

FCC Test Report

Equipment : 802.11 an PCIe Module
Brand Name : FreeWave
Model No. : W5800-01
FCC ID : KNYPRW1001EC
Standard : 47 CFR FCC Part 15.247
Operating Band : 5725 MHz – 5850 MHz
FCC Classification : DTS
Applicant : FreeWave Technologies Inc.
5395 Pearl Parkway, Suite 100, Boulder, CO 80301,
U.S.A.

The product sample received on Jun. 22, 2013 and completely tested on Aug. 16, 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:


Gary Chang / Manager





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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]: 0.489MHz 39.45 (Margin 6.74dB) - AV 43.22 (Margin 12.97dB) - QP	FCC 15.207	Complied
3.2	15.247(a)	6dB Bandwidth	6dB Bandwidth [MHz] 20M:17.74/ 40M: 36.64	≥500kHz	Complied
3.3	15.247(b)	RF Output Power (Maximum Conducted (Average) Output Power)	Power [dBm]: 26.79	Power [dBm]:30	Complied
3.4	15.247(e)	Power Spectral Density	PSD [dBm/30kHz]: -1.00	PSD [dBm/30kHz]:8	Complied
3.5	15.247(d)	Emissions in non-restricted frequency bands	Out-of -band emissions are 30dB below the highest power	Non-Restricted Bands: > 30 dBc Restricted Bands: FCC 15.209	Complied
3.6	15.247(d)	Transmitter Unwanted Emissions	Restricted Bands [dBuV/m at 3m]: 5350.00MHz 53.00 (Margin 1.00dB) - AV	Non-Restricted Bands: > 30 dBc Restricted Bands: FCC 15.209	Complied

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
5725-5850	a	5745-5825	149-165 [5]	1 / 3	26.79	N/A
5725-5850	n (HT20)	5745-5825	149-165 [5]	1 / 3	26.06	N/A
5725-5850	n (HT40)	5755-5795	151-159 [2]	1 / 3	26.10	N/A

Note 1: RF output power specifies that Maximum Conducted (Average) Output Power.
 Note 2: 802.11a/n uses a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM modulation.

1.1.2 Antenna Information

Antenna Category	
<input type="checkbox"/>	Equipment placed on the market without antennas
<input type="checkbox"/>	Integral antenna (antenna permanently attached)
<input 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.
<input checked="" type="checkbox"/>	External antenna (dedicated antennas)
<input type="checkbox"/>	Single power level with corresponding antenna(s).
<input checked="" type="checkbox"/>	Multiple power level and corresponding antenna(s).
<input checked="" type="checkbox"/>	RF connector provided
<input type="checkbox"/>	Unique antenna connector. (e.g., MMCX, U.FL, IPX, and RP-SMA, RP-N type...)
<input checked="" type="checkbox"/>	Standard antenna connector. (e.g., SMA, N, BNC, and TNC type...)

Antenna General Information							
No.	Ant. Cat.	Model	Ant. Type	Gain (dBi)	Manufacturer	Transmit Chains (N _{TX})	Application
1	External	Y5815	Yagi	15	WADE Antenna Inc.	1	P to MP
2	External	ZDAQJ5800-12	Omni	12	ZDA Communications US LLC.	1	P to MP
3	External	P250-5.8	Panel	14.4	WADE Antenna Inc.	1	P to MP
4	External	ZDAGP5800-24-12	Dish	24	ZDA Communications US LLC.	1	P to P
5	External	98618UNXX000	Dipole	7	Master Wave Technology Co., Ltd	3	P to MP

Note: The antennas are professionally installed.



1.1.3 Type of EUT

Identify EUT	
EUT Serial Number	N/A
Presentation of Equipment	<input type="checkbox"/> Production ; <input checked="" type="checkbox"/> Pre-Production ; <input type="checkbox"/> Prototype
Type of EUT	
<input checked="" type="checkbox"/>	Stand-alone
<input type="checkbox"/>	Combined (EUT where the radiopart 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 802.11a	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 checked="" type="checkbox"/> DC (5 Vdc)	
Type of DC Source	<input type="checkbox"/> Internal DC supply	<input type="checkbox"/> External DC adapter	<input checked="" type="checkbox"/> From Host

1.2 Support Equipment

Support Equipment				
No.	Equipment	Brand Name	Model Name	Remarks
1	Notebook	DELL	E6430	DoC
2	Power Supply	GW	GPL-6030D	--
3	Extender card	N/A	adapter	N/A

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
- ◆ FCC KDB 412172

1.4 Testing Location Information

Testing Location				
<input checked="" type="checkbox"/>	Sporton Lab	ADD : No. 52, Hwa Ya 1st Rd., Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL : 886-3-327-3456 FAX : 886-3-318-0055		
<input checked="" type="checkbox"/>	ICC Lab	ADD : No.3-1, Lane 6, Wen San 3rd St., Kwei Shan Hsiang, Tao Yuan Hsein 333, Taiwan (R.O.C.) TEL : 886-3-271-8666 FAX : 886-3-318-0155		
Test Condition	Test Site No.	Test Engineer	Test Environment	Test Date
RF Conducted	TH01-HY	Ian Du	22.1°C / 61%	Jul. 24 ~ Aug. 16, 2013
*AC Conduction	CO01-WS	Skys Huang	23°C / 65%	Aug. 13, 2013
*Radiated Emission	03CH01-WS	Mark Liao Anderson Hong	22°C / 65~69%	Jul. 23 ~ Aug. 09, 2013
Test site registered number [657002] with FCC. Test site registered number [10807A-1] with IC.				

Note: * Sporton Lab subcontracts this test item to ICC lab (TAF: 2732).

ICC lab is a TAF accreditation test firm and also is an approved provider of Sporton lab.



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
All emissions, radiated	30 – 1000 MHz	±3.9 dB
	Above 1GHz	±4.2 dB
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 The Worst Case Modulation Configuration

Worst Modulation Used for Conformance Testing			
Modulation Mode	Transmit Chains (N _{TX})	Data Rate / MCS	Worst Data Rate / MCS
11a	1 / 3	6-54 Mbps	6 Mbps
HT20	1 / 3	M0-23	MCS 0
HT40	1 / 3	M0-23	MCS 0

2.2 The Worst Case Power Setting Parameter

The Worst Case Power Setting Parameter (5725-5850MHz band)							
Operating Mode	1 (Ant. 1, Yagi antenna)						
Test Software Version	ART2-GUI V2.3						
Modulation Mode	N _{TX}	Test Frequency (MHz)					
		NCB: 20MHz			NCB: 40MHz		
		5745	5785	5825	5755	5795	-
11a	1	17.5	18	18	-	-	-
HT20	1	17.5	18	18	-	-	-
HT40	1	-	-	-	17.5	18.5	-

The Worst Case Power Setting Parameter (5725-5850MHz band)							
Operating Mode	2 (Ant. 2, Omni antenna)						
Test Software Version	ART2-GUI V2.3						
Modulation Mode	N _{TX}	Test Frequency (MHz)					
		NCB: 20MHz			NCB: 40MHz		
		5745	5785	5825	5755	5795	-
11a	1	19.5	22	22	-	-	-
HT20	1	20	22	22	-	-	-
HT40	1	-	-	-	18	20.5	-



The Worst Case Power Setting Parameter (5725-5850MHz band)							
Operating Mode	3 (Ant. 3, Panel antenna)						
Test Software Version	ART2-GUI V2.3						
Modulation Mode	N _{TX}	Test Frequency (MHz)					
		NCB: 20MHz			NCB: 40MHz		
		5745	5785	5825	5755	5795	-
11a	1	17.5	19	17.5	-	-	-
HT20	1	17.5	19	17.5	-	-	-
HT40	1	-	-	-	16.5	17.5	-




The Worst Case Power Setting Parameter (5725-5850MHz band)							
Operating Mode	4 (Ant. 4, Dish antenna)						
Test Software Version	ART2-GUI V2.3						
Modulation Mode	N _{TX}	Test Frequency (MHz)					
		NCB: 20MHz			NCB: 40MHz		
		5745	5785	5825	5755	5795	-
11a	1	11	10.5	10	-	-	-
HT20	1	11	10.5	10	-	-	-
HT40	1	-	-	-	11.5	11	-

The Worst Case Power Setting Parameter (5725-5850MHz band)							
Operating Mode	5 (Ant. 5, Dipole antenna)						
Test Software Version	ART2-GUI V2.3						
Modulation Mode	N _{TX}	Test Frequency (MHz)					
		NCB: 20MHz			NCB: 40MHz		
		5745	5785	5825	5755	5795	-
11a	3	22.5	22.5	22.5	-	-	-
HT20	3	22.5	22.5	22.5	-	-	-
HT40	3	-	-	-	20	22	-

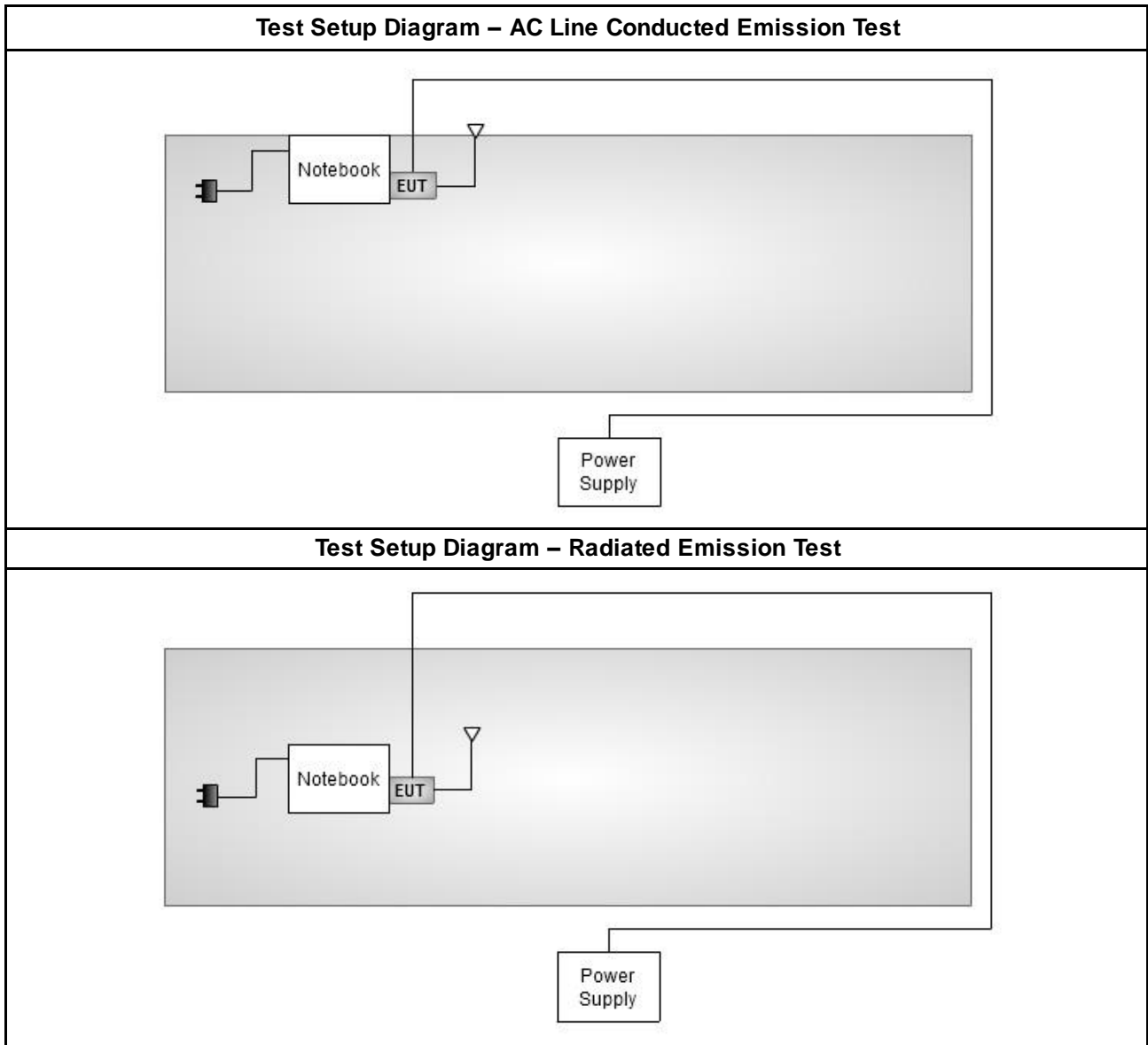
2.3 The Worst Case Measurement Configuration

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	Radio link (WLAN) with Ant. 1, Yagi antenna
2	Radio link (WLAN) with Ant. 2, Omni antenna
3	Radio link (WLAN) with Ant. 3, Panel antenna
4	Radio link (WLAN) with Ant. 4, Dish antenna
5	Radio link (WLAN) with Ant. 5, Dipole antenna

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	11a, 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 X. <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. The worst planes is X.		
Operating Mode < 1GHz	<input checked="" type="checkbox"/> Radio link (WLAN) with Ant. 1, Yagi antenna <input checked="" type="checkbox"/> Radio link (WLAN) with Ant. 2, Omni antenna <input checked="" type="checkbox"/> Radio link (WLAN) with Ant. 3, Panel antenna <input checked="" type="checkbox"/> Radio link (WLAN) with Ant. 4, Dish antenna <input checked="" type="checkbox"/> Radio link (WLAN) with Ant. 5, Dipole antenna		
Modulation Mode	11a, HT20, HT40		
Orthogonal Planes of EUT	X Plane	Y Plane	Z Plane
			

2.4 Test Setup Diagram



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.

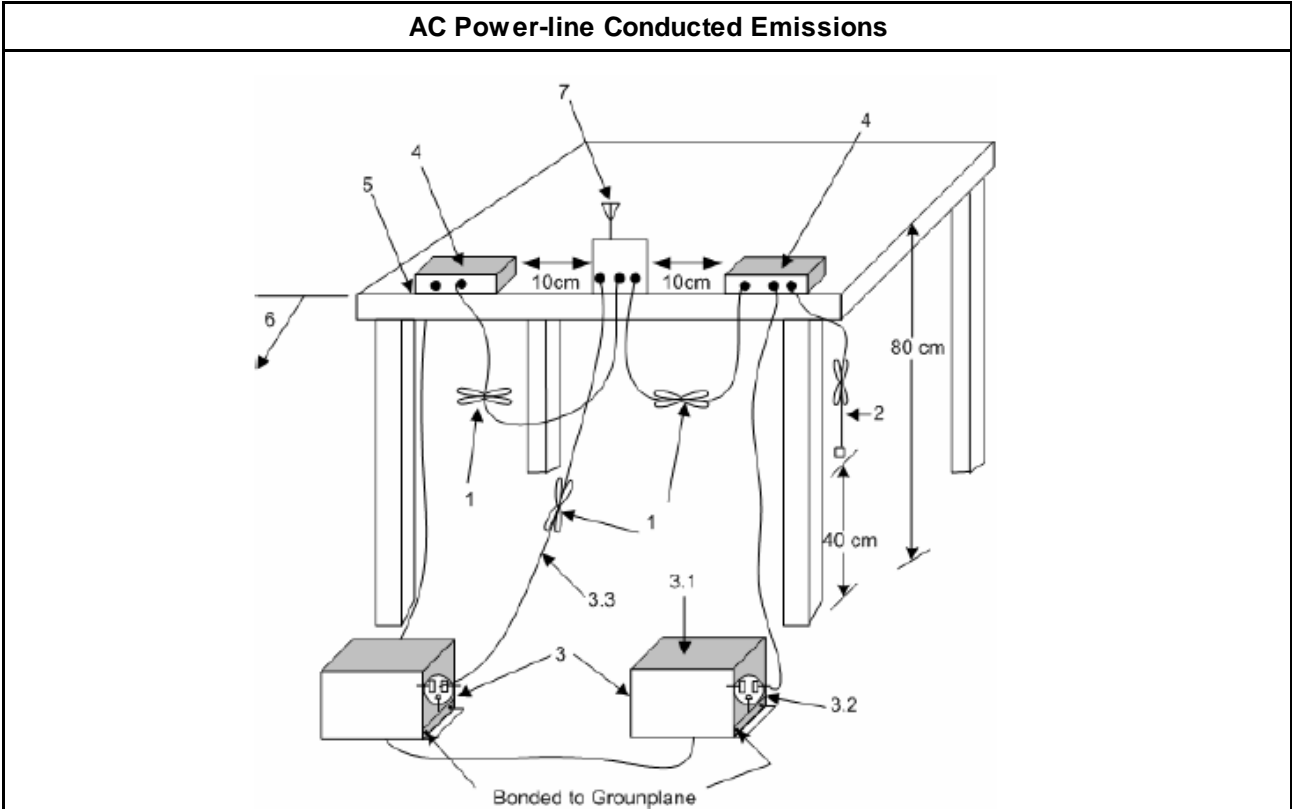
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

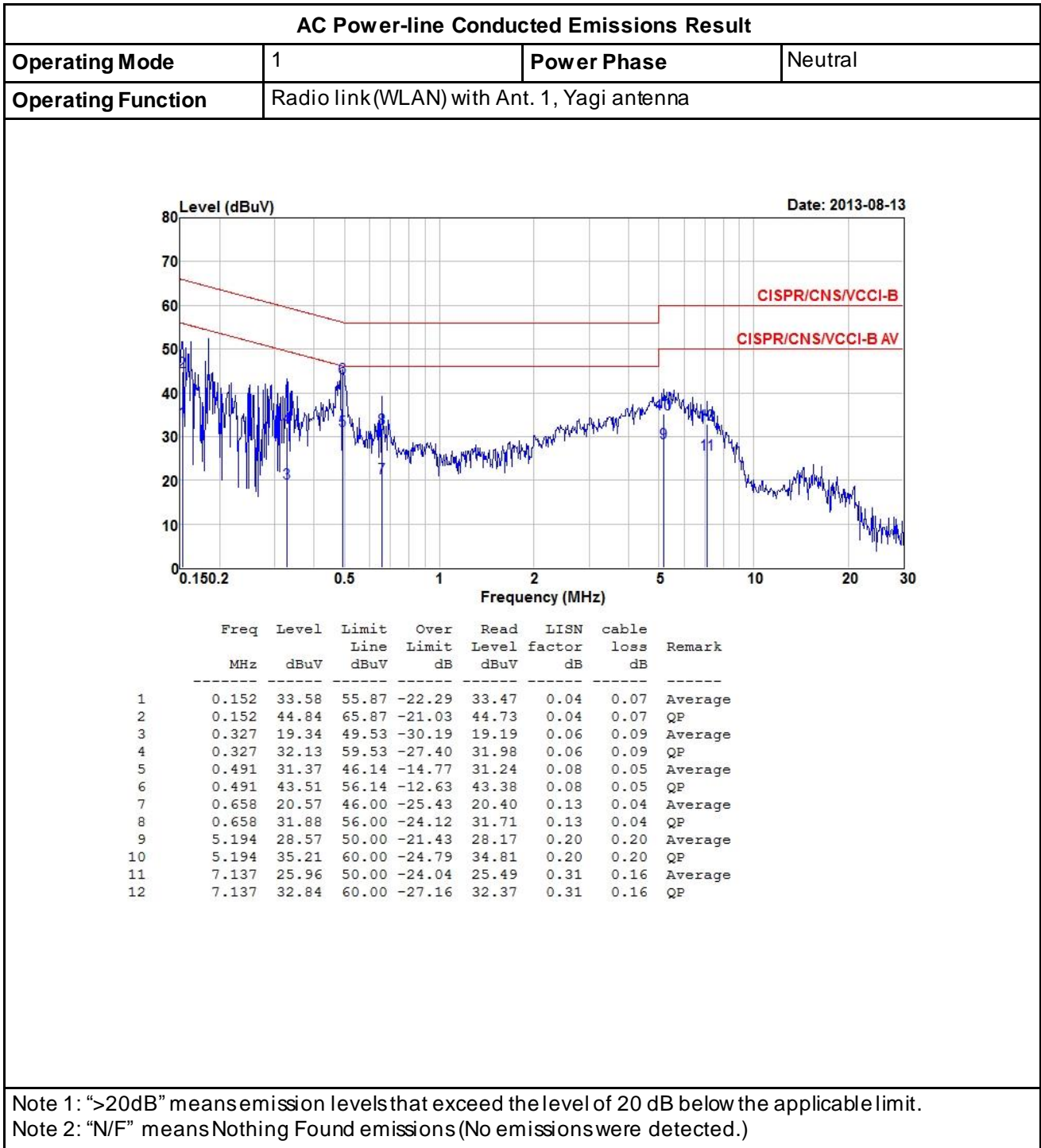
Test Method
<input checked="" type="checkbox"/> Refer as ANSI C63.10-2009, clause 6.2 for AC power-line conducted emissions.

3.1.4 Test Setup





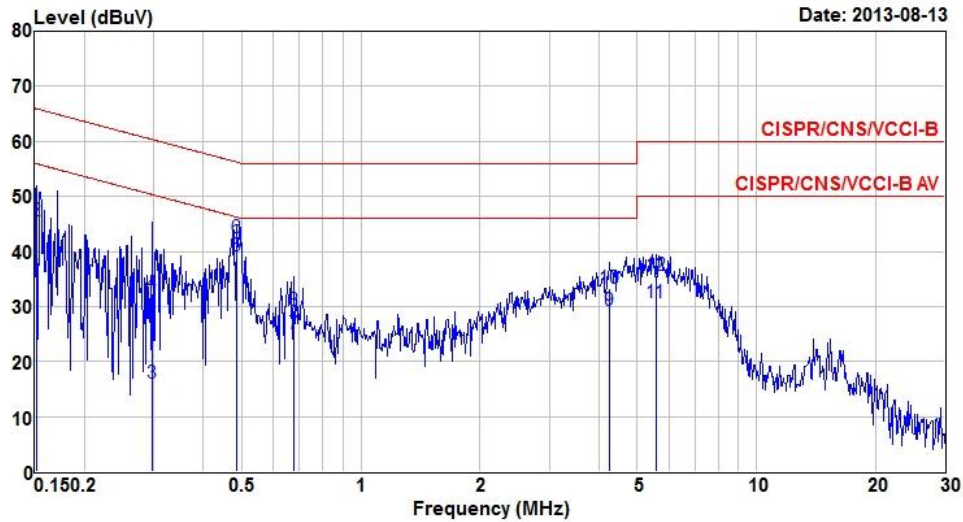
3.1.5 Test Result of AC Power-line Conducted Emissions





AC Power-line Conducted Emissions Result

Operating Mode	1	Power Phase	Line
Operating Function	Radio link(WLAN) with Ant. 1, Yagi antenna		



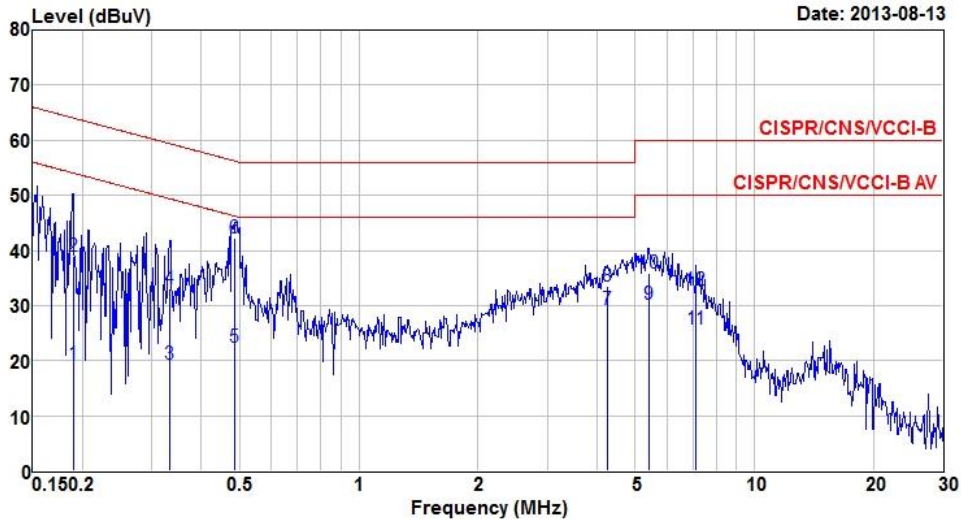
	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.152	35.36	55.91	-20.55	35.25	0.05	0.06	Average
2	0.152	45.48	65.91	-20.43	45.37	0.05	0.06	QP
3	0.297	15.99	50.32	-34.33	15.82	0.06	0.11	Average
4	0.297	32.42	60.32	-27.90	32.25	0.06	0.11	QP
5	0.484	39.15	46.27	-7.12	39.02	0.08	0.05	Average
6	0.484	42.60	56.27	-13.67	42.47	0.08	0.05	QP
7	0.675	25.12	46.00	-20.88	24.98	0.10	0.04	Average
8	0.675	29.35	56.00	-26.65	29.21	0.10	0.04	QP
9	4.247	29.27	46.00	-16.73	28.86	0.18	0.23	Average
10	4.247	33.22	56.00	-22.78	32.81	0.18	0.23	QP
11	5.564	30.77	50.00	-19.23	30.34	0.24	0.19	Average
12	5.564	35.68	60.00	-24.32	35.25	0.24	0.19	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.)



AC Power-line Conducted Emissions Result

Operating Mode	2	Power Phase	Neutral
Operating Function	Radio link(WLAN) with Ant. 2, Omni antenna		



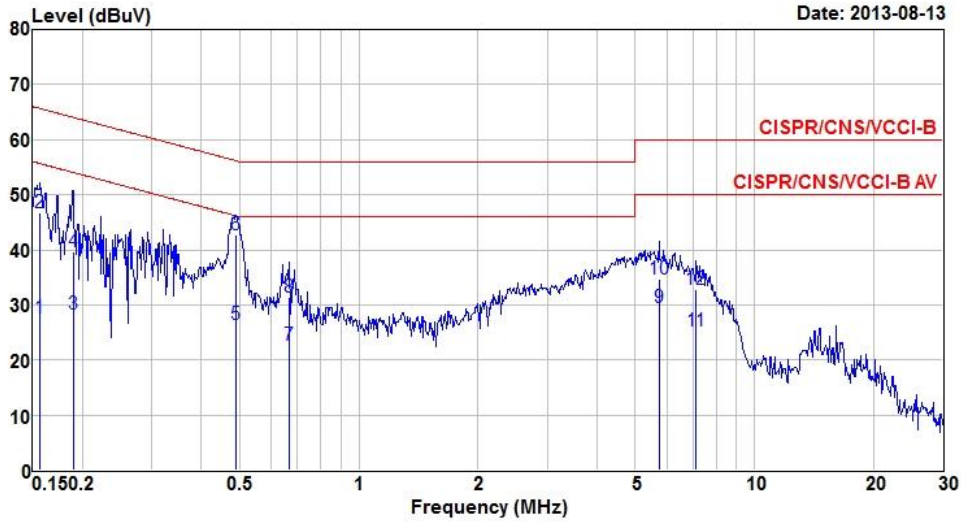
	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.189	19.47	54.06	-34.59	19.27	0.04	0.16	Average
2	0.189	38.95	64.06	-25.11	38.75	0.04	0.16	QP
3	0.332	19.37	49.40	-30.03	19.23	0.06	0.08	Average
4	0.332	33.07	59.40	-26.33	32.93	0.06	0.08	QP
5	0.486	22.51	46.23	-23.72	22.38	0.08	0.05	Average
6	0.486	42.14	56.23	-14.09	42.01	0.08	0.05	QP
7	4.247	29.25	46.00	-16.75	28.87	0.15	0.23	Average
8	4.247	33.42	56.00	-22.58	33.04	0.15	0.23	QP
9	5.419	30.20	50.00	-19.80	29.79	0.21	0.20	Average
10	5.419	35.81	60.00	-24.19	35.40	0.21	0.20	QP
11	7.137	25.81	50.00	-24.19	25.34	0.31	0.16	Average
12	7.137	32.88	60.00	-27.12	32.41	0.31	0.16	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.)



AC Power-line Conducted Emissions Result

Operating Mode	2	Power Phase	Line
Operating Function	Radio link(WLAN) with Ant. 2, Omni antenna		



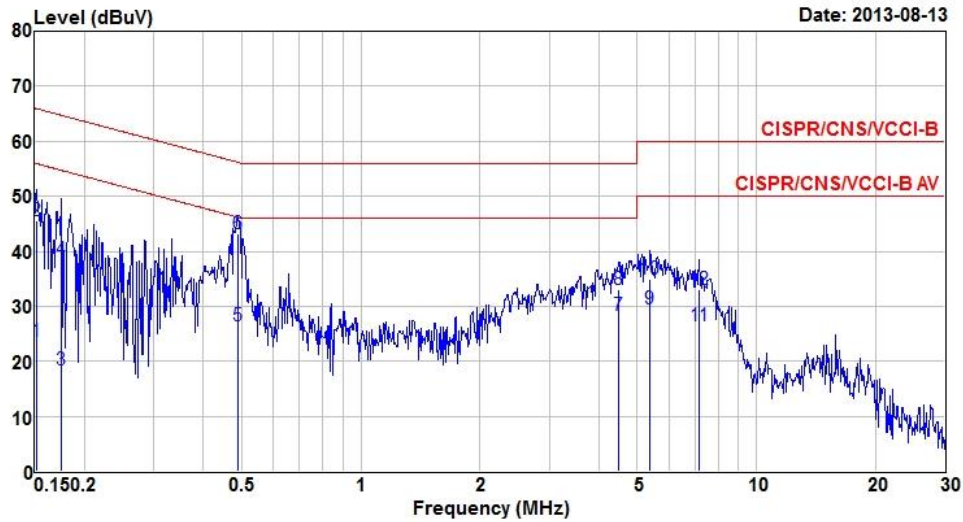
	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.156	27.66	55.65	-27.99	27.53	0.05	0.08	Average
2	0.156	46.64	65.65	-19.01	46.51	0.05	0.08	QP
3	0.189	28.25	54.06	-25.81	28.04	0.05	0.16	Average
4	0.189	39.75	64.06	-24.31	39.54	0.05	0.16	QP
5	0.489	26.40	46.19	-19.79	26.27	0.08	0.05	Average
6	0.489	42.66	56.19	-13.53	42.53	0.08	0.05	QP
7	0.668	22.75	46.00	-23.25	22.61	0.10	0.04	Average
8	0.668	31.36	56.00	-24.64	31.22	0.10	0.04	QP
9	5.744	29.47	50.00	-20.53	29.03	0.25	0.19	Average
10	5.744	34.68	60.00	-25.32	34.24	0.25	0.19	QP
11	7.137	25.37	50.00	-24.63	24.88	0.33	0.16	Average
12	7.137	32.90	60.00	-27.10	32.41	0.33	0.16	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.)



AC Power-line Conducted Emissions Result

Operating Mode	3	Power Phase	Neutral
Operating Function	Radio link(WLAN) with Ant. 3, Panel antenna		



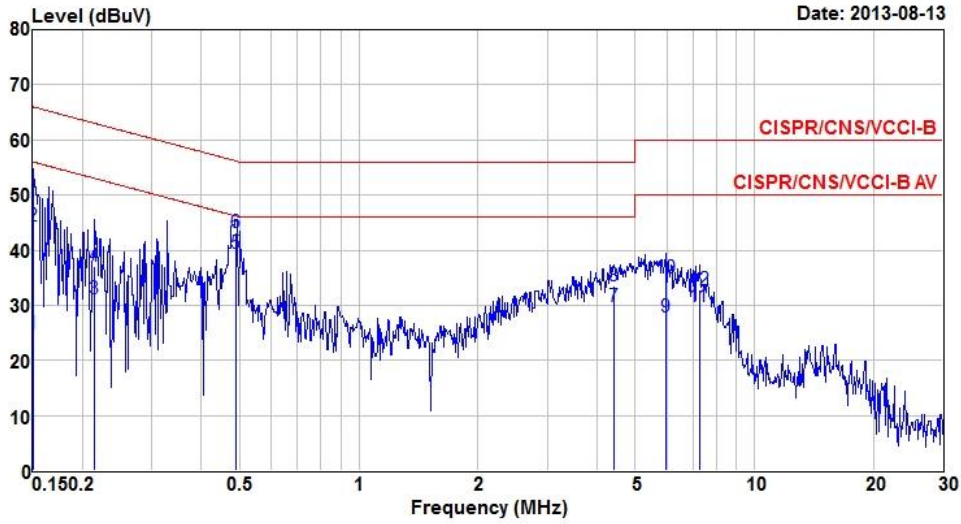
	Freq	Level	Limit	Over	Read	LISN	cable	
	MHz	dBuV	Line	Limit	Level	factor	loss	Remark
			dBuV	dB	dBuV	dB	dB	
1	0.152	23.68	55.91	-32.23	23.58	0.04	0.06	Average
2	0.152	45.51	65.91	-20.40	45.41	0.04	0.06	QP
3	0.175	18.45	54.72	-36.27	18.28	0.04	0.13	Average
4	0.175	38.41	64.72	-26.31	38.24	0.04	0.13	QP
5	0.489	26.40	46.19	-19.79	26.27	0.08	0.05	Average
6	0.489	43.24	56.19	-12.95	43.11	0.08	0.05	QP
7	4.478	28.33	46.00	-17.67	27.94	0.17	0.22	Average
8	4.478	33.14	56.00	-22.86	32.75	0.17	0.22	QP
9	5.390	29.47	50.00	-20.53	29.06	0.21	0.20	Average
10	5.390	35.01	60.00	-24.99	34.60	0.21	0.20	QP
11	7.175	26.53	50.00	-23.47	26.06	0.31	0.16	Average
12	7.175	32.94	60.00	-27.06	32.47	0.31	0.16	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.)



AC Power-line Conducted Emissions Result

Operating Mode	3	Power Phase	Line
Operating Function	Radio link(WLAN) with Ant. 3, Panel antenna		



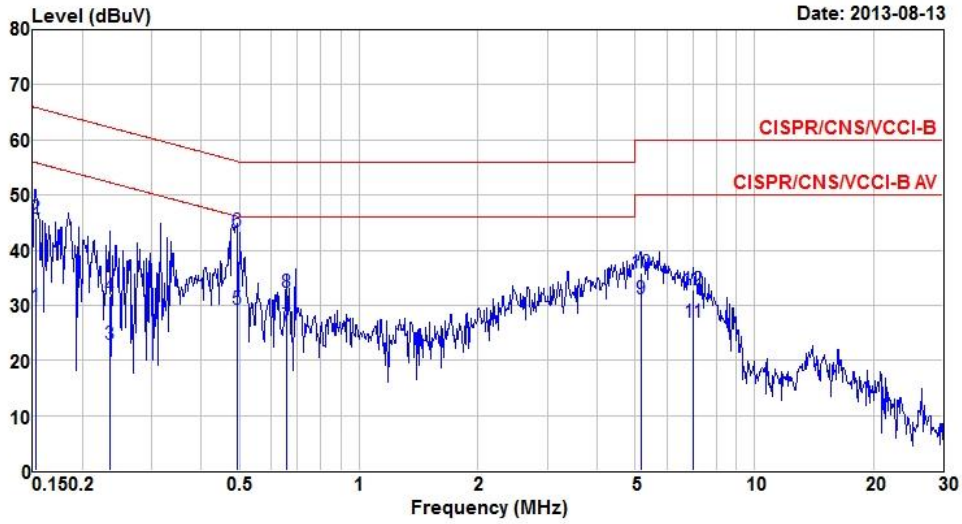
	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.151	24.82	55.96	-31.14	24.71	0.05	0.06	Average
2	0.151	44.33	65.96	-21.63	44.22	0.05	0.06	QP
3	0.215	31.09	53.01	-21.92	30.87	0.05	0.17	Average
4	0.215	37.09	63.01	-25.92	36.87	0.05	0.17	QP
5	0.489	39.45	46.19	-6.74	39.32	0.08	0.05	Average
6	0.489	43.22	56.19	-12.97	43.09	0.08	0.05	QP
7	4.430	29.64	46.00	-16.36	29.23	0.18	0.23	Average
8	4.430	33.61	56.00	-22.39	33.20	0.18	0.23	QP
9	5.961	27.80	50.00	-22.20	27.36	0.26	0.18	Average
10	5.961	34.83	60.00	-25.17	34.39	0.26	0.18	QP
11	7.252	29.83	50.00	-20.17	29.33	0.34	0.16	Average
12	7.252	32.79	60.00	-27.21	32.29	0.34	0.16	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.)



AC Power-line Conducted Emissions Result

Operating Mode	4	Power Phase	Neutral
Operating Function	Radio link(WLAN) with Ant. 4, Dish antenna		



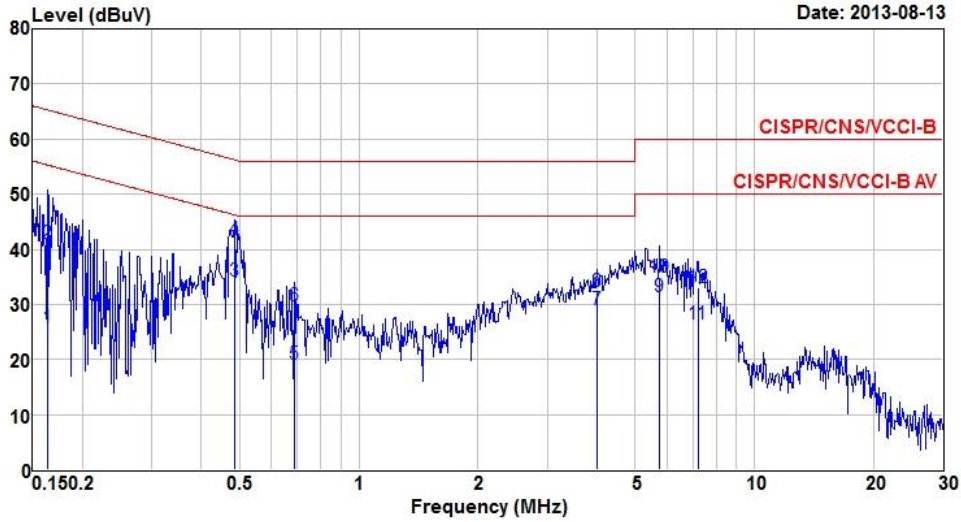
	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.152	29.73	55.87	-26.14	29.62	0.04	0.07	Average
2	0.152	45.77	65.87	-20.10	45.66	0.04	0.07	QP
3	0.235	23.01	52.26	-29.25	22.82	0.04	0.15	Average
4	0.235	31.54	62.26	-30.72	31.35	0.04	0.15	QP
5	0.491	29.16	46.14	-16.98	29.03	0.08	0.05	Average
6	0.491	43.35	56.14	-12.79	43.22	0.08	0.05	QP
7	0.658	26.18	46.00	-19.82	26.01	0.13	0.04	Average
8	0.658	32.38	56.00	-23.62	32.21	0.13	0.04	QP
9	5.166	31.09	50.00	-18.91	30.69	0.20	0.20	Average
10	5.166	35.78	60.00	-24.22	35.38	0.20	0.20	QP
11	7.025	26.91	50.00	-23.09	26.45	0.30	0.16	Average
12	7.025	32.92	60.00	-27.08	32.46	0.30	0.16	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.)



AC Power-line Conducted Emissions Result

Operating Mode	4	Power Phase	Line
Operating Function	Radio link(WLAN) with Ant. 4, Dish antenna		



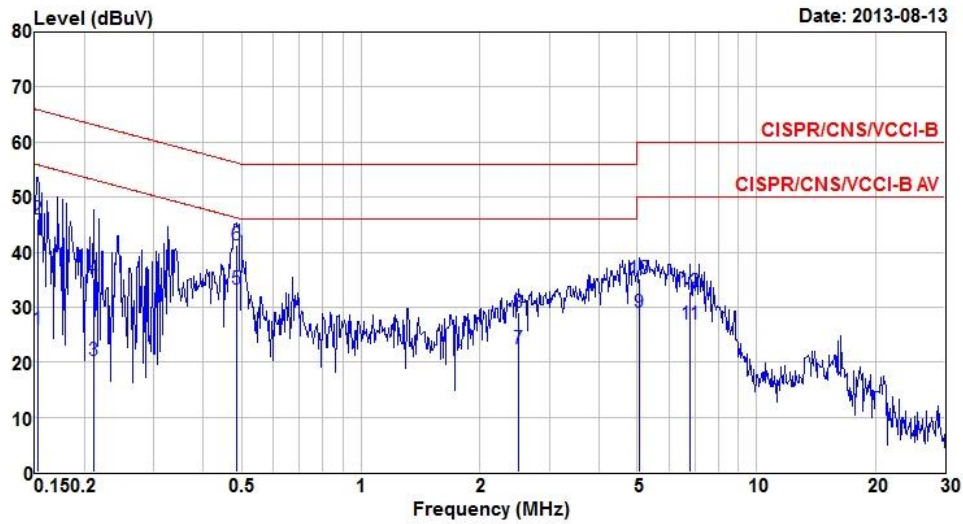
	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.163	25.73	55.30	-29.57	25.59	0.05	0.09	Average
2	0.163	41.05	65.30	-24.25	40.91	0.05	0.09	QP
3	0.486	34.26	46.23	-11.97	34.13	0.08	0.05	Average
4	0.486	41.84	56.23	-14.39	41.71	0.08	0.05	QP
5	0.686	19.06	46.00	-26.94	18.92	0.10	0.04	Average
6	0.686	29.84	56.00	-26.16	29.70	0.10	0.04	QP
7	4.006	28.93	46.00	-17.07	28.53	0.16	0.24	Average
8	4.006	32.29	56.00	-23.71	31.89	0.16	0.24	QP
9	5.774	31.30	50.00	-18.70	30.86	0.25	0.19	Average
10	5.774	34.97	60.00	-25.03	34.53	0.25	0.19	QP
11	7.213	26.36	50.00	-23.64	25.87	0.33	0.16	Average
12	7.213	33.01	60.00	-26.99	32.52	0.33	0.16	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.)



AC Power-line Conducted Emissions Result

Operating Mode	5	Power Phase	Neutral
Operating Function	Radio link(WLAN) with Ant. 5, Dipole antenna		



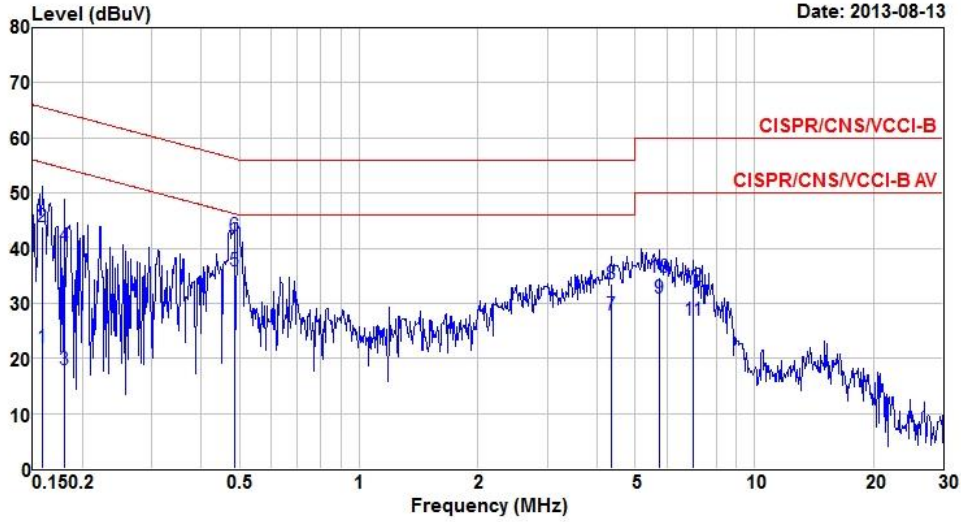
	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.152	25.96	55.87	-29.91	25.85	0.04	0.07	Average
2	0.152	46.05	65.87	-19.82	45.94	0.04	0.07	QP
3	0.211	20.27	53.18	-32.91	20.06	0.04	0.17	Average
4	0.211	35.17	63.18	-28.01	34.96	0.04	0.17	QP
5	0.484	33.36	46.27	-12.91	33.23	0.08	0.05	Average
6	0.484	41.25	56.27	-15.02	41.12	0.08	0.05	QP
7	2.513	22.48	46.00	-23.52	22.11	0.18	0.19	Average
8	2.513	28.94	56.00	-27.06	28.57	0.18	0.19	QP
9	5.058	28.94	50.00	-21.06	28.53	0.20	0.21	Average
10	5.058	35.24	60.00	-24.76	34.83	0.20	0.21	QP
11	6.805	26.81	50.00	-23.19	26.35	0.29	0.17	Average
12	6.805	32.81	60.00	-27.19	32.35	0.29	0.17	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.)



AC Power-line Conducted Emissions Result

Operating Mode	5	Power Phase	Line
Operating Function	Radio link (WLAN) with Ant. 5, Dipole antenna		



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.159	21.93	55.52	-33.59	21.80	0.05	0.08	Average
2	0.159	43.81	65.52	-21.71	43.68	0.05	0.08	QP
3	0.180	18.06	54.50	-36.44	17.87	0.05	0.14	Average
4	0.180	40.28	64.50	-24.22	40.09	0.05	0.14	QP
5	0.486	35.77	46.23	-10.46	35.64	0.08	0.05	Average
6	0.486	42.20	56.23	-14.03	42.07	0.08	0.05	QP
7	4.361	27.78	46.00	-18.22	27.37	0.18	0.23	Average
8	4.361	33.51	56.00	-22.49	33.10	0.18	0.23	QP
9	5.744	30.95	50.00	-19.05	30.51	0.25	0.19	Average
10	5.744	34.70	60.00	-25.30	34.26	0.25	0.19	QP
11	7.025	26.93	50.00	-23.07	26.45	0.32	0.16	Average
12	7.025	32.94	60.00	-27.06	32.46	0.32	0.16	QP

Note 1: ">20dB" means emission levels that exceed the level of 20 dB below the applicable limit.
 Note 2: "N/F" means Nothing Found emissions (No emissions were detected.)

3.2 6dB Bandwidth

3.2.1 6dB Bandwidth Limit

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

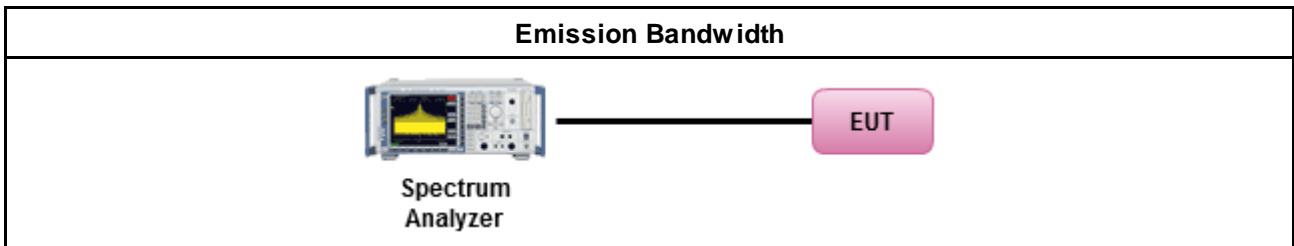
3.2.2 Measuring Instruments

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 checked="" 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 checked="" 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										
Operating Mode			1 (Ant. 1, Yagi antenna)							
Condition			Emission Bandwidth (MHz)							
Modulation Mode	N _{TX}	Freq. (MHz)	99% Bandwidth				6dB Bandwidth			
			Chain-Port 1	Chain-Port 2	Chain-Port 3	Chain-Port 4	Chain-Port 1	Chain-Port 2	Chain-Port 3	Chain-Port 4
11a	1	5745	16.96	-	-	-	16.29	-	-	-
11a	1	5785	17.08	-	-	-	16.29	-	-	-
11a	1	5825	17.02	-	-	-	16.29	-	-	-
HT20	1	5745	18.06	-	-	-	17.57	-	-	-
HT20	1	5785	18.18	-	-	-	17.33	-	-	-
HT20	1	5825	18.06	-	-	-	17.33	-	-	-
HT40	1	5755	37.97	-	-	-	36.17	-	-	-
HT40	1	5795	37.97	-	-	-	36.06	-	-	-
Limit			N/A				≥500 kHz			
Result			Complied							

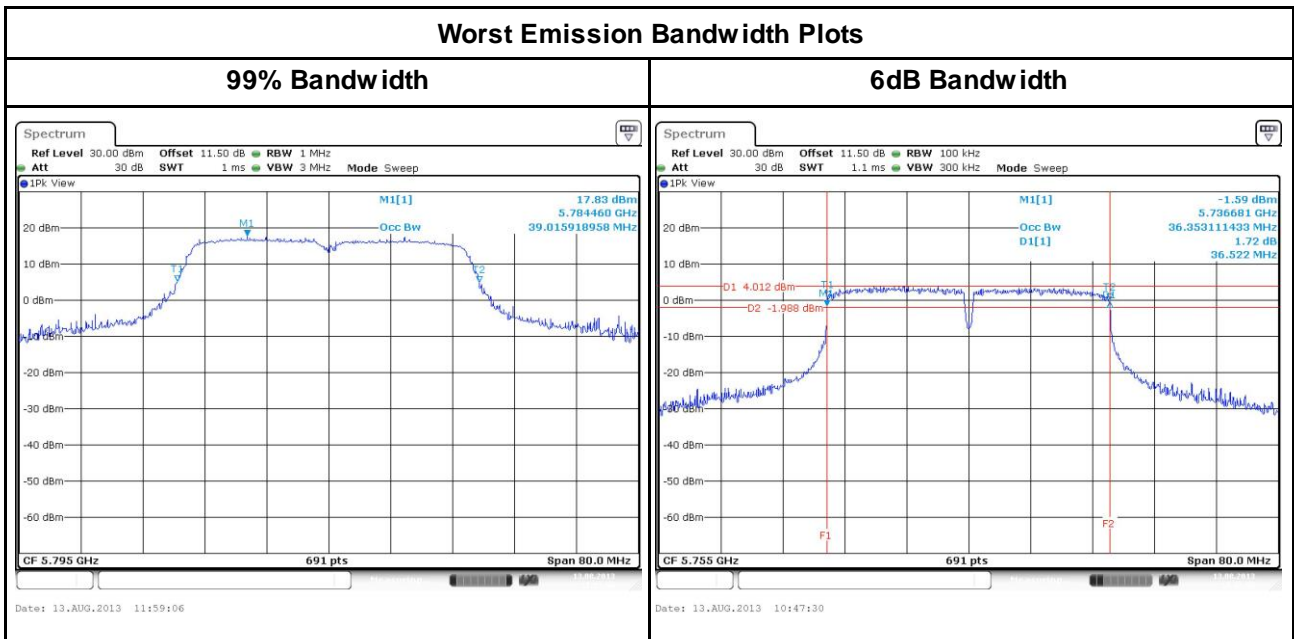
Note 1: N_{TX} = Number of Transmit Chains





Emission Bandwidth Result										
Operating Mode			2 (Ant. 2, Omni antenna)							
Condition			Emission Bandwidth (MHz)							
Modulation Mode	N _{TX}	Freq. (MHz)	99% Bandwidth				6dB Bandwidth			
			Chain-Port 1	Chain-Port 2	Chain-Port 3	Chain-Port 4	Chain-Port 1	Chain-Port 2	Chain-Port 3	Chain-Port 4
11a	1	5745	17.36	-	-	-	16.58	-	-	-
11a	1	5785	18.92	-	-	-	16.52	-	-	-
11a	1	5825	18.46	-	-	-	16.46	-	-	-
HT20	1	5745	18.40	-	-	-	17.68	-	-	-
HT20	1	5785	19.97	-	-	-	17.68	-	-	-
HT20	1	5825	19.62	-	-	-	17.74	-	-	-
HT40	1	5755	38.32	-	-	-	36.52	-	-	-
HT40	1	5795	39.02	-	-	-	36.41	-	-	-
Limit			N/A				≥500 kHz			
Result			Complied							

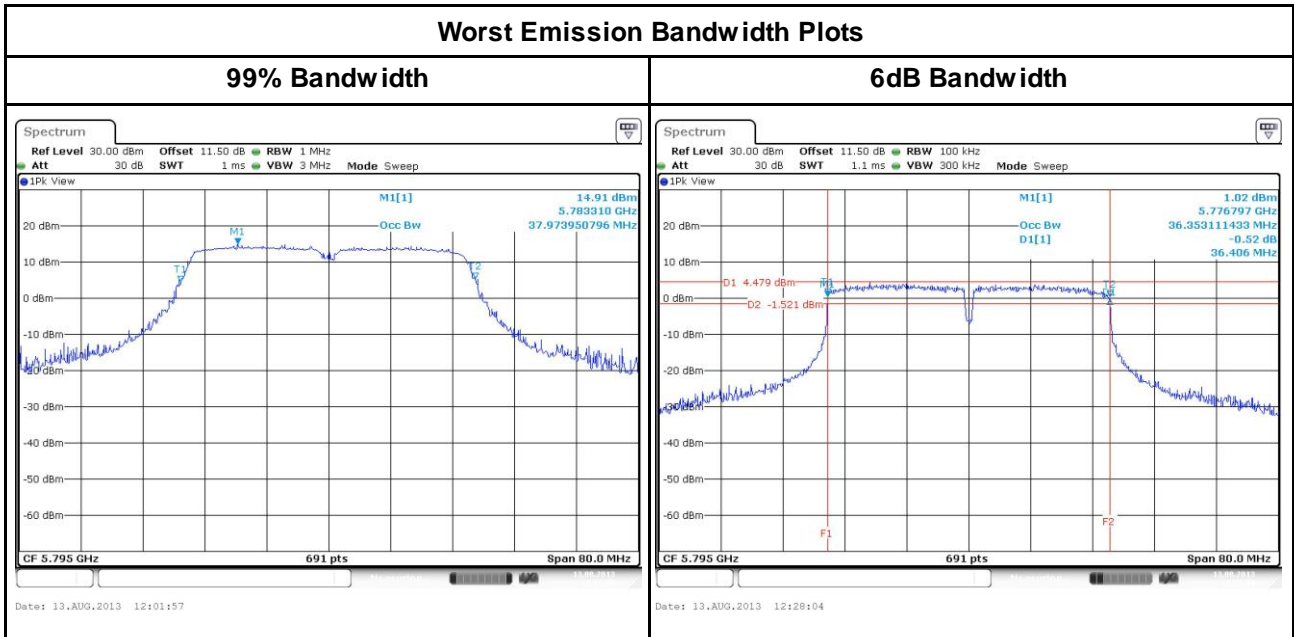
Note 1: N_{TX} = Number of Transmit Chains





Emission Bandwidth Result										
Operating Mode			3 (Ant. 3, Panel antenna)							
Condition			Emission Bandwidth (MHz)							
Modulation Mode	N _{TX}	Freq. (MHz)	99% Bandwidth				6dB Bandwidth			
			Chain-Port 1	Chain-Port 2	Chain-Port 3	Chain-Port 4	Chain-Port 1	Chain-Port 2	Chain-Port 3	Chain-Port 4
11a	1	5745	17.19	-	-	-	16.46	-	-	-
11a	1	5785	17.25	-	-	-	16.52	-	-	-
11a	1	5825	17.08	-	-	-	16.52	-	-	-
HT20	1	5745	18.12	-	-	-	17.74	-	-	-
HT20	1	5785	18.23	-	-	-	17.68	-	-	-
HT20	1	5825	18.06	-	-	-	17.74	-	-	-
HT40	1	5755	37.86	-	-	-	36.41	-	-	-
HT40	1	5795	37.97	-	-	-	36.41	-	-	-
Limit			N/A				≥500 kHz			
Result			Complied							

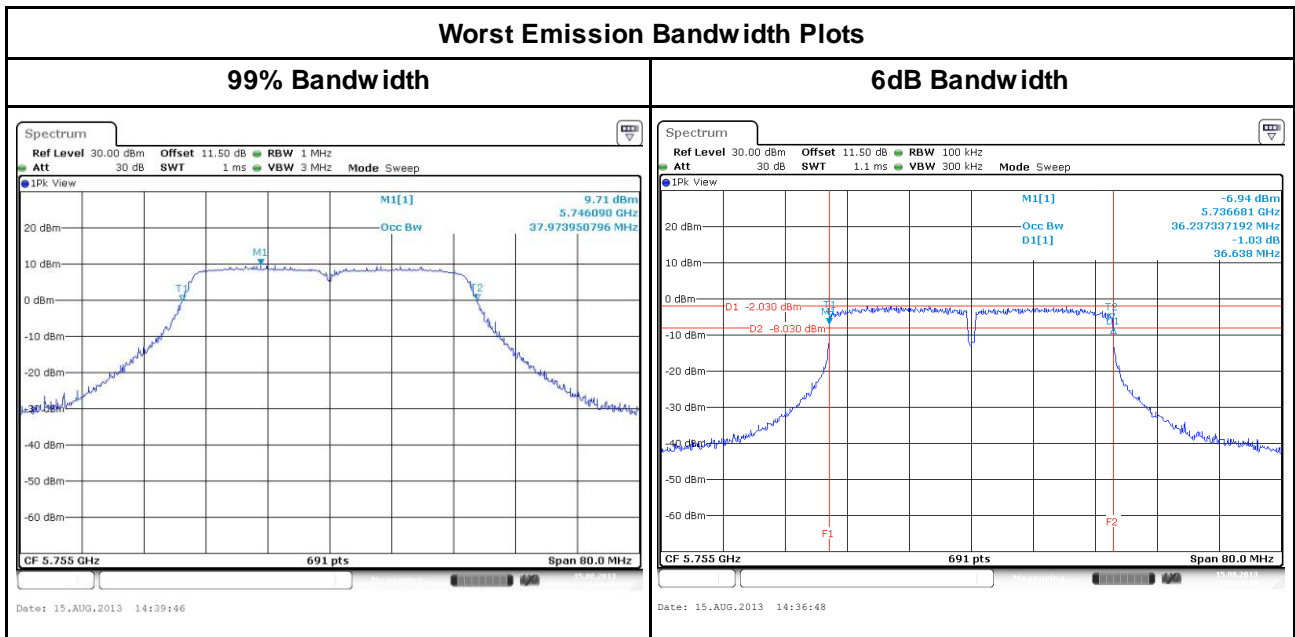
Note 1: N_{TX} = Number of Transmit Chains





Emission Bandwidth Result										
Operating Mode			4 (Ant. 4, Dish antenna)							
Condition			Emission Bandwidth (MHz)							
Modulation Mode	N _{TX}	Freq. (MHz)	99% Bandwidth				6dB Bandwidth			
			Chain-Port 1	Chain-Port 2	Chain-Port 3	Chain-Port 4	Chain-Port 1	Chain-Port 2	Chain-Port 3	Chain-Port 4
11a	1	5745	16.96	-	-	-	16.58	-	-	-
11a	1	5785	17.02	-	-	-	16.58	-	-	-
11a	1	5825	16.96	-	-	-	16.52	-	-	-
HT20	1	5745	18.06	-	-	-	17.68	-	-	-
HT20	1	5785	18.00	-	-	-	17.74	-	-	-
HT20	1	5825	18.00	-	-	-	17.74	-	-	-
HT40	1	5755	37.97	-	-	-	36.64	-	-	-
HT40	1	5795	37.74	-	-	-	36.52	-	-	-
Limit			N/A				≥500 kHz			
Result			Complied							

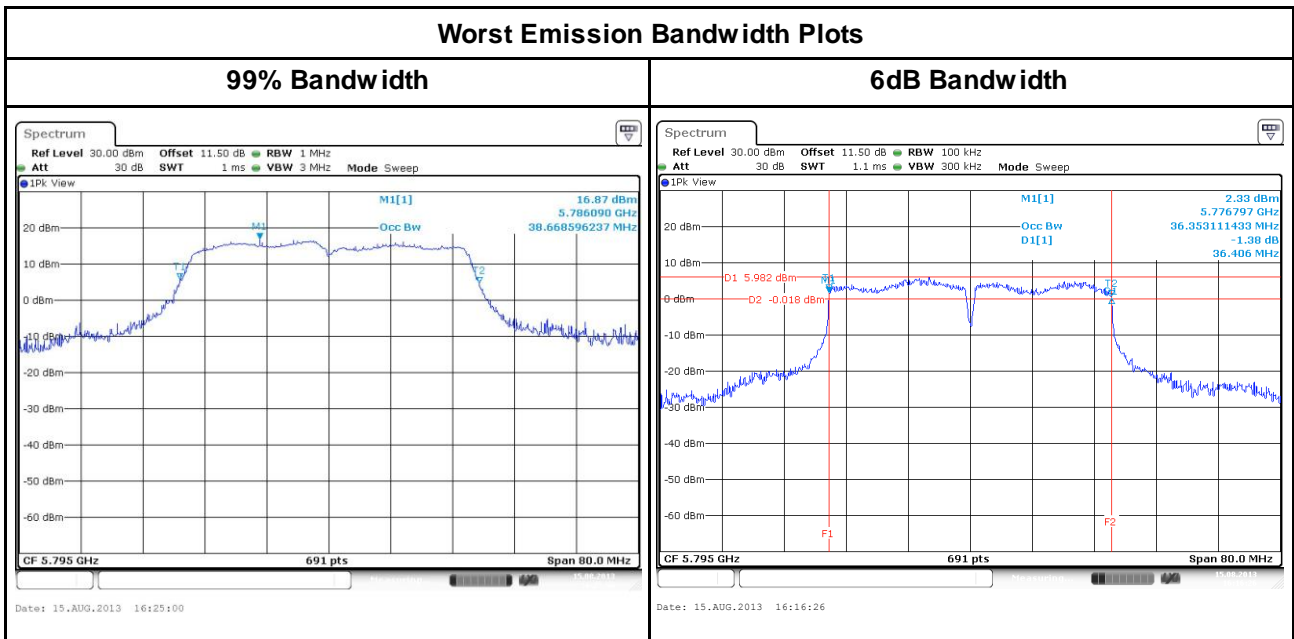
Note 1: N_{TX} = Number of Transmit Chains





Emission Bandwidth Result										
Operating Mode			5 (Ant. 5, Dipole antenna)							
Condition			Emission Bandwidth (MHz)							
Modulation Mode	N _{TX}	Freq. (MHz)	99% Bandwidth				6dB Bandwidth			
			Chain-Port 1	Chain-Port 2	Chain-Port 3	Chain-Port 4	Chain-Port 1	Chain-Port 2	Chain-Port 3	Chain-Port 4
11a	3	5745	17.19	16.90	16.90	-	16.41	16.41	16.46	-
11a	3	5785	17.19	16.79	16.85	-	16.52	16.41	16.46	-
11a	3	5825	17.02	16.85	16.85	-	16.52	16.41	16.46	-
HT20	3	5745	18.23	17.66	17.89	-	17.68	17.62	17.74	-
HT20	3	5785	18.35	17.95	18.00	-	17.68	17.57	17.68	-
HT20	3	5825	18.41	17.89	17.89	-	17.57	17.62	17.62	-
HT40	3	5755	38.55	37.63	37.63	-	36.41	36.06	36.41	-
HT40	3	5795	38.67	37.74	37.97	-	36.41	36.41	36.41	-
Limit			N/A				≥500 kHz			
Result			Complied							

Note 1: N_{TX} = Number of Transmit Chains



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	
<input checked="" type="checkbox"/> 5725-5850 MHz Band:	
<input checked="" type="checkbox"/>	If $G_{TX} \leq 6$ dBi, then $P_{Out} \leq 30$ dBm (1 W)
<input checked="" type="checkbox"/>	Point-to-multipoint systems (P2M): If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)$ dBm
<input checked="" type="checkbox"/>	Point-to-point systems (P2P): If $G_{TX} > 6$ dBi, then $P_{Out} = 30$ dBm
e.i.r.p. Power Limit:	
<input checked="" type="checkbox"/> 5725-5850 MHz Band	
<input checked="" type="checkbox"/>	Point-to-multipoint systems (P2M): $P_{eirp} \leq 36$ dBm (4 W)
<input checked="" type="checkbox"/>	Point-to-point systems (P2P): N/A
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.	

RF Output Power Limit - IC	
Maximum Peak Conducted Output Power or Maximum Conducted Output Power Limit and e.i.r.p.	
<input checked="" type="checkbox"/> 5725-5850 MHz Band:	
<input checked="" type="checkbox"/>	Point-to-multipoint systems (P2M): $P_{Out} \leq 30$ dBm (1 W); $P_{eirp} \leq 36$ dBm (4 W)
<input checked="" type="checkbox"/>	Point-to-point systems (P2P): If $P_{eirp} > 36$ dBm, $G_{TX} \leq P_{Out}$
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.	

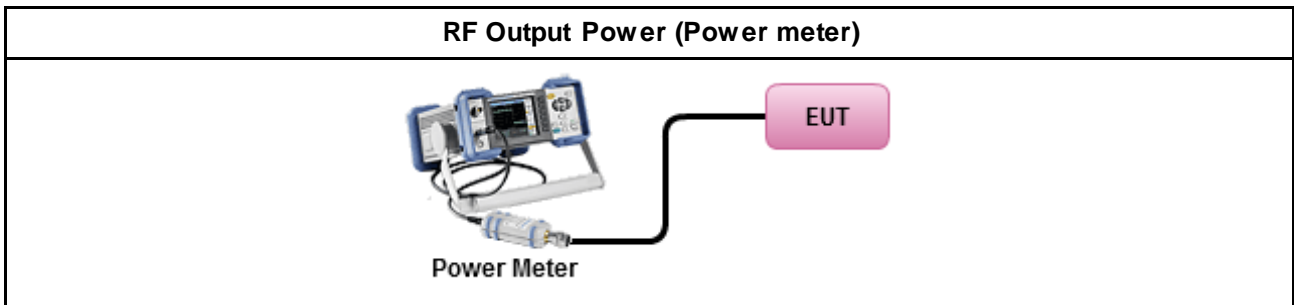
3.3.2 Measuring Instruments

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

3.3.3 Test Procedures

Test Method	
<input type="checkbox"/>	Maximum Peak Conducted Output Power
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 9.1.1 Option 1 (RBW ≥ EBW method).
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 9.1.2 Option 2 (integrated band power method).
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 9.1.3 Option 2 (peak power meter for VBW ≥ DTS BW)
<input checked="" type="checkbox"/>	Maximum Conducted (Average) Output Power
	[duty cycle ≥ 98% or external video / power trigger]
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 9.2.2.2 Method AVGSA-1 (spectral trace averaging).
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 9.2.2.3 Method AVGSA-1 Alt. (slow sweep speed)
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 9.2.2.4 Method AVGSA-2 (spectral trace averaging).
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 9.2.2.5 Method AVGSA-2 Alt. (slow sweep speed)
	RF power meter and average over on/off periods with duty factor or gated trigger
<input checked="" type="checkbox"/>	Refer as FCC KDB 558074, clause 9.2.3 Method AVGPM (using an RF average power meter).
<input checked="" type="checkbox"/>	For conducted measurement.
<input checked="" type="checkbox"/>	The EUT supports single transmit chain and measurements performed on this transmit chain.
<input type="checkbox"/>	The EUT supports diversity transmitting and the results on transmit chain port 1 is the worst case.
<input checked="" 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 checked="" type="checkbox"/>	If multiple transmit chains, EIRP calculation could be following as methods: $P_{total} = P_1 + P_2 + \dots + P_n$ (calculated in linear unit [mW] and transfer to log unit [dBm]) $EIRP_{total} = P_{total} + DG$

3.3.4 Test Setup



3.3.5 Directional Gain for Power Measurement

Directional Gain (DG) Result					
Operating Mode		1 (Ant. 1, Yagi antenna)			
Transmit Chains No.		1	-	-	-
Maximum G _{ANT} (dBi)		15	-	-	-
Modulation Mode	DG (dBi)	N _{TX}	N _{SS}	STBC	Array Gain (dB)
11a,6-54Mbps	15	1	1	-	-
HT20,M0-7	15	1	1	-	-
HT40,M0-7	15	1	1	-	-

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 = $10 \log[(10^{G1/20} + \dots + 10^{GN/20})^2 / N_{TX}]$
All transmit signals are completely uncorrelated, Directional Gain = $10 \log[(10^{G1/10} + \dots + 10^{GN/10}) / N_{TX}]$

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} ;

Directional Gain (DG) Result					
Operating Mode		2 (Ant. 2, Omni antenna)			
Transmit Chains No.		1	-	-	-
Maximum G _{ANT} (dBi)		12	-	-	-
Modulation Mode	DG (dBi)	N _{TX}	N _{SS}	STBC	Array Gain (dB)
11a,6-54Mbps	12	1	1	-	-
HT20,M0-7	12	1	1	-	-
HT40,M0-7	12	1	1	-	-

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 = $10 \log[(10^{G1/20} + \dots + 10^{GN/20})^2 / N_{TX}]$
All transmit signals are completely uncorrelated, Directional Gain = $10 \log[(10^{G1/10} + \dots + 10^{GN/10}) / N_{TX}]$

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} ;

Directional Gain (DG) Result					
Operating Mode		3 (Ant. 3, Panel antenna)			
Transmit Chains No.		1	-	-	-
Maximum G _{ANT} (dBi)		14.4	-	-	-
Modulation Mode	DG (dBi)	N _{TX}	N _{SS}	STBC	Array Gain (dB)
11a,6-54Mbps	14.4	1	1	-	-
HT20,M0-7	14.4	1	1	-	-
HT40,M0-7	14.4	1	1	-	-

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 = $10 \log[(10^{G1/20} + \dots + 10^{GN/20})^2 / N_{TX}]$
All transmit signals are completely uncorrelated, Directional Gain = $10 \log[(10^{G1/10} + \dots + 10^{GN/10}) / N_{TX}]$

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} ;

Directional Gain (DG) Result					
Operating Mode		4 (Ant. 4, Dish antenna)			
Transmit Chains No.		1	-	-	-
Maximum G _{ANT} (dBi)		24	-	-	-
Modulation Mode	DG (dBi)	N _{TX}	N _{SS}	STBC	Array Gain (dB)
11a,6-54Mbps	24	1	1	-	-
HT20,M0-7	24	1	1	-	-
HT40,M0-7	24	1	1	-	-

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 = $10 \log[(10^{G1/20} + \dots + 10^{GN/20})^2 / N_{TX}]$
All transmit signals are completely uncorrelated, Directional Gain = $10 \log[(10^{G1/10} + \dots + 10^{GN/10}) / N_{TX}]$

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} ;

Directional Gain (DG) Result					
Operating Mode		5 (Ant. 5, Dipole antenna)			
Transmit Chains No.		1	2	3	-
Maximum G _{ANT} (dBi)		7	7	7	-
Modulation Mode	DG (dBi)	N _{TX}	N _{SS}	STBC	Array Gain (dB)
11a,6-54Mbps	7	3	1	-	-
HT20,M0-23	7	3	1	-	-
HT40,M0-23	7	3	1	-	-

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 = $10 \log[(10^{G1/20} + \dots + 10^{GN/20})^2 / N_{TX}]$
All transmit signals are completely uncorrelated, Directional Gain = $10 \log[(10^{G1/10} + \dots + 10^{GN/10}) / N_{TX}]$

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} ;



3.3.6 Test Result of Maximum Conducted Output Power

Maximum Conducted Output Power											
Operating Mode			1 (Ant. 1, Yagi antenna)								
Condition			RF Output Power (dBm)								
Modulation Mode	N _{TX}	Freq. (MHz)	Chain Port 1	Chain Port 2	Chain Port 3	Chain Port 4	Sum Chain	Power Limit	DG (dBi)	EIRP Power	EIRP Limit
11a	1	5745	20.55	-	-	-	20.55	21.00	15.00	35.55	36.00
11a	1	5785	20.86	-	-	-	20.86	21.00	15.00	35.86	36.00
11a	1	5825	20.83	-	-	-	20.83	21.00	15.00	35.83	36.00
HT20	1	5745	20.64	-	-	-	20.64	21.00	15.00	35.64	36.00
HT20	1	5785	20.68	-	-	-	20.68	21.00	15.00	35.68	36.00
HT20	1	5825	20.43	-	-	-	20.43	21.00	15.00	35.43	36.00
HT40	1	5755	20.57	-	-	-	20.57	21.00	15.00	35.57	36.00
HT40	1	5795	20.93	-	-	-	20.93	21.00	15.00	35.93	36.00
Result			Complied								

Maximum Conducted Output Power											
Operating Mode			2 (Ant. 2, Omni antenna)								
Condition			RF Output Power (dBm)								
Modulation Mode	N _{TX}	Freq. (MHz)	Chain Port 1	Chain Port 2	Chain Port 3	Chain Port 4	Sum Chain	Power Limit	DG (dBi)	EIRP Power	EIRP Limit
11a	1	5745	22.11	-	-	-	22.11	24.00	12.00	34.11	36.00
11a	1	5785	23.68	-	-	-	23.68	24.00	12.00	35.68	36.00
11a	1	5825	23.61	-	-	-	23.61	24.00	12.00	35.61	36.00
HT20	1	5745	22.42	-	-	-	22.42	24.00	12.00	34.42	36.00
HT20	1	5785	23.83	-	-	-	23.83	24.00	12.00	35.83	36.00
HT20	1	5825	23.65	-	-	-	23.65	24.00	12.00	35.65	36.00
HT40	1	5755	20.93	-	-	-	20.93	24.00	12.00	32.93	36.00
HT40	1	5795	22.85	-	-	-	22.85	24.00	12.00	34.85	36.00
Result			Complied								



Maximum Conducted Output Power											
Operating Mode		3 (Ant. 3, Panel antenna)									
Condition			RF Output Power (dBm)								
Modulation Mode	N _{TX}	Freq. (MHz)	Chain Port 1	Chain Port 2	Chain Port 3	Chain Port 4	Sum Chain	Power Limit	DG (dBi)	EIRP Power	EIRP Limit
11a	1	5745	20.55	-	-	-	20.55	21.60	14.40	34.95	36.00
11a	1	5785	21.36	-	-	-	21.36	21.60	14.40	35.76	36.00
11a	1	5825	19.84	-	-	-	19.84	21.60	14.40	34.24	36.00
HT20	1	5745	20.64	-	-	-	20.64	21.60	14.40	35.04	36.00
HT20	1	5785	21.23	-	-	-	21.23	21.60	14.40	35.63	36.00
HT20	1	5825	19.85	-	-	-	19.85	21.60	14.40	34.25	36.00
HT40	1	5755	19.61	-	-	-	19.61	21.60	14.40	34.01	36.00
HT40	1	5795	19.66	-	-	-	19.66	21.60	14.40	34.06	36.00
Result			Complied								

Maximum Conducted Output Power											
Operating Mode		4 (Ant. 4, Dish antenna)									
Condition			RF Output Power (dBm)								
Modulation Mode	N _{TX}	Freq. (MHz)	Chain Port 1	Chain Port 2	Chain Port 3	Chain Port 4	Sum Chain	Power Limit	DG (dBi)	EIRP Power	EIRP Limit
11a	1	5745	13.87	-	-	-	13.87	30.00	24.00	37.87	NA
11a	1	5785	13.36	-	-	-	13.36	30.00	24.00	37.36	NA
11a	1	5825	12.59	-	-	-	12.59	30.00	24.00	36.59	NA
HT20	1	5745	13.97	-	-	-	13.97	30.00	24.00	37.97	NA
HT20	1	5785	13.60	-	-	-	13.60	30.00	24.00	37.60	NA
HT20	1	5825	12.66	-	-	-	12.66	30.00	24.00	36.66	NA
HT40	1	5755	14.98	-	-	-	14.98	30.00	24.00	38.98	NA
HT40	1	5795	14.44	-	-	-	14.44	30.00	24.00	38.44	NA
Result			Complied								



Maximum Conducted Output Power											
Operating Mode			5 (Ant. 5, Dipole antenna)								
Condition			RF Output Power (dBm)								
Modulation Mode	N _{TX}	Freq. (MHz)	Chain Port 1	Chain Port 2	Chain Port 3	Chain Port 4	Sum Chain	Power Limit	DG (dBi)	EIRP Power	EIRP Limit
11a	3	5745	22.03	22.36	21.63	-	26.79	29.00	7.00	33.79	36.00
11a	3	5785	21.83	22.17	21.87	-	26.73	29.00	7.00	33.73	36.00
11a	3	5825	22.03	22.21	21.74	-	26.77	29.00	7.00	33.77	36.00
HT20	3	5745	21.34	21.36	21.16	-	26.06	29.00	7.00	33.06	36.00
HT20	3	5785	21.06	21.16	21.22	-	25.92	29.00	7.00	32.92	36.00
HT20	3	5825	21.33	21.02	21.29	-	25.99	29.00	7.00	32.99	36.00
HT40	3	5755	20.20	20.72	20.41	-	25.22	29.00	7.00	32.22	36.00
HT40	3	5795	21.42	21.27	21.28	-	26.10	29.00	7.00	33.10	36.00
Result			Complied								

3.4 Power Spectral Density

3.4.1 Power Spectral Density Limit

Power Spectral Density Limit
<input checked="" type="checkbox"/> Power Spectral Density (PSD) ≤ 8 dBm/3kHz

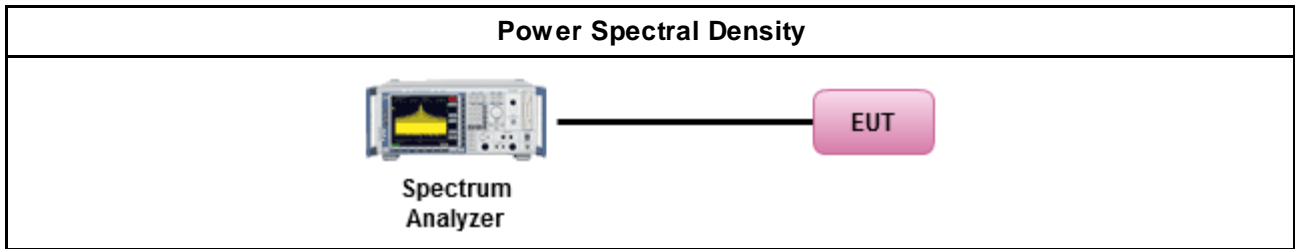
3.4.2 Measuring Instruments

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

3.4.3 Test Procedures

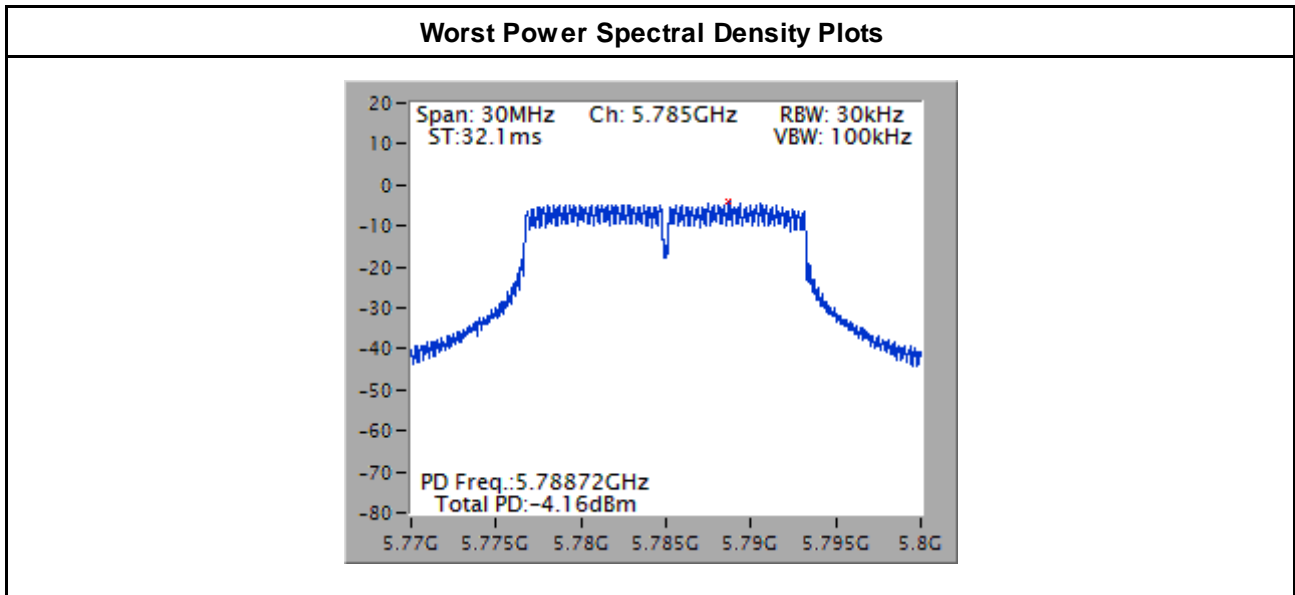
Test Method
<input checked="" type="checkbox"/> Peak power spectral density procedures that the same method as used to determine the conducted output power. If maximum peak conducted output power was measured to demonstrate compliance to the output power limit, then the peak PSD procedure below (Method 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 type="checkbox"/> Refer as FCC KDB 558074, clause 10.2 Method PKPSD (RBW=3-100kHz; detector=peak).. [duty cycle ≥ 98% or external video / power trigger]
<input checked="" 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 checked="" type="checkbox"/> The EUT supports multiple transmit chains using options given below:
<input checked="" 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



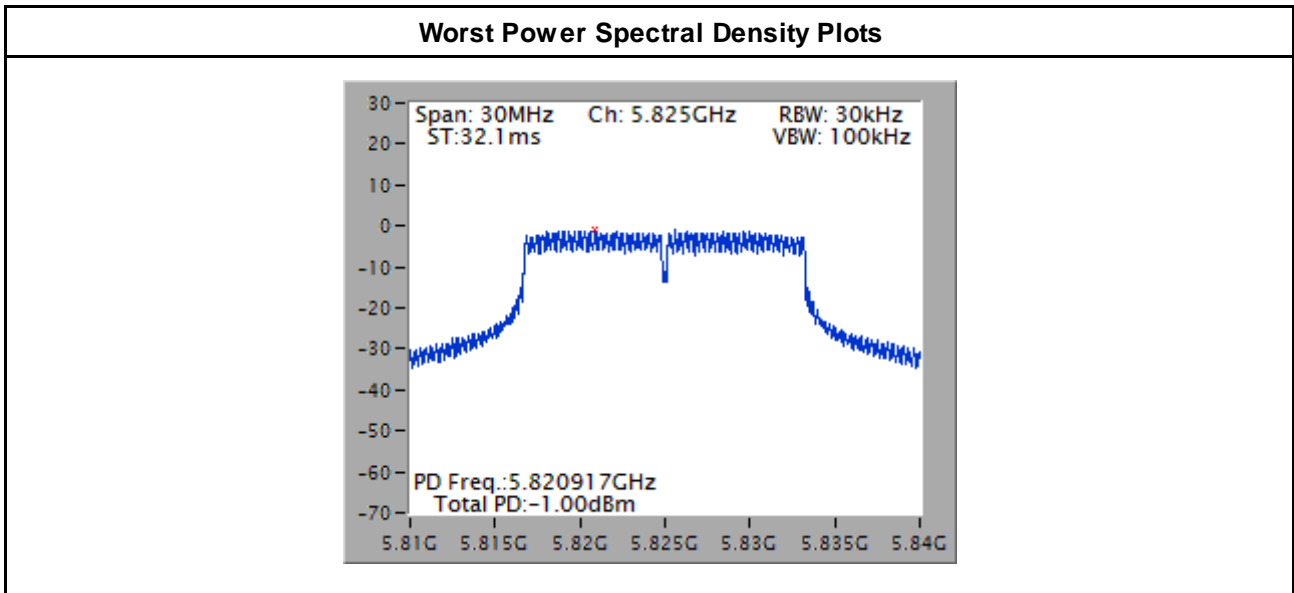
3.4.5 Test Result of Power Spectral Density

Power Spectral Density Result				
Operating Mode		1 (Ant. 1, Yagi antenna)		
Condition		Power Spectral Density		
Modulation Mode	N _{TX}	Freq. (MHz)	Sum Chain (dBm/30kHz)	Power Limit (dBm/3kHz)
11a	1	5745	-4.32	-1.00
11a	1	5785	-4.16	-1.00
11a	1	5825	-4.49	-1.00
HT20	1	5745	-5.16	-1.00
HT20	1	5785	-4.61	-1.00
HT20	1	5825	-4.98	-1.00
HT40	1	5755	-7.24	-1.00
HT40	1	5795	-7.00	-1.00
Result		Complied		



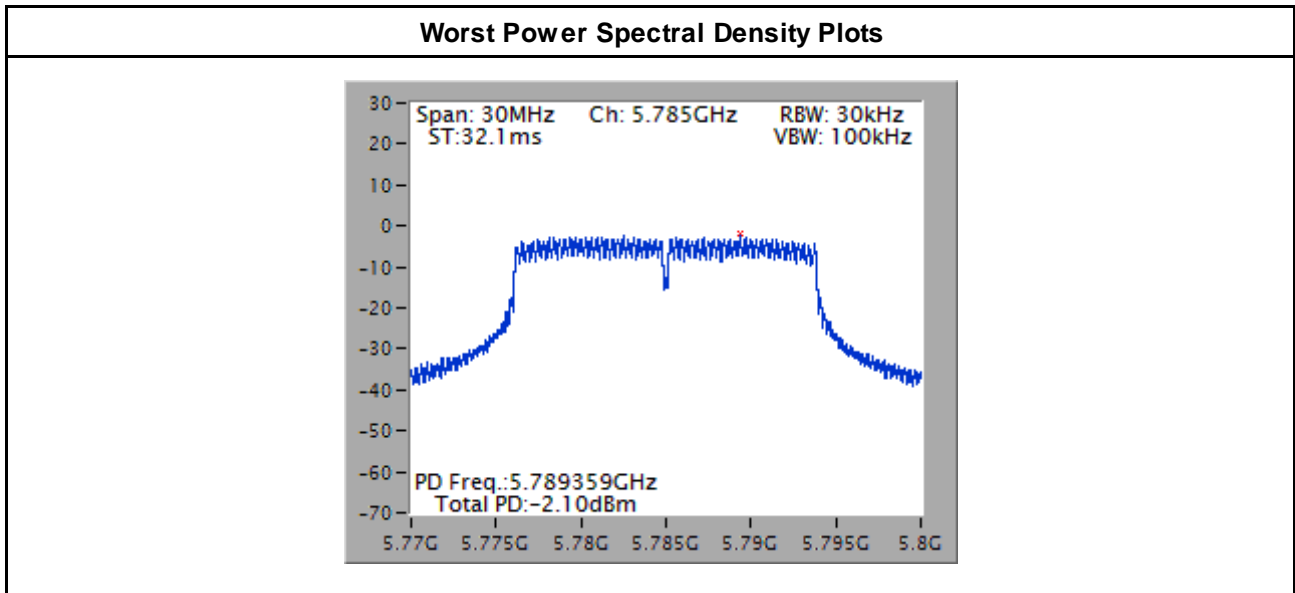


Power Spectral Density Result				
Operating Mode		2 (Ant. 2, Omni antenna)		
Condition		Power Spectral Density		
Modulation Mode	N _{TX}	Freq. (MHz)	Sum Chain (dBm/30kHz)	Power Limit (dBm/3kHz)
11a	1	5745	-2.95	2.00
11a	1	5785	-1.32	2.00
11a	1	5825	-1.00	2.00
HT20	1	5745	-3.04	2.00
HT20	1	5785	-1.95	2.00
HT20	1	5825	-1.13	2.00
HT40	1	5755	-7.48	2.00
HT40	1	5795	-5.23	2.00
Result		Complied		



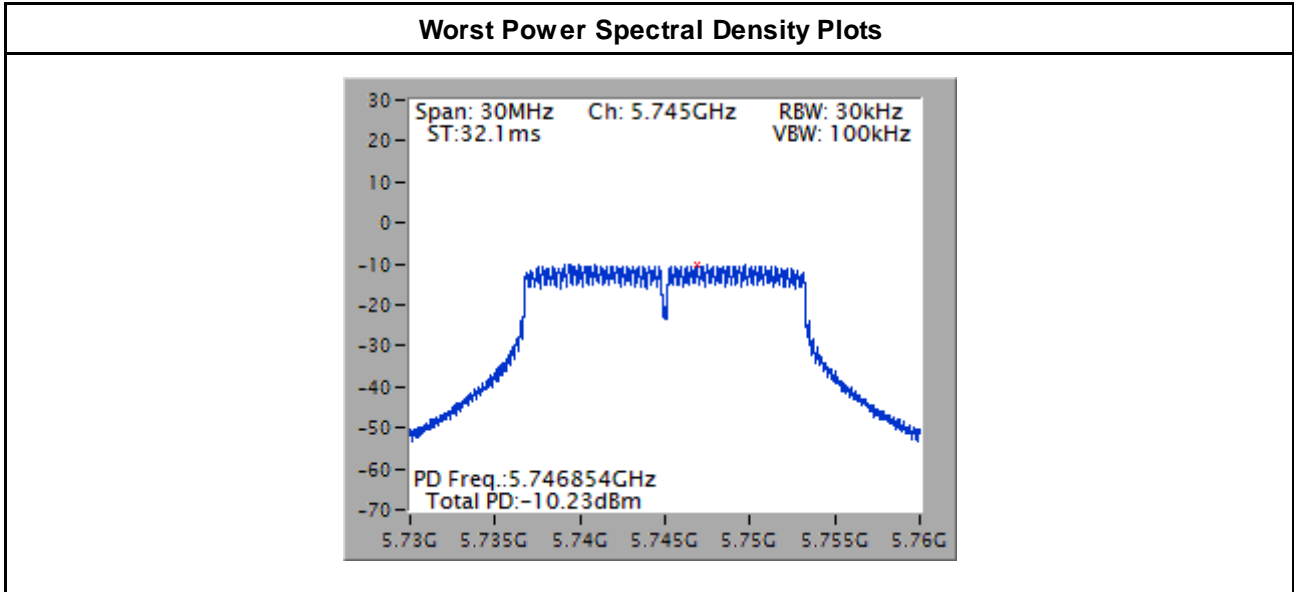


Power Spectral Density Result				
Operating Mode		3 (Ant. 3, Panel antenna)		
Condition		Power Spectral Density		
Modulation Mode	N _{TX}	Freq. (MHz)	Sum Chain (dBm/30kHz)	Power Limit (dBm/3kHz)
11a	1	5745	-3.33	-0.40
11a	1	5785	-2.21	-0.40
11a	1	5825	-3.46	-0.40
HT20	1	5745	-3.27	-0.40
HT20	1	5785	-2.10	-0.40
HT20	1	5825	-3.65	-0.40
HT40	1	5755	-6.73	-0.40
HT40	1	5795	-6.22	-0.40
Result		Complied		





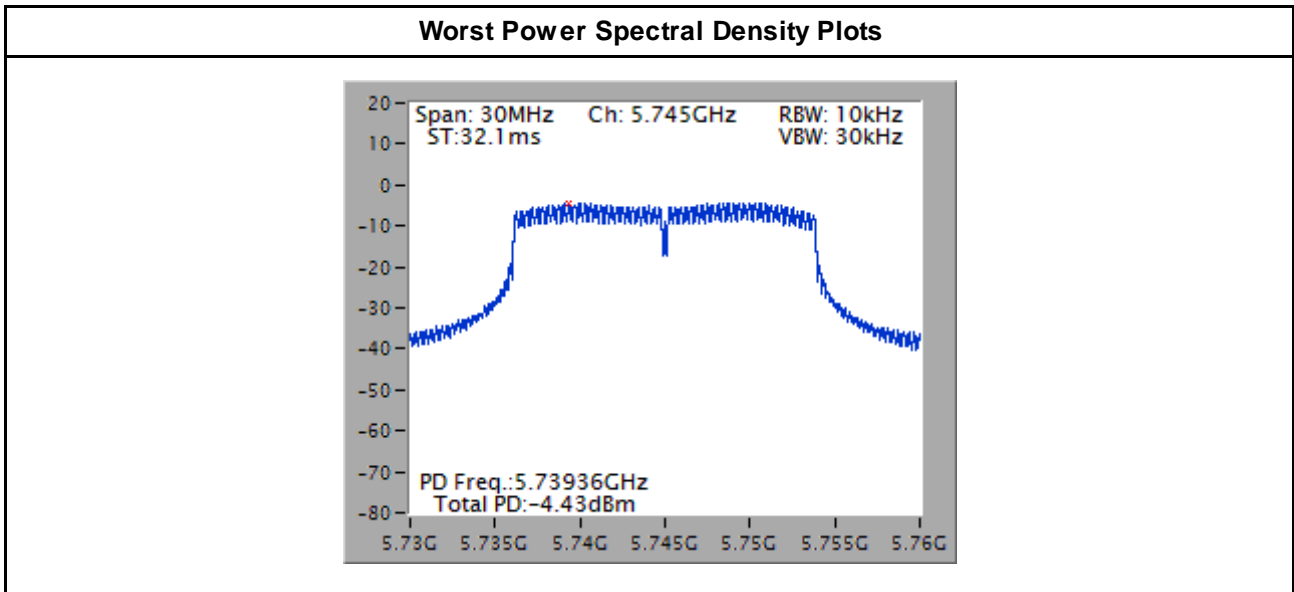
Power Spectral Density Result				
Operating Mode		4 (Ant. 4, Dish antenna)		
Condition		Power Spectral Density		
Modulation Mode	N _{TX}	Freq. (MHz)	Sum Chain (dBm/30kHz)	Power Limit (dBm/3kHz)
11a	1	5745	-10.23	8.00
11a	1	5785	-10.43	8.00
11a	1	5825	-10.58	8.00
HT20	1	5745	-10.71	8.00
HT20	1	5785	-10.85	8.00
HT20	1	5825	-11.94	8.00
HT40	1	5755	-12.23	8.00
HT40	1	5795	-13.12	8.00
Result		Complied		





Power Spectral Density Result				
Operating Mode		5 (Ant. 5, Dipole antenna)		
Condition		Power Spectral Density		
Modulation Mode	N _{TX}	Freq. (MHz)	Sum Chain (dBm/30kHz)	Power Limit (dBm/3kHz)
11a	3	5745	-5.51	2.23
11a	3	5785	-5.56	2.23
11a	3	5825	-4.69	2.23
HT20	3	5745	-4.43	2.23
HT20	3	5785	-4.55	2.23
HT20	3	5825	-5.62	2.23
HT40	3	5755	-8.39	2.23
HT40	3	5795	-7.81	2.23
Result		Complied		

Note: Test result is bin-by-bin summing measured value of each TX port



3.5 Emissions in non-restricted frequency bands

3.5.1 Emissions in non-restricted frequency bands limit

- The peak output power measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz.
- The peak power in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum in-band peak PSD level in 100 kHz.

3.5.2 Test Procedures

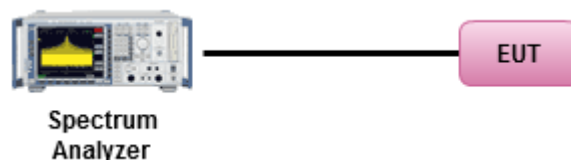
Reference Level Measurement

1. Set the RBW = 100 kHz, VBW = 300 kHz, Detector = peak.
2. Set Sweep time = auto couple, Trace mode = max hold.
3. Allow trace to fully stabilize.
4. Use the peak marker function to determine the maximum amplitude level.

Unwanted Emissions Level Measurement

1. Set RBW = 100 kHz, VBW = 300 kHz, Detector = peak.
2. Trace Mode = max hold, Sweep = auto couple.
3. Allow the trace to stabilize.
4. Use peak marker function to determine maximum amplitude of all unwanted emissions within any 100 kHz bandwidth.

3.5.3 Test Setup



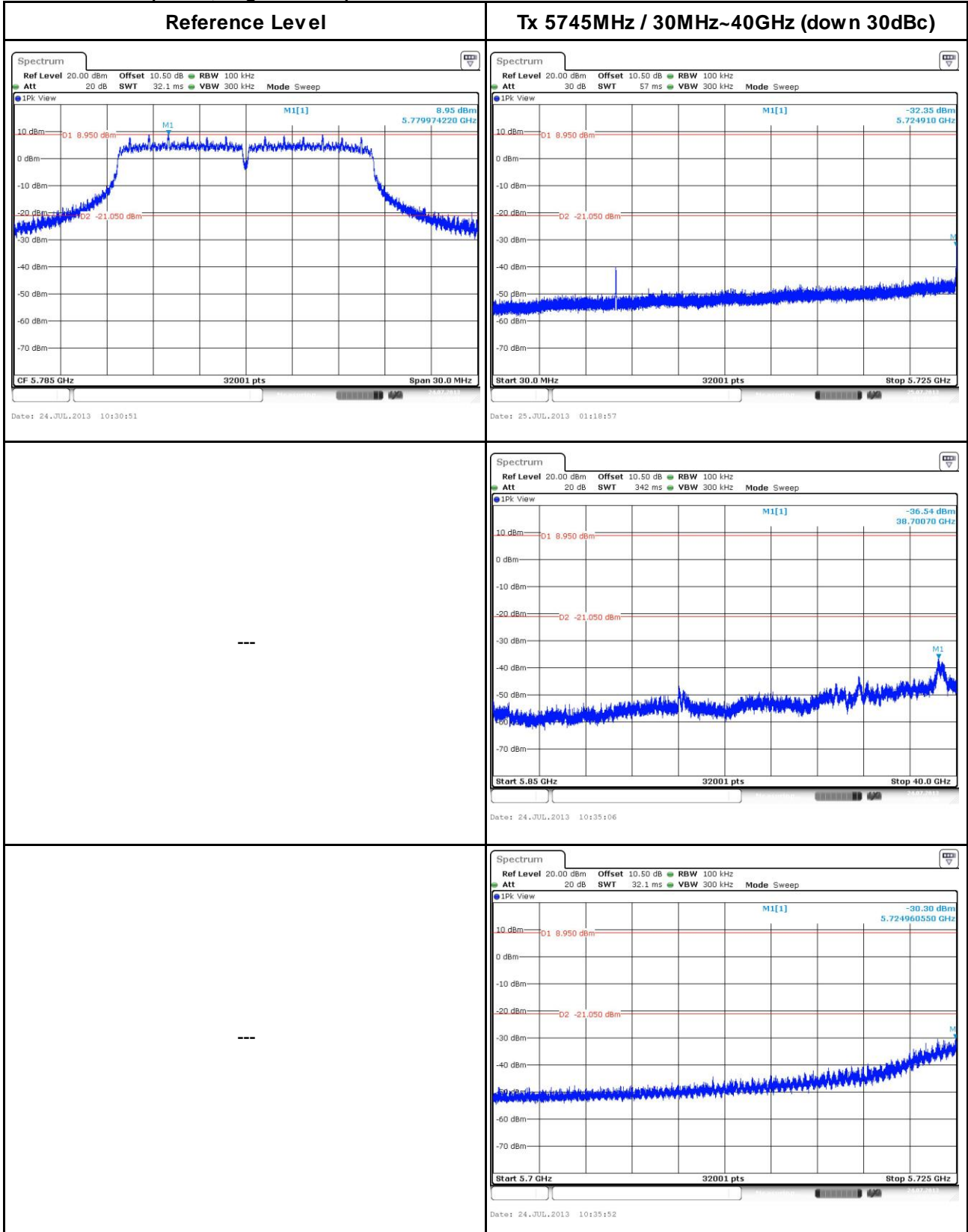
3.5.4 Test Result of Emissions in non-restricted frequency bands

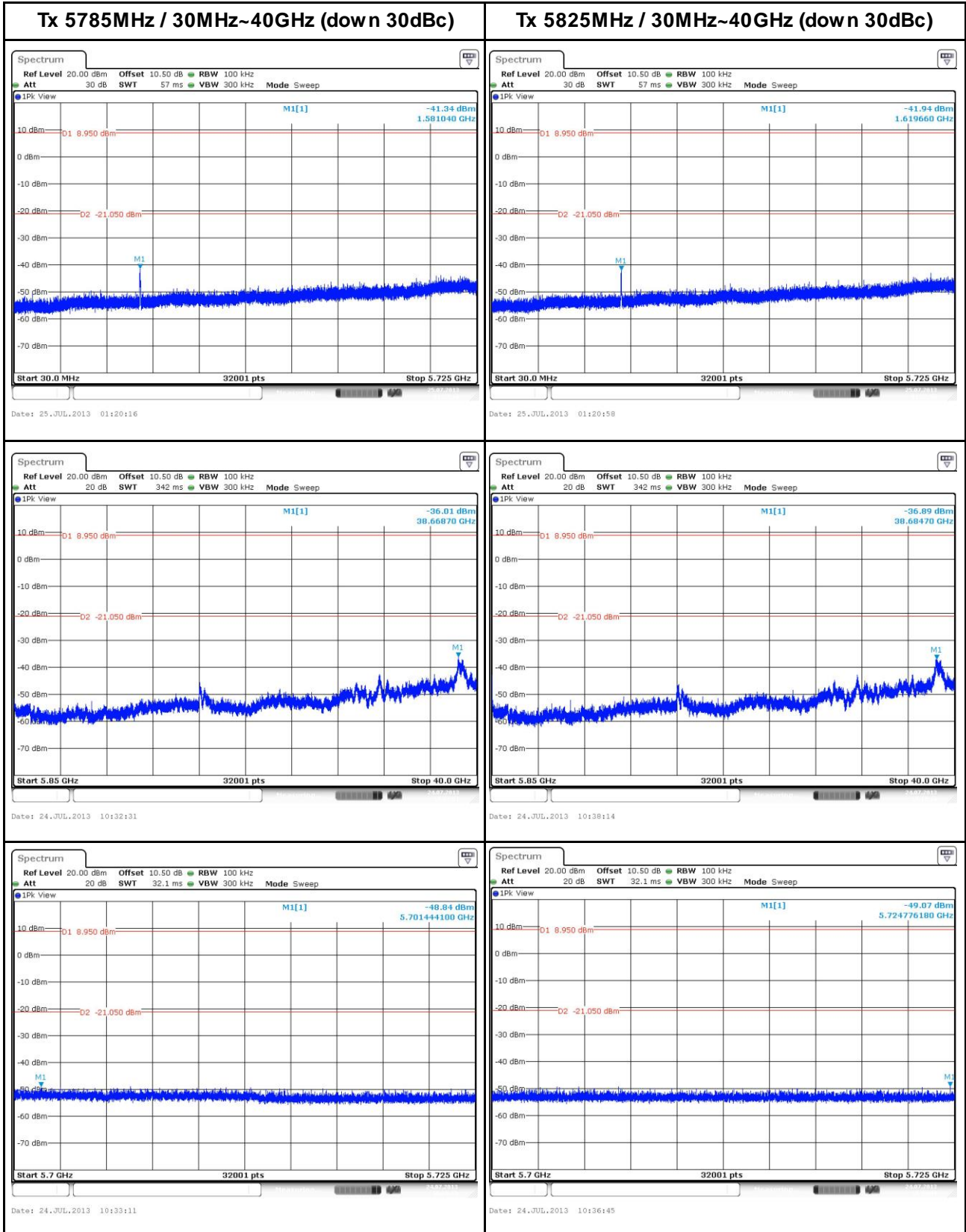
This test item is performed on each TX output individually without summing or adding $10 \log(N_{ANT})$ since measurements are made relative to the in-band emissions on the individual outputs. Only worst test result of each operating mode is presented.



3.5.5 Unwanted Emissions into Non-Restricted Frequency Bands

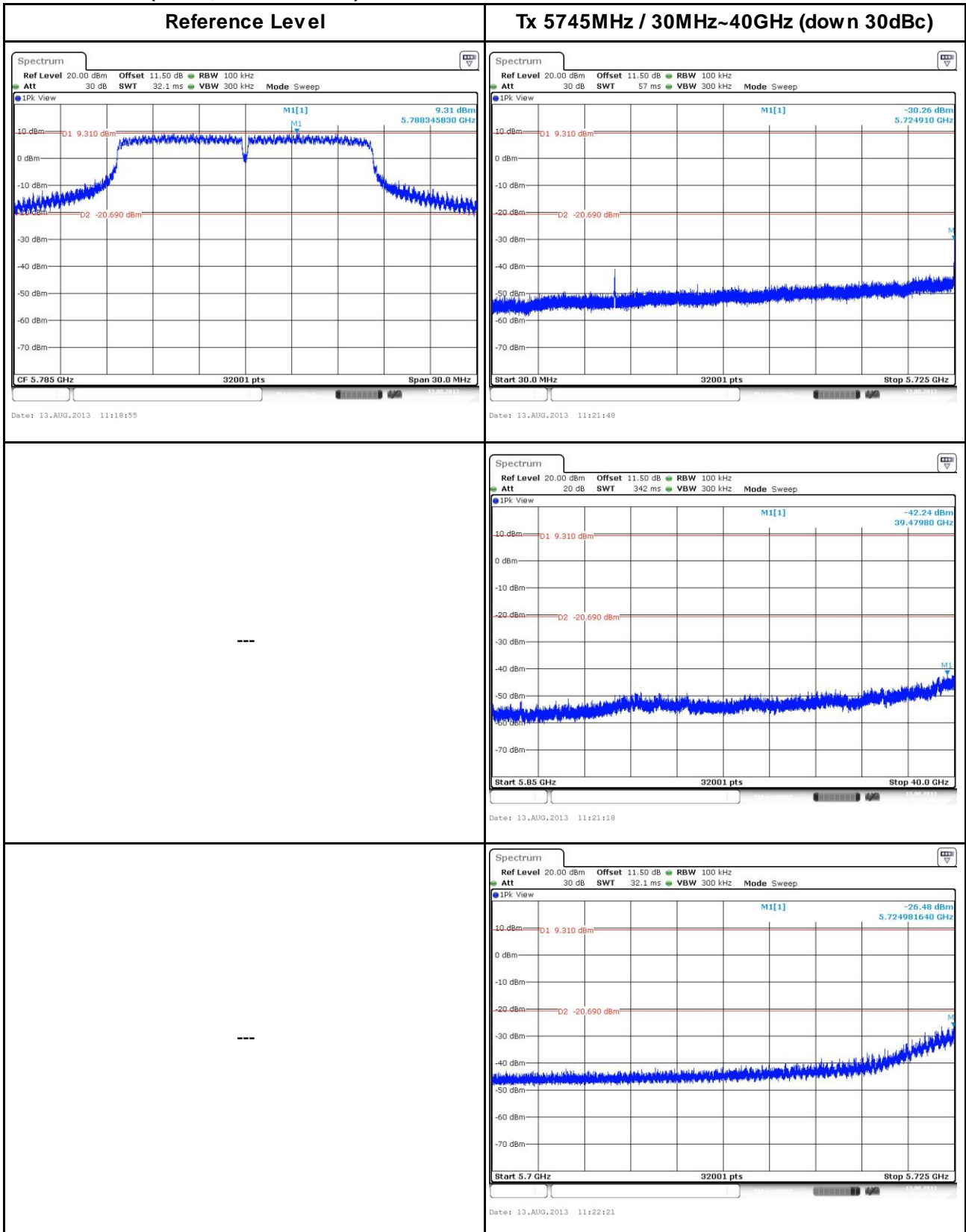
802.11a, Mode 1 (Ant. 1, Yagi antenna)

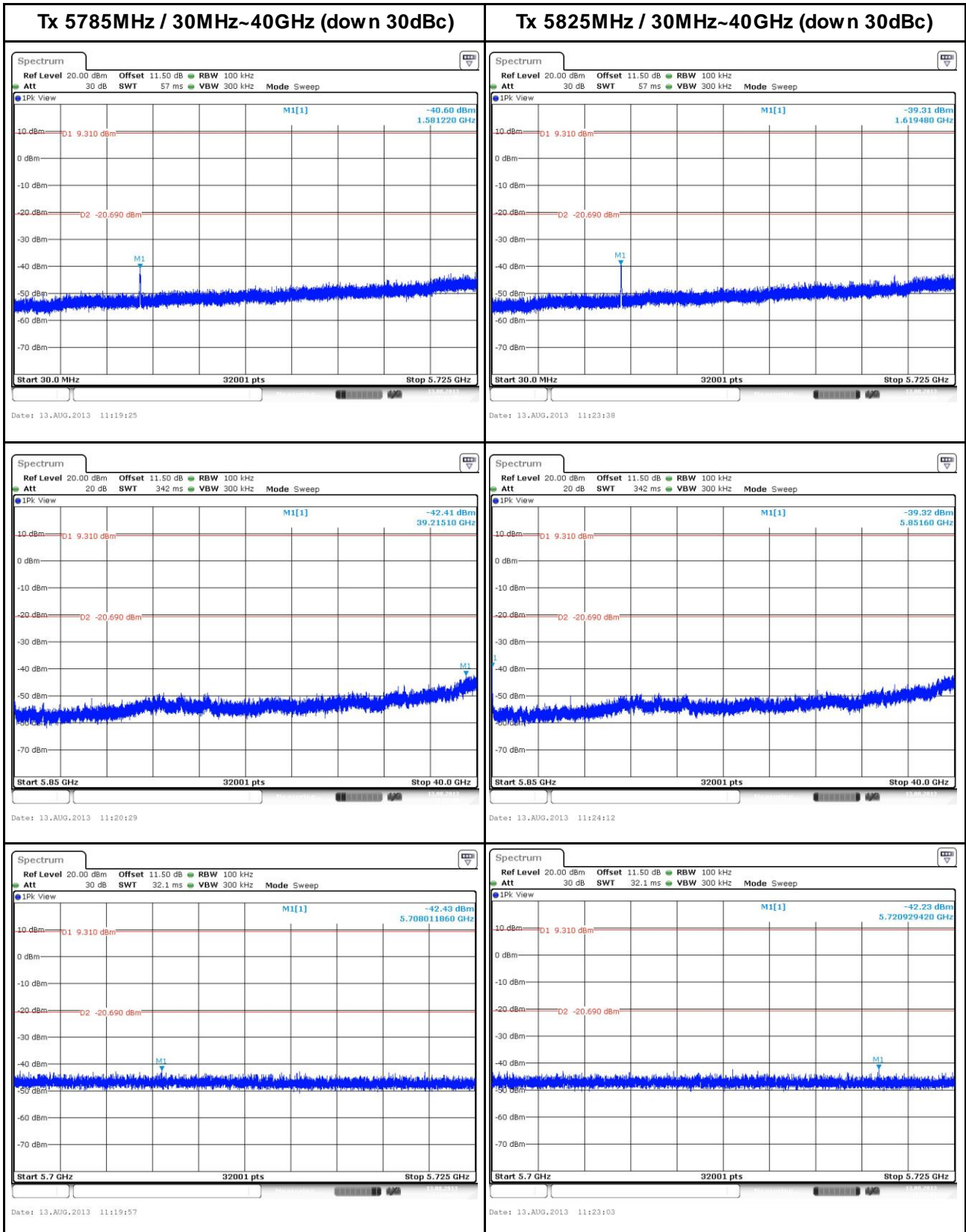






802.11a, Mode 2 (Ant. 2, Omni antenna)







802.11a, Mode 3 (Ant. 3, Panel antenna)

