TEST REPORT

Part 15 Subpart C 15.247

Equipment under test	HiTRONIC Blaster
Model name	HEBS-B-2A
FCC ID	2ATCL-HEBS-B-2A
Applicant	HANWHA CORPORATION
Manufacturer	HANWHA CORPORATION
Date of test(s)	2019.05.16 ~ 2019.05.21
Date of issue	2019.05.22

Issued to
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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
-	2019.05.22	KES-RF-19T0061	Initial

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1. General information

Applicant:	HANWHA CORPORATION
Applicant address:	04541 86, Cheonggyecheon-ro, Jung-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):	15.247
FCC ID:	2ATCL-HEBS-B-2A
Test device serial No.:	☒ Production ☐ Pre-production ☐ Engineering

1.1. EUT description

Equipment under test	HiTRONIC Blaster
Frequency range	13.56 ㎒ (NFC) 903 ㎒ ~ 927 ㎒ (Telecommand) 2 402 ㎒ ~ 2 480 ㎒ (EDR)
Model:	HEBS-B-2A
Modulation technique	ASK, FSK, π/4-DQPSK, 8DPSK
Number of channels	13.56 ㎒ (NFC) : 1ch 903 ㎒ ~ 927 ㎒ (Telecommand) : 120ch 2 402 ㎒ ~ 2 480 ㎒ (EDR) : 79ch
Antenna specification	Telecommand Antenna Peck Gain : 1.2 dBi EDR Antenna Peck Gain : 1 dBi NFC Flexible Antenna : N/A
Power source	DC 10.8 V

1.2. Test configuration

The **HANWHA CORPORATION // HEBS-B-2A // FCC ID: 2ATCL-HEBS-B-2A** was tested according to the specification of EUT, the EUT must comply with following standards and KDB documents.

FCC Part 15.247
KDB 558074 D01 v05 r02
ANSI C63.10-2013

1.3. Device modifications
N/A

1.4. Accessory information
N/A

1.5. Software and Firmware description
The software and firmware installed in the EUT is UC_01305

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).
= 0.70 + 10 = 10.70 (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)
00	903
.	.
60	915
.	.
120	927

2. Summary of tests

Section in FCC Part 15	Test description	Test results
15.247(a)(2)	6 ㏈ bandwidth	Pass
15.247(b)(3)	Output power	Pass
15.247(e)	Power spectral density	Pass
15.205 15.209	Radiated restricted band and emission	Pass
15.247(d)	Conducted spurious emission and band edge	Pass
15.207(a)	AC conducted emissions	Pass

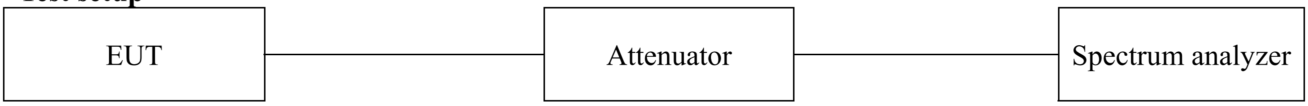
3. Test results

3.1. 6 ㏈ bandwidth

Test procedure

ANSI C63.10-2013 - Section 11.8.2

Test setup



ANSI C63.10-2013 - Section 11.8.2

The automatic bandwidth measurement capability of an instrument may be employed using the X dB bandwidth mode with X set to 6 ㏈, if the functionality described above (i.e., RBW = 100 ㎑, VBW ≥ 3 × RBW, peak detector with maximum hold) is implemented by the instrumentation function. When using this capability, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be ≥ 6 ㏈.

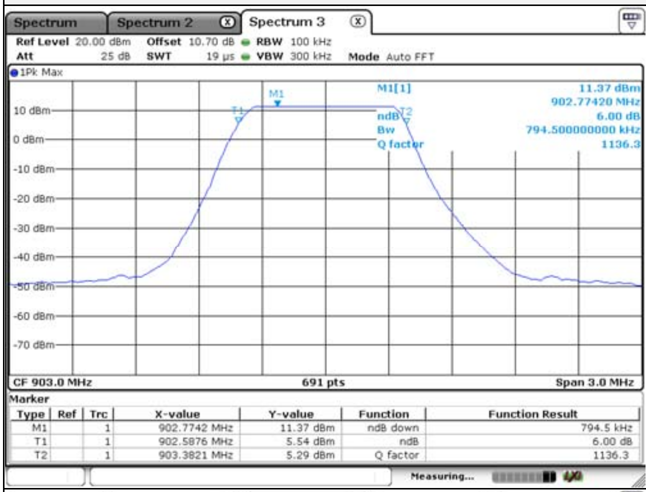
Limit

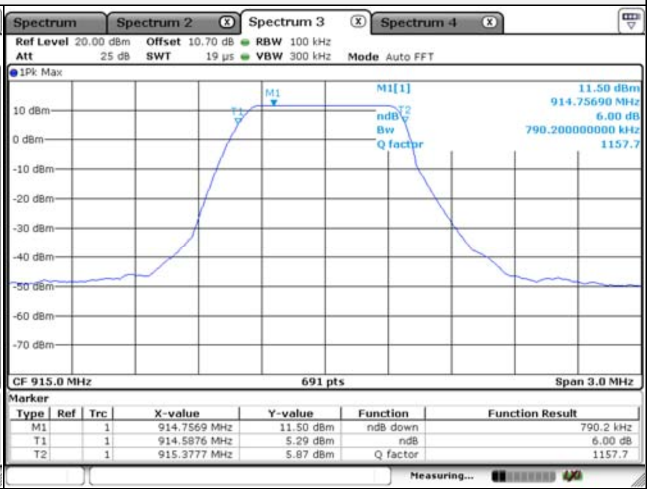
According to §15.247(a)(2), systems using digital modulation techniques may operate 902 ~ 928 ㎒, 2 400 ~ 2 483.5 ㎒, and 5 725 ~ 5 850 ㎒ bands. The minimum 6 ㏈ bandwidth shall be at least 500 ㎑.

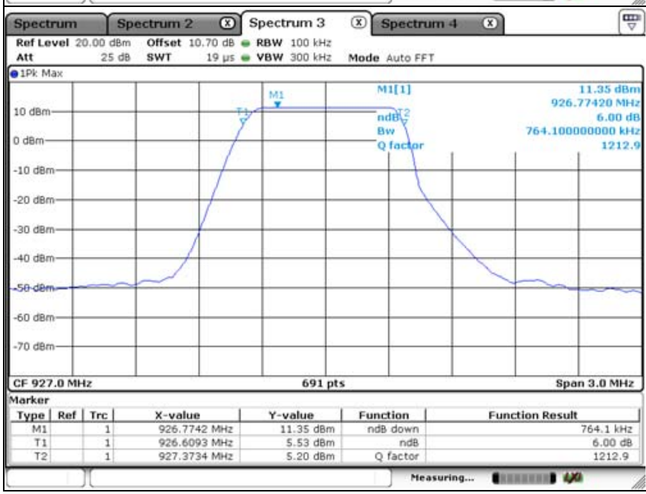
Test results

Frequency(㎒)	6 ㏈ bandwidth(㎒)	Limit(㎒)
903	0.795	0.5
915	0.790	
927	0.764	

900 MHz SRD







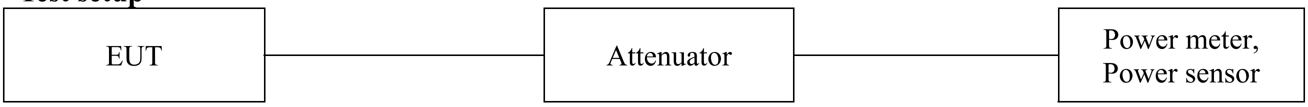
N/A

3.2. Output power

Test procedure

ANSI C63.10-2013 - Section 11.9.1.3 and 11.9.2.3.2

Test setup



ANSI C63.10-2013 - Section 11.9.1.3

The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS ba ndwidth and shall use a fast-responding diode detector.

ANSI C63.10-2013 - Section 11.9.2.3.2

Alternatively, measurements may be performed using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Because the measurement is made only during the ON time of the transmitter, no duty cycle correction is required.

Limit

According to §15.247(b)(3), For systems using digital modulation in the 902~928 ㎒, 2 400~2 483.5 ㎒, and 5 725~5 850 ㎒ bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted out-put power. Maximum Conducted Out-put Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

Test results

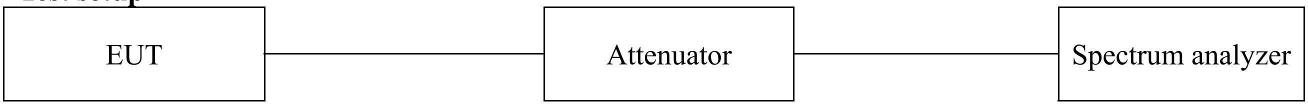
Mode	903 ㎒		915 ㎒		927 ㎒	
	Peak (dBm)	Average (dBm)	Peak (dBm)	Average (dBm)	Peak (dBm)	Average (dBm)
903 ~ 927 MHz (Telecommand)	11.64	11.48	11.62	11.49	11.58	11.43

3.3. Power spectral density

Test procedure

ANSI C63.10-2013 - Section 11.10.2

Test setup



Section 10.2 & ANSI C63.10-2013 - Section 11.10.2

a. Set analyzer center frequency to DTS channel center frequency.
b. Set the span to 1.5 times the DTS bandwidth.
c. Set the RBW to 3 ㎑ ≤ RBW ≤ 100 ㎑
d. Set the VBW ≥ [3 × RBW].
e. Detector = peak.
f. Sweep time = auto couple.
g. Trace mode = max hold.
h. Allow trace to fully stabilize.
i. Use the peak marker function to determine the maximum amplitude level within the RBW.
j. If measured value exceeds requirement, then reduce RBW (but no less than 3 kHz) and repeat.

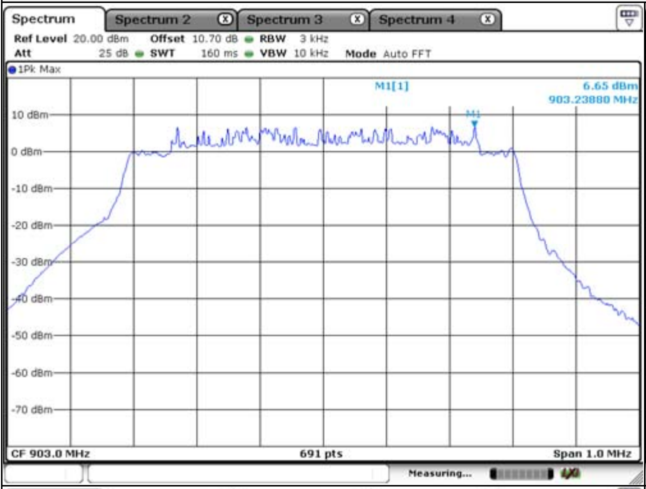
Limit

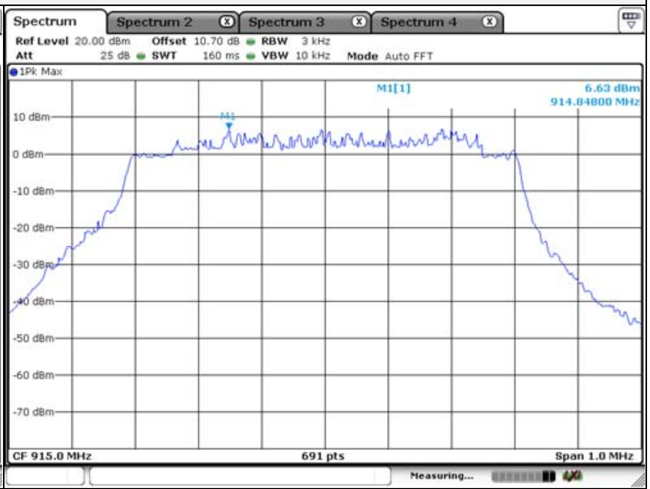
According to §15.247(e), For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 ㏈m in any 3 ㎑ band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

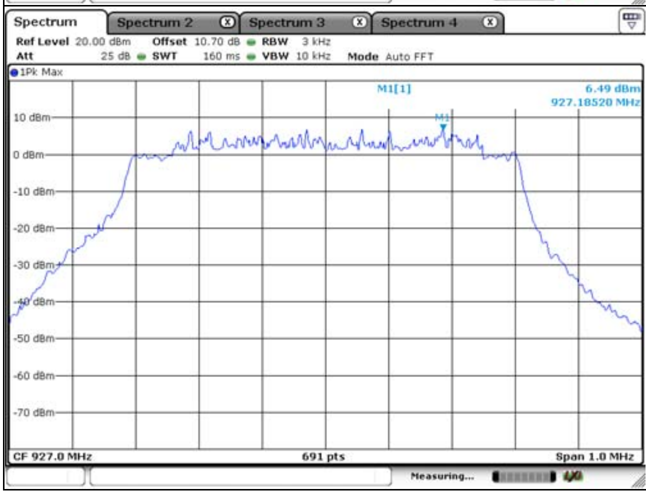
Results

Frequency(㎒)	PSD (㏈m)	Limit(㏈m)
903	6.65	8
915	6.63	
927	6.49	

903 ㎒ ~ 927 ㎒ (Telecommand)





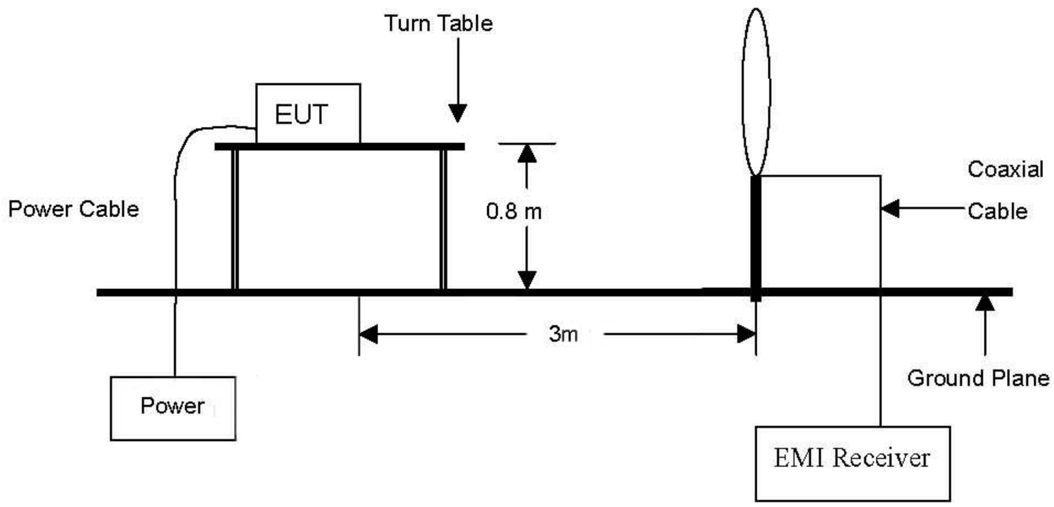


Blank

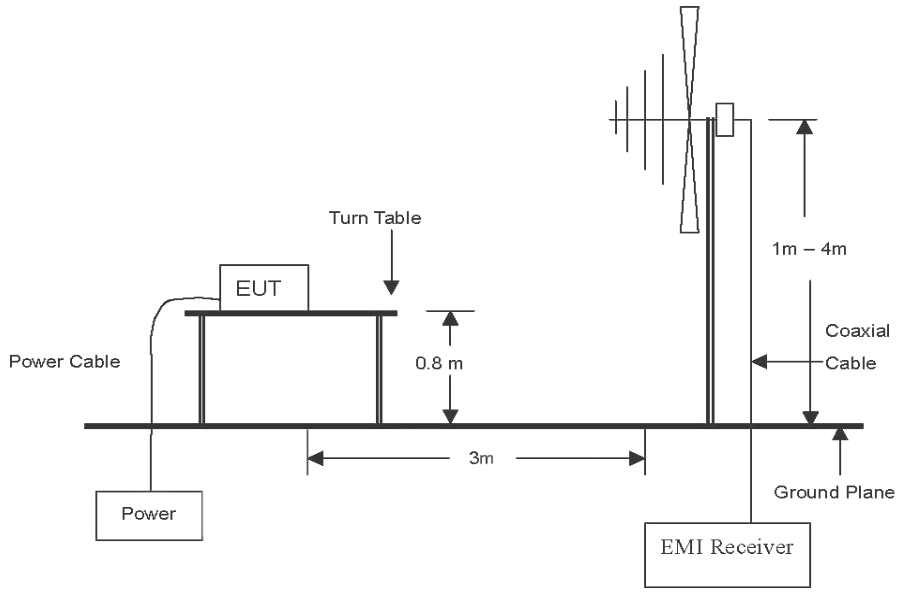
3.4. Radiated restricted band and emissions

Test setup

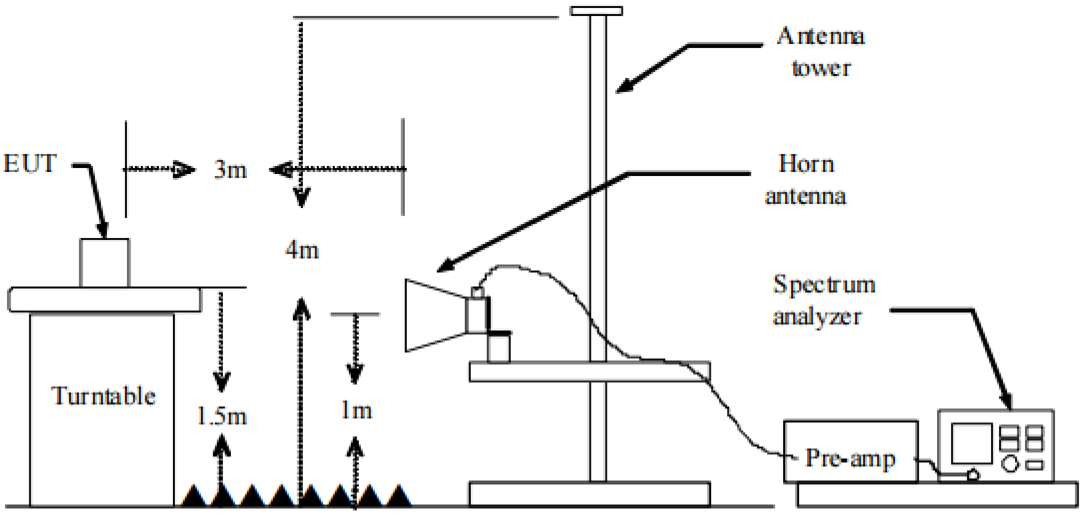
The diagram below shows the test setup that is utilized to make the measurements for emission from 9 ㎑ to 30 ㎒ Emissions.



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.



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. 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.
4. 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

3. Spectrum analyzer settings for f ≥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. f<30 ㎒, extrapolation factor of 40 ㏈/decade of distance. $F_d = 40\log(D_m/Ds)$
   f ≥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 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.

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.

Duty cycle

Regarding to KDB 558074 D01_ v05r02, 6.0,Measurements of duty cycle and transmission duration shall be performed using one of the following techniques:

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

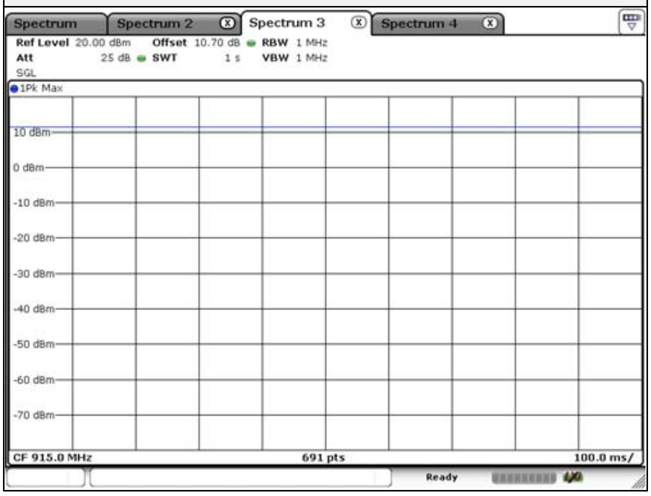
b) The zero-span mode on a spectrum analyzer or EMI receiver if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the on- and off-times of the transmitted signal.

T_{on} time (㎳)	Period (㎳)	Duty cycle (Linear)	Duty cycle (%)	Duty cycle correction factor (㏈)
1000.0	1000.0	1	100	0

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

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

Middle channel



Test results (Below 30 ㎒)

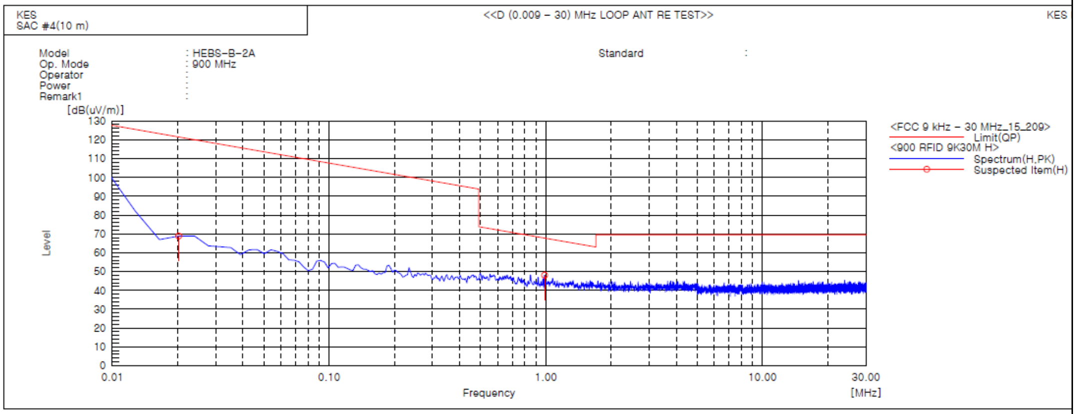
Mode: 900 MHz (Telecommand)

Distance of measurement: 3 meter

Channel: 00 (Worst case)

Frequency (㎒)	Level (dBμV)	Ant. Pol. (H/V)	CF (dB)	Distance factor (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
0.020	49.30	H	19.50	-80	-11.20	41.50	52.70
0.987	27.00	H	21.00	-40	-8.00	27.70	19.70
0.020	50.90	V	19.50	-80	-9.60	41.50	51.10
0.586	28.40	V	20.70	-40	9.10	32.20	23.10

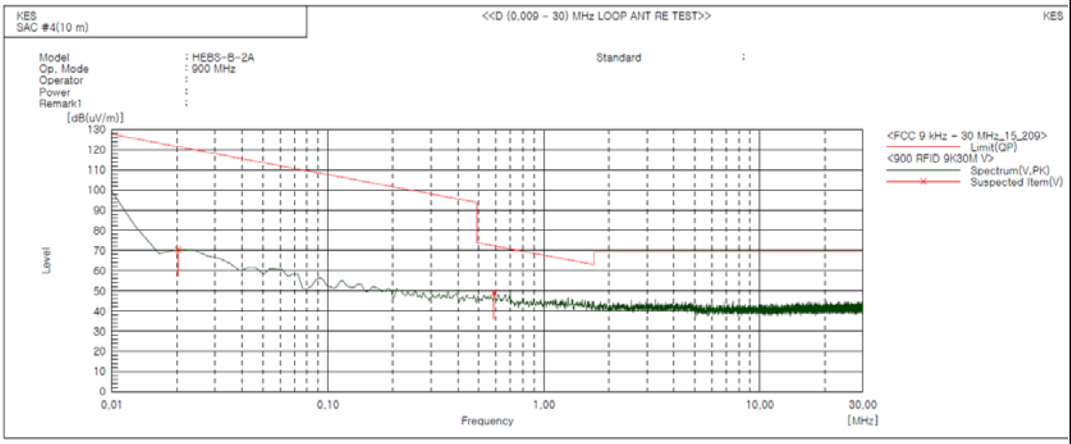
Horizontal



Spectrum Selection

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	0.020	H	49.3	19.5	68.8	121.5	52.7	100.0	232.0	
2	0.987	H	27.0	21.0	48.0	67.7	19.7	100.0	185.0	

Vertical



Spectrum Selection

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	0.020	V	50.9	19.5	70.4	121.5	51.1	100.0	97.0	
2	0.586	V	28.4	20.7	49.1	72.2	23.1	100.0	253.0	

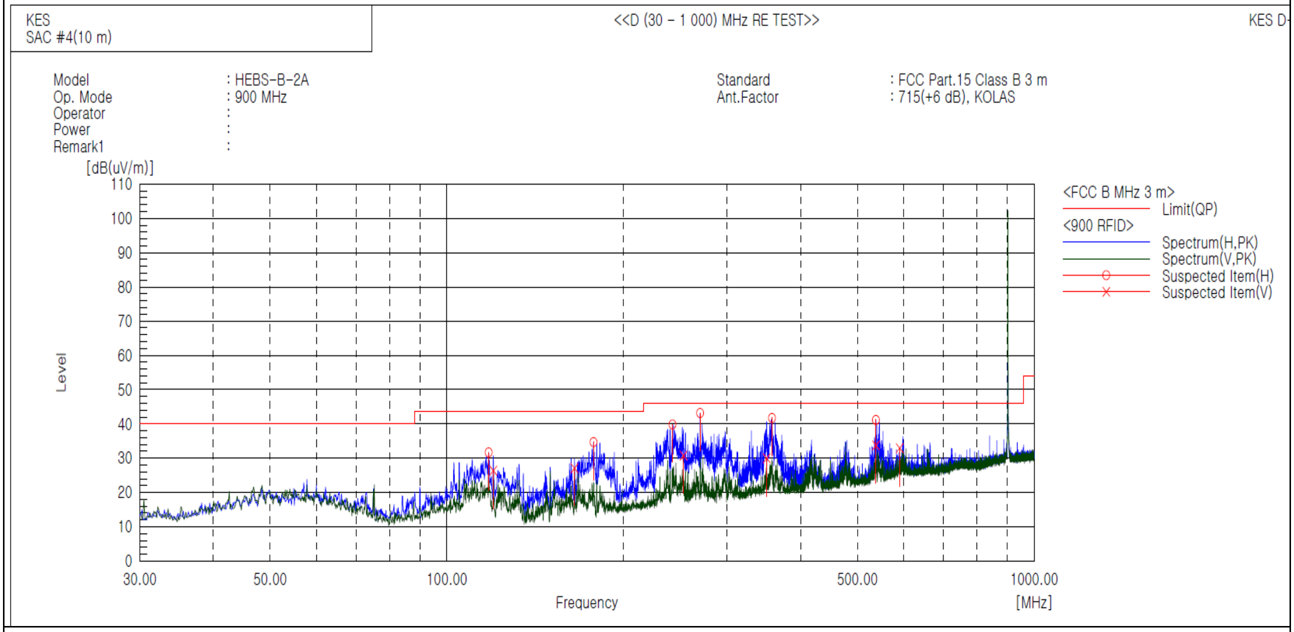
Test results (Below 1 000 ㎒) – Worst case

Mode: 900 MHz (Telecommand)

Distance of measurement: 3 meter

Channel: 00 (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	117.785	H	56.2	-24.5	31.7	43.5	11.8	100.0	245.0	
2	177.683	H	59.7	-25.0	34.7	43.5	8.8	200.0	80.0	
3	242.188	H	61.0	-21.2	39.8	46.0	6.2	100.0	142.0	
4	269.954	H	64.0	-20.8	43.2	46.0	2.8	100.0	253.0	
5	357.739	H	59.2	-17.5	41.7	46.0	4.3	100.0	134.0	
6	537.795	H	54.8	-13.6	41.2	46.0	4.8	400.0	349.0	
7	119.968	V	51.2	-24.8	26.4	43.5	17.1	150.0	302.0	
8	164.951	V	52.7	-25.6	27.1	43.5	16.4	150.0	271.0	
9	252.858	V	51.9	-21.1	30.8	46.0	15.2	150.0	263.0	
10	350.464	V	47.6	-17.6	30.0	46.0	16.0	150.0	137.0	
11	537.674	V	47.4	-13.7	33.7	46.0	12.3	100.0	56.0	
12	590.175	V	44.6	-11.7	32.9	46.0	13.1	100.0	12.0	

Note.

1. No Band edge were detected Below 1 ㎓.

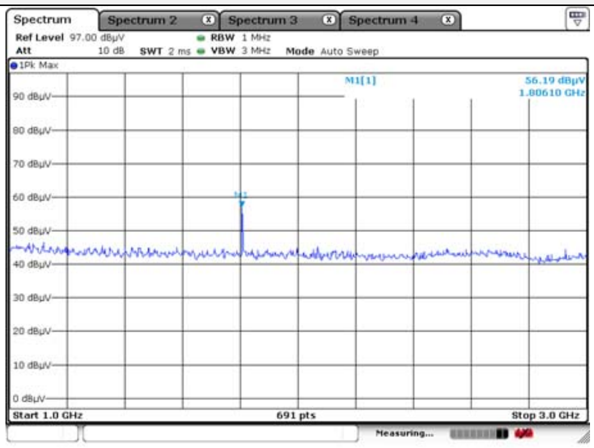
Test results (Above 1 000 MHz)

Mode:	900 MHz (Telecommand)
Distance of measurement:	3 meter
Channel:	00

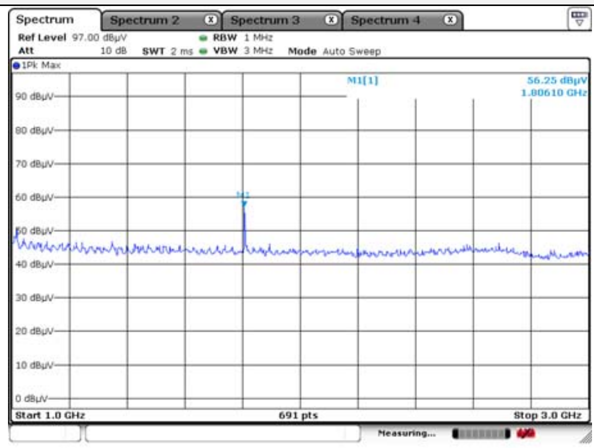
- **Spurious**

Frequency (MHz)	Level (dBµV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1806.10	56.19	Peak	H	-2.76	-	53.43	74.00	20.57
1806.10	56.25	Peak	V	-2.76	-	53.49	74.00	20.51

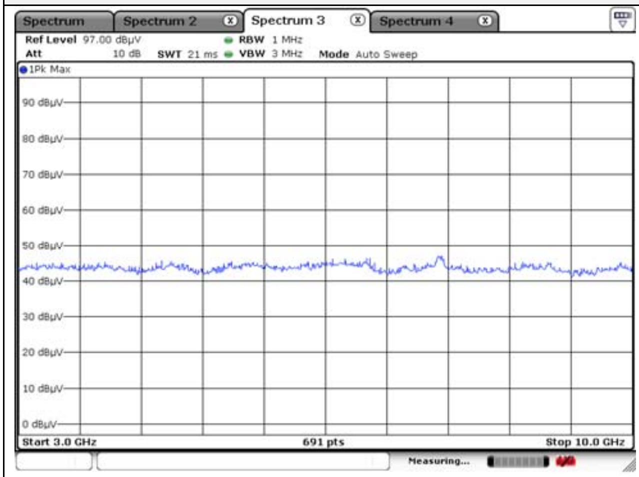
Horizontal // Peak for 1 GHz to 3 GHz



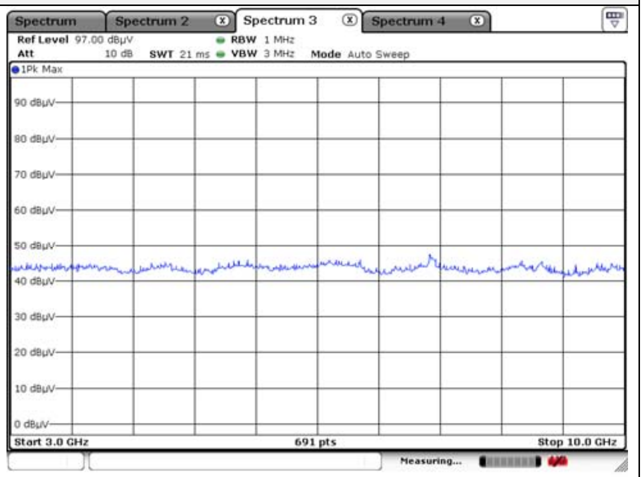
Vertical // Peak for 1 GHz to 3 GHz



Horizontal // Peak for 3 GHz to 10 GHz



Vertical // Peak for 3 GHz to 10 GHz



Note.

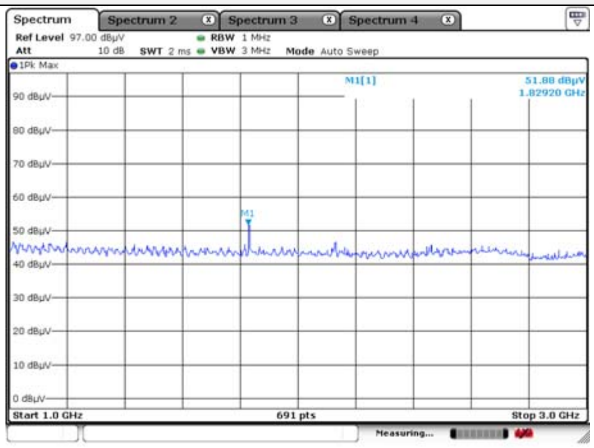
1. No spurious emission were detected above 3 GHz

Mode:	900 MHz (Telecommand)
Distance of measurement:	3 meter
Channel:	60

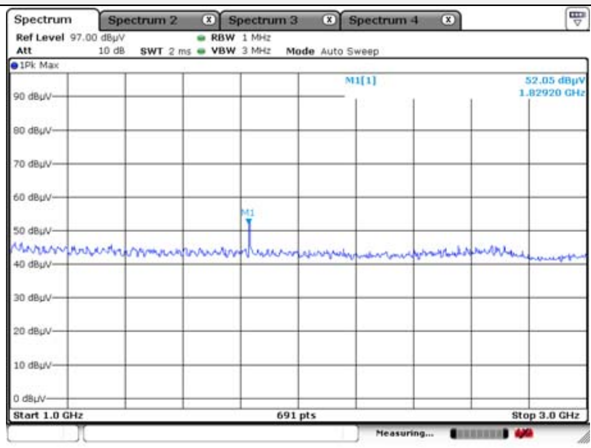
- **Spurious**

Frequency (MHz)	Level (dBµV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1829.20	51.88	Peak	H	-2.54	-	49.34	74.00	24.66
1829.20	52.05	Peak	V	-2.54	-	49.51	74.00	24.49

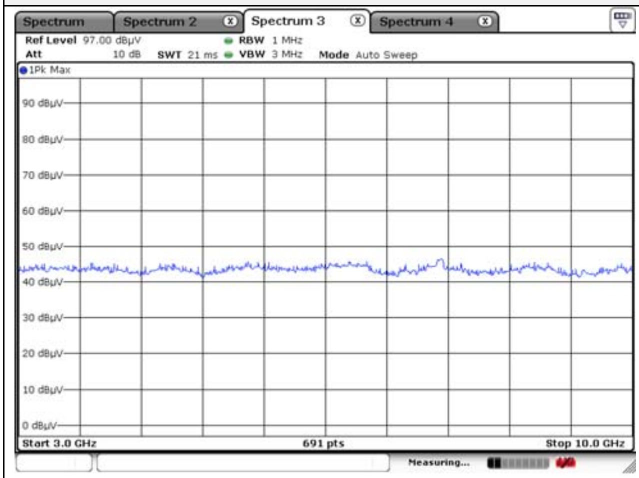
Horizontal // Peak for 1 GHz to 3 GHz



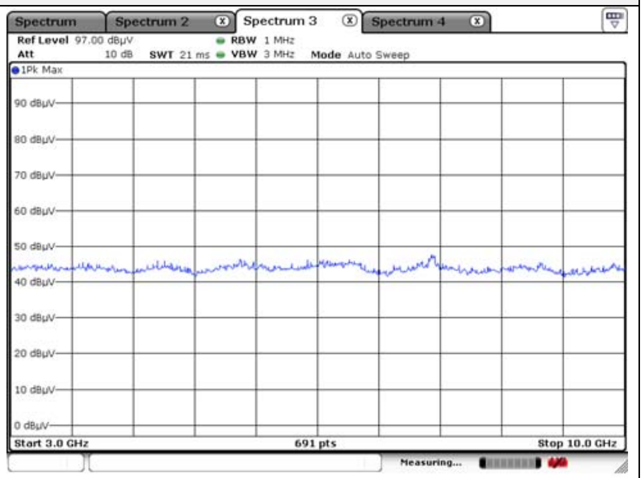
Vertical // Peak for 1 GHz to 3 GHz



Horizontal // Peak for 3 GHz to 18 GHz



Vertical // Peak for 3 GHz to 18 GHz



Note.

1. No spurious emission were detected above 3 GHz

.

Mode: 900 MHz (Telecommand)

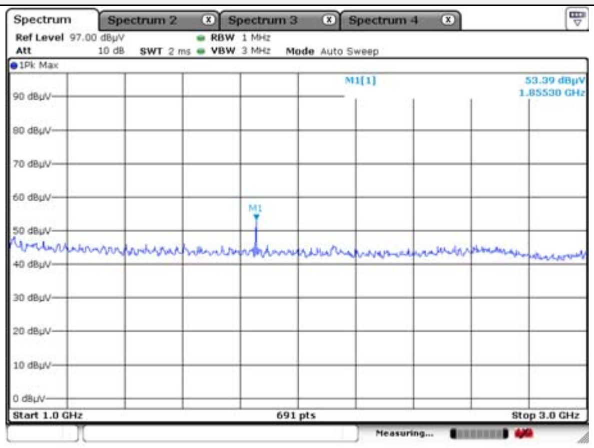
Distance of measurement: 3 meter

Channel: 120

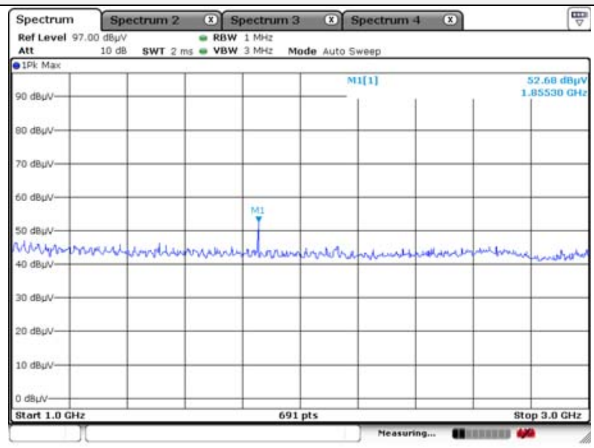
- **Spurious**

Frequency (㎒)	Level (dBµV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1855.30	53.39	Peak	H	-2.30	-	51.09	74.00	22.91
1855.30	52.68	Peak	V	-2.30	-	50.38	74.00	23.62

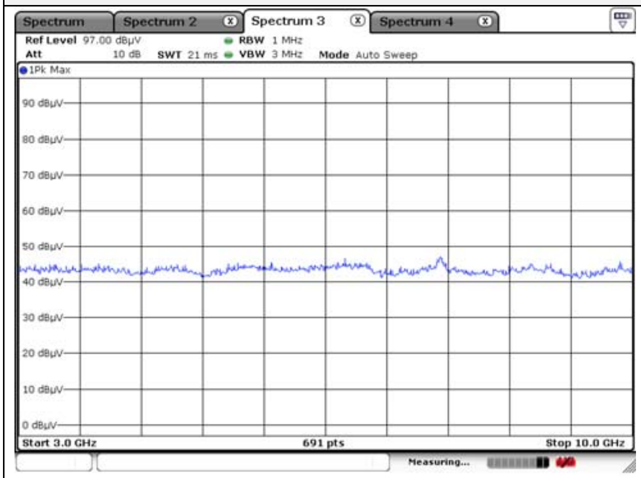
Horizontal // Peak for 1 ㎓ to 3 ㎓



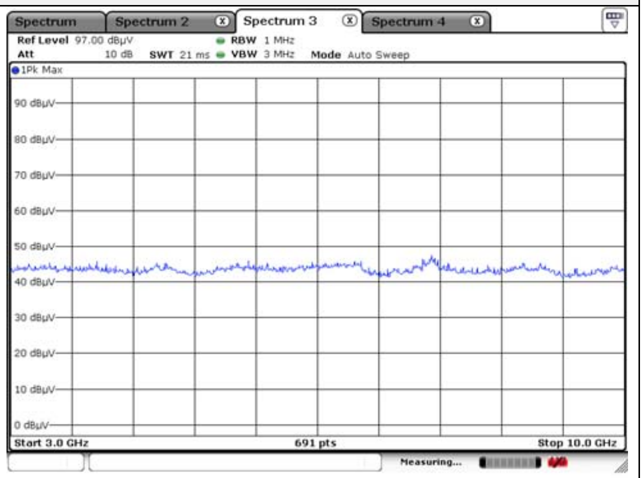
Vertical // Peak for 1 ㎓ to 3 ㎓



Horizontal // Peak for 3 ㎓ to 18 ㎓



Vertical // Peak for 3 ㎓ to 18 ㎓

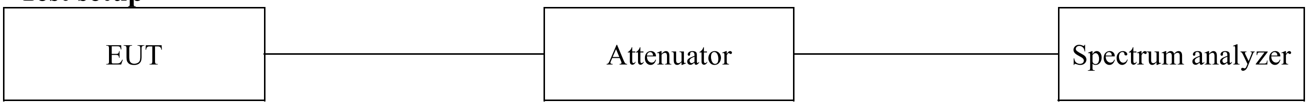


Note.

1. No spurious emission were detected above 3 ㎓

3.5. Conducted spurious emissions & band edge

Test setup



Test procedure

<u>Band edge</u>

ANSI C63.10-2013 - Section 11.11

1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
2. Span was set large enough so as to capture all out of band emissions near the band edge
3. Set the RBW = 100 ㎑
4. Set the VBW = [3 × RBW].
5. Detector = Peak
6. Sweep time = auto
7. Trace mode = max hold
8. Allow trace to fully stabilize.

<u>Out of band emissions</u>

ANSI C63.10-2013 - Section 11.11

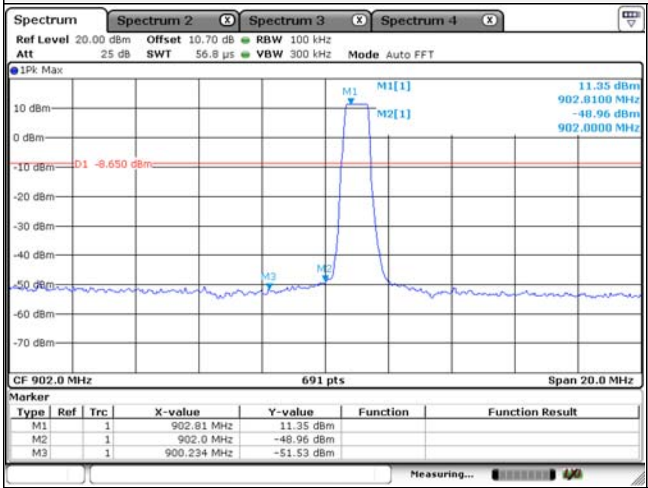
1. Start frequency was set to 30 ㎒ and stop frequency was set to 25 ㎓ for 2.4 ㎓ frequencies and 40 ㎓ for 5 ㎓ frequencies
2. Set the RBW = 100 ㎑
3. Set the VBW = [3 × RBW].
4. Detector = Peak
5. Sweep time = auto
6. Trace mode = max hold
7. Allow trace to fully stabilize.

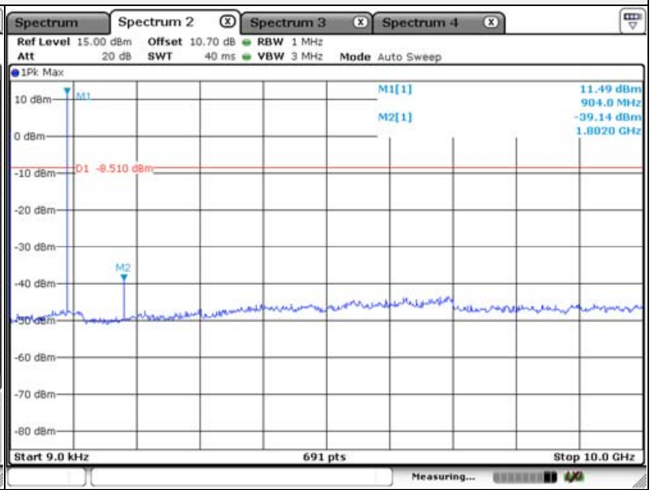
Limit

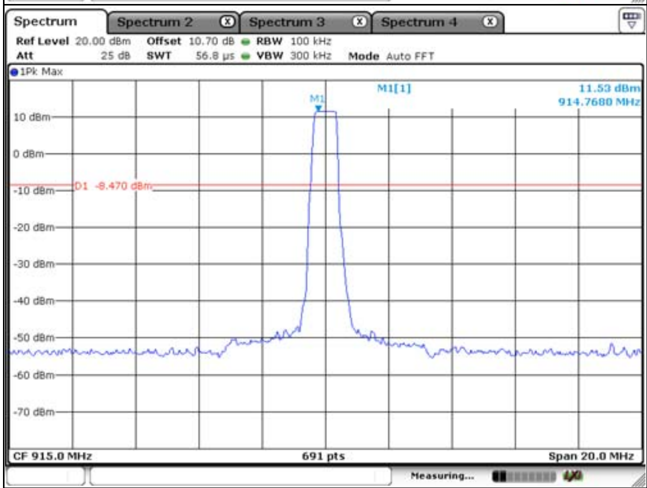
According to 15.247(d), in any 100 ㎑ bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 ㏈ below that in the 100 ㎑ bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval , as permitted under paragraph(b)(3) of this section , the attenuation required under this paragraph shall be 30 ㏈ instead of 20 ㏈. Attenuation below the general limits specified in section 15.209(a) is not required. In addition, radiated emission which in the restricted band, as define in section 15.205(a), must also comply the radiated emission limits specified in section 15.209(a) (see section 15.205(c))

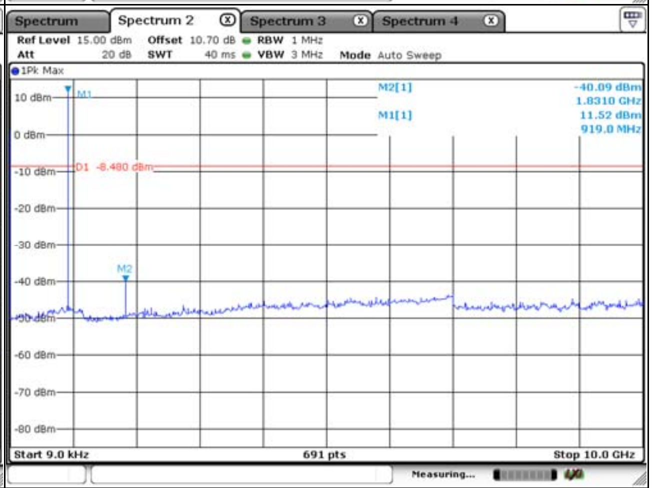
Test results

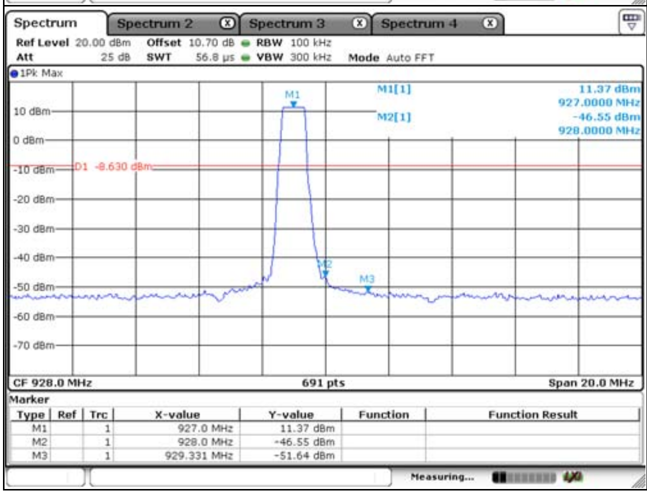
900 MHz SRD

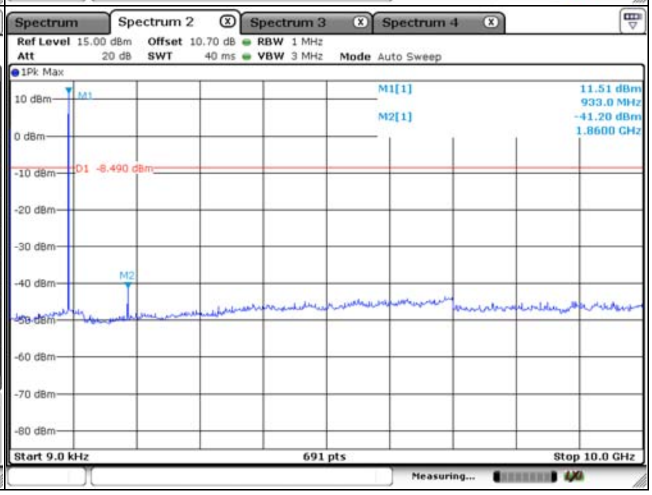






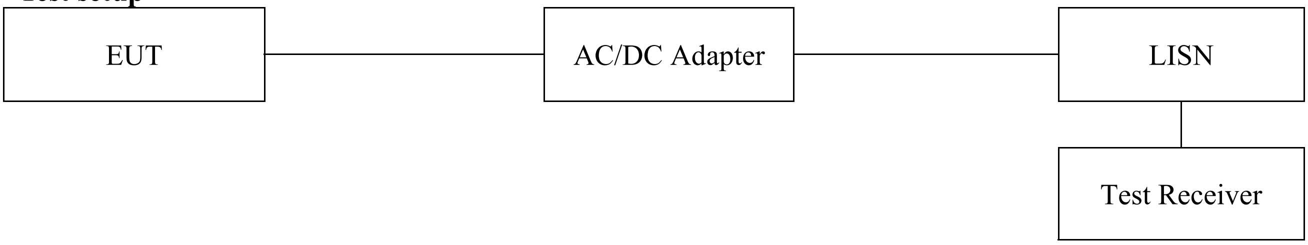






3.6. AC conducted emissions

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.

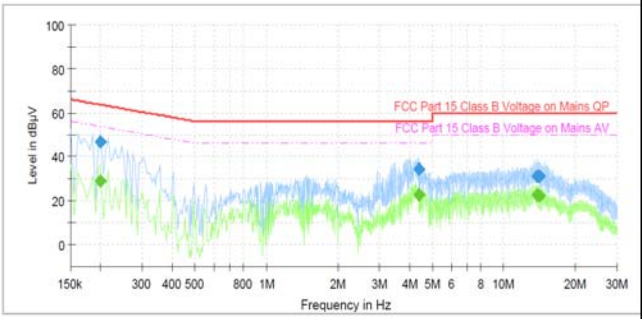
Frequency of Emission (㎒)	Conducted limit (dBµV/m)	
	Quasi-peak	Average
0.15 – 0.50	66 - 56*	56 - 46*
0.50 – 5.00	56	46
5.00 – 30.0	60	50

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).

Test results

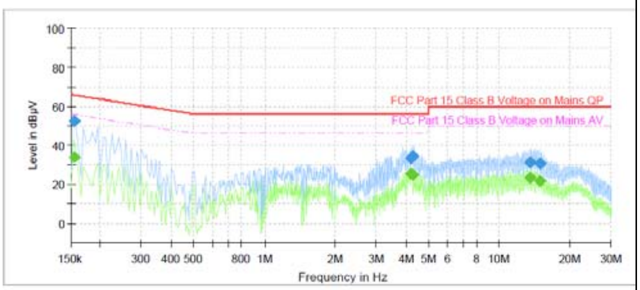
Hot Line



Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.200000	---	29.07	53.61	24.54	1000.0	9.000	L1	9.6
0.200000	46.33	---	63.61	17.28	1000.0	9.000	L1	9.6
4.390000	---	22.73	46.00	23.27	1000.0	9.000	L1	10.1
4.390000	34.36	---	56.00	21.64	1000.0	9.000	L1	10.1
13.860000	---	22.96	50.00	27.04	1000.0	9.000	L1	9.9
13.860000	31.46	---	60.00	28.54	1000.0	9.000	L1	9.9
14.140000	---	22.41	50.00	27.59	1000.0	9.000	L1	9.9
14.140000	31.12	---	60.00	28.88	1000.0	9.000	L1	9.9

Neutral Line



Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.155000	---	33.77	55.73	21.96	1000.0	9.000	N	9.6
0.155000	52.19	---	65.73	13.54	1000.0	9.000	N	9.6
4.205000	---	25.29	46.00	20.71	1000.0	9.000	N	10.1
4.205000	33.57	---	56.00	22.43	1000.0	9.000	N	10.1
4.285000	---	24.98	46.00	21.02	1000.0	9.000	N	10.1
4.285000	34.68	---	56.00	21.32	1000.0	9.000	N	10.1
13.520000	---	23.08	50.00	26.92	1000.0	9.000	N	9.9
13.520000	31.28	---	60.00	28.72	1000.0	9.000	N	9.9
14.980000	---	21.48	50.00	28.52	1000.0	9.000	N	10.0
14.980000	30.94	---	60.00	29.06	1000.0	9.000	N	10.0

Appendix A. Measurement equipment

Equipment	Manufacturer	Model	Serial No.	Calibration interval	Calibration due.
Spectrum Analyzer	R&S	FSV30	101389	1 year	2020.01.09
Spectrum Analyzer	R&S	FSV40	101002	1 year	2019.06.29
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
Attenuator	HP	8494B	2630A12857	1 year	2020.01.15
Loop Antenna	Schwarzbeck	FMZB1513	225	2 years	2021.02.15
Trilog-broadband antenna	SCHWARZBECK	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	2019.06.29
Low Pass Filter	Wainwright Instrument Gmbh	WLK1.0/18G-10TT	1	1 year	2019.06.29
Broadband Amplifier	Schwarzbeck	BBV9721	PS9721-003	1 year	2020.01.16
Amplifier	AGILENT	8449B	3008A00538	1 year	2019.06.29
Amplifier	R&S	SCU 01	100603	1 year	2019.11.26
Attenuator	HP	8491A	32173	1 year	2020.03.11
EMI Test Receiver	R&S	ESU26	100552	1 year	2020.04.19
EMI Test Receiver	R&S	ESR3	101781	1 year	2020.04.22
DC Power supply	HP	6632B	MY43004130	1 year	2019.06.28
Pulse Limiter	R&S	ESH3-Z2	101915	1 year	2019.11.26
LISN	R&S	ENV216	101787	1 year	2020.01.04

Peripheral devices

Device	Manufacturer	Model No.	Serial No.
Notebook computer	LG Electronics Inc.,	LGS53	306QCZP560949