TEST REPORT

Part 15 Subpart C 15.249

Equipment under test LPWA Gateway

Model name CST-N001

FCC ID 2AVFH-CSTN001

Applicant Corners Co.Ltd

Manufacturer Corners Co.Ltd

Date of test(s) 2019.12.11 ~ 2019.12.20, 2020.01.03

Date of issue 2020.01.03

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Test and report completed by :	**Report approval by :**
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Revision history

Revision	Date of issue	Test report No.	Description
-	2019.12.27	KES-RF-19T0197	Initial
-	2020.01.03	KES-RF-19T0197-R1	Added Field strength of fundamental test

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1. General information

Applicant:	Corners Co.Ltd
Applicant address:	806, 26, Sangwon 1-gil, Seongdong-gu, Seoul, Republic of Korea
Test site:	KES Co., Ltd.
Test site address:	3701, 40, Simin-daero 365beon-gil, Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea 473-21, Gayeo-ro, Yeoju-si, Gyeonggi-do, Korea
Test Facility	FCC Accreditation Designation No.: KR0100, Registration No.: 444148
FCC rule part(s):	15.249
FCC ID:	2AVFH-CSTN001
Test device serial No.:	☐ Production ☒ Pre-production ☐ Engineering

1.1. EUT description

Equipment under test	LPWA Gateway
Frequency range	917.3 ㎒ ~ 923.3 ㎒ (125 kHz, 250 kHz)
Model:	CST-N001
Modulation technique	GFSK
Number of channels	31ch : 917.3 ㎒ ~923.3 ㎒ (125 kHz, 250 kHz)
Antenna type	Dipole antenna : 2 ㏈i
Power source	AC 120V Adapter (Output : DC 12V / 1A)

1.2. Test configuration

The **Corners Co.Ltd LPWA Gateway FCC ID: 2AVFH-CSTN001** was tested per the guidance of ANSI C63.10-2013 was used to reference the appropriate EUT setup for radiated spurious emissions testing and AC line conducted testing.

1.3. Information about derivative model

N/A

1.4. Accessory information

Applicant	Equipment	Manufacturer	Model	Power source
-	-	-	-	-

1.5. Software and Firmware description

The software and firmware installed in the EUT is 116

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1.6. Measurement results explanation example

For all conducted test items :

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

Offset(dB) = RF cable loss(dB) + attenuator factor(dB).
= 0.85 + 10 = 10.85 (dB)

1.7. Measurement Uncertainty

Test Item		Uncertainty
Uncertainty for Conduction emission test		2.62 dB
Uncertainty for Radiation emission test (include Fundamental emission)	9kHz - 30MHz	4.54 dB
	30MHz - 1GHz	4.36 dB
	Above 1GHz	5.00 dB
Note. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.		

1.8. Frequency/channel operations

Ch.	Frequency (MHz)
01	917.3
. .	. .
16	920.3
. .	. .
31	923.3

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2. Summary of tests

Reference	Parameter	Test results
15.249(a)	Field strength of fundamental & Out-of-band emission	Pass
15.205 15.209 15.249(d)	Radiated spurious emission	Pass
15.215(c)	20 dB bandwidth	Pass
15.207(a)	AC conducted emissions	Pass

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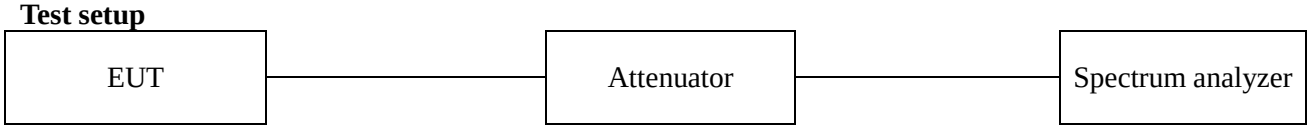
3. Test results

3.1. 20 dB bandwidth

Test procedure

ANSI C63.10-2013

Test setup



Section 6.9.3

1. Use the following spectrum analyzer setting
2. Center frequency: Lowest, middle and highest channels
3. Span = approximately 2 to 3 times the 20dB bandwidth
4. RBW ≥ 1 % of the 20dB bandwidth
5. VBW ≥ 3 x RBW
6. Sweep = auto
7. Detector function = peak
8. Trace = max hold
9. 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 20 dB relative to the maximum level measured in the fundamental emission.

Limit

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Test results

125 ㎑ bandwidth

Frequency(㎒)	20 ㏈ bandwidth(㎑)	Limit(㎒)
917.3	140.38	-
920.3	141.10	
923.3	140.38	

250 ㎑ bandwidth

Frequency(㎒)	20 ㏈ bandwidth(㎑)	Limit(㎒)
917.3	293.80	-
920.3	293.80	
923.3	293.80	

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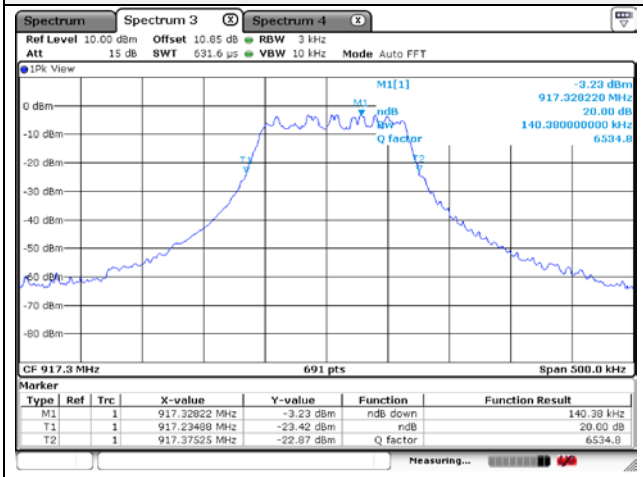
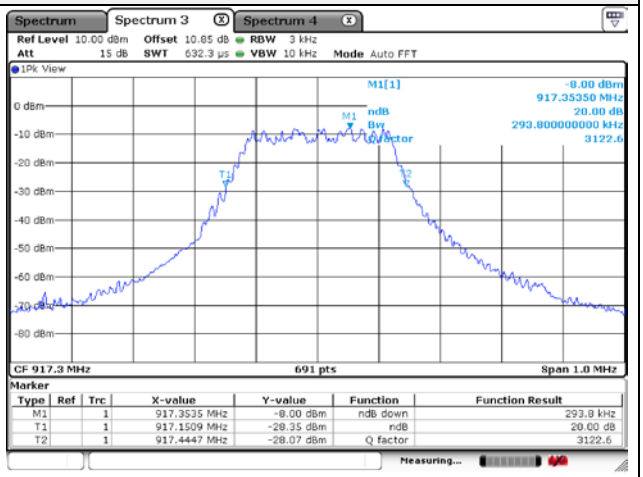
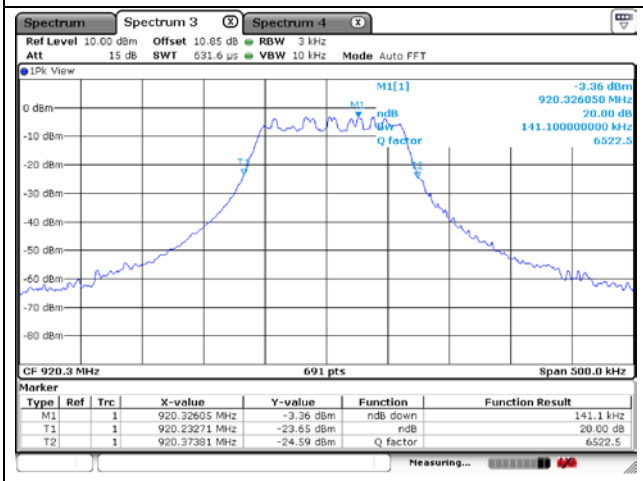
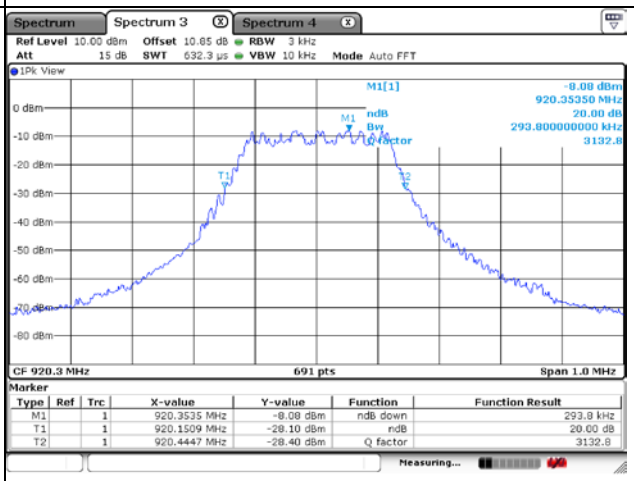
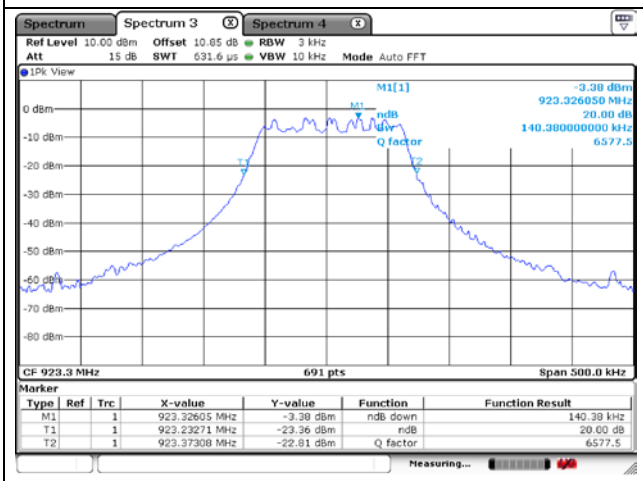
20 dB bandwidth of 125 kHz bandwidth	20 dB bandwidth of 250 kHz bandwidth

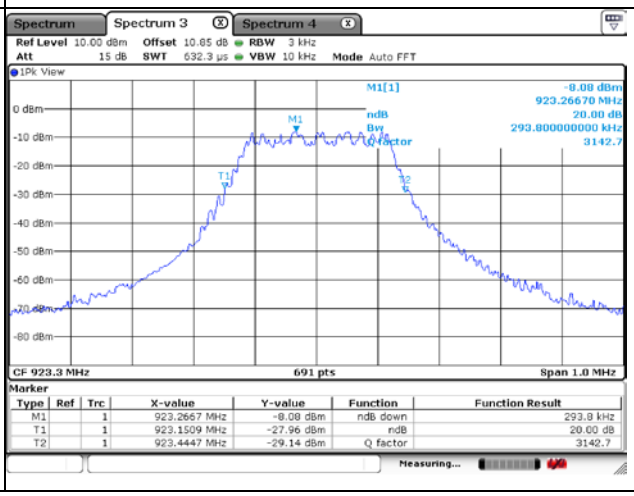












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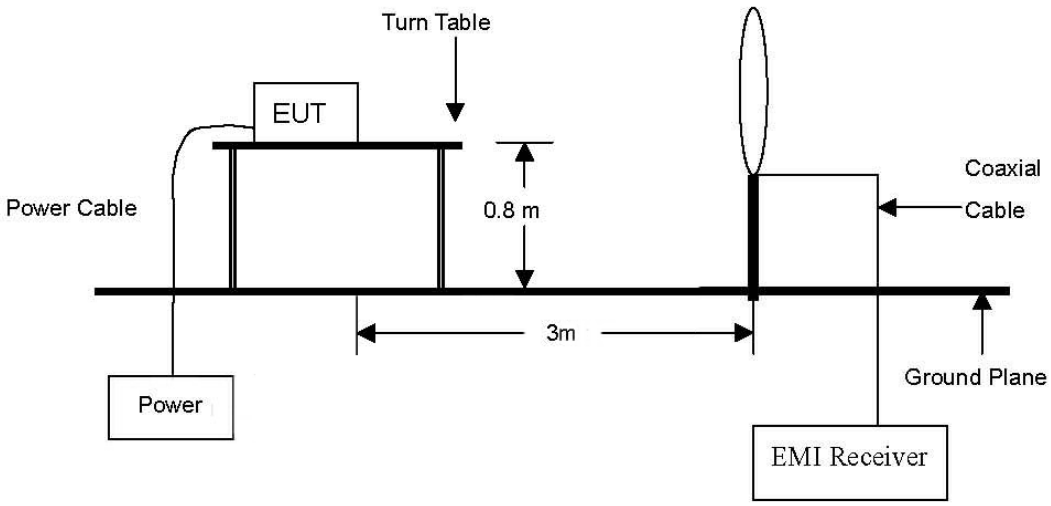
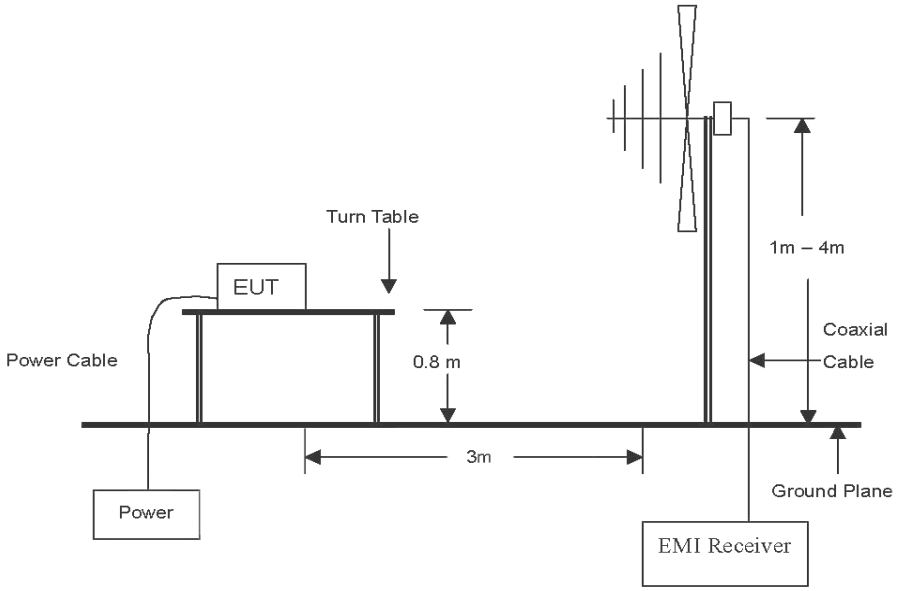
3.2. Field strength of fundamental & Radiated spurious emission & Out-of-band emission

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.



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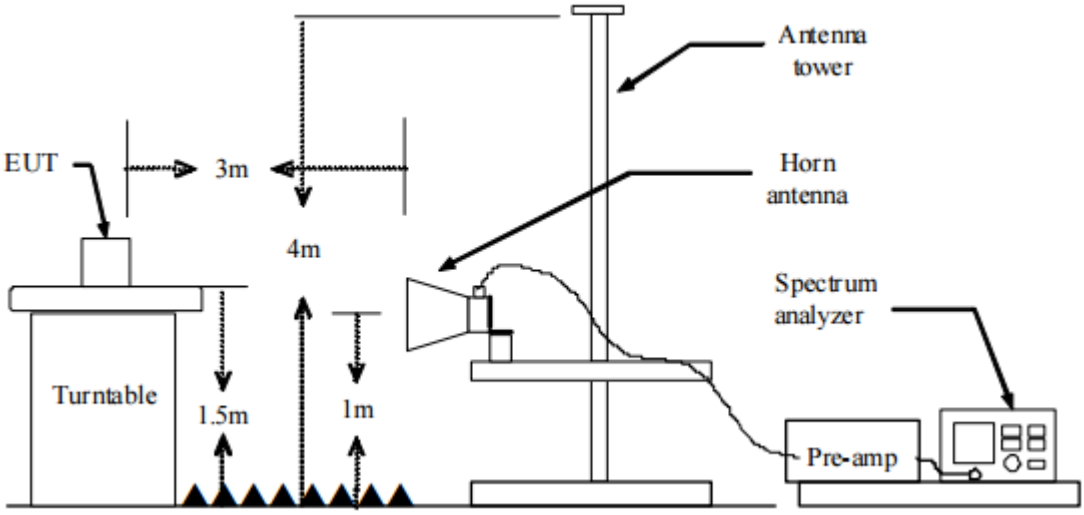
The diagram below shows the test setup that is utilized to make the measurements for emission from 1 ㎓ to the tenth harmonic of the highest fundamental frequency or to 40 ㎓ emissions, whichever is lower.



Test procedure below 30 ㎒

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter anechoic chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation.
2. Then antenna is a loop antenna is fixed at one meter above the ground to determine the maximum value of the field strength. Both parallel and perpendicular of the antenna are set to make the measurement.
3. We have done x, y, z planes in EUT and horizontal and vertical polarization and Parallel to the ground plane in detecting antenna.
4. For each suspected emission, the EUT was arranged to its worst case and then the table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to average or quasi peak detect function and Specified Bandwidth with Maximum hold mode.

Test procedure above 30 ㎒

1. Spectrum analyzer settings for f < 1 ㎓:
   ① Span = wide enough to fully capture the emission being measured
   ② RBW = 100 ㎑
   ③ VBW ≥ RBW
   ④ Detector = quasi peak
   ⑤ Sweep time = auto
   ⑥ Trace = max hold
2. Spectrum analyzer settings for f ≥1 ㎓: Peak
   ① Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
   ② RBW = 1 ㎒
   ③ VBW ≥ 3 ㎒
   ④ Detector = peak
   ⑤ Sweep time = auto
   ⑥ Trace = max hold
   ⑦ Trace was allowed to stabilize

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3. Spectrum analyzer settings for $f \geq 1$ ㎓: Average
   ① Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
   ② RBW = 1 ㎒
   ③ VBW ≥ 3 × RBW
   ④ Detector = RMS, 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.
   ⑤ 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 in order to use linear voltage averaging. Log or ㏈ averaging shall not be used.
   ⑥ Sweep = auto
   ⑦ Trace = max hold
   ⑧ Perform a trace average of at least 100 traces.
   ⑨ 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 percent duty cycle. The correction factor is computed as follows:
      1) If power averaging (RMS) mode was used in step ⑤, then the applicable correction factor is 10 log(1/x), where x is the duty cycle.
      2) If linear voltage averaging mode was used in step ⑤, then the applicable correction factor is 20 log(1/x), where x is the duty cycle.
      3) If a specific emission is demonstrated to be continuous (≥ 98 percent duty cycle) rather than turning on and off with the transmit cycle, then no duty cycle correction is required for that emission.

Note.

1. The loop antenna was investigated with three polarizations, and horizontal and vertical polarizations were reported as the worst case.
2. f<30 ㎒, extrapolation factor of 40 ㏈/decade of distance. $F_d = 40\log(D_m/Ds)$
   $f \geq 30$ ㎒, extrapolation factor of 20 ㏈/decade of distance. $F_d = 20\log(D_m/Ds)$
   Where:
   F_d = Distance factor in ㏈
   D_m = Measurement distance in meters
   D_s = Specification distance in meters
3. CF(Correction factors(㏈)) = Antenna factor(㏈/m) + Cable loss(㏈) + or Amp. gain(㏈) + or F_d(㏈)
4. Field strength(㏈㎶/m) = Level(㏈㎶) + CF (㏈) + or DCF(㏈)
5. Margin(㏈) = Limit(㏈㎶/m) - Field strength(㏈㎶/m)
6. Emissions below 18 ㎓ were measured at a 3 meter test distance while emissions above 18 ㎓ were measured at a 1 meter test distance with the application of a distance correction factor.
7. The fundamental of the EUT was investigated in three orthogonal orientations X, Y and Z, it was determined that **X orientation** was worst-case orientation; therefore, all final radiated testing was performed with the EUT in **X orientation.**
8. The worst-case emissions are reported however emissions whose levels were not within 20 ㏈ of respective limits were not reported.
9. According to exploratory test no any obvious emission were detected from 9㎑ to 30㎒. Although these tests were performed other than open field test site, adequate comparison measurements were confirmed against 30 m open field test site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 414788.

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Limit

According to 15.209(a), for an intentional radiator devices, the general required of field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values：

Frequency (㎒)	Distance (Meters)	Radiated (㎶/m)
0.009 ~ 0.490	300	2400/F(㎑)
0.490 ~ 1.705	30	24000/F(㎑)
1.705 ~ 30.0	30	30
30 ~ 88	3	100**
88 ~ 216	3	150**
216 ~ 960	3	200**
Above 960	3	500

**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., Sections 15.231 and 15.241.

According to 15.249(a)

Fundamental frequency	Field strength of fundamental		Field strength of harmonics	
	mV/m	dBuV/m	uV/m	dBuV/m
902-928 MHz	50	94	500	54
2400-2483.5 MHz	50	94	500	54
5725-5875 MHz	50	94	500	54
24.0-24.25 GHz	250	108	2500	68

According to 15.249(d)

Emission radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated limit in FCC part 15C, Section 15.209, whichever is the lesser attenuation.

According to 15.249(e)

As shown in §15.35(b), for frequencies above 1000 MHz, the field strength limits in paragraphs (a) and (b) of this section are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For point-to-point operation under paragraph (b) of this section, the peak field strength shall not exceed 2500 millivolts/meter at 3 meters along the antenna azimuth.

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Duty cycle

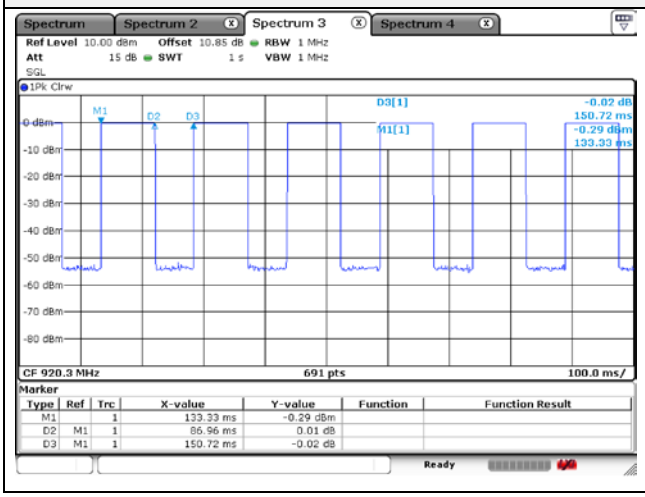
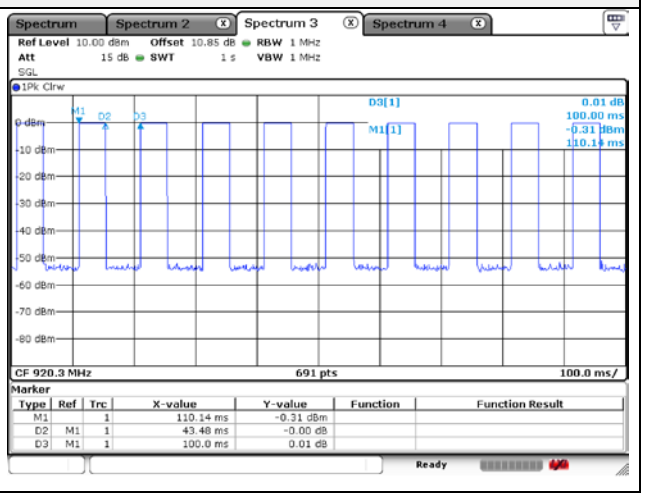
Regarding to KDB 558074 D01_v04, 6.0, the maximum duty cycles of all modes were investigated and set the spectrum analyzer as below.

Set RBW ≥ OBW if possible; otherwise, set RBW to the largest available value. Set detector = peak or average. The zero-span measurement method shall not be used unless both RBW and VBW are > 50/T and the number of sweep points across duration T exceeds 100.

Test mode	T_{on} time (㎳)	Period (㎳)	Duty cycle (Linear)	Duty cycle (%)	Duty cycle correction factor (㏈)
BW 125 kHz	86.96	150.72	0.58	57.69	2.39
BW 250 kHz	43.48	100.00	0.43	43.48	3.62

Duty cycle (Linear) = T_{on} time/Period

DCF(Duty cycle correction factor (㏈)) = 10log(1/duty cycle)

BW 125 kHz // Middle channel	BW 250 kHz // Middle channel
	

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Test result (Fundamental & Out-of-band emission)

Channel: 01

BW: 250 ㎑

Frequency (㎒)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
917.31	63.55	Peak	H	33.83	-	97.38	114.00	16.62
917.29	52.69	Average	H	33.83	3.62	90.14	94.00	3.86
917.16	59.24	Peak	V	33.83	-	93.07	114.00	20.93
902.00	9.50	Peak	H	33.35	-	42.85	46.00	3.15
902.00	9.75	Peak	V	33.35	-	43.10	46.00	2.90

Channel: 16

BW: 250 ㎑

Frequency (㎒)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
920.40	63.91	Peak	H	33.93	-	97.84	114.00	16.16
920.28	52.51	Average	H	33.93	3.62	90.06	94.00	3.94
920.24	59.37	Peak	V	33.93	-	93.30	114.00	20.70

Channel: 31

BW: 250 ㎑

Frequency (㎒)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
923.41	64.14	Peak	H	34.02	-	98.16	114.00	15.84
923.28	54.05	Average	H	34.02	3.62	91.69	94.00	2.31
923.19	59.34	Peak	V	34.02	-	93.36	114.00	20.64
928.00	9.42	Peak	H	34.17	-	43.59	46.00	2.41
928.00	9.33	Peak	V	34.17	-	43.50	46.00	2.50

Note.
1. worst-case emissions(for BW 250 kHz) are reported in this section.

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Test results (Below 30 ㎒)

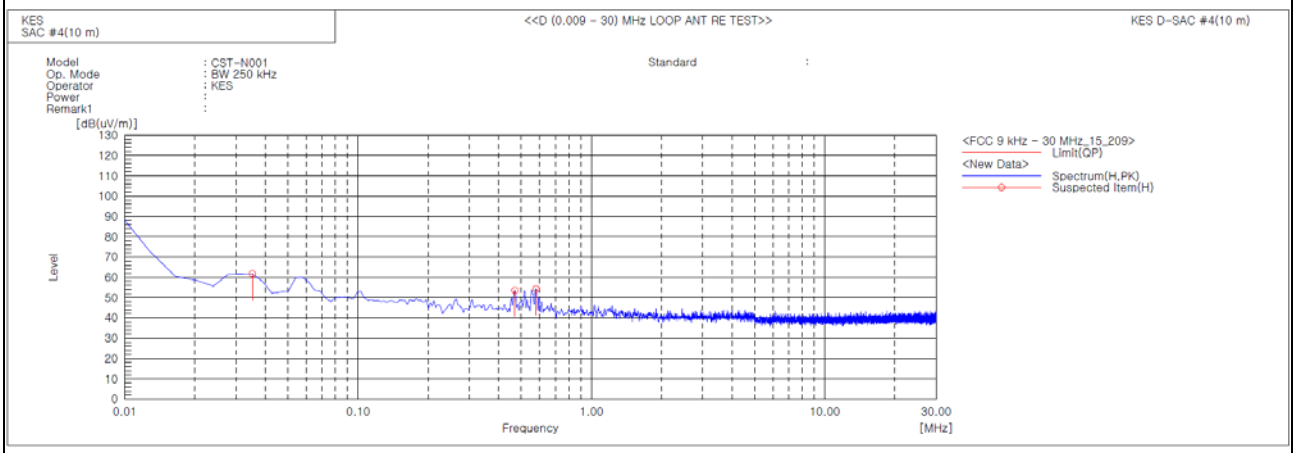
Mode: BW 250 kHz

Distance of measurement: 3 meter

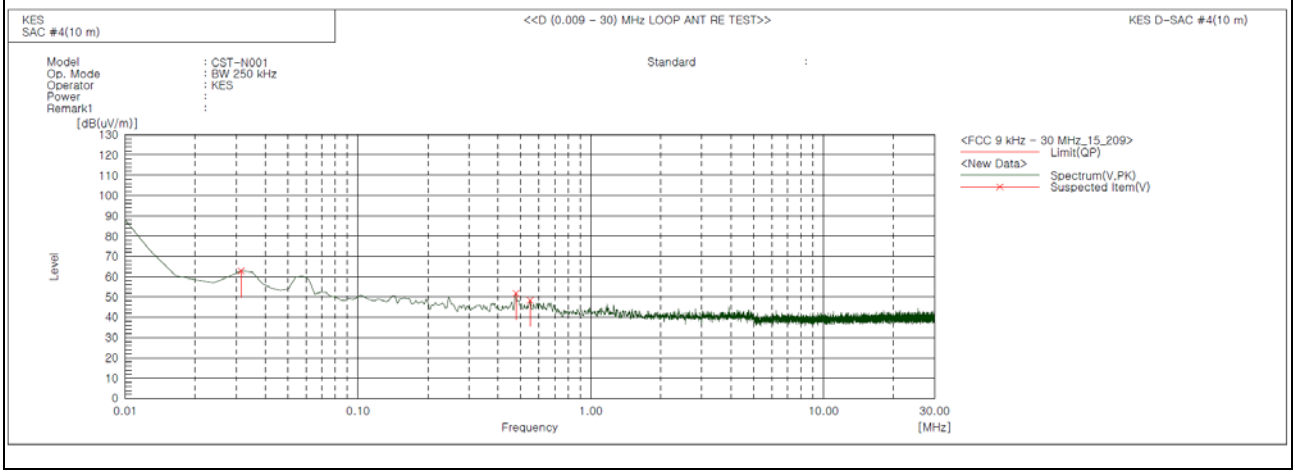
Channel: 31 (Worst case)

Frequency (㎒)	Level (dBμV)	Ant. Pol. (H/V)	CF (dB)	Distance factor (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
0.035	42.90	H	18.90	-80.00	-18.20	36.70	54.90
0.470	33.80	H	19.80	-80.00	-26.40	14.20	40.60
0.579	34.30	H	20.10	-40.00	14.40	32.40	18.00
0.031	44.20	V	18.80	-80.00	-17.00	37.6	54.60
0.478	32.00	V	19.80	-80.00	-28.20	14.00	42.20
0.549	28.40	V	20.00	-40.00	8.40	32.80	24.40

Horizontal



Vertical



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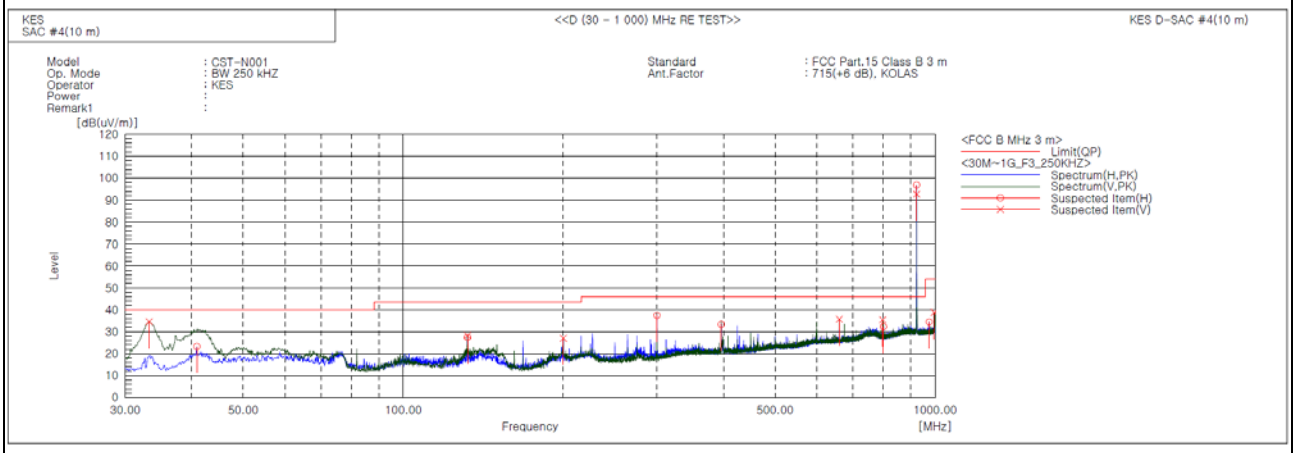
Test results (Below 1 000 ㎒)

Mode:	BW 250 kHz
Distance of measurement:	3 meter
Channel:	31 (Worst case)

Horizontal//Vertical



No.	Frequency [MHz]	(P)	Reading [dB(uV)]	c.f [dB(1/m)]	Result PK [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	Remark
1	40.913	H	46.5	-23.2	23.3	40.0	16.7	100.0	125.0	
2	132.093	H	54.2	-26.6	27.6	43.5	15.9	200.0	281.0	
3	300.024	H	57.5	-20.0	37.5	46.0	8.5	100.0	161.0	
4	396.296	H	50.2	-16.8	33.4	46.0	12.6	100.0	201.0	
5	799.816	H	42.2	-9.9	32.3	46.0	13.7	100.0	249.0	
6	923.370	H	104.6	-7.7	96.9	46.0	-50.9	100.0	301.0	
7	975.023	H	42.0	-7.5	34.5	54.0	19.5	200.0	250.0	
8	33.274	V	60.2	-25.5	34.7	40.0	5.3	150.0	235.0	
9	132.093	V	54.9	-26.6	28.3	43.5	15.2	100.0	151.0	
10	199.993	V	49.9	-22.9	27.0	43.5	16.5	100.0	194.0	
11	660.500	V	46.7	-11.0	35.7	46.0	10.3	100.0	266.0	
12	797.028	V	45.4	-9.9	35.5	46.0	10.5	100.0	353.0	
13	923.370	V	100.4	-7.7	92.7	46.0	-46.7	100.0	11.0	
14	995.878	V	45.9	-7.1	38.8	54.0	15.2	100.0	158.0	

Note.
1. No.6, No.13 are Field strength of fundamental markers.

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Test results (Above 1 000 ㎒)

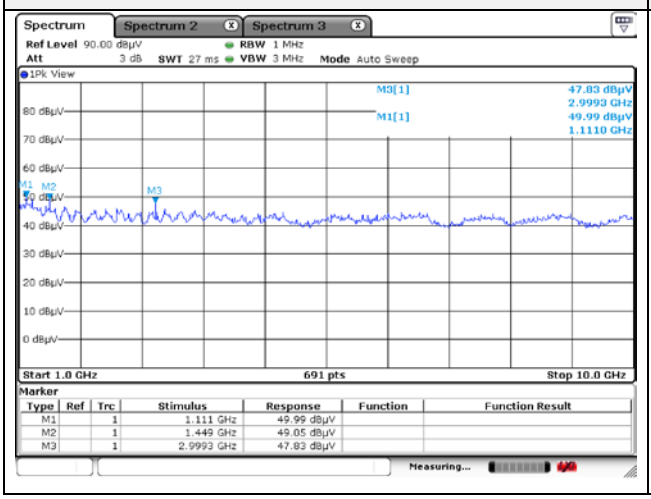
Mode: BW 125 kHz

Distance of measurement: 3 meter

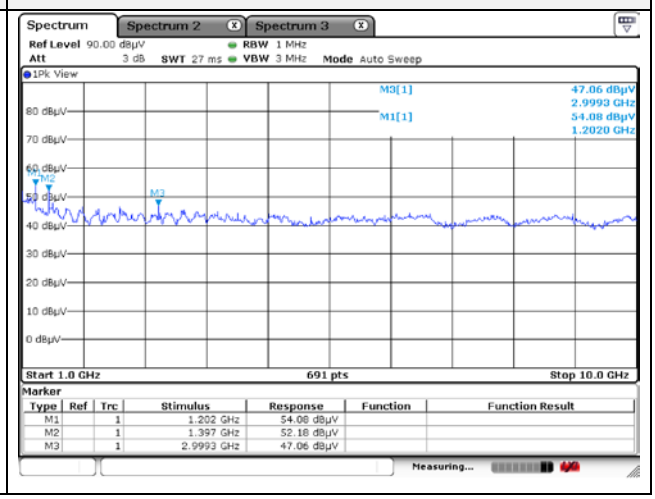
Channel: 01

Frequency (㎒)	Level (dB㎶)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
1 111.00	49.99	Peak	H	-8.43	-	41.56	74.00	32.44
1 449.00	49.05	Peak	H	-6.28	-	42.77	74.00	31.23
2 999.30	47.83	Peak	H	1.80	-	49.63	74.00	24.37
1 202.00	54.08	Peak	V	-7.85	-	46.23	74.00	27.77
1 397.00	52.18	Peak	V	-6.60	-	45.58	74.00	28.42
2 999.30	47.06	Peak	V	1.80	-	48.86	74.00	25.14

Horizontal // Peak for 1 ㎓ to 10 ㎓



Vertical // Peak for 1 ㎓ to 10 ㎓



Note.
1. Average test would be performed if the peak result were greater than the average limit.

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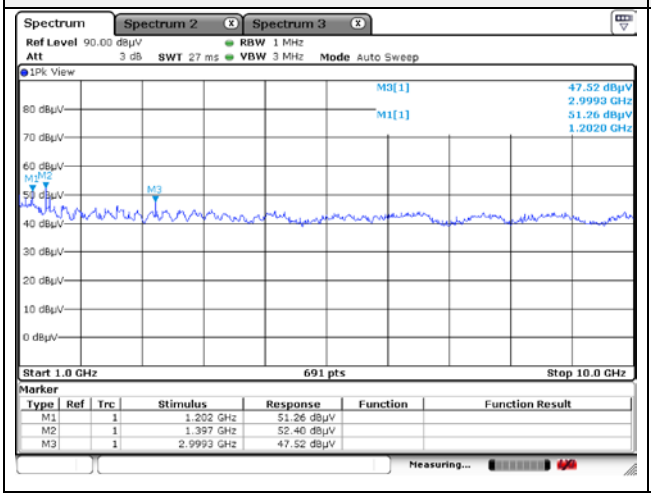
Mode: BW 125 kHz

Distance of measurement: 3 meter

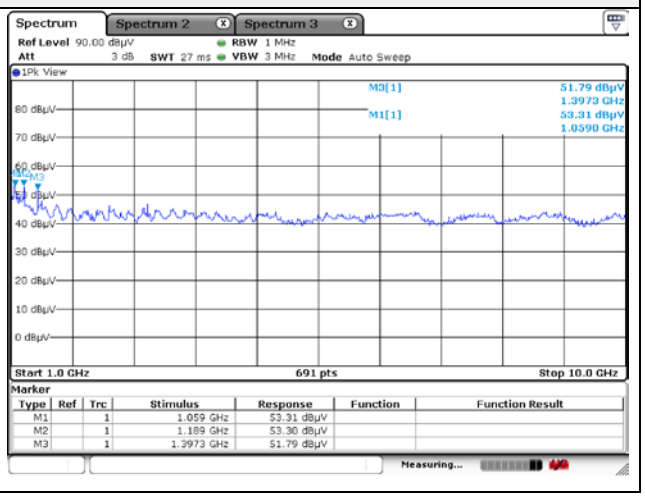
Channel: 16

Frequency (㎒)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1 202.00	51.26	Peak	H	-7.85	-	43.41	74.00	30.59
1 397.00	52.40	Peak	H	-6.60	-	45.80	74.00	28.20
2 999.30	47.52	Peak	H	1.80	-	49.32	74.00	24.68
1 059.00	53.31	Peak	V	-8.76	-	44.55	74.00	29.45
1 189.00	53.30	Peak	V	-7.93	-	45.37	74.00	28.63
1 397.30	51.79	Peak	V	-6.59	-	45.20	74.00	28.80

Horizontal // Peak for 1 ㎓ to 10 ㎓



Vertical // Peak for 1 ㎓ to 10 ㎓



Note.
1. Average test would be performed if the peak result were greater than the average limit.

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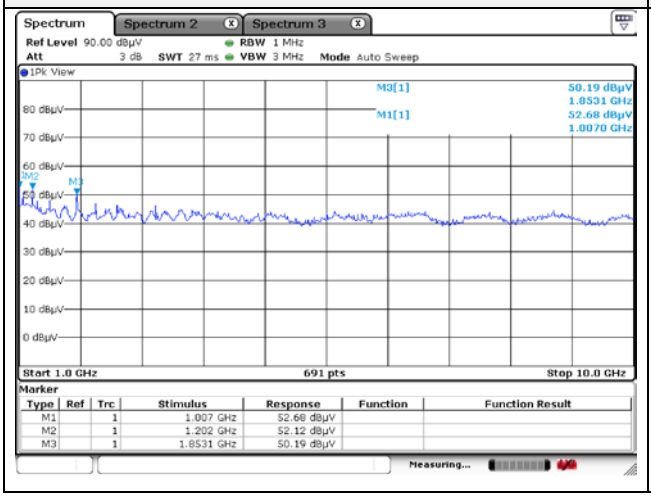
Mode: BW 125 kHz

Distance of measurement: 3 meter

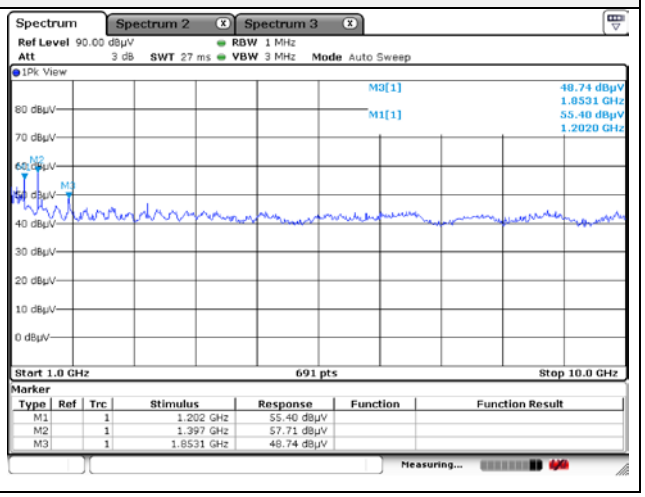
Channel: 31

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1 007.00	52.68	Peak	H	-9.10	-	43.58	74.00	30.42
1 202.00	52.12	Peak	H	-7.85	-	44.27	74.00	29.73
1 853.10	50.19	Peak	H	-2.52	-	47.67	74.00	26.33
1 202.00	55.40	Peak	V	-7.85	-	47.55	74.00	26.45
1 397.00	57.71	Peak	V	-6.60	-	51.11	74.00	22.89
1 853.10	48.74	Peak	V	-2.52	-	46.22	74.00	27.78

Horizontal // Peak for 1 GHz to 10 GHz



Vertical // Peak for 1 GHz to 10 GHz



Note.
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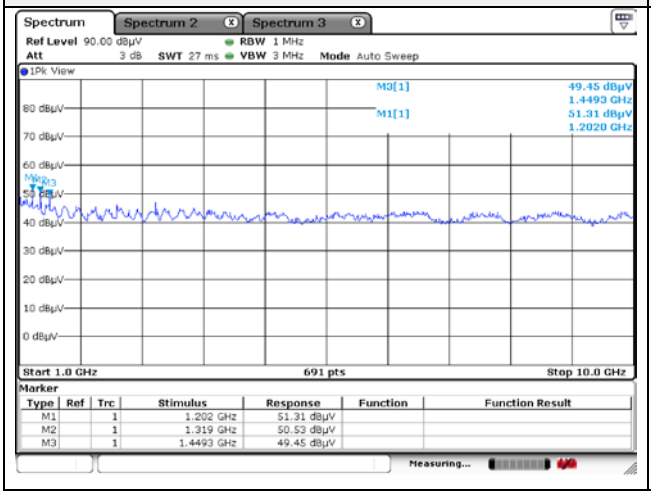
Mode: BW 250 kHz

Distance of measurement: 3 meter

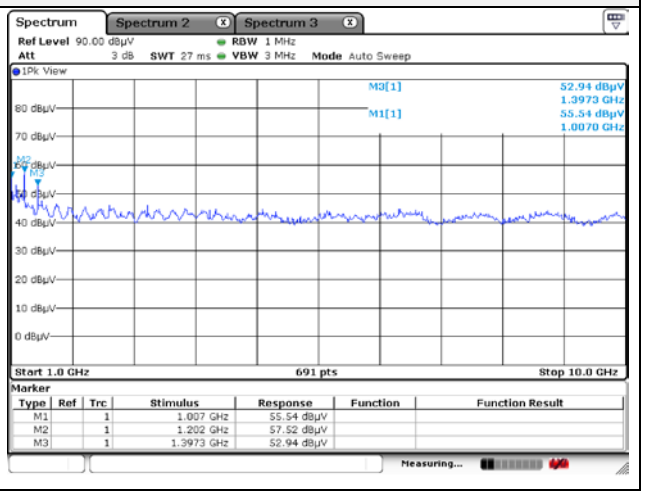
Channel: 01

Frequency (㎒)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1 202.00	51.31	Peak	H	-7.85	-	43.46	74.00	30.54
1 319.00	50.53	Peak	H	-7.10	-	43.43	74.00	30.57
1 449.30	49.45	Peak	H	-6.28	-	43.17	74.00	30.83
1 007.00	55.54	Peak	V	-9.10	-	46.44	74.00	27.56
1 202.00	57.52	Peak	V	-7.85	-	49.67	74.00	24.33
1 397.30	52.94	Peak	V	-6.59	-	46.35	74.00	27.65

Horizontal // Peak for 1 ㎓ to 10 ㎓



Vertical // Peak for 1 ㎓ to 10 ㎓



Note.
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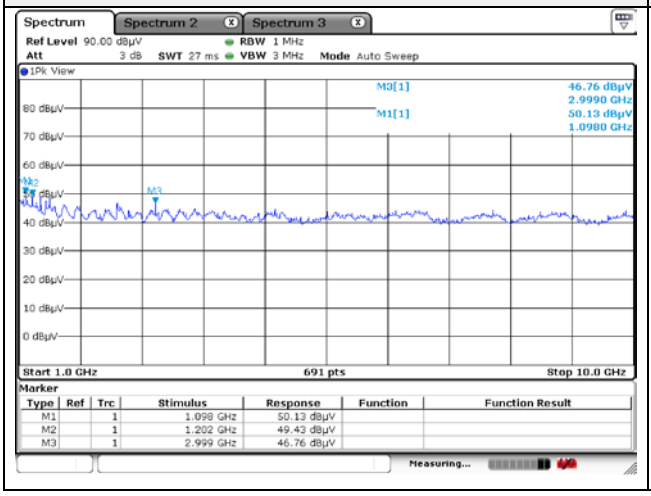
Mode: BW 250 kHz

Distance of measurement: 3 meter

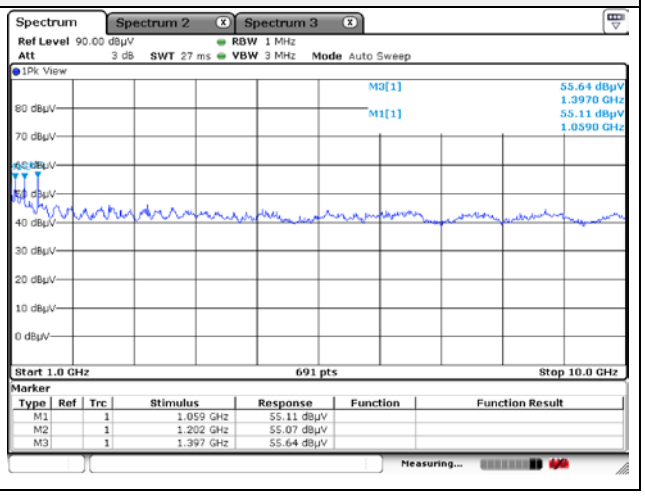
Channel: 16

Frequency (㎒)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1 098.00	50.13	Peak	H	-8.51	-	41.62	74.00	32.38
1 202.00	49.43	Peak	H	-7.85	-	41.58	74.00	32.42
2 999.00	46.76	Peak	H	1.80	-	48.56	74.00	25.44
1 059.00	55.11	Peak	V	-8.76	-	46.35	74.00	27.65
1 202.00	55.07	Peak	V	-7.85	-	47.22	74.00	26.78
1 397.00	55.64	Peak	V	-6.60	-	49.04	74.00	24.96

Horizontal // Peak for 1 ㎓ to 10 ㎓



Vertical // Peak for 1 ㎓ to 10 ㎓



Note.
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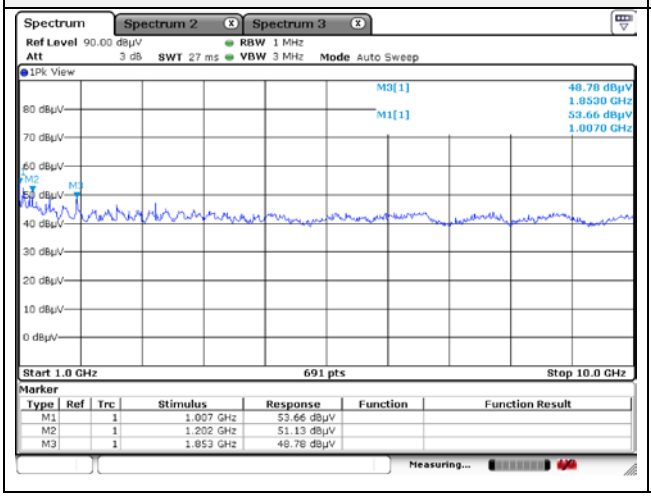
Mode: BW 250 kHz

Distance of measurement: 3 meter

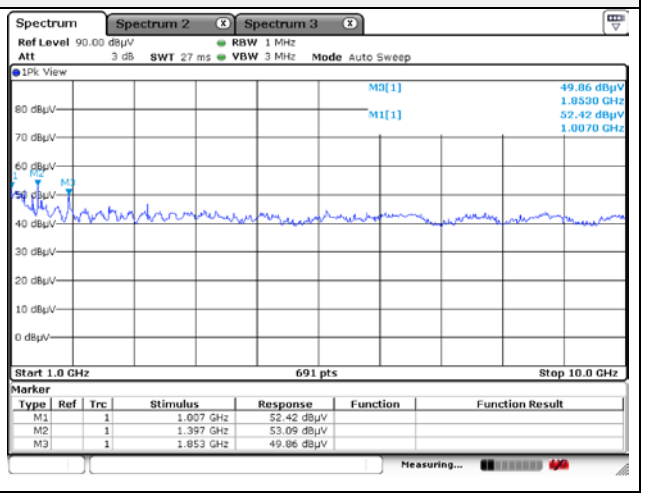
Channel: 31

Frequency (㎒)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1 007.00	53.66	Peak	H	-9.10	-	44.56	74.00	29.44
1 202.00	51.13	Peak	H	-7.85	-	43.28	74.00	30.72
1 853.00	48.78	Peak	H	-2.52	-	46.26	74.00	27.74
1 007.00	52.42	Peak	V	-9.10	-	43.32	74.00	30.68
1 397.00	53.09	Peak	V	-6.60	-	46.49	74.00	27.51
1 853.00	49.86	Peak	V	-2.52	-	47.34	74.00	26.66

Horizontal // Peak for 1 ㎓ to 10 ㎓



Vertical // Peak for 1 ㎓ to 10 ㎓



Note.
1. Average test would be performed if the peak result were greater than the average limit.

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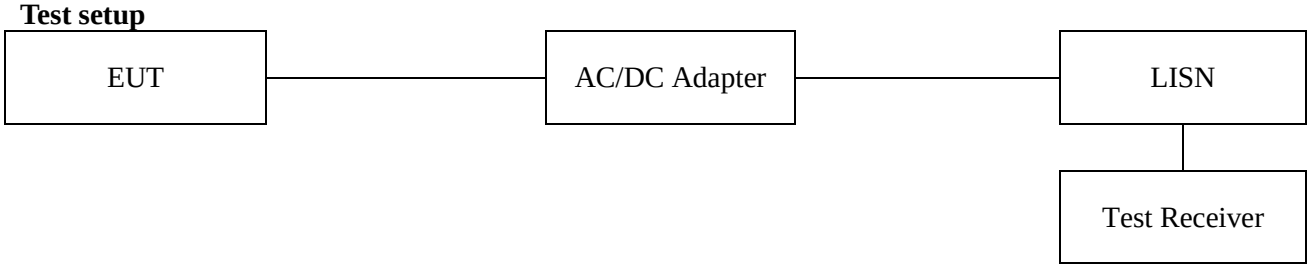
3.3. AC conducted emissions

Test setup



Limit

According to 15.207(a), for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 ㎑ to 30 ㎒, shall not exceed the limits in the following table, as measured using a 50uH/50 ohm line impedance stabilization network (LISN). Compliance with the provision of this paragraph shall on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower applies at the boundary between the frequencies ranges.

Frequency of Emission (㎒)	Conducted limit (dBμV/m)	
	Quasi-peak	Average
0.15 – 0.50	66 - 56*	56 - 46*
0.50 – 5.00	56	46
5.00 – 30.0	60	50

Note.

1. All AC line conducted spurious emission are measured with a receiver connected to a grounded LISN while the EUT is operating at its maximum duty cycle, at maximum power, and the appropriate frequencies. All data rates and modes were investigated for conducted spurious emission. Only the conducted emissions of the configuration that produced the worst case emissions are reported in this section.
3. Both Cable loss and LISN factor are included in measurement level(QP Level or AV Level).

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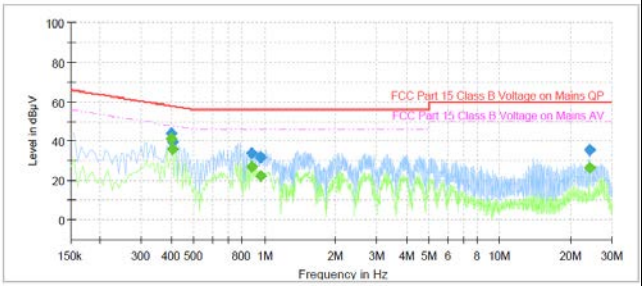
Test results

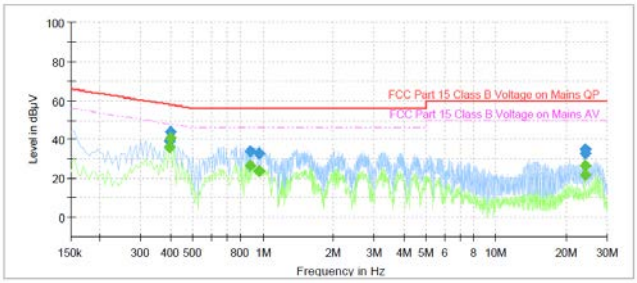
Hot Line



Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.400000	---	41.09	47.85	6.76	1000.0	9.000	L1	10.7
0.400000	43.75	---	57.85	14.10	1000.0	9.000	L1	10.7
0.405000	---	36.25	47.75	11.50	1000.0	9.000	L1	10.7
0.405000	39.52	---	57.75	18.23	1000.0	9.000	L1	10.7
0.885000	---	26.98	46.00	19.02	1000.0	9.000	L1	11.4
0.885000	34.13	---	56.00	21.87	1000.0	9.000	L1	11.4
0.960000	---	22.46	46.00	23.54	1000.0	9.000	L1	11.4
0.960000	31.77	---	56.00	24.23	1000.0	9.000	L1	11.4
24.000000	---	26.60	50.00	23.40	1000.0	9.000	L1	11.0
24.000000	35.24	---	60.00	24.76	1000.0	9.000	L1	11.0

Neutral Line



Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.395000	---	35.88	47.96	12.08	1000.0	9.000	N	10.7
0.395000	39.44	---	57.96	18.52	1000.0	9.000	N	10.7
0.400000	---	40.93	47.85	6.92	1000.0	9.000	N	10.7
0.400000	43.88	---	57.85	13.97	1000.0	9.000	N	10.7
0.885000	---	26.60	46.00	19.40	1000.0	9.000	N	11.4
0.885000	33.77	---	56.00	22.23	1000.0	9.000	N	11.4
0.960000	---	23.66	46.00	22.34	1000.0	9.000	N	11.4
0.960000	32.68	---	56.00	23.32	1000.0	9.000	N	11.4
24.000000	---	26.28	50.00	23.72	1000.0	9.000	N	11.0
24.000000	35.20	---	60.00	24.80	1000.0	9.000	N	11.0
24.040000	---	21.89	50.00	28.11	1000.0	9.000	N	11.0
24.040000	32.66	---	60.00	27.34	1000.0	9.000	N	11.0

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Appendix A. Measurement equipment

Equipment	Manufacturer	Model	Serial No.	Calibration interval	Calibration due.
Spectrum Analyzer	R&S	FSV30	101389	1 year	2020.01.16
Spectrum Analyzer	R&S	FSV30	100736	1 year	2020.01.09
8360B Series Swept Signal Generator	HP	83630B	3844A00786	1 year	2020.01.15
Power Meter	Anritsu	ML2495A	1438001	1 year	2020.01.15
Pulse Power Sensor	Anritsu	MA2411B	1339205	1 year	2020.01.15
AC POWER SOURCE/ ANALYZER	HP	6813A	3729A00754	1 year	2020.01.15
DC Power Supply	Agilent	6632B	MY43004130	1 year	2020.06.24
Attenuator	KEYSIGHT	8493C	82506	1 year	2020.01.15
Loop Antenna	Schwarzbeck	FMZB1513	225	2 years	2021.02.15
Trilog-broadband antenna	S/B	VULB 9163	714	2 years	2020.11.26
Horn Antenna	A.H	SAS-571	414	2 years	2021.02.11
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA 9170550	2 years	2021.02.19
High Pass Filter	Wainwright Instrument Gmbh	WHJS3000-10TT	1	1 year	2020.06.25
Low Pass Filter	Wainwright Instrument Gmbh	WLK1.0/18G-10TT	1	1 year	2020.06.24
Preamplifier	R&S	SCU01	100603	1 year	2020.11.25
Preamplifier	AGILENT	8449B	3008A01742	1 year	2020.01.08
EMI Test Receiver	R&S	ESR3	101781	1 year	2020.04.22
EMI Test Receiver	R&S	ESU26	100552	1 year	2020.04.19
Pulse Limiter	R&S	ESH3-Z2	101915	1 year	2020.11.25
LISN	R&S	ENV216	101787	1 year	2020.01.04

Peripheral devices

Device	Manufacturer	Model No.	Serial No.
Laptop	LG Electronics Inc.,	LGS53	306QCZP560949
Test board	N/A	N/A	N/A

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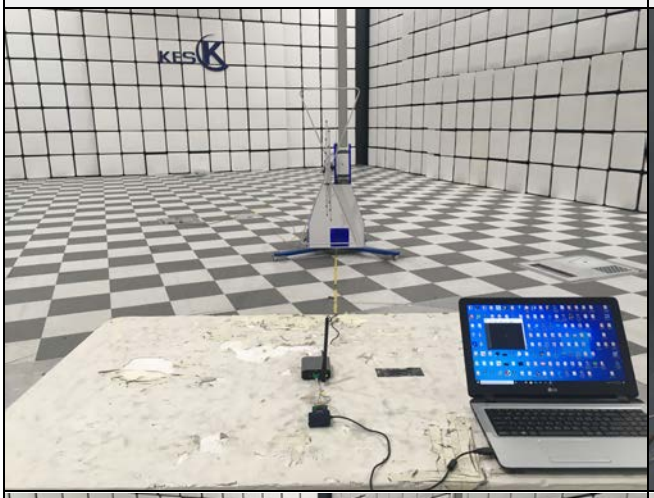
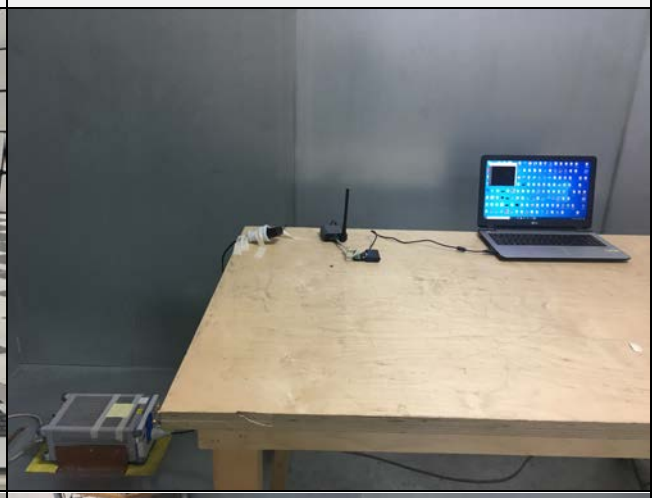
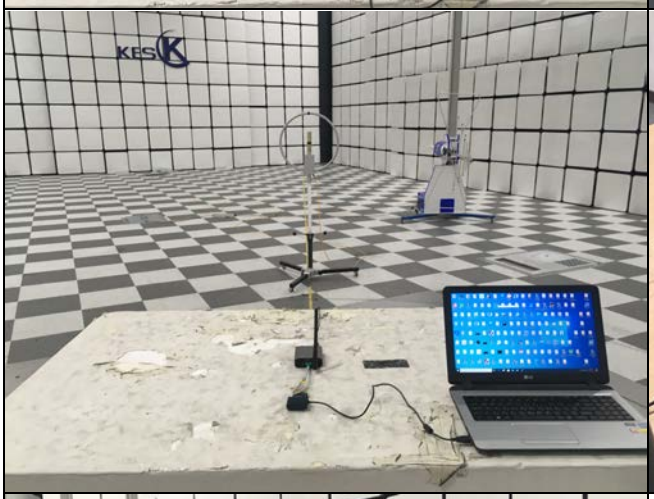
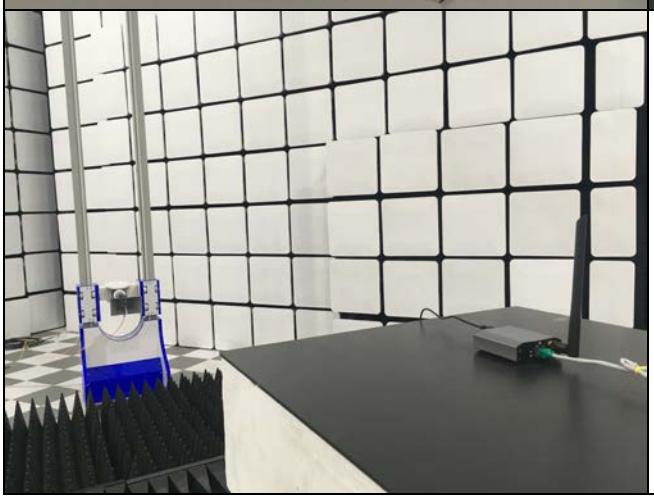
Appendix B. Test setup photos

Radiated	AC conducted
	
	
	Blank

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