

TEST REPORT

KCTL Inc.

65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 443-390, Korea
TEL: 82 70 5008 1021
FAX: 82 505 299 8311

Report No.: KCTL15-FR0055

Page(1) / (22) Pages

KCTL
<http://www.kctl.co.kr>

1. Applicant

Name: Samsung Electronics Co., Ltd.
Address: 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do,
446-908, South Korea

2. Sample Description:

FCC ID: A3LWSZWM110C00
IC ID: 649E-WSZWM110C00
Type of equipment: Z-Wave Module
Basic Model: WSZWM110C00

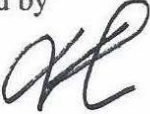

3. Date of Test: October 21 ~ October 22, 2015

4. Test method used: FCC Part 15 Subpart C 15.249
RSS-210 Issue 8, December 2010
RSS-GEN Issue 4, November 2014

5. Test Results

Test Item: Refer to page 6
Result: Refer to page 7 ~ page 21
Measurement Uncertainty: Refer to page 6

This result shown in this report refer only to the sample(s) tested unless otherwise stated.

Affirmation	Tested by	Technical Manager
	 Name: KIM, EUI JUNG	 Name: SON, MIN GI

2015. 10. 23

KCTL Inc. Testing Laboratory

[Contents]

1. Client information	3
2. Laboratory information	4
3. Description of E.U.T.	5
3.1 Basic description	5
3.2 General description	5
3.3 Test Voltage	5
4. Summary of test results	6
4.1 Standards & results	6
4.2 Uncertainty	6
5. Test results	7
5.1 Antenna Requirement	7
5.2 Field Strength of Fundamental	8
5.3 Out of Band Emission	10
5.4 Bandwidth Measurement	12
5.5 Spurious Emission and Restricted bands	16
5.6 Conducted Emission	20
6. Test equipment used for test	22

1. Client information

Applicant: Samsung Electronics Co., Ltd.
Address: 129, Samsung-ro, Yeongtont-gu, Suwon-si, Gyeonggi-do, 446-908,
South Korea
Telephone number: +82-31-8062-7825
Facsimile number: +82-31 8062 9323
Contact person: Chan Ho Youn / jjano.youn@samsung.com

Manufacturer: Samsung Electronics Co., Ltd.
Address: 129, Samsung-ro, Yeongtont-gu, Suwon-si, Gyeonggi-do, 446-908,
South Korea

2. Laboratory information

Address

KCTL Ltd.

65 Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, Korea

Telephone Number: 82-70-5008-1016 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:	Samsung Electronics Co., Ltd.
Address of Applicant	129, Samsung-ro, Yeongtont-gu, Suwon-si, Gyeonggi-do, 446-908, South Korea
Manufacturer	Samsung Electronics Co., Ltd.
Address of Manufacturer	129, Samsung-ro, Yeongtont-gu, Suwon-si, Gyeonggi-do, 446-908, South Korea
Type of equipment	Z-Wave Module
Basic Model	WSZWM110C00
Serial number	N/A

3.2 General description

Frequency Range	908.4 MHz ~ 916.0 MHz
Type of Modulation	ASK
Number of Channels	2 ch
Type of Antenna	Chip Antenna
Antenna Gain	-1.7 dBi
Transmit Power	4.85 dBm
Power supply	DC 3.3 V
Product SW/HW version	Rev 1.0 / Rev 5.0
Radio SW/HW version	Rev 1.0 / Rev 5.0
Test SW Version	1.0
RF power setting in TEST SW	1.0

3.3 Test Voltage

Mode	Voltage
Norminal voltage	DC 3.3 V

4. Summary of test results

4.1 Standards & results

FCC Rule Reference	IC Rule Reference	Parameter	Status
15.203 15.249(b)(3)	-	Antenna Requirement	5.1
15.249(a)(b)(c)	RSS-210, A2.9	Field Strength of Fundamental	5.2
15.249(d)	RSS-210, A2.9	Out of Band Emission	5.3
-	RSS-GEN, 6.6	Occupied Bandwidth	5.4
15.249(d), 15.205(a), 15.209(a)	RSS-210, A2.9 RSS-GEN, 8.9 RSS-GEN, 8.10	Spurious Emission, Band Edge and Restricted bands	5.4
15.207(a)	RSS-GEN, 8.8	Conducted Emissions	5.5
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	± 1.30 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		
Conducted Emissions	1 GHz ~ 25 GHz:	+ 6.03 dB, - 6.05 dB
	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 §15.249(b)(3), Antenna gain must be at least 33 dBi. Alternatively, the main lobe beamwidth must not exceed 3.5 degrees. The beamwidth limit shall apply to both the azimuth and elevation planes. At antenna gains over 33 dBi or beamwidths narrower than 3.5 degrees, power must be reduced to ensure that the field strength does not exceed 2500 millivolts/meter.

5.1.2 Result

-Complied

The transmitter has a Chip antenna. The directional peak gain of the antenna is -1.7 dBi.

5.2 Field Strength of Fundamental

5.2.1 Regulation

According to §15.249, (a) Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental Frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902-928 MHz	50	500
2400-2483.5 MHz	50	500
5725-5875 MHz	50	500
24.0-24.25 GHz	250	2500

According to §15.249(c), Field strength limits are specified at a distance of 3 meters.

5.2.2 Measurement Procedure

The EUT was setup according to ANSI C63.10: 2013 and tested compliance to FCC 47CFR 15.249 requirements.

Measuring the frequency range below 1 GHz, the EUT is placed on a turn table which is 0.8 meter above ground, when measuring the frequency range above 1 GHz, the EUT is placed on a turntable which is 1.5 meter above ground.

The turn table is rotated 360 degrees to determine the position of the maximum emission level.

The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned between 1 meter and 4 meters to find out the maximum emission level.

This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10:2013 on radiated measurement.

The resolution bandwidth below 30 MHz setting on the field strength meter is 9 kHz and 30 MHz~1 GHz is 120 kHz and above 1 GHz is 1MHz.

Radiated emission measurements below 30 MHz are made using Loop Antenna and 30 MHz~1 GHz are made using broadband Bilog antenna and above 1 GHz are made using Horn Antennas.

The measurement is divided into the Preliminary Measurement and the Final Measurement.

The suspected frequencies are searched for in Preliminary Measurement with the measurement antenna kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. The antenna is pointed at an angle towards the source of the emission, and the EUT is rotated in both height and polarization to maximize the measured emission. The emission is kept within the illumination area of the 3 dB bandwidth of the antenna.

The worst radiated emission is measured in the Open Area Test Site on the Final Measurement.

The measurement frequency range from 9 kHz - 10th Harmonic of fundamental was investigated.

5.2.3 Test Result

-Complied

-908.4 MHz

Frequency [MHz]	Receiver Bandwidth [kHz]	Pol. [V/H]	Reading [dB(μ V)]	Factor [dB]	Result [dB(μ V/m)]	Limit [dB(μ V/m)]	Margin [dB]
908.46	120	H	96.30	-2.80	93.50	94.00	0.50

-916.0 MHz

Frequency [MHz]	Receiver Bandwidth [kHz]	Pol. [V/H]	Reading [dB(μ V)]	Factor [dB]	Result [dB(μ V/m)]	Limit [dB(μ V/m)]	Margin [dB]
916.10	120	H	94.70	-2.60	92.10	94.00	1.90

NOTE:

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

5.3 Out of Band Emission

5.3.1 Regulation

According to §15.249(d), Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

5.3.2 Measurement Procedure

The EUT is placed on a turn table which is 1.5 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.10: 2013 on radiated measurement.

The bandwidth setting below 1GHz and above 1GHz on the field strength meter is 120 kHz and 1MHz, respectively.

5.3.3 Test Result

- Complied

-908.4 MHz

Frequency [MHz]	Receiver Bandwidth [kHz]	Pol. [V/H]	Reading [dB(μ V)]	Factor [dB]	Result [dB(μ V/m)]	Limit [dB(μ V/m)]	Margin [dB]
896.09	120	H	38.10	-3.00	35.10	46.00	10.90

-916.0 MHz

Frequency [MHz]	Receiver Bandwidth [kHz]	Pol. [V/H]	Reading [dB(μ V)]	Factor [dB]	Result [dB(μ V/m)]	Limit [dB(μ V/m)]	Margin [dB]
884.09	120	H	36.50	-3.30	33.20	46.00	12.80

NOTE:

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

5.4 Bandwidth Measurement

5.4.1 Regulation

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

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 kHz.
- 2) Set the video bandwidth (VBW) $\geq 3 \times$ 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 dB 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 dB bandwidth mode with X set to 6 dB, if the functionality described above (i.e., RBW = 100 kHz, VBW $\geq 3 \times$ 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 dB.

5.4.3 Test Result

- Complied

Channel	Frequency [MHz]	6 dB Bandwidth [MHz]	Min. Limit [MHz]	Occupied Bandwidth (99 % BW) [MHz]
Lowest	908.4	0.18	0.50	0.26
Highest	916.0	0.20	0.50	0.27

NOTE:

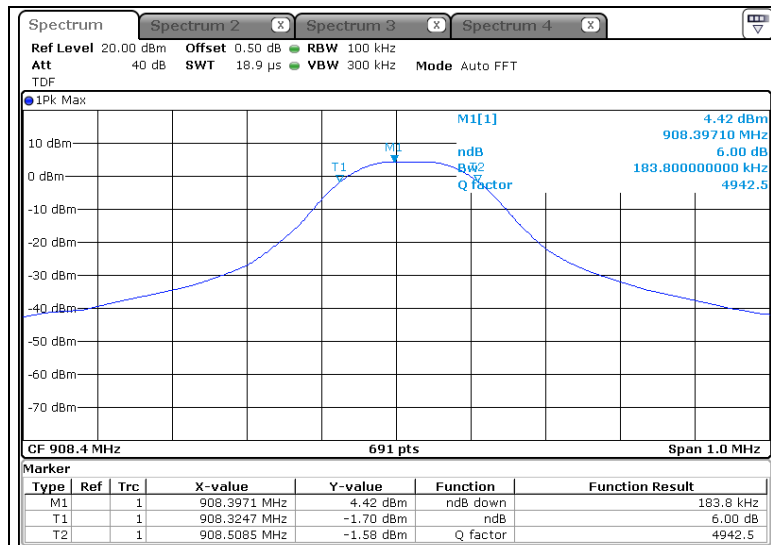
1. We took the insertion loss of the cable loss into consideration within the measuring instrument.

5.4.4 Test Plot

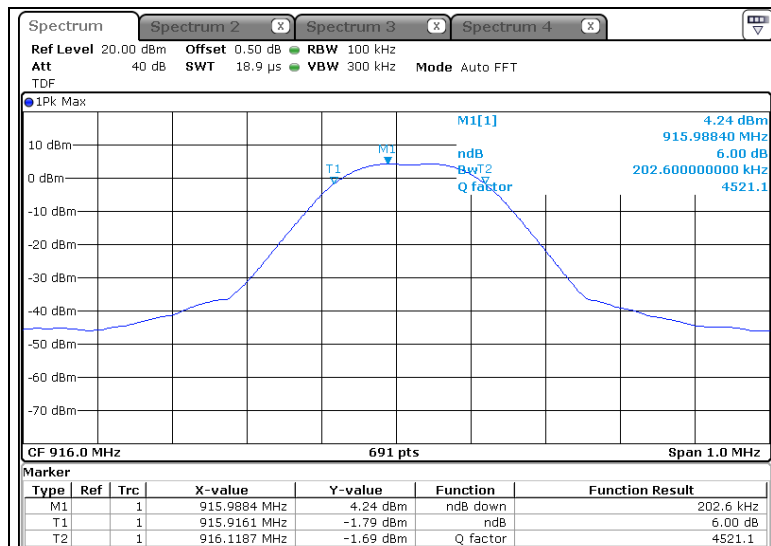
Figure 2. Plot of the 6 dB Bandwidth & Occupied Bandwidth

* 6 dB Bandwidth

Lowest Channel(908.4 MHz)

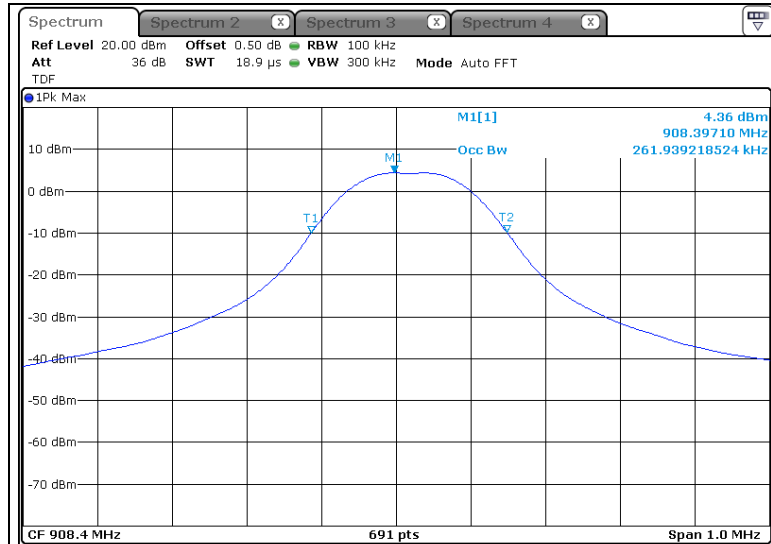


Highest Channel (916.0 MHz)

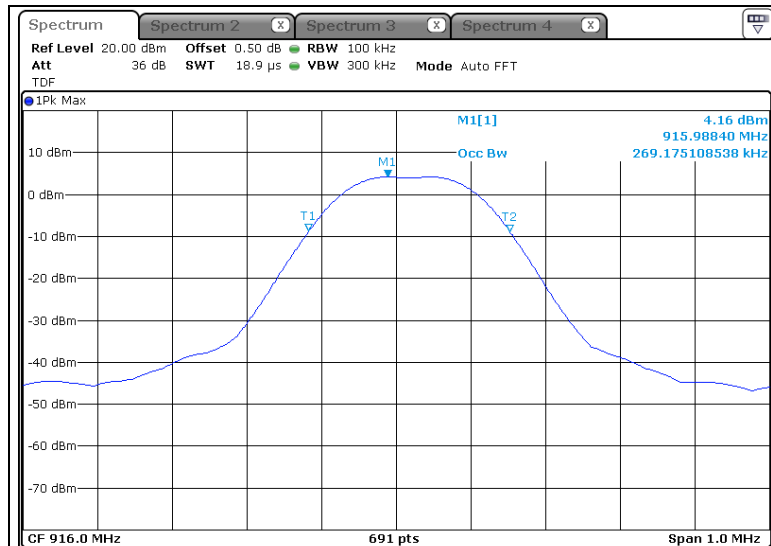


*** Occupied Bandwidth**

Lowest Channel(908.4 MHz)



Highest Channel (916.0 MHz)



5.5 Spurious Emission and Restricted bands

5.5.1 Regulation

According to §15.249(d), (d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.. 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 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 not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field strength ($\mu V/m$)	Measurement distance (m)
0.009 - 0.490	2 400/F(kHz)	300
0.490 - 1.705	24 000/F(kHz)	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 MHz, 76–88 MHz, 174–216 MHz or 470–806 MHz. 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 Radiated Spurious Emissions

- 1) The preliminary and final radiated 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 kHz to 30 MHz using the loop antenna, and from 30 to 1 000 MHz using the TRILOG broadband antenna, and from 1 000 MHz to 26 500 MHz 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 kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1 GHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection and frequency above 1 GHz.
The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 1 kHz ($\geq 1/T$) for Average detection (AV) at frequency above 1 GHz. (where T = pulse width)

5.5.3 Test Result

- Complied

1. Measured value of the Field strength of spurious Emissions (Radiated)
2. 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.

* 30MHz ~ 1 GHz data

-908.4 MHz

Frequency [MHz]	Receiver Bandwidth [kHz]	Pol. [V/H]	Reading [dB(μ V)]	Factor [dB]	Result [dB(μ V/m)]	Limit [dB(μ V/m)]	Margin [dB]
Quasi-Peak DATA. Emissions below 30 MHz							
Below 30.00	Not Detected	-	-	-	-	-	-
Quasi-Peak DATA. Emissions below 1 GHz							
47.10	120	V	42.30	-16.50	25.80	40.00	14.20
66.38	120	H	36.90	-19.60	17.30	40.00	22.70
859.11	120	V	29.20	-3.90	25.30	46.00	20.70
Above 900.00	Not detected	-	-	-	-	-	-

-916.0 MHz

Frequency [MHz]	Receiver Bandwidth [kHz]	Pol. [V/H]	Reading [dB(μ V)]	Factor [dB]	Result [dB(μ V/m)]	Limit [dB(μ V/m)]	Margin [dB]
Quasi-Peak DATA. Emissions below 30 MHz							
Below 30.00	Not Detected	-	-	-	-	-	-
Quasi-Peak DATA. Emissions below 1 GHz							
47.58	120	V	37.90	-16.50	21.40	40.00	18.60
66.50	120	V	35.20	-19.60	15.60	40.00	24.40
859.11	120	V	31.20	-3.90	27.30	46.00	18.70
Above 900.00	Not detected	-	-	-	-	-	-

5.6 Conducted Emission

5.6.1 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 kHz to 30 MHz, 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 (MHz)	Conducted limit (dB _{μV})	
	Quasi-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.

5.5.2 Measurement Procedure

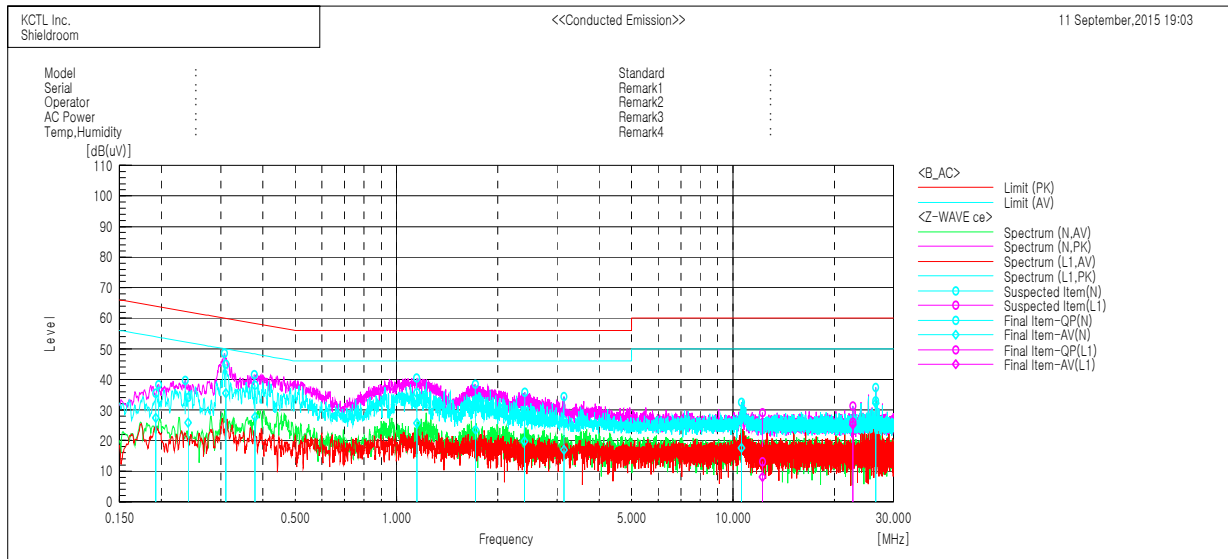
- 1) The EUT was placed on a wooden table of size, 1 m by 1.5 m, raised 80 cm in which is located 40 cm away from the vertical wall and 1.5m away from the side wall of the shielded room.
- 2) Each current-carrying conductor of the EUT power cord was individually connected through a 50Ω/50μH LISN, which 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 MHz to 30 MHz.
- 5) The measurements were made with the detector set to PEAK amplitude within a bandwidth of 10 kHz or to QUASI-PEAK and AVERAGE within a bandwidth of 9 kHz. The EUT was in transmitting mode during the measurements.

5.6.3 Test Result

- Complied

Figure 7. plot of Conducted Emission

*Conducted worst-case data : Highest Channel (916.0 MHz)



Final Result

--- N 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	0.19231	25.5	17.5	10.0	35.5	27.5	63.9	53.9	28.4	26.4
2	0.23994	24.4	16.1	9.7	34.1	25.8	62.1	52.1	28.0	26.3
3	0.31107	35.2	25.8	9.8	45.0	35.6	59.9	49.9	14.9	14.3
4	0.37922	28.1	17.7	10.0	38.1	27.7	58.3	48.3	20.2	20.6
5	1.14819	25.8	15.9	9.8	35.6	25.7	56.0	46.0	20.4	20.3
6	1.71984	23.6	13.9	9.7	33.3	23.6	56.0	46.0	22.7	22.4
7	2.3997	20.2	10.1	9.6	29.8	19.7	56.0	46.0	26.2	26.3
8	3.14056	16.9	7.2	9.7	26.6	16.9	56.0	46.0	29.4	29.1
9	10.61003	17.6	7.9	9.7	27.3	17.6	60.0	50.0	32.7	32.4
10	26.52938	23.3	22.5	9.7	33.0	32.2	60.0	50.0	27.0	17.8

--- L1 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	12.2279	3.3	-1.6	9.7	13.0	8.1	60.0	50.0	47.0	41.9
2	22.73899	16.3	15.6	9.7	26.0	25.3	60.0	50.0	34.0	24.7

6. Test equipment used for test

	Description	Manufacturer	Model No.	Serial No.	Next Cal Date.
■	Spectrum Analyzer	R&S	FSV30	100807	16.09.02
■	Wideband Power Sensor	R&S	NRP-Z81	100677	16.01.26
■	DC Power Supply	AGILENT	E3632A	MY40004399	16.01.06
■	Loop Antenna	R&S	HFH2-Z2	861971/003	17.03.03
■	Bi-Log Antenna	SCHWARZBECK	VULB9163	552	16.06.14
■	Horn Antenna	SCHWARZBECK	3117	155787	16.02.05
■	Horn Antenna	ETS.lindgren	3116	00086635	16.04.29
■	Preamplifier	AGILENT	3008A02343	8449B	16.09.02
■	Broadband Preamplifier	SCHWARZBECK	BBV9721	2	16.05.19
■	Amplifier	SONOMA INSTRUMENT	310	186280	16.09.01
■	EMI Test Receiver	R&S	ESR	101078	16.02.16
■	Attenuator	R&S	DNF Dämpfungsglied 10 dB in N-50 Ohm	0001	16.06.15
■	Attenuator	AGILENT	8491A	MY52460424	16.07.13
■	Antenna Mast	Innco Systems	MA4000-EP	-	-
■	Turn Table	Innco Systems	DT2000	-	-
■	Highpass Filter	Wainwright Instruments GmbH	WHKX1.0 /1.5S-10SS	14	16.02.02
■	Two-Line-V-Network	R&S	ENV216	101358	16.09.03
■	Test Receiver	R&S	ESCI	100001	16.08.04