TEST REPORT

Eurofins KCTL Co.,Ltd. 65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea TEL: 82-31-285-0894 FAX: 82-505-299-8311 www.kctl.co.kr	Report No.: KR23-SRF0073 Page (1) of (32)	eurofins | KCTL

1. Client

- Name : SUPREMA INC
- Address : 17F-5, Parkview officetower,, 248, Jeongjail-ro, Bundang-gu, Seongnam-si, Gyeonggi-do 13554 Korea (Republic Of)
- Date of Receipt : 2022-11-22

2. Use of Report : FCC Class II permissive change

3. Name of Product / Model : FaceStation F2 / FSF2-ODB

4. Manufacturer / Country of Origin : SUPREMA INC / Korea

5. FCC ID : TKWFSF2-ODB

6. IC Certificate No. : 23080-FSF2ODB

7. Date of Test : 2023-01-27 to 2023-02-17

8. Location of Test : ■ Permanent Testing Lab ☐ On Site Testing
(Address:65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea)

9. Test method used : FCC Part 15 Subpart C, 15.247
RSS-247 Issue 2 February 2017
RSS-Gen Issue 5 February 2021

10. Test Result : Refer to the test result in the test report

	Tested by	Technical Manager
Affirmation	Name : Eunseong Lim (Signature)	Name : Heesu Ahn (Signature)

2023-03-06

Eurofins KCTL Co.,Ltd.

REPORT REVISION HISTORY

Date	Revision	Page No
2023-03-06	Originally issued	-

General remarks for test reports

Statement concerning the uncertainty of the measurement systems used for the tests

(may be required by the product standard or client)

☐ **Internal procedure used for type testing through which traceability of the measuring uncertainty has been established:**

Procedure number, issue date and title:

Calculations leading to the reported values are on file with the testing laboratory that conducted the testing.

☒ **Statement not required by the standard or client used for type testing**

CONTENTS

1. General information

Client	:	SUPREMA INC
Address	:	17F-5, Parkview officetower,, 248, Jeongjail-ro, Bundang-gu, Seongnam-si, Gyeonggi-do 13554 Korea (Republic Of)
Manufacturer	:	SUPREMA INC
Address	:	17F-5, Parkview officetower,, 248, Jeongjail-ro, Bundang-gu, Seongnam-si, Gyeonggi-do 13554 Korea (Republic Of)
Laboratory	:	Eurofins KCTL Co.,Ltd.
Address	:	65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea
Accreditations	:	FCC Site Designation No: KR0040, FCC Site Registration No: 687132
		VCCI Registration No. : R-20080, G-20078, C-20059, T-20056
		CAB Identifier: KR0040, ISED Number: 8035A
		KOLAS No.: KT231

2. Device information

Equipment under test	:	FaceStation F2
Model	:	FSF2-ODB
Derivative Model	:	FSF2-ODBT10
Frequency range	:	13.56 ㎒ (NFC)
		125 ㎑ (RFID)
		2 402 ㎒ ~ 2 480 ㎒ (Bluetooth Low Energy)
Modulation technique	:	ASK (NFC,RFID), GFSK (Bluetooth Low Energy)
Number of channels	:	40 ch (Bluetooth Low Energy), 1 ch (NFC, RFID)
Power source	:	DC 12 Ⅴ, DC 24 Ⅴ
Antenna specification	:	PCB Loop antenna (NFC)
		Coil antenna (RFID)
		PCB Pattern antenna (Bluetooth Low Energy)
Antenna gain	:	5.02 ㏈i (Bluetooth Low Energy)
Software version	:	V2.0.0
Hardware version	:	V2.1.1
Operation temperature	:	-20 ℃ ~ 50 ℃
Test device serial No.	:	Conducted : 547835978
		Radiated : 547835870

2.1. Information about derivative model

The difference between basic model and derivative models is:

- Radio Hardware such as circuits and electrical components and Software are the same.

Components	Basic model	Derivative model
LED board	FSF2_WHITE-LED_PS1	**FSF2_WHITE-LED_V02**
IR LED board	FSF2_IR LED_PS1	**FSF2_IR LED_V01**
Main board	FSF2_MAIN_PS1	**FSF2_MAIN_V04**
RF board	FSF2_ODB-RFBD_DB_PS1	**FSF2-ODB-RFBD-V01**
USB board	FSF2_ODB_USB_PS1	**FSF2_ODB_USB_V01**
Camera 1 module	SV-SUE1-ET020S	SV-SUE1-ET020S
Camera 2 module	SV-SUE1L-ET020S	SV-SUE1L-ET020S
Finger print module	SFMSLIM-MAIN_02A	SFMSLIM-MAIN_V02A

2.2. Frequency/channel operations

This device contains the following capabilities:

NFC, RFID(125 ㎑), Bluetooth Low Energy

Ch.	Frequency (㎒)
00	2 402
.	.
.	.
19	2 440
.	.
.	.
39	2 480

Table 2.2.1. Bluetooth Low Energy

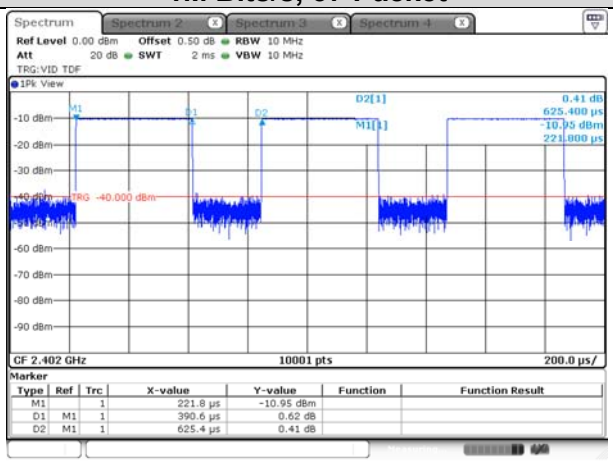
2.3. Duty Cycle Factor

Test mode	Period (㎳)	On time (㎳)	Duty cycle		Duty Cycle Factor (㏈)
			(Linear)	(%)	
1M Bits/s, 37 Packet	0.625	0.391	0.624 6	62.46	2.04

Notes.

1. Duty cycle (Linear) = Ton time / Period
2. DCF(Duty cycle factor) = 10log(1/duty cycle)

1M Bits/s, 37 Packet



2.4. RF power setting in TEST SW

Test condition	Test Program	Frequency (㎒)	Power Setting
Bluetooth Low Energy_1M	nRFConnect for Desktop v3.12.0	2 402	-16
		2 440	
		2 480	

3. Antenna requirement

Requirement of FCC part section 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.

Requirement of RSS-Gen Section 6.8:

The applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna. The test report shall demonstrate the compliance of the transmitter with the limit for maximum equivalent isotropically radiated power (e.i.r.p.) specified in the applicable RSS, when the transmitter is equipped with any antenna type, selected from this list.

For expediting the testing, measurements may be performed using only the antenna with highest gain of each combination of transmitter and antenna type, with the transmitter output power set at the maximum level. However, the transmitter shall comply with the applicable requirements under all operational conditions and when in combination with any type of antenna from the list provided in the test report (and in the notice to be included in the user manual, provided below).

When measurements at the antenna port are used to determine the RF output power, the effective gain of the device's antenna shall be stated, based on a measurement or on data from the antenna's manufacturer.

The test report shall state the RF power, output power setting and spurious emission measurements with each antenna type that is used with the transmitter being tested.

Immediately following the above notice, the manufacturer shall provide a list of all antenna types which can be used with the transmitter, indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna type.

- The transmitter has permanently attached PCB Pattern antenna (internal antenna) on board.
- The E.U.T Complies with the requirement of §15.203, §15.247.

4. Summary of tests

FCC Part section(s)	IC Rule Reference	Parameter	Test mode	Test results
15.247(b)(3)	RSS-247 (5.4)(d)	Maximum Peak Output Power	Conducted	N/T[1)]
15.247(e)	RSS-247 (5.2)(b)	Peak Power Spectral Density		N/T[1)]
15.247(a)(2)	RSS-247 (5.2)(a)	6dB Channel Bandwidth		N/T[1)]
-	RSS-Gen (6.7)	Occupied Bandwidth		N/T[1)]
15.207(a)	RSS-Gen (8.8)	AC Conducted Emissions		N/A[2)]
15.247(d), 15.205(a), 15.209(a)	RSS-Gen (8.9), (8.10) RSS-247(5.5)	Spurious emission	Radiated	Pass
		Band-edge, restricted band		Pass

Notes: (N/T: Not Tested, N/A: Not Applicable)

1. This is a FCC Class II Permissive Change report.
   These test items were performed. (FCC ID: TKWFSF2-ODB,
   Test Report No. KR20-SRF0239-A issued on 14, October, 2020 by KCTL Inc.
   Test Report No. KR21-SRF0001-A issued on 28, January, 2021 by KCTL Inc.)
2. This test is not applicable because the EUT only connects DC power line.
3. All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.
4. According to exploratory test no any obvious emission were detected from 9 ㎑ to 30 ㎒. Although these tests were performed other than open field site, adequate comparison measurements were confirmed against 30 m open field site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 414788.
5. The fundamental of the EUT was investigated in three orthogonal orientations X, Y and Z. It was determined that **Y** orientation was worst-case orientation. Therefore, all final radiated testing was performed with the EUT in **Y** orientation
6. The worst-case data rate were: Packet length 37 Bytes
7. The test procedure(s) in this report were performed in accordance as following.
   - ANSI C63.10-2013
   - KDB 558074 D01 v05r02

5. Measurement uncertainty

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2013.

All measurement uncertainty values are shown with a coverage factor of k=2 to indicated a 95 % level of confidence. The measurement data shown herein meets of exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and thus, can be compared directly to specified limits to determine compliance.

Parameter	Expanded uncertainty (±)	
Radiated spurious emissions	9 ㎑ ~ 30 ㎒	2.3 ㏈
	30 ㎒ ~ 1 000 ㎒	2.5 ㏈
	1 000 ㎒ ~ 18 000 ㎒	4.7 ㏈
	Above 18 000 ㎒	4.8 ㏈
Conducted Emissions	9 ㎑ ~ 150 ㎑	0.9 ㏈
	150 ㎑ ~ 30 ㎒	1.3 ㏈

6. Measurement results explanation example

Frequency (㎒)	Factor(㏈)	Frequency (㎒)	Factor(㏈)
30	10.11	9 000	12.26
50	10.12	10 000	12.39
100	10.12	11 000	12.58
200	10.24	12 000	12.64
300	10.22	13 000	12.79
400	10.31	14 000	12.58
500	10.46	15 000	12.63
600	10.48	16 000	12.54
700	10.51	17 000	12.68
800	10.52	18 000	12.73
900	10.61	19 000	13.15
1 000	10.62	20 000	13.15
2 000	10.75	21 000	13.16
3 000	11.14	22 000	13.21
4 000	11.31	23 000	13.81
5 000	11.55	24 000	14.11
6 000	11.56	25 000	13.86
7 000	12.16	26 000	13.94
8 000	12.43	26 500	14.11

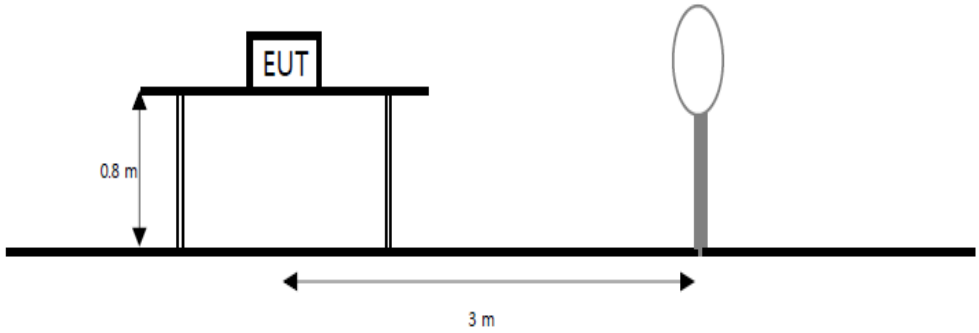
Note : Offset(㏈) = RF cable loss(㏈) + Attenuator(㏈)

7. Test results

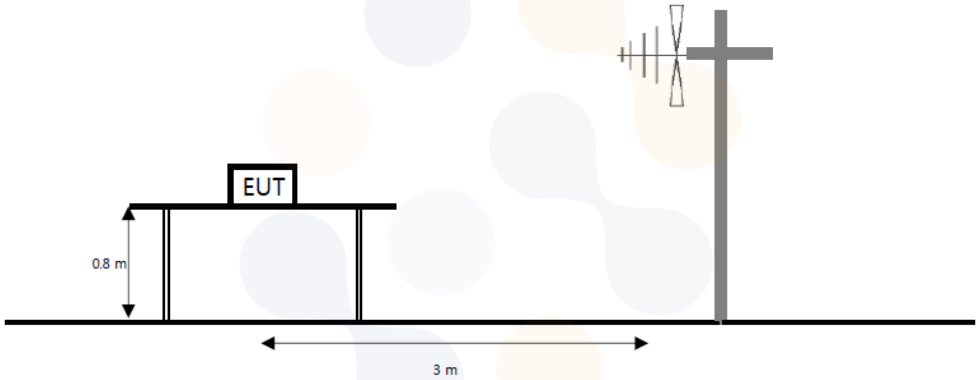
7.1. Spurious Emission, Band Edge and Restricted bands

Test setup

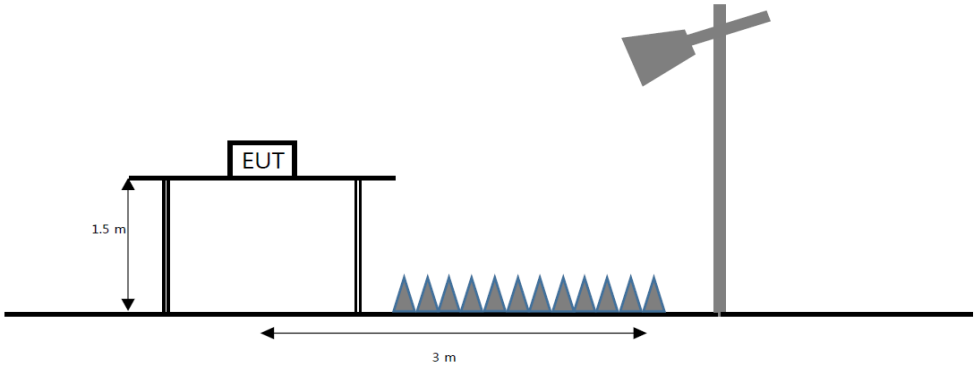
The diagram below shows the test setup that is utilized to make the measurements for emission from 9 ㎑ to 30 ㎒ Emissions



The diagram below shows the test setup that is utilized to make the measurements for emission from 30 ㎒ to 1 ㎓ emissions.



The diagram below shows the test setup that is utilized to make the measurements for emission from 1 ㎓ to the tenth harmonic of the highest fundamental frequency or to 40 ㎓ emissions, whichever is lower.



Limit

FCC

According to section 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 (㎒)	Field strength (㎶/m)	Measurement distance (m)
0.009 - 0.490	2 400/F(㎑)	300
0.490 - 1.705	24 000/F(㎑)	30
1.705 - 30	30	30
30 - 88	100**	3
88 - 216	150**	3
216 - 960	200**	3
Above 960	500	3

**Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54–72 ㎒, 76–88 ㎒, 174–216 ㎒ or 470–806 ㎒. However, operation within these frequency bands is permitted under other sections of this part, e.g., Section15.231 and 15.241.

According to section 15.205(a) and (b), only spurious emissions are permitted in any of the frequency bands listed below:

㎒	㎒	㎒	㎓
0.009 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
0.495 - 0.505	16.694 75 - 16.695 25	608 - 614	5.35 - 5.46
2.173 5 - 2.190 5	16.804 25 - 16.804 75	960 – 1 240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1 300 – 1 427	8.025 - 8.5
4.177 25 - 4.177 75	37.5 - 38.25	1 435 – 1 626.5	9.0 - 9.2
4.207 25 - 4.207 75	73 - 74.6	1 645.5 – 1 646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1 660 – 1 710	10.6 - 12.7
6.267 75 - 6.268 25	108 - 121.94	1 718.8 – 1 722.2	13.25 - 13.4
6.311 75 - 6.312 25	123 - 138	2 200 – 2 300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2 310 – 2 390	15.35 - 16.2
8.362 - 8.366	156.524 75 - 156.525 25	2 483.5 – 2 500	17.7 - 21.4
8.376 25 - 8.386 75		2 690 – 2 900	22.01 - 23.12
8.414 25 - 8.414 75	156.7 - 156.9	3 260 – 3 267	23.6 - 24.0
12.29 - 12.293	162.012 5 - 167.17	3 332 – 3 339	31.2 - 31.8
12.519 75 - 12.520 25	167.72 - 173.2	3 345.8 – 3 358	36.43 - 36.5
12.576 75 - 12.577 25	240 - 285	3 600 – 4 400	Above 38.6
13.36 - 13.41	322 - 335.4		

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 1 000 ㎒, compliance with the limits in section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1 000 ㎒, 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.

IC

According to RSS-247(5.5), In any 100 ㎑ 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 ㏈ below that in the 100 ㎑ 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(d), the attenuation required shall be 30 ㏈ instead of 20 ㏈. Attenuation below the general field strength limits specified in RSS-Gen is not required.

According to RSS-Gen(8.9), Except where otherwise indicated in the applicable RSS, radiated emissions shall comply with the field strength limits shown in table 5 and table 6. Additionally, the level of any transmitter unwanted emission shall not exceed the level of the transmitter's fundamental emission.

Table 5- General field strength limits at frequencies above 30 ㎒

Frequency(㎒)	Field strength (㎶/m at 3 m)
30 to 88	100
88 to 216	150
216 to 960	200
Above 960	500

Table 6- General field strength limits at frequencies below 30 ㎒

Frequency	Magnetic field strength (H-Field) (㎂/m)	Measurement distance(m)
9 – 490 ㎑ 1)	6.37/F (F in ㎑)	300
490 – 1 705 ㎑	63.7/F (F in ㎑)	30
1.705 - 30 ㎒	0.08	30

Note 1: The emission limits for the ranges 9-90 ㎑ and 110-490 ㎑ are based on measurements employing a linear average detector.

According to RSS-Gen(8.10), Restricted frequency bands, identified in table 7, are designated primarily for safety-of-life services (distress calling and certain aeronautical activities), certain satellite downlinks, radio astronomy and some government uses. Except where otherwise indicated, the following conditions related to the restricted frequency bands apply:

(a) The transmit frequency, including fundamental components of modulation, of licence-exempt radio apparatus shall not fall within the restricted frequency bands listed in table 7 except for apparatus compliant with RSS-287, Emergency Position Indicating Radio Beacons (EPIRB), Emergency Locator Transmitters (ELT), Personal Locator Beacons (PLB), and Maritime Survivor Locator Devices (MSLD).
(b) Unwanted emissions that fall into restricted frequency bands listed in table 7 shall comply with the limits specified in table 5 and table 6.
(c) Unwanted emissions that do not fall within the restricted frequency bands listed in table 7 shall comply either with the limits specified in the applicable RSS or with those specified in table 5 and table 6.

Table 7- Restricted frequency bands*

MHz	MHz	GHz
0.090 - 0.110	149.9 - 150.05	9.0 - 9.2
0.495 - 0.505	156.52475 - 156.52525	9.3 - 9.5
2.1735 - 2.1905	156.7 - 156.9	10.6 - 12.7
3.020 - 3.026	162.0125 - 167.17	13.25 - 13.4
4.125 - 4.128	167.72 - 173.2	14.47 - 14.5
4.17725 - 4.17775	240 - 285	15.35 - 16.2
4.20725 - 4.20775	322 - 335.4	17.7 - 21.4
5.677 - 5.683	399.9 - 410	22.01 - 23.12
6.215 - 6.218	608 - 614	23.6 - 24.0
6.26775 - 6.26825	960 - 1427	31.2 - 31.8
6.31175 - 6.31225	1435 - 1626.5	36.43 - 36.5
8.291 - 8.294	1645.5 - 1646.5	Above 38.6
8.362 - 8.366	1660 - 1710	
8.37625 - 8.38675	1718.8 - 1722.2	
8.41425 - 8.41475	2200 - 2300	
12.29 - 12.293	2310 - 2390	
12.51975 - 12.52025	2483.5 - 2500	
12.57675 - 12.57725	2655 - 2900	
13.36 - 13.41	3260 - 3267	
16.42 - 16.423	3332 - 3339	
16.69475 - 16.69525	3345.8 - 3358	
16.80425 - 16.80475	3500 - 4400	
25.5 - 25.67	4500 - 5150	
37.5 - 38.25	5350 - 5460	
73 - 74.6	7250 - 7750	
74.8 - 75.2	8025 - 8500	
108 - 138	--	

* Certain frequency bands listed in table 7 and in bands above 38.6 GHz are designated for licence-exempt applications. These frequency bands and the requirements that apply to related devices are set out in the 200 and 300 series of RSSs.

Test procedure
ANSI C63.10-2013

Test settings
Peak field strength measurements

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = as specified in table
3. VBW ≥ (3×RBW)
4. Detector = peak
5. Sweep time = auto
6. Trace mode = max hold
7. Allow sweeps to continue until the trace stabilizes

Table. RBW as a function of frequency

Frequency	RBW
9 ㎑ to 150 ㎑	200 ㎐ to 300 ㎐
0.15 ㎒ to 30 ㎒	9 ㎑ to 10 ㎑
30 ㎒ to 1 000 ㎒	100 ㎑ to 120 ㎑
> 1 000 ㎒	1 ㎒

Average field strength measurements

Trace averaging with continuous EUT transmission at full power

If the EUT can be configured or modified to transmit continuously (D ≥ 98%), then the average emission levels shall be measured using the following method (with EUT transmitting continuously):

1. RBW = 1 ㎒ (unless otherwise specified).
2. VBW ≥ (3×RBW).
3. Detector = RMS (power averaging), if [span / (# of points in sweep)] ≤ (RBW / 2). Satisfying this condition may require increasing the number of points in the sweep or reducing the span. If this condition cannot be satisfied, then the detector mode shall be set to peak.
4. Averaging type = power (i.e., rms):
   1) As an alternative, the detector and averaging type may be set for linear voltage averaging.
   2) Some instruments require linear display mode to use linear voltage averaging. Log or ㏈ averaging shall not be used.
5. Sweep time = auto.
6. Perform a trace average of at least 100 traces.

Trace averaging across ON and OFF times of the EUT transmissions followed by duty cycle correction

If continuous transmission of the EUT (D ≥ 98%) cannot be achieved and the duty cycle is constant (duty cycle variations are less than ±2%), then the following procedure shall be used:

1. The EUT shall be configured to operate at the maximum achievable duty cycle.
2. Measure the duty cycle D of the transmitter output signal as described in 11.6.
3. RBW = 1 ㎒ (unless otherwise specified).
4. VBW ≥ [3 × RBW].
5. Detector = RMS (power averaging), if [span / (# of points in sweep)] ≤ (RBW / 2). Satisfying this condition may require increasing the number of points in the sweep or reducing the span. If this condition cannot be satisfied, then the detector mode shall be set to peak.
6. Averaging type = power (i.e., rms):

1) As an alternative, the detector and averaging type may be set for linear voltage averaging.
2) Some instruments require linear display mode to use linear voltage averaging. Log or dB averaging shall not be used.

7. Sweep time = auto.
8. Perform a trace average of at least 100 traces.
9. A correction factor shall be added to the measurement results prior to comparing with the emission limit to compute the emission level that would have been measured had the test been performed at 100% duty cycle. The correction factor is computed as follows:
   1) If power averaging (rms) mode was used in step f), then the applicable correction factor is [10 log (1 / D)], where D is the duty cycle.
   2) If linear voltage averaging mode was used in step f), then the applicable correction factor is [20 log (1 / D)], where D is the duty cycle.
   3) If a specific emission is demonstrated to be continuous (D ≥ 98%) rather than turning ON and OFF with with the transmit cycle, then no duty cycle correction is required for that emission.

Notes:

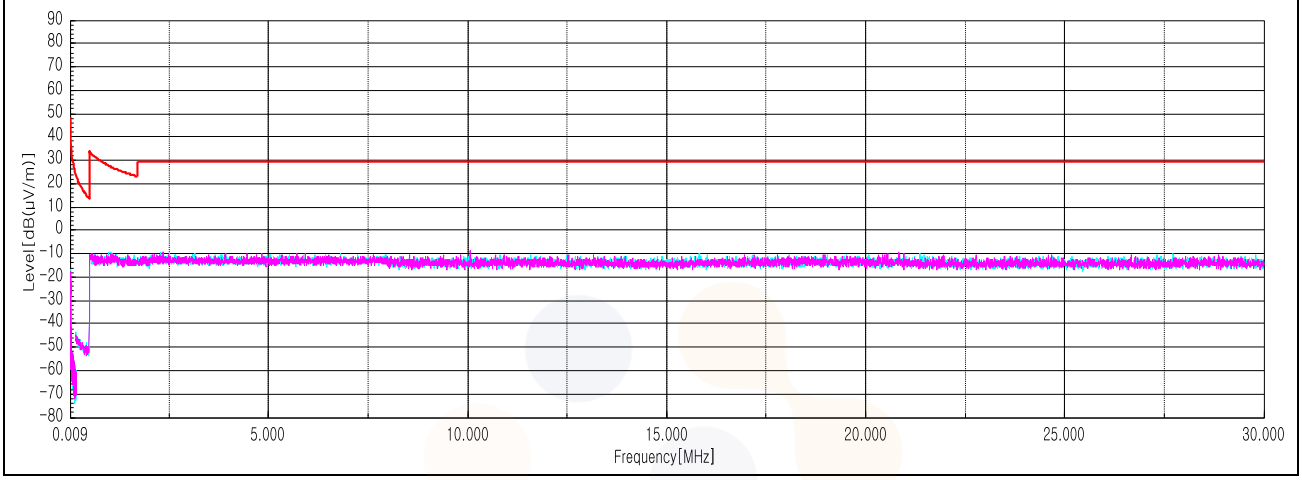
1. *f* <30 ㎒, extrapolation factor of 40 dB/decade of distance. $F_d = 40\log(D_m/D_s)$
   f ≥30 ㎒, extrapolation factor of 20 dB/decade of distance. $F_d = 20\log(D_m/D_s)$
   Where:
   F_d= Distance factor in dB
   D_m= Measurement distance in meters
   D_s= Specification distance in meters
2. Factors(dB) = Antenna factor(dB/m) + Cable loss(dB) + or Amp. gain(dB) - or F_d(dB)
3. Average test would be performed if the peak result were greater than the average limit.
4. 1) means restricted band.
5. The worst-case emissions are reported however emissions whose levels were not within 20 dB of respective limits were not reported.
6. The limits in CFR 47, Part 15, Subpart C, paragraph 15.209 (a), are identical to those in RSS-GEN Section 8.9, Table 6, since the measurements are performed in terms of magnetic field strength and converted to electric field strength levels (as reported in the table) using the free space impedance of 377Ω. For example, the measurement frequency X ㎑ resulted in a level of Y dBμV/m, which is equivalent to Y-51.5 = Z dBμA/m, which has the same margin, W dB, to the corresponding RSS-GEN Table 6 limit as it has to the 15.209(a) limit.

[DC 12 V]

Test results (Below 30 ㎒) –Worst case: 1 MBits/s(37 Bytes)_2 402 ㎒

Frequency	Pol.	Reading	Antenna Factor	Amp. + Cable	Distance Factor	DCF	Result	Limit	Margin
[㎒]	[V/H]	[dB(μV)]	[dB]	[dB]	[dB]	[dB]	[dB(μV/m)]	[dB(μV/m)]	[dB]
No spurious emissions were detected within 20 dB of the limit									

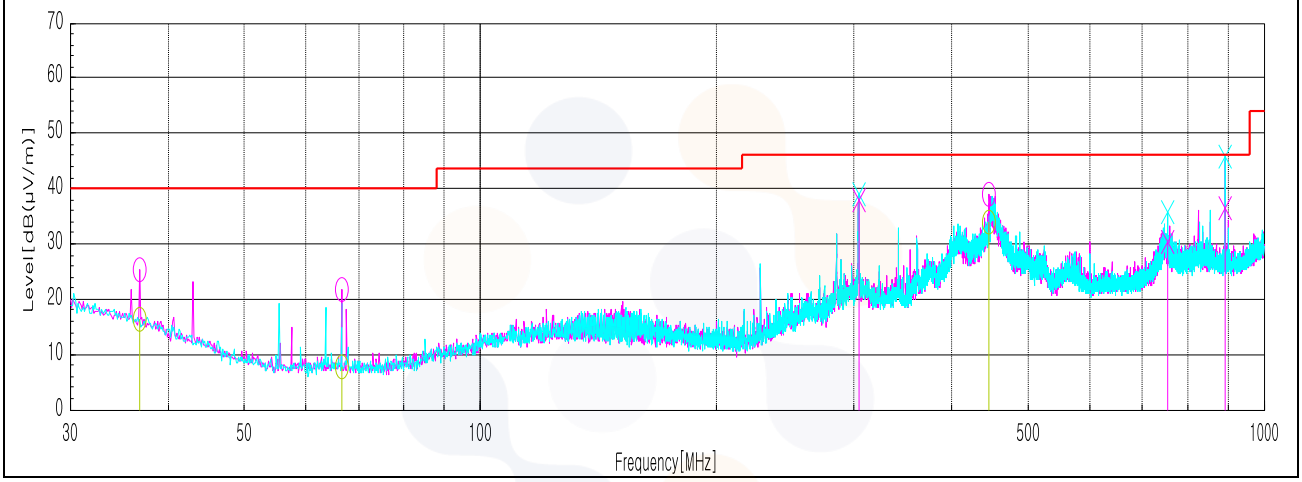
Horizontal/Vertical



Test results (Below 1 000 ㎒) –Worst case: 1 MBits/s(37 Bytes)_2 402 ㎒

Frequency	Pol.	Reading	Antenna Factor	Amp. + Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
36.79	H	25.50	21.08	-30.12	-	16.46	40.00	23.54
66.62	H	24.80	12.16	-29.14	-	7.82	40.00	32.18
304.03	V	44.90	19.18	-26.05	-	38.03	46.00	7.97
446.49	H	36.00	22.70	-24.56	-	34.14	46.00	11.86
754.59	V	26.40	25.60	-21.70	-	30.30	46.00	15.70
891.12	V	30.20	26.52	-20.30	-	36.42	46.00	9.58

Horizontal/Vertical

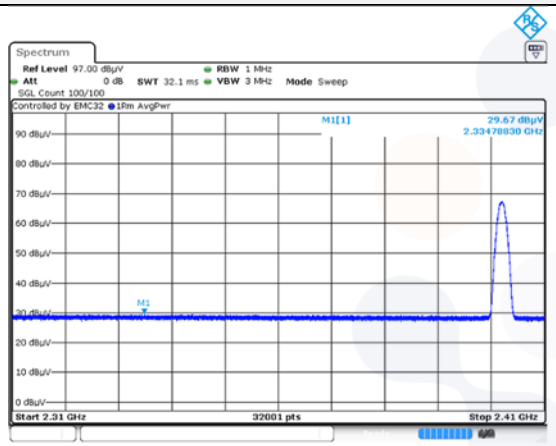


Test results (Above 1 000 ㎒)_1 MBits/s(37 Bytes)

2 402 ㎒

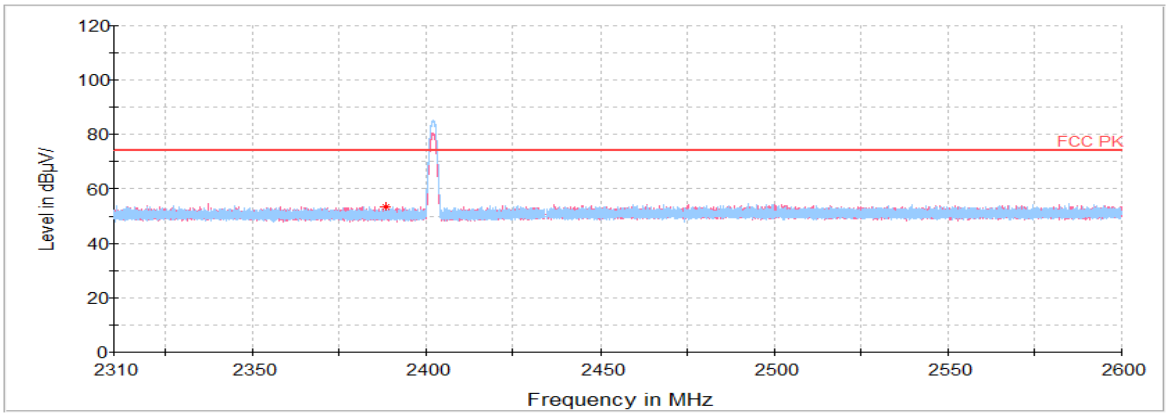
Frequency	Pol.	Reading	Antenna Factor	Amp. + Cable	DCF	Result	Limit	Margin
[㎒]	[V/H]	[dB(μV)]	[dB]	[dB]	[dB]	[dB(μV/m)]	[dB(μV/m)]	[dB]
Peak data								
2 334.79[1)]	H	39.91	32.04	-18.16	-	53.79	74.00	20.21
3 600.14[1)]	H	70.27	33.12	-56.66	-	46.73	74.00	27.27
4 855.30[1)]	H	65.54	33.70	-55.11	-	44.13	74.00	29.87
7 203.39	V	62.27	35.14	-51.55	-	45.86	74.00	28.14
Average Data								
2 334.79[1)]	H	29.67	32.04	-18.16	2.04	45.59	54.00	8.41

Average Data

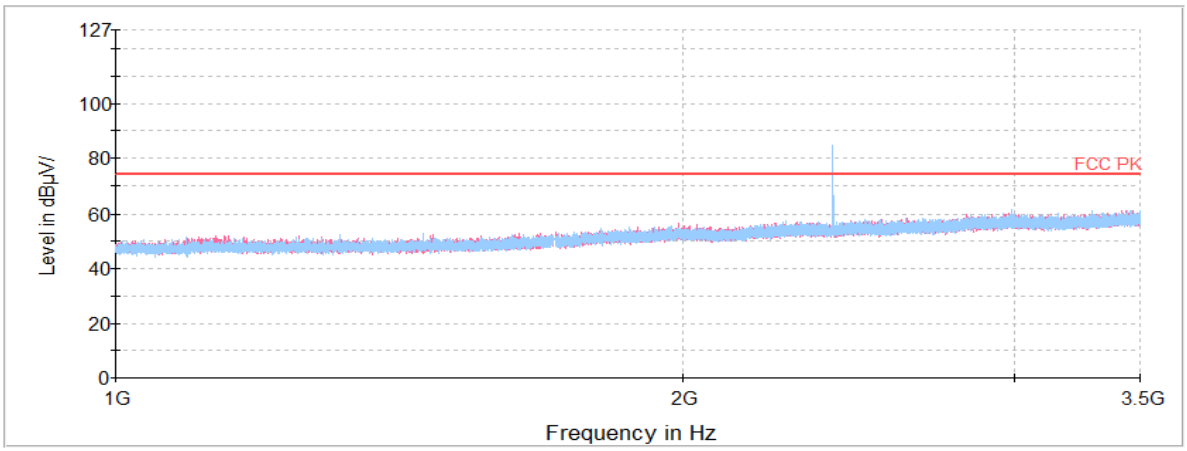


Blank

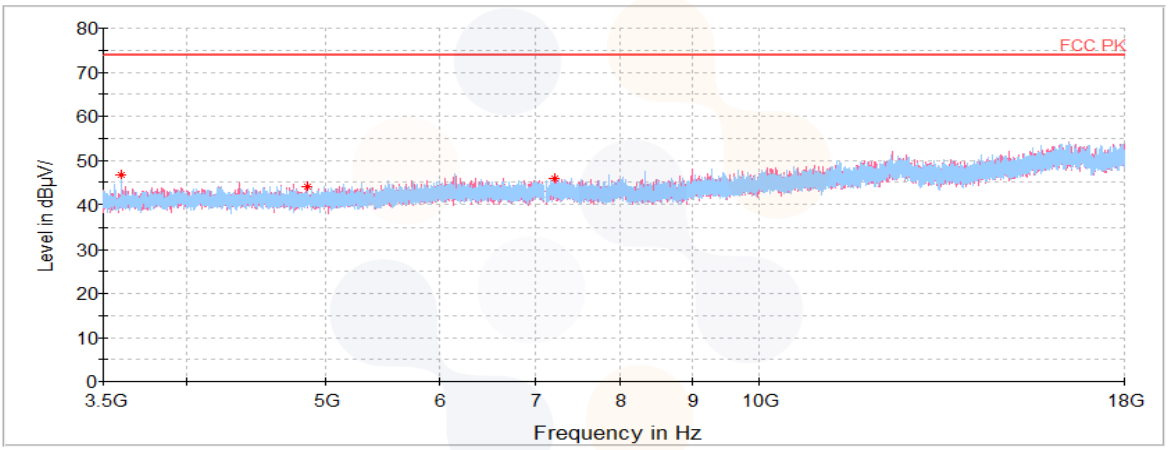
Horizontal/Vertical for Band-edge



Horizontal/Vertical for 1 ㎓ ~ 3.5 ㎓



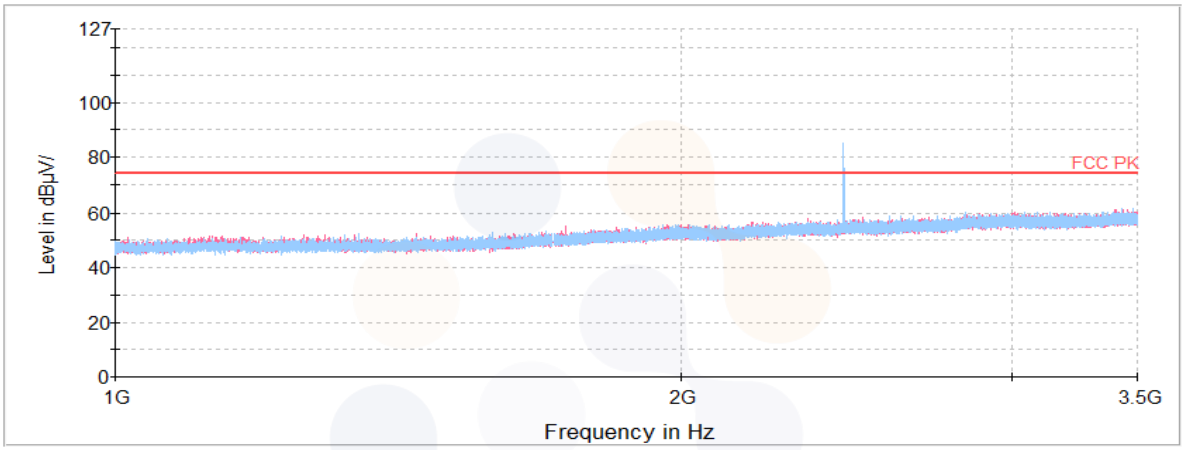
Horizontal/Vertical for 3.5 ㎓ ~ 18 ㎓



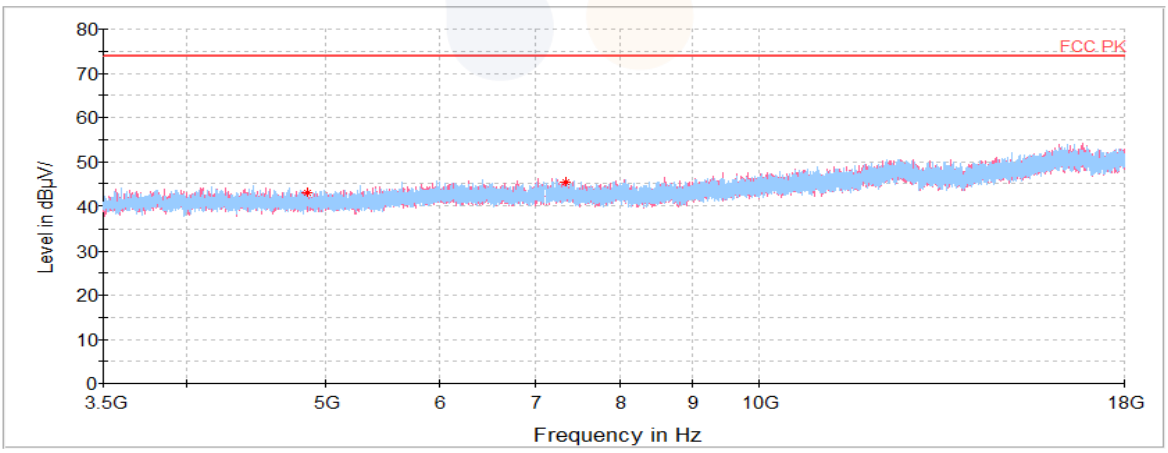
2 440 ㎒

Frequency	Pol.	Reading	Antenna Factor	Amp. + Cable	DCF	Result	Limit	Margin
[㎒]	[V/H]	[dB(㎶)]	[dB]	[dB]	[dB]	[dB(㎶/m)]	[dB(㎶/m)]	[dB]
Peak data								
4 855.75[1)]	H	64.39	33.70	-55.11	-	42.98	74.00	31.02
7 335.70[1)]	V	61.87	35.17	-51.58	-	45.46	74.00	28.54
Average Data								
No spurious emissions were detected within 20 ㏈ of the limit.								

Horizontal/Vertical for 1 ㎓ ~ 3.5 ㎓



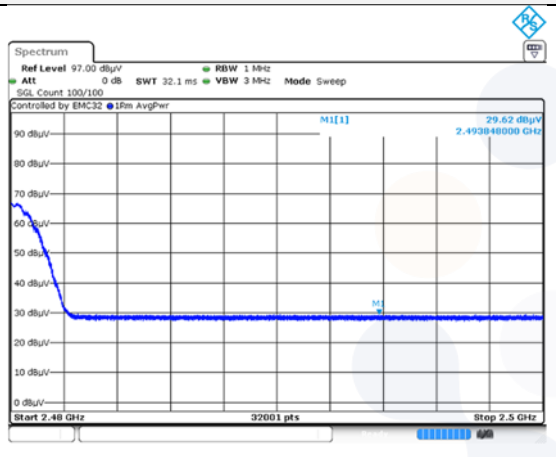
Horizontal/Vertical for 3.5 ㎓ ~ 18 ㎓



2 480 ㎒

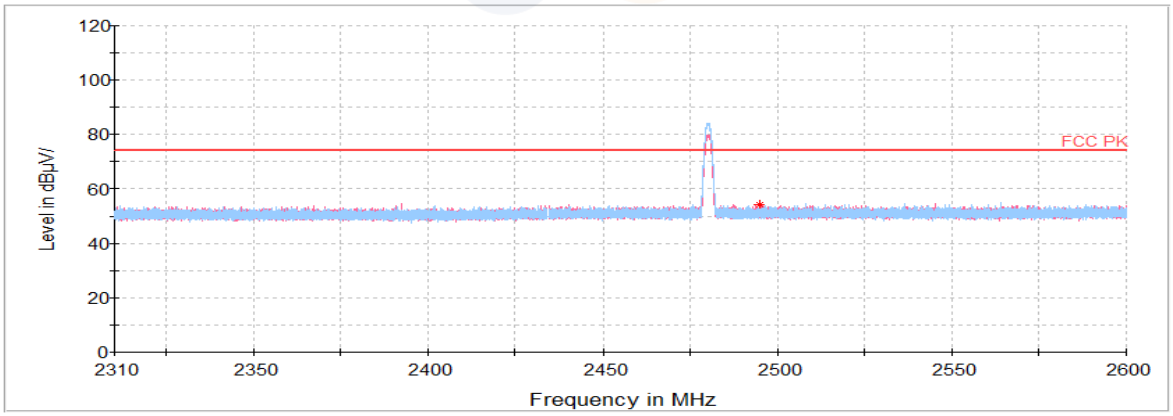
Frequency	Pol.	Reading	Antenna Factor	Amp. + Cable	DCF	Result	Limit	Margin
[㎒]	[V/H]	[dB(㎶)]	[dB]	[dB]	[dB]	[dB(㎶/m)]	[dB(㎶/m)]	[dB]
Peak data								
2 493.85[1)]	H	40.02	32.39	-17.85	-	54.56	74.00	19.44
3 600.14[1)]	H	69.67	33.12	-56.66	-	46.13	74.00	27.87
4 961.33[1)]	V	64.31	33.70	-54.98	-	43.03	74.00	30.97
7 430.41[1)]	H	61.67	35.19	-51.61	-	45.25	74.00	28.75
Average Data								
2 493.85[1)]	H	29.62	32.39	-17.85	2.04	46.20	54.00	7.80

Average Data

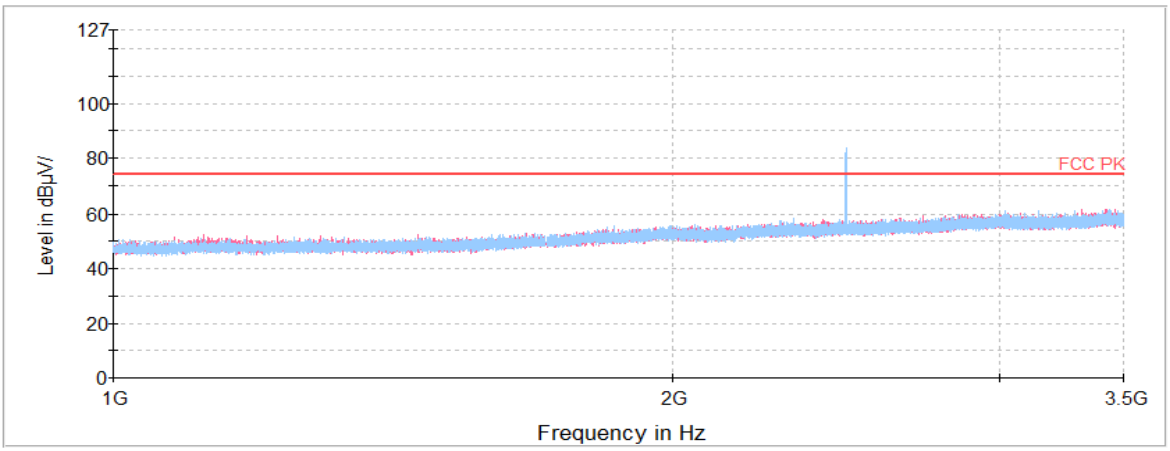


Blank

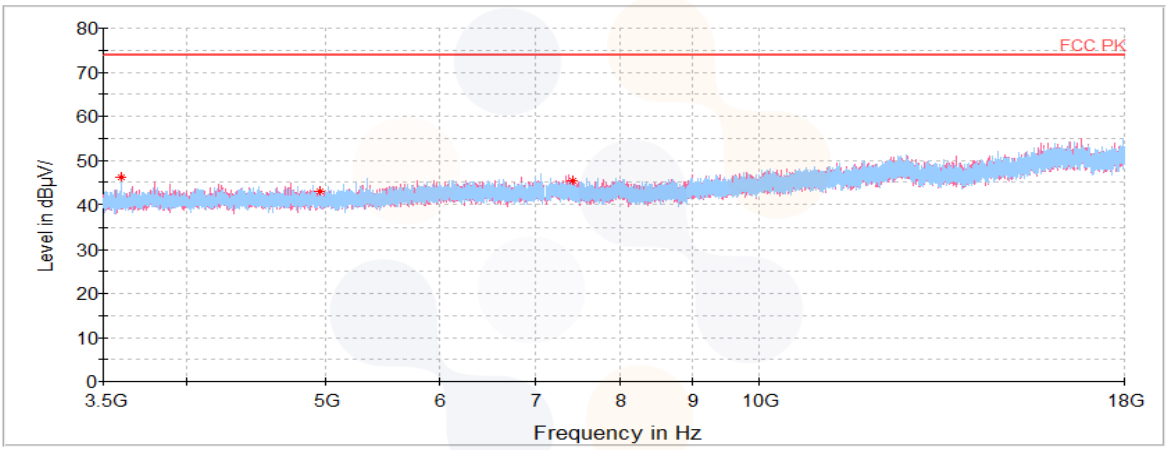
Horizontal/Vertical for Band-edge



Horizontal/Vertical for 1 ㎓ ~ 3.5 ㎓



Horizontal/Vertical for 3.5 ㎓ ~ 18 ㎓

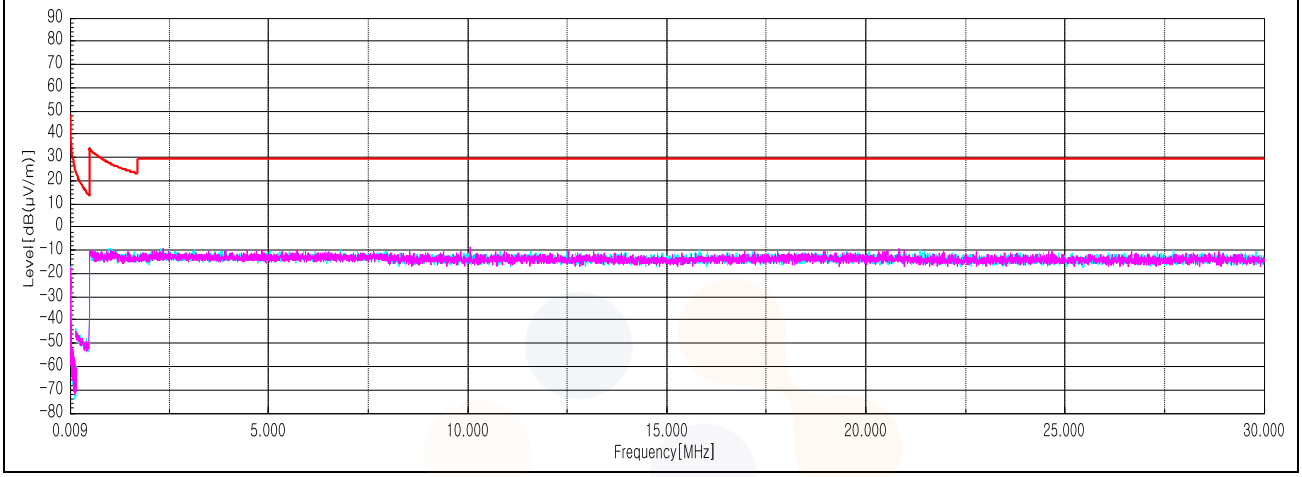


[DC 24 V]

Test results (Below 30 ㎒) –Worst case: 1 MBits/s(37 Bytes)_2 402 ㎒

Frequency	Pol.	Reading	Antenna Factor	Amp. + Cable	Distance Factor	DCF	Result	Limit	Margin
[㎒]	[V/H]	[dB(μV)]	[dB]	[dB]	[dB]	[dB]	[dB(μV/m)]	[dB(μV/m)]	[dB]
No spurious emissions were detected within 20 ㏈ of the limit									

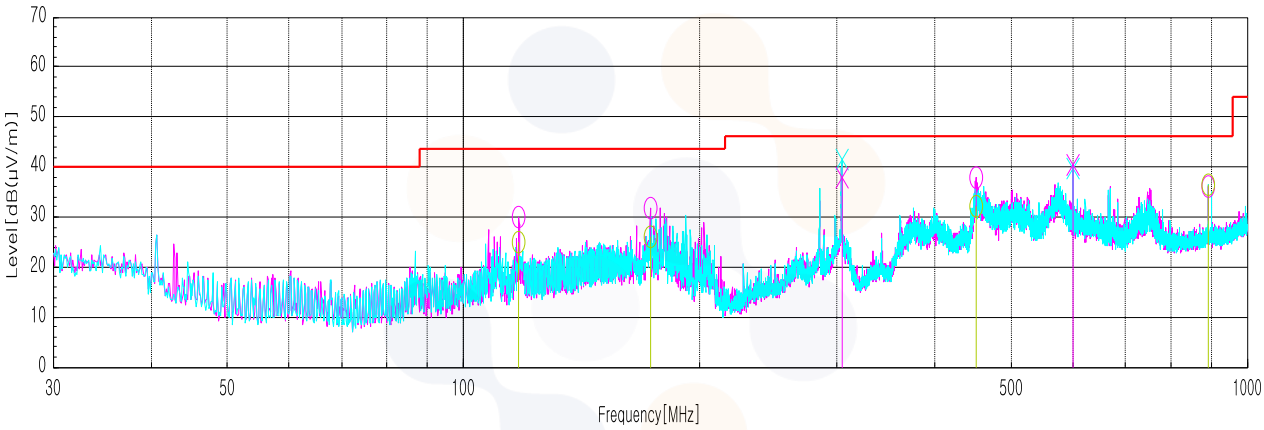
Horizontal/Vertical



Test results (Below 1 000 ㎒) –Worst case: 1 MBits/s(37 Bytes)_2 402 ㎒

Frequency	Pol.	Reading	Antenna Factor	Amp. + Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Quasi peak data								
117.91	H	35.70	17.70	-28.37	-	25.03	43.50	18.47
173.32	H	38.40	15.17	-27.43	-	26.14	43.50	17.36
304.03	V	44.90	19.18	-26.05	-	38.03	46.00	7.97
451.83	H	34.20	22.74	-24.63		32.31	46.00	13.69
600.00	V	39.10	24.50	-23.31	-	40.29	46.00	5.71
891.12	H	30.30	26.52	-20.30	-	36.52	46.00	9.48

Horizontal/Vertical

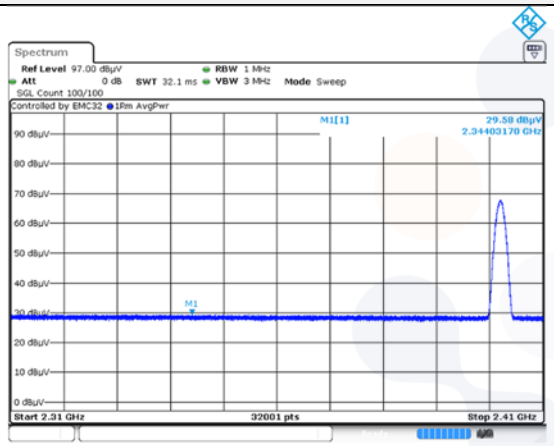


Test results (Above 1 000 ㎒)_1 MBits/s(37 Bytes)

2 402 ㎒

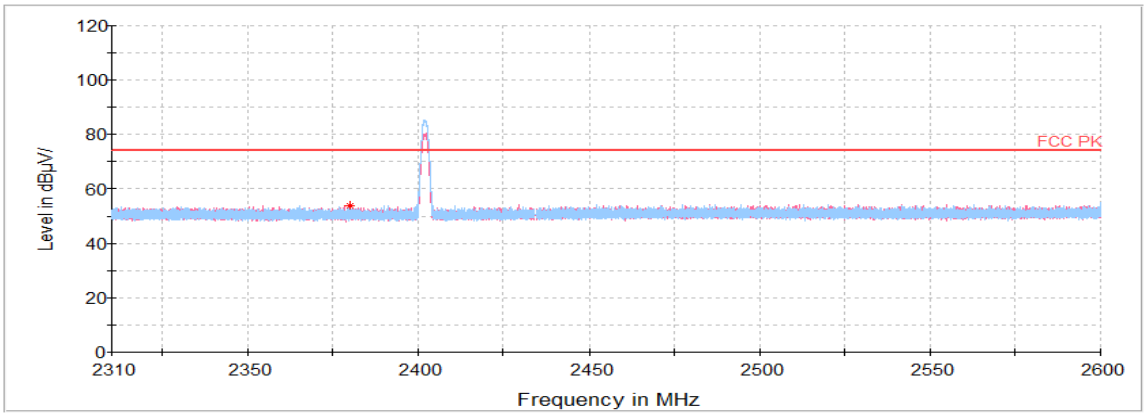
Frequency	Pol.	Reading	Antenna Factor	Amp. + Cable	DCF	Result	Limit	Margin
[㎒]	[V/H]	[dB(μV)]	[dB]	[dB]	[dB]	[dB(μV/m)]	[dB(μV/m)]	[dB]
Peak data								
2 344.03[1)]	H	40.12	32.06	-18.16	-	54.02	74.00	19.98
3 600.14[1)]	H	70.23	33.12	-56.66	-	46.69	74.00	27.31
4 853.94[1)]	V	65.39	33.70	-55.11	-	43.98	74.00	30.02
7 224.23	H	62.24	35.14	-51.55	-	45.83	74.00	28.17
Average Data								
2 344.03[1)]	H	29.58	32.06	-18.16	2.04	45.52	54.00	8.48

Average Data

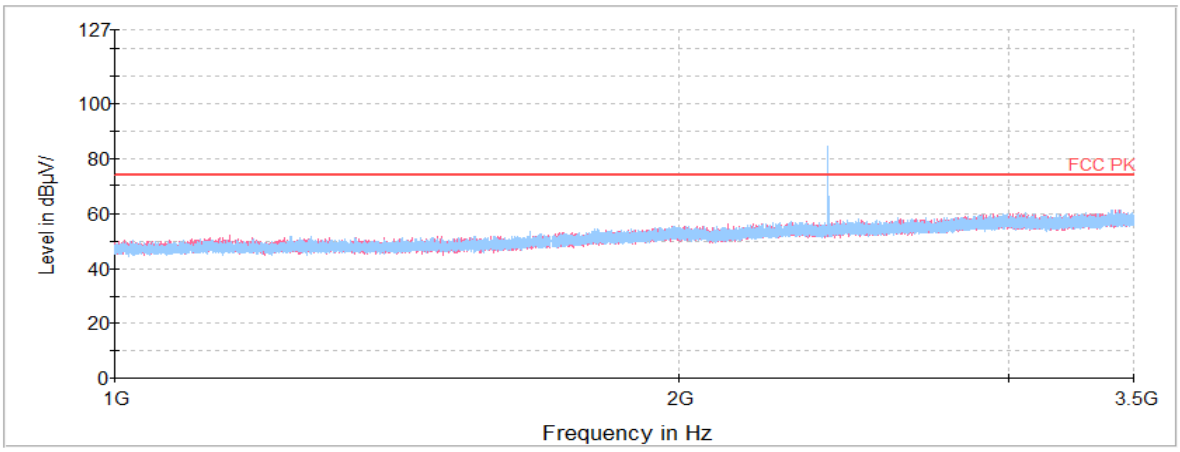


Blank

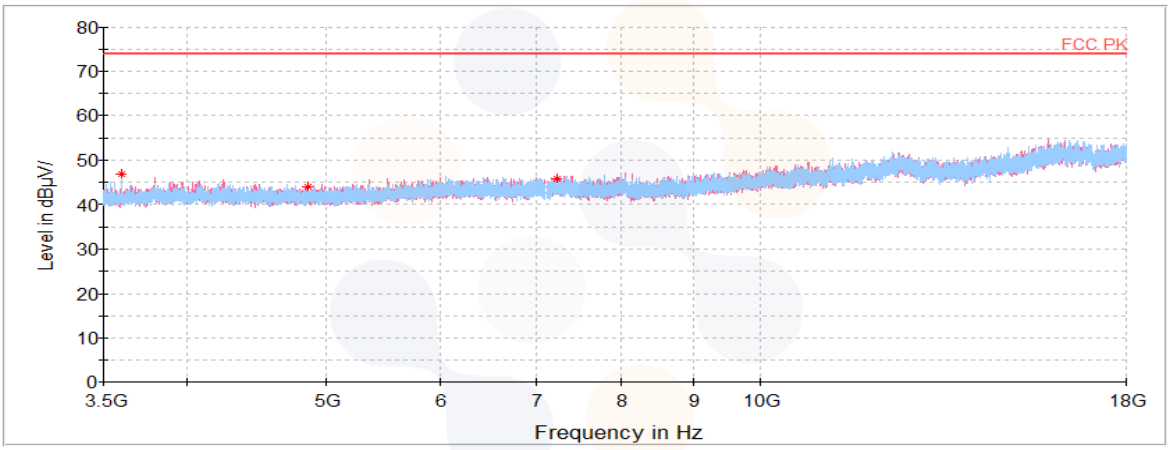
Horizontal/Vertical for Band-edge



Horizontal/Vertical for 1 ㎓ ~ 3.5 ㎓



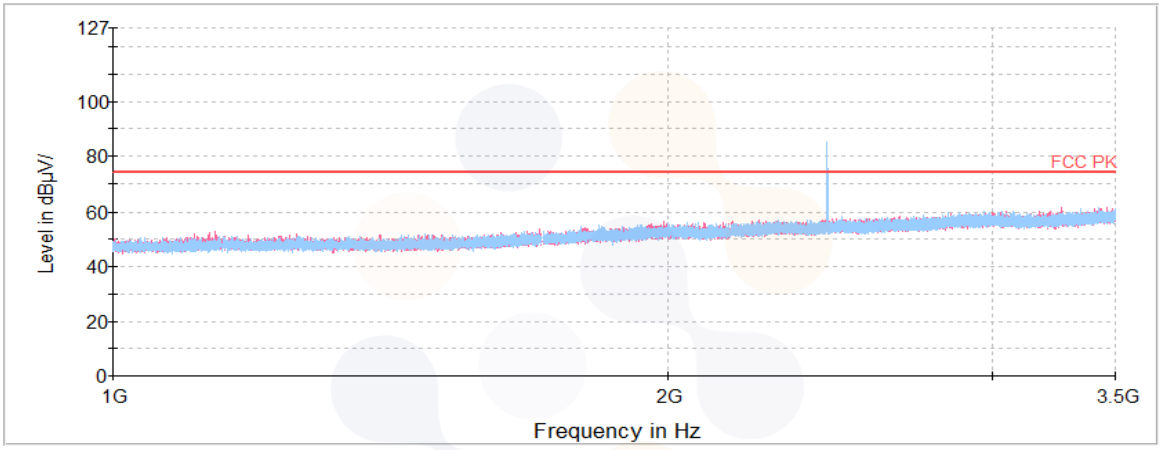
Horizontal/Vertical for 3.5 ㎓ ~ 18 ㎓



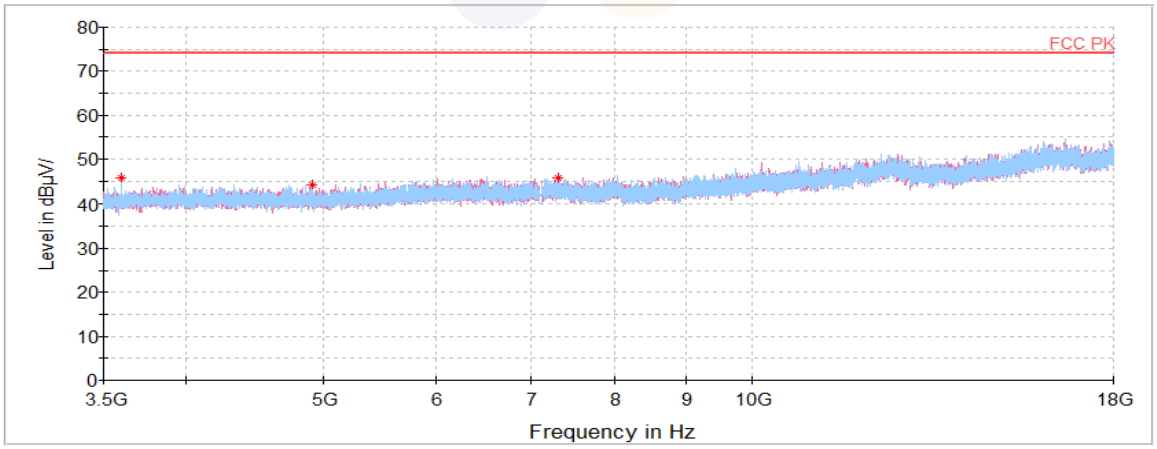
2 440 ㎒

Frequency	Pol.	Reading	Antenna Factor	Amp. + Cable	DCF	Result	Limit	Margin
[㎒]	[V/H]	[dB(㎶)]	[dB]	[dB]	[dB]	[dB(㎶/m)]	[dB(㎶/m)]	[dB]
Peak data								
3 599.69	H	69.20	33.12	-56.66	-	45.66	74.00	28.34
4 914.20[1)]	H	65.44	33.70	-55.05	-	44.09	74.00	29.91
7 308.06[1)]	V	62.30	35.16	-51.58	-	45.88	74.00	28.12
Average Data								
No spurious emissions were detected within 20 ㏈ of the limit.								

Horizontal/Vertical for 1 ㎓ ~ 3.5 ㎓

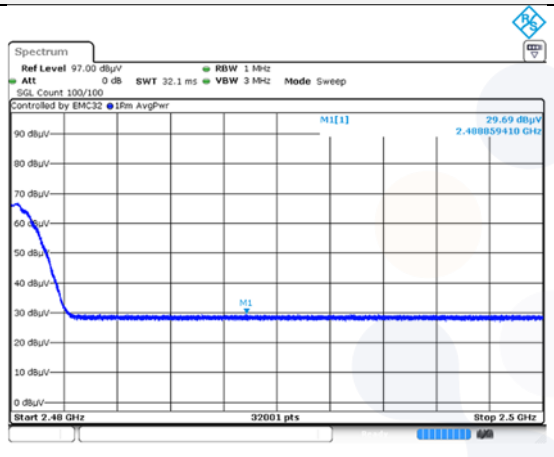


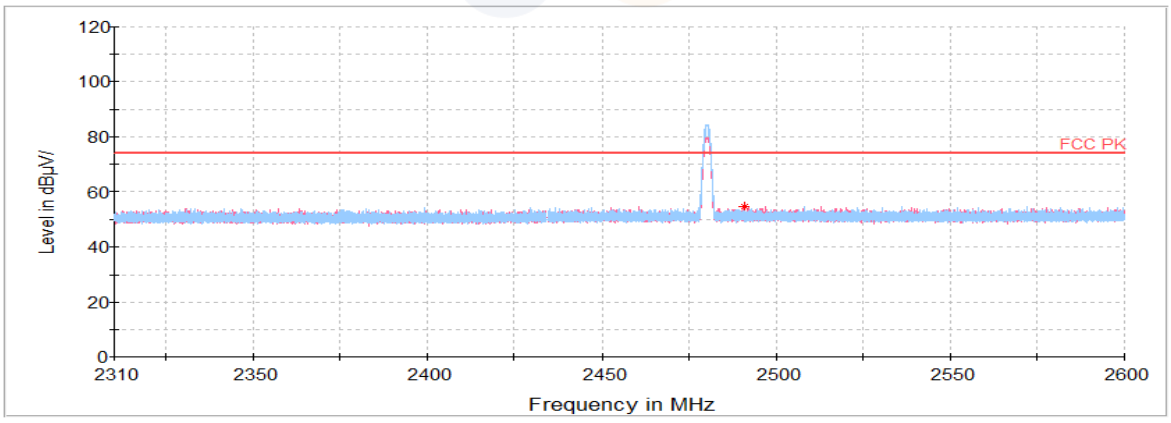
Horizontal/Vertical for 3.5 ㎓ ~ 18 ㎓



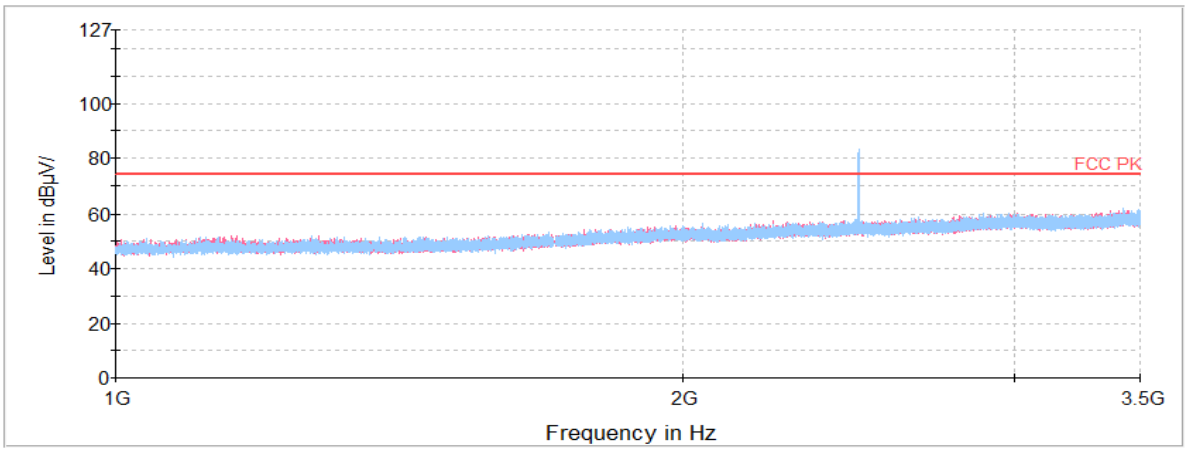
2 480 ㎒

Frequency	Pol.	Reading	Antenna Factor	Amp. + Cable	DCF	Result	Limit	Margin
[㎒]	[V/H]	[dB(㎶)]	[dB]	[dB]	[dB]	[dB(㎶/m)]	[dB(㎶/m)]	[dB]
Peak data								
2 488.86[1)]	H	40.28	32.38	-17.87	-	54.79	74.00	19.21
3 599.69	H	68.16	33.12	-56.66	-	44.62	74.00	29.38
4 945.47[1)]	V	64.98	33.70	-55.00	-	43.68	74.00	30.32
7 395.97[1)]	V	61.64	35.18	-51.60	-	45.22	74.00	28.78
Average Data								
2 488.86[1)]	H	29.69	32.38	-17.87	2.04	46.24	54.00	7.76

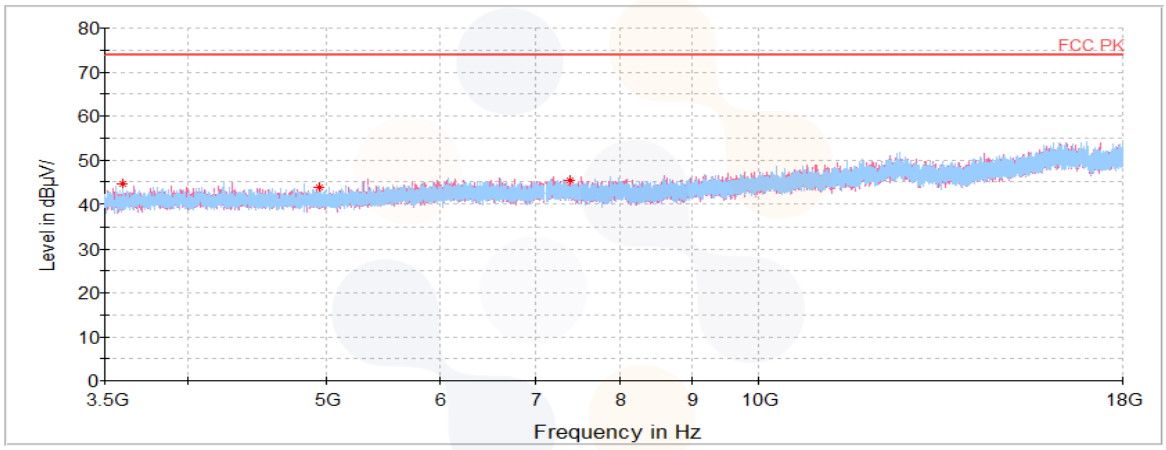
Average Data	
	Blank

Horizontal/Vertical for Band-edge


Horizontal/Vertical for 1 ㎓ ~ 3.5 ㎓



Horizontal/Vertical for 3.5 ㎓ ~ 18 ㎓



Test results (Above 18 ㎓) – Worst case: 1 MBits/s(37 Bytes) 2 480 ㎒_[DC 24 V]

Horizontal/Vertical for 18 ㎓ ~ 26.5 ㎓


Note: The worst case was based on the lowest margin condition considering harmonic and spurious emission.

8. Measurement equipment

Equipment Name	Manufacturer	Model No.	Serial No.	Next Cal. Date
Spectrum Analyzer	R&S	FSV30	100914	23.09.14
Power Sensor	R&S	NRP-Z81	1137.9009.02-106223-bB	23.05.02
Spectrum Analyzer	R&S	FSV40	100989	23.10.14
EMI TEST RECEIVER	R&S	ESCI7	100732	*24.03.03
Bi-Log Antenna	TESEQ	CBL 6112D	62438	24.08.24
Amplifier	SONOMA INSTRUMENT	310N	284608	23.08.18
ATTENUATOR	KEYSIGHT	8491B-6dB	MY39271082	24.04.27
ISOLATION TRANSFORMER	ONETECH CO., LTD	OT-IT500VA	OTR1-16026	23.03.28
Horn antenna	ETS.lindgren	3117	155787	23.09.29
Horn antenna	ETS.lindgren	3116	86632	24.01.25
Attenuator	API Inmet	40AH2W-10	12	23.05.03
AMPLIFIER	B&Z Technologies	BZRT-00504000-481055-382525	26299-27735	23.09.19
AMPLIFIER	B&Z Technologies	BZR-0050400 -551028-252525	27736	23.09.19
LOOP Antenna	R&S	HFH2-Z2	100355	24.08.10
Antenna Mast	Innco Systems	MA4640-XP-ET	-	-
Turn Table	Innco Systems	CO3000	1175/45850319/P	-
Antenna Mast	Innco Systems	MA4000-EP	303	-
Turn Table	Innco Systems	CO3000	1175/45850319/P	-
High pass Filter	WT	WT-A1698-HS	WT160411001	23.05.03
Vector Signal Generator	R&S	SMBV100A	257566	23.07.04
Signal Generator	R&S	SMB100A	176206	24.01.19

*This test was performed prior to calibration.

End of test report