

Report on the RF Testing of:

KYOCERA Corporation
Mobile Phone, Model: EB1155
FCC ID: JOYEB1155

In accordance with FCC Part 15 Subpart C

Prepared for: KYOCERA Corporation
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Japan

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Document Number: JPD-TR-22218-1

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| Hiroaki Suzuki | Deputy Manager of RF Group | Approved Signatory | 2023.01.06 |

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EXECUTIVE SUMMARY – Result: Complied

A sample of this product was tested and the result above was confirmed in accordance with FCC Part 15 Subpart C.



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1 Summary of Test

1.1 Modification history of the test report

| Document Number | Modification History | Issue Date |
|-----------------|--|-------------------------|
| JPD-TR-22218-0 | First Issue | 20-December-2022 |
| JPD-TR-22218-1 | Conducted test results for EB1146 added. | Refer to the cover page |

1.2 Standards

CFR47 FCC Part 15 Subpart C

1.3 Test methods

ANSI C63.10-2013

1.4 Deviation from standards

None

1.5 List of applied test(s) of the EUT

| Test item section | Test item | Condition | Result | Remark |
|-------------------------------|--|-----------|--------|--------|
| 15.247(a)(1) | 20dB Bandwidth | Conducted | PASS | *1 |
| 15.247(a)(1) | Carrier Frequency Separation | Conducted | PASS | *1 |
| 15.247(a)(1)(iii) | Number of Hopping Frequencies | Conducted | PASS | *1 |
| 15.247(a)(1)(iii) | Time of Occupancy (Dwell Time) | Conducted | PASS | *1 |
| 15.247(b)(1) | Maximum Peak Output Power | Conducted | PASS | *1 |
| 15.247(d) | Band Edge Compliance of RF Conducted Emissions | Conducted | PASS | *1 |
| 15.247(d) 15.205 15.209 | Spurious Emissions | Conducted | PASS | *1 |
| | | 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 Since there is no change in Module from FCC ID: JOYEB1146, only the Radiated test items were performed. Conduction test results are listed as "JPD-TR-22190-0" of "FCC ID: JOYEB1146".

1.6 Test information

None

1.7 Test set up

Table-top



Japan

1.8 Test period

28-October-2022 - 9-December-2022

2 Equipment Under Test

All information in this chapter was provided by the applicant.

2.1 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 (EUT) | Mobile Phone |
| Model number | EB1155 |
| Serial number | 352034010006537, 352034010006552 |
| Trade name | Kyocera |
| Number of sample(s) | 2 |
| EUT condition | Pre-Production |
| Power rating | Battery: DC 3.87 V |
| Size | (W) 70 mm x (D) 161 mm x (H) 8.9 mm |
| Environment | Indoor and Outdoor use |
| Terminal limitation | -20 °C to 60 °C |
| Hardware version | DMT |
| Software version | 0.100ML.9013.a |
| Firmware version | Not applicable |
| RF Specification | |
| Protocol | Bluetooth 5.3 + EDR |
| Frequency range | 2402 MHz-2480 MHz |
| Number of RF Channels | 79 Channels |
| Modulation method/Data rate | FHSS: GFSK (1 Mbps), $\pi/4$ -DQPSK (2 Mbps), 8-DPSK (3 Mbps) |
| Channel separation | 1 MHz |
| Conducted power | 12.246 mW (DH5) 9.772 mW (3-DH5) |
| Antenna type | Internal antenna |
| Antenna gain | -0.5 dBi |

2.2 Modification to the EUT

The table below details modifications made to the EUT during the test project.

| Modification State | Description of Modification | Modification fitted by | Date of Modification |
|--|------------------------------|------------------------|----------------------|
| Model: EB1155, Serial Number: 352034010006537, 352034010006552 | | | |
| 0 | As supplied by the applicant | Not Applicable | Not Applicable |

2.3 Variation of family model(s)

2.3.1 List of family model(s)

Not applicable

2.3.2 Reason for selection of EUT

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 | | |

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.

Pre-scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports.

2.6 Operating flow

[Tx mode]

- i) Test program setup to the Software
- ii) Select a Test mode
Operating frequency: Channel Low: 2402 MHz, Channel Middle: 2441 MHz, Channel High: 2480 MHz
- iii) Start test mode

[Rx mode]

- i) Test program setup to the Software
- ii) Select a Test mode
Operating frequency: Channel Low: 2402 MHz, Channel Middle: 2441 MHz, Channel High: 2480 MHz
- iii) Start test mode

3 Configuration of Equipment

Numbers assigned to equipment on the diagram in “3.3 System configuration” correspond to the list in “3.1 Equipment used” and “3.2 Cable(s) used”.

This test configuration is based on the manufacture’s instruction.

Cabling and setup(s) were taken into consideration and test data was taken under worse case condition.

3.1 Equipment used

| No. | Equipment | Company | Model No. | Serial No. | FCC ID/DoC | Comment |
|-----|--------------|---------|-----------|------------------------------------|------------|---------|
| 1 | Mobile Phone | KYOCERA | EB1155 | 352034010006537 352034010006552 | JOYEB1155 | EUT |
| 2 | AC Adapter | KDDI | 0602PQA | N/A | N/A | * |

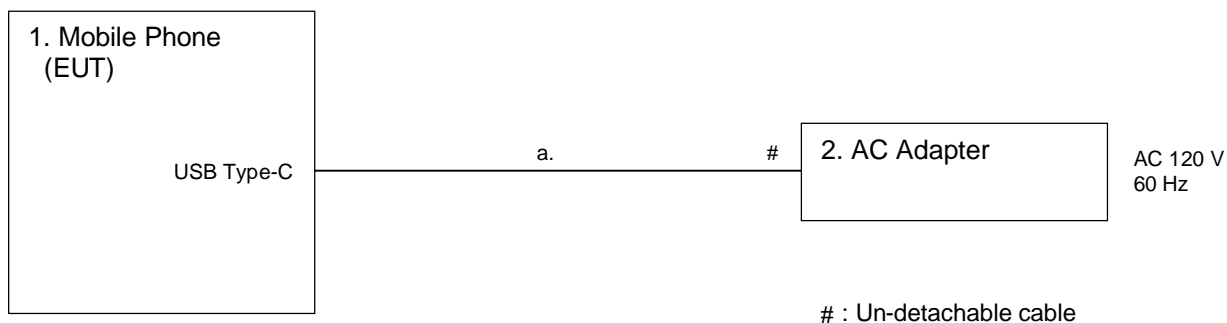
*:AC power line Conducted Emission Test.

3.2 Cable(s) used

| No. | Equipment | Length[m] | Shield | Connector | Comment |
|-----|----------------------------|-----------|--------|-----------|---------|
| a | USB cable (for AC Adapter) | 1.5 | No | Plastic | * |

*:AC power line Conducted Emission Test.

3.3 System configuration



4 Test Result

4.1 20dB Bandwidth

4.1.1 Measurement procedure

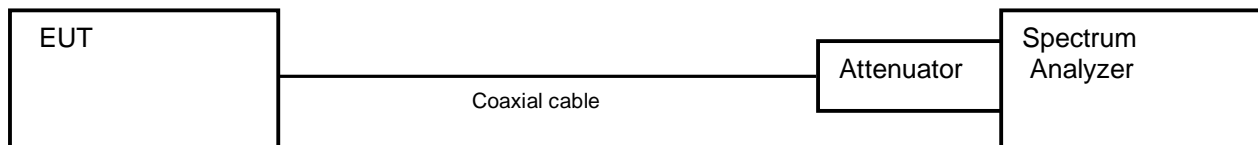
[FCC 15.247(a)(1)]

The bandwidth at 6 dB down from the highest inband spectral density is measured with 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 \geq 1% of the 20 dB bandwidth
- c) VBW \geq RBW
- d) Sweep time = auto-couple
- e) Detector = peak
- f) Trace mode = max hold

- Test configuration



4.1.2 Limit

None

4.1.3 Measurement result

Date : 18-October-2022

Temperature : 21.4 [°C]

Humidity : 47.0 [%]

Test place : Shielded room No.4

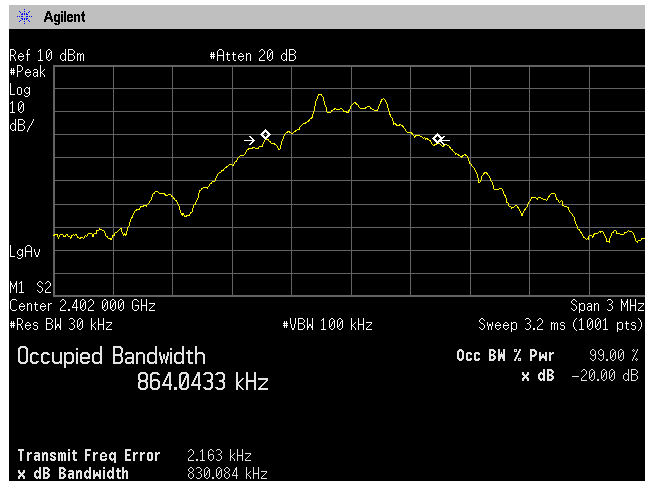
Test engineer :

Kazunori Saito

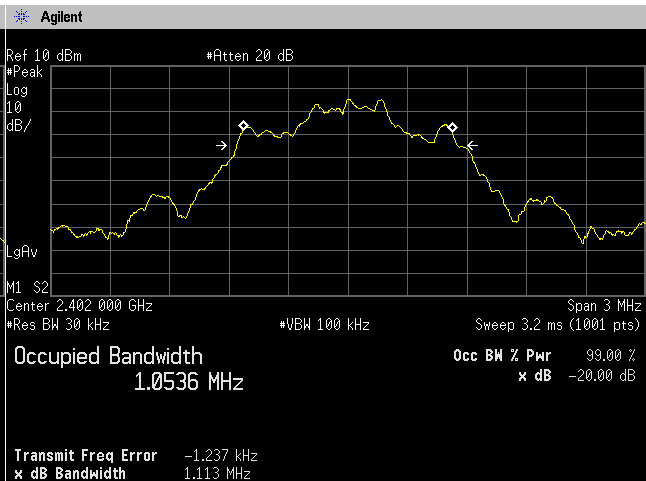
| Channel | Frequency (MHz) | 20dB bandwidth [MHz] | |
|---------|-----------------|----------------------|-------|
| | | DH5 | 3DH5 |
| Low | 2402 | 0.830 | 1.113 |
| Middle | 2441 | 0.829 | 1.114 |
| High | 2480 | 0.830 | 1.116 |

*: Tested by EB1146

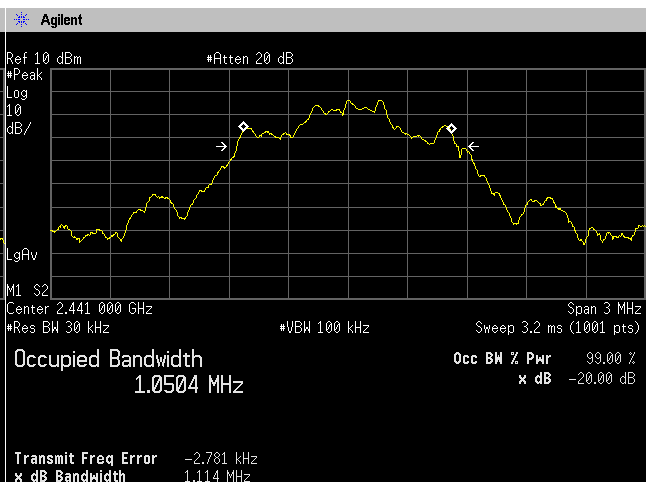
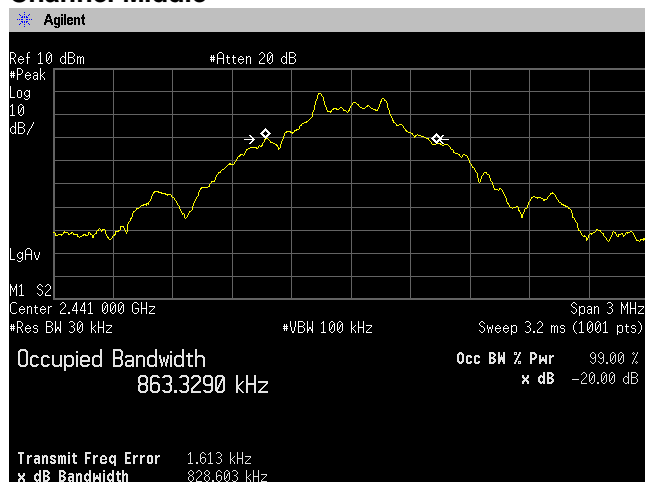
4.1.4 Trace data

[DH5]
Channel Low

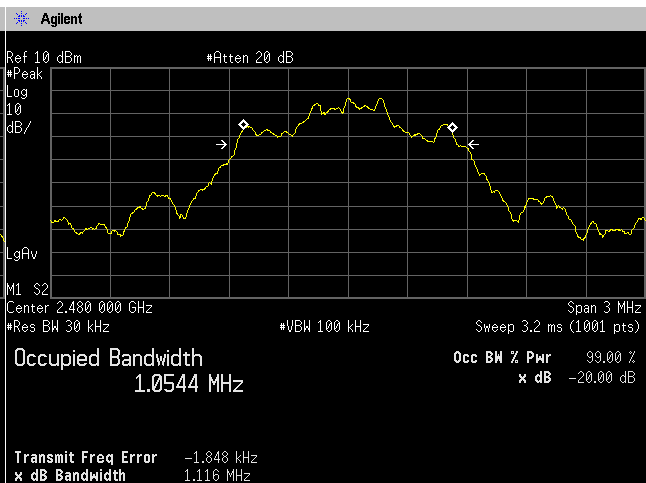
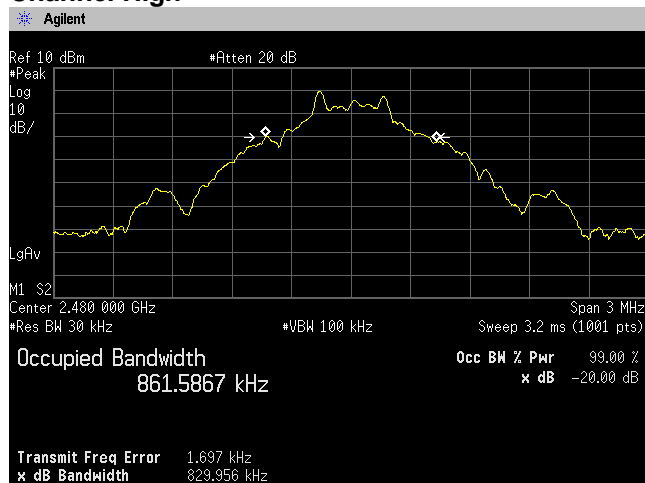
[3-DH5]



Channel Middle



Channel High



4.2 Carrier Frequency Separation

4.2.1 Measurement procedure

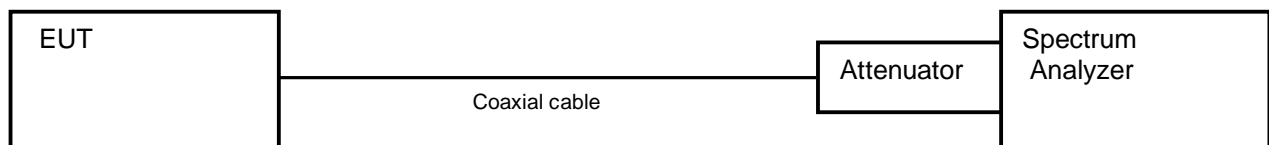
[FCC 15.247(a)(1)]

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;

- g) Span = wide enough to capture the peaks of two adjacent channels
- h) RBW \geq 1% of the span
- i) VBW \geq RBW
- j) Sweep time = auto-couple
- k) Detector = peak
- l) Trace mode = max hold

- Test configuration



4.2.2 Limit

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

4.2.3 Measurement result

Date : 14-October-2022
 Temperature : 24.8 [°C]
 Humidity : 48.3 [%]
 Test place : Shielded room No.4

Test engineer : Taiki Watanabe

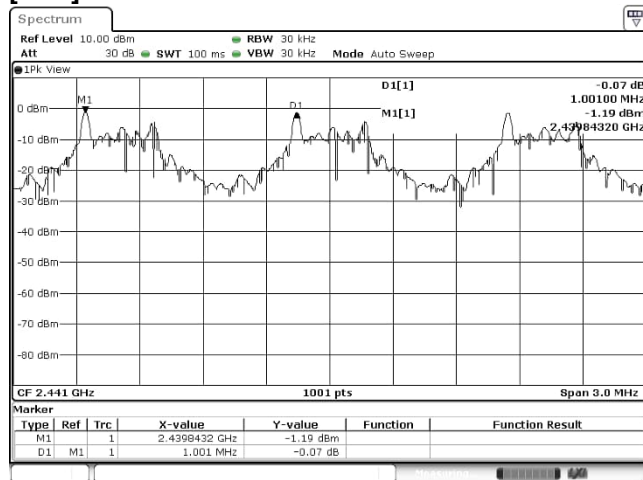
Battery Full

| Packet type | Channel separation (MHz) | Limit (MHz) | Result |
|-------------|--------------------------|--|--------|
| DH5 | 1.001 | >two-thirds of the 20dB Bandwidth = 553kHz | PASS |
| 3-DH5 | 1.001 | >two-thirds of the 20dB Bandwidth = 744kHz | PASS |
| DH5(AFH) | 1.001 | >two-thirds of the 20dB Bandwidth = 553kHz | PASS |
| 3-DH5(AFH) | 1.001 | >two-thirds of the 20dB Bandwidth = 744kHz | PASS |

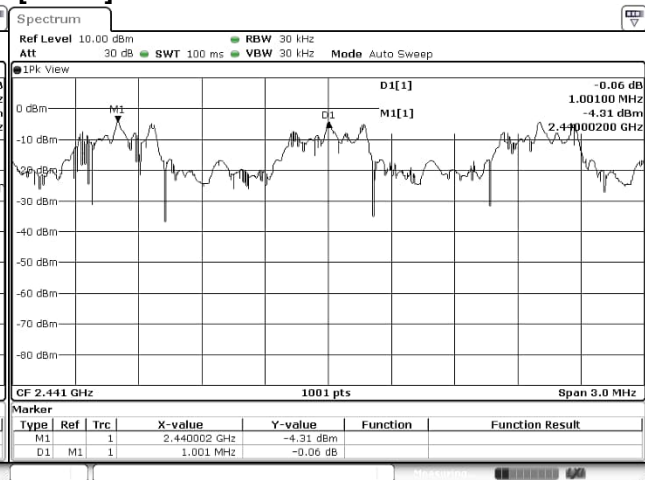
*: Tested by EB1146

4.2.4 Trace data

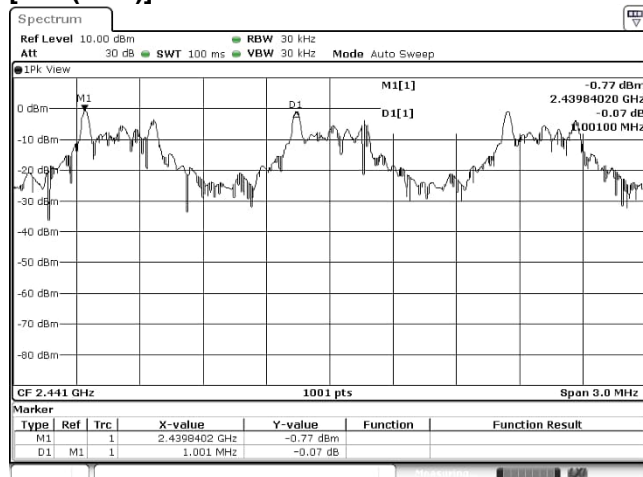
[DH5]



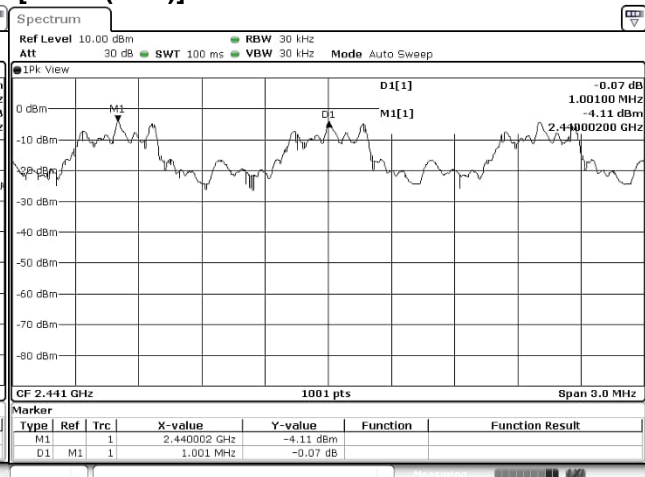
[3-DH5]



[DH5(AFH)]



[3-DH5(AFH)]



4.3 Number of Hopping Frequencies

4.3.1 Measurement procedure

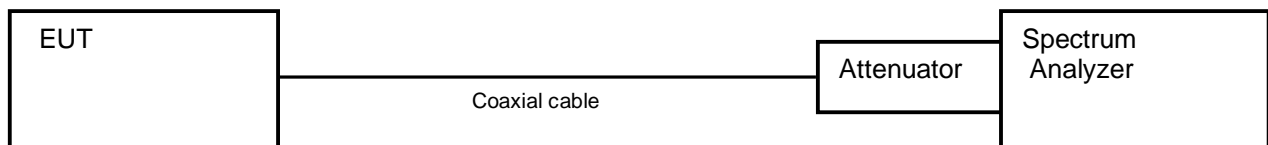
[FCC 15.247(a)(1)(iii)]

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 \geq 1% of the Span
- c) VBW \geq RBW
- d) Sweep time = auto-couple
- e) Detector = peak
- f) Trace mode = max hold

- Test configuration



4.3.2 Limit

Shall have more than 15 channels.

4.3.3 Measurement result

Date : 18-October-2022

Temperature : 21.4 [°C]

Humidity : 47.0 [%]

Test place : Shielded room No.4

Test engineer :

Kazunori Saito

FHSS

| Number of channels | Limit | Result |
|--------------------|-------------------|--------|
| 79 | ≥ 15 channel | PASS |

*: Tested by EB1146

AFH

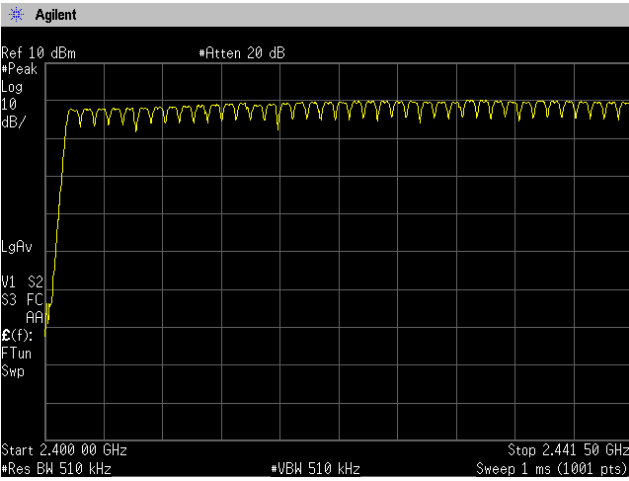
| Channel | Number of channels | Limit | Result |
|---------|--------------------|-------------------|--------|
| Low | 20 | ≥ 15 channel | PASS |
| Middle | 20 | ≥ 15 channel | PASS |
| High | 20 | ≥ 15 channel | PASS |

*: Tested by EB1146

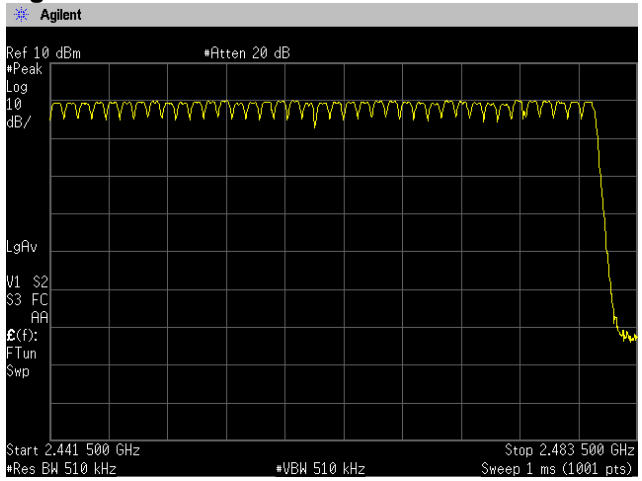
4.3.4 Trace data

[DH5]

Low

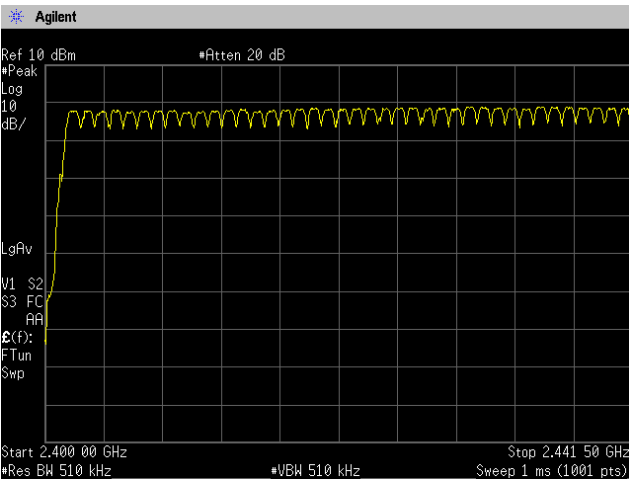


High

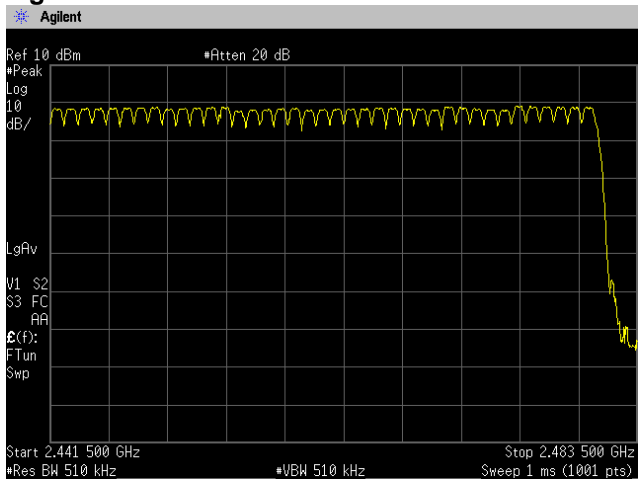


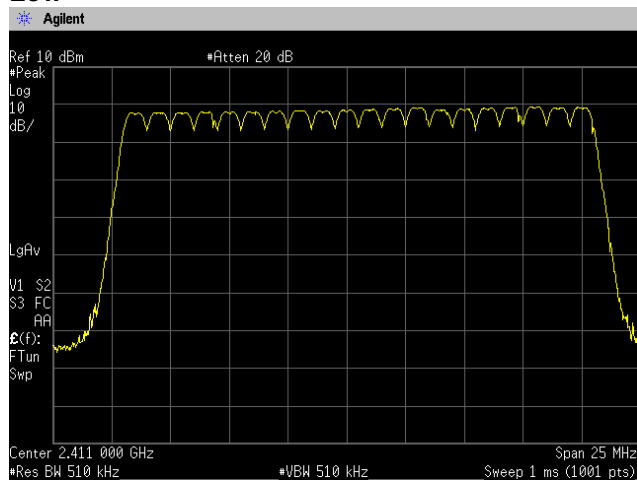
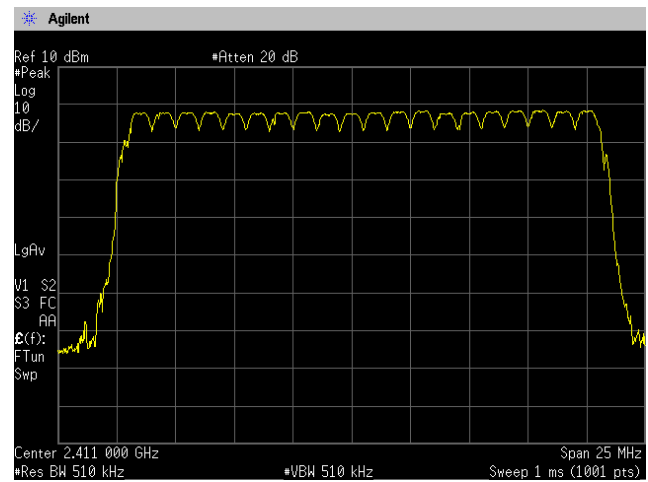
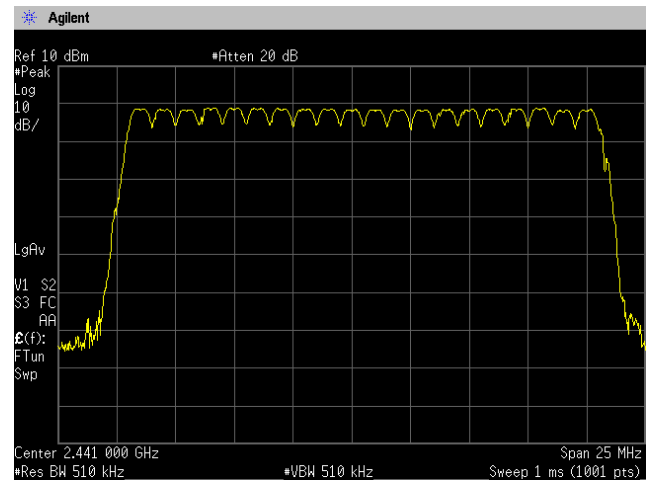
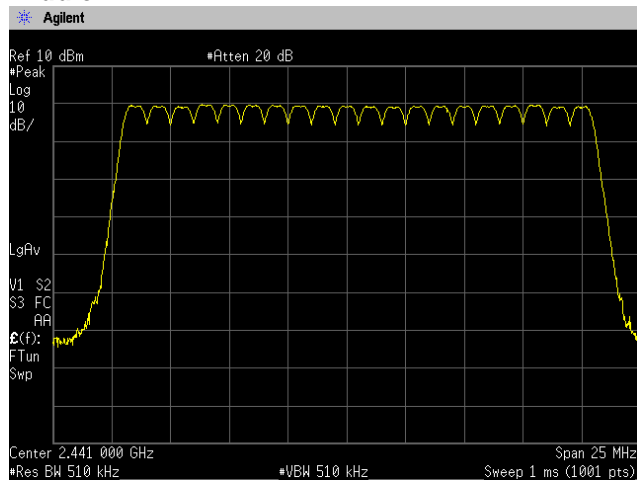
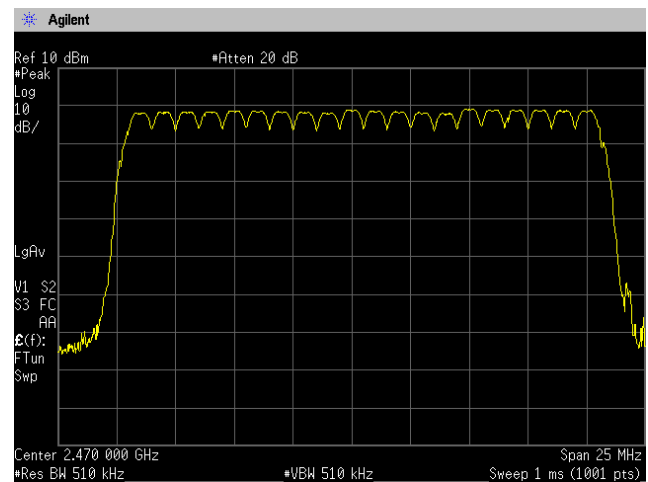
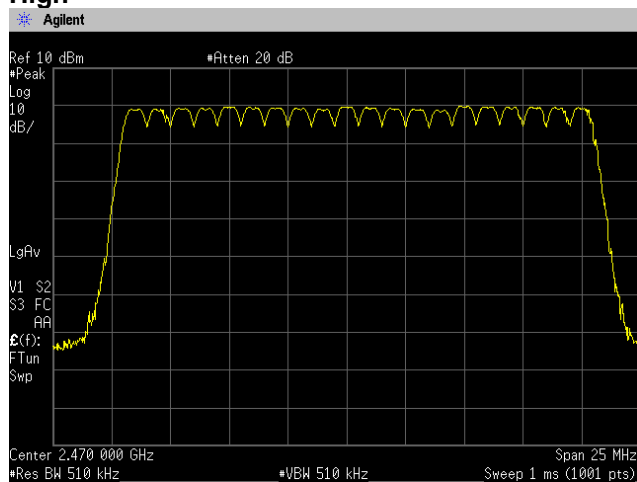
[3-DH5]

Low



High



[DH5(AFH)]**Low****[3-DH5(AFH)]****Middle****High**

4.4 Time of Occupancy (Dwell Time)

4.4.1 Measurement procedure

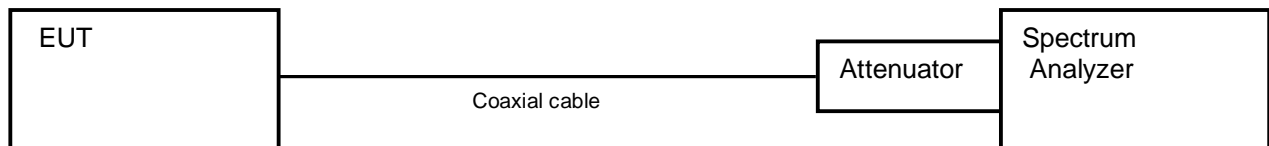
[FCC 15.247(a)(1)(iii)]

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 = 1 MHz
- c) VBW \geq RBW
- d) Sweep time = auto-couple
- e) Detector = peak
- f) Trace mode = Single

- Test configuration



4.4.2 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.

4.4.3 Measurement result

Date : 18-October-2022
 Temperature : 21.4 [°C]
 Humidity : 47.0 [%]
 Test place : Shielded room No.4

Test engineer : Kazunori Saito

FHSS

| Packet type | Channel | Frequency (MHz) | Dwell time (ms) | Occupancy time of 31.6 seconds (s) | Limit | Result |
|-------------|---------|-----------------|-----------------|------------------------------------|-------|--------|
| DH5 | Low | 2402 | 2.876 | 0.307 | <0.4s | PASS |
| | Middle | 2441 | 2.872 | 0.306 | <0.4s | PASS |
| | High | 2480 | 2.876 | 0.307 | <0.4s | PASS |
| 3-DH5 | Low | 2402 | 2.884 | 0.308 | <0.4s | PASS |
| | Middle | 2441 | 2.884 | 0.308 | <0.4s | PASS |
| | High | 2480 | 2.884 | 0.308 | <0.4s | PASS |

*: Tested by EB1146

AFH

| Packet type | Channel | Frequency (MHz) | Dwell time (ms) | Occupancy time of 8 seconds (s) | Limit | Result |
|-------------|---------|-----------------|-----------------|---------------------------------|-------|--------|
| DH5(AFH) | Low | 2402 | 2.876 | 0.153 | <0.4s | PASS |
| | Middle | 2441 | 2.876 | 0.153 | <0.4s | PASS |
| | High | 2480 | 2.872 | 0.153 | <0.4s | PASS |
| 3-DH5(AFH) | Low | 2402 | 2.884 | 0.154 | <0.4s | PASS |
| | Middle | 2441 | 2.884 | 0.154 | <0.4s | PASS |
| | High | 2480 | 2.884 | 0.154 | <0.4s | PASS |

*: Tested by EB1146

FHSS

$$\text{DH5/3-DH5} = \text{Dwell time (ms)} \times 1600 / 6 / 79 \times 31.6$$

AFH

$$\text{DH5/3-DH5} = \text{Dwell time (ms)} \times 800 / 6 / 20 \times 8$$

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:

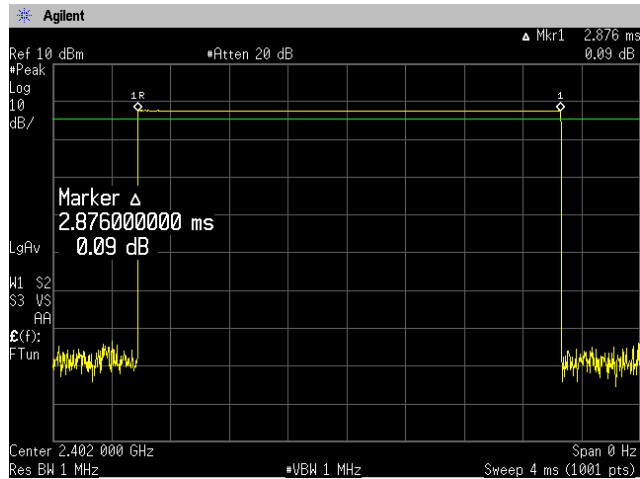
$$\text{Occupancy time of 31.6 seconds}^* = \text{time domain slot length} \times \text{hop rate} / \text{number of hopper channel} / 79 \times 31.6$$

$$\text{Ex.) for FHSS mode Channel Low, 3-DH5} = 2.890\text{ms} \times 1600 / 6 / 79 \times 31.6 = 308\text{ms}$$

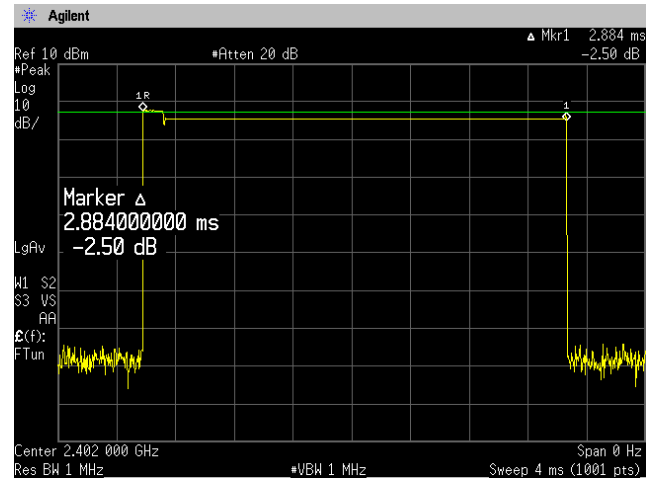
4.4.4 Trace data

FHSS
[DH5]

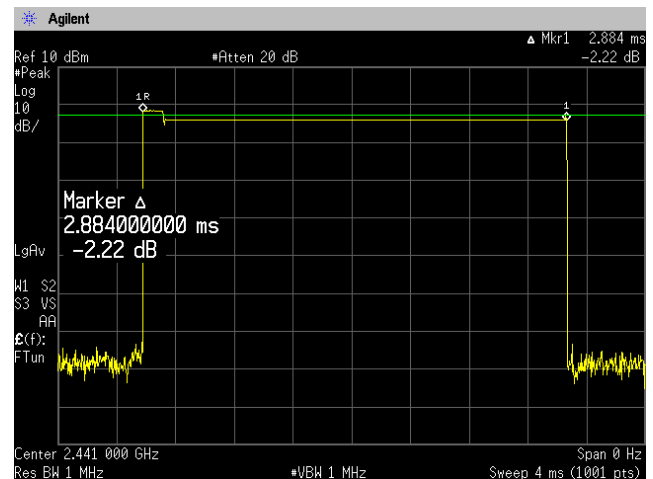
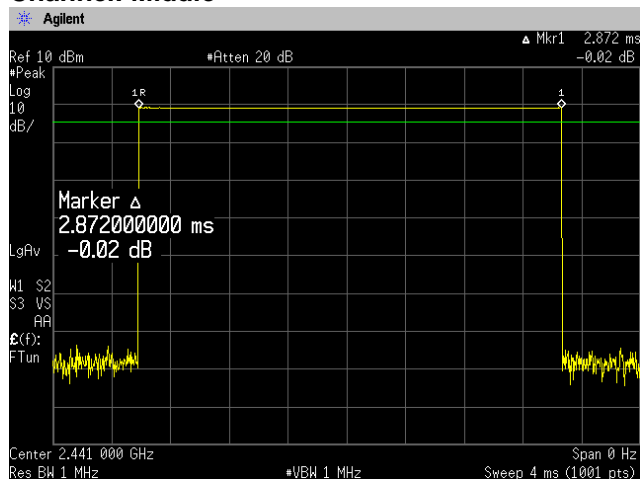
Channel: Low



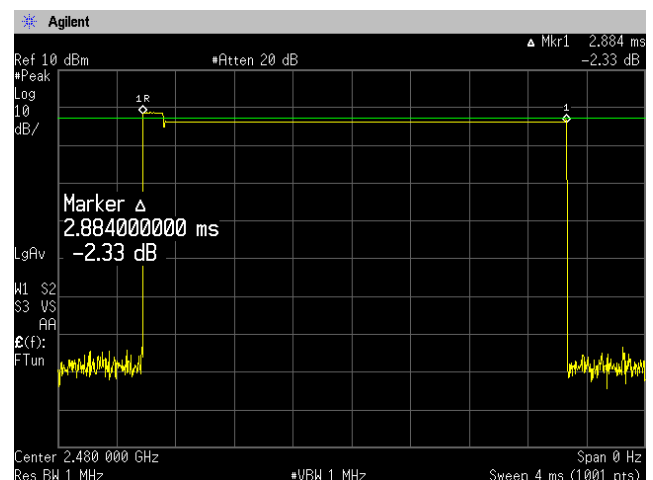
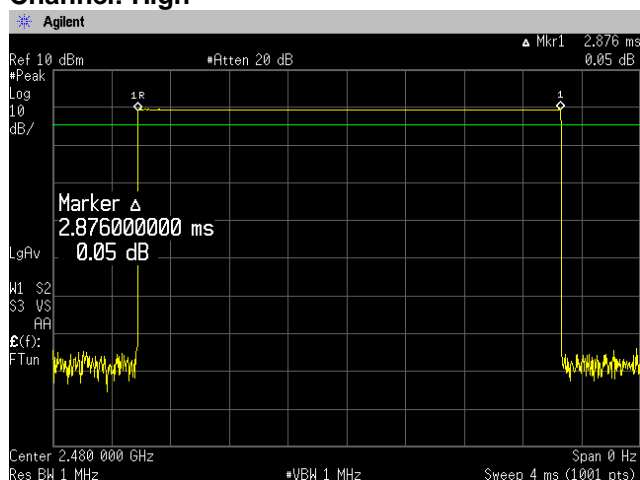
[3-DH5]



Channel: Middle



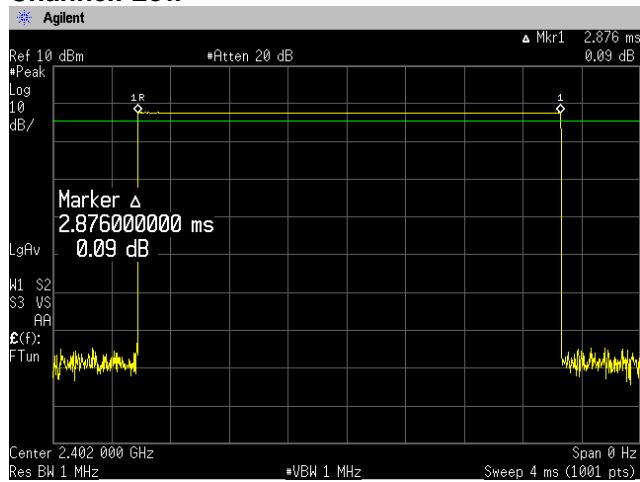
Channel: High



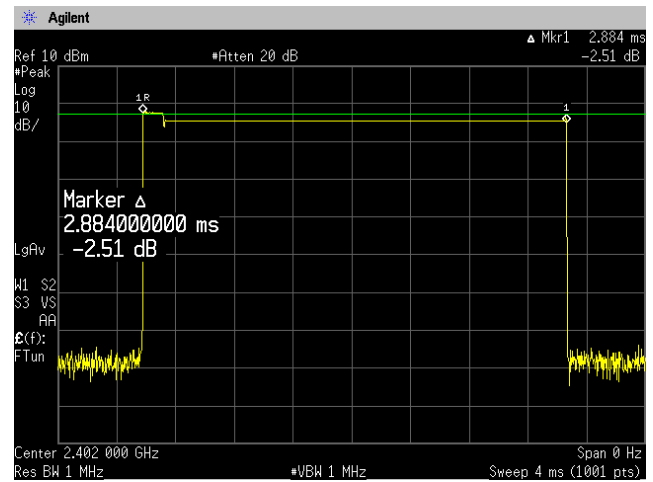
FHSS_AFH

[DH5]

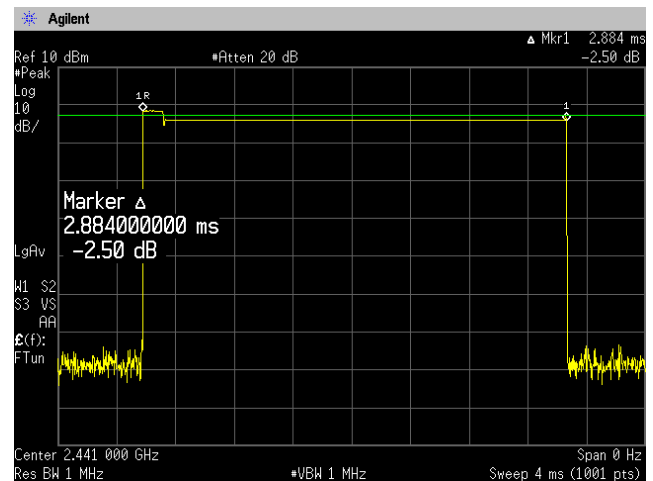
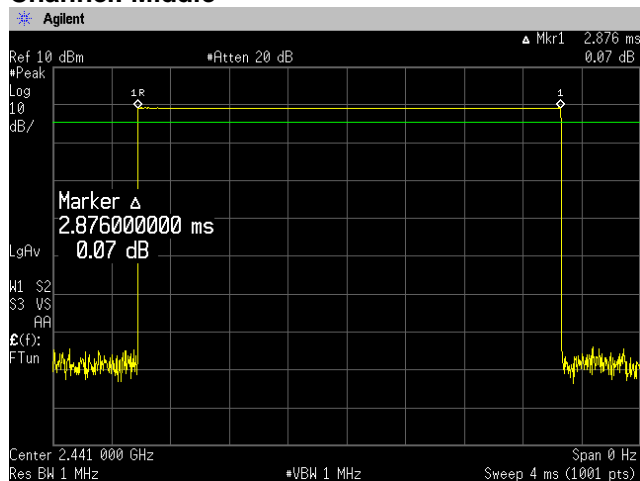
Channel: Low



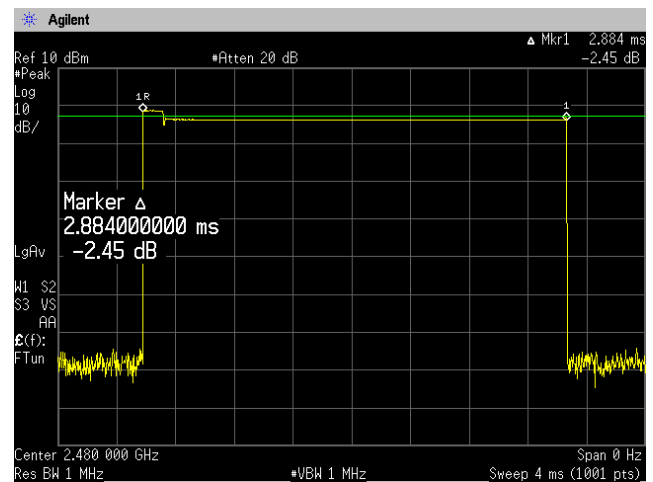
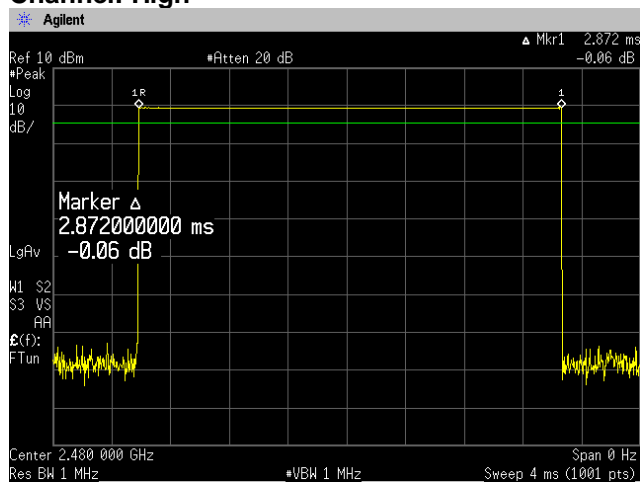
[3-DH5]



Channel: Middle



Channel: High



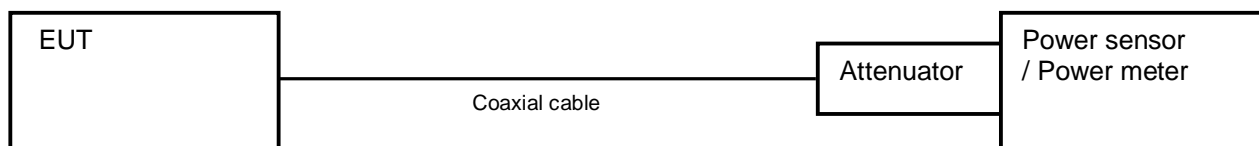
4.5 Maximum Peak Output Power

4.5.1 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



4.5.2 Limit

0.125 W or less

4.5.3 Measurement result

Date : 18-October-2022
 Temperature : 21.4 [°C]
 Humidity : 47.0 [%]
 Test place : Shielded room No.4

Test engineer : Kazunori Saito

Battery Full

| Packet type | Channel | Center Frequency (MHz) | Reading (dBm) | Factor (dB) | Level (dBm) | Peak Output Power (mW) | Limit (mW) | Result |
|-------------|---------|------------------------|---------------|-------------|-------------|------------------------|------------|--------|
| DH5 | Low | 2402 | -1.98 | 10.93 | 8.95 | 7.852 | ≤ 125 | PASS |
| | Middle | 2441 | -0.05 | 10.93 | 10.88 | 12.246 | ≤ 125 | PASS |
| | High | 2480 | -0.23 | 10.93 | 10.70 | 11.749 | ≤ 125 | PASS |
| 3-DH5 | Low | 2402 | -1.98 | 10.93 | 8.95 | 7.852 | ≤ 125 | PASS |
| | Middle | 2441 | -1.29 | 10.93 | 9.64 | 9.204 | ≤ 125 | PASS |
| | High | 2480 | -1.03 | 10.93 | 9.90 | 9.772 | ≤ 125 | PASS |

*: Tested by EB1146

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

4.6 Band Edge Compliance of RF Conducted Emissions

4.6.1 Measurement procedure

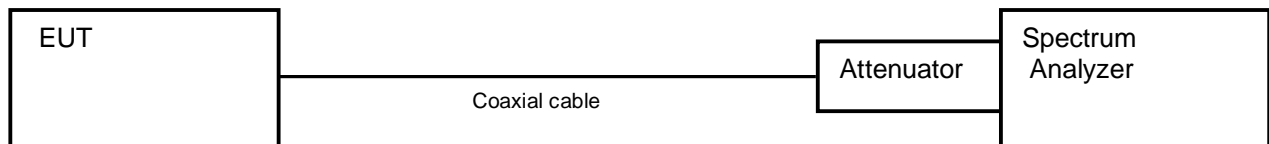
[FCC 15.247(d)]

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 \geq RBW
- d) Sweep time = auto-couple
- e) Detector = peak
- f) Trace mode = max hold

- Test configuration



4.6.2 Limit

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

4.6.3 Measurement result

Date : 7-October-2022

Temperature : 23.2 [°C]

Humidity : 39.3 [%]

Test place : Shielded room No.4

Test engineer :

Taiki Watanabe

[Hopping]

| Packet type | Channel | Frequency (MHz) | RF Power Level (dBm) | Band-edge Frequency (MHz) | Band-edge Level (dBm) | Difference Level (dBm) | Limit (dBm) | Result |
|-------------|---------|-----------------|----------------------|---------------------------|-----------------------|------------------------|-------------------------------------|--------|
| DH5 | Low | 2402 | -0.35 | 2399.95 | -65.72 | 65.37 | At least 20dB below from peak of RF | PASS |
| | High | 2480 | -0.16 | 2484.15 | -66.51 | 66.35 | At least 20dB below from peak of RF | PASS |
| 3-DH5 | Low | 2402 | -1.96 | 2399.55 | -62.54 | 60.58 | At least 20dB below from peak of RF | PASS |
| | High | 2480 | -1.17 | 2493.04 | -67.10 | 65.93 | At least 20dB below from peak of RF | PASS |

*: Tested by EB1146

[No Hopping]

| Packet type | Channel | Frequency (MHz) | RF Power Level (dBm) | Band-edge Frequency (MHz) | Band-edge Level (dBm) | Difference Level (dBm) | Limit (dBm) | Result |
|-------------|---------|-----------------|----------------------|---------------------------|-----------------------|------------------------|-------------------------------------|--------|
| DH5 | Low | 2402 | -2.31 | 2399.10 | -65.24 | 62.93 | At least 20dB below from peak of RF | PASS |
| | High | 2480 | -0.76 | 2483.85 | -66.75 | 65.99 | At least 20dB below from peak of RF | PASS |
| 3-DH5 | Low | 2402 | -3.19 | 2399.55 | -63.33 | 60.14 | At least 20dB below from peak of RF | PASS |
| | High | 2480 | -1.69 | 2484.00 | -68.03 | 66.34 | At least 20dB below from peak of RF | PASS |

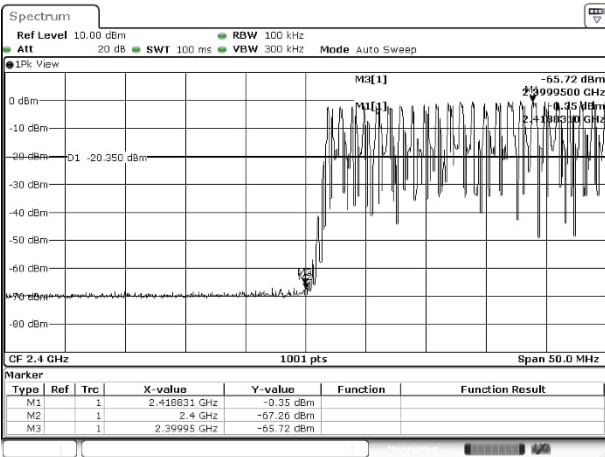
*: Tested by EB1146

4.6.4 Trace data

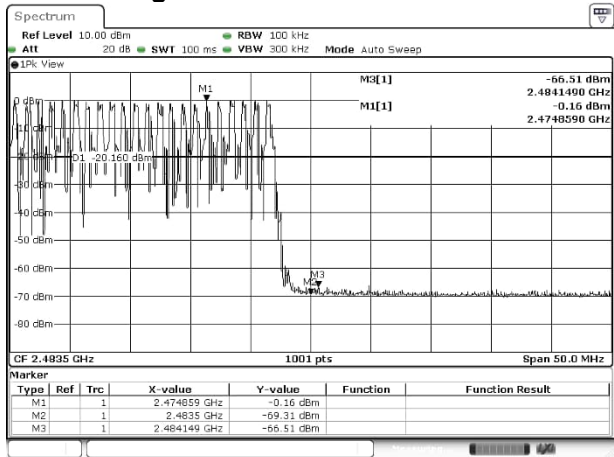
[Hopping]

DH5

Channel Low

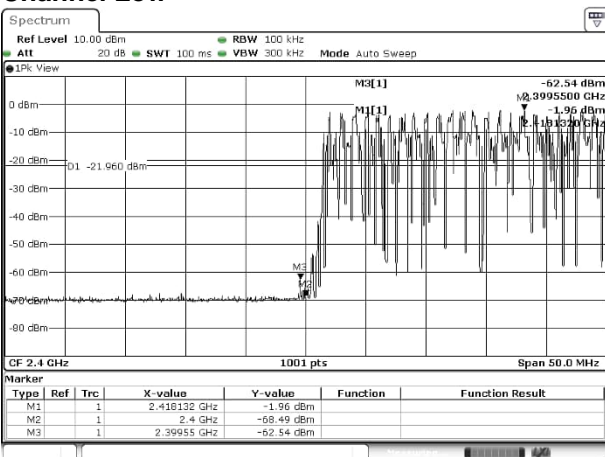


Channel High

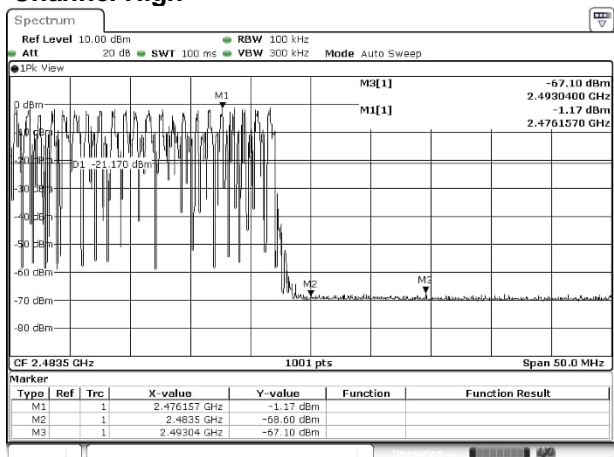


3DH5

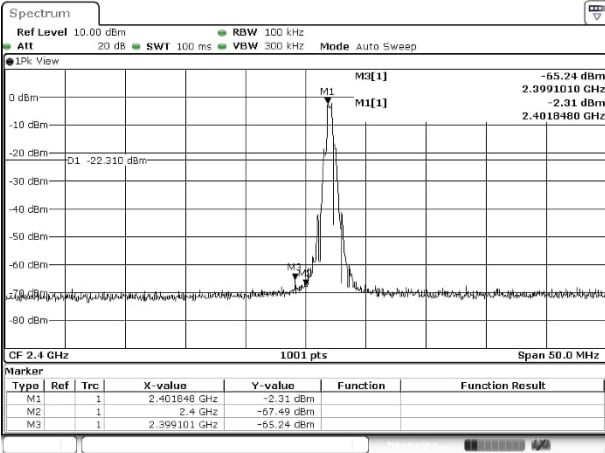
Channel Low



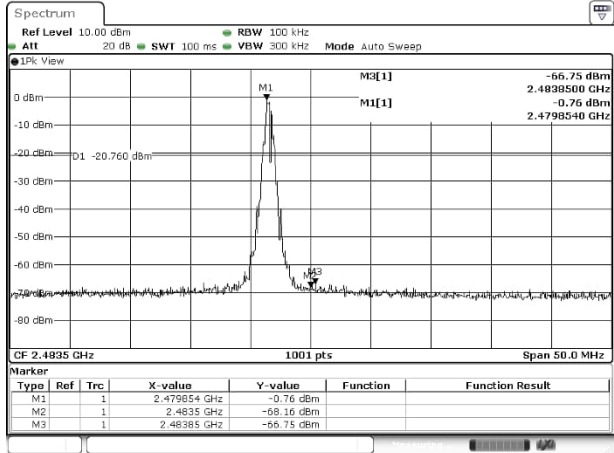
Channel High



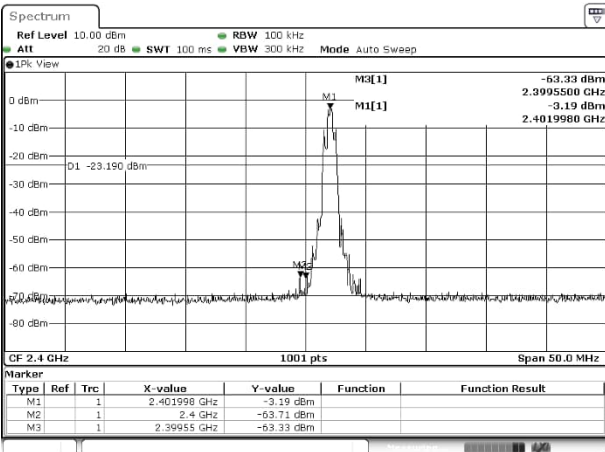
[No Hopping]
DH5
Channel Low



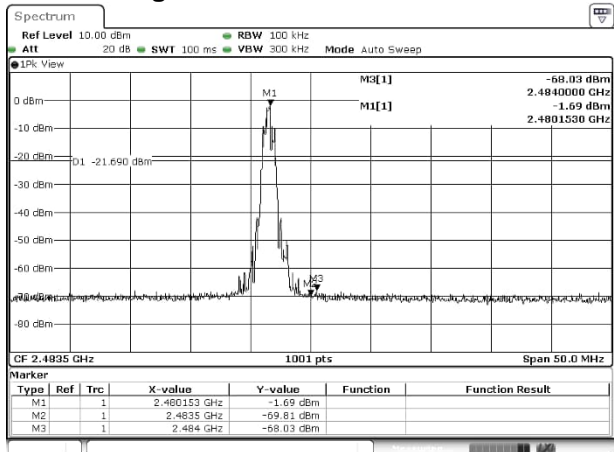
Channel High



3DH5
Channel Low



Channel High



4.7 Spurious emissions - Conducted -

4.7.1 Measurement procedure

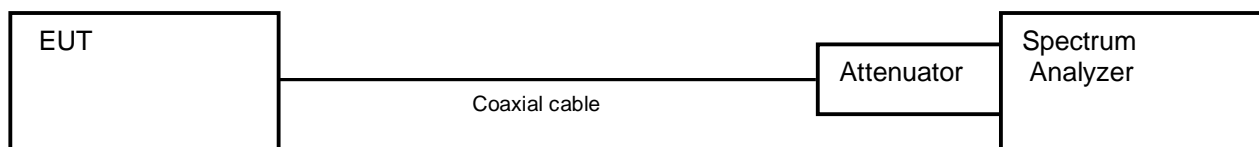
[FCC 15.247(d)]

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 \geq RBW
- d) Sweep time = auto-couple
- e) Detector = peak
- f) Trace mode = max hold

- Test configuration



4.7.2 Limit

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

4.7.3 Measurement result

Date : 7-October-2022

Temperature : 23.2 [°C]

Humidity : 39.3 [%]

Test place : Shielded room No.4

Test engineer :

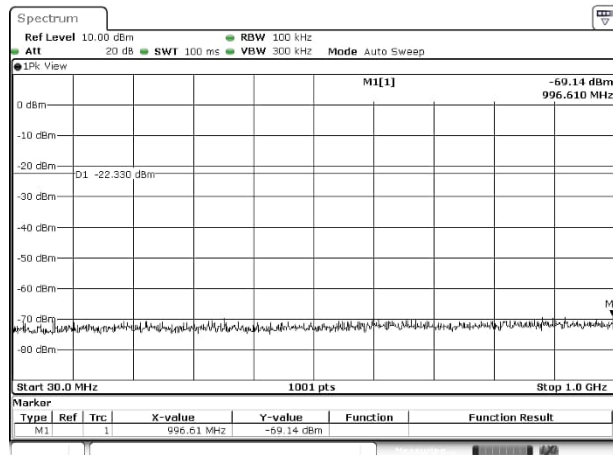
Taiki Watanabe

| 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 |

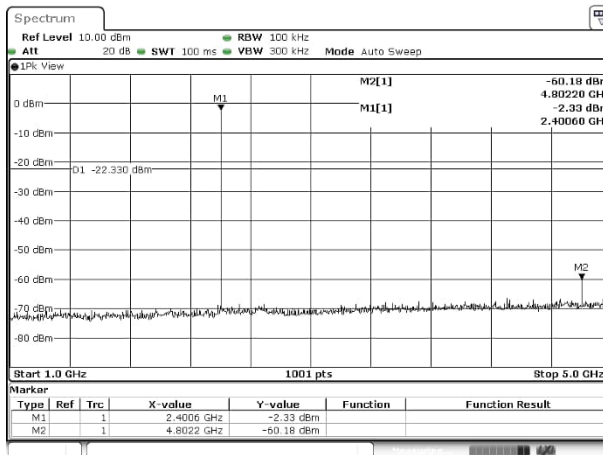
*: Tested by EB1146

4.7.4 Trace data

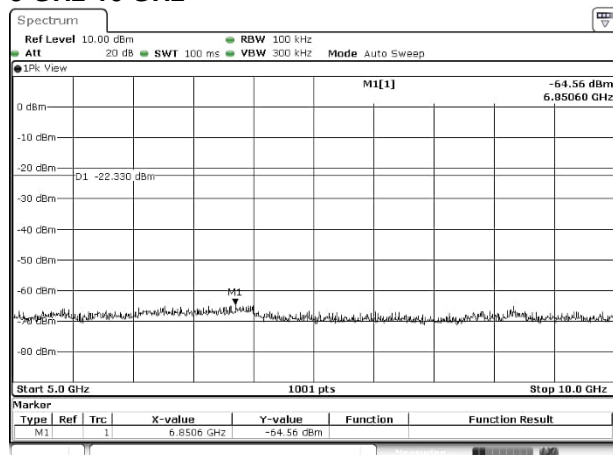
[DH5] Channel Low 30 MHz-1 GHz



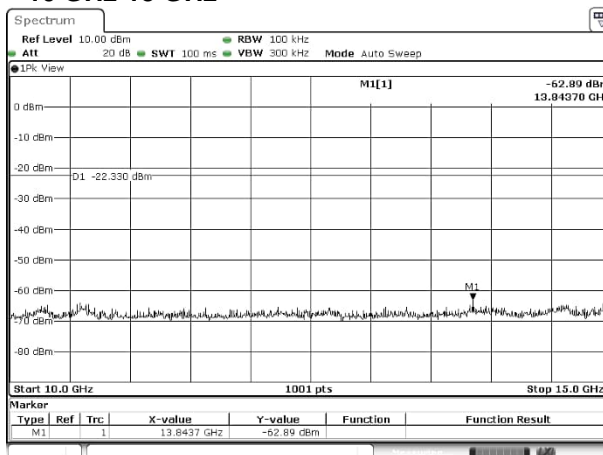
1 GHz-5 GHz



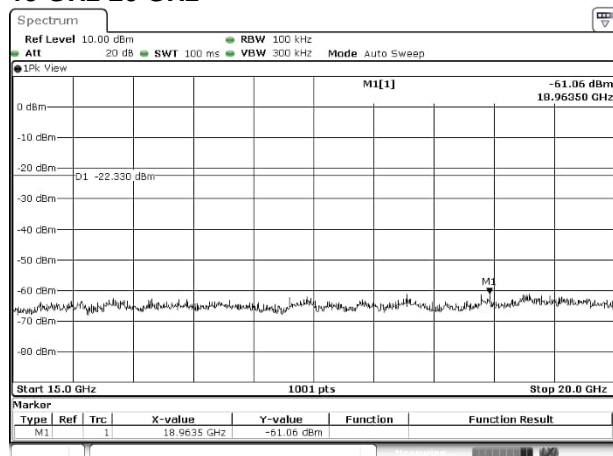
5 GHz-10 GHz



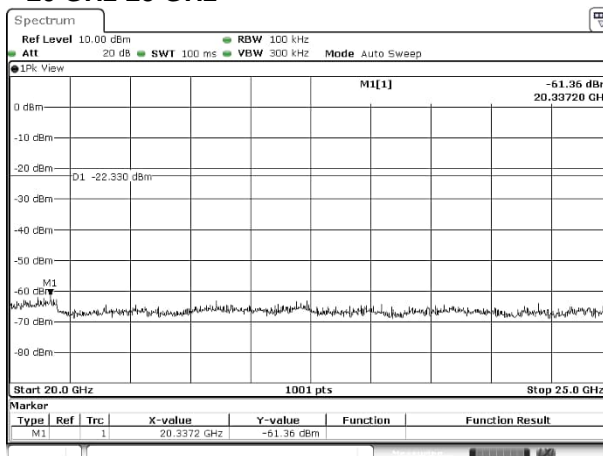
10 GHz-15 GHz



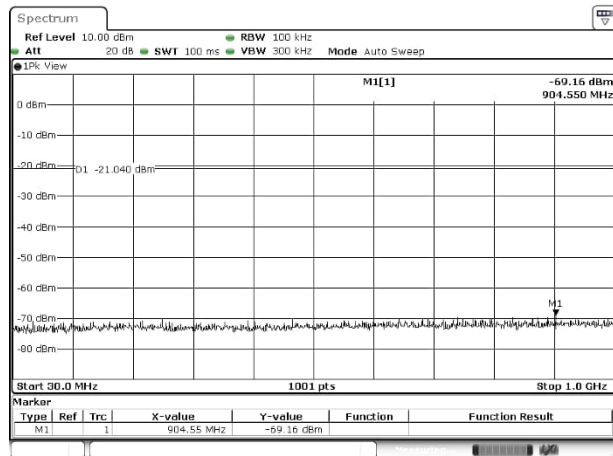
15 GHz-20 GHz



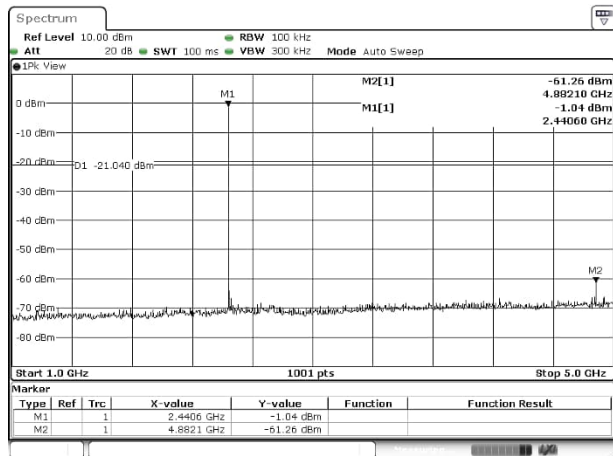
20 GHz-25 GHz



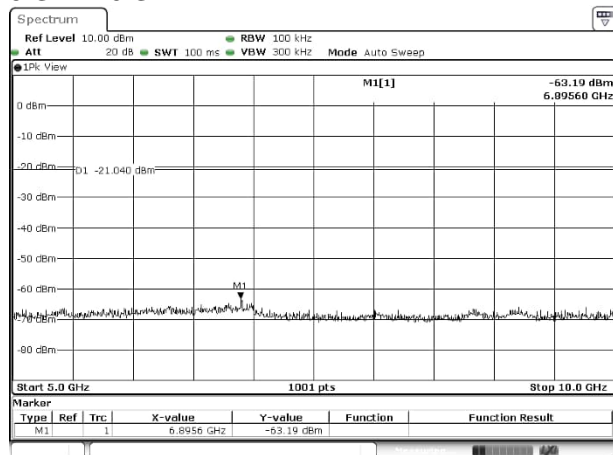
[DH5] Channel Middle 30 MHz-1 GHz



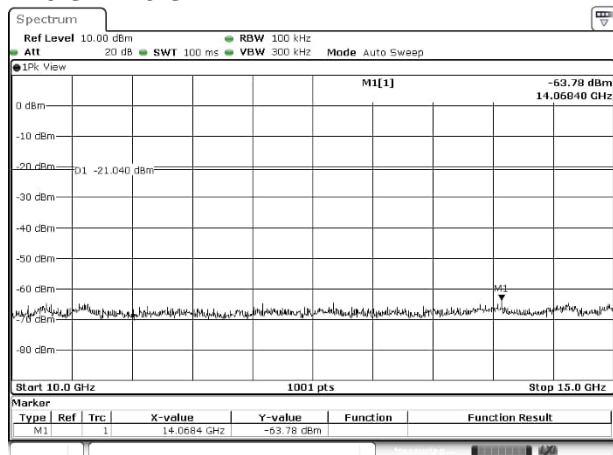
1 GHz-5 GHz



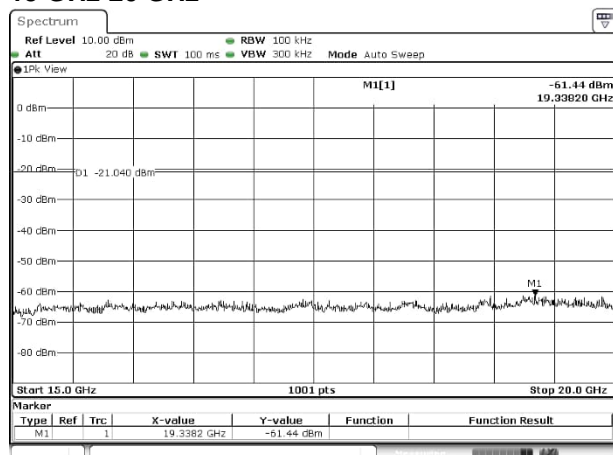
5 GHz-10 GHz



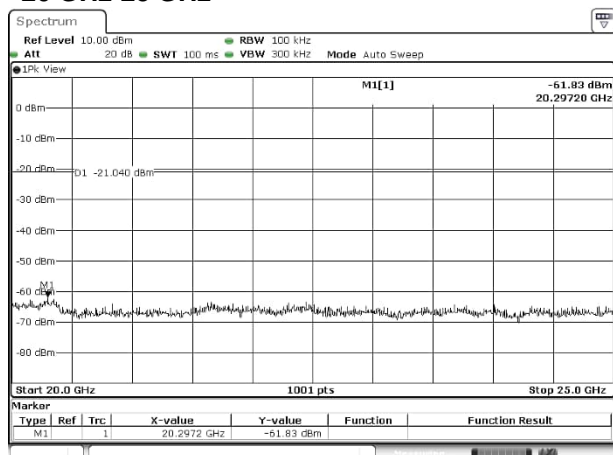
10 GHz-15 GHz



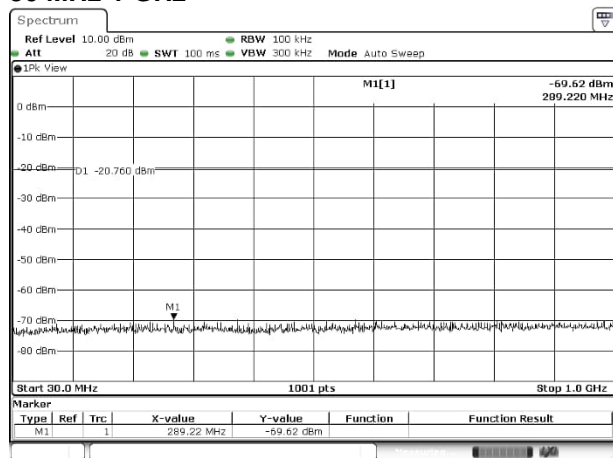
15 GHz-20 GHz



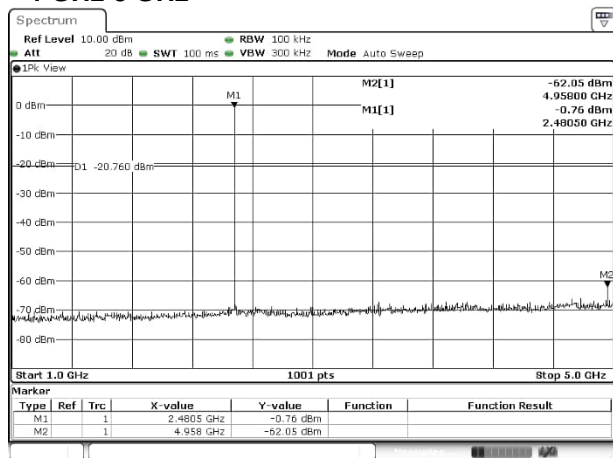
20 GHz-25 GHz



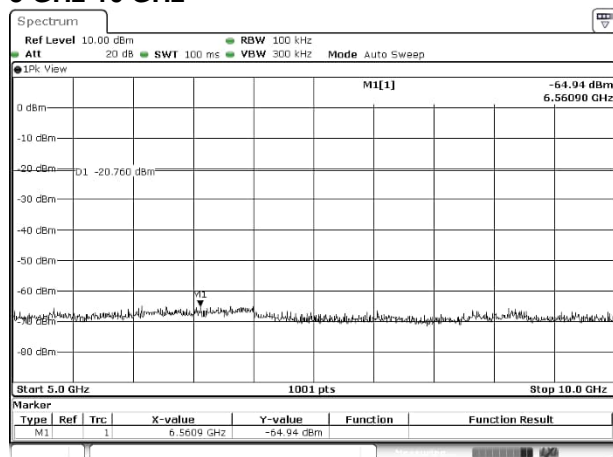
[DH5] Channel High 30 MHz-1 GHz



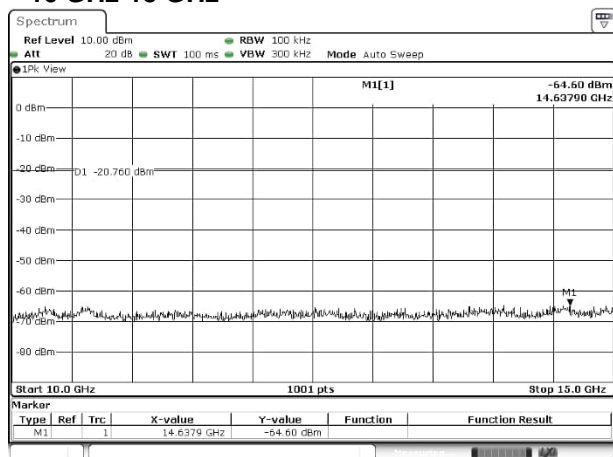
1 GHz-5 GHz



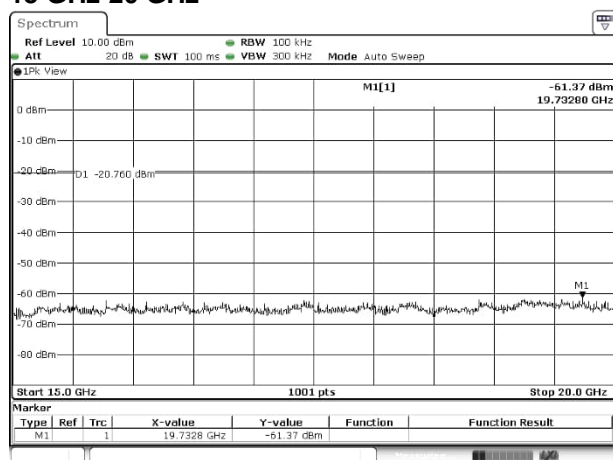
5 GHz-10 GHz



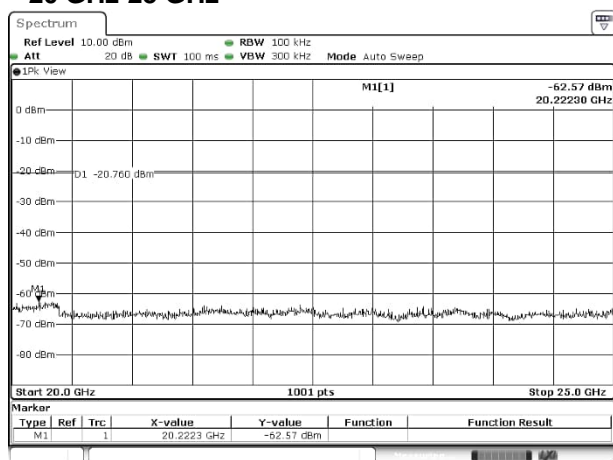
10 GHz-15 GHz



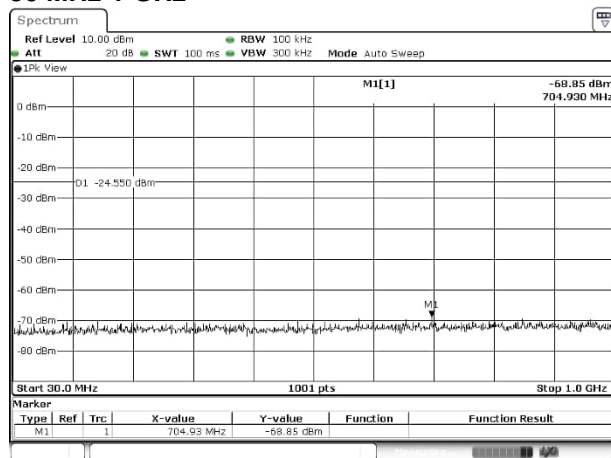
15 GHz-20 GHz



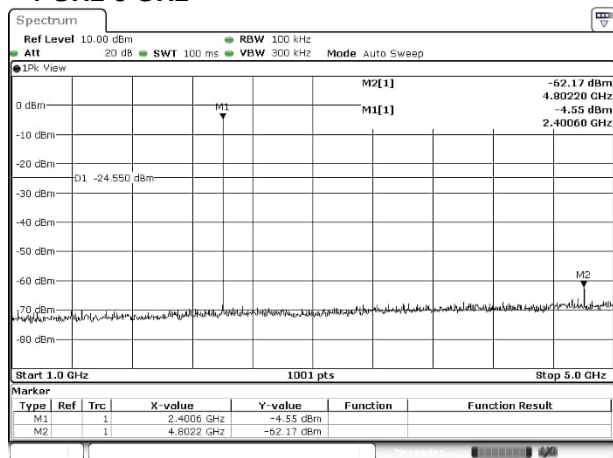
20 GHz-25 GHz



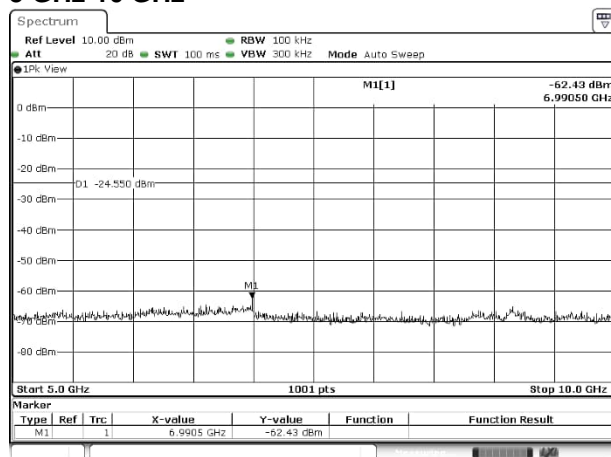
[3-DH5] Channel Low 30 MHz-1 GHz



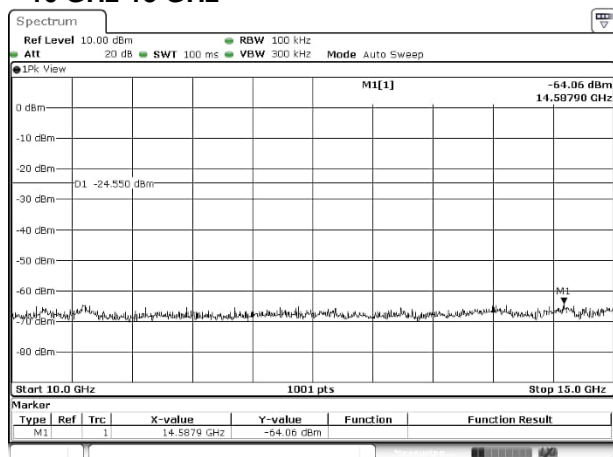
1 GHz-5 GHz



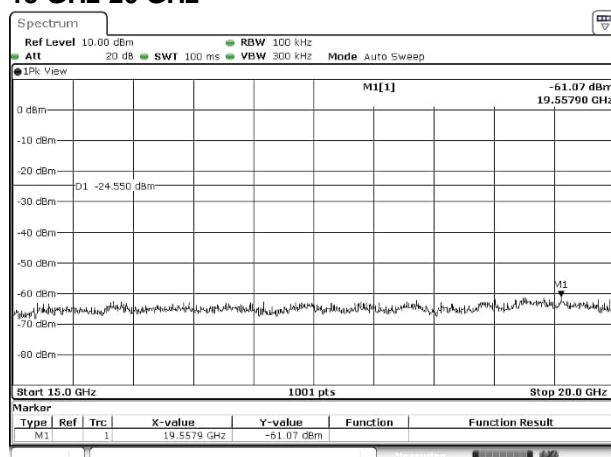
5 GHz-10 GHz



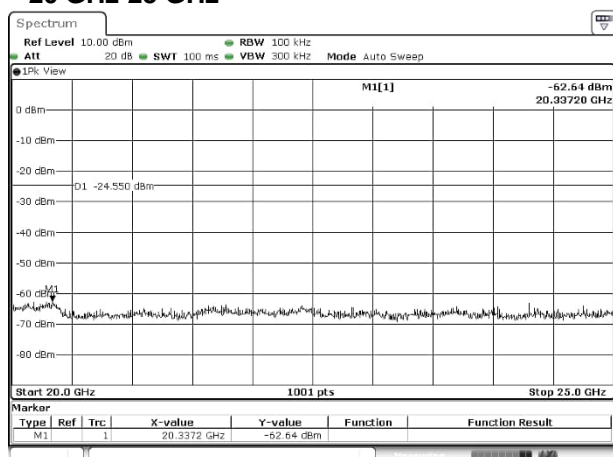
10 GHz-15 GHz



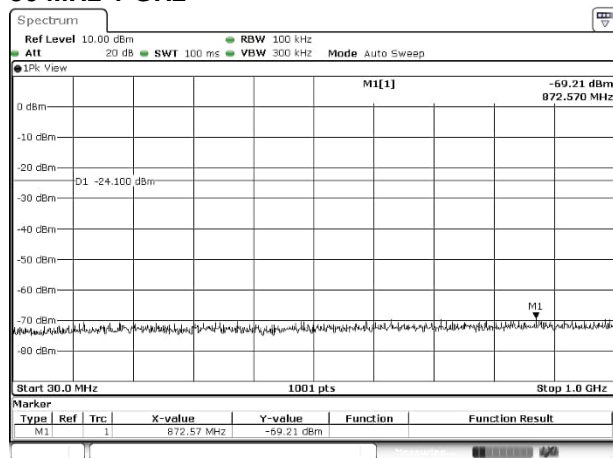
15 GHz-20 GHz



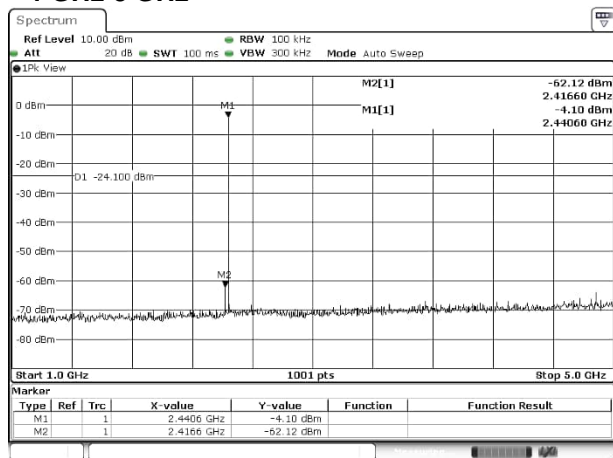
20 GHz-25 GHz



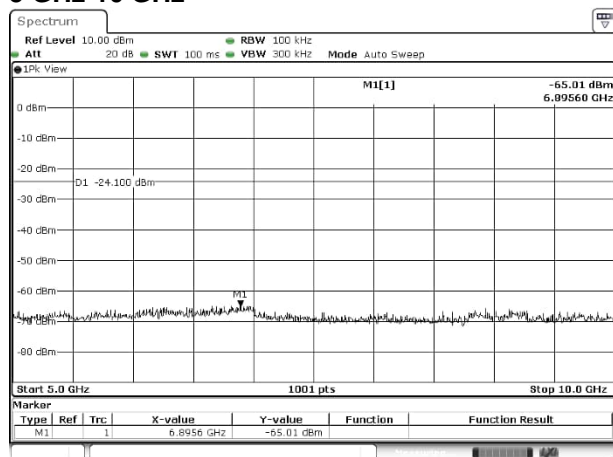
[3-DH5] Channel Middle 30 MHz-1 GHz



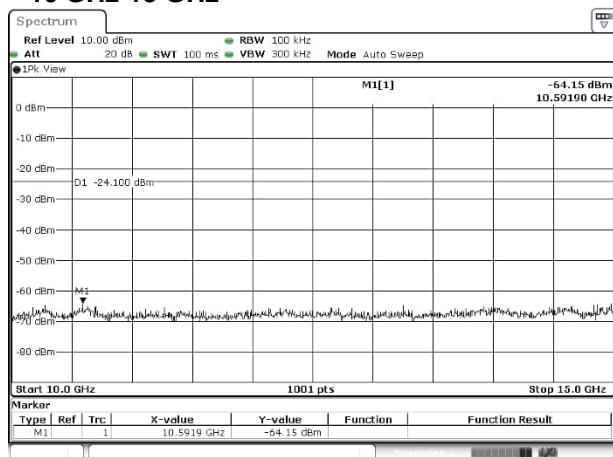
1 GHz-5 GHz



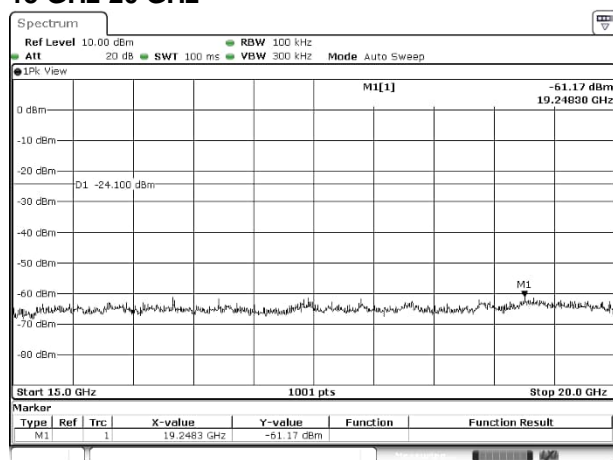
5 GHz-10 GHz



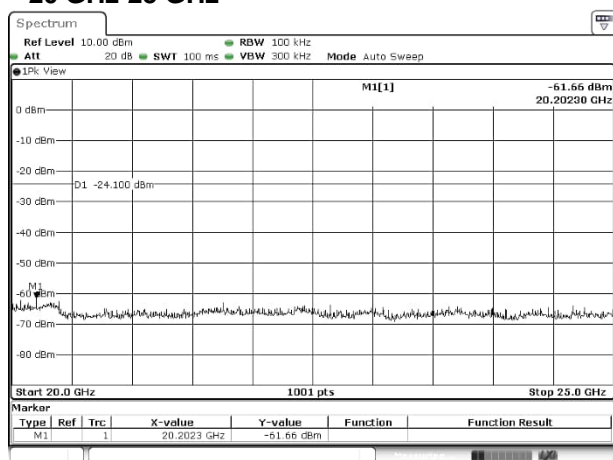
10 GHz-15 GHz



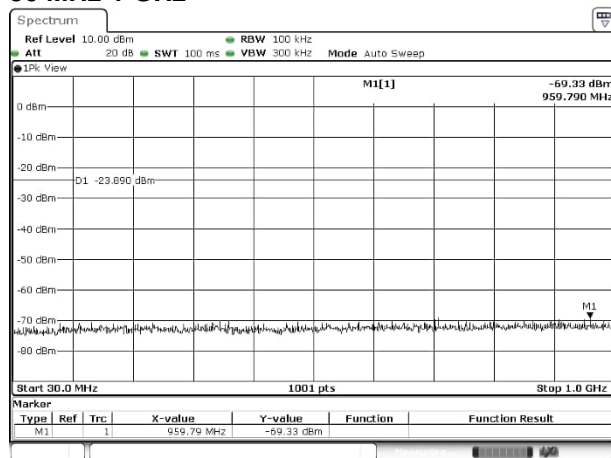
15 GHz-20 GHz



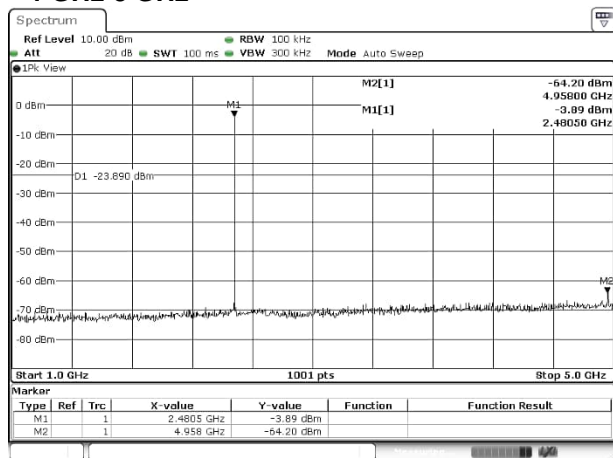
20 GHz-25 GHz



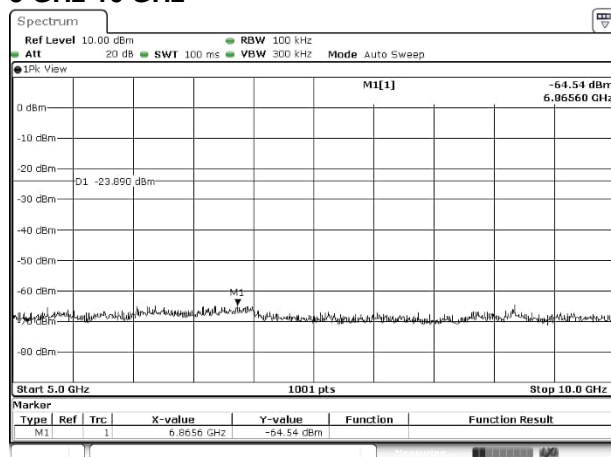
[3-DH5] Channel High 30 MHz-1 GHz



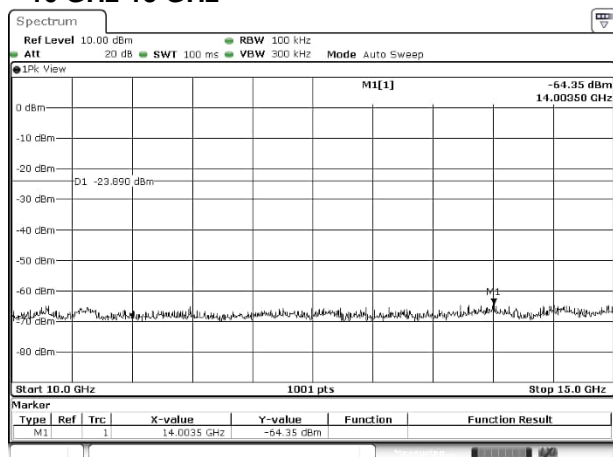
1 GHz-5 GHz



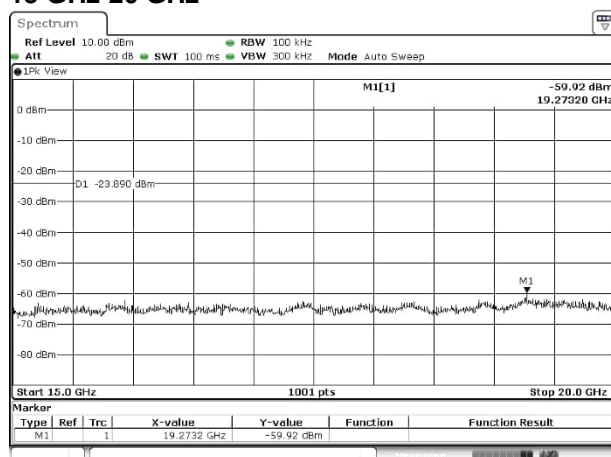
5 GHz-10 GHz



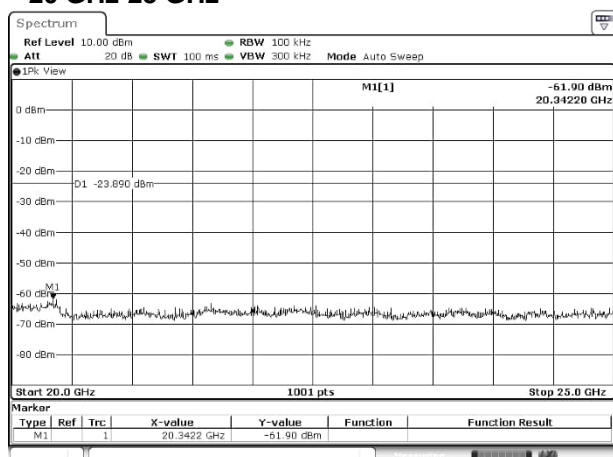
10 GHz-15 GHz



15 GHz-20 GHz



20 GHz-25 GHz



4.8 Spurious Emissions - Radiated -

4.8.1 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 | : Styrofoam table / (W)1.0m × (D)0.8m × (H)0.8m (below 1GHz) Styrofoam table / (W)0.6m × (D)0.6m × (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=1kHz, Span=0Hz, Sweep=auto Display mode=Linear |

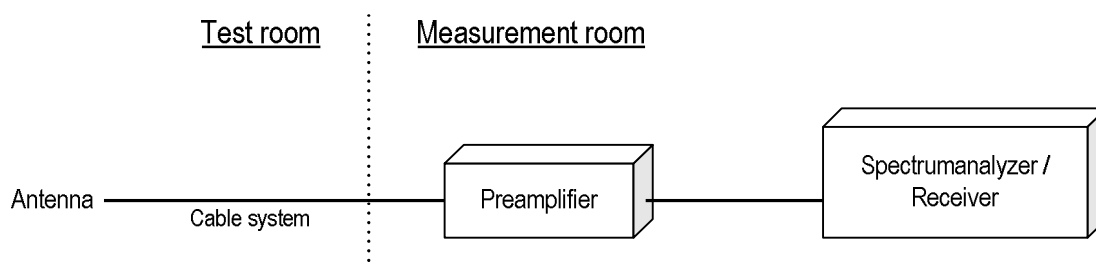
Average Measurement Setting [VBW]

| Mode | Duty Cycle (%) | T _{on} (us) | T _{off} (us) | 1/T _{on} (kHz) | Determined VBW Setting |
|-------------------|----------------|----------------------|-----------------------|-------------------------|------------------------|
| Bluetooth 5.3 BDR | 76.73 | 2885 | 875 | 0.347 | 1kHz |
| Bluetooth 5.3 EDR | 76.96 | 2890 | 865 | 0.346 | 1kHz |

Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 30 m open area test site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 937606.

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/1.5m 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



4.8.2 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 = 49.0dBuV Cable system loss = 8.3dB

Result = 49.0 + 8.3 = 57.3dBuV/m

Margin = 74.0 - 57.3 = 16.7dB

4.8.3 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.



Japan

4.8.4 Test data

Date : 28-October-2022
Temperature : 23.1 [°C]
Humidity : 24.3 [%]
Test place : 3m Semi-anechoic chamber

Test engineer : Chiaki Kanno

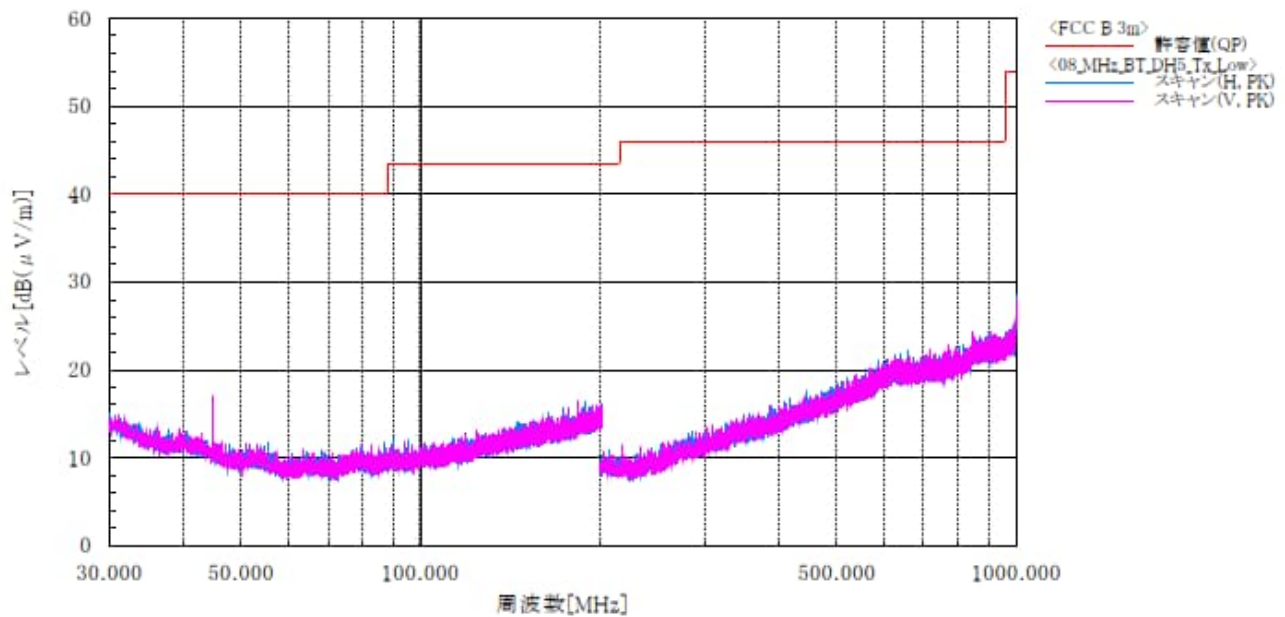
Date : 28-November-2022
Temperature : 22.6 [°C]
Humidity : 22.5 [%]
Test place : 3m Semi-anechoic chamber

Test engineer : Kazunori Saito

[Transmission mode]**[DH5]****Channel: Low****BELOW 1 GHz**

Company name : KYOCERA Corporation
 EUT : Mobile Phone
 Model No. : EB1155
 Serial No. : N/A
 Test mode : BT_DH5_Tx_ch:Low

Standard : FCC Part.15 subpartC
 Operator : K.Saito
 Temp,Hum,Atm : 22.6[°C] 22.5[%]
 Note1 : X axis
 Note2 :

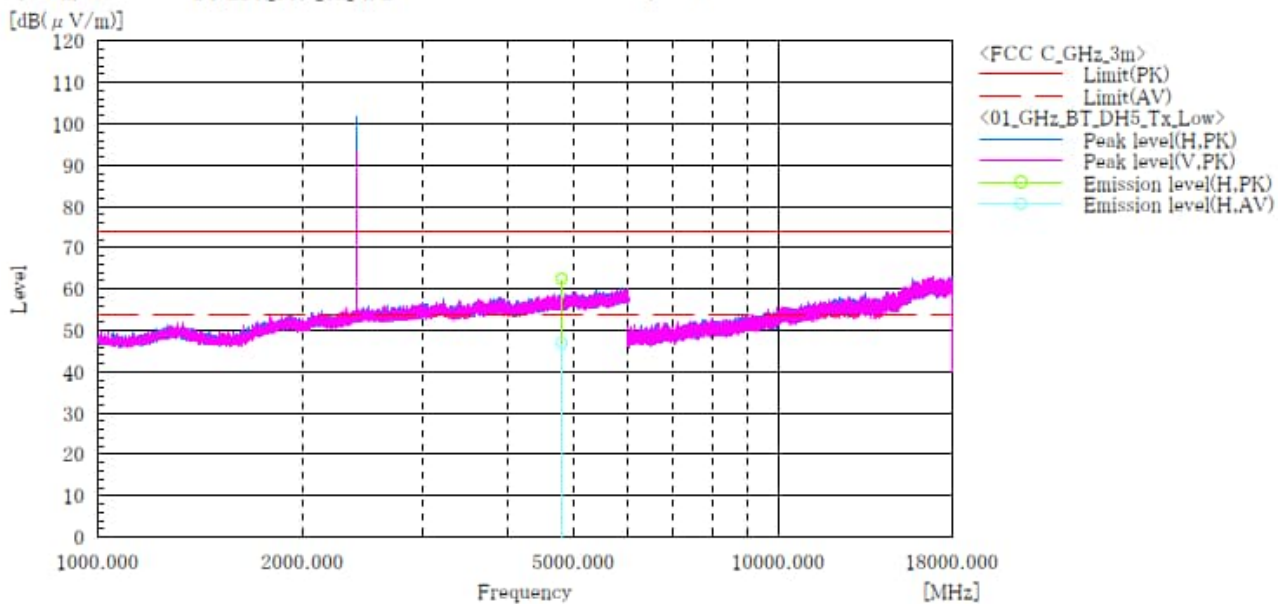
**Final Result****Note:**

1. Emission Level (Margin) = Limit - [Reading + Factor (Antenna + Cable - Amp)]
2. No emission were detected in frequency range 9kHz to 30MHz at the 3 meters distance.

**[DH5]
Channel: Low
ABOVE 1 GHz**

Company name : KYOCERA Corporation
EUT : Mobile Phone
Model No. : EB1155
Serial No. : N/A
Test mode : BT EDR_DH5_Tx_ch:Low

Standard : FCC Part.15 subpart C
Operator : C.Kanno
Temp,Hum,Atm : 23.1[°C] 24.3[%]
Note1 : X axis
Note2 :



Final Result

| No. | Frequency [MHz] | (P) | Reading PK [dB(μV)] | Reading AV [dB(μV)] | c.f [dB(1/m)] | Result PK [dB(μV/m)] | Result AV [dB(μV/m)] | Limit PK [dB(μV/m)] | Limit AV [dB(μV/m)] | Margin PK [dB] | Margin AV [dB] | Height [cm] | Angle [°] | Remark |
|-----|-----------------|-----|---------------------|---------------------|---------------|----------------------|----------------------|---------------------|---------------------|----------------|----------------|-------------|-----------|--------|
| 1 | 4804.000 | H | 52.4 | 36.8 | 10.2 | 62.6 | 47.0 | 74.0 | 54.0 | 11.4 | 7.0 | 100.0 | 264.0 | |

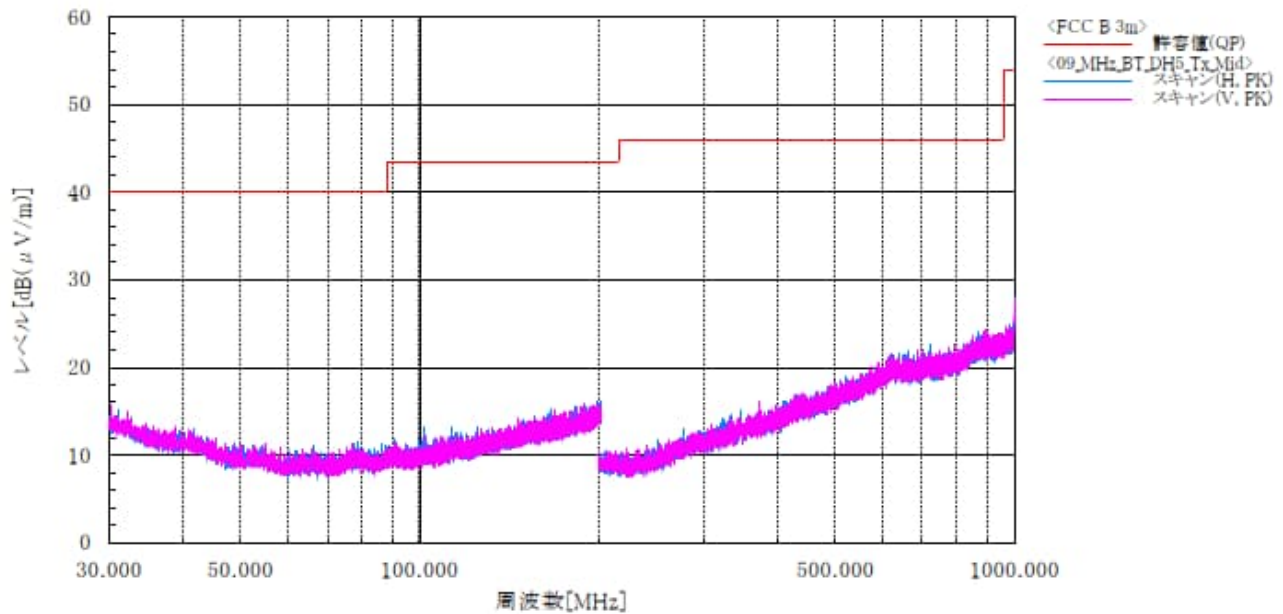
Note:

- Emission Level (Margin) = Limit - [Reading + Factor (Antenna + Cable - Amp)]
- No emission were detected in frequency range 18GHz to 25GHz at the 3 meters distance.

**[DH5]
Channel: Middle
BELOW 1 GHz**

Company name : KYOCERA Corporation
EUT : Mobile Phone
Model No. : EB1155
Serial No. : N/A
Test mode : BT_DH5_Tx_ch:Mid

Standard : FCC Part.15 subpartC
Operator : K.Saito
Temp,Hum,Atm : 22.6[°C] 22.5[%]
Note1 : X axis
Note2 :



Final Result

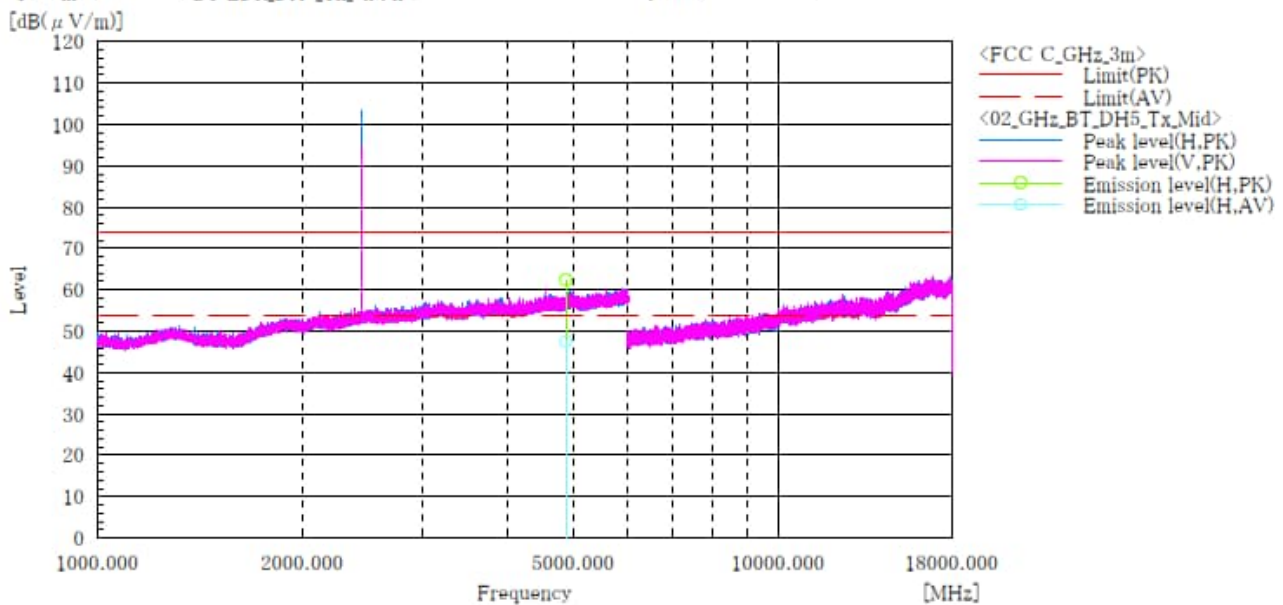
Note:

1. Emission Level (Margin) = Limit - [Reading + Factor (Antenna + Cable - Amp)]
2. No emission were detected in frequency range 9kHz to 30MHz at the 3 meters distance.

**[DH5]
Channel: Middle
ABOVE 1 GHz**

Company name : KYOCERA Corporation
EUT : Mobile Phone
Model No. : EB1155
Serial No. : N/A
Test mode : BT EDR_DH5_Tx_ch:Mid

Standard : FCC Part.15 subpart C
Operator : C.Kanno
Temp.,Hum.,Atm : 23.1[°C] 24.3[%]
Note1 : X axis
Note2 :



Final Result

| No. | Frequency [MHz] | (P) | Reading PK [dB(μV)] | Reading AV [dB(μV)] | c.f [dB(1/m)] | Result PK [dB(μV/m)] | Result AV [dB(μV/m)] | Limit PK [dB(μV/m)] | Limit AV [dB(μV/m)] | Margin PK [dB] | Margin AV [dB] | Height [cm] | Angle [°] | Remark |
|-----|-----------------|-----|---------------------|---------------------|---------------|----------------------|----------------------|---------------------|---------------------|----------------|----------------|-------------|-----------|--------|
| 1 | 4882.000 | H | 52.1 | 37.2 | 10.4 | 62.5 | 47.6 | 74.0 | 54.0 | 11.5 | 6.4 | 128.0 | 192.0 | |

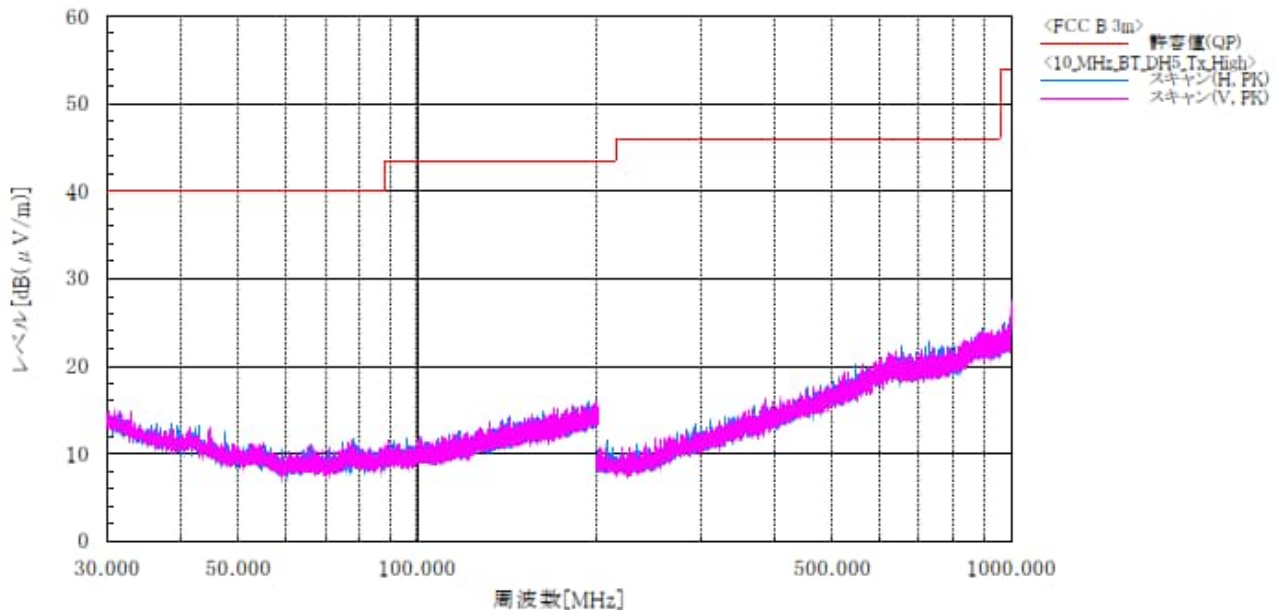
Note:

- Emission Level (Margin) = Limit - [Reading + Factor (Antenna + Cable – Amp)]
- No emission were detected in frequency range 18GHz to 25GHz at the 3 meters distance.

**[DH5]
Channel: High
BELOW 1 GHz**

Company name : KYOCERA Corporation
EUT : Mobile Phone
Model No. : EB1155
Serial No. : N/A
Test mode : BT_DH5_Tx_ch:High

Standard : FCC Part.15 subpartC
Operator : K.Saito
Temp,Hum,Atm : 22.6[°C] 22.5[%]
Note1 : X axis
Note2 :



Final Result

Note:

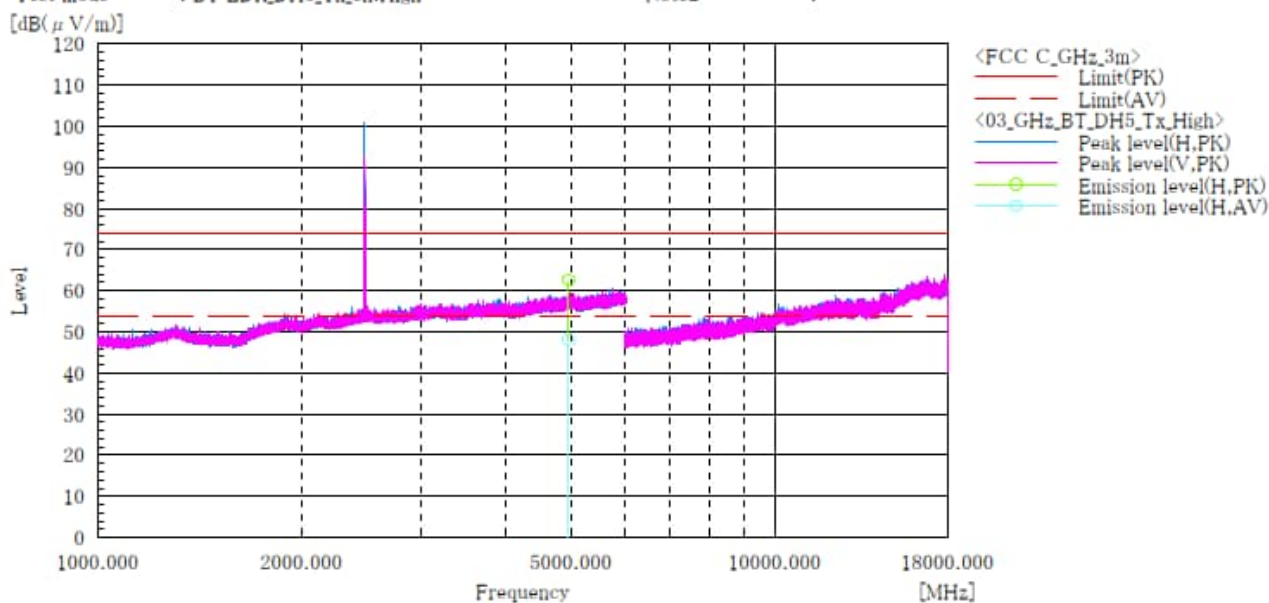
1. Emission Level (Margin) = Limit - [Reading + Factor (Antenna + Cable - Amp)]
2. No emission were detected in frequency range 9kHz to 30MHz at the 3 meters distance.

[DH5]

Channel: High
ABOVE 1 GHz

Company name : KYOCERA Corporation
 EUT : Mobile Phone
 Model No. : EB1155
 Serial No. : N/A
 Test mode : BT EDR_DH5_Tx_ch:High

Standard : FCC Part.15 subpart C
 Operator : C.Kanno
 Temp,Hum,Atm : 23.1[°C] 24.3[%]
 Note1 : X axis
 Note2 :



Final Result

| No. | Frequency [MHz] | (P) | Reading PK [dB(μV)] | Reading AV [dB(μV)] | c.f [dB(1/m)] | Result PK [dB(μV/m)] | Result AV [dB(μV/m)] | Limit PK [dB(μV/m)] | Limit AV [dB(μV/m)] | Margin PK [dB] | Margin AV [dB] | Height [cm] | Angle [°] | Remark |
|-----|-----------------|-----|---------------------|---------------------|---------------|----------------------|----------------------|---------------------|---------------------|----------------|----------------|-------------|-----------|--------|
| 1 | 4960.000 | H | 51.6 | 37.1 | 11.0 | 62.6 | 48.1 | 74.0 | 54.0 | 11.4 | 5.9 | 100.0 | 263.0 | |

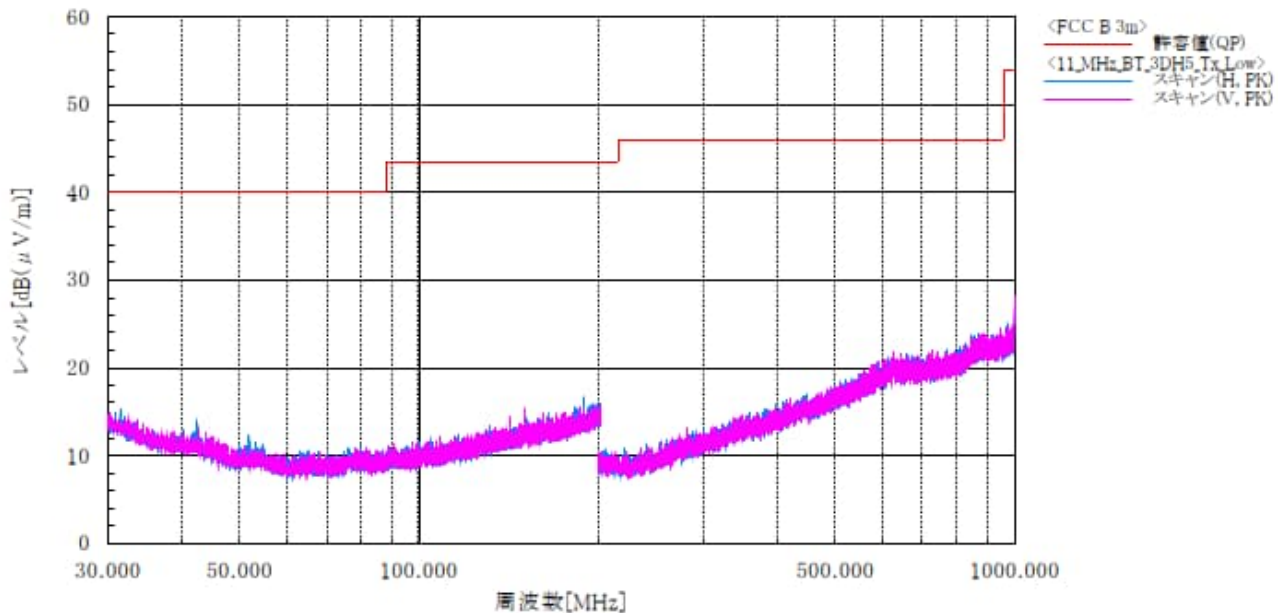
Note:

- Emission Level (Margin) = Limit - [Reading + Factor (Antenna + Cable - Amp)]
- No emission were detected in frequency range 18GHz to 25GHz at the 3 meters distance.

[3-DH5]
Channel: Low
BELOW 1 GHz

Company name : KYOCERA Corporation
 EUT : Mobile Phone
 Model No. : EB1155
 Serial No. : N/A
 Test mode : BT_3-DH5_Tx_ch:Low

Standard : FCC Part.15 subpartC
 Operator : K.Saito
 Temp,Hum,Atm : 22.6[°C] 22.5[%]
 Note1 : X axis
 Note2 :



Final Result

Note:

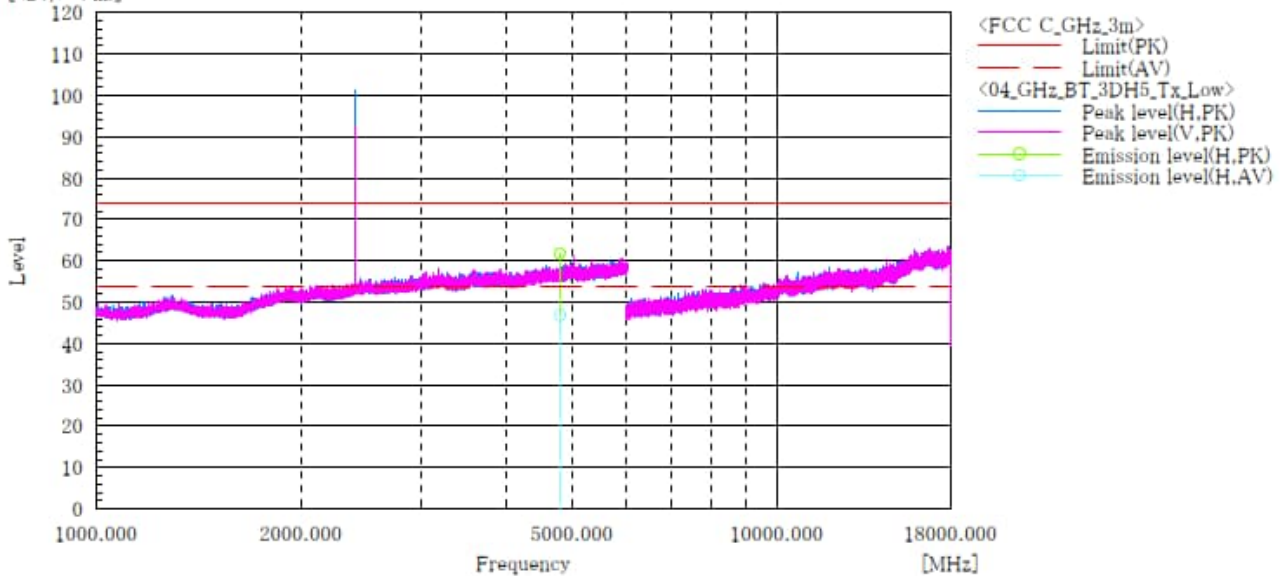
1. Emission Level (Margin) = Limit - [Reading + Factor (Antenna + Cable - Amp)]
2. No emission were detected in frequency range 9kHz to 30MHz at the 3 meters distance.

[3-DH5]
Channel: Low
ABOVE 1 GHz

Company name : KYOCERA Corporation
 EUT : Mobile Phone
 Model No. : EB1155
 Serial No. : N/A
 Test mode : BT EDR_3-DH5_Tx_ch:Low

Standard : FCC Part.15 subpart C
 Operator : C.Kanno
 Temp,Hum,Atm : 23.1[°C] 24.3[%]
 Note1 : X axis
 Note2 :

[dB(μV/m)]



Final Result

| No. | Frequency [MHz] | (P) | Reading PK [dB(μV)] | Reading AV [dB(μV)] | c.f [dB(1/m)] | Result PK [dB(μV/m)] | Result AV [dB(μV/m)] | Limit PK [dB(μV/m)] | Limit AV [dB(μV/m)] | Margin PK [dB] | Margin AV [dB] | Height [cm] | Angle [°] | Remark |
|-----|-----------------|-----|---------------------|---------------------|---------------|----------------------|----------------------|---------------------|---------------------|----------------|----------------|-------------|-----------|--------|
| 1 | 4804.000 | H | 51.6 | 36.7 | 10.2 | 61.8 | 46.9 | 74.0 | 54.0 | 12.2 | 7.1 | 100.0 | 264.0 | |

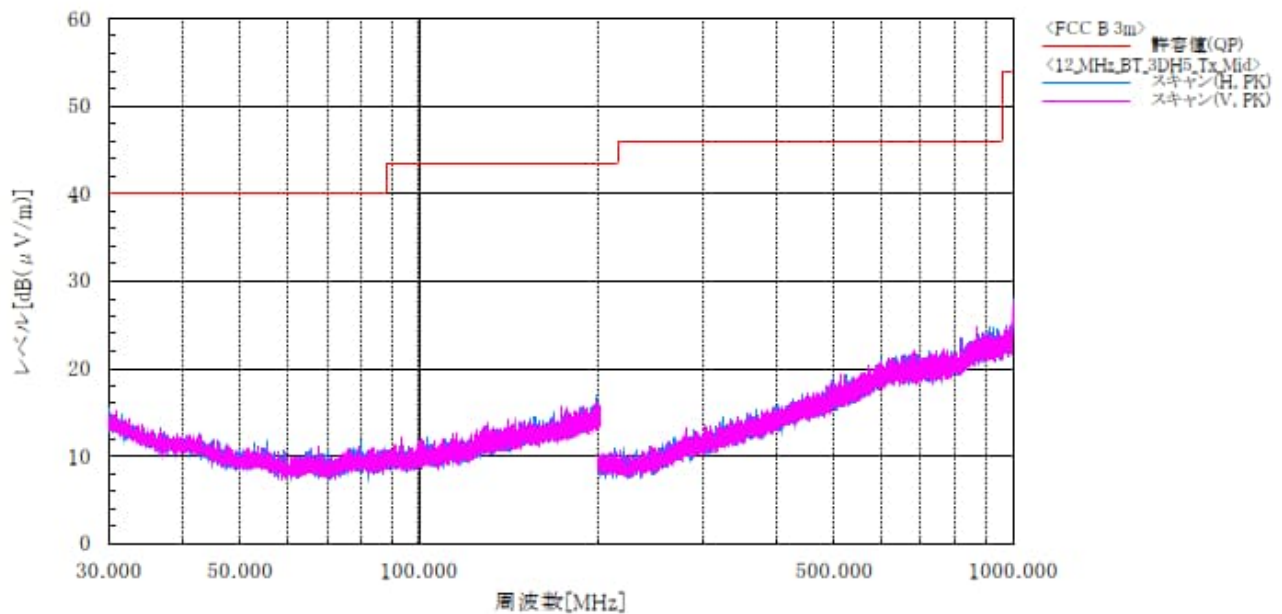
Note:

1. Emission Level (Margin) = Limit - [Reading + Factor (Antenna + Cable - Amp)]
2. No emission were detected in frequency range 18GHz to 25GHz at the 3 meters distance.

[3-DH5]
Channel: Middle
BELOW 1 GHz

Company name : KYOCERA Corporation
 EUT : Mobile Phone
 Model No. : EB1155
 Serial No. : N/A
 Test mode : BT_3-DH5_Tx_ch:Mid

Standard : FCC Part.15 subpartC
 Operator : K.Saito
 Temp,Hum,Atm : 22.6[°C] 22.5[%]
 Note1 : X axis
 Note2 :



Final Result

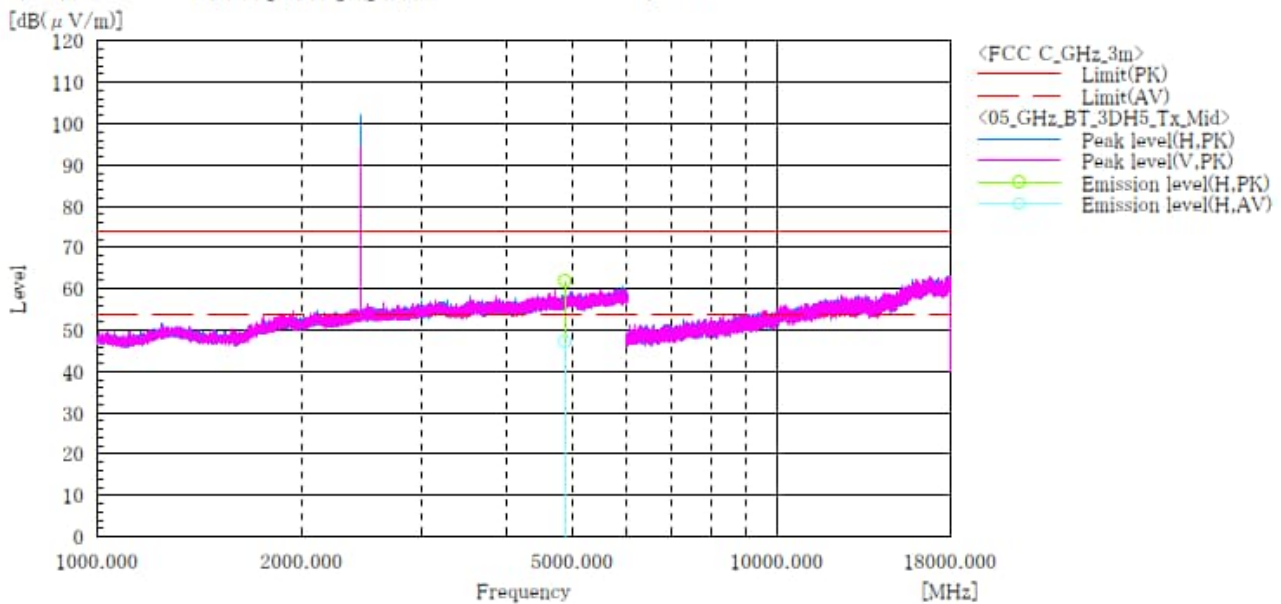
Note:

1. Emission Level (Margin) = Limit - [Reading + Factor (Antenna + Cable - Amp)]
2. No emission were detected in frequency range 9kHz to 30MHz at the 3 meters distance.

[3-DH5]
Channel: Middle
ABOVE 1 GHz

Company name : KYOCERA Corporation
 EUT : Mobile Phone
 Model No. : EB1155
 Serial No. : N/A
 Test mode : BT EDR_3-DH5_Tx_ch:Mid

Standard : FCC Part.15 subpart C
 Operator : C.Kanno
 Temp.Hum.Atm : 23.1[°C] 24.3[%]
 Note1 : X axis
 Note2 :



Final Result

| No. | Frequency (P) | Reading PK | Reading AV | c.f | Result PK | Result AV | Limit PK | Limit AV | Margin PK | Margin AV | Height | Angle | Remark | |
|-----|---------------|---------------|---------------|-----------|--------------|--------------|-------------|-------------|--------------|--------------|--------|-------|--------|--|
| | [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 | 51.6 | 36.9 | 10.4 | 62.0 | 47.3 | 74.0 | 54.0 | 12.0 | 6.7 | 100.0 | 277.0 | |

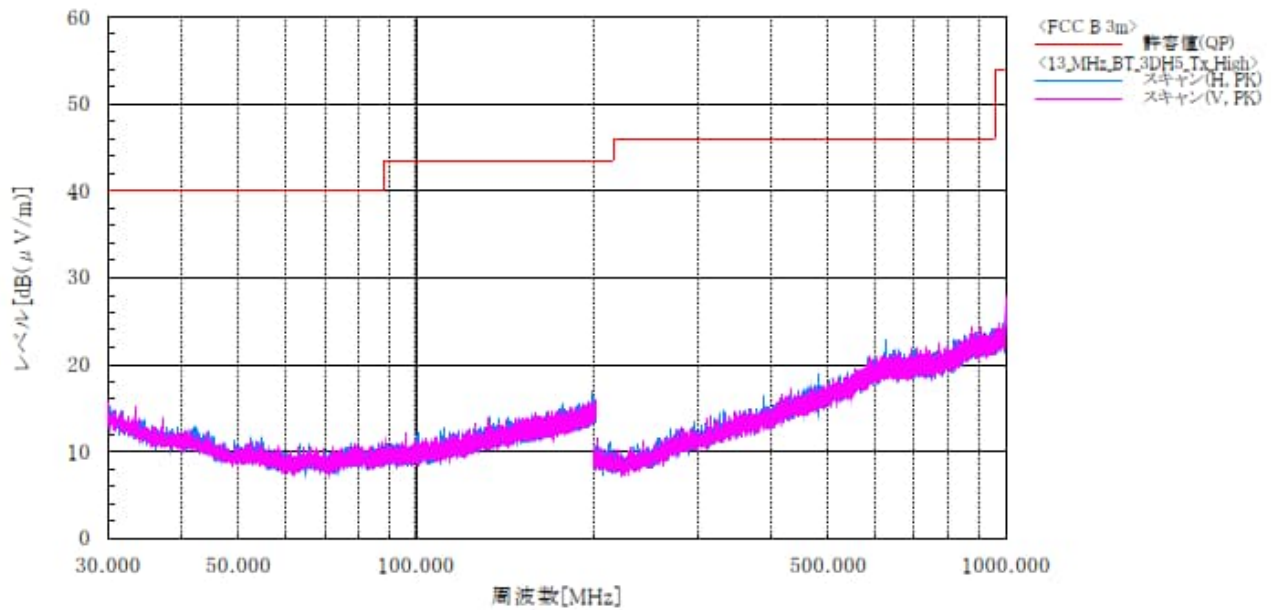
Note:

- Emission Level (Margin) = Limit - [Reading + Factor (Antenna + Cable - Amp)]
- No emission were detected in frequency range 18GHz to 25GHz at the 3 meters distance.

[3-DH5]
Channel: High
BELOW 1 GHz

Company name : KYOCERA Corporation
 EUT : Mobile Phone
 Model No. : EB1155
 Serial No. : N/A
 Test mode : BT_3-DH5_Tx_ch:High

Standard : FCC Part.15 subpartC
 Operator : K.Saito
 Temp.,Hum.,Atm : 22.6[°C] 22.5[%]
 Note1 : X axis
 Note2 :



Final Result

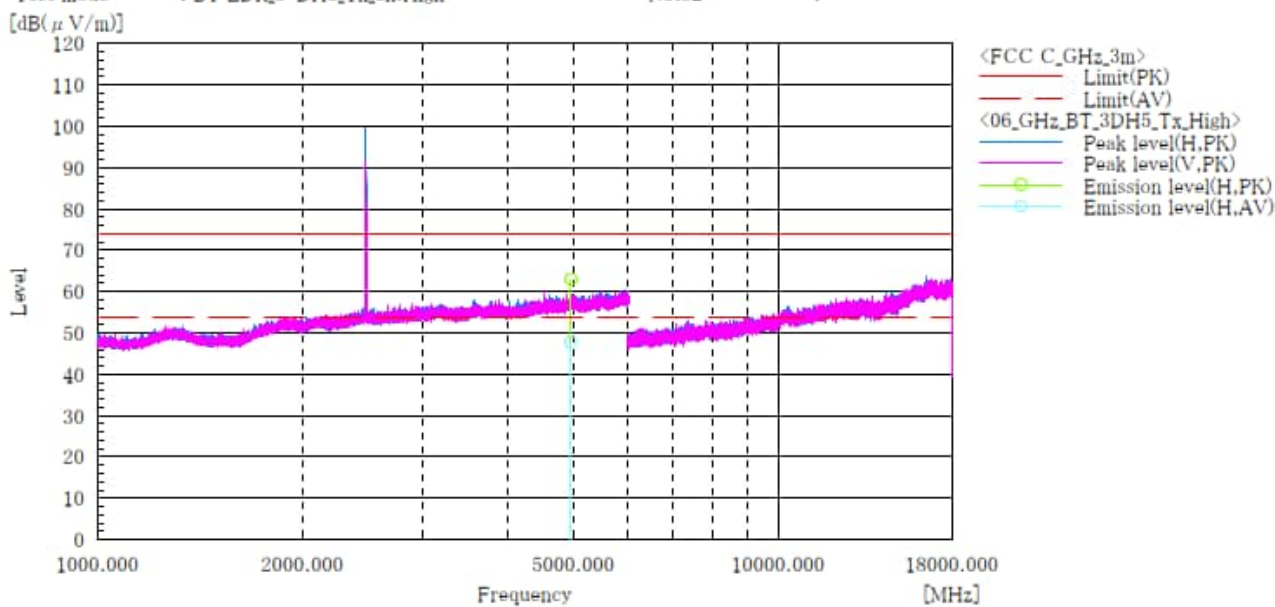
Note:

1. Emission Level (Margin) = Limit - [Reading + Factor (Antenna + Cable - Amp)]
2. No emission were detected in frequency range 9kHz to 30MHz at the 3 meters distance.

[3-DH5]
Channel: High
ABOVE 1 GHz

Company name : KYOCERA Corporation
 EUT : Mobile Phone
 Model No. : EB1155
 Serial No. : N/A
 Test mode : BT EDR_3-DH5_Tx_ch:High

Standard : FCC Part.15 subpart C
 Operator : C.Kanno
 Temp,Hum,Atm : 23.1[°C] 24.3[%]
 Note1 : X axis
 Note2 :



Final Result

| No. | Frequency [MHz] | (P) | Reading PK [dB(μV)] | Reading AV [dB(μV)] | c.f [dB(1/m)] | Result PK [dB(μV/m)] | Result AV [dB(μV/m)] | Limit PK [dB(μV/m)] | Limit AV [dB(μV/m)] | Margin PK [dB] | Margin AV [dB] | Height [cm] | Angle [°] | Remark |
|-----|-----------------|-----|---------------------|---------------------|---------------|----------------------|----------------------|---------------------|---------------------|----------------|----------------|-------------|-----------|--------|
| 1 | 4960.000 | H | 52.0 | 36.8 | 11.0 | 63.0 | 47.8 | 74.0 | 54.0 | 11.0 | 6.2 | 100.0 | 267.0 | |

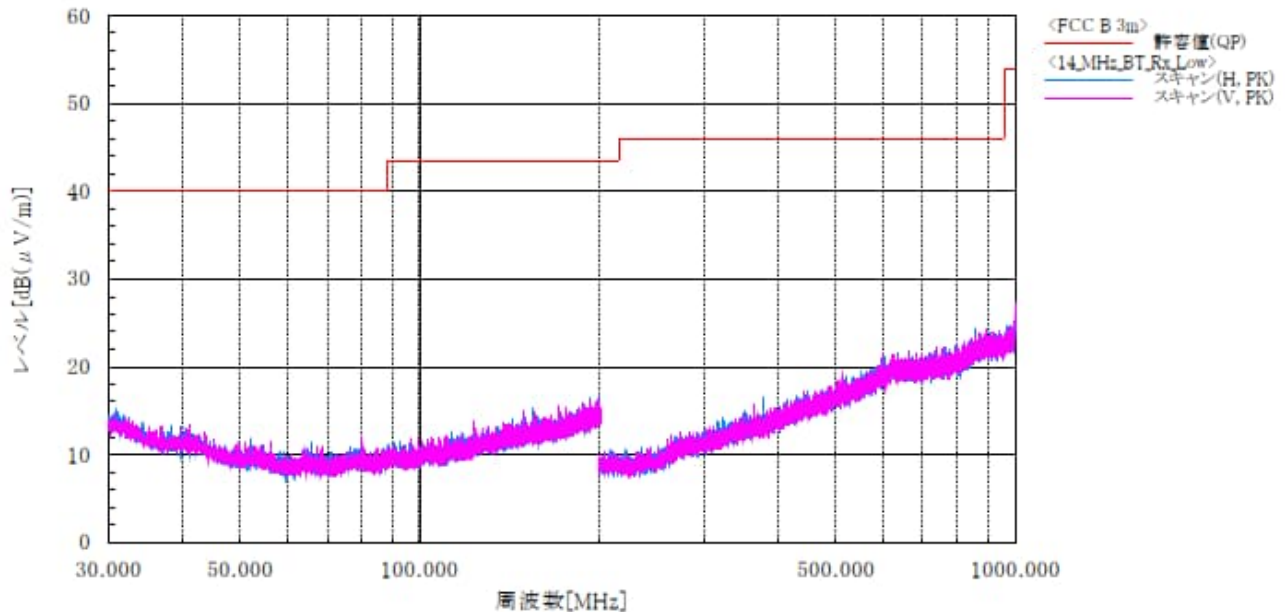
Note:

- Emission Level (Margin) = Limit - [Reading + Factor (Antenna + Cable - Amp)]
- No emission were detected in frequency range 18GHz to 25GHz at the 3 meters distance.

[Receive mode]
Channel: Low
BELOW 1 GHz

Company name : KYOCERA Corporation
 EUT : Mobile Phone
 Model No. : EB1155
 Serial No. : N/A
 Test mode : BT_Rx_ch:Low

Standard : FCC Part.15 subpartC
 Operator : K.Saito
 Temp,Hum,Atm : 22.6[°C] 22.5[%]
 Note1 : X axis
 Note2 :



Final Result

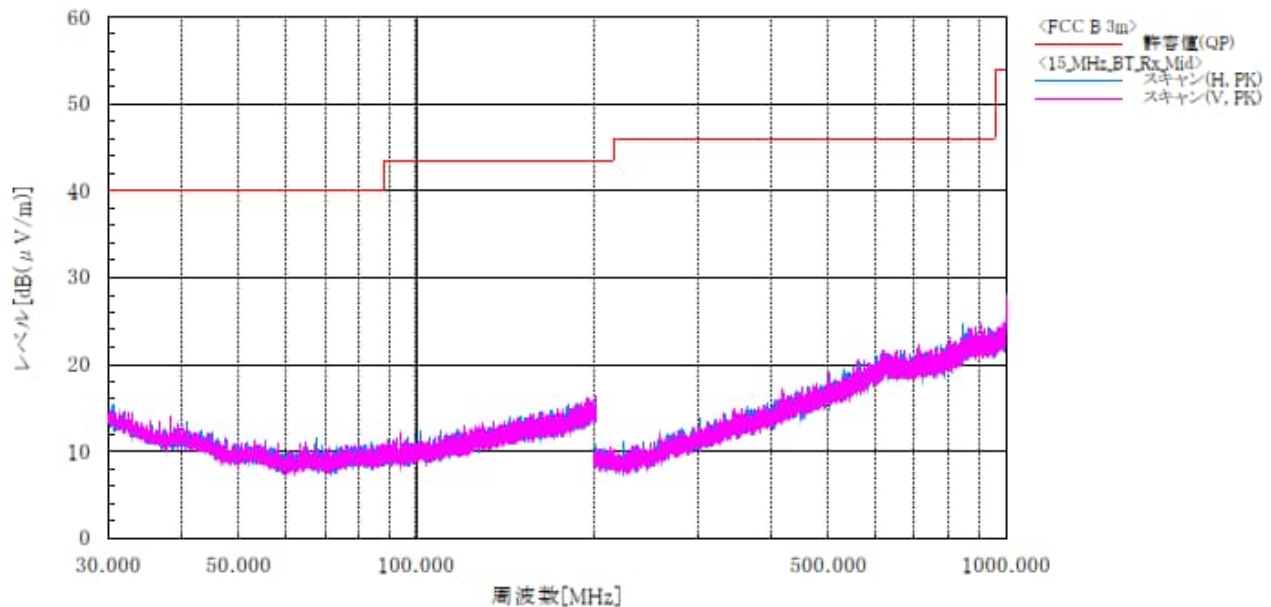
Note:

1. Emission Level (Margin) = Limit - [Reading + Factor (Antenna + Cable - Amp)]
2. No emission were detected in frequency range 9kHz to 30MHz and 1GHz to 25GHz at the 3 meters distance.

Channel: Middle
BELOW 1 GHz

Company name : KYOCERA Corporation
 EUT : Mobile Phone
 Model No. : EB1155
 Serial No. : N/A
 Test mode : BT_Rx_ch:Mid

Standard : FCC Part.15 subpartC
 Operator : K.Saito
 Temp.Hum.Atm : 22.6[°C] 22.5[%]
 Note1 : X axis
 Note2 :

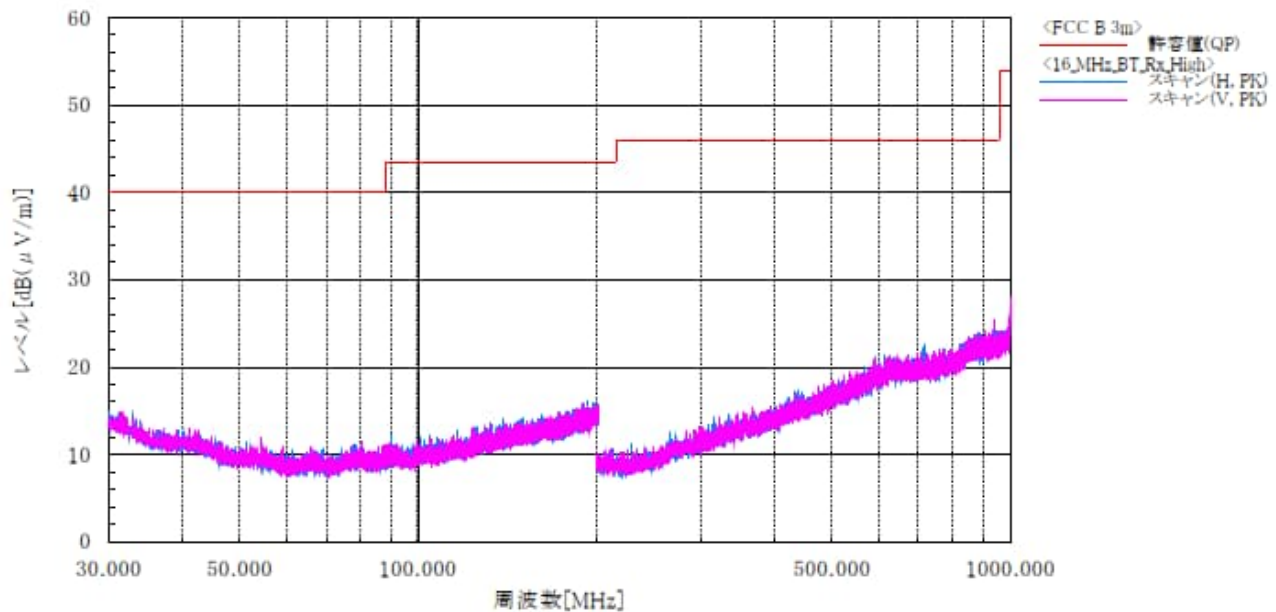

Final Result
Note:

1. Emission Level (Margin) = Limit - [Reading + Factor (Antenna + Cable - Amp)]
2. No emission were detected in frequency range 9kHz to 30MHz and 1GHz to 25GHz at the 3 meters distance.

Channel: High
BELOW 1 GHz

Company name : KYOCERA Corporation
 EUT : Mobile Phone
 Model No. : EB1155
 Serial No. : N/A
 Test mode : BT_Rx_ch:High

Standard : FCC Part.15 subpartC
 Operator : K.Saito
 Temp,Hum,Atm : 22.6[°C] 22.5[%]
 Note1 : X axis
 Note2 :


Final Result
Note:

1. Emission Level (Margin) = Limit - [Reading + Factor (Antenna + Cable - Amp)]
2. No emission were detected in frequency range 9kHz to 30MHz and 1GHz to 25GHz at the 3 meters distance.

4.9 Restricted Band of Operation

4.9.1 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 | : | Styrofoam table / (W)1.0m × (D)0.8m × (H)0.8m (below 1GHz) Styrofoam table / (W)0.6m × (D)0.6m × (H)1.5m (above 1GHz) |
| 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 |

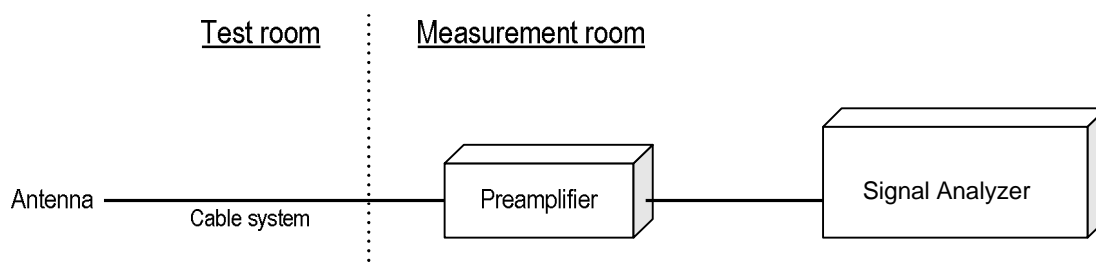
Average Measurement Setting [VBW]

| Mode | Duty Cycle (%) | T _{on} (us) | T _{off} (us) | 1/T _{on} (kHz) | Determined VBW Setting |
|-------------------|----------------|----------------------|-----------------------|-------------------------|------------------------|
| Bluetooth 5.3 BDR | 76.73 | 2885 | 875 | 0.347 | 1kHz |
| Bluetooth 5.3 EDR | 76.96 | 2890 | 865 | 0.346 | 1kHz |

Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 30 m open area test site. Therefore, sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 937606.

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/1.5m 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



4.9.2 Limit

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

4.9.3 Measurement result

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

4.9.4 Test data

Date : 6-December-2022

Temperature : 22.6 [°C]

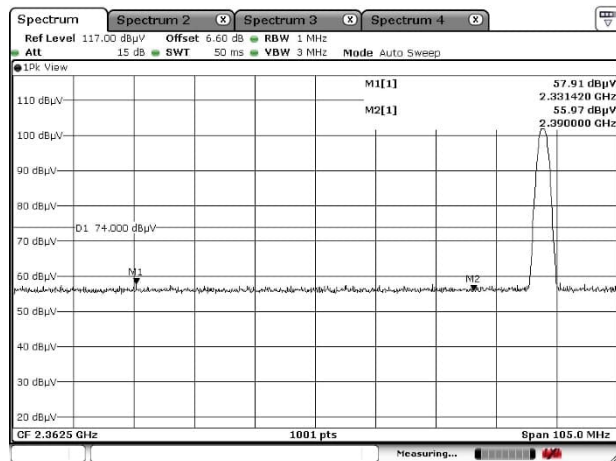
Humidity : 30.5 [%]

Test place : 3m Semi-anechoic chamber

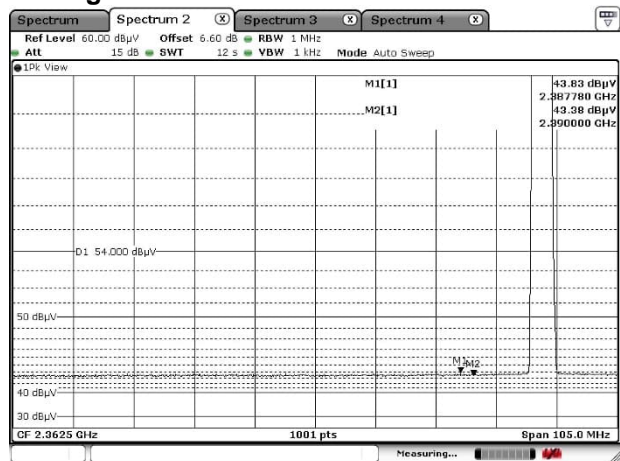
Test engineer :

Tadahiro Seino

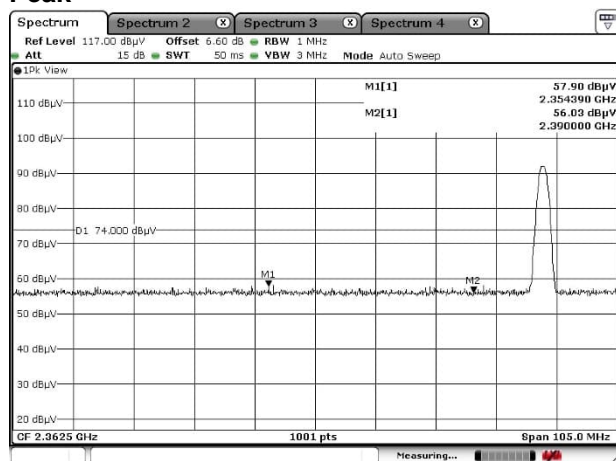
**[DH5]
Channel: Low
Horizontal
Peak**



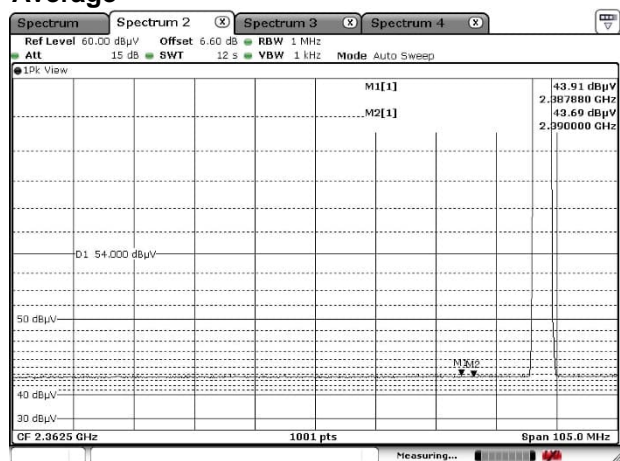
Average



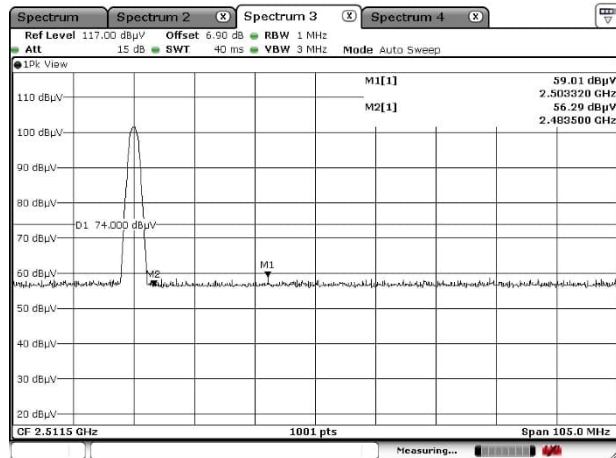
**Vertical
Peak**



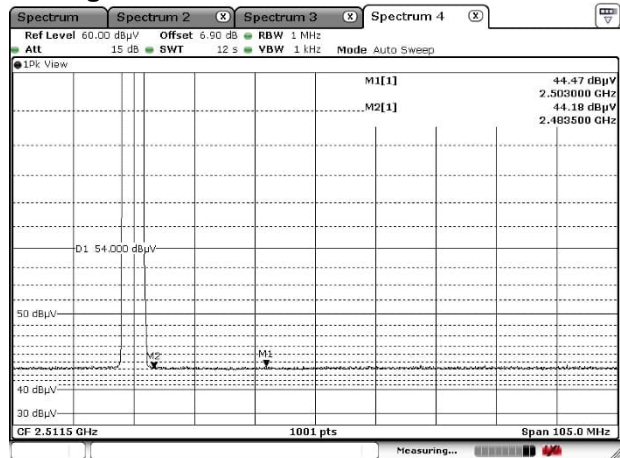
Average



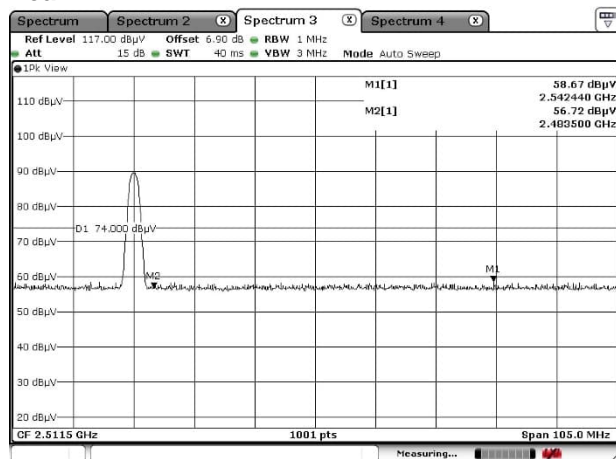
**[DH5]
Channel: High
Horizontal
Peak**



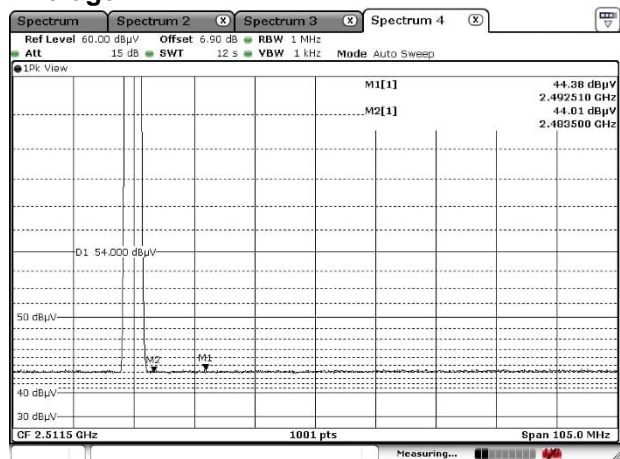
Average



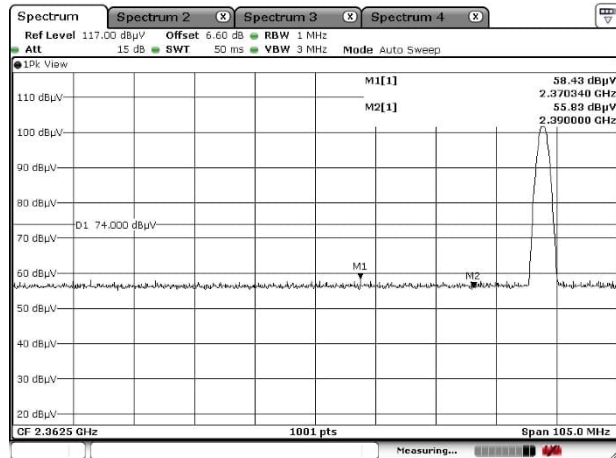
**Vertical
Peak**



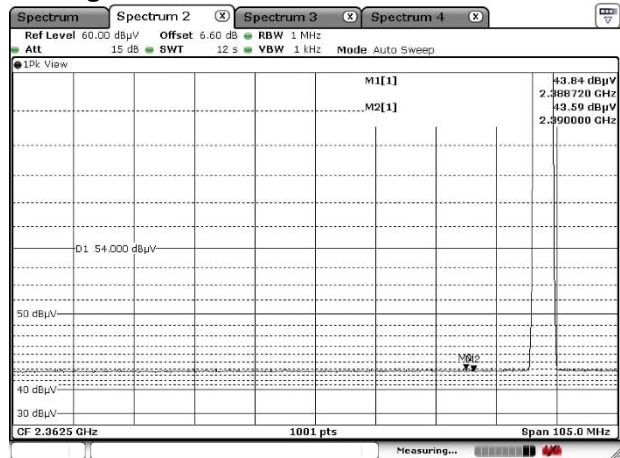
Average



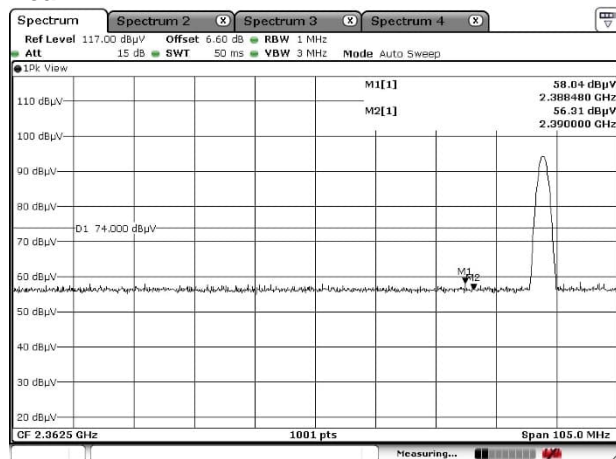
**[3-DH5]
Channel: Low
Horizontal
Peak**



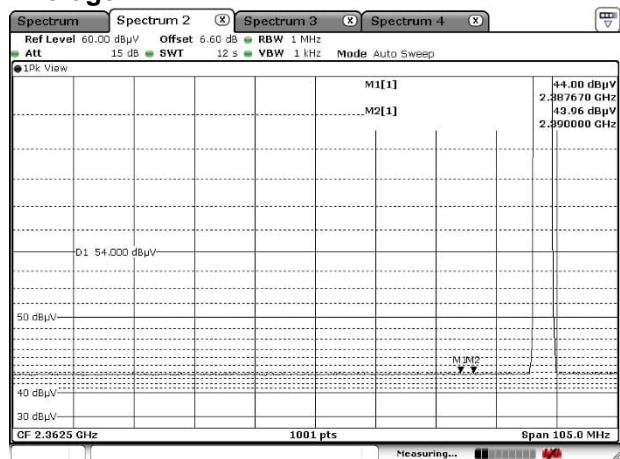
Average



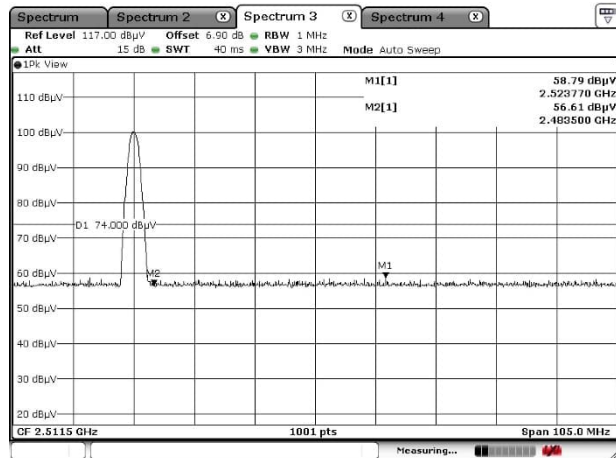
**Vertical
Peak**



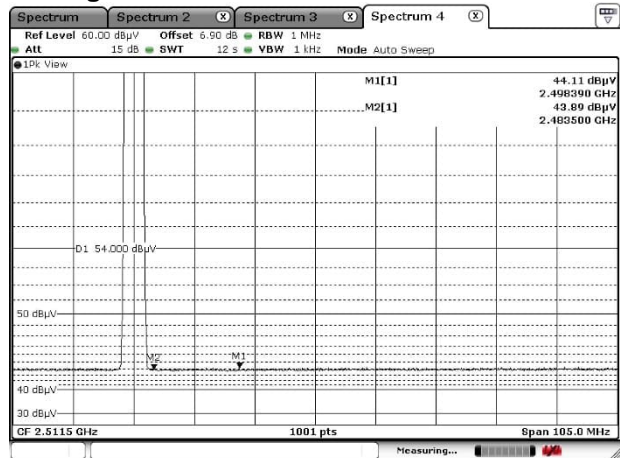
Average



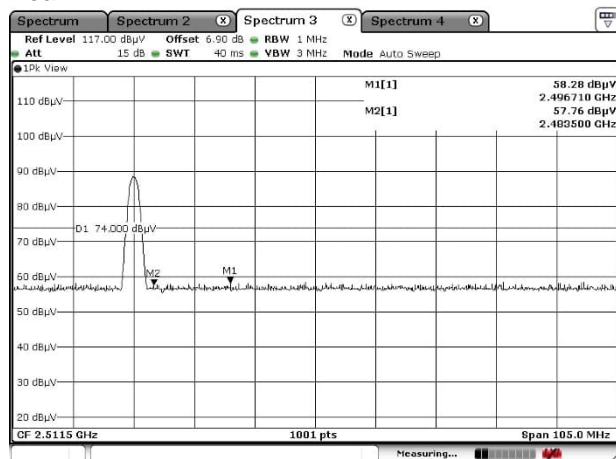
[3-DH5] Channel: High Horizontal Peak



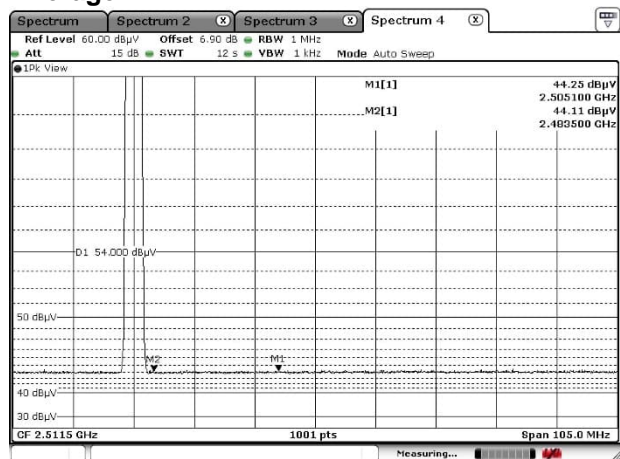
Average



Vertical Peak



Average



4.10 AC Power Line Conducted Emissions

4.10.1 Measurement procedure

[FCC 15.207]

Test was applied by following conditions.

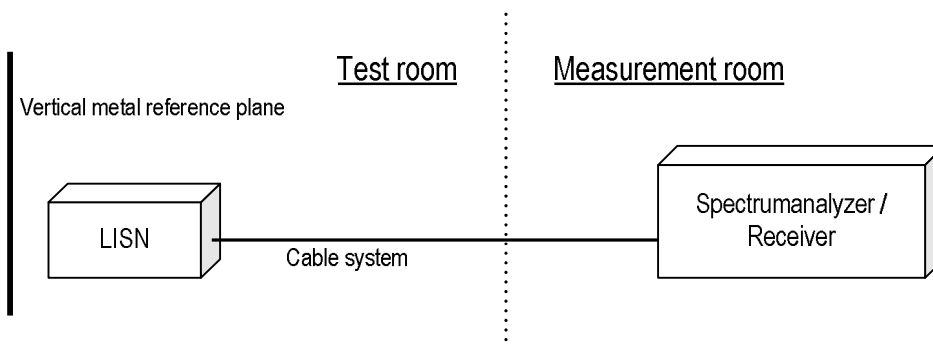
| | |
|--------------------------------|---|
| Test method | : ANSI C63.10 |
| Frequency range | : 0.15 MHz to 30 MHz |
| Test place | : 3 m Semi-anechoic chamber |
| EUT was placed on | : Styrofoam table / (W)1.0m × (D)0.8m × (H)0.8m |
| Vertical Metal Reference Plane | : (W)2.0 m × (H)2.0 m 0.4 m away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

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



4.10.2 Calculation method

Emission level = Reading + (LISN. Factor + Cable system loss)

Margin = Limit – Emission level

Example:

Limit @ 6.770 MHz: 60.0 dB μ V(Quasi-peak)

: 50.0 dB μ V(Average)

(Quasi peak) Reading = 41.2 dB μ V c.f = 10.3 dB

Emission level = 41.2 + 10.3 = 51.5 dB μ V

Margin = 60.0 – 51.5 = 8.5 dB

(Average) Reading = 35.0 dB μ V c.f = 10.3 dB

Emission level = 35.0 + 10.3 = 45.3 dB μ V

Margin = 50.0 – 45.3 = 4.7 dB

4.10.3 Limit

| Frequency [MHz] | Limit | |
|--------------------|-----------------|-----------------|
| | QP [dB μ V] | AV [dB μ V] |
| 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.

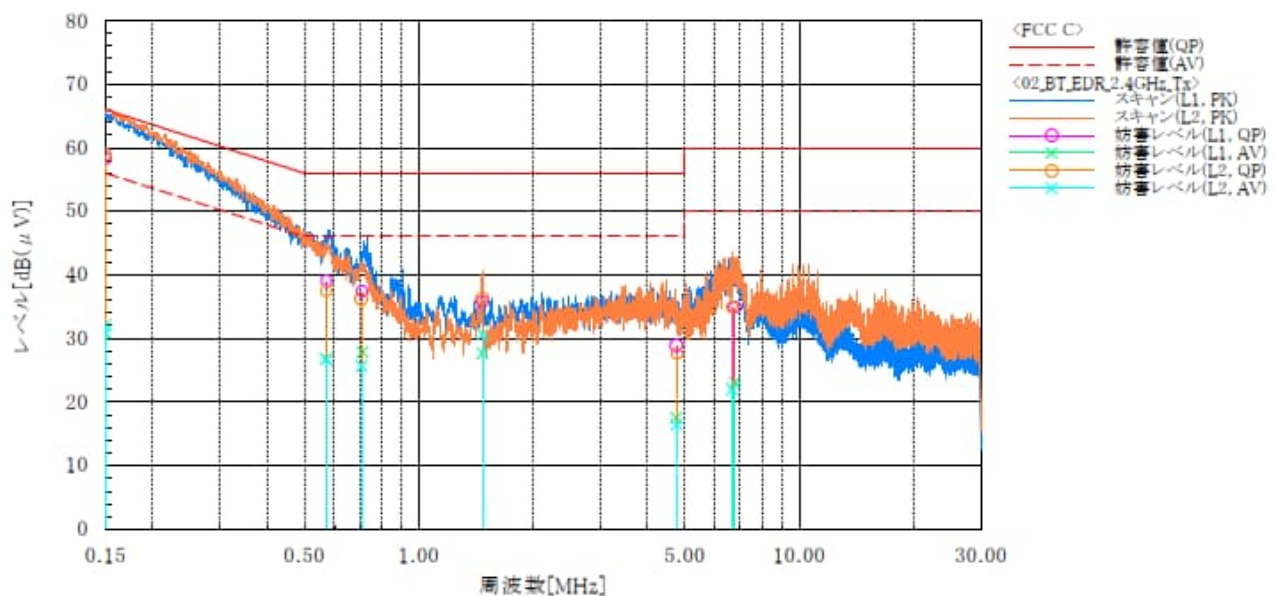
4.10.4 Test data

Date : 9-December-2022
 Temperature : 20.4 [°C]
 Humidity : 24.6 [%]
 Test place : 3m Semi-anechoic chamber

Test engineer : Tadahiro Seino

Company name : KYOCERA Corporation
 EUT : Mobile Phone
 Model No. : EB1155
 Serial No. : N/A
 Test mode : BT_EDR_Tx

Standard : FCC Part 15 Class C
 Operator : T.Seino
 Temp.Hum.Atm : 20.4 [°C], 24.6 [%]
 Note1 :
 Note2 :



Final Result

--- L1 ---

| No. | Frequency | Reading QP | Reading AV | c.f | Result QP | Result AV | Limit QP | Limit AV | Margin QP | Margin AV | Remark |
|-----|-----------|---------------|---------------|------|--------------|--------------|-------------|-------------|--------------|--------------|--------|
| | [MHz] | [dB(μV)] | [dB(μV)] | [dB] | [dB(μV)] | [dB(μV)] | [dB(μV)] | [dB(μV)] | [dB] | [dB] | |
| 1 | 0.150 | 47.8 | 20.3 | 10.6 | 58.4 | 30.9 | 66.0 | 56.0 | 7.6 | 25.1 | |
| 2 | 0.573 | 28.7 | 16.3 | 10.4 | 39.1 | 26.7 | 56.0 | 46.0 | 16.9 | 19.3 | |
| 3 | 0.712 | 27.0 | 17.4 | 10.4 | 37.4 | 27.8 | 56.0 | 46.0 | 18.6 | 18.2 | |
| 4 | 1.472 | 25.3 | 17.1 | 10.5 | 35.8 | 27.6 | 56.0 | 46.0 | 20.2 | 18.4 | |
| 5 | 4.745 | 18.2 | 6.8 | 10.7 | 28.9 | 17.5 | 56.0 | 46.0 | 27.1 | 28.5 | |
| 6 | 6.767 | 24.0 | 12.2 | 10.9 | 34.9 | 23.1 | 60.0 | 50.0 | 25.1 | 26.9 | |

--- L2 ---

| No. | Frequency | Reading QP | Reading AV | c.f | Result QP | Result AV | Limit QP | Limit AV | Margin QP | Margin AV | Remark |
|-----|-----------|---------------|---------------|------|--------------|--------------|-------------|-------------|--------------|--------------|--------|
| | [MHz] | [dB(μV)] | [dB(μV)] | [dB] | [dB(μV)] | [dB(μV)] | [dB(μV)] | [dB(μV)] | [dB] | [dB] | |
| 1 | 0.150 | 48.4 | 21.5 | 10.6 | 59.0 | 32.1 | 66.0 | 56.0 | 7.0 | 23.9 | |
| 2 | 0.571 | 27.1 | 16.3 | 10.4 | 37.5 | 26.7 | 56.0 | 46.0 | 18.5 | 19.3 | |
| 3 | 0.707 | 25.8 | 15.3 | 10.4 | 36.2 | 25.7 | 56.0 | 46.0 | 19.8 | 20.3 | |
| 4 | 1.474 | 25.9 | 20.1 | 10.5 | 36.4 | 30.6 | 56.0 | 46.0 | 19.6 | 15.4 | |
| 5 | 4.770 | 16.9 | 5.7 | 10.7 | 27.6 | 16.4 | 56.0 | 46.0 | 28.4 | 29.6 | |
| 6 | 6.656 | 24.1 | 11.1 | 10.9 | 35.0 | 22.0 | 60.0 | 50.0 | 25.0 | 28.0 | |



Japan

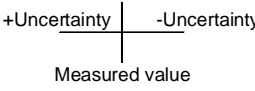
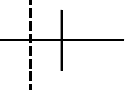

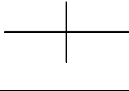
5 Antenna requirement

According to FCC section 15.203, an intentional radiator shall be designed to ensure that no antenna other than 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.

6 Measurement Uncertainty

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 Parts 1 and 2 determining compliance or non-compliance with test result.

| Test item | Measurement uncertainty |
|--|-------------------------|
| Conducted emission, AMN (9 kHz – 150 kHz) | ± 3.7 dB |
| Conducted emission, AMN (150 kHz – 30 MHz) | ± 3.3 dB |
| Radiated emission (9 kHz – 30 MHz) | ± 3.2 dB |
| Radiated emission (30 MHz – 1000 MHz) | ± 5.5 dB |
| Radiated emission (1 GHz – 6 GHz) | ± 5.0 dB |
| Radiated emission (6 GHz – 18 GHz) | ± 4.6 dB |
| Radiated emission (18 GHz – 40 GHz) | ± 6.4 dB |
| Radio Frequency | $\pm 1.3 \cdot 10^{-8}$ |
| RF power, conducted | ± 0.7 dB |
| Adjacent channel power | ± 1.5 dB |
| Temperature | ± 0.6 °C |
| Humidity | ± 1.2 % |
| Voltage (DC) | ± 0.4 % |
| Voltage (AC, <10kHz) | ± 0.2 % |

| Judge | Measured value and standard limit value | |
|-------|---|--|
| PASS | <div> <div> <div>Standard limit value</div> <div> <div>+Uncertainty</div> <div>-Uncertainty</div> </div> <div>Measured value</div> </div> <div> <p>Case1</p>  <p>Even if it takes uncertainty into consideration, a standard limit value is fulfilled.</p> </div> </div> | |
| | <div> <div> <div>Standard limit value</div> <div> <div>+Uncertainty</div> <div>-Uncertainty</div> </div> <div>Measured value</div> </div> <div> <p>Case2</p>  <p>Although measured value is in a standard limit value, a limit value won't be fulfilled if uncertainty is taken into consideration.</p> </div> </div> | |
| FAIL | <div> <div> <div>Standard limit value</div> <div> <div>+Uncertainty</div> <div>-Uncertainty</div> </div> <div>Measured value</div> </div> <div> <p>Case3</p>  <p>Although measured value exceeds a standard limit value, a limit value will be fulfilled if uncertainty is taken into consideration.</p> </div> </div> | |
| | <div> <div> <div>Standard limit value</div> <div> <div>+Uncertainty</div> <div>-Uncertainty</div> </div> <div>Measured value</div> </div> <div> <p>Case4</p>  <p>Even if it takes uncertainty into consideration, a standard limit value isn't fulfilled.</p> </div> </div> | |



Japan

7 Laboratory Information

Testing was performed and the report was issued at:

TÜV SÜD Japan Ltd. Yonezawa Testing Center

Address: 5-4149-7 Hachimanpara, Yonezawa-shi, Yamagata, 992-1128 Japan
Phone: +81-238-28-2881

Accreditation and Registration

A2LA

Certificate #3686.03

VLAC

Accreditation No.: VLAC-013

BSMI

Laboratory Code: SL2-IN-E-6018, SL2-A1-E-6018

Innovation, Science and Economic Development Canada

ISED#: 4224A

VCCI Council

Registration number: A-0166

Appendix A. Test Equipment

Radiated emission

| Equipment | Company | Model No. | Serial No. | Cal. Due | Cal. Date |
|-----------------------------|----------------------|-------------------|-------------------|-------------|-------------|
| EMI Receiver | ROHDE&SCHWARZ | ESCI | 100765 | 30-Sep-2023 | 14-Sep-2022 |
| EMI receiver | ROHDE&SCHWARZ | ESW44 | 103171 | 30-Sep-2023 | 20-Sep-2022 |
| Spectrum analyzer | Agilent Technologies | E4440A | US44302655 | 30-Sep-2023 | 05-Sep-2022 |
| Spectrum analyzer | ROHDE&SCHWARZ | FSV40 | 101731 | 31-Jul-2023 | 19-Jul-2022 |
| Preamplifier | SONOMA | 310 | 372170 | 30-Sep-2023 | 28-Sep-2022 |
| Loop antenna | ROHDE&SCHWARZ | HFH2-Z2 | 100515 | 30-Apr-2023 | 18-Apr-2022 |
| Attenuator | TOYO Connector | NA-PJ-6 | N/A(S507) | 28-Feb-2023 | 03-Feb-2022 |
| Biconical antenna | Schwarzbeck | VHBB9124/BBA9106 | 1145 | 30-Jun-2023 | 28-Jun-2022 |
| Log periodic antenna | Schwarzbeck | VUSLP9111B | 345 | 30-Nov-2022 | 08-Nov-2021 |
| | | | 346 | 30-Nov-2023 | 16-Nov-2022 |
| Attenuator | TOYO Connector | NA-PJ-6/6dB | N/A(S541) | 30-Sep-2023 | 28-Sep-2022 |
| Attenuator | TAMAGAWA.ELEC | CFA-10/3dB | N/A(S503) | 31-Jul-2023 | 14-Jul-2022 |
| Preamplifier | TSJ | MLA-100M18-B02-40 | 1929118 | 31-Dec-2022 | 22-Dec-2021 |
| Attenuator | AEROFLEX | 26A-10 | 081217-08 | 31-Dec-2022 | 22-Dec-2021 |
| Double ridged guide antenna | ETS LINDGREN | 3117 | 00052315 | 30-Jun-2023 | 22-Jun-2022 |
| Attenuator | HUBER+SUHNER | 6803.17.B | N/A(2340) | 31-Dec-2022 | 23-Dec-2021 |
| Double ridged guide antenna | A.H.Systems Inc. | SAS-574 | 469 | 31-Aug-2023 | 19-Aug-2022 |
| Preamplifier | TSJ | MLA-1840-B03-35 | 1240332 | 31-Aug-2023 | 19-Aug-2022 |
| Notch Filter | Micro-Tronics | BRM50702 | G433 | 30-Sep-2023 | 28-Sep-2022 |
| Microwave cable | HUBER+SUHNER | SUCOFLEX104/9m | MY30037/4 | 31-Dec-2022 | 22-Dec-2021 |
| | | SUCOFLEX104/1m | my24610/4 | 31-Dec-2022 | 22-Dec-2021 |
| | | SUCOFLEX104/8m | SN MY30033/4 | 31-Dec-2022 | 22-Dec-2021 |
| | | SUCOFLEX104/1m | MY32976/4 | 31-Dec-2022 | 22-Dec-2021 |
| | | SUCOFLEX104/2m | SN MY28404/4 | 31-Dec-2022 | 22-Dec-2021 |
| | | SUCOFLEX104/7m | 41625/6 | 31-Dec-2022 | 22-Dec-2021 |
| PC | DELL | DIMENSION E521 | 75465BX | N/A | N/A |
| Software | TOYO Corporation | EP5/RE-AJ | 0611193/V6.0.140 | N/A | N/A |
| PC | DELL | OPTIPLEX9010 | 00186-228-073-851 | N/A | N/A |
| Software | TOYO Technica | ES10/RE-AJ | Ver.2021.10.001 | N/A | N/A |
| Absorber | RIKEN | PFP30 | N/A | N/A | N/A |
| 3m Semi an-echoic Chamber | TOKIN | N/A | N/A(9002-NSA) | 31-May-2023 | 28-May-2022 |
| 3m Semi an-echoic Chamber | TOKIN | N/A | N/A(9002-SVSWR) | 31-May-2023 | 28-May-2022 |

Conducted emission at mains port

| Equipment | Company | Model No. | Serial No. | Cal. Due | Cal. Date |
|--------------------------------------|---------------------------------|----------------|-------------------|-------------|-------------|
| EMI receiver | ROHDE&SCHWARZ | ESW44 | 103171 | 30-Sep-2023 | 20-Sep-2022 |
| Attenuator | HUBER+SUHNER | 6810.01.A | N/A (S411) | 31-Dec-2022 | 22-Dec-2021 |
| Line impedance stabilization network | Kyoritsu Electrical Works, Ltd. | TNW-407F2 | 12-17-110-2 | 30-Jun-2023 | 15-Jun-2022 |
| Microwave cable | HUBER+SUHNER | SUCOFLEX104/5m | MY33601/4 | 31-Oct-2023 | 27-Oct-2022 |
| Microwave cable | HUBER+SUHNER | SUCOFLEX104/2m | MY37268/4 | 31-Oct-2023 | 27-Oct-2022 |
| Coaxial cable | HUBER+SUHNER | RG214/U/10m | N/A (S194) | 31-Dec-2022 | 22-Dec-2021 |
| PC | DELL | OPTIPLEX9010 | 00186-228-073-851 | N/A | N/A |
| Software | TOYO Technica | ES10/RE-AJ | Ver.2021.10.001 | N/A | N/A |

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