NCC Test Report

Equipment	:	**802.11ac Wave 2** 同步雙頻整合式無線網路基地台
Model No.	:	**NWA5123-AC HD**
Brand Name	:	**ZYXEL**
Applicant	:	合勤科技股份有限公司
Address	:	新北市新店區北新路 **3** 段 **223** 號 **11** 樓
Standard	:	**LP0002 Section 3.10.1 (2016-08-23)**
Received Date	:	**Jun. 22, 2017**
Tested Date	:	**Jun. 27 ~ Jul. 21, 2017**

We, International Certification Corp., would like to declare that the tested sample has been evaluated and in compliance with the requirement of the above standards. The test results contained in this report refer exclusively to the product. It may be duplicated completely for legal use with the approval of the applicant. It shall not be reproduced except in full without the written approval of our laboratory.

Reviewed by:

Along Chen / Assistant Manager

Approved by:

Gary Chang / Manager

Testing Laboratory 2732

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Release Record

Report No.	Version	Description	Issued Date
TR762202AC	Rev. 01	Initial issue	Aug. 18, 2017

Summary of Test Results

NCC Rules	Test Items	Measured	Result
2.3	Conducted Emissions	[dBuV]: 0.561MHz 39.94 (Margin -6.06dB) - AV	Pass
3.10.1.5 2.8	Radiated Emissions	[dBuV/m at 3m]: 2390.00MHz 53.90 (Margin -0.10dB) - AV	Pass
3.10.1.2(1)(C)	Maximum Output Power	Max Power [dBm]: ***Non-beamforming mode*** 29.89 ***Beamforming mode*** 29.58	Pass
3.10.1.6(2)(A)	6dB Bandwidth	Meet the requirement of limit	Pass
3.10.1.6(2)(B)	Power Spectral Density	Meet the requirement of limit	Pass
3.10.1.4	Antenna Requirement	Meet the requirement of limit	Pass

1 General Description

1.1 Information

1.1.1 Specification of the Equipment under Test (EUT)

RF General Information					
Frequency Range (MHz)	**IEEE Std. 802.11**	**Ch. Freq. (MHz)**	**Channel Number**	**Transmit Chains (N_{TX})**	**Data Rate / MCS**
2400-2483.5	b	2412-2462	1-11 [11]	2	1-11 Mbps
2400-2483.5	g	2412-2462	1-11 [11]	2	6-54 Mbps
2400-2483.5	n (HT20)	2412-2462	1-11 [11]	2	MCS 0-15
2400-2483.5	n (HT40)	2422-2452	3-9 [7]	2	MCS 0-15
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, 256QAM modulation.. Note 4: 802.11n supports beamforming function.					

1.1.2 Antenna Details

Type	Connector	Operating Frequencies (MHz) / Antenna Gain (dBi)		
		2400~2483.5	**5150~5250**	**5725~5850**
PIFA	I-PEX	3	---	---
PIFA	I-PEX	3	---	---
Monopole	I-PEX	---	4	4
Monopole	I-PEX	---	4	4
Monopole	I-PEX	---	4	4

1.1.3 Power Supply Type of Equipment under Test (EUT)

Power Supply Type	From AC adapter: 12Vdc From PoE: 54Vdc

1.1.4 Accessories

Accessories		
No.	**Equipment**	**Description**
1	AC adapter	Brand: APD Model: WA-24Q12R Power Rating: I/P: 100-240Vac, 50-60Hz, 0.7A Max. O/P: 12Vdc, 2A Power Line: 1.4m non-shielded without core

1.1.5 Channel List

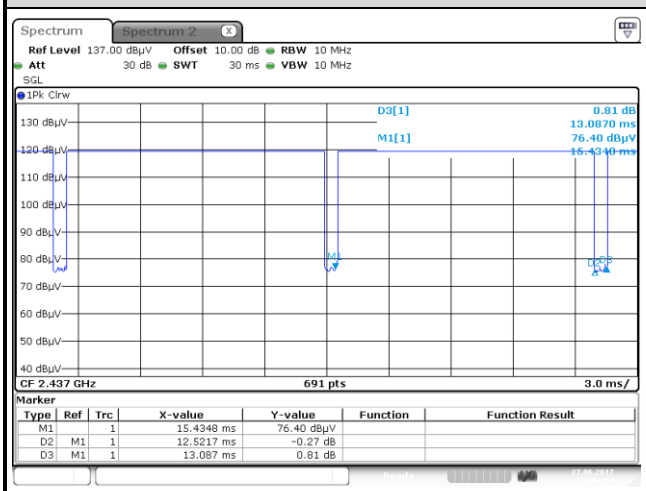
Frequency band (MHz)		**2400~2483.5**	
802.11 b / g / n HT20		**802.11n HT40**	
Channel	**Frequency(MHz)**	**Channel**	**Frequency(MHz)**
1	2412	3	2422
2	2417	4	2427
3	2422	5	2432
4	2427	6	2437
5	2432	7	2442
6	2437	8	2447
7	2442	9	2452
8	2447	---	---
9	2452	---	---
10	2457	---	---
11	2462	---	---

1.1.6 Test Tool and Duty Cycle

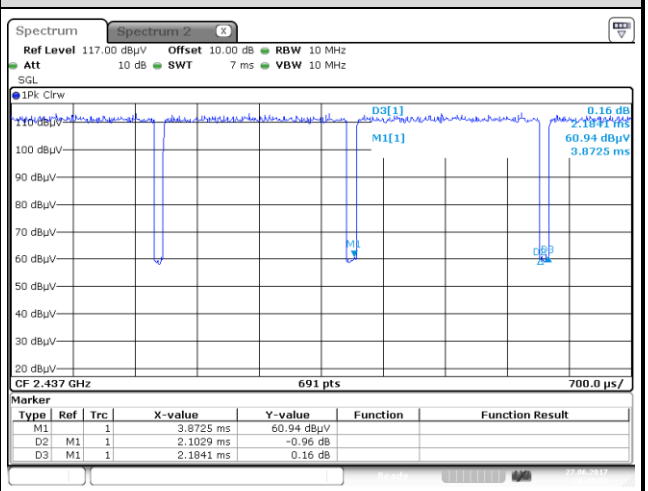
Test Tool	putty, V0.6				
Duty Cycle and Duty Factor	**Mode**	**Non-beamforming**		**Beamforming**	
		Duty cycle (%)	**Duty factor (dB)**	**Duty cycle (%)**	**Duty factor (dB)**
	11b	95.68%	0.19	---	---
	11g	96.28%	0.16	---	---
	HT20	95.99%	0.18	98.72%	0.06
	HT40	91.29%	0.40	98.93%	0.05

Non-beamforming mode

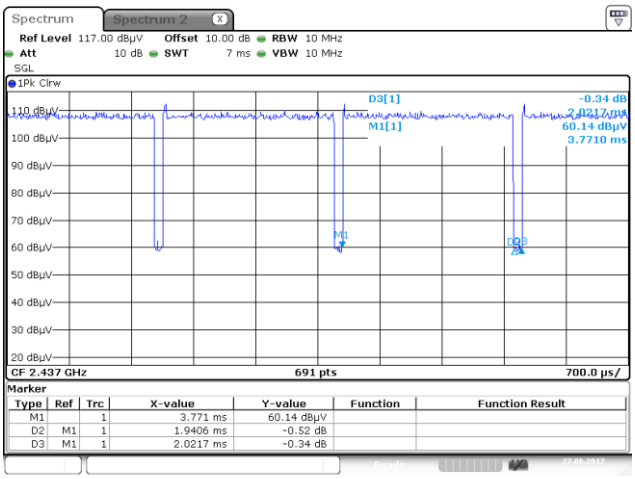
11b



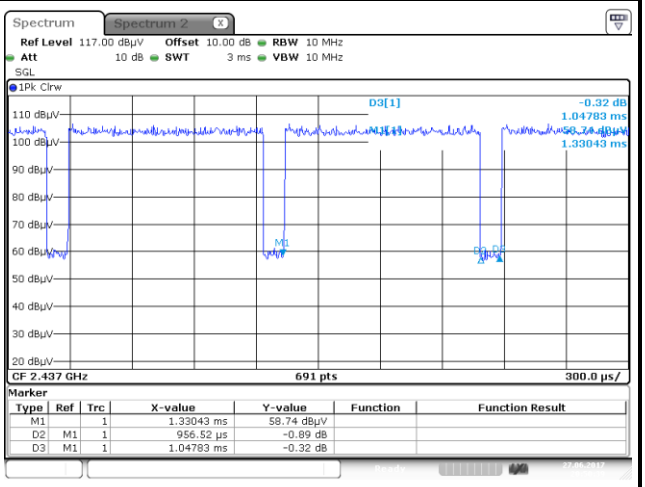
11g



11n HT20

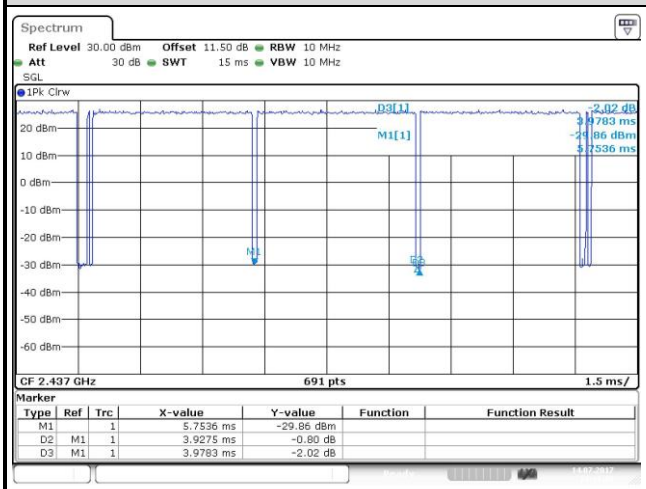


11n HT40

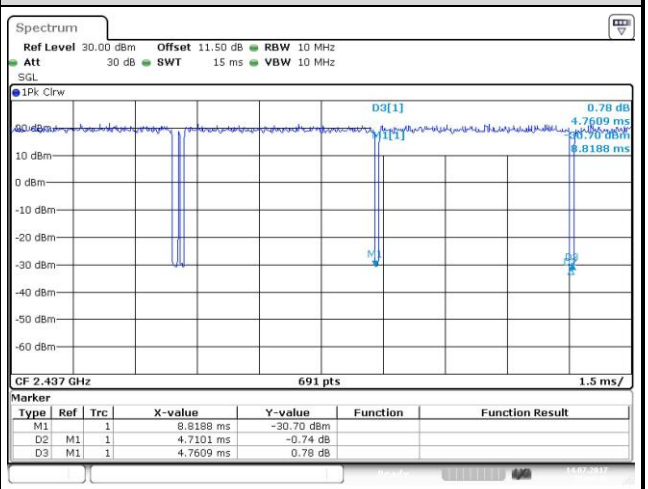


Beamforming mode

11n HT20



11n HT40



1.1.7 Power Setting

Modulation Mode	Test Frequency (MHz)	Power Set	
		Non-beamforming	Beamforming
11b	2412	88	---
11b	2437	88	---
11b	2462	86	---
11g	2412	68	---
11g	2437	88	---
11g	2462	72	---
HT20	2412	66	66
HT20	2437	88	88
HT20	2462	72	72
HT40	2422	54	52
HT40	2437	72	70
HT40	2452	70	68

1.2 Local Support Equipment List

Non-beamforming mode

Support Equipment List					
No.	**Equipment**	**Brand**	**Model**	**S/N**	**Signal cable / Length (m)**
1	Notebook	DELL	Latitude E6430	9ZFB4X1	RJ45, 10m non-shielded.
2	POE	ZYXEL	GS1900-8HP	---	---

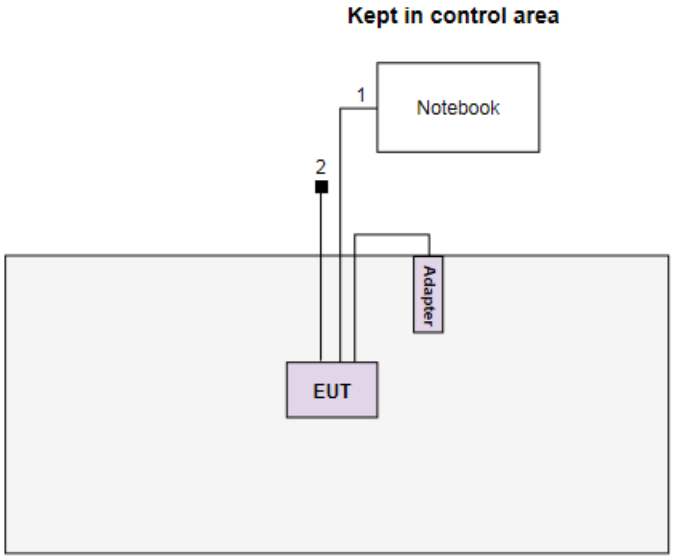
Beamforming mode

Support Equipment List					
No.	**Equipment**	**Brand**	**Model**	**S/N**	**Signal cable / Length (m)**
1	Notebook	DELL	Latitude E6430	9ZFB4X1	RJ45, 10m non-shielded.
2	Client	ASUS	PCE-AC68	---	---
3	POE	ZYXEL	GS1900-8HP	---	---

1.3 Test Setup Chart

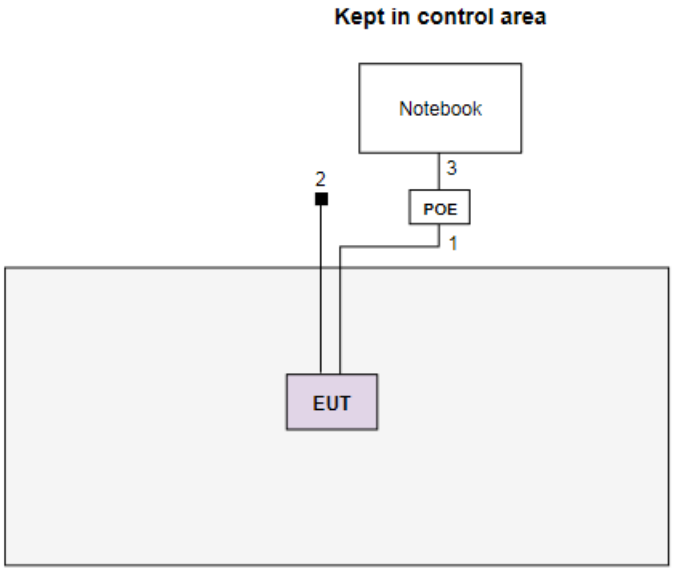
Non-beamforming mode

Test Setup Diagram (Adapter mode)



1. RJ45, 10m non-shielded
2. RJ45, 1m non-shielded with load

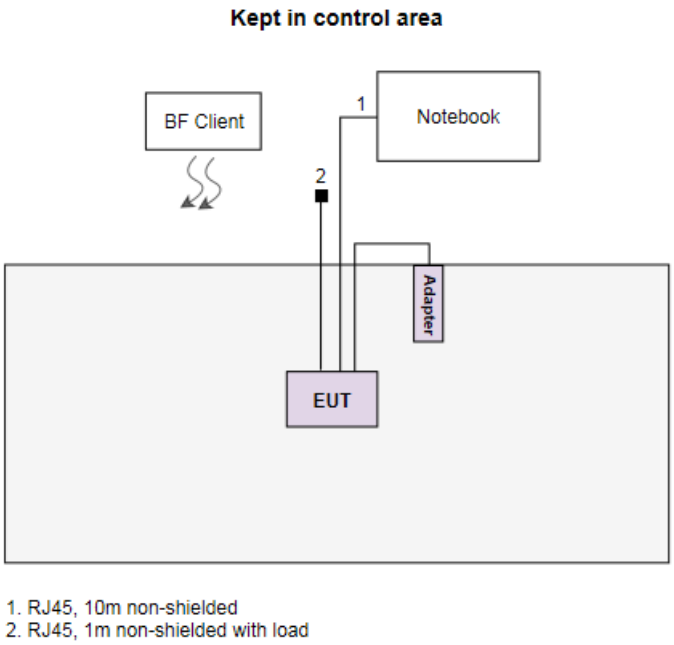
Test Setup Diagram (PoE mode)



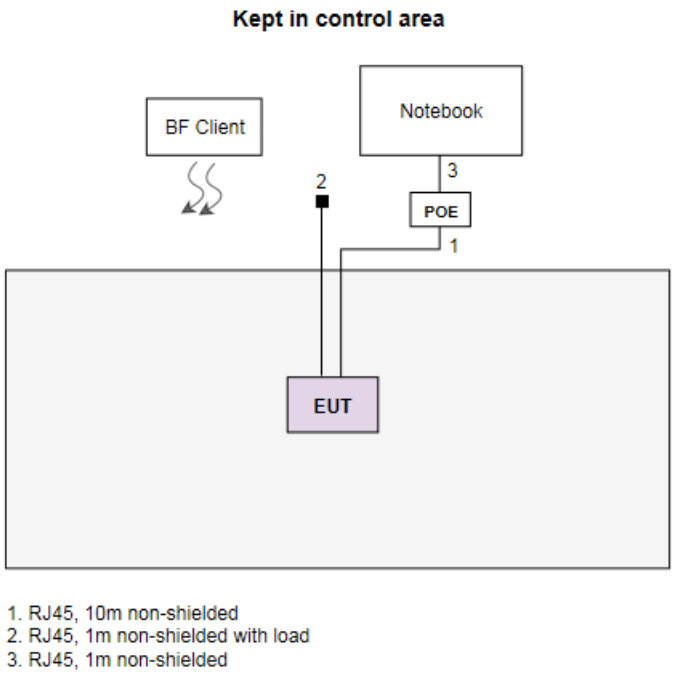
1. RJ45, 10m non-shielded
2. RJ45, 1m non-shielded with load
3. RJ45, 1m non-shielded

Beamforming mode

Test Setup Diagram (Adapter mode)



Test Setup Diagram (PoE mode)



1.4 The Equipment List

Test Item	Conducted Emission				
Test Site	Conduction room 1 / (CO01-WS)				
Instrument	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Date**	**Calibration Until**
Receiver	R&S	ESR3	101657	Dec. 21, 2016	Dec. 20, 2017
LISN	R&S	ENV216	101579	Jan. 19, 2017	Jan. 18, 2018
RF Cable-CON	EMC	EMCCFD300-BM-BM-6000	50821	Dec. 20, 2016	Dec. 19, 2017
Measurement Software	AUDIX	e3	6.120210k	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

Test Item	Radiated Emission				
Test Site	966 chamber 3 / (03CH03-WS)				
Instrument	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Date**	**Calibration Until**
Spectrum Analyzer	Agilent	N9010A	MY53400091	Sep. 09, 2016	Sep. 08, 2017
Receiver	Agilent	N9038A	MY53290044	Oct. 06, 2016	Oct. 05, 2017
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-685	Apr. 28, 2017	Apr. 27, 2018
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1206	Feb. 09, 2017	Feb. 08, 2018
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	Oct. 25, 2016	Oct. 24, 2017
Loop Antenna	R&S	HFH2-Z2	100330	Nov. 10, 2016	Nov. 09, 2017
Loop Antenna Cable	KOAX KABEL	101354-BW	101354-BW	Dec. 09, 2016	Dec. 08, 2017
Preamplifier	EMC	EMC02325	980187	Sep. 08, 2016	Sep. 07, 2017
Preamplifier	Agilent	83017A	MY53270014	Aug. 22, 2016	Aug. 21, 2017
Preamplifier	EMC	EMC184045B	980192	Aug. 24, 2016	Aug. 23, 2017
RF cable-3M	HUBER+SUHNER	SUCOFLEX104	MY22620/4	Feb. 04, 2017	Feb. 03, 2018
RF cable-8M	HUBER+SUHNER	SUCOFLEX104	MY22600/4	Feb. 04, 2017	Feb. 03, 2018
RF cable-1M	HUBER+SUHNER	SUCOFLEX104	MY22624/4	Feb. 04, 2017	Feb. 03, 2018
LF cable-0.8M	EMC	EMC8D-NM-NM-800	EMC8D-NM-NM-800-001	Feb. 04, 2017	Feb. 03, 2018
LF cable-3M	EMC	EMC8D-NM-NM-3000	131103	Feb. 04, 2017	Feb. 03, 2018
LF cable-13M	EMC	EMC8D-NM-NM-13000	131104	Feb. 04, 2017	Feb. 03, 2018
Measurement Software	AUDIX	e3	6.120210g	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

Test Item	RF Conducted				
Test Site	(TH01-WS)				
Instrument	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Date**	**Calibration Until**
Spectrum Analyzer	R&S	FSV40	101063	Mar. 15, 2017	Mar. 14, 2018
Power Meter	Anritsu	ML2495A	1241002	Oct. 06, 2016	Oct. 05, 2017
Power Sensor	Anritsu	MA2411B	1207366	Oct. 06, 2016	Oct. 05, 2017
AC POWER SOURCE	APC	AFC-500W	F312060012	Oct. 28, 2016	Oct. 27, 2017
Measurement Software	Sporton	Sporton_1	1.3.30	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

1.5 Test Standards

According to the specification of EUT, the EUT must comply with following standards and KDB documents.

LP0002 Section 3.10.1 (2016-08-23)
ANSI C63.10-2013
ANSI C63.4-2014
FCC KDB 558074 D01 DTS Meas Guidance v04
FCC KDB 662911 D01 Multiple Transmitter Output v02r01

1.6 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	
Parameters	**Uncertainty**
Bandwidth	±34.134 Hz
Conducted power	±0.808 dB
Power density	±0.463 dB
Conducted emission	±2.670 dB
AC conducted emission	±2.90 dB
Radiated emission ≤ 1GHz	±3.66 dB
Radiated emission > 1GHz	±5.37 dB

2 Test Configuration

2.1 Testing Condition

Test Item	Test Site	Ambient Condition	Tested By
AC Conduction	CO01-WS	24°C / 57%	Alex Tsai
Radiated Emissions	03CH03-WS	24-25°C / 67%	Aska Huang Kevin Lee
RF Conducted	TH01-WS	22°C / 63%	Felix Sung

- FCC Designation No.: TW0009
- FCC site registration No.: 207696
- IC site registration No.: 10807C-1

2.2 The Worst Test Modes and Channel Details

Non-beamforming mode				
Test item	**Modulation Mode**	**Test Frequency (MHz)**	**Data Rate**	**Test Configuration**
Conducted Emissions	11g	2437	6 Mbps	1, 2
Radiated Emissions ≤1GHz	11g	2437	6 Mbps	1, 2
Radiated Emissions >1GHz Maximum Output Power 6dB bandwidth Power spectral density	11b 11g HT20 HT40	2412 / 2437 / 2462 2412 / 2437 / 2462 2412 / 2437 / 2462 2422 / 2437 / 2452	1 Mbps 6 Mbps MCS 0 MCS 0	1
Beamforming mode				
Conducted Emissions	HT20	2437	MCS 0	1, 2
Radiated Emissions ≤1GHz	HT20	2437	MCS 0	1, 2
Radiated Emissions >1GHz Maximum Output Power 6dB bandwidth Power spectral density	HT20 HT40	2412 / 2437 / 2462 2422 / 2437 / 2452	MCS 0 MCS 0	1

NOTE:

1. The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement – X, Y, and Z-plane. The **Y-plane** results were found as the worst case and were shown in this report.
2. This device can be powered by AC adapter or POE. Each power supply was selected for final testing as below configuration.
   1) Test configuration 1: POE mode
   2) Test configuration 2: Adapter mode

Test item	**Modulation Mode**	**Test Frequency (MHz)**	**Mode**	**Test Configuration**
Conducted Emissions	11g	2437	RX	1, 2
Radiated Emissions ≤1GHz	11g	2437	RX	1, 2
Radiated Emissions >1GHz	11g	2437	RX	1

NOTE:

1. The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement – X, Y, and Z-plane. The **Y-plane** results were found as the worst case and were shown in this report.
2. This device can be powered by AC adapter or POE. Each power supply was selected for final testing as below configuration.
   1) Test configuration 1: POE mode
   2) Test configuration 2: Adapter mode

3 Transmitter Test Results

3.1 Conducted Emissions

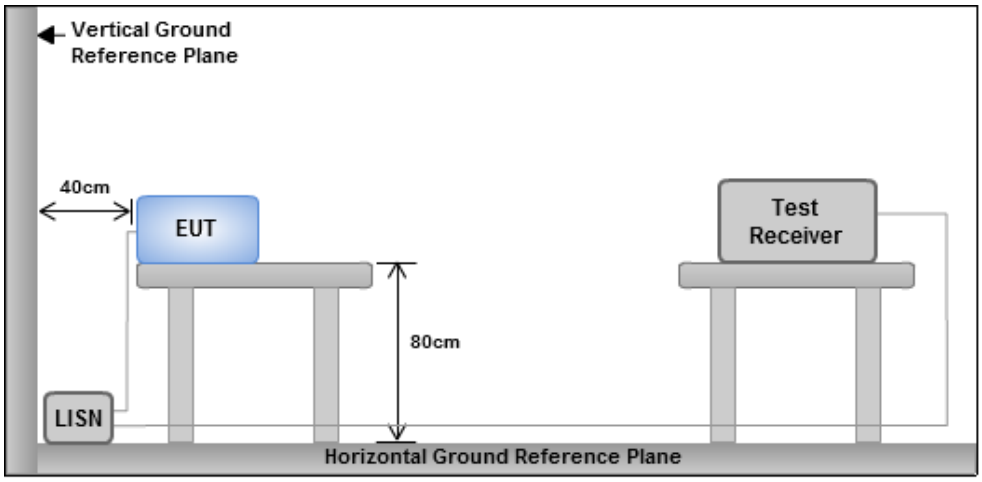
3.1.1 Limit of Conducted Emissions

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 Test Procedures

1. The device is placed on a test table, raised 80 cm above the reference ground plane. The vertical conducting plane is located 40 cm to the rear of the device.
2. The device is connected to line impedance stabilization network (LISN) and other accessories are connected to other LISN. Measured levels of AC power line conducted emission are across the 50 Ω LISN port.
3. AC conducted emission measurements is made over frequency range from 150 kHz to 30 MHz.
4. This measurement was performed with AC 120V / 60Hz.

3.1.3 Test Setup

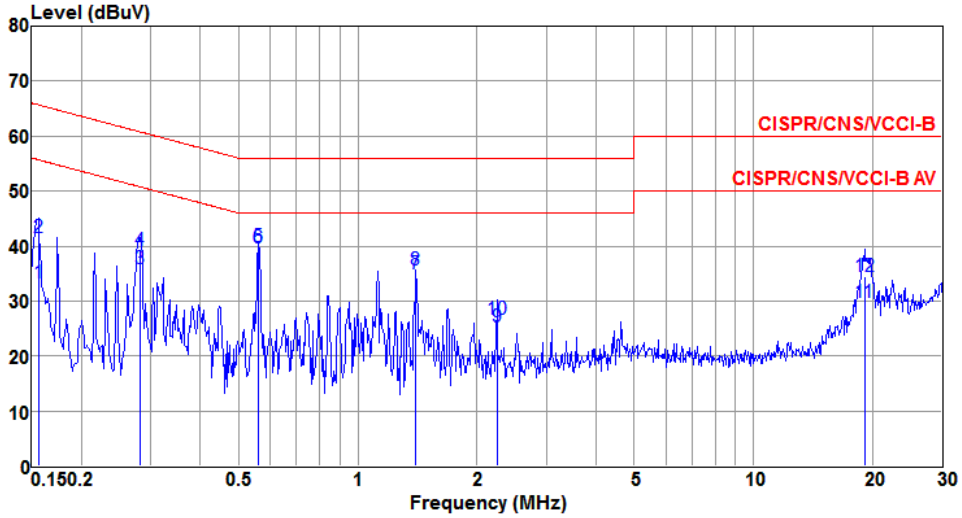


Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

3.1.4 Test Result of Conducted Emissions

Non-beamforming mode

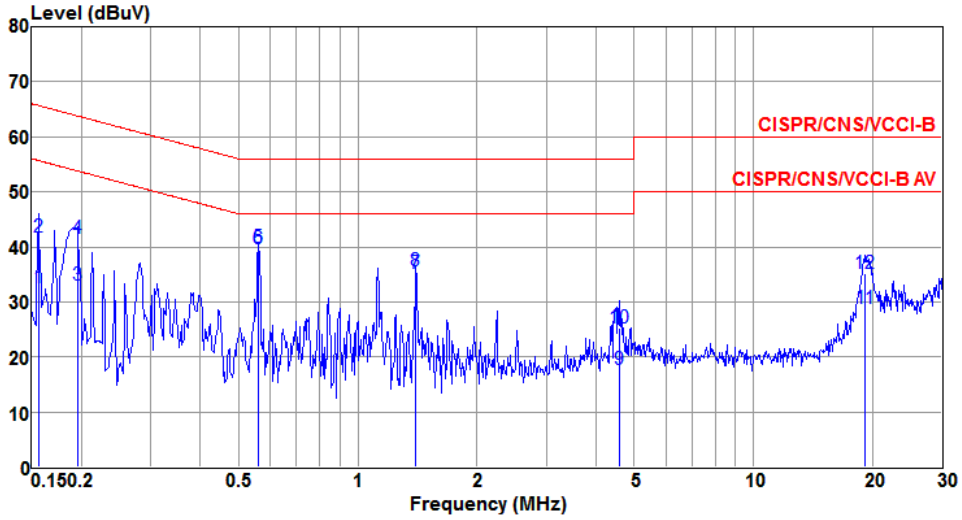
Modulation	11g	Test Freq. (MHz)	2437
Power Phase	Line	Test configuration	1



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.156	33.28	55.69	-22.41	23.74	9.50	0.04	Average
2	0.156	41.65	65.69	-24.04	32.11	9.50	0.04	QP
3	0.282	35.83	50.76	-14.93	26.24	9.55	0.04	Average
4	0.282	39.14	60.76	-21.62	29.55	9.55	0.04	QP
5@	0.561	39.79	46.00	-6.21	30.20	9.55	0.04	Average
6	0.561	39.59	56.00	-16.41	30.00	9.55	0.04	QP
7	1.403	34.95	46.00	-11.05	25.36	9.55	0.04	Average
8	1.403	35.61	56.00	-20.39	26.02	9.55	0.04	QP
9	2.249	25.29	46.00	-20.71	15.62	9.61	0.06	Average
10	2.249	26.72	56.00	-29.28	17.05	9.61	0.06	QP
11	19.122	29.79	50.00	-20.21	19.83	9.71	0.25	Average
12	19.122	34.56	60.00	-25.44	24.60	9.71	0.25	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).
2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).

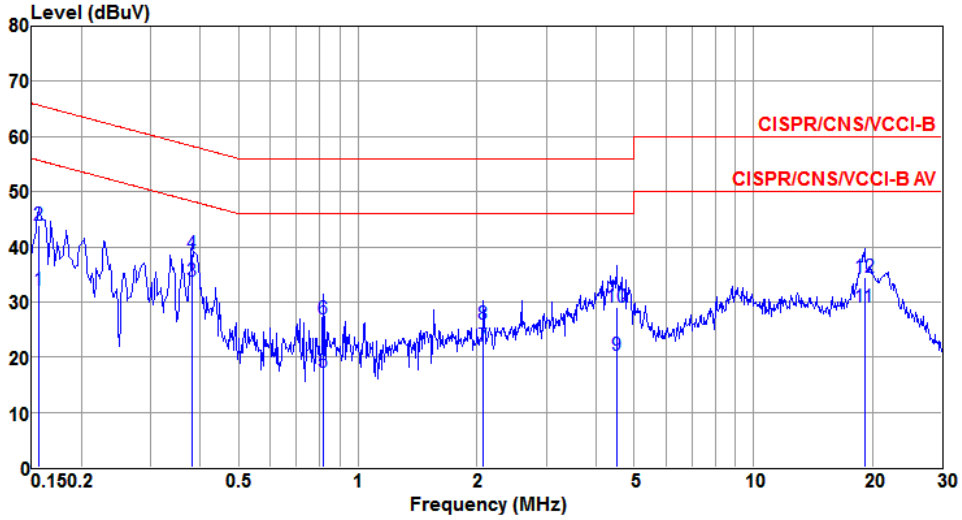
Modulation	11g	Test Freq. (MHz)	2437
Power Phase	Neutral	Test configuration	1



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.156	32.51	55.69	-23.18	22.89	9.58	0.04	Average
2	0.156	41.88	65.69	-23.81	32.26	9.58	0.04	QP
3	0.195	33.13	53.80	-20.67	23.49	9.60	0.04	Average
4	0.195	41.62	63.80	-22.18	31.98	9.60	0.04	QP
5@	0.561	39.94	46.00	-6.06	30.31	9.59	0.04	Average
6	0.561	39.69	56.00	-16.31	30.06	9.59	0.04	QP
7	1.403	35.10	46.00	-10.90	25.46	9.60	0.04	Average
8	1.403	35.63	56.00	-20.37	25.99	9.60	0.04	QP
9	4.574	17.71	46.00	-28.29	7.83	9.71	0.17	Average
10	4.574	25.21	56.00	-30.79	15.33	9.71	0.17	QP
11	19.224	28.70	50.00	-21.30	18.72	9.72	0.26	Average
12	19.224	35.18	60.00	-24.82	25.20	9.72	0.26	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).
2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).

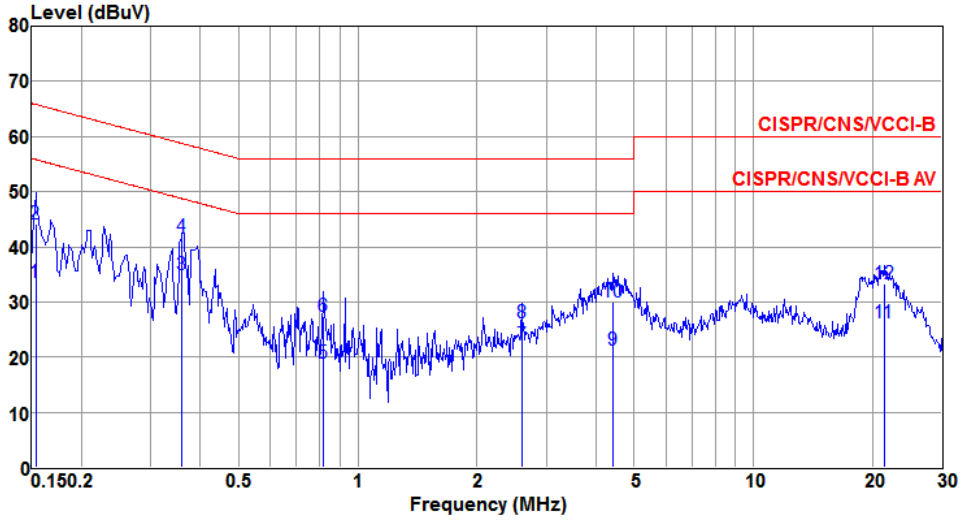
Modulation	11g	Test Freq. (MHz)	2437
Power Phase	Line	Test configuration	2



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.156	32.14	55.69	-23.55	22.60	9.50	0.04	Average
2	0.156	43.97	65.69	-21.72	34.43	9.50	0.04	QP
3@	0.381	33.77	48.25	-14.48	24.14	9.59	0.04	Average
4	0.381	38.70	58.25	-19.55	29.07	9.59	0.04	QP
5	0.817	17.29	46.00	-28.71	7.76	9.49	0.04	Average
6	0.817	26.95	56.00	-29.05	17.42	9.49	0.04	QP
7	2.077	21.86	46.00	-24.14	12.18	9.63	0.05	Average
8	2.077	25.87	56.00	-30.13	16.19	9.63	0.05	QP
9	4.501	20.26	46.00	-25.74	10.59	9.50	0.17	Average
10	4.501	29.12	56.00	-26.88	19.45	9.50	0.17	QP
11	19.122	29.05	50.00	-20.95	19.09	9.71	0.25	Average
12	19.122	34.42	60.00	-25.58	24.46	9.71	0.25	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).
2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).

Modulation	11g	Test Freq. (MHz)	2437
Power Phase	Neutral	Test configuration	2

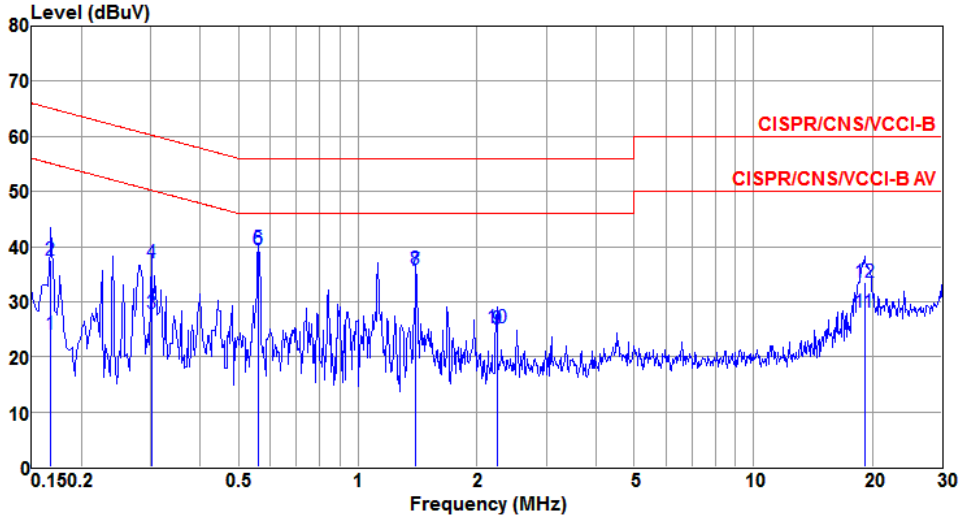


	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.153	33.49	55.82	-22.33	23.87	9.58	0.04	Average
2	0.153	44.20	65.82	-21.62	34.58	9.58	0.04	QP
3@	0.360	34.93	48.74	-13.81	25.34	9.55	0.04	Average
4	0.360	41.68	58.74	-17.06	32.09	9.55	0.04	QP
5	0.817	18.92	46.00	-27.08	9.24	9.64	0.04	Average
6	0.817	27.33	56.00	-28.67	17.65	9.64	0.04	QP
7	2.594	22.17	46.00	-23.83	12.50	9.59	0.08	Average
8	2.594	26.24	56.00	-29.76	16.57	9.59	0.08	QP
9	4.407	21.36	46.00	-24.64	11.48	9.71	0.17	Average
10	4.407	30.02	56.00	-25.98	20.14	9.71	0.17	QP
11	21.373	26.23	50.00	-23.77	16.22	9.74	0.27	Average
12	21.373	33.35	60.00	-26.65	23.34	9.74	0.27	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).
2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).

Beamforming mode

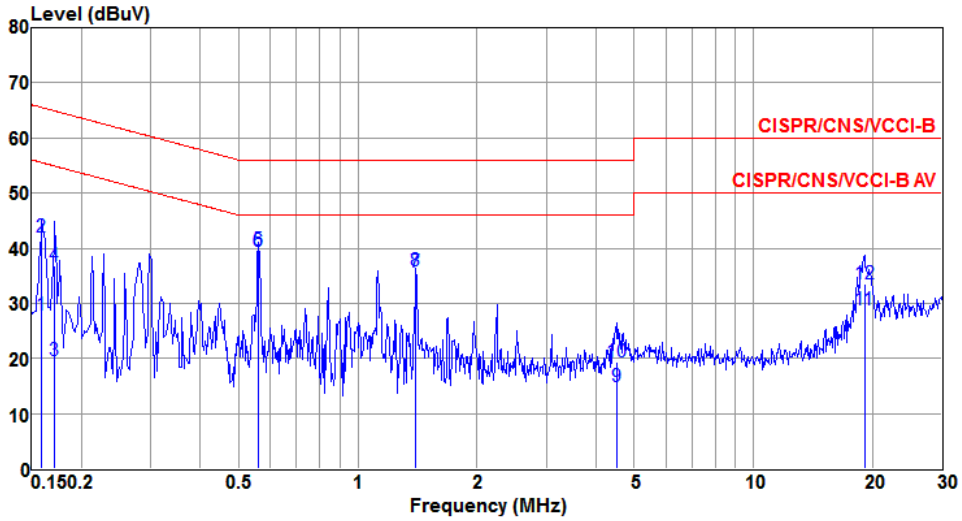
Modulation	HT20	**Test Freq. (MHz)**	2437
Power Phase	Line	**Test configuration**	1



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.168	24.06	55.08	-31.02	14.52	9.50	0.04	Average
2	0.168	37.54	65.08	-27.54	28.00	9.50	0.04	QP
3	0.300	27.93	50.24	-22.31	18.33	9.56	0.04	Average
4	0.300	36.96	60.24	-23.28	27.36	9.56	0.04	QP
5@	0.561	39.64	46.00	-6.36	30.05	9.55	0.04	Average
6	0.561	39.46	56.00	-16.54	29.87	9.55	0.04	QP
7	1.403	35.62	46.00	-10.38	26.03	9.55	0.04	Average
8	1.403	35.86	56.00	-20.14	26.27	9.55	0.04	QP
9	2.249	24.92	46.00	-21.08	15.25	9.61	0.06	Average
10	2.249	25.17	56.00	-30.83	15.50	9.61	0.06	QP
11	19.122	28.11	50.00	-21.89	18.15	9.71	0.25	Average
12	19.122	33.46	60.00	-26.54	23.50	9.71	0.25	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).
2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).

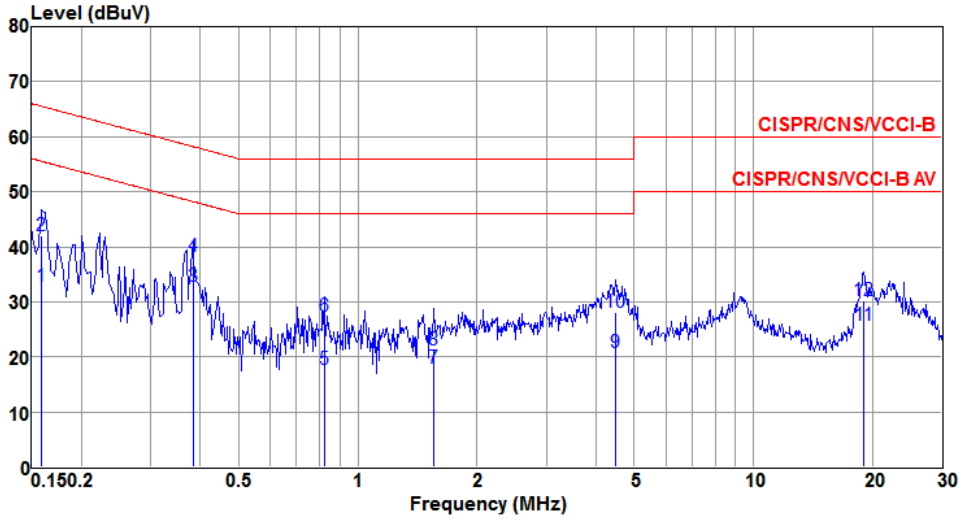
Modulation	HT20	Test Freq. (MHz)	2437
Power Phase	Neutral	Test configuration	1



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.159	27.97	55.52	-27.55	18.35	9.58	0.04	Average
2	0.159	41.91	65.52	-23.61	32.29	9.58	0.04	QP
3	0.171	19.64	54.90	-35.26	10.01	9.59	0.04	Average
4	0.171	36.90	64.90	-28.00	27.27	9.59	0.04	QP
5@	0.561	39.70	46.00	-6.30	30.07	9.59	0.04	Average
6	0.561	39.52	56.00	-16.48	29.89	9.59	0.04	QP
7	1.403	35.66	46.00	-10.34	26.02	9.60	0.04	Average
8	1.403	35.85	56.00	-20.15	26.21	9.60	0.04	QP
9	4.525	14.91	46.00	-31.09	5.03	9.71	0.17	Average
10	4.525	19.31	56.00	-36.69	9.43	9.71	0.17	QP
11	19.122	28.74	50.00	-21.26	18.77	9.72	0.25	Average
12	19.122	33.56	60.00	-26.44	23.59	9.72	0.25	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).
2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).

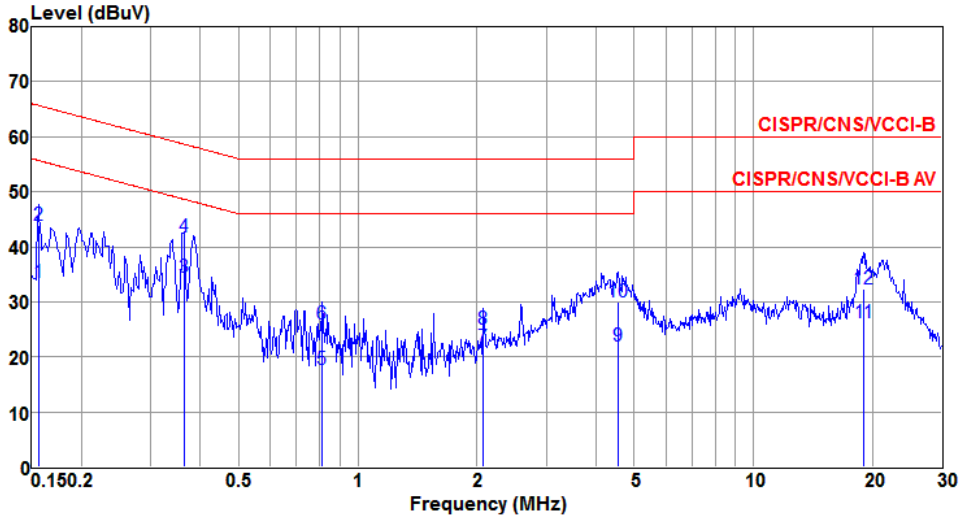
Modulation	HT20	Test Freq. (MHz)	2437
Power Phase	Line	Test configuration	2



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.159	32.73	55.52	-22.79	23.19	9.50	0.04	Average
2	0.159	42.11	65.52	-23.41	32.57	9.50	0.04	QP
3@	0.383	32.90	48.21	-15.31	23.27	9.59	0.04	Average
4	0.383	38.18	58.21	-20.03	28.55	9.59	0.04	QP
5	0.822	17.71	46.00	-28.29	8.18	9.49	0.04	Average
6	0.822	27.47	56.00	-28.53	17.94	9.49	0.04	QP
7	1.560	18.06	46.00	-27.94	8.44	9.58	0.04	Average
8	1.560	21.24	56.00	-34.76	11.62	9.58	0.04	QP
9	4.478	20.72	46.00	-25.28	11.05	9.50	0.17	Average
10	4.478	28.12	56.00	-27.88	18.45	9.50	0.17	QP
11	19.021	25.70	50.00	-24.30	15.74	9.71	0.25	Average
12	19.021	30.10	60.00	-29.90	20.14	9.71	0.25	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).
2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).

Modulation	HT20	Test Freq. (MHz)	2437
Power Phase	Neutral	Test configuration	2



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.156	33.47	55.69	-22.22	23.85	9.58	0.04	Average
2	0.156	43.89	65.69	-21.80	34.27	9.58	0.04	QP
3@	0.363	34.47	48.65	-14.18	24.88	9.55	0.04	Average
4	0.363	41.69	58.65	-16.96	32.10	9.55	0.04	QP
5	0.813	17.66	46.00	-28.34	7.98	9.64	0.04	Average
6	0.813	25.91	56.00	-30.09	16.23	9.64	0.04	QP
7	2.077	21.73	46.00	-24.27	12.15	9.53	0.05	Average
8	2.077	25.05	56.00	-30.95	15.47	9.53	0.05	QP
9	4.549	21.95	46.00	-24.05	12.07	9.71	0.17	Average
10	4.549	29.93	56.00	-26.07	20.05	9.71	0.17	QP
11	19.021	26.22	50.00	-23.78	16.25	9.72	0.25	Average
12	19.021	32.38	60.00	-27.62	22.41	9.72	0.25	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).
2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).

3.2 6dB and Occupied Bandwidth

3.2.1 Limit of 6dB Bandwidth

The minimum 6dB bandwidth shall be at least 500 kHz.

3.2.2 Test Procedures

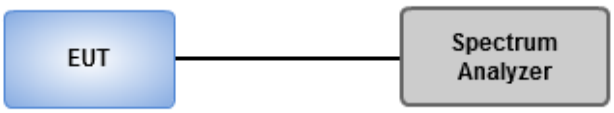
6dB Bandwidth

1. Set resolution bandwidth (RBW) = 100 kHz, Video bandwidth = 300 kHz.
2. Detector = Peak, Trace mode = max hold.
3. Sweep = auto couple, Allow the trace to stabilize.
4. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6dB relative to the maximum level measured in the fundamental emission.

Occupied Bandwidth

1. Set resolution bandwidth (RBW) = 1 MHz, Video bandwidth = 3 MHz.
2. Detector = Sample, Trace mode = max hold.
3 Sweep = auto couple, Allow the trace to stabilize.
4. Use the OBW measurement function of spectrum analyzer to measure the occupied bandwidth.

3.2.3 Test Setup

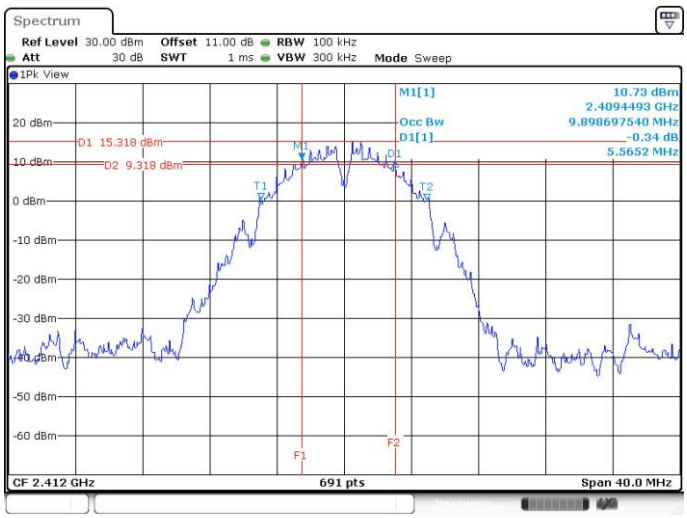


3.2.4 Test Result of 6dB and Occupied Bandwidth

Non-beamforming mode

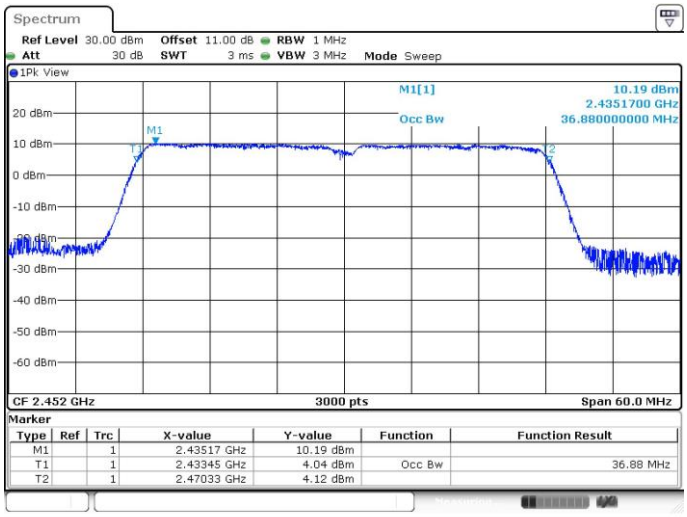
Modulation Mode	N_{TX}	Freq. (MHz)	6dB Bandwidth (MHz)				Limit (kHz)
			Chain 0	Chain 1	Chain 2	Chain 3	
11b	2	2412	5.57	6.03	---	---	500
11b	2	2437	6.55	6.03	---	---	500
11b	2	2462	6.55	6.09	---	---	500
11g	2	2412	16.35	16.35	---	---	500
11g	2	2437	15.71	16.35	---	---	500
11g	2	2462	16.29	16.35	---	---	500
HT20	2	2412	17.57	17.62	---	---	500
HT20	2	2437	16.58	17.57	---	---	500
HT20	2	2462	17.57	17.57	---	---	500
HT40	2	2422	35.83	36.06	---	---	500
HT40	2	2437	35.83	36.41	---	---	500
HT40	2	2452	36.17	36.41	---	---	500

Worst Plot



Modulation Mode	N_{TX}	Freq. (MHz)	99% Occupied Bandwidth (MHz)			
			Chain 0	Chain 1	Chain 2	Chain 3
11b	2	2412	10.01	9.90	---	---
11b	2	2437	10.11	10.00	---	---
11b	2	2462	9.90	9.83	---	---
11g	2	2412	16.89	16.71	---	---
11g	2	2437	17.63	17.06	---	---
11g	2	2462	16.85	16.71	---	---
HT20	2	2412	18.09	17.90	---	---
HT20	2	2437	18.75	18.28	---	---
HT20	2	2462	18.12	17.90	---	---
HT40	2	2422	36.66	36.58	---	---
HT40	2	2437	36.84	36.72	---	---
HT40	2	2452	36.88	36.66	---	---

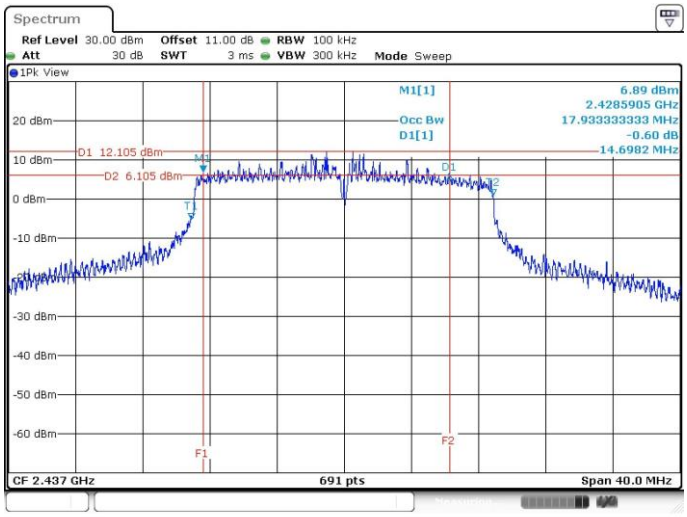
Worst Plot



Beamforming mode

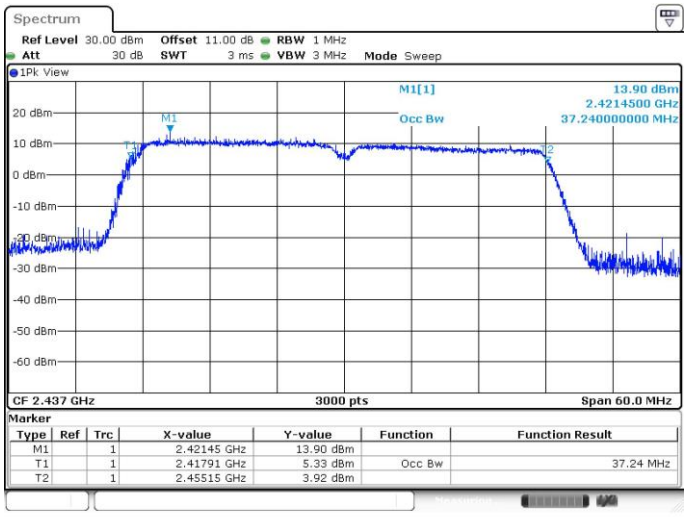
Modulation Mode	N_{TX}	Freq. (MHz)	6dB Bandwidth (MHz)				Limit (kHz)
			Chain 0	Chain 1	Chain 2	Chain 3	
HT20	2	2412	17.57	16.06	---	---	500
HT20	2	2437	14.70	15.34	---	---	500
HT20	2	2462	17.55	17.57	---	---	500
HT40	2	2422	35.13	32.58	---	---	500
HT40	2	2437	36.17	35.13	---	---	500
HT40	2	2452	36.41	35.71	---	---	500

Worst Plot



Modulation Mode	N_{TX}	Freq. (MHz)	99% Occupied Bandwidth (MHz)			
			Chain 0	Chain 1	Chain 2	Chain 3
HT20	2	2412	17.84	17.85	---	---
HT20	2	2437	18.33	18.15	---	---
HT20	2	2462	17.86	17.85	---	---
HT40	2	2422	36.50	36.50	---	---
HT40	2	2437	37.24	36.64	---	---
HT40	2	2452	36.74	36.64	---	---

Worst Plot



3.3 RF Output Power

3.3.1 Limit of RF Output Power

Conducted power shall not exceed 1Watt.

Antenna gain <= 6dBi, no any corresponding reduction is in output power limit.

Antenna gain > 6dBi

Non Fixed, point to point operations.
The conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dB

Fixed, point to point operations
Systems operating in the 2400–2483.5 MHz band that are used exclusively for fixed, point-to-point Operations, maximum peak output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

Systems operating in the 5725–5850 MHz band that are used exclusively for fixed, point-to-point operations ,no any corresponding reduction is in transmitter peak output power

3.3.2 Test Procedures

☐ Maximum Peak Conducted Output Power

☐ **Spectrum analyzer**

1. Set RBW = 1MHz, VBW = 3MHz, Detector = Peak.
2. Sweep time = auto, Trace mode = max hold, Allow trace to fully stabilize.
3. Use the spectrum analyzer channel power measurement function with the band limits set equal to the DTS bandwidth edges.

☐ **Power meter**

1. A broadband Peak RF power meter is used for output power measurement. The video bandwidth of power meter is greater than DTS bandwidth of EUT. If duty cycle of test signal is not 100 %, trigger and gating function of power meter will be enabled to capture transmission burst for measuring output power.

☒ Maximum Conducted Output Power

☒ **Power meter**

1. A broadband Average RF power meter is used for output power measurement. The video bandwidth of power meter is greater than DTS bandwidth of EUT. If duty cycle of test signal is not 100 %, trigger and gating function of power meter will be enabled to capture transmission burst for measuring output power.

3.3.3 Test Setup

3.3.4 Test Result of Maximum Output Power

Non-beamforming mode

Modulation Mode	N_{TX}	Freq. (MHz)	Peak conducted Output Power (dBm)							Ant. Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)
			Chain 0	Chain 1	Chain 2	Chain 3	Total Power (mW)	Total Power (dBm)	Limit (dBm)			
11b	2	2412	25.96	25.47	---	---	746.828	28.73	30.00	3.00	31.73	36.00
11b	2	2437	25.93	25.45	---	---	742.494	28.71	30.00	3.00	31.71	36.00
11b	2	2462	25.94	25.27	---	---	729.157	28.63	30.00	3.00	31.63	36.00
11g	2	2412	25.86	24.89	---	---	693.797	28.41	30.00	3.00	31.41	36.00
11g	2	2437	27.11	26.63	---	---	974.300	29.89	30.00	3.00	32.89	36.00
11g	2	2462	26.47	25.73	---	---	817.719	29.13	30.00	3.00	32.13	36.00
HT20	2	2412	25.37	24.83	---	---	648.438	28.12	30.00	3.00	31.12	36.00
HT20	2	2437	27.08	26.62	---	---	969.703	29.87	30.00	3.00	32.87	36.00
HT20	2	2462	26.57	25.86	---	---	839.420	29.24	30.00	3.00	32.24	36.00
HT40	2	2422	23.22	22.37	---	---	382.478	25.83	30.00	3.00	28.83	36.00
HT40	2	2437	25.86	25.31	---	---	725.104	28.60	30.00	3.00	31.60	36.00
HT40	2	2452	25.66	25.17	---	---	696.981	28.43	30.00	3.00	31.43	36.00

Modulation Mode	N_{TX}	Freq. (MHz)	Conducted (Average) Output Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)
			Chain 0	Chain 1	Chain 2	Chain 3			
11b	2	2412	22.58	21.65	---	---	327.352	25.15	---
11b	2	2437	22.42	21.92	---	---	330.179	25.19	---
11b	2	2462	22.24	21.48	---	---	308.099	24.89	---
11g	2	2412	17.24	16.45	---	---	97.123	19.87	---
11g	2	2437	22.69	21.81	---	---	337.485	25.28	---
11g	2	2462	18.31	17.48	---	---	123.740	20.93	---
HT20	2	2412	16.76	16.01	---	---	87.327	19.41	---
HT20	2	2437	22.63	21.76	---	---	333.200	25.23	---
HT20	2	2462	18.21	17.35	---	---	120.547	20.81	---
HT40	2	2422	13.51	12.79	---	---	41.450	16.18	---
HT40	2	2437	17.86	17.41	---	---	116.175	20.65	---
HT40	2	2452	17.32	16.82	---	---	102.035	20.09	---

Note: Conducted average output power is for reference only.

Beamforming mode

Modulation Mode	N_{TX}	Freq. (MHz)	Peak conducted Output Power (dBm)							Ant. Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)
			Chain 0	Chain 1	Chain 2	Chain 3	Total Power (mW)	Total Power (dBm)	Limit (dBm)			
HT20	2	2412	25.06	24.41	---	---	596.685	27.76	29.99	6.01	33.77	36.00
HT20	2	2437	26.75	26.38	---	---	907.661	29.58	29.99	6.01	35.59	36.00
HT20	2	2462	26.35	25.93	---	---	823.261	29.16	29.99	6.01	35.17	36.00
HT40	2	2422	22.03	21.29	---	---	294.174	24.69	29.99	6.01	30.70	36.00
HT40	2	2437	25.39	24.94	---	---	657.828	28.18	29.99	6.01	34.19	36.00
HT40	2	2452	25.11	24.79	---	---	625.640	27.96	29.99	6.01	33.97	36.00

Note:

1. Directional gain = 3+10* log(2/1) = 6.01 dBi > 6 dBi.
   Limit shall be reduced to 30 dBm – (6.01 dBi – 6 dBi) = 29.99 dBm

Modulation Mode	N_{TX}	Freq. (MHz)	Conducted (Average) Output Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)
			Chain 0	Chain 1	Chain 2	Chain 3			
HT20	2	2412	16.32	16.13	---	---	83.875	19.24	---
HT20	2	2437	22.31	21.63	---	---	315.762	24.99	---
HT20	2	2462	18.01	17.52	---	---	119.735	20.78	---
HT40	2	2422	12.85	12.18	---	---	35.795	15.54	---
HT40	2	2437	17.11	16.58	---	---	96.903	19.86	---
HT40	2	2452	16.43	16.29	---	---	86.514	19.37	---

Note: Conducted average output power is for reference only.

3.4 Power Spectral Density

3.4.1 Limit of Power Spectral Density

Power spectral density shall not be greater than 8 dBm in any 3 kHz band.

3.4.2 Test Procedures

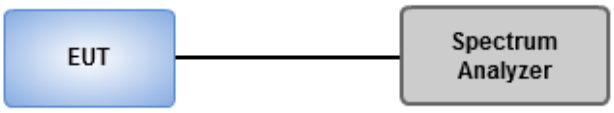
☒ Method PKPSD

1. Set the RBW = 3kHz, VBW = 10kHz.
2. Detector = Peak, Sweep time = auto couple.
3. Trace mode = max hold, allow trace to fully stabilize.
4. Use the peak marker function to determine the maximum amplitude level.

☐ Method AVGPSD-2 Alternative

1. Set the RBW = 30kHz, VBW = 100 kHz, Detector = RMS
2. Manually set the sweep time to: ≥ 10 x (number of measurement points in sweep) x (total on/off period of the transmitted signal).
3. Perform the measurement over a single sweep.
4. Use the peak marker function to determine the maximum amplitude level.
5. Add 10 log (1/x), where x is the duty cycle

3.4.3 Test Setup



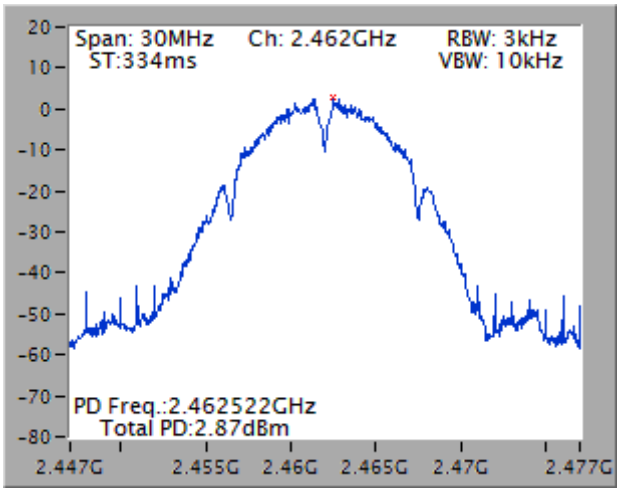
3.4.4 Test Result of Power Spectral Density

Non-beamforming mode

Modulation Mode	N_{TX}	Freq. (MHz)	PPSD (dBm/3kHz)	Limit (dBm/3kHz)
11b	2	2412	2.48	7.99
11b	2	2437	2.57	7.99
11b	2	2462	2.87	7.99
11g	2	2412	-5.81	7.99
11g	2	2437	-0.23	7.99
11g	2	2462	-4.87	7.99
HT20	2	2412	-6.43	7.99
HT20	2	2437	-0.39	7.99
HT20	2	2462	-4.83	7.99
HT40	2	2422	-12.89	7.99
HT40	2	2437	-9.10	7.99
HT40	2	2452	-9.51	7.99

Note:
1. Test result is bin-by-bin summing measured value of each TX port.
2. D.F is duty factor
3. Directional gain = 3+10* log(2/1) = 6.01 dBi > 6 dBi.
   Limit shall be reduced to 8 dBm – (6.01 dBi – 6 dBi) = 7.99 dBm

Worst Plot



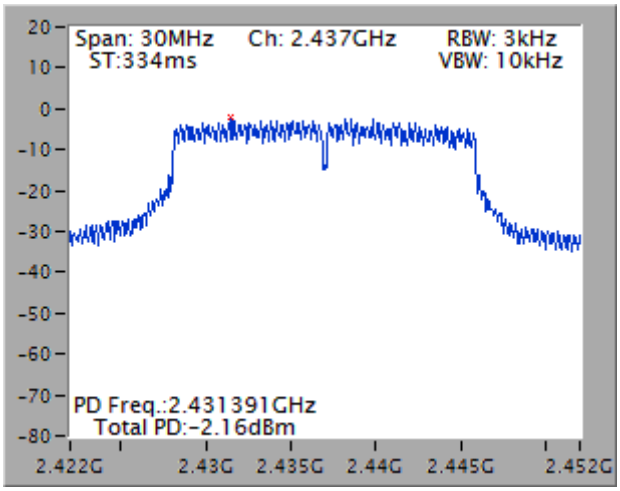
Beamforming mode

Modulation Mode	N_{TX}	Freq. (MHz)	PPSD (dBm/3kHz)	Limit (dBm/3kHz)
HT20	2	2412	-5.31	7.99
HT20	2	2437	-2.16	7.99
HT20	2	2462	-6.46	7.99
HT40	2	2422	-13.79	7.99
HT40	2	2437	-9.84	7.99
HT40	2	2452	-10.10	7.99

Note:

1. Test result is bin-by-bin summing measured value of each TX port.
2. D.F is duty factor
3. Directional gain = 3+10* log(2/1) = 6.01 dBi > 6 dBi.
   Limit shall be reduced to 8 dBm – (6.01 dBi – 6 dBi) = 7.99 dBm

Worst Plot



3.5 Unwanted Emissions into Restricted Frequency Bands

3.5.1 Limit of Unwanted Emissions into Restricted Frequency Bands

Restricted Band Emissions Limit			
Frequency Range (MHz)	**Field Strength (uV/m)**	**Field Strength (dBuV/m)**	**Measure Distance (m)**
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300
0.490~1.705	24000/F(kHz)	33.8 - 23	30
1.705~30.0	30	29	30
30~88	100	40	3
88~216	150	43.5	3
216~960	200	46	3
Above 960	500	54	3

Note 1:
Qusai-Peak value is measured for frequency below 1GHz except for 9–90 kHz, 110–490 kHz frequency band. Peak and average value are measured for frequency above 1GHz. The limit on average radio frequency emission is as above table. The limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit
Note 2:
Measurements may be performed at a distance other than what is specified provided. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor as below, Frequency at or above 30 MHz: 20 dB/decade Frequency below 30 MHz: 40 dB/decade.

3.5.2 Test Procedures

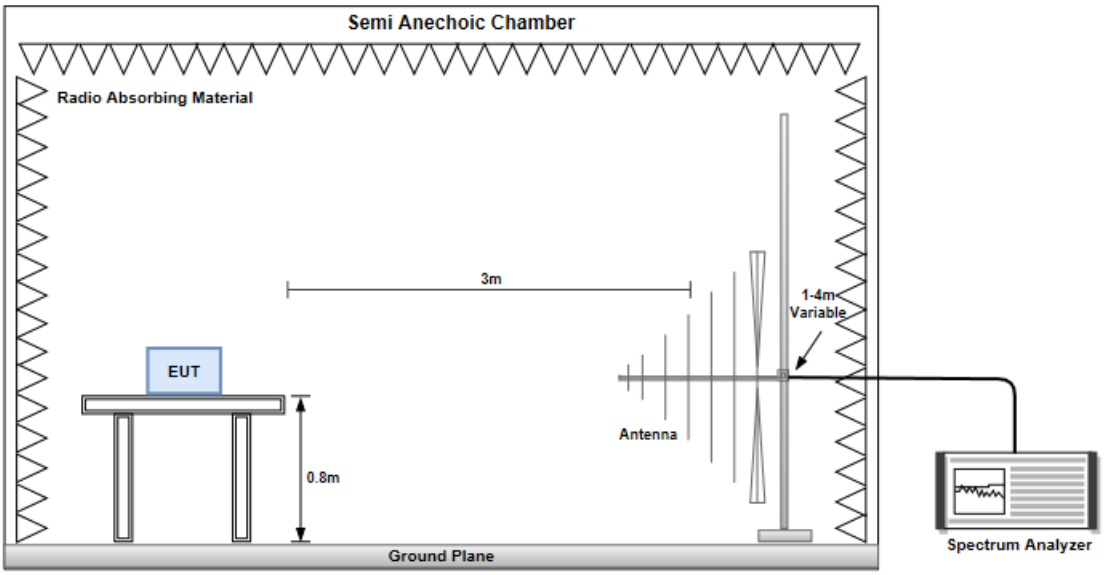
1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission frequency. The EUT is placed at test table. For emissions testing at or below 1 GHz, the table height is 80 cm above the reference ground plane. For emission measurements above 1 GHz, the table height is 1.5 m
2. Measurement is made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna is varied in height (1m ~ 4m) above the reference ground plane to obtain the maximum signal strength. Distance between EUT and antenna is 3 m.
3. This investigation is performed with the EUT rotated 360°, the antenna height scanned between 1 m and 4 m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations.

Note:

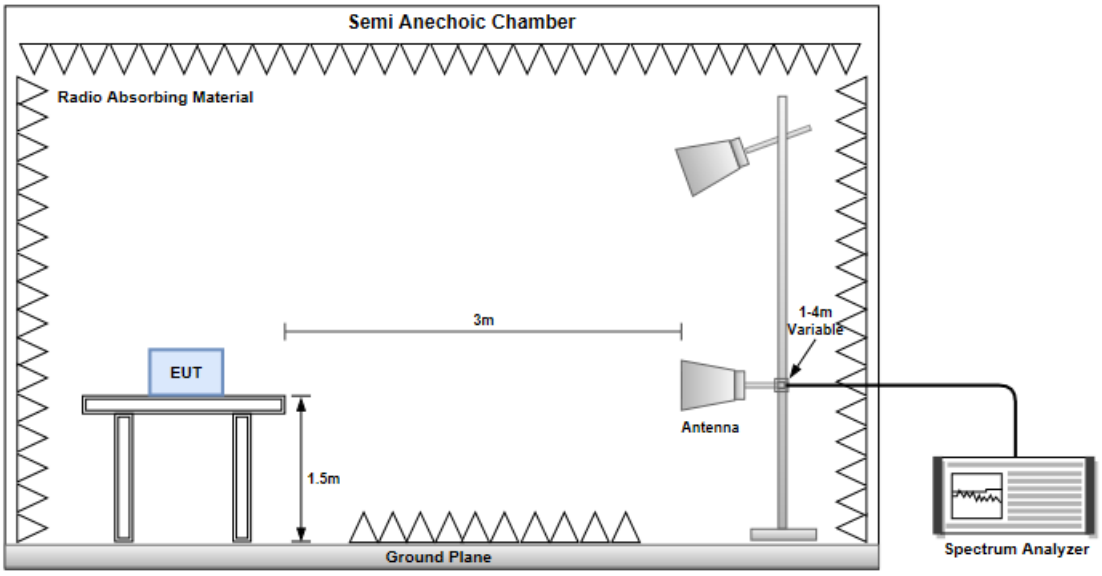
1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
2. RBW=1MHz, VBW=3MHz and Peak detector is for peak measured value of radiated emission above 1GHz.
3. RBW=1MHz, VBW=1/T and Peak detector is for average measured value of radiated emission above 1GHz.

3.5.3 Test Setup

Radiated Emissions below 1 GHz



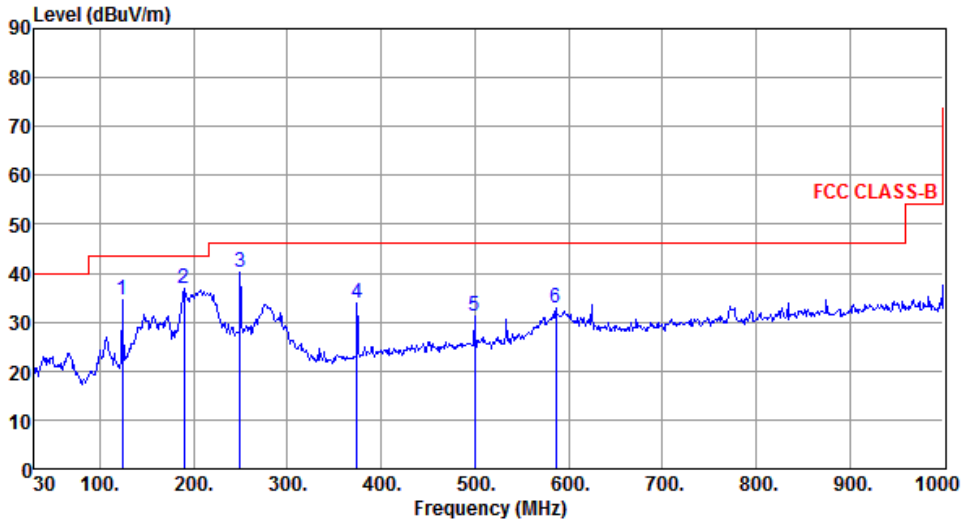
Radiated Emissions above 1 GHz



Non-beamforming mode

3.5.4 Transmitter Radiated Unwanted Emissions (Below 1GHz)

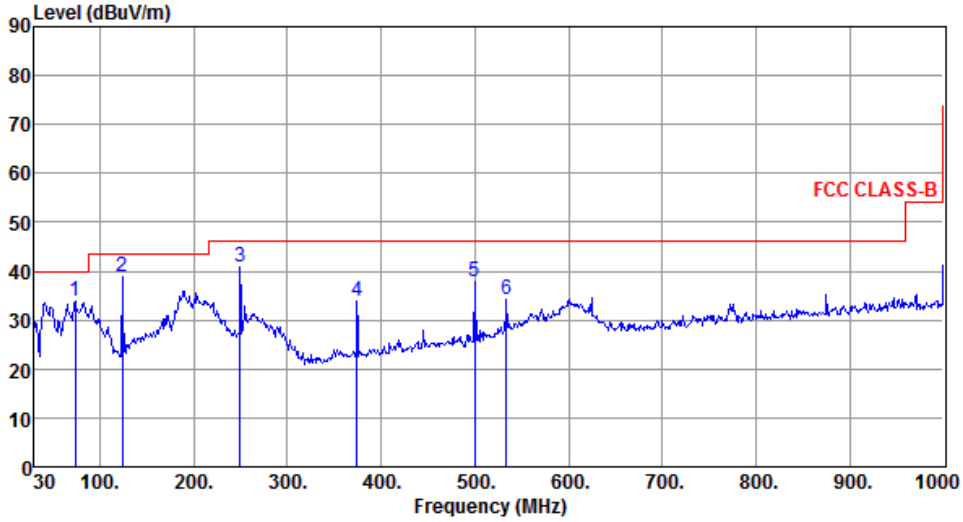
Modulation	11g	**Test Freq. (MHz)**	2437
Polarization	Horizontal	**Test Configuration**	1



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	124.09	34.66	43.50	-8.84	45.27	-10.61	Peak	---	---
2	190.05	36.75	43.50	-6.75	47.58	-10.83	Peak	---	---
3	249.22	40.28	46.00	-5.72	49.71	-9.43	Peak	---	---
4	374.35	33.99	46.00	-12.01	39.97	-5.98	Peak	---	---
5	499.48	31.09	46.00	-14.91	34.34	-3.25	Peak	---	---
6	586.78	32.76	46.00	-13.24	34.02	-1.26	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

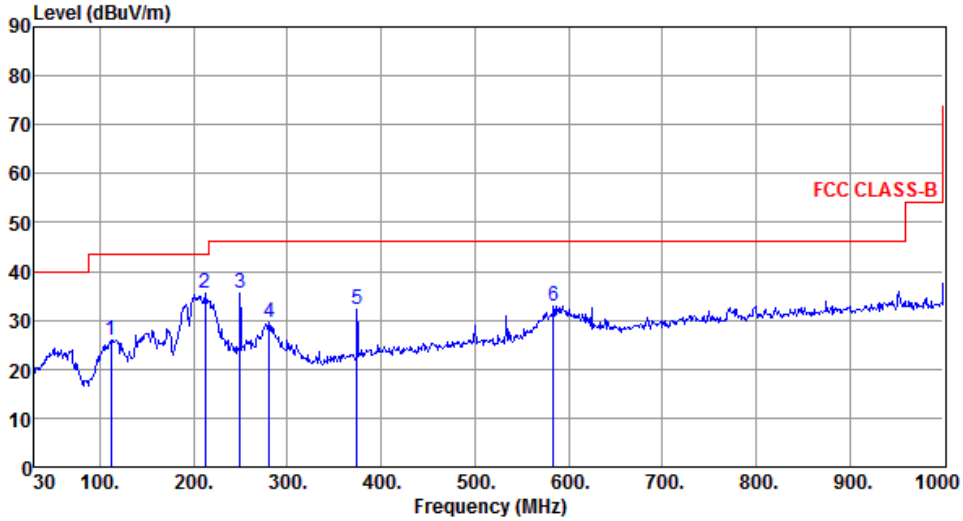
Modulation	11g	Test Freq. (MHz)	2437
Polarization	Vertical	Test Configuration	1



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	73.65	33.89	40.00	-6.11	45.54	-11.65	Peak	---	---
2	124.09	38.99	43.50	-4.51	49.60	-10.61	Peak	---	---
3	249.22	40.74	46.00	-5.26	50.17	-9.43	Peak	---	---
4	374.35	33.92	46.00	-12.08	39.90	-5.98	Peak	---	---
5	499.48	37.94	46.00	-8.06	41.19	-3.25	Peak	---	---
6	533.43	34.26	46.00	-11.74	36.82	-2.56	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

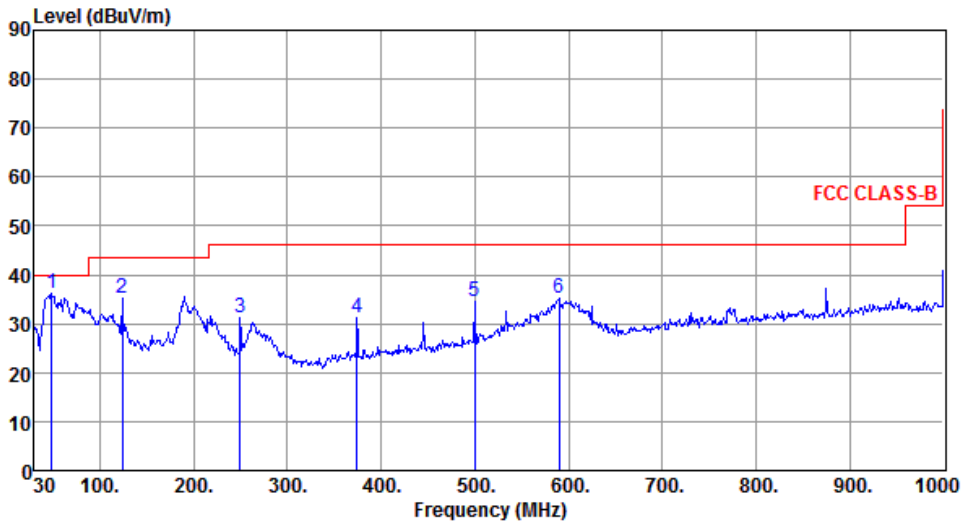
Modulation	11g	Test Freq. (MHz)	2437
Polarization	Horizontal	Test Configuration	2



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	111.48	26.02	43.50	-17.48	37.71	-11.69	Peak	---	---
2	212.36	35.42	43.50	-8.08	46.50	-11.08	Peak	---	---
3	249.22	35.64	46.00	-10.36	45.07	-9.43	Peak	---	---
4	280.26	29.45	46.00	-16.55	37.75	-8.30	Peak	---	---
5	374.35	32.10	46.00	-13.90	38.08	-5.98	Peak	---	---
6	583.87	33.03	46.00	-12.97	34.37	-1.34	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

Modulation	11g	Test Freq. (MHz)	2437
Polarization	Vertical	Test Configuration	2

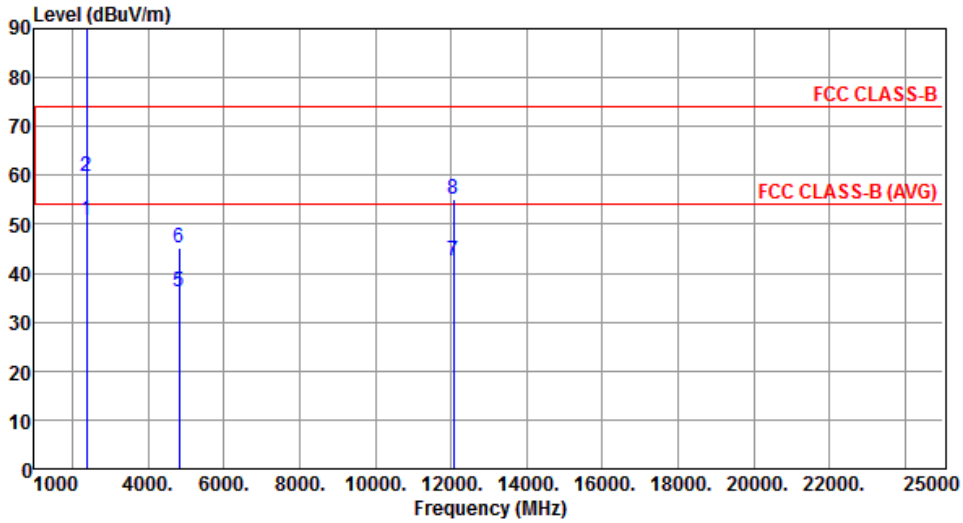


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	48.43	36.30	40.00	-3.70	44.50	-8.20	Peak	---	---
2	124.09	35.06	43.50	-8.44	45.67	-10.61	Peak	---	---
3	249.22	31.23	46.00	-14.77	40.66	-9.43	Peak	---	---
4	374.35	31.19	46.00	-14.81	37.17	-5.98	Peak	---	---
5	499.48	34.52	46.00	-11.48	37.77	-3.25	Peak	---	---
6	589.69	35.24	46.00	-10.76	36.43	-1.19	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

3.5.5 Transmitter Radiated Unwanted Emissions (Above 1GHz) for 11b

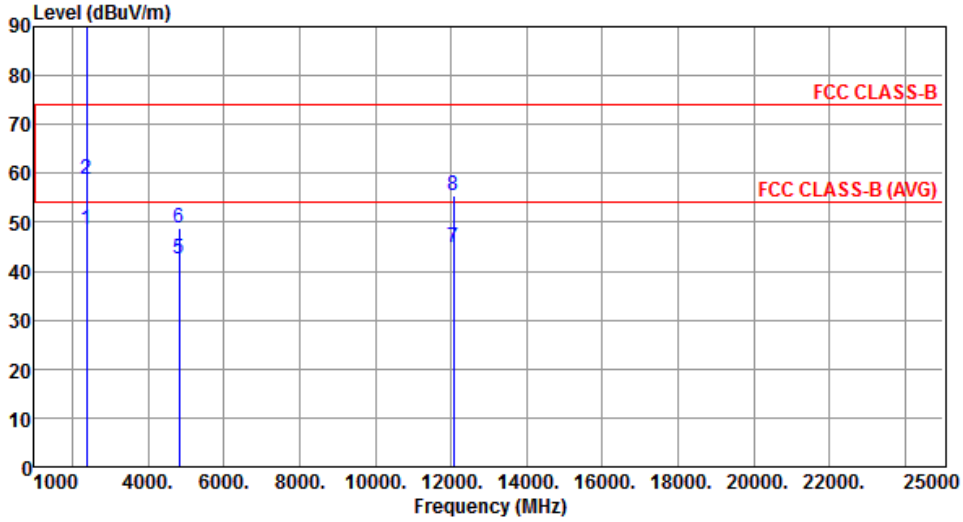
Modulation	11b	Test Freq. (MHz)	2412
Polarization	Horizontal		



		Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1		2390.00	50.89	54.00	-3.11	53.01	-2.12	Average	233	46
2		2390.00	59.69	74.00	-14.31	61.81	-2.12	Peak	233	46
3	*	2412.00	114.58			116.61	-2.03	Average	233	46
4	*	2412.00	117.02			119.05	-2.03	Peak	233	46
5		4824.00	36.24	54.00	-17.76	31.76	4.48	Average	100	322
6		4824.00	45.10	74.00	-28.90	40.62	4.48	Peak	100	322
7		12060.00	42.53	54.00	-11.47	28.87	13.66	Average	100	242
8		12060.00	55.00	74.00	-19.00	41.34	13.66	Peak	100	242

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3:"*" is Peak / Average value of fundamental frequency

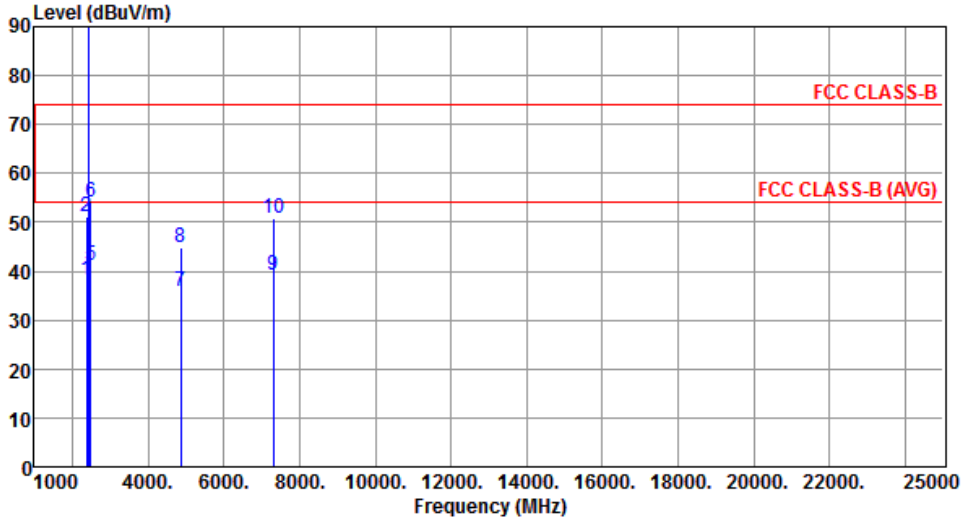
Modulation	11b	Test Freq. (MHz)	2412
Polarization	Vertical		



		Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1		2390.00	48.44	54.00	-5.56	50.56	-2.12	Average	246	350
2		2390.00	58.74	74.00	-15.26	60.86	-2.12	Peak	246	350
3	*	2412.00	113.84			115.87	-2.03	Average	246	350
4	*	2412.00	116.30			118.33	-2.03	Peak	246	350
5		4824.00	42.46	54.00	-11.54	37.98	4.48	Average	100	353
6		4824.00	48.76	74.00	-25.24	44.28	4.48	Peak	100	353
7		12060.00	44.81	54.00	-9.19	31.15	13.66	Average	100	359
8		12060.00	55.47	74.00	-18.53	41.81	13.66	Peak	100	359

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3:"*" is Peak / Average value of fundamental frequency

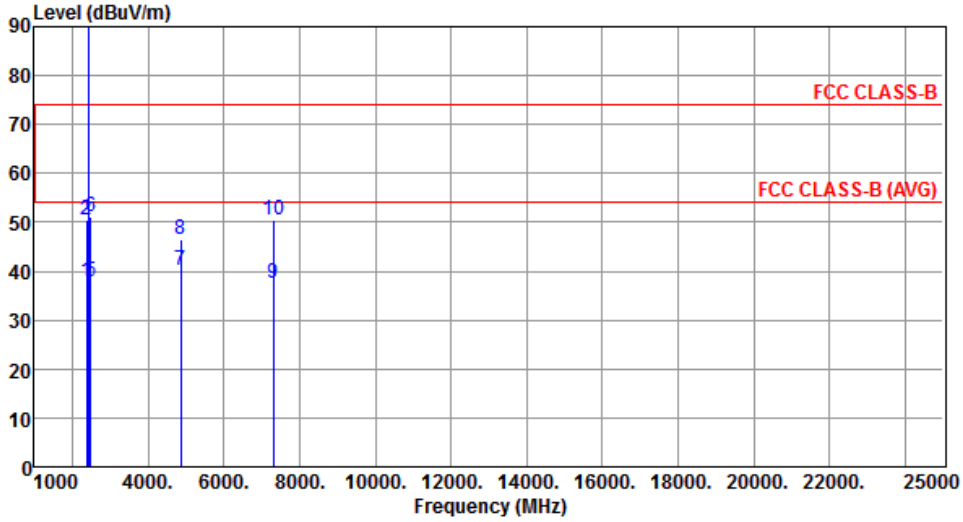
Modulation	11b	Test Freq. (MHz)	2437
Polarization	Horizontal		



		Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1		2390.00	38.23	54.00	-15.77	40.35	-2.12	Average	221	52
2		2390.00	51.05	74.00	-22.95	53.17	-2.12	Peak	221	52
3	*	2437.00	114.90			116.83	-1.93	Average	221	52
4	*	2437.00	117.40			119.33	-1.93	Peak	221	52
5		2483.50	41.04	54.00	-12.96	42.81	-1.77	Average	221	52
6		2483.50	54.09	74.00	-19.91	55.86	-1.77	Peak	221	52
7		4874.00	36.00	54.00	-18.00	31.42	4.58	Average	258	18
8		4874.00	44.79	74.00	-29.21	40.21	4.58	Peak	258	18
9		7311.00	39.05	54.00	-14.95	29.92	9.13	Average	100	178
10		7311.00	50.92	74.00	-23.08	41.79	9.13	Peak	100	178

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3:"*" is Peak / Average value of fundamental frequency

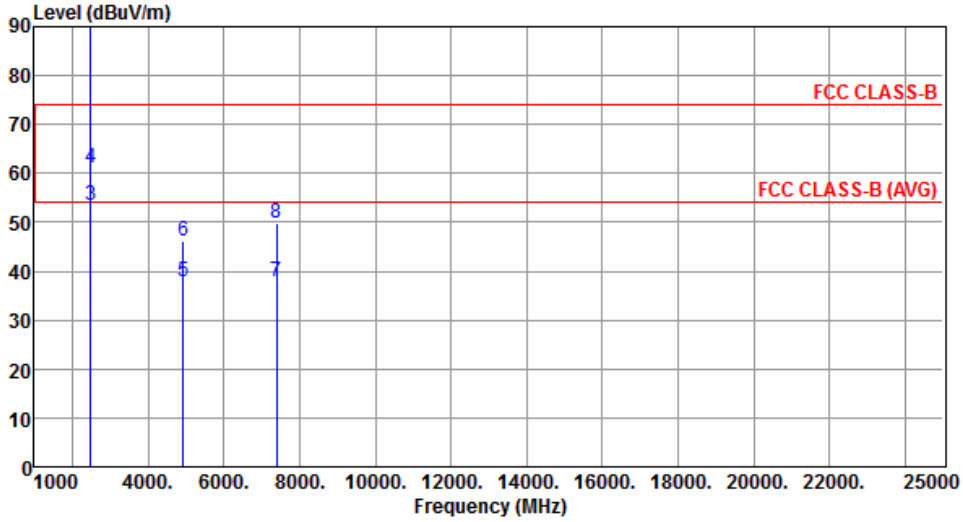
Modulation	11b	Test Freq. (MHz)	2437
Polarization	Vertical		



		Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1		2390.00	37.82	54.00	-16.18	39.94	-2.12	Average	273	354
2		2390.00	50.63	74.00	-23.37	52.75	-2.12	Peak	273	354
3	*	2437.00	113.65			115.58	-1.93	Average	273	354
4	*	2437.00	116.09			118.02	-1.93	Peak	273	354
5		2483.50	37.91	54.00	-16.09	39.68	-1.77	Average	273	354
6		2483.50	51.07	74.00	-22.93	52.84	-1.77	Peak	273	354
7		4874.00	40.21	54.00	-13.79	35.63	4.58	Average	100	18
8		4874.00	46.61	74.00	-27.39	42.03	4.58	Peak	100	18
9		7311.00	37.61	54.00	-16.39	28.48	9.13	Average	100	161
10		7311.00	50.41	74.00	-23.59	41.28	9.13	Peak	100	161

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3:"*" is Peak / Average value of fundamental frequency

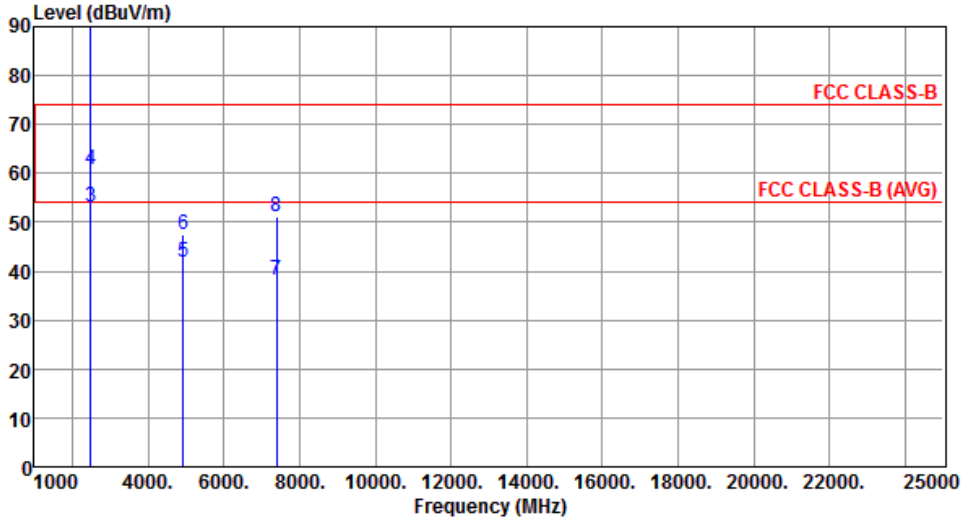
Modulation	11b	Test Freq. (MHz)	2462
Polarization	Horizontal		



		Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	*	2462.00	114.55			116.39	-1.84	Average	239	52
2	*	2462.00	117.00			118.84	-1.84	Peak	239	52
3		2483.50	53.51	54.00	-0.49	55.28	-1.77	Average	232	43
4		2483.50	61.24	74.00	-12.76	63.01	-1.77	Peak	232	43
5		4924.00	37.89	54.00	-16.11	33.22	4.67	Average	100	26
6		4924.00	46.31	74.00	-27.69	41.64	4.67	Peak	100	26
7		7386.00	37.79	54.00	-16.21	28.39	9.40	Average	100	318
8		7386.00	49.96	74.00	-24.04	40.56	9.40	Peak	100	318

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3:"*" is Peak / Average value of fundamental frequency

Modulation	11b	Test Freq. (MHz)	2462
Polarization	Vertical		

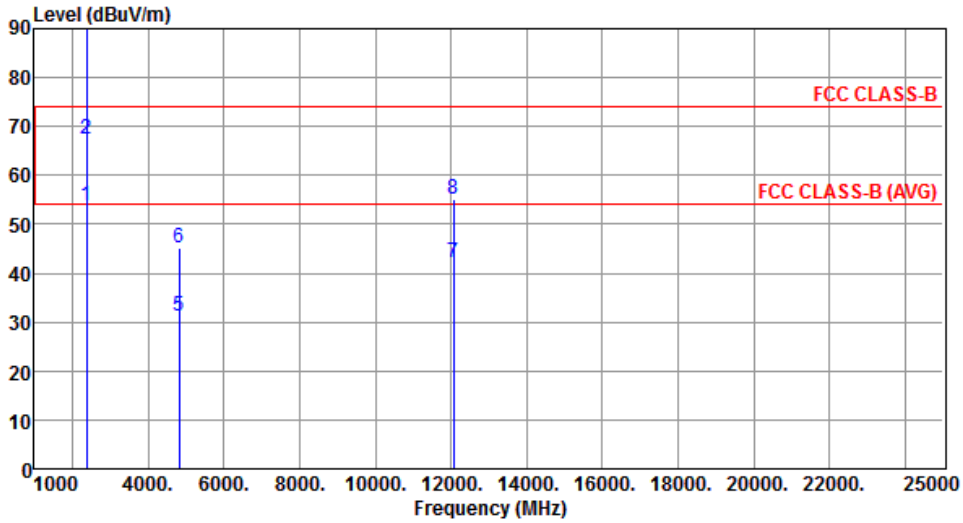


		Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	*	2462.00	113.14			114.98	-1.84	Average	217	23
2	*	2462.00	115.50			117.34	-1.84	Peak	217	23
3		2483.50	53.00	54.00	-1.00	54.77	-1.77	Average	195	25
4		2483.50	60.76	74.00	-13.24	62.53	-1.77	Peak	195	25
5		4924.00	41.73	54.00	-12.27	37.06	4.67	Average	100	355
6		4924.00	47.42	74.00	-26.58	42.75	4.67	Peak	100	355
7		7386.00	38.29	54.00	-15.71	28.89	9.40	Average	100	178
8		7386.00	51.03	74.00	-22.97	41.63	9.40	Peak	100	178

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3:"*" is Peak / Average value of fundamental frequency

3.5.6 Transmitter Radiated Unwanted Emissions (Above 1GHz) for 11g

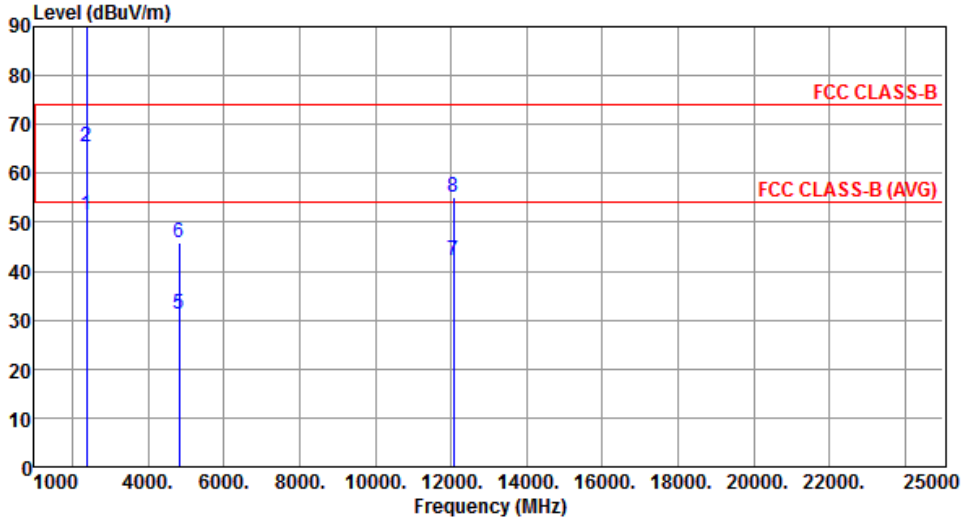
Modulation	11g	Test Freq. (MHz)	2412
Polarization	Horizontal		



		Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1		2390.00	53.70	54.00	-0.30	55.82	-2.12	Average	205	42
2		2390.00	67.44	74.00	-6.56	69.56	-2.12	Peak	205	42
3	*	2412.00	102.75			104.78	-2.03	Average	205	42
4	*	2412.00	113.29			115.32	-2.03	Peak	205	42
5		4824.00	31.13	54.00	-22.87	26.65	4.48	Average	100	143
6		4824.00	45.13	74.00	-28.87	40.65	4.48	Peak	100	143
7		12060.00	42.23	54.00	-11.77	28.57	13.66	Average	100	196
8		12060.00	54.98	74.00	-19.02	41.32	13.66	Peak	100	196

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3:"*" is Peak / Average value of fundamental frequency

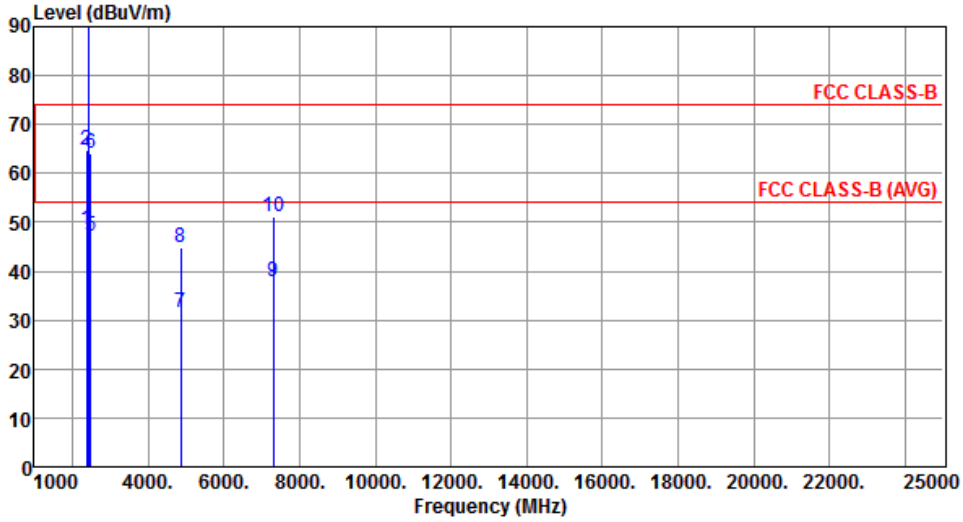
Modulation	11g	Test Freq. (MHz)	2412
Polarization	Vertical		



		Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1		2390.00	51.54	54.00	-2.46	53.66	-2.12	Average	207	16
2		2390.00	65.33	74.00	-8.67	67.45	-2.12	Peak	207	16
3	*	2412.00	101.50			103.53	-2.03	Average	207	16
4	*	2412.00	111.55			113.58	-2.03	Peak	207	16
5		4824.00	31.25	54.00	-22.75	26.77	4.48	Average	100	137
6		4824.00	45.91	74.00	-28.09	41.43	4.48	Peak	100	137
7		12060.00	42.29	54.00	-11.71	28.63	13.66	Average	100	260
8		12060.00	55.15	74.00	-18.85	41.49	13.66	Peak	100	260

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3:"*" is Peak / Average value of fundamental frequency

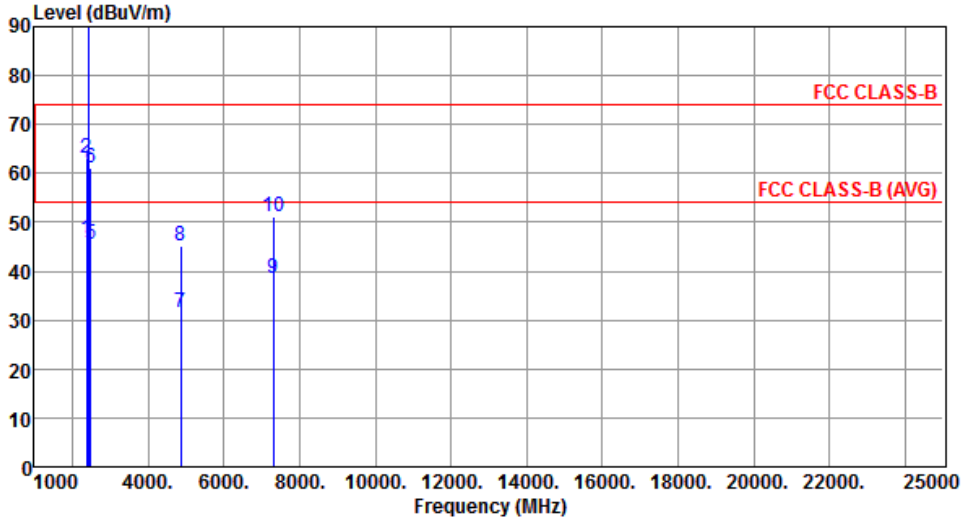
Modulation	11g	Test Freq. (MHz)	2437
Polarization	Horizontal		



		Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1		2390.00	48.41	54.00	-5.59	50.53	-2.12	Average	203	45
2		2390.00	64.72	74.00	-9.28	66.84	-2.12	Peak	203	45
3	*	2437.00	108.49			110.42	-1.93	Average	203	45
4	*	2437.00	118.09			120.02	-1.93	Peak	203	45
5		2483.50	47.08	54.00	-6.92	48.85	-1.77	Average	203	45
6		2483.50	64.12	74.00	-9.88	65.89	-1.77	Peak	203	45
7		4874.00	31.42	54.00	-22.58	26.84	4.58	Average	100	218
8		4874.00	44.99	74.00	-29.01	40.41	4.58	Peak	100	218
9		7311.00	37.70	54.00	-16.30	28.57	9.13	Average	100	113
10		7311.00	51.20	74.00	-22.80	42.07	9.13	Peak	100	113

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3:"*" is Peak / Average value of fundamental frequency

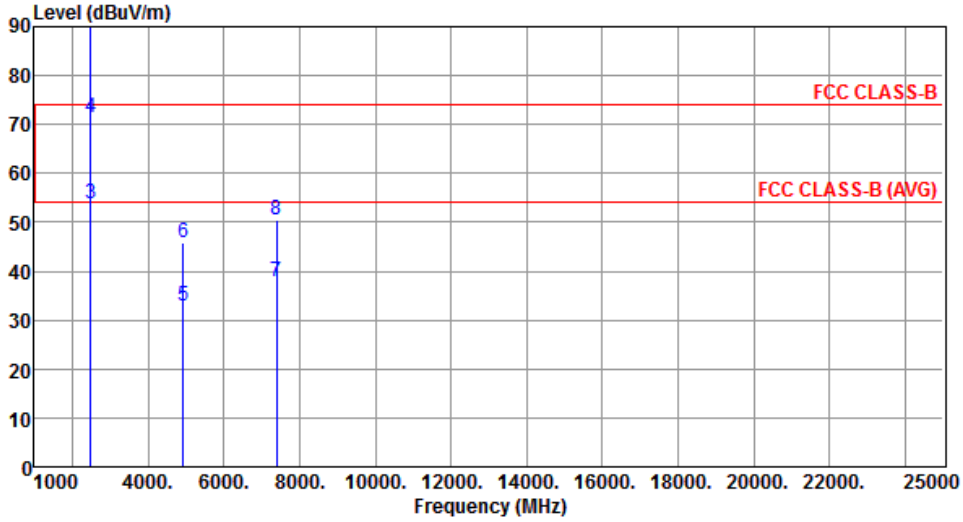
Modulation	11g	Test Freq. (MHz)	2437
Polarization	Vertical		



		Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1		2390.00	46.50	54.00	-7.50	48.62	-2.12	Average	247	14
2		2390.00	63.00	74.00	-11.00	65.12	-2.12	Peak	247	14
3	*	2437.00	105.36			107.29	-1.93	Average	247	14
4	*	2437.00	115.58			117.51	-1.93	Peak	247	14
5		2483.50	45.36	54.00	-8.64	47.13	-1.77	Average	247	14
6		2483.50	61.02	74.00	-12.98	62.79	-1.77	Peak	247	14
7		4874.00	31.48	54.00	-22.52	26.90	4.58	Average	100	135
8		4874.00	45.23	74.00	-28.77	40.65	4.58	Peak	100	135
9		7311.00	38.58	54.00	-15.42	29.45	9.13	Average	100	192
10		7311.00	51.19	74.00	-22.81	42.06	9.13	Peak	100	192

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3:"*" is Peak / Average value of fundamental frequency

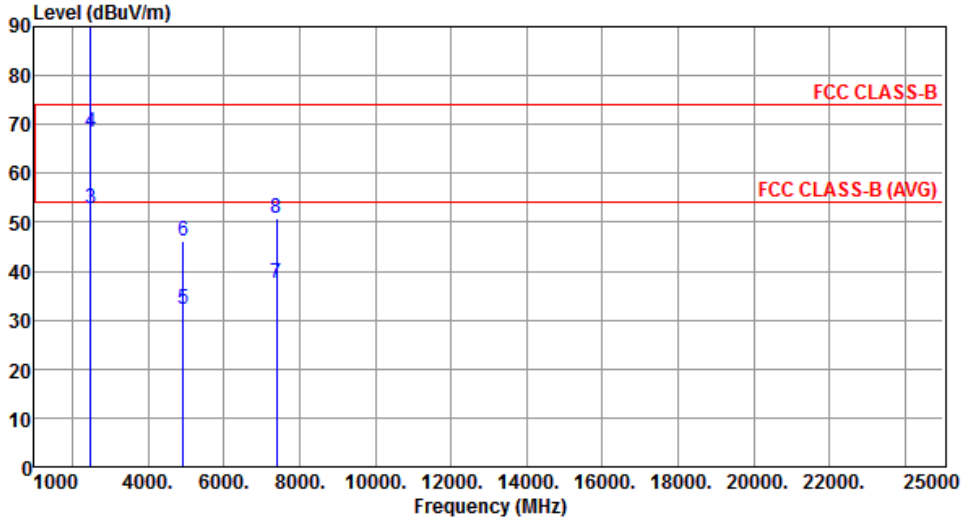
Modulation	11g	Test Freq. (MHz)	2462
Polarization	Horizontal		



		Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	*	2462.00	103.71			105.55	-1.84	Average	191	47
2	*	2462.00	113.44			115.28	-1.84	Peak	191	47
3		2483.50	53.84	54.00	-0.16	55.61	-1.77	Average	191	47
4		2483.50	71.54	74.00	-2.46	73.31	-1.77	Peak	191	47
5		4924.00	32.83	54.00	-21.17	28.16	4.67	Average	100	175
6		4924.00	45.72	74.00	-28.28	41.05	4.67	Peak	100	175
7		7386.00	37.73	54.00	-16.27	28.33	9.40	Average	100	161
8		7386.00	50.64	74.00	-23.36	41.24	9.40	Peak	100	161

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3:"*" is Peak / Average value of fundamental frequency

Modulation	11g	Test Freq. (MHz)	2462
Polarization	Vertical		

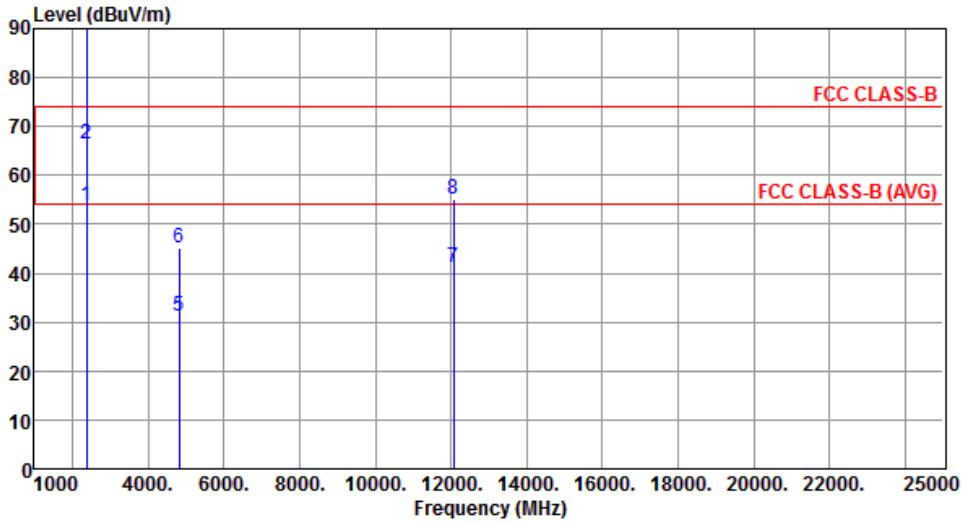


		Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	*	2462.00	103.58			105.42	-1.84	Average	175	348
2	*	2462.00	113.09			114.93	-1.84	Peak	175	348
3		2483.50	52.94	54.00	-1.06	54.71	-1.77	Average	175	348
4		2483.50	68.53	74.00	-5.47	70.30	-1.77	Peak	175	348
5		4924.00	32.30	54.00	-21.70	27.63	4.67	Average	100	156
6		4924.00	46.14	74.00	-27.86	41.47	4.67	Peak	100	156
7		7386.00	37.64	54.00	-16.36	28.24	9.40	Average	100	35
8		7386.00	50.88	74.00	-23.12	41.48	9.40	Peak	100	35

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3:"*" is Peak / Average value of fundamental frequency

3.5.7 Transmitter Radiated Unwanted Emissions (Above 1GHz) for HT20

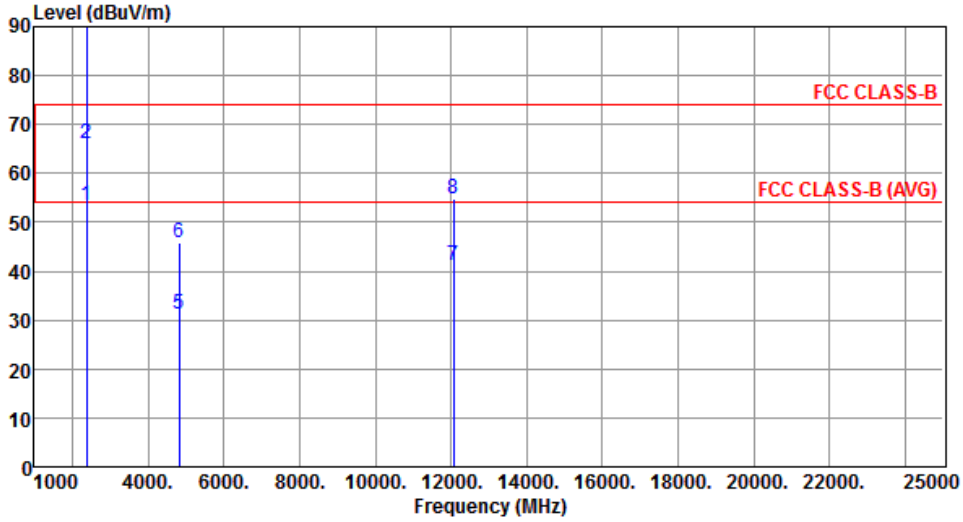
Modulation	HT20	**Test Freq. (MHz)**	2412
Polarization	Horizontal		



		Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1		2390.00	53.79	54.00	-0.21	55.91	-2.12	Average	190	46
2		2390.00	66.50	74.00	-7.50	68.62	-2.12	Peak	190	46
3	*	2412.00	101.57			103.60	-2.03	Average	190	46
4	*	2412.00	110.70			112.73	-2.03	Peak	190	46
5		4824.00	31.20	54.00	-22.80	26.72	4.48	Average	100	134
6		4824.00	45.11	74.00	-28.89	40.63	4.48	Peak	100	134
7		12060.00	41.22	54.00	-12.78	27.56	13.66	Average	100	142
8		12060.00	54.98	74.00	-19.02	41.32	13.66	Peak	100	142

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3:"*" is Peak / Average value of fundamental frequency

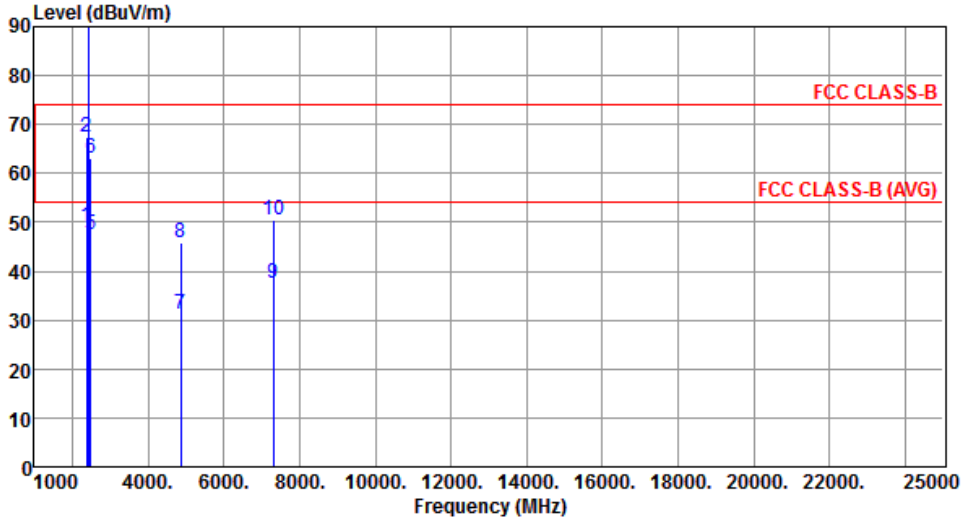
Modulation	HT20	Test Freq. (MHz)	2412
Polarization	Vertical		



		Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1		2390.00	53.51	54.00	-0.49	55.63	-2.12	Average	183	13
2		2390.00	66.18	74.00	-7.82	68.30	-2.12	Peak	183	13
3	*	2412.00	101.46			103.49	-2.03	Average	183	13
4	*	2412.00	110.61			112.64	-2.03	Peak	183	13
5		4824.00	31.09	54.00	-22.91	26.61	4.48	Average	100	148
6		4824.00	45.70	74.00	-28.30	41.22	4.48	Peak	100	148
7		12060.00	41.29	54.00	-12.71	27.63	13.66	Average	100	131
8		12060.00	54.92	74.00	-19.08	41.26	13.66	Peak	100	131

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3:"*" is Peak / Average value of fundamental frequency

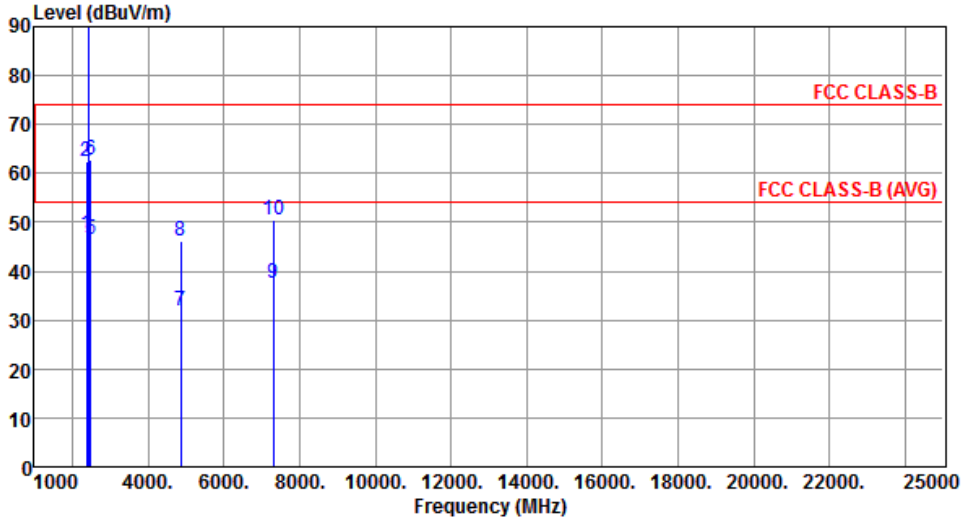
Modulation	HT20	Test Freq. (MHz)	2437
Polarization	Horizontal		



		Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1		2390.00	49.17	54.00	-4.83	51.29	-2.12	Average	209	50
2		2390.00	67.45	74.00	-6.55	69.57	-2.12	Peak	209	50
3	*	2437.00	108.34			110.27	-1.93	Average	209	50
4	*	2437.00	117.69			119.62	-1.93	Peak	209	50
5		2483.50	47.54	54.00	-6.46	49.31	-1.77	Average	209	50
6		2483.50	63.08	74.00	-10.92	64.85	-1.77	Peak	209	50
7		4874.00	31.23	54.00	-22.77	26.65	4.58	Average	100	183
8		4874.00	45.83	74.00	-28.17	41.25	4.58	Peak	100	183
9		7311.00	37.48	54.00	-16.52	28.35	9.13	Average	100	142
10		7311.00	50.41	74.00	-23.59	41.28	9.13	Peak	100	142

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3:"*" is Peak / Average value of fundamental frequency

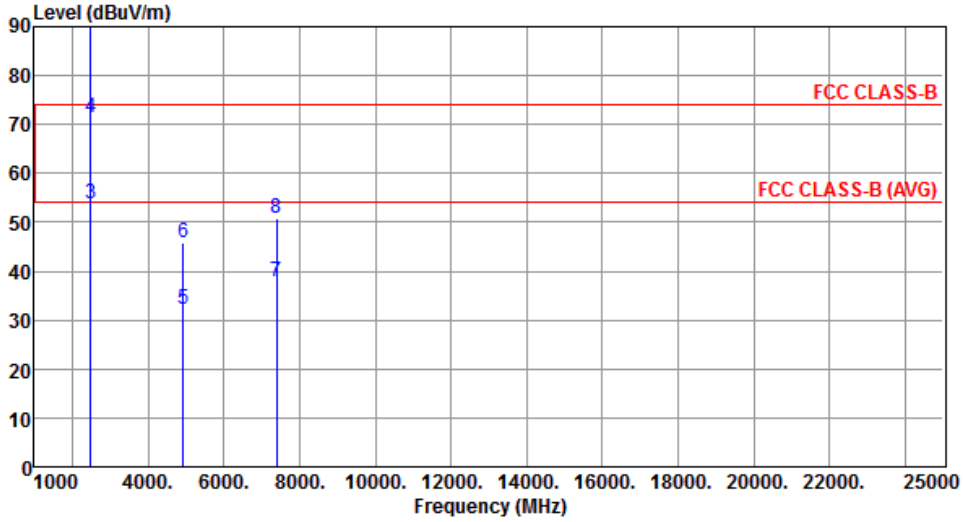
Modulation	HT20	Test Freq. (MHz)	2437
Polarization	Vertical		



		Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1		2390.00	47.49	54.00	-6.51	49.61	-2.12	Average	226	17
2		2390.00	62.29	74.00	-11.71	64.41	-2.12	Peak	226	17
3	*	2437.00	106.59			108.52	-1.93	Average	226	17
4	*	2437.00	116.30			118.23	-1.93	Peak	226	17
5		2483.50	46.47	54.00	-7.53	48.24	-1.77	Average	226	17
6		2483.50	62.76	74.00	-11.24	64.53	-1.77	Peak	226	17
7		4874.00	31.97	54.00	-22.03	27.39	4.58	Average	100	119
8		4874.00	46.14	74.00	-27.86	41.56	4.58	Peak	100	119
9		7311.00	37.47	54.00	-16.53	28.34	9.13	Average	100	165
10		7311.00	50.36	74.00	-23.64	41.23	9.13	Peak	100	165

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3:"*" is Peak / Average value of fundamental frequency

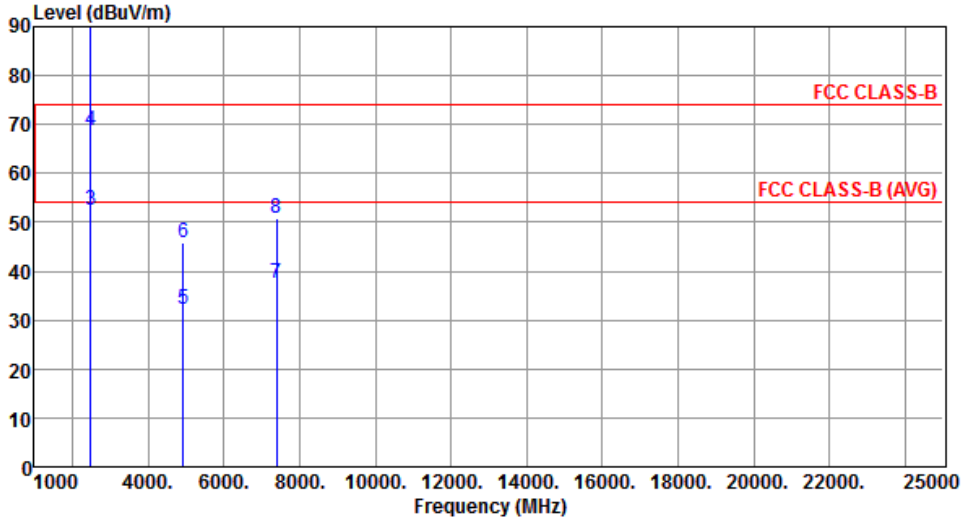
Modulation	HT20	Test Freq. (MHz)	2462
Polarization	Horizontal		



		Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	*	2462.00	103.37			105.21	-1.84	Average	234	54
2	*	2462.00	113.10			114.94	-1.84	Peak	234	54
3		2483.50	53.83	54.00	-0.17	55.60	-1.77	Average	234	54
4		2483.50	71.33	74.00	-2.67	73.10	-1.77	Peak	234	54
5		4924.00	32.29	54.00	-21.71	27.62	4.67	Average	100	263
6		4924.00	45.92	74.00	-28.08	41.25	4.67	Peak	100	263
7		7386.00	37.75	54.00	-16.25	28.35	9.40	Average	100	148
8		7386.00	50.84	74.00	-23.16	41.44	9.40	Peak	100	148

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3:"*" is Peak / Average value of fundamental frequency

Modulation	HT20	Test Freq. (MHz)	2462
Polarization	Vertical		

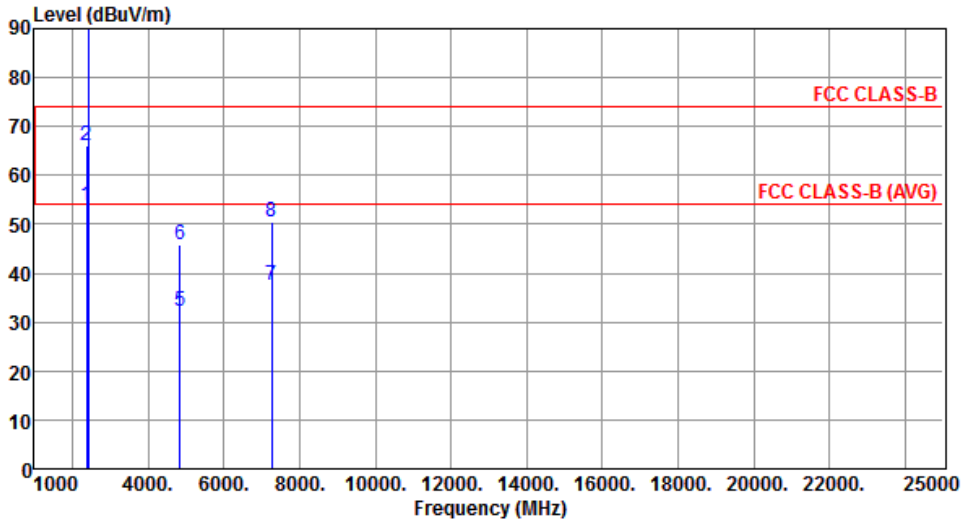


		Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	*	2462.00	101.80			103.64	-1.84	Average	174	13
2	*	2462.00	111.38			113.22	-1.84	Peak	174	13
3		2483.50	52.39	54.00	-1.61	54.16	-1.77	Average	174	13
4		2483.50	68.90	74.00	-5.10	70.67	-1.77	Peak	174	13
5		4924.00	32.15	54.00	-21.85	27.48	4.67	Average	100	163
6		4924.00	45.92	74.00	-28.08	41.25	4.67	Peak	100	163
7		7386.00	37.64	54.00	-16.36	28.24	9.40	Average	100	162
8		7386.00	50.78	74.00	-23.22	41.38	9.40	Peak	100	162

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3:"*" is Peak / Average value of fundamental frequency

3.5.8 Transmitter Radiated Unwanted Emissions (Above 1GHz) for HT40

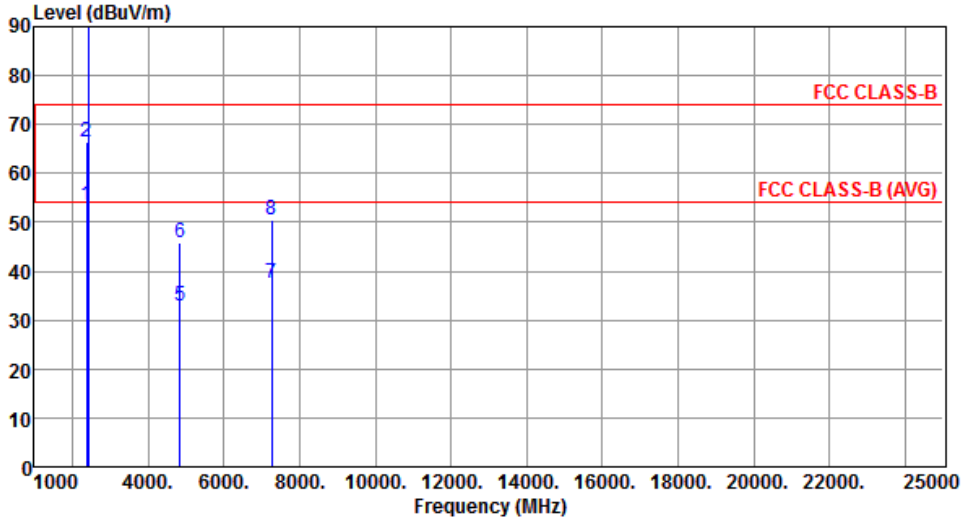
Modulation	HT40	**Test Freq. (MHz)**	2422
Polarization	Horizontal		



		Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1		2390.00	53.89	54.00	-0.11	56.01	-2.12	Average	211	52
2		2390.00	65.99	74.00	-8.01	68.11	-2.12	Peak	211	52
3	*	2422.00	95.22			97.21	-1.99	Average	211	52
4	*	2422.00	105.13			107.12	-1.99	Peak	211	52
5		4844.00	32.08	54.00	-21.92	27.57	4.51	Average	100	144
6		4844.00	45.83	74.00	-28.17	41.32	4.51	Peak	100	144
7		7266.00	37.59	54.00	-16.41	28.62	8.97	Average	100	61
8		7266.00	50.45	74.00	-23.55	41.48	8.97	Peak	100	61

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3:"*" is Peak / Average value of fundamental frequency

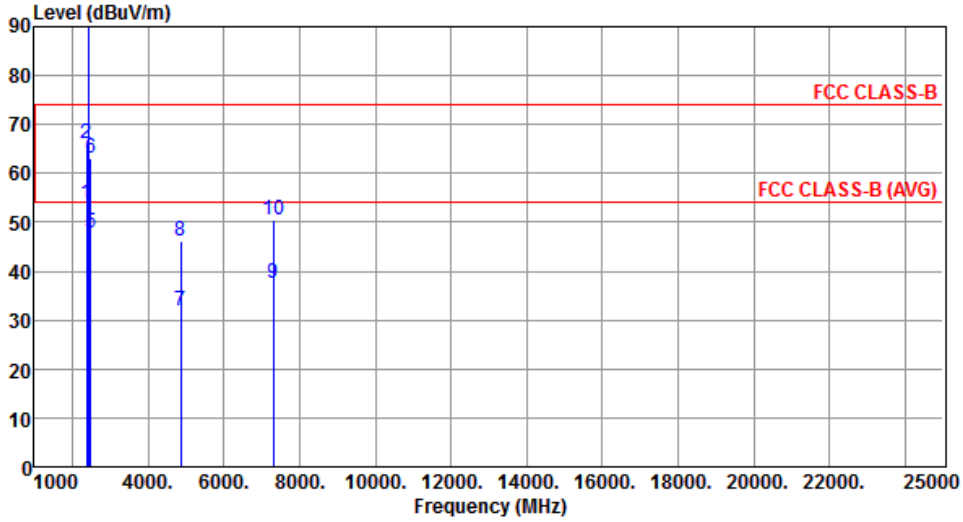
Modulation	HT40	Test Freq. (MHz)	2422
Polarization	Vertical		



		Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1		2390.00	53.41	54.00	-0.59	55.53	-2.12	Average	182	12
2		2390.00	66.37	74.00	-7.63	68.49	-2.12	Peak	182	12
3	*	2422.00	93.93			95.92	-1.99	Average	182	12
4	*	2422.00	103.05			105.04	-1.99	Peak	182	12
5		4844.00	32.87	54.00	-21.13	28.36	4.51	Average	100	242
6		4844.00	45.83	74.00	-28.17	41.32	4.51	Peak	100	242
7		7266.00	37.68	54.00	-16.32	28.71	8.97	Average	100	138
8		7266.00	50.45	74.00	-23.55	41.48	8.97	Peak	100	138

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3:"*" is Peak / Average value of fundamental frequency

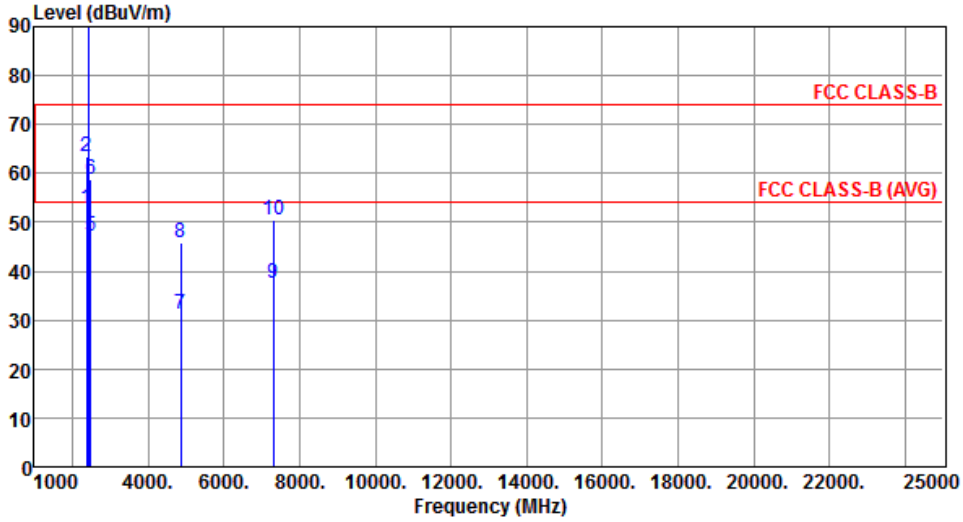
Modulation	HT40	Test Freq. (MHz)	2437
Polarization	Horizontal		



		Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1		2390.00	53.90	54.00	-0.10	56.02	-2.12	Average	239	52
2		2390.00	65.98	74.00	-8.02	68.10	-2.12	Peak	239	52
3	*	2437.00	100.41			102.34	-1.93	Average	239	52
4	*	2437.00	109.99			111.92	-1.93	Peak	239	52
5		2483.50	47.80	54.00	-6.20	49.57	-1.77	Average	239	52
6		2483.50	63.07	74.00	-10.93	64.84	-1.77	Peak	239	52
7		4874.00	32.01	54.00	-21.99	27.43	4.58	Average	100	158
8		4874.00	46.20	74.00	-27.80	41.62	4.58	Peak	100	158
9		7311.00	37.57	54.00	-16.43	28.44	9.13	Average	100	122
10		7311.00	50.44	74.00	-23.56	41.31	9.13	Peak	100	122

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3:"*" is Peak / Average value of fundamental frequency

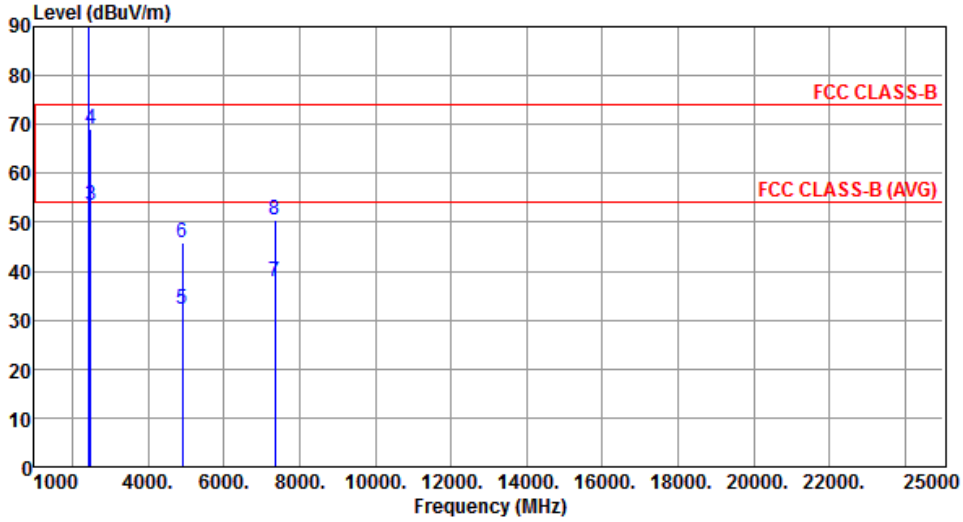
Modulation	HT40	Test Freq. (MHz)	2437
Polarization	Vertical		



		Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1		2390.00	52.82	54.00	-1.18	54.94	-2.12	Average	185	19
2		2390.00	63.45	74.00	-10.55	65.57	-2.12	Peak	185	19
3	*	2437.00	97.78			99.71	-1.93	Average	185	19
4	*	2437.00	106.89			108.82	-1.93	Peak	185	19
5		2483.50	47.00	54.00	-7.00	48.77	-1.77	Average	185	19
6		2483.50	58.79	74.00	-15.21	60.56	-1.77	Peak	185	19
7		4874.00	31.23	54.00	-22.77	26.65	4.58	Average	100	125
8		4874.00	45.89	74.00	-28.11	41.31	4.58	Peak	100	125
9		7311.00	37.44	54.00	-16.56	28.31	9.13	Average	100	162
10		7311.00	50.61	74.00	-23.39	41.48	9.13	Peak	100	162

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3:"*" is Peak / Average value of fundamental frequency

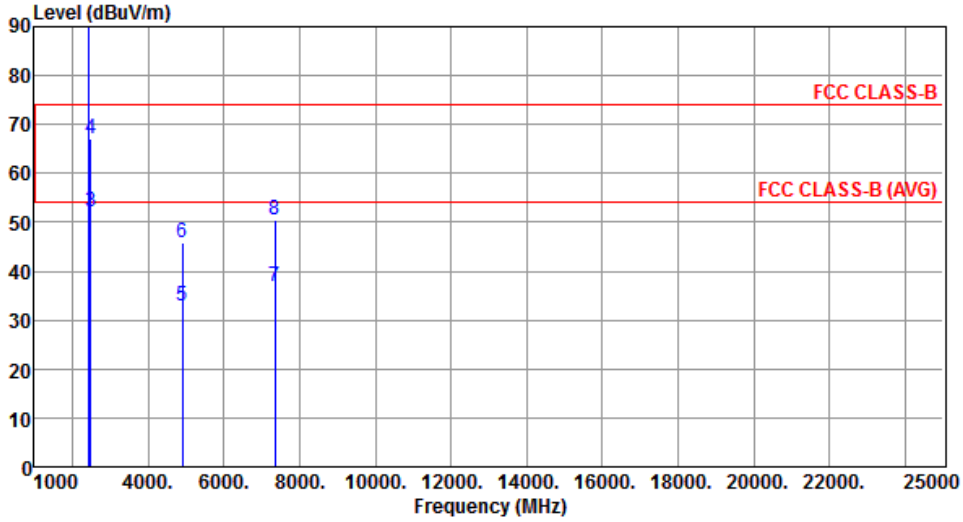
Modulation	HT40	Test Freq. (MHz)	2452
Polarization	Horizontal		



		Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	*	2452.00	99.18			101.06	-1.88	Average	235	55
2	*	2452.00	109.34			111.22	-1.88	Peak	235	55
3		2483.50	53.58	54.00	-0.42	55.35	-1.77	Average	235	55
4		2483.50	69.01	74.00	-4.99	70.78	-1.77	Peak	235	55
5		4904.00	32.19	54.00	-21.81	27.56	4.63	Average	100	147
6		4904.00	45.84	74.00	-28.16	41.21	4.63	Peak	100	147
7		7356.00	37.91	54.00	-16.09	28.62	9.29	Average	100	152
8		7356.00	50.60	74.00	-23.40	41.31	9.29	Peak	100	152

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3:"*" is Peak / Average value of fundamental frequency

Modulation	HT40	Test Freq. (MHz)	2452
Polarization	Vertical		



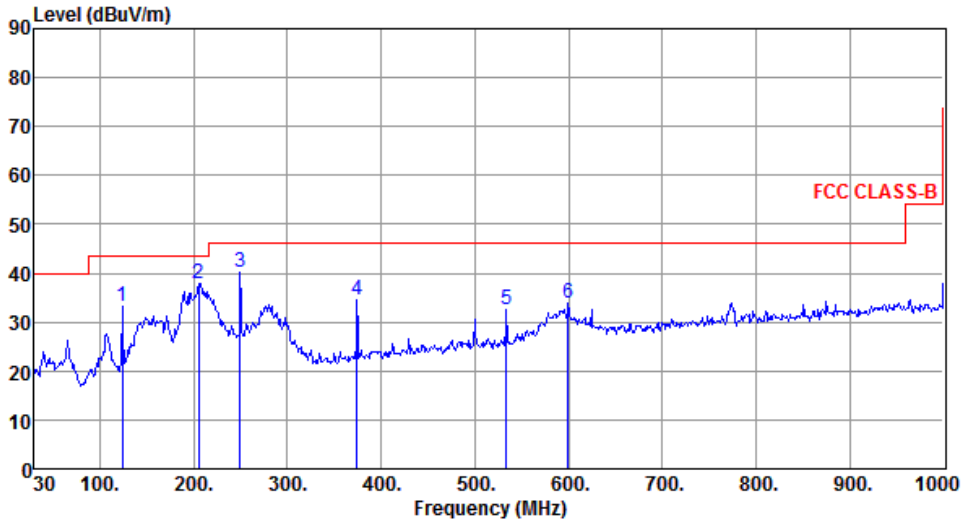
		Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	*	2452.00	97.53			99.41	-1.88	Average	192	0
2	*	2452.00	107.01			108.89	-1.88	Peak	192	0
3		2483.50	51.99	54.00	-2.01	53.76	-1.77	Average	192	0
4		2483.50	67.16	74.00	-6.84	68.93	-1.77	Peak	192	0
5		4904.00	32.87	54.00	-21.13	28.24	4.63	Average	100	145
6		4904.00	45.93	74.00	-28.07	41.30	4.63	Peak	100	145
7		7356.00	36.92	54.00	-17.08	27.63	9.29	Average	100	132
8		7356.00	50.54	74.00	-23.46	41.25	9.29	Peak	100	132

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3:"*" is Peak / Average value of fundamental frequency

Beamforming mode

3.5.9 Transmitter Radiated Unwanted Emissions (Below 1GHz)

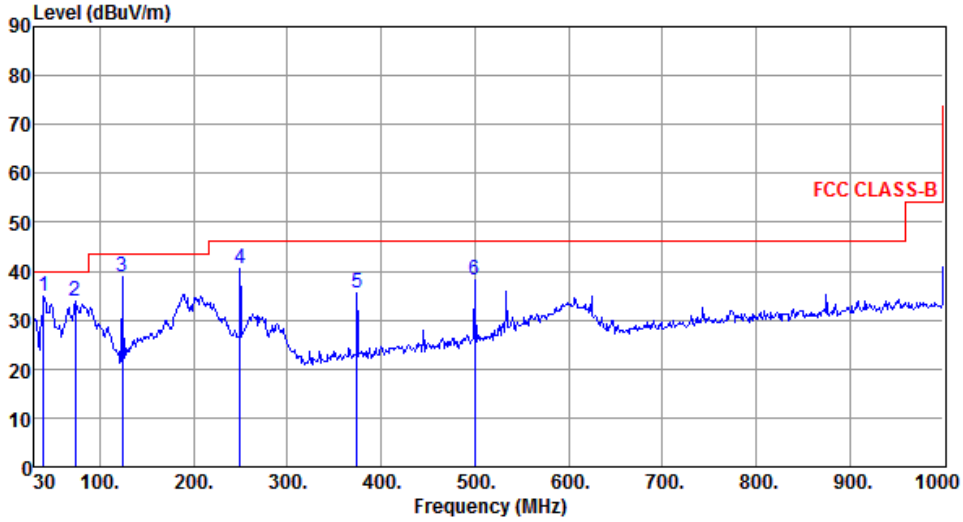
Modulation	HT20	**Test Freq. (MHz)**	2437
Polarization	Horizontal	**Test Configuration**	1



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	124.09	33.07	43.50	-10.43	43.68	-10.61	Peak	---	---
2	205.57	37.93	43.50	-5.57	49.07	-11.14	Peak	---	---
3	249.22	40.30	46.00	-5.70	49.73	-9.43	Peak	---	---
4	374.35	34.52	46.00	-11.48	40.50	-5.98	Peak	---	---
5	533.43	32.46	46.00	-13.54	35.02	-2.56	Peak	---	---
6	599.39	33.84	46.00	-12.16	34.77	-0.93	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

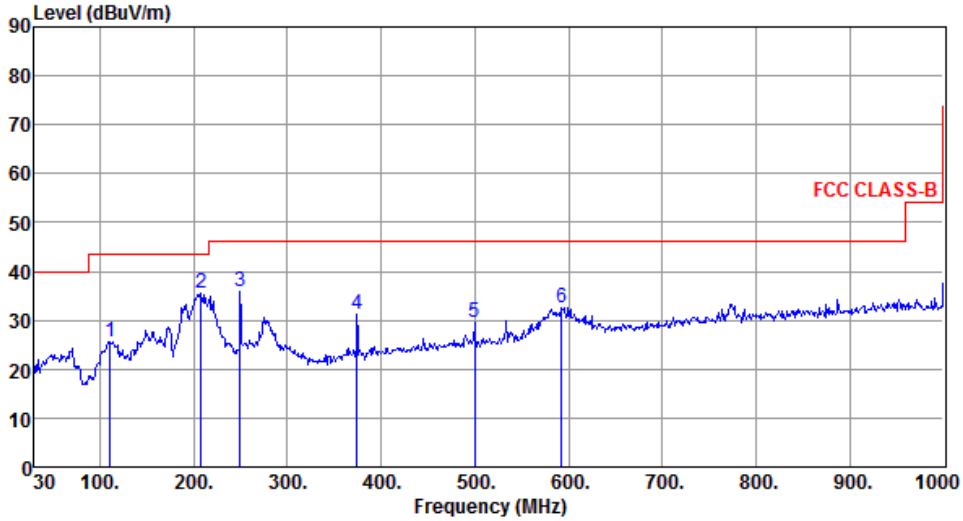
Modulation	HT20	Test Freq. (MHz)	2437
Polarization	Vertical	Test Configuration	1



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	39.70	34.73	40.00	-5.27	43.47	-8.74	Peak	---	---
2	73.65	33.80	40.00	-6.20	45.45	-11.65	Peak	---	---
3	124.09	38.75	43.50	-4.75	49.36	-10.61	Peak	---	---
4	249.22	40.53	46.00	-5.47	49.96	-9.43	Peak	---	---
5	374.35	35.43	46.00	-10.57	41.41	-5.98	Peak	---	---
6	499.48	38.09	46.00	-7.91	41.34	-3.25	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

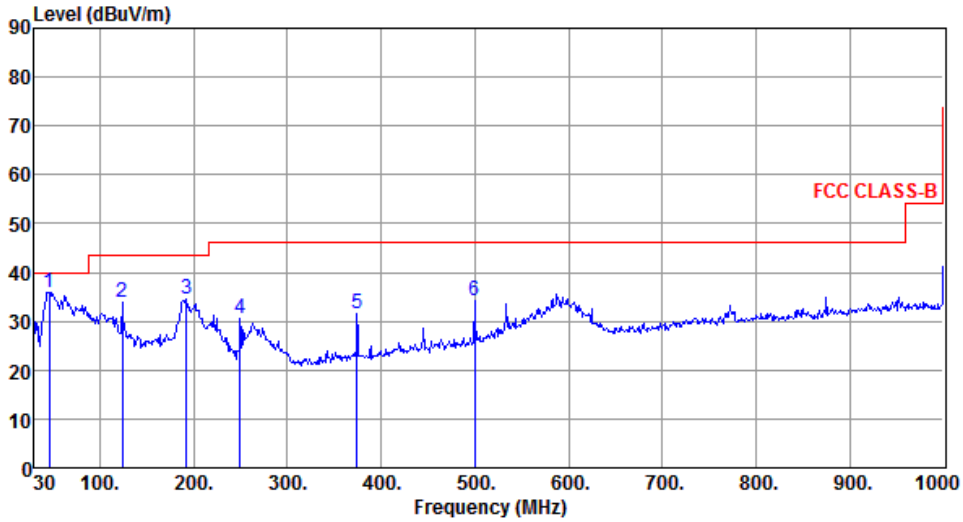
Modulation	HT20	Test Freq. (MHz)	2437
Polarization	Horizontal	Test Configuration	2



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	110.51	25.73	43.50	-17.77	37.51	-11.78	Peak	---	---
2	207.51	35.47	43.50	-8.03	46.58	-11.11	Peak	---	---
3	249.22	36.01	46.00	-9.99	45.44	-9.43	Peak	---	---
4	374.35	31.10	46.00	-14.90	37.08	-5.98	Peak	---	---
5	499.48	29.53	46.00	-16.47	32.78	-3.25	Peak	---	---
6	592.60	32.71	46.00	-13.29	33.82	-1.11	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

Modulation	HT20	Test Freq. (MHz)	2437
Polarization	Vertical	Test Configuration	2

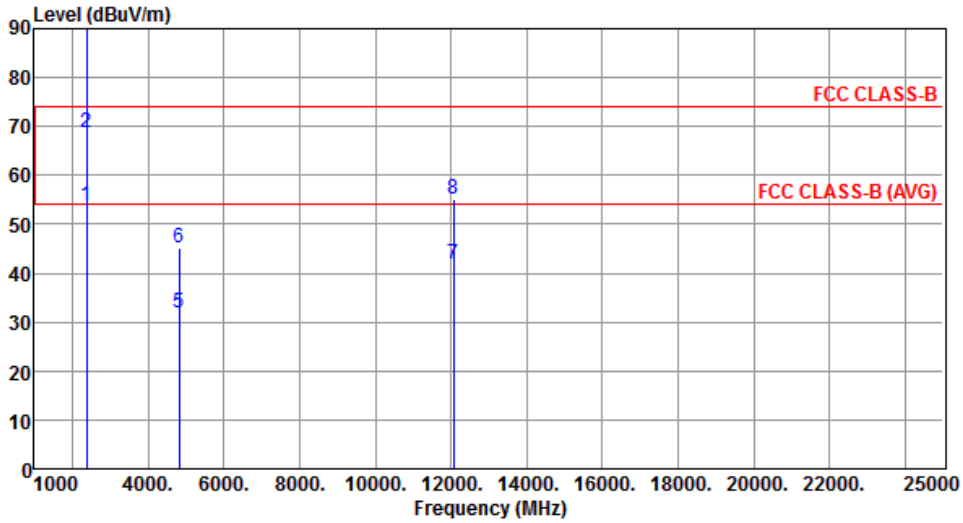


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	45.52	36.00	40.00	-4.00	44.34	-8.34	Peak	---	---
2	124.09	34.03	43.50	-9.47	44.64	-10.61	Peak	---	---
3	191.99	34.63	43.50	-8.87	45.54	-10.91	Peak	---	---
4	249.22	30.39	46.00	-15.61	39.82	-9.43	Peak	---	---
5	374.35	31.39	46.00	-14.61	37.37	-5.98	Peak	---	---
6	499.48	34.14	46.00	-11.86	37.39	-3.25	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

3.5.10 Transmitter Radiated Unwanted Emissions (Above 1GHz) for HT20

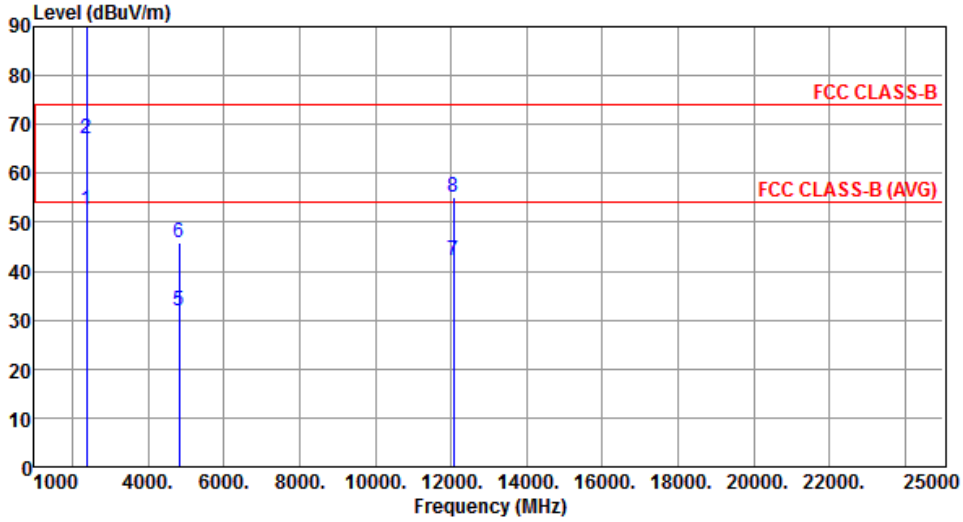
Modulation	HT20	**Test Freq. (MHz)**	2412
Polarization	Horizontal		



		Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1		2390.00	53.77	54.00	-0.23	55.89	-2.12	Average	189	58
2		2390.00	68.62	74.00	-5.38	70.74	-2.12	Peak	189	58
3	*	2412.00	100.46			102.49	-2.03	Average	189	58
4	*	2412.00	112.46			114.49	-2.03	Peak	189	58
5		4824.00	32.01	54.00	-21.99	27.53	4.48	Average	100	156
6		4824.00	45.09	74.00	-28.91	40.61	4.48	Peak	100	156
7		12060.00	41.90	54.00	-12.10	28.24	13.66	Average	100	193
8		12060.00	55.11	74.00	-18.89	41.45	13.66	Peak	100	193

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3:"*" is Peak / Average value of fundamental frequency

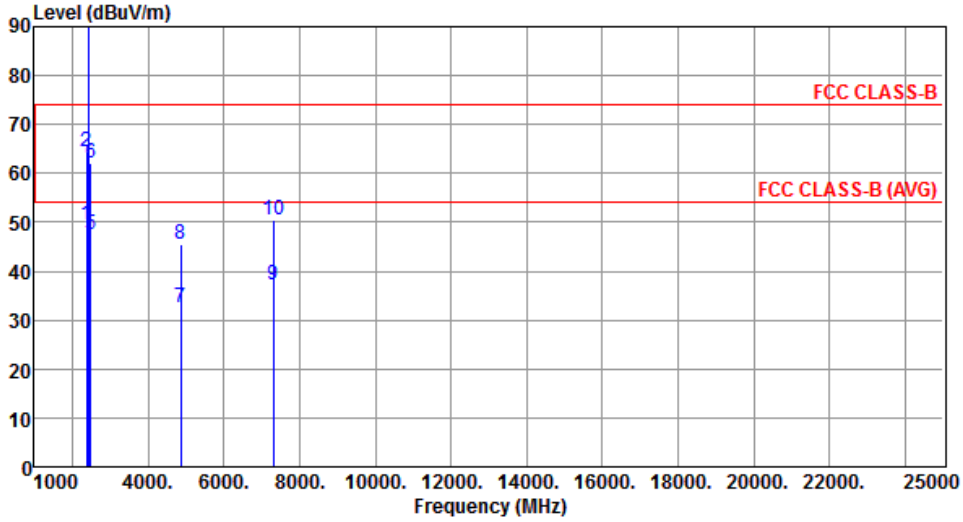
Modulation	HT20	Test Freq. (MHz)	2412
Polarization	Vertical		



		Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1		2390.00	52.33	54.00	-1.67	54.45	-2.12	Average	197	0
2		2390.00	67.10	74.00	-6.90	69.22	-2.12	Peak	197	0
3	*	2412.00	99.33			101.36	-2.03	Average	197	0
4	*	2412.00	111.20			113.23	-2.03	Peak	197	0
5		4824.00	31.74	54.00	-22.26	27.26	4.48	Average	100	154
6		4824.00	45.79	74.00	-28.21	41.31	4.48	Peak	100	154
7		12060.00	42.22	54.00	-11.78	28.56	13.66	Average	100	205
8		12060.00	54.98	74.00	-19.02	41.32	13.66	Peak	100	205

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3:"*" is Peak / Average value of fundamental frequency

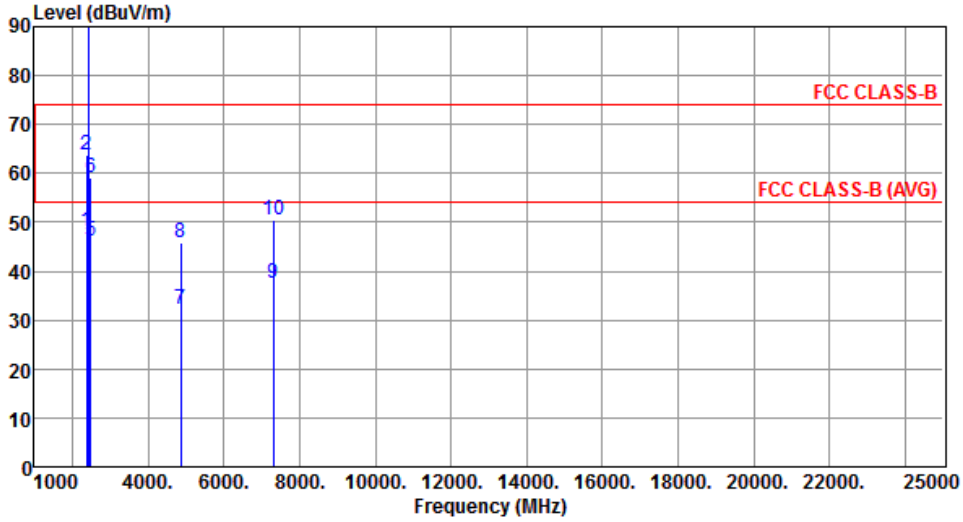
Modulation	HT20	Test Freq. (MHz)	2437
Polarization	Horizontal		



		Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1		2390.00	49.45	54.00	-4.55	51.57	-2.12	Average	100	300
2		2390.00	64.43	74.00	-9.57	66.55	-2.12	Peak	100	300
3	*	2437.00	107.64			109.57	-1.93	Average	100	300
4	*	2437.00	118.80			120.73	-1.93	Peak	100	300
5		2483.50	47.57	54.00	-6.43	49.34	-1.77	Average	100	300
6		2483.50	62.04	74.00	-11.96	63.81	-1.77	Peak	100	300
7		4874.00	32.70	54.00	-21.30	28.12	4.58	Average	100	135
8		4874.00	45.63	74.00	-28.37	41.05	4.58	Peak	100	135
9		7311.00	37.11	54.00	-16.89	27.98	9.13	Average	100	245
10		7311.00	50.38	74.00	-23.62	41.25	9.13	Peak	100	245

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3:"*" is Peak / Average value of fundamental frequency

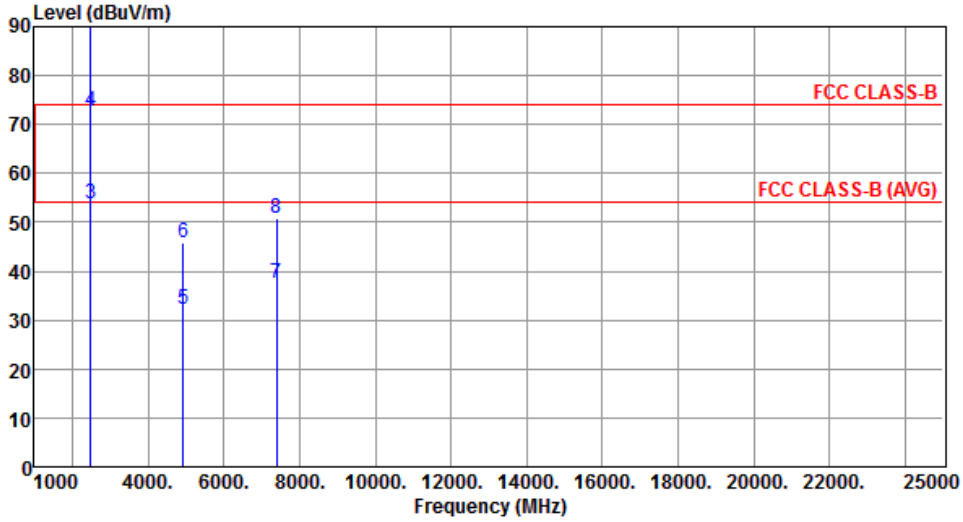
Modulation	HT20	Test Freq. (MHz)	2437
Polarization	Vertical		



		Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1		2390.00	48.02	54.00	-5.98	50.14	-2.12	Average	224	15
2		2390.00	63.76	74.00	-10.24	65.88	-2.12	Peak	224	15
3	*	2437.00	107.29			109.22	-1.93	Average	224	15
4	*	2437.00	118.80			120.73	-1.93	Peak	224	15
5		2483.50	46.28	54.00	-7.72	48.05	-1.77	Average	224	15
6		2483.50	59.26	74.00	-14.74	61.03	-1.77	Peak	224	15
7		4874.00	32.24	54.00	-21.76	27.66	4.58	Average	100	156
8		4874.00	45.79	74.00	-28.21	41.21	4.58	Peak	100	156
9		7311.00	37.69	54.00	-16.31	28.56	9.13	Average	100	145
10		7311.00	50.44	74.00	-23.56	41.31	9.13	Peak	100	145

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3:"*" is Peak / Average value of fundamental frequency

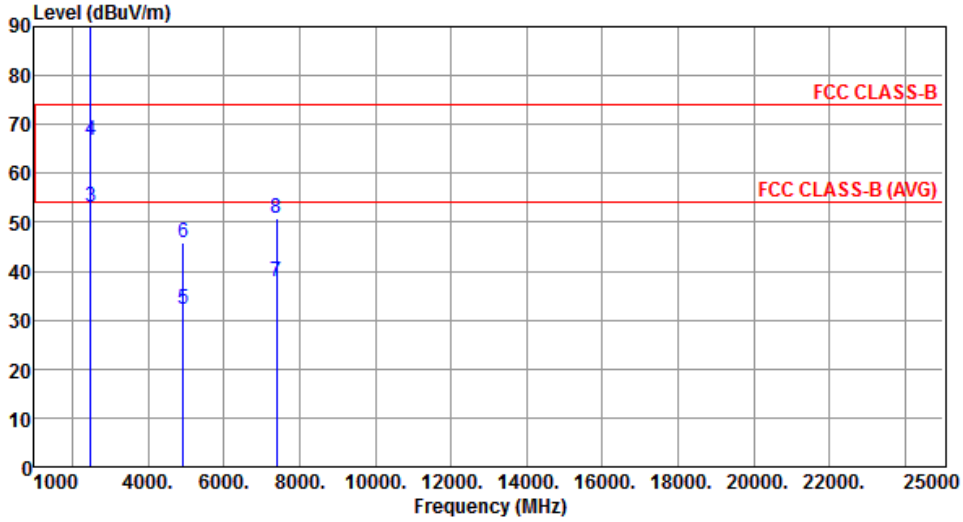
Modulation	HT20	Test Freq. (MHz)	2462
Polarization	Horizontal		



		Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	*	2462.00	100.44			102.28	-1.84	Average	190	53
2	*	2462.00	112.25			114.09	-1.84	Peak	190	53
3		2483.50	53.82	54.00	-0.18	55.59	-1.77	Average	190	53
4		2483.50	72.85	74.00	-1.15	74.62	-1.77	Peak	190	53
5		4924.00	32.12	54.00	-21.88	27.45	4.67	Average	100	143
6		4924.00	45.89	74.00	-28.11	41.22	4.67	Peak	100	143
7		7386.00	37.65	54.00	-16.35	28.25	9.40	Average	100	165
8		7386.00	50.73	74.00	-23.27	41.33	9.40	Peak	100	165

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3:"*" is Peak / Average value of fundamental frequency

Modulation	HT20	Test Freq. (MHz)	2462
Polarization	Vertical		

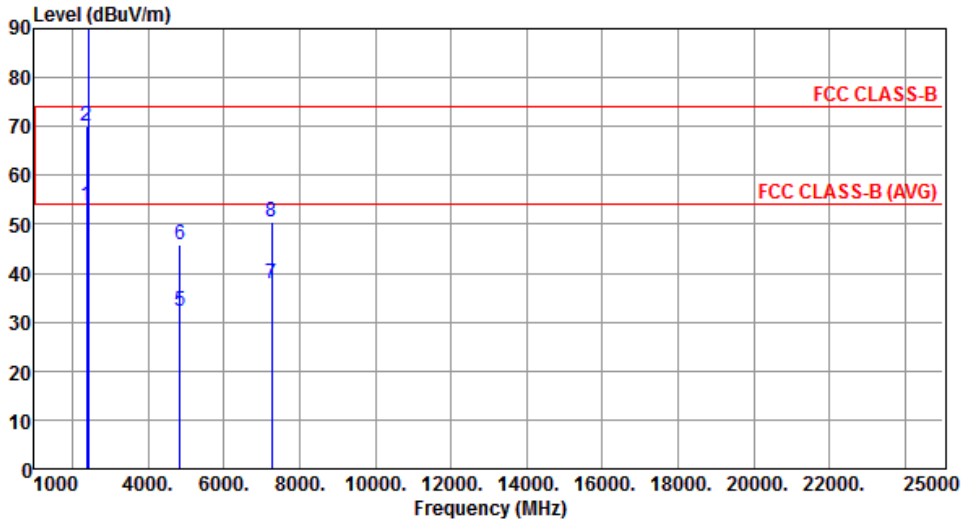


		Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	*	2462.00	99.68			101.52	-1.84	Average	188	359
2	*	2462.00	101.53			103.37	-1.84	Peak	188	359
3		2483.50	53.16	54.00	-0.84	54.93	-1.77	Average	188	359
4		2483.50	66.64	74.00	-7.36	68.41	-1.77	Peak	188	359
5		4924.00	32.22	54.00	-21.78	27.55	4.67	Average	100	154
6		4924.00	45.98	74.00	-28.02	41.31	4.67	Peak	100	154
7		7386.00	37.91	54.00	-16.09	28.51	9.40	Average	100	148
8		7386.00	50.79	74.00	-23.21	41.39	9.40	Peak	100	148

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3:"*" is Peak / Average value of fundamental frequency

3.5.11 Transmitter Radiated Unwanted Emissions (Above 1GHz) for HT40

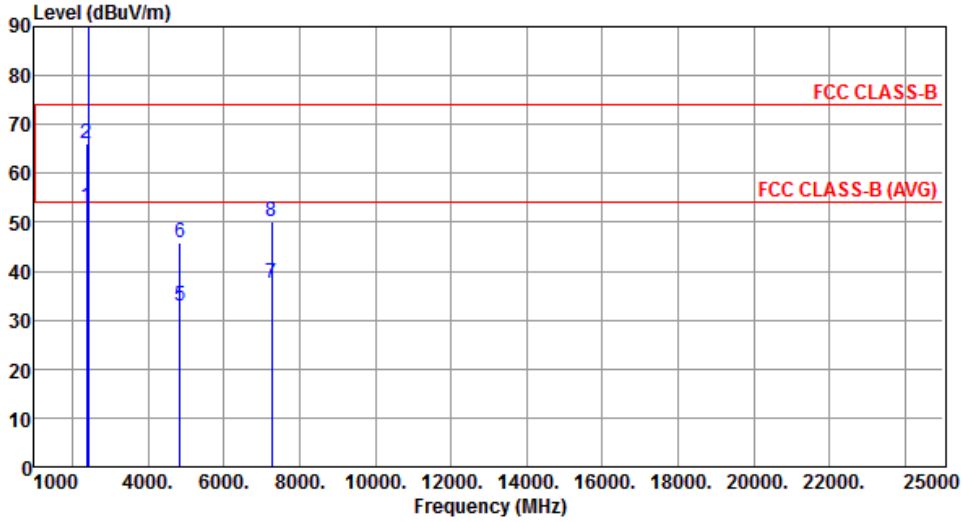
Modulation	HT40	**Test Freq. (MHz)**	2422
Polarization	Horizontal		



		Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1		2390.00	53.82	54.00	-0.18	55.94	-2.12	Average	178	48
2		2390.00	69.96	74.00	-4.04	72.08	-2.12	Peak	178	48
3	*	2422.00	95.90			97.89	-1.99	Average	178	48
4	*	2422.00	108.44			110.43	-1.99	Peak	178	48
5		4844.00	32.16	54.00	-21.84	27.65	4.51	Average	105	152
6		4844.00	45.98	74.00	-28.02	41.47	4.51	Peak	105	152
7		7266.00	37.81	54.00	-16.19	28.84	8.97	Average	105	162
8		7266.00	50.61	74.00	-23.39	41.64	8.97	Peak	105	162

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3:"*" is Peak / Average value of fundamental frequency

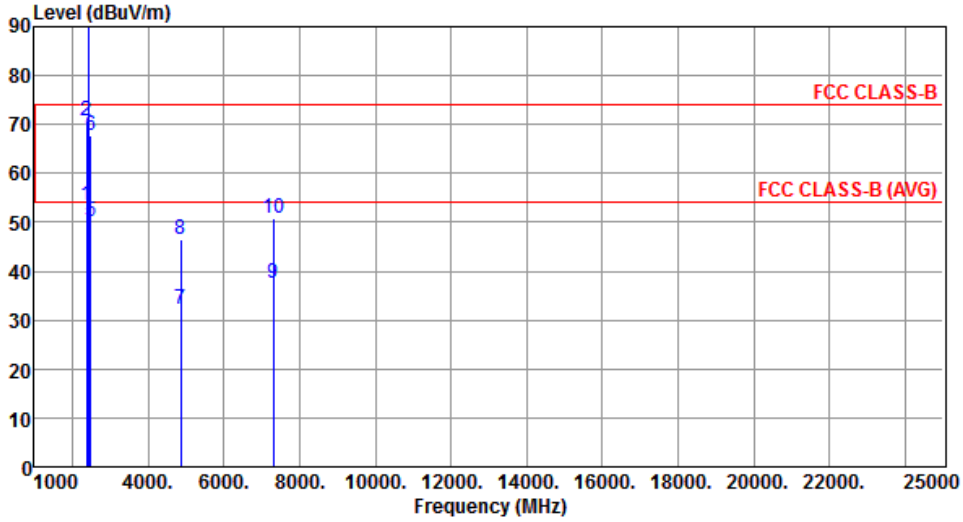
Modulation	HT40	Test Freq. (MHz)	2422
Polarization	Vertical		



		Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1		2390.00	53.15	54.00	-0.85	55.27	-2.12	Average	181	16
2		2390.00	66.24	74.00	-7.76	68.36	-2.12	Peak	181	16
3	*	2422.00	94.82			96.81	-1.99	Average	181	16
4	*	2422.00	106.25			108.24	-1.99	Peak	181	16
5		4844.00	32.99	54.00	-21.01	28.48	4.51	Average	106	124
6		4844.00	45.91	74.00	-28.09	41.40	4.51	Peak	106	124
7		7266.00	37.52	54.00	-16.48	28.55	8.97	Average	109	111
8		7266.00	50.28	74.00	-23.72	41.31	8.97	Peak	109	111

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3:"*" is Peak / Average value of fundamental frequency

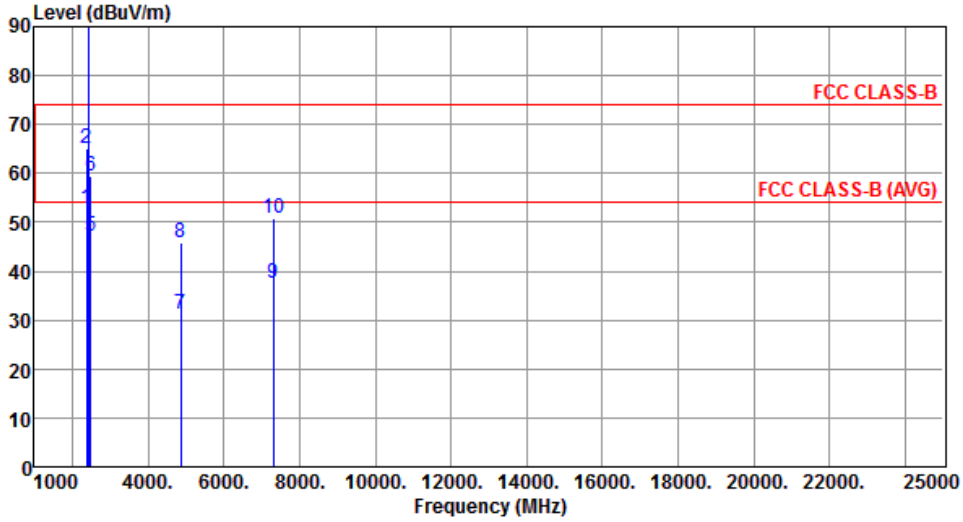
Modulation	HT40	Test Freq. (MHz)	2437
Polarization	Horizontal		



		Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1		2390.00	53.59	54.00	-0.41	55.71	-2.12	Average	178	48
2		2390.00	70.61	74.00	-3.39	72.73	-2.12	Peak	178	48
3	*	2437.00	101.61			103.54	-1.93	Average	178	48
4	*	2437.00	114.01			115.94	-1.93	Peak	178	48
5		2483.50	50.24	54.00	-3.76	52.01	-1.77	Average	178	48
6		2483.50	67.71	74.00	-6.29	69.48	-1.77	Peak	178	48
7		4874.00	32.15	54.00	-21.85	27.57	4.58	Average	108	122
8		4874.00	46.58	74.00	-27.42	42.00	4.58	Peak	108	122
9		7311.00	37.61	54.00	-16.39	28.48	9.13	Average	110	129
10		7311.00	50.72	74.00	-23.28	41.59	9.13	Peak	110	129

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3:"*" is Peak / Average value of fundamental frequency

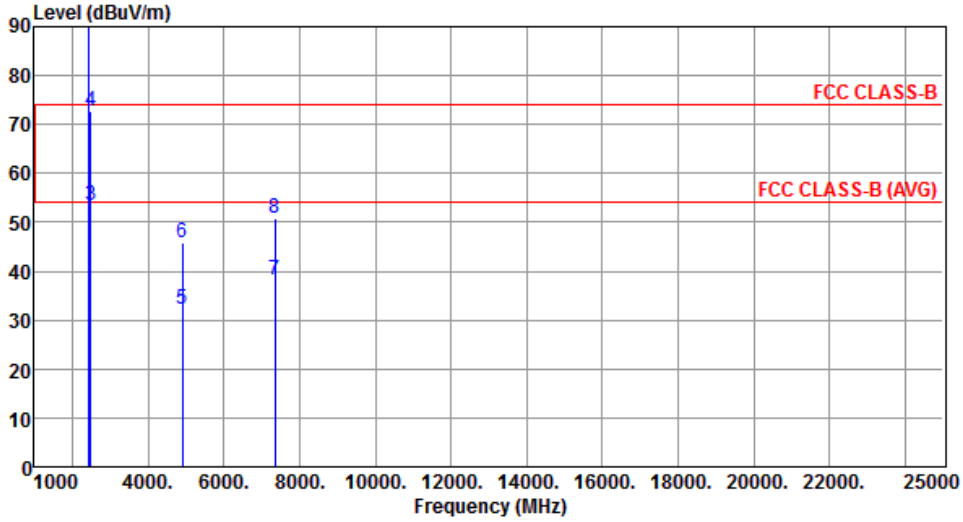
Modulation	HT40	Test Freq. (MHz)	2437
Polarization	Vertical		



		Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1		2390.00	52.86	54.00	-1.14	54.98	-2.12	Average	181	24
2		2390.00	64.95	74.00	-9.05	67.07	-2.12	Peak	181	24
3	*	2437.00	99.52			101.45	-1.93	Average	181	24
4	*	2437.00	111.80			113.73	-1.93	Peak	181	24
5		2483.50	47.24	54.00	-6.76	49.01	-1.77	Average	181	24
6		2483.50	59.36	74.00	-14.64	61.13	-1.77	Peak	181	24
7		4874.00	31.35	54.00	-22.65	26.77	4.58	Average	110	158
8		4874.00	45.96	74.00	-28.04	41.38	4.58	Peak	110	158
9		7311.00	37.62	54.00	-16.38	28.49	9.13	Average	102	161
10		7311.00	50.88	74.00	-23.12	41.75	9.13	Peak	102	161

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3:"*" is Peak / Average value of fundamental frequency

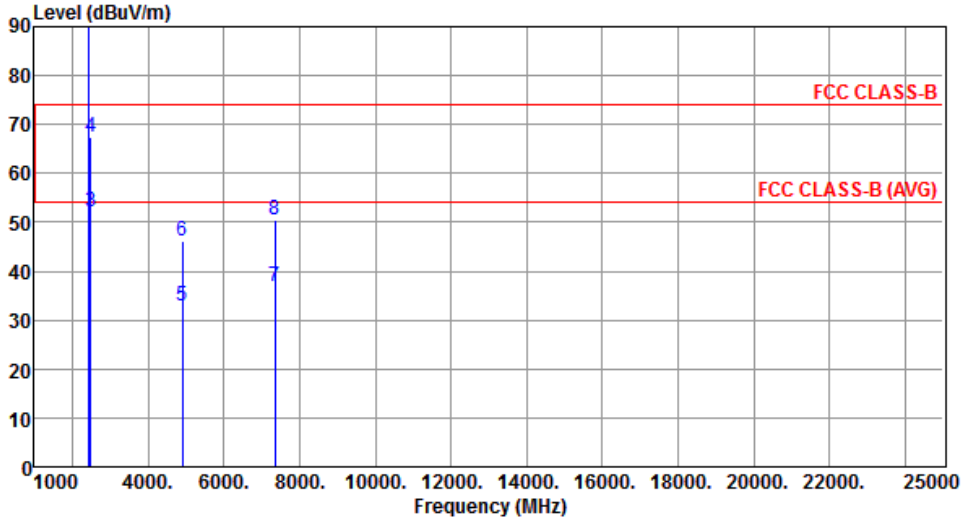
Modulation	HT40	Test Freq. (MHz)	2452
Polarization	Horizontal		



		Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	*	2452.00	99.88			101.76	-1.88	Average	178	56
2	*	2452.00	110.91			112.79	-1.88	Peak	178	56
3		2483.50	53.58	54.00	-0.42	55.35	-1.77	Average	178	56
4		2483.50	72.62	74.00	-1.38	74.39	-1.77	Peak	178	56
5		4904.00	32.25	54.00	-21.75	27.62	4.63	Average	109	111
6		4904.00	45.96	74.00	-28.04	41.33	4.63	Peak	109	111
7		7356.00	38.13	54.00	-15.87	28.84	9.29	Average	103	28
8		7356.00	50.85	74.00	-23.15	41.56	9.29	Peak	103	28

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3:"*" is Peak / Average value of fundamental frequency

Modulation	HT40	Test Freq. (MHz)	2452
Polarization	Vertical		



		Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	*	2452.00	97.65			99.53	-1.88	Average	108	21
2	*	2452.00	108.82			110.70	-1.88	Peak	108	21
3		2483.50	52.14	54.00	-1.86	53.91	-1.77	Average	108	21
4		2483.50	67.48	74.00	-6.52	69.25	-1.77	Peak	108	21
5		4904.00	32.95	54.00	-21.05	28.32	4.63	Average	119	142
6		4904.00	46.11	74.00	-27.89	41.48	4.63	Peak	119	142
7		7356.00	36.82	54.00	-17.18	27.53	9.29	Average	121	34
8		7356.00	50.39	74.00	-23.61	41.10	9.29	Peak	121	34

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3:"*" is Peak / Average value of fundamental frequency

3.6 Emissions in Non-Restricted Frequency Bands

3.6.1 Emissions in Non-Restricted Frequency Bands Limit

Peak power 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

3.6.2 Test Procedures

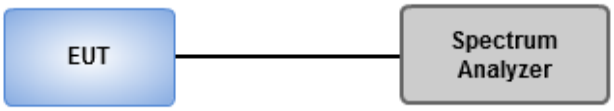
Reference level measurement

1. Set RBW=100kHz, VBW = 300kHz , Detector = Peak, Sweep time = Auto
2. Trace = max hold , Allow Trace to fully stabilize
3. Use the peak marker function to determine the maximum PSD level

Emission level measurement

1. Set RBW=100kHz, VBW = 300kHz , Detector = Peak, Sweep time = Auto
2. Trace = max hold , Allow Trace to fully stabilize
3. Scan Frequency range is up to 25GHz
4. Use the peak marker function to determine the maximum amplitude level

3.6.3 Test Setup



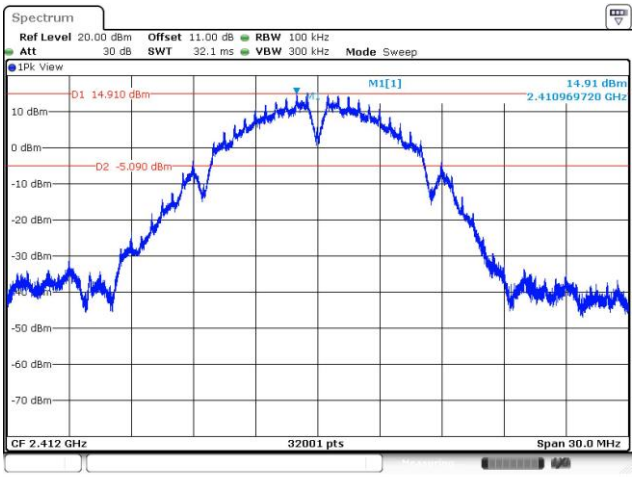
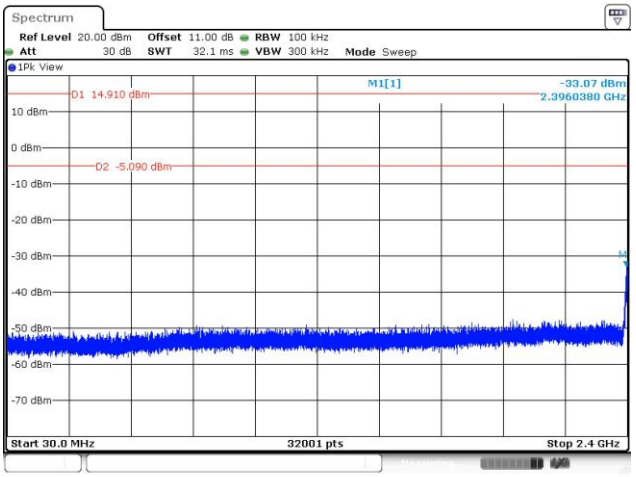
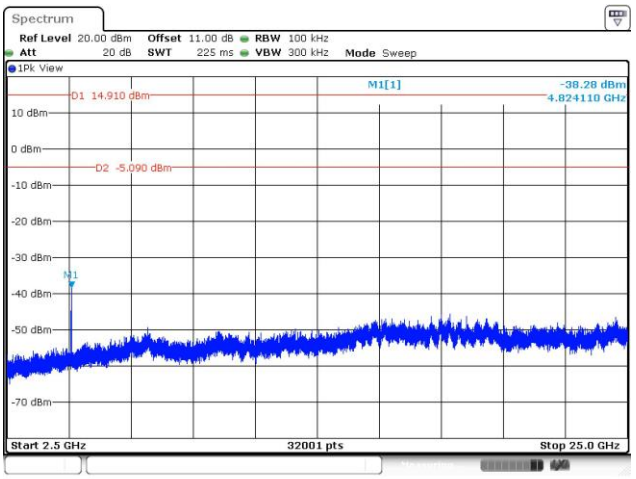
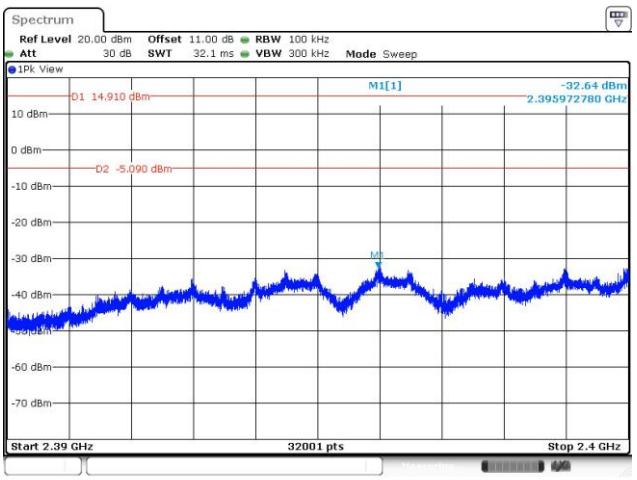
3.6.4 Test Result of Emissions in non-restricted frequency bands

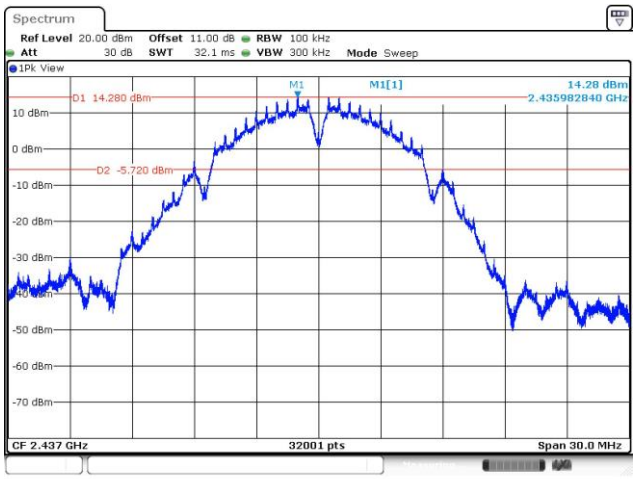
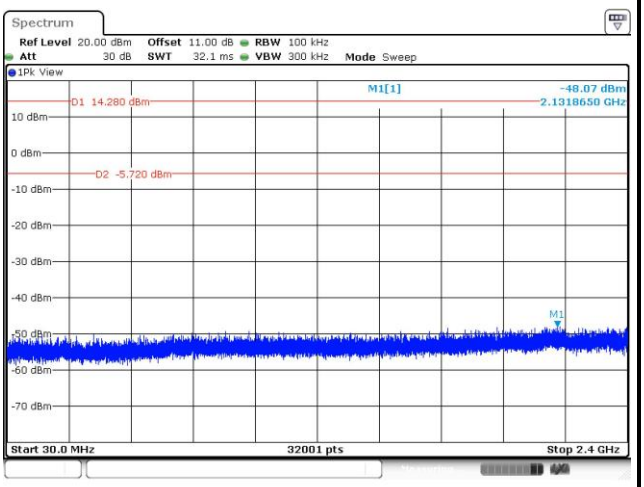
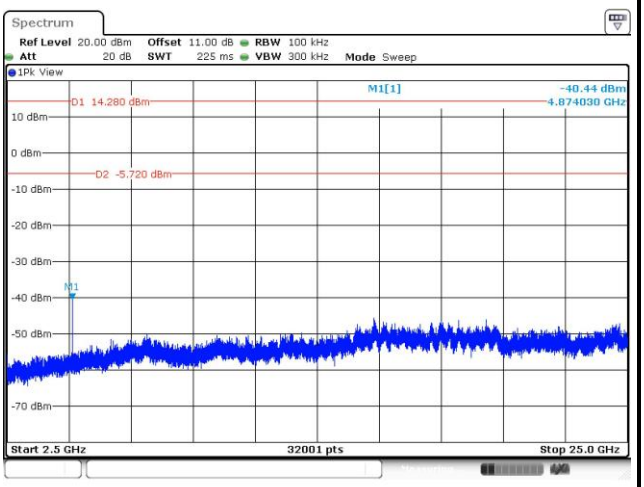
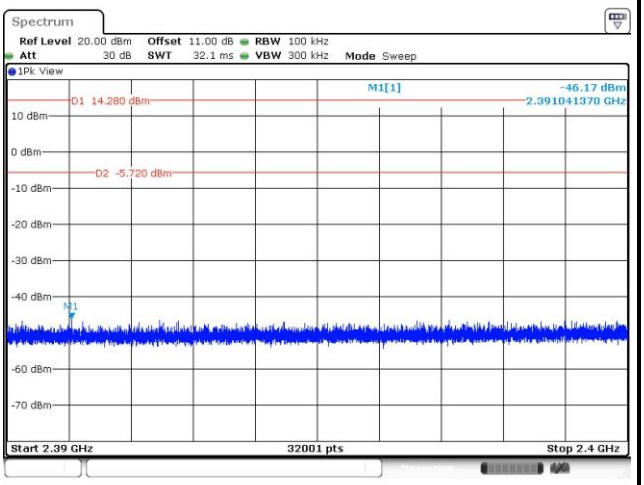
This test item is performed on each TX output individually without summing or adding 10 log(N_{ANT}) since measurements are made relative to the in-band emissions on the individual outputs. Only worst test result of each operating mode is presented.

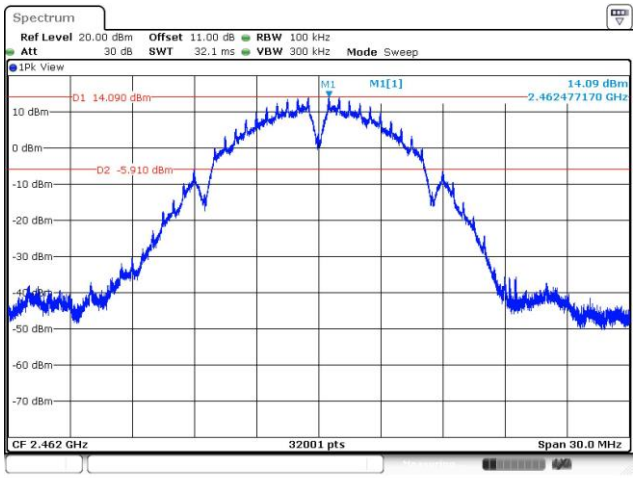
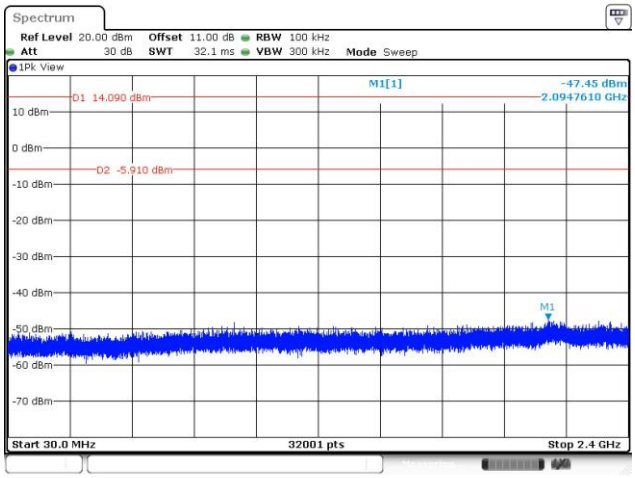
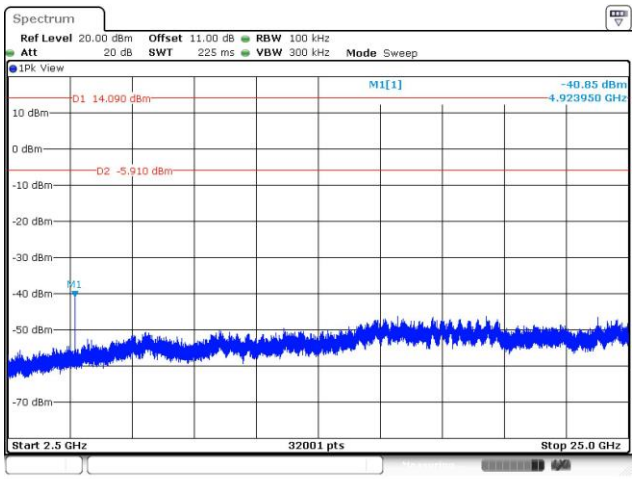
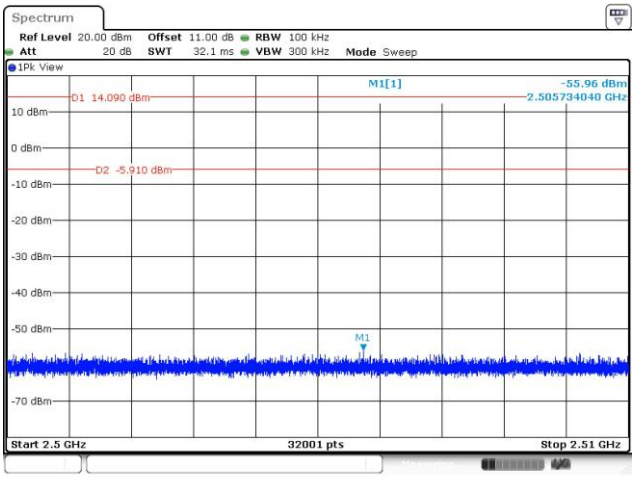
Non-beamforming mode

3.6.5 Unwanted Emissions into Non-Restricted Frequency Bands

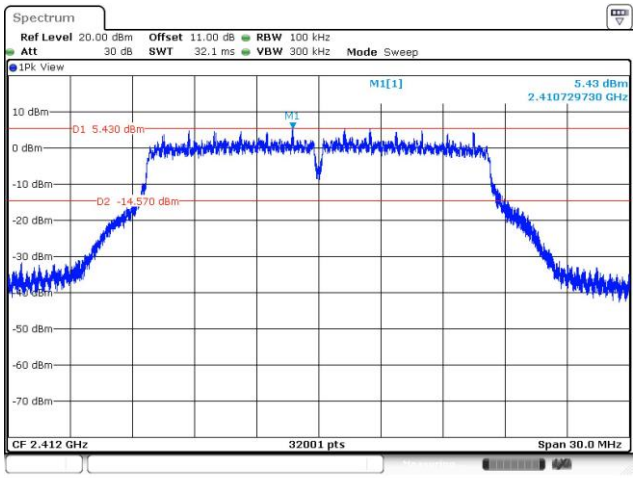
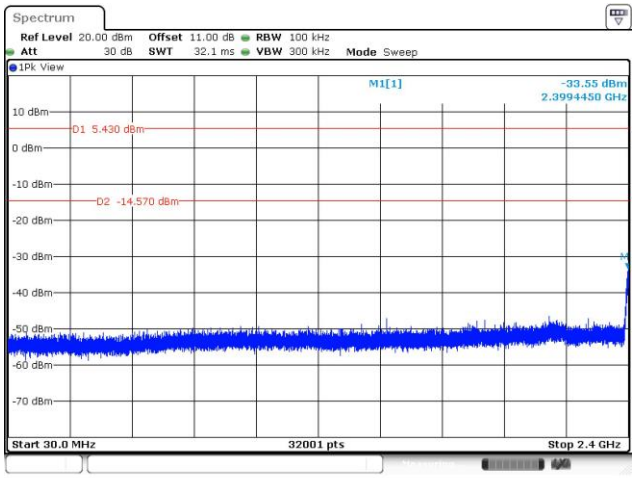
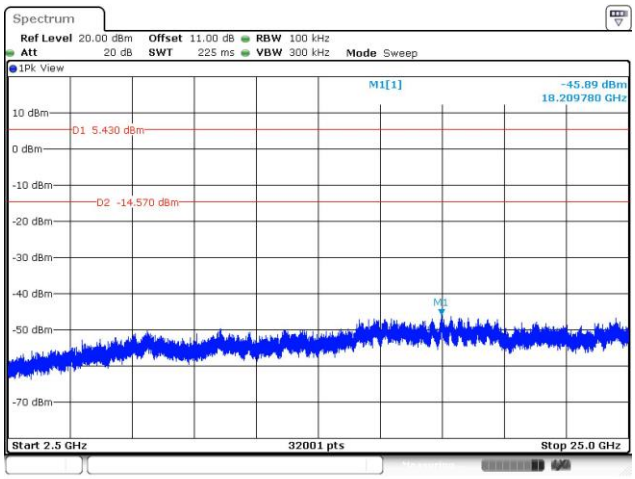
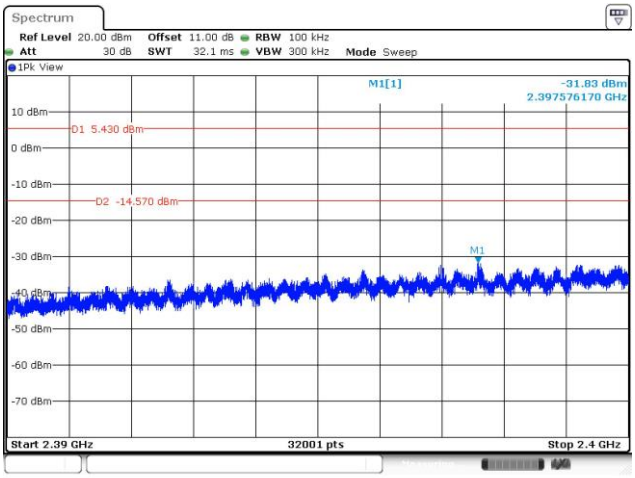
802.11b

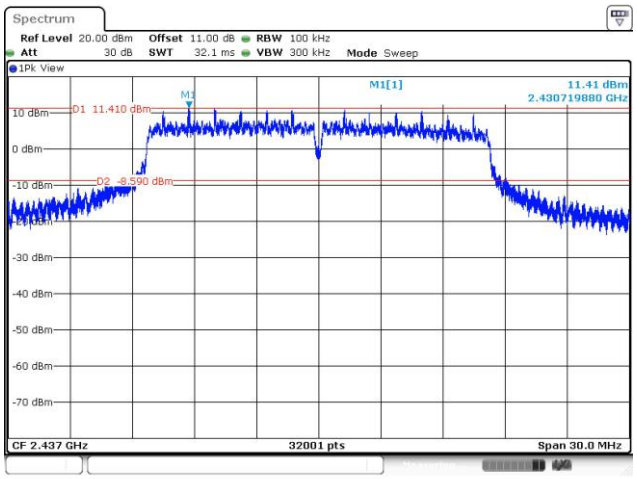
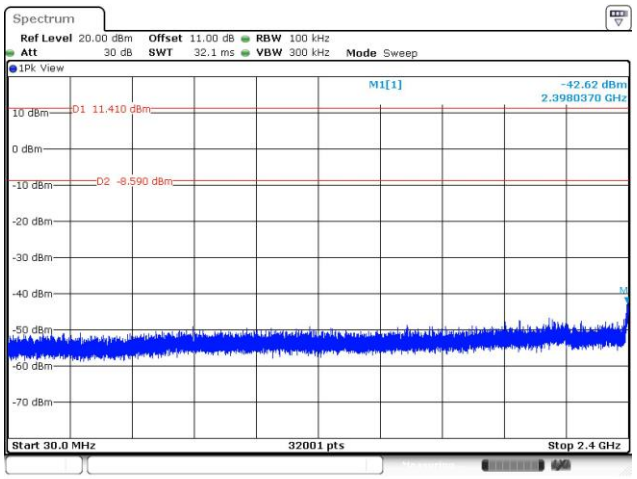
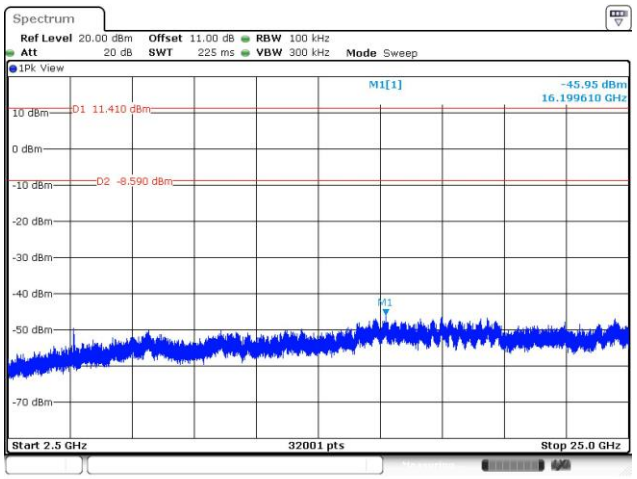
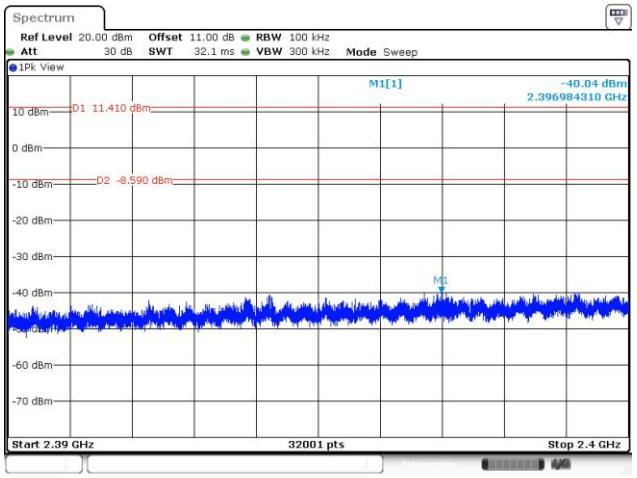
Reference Level	Tx 2412MHz / 30MHz~25GHz (down 20dBc)
	
---	
---	

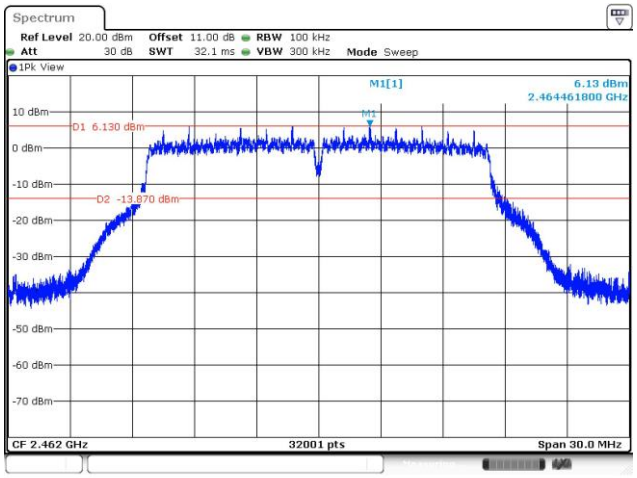
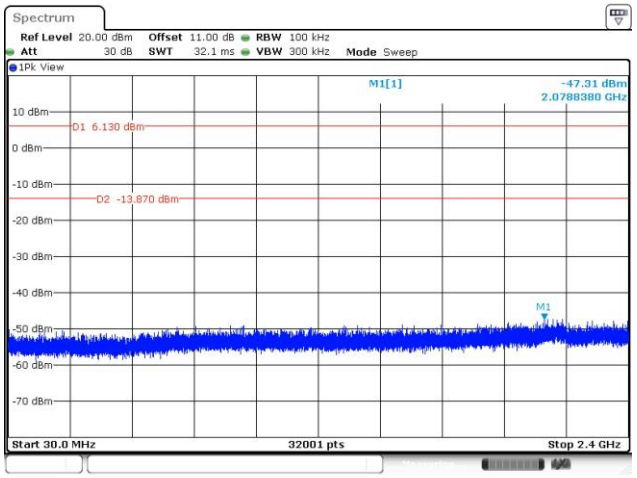
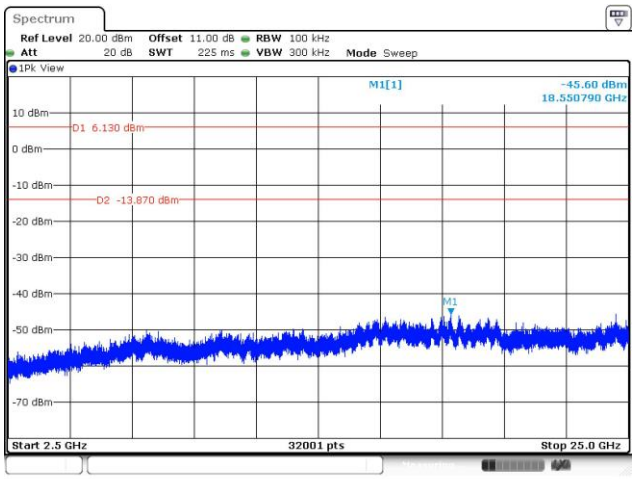
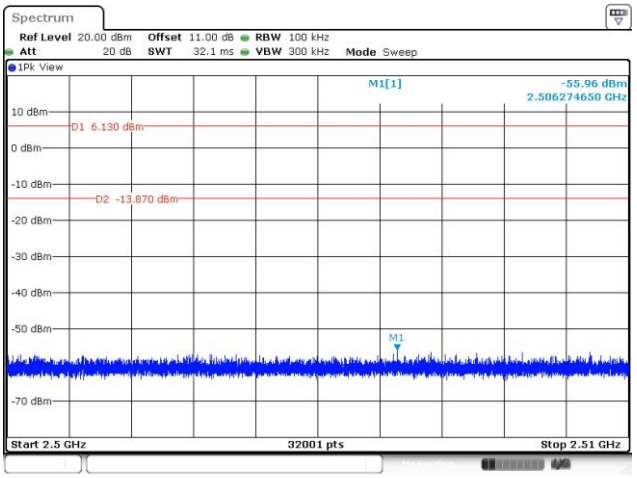
Reference Level	Tx 2437MHz / 30MHz~25GHz (down 20dBc)
	
---	
---	

Reference Level	Tx 2462MHz / 30MHz~25GHz (down 20dBc)
	
---	
---	

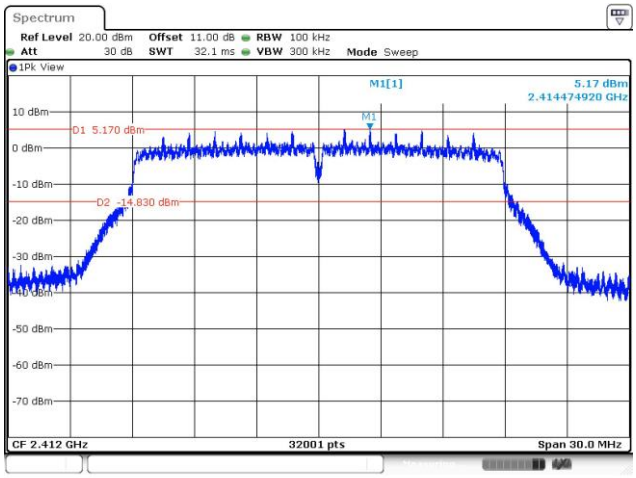
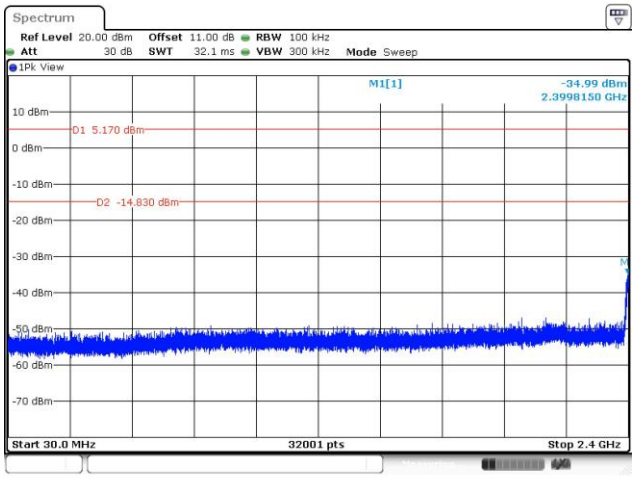
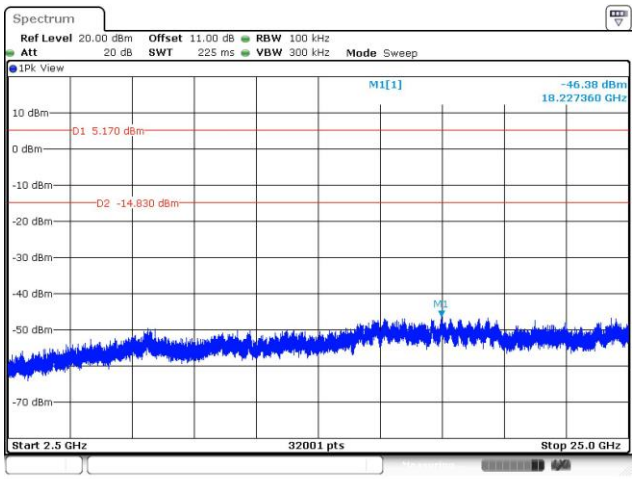
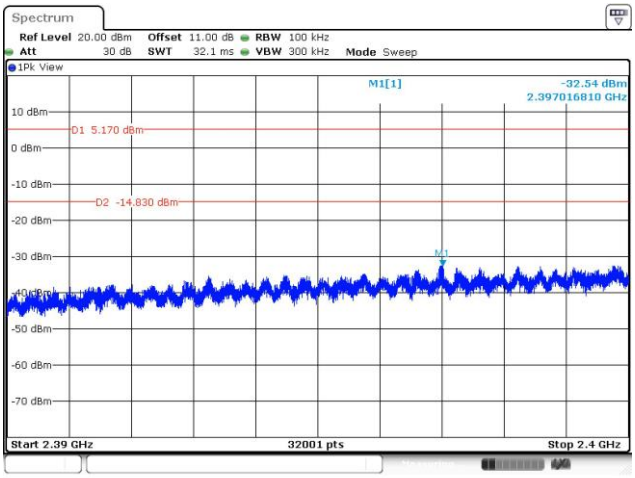
802.11g

Reference Level	Tx 2412MHz / 30MHz~25GHz (down 20dBc)
	
---	
---	

Reference Level	Tx 2437MHz / 30MHz~25GHz (down 20dBc)
	
---	
---	

Reference Level	Tx 2462MHz / 30MHz~25GHz (down 20dBc)
	
---	
---	

802.11n HT20

Reference Level	Tx 2412MHz / 30MHz~25GHz (down 20dBc)
	
---	
---	

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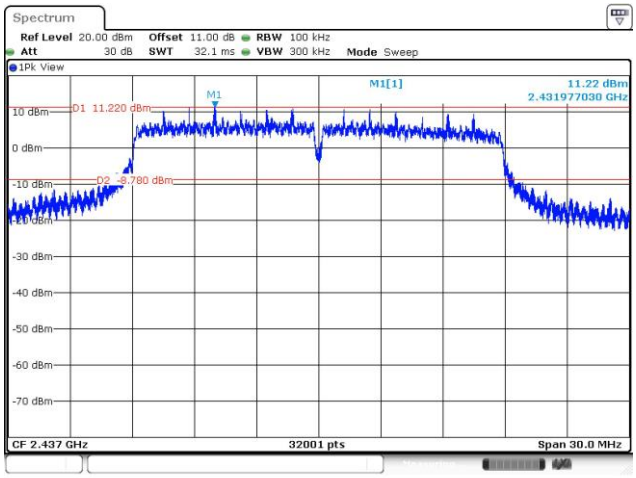
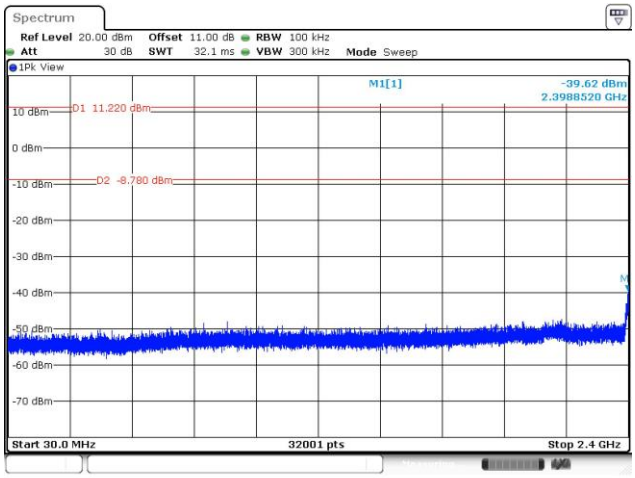
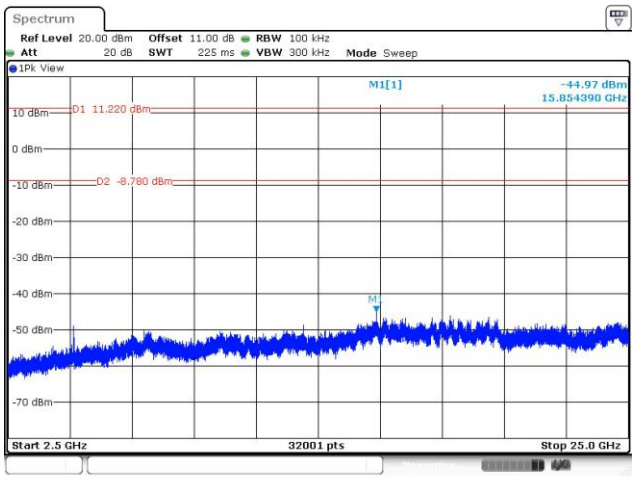
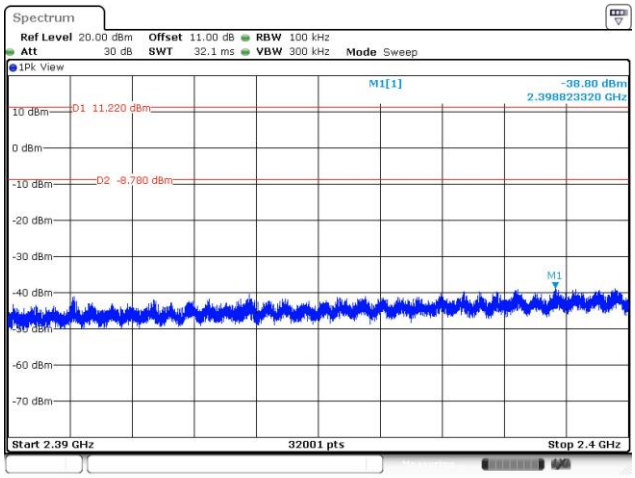
	
---	
---	

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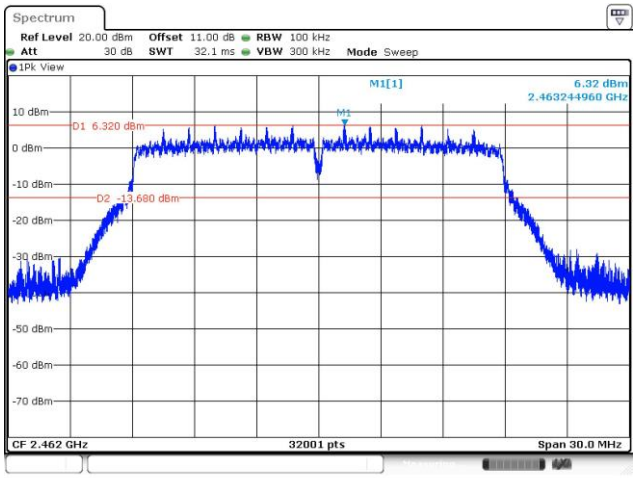
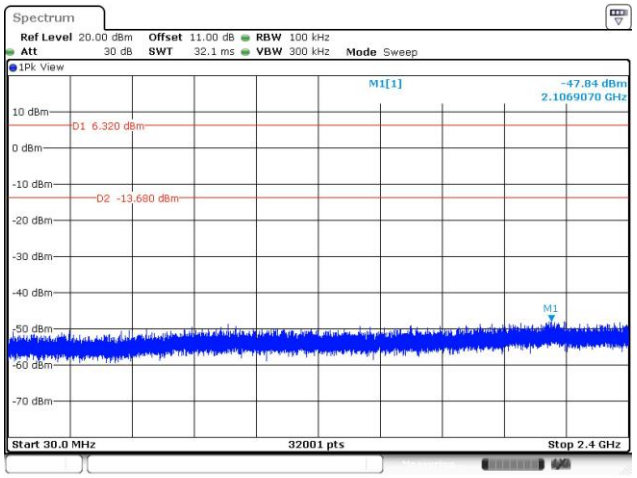
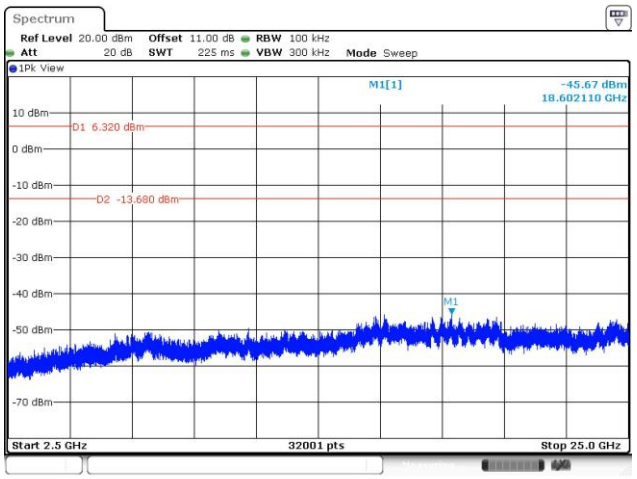
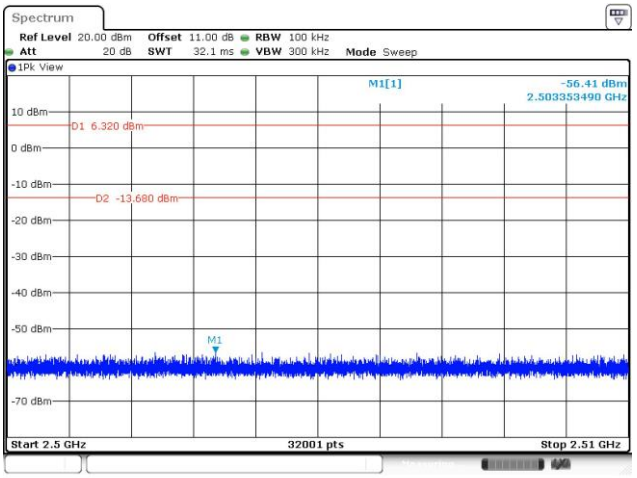
	
---	
---	

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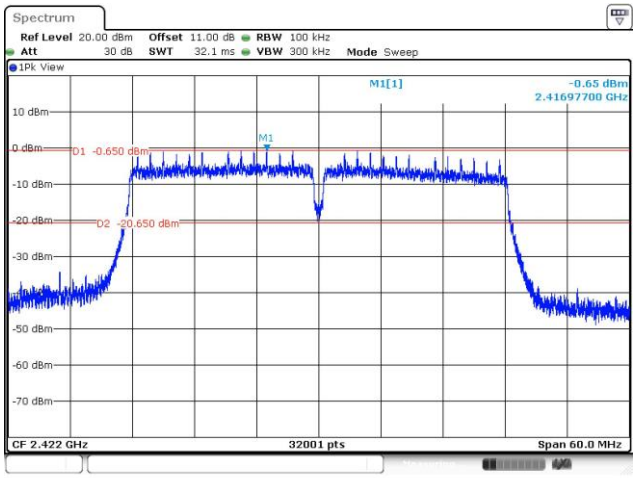
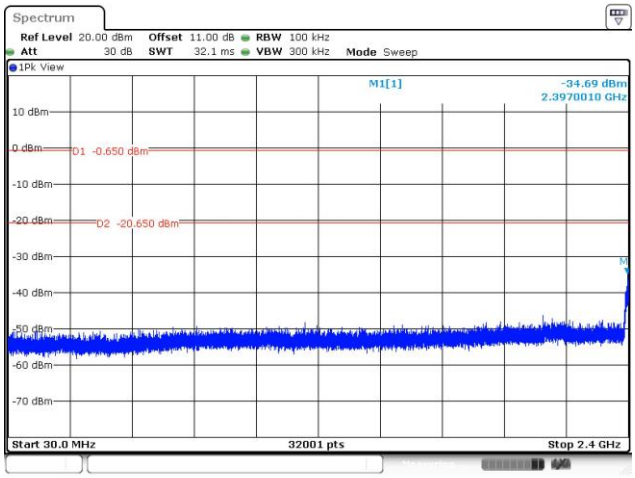
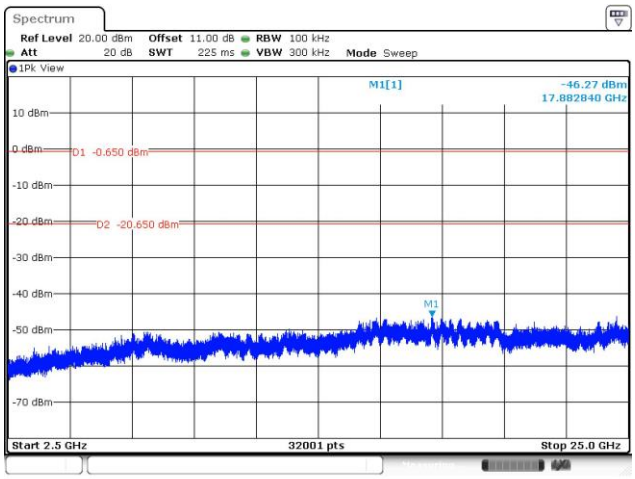
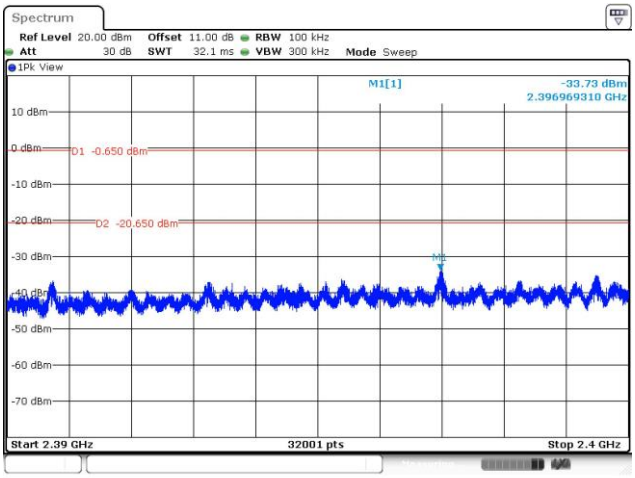
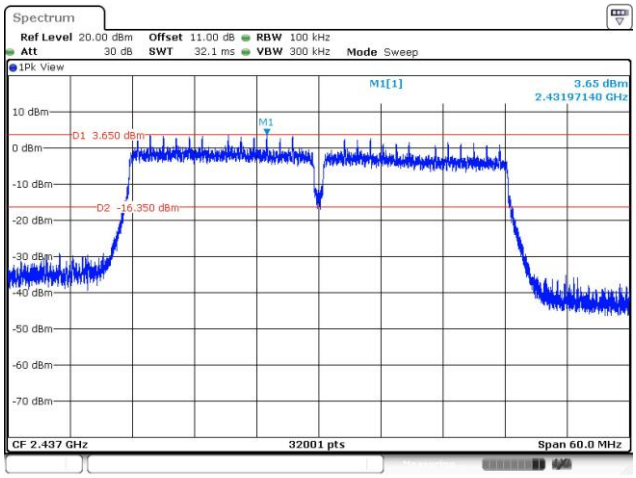
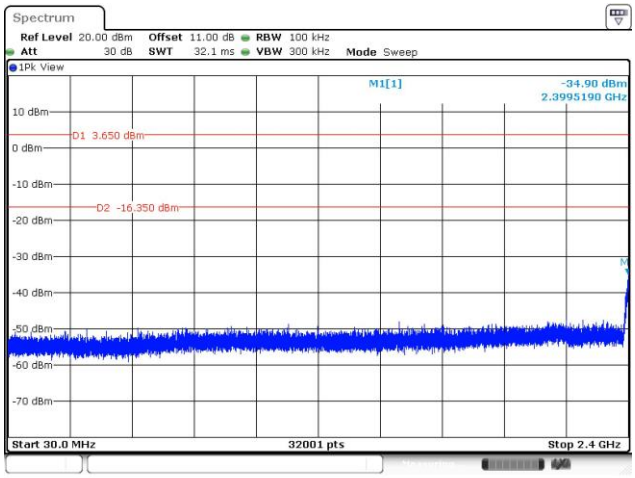
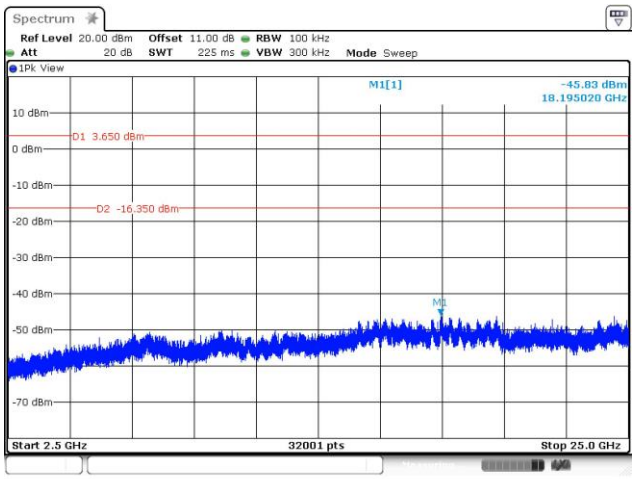
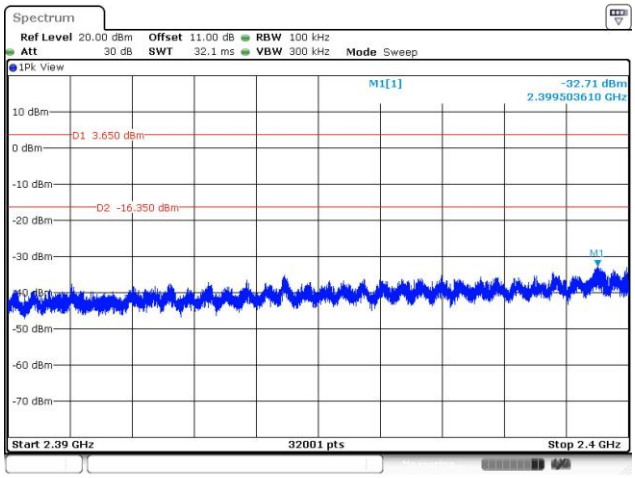
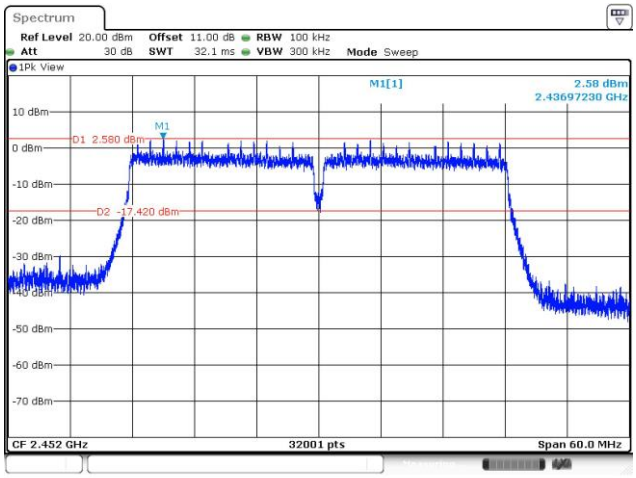
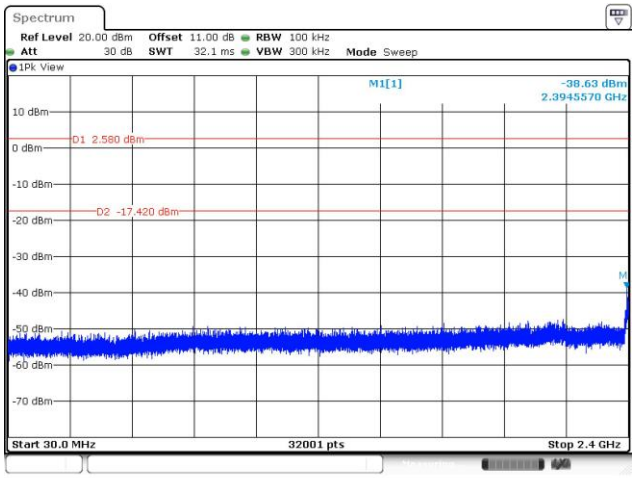
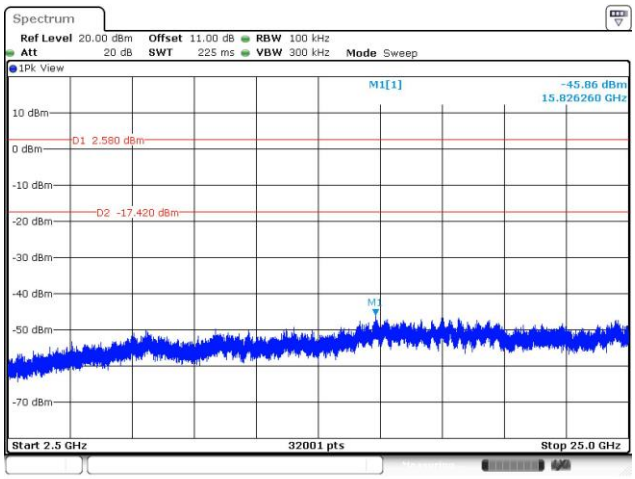
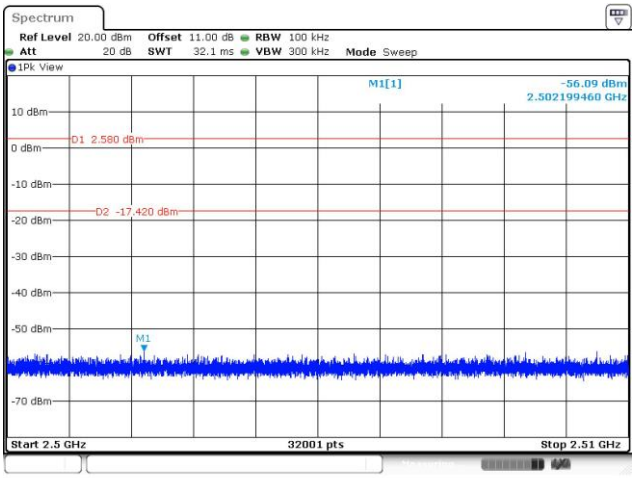
Reference Level	Tx 2422MHz / 30MHz~25GHz (down 20dBc)
	
---	
---	

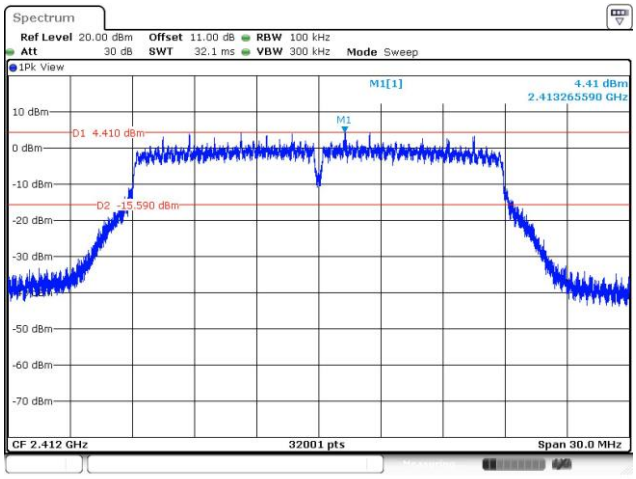
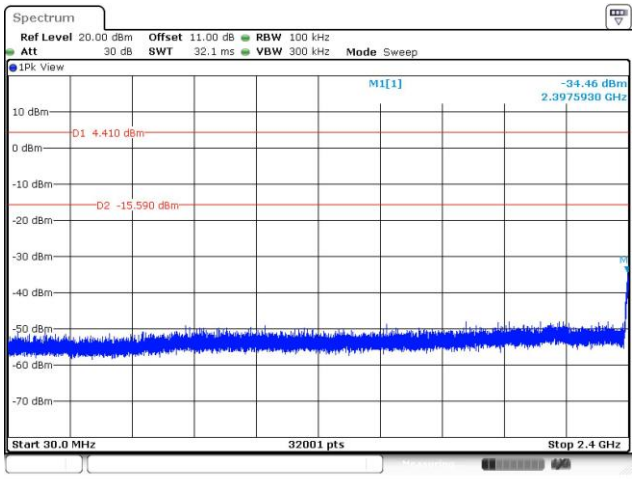
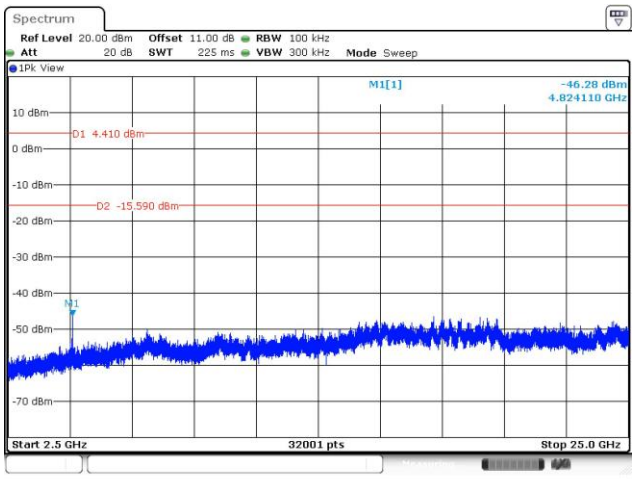
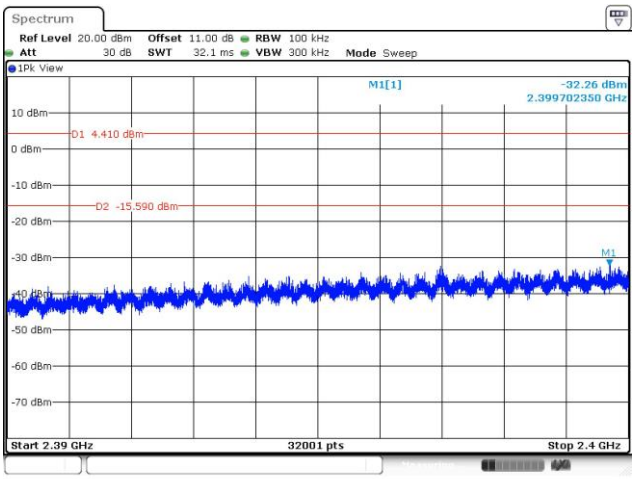
Reference Level	Tx 2437MHz / 30MHz~25GHz (down 20dBc)
	
---	
---	

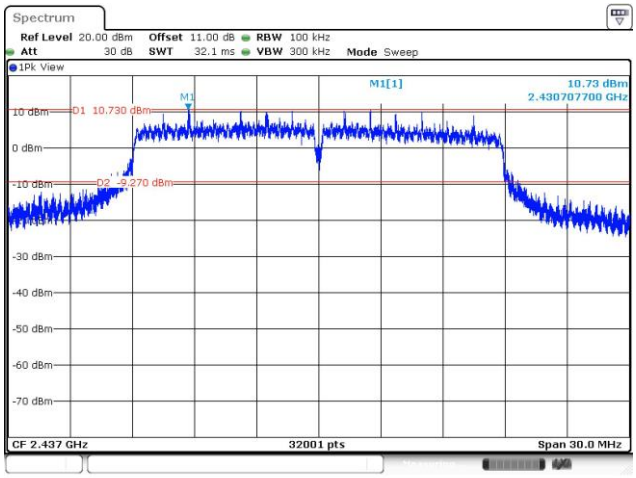
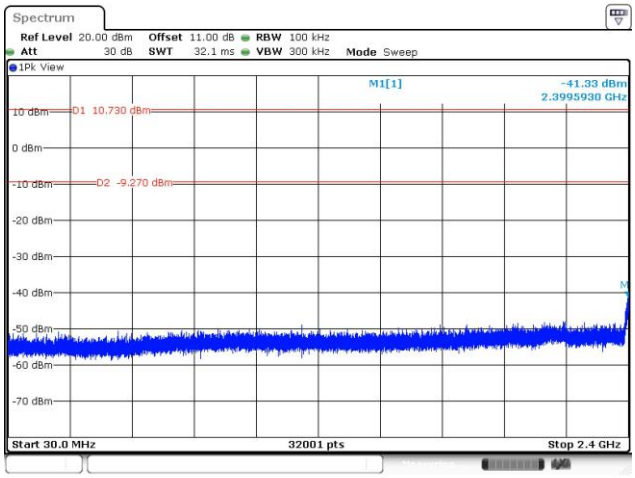
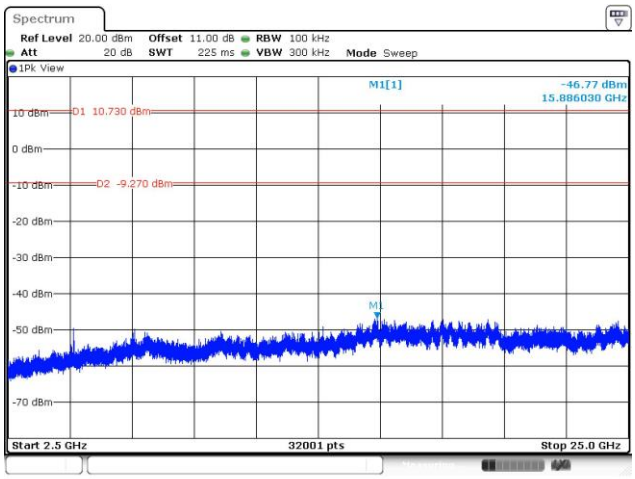
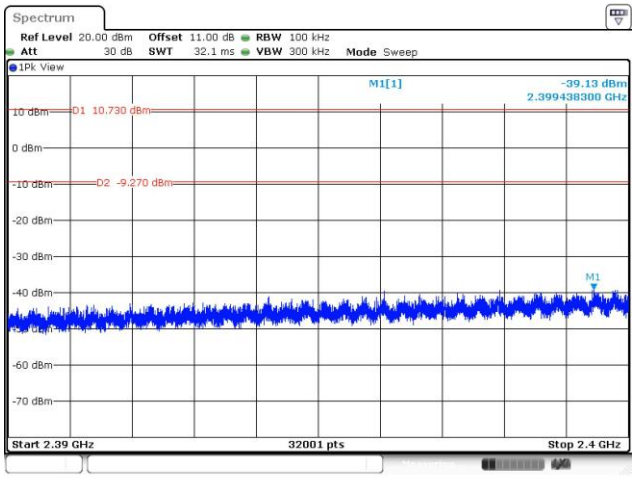
Reference Level	Tx 2452MHz / 30MHz~25GHz (down 20dBc)
	
---	
---	

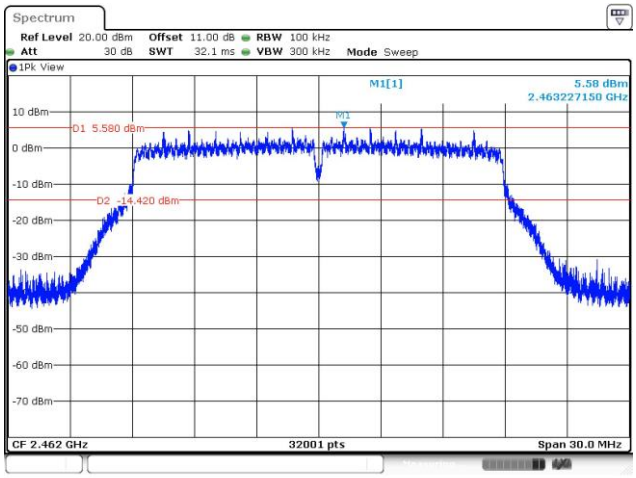
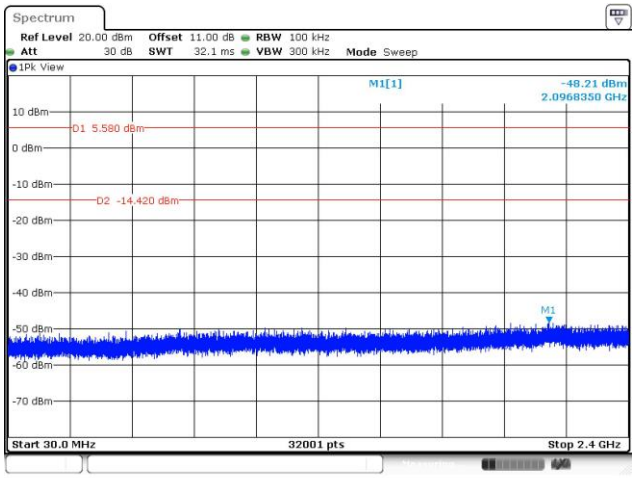
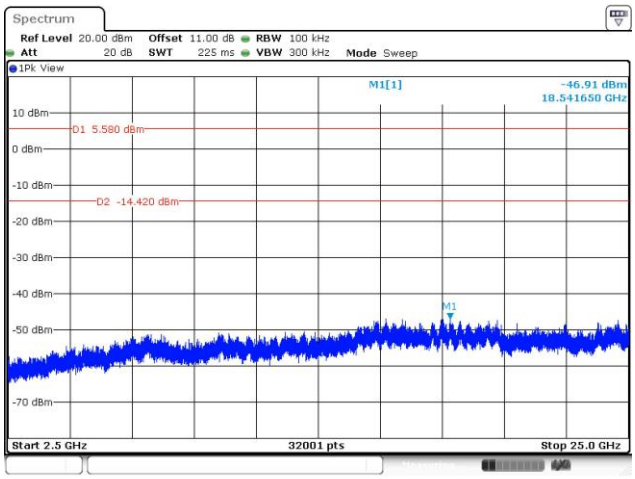
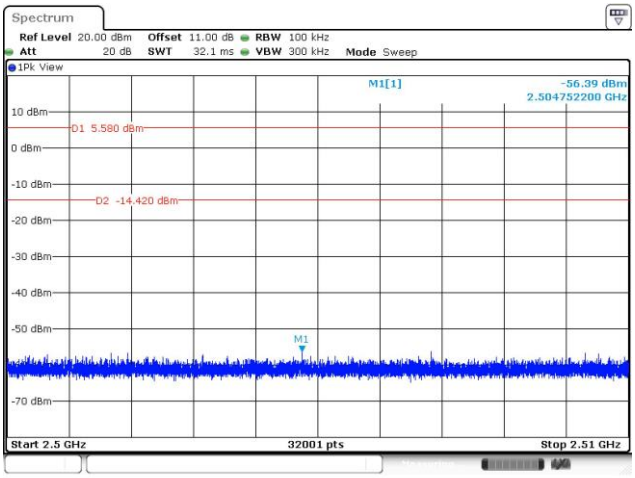
Beamforming mode

3.6.6 Unwanted Emissions into Non-Restricted Frequency Bands

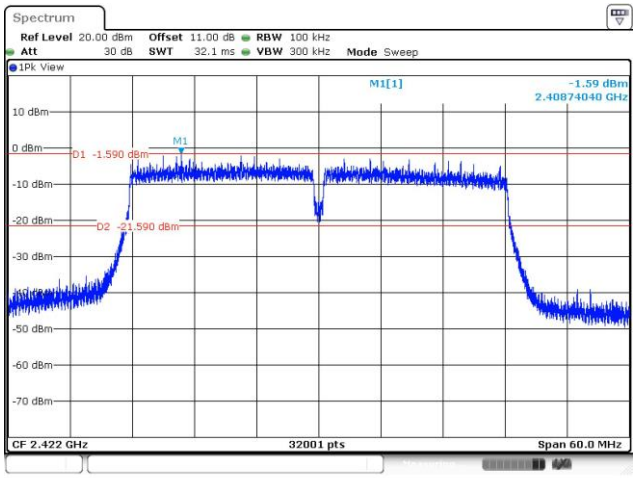
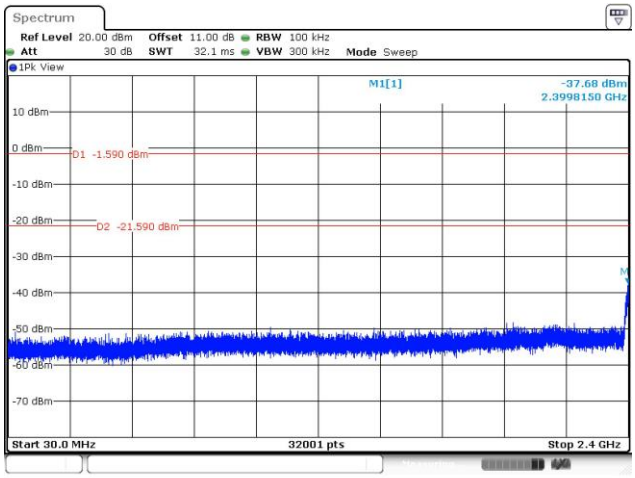
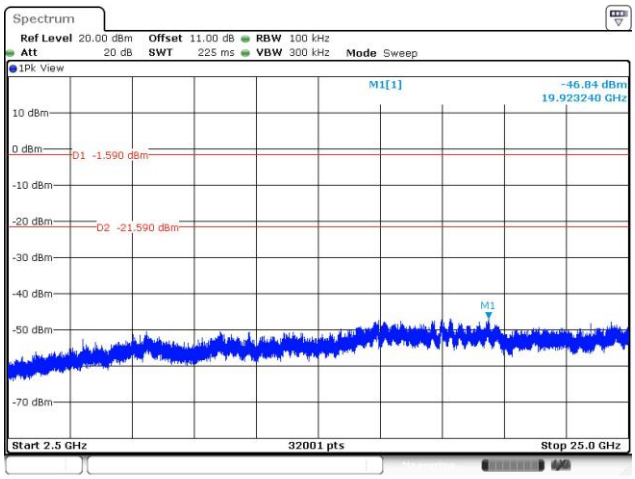
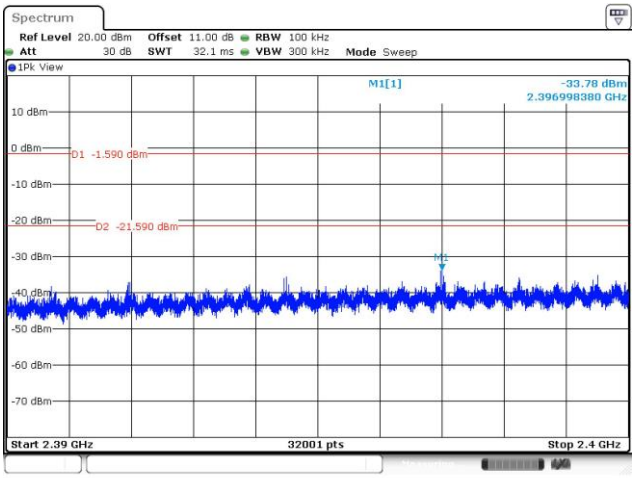
802.11n HT20

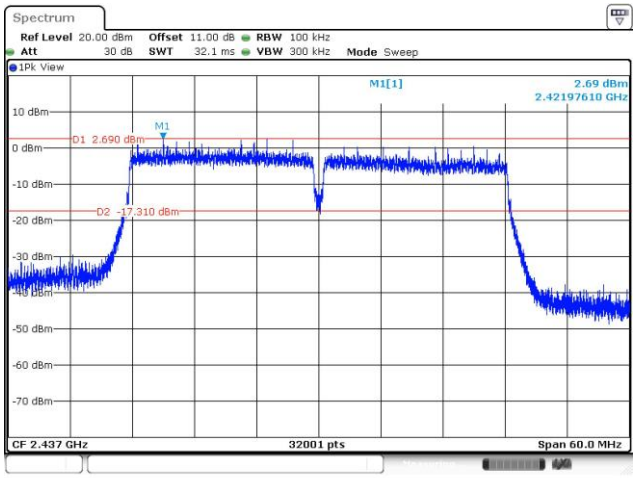
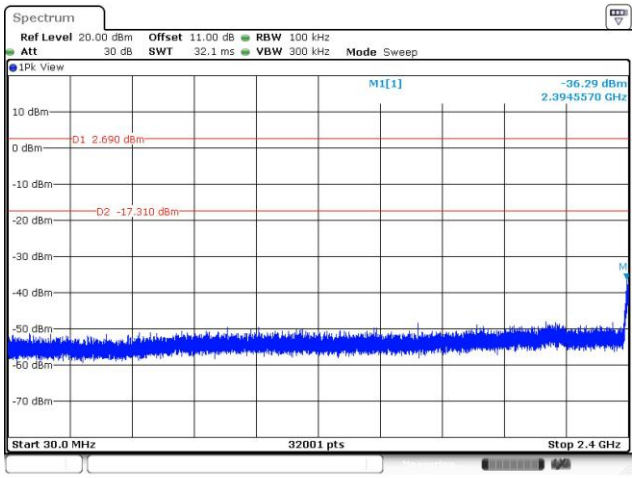
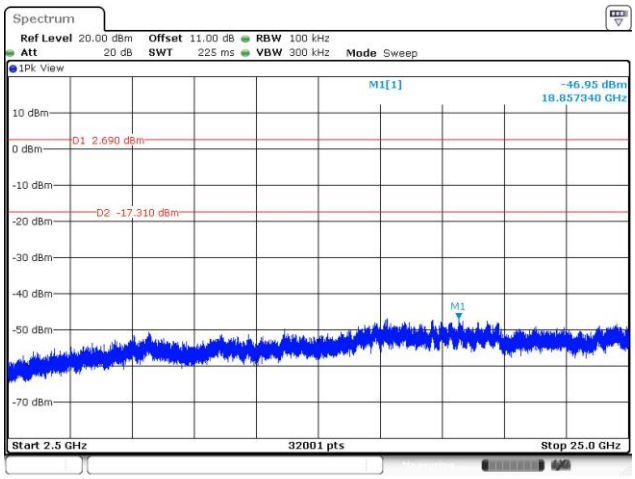
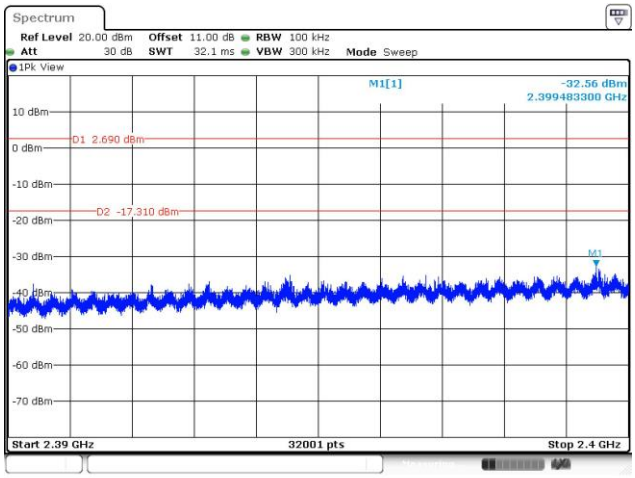
Reference Level	Tx 2412MHz / 30MHz~25GHz (down 20dBc)
	
---	
---	

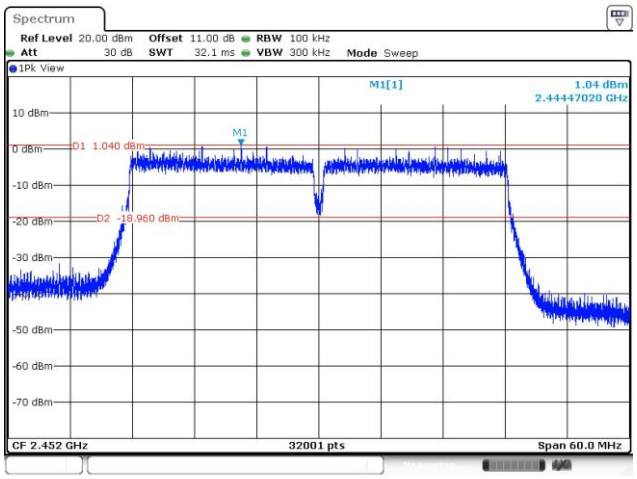
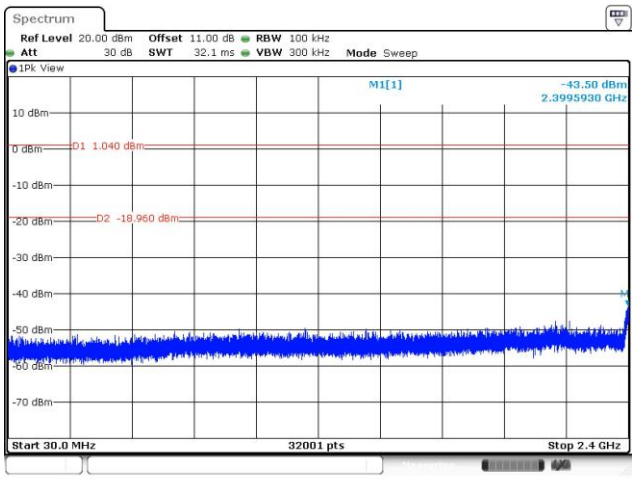
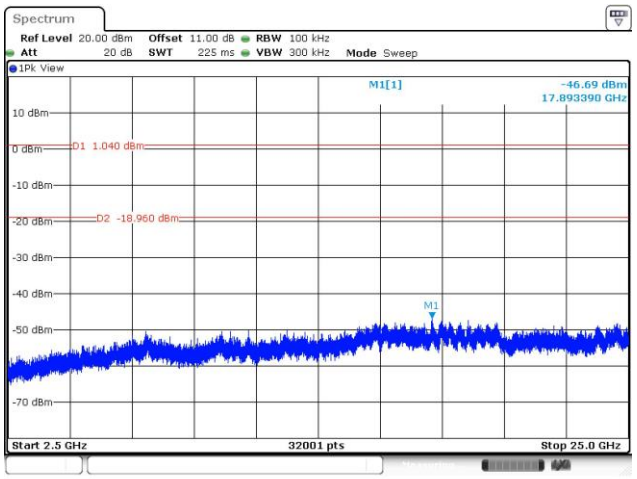
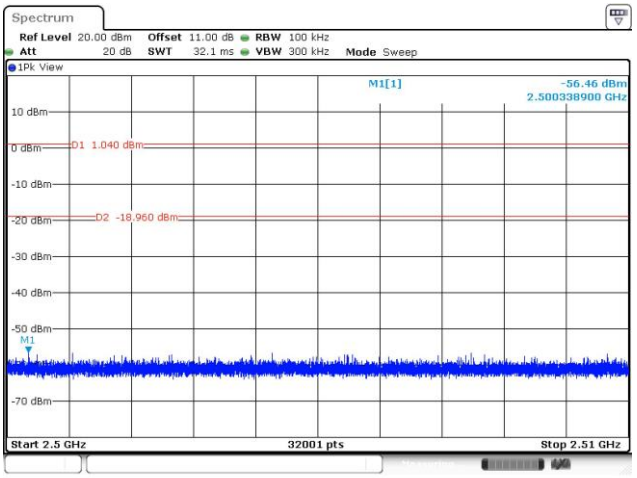
Reference Level	Tx 2437MHz / 30MHz~25GHz (down 20dBc)
	
---	
---	

Reference Level	Tx 2462MHz / 30MHz~25GHz (down 20dBc)
	
---	
---	

802.11n HT40

Reference Level	Tx 2422MHz / 30MHz~25GHz (down 20dBc)
	
---	
---	

Reference Level	Tx 2437MHz / 30MHz~25GHz (down 20dBc)
	
---	
---	

Reference Level	Tx 2452MHz / 30MHz~25GHz (down 20dBc)
	
---	
---	

4 Receiver Test Results

4.1 Conducted Emissions

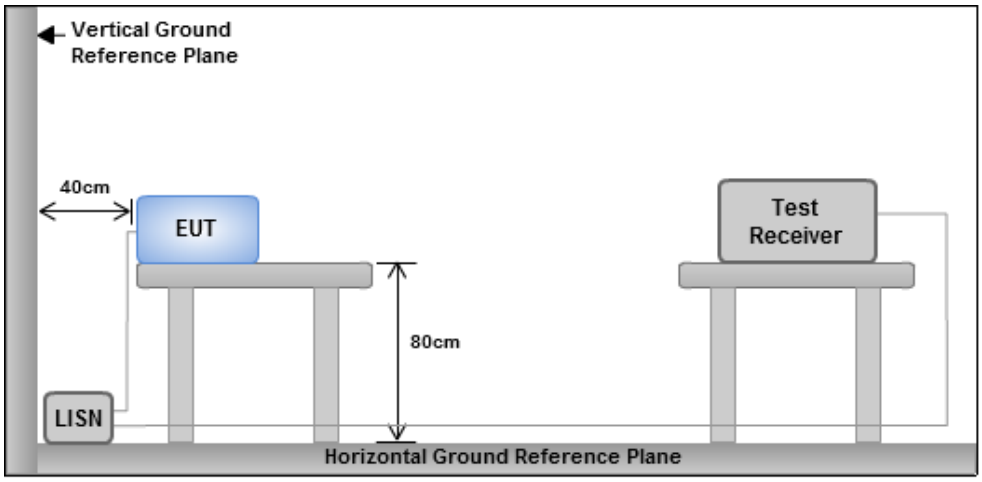
4.1.1 Limit of Conducted Emissions

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.		

4.1.2 Test Procedures

1. The device is placed on a test table, raised 80 cm above the reference ground plane. The vertical conducting plane is located 40 cm to the rear of the device.
2. The device is connected to line impedance stabilization network (LISN) and other accessories are connected to other LISN. Measured levels of AC power line conducted emission are across the 50 Ω LISN port.
3. AC conducted emission measurements is made over frequency range from 150 kHz to 30 MHz.
4. This measurement was performed with AC 120V / 60Hz.

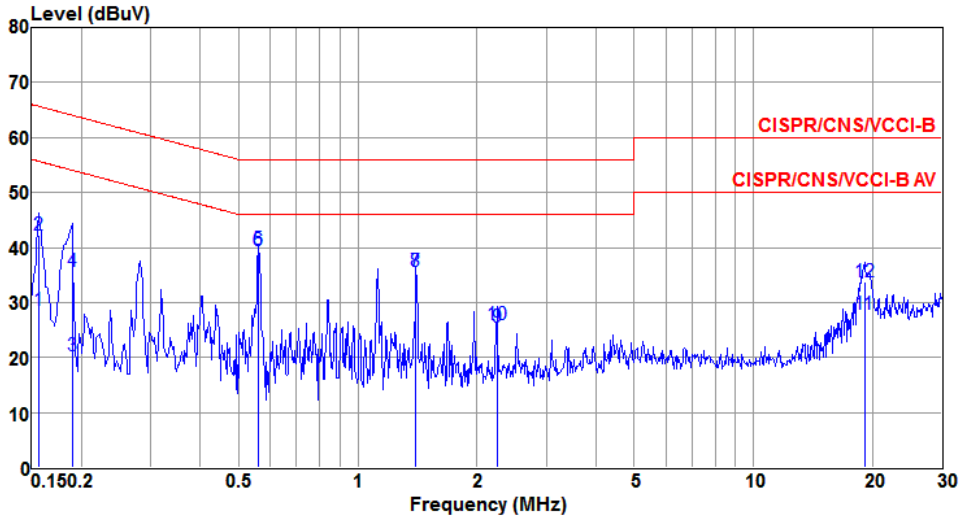
4.1.3 Test Setup



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

4.1.4 Test Result of Conducted Emissions

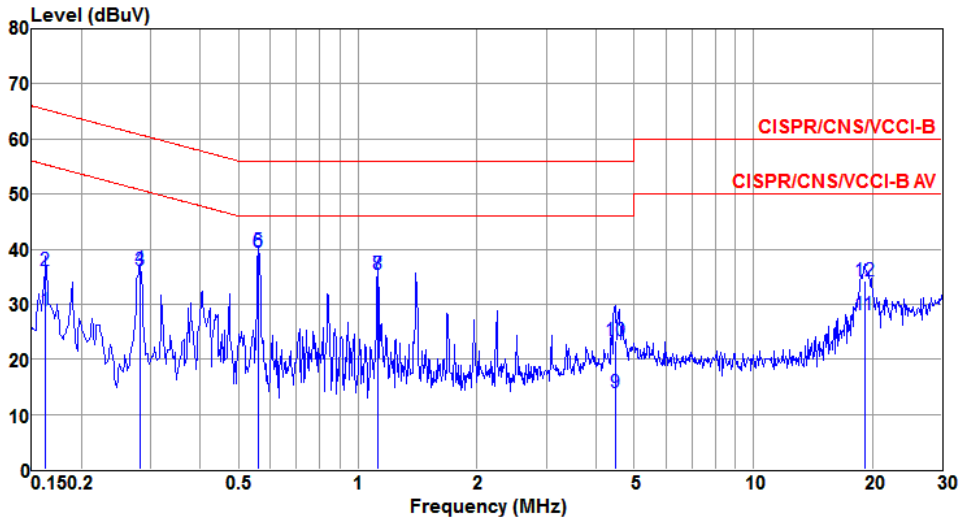
Modulation	11g	Test Freq. (MHz)	2437
Power Phase	Line	Test configuration	1



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.156	28.65	55.69	-27.04	19.11	9.50	0.04	Average
2	0.156	42.33	65.69	-23.36	32.79	9.50	0.04	QP
3	0.189	20.20	54.06	-33.86	10.66	9.50	0.04	Average
4	0.189	35.66	64.06	-28.40	26.12	9.50	0.04	QP
5@	0.561	39.62	46.00	-6.38	30.03	9.55	0.04	Average
6	0.561	39.33	56.00	-16.67	29.74	9.55	0.04	QP
7	1.403	35.59	46.00	-10.41	26.00	9.55	0.04	Average
8	1.403	35.54	56.00	-20.46	25.95	9.55	0.04	QP
9	2.249	25.57	46.00	-20.43	15.90	9.61	0.06	Average
10	2.249	25.88	56.00	-30.12	16.21	9.61	0.06	QP
11	19.122	27.88	50.00	-22.12	17.92	9.71	0.25	Average
12	19.122	33.87	60.00	-26.13	23.91	9.71	0.25	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).
2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).

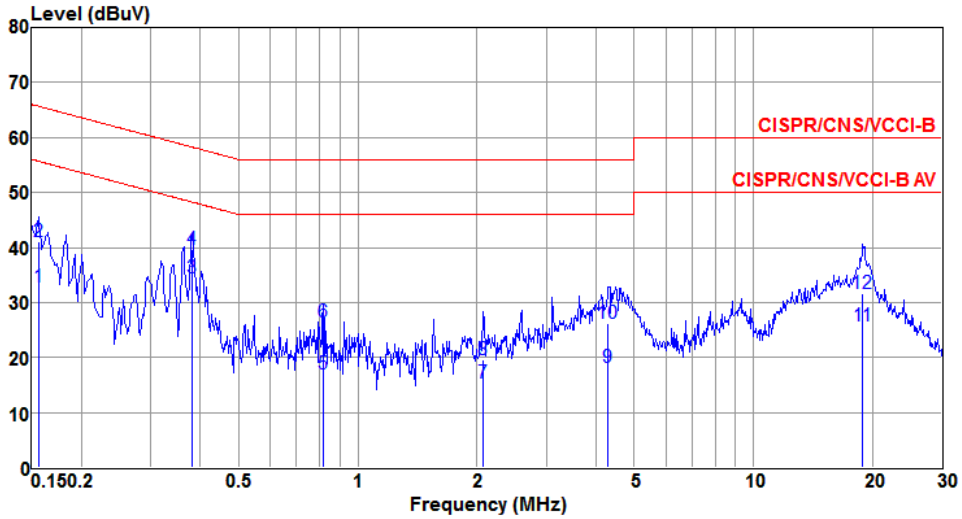
Modulation	11g	Test Freq. (MHz)	2437
Power Phase	Neutral	Test configuration	1



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.162	28.77	55.34	-26.57	19.14	9.59	0.04	Average
2	0.162	36.16	65.34	-29.18	26.53	9.59	0.04	QP
3	0.282	36.01	50.76	-14.75	26.40	9.57	0.04	Average
4	0.282	36.29	60.76	-24.47	26.68	9.57	0.04	QP
5@	0.561	39.67	46.00	-6.33	30.04	9.59	0.04	Average
6	0.561	39.36	56.00	-16.64	29.73	9.59	0.04	QP
7	1.123	35.42	46.00	-10.58	25.73	9.65	0.04	Average
8	1.123	35.41	56.00	-20.59	25.72	9.65	0.04	QP
9	4.478	13.87	46.00	-32.13	3.99	9.71	0.17	Average
10	4.478	23.31	56.00	-32.69	13.43	9.71	0.17	QP
11	19.122	28.15	50.00	-21.85	18.18	9.72	0.25	Average
12	19.122	34.18	60.00	-25.82	24.21	9.72	0.25	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).
2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).

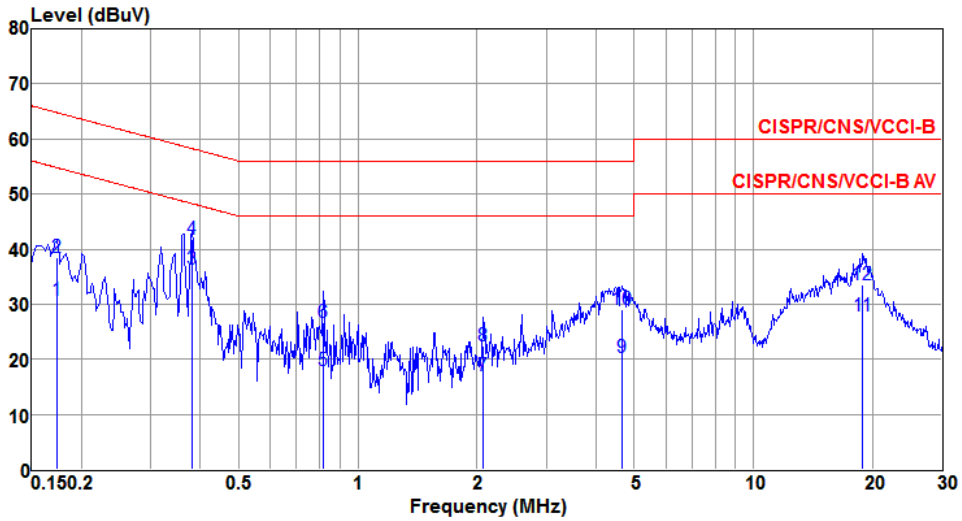
Modulation	11g	Test Freq. (MHz)	2437
Power Phase	Line	Test configuration	2



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.156	32.81	55.69	-22.88	23.27	9.50	0.04	Average
2	0.156	40.97	65.69	-24.72	31.43	9.50	0.04	QP
3@	0.381	34.41	48.25	-13.84	24.78	9.59	0.04	Average
4	0.381	39.65	58.25	-18.60	30.02	9.59	0.04	QP
5	0.817	16.89	46.00	-29.11	7.36	9.49	0.04	Average
6	0.817	26.52	56.00	-29.48	16.99	9.49	0.04	QP
7	2.066	15.24	46.00	-30.76	5.56	9.63	0.05	Average
8	2.066	19.51	56.00	-36.49	9.83	9.63	0.05	QP
9	4.292	18.24	46.00	-27.76	8.59	9.49	0.16	Average
10	4.292	26.21	56.00	-29.79	16.56	9.49	0.16	QP
11	18.920	25.65	50.00	-24.35	15.69	9.71	0.25	Average
12	18.920	31.56	60.00	-28.44	21.60	9.71	0.25	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).
2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).

Modulation	11g	Test Freq. (MHz)	2437
Power Phase	Neutral	Test configuration	2



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.174	30.61	54.77	-24.16	20.98	9.59	0.04	Average
2	0.174	38.36	64.77	-26.41	28.73	9.59	0.04	QP
3@	0.381	36.32	48.25	-11.93	26.74	9.54	0.04	Average
4	0.381	41.75	58.25	-16.50	32.17	9.54	0.04	QP
5	0.817	18.03	46.00	-27.97	8.35	9.64	0.04	Average
6	0.817	26.71	56.00	-29.29	17.03	9.64	0.04	QP
7	2.077	17.06	46.00	-28.94	7.48	9.53	0.05	Average
8	2.077	22.46	56.00	-33.54	12.88	9.53	0.05	QP
9	4.672	20.40	46.00	-25.60	10.52	9.71	0.17	Average
10	4.672	29.07	56.00	-26.93	19.19	9.71	0.17	QP
11	18.920	27.85	50.00	-22.15	17.89	9.71	0.25	Average
12	18.920	33.54	60.00	-26.46	23.58	9.71	0.25	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).
2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).

4.2 Radiated Emissions

4.2.1 Limit of Radiated Emissions

Restricted Band Emissions Limit			
Frequency Range (MHz)	**Field Strength (uV/m)**	**Field Strength (dBuV/m)**	**Measure Distance (m)**
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300
0.490~1.705	24000/F(kHz)	33.8 - 23	30
1.705~30.0	30	29	30
30~88	100	40	3
88~216	150	43.5	3
216~960	200	46	3
Above 960	500	54	3

Note 1:
Qusai-Peak value is measured for frequency below 1GHz except for 9–90 kHz, 110–490 kHz frequency band. Peak and average value are measured for frequency above 1GHz. The limit on average radio frequency emission is as above table. The limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit
Note 2:
Measurements may be performed at a distance other than what is specified provided. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor as below, Frequency at or above 30 MHz: 20 dB/decade Frequency below 30 MHz: 40 dB/decade.

4.2.2 Test Procedures

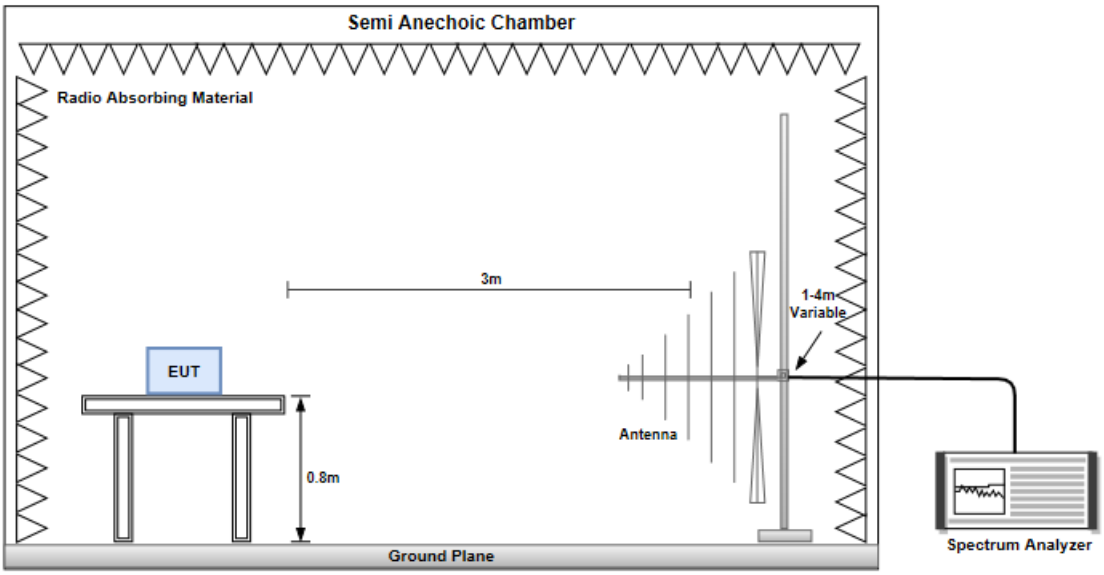
1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission frequency. The EUT is placed at test table. For emissions testing at or below 1 GHz, the table height is 80 cm above the reference ground plane. For emission measurements above 1 GHz, the table height is 1.5 m
2. Measurement is made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna is varied in height (1m ~ 4m) above the reference ground plane to obtain the maximum signal strength. Distance between EUT and antenna is 3 m.
3. This investigation is performed with the EUT rotated 360°, the antenna height scanned between 1 m and 4 m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations.

Note:

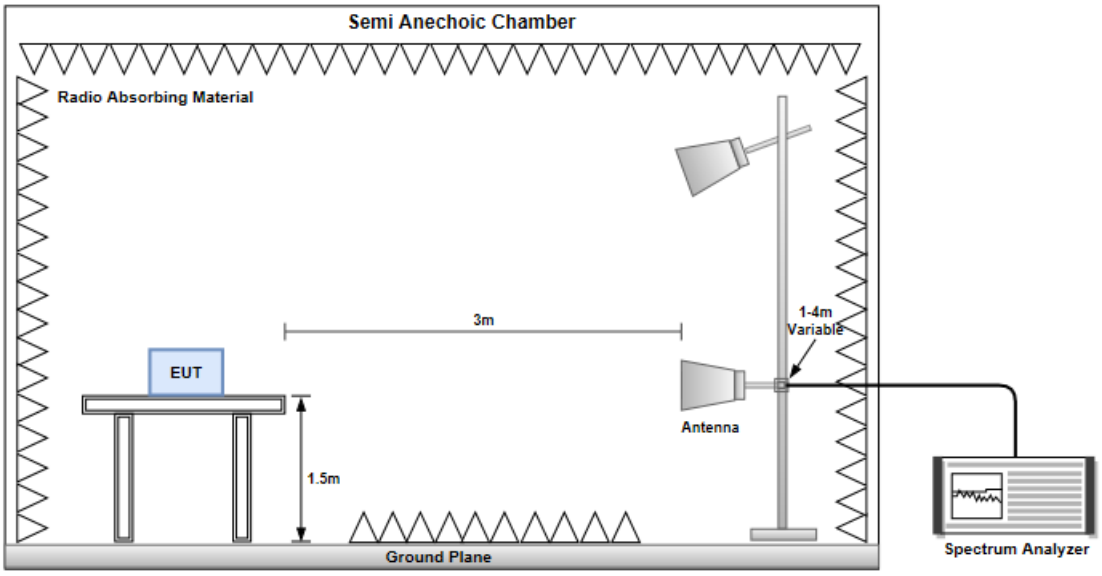
1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
2. RBW=1MHz, VBW=3MHz and Peak detector is for peak measured value of radiated emission above 1GHz.
3. RBW=1MHz, VBW=3MHz and RMS detector is for average measured value of radiated emission above 1GHz.

4.2.3 Test Setup

Radiated Emissions below 1 GHz

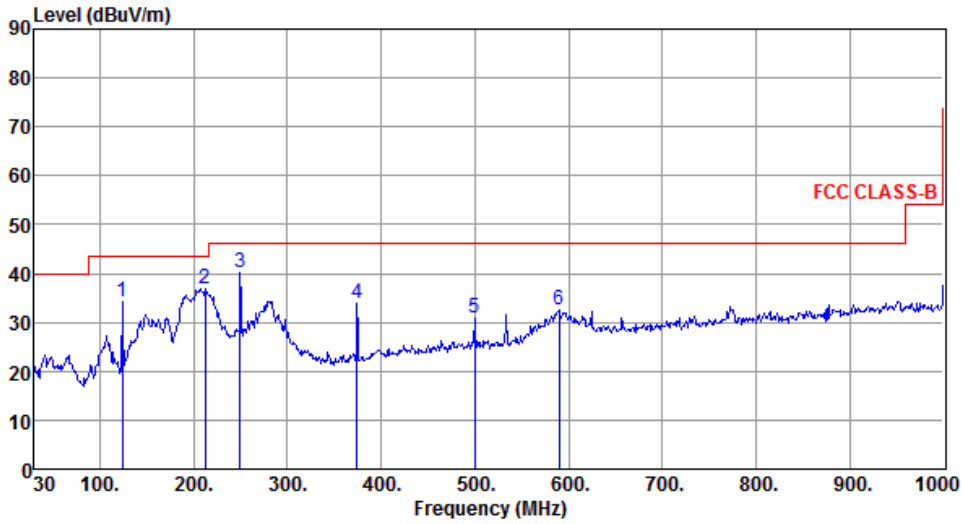


Radiated Emissions above 1 GHz



4.2.4 Receiver Emissions (Below 1GHz)

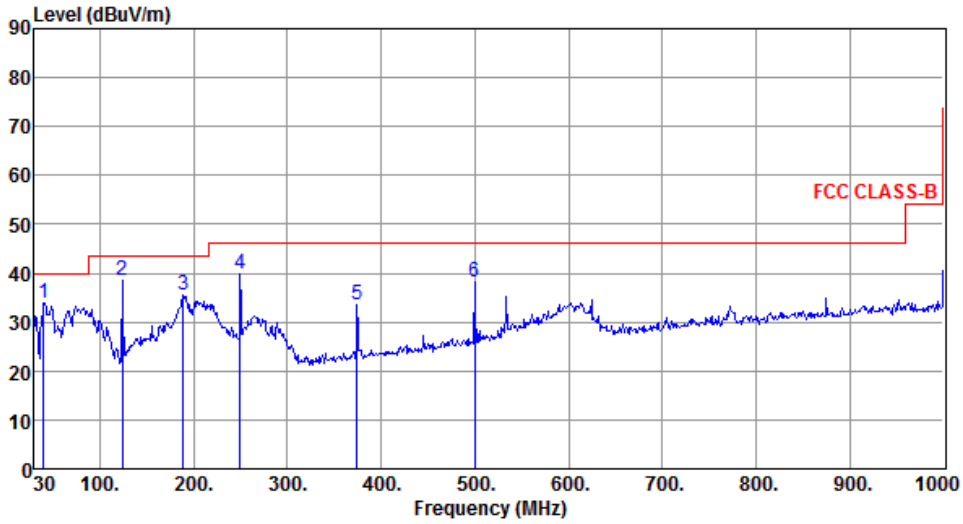
Modulation	11g	**Test Freq. (MHz)**	2437
Polarization	Horizontal	**Test configuration**	1



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	124.09	34.15	43.50	-9.35	44.76	-10.61	Peak	---	---
2	212.36	36.93	43.50	-6.57	48.01	-11.08	Peak	---	---
3	249.22	40.34	46.00	-5.66	49.77	-9.43	Peak	---	---
4	374.35	33.95	46.00	-12.05	39.93	-5.98	Peak	---	---
5	499.48	30.81	46.00	-15.19	34.06	-3.25	Peak	---	---
6	589.69	32.66	46.00	-13.34	33.85	-1.19	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

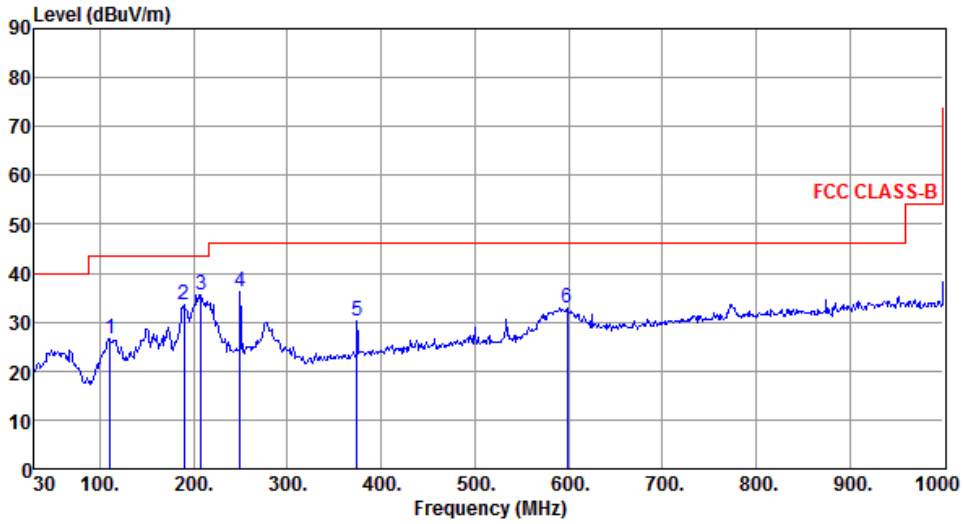
Modulation	11g	Test Freq. (MHz)	2437
Polarization	Vertical	Test configuration	1



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	39.70	33.87	40.00	-6.13	42.61	-8.74	Peak	---	---
2	124.09	38.64	43.50	-4.86	49.25	-10.61	Peak	---	---
3	189.08	35.40	43.50	-8.10	46.16	-10.76	Peak	---	---
4	249.22	39.97	46.00	-6.03	49.40	-9.43	Peak	---	---
5	374.35	33.60	46.00	-12.40	39.58	-5.98	Peak	---	---
6	499.48	38.08	46.00	-7.92	41.33	-3.25	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

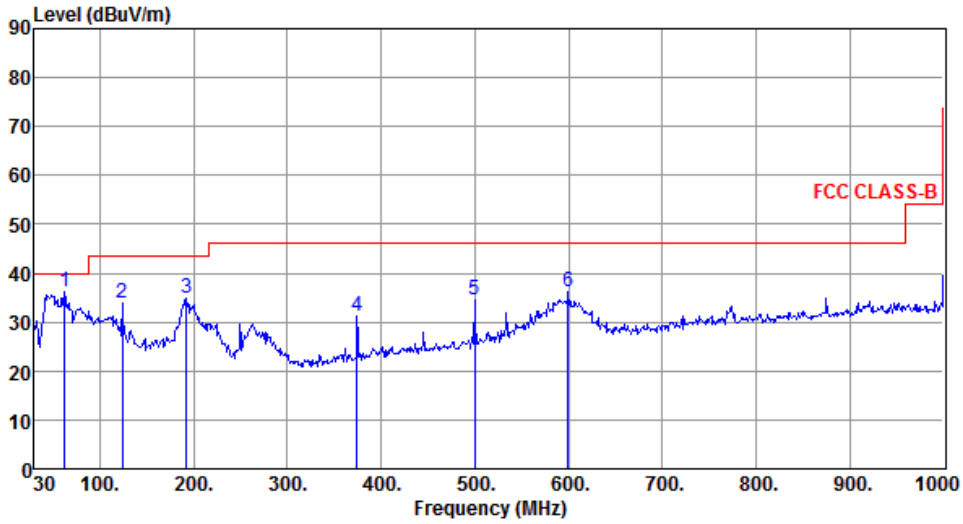
Modulation	11g	Test Freq. (MHz)	2437
Polarization	Horizontal	Test configuration	2



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	110.51	26.58	43.50	-16.92	38.36	-11.78	Peak	---	---
2	190.05	33.63	43.50	-9.87	44.46	-10.83	Peak	---	---
3	207.51	35.47	43.50	-8.03	46.58	-11.11	Peak	---	---
4	249.22	36.37	46.00	-9.63	45.80	-9.43	Peak	---	---
5	374.35	30.27	46.00	-15.73	36.25	-5.98	Peak	---	---
6	598.42	32.87	46.00	-13.13	33.82	-0.95	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

Modulation	11g	Test Freq. (MHz)	2437
Polarization	Vertical	Test configuration	2

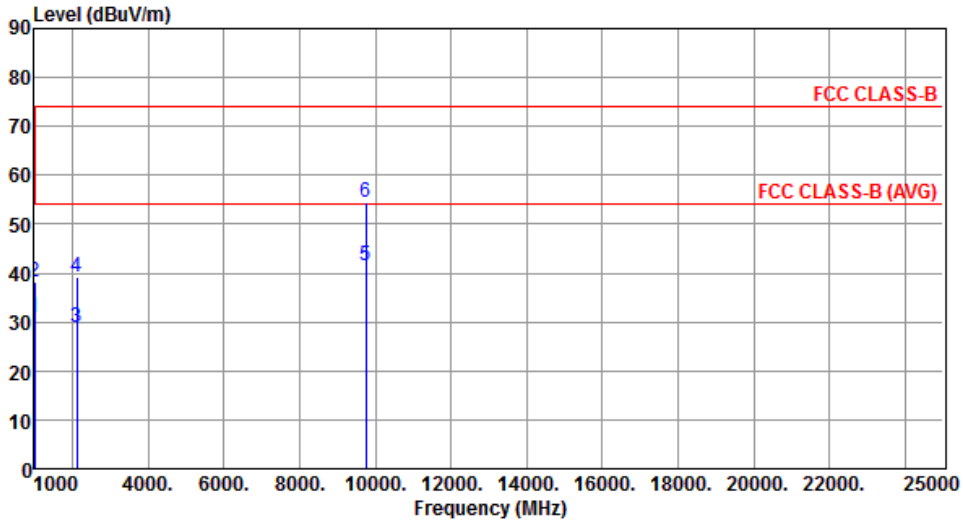


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	62.01	36.15	40.00	-3.85	45.42	-9.27	Peak	---	---
2	124.09	33.82	43.50	-9.68	44.43	-10.61	Peak	---	---
3	191.99	34.72	43.50	-8.78	45.63	-10.91	Peak	---	---
4	374.35	31.07	46.00	-14.93	37.05	-5.98	Peak	---	---
5	499.48	34.43	46.00	-11.57	37.68	-3.25	Peak	---	---
6	599.39	36.22	46.00	-9.78	37.15	-0.93	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

4.2.5 Receiver Emissions (Above 1GHz)

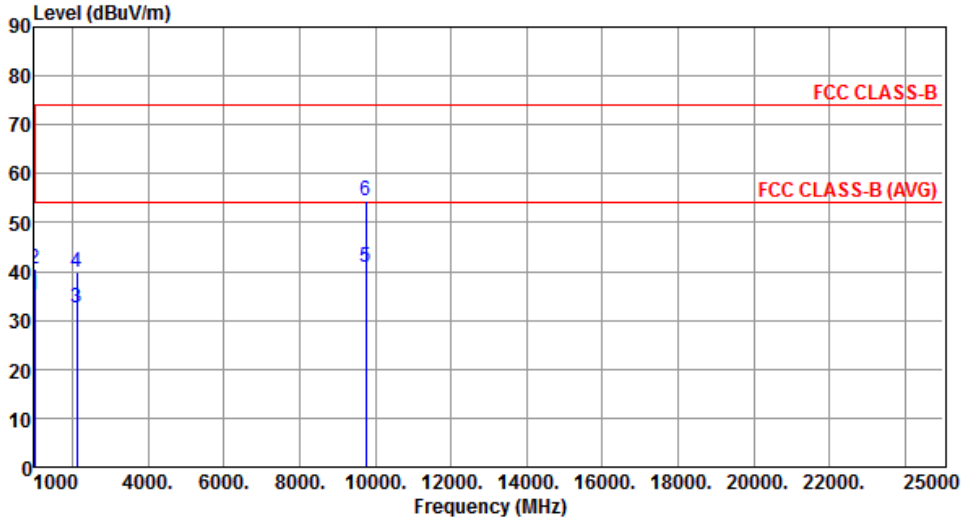
Modulation	11g	Test Freq. (MHz)	2437
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	1000.10	30.76	54.00	-23.24	39.76	-9.00	Average	100	324
2	1000.10	38.26	74.00	-35.74	47.26	-9.00	Peak	100	324
3	2133.00	28.94	54.00	-25.06	32.04	-3.10	Average	135	322
4	2133.00	39.04	74.00	-34.96	42.14	-3.10	Peak	135	322
5	9748.00	41.64	54.00	-12.36	28.53	13.11	Average	100	168
6	9748.00	54.35	74.00	-19.65	41.24	13.11	Peak	100	168

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Modulation	11g	Test Freq. (MHz)	2437
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	1000.10	35.21	54.00	-18.79	44.21	-9.00	Average	100	43
2	1000.10	40.45	74.00	-33.55	49.45	-9.00	Peak	100	43
3	2133.00	32.49	54.00	-21.51	35.59	-3.10	Average	124	0
4	2133.00	39.96	74.00	-34.04	43.06	-3.10	Peak	124	0
5	9748.00	40.90	54.00	-13.10	27.79	13.11	Average	100	156
6	9748.00	54.31	74.00	-19.69	41.20	13.11	Peak	100	156

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

5 Test laboratory information

Established in 2012, ICC provides foremost EMC & RF Testing and advisory consultation services by our skilled engineers and technicians. Our services employ a wide variety of advanced edge test equipment and one of the widest certification extents in the business.

International Certification Corp (EMC and Wireless Communication Laboratory), it is our definitive objective is to institute long term, trust-based associations with our clients. The expectation we set up with our clients is based on outstanding service, practical expertise and devotion to a certified value structure. Our passion is to grant our clients with best EMC / RF services by oriented knowledgeable and accommodating staff.

Our Test sites are located at Linkou District and Kwei Shan District. Location map can be found on our website http://www.icertifi.com.tw.

Linkou	**Kwei Shan**	**Kwei Shan Site II**
Tel: 886-2-2601-1640	Tel: 886-3-271-8666	Tel: 886-3-271-8640
No. 30-2, Ding Fwu Tsuen, Lin Kou District, New Taipei City, Taiwan, R.O.C.	No. 3-1, Lane 6, Wen San 3rd St., Kwei Shan District, Tao Yuan City 333, Taiwan, R.O.C.	No. 14-1, Lane 19, Wen San 3rd St., Kwei Shan District, Tao Yuan City 333, Taiwan, R.O.C.

If you have any suggestion, please feel free to contact us as below information.

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