

# TEST REPORT



**CTK Co., Ltd.**  
(Ho-dong), 113, Yejik-ro, Cheoin-gu,  
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Report No.:  
CTK-2019-03542  
Page (1) / (32) Pages

## 1. Client

- Name : CnR Tech. Co., Ltd.
- Address : #713, 11-41 simin-daero 327beon-gil, Dongan-gu, Anyang-si, Gyeonggi-do, Korea
- Date of Receipt : 2019-08-23

## 2. Manufacturer

- Name : CnR Tech. Co., Ltd.
- Address : #713, 11-41 simin-daero 327beon-gil, Dongan-gu, Anyang-si, Gyeonggi-do, Korea

## 3. Use of Report : For FCC Certification

## 4. Test Sample / Model: Code-Play Block / CR-CPB-v001

## 5. Date of Test : 2019-09-02 to 2019-09-05

## 6. Test Standard(method) used : FCC 47 CFR part 15 subpart C 15.247

## 7. Testing Environment: Temp.: (25 ± 1) °C, Humidity: (51 ± 3) % R.H.

## 8. Test Results : Compliance

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This Test Report cannot be reproduced, except in full.

|             |                                                                                               |                                                                                                         |
|-------------|-----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| Affirmation | Tested by  | Technical Manager  |
|             | Ji-Hye Kim: (Signature)                                                                       | Won-Jae, Hwang: (Signature)                                                                             |

2019-09-09

Republic of KOREA **CTK Co., Ltd.**



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## REPORT REVISION HISTORY

| Date       | Revision                | Page No |
|------------|-------------------------|---------|
| 2019-09-09 | Issued (CTK-2019-03542) | all     |
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|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|--|

## 1. General Product Description

### 1.1 Client Information

|                       |                                                                                                   |
|-----------------------|---------------------------------------------------------------------------------------------------|
| <b>Company</b>        | CnR Tech. Co., Ltd.                                                                               |
| <b>Contact Point</b>  | #713, 11-41 simin-daero 327beon-gil, Dongan-gu, Anyang-si,<br>Gyeonggi-do, Korea                  |
| <b>Contact Person</b> | Name : Deeksoo Han<br>E-mail : cnr@candr.co.kr<br>Tel : +82-70-4821-4328<br>Fax : +82-31-422-4328 |

### 1.2 Product Information

|                              |                                                     |
|------------------------------|-----------------------------------------------------|
| <b>FCC ID</b>                | 2AUIN-CR-CPB-V001                                   |
| <b>Product Description</b>   | Code-Play Block                                     |
| <b>Model name</b>            | CR-CPB-v001                                         |
| <b>Variant Model name</b>    | -                                                   |
| <b>Operating Frequency</b>   | 2 402 MHz – 2 480 MHz                               |
| <b>RF Output Power</b>       | -11.560 dBm (0.07 mW)                               |
| <b>Antenna Specification</b> | Antenna type : PCB Antenna<br>Peak Gain : -1.13 dBi |
| <b>Type of Modulation</b>    | GFSK (Bluetooth LE)                                 |
| <b>Power Source</b>          | DC 3.7 V (Li-ion Battery)                           |
| <b>Hardware Rev</b>          | 0.4                                                 |
| <b>Software Rev</b>          | 7.2                                                 |

### 1.3 Peripheral Devices

| Device        | Manufacturer | Model No.  | Serial No. |
|---------------|--------------|------------|------------|
| Note Computer | HP           | 15-bs563TU | CND7253R6N |
| AC/DC Adapter | HP           | HSTNN-CA40 | -          |

## 2. Facility and Accreditations

### 2.1 Test Facility

The measurement facility is located at (Ho-dong), 113, Yejik-ro, Cheoin-gu, Yong-in-si, Gyeonggi-do, Korea.

### 2.2 Laboratory Accreditations and Listings

| Country | Agency | Registration Number |
|---------|--------|---------------------|
| USA     | FCC    | 805871              |
| CANADA  | ISED   | 8737A-2             |
| KOREA   | NRRA   | KR0025              |

### 2.3 Calibration Details of Equipment Used for Measurement

Test equipment and test accessories are calibrated on regular basis. The maximum time between calibrations is one year or what is recommended by the manufacturer, whichever is less. All test equipment calibrations are traceable to the Korea Research Institute of Standards and Science (KRISS), therefore, all test data recorded in this report is traceable to KRISS.

### 3. Test Specifications

#### 3.1 Standards

| FCC Part Section(s)                                                                                                           | Requirement(s)                     | Status (Note 1) | Test Condition |
|-------------------------------------------------------------------------------------------------------------------------------|------------------------------------|-----------------|----------------|
| 15.247(a)                                                                                                                     | 6 dB Bandwidth                     | C               | Conducted      |
| 15.247(b)                                                                                                                     | Maximum Output Power               | C               |                |
| 15.247(d)                                                                                                                     | Conducted Spurious emission        | C               |                |
| 15.247(d)                                                                                                                     | Unwanted Emission(Conducted)       | C               |                |
| 15.247(e)                                                                                                                     | Transmitter Power Spectral Density | C               |                |
| 15.209                                                                                                                        | Radiated Emissions                 | C               | Radiated       |
| 15.207                                                                                                                        | AC Conducted Emissions             | C               | Line Conducted |
| <u>Note 1:</u> C=Complies NC=Not Complies NT=Not Tested NA=Not Applicable                                                     |                                    |                 |                |
| <u>Note 2:</u> The data in this test report are traceable to the national or international standards.                         |                                    |                 |                |
| <u>Note 3:</u> The sample was tested according to the following specification: FCC Part 15.247                                |                                    |                 |                |
| <u>Note 4:</u> The tests were performed according to the method of measurements prescribed in KDB No.558074, ANSI C63.10-2013 |                                    |                 |                |

### 3.2 Mode of operation during the test

The EUT is operated in a manner representative of the typical of the equipments.  
 During at testing, system components were manipulated within the confines of typical usage to maximize each emission. All modulation modes were tests.  
 The results are only attached worst cases.

#### Test Frequency

| Lowest channel | Middle channel | Highest channel |
|----------------|----------------|-----------------|
| 2 402 MHz      | 2 440 MHz      | 2 480 MHz       |

#### Test mode

| Modulation | Duty Cycle | Duty Cycle Factor |
|------------|------------|-------------------|
| GFSK       | 17.5%      | 7.58 dB           |

### 3.3 Device Modifications

The following modifications were necessary for compliance:

Not applicable

### 3.4 Maximum Measurement Uncertainty

The value of the measurement uncertainty for the measurement of each parameter.  
 Coverage factor  $k = 2$ , Confidence levels of 95 %

| Description                          | Uncertainty   |
|--------------------------------------|---------------|
| Conducted RF Output Power            | $\pm 1.5$ dB  |
| Power Spectral Density               | $\pm 1.5$ dB  |
| Occupied Bandwidth                   | $\pm 0.1$ MHz |
| Unwanted Emission(conducted)         | $\pm 3.0$ dB  |
| Radiated Emissions ( $f \leq 1$ GHz) | $\pm 4.0$ dB  |
| Radiated Emissions ( $f > 1$ GHz)    | $\pm 5.0$ dB  |

### 3.5 Test Software

|                     |                                                                          |
|---------------------|--------------------------------------------------------------------------|
| Conducted Test      | Ics Pro Ver. 6.0.3                                                       |
| Radiated Test       | TOYO EMI software EP5RE Ver. 5.1.0<br>TOYO EMI software EP5RE Ver. 6.0.1 |
| Line Conducted Test | ESCI7, ESCI3 : EMC32 Ver. 8.50.0<br>ESR7 : EMC32 Ver. 8.53.0             |

## 4. Technical Characteristic Test

### 4.1 6dB Bandwidth

#### Test Procedures

KDB 558074 - Section 8.2  
ANSI C63.10-2013 - Section 11.8.2

Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

#### Test Procedures

ANSI C63.10-2013 - Section 6.9

The occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission.

Use the 99% power bandwidth function of the instrument and report the measured bandwidth.

#### Test Settings :

Center frequency = the highest, middle and the lowest channels

- a) RBW = 100 kHz
- b) VBW  $\geq 3 \times$  RBW
- c) Detector = peak
- d) Trace mode = Max hold
- e) Sweep = auto couple
- f) Allow trace to fully stabilize
- g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

#### **Minimum Standard :**

---

6 dB Bandwidth > 500kHz

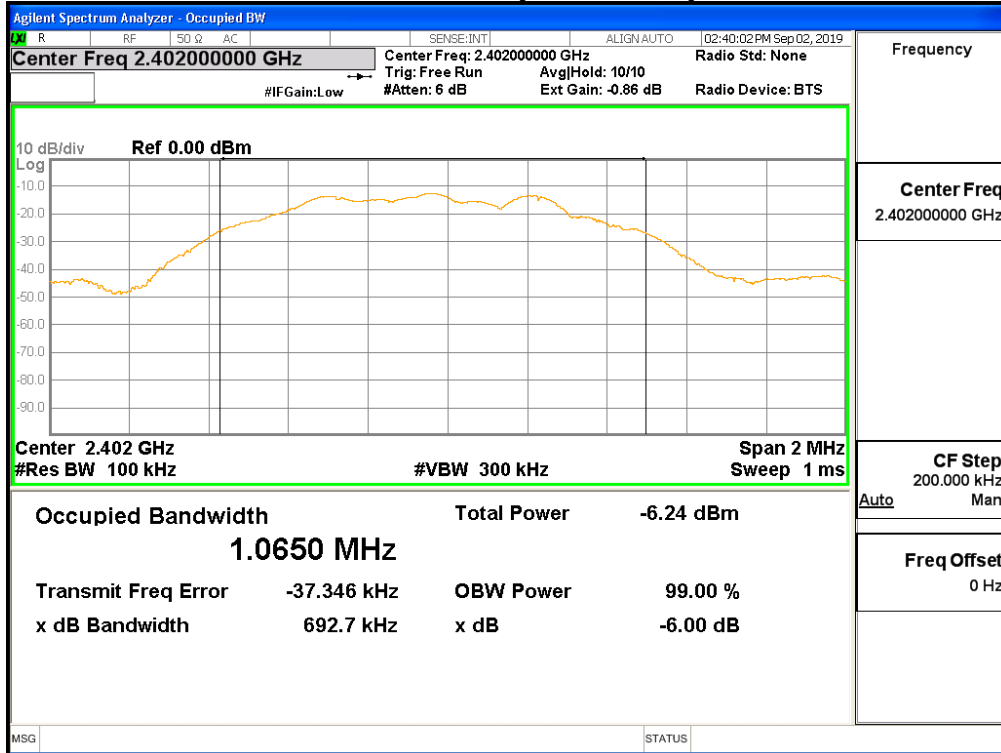
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**Test Data :**

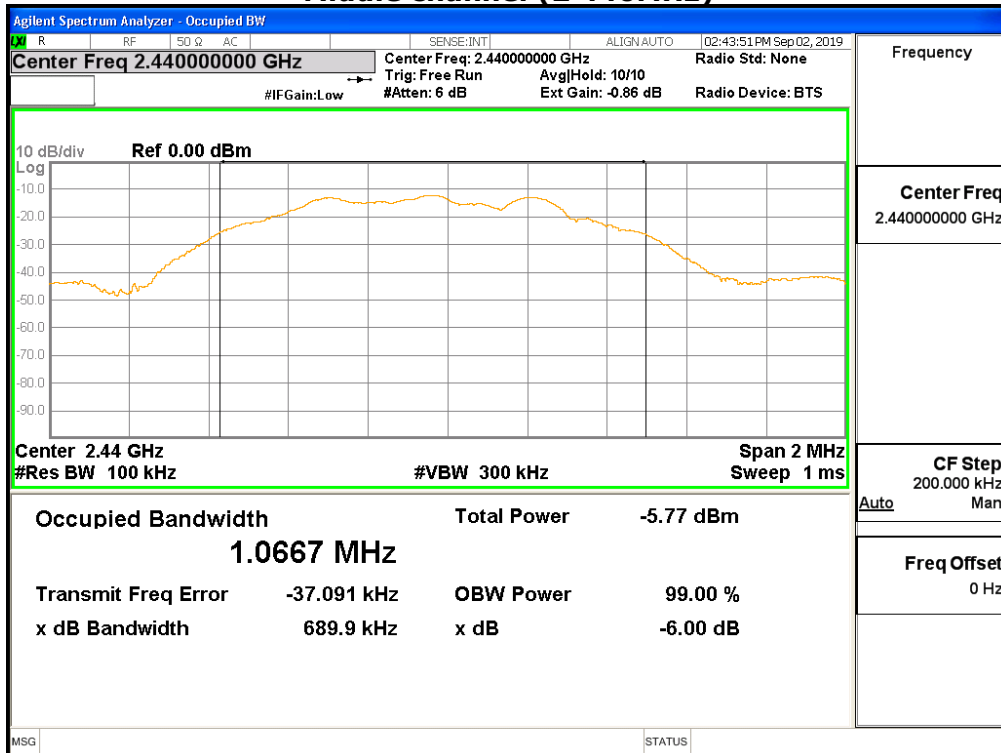
| Frequency<br>(MHz) | 6dB Bandwidth<br>(MHz) | 99% Bandwidth<br>(MHz) | Result   |
|--------------------|------------------------|------------------------|----------|
| 2 402              | 0.693                  | 1.065                  | Complies |
| 2 440              | 0.690                  | 1.067                  | Complies |
| 2 480              | 0.684                  | 1.068                  | Complies |

See next pages for actual measured spectrum plots.

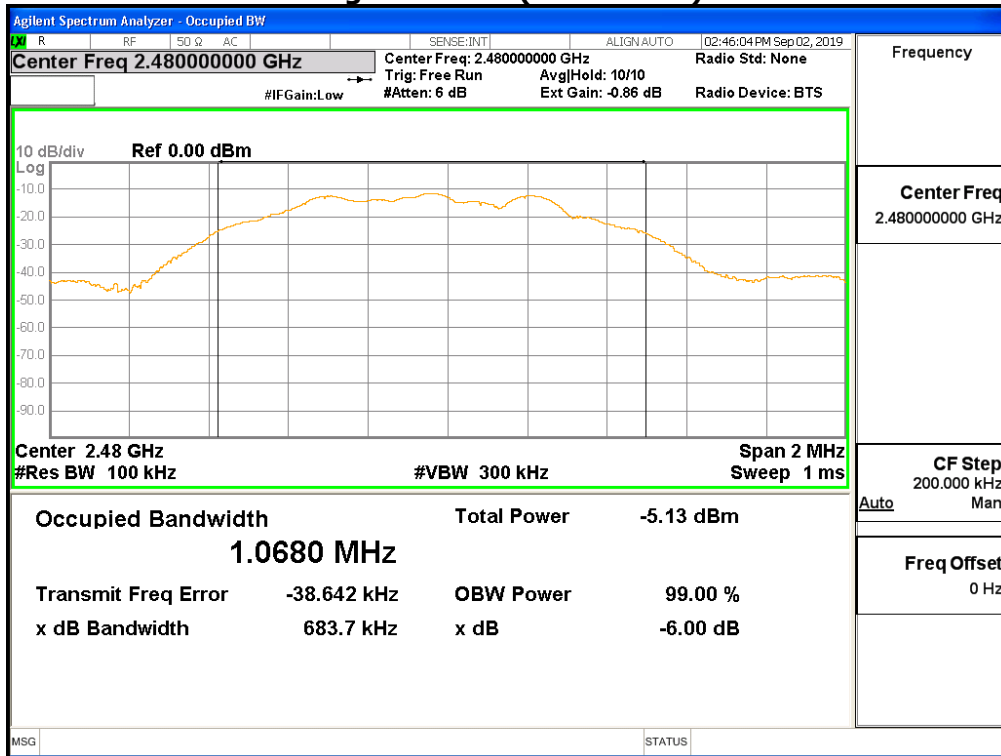
### 6 dB bandwidth & 99% Bandwidth Low channel (2 402 MHz)



### Middle channel (2 440MHz)



### High channel (2 480 MHz)



## 4.2 Maximum peak Conducted Output Power

### Test Procedures

KDB 558074 - Section 8.3.1.1  
ANSI C63.10-2013 - Section 11.9.1.1

This procedure shall be used when the measurement instrument has available a resolution bandwidth that is greater than the DTS bandwidth.

#### Test Settings:

Center frequency = the highest, middle and the lowest channels

- a) RBW  $\geq$  DTS bandwidth
- b) VBW  $\geq 3 \times$  RBW
- c) span  $\geq 3 \times$  RBW
- d) Sweep time = auto couple
- e) Detector = peak
- f) Trace mode = max hold
- g) Allow trace to fully stabilize
- h) Use peak marker function to determine the peak amplitude level.

#### Limit :

---

Maximum Output Power < 1 W (30 dBm)

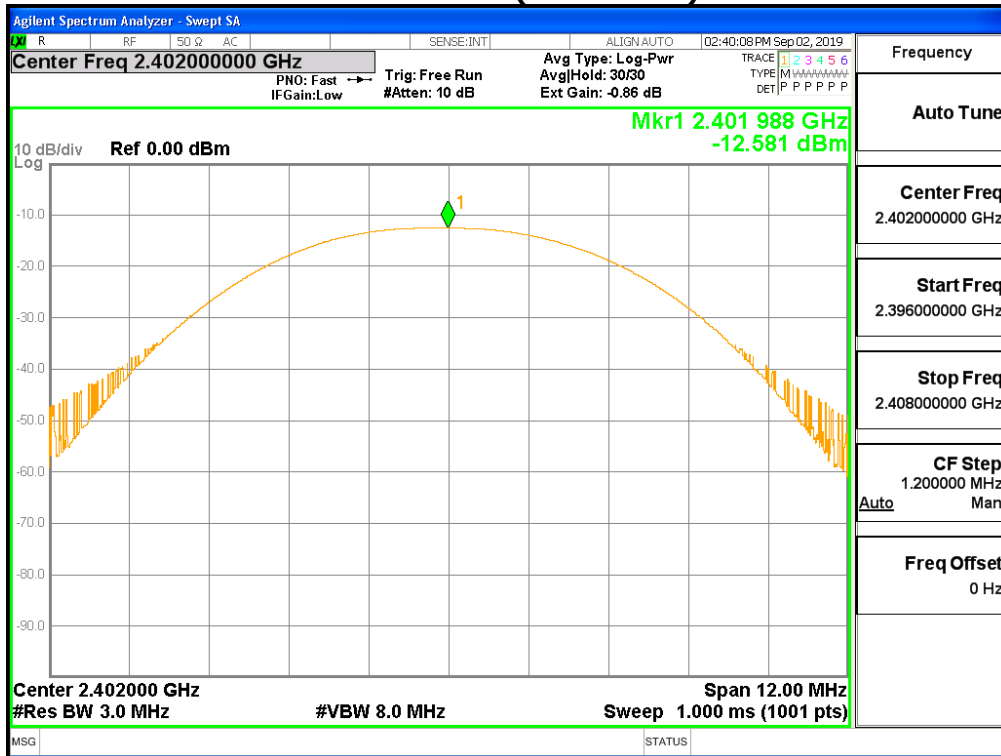
---

#### Test Data :

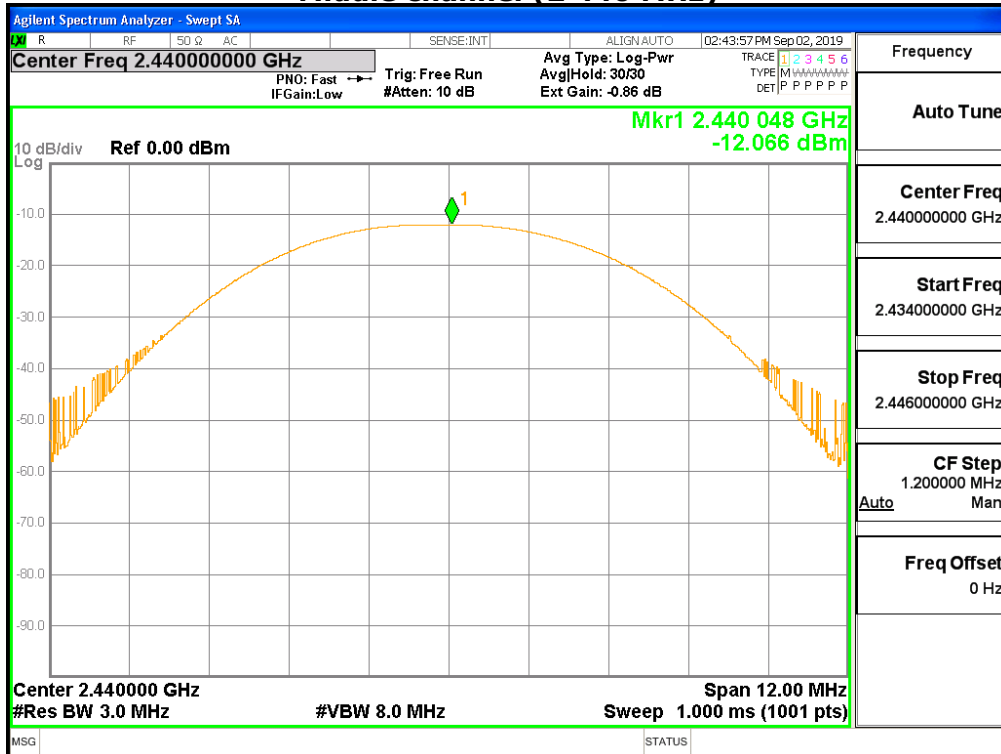
| Frequency<br>(MHz) | Maximum peak Conducted Output Power |                      |          |
|--------------------|-------------------------------------|----------------------|----------|
|                    | Output power<br>(dBm)               | Output power<br>(mW) | Result   |
| 2 402              | -12.581                             | 0.055                | Complies |
| 2 440              | -12.066                             | 0.062                | Complies |
| 2 480              | -11.560                             | 0.070                | Complies |

See next pages for actual measured spectrum plots.

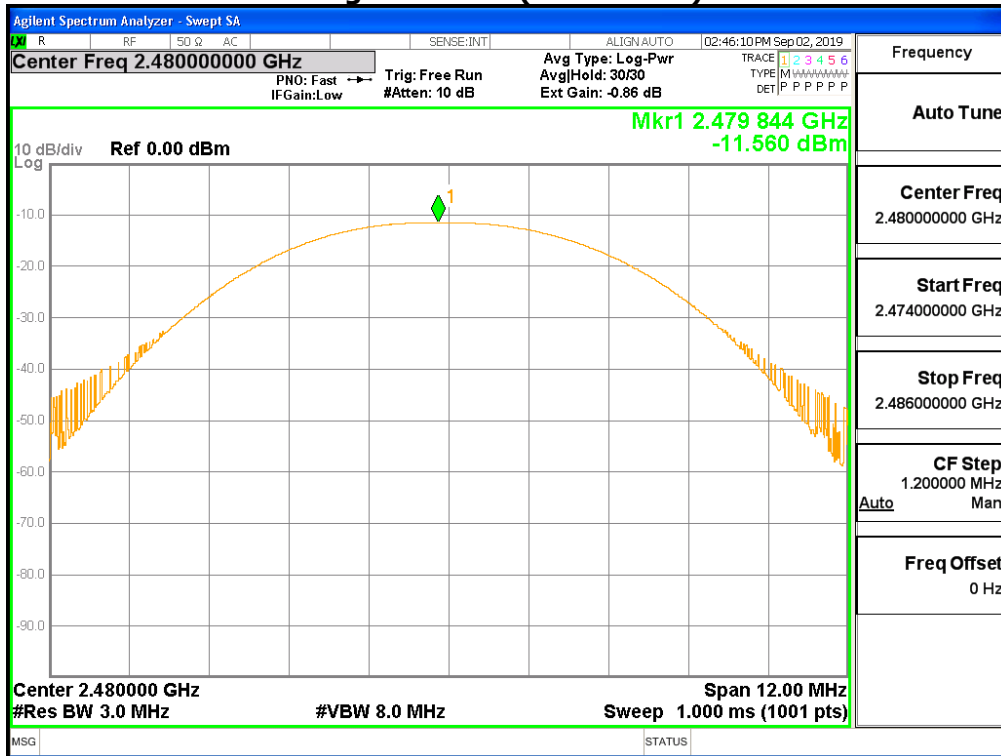
### Low channel (2 402 MHz)



### Middle channel (2 440 MHz)



### High channel (2 480 MHz)



## 4.3 Transmitter Power Spectral Density

### Test Procedures

KDB 558074 - Section 8.4

ANSI C63.10-2013 - Section 11.10.2

This procedure shall be used if maximum peak conducted output power was used to demonstrate compliance.

#### Test Settings:

Center frequency = the highest, middle and the lowest channels

a) RBW :  $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$

b) VBW  $\geq 3 \times \text{RBW}$

c) span  $\geq 1.5 \times \text{DTS bandwidth}$

d) Sweep time = auto couple

e) Detector = peak

f) Trace mode = max hold

g) Allow trace to fully stabilize

h) Use the peak marker function to determine the maximum amplitude level within the RBW.

#### Limit :

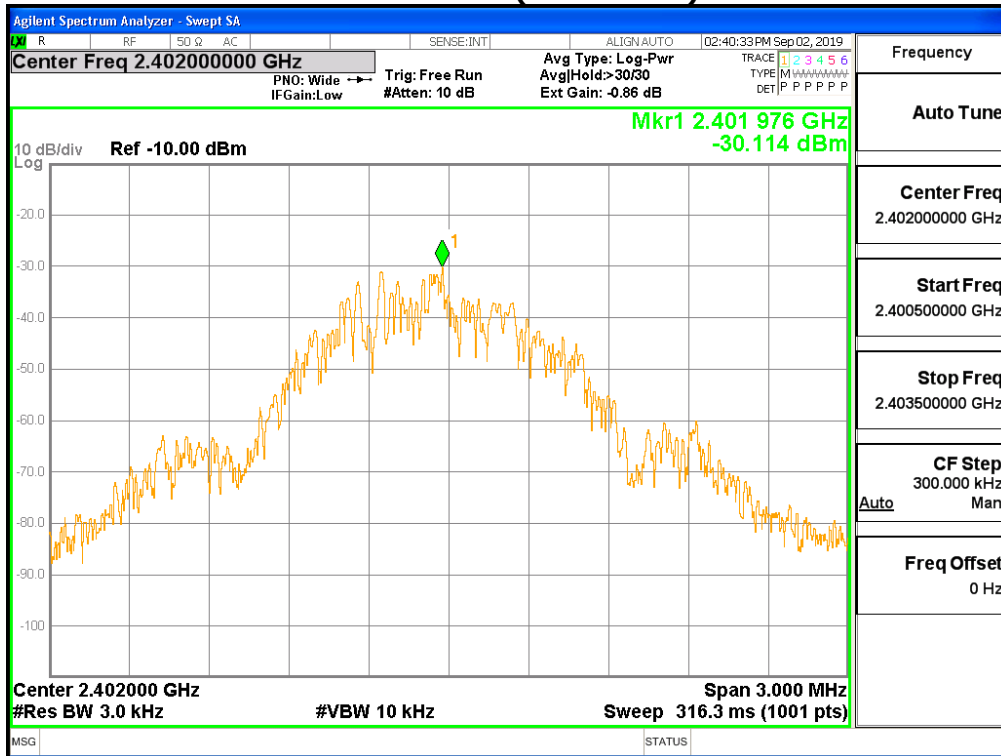
Power Spectral Density < 8dBm @ 3 kHz BW

#### Test Data :

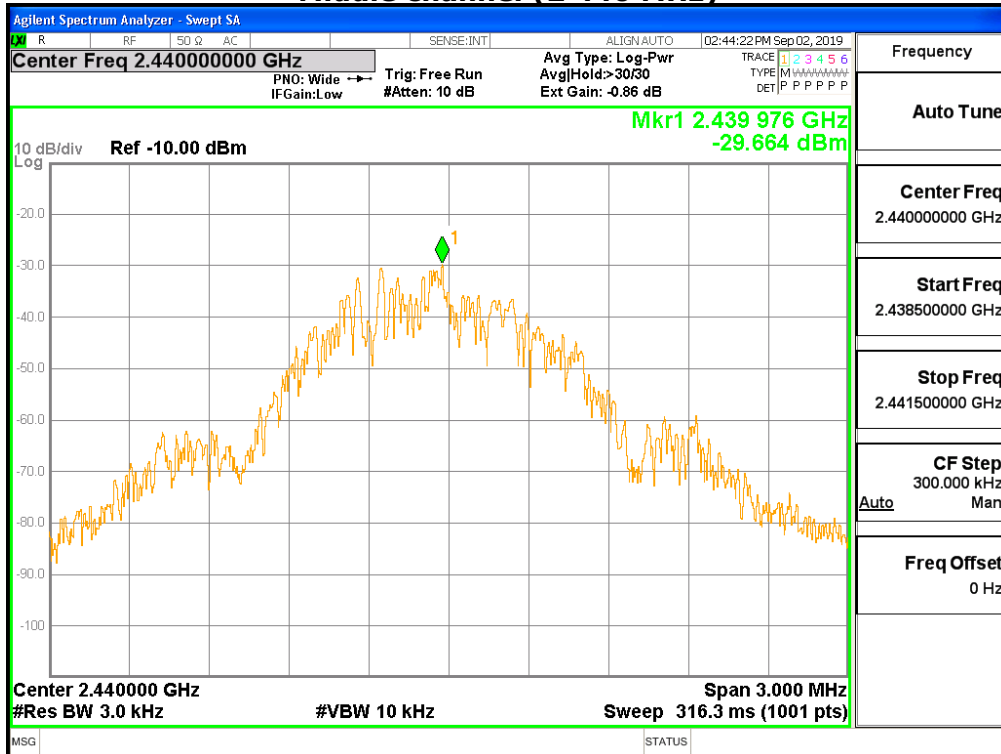
| Frequency<br>(MHz) | Power Spectral Density |          |
|--------------------|------------------------|----------|
|                    | dBm/3kHz               | Result   |
| 2 402              | -30.114                | Complies |
| 2 440              | -29.664                | Complies |
| 2 480              | -29.184                | Complies |

See next pages for actual measured spectrum plots.

### Low channel (2 402 MHz)



### Middle channel (2 440 MHz)





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High channel (2 480 MHz)



## 4.4 Conducted Spurious emission

### Test Procedures

KDB 558074 - Section 8.5

ANSI C63.10-2013 - Section 11.11.3

The Unwanted emission from the EUT were measured according to the dictates PKPSD measurement procedure in section 11.11 of ANSI C63.10-2013.

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under Section 5.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

#### Test Settings:

Center frequency = the highest, middle and the lowest channels

- a) RBW = 100 kHz
- b) VBW  $\geq 3 \times$  RBW
- c) Detector = peak
- d) Sweep time = auto couple
- e) Trace mode= max hold
- f) Allow trace to fully stabilize
- g) Use the peak marker function to determine the maximum amplitude level.

#### **Limit :**

---

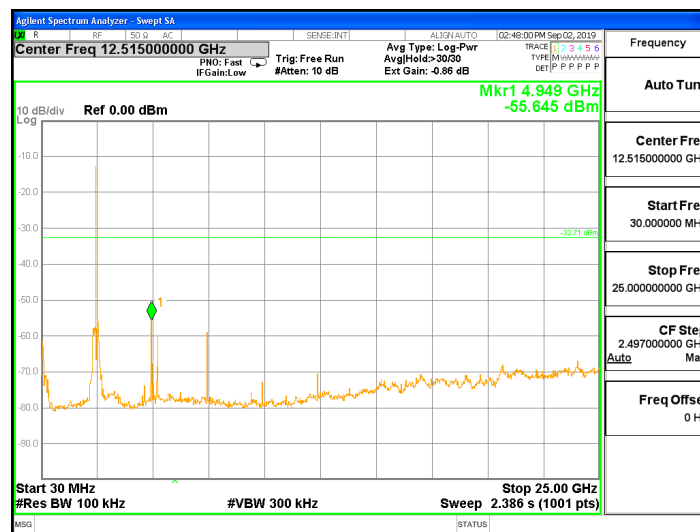
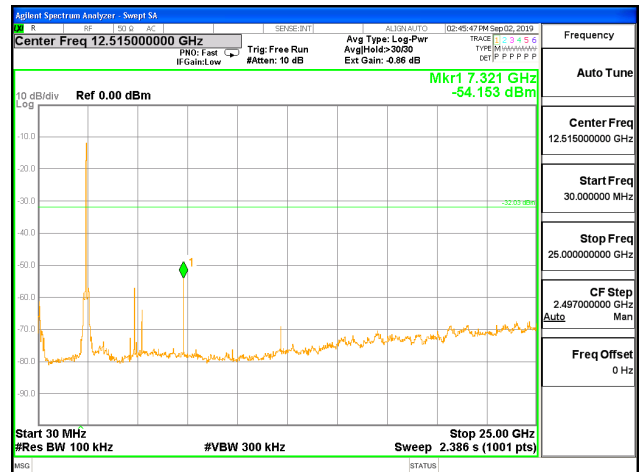
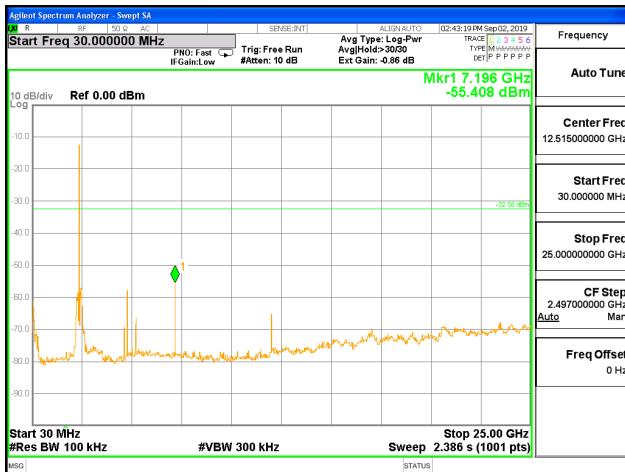
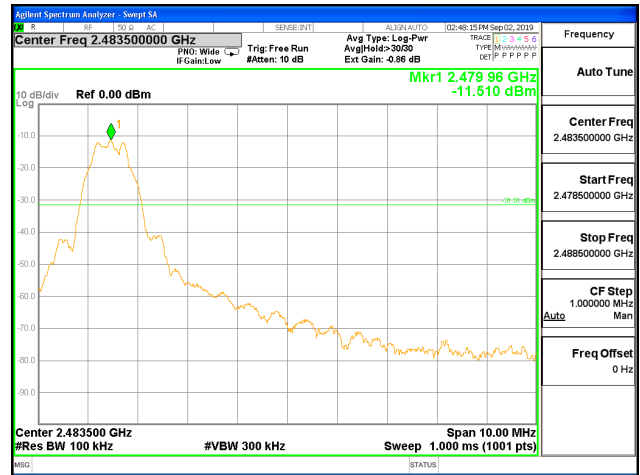
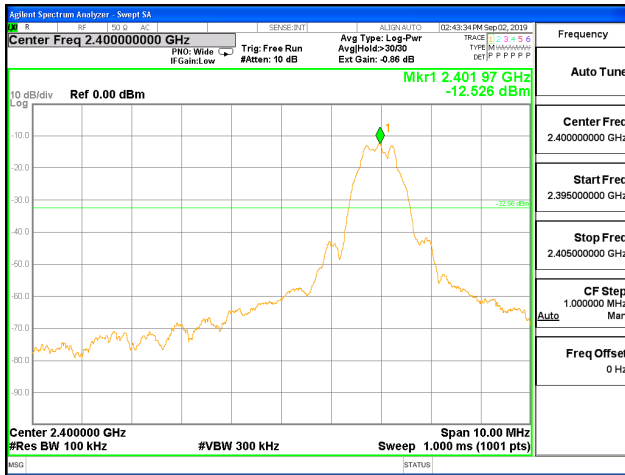
Emission level < 20 dBc

---

### **Test results: Complies**

- All conducted emission in any 100kHz bandwidth outside of the spread spectrum band was at least 20dB lower than the highest in-band spectral density. Therefore the applying equipment meets the requirement.

See next pages for actual measured spectrum plots.





- Average (duty cycle < 98%, duty cycle variations are less than  $\pm 2\%$ )

Frequency Range = 1 GHz ~ 25 GHz (2.4 GHz 10<sup>th</sup> harmonic)

a) RBW = 1 MHz

b) VBW  $\geq 3 \times$  RBW

c) Detector = RMS

d) Sweep time = auto

e) Averaging type = power (i.e., RMS)

f) Trace mode = average (at least 100 traces)

A correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100 % duty cycle.

If power averaging (RMS) mode, then the applicable correction factor is  $10 \log(1/x)$ , where x is the duty cycle.

**Duty Cycle Factor : 7.58 dB**

### Limit :

FCC Part 15 § 15.205 (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

| MHz                      | MHz               | MHz                 | MHz           | MHz         | GHz                     |
|--------------------------|-------------------|---------------------|---------------|-------------|-------------------------|
| 0.09-0.11                | 8.37626-8.38675   | 73-74.6             | 399.9-410     | 2690-2900   | 10.6-12.7               |
| <sup>1</sup> 0.495-0.505 | 8.41425-8.41475   | 74.8-75.2           | 608-614       | 3260-3267   | 13.25-13.4              |
| 2.1735-2.1905            | 12.29-12.293      | 108-121.94          | 960-1240      | 3332-3339   | 14.47-14.5              |
| 4.125-4.128              | 12.51975-12.52025 | 123-138             | 1300-1427     | 3345.8-3358 | 15.35-16.2              |
| 4.17725-4.17775          | 12.57675-12.57725 | 149.9-150.05        | 1435-1626.5   | 3600-4400   | 17.7-21.4               |
| 4.20725-4.20775          | 13.36-13.41       | 156.52475-156.52525 | 1645.5-1646.5 | 4500-5150   | 22.01-23.12             |
| 6.215-6.218              | 16.42-16.423      | 156.7-156.9         | 1660-1710     | 5350-5460   | 23.6-24                 |
| 6.26775-6.26825          | 16.69475-16.69525 | 162.0125-167.17     | 1718.8-1722.2 | 7250-7750   | 31.2-31.8               |
| 6.31175-6.31225          | 16.80425-16.80475 | 167.72-173.2        | 2200-2300     | 8025-8500   | 36.43-36.5              |
| 8.291-8.294              | 25.5-25.67        | 240-285             | 2310-2390     | 9000-9200   | <sup>2</sup> Above 38.6 |
| 8.362-8.366              | 37.5-38.25        | 322-335.4           | 2483.5-2500   | 9300-9500   |                         |

<sup>1</sup> Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

<sup>2</sup> Above 38.6

§ 15.205 (b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

FCC Part 15 § 15.209 (a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table :

| Frequency(MHz) | Field Strength<br>uV/m@3m | Field Strength<br>dBuV/m@3m | Deasurement<br>Distance (meters) |
|----------------|---------------------------|-----------------------------|----------------------------------|
| 0.009-0.490    | 2400/F(kHz)               | -                           | 300                              |
| 0.490-1.705    | 24000/F(kHz)              | -                           | 30                               |
| 1.705-30       | 30                        | -                           | 30                               |
| 30-88          | 100**                     | 40                          | 3                                |
| 88-216         | 150**                     | 43.5                        | 3                                |
| 216-960        | 200**                     | 46                          | 3                                |
| Above 960      | 500                       | 54                          | 3                                |

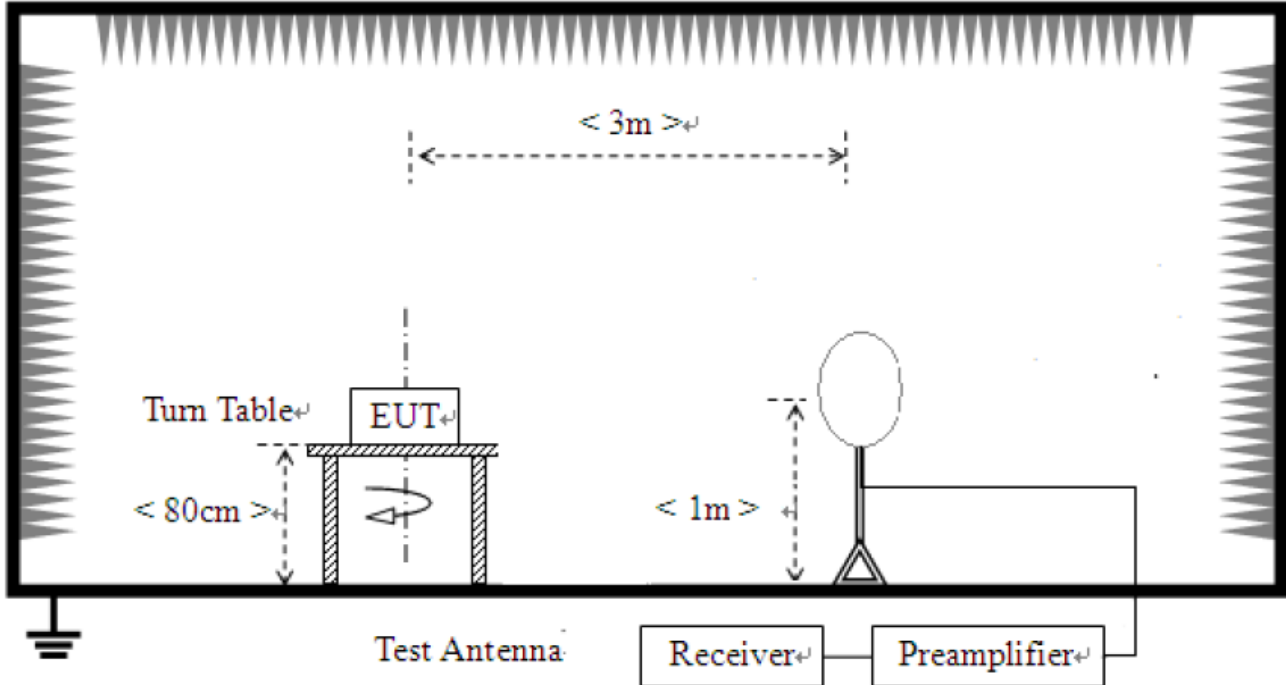
\*\* Except as provided in 15.209(g).fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72MHz, 76-88MHz, 174-216MHz, 470-806MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g.15.231 and 15.241.

Note :

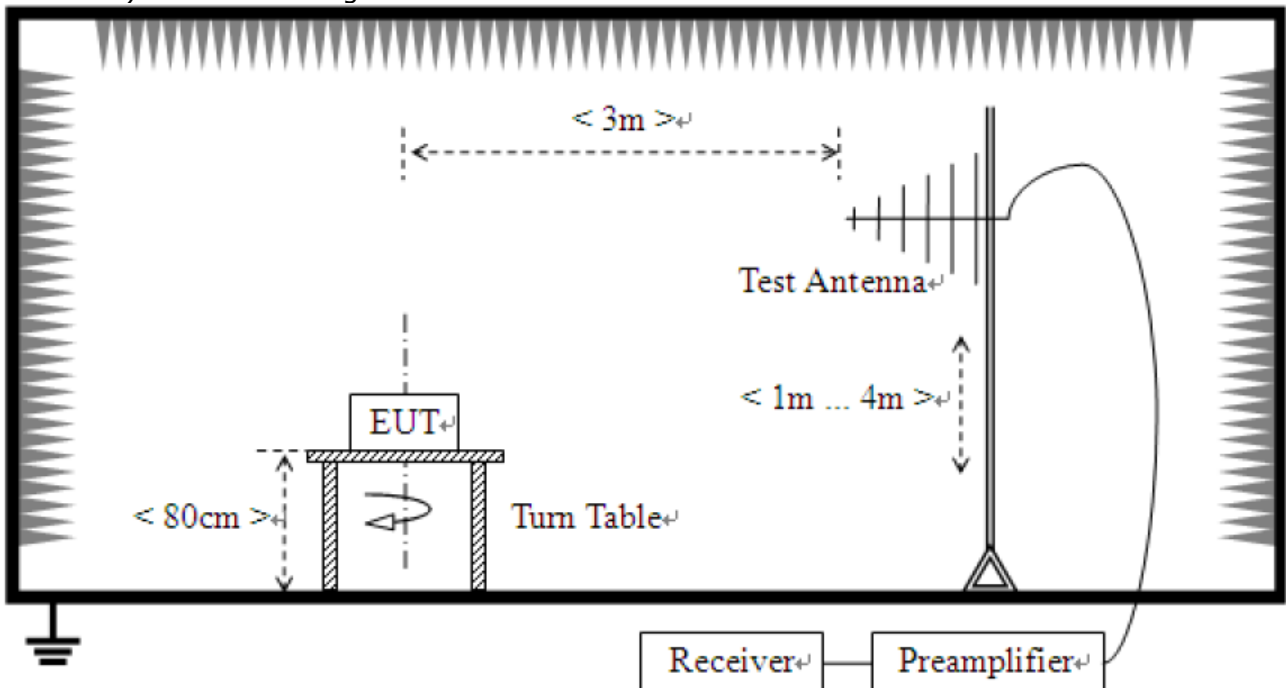
- 1) For above 1 GHz, the emission limit in this paragraph is based on measurement instrumentation employing an average detector, measurement using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit.
- 2) For above 1 GHz, limit field strength of harmonics : 54 dBuV/m@3m (AV) and 74 dBuV/m@3m (PK)

### Test Setup:

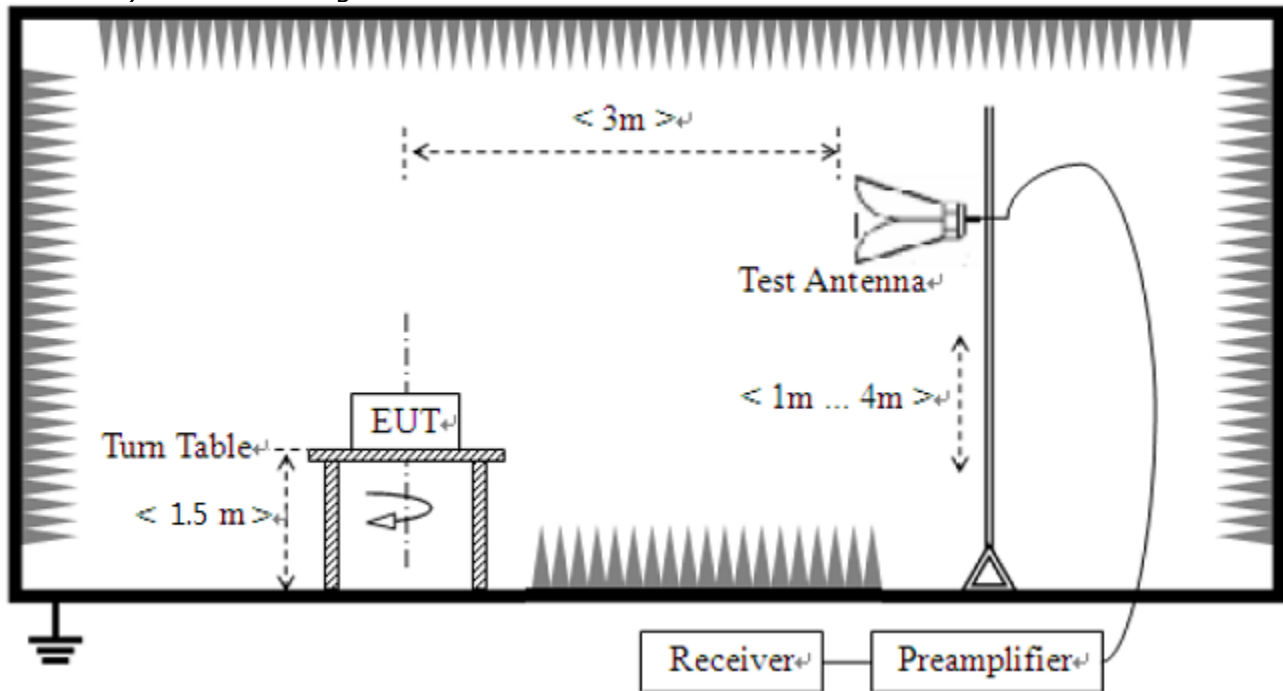
- 1) For field strength of emissions from 9 kHz to 30 MHz



- 2) For field strength of emissions from 30 MHz to 1 GHz



3) For field strength of emissions above 1 GHz



## Test results

### 1) 9 kHz to 30 MHz

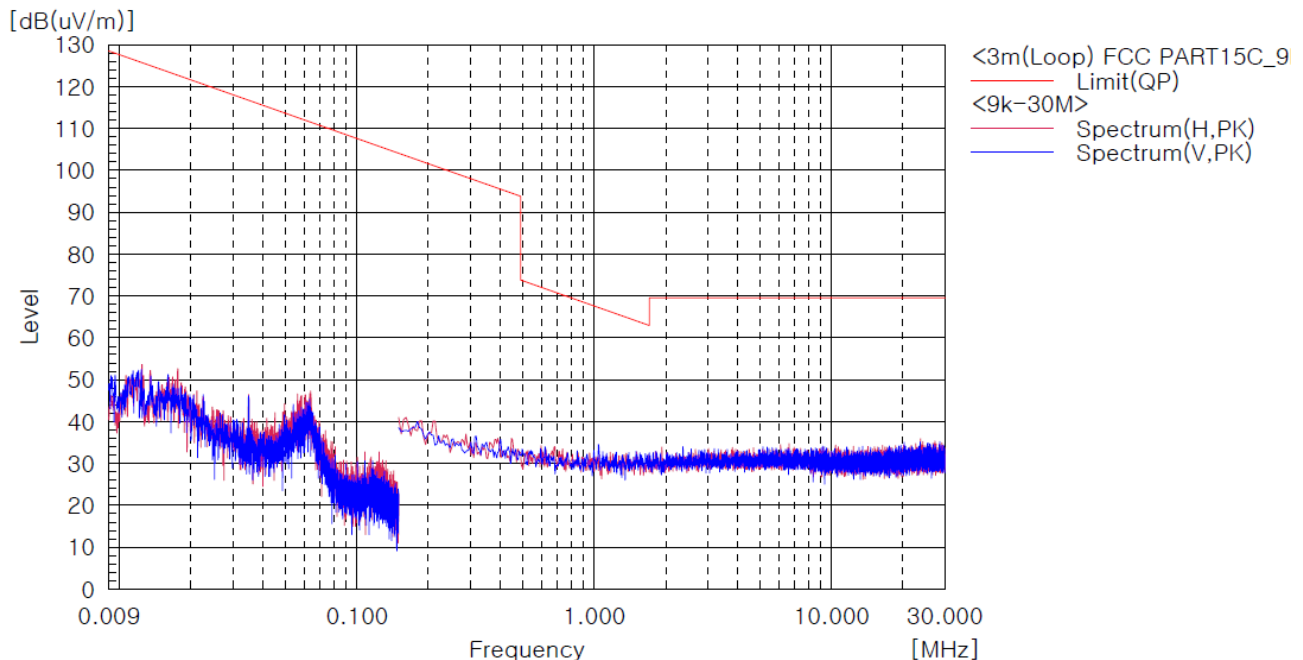
**Test mode : Transmitter**

The requirements are:

☒ Complies

### Test Data

Test Model : CR-CPB-v001  
Test Mode : 9k-30M  
Tester : Kim Ji Hye



| Frequency<br>[MHz] | (P) | Reading<br>QP<br>[dBuV] | dB<br>[1/m] | Result<br>QP<br>[dBuV/m] | Limit<br>QP<br>[dBuV/m] | Margin<br>QP<br>[dB] |
|--------------------|-----|-------------------------|-------------|--------------------------|-------------------------|----------------------|
|--------------------|-----|-------------------------|-------------|--------------------------|-------------------------|----------------------|

The emissions 9 kHz to 30MHz were 20 dB lower than the limit.

### Remark :

- The Unwanted emission was measured in the following position: EUT stand-up position(Z axis), lie-down position(X,Y axis). The worst emission was found in lie-down position(X axis) and the worst case was recorded.
- Distance extrapolation factor = 40 log (specific distance / test distance) (dB)

## 2) 30 MHz to 1 GHz

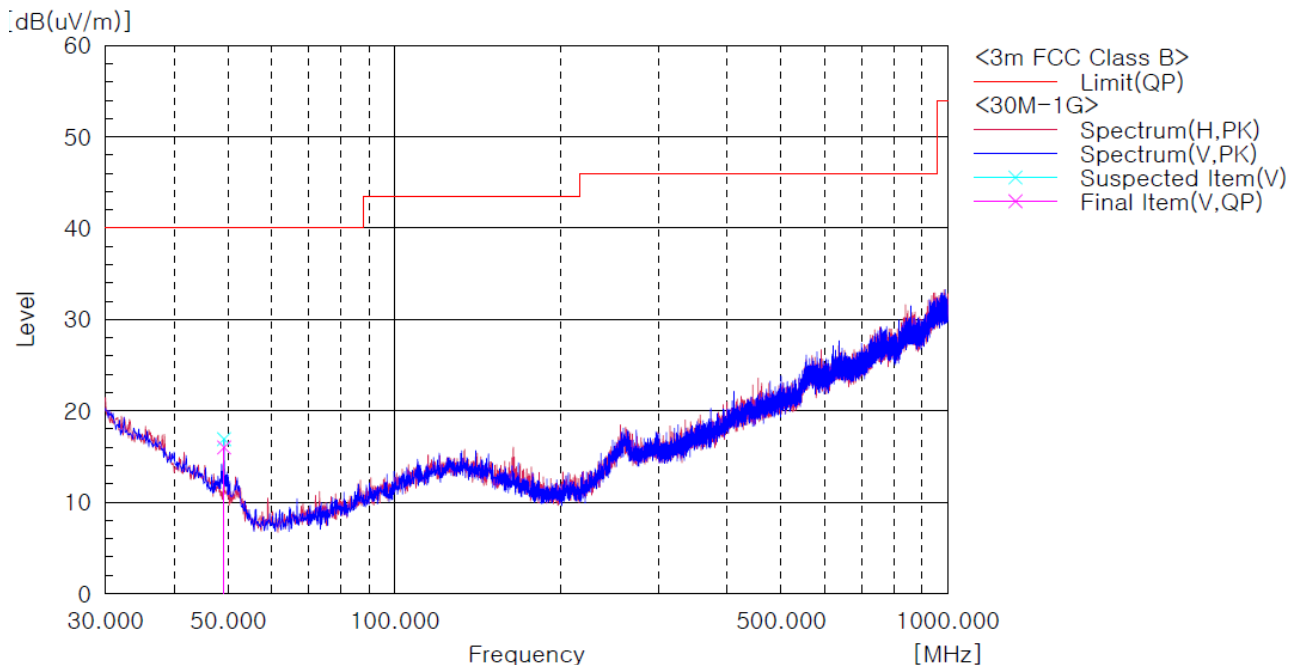
### Test mode : Transmitter (Worst Case)

The requirements are:

☒ Complies

### Test Data

Test Model : CR-CPB-v001  
Test Mode : 30M-1G  
Tester : Kim Ji Hye



### Final Result

| No. | Frequency (P) | Reading QP | c.f       | Result QP  | Limit QP   | Margin QP | Height | Angle |
|-----|---------------|------------|-----------|------------|------------|-----------|--------|-------|
|     | [MHz]         | [dB(uV)]   | [dB(1/m)] | [dB(uV/m)] | [dB(uV/m)] | [dB]      | [cm]   | [deg] |
| 1   | 49.158        | V 31.1     | -15.1     | 16.0       | 40.0       | 24.0      | 291.0  | 42.0  |

### Remark :

1. The Unwanted emission was measured in the following position: EUT stand-up position(Z axis), lie-down position(X,Y axis). The worst emission was found in lie-down position(X axis) and the worst case was recorded.
2. Result = Reading + c.f(Correction factor)
3. Correction factor = Antenna factor + Cable loss + 6 dB attenuator - Amp Gain

### 3) above 1 GHz

#### Test mode : Transmitter

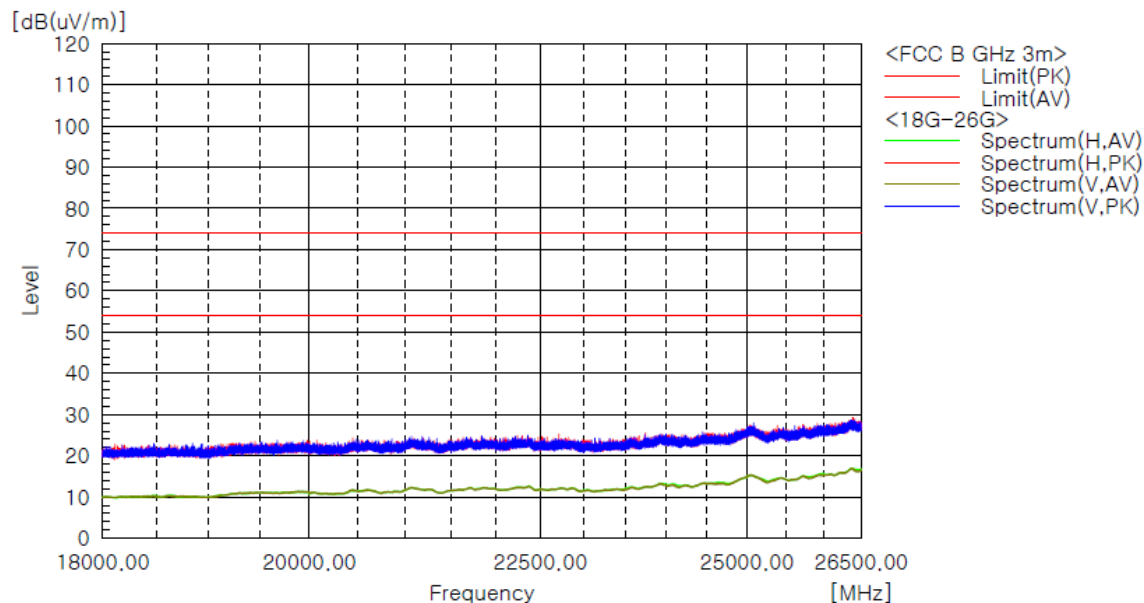
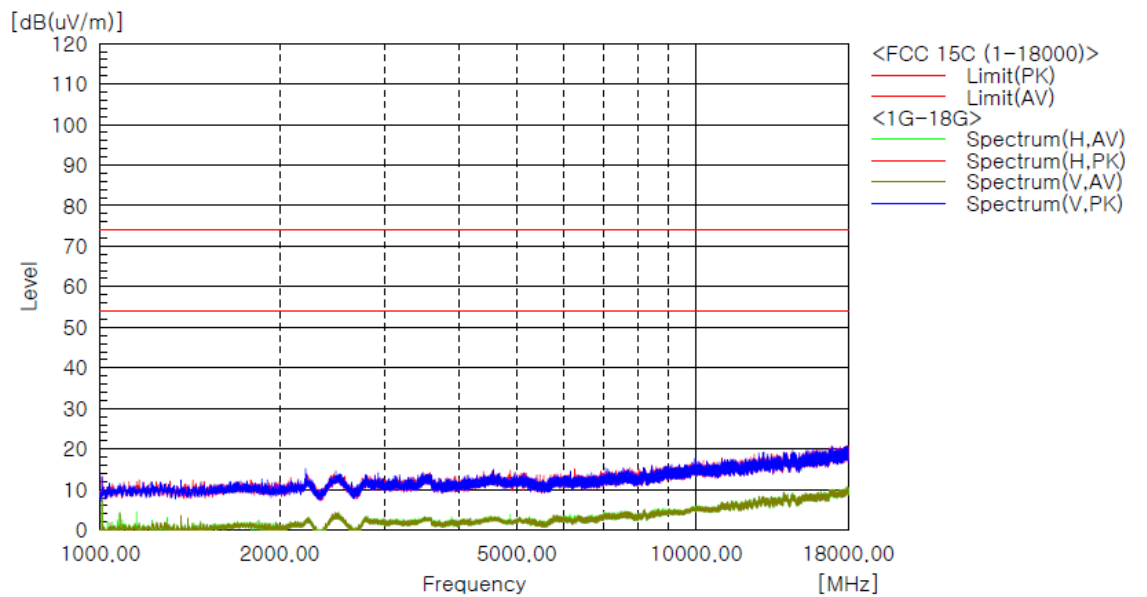
The requirements are:

☒ Complies

#### Test Data

Model Name : CR-CPB-v001  
Manufacturer :  
Mode : 1G-18G

Model Type :



Low (2 402 MHz)

| Frequency<br>[MHz] | (P) | Limit<br>AV<br>[dBuV/m] | Limit<br>PK<br>[dBuV/m] | Result<br>AV<br>[dBuV/m] | Result<br>PK<br>[dBuV/m] | Margin<br>AV<br>[dB] | Margin<br>PK<br>[dB] |
|--------------------|-----|-------------------------|-------------------------|--------------------------|--------------------------|----------------------|----------------------|
|--------------------|-----|-------------------------|-------------------------|--------------------------|--------------------------|----------------------|----------------------|

The emissions above 1GHz were 20 dB lower than the limit.

Mid (2 440 MHz)

| Frequency<br>[MHz] | (P) | Limit<br>AV<br>[dBuV/m] | Limit<br>PK<br>[dBuV/m] | Result<br>AV<br>[dBuV/m] | Result<br>PK<br>[dBuV/m] | Margin<br>AV<br>[dB] | Margin<br>PK<br>[dB] |
|--------------------|-----|-------------------------|-------------------------|--------------------------|--------------------------|----------------------|----------------------|
|--------------------|-----|-------------------------|-------------------------|--------------------------|--------------------------|----------------------|----------------------|

The emissions above 1GHz were 20 dB lower than the limit.

High (2 480 MHz)

| Frequency<br>[MHz] | (P) | Limit<br>AV<br>[dBuV/m] | Limit<br>PK<br>[dBuV/m] | Result<br>AV<br>[dBuV/m] | Result<br>PK<br>[dBuV/m] | Margin<br>AV<br>[dB] | Margin<br>PK<br>[dB] |
|--------------------|-----|-------------------------|-------------------------|--------------------------|--------------------------|----------------------|----------------------|
|--------------------|-----|-------------------------|-------------------------|--------------------------|--------------------------|----------------------|----------------------|

The emissions above 1GHz were 20 dB lower than the limit.

**Remarks**

1. The Unwanted emission was measured in the following position: EUT stand-up position(Z axis), lie-down position(X,Y axis). The worst emission was found in lie-down position(X axis) and the worst case was recorded.
2. Result = Reading + c.f(correction factor)
3. Correction factor = Antenna factor + Cable loss - Amp Gain

## 4.6 AC Conducted Emissions

### Frequency Range of Measurement

150 kHz to 30 MHz

### Instrument Settings

IF Band Width: 9 kHz

### Test Procedures

ANSI C63.10-2013 - Section 6.2

The EUT was placed on a non-metallic table 0.8m above the metallic, grounded floor and 0.4m from the reference ground plane wall. The distance to other metallic surfaces was at least 0.8m.

Amplitude measurements were performed with a quasi-peak detector and an average detector.

### Limit

- 15.207(a)

| Frequency (MHz) | Conducted Limit (dBuV) |           |
|-----------------|------------------------|-----------|
|                 | Quasi-peak             | Average** |
| 0.15 ~ 0.5      | 66 to 56*              | 56 to 46* |
| 0.5 ~ 5         | 56                     | 46        |
| 5 ~ 30          | 60                     | 50        |

\* The level decreases linearly with the logarithm of the frequency.

\*\* A linear average detector is required.

### Test Results

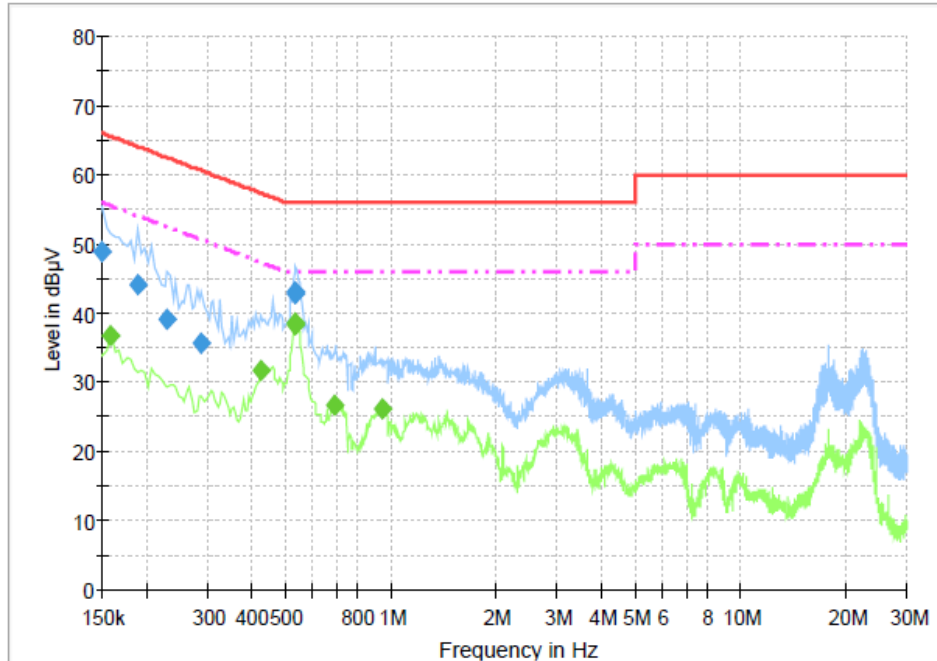
The requirements are:

☒ Complies

## Test Data

[LINE]

3CE\_Class B\_L1



## Final Result 1

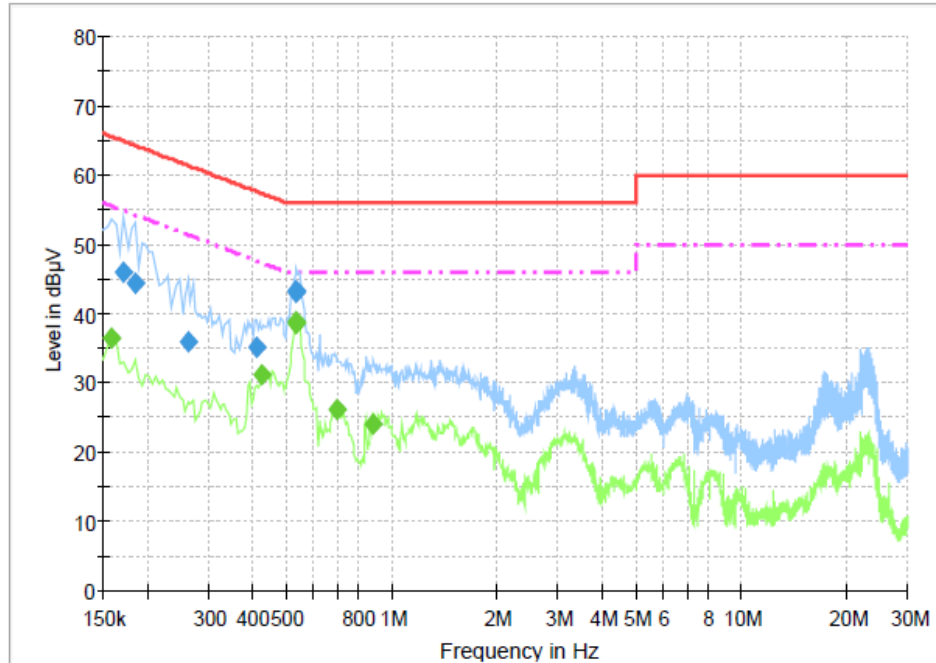
| Frequency (MHz) | QuasiPeak (dBµV) | Meas. Time (ms) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) |
|-----------------|------------------|-----------------|-----------------|--------|------|------------|-------------|--------------|
| 0.150000        | 48.8             | 1000.0          | 9.000           | On     | L1   | 9.8        | 17.2        | 66.0         |
| 0.190500        | 44.1             | 1000.0          | 9.000           | On     | L1   | 10.0       | 19.9        | 64.0         |
| 0.231000        | 39.1             | 1000.0          | 9.000           | On     | L1   | 9.8        | 23.3        | 62.4         |
| 0.289500        | 35.7             | 1000.0          | 9.000           | On     | L1   | 9.8        | 24.8        | 60.5         |
| 0.532500        | 42.7             | 1000.0          | 9.000           | On     | L1   | 10.0       | 13.3        | 56.0         |
| 0.537000        | 43.1             | 1000.0          | 9.000           | On     | L1   | 10.0       | 12.9        | 56.0         |

## Final Result 2

| Frequency (MHz) | CAverage (dBµV) | Meas. Time (ms) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) |
|-----------------|-----------------|-----------------|-----------------|--------|------|------------|-------------|--------------|
| 0.159000        | 36.6            | 1000.0          | 9.000           | On     | L1   | 10.0       | 18.9        | 55.5         |
| 0.429000        | 31.6            | 1000.0          | 9.000           | On     | L1   | 10.0       | 15.7        | 47.3         |
| 0.532500        | 38.2            | 1000.0          | 9.000           | On     | L1   | 10.0       | 7.8         | 46.0         |
| 0.537000        | 38.6            | 1000.0          | 9.000           | On     | L1   | 10.0       | 7.4         | 46.0         |
| 0.694500        | 26.6            | 1000.0          | 9.000           | On     | L1   | 10.0       | 19.4        | 46.0         |
| 0.951000        | 26.1            | 1000.0          | 9.000           | On     | L1   | 9.9        | 19.9        | 46.0         |

**[NEUTRAL]**

3CE\_Class B\_N



**Final Result 1**

| Frequency (MHz) | QuasiPeak (dBµV) | Meas. Time (ms) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) |
|-----------------|------------------|-----------------|-----------------|--------|------|------------|-------------|--------------|
| 0.172500        | 45.9             | 1000.0          | 9.000           | On     | N    | 10.1       | 18.9        | 64.8         |
| 0.186000        | 44.4             | 1000.0          | 9.000           | On     | N    | 10.0       | 19.8        | 64.2         |
| 0.262500        | 35.9             | 1000.0          | 9.000           | On     | N    | 9.8        | 25.5        | 61.4         |
| 0.411000        | 35.2             | 1000.0          | 9.000           | On     | N    | 10.0       | 22.4        | 57.6         |
| 0.532500        | 43.1             | 1000.0          | 9.000           | On     | N    | 10.0       | 12.9        | 56.0         |
| 0.537000        | 43.4             | 1000.0          | 9.000           | On     | N    | 10.0       | 12.6        | 56.0         |

**Final Result 2**

| Frequency (MHz) | CAverage (dBµV) | Meas. Time (ms) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) |
|-----------------|-----------------|-----------------|-----------------|--------|------|------------|-------------|--------------|
| 0.159000        | 36.4            | 1000.0          | 9.000           | On     | N    | 10.0       | 19.2        | 55.5         |
| 0.429000        | 31.1            | 1000.0          | 9.000           | On     | N    | 10.0       | 16.2        | 47.3         |
| 0.532500        | 38.6            | 1000.0          | 9.000           | On     | N    | 10.0       | 7.4         | 46.0         |
| 0.537000        | 38.8            | 1000.0          | 9.000           | On     | N    | 10.0       | 7.2         | 46.0         |
| 0.703500        | 26.2            | 1000.0          | 9.000           | On     | N    | 9.9        | 19.8        | 46.0         |
| 0.888000        | 24.1            | 1000.0          | 9.000           | On     | N    | 9.9        | 21.9        | 46.0         |

## APPENDIX A – Test Equipment Used For Tests

|    | <b>Name of Equipment</b> | <b>Manufacturer</b> | <b>Model No.</b> | <b>Serial No.</b> | <b>Date of Calibration</b> | <b>Due Date</b> |
|----|--------------------------|---------------------|------------------|-------------------|----------------------------|-----------------|
| 1  | MXA Signal Analyzer      | AGILENT             | N9020A           | MY50200512        | 2019-04-23                 | 2020-04-23      |
| 2  | Signal Generator         | Rohde & Schwarz     | SMB100A          | 175528            | 2018-10-24                 | 2019-10-24      |
| 3  | EMI Test Receiver        | Rohde & Schwarz     | ESCI7            | 100814            | 2018-10-25                 | 2019-10-25      |
| 4  | Bilog Antenna            | Schaffner           | CBL6111C         | 2551              | 2018-05-10                 | 2020-05-10      |
| 5  | Active Loop Antenna      | SCHWARZBECK         | FMZB 1513        | 1513-126          | 2018-05-27                 | 2020-05-27      |
| 6  | 6dB Attenuator           | R&S                 | DNF              | 272.4110.50-2     | 2018-10-25                 | 2019-10-25      |
| 7  | AMPLIFIER                | SONOMA              | 310              | 291721            | 2019-01-28                 | 2020-01-28      |
| 8  | EMI Test Receiver        | Rohde & Schwarz     | ESU40            | 100336            | 2019-01-29                 | 2020-01-29      |
| 9  | Preamplifier             | Agilent             | 8449B            | 3008A02011        | 2018-12-03                 | 2019-12-03      |
| 10 | Horn Antenna             | ETS-Lindgren        | 3117             | 00154525          | 2017-09-14                 | 2019-09-14      |
| 11 | Horn Antenna             | ETS-Lindgren        | 3116             | 00062916          | 2019-04-22                 | 2021-04-22      |
| 12 | Band Reject Filter       | Micro Tronics       | BRM50702         | G233              | 2019-01-28                 | 2020-01-28      |
| 13 | EMI Test Receiver        | Rohde & Schwarz     | ESCI3            | 100032            | 2019-01-29                 | 2020-01-29      |
| 14 | LISN                     | Rohde & Schwarz     | ENV216           | 101235            | 2019-01-29                 | 2020-01-29      |

|   | <b>Cable</b> | <b>Manufacturer</b> | <b>Model No.</b> | <b>Serial No.</b> | <b>Check Date</b> |
|---|--------------|---------------------|------------------|-------------------|-------------------|
| 1 | RF Cable     | Junkosha Inc.       | MWX221           | 1512S148          | 2019-09-02        |
| 2 | RF Cable     | HUBER+SUHNER        | SUCOFLEX 102     | MY073/2           | 2018-12-19        |
| 3 | RF Cable     | HUBER+SUHNER        | SUCOFLEX 102     | MY4728/2          | 2018-12-19        |
| 4 | RF Cable     | HUBER+SUHNER        | SUCOFLEX 104     | MY27558/4         | 2018-12-19        |
| 5 | RF Cable     | HUBER+SUHNER        | SUCOFLEX 104     | N/A               | 2018-12-19        |
| 6 | RF Cable     | HUBER+SUHNER        | SUCOFLEX 104     | MY27573/4         | 2018-12-19        |
| 7 | RF Cable     | HUBER+SUHNER        | SUCOFLEX 106     | N/A               | 2018-12-19        |
| 8 | RF Cable     | Canare Corporation  | L-5D2W           | N/A               | 2018-12-19        |