



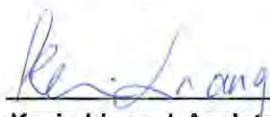
# FCC Test Report

**Equipment** : IP Camera  
**Model No.** : ALLie Home  
**FCC ID** : 2AFCRAH720  
**Standard** : 47 CFR FCC Part 15.247  
**Operating Band** : 2400 MHz – 2483.5 MHz  
**Equipment Class** : DTS  
**Applicant** : IC Real Tech  
3050 North Andrews Avenue Extension,  
Pompano Beach, Florida, United States  
33064.  
**Manufacturer** : Hi-P Electronics Pte Ltd  
12 Ang Mo Kio Street 64, #03-02, UE  
BizHub Central Blk A, Singapore 569088.

The product sample received on Aug. 18, 2015 and completely tested on Sep. 07, 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	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]: 2.650MHz 55.60 (Margin 0.4dB) - QP 42.71 (Margin 3.29dB) - AV	FCC 15.207	Complied
3.2	15.247(a)	6dB Bandwidth	6dB Bandwidth Unit [MHz] 20M:8.44	$\geq$ 500kHz	Complied
3.3	15.247(b)	RF Output Power (Maximum Peak Conducted Output Power)	Power [dBm]: 19.40	Power [dBm]:30	Complied
3.4	15.247(e)	Power Spectral Density	PSD [dBm/100kHz]: -6.44	PSD [dBm/3kHz]:8	Complied
3.5	15.247(d)	Transmitter Radiated Bandedge Emissions	Non-Restricted Bands: 2398.25 MHz: 30.21 dB Restricted Bands [dBuV/m at 3m]: 2486.20MHz 61.05 (Margin 12.95 dB) - PK 52.25 (Margin 1.75 dB) - AV	Non-Restricted Bands: > 20 dBc Restricted Bands: FCC 15.209	Complied
3.6	15.247(d)	Radiated Unwanted Emissions	Restricted Bands [dBuV/m at 3m]: 4924.00 MHz 52.50 (Margin 1.50 dB) – AV 56.76 (Margin 17.24 dB) - PK	Non-Restricted Bands: > 20 dBc Restricted Bands: FCC 15.209	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)
2400-2483.5	b	2412-2462	1-11 [11]	1	22.32
2400-2483.5	g	2412-2462	1-11 [11]	1	22.65
2400-2483.5	n (HT20)	2412-2462	1-11 [11]	1	22.77

Note 1: RF output power specifies that Maximum Peak Conducted Output Power.  
Note 2: 802.11b uses a combination of DSSS-DBPSK, DQPSK, CCK modulation.  
Note 3: 802.11g/n uses a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM modulation.

#### 1.1.2 Antenna Information

Antenna Category	
<input checked="" type="checkbox"/>	Integral antenna (antenna permanently attached)
<input type="checkbox"/>	<input checked="" type="checkbox"/> Temporary RF connector provided
<input type="checkbox"/>	<input type="checkbox"/> No temporary RF connector provided Transmit chains bypass antenna and soldered temporary RF connector provided for connected measurement. In case of conducted measurements the transmitter shall be connected to the measuring equipment via a suitable attenuator and correct for all losses in the RF path.

Antenna General Information			
No.	Ant. Cat.	Ant. Type	Gain (dBi)
1	Integral	PIFA	2.30



### 1.1.3 Type of EUT

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

### 1.1.4 Test Signal Duty Cycle

Operated Mode for Worst Duty Cycle	
<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 802.11b	0.00
<input checked="" type="checkbox"/> 97.28%- IEEE 802.11g	0.12
<input checked="" type="checkbox"/> 97.08%- IEEE 802.11n (HT20)	0.13

### 1.1.5 EUT Operational Condition

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



## 1.2 Accessories and Support Equipment

Accessories Information				
AC Adapter	Brand Name	Ten Pao	Model Name	S012BEU0900100
	Power Rating	I/P: 100 - 240 Vac, 500 mA, O/P: 9 Vdc, 1000 mA		
	Power Cord	3 meter, non-shielded cable, w/o ferrite core		
USB Cable	Brand Name	YuanLing Technology (HK) Limited	Model Name	YL008-065
	Signal Line	0.9 meter, with braid shielded cable, w/o ferrite core		

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

Support Equipment - AC Conduction				
No.	Equipment	Brand Name	Model Name	FCC ID
1	Notebook	DELL	E5530	DoC
2	Adapter	DELL	LA65NS2-01	DoC

Support Equipment - 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 558074 D01 v03r03



## 1.4 Testing Location Information

Testing Location			
<input checked="" type="checkbox"/>	HWA YA	ADD : 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 FAX : 886-3-327-0973			
Test site registered number [636805] with FCC.			
Test Condition	Test Site No.	Test Engineer	Test Environment
AC Conduction	CO04-HY	Zeus	21°C / 57%
RF Conducted	TH06-HY	Leo	22.4°C / 62%
Radiated Emission	03CH03-HY	Hsiao	24.2°C / 63%

## 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, 6dB bandwidth	±0.6 %	
RF output power, conducted	±0.1 dB	
Power density, conducted	±0.6 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	±0.6 %	



## 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
11b,1-11Mbps	1	1-11 Mbps	1 Mbps
11g,6-54Mbps	1	6-54 Mbps	6 Mbps
HT20, M0-7	1	MCS 0-7	MCS 0

Note 1: IEEE Std. 802.11n modulation consists of HT20 (HT: High Throughput). The EUT supports HT20. Worst modulation mode of Guard Interval (GI) is 800ns.

Note 2: Modulation modes consist below configuration:  
11b: IEEE 802.11b, 11g: IEEE 802.11g, HT20: IEEE 802.11n

Note 3: RF output power specifies that Maximum Peak Conducted Output Power.

### 2.2 The Worst Case Power Setting Parameter

The Worst Case Power Setting Parameter (2400-2483.5MHz band)					
Test Software Version	DOS Command				
Modulation Mode	N <sub>TX</sub>	Test Frequency (MHz)			
		NCB: 20MHz			
		2412	2437	2462	
11b	1	16.5	11.5	20	
11g	1	13	20	14.5	
HT20	1	12.5	20	13.5	



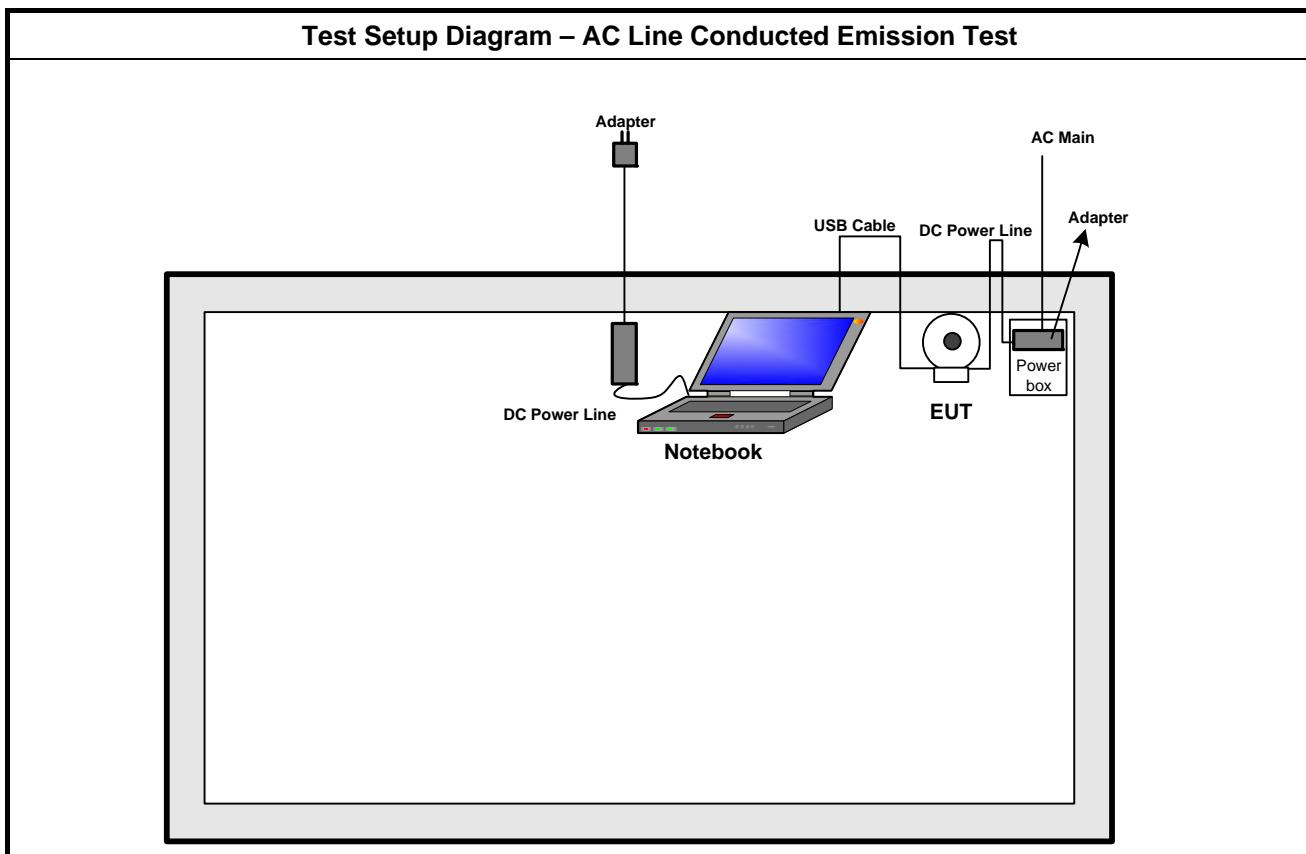
## 2.3 The Worst Case Measurement Configuration

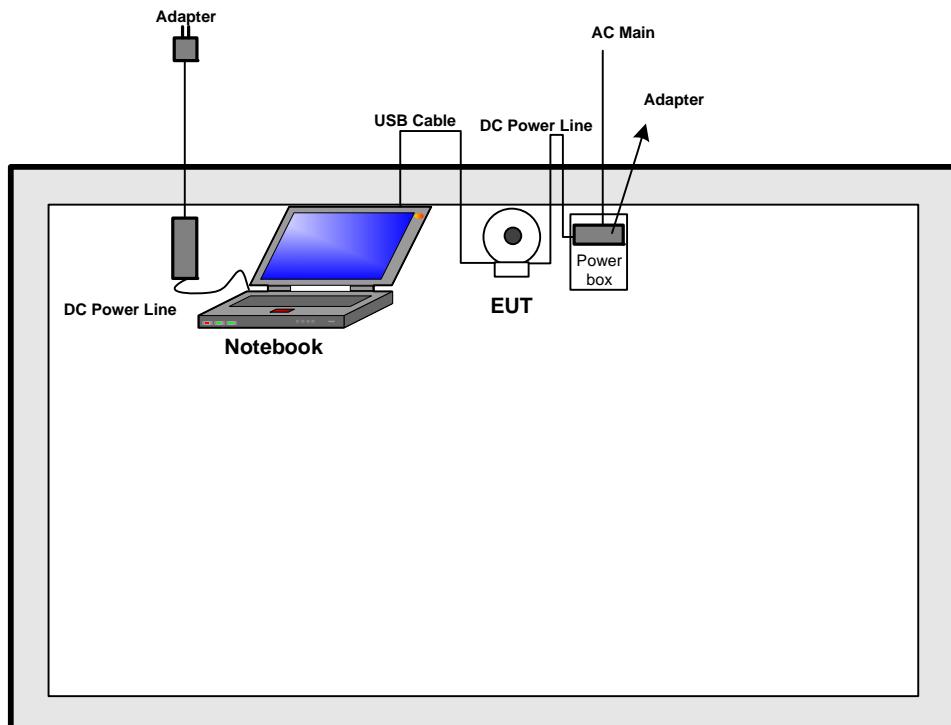
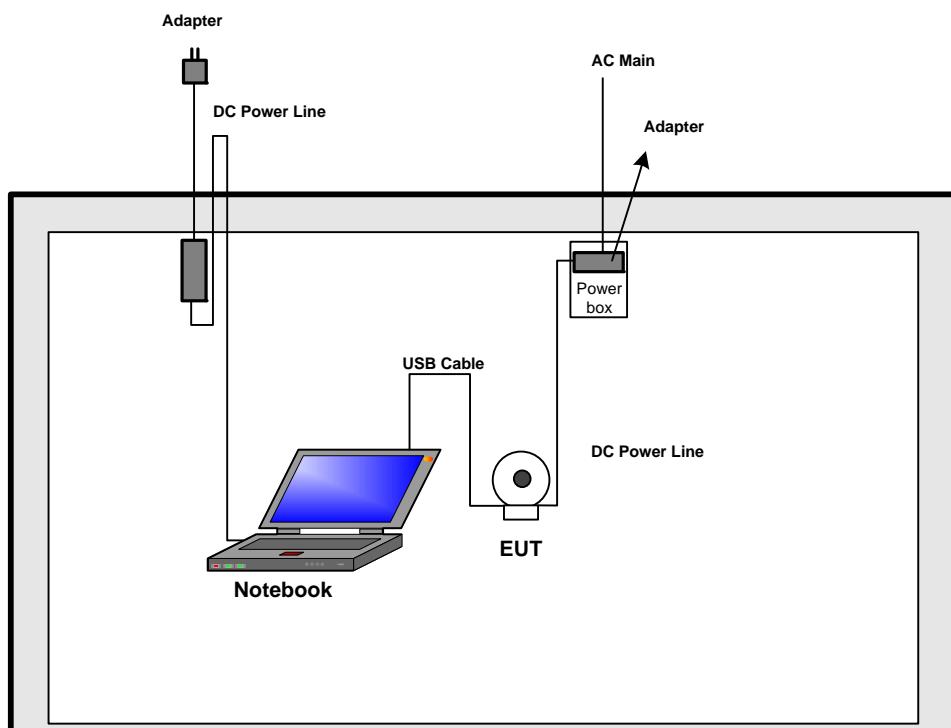
The Worst Case Mode for Following Conformance Tests	
Tests Item	AC power-line conducted emissions
Condition	AC power-line conducted measurement for line and neutral Test Voltage: 120Vac / 60Hz
Operating Mode	Operating Mode Description
1	Adapter mode and transmit

The Worst Case Mode for Following Conformance Tests	
Tests Item	RF Output Power, Power Spectral Density, 6 dB Bandwidth
Test Condition	Conducted measurement at transmit chains
Modulation Mode	11b, 11g, HT20

The Worst Case Mode for Following Conformance Tests							
Tests Item	Transmitter Radiated Unwanted Emissions Transmitter Radiated Bandedge Emissions						
Test Condition	Radiated measurement						
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. <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	Operating Mode Description						
Radiated Emissions	1. Adapter mode and transmit						
Modulation Mode	11b, 11g, HT20						
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					
Worst Planes of EUT	V						

## 2.4 Test Setup Diagram



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

### 3 Transmitter Test Result

#### 3.1 AC Power-line Conducted Emissions

##### 3.1.1 AC Power-line Conducted Emissions Limit

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

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

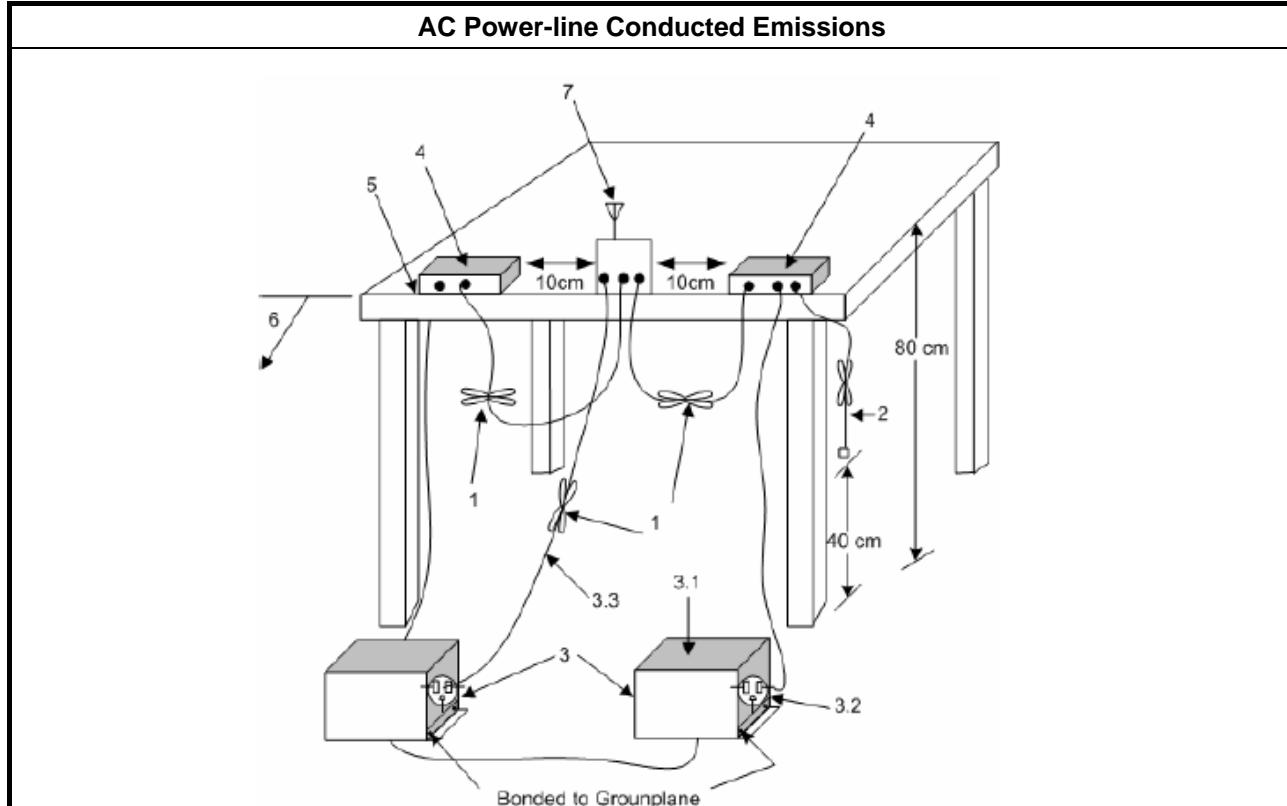
##### 3.1.2 Measuring Instruments

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

##### 3.1.3 Test Procedures

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

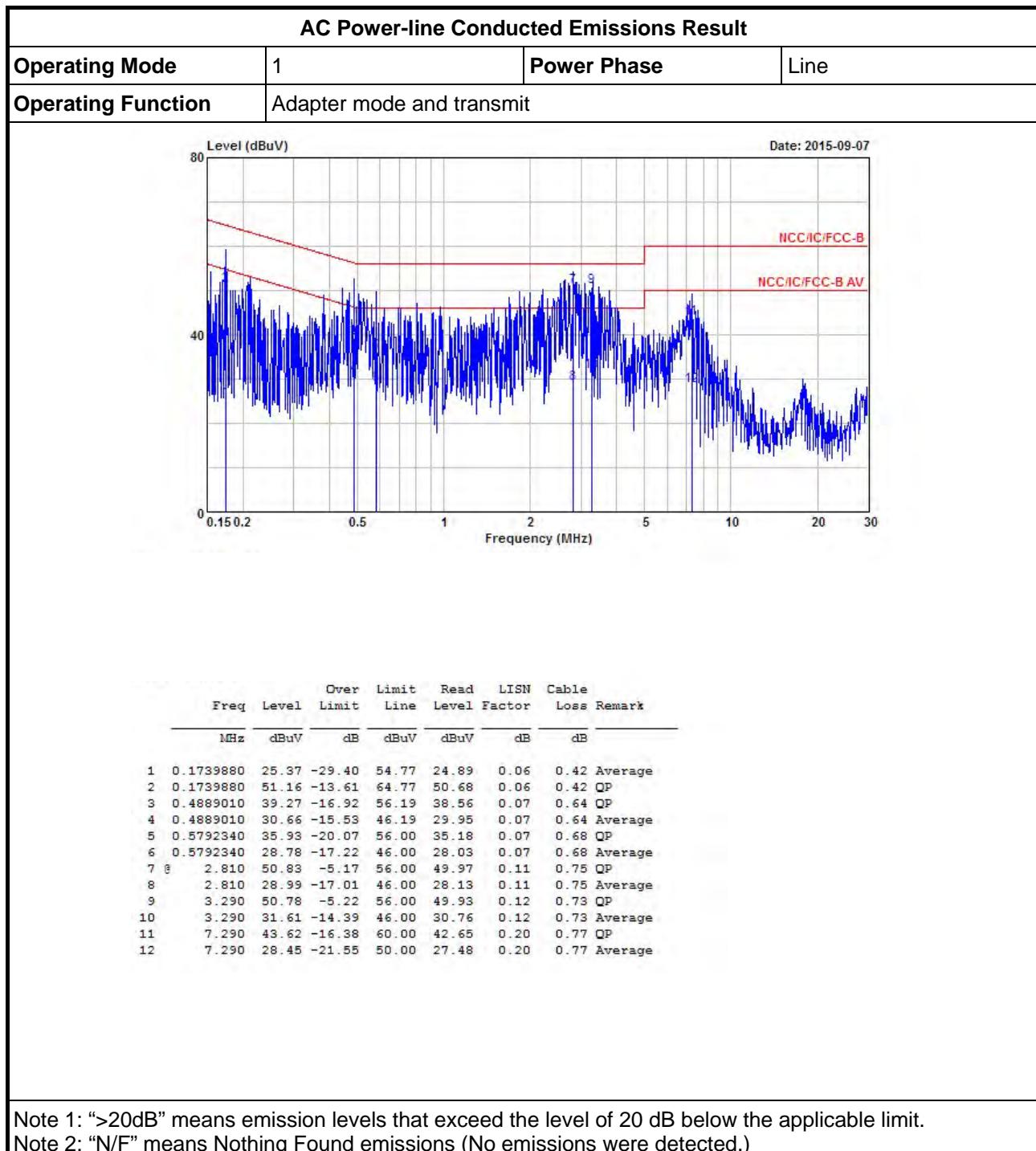
##### 3.1.4 Test Setup





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

AC Power-line Conducted Emissions Result																																																																																																																																																																																																					
Operating Mode	1	Power Phase			Neutral																																																																																																																																																																																																
Operating Function	Adapter mode and transmit																																																																																																																																																																																																				
<table><thead><tr><th>Freq</th><th>Over Limit</th><th>Limit</th><th>Read Line</th><th>LISN</th><th>Cable Factor</th><th>Loss</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>0.1721540</td><td>48.62</td><td>-6.24</td><td>54.86</td><td>48.13</td><td>0.07</td><td>0.42 Average</td></tr><tr><td>2</td><td>0.1721540</td><td>57.82</td><td>-7.04</td><td>64.86</td><td>57.33</td><td>0.07</td><td>0.42 QP</td></tr><tr><td>3</td><td>0.2094380</td><td>44.49</td><td>-8.74</td><td>53.23</td><td>43.91</td><td>0.07</td><td>0.51 Average</td></tr><tr><td>4</td><td>0.2094380</td><td>56.21</td><td>-7.02</td><td>63.23</td><td>55.63</td><td>0.07</td><td>0.51 QP</td></tr><tr><td>5</td><td>0.5182420</td><td>55.23</td><td>-0.77</td><td>56.00</td><td>54.49</td><td>0.08</td><td>0.66 QP</td></tr><tr><td>6</td><td>0.5182420</td><td>43.04</td><td>-2.96</td><td>46.00</td><td>42.30</td><td>0.08</td><td>0.66 Average</td></tr><tr><td>7</td><td>0</td><td>1.720</td><td>54.32</td><td>-1.68</td><td>56.00</td><td>53.42</td><td>0.10</td><td>0.80 QP</td></tr><tr><td>8</td><td>0</td><td>1.720</td><td>43.16</td><td>-2.84</td><td>46.00</td><td>42.26</td><td>0.10</td><td>0.80 Average</td></tr><tr><td>9</td><td>0</td><td>2.090</td><td>39.99</td><td>-6.01</td><td>46.00</td><td>39.10</td><td>0.10</td><td>0.79 Average</td></tr><tr><td>10</td><td>0</td><td>2.090</td><td>55.60</td><td>-0.40</td><td>56.00</td><td>54.71</td><td>0.10</td><td>0.79 QP</td></tr><tr><td>11</td><td>0</td><td>2.460</td><td>41.45</td><td>-4.55</td><td>46.00</td><td>40.57</td><td>0.11</td><td>0.77 Average</td></tr><tr><td>12</td><td>0</td><td>2.460</td><td>55.46</td><td>-0.54</td><td>56.00</td><td>54.58</td><td>0.11</td><td>0.77 QP</td></tr><tr><td>13</td><td>0</td><td>2.650</td><td>42.71</td><td>-3.29</td><td>46.00</td><td>41.84</td><td>0.11</td><td>0.76 Average</td></tr><tr><td>14</td><td>0</td><td>2.650</td><td>55.60</td><td>-0.40</td><td>56.00</td><td>54.73</td><td>0.11</td><td>0.76 QP</td></tr><tr><td>15</td><td>0</td><td>2.900</td><td>55.50</td><td>-0.50</td><td>56.00</td><td>54.63</td><td>0.12</td><td>0.75 QP</td></tr><tr><td>16</td><td>0</td><td>2.900</td><td>43.78</td><td>-2.22</td><td>46.00</td><td>42.91</td><td>0.12</td><td>0.75 Average</td></tr><tr><td>17</td><td>0</td><td>3.290</td><td>55.16</td><td>-0.84</td><td>56.00</td><td>54.31</td><td>0.12</td><td>0.73 QP</td></tr><tr><td>18</td><td>0</td><td>3.290</td><td>42.59</td><td>-3.41</td><td>46.00</td><td>41.74</td><td>0.12</td><td>0.73 Average</td></tr><tr><td>19</td><td>0</td><td>3.620</td><td>40.05</td><td>-5.95</td><td>46.00</td><td>39.20</td><td>0.13</td><td>0.72 Average</td></tr><tr><td>20</td><td>0</td><td>3.620</td><td>53.85</td><td>-2.15</td><td>56.00</td><td>53.00</td><td>0.13</td><td>0.72 QP</td></tr></tbody></table>								Freq	Over Limit	Limit	Read Line	LISN	Cable Factor	Loss	Remark	MHz	dBuV	dB	dBuV	dBuV	dB	dB		1	0.1721540	48.62	-6.24	54.86	48.13	0.07	0.42 Average	2	0.1721540	57.82	-7.04	64.86	57.33	0.07	0.42 QP	3	0.2094380	44.49	-8.74	53.23	43.91	0.07	0.51 Average	4	0.2094380	56.21	-7.02	63.23	55.63	0.07	0.51 QP	5	0.5182420	55.23	-0.77	56.00	54.49	0.08	0.66 QP	6	0.5182420	43.04	-2.96	46.00	42.30	0.08	0.66 Average	7	0	1.720	54.32	-1.68	56.00	53.42	0.10	0.80 QP	8	0	1.720	43.16	-2.84	46.00	42.26	0.10	0.80 Average	9	0	2.090	39.99	-6.01	46.00	39.10	0.10	0.79 Average	10	0	2.090	55.60	-0.40	56.00	54.71	0.10	0.79 QP	11	0	2.460	41.45	-4.55	46.00	40.57	0.11	0.77 Average	12	0	2.460	55.46	-0.54	56.00	54.58	0.11	0.77 QP	13	0	2.650	42.71	-3.29	46.00	41.84	0.11	0.76 Average	14	0	2.650	55.60	-0.40	56.00	54.73	0.11	0.76 QP	15	0	2.900	55.50	-0.50	56.00	54.63	0.12	0.75 QP	16	0	2.900	43.78	-2.22	46.00	42.91	0.12	0.75 Average	17	0	3.290	55.16	-0.84	56.00	54.31	0.12	0.73 QP	18	0	3.290	42.59	-3.41	46.00	41.74	0.12	0.73 Average	19	0	3.620	40.05	-5.95	46.00	39.20	0.13	0.72 Average	20	0	3.620	53.85	-2.15	56.00	53.00	0.13	0.72 QP
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19	0	3.620	40.05	-5.95	46.00	39.20	0.13	0.72 Average																																																																																																																																																																																													
20	0	3.620	53.85	-2.15	56.00	53.00	0.13	0.72 QP																																																																																																																																																																																													
Note 1: ">20dB" means emission levels that exceed the level of 20 dB below the applicable limit.																																																																																																																																																																																																					
Note 2: "N/F" means Nothing Found emissions (No emissions were detected.)																																																																																																																																																																																																					



## 3.2 6dB Bandwidth

### 3.2.1 6dB Bandwidth Limit

6dB Bandwidth Limit
<b>Systems using digital modulation techniques:</b>
<input checked="" type="checkbox"/> 6 dB bandwidth $\geq$ 500 kHz.

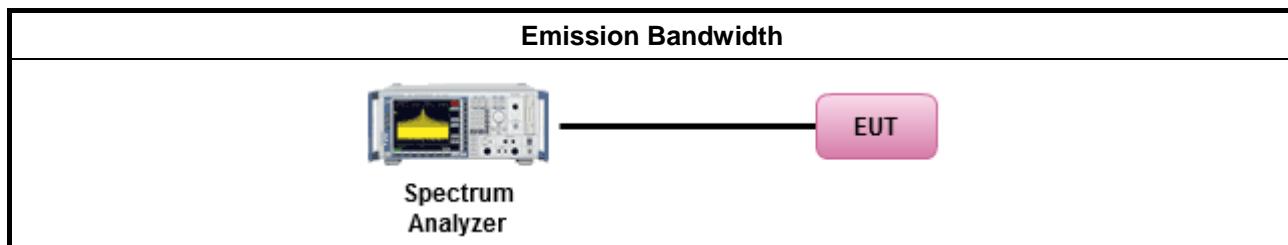
### 3.2.2 Measuring Instruments

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 558074 D01 v03r03, clause 8.1 Option 1 for 6 dB bandwidth measurement.
<input type="checkbox"/> Refer as FCC KDB 558074 D01 v03r03, clause 8.2 Option 2 for 6 dB bandwidth measurement.
<input type="checkbox"/> Refer as ANSI C63.10, clause 6.9.1 for occupied 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 1.
<input type="checkbox"/> The EUT supports diversity transmitting and the results on transmit chain port 2 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.

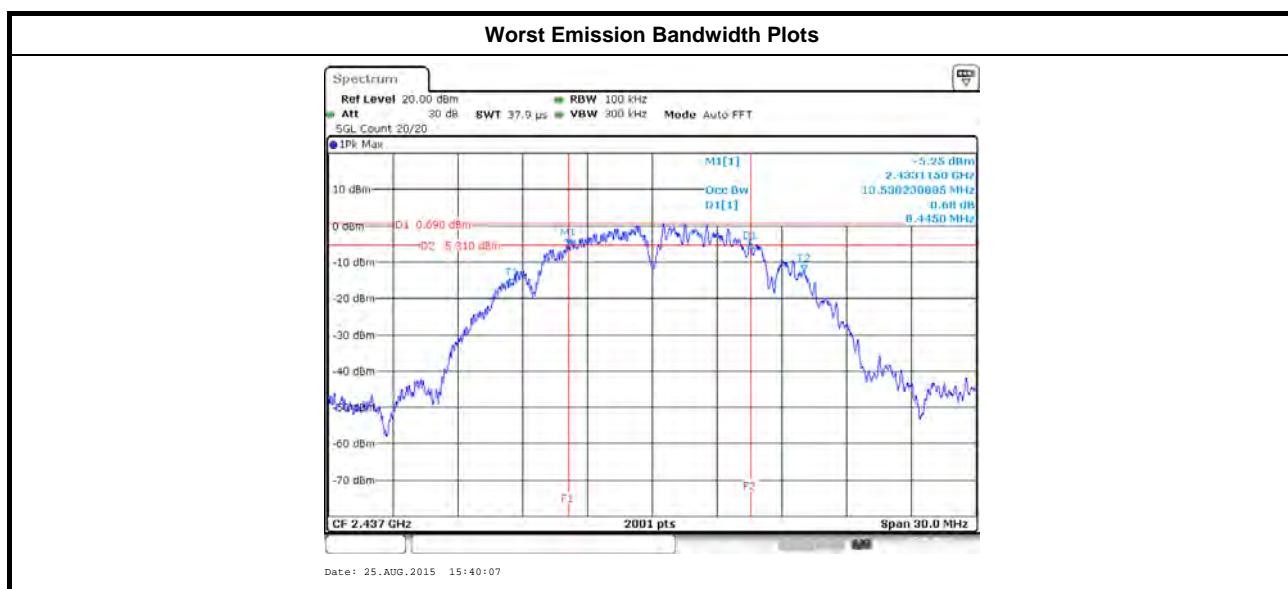
### 3.2.4 Test Setup





## 3.2.5 Test Result of Emission Bandwidth

Emission Bandwidth Result					
Condition			Emission Bandwidth (MHz)		
Modulation Mode	N <sub>TX</sub>	Freq. (MHz)	99% Bandwidth		6dB Bandwidth
			Chain Port 1		Chain Port 1
11b	1	2412	13.19		8.49
11b	1	2437	13.53		8.44
11b	1	2462	15.72		9.55
11g	1	2412	16.43		16.48
11g	1	2437	22.41		16.45
11g	1	2462	17.04		16.45
HT20	1	2412	17.58		17.58
HT20	1	2437	23.14		17.56
HT20	1	2462	17.87		17.49
Limit			N/A	≥500 kHz	
Result			Complied		

Note 1: N<sub>TX</sub> = Number of Transmit Chains



### 3.3 RF Output Power

#### 3.3.1 RF Output Power Limit

RF Output Power Limit	
<b>Maximum Peak Conducted Output Power or Maximum Conducted Output Power Limit</b>	
<input checked="" type="checkbox"/> 2400-2483.5 MHz Band:	
<input checked="" type="checkbox"/> If $G_{TX} \leq 6$ dBi, then $P_{Out} \leq 30$ dBm (1 W)	
<input checked="" type="checkbox"/> Point-to-multipoint systems (P2M): If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)$ dBm	
<input type="checkbox"/> Point-to-point systems (P2P): If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)/3$ dBm	
<input type="checkbox"/> Smart antenna system (SAS):	
	<input type="checkbox"/> Single beam: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)/3$ dBm
	<input type="checkbox"/> Overlap beam: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)/3$ dBm
	<input type="checkbox"/> Aggregate power on all beams: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)/3 + 8$ dB dBm
<b>e.i.r.p. Power Limit:</b>	
<input checked="" type="checkbox"/> 2400-2483.5 MHz Band	
<input checked="" type="checkbox"/> Point-to-multipoint systems (P2M): $P_{eirp} \leq 36$ dBm (4 W)	
<input type="checkbox"/> Point-to-point systems (P2P): $P_{eirp} \leq \text{MAX}(36, [P_{Out} + G_{TX}])$ dBm	
<input type="checkbox"/> Smart antenna system (SAS)	
	<input type="checkbox"/> Single beam: $P_{eirp} \leq \text{MAX}(36, P_{Out} + G_{TX})$ dBm
	<input type="checkbox"/> Overlap beam: $P_{eirp} \leq \text{MAX}(36, P_{Out} + G_{TX})$ dBm
	<input type="checkbox"/> Aggregate power on all beams: $P_{eirp} \leq \text{MAX}(36, [P_{Out} + G_{TX} + 8])$ dBm
$P_{Out}$ = maximum peak conducted output power or maximum conducted output power in dBm, $G_{TX}$ = the maximum transmitting antenna directional gain in dBi. $P_{eirp}$ = e.i.r.p. Power in dBm.	

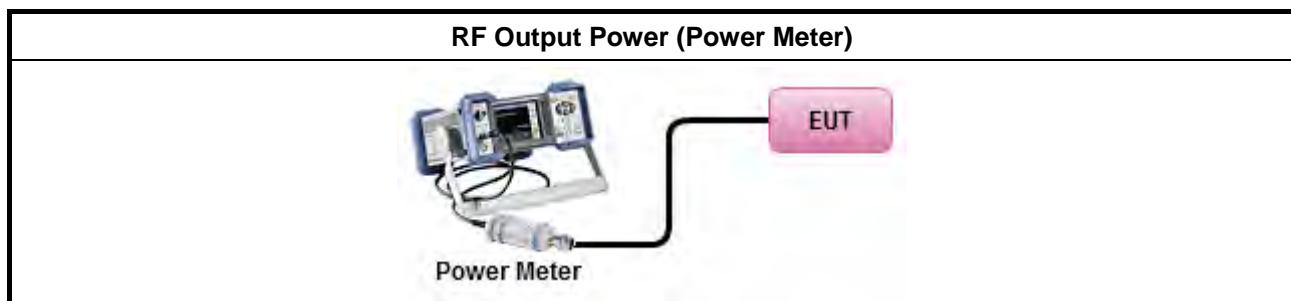
#### 3.3.2 Measuring Instruments

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

### 3.3.3 Test Procedures

Test Method
<input checked="" type="checkbox"/> Maximum Peak Conducted Output Power
<input type="checkbox"/> Refer as FCC KDB 558074 D01 v03r03, clause 9.1.1 (RBW $\geq$ EBW method).
<input checked="" type="checkbox"/> Refer as FCC KDB 558074 D01 v03r03, clause 9.1.2 (peak power meter for VBW $\geq$ DTS BW).
<input checked="" type="checkbox"/> Maximum Conducted Output Power
[duty cycle $\geq$ 98% or external video / power trigger]
<input type="checkbox"/> Refer as FCC KDB 558074 D01 v03r03, clause 9.2.2.2 Method AVGSA-1 (spectral trace averaging).
<input type="checkbox"/> Refer as FCC KDB 558074 D01 v03r03, clause 9.2.2.3 Method AVGSA-1 Alt. (slow sweep speed)
duty cycle $<$ 98% and average over on/off periods with duty factor
<input type="checkbox"/> Refer as FCC KDB 558074 D01 v03r03, clause 9.2.2.4 Method AVGSA-2 (spectral trace averaging).
<input type="checkbox"/> Refer as FCC KDB 558074 D01 v03r03, clause 9.2.2.5 Method AVGSA-2 Alt. (slow sweep speed)
RF power meter and average over on/off periods with duty factor or gated trigger
<input checked="" type="checkbox"/> Refer as FCC KDB 558074 D01 v03r03, clause 9.2.3 Method AVGPM (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 1.
<input type="checkbox"/> The EUT supports diversity transmitting and the results on transmit chain port 2 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 Directional Gain for Power Measurement

Directional Gain (DG) Result					
Transmit Chains No.		1		-	-
Maximum $G_{ANT}$ (dBi)		2.30		-	-
Modulation Mode	DG (dBi)	$N_{TX}$	$N_{SS}$ (Min.)	STBC	Array Gain (dB)
11b	2.30	1	1	-	0.00
11g	2.30	1	1	-	0.00
HT20	2.30	1	1	-	0.00

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

Note 2: For all transmitter outputs with unequal antenna gains, directional gain is to be computed as follows:  
Any transmit signals are correlated, Directional Gain =  $10 \log[(10^{G_{1/20}} + \dots + 10^{G_{N/20}})^2 / N_{TX}]$   
All transmit signals are completely uncorrelated, Directional Gain =  $10 \log[(10^{G_{1/10}} + \dots + 10^{G_{N/10}}) / N_{TX}]$

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

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



### 3.3.6 Test Result of Maximum Peak Conducted Output Power

Maximum Peak Conducted Output Power Result							
Condition			RF Output Power (dBm)				
Modulation Mode	N <sub>TX</sub>	Freq. (MHz)	Chain Port 1	Power Limit	DG (dBi)	EIRP Power	EIRP Limit
11b	1	2412	21.34	30.00	2.30	23.64	36.00
11b	1	2437	15.62	30.00	2.30	17.92	36.00
11b	1	2462	22.32	30.00	2.30	24.62	36.00
11g	1	2412	19.68	30.00	2.30	21.98	36.00
11g	1	2437	22.65	30.00	2.30	24.95	36.00
11g	1	2462	18.92	30.00	2.30	21.22	36.00
HT20	1	2412	19.06	30.00	2.30	21.36	36.00
HT20	1	2437	22.77	30.00	2.30	25.07	36.00
HT20	1	2462	17.97	30.00	2.30	20.27	36.00
Result			Complied				

### 3.3.7 Test Result of Maximum Conducted Output Power

Maximum Conducted Output Power Result							
Condition			RF Output Power (dBm)				
Modulation Mode	N <sub>TX</sub>	Freq. (MHz)	Chain Port 1	Power Limit	DG (dBi)	EIRP Power	EIRP Limit
11b	1	2412	18.54	30.00	2.30	20.84	36.00
11b	1	2437	12.56	30.00	2.30	14.86	36.00
11b	1	2462	19.40	30.00	2.30	21.70	36.00
11g	1	2412	14.77	30.00	2.30	17.07	36.00
11g	1	2437	17.71	30.00	2.30	20.01	36.00
11g	1	2462	13.94	30.00	2.30	16.24	36.00
HT20	1	2412	14.05	30.00	2.30	16.35	36.00
HT20	1	2437	17.80	30.00	2.30	20.10	36.00
HT20	1	2462	13.04	30.00	2.30	15.34	36.00
Result			Complied				



## 3.4 Power Spectral Density

### 3.4.1 Power Spectral Density Limit

Power Spectral Density Limit
<input checked="" type="checkbox"/> Power Spectral Density (PSD) $\leq 8 \text{ dBm/3kHz}$

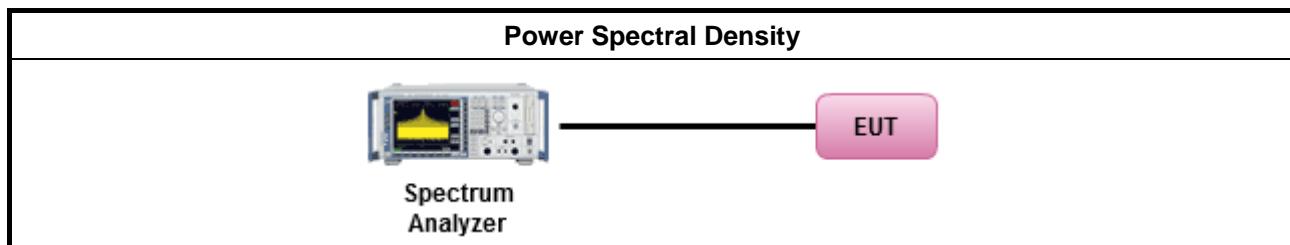
### 3.4.2 Measuring Instruments

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

### 3.4.3 Test Procedures

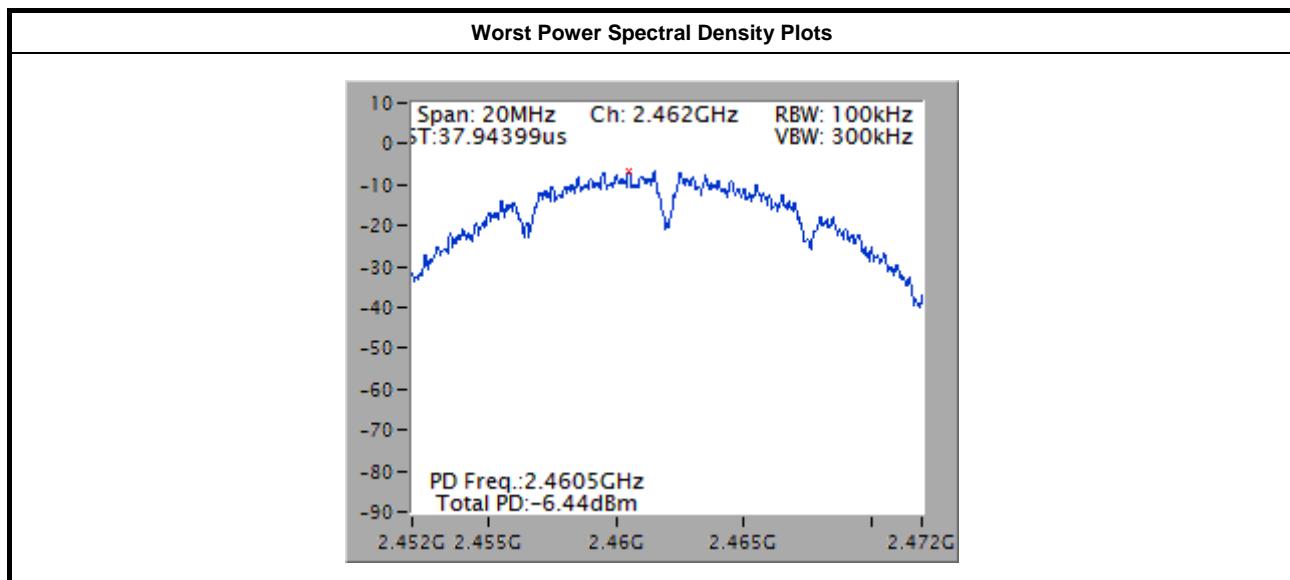
Test Method
<input checked="" type="checkbox"/> Peak power spectral density procedures that the same method as used to determine the conducted output power. If maximum peak conducted output power was measured to demonstrate compliance to the output power limit, then the peak PSD procedure below (Method PKPSD) shall be used. If maximum conducted output power was measured to demonstrate compliance to the output power limit, then one of the average PSD procedures shall be used, as applicable based on the following criteria (the peak PSD procedure is also an acceptable option).
<input checked="" type="checkbox"/> Refer as FCC KDB 558074 D01 v03r03, clause 10.2 Method PKPSD (RBW=3-100kHz;detector=peak). [duty cycle $\geq 98\%$ or external video / power trigger]
<input checked="" type="checkbox"/> Refer as FCC KDB 558074 D01 v03r03, clause 10.3 Method AVGPSD-1 (spectral trace averaging).
<input type="checkbox"/> Refer as FCC KDB 558074 D01 v03r03, clause 10.4 Method AVGPSD-1 Alt. (slow sweep speed) duty cycle $< 98\%$ and average over on/off periods with duty factor
<input checked="" type="checkbox"/> Refer as FCC KDB 558074 D01 v03r03, clause 10.5 Method AVGPSD-2 (spectral trace averaging).
<input type="checkbox"/> Refer as FCC KDB 558074 D01 v03r03, clause 10.6 Method AVGPSD-2 Alt. (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 1.
<input type="checkbox"/> The EUT supports diversity transmitting and the results on transmit chain port 2 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 spectral density (PSD). Sample all transmit ports simultaneously using a spectrum analyzer for each transmit port. Where the trace bin-by-bin of each transmit port summing can be performed. (i.e., in the first spectral bin of output 1 is summed with that in the first spectral bin of output 2 and that from the first spectral bin of output 3, and so on up to the $N_{TX}$ output to obtain the value for the first frequency bin of the summed spectrum.). Add up the amplitude (power) values for the different transmit chains and use this as the new data trace.
<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.

### 3.4.4 Test Setup



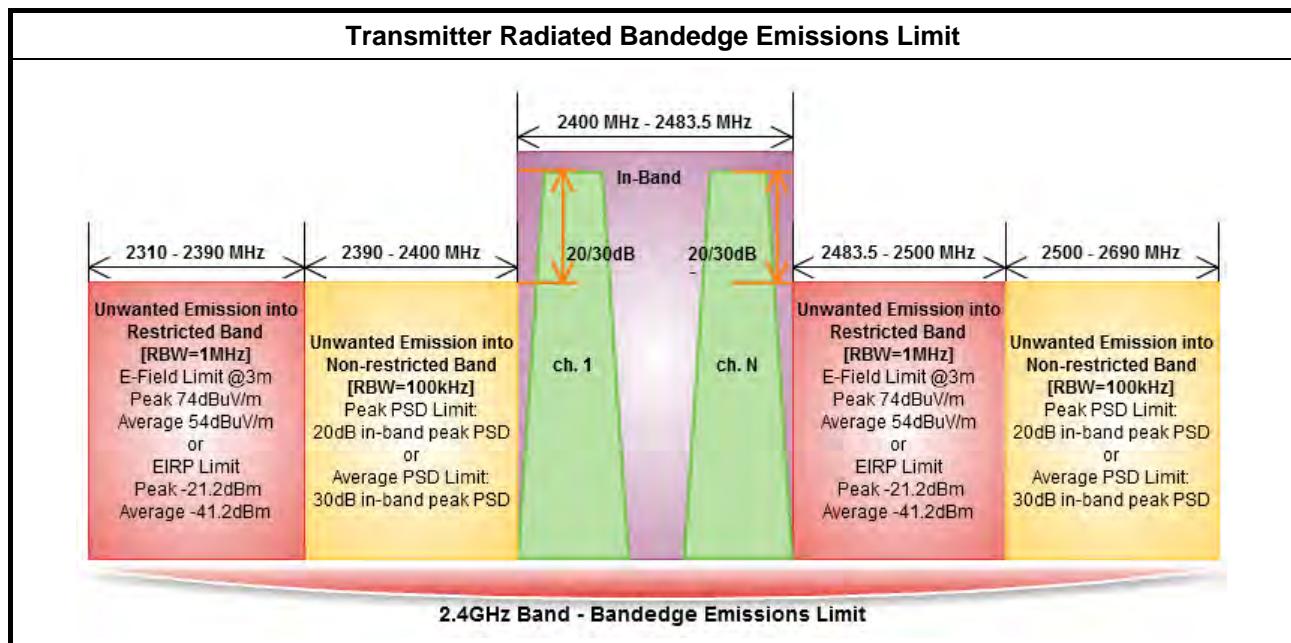
### 3.4.5 Test Result of Power Spectral Density

Condition			Power Spectral Density	
Modulation Mode	N <sub>TX</sub>	Freq. (MHz)	Sum Chain (dBm/100kHz)	PSD Limit (dBm/3kHz)
11b	1	2412	-7.83	8.00
11b	1	2437	-12.79	8.00
11b	1	2462	-6.44	8.00
11g	1	2412	-14.20	8.00
11g	1	2437	-9.89	8.00
11g	1	2462	-14.22	8.00
HT20	1	2412	-15.71	8.00
HT20	1	2437	-10.91	8.00
HT20	1	2462	-14.37	8.00
Result		Complied		



## 3.5 Transmitter Radiated Bandedge Emissions

### 3.5.1 Transmitter Radiated Bandedge Emissions Limit



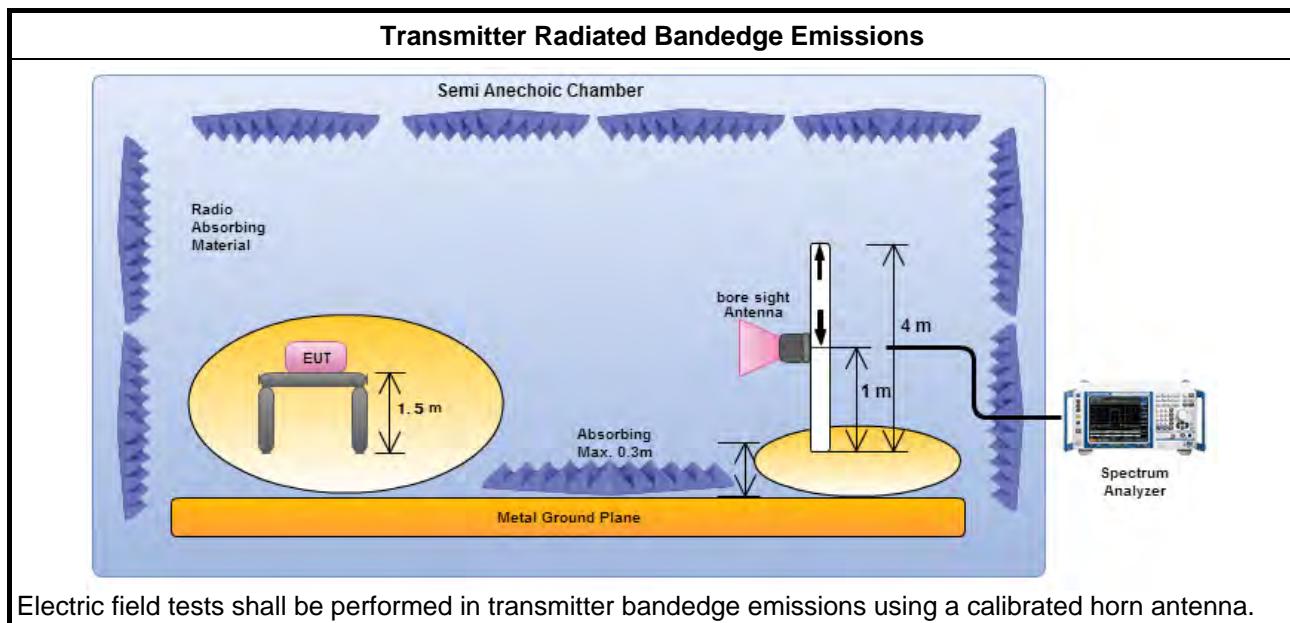
### 3.5.2 Measuring Instruments

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 checked="" type="checkbox"/> For the transmitter unwanted emissions shall be measured using following options below:	
<input checked="" type="checkbox"/> Refer as FCC KDB 558074 D01 v03r03, clause 11 for unwanted emissions into non-restricted bands.	
<input checked="" type="checkbox"/> Refer as FCC KDB 558074 D01 v03r03, clause 12 for unwanted emissions into restricted bands.	
	<input checked="" type="checkbox"/> Refer as FCC KDB 558074 D01 v03r03, clause 12.2.5.1 Option 1 (trace averaging for duty cycle $\geq 98\%$ )
	<input type="checkbox"/> Refer as FCC KDB 558074 D01 v03r03, clause 12.2.5.2 Option 2 (trace averaging + duty factor).
	<input type="checkbox"/> Refer as FCC KDB 558074 D01 v03r03, clause 12.2.5.3 Option 3 (Reduced $VBW \geq 1/T$ ).
	<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 558074 D01 v03r03, clause 11.3 and 12.2.4 measurement procedure peak limit.
<input checked="" type="checkbox"/> For the transmitter bandedge emissions shall be measured using following options below:	
<input type="checkbox"/> Refer as FCC KDB 558074 D01 v03r03, clause 13.3 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 FCC KDB 558074 D01 v03r03, clause 12.2.7 and ANSI C63.10, clause 6.6. Test distance is 3m.	

### 3.5.4 Test Setup





## 3.5.5 Test Result of Transmitter Radiated Bandedge Emissions

2400-2483.5MHz Transmitter Radiated Bandedge Emissions (Non-restricted Band)								
Modulation	N <sub>TX</sub>	Test Freq. (MHz)	In-band PSD [i] (dBuV/100kHz)	Freq. (MHz)	Out-band PSD [o] (dBuV/100kHz)	[i] – [o] (dB)	Limit (dB)	Pol.
11b	1	2412	105.42	2399.15	68.06	37.36	20	H
11b	1	2462	106.36	2503.00	61.54	44.82	20	H
11g	1	2412	98.12	2398.25	67.91	30.21	20	H
11g	1	2462	100.32	2542.20	62.17	38.15	20	H
HT20	1	2412	98.02	2398.03	66.22	31.80	20	H
HT20	1	2462	99.01	2545.80	61.53	37.48	20	H

Note 1: Measurement worst emissions of receive antenna polarization

2400-2483.5MHz Transmitter Radiated Bandedge Emissions (Restricted Band)										
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.
11b	1	2412	3	2387.50	60.52	74	2387.72	51.75	54	H
11b	1	2462	3	2486.60	61.05	74	2486.20	52.25	54	H
11g	1	2412	3	2389.96	70.21	74	2389.96	52.16	54	H
11g	1	2462	3	2483.60	71.30	74	2483.60	52.06	54	H
HT20	1	2412	3	2389.74	72.63	74	2389.96	51.65	54	H
HT20	1	2462	3	2484.00	71.27	74	2483.50	51.18	54	H

Note 1: Measurement worst emissions of receive antenna polarization.



## 3.6 Radiated Unwanted Emissions

### 3.6.1 Radiated Unwanted Emissions Limit

Restricted Band Emissions 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 Limit	
RF output power procedure	Limit (dB)
Peak output power procedure	20
Average output power procedure	30

Note 1: If the peak output power procedure is used to measure the fundamental emission power to demonstrate compliance to requirements, then the peak conducted output power measured within any 100 kHz outside the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum measured in-band peak PSD level.

Note 2: If the average output power procedure is used to measure the fundamental emission power to demonstrate compliance to requirements, then the power in any 100 kHz outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum measured in-band average PSD level.

### 3.6.2 Measuring Instruments

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

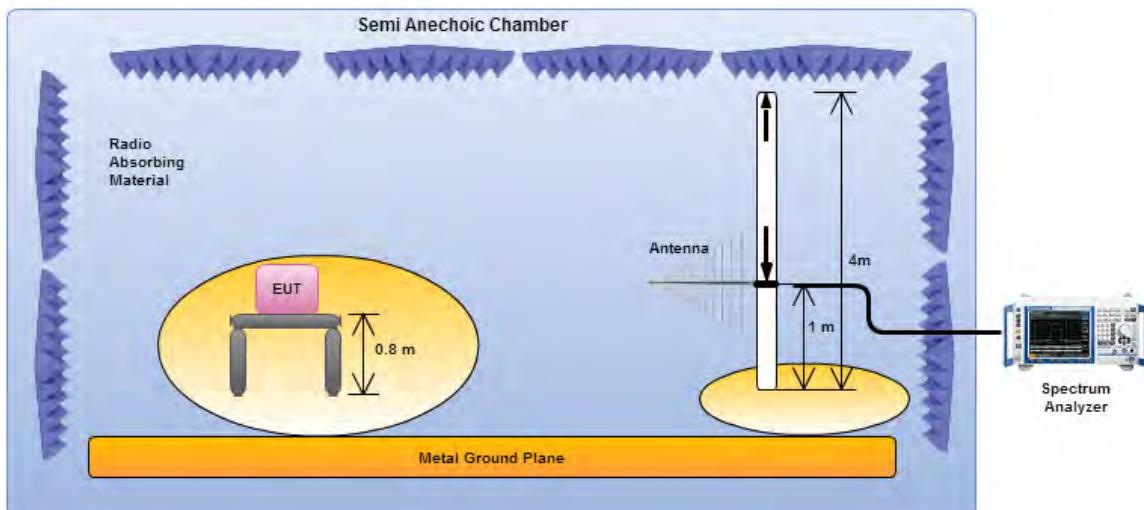


### 3.6.3 Test Procedures

Test Method
<input checked="" type="checkbox"/> Measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).
<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 558074 D01 v03r03, clause 11 for unwanted emissions into non-restricted bands.
<input checked="" type="checkbox"/> Refer as FCC KDB 558074 D01 v03r03, clause 12 for unwanted emissions into restricted bands.
<input checked="" type="checkbox"/> Refer as FCC KDB 558074 D01 v03r03, clause 12.2.5.1 Option 1 (trace averaging for duty cycle $\geq 98\%$ )
<input type="checkbox"/> Refer as FCC KDB 558074 D01 v03r03, clause 12.2.5.2 Option 2 (trace averaging + duty factor).
<input type="checkbox"/> Refer as FCC KDB 558074 D01 v03r03, clause 12.2.5.3 Option 3 (Reduced VBW $\geq 1/T$ ).
<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 558074 D01 v03r03, clause 11.3 and 12.2.4 measurement procedure peak limit.
<input checked="" type="checkbox"/> Refer as FCC KDB 558074 D01 v03r03, clause 12.2.3 measurement procedure Quasi-Peak limit.
<input checked="" type="checkbox"/> For radiated measurement, refer as FCC KDB 558074 D01 v03r03, clause 12.2.7.
<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 1 GHz and test distance is 3m.
<input checked="" type="checkbox"/> The any unwanted emissions level shall not exceed the fundamental emission level.
<input checked="" type="checkbox"/> All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

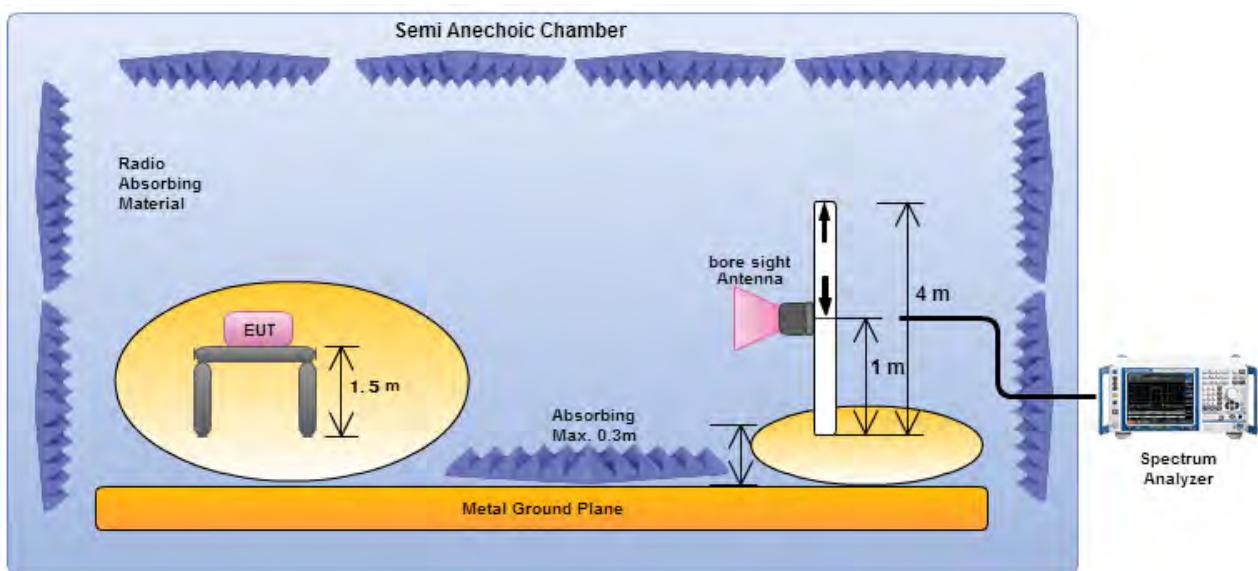
### 3.6.4 Test Setup

#### Transmitter Radiated Unwanted Emissions (below 1GHz)



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

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



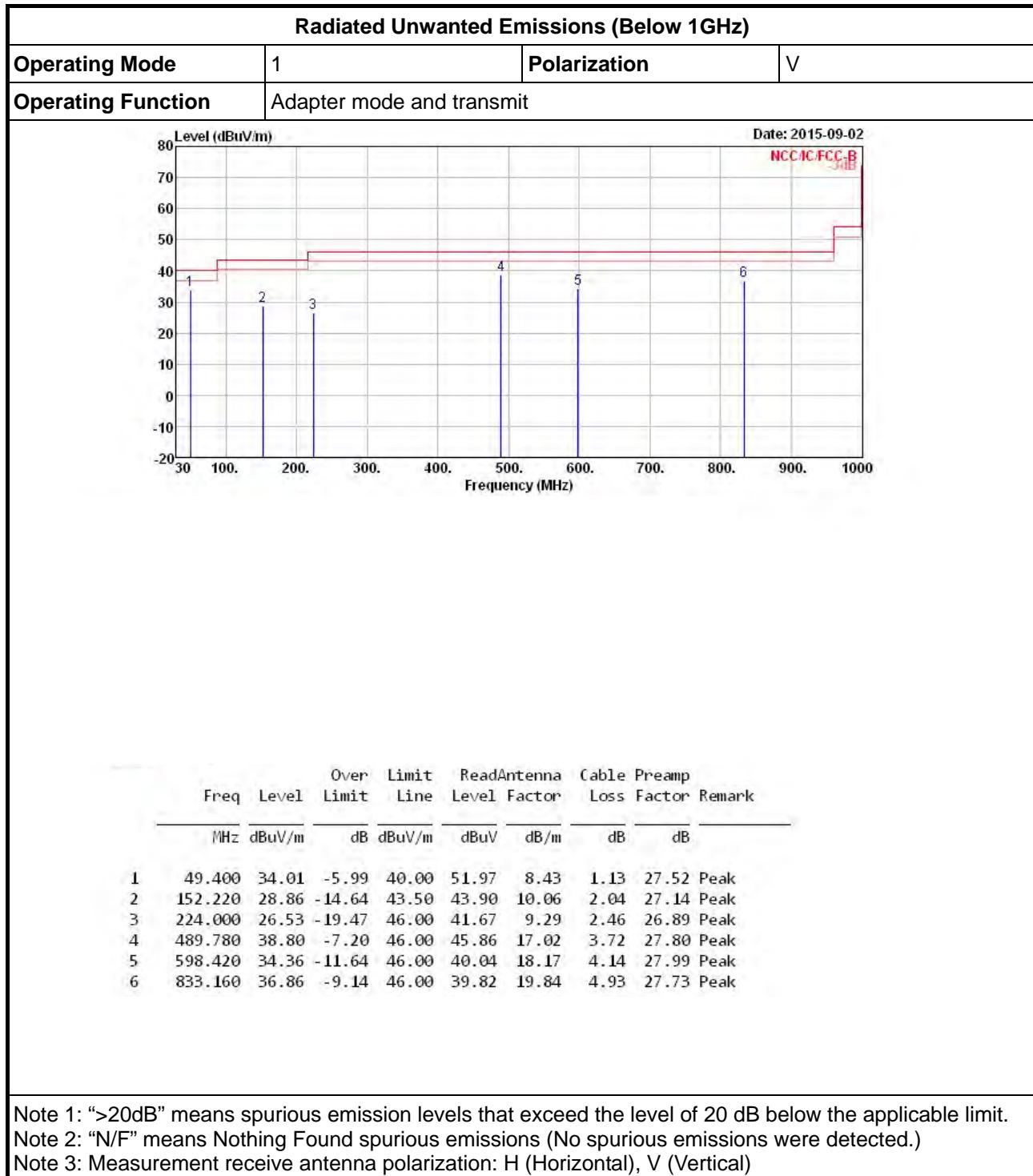
- Electric field tests shall be performed in the frequency range of 1 GHz to 10th harmonic of highest fundamental frequency or 40 GHz using a calibrated horn antenna.

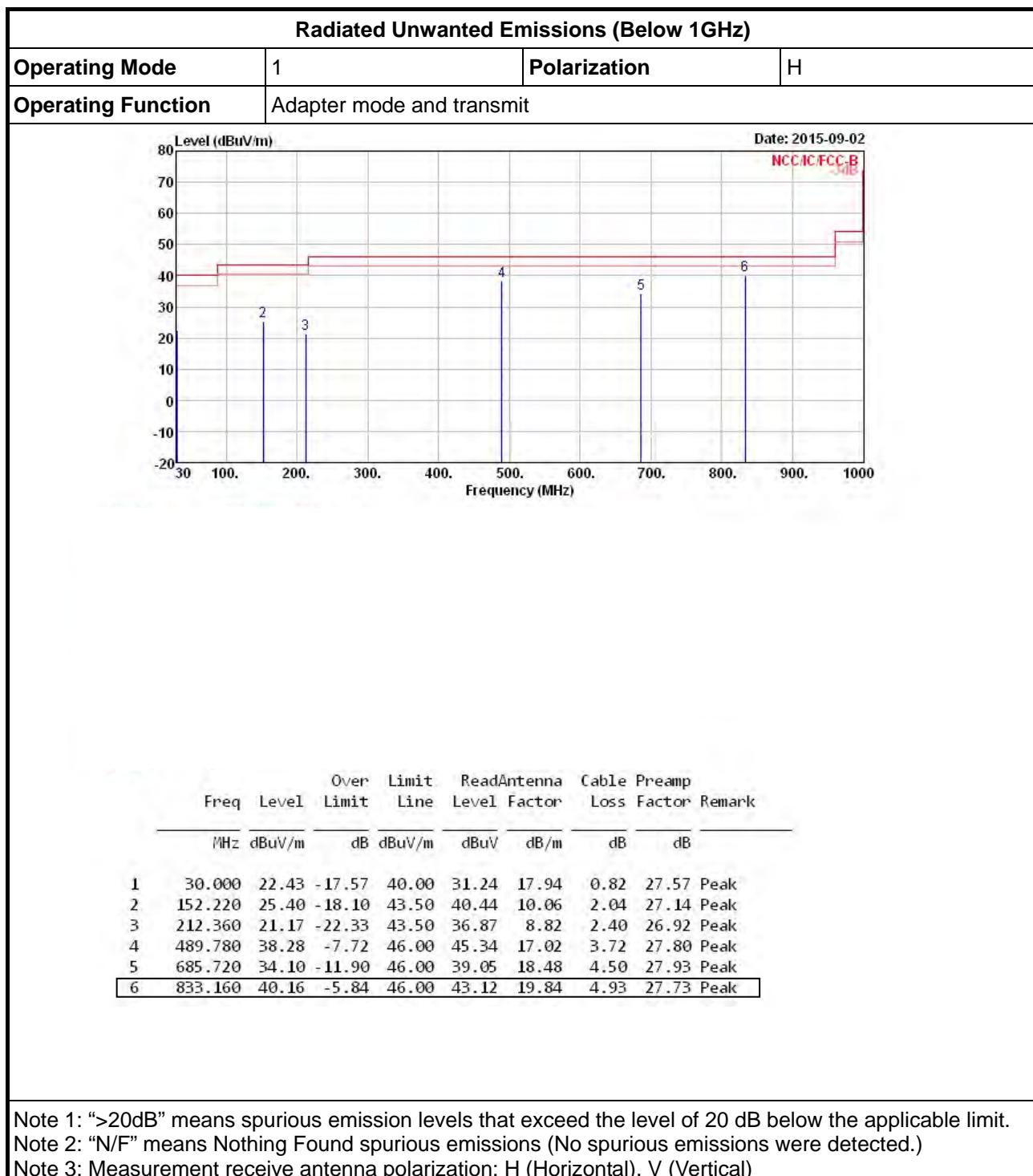
### 3.6.5 Radiated Unwanted Emissions (Below 30MHz)

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



## 3.6.6 Radiated Unwanted Emissions (Below 1GHz)

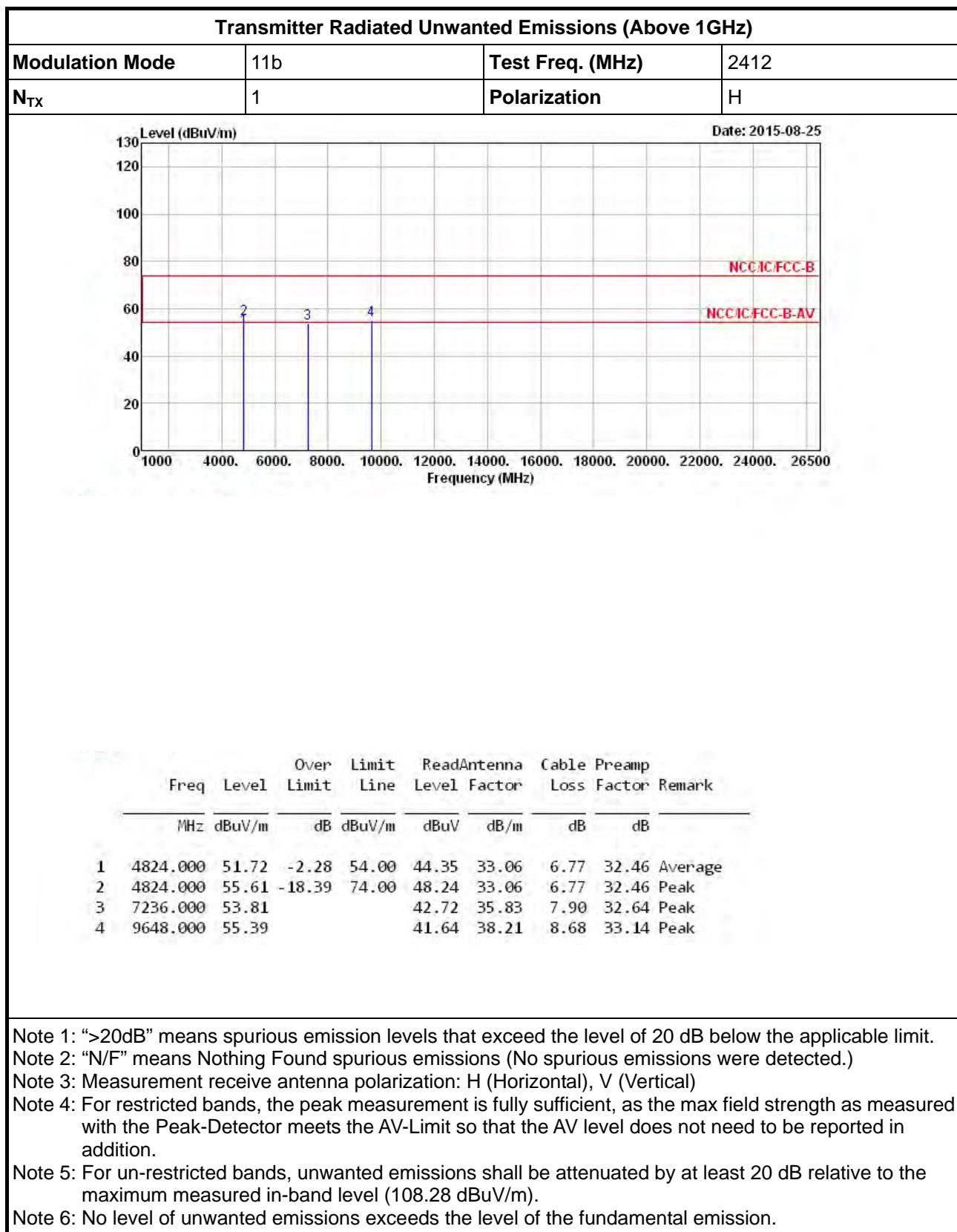


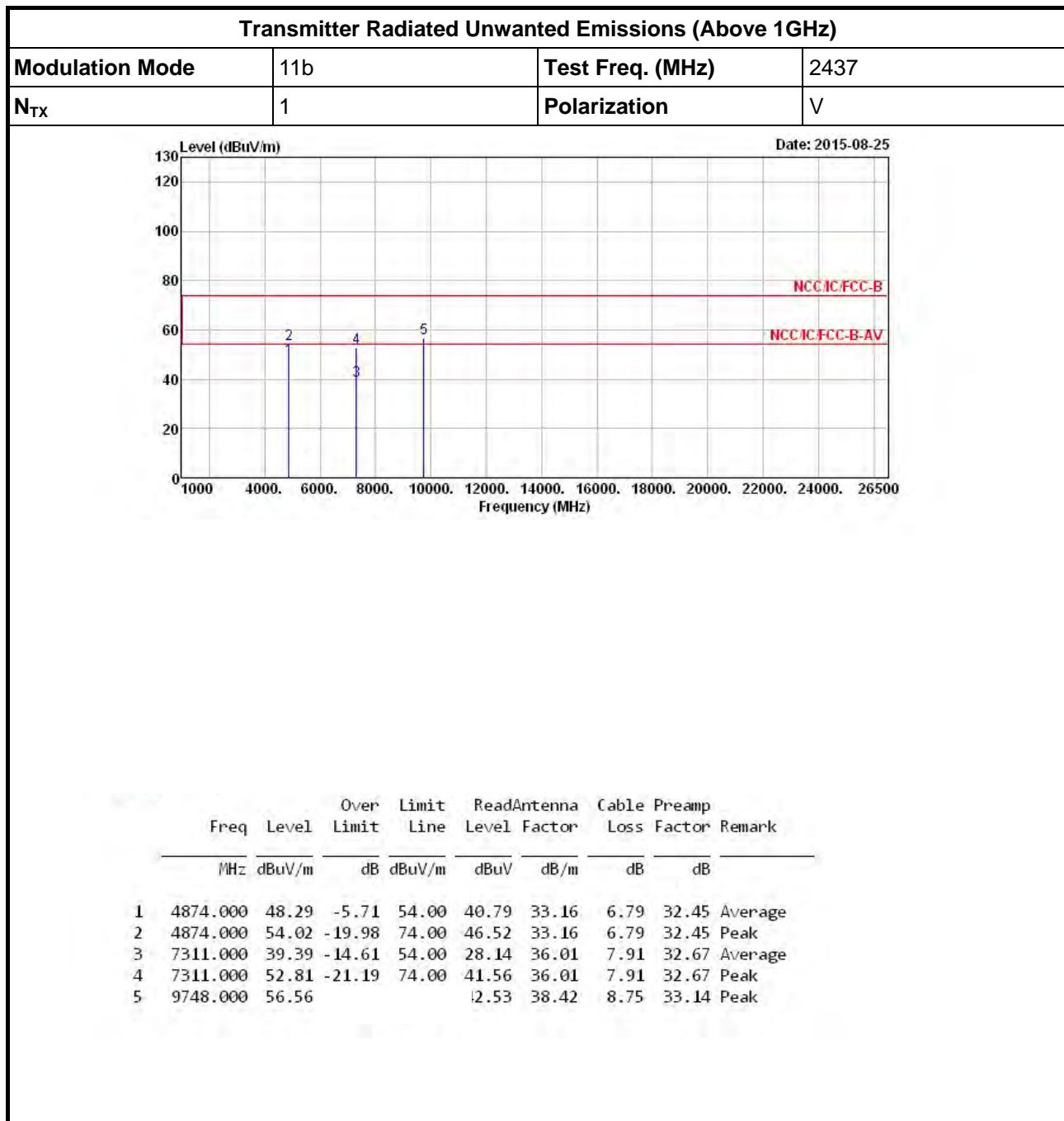




## 3.6.7 Transmitter Radiated Unwanted Emissions (Above 1GHz)

Transmitter Radiated Unwanted Emissions (Above 1GHz)																																																																					
Modulation Mode	11b		Test Freq. (MHz)		2412																																																																
N <sub>TX</sub>	1		Polarization		V																																																																
Level (dB <sub>uV/m</sub> )									Date: 2015-08-25																																																												
1000	4000.	6000.	8000.	10000.	12000.	14000.	16000.	18000.	20000.	22000.	24000.	26500																																																									
2	3	4																																																																			
Frequency (MHz)																																																																					
<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;">Line</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;">dB<sub>uV/m</sub></th> <th style="text-align: center;">dB</th> <th style="text-align: center;">dB<sub>uV/m</sub></th> <th style="text-align: center;">dB<sub>uV</sub></th> <th style="text-align: center;">dB<sub>uV</sub></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>4824.000</td> <td>49.68</td> <td>-4.32</td> <td>54.00</td> <td>42.31</td> <td>33.06</td> <td>6.77</td> <td>32.46</td> <td>Average</td> </tr> <tr> <td>2</td> <td>4824.000</td> <td>54.26</td> <td>-19.74</td> <td>74.00</td> <td>46.89</td> <td>33.06</td> <td>6.77</td> <td>32.46</td> <td>Peak</td> </tr> <tr> <td>3</td> <td>7236.000</td> <td>53.39</td> <td></td> <td></td> <td>42.30</td> <td>35.83</td> <td>7.90</td> <td>32.64</td> <td>Peak</td> </tr> <tr> <td>4</td> <td>9648.000</td> <td>55.45</td> <td></td> <td></td> <td>41.70</td> <td>38.21</td> <td>8.68</td> <td>33.14</td> <td>Peak</td> </tr> </tbody> </table>										Freq	Level	Over Limit	Limit	Line	Read	Antenna	Cable	Preamp		MHz	dB <sub>uV/m</sub>	dB	dB <sub>uV/m</sub>	dB <sub>uV</sub>	dB <sub>uV</sub>	dB/m	dB	dB	Remark	1	4824.000	49.68	-4.32	54.00	42.31	33.06	6.77	32.46	Average	2	4824.000	54.26	-19.74	74.00	46.89	33.06	6.77	32.46	Peak	3	7236.000	53.39			42.30	35.83	7.90	32.64	Peak	4	9648.000	55.45			41.70	38.21	8.68	33.14	Peak
Freq	Level	Over Limit	Limit	Line	Read	Antenna	Cable	Preamp																																																													
MHz	dB <sub>uV/m</sub>	dB	dB <sub>uV/m</sub>	dB <sub>uV</sub>	dB <sub>uV</sub>	dB/m	dB	dB	Remark																																																												
1	4824.000	49.68	-4.32	54.00	42.31	33.06	6.77	32.46	Average																																																												
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<p>Note 1: "&gt;20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.</p> <p>Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)</p> <p>Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)</p> <p>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.</p> <p>Note 5: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level (108.28 dB<sub>uV/m</sub>).</p> <p>Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.</p>																																																																					





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

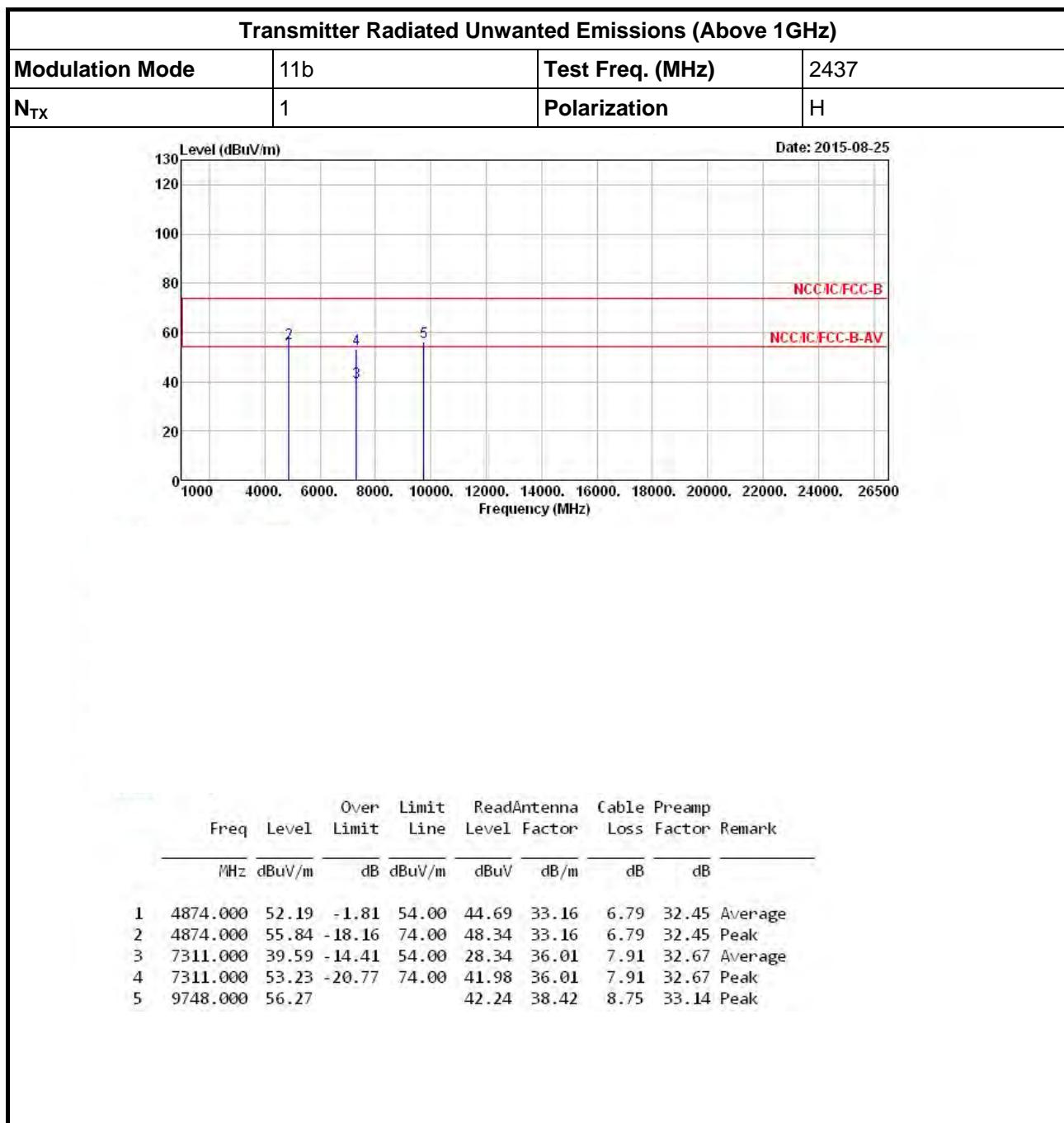
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

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, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level (101.74 dBuV/m).

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



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

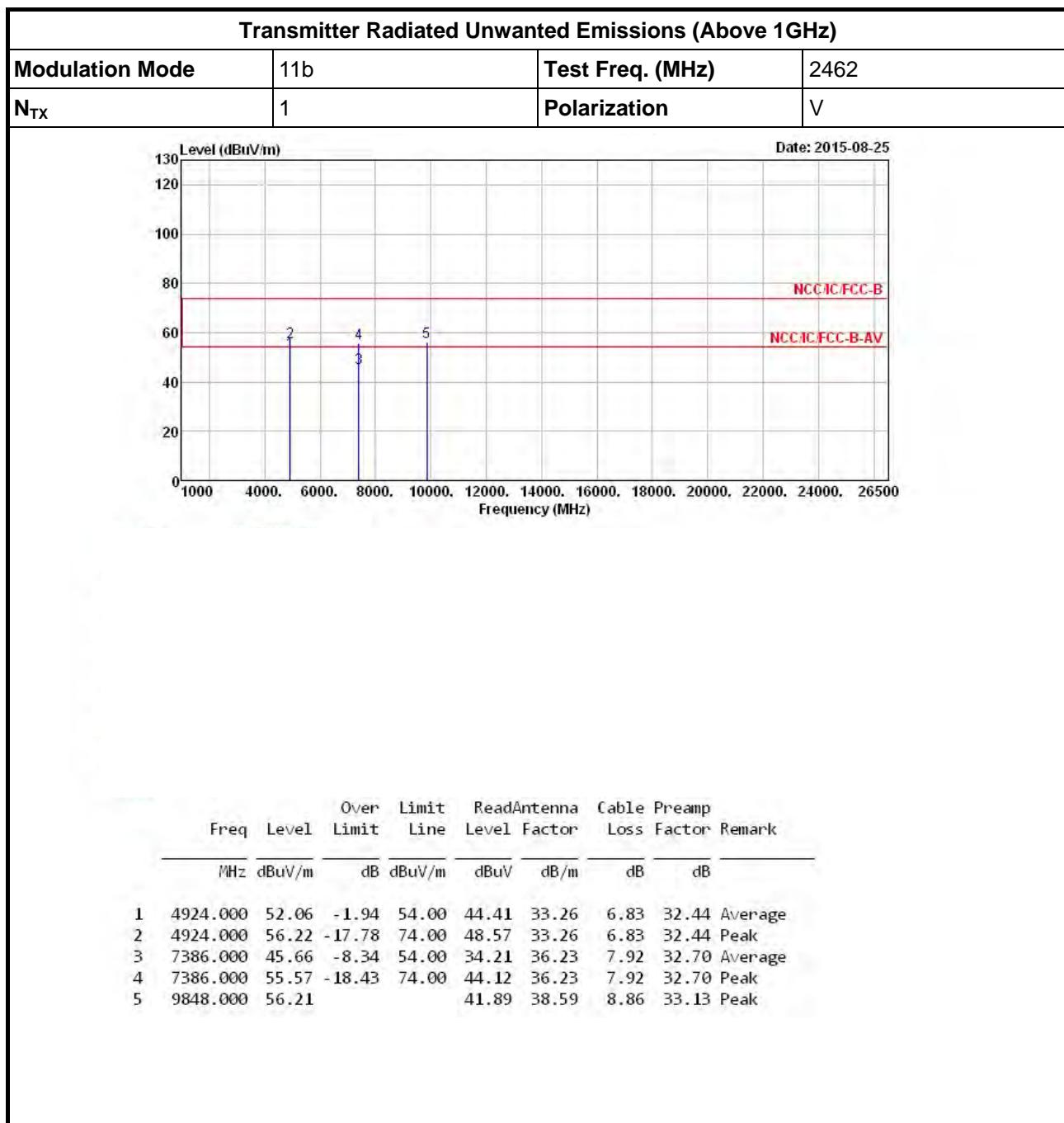
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

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

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

Note 5: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level (101.74 dBuV/m).

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



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

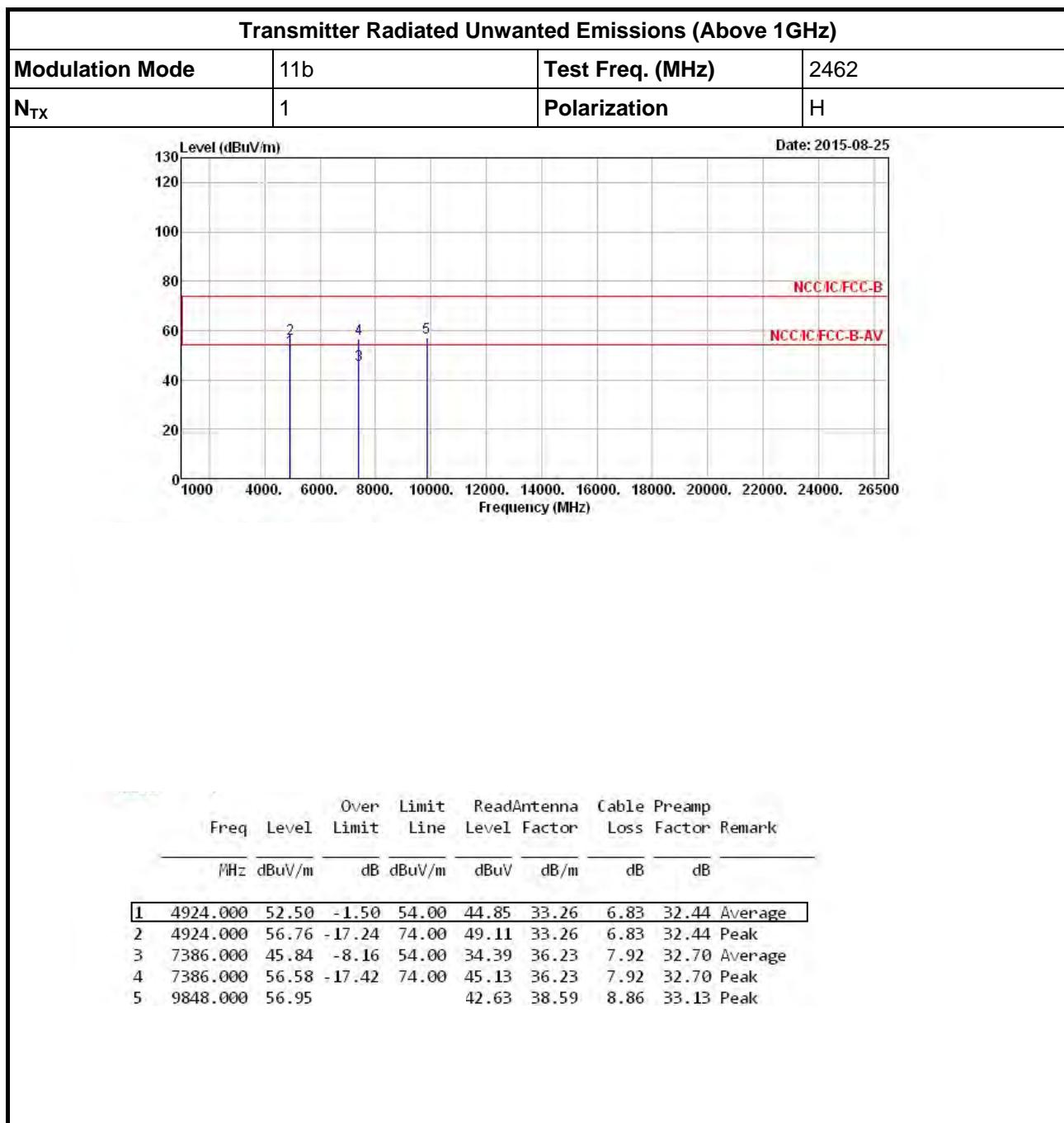
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

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

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

Note 5: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level (108.51 dBuV/m).

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



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

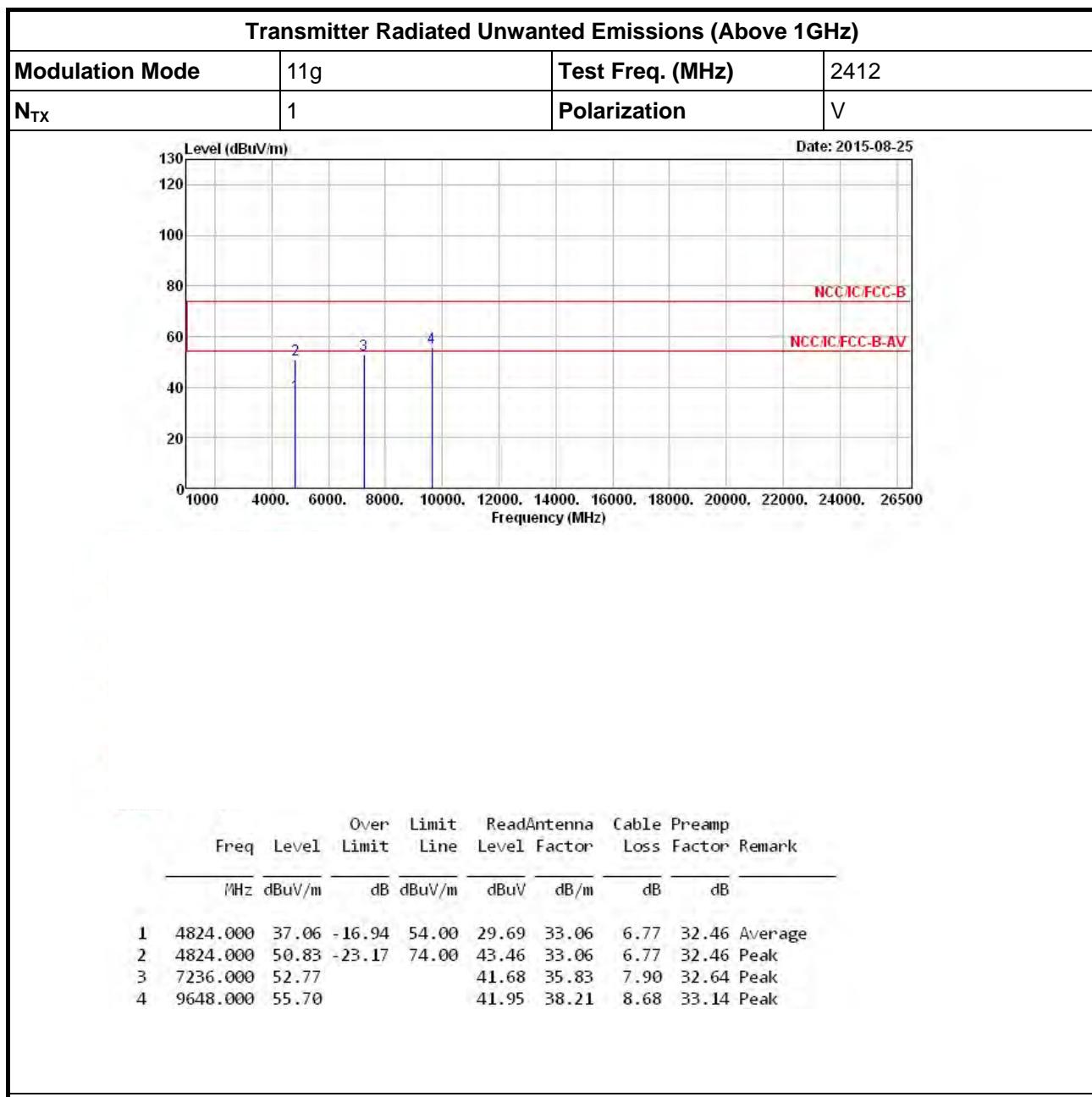
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

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

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

Note 5: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level (108.51 dBuV/m).

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



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

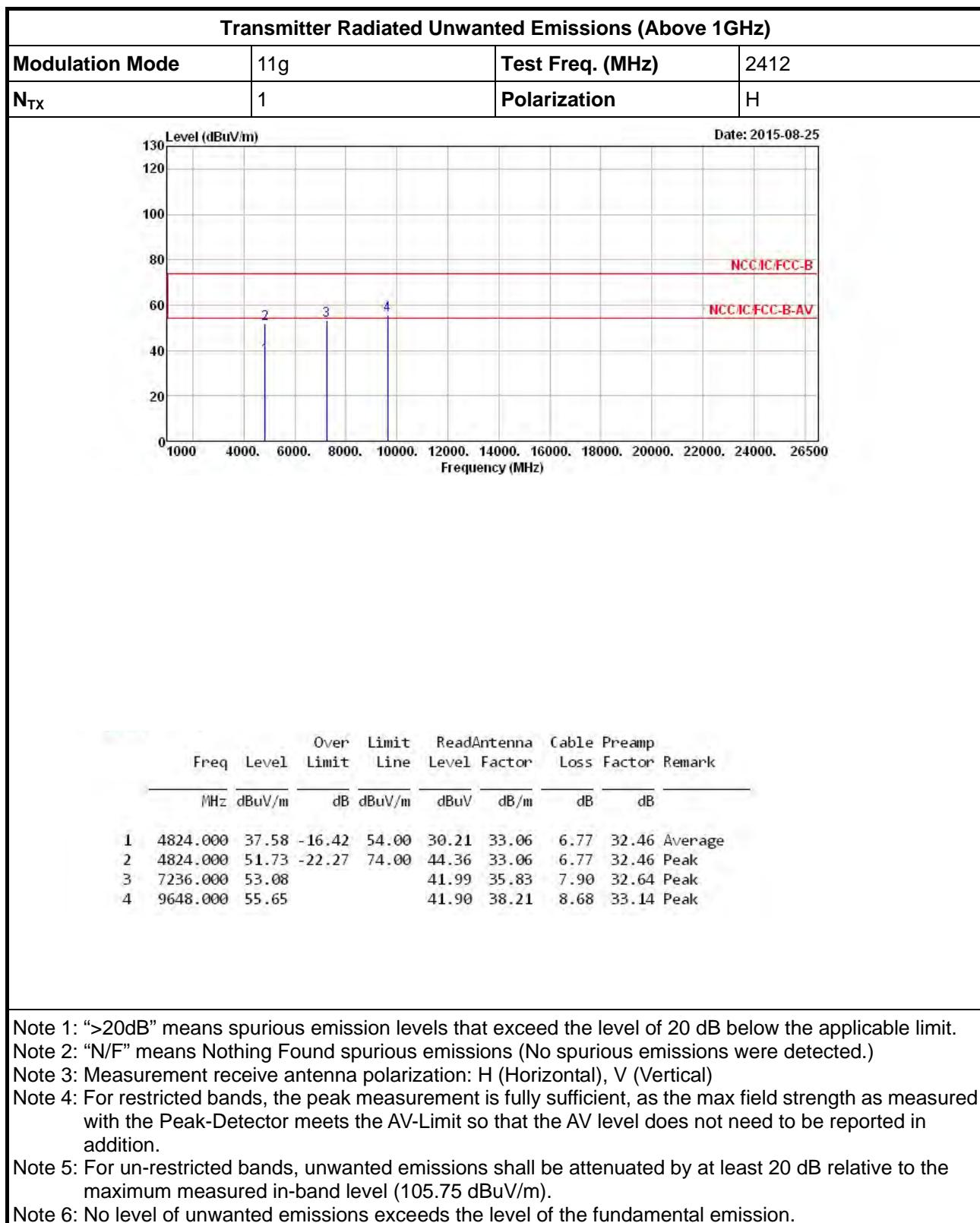
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

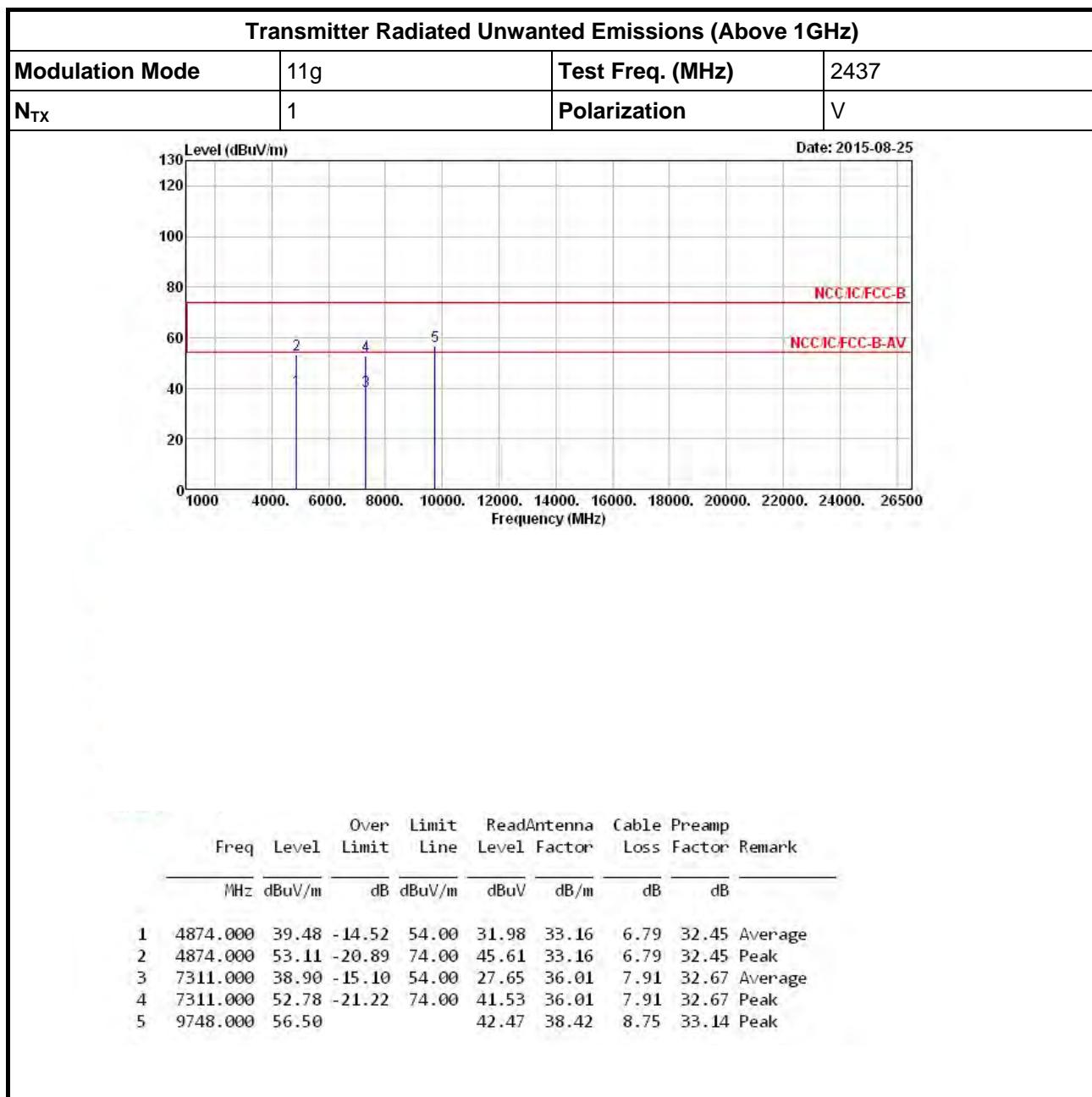
Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

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

Note 5: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level (105.75 dBuV/m).

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





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

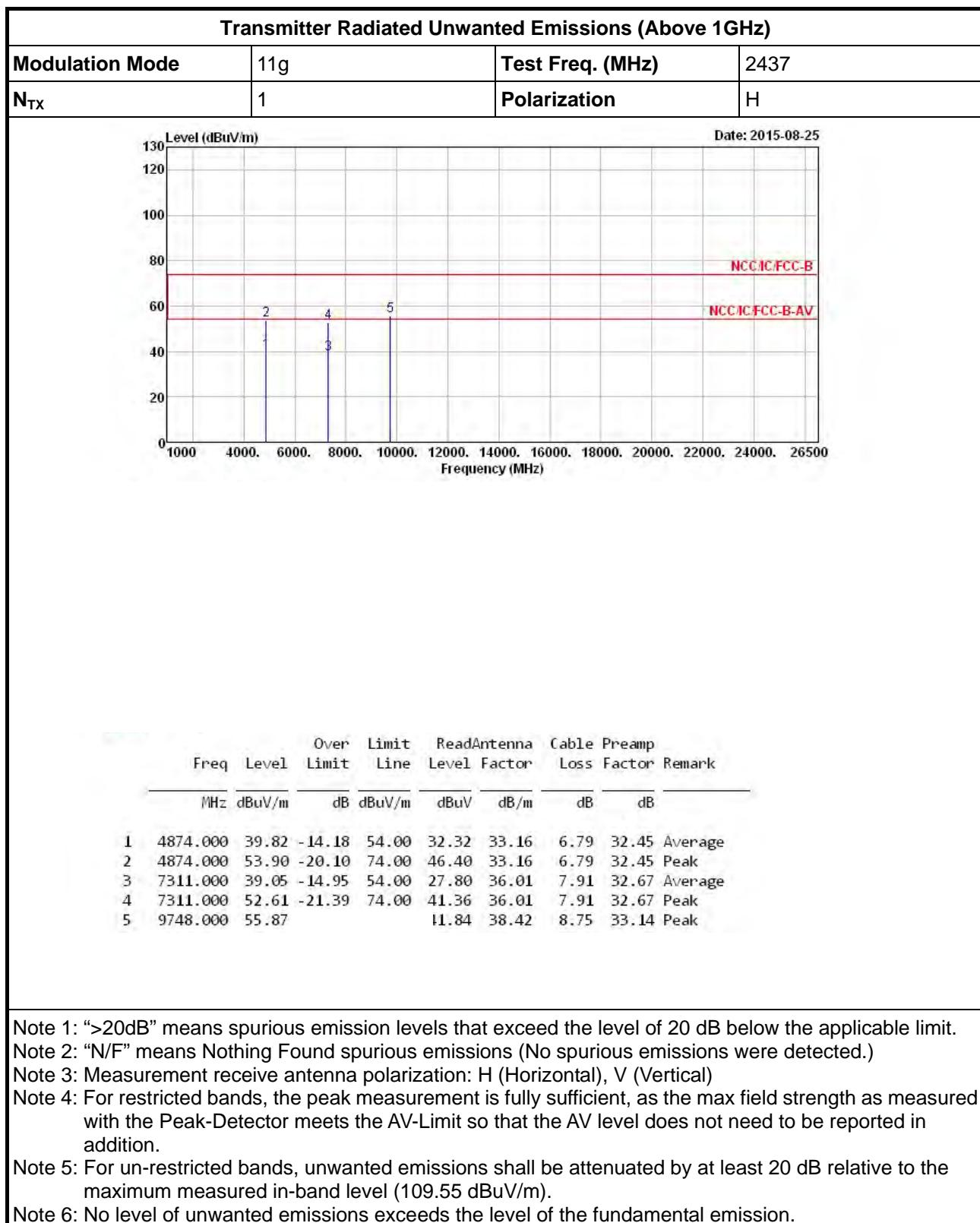
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

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

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

Note 5: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level (109.55 dBuV/m).

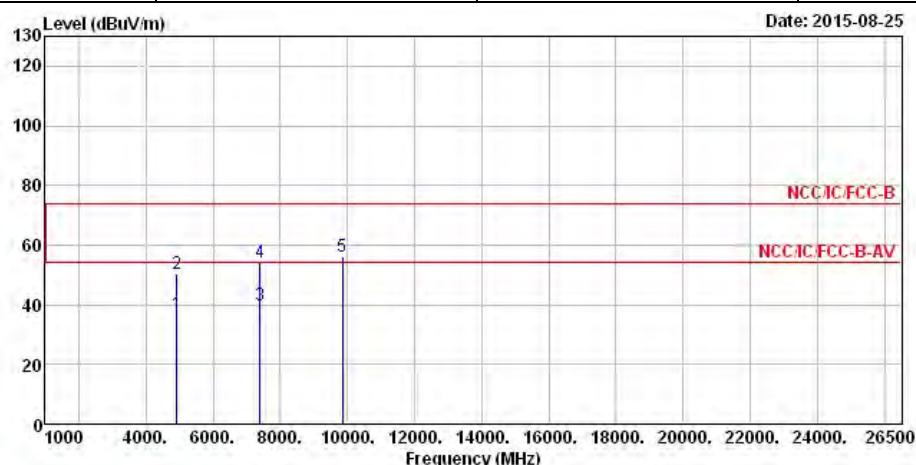
Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.





## Transmitter Radiated Unwanted Emissions (Above 1GHz)

Modulation Mode	11g	Test Freq. (MHz)	2462
N <sub>TX</sub>	1	Polarization	V



Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Remark
		Limit	Line	Level	Factor	Loss	Factor	
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4924.000	36.97	-17.03	54.00	29.32	33.26	6.83	32.44 Average
2	4924.000	50.22	-23.78	74.00	42.57	33.26	6.83	32.44 Peak
3	7386.000	39.61	-14.39	54.00	28.16	36.23	7.92	32.70 Average
4	7386.000	54.06	-19.94	74.00	42.61	36.23	7.92	32.70 Peak
5	9848.000	56.07			41.75	38.59	8.86	33.13 Peak

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

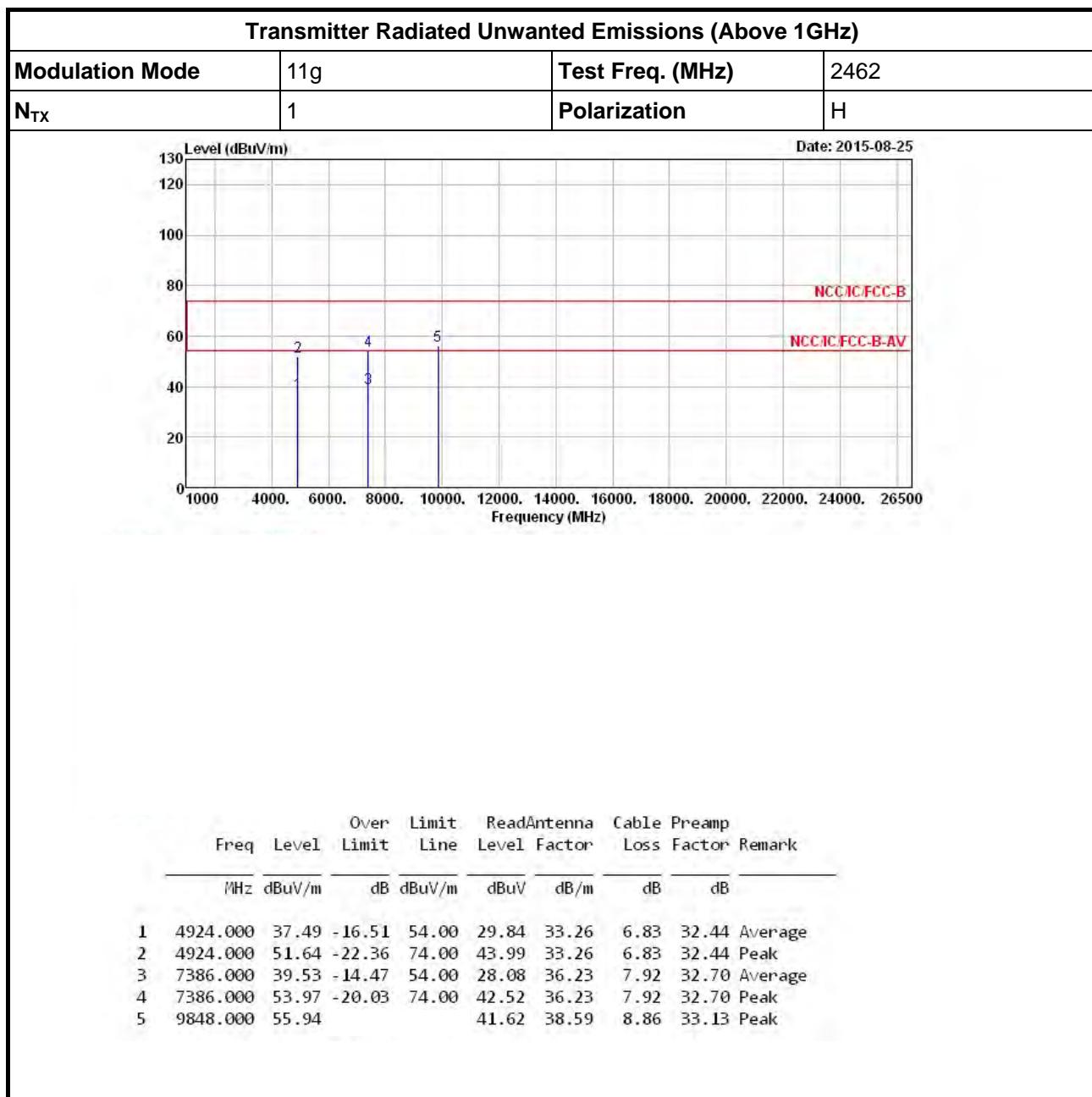
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

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, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level (107.03 dBuV/m).

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



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

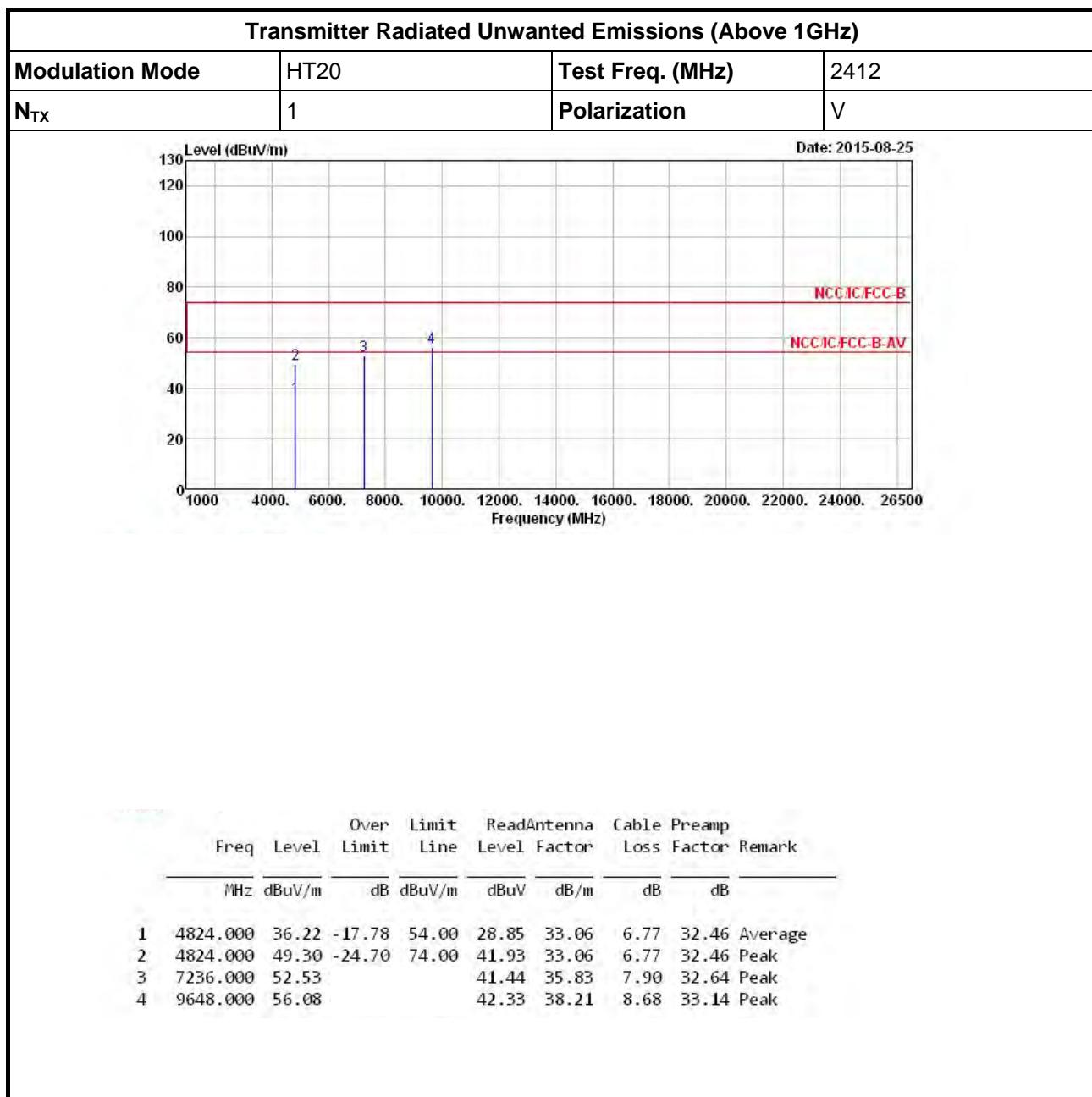
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

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

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

Note 5: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level (107.03 dBuV/m).

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



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

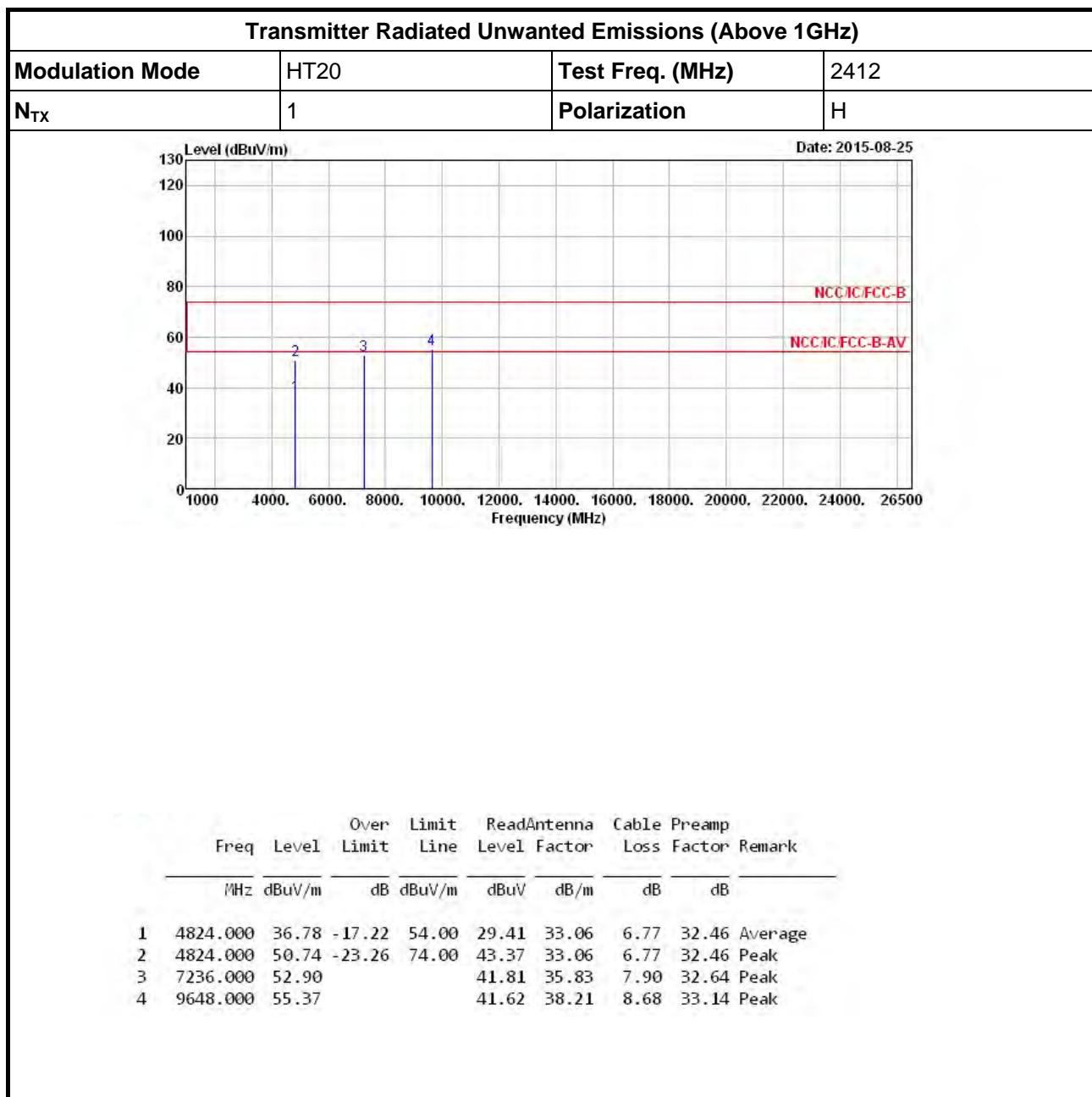
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

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

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

Note 5: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level (105.55 dBuV/m).

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



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

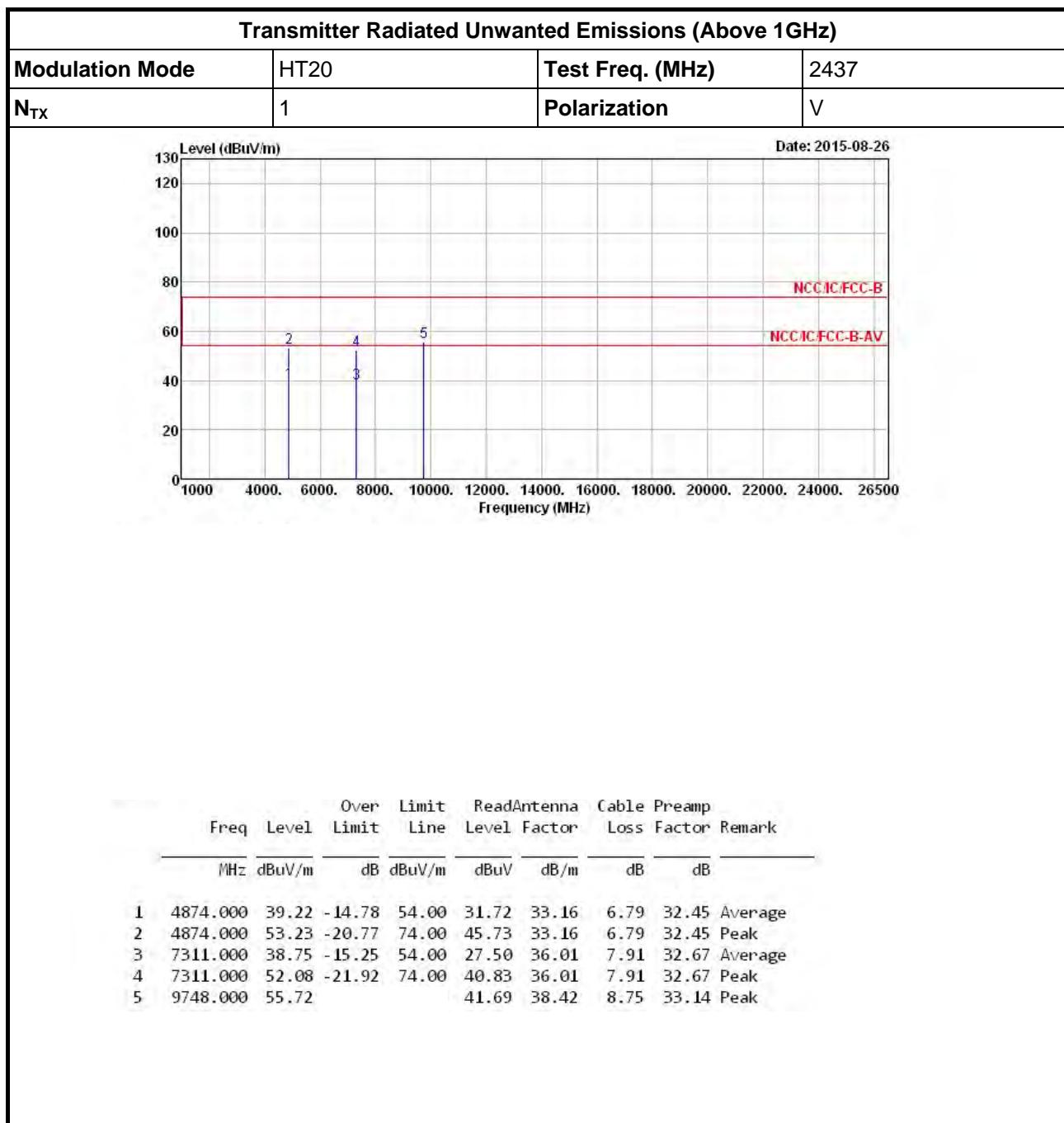
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

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

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

Note 5: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level (105.55 dBuV/m).

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



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

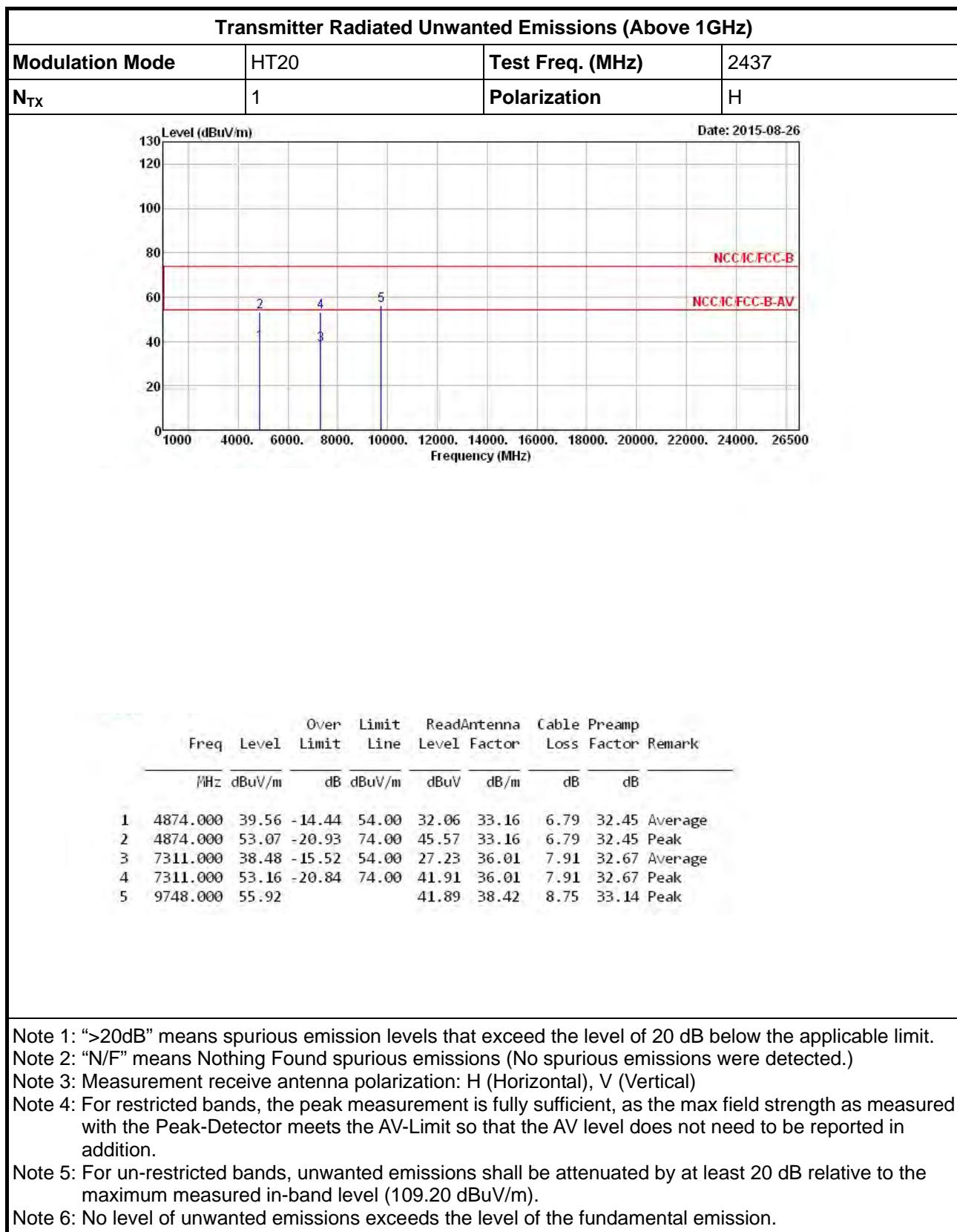
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

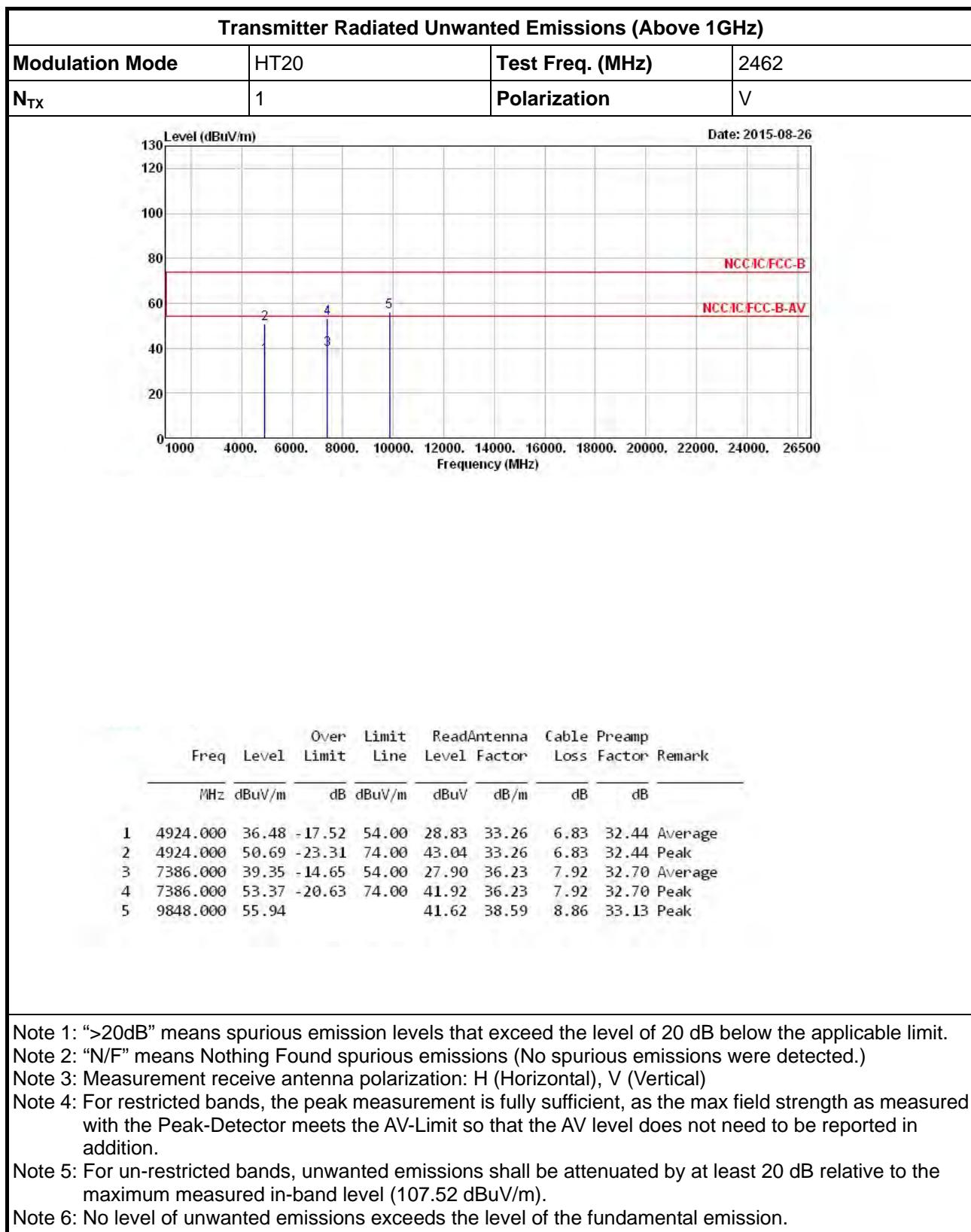
Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

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

Note 5: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level (109.20 dBuV/m).

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

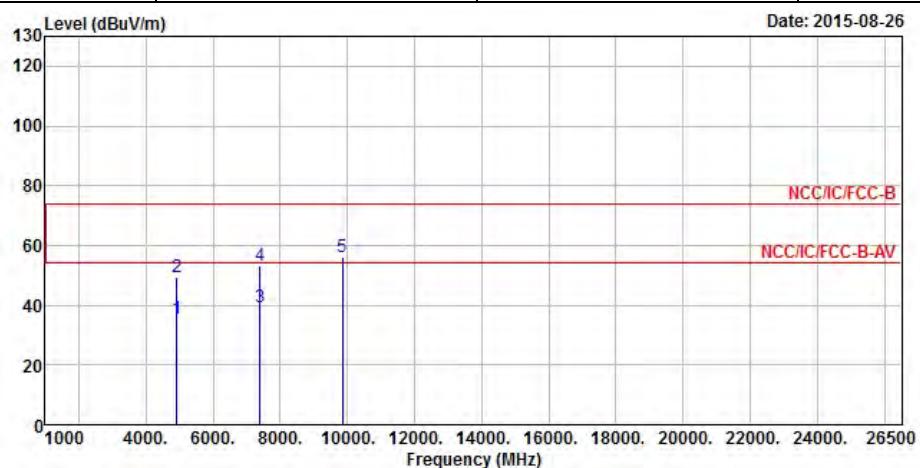






## Transmitter Radiated Unwanted Emissions (Above 1GHz)

Modulation Mode	HT20	Test Freq. (MHz)	2462
N <sub>TX</sub>	1	Polarization	H



Freq	Level	Over Limit	Line	Read	Antenna		Cable	Preamp	Remark
					Antenna	Factor			
	MHz	dBuV/m	dB	dBuV/m			dB	dB	
1	4924.000	35.45	-18.55	54.00	27.80	33.26	6.83	32.44	Average
2	4924.000	49.46	-24.54	74.00	41.81	33.26	6.83	32.44	Peak
3	7386.000	39.46	-14.54	54.00	28.01	36.23	7.92	32.70	Average
4	7386.000	53.38	-20.62	74.00	41.93	36.23	7.92	32.70	Peak
5	9848.000	55.98			41.66	38.59	8.86	33.13	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, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level (107.52 dBuV/m).

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



## 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
RF Cable-CON	HUBER+SUHNER	RG213/U	07611832020001	9kHz ~ 30MHz	Oct. 31, 2014	AC Conduction
EMI Filter	LINDGREN	LRE-2030	2651	< 450 Hz	NCR	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	101500	9KHz~40GHz	May 06, 2015	RF Conducted
Signal Generator	R&S	SMR40	100116	10MHz ~ 40GHz	Jul. 28, 2015	RF Conducted
Power Sensor	Anritsu	MA2411B	1027452	300MHz ~ 40GHz	Jan. 29, 2015	RF Conducted
Power Meter	Anritsu	ML2495A	1124009	300MHz ~ 40GHz	Jan. 29, 2015	RF Conducted
Temp. and Humidity Chamber	Giant Force	GTH-225-20-S	MAB0103-001	-20 ~ 100°C	Jun. 12, 2015	RF Conducted
AC Power Source	G.W	APS-9102	EL920581	AC 0V ~ 300V	Jun. 22, 2015	RF Conducted

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

### <Radiation Emissions >

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30MHz ~ 1GHz 3m	Nov. 29, 2014	Radiation
Amplifier	HP	8447D	2944A08033	10kHz ~ 1.3GHz	May 11, 2015	Radiation
Amplifier	Agilent	8449B	3008A02120	1GHz ~ 26.5GHz	Oct. 20, 2014	Radiation
Spectrum	R&S	FSP40	100004	9kHz ~ 40GHz	Apr. 02, 2015	Radiation
Bilog Antenna	SCHAFFNER	CBL 6112D	22237	30MHz ~ 1GHz	Sep. 20, 2014	Radiation
Horn Antenna	ETS • LINDGREN	3115	6741	1GHz ~ 18GHz	Jul. 15, 2015	Radiation
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170154	18GHz ~ 40GHz	Jan. 27, 2015	Radiation
RF Cable-R03m	Jye Bao	RG142	CB021	9kHz ~ 1GHz	Nov. 15, 2014	Radiation
RF Cable-high	SUHNER	SUCOFLEX 106	03CH03-HY	1GHz ~ 40GHz	Dec. 12, 2014	Radiation
Turn Table	EM Electronics	EM Electronics	060615	0 ~ 360 degree	N/A	Radiation
Antenna Mast	MF	MF-7802	MF780208179	1 ~ 4 m	N/A	Radiation

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

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Amplifier	EMC INSTRUMENTS	EMC184045B	980192	18GHz ~ 40GHz	Aug. 25.2014	Radiation
Loop Antenna	TESEQ	HLA 6120	24155	9 kHz~30 MHz	Mar 12, 2015	Radiation

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