Zacta

TEST REPORT

Report number : Z101C-15121
Issue date : December 18, 2015

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	:	CA12
FCC ID	:	JOYCA12

Date of test	:	October 15, 19, 2015 November 18, 28, 30, December 1, 2015
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 : Taiki Watanabe Kazunori Saito
Taiki Watanabe Kazunori Saito

Tested by : Hikaru Shibata
Hikaru Shibata

Authorized by :
Eiji Akiba
Deputy General 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 C63.10-2009

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)(1)	20dB Bandwidth	Conducted	PASS
15.247(a)(1)	Carrier Frequency Separation	Conducted	PASS
15.247(a)(1)(iii)	Number of Hopping Frequencies	Conducted	PASS
15.247(a)(1)(iii)	Time of Occupancy (Dwell Time)	Conducted	PASS
15.247(b)(1)	Maximum Peak 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
15.207	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	:	CA12
Serial number	:	N/A
EUT condition	:	Pre-Production
Power ratings	:	Battery: DC 3.8V
Size	:	(W) 72.2 × (D) 8.55 × (H) 146.3 mm
Environment	:	Indoor and Outdoor use
Terminal limitation	:	-20˚C to 60˚C
RF Specification		
Protocol	:	Bluetooth 4.1 + EDR
Frequency range	:	2402MHz-2480MHz
Number of RF Channels	:	79 Channels
Modulation type/ Data rate	:	FHSS: GFSK (1Mbps), π/4-DQPSK (2Mbps), 8-DPSK (3Mbps)
Channel separation	:	1MHz
Output power	:	7.464mW (DH5) 4.375mW (3-DH5)
Antenna type	:	Internal antenna
Antenna gain	:	-1.5dBi

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2.3 Variation of the family model(s)

Not applicable

2.4 Operating channels and frequencies

Channel	Frequency [MHz]	Channel	Frequency [MHz]	Channel	Frequency [MHz]
0	2402	27	2429	54	2456
1	2403	28	2430	55	2457
2	2404	29	2431	56	2458
3	2405	30	2432	57	2459
4	2406	31	2433	58	2460
5	2407	32	2434	59	2461
6	2408	33	2435	60	2462
7	2409	34	2436	61	2463
8	2410	35	2437	62	2464
9	2411	36	2438	63	2465
10	2412	37	2439	64	2466
11	2413	38	2440	65	2467
12	2414	39	2441	66	2468
13	2415	40	2442	67	2469
14	2416	41	2443	68	2470
15	2417	42	2444	69	2471
16	2418	43	2445	70	2472
17	2419	44	2446	71	2473
18	2420	45	2447	72	2474
19	2421	46	2448	73	2475
20	2422	47	2449	74	2476
21	2423	48	2450	75	2477
22	2424	49	2451	76	2478
23	2425	50	2452	77	2479
24	2426	51	2453	78	2480
25	2427	52	2454		
26	2428	53	2455		

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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]
Low	2402
Middle	2441
High	2480

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

Tested Channel	Modulation Technology	Modulation Type	Packet Type
Low, Middle, High	FHSS	GFSK	DH5
Low, Middle, High	FHSS	8-DPSK	3-DH5

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) Bluetooth test program setup to the DM tool
ii) Select a test mode
Operating frequency:
No hopping (Channel Low: 2402MHz, Channel Middle: 2441MHz, Channel High: 2480MHz)
Hopping
Packet type: DH5, 3-DH5
iii) Start test mode

[Rx mode]
i) Bluetooth test program setup to the DM tool
ii) Select a test mode
Operating frequency: Channel Low: 2402MHz, Channel Middle: 2441MHz, Channel High: 2480MHz
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	CA12	N/A	JOYCA12	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”.

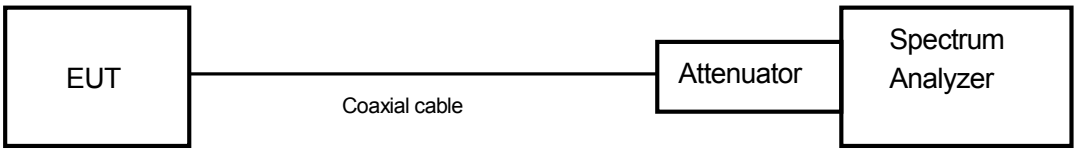
4. 20dB Bandwidth

4.1 Measurement procedure [FCC 15.247(a)(1)]

The bandwidth at 20dB 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) Span = 2-3 times the 20 dB bandwidth.
b) RBW ≥ 1% of the 20 dB bandwidth.
c) VBW ≥ RBW.
d) Sweep time = auto-couple.
e) Detector = peak.
f) Trace mode = max hold.

- Test configuration



4.2 Limit

None

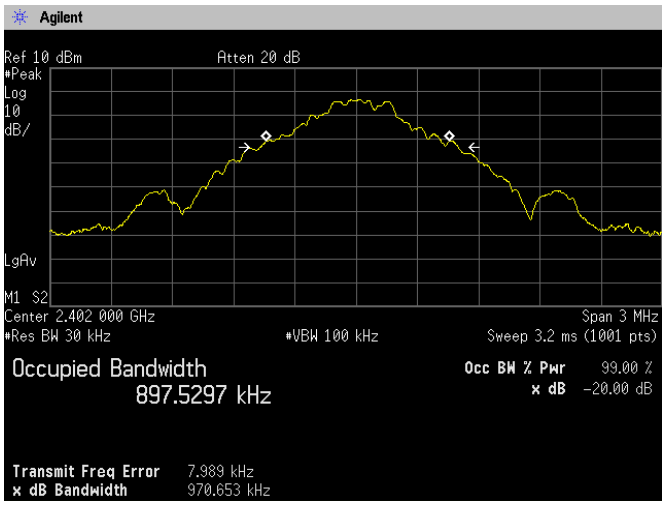
4.3 Measurement result

Date : October 15, 2015
Temperature : 23.1 [˚C]
Humidity : 47.9 [%]
Test place : Shielded room No.4
Test engineer : Hikaru Shibata

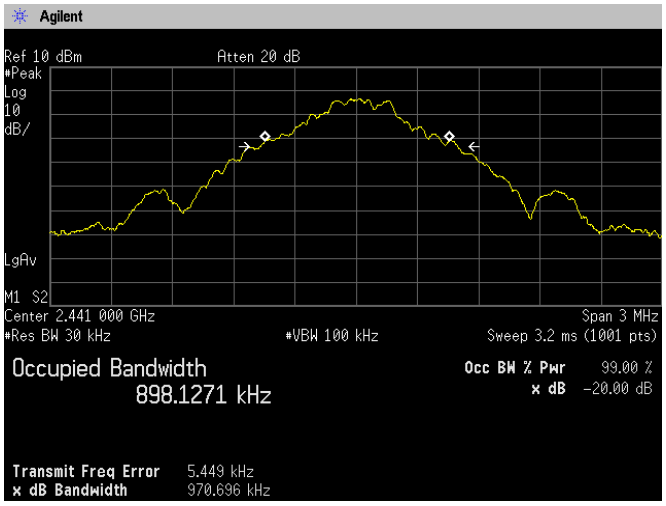
Channel	Frequency [MHz]	20dB bandwidth [MHz]	
		DH5	3-DH5
Low	2402	0.971	1.308
Middle	2441	0.971	1.307
High	2480	0.971	1.308

4.4 Trace data
[DH5]

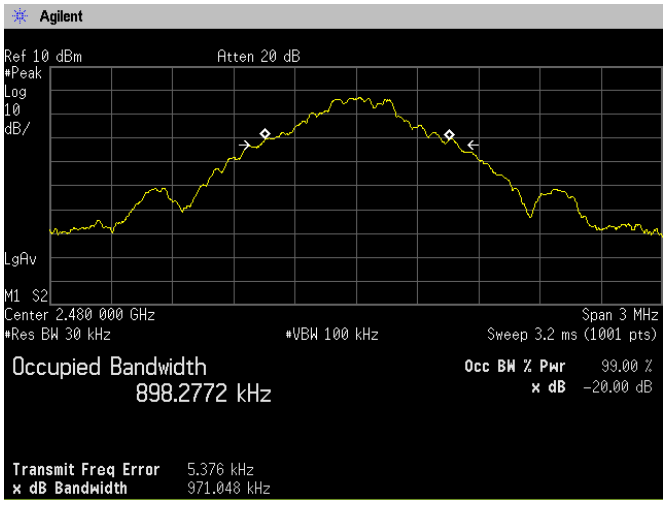
Channel Low



Channel Middle

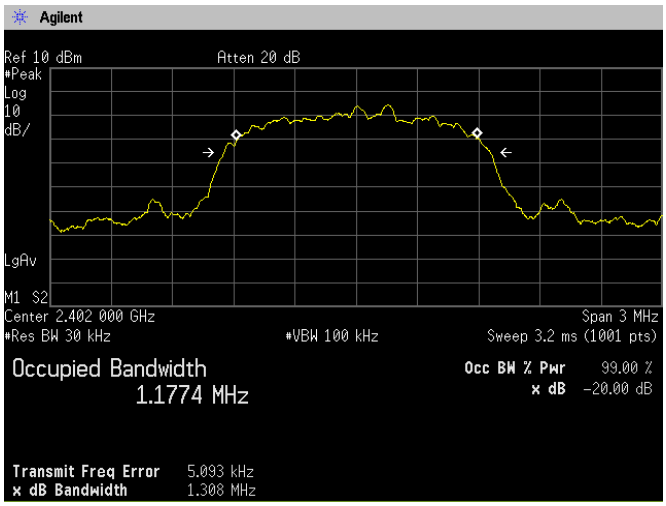


Channel High

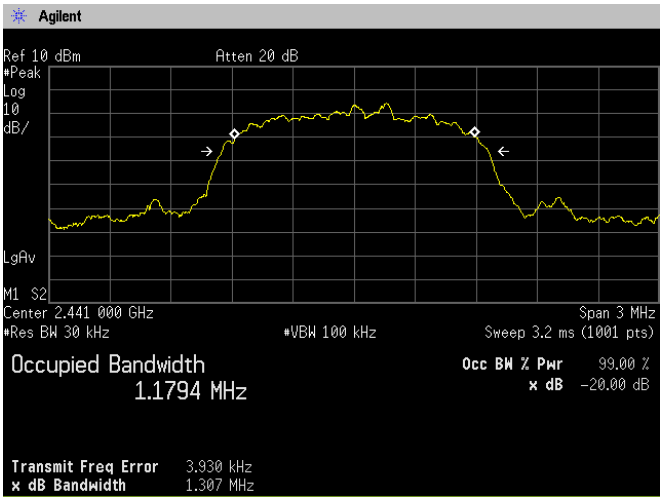


[3-DH5]

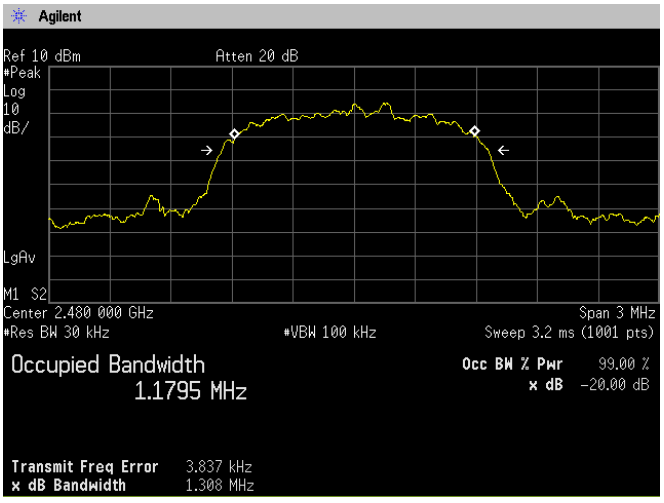
Channel Low



Channel Middle



Channel High



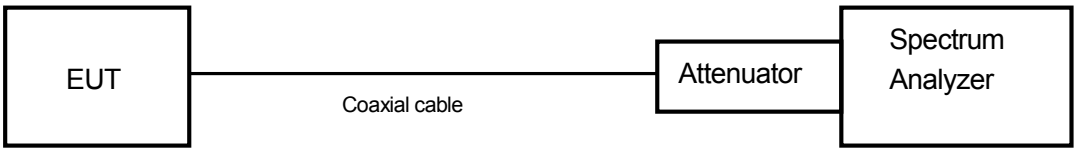
5. Carrier Frequency Separation

5.1 Measurement procedure [FCC 15.247(a)(1)]

The adjacent channel interval 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 = wide enough to capture the peaks of two adjacent channels.
b) RBW ≥ 1% of the span.
c) VBW ≥ RBW.
d) Sweep time = auto-couple.
e) Detector = peak.
f) Trace mode = max hold.

- Test configuration



5.2 Limit

System shall have hopping channel carrier frequencies separated by a minimum of;
25kHz or two-thirds of the 20dB bandwidth of the hopping channel, whichever is greater.

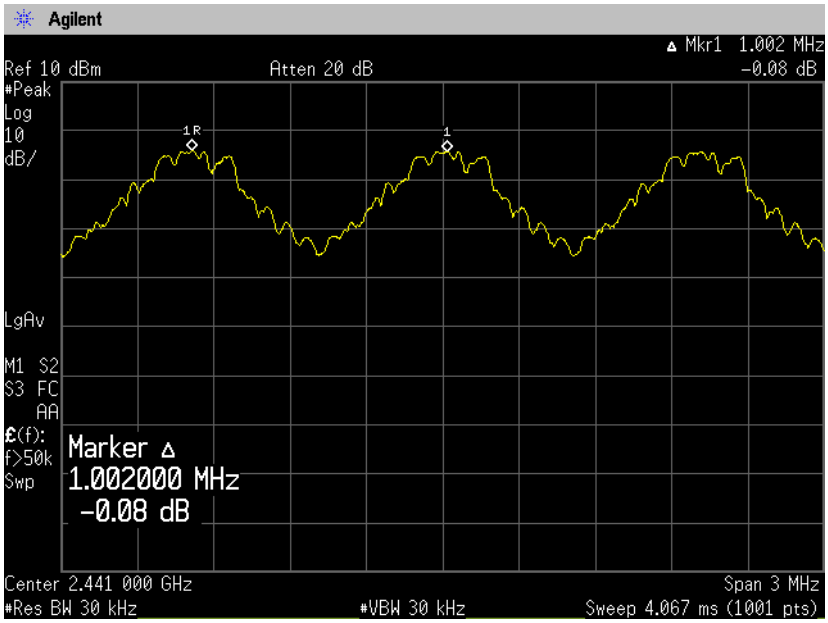
5.3 Measurement result

Date : October 15, 2015
Temperature : 23.1 [˚C]
Humidity : 47.9 [%] Test engineer : Hikaru Shibata
Test place : Shielded room No.4

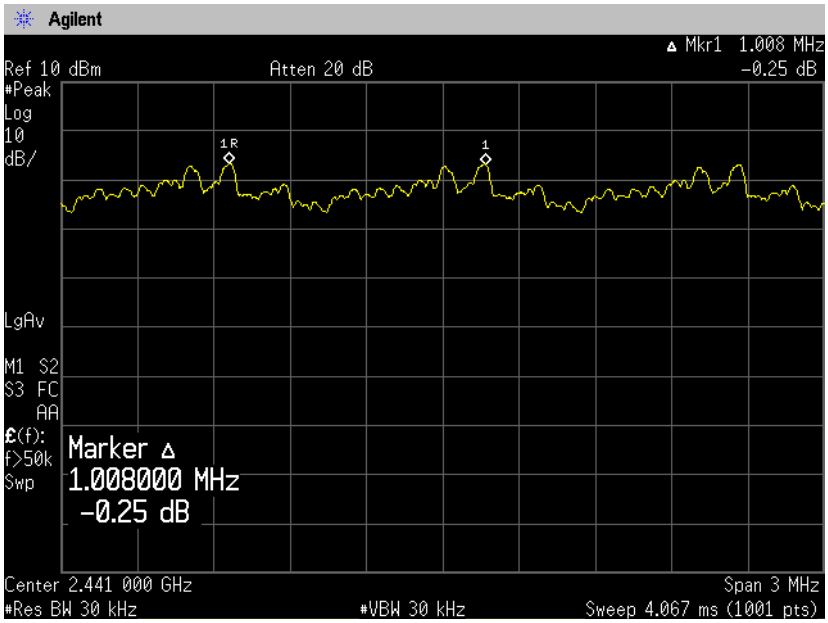
Packet type	Channel separation (MHz)	Limit (MHz)	Result
DH5	1.002	>two-thirds of the 20dB Bandwidth =649kHz	PASS
DH5(AFH)	1.032	>two-thirds of the 20dB Bandwidth =649kHz	PASS
3-DH5	1.008	>two-thirds of the 20dB Bandwidth =872kHz	PASS
3-DH5(AFH)	1.002	>two-thirds of the 20dB Bandwidth =872kHz	PASS

5.4 Trace data

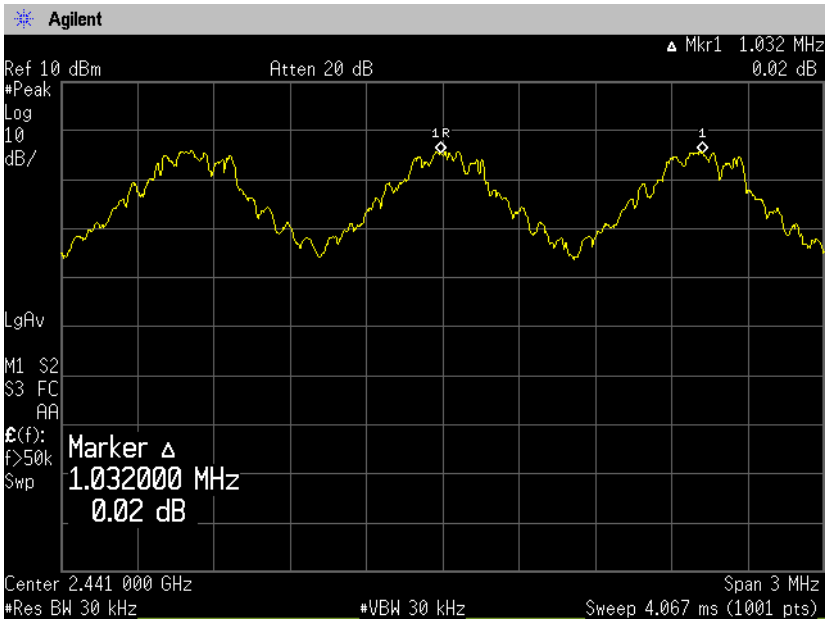
[DH5]



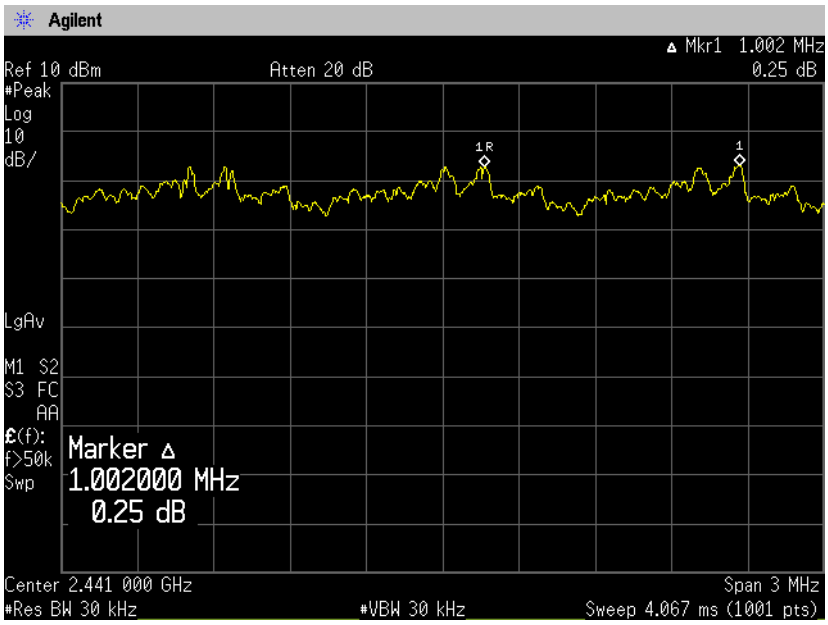
[3-DH5]



[DH5(AFH)]



[3-DH5(AFH)]



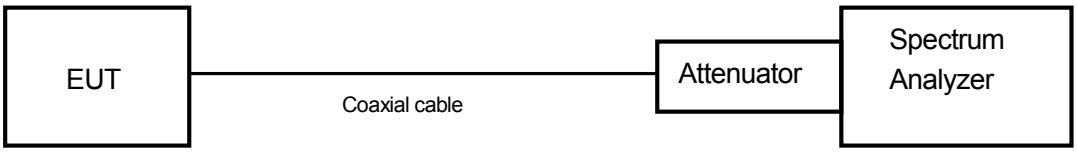
6. Number of Hopping Frequencies

6.1 Measurement procedure [FCC 15.247(a)(1)(iii)]

The number of hopping channels 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 = the frequency band of operation.
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

Shall have more than 15 channels.

6.3 Measurement result

Date : October 19, 2015
Temperature : 22.6 [˚C]
Humidity : 50.1 [%]
Test place : Shielded room No.4

Test engineer : Kazunori Saito

FHSS

Number of channels	Limit	Result
79	≥15 channel	PASS

AFH

Channel	Number of channels	Limit	Result
Low	20	≥15 channel	PASS
Middle	20	≥15 channel	PASS
High	20	≥15 channel	PASS

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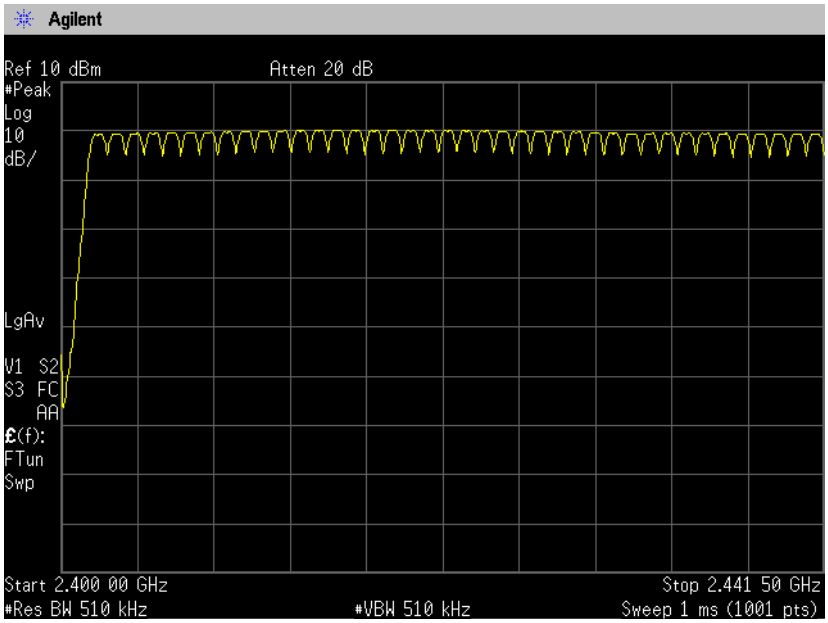
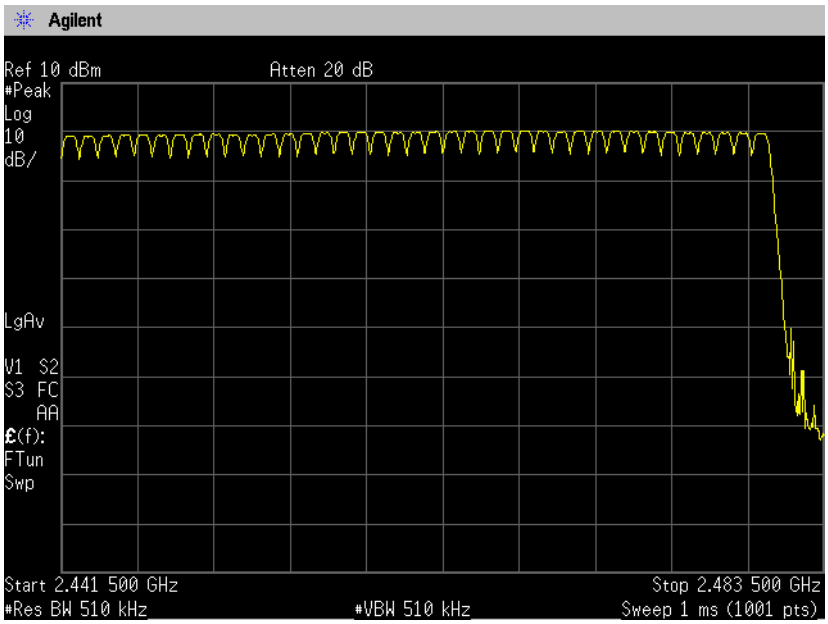
6.4 Trace data

[DH5]

Low



High



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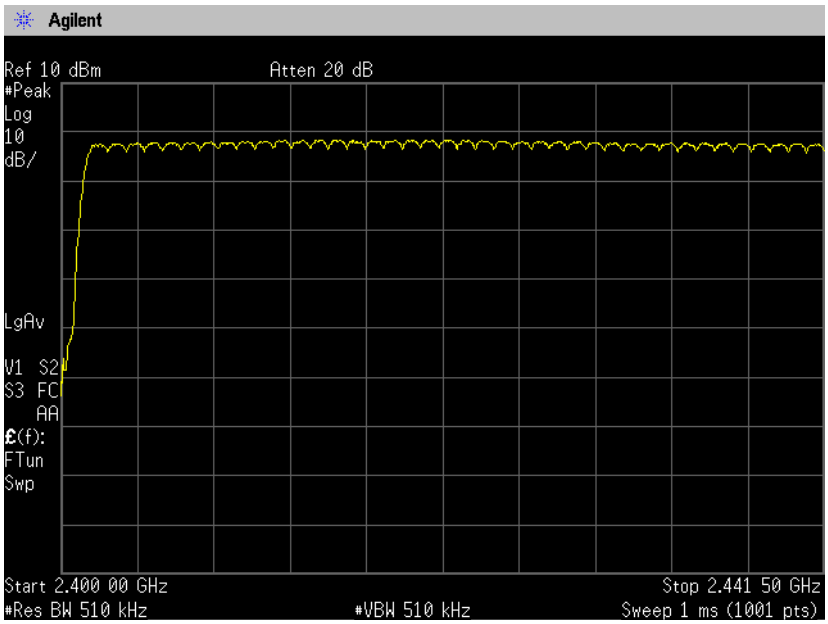
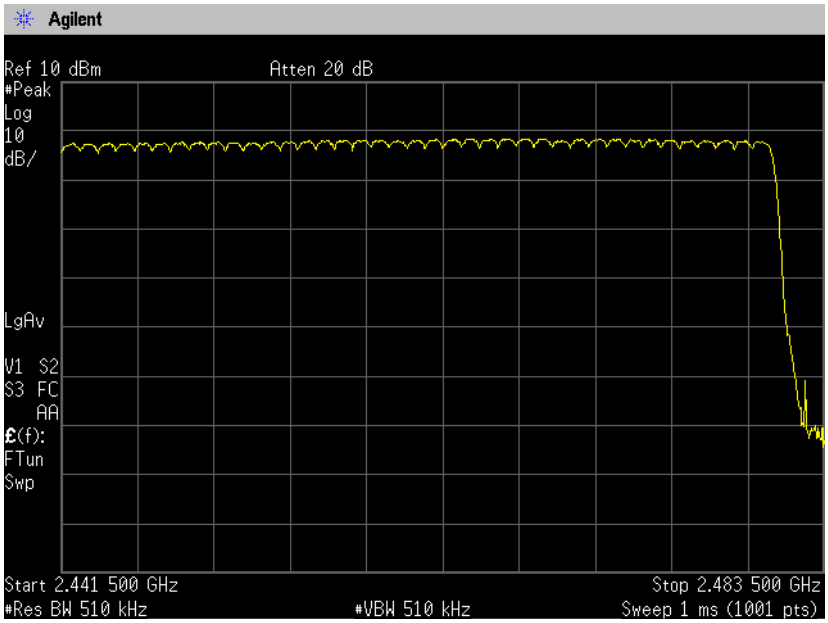
[3-DH5]

Low



High



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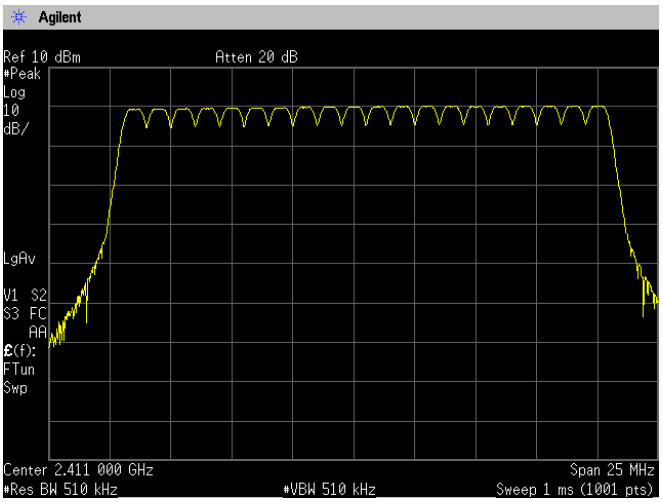
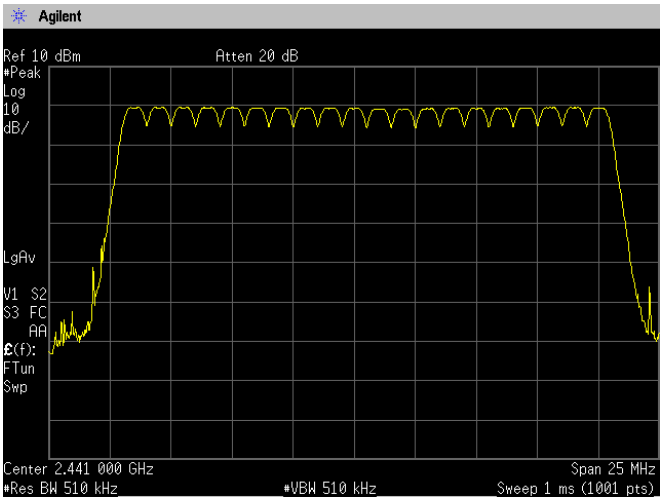
[DH5(AFH)]

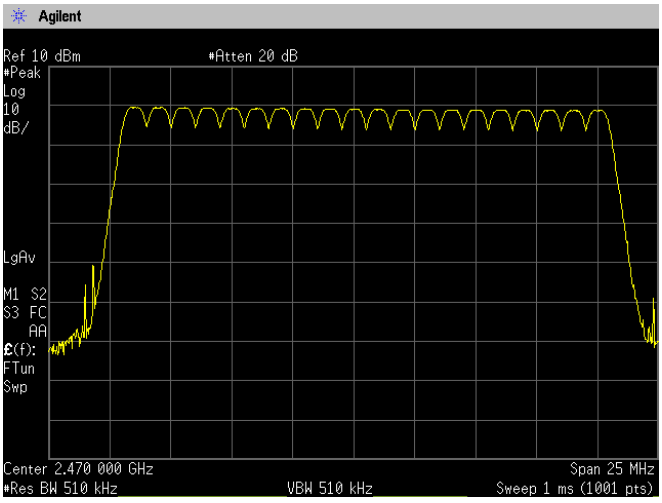
Low



Middle



High



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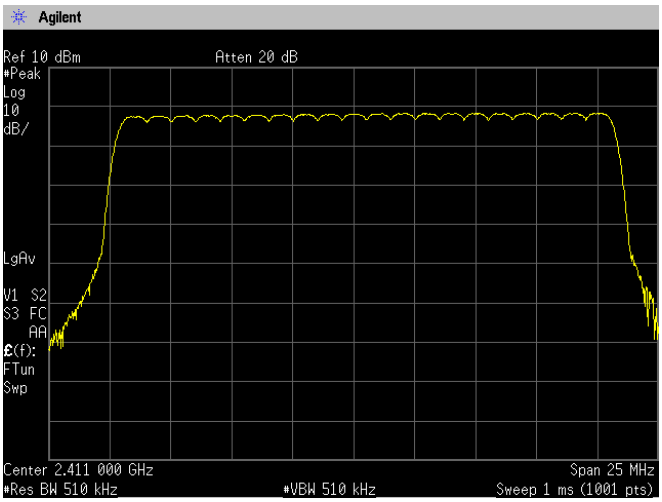
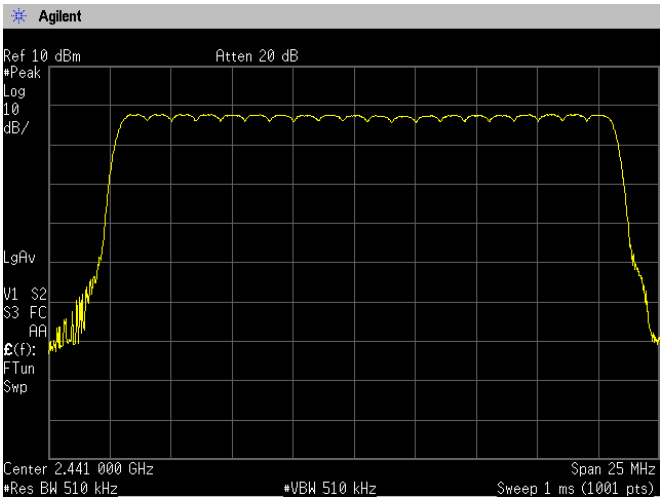
[3-DH5(AFH)]

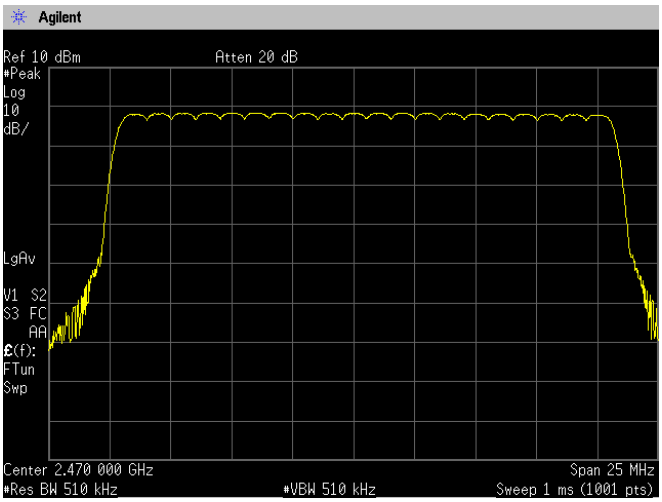
Low



Middle



High



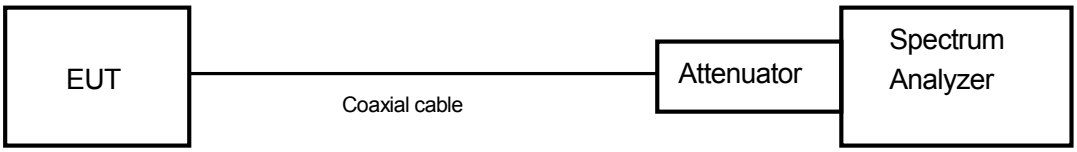
7. Time of Occupancy (Dwell Time)

7.1 Measurement procedure [FCC 15.247(a)(1)(iii)]

The time occupancy of hopping channel 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 = Zero span, centered on a hopping channel.
b) RBW ≥ 1MHz.
c) VBW ≥ RBW.
d) Sweep time = auto-couple.
e) Detector = peak.
f) Trace mode=Single.

- Test configuration



7.2 Limit

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

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7.3 Measurement result

Date : October 19, 2015
Temperature : 22.6 [˚C]
Humidity : 50.1 [%] Test engineer :
Test place : Shielded room No.4 Kazunori Saito

FHSS

Channel	Frequency (MHz)	Packet type	Dwell time (ms)	Occupancy time of 31.6 seconds (s)	Limit	Result
Low	2402.00	DH5	2.880	0.307	<0.4s	PASS
	2402.00	3-DH5	2.884	0.308	<0.4s	PASS
Middle	2441.00	DH5	2.880	0.307	<0.4s	PASS
	2441.00	3-DH5	2.884	0.308	<0.4s	PASS
High	2480.00	DH5	2.884	0.308	<0.4s	PASS
	2480.00	3-DH5	2.888	0.308	<0.4s	PASS

AFH

Channel	Frequency (MHz)	Packet type	Dwell time (ms)	Occupancy time of 31.6 seconds (s)	Limit	Result
Low	2402.00	DH5	2.884	0.154	<0.4s	PASS
	2402.00	3-DH5	2.884	0.154	<0.4s	PASS
Middle	2441.00	DH5	2.880	0.154	<0.4s	PASS
	2441.00	3-DH5	2.888	0.154	<0.4s	PASS
High	2480.00	DH5	2.884	0.154	<0.4s	PASS
	2480.00	3-DH5	2.888	0.154	<0.4s	PASS

FHSS
DH5/3-DH5 = Dwell time (ms) x 1600 / 6 / 79 x 31.6

AFH
DH5/3-DH5 = Dwell time (ms) x 1600 / 6 / 20 x 8

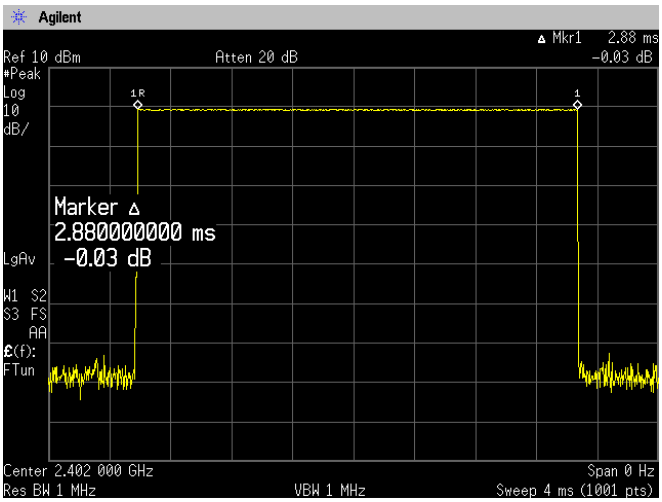
The hopping rates of Bluetooth devices change with different types of payload. The longer the payload is, the slower the hopping rate. The hopping rate scenario is defined in Bluetooth core specification.
Calculation:
Occupancy time of 31.6 seconds* = time domain slot length x hop rate / number of hopper channel / 79 /x 31.6
Ex.) for FHSS mode Channel Low, DH5 = 2.880ms x 1600 / 6/ 79 x 31.6 = 307ms

7.4 Trace data

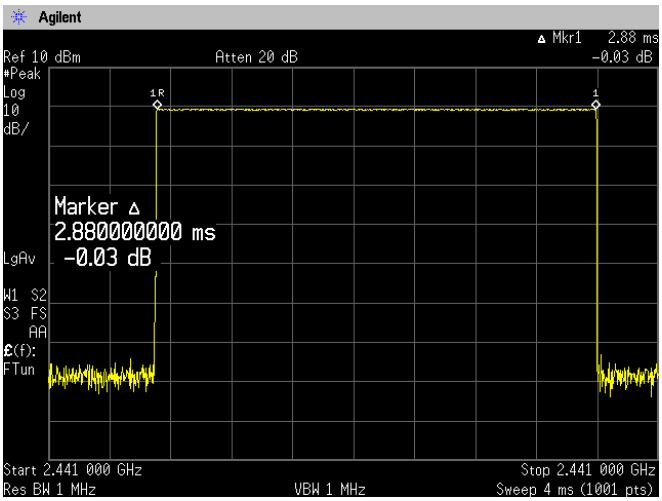
FHSS

[DH5]

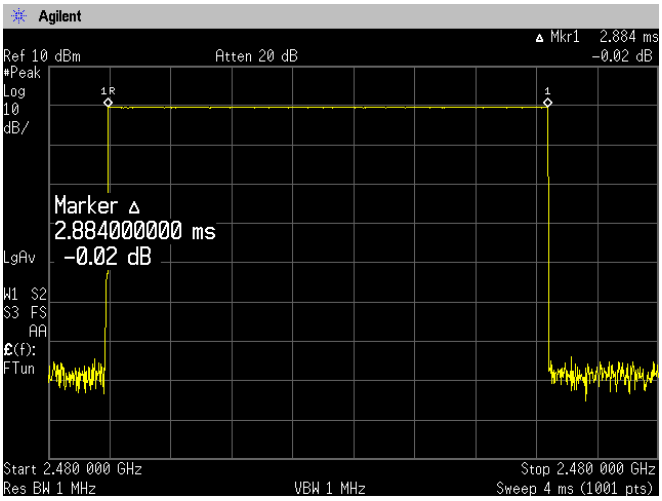
Channel Low



Channel Middle

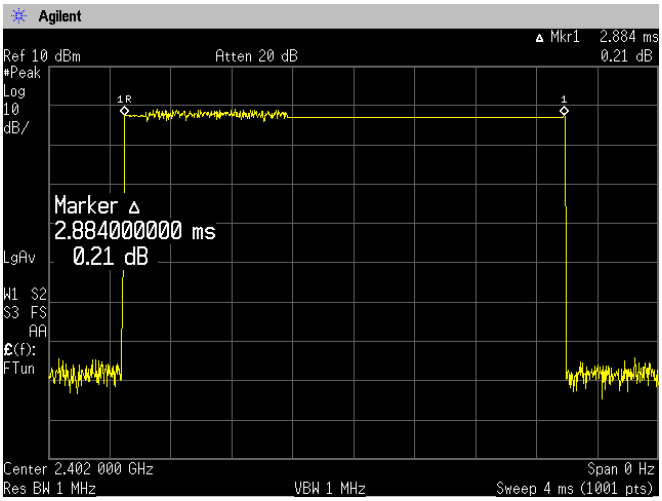


Channel High

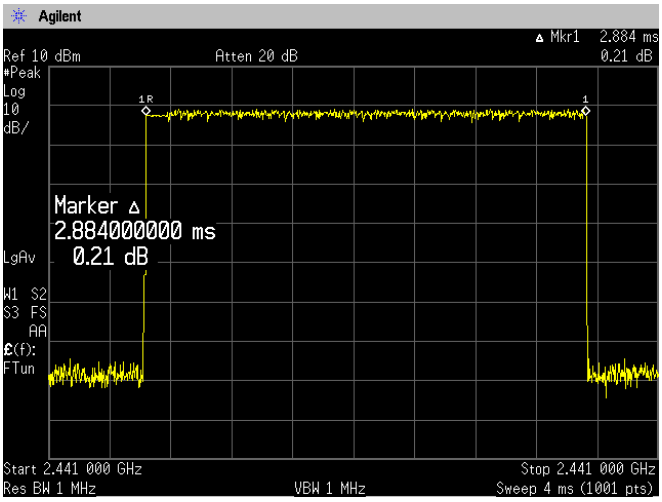


FHSS
[3-DH5]

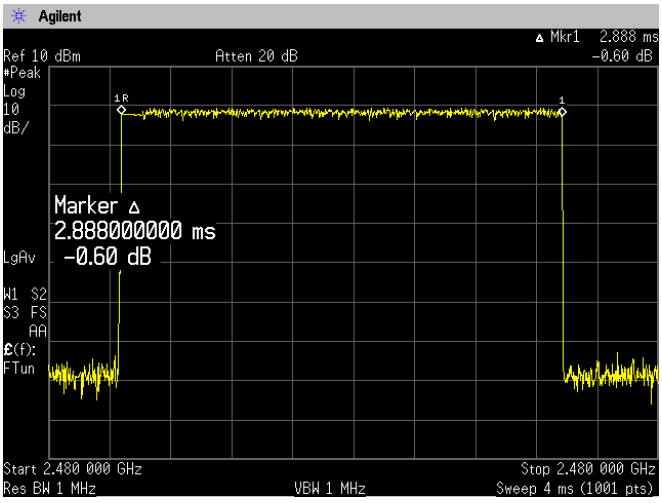
Channel Low



Channel Middle

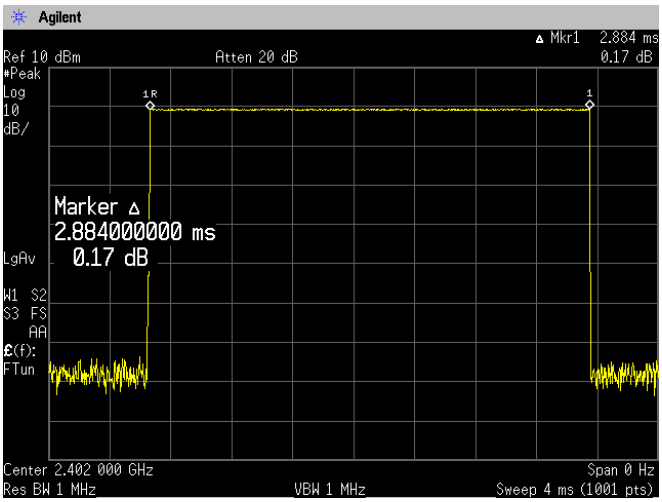


Channel High

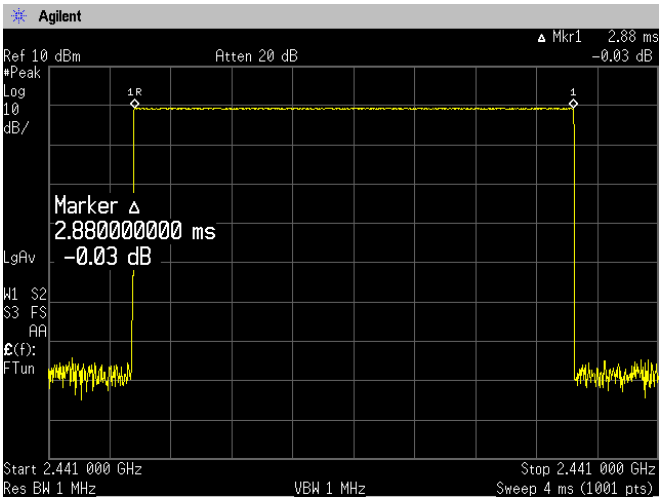


AFH
[DH5]

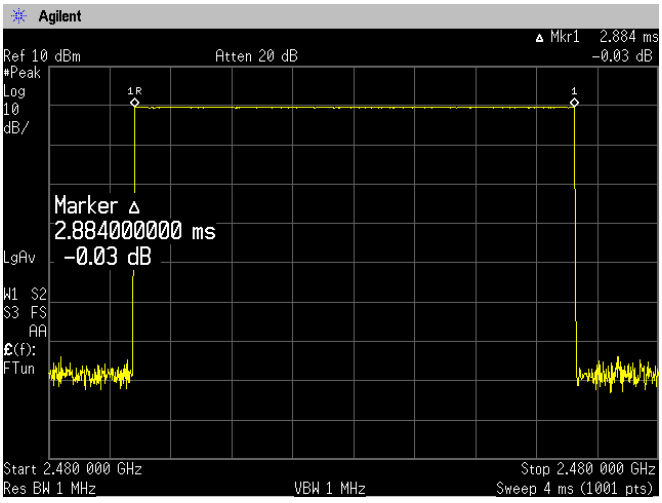
Channel Low



Channel Middle

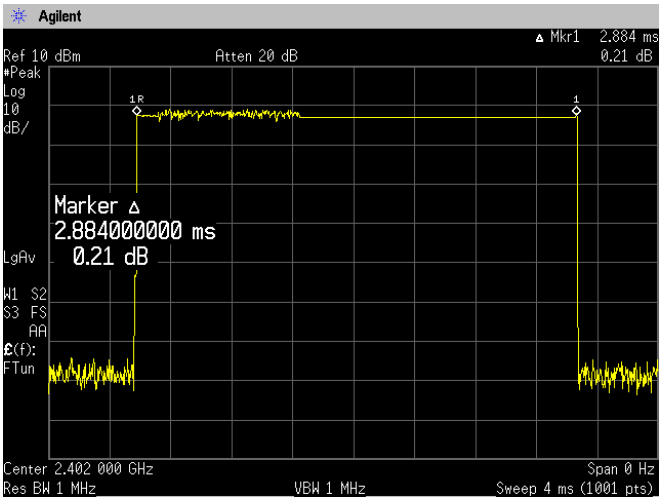


Channel High

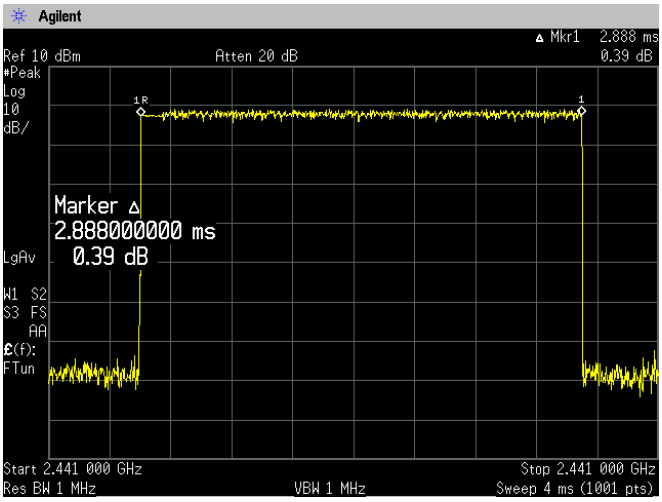


AFH
[3-DH5]

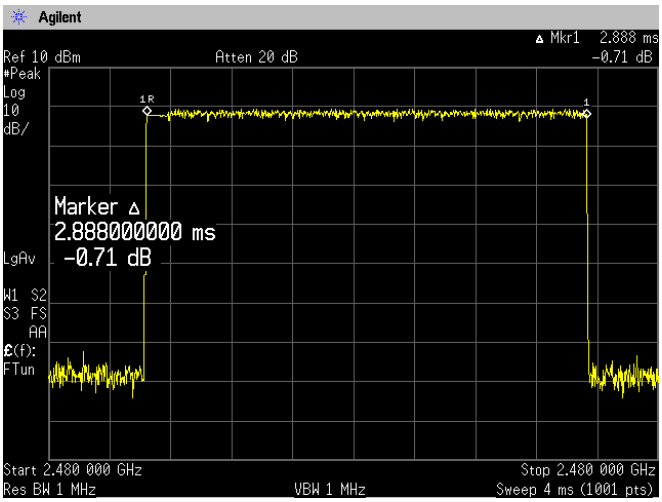
Channel Low



Channel Middle



Channel High



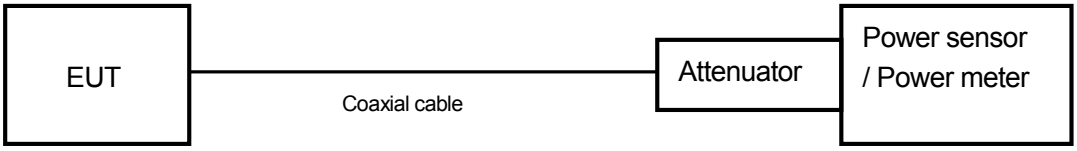
Zacta

8. Maximum Peak Output Power

8.1 Measurement procedure [FCC 15.247(b)(1)]

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

- Test configuration



8.2 Limit

0.125 W or less

8.3 Measurement result

Date : October 19, 2015
Temperature : 22.6 [˚C]
Humidity : 50.1 [%]
Test place : Shielded room No.4

Test engineer : Kazunori Saito

Battery Full

Channel	Center Frequency (MHz)	Packet type	Reading (dBm)	Factor (dB)	Level (dBm)	Peak Output Power (mW)	Limit (mW)	Result
Low	2402.00	DH5	-2.18	10.49	8.31	6.776	≤125	PASS
		3-DH5	-4.50	10.49	5.99	3.972	≤125	PASS
Middle	2441.00	DH5	-2.13	10.49	8.36	6.855	≤125	PASS
		3-DH5	-4.44	10.49	6.05	4.027	≤125	PASS
High	2480.00	DH5	-1.76	10.49	8.73	7.464	≤125	PASS
		3-DH5	-4.08	10.49	6.41	4.375	≤125	PASS

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

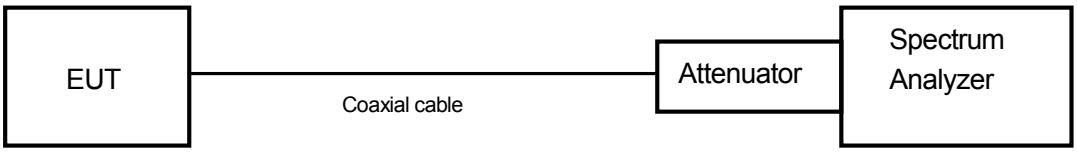
9. Band Edge Compliance of RF Conducted Emissions

9.1 Measurement procedure [FCC 15.247(d)]

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



9.2 Limit

In any 100kHz bandwidth outside the frequency band the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power.

9.3 Measurement result

Date : October 19, 2015
Temperature : 22.6 [˚C]
Humidity : 50.1 [%]
Test place : Shielded room No.4
Test engineer : Kazunori Saito

[Hopping]

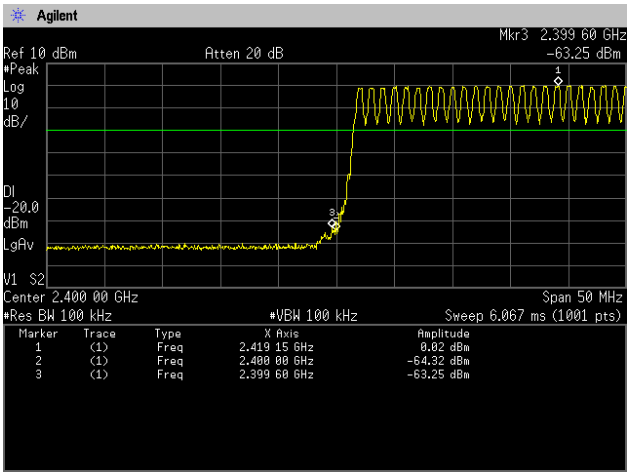
Channel	Frequency (MHz)	Packet type	RF Power Level (dBm)	Band-edge Frequency (MHz)	Band-edge Level (dBm)	Difference Level (dBm)	Limit (dBm)	Result
Low	2402.00	DH5	0.02	2399.60	-63.25	63.27	At least 20dB below from peak of RF	PASS
		3-DH5	-1.81	2399.70	-64.12	62.31		PASS
High	2480.00	DH5	-0.01	2483.50	-67.17	67.16		PASS
		3-DH5	-1.79	2483.60	-67.68	65.89		PASS

[No hopping]

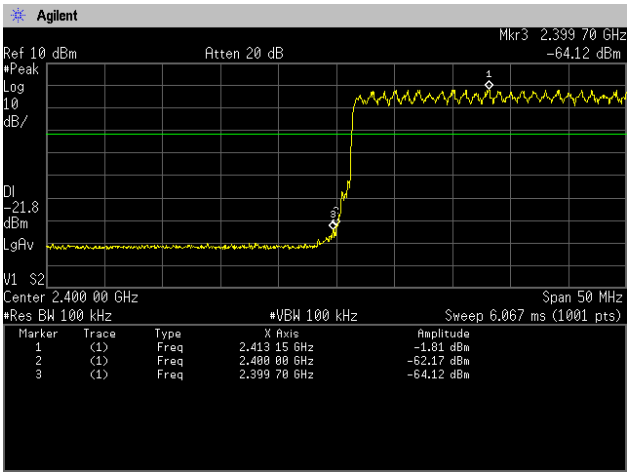
Channel	Frequency (MHz)	Packet type	RF Power Level (dBm)	Band-edge Frequency (MHz)	Band-edge Level (dBm)	Difference Level (dBm)	Limit (dBm)	Result
Low	2402.00	DH5	-1.00	2399.85	-61.47	60.47	At least 20dB below from peak of RF	PASS
		3-DH5	-2.65	2400.00	-59.90	57.25		PASS
High	2480.00	DH5	-0.42	2483.55	-66.67	66.25		PASS
		3-DH5	-2.21	2484.20	-67.68	65.47		PASS

9.4 Trace data

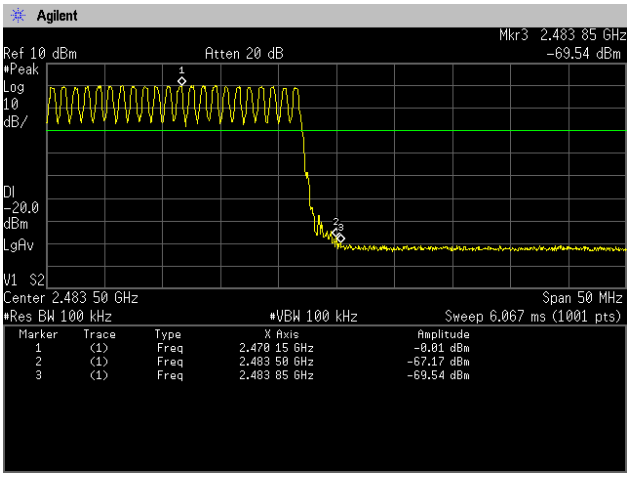
[Hopping]
Channel Low
DH5



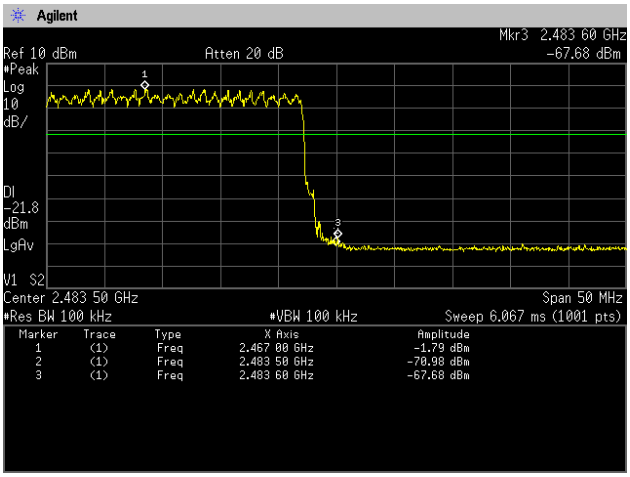
3-DH5



Channel High
DH5



3-DH5



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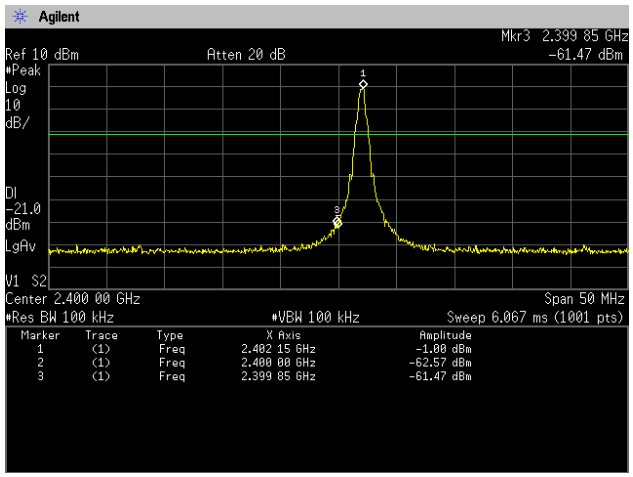
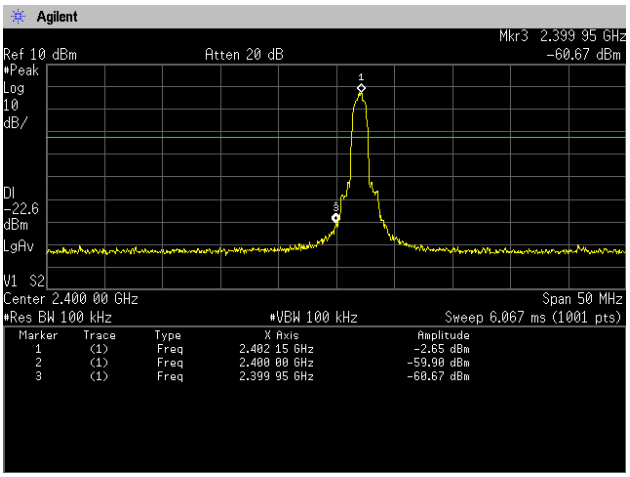
[No hopping]

Channel Low

DH5

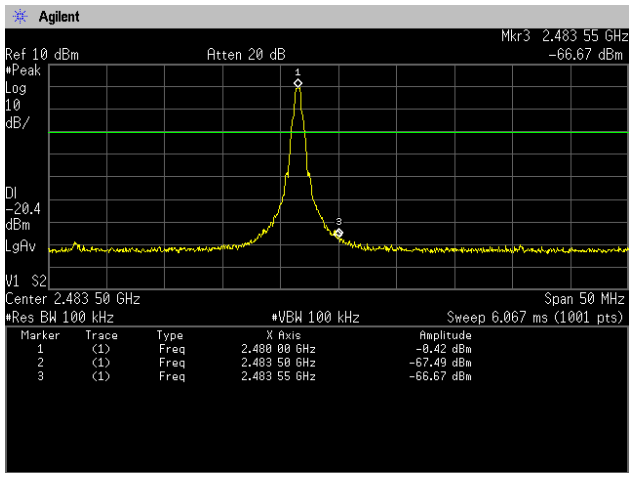


3-DH5

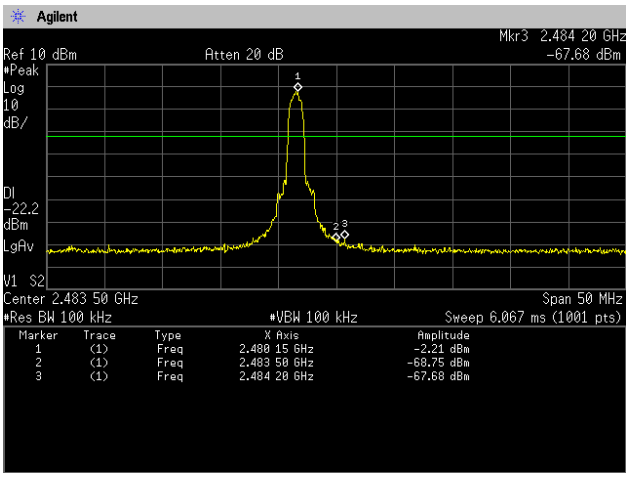


Channel High

DH5



3-DH5



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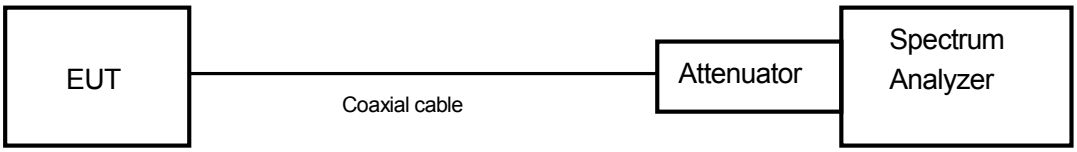
10. Spurious emissions - Conducted -

10.1 Measurement procedure [FCC 15.247(d)]

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



10.2 Limit

In any 100kHz bandwidth outside the frequency band the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power.

10.3 Measurement result

Date : October 19, 2015
Temperature : 22.6 [˚C]
Humidity : 50.1 [%]
Test place : Shielded room No.4
Test engineer : Kazunori Saito

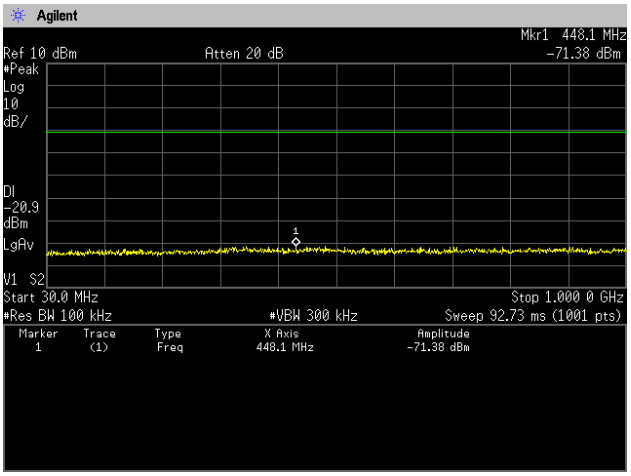
Channel	Frequency [MHz]	Limit [dB]	Results Chart	Result
Low	2402	At least 20dB below from peak of RF	See the trace Data	PASS
Middle	2441	At least 20dB below from peak of RF	See the trace Data	PASS
High	2480	At least 20dB below from peak of RF	See the trace Data	PASS

10.4 Trace data

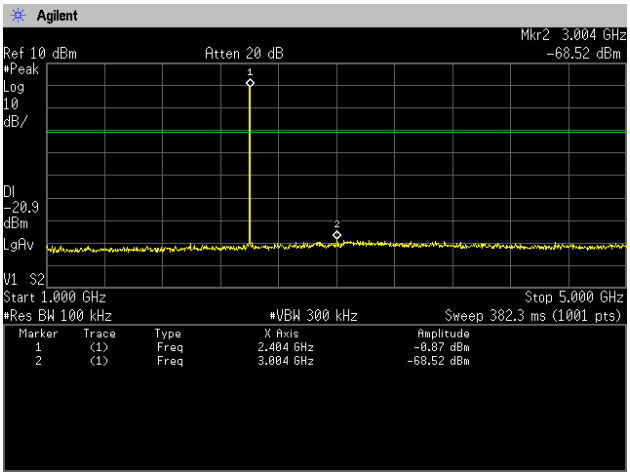
[DH5]

Channel Low

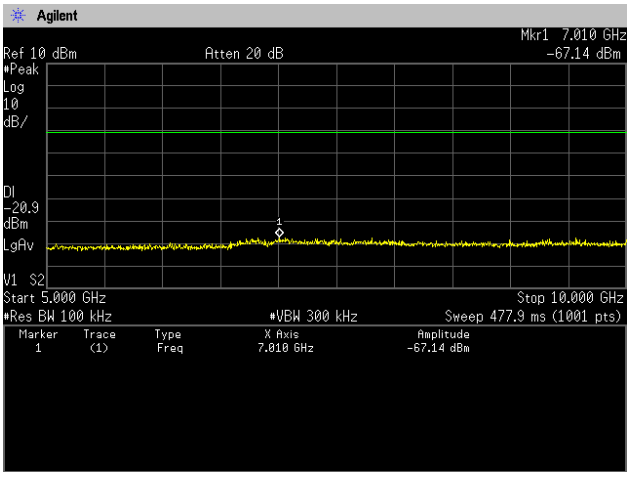
30MHz-1GHz



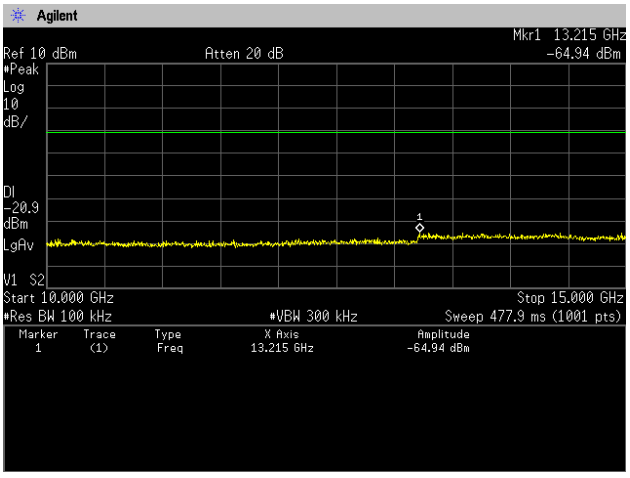
1GHz-5GHz



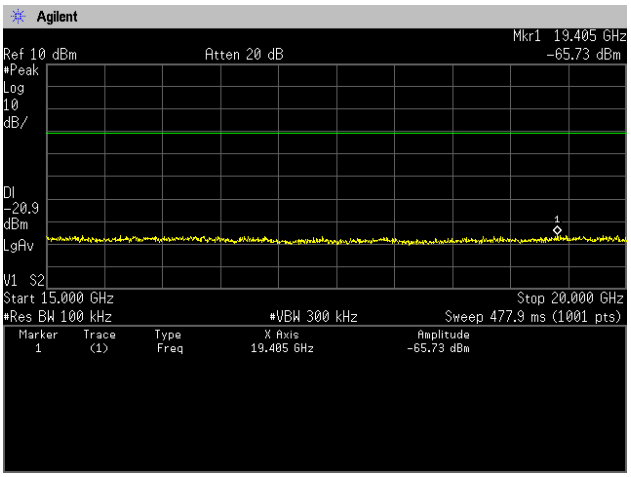
5GHz-10GHz



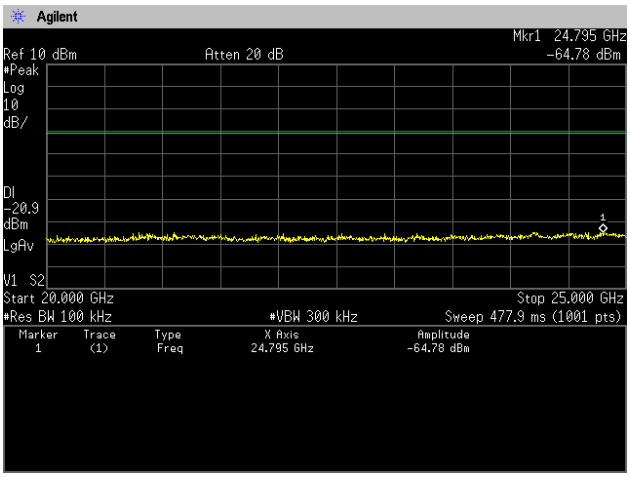
10GHz-15GHz



15GHz-20GHz

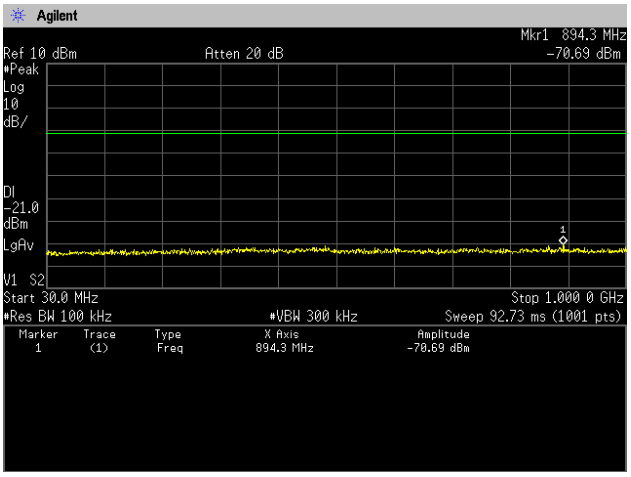


20GHz-25GHz

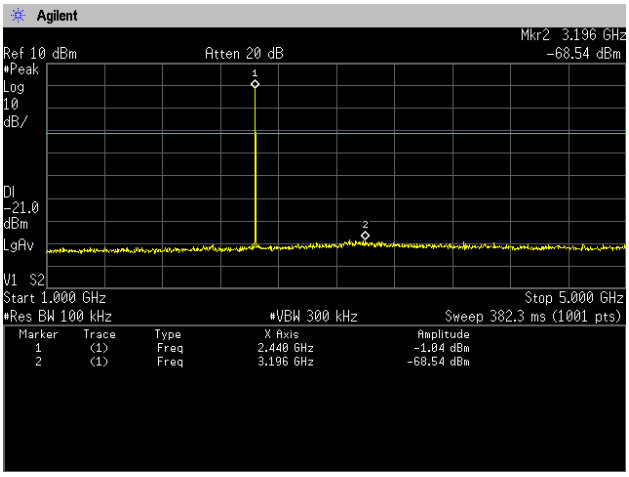


Channel Middle

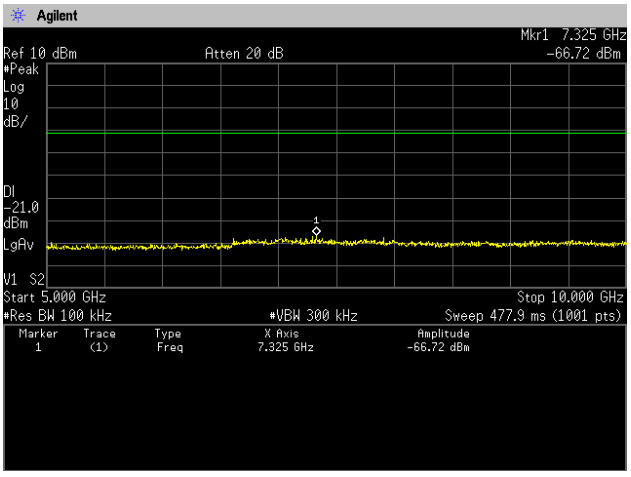
30MHz-1GHz



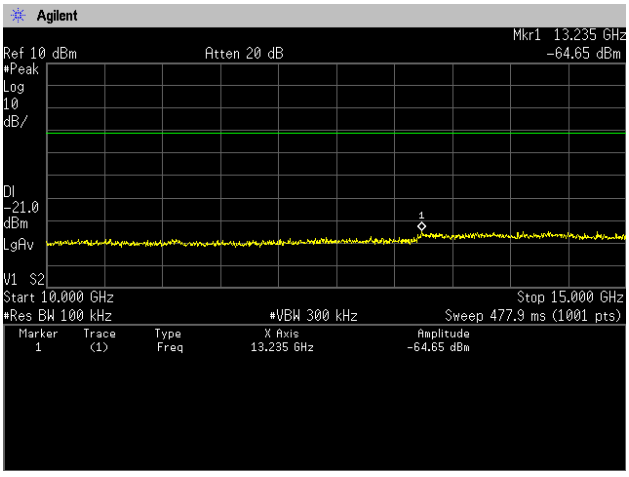
1GHz-5GHz



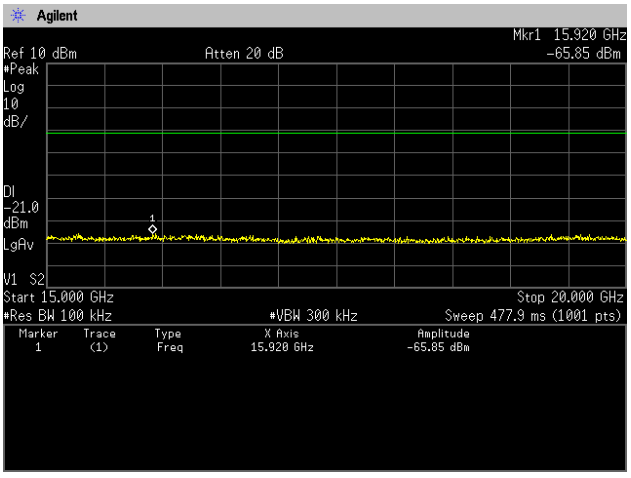
5GHz-10GHz



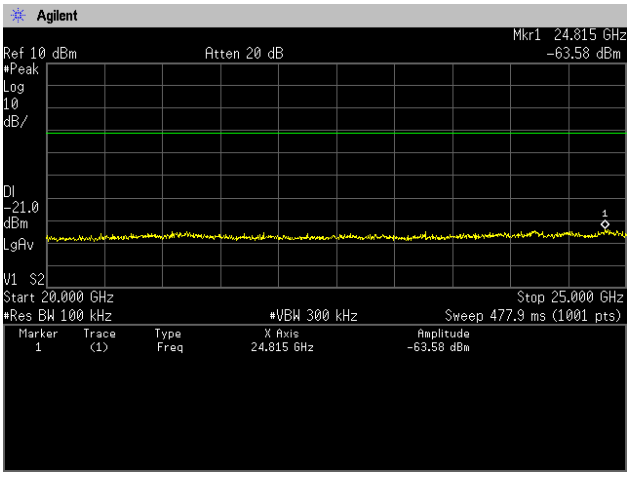
10GHz-15GHz



15GHz-20GHz

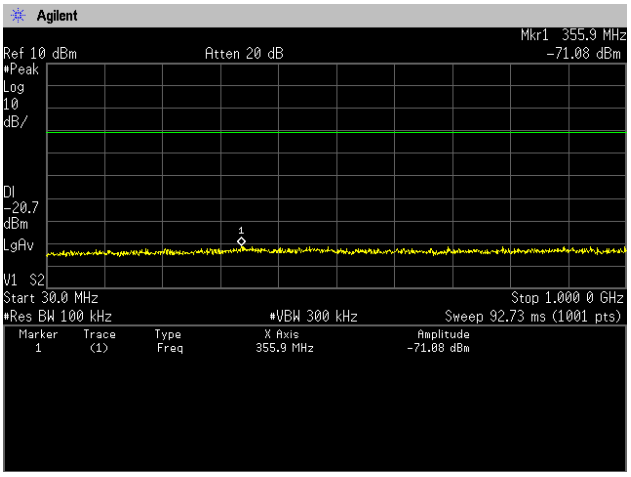


20GHz-25GHz

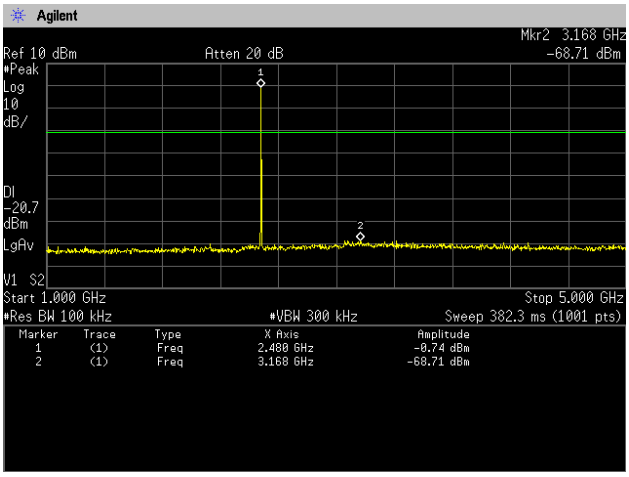


Channel High

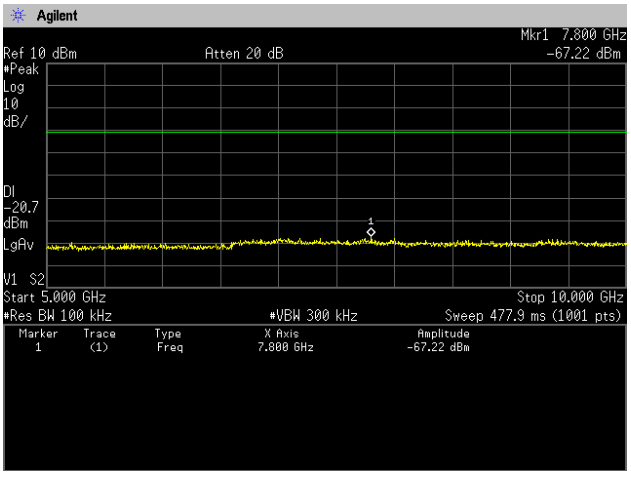
30MHz-1GHz



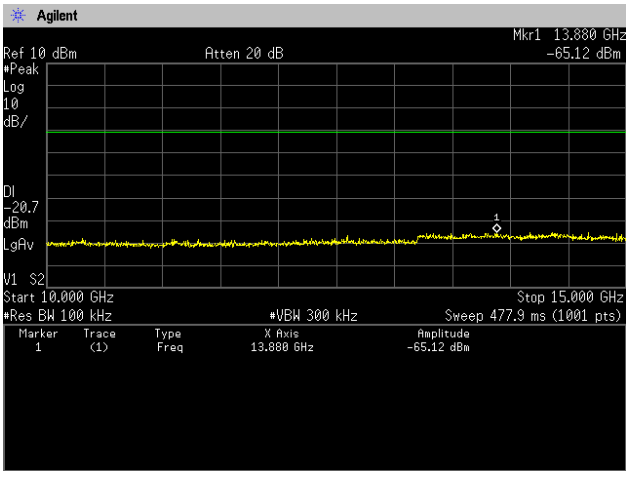
1GHz-5GHz



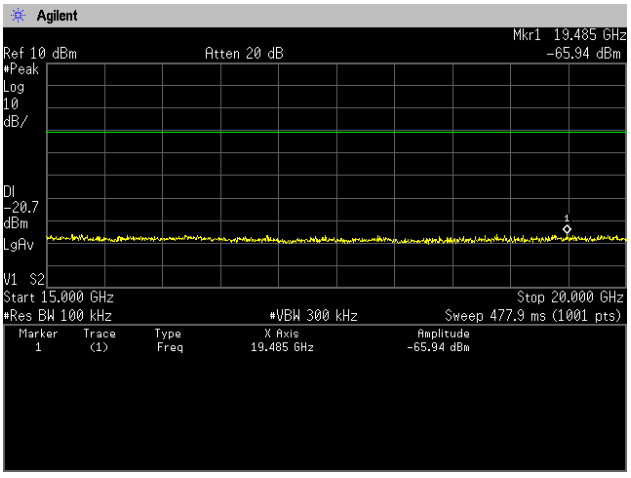
5GHz-10GHz



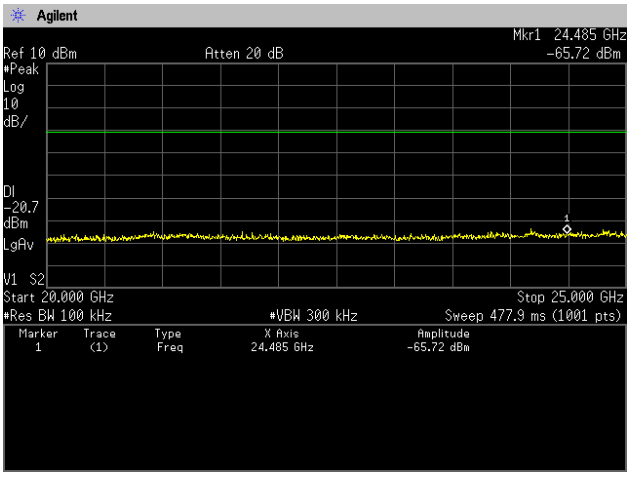
10GHz-15GHz



15GHz-20GHz



20GHz-25GHz



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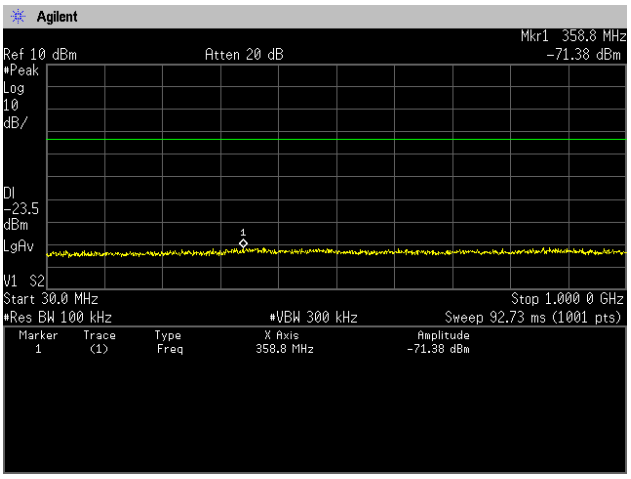
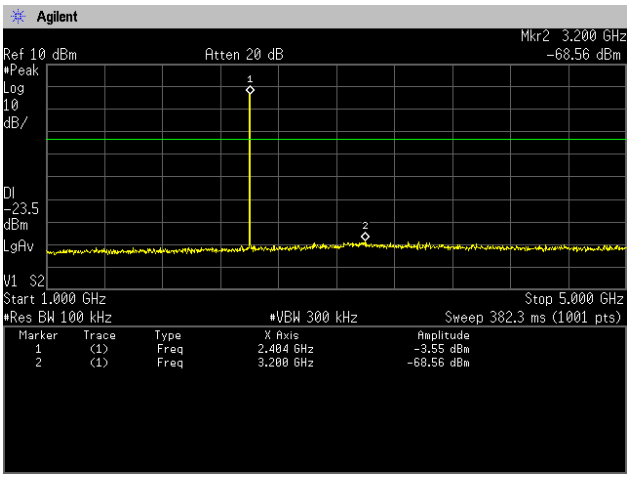
[3-DH5]
Channel Low

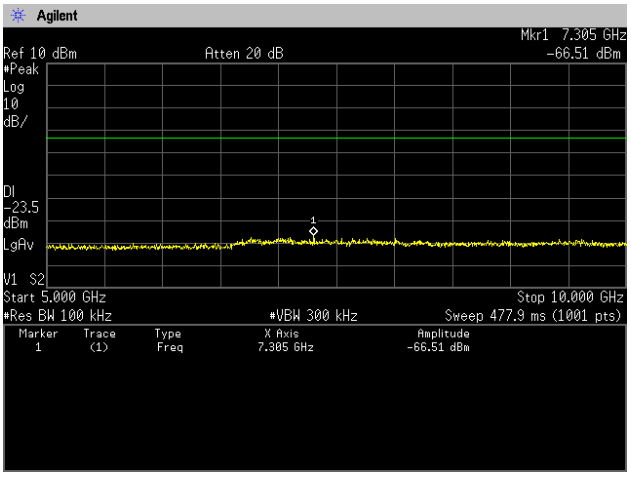
30MHz-1GHz



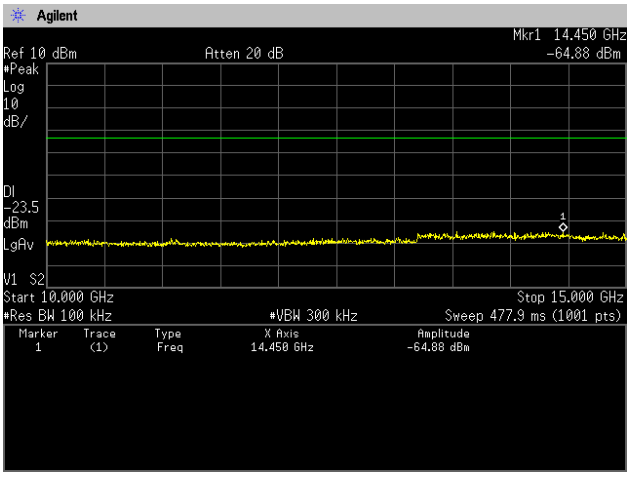
1GHz-5GHz



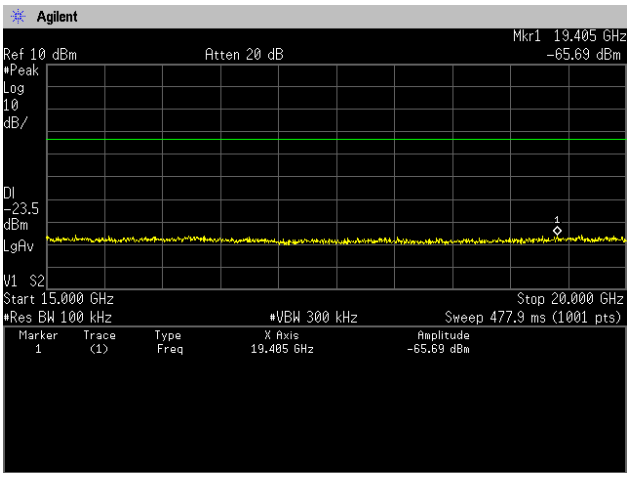
5GHz-10GHz



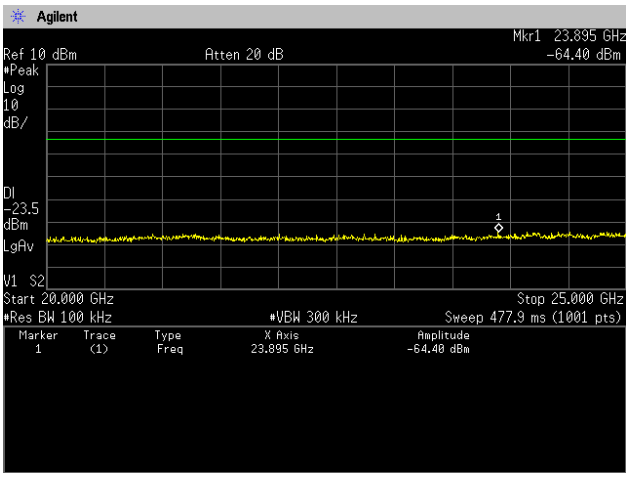
10GHz-15GHz



15GHz-20GHz

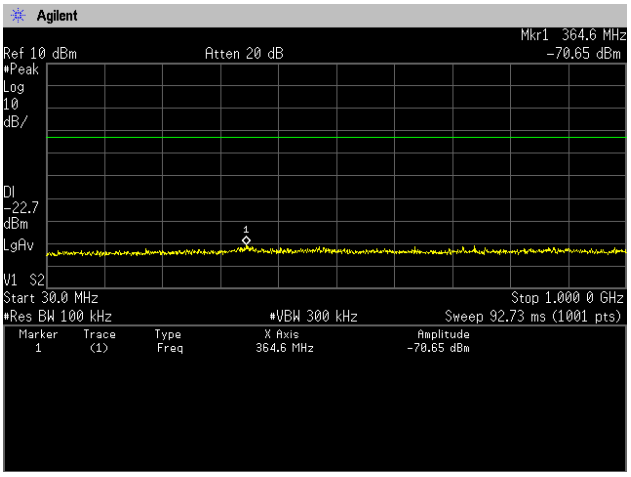


20GHz-25GHz

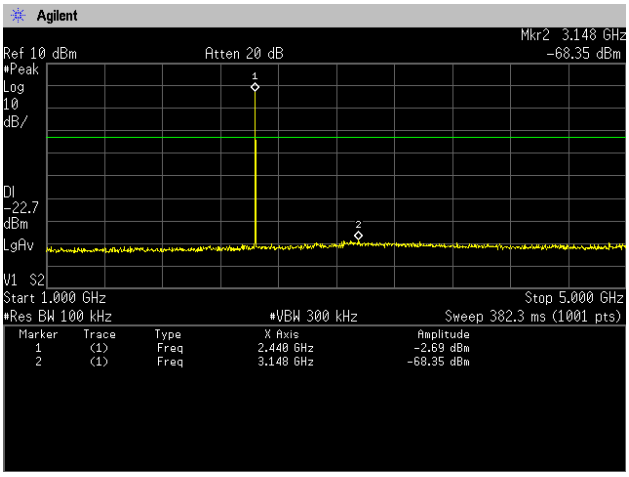


Channel Middle

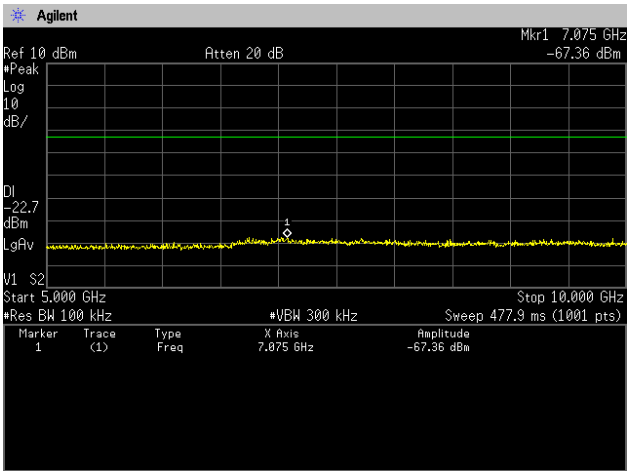
30MHz-1GHz



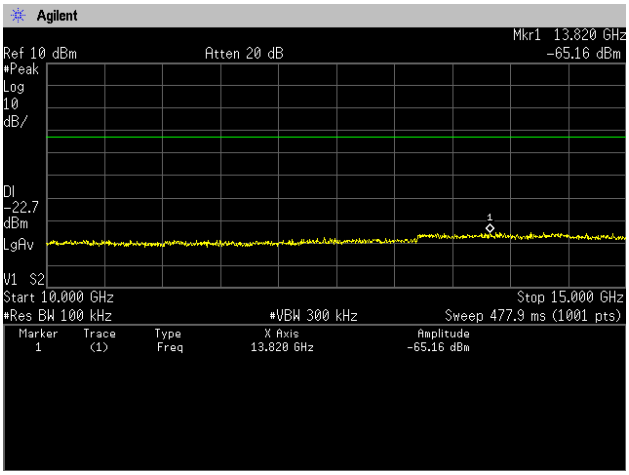
1GHz-5GHz



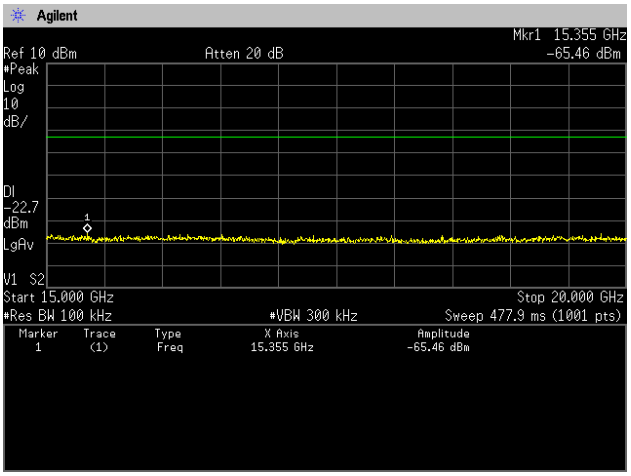
5GHz-10GHz



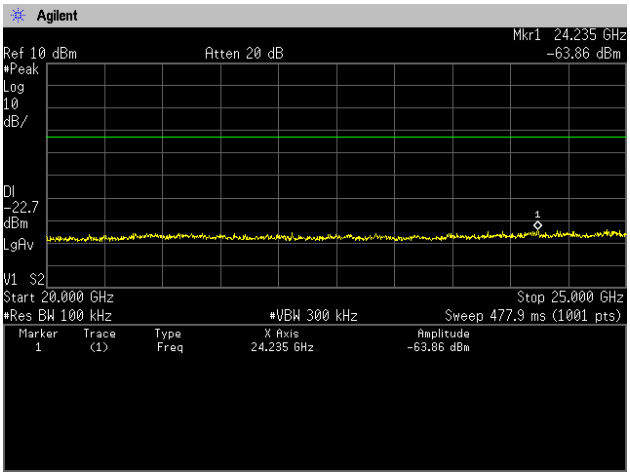
10GHz-15GHz



15GHz-20GHz

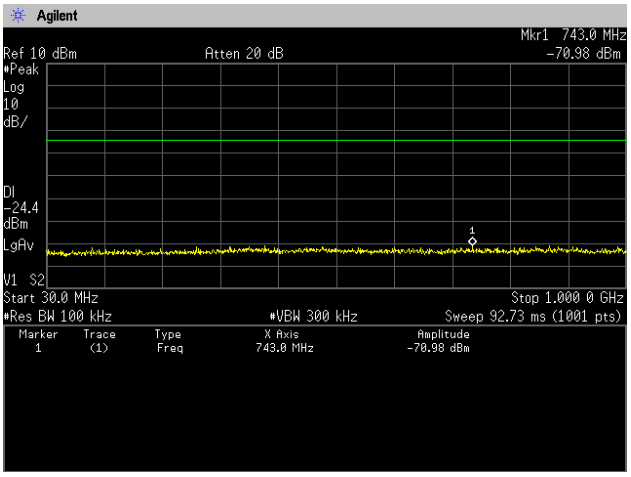


20GHz-25GHz

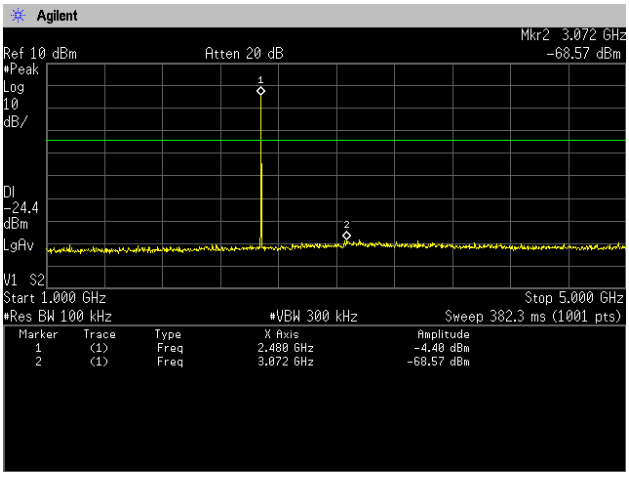


Channel High

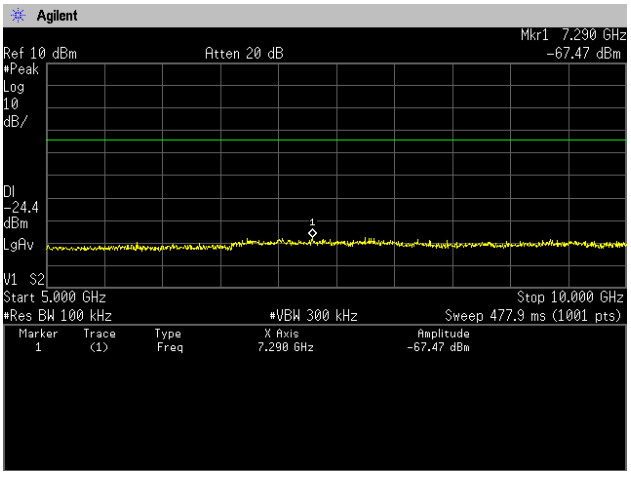
30MHz-1GHz



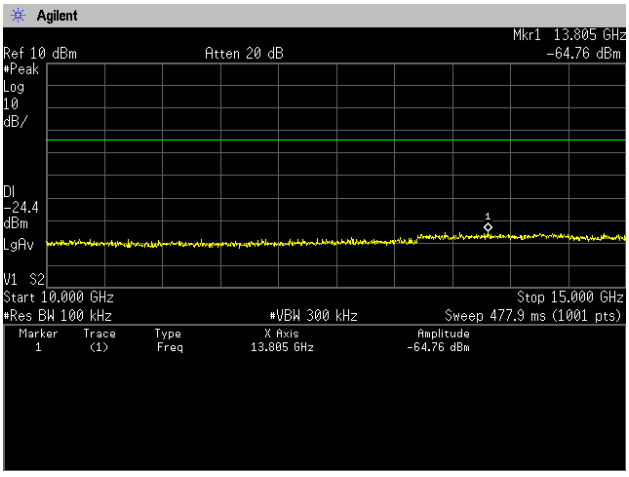
1GHz-5GHz



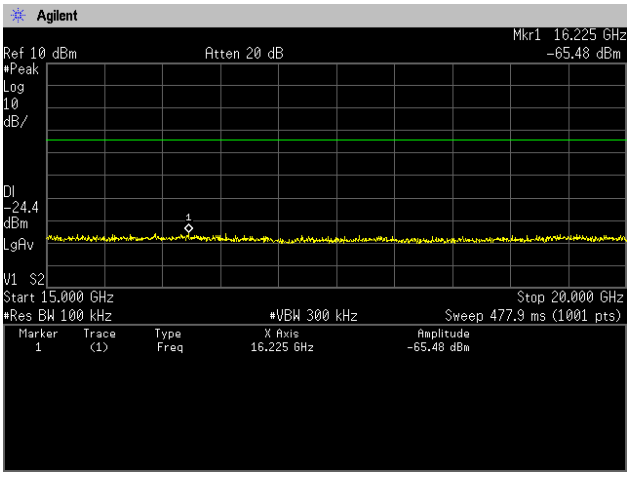
5GHz-10GHz



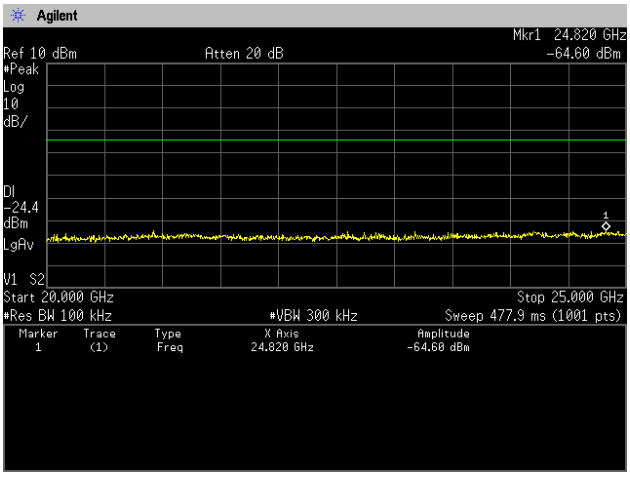
10GHz-15GHz



15GHz-20GHz



20GHz-25GHz



11. Spurious Emissions - Radiated -

11.1 Measurement procedure

[FCC 15.247(d), 15,205, 15.209]

Test was applied by following conditions.

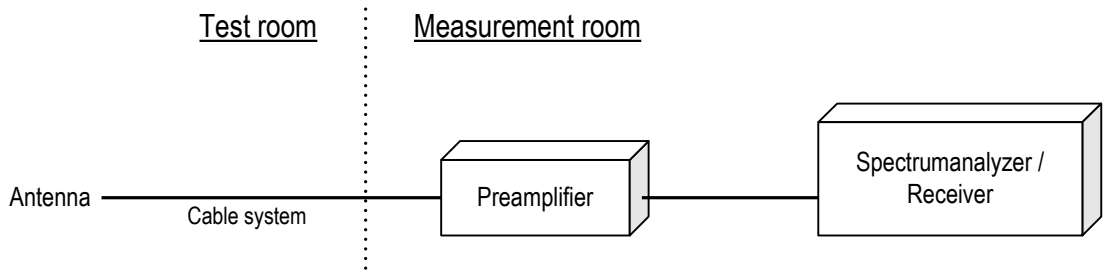
Test method	:	ANSI C63.10
Frequency range	:	9kHz to 25GHz
Test place	:	3m Semi-anechoic chamber
EUT was placed on	:	FRP table / (W)2.0m × (D)1.0m × (H)0.8m
Antenna distance	:	3m
Test receiver setting		Below 1GHz
- Detector	:	Average (9kHz-90kHz, 110kHz-490kHz), Quasi-peak
- Bandwidth	:	200Hz, 120kHz
Spectrum analyzer setting		Above 1GHz
- Peak	:	RBW=1MHz, VBW=3MHz, Span=0Hz, Sweep=auto
- Average	:	RBW=1MHz, VBW=1kHz, Span=0Hz, Sweep=auto
		Display mode=Linear

Average Measurement Setting [VBW]

Mode	Duty Cycle (%)	T_{on} (us)	T_{off} (us)	$1/T_{on}$ (kHz)	Determined VBW Setting
Bluetooth 4.1 EDR	77.0	2885	865	0.3	1kHz

Radiated emission measurements are performed at 3m distance with the broadband antenna (Loop antenna, Biconical antenna, Log periodic antenna, Double ridged guide antenna and Broad-band horn 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



11.2 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

11.3 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.

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11.4 Test data

Date	:	November 28, 2015			
Temperature	:	23.3 [°C]			
Humidity	:	20.5 [%]	Test engineer	:	
Test place	:	3m Semi-anechoic chamber			Taiki Watanabe

Date	:	November 30, 2015			
Temperature	:	23.9 [°C]			
Humidity	:	24.5 [%]	Test engineer	:	
Test place	:	3m Semi-anechoic chamber			Kazunori Saito

[DH5]
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	4804.000	H	48.7	36.0	8.3	57.0	44.3	74.0	54.0	17.0	9.7	100.0	3.0

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	4882.000	H	48.6	35.8	8.7	57.3	44.5	74.0	54.0	16.7	9.5	100.0	2.0

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	4960.000	H	48.7	34.8	8.8	57.5	43.6	74.0	54.0	16.5	10.4	105.0	258.0

[3-DH5]
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	4804.000	H	48.2	35.8	8.3	56.5	44.1	74.0	54.0	17.5	9.9	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	4882.000	H	48.7	35.9	8.7	57.4	44.6	74.0	54.0	16.6	9.4	100.0	4.0

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	4960.000	H	48.6	35.8	8.8	57.4	44.6	74.0	54.0	16.6	9.4	100.0	355.0

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.

12. Restricted Band of Operation

12.1 Measurement procedure [FCC 15.247(d), 15,205, 15.209]

Test was applied by following conditions.

Test method	:	ANSI C63.10
Test place	:	3m Semi-anechoic chamber
EUT was placed on	:	FRP table / (W)2.0m × (D)1.0m × (H)0.8m
Antenna distance	:	3m

Spectrum analyzer setting

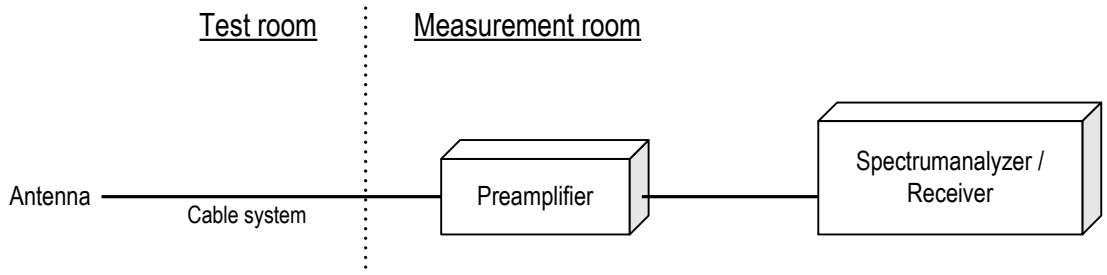
- Peak	:	RBW=1MHz, VBW=3MHz, Span=Arbitrary setting, Sweep=auto
- Average	:	RBW=1MHz, VBW=1kHz, Span=Arbitrary setting, Sweep=auto Display mode=Linear

Average Measurement Setting [VBW]

Mode	Duty Cycle (%)	T_{on} (us)	T_{off} (us)	$1/T_{on}$ (kHz)	Determined VBW Setting
Bluetooth 4.1 EDR	77.0	2885	865	0.3	1kHz

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



12.2 Limit

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

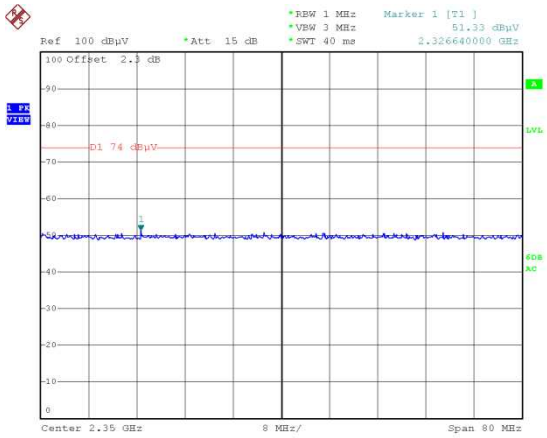
12.3 Measurement Result

Channel	Frequency [MHz]	Results Chart	Result
Low	2402	See the Trace Data	Pass
High	2480	See the Trace Data	Pass

12.4 Test data

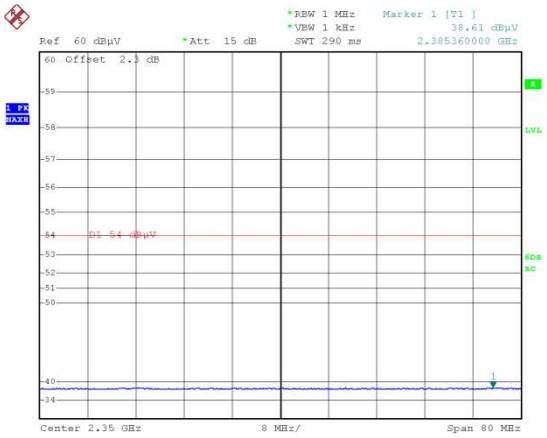
Date : December 1, 2015
Temperature : 23.9 [˚C]
Humidity : 24.5 [%] Test engineer :
Test place : 3m Semi-anechoic chamber Hikaru Shibata

[DH5]
Channel Low
Horizontal
Peak



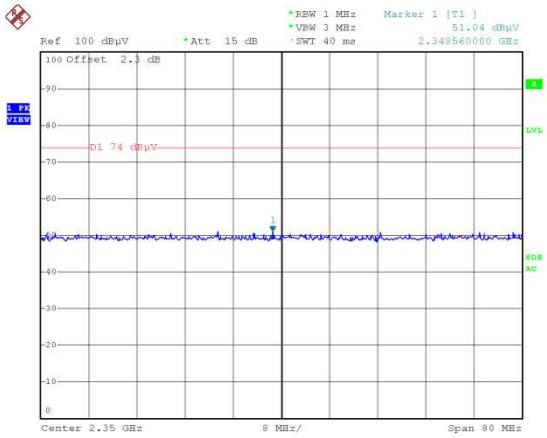
Date: 1.DEC.2015 08:52:03

Average



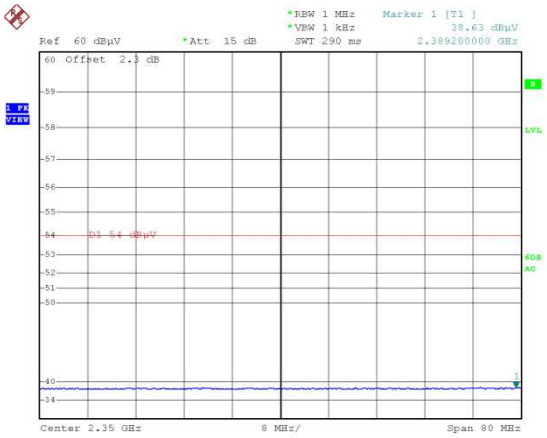
Date: 1.DEC.2015 08:52:56

Vertical
Peak



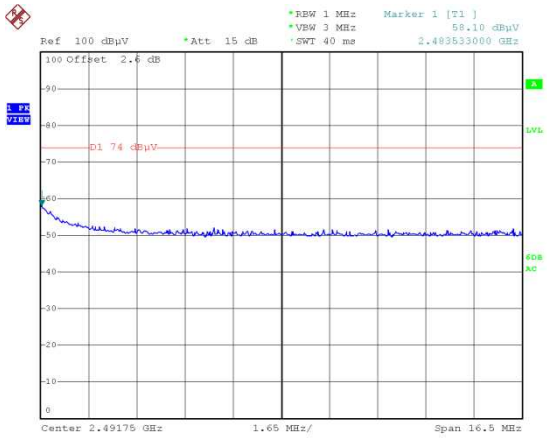
Date: 1.DEC.2015 10:02:36

Average



Date: 1.DEC.2015 10:02:08

[DH5]
Channel High
Horizontal
Peak



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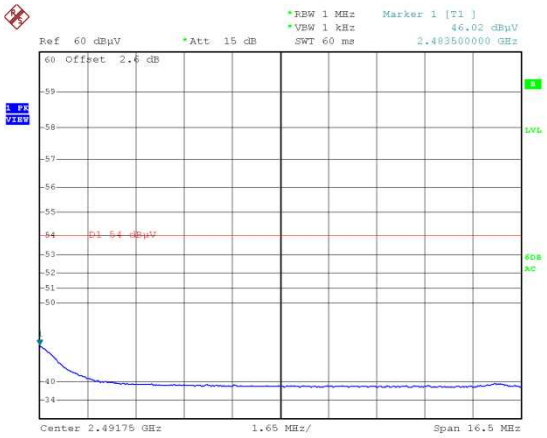
Average



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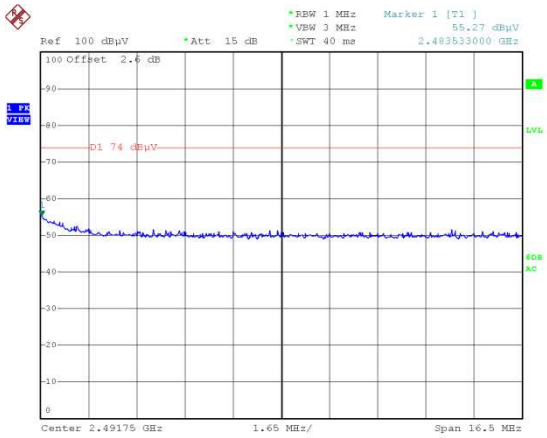
Vertical
Peak



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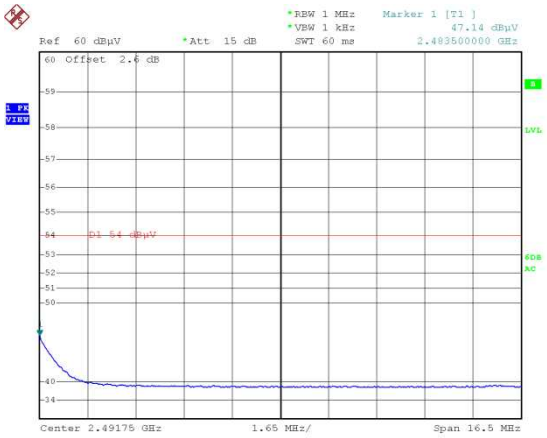
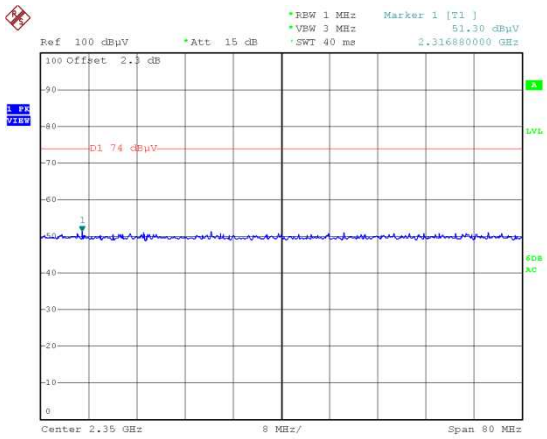


Date: 1.DEC.2015 10:17:54

Zacta

[3-DH5]
Channel Low
Horizontal
Peak



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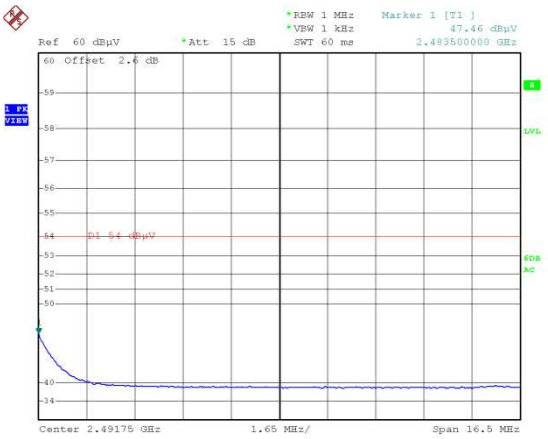

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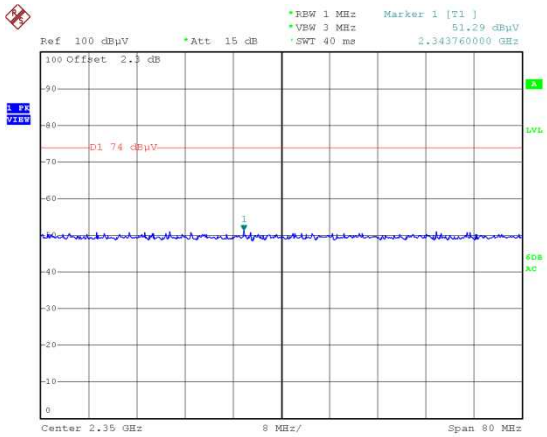
Vertical
Peak



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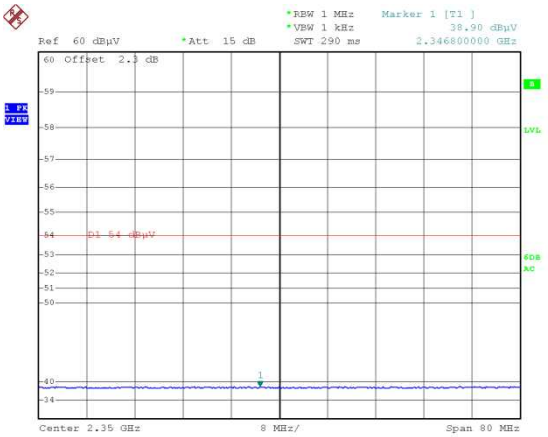
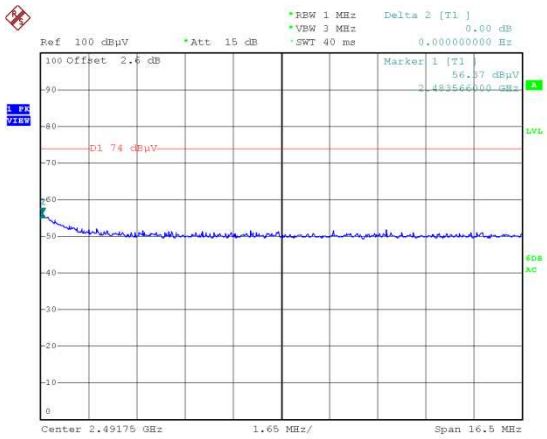
Average



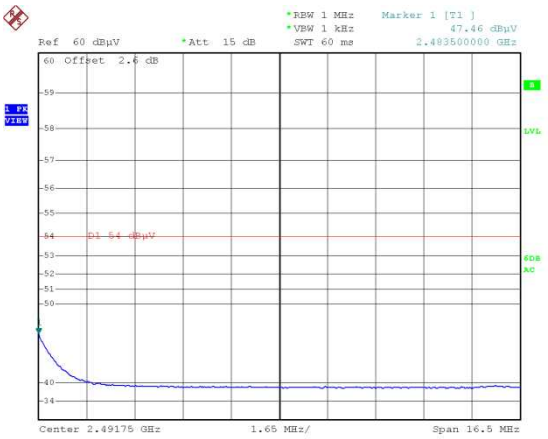
Date: 1.DEC.2015 11:02:08

[3-DH5]
Channel High
Horizontal
Peak



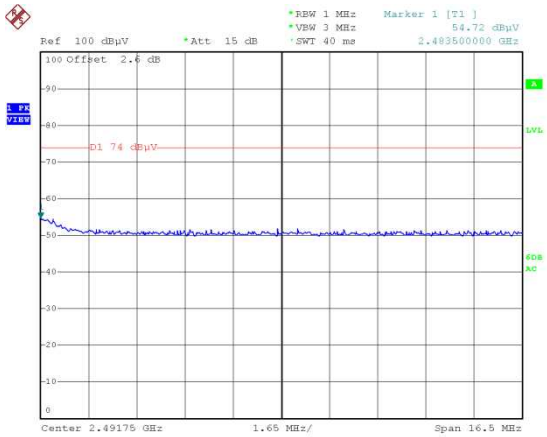
Date: 1.DEC.2015 10:36:56

Average



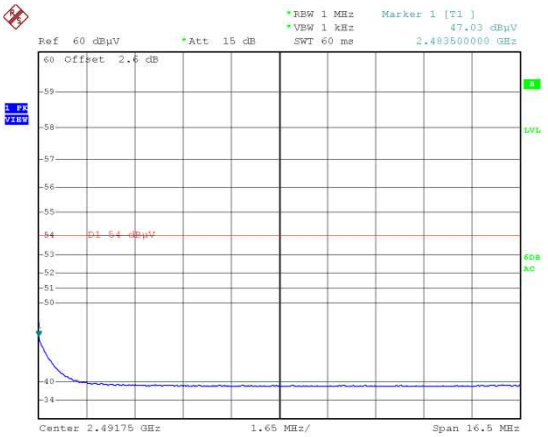
Date: 1.DEC.2015 10:37:42

Vertical
Peak



Date: 1.DEC.2015 10:49:23

Average



Date: 1.DEC.2015 10:48:35

13. AC Power Line Conducted Emissions

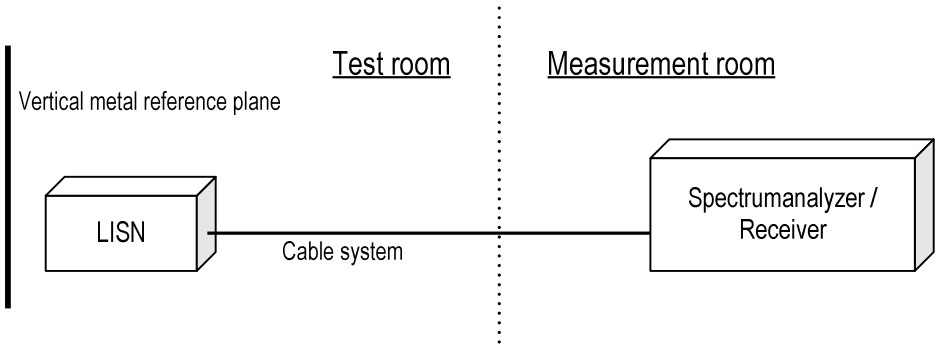
13.1 Measurement procedure [FCC 15.207]

Test was applied by following conditions.

Test method	:	ANSI C63.10
Frequency range	:	0.15MHz to 30MHz
Test place	:	10m 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



13.2 Calculation method

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

13.3 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

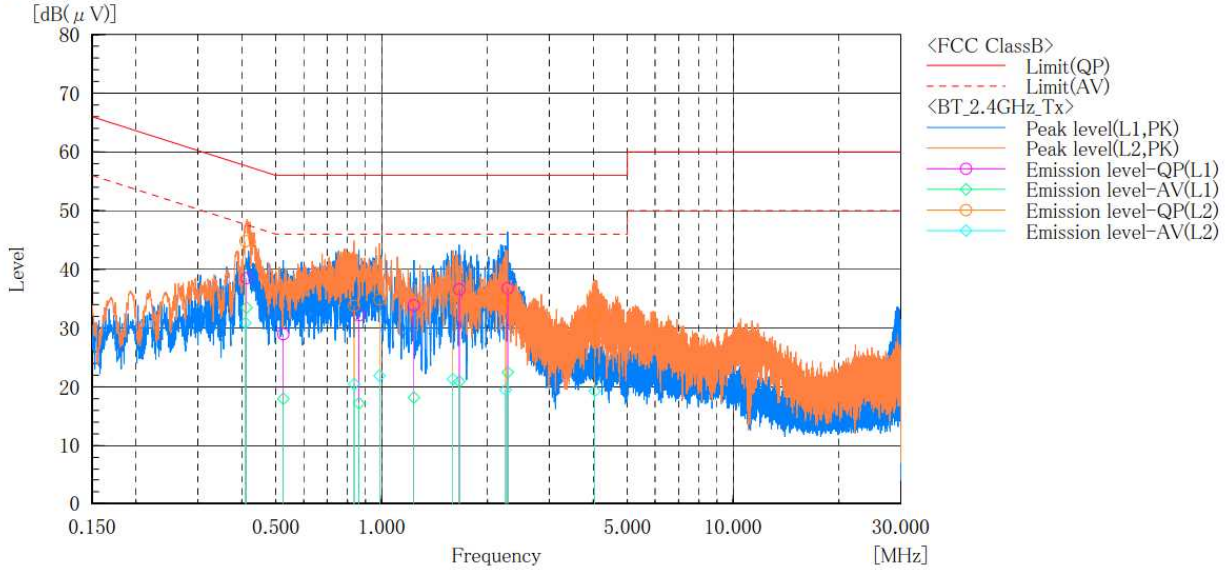
*: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz.

13.4 Test data

***** CONDUCTED EMISSION at MAINS PORT *****
[10m semi-anechoic chamber #1]

TUV SUD Zacta Ltd. | <<DATA Sheet No.01>> | 18 November,2015

Company name	: KYOCERA Corporation	Standard	: FCC Part.15 Subpart C
EUT	: Mobile Phone	Operator	: H.Shibata
Model No.	: CA12	Temp,Hum	: 20.6[℃] 52.4[%]
Serial No.	: N/A	Note1	:
Test mode	: BT_EDR_Tx	Note2	:



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	0.413	27.9	22.9	10.6	38.5	33.5	57.6	47.6	19.1	14.1
2	0.525	18.4	7.4	10.6	29.0	18.0	56.0	46.0	27.0	28.0
3	0.862	21.6	6.6	10.6	32.2	17.2	56.0	46.0	23.8	28.8
4	1.236	23.3	7.6	10.6	33.9	18.2	56.0	46.0	22.1	27.8
5	1.663	25.9	10.2	10.7	36.6	20.9	56.0	46.0	19.4	25.1
6	2.284	26.1	11.8	10.7	36.8	22.5	56.0	46.0	19.2	23.5

--- 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	0.410	34.1	20.2	10.7	44.8	30.9	57.6	47.6	12.8	16.7
2	0.835	23.1	9.8	10.7	33.8	20.5	56.0	46.0	22.2	25.5
3	0.986	24.2	11.2	10.7	34.9	21.9	56.0	46.0	21.1	24.1
4	1.595	24.7	10.5	10.8	35.5	21.3	56.0	46.0	20.5	24.7
5	2.254	24.2	8.6	10.9	35.1	19.5	56.0	46.0	20.9	26.5
6	4.040	21.1	8.3	11.0	32.1	19.3	56.0	46.0	23.9	26.7

14. 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.

15. 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 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

16. 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 (S403)	May 31, 2016	May 10, 2015
Coaxial cable	RS	YH20_S1	N/A (S389)	Aug. 31, 2016	Aug. 6, 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
Preamplifier	Agilent Technologies	8449B	3008A1008	Dec. 31, 2015	Dec. 5, 2014
Double ridged guide antenna	EMCO	3115	5205	Feb. 29, 2016	Feb. 16, 2015
Attenuator	Agilent Technologies	8491B	MY39268633	Feb. 29, 2016	Feb. 1, 2015
Broad-Band Horn Antenna	Schwarzbeck	BBHA9170	BBHA9170189	Jun. 30, 2016	Jun. 16, 2015
Preamplifier	TSJ	MLA-1ooM18-B02-40	1929118	May 31, 2016	May 1, 2015
Notch filter	Micro-Tronics	BRM50702	045	Nov. 30, 2016	Nov. 12, 2015
Microwave cable	SUHNER	SUCOFLEX104/9m	346316/4	Oct. 31, 2016	Oct. 23, 2015
		SUCOFLEX104/1m	322084/4	Oct. 31, 2016	Oct. 23, 2015
		SUCOFLEX104/1.5m	317226/4	Oct. 31, 2016	Oct. 23, 2015
		SUCOFLEX104/7m	41625/6	Oct. 31, 2016	Oct. 23, 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

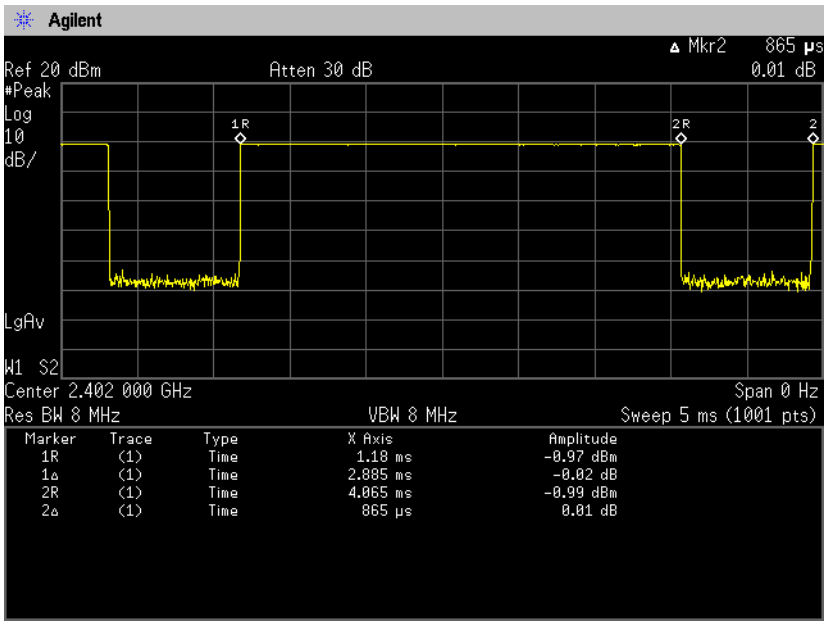
Conducted emission at mains port

Equipment	Company	Model No.	Serial No.	Cal. due	Cal. date
EMI Receiver	ROHDE&SCHWARZ	ESCI	100765	Sep. 30, 2016	Sep. 2, 2015
Attenuator	TYC	BA-PJ-10	N/A (S344)	Apr. 30, 2016	Apr. 6, 2015
Line impedance stabilization network for EUT	Kyoritsu Electrical Works, Ltd.	KNW-407F	8-2003-1	Mar. 31, 2016	Mar. 5, 2015
Coaxial cable	FUJIKURA	5D-2W/4m	N/A (S349)	Feb. 29, 2016	Feb. 27, 2015
Coaxial cable	SUHNER	SUCOFLEX104/2m	317672/4	May. 31, 2016	May. 29, 2015
Coaxial cable	SUHNER	RG214/U/25m	N/A (S191)	Feb. 29, 2016	Feb. 27, 2015
PC	HP	Dc7800small	JPA7450FPJ	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]



Duty Cycle = T_{on} / (T_{on} + T_{off}) = 2885[us] / (2885[us] + 865[us]) = 77.0[%]