FCC15.247 Test Report

Applicant	:	SHENZHEN TENA ELECTRONIC CO., LTD.
Product	:	Multi-Screen Interactive Device
Model No.	:	S311A
FCC ID	:	SGRS311A0001
Standards	:	FCC CFR Title 47 Part 15 Subpart C: 2013
		ANSI C63.4: 2009
		ANSI C63.10: 2009
Test Date	:	September 30, 2013 ~ November 01, 2013

Reviewed By : Sunny Sun

(Engineer: Sunny Sun)

Approved By : Marlin Chen

(Manager: Marlin Chen)

Revision History

Report No.	Version	Description	Issue Date
1309RSU00501	Rev. 01	Initial report	2013-11-02

Test Summary

FCC Part Section(s)	Test Description	Test Result (Pass/Fail)	Reference
15.207	Conducted Emission	Pass	Section 3
15.205 15.209	Radiated Emission	Pass	Section 4
15.247(d)	RF Antenna Conducted Spurious	Pass	Section 5
15.247(d)	Radiated Emission Band Edge	Pass	Section 6
15.215(c)	Operation Frequency Range of 20dB Bandwidth	Pass	Section 7
15.247(a)(2)	Occupied Bandwidth	Pass	Section 8
15.247(b)(3)	Power Output	Pass	Section 9
15.247(e)	Power Spectral Density	Pass	Section 10

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Description Page

1. General Information

1.1. Applicant

SHENZHEN TENA ELECTRONIC CO., LTD.
9 Floor IER Building, South Area, Hi-Tech Industrial Park, Shenzhen, China

1.2. Manufacturer

SHENZHEN TENA ELECTRONIC CO., LTD.
9 Floor IER Building, South Area, Hi-Tech Industrial Park, Shenzhen, China

1.3. Feature of Product

Product Name	Multi-Screen Interactive Device
Model No.	S311A
Frequency Range	802.11b/g/n(20MHz): 2412 ~ 2462 MHz 802.11n(40MHz): 2422 ~ 2452MHz
Channel Number	802.11b/g/n(20MHz): 11 802.11 n(40MHz): 7
Type of Modulation	802.11b: DSSS 802.11g/n: OFDM
Data Rate	802.11g: 6/9/12/18/24/36/48/54 Mbps 802.11b: 1/2/5.5/11 Mbps 802.11n: up to 150 Mbps
Channel Control	Auto
Antenna Type	Internal
Peak Antenna Gain	-2.0dBi

Channel List for 802.11b/g/n(20MHz)

Channel	Frequency	Channel	Frequency	Channel	Frequency
01	2412 MHz	02	2417 MHz	03	2422 MHz
04	2427 MHz	05	2432 MHz	06	2437 MHz
07	2442 MHz	08	2447 MHz	09	2452 MHz
10	2457 MHz	11	2462 MHz	N/A	N/A

Channel List for 802.11n(40MHz)

Channel	Frequency	Channel	Frequency	Channel	Frequency
03	2422 MHz	04	2427 MHz	05	2432 MHz
06	2437 MHz	07	2442 MHz	08	2447 MHz
09	2452 MHz	N/A	N/A	N/A	N/A

1.4. Testing Facility

Test Site	MRT Technology (Suzhou) Co., Ltd
Test Site Location	D8 Building, Youxin Industrial Park, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China
Registration No.	809388

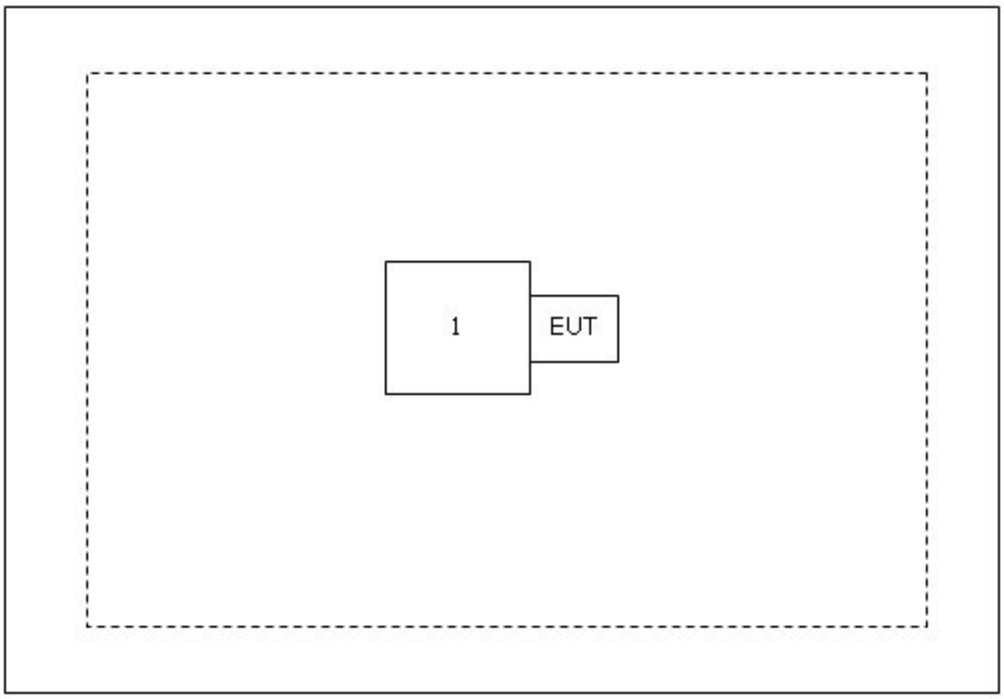
2. Test Configuration of Equipment Under Test

2.1. Test Mode

Test Mode
Mode 1: Transmit by 802.11b
Mode 2: Transmit by 802.11g
Mode 3: Transmit by 802.11n(20MHz)
Mode 4: Transmit by 802.11n(40MHz)

2.2. Configuration of Tested System

Connection Diagram



Signal Cable Type		Signal cable Description
A	N/A	N/A

2.3. Test System Details

The types for all equipments, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product		Manufacturer	Model No.	Serial No.	Power Cord
1	Notebook	HP	HP 520	CND7480N5S	Non-Shielded, 1.8m

2.4. Test Software

Turn on the power of all equipment, then run the RF test software “Secure CRT 4.1” provided by applicant, and set the test mode and channel, then press OK to start continue transmit.

3. Conducted Emission

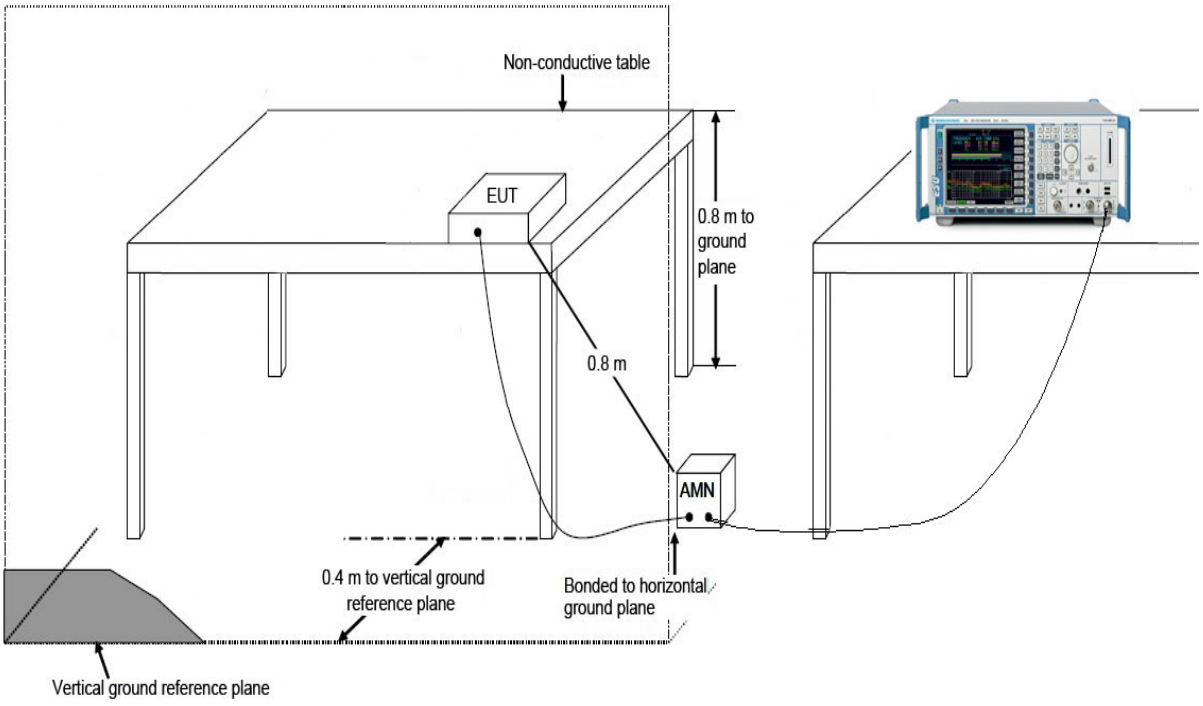
3.1. Limit of Conducted Emission

FCC Part 15 Subpart C Paragraph 15.207 Limits		
Frequency (MHz)	QP (dBuV)	AV (dBuV)
0.15 - 0.50	66 - 56	56 – 46
0.50 - 5.0	56	46
5.0 - 30	60	50

Note 1: The lower limit shall apply at the transition frequencies.

Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz.

3.2. Test Setup



3.3. Test Procedure

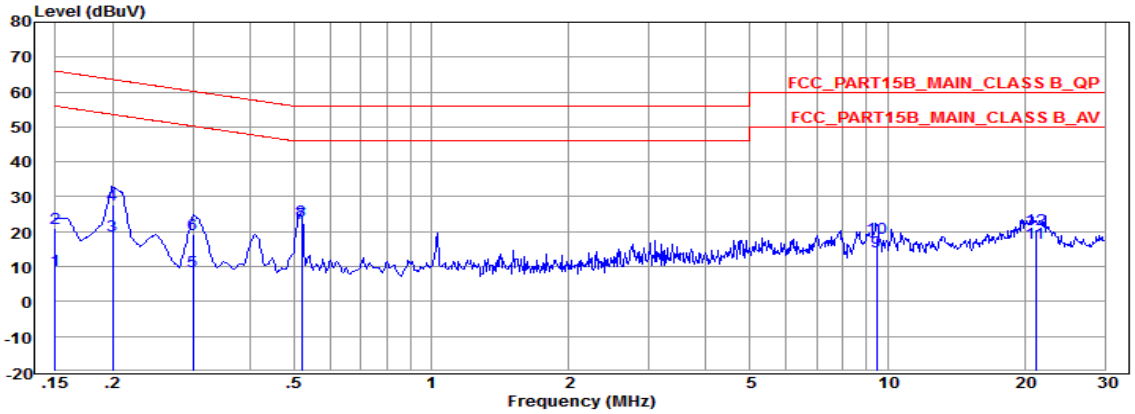
The EUT was setup according to ANSI C63.4, 2009 and tested according to KDB 558074 for compliance to FCC 47CFR 15.247 requirements. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface. The EUT and simulators are connected to the main power through a line impedance stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs) Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.

The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.

Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.

3.4. Test Result

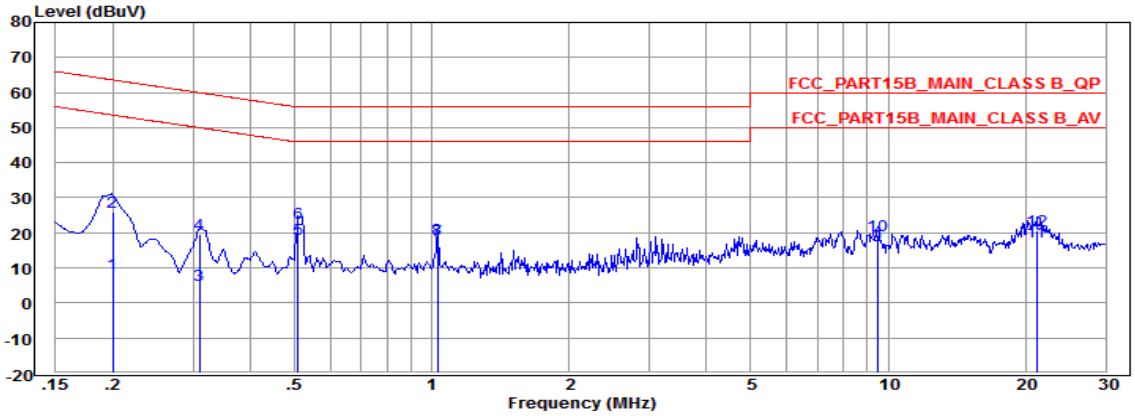
Tested by	Roy	Test Data	2013-10-18- 17:44:12
Site	SR2	Power	AC 120V/60Hz
Limit	FCC_PART15B_MAIN_CLASS B	Polarity	Line
AMN	LISN_101683-FILTER ON	Test Mode	Mode 1
EUT	Multi-Screen Interactive Device		



Freq (MHz)	Level (dBuV)	Reading (dBuV)	Detector	AMN Factor (dB)	Cable Loss (dB)	Limit (dBuV)	Over Limit (dB)
0.15	8.83	-7.00	AV	9.82	6.01	56.00	-47.17
0.15	21.03	5.20	QP	9.82	6.01	66.00	-44.97
0.20	18.92	3.00	AV	9.91	6.01	53.61	-34.69
0.20	27.82	11.90	QP	9.91	6.01	63.61	-35.79
0.30	8.73	-7.30	AV	10.02	6.01	50.24	-41.51
0.30	19.13	3.10	QP	10.02	6.01	60.24	-41.11
0.52	22.55	6.39	AV	10.14	6.02	46.00	-23.45
0.52	23.05	6.89	QP	10.14	6.02	56.00	-32.95
9.48	14.35	-1.80	AV	9.75	6.40	50.00	-35.65
9.48	18.25	2.10	QP	9.75	6.40	60.00	-41.75
21.15	16.84	0.70	AV	9.81	6.33	50.00	-33.16
21.15	20.54	4.40	QP	9.81	6.33	60.00	-39.46

Remarks: Level = Reading + AMN Factor + Cable Loss

Tested by	Roy	Test Data	2013-10-18- 17:51:16
Site	SR2	Power	AC 120V/60Hz
Limit	FCC_PART15B_MAIN_CLASS B	Polarity	Neutral
AMN	LISN_101683-FILTER ON	Test Mode	Mode 1
EUT	Multi-Screen Interactive Device		



Freq (MHz)	Level (dBuV)	Reading (dBuV)	Detector	AMN Factor (dB)	Cable Loss (dB)	Limit (dBuV)	Over Limit (dB)
0.20	8.16	-7.80	AV	9.95	6.01	53.61	-45.45
0.20	25.76	9.80	QP	9.95	6.01	63.61	-37.85
0.31	4.97	-11.10	AV	10.06	6.01	49.97	-45.00
0.31	19.57	3.50	QP	10.06	6.01	59.97	-40.40
0.51	18.18	2.00	AV	10.16	6.02	46.00	-27.82
0.51	22.88	6.70	QP	10.16	6.02	56.00	-33.12
1.03	17.71	1.80	AV	9.89	6.02	46.00	-28.29
1.03	18.01	2.10	QP	9.89	6.02	56.00	-37.99
9.48	16.37	0.20	AV	9.77	6.40	50.00	-33.63
9.48	19.37	3.20	QP	9.77	6.40	60.00	-40.63
21.15	17.59	1.40	AV	9.86	6.33	50.00	-32.41
21.15	20.59	4.40	QP	9.86	6.33	60.00	-39.41

Remarks: Level = Reading + AMN Factor + Cable Loss

4. Radiated Emission

4.1. Limit

FCC Part 15 Subpart C Paragraph 15.209		
Frequency (MHz)	Distance (m)	Level (dBuV/m)
30 - 88	3	40
88 - 216	3	43.5
216 - 960	3	46
Above 960	3	54

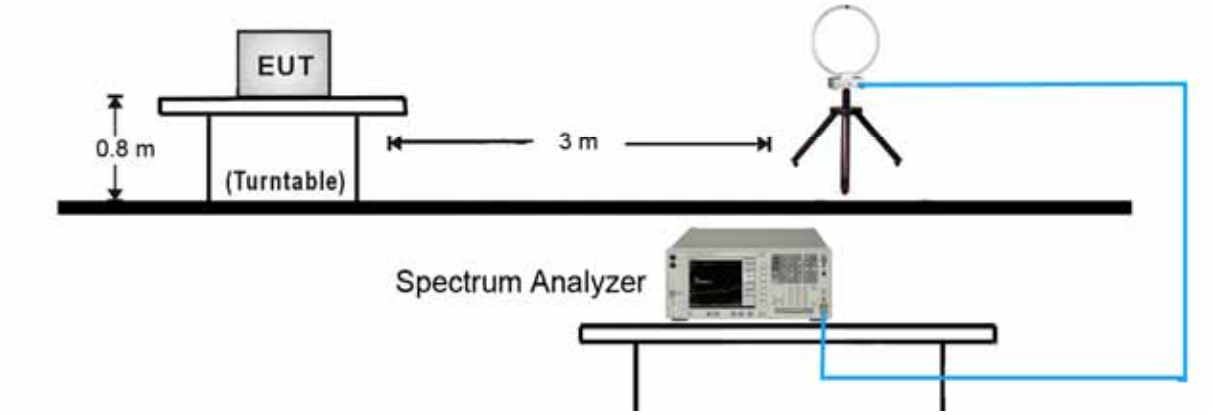
Note 1: The lower limit shall apply at the transition frequency.

Note 2: Distance refers to the distance in meters between the measuring instrument Antenna and the closed point of any part of the device or system.

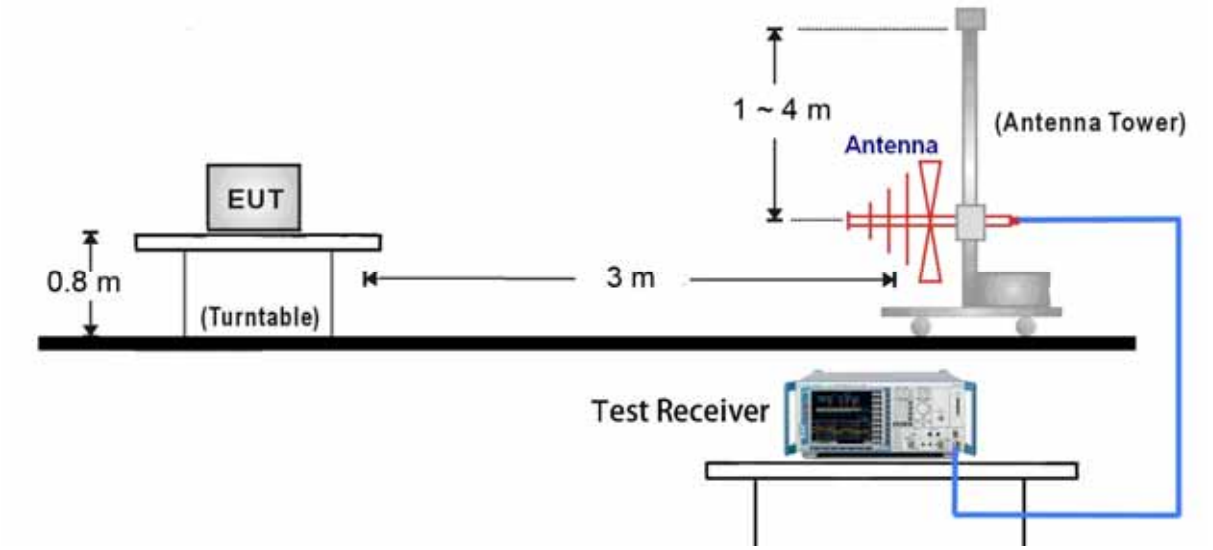
Note 3: E field strength (dBuV/m) = 20 log E field strength (uV/m)

4.2. Test Setup

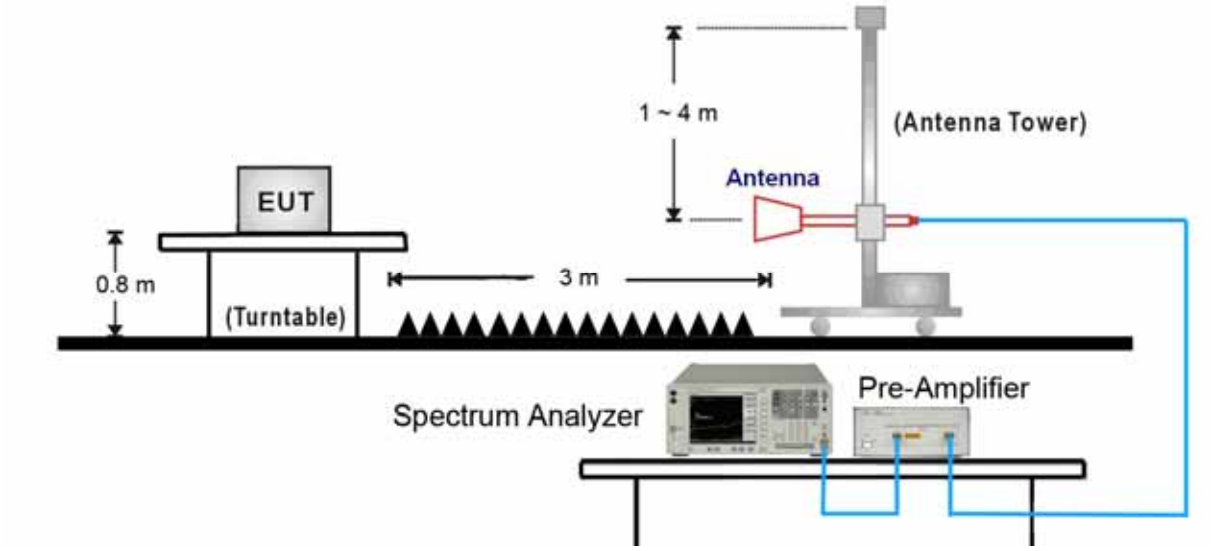
Below 30MHz Test Setup:



Below 1GHz Test Setup:



Above 1GHz Test Setup:



4.3. Test Procedure

The EUT was setup according to ANSI C63.4, 2009 and tested according to KDB 558074 forcompliance to FCC 47CFR 15.247 requirements.

The EUT is placed on a turn table which is 0.8 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from Antenna to the EUT was 3 meters.

The Antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the Antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.4:2009 on radiated measurement.

The resolution bandwidth below 1GHz setting on the field strength meter is 120 kHz and above 1GHz is 1MHz.The frequency range from 30MHz to 10th harmonic is checked.

Note: When doing emission measurement above 1GHz, the horn Antenna will be bended down a little (as horn Antenna has the narrow beamwidth) in order to keeping the Antenna in the “cone of radiation” of EUT. The 3dB beamwidth is 10~60 degrees for H-plane and 10~90 degrees for E-plane.

4.4. Test Result

All of the test result shown indicates the worst case, and spectrum analyzer parameters setting as shown below:

Peak detector: RBW = 1MHz, VBW = 3MHz, sweep time = 200ms;

Average detector: RBW = 1MHz, VBW = 10Hz, sweep time = auto.

Measure Level = Reading Level + Cable Loss + Antenna Factor - Preamplifier Gain

Mode1: Transmit by 802.11b

CH	Antenna	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	H	3060.5	37.7	8.1	45.8	54(Note3)	-28.3	PK
	V	3177.7	37.9	8.4	46.3	54(Note3)	-27.7	PK
	H	4825.0	46.3	9.4	55.7	74	-18.3	PK
	H	4823.9	44.4	9.4	53.8	54	-0.3	AV
	V	4825.0	47.3	9.4	56.7	74	-17.3	PK
	V	4824.0	43.6	9.4	53.0	54	-1.0	AV
	H	7236.0	35.2	13.2	48.4	54(Note3)	-25.6	PK
	V	7236.0	35.3	13.2	48.5	54(Note3)	-25.5	PK
	H	9648.0	34.0	14.7	48.7	54(Note3)	-25.3	PK
	V	9648.0	34.2	14.7	48.9	54(Note3)	-25.1	PK
6	H	2990.5	37.6	8.0	45.6	54(Note3)	-28.4	PK
	V	3196.1	37.1	8.5	45.6	54(Note3)	-28.4	PK
	H	4894.0	47.8	9.6	57.4	74	-16.6	PK
	H	4894.0	43.3	9.6	52.9	54	-1.1	AV
	V	4894.0	48.0	9.6	57.5	74	-16.5	PK
	V	4894.0	43.4	9.6	52.9	54	-1.1	AV
	H	7311.0	32.6	13.4	46.1	54(Note3)	-27.9	PK
	V	7311.0	32.4	13.4	45.8	54(Note3)	-28.2	AV
	H	9748.0	32.6	15.2	47.8	54(Note3)	-26.2	PK
	V	9748.0	31.9	15.2	47.0	54(Note3)	-27.0	PK
11	H	3025.3	37.8	8.0	45.8	54(Note3)	-28.2	PK
	V	3196.1	39.0	8.4	47.4	54(Note3)	-26.6	PK
	H	4927.0	41.1	9.6	50.7	54(Note3)	-23.3	PK

	V	4927.0	46.0	9.6	55.5	74	-18.5	PK
	V	4924.0	44.2	9.6	53.8	54	-0.2	AV
	H	7386.0	32.3	13.5	45.8	54(Note3)	-28.2	PK
	V	7386.0	31.7	13.5	45.2	54(Note3)	-28.8	PK
	H	9848.0	32.9	15.4	48.3	54(Note3)	-25.7	PK
	V	9848.0	33.2	15.4	48.5	54(Note3)	-25.5	PK

Note: 1. Measure Level = Reading Level + Factor.

2. The test trace is same as the ambient noise (the test frequency range: 9kHz~30MHz, 18GHz~25GHz), therefore no data appear in the report.

3. This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.

Mode2: Transmit by 802.11g

CH	Antenna	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	H	2990.5	38.0	8.0	46.0	54(Note3)	-28.0	PK
	V	3214.6	38.0	8.5	46.5	54(Note3)	-27.5	PK
	H	4825.0	40.2	9.4	49.6	54(Note3)	-24.4	PK
	V	4825.0	45.8	9.4	55.2	74	-18.8	PK
	V	4824.0	37.5	9.4	46.9	54	-7.2	AV
	H	7236.0	34.2	13.2	47.4	54(Note3)	-26.7	PK
	V	7236.0	34.0	13.2	47.2	54(Note3)	-26.8	PK
	H	9648.0	31.5	14.7	46.2	54(Note3)	-27.8	PK
	V	9648.0	32.0	14.7	46.7	54(Note3)	-27.3	PK
6	H	3060.5	37.8	8.1	45.9	54(Note3)	-28.1	PK
	V	3177.7	39.1	8.4	47.5	54(Note3)	-26.5	PK
	H	4874.0	43.5	9.6	53.1	54(Note3)	-20.9	PK
	V	4874.0	48.6	9.6	58.2	74.0	-15.8	PK
	V	4874.0	35.3	9.6	44.9	54.0	-9.1	AV
	H	7311.0	32.1	13.4	45.5	54(Note3)	-28.5	PK
	V	7311.0	33.6	13.4	47.0	54(Note3)	-27.0	PK
	H	9748.0	32.2	15.2	47.3	54(Note3)	-26.7	PK
	V	9748.0	31.7	15.2	46.9	54(Note3)	-27.1	PK
11	H	3196.1	37.9	8.5	46.4	54(Note3)	-27.6	PK
	V	3159.4	37.1	8.4	45.5	54(Note3)	-28.5	PK

	H	4924.0	44.4	9.6	53.9	54(Note3)	-20.1	PK
	V	4927.0	46.8	9.6	56.4	74.0	-17.6	PK
	V	4924.0	35.2	9.6	44.8	54.0	-9.2	AV
	H	7386.0	32.2	13.5	45.7	54(Note3)	-28.3	PK
	V	7386.0	30.7	13.5	44.2	54(Note3)	-29.8	PK
	H	9848.0	32.9	15.4	48.3	54(Note3)	-25.7	PK
	V	9848.0	33.0	15.4	48.3	54(Note3)	-25.7	PK

Note: 1. Measure Level = Reading Level + Factor.

2. The test trace is same as the ambient noise (the test frequency range: 9kHz~30MHz, 18GHz~25GHz), therefore no data appear in the report.

3. This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.

Mode3: Transmit by 802.11n (20MHz)

CH	Antenna	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	H	3214.6	37.9	8.5	46.4	54(Note3)	-27.6	PK
	V	3196.1	38.2	8.5	46.7	54(Note3)	-27.3	PK
	H	4825.0	42.7	9.4	52.1	54(Note3)	-21.9	PK
	V	4825.0	45.8	9.4	55.2	74.0	-18.8	PK
	V	4824.0	39.1	9.4	48.5	54.0	-5.5	AV
	H	7236.0	33.8	13.2	47.0	54(Note3)	-27.0	PK
	V	7236.0	33.2	13.2	46.4	54(Note3)	-27.6	PK
	H	9648.0	32.7	14.7	47.4	54(Note3)	-26.6	PK
	V	9648.0	32.6	14.7	47.3	54(Note3)	-26.7	PK
6	H	3196.1	38.2	8.5	46.7	54(Note3)	-27.3	PK
	V	3042.9	37.7	8.0	45.7	54(Note3)	-28.3	PK
	H	4874.0	45.1	9.6	54.7	74.0	-19.3	PK
	H	4874.0	37.0	9.6	46.6	54.0	-7.4	AV
	V	4874.0	50.2	9.6	59.7	74.0	-14.3	PK
	V	4874.0	41.1	9.6	50.6	54.0	-3.4	AV
	H	7311.0	32.5	13.4	45.9	54(Note3)	-28.1	PK
	V	7311.0	32.8	13.4	46.2	54(Note3)	-27.8	PK
	H	9748.0	31.8	15.2	47.0	54(Note3)	-27.0	PK
	V	9748.0	32.9	15.2	48.0	54(Note3)	-26.0	PK

11	H	3123.0	38.2	8.2	46.4	54(Note3)	-27.6	PK
	V	3177.7	37.7	8.5	46.2	54(Note3)	-27.9	PK
	H	4927.0	47.6	9.6	57.2	74.0	-16.8	PK
	H	4924.0	38.2	9.6	47.8	54.0	-6.2	AV
	V	4927.0	49.3	9.6	58.9	74.0	-15.1	PK
	V	4924.0	39.0	9.6	48.6	54.0	-5.4	AV
	H	7386.0	32.0	13.5	45.5	54(Note3)	-28.5	PK
	V	7386.0	32.0	13.5	45.5	54(Note3)	-28.5	PK
	H	9848.0	33.0	15.4	48.3	54(Note3)	-5.7	PK
	V	9848.0	32.7	15.4	48.1	54(Note3)	-25.9	PK

Note: 1. Measure Level = Reading Level + Factor.

2. The test trace is same as the ambient noise (the test frequency range: 9kHz~30MHz, 18GHz~25GHz), therefore no data appear in the report.

3. This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.

Mode4: Transmit by 802.11n (40MHz)

CH	Antenna	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
3	H	3007.9	37.6	8.0	45.6	54(Note3)	-28.4	PK
	V	3177.7	38.9	8.4	47.3	54(Note3)	-26.7	PK
	H	4844.0	37.7	9.4	47.2	54(Note3)	-26.8	PK
	V	4844.0	38.0	9.4	47.4	54(Note3)	-26.6	PK
	H	7266.0	33.7	13.3	47.0	54(Note3)	-27.0	PK
	V	7266.0	33.5	13.3	46.8	54(Note3)	-27.2	PK
	H	9688.0	32.0	14.9	46.8	54(Note3)	-27.2	PK
	V	9688.0	31.0	14.9	45.8	54(Note3)	-28.2	PK
6	H	3060.5	38.3	8.1	46.4	54(Note3)	-27.6	PK
	V	3177.7	38.8	8.4	47.2	54(Note3)	-26.8	PK
	H	4874.0	36.6	9.6	46.1	54(Note3)	-27.9	PK
	V	4874.0	40.7	9.6	50.3	54(Note3)	-23.7	PK
	H	7311.0	32.2	13.4	45.7	54(Note3)	-28.3	PK
	V	7311.0	32.6	13.4	46.0	54(Note3)	-28.0	PK
	H	9748.0	32.1	15.2	47.2	54(Note3)	-26.8	PK
	V	9748.0	30.9	15.2	46.1	54(Note3)	-27.9	PK

9	H	3177.7	37.5	8.4	45.9	54(Note3)	-28.1	PK
	V	3123.0	38.9	8.2	47.1	54(Note3)	-26.9	PK
	H	4904.0	37.9	9.6	47.5	54(Note3)	-26.5	PK
	V	4904.0	42.0	9.6	51.6	54(Note3)	-22.4	PK
	H	7356.0	34.1	13.5	47.6	54(Note3)	-26.4	PK
	V	7356.0	33.6	13.5	47.1	54(Note3)	-26.9	PK
	H	9808.0	32.9	15.2	48.2	54(Note3)	-25.9	PK
	V	9808.0	32.1	15.2	47.3	54(Note3)	-26.7	PK

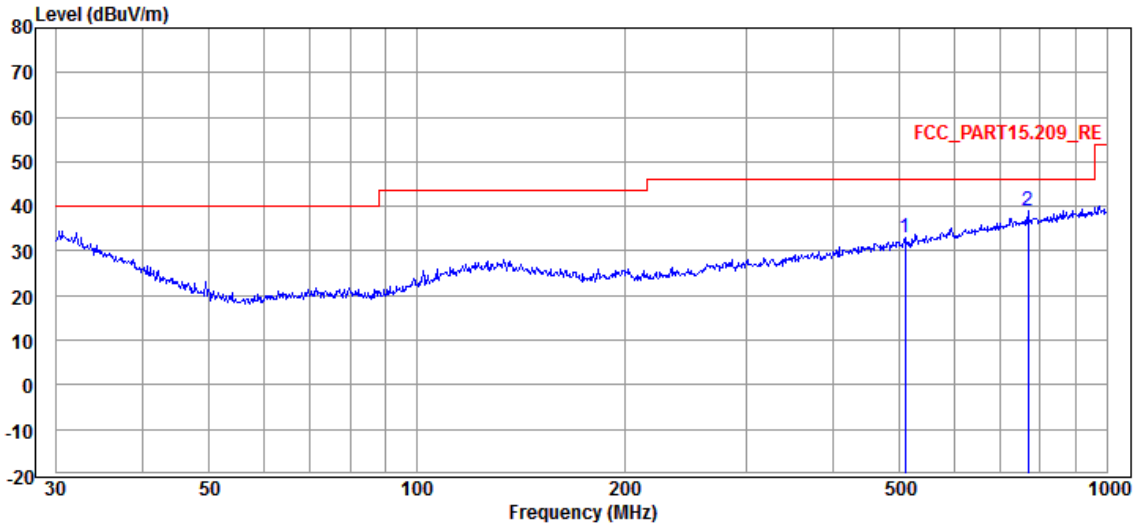
Note: 1. Measure Level = Reading Level + Factor.

2. The test trace is same as the ambient noise (the test frequency range: 9kHz~30MHz, 18GHz~25GHz), therefore no data appear in the report.

3. This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn’t be performed.

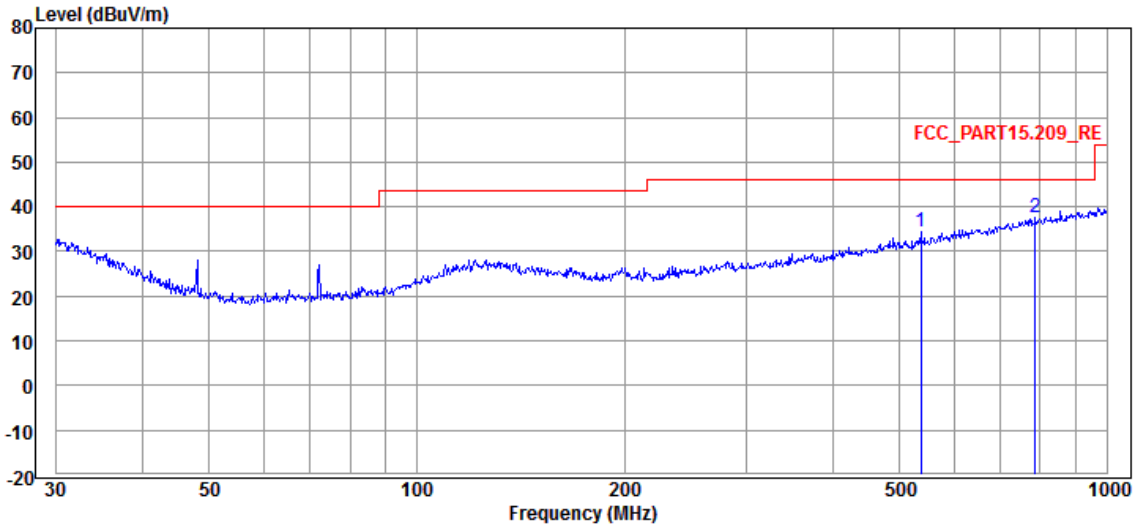
The worst case of Radiated Emission below 1GHz:

Tested by	Roy	Test Data	2013-10-31- 19:03:02
Site	AC1	Power	AC 120V/60Hz
Limit	FCC_PART15.209_RE	Polarity	Horizontal
Antenna	VULB_9162	Test Mode	Mode 1
EUT	Multi-Screen Interactive Device		



Freq (MHz)	Level (dBμV/m)	Reading (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector
510.04	32.88	13.46	18.00	1.42	46.00	-13.12	QP
768.75	38.91	15.80	21.38	1.73	46.00	-7.09	QP

Tested by	Roy	Test Data	2013-10-31- 19:02:50
Site	AC1	Power	AC 120V/60Hz
Limit	FCC_PART15.209_RE	Polarity	Vertical
Antenna	VULB_9162	Test Mode	Mode 1
EUT	Multi-Screen Interactive Device		



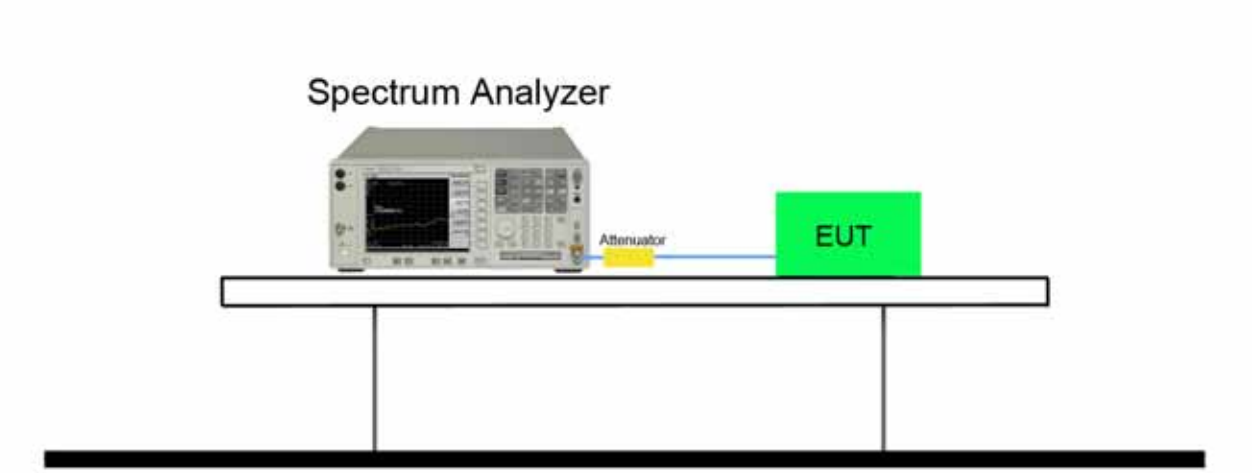
Freq (MHz)	Level (dBμV/m)	Reading (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector
537.59	34.33	14.78	18.12	1.43	46.00	-11.67	QP
787.85	37.71	14.71	21.25	1.75	46.00	-8.29	QP

5. RF Antenna Conducted Spurious

5.1. Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

5.2. Test Setup



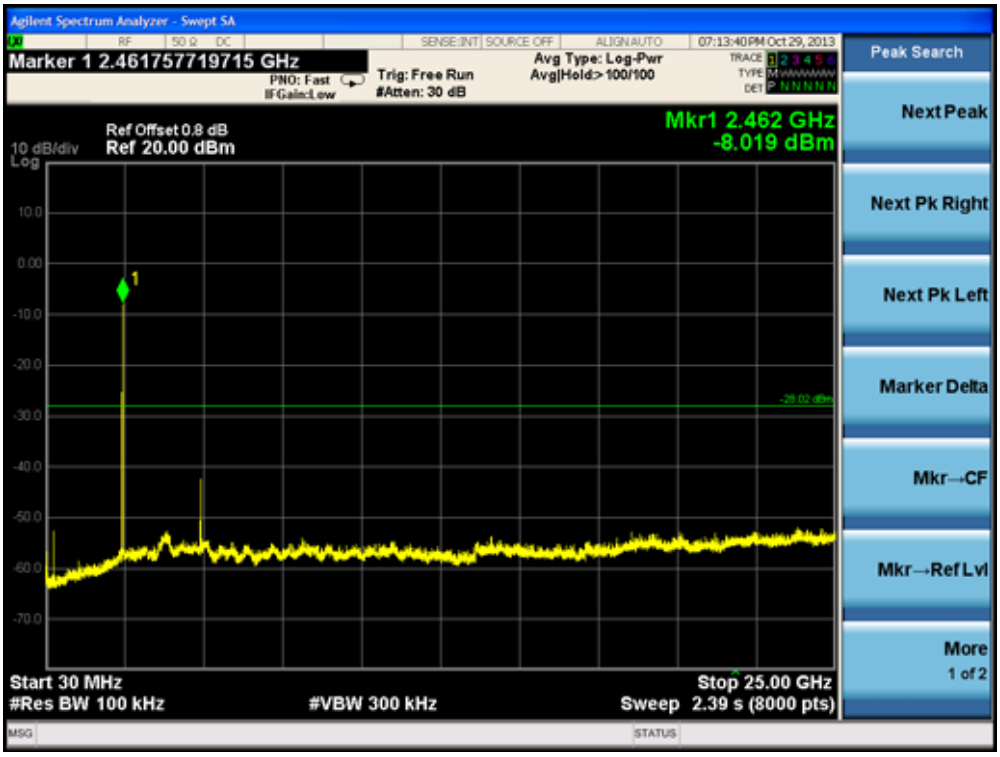
5.3. Test Procedure

The EUT was tested according to KDB 558074 for compliance to FCC 47CFR 15.247 requirements.
Set RBW = 100 kHz, Set VBW > RBW, scan up through 10th harmonic.

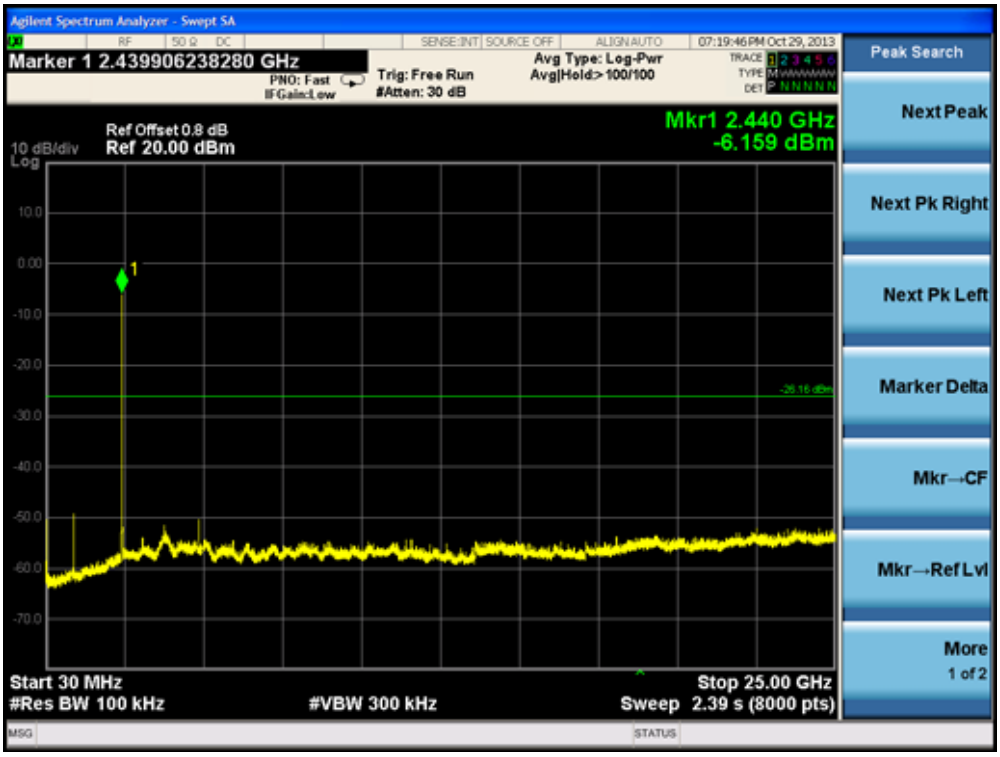
5.4. Test Result

Product	:	Multi-Screen Interactive Device
Test Item	:	RF Antenna Conducted Spurious
Test Site	:	TR3
Test Mode	:	Mode 1: Transmit by 802.11b

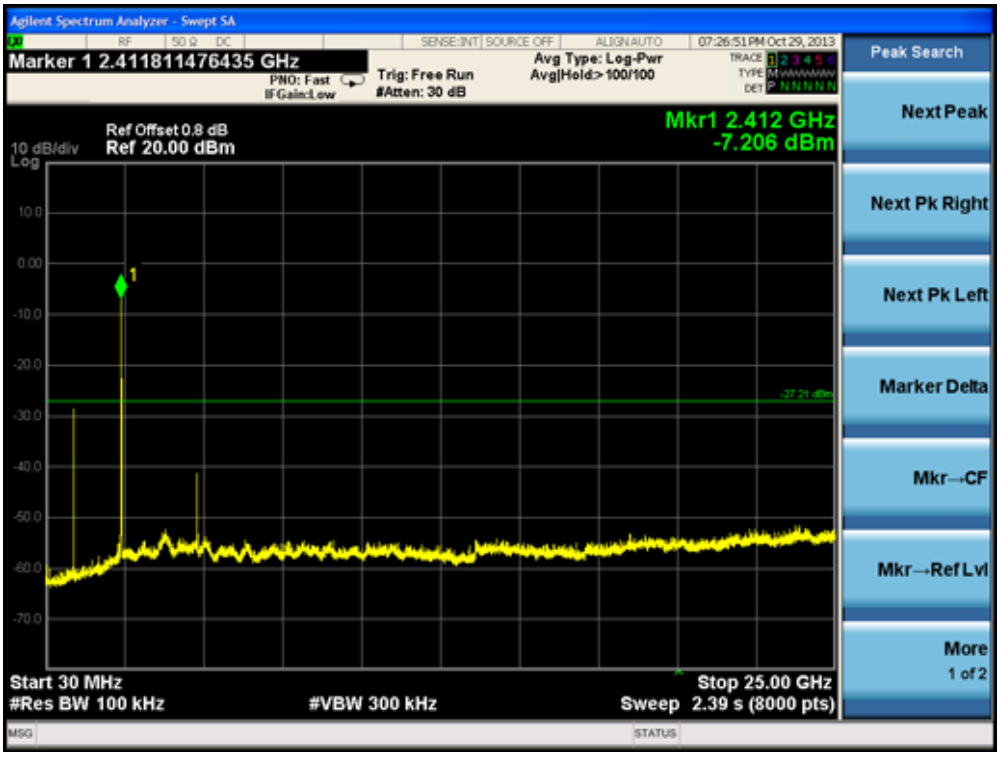
Channel 01 (2412MHz)



Channel 06 (2437MHz)

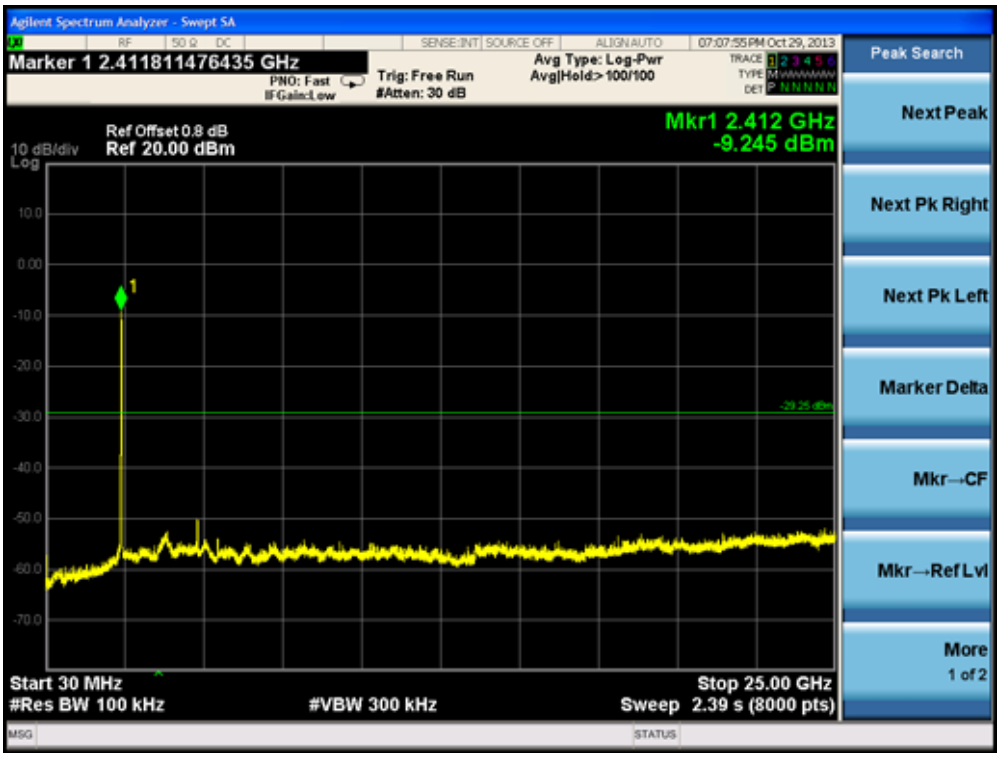


Channel 11 (2462MHz)

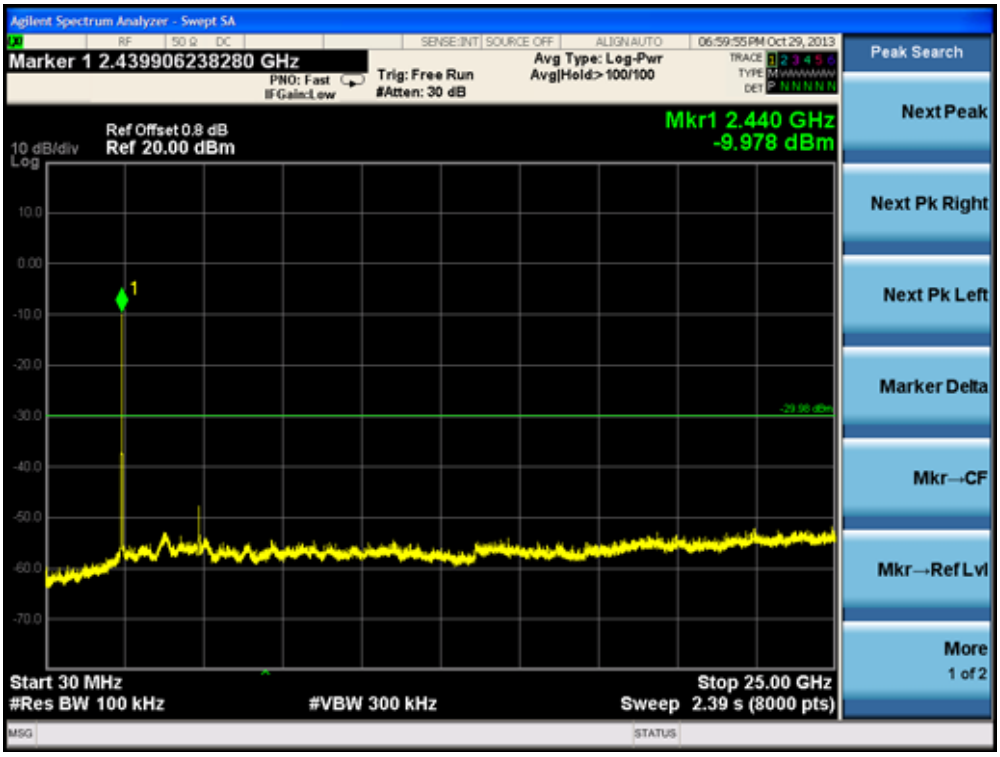


Product	:	Multi-Screen Interactive Device
Test Item	:	RF Antenna Conducted Spurious
Test Site	:	TR3
Test Mode	:	Mode 2: Transmit by 802.11g

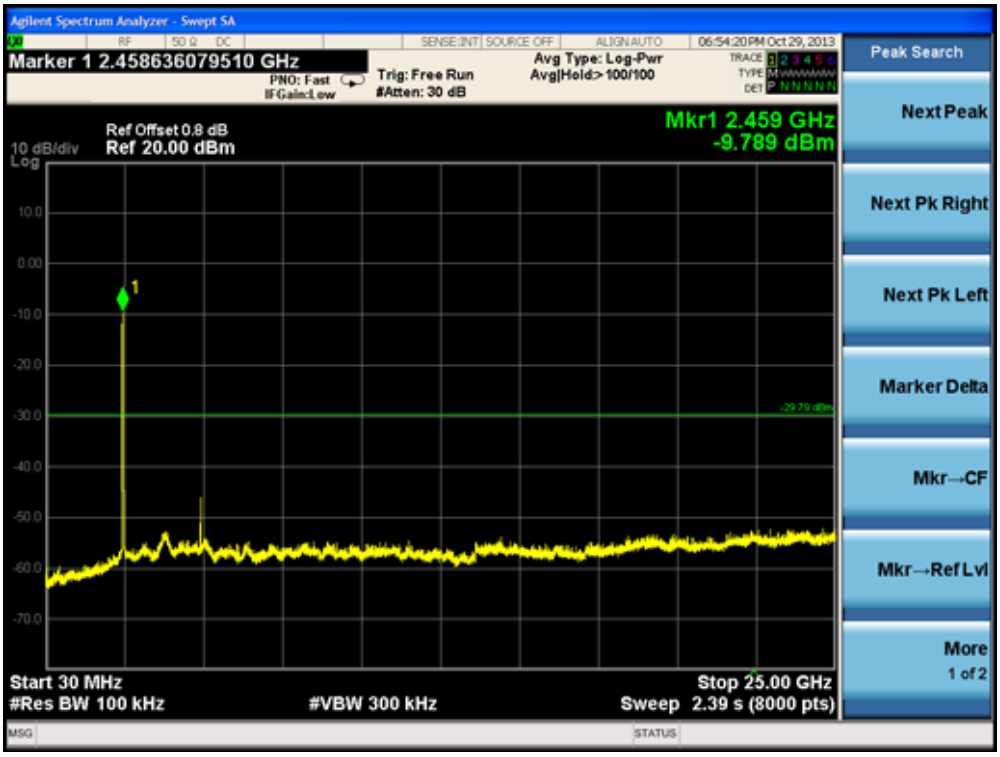
Channel 01 (2412MHz)



Channel 06 (2437MHz)



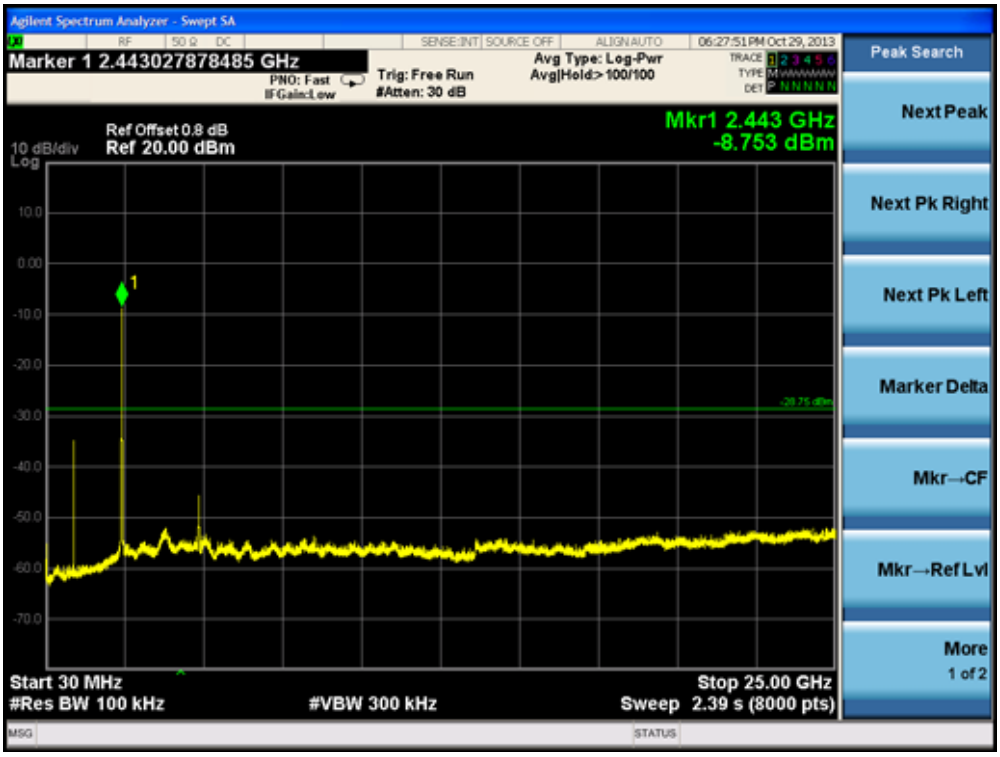
Channel 11 (2462MHz)



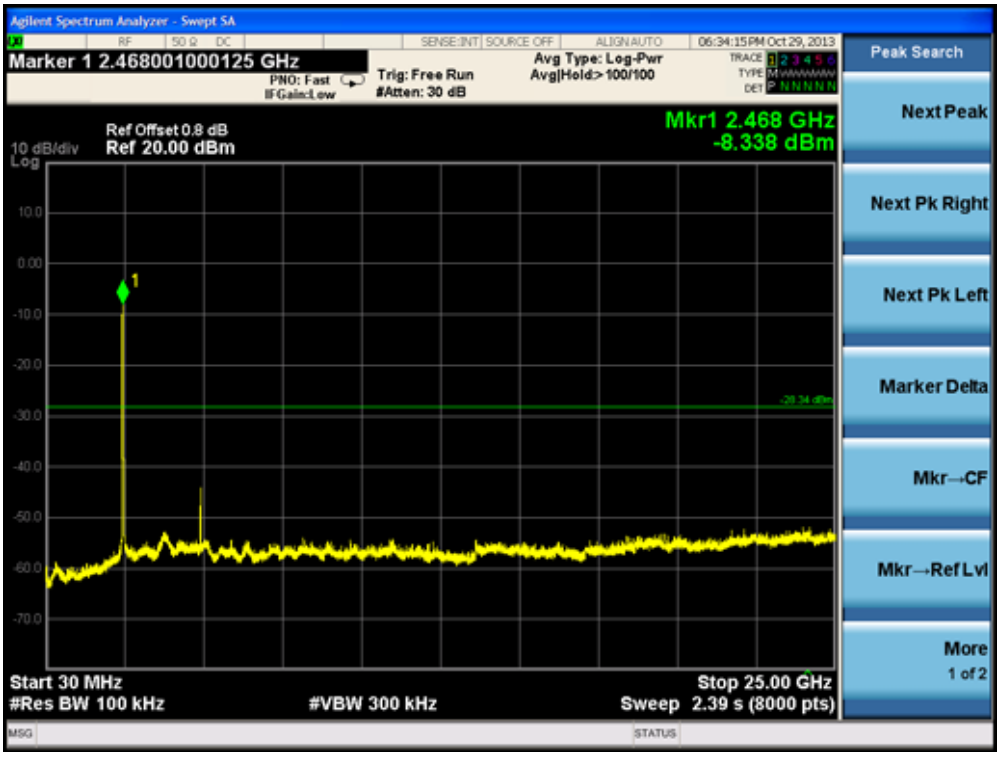
Product	:	Multi-Screen Interactive Device
Test Item	:	RF Antenna Conducted Spurious
Test Site	:	TR3
Test Mode	:	Mode 3: Transmit by 802.11n(20MHz)

Channel 01 (2412MHz)

Channel 06 (2437MHz)

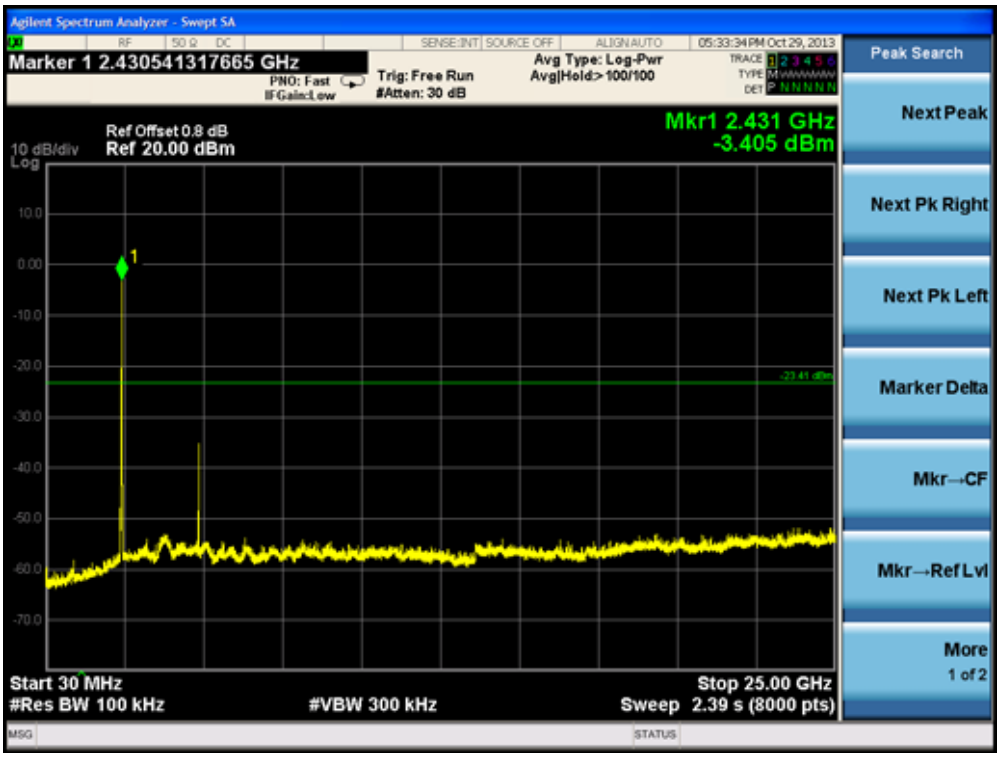


Channel 11 (2462MHz)

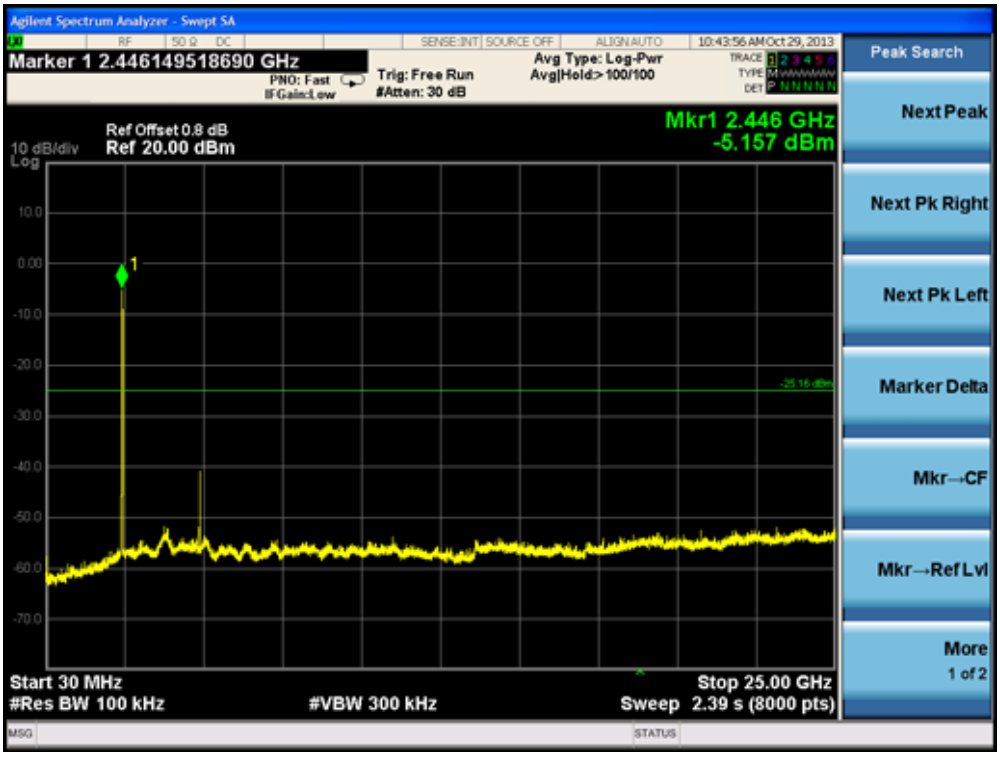


Product	:	Multi-Screen Interactive Device
Test Item	:	RF Antenna Conducted Spurious
Test Site	:	TR3
Test Mode	:	Mode 4: Transmit by 802.11n(40MHz)

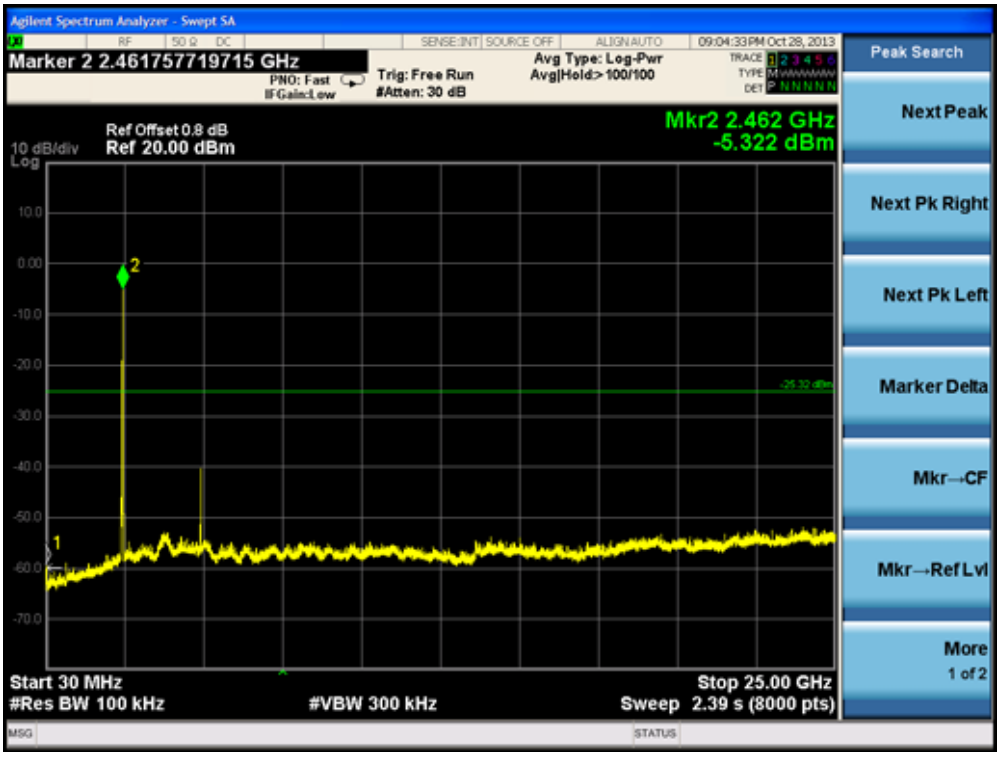
Channel 03 (2422MHz)



Channel 06 (2437MHz)



Channel 09 (2452MHz)

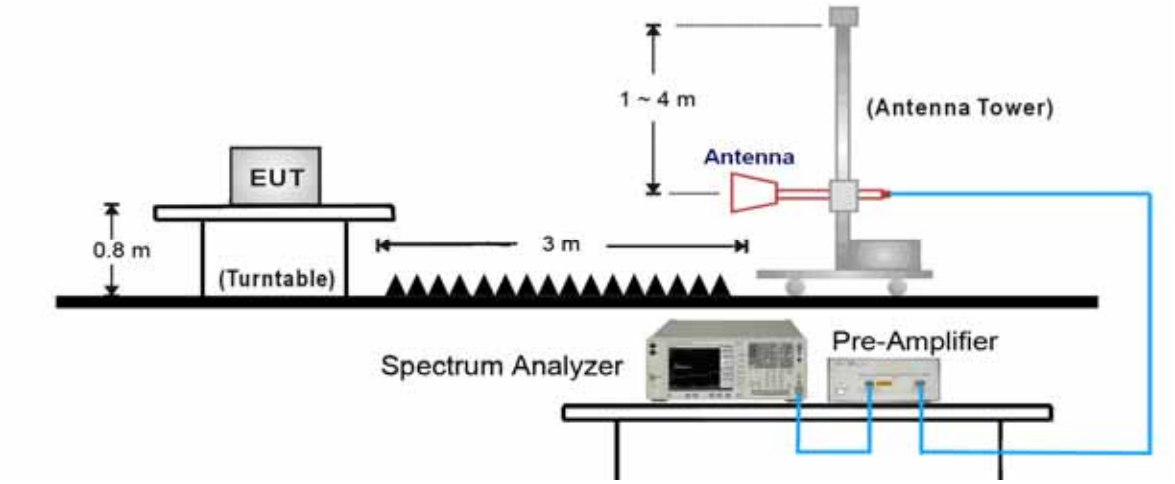


6. Radiated Emission Band Edge

6.1. Limit

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a) of FCC part 15, must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

6.2. Test Setup



6.3. Test Procedure

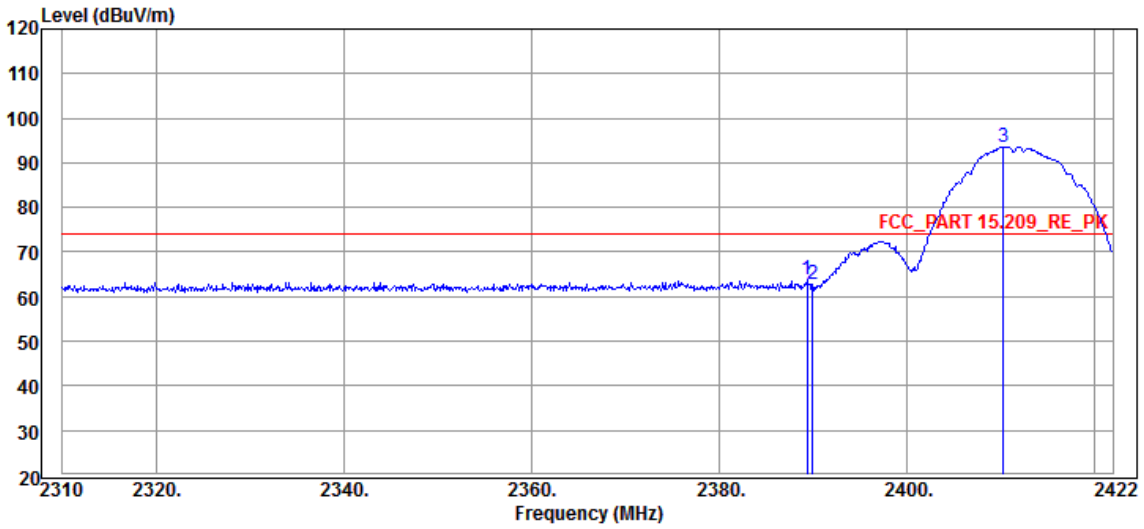
The EUT was setup according to ANSI C63.4, 2009 and tested according to KDB 558074 for compliance to FCC 47CFR 15.247 requirements.

The EUT is placed on a turn table which is 0.8 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from Antenna to the EUT was 3 meters.

The Antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the Antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.4: 2009 on radiated measurement.

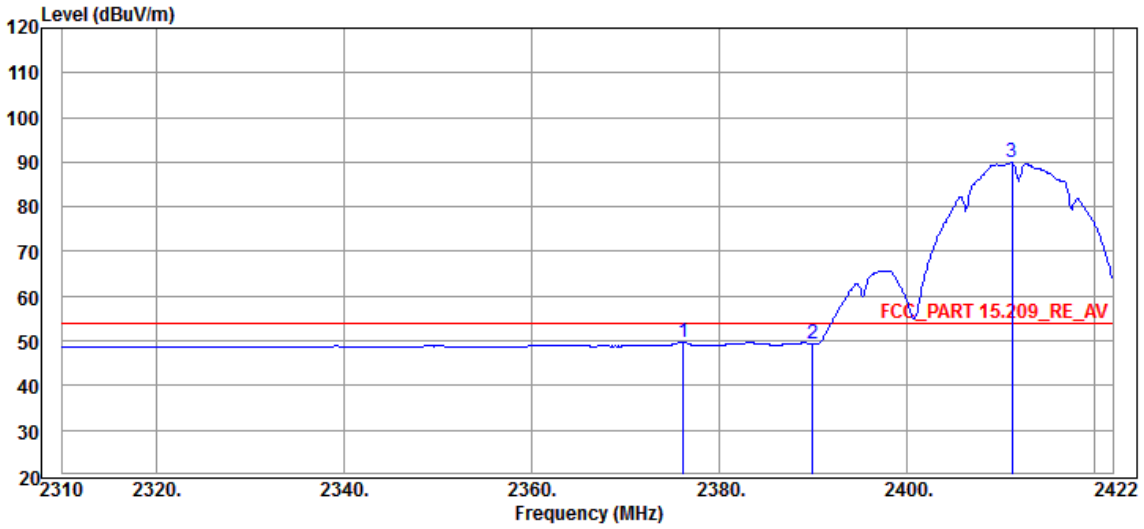
6.4. Test Result

Tested by	Roy	Test Data	2013-10-11- 10:53:32
Site	AC1	Power	DC 5V
Limit	FCC_PART 15.209_RE	Polarity	Horizontal
Antenna	BBHA_9120D	EUT	Multi-Screen Interactive Device
Test Mode	Mode 1:Transmit at Channel 2412MHz by 802.11b		



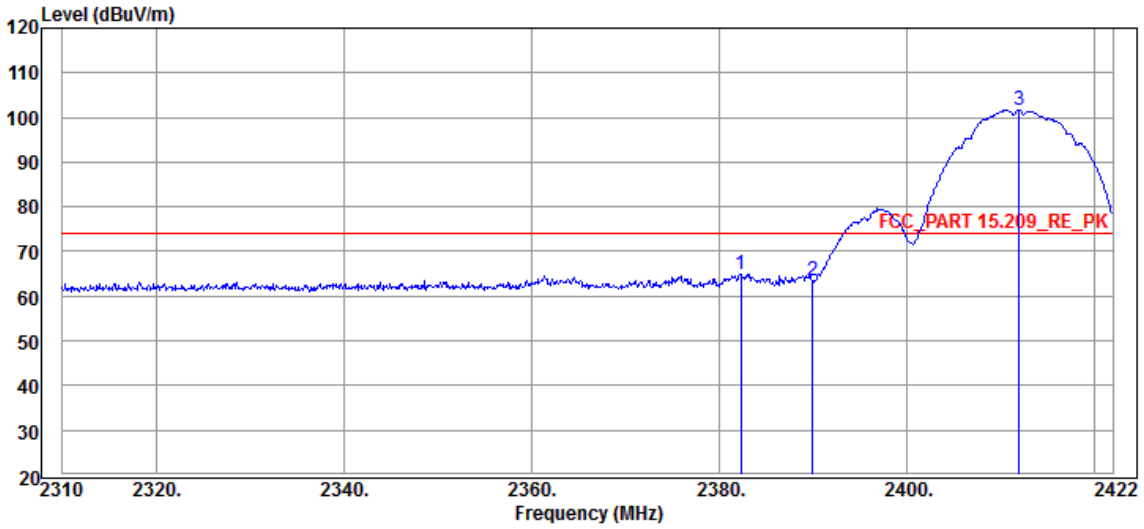
Freq (MHz)	Level (dBμV/m)	Reading (dBuV)	Detector	C.F (dB)	Limit (dBuV/m)	Over Limit (dB)
2389.41	63.75	28.25	PK	35.50	74.00	-10.25
2390.00	62.69	27.19	PK	35.50	74.00	-11.31
2410.35	93.65	58.10	PK	35.55	N/A	N/A

Tested by	Roy	Test Data	2013-10-11- 10:54:29
Site	AC1	Power	DC 5V
Limit	FCC_PART 15.209_RE	Polarity	Horizontal
Antenna	BBHA_9120D	EUT	Multi-Screen Interactive Device
Test Mode	Mode 1:Transmit at Channel 2412MHz by 802.11b		



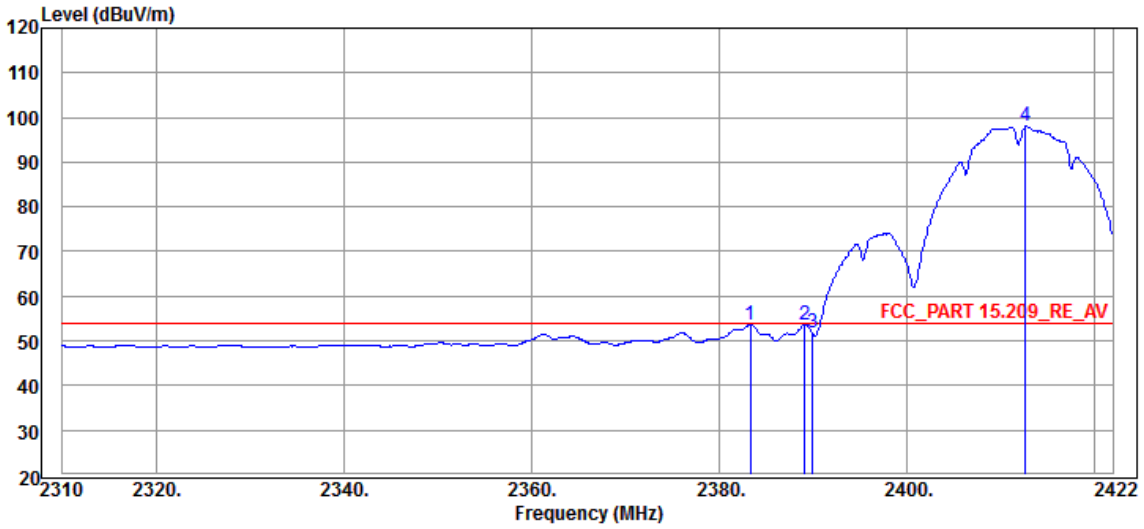
Freq (MHz)	Level (dBμV/m)	Reading (dBuV)	Detector	C.F (dB)	Limit (dBuV/m)	Over Limit (dB)
2376.19	49.80	14.32	AV	35.48	54.00	-4.20
2390.00	49.26	13.76	AV	35.50	54.00	-4.74
2411.25	89.83	54.28	AV	35.55	N/A	N/A

Tested by	Roy	Test Data	2013-10-11- 10:54:29
Site	AC1	Power	DC 5V
Limit	FCC_PART 15.209_RE	Polarity	Vertical
Antenna	BBHA_9120D	EUT	Multi-Screen Interactive Device
Test Mode	Mode 1:Transmit at Channel 2412MHz by 802.11b		



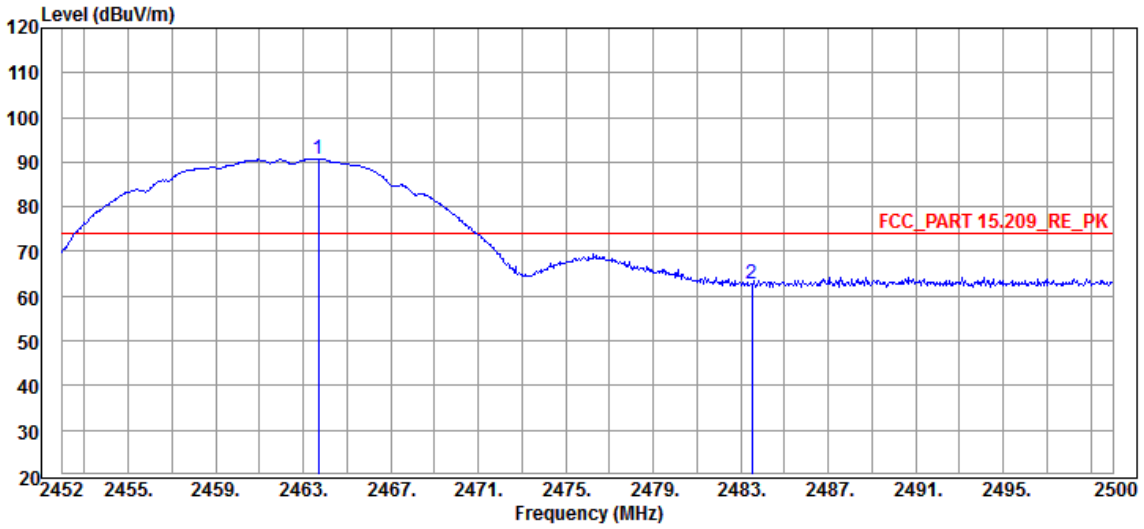
Freq (MHz)	Level (dBμV/m)	Reading (dBuV)	Detector	C.F (dB)	Limit (dBuV/m)	Over Limit (dB)
2382.35	64.82	29.33	PK	35.49	74.00	-9.18
2390.00	63.40	27.90	PK	35.50	74.00	-10.60
2412.03	101.58	66.03	PK	35.55	N/A	N/A

Tested by	Roy	Test Data	2013-10-11- 10:54:29
Site	AC1	Power	DC 5V
Limit	FCC_PART 15.209_RE	Polarity	Vertical
Antenna	BBHA_9120D	EUT	Multi-Screen Interactive Device
Test Mode	Mode 1:Transmit at Channel 2412MHz by 802.11b		



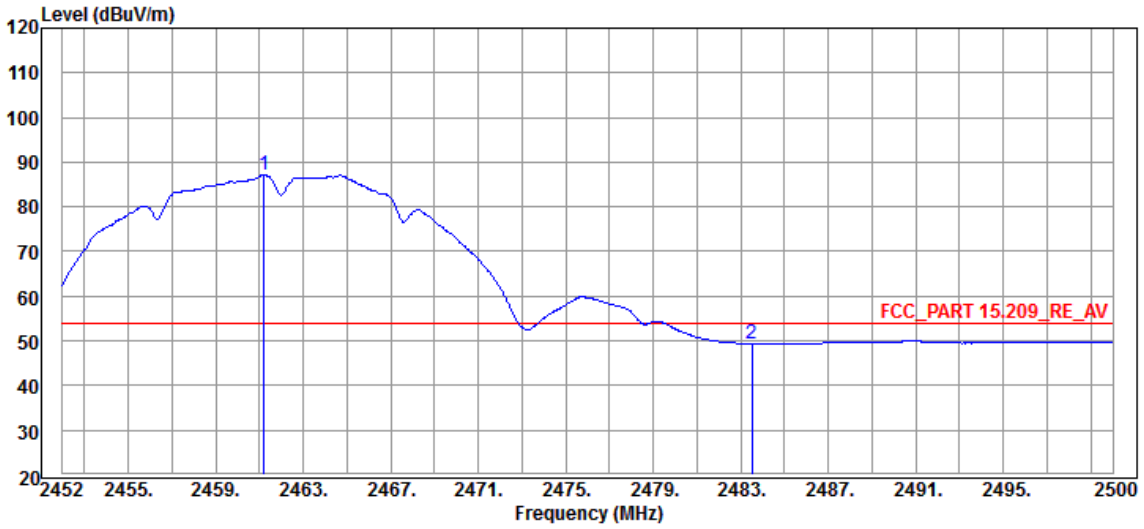
Freq (MHz)	Level (dBμV/m)	Reading (dBuV)	Detector	C.F (dB)	Limit (dBuV/m)	Over Limit (dB)
2383.36	53.59	18.10	AV	35.49	54.00	-0.41
2389.18	53.55	18.05	AV	35.50	54.00	-0.45
2390.00	51.76	16.26	AV	35.50	54.00	-2.24
2412.70	97.92	62.37	AV	35.55	N/A	N/A

Tested by	Roy	Test Data	2013-10-11- 10:54:29
Site	AC1	Power	DC 5V
Limit	FCC_PART 15.209_RE	Polarity	Horizontal
Antenna	BBHA_9120D	EUT	Multi-Screen Interactive Device
Test Mode	Mode 1:Transmit at Channel 2462MHz by 802.11b		



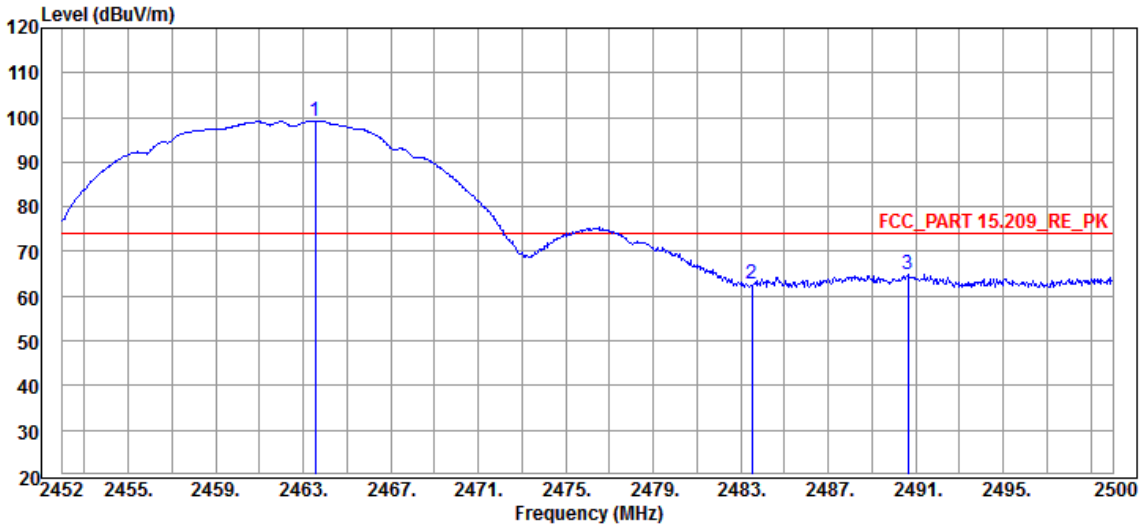
Freq (MHz)	Level (dBμV/m)	Reading (dBuV)	Detector	C.F (dB)	Limit (dBuV/m)	Over Limit (dB)
2463.71	90.74	55.08	PK	35.66	N/A	N/A
2483.50	62.81	27.08	PK	35.73	74.00	-11.19

Tested by	Roy	Test Data	2013-10-11- 11:05:09
Site	AC1	Power	DC 5V
Limit	FCC_PART 15.209_RE	Polarity	Horizontal
Antenna	BBHA_9120D	EUT	Multi-Screen Interactive Device
Test Mode	Mode 1:Transmit at Channel 2462MHz by 802.11b		



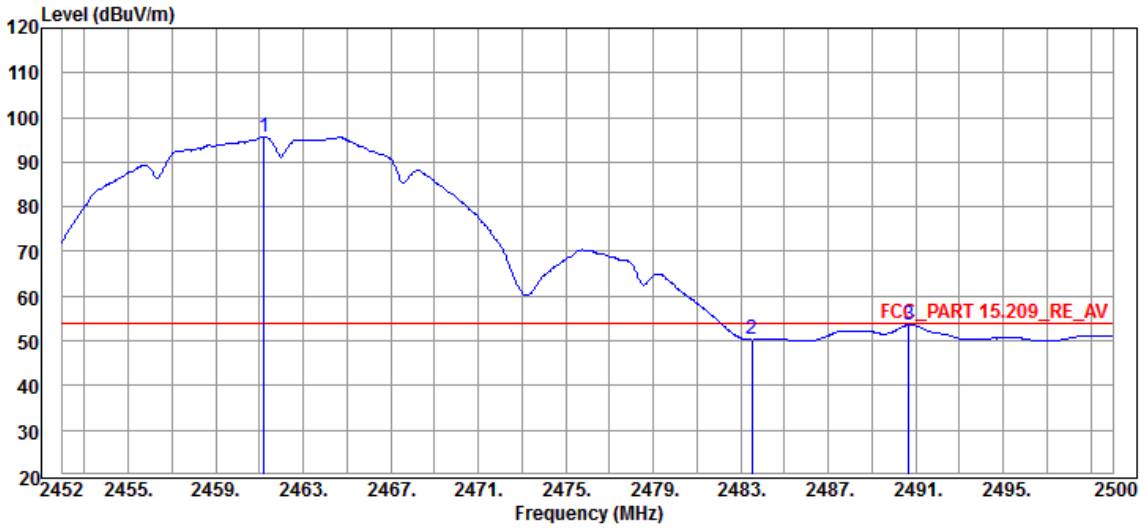
Freq (MHz)	Level (dBμV/m)	Reading (dBuV)	Detector	C.F (dB)	Limit (dBuV/m)	Over Limit (dB)
2461.22	87.09	51.43	AV	35.66	N/A	N/A
2483.50	49.43	13.70	AV	35.73	54.00	-4.57

Tested by	Roy	Test Data	2013-10-11- 11:07:02
Site	AC1	Power	DC 5V
Limit	FCC_PART 15.209_RE	Polarity	Vertical
Antenna	BBHA_9120D	EUT	Multi-Screen Interactive Device
Test Mode	Mode 1:Transmit at Channel 2462MHz by 802.11b		



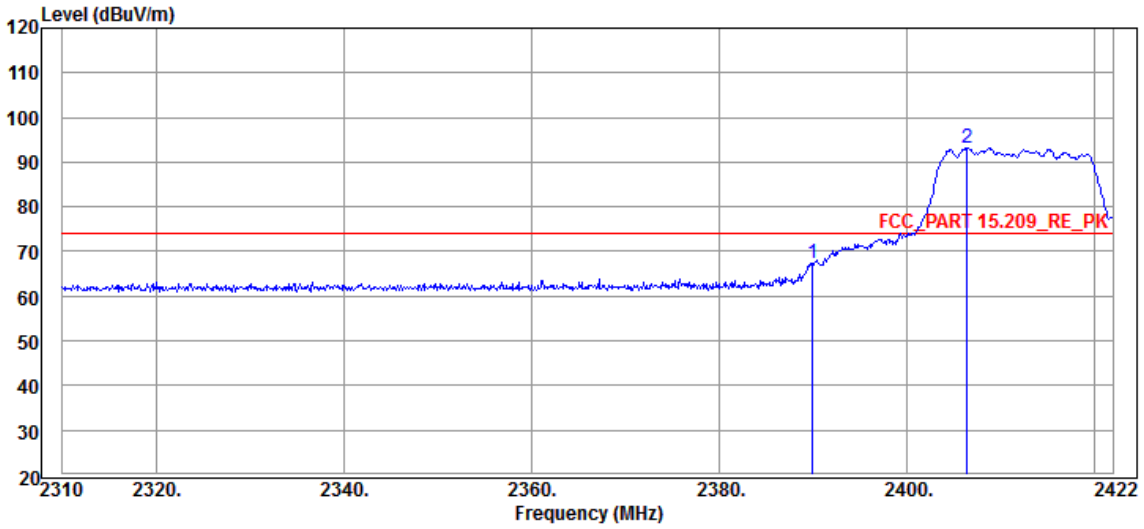
Freq (MHz)	Level (dBμV/m)	Reading (dBuV)	Detector	C.F (dB)	Limit (dBuV/m)	Over Limit (dB)
2463.57	99.15	63.49	PK	35.66	N/A	N/A
2483.50	62.74	27.01	PK	35.73	74.00	-11.26
2490.64	65.02	29.27	PK	35.75	74.00	-8.98

Tested by	Roy	Test Data	2013-10-11- 11:08:17
Site	AC1	Power	DC 5V
Limit	FCC_PART 15.209_RE	Polarity	Vertical
Antenna	BBHA_9120D	EUT	Multi-Screen Interactive Device
Test Mode	Mode 1:Transmit at Channel 2462MHz by 802.11b		



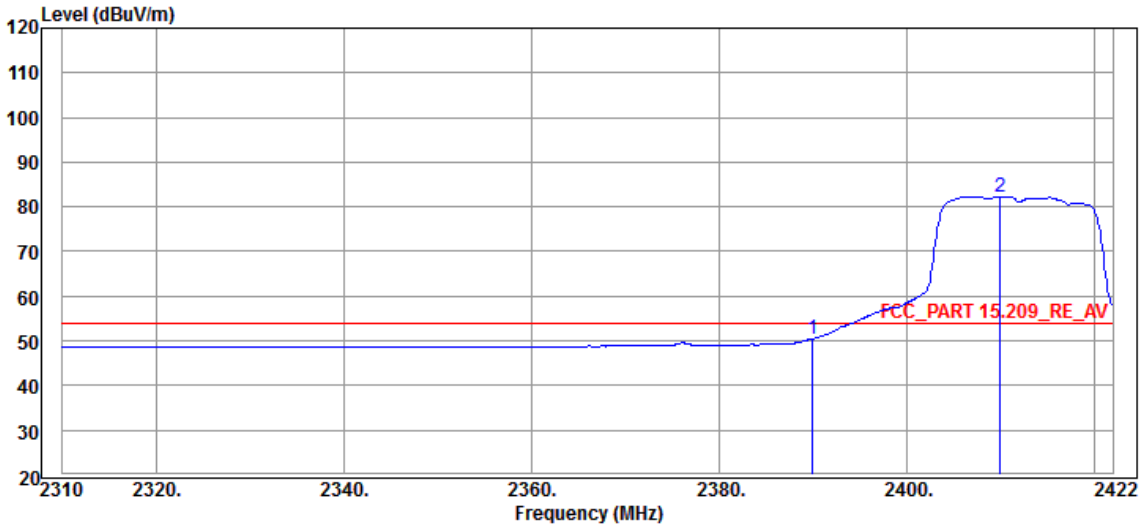
Freq (MHz)	Level (dBμV/m)	Reading (dBuV)	Detector	C.F (dB)	Limit (dBuV/m)	Over Limit (dB)
2461.22	95.69	60.03	AV	35.66	N/A	N/A
2483.50	50.21	14.48	AV	35.73	54.00	-3.79
2490.69	53.54	17.79	AV	35.75	54.00	-0.46

Tested by	Roy	Test Data	2013-10-11- 11:17:57
Site	AC1	Power	DC 5V
Limit	FCC_PART 15.209_RE	Polarity	Horizontal
Antenna	BBHA_9120D	EUT	Multi-Screen Interactive Device
Test Mode	Mode 2:Transmit at Channel 2412MHz by 802.11g		



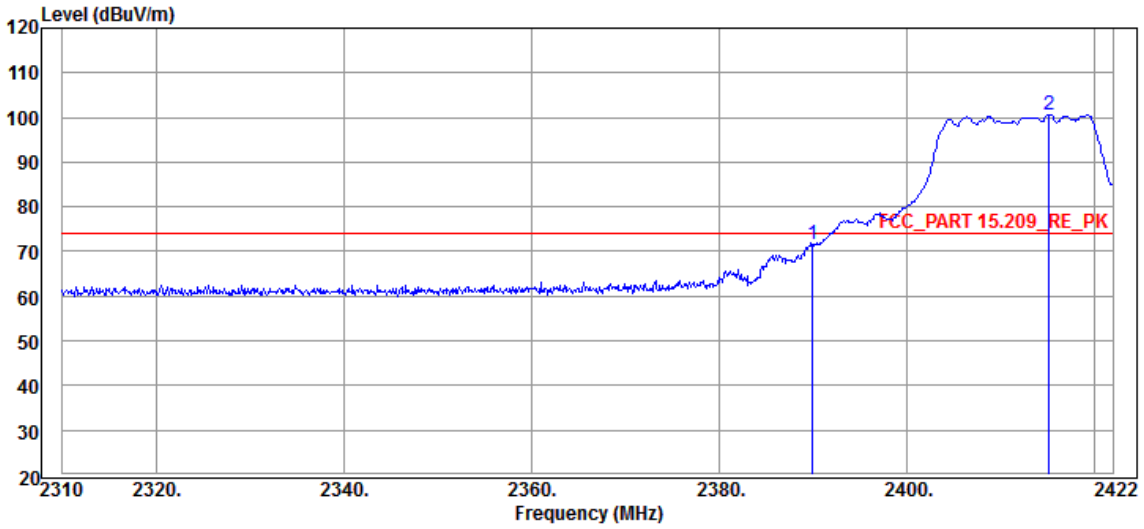
Freq (MHz)	Level (dBμV/m)	Reading (dBuV)	Detector	C.F (dB)	Limit (dBuV/m)	Over Limit (dB)
2390.00	67.45	31.95	PK	35.50	74.00	-6.55
2406.43	93.28	57.74	PK	35.54	N/A	N/A

Tested by	Roy	Test Data	2013-10-11- 11:18:47
Site	AC1	Power	DC 5V
Limit	FCC_PART 15.209_RE	Polarity	Horizontal
Antenna	BBHA_9120D	EUT	Multi-Screen Interactive Device
Test Mode	Mode 2:Transmit at Channel 2412MHz by 802.11g		



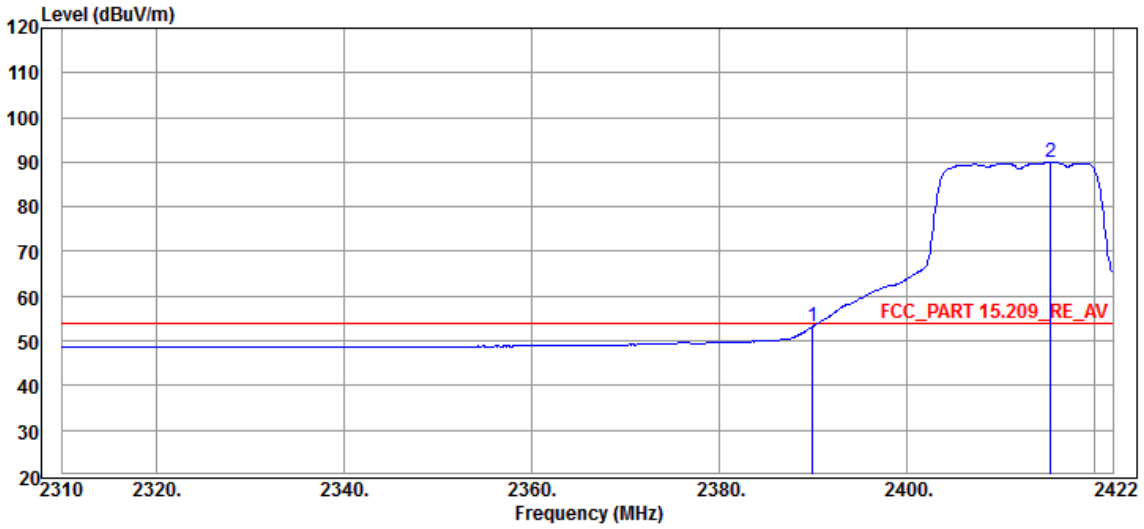
Freq (MHz)	Level (dBμV/m)	Reading (dBuV)	Detector	C.F (dB)	Limit (dBuV/m)	Over Limit (dB)
2390.00	50.46	14.96	AV	35.50	54.00	-3.54
2410.02	82.36	46.81	AV	35.55	N/A	N/A

Tested by	Roy	Test Data	2013-10-11- 11:23:25
Site	AC1	Power	DC 5V
Limit	FCC_PART 15.209_RE	Polarity	Vertical
Antenna	BBHA_9120D	EUT	Multi-Screen Interactive Device
Test Mode	Mode 2:Transmit at Channel 2412MHz by 802.11g		



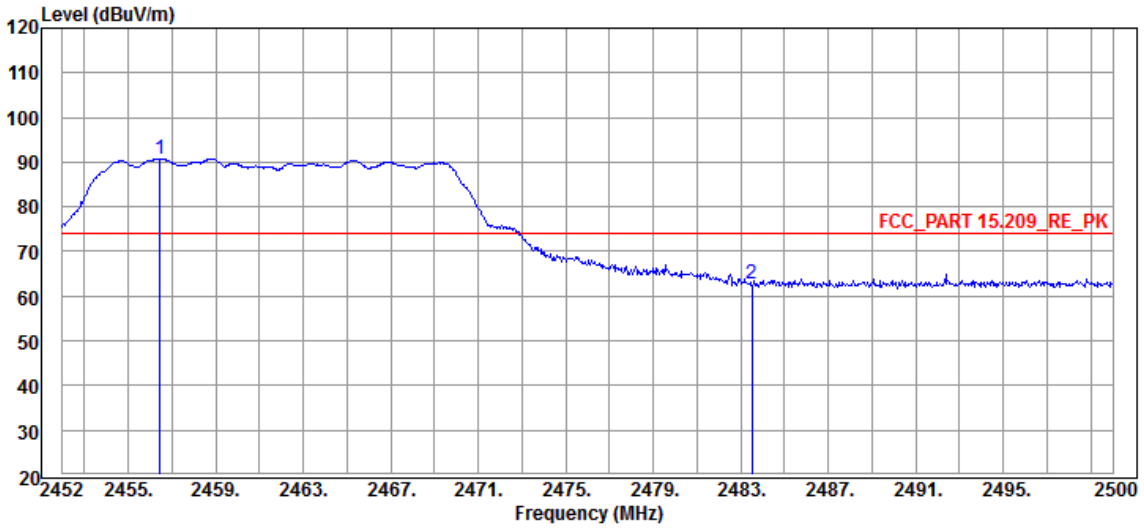
Freq (MHz)	Level (dBμV/m)	Reading (dBuV)	Detector	C.F (dB)	Limit (dBuV/m)	Over Limit (dB)
2390.00	71.68	36.18	PK	35.50	74.00	-2.32
2415.17	100.67	65.12	PK	35.55	N/A	N/A

Tested by	Roy	Test Data	2013-10-11- 11:24:29
Site	AC1	Power	DC 5V
Limit	FCC_PART 15.209_RE	Polarity	Vertical
Antenna	BBHA_9120D	EUT	Multi-Screen Interactive Device
Test Mode	Mode 2:Transmit at Channel 2412MHz by 802.11g		



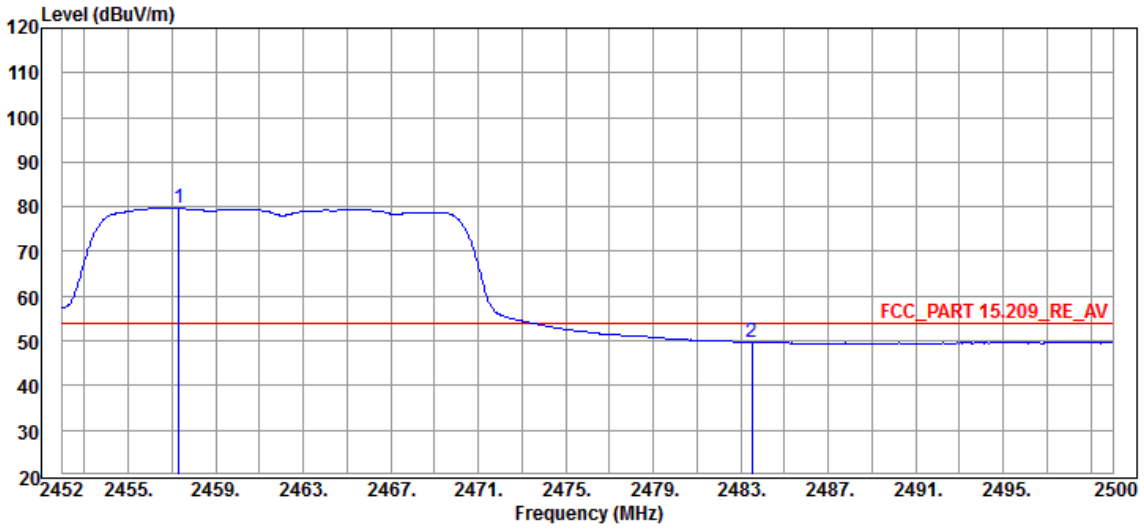
Freq (MHz)	Level (dBμV/m)	Reading (dBuV)	Detector	C.F (dB)	Limit (dBuV/m)	Over Limit (dB)
2390.00	53.15	17.65	AV	35.50	54.00	-0.85
2415.39	90.04	54.49	AV	35.55	N/A	N/A

Tested by	Roy	Test Data	2013-10-11- 11:30:27
Site	AC1	Power	DC 5V
Limit	FCC_PART 15.209_RE	Polarity	Horizontal
Antenna	BBHA_9120D	EUT	Multi-Screen Interactive Device
Test Mode	Mode 2:Transmit at Channel 2462MHz by 802.11g		



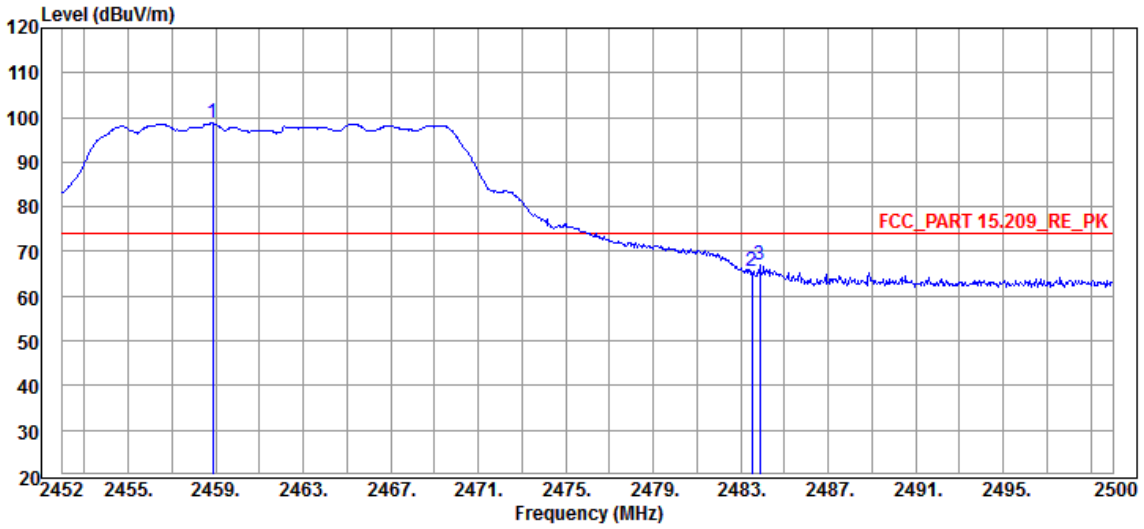
Freq (MHz)	Level (dBμV/m)	Reading (dBuV)	Detector	C.F (dB)	Limit (dBuV/m)	Over Limit (dB)
2456.46	90.80	55.15	PK	35.65	N/A	N/A
2483.50	62.89	27.16	PK	35.73	74.00	-11.11

Tested by	Roy	Test Data	2013-10-11- 11:31:13
Site	AC1	Power	DC 5V
Limit	FCC_PART 15.209_RE	Polarity	Horizontal
Antenna	BBHA_9120D	EUT	Multi-Screen Interactive Device
Test Mode	Mode 2:Transmit at Channel 2462MHz by 802.11g		



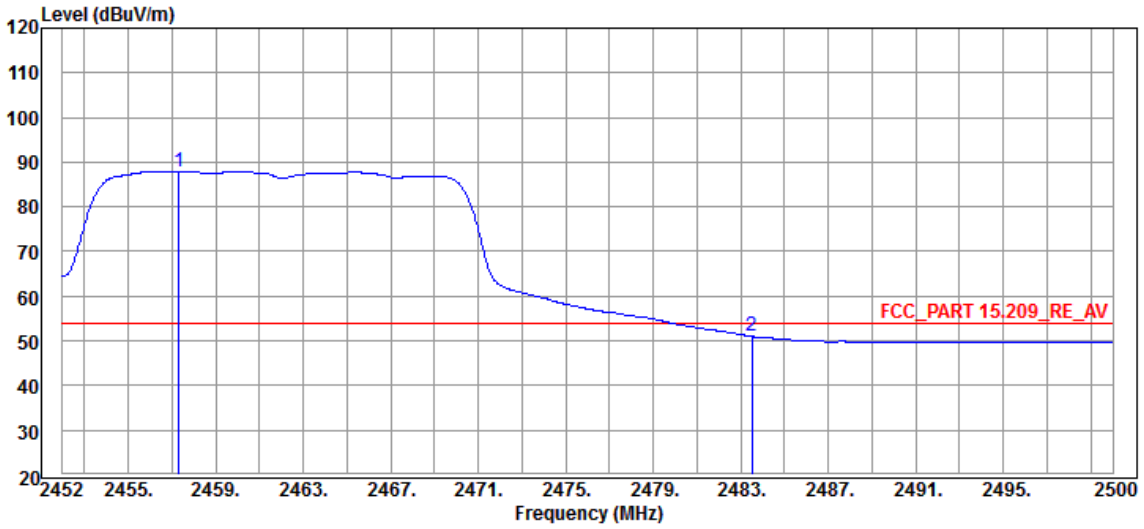
Freq (MHz)	Level (dBμV/m)	Reading (dBuV)	Detector	C.F (dB)	Limit (dBuV/m)	Over Limit (dB)
2457.33	79.65	44.00	AV	35.65	N/A	N/A
2483.50	49.65	13.92	AV	35.73	54.00	-4.35

Tested by	Roy	Test Data	2013-10-11- 11:33:45
Site	AC1	Power	DC 5V
Limit	FCC_PART 15.209_RE	Polarity	Vertical
Antenna	BBHA_9120D	EUT	Multi-Screen Interactive Device
Test Mode	Mode 2:Transmit at Channel 2462MHz by 802.11g		



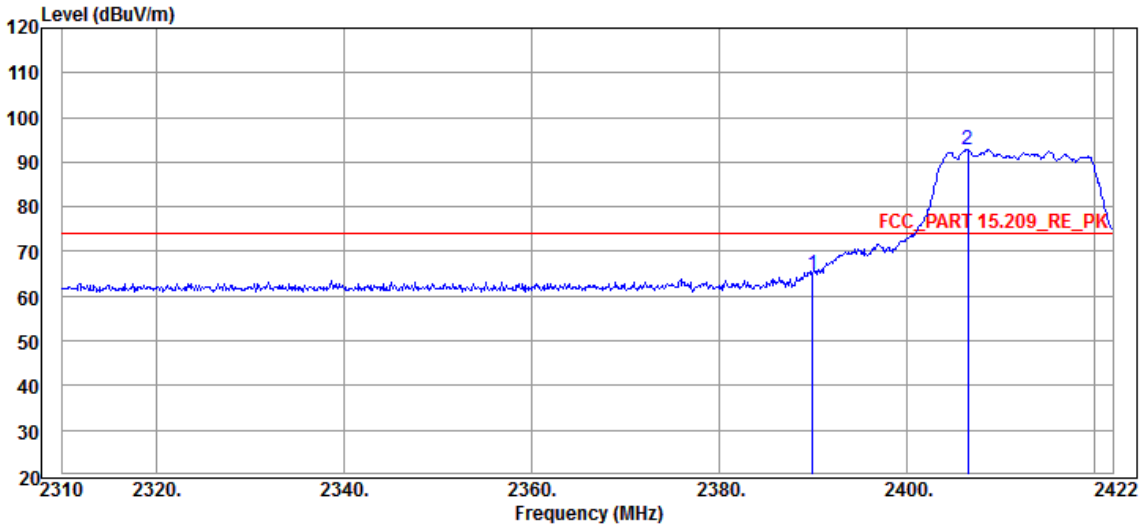
Freq (MHz)	Level (dBμV/m)	Reading (dBuV)	Detector	C.F (dB)	Limit (dBuV/m)	Over Limit (dB)
2458.86	98.70	63.05	PK	35.65	N/A	N/A
2483.50	65.41	29.68	PK	35.73	74.00	-8.59
2483.87	67.15	31.42	PK	35.73	74.00	-6.85

Tested by	Roy	Test Data	2013-10-11- 11:34:30
Site	AC1	Power	DC 5V
Limit	FCC_PART 15.209_RE	Polarity	Vertical
Antenna	BBHA_9120D	EUT	Multi-Screen Interactive Device
Test Mode	Mode 2:Transmit at Channel 2462MHz by 802.11g		



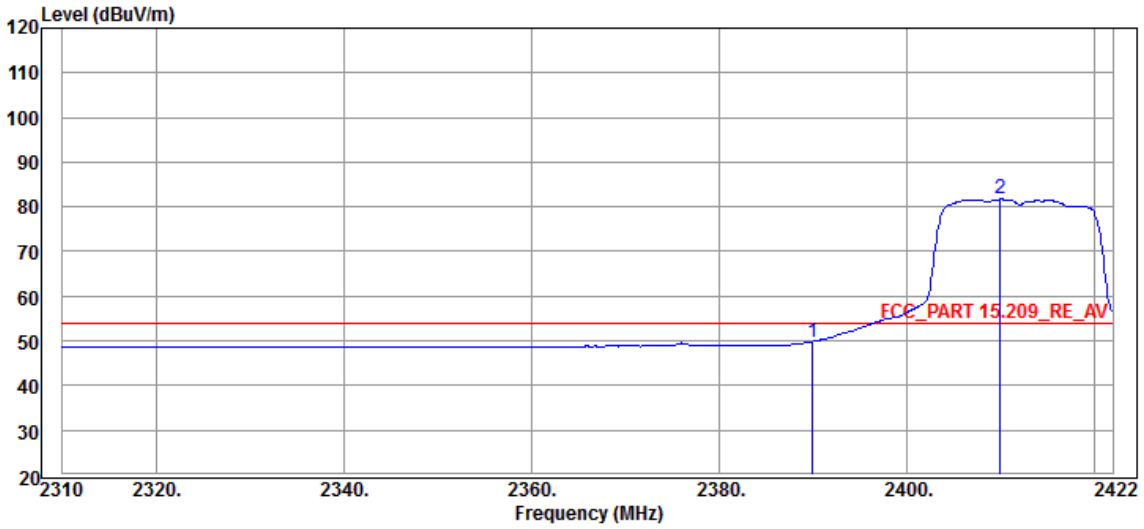
Freq (MHz)	Level (dBμV/m)	Reading (dBuV)	Detector	C.F (dB)	Limit (dBuV/m)	Over Limit (dB)
2457.33	87.96	52.31	AV	35.65	N/A	N/A
2483.50	51.05	15.32	AV	35.73	54.00	-2.95

Tested by	Roy	Test Data	2013-10-11- 11:42:53
Site	AC1	Power	DC 5V
Limit	FCC_PART 15.209_RE	Polarity	Horizontal
Antenna	BBHA_9120D	EUT	Multi-Screen Interactive Device
Test Mode	Mode 3:Transmit at Channel 2412MHz by 802.11n(20MHz)		



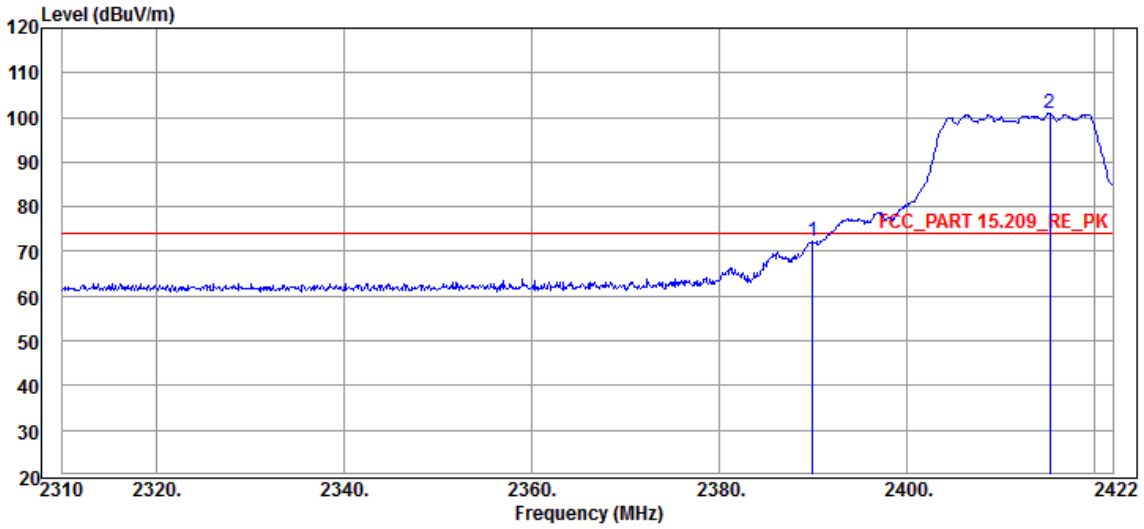
Freq (MHz)	Level (dBμV/m)	Reading (dBuV)	Detector	C.F (dB)	Limit (dBuV/m)	Over Limit (dB)
2390.00	64.86	29.36	PK	35.50	74.00	-9.14
2406.54	92.72	57.18	PK	35.54	N/A	N/A

Tested by	Roy	Test Data	2013-10-11- 11:43:45
Site	AC1	Power	DC 5V
Limit	FCC_PART 15.209_RE	Polarity	Horizontal
Antenna	BBHA_9120D	EUT	Multi-Screen Interactive Device
Test Mode	Mode 3:Transmit at Channel 2412MHz by 802.11n(20MHz)		



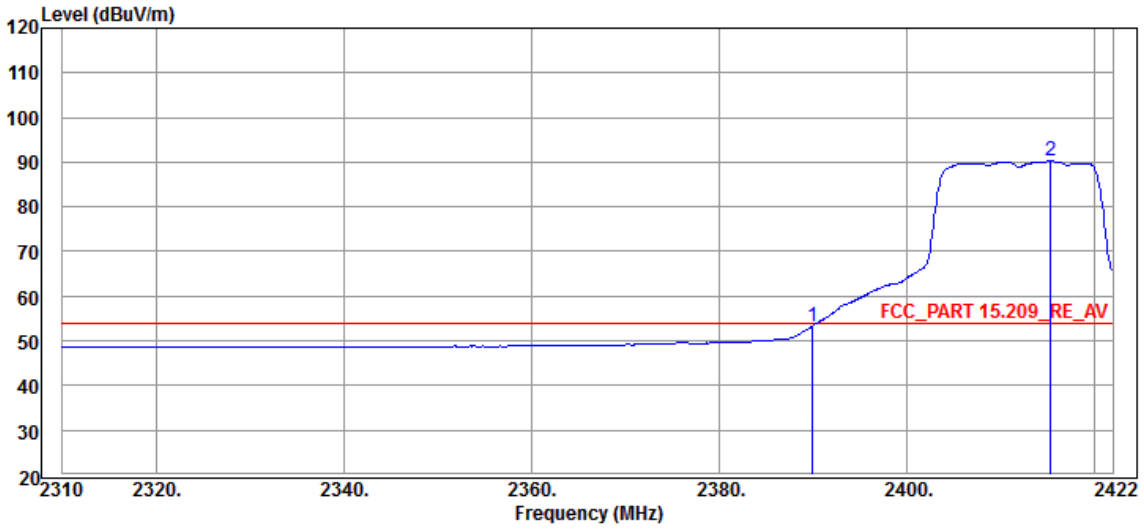
Freq (MHz)	Level (dBμV/m)	Reading (dBuV)	Detector	C.F (dB)	Limit (dBuV/m)	Over Limit (dB)
2390.00	49.83	14.33	AV	35.50	54.00	-4.17
2410.02	81.68	46.13	AV	35.55	N/A	N/A

Tested by	Roy	Test Data	2013-10-11- 11:46:17
Site	AC1	Power	DC 5V
Limit	FCC_PART 15.209_RE	Polarity	Vertical
Antenna	BBHA_9120D	EUT	Multi-Screen Interactive Device
Test Mode	Mode 3:Transmit at Channel 2412MHz by 802.11n(20MHz)		



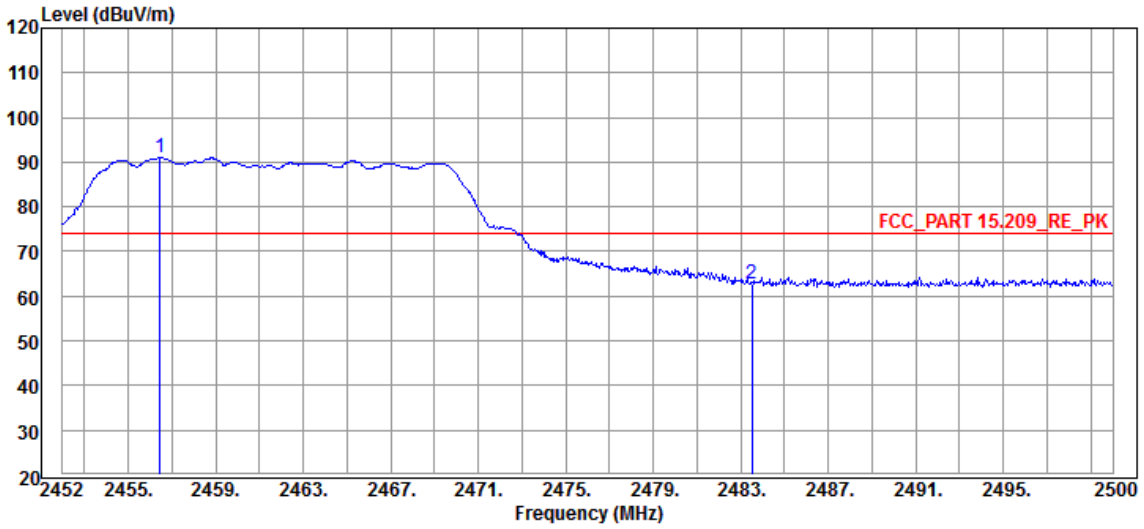
Freq (MHz)	Level (dBμV/m)	Reading (dBuV)	Detector	C.F (dB)	Limit (dBuV/m)	Over Limit (dB)
2390.00	72.28	36.78	PK	35.50	74.00	-1.72
2415.28	100.92	65.37	PK	35.55	N/A	N/A

Tested by	Roy	Test Data	2013-10-11- 11:47:20
Site	AC1	Power	DC 5V
Limit	FCC_PART 15.209_RE	Polarity	Vertical
Antenna	BBHA_9120D	EUT	Multi-Screen Interactive Device
Test Mode	Mode 3:Transmit at Channel 2412MHz by 802.11n(20MHz)		



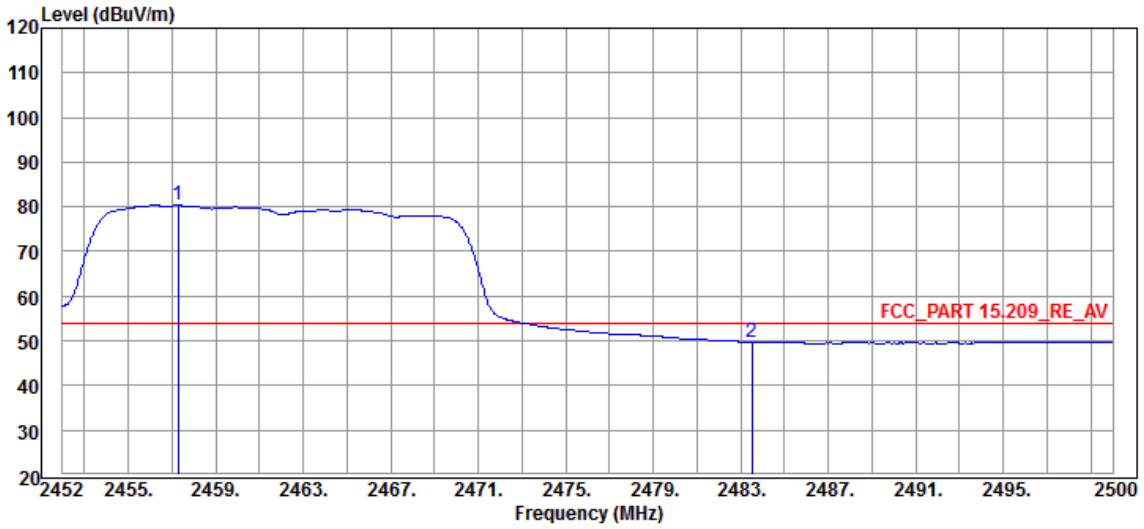
Freq (MHz)	Level (dBμV/m)	Reading (dBuV)	Detector	C.F (dB)	Limit (dBuV/m)	Over Limit (dB)
2390.00	53.25	17.75	AV	35.50	54.00	-0.75
2415.39	90.27	54.72	AV	35.55	N/A	N/A

Tested by	Roy	Test Data	2013-10-11- 11:52:36
Site	AC1	Power	DC 5V
Limit	FCC_PART 15.209_RE	Polarity	Horizontal
Antenna	BBHA_9120D	EUT	Multi-Screen Interactive Device
Test Mode	Mode 3:Transmit at Channel 2462MHz by 802.11n(20MHz)		



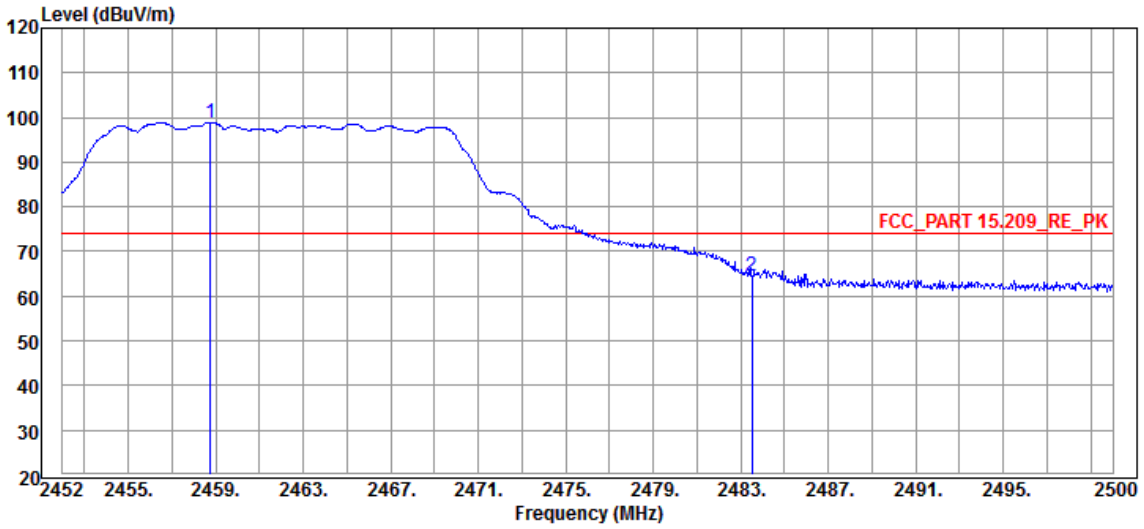
Freq (MHz)	Level (dBμV/m)	Reading (dBuV)	Detector	C.F (dB)	Limit (dBuV/m)	Over Limit (dB)
2456.46	90.94	55.29	PK	35.65	N/A	N/A
2483.50	62.78	27.05	PK	35.73	74.00	-11.22

Tested by	Roy	Test Data	2013-10-11- 11:53:29
Site	AC1	Power	DC 5V
Limit	FCC_PART 15.209_RE	Polarity	Horizontal
Antenna	BBHA_9120D	EUT	Multi-Screen Interactive Device
Test Mode	Mode 3:Transmit at Channel 2462MHz by 802.11n(20MHz)		



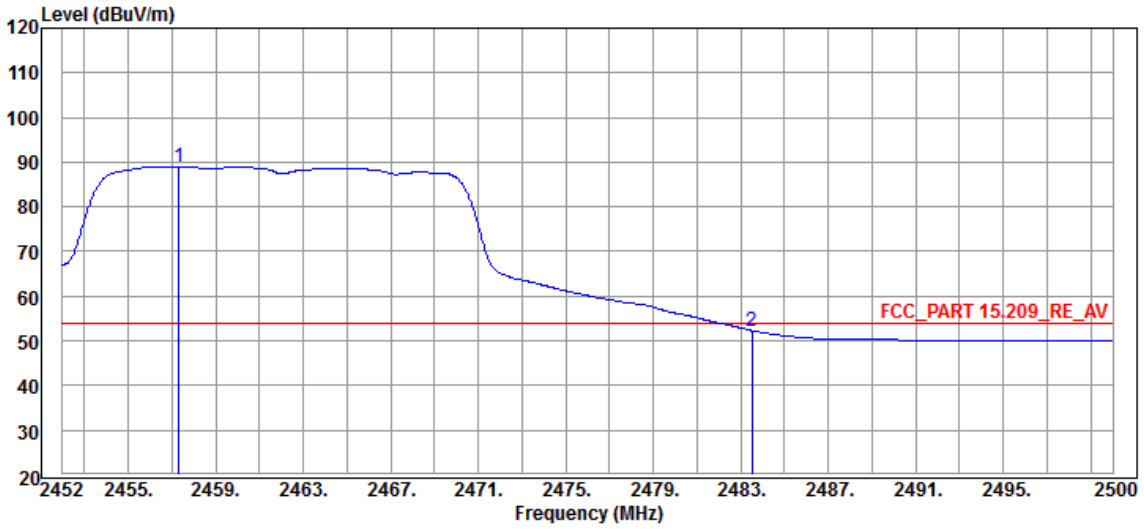
Freq (MHz)	Level (dBμV/m)	Reading (dBuV)	Detector	C.F (dB)	Limit (dBuV/m)	Over Limit (dB)
2457.28	80.29	44.64	AV	35.65	N/A	N/A
2483.50	49.71	13.98	AV	35.73	54.00	-4.29

Tested by	Roy	Test Data	2013-10-11- 11:56:57
Site	AC1	Power	DC 5V
Limit	FCC_PART 15.209_RE	Polarity	Vertical
Antenna	BBHA_9120D	EUT	Multi-Screen Interactive Device
Test Mode	Mode 3:Transmit at Channel 2462MHz by 802.11n(20MHz)		



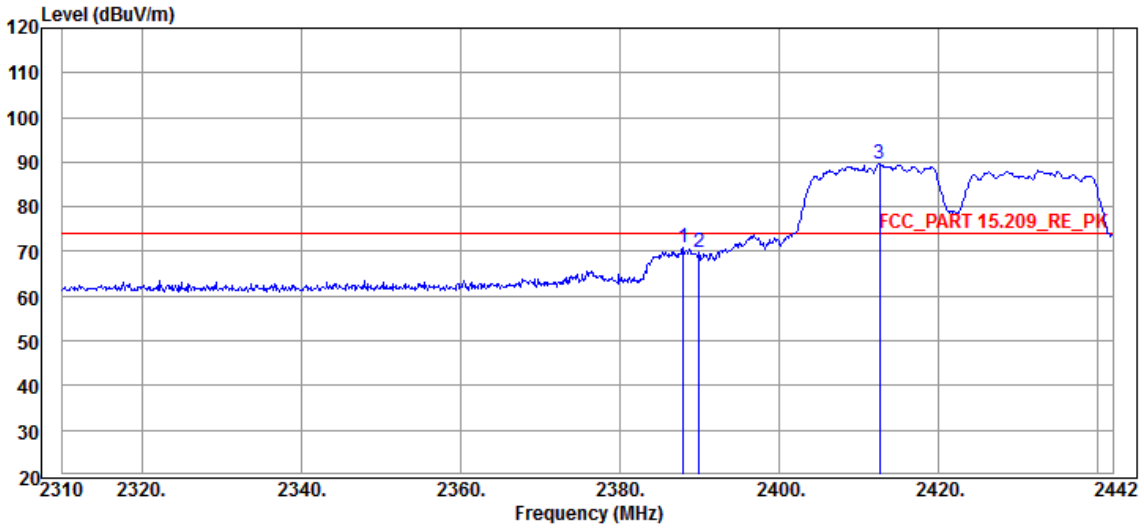
Freq (MHz)	Level (dBμV/m)	Reading (dBuV)	Detector	C.F (dB)	Limit (dBuV/m)	Over Limit (dB)
2458.77	98.93	63.28	PK	35.65	N/A	N/A
2483.50	64.65	28.92	PK	35.73	74.00	-9.35

Tested by	Roy	Test Data	2013-10-11- 11:59:33
Site	AC1	Power	DC 5V
Limit	FCC_PART 15.209_RE	Polarity	Vertical
Antenna	BBHA_9120D	EUT	Multi-Screen Interactive Device
Test Mode	Mode 3:Transmit at Channel 2462MHz by 802.11n(20MHz)		



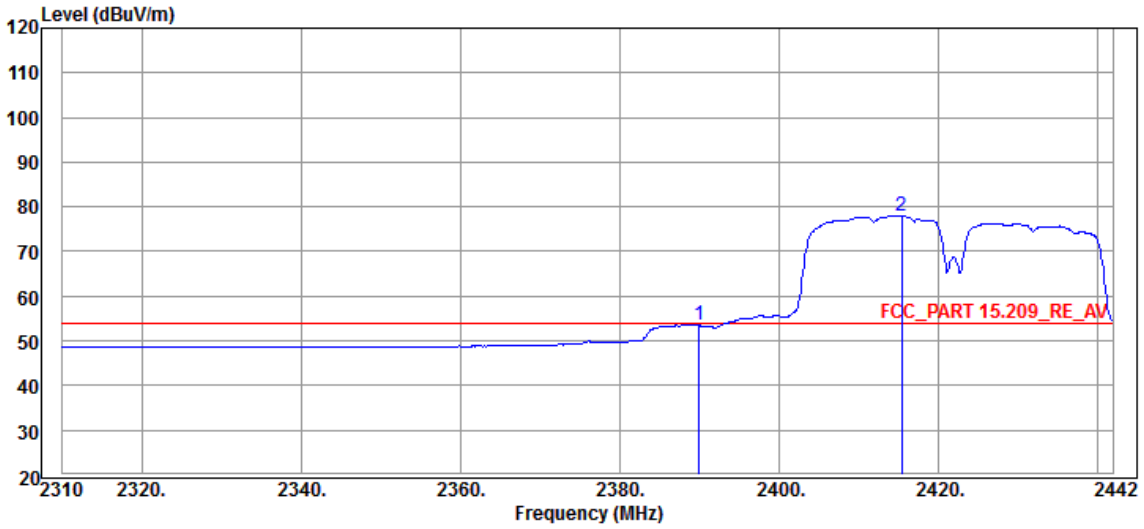
Freq (MHz)	Level (dBμV/m)	Reading (dBuV)	Detector	C.F (dB)	Limit (dBuV/m)	Over Limit (dB)
2457.33	89.02	53.37	AV	35.65	N/A	N/A
2483.50	52.32	16.59	AV	35.73	54.00	-1.68

Tested by	Roy	Test Data	2013-10-11- 12:05:32
Site	AC1	Power	DC 5V
Limit	FCC_PART 15.209_RE	Polarity	Horizontal
Antenna	BBHA_9120D	EUT	Multi-Screen Interactive Device
Test Mode	Mode 4:Transmit at Channel 2422MHz by 802.11n(40MHz)		



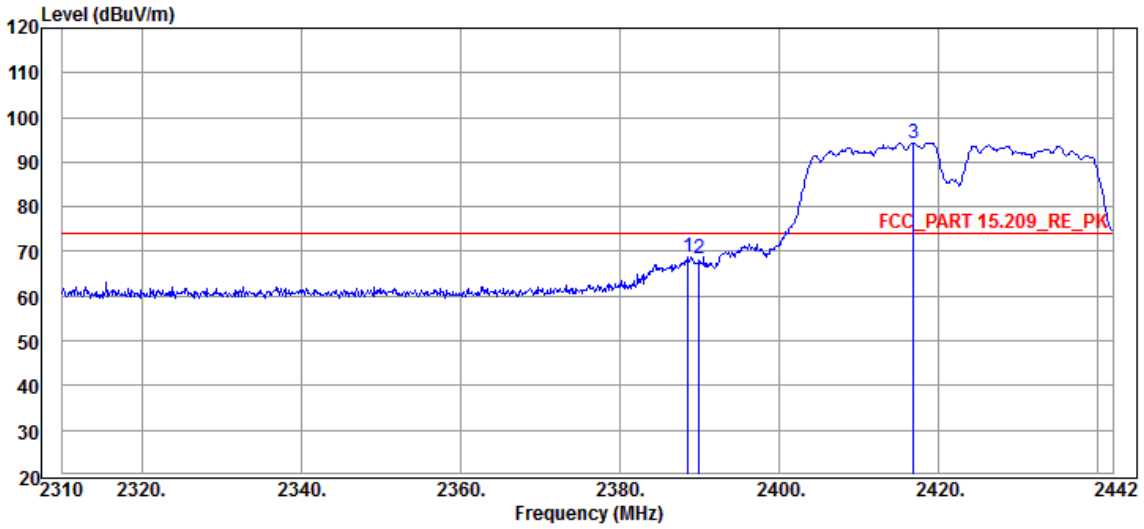
Freq (MHz)	Level (dBμV/m)	Reading (dBuV)	Detector	C.F (dB)	Limit (dBuV/m)	Over Limit (dB)
2388.01	71.03	35.53	PK	35.50	74.00	-2.97
2390.00	69.71	34.21	PK	35.50	74.00	-4.29
2412.70	89.49	53.94	PK	35.55	N/A	N/A

Tested by	Roy	Test Data	2013-10-11- 12:09:34
Site	AC1	Power	DC 5V
Limit	FCC_PART 15.209_RE	Polarity	Horizontal
Antenna	BBHA_9120D	EUT	Multi-Screen Interactive Device
Test Mode	Mode 4:Transmit at Channel 2422MHz by 802.11n(40MHz)		



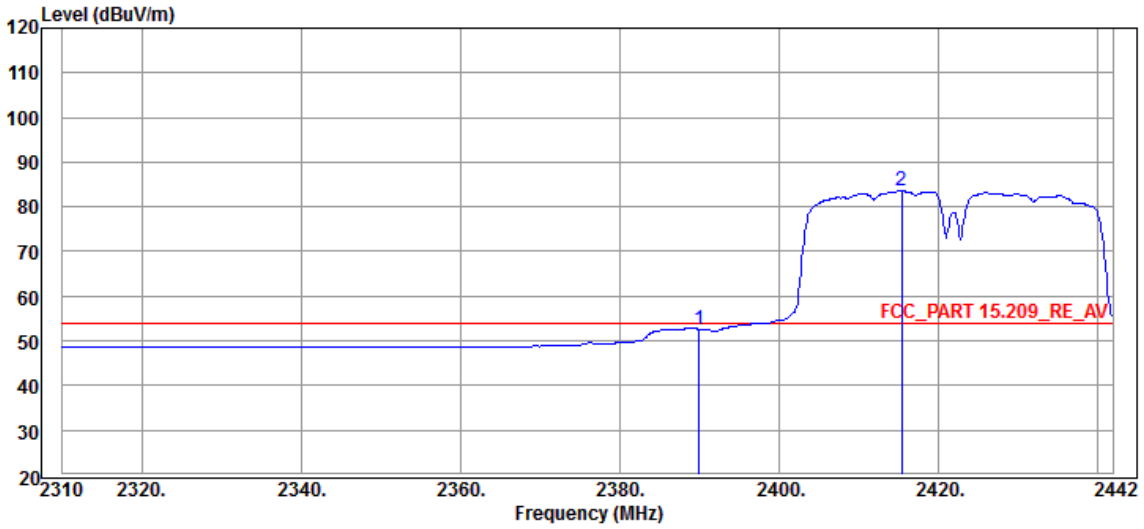
Freq (MHz)	Level (dBμV/m)	Reading (dBuV)	Detector	C.F (dB)	Limit (dBuV/m)	Over Limit (dB)
2390.00	53.48	17.98	AV	35.50	54.00	-0.52
2415.47	78.05	42.50	AV	35.55	N/A	N/A

Tested by	Roy	Test Data	2013-10-11- 13:17:24
Site	AC1	Power	DC 5V
Limit	FCC_PART 15.209_RE	Polarity	Vertical
Antenna	BBHA_9120D	EUT	Multi-Screen Interactive Device
Test Mode	Mode 4:Transmit at Channel 2422MHz by 802.11n(40MHz)		



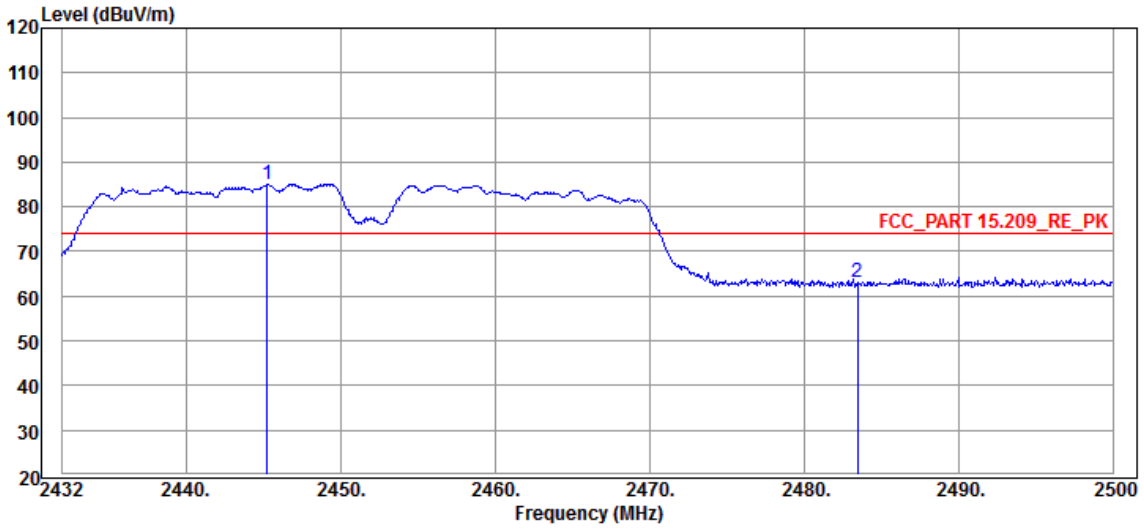
Freq (MHz)	Level (dBμV/m)	Reading (dBuV)	Detector	C.F (dB)	Limit (dBuV/m)	Over Limit (dB)
2388.67	68.67	33.17	PK	35.50	74.00	-5.33
2390.00	68.58	33.08	PK	35.50	74.00	-5.42
2416.92	94.27	58.71	PK	35.56	N/A	N/A

Tested by	Roy	Test Data	2013-10-11- 13:18:19
Site	AC1	Power	DC 5V
Limit	FCC_PART 15.209_RE	Polarity	Vertical
Antenna	BBHA_9120D	EUT	Multi-Screen Interactive Device
Test Mode	Mode 4:Transmit at Channel 2422MHz by 802.11n(40MHz)		



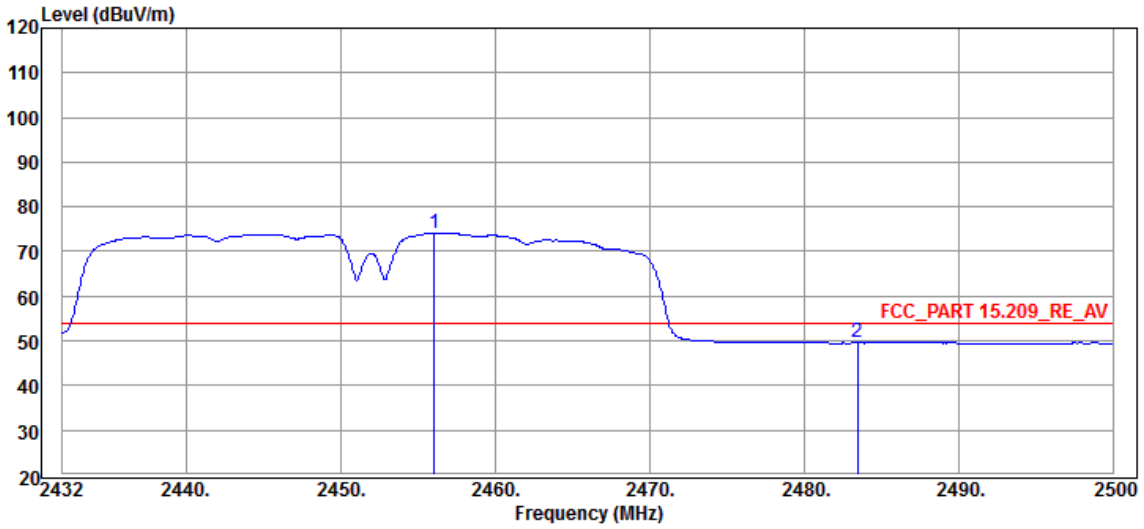
Freq (MHz)	Level (dBμV/m)	Reading (dBuV)	Detector	C.F (dB)	Limit (dBuV/m)	Over Limit (dB)
2390.00	52.64	17.14	AV	35.50	54.00	-1.36
2415.47	83.58	48.03	AV	35.55	N/A	N/A

Tested by	Roy	Test Data	2013-10-11- 13:22:49
Site	AC1	Power	DC 5V
Limit	FCC_PART 15.209_RE	Polarity	Horizontal
Antenna	BBHA_9120D	EUT	Multi-Screen Interactive Device
Test Mode	Mode 4:Transmit at Channel 2452MHz by 802.11n(40MHz)		



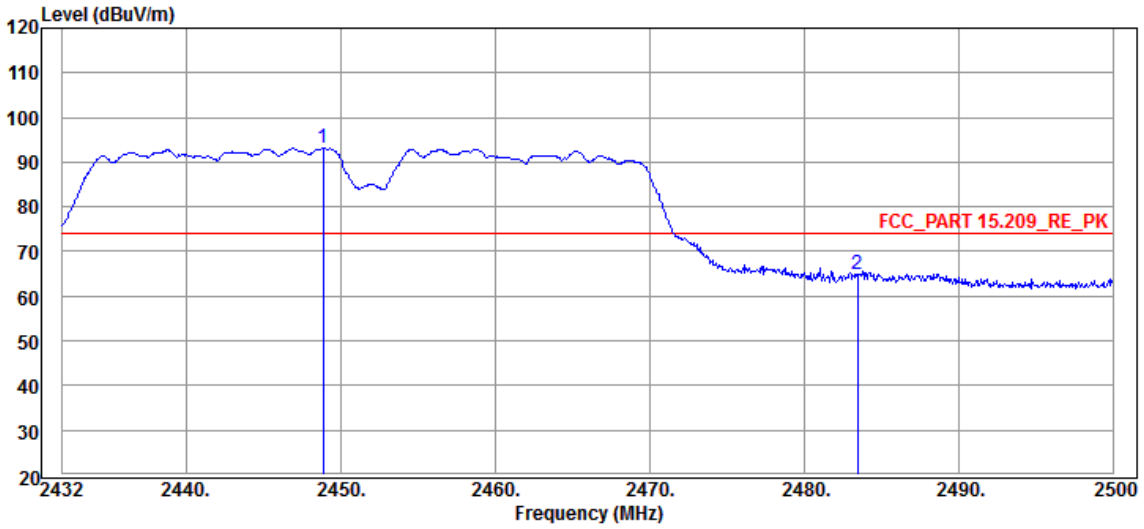
Freq (MHz)	Level (dBμV/m)	Reading (dBuV)	Detector	C.F (dB)	Limit (dBuV/m)	Over Limit (dB)
2445.26	85.15	49.53	PK	35.62	N/A	N/A
2483.50	63.04	27.31	PK	35.73	74.00	-10.96

Tested by	Roy	Test Data	2013-10-11- 13:23:49
Site	AC1	Power	DC 5V
Limit	FCC_PART 15.209_RE	Polarity	Horizontal
Antenna	BBHA_9120D	EUT	Multi-Screen Interactive Device
Test Mode	Mode 4:Transmit at Channel 2452MHz by 802.11n(40MHz)		



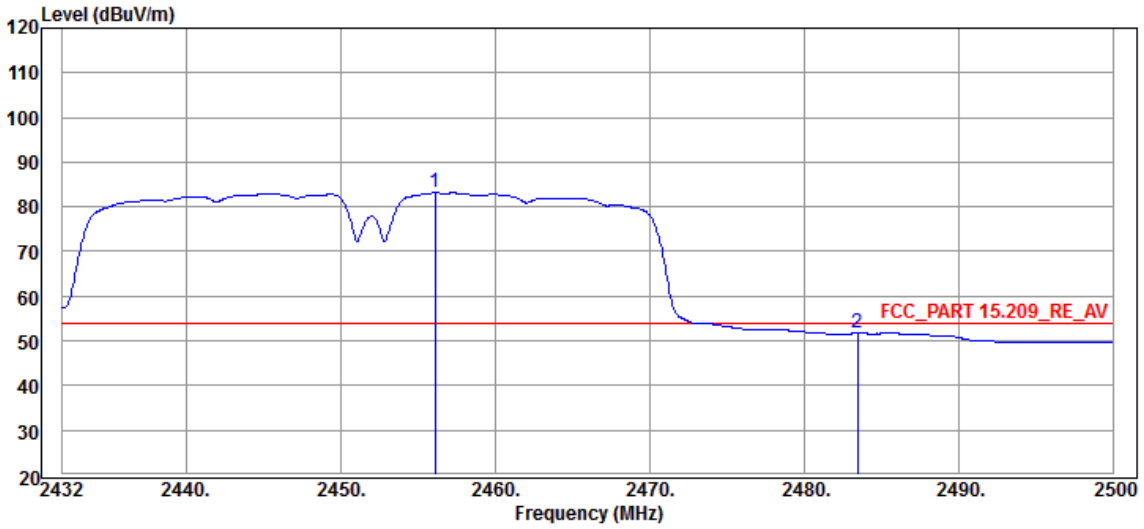
Freq (MHz)	Level (dBμV/m)	Reading (dBuV)	Detector	C.F (dB)	Limit (dBuV/m)	Over Limit (dB)
2456.07	74.09	38.44	AV	35.65	N/A	N/A
2483.50	49.52	13.79	AV	35.73	54.00	-4.48

Tested by	Roy	Test Data	2013-10-11- 13:26:20
Site	AC1	Power	DC 5V
Limit	FCC_PART 15.209_RE	Polarity	Vertical
Antenna	BBHA_9120D	EUT	Multi-Screen Interactive Device
Test Mode	Mode 4:Transmit at Channel 2452MHz by 802.11n(40MHz)		



Freq (MHz)	Level (dBμV/m)	Reading (dBuV)	Detector	C.F (dB)	Limit (dBuV/m)	Over Limit (dB)
2448.86	93.03	57.39	PK	35.64	N/A	N/A
2483.50	65.01	29.28	PK	35.73	74.00	-8.99

Tested by	Roy	Test Data	2013-10-11- 13:30:47
Site	AC1	Power	DC 5V
Limit	FCC_PART 15.209_RE	Polarity	Vertical
Antenna	BBHA_9120D	EUT	Multi-Screen Interactive Device
Test Mode	Mode 4:Transmit at Channel 2452MHz by 802.11n(40MHz)		



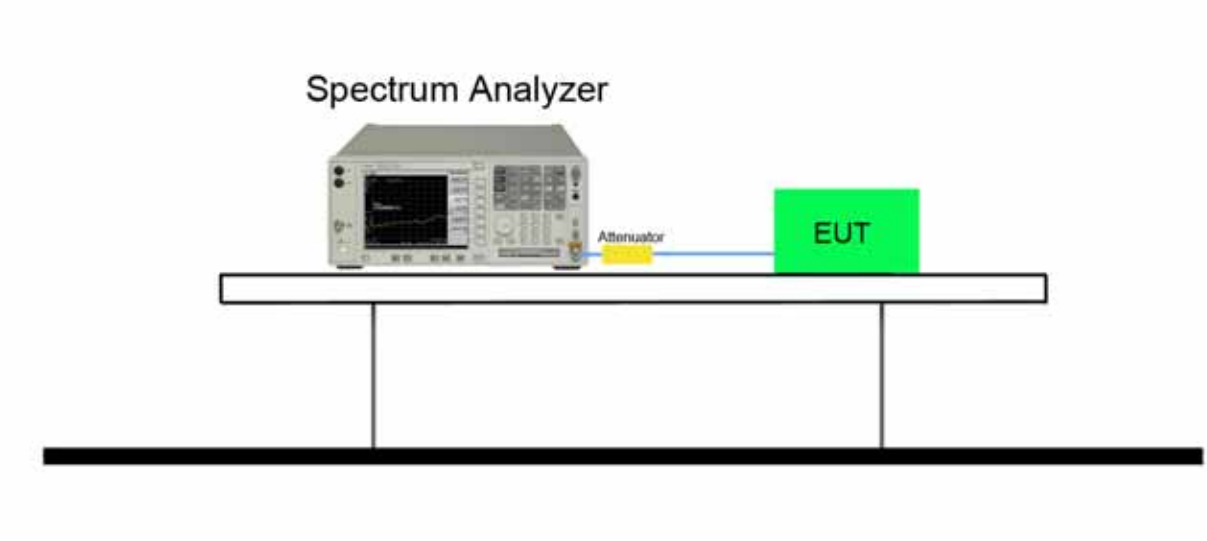
Freq (MHz)	Level (dBμV/m)	Reading (dBuV)	Detector	C.F (dB)	Limit (dBuV/m)	Over Limit (dB)
2456.14	83.12	47.47	AV	35.65	N/A	N/A
2483.50	51.67	15.94	AV	35.73	54.00	-2.33

7. Operation Frequency Range of 20dB Bandwidth

7.1. Limit

20 dB bandwidth of the emission is contained within the operation frequency band.

7.2. Test Setup



7.3. Test Procedure

The EUT was tested according to KDB 558074 for compliance to FCC 47CFR 15.247 requirements.

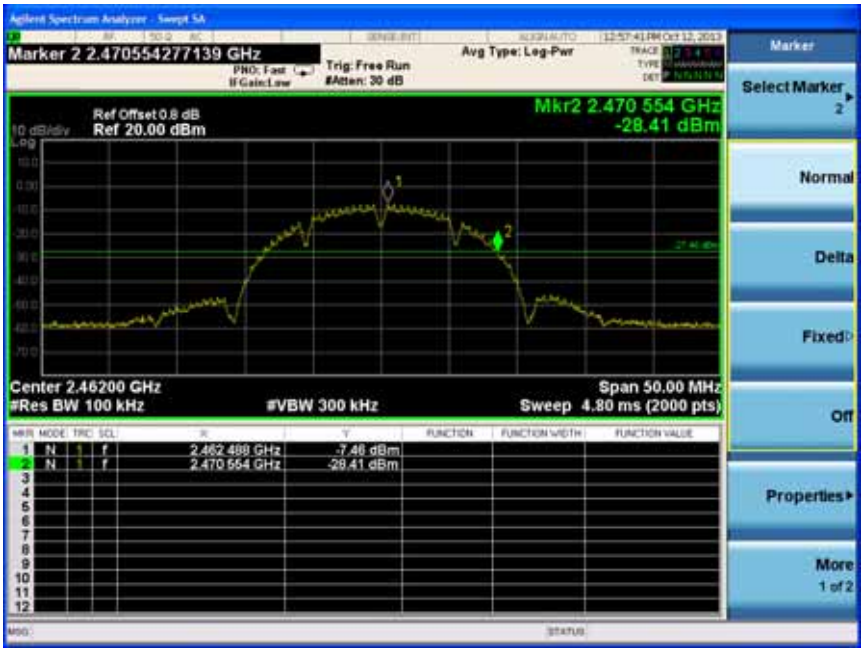
Set RBW = 100 kHz, Span greater than RBW.

7.4. Test Result

Product	:	Multi-Screen Interactive Device
Test Item	:	Operation Frequency Range of 20dB Bandwidth
Test Site	:	TR3
Test Mode	:	Mode 1: Transmit by 802.11b

Channel 01 (2412MHz)

Channel 11 (2462MHz)



Product	:	Multi-Screen Interactive Device
Test Item	:	Operation Frequency Range of 20dB Bandwidth
Test Site	:	TR3
Test Mode	:	Mode 2: Transmit by 802.11g

Channel 01 (2412MHz)

Channel 11 (2462MHz)

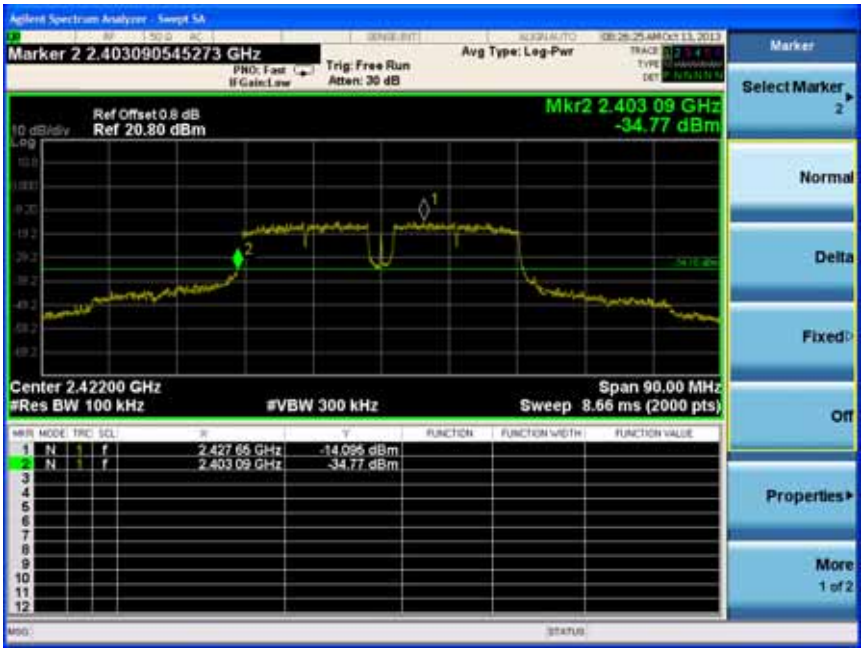
Product	:	Multi-Screen Interactive Device
Test Item	:	Operation Frequency Range of 20dB Bandwidth
Test Site	:	TR3
Test Mode	:	Mode 3: Transmit by 802.11n(20MHz)

Channel 01 (2412MHz)

Channel 11 (2462MHz)

Product	:	Multi-Screen Interactive Device
Test Item	:	Operation Frequency Range of 20dB Bandwidth
Test Site	:	TR3
Test Mode	:	Mode 4: Transmit by 802.11n(40MHz)

Channel 03 (2422MHz)



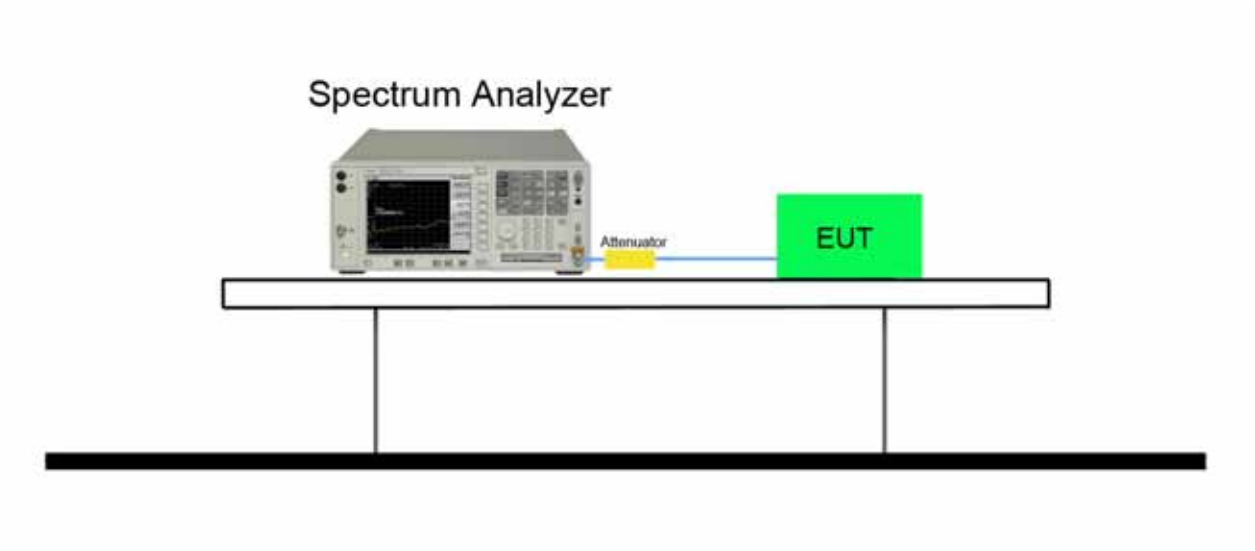
Channel 09 (2452MHz)

8. Occupied Bandwidth

8.1. Limit

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

8.2. Test Setup



8.3. Test Procedure

The EUT was tested according to KDB 558074 for compliance to FCC 47CFR 15.247 requirements.

DTS bandwidth OPTION 2:

The automatic bandwidth measurement capability of an instrument may be employed using the X dB bandwidth mode with X set to 6 dB, if the functionality described above (i.e., RBW = 100 kHz, VBW ≥ 3 * RBW, peak detector with maximum hold) is implemented by the instrumentation function.

8.4. Test Result

Product	:	Multi-Screen Interactive Device
Test Item	:	6dB Occupied Bandwidth
Test Site	:	TR3
Test Mode	:	Mode 1: Transmit by 802.11b

Channel No.	Frequency (MHz)	Occupied Bandwidth (kHz)	Limit (kHz)	Result
01	2412	10105	≥500	Pass
06	2437	10230	≥500	Pass
11	2462	10105	≥500	Pass

Channel 01 (2412MHz)

Channel 06 (2437MHz)

Channel 11 (2462MHz)

Product	:	Multi-Screen Interactive Device
Test Item	:	6dB Occupied Bandwidth
Test Site	:	TR3
Test Mode	:	Mode 2: Transmit by 802.11g

Channel No.	Frequency (MHz)	Occupied Bandwidth (kHz)	Limit (kHz)	Result
01	2412	16533	≥500	Pass
06	2437	16558	≥500	Pass
11	2462	16558	≥500	Pass

Channel 01 (2412MHz)

Channel 06 (2437MHz)

Channel 11 (2462MHz)

Product	:	Multi-Screen Interactive Device
Test Item	:	6dB Occupied Bandwidth
Test Site	:	TR3
Test Mode	:	Mode 3: Transmit by 802.11n(20MHz)

Channel No.	Frequency (MHz)	Occupied Bandwidth (kHz)	Limit (kHz)	Result
01	2412	16533	≥500	Pass
06	2437	16533	≥500	Pass
11	2462	16533	≥500	Pass

Channel 01 (2412MHz)

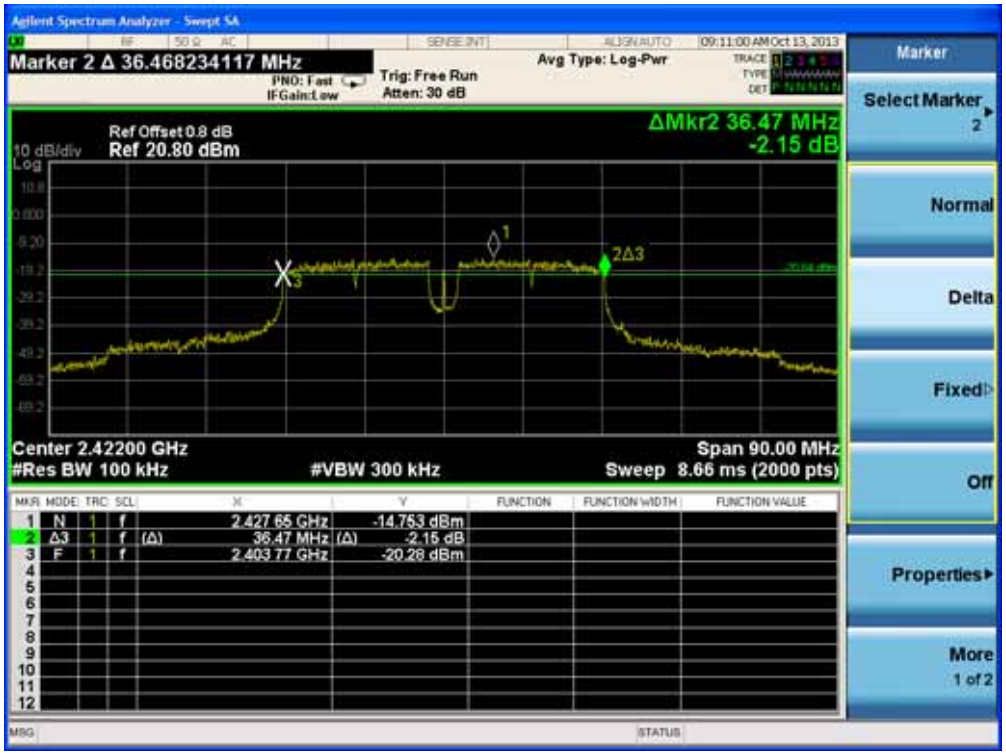
Channel 06 (2437MHz)

Channel 11 (2462MHz)

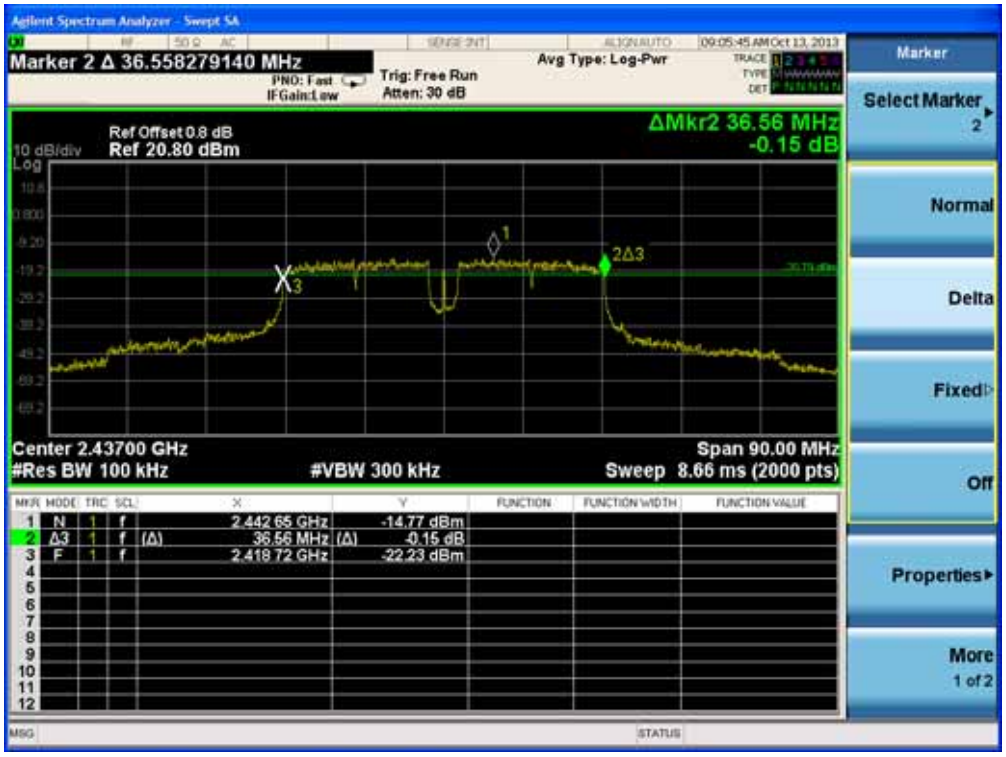
Product	:	Multi-Screen Interactive Device
Test Item	:	6dB Occupied Bandwidth
Test Site	:	TR3
Test Mode	:	Mode 4: Transmit by 802.11n(40MHz)

Channel No.	Frequency (MHz)	Occupied Bandwidth (kHz)	Limit (kHz)	Result
03	2422	36470.0	≥500	Pass
06	2437	36560.0	≥500	Pass
09	2452	36470.0	≥500	Pass

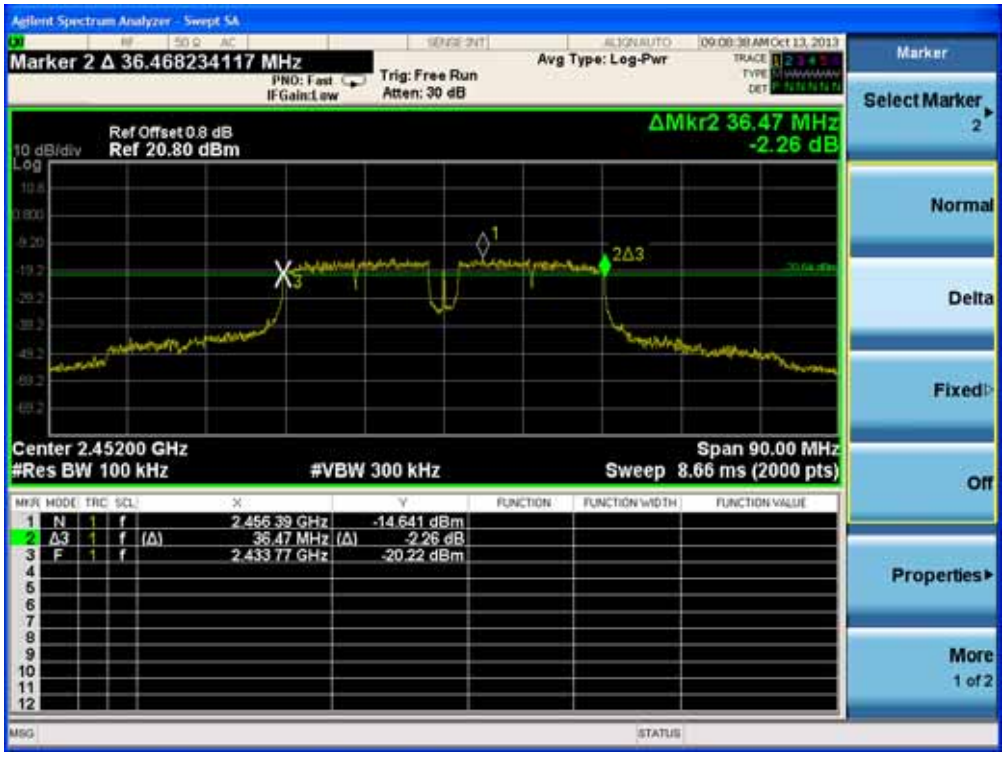
Channel 03 (2422MHz)



Channel 06 (2437MHz)



Channel 09 (2452MHz)



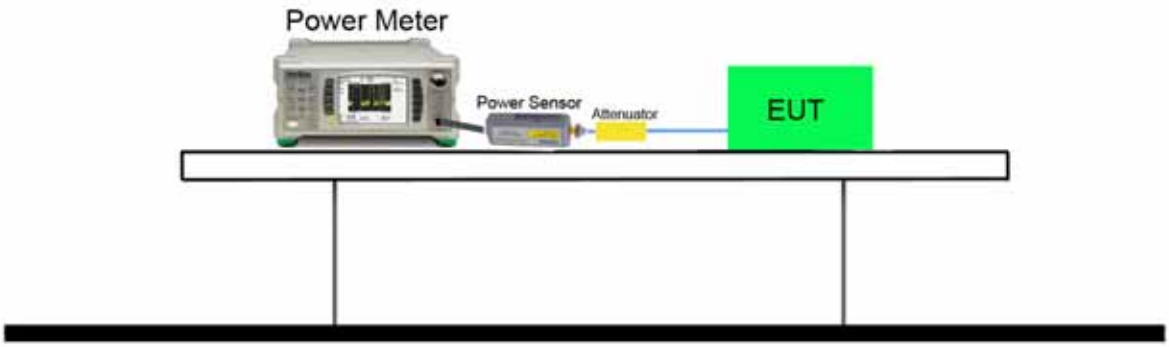
9. Power Output

9.1. Limit

The maximum peak power shall be less 1 Watt (30dBm).

Note: the conducted output power limit specified above is based on the use the antennas with directional gains that do not exceed 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values above, as appropriate, by the amount in dB that the directional gain of antenna exceeds 6 dBi.

9.2. Test Setup



9.3. Test Procedure

The EUT was tested according to KDB 558074 for compliance to FCC 47CFR 15.247 requirements.

Use the broadband peak RF power meter to test peak power and record the result.

9.4. Test Result

Power output test was verified over all data rates of each mode shown as below, and then choose the maximum power output (blue marker) for final test of each channel.

MCS Index for 802.11n	Spatial Streams	Data Rate (Mbps)					
		802.11b	802.11g	20MHz Bandwidth		40MHz Bandwidth	
				800ns GI	400ns GI	800ns GI	400ns GI
0	1	1	6	6.5	7.2	13.5	15.0
1	1	2	9	13.0	14.4	27.0	30.0
2	1	5.5	12	19.5	21.7	40.5	45.0
3	1	11	18	26.0	28.9	54.0	60.0
4	1	---	24	39.0	43.3	81.0	90.0
5	1	---	36	52.0	57.8	108.0	120.0
6	1	---	48	58.5	65.0	121.5	135.0
7	1	---	54	65.0	72.2	135.0	150.0

Power output at various data rates:

Test Mode	Bandwidth	Frequency (MHz)	Channel	Data Rate	Peak Power (dBm)
802.11b	20	2437	6	1	9.17
				5.5	8.92
				11	8.96
802.11g	20	2437	6	6	8.97
				24	8.42
				54	8.85
802.11n	20	2437	6	MCS0	9.12
				MCS4	9.05
				MCS7	8.96
802.11n	40	2437	6	MCS0	9.56
				MCS4	8.98
				MCS7	9.41

Product	:	Multi-Screen Interactive Device
Test Item	:	Power Output
Test Site	:	TR3
Test Mode	:	Mode 1: Transmit by 802.11b

Channel No.	Frequency (MHz)	Peak Power Output (dBm)	Limit (dBm)	Result
1	2412	8.63	30.00	Pass
6	2437	9.17	30.00	Pass
11	2462	8.86	30.00	Pass

Product	:	Multi-Screen Interactive Device
Test Item	:	Power Output
Test Site	:	TR3
Test Mode	:	Mode 2: Transmit by 802.11g

Channel No.	Frequency (MHz)	Peak Power Output (dBm)	Limit (dBm)	Result
1	2412	8.36	30.00	Pass
6	2437	8.97	30.00	Pass
11	2462	8.43	30.00	Pass

Product	:	Multi-Screen Interactive Device
Test Item	:	Power Output
Test Site	:	TR3
Test Mode	:	Mode 3: Transmit by 802.11n(20MHz)

Channel No.	Frequency (MHz)	Peak Power Output (dBm)	Limit (dBm)	Result
1	2412	8.98	30.00	Pass
6	2437	9.12	30.00	Pass
11	2462	9.04	30.00	Pass

Product	:	Multi-Screen Interactive Device
Test Item	:	Power Output
Test Site	:	TR3
Test Mode	:	Mode 4: Transmit by 802.11n(40MHz)

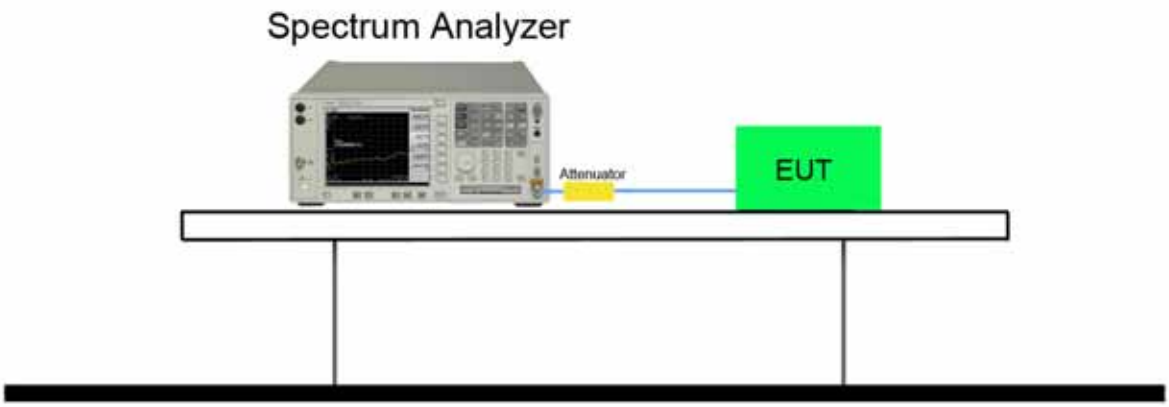
Channel No.	Frequency (MHz)	Peak Power Output (dBm)	Limit (dBm)	Result
3	2422	9.07	30.00	Pass
6	2437	9.56	30.00	Pass
9	2452	9.11	30.00	Pass

10. Power Spectral Density

10.1. Limit

For digitally modulated systems, the power spectral density conducted from the intentional radiated to the Antenna shall not be greater than 8dBm in any 3kHz band during any time interval of continuous transmission.

10.2. Test Setup



10.3. Test Procedure

The EUT was tested according to KDB 558074 for compliance to FCC 47CFR 15.247 requirements.

Set analyzer center frequency to DTS channel center frequency, the span to 1.5 times the DTS channel bandwidth, RBW ≥ 3 kHz, Set VBW ≥ 3 * RBW, Sweep time = auto couple, Detector = peak, Trace mode = max hold, Allow trace to fully stabilize, use the peak marker function to determine the maximum amplitude level. If measured value exceed limit reduce RBW (no less than 3kHz) and repeat.

10.4. Test Result

Product	:	Multi-Screen Interactive Device
Test Item	:	Power Spectral Density
Test Site	:	TR3
Test Mode	:	Mode 1: Transmit by 802.11b

Channel No.	Frequency (MHz)	Measurement PSD (dBm)	Limit (dBm)	Result
01	2412	-7.03	8	Pass
06	2437	-6.99	8	Pass
11	2462	-6.96	8	Pass

Channel 01 (2412MHz)

Channel 06 (2437MHz)

Channel 11 (2462MHz)

Product	:	Multi-Screen Interactive Device
Test Item	:	Power Spectral Density
Test Site	:	TR3
Test Mode	:	Mode 2: Transmit by 802.11g

Channel No.	Frequency (MHz)	Measurement PSD (dBm)	Limit (dBm)	Result
01	2412	-9.10	8	Pass
06	2437	-9.06	8	Pass
11	2462	-9.00	8	Pass

Channel 01 (2412MHz)

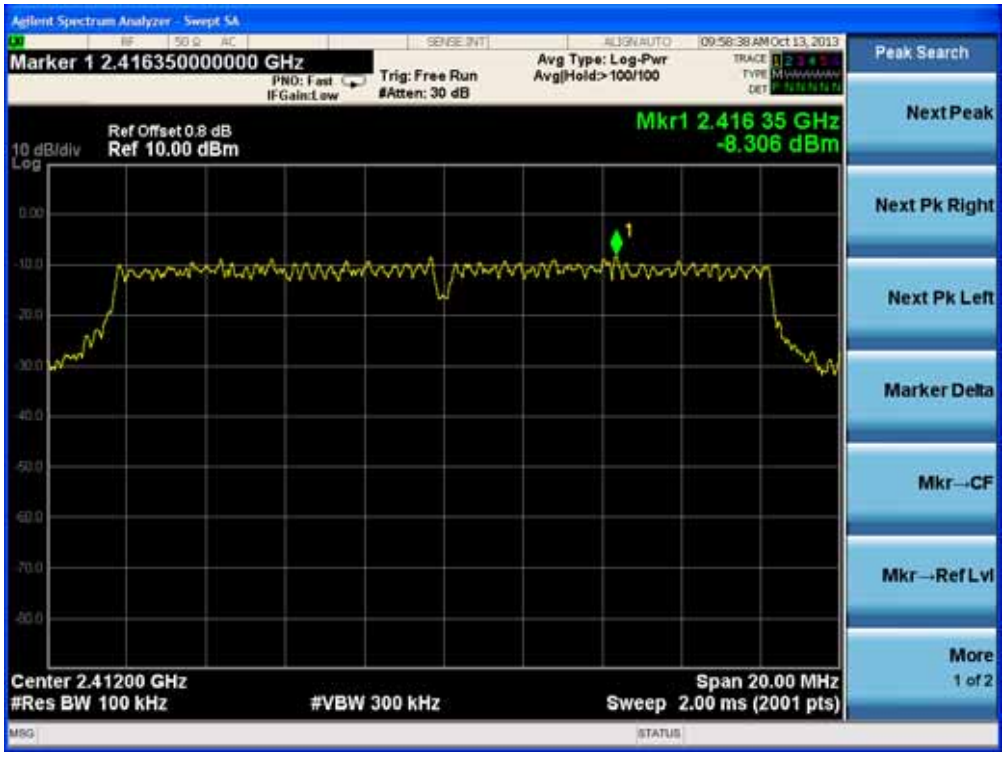
Channel 06 (2437MHz)

Channel 11 (2462MHz)

Product	:	Multi-Screen Interactive Device
Test Item	:	Power Spectral Density
Test Site	:	TR3
Test Mode	:	Mode 3: Transmit by 802.11n(20MHz)

Channel No.	Frequency (MHz)	Measurement PSD (dBm)	Limit (dBm)	Result
01	2412	-8.31	8	Pass
06	2437	-8.25	8	Pass
11	2462	-8.16	8	Pass

Channel 01 (2412MHz)



Channel 06 (2437MHz)

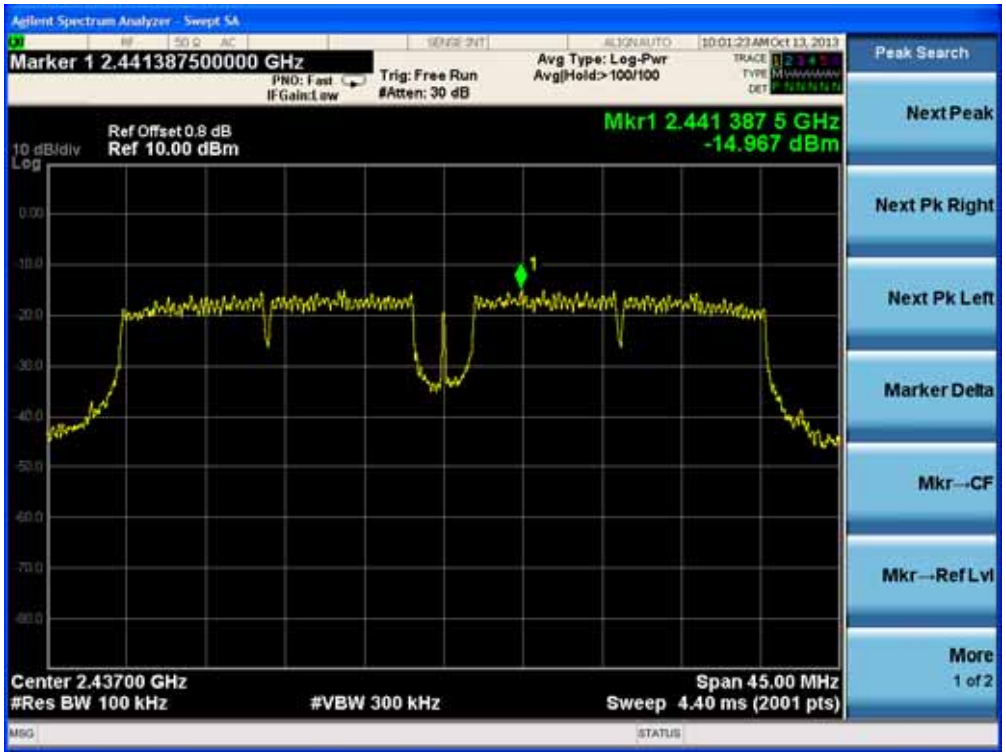
Channel 11 (2462MHz)

Product	:	Multi-Screen Interactive Device
Test Item	:	Power Spectral Density
Test Site	:	TR3
Test Mode	:	Mode 4: Transmit by 802.11n(40MHz)

Channel No.	Frequency (MHz)	Measurement PSD (dBm)	Limit (dBm)	Result
03	2422	-14.96	8	Pass
06	2437	-14.97	8	Pass
09	2452	-14.91	8	Pass

Channel 03 (2422MHz)

Channel 06 (2437MHz)



Channel 09 (2452MHz)

11. Measurement Uncertainty

Conducted Emission
The maximum measurement uncertainty is defined as: 9kHz~30MHz: ±2.02dB
Radiated disturbance
The maximum measurement uncertainty is defined as: Below 1GHz: ±3.8dB Above 1GHz: ±3.9dB
RF Antenna Conducted Spurious
The maximum measurement uncertainty is defined as: ±1.27 dB.
Radiated Emission Band Edge
The maximum measurement uncertainty is defined as: Above 1GHz: ±3.9dB
Operation Frequency Range of 20dB Bandwidth
The maximum measurement uncertainty is defined as: ±1 kHz.
Occupied Bandwidth
The maximum measurement uncertainty is defined as: ±1 kHz.
Power Output
The maximum measurement uncertainty is evaluated as ±1.27 dB.
Power Spectral Density
The maximum measurement uncertainty is evaluated as ±1.27 dB.

12. List of Measuring Instrument

Conducted Emission

Instrument	Manufacturer	Type No.	Serial No.	Cali. Due Date
EMI Test Receiver	R&S	ESR7	101209	2014/07/17
Two-Line V-Network	R&S	ENV216	101683	2014/07/17
Two-Line V-Network	R&S	ENV216	101684	2014/07/17
Temperature/ Meter Humidity	Anymetre	TH101B	SR2-01	2014/08/15

Radiated Emission

Instrument	Manufacturer	Type No.	Serial No.	Cal. Date
Spectrum Analyzer	Agilent	N9038A	MY51210155	2014/08/15
Preamplifier	MRT	AP01G18	1310002	2014/10/08
Preamplifier	MRT	AP18G40	1310003	2014/10/08
Loop Antenna	Schwarzbeck	FMZB1519	1519-041	2014/09/13
TRILOG Antenna	Schwarzbeck	VULB9162	9162-047	2014/09.13
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1167	2014/09/13
Broadband Horn Antenna	Schwarzbeck	BBHA9170	9170-549	2014/09/13
Temperature/Humidity Meter	Anymetre	TH101B	AC1-01	2014/08/15

Operation Frequency Range of 20dB Bandwidth

Instrument	Manufacturer	Type No.	Serial No.	Cal. Date
Spectrum Analyzer	Agilent	N9010A	MY5144016A	2014/08/15
Temperature/Humidity Meter	Anymetre	TH101B	TR3-01	2014/08/15

Occupied Channel Bandwidth

Instrument	Manufacturer	Type No.	Serial No.	Cali. Due Date
Spectrum Analyzer	Agilent	N9010A	MY5144016A	2014/08/15
Temperature/Humidity Meter	Anymetre	TH101B	TR3-01	2014/08/15

Power Output

Instrument	Manufacturer	Type No.	Serial No.	Cali. Due Date
Power Meter	Anritsu	ML2495A	0905006	2013/11/10
Power Sensor	Anritsu	MA2411B	0846014	2013/11/10
Temperature/Humidity Meter	Anymetre	TH101B	TR3-01	2014/08/15

Power Spectral Density

Instrument	Manufacturer	Type No.	Serial No.	Cal. Date
Spectrum Analyzer	Agilent	N9010A	MY5144016A	2014/08/15
Temperature/Humidity Meter	Anymetre	TH101B	TR3-01	2014/08/15

The End