

Report on the RF Testing of:

KYOCERA Corporation
Mobile Phone, Model: CB70
FCC ID: JOYCB70

In accordance with FCC Part 15 Subpart C

Prepared for: KYOCERA Corporation
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Document Number: JPD-TR-19185-0

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| Hiroaki Suzuki | Deputy Manager of RF Group | Approved Signatory | 25 NOV 2019 |

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EXECUTIVE SUMMARY

A sample(s) of this product was tested and found to be compliant with FCC Part 15 Subpart C.



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Contents

| | | |
|----------|--|-----------|
| 1 | Summary of Test | 3 |
| 1.1 | Modification history of the test report | 3 |
| 1.2 | Standards | 3 |
| 1.3 | Test methods | 3 |
| 1.4 | Deviation from standards | 3 |
| 1.5 | List of applied test(s) of the EUT | 3 |
| 1.6 | Test information | 3 |
| 1.7 | Test set up | 3 |
| 1.8 | Test period | 3 |
| 2 | Equipment Under Test | 4 |
| 2.1 | EUT information | 4 |
| 2.2 | Modification to the EUT | 4 |
| 2.3 | Variation of family model(s) | 5 |
| 2.4 | Operating channels and frequencies | 5 |
| 2.5 | Operating mode | 5 |
| 2.6 | Operating flow | 6 |
| 3 | Configuration of Equipment | 7 |
| 3.1 | Equipment used | 7 |
| 3.2 | Cable(s) used | 7 |
| 3.3 | System configuration | 7 |
| 4 | Test Result | 8 |
| 4.1 | 6dB Bandwidth / Occupied Bandwidth (99%) | 8 |
| 4.2 | Maximum Peak Output Power | 10 |
| 4.3 | Band Edge Compliance of RF Conducted Emissions | 11 |
| 4.4 | Spurious emissions - Conducted - | 13 |
| 4.5 | Spurious Emissions - Radiated - | 17 |
| 4.6 | Restricted Band of Operation | 29 |
| 4.7 | Transmitter Power Spectral Density | 33 |
| 4.8 | AC Power Line Conducted Emissions | 35 |
| 5 | Antenna requirement | 38 |
| 6 | Measurement Uncertainty | 39 |
| 7 | Laboratory Information | 40 |
| | Appendix A. Test Equipment | 41 |
| | Appendix B. Duty Cycle | 42 |

1 Summary of Test

1.1 Modification history of the test report

| Document Number | Modification History | Issue Date |
|-----------------|----------------------|-------------------------|
| JPD-TR-19185-0 | First Issue | Refer to the cover page |

1.2 Standards

CFR47 FCC Part 15 Subpart C

1.3 Test methods

ANSI C63.10-2013,
KDB 558074 D01 15.247 Meas Guidance v05r02

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)(2) | 6dB Bandwidth | Conducted | PASS | - |
| 15.247(b)(3) | 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 | - |
| 15.247(e) | Transmitter Power Spectral Density | Conducted | PASS | - |
| 15.207 | AC Power Line Conducted Emissions | Conducted | PASS | - |

1.6 Test information

None

1.7 Test set up

Table-top

1.8 Test period

23-October-2019 - 31-October-2019

2 Equipment Under Test

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 | CB70 |
| Serial number | N/A |
| Trade name | Kyocera |
| Number of sample(s) | 1 |
| EUT condition | Pre-Production |
| Power rating | Battery: DC 3.85 V |
| Size | (W) 71.0 × (D) 159.0 × (H) 8.9 mm |
| Environment | Indoor and Outdoor use |
| Terminal limitation | -20 °C to 60 °C |
| Hardware version | DMT2 |
| Software version | 0.410HA |
| Firmware version | Not applicable |
| RF Specification | |
| Protocol | Bluetooth 5.0 + EDR |
| Frequency range | 2402 MHz-2480 MHz |
| Number of RF Channels | 40 Channels |
| Modulation method/Data rate | GFSK (1 Mbps) |
| Channel separation | 2 MHz |
| Conducted power | 3.631 mW |
| Antenna type | Internal antenna |
| Antenna gain | 1.7 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: CB70, Serial Number: N/A | | | |
| 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] |
|---------|-----------------|---------|-----------------|
| 0 | 2402 | 20 | 2442 |
| 1 | 2404 | 21 | 2444 |
| 2 | 2406 | 22 | 2446 |
| 3 | 2408 | 23 | 2448 |
| 4 | 2410 | 24 | 2450 |
| 5 | 2412 | 25 | 2452 |
| 6 | 2414 | 26 | 2454 |
| 7 | 2416 | 27 | 2456 |
| 8 | 2418 | 28 | 2458 |
| 9 | 2420 | 29 | 2460 |
| 10 | 2422 | 30 | 2462 |
| 11 | 2424 | 31 | 2464 |
| 12 | 2426 | 32 | 2466 |
| 13 | 2428 | 33 | 2468 |
| 14 | 2430 | 34 | 2470 |
| 15 | 2432 | 35 | 2472 |
| 16 | 2434 | 36 | 2474 |
| 17 | 2436 | 37 | 2476 |
| 18 | 2438 | 38 | 2478 |
| 19 | 2440 | 39 | 2480 |

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 | 2440 |
| 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 Type | Data Rate |
|-------------------|-----------------|-----------|
| Low, Middle, High | GFSK | 1 Mbps |

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, open 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.



Japan

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: 2440 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: 2440 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”.

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 | CB70 | N/A | JOYCB70 | EUT |
| 2 | AC Adapter | KDDI | 0301PQA | N/A | N/A | * |

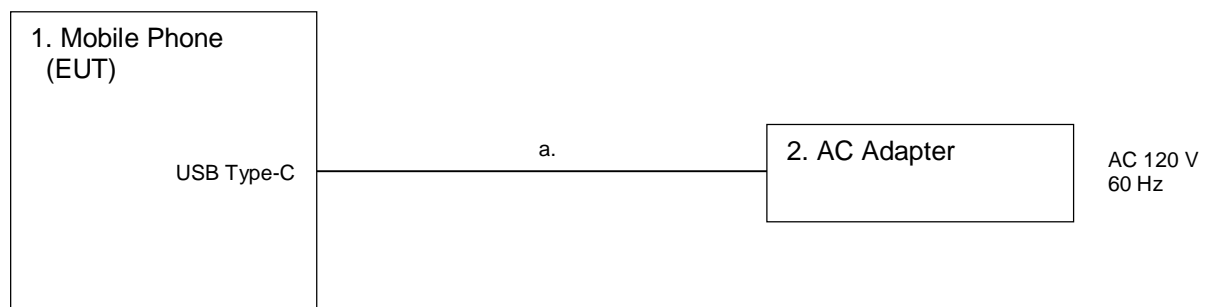
*:AC power line Conducted Emission Test.

3.2 Cable(s) used

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

*:AC power line Conducted Emission Test.

3.3 System configuration



4 Test Result

4.1 6dB Bandwidth / Occupied Bandwidth (99%)

4.1.1 Measurement procedure

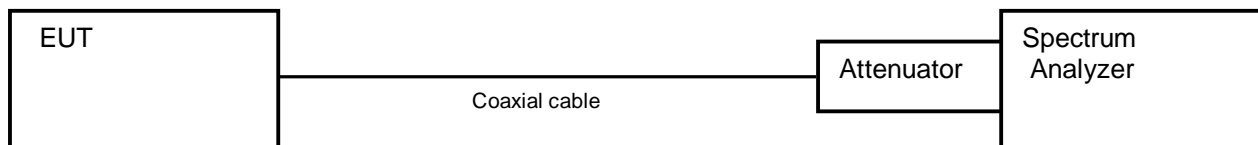
[FCC 15.247(a)(2), KDB558074 D01 v05r02]

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) RBW = 100 kHz
- b) VBW $\geq 3 \times$ RBW
- c) Sweep time = auto-couple
- d) Detector = peak
- e) Trace mode = max hold

- Test configuration



4.1.2 Limit

The minimum permissible 6dB bandwidth is 500kHz.

4.1.3 Measurement result

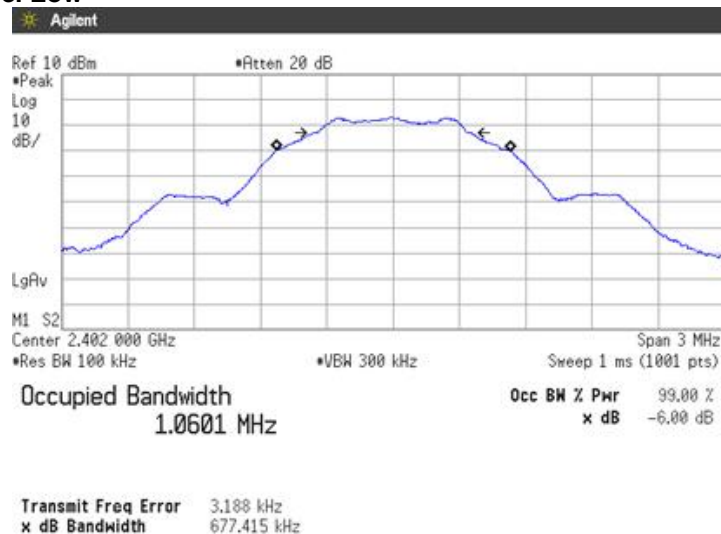
Date : 24-October-2019
 Temperature : 23.9 [°C]
 Humidity : 47.7 [%]
 Test place : Shielded room No.4

Test engineer :
 Taiki Watanabe

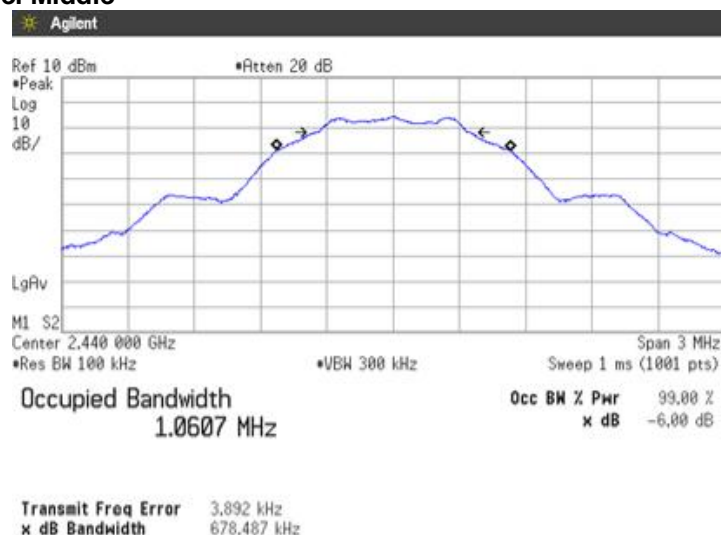
| Channel | Frequency [MHz] | 6 dB bandwidth [MHz] | Occupied Bandwidth (99%) [MHz] |
|---------|-----------------|----------------------|--------------------------------|
| Low | 2402 | 0.677 | 1.0601 |
| Middle | 2440 | 0.678 | 1.0607 |
| High | 2480 | 0.685 | 1.0571 |

4.1.4 Trace data

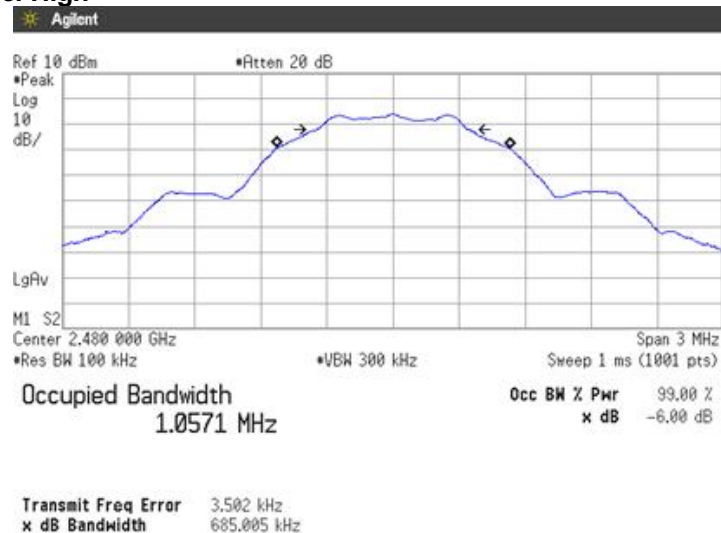
Channel Low



Channel Middle



Channel High



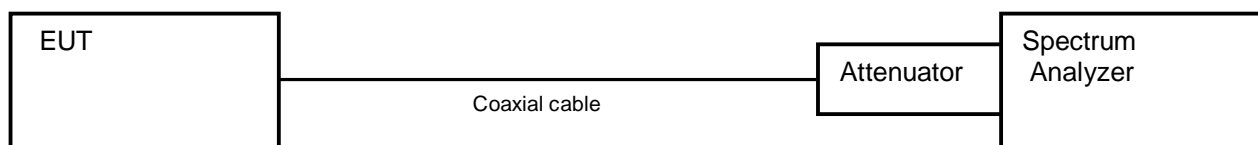
4.2 Maximum Peak Output Power

4.2.1 Measurement procedure

[FCC 15.247(b)(3), KDB558074 D01 v05r02]

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



4.2.2 Limit

1 W(1000 mW) or less

4.2.3 Measurement result

Date : 24-October-2019
 Temperature : 23.9 [°C]
 Humidity : 47.7 [%]
 Test place : Shielded room No.4

Test engineer : Taiki Watanabe

Battery Full

| Channel | Center Frequency (MHz) | Reading (dBm) | Factor (dB) | Level (dBm) | Peak Output Power (mW) | Limit (mW) | Result |
|---------|------------------------|---------------|-------------|-------------|------------------------|------------|--------|
| Low | 2402 | -6.21 | 10.63 | 4.42 | 2.767 | ≤1000 | PASS |
| Middle | 2441 | -5.03 | 10.63 | 5.60 | 3.631 | ≤1000 | PASS |
| High | 2480 | -5.47 | 10.63 | 5.16 | 3.281 | ≤1000 | PASS |

Calculation;

Reading (dBm) + Factor (dB) = Level (dBm)

$10\log P = \text{Level (dBm)}$

$P = 10^{(\text{Maximum Peak Output Power} / 10)} \text{ (mW)}$

4.3 Band Edge Compliance of RF Conducted Emissions

4.3.1 Measurement procedure

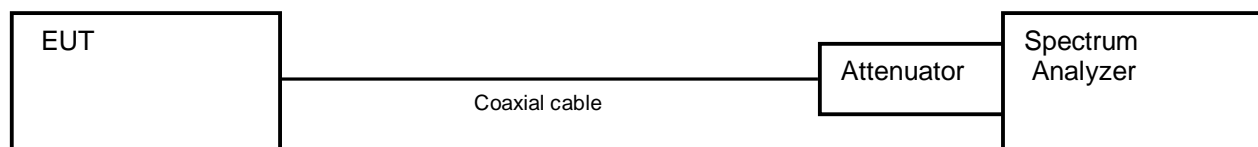
[FCC 15.247(d), KDB558074 D01 v05r02]

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 = 100 kHz
- c) VBW $\geq 3 \times$ RBW
- d) Sweep time = auto-couple
- e) Detector = peak
- f) Trace mode = max hold

- Test configuration



4.3.2 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.

4.3.3 Measurement result

Date : 24-October-2019

Temperature : 23.9 [°C]

Humidity : 47.7 [%]

Test place : Shielded room No.4

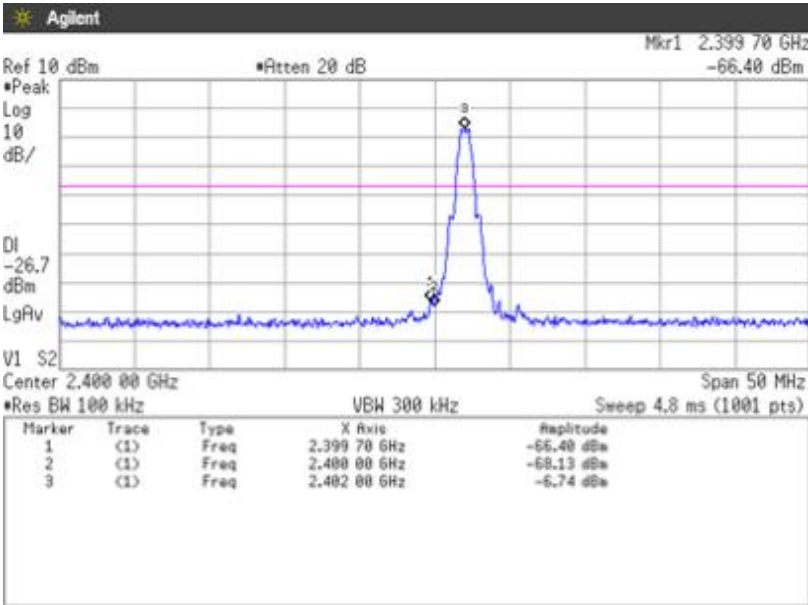
Test engineer :

Taiki Watanabe

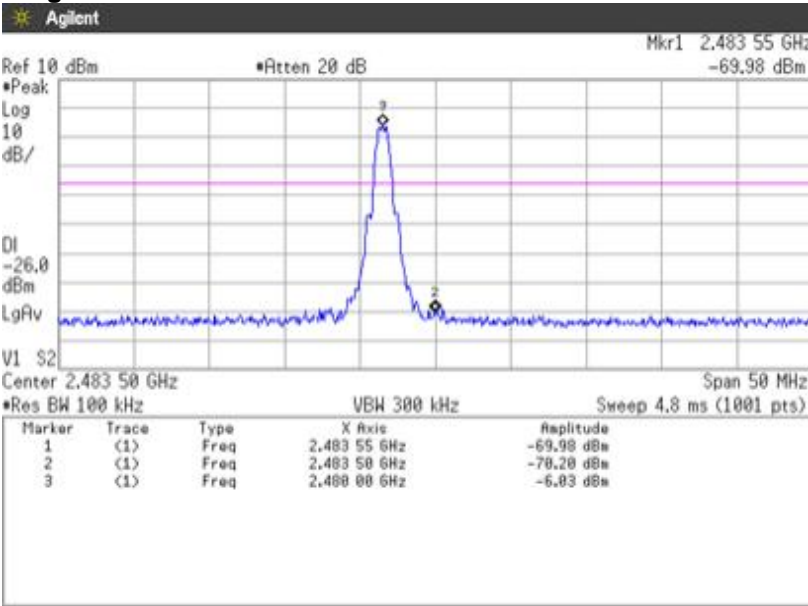
| Channel | Frequency (MHz) | RF Power Level (dBm) | Band-edge Frequency (MHz) | Band-edge Level (dBm) | Difference Level (dBm) | Limit (dBm) | Result |
|---------|-----------------|----------------------|---------------------------|-----------------------|------------------------|-------------------------------------|--------|
| Low | 2402 | -6.74 | 2399.70 | -66.40 | 59.66 | At least 20dB below from peak of RF | PASS |
| High | 2480 | -6.03 | 2483.55 | -69.98 | 63.95 | At least 20dB below from peak of RF | PASS |

4.3.4 Trace data

Channel: Low



Channel: High



4.4 Spurious emissions - Conducted -

4.4.1 Measurement procedure

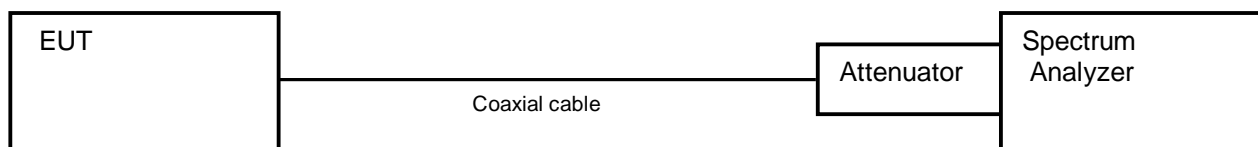
[FCC 15.247(d), KDB558074 D01 v05r02]

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



4.4.2 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.

4.4.3 Measurement result

Date : 25-October-2019

Temperature : 22.6 [°C]

Humidity : 45.1 [%]

Test place : Shielded room No.4

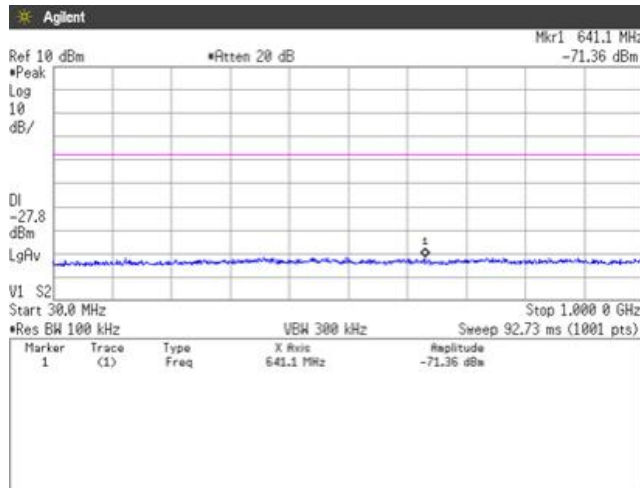
Test engineer :

Taiki Watanabe

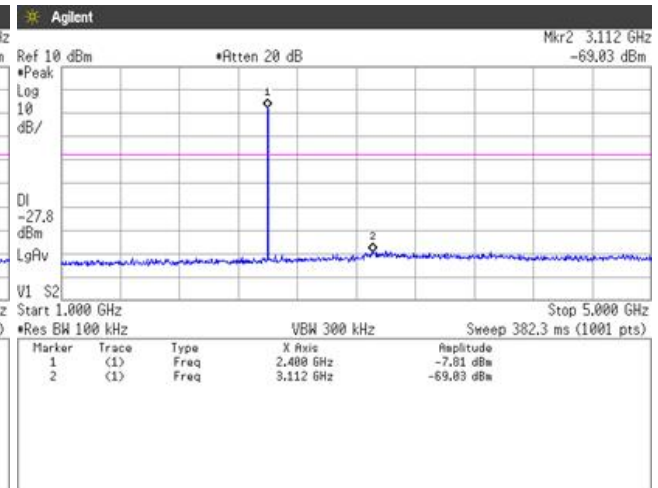
| Channel | Frequency [MHz] | Limit [dB] | Results Chart | Result |
|---------|-----------------|-------------------------------------|--------------------|--------|
| Low | 2402 | At least 20dB below from peak of RF | See the trace Data | PASS |
| Middle | 2440 | At least 20dB below from peak of RF | See the trace Data | PASS |
| High | 2480 | At least 20dB below from peak of RF | See the trace Data | PASS |

4.4.4 Trace data

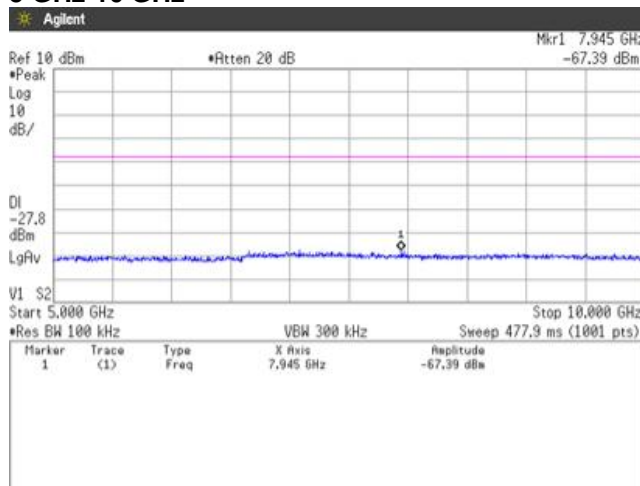
Channel: Low
30 MHz-1 GHz



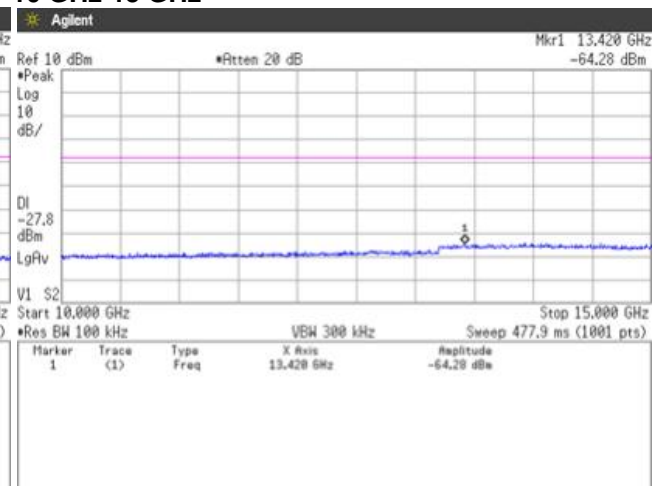
1 GHz-5 GHz



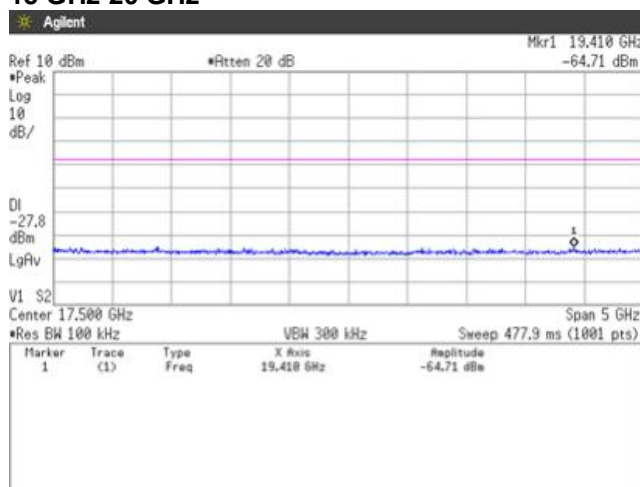
5 GHz-10 GHz



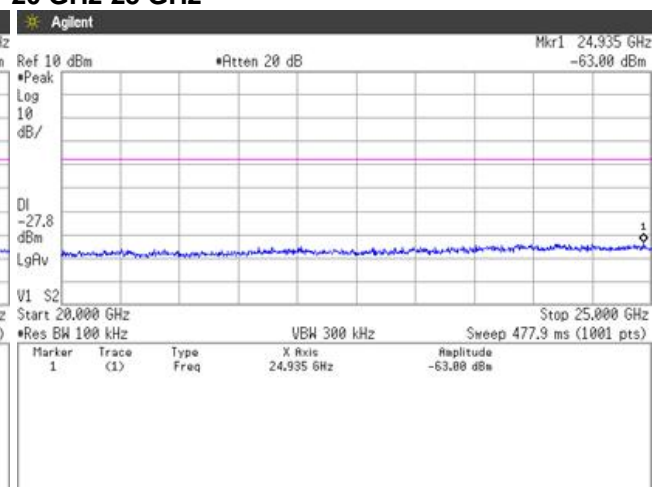
10 GHz-15 GHz

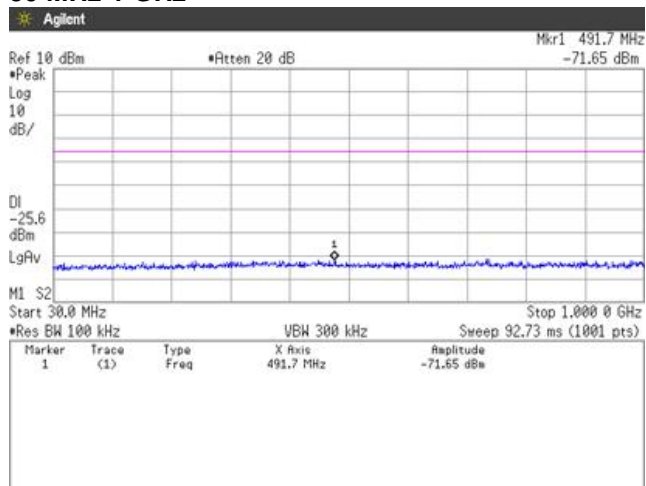
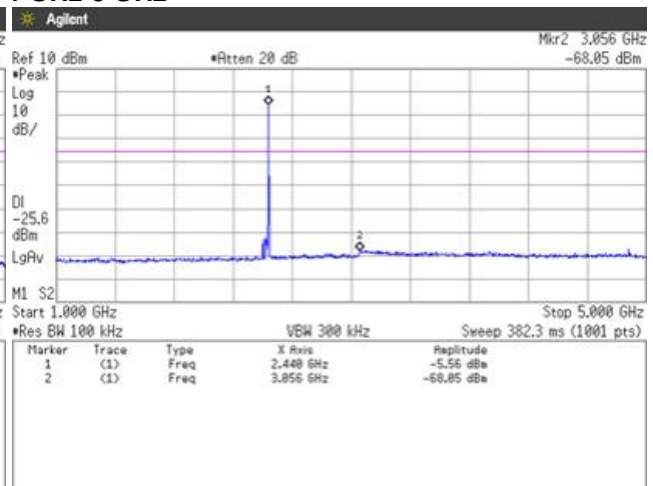
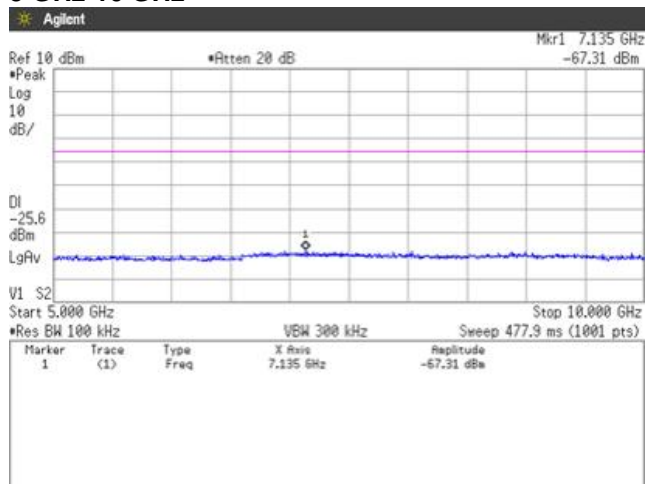
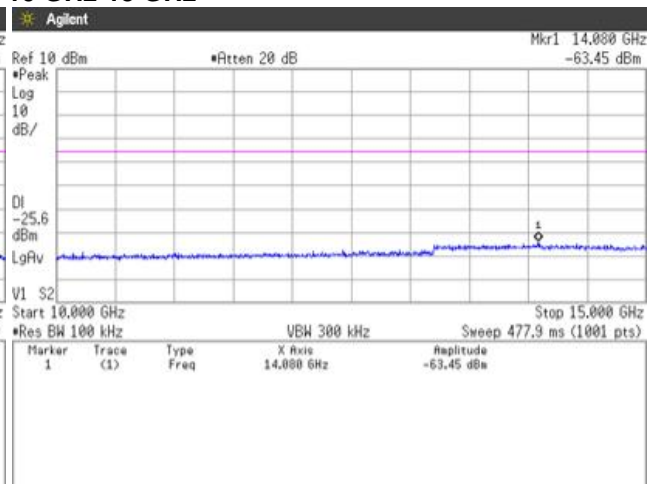
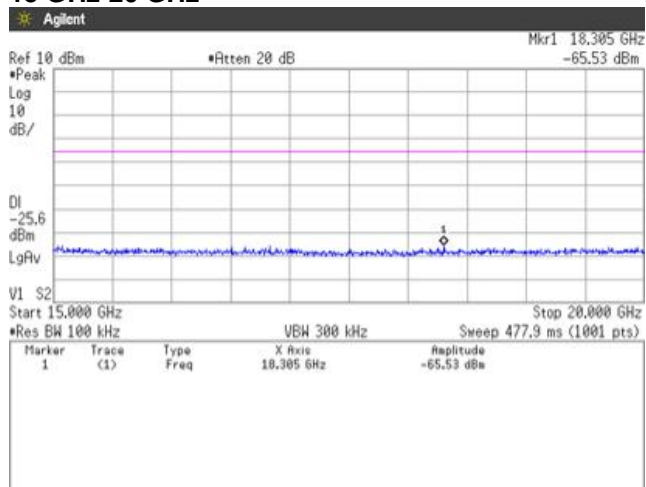
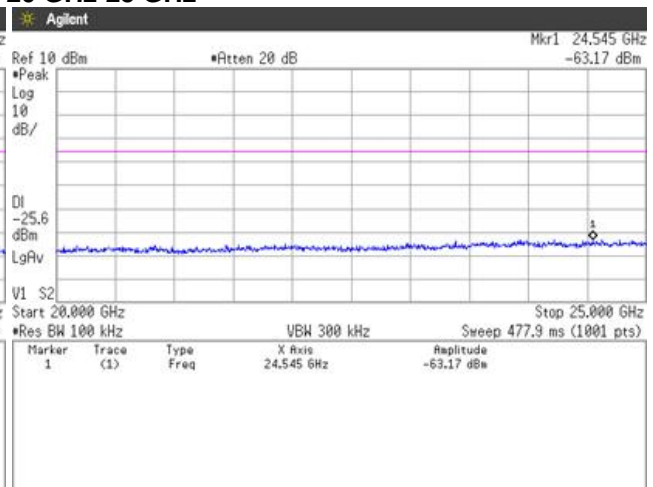


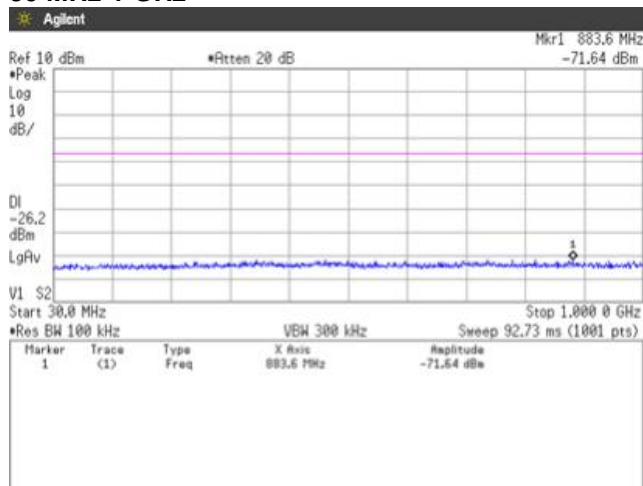
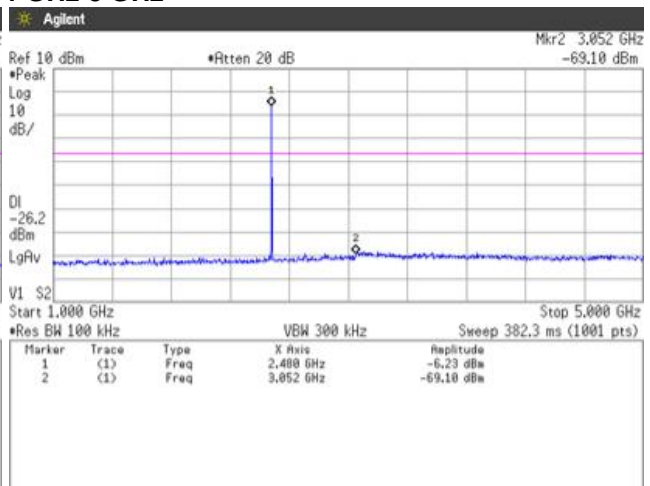
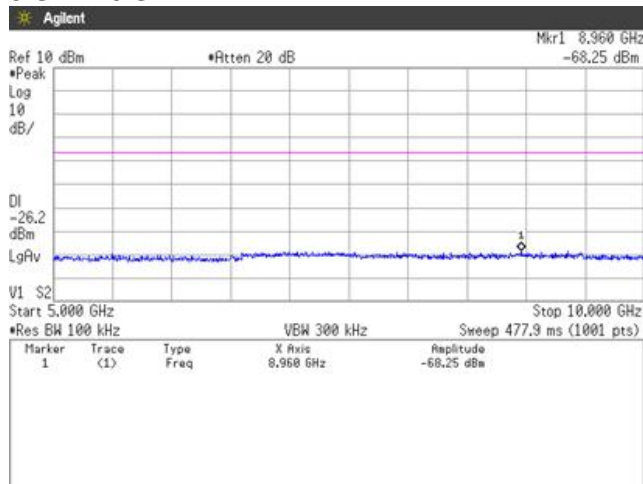
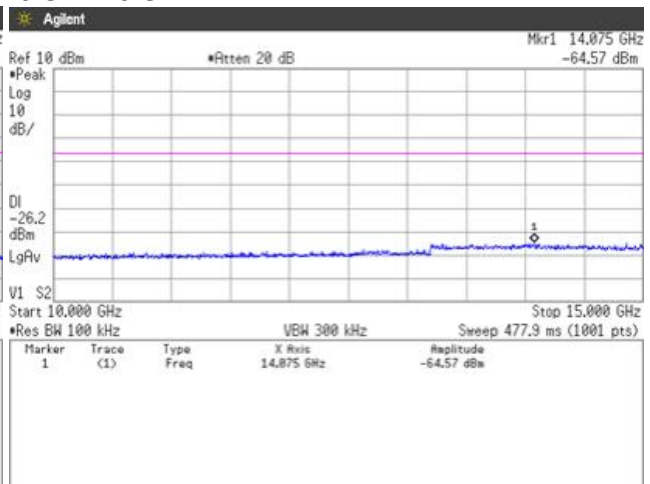
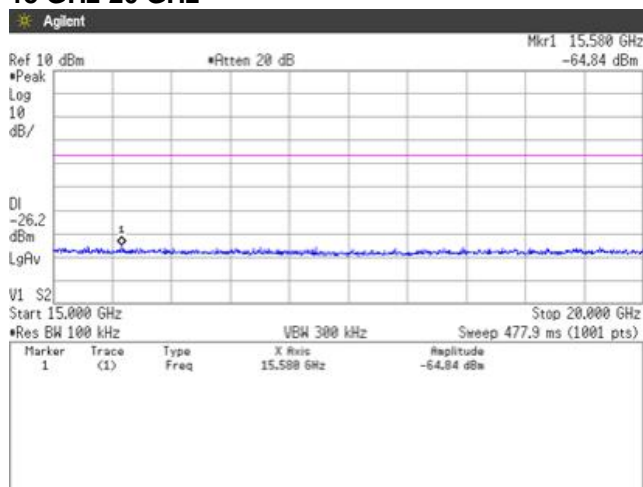
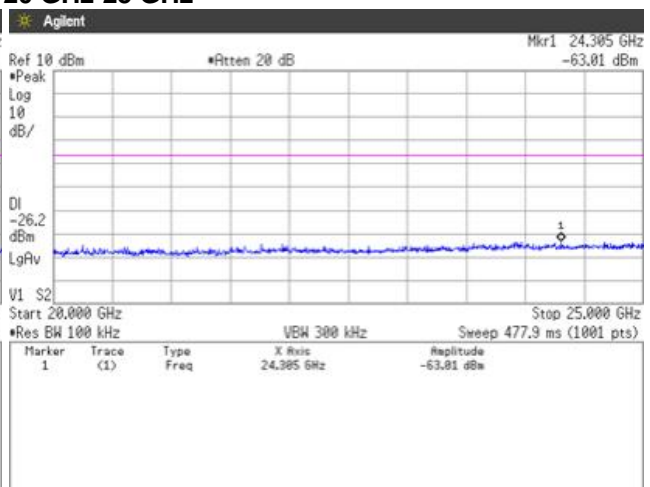
15 GHz-20 GHz



20 GHz-25 GHz



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


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


4.5 Spurious Emissions - Radiated -

4.5.1 Measurement procedure

[FCC 15.247(d), 15.205, 15.209, KDB558074 D01 v05r02]

Test was applied by following conditions.

| | |
|---------------------------|--|
| Test method | : ANSI C63.10 |
| Frequency range | : 9kHz to 25GHz |
| Test place | : 3m Semi-anechoic chamber |
| EUT was placed on | : Styrofoam table / (W)1.0m × (D)1.0m × (H)0.8m (below 1GHz) Styrofoam table / (W)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=3kHz, Span=0Hz, Sweep=auto Display mode=Linear |

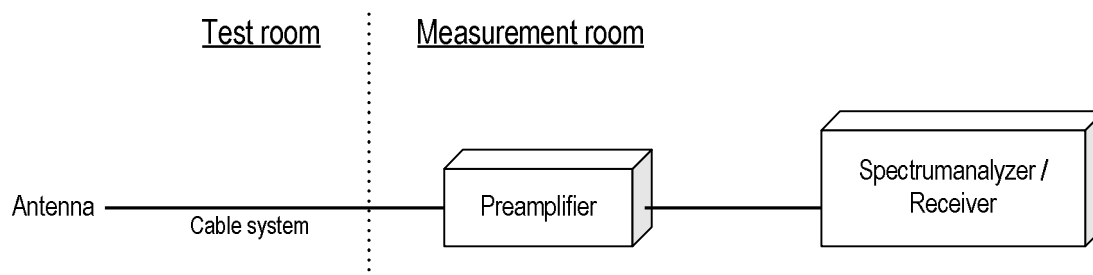
Average Measurement Setting [VBW]

| Mode | Duty Cycle (%) | T _{on} (us) | T _{off} (us) | 1/T _{on} (kHz) | Determined VBW Setting |
|------------------|----------------|----------------------|-----------------------|-------------------------|------------------------|
| Bluetooth 5.0 LE | 60.96 | 381 | 244 | 2.625 | 3kHz |

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



4.5.2 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

4.5.3 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

4.5.4 Test data

Date : 23-October-2019
Temperature : 22.0 [°C]
Humidity : 43.6 [%]
Test place : 3m Semi-anechoic chamber

Test engineer : Chiaki Kanno

Date : 28-October-2019
Temperature : 21.3 [°C]
Humidity : 42.3 [%]
Test place : 3m Semi-anechoic chamber

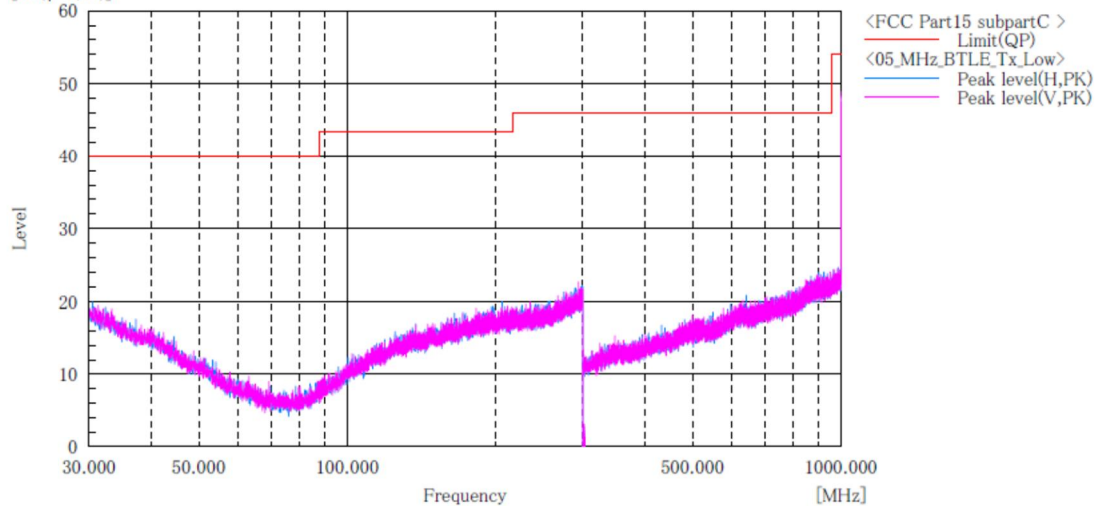
Test engineer : Chiaki Kanno

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

Company name : KYOCERA Corporation
 EUT : Mobile Phone
 Model No. : CB70
 Serial No. : N/A
 Test mode : BT_LE_Tx_ch:Low

Standard : FCC Part.15 subpartC
 Operator : C.Kanno
 Temp,Hum : 21.3[°C] 42.3[%]
 Note1 :
 Note2 :

[dB(μV/m)]

**Final Result**

| No. | Frequency (P) [MHz] | c.f [dB(1/m)] | Height [cm] | Angle [°] |
|-----|------------------------|------------------|----------------|--------------|
| | | | | |

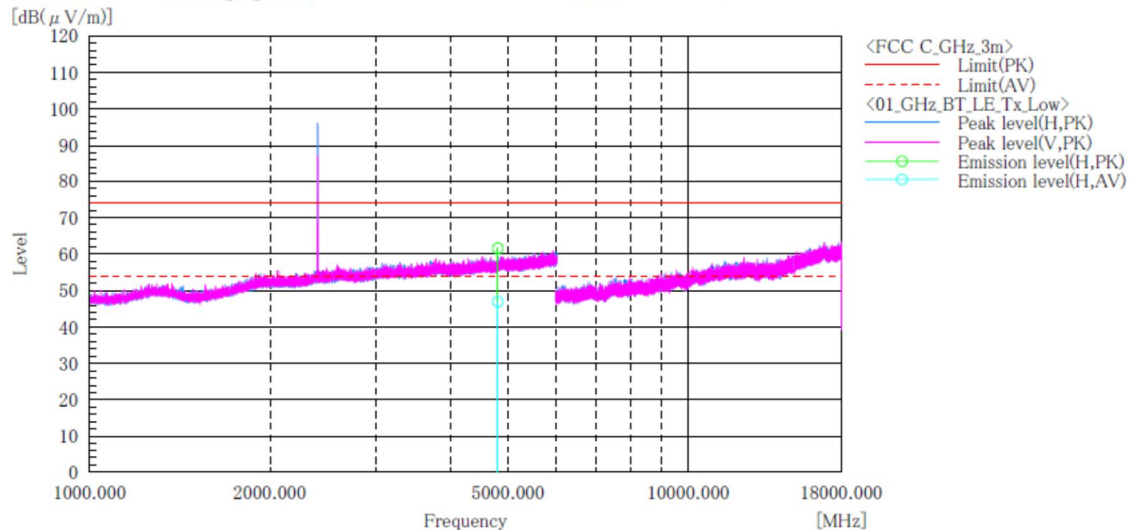
Note:

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

Channel: Low
ABOVE 1 GHz

Company name : KYOCERA Corporation
 EUT : Mobile Phone
 Model No. : CB70
 Serial No. : N/A
 Test mode : BT LE_Tx, ch:Low

Standard : FCC Part.15 subpart C
 Operator : C.Kanno
 Temp,Hum,Atm : 22.0[°C] 43.6[%]
 Note1 :
 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 [°] |
|-----|-----------------|-----|---------------------|---------------------|---------------|----------------------|----------------------|---------------------|---------------------|----------------|----------------|-------------|-----------|
| 1 | 4804.000 | H | 51.6 | 36.9 | 10.0 | 61.6 | 46.9 | 74.0 | 54.0 | 12.4 | 7.1 | 283.0 | 11.0 |

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.

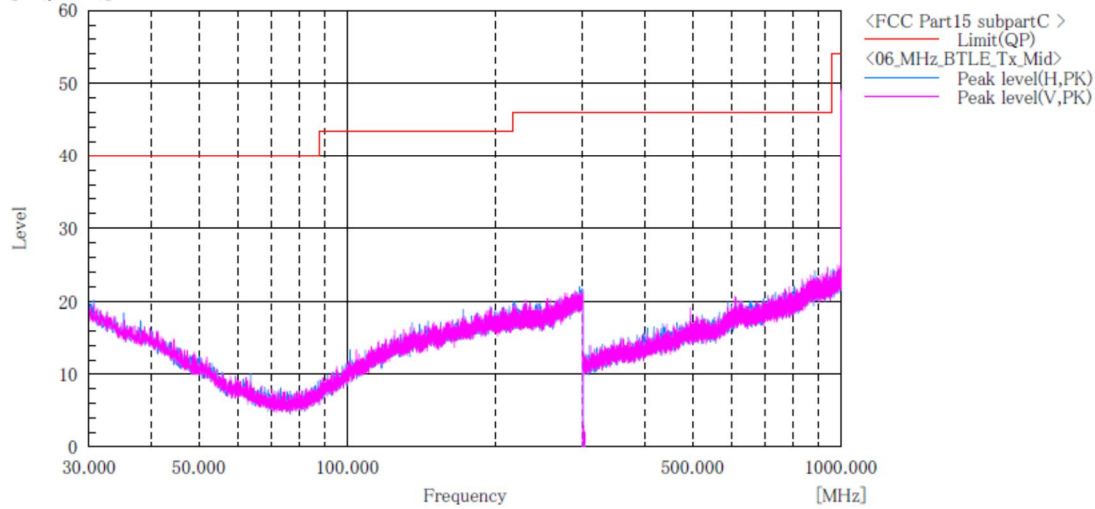
Channel: Middle

BELOW 1 GHz

Company name : KYOCERA Corporation
EUT : Mobile Phone
Model No. : CB70
Serial No. : N/A
Test mode : BT_LE_Tx_ch:Mid

Standard : FCC Part.15 subpartC
Operator : C.Kanno
Temp,Hum : 21.3[°C] 42.3[%]
Note1 :
Note2 :

[dB(μV/m)]



Final Result

| No. | Frequency (P) [MHz] | c.f [dB(1/m)] | Height [cm] | Angle [°] |
|-----|------------------------|------------------|----------------|--------------|
|-----|------------------------|------------------|----------------|--------------|

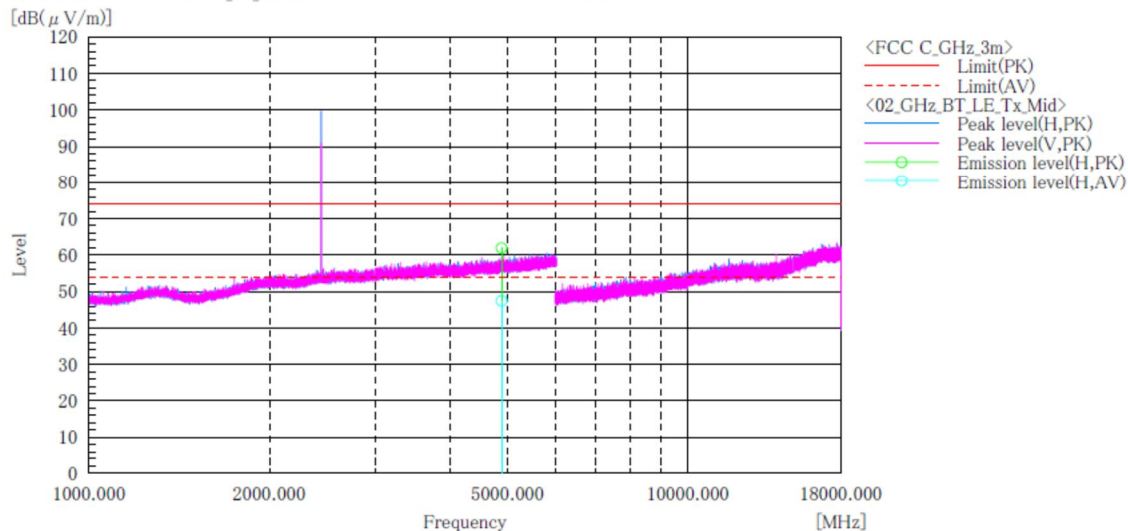
Note:

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.

Channel: Middle
ABOVE 1 GHz

Company name : KYOCERA Corporation
 EUT : Mobile Phone
 Model No. : CB70
 Serial No. : N/A
 Test mode : BT LE_Tx_ch:Mid

Standard : FCC Part.15 subpart C
 Operator : C.Kanno
 Temp,Hum,Atm : 22.0[°C] 43.6[%]
 Note1 :
 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 [°] |
|-----|-----------------|-----|---------------------|---------------------|---------------|----------------------|----------------------|---------------------|---------------------|----------------|----------------|-------------|-----------|
| 1 | 4880.000 | H | 51.6 | 37.1 | 10.3 | 61.9 | 47.4 | 74.0 | 54.0 | 12.1 | 6.6 | 250.0 | 14.0 |

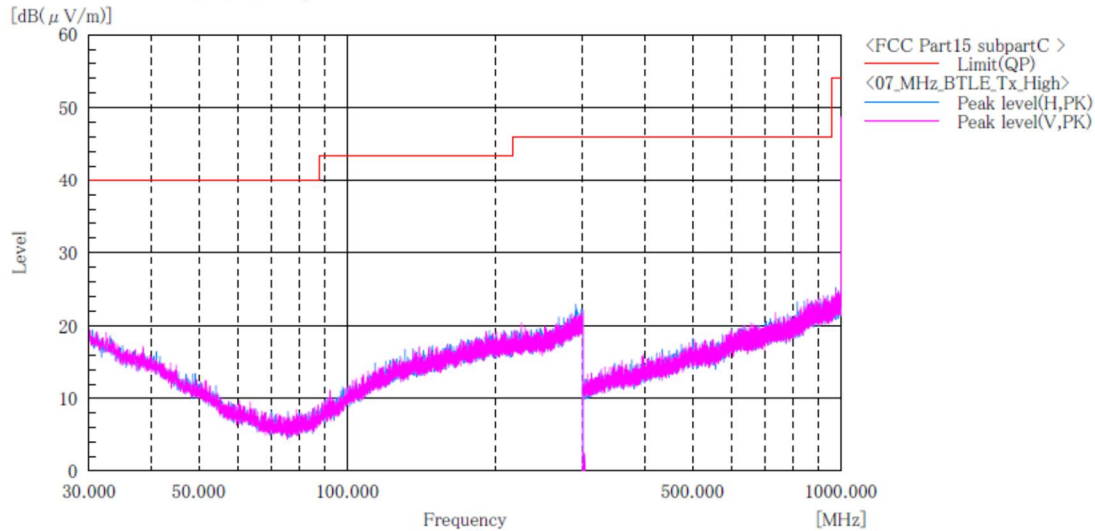
Note:

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

Channel: High
BELOW 1 GHz

Company name : KYOCERA Corporation
EUT : Mobile Phone
Model No. : CB70
Serial No. : N/A
Test mode : BT_LE_Tx_ch:High

Standard : FCC Part.15 subpartC
Operator : C.Kanno
Temp,Hum : 21.3[°C] 42.3[%]
Note1 :
Note2 :



Final Result

| No. | Frequency (P) | c. f | Height | Angle |
|-----|---------------|-----------|--------|-------|
| | [MHz] | [dB(1/m)] | [cm] | [°] |

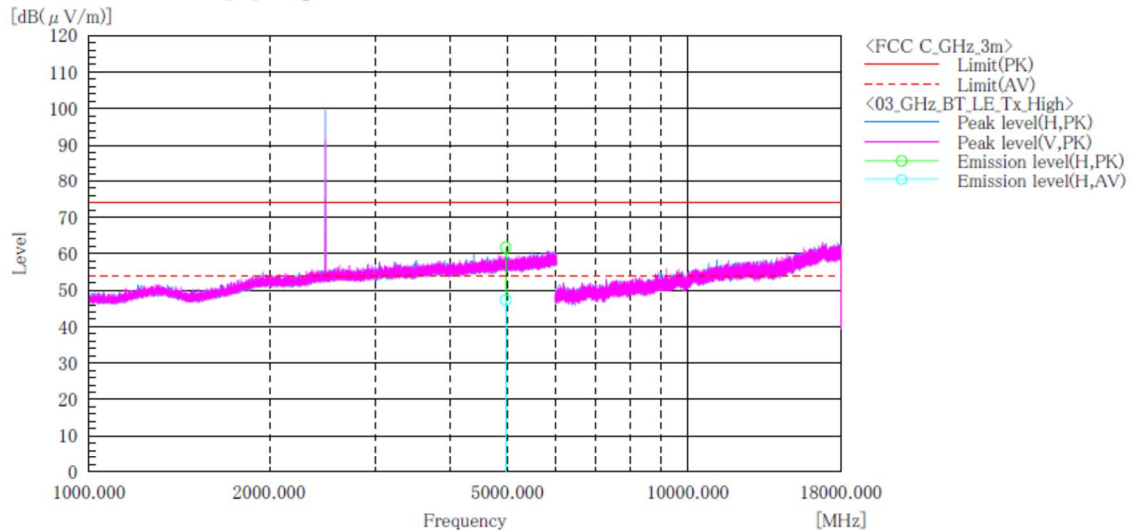
Note:

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.

Channel: High
ABOVE 1 GHz

Company name : KYOCERA Corporation
 EUT : Mobile Phone
 Model No. : CB70
 Serial No. : N/A
 Test mode : BT LE_Tx_ch:High

Standard : FCC Part.15 subpart C
 Operator : C.Kanno
 Temp,Hum,Atm : 22.0[°C] 43.6[%]
 Note1 :
 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 [°] |
|-----|-----------------|-----|---------------------|---------------------|---------------|----------------------|----------------------|---------------------|---------------------|----------------|----------------|-------------|-----------|
| 1 | 4960.000 | H | 51.4 | 37.0 | 10.3 | 61.7 | 47.3 | 74.0 | 54.0 | 12.3 | 6.7 | 219.0 | 4.0 |

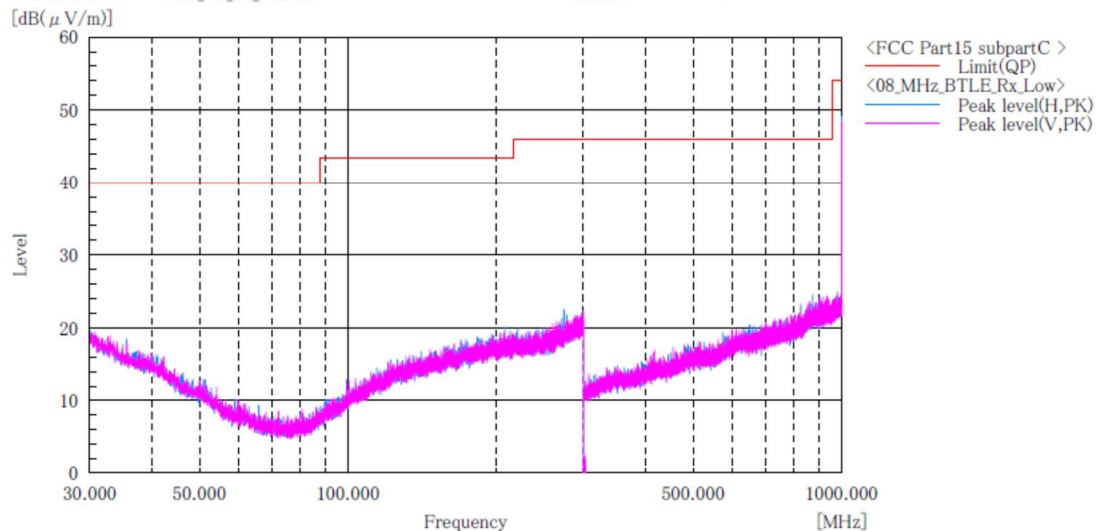
Note:

- 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. : CB70
 Serial No. : N/A
 Test mode : BT_LE_Rx_ch:Low

Standard : FCC Part.15 subpartC
 Operator : C.Kanno
 Temp,Hum : 21.3[°C] 42.3[%]
 Note1 :
 Note2 :

**Final Result**

| No. | Frequency (P) | c.f | Height | Angle |
|-----|---------------|-----------|--------|-------|
| | [MHz] | [dB(1/m)] | [cm] | [°] |

Note:

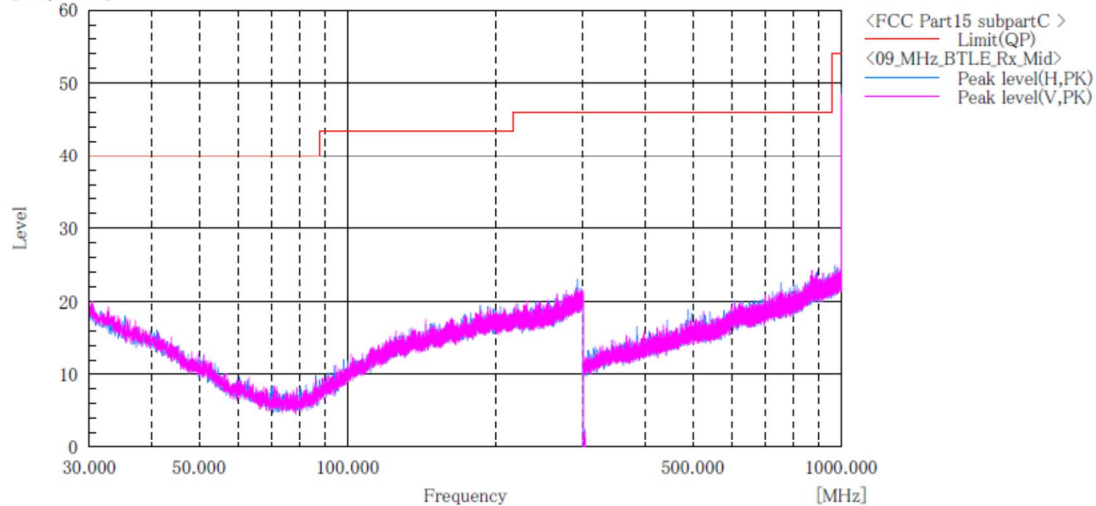
1. Emission Level (Margin) = Limit - [Reading + Factor (Antenna + Cable – Amp)]
2. No emission were detected in frequency range 9kHz to 30MHz and 1GHz to 25GHz at the 3 meters distance.

Channel: Middle
BELOW 1 GHz

Company name : KYOCERA Corporation
 EUT : Mobile Phone
 Model No. : CB70
 Serial No. : N/A
 Test mode : BT_LE_Rx_ch:Mid

Standard : FCC Part.15 subpartC
 Operator : C.Kanno
 Temp,Hum : 21.3[°C] 42.3[%]
 Note1 :
 Note2 :

[dB(μV/m)]



Final Result

| No. | Frequency (P) | c.f | Height | Angle |
|-----|---------------|-----------|--------|-------|
| | [MHz] | [dB(1/m)] | [cm] | [°] |

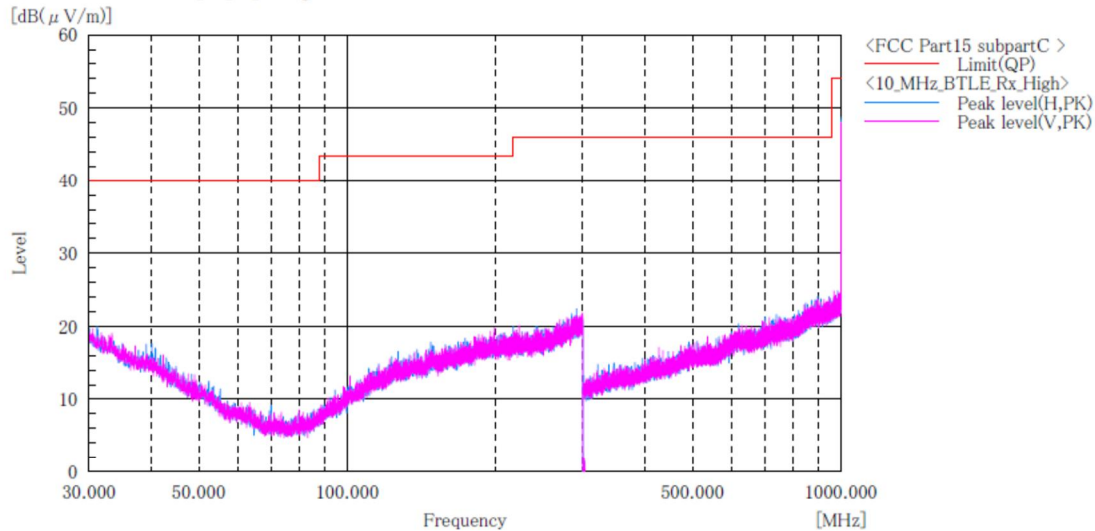
Note:

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. : CB70
Serial No. : N/A
Test mode : BT_LE_Rx_ch:High

Standard : FCC Part.15 subpartC
Operator : C.Kanno
Temp,Hum : 21.3[°C] 42.3[%]
Note1 :
Note2 :



Final Result

| No. | Frequency (P) | c. f | Height | Angle |
|-----|---------------|-----------|--------|-------|
| | [MHz] | [dB(1/m)] | [cm] | [°] |

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.

4.6 Restricted Band of Operation

4.6.1 Measurement procedure

[FCC 15.247(d), 15.205, 15.209, KDB558074 D01 v05r02]

Test was applied by following conditions.

| | | |
|---------------------------|---|--|
| Test method | : | ANSI C63.10 |
| Test place | : | 3m Semi-anechoic chamber |
| EUT was placed on | : | Styrofoam table / (W)1.0m × (D)1.0m × (H)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=3kHz, Span=Arbitrary setting, Sweep=auto Display mode=Linear |

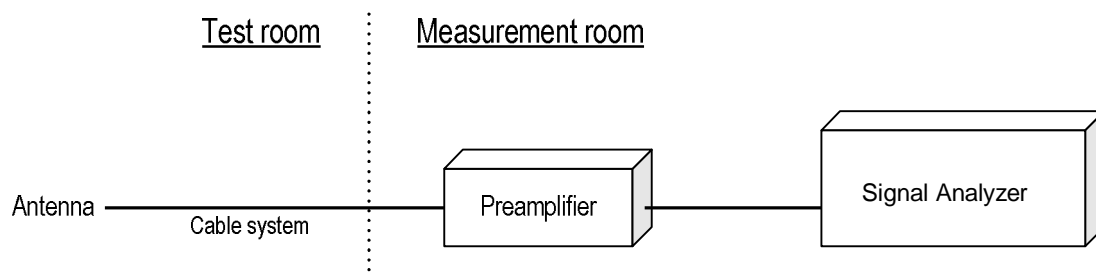
Average Measurement Setting [VBW]

| Mode | Duty Cycle (%) | T _{on} (us) | T _{off} (us) | 1/T _{on} (kHz) | Determined VBW Setting |
|------------------|----------------|----------------------|-----------------------|-------------------------|------------------------|
| Bluetooth 5.0 LE | 60.96 | 381 | 244 | 2.625 | 3kHz |

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



4.6.2 Limit

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

4.6.3 Measurement result

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

4.6.4 Test data

Date : 24-October-2019

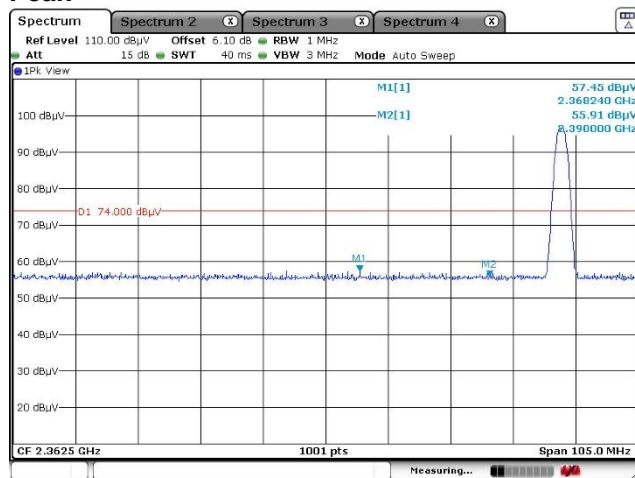
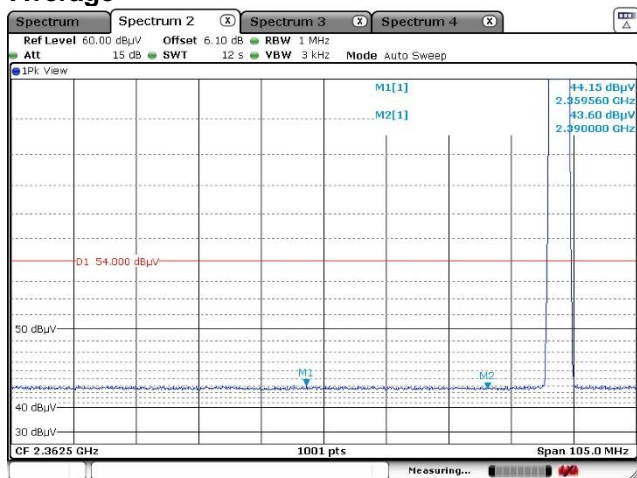
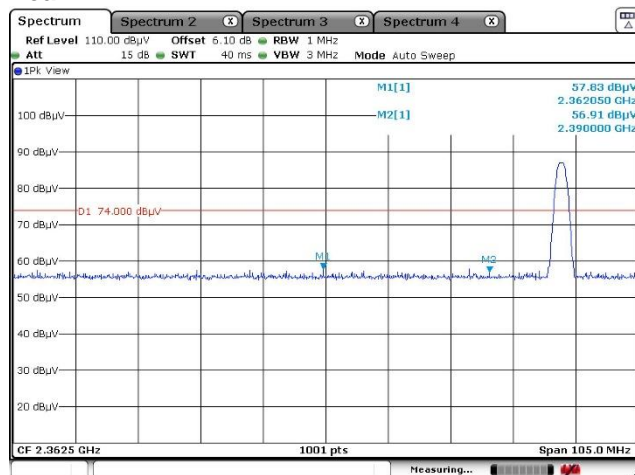
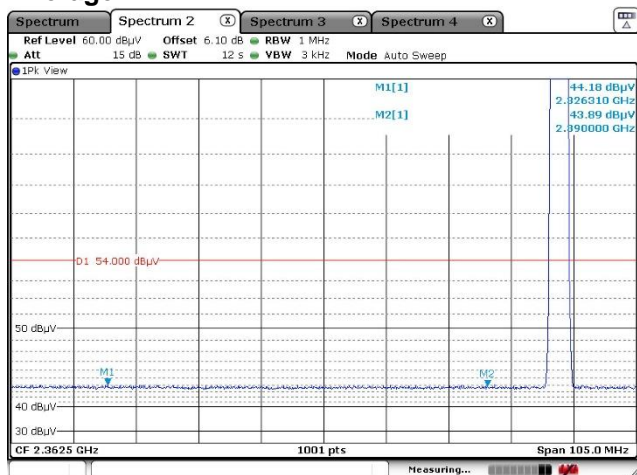
Temperature : 21.4 [°C]

Humidity : 42.3 [%]

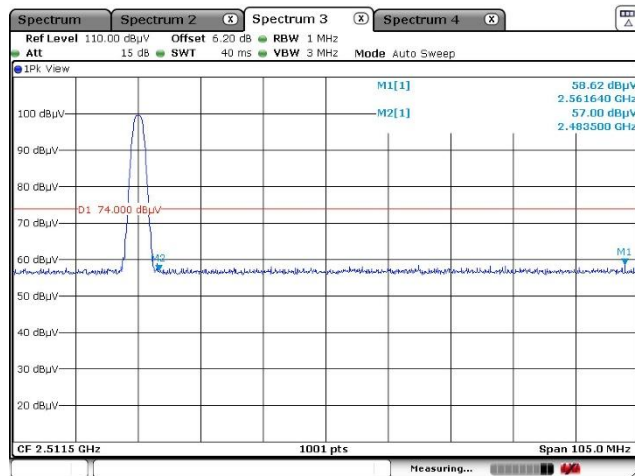
Test place : Shielded room No.4

Test engineer :

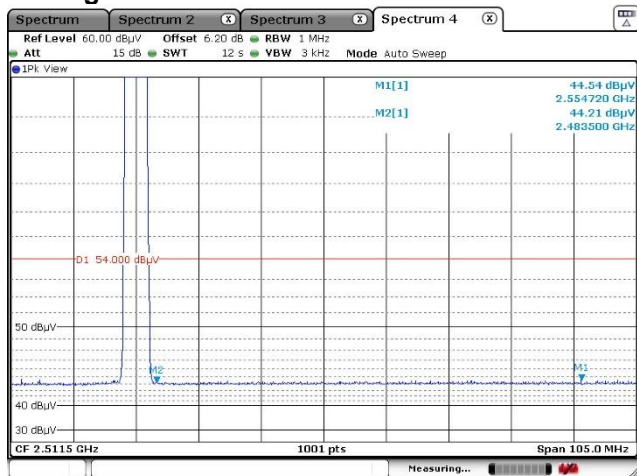
Tadahiro Seino

**Channel: Low
Horizontal
Peak****Average****Vertical
Peak****Average**

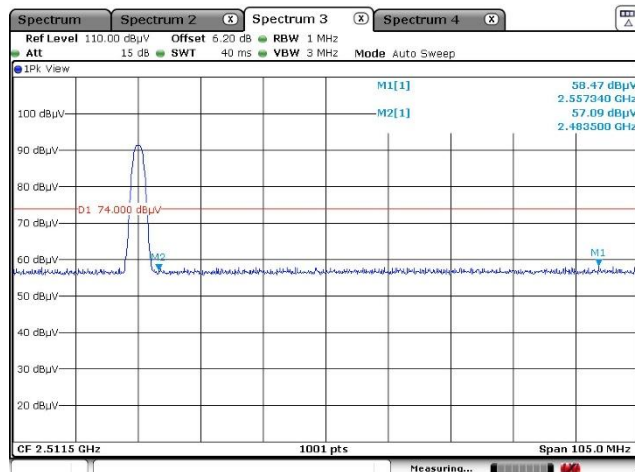
Channel: High Horizontal Peak



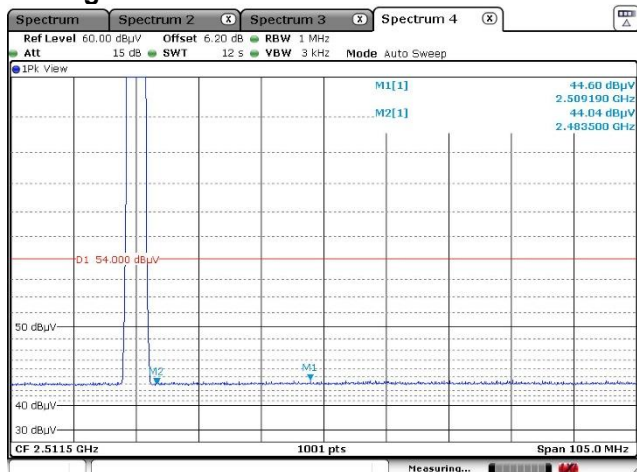
Average



Vertical Peak



Average



4.7 Transmitter Power Spectral Density

4.7.1 Measurement procedure

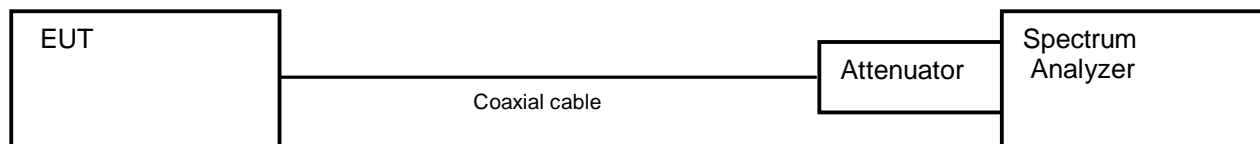
[FCC 15.247(e), KDB558074 D01 v05r02]

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

The spectrum analyzer is set to;

- a) Span = 1.5 times the 6 dB bandwidth.
- b) RBW = 3kHz - 100kHz.
- c) VBW $\geq 3 \times$ RBW.
- d) Sweep time = auto-couple.
- e) Detector = peak.
- f) Trace mode = max hold.

- Test configuration



4.7.2 Limit

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

4.7.3 Measurement result

Date : 25-October-2019

Temperature : 22.6 [°C]

Humidity : 45.1 [%]

Test place : Shielded room No.4

Test engineer :

Taiki Watanabe

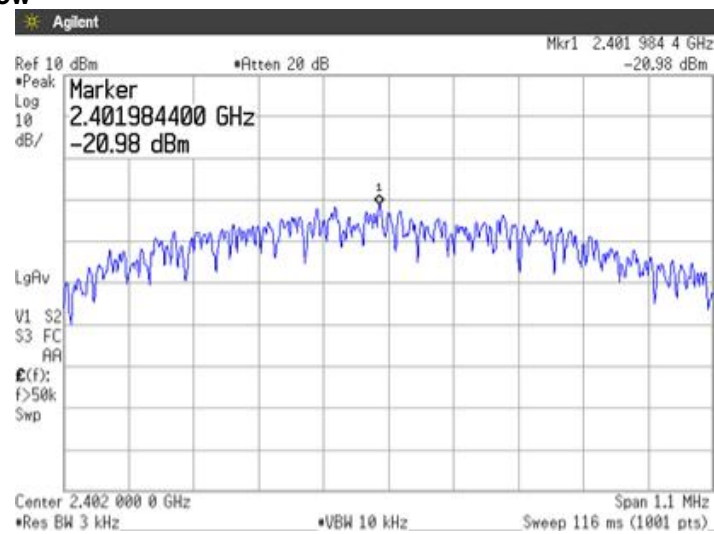
| Channel | Center Frequency (MHz) | Reading (dBm) | Factor (dB) | Level (dBm) | Limit (dBm) | Margin (dBm) | Result |
|---------|------------------------|---------------|-------------|-------------|-------------|--------------|--------|
| Low | 2402 | -20.98 | 10.63 | -10.35 | 8.00 | 18.35 | PASS |
| Middle | 2440 | -19.81 | 10.63 | -9.18 | 8.00 | 17.18 | PASS |
| High | 2480 | -20.23 | 10.63 | -9.60 | 8.00 | 17.60 | PASS |

Calculation;

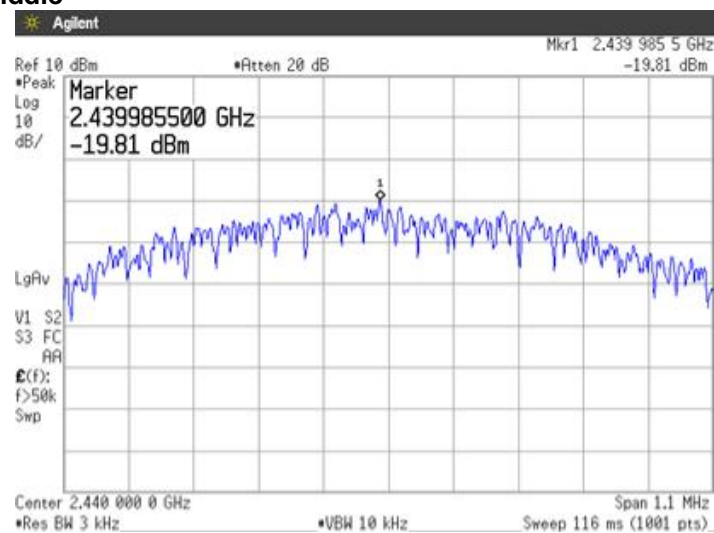
Transmitter Power Spectral Density Level (Margin) = Limit – (Reading + Factor)

4.7.4 Trace data

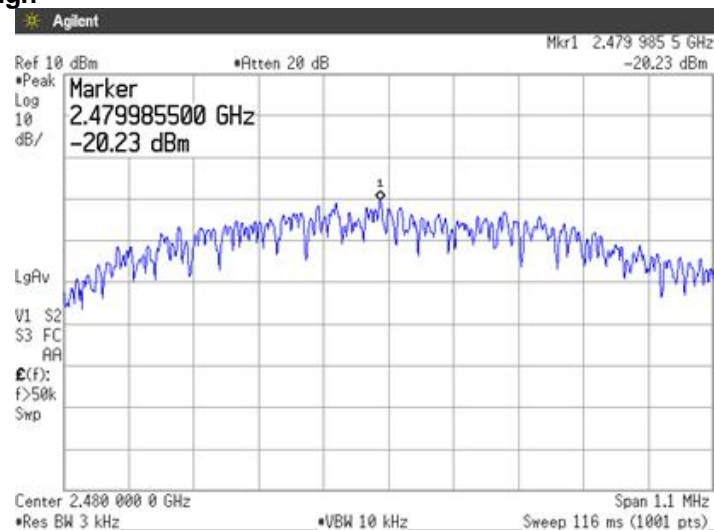
Channel Low



Channel Middle



Channel High



4.8 AC Power Line Conducted Emissions

4.8.1 Measurement procedure

[FCC 15.207]

Test was applied by following conditions.

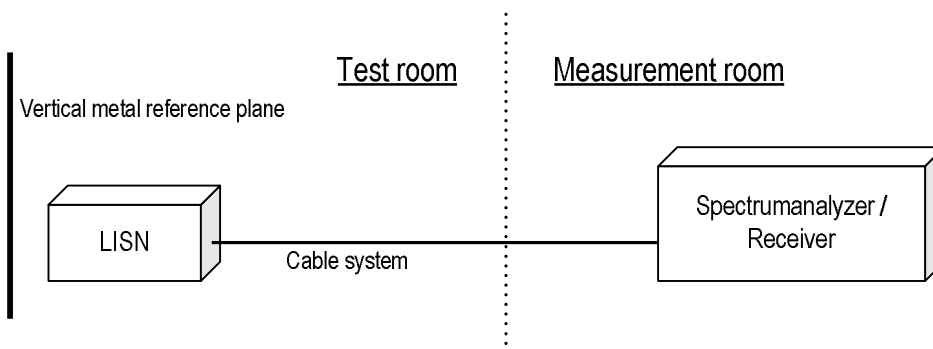
| | |
|--------------------------------|--|
| Test method | : ANSI C63.10 |
| Frequency range | : 0.15 MHz to 30 MHz |
| Test place | : 3 m Semi-anechoic chamber |
| EUT was placed on | : FRP table / (W)2.0 m × (D)1.0 m × (H)0.8 m |
| Vertical Metal Reference Plane | : (W)2.0 m × (H)2.0 m 0.4 m away 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



4.8.2 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

4.8.3 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.

4.8.4 Test data

Date : 31-October-2019

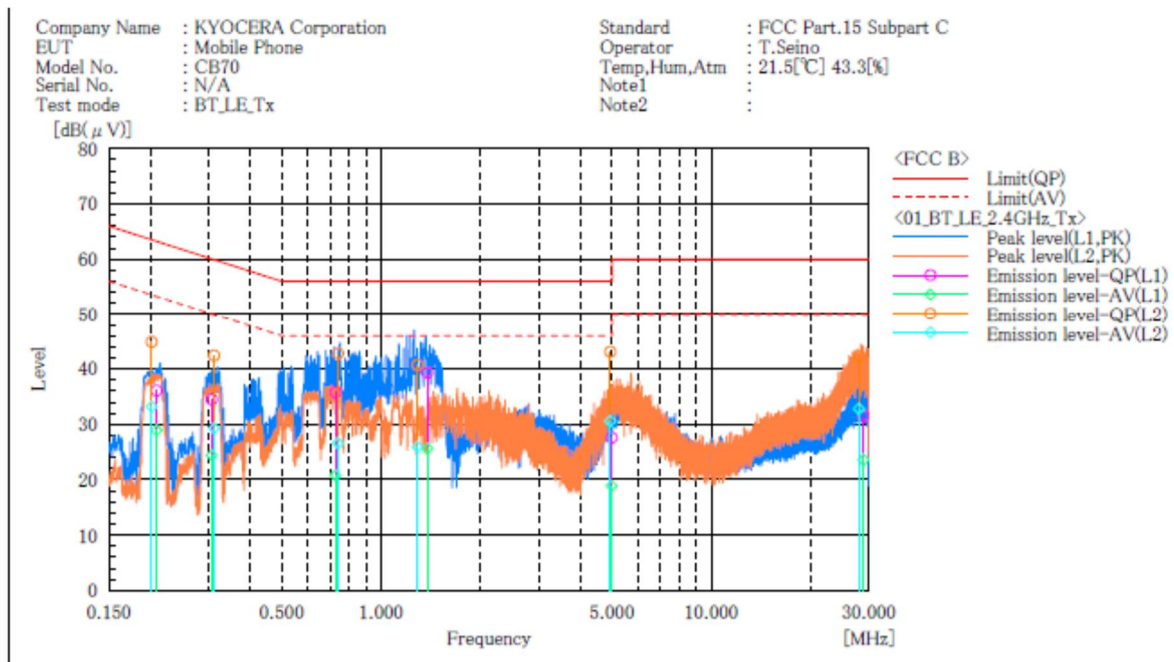
Temperature : 21.5 [°C]

Humidity : 43.3 [%]

Test place : 3m Semi-anechoic chamber

Test engineer :

Tadahiro Seino



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 | 0.209 | 25.7 | 18.5 | 10.4 | 36.1 | 28.9 | 63.2 | 53.2 | 27.1 | 24.3 |
| 2 | 0.307 | 24.2 | 14.1 | 10.3 | 34.5 | 24.4 | 60.1 | 50.1 | 25.6 | 25.7 |
| 3 | 0.728 | 25.5 | 10.5 | 10.3 | 35.8 | 20.8 | 56.0 | 46.0 | 20.2 | 25.2 |
| 4 | 1.381 | 28.9 | 15.2 | 10.4 | 39.3 | 25.6 | 56.0 | 46.0 | 16.7 | 20.4 |
| 5 | 4.988 | 17.1 | 8.4 | 10.5 | 27.6 | 18.9 | 56.0 | 46.0 | 28.4 | 27.1 |
| 6 | 28.860 | 20.2 | 12.3 | 11.3 | 31.5 | 23.6 | 60.0 | 50.0 | 28.5 | 26.4 |

--- 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 | 0.202 | 34.5 | 22.8 | 10.4 | 44.9 | 33.2 | 63.5 | 53.5 | 18.6 | 20.3 |
| 2 | 0.312 | 32.1 | 19.0 | 10.3 | 42.4 | 29.3 | 59.9 | 49.9 | 17.5 | 20.6 |
| 3 | 0.740 | 32.5 | 16.3 | 10.3 | 42.8 | 26.6 | 56.0 | 46.0 | 13.2 | 19.4 |
| 4 | 1.288 | 30.3 | 15.5 | 10.4 | 40.7 | 25.9 | 56.0 | 46.0 | 15.3 | 20.1 |
| 5 | 4.941 | 32.6 | 20.1 | 10.5 | 43.1 | 30.6 | 56.0 | 46.0 | 12.9 | 15.4 |
| 6 | 27.960 | 31.0 | 21.5 | 11.3 | 42.3 | 32.8 | 60.0 | 50.0 | 17.7 | 17.2 |



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) | ± 3.8 dB |
| Conducted emission, AMN (150 kHz – 30 MHz) | ± 3.3 dB |
| Radiated emission (9 kHz – 30 MHz) | ± 3.1 dB |
| Radiated emission (30 MHz – 1000 MHz) | ± 4.9 dB |
| Radiated emission (1 GHz – 6 GHz) | ± 4.8 dB |
| Radiated emission (6 GHz – 18 GHz) | ± 5.1 dB |
| Radiated emission (18 GHz – 40 GHz) | ± 5.8 dB |
| Radio Frequency | $\pm 1.4 \times 10^{-8}$ |
| RF power, conducted | ± 0.6 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> | |

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
Fax: +81-238-28-2888

Accreditation and Registration

NVLAP

LAB CODE: 200306-0

VLAC

Accreditation No.: VLAC-013

BSMI

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

Innovation, Science and Economic Development Canada

| Site number | Facility | Expiration date |
|-------------|----------------------------------|------------------|
| 4224A-4 | 3 m Semi-anechoic chamber | 27-November-2020 |
| 4224A-5 | 10 m Semi-anechoic chamber No. 1 | 27-November-2020 |
| 4224A-6 | 10 m Semi-anechoic chamber No. 2 | 14-December-2019 |

VCCI Council

| Registration number | Expiration date |
|---------------------|-----------------|
| A-0166 | 03-July-2021 |

Appendix A. Test Equipment

Antenna port conducted test

| Equipment | Company | Model No. | Serial No. | Cal. Due | Cal. Date |
|-------------------|----------------------|-----------|------------|-------------|-------------|
| Spectrum analyzer | Agilent Technologies | E4440A | US44302655 | 31-Aug-2020 | 05-Aug-2019 |
| Attenuator | Weinschel | 56-10 | J4180 | 31-Jul-2020 | 18-Jul-2019 |
| Power meter | ROHDE&SCHWARZ | NRP2 | 103269 | 31-Jul-2020 | 18-Jul-2019 |
| Power sensor | ROHDE&SCHWARZ | NRP-Z81 | 102467 | 31-Jul-2020 | 18-Jul-2019 |

Radiated emission

| Equipment | Company | Model No. | Serial No. | Cal. Due | Cal. Date |
|-----------------------------|----------------------|-------------------|-----------------|-------------|-------------|
| EMI Receiver | ROHDE&SCHWARZ | ESCI | 100765 | 30-Sep-2020 | 25-Sep-2019 |
| Spectrum analyzer | Agilent Technologies | E4440A | US44302655 | 31-Aug-2020 | 05-Aug-2019 |
| Signal analyzer | ROHDE&SCHWARZ | FSV40 | 101731 | 31-Dec-2019 | 07-Dec-2018 |
| Preamplifier | SONOMA | 310 | 372170 | 30-Sep-2020 | 26-Sep-2019 |
| Loop antenna | ROHDE&SCHWARZ | HFH2-Z2 | 100515 | 31-Mar-2020 | 07-Mar-2019 |
| Attenuator | TOYO Connector | NA-PJ-6 | N/A(S507) | 31-Dec-2019 | 17-Dec-2018 |
| Biconical antenna | Schwarzbeck | VHA9103/BBA9106 | VHA91031308 | 31-May-2020 | 16-May-2019 |
| Log periodic antenna | Schwarzbeck | UHALP9108A | 0728 | 31-May-2020 | 16-May-2019 |
| Attenuator | TAMAGAWA.ELEC | CFA-01/6dB | N/A(S465) | 31-May-2020 | 17-May-2019 |
| Attenuator | TAMAGAWA.ELEC | CFA-10/3dB | N/A(S503) | 31-Jul-2020 | 17-Jul-2019 |
| Preamplifier | TSJ | MLA-100M18-B02-40 | 1929118 | 31-Jan-2020 | 17-Jan-2019 |
| Attenuator | AEROFLEX | 26A-10 | 081217-08 | 31-Jan-2020 | 17-Jan-2019 |
| Double ridged guide antenna | ETS LINDGREN | 3117 | 00224193 | 31-Jan-2020 | 23-Jan-2019 |
| Attenuator | Agilent Technologies | 8491B | MY39268633 | 31-Mar-2020 | 08-Mar-2019 |
| DRGH antenna | A.H.Systems Inc. | SAS-574 | 469 | 31-Aug-2020 | 28-Aug-2019 |
| Preamplifier | TSJ | MLA-1840-B03-35 | 1240332 | 31-Aug-2020 | 28-Aug-2019 |
| Notch filter | Micro-Tronics | BRM50702 | 045 | 31-May-2020 | 16-May-2019 |
| Microwave cable | HUBER+SUHNER | SUCOFLEX104/9m | MY30037/4 | 31-Jan-2020 | 16-Jan-2019 |
| | | SUCOFLEX104/1m | my24610/4 | 31-Jan-2020 | 16-Jan-2019 |
| | | SUCOFLEX104/8m | SN MY30031/4 | 31-Jan-2020 | 16-Jan-2019 |
| | | SUCOFLEX104 | MY32976/4 | 31-Jan-2020 | 16-Jan-2019 |
| | | SUCOFLEX104/1.5m | MY19309/4 | 31-Jan-2020 | 16-Jan-2019 |
| | | SUCOFLEX104/7m | 41625/6 | 31-Jan-2020 | 16-Jan-2019 |
| PC | DELL | DIMENSION E521 | 75465BX | N/A | N/A |
| Software | TOYO Corporation | EP5/RE-AJ | 0611193/V5.6.0 | 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-2020 | 14-May-2019 |
| 3m Semi an-echoic Chamber | TOKIN | N/A | N/A(9002-SVSWR) | 31-May-2020 | 13-May-2019 |

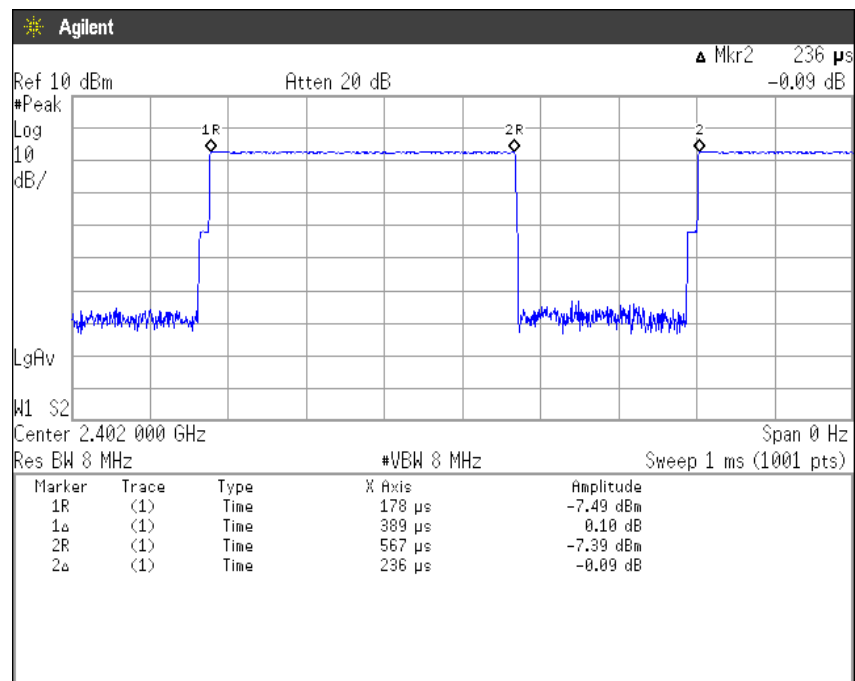
Conducted emission at mains port

| Equipment | Company | Model No. | Serial No. | Cal. Due | Cal. Date |
|--------------------------------------|---------------------------------|-------------|-----------------|-------------|-------------|
| EMI Receiver | ROHDE&SCHWARZ | ESCI | 100765 | 30-Sep-2020 | 25-Sep-2019 |
| Attenuator | HUBER+SUHNER | 6810.01.A | N/A (S411) | 31-Jan-2020 | 17-Jan-2019 |
| Line impedance stabilization network | Kyoritsu Electrical Works, Ltd. | TNW-407F2 | 12-17-110-2 | 31-May-2020 | 16-May-2019 |
| Coaxial cable | FUJIKURA | 5D-2W/4m | N/A (S350) | 31-Jan-2020 | 16-Jan-2019 |
| Coaxial cable | FUJIKURA | 5D-2W/1m | N/A (S193) | 31-Jan-2020 | 16-Jan-2019 |
| Coaxial cable | HUBER+SUHNER | RG214/U/10m | N/A (S194) | 31-Jan-2020 | 16-Jan-2019 |
| PC | DELL | DIMENSION | 75465BX | N/A | N/A |
| Software | TOYO Corporation | EP5/CE-AJ | 0611193/V5.4.11 | 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]



$$\text{Duty Cycle} = \text{Ton} / (\text{Ton} + \text{Toff}) = 389[\mu\text{s}] / (389[\mu\text{s}] + 236[\mu\text{s}]) = 62.24[\%]$$