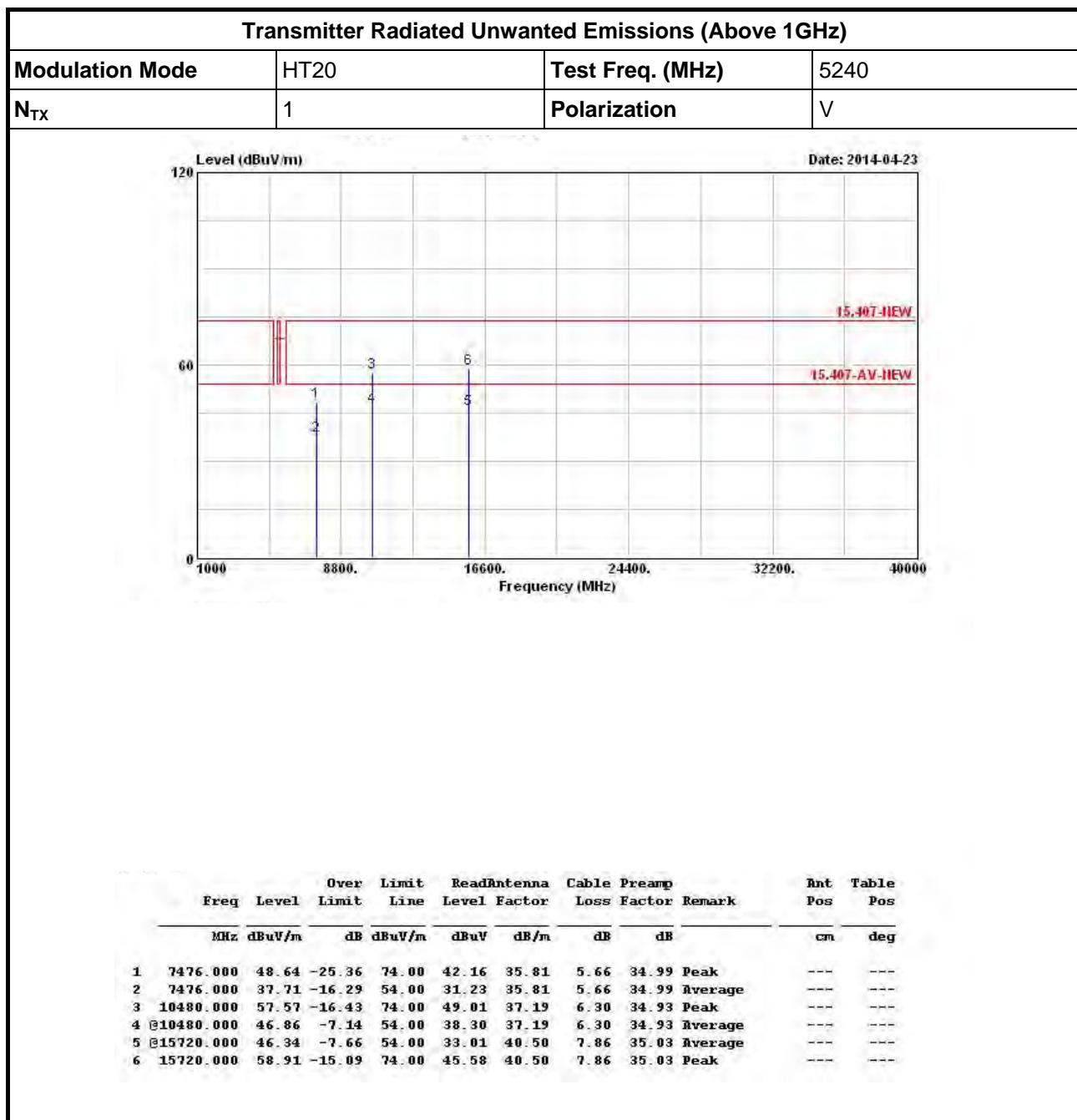


Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

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

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

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

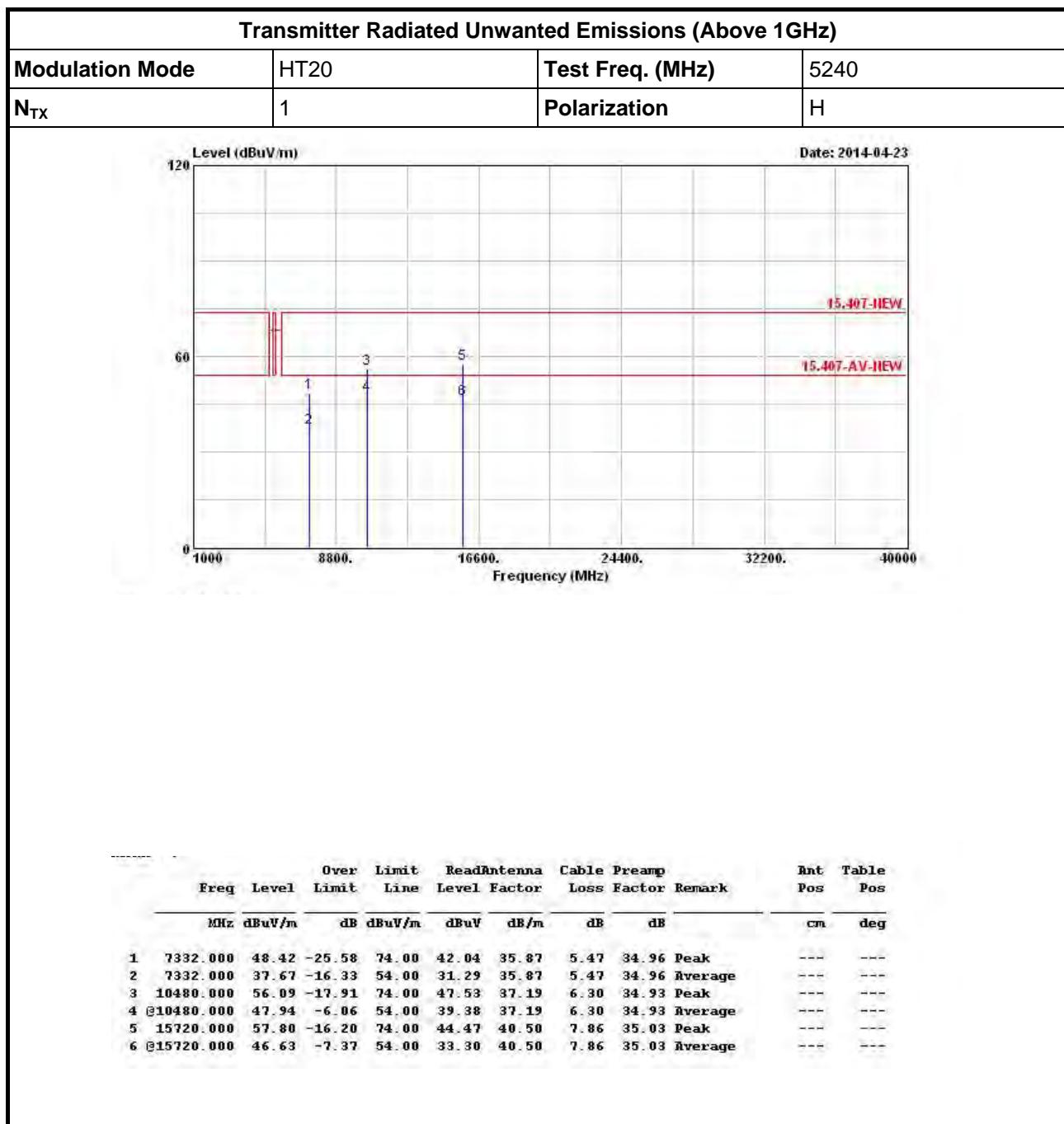


Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

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

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

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

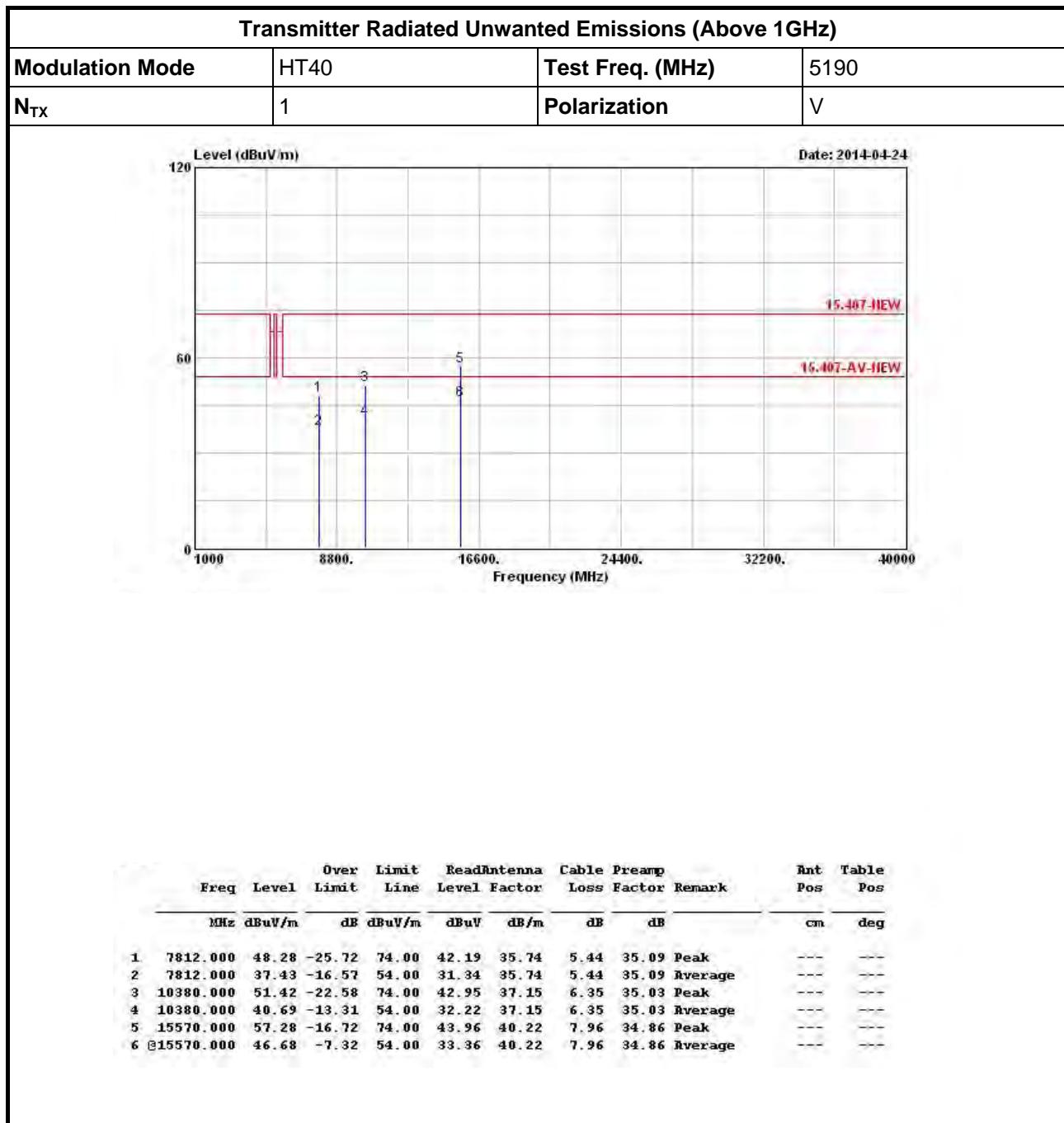


Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

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

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

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

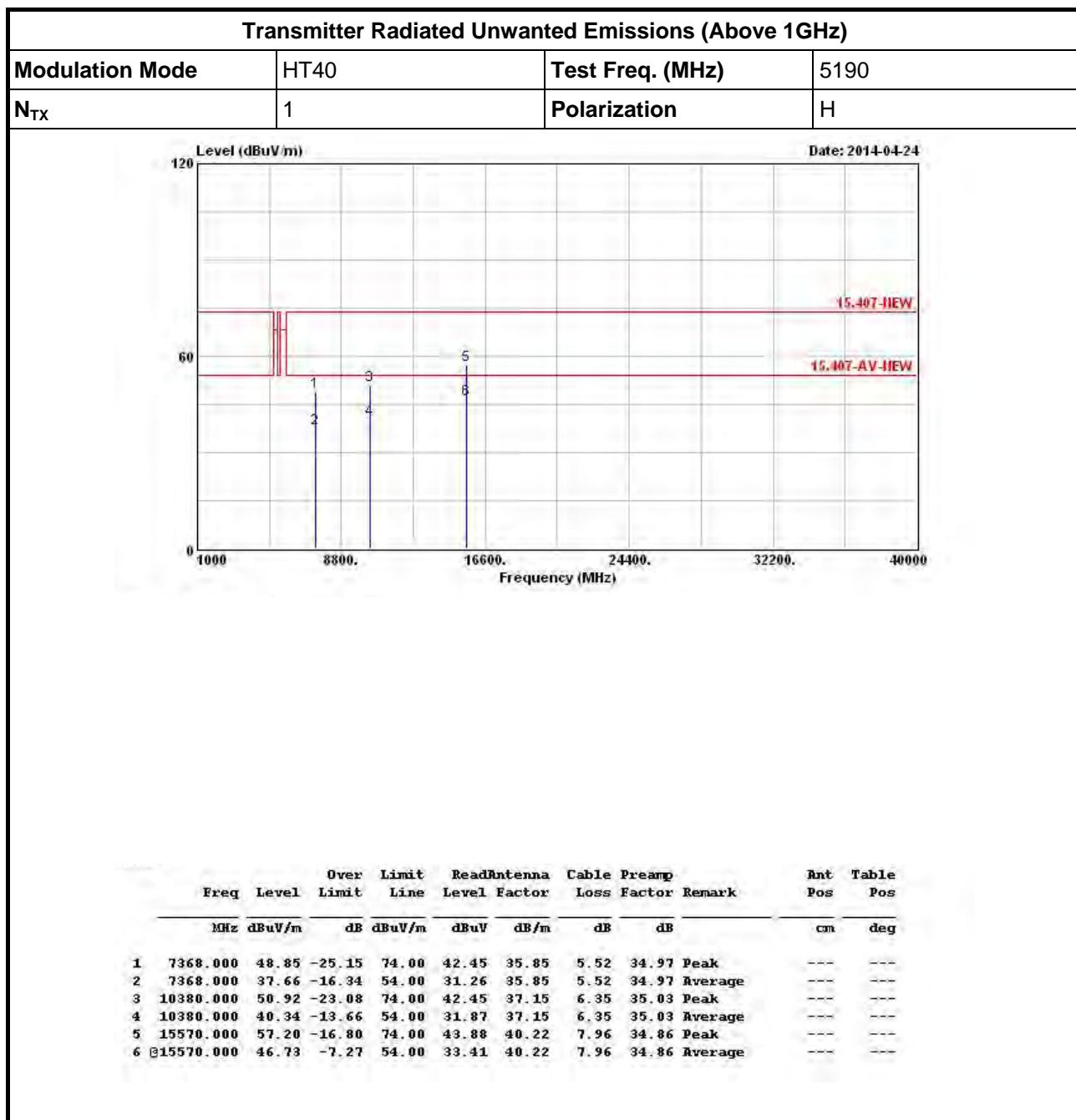


Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

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

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

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

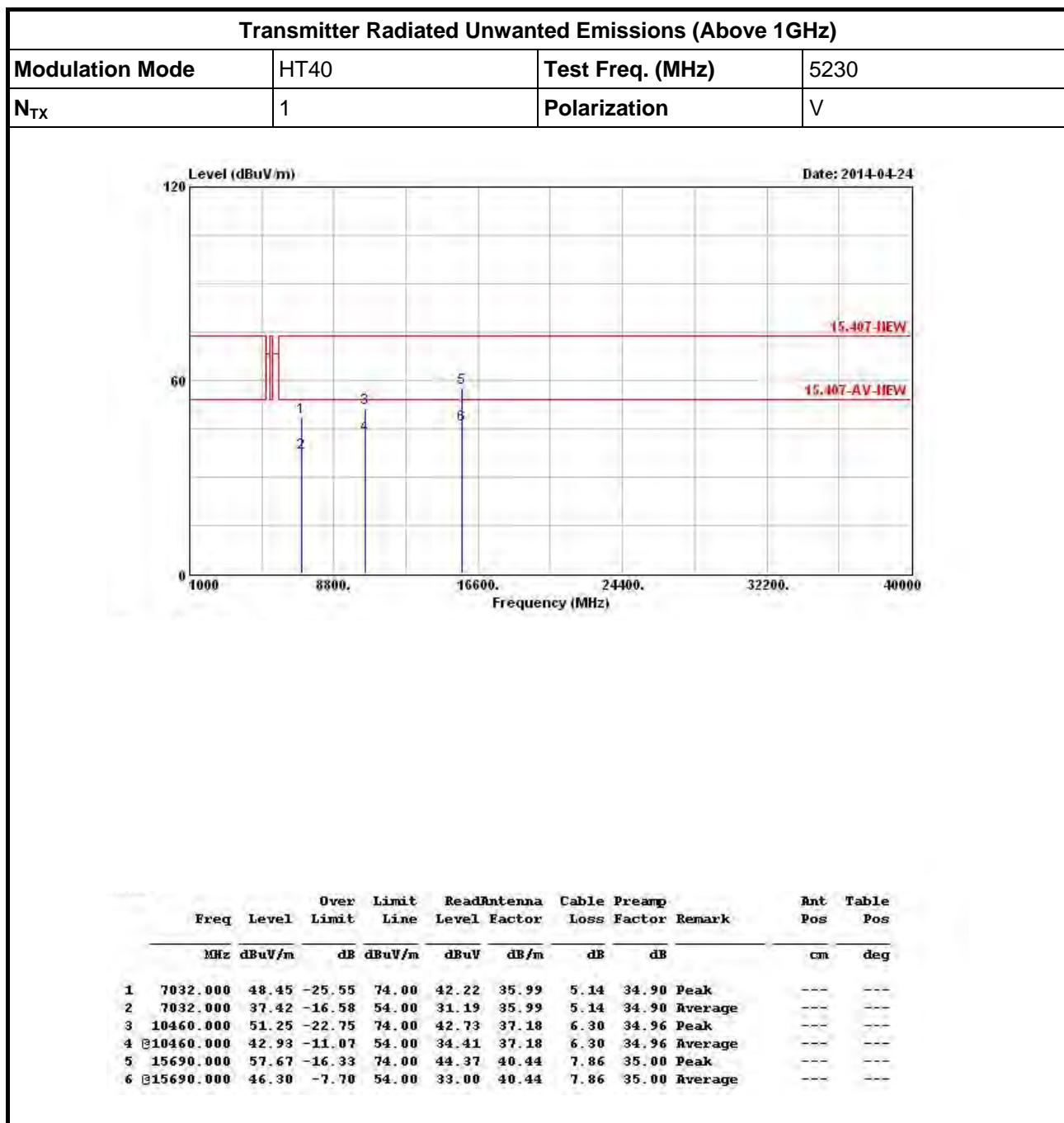


Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

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

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

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

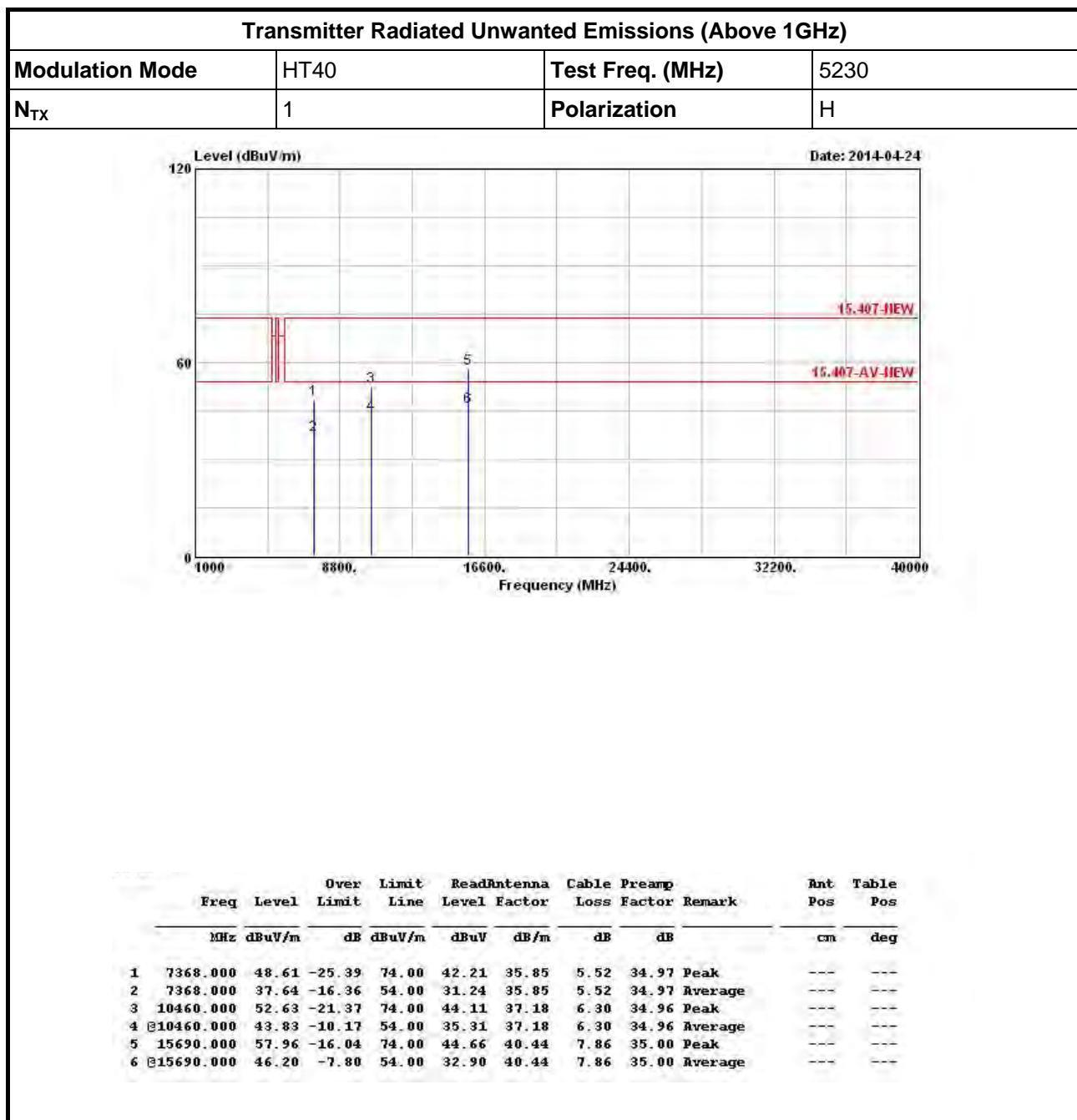


Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

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

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

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

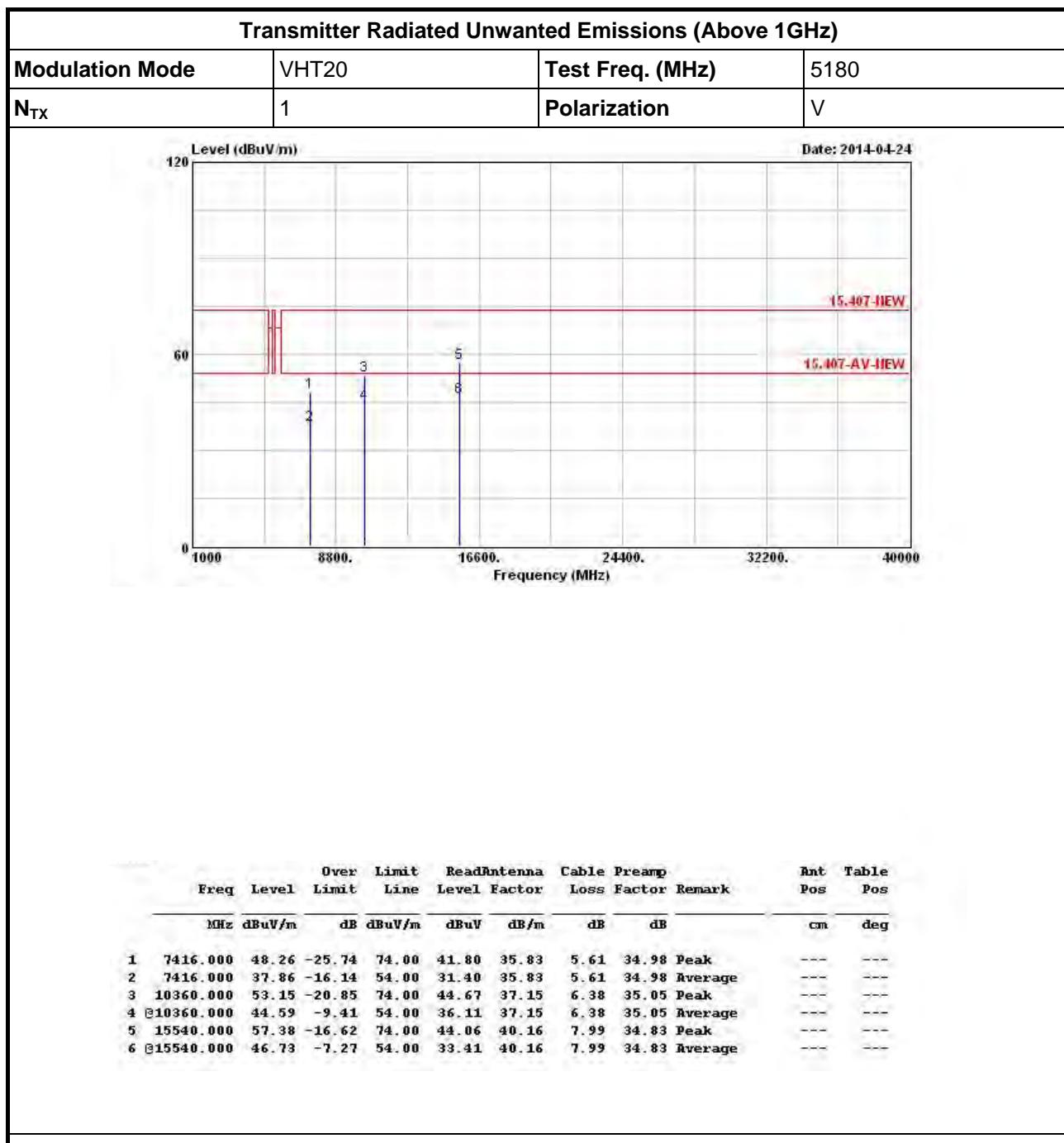


Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

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

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

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

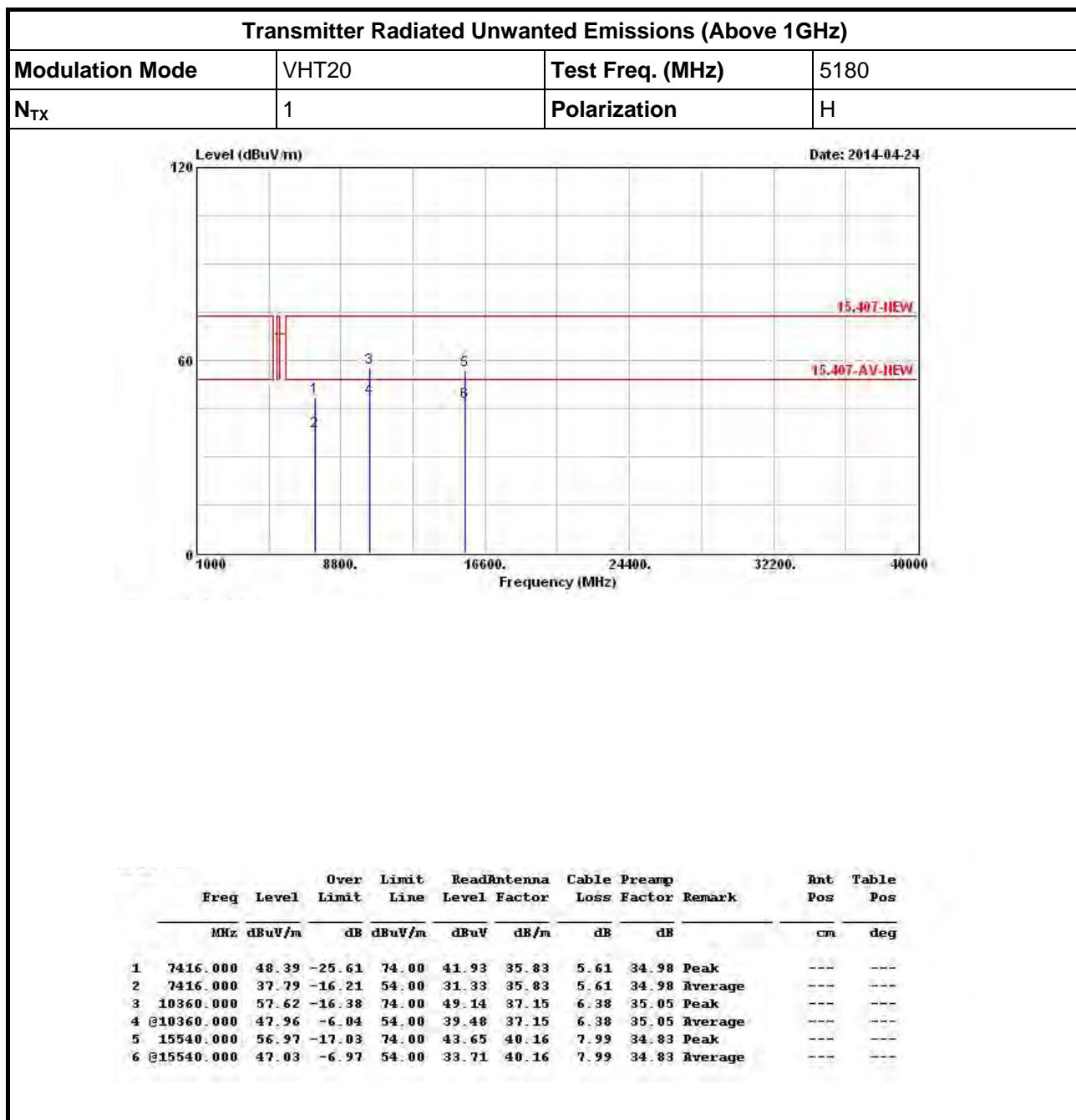


Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

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

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

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

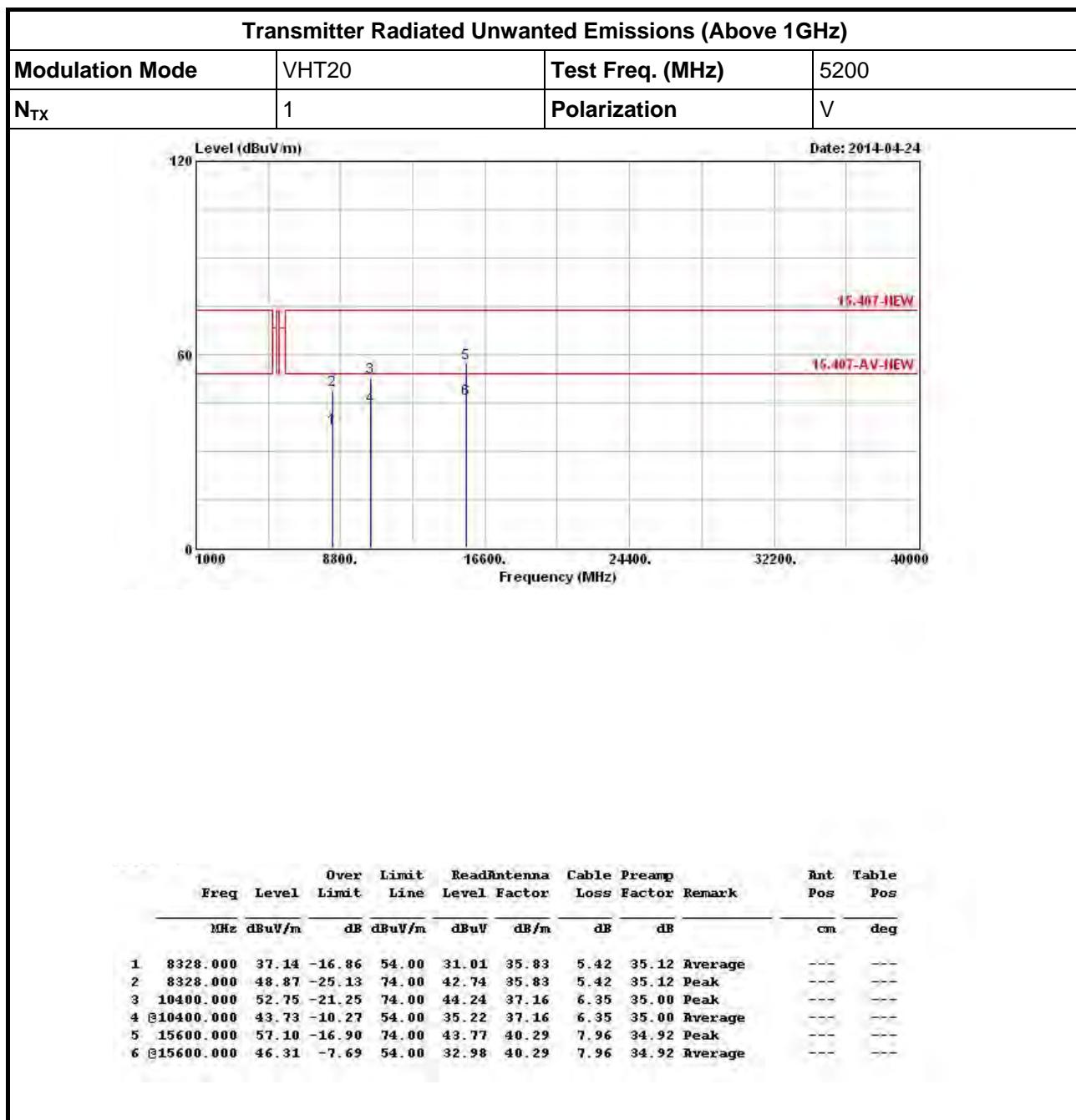


Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

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

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

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

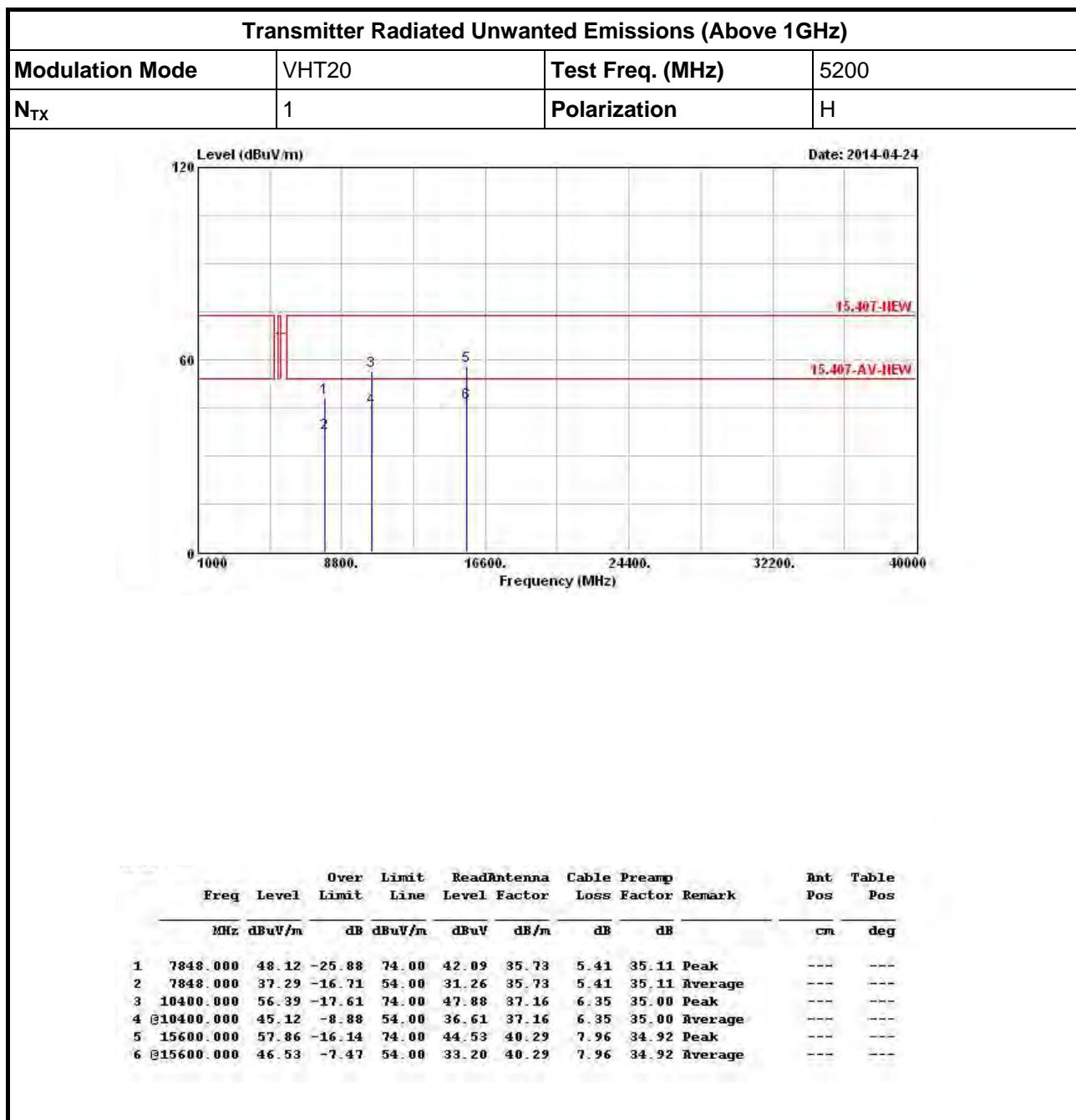


Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

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

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

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

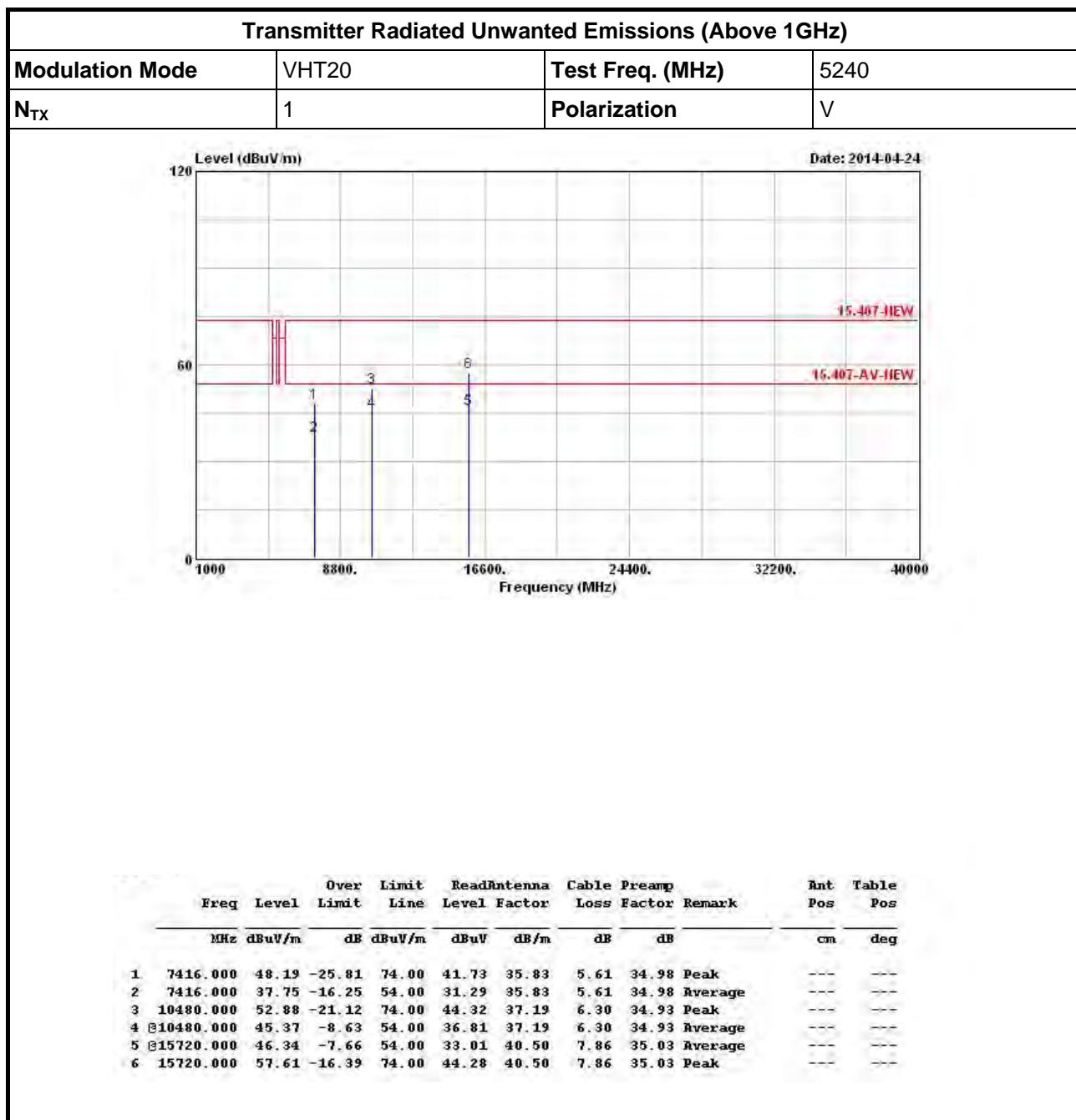


Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

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

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

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

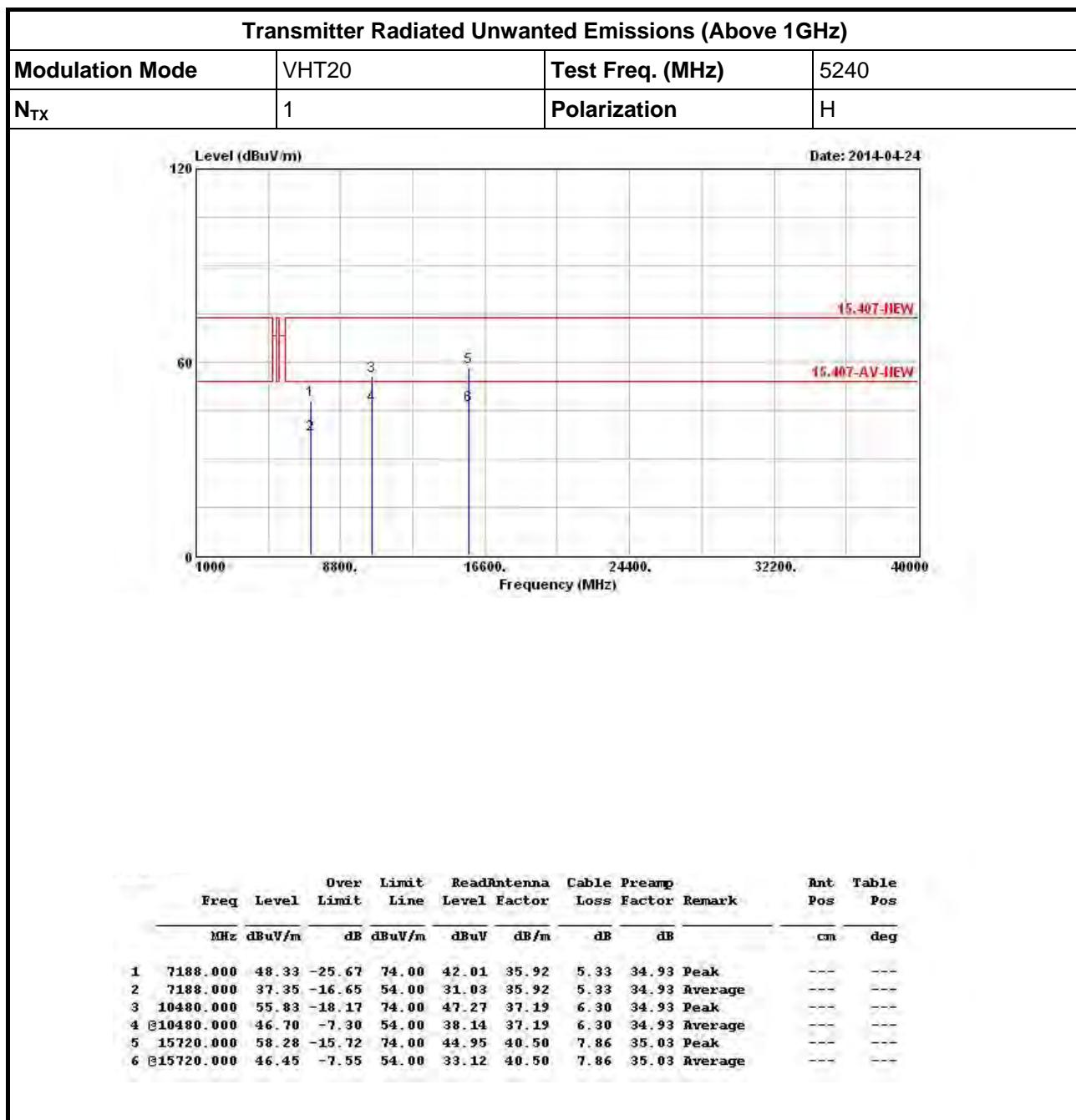


Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

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

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

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

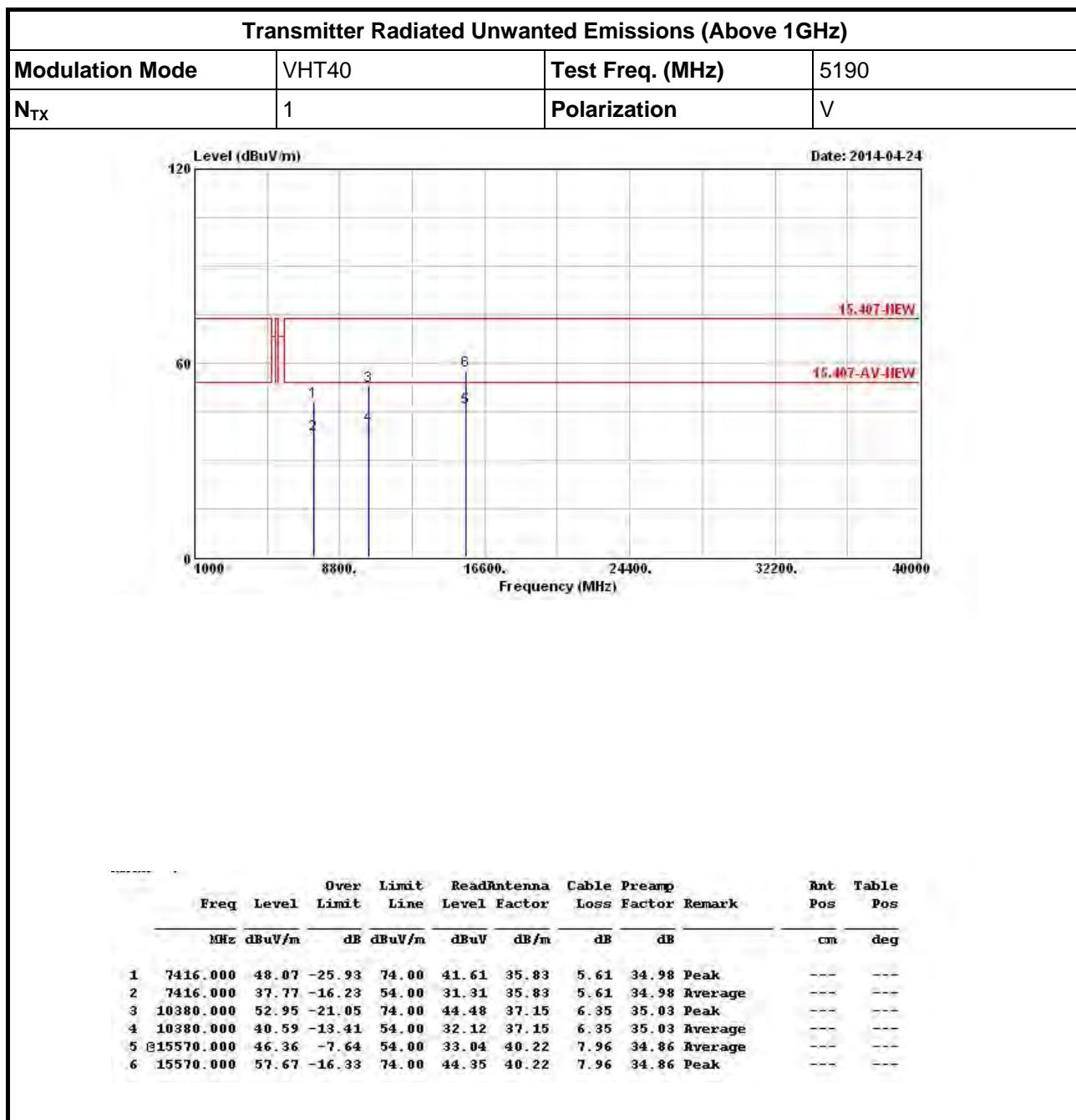


Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

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

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

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

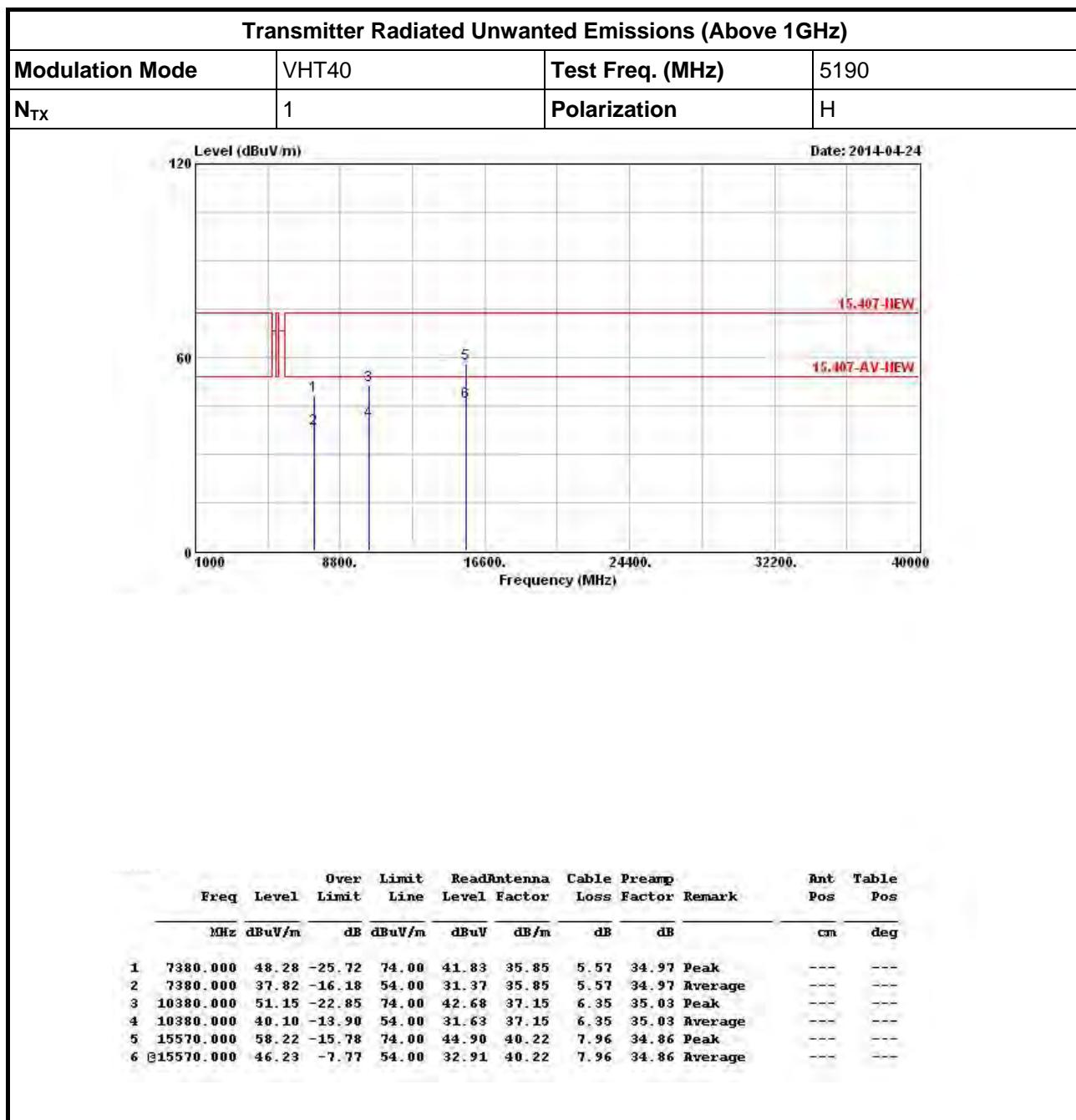


Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

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

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

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

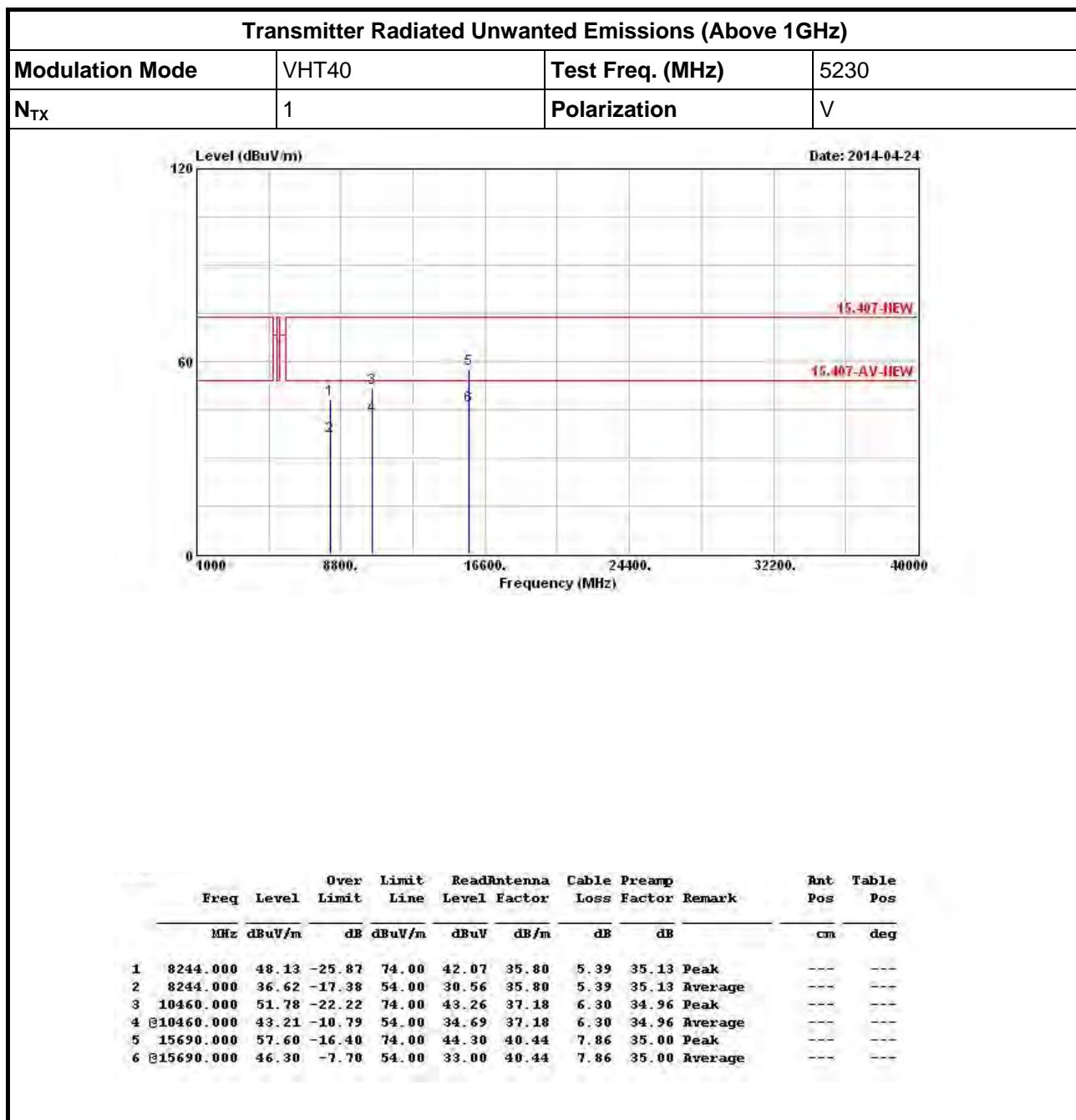


Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

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

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

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

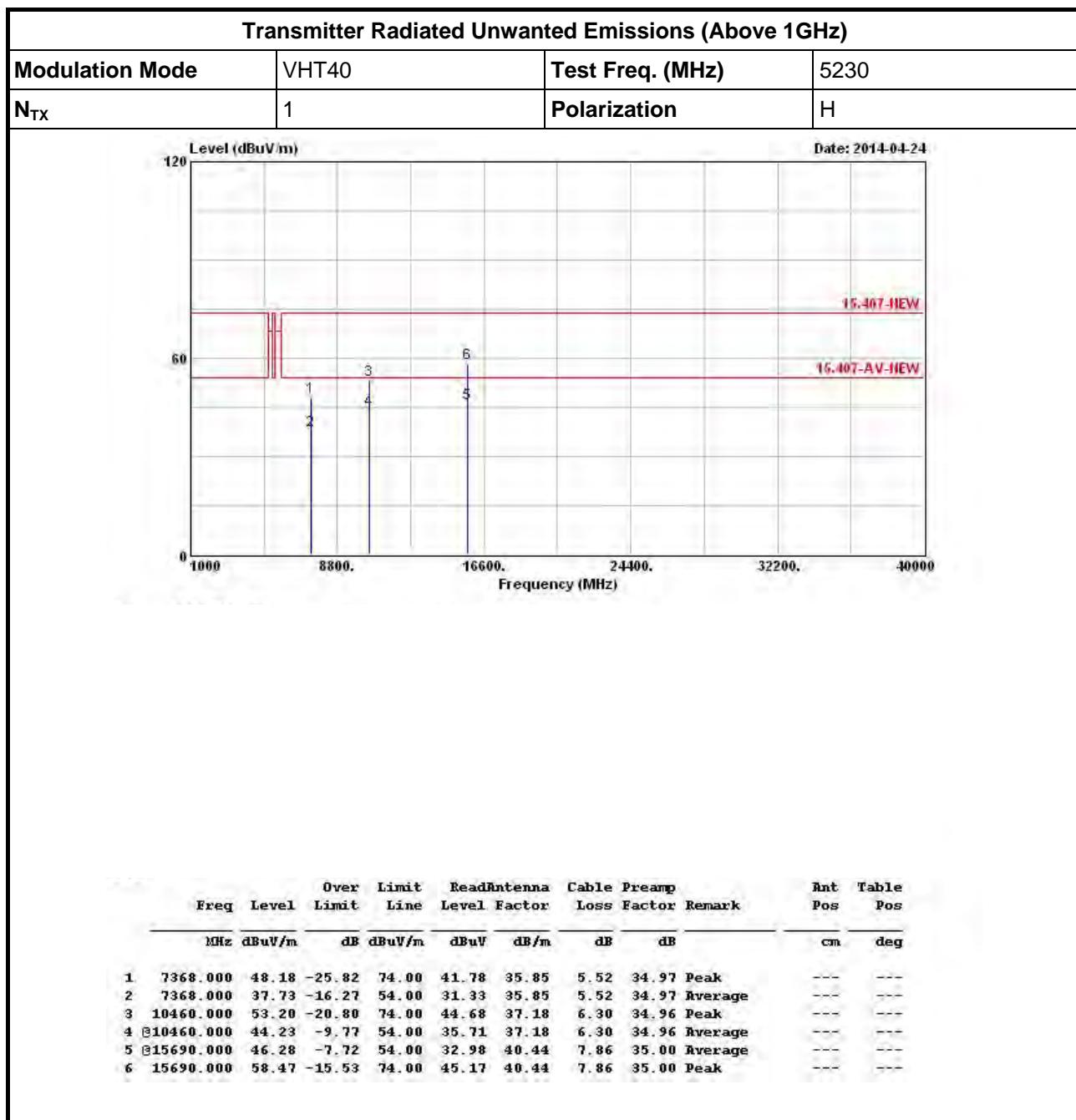


Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

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

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

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

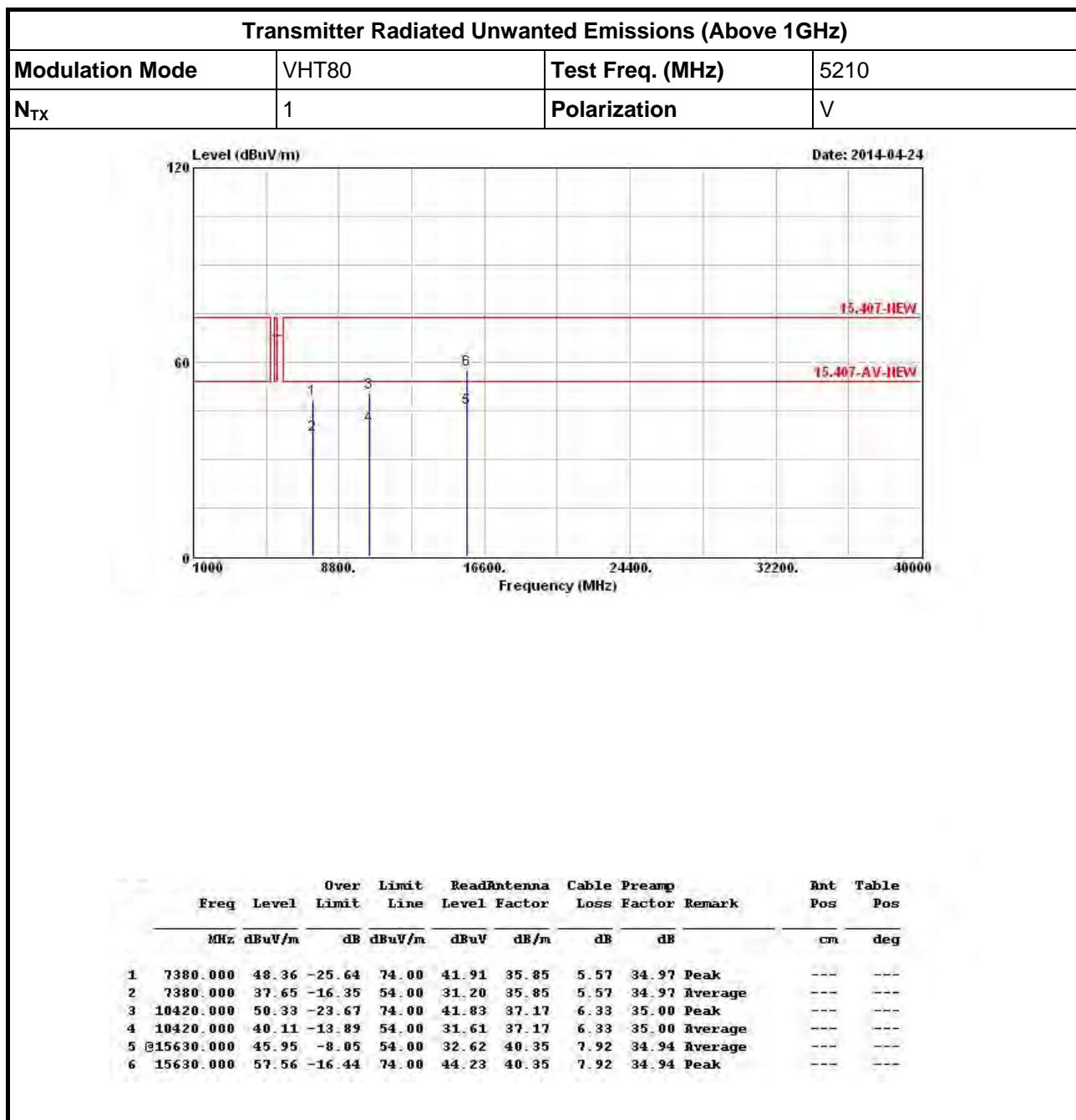


Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

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

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

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

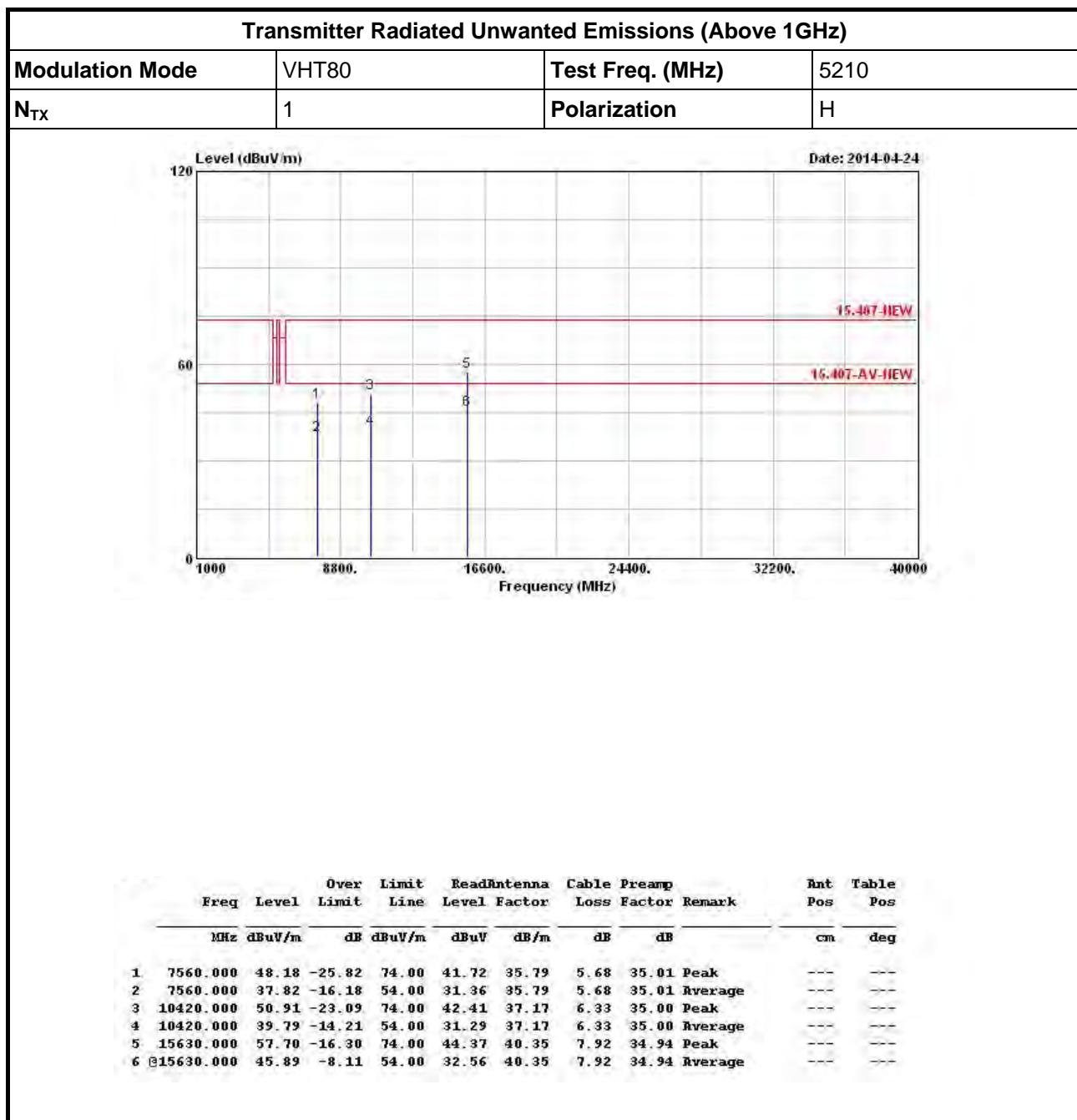


Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

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

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

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



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

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

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

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

## 3.8 Frequency Stability

### 3.8.1 Frequency Stability Limit

Frequency Stability Limit	
<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>LE-LAN Devices</b>	
<input checked="" type="checkbox"/> N/A	
<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.	

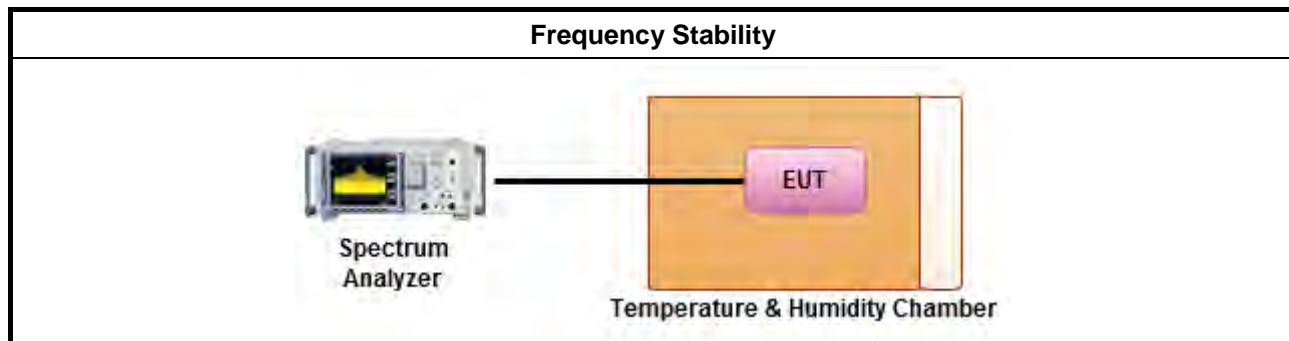
### 3.8.2 Measuring Instruments

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

### 3.8.3 Test Procedures

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

### 3.8.4 Test Setup





### 3.8.5 Test Result of Frequency Stability

Frequency Stability Result			
Mode		Frequency Stability (ppm)	
Condition	Freq. (MHz)	Test Frequency (MHz)	Frequency Stability (ppm)
T <sub>20°C</sub> Vmax	5180	5179.98641	-2.6236
T <sub>20°C</sub> Vmin	5180	5179.98352	-3.1815
T <sub>50°C</sub> Vnom	5180	5179.97916	-4.0232
T <sub>40°C</sub> Vnom	5180	5179.97091	-5.6158
T <sub>30°C</sub> Vnom	5180	5179.97395	-5.0290
T <sub>20°C</sub> Vnom	5180	5179.98133	-3.6042
T <sub>10°C</sub> Vnom	5180	5179.99262	-1.4247
T <sub>0°C</sub> Vnom	5180	5180.00695	1.3417
T <sub>-10°C</sub> Vnom	5180	5180.01867	3.6042
T <sub>-20°C</sub> Vnom	5180	5180.02171	4.1911
Limit (ppm)		20	
Result		Complied	

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



## 4 Test Equipment and Calibration Data

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMC Receiver	R&S	ESCS 30	100174	9kHz ~ 2.75GHz	Mar. 26, 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. 16, 2013	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	Jun. 27, 2013	RF Conducted
RF Cable-2m	HUBER+SUHNER	SUCOFLEX_104	SN 345675/4	30MHz ~ 26.5GHz	Dec. 02, 2013	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	Radiated Emission
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH02-HY	30MHz ~ 1GHz 3m	May 11, 2013	Radiated Emission
Amplifier	Agilent	8447D	2944A11149	100kHz ~ 1.3GHz	Jul. 18, 2013	Radiated Emission
Amplifier	Agilent	8449B	3008A02373	1GHz ~ 26.5GHz	Aug. 28, 2013	Radiated Emission
Horn Antenna	ETS-LINDGREN	3117	00091920	1GHz ~ 18GHz	Nov. 25, 2013	Radiated Emission
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170154	15GHz ~ 40GHz	Jan. 10, 2014	Radiated Emission
RF Cable-R03m	Jye Bao	RG142	CB021	9kHz ~ 1GHz	Nov. 09, 2013	Radiated Emission
RF Cable-high	SUHNER	SUCOFLEX106	03CH02-HY	1GHz ~ 40GHz	Mar. 05, 2014	Radiated Emission
Bilog Antenna	SCHAFFNER	CBL61128	2723	30MHz ~ 2GHz	Oct. 10, 2013	Radiated Emission
Turn Table	Chaintek Instruments	3000	MF7802058	0~ 360 degree	N/A	Radiated Emission
Antenna Mast	MF	MF7802	MF780208205	1 ~ 4 m	N/A	Radiated Emission
Software	Audix	E3	4.03260c	Radiate	NCR	Radiated Emission

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

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Amplifier	MITEQ	AMF-6F-260400	9121372	26.5GHz ~ 40GHz	Apr. 19, 2013	Radiated Emission
Loop Antenna	TESEQ	HLA 6120	31244	9 kHz - 30 MHz	Dec. 02, 2012	Radiated Emission

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