Zacta

TEST REPORT

Report number : Z101C-16039
Issue date : April 20, 2016

The device, as described herewith, was tested pursuant to applicable test procedure and complies with the requirements of;

FCC Part15 Subpart C

The test results are traceable to the international or national standards.

Applicant	:	KYOCERA Corporation
Equipment under test (EUT)	:	Mobile Phone
Model number	:	YKCA04
FCC ID	:	JOYYKCA04

Date of test : March 1, 2, 7, 17, 18, 25, April 12, 20, 2016
Test place : TÜV SÜD Zacta Ltd. Yonezawa Testing Center
4149-7 Hachimanpara 5-chome
Yonezawa-shi Yamagata 992-1128 Japan
Phone: +81-238-28-2880 Fax: +81-238-28-2888
Test results : Complied

The results in this report are applicable only to the equipment tested.
This report shall not be re-produced except in full without the written approval of TÜV SÜD Zacta Ltd.
This test report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.

Tested by : Kazunori Saito
Kazunori Saito

Tested by : Hikaru Shibata
Hikaru Shibata

Tested by : Taiki Watanabe
Taiki Watanabe

Authorized by : Hiro Suzuki
Hiroaki Suzuki
Manager of EMC Technical Department

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1. Summary of Test

1.1 Purpose of test

It is the original test in order to verify conformance to FCC Part 15 Subpart C.

1.2 Standards

CFR47 FCC Part 15 Subpart C

1.2.1 Test Methods

ANSI C63.10-2013, KDB 558074 D01 DTS Meas Guidance v03r05

1.2.2 Deviation from standards

None

1.3 List of applied test to the EUT

Test items Section	Test items	Condition	Result
15.247(a)(2)	6dB Bandwidth	Conducted	PASS
15.247(b)(3)	Maximum conducted (average) output power	Conducted	PASS
15.247(d)	Band Edge Compliance of RF Conducted Emissions	Conducted	PASS
15.247(d) 15.205 15.209	Spurious Emissions	Conducted Radiated	PASS
15.247(d) 15.205 15.209	Restricted Bands of Operation	Radiated	PASS
15.247(e)	Transmitter Power Spectral Density	Conducted	PASS
15.207	AC Power Line Conducted Emissions	Conducted	PASS

1.3.1 Test set up

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1.4 Modification to the EUT by laboratory

None

2. Equipment Under Test

2.1 General Description of equipment

EUT is the Mobile Phone.

2.2 EUT information

Applicant	:	KYOCERA Corporation Yokohama Office 2-1-1 Kagahara, Tsuzuki-ku Yokohama-shi, Kanagawa, Japan Phone: +81-45-943-6253 Fax: +81-45-943-6314
Equipment under test	:	Mobile Phone
Trade name	:	Kyocera
Model number	:	YKCA04
Serial number	:	N/A
EUT condition	:	Pre-Production
Power ratings	:	Battery: DC 3.8V
Size	:	(W) 71.6 × (D) 10.7 × (H) 142 mm
Environment	:	Indoor and Outdoor use
Thermal limitation	:	-20˚C to 60˚C
RF Specification		
Protocol	:	IEEE802.11b, IEEE802.11g, IEEE802.11n (HT20), IEEE802.11n(HT40)
Frequency range	:	IEEE802.11b /11g/11n (HT20): 2412MHz-2462MHz IEEE802.11n (HT40): 2422MHz-2452MHz
Number of RF Channels	:	11 Channels
Modulation type	:	IEEE802.11b: DSSS (DBPSK, DQPSK, CCK) IEEE802.11g / n (HT20) / n (HT40): OFDM (BPSK, QPSK, 16QAM, 64QAM)
Data rate	:	IEEE802.11b: 1, 2, 5.5, 11Mbps IEEE802.11g: 6, 9, 12, 18, 24, 36, 48, 54Mbps IEEE802.11n (HT20 LGI): 6.5, 13, 19.5, 26, 39, 52, 58.5, 65Mbps IEEE802.11n (HT20 SGI): 7.2, 14.4, 21.7, 28.9, 43.3, 57.8, 65, 72.2Mbps IEEE802.11n (HT40 LGI): 13.5, 27, 40.5, 54, 81, 108, 121.5, 135Mbps IEEE802.11n (HT40 SGI): 15, 30, 45, 60, 90, 120, 135, 150Mbps
Channel separation	:	5MHz
Output power	:	26.303mW (IEEE802.11b) 14.093mW (IEEE802.11g) 13.459mW (IEEE802.11n: HT20) 13.213mW (IEEE802.11n: HT40)
Antenna type	:	Internal antenna
Antenna gain	:	-1.1dBi

2.3 Variation of the family model(s)

Not applicable

2.4 Operating channels and frequencies

Channel	Frequency [MHz]
1	2412
2	2417
3	2422
4	2427
5	2432
6	2437
7	2442
8	2447
9	2452
10	2457
11	2462

2.5 Operating mode

The EUT had been tested under operating condition.
There are three channels have been tested as following:

Tested Channel	Frequency [MHz]	Frequency [MHz](11n HT40)
Low	2412	2422
Middle	2437	2437
High	2462	2452

The pre-test has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates.

Tested Channel	Modulation Type	Data Rate
Low, Middle, High	IEEE802.11b: DSSS	1Mbps
Low, Middle, High	IEEE802.11g: OFDM	6Mbps
Low, Middle, High	IEEE802.11n (HT20 LGI): OFDM	MCS0 (6.5Mbps)
Low, Middle, High	IEEE802.11n (HT40 LGI): OFDM	MCS0 (13.5Mbps)

The field strength of spurious emissions was measured at each position of all three axis X, Y and Z to compare the level, and the maximum noise.
The worst emission was found in X axis and the worst case recorded.

2.6 Operating flow

[Tx mode]
i) Test program setup to the DM tool
ii) Select a Test mode
[IEEE802.11b、IEEE802.11g、IEEE802.11n (HT20)]
Operating frequency: Channel Low: 2412MHz, Channel Middle: 2437MHz, Channel High: 2462MHz
[IEEE802.11n (HT40)]
Operating frequency: Channel Low: 2422MHz, Channel Middle: 2437MHz, Channel High: 2452MHz
iii) Start test mode

[Rx mode]
i) Test program setup to the DM tool
ii) Select a Test mode
[IEEE802.11b、IEEE802.11g、IEEE802.11n (HT20)]
Operating frequency: Channel Low: 2412MHz, Channel Middle: 2437MHz, Channel High: 2462MHz
[IEEE802.11n (HT40)]
Operating frequency: Channel Low: 2422MHz, Channel Middle: 2437MHz, Channel High: 2452MHz
iii) Start test mode

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3. Configuration of equipment

3.1 Equipment(s) used

No.	Equipment	Company	Model No.	Serial No.	FCC ID / DoC	Comment
1	Mobile Phone	KYOCERA	YKCA04	N/A	JOYYKCA04	EUT
2	AC Adapter	Au	N/A	N/A	N/A	*

*: AC power line Conducted Emission Test.

3.2 Cable(s) used

No.	Cable	Length[m]	Shield	Connector	Comment
a	Micro USB cable(for AC Adapter)	1.0	Yes	Metal	*

*: AC power line Conducted Emission Test.

3.3 System configuration

: Un-detachable cable

Note1: Numbers assigned to equipment or cables on this diagram correspond to the list in “3.1 Equipment(s) used” and “3.2 Cable(s) used”.

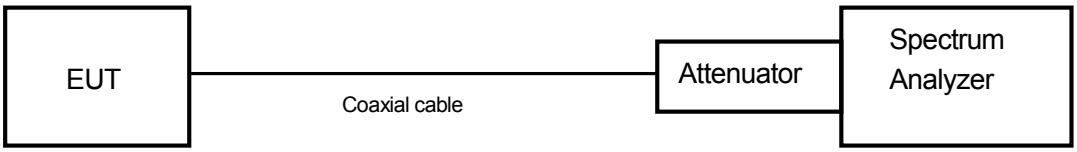
4. 6dB Bandwidth

4.1 Measurement procedure
[FCC 15.247(a)(2), KDB 558074 D01 v03r05, Section 8.2]

The bandwidth at 6dB down from the highest inband spectral density is measured with a spectrum analyzer connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate center frequency.

The spectrum analyzer is set to;
a) RBW = 100kHz.
b) VBW ≥ 3 x RBW.
c) Sweep time = auto-couple.
d) Detector = peak.
e) Trace mode = max hold.

- Test configuration



4.2 Limit

The minimum permissible 6dB bandwidth is 500kHz.

4.3 Measurement result

Date : March 1, 2016
Temperature : 22.3 [˚C]
Humidity : 32.6 [%]
Test place : Shielded room No.4
Test engineer : Kazunori Saito

[IEEE802.11b、IEEE802.11g、IEEE802.11n (HT20)]

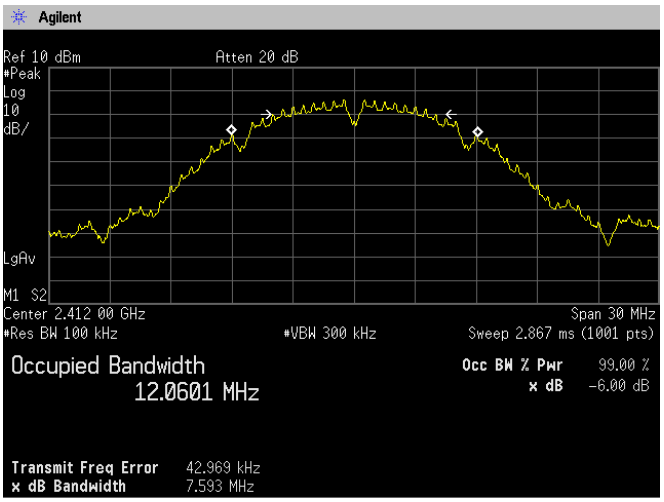
Channel	Frequency [MHz]	6dB bandwidth [MHz]		
		IEEE802.11b	IEEE802.11g	IEEE802.11n (HT20)
Low	2412	7.593	16.106	16.804
Middle	2437	7.597	16.322	17.010
High	2462	7.586	16.310	16.912

[IEEE802.11n (HT40)]

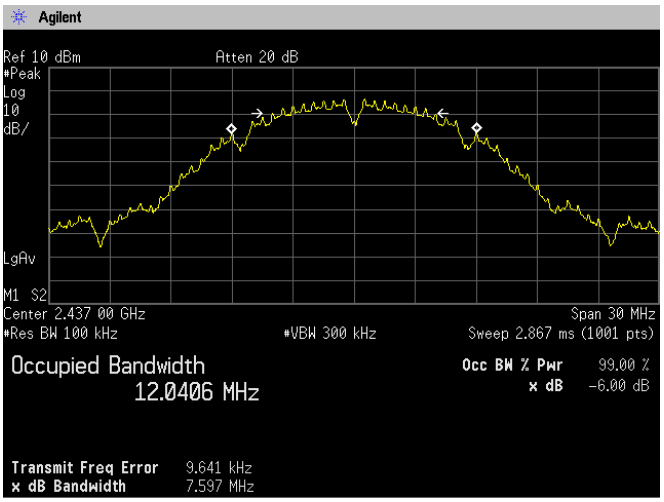
Channel	Frequency [MHz]	6dB bandwidth [MHz]
		IEEE802.11n (HT40)
Low	2422	35.218
Middle	2437	35.663
High	2452	35.346

4.4 Trace data [IEEE802.11b]

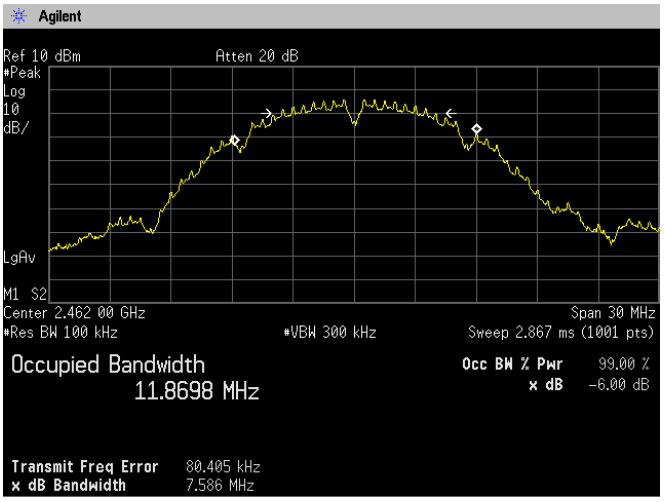
Channel Low



Channel Middle

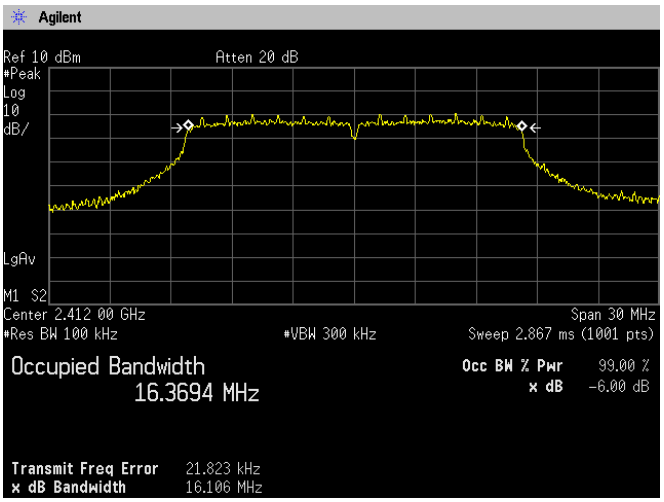


Channel High

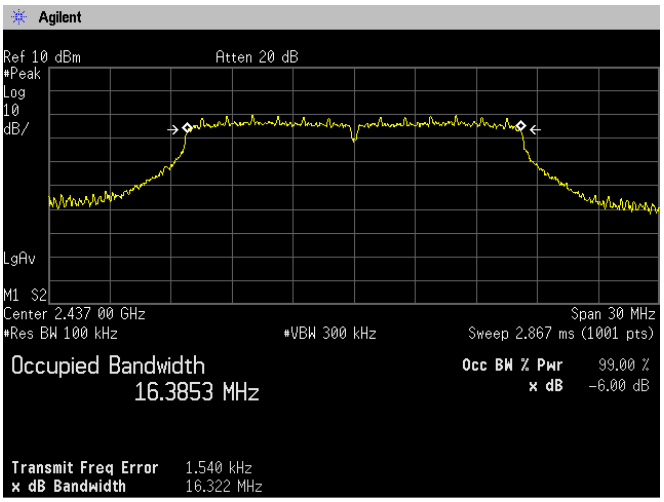


[IEEE802.11g]

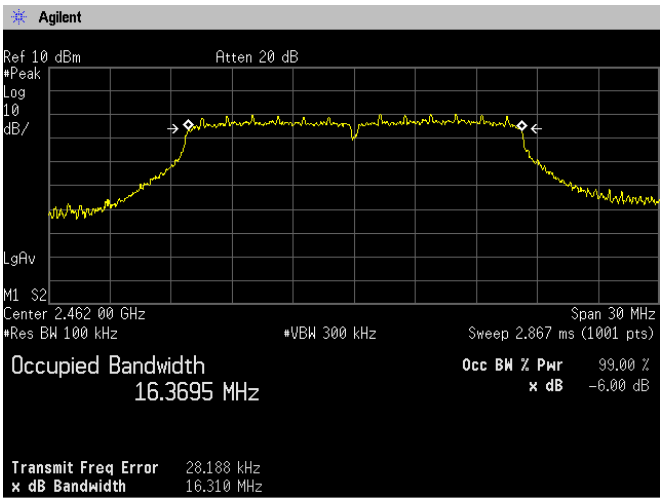
Channel Low



Channel Middle

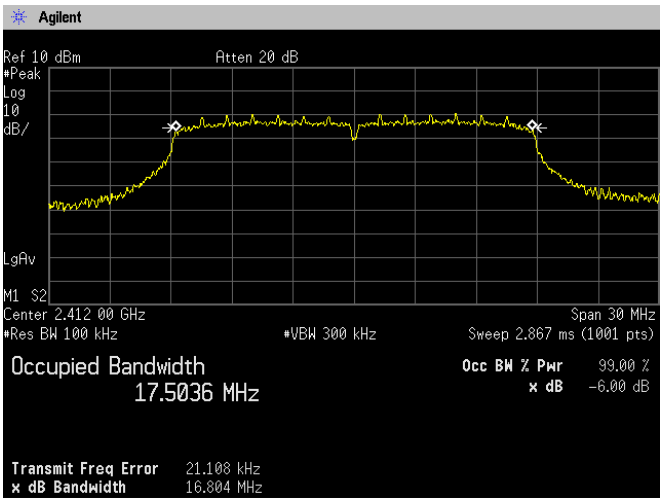


Channel High

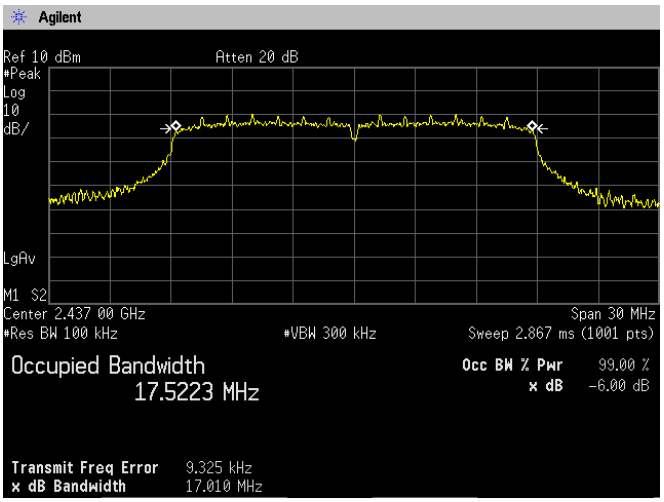


[IEEE802.11n (HT20)]

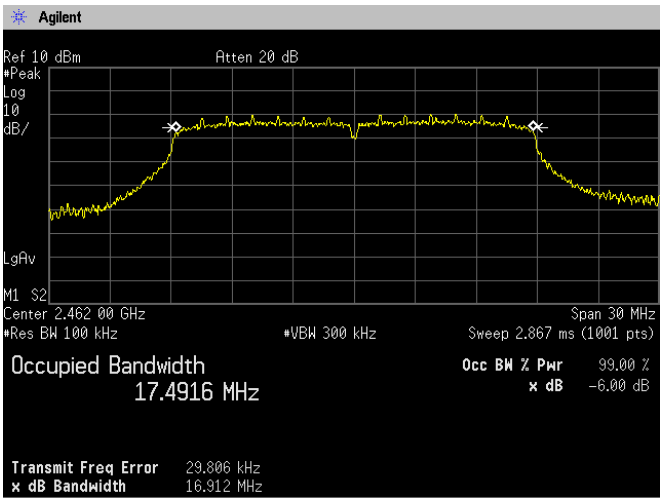
Channel Low



Channel Middle

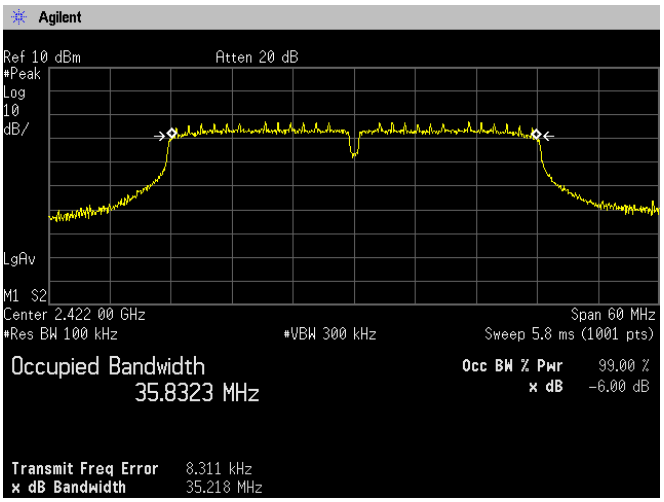


Channel High

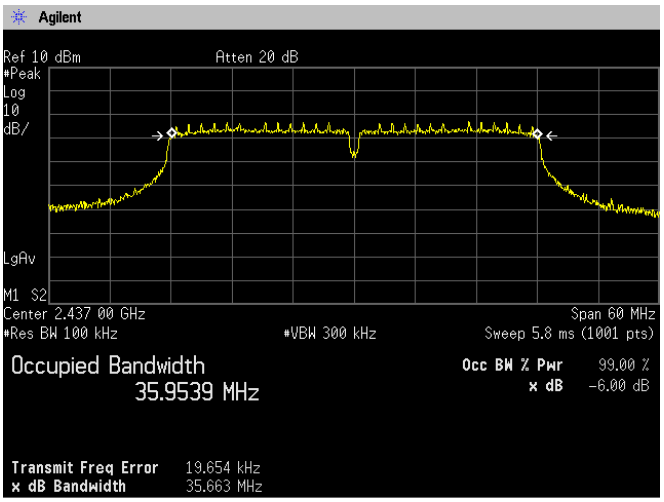


[IEEE802.11n (HT40)]

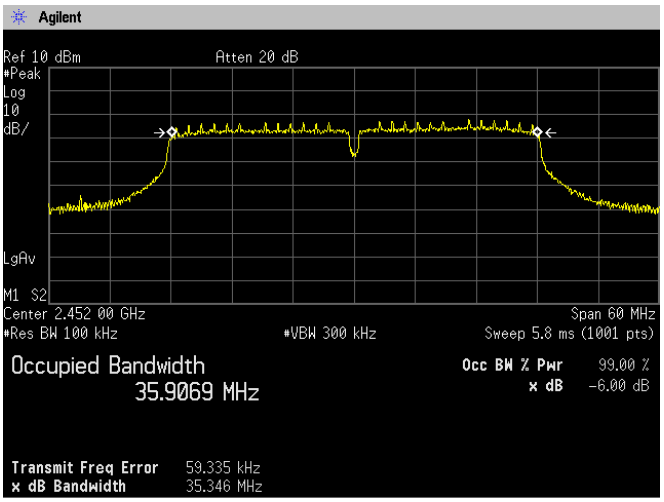
Channel Low



Channel Middle



Channel High



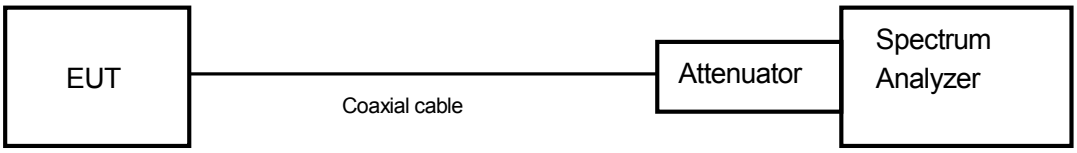
5. Maximum conducted (average) output power

5.1 Measurement procedure
[FCC 15.247(b)(3), KDB 558074 D01 v03r05, Section 9.2.2.1]

The peak power is measured with a spectrum analyzer connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate center frequency.

The spectrum analyzer is set to;
a) RBW = 1-5% of the DTS bandwidth not to exceed 1MHz.
b) VBW ≥ 3 x RBW.
c) Span ≥ 1.5 times the DTS bandwidth.
d) Sweep time = auto-couple.
e) Detector = RMS.
f) Trace mode = Clear/Write, Single, 100 count
g) Points ≥ 2 x Span / RBW

- Test configuration



5.2 Limit

1W (1000mW) or less

5.3 Measurement result

Date	:	March 1, 2016			
Temperature	:	22.3 [˚C]			
Humidity	:	32.6 [%]	Test engineer	:	
Test place	:	Shielded room No.4			Kazunori Saito
Date	:	April 12, 2016			
Temperature	:	22.4 [˚C]			
Humidity	:	28.7 [%]	Test engineer	:	
Test place	:	Shielded room No.4			Kazunori Saito
Date	:	April 20, 2016			
Temperature	:	25.1 [˚C]			
Humidity	:	30.9 [%]	Test engineer	:	
Test place	:	Shielded room No.4			Taiki Watanabe

[IEEE802.11b]
Battery Full

Channel	Center Frequency (MHz)	Reading (dBm)	Factor (dB)	Level (dBm)	Output Power (mW)	Limit (mW)	Result
Low	2412	2.82	10.62	13.44	22.080	≦1000	PASS
Middle	2437	3.58	10.62	14.20	26.303	≦1000	PASS
High	2462	2.97	10.62	13.59	22.856	≦1000	PASS

[IEEE802.11g]
Battery Full

Channel	Center Frequency (MHz)	Reading (dBm)	Factor (dB)	Level (dBm)	Output Power (mW)	Limit (mW)	Result
Low	2412.00	0.87	10.62	11.49	14.093	≦1000	PASS
Middle	2437.00	0.38	10.62	11.00	12.589	≦1000	PASS
High	2462.00	0.62	10.62	11.24	13.305	≦1000	PASS

[IEEE802.11n (HT20)]
Battery Full

Channel	Center Frequency (MHz)	Reading (dBm)	Factor (dB)	Level (dBm)	Output Power (mW)	Limit (mW)	Result
Low	2412.00	0.40	10.62	11.02	12.647	≦1000	PASS
Middle	2437.00	0.29	10.62	10.91	12.331	≦1000	PASS
High	2462.00	0.67	10.62	11.29	13.459	≦1000	PASS

[IEEE802.11n (HT40)]
Battery Full

Channel	Center Frequency (MHz)	Reading (dBm)	Factor (dB)	Level (dBm)	Output Power (mW)	Limit (mW)	Result
Low	2422.00	0.14	10.62	10.76	11.912	≦1000	PASS
Middle	2437.00	0.25	10.62	10.87	12.218	≦1000	PASS
High	2452.00	0.59	10.62	11.21	13.213	≦1000	PASS

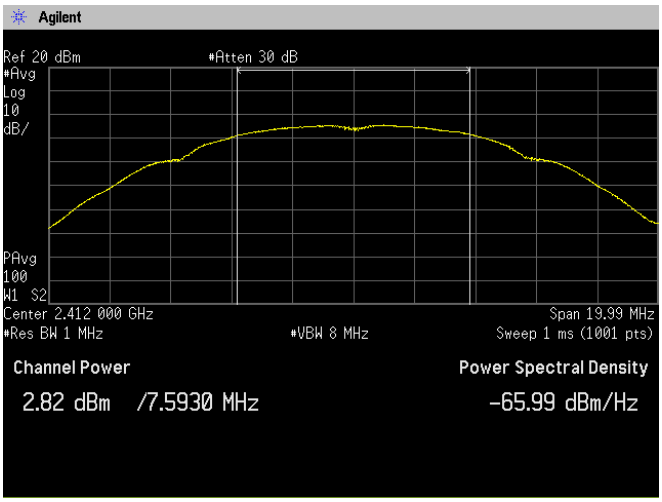
Calculation;
Reading (dBm) + Factor (dB) = Level (dBm)
10logP = Level (dBm)
$P = 10^{(\text{Maximum Peak Output Power} / 10)}$ (mW)

5.4 Trace data

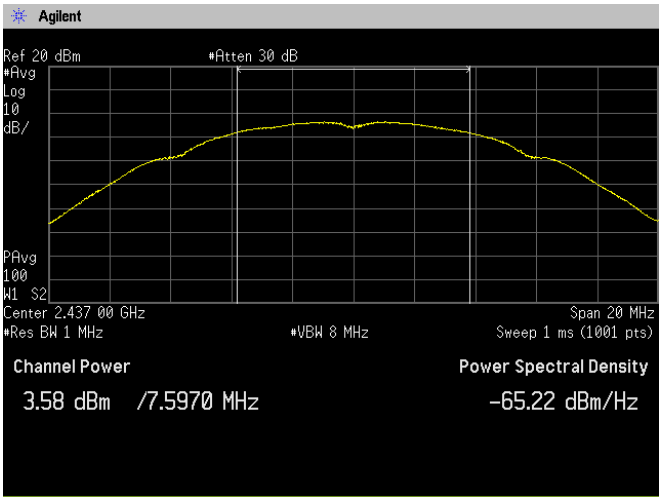
[IEEE802.11b]

[Battery Full]

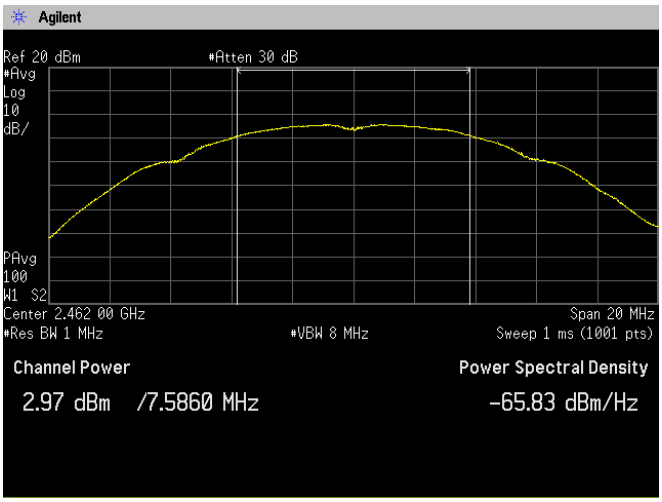
Channel Low



Channel Middle



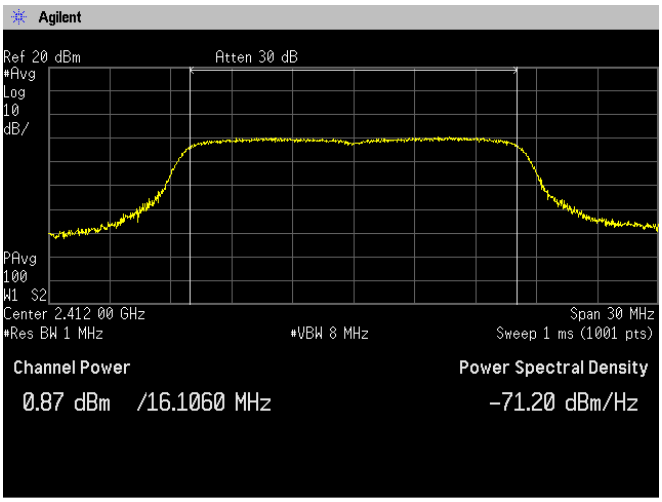
Channel High



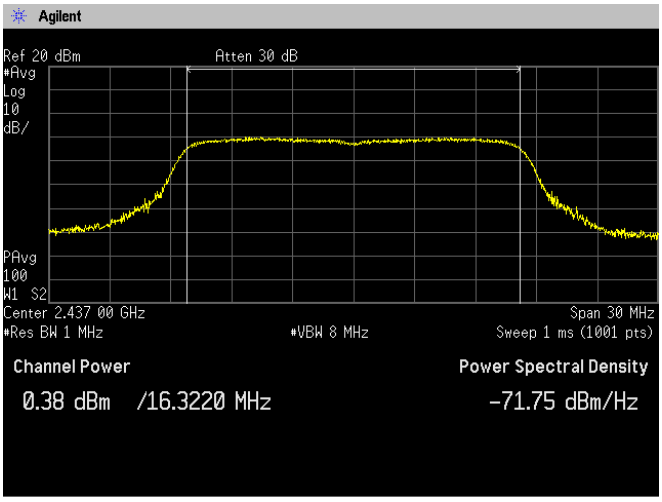
[IEEE802.11g]

[Battery Full]

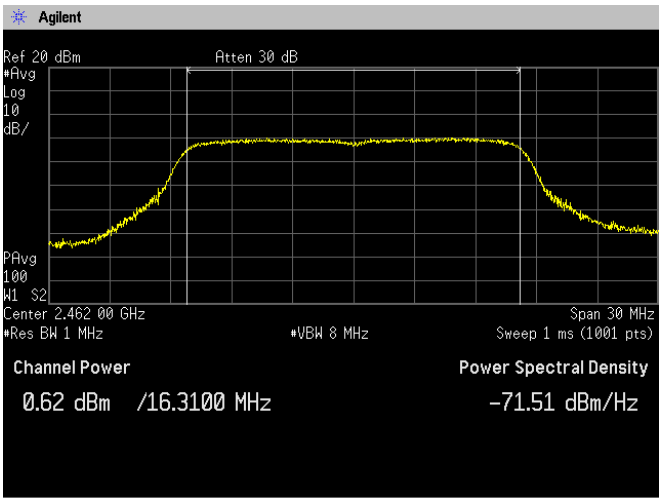
Channel Low



Channel Middle



Channel High



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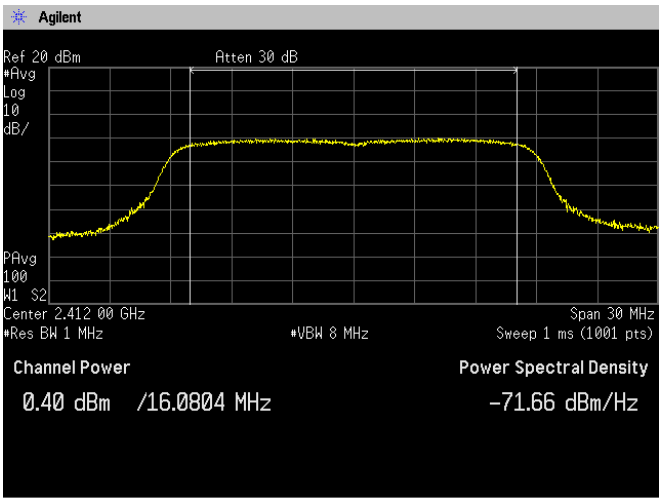
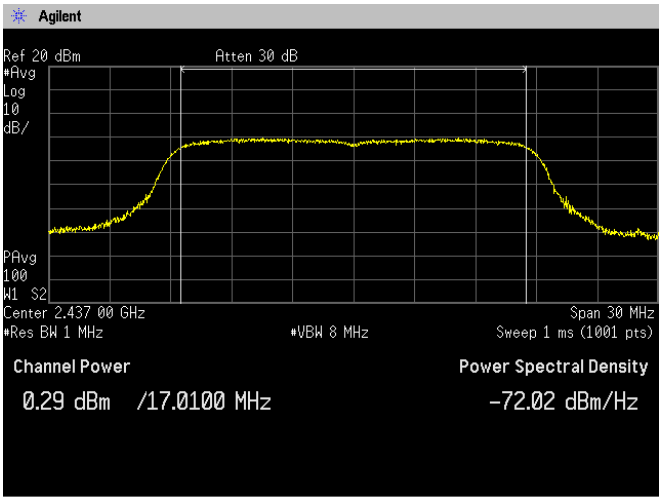
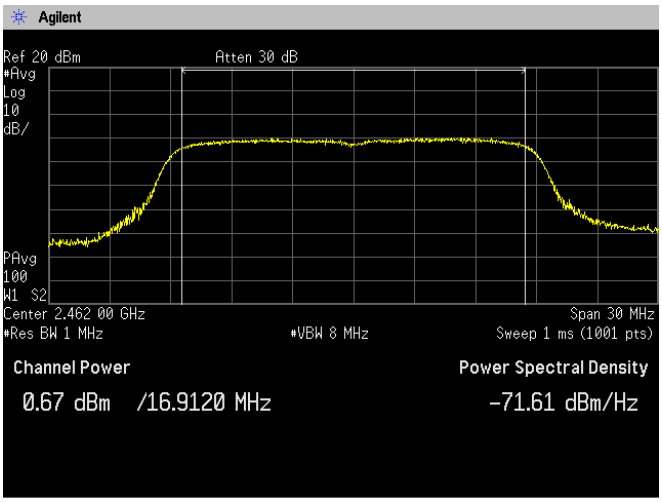
[IEEE802.11n (HT20)]
[Battery Full]
Channel Low



Channel Middle



Channel High



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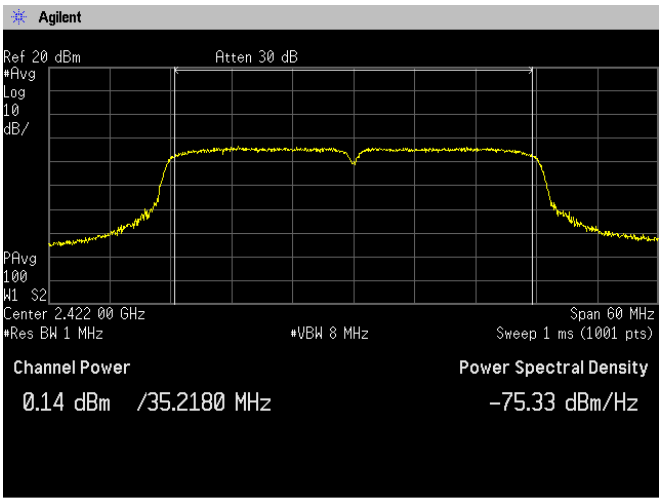
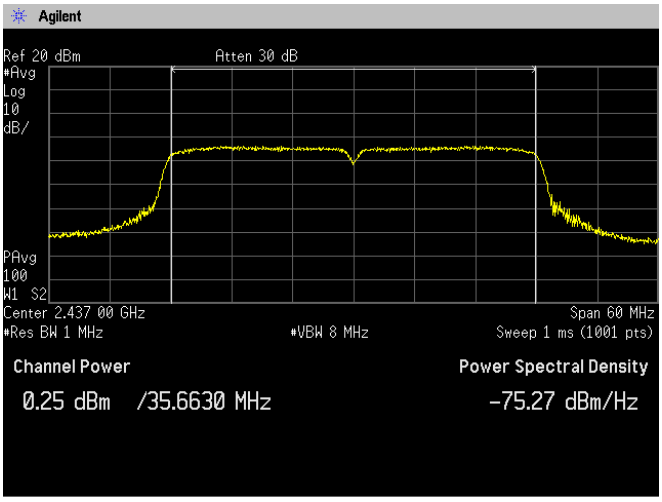
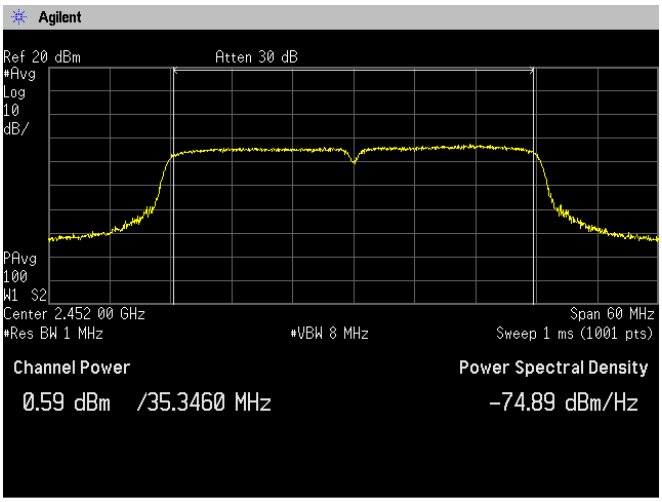
[IEEE802.11n (HT40)]
[Battery Full]
Channel Low



Channel Middle



Channel High



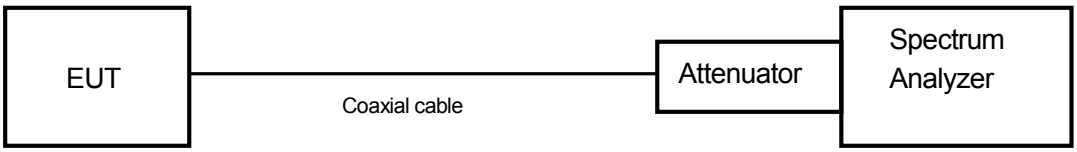
6. Band Edge Compliance of RF Conducted Emissions

6.1 Measurement procedure
[FCC 15.247(d), KDB 558074 D01 v03r05, Section 11.0]

The Band Edge is measured with a spectrum analyzer connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate center frequency.

The spectrum analyzer is set to;
a) Span = Arbitrary setting. (Setting suitable for measurement.)
b) RBW ≥ 1% of the span
c) VBW ≥ RBW
d) Sweep time = auto-couple.
e) Detector = peak.
f) Trace mode = max hold.

- Test configuration



6.2 Limit

In any 100kHz bandwidth outside the frequency band the radio frequency power that is produced by the intentional radiator shall be at least 30dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power.

6.3 Measurement result

Date : March 1, 2016
Temperature : 22.3 [˚C]
Humidity : 32.6 [%]
Test place : Shielded room No.4

Test engineer : Kazunori Saito

[IEEE802.11b]

Channel	Frequency (MHz)	RF Power Level (dBm)	Band-edge Frequency (MHz)	Band-edge Level (dBm)	Difference Level (dBm)	Limit (dBm)	Result
Low	2412.00	-4.71	2399.04	-56.20	51.49	At least 30dB below from peak of RF	PASS
High	2462.00	-4.48	2484.30	-67.89	63.41	At least 30dB below from peak of RF	PASS

[IEEE802.11g]

Channel	Frequency (MHz)	RF Power Level (dBm)	Band-edge Frequency (MHz)	Band-edge Level (dBm)	Difference Level (dBm)	Limit (dBm)	Result
Low	2412.00	-10.01	2399.20	-43.50	33.49	At least 30dB below from peak of RF	PASS
High	2462.00	-10.39	2483.50	-56.97	46.58	At least 30dB below from peak of RF	PASS

[IEEE802.11n (HT20)]

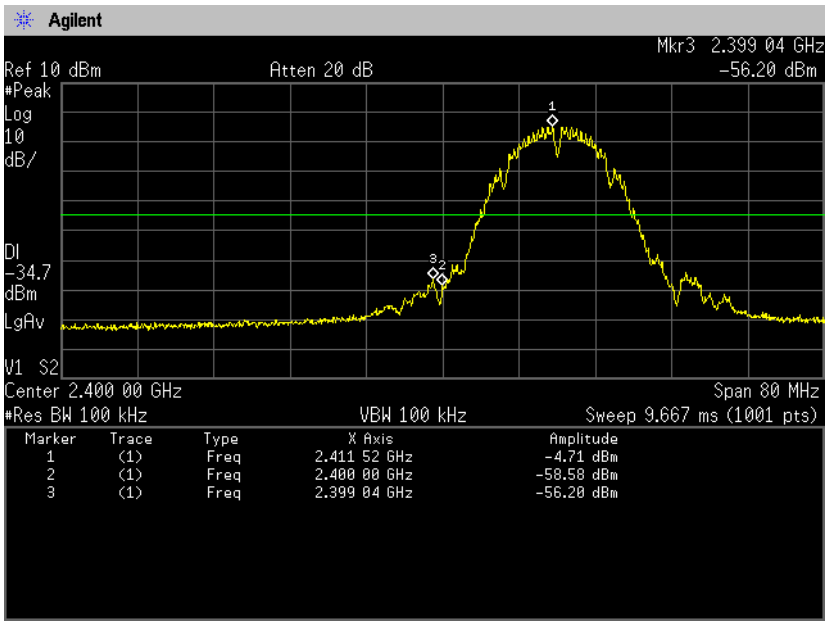
Channel	Frequency (MHz)	RF Power Level (dBm)	Band-edge Frequency (MHz)	Band-edge Level (dBm)	Difference Level (dBm)	Limit (dBm)	Result
Low	2412.00	-10.07	2399.92	-44.08	34.01	At least 30dB below from peak of RF	PASS
High	2462.00	-10.24	2483.58	-54.33	44.09	At least 30dB below from peak of RF	PASS

[IEEE802.11n (HT40)]

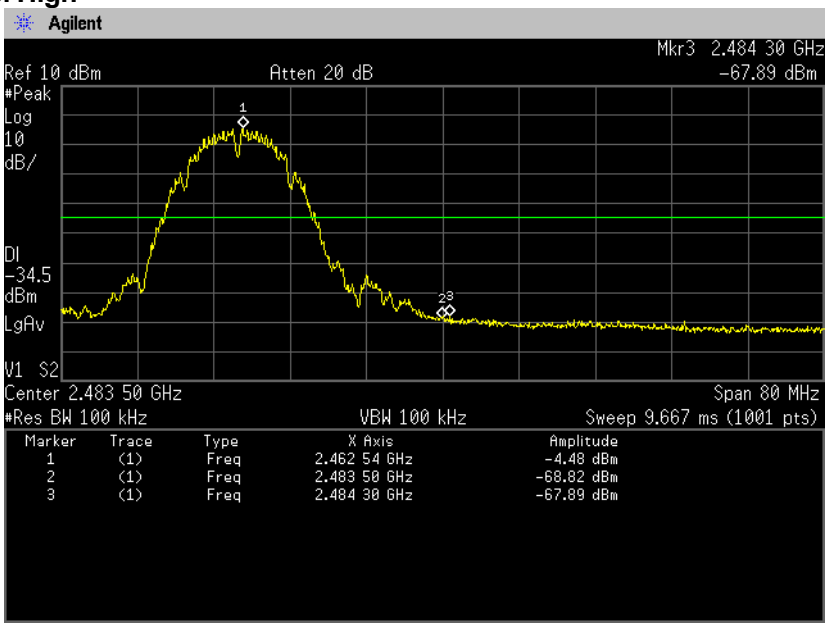
Channel	Frequency (MHz)	RF Power Level (dBm)	Band-edge Frequency (MHz)	Band-edge Level (dBm)	Difference Level (dBm)	Limit (dBm)	Result
Low	2422.00	-13.54	2399.52	-46.36	32.82	At least 30dB below from peak of RF	PASS
High	2452.00	-12.48	2484.46	-49.34	36.86	At least 30dB below from peak of RF	PASS

6.4 Trace data [IEEE802.11b]

Channel Low

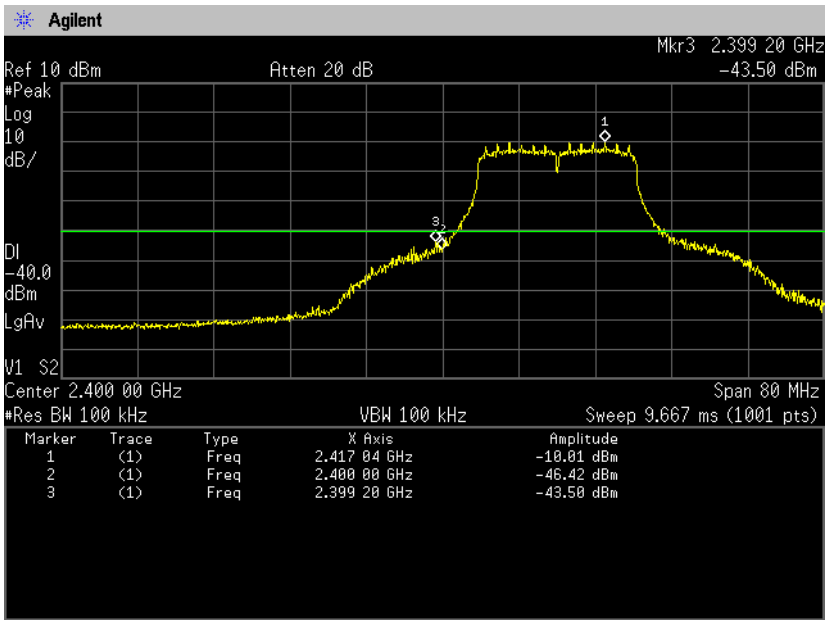


Channel High

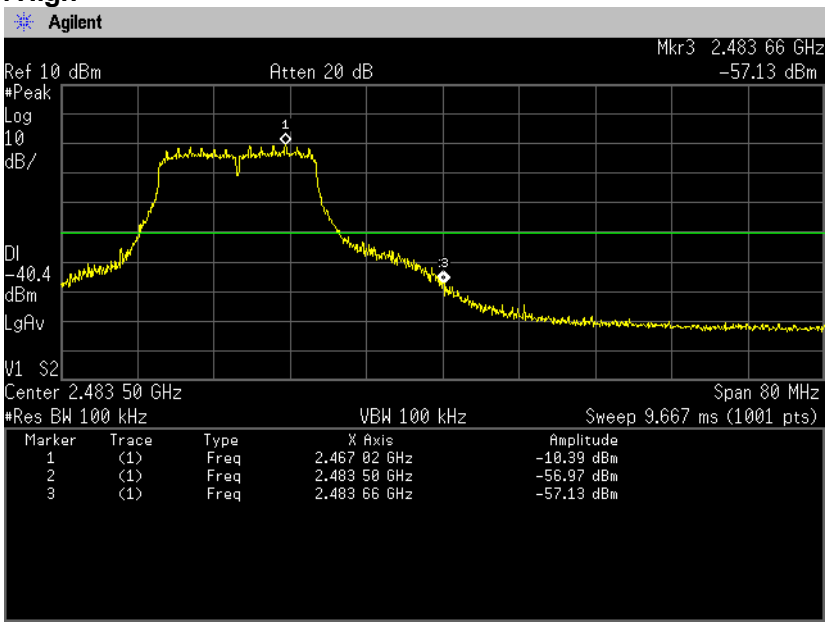


[IEEE802.11g]

Channel Low

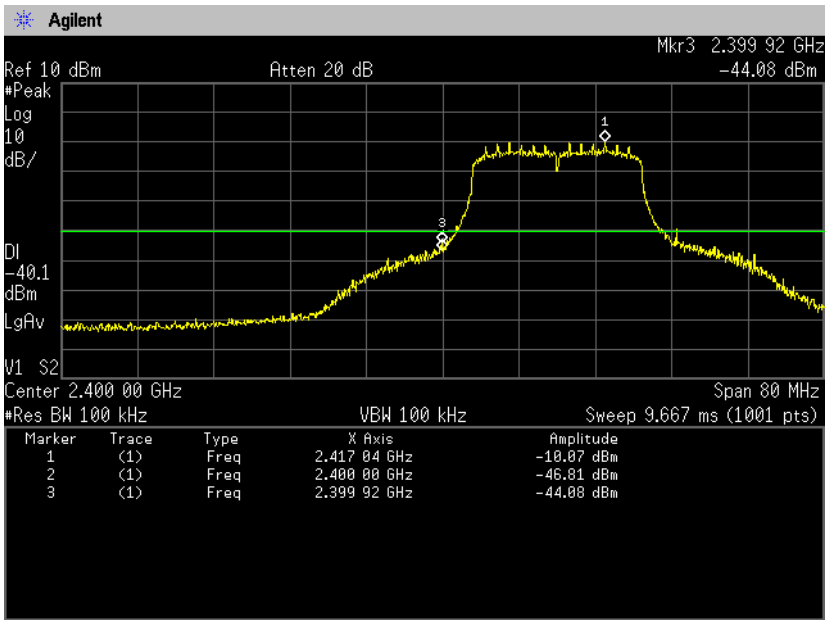


Channel High

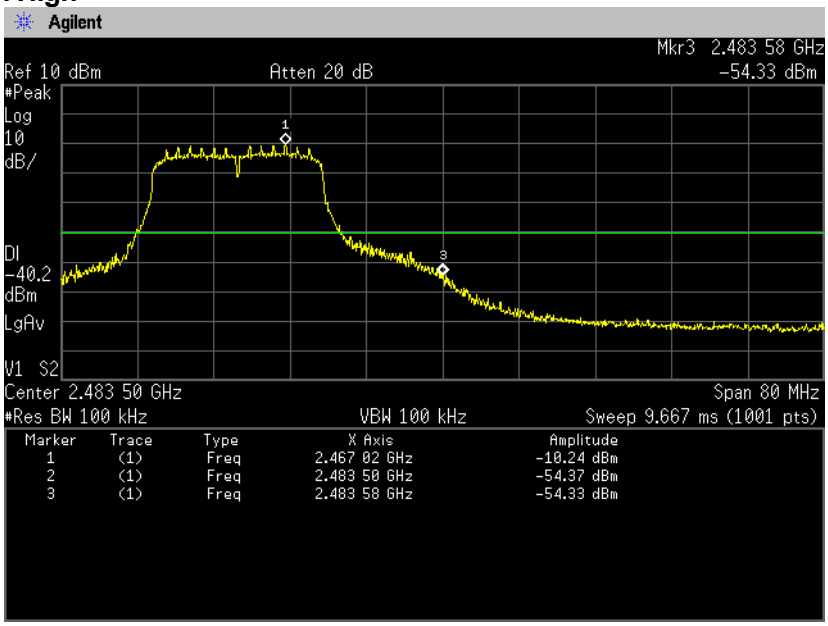


[IEEE802.11n (HT20)]

Channel Low

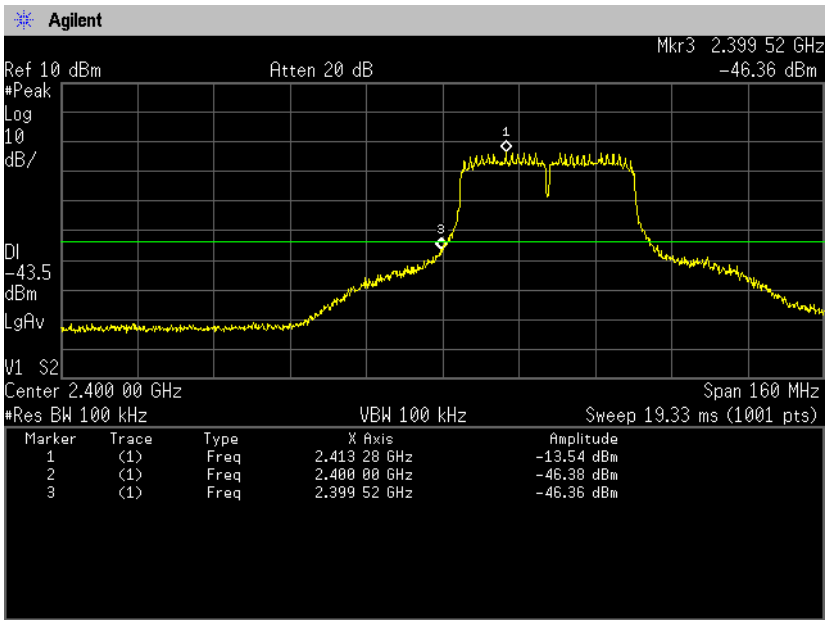


Channel High

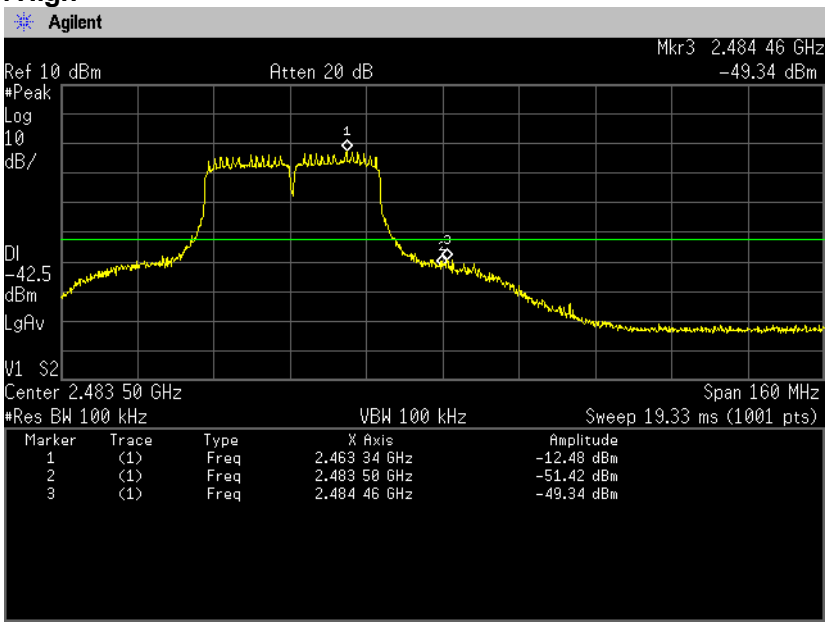


[IEEE802.11n (HT40)]

Channel Low



Channel High



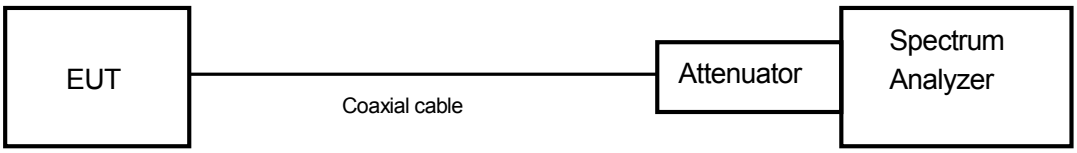
7. Spurious emissions - Conducted -

7.1 Measurement procedure
[FCC 15.247(d), KDB 558074 D01 v03r05, Section 11.0]

The spurious emissions (Conducted) are measured with a spectrum analyzer connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate center frequency.

The spectrum analyzer is set to;
a) Span = wide enough to fully capture the emission being measured.
b) RBW = 100 kHz.
c) VBW ≥ RBW.
d) Sweep time = auto-couple.
e) Detector = peak.
f) Trace mode = max hold.

- Test configuration



7.2 Limit

In any 100kHz bandwidth outside the frequency band the radio frequency power that is produced by the intentional radiator shall be at least 30dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power.

7.3 Measurement result

Date	:	March 1, 2016			
Temperature	:	22.3 [˚C]			
Humidity	:	32.6 [%]	Tested by	:	
Test place	:	Shielded room No.4			Kazunori Saito
Date	:	March 18, 2016			
Temperature	:	21.1 [˚C]			
Humidity	:	35.4 [%]	Tested by	:	
Test place	:	Shielded room No.4			Hikaru Shibata
Date	:	April 12, 2016			
Temperature	:	22.4 [˚C]			
Humidity	:	28.7 [%]	Test engineer	:	
Test place	:	Shielded room No.4			Kazunori Saito

[IEEE802.11b、IEEE802.11g、IEEE802.11n (HT20)]

Channel	Frequency [MHz]	Limit [dB]	Results Chart	Result
Low	2412	At least 30dB below from peak of RF	See the trace Data	PASS
Middle	2437	At least 30dB below from peak of RF	See the trace Data	PASS
High	2462	At least 30dB below from peak of RF	See the trace Data	PASS

[IEEE802.11n (HT40)]

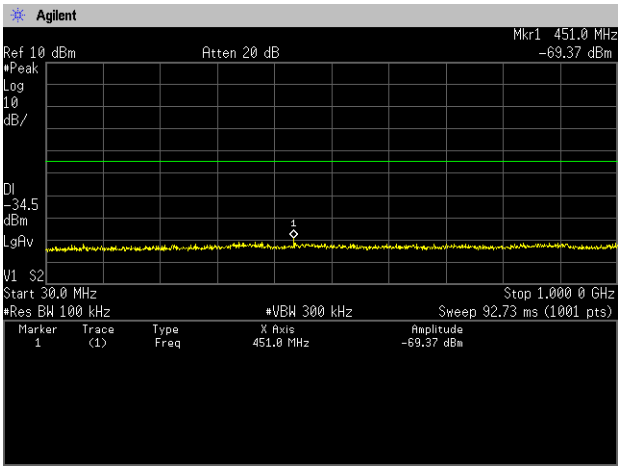
Channel	Frequency [MHz]	Limit [dB]	Results Chart	Result
Low	2422	At least 30dB below from peak of RF	See the trace Data	PASS
Middle	2437	At least 30dB below from peak of RF	See the trace Data	PASS
High	2452	At least 30dB below from peak of RF	See the trace Data	PASS

7.4 Trace data

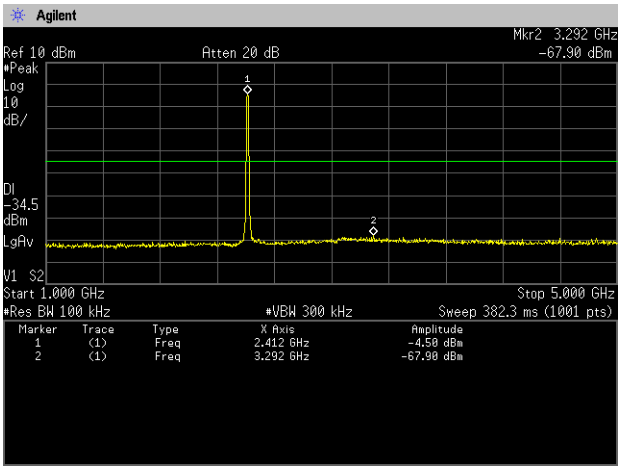
[IEEE802.11b]

Channel Low

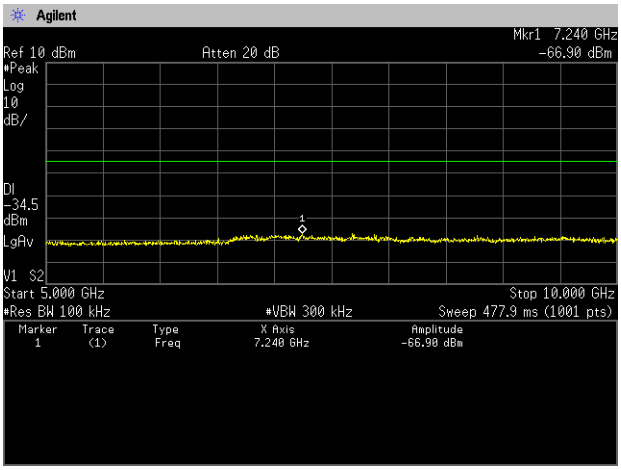
30MHz-1GHz



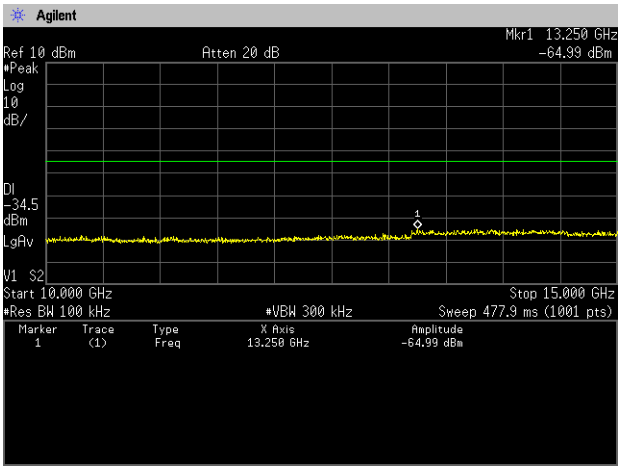
1GHz-5GHz



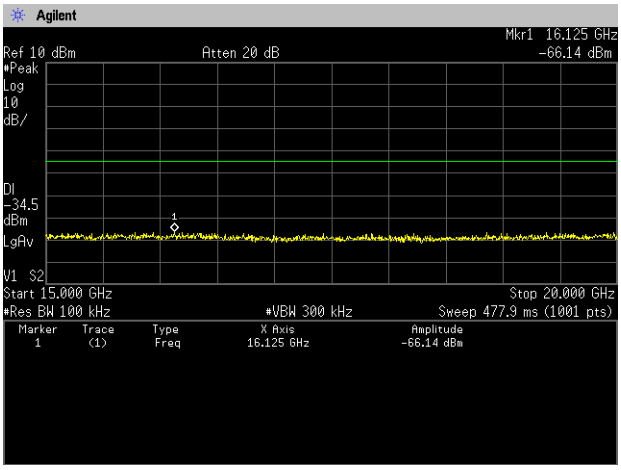
5GHz-10GHz



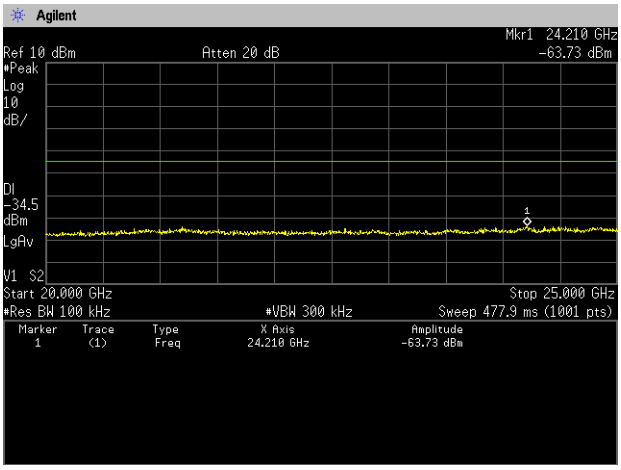
10GHz-15GHz



15GHz-20GHz

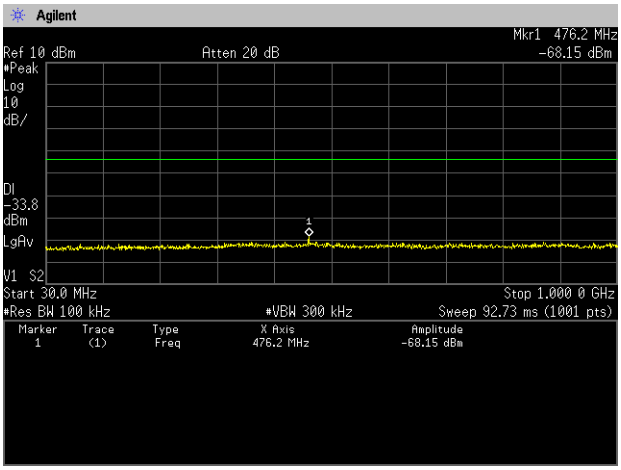


20GHz-25GHz

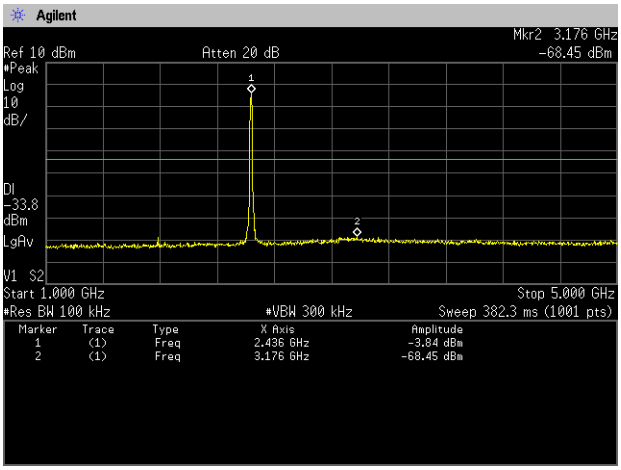


Channel Middle

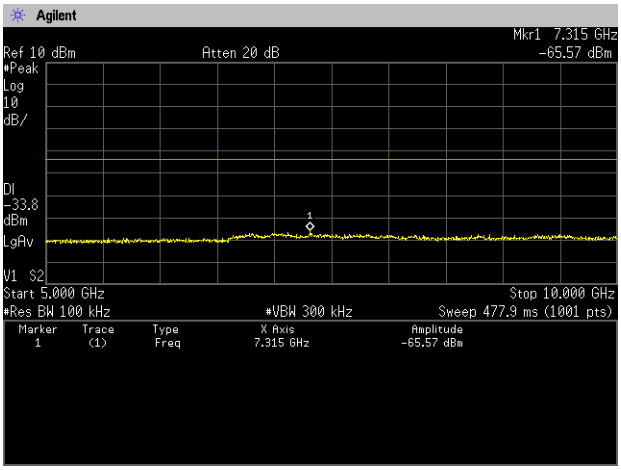
30MHz-1GHz



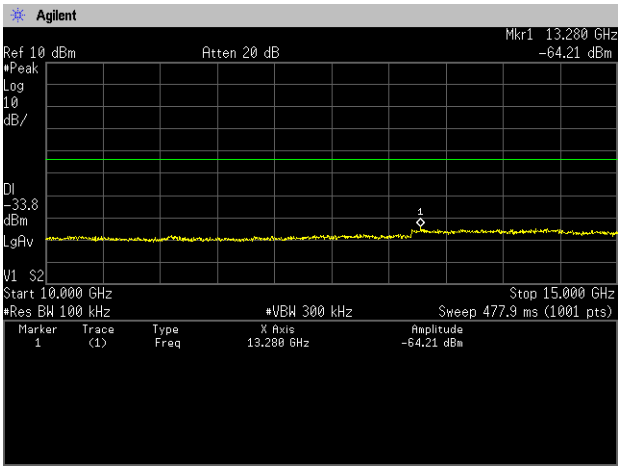
1GHz-5GHz



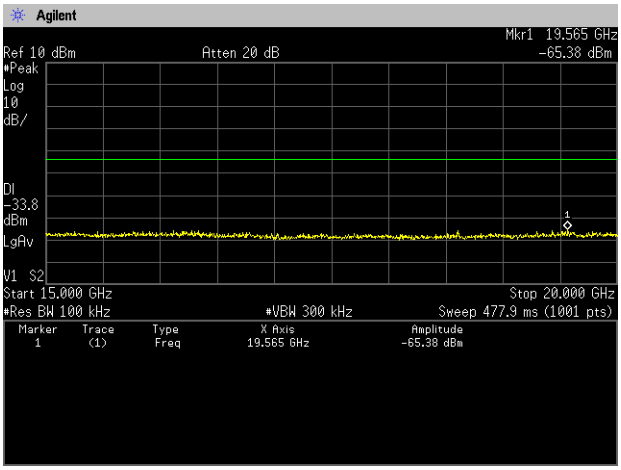
5GHz-10GHz



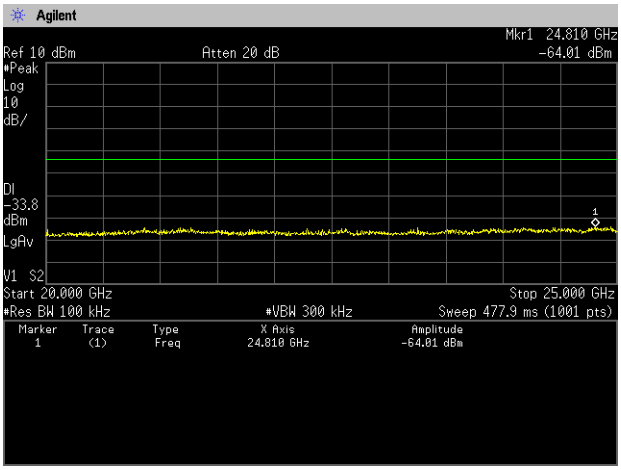
10GHz-15GHz



15GHz-20GHz

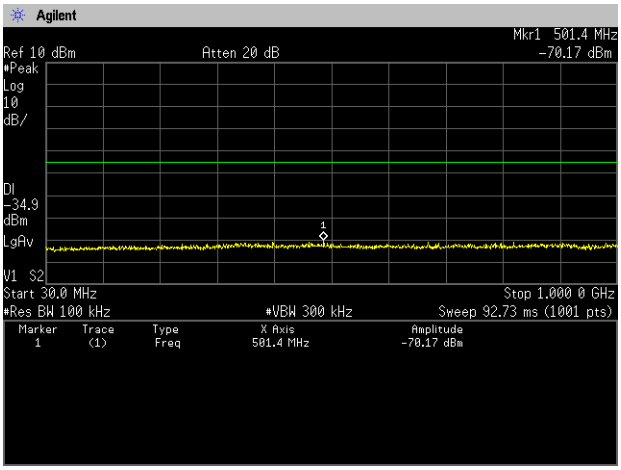


20GHz-25GHz

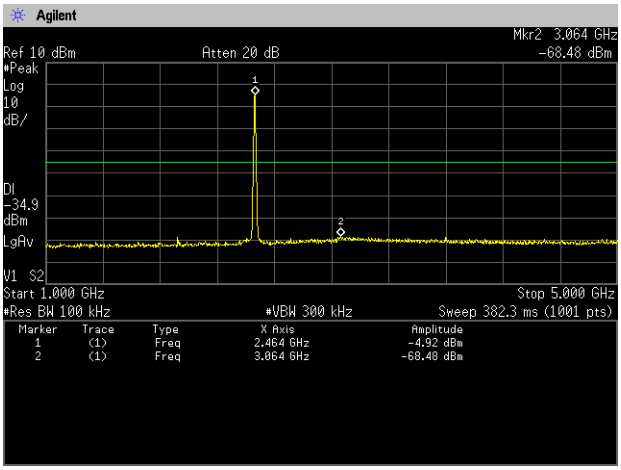


Channel High

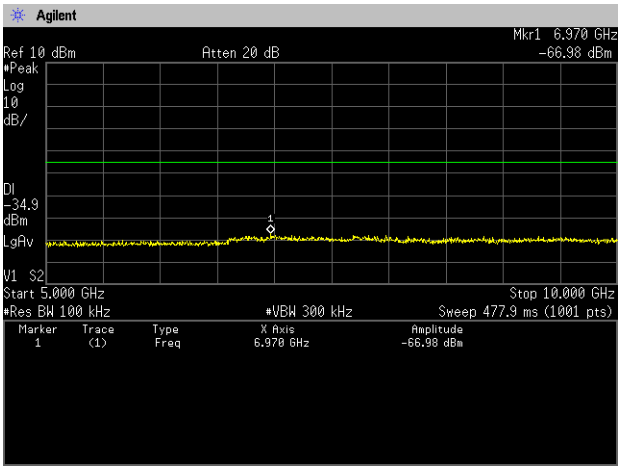
30MHz-1GHz



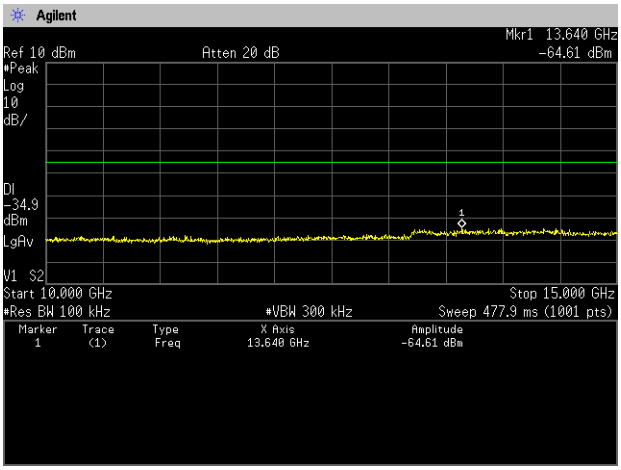
1GHz-5GHz



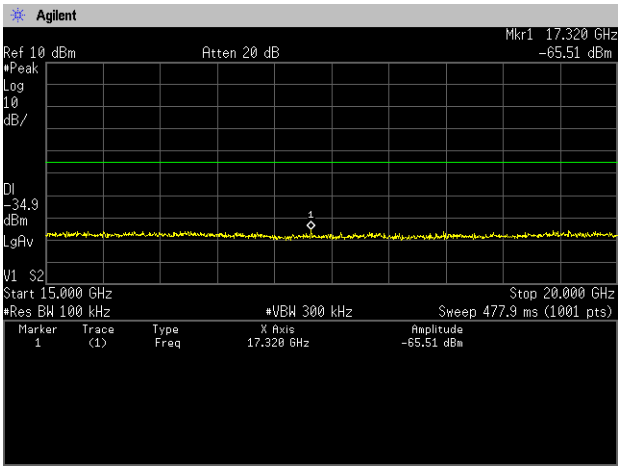
5GHz-10GHz



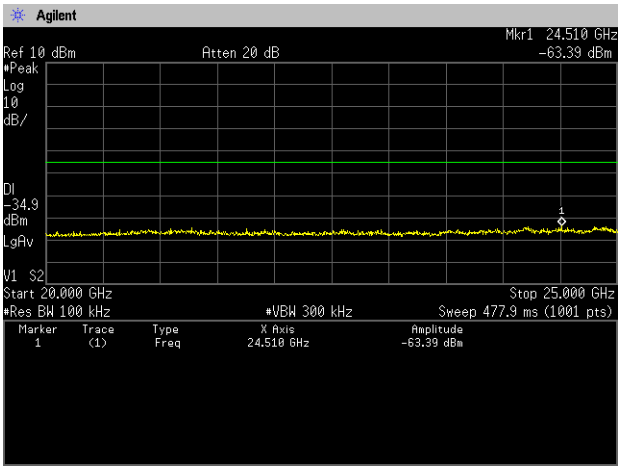
10GHz-15GHz



15GHz-20GHz



20GHz-25GHz

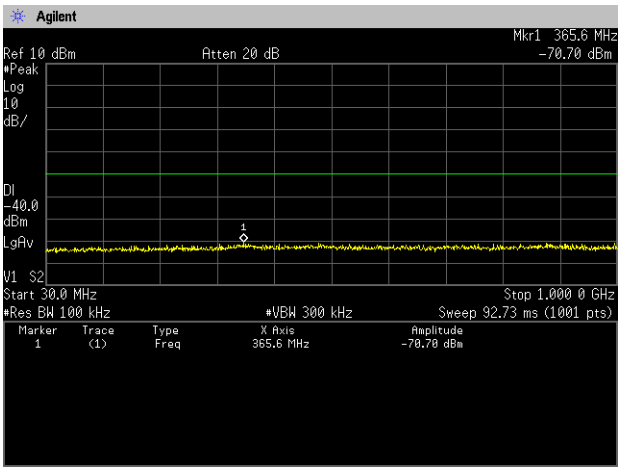


Zacta

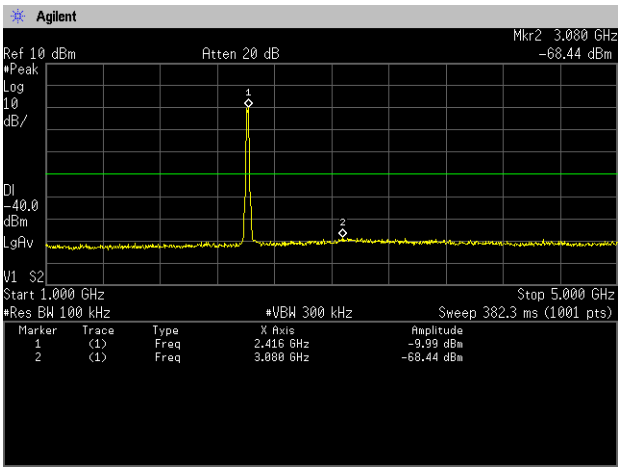
[IEEE802.11g]

Channel Low

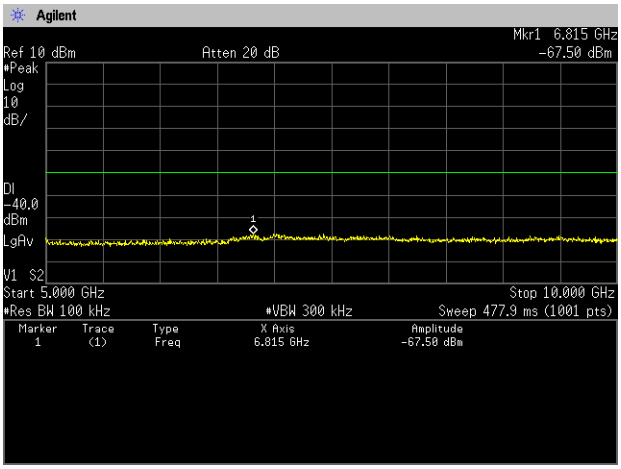
30MHz-1GHz



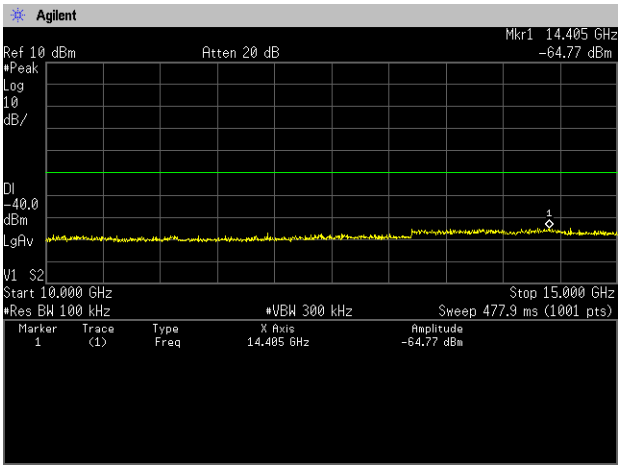
1GHz-5GHz



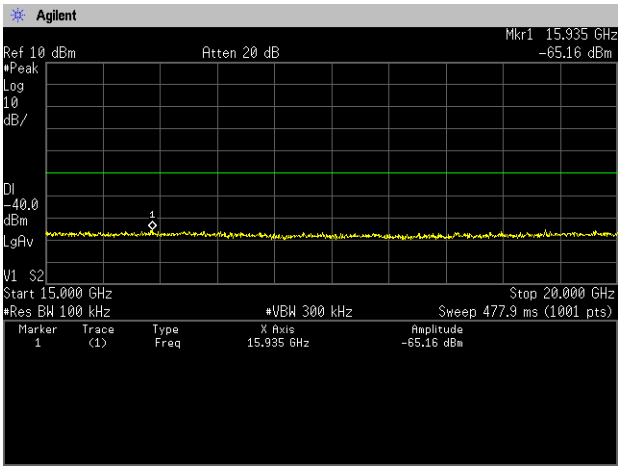
5GHz-10GHz



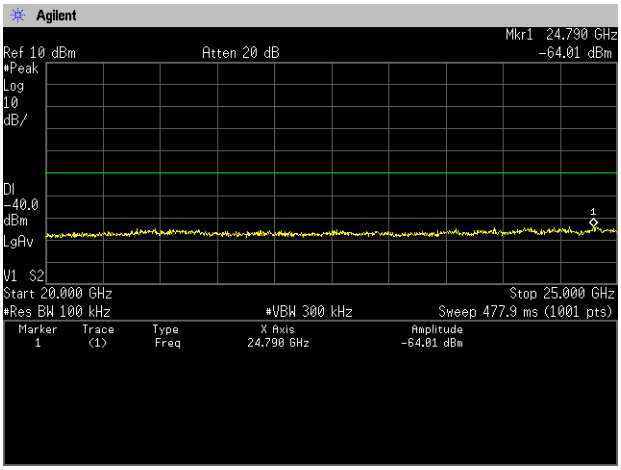
10GHz-15GHz



15GHz-20GHz

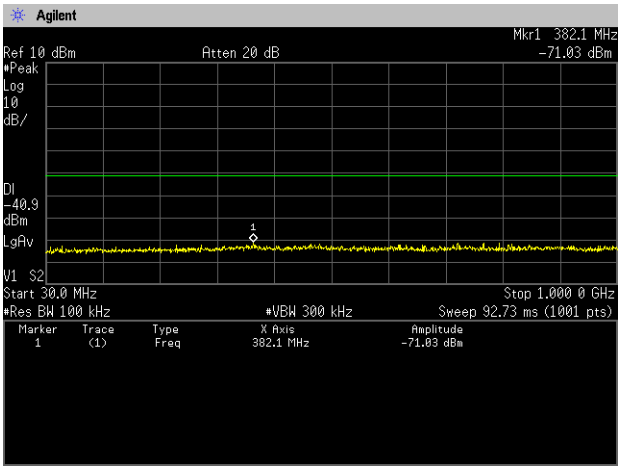


20GHz-25GHz

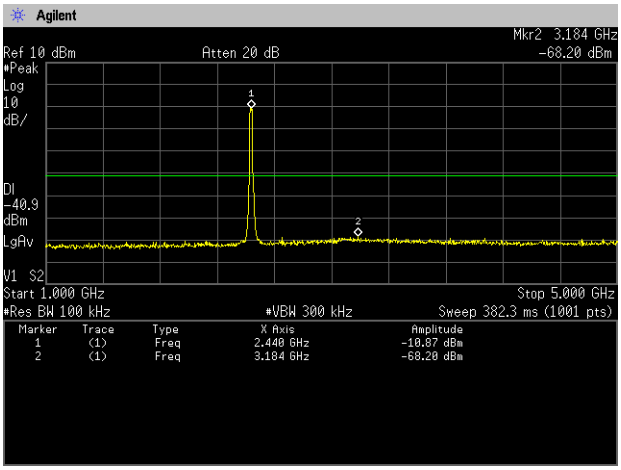


Channel Middle

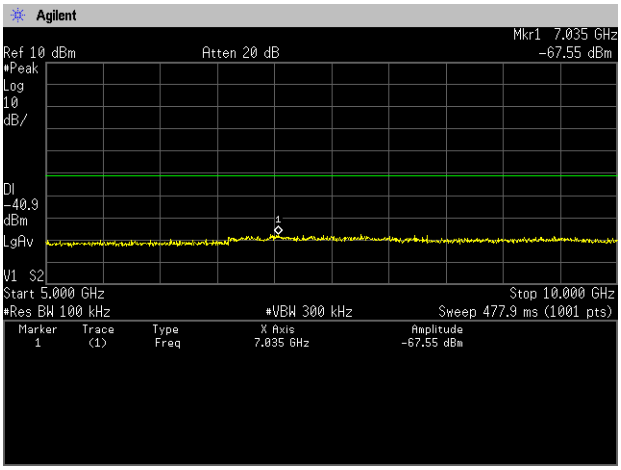
30MHz-1GHz



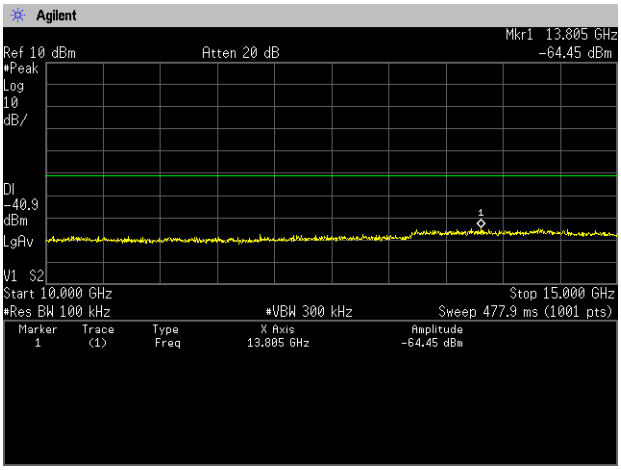
1GHz-5GHz



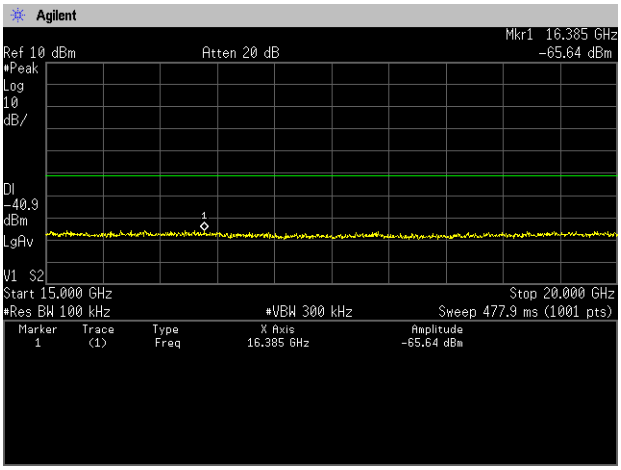
5GHz-10GHz



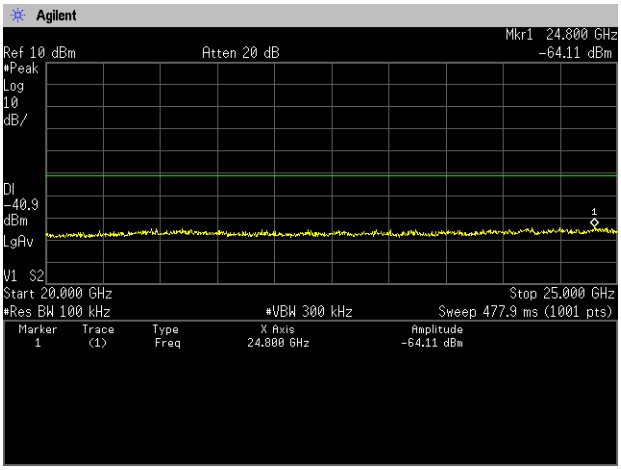
10GHz-15GHz



15GHz-20GHz

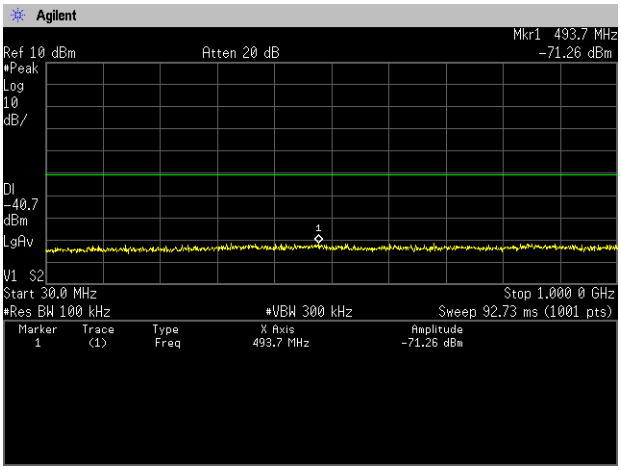


20GHz-25GHz

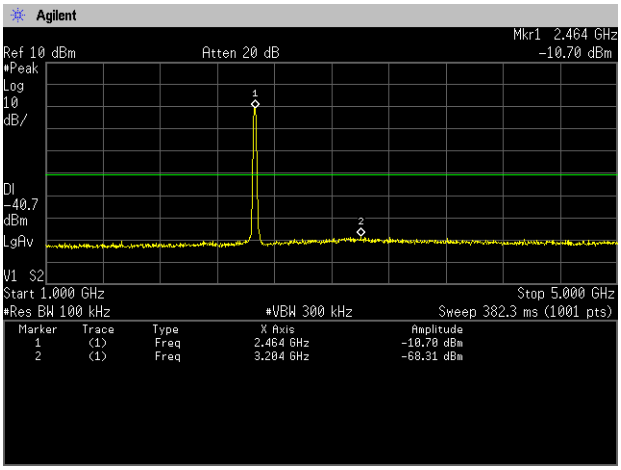


Channel High

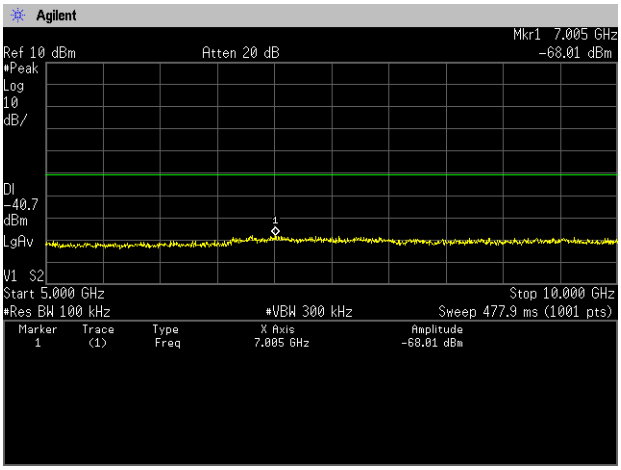
30MHz-1GHz



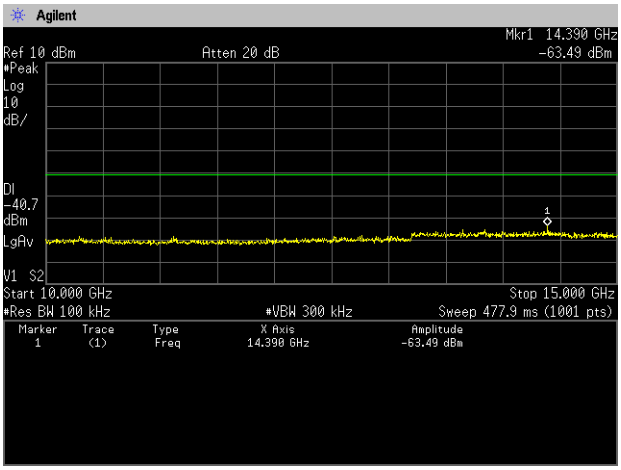
1GHz-5GHz



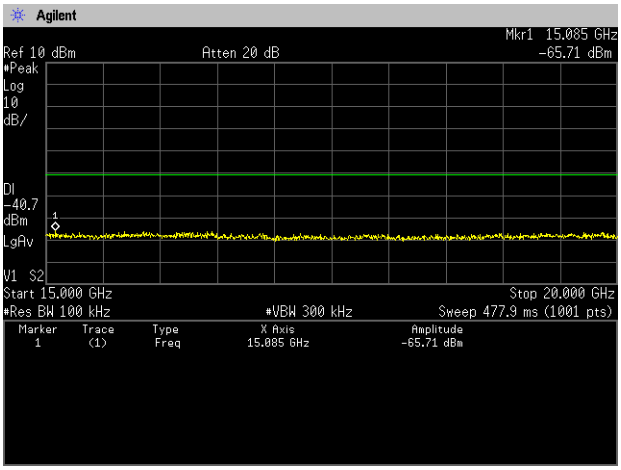
5GHz-10GHz



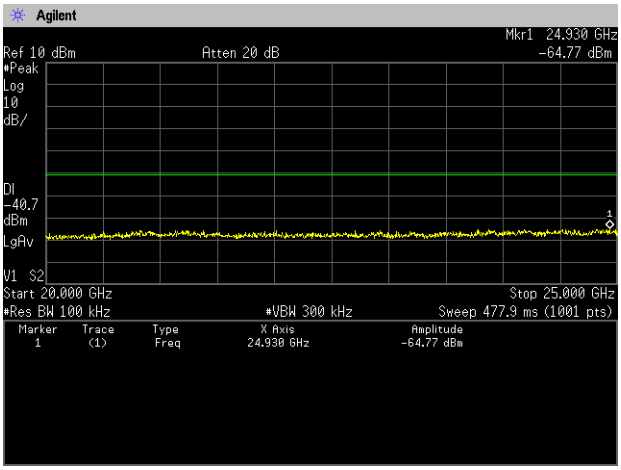
10GHz-15GHz



15GHz-20GHz



20GHz-25GHz

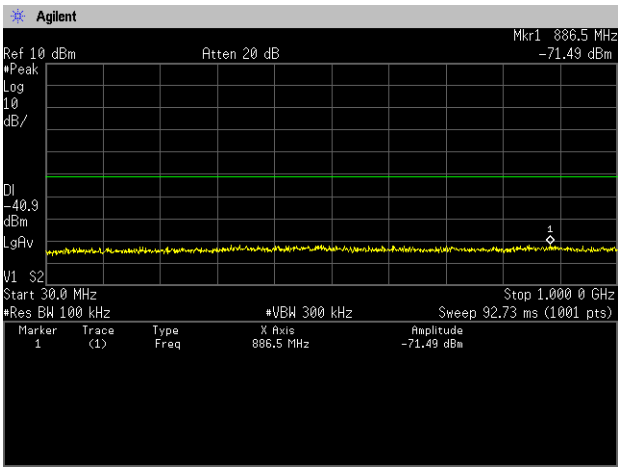


Zacta

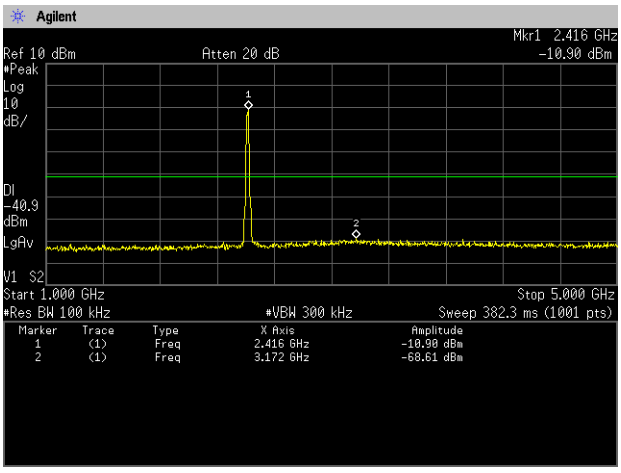
[IEEE802.11n (HT20)]

Channel Low

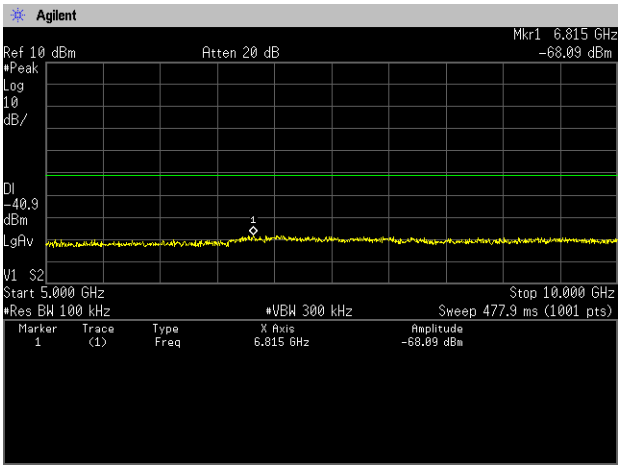
30MHz-1GHz



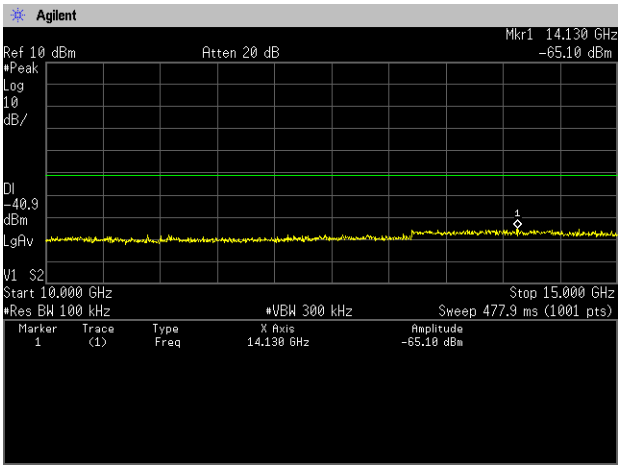
1GHz-5GHz



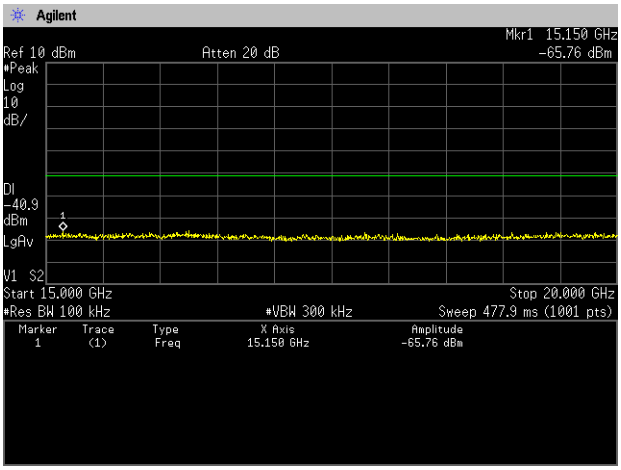
5GHz-10GHz



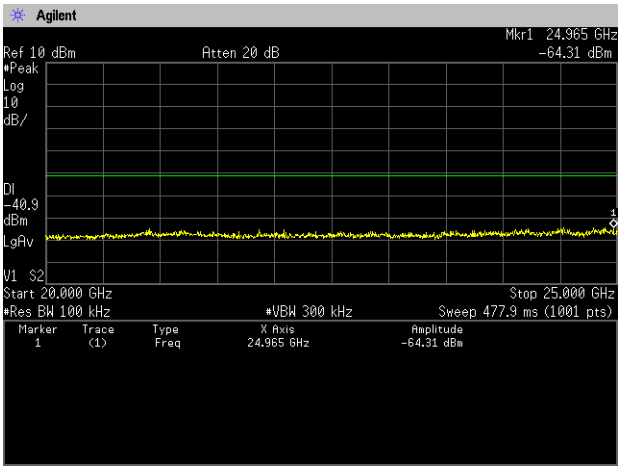
10GHz-15GHz



15GHz-20GHz

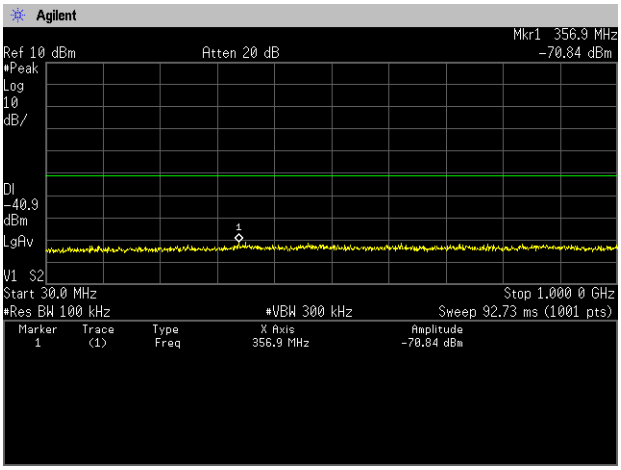


20GHz-25GHz

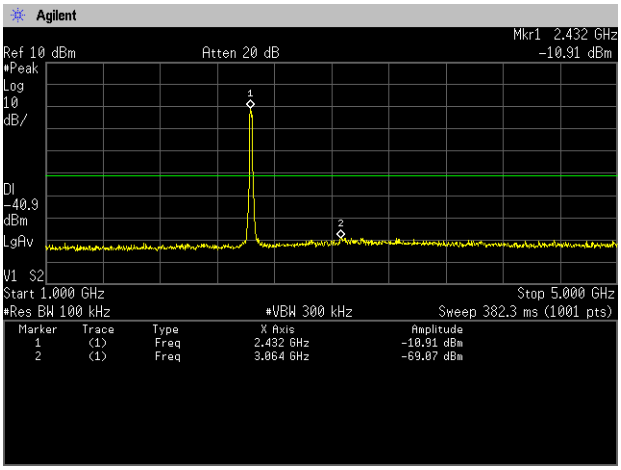


Channel Middle

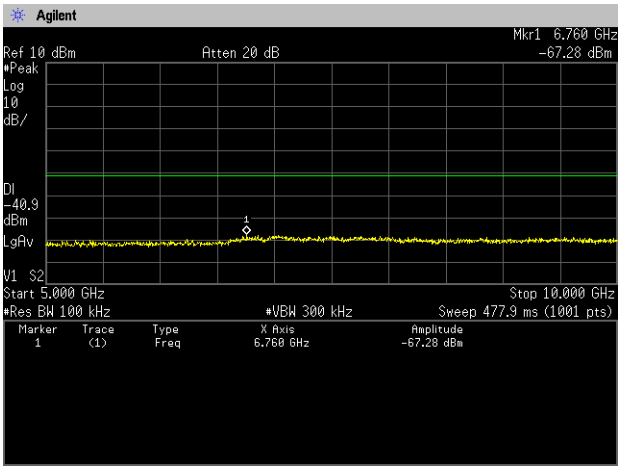
30MHz-1GHz



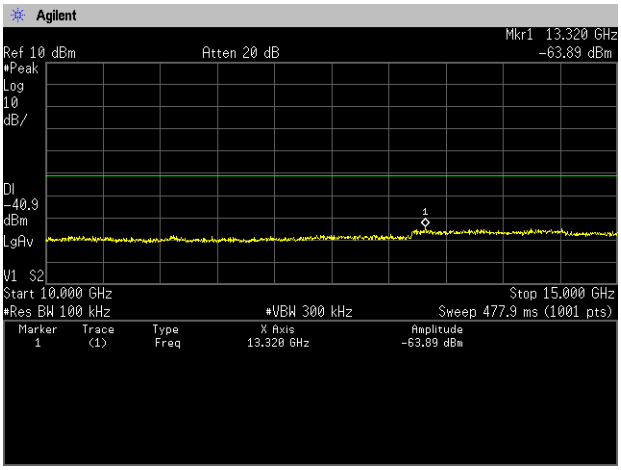
1GHz-5GHz



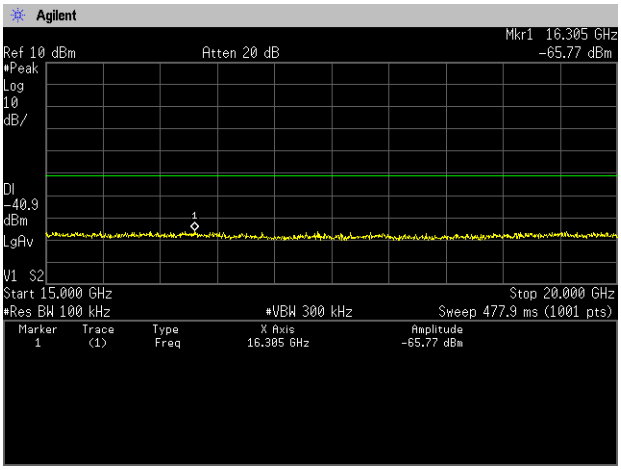
5GHz-10GHz



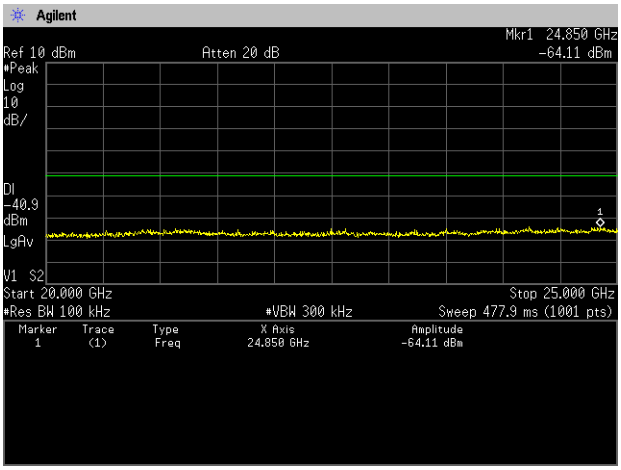
10GHz-15GHz



15GHz-20GHz

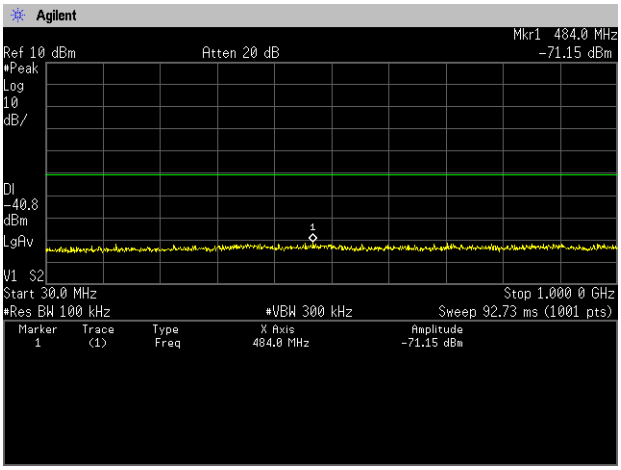


20GHz-25GHz

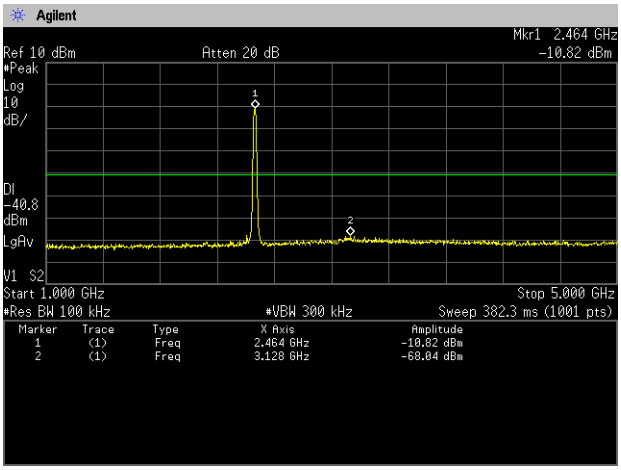


Channel High

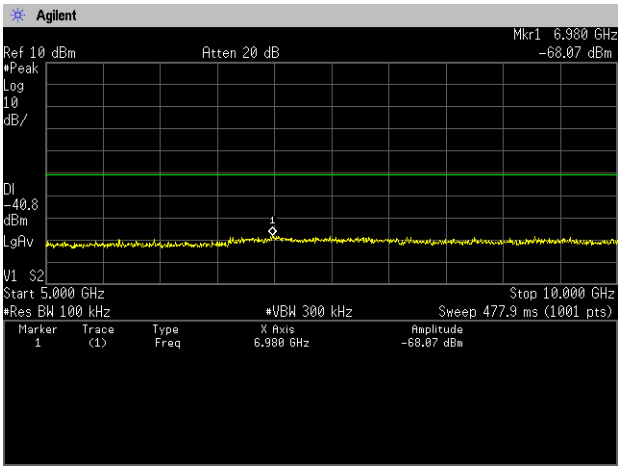
30MHz-1GHz



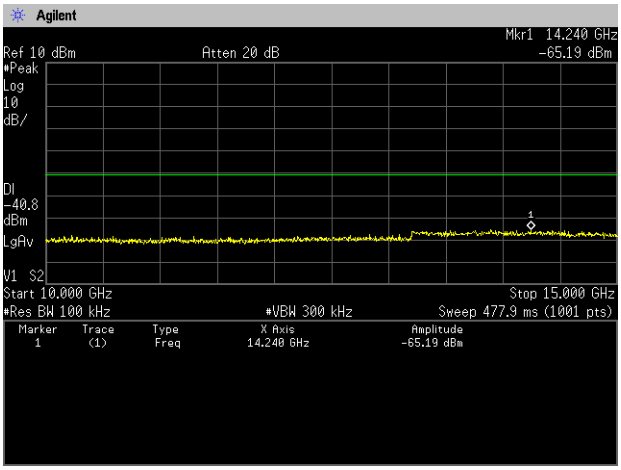
1GHz-5GHz



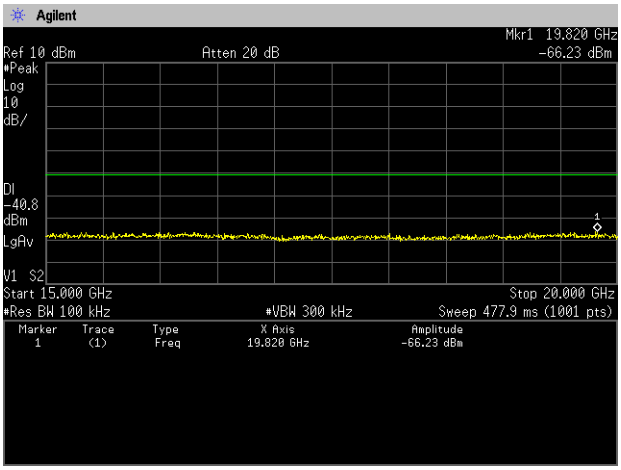
5GHz-10GHz



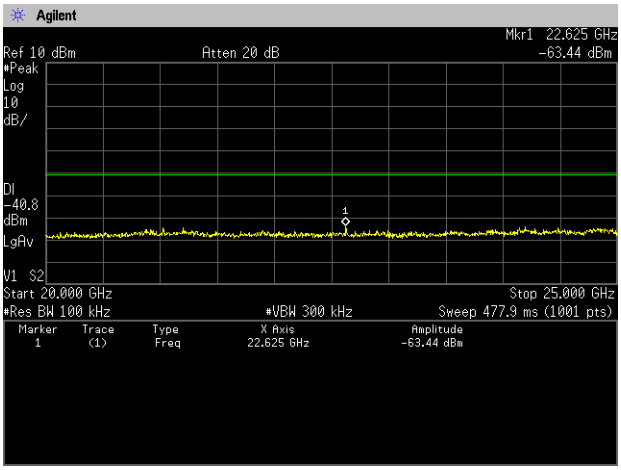
10GHz-15GHz



15GHz-20GHz



20GHz-25GHz

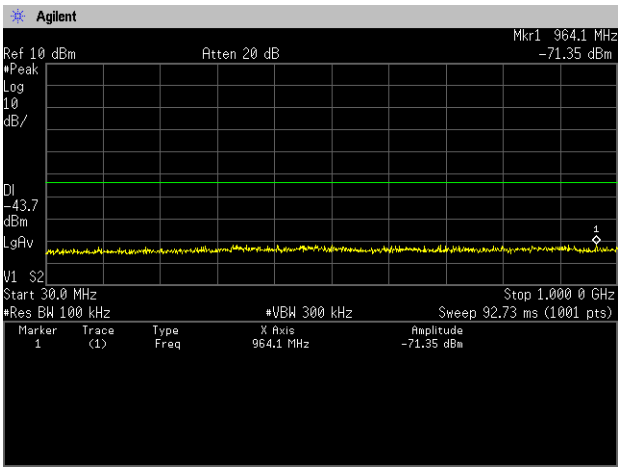


Zacta

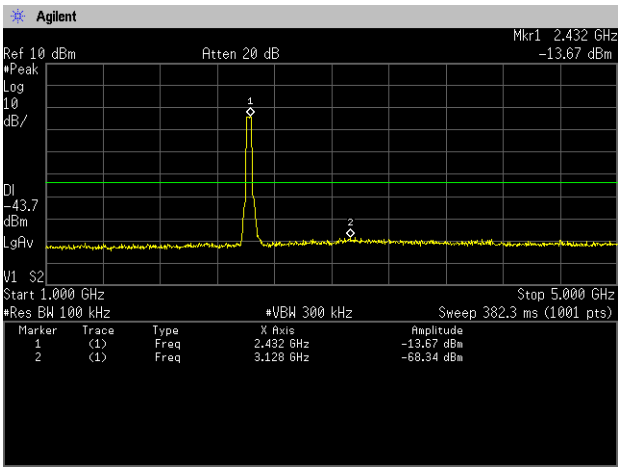
[IEEE802.11n (HT40)]

Channel Low

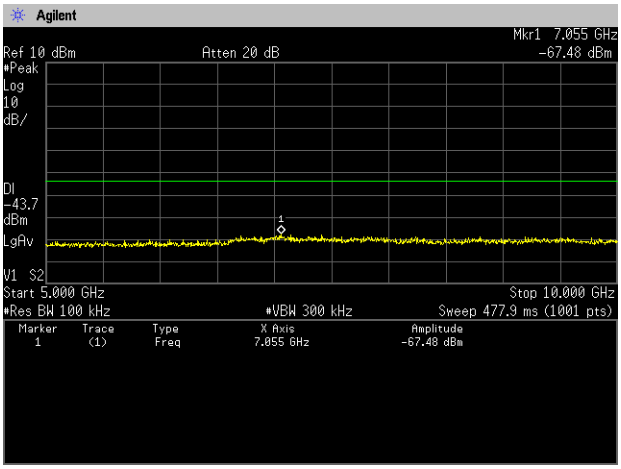
30MHz-1GHz



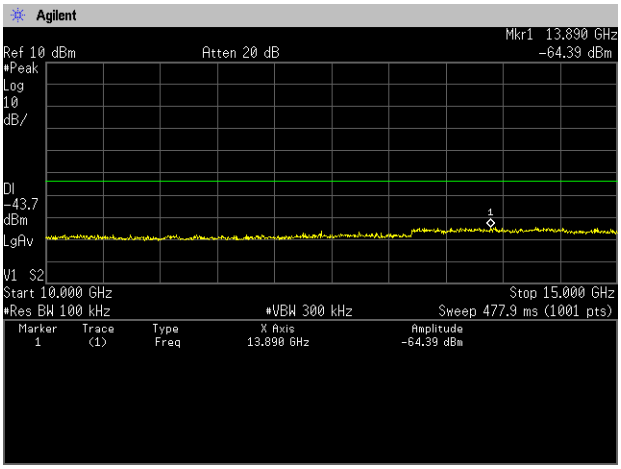
1GHz-5GHz



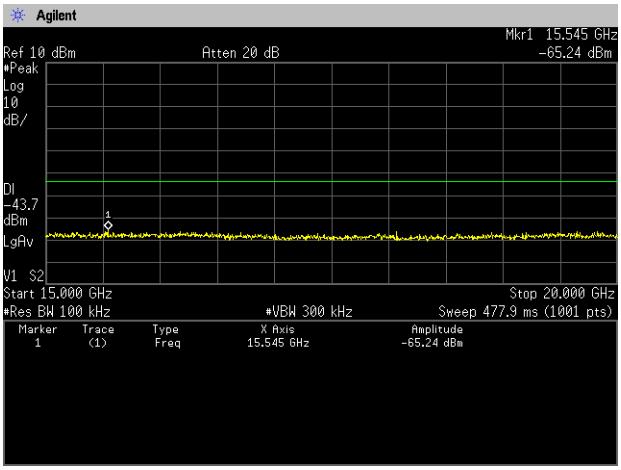
5GHz-10GHz



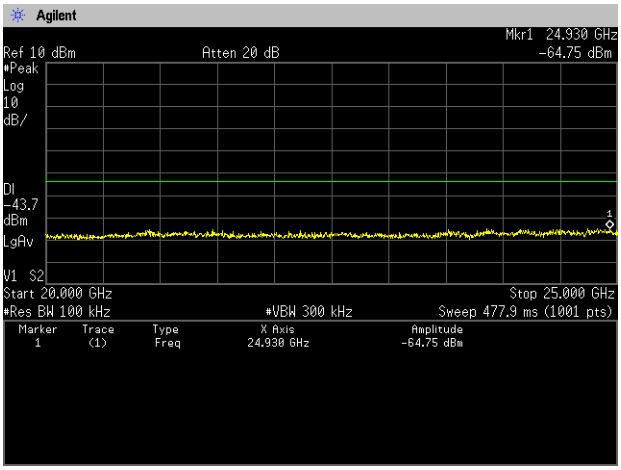
10GHz-15GHz



15GHz-20GHz

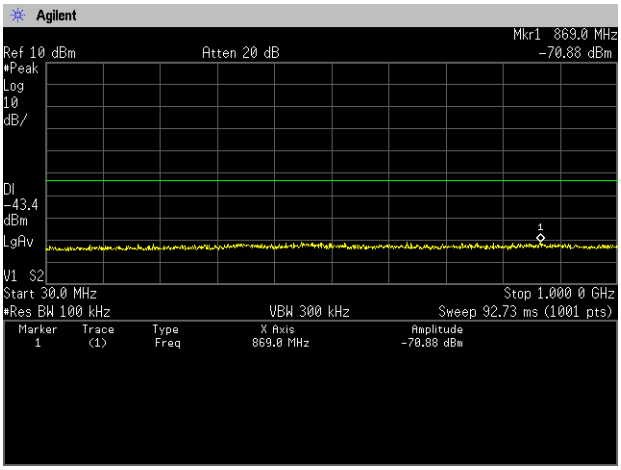


20GHz-25GHz

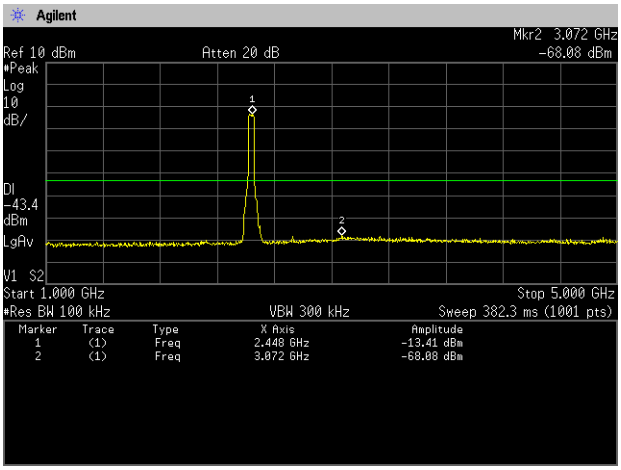


Channel Middle

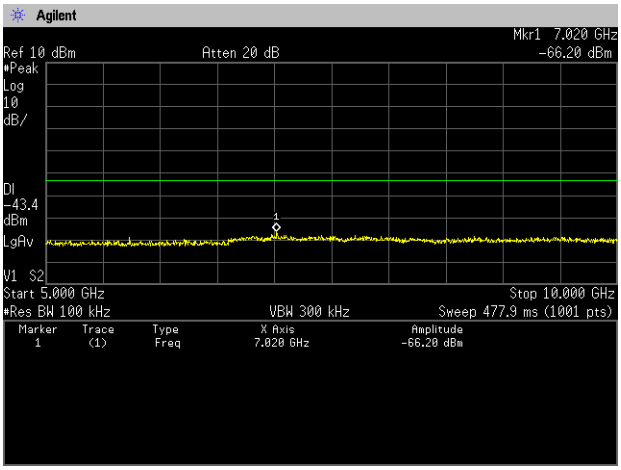
30MHz-1GHz



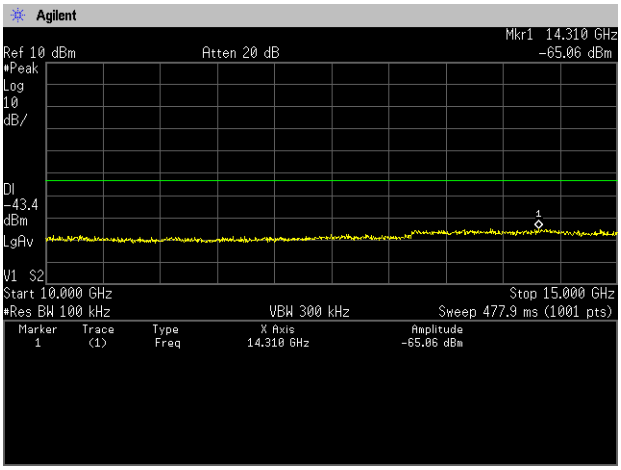
1GHz-5GHz



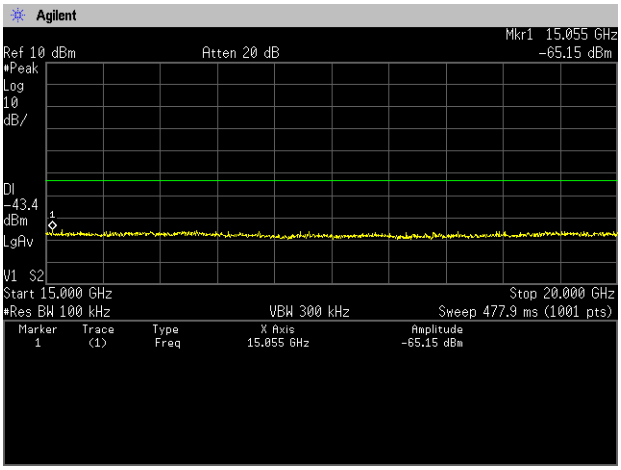
5GHz-10GHz



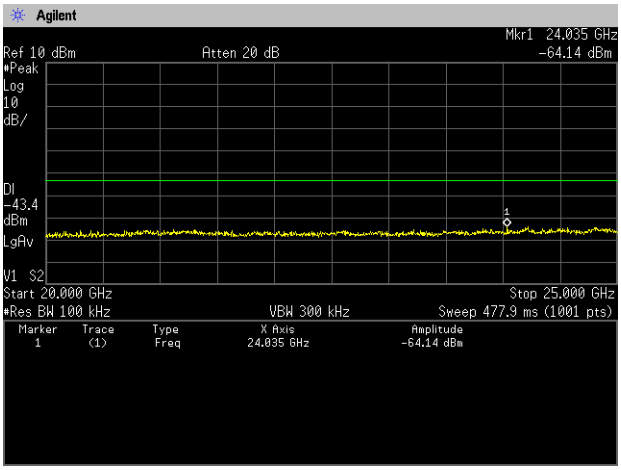
10GHz-15GHz



15GHz-20GHz

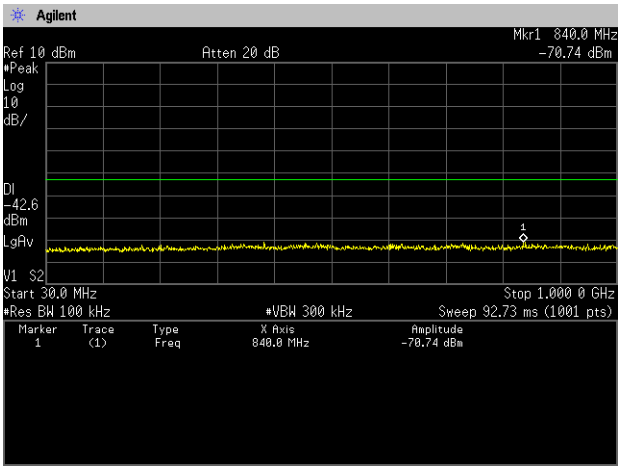


20GHz-25GHz

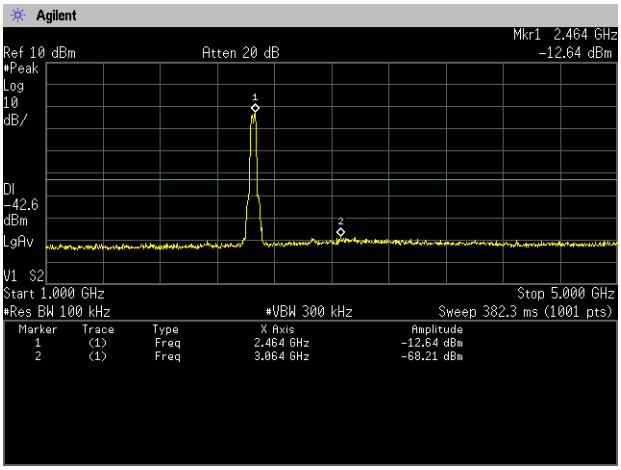


Channel High

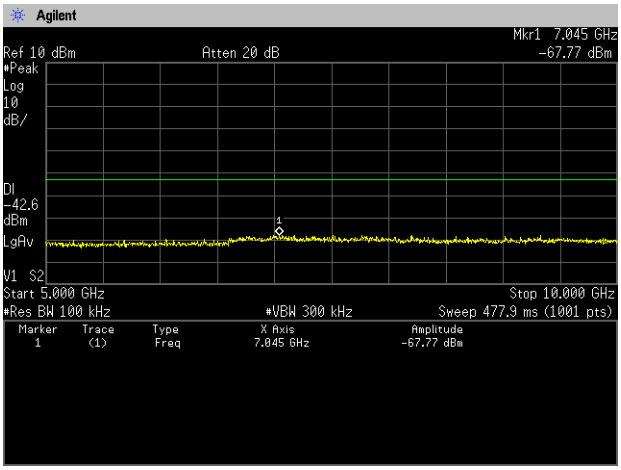
30MHz-1GHz



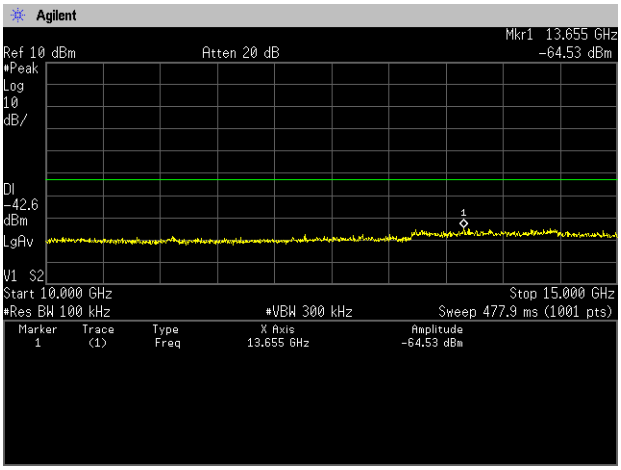
1GHz-5GHz



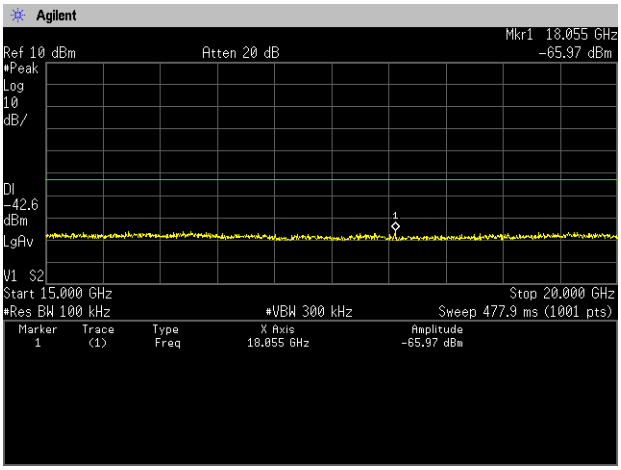
5GHz-10GHz



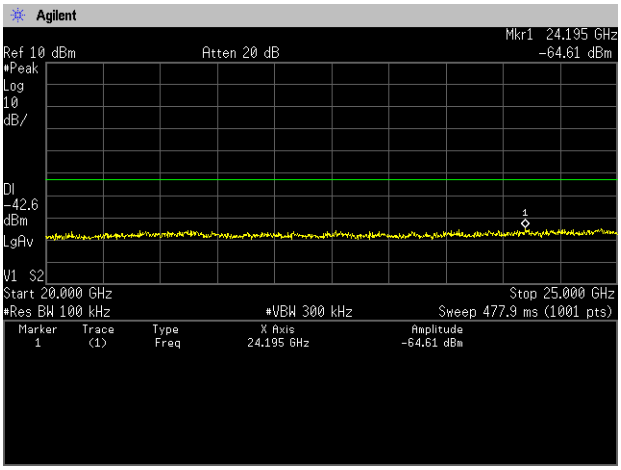
10GHz-15GHz



15GHz-20GHz



20GHz-25GHz



8. Spurious Emissions - Radiated -

8.1 Measurement procedure
[FCC 15.247(d), 15,205, 15.209, KDB 558074 D01 v03r05, Section 12.1]

Test was applied by following conditions.

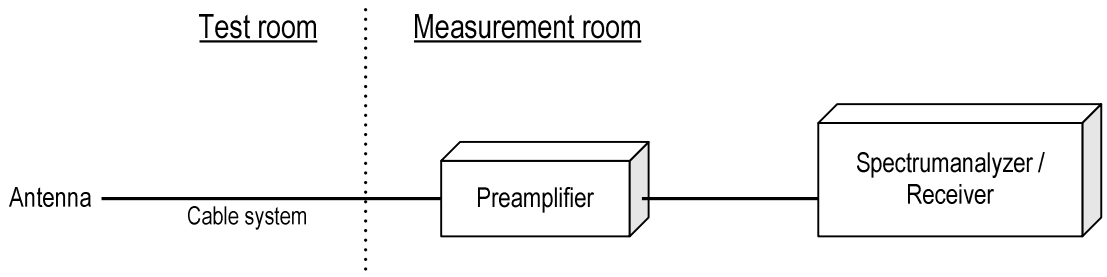
Test method	:	ANSI C63.10
Frequency range	:	9kHz to 25GHz
Test place	:	3m Semi-anechoic chamber
EUT was placed on	:	Styrofoam table / (W)1.0m × (D)1.0m × (H)0.8m (below 1GHz) Styrofoam table / (W)1.0m × (D)1.0m ×(H)1.5m (above 1GHz)
Antenna distance	:	3m
Test receiver setting		Below 1GHz
- Detector	:	Average (9kHz-90kHz, 110kHz-490kHz), Quasi-peak
- Bandwidth	:	200Hz, 120kHz
Spectrum analyzer setting		Above 1GHz
- Peak	:	RBW=1MHz, VBW=3MHz, Span=0Hz, Sweep=auto
- Average	:	RBW=1MHz, VBW=10Hz, Span=0Hz, Sweep=auto Display mode=Linear

Average Measurement Setting [VBW]

Mode	Duty Cycle (%)	T_{on} (us)	T_{off} (us)	Determined VBW Setting
IEEE802.11b	99.11	1023	9.2	10Hz (Duty Cycle ≧98%)
IEEE802.11g	99.27	1362	10	10Hz (Duty Cycle ≧98%)
IEEE802.11n(HT20)	99.22	1274	10	10Hz (Duty Cycle ≧98%)
IEEE802.11n(HT40)	98.45	635	10	10Hz (Duty Cycle ≧98%)

Radiated emission measurements are performed at 3m distance with the broadband antenna (Loop antenna, TRILOG antenna and Double ridged guide antenna). The antenna is positioned both the horizontal and vertical planes of polarization and height is varied 1m to 4m and stopped at height producing the maximum emission. As for the Loop antenna, it is positioned with its plane vertical, and the center of the Loop antenna is 1m above the ground plane.
The EUT is Placed on a turntable, which is 0.8m above ground plane. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level. The test results represent the worst case emission for each emission with manipulating the EUT, support equipment, interconnecting cables and varying the mode of operation. Sufficient time for the EUT, support equipment, and test equipment are allowed in order for them to warm up to their normal operating condition.

- Test configuration



8.2 Calculation method

[9kHz to 150kHz]
Emission level = Reading + (Ant. factor + Cable system loss)
Margin = Limit – Emission level

[150kHz to 25GHz]
Emission level = Reading + (Ant. factor + Cable system loss – Amp. Gain)
Margin = Limit – Emission level

Example:
Limit @ 4804.0MHz : 74.0dBuV/m (Peak Limit)
S.A Reading = 39.9dBuV Cable system loss = 8.3dB
Result = 39.9 + 8.3 = 48.2dBuV/m
Margin = 74.0 - 48.2 = 25.8dB

8.3 Limit

Frequency [MHz]	Field strength		Distance [m]
	[uV/m]	[dBuV/m]	
0.009-0.490	2400 / F [kHz]	20logE [uV/m]	300
0.490-1.705	24000 / F [kHz]	20logE [uV/m]	30
1.705-30	30	29.5	30
30-88	100	40.0	3
88-216	150	43.5	3
216-960	200	46.0	3
Above 960	500	54.0	3

Note:
1. The lower limit shall apply at the transition frequencies.
2. Emission level [dBuV/m] = 20log Emission [uV/m]
3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition modulation.

8.4 Test data

Date	:	March 2, 2016		
Temperature	:	21.0 [˚C]		
Humidity	:	23.6 [%]	Test engineer	:
Test place	:	3m Semi-anechoic chamber		Kazunori Saito

Date	:	March 17, 2016		
Temperature	:	23.1 [˚C]		
Humidity	:	22.4 [%]	Test engineer	:
Test place	:	3m Semi-anechoic chamber		Kazunori Saito

[IEEE802.11b]

Channel Low

No.	Frequency	(P)	Reading PK	Reading CAV	c.f	Result PK	Result CAV	Limit PK	Limit AV	Margin PK	Margin CAV	Height	Angle
	[MHz]		[dB(μV)]	[dB(μV)]	[dB(1/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB]	[dB]	[cm]	[°]
1	4824.000	H	48.6	35.1	8.4	57.0	43.5	74.0	54.0	17.0	10.5	100.0	0.0
2	4824.000	V	48.9	35.2	8.4	57.3	43.6	74.0	54.0	16.7	10.4	100.0	0.0

Channel Middle

No.	Frequency	(P)	Reading PK	Reading CAV	c.f	Result PK	Result CAV	Limit PK	Limit AV	Margin PK	Margin CAV	Height	Angle
	[MHz]		[dB(μV)]	[dB(μV)]	[dB(1/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB]	[dB]	[cm]	[°]
1	4874.000	H	49.6	36.7	8.6	58.2	45.3	74.0	54.0	15.8	8.7	100.0	0.0
2	4874.000	V	48.4	34.8	8.6	57.0	43.4	74.0	54.0	17.0	10.6	100.0	0.0

Channel High

No.	Frequency	(P)	Reading PK	Reading CAV	c.f	Result PK	Result CAV	Limit PK	Limit AV	Margin PK	Margin CAV	Height	Angle
	[MHz]		[dB(μV)]	[dB(μV)]	[dB(1/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB]	[dB]	[cm]	[°]
1	4924.000	H	48.0	34.7	8.7	56.7	43.4	74.0	54.0	17.3	10.6	100.0	0.0
2	4924.000	V	48.2	34.8	8.7	56.9	43.5	74.0	54.0	17.1	10.5	100.0	0.0

Note:
1. Emission Level (Margin) = Limit - [Reading + Factor (Antenna + Cable – Amp)]
2. No emission were detected in frequency range 9kHz to 1000MHz at the 3 meters distance.
3. No emission was detected in the receive mode.

[IEEE802.11g]

Channel Low

No.	Frequency	(P)	Reading PK	Reading CAV	c.f	Result PK	Result CAV	Limit PK	Limit AV	Margin PK	Margin CAV	Height	Angle
	[MHz]		[dB(μV)]	[dB(μV)]	[dB(1/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB]	[dB]	[cm]	[°]
1	4824.000	H	48.1	34.7	8.4	56.5	43.1	74.0	54.0	17.5	10.9	100.0	0.0
2	4824.000	V	48.3	34.7	8.4	56.7	43.1	74.0	54.0	17.3	10.9	100.0	0.0

Channel Middle

No.	Frequency	(P)	Reading PK	Reading CAV	c.f	Result PK	Result CAV	Limit PK	Limit AV	Margin PK	Margin CAV	Height	Angle
	[MHz]		[dB(μV)]	[dB(μV)]	[dB(1/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB]	[dB]	[cm]	[°]
1	4874.000	H	48.6	34.8	8.6	57.2	43.4	74.0	54.0	16.8	10.6	100.0	0.0
2	4874.000	V	48.6	34.9	8.6	57.2	43.5	74.0	54.0	16.8	10.5	100.0	0.0

Channel High

No.	Frequency	(P)	Reading PK	Reading CAV	c.f	Result PK	Result CAV	Limit PK	Limit AV	Margin PK	Margin CAV	Height	Angle
	[MHz]		[dB(μV)]	[dB(μV)]	[dB(1/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB]	[dB]	[cm]	[°]
1	4924.000	H	48.3	34.7	8.7	57.0	43.4	74.0	54.0	17.0	10.6	100.0	0.0
2	4924.000	V	48.5	34.7	8.7	57.2	43.4	74.0	54.0	16.8	10.6	100.0	0.0

Note:
1. Emission Level (Margin) = Limit - [Reading + Factor (Antenna + Cable – Amp)]
2. No emission were detected in frequency range 9kHz to 1000MHz at the 3 meters distance.
3. No emission was detected in the receive mode.

Zacta

[IEEE802.11n (HT20)]

Channel Low

No.	Frequency	(P)	Reading PK	Reading CAV	c.f	Result PK	Result CAV	Limit PK	Limit AV	Margin PK	Margin CAV	Height	Angle
	[MHz]		[dB(μV)]	[dB(μV)]	[dB(1/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB]	[dB]	[cm]	[°]
1	4824.000	H	48.0	34.8	8.4	56.4	43.2	74.0	54.0	17.6	10.8	100.0	0.0
2	4824.000	V	48.0	34.9	8.4	56.4	43.3	74.0	54.0	17.6	10.7	100.0	0.0

Channel Middle

No.	Frequency	(P)	Reading PK	Reading CAV	c.f	Result PK	Result CAV	Limit PK	Limit AV	Margin PK	Margin CAV	Height	Angle
	[MHz]		[dB(μV)]	[dB(μV)]	[dB(1/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB]	[dB]	[cm]	[°]
1	4874.000	H	48.2	34.8	8.6	56.8	43.4	74.0	54.0	17.2	10.6	100.0	0.0
2	4874.000	V	48.4	34.8	8.6	57.0	43.4	74.0	54.0	17.0	10.6	100.0	0.0

Channel High

No.	Frequency	(P)	Reading PK	Reading CAV	c.f	Result PK	Result CAV	Limit PK	Limit AV	Margin PK	Margin CAV	Height	Angle
	[MHz]		[dB(μV)]	[dB(μV)]	[dB(1/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB]	[dB]	[cm]	[°]
1	4924.000	H	48.2	34.7	8.7	56.9	43.4	74.0	54.0	17.1	10.6	100.0	0.0
2	4924.000	V	48.1	34.8	8.7	56.8	43.5	74.0	54.0	17.2	10.5	100.0	0.0

Note:
1. Emission Level (Margin) = Limit - [Reading + Factor (Antenna + Cable – Amp)]
2. No emission were detected in frequency range 9kHz to 1000MHz at the 3 meters distance.
3. No emission was detected in the receive mode.

[IEEE802.11n (HT40)]

Channel Low

No.	Frequency	(P)	Reading PK	Reading CAV	c.f	Result PK	Result CAV	Limit PK	Limit AV	Margin PK	Margin CAV	Height	Angle
	[MHz]		[dB(μV)]	[dB(μV)]	[dB(1/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB]	[dB]	[cm]	[°]
1	4844.000	H	48.2	34.6	8.5	56.7	43.1	74.0	54.0	17.3	10.9	100.0	0.0
2	4844.000	V	48.0	34.6	8.5	56.5	43.1	74.0	54.0	17.5	10.9	100.0	0.0

Channel Middle

No.	Frequency	(P)	Reading PK	Reading CAV	c.f	Result PK	Result CAV	Limit PK	Limit AV	Margin PK	Margin CAV	Height	Angle
	[MHz]		[dB(μV)]	[dB(μV)]	[dB(1/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB]	[dB]	[cm]	[°]
1	4874.000	H	48.2	34.8	8.6	56.8	43.4	74.0	54.0	17.2	10.6	100.0	0.0
2	4874.000	V	48.7	34.8	8.6	57.3	43.4	74.0	54.0	16.7	10.6	100.0	0.0

Channel High

No.	Frequency	(P)	Reading PK	Reading CAV	c.f	Result PK	Result CAV	Limit PK	Limit AV	Margin PK	Margin CAV	Height	Angle
	[MHz]		[dB(μV)]	[dB(μV)]	[dB(1/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB]	[dB]	[cm]	[°]
1	4904.000	H	48.1	35.0	8.7	56.8	43.7	74.0	54.0	17.2	10.3	100.0	0.0
2	4904.000	V	48.1	34.9	8.7	56.8	43.6	74.0	54.0	17.2	10.4	100.0	0.0

Note:
1. Emission Level (Margin) = Limit - [Reading + Factor (Antenna + Cable – Amp)]
2. No emission were detected in frequency range 9kHz to 1000MHz at the 3 meters distance.
3. No emission was detected in the receive mode.

9. Restricted Band of Operation

9.1 Measurement procedure
[FCC 15.247(d), 15,205, 15.209, KDB 558074 D01 v03r05, Section 12.0]

Test was applied by following conditions.

Test method	:	ANSI C63.10
Test place	:	3m Semi-anechoic chamber
EUT was placed on	:	Styrofoam table / (W)1.0m × (D)1.0m ×(H)1.5m
Antenna distance	:	3m

Spectrum analyzer setting

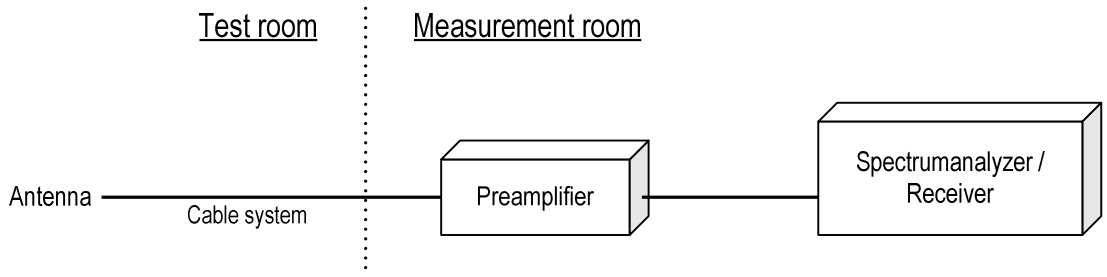
- Peak	:	RBW=1MHz, VBW=3MHz, Span=Arbitrary setting, Sweep=auto
- Average	:	RBW=1MHz, VBW=10Hz, Span=Arbitrary setting, Sweep=auto Display mode=Linear

Average Measurement Setting [VBW]

Mode	Duty Cycle (%)	T_{on} (us)	T_{off} (us)	Determined VBW Setting
IEEE802.11b	99.11	1023	9.2	10Hz (Duty Cycle ≧98%)
IEEE802.11g	99.27	1362	10	10Hz (Duty Cycle ≧98%)
IEEE802.11n(HT20)	99.22	1274	10	10Hz (Duty Cycle ≧98%)
IEEE802.11n(HT40)	98.45	635	10	10Hz (Duty Cycle ≧98%)

Radiated emission measurements are performed at 3m distance with the broadband antenna (Double ridged guide antenna). The antenna is positioned both the horizontal and vertical planes of polarization and height is varied 1m to 4m and stopped at height producing the maximum emission.
The EUT is Placed on a turntable, which is 0.8m above ground plane. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level. The test results represent the worst case emission for each emission with manipulating the EUT, support equipment, interconnecting cables and varying the mode of operation. Sufficient time for the EUT, support equipment, and test equipment are allowed in order for them to warm up to their normal operating condition.

- Test configuration



9.2 Limit

Emission at the boundary of the restricted band provided by 15.205 shall be lower than 15.209 limit.

9.3 Measurement Result

[IEEE802.11b、IEEE802.11g、IEEE802.11n (HT20)]

Channel	Frequency [MHz]	Results Chart	Result
Low	2412	See the Trace Data	Pass
High	2462	See the Trace Data	Pass

[IEEE802.11n (HT40)]

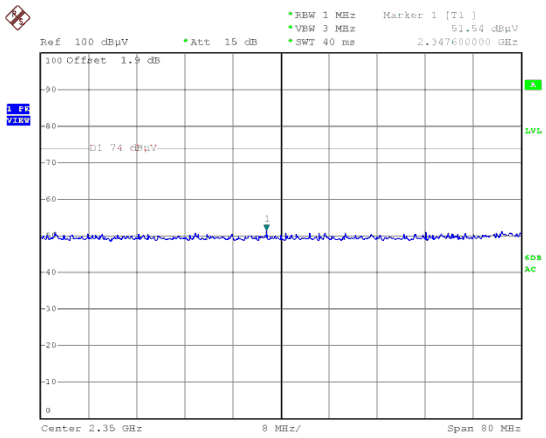
Channel	Frequency [MHz]	Results Chart	Result
Low	2422	See the Trace Data	Pass
High	2452	See the Trace Data	Pass

9.4 Test data

Date : March 7, 2016
Temperature : 20.4[˚C]
Humidity : 31.3 [%] Test engineer :
Test place : 3m Semi-anechoic chamber Kazunori Saito

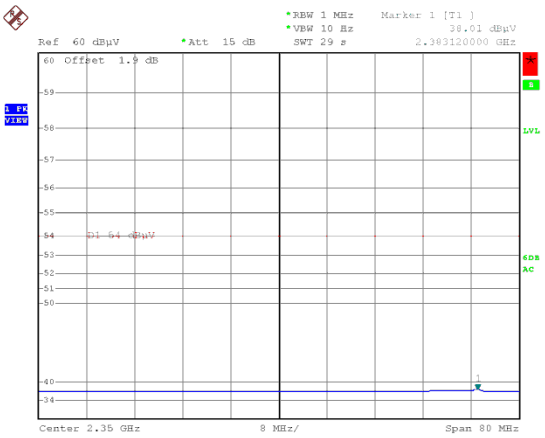
[IEEE802.11b]

Channel Low
Horizontal
Peak



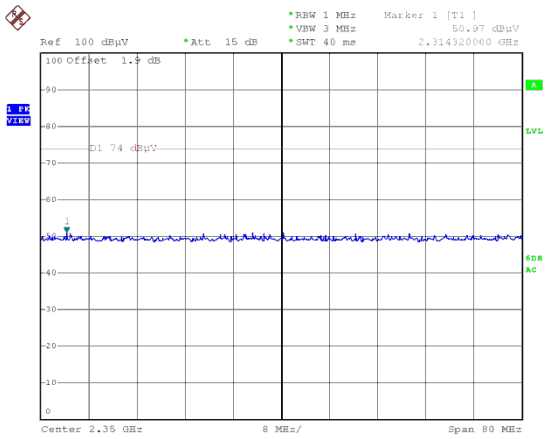
Date: 7.MAR.2016 21:12:00

Average



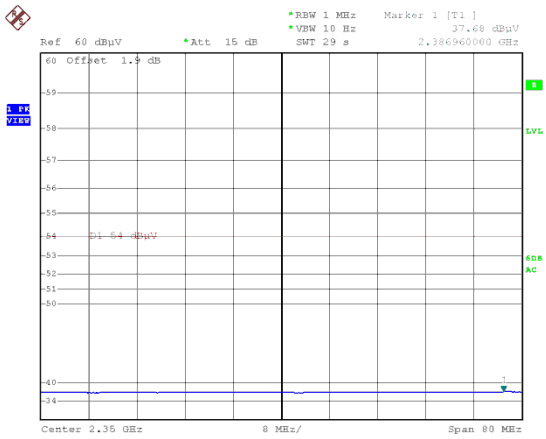
Date: 7.MAR.2016 21:13:07

Vertical
Peak



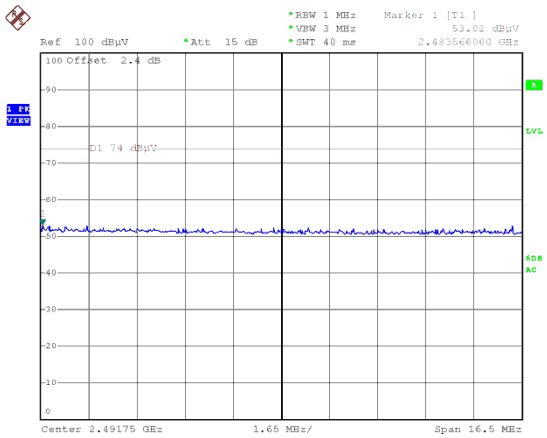
Date: 7.MAR.2016 21:16:32

Average



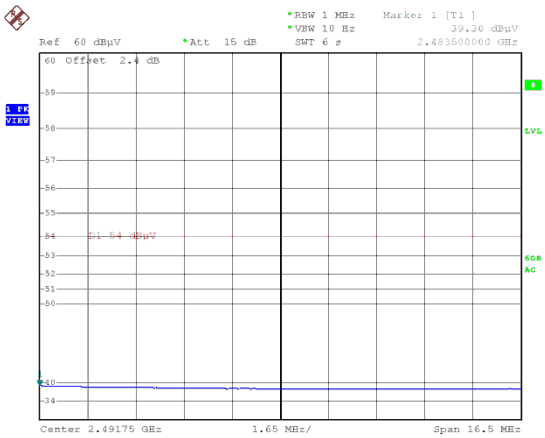
Date: 7.MAR.2016 21:17:24

Channel High
Horizontal
Peak



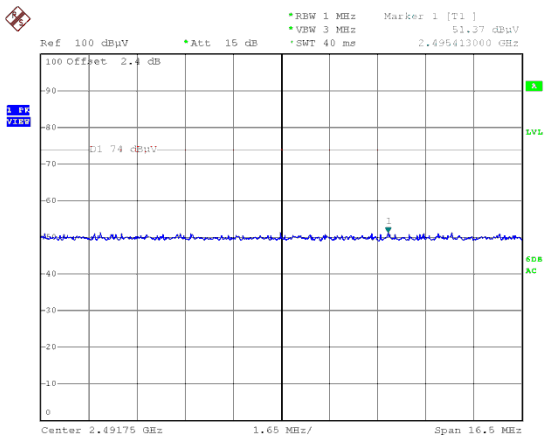
Date: 7.MAR.2016 21:27:06

Average



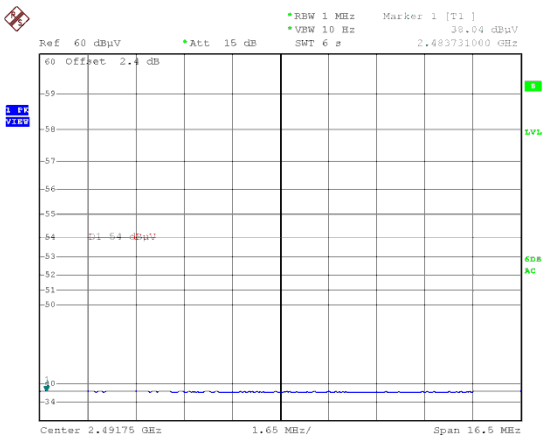
Date: 7.MAR.2016 21:27:41

Vertical
Peak



Date: 7.MAR.2016 21:31:03

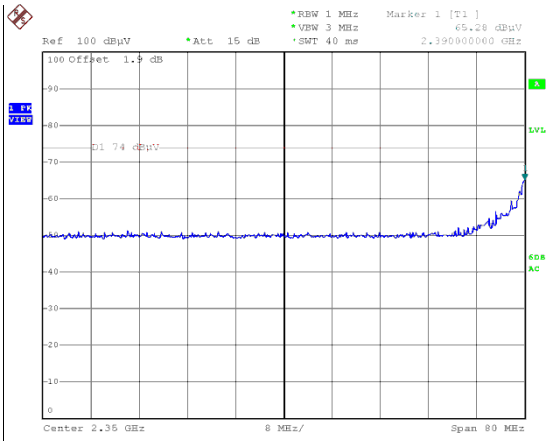
Average



Date: 7.MAR.2016 21:31:33

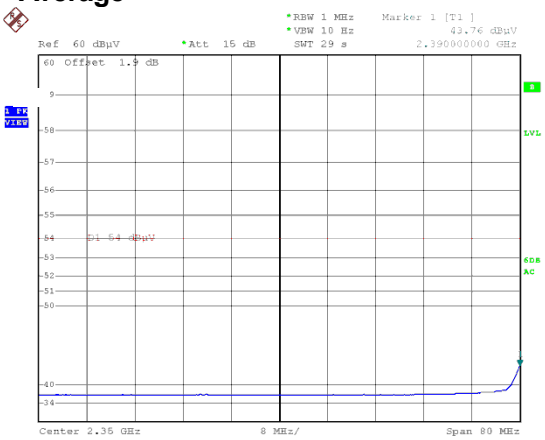
[IEEE802.11g]

Channel Low
Horizontal
Peak



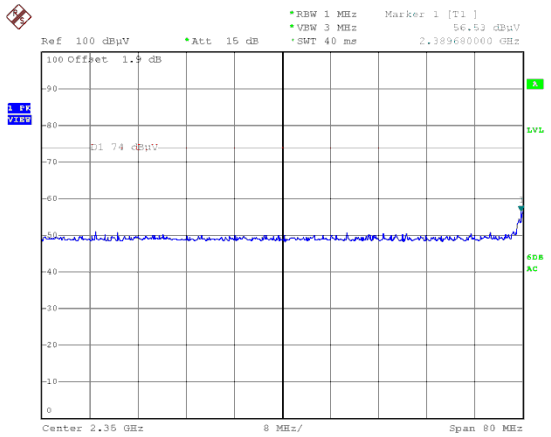
Date: 7.MAR.2016 20:11:45

Average



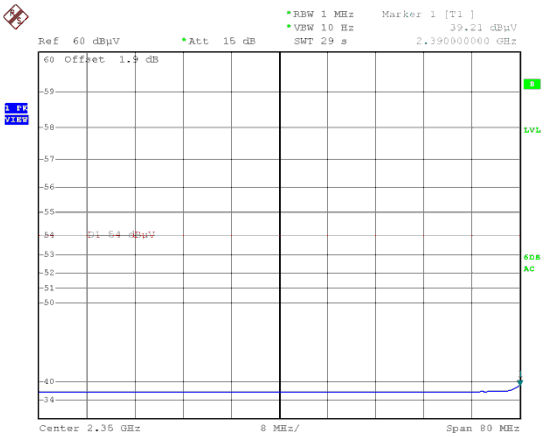
Date: 7.MAR.2016 20:12:46

Vertical
Peak



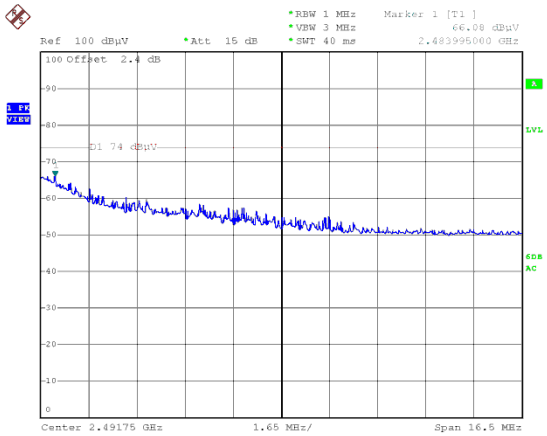
Date: 7.MAR.2016 20:17:10

Average



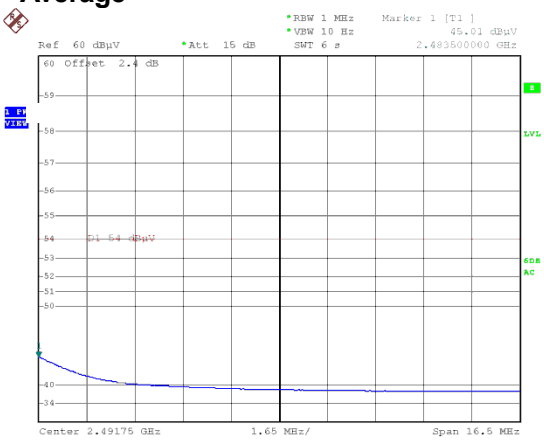
Date: 7.MAR.2016 20:18:02

Channel High
Horizontal
Peak



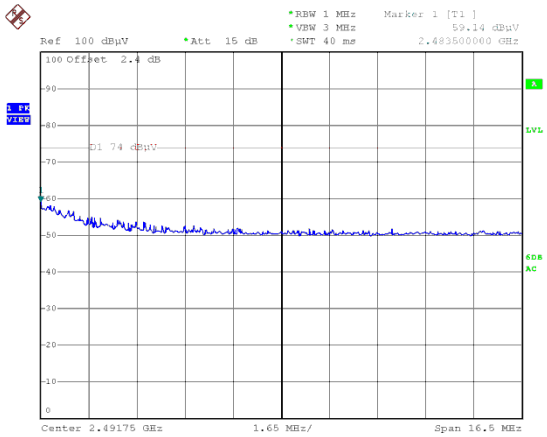
Date: 7.MAR.2016 20:54:13

Average



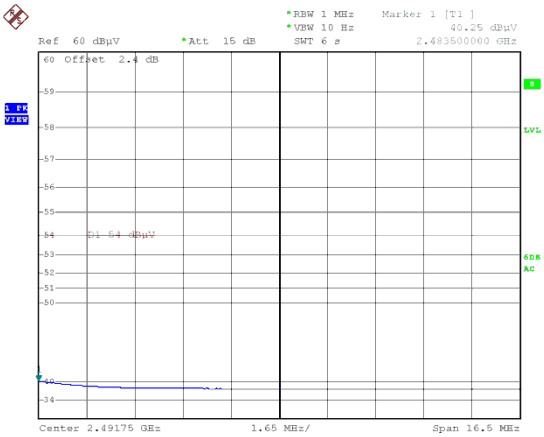
Date: 7.MAR.2016 20:57:41

Vertical
Peak



Date: 7.MAR.2016 21:03:32

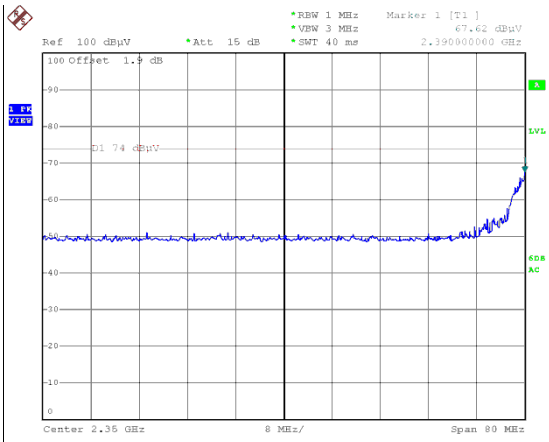
Average



Date: 7.MAR.2016 21:04:04

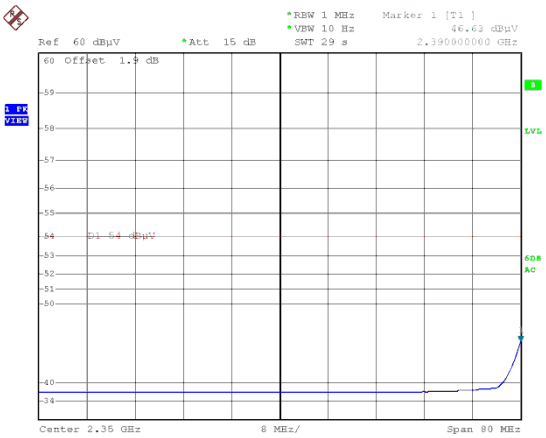
[IEEE802.11n (HT20)]

Channel Low
Horizontal
Peak



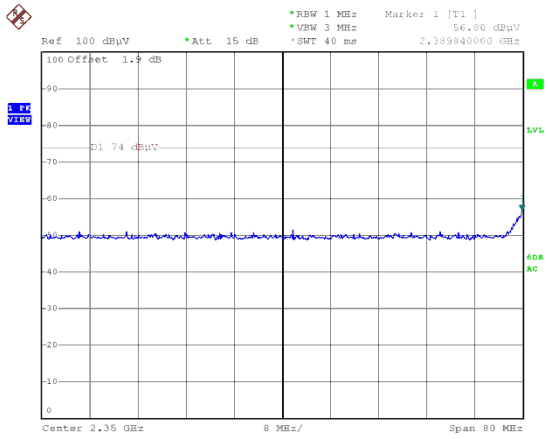
Date: 7.MAR.2016 21:39:15

Average



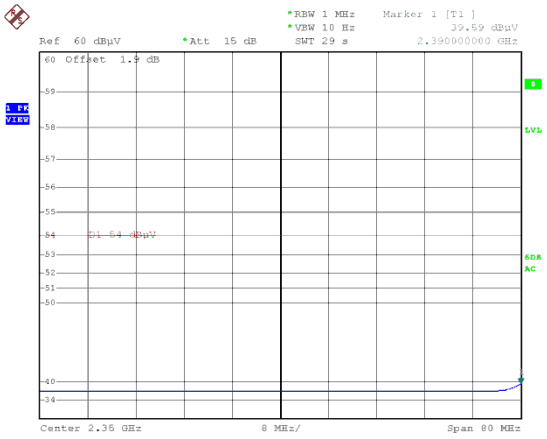
Date: 7.MAR.2016 21:40:22

Vertical
Peak



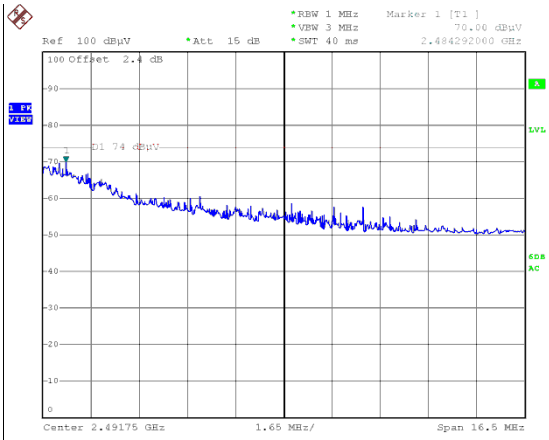
Date: 7.MAR.2016 21:44:10

Average



Date: 7.MAR.2016 21:45:05

Channel High
Horizontal
Peak



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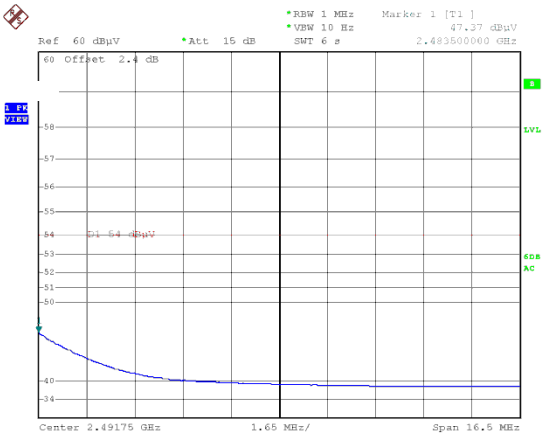
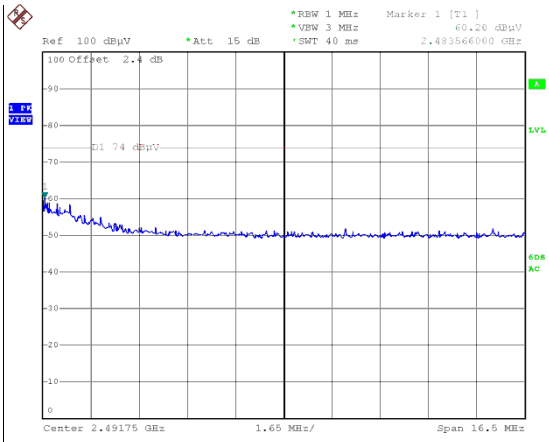


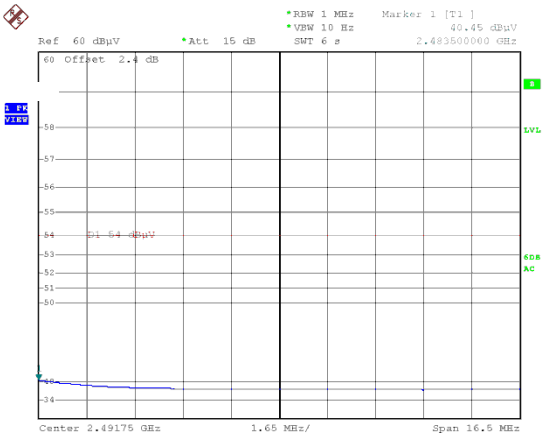
Date: 7.MAR.2016 21:56:15

Vertical
Peak



Date: 7.MAR.2016 22:04:17

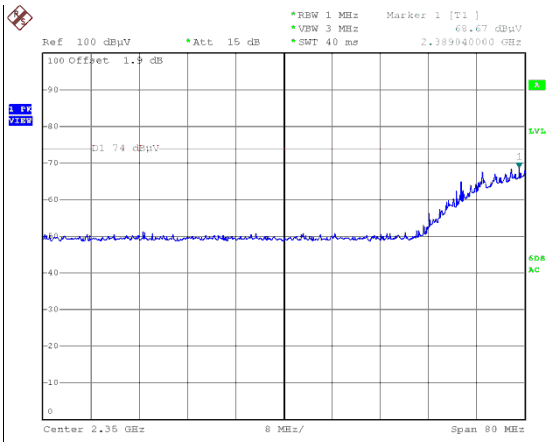
Average



Date: 7.MAR.2016 22:04:51

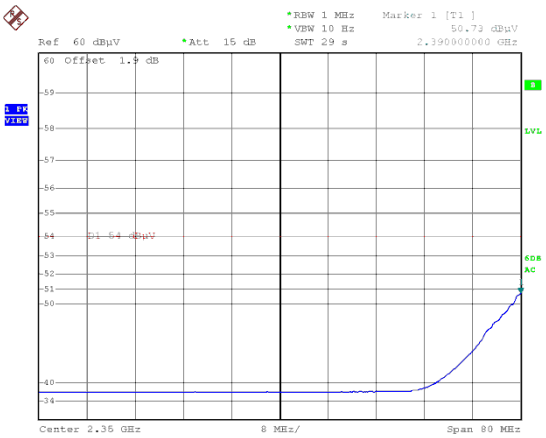
[IEEE802.11n (HT40)]

Channel Low
Horizontal
Peak



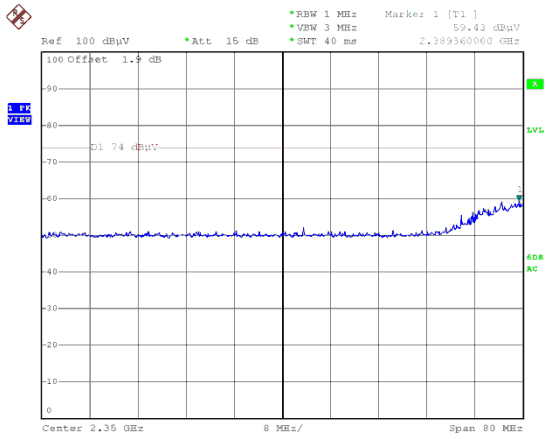
Date: 7.MAR.2016 22:13:43

Average



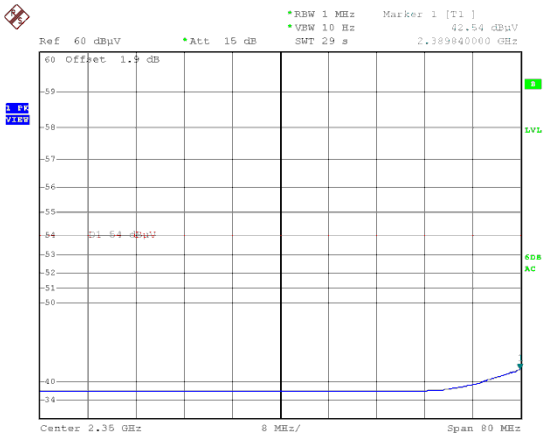
Date: 7.MAR.2016 22:14:35

Vertical
Peak



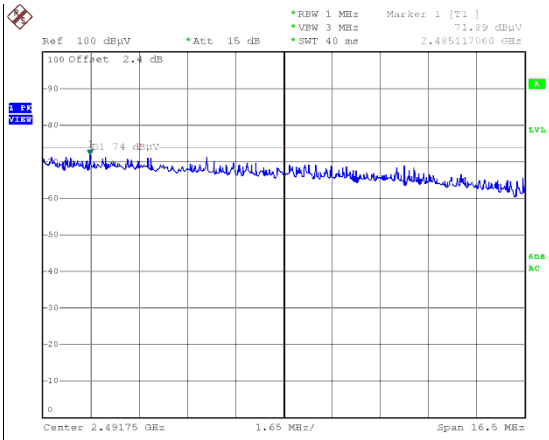
Date: 7.MAR.2016 22:20:59

Average



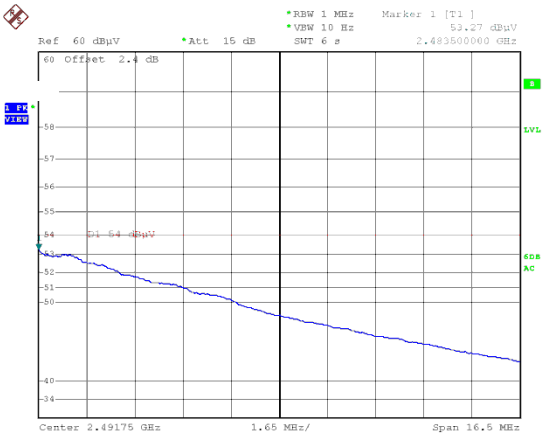
Date: 7.MAR.2016 22:21:48

Channel High
Horizontal
Peak



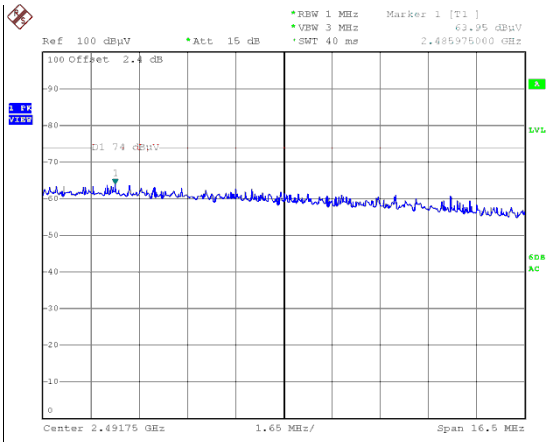
Date: 7.MAR.2016 22:27:36

Average



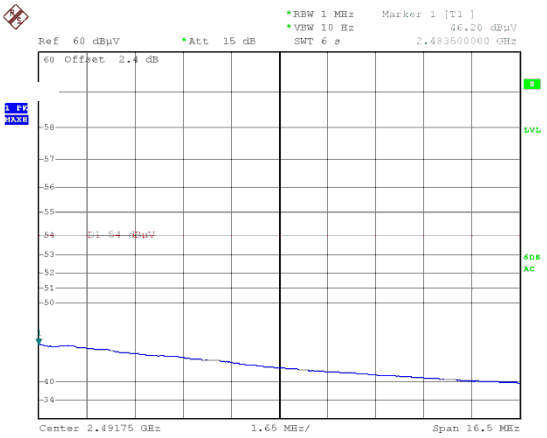
Date: 7.MAR.2016 22:28:12

Vertical
Peak



Date: 7.MAR.2016 22:34:26

Average



Date: 7.MAR.2016 22:34:59

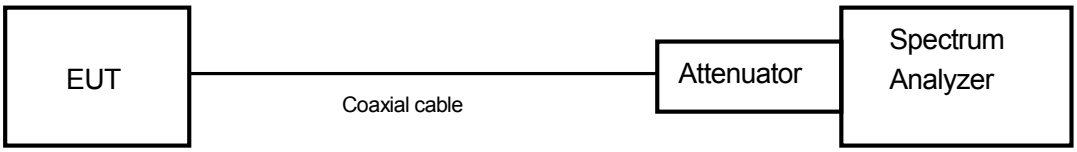
10. Transmitter Power Spectral Density

10.1 Measurement procedure
[FCC 15.247(e), KDB 558074 D01 v03r05, Section 10.2]

The peak power is measured with a spectrum analyzer connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate center frequency.

The spectrum analyzer is set to;
a) Span = 1.5 times the 6 dB bandwidth.
b) RBW = 3kHz - 100kHz.
c) VBW ≥ 3 x RBW.
d) Sweep time = auto-couple.
e) Detector = peak.
f) Trace mode = max hold.

- Test configuration



10.2 Limit

The peak power spectral density shall not be greater than 8dBm in any 3kHz band.

10.3 Measurement result

Date	:	March 18, 2016		
Temperature	:	22.1 [˚C]		
Humidity	:	35.4 [%]	Test engineer	:
Test place	:	Shielded room No.4		Hikaru Shibata

[IEEE802.11b]

Channel	Center Frequency (MHz)	Reading (dBm)	Factor (dB)	Level (dBm)	Limit (dBm)	Margin (dBm)	Result
Low	2412	-17.87	10.62	-7.25	8.00	15.25	PASS
Middle	2437	-18.36	10.62	-7.74	8.00	15.74	PASS
High	2462	-18.76	10.62	-8.14	8.00	16.14	PASS

Calculation;
Transmitter Power Spectral Density Level (Margin) = Limit – (Reading + Factor)

[IEEE802.11g]

Channel	Center Frequency (MHz)	Reading (dBm)	Factor (dB)	Level (dBm)	Limit (dBm)	Margin (dBm)	Result
Low	2412.00	-23.50	10.62	-12.88	8.00	20.88	PASS
Middle	2437.00	-24.10	10.62	-13.48	8.00	21.48	PASS
High	2462.00	-22.89	10.62	-12.27	8.00	20.27	PASS

Calculation;
Transmitter Power Spectral Density Level (Margin) = Limit – (Reading + Factor)

[IEEE802.11n (HT20)]

Channel	Center Frequency (MHz)	Reading (dBm)	Factor (dB)	Level (dBm)	Limit (dBm)	Margin (dBm)	Result
Low	2412.00	-23.83	10.62	-13.21	8.00	21.21	PASS
Middle	2437.00	-24.69	10.62	-13.33	8.00	21.33	PASS
High	2462.00	-24.18	10.62	-13.56	8.00	21.56	PASS

Calculation;
Transmitter Power Spectral Density Level (Margin) = Limit – (Reading + Factor)

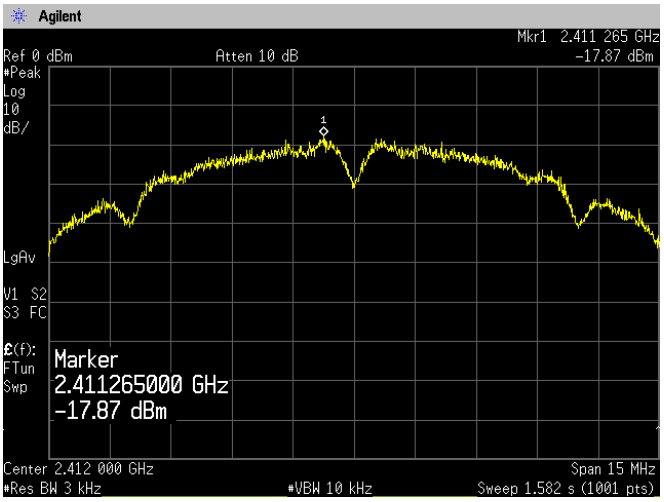
[IEEE802.11n (HT40)]

Channel	Center Frequency (MHz)	Reading (dBm)	Factor (dB)	Level (dBm)	Limit (dBm)	Margin (dBm)	Result
Low	2422.00	-27.54	10.62	-16.92	8.00	24.92	PASS
Middle	2437.00	-28.65	10.62	-18.03	8.00	26.03	PASS
High	2452.00	-26.95	10.62	-16.33	8.00	24.33	PASS

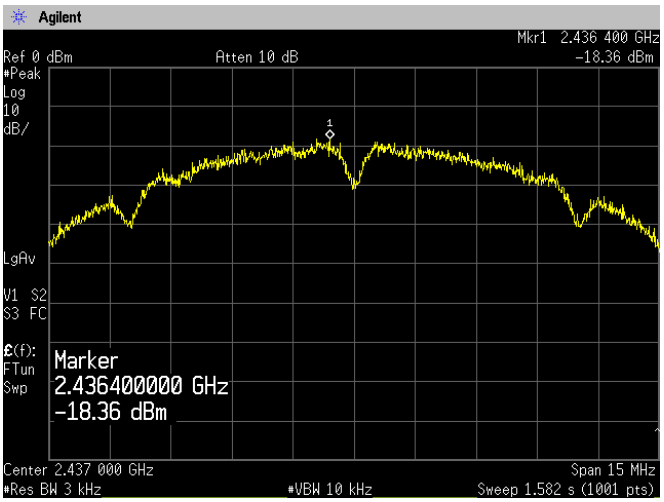
Calculation;
Transmitter Power Spectral Density Level (Margin) = Limit – (Reading + Factor)

10.4 Trace data [IEEE802.11b]

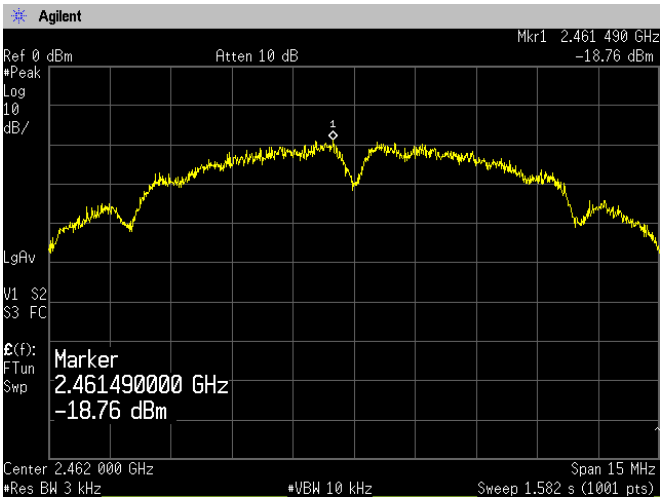
Channel Low



Channel Middle

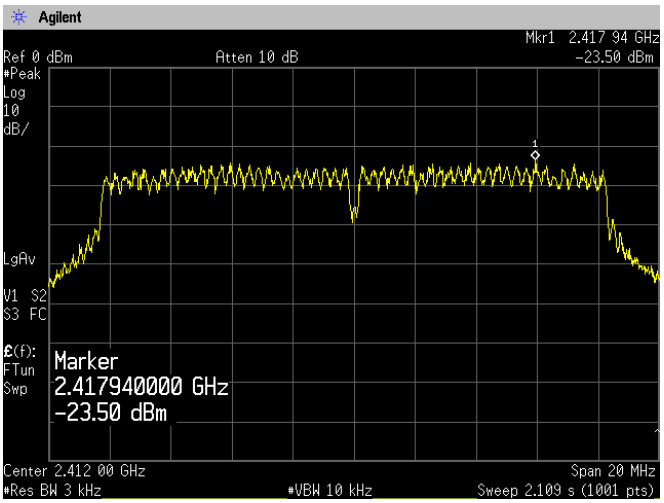


Channel High

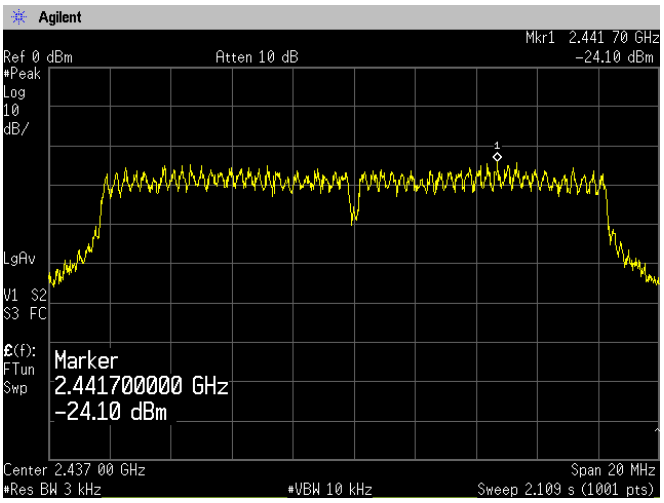


[IEEE802.11g]

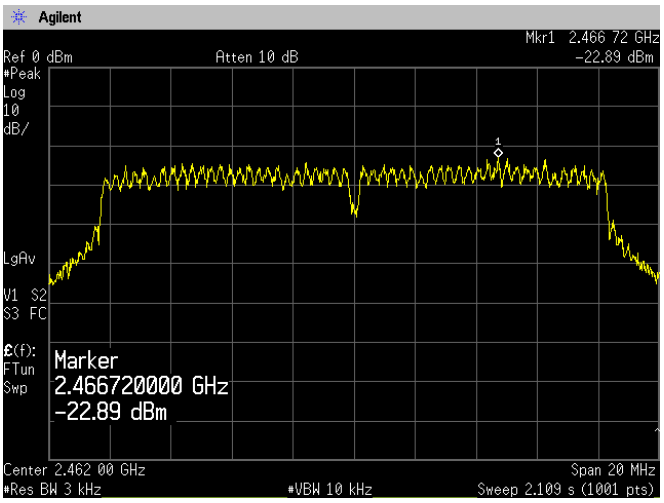
Channel Low



Channel Middle

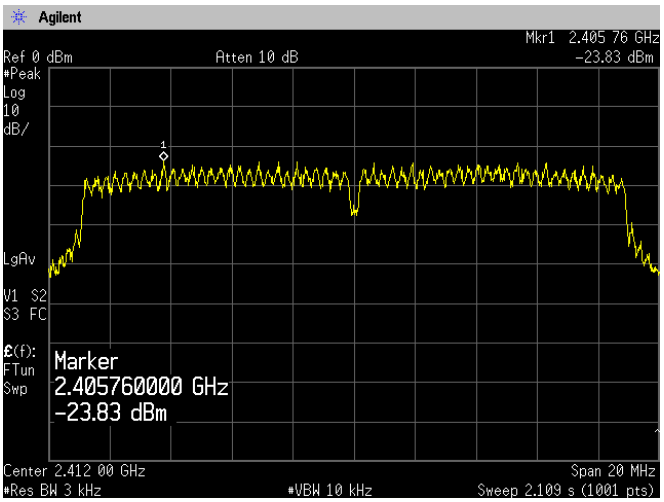


Channel High

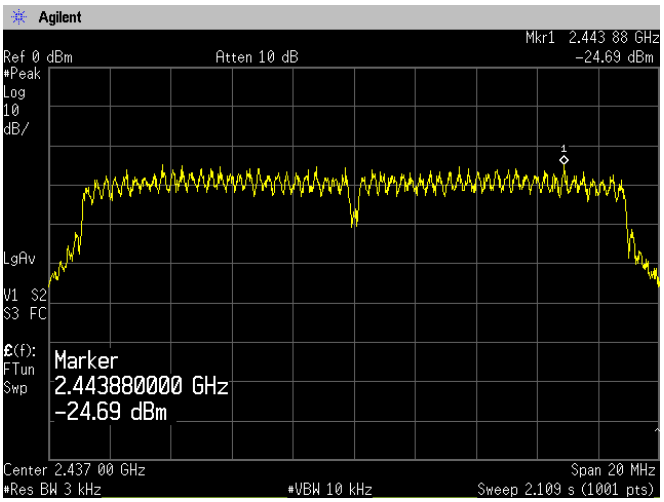


[IEEE802.11n (HT20)]

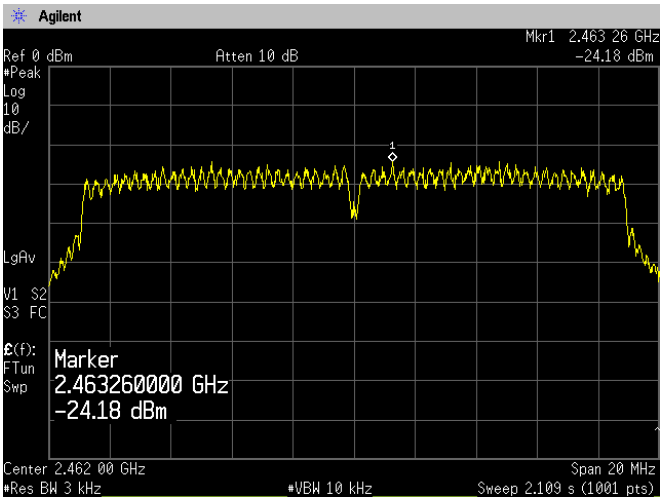
Channel Low



Channel Middle

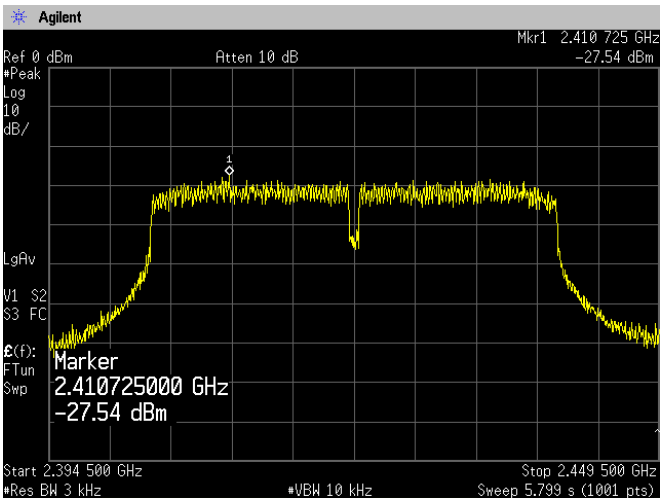


Channel High

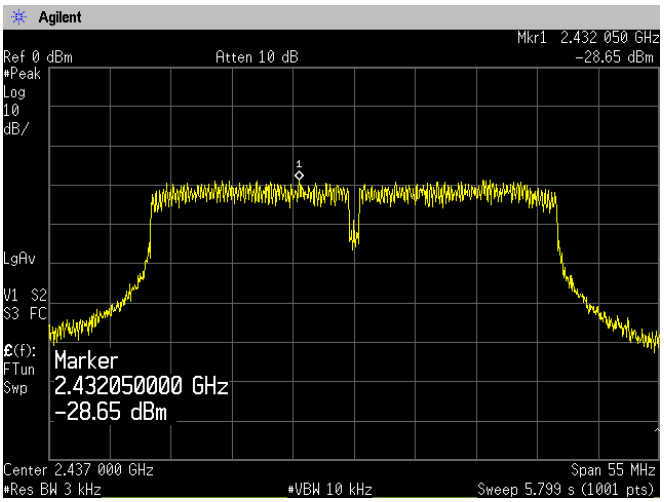


[IEEE802.11n (HT40)]

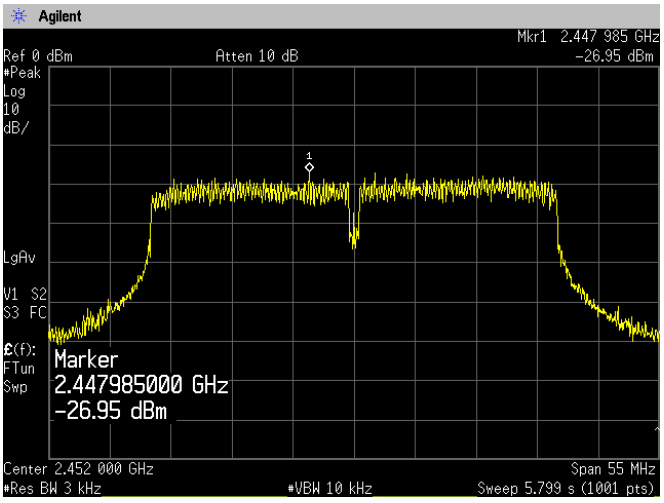
Channel Low



Channel Middle



Channel High



11. AC Power Line Conducted Emissions

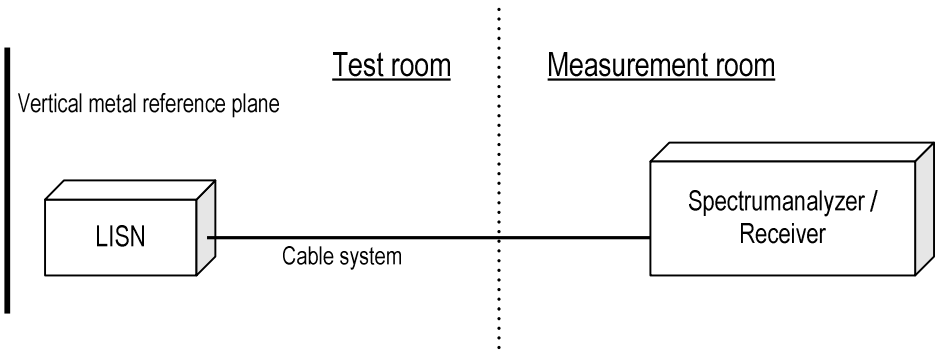
11.1 Measurement procedure [FCC 15.207]

Test was applied by following conditions.

Test method	:	ANSI C63.10
Frequency range	:	0.15MHz to 30MHz
Test place	:	3m Semi-anechoic chamber
EUT was placed on	:	FRP table / (W)2.0m × (D)1.0m × (H)0.8m
Vertical Metal Reference Plane	:	(W)2.0m × (H)2.0m 0.4m away from EUT
Test receiver setting		
- Detector	:	Quasi-peak, Average
- Bandwidth	:	9kHz

EUT and peripherals are connected to 50Ω/50μH Line Impedance Stabilization Network (LISN) which are connected to reference ground plane, and are placed 80cm away from EUT. Excess of AC power cable is bundled in center.
LISN for peripheral is terminated in 50Ω.
EUT operating mode is selected to emit the maximum noise. Overall frequency range is investigated with spectrum analyzer using peak detector. Maximum emission configuration is determined by manipulating the EUT, peripherals, interconnecting cables. Then, emission measurements are performed with test receiver in above setting to each current-carrying conductor of the mains port. Sufficient time for EUT, peripherals and test equipment is provided in order for them to warm up to their normal operating condition. If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits.

- Test configuration



11.2 Calculation method

Emission level = Reading + (LISN. factor + Cable system loss)
Margin = Limit – Emission level

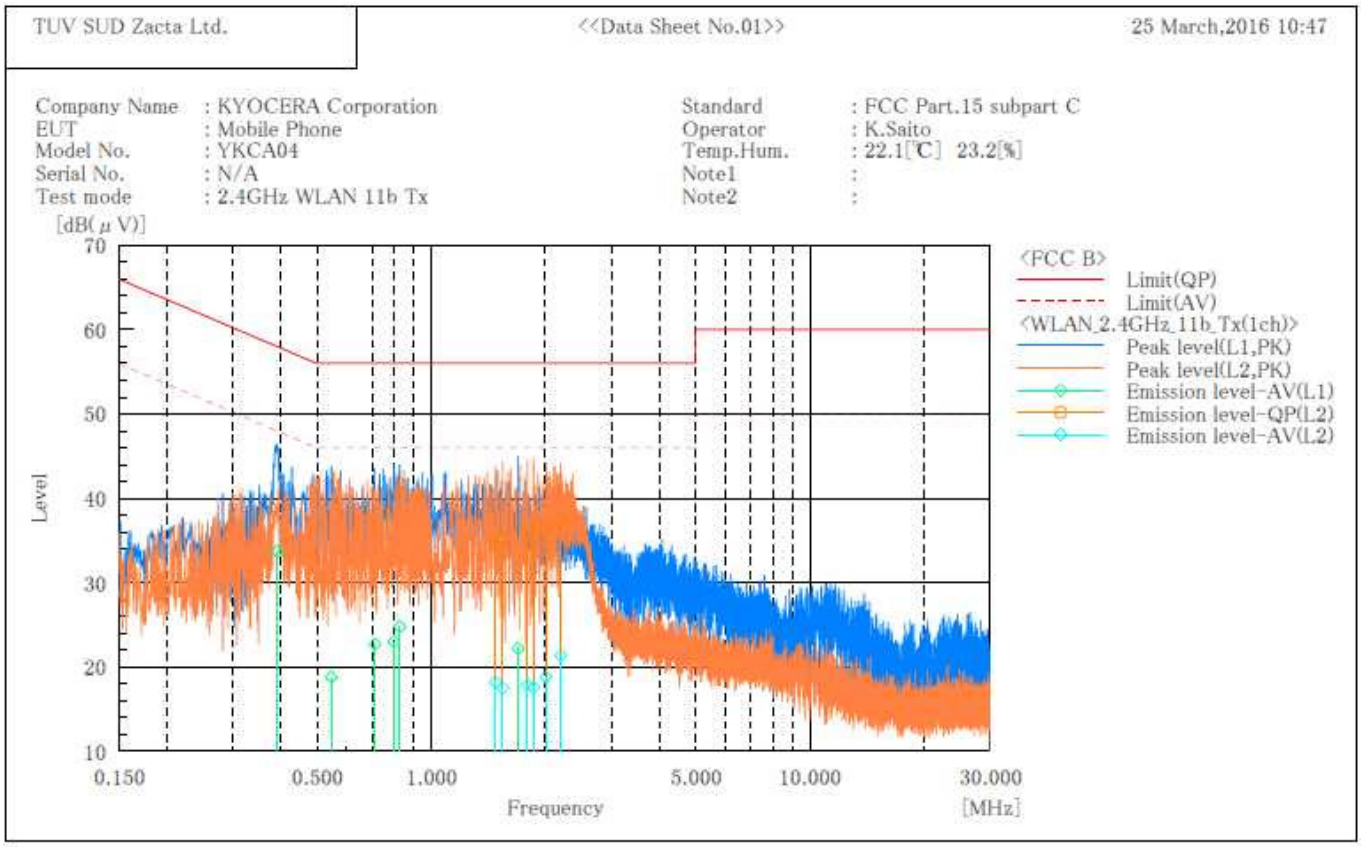
Example:
Limit @ 6.770MHz : 60.0dBμV(Quasi-peak)
: 50.0dBμV(Average)
(Quasi peak) Reading = 41.2dBμV c.f = 10.3dB
Emission level = 41.2 + 10.3 = 51.5dBμV
Margin = 60.0 – 51.5 = 8.5dB
(Average) Reading = 35.0dBμV c.f = 10.3dB
Emission level = 35.0 + 10.3 = 45.3dBμV
Margin = 50.0 – 45.3 = 4.7dB

11.3 Limit

Frequency [MHz]	Limit	
	QP [dBuV]	AV [dBuV]
0.15-0.5	66-56*	56-46*
0.5-5	56	46
5-30	60	50

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

11.4 Test data



Final Result

--- L1 Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading AV [dB(μV)]	c.f [dB]	Result QP [dB(μV)]	Result AV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin AV [dB]
1	0.39268	33.8	23.3	10.4	44.2	33.7	58.0	48.0	13.8	14.3
2	0.54621	21.2	8.4	10.4	31.6	18.8	56.0	46.0	24.4	27.2
3	0.71065	23.8	12.3	10.4	34.2	22.7	56.0	46.0	21.8	23.3
4	0.79883	24.3	12.6	10.4	34.7	23.0	56.0	46.0	21.3	23.0
5	0.82737	25.9	14.4	10.4	36.3	24.8	56.0	46.0	19.7	21.2
6	1.70044	25.3	11.8	10.4	35.7	22.2	56.0	46.0	20.3	23.8

--- L2 Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading AV [dB(μV)]	c.f [dB]	Result QP [dB(μV)]	Result AV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin AV [dB]
1	1.48177	24.8	7.7	10.5	35.3	18.2	56.0	46.0	20.7	27.8
2	1.54742	24.6	7.0	10.5	35.1	17.5	56.0	46.0	20.9	28.5
3	1.79942	25.9	7.4	10.5	36.4	17.9	56.0	46.0	19.6	28.1
4	1.86506	25.1	7.1	10.5	35.6	17.6	56.0	46.0	20.4	28.4
5	2.01354	25.8	8.3	10.5	36.3	18.8	56.0	46.0	19.7	27.2
6	2.20241	26.9	10.8	10.6	37.5	21.4	56.0	46.0	18.5	24.6

12. Antenna requirement

According to FCC section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.
The antenna is a special antenna mounted inside of the EUT. Therefore, the EUT complies with the antenna requirement of FCC section 15.203.

13. Uncertainty of measurement

Expanded uncertainties stated are calculated with a coverage Factor k=2.
Please note that these results are not taken into account when measurement uncertainty considerations contained in ETSI TR 100 028-0011 determining compliance or non-compliance with test result.

Test item	Measurement uncertainty
Conducted emission at mains port	±3.0dB
Radiated emission (9kHz – 30MHz)	±4.4dB
Radiated emission (30MHz – 1000MHz)	±4.5dB
Radiated emission (1000MHz – 26GHz)	±3.9dB

14. Laboratory description

1. Location:

TÜV SÜD Zacta Ltd. Yonezawa Testing Center
4149-7 Hachimanpara 5-chome Yonezawa-shi Yamagata 992-1128 Japan
Phone: +81-238-28-2880 Fax: +81-238-28-2888

2. Facility filing information:

1) NVLAP accreditation: NVLAP Lab. code: 200306-0

2) VLAC accreditation: Lab. code: VLAC-013

Site name	Radiated emission	Conducted emission for mains port	Conducted emission for telecom port	Radiated emission (CMAD)	Expiry Date
3m Semi-anechoic chamber	VLAC-013			-	Jul. 3, 2017
10m Semi-anechoic chamber No.1				VLAC-013	
10m Semi-anechoic chamber No.2					
Shielded room No.1	-	VLAC-013		-	

3) FCC filing:

Site name	Registration Number	Expiry Date
Site 3	91065	Oct. 1, 2017
3m Semi-anechoic chamber	540072	Feb. 20, 2017
10m Semi-anechoic chamber No.1		
10m Semi-anechoic chamber No.2		
Shielded room No.1		

4) Industry Canada Oats site filing:

Site name	Sites on file: Oats 3m/10m	Expiry Date
Site 3	4224A-3	Dec. 3, 2017
3m Semi-anechoic chamber	4224A-4	
10m Semi-anechoic chamber No.1	4224A-5	
10m Semi-anechoic chamber No.2	4224A-6	Jan. 15, 2017

5) VCCI site filing:

Site name	Radiated emission	Conducted emission for mains port	Conducted emission for telecom port	Expiry Date
Site 3	R-138	C-134	T-1222	Nov. 16, 2017
3m Semi-anechoic chamber	A-0166			Jul. 3, 2017
10m Semi-anechoic chamber No.1				
10m Semi-anechoic chamber No.2				
Shielded room No.1	-	A-0166		

6) TÜV SÜD PS authorization:
Authorized as an EMC test laboratory

7) TÜV Rheinland authorization:
Authorized as an EMC test laboratory

Appendix A. Test equipment

Antenna port conducted test

Equipment	Company	Model No.	Serial No.	Cal. due	Cal. date
Spectrum analyzer	Agilent Technologies	E4440A	US44302655	Jun. 30, 2016	Jun. 11, 2015
Microwave cable	RS	YH-13S5	N/A (S441)	May 31, 2016	May 12, 2015
Attenuator	Weinschel	56-10	J4993	Nov. 30, 2016	Nov. 12, 2015
Power meter	ROHDE&SCHWARZ	NRP2	103269	Jun. 30, 2016	Jun. 25, 2015
Power sensor	ROHDE&SCHWARZ	NRP-Z81	102467	Jun. 30, 2016	Jun. 25, 2015

Radiated emission

Equipment	Company	Model No.	Serial No.	Cal. Due	Cal. Date
EMI Receiver	ROHDE&SCHWARZ	ESCI	100764	Aug. 31, 2016	Aug. 21, 2015
Preamplifier	ANRITSU	MH648A	M96057	Jun. 30, 2016	Jun. 30, 2015
Loop antenna	ROHDE&SCHWARZ	HFH2-Z2	892246/010	Apr. 30, 2016	Apr. 2, 2015
Attenuator	TDC	TAT-43B-06	N/A (S209)	Apr. 30, 2016	Apr. 16, 2015
Biconical antenna	Schwarzbeck	VHA9103/BBA9106	2155	Jun. 30, 2016	Jun. 4, 2015
Log periodic antenna	Schwarzbeck	UHALP9108A	0560	Jun. 30, 2016	Jun. 4, 2015
Attenuator	TME	CFA-01NPJ-6	N/A (S275)	Jun. 30, 2016	Jun. 23, 2015
Attenuator	TME	CFA-01NPJ-3	N/A (S272)	Jun. 30, 2016	Jun. 23, 2015
Spectrum analyzer	Agilent Technologies	E4440A	US40420937	Jul. 31, 2016	Jul. 23, 2015
Double ridged guide antenna	EMCO	3115	5205	Mar. 31, 2017	Mar. 3, 2016
Attenuator	Agilent Technologies	8491B	MY39268633	Feb. 28, 2017	Feb. 23, 2016
Double ridged guide antenna	EMCO	3115	000058532	Nov. 30, 2016	Nov. 6, 2015
Broad-Band Horn Antenna	Schwarzbeck	BBHA9170	BBHA9170189	Jun. 30, 2016	Jun. 16, 2015
Preamplifier	TSJ	MLA-100M18-B02-40	1929118	May 31, 2016	May 1, 2015
Attenuator	AEROFLEX	26A-10	081217-08	May 31, 2016	May 7, 2015
Notch filter	Micro-Tronics	BRM50702	045	Nov. 30, 2016	Nov. 12, 2015
Microwave cable	SUHNER	SUCOFLEX104/9m	MY30037/4	Oct. 31, 2016	Oct. 23, 2015
		SUCOFLEX104/1m	MY24610/4	Oct. 31, 2016	Oct. 23, 2015
		SUCOFLEX104/8m	MY30031/4	May 31, 2016	May 29, 2015
		SUCOFLEX104/1.5m	322086/4	May 31, 2016	May 29, 2015
PC	DELL	DIMENSION E521	75465BX	N/A	N/A
Software	TOYO Corporation	EP5/RE-AJ	0611193/V5.4.011	N/A	N/A
3m Semi-anechoic chamber	TOKIN	N/A	N/A (9002-NSA)	Apr. 30, 2016	Apr. 27, 2015
3m Semi-anechoic chamber	TOKIN	N/A	N/A (9002-SVSWR)	Apr. 30, 2016	Apr. 27, 2015
Absorber	RIKEN	PFP30	N/A	N/A	N/A

Conducted emission at mains port

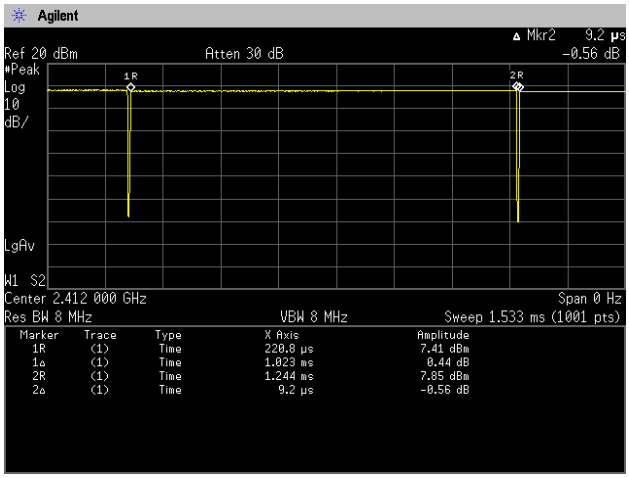
Equipment	Company	Model No.	Serial No.	Cal. due	Cal. date
EMI Receiver	ROHDE&SCHWARZ	ESCI	100764	Aug. 30, 2016	Aug. 2, 2015
Attenuator	HUBER+SUHNER	6810.01.A	N/A (S344)	Feb. 28, 2017	Feb. 23, 2016
Line impedance stabilization network for EUT	Kyoritsu Electrical Works, Ltd.	KNW-242C	8-875-19	Apr. 30, 2016	Apr. 16, 2015
Coaxial cable	FUJIKURA	5D-2W/4m	N/A (S350)	Feb. 28, 2017	Feb. 23, 2016
Coaxial cable	FUJIKURA	5D-2W/1m	N/A(S193)	May 31, 2016	May 29, 2015
Coaxial cable	SUHNER	RG214/U/10m	N/A (S194)	Feb. 28, 2017	Feb. 23, 2016
PC	DELL	DIMENSION E251	75465BX	N/A	N/A
Software	TOYO Corporation	EP5/CE-AJ	0611193/V5.6.000	N/A	N/A

*: The calibrations of the above equipment are traceable to NIST or equivalent standards of the reference organizations.

Appendix B. Duty Cycle

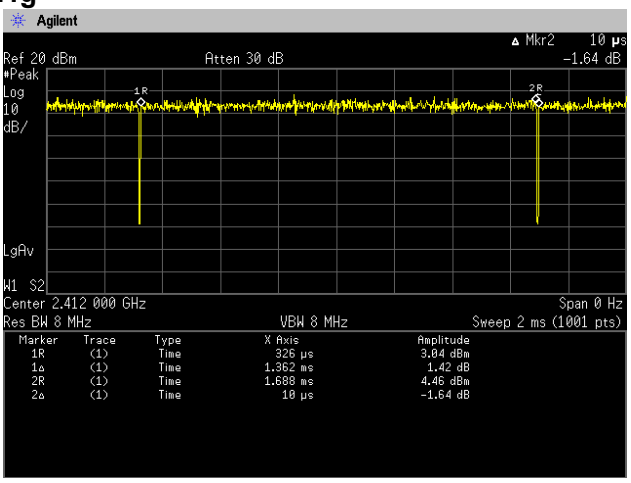
[Plot & Calculation]

11b



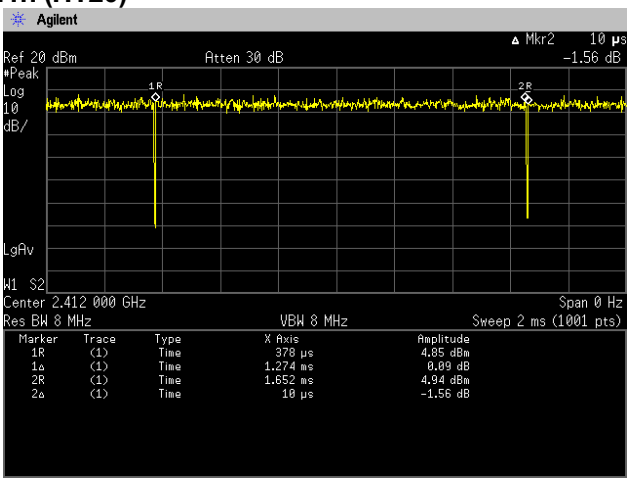
Duty Cycle = T_{on} / (T_{on} + T_{off}) = 1023[us] / (1023[us] + 9.2[us]) = 99.11[%]

11g



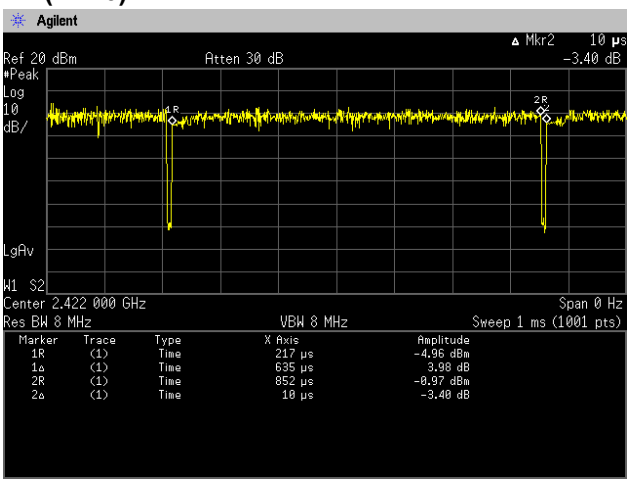
Duty Cycle = T_{on} / (T_{on} + T_{off}) = 1362[us] / (1362[us] + 10[us]) = 99.27[%]

11n (HT20)



Duty Cycle = T_{on} / (T_{on} + T_{off}) = 1274[us] / (1274[us] + 10[us]) = 99.22[%]

11n (HT40)



Duty Cycle = T_{on} / (T_{on} + T_{off}) = 635[us] / (635[us] + 10[us]) = 98.45[%]