TEST REPORT

KCTL Inc. 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.: KR18-SRF0114-A Page (1) of (35)	KCTL

1. Client

- ◦ Name : RainUs Co., Ltd.
- ◦ Address : 173-36, Saneop-ro, Gwonseon-gu, Suwon-si, Gyeonggi-do, Korea
- ◦ Date of Receipt : 2018-07-30

2. Use of Report : -

3. Name of Product and Model : RF Remote Controller / RC100

4. Manufacturer and Country of Origin : RainUs Co., Ltd. / Korea

5. FCC ID : 2AMKA-RC100

6. Date of Test : 2018-08-20 to 2018-08-22

7. Test Standards : FCC Part 15 Subpart C, 15.247

8. Test Results : Refer to the test result in the test report

Affirmation	Tested by Name : Seonjun Yun (Signature)	Technical Manager Name : Jongha Choi (Signature)

2018-10-17

KCTL Inc.

As a test result of the sample which was submitted from the client, this report does not guarantee the whole product quality. This test report should not be used and copied without a written agreement by KCTL Inc.

REPORT REVISION HISTORY

Date	Revision	Page No
2018-09-20	Originally issued	-
2018-10-17	Revised a typo	6

[Contents]

1. Client information

Applicant: RainUs Co., Ltd.

Address: 173-36, Saneop-ro, Gwonseon-gu, Suwon-si, Gyeonggi-do, Korea

Telephone number: +82 31 326 6783

Contact person: Taehoon Kim / thkim@rainus.co.kr

Manufacturer: RainUs Co., Ltd.

Address: 173-36, Saneop-ro, Gwonseon-gu, Suwon-si, Gyeonggi-do, Korea

2. Laboratory information

Address

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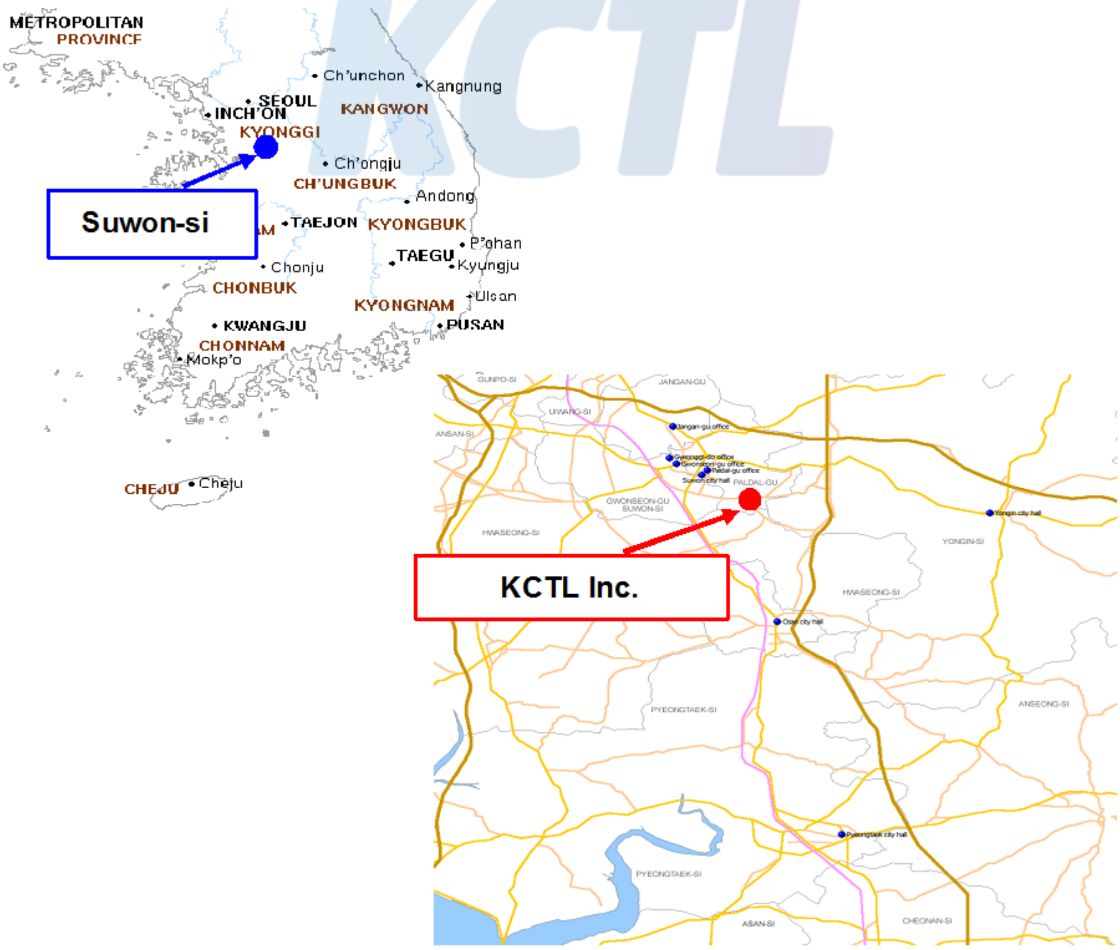
FCC Site Designation No: KR0040, FCC Site Registration No: 687132

VCCI Registration No. : R-3327, G-198, C-3706, T-1849

Industry Canada Registration No. : 8035A

KOLAS NO.: KT231

SITE MAP



3. Description of E.U.T.

3.1 Basic description

Applicant	RainUs Co., Ltd.
Address of Applicant	173-36, Saneop-ro, Gwonseon-gu, Suwon-si, Gyeonggi-do, Korea
Manufacturer	RainUs Co., Ltd.
Address of Manufacturer	173-36, Saneop-ro, Gwonseon-gu, Suwon-si, Gyeonggi-do, Korea
Type of equipment	RF Remote Controller
Basic Model	RC100
Serial number	N/A

3.2 General description

Frequency Range	2 405 ㎒ ~ 2 480 ㎒ (Zigbee)
Type of Modulation	DSSS
The number of channels	16 ch
Type of Antenna	PIFA Antenna
Antenna Gain	-0.04 dBi
Transmit Power	5.05 dBm
Power supply	DC 3 V
Product SW/HW version	V09 / V1.0
Radio SW/HW version	V09 / V1.0
Test SW Version	Tera Term v4.91
RF power setting in TEST SW	0

Note : The above EUT information was declared by the manufacturer.

3.3 Ambient Conditions

	Temperature [℃]	Relative humidity [%]
Ambient Conditions	21	65

3.4 Test frequency

	Zigbee
Lowest frequency	2 405 ㎒
Middle frequency	2 440 ㎒
Highest frequency	2 480 ㎒

3.5 Test Voltage

Mode	Voltage
Nominal Voltage	DC 3 V

4. Summary of test results

4.1 Standards & results

FCC Rule Reference	Parameter	Report Section	Test Result
15.203, 15.247(b)(4)	Antenna Requirement	5.1	C
15.247(b)(3)	Maximum Peak Output Power	5.2	C
15.247(e)	Peak Power Spectral Density	5.3	C
15.247(a)(2)	6 dB Channel Bandwidth	5.4	C
-	Occupied Bandwidth	5.4	C
15.247(d),15.205(a),15.209(a)	Spurious Emission, Band Edge and Restricted bands	5.5	C
15.207(a)	Conducted Emissions	5.6	NA (Note2)
Note1) : C = Complies, NC = Not Complies, NT = Not Tested, NA = Not Applicable Note2) : This test is not applicable because the EUT uses battery and it's not to be connected to the public utility(AC) power line.			

4.2 Measurement Uncertainty

Measurement Item	Expanded Uncertainty U = *k*Uc (*k* = 2)	
Conducted RF power	1.44 dB	
Conducted Spurious Emissions	1.52 dB	
Radiated Spurious Emissions	30 MHz ~ 300 MHz:	+4.94 dB, -5.06 dB
		+4.93 dB, -5.05 dB
	300 MHz ~ 1 000 MHz:	+4.97 dB, -5.08 dB
		+4.84 dB, -4.96 dB
	1 GHz ~ 25 GHz:	+6.03 dB, -6.05 dB
Conducted Emissions	9 kHz ~ 150 kHz:	3.75 dB
	150 kHz ~ 30 MHz:	3.36 dB

5. Test results

5.1 Antenna Requirement

5.1.1 Regulation

According to §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

And according to §15.247(b)(4), the conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

5.1.2 Result

-Complied

The transmitter has permanently attached PIFA Antenna (internal antenna) on board.

5.2 Maximum Peak Output Power

5.2.1 Regulation

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 output power. Maximum Conducted Output 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.

According to §15.247(b)(4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 ㏈i. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 ㏈i are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in ㏈ that the directional gain of the antenna exceeds 6 ㏈i.

5.2.2 Measurement Procedure

These test measurement settings are specified in section 9.0 of 558074 D01 DTS Meas Guidance.

5.2.2.1 PKPM1 Peak-reading power meter method

5.2.2.1.1 General

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

If possible, configure or modify the operation of the EUT so that it transmits continuously at its maximum power control level. The intent is to test at 100 % duty cycle; however a small reduction in duty cycle (to no lower than 98 %) is permitted, if required by the EUT for amplitude control purposes. Manufacturers are expected to provide software to the test lab to permit such continuous operation.
If continuous transmission (or at least 98 % duty cycle) cannot be achieved due to hardware limitations (e.g., overheating), the EUT shall be operated at its maximum power control level, with the transmit duration as long as possible, and the duty cycle as high as possible during which sweep triggering/signal gating techniques may be used to perform the measurement over the transmission duration.

5.2.2.1.2 Measurement using a spectrum analyzer (SA)

5.2.2.1.2.1 Method AVGSA-1 (trace averaging with the EUT transmitting at full power throughout each sweep)

a) Set span to at least 1.5 times the OBW.
b) Set RBW = 1-5% of the OBW, not to exceed 1 MHz.
c) Set VBW ≥ 3 x RBW.
d) Number of points in sweep ≥ 2 × span / RBW. (This gives bin-to-bin spacing ≤ RBW/2, so that narrowband signals are not lost between frequency bins.)
e) Sweep time = auto.
f) Detector = RMS (i.e., power averaging), if available. Otherwise, use sample detector mode.
g) If transmit duty cycle < 98 %, use a sweep trigger with the level set to enable triggering only on full power pulses. The transmitter shall operate at maximum power control level for the entire duration of every sweep. If the EUT transmits continuously (i.e., with no off intervals) or at duty cycle ≥ 98 %, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to “free run”.
h) Trace average at least 100 traces in power averaging (i.e., RMS) mode.
i) Compute power by integrating the spectrum across the OBW of the signal using the instrument’s band power measurement function, with band limits set equal to the OBW band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.

5.2.2.1.2.2 Method AVGSA-2 (trace averaging across on and off times of the EUT transmissions, followed by duty cycle correction)

a)Measure the duty cycle, x, of the transmitter output signal as described in 6.0.
b) Set span to at least 1.5 times the OBW.
c) Set RBW = 1-5% of the OBW, not to exceed 1 ㎒.
d) Set VBW ≥ 3 x RBW.
e) Number of points in sweep ≥ 2 × span / RBW. (This gives bin-to-bin spacing ≤ RBW/2, so that narrowband signals are not lost between frequency bins.)
f) Sweep time = auto.
g) Detector = RMS (i.e., power averaging), if available. Otherwise, use sample detector mode.
h) Do not use sweep triggering. Allow the sweep to “free run”.
i) Trace average at least 100 traces in power averaging (i.e., RMS) mode; however, the number of traces to be averaged shall be increased above 100 as needed such that the average accurately represents the true average over the on and off periods of the transmitter.
j) Compute power by integrating the spectrum across the OBW of the signal using the instrument’s band power measurement function with band limits set equal to the OBW band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.
k) Add 10 log (1/x), where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times (because the measurement represents an average over both the on and off times of the transmission). For example, add 10 log (1/0.25) = 6 ㏈ if the duty cycle is 25 %.

5.2.3 Test Result

- Complied

Channel	Frequency [㎒]	Result [dBm]	Limit [dBm]	Margin [dB]	Average Power [dBm]
Lowest	2 405	5.05	30.00	24.95	-2.71
Middle	2 440	4.15	30.00	25.85	-3.53
Highest	2 480	3.05	30.00	26.95	-4.63

NOTE:

1. We took the insertion loss of the cable loss into consideration within the measuring instrument.

5.3 Peak Power Spectral Density

5.3.1 Regulation

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.

5.3.2 Measurement Procedure

These test measurement settings are specified in section 10.0 of 558074 D01 DTS Meas Guidance.

5.3.2.1 Method PKPSD (peak PSD)

This procedure shall be used if maximum peak conducted output power was used to demonstrate compliance, and is optional if the maximum conducted (average) output power was used to demonstrate compliance.

1) Set analyzer center frequency to DTS channel center frequency.

2) Set the span to 1.5 times the DTS bandwidth.

3) Set the RBW to: 3 ㎑ ≤ RBW ≤ 100 ㎑.

4) Set the VBW ≥ 3 x RBW.

5) Detector = peak.

6) Sweep time = auto couple.

7) Trace mode = max hold.

8) Allow trace to fully stabilize.

9) Use the peak marker function to determine the maximum amplitude level within the RBW.

10) If measured value exceeds limit, reduce RBW (no less than 3 ㎑) and repeat.

5.3.3 Test Result

- Complied

Channel	Frequency [㎒]	Result (RBW=3 ㎑) [dB m]	Limit [dBm/3 ㎑]	Margin [dB]
Lowest	2 405	-9.52	8.00	17.52
Middle	2 440	-11.10	8.00	19.10
Highest	2 480	-11.67	8.00	19.67

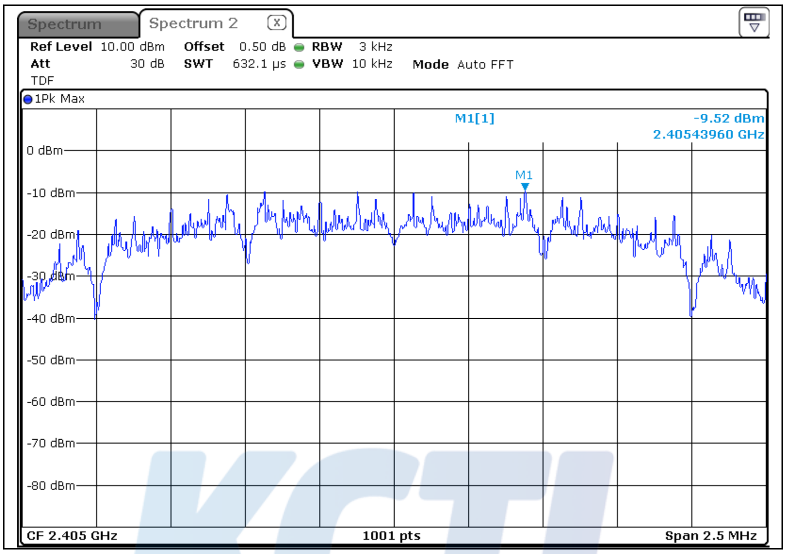
NOTE:

1. We took the insertion loss of the cable loss into consideration within the measuring instrument.

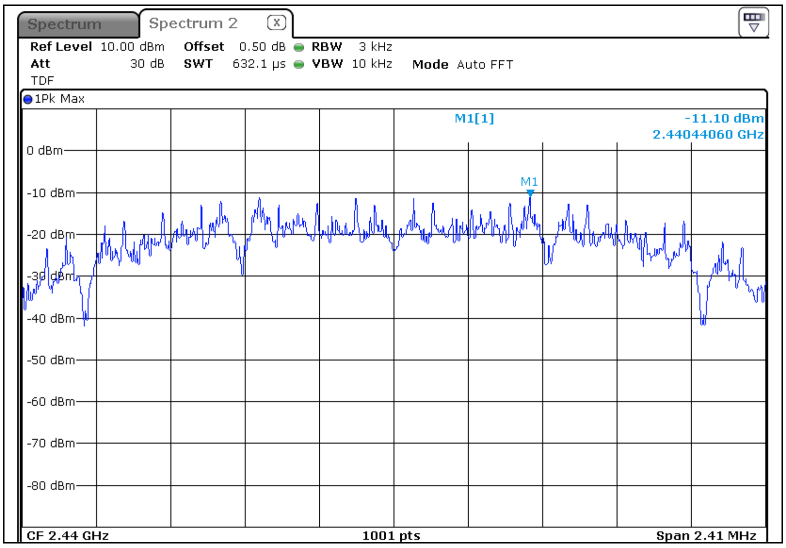
5.3.4 Test Plot

Figure 1. Plot of the Power Density

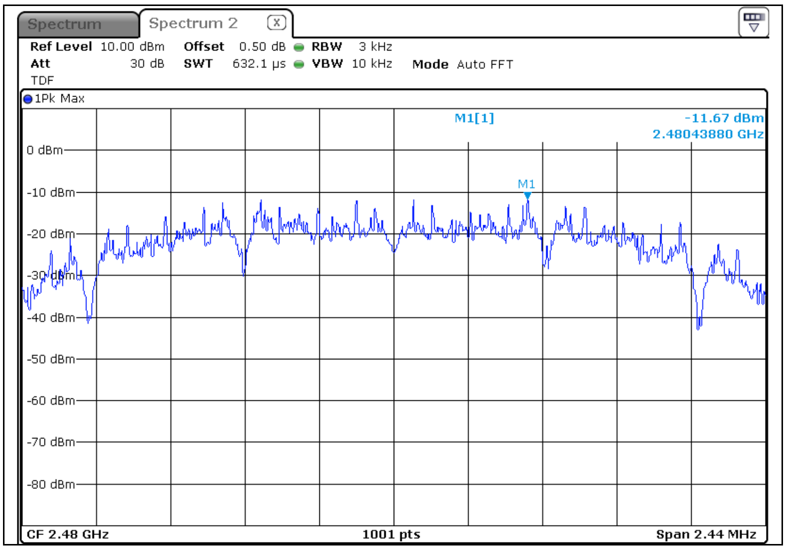
Lowest Channel (2 405 ㎒)



Middle Channel (2 440 ㎒)



Highest Channel (2 480 ㎒)



5.4 6 dB Bandwidth(DTS Channel Bandwidth)

5.4.1 Regulation

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

5.4.2 Measurement Procedure

These test measurement settings are specified in section 8.0 of 558074 D01 DTS Meas Guidance.

5.4.2.1 DTS Channel Bandwidth-Option 1

1) Set RBW = 100 ㎑.
2) Set the video bandwidth (VBW) ≥ 3 x RBW.
3) Detector = Peak.
4) Trace mode = max hold.
5) Sweep = auto couple.
6) Allow the trace to stabilize.
7) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 ㏈ relative to the maximum level measured in the fundamental emission.

5.4.2.2 DTS Channel Bandwidth Measurement Procedure-Option 2

The automatic bandwidth measurement capability of an instrument may be employed using the X ㏈ bandwidth mode with X set to 6 ㏈, if the functionality described above (i.e., RBW = 100 ㎑, VBW ≥ 3 x 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 ㏈.

5.4.3 Test Result

- Complied

Channel	Frequency [MHz]	6 dB Bandwidth [MHz]	Min. Limit [MHz]	Occupied Bandwidth (99 % BW) [MHz]
Lowest	2 405	1.67	0.50	2.25
Middle	2 440	1.61	0.50	2.24
Highest	2 480	1.63	0.50	2.25

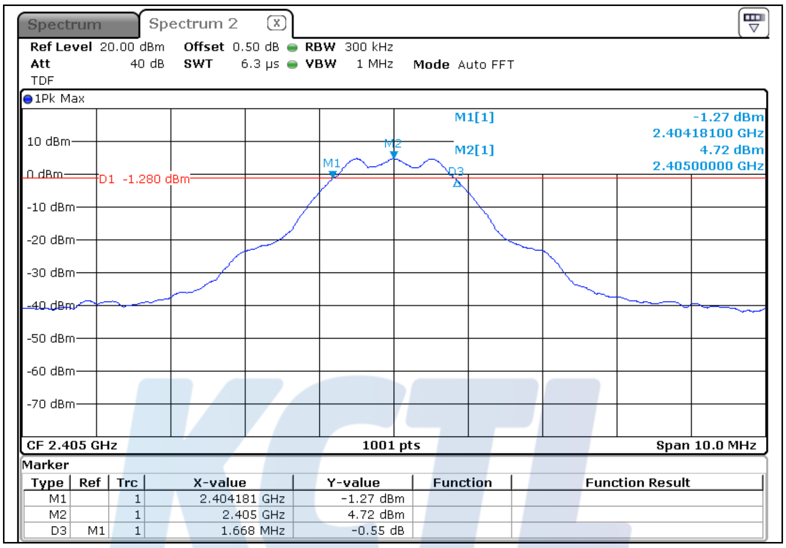
NOTE:
1. We took the insertion loss of the cable loss into consideration within the measuring instrument.

5.4.4 Test Plot

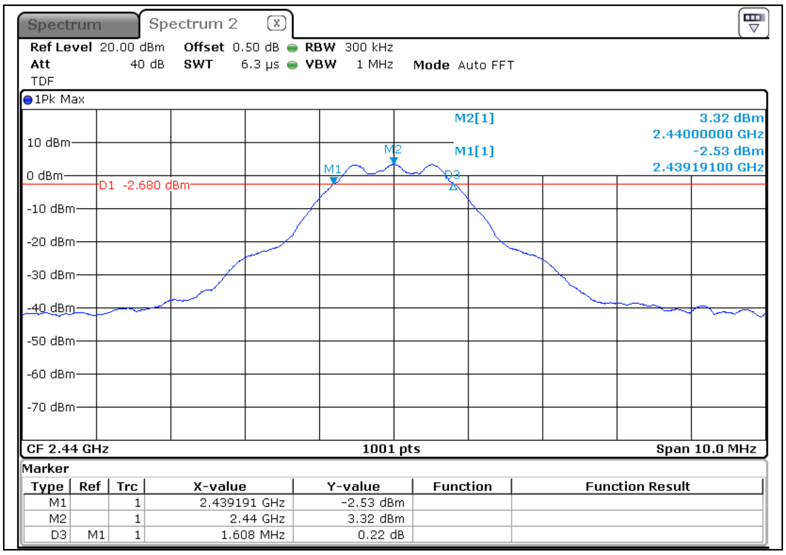
Figure 2. Plot of the 6 ㏈ Bandwidth & Occupied Bandwidth

- 6 ㏈ Bandwidth

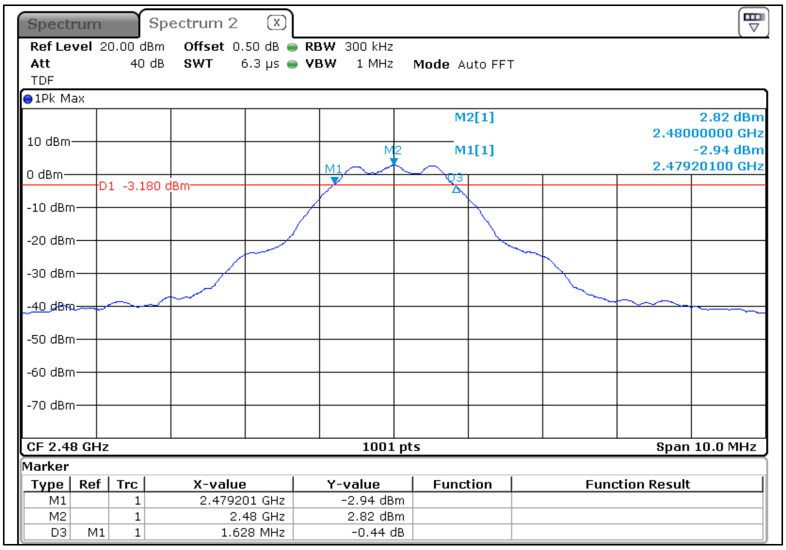
Lowest Channel (2 405 ㎒)



Middle Channel (2 440 ㎒)

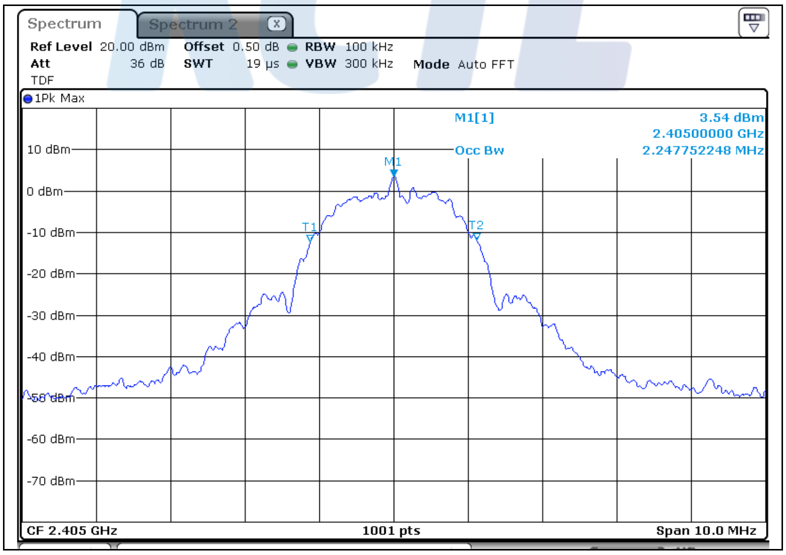


Highest Channel (2 480 ㎒)

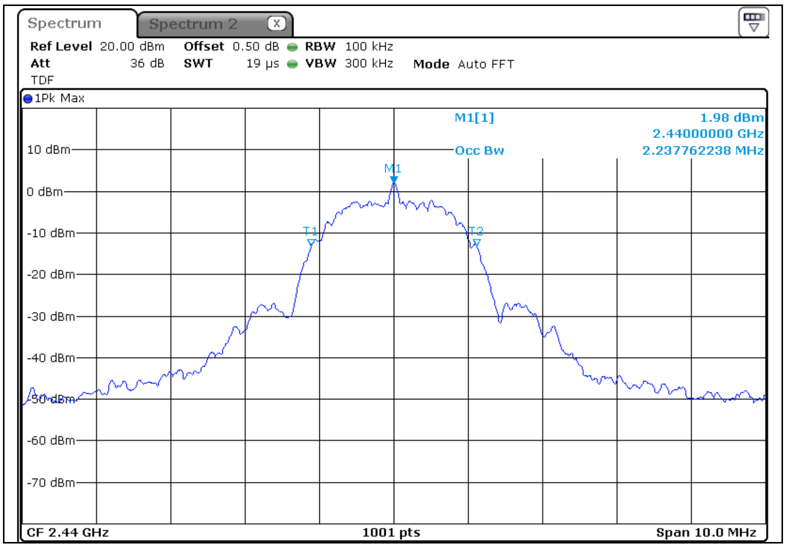


- Occupied Bandwidth

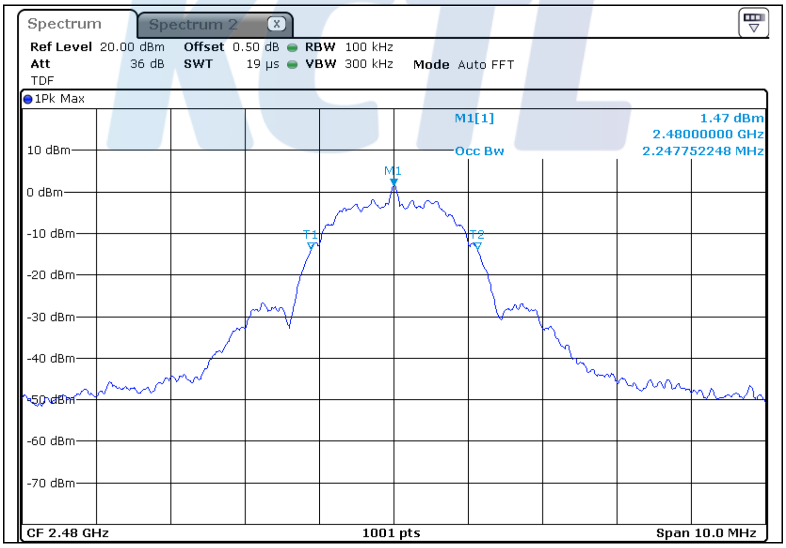
Lowest Channel (2 405 ㎒)



Middle Channel (2 440 ㎒)



Highest Channel (2 480 ㎒)



5.5 Spurious Emission, Band Edge, and Restricted bands

5.5.1 Regulation

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 emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

According to §15.209(a), Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall notexceed 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., §§15.231 and 15.241.

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

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

The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in §15.209. At frequencies equal to or less than 1 000 ㎒, compliance with the limits in §15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1 000 ㎒, compliance with the emission limits in §15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in §15.35 apply to these measurements.

5.5.2 Measurement Procedure

5.5.2.1 Band-edge Compliance of RF Conducted Emissions

5.5.2.1.1 Reference Level Measurement

Establish a reference level by using the following procedure:

1) Set instrument center frequency to DTS channel center frequency.
2) Set the span to ≥ 1.5 times the DTS bandwidth.
3) Set the RBW = 100 ㎑.
4) Set the VBW ≥ 3 x RBW.
5) Detector = peak.
6) Sweep time = auto couple.
7) Trace mode = max hold.
8) Allow trace to fully stabilize.
9) Use the peak marker function to determine the maximum PSD level.

5.5.2.1.2 Emissions Level Measurement

1) Set the center frequency and span to encompass frequency range to be measured.
2) Set the RBW = 100 ㎑.
3) Set the VBW ≥ 3 x RBW.
4) Detector = peak.
5) Ensure that the number of measurement points ≥ span/RBW
6) Sweep time = auto couple.
7) Trace mode = max hold.
8) Allow trace to fully stabilize.
9) Use the peak marker function to determine the maximum amplitude level.

Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) are attenuated by at least the minimum requirements specified in 11.1 a) or 11.1 b). Report the three highest emissions relative to the limit.

5.5.2.2 Conducted Spurious Emissions

Set the spectrum analyzer as follows:

1) Span = wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10th harmonic.
   Typically, several plots are required to cover this entire span.
2) RBW = 100 ㎑
3) VBW ≥ RBW
4) Sweep = auto
5) Detector function = peak
6) Trace = max hold
7) Allow the trace to stabilize. Set the marker on the peak of any spurious emission recorded.
8) Each frequency found during preliminary measurements was re-examined and investigated.
   The test-receiver system was set up to average, peak, and quasi-peak detector function with specified bandwidth.

5.5.2.3 Radiated Spurious Emissions

1) The preliminary and final rdiated measurements were performed to determine the frequency producing the maximum emissions in at a 10m anechoic chamber. The EUT was tested at a distance 3 meters.
2) The EUT was placed on the top of the 0.8-meter height, 1 × 1.5 meter non-metallic table. To find the maximum emission levels, the height of a measuring antenna was changed and the turntable was rotated 360˚.
3) The antenna polarization was also changed from vertical to horizontal. The spectrum was scanned from 9 ㎑ to 30 ㎒ using the loop antenna, and from 30 to 1 000 ㎒ using the TRILOG broadband antenna, and from 1 000 ㎒ to 26 500 ㎒ using the horn antenna.
4) Each frequency found during preliminary measurements was re-examined and investigated. The test-receiver system was set up to average, peak, and quasi-peak detector function with specified bandwidth.
5) The 0.8m height is for below 1 G testing, and 1.5m is for above 1G testing.

Note

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 ㎑ for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1 ㎓.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 ㎒ for Peak detection and frequency above 1 ㎓.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 ㎒ and the video bandwidth is 3 ㎒ for Average detection (AV) at frequency above 1 ㎓. (Detector = RMS, Averaging type = power)
   In case of duty cycle less than 98%, a duty cycle correction factor has to be added to the measurement result.

5.5.3 Test Result

- Complied

1. Band edge & Conducted Spurious Emissions was shown in figure 3 & 4.
   Note: We took the insertion loss of the cable into consideration within the measuring instrument.
2. Measured value of the Field strength of spurious Emissions (Radiated)
3. It tested x,y and z – 3 axis each, mentioned only worst case data at this report.

※ Noise was not measured. (Margin was more than 20 ㏈)

- Below 1 ㎓ data (worst-case)

Lowest channel (2 405 ㎒)

Frequency [㎒]	Receiver Bandwidth [㎑]	Pol. [V/H]	Reading [dB(㎶)]	Cable Loss [dB]	Amp Gain [dB]	Antenna Factor [dB]	Factor [dB]	Result [dB(㎶/m)]	Limit [dB(㎶/m)]	Margin [dB]
Quasi-Peak DATA. Emissions below 30 ㎒										
Not detected										
Quasi-Peak DATA. Emissions below 1 ㎓										
103.841	120	V	22.90	2.19	-33.02	16.93	-13.90	9.00	43.50	34.50
142.884	120	V	27.40	2.59	-29.52	17.13	-9.80	17.60	43.50	25.90
199.508	120	V	22.90	3.11	-30.91	15.30	-12.50	10.40	43.50	33.10
261.102	120	H	21.10	3.59	-31.41	18.42	-9.40	11.70	46.00	34.30
278.805	120	H	21.00	3.72	-30.90	18.78	-8.40	12.60	46.00	33.40
783.933	120	V	20.90	6.53	-27.42	25.59	4.70	25.60	46.00	20.40

NOTE 1. Factor = Cable loss + Amplifier gain + Antenna factor
NOTE 2. 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.

- Above 1 ㎓ data

Lowest channel (2 405 ㎒)

Frequency [㎒]	Receiver Bandwidth [㎑]	Pol. [V/H]	Reading [dB(㎶)]	Cable Loss [dB]	Amp Gain [dB]	Antenna Factor [dB]	DCCF [dB]	Factor [dB]	Result [dB(㎶/m)]	Limit [dB(㎶/m)]	Margin [dB]
Peak DATA. Emissions above 1 ㎓											
1 559.26[1)]	1 000	V	81.36	3.00	-60.72	26.03	-	-31.69	49.68	74.00	24.32
2 338.80[1,2)]	1 000	H	70.32	3.67	-59.12	28.45	-	-27.00	43.32	74.00	30.68
3 243.44	1 000	V	68.12	4.29	-59.91	30.36	-	-25.26	42.86	74.00	31.14
5 906.55	1 000	V	71.23	6.04	-61.81	34.26	-	-21.51	49.73	74.00	24.27
17 679.64	1 000	V	60.91	10.74	-63.26	44.38	-	-8.14	52.77	74.00	21.23
21 712.38	1 000	V	47.90	12.00	-49.45	45.00	-	7.55	55.45	74.00	18.55
25 635.92	1 000	H	46.00	13.40	-46.94	45.50	-	11.96	57.96	74.00	16.04
Average DATA. Emissions above 1 ㎓											
1 559.26[1)]	1 000	V	68.85	3.00	-60.73	26.04	-	-31.69	37.16	54.00	16.84
2 338.80[1,2)]	1 000	H	69.49	3.67	-59.11	28.44	-	-27.00	42.49	54.00	11.51

[1)] Restricted band
[2)] Bandedge

Middle channel (2 440 ㎒)

Frequency [㎒]	Receiver Bandwidth [㎑]	Pol. [V/H]	Reading [dB(㎶)]	Cable Loss [dB]	Amp Gain [dB]	Antenna Factor [dB]	DCCF [dB]	Factor [dB]	Result [dB(㎶/m)]	Limit [dB(㎶/m)]	Margin [dB]
Peak DATA. Emissions above 1 ㎓											
1 593.51[1)]	1 000	V	81.35	3.04	-60.60	26.17	-	-31.39	49.96	74.00	24.04
3 283.83	1 000	H	73.73	4.32	-60.00	30.47	-	-25.21	48.51	74.00	25.49
5 907.00	1 000	V	71.37	6.04	-61.81	34.26	-	-21.51	49.87	74.00	24.13
5 994.00	1 000	V	68.45	6.10	-62.24	34.39	-	-21.75	46.69	74.00	27.31
16 959.17	1 000	V	60.60	10.41	-59.33	40.19	-	-8.73	51.87	74.00	22.13
21 853.95	1 000	V	47.77	12.10	-49.53	45.00	-	7.57	55.34	74.00	18.66
25 953.08	1 000	H	44.80	13.60	-46.60	45.70	-	12.70	57.50	74.00	16.50
Average DATA. Emissions above 1 ㎓											
1 593.51[1)]	1 000	V	59.23	3.04	-60.60	26.17	-	-31.39	27.84	54.00	26.16

[1)] Restricted band

Highest channel (2 480 ㎒)

Frequency [㎒]	Receiver Bandwidth [㎑]	Pol. [V/H]	Reading [dB(㎶)]	Cable Loss [dB]	Amp Gain [dB]	Antenna Factor [dB]	DCCF [dB]	Factor [dB]	Result [dB(㎶/m)]	Limit [dB(㎶/m)]	Margin [dB]
Peak DATA. Emissions above 1 ㎓											
1 634.69	1 000	V	75.07	3.08	-60.46	26.34	-	-31.04	44.03	74.00	29.97
2 483.75[1,2)	1 000	H	78.53	3.77	-59.09	28.72	-	-26.60	51.93	74.00	22.07
3 319.92	1 000	V	77.07	4.34	-60.02	30.56	-	-25.12	51.94	74.00	22.06
4 959.10[1,3)	1 000	V	68.99	5.44	-60.81	32.88	-	-22.49	46.50	74.00	27.50
5 906.75	1 000	V	71.63	6.04	-61.81	34.26	-	-21.51	50.13	74.00	23.87
16 603.47	1 000	V	61.58	10.30	-58.54	39.19	-	-9.05	52.54	74.00	21.46
21 877.86	1 000	V	47.70	12.10	-49.53	45.00	-	7.57	55.28	74.00	18.72
25 761.83	1 000	H	46.27	13.50	-46.84	45.60	-	12.26	58.53	74.00	15.47
Average DATA. Emissions above 1 ㎓											
2 483.75[1,2)	1 000	H	69.69	3.77	-59.09	28.72	-	-26.60	43.09	54.00	10.91
4 959.10[1,3)	1 000	V	56.60	5.44	-60.81	32.88	-	-22.49	34.11	54.00	19.89

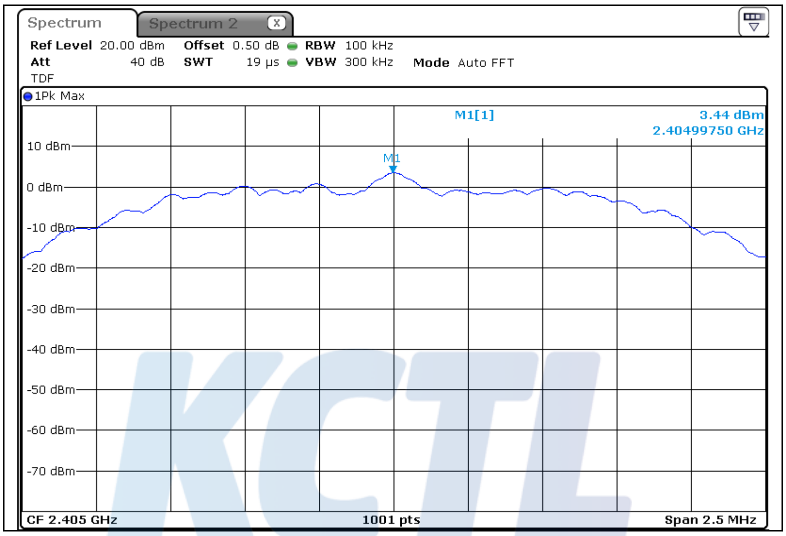
[1)] Restricted band
[2)] Bandedge
[3)] Harmonic

5.7.4 Test Plot

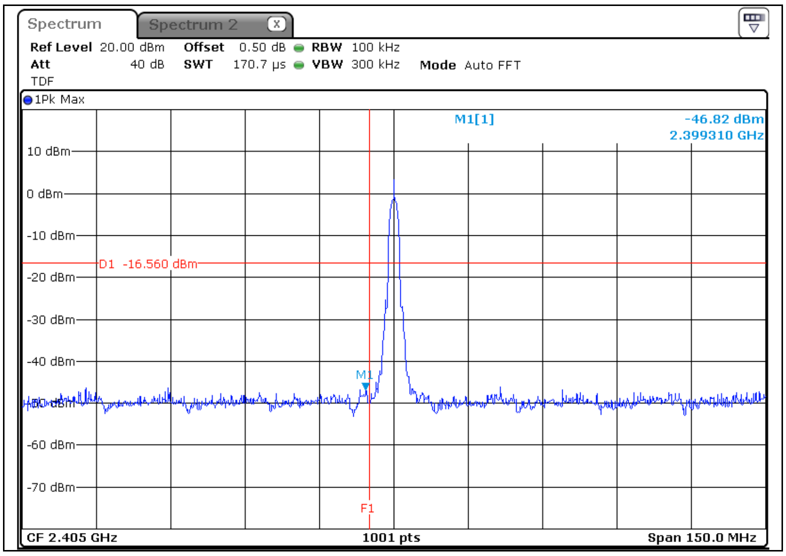
Figure 3. Plot of the Band-edge & Conducted Spurious Emissions

Lowest Channel (2 405 ㎒)

Reference

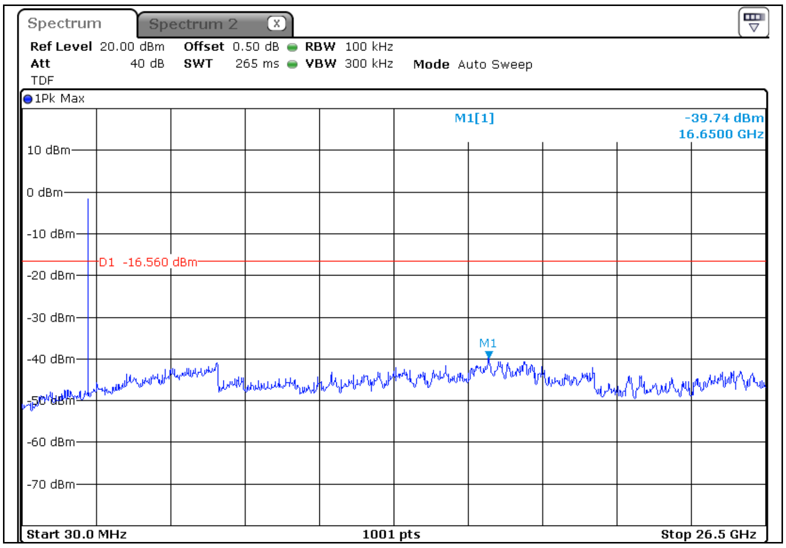


Band-edge



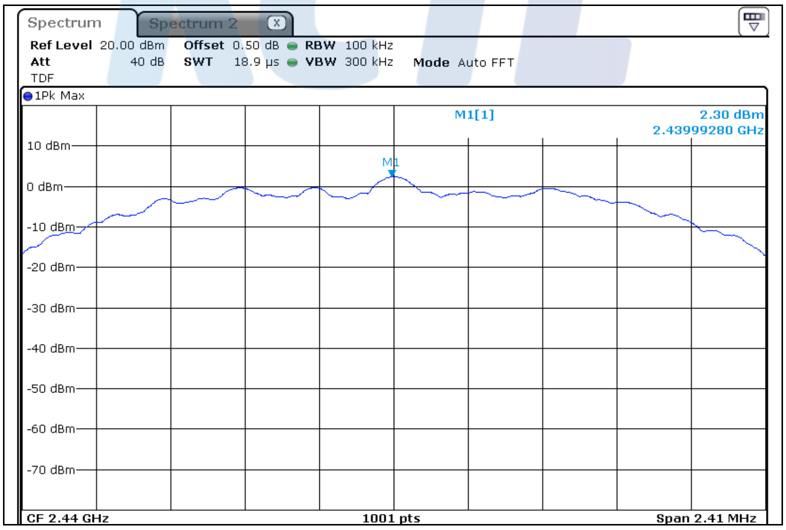
- Result of 2 400.0 ㎒

Conducted Spurious Emissions

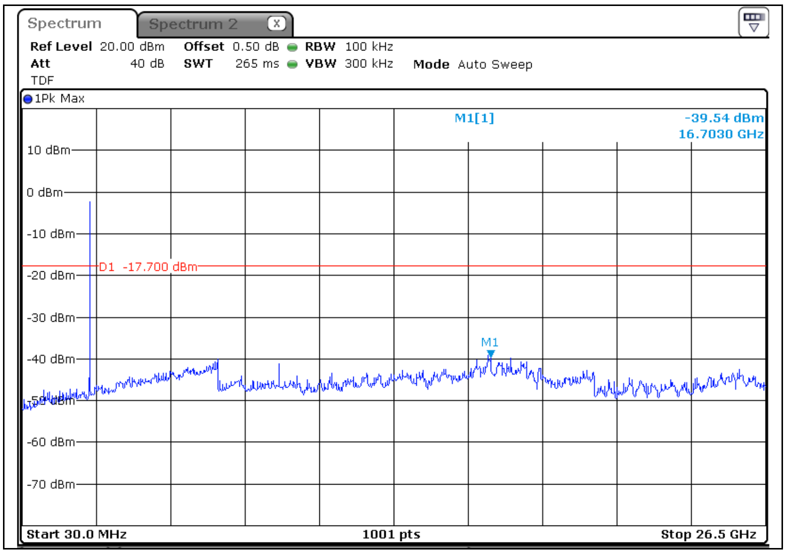


Middle Channel (2 440 ㎒)

Reference

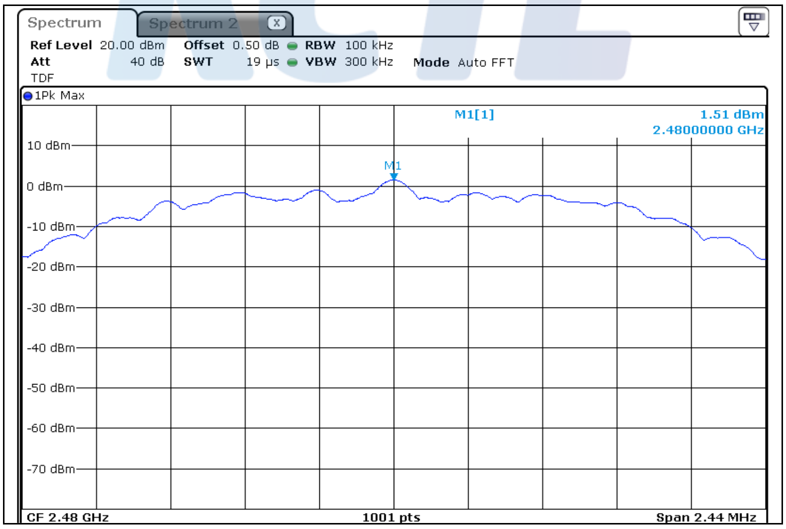


Conducted Spurious Emissions

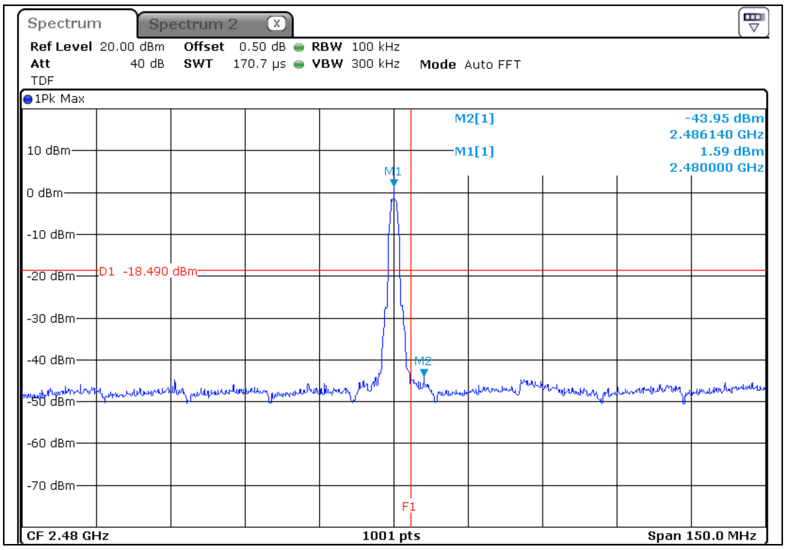


Highest Channel (2 480 ㎒)

Reference

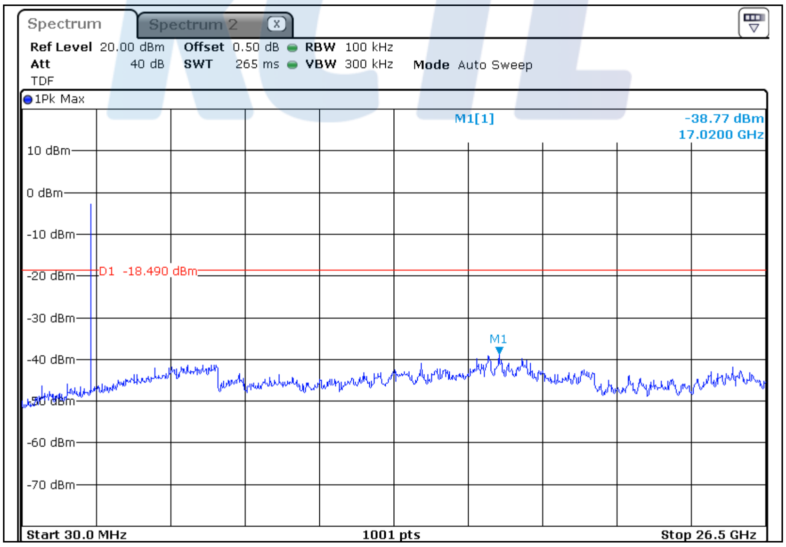


Band-edge



- Result of 2 483.5 ㎒

Conducted Spurious Emissions



6. Test equipment used for test

	Equipment Name	Manufacturer	Model No.	Serial No.	Next Cal. Date
■	Spectrum Analyzer	R & S	FSV40	100989	19.01.05
■	Wideband Power Sensor	R & S	NRP-Z81	102398	19.01.31
■	ATTENUATOR	R & S	DNF Dämpfungsglied 10 dB in N-50 Ohm	31212	19.05.14
■	EMI TEST RECEIVER	R & S	ESCI	100732	19.08.23
■	Bilog Antenna	SCHWARZBECK	VULB 9168	583	20.04.13
■	COAXIAL FIXED ATTENUATOR	AGILENT	8491B-003	2708A18758	20.05.04
■	Amplifier	SONOMA INSTRUMENT	310N	186280	19.04.05
■	ATTENUATOR	Weinschel ENGINEERING	1	AE7348	19.05.14
■	Horn antenna	ETS.lindgren	3116	00086632	19.04.20
■	Horn antenna	ETS.lindgren	3117	155787	18.10.20
■	AMPLIFIER	L-3 Narda-MITEQ	AMF-7D-01001800-22-10P	2003683	19.05.15
■	AMPLIFIER	L-3 Narda-MITEQ	JS44-18004000-33-8P	2000997	19.08.02
■	LOOP Antenna	R & S	HFH2-Z2	100355	20.01.31
■	Antenna Mast	Innco Systems	MA4640-XP-ET	-	-
■	Turn Table	Innco Systems	DT2000	79	-
■	Antenna Mast	Innco Systems	MA4000-EP	303	-
■	Turn Table	Innco Systems	DT2000	79	-
■	Highpass Filter	WT	WT-A1698-HS	WT160411001	19.05.14
■	Vector Signal Generator	R & S	SMBV100A	257566	19.01.05
■	Signal Generator	R & S	SMR40	100007	19.05.15
■	Cable Assembly	RadiAll	2301762000PJ	1724.66	-
■	Cable Assembly	gigalane	RG-400	-	-
■	Cable Assembly	HUER+SUHNER	SUCOFLEX 104	MY4342/4	-