FCC TEST REPORT

Test report No.:	EMC- FCC- R0255
FCC ID:	2ADMB-M-RFID001
Type of equipment:	MicroSD Type RFID Reader
Model Name:	M-RFID001
Applicant:	SK Telecom Co., Ltd.
Max.RF Output Power:	13.91 dBm
FCC Rule Part(s):	FCC Part 15 Subpart C 15.247
Frequency Range:	917.1 ㎒ ~ 926.9 ㎒
Test result:	Complied

The above equipment was tested by EMC compliance Testing Laboratory for compliance with the requirements of FCC Rules and Regulations.
The results of testing in this report apply to the product/system which was tested only.
Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Date of receipt: 2015. 04. 13

Date of test: 2015. 05. 04 ~ 05. 07

Issued date: 2015. 07. 07

Tested by: YOO, YOUNG BIN

Approved by: SON, MIN GI

[Contents]

1. Client information

Applicant:	SK Telecom Co., Ltd.
Address:	SK T-Tower, Euljiro 65, Jung-gu, Seoul, Korea
Telephone number:	+82-82-2-6100-3082
Facsimile number:	+82-82-2-6100-7908
Contact person:	Kim Gyeong Jin / kkj@vlv.co.kr

Manufacturer:	Villiv micron
Address:	A-102 ~ 103, Woolim Lions Valley 5 Cha, Sangdaewon 1-dong, Jungwon-gu, Seongnam-si, Gyeonggi-do, Korea

2. Laboratory information

Address

EMC compliance Ltd.
480-5, Sin-dong, Yeongtong-gu, Suwon-si, Gyeonggi-do, Korea
Telephone Number: 82-31-336-9919 Facsimile Number: 82-505-299-8311

Certificate

KOLAS No.: 231
FCC Site Designation No: KR0040
FCC Site Registration No: 687132
VCCI Site Registration No.: R-3327, G-198, C-3706, T-1849
IC Site Registration No.:8035A-2

SITE MAP

3. Description of E.U.T.

3.1 Basic description

Applicant:	SK Telecom Co., Ltd.
Address of Applicant	SK T-Tower, Euljiro 65, Jung-gu, Seoul, Korea
Manufacturer	Villiv micron
Address of Manufacturer	A-102 ~ 103, Woolim Lions Valley 5 Cha, Sangdaewon 1-dong, Jungwon-gu, Seongnam-si, Gyeonggi-do, Korea
Type of equipment	MicroSD Type RFID Reader
Basic Model	M-RFID001
Serial number	N/A

3.2 General description

Frequency Range	917.1 ㎒ ~ 926.9 ㎒
Type of Modulation	ASK
Number of Channels	50 ch
Type of Antenna	PCB Pattern Antenna
Antenna Gain	-35.07 dBi
Transmit Power	13.91 dBm
Power supply	DC 3 V

3.3 Test Voltage

Mode	Voltage
Norminal voltage	DC 3 V

4. Summary of test results

4.1 Standards & results

Rule Reference	Parameter	Status
15.203	Antenna Requirement	C
15.247 (a) (1)	Carrier Frequency Separation	C
15.247 (a) (1) (i)	Minimum Number of Hopping Channels	C
15.247 (a) (1) (i)	Average Time of Occupancy	C
15.247 (b) (2)	Maximum Peak Conducted Output Power	C
15.247 (d)	100 kHz Bandwidth Outside the Frequency Band	C
15.247 (d)	Radiated Emission which fall in the Restricted Band	C
15.209	Radiated Emission Limits, General Requirement	C
15.207	Conducted Emissions	C

Note: C=complies
NC= Not complies
NT=Not tested
NA=Not Applicable

4.2 Uncertainty

Measurement Item	Expanded Uncertainty U = KUc (K = 2)	
Conducted RF power	± 1.36 dB	
Conducted Spurious Emissions	± 1.52 dB	
Radiated Spurious Emissions	30 ㎒ ~ 300 ㎒:	+ 4.94 dB, - 5.06 dB
		+ 4.93 dB, - 5.05 dB
	300 ㎒ ~ 1 000 ㎒:	+ 4.97 dB, - 5.08 dB
		+ 4.84 dB, - 4.96 dB
	1 ㎓ ~ 25 ㎓:	+ 6.03 dB, - 6.05 dB
Conducted Emissions	9 ㎑ ~ 150 ㎑:	± 3.75 dB
	150 ㎑ ~ 30 ㎒:	± 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 a PCB type of antenna. The directional peak gain of the antenna is -35.07 dBi.

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 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.

5.2.2 Measurement Procedure

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

5.2.2.1 PKPM1 Peak power meter method

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.

5.2.3 Test Result

-Complied

Channel	Frequency (㎒)	Result (dBm)	Limit (dBm)	Margin (dB)
Lowest	917.1	13.76	30.00	16.24
Middle	921.9	13.83	30.00	16.17
Highest	926.9	13.91	30.00	16.09

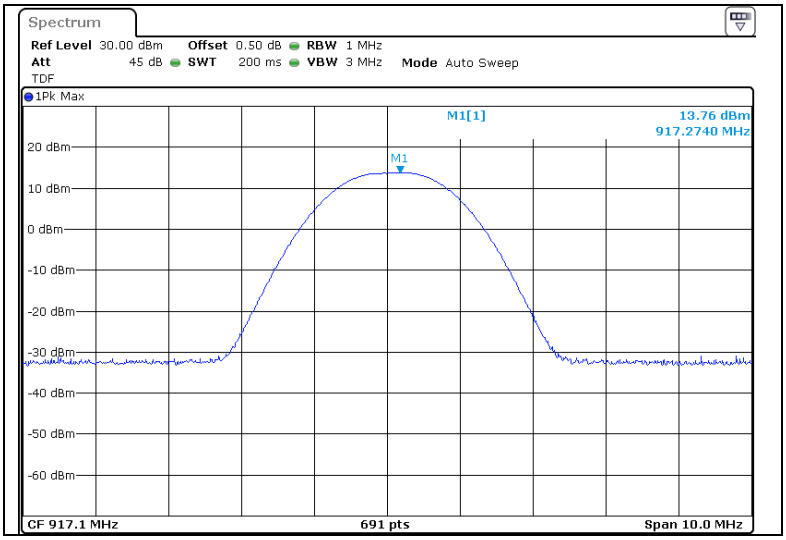
-NOTE:

1. Since the directional gain of the PCB antenna declared by the manufacturer (G_{ANT} =-35.07dBi), does not exceed 6.0 dBi , there was no need to reduce the output power.
   We took the insertion loss of the cable loss into consideration within the measuring instrument.

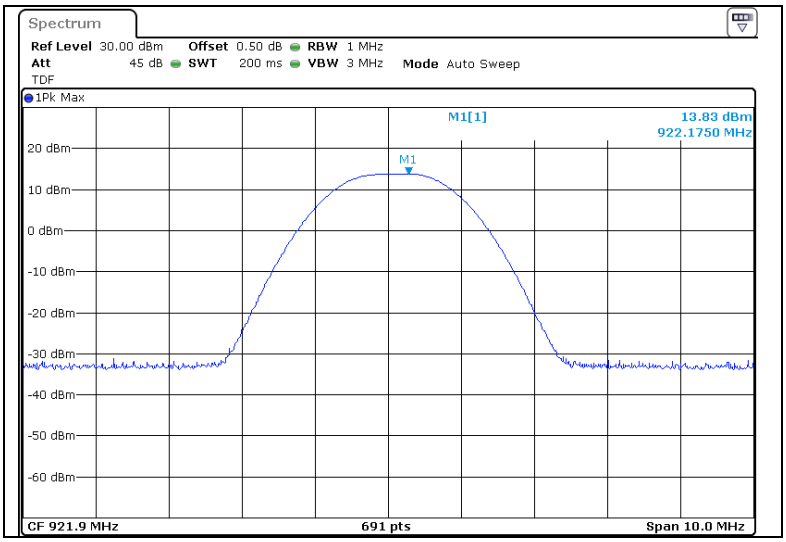
5.4.4 Test Plot

Figure 2. Plot of the Maximum Peak Output Power

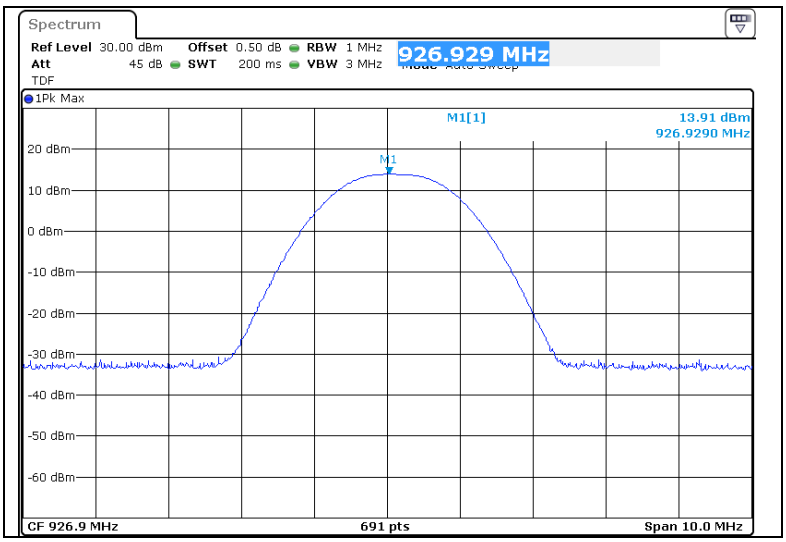
Lowest Channel (917.1 ㎒)



Middle Channel (921.9 ㎒)



Highest Channel (926.9 ㎒)



5.3 20 dB Bandwidth

5.3.1 Regulation

According to §15.247(a)(1), frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 ㎑ or the 20 ㏈ bandwidth of the hopping channel, whichever is greater.

5.4.2 Measurement Procedure

These test measurement settings are specified in section FCC Public Notice DA 00-705.

Use the following spectrum analyzer settings:

Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel

RBW 1% of the 20 dB bandwidth

VBW RBW

Sweep = auto

Detector function = peak

Trace = max hold

The EUT should be transmitting at its maximum data rate. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. Use the marker-delta function to measure 20 dB down one side of the emission. Reset the marker-delta function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is the 20 dB bandwidth of the emission. If this value varies with different modes of operation (e.g., data rate, modulation format, etc.), repeat this test for each variation. The limit is specified in one of the subparagraphs of this Section. Submit this plot(s).

5.4.3 Test Result

-Complied

Channel	Frequency (㎒)	20 ㏈ Bandwidth (㎑)	Max. Limit (㎑)
Low	917.1	374.8	500
Middle	921.9	454.4	500
High	926.9	496.4	500

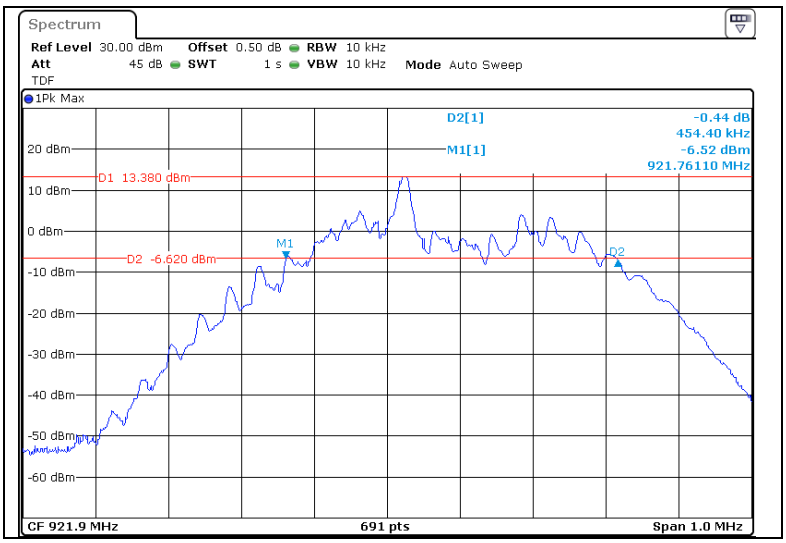
5.4.4 Test Plot

Figure 2. Plot of the 20 dB Bandwidth

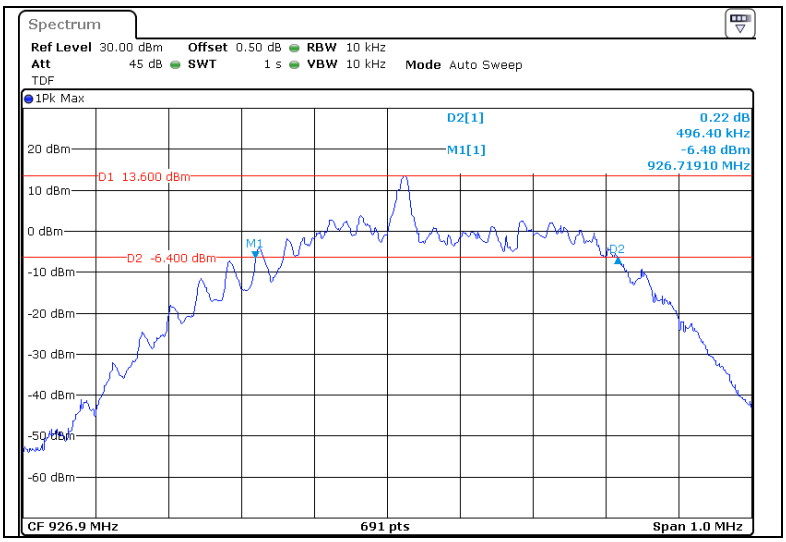
*** 20 dB Bandwidth**

Lowest Channel (917.1 ㎒)

Middle Channel (921.9 ㎒)



Highest Channel (926.9 ㎒)



5.5 100 kHz Bandwidth Outside the Frequency Band

5.4.1 Regulation

According to §15.247(d), In any 100 kHz 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 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided 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 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

5.4.2 Measurement Procedure

Establish a reference level by using the following procedure:

a) Set instrument center frequency to DTS channel center frequency.

b) Set the span to ≥ 1.5 times the DTS bandwidth.

c) Set the RBW = 100 kHz.

d) Set the VBW ≥ 3 x 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 PSD level.

Note that the channel found to contain the maximum PSD level can be used to establish the reference level.

5.4.3 Test Result

-Complied

Channel	Frequency [㎒]	Result [dBm]	Limit [dBm]
Low	917.1	-35.52	-6.38
Middle	921.9	-34.67	-6.17
High	926.9	-35.44	-6.10

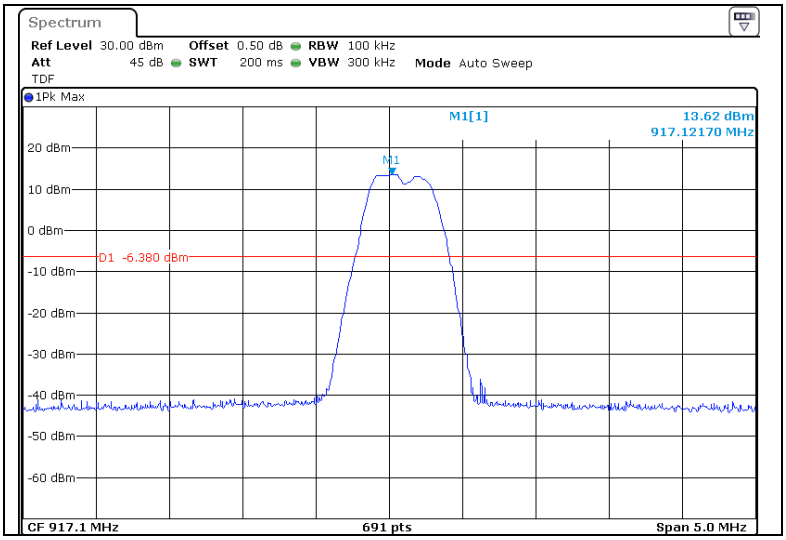
-NOTE:

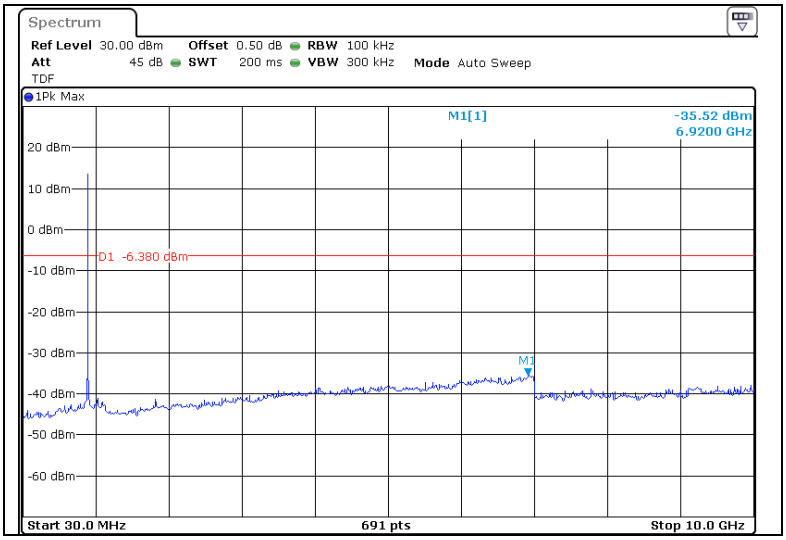
1. We took the insertion loss of the cable loss into consideration within the measuring instrument.

5.4.4 Test Plot

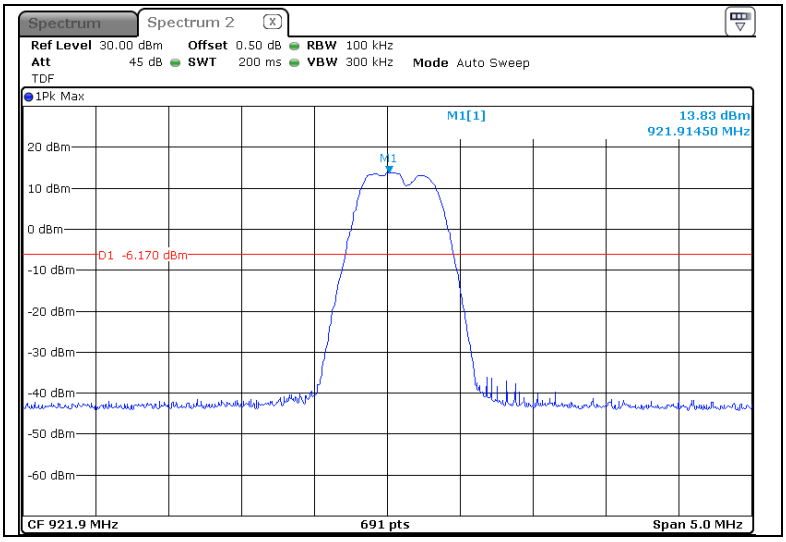
Figure 2. Plot of the 100 kHz Bandwidth Outside the Frequency Band

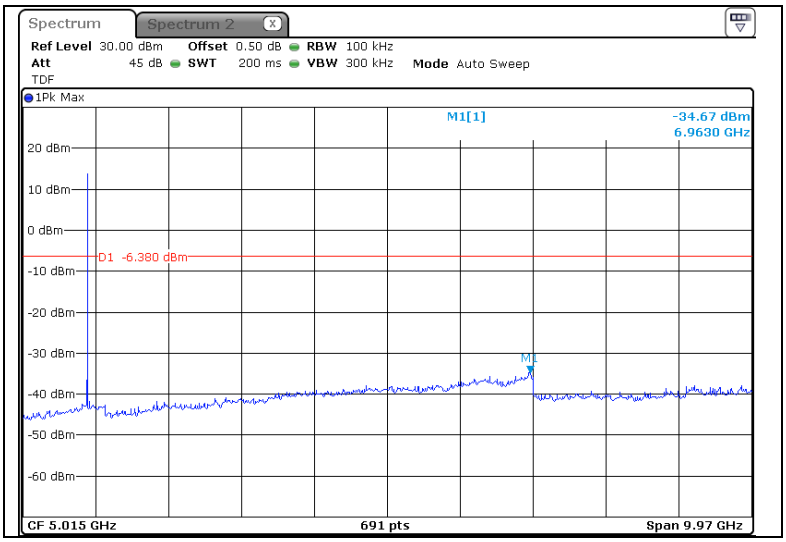
Lowest Channel (917.1 ㎒)



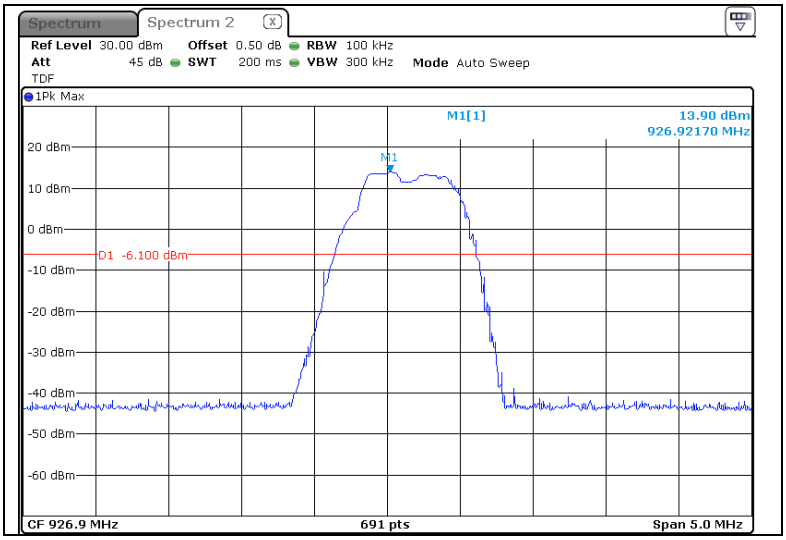


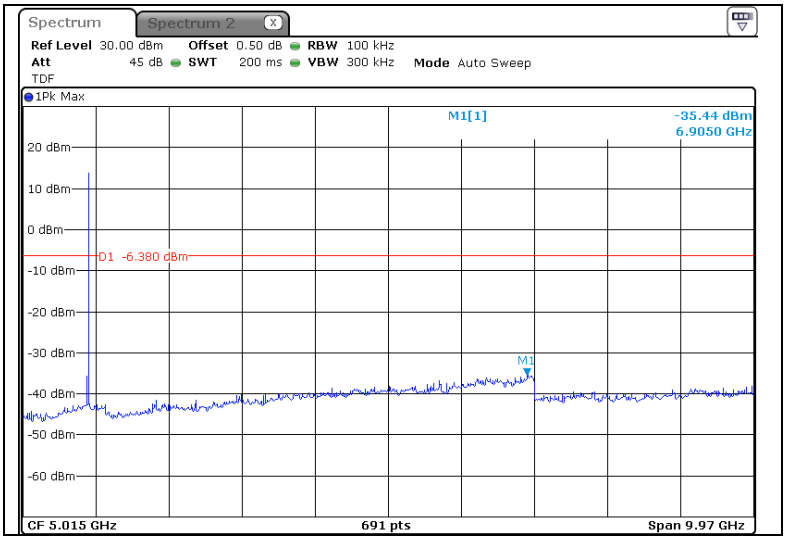
Middle Channel (921.9 ㎒)





Highest Channel (926.9 ㎒)





5.3 Carrier Frequency Separation

5.3.1 Regulation

According to §15.247(a)(1), Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

5.3.2 Measurement Procedure

The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:

Span = wide enough to capture the peaks of two adjacent channels

Resolution (or IF) Bandwidth (RBW) 1% of the span

Video (or Average) Bandwidth (VBW) RBW

Sweep = auto

Detector function = peak

Trace = max hold

Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. The limit is specified in one of the subparagraphs of this Section. Submit this plot.

5.3.3 Test Result

- Complied

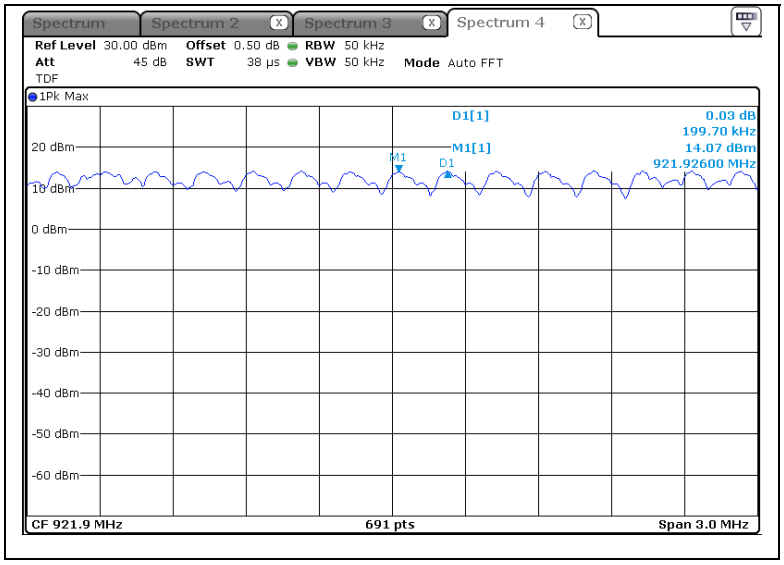
Channel	Carrier frequency separation [㎒]	Limit
Middle	199.7	Minimum of 25 ㎑ or the 20 dB bandwidth

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

5.3.4 Test Plot

Figure 2. Plot of the Carrier Frequency Separation (Conducted)

Middle Channel (921.9 ㎒)



5.5 Number of Hopping Channels

5.5.1 Regulation

According to §15.247(a)(1)(i), For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

5.5.2 Measurement Procedure

The method of measurement used to test this DSS device is FCC Public Notice DA 00-705.

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Connect the antenna port of the EUT to RF input on the spectrum analyzer via a low loss cable and attenuator.
3. Turn on the EUT and set the hopping function enabled by controlling it via UART interface or Bluetooth tester.
4. Set the spectrum analyzer as follows: Span = the frequency band of operation RBW ≥ 1% of the span VBW ≥ RBW Sweep = auto Detector function = peak Trace = max hold
5. Record the number of hopping channels.

5.5.3 Test Result

- Complied

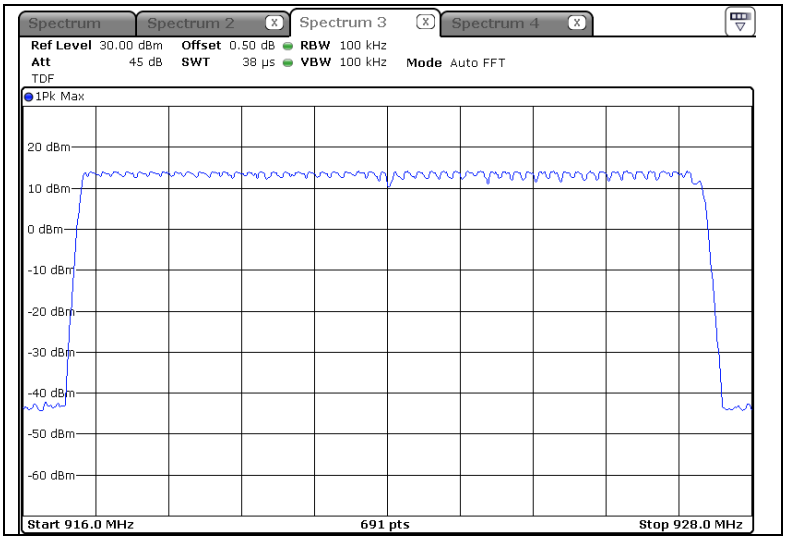
Frequency	Number of hopping channel	Limit
917.1 ~ 926.9 ㎒	50	≥25

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 Number of Hopping Channels



5.6 Time of Occupancy(Dwell Time)

5.6.1 Regulation

According to §15.247(a)(1)(i), For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

5.6.2 Measurement Procedure

The method of measurement used to test this DSS device is FCC Public Notice DA 00-705.
The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:

Span = zero span, centered on a hopping channel
RBW = 1 MHz
VBW RBW
Sweep = as necessary to capture the entire dwell time per hopping channel
Detector function = peak
Trace = max hold

If possible, use the marker-delta function to determine the dwell time. If this value varies with different modes of operation (e.g., data rate, modulation format, etc.), repeat this test for each variation. The limit is specified in one of the subparagraphs of this Section. Submit this plot(s). An oscilloscope may be used instead of a spectrum analyzer.

5.6.3 Test Result

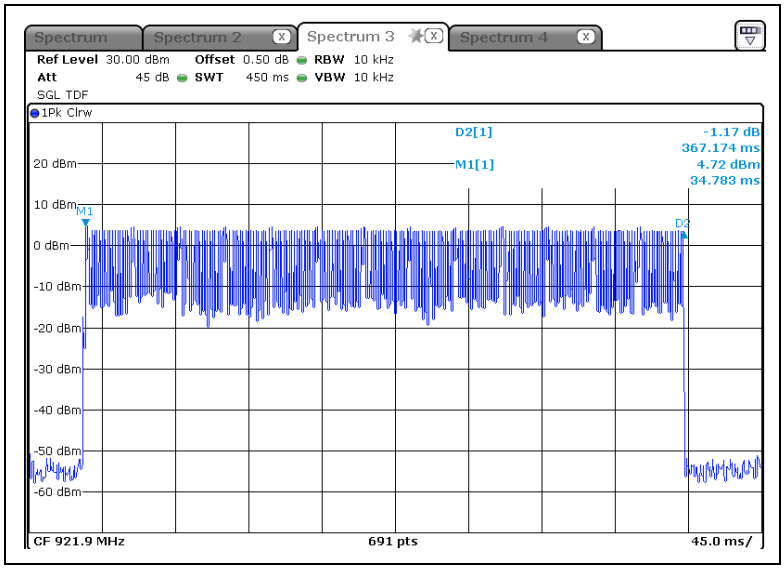
- Complied

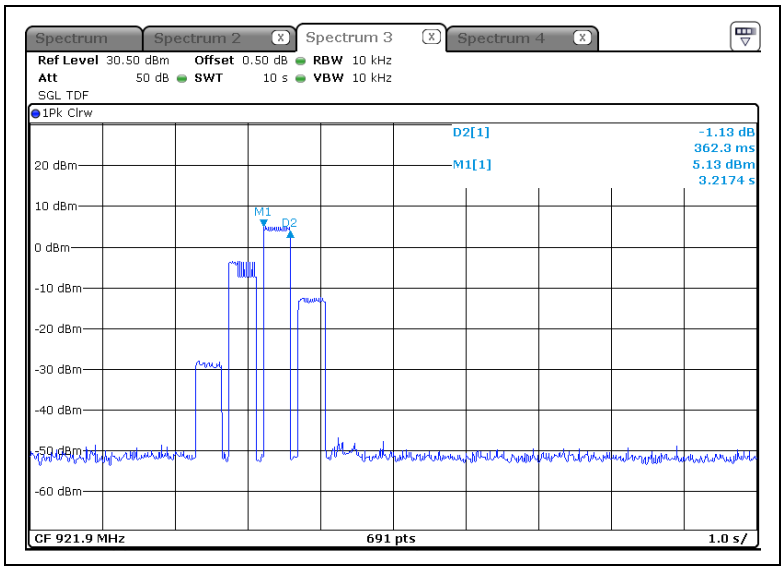
Frequency Range [MHz]	20 dB Bandwidth [kHz]	Pulse Time [ms]	Number of Transmission [10 s period]	Dwell Time [ms]	Limte [ms]
917.1~926.9	< 500	367.174	1	367.174	< 400

5.6.4 Test Plot

Figure 5. Plot of the Time of Occupancy (Conducted)

Middle Channel (921.9 ㎒)





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:

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

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

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 ㎓.
   The resolution bandwidth of test receiver/spectrum analyzer is 1 ㎒ and the video bandwidth is 1 ㎑(≥1/T) for Average detection (AV) at frequency above 1 ㎓. (where T = pulse width)

5.5.3 Test Result

- Complied

1. Band edge compliance of RF Conducted Emissions was shown in figure 6.
2. Spurious RF conducted Emissions were shown in the Figure 7.
   Note: We took the insertion loss of the cable into consideration within the measuring instrument.
3. Measured value of the Field strength of spurious Emissions (Radiated)
4. 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 dB)
Worst value of noise floor was recorded.

*** Above 1 ㎓ data**

Lowest channel (917.1 ㎒)

Frequency [㎒]	Receiver Bandwidth [㎑]	Pol. [V/H]	Reading [dB(㎶)]	Factor [dB]	Result [dB(㎶/m)]	Limit [dB(㎶/m)]	Margin [dB]
Quasi-Peak DATA. Emissions below 30 ㎒ (3 m Distance)							
Below 30.00	Not Detected	-	-	-	-	-	-
Quasi-Peak DATA. Emissions below 1 ㎓							
897.97	120	H	39.70	-0.10	39.60	46.00	6.40
936.38	120	H	35.90	1.10	37.00	46.00	9.00

Middle channel (921.9 ㎒)

Frequency [㎒]	Receiver Bandwidth [㎑]	Pol. [V/H]	Reading [dB(㎶)]	Factor [dB]	Result [dB(㎶/m)]	Limit [dB(㎶/m)]	Margin [dB]
Quasi-Peak DATA. Emissions below 30 ㎒ (3 m Distance)							
Below 30.00	Not Detected	-	-	-	-	-	-
Quasi-Peak DATA. Emissions below 1 ㎓							
902.78	120	H	32.80	0.10	32.90	46.00	13.10

Highest channel (926.9 ㎒)

Frequency [㎒]	Receiver Bandwidth [㎑]	Pol. [V/H]	Reading [dB(㎶)]	Factor [dB]	Result [dB(㎶/m)]	Limit [dB(㎶/m)]	Margin [dB]
Quasi-Peak DATA. Emissions below 30 ㎒ (3 m Distance)							
Below 30.00	Not Detected	-	-	-	-	-	-
Quasi-Peak DATA. Emissions below 1 ㎓							
907.77	120	H	36.20	0.40	36.60	46.00	9.40

5.8 Conducted Emission

5.8.1 Regulation

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 50 μH/50 Ω line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency of emission (㎒)	Conducted limit (dB㎶)	
	Qausi-peak	Average
0.15 – 0.5	66 to 56 *	56 to 46 *
0.5 – 5	56	46
5 – 30	60	50

* Decreases with the logarithm of the frequency.

According to §15.107(a), for unintentional device, except for Class A digital devices, line conducted emission limits are the same as the above table.

5.8.2 Measurement Procedure

1) The EUT was placed on a wooden table of size, 1 m by 1.5 m, raised 80 ㎝ in which is located 40 ㎝ away from the vertical wall and 1.5m away from the side wall of the shielded room.

2) Each current-carrying conductor of the EUT power cord was individually connected through a 50Ω/50μH LISN, which is an input transducer to a Spectrum Analyzer or an EMI/Field Intensity Meter, to the input power source.

3) Exploratory measurements were made to identify the frequency of the emission that had the highest amplitude relative to the limit by operating the EUT in a range of typical modes of operation, cable position, and with a typical system equipment configuration and arrangement. Based on the exploratory tests of the EUT, the one EUT cable configuration and arrangement and mode of operation that had produced the emission with the highest amplitude relative to the limit was selected for the final measurement.

4) The final test on all current-carrying conductors of all of the power cords to the equipment that comprises the EUT (but not the cords associated with other non-EUT equipment is the system) was then performed over the frequency range of 0.15 ㎒ to 30 ㎒.

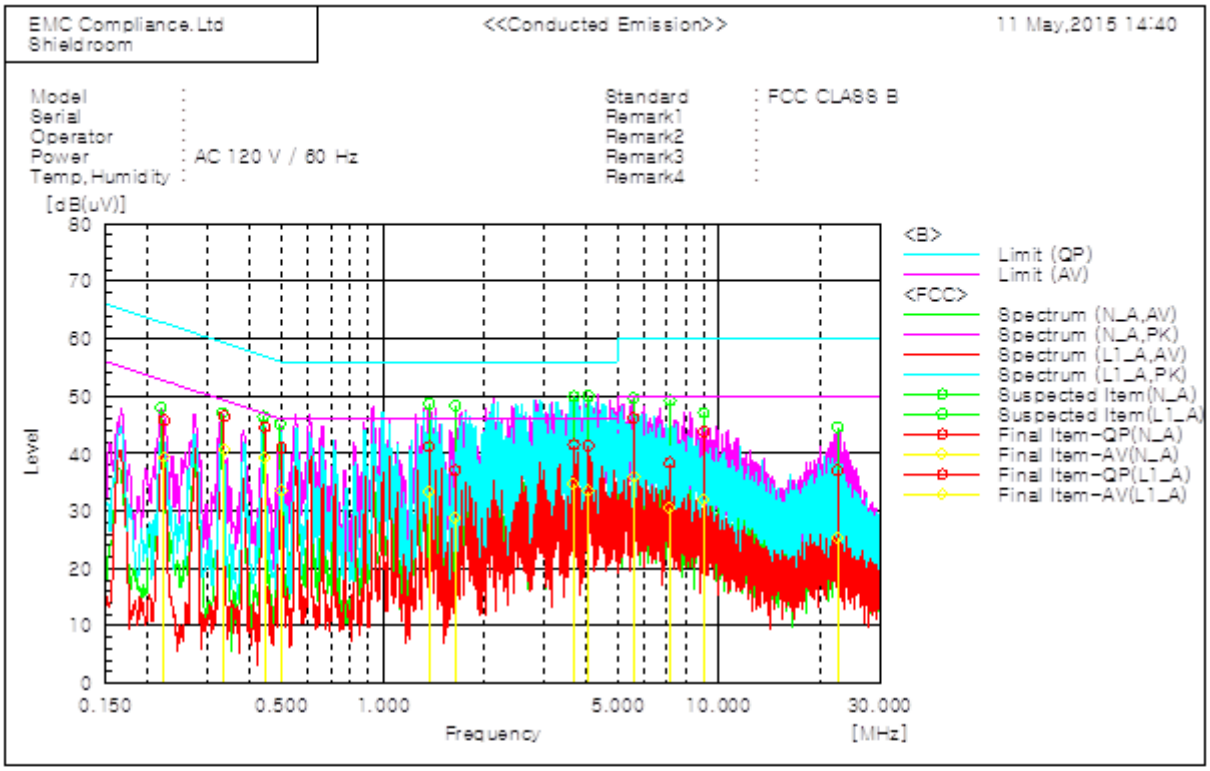
5) The measurements were made with the detector set to PEAK amplitude within a bandwidth of 10 ㎑ or to QUASI-PEAK and AVERAGE within a bandwidth of 9 ㎑. The EUT was in transmitting mode during the measurements.

5.8.3 Test Result

- Complied

Figure 7. plot of Conducted Emission

*Conducted worst-case data : Highest Channel (926.9 ㎒)



Final Result

-- N_A Phase --

No.	Frequency [MHz]	Reading QP [dB(uV)]	Reading CAV [dB(uV)]	c.f [dB]	Result QP [dB(uV)]	Result CAV [dB(uV)]	Limit QP [dB(uV)]	Limit AV [dB(uV)]	Margin QP [dB]	Margin CAV [dB]
1	0.22363	35.3	28.9	10.5	45.8	39.4	62.7	52.7	16.9	13.3
2	0.3372	36.0	30.2	10.5	46.5	40.7	59.3	49.3	12.8	8.6
3	0.49916	30.2	22.7	10.8	41.0	33.5	56.0	46.0	15.0	12.5
4	1.36789	28.8	21.0	12.4	41.2	33.4	56.0	46.0	14.8	12.6
5	1.64129	24.2	15.9	12.8	37.0	28.7	56.0	46.0	19.0	17.3
6	5.55847	32.1	21.8	14.1	46.2	35.9	60.0	50.0	13.8	14.1
7	7.13615	24.0	16.1	14.4	38.4	30.5	60.0	50.0	21.6	19.5
8	9.00313	28.8	16.8	15.1	43.9	31.9	60.0	50.0	16.1	18.1
9	22.51616	19.6	7.8	17.4	37.0	25.2	60.0	50.0	23.0	24.8

-- L1_A Phase --

No.	Frequency [MHz]	Reading QP [dB(uV)]	Reading CAV [dB(uV)]	c.f [dB]	Result QP [dB(uV)]	Result CAV [dB(uV)]	Limit QP [dB(uV)]	Limit AV [dB(uV)]	Margin QP [dB]	Margin CAV [dB]
1	0.44583	34.0	28.8	10.6	44.6	39.4	57.0	47.0	12.4	7.6
2	3.69842	26.2	19.4	15.3	41.5	34.7	56.0	46.0	14.5	11.3
3	4.08505	26.1	18.3	15.3	41.4	33.6	56.0	46.0	14.6	12.4

6. Test equipment used for test

	Description	Manufacture	Model No.	Serial No.	Next Cal Date.
■	Amplifier	SONOMA INSTRUMENT	310	293004	15.09.25
■	Attenuator	HP	MY52460424	8491A	15.07.23
■	Antenna Mast	Innco Systems	MA4000-EP	-	-
■	Turn Table	Innco Systems	DT2000	-	
■	Bi-Log Antenna	SCHWARZBECK	VULB9163	552	16.06.14
■	Loop Antenna	R&S	HFH2-Z2	100355	16.03.03
■	Horn Antenna	ETS.lindgren	3115	62589	15.10.16
■	Horn Antenna	ETS.lindgren	3116	86632	15.10.20
■	Broadband Preamplifier	SCHWARZBECK	BBV9718	216	15.08.12
■	Broadband Preamplifier	SCHWARZBECK	BBV9721	2	16.05.19
■	Spectrum Analyzer	R&S	FSV40	100989	16.01.26
■	SignalI Generator	R&S	SMB 100A	176206	16.03.10
■	DC Power Supply	AGILENT	E3632A	MY40004399	16.01.06
■	Wideband Power Sensor	R&S	NRP-Z81	102398	15.11.27