



FCC Test Report

Equipment : Wi-Fi Stick
Brand Name : Xfinity
Model No. : KXW02AAA
FCC ID : H8N-5250
Standard : 47 CFR FCC Part 15.247
Operating Band : 2400 MHz – 2483.5 MHz
Equipment Class : DTS
Applicant : ASKEY COMPUTER CORP
10F, NO.119, Chienkang Road, Chung-Ho DIST.,
New Taipei City, Taiwan
Manufacturer : ASKEY COMPUTER CORP
10F, NO.119, Chienkang Road, Chung-Ho DIST.,
New Taipei City, Taiwan
Askey TECHNOLOGY (JIANG SU) LTD.
No. 1388, Jiao Tong Road, Wujiang Economic-Technological
Development Area, Jiangsu Province, P.R. China

The product sample received on Sep. 27, 2013 and completely tested on Nov. 10, 2013. We, SPORTON, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.10-2009 and shown compliance with the applicable technical standards.

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

Reviewed by:


Wayne Hsu / Assistant Manager





Table of Contents

1	GENERAL DESCRIPTION	5
1.1	Information.....	5
1.2	Support Equipment	7
1.3	Testing Applied Standards	7
1.4	Testing Location Information	7
1.5	Measurement Uncertainty	8
2	TEST CONFIGURATION OF EUT	9
2.1	The Worst Case Modulation Configuration	9
2.2	The Worst Case Power Setting Parameter	9
2.3	The Worst Case Measurement Configuration	10
2.4	Test Setup Diagram	11
3	TRANSMITTER TEST RESULT	13
3.1	AC Power-line Conducted Emissions	13
3.2	6dB Bandwidth.....	16
3.3	RF Output Power	18
3.4	Power Spectral Density	22
3.5	Transmitter Bandedge Emissions.....	24
3.6	Transmitter Unwanted Emissions	27
4	TEST EQUIPMENT AND CALIBRATION DATA.....	56

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]: 0.1913990MHz 54.29 (Margin 9.69dB) - QP 47.37 (Margin 6.61dB) - AV	FCC 15.207	Complied
3.2	15.247(a)	Bandwidth	6dB Bandwidth Unit [MHz] 20M: 9.09 / 40M: 36.32	≥500kHz	Complied
3.3	15.247(b)	RF Output Power (Maximum Peak Conducted Output Power)	Power [dBm]:25.35	Power [dBm]:30	Complied
3.4	15.247(d)	Power Spectral Density	PSD [dBm/100kHz]:-6.16	PSD [dBm/3kHz]:8	Complied
3.5	15.247(c)	Transmitter Radiated Bandedge Emissions	Non-Restricted Bands: 2399.82MHz: 26.81dB Restricted Bands [dBuV/m at 3m]: 2390.00MHz 52.80 (Margin 1.20dB) - PK 68.59 (Margin 5.41dB) - AV	Non-Restricted Bands: > 20 dBc Restricted Bands: FCC 15.209	Complied
3.6	15.247(c)	Transmitter Radiated Unwanted Emissions	[dBuV/m at 3m]: 365.62MHz 41.40 (Margin 4.60dB) – 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 _{TX})	RF Output Power (dBm)	Co-location
2400-2483.5	b	2412-2462	1-11 [11]	1	22.97	N/A
2400-2483.5	g	2412-2462	1-11 [11]	1	24.05	N/A
2400-2483.5	n (HT20)	2412-2462	1-11 [11]	1	25.35	N/A
2400-2483.5	n (HT40)	2422-2452	3-9 [7]	1	18.88	N/A

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.
Note 4: Co-location, Co-location is generally defined as simultaneously transmitting (co-transmitting) antennas within 20 cm of each other. (i.e., EUT has simultaneously co-transmitting that operating 2.4GHz and 5GHz.)

1.1.2 Antenna Information

Antenna Category	
<input checked="" type="checkbox"/>	Integral antenna (antenna permanently attached)
<input checked="" type="checkbox"/>	Temporary RF connector provided
<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	Printed	2.63



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% - IEEE 802.11b	0
<input checked="" type="checkbox"/> 100% - IEEE 802.11g	0
<input checked="" type="checkbox"/> 100% - IEEE 802.11n (HT20)	0
<input checked="" type="checkbox"/> 100% - IEEE 802.11n (HT40)	0

1.1.5 EUT Operational Condition

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



1.2 Support Equipment

Support Equipment - AC Conduction and Radiated Emission				
No.	Equipment	Brand Name	Model Name	FCC ID
1	Printer	EPSON	C61	3912E128
2	(USB) Mouse	Microsoft	1004	DoC
3	Notebook	ASUS	F6E	DoC
4	AP (Remote)	ASUS	RT-AC66U	MSQ-RTAC66U

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

Reminder: The support equipment (Notebook) provide by customer.

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 558074
- FCC KDB 662911

1.4 Testing Location Information

Testing Location				
<input checked="" type="checkbox"/>	HWA YA	ADD : No. 52, Hwa Ya 1 st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.	TEL : 886-3-327-3456	FAX : 886-3-327-0973
Test Condition		Test Site No.	Test Engineer	Test Environment
AC Conduction		CO04-HY	Zeus	24°C / 50%
RF Conducted		TH06-HY	Cain	24.3°C / 61%
Radiated Emission		03CH03-HY	Hsiao	23°C / 56%



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	± 2.26 dB	
Emission bandwidth, 6dB bandwidth	± 1.42 %	
RF output power, conducted	± 0.63 dB	
Power density, conducted	± 0.81 dB	
Unwanted emissions, conducted	9 – 150 kHz	± 0.38 dB
	0.15 – 30 MHz	± 0.42 dB
	30 – 1000 MHz	± 0.51 dB
	1 – 18 GHz	± 0.67 dB
	18 – 40 GHz	± 0.83 dB
	40 – 200 GHz	N/A
All emissions, radiated	9 – 150 kHz	± 2.49 dB
	0.15 – 30 MHz	± 2.28 dB
	30 – 1000 MHz	± 2.56 dB
	1 – 18 GHz	± 3.59 dB
	18 – 40 GHz	± 3.82 dB
	40 – 200 GHz	N/A
Temperature	± 0.8 °C	
Humidity	± 3 %	
DC and low frequency voltages	± 3 %	
Time	± 1.42 %	
Duty Cycle	± 1.42 %	



2 Test Configuration of EUT

2.1 The Worst Case Modulation Configuration

Worst Modulation Used for Conformance Testing			
Modulation Mode	Transmit Chains (N _{TX})	Data Rate / MCS	Worst Data Rate / MCS
11b,1-11Mbps	1	1-11 Mbps	1 Mbps
11g,6-54Mbps	1	6-54 Mbps	6 Mbps
HT20,M0-7	1	M0-7	MCS 0
HT40,M0-7	1	M0-7	MCS 0

2.2 The Worst Case Power Setting Parameter

The Worst Case Power Setting Parameter (2400-2483.5MHz band)							
Test Software Version	MT76xxU QA _ 2.0.10.1						
Modulation Mode	N _{TX}	Test Frequency (MHz)					
		NCB: 20MHz			NCB: 40MHz		
		2412	2437	2462	2422	2437	2452
11b,1-11Mbps	1	17	3F	1C	-	-	-
11g,6-54Mbps	1	0A	1C	0D	-	-	-
HT20,M0-7	1	7	20	0C	-	-	-
HT40,M0-7	1	-	-	-	3	0E	7



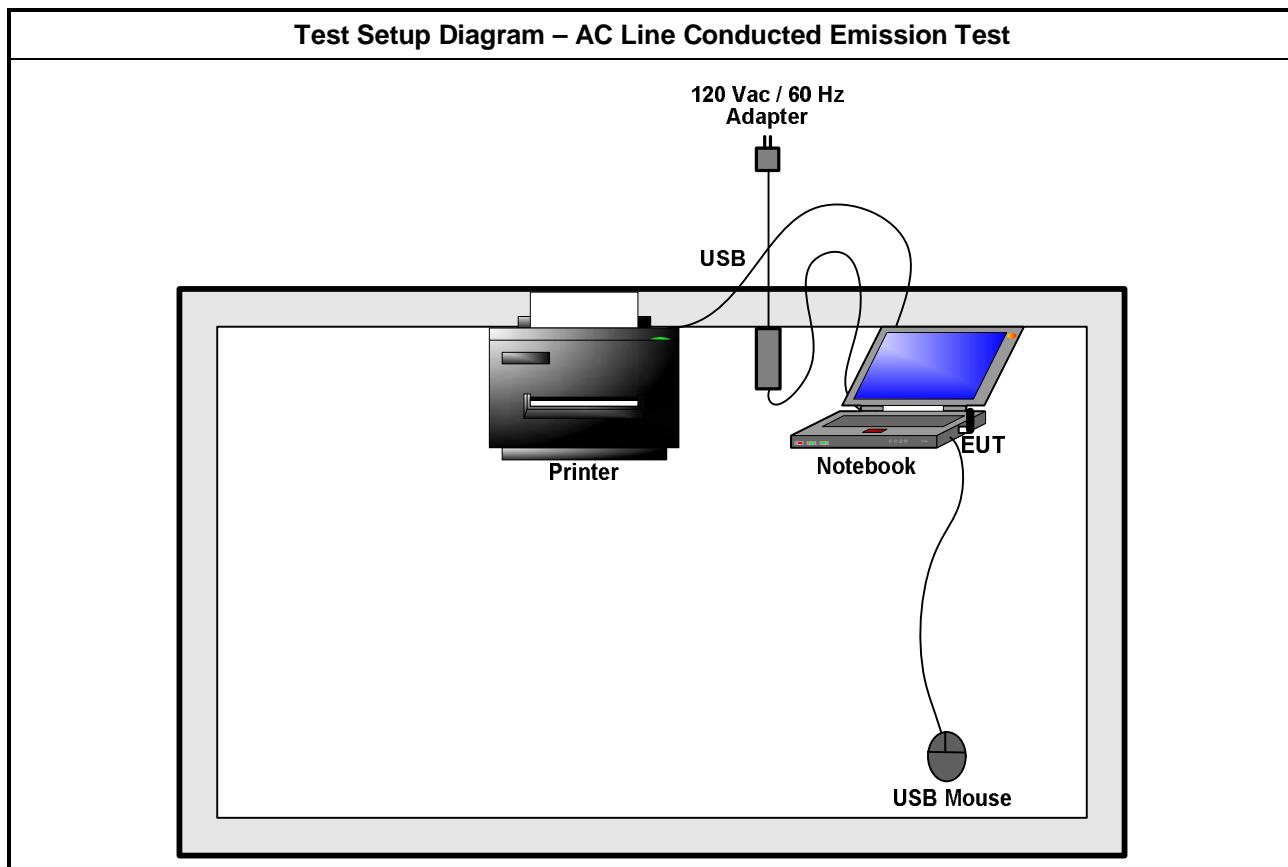
2.3 The Worst Case Measurement Configuration

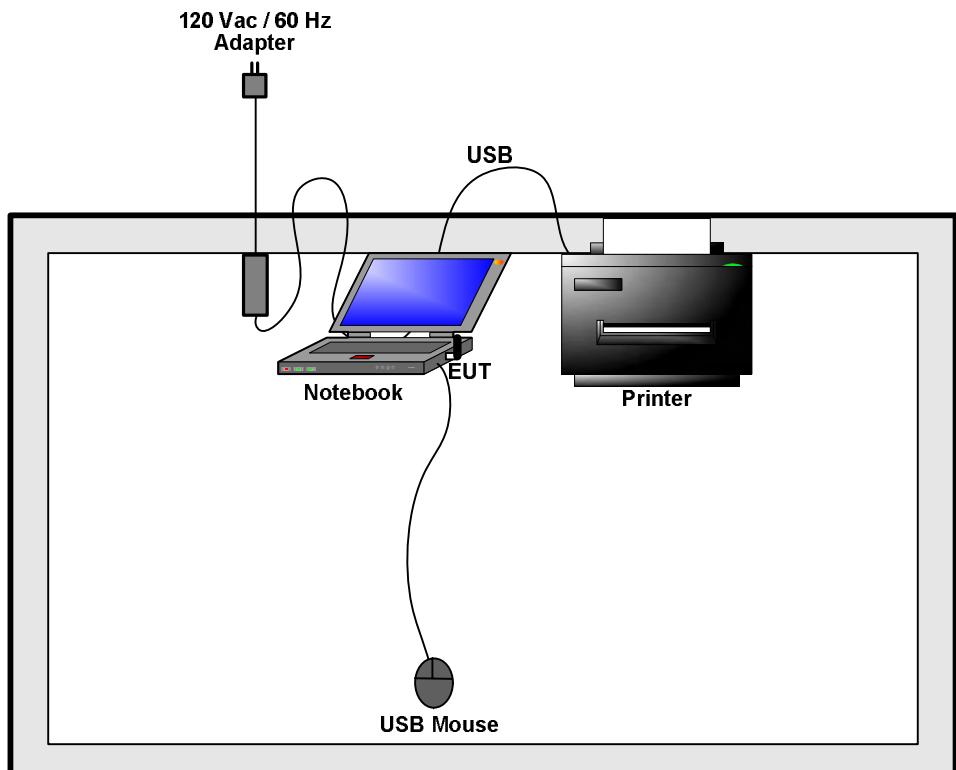
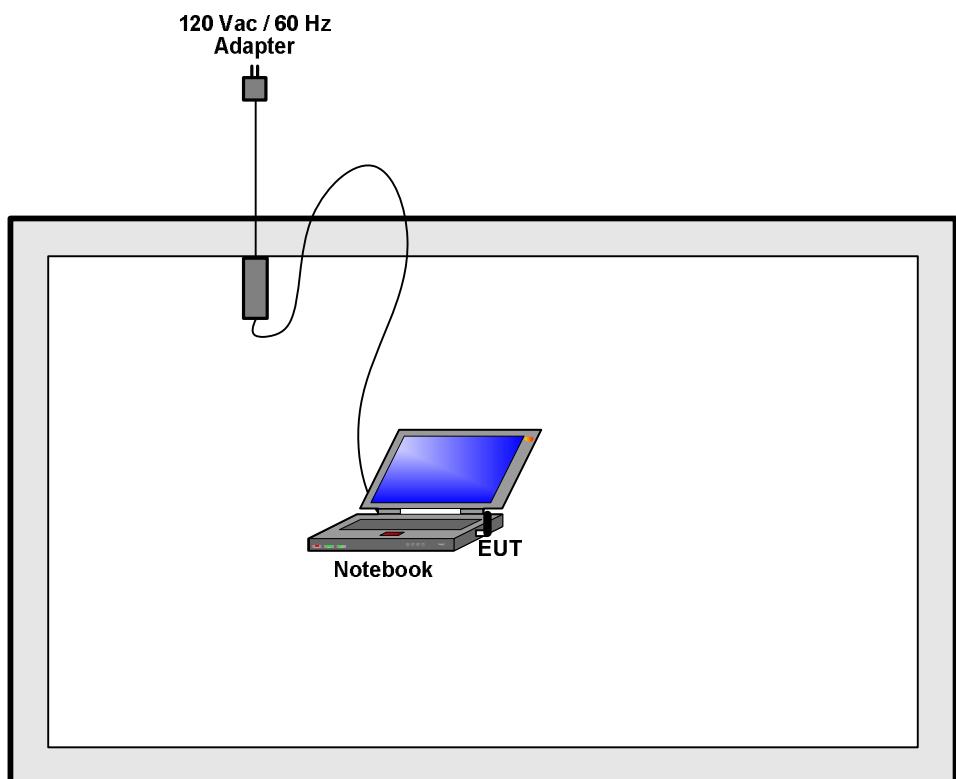
The Worst Case Mode for Following Conformance Tests	
Tests Item	AC power-line conducted emissions
Condition	AC power-line conducted measurement for line and neutral Test Voltage: 120Vac / 60Hz
Operating Mode	Operating Mode Description
1	EUT with Notebook via USB port & Radio link (WLAN)

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, HT40

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

2.4 Test Setup Diagram



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

3 Transmitter Test Result

3.1 AC Power-line Conducted Emissions

3.1.1 AC Power-line Conducted Emissions Limit

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

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

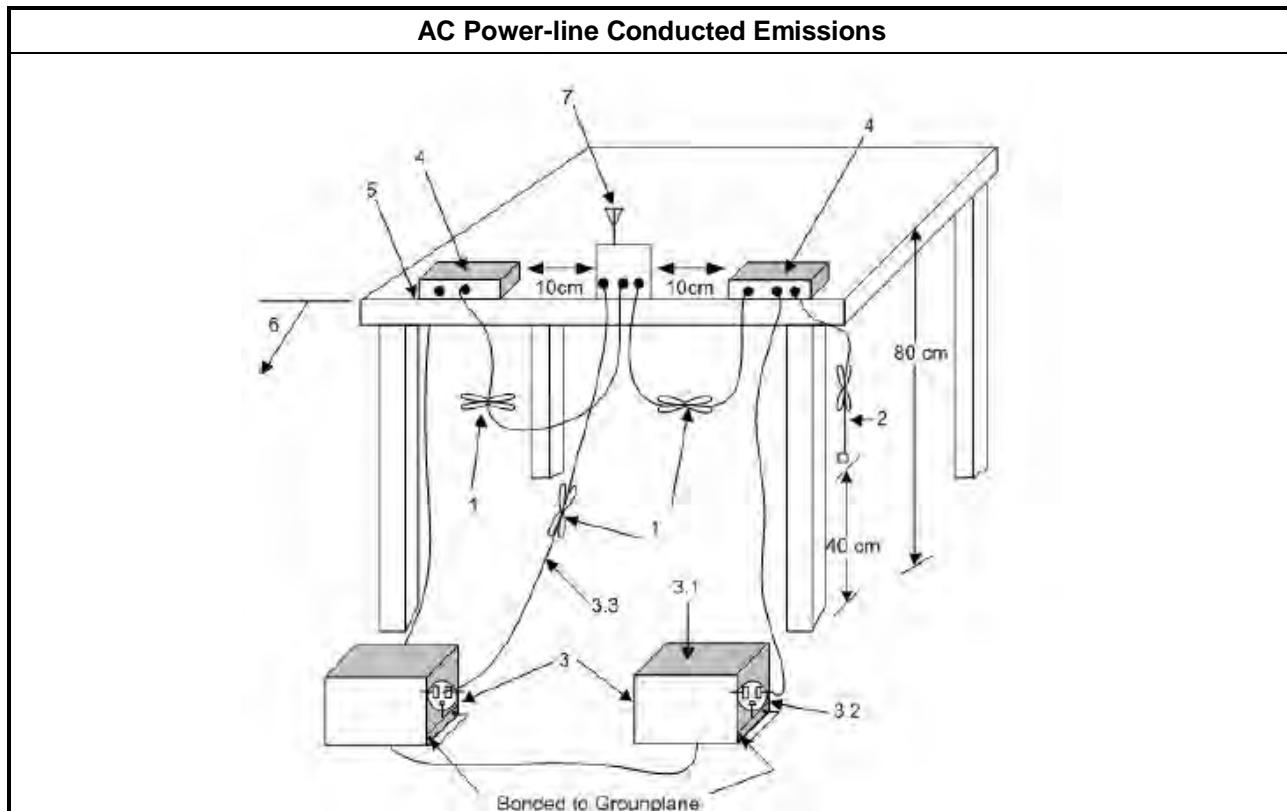
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

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

3.1.4 Test Setup



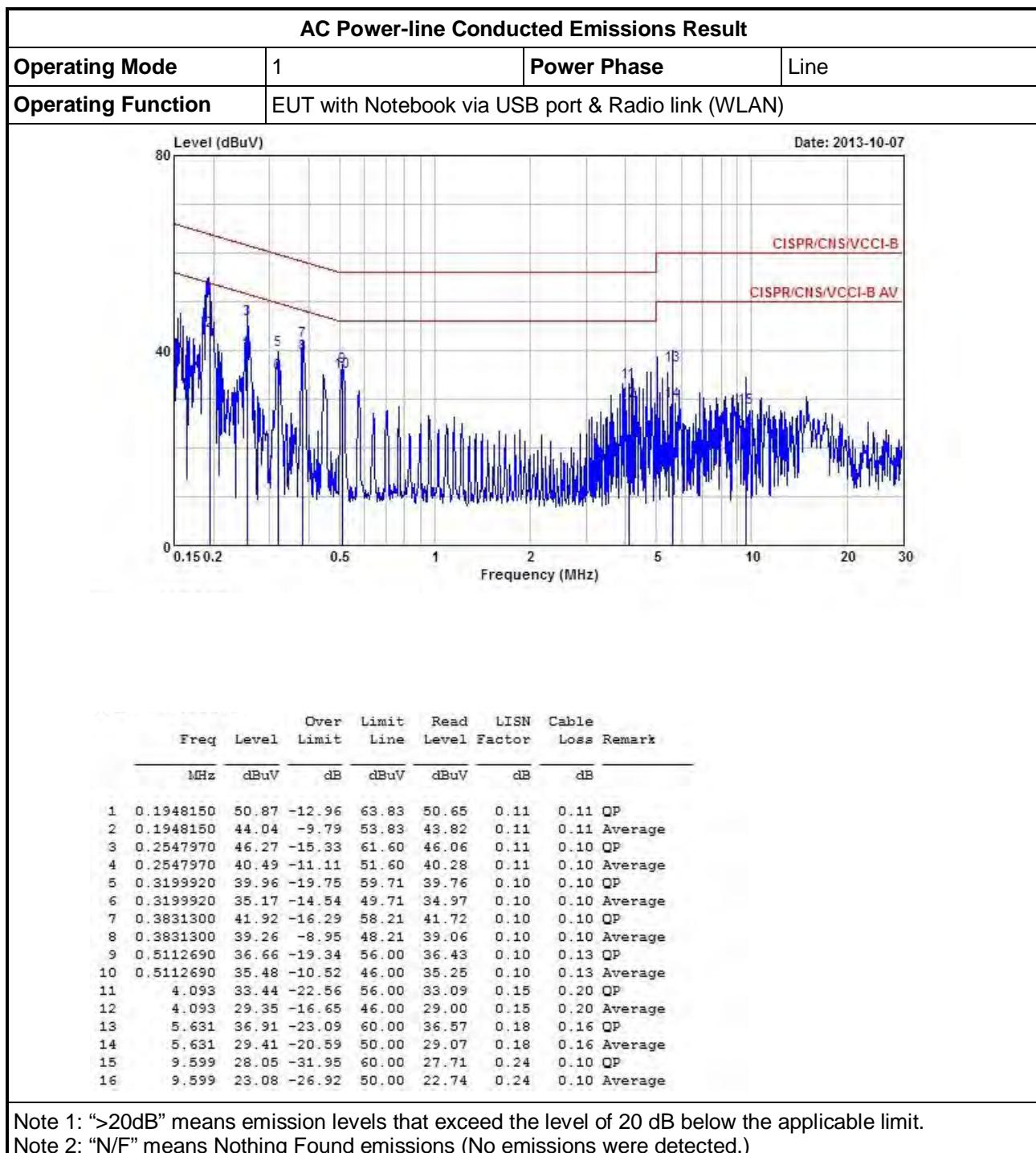


3.1.5 Test Result of AC Power-line Conducted Emissions

AC Power-line Conducted Emissions Result									
Operating Mode	1	Power Phase	Neutral						
Operating Function	EUT with Notebook via USB port & Radio link (WLAN)								
Level (dBuV)							Date: 2013-10-07		
0	0.15	0.2	0.5	1	2	5	10	20	30
0	40	80							
Freq Level Over Limit Read LISN Cable									
Freq	Level	Over Limit	Line	Read	LISN	Cable	Remark		
MHz	dBuV	dB	dBuV	dBuV	dB	dB			
1	0.1913990	54.29	-9.69	63.98	53.94	0.23	0.12 QP		
2	0.1913990	47.37	-6.61	53.98	47.02	0.23	0.12 Average		
3	0.2561510	46.21	-15.35	61.56	45.88	0.23	0.10 QP		
4	0.2561510	41.20	-10.36	51.56	40.87	0.23	0.10 Average		
5	0.3199920	39.20	-20.51	59.71	38.88	0.22	0.10 QP		
6	0.3199920	35.82	-13.89	49.71	35.50	0.22	0.10 Average		
7	0.3831540	42.10	-16.11	58.21	41.78	0.22	0.10 QP		
8	0.3831540	38.86	-9.35	48.21	38.54	0.22	0.10 Average		
9	0.5100690	35.29	-10.71	46.00	34.94	0.22	0.13 Average		
10	0.5100690	36.62	-19.38	56.00	36.27	0.22	0.13 QP		
11	3.900	29.24	-16.76	46.00	28.75	0.29	0.20 Average		
12	3.900	32.69	-23.31	56.00	32.20	0.29	0.20 QP		
13	5.500	28.73	-21.27	50.00	28.23	0.33	0.17 Average		
14	5.500	38.23	-21.77	60.00	37.73	0.33	0.17 QP		
15	8.954	31.83	-28.17	60.00	31.32	0.40	0.11 QP		
16	8.954	27.15	-22.85	50.00	26.64	0.40	0.11 Average		

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

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



3.2 6dB Bandwidth

3.2.1 6dB Bandwidth Limit

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

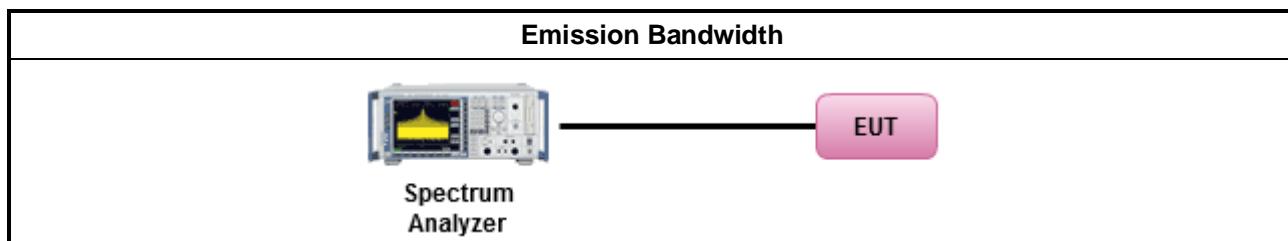
3.2.2 Measuring Instruments

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, clause 8.1 Option 1 for 6 dB bandwidth measurement.
<input type="checkbox"/> Refer as FCC KDB 558074, 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.
<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.

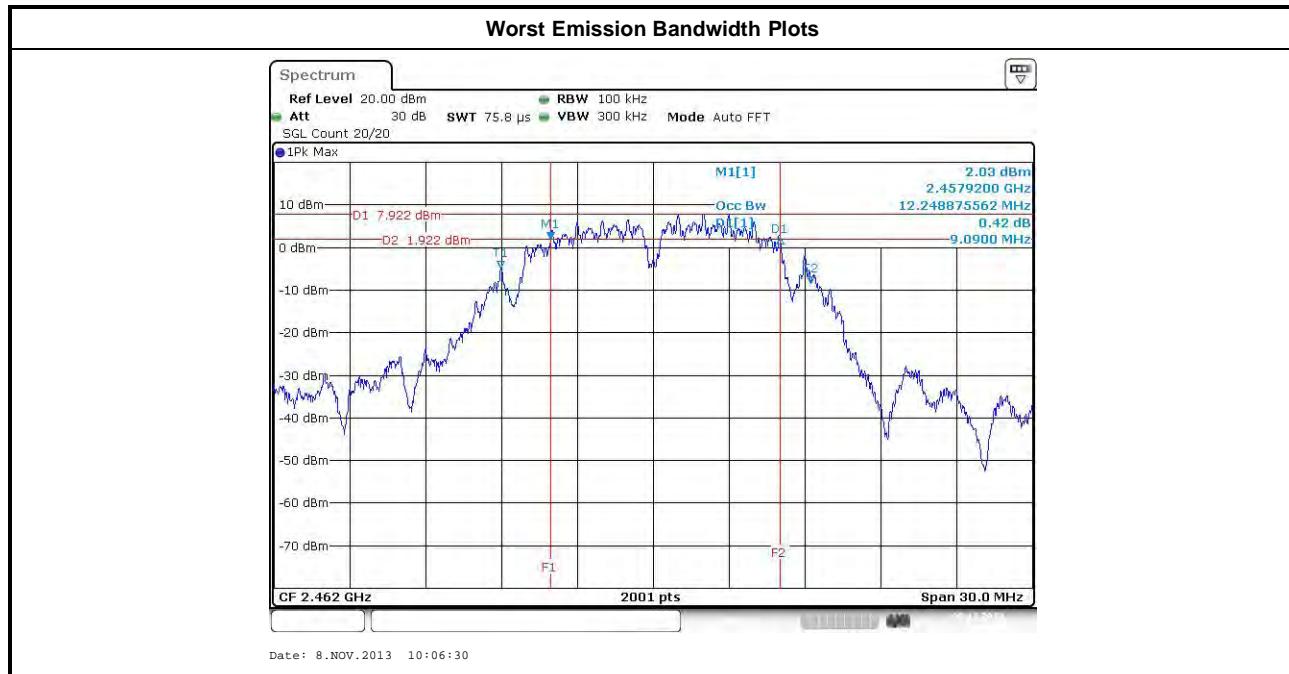
3.2.4 Test Setup





3.2.5 Test Result of Emission Bandwidth

Emission Bandwidth Result				
Condition		Emission Bandwidth (MHz)		
Modulation Mode	N _{TX}	Freq. (MHz)	99% Bandwidth	6dB Bandwidth
11b	1	2412	12.17	9.73
11b	1	2437	14.25	10.05
11b	1	2462	12.24	9.09
11g	1	2412	16.38	16.42
11g	1	2437	17.63	16.33
11g	1	2462	16.28	16.33
HT20	1	2412	17.51	17.59
HT20	1	2437	21.34	17.65
HT20	1	2462	17.45	17.16
HT40	1	2422	36.02	36.32
HT40	1	2437	35.98	36.32
HT40	1	2452	35.98	36.32
Limit		N/A		≥500 kHz
Result		Complied		





3.3 RF Output Power

3.3.1 RF Output Power Limit

RF Output Power Limit	
Maximum Peak Conducted Output Power or Maximum Conducted Output Power Limit and e.i.r.p.	
<input checked="" type="checkbox"/> 2400-2483.5 MHz Band:	
<input checked="" type="checkbox"/>	Point-to-multipoint systems (P2M): $P_{out} \leq 30 \text{ dBm}$ (1 W); $P_{eirp} \leq 36 \text{ dBm}$ (4 W)
<input type="checkbox"/>	Point-to-point systems (P2P): If $P_{eirp} > 36 \text{ dBm}$, $G_{TX} \leq P_{out}$
<input type="checkbox"/>	Smart antenna system (SAS): If $P_{eirp} > 36 \text{ dBm}$, $G_{TX} \leq P_{out}$
	<input type="checkbox"/> Single beam: follow P2M, P2P limits
	<input type="checkbox"/> Overlap beam: follow P2M limit
	<input type="checkbox"/> Aggregate power on all beams: follow P2M limit + 8dB
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

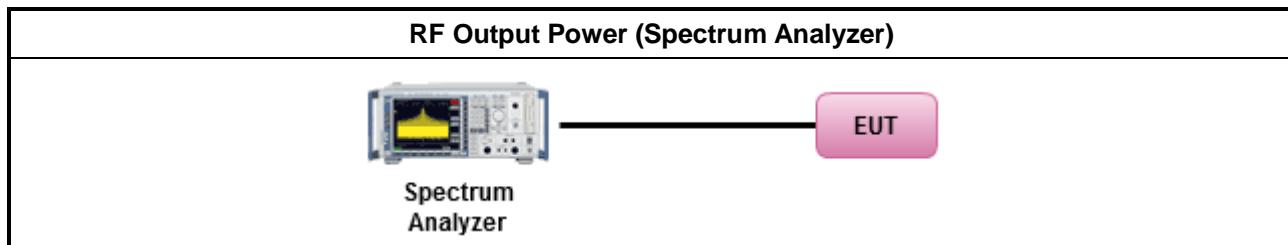
Refer a test equipment and calibration data table in this test report.

3.3.3 Test Procedures

Test Method	
<input checked="" type="checkbox"/> Maximum Peak Conducted Output Power	
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 8.1.1 Option 1 (RBW \geq EBW method).
<input checked="" type="checkbox"/>	Refer as FCC KDB 558074, clause 8.1.2 Option 2 (integrated band power method).
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 8.1.3 Option 2 (peak power meter for VBW \geq DTS BW)
<input checked="" type="checkbox"/> Maximum Conducted (Average) Output Power	
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 8.2.1 Option 1 (spectral trace averaging).
<input checked="" type="checkbox"/>	Refer as FCC KDB 558074, clause 8.2.2 Option 2 (slow sweep speed).
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 8.2.3 Option 3 (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



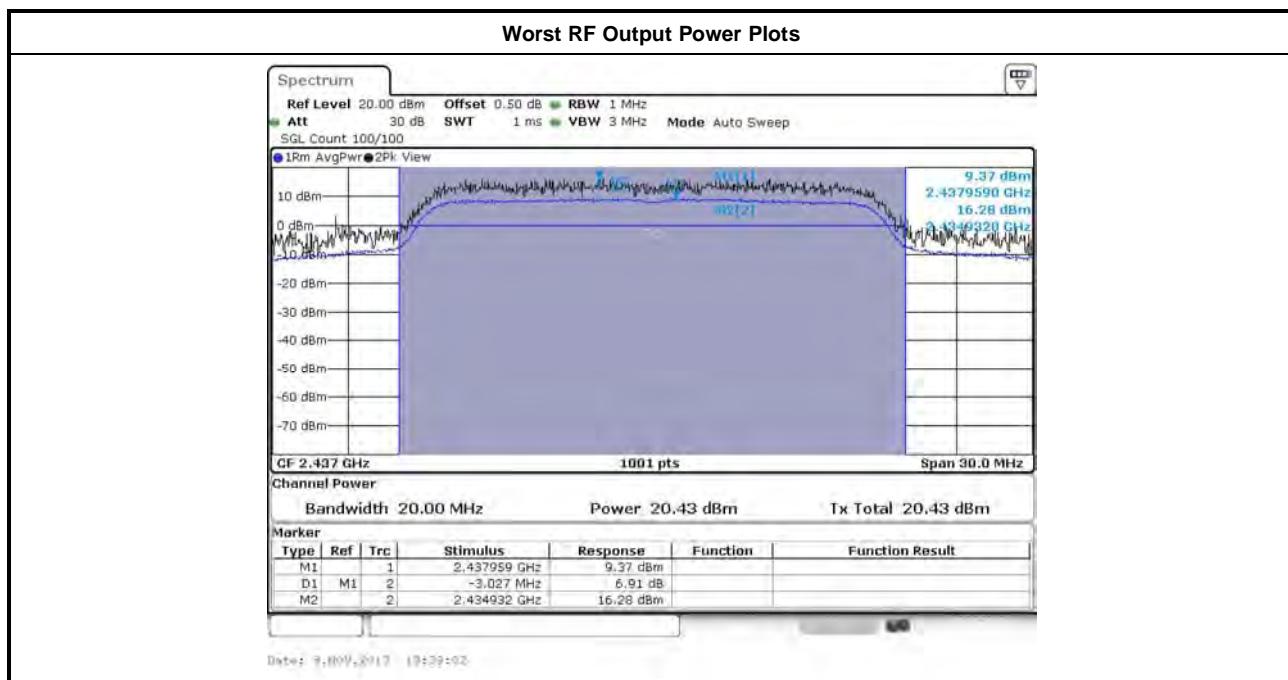


3.3.5 Test Result of Maximum Peak Conducted Output Power

Maximum Peak Conducted Output Power Result						
Condition			RF Output Power (dBm)			
Modulation Mode	N _{TX}	Freq. (MHz)	Output Power	Power Limit	EIRP Power	EIRP Limit
11b	1	2412	19.19	30	21.82	36
11b	1	2437	22.97	30	25.60	36
11b	1	2462	20.36	30	22.99	36
11g	1	2412	17.17	30	19.80	36
11g	1	2437	24.05	30	26.68	36
11g	1	2462	18.14	30	20.77	36
HT20	1	2412	16.79	30	19.42	36
HT20	1	2437	25.35	30	27.98	36
HT20	1	2462	17.97	30	20.60	36
HT40	1	2422	14.04	30	16.67	36
HT40	1	2437	18.88	30	21.51	36
HT40	1	2452	15.63	30	18.26	36
Result			Complied			

3.3.6 Test Result of Maximum Conducted Output Power

Maximum Conducted Output Power						
Condition			RF Output Power (dBm)			
Modulation Mode	N _{TX}	Freq. (MHz)	Output Power	Power Limit	EIRP Power	EIRP Limit
11b	1	2412	16.32	30	18.95	36
11b	1	2437	20.05	30	22.68	36
11b	1	2462	17.50	30	20.13	36
11g	1	2412	12.32	30	14.95	36
11g	1	2437	19.22	30	21.85	36
11g	1	2462	13.34	30	15.97	36
HT20	1	2412	11.48	30	14.11	36
HT20	1	2437	20.43	30	23.06	36
HT20	1	2462	12.92	30	15.55	36
HT40	1	2422	9.07	30	11.70	36
HT40	1	2437	14.05	30	16.68	36
HT40	1	2452	10.73	30	13.36	36
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

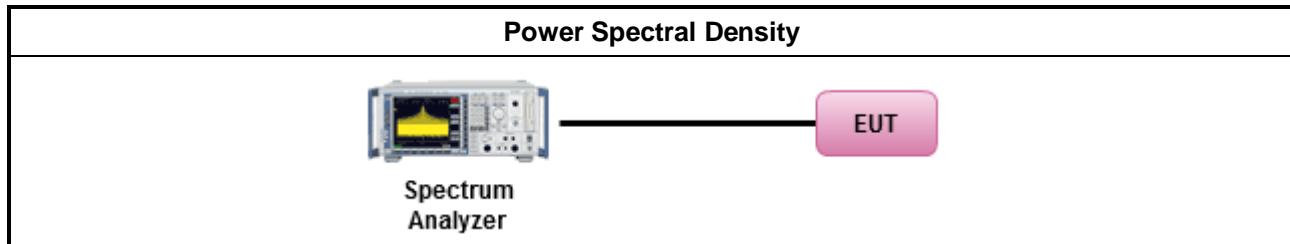
Refer a test equipment and calibration data table in this test report.

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, clause 10.2 Method PKPSD (RBW=3-100kHz;detector=peak).. [duty cycle $\geq 98\%$ or external video / power trigger]
<input type="checkbox"/> Refer as FCC KDB 558074, clause 10.3 Method AVGPSD-1 (spectral trace averaging).
<input type="checkbox"/> Refer as FCC KDB 558074, clause 10.4 Method AVGPSD-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, clause 10.5 Method AVGPSD-2 (spectral trace averaging).
<input type="checkbox"/> Refer as FCC KDB 558074, 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.
<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 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.

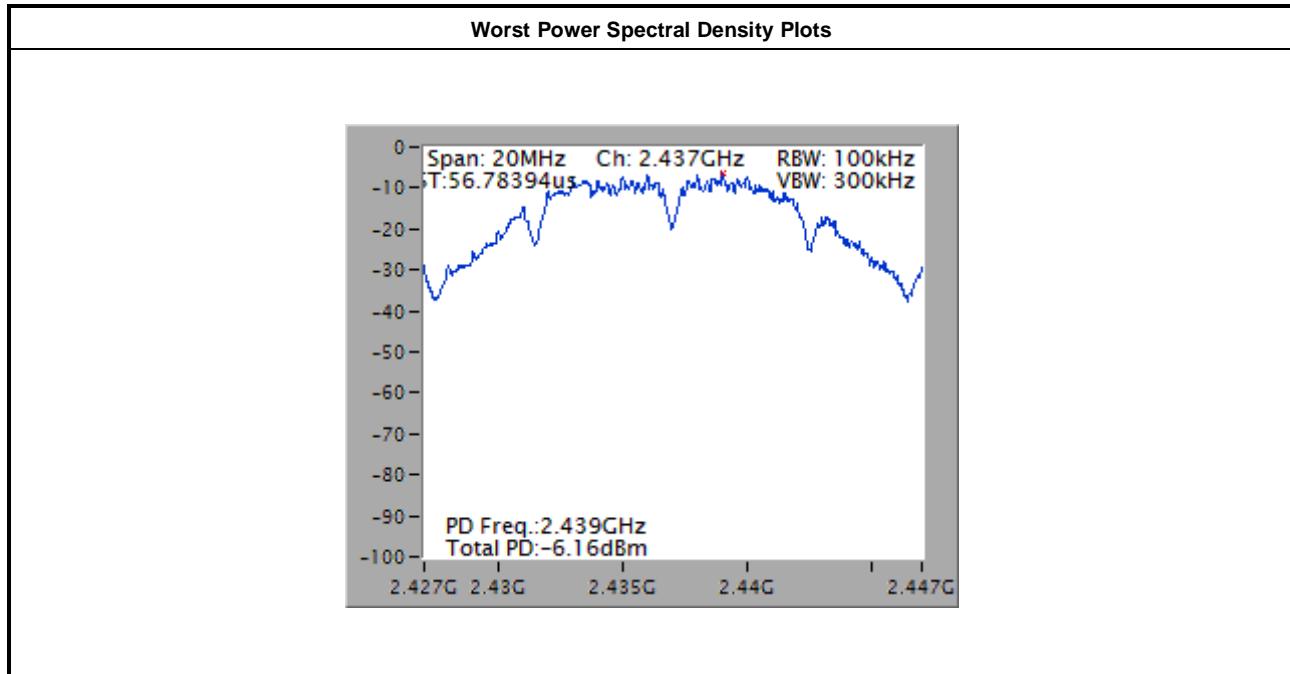


3.4.4 Test Setup



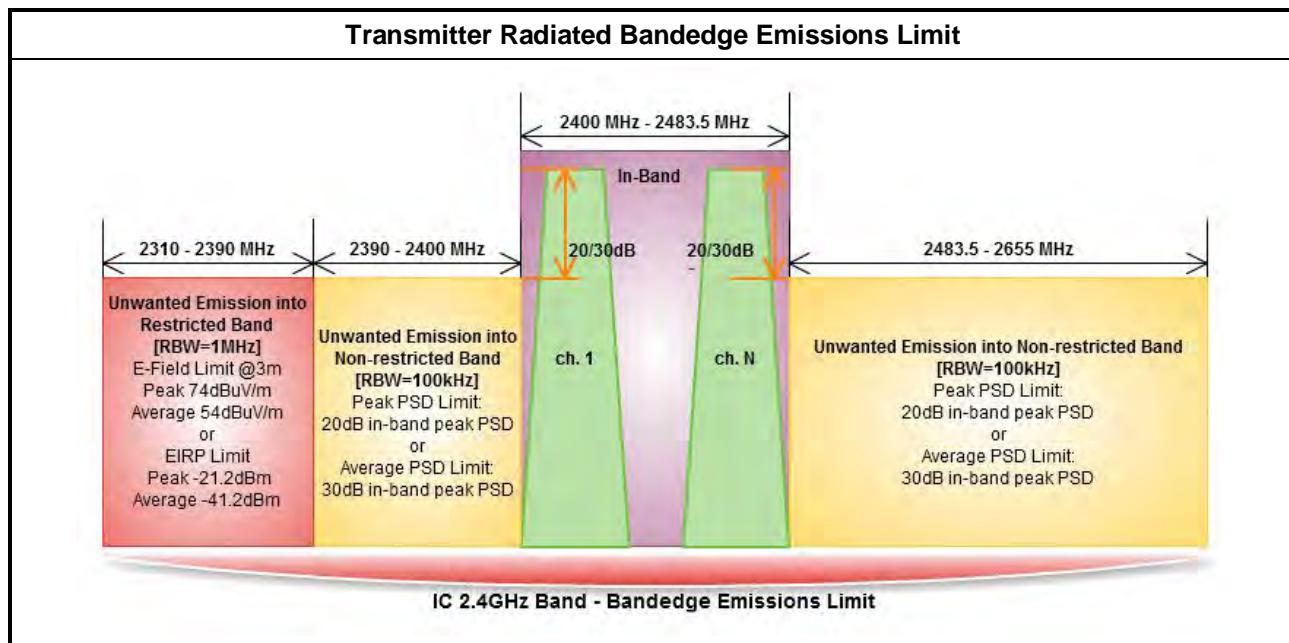
3.4.5 Test Result of Power Spectral Density

Power Spectral Density Result				
Modulation Mode	N _{TX}	Freq. (MHz)	Power Spectral Density (dBm/100kHz)	Power Limit (dBm/3kHz)
11b	1	2412	-11.42	8
11b	1	2437	-6.16	8
11b	1	2462	-7.92	8
11g	1	2412	-17.00	8
11g	1	2437	-9.86	8
11g	1	2462	-16.53	8
HT20	1	2412	-18.04	8
HT20	1	2437	-8.69	8
HT20	1	2462	-16.59	8
HT40	1	2422	-23.16	8
HT40	1	2437	-18.67	8
HT40	1	2452	-21.75	8
Result		Complied		



3.5 Transmitter Bandedge Emissions

3.5.1 Transmitter Radiated Bandedge Emissions Limit



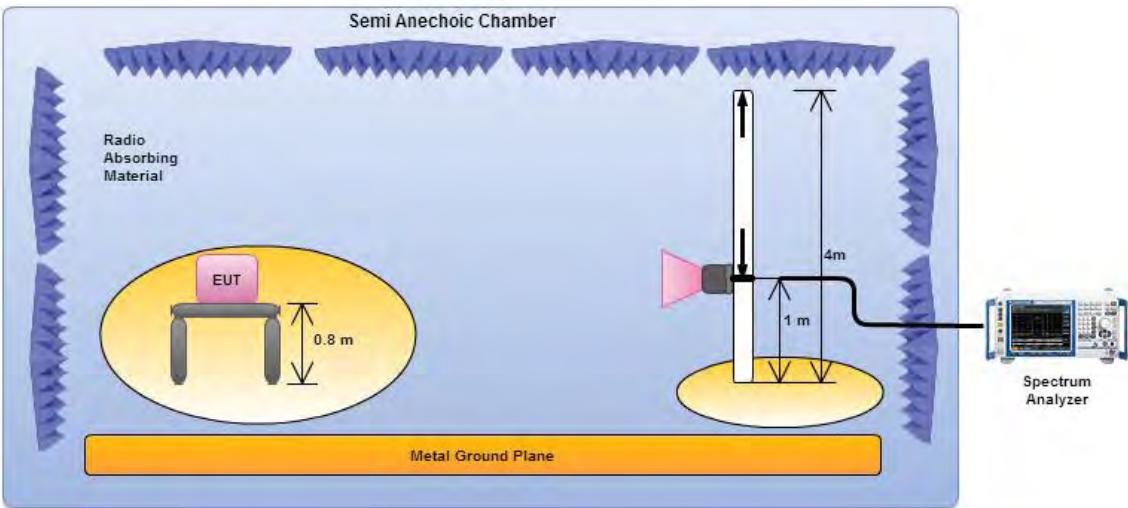
3.5.2 Measuring Instruments

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

3.5.3 Test Procedures

Test Method
<input checked="" type="checkbox"/> The average emission levels shall be measured in [duty cycle \geq 98 or duty factor].
<input checked="" type="checkbox"/> Refer as ANSI C63.10, clause 6.9.2.2 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, clause 11 for unwanted emissions into non-restricted bands.
<input checked="" type="checkbox"/> Refer as FCC KDB 558074, clause 12 for unwanted emissions into restricted bands.
<input checked="" type="checkbox"/> Refer as FCC KDB 558074, clause 12.2.5.1 Option 1 (trace averaging for duty cycle $\geq 98\%$)
<input type="checkbox"/> Refer as FCC KDB 558074, clause 12.2.5.2 Option 2 (trace averaging + duty factor).
<input type="checkbox"/> Refer as FCC KDB 558074, clause 12.2.5.3 Option 3 (Reduced VBW $\geq 1/T$).
<input 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 558074, 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, 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 6.9.2 for band-edge testing.
<input type="checkbox"/> Refer as ANSI C63.10, clause 6.9.3 for marker-delta method for band-edge measurements.
<input checked="" type="checkbox"/> For radiated measurement, refer as FCC KDB 558074, clause 12.2.7 and ANSI C63.10, clause 6.6. Test distance is 3m.

3.5.4 Test Setup

Transmitter Radiated Bandedge Emissions
 <p>Electric field tests shall be performed in transmitter bandedge emissions using a calibrated horn antenna.</p>



3.5.5 Transmitter Radiated Bandedge Emissions

2400-2483.5MHz Transmitter Radiated Bandedge Emissions (Non-restricted Band)								
Modulation	N _{TX}	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	102.45	2400.00	67.29	35.16	20	V
11b	1	2462	102.45	2509.90	60.51	41.94	20	V
11g	1	2412	95.69	2399.82	68.88	26.81	20	V
11g	1	2462	95.60	2534.60	59.78	35.82	20	V
HT20	1	2412	94.44	2399.94	67.03	27.41	20	V
HT20	1	2462	94.96	2521.50	59.73	35.23	20	V
HT40	1	2422	90.49	2399.50	61.05	29.44	20	V
HT40	1	2452	90.42	2501.00	60.45	29.97	20	V

Note 1: Measurement worst emissions of receive antenna polarization

2400-2483.5MHz Transmitter Radiated Bandedge Emissions (Restricted Band)										
Modulation Mode	N _{TX}	Freq. (MHz)	Measure Distance (m)	Freq. (MHz) PK	Level (dBuV/m) PK	Limit (dBuV/m) PK	Freq. (MHz) AV	Level (dBuV/m) AV	Limit (dBuV/m) AV	Pol.
11b	1	2412	3	2389.18	61.56	74	2390.00	51.66	54	V
11b	1	2462	3	2483.50	62.54	74	2483.50	52.52	54	V
11g	1	2412	3	2390.00	70.56	74	2390.00	51.19	54	V
11g	1	2462	3	2483.80	68.53	74	2483.50	49.75	54	V
HT20	1	2412	3	2390.00	72.46	74	2390.00	50.94	54	V
HT20	1	2462	3	2483.80	67.85	74	2483.50	49.33	54	V
HT40	1	2422	3	2388.94	68.59	74	2390.00	52.80	54	V
HT40	1	2452	3	2487.56	67.19	74	2483.72	52.61	54	V

Note 1: Measurement worst emissions of receive antenna polarization.



3.6 Transmitter Unwanted Emissions

3.6.1 Transmitter 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.

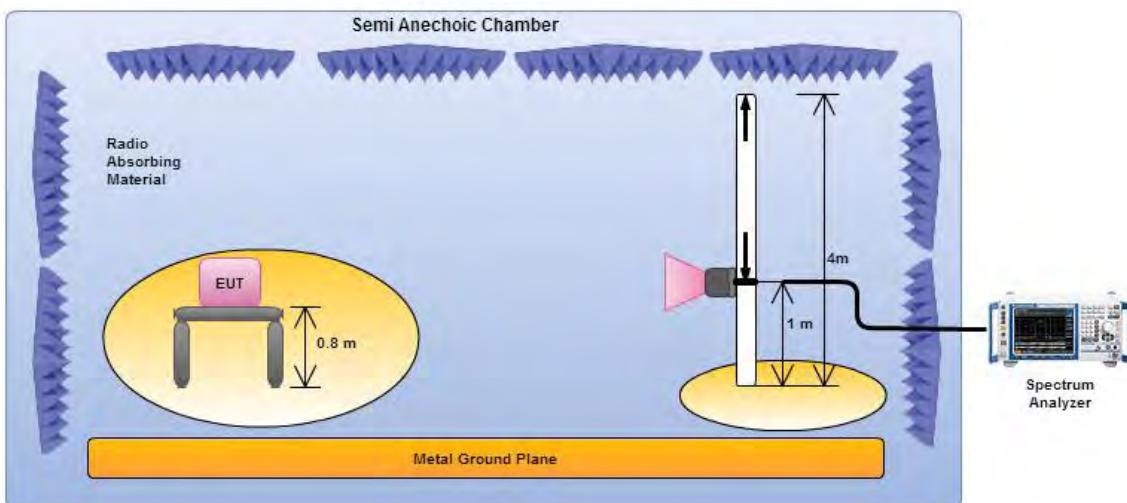


3.6.3 Test Procedures

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, clause 11 for unwanted emissions into non-restricted bands.
<input checked="" type="checkbox"/> Refer as FCC KDB 558074, clause 12 for unwanted emissions into restricted bands.
<input checked="" type="checkbox"/> Refer as FCC KDB 558074, clause 12.2.5.1 Option 1 (trace averaging for duty cycle $\geq 98\%$)
<input type="checkbox"/> Refer as FCC KDB 558074, clause 12.2.5.2 Option 2 (trace averaging + duty factor).
<input type="checkbox"/> Refer as FCC KDB 558074, clause 12.2.5.3 Option 3 (Reduced $VBW \geq 1/T$).
<input 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 558074, clause 11.3 and 12.2.4 measurement procedure peak limit.
<input checked="" type="checkbox"/> Refer as FCC KDB 558074, clause 12.2.3 measurement procedure Quasi-Peak limit.
<input checked="" type="checkbox"/> For radiated measurement, refer as FCC KDB 558074, 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



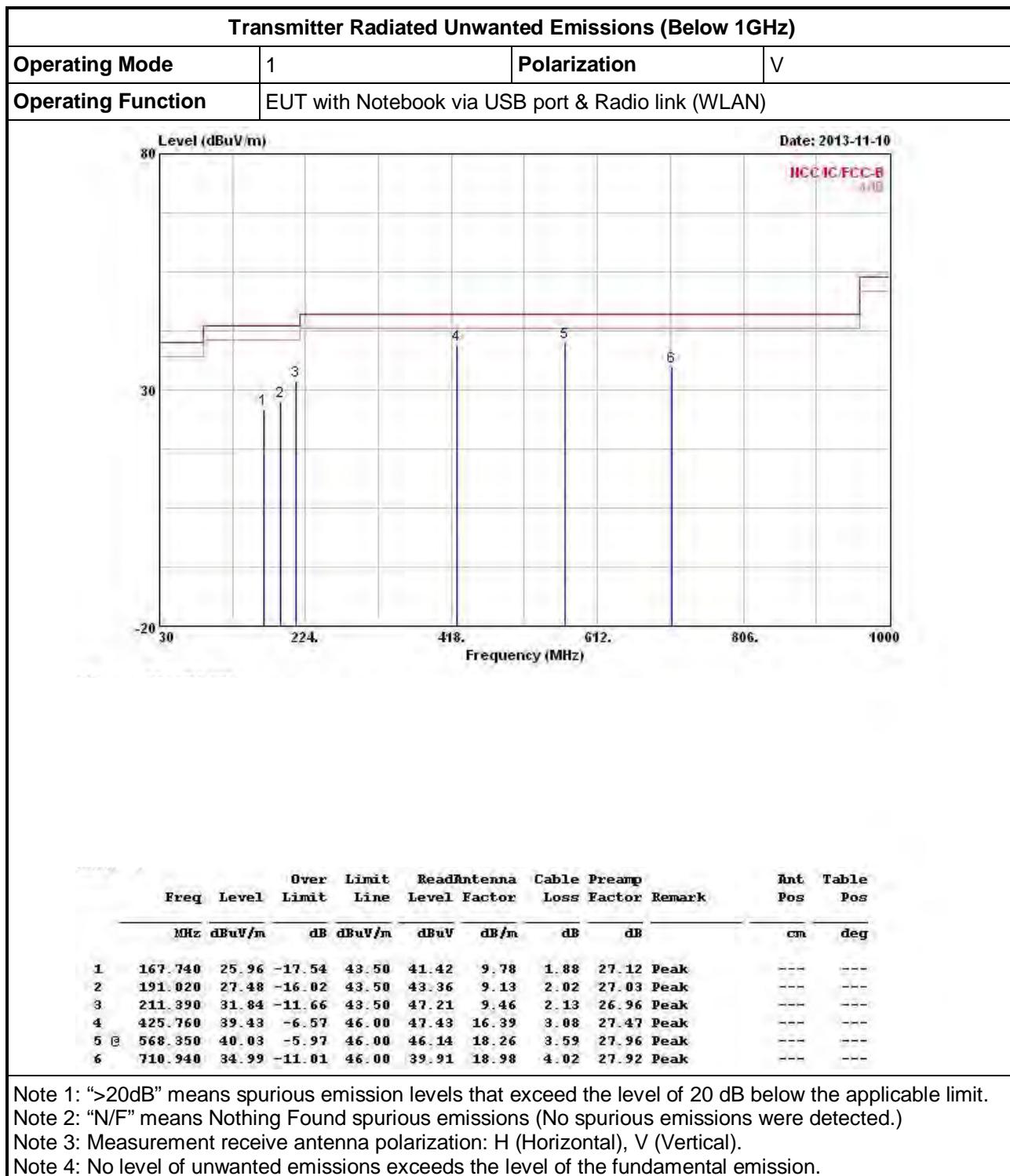
Magnetic field tests shall be performed in the frequency range of 9 kHz to 30 MHz using a calibrated loop antenna. Electric field tests shall be performed in the frequency range of 30 MHz to 1000 MHz using a calibrated bi-log antenna and the frequency range of 1 GHz to 40 GHz using a calibrated horn antenna.

3.6.5 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.



3.6.6 Transmitter Radiated Unwanted Emissions (Below 1GHz)





Transmitter Radiated Unwanted Emissions (Below 1GHz)

Operating Mode	1	Polarization	H																																																																																																	
Operating Function	EUT with Notebook via USB port & Radio link (WLAN)																																																																																																			
Level (dBuV/m)			Date: 2013-11-10																																																																																																	
<table border="1"> <thead> <tr> <th rowspan="2">Freq</th> <th rowspan="2">Level</th> <th>Over</th> <th>Limit</th> <th>Read</th> <th>Antenna</th> <th>Cable</th> <th>Preamp</th> <th rowspan="2">Remark</th> <th rowspan="2">Ant</th> <th rowspan="2">Table</th> </tr> <tr> <th>Line</th> <th>dBuV/m</th> <th>Level</th> <th>Factor</th> <th>dB/m</th> <th>dB</th> <th>dB</th> <th>Pos</th> <th>Pos</th> </tr> </thead> <tbody> <tr> <td>MHz</td> <td>dBuV/m</td> <td>dB</td> <td>dBuV/m</td> <td>dBuV</td> <td>dB/m</td> <td>dB</td> <td>dB</td> <td></td> <td>cm</td> <td>deg</td> </tr> <tr> <td>1</td> <td>176.470</td> <td>27.63</td> <td>-15.87</td> <td>43.50</td> <td>43.26</td> <td>9.54</td> <td>1.92</td> <td>27.09 Peak</td> <td>---</td> <td>---</td> </tr> <tr> <td>2</td> <td>211.390</td> <td>30.94</td> <td>-12.56</td> <td>43.50</td> <td>46.31</td> <td>9.46</td> <td>2.13</td> <td>26.96 Peak</td> <td>---</td> <td>---</td> </tr> <tr> <td>3</td> <td>265.710</td> <td>36.63</td> <td>-9.37</td> <td>46.00</td> <td>47.68</td> <td>13.33</td> <td>2.39</td> <td>26.77 Peak</td> <td>---</td> <td>---</td> </tr> <tr> <td>4</td> <td>365.620</td> <td>41.40</td> <td>-4.60</td> <td>46.00</td> <td>50.94</td> <td>14.72</td> <td>2.84</td> <td>27.10 Peak</td> <td>---</td> <td>---</td> </tr> <tr> <td>5</td> <td>424.790</td> <td>35.72</td> <td>-10.28</td> <td>46.00</td> <td>43.72</td> <td>16.40</td> <td>3.07</td> <td>27.47 Peak</td> <td>---</td> <td>---</td> </tr> <tr> <td>6</td> <td>710.940</td> <td>36.71</td> <td>-9.29</td> <td>46.00</td> <td>41.63</td> <td>18.98</td> <td>4.02</td> <td>27.92 Peak</td> <td>---</td> <td>---</td> </tr> </tbody> </table>			Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Remark	Ant	Table	Line	dBuV/m	Level	Factor	dB/m	dB	dB	Pos	Pos	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	1	176.470	27.63	-15.87	43.50	43.26	9.54	1.92	27.09 Peak	---	---	2	211.390	30.94	-12.56	43.50	46.31	9.46	2.13	26.96 Peak	---	---	3	265.710	36.63	-9.37	46.00	47.68	13.33	2.39	26.77 Peak	---	---	4	365.620	41.40	-4.60	46.00	50.94	14.72	2.84	27.10 Peak	---	---	5	424.790	35.72	-10.28	46.00	43.72	16.40	3.07	27.47 Peak	---	---	6	710.940	36.71	-9.29	46.00	41.63	18.98	4.02	27.92 Peak	---	---	
Freq	Level	Over			Limit	Read	Antenna	Cable	Preamp	Remark				Ant	Table																																																																																					
		Line	dBuV/m	Level	Factor	dB/m	dB	dB	Pos		Pos																																																																																									
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg																																																																																										
1	176.470	27.63	-15.87	43.50	43.26	9.54	1.92	27.09 Peak	---	---																																																																																										
2	211.390	30.94	-12.56	43.50	46.31	9.46	2.13	26.96 Peak	---	---																																																																																										
3	265.710	36.63	-9.37	46.00	47.68	13.33	2.39	26.77 Peak	---	---																																																																																										
4	365.620	41.40	-4.60	46.00	50.94	14.72	2.84	27.10 Peak	---	---																																																																																										
5	424.790	35.72	-10.28	46.00	43.72	16.40	3.07	27.47 Peak	---	---																																																																																										
6	710.940	36.71	-9.29	46.00	41.63	18.98	4.02	27.92 Peak	---	---																																																																																										

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

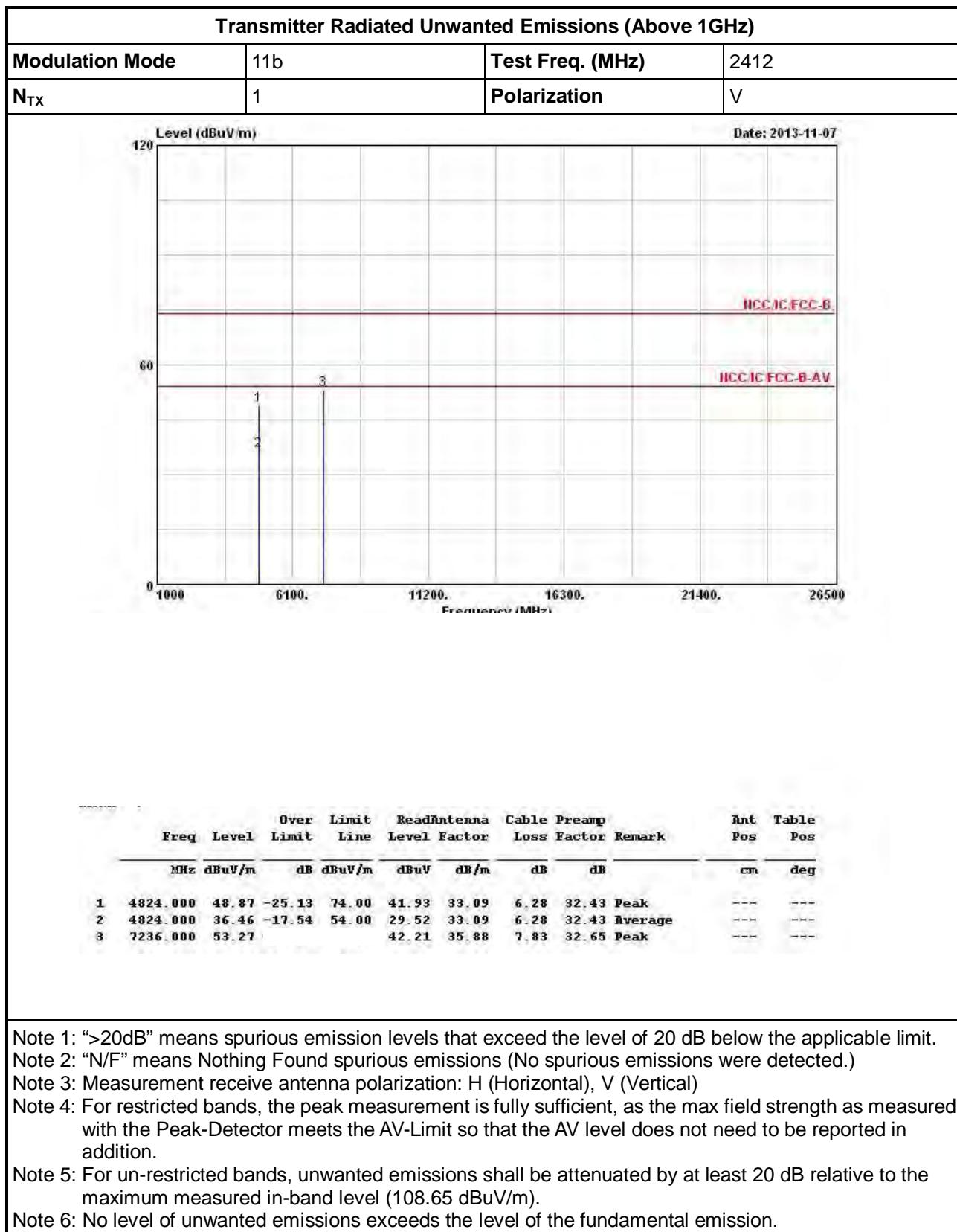
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

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

Note 4: No level of unwanted emissions exceeds the level of the fundamental emission.



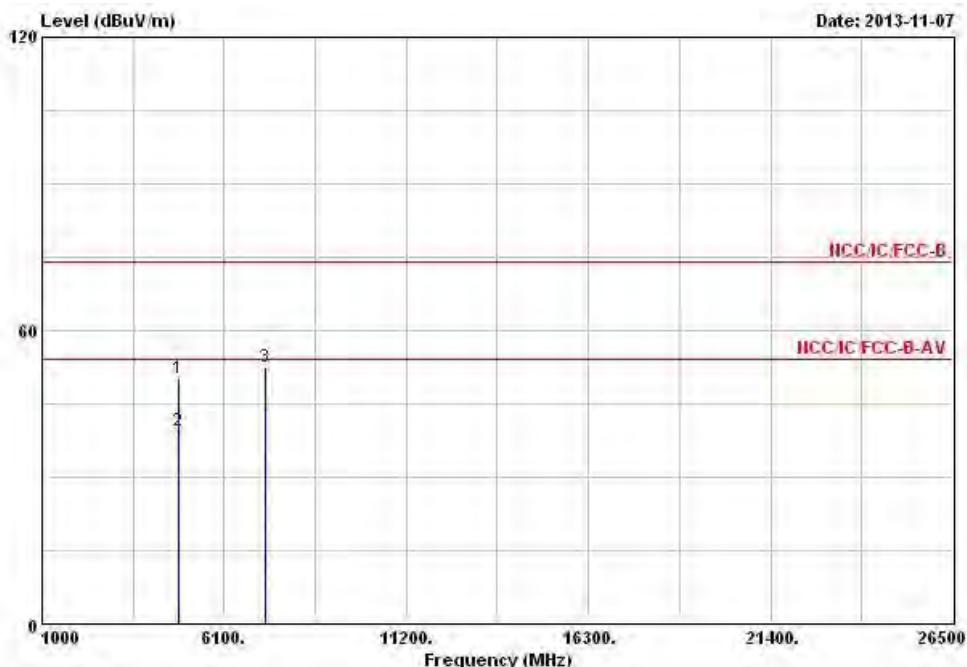
3.6.7 Transmitter Radiated Unwanted Emissions (Above 1GHz)





Transmitter Radiated Unwanted Emissions (Above 1GHz)

Modulation Mode	11b	Test Freq. (MHz)	2412
N _{TX}	1	Polarization	H



Freq MHz	Level dBuV/m	Over	Limit	Read	Antenna	Cable	Preamp	Remark	Ant Pos	Table Pos
		Limit	Line	Level	Factor	Cable	Preamp		cm	deg
1 4824.000	50.22	-23.78	74.00	43.28	33.09	6.28	32.43	Peak	---	---
2 4824.000	39.53	-14.47	54.00	32.59	33.09	6.28	32.43	Average	---	---
3 7236.000	52.66			41.60	35.88	7.83	32.65	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.

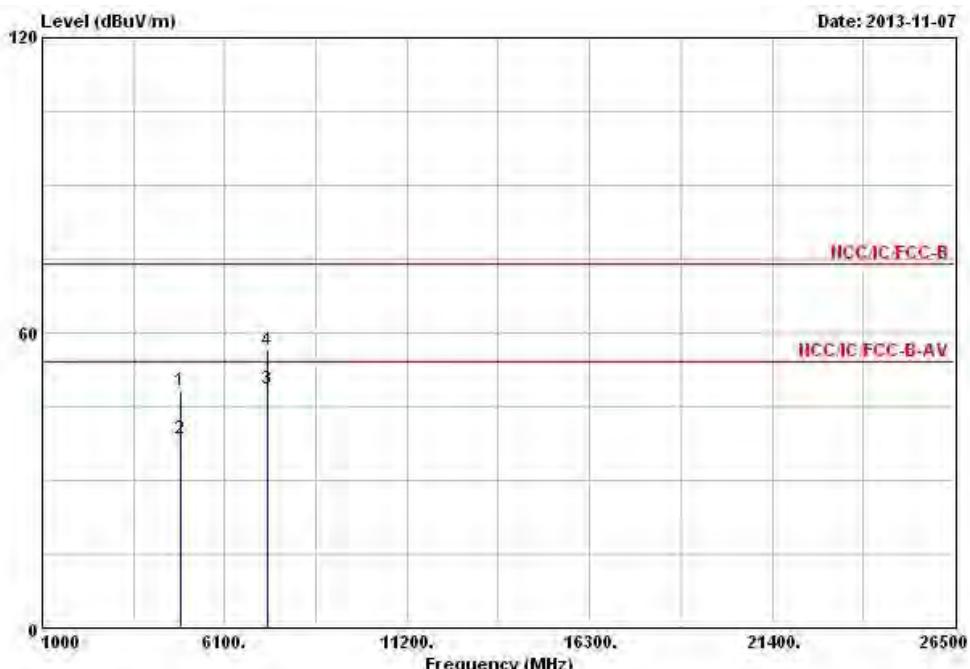
Note 5: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level (108.65 dBuV/m).

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



Transmitter Radiated Unwanted Emissions (Above 1GHz)

Modulation Mode	11b	Test Freq. (MHz)	2437
N _{TX}	1	Polarization	V



Freq	Level	Over Limit	Line	ReadAntenna		Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
				MHz	dBuV/m	dB	dBuV/m	dB		
1	4874.000	48.22	-25.78	74.00	41.14	33.18	6.32	32.42 Peak	---	---
2	4874.000	38.49	-15.51	54.00	31.41	33.18	6.32	32.42 Average	---	---
3	7311.000	48.47	-5.53	54.00	37.22	36.04	7.87	32.66 Average	---	---
4	7311.000	56.38	-17.62	74.00	45.13	36.04	7.87	32.66 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.

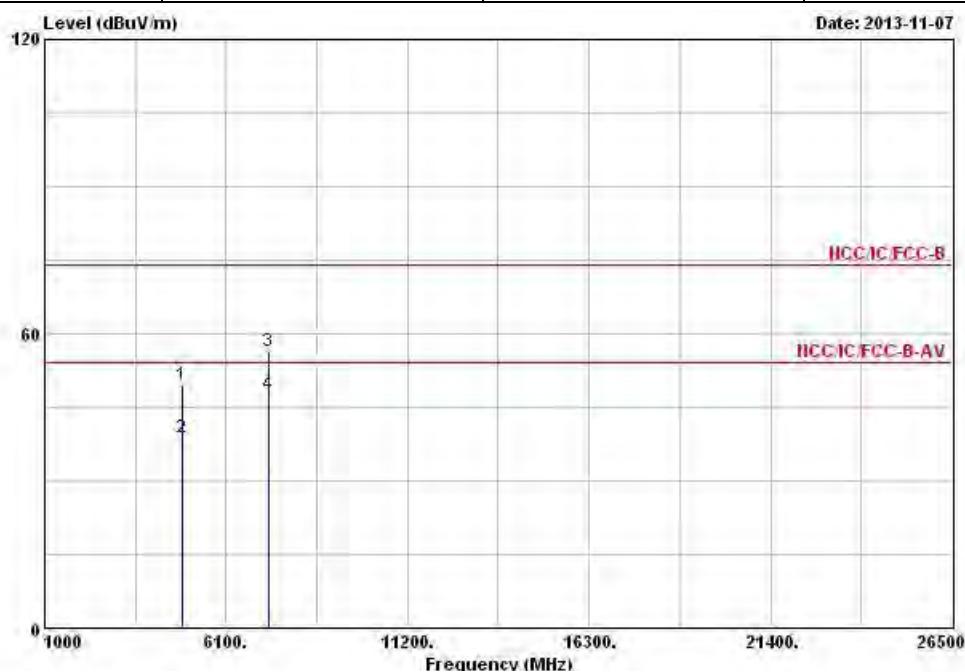
Note 5: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level (111.78 dBuV/m).

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



Transmitter Radiated Unwanted Emissions (Above 1GHz)

Modulation Mode	11b	Test Freq. (MHz)	2437
N _{TX}	1	Polarization	H



Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Remark	Ant	Table
		Limit	Line	Antenna	Level	Factor	Loss			
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 4874.000	49.50	-24.50	74.00	42.42	33.18	6.32	32.42	Peak	---	---
2 4874.000	38.85	-15.15	54.00	31.77	33.18	6.32	32.42	Average	---	---
3 7311.000	56.44	-17.56	74.00	45.19	36.04	7.87	32.66	Peak	---	---
4 7311.000	47.76	-6.24	54.00	36.51	36.04	7.87	32.66	Average	---	---

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.

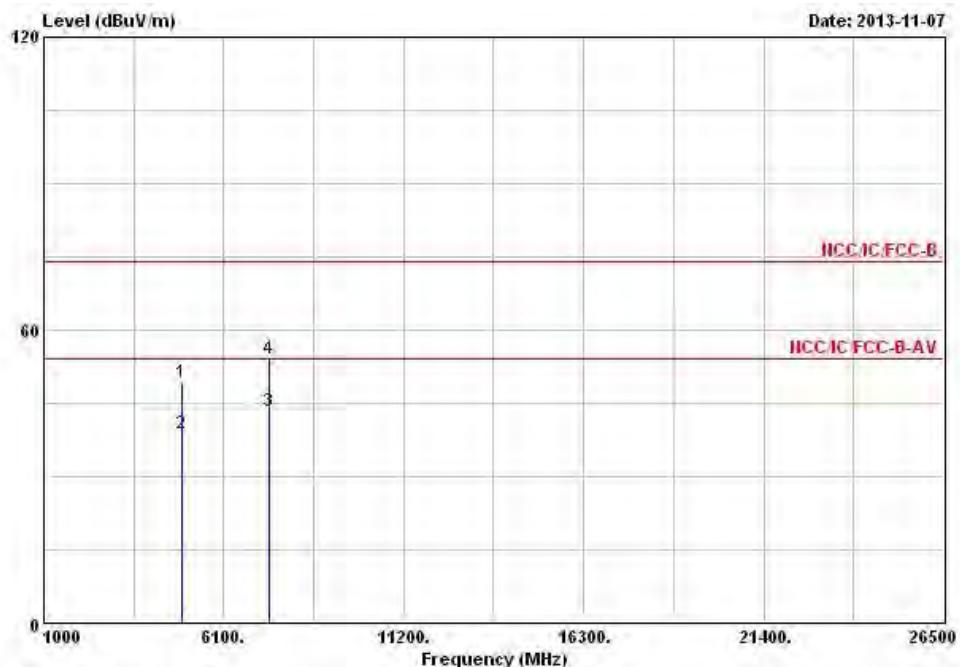
Note 5: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level (111.78 dBuV/m).

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



Transmitter Radiated Unwanted Emissions (Above 1GHz)

Modulation Mode	11b	Test Freq. (MHz)	2462
N _{TX}	1	Polarization	V



Freq	Level	Over Limit		Read	Antenna	Cable Preamp			Int Pos	Table Pos
		MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB		
1	4924.000	49.32	-24.68	74.00	42.05	33.28	6.40	32.41	Peak	---
2	4924.000	38.80	-15.20	54.00	31.53	33.28	6.40	32.41	Average	---
3	7386.000	43.32	-10.68	54.00	31.85	36.25	7.91	32.69	Average	---
4	7386.000	54.01	-19.99	74.00	42.54	36.25	7.91	32.69	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.

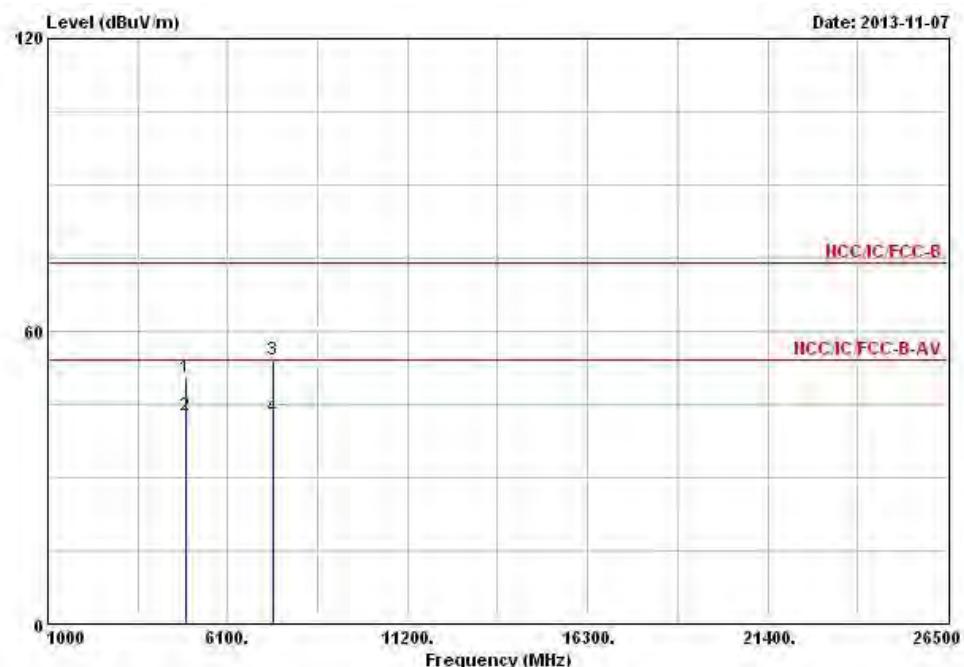
Note 5: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level (108.57 dBuV/m).

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



Transmitter Radiated Unwanted Emissions (Above 1GHz)

Modulation Mode	11b	Test Freq. (MHz)	2462
N _{TX}	1	Polarization	H



Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Remark	Int	Table
		MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m			
1	4924.000	50.62	-23.38	74.00	43.35	33.28	6.40	32.41 Peak	---	---
2	4924.000	42.59	-11.41	54.00	35.32	33.28	6.40	32.41 Average	---	---
3	7386.000	54.27	-19.73	74.00	42.80	36.25	7.91	32.69 Peak	---	---
4	7386.000	42.52	-11.48	54.00	31.05	36.25	7.91	32.69 Average	---	---

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.

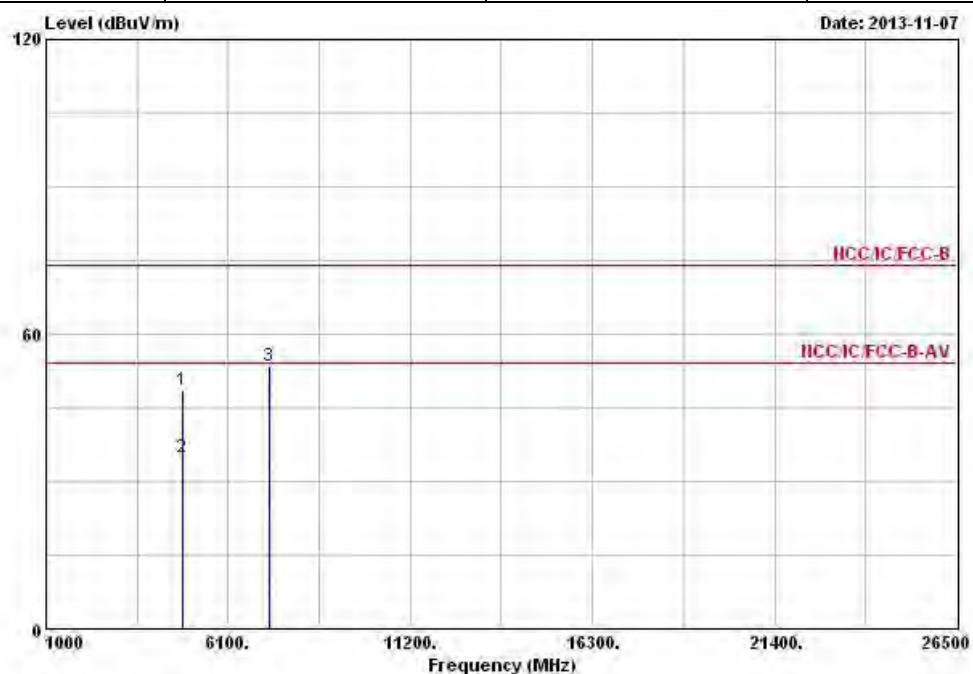
Note 5: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level (108.57 dBuV/m).

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)	2412
N _{TX}	1	Polarization	V



Freq MHz	Level dBuV/m	Over Limit		Read Line	Antenna Level	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
		dB	dBuV/m							
1 4824.000	48.55	-25.45	74.00	41.61	33.09	6.28	32.43	Peak	---	---
2 4824.000	34.97	-19.03	54.00	28.03	33.09	6.28	32.43	Average	---	---
3 7236.000	53.43			42.37	35.88	7.83	32.65	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.

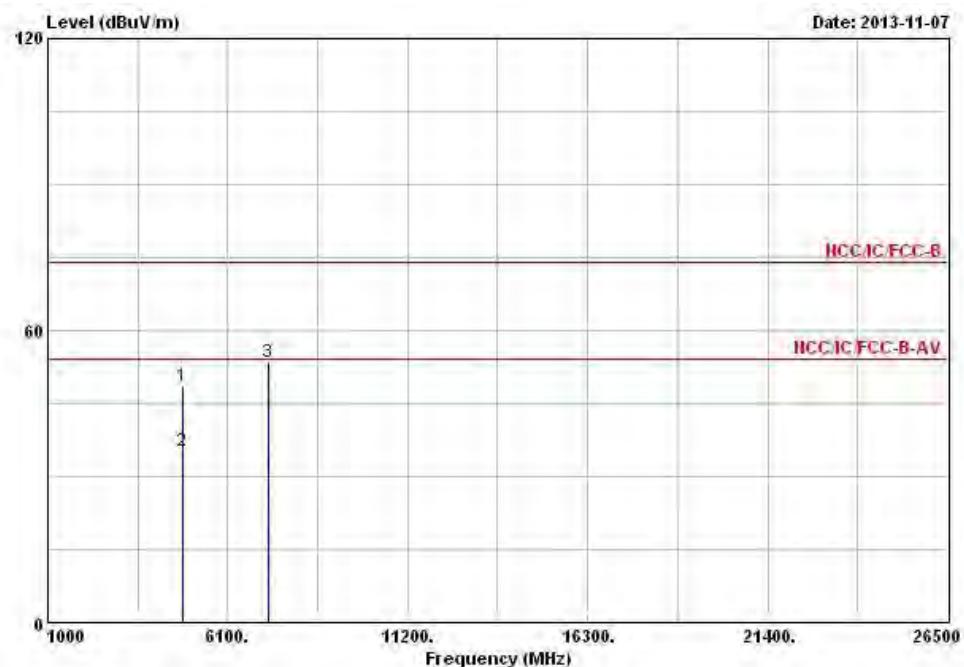
Note 5: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level (107.35 dBuV/m).

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)	2412
N _{TX}	1	Polarization	H



Freq	Level	Over Limit	Limit Line	Read Antenna		Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
				MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	deg
1	4824.000	48.44	-25.56	74.00	41.50	33.09	6.28	32.43	Peak	---
2	4824.000	35.28	-18.72	54.00	28.34	33.09	6.28	32.43	Average	---
3	7236.000	53.64			42.58	35.88	7.83	32.65	Peak	---

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

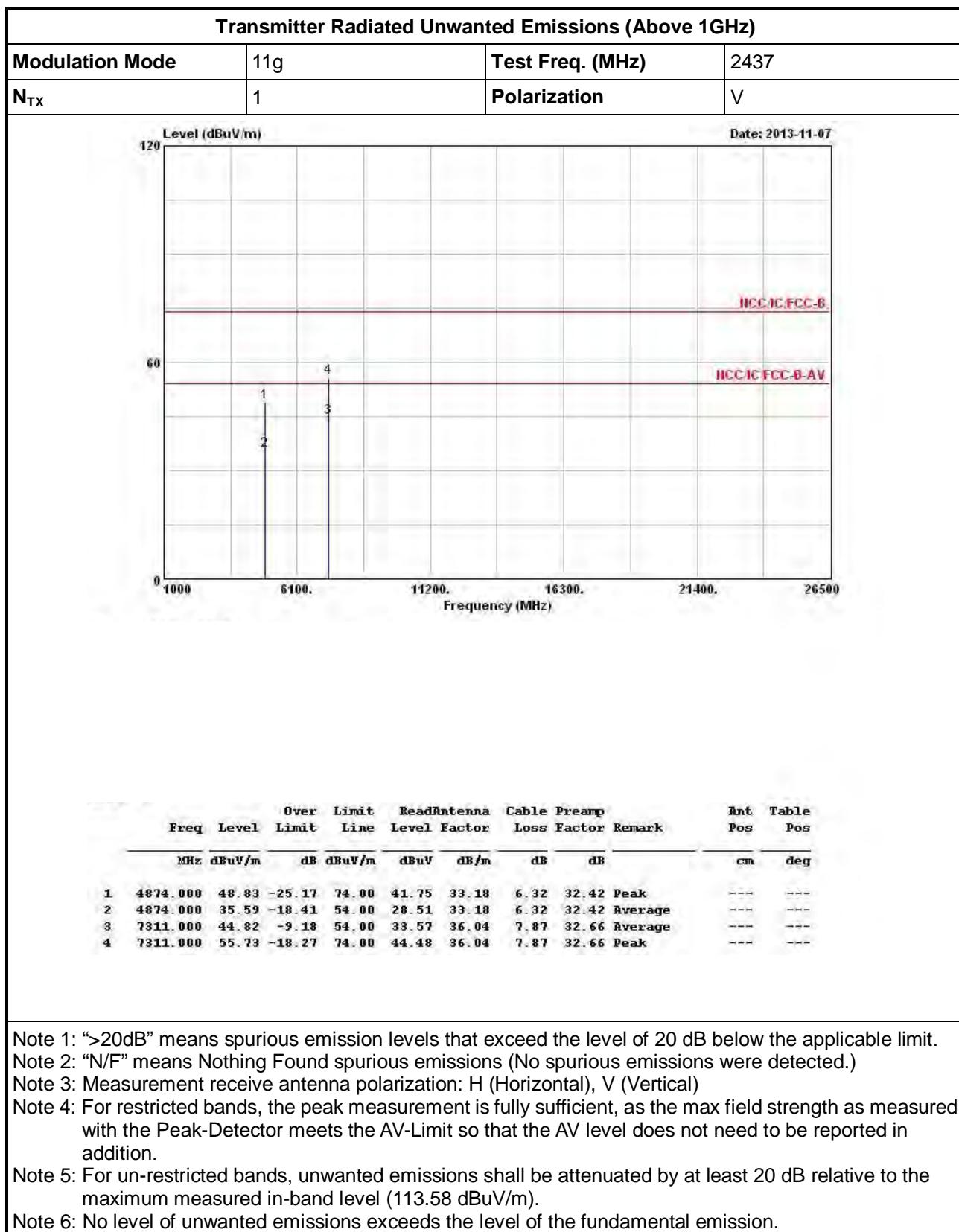
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

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 (107.35 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)	2437
N_{TX}	1	Polarization	H



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
4874.000	48.89	-25.11	74.00	41.81	33.18	6.32	32.42	Peak	---
4874.000	35.57	-18.43	54.00	28.49	33.18	6.32	32.42	Average	---
7311.000	54.33	-19.67	74.00	43.08	36.04	7.87	32.66	Peak	---
7311.000	42.99	-11.01	54.00	31.74	36.04	7.87	32.56	Average	---

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.

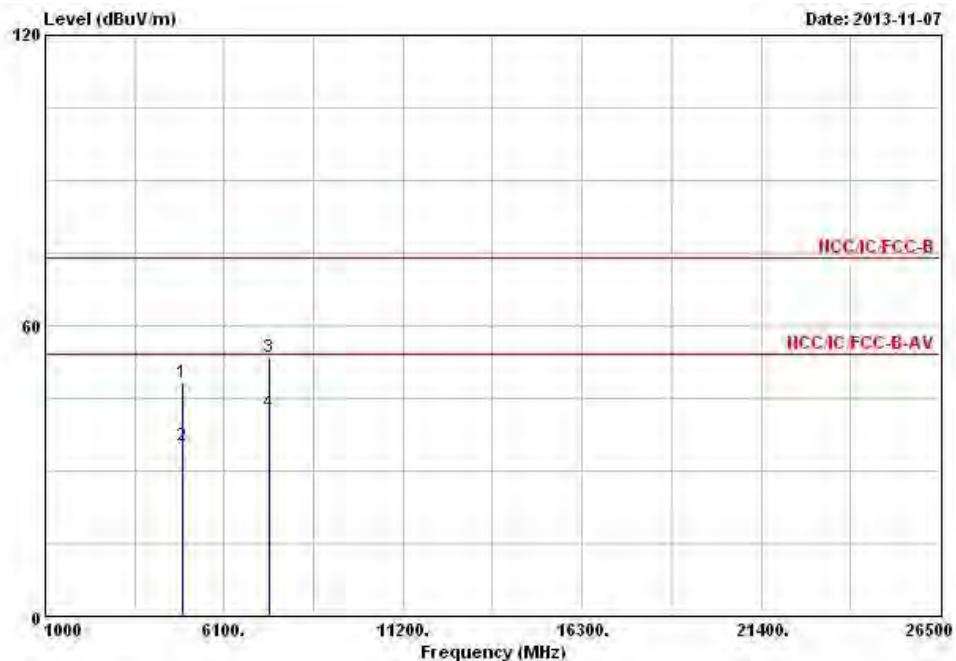
Note 5: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level (113.58 dB_{UV}/m).

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_{TX}	1	Polarization	V



Freq	Level	Over Limit		ReadIntenna		Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	
		MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1	4924.000	48.11	-25.89	74.00	40.84	33.28	6.40	32.41	Peak	---	---
2	4924.000	35.37	-18.63	54.00	28.10	33.28	6.40	32.41	Average	---	---
3	7386.000	53.45	-20.55	74.00	41.98	36.25	7.91	32.69	Peak	---	---
4	7386.000	41.93	-12.07	54.00	30.46	36.25	7.91	32.69	Average	---	---

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

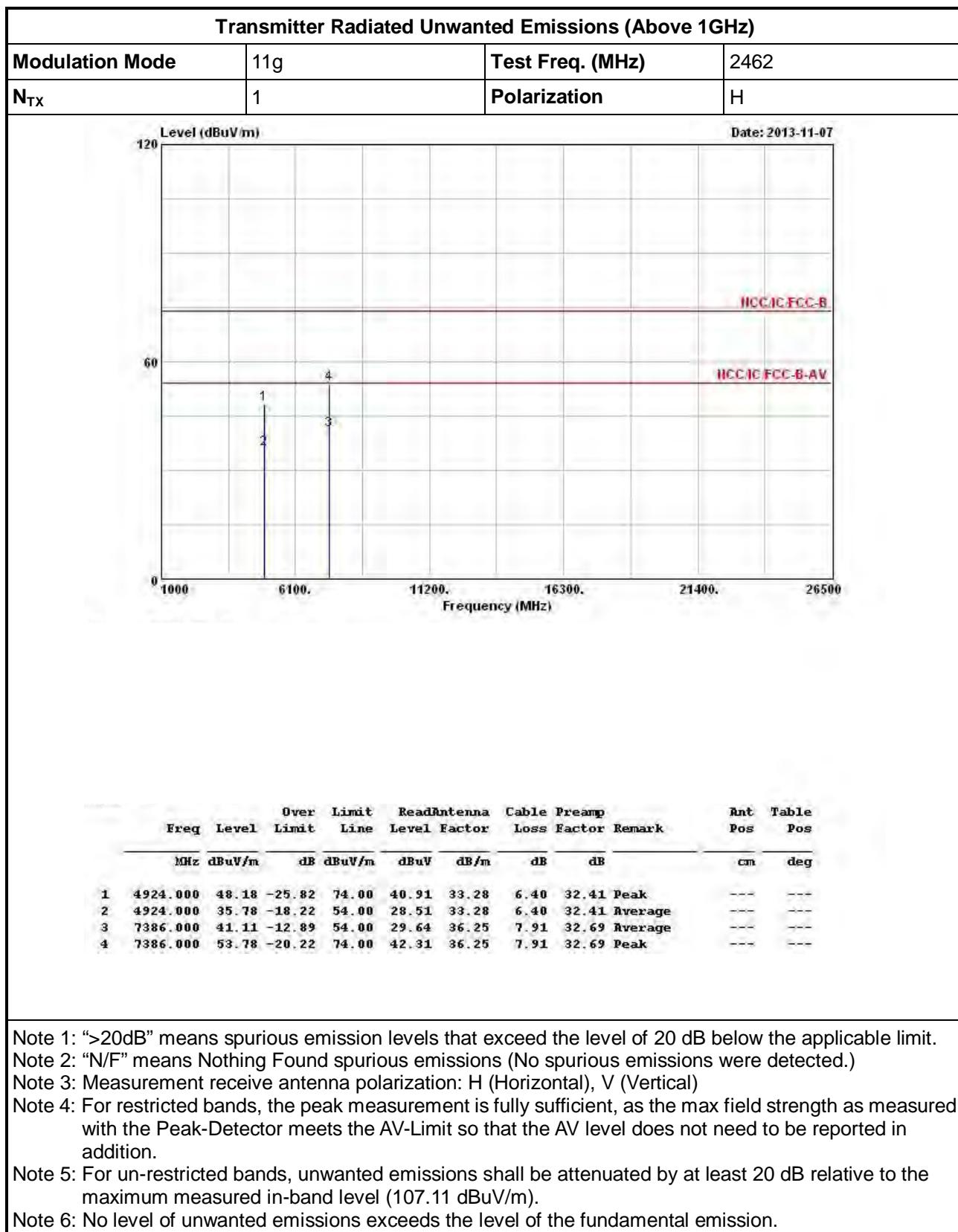
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

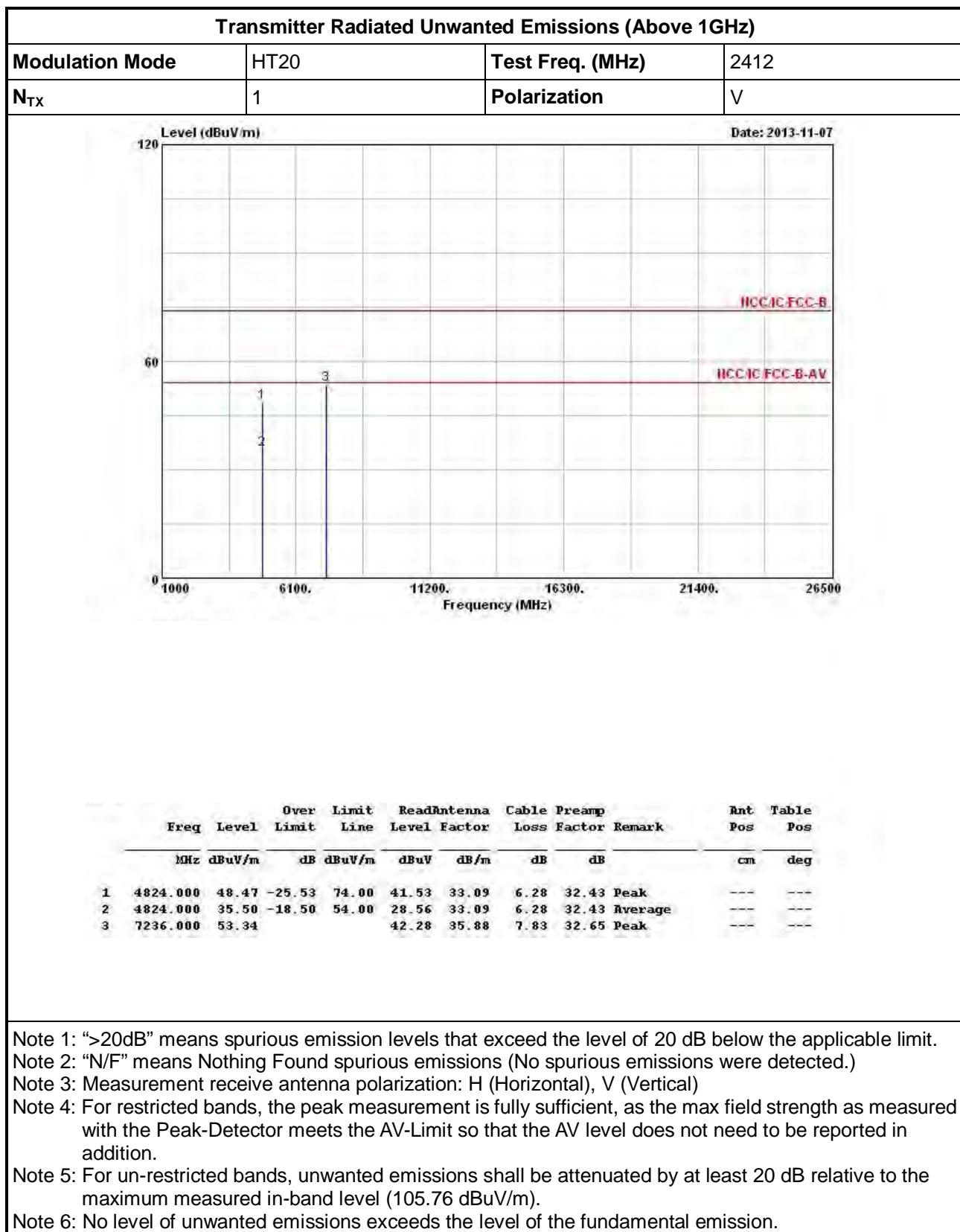
Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

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 (107.11 dBuV/m).

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

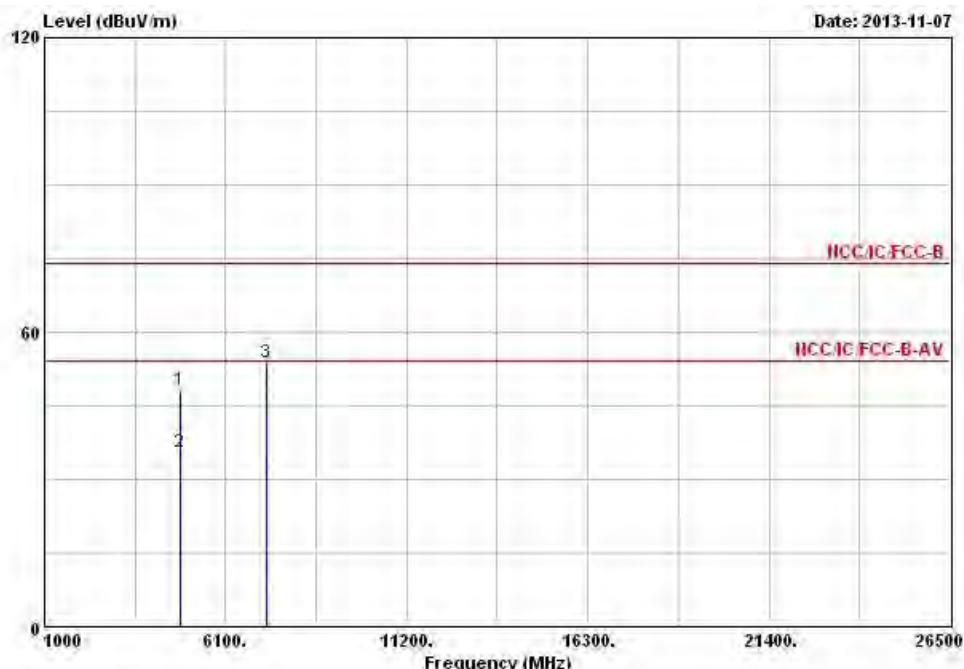






Transmitter Radiated Unwanted Emissions (Above 1GHz)

Modulation Mode	HT20	Test Freq. (MHz)	2412
N _{TX}	1	Polarization	H



Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Remark	Ant	Table
		Limit	Line	Antenna	Level	Loss	Factor		Pos	Pos
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4824.000	48.42	-25.58	74.00	41.48	33.09	6.28	32.43 Peak	---	---
2	4824.000	35.39	-18.61	54.00	28.45	33.09	6.28	32.43 Average	---	---
3	7236.000	53.92			42.86	35.88	7.83	32.65 Peak	---	---

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

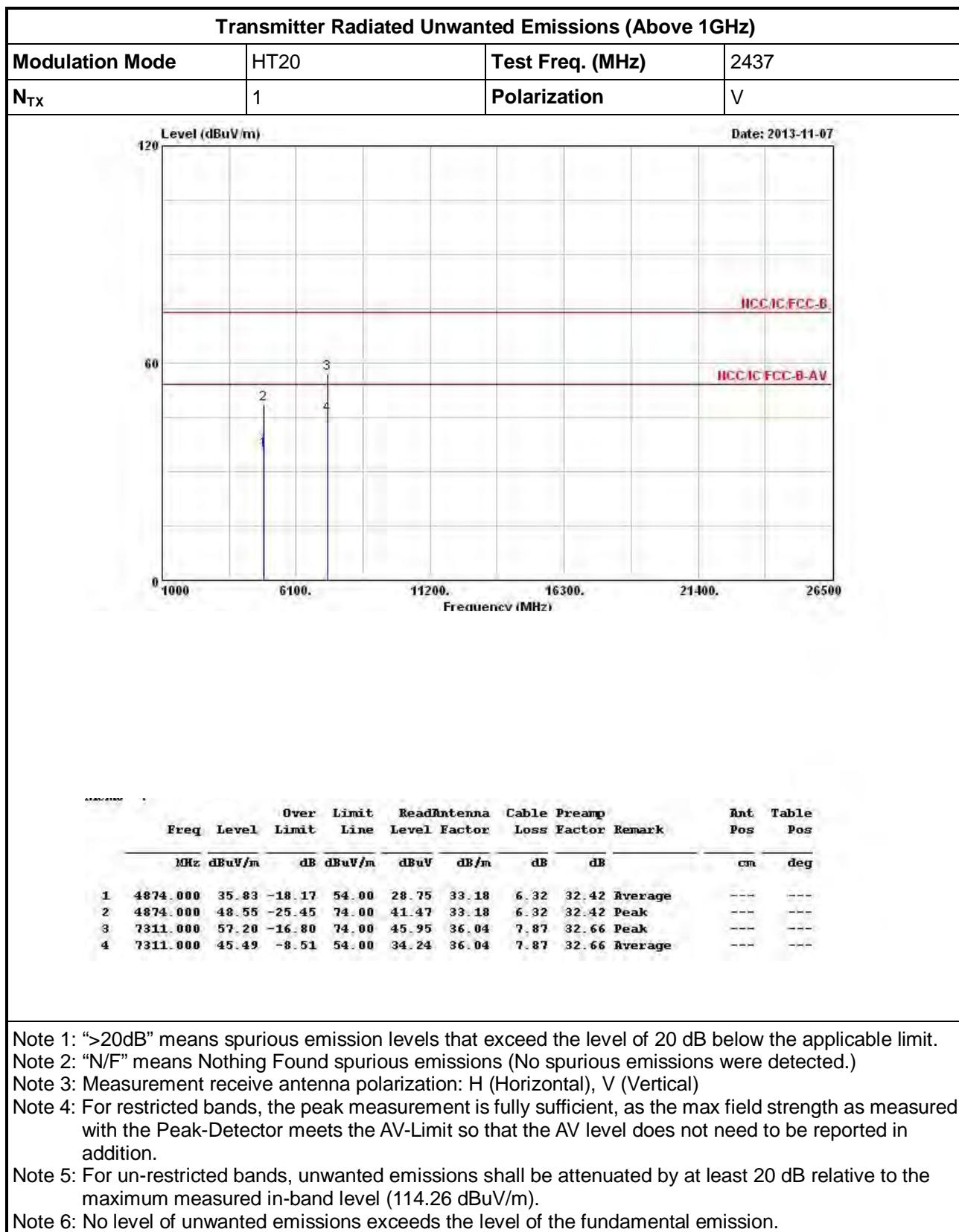
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

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 (105.76 dBuV/m).

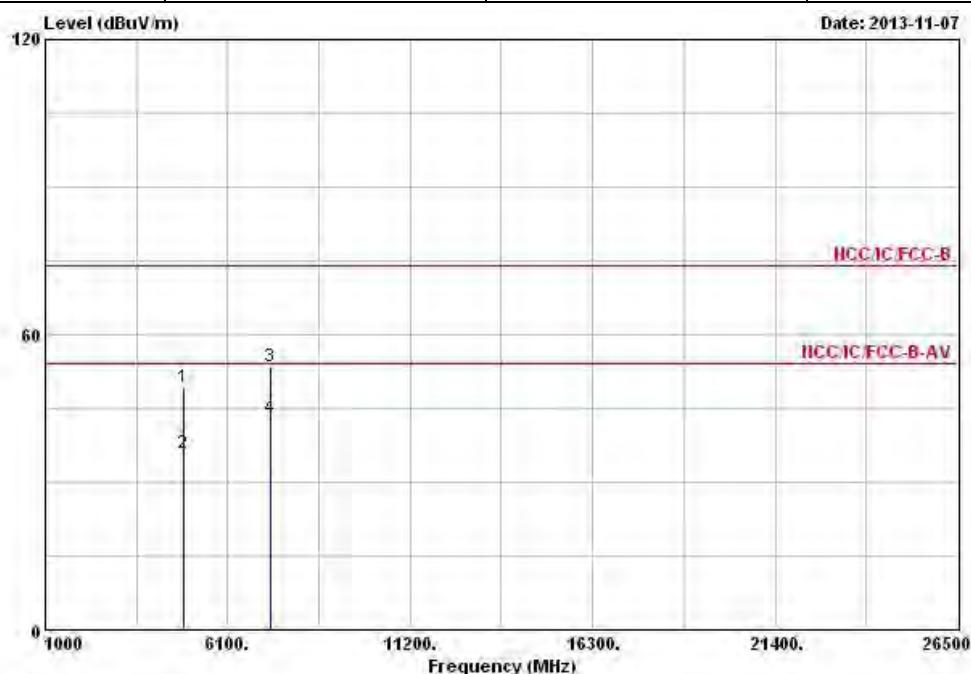
Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.





Transmitter Radiated Unwanted Emissions (Above 1GHz)

Modulation Mode	HT20	Test Freq. (MHz)	2437
N_{TX}	1	Polarization	H



Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Remark	Ant	Table
		Limit	Line	Level	Factor	Loss	Factor			
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1. 4874.000	49.32	-24.68	74.00	42.24	33.18	6.32	32.42	Peak	---	---
2. 4874.000	35.80	-18.20	54.00	28.72	33.18	6.32	32.42	Average	---	---
3. 7311.000	53.41	-20.59	74.00	42.16	36.04	7.87	32.66	Peak	---	---
4. 7311.000	43.13	-10.87	54.00	31.88	36.04	7.87	32.66	Average	---	---

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.

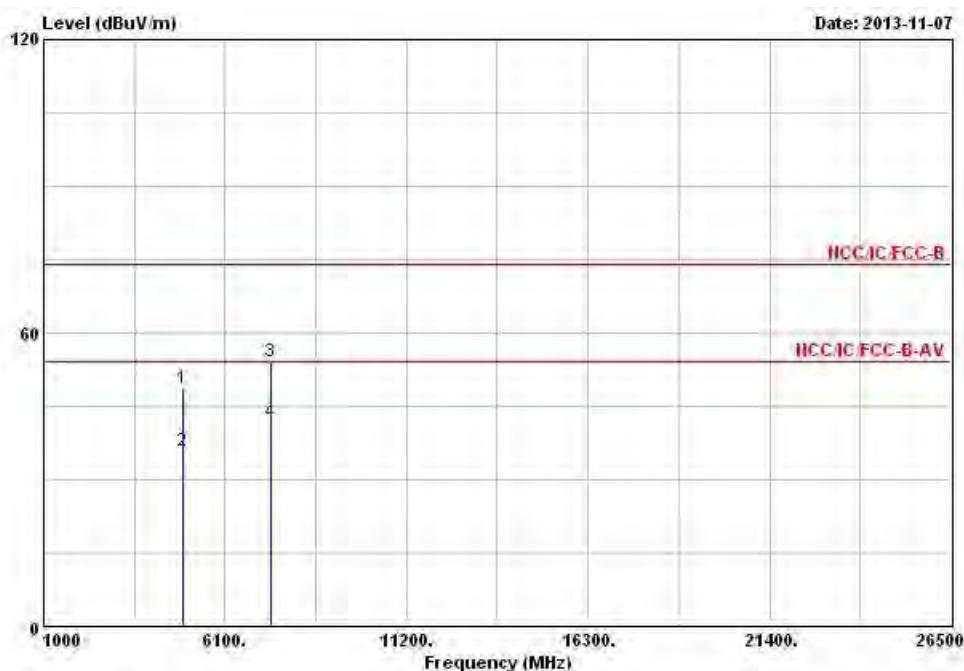
Note 5: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level (114.26 dB_{UV}/m).

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 _{TX}	1	Polarization	V



Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Remark	Ant	Table
		Limit	Line	Antenna	Cable	Loss	Factor			
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 4924.000	48.56	-25.44	74.00	41.29	33.28	6.40	32.41	Peak	---	---
2 4924.000	35.92	-18.08	54.00	28.65	33.28	6.40	32.41	Average	---	---
3 7386.000	53.97	-20.03	74.00	42.50	36.25	7.91	32.69	Peak	---	---
4 7386.000	41.80	-12.20	54.00	30.33	36.25	7.91	32.69	Average	---	---

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

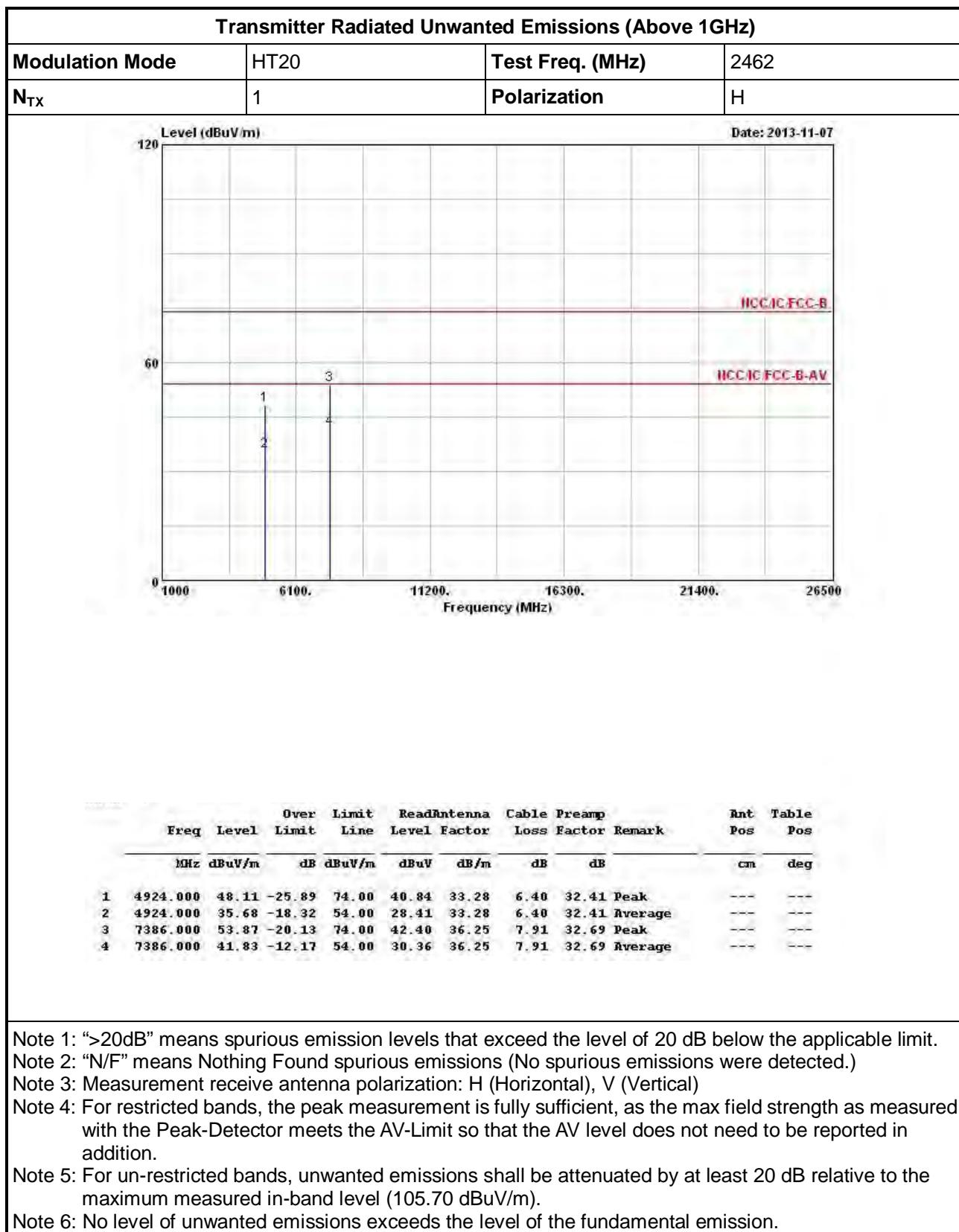
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

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 (105.70 dBuV/m).

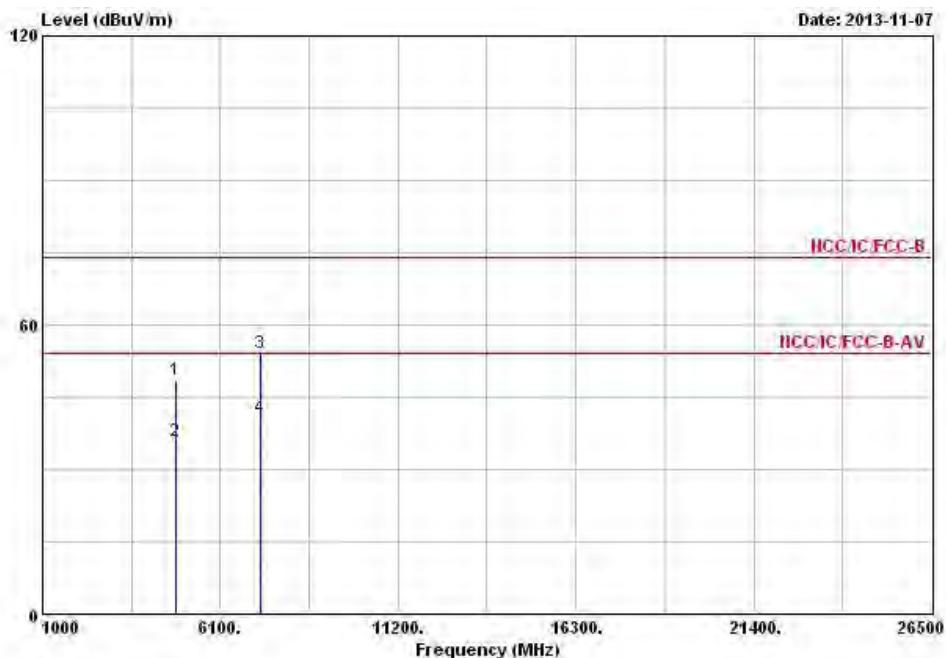
Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.





Transmitter Radiated Unwanted Emissions (Above 1GHz)

Modulation Mode	HT40	Test Freq. (MHz)	2422
N _{TX}	1	Polarization	V



Freq	Level	Over Limit	Line	Read	Antenna	Cable	Preamp	Remark	Rnt	Table
									Pos	Pos
MHz	dBuV/m		dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1 4844.000	48.43	-25.57	74.00	41.42	33.12	6.32	32.43	Peak	---	---
2 4844.000	35.78	-18.22	54.00	28.77	33.12	6.32	32.43	Average	---	---
3 7266.000	53.97	-20.03	74.00	42.82	35.96	7.85	32.66	Peak	---	---
4 7266.000	40.68	-13.32	54.00	29.53	35.96	7.85	32.66	Average	---	---

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

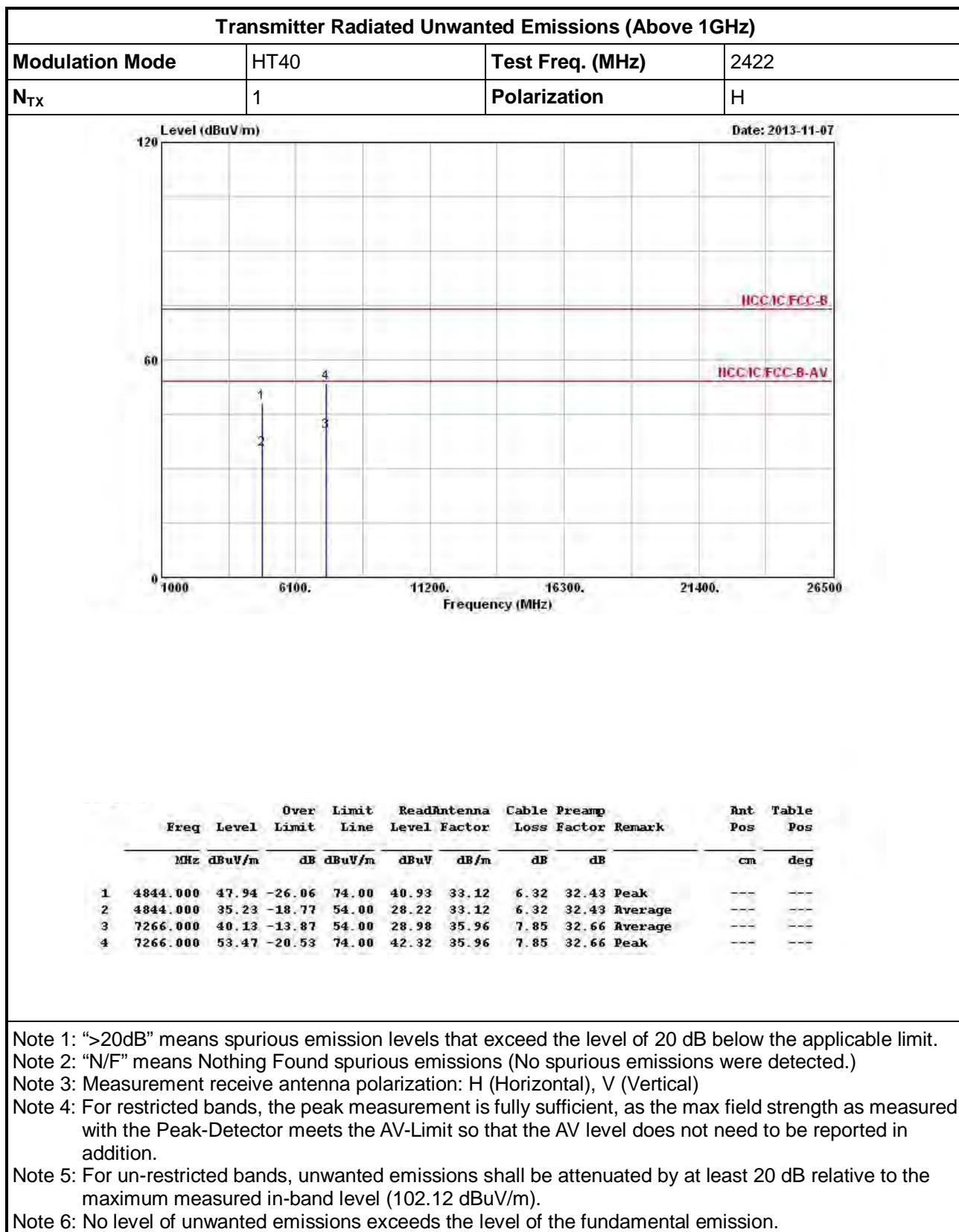
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

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 (102.12 dBuV/m).

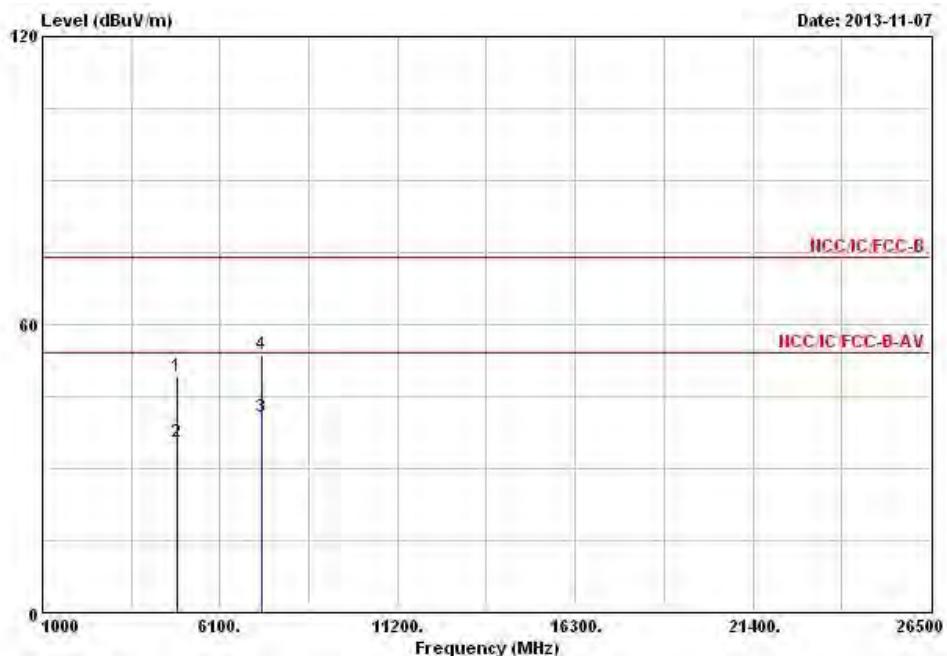
Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.





Transmitter Radiated Unwanted Emissions (Above 1GHz)

Modulation Mode	HT40	Test Freq. (MHz)	2437
N _{TX}	1	Polarization	V



Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table
		Line	Limit	Level	Factor	Cable	Preamp		
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1	4874.000	49.26	-24.74	74.00	42.18	33.18	6.32	32.42	Peak
2	4874.000	35.57	-18.43	54.00	28.49	33.18	6.32	32.42	Average
3	7311.000	40.67	-13.33	54.00	29.42	36.04	7.87	32.66	Average
4	7311.000	53.76	-20.24	74.00	42.51	36.04	7.87	32.66	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.

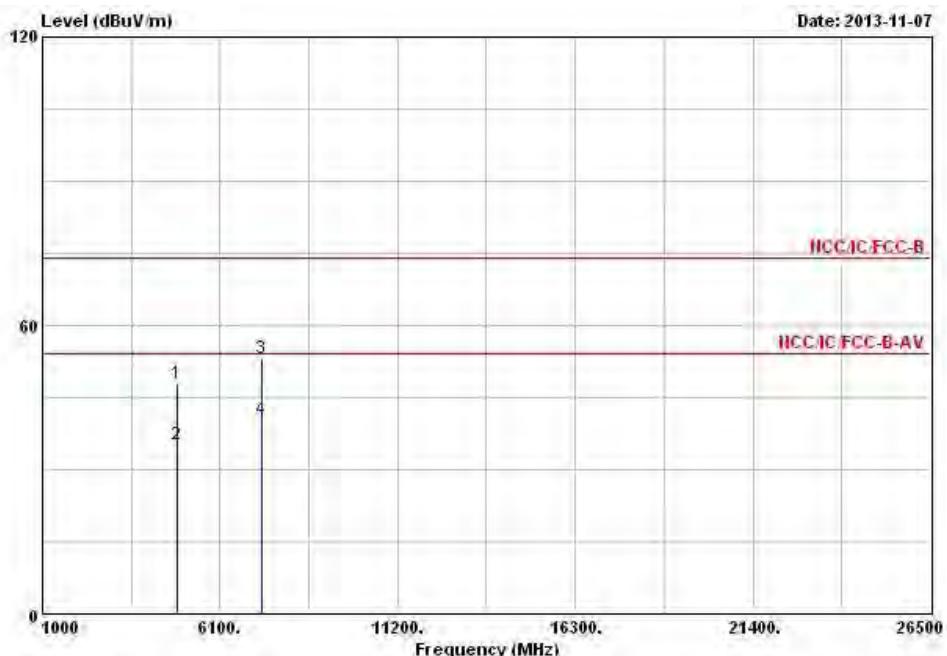
Note 5: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level (106.27 dBuV/m).

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



Transmitter Radiated Unwanted Emissions (Above 1GHz)

Modulation Mode	HT40	Test Freq. (MHz)	2437
N _{TX}	1	Polarization	H



Freq	Level	Over Limit	Line	Read	Antenna	Cable Preamp			Ant Pos	Table Pos
						Antenna Level	Factor	Loss		
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1 4874.000	47.83	-26.17	74.00	40.75	33.18	6.32	32.42	Peak	---	---
2 4874.000	35.35	-18.65	54.00	28.27	33.18	6.32	32.42	Average	---	---
3 7311.000	53.30	-20.70	74.00	42.05	36.04	7.87	32.66	Peak	---	---
4 7311.000	40.36	-13.64	54.00	29.11	36.04	7.87	32.66	Average	---	---

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

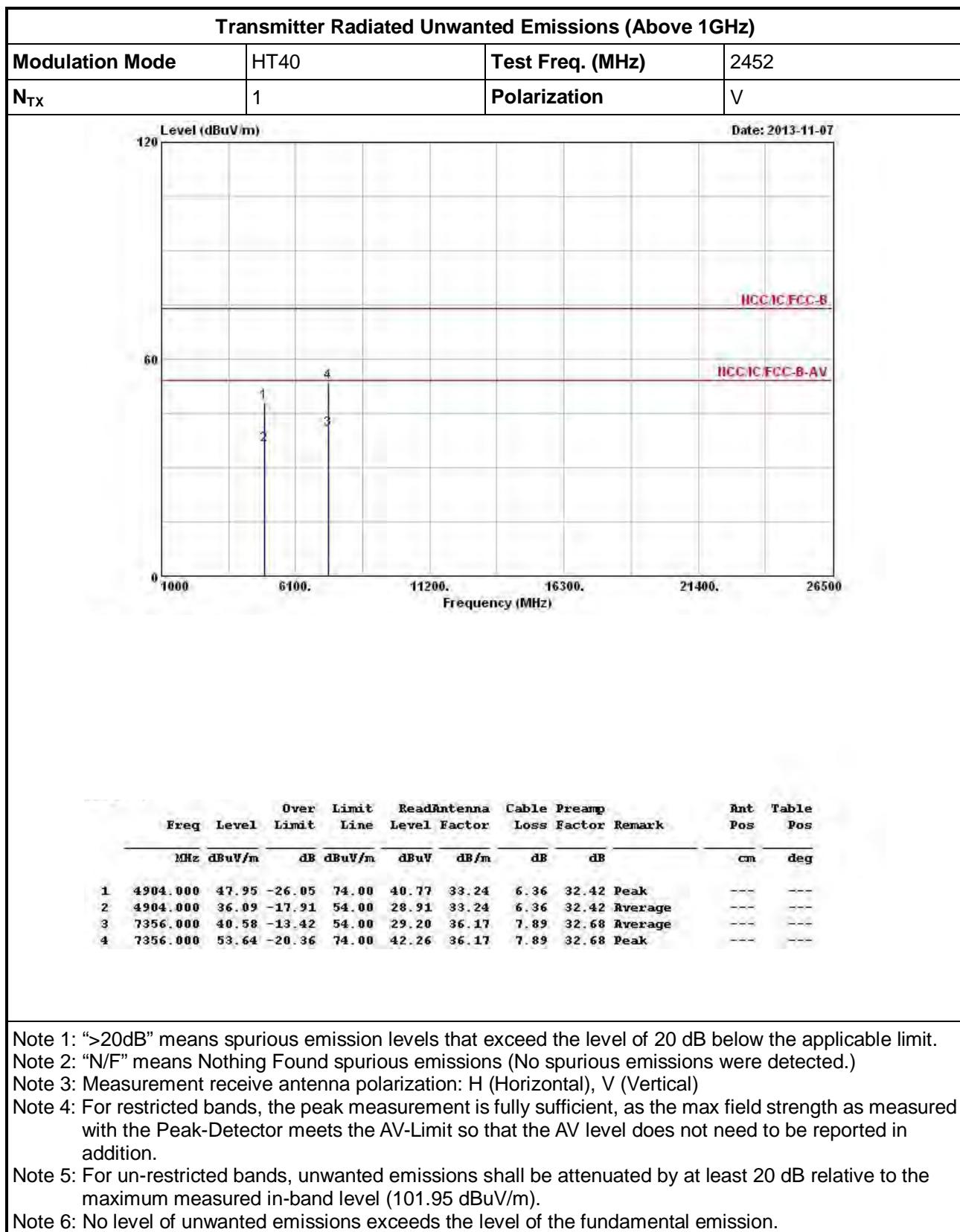
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

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 (106.27 dBuV/m).

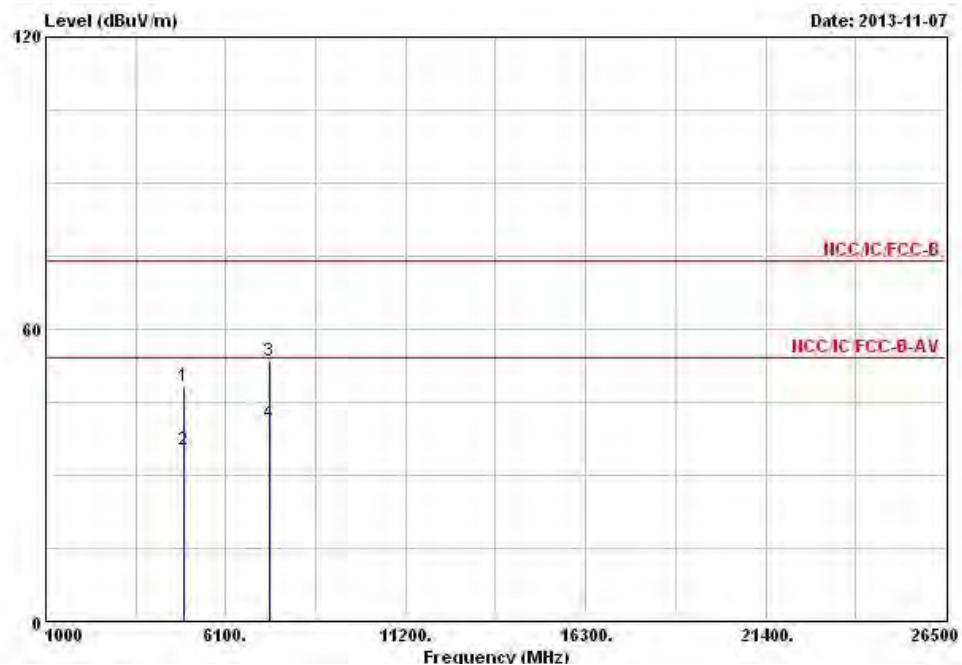
Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.





Transmitter Radiated Unwanted Emissions (Above 1GHz)

Modulation Mode	HT40	Test Freq. (MHz)	2452
N _{TX}	1	Polarization	H



Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Remark	Ant	Table
		Line	dBuV/m	Level	Factor	Cable	Preamp			
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 4904.000	48.34	-25.66	74.00	41.16	33.24	6.36	32.42	Peak	---	---
2 4904.000	35.28	-18.72	54.00	28.10	33.24	6.36	32.42	Average	---	---
3 7356.000	53.45	-20.55	74.00	42.07	36.17	7.89	32.68	Peak	---	---
4 7356.000	40.69	-13.31	54.00	29.31	36.17	7.89	32.68	Average	---	---

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 (101.95 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	Mar. 26, 2013	Conduction (CO04-HY)
LISN	SCHWARZBECK MESS-ELEKTRONIK	NSLK 8127	8127-477	9kHz ~ 30MHz	Jan. 21, 2013	Conduction (CO04-HY)
LISN (Support Unit)	EMCO	3810/2NM	9703-1839	9kHz ~ 30MHz	Apr. 18, 2013	Conduction (CO04-HY)
RF Cable-CON	HUBER+SUHNER	RG213/U	7.61183201e+012	9kHz ~ 30MHz	Nov. 09, 2012	Conduction (CO04-HY)

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

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Spectrum Analyzer	R&S	FSV 40	101013	9KHz ~ 40GHz	Jan. 29, 2013	Conducted (TH06-HY)
Signal Generator	R&S	SMR40	100116	10MHz ~ 40GHz	Jun. 27, 2013	Conducted (TH06-HY)
RF Cable-0.5m	HUBER+SUHNER	SUCOFLEX_104	10715/4	30MHz ~ 26.5GHz	Dec. 04, 2012	Conducted (TH06-HY)

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



Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30MHz ~ 1GHz 3m	Dec. 01, 2012	Radiation (03CH03-HY)
Amplifier	HP	8447D	2944A08033	10kHz ~ 1.3GHz	May. 03, 2013	Radiation (03CH03-HY)
Amplifier	Agilent	8449B	3008A02120	1GHz ~ 26.5GHz	Aug. 20, 2013	Radiation (03CH03-HY)
Spectrum	R&S	FSP30	100023	9kHz ~ 30GHz	Jul. 20, 2013	Radiation (03CH03-HY)
Bilog Antenna	SCHAFFNER	CBL 6112D	22237	30MHz ~ 1GHz	Sep. 21, 2013	Radiation (03CH03-HY)
Horn Antenna	EMCO	3115	6741	1GHz ~ 18GHz	May 31, 2013	Radiation (03CH03-HY)
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170154	15GHz ~ 40GHz	Jan. 08, 2013	Radiation (03CH03-HY)
RF Cable-R03m	Jye Bao	RG142	CB021	9kHz ~ 1GHz	Jan. 17, 2013	Radiation (03CH03-HY)
RF Cable-high	SUHNER	SUCOFLEX 106	03CH03-HY	1GHz ~ 40GHz	Jan. 17, 2013	Radiation (03CH03-HY)
Turn Table	EM Electronics	EM Electronics	060615	0 ~ 360 degree	N/A	Radiation (03CH03-HY)
Antenna Mast	MF	MF-7802	MF780208179	1 ~ 4 m	N/A	Radiation (03CH03-HY)

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

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Loop Antenna	TESEQ	HLA 6120	31244	9kHz ~ 30MHz	Dec. 02, 2012	Radiation (03CH03-HY)

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