

FCC / IC Radio Test Report

Applicant : Qualcomm Atheros, Inc.
Manufacturer : 1700 Technology Drive, San Jose, CA95110
Equipment : 1X1 802.11b/g/n-BT4.0 Combo PCIe MoB Module
Brand Name : Qualcomm Atheros
Model No. : QCMD335
FCC ID : PPD-QCMD335
IC ID : 4104A-QCMD335
Standard : 47 CFR FCC Part 15.247
RSS-210 Issue 8
Operating Band : 2400 MHz – 2483.5 MHz

The product sample received on Apr. 25, 2013 and completely tested on May 21, 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:

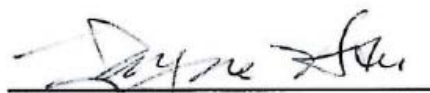

Wayne Hsu

Table of Contents

1	GENERAL DESCRIPTION	5
1.1	Information.....	5
1.2	Support Equipment.....	8
1.3	Testing Applied Standards	8
1.4	Testing Location Information.....	8
1.5	Measurement Uncertainty	9
2	TEST CONFIGURATION OF EUT	10
2.1	Test Setup Diagram	10
3	TRANSMITTER TEST RESULT	12
3.1	99% and 6dB Bandwidth	12
3.2	RF Output Power.....	16
3.3	Power Spectral Density	19
3.4	Emission in Non-Restricted Frequency Bands.....	22
3.5	Emission in Restricted Frequency Bands	27
3.5.3	Emission in Restricted Frequency Bands- (Below 30MHz)	28
3.5.4	Emission in Restricted Frequency Bands- (Below 1GHz).....	29
3.5.5	Emission in Restricted Frequency Bands- (Above 1GHz)	35
3.6	AC Power-line Conducted Emissions	47
4	TEST EQUIPMENT AND CALIBRATION DATA	50
APPENDIX A. TEST PHOTOS		
APPENDIX B. PHOTOGRAPHS OF EUT		

Summary of Test Result

Conformance Test Specifications					
Report Clause	Ref. Std. Clause	Description	Typical Data	Limit	Result
1.1.4	15.203	Antenna Requirement	Antenna connector mechanism complied	According to FCC 15.203	Complied
3.1	15.247(a) / RSS-210 A8.2 / /RSS-Gen 4.6.1	6dB Bandwidth	20M: 17.73 MHz 40M: 36.32 MHz	≥500kHz	Complied
		99% Bandwidth	20M: 18.03 MHz 40M: 36.90 MHz		
3.2	15.247(b) / RSS-210 A8.4	RF Output Power (Maximum Peak Conducted Output Power)	11 b: 20.96 dBm 11 g: 22.92 dBm 11 n HT20: 21.94 dBm 11 n HT40: 21.05 dBm	≤ 30 dBm	Complied
3.3	15.247(e) / RSS-210 A8.2	Power Spectral Density	11 b: -7.23 dBm/3kHz 11 g: -11.90 dBm/3kHz 11 n HT20: -13.11 dBm/3kHz 11 n HT40: -16.80 dBm/3kHz	≤ 8 dBm/3kHz	Complied
3.4	15.247(d) / RSS-210 A8.5	Emission in Non-Restricted Frequency Bands	Non-Restricted Bands	Non-Restricted Bands: > 20 dBc	Complied
3.5	15.247(d) / RSS-210 A8.5	Emission in Restricted Frequency Bands	Restricted Bands 2483.616 MHz -24.58 dBm – PK -42.18 dBm – AV	Restricted Bands: According to FCC 15.209 / RSS-Gen 6.1	Complied
3.6	15.207 / RSS-Gen 7.2.4	AC Power-line Conducted Emissions	0.1524030 MHz 30.94 dBuV - AV 50.53 dBuV - QP	According to FCC 15.207 / RSS-Gen 7.2.4	Complied

Revision History

[illegible]

1 General Description

1.1 Information

1.1.1 RF General Information (WLAN)

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, 2417, 2422, 2427, 2432, 2437, 2442, 2447, 2452, 2457, 2462	11	1	20.96	Yes
	g	2412, 2417, 2422, 2427, 2432, 2437, 2442, 2447, 2452, 2457, 2462	11	1	22.92	Yes
	n (HT20)	2412, 2417, 2422, 2427, 2432, 2437, 2442, 2447, 2452, 2457, 2462	11	1	21.94	Yes
	n (HT40)	2422, 2427, 2432, 2437, 2442, 2447, 2452	7	1	21.05	Yes
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 WLAN/ BT coexistence mode

- ♦ 1X1 WLAN + BT: WLAN/BT concurrent at different antenna port and 18MHz separation between WLAN and BT fundamental.

1.1.3 The HW Variants

There are two HW variants to this module. The pretesting is conducted and test data from worst case is recorded in test report.

- ♦ HW version 032: Single module - Antenna port on module.
- ♦ HW version 132: Limited module - Micro-strip trace and antenna port on host printed circuit board to antenna ports.

1.1.4 Antenna Information

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

Antenna General Information			
No.	Ant. Type	Frequency Band	Maximum Gain (dBi)
1	PIFA	2400~2483.5MHz	3.60

Directional Gain (DG) Result				
Transmit Chains No.	1			
Maximum G _{ANT} (dBi)	3.62			
Modulation Mode	N _{TX}	N _{SS}	Array Gain (dB)	DG (dBi)
11b, 1-11Mbps	1	1	0	3.62
11g, 6-54Mbps	1	1	0	3.62
HT20, M0-7	1	1	0	3.62
HT40, M0-M7	1	1	0	3.62

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 ≥ 40 MHz for any N_{TX} ;

Note 5: For power spectral density (PSD) measurements on all devices,
Array Gain = $10 \log(N_{ANT}/N_{SS})$ dB.

1.1.5 Test Signal Duty Cycle

Operated Mode for Duty Cycle	
<input type="checkbox"/> Operated normally mode for duty cycle	
<input checked="" type="checkbox"/> Operated test mode for duty cycle	
Test Signal Duty Cycle (x)	Power Duty Factor [dB] – (10 log 1/x)
<input checked="" type="checkbox"/> 100% - IEEE 802.11b	0.00
<input checked="" type="checkbox"/> 100% - IEEE 802.11g	0.00
<input checked="" type="checkbox"/> 98.97% - IEEE 802.11n (HT20)	0.05
<input checked="" type="checkbox"/> 100% - IEEE 802.11n (HT40)	0.00

1.1.6 EUT Operational Condition

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

1.2 Support Equipment

Support Equipment - Conducted Emissions				
No.	Equipment	Brand Name	Model Name	Serial No.
1	Notebook	DELL	E6320	DoC
2	(USB) Mouse	Microsoft	1113	DoC
3	(USB) Printer	EPSON	C61	DoC
4	Bluetooth Earphone	SONY	HBH-PV702	--
5	Test Fixture	--	--	--
6	Wireless AP (Remote Workstation)	D-LINK	DNS-G120	DoC

Support Equipment - Radiated Emissions				
No.	Equipment	Brand Name	Model Name	Serial No.
1	Notebook	DELL	INSPIRON 6400	DoC
2	Test Fixture	--	--	--

1.3 Testing Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ◆ 47 CFR FCC Part 15 Subpart C 15.247
- ◆ RSS-210 Issue 8
- ◆ RSS-GEN Issue 3
- ◆ ANSI C63.10-2009
- ◆ FCC KDB 558074
- ◆ FCC KDB 662911
- ◆ FCC KDB 412172

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	Test Date
AC Conduction	CO04-HY	Zeus	19.6°C / 60%	May 17, 2013
RF Conducted	TH01-HY	Ian	22.7°C / 47.6%	May 16, 2013~ May 21, 2013
Radiated Emission	03CH02-HY	Hsiao	24.6°C / 63%	May 13, 2013~ May 15, 2013

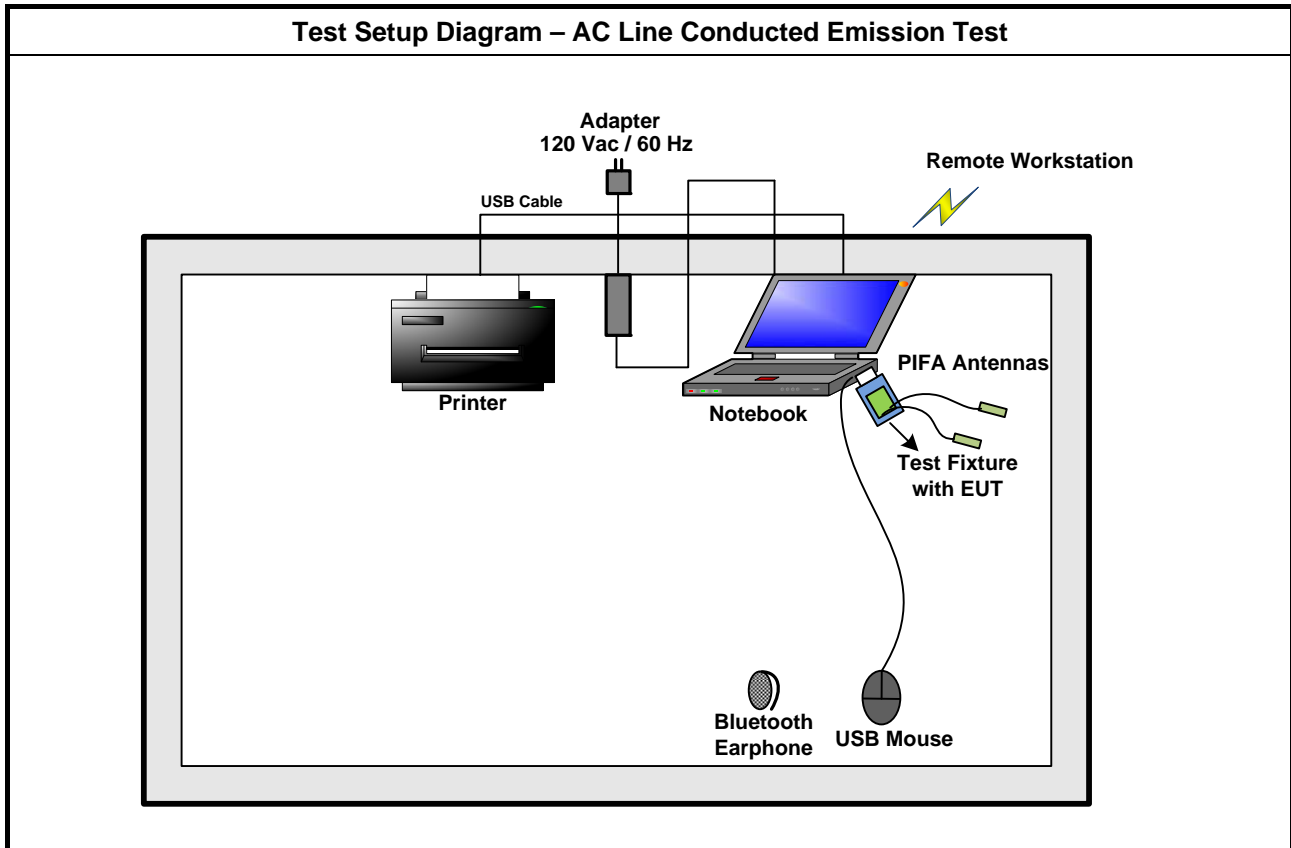
1.5 Measurement Uncertainty

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))

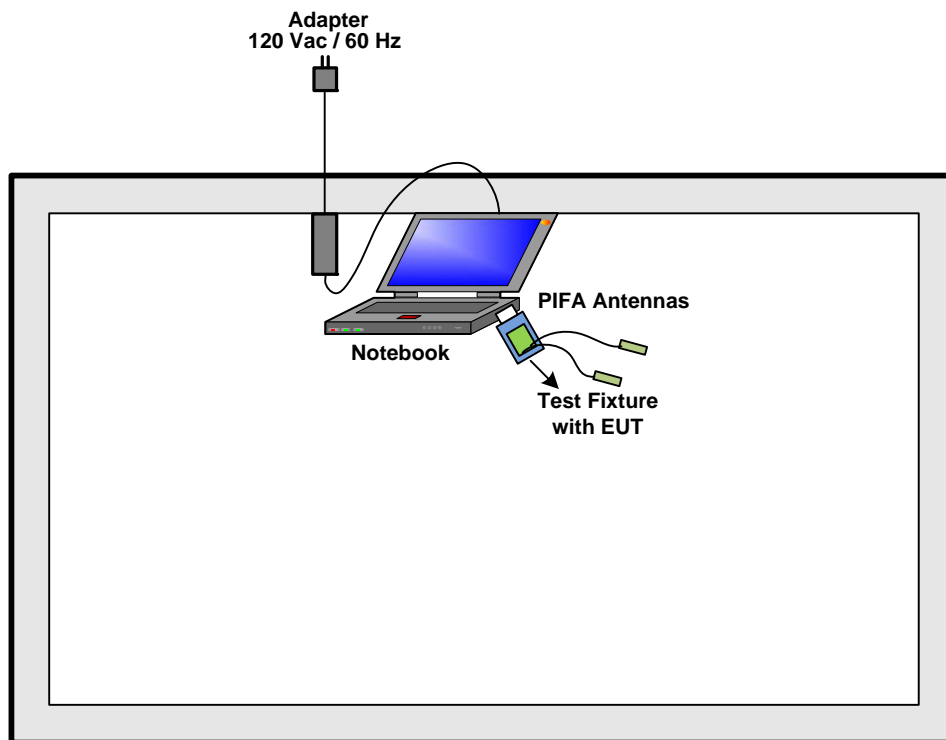
Measurement Uncertainty			
Test Item		Uncertainty	Limit
AC power-line conducted emissions		±2.26 dB	N/A
Emission bandwidth, 6dB bandwidth		±1.42 %	N/A
RF output power, conducted		±0.63 dB	N/A
Power density, conducted		±0.81 dB	N/A
Unwanted emissions, conducted	30 – 1000 MHz	±0.51 dB	N/A
	1 – 18 GHz	±0.67 dB	N/A
	18 – 40 GHz	±0.83 dB	N/A
	40 – 200 GHz	N/A	N/A
All emissions, radiated	30 – 1000 MHz	±2.56 dB	N/A
	1 – 18 GHz	±3.59 dB	N/A
	18 – 40 GHz	±3.82 dB	N/A
	40 – 200 GHz	N/A	N/A
Temperature		±0.8 °C	N/A
Humidity		±3 %	N/A
DC and low frequency voltages		±3 %	N/A
Time		±1.42 %	N/A
Duty Cycle		±1.42 %	N/A

2 Test Configuration of EUT

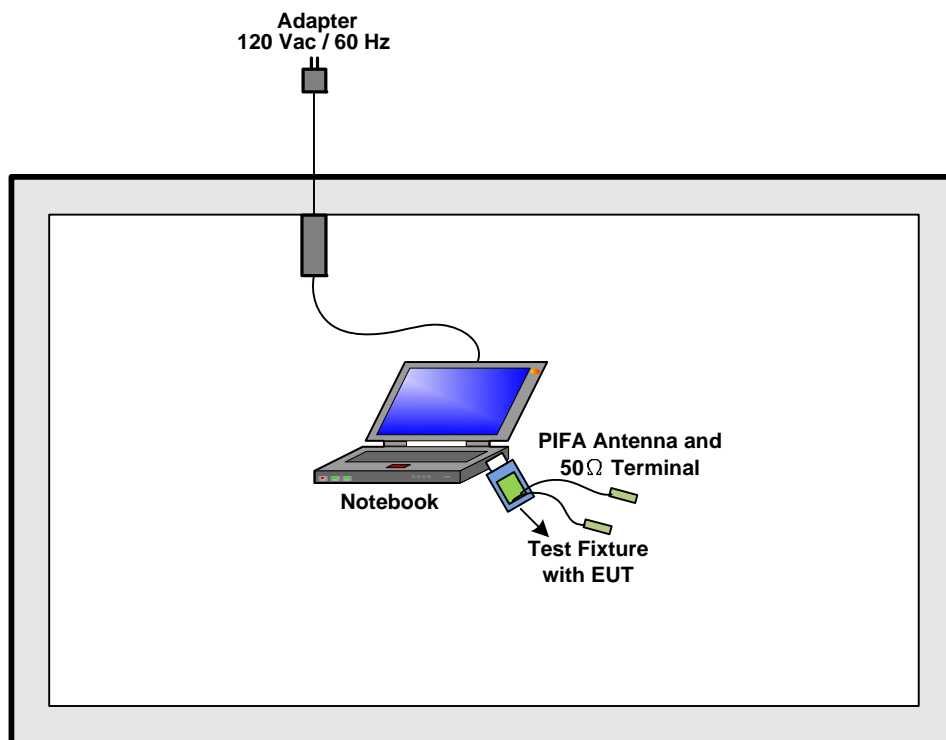
2.1 Test Setup Diagram



Test Setup Diagram - Radiated Test (Below 1GHz)



Test Setup Diagram - Radiated Test (Above 1GHz)



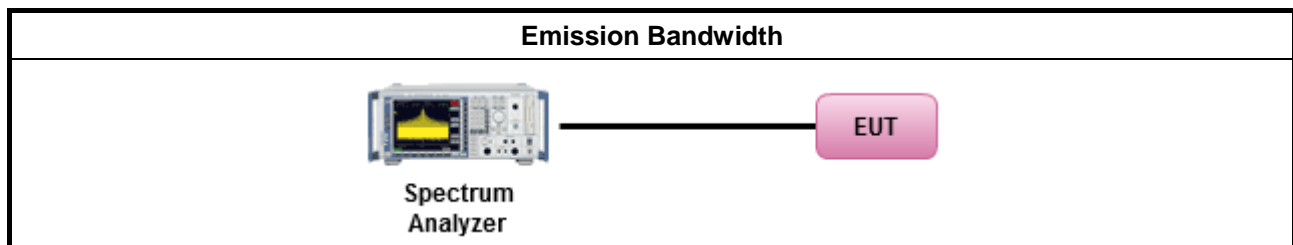
3 Transmitter Test Result

3.1 99% and 6dB Bandwidth

3.1.1 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 7.1 Option 1 for 6 dB bandwidth measurement.
<input checked="" type="checkbox"/>	Refer as RSS-210 A8.2 for 6 dB bandwidth and RSS-Gen section 4.6.1 for 99% dB bandwidth measurement.
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 7.2 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 checked="" 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.

3.1.2 Test Setup



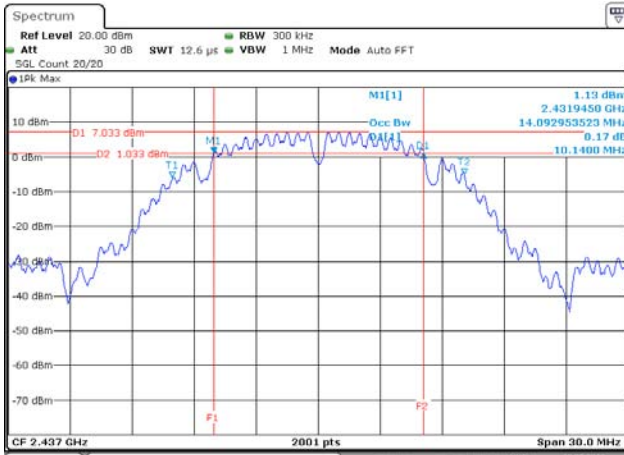
3.1.3 Test Result of Emission Bandwidth

Emission Bandwidth Result				
Condition			Emission Bandwidth (MHz)	
Modulation Mode	N _{TX}	Freq. (MHz)	99% Bandwidth	6dB Bandwidth
			Chain 0	Chain 0
11b_1Mbps	1	2412	14.06	9.72
11b_1Mbps	1	2437	14.09	9.85
11b_1Mbps	1	2462	14.04	9.57
11g_6Mbps	1	2412	16.62	16.41
11g_6Mbps	1	2437	16.77	16.48
11g_6Mbps	1	2462	16.79	16.33
HT-20_MCS0	1	2412	17.72	17.73
HT-20_MCS0	1	2437	17.70	17.64
HT-20_MCS0	1	2462	18.03	17.55
HT-40_MCS0	1	2422	36.90	36.32
HT-40_MCS0	1	2437	36.42	36.28
HT-40_MCS0	1	2452	36.38	36.32
Limit			N/A	≥500 kHz
Result			Complied	
Note 1: N _{TX} = Number of Transmit Chains				

Worst Emission Bandwidth Plots

99% bandwidth

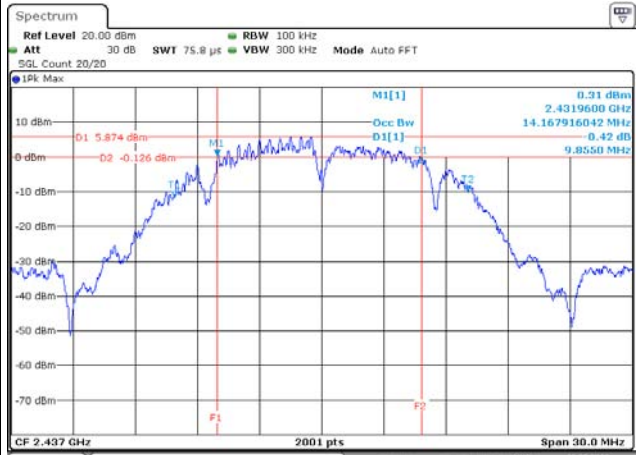
11b



Date: 18.MAY.2013 09:50:22

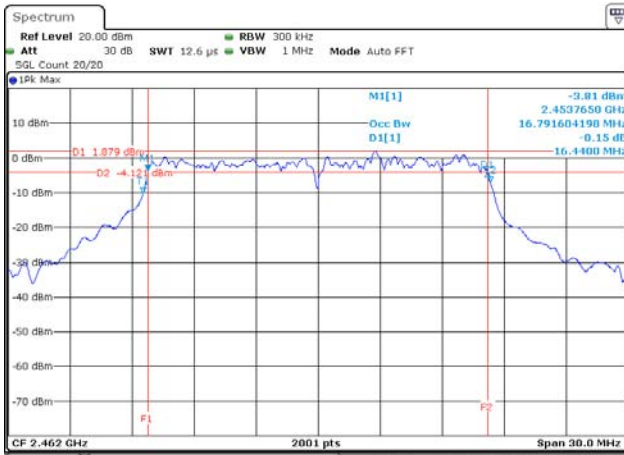
6dB bandwidth

11b



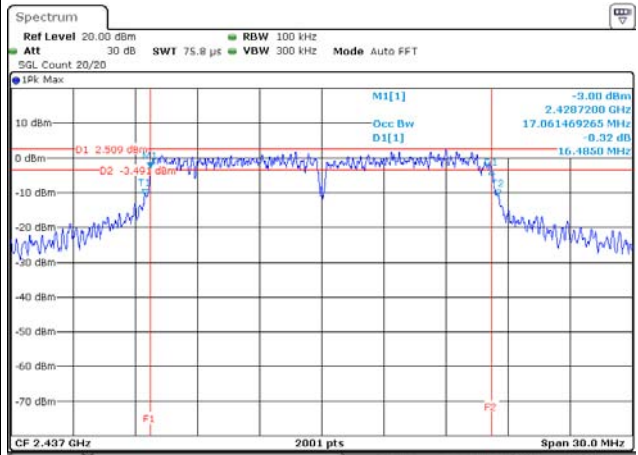
Date: 16.MAY.2013 16:59:58

11g



Date: 18.MAY.2013 09:53:37

11g

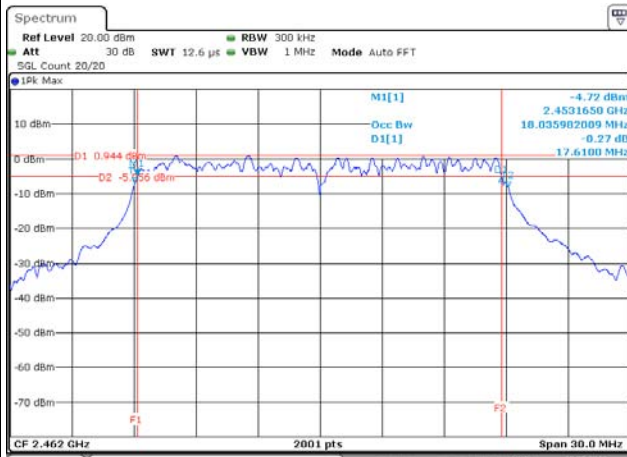


Date: 16.MAY.2013 17:50:03

Worst Emission Bandwidth Plots

99% bandwidth

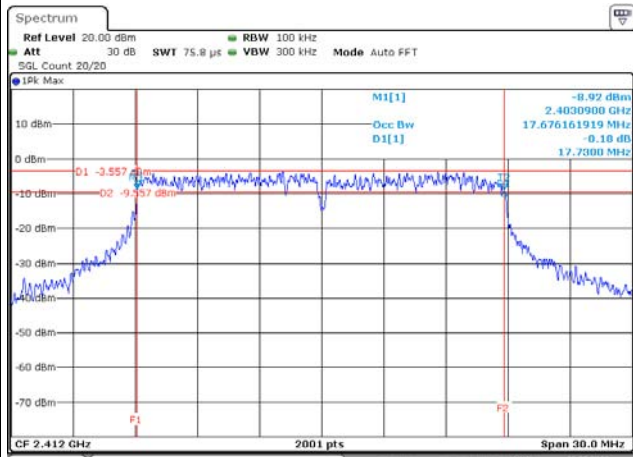
HT20



Date: 18.MAY.2013 09:56:40

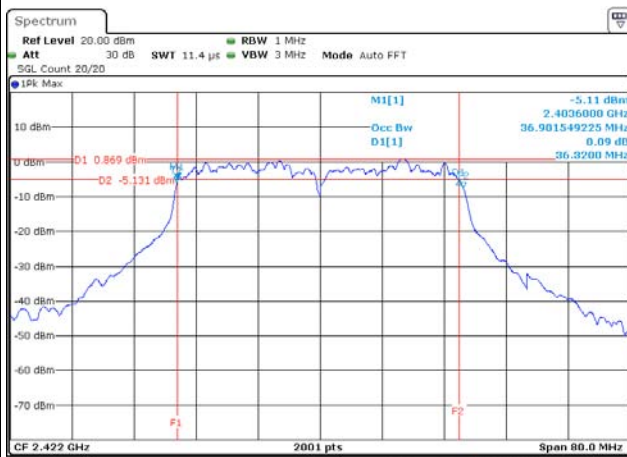
6dB bandwidth

HT20



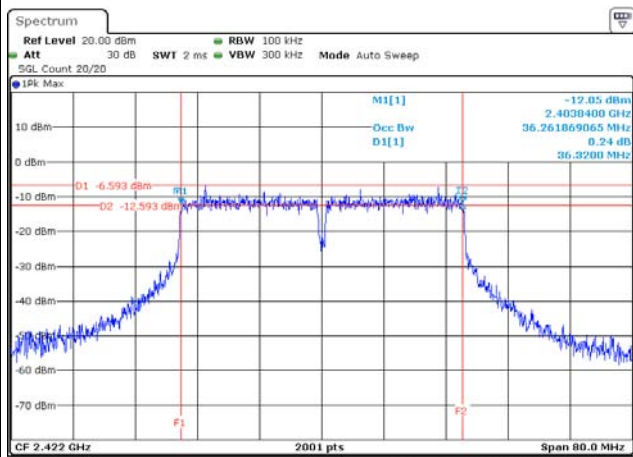
Date: 16.MAY.2013 18:56:04

HT40



Date: 18.MAY.2013 09:57:32

HT40



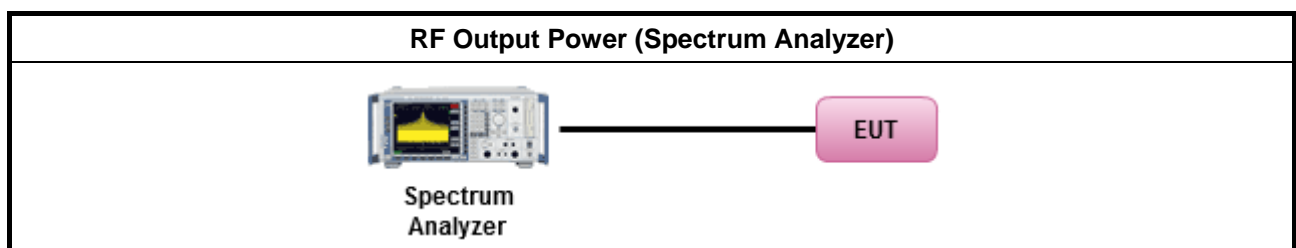
Date: 16.MAY.2013 19:34:40

3.2 RF Output Power

3.2.1 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 ≥ 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 ≥ DTS BW)
<input checked="" type="checkbox"/>	Refer as RSS-210 A8.4.
<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 type="checkbox"/>	Refer as FCC KDB 558074, clause 8.2.2 Option 2 (slow sweep speed).
<input checked="" 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 checked="" 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]) $EIRP_{total} = P_{total} + DG$

3.2.2 Test Setup



3.2.3 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)	Chain 0	Sum Chain	Power Limit	DG (dBi)	EIRP Power	EIRP Limit
11b_1Mbps	1	2412	20.94	20.94	30.00	3.60	24.54	36.00
11b_1Mbps	1	2437	20.96	20.96	30.00	3.60	24.56	36.00
11b_1Mbps	1	2462	20.11	20.11	30.00	3.60	23.71	36.00
11g_6Mbps	1	2412	18.58	18.58	30.00	3.60	22.18	36.00
11g_6Mbps	1	2437	22.92	22.92	30.00	3.60	26.52	36.00
11g_6Mbps	1	2462	18.73	18.73	30.00	3.60	22.33	36.00
HT-20_MCS0	1	2412	17.91	17.91	30.00	3.60	21.51	36.00
HT-20_MCS0	1	2437	21.94	21.94	30.00	3.60	25.54	36.00
HT-20_MCS0	1	2462	18.16	18.16	30.00	3.60	21.76	36.00
HT-40_MCS0	1	2422	15.38	15.38	30.00	3.60	18.98	36.00
HT-40_MCS0	1	2437	21.05	21.05	30.00	3.60	24.65	36.00
HT-40_MCS0	1	2452	16.57	16.57	30.00	3.60	20.17	36.00
Result			Complied					

3.2.4 Test Result of Maximum Average Conducted Output Power

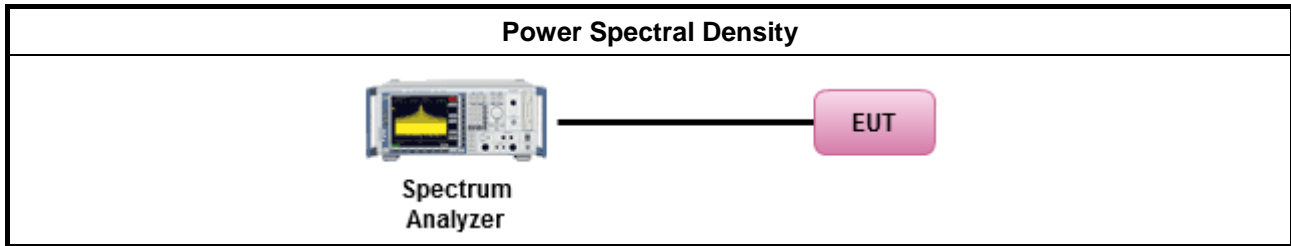
Maximum Average Conducted Output Power								
Condition			RF Output Power (dBm)					
Modulation Mode	N _{TX}	Freq. (MHz)	Chain 0	Sum Chain	Power Limit	DG (dBi)	EIRP Power	EIRP Limit
11b_1Mbps	1	2412	18.02	18.02	30.00	3.60	21.62	36.00
11b_1Mbps	1	2437	18.06	18.06	30.00	3.60	21.66	36.00
11b_1Mbps	1	2462	17.21	17.21	30.00	3.60	20.81	36.00
11g_6Mbps	1	2412	13.60	13.60	30.00	3.60	17.20	36.00
11g_6Mbps	1	2437	18.01	18.01	30.00	3.60	21.61	36.00
11g_6Mbps	1	2462	13.68	13.68	30.00	3.60	17.28	36.00
HT-20_MCS0	1	2412	13.01	13.01	30.00	3.60	16.61	36.00
HT-20_MCS0	1	2437	17.06	17.06	30.00	3.60	20.66	36.00
HT-20_MCS0	1	2462	13.19	13.19	30.00	3.60	16.79	36.00
HT-40_MCS0	1	2422	10.23	10.23	30.00	3.60	13.83	36.00
HT-40_MCS0	1	2437	16.02	16.02	30.00	3.60	19.62	36.00
HT-40_MCS0	1	2452	11.53	11.53	30.00	3.60	15.13	36.00
Result			Complied					

3.3 Power Spectral Density

3.3.1 Test Procedures

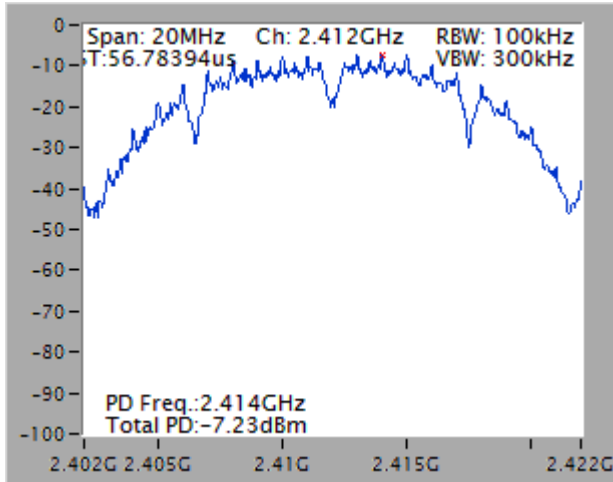
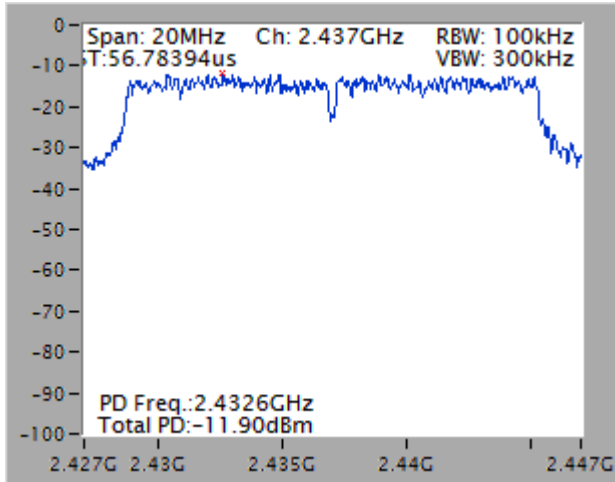
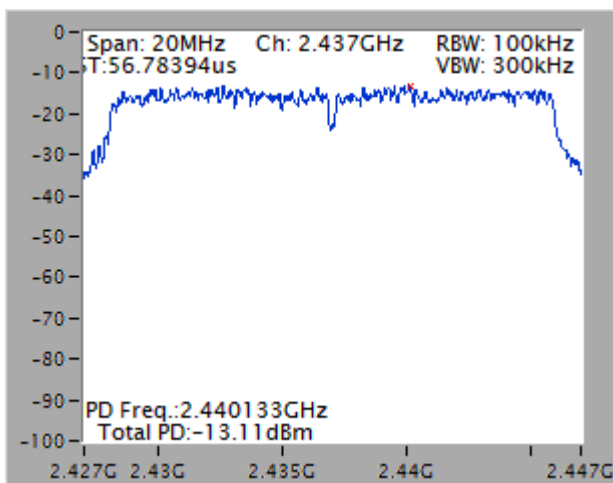
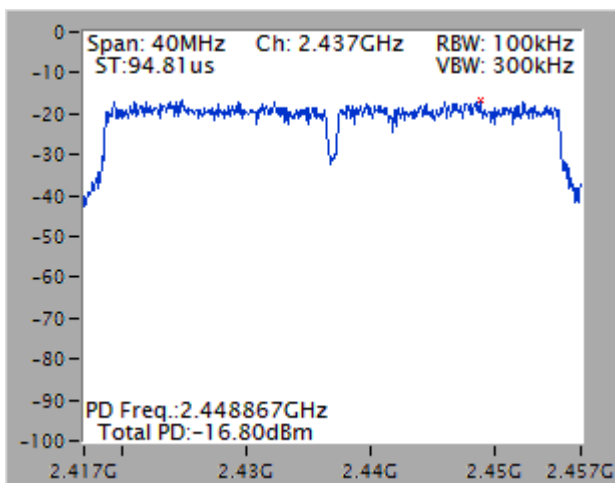
Test Method	
<input checked="" type="checkbox"/>	Power spectral density procedures that the same method as used to determine the conducted output power shall be used to determine the power spectral density. In addition, the use of a peak PSD procedure will always result in a "worst-case" measured level for comparison to the limit. Therefore, whenever the DTS bandwidth exceeds 500 kHz, it is acceptable to utilize the peak PSD procedure to demonstrate compliance to the PSD limit, regardless of how the fundamental output power was measured. For the power spectral density shall be measured using below options:
<input checked="" type="checkbox"/>	Refer as FCC KDB 558074, clause 9.1 Option 1 - (RBW \geq 3kHz; sweep=auto, detector=peak).
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 9.2 Option 2 - (RBW \geq 3kHz; sweep=auto, average=100).
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 9.3 Option 3 - (RBW \geq 3kHz; slow sweep speed).
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 9.4 Alternative 1 (average PSD; Add 10log (1/duty cycle).
<input checked="" type="checkbox"/>	Refer as RSS-210 A8.2.
<input checked="" type="checkbox"/>	RBW>3kHz, add the bandwidth correction factor (BWCF) adjusting in PSD per 3kHz.
<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 checked="" 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.

3.3.2 Test Setup



3.3.3 Test Result of Power Spectral Density

Power Spectral Density Result				
Condition			Power Spectral Density (dBm/3kHz)	
Modulation Mode	N _{TX}	Freq. (MHz)	Sum Chain	Power Limit
11b_1Mbps	1	2412	-7.23	8
11b_1Mbps	1	2437	-8.37	8
11b_1Mbps	1	2462	-9.84	8
11g_6Mbps	1	2412	-16.31	8
11g_6Mbps	1	2437	-11.90	8
11g_6Mbps	1	2462	-13.93	8
HT-20_MCS0	1	2412	-17.16	8
HT-20_MCS0	1	2437	-13.11	8
HT-20_MCS0	1	2462	-17.00	8
HT-40_MCS0	1	2422	-18.74	8
HT-40_MCS0	1	2437	-16.80	8
HT-40_MCS0	1	2452	-21.30	8
Result			Complied	
Note 1: PSD [dBm/3kHz] = sum each transmit chains by bin-to-bin PSD [dBm/100kHz] + BWFC [-15.2 dB]				

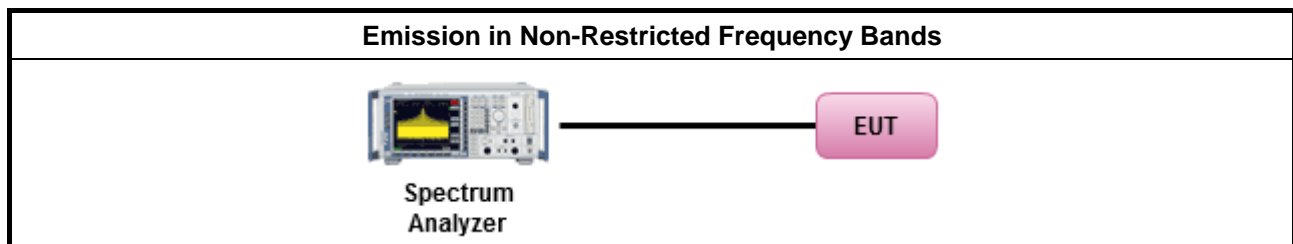
Worst Power Spectral Density Plots
11b [Sum All Chains]

11g [Sum All Chains]

HT-20 [Sum All Chains]

HT-40 [Sum All Chains]


3.4 Emission in Non-Restricted Frequency Bands

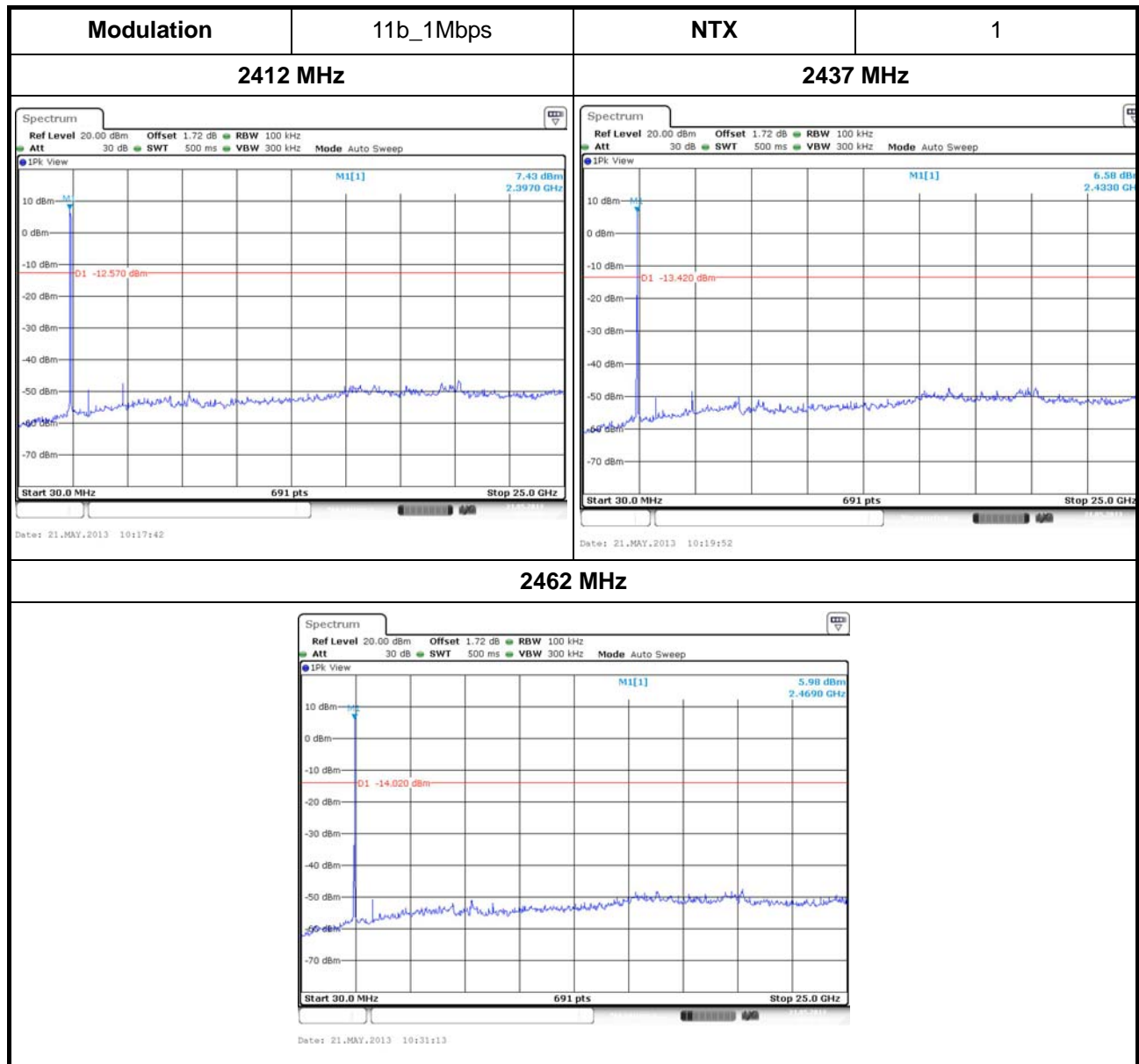
3.4.1 Test Procedures

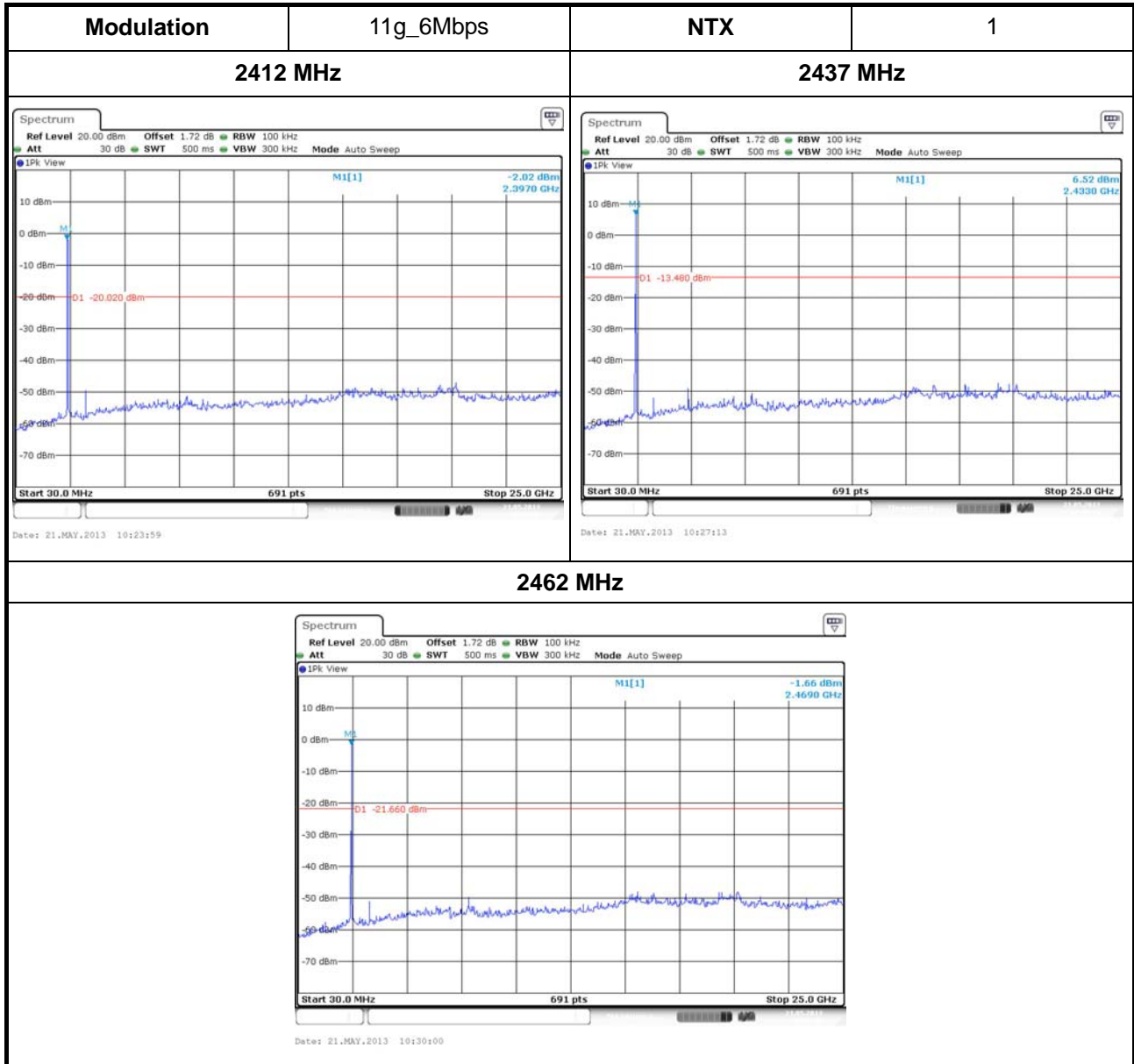
Test Method	
<input checked="" type="checkbox"/>	The average emission levels shall be measured in [duty cycle \geq 98 or duty factor].
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 6.9.2.2 band edge testing shall be performed at the lowest frequency channel and highest frequency channel 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 10.1 for unwanted emissions into non-restricted bands.
<input checked="" type="checkbox"/>	Refer as FCC KDB 558074, clause 10.2 for unwanted emissions into restricted bands.
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 10.2.3.3 and 8.2.1 Option 1 (spectral trace averaging)
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 10.2.3.3 and 8.2.1 Option 2 (slow sweep speed).
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 4.2.3.2.3 (Reduced VBW). VBW \geq 1/T, where T is pulse time.
<input type="checkbox"/>	Refer as ANSI C63.10, clause 4.2.3.2.4 average value of pulsed emissions.
<input checked="" type="checkbox"/>	Refer as FCC KDB 558074, clause 10.2.3.2 and 8.1.1 measurement procedure peak limit.
<input checked="" type="checkbox"/>	For the transmitter band edge emissions shall be measured using following options below:
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 10.2.5.2 for narrower resolution bandwidth using the band power and summing the spectral levels (i.e., 100 kHz or 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 10.2.1.
<input checked="" type="checkbox"/>	For conducted measurement, refer as FCC KDB 558074, clause 10.2.2.

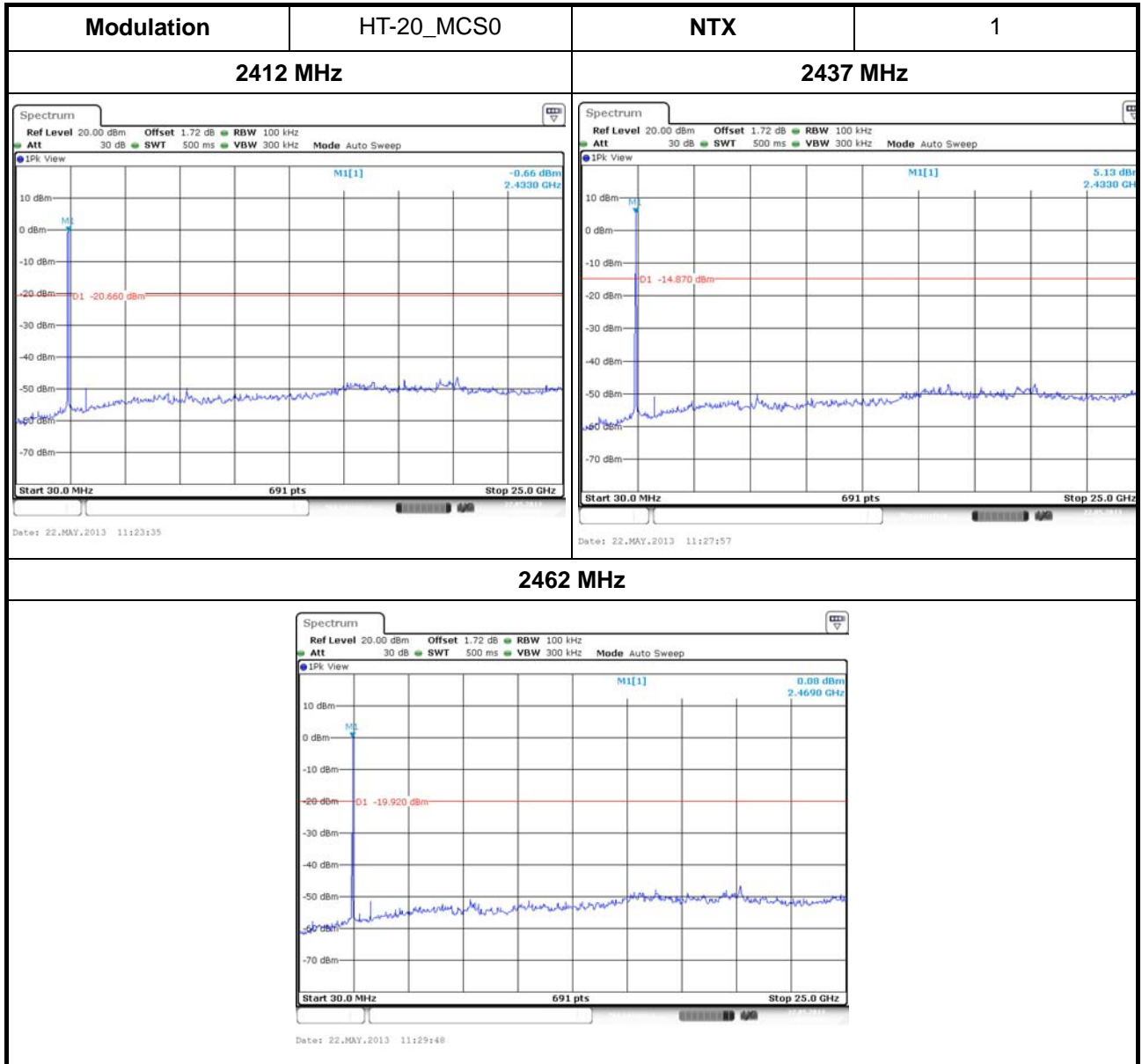
3.4.2 Test Setup

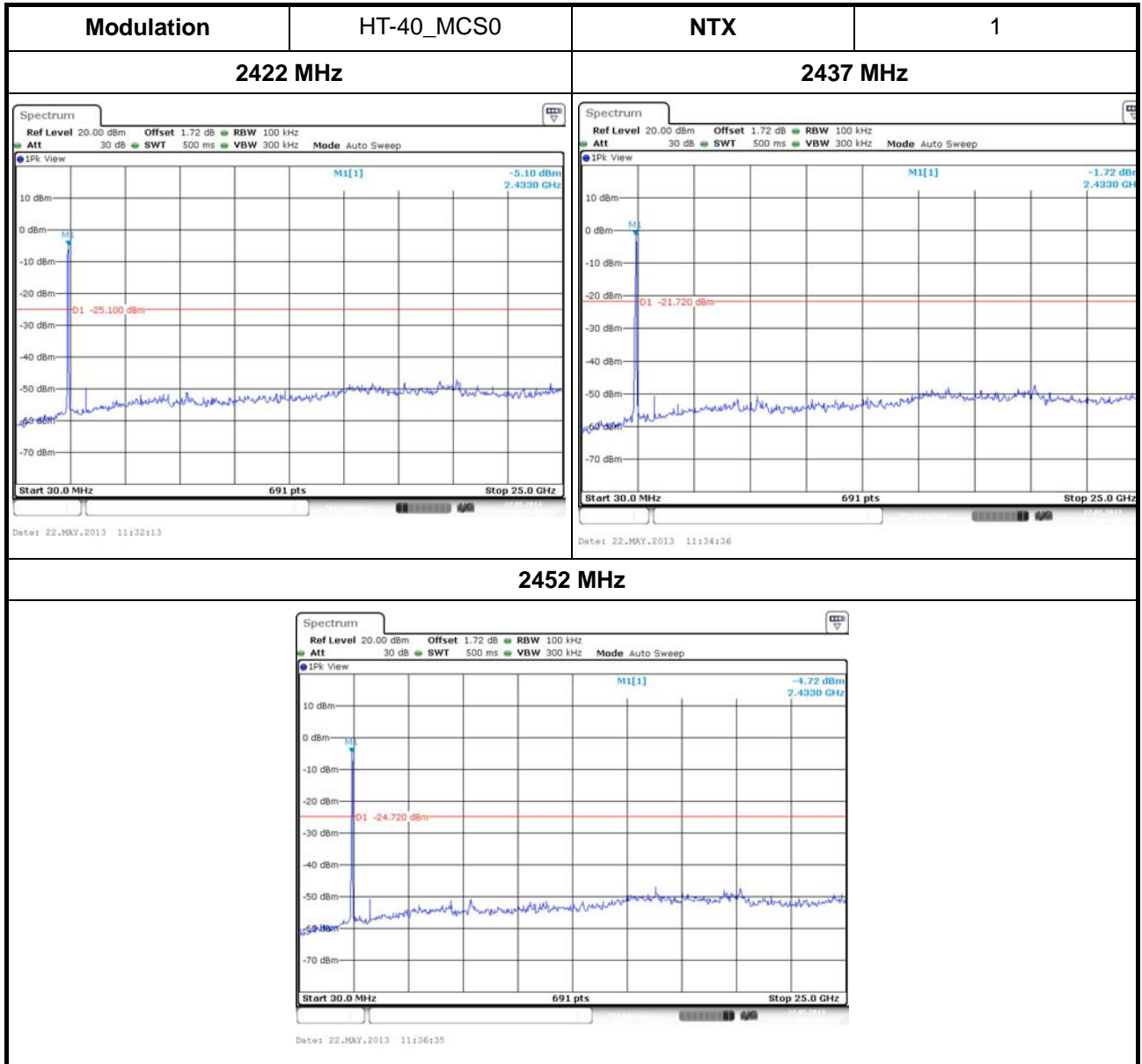


3.4.3 Test Results of Emission in Non-Restricted Frequency Bands







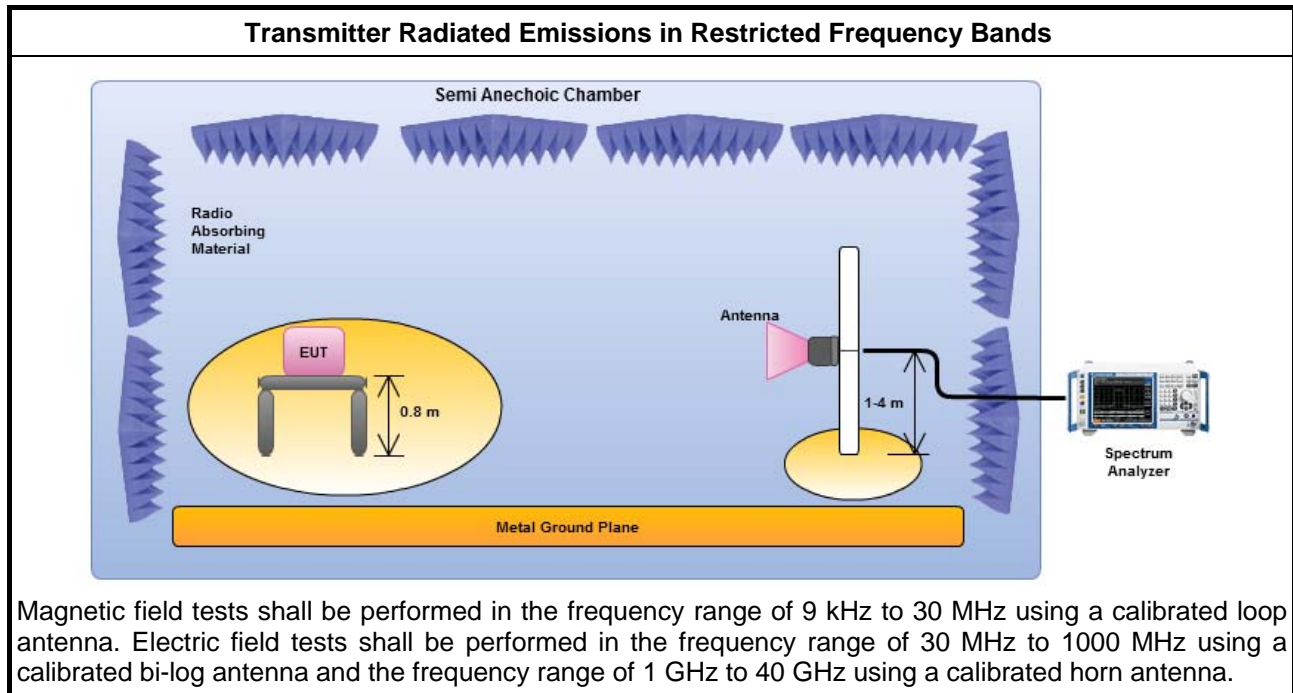
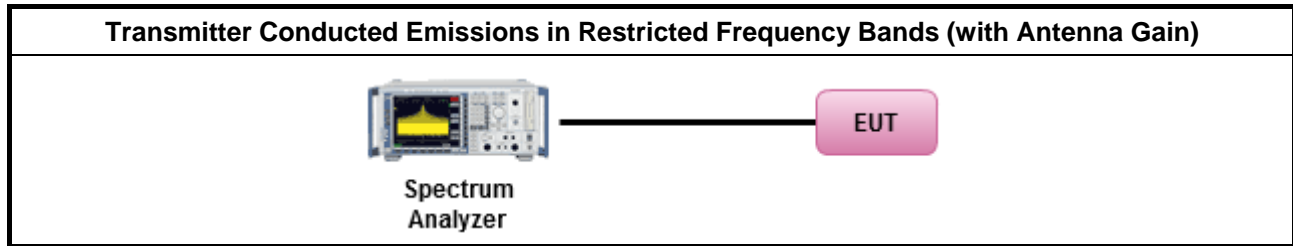


3.5 Emission in Restricted Frequency Bands

3.5.1 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"/>	Measurements in the frequency range 10 GHz - 18GHz are typically made at a closer distance 1m, because the instrumentation noise floor is typically close to the radiated emission limit.
<input checked="" type="checkbox"/>	Measurements in the frequency range above 18 GHz - 25GHz are typically made at a closer distance 0.5m, because the instrumentation noise floor is typically close to the radiated emission limit.
<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 10.1 for unwanted emissions into non-restricted bands.
<input checked="" type="checkbox"/>	Refer as FCC KDB 558074, clause 10.2 for unwanted emissions into restricted bands.
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 10.2.3.3 and 8.2.1 Option 1 (spectral trace averaging)
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 10.2.3.3 and 8.2.1 Option 2 (slow sweep speed).
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 4.2.3.2.3 (Reduced VBW). VBW \geq 1/T, where T is pulse time.
<input type="checkbox"/>	Refer as ANSI C63.10, clause 4.2.3.2.4 average value of pulsed emissions.
<input checked="" type="checkbox"/>	Refer as FCC KDB 558074, clause 10.2.3.2 and 8.1.1 measurement procedure peak limit.
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 10.2.3.1 measurement procedure Quasi-Peak limit.
<input checked="" type="checkbox"/>	For radiated measurement, refer as FCC KDB 558074, clause 10.2.1.
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 6.4 for radiated emissions from below 30 MHz.
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 6.5 for radiated emissions from 30 MHz to 1000 MHz.
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 6.6 for radiated emissions from above 1 GHz.
<input checked="" type="checkbox"/>	For conducted and cabinet radiation measurement, refer as FCC KDB 558074, clause 10.2.2.
<input checked="" type="checkbox"/>	For conducted unwanted emissions into non-restricted bands (relative emission limits). Devices with multiple transmit chains: Refer as FCC KDB 662911, when testing out-of-band and spurious emissions against relative emission limits, tests may be performed on each output individually without summing or adding 10 log(N) if the measurements are made relative to the in-band emissions on the individual outputs.
<input checked="" type="checkbox"/>	For conducted unwanted emissions into restricted bands (absolute emission limits). Devices with multiple transmit chains using options given below: (1) Measure and sum the spectra across the outputs or (2) Measure and add 10 log(N) dB

3.5.2 Test Setup



3.5.3 Emission in Restricted Frequency Bands- (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.

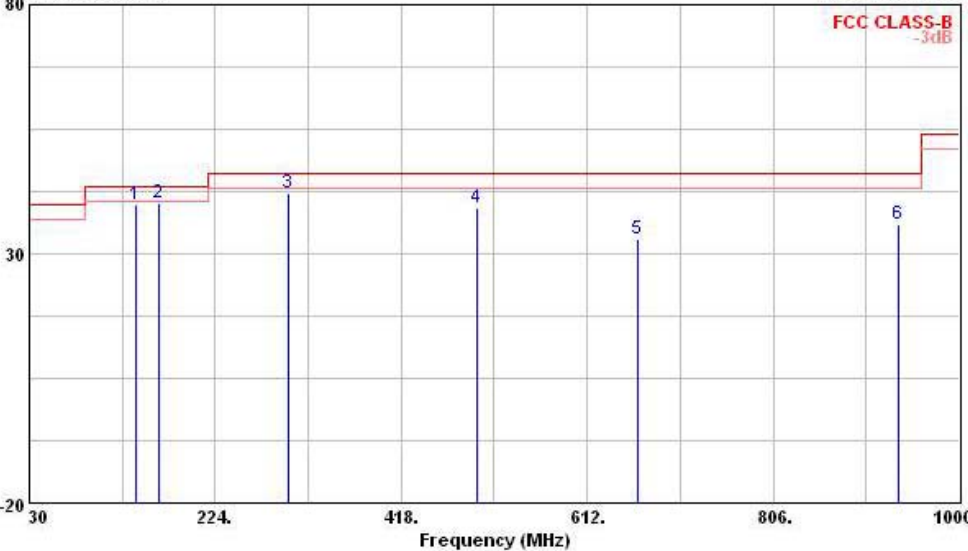
3.5.4 Emission in Restricted Frequency Bands- (Below 1GHz)

Operating Mode	11g_6Mbps	Polarization	H
Operating Frequency	2412 MHz	Configuration	With PIFA Ant.

Level (dBuV/m)

Date: 2013-05-13

FCC CLASS-B
-3dB

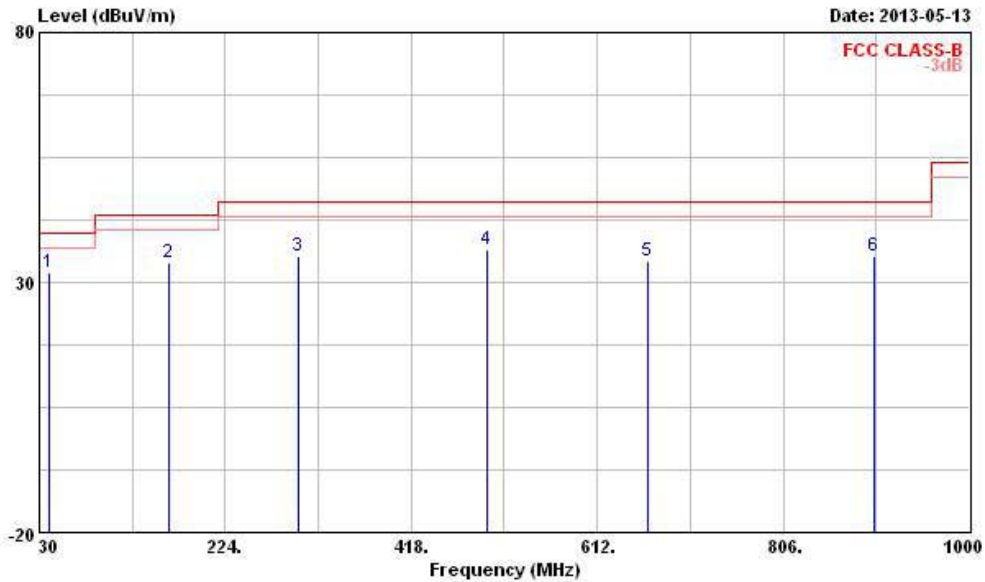


Frequency (MHz)

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	141.550	40.01	-3.49	43.50	54.25	11.78	1.71	27.73	Peak	---	---
2	164.830	40.36	-3.14	43.50	55.84	10.34	1.82	27.64	QP	---	---
3	299.660	42.31	-3.69	46.00	53.27	13.70	2.55	27.21	Peak	---	---
4	497.540	39.18	-6.82	46.00	47.00	17.24	3.41	28.47	Peak	---	---
5	664.380	32.96	-13.04	46.00	38.18	19.32	3.94	28.48	Peak	---	---
6	935.980	35.87	-10.13	46.00	37.80	20.92	4.76	27.61	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)

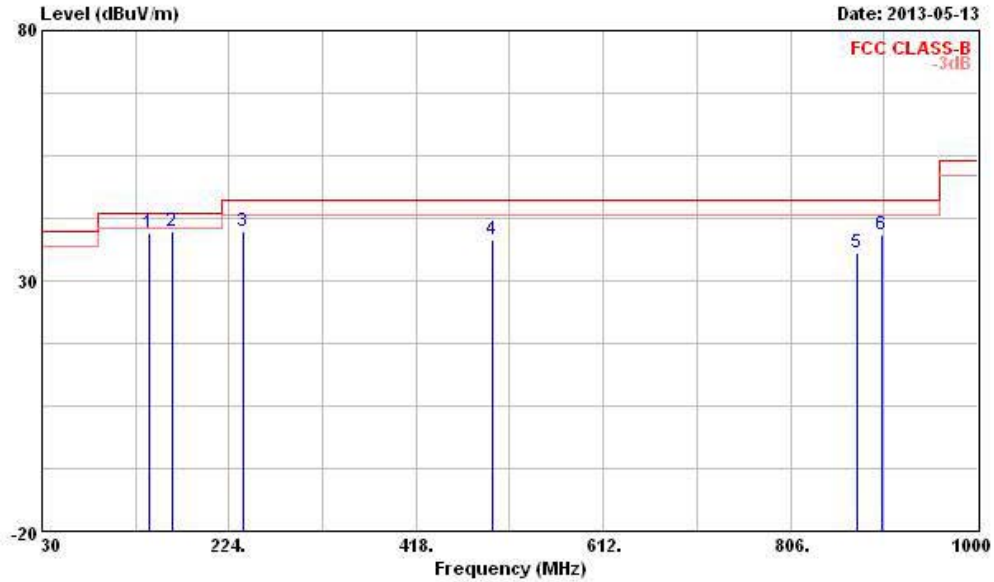
Operating Mode	11g_6Mbps	Polarization	V
Operating Frequency	2412 MHz	Configuration	With PIFA Ant.



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	40.670	31.88	-8.12	40.00	45.90	13.01	0.88	27.91	Peak	---	---
2	164.830	33.85	-9.65	43.50	49.33	10.34	1.82	27.64	Peak	---	---
3	299.660	35.11	-10.89	46.00	46.07	13.70	2.55	27.21	Peak	---	---
4	497.540	36.70	-9.30	46.00	44.52	17.24	3.41	28.47	Peak	---	---
5	665.350	34.44	-11.56	46.00	39.65	19.31	3.95	28.47	Peak	---	---
6	901.060	35.26	-10.74	46.00	38.33	20.08	4.61	27.76	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)

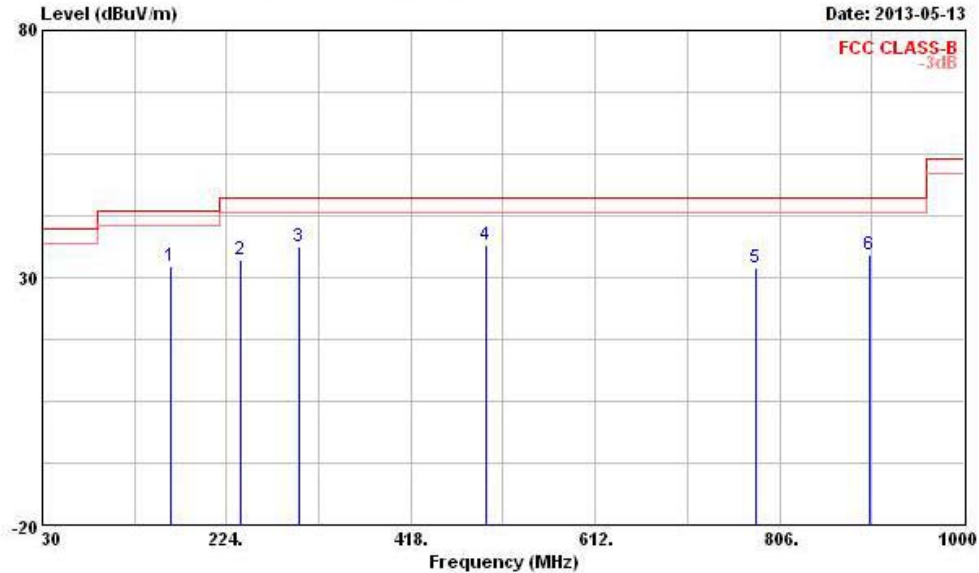
Operating Mode	HT-20_MCS0	Polarization	H
Operating Frequency	2412 MHz	Configuration	With PIFA Ant.



	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp		Ant	Table
	MHz	dBuV/m	Limit	Line	Level	Loss	Factor	Remark	Pos	Pos
			dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1	141.550	39.66	-3.84	43.50	53.90	11.78	1.71	27.73 Peak	---	---
2	164.830	39.78	-3.72	43.50	55.26	10.34	1.82	27.64 QP	---	---
3	238.550	39.73	-6.27	46.00	52.18	12.62	2.32	27.39 Peak	---	---
4	497.540	38.34	-7.66	46.00	46.16	17.24	3.41	28.47 Peak	---	---
5	874.870	35.43	-10.57	46.00	38.63	20.09	4.56	27.85 Peak	---	---
6	901.060	39.18	-6.82	46.00	42.25	20.08	4.61	27.76 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)

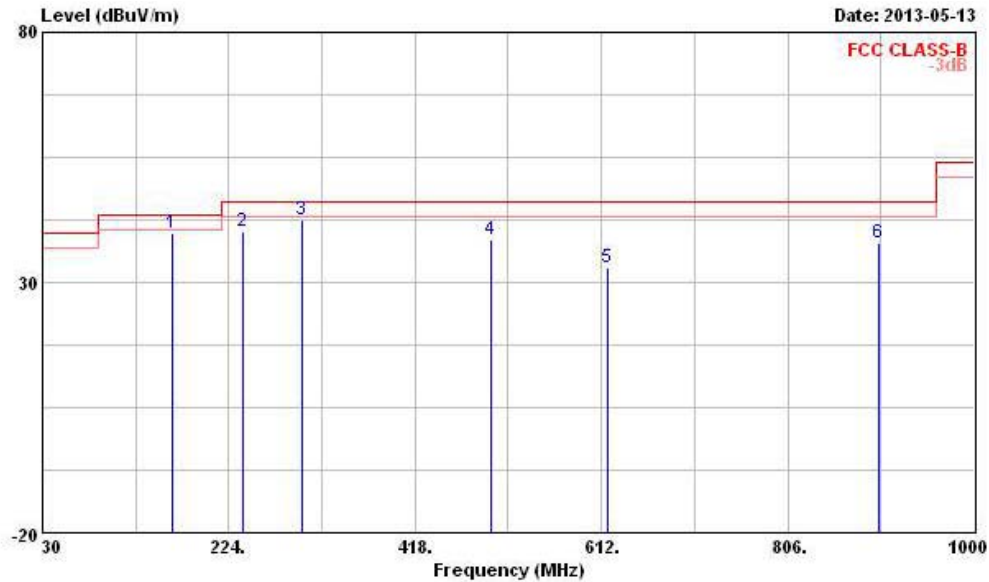
Operating Mode	HT-20_MCS0	Polarization	V
Operating Frequency	2412 MHz	Configuration	With PIFA Ant.



	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp			Ant	Table
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	Remark	Pos	Pos
			dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	164.830	32.19	-11.31	43.50	47.67	10.34	1.82	27.64	Peak	---	---
2	238.550	33.49	-12.51	46.00	45.94	12.62	2.32	27.39	Peak	---	---
3	299.660	36.13	-9.87	46.00	47.09	13.70	2.55	27.21	Peak	---	---
4	497.540	36.51	-9.49	46.00	44.33	17.24	3.41	28.47	Peak	---	---
5	780.780	31.93	-14.07	46.00	35.77	19.99	4.32	28.15	Peak	---	---
6	901.060	34.65	-11.35	46.00	37.72	20.08	4.61	27.76	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)

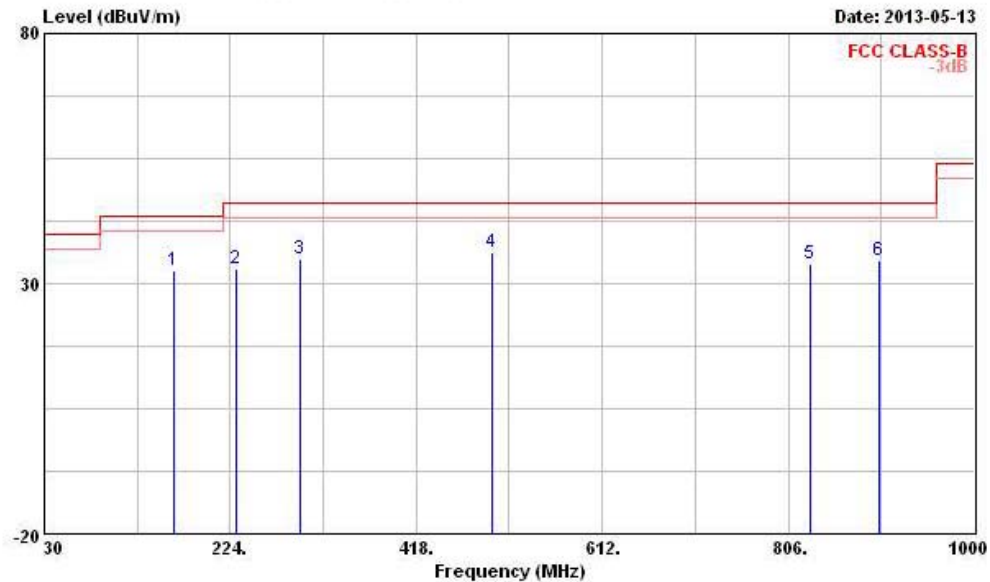
Operating Mode	HT-40_MCS0	Polarization	H
Operating Frequency	2412 MHz	Configuration	With PIFA Ant.



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamplifier	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	164.830	39.97	-3.53	43.50	55.45	10.34	1.82	27.64	QP	---	---
2	238.550	40.33	-5.67	46.00	52.78	12.62	2.32	27.39	Peak	---	---
3	299.660	42.63	-3.37	46.00	53.59	13.70	2.55	27.21	Peak	---	---
4	497.540	38.46	-7.54	46.00	46.28	17.24	3.41	28.47	Peak	---	---
5	617.820	33.02	-12.98	46.00	37.85	19.95	3.76	28.54	Peak	---	---
6	901.060	37.79	-8.21	46.00	40.86	20.08	4.61	27.76	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)

Operating Mode	HT-40_MCS0	Polarization	V
Operating Frequency	2412 MHz	Configuration	With PIFA Ant.



	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp		Ant	Table
	MHz	dBuV/m	Limit	Line	Level	Loss	Factor	Remark	Pos	Pos
			dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1	164.830	32.73	-10.77	43.50	48.21	10.34	1.82	27.64 Peak	---	---
2	230.790	33.06	-12.94	46.00	45.83	12.37	2.27	27.41 Peak	---	---
3	296.750	35.02	-10.98	46.00	46.04	13.66	2.54	27.22 Peak	---	---
4	497.540	36.28	-9.72	46.00	44.10	17.24	3.41	28.47 Peak	---	---
5	828.310	33.85	-12.15	46.00	37.17	20.20	4.48	28.00 Peak	---	---
6	901.060	34.55	-11.45	46.00	37.62	20.08	4.61	27.76 Peak	---	---

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

3.5.5 Emission in Restricted Frequency Bands- (Above 1GHz)

Antenna-ports conducted measurements are used as an alternative to radiated measurements for demonstrating compliance in the restricted frequency bands; in the meanwhile, an additional radiated test with 50ohm terminator for cabinet spurious emission is also performed.

Modulation: 11b_1Mbps; Test Frequency: 2412 MHz; number of TX Chain: 1

Transmitter Conducted Unwanted Emissions Result in Restricted Bands					
Frequency (MHz)	Chain 0 Test Level (dBm)	DG (dBi)	EIRP Level (dBm)	Limit (dBm)	Level Type
2387.12	-39.72	3.60	-36.12	-21.2	Peak
2386.80	-45.19	3.60	-41.59	-41.2	Average
4823.88	-42.27	3.60	-38.67	-21.2	Peak
4823.87	-47.40	3.60	-43.80	-41.2	Average

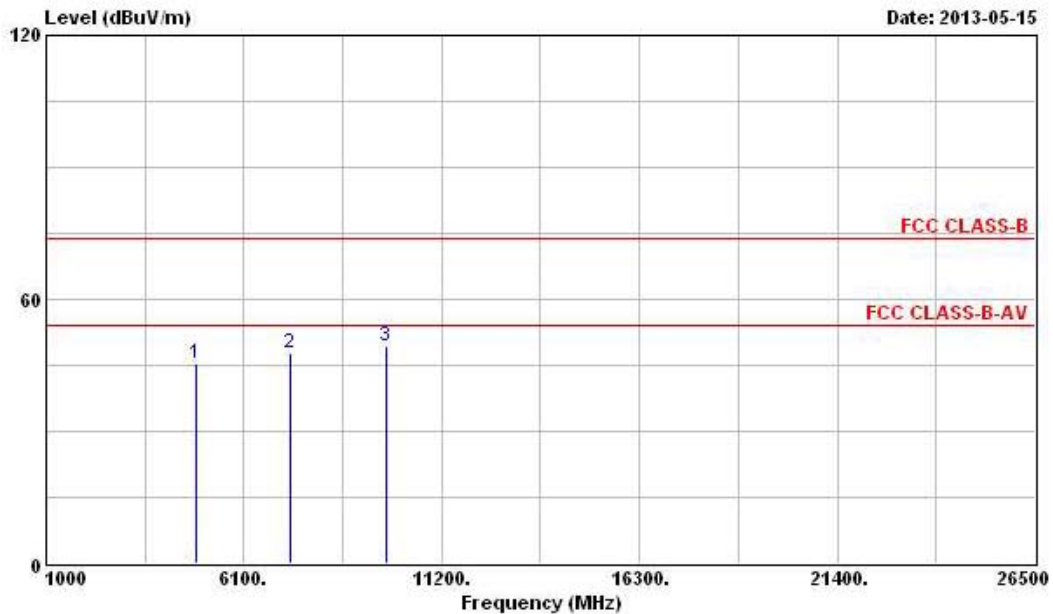
Modulation: 11b_1Mbps; Test Frequency: 2437 MHz; number of TX Chain: 1

Transmitter Conducted Unwanted Emissions Result in Restricted Bands					
Frequency (MHz)	Chain 0 Test Level (dBm)	DG (dBi)	EIRP Level (dBm)	Limit (dBm)	Level Type
4874.13	-42.87	3.60	-39.27	-21.2	Peak
4873.86	-47.58	3.60	-43.98	-41.2	Average

Modulation: 11b_1Mbps; Test Frequency: 2462 MHz; number of TX Chain: 1

Transmitter Conducted Unwanted Emissions Result in Restricted Bands					
Frequency (MHz)	Chain 0 Test Level (dBm)	DG (dBi)	EIRP Level (dBm)	Limit (dBm)	Level Type
2483.525	-39.01	3.60	-35.41	-21.2	Peak
2487.600	-45.36	3.60	-41.76	-41.2	Average
4924.040	-45.86	3.60	-42.26	-21.2	Peak
4924.000	-54.72	3.60	-51.12	-41.2	Average

Operating Mode	11b_1Mbps	Polarization	H
Operating Frequency	2437 MHz	Configuration	With 50Ω Terminated



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4874.000	45.33	-8.67	54.00	41.11	34.77	4.31	34.86	PK	---	---
2	7311.000	47.73	-6.27	54.00	41.29	35.90	5.71	35.17	PK	---	---
3	9748.000	49.38			41.51	37.11	6.34	35.58	Peak	---	---

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

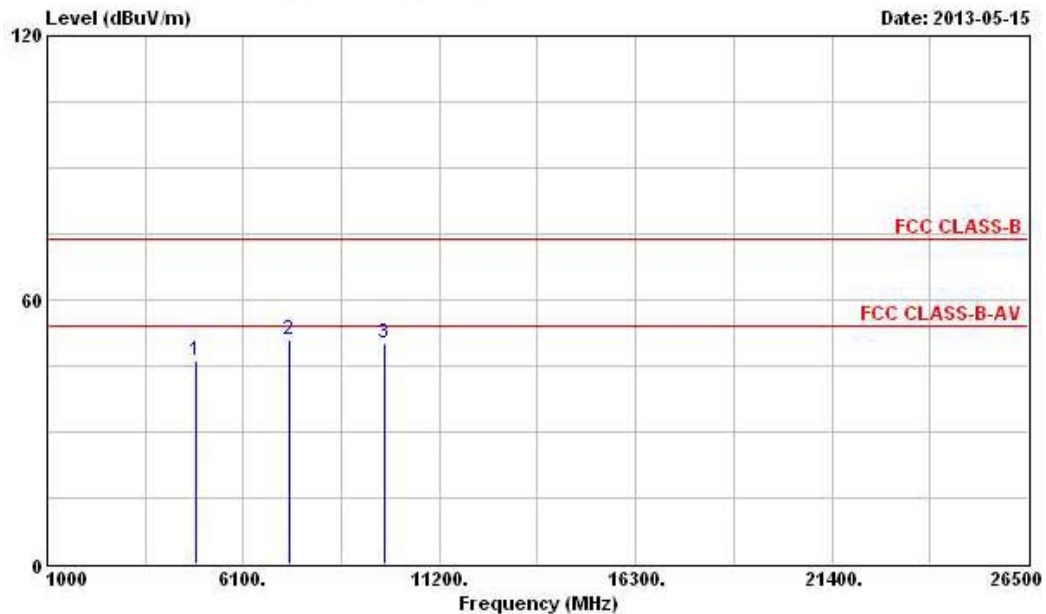
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

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 (item 3) shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

Operating Mode	11b_1Mbps	Polarization	V
Operating Frequency	2437 MHz	Configuration	With 50Ω Terminated



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4874.000	46.16	-7.84	54.00	41.94	34.77	4.31	34.86	PK	---	---
2	7311.000	50.96	-3.04	54.00	44.52	35.90	5.71	35.17	PK	---	---
3	9748.000	50.03			42.16	37.11	6.34	35.58	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 (item 3) shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

Modulation: 11g_6Mbps; Test Frequency: 2412 MHz; number of TX Chain: 1

Transmitter Conducted Unwanted Emissions Result in Restricted Bands					
Frequency (MHz)	Chain 0 Test Level (dBm)	DG (dBi)	EIRP Level (dBm)	Limit (dBm)	Level Type
2389.32	-32.83	3.60	-29.23	-21.2	Peak
2930.00	-45.57	3.60	-41.97	-41.2	Average
4817.44	-45.62	3.60	-42.02	-21.2	Peak
4824.01	-57.30	3.60	-53.70	-41.2	Average

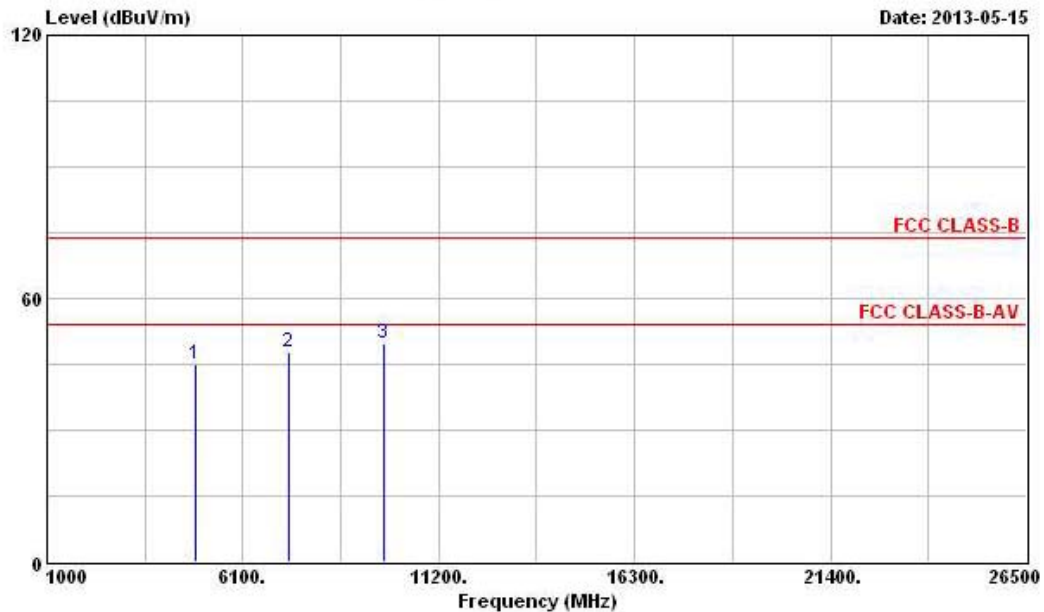
Modulation: 11g_6Mbps; Test Frequency: 2437 MHz; number of TX Chain: 1

Transmitter Conducted Unwanted Emissions Result in Restricted Bands					
Frequency (MHz)	Chain 0 Test Level (dBm)	DG (dBi)	EIRP Level (dBm)	Limit (dBm)	Level Type
4869.78	-41.85	3.60	-38.25	-21.2	Peak
4874.40	-54.60	3.60	-51.00	-41.2	Average

Modulation: 11g_6Mbps; Test Frequency: 2462 MHz; number of TX Chain: 1

Transmitter Conducted Unwanted Emissions Result in Restricted Bands					
Frequency (MHz)	Chain 0 Test Level (dBm)	DG (dBi)	EIRP Level (dBm)	Limit (dBm)	Level Type
2483.979	-28.18	3.60	-24.58	-21.2	Peak
2483.616	-45.78	3.60	-42.18	-41.2	Average
4930.940	-45.70	3.60	-42.10	-21.2	Peak
4925.390	-57.07	3.60	-53.47	-41.2	Average

Operating Mode	11g_6Mbps	Polarization	H
Operating Frequency	2437 MHz	Configuration	With 50Ω Terminated



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4874.000	45.11	-8.89	54.00	40.89	34.77	4.31	34.86	PK	---	---
2	7311.000	47.76	-6.24	54.00	41.32	35.90	5.71	35.17	PK	---	---
3	9748.000	49.57			41.70	37.11	6.34	35.58	Peak	---	---

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

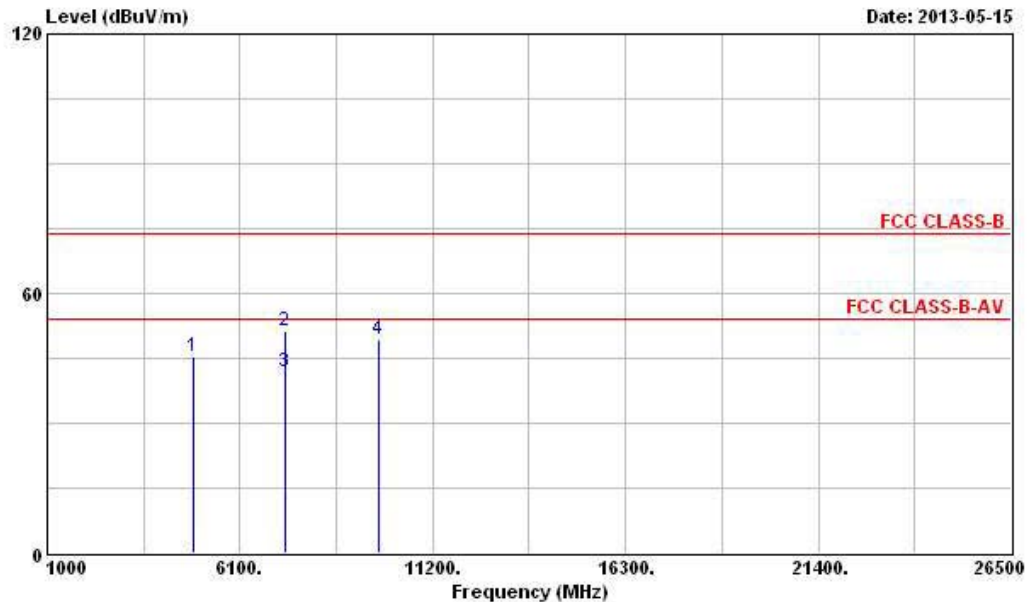
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

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 (item 3) shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

Operating Mode	11g_6Mbps	Polarization	V
Operating Frequency	2437 MHz	Configuration	With 50Ω Terminated



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamplifier Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4874.000	45.49	-8.51	54.00	41.27	34.77	4.31	34.86	PK	---	---
2	7311.000	51.40	-22.60	74.00	44.96	35.90	5.71	35.17	Peak	---	---
3	7311.000	41.81	-12.19	54.00	35.37	35.90	5.71	35.17	Average	---	---
4	9748.000	49.50			41.63	37.11	6.34	35.58	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 (item 4) shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

Modulation: HT-20_MCS0; Test Frequency: 2412 MHz; number of TX Chain: 1

Transmitter Conducted Unwanted Emissions Result in Restricted Bands					
Frequency (MHz)	Chain 0 Test Level (dBm)	DG (dBi)	EIRP Level (dBm)	Limit (dBm)	Level Type
2389.76	-31.49	3.60	-27.89	-21.2	Peak
2389.60	-45.37	3.60	-41.77	-41.2	Average
4829.14	-45.81	3.60	-42.21	-21.2	Peak
4818.38	-57.21	3.60	-53.61	-41.2	Average

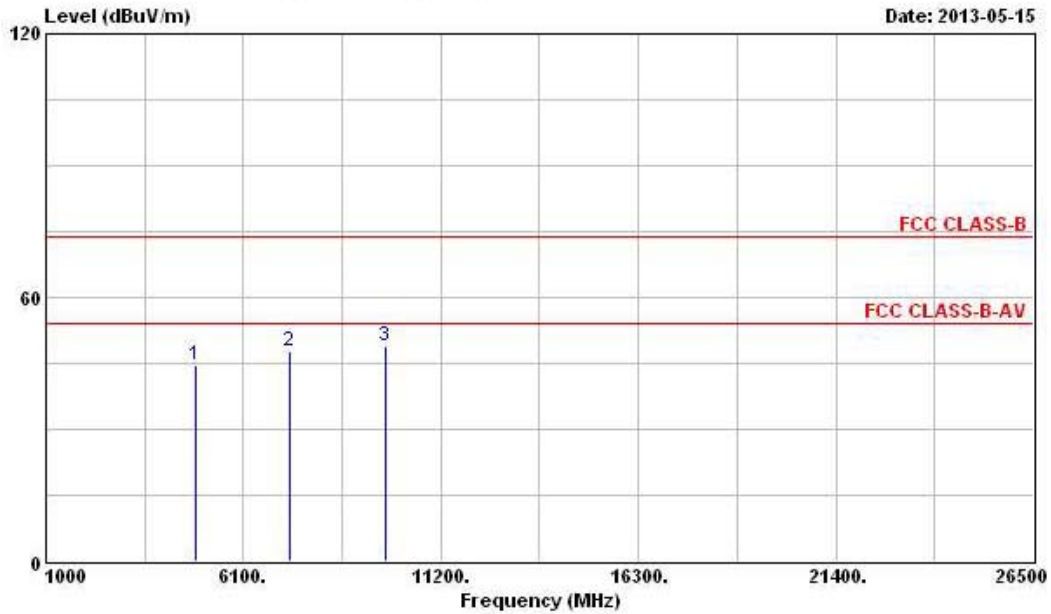
Modulation: HT-20_MCS0; Test Frequency: 2437 MHz; number of TX Chain: 1

Transmitter Conducted Unwanted Emissions Result in Restricted Bands					
Frequency (MHz)	Chain 0 Test Level (dBm)	DG (dBi)	EIRP Level (dBm)	Limit (dBm)	Level Type
4871.82	-44.08	3.60	-40.48	-21.2	Peak
4871.82	-56.06	3.60	-52.46	-41.2	Average

Modulation: HT-20_MCS0; Test Frequency: 2462 MHz; number of TX Chain: 1

Transmitter Conducted Unwanted Emissions Result in Restricted Bands					
Frequency (MHz)	Chain 0 Test Level (dBm)	DG (dBi)	EIRP Level (dBm)	Limit (dBm)	Level Type
2483.962	-29.14	3.60	-25.54	-21.2	Peak
2483.838	-45.62	3.60	-42.02	-41.2	Average
4934.800	-45.58	3.60	-41.98	-21.2	Peak
4932.460	-56.98	3.60	-53.38	-41.2	Average

Operating Mode	HT-20_MCS0	Polarization	H
Operating Frequency	2437 MHz	Configuration	With 50Ω Terminated



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4874.000	44.74	-9.26	54.00	40.52	34.77	4.31	34.86	PK	---	---
2	7311.000	47.85	-6.15	54.00	41.41	35.90	5.71	35.17	PK	---	---
3	9748.000	48.95			41.08	37.11	6.34	35.58	Peak	---	---

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

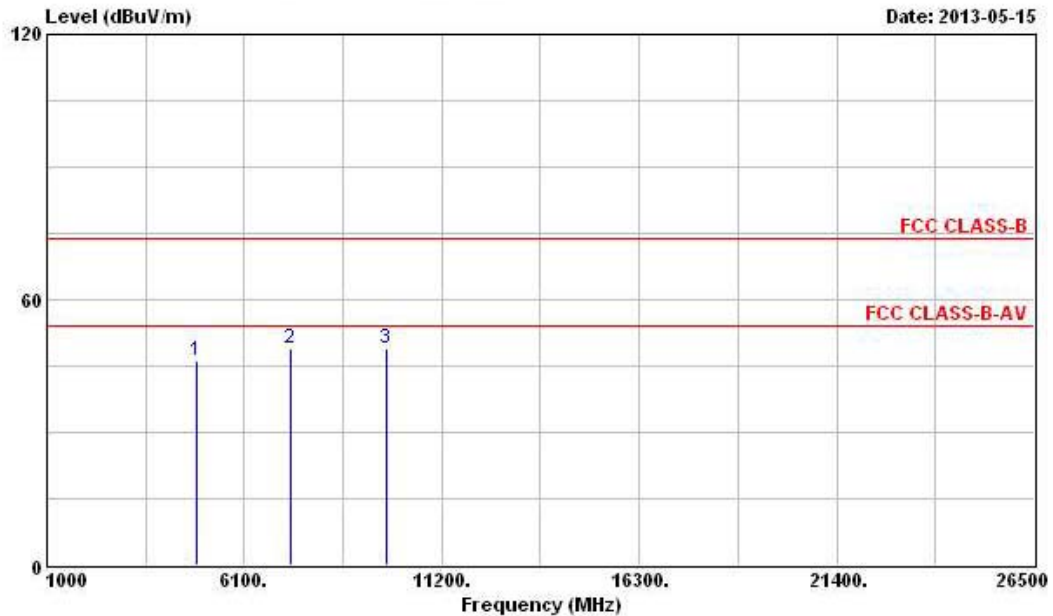
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

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 (item 3) shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

Operating Mode	HT-20_MCS0	Polarization	V
Operating Frequency	2437 MHz	Configuration	With 50Ω Terminated



Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Remark	Ant	Table
MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor		Pos	Pos
		dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @ 4874.000	46.14	-7.86	54.00	41.92	34.77	4.31	34.86	PK	---	---
2 @ 7311.000	48.82	-5.18	54.00	42.38	35.90	5.71	35.17	PK	---	---
3 @ 9748.000	48.95			41.08	37.11	6.34	35.58	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 (item 3) shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

Modulation: HT-40_MCS0; Test Frequency: 2422 MHz; number of TX Chain: 1

Transmitter Conducted Unwanted Emissions Result in Restricted Bands					
Frequency (MHz)	Chain 0 Test Level (dBm)	DG (dBi)	EIRP Level (dBm)	Limit (dBm)	Level Type
2489.56	-32.63	3.60	-29.03	-21.2	Peak
2390.00	-45.83	3.60	-42.23	-41.2	Average
4833.32	-45.47	3.60	-41.87	-21.2	Peak
4843.91	-57.01	3.60	-53.41	-41.2	Average

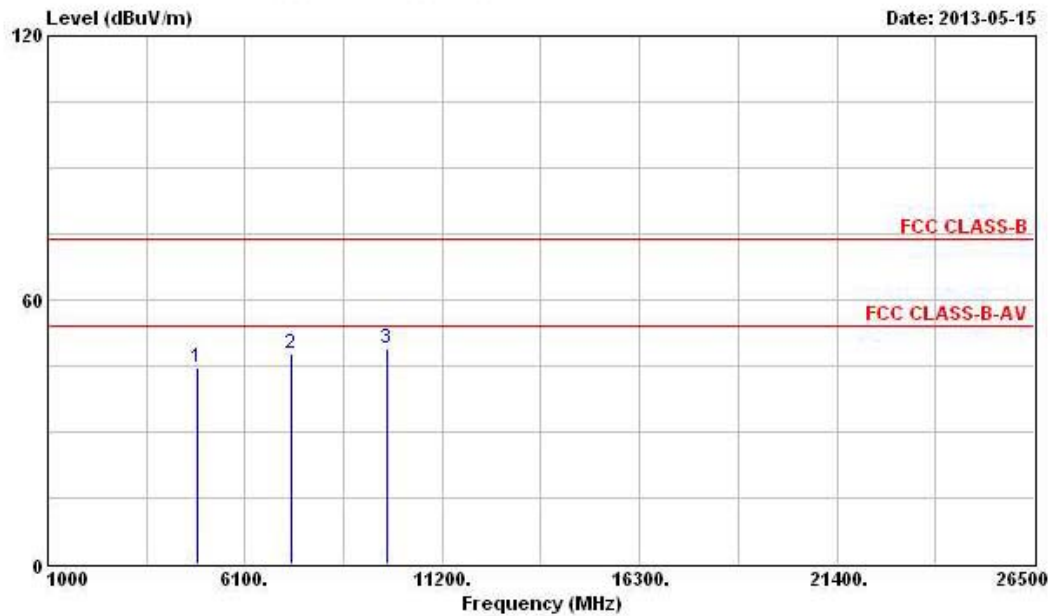
Modulation: HT-40_MCS0; Test Frequency: 2437 MHz; number of TX Chain: 1

Transmitter Conducted Unwanted Emissions Result in Restricted Bands					
Frequency (MHz)	Chain 0 Test Level (dBm)	DG (dBi)	EIRP Level (dBm)	Limit (dBm)	Level Type
4873.07	-44.52	3.60	-40.92	-21.2	Peak
4883.96	-56.69	3.60	-53.09	-41.2	Average

Modulation: HT-40_MCS0; Test Frequency: 2452 MHz; number of TX Chain: 1

Transmitter Conducted Unwanted Emissions Result in Restricted Bands					
Frequency (MHz)	Chain 0 Test Level (dBm)	DG (dBi)	EIRP Level (dBm)	Limit (dBm)	Level Type
2483.517	-31.83	3.60	-28.23	-21.2	Peak
2483.640	-45.96	3.60	-42.36	-41.2	Average
4897.830	-44.78	3.60	-41.18	-21.2	Peak
4896.240	-56.85	3.60	-53.25	-41.2	Average

Operating Mode	HT-40_MCS0	Polarization	H
Operating Frequency	2437 MHz	Configuration	With 50Ω Terminated



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Cable Factor	Preamp Loss	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1	4874.000	44.74	-9.26	54.00	40.52	34.77	4.31	34.86 PK	---	---
2 @	7311.000	47.85	-6.15	54.00	41.41	35.90	5.71	35.17 PK	---	---
3	9748.000	48.95			41.08	37.11	6.34	35.58 Peak	---	---

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

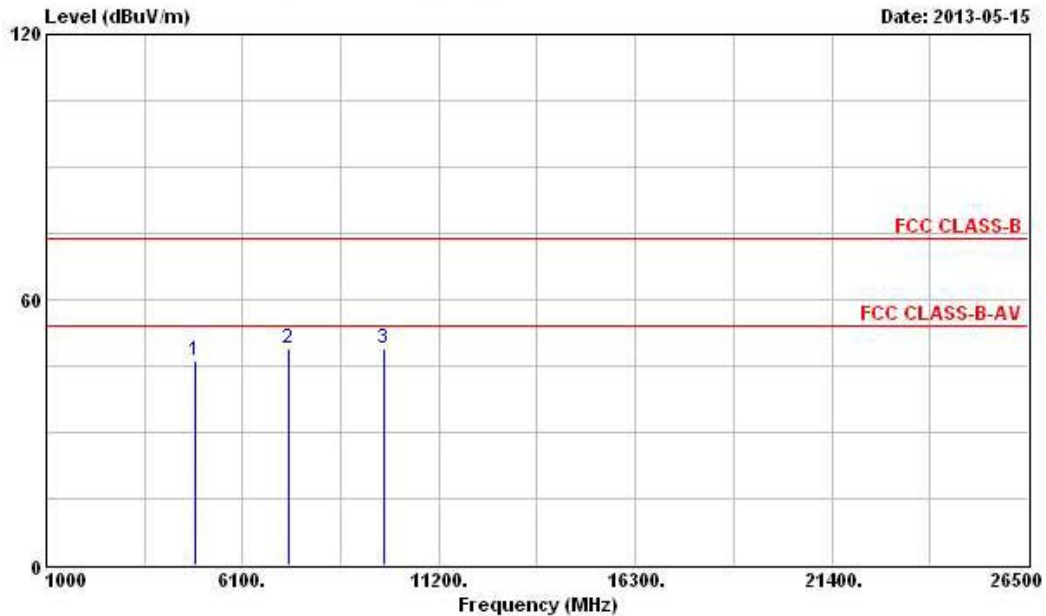
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

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 (item 3) shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

Operating Mode	HT-40_MCS0	Polarization	V
Operating Frequency	2437 MHz	Configuration	With 50Ω Terminated



Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @ 4874.000	46.14	-7.86	54.00	41.92	34.77	4.31	34.86	PK	---	---
2 @ 7311.000	48.82	-5.18	54.00	42.38	35.90	5.71	35.17	PK	---	---
3 9748.000	48.95			41.08	37.11	6.34	35.58	Peak	---	---

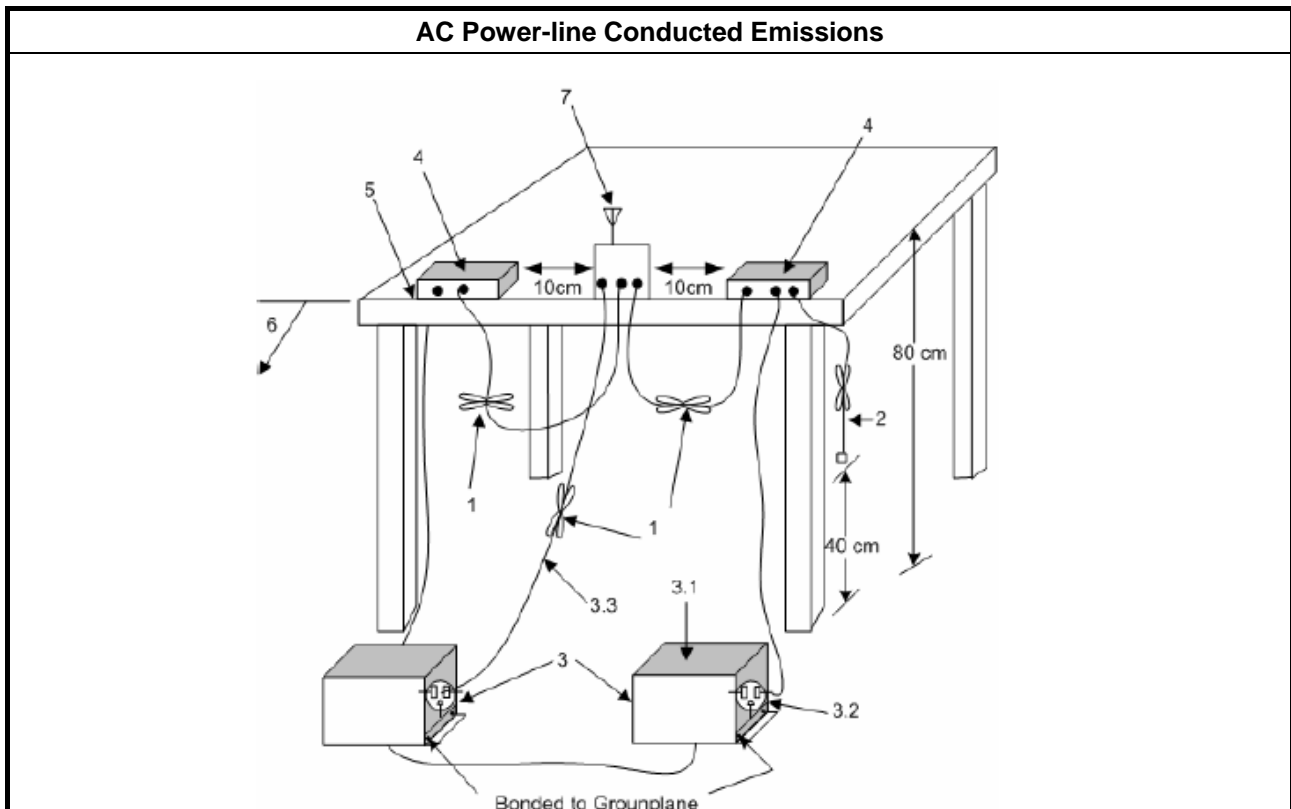
Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)
 Note 4: For restricted 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 (item 3) shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

3.6 AC Power-line Conducted Emissions

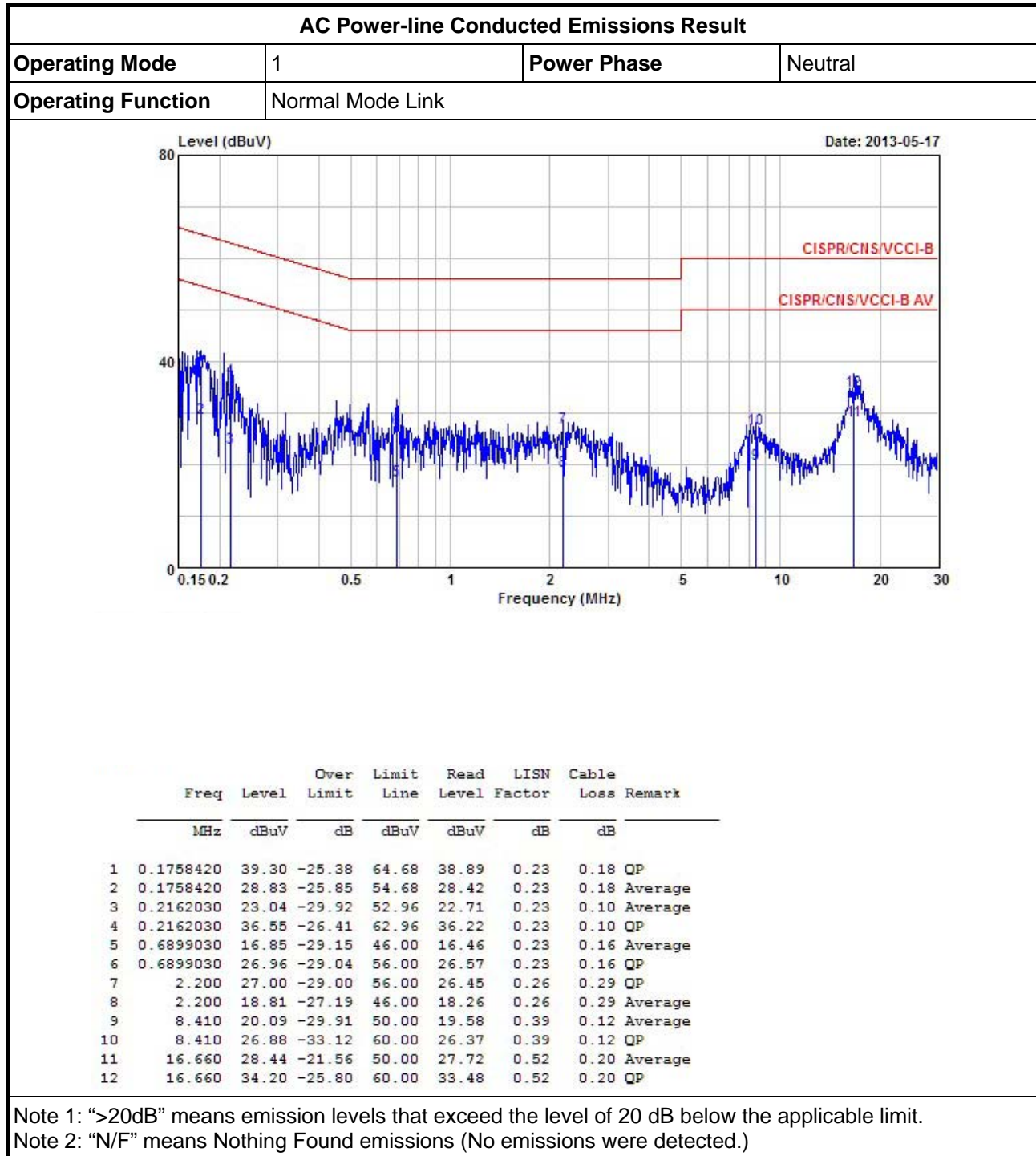
3.6.1 Test Procedures

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

3.6.2 Test Setup

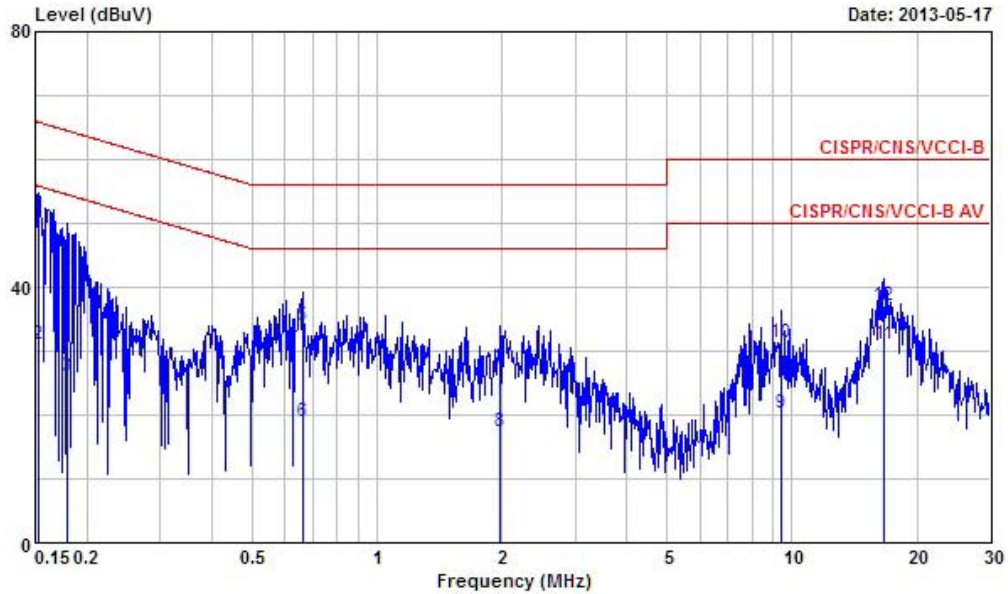


3.6.3 Test Result of AC Power-line Conducted Emissions



AC Power-line Conducted Emissions Result

Operating Mode	1	Power Phase	Line
Operating Function	Normal Mode Link		



	Freq	Level	Over	Limit	Read	LISN	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1	0.1524030	50.53	-15.34	65.87	50.16	0.11	0.26	QP
2	0.1524030	30.94	-24.93	55.87	30.57	0.11	0.26	Average
3	0.1796080	25.93	-28.57	54.50	25.66	0.11	0.16	Average
4	0.1796080	42.48	-22.02	64.50	42.21	0.11	0.16	QP
5	0.6612710	33.88	-22.12	56.00	33.62	0.11	0.15	QP
6	0.6612710	18.98	-27.02	46.00	18.72	0.11	0.15	Average
7	1.980	27.02	-28.98	56.00	26.59	0.13	0.30	QP
8	1.980	17.36	-28.64	46.00	16.93	0.13	0.30	Average
9	9.400	20.29	-29.71	50.00	19.95	0.23	0.11	Average
10	9.400	31.20	-28.80	60.00	30.86	0.23	0.11	QP
11	16.660	31.01	-18.99	50.00	30.52	0.29	0.20	Average
12	16.660	37.05	-22.95	60.00	36.56	0.29	0.20	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.)

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	FSP 40	100305	9KHz~40GHz	Mar. 20, 2013	Conducted (TH01-HY)
AC Power Source	G.W	APS-9102	EL920581	AC 0V ~ 300V	Jul. 02, 2012	Conducted (TH01-HY)
Temp. and Humidity Chamber	Giant Force	GTH-225-20-SP-SD	MAA1112-007	-20 ~ 100℃	Nov. 21, 2012	Conducted (TH01-HY)
Signal Generator	R&S	SMR40	100116	10MHz ~ 40GHz	Jun. 26, 2012	Conducted (TH01-HY)
Power Sensor	Anritsu	MA2411B	0917017	300MHz ~ 40GHz	Feb. 02, 2013	Conducted (TH01-HY)
Power Meter	Anritsu	ML2495A	0949003	300MHz ~ 40GHz	Feb. 02, 2013	Conducted (TH01-HY)
RF Cable-2m	HUBER+SUHNER	SUCOFLEX_104	SN 345675/4	1GHz ~ 26.5GHz	NA	Conducted (TH01-HY)
RF Cable-3m	HUBER+SUHNER	SUCOFLEX_104	SN 345669/4	1GHz ~ 26.5GHz	NA	Conducted (TH01-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	FSP40	100593	9kHz ~ 40GHz	Sep. 14, 2012	Radiation (03CH02-HY)
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH02-HY	30MHz ~ 1GHz 3m	May 09, 2013	Radiation (03CH02-HY)
Amplifier	Agilent	8447D	2944A11146	100kHz ~ 1.3GHz	Jul. 23, 2012	Radiation (03CH02-HY)
Amplifier	Agilent	8449B	3008A02373	1GHz ~ 26.5GHz	Aug. 10, 2012	Radiation (03CH02-HY)
Horn Antenna	ETS-LINDGREN	3117	00091920	1GHz ~ 18GHz	Nov. 16, 2012	Radiation (03CH02-HY)
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170154	15GHz ~ 40GHz	Jan. 08, 2013	Radiation (03CH02-HY)
RF Cable-R03m	Jye Bao	RG142	CB021	9kHz ~ 1GHz	Nov. 10, 2012	Radiation (03CH02-HY)
RF Cable-high	SUHNER	SUCOFLEX106	03CH02-HY	1GHz ~ 40GHz	Mar. 05, 2013	Radiation (03CH02-HY)
Bilog Antenna	SCHAFFNER	CBL61128	2723	30MHz ~ 2GHz	Oct. 22, 2012	Radiation (03CH02-HY)
Turn Table	HD	DS 420	420/649/00	0~ 360 degree	N/A	Radiation (03CH02-HY)
Antenna Mast	HD	MA 240	240/559/00	1 ~ 4 m	N/A	Radiation (03CH02-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	9 kHz - 30 MHz	Dec. 02, 2012	Radiation (03CH02-HY)

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