TEST REPORT

CTK Co., Ltd.
(Ho-dong), 113, Yejik-ro, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea
Tel: +82-31-339-9970
Fax: +82-31-624-9501

1. Client

◦ Name : Samsung Electronics Co Ltd

◦ Address : 19 Chapin Rd, Building D. Pine Brook, New Jersey, United States

◦ Date of Receipt : 2021-10-13

2. Manufacturer

◦ Name : Samsung Electronics Co., Ltd.

◦ Address : 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea

3. Use of Report : For FCC & ISED Certification

4. Test Sample / Model: Smart Control / RMCSPB1EP1, RMCSPB1GP1, RMCSPB1FP1

5. Date of Test : 2021-11-02 to 2021-11-09

6. Test Standard(method) used : FCC 47 CFR part 15 subpart C 15.247
ANSI C63.10-2013, RSS-247, RSS-Gen

7. Testing Environment: Temp.: (23 ± 1) ℃, Humidity: (48 ± 5) % 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 Su-Jun Hwang: (Signature)	Technical Manager Won-Jae Hwang: (Signature)

The above testing certificate is the accredited test result by Korea Laboratory Accreditation Scheme, which signed the ILAC-MRA.

2021-11-16

Accredited by KOLAS, Republic of KOREA **CTK Co., Ltd.**

REPORT REVISION HISTORY

Date	Revision	Page No
2021-11-16	Issued (CTK-K-2021-00891)	all

CONTENTS

1. General Product Description

1.1 Client Information

Company	Samsung Electronics Co Ltd
Contact Point	19 Chapin Rd, Building D. Pine Brook, New Jersey, United States
Contact Person	Name : HanSung You E-mail : digitalyou@samsung.com Tel : +82 31-277-2746 Fax : -

1.2 Product Information

FCC ID	A3LRMCSPB1EP1
Certification Number ISED	649E-RMCSPB1EP1
Product Description	Smart Control
Basic model	RMCSPB1EP1
Variant Model name	RMCSPB1GP1, RMCSPB1FP1 RMCSPB1GP1, RMCSPB1FP1 has the same basic model and internal circuit, but the CP Key part of the exterior has been different. (CP key : Contents Provider key)
Operating Frequency	2 402 MHz - 2 480 MHz
RF Output Power	-1.746 dBm (0.669 mW)
Antenna type	BLE : Chip Antenna 2.4GHz ISM Band(Only Receiver) : FPCB Antenna
Antenna gain	0.5 dBi
Number of channels	40
Channel Spacing	1 MHz
Type of Modulation	GFSK (Bluetooth LE)
Power Source	DC 3.80 V (Battery)
Hardware Rev	A1.0
Software Rev	A1.0
Test Software(Version)	Atmosic RF Tool(Ver.1.5.3)
RF Power setting in Test SW	W "7"

1.3 Peripheral Devices

Device	Manufacturer	Model No.	Serial No.
Note Computer	HP	HP ProBook 455 G7	5CD0234DWL
AC/DC Adapter	HP	HSTNN-LA40	7628050001

2. Facility and Accreditations

2.1 Test Facility

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

2.2 Laboratory Accreditations and Listings

Country	Agency	Registration Number	Logo
USA	FCC	805871	
CANADA	ISED	8737A-2	
KOREA	NRRA	KR0025	
International	KOLAS	TESTING No.KT119	

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

Section in FCC	Section in RSS	Requirement(s)	Status (Note 1)	Test Condition
15.247(a)	RSS-247 5.2(a)	6 dB Bandwidth	C	Conducted
15.247(e)	RSS-247 5.2(b)	Transmitter power spectral density	C	
15.247(b)	RSS-247 5.4(d)	Maximum peak conducted output power	C	
15.247(d)	RSS-247 5.5	Unwanted emission	C	
15.209	RSS-Gen 6.13	Transmitter emission	C	Radiated
15.207(a)	RSS-Gen 8.8	AC Conducted Emission	C	Line Conducted
Note 1: C=Complies NC=Not Complies NT=Not Tested NA=Not Applicable				
Note 2: The data in this test report are traceable to the national or international standards.				
Note 3: The sample was tested according to the following specification: FCC Part 15.247, ANSI C63.10-2013, RSS-247 Issue 2, RSS-GEN Issue 5				
Note 4: The tests were performed according to the method of measurements prescribed in KDB No.558074, ANSI C63.10-2013				
Note 5: This equipment is operated on battery power only.				

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

Duty Cycle	Duty Cycle Factor
61.57 %	2.11 dB

3.3 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	1.50 dB(C.L. : Approx, 95%, k = 2)
Power Spectral Density	1.50 dB(C.L. : Approx, 95%, k = 2)
Occupied Bandwidth	0.1 MHz(C.L. : Approx, 95%, k = 2)
Unwanted Emission(conducted)	3.0 dB(C.L. : Approx, 95%, k = 2)
Radiated Emissions (f ≤ 1 GHz)	4.66 dB(C.L. : Approx, 95%, k = 2)
Radiated Emissions (f > 1 GHz)	4.76 dB(C.L. : Approx, 95%, k = 2)
AC Conducted Emission	1.96 dB(C.L. : Approx, 95%, k = 2)

4. Technical Characteristic Test

4.1 6dB Bandwidth and 99 % Bandwidth

Test Procedures

KDB 558074 - Section 8.2
ANSI C63.10-2013 - Section 11.8.2
RSS-Gen – Section 6.7

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 6.9.3
RSS-Gen – Section 6.7

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 (6dB Bandwidth)
b) RBW = 1% to 5% of the OBW (99 % Bandwidth)
c) VBW ≥ 3 x RBW
d) Detector = peak
e) Trace mode = Max hold
f) Sweep = auto couple
g) Allow trace to fully stabilize
h) 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.

Limit : 6 dB Bandwidth

6 dB Bandwidth > 500 kHz

Limit : 99 % Bandwidth

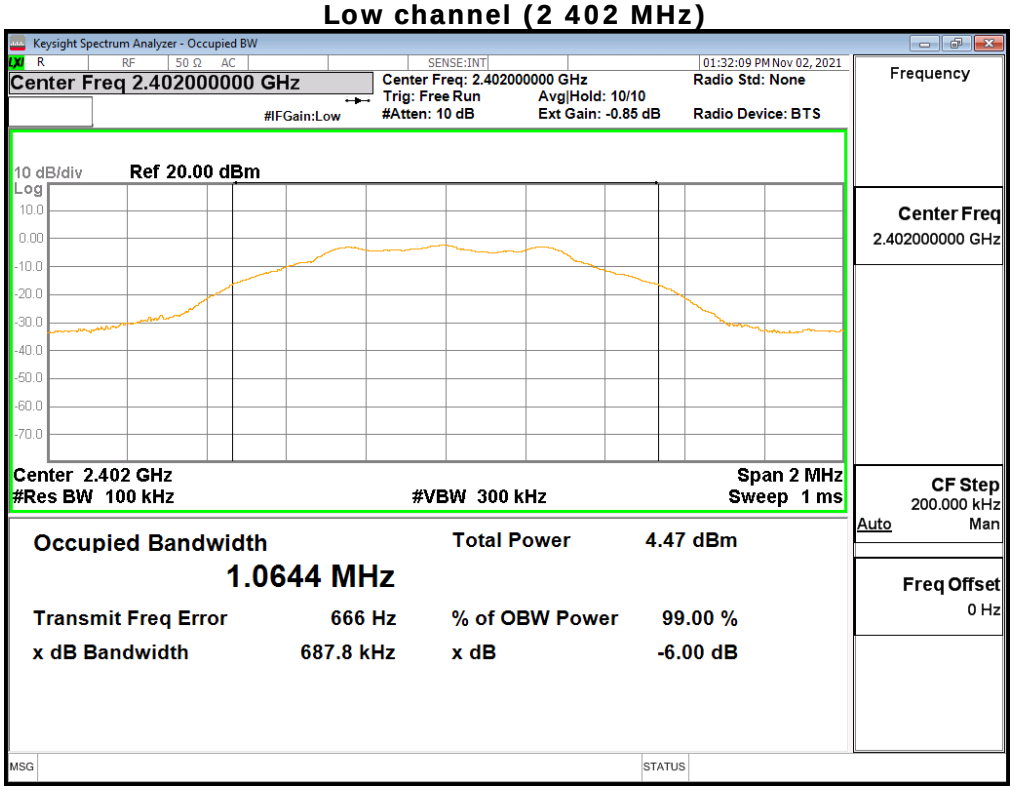
N/A

Test Data :

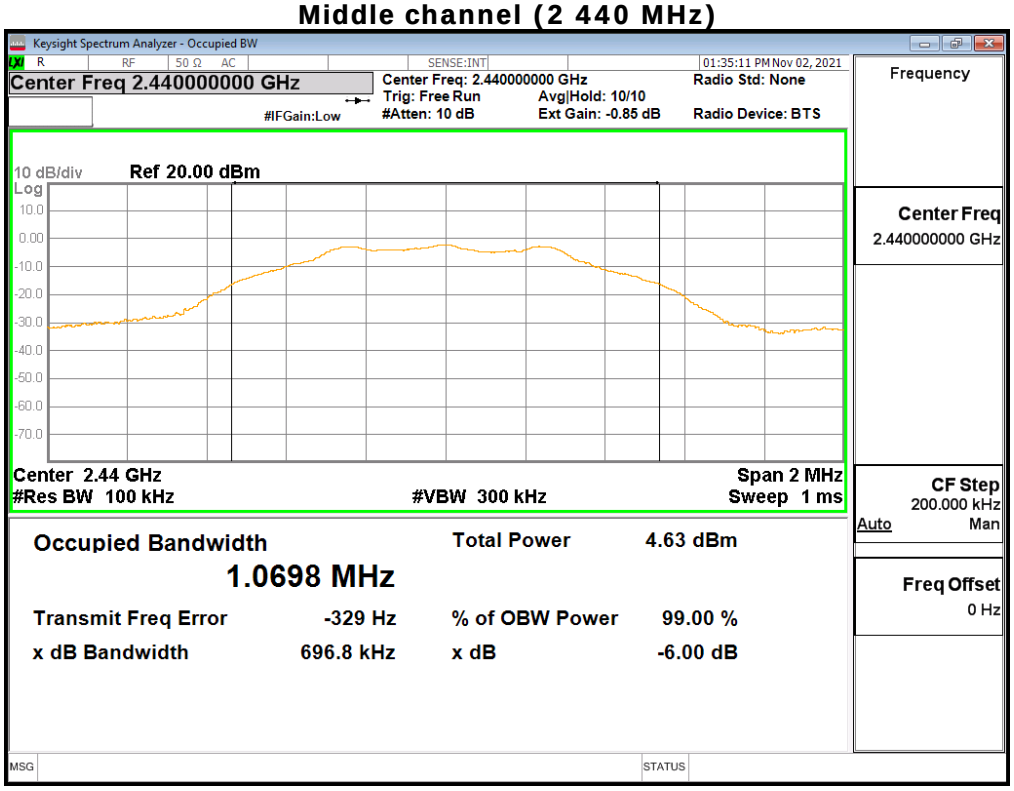
Channel	Frequency [MHz]	6 dB Bandwidth [MHz]	99 % Bandwidth [MHz]	Result
Low	2 402	0.688	1.064	Complies
Middle	2 440	0.697	1.070	
High	2 480	0.692	1.088	

See next pages for actual measured spectrum plots.

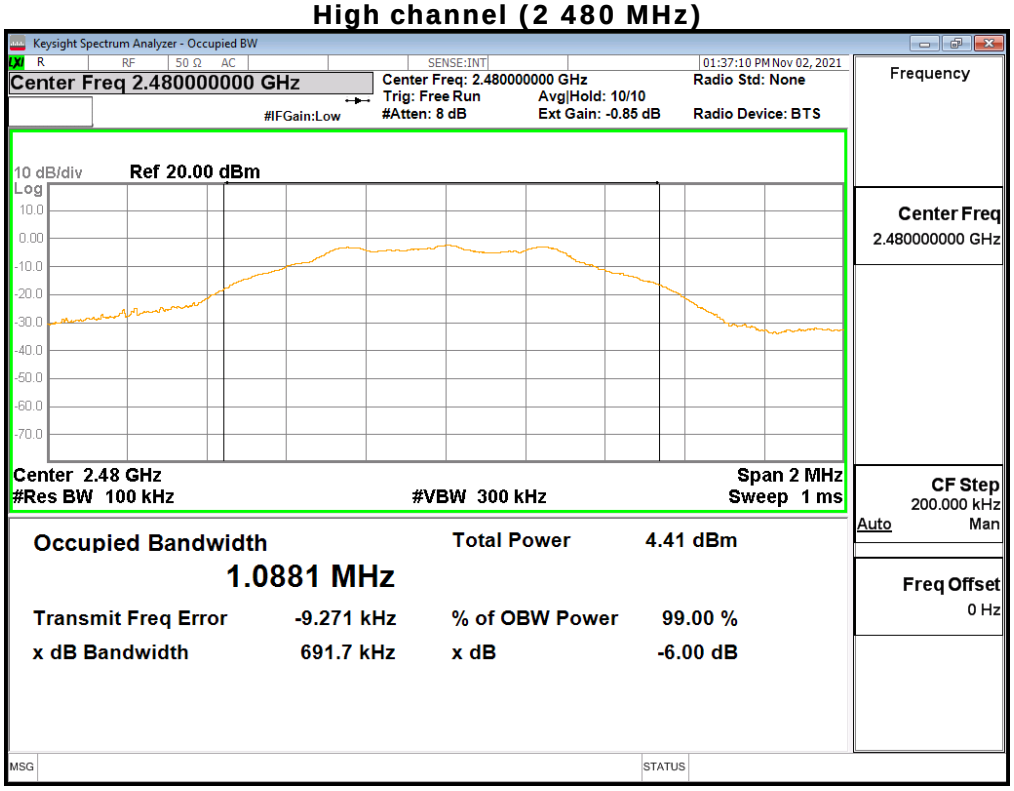
Low channel (2 402 MHz)



Middle channel (2 440 MHz)



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
RSS-Gen – Section 6.12

The following procedure can be used when the maximum available RBW of the instrument is greater than the DTS bandwidth:

Test Settings:

Center frequency = the highest, middle and the lowest channels

a) RBW ≥ DTS Bandwidth
b) VBW ≥ 3 x RBW
c) span ≥ 3 x 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 :

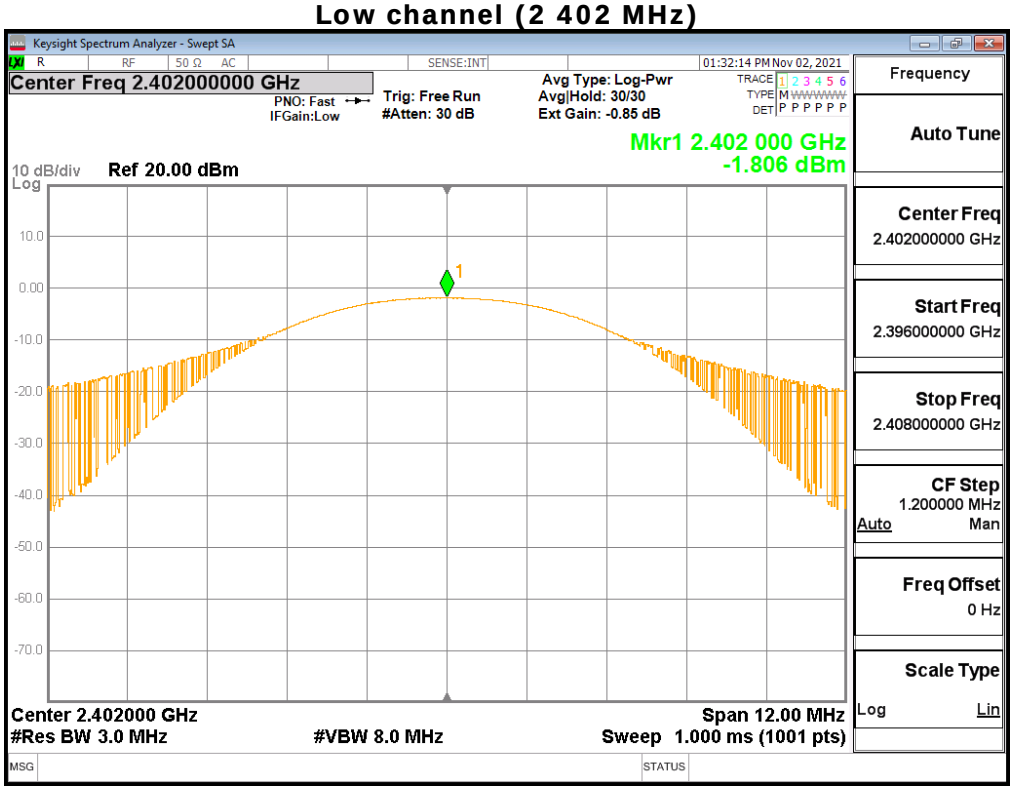
Maximum Output Power	<	1 W (30 dBm)

Test Data :

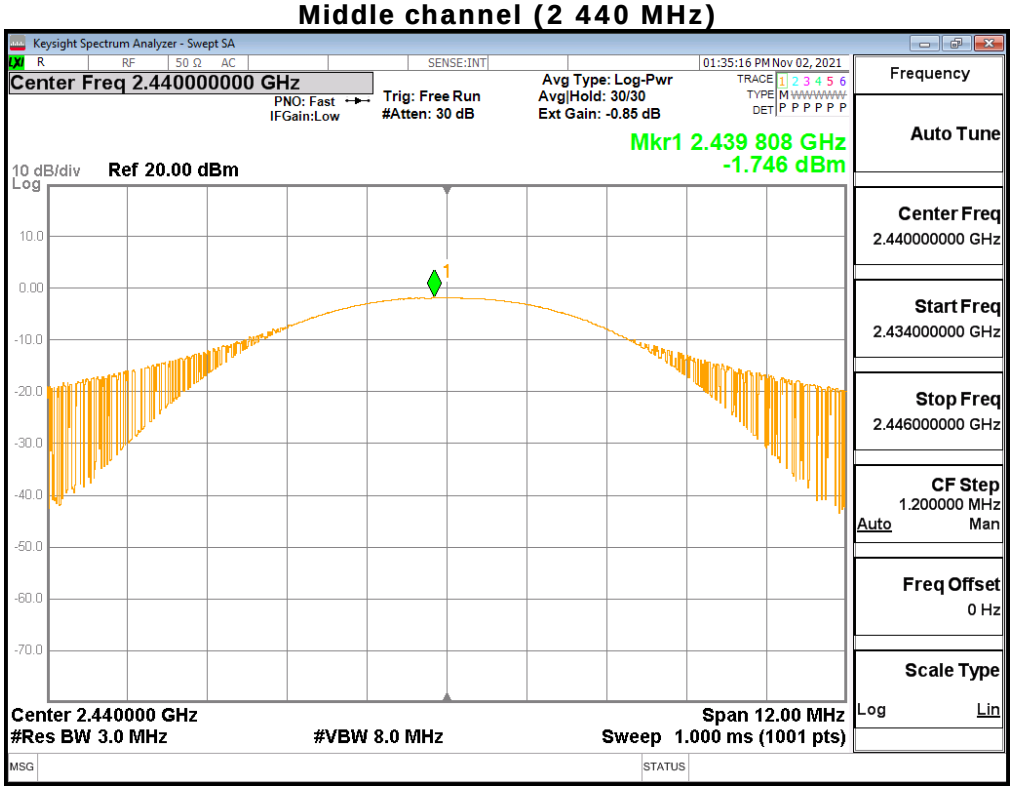
Channel	Frequency [MHz]	Measurement data [dBm]	Limit [dBm]	Result
Low	2 402	-1.806	30	Complies
Middle	2 440	-1.746	30	
High	2 480	-1.922	30	

See next pages for actual measured spectrum plots.

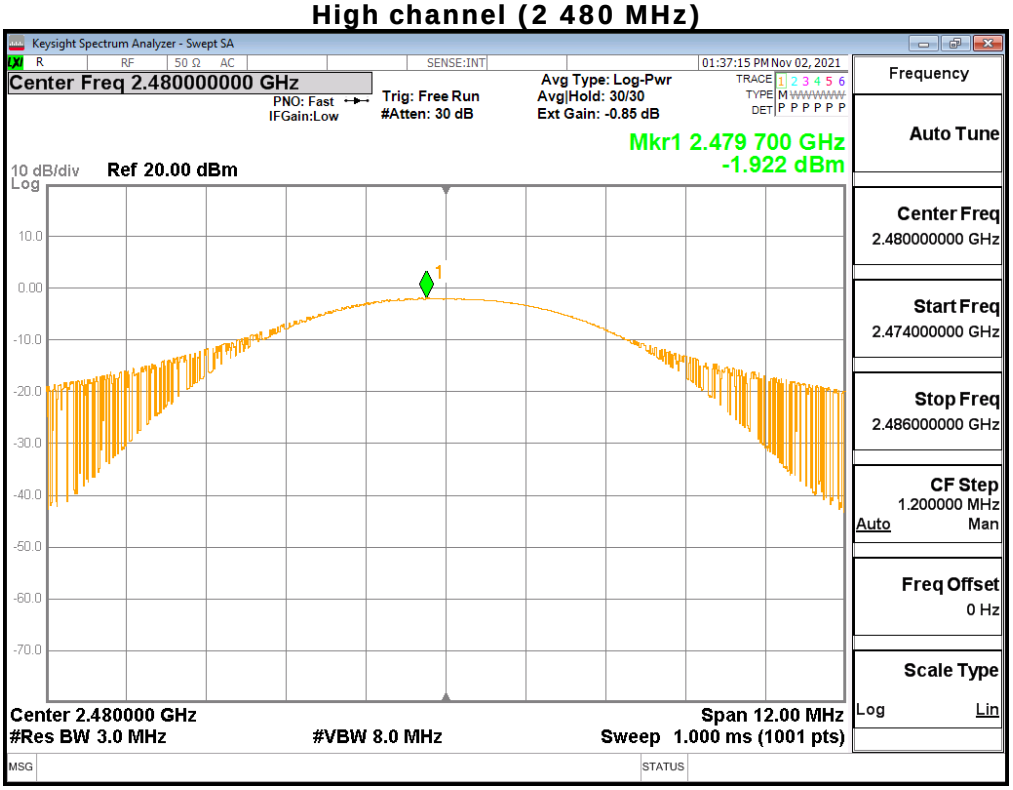
Low channel (2 402 MHz)



Middle channel (2 440 MHz)



High channel (2 480 MHz)



4.3 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 kHz ≤ RBW ≤ 100 kHz
b) VBW ≥ 3 x RBW
c) span ≥ 1.5 x 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 :

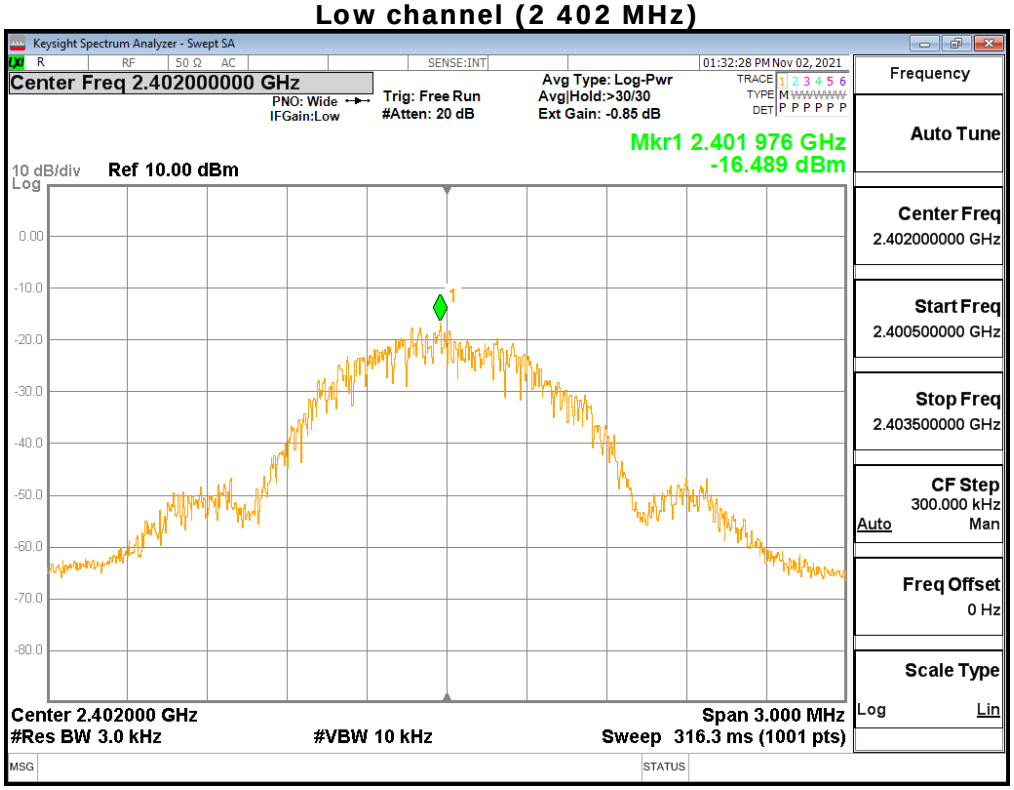
Power Spectral Density	<	8 dBm @ 3 kHz BW

Test Data :

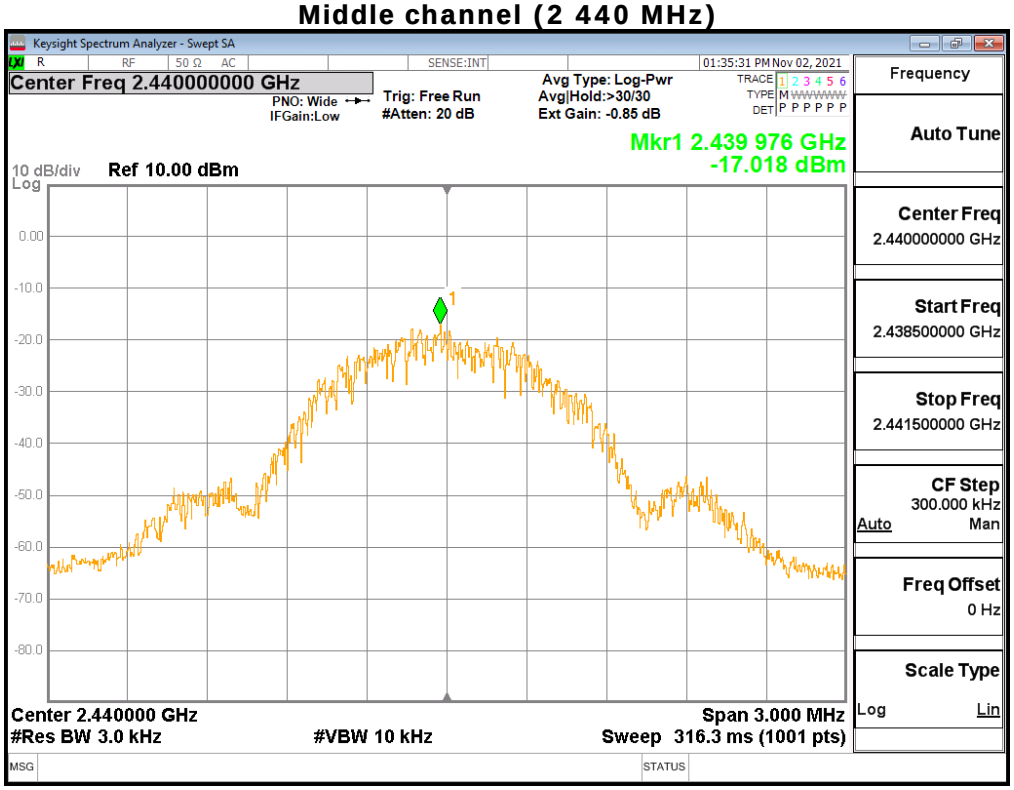
Channel	Frequency [MHz]	Measurement data [dBm]	Limit [dBm]	Result
Low	2 402	-16.49	8	Complies
Middle	2 440	-17.02		
High	2 480	-17.07		

See next pages for actual measured spectrum plots.

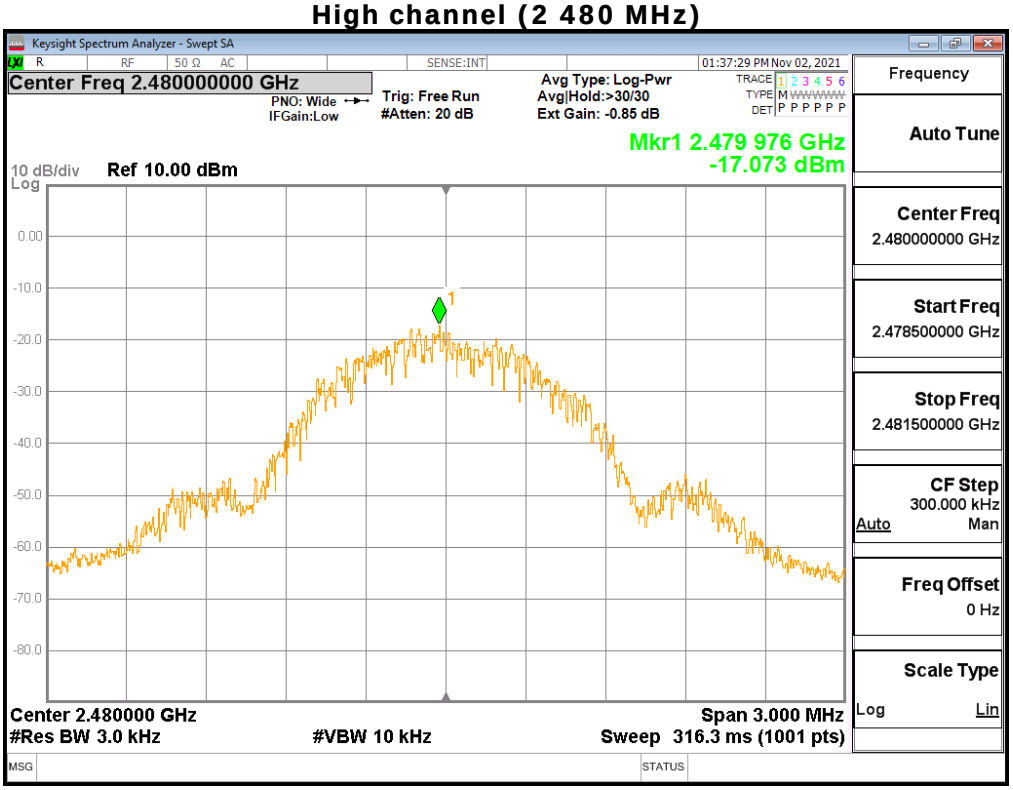
Low channel (2 402 MHz)



Middle channel (2 440 MHz)



High channel (2 480 MHz)



4.4 Band Edge & Conducted Spurious emission

Test Procedures

KDB 558074 - Section 8.5
ANSI C63.10-2013 - Section 11.11.3
RSS-Gen - Section 6.13

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 ≥ 3 x 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 :

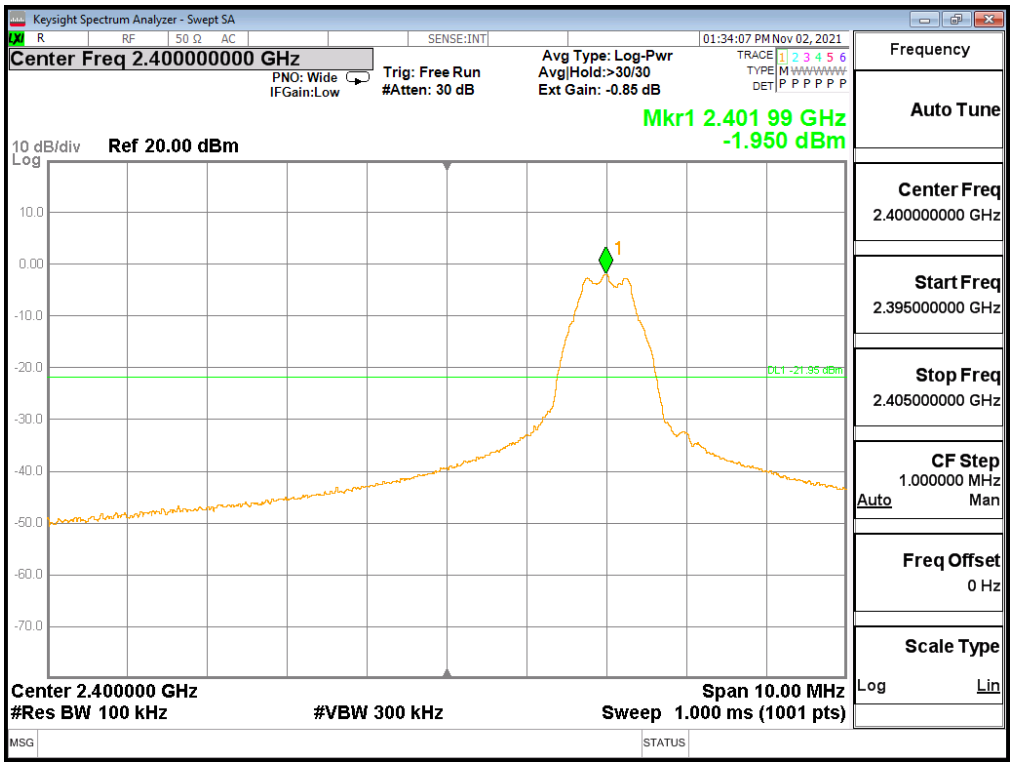
Emission level < 20 dBc

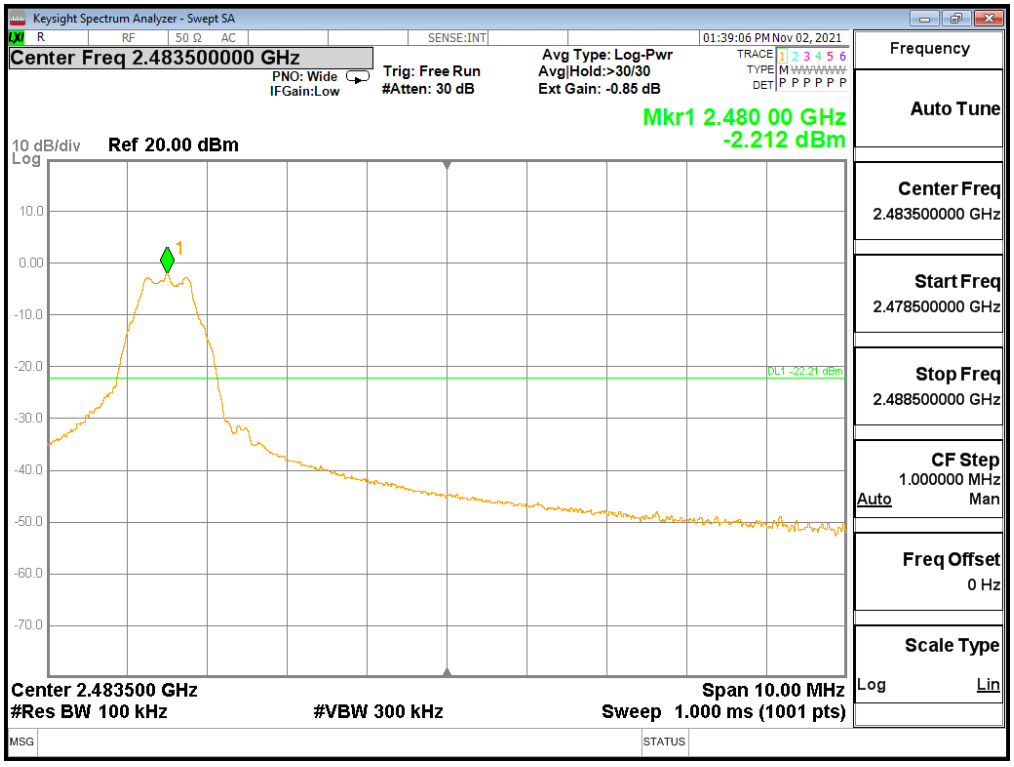
Test results: Complies

- 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.

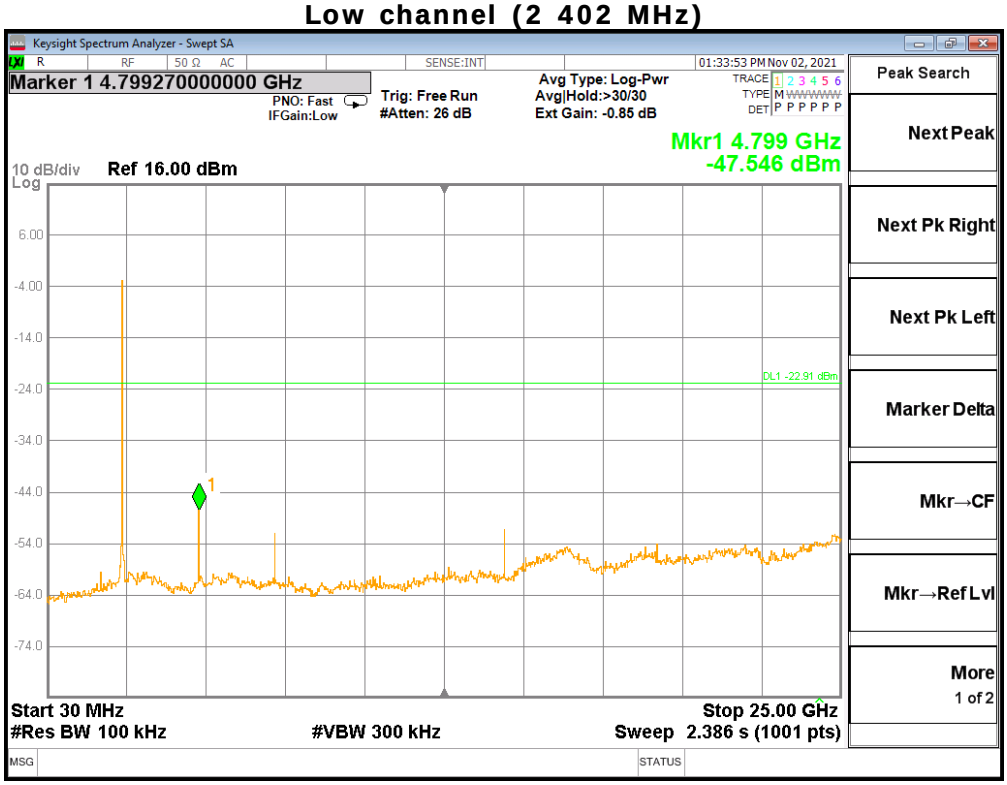
Band-edge


Keysight Spectrum Analyzer - Swept SA
Center Freq 2.400000000 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold:>30/30
Ext Gain: -0.85 dB
01:34:07 PM Nov 02, 2021
Mkr1 2.401 99 GHz
-1.950 dBm
10 dB/div
Log
Ref 20.00 dBm
DL1 -21.95 dBm
Center 2.400000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 10.00 MHz
Sweep 1.000 ms (1001 pts)
Frequency
Auto Tune
Center Freq
2.400000000 GHz
Start Freq
2.395000000 GHz
Stop Freq
2.405000000 GHz
CF Step
1.000000 MHz
Auto
Man
Freq Offset
0 Hz
Scale Type
Log
Lin

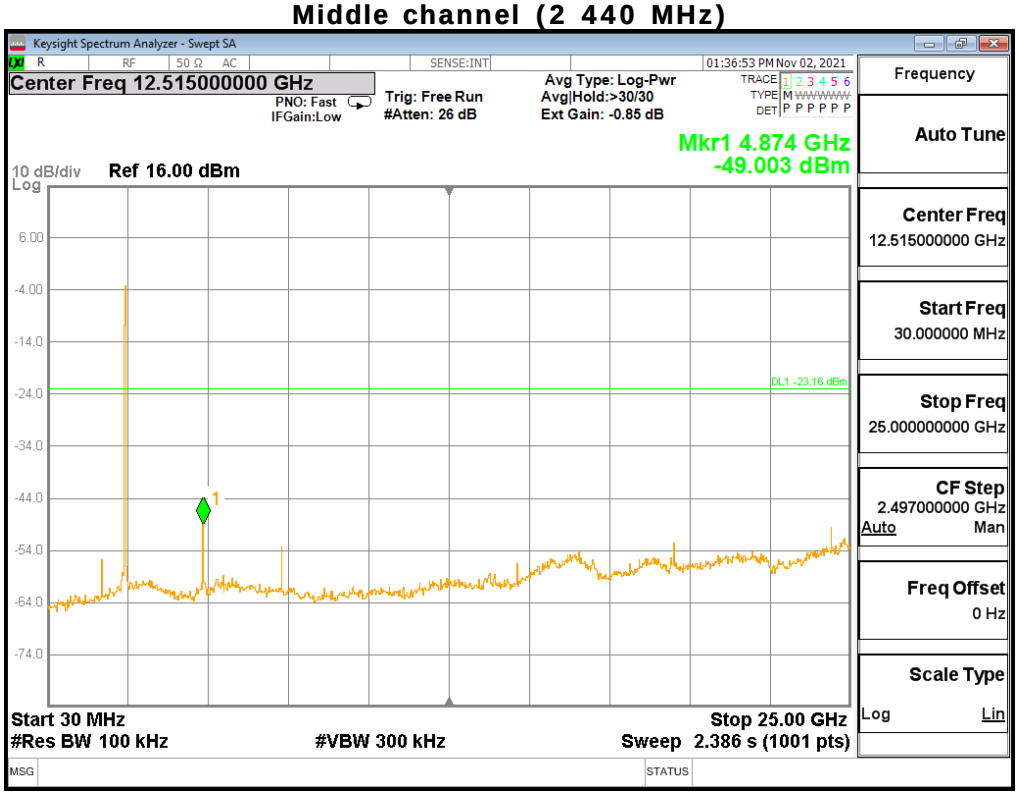

Keysight Spectrum Analyzer - Swept SA
Center Freq 2.483500000 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold:>30/30
Ext Gain: -0.85 dB
01:39:06 PM Nov 02, 2021
Mkr1 2.480 00 GHz
-2.212 dBm
10 dB/div
Log
Ref 20.00 dBm
DL1 -22.21 dBm
Center 2.483500 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 10.00 MHz
Sweep 1.000 ms (1001 pts)
Frequency
Auto Tune
Center Freq
2.483500000 GHz
Start Freq
2.478500000 GHz
Stop Freq
2.488500000 GHz
CF Step
1.000000 MHz
Auto
Man
Freq Offset
0 Hz
Scale Type
Log
Lin

Conducted Spurious emission

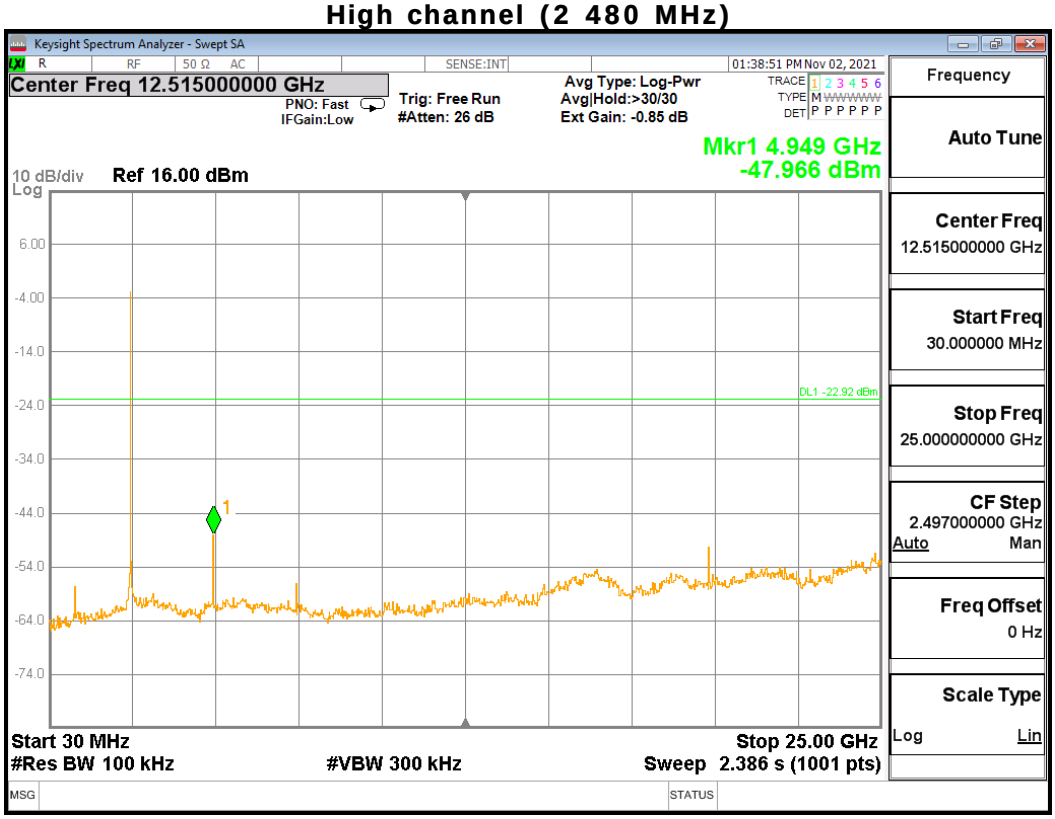
Low channel (2 402 MHz)



Middle channel (2 440 MHz)



High channel (2 480 MHz)



4.5 Radiated Emission

Test Location

☒ 10 m SAC (test distance : ☐ 10 m, ☒ 3 m)
☒ 3 m SAC (test distance : 3 m)

Test Procedures

KDB 558074 - Section 8.5, 8.6
ANSI C63.10-2013 - Section 11.11, 11.12
RSS-Gen - Section 6.13

1) In the frequency range of 9 kHz to 30 MHz, magnetic field is measured with Loop Antenna. The center of the Loop Test Antenna is 1m above the ground. During the measurement the Loop Test Antenna rotates about its vertical axis for maximum response at each azimuth about the EUT.
2) In the frequency rage above 30 MHz, Bi-Log Test Antenna(30 MHz to 1 GHz) and Horn Test Antenna(above 1 GHz) are used. Test Antenna is 3m away from the EUT. The emissions levels at both horizontal and vertical polarizations should be tested.

Test Settings:

Test Settings:

Frequency Range = 9 kHz ~ 1 GHz

a) RBW = 100 kHz for f < 1 GHz, 9 kHz for f < 30 MHz

b) VBW ≥ RBW

c) Detector = CISPR Quasi-peak

d) Sweep time = auto couple

- Peak

Frequency Range = 1 GHz ~ 26.5 GHz (2.4 GHz 10^{th} harmonic)

a) RBW = 1 MHz

b) VBW ≥ 3 x RBW

c) Detector = Peak

d) Sweep time = auto

e) Trace mode = max hold

- Average (duty cycle ≥ 98%)

Frequency Range = 1 GHz ~ 26.5 GHz (2.4 GHz 10^{th} harmonic)

a) RBW = 1 MHz

b) VBW ≥ 3 x RBW

c) Detector = RMS

d) Sweep time = auto

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

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

- Average (duty cycle < 98%, duty cycle variations are less than ±2%)

Frequency Range = 1 GHz ~ 25 GHz (2.4 GHz 10th harmonic)

a) RBW = 1 MHz

b) VBW ≥ 3 x 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.

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:

Table 1. Restricted Frequency Bands

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
[1]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	[2]Above 38.6
8.362-8.366	37.5-38.25	322-335.4	2483.5-2500	9300-9500	

[1] Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

[2] 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 is 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.

*Certain frequency bands listed in Table 6 and in band above 38.6 GHz are designated for licence-exempt applications. These frequency bands and the requirements that apply to the devices are set out in the 200- and 300-series of RSSs, such as RSS-210 and RSS-310, which contain the requirements that apply to licence-exempt radio apparatus.

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 uV/m	Field Strength dBuV/m	Deasurement 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

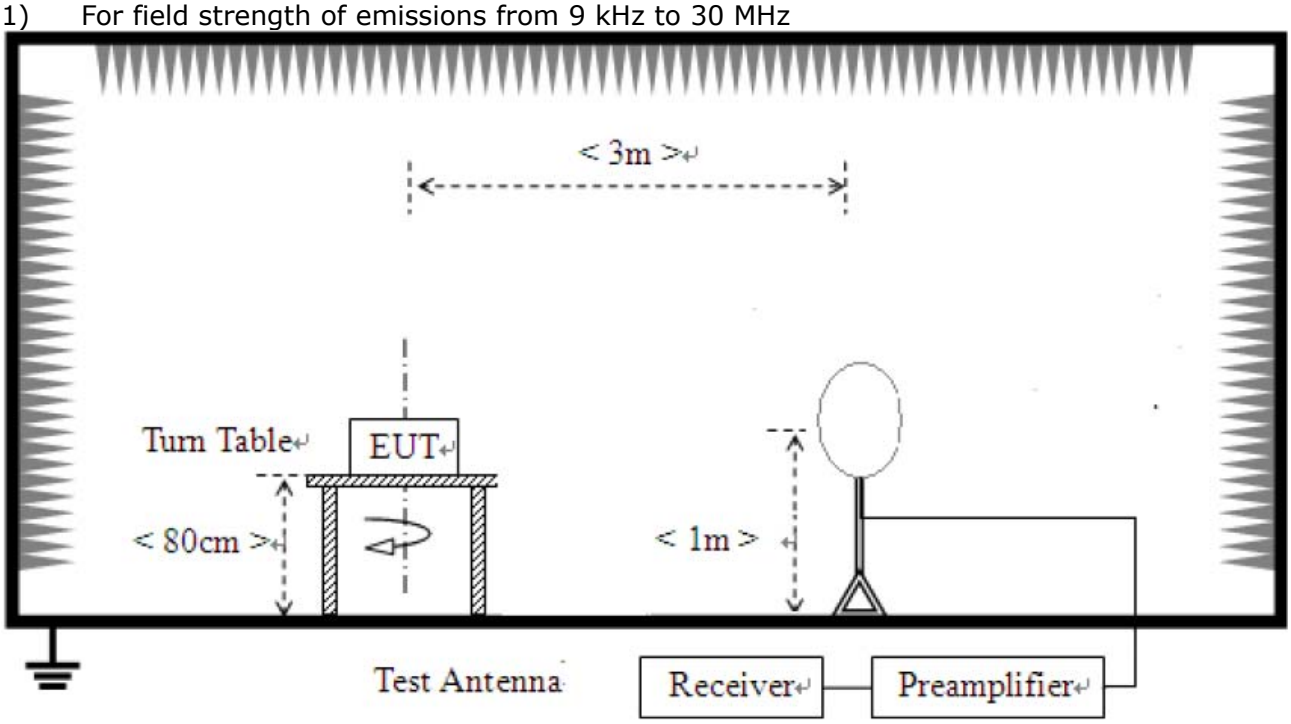
** Except as provided in 15.209(g).fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72MHz, 76-88MHz, 174-216MHz, 470-806MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g.15.231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

Note :

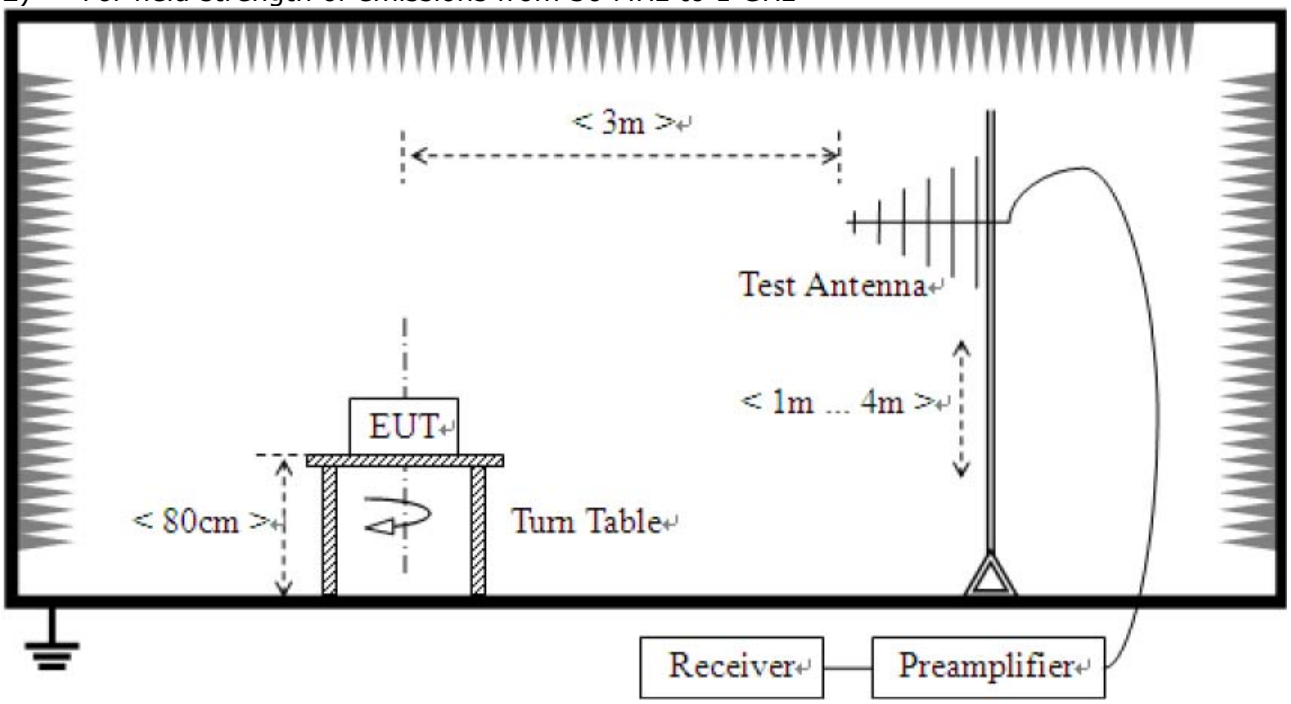
1) For above 1 GHz, the emission limit in this paragraph is based on measurement instrumentation employing an average detector, measurement using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit.
2) For above 1 GHz, limit field strength of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

Test Setup:

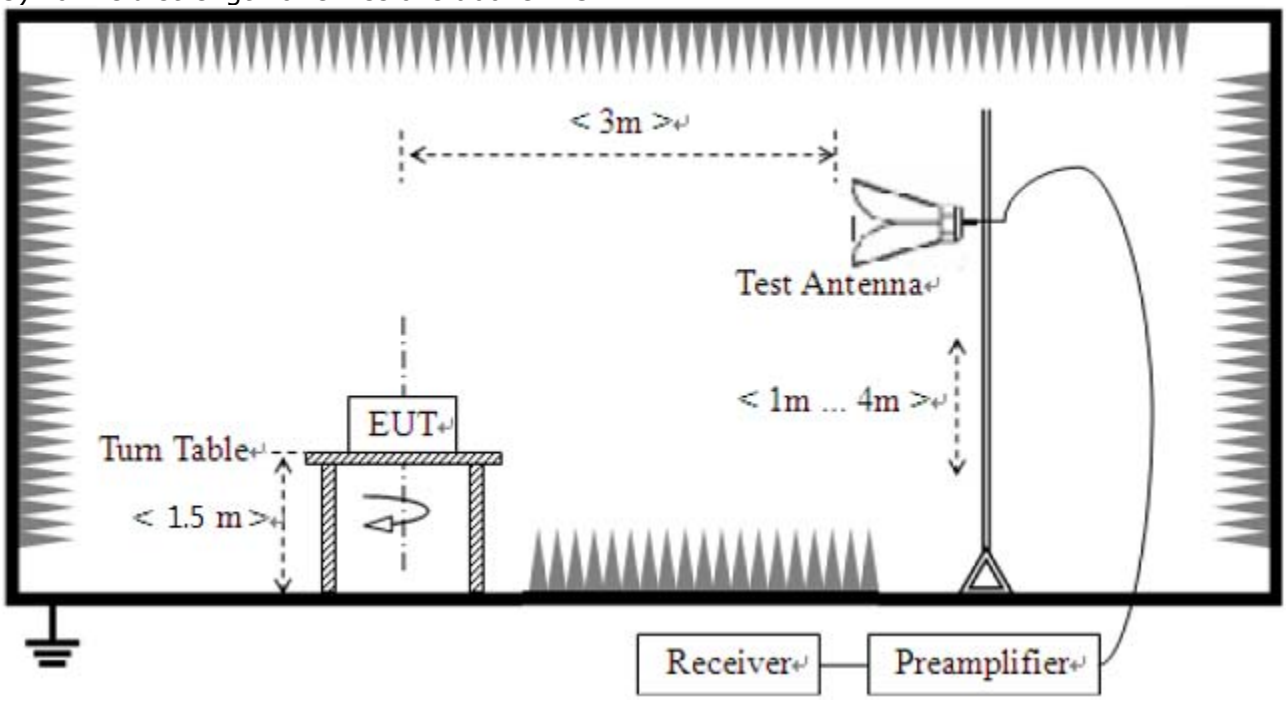
1) For field strength of emissions from 9 kHz to 30 MHz



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



3) For field strength of emissions above 1 GHz



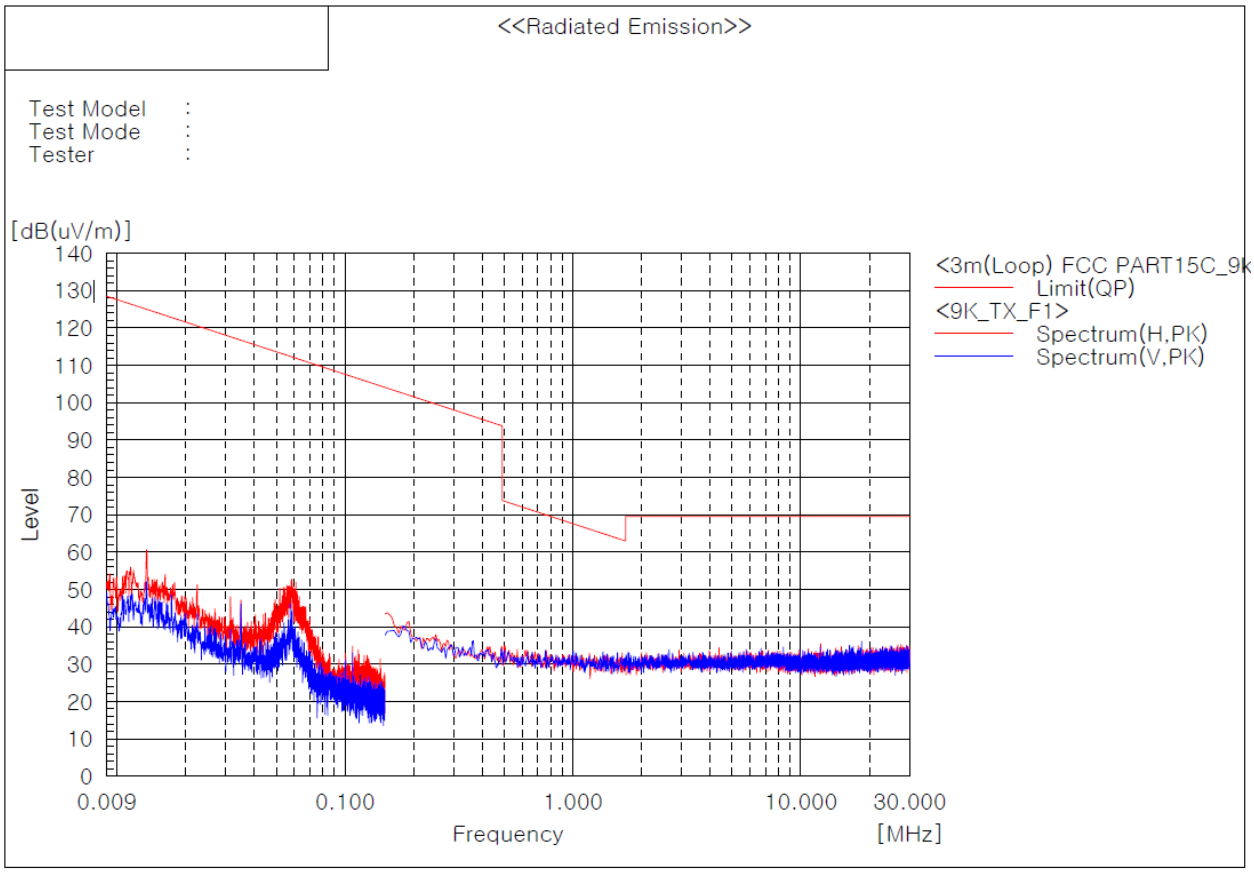
Test results

1) 9 kHz to 30 MHz

Test mode : Transmission status(Worst case)

The requirements are:
☒ Complies

Test Data



Frequency [MHz]	(P)	Reading [dBuV]	c.f [dB(1/m)]	Level [dB(uV/m)]	Limit [dB(uV/m)]	Margin [dB]

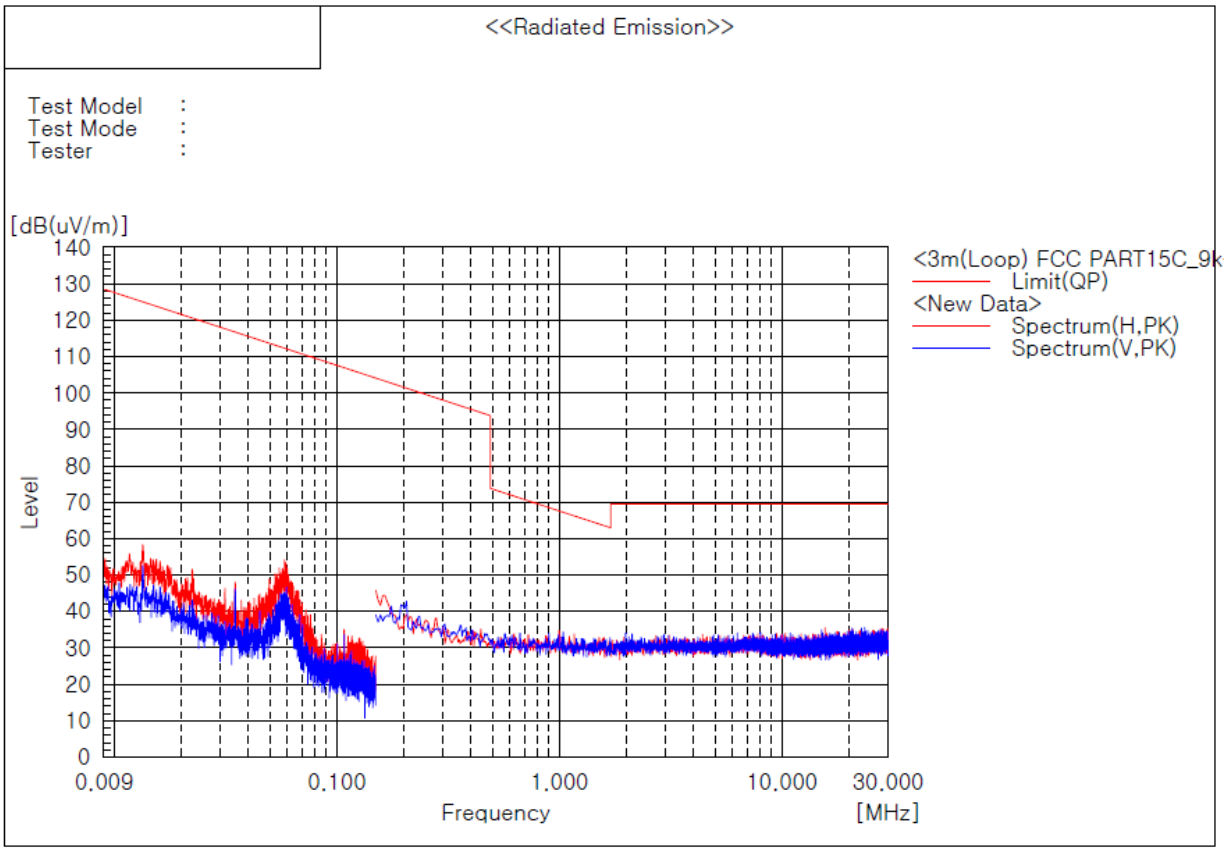
The emissions 9 kHz to 30 MHz were 20 dB lower than the limit.

Remark :
1. Measuring position : The Unwanted emission was measured in the following position: EUT stand-up position(X,Y axis), lie-down position(Z axis). The worst emission was found in lie-down position(Z 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
4. This data is the Peak(PK) value

Test mode : Receiving status(Worst case)

The requirements are:
☒ Complies

Test Data



Frequency [MHz]	(P)	Reading [dBuV]	c.f [dB(1/m)]	Level [dB(uV/m)]	Limit [dB(uV/m)]	Margin [dB]
The emissions 9 kHz to 30 MHz were 20 dB lower than the limit.						

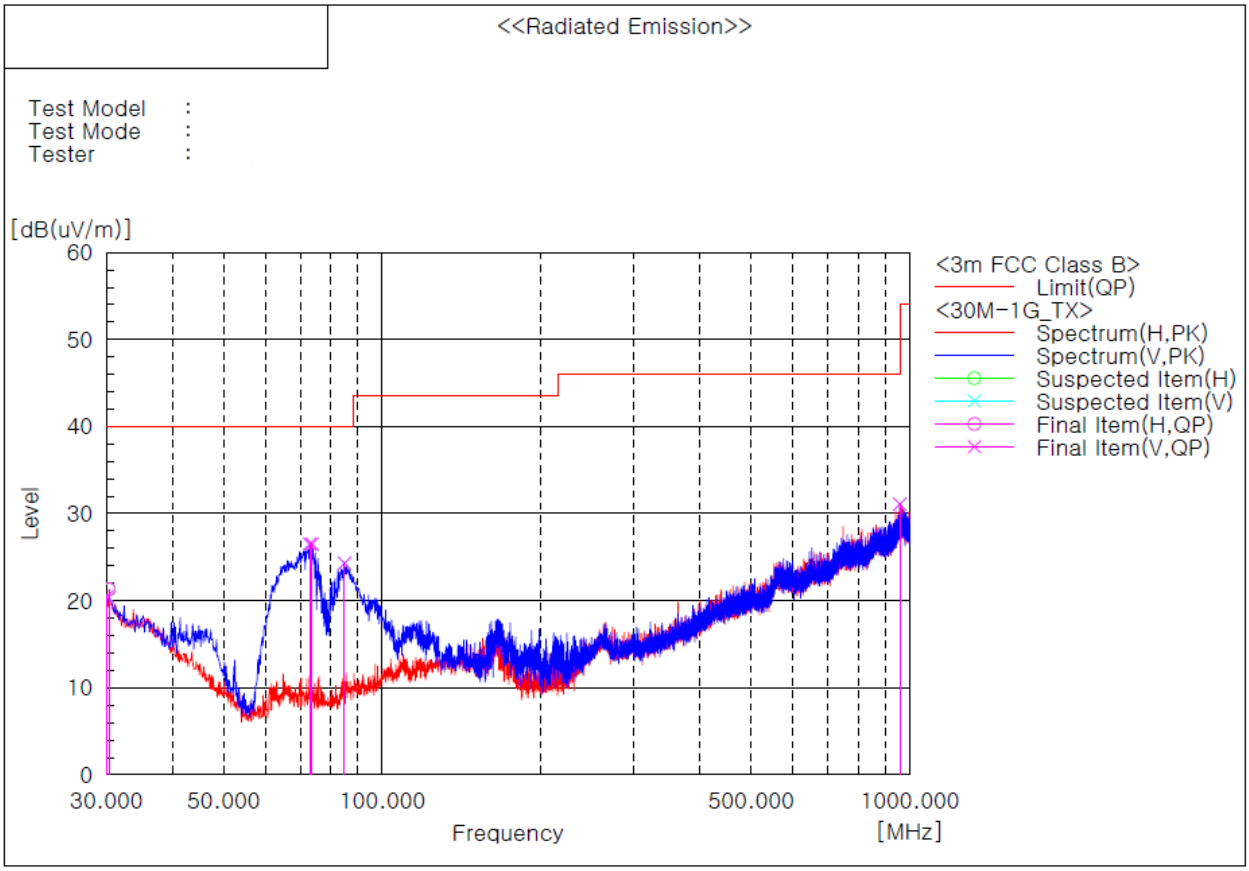
Remark :
1. Measuring position : The Unwanted emission was measured in the following position: EUT stand-up position(X,Y axis), lie-down position(Z axis). The worst emission was found in lie-down position(Z axis) and the worst case was recorded.
2. Result = Reading + c.f(correction factor)
3. Correction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

2) 30 MHz to 1 GHz

Test mode : Transmission status(Worst case)

The requirements are:
☒ Complies

Test Data



Final Result

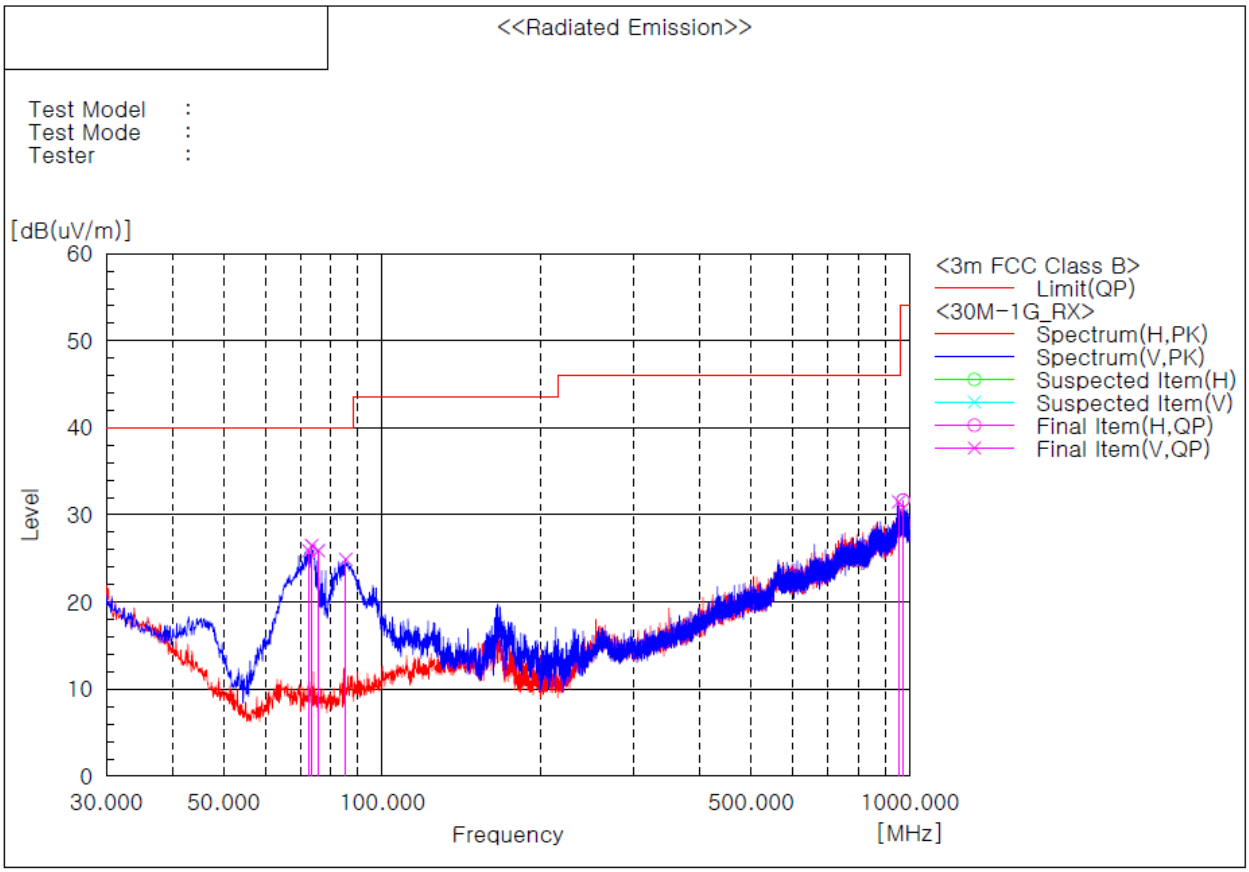
No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]
1	30.121	V	26.4	-5.9	20.5	40.0	19.5	101.0	83.0
2	30.364	H	27.3	-6.0	21.3	40.0	18.7	101.0	124.0
3	72.923	V	44.0	-17.5	26.5	40.0	13.5	101.0	359.0
4	73.650	V	44.0	-17.5	26.5	40.0	13.5	101.0	339.0
5	84.805	V	40.3	-16.0	24.3	40.0	15.7	101.0	359.0
6	958.048	V	22.8	8.3	31.1	46.0	14.9	101.0	196.0

Remark :
1. Measuring position : The Unwanted emission was measured in the following position: EUT stand-up position(X,Y axis), lie-down position(Z axis). The worst emission was found in lie-down position(Z 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
4. This data is the Peak(PK) value

Test mode : Receiving status(Worst case)

The requirements are:
☒ Complies

Test Data



Final Result

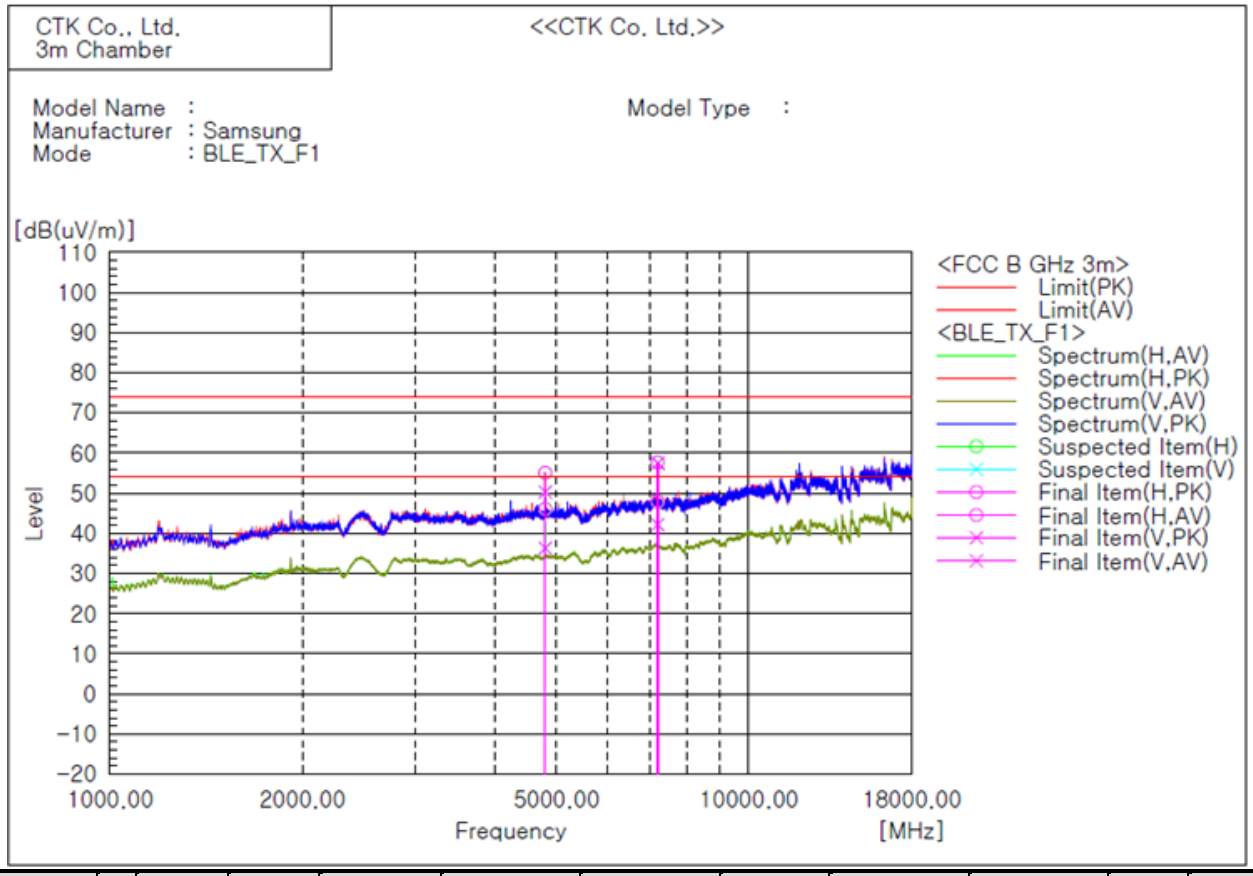
No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]
1	72.559	V	43.4	-17.5	25.9	40.0	14.1	101.0	15.0
2	73.529	V	44.0	-17.5	26.5	40.0	13.5	101.0	9.0
3	75.711	V	43.1	-17.2	25.9	40.0	14.1	101.0	47.0
4	85.290	V	40.8	-15.9	24.9	40.0	15.1	101.0	193.0
5	952.955	V	23.3	8.2	31.5	46.0	14.5	101.0	64.0
6	971.385	H	23.0	8.7	31.7	54.0	22.3	101.0	330.0

Remark :
1. Measuring position : The Unwanted emission was measured in the following position: EUT stand-up position(X,Y axis), lie-down position(Z axis). The worst emission was found in lie-down position(Z 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
4. This data is the Peak(PK) value

3) 1 GHz to 18 GHz

Test mode : Transmission status(Worst case)

The requirements are:
☒ Complies

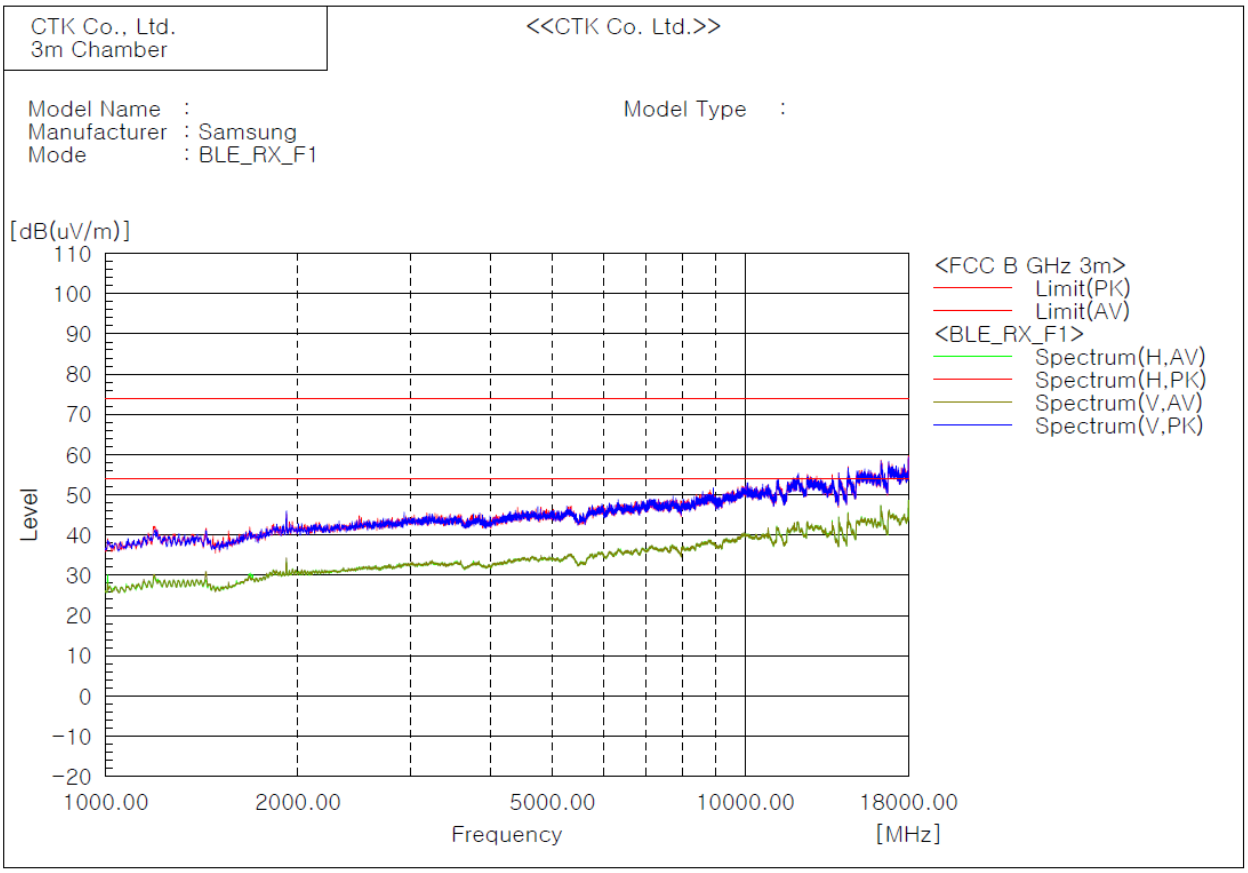


Frequency [MHz]	(P)	Reading PK [dBuV]	Reading AV [dBuV]	c.f [dB(1/m)]	Level PK [dB(uV/m)]	Level AV [dB(uV/m)]	Duty Cycle Factor [dB]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin AV [dB]
4 803.750	H	53.40	----	1.70	55.10	----	----	74.00	----	18.90	----
4 803.750	H	----	44.40	1.70	----	46.10	2.11	----	54.00	----	5.79
4 803.750	V	48.60	----	1.70	50.30	----	----	74.00	----	23.70	----
4 803.750	V	----	34.60	1.70	----	36.30	2.11	----	54.00	----	15.59
7 205.000	H	53.50	----	4.20	57.70	----	----	74.00	----	16.30	----
7 205.000	H	----	43.70	4.20	----	47.90	2.11	----	54.00	----	3.99
7 207.125	V	53.30	----	4.20	57.50	----	----	74.00	----	16.50	----
7 205.000	V	----	38.00	4.20	----	42.20	2.11	----	54.00	----	9.69

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

Test mode : Receiving status(Worst case)

The requirements are:
☒ Complies



Frequency [MHz]	(P)	Reading PK [dBuV]	Reading AV [dBuV]	c.f [dB(1/m)]	Level PK [dB(uV/m)]	Level AV [dB(uV/m)]	Duty Cycle Factor [dB]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin AV [dB]
The emissions 1 GHz to 18GHz were 20 dB lower than the limit.											

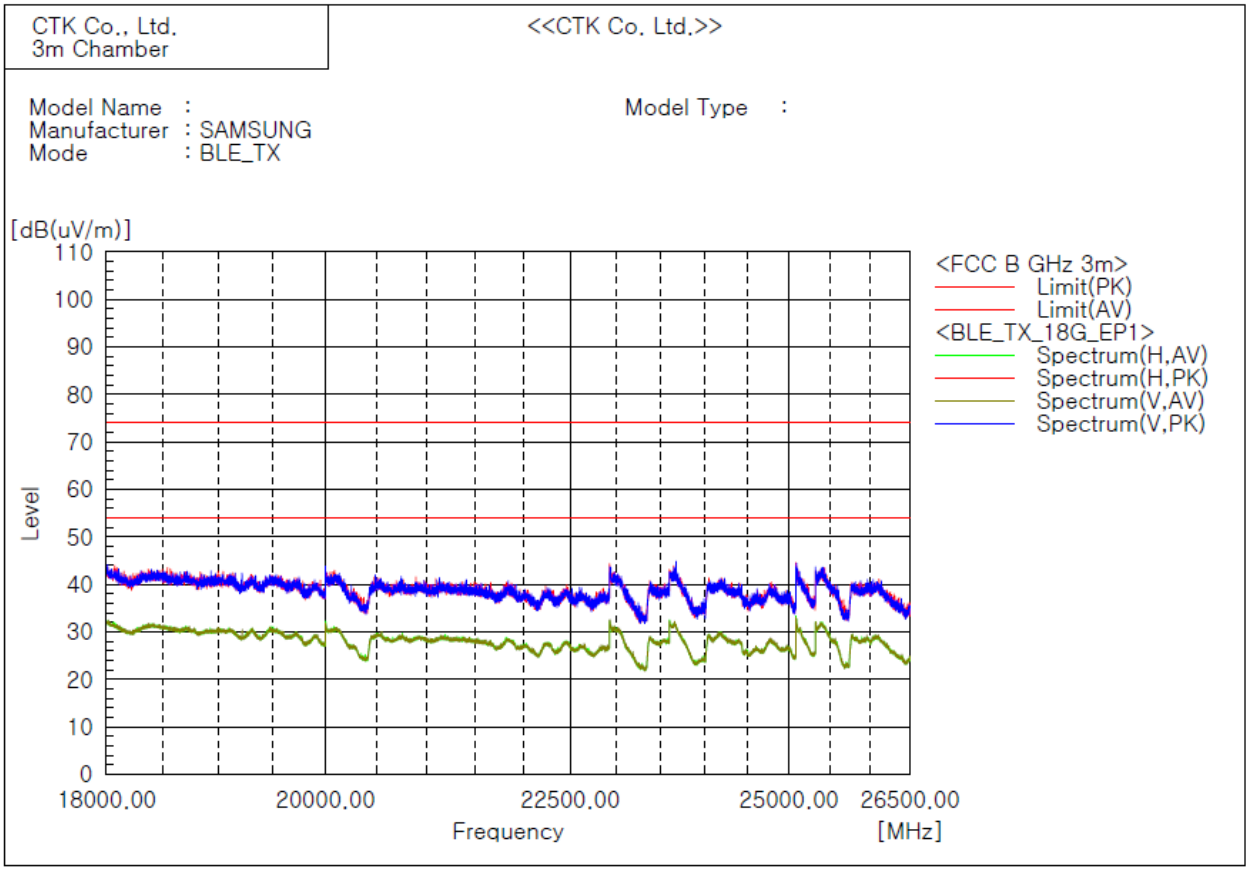
Remarks

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

4) 18 GHz to 26 GHz

Test mode : Transmission status(Worst case)

The requirements are:
☒ Complies

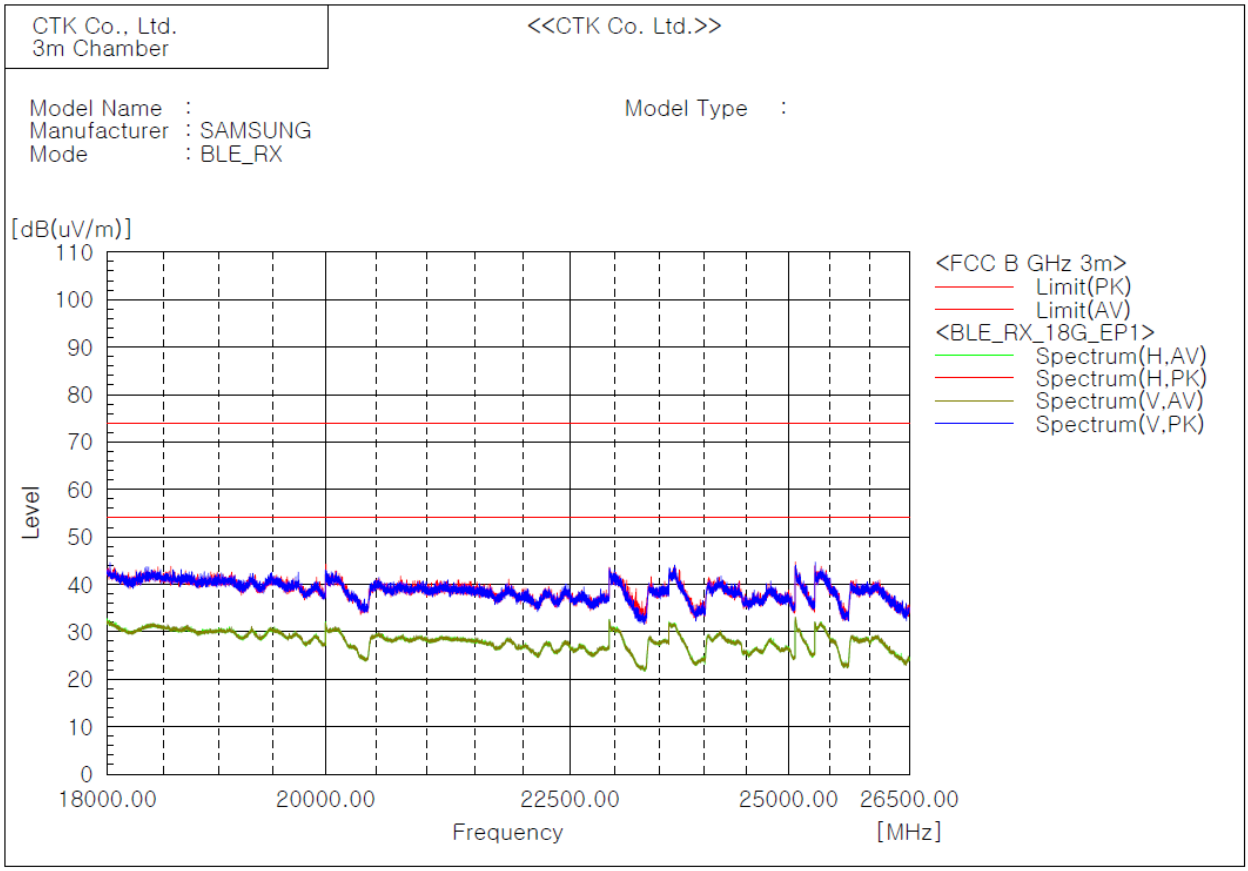


Frequency [MHz]	(P)	Reading PK [dBuV]	Reading AV [dBuV]	c.f [dB(1/m)]	Level PK [dB(uV/m)]	Level AV [dB(uV/m)]	Duty Cycle Factor [dB]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin AV [dB]
The emissions 18 GHz to 26GHz were 20 dB lower than the limit.											

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

Test mode : Receiving status(Worst case)

The requirements are:
☒ Complies

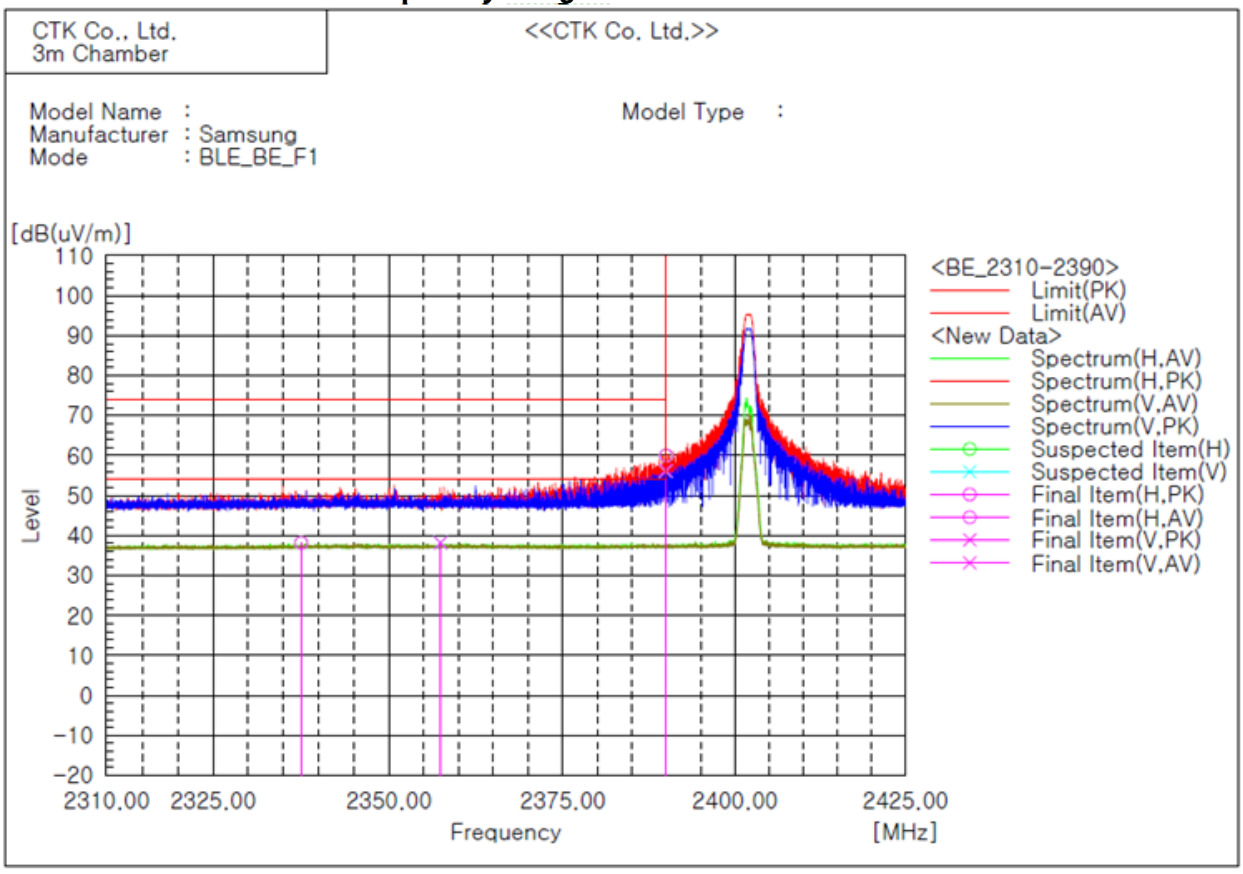


Frequency [MHz]	(P)	Reading PK [dBuV]	Reading AV [dBuV]	c.f [dB(1/m)]	Level PK [dB(uV/m)]	Level AV [dB(uV/m)]	Duty Cycle Factor [dB]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin AV [dB]
The emissions 18 GHz to 26GHz were 20 dB lower than the limit.											

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

5) Restricted Frequency Bands

Test frequency range : 2 310 MHz – 2 390 MHz

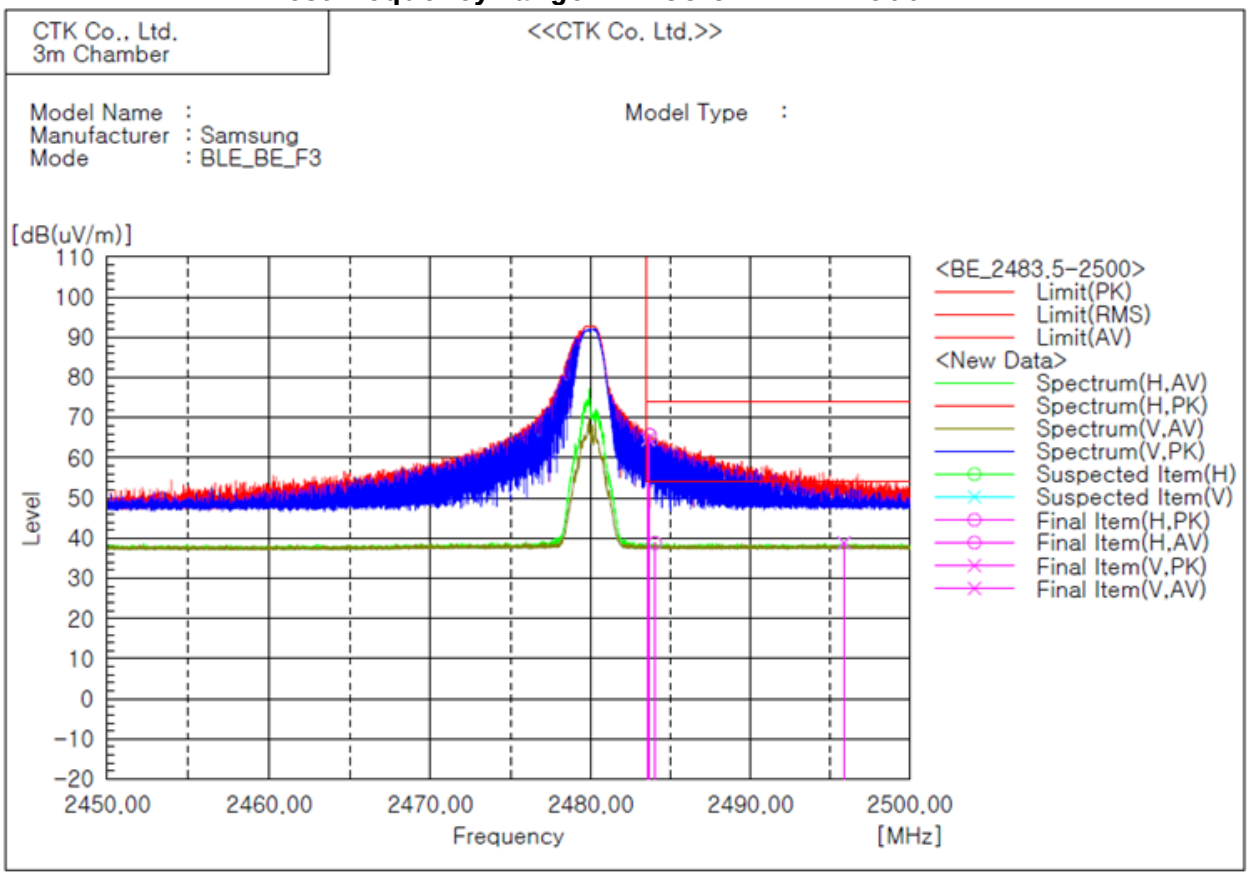


Frequency [MHz]	(P)	Reading PK [dBuV]	Reading AV [dBuV]	c.f [dB(1/m)]	Level PK [dB(uV/m)]	Level AV [dB(uV/m)]	Duty Cycle Factor [dB]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin AV [dB]
2 389.982	H	62.50	-----	-2.50	60.00	-----	-----	74.00	-----	14.00	-----
2 337.528	H	-----	40.90	-2.70	-----	38.20	2.11	-----	54.00	-----	13.69
2 389.925	V	58.70	-----	-2.50	56.20	-----	-----	74.00	-----	17.80	-----
2 357.395	V	-----	40.80	-2.60	-----	38.20	2.11	-----	54.00	-----	13.69

Remarks

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

Test frequency range : 2 483.5 MHz – 2 500 MHz



Frequency [MHz]	(P)	Reading PK [dBuV]	Reading AV [dBuV]	c.f [dB(1/m)]	Level PK [dB(uV/m)]	Level AV [dB(uV/m)]	Duty Cycle Factor [dB]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin AV [dB]
2 483.600	H	66.80	-----	-2.10	64.70	-----	-----	74.00	-----	9.30	-----
2 483.012	H	-----	40.90	-2.10	-----	38.80	2.11	-----	54.00	-----	13.09
2 484.700	V	67.80	-----	-2.10	65.70	-----	-----	74.00	-----	8.30	-----
2 495.863	V	-----	40.90	-2.10	-----	38.80	2.11	-----	54.00	-----	13.09

Remarks

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

4.6 AC Conducted Emissions

A radio apparatus that is designed to be connected to the public utility (AC) power line shall ensure that the radio frequency voltage, which is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz-30 MHz, shall not exceed the limits.

Instrument Settings

IF Band Width: 9 kHz

Test Procedures

RSS-Gen - Section 8.8

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

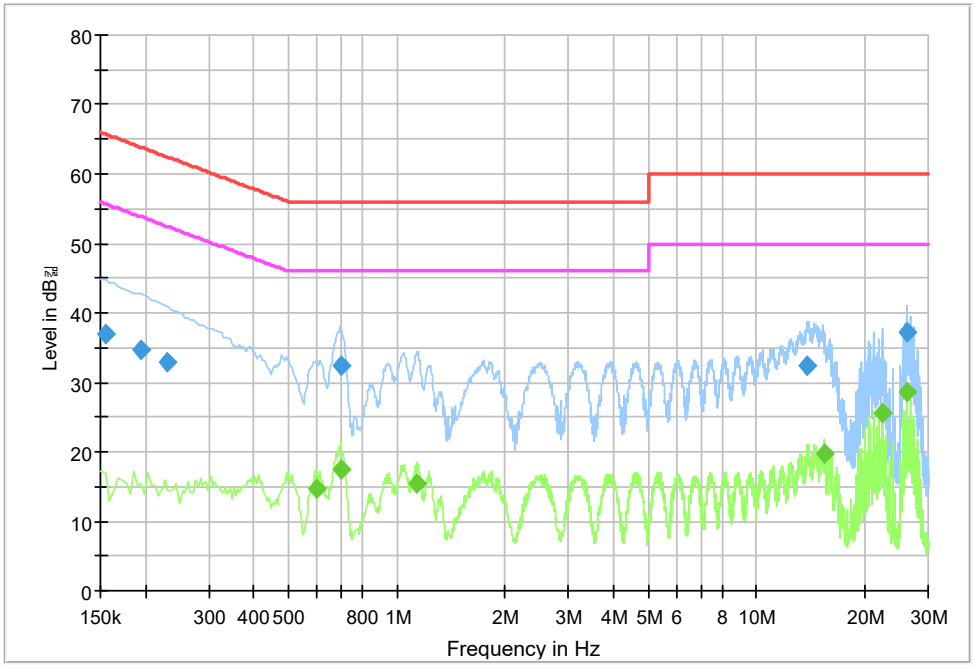
The requirements are:
☒ Complies

Test Data

Test mode : Worst case

[LINE]

(with EC)3CE_Class B_L1



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.154500	37.0	1000.0	9.000	On	L1	9.9	28.7	65.8
0.195000	34.6	1000.0	9.000	On	L1	10.0	29.2	63.8
0.231000	32.9	1000.0	9.000	On	L1	9.8	29.5	62.4
0.699000	32.3	1000.0	9.000	On	L1	10.0	23.7	56.0
13.830000	32.4	1000.0	9.000	On	L1	10.4	27.6	60.0
26.223000	37.2	1000.0	9.000	On	L1	11.1	22.8	60.0

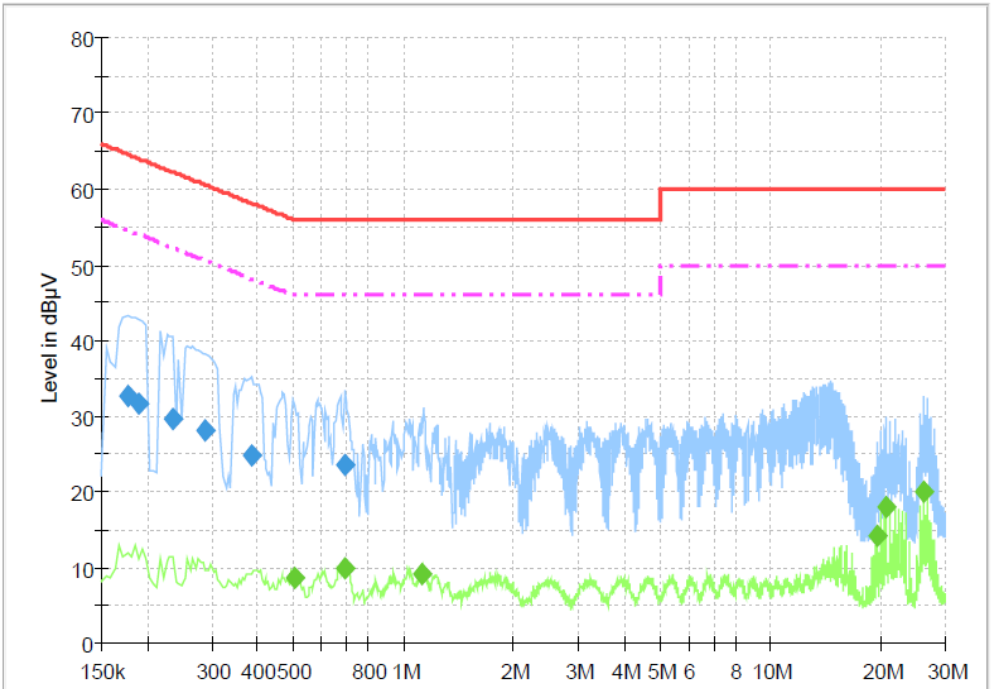
Final Result 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.600000	14.6	1000.0	9.000	On	L1	10.0	31.4	46.0
0.699000	17.4	1000.0	9.000	On	L1	10.0	28.6	46.0
1.135500	15.5	1000.0	9.000	On	L1	9.9	30.5	46.0
15.454500	19.8	1000.0	9.000	On	L1	10.5	30.2	50.0
22.461000	25.6	1000.0	9.000	On	L1	11.1	24.4	50.0
26.223000	28.6	1000.0	9.000	On	L1	11.1	21.4	50.0

Test mode : Worst case

[NEUTRAL]

(with EC)3CE_Class B_N



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.177000	32.7	1000.0	9.000	On	N	9.9	31.9	64.6
0.190500	31.5	1000.0	9.000	On	N	9.9	32.5	64.0
0.235500	29.7	1000.0	9.000	On	N	9.8	32.5	62.3
0.289500	28.0	1000.0	9.000	On	N	9.9	32.5	60.5
0.384000	24.8	1000.0	9.000	On	N	10.1	33.3	58.2
0.694500	23.4	1000.0	9.000	On	N	10.0	32.6	56.0

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.505500	8.6	1000.0	9.000	On	N	10.1	37.4	46.0
0.694500	9.8	1000.0	9.000	On	N	10.0	36.2	46.0
1.122000	9.0	1000.0	9.000	On	N	9.9	37.0	46.0
19.554000	14.1	1000.0	9.000	On	N	10.8	35.9	50.0
20.751000	17.9	1000.0	9.000	On	N	10.8	32.1	50.0
26.223000	20.0	1000.0	9.000	On	N	11.1	30.0	50.0

APPENDIX A – Test Equipment Used For Tests

	Name of Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	Signal Analyzer	Agilent	N9020A	MY50200512	2021-04-07	2022-04-07
2	Signal Generator	Rohde & Schwarz	SMB100A	175528	2021-04-12	2022-04-12
3	EMI Test Receiver	Rohde & Schwarz	ESCI7	100814	2021-10-20	2022-10-20
4	Bilog Antenna	SCHAFFNER	CBL6111C	2551	2021-03-22	2023-03-22
5	Active Loop Antenna	SCHWARZBECK	FMZB 1513	1513-126	2020-05-20	2022-05-20
6	6dB Attenuator	BIRD	5W 6dB	1744	2020-12-16	2021-12-16
7	6dB Attenuator	Rohde & Schwarz	DNF	272.4110.50-2	2021-10-22	2022-10-22
8	AMPLIFIER	SONOMA	310	291721	2020-01-22	2022-01-22
9	EMI Test Receiver	Rohde & Schwarz	ESU40	100336	2021-01-12	2022-01-12
10	Preamplifier	Agilent	8449B	3008A02011	2020-11-30	2021-11-30
11	Double Ridged Guide Antenna	ETS-Lindgren	3117	00154525	2020-10-21	2022-10-21
12	Horn Antenna	SCHWARZBECK	BBHA9170	00967	2021-05-25	2022-05-25
13	Band Reject Filter	Micro Tronics	BRM50702	G444	2021-10-08	2022-10-08
15	Low Noise Amplifier	TESTEK	TK-PA1840H	200115-L	2021-05-21	2022-05-21
16	LISN	Rohde & Schwarz	ENV216	101236	2021-10-20	2022-10-20
17	EMI Test Receiver	Rohde & Schwarz	ESCI3	100032	2022-01-15	2022-01-15

	Cable	Manufacturer	Model No.	Serial No.	Check Date
1	RF Cable	Canare Corporation	L-5D2W	N/A	2021-01-12
2	RF Cable	Junkosha Inc.	MWX221	2005S321	2021-11-02
3	RF Cable	HUBER+SUHNER	SUCOFLEX 102	MY073/2	2021-06-01
4	RF Cable	HUBER+SUHNER	SUCOFLEX 102	MY4728/2	2021-06-01
5	RF Cable	HUBER+SUHNER	SUCOFLEX 104	MY27558/4	2021-06-01
6	RF Cable	HUBER+SUHNER	SUCOFLEX 104	N/A	2021-06-01
7	RF Cable	HUBER+SUHNER	SUCOFLEX 104	MY27573/4	2021-06-01
8	RF Cable	HUBER+SUHNER	SUCOFLEX 106	N/A	2021-06-01