FCC/IC TEST REPORT

Test Report No.	W19WD-001		
Date of test	Jul. 30, 2019 ~ Aug. 19, 2019	Date of Issuing	Aug. 22, 2019

Applicant	KONO CORPORATION LTD.		
Address	Kabul Great Valley A-1104, 32, Digital-ro 9-gil, Geumcheon-gu, Seoul, Republic of Korea		
Manufacturer	KONO CORPORATION LTD.		
Address	Kabul Great Valley A-1104, 32, Digital-ro 9-gil, Geumcheon-gu, Seoul, Republic of Korea		
Telephone no.	+82-02-858-8877	Fax No.	+82-02-3397-7104

Type of Equipment	Smart LED Stick		
Model Name	MS1001	FCC ID	2AT4K-MS1001
Multi Model Name	N/A	Brand Name	N/A

Standards	FCC CFR47, Part15 Subpart C – 15.247 ANSI C 63.10:2013
Test Result	Compliance

This report details the results of the testing carried out on one sample, the results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.
This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

Tested by: 전준영 2019.08.22
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Revision History

Issued Date.	Issue Report No	Descripsion
Aug. 22, 2019	W19WD-001	Initial Issue
-	-	-

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1. General Information

1.1 Information of Test Laboratory.

Name	Standardbank Co., Ltd.
Address	48, Gunpocheomdansaneop 2-ro, Gunpo-si, Gyeonggi-do, 15880, Republic of Korea
Tel/Fax	(82)31-393-9394 / (82)31-393-9392

1.2 Details of EUT

FCC ID	2AT4K-MS1001
Equipment Class	DTS – Digital Transmission System
Frequency Range	2402 MHz ~ 2480 MHz
Modulation Type	GFSK
Number of Channel	40
Antenna Type	PCB Pattern Antenna
Antenna Gain	-0.07 dBi
RF Power	0.02 dBm
Power Source	DC 3.7 V (Rechargeable Lithium-ion Battery)
Operating Temp.	-20 ~ 55 ℃
Serial No.	Identical prototype
Clock Frequency	32 MHz

1.3 Measurement Uncertainty

The measurement instrumentation uncertainly consideration contained in CISPR 16-4-2.

This uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level using a coverage factor of k=2.

Test Item	Uncertainty
Radiated Spurious Emission (Below 1 GHz)	4.4 dB
Radiated Spurious Emission (Above 1GHz)	5.7 dB
AC Conducted Emissions	2.4 dB

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1.4 Test Methodolgy

Both conducted and radiated testing was performed according to the procedures in ANSI C63.10:2013.
Radiated testing was performed at 3 m from EUT to antenna.

1.5 Test Facility

The Electromagnetic compatibility measurement facilities are located on at **48, Gunpocheomdansaneop 2-ro, Gunpo-si, Gyeonggi-do, 15880, Republic of Korea.**
Description details of test facilities were submitted to the **RRA** (National Radio Research Agency) **in accordance with** the requirement of ISO 17025, **FCC** (Federal Communications Commission) **MRA, Vietnam MRA, TUV SUD CARAT** and approved by **VCCI**.
RRA Designation No. : **KR0144** (Sep. 17, 2009)
KOLAS Accreditation No. : **KT558** (Mar. 27, 2013)
FCC MRA Designation No. : **KR0144** (May 06, 2015)
Vietnam MRA Designation No. : **KR0144** (May 13, 2015)
TUV SUD CARAT Recognition of Agent's Testing (Jan. 10, 2019), Certificate No. : **CARAT 086270 0002 Rev. 00, VCCI** member No. : **3096**
- Resistration No :
C-20024 (Facility for measuring conducted emissions at AC mains power ports) : (Feb. 19, 2018)
T-20025 (Facility for measuring conducted emissions at Telecommunication (Wired) ports) : (Apr. 23, 2018)
R-20071 (Facility for measuring radiated emissions below 1 GHz : 10 m method) : (Apr. 22, 2019)
G-20043 (Facility for measuring radiated emissions above 1 GHz : 3 m method) : (Apr. 23, 2018)

1.6 Frequency Table

Channel	Frequency (MHz)
00	2402
:	:
19	2440
:	:
39	2480

1.7 Test Environment

Temperature	Relative Humidity
(23.5 ± 1.6) ℃	(50.3 ± 7.2) % R.H.

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1.8 Test System Details

The model numbers for all the equipments that were used in the tested system is:

DESCRIPTION	MODEL NAME	MANUFACTURE NO.	MANUFACTURE	Remark
Notebook	X552E	N/A	ASUSTeK Computer Inc.	-

2. SUMMARY

FCC part	Parameter	Limit	Test Condition	Test Result
15.247(a)(2)	6 dB Bandwidth	> 500 kHz	Conducted	C
15.247(b)(3)	Maximum Peak Output Power	< 1 Watt		C
15.247(e)	Power Spectral Density	< 8 dBm/3 kHz		C
15.247(d)	Band Edge & Conducted Spurious Emission	> 20 dBc		C
15.247(d), 15.205, 15.209(a)	Radiated Spurious Emission & Restricted Band Edge	15.209	Radiated	C Note 2
15.207	AC Power Line Conducted Emission	15.207	AC Line Conducted	C
15.203	Antenna Requirement	15.203	N/A	C

Note 1 : C=Compliance, NC=Not Compliance, NA : Not Applicable

Note 2 : Radiation measurements are investigated in X, Y, Z axis position and 2402 MHz, 2440 MHz, 2480 MHz. Only worst cases("X" and 2402MHz) are shown in the report.

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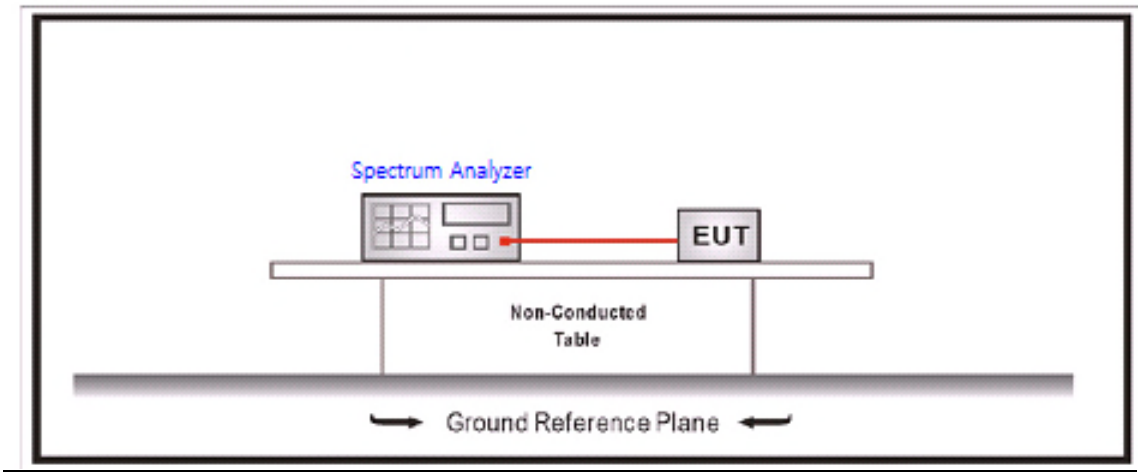
3. 6 dB Bandwidth

3.1 Limit (§15.247(a)(2))

System using digital modulation techniques may operate in the 902 ~ 928 MHz, 2400 ~ 2483.5 MHz, and 5725 ~5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

3.2 Test Configuration

RF Conducted Measurement:



3.3 Test Procedure (ANSI 63.10-2013 Section 11.8.1)

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.

2 Use the following spectrum analyser setting :

a) Span : Wide enough to capture the peaks of two adjacent channels.

b) RBW =100 kHz

c) VBW) >= [3 X RBW.]

d) Sweep = Auto.

e) Detector = Peak

f) Trace = Max hold

g) Allow the trace to stabilize.

3. 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 6dB relative to the maximum level measured in the fundamental emission.

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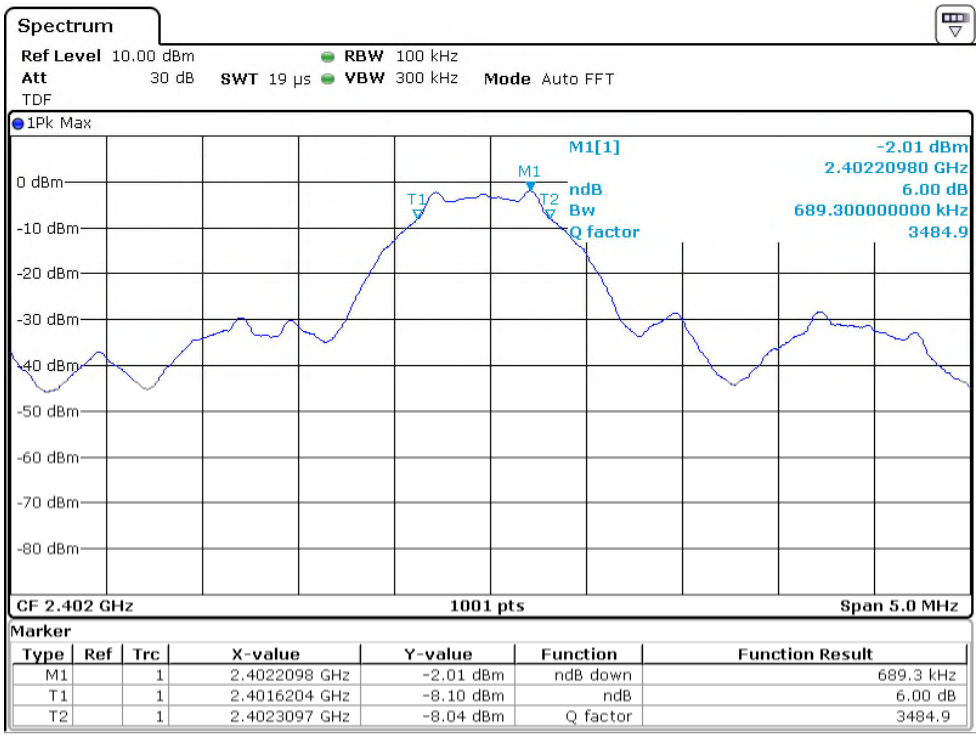
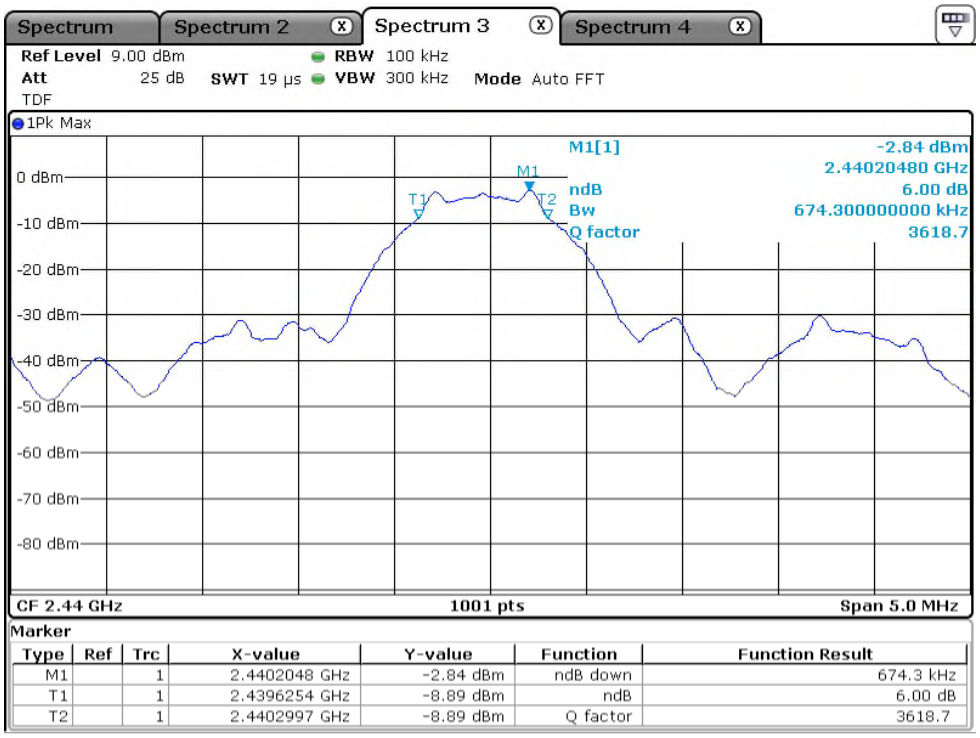
3.4 Test Result

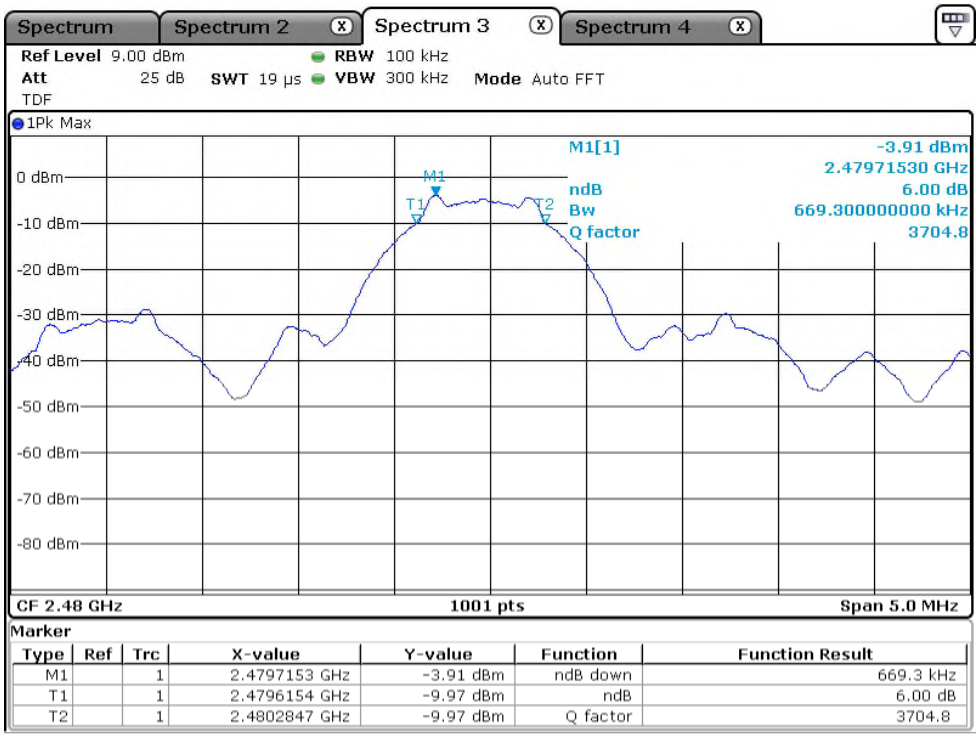
Test Mode	Ch. No.	Freq. (MHz)	6 dB Bandwidth (kHz)	Limit (kHz)	Result
BLE	0	2402	689.3	> 500	Pass
	19	2440	674.3		
	39	2480	669.3		



2402 MHz



2440 MHz



2480 MHz

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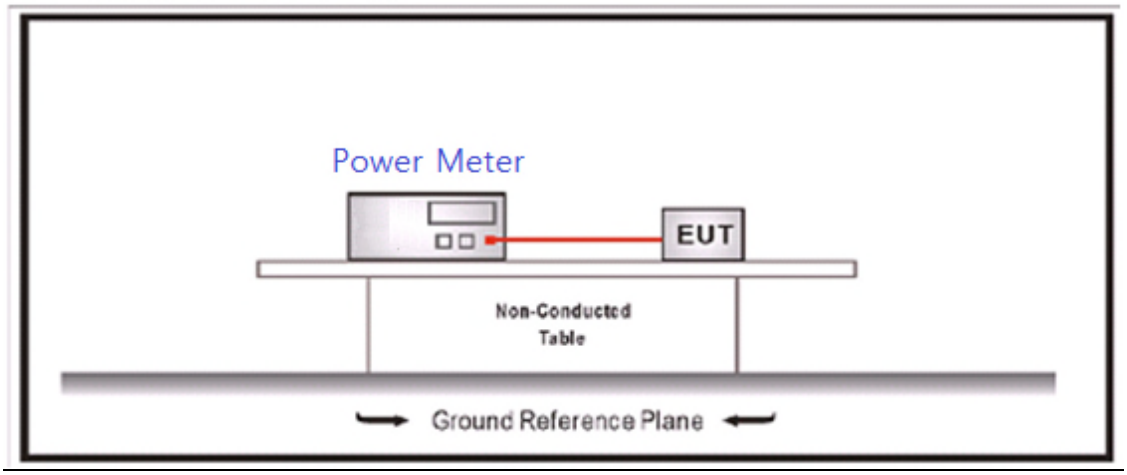
4. Maximum Peak Output Power

4.1 Limit (§15.247(b)(3))

The maximum peak conducted output power of the intentional radiator shall not exceed the following :
For system using digital modulation in the 902 ~ 928 MHz, 2400 ~ 2483.5 MHz, and
5725 ~ 5850 MHz bands : 1 Watt

4.2 Test Configuration

RF Conducted Measurement:



4.3 Test Procedure(ANSI 63.10-2013 Section 11.9.1.3)

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Turn on the EUT and connect it to measurement instrument. Then set it to anyone convenient frequency within its operating range.
3. Use the power sensor.
   The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall use a fast-responding diode detector.

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4.4 Test Result

Test Mode	Ch. No.	Freq. (MHz)	Maxium Peak Output Power		Limit (dBm)	Result
			dBm	mW		
BLE	0	2402	0.02	1.00	< 30	Pass
	19	2440	-1.56	0.70		
	39	2480	-2.26	0.59		

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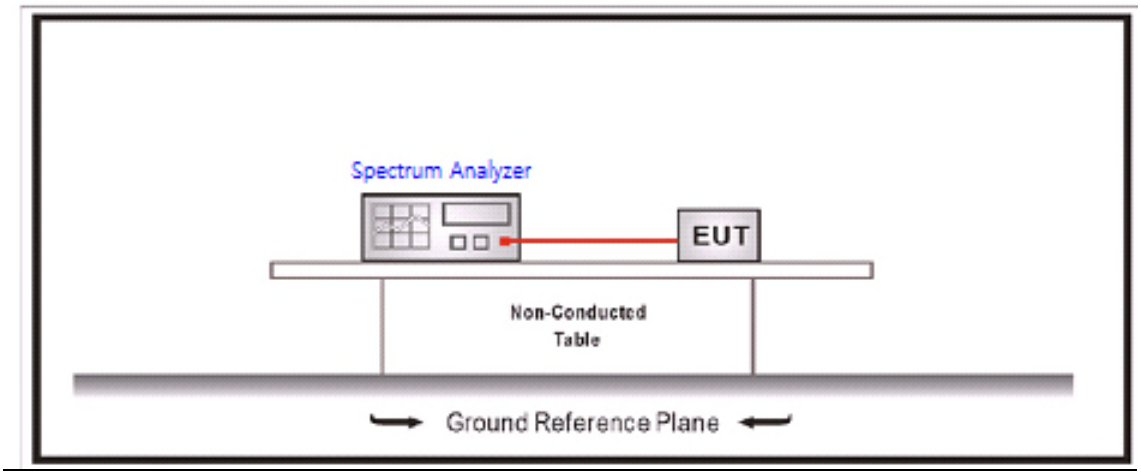
5. Maximum Power Spectral Density

5.1 Limit (§15.247(e))

For digitally modulated system, the power spectral density conducted from the intentional radiator the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

5.2 Test Configuration

RF Conducted Measurement:



5.3 Test Procedure(ANSI 63.10-2013 Section 11.10.2)

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Turn on the EUT and connect it to measurement instrument. Then set it to anyone convenient frequency within its operating range.
3. Use the following spectrum analyser setting :
   a) Frequency = Center frequency
   a) Span : 1.5 X DTS bandwidth
   b) RBW : 3 kHz ≤ RBW ≤ 100 kHz
   c) VBW ≥ 3 X RBW
   d) Sweep : Auto couple
   e) Detector function : Peak
   f) Trace : Max hold
4. Use the peak marker function to determine the Maximum amplitude level.
5. If measured value exceeds requirement, then reduce RBW (but no less than 3 kHz) and repeat.

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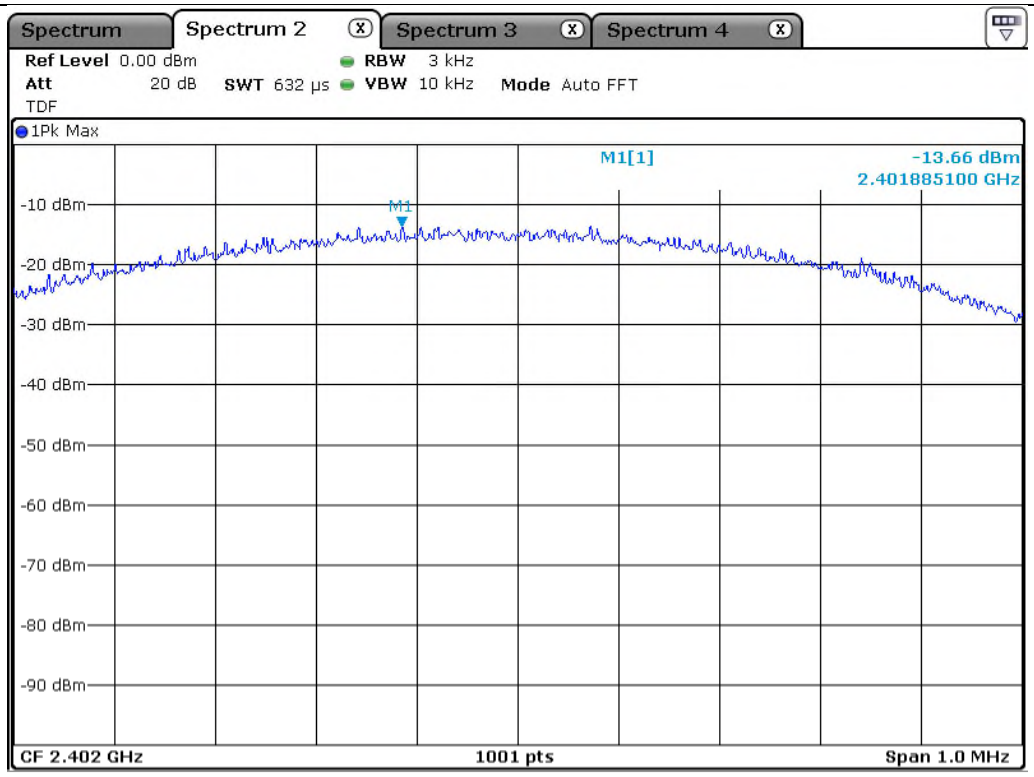
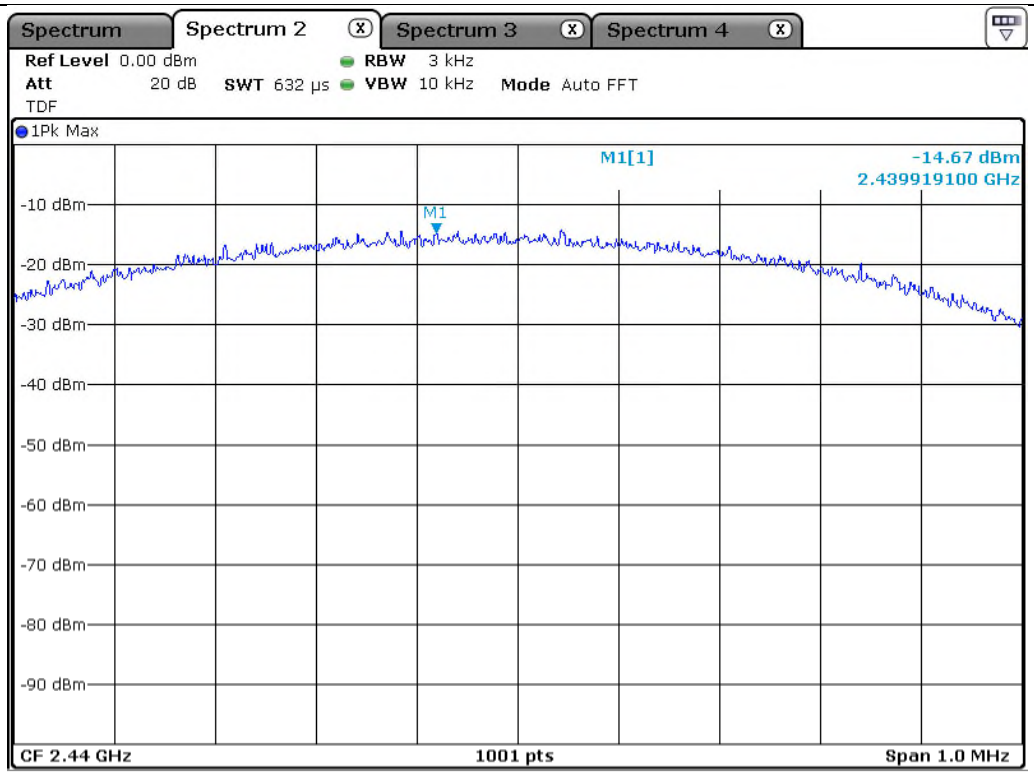
5.4 Test Result

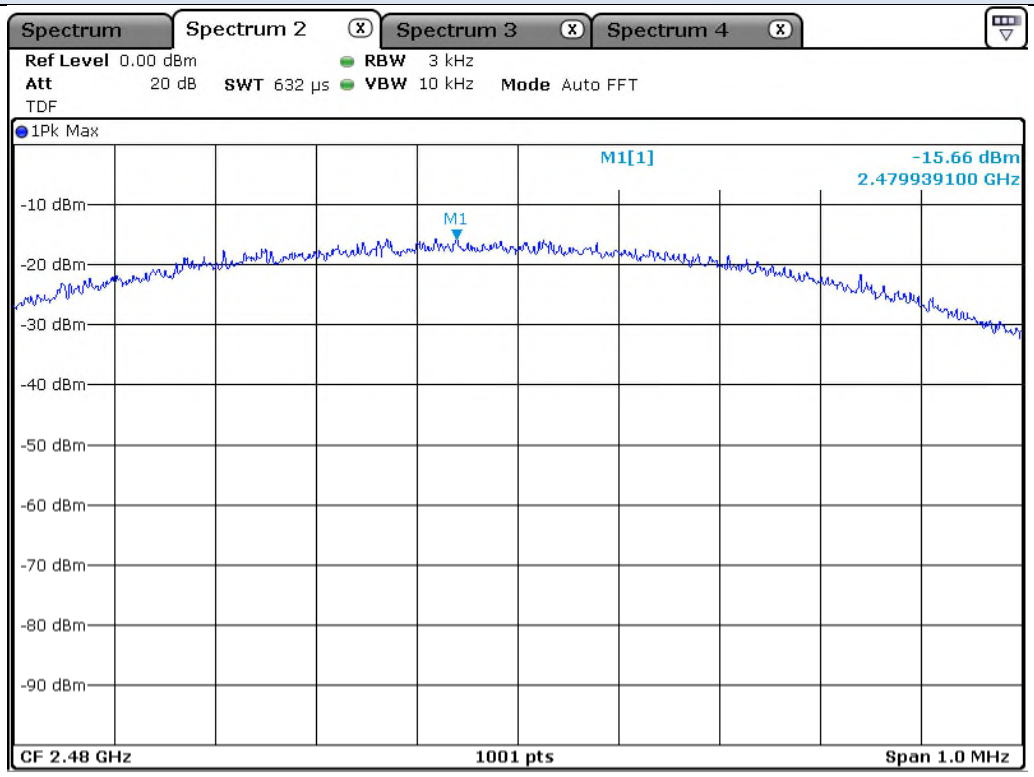
Test Mode	Ch. No.	Freq. (MHz)	Maxium Power Spectral Density (dBm)	Limit (dBm)	Result
BLE	0	2402	-13.66	< 8	Pass
	19	2440	-14.67		
	39	2480	-15.66		



2402 MHz



2440 MHz



2480 MHz

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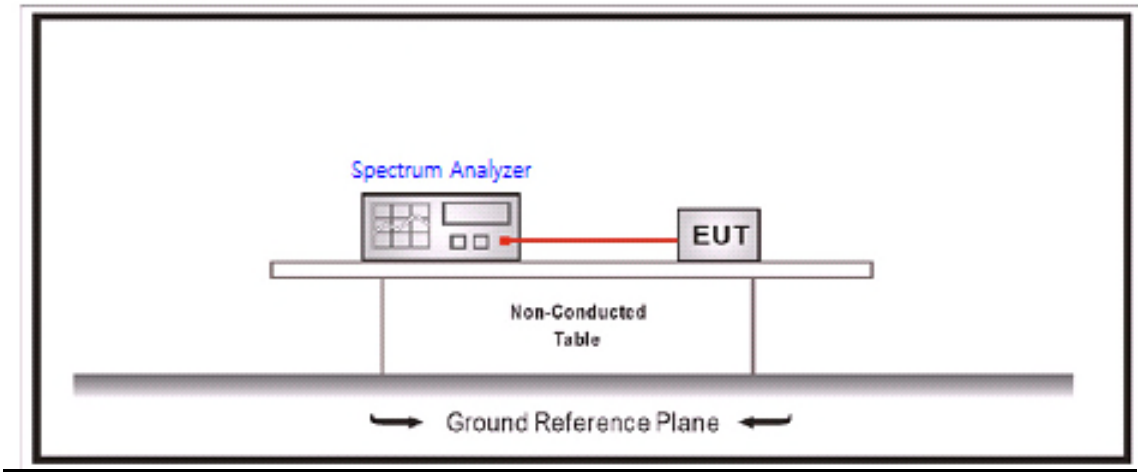
6. Band Edge and Conducted Spurious Emission

6.1 Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator 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, base on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits base on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of thes section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in 15.209(a) is not required.

6.2 Test Configuration

RF Conducted Measurement:



6.3 Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Set the EUT to the lowest and highest frequency channel, hopping mode.
3. Use the following spectrum analyser setting :
   a) Span : Wide enough to capture the peak level of the emission operating on the channel closest to the band edge, as well as any modulation products that fall outside of the authorized band of operation. (Band Edge) 30 MHz to 10 times the operating frequency in GHz. (Conducted Spurious Emission)
   b) RBW : 100 kHz
   c) VBW : 300 kHz
   d) Sweep time : Coupled
   e) Trace : Max hold
   f) Detector : Peak

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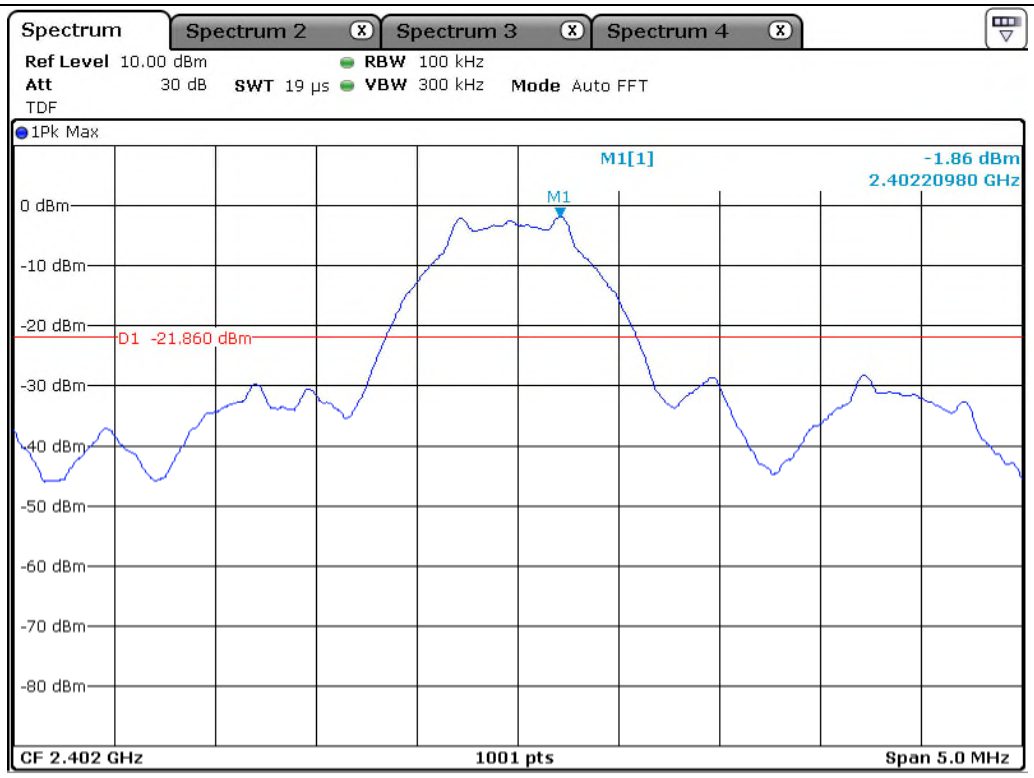
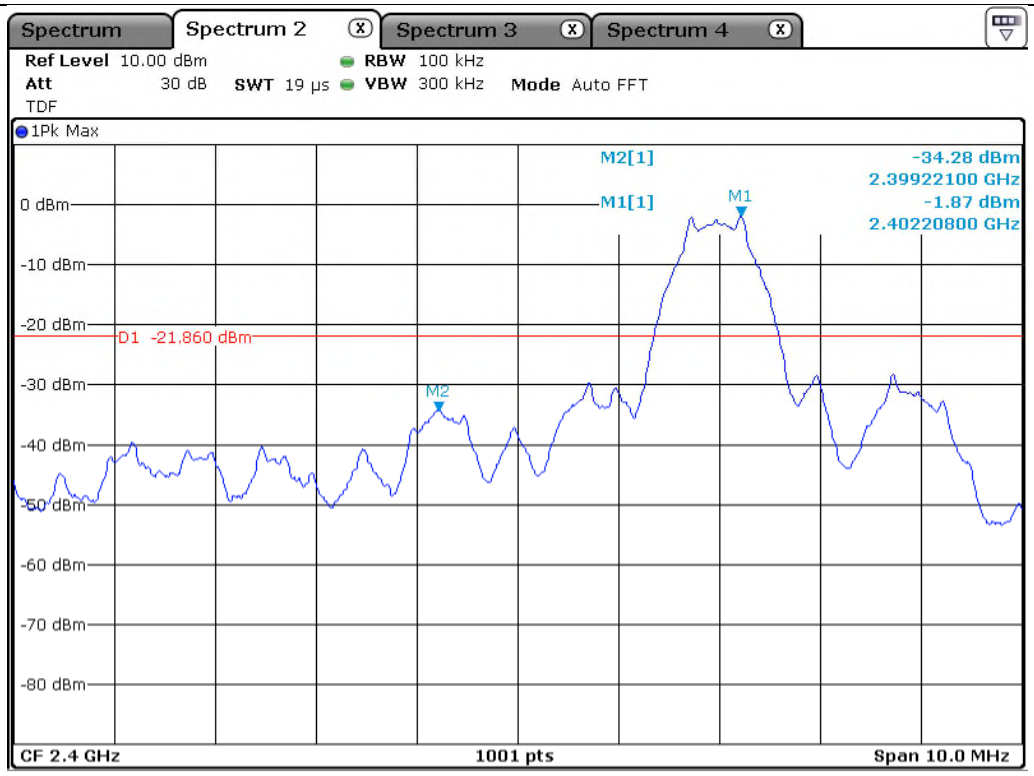
4. Set the marker on the emission at the band edge, or on the highest modulation product outside of the band, if this level is geater than that at the band edge. Enable the marker-delta function, and then use the marker-to-peak function to move the marker to the marker to the peak of the in-band emission. (Band Edge)
   Set marker to the peak of fundamental emission. Enable the marker-delta function, and then use the marker-to-peak function to move the marker to the peak of harmonic emission. (Conducted Spurious Emission)

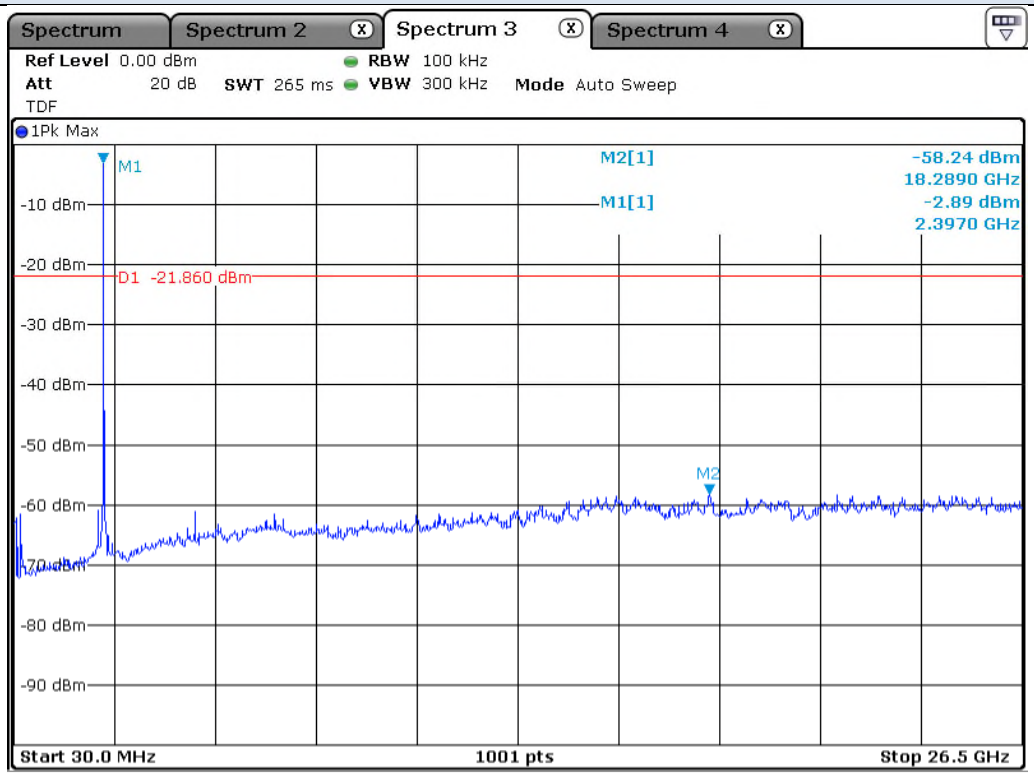
6.4 Test Result



2402 MHz / Reference Level



2402 MHz / Band Edge



2402 MHz / Spurious Emission

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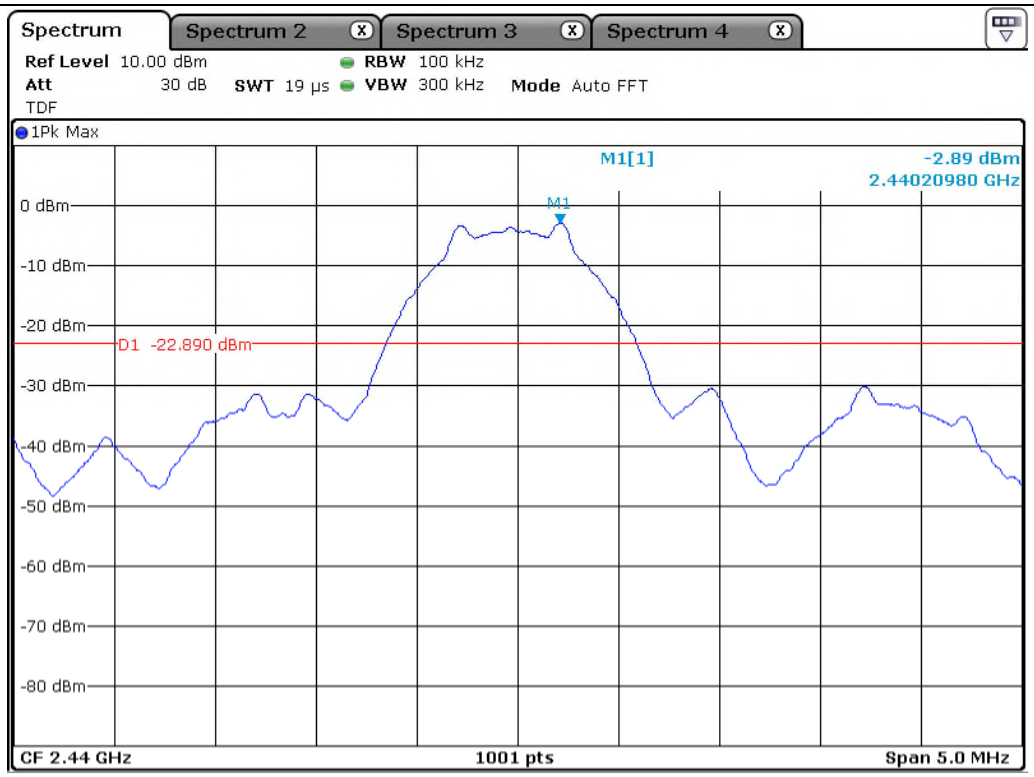
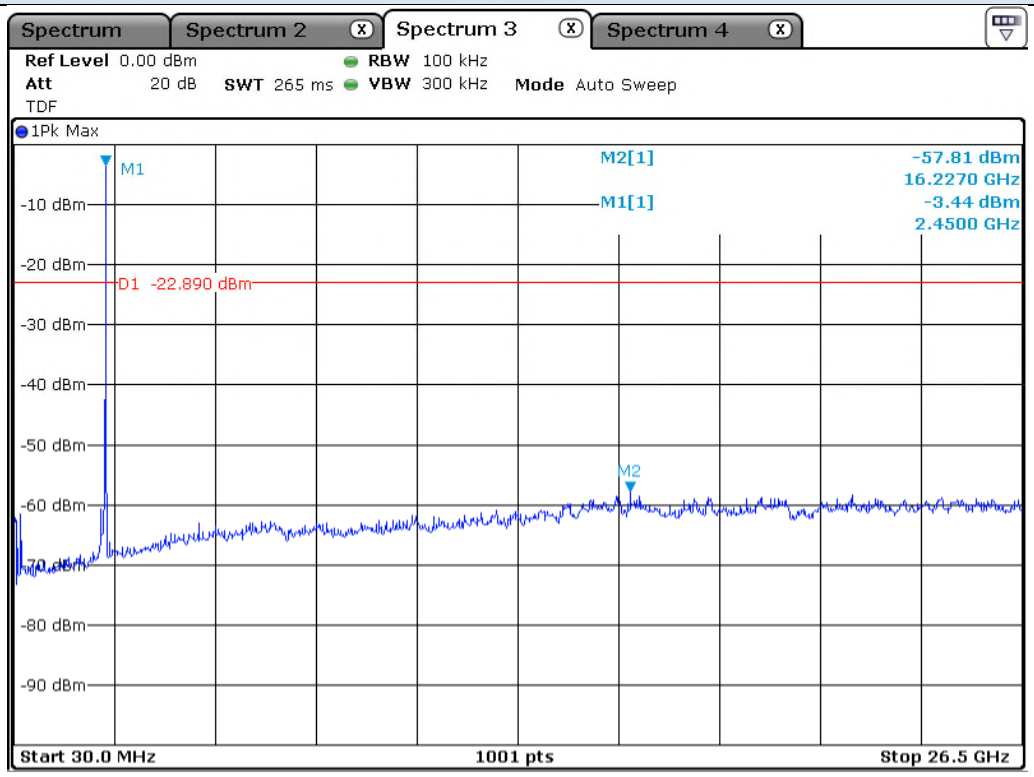
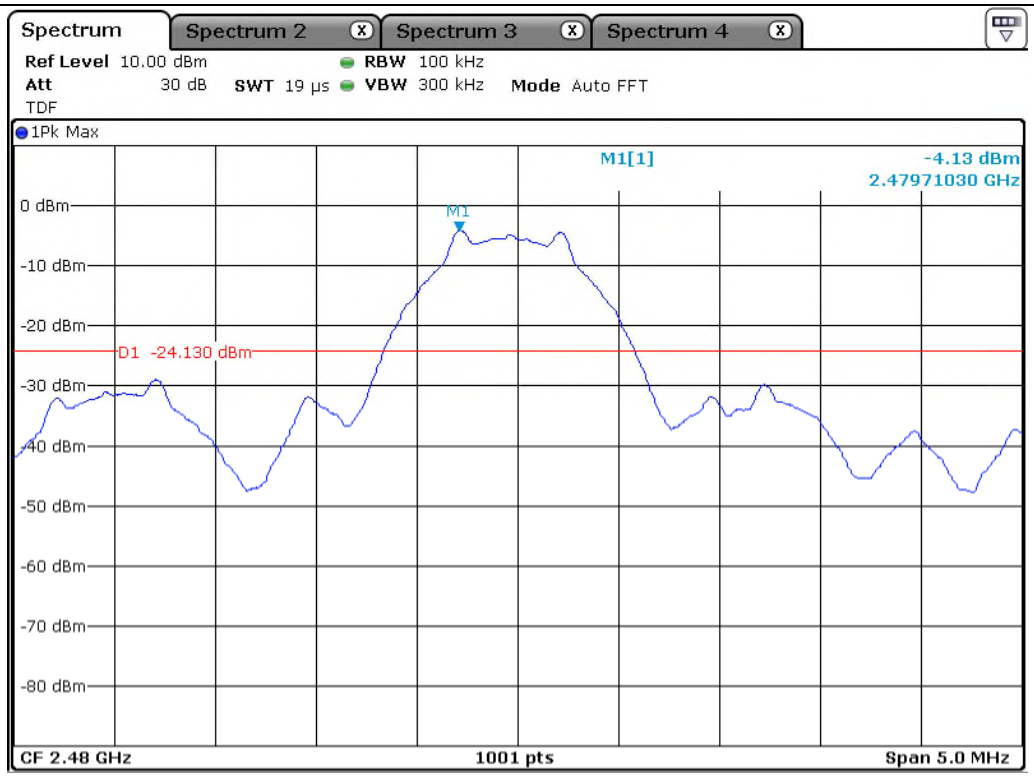


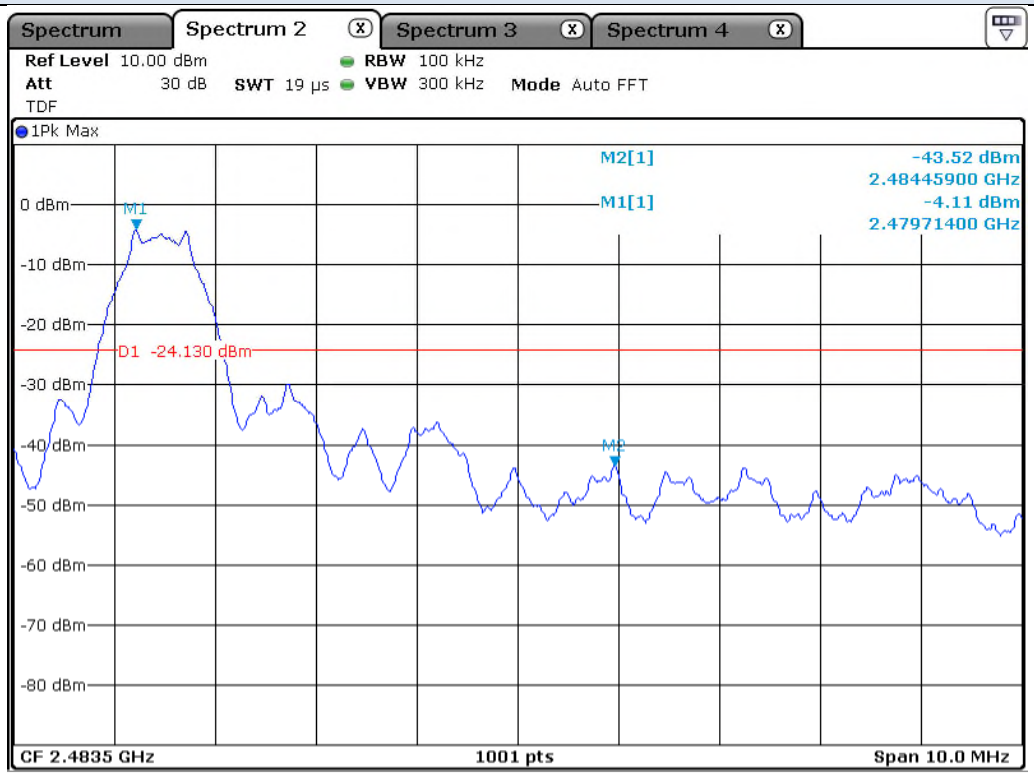
2440 MHz / Reference Level



2440 MHz / Spurious Emission



2480 MHz / Reference Level



2480 MHz / Band Edge

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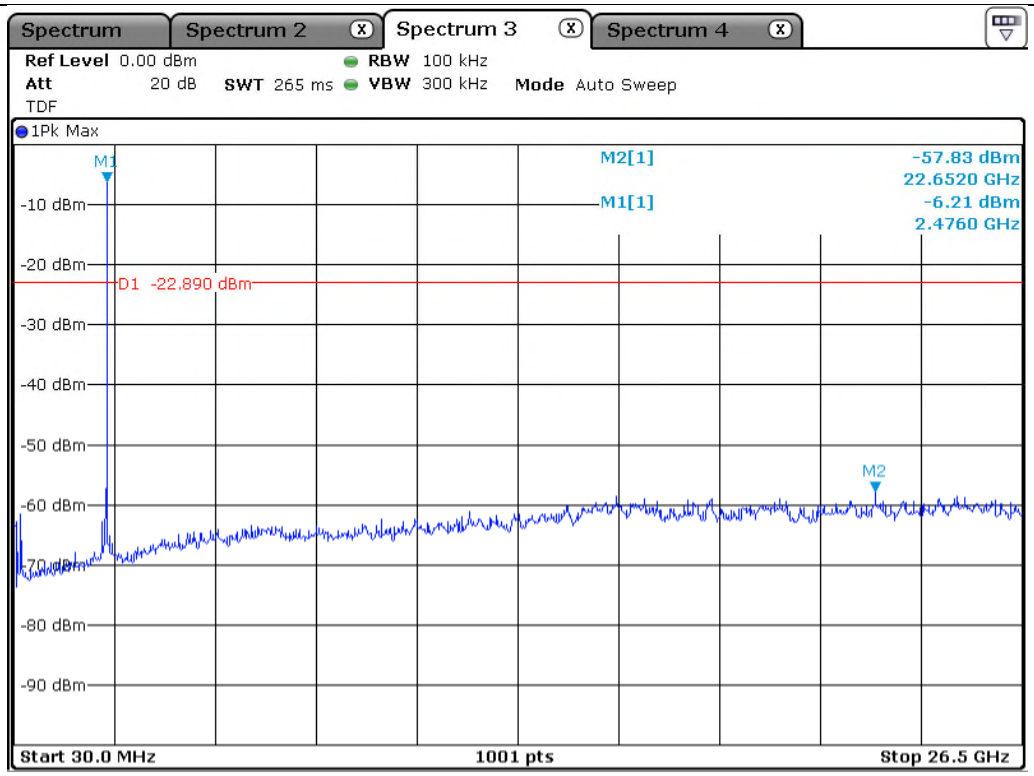

2480 MHz / Spurious Emission

7. Radiated Spurious Emission and Restricted Band Edge

7.1 Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio Frequency power that is produced by the intentional radiator 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.

Attenuation below the general limits specified in section 15.209(a) is not required. In addition, radiated emission which fall in the restricted bands, as defined in section 15.205(a), must also comply with the radiated emission limits specified in section 15.209(a)(see Section 15.205(c).

All emission from a digital device, including any network of conductors and apparatus connected there to shall not exceed the level of field strength specified below:

Frequencies in restricted band are complied to limit on Paragraph 15.209

Frequency Range (MHz)	Distance (m)	Field strength (dBuV/m)
0.009-0.490	300	20log 2400/F (kHz) + 80
0.490-1.705	30	20log 24000/F (kHz) + 40
1.705-30	30	20log 30 + 40
30-88	3	40.0
88-216	3	43.5
216-960	3	46.0
Above 960	3	54.0

- Note : 1. RF voltage (dBuV) = 20 log RF Voltage (uV)
  2. In the Above Table, the tighter limit applies at the band edges.
  3. Distance refers to the distance in meters between the measuring instrument antenna and the EUT
  4. This device used to install a within vehicular. The location of EUT measurements has the Y-plane(Stand).
  5. All scanning using PK detector. And the final emission level was get using QP detector for frequency range from 30 – 1000 MHz. As to 1 – 26.5 GHz, the final emission level got using PK and AV detector.
  6. If measurement is made at 3m distance.

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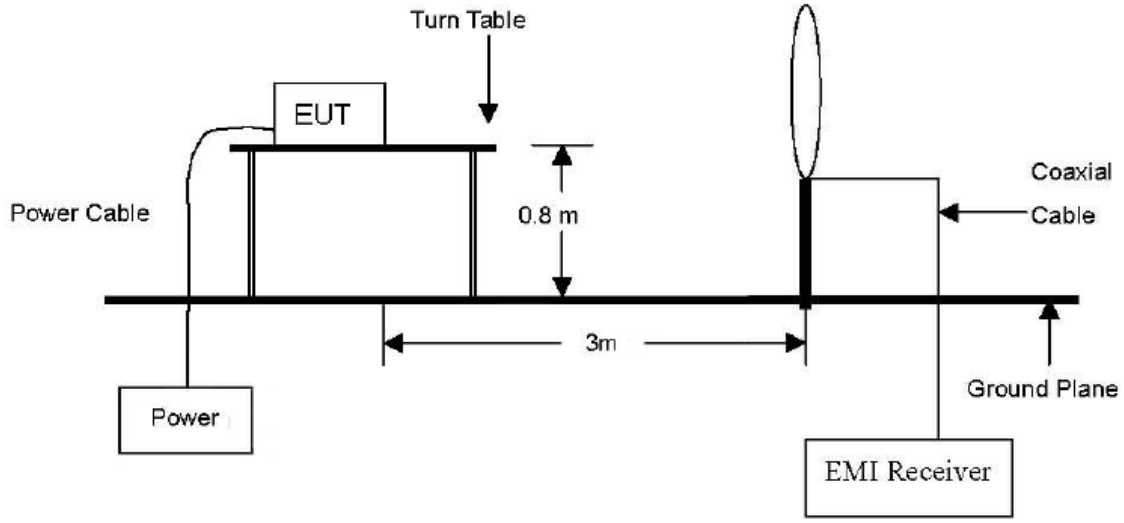
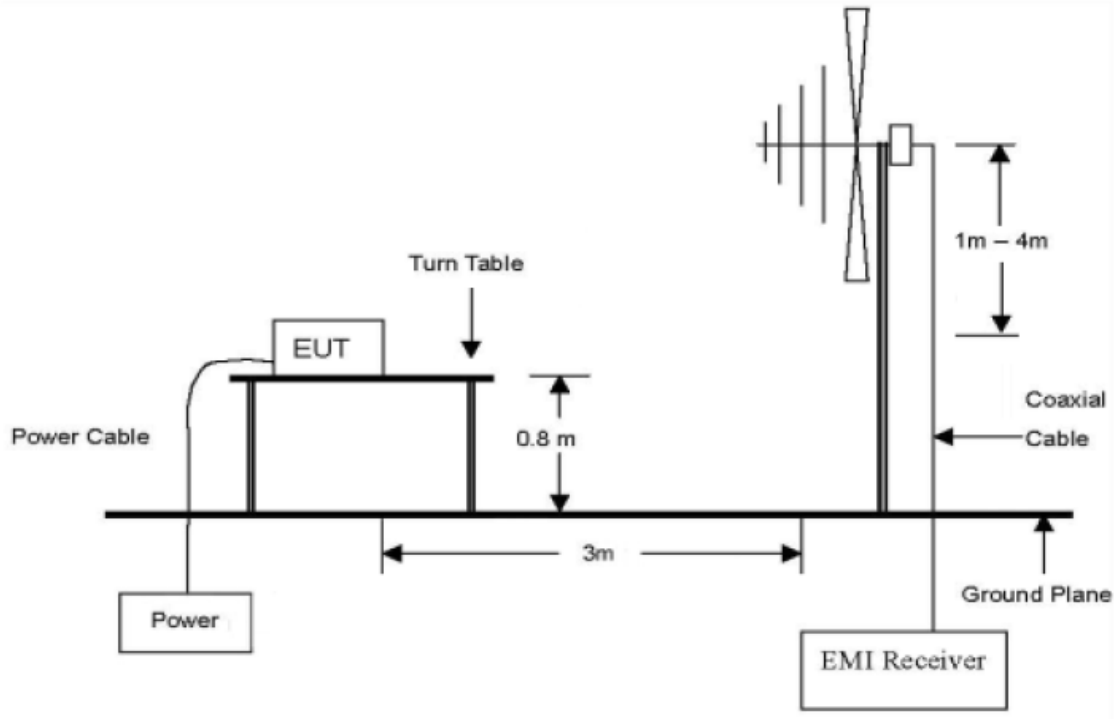
7.2 Test Configuration

Below 30MHz



Below 1GHz Test Setup :



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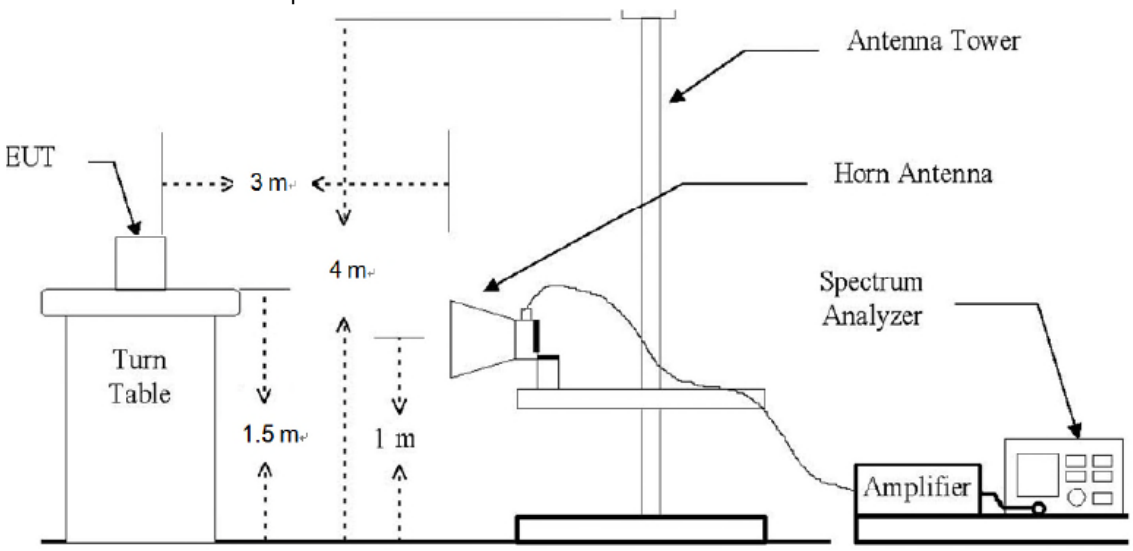
Above 1GHz Test Setup :



7.3 Test Procedure

The EUT was setup according to ANSI C63.10: 2013 and tested according to DTS test procedure of ANSI C63.10: 2013 for compliance to FCC 47CFR 15.247 requirements.
In case of measurement below 1GHz, The EUT is placed on a turn table which is 0.8 meter above ground. If above 1GHz, that is 1.5 meter above ground.
The turn table is rotated 360 degrees to determine the position of the maximum emission level.
The EUT was positioned such that the distance from antenna to the EUT was 3 meters.
The antenna is scanned between 1 meter and 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.4: 2014 on radiated measurement.
The resolution bandwidth below 1 GHz setting on the field strength meter is 120 kHz and above 1 GHz is 1 MHz. Radiated emission measurements below 1 GHz are made using broadband Bilog antenna and above 1 GHz are made using Horn Antennas.
The measurement is divided into the Preliminary Measurement and the Final Measurement. The suspected frequencies are searched for in Preliminary Measurement with the measurement antenna kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. The antenna is pointed at an angle towards the source of the emission, and the EUT is rotated in both height and polarization to maximize the measured emission. The emission is kept within the illumination area of the 3 dB bandwidth of the antenna. The frequency range from 30 MHz to 10th harmonics is checked.

Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable loss, and subtracting the Amplifier Gain (if any) from the measured reading. For the limit is employed average value, therefore the peak value can be transferred to average value by subtracting the duty factor. The basic equation with a sample calculation is as follows:

Result = Reading + Corrected Factor

Corr. Factor = Antenna Factor + Cable loss - Amplifier Gain

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7.4 Duty circle (KDB558074 D01v05r02 Section 6.0)

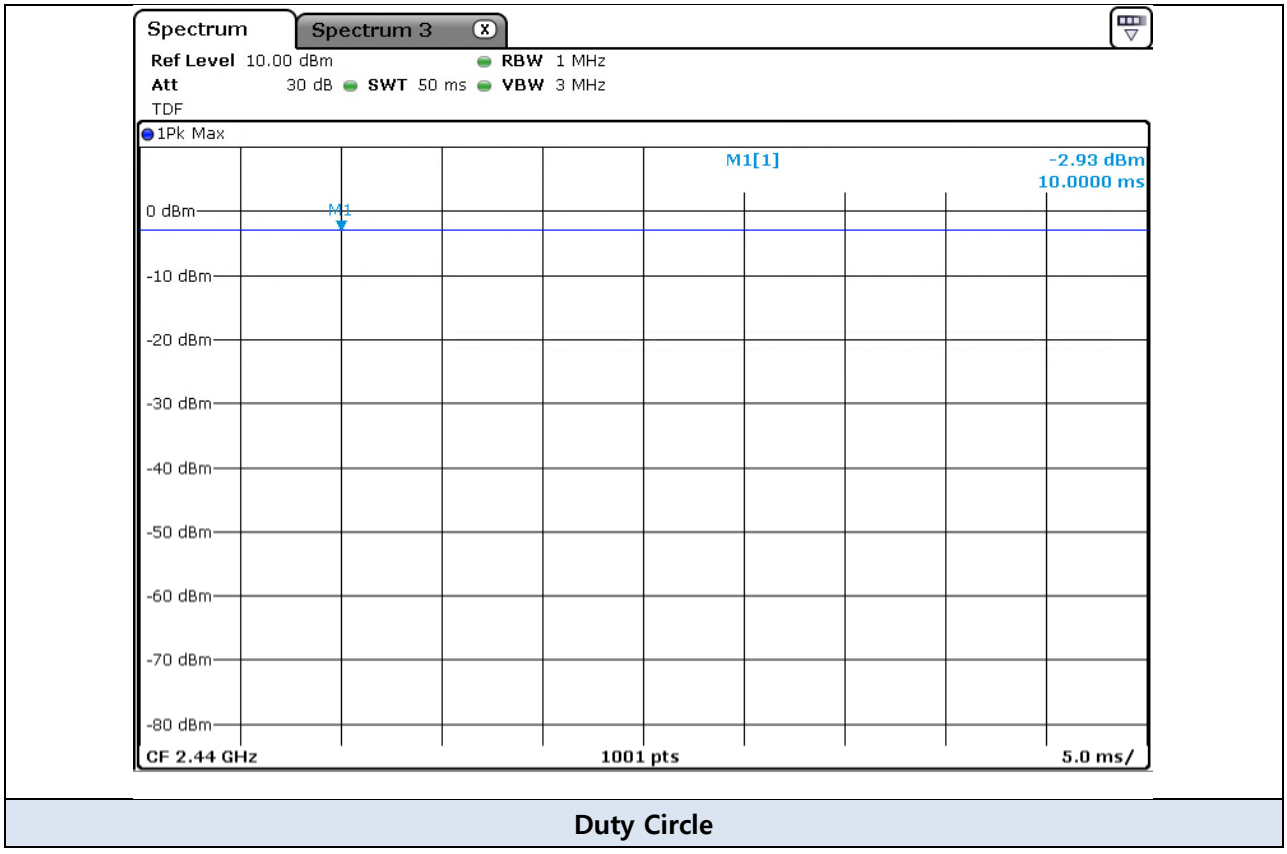
Measurements of duty cycle and transmission duration shall be performed using one of the following techniques:

a) A diode detector and an oscilloscope that together have sufficiently short response time to permit accurate measurements of the on-and off-times of the transmitted signal

b) The zero-span mode on a spectrum analyzer or EMI receiver if the response time and spacing between bin on the sweep are sufficient to permit accurate measurements of the on-and off-times of the transmitted signal

T_{on} time (ms)	T_{on+off} time (ms)	T_{on} / T_{on+off}	Duty cycle (%)	D.C.F (dB)
-	-	1	100	0

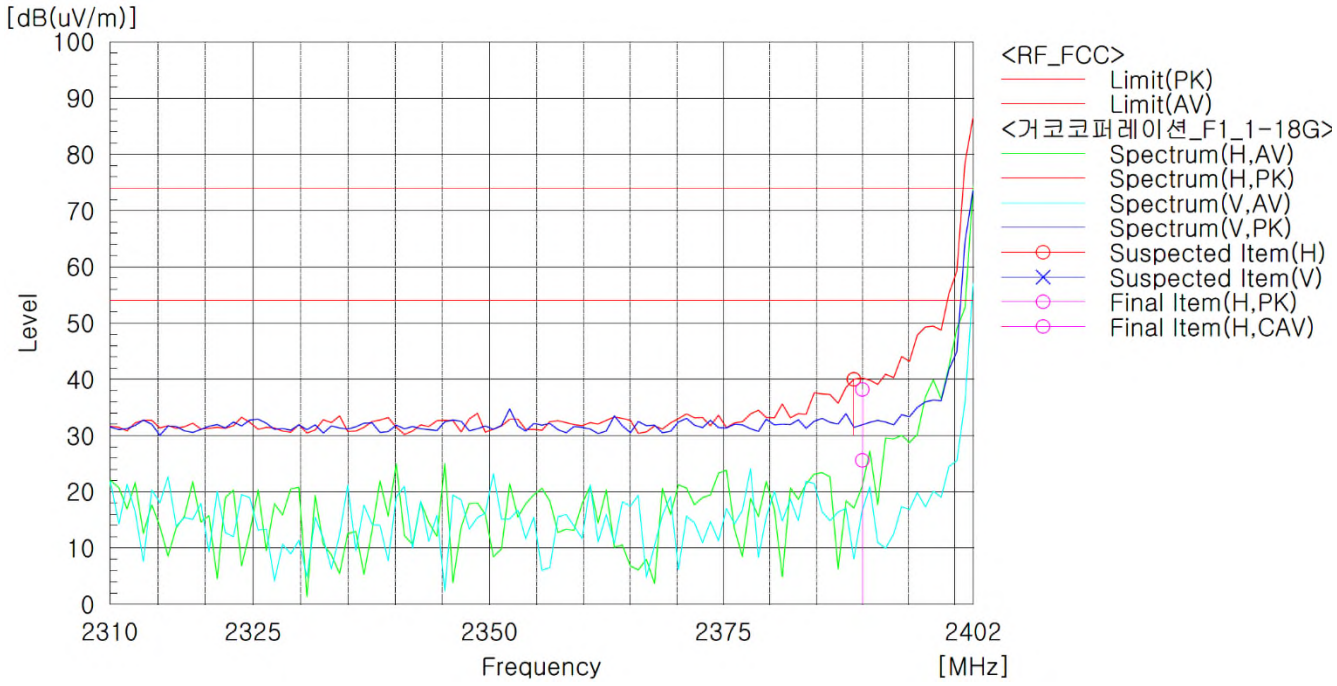
D.C.F = Duty cycle Correction Factor = 10log(1/ (T_{on} / T_{on+off}))



Duty Circle

7.5 Test Result - Radiated Restricted Band Edge

Test date	2019.07.30	Meas. Distance	3 m
Temperature	(23.7 ± 0.5) °C	Humidity	(55.8 ± 0.5) % R.H
Frequency	2402 MHz	Polarization	Horizontal / Vertical
Mode	BLE		



Frequency (MHz)	Pol. (H/V)	Detector (Peak/Avg.)	Reading (dBuV/m)	Correction Factor (dB)	Result (dBuV/m)	Limits (dBuV/m)	Margin (dB)
2389.96	H	Peak	50.9	-12.7	38.2	74.00	35.8
2389.96	H	Avg.	38.3	-12.7	25.6	54.0	28.4

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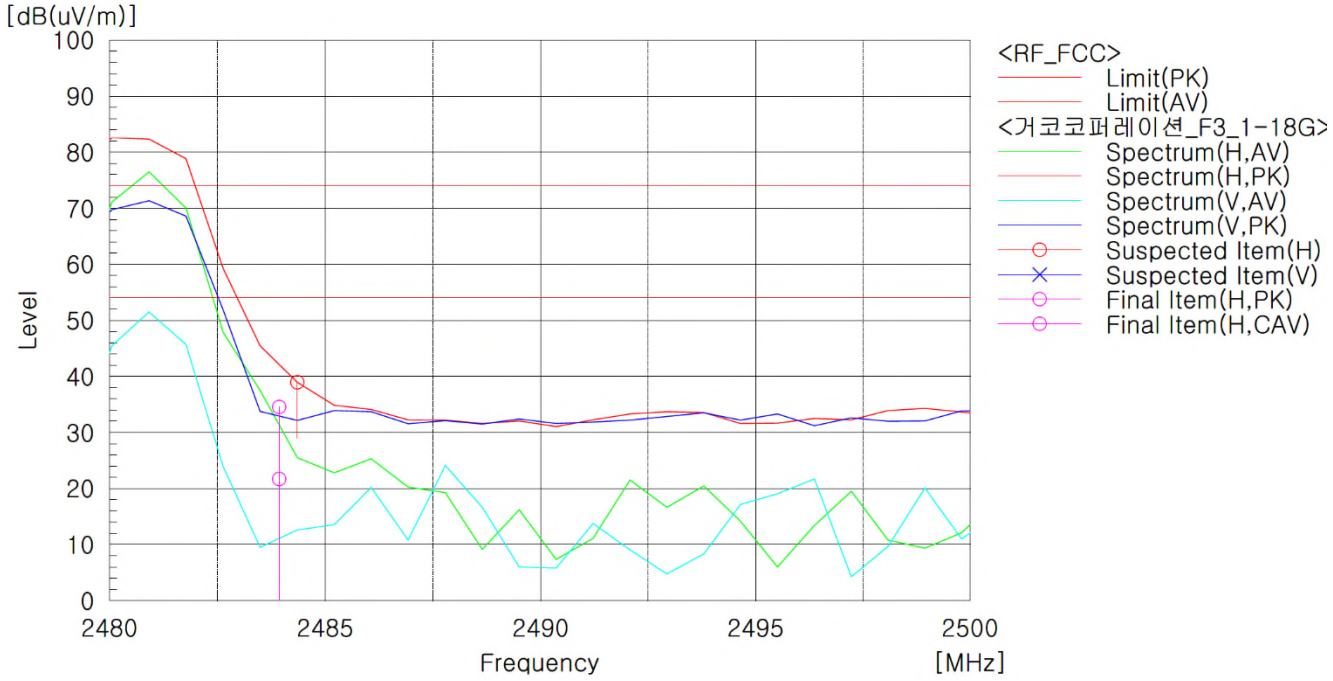
Test date	2019.07.30	Meas. Distance	3 m
Temperature	(23.7 ± 0.5) °C	Humidity	(55.8 ± 0.5) % R.H
Frequency	2480 MHz	Polarization	Horizontal / Vertical
Mode	BLE		



Frequency (MHz)	Pol. (H/V)	Detector (Peak/Avg.)	Reading (dBuV/m)	Correction Factor (dB)	Result (dBuV/m)	Limits (dBuV/m)	Margin (dB)
2483.93	H	Peak	46.7	-12.1	34.6	74.00	39.4
2483.93	H	Avg.	33.8	-12.1	21.7	54.0	32.3

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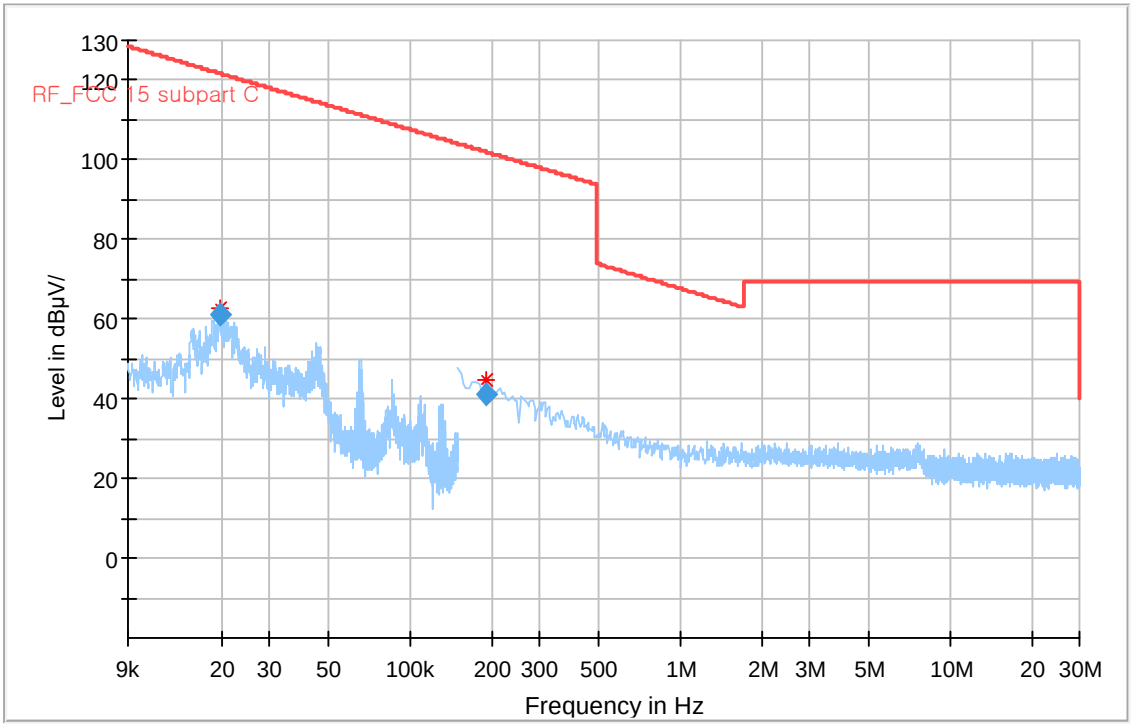
7.6 Test Result - Radiated Spurious Emission (9 kHz to 30 MHz)

Test date	2019.08.16	Meas. Distance	3 m
Temperature	(21.9 ± 0.5) °C	Humidity	(51.3 ± 0.5) % R.H
Frequency	2402 MHz – Worst Case	Polarization	Horizontal
Mode	BLE		



Frequency (MHz)	Pol. (H/V)	Reading (dBuV/m)	Correction Factor (dB)	Result (dBuV/m)	Limits (dBuV/m)	Margin (dB)
-	-	-	-	-	-	-
Other emissions don't exceed the level of 20 dB below the applicable Limit.						
-	-	-	-	-	-	-

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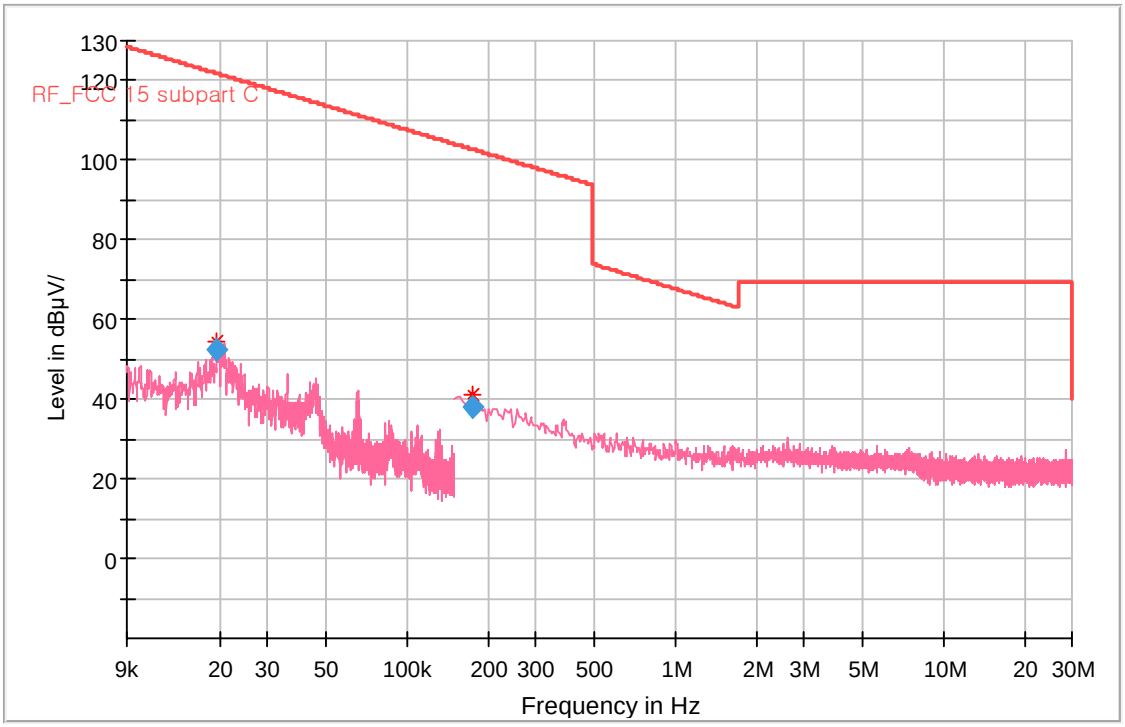
Test date	2019.08.16	Meas. Distance	3 m
Temperature	(21.9 ± 0.5) °C	Humidity	(51.3 ± 0.5) % R.H
Frequency	2402 MHz – Worst Case	Polarization	Vertical
Mode	BLE		



Frequency (MHz)	Pol. (H/V)	Reading (dBuV/m)	Correction Factor (dB)	Result (dBuV/m)	Limits (dBuV/m)	Margin (dB)
-	-	-	-	-	-	-
Other emissions don't exceed the level of 20 dB below the applicable Limit.						
-	-	-	-	-	-	-

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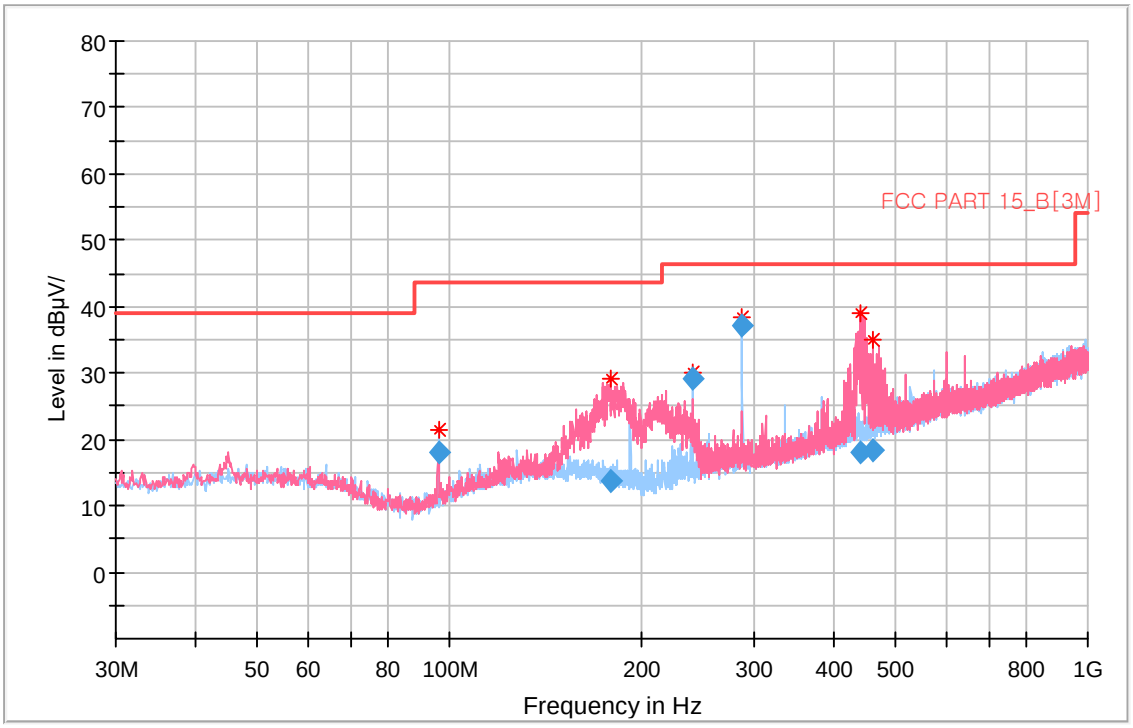
7.7 Test Result - Radiated Spurious Emission (30 MHz to 1 GHz)

Test date	2019.08.16	Meas. Distance	3 m
Temperature	(21.9 ± 0.5) °C	Humidity	(51.3 ± 0.5) % R.H
Frequency	2402 MHz – Worst Case	Polarization	Horizontal / Vertical
Mode	BLE		



Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
95.960000	18.18	43.50	25.32	400.0	H	334.0	-15.2
178.895000	13.87	43.50	29.63	100.0	V	345.0	-11.6
240.005000	29.19	46.40	17.21	100.0	H	322.0	-10.9
288.020000	37.10	46.40	9.30	100.0	H	312.0	-9.1
440.916250	18.15	46.40	28.25	100.0	V	0.0	-4.2
459.710000	18.47	46.40	27.93	100.0	V	0.0	-3.7

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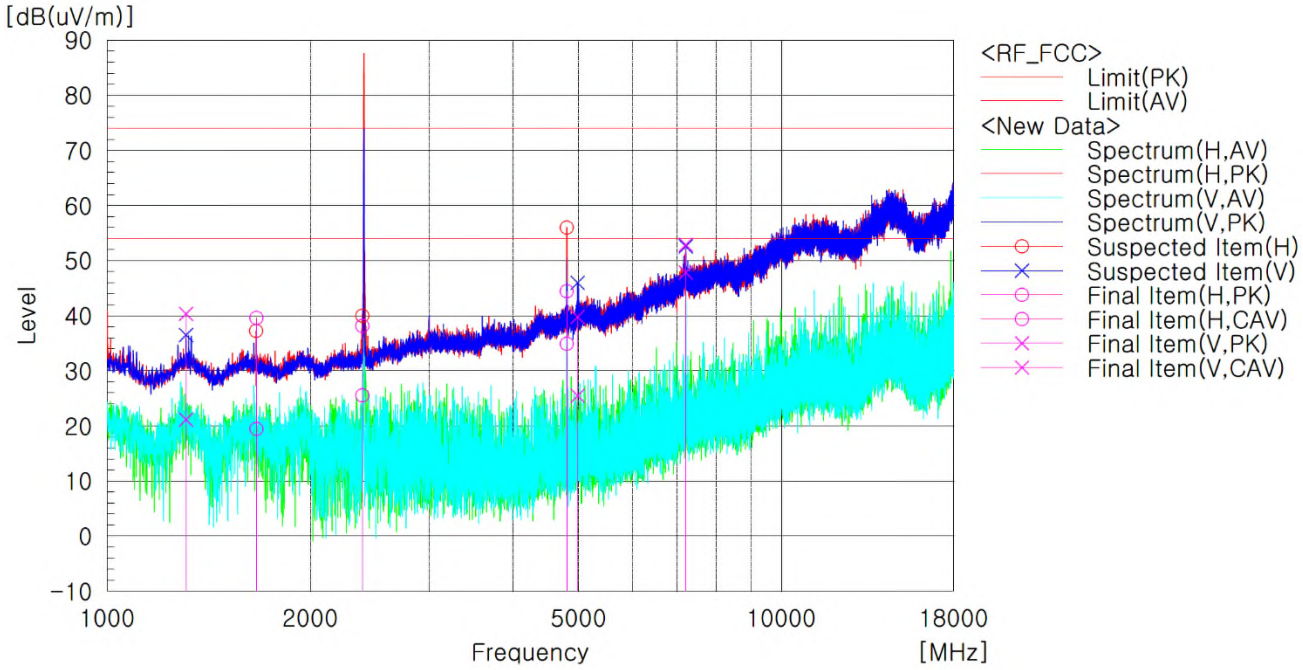
7.8 Test Result - Radiated Spurious Emission (1 to 18 GHz)

Test date	2019.07.30	Meas. Distance	3 m
Temperature	(23.7 ± 0.5) °C	Humidity	(55.8 ± 0.5) % R.H
Frequency	2402 MHz	Polarization	Horizontal / Vertical
Mode	BLE		



Frequency (MHz)	Pol. (H/V)	Detector (Peak/Avg.)	Reading (dBuV/m)	Correction Factor (dB)	Result (dBuV/m)	Limits (dBuV/m)	Margin (dB)
4804.44	H	Peak	48.1	-3.6	44.5	74.0	29.5
4804.44	H	Avg.	38.5	-3.6	34.9	54.0	19.1
4983.83	V	Peak	42.8	-3.0	39.8	74.0	34.2
4983.83	V	Avg.	28.5	-3.0	25.5	54.0	28.5
7209.71	V	Peak	47.9	5.0	52.9	74.0	21.1
7209.71	V	Avg.	42.8	5.0	47.8	54.0	6.2

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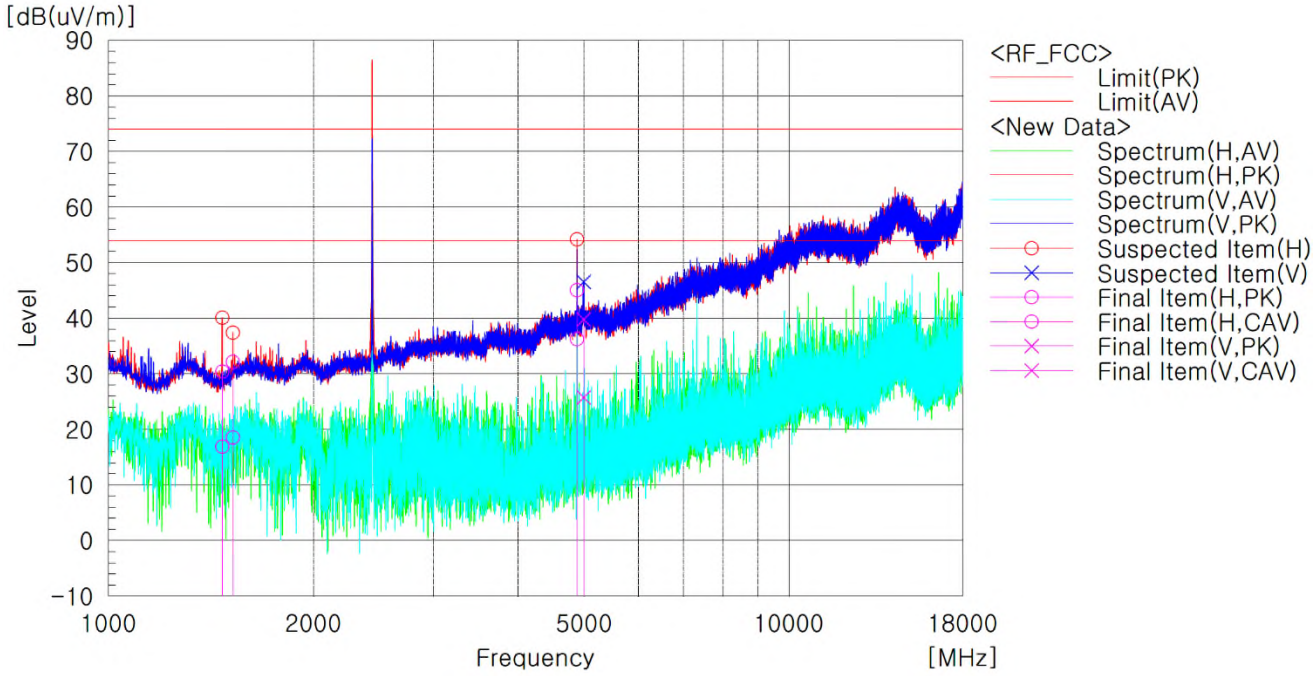
Test date	2019.07.30	Meas. Distance	3 m
Temperature	(23.7 ± 0.5) °C	Humidity	(55.8 ± 0.5) % R.H
Frequency	2440 MHz	Polarization	Horizontal / Vertical
Mode	BLE		



Frequency (MHz)	Pol. (H/V)	Detector (Peak/Avg.)	Reading (dBuV/m)	Correction Factor (dB)	Result (dBuV/m)	Limits (dBuV/m)	Margin (dB)
4880.36	H	Peak	48.4	-3.4	45.0	74.0	29.0
4880.36	H	Avg.	39.7	-3.4	36.3	54.0	17.7
4991.27	V	Peak	42.8	-3.0	39.8	74.0	34.2
4991.27	V	Avg.	28.8	-3.0	25.8	54.0	28.2

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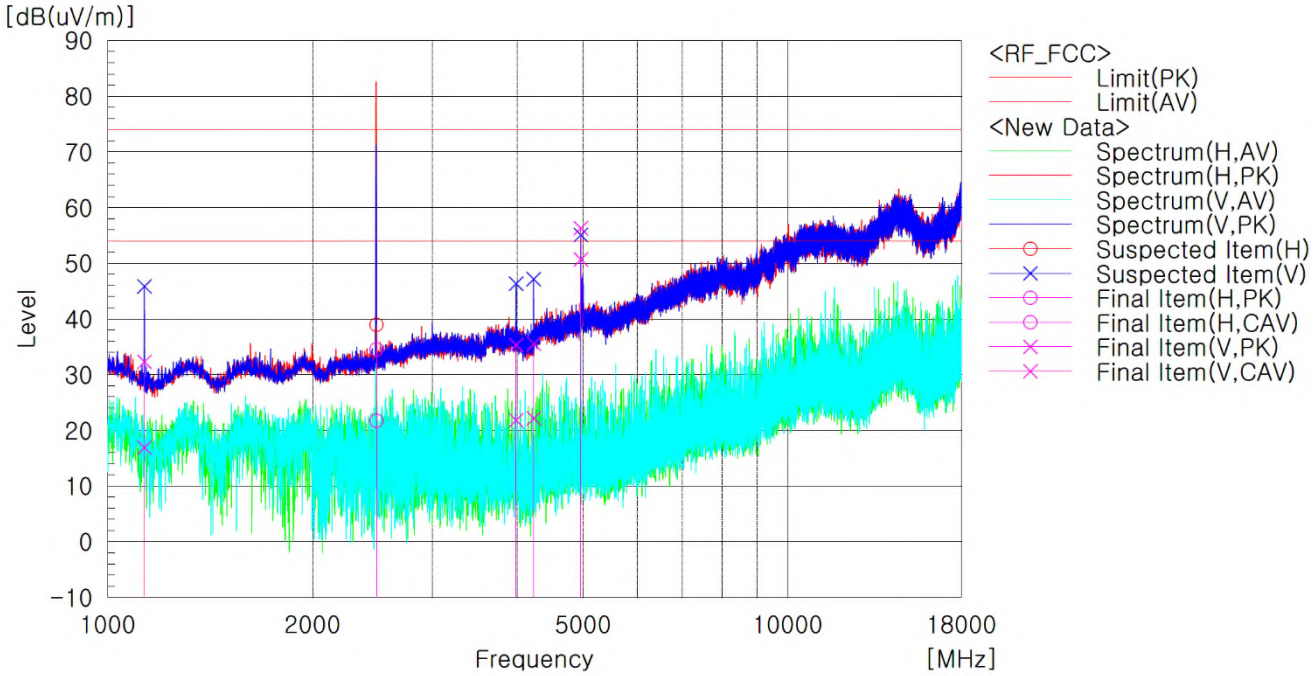
Test date	2019.07.30	Meas. Distance	3 m
Temperature	(23.7 ± 0.5) °C	Humidity	(55.8 ± 0.5) % R.H
Frequency	2480 MHz	Polarization	Horizontal / Vertical
Mode	BLE		



Frequency (MHz)	Pol. (H/V)	Detector (Peak/Avg.)	Reading (dBuV/m)	Correction Factor (dB)	Result (dBuV/m)	Limits (dBuV/m)	Margin (dB)
1132.42	H	Peak	49.4	-17.1	32.3	74.0	41.7
1132.42	H	Avg.	34.0	-17.1	16.9	54.0	37.1
4228.87	V	Peak	41.8	-6.2	35.6	74.0	38.4
4228.87	V	Avg.	28.3	-6.2	22.1	54.0	31.9
4957.88	V	Peak	59.4	-3.1	56.3	74.0	17.7
4957.88	V	Avg.	53.8	-3.1	50.7	54.0	3.3

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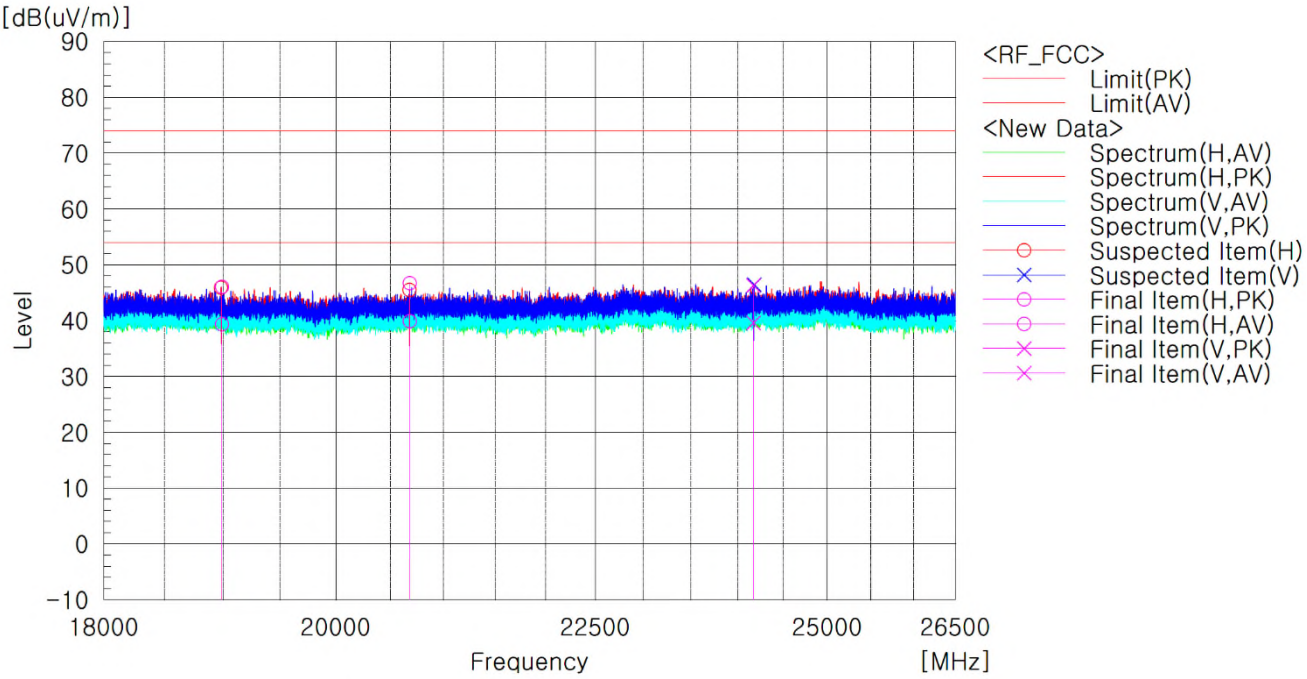
7.9 Test Result - Radiated Spurious Emission (18 to 26.5 GHz)

Test date	2019.08.01	Meas. Distance	3 m
Temperature	(25.1 ± 0.5) °C	Humidity	(43.1 ± 0.5) % R.H
Frequency	2402 MHz - Worst Case	Polarization	Horizontal / Vertical
Mode	BLE		



Frequency (MHz)	Pol. (H/V)	Detector (Peak/Avg.)	Reading (dBuV/m)	Correction Factor (dB)	Result (dBuV/m)	Limits (dBuV/m)	Margin (dB)
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
No other spurious and harmonic emission were detected.							
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-

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8. AC Power Line Conducted Emission

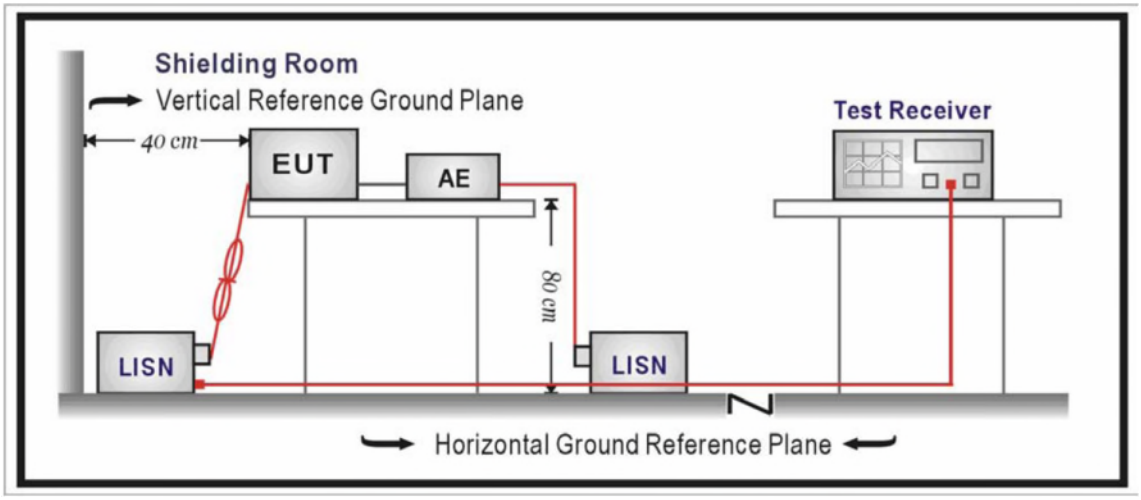
8.1 Limit

Test Specification **:** According to FCC CFR Title 47 Part 15 Subpart C Section 15.207

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

Note : * Decrease with the logarithm of the frequency

8.2 Test Configuration



8.3 Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50 uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50 ohm/50 uH coupling impedance with 50ohm termination.(Please refers to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed on conducted measurement.

Conducted emissions were invested over the frequency range from 0.15 MHz to 30 MHz using a receiver bandwidth of 9kHz.

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8.4 Test Result

[AC Power]

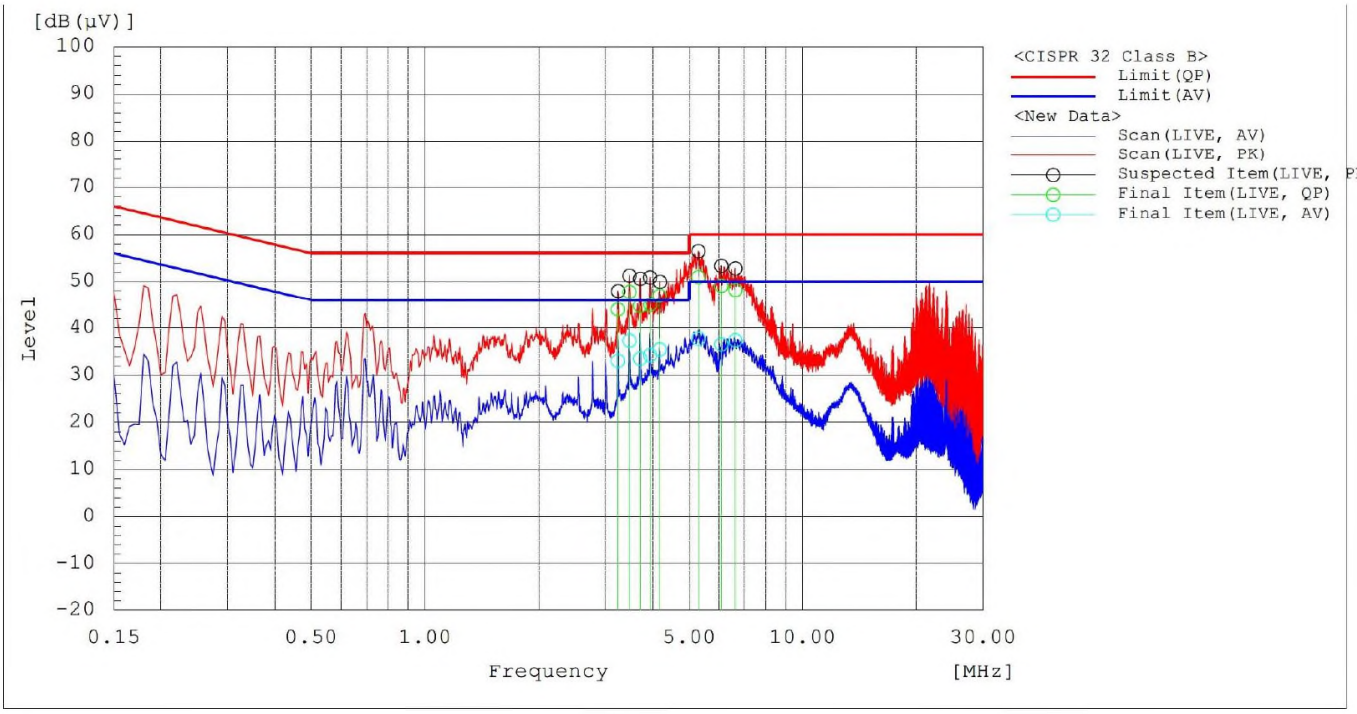
[LIVE]

Conducted Emission Test Report

PROFILE

Applicant	KONO CORPORATION LTD.	Standard	FCC Part15 Subpart C
Modelname	MS1001	Date	2019.08.05
Mode	BLE	Operator	J.J.Y
Phase	LIVE	Tem./ Hum.	(23.4 ± 0.5) °C / (57.4 ± 0.5) % R.H.

SCREEN SHOT



Final Result

--- LIVE (QP) ---

No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB]	Result [dB(μV)]	Limit [dB(μV)]	Margin [dB]	Remark
1	3.471	38.0	9.8	47.8	56.0	8.2	
2	3.238	34.2	9.8	44.0	56.0	12.0	
3	3.940	35.2	9.8	45.0	56.0	11.0	
4	3.708	35.0	9.8	44.8	56.0	11.2	
5	4.176	37.2	9.8	47.0	56.0	9.0	
6	5.285	41.1	9.9	51.0	60.0	9.0	
7	6.078	39.2	9.9	49.1	60.0	10.9	
8	6.626	38.3	9.9	48.2	60.0	11.8	

--- LIVE (AV) ---

No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB]	Result [dB(μV)]	Limit [dB(μV)]	Margin [dB]	Remark
1	3.471	27.5	9.8	37.3	46.0	8.7	
2	3.238	23.3	9.8	33.1	46.0	12.9	
3	3.940	24.5	9.8	34.3	46.0	11.7	
4	3.708	23.8	9.8	33.6	46.0	12.4	
5	4.176	25.7	9.8	35.5	46.0	10.5	
6	5.285	27.9	9.9	37.8	50.0	12.2	
7	6.078	26.7	9.9	36.6	50.0	13.4	
8	6.626	27.5	9.9	37.4	50.0	12.6	

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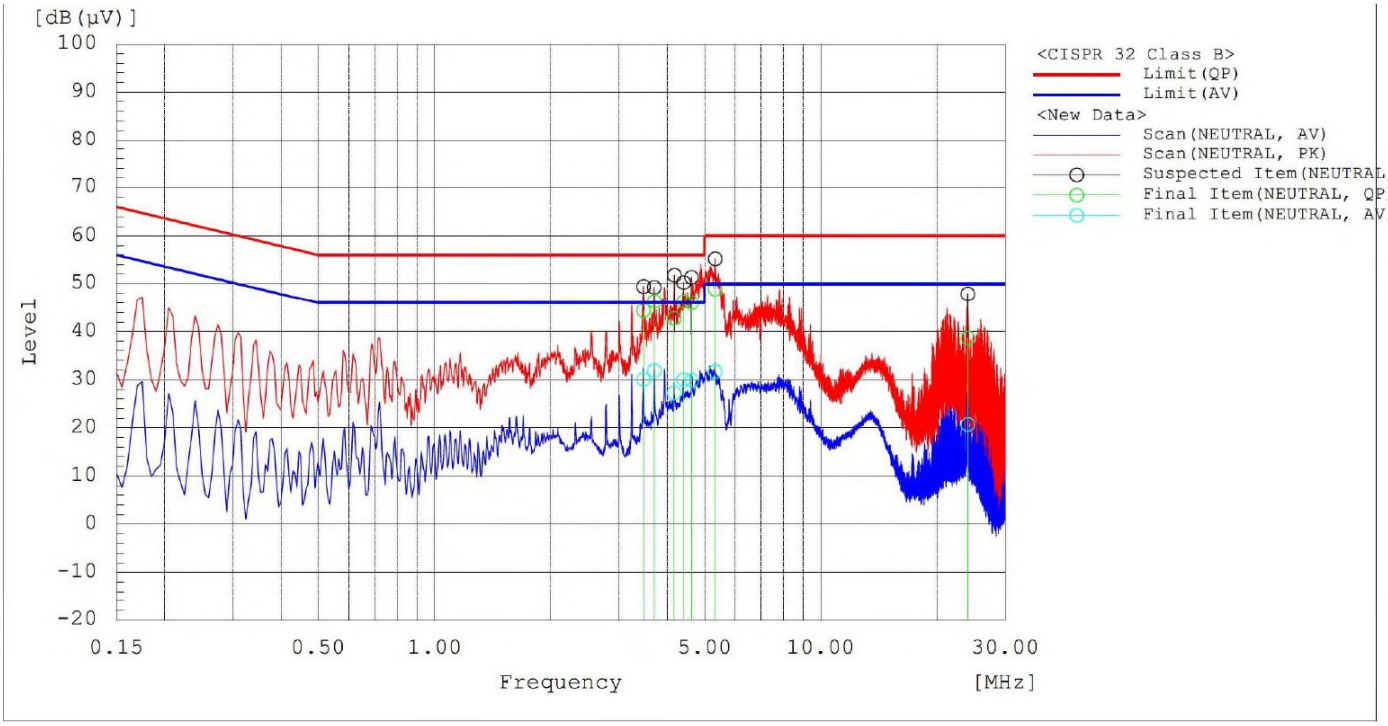
[NEUTRAL]

Conducted Emission Test Report

PROFILE

Applicant	KONO CORPORATION LTD.	Standard	FCC Part15 Subpart C
Modelname	MS1001	Date	2019.08.05
Mode	BLE	Operator	J.J.Y
Phase	Neutral	Tem./ Hum.	(23.4 ± 0.5) °C / (57.4 ± 0.5) % R.H.

SCREEN SHOT



Final Result

--- NEUTRAL (QP) ---

No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB]	Result [dB(μV)]	Limit [dB(μV)]	Margin [dB]	Remark
1	3.475	34.4	10.0	44.4	56.0	11.6	
2	3.704	36.4	10.0	46.4	56.0	9.6	
3	4.171	32.8	10.0	42.8	56.0	13.2	
4	4.409	36.3	10.0	46.3	56.0	9.7	
5	4.629	36.0	10.0	46.0	56.0	10.0	
6	5.325	38.9	10.0	48.9	60.0	11.1	
7	23.997	27.9	10.8	38.7	60.0	21.3	

--- NEUTRAL (AV) ---

No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB]	Result [dB(μV)]	Limit [dB(μV)]	Margin [dB]	Remark
1	3.475	20.1	10.0	30.1	46.0	15.9	
2	3.704	21.9	10.0	31.9	46.0	14.1	
3	4.171	17.3	10.0	27.3	46.0	18.7	
4	4.409	20.0	10.0	30.0	46.0	16.0	
5	4.629	19.8	10.0	29.8	46.0	16.2	
6	5.325	21.7	10.0	31.7	50.0	18.3	
7	23.997	9.9	10.8	20.7	50.0	29.3	

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9. ANTENNA REQUIREMENT

9.1 Applicable Stamdard

According to § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

9.2 Applicable Construction

- The Antenna is permanently attached on the main board

9.3 Test Result

Pass

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10. Equipment List

Test Equipment		Model	Mfg.	Serial No.	Cal. Date	Cal. Due Date
☐	Spectrum Analyzer	E4440A	Agilent	MY45304577	2018.11.30	2019.11.30
☐	Spectrum Analyzer	E4440A	Agilent	MY46115274	2018.11.30	2019.11.30
☐	10 dB Attenuator	SA26B	FAIRVIEW	N/A	2018.12.03	2019.12.03
☐	10 dB Attenuator	SA26B	FAIRVIEW	N/A	2018.12.03	2019.12.03
☐	10 dB Attenuator	SA26B	FAIRVIEW	N/A	2018.12.03	2019.12.03
☒	Double Ridged Horn Antenna	BBHA9120D	SCHWARZBECK	9120D-1166	2019.01.21	2020.01.21
☒	Low Noise Amplifier	TK-PA18H	TESTEK	170028-L	2018.12.17	2019.12.17
☒	Low Noise Amplifier	TK-PA1840H	TESTEK	170029-L	2018.12.17	2019.12.17
☒	Horn Antenna	BBHA9170	SCHWARZBECK	#794	2018.12.19	2019.12.19
☒	Power Meter	E4416A	Agilent	GB41050459	2018.11.30	2019.11.30
☐	Avg. Power Sensor	E9304A	Agilent	MY51110045	2018.11.30	2019.11.30
☒	Peak & Avg. Power Sensor	E9327A	Agilent	US40440771	2018.11.30	2019.11.30
☒	True RMS Multimeter	87-V	FLUKE	14990137	2018.11.30	2019.11.30
☒	DC Power Supply	IPS-30B05DD	INTERACT	N/A	2019.06.14	2020.06.14
☒	Signal Generator	83640L	Hewlett-Packard	3722A00285	2019.06.14	2020.06.14
☒	Spectrum Analyzer	FSV40-N	ROHDE& SCHWARZ	102183	2019.06.14	2020.06.14
☒	EMI RECEIVER	PMM 9010	NARDA	697WW30607	2019.01.07	2020.01.07
☒	TWO LINE V-NETWORK	ENV216	ROHDE& SCHWARZ	101771	2019.01.07	2020.01.07
☒	EMI TEST RECEIVER	ESCI 7	ROHDE& SCHWARZ	100971	2019.07.14	2020.07.14
☒	AMPLIFIER	310N	Sonoma Instrument	187066	2019.07.14	2020.07.14
☒	Bilog Antenna	VULB 9160	SCHWARZBECK	3292	2019.03.22	2020.03.22
☒	MXE TEST RECEIVER	N9038A	KEYSIGHT	MY55420166	2018.09.12	2019.09.12
☒	Loop Ant.	FMZB1513	SCHWARZBECK	1513-167	2018.02.12	2020.02.12
☐	DTV MODULATOR	TVB597A	TELEVIEW	N/A	2019.07.14	2020.07.14
☒	Impedance Stabilization Network	ISN ST08	TESEQ GmbH	32278	2019.01.07	2020.01.07

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