

TEST REPORT



CTK Co., Ltd.
(Ho-dong), 113, Yejik-ro, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea
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Report No.:
CTK-K-2016-00055
Page (1) / (43) Pages



1. Client

- Name : Samsung Electronics Co., Ltd.
- Address : 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
- Date of Receipt : 2015-12-09

2. Manufacturer

- Name : Samsung Electronics Co., Ltd.
- Address : 19 Chapin Rd., Building D Pine Brook, New Jersey, United States, 07058

3. Factory

- Name :
 1. WISOL CO., LTD.
 2. WISOL HANOI Co., Ltd.
- Address :
 1. 531-7 Gajang-ro, Osan-si, Gyeonggi-do, Korea
 2. 26, ROAD 05, VSIP, PHU CHAN COMMUNE, TU SON DISTRICT, BAC NINH PROVINCE, VIETNAM

4. Use of Report : For FCC Certification

5. Test Sample / Model: Wi-Fi/BT Transceiver / WCK720Q

6. Date of Test : 2016-02-01

7. FCC ID : A3LWCK720Q

8. Certification Number IC : 649E-WCK720Q

9. Test Standard(method) used : FCC Part 15 Subpart B ICES-003, Issue 5

10. Testing Environment: refer to 11 pages to 25 pages

11. Test Results : refer to 12 pages to 26 pages

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This Test Report cannot be reproduced, except in full.

Affirmation	Tested by	Approved by
	Kim Minkyu: (Signature) EMC Test Engineer	Lee Eunwon: (Signature) Technical Manager

The above testing certificate is the accredited test result by Korea Laboratory Accreditation Scheme, which signed the ILAC-MRA.

2016-02-03

Accredited by KOLAS, Republic of KOREA **CTK Co., Ltd.**

REPORT REVISION HISTORY

Date	Revision	Page No
2016-02-03	Issued (CTK-K-2016-00055)	All

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1.0 General Product Description

No.	ITEM	APPLICATION
1	Test Sample	Wi-Fi/BT Transceiver
2	Model	WCK720Q
3	Variant Model	-
4	Dimensions (W x L x H)	25.0 mm X 58.0 mm X 6.0 mm
5	Mobility	☐ Table-top ☐ Floor-standing ☒ Built-in ☐ Portable
6	Maximum Clock Frequency	48 MHz
7	Electrical Ratings	Input: DC 5 V
		Output: -
8	Test Voltage / Frequency	Voltage: AC 120 V
		Frequency: 60 Hz

1.1 Model Differences

Not applicable

1.2 Device Modifications

The following modifications were necessary for compliance:

Not applicable

1.3 EUT Configuration(s)

See Appendix A for individual test set-up configuration(s). The following peripheral devices and/or interface cables were connected during the measurement:

☒ Peripheral Devices

[2.4 GHz WLAN Mode], [5 GHz WLAN Mode]

Device	Model No.	Serial No.	Manufacturer
AC/DC ADAPTER1	ADP-75SB	708W15Y01MK	DELTA ELECTRONICS
Notebook Computer	PSL48K-00L00K	Z7037782R	AUSTeK COMPUTER INC.
AP	DIR-825	-	D-LINK
AC/DC ADAPTER2	CG2412-K	-	D-Link

[BT Mode]

Device	Model No.	Serial No.	Manufacturer
AC/DC ADAPTER	CPA09-002A	-	Chicony Power Technology Co., Ltd.
Notebook Computer	NT-R480	Z07093FZ400685L	Samsung Electronics Co., Ltd.
Bluetooth Tester	TC-3000B	3000B640056	TESCOM CO., LTD.
Antenna	-	-	-

☒ Cable Description

[2.4 GHz WLAN Mode], [5 GHz WLAN Mode]

No.	From		To		Type of Cable		
	Device	I/O Port	Device	I/O Port	Length (m)	Shielded or Unshielded	Ferrite Core [Y/N]
1	EUT	Data	Notebook Computer	USB1	0.1	S	N
2		Data	Notebook Computer	USB2	0.1	S	N
3		WLAN Communication	AP	WLAN Communication	-	-	-
4	Notebook Computer	DC IN	AC/DC ADAPTER1	DC OUT	1.0	U	Y
5	AC/DC ADAPTER1	AC Power	AC Mains	-	1.5	U	N
6	AP	DC IN	AC/DC ADAPTER2	DC OUT	1.0	U	Y
7	AC/DC ADAPTER2	AC Power	-	-	-	-	-

[BT Mode]

No.	From		To		Type of Cable		
	Device	I/O Port	Device	I/O Port	Length (m)	Shielded or Unshielded	Ferrite Core [Y/N]
1	EUT	Data	Notebook Computer	USB1	0.1	S	N
2		Data	Notebook Computer	USB2	0.1	S	N
3		2.4 GHz BT Communication	ANTENNA	2.4 GHz BT Communication	-	-	-
4	Notebook Computer	DC IN	AC/DC ADAPTER	DC OUT	1.0	U	Y
5	AC/DC ADAPTER	AC Power	AC Mains	-	1.5	U	N
6	ANTENNA	-	Bluetooth Tester	RF IN	10.0	S	N
7	Bluetooth Tester	AC Power	AC Mains	-	1.8	U	N

* Shielded or Unshielded : Unshielded=U, Shielded=S

1.4 Test Software

- ☐ EMC Test V 1.0
- ☐ Display Test Patterns – V1.5
- ☒ Ping.exe
- ☐ NFC test program
- ☐ Not applicable

1.5 EUT Operating Mode(s)

Equipment under test was operated during the measurement under the following conditions:

☒ 2.4 GHz WLAN Mode

During the test, the EUT is connected a AP via 2.4 GHz wireless communication and Notebook Computer work on ping test.

☒ 5 GHz WLAN Mode

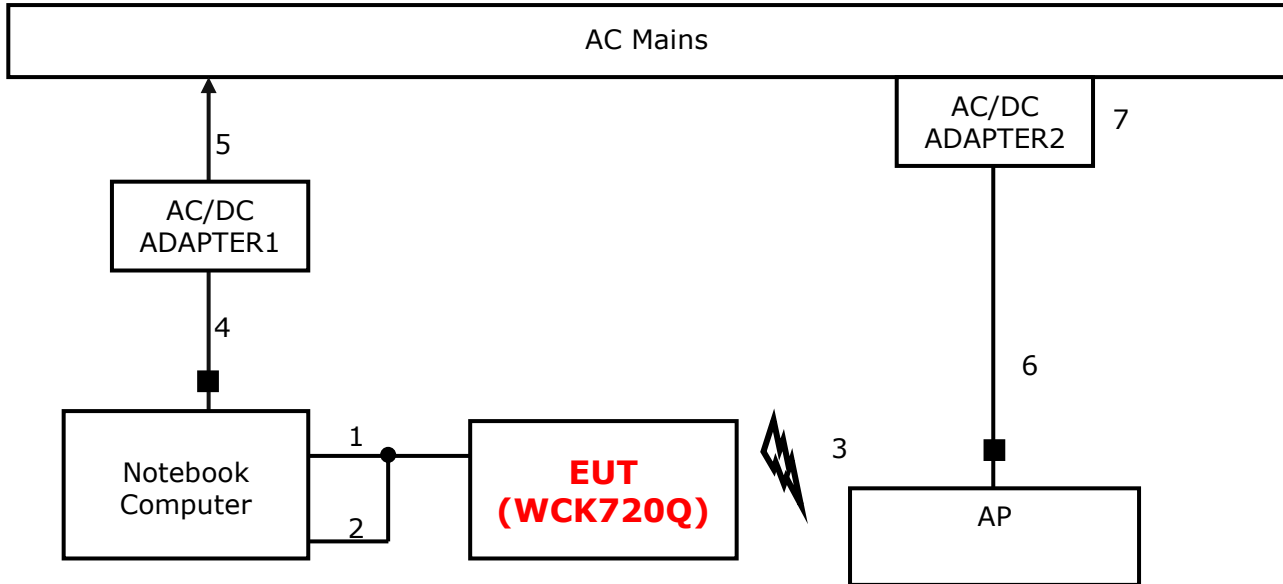
During the test, the EUT is connected a AP via 5 GHz wireless communication and Notebook Computer work on ping test.

☒ BT Mode

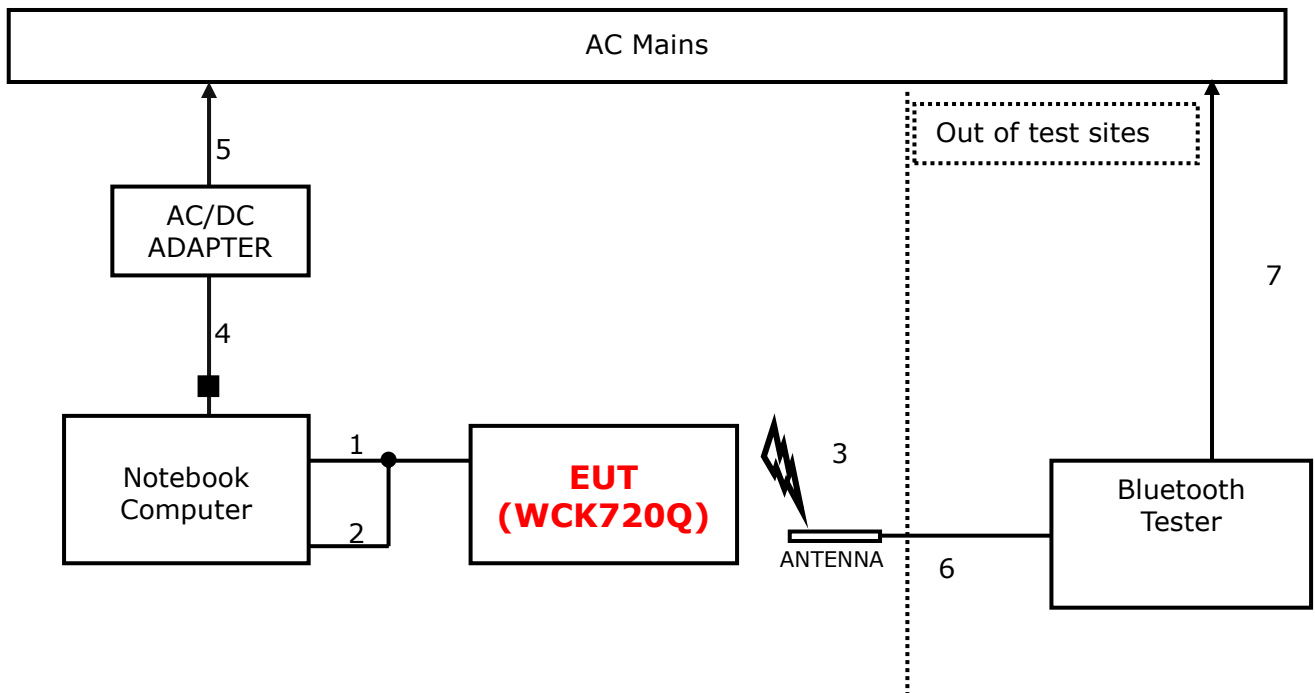
During the test, the EUT is connected a Bluetooth Tester via 2.4 GHz wireless communication and Bluetooth Tester measure BER.

1.6 Configuration

[2.4 GHz WLAN Mode], [5 GHz WLAN Mode]



[BT Mode]



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1.7 Calibration Details of Equipment Used for Measurement

Test equipment and test accessories are calibrated on regular basis. The maximum time between calibrations is one year or what is recommended by the manufacturer, whichever is less. All test equipment calibrations are traceable to the Korea Research Institute of Standards and Science (KRISS), therefore, all test data recorded in this report is traceable to KRISS.

1.8 Test Facility

The measurement facility is located at (Ho-dong) 113, Yejik-ro, Cheoin-gu, Yong-in-si, Gyeonggi-do, Korea. The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

1.9 Measurement Procedure

Preliminary AC power line conducted emissions tests were performed shielded room. To find worst mode, several typical mode and typical cable position were tested.

Final AC power line conducted emissions test was performed shielded room. (location is same as Preliminary test)

Based on the preliminary tests of the EUT, final test was proceeded worst case test mode and cable configuration.

Preliminary radiated emissions test were performed Semi-Anechoic Chamber or anechoic chamber (Distance of antenna and EUT was 3 m). To find worst mode, several typical mode and typical cable position were tested and peak level and frequency were recorded.

Final radiated emissions test was performed Semi-Anechoic Chamber.

Based on the preliminary tests of the EUT, final test was proceeded worst case test mode and cable configuration.

* Measurement procedures was In accordance with ANSI C63.4-2009 7.3.3, 7.3.4, 8.3.1.1, 8.3.1.2, 8.3.2.1, 8.3.2.2

Note #1: These results are deemed satisfactory evidence of compliance with ICES-003 of the Canadian Interference-Causing Equipment Regulations.

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1.10 Laboratory Accreditations and Listings

Country	Agency	Scope of Accreditation	Registration Number	Logo
USA	FCC	FCC Part 15 & 18 EMI (Electromagnetic Interference / Emission)	805871	
JAPAN	VCCI	VCCI V-3 EMI (Electromagnetic Interference / Emission)	C-986 T-1843 R-3627 G-387	
KOREA	MSIP	EMI (Electromagnetic Interference / Emission) EMS (Electromagnetic Susceptibility / Immunity)	KR0025	
CANADA	IC	ICES-003, Issue 5 EMI (Electromagnetic Interference / Emission)	8737A-2	
International	KOLAS	EMI (Electromagnetic Interference / Emission) EMS (Electromagnetic Susceptibility / Immunity)	TESTING NO. 119	

1.11 Measurement Uncertainty

Compliance of the product is based on the measured value.

However, the measurement uncertainty is included for information purposes.

The measurement uncertainties given below are based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

Measurement Type	Frequency Range	Expanded Uncertainty
Conducted Emission	9 kHz to 150 kHz	2.78 dB (C.L.: Approx. 95 %, $k=2$)
Conducted Emission	150 kHz to 30 MHz	2.70 dB (C.L.: Approx. 95 %, $k=2$)
Disturbance Power	30 MHz to 300 MHz	3.74 dB (C.L.: Approx. 95 %, $k=2$)
Radiated Emission	30 MHz to 1000 MHz	3.66 dB (C.L.: Approx. 95 %, $k=2$)
Radiated Emission	1 GHz Above	4.16 dB (C.L.: Approx. 95 %, $k=2$)

2.0 EMC Test Regulations/Standards

The tests were performed according to following regulations:

Applied standard	Title	Applied	Test Result
FCC Part 15 Subpart B ICES-003, Issue 5 ☐ Class A ☒ Class B	Conducted Voltage Emissions	☒	☒ MET ☐ NOT MET
	Radiated Electric Field Emissions	☒	☒ MET ☐ NOT MET

3.0 Results of Individual Test

3.1 Conducted Voltage Emissions of Mains ports

Test Date

2016-02-01

Test Location

Shielded Room

Test Equipment

Name of Equipment	Model No.	Manufacturer	Serial No.	Cal Date	Due Date	Applied
EMI Test Receiver	ESCI3	Rohde & Schwarz	100032	2015-02-02	2016-02-02	☐
LISN	ENV216	Rohde & Schwarz	101235	2015-05-14	2016-05-14	☐
LISN	ENV216	Rohde & Schwarz	101236	2015-05-14	2016-05-14	☐
EMI Test Receiver	ESR7	Rohde & Schwarz	101088	2015-06-12	2016-06-12	☐
LISN	ENV216	Rohde & Schwarz	101151	2015-11-02	2016-11-02	☐
LISN	ESH3-Z5	Rohde & Schwarz	100207	2015-11-02	2016-11-02	☐
EMI Test Receiver	ESCI7	Rohde & Schwarz	100816	2015-11-02	2016-11-02	☒
LISN	ENV216	Rohde & Schwarz	101760	2015-02-02	2016-02-02	☒
LISN	NNLK 8121	SCHWARZBECK	8121-644	2015-05-15	2016-05-15	☐
Pulse Limiter	VTSD 9561-F	SCHWARZBECK	9561-F064	2015-05-15	2016-05-15	☐
LISN	ENV216	Rohde & Schwarz	101150	2015-02-02	2016-02-02	☒

Test Software

ESCI7, ESCI3 : EMC32 Ver. 8.50.0

ESR7 : EMC32 Ver. 8.53.0

Frequency Range of Measurement

150 kHz to 30 MHz

Instrument Setting

IF Band Width: 9 kHz

Climate Condition

Temperature: (21 ± 1) °C

Relative Humidity: (42 ± 1) %

Atmospheric Pressure: 98 kPa

Test Result

The requirements are: ☒ MET ☐ NOT MET

[2.4 GHz WLAN Mode]

Frequency (MHz)	Measured Data (dBμV)	Margin (dB)	Remark
0.469 500	30.6	15.9	CAverage

[5 GHz WLAN Mode]

Frequency (MHz)	Measured Data (dBμV)	Margin (dB)	Remark
2.233 500	41.4	14.6	Quasi-peak

[BT Mode]

Frequency (MHz)	Measured Data (dBμV)	Margin (dB)	Remark
0.186 000	55.7	8.5	Quasi-peak

The Result is calculated by using the following formula;

* Result = Limit – Margin (Result included the correction factor)

* Correction factor = Cable Loss + Insertion loss of LISN

Test Data

[2.4 GHz WLAN Mode] [Line: L1]

Test

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Test Report

Common Information

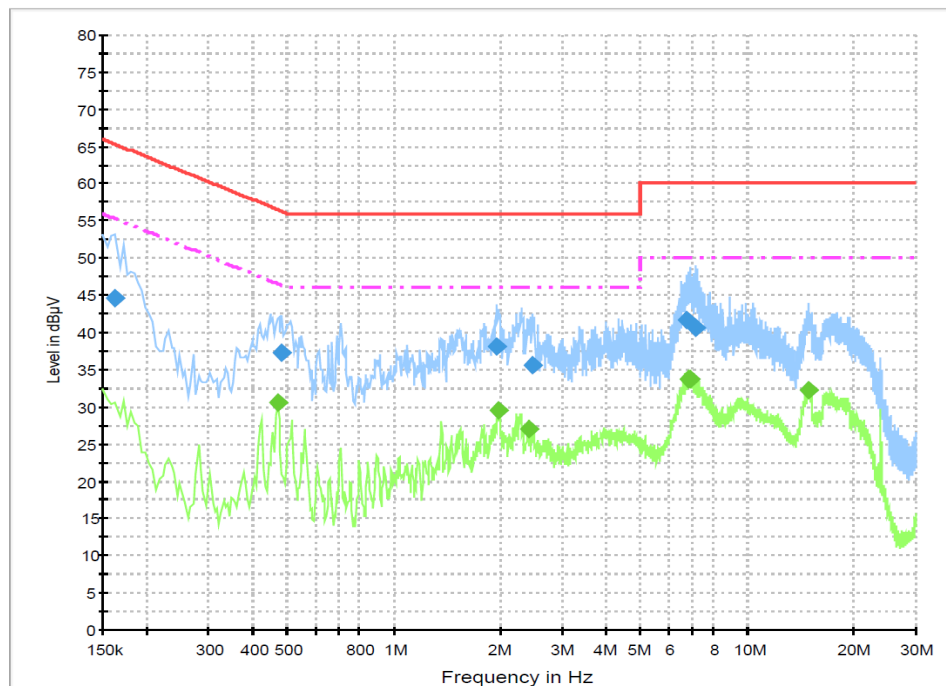
Test Model Name: WCK720Q
Test Mode: 2.4 G WLAN
Manufacturer: Samsung Electronics Co., Ltd.
Tester: Kim Minkyu

Hardware Setup: EMI conducted Voltage with ENV216_FO(101760) - [EMI conducted]

Subrange 1
Frequency Range: 150 kHz - 30 MHz

Receiver: ESCI 7 [ESCI 7]
@ GPIB0 (ADR 23), SN 100816/007, FW 4.42
Signal Path: ESCI 7-ENV216 FO(101760)
Correction Table: 3-2 CE Cable Loss
LISN: ENV216 FO(101760)
Correction Table (Line 0): ENV216_FO_N(101760)
Correction Table (Line 1): ENV216_FO_L1(101760)

CISPR 22 Class B_L1



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8:21:19

Test

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Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.163500	44.7	1000.0	9.000	On	L1	9.8	20.6	65.3
0.483000	37.4	1000.0	9.000	On	L1	9.9	18.9	56.3
1.950000	38.1	1000.0	9.000	On	L1	9.7	17.9	56.0
2.463000	35.5	1000.0	9.000	On	L1	9.8	20.5	56.0
6.747000	41.6	1000.0	9.000	On	L1	9.8	18.4	60.0
7.170000	40.6	1000.0	9.000	On	L1	9.8	19.4	60.0

Final Result 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.469500	30.6	1000.0	9.000	On	L1	9.9	15.9	46.5
1.977000	29.5	1000.0	9.000	On	L1	9.7	16.5	46.0
2.404500	27.1	1000.0	9.000	On	L1	9.8	18.9	46.0
6.792000	33.7	1000.0	9.000	On	L1	9.8	16.3	50.0
6.882000	33.7	1000.0	9.000	On	L1	9.8	16.3	50.0
14.923500	32.2	1000.0	9.000	On	L1	9.9	17.8	50.0

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[2.4 GHz WLAN Mode] [Line : Neutral]

Test

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Test Report

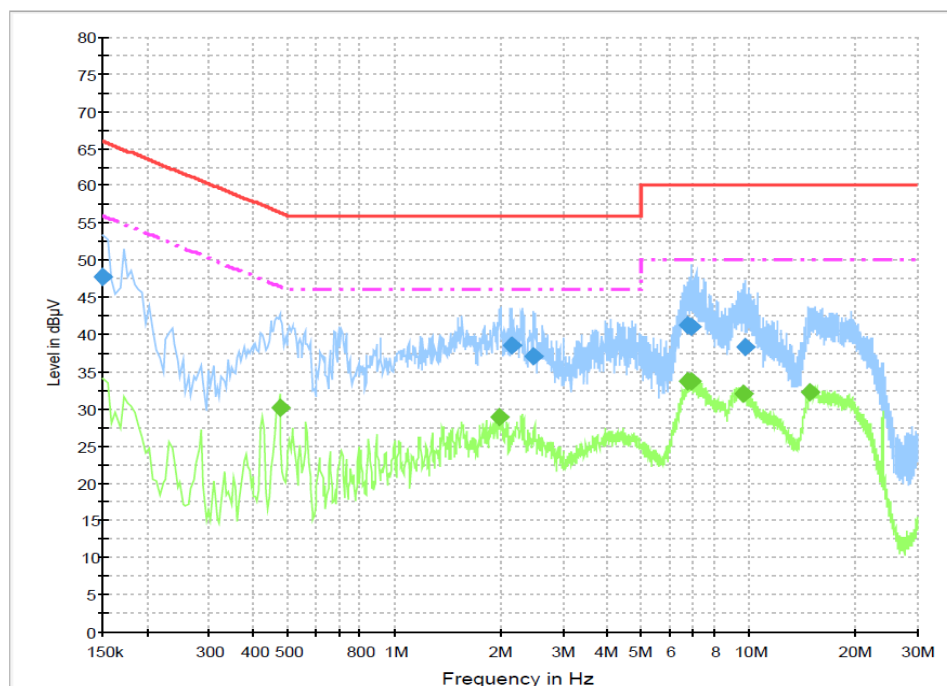
Common Information

Test Model Name: WCK720Q
Test Mode: 2.4 G WLAN
Manufacturer: Samsung Electronics Co., Ltd.
Tester: Kim Minkyu

Hardware Setup: EMI conducted Voltage with ENV216_FO(101760) - [EMI conducted]

Subrange 1
Frequency Range: 150 kHz - 30 MHz
Receiver: ESCI 7 [ESCI 7]
@ GPIB0 (ADR 23), SN 100816/007, FW 4.42
Signal Path: ESCI 7-ENV216 FO(101760)
Correction Table: 3-2 CE Cable Loss
LISN: ENV216 FO(101760)
Correction Table (Line 0): ENV216_FO_N(101760)
Correction Table (Line 1): ENV216_FO_L1(101760)

CISPR 22 Class B_N



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8:15:31

Test

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Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	47.8	1000.0	9.000	On	N	9.7	18.2	66.0
2.134500	38.6	1000.0	9.000	On	N	9.8	17.4	56.0
2.472000	37.0	1000.0	9.000	On	N	9.8	19.0	56.0
6.724500	41.2	1000.0	9.000	On	N	9.7	18.8	60.0
6.868500	41.1	1000.0	9.000	On	N	9.7	18.9	60.0
9.793500	38.4	1000.0	9.000	On	N	9.9	21.6	60.0

Final Result 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.474000	30.2	1000.0	9.000	On	N	9.9	16.2	46.4
1.981500	28.9	1000.0	9.000	On	N	9.7	17.1	46.0
6.751500	33.7	1000.0	9.000	On	N	9.7	16.4	50.0
6.855000	33.6	1000.0	9.000	On	N	9.7	16.4	50.0
9.658500	32.0	1000.0	9.000	On	N	9.9	18.0	50.0
14.973000	32.2	1000.0	9.000	On	N	9.9	17.8	50.0

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[5 GHz WLAN Mode] [Line: L1]

Test

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Test Report

Common Information

Test Model Name: WCK720Q
Test Mode: 5 G WLAN
Manufacturer: Samsung Electronics Co., Ltd.
Tester: Kim Minkyu

Hardware Setup: EMI conducted Voltage with ENV216_FO(101760) - [EMI conducted]

Subrange 1

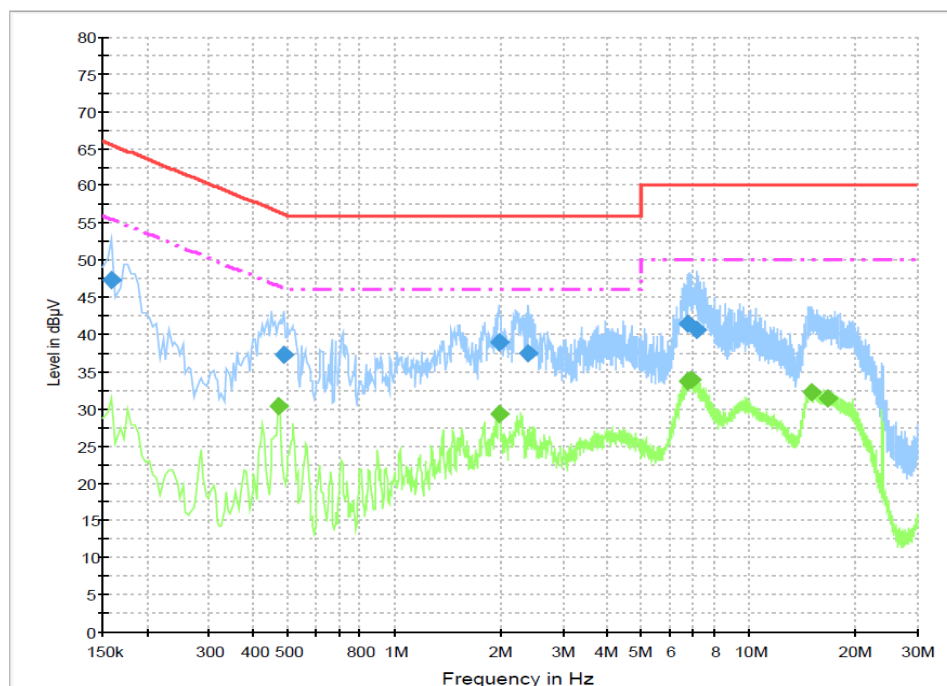
Frequency Range: 150 kHz - 30 MHz

Receiver: ESCI 7 [ESCI 7]
@ GPIB0 (ADR 23), SN 100816/007, FW 4.42

Signal Path: ESCI 7-ENV216 FO(101760)
Correction Table: 3-2 CE Cable Loss

LISN: ENV216 FO(101760)
Correction Table (Line 0): ENV216_FO_N(101760)
Correction Table (Line 1): ENV216_FO_L1(101760)

CISPR 22 Class B_L1



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Test

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Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.159000	47.4	1000.0	9.000	On	L1	9.8	18.2	65.5
0.487500	37.2	1000.0	9.000	On	L1	9.9	19.0	56.2
1.968000	39.0	1000.0	9.000	On	L1	9.7	17.0	56.0
2.395500	37.4	1000.0	9.000	On	L1	9.8	18.6	56.0
6.769500	41.4	1000.0	9.000	On	L1	9.8	18.6	60.0
7.138500	40.7	1000.0	9.000	On	L1	9.8	19.3	60.0

Final Result 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.469500	30.4	1000.0	9.000	On	L1	9.9	16.2	46.5
1.986000	29.3	1000.0	9.000	On	L1	9.7	16.7	46.0
6.756000	33.8	1000.0	9.000	On	L1	9.8	16.2	50.0
6.909000	33.8	1000.0	9.000	On	L1	9.8	16.2	50.0
15.031500	32.3	1000.0	9.000	On	L1	9.9	17.7	50.0
16.786500	31.4	1000.0	9.000	On	L1	9.9	18.6	50.0

2/1/2016

8:27:12

[5 GHz WLAN Mode] [Line : Neutral]

Test

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Test Report

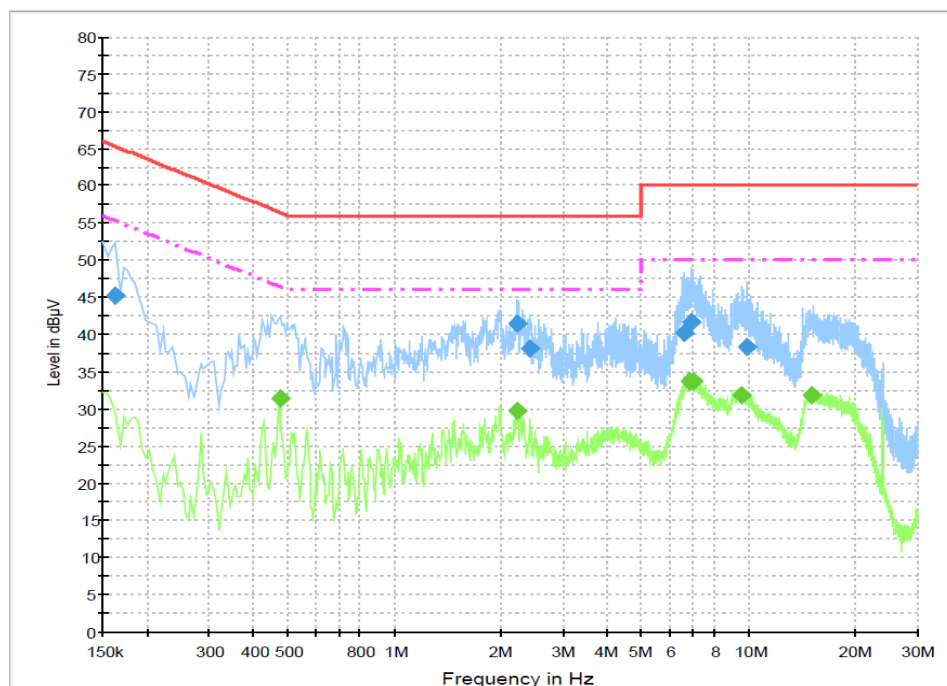
Common Information

Test Model Name: WCK720Q
Test Mode: 5 G WLAN
Manufacturer: Samsung Electronics Co., Ltd.
Tester: Kim Minkyu

Hardware Setup: EMI conducted Voltage with ENV216_FO(101760) - [EMI conducted]

Subrange 1
Frequency Range: 150 kHz - 30 MHz
Receiver: ESCI 7 [ESCI 7]
@ GPIB0 (ADR 23), SN 100816/007, FW 4.42
Signal Path: ESCI 7-ENV216 FO(101760)
Correction Table: 3-2 CE Cable Loss
LISN: ENV216 FO(101760)
Correction Table (Line 0): ENV216_FO_N(101760)
Correction Table (Line 1): ENV216_FO_L1(101760)

CISPR 22 Class B_N



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Test

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Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.163500	45.2	1000.0	9.000	On	N	9.7	20.1	65.3
2.233500	41.4	1000.0	9.000	On	N	9.8	14.6	56.0
2.413500	38.2	1000.0	9.000	On	N	9.8	17.8	56.0
6.598500	40.3	1000.0	9.000	On	N	9.7	19.7	60.0
6.918000	41.7	1000.0	9.000	On	N	9.7	18.3	60.0
9.856500	38.3	1000.0	9.000	On	N	9.9	21.7	60.0

Final Result 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.474000	31.4	1000.0	9.000	On	N	9.9	15.0	46.4
2.229000	29.8	1000.0	9.000	On	N	9.8	16.2	46.0
6.787500	33.8	1000.0	9.000	On	N	9.7	16.2	50.0
6.954000	33.7	1000.0	9.000	On	N	9.7	16.3	50.0
9.537000	31.9	1000.0	9.000	On	N	9.9	18.1	50.0
15.000000	31.9	1000.0	9.000	On	N	9.9	18.1	50.0

2/1/2016

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[BT Mode] [Line: L1]

Test

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Test Report

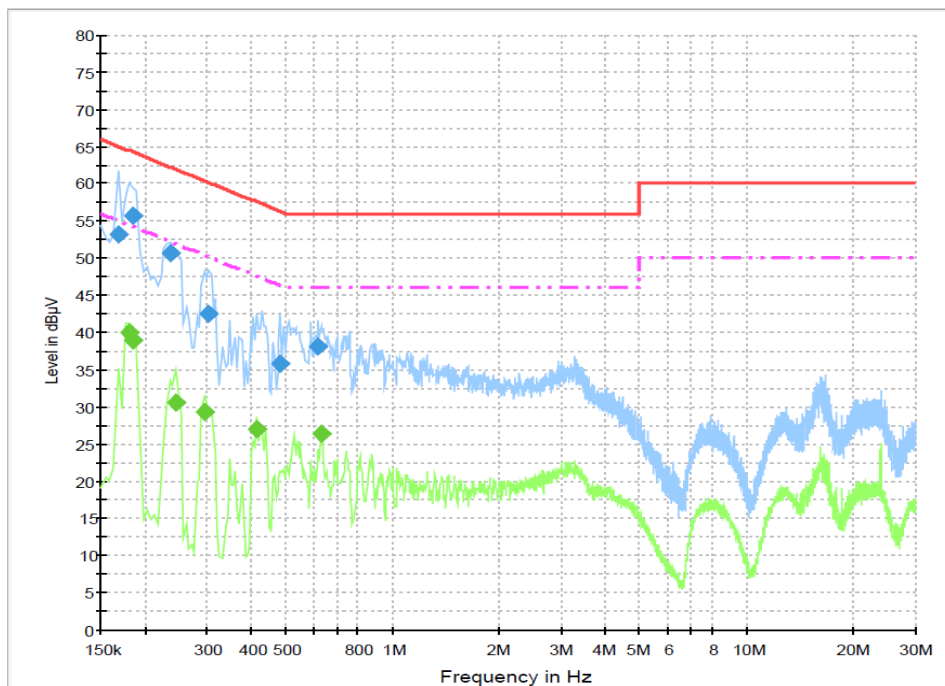
Common Information

Test Model Name: WCK720Q
Test Mode: BT
Manufacturer: Samsung Electronics Co., Ltd.
Tester: Kim Minkyu

Hardware Setup: EMI conducted Voltage with ENV216_FO(101760) - [EMI conducted]

Subrange 1
Frequency Range: 150 kHz - 30 MHz
Receiver: ESCI 7 [ESCI 7]
@ GPIB0 (ADR 23), SN 100816/007, FW 4.42
Signal Path: ESCI 7-ENV216 FO(101760)
Correction Table: 3-2 CE Cable Loss
LISN: ENV216 FO(101760)
Correction Table (Line 0): ENV216_FO_N(101760)
Correction Table (Line 1): ENV216_FO_L1(101760)

CISPR 22 Class B_L1



2/1/2016

7:54:30

Test

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Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.168000	53.1	1000.0	9.000	On	L1	9.8	11.9	65.1
0.186000	55.7	1000.0	9.000	On	L1	9.8	8.5	64.2
0.235500	50.6	1000.0	9.000	On	L1	9.7	11.6	62.3
0.303000	42.6	1000.0	9.000	On	L1	9.7	17.5	60.2
0.483000	35.7	1000.0	9.000	On	L1	9.9	20.6	56.3
0.618000	38.2	1000.0	9.000	On	L1	9.8	17.8	56.0

Final Result 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.181500	40.0	1000.0	9.000	On	L1	9.8	14.4	54.4
0.186000	38.9	1000.0	9.000	On	L1	9.8	15.3	54.2
0.244500	30.7	1000.0	9.000	On	L1	9.6	21.3	51.9
0.294000	29.2	1000.0	9.000	On	L1	9.7	21.2	50.4
0.415500	26.9	1000.0	9.000	On	L1	9.9	20.6	47.5
0.631500	26.3	1000.0	9.000	On	L1	9.8	19.7	46.0

2/1/2016

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[BT Mode] [Line : Neutral]

Test

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Test Report

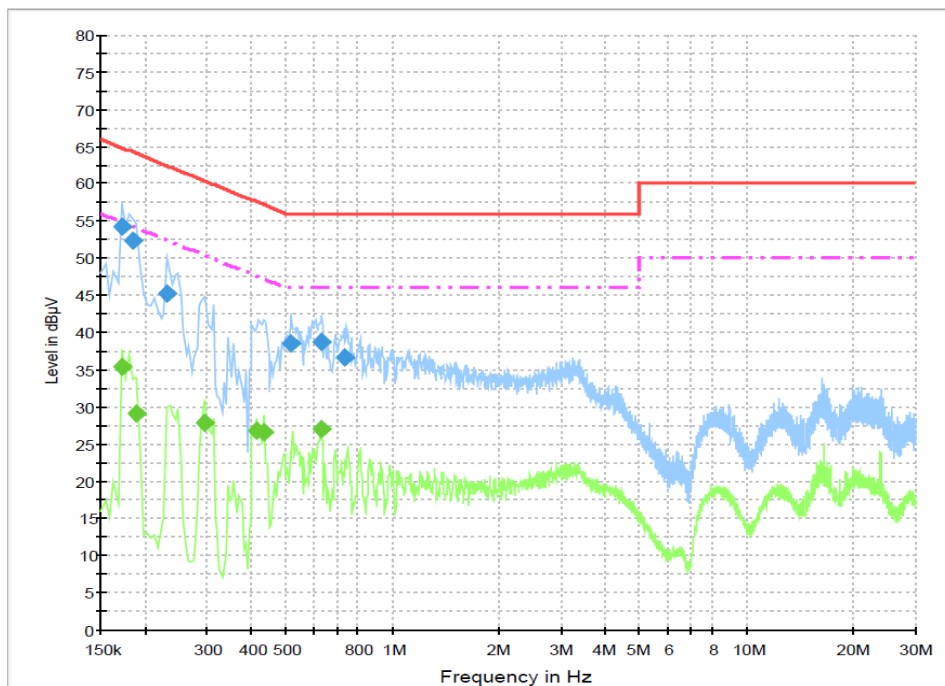
Common Information

Test Model Name: WCK720Q
Test Mode: BT
Manufacturer: Samsung Electronics Co., Ltd.
Tester: Kim Minkyu

Hardware Setup: EMI conducted Voltage with ENV216_FO(101760) - [EMI conducted]

Subrange 1
Frequency Range: 150 kHz - 30 MHz
Receiver: ESCI 7 [ESCI 7]
@ GPIB0 (ADR 23), SN 100816/007, FW 4.42
Signal Path: ESCI 7-ENV216 FO(101760)
Correction Table: 3-2 CE Cable Loss
LISN: ENV216 FO(101760)
Correction Table (Line 0): ENV216_FO_N(101760)
Correction Table (Line 1): ENV216_FO_L1(101760)

CISPR 22 Class B_N



2/1/2016

8:02:51

Test

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Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.172500	54.3	1000.0	9.000	On	N	9.7	10.5	64.8
0.186000	52.4	1000.0	9.000	On	N	9.8	11.8	64.2
0.231000	45.3	1000.0	9.000	On	N	9.7	17.1	62.4
0.519000	38.5	1000.0	9.000	On	N	9.9	17.5	56.0
0.631500	38.8	1000.0	9.000	On	N	9.8	17.2	56.0
0.730500	36.7	1000.0	9.000	On	N	9.8	19.3	56.0

Final Result 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.172500	35.4	1000.0	9.000	On	N	9.7	19.5	54.8
0.190500	29.1	1000.0	9.000	On	N	9.8	25.0	54.0
0.294000	27.9	1000.0	9.000	On	N	9.7	22.5	50.4
0.415500	26.8	1000.0	9.000	On	N	9.9	20.7	47.5
0.433500	26.5	1000.0	9.000	On	N	9.9	20.6	47.2
0.627000	27.1	1000.0	9.000	On	N	9.8	18.9	46.0

2/1/2016

8:02:51

3.2 Radiated Electric Field Emissions (Below 1 GHz)

Test Date

2016-02-01

Test Location

10 m SAC (test distance : ☐ 10 m, ☒ 3 m)

Test Equipment

Name of Equipment	Model No.	Manufacturer	Serial No.	Cal Date	Due Date	Applied
EMI Test Receiver	ESCI7	Rohde & Schwarz	100814	2015-11-02	2016-11-02	☒
Bilog Antenna	CBL6111C	Schaffner	2551	2015-04-24	2017-04-24	☒
6dB Attenuator	DNF	Rohde & Schwarz	272.4110.50-2	2015-11-03	2016-11-03	☒
Amplifier	310	Sonoma Instrument Co.	291721	2015-02-02	2016-02-02	☒

Test Software

TOYO EMI software Ver. 5.1.0

Frequency Range of Measurement

30 MHz to 1 GHz

Instrument Setting

IF Band Width: 120 kHz

Climate Condition

Temperature: (21 ± 1) °C

Relative Humidity: (42 ± 1) %

Atmospheric Pressure: 98 kPa

Test Result

The requirements are: ☒ MET ☐ NOT MET

[2.4 GHz WLAN Mode]

Frequency (MHz)	Measured Data (dBμV/m)	Margin (dB)	Remark
692.631	42.0	4.0	Quasi-peak

[5 GHz WLAN Mode]

Frequency (MHz)	Measured Data (dBμV/m)	Margin (dB)	Remark
207.753	35.9	7.6	Quasi-peak

[BT Mode]

Frequency (MHz)	Measured Data (dBμV/m)	Margin (dB)	Remark
122.635	32.7	10.8	Quasi-peak

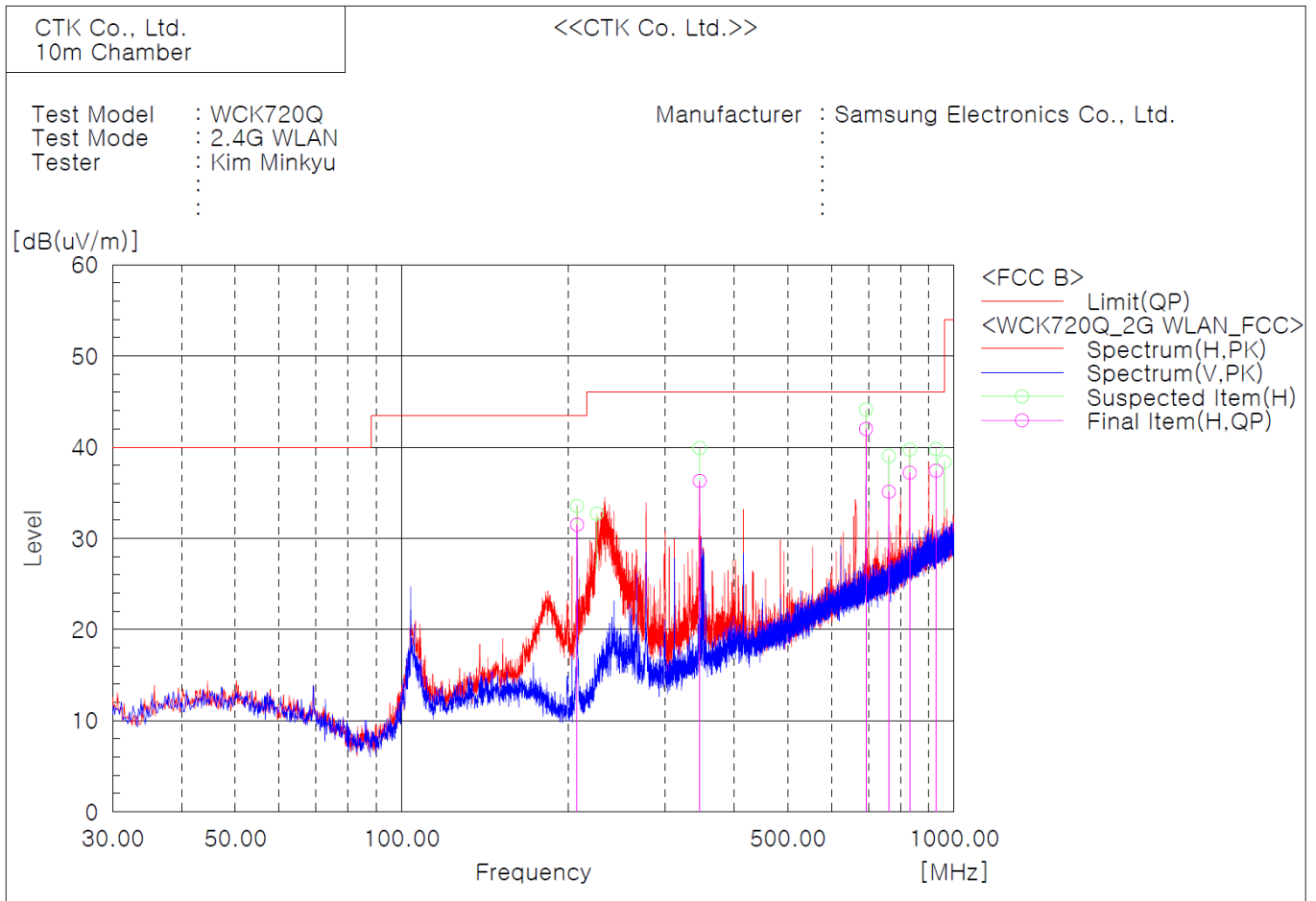
The Result is calculated by using the following formula;

* Result = Reading + Correction factor

* Correction factor = Antenna Factor + Cable Loss + 6 dB attenuator – Amp Gain

Test Data

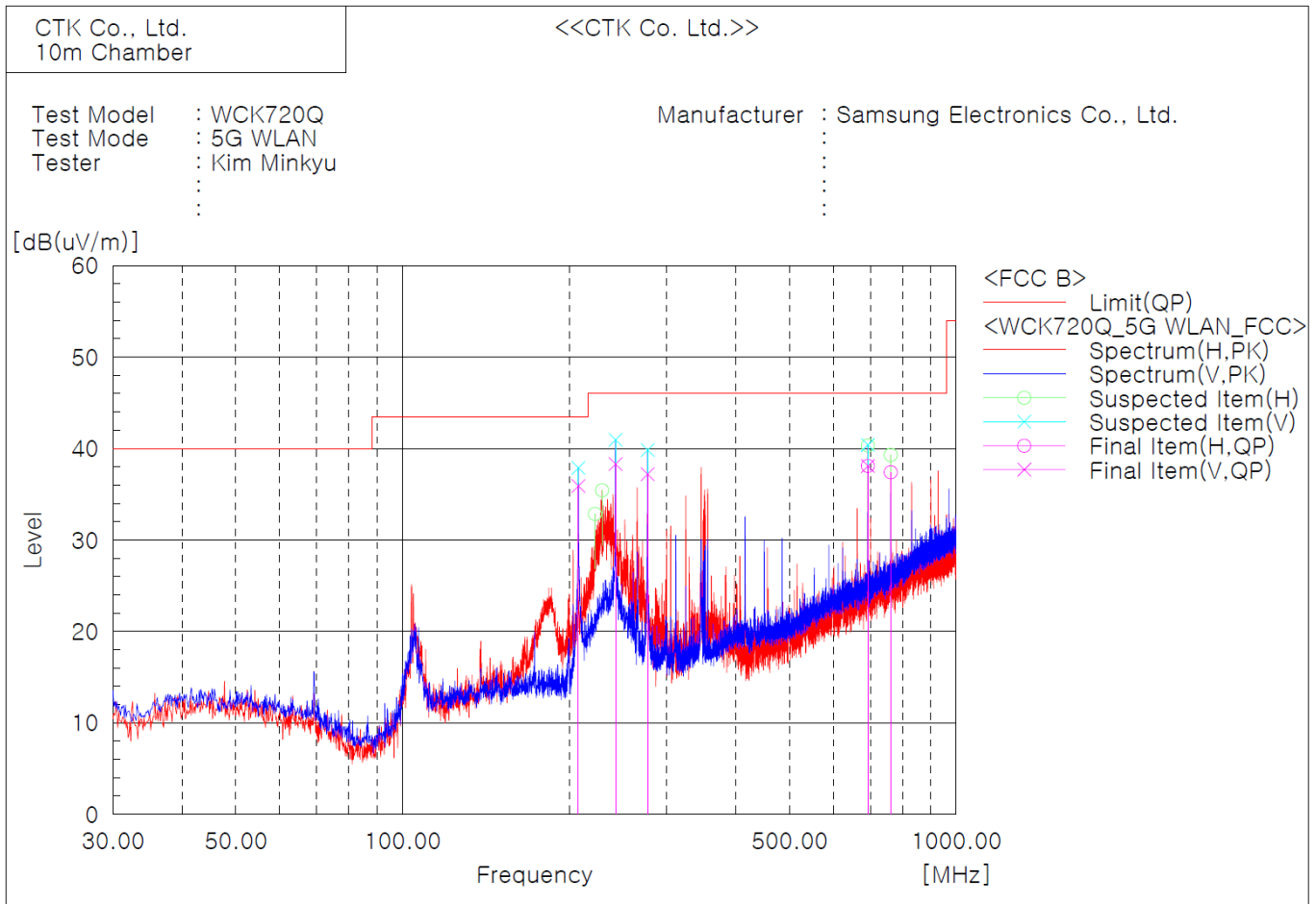
[2.4 GHz WLAN Mode]



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]
1	207.753	H	44.9	-13.4	31.5	43.5	12.0	100.0	8.0
2	346.341	H	43.2	-6.9	36.3	46.0	9.7	100.0	268.0
3	692.631	H	40.1	1.9	42.0	46.0	4.0	100.0	45.0
4	761.865	H	31.9	3.2	35.1	46.0	10.9	100.0	306.0
5	831.099	H	32.3	4.9	37.2	46.0	8.8	100.0	268.0
6	927.614	H	30.1	7.3	37.4	46.0	8.6	100.0	306.0

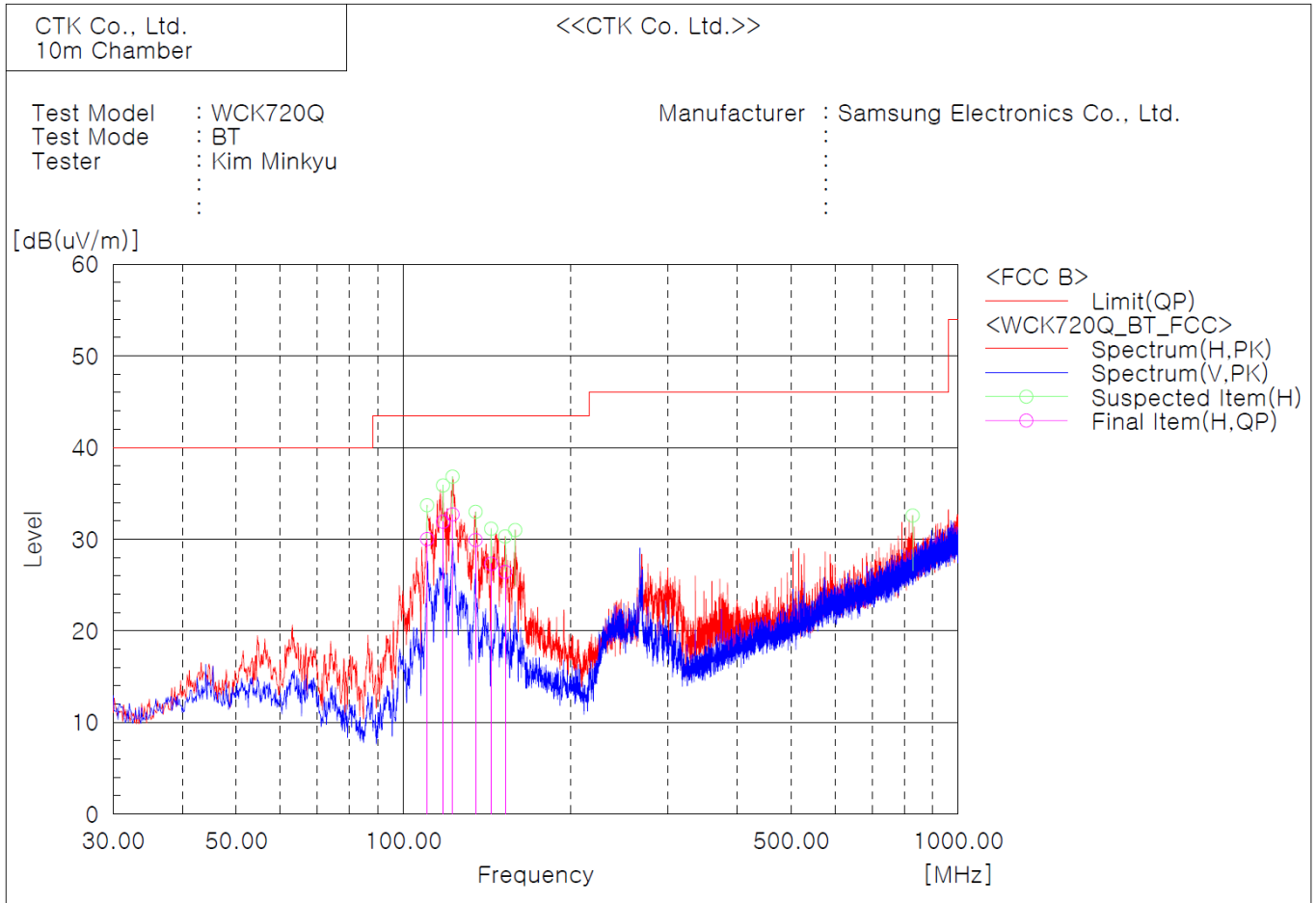
[5 GHz WLAN Mode]



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]
1	207.753	V	49.3	-13.4	35.9	43.5	7.6	295.0	311.0
2	242.430	V	49.2	-10.9	38.3	46.0	7.7	295.0	51.0
3	277.108	V	46.2	-9.0	37.2	46.0	8.8	295.0	311.0
4	692.631	V	36.2	1.9	38.1	46.0	7.9	295.0	237.0
5	692.631	H	36.2	1.9	38.1	46.0	7.9	100.0	311.0
6	761.865	H	34.2	3.2	37.4	46.0	8.6	100.0	0.0

[BT Mode]



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]
1	110.389	H	43.2	-13.2	30.0	43.5	13.5	400.0	55.0
2	117.906	H	44.2	-12.3	31.9	43.5	11.6	400.0	55.0
3	122.635	H	44.6	-11.9	32.7	43.5	10.8	400.0	55.0
4	135.003	H	41.2	-11.3	29.9	43.5	13.6	400.0	204.0
5	143.975	H	38.2	-10.9	27.3	43.5	16.2	400.0	55.0
6	152.584	H	36.9	-10.5	26.4	43.5	17.1	400.0	204.0

3.3 Radiated Electric Field Emissions (Above 1 GHz)

Test Date

Not applicable

Test Location

3 m SAC

Test Equipment

Name of Equipment	Model No.	Manufacturer	Serial No.	Cal Date	Due Date	Applied
EMI Test Receiver	ESCI7	Rohde & Schwarz	100816	2015-11-02	2016-11-02	☐
Double Ridged Guide Antenna	3117	ETS-Lindgren	00154525	2015-09-02	2017-09-02	☐
Preamplifier	8449B	Agilent Technologies	3008A02011	2015-12-08	2016-12-08	☐

Test Software

TOYO EMI software Ver. 5.1.0

Frequency Range of Measurement

1 GHz to 6 GHz

Instrument Setting

IF Band Width: 1 MHz

Climate Condition

Temperature:

Relative Humidity:

Atmospheric Pressure:

Test Result

The requirements are: ☐ MET ☐ NOT MET

Frequency (MHz)	Measured Data (dBμV/m)	Margin (dB)	Remark

The Result is calculated by using the following formula;

* Result = Reading + Correction factor

* Correction factor = Antenna Factor + Cable Loss- Amp Gain

Test Data

 CTK Co., Ltd. The Prime Leader of Global Regulatory Certification	CTK Co., Ltd. (Ho-dong), 113, Yejik-ro, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea Tel: +82-31-339-9871 Fax: +82-31-624-9501	Report No.: CTK-K-2016-00055 Page (31) / (43) Pages	
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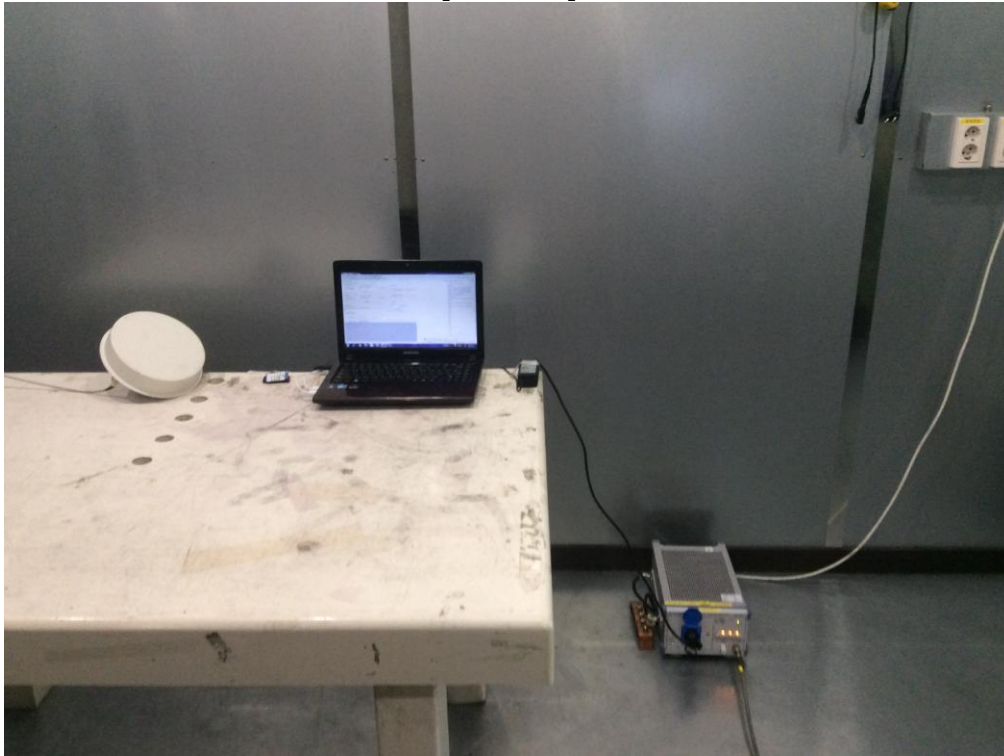
APPENDIX A - Test Setup Photos and Configuration

Conducted Voltage Emissions of Mains Ports

[2.4 GHz WLAN Mode], [5 GHz WLAN Mode]

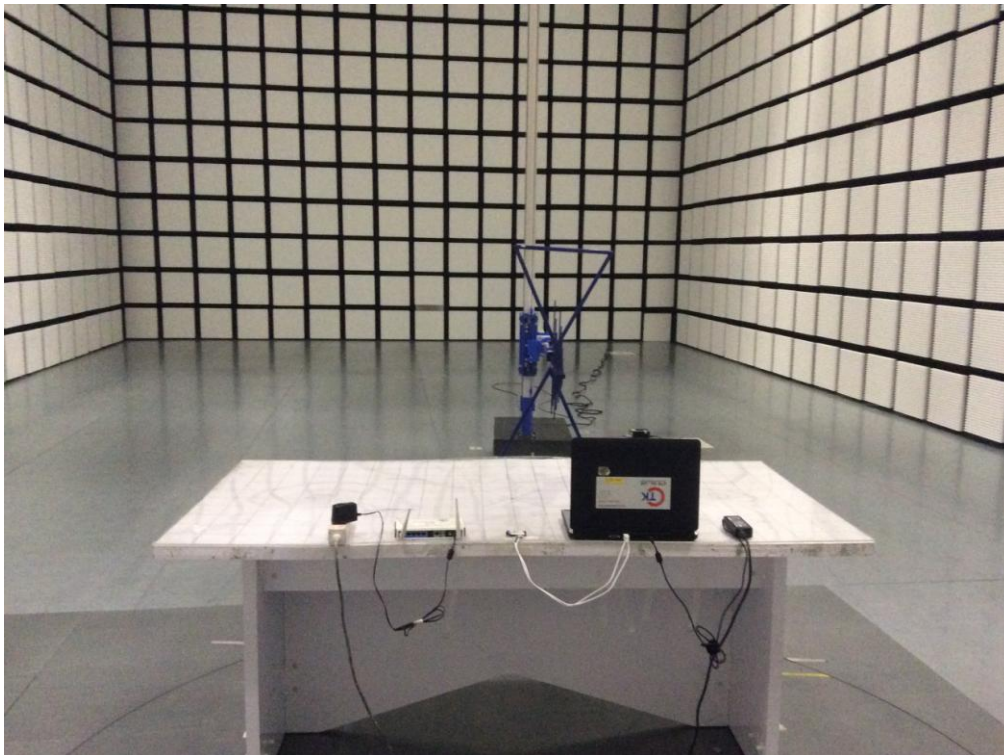
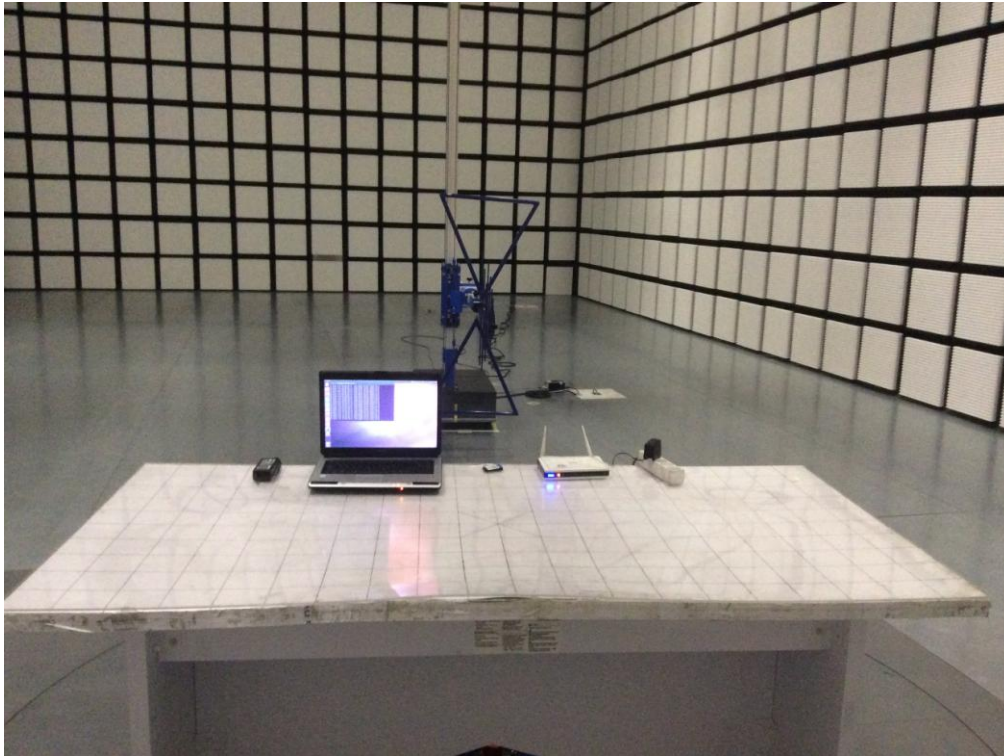


[BT Mode]

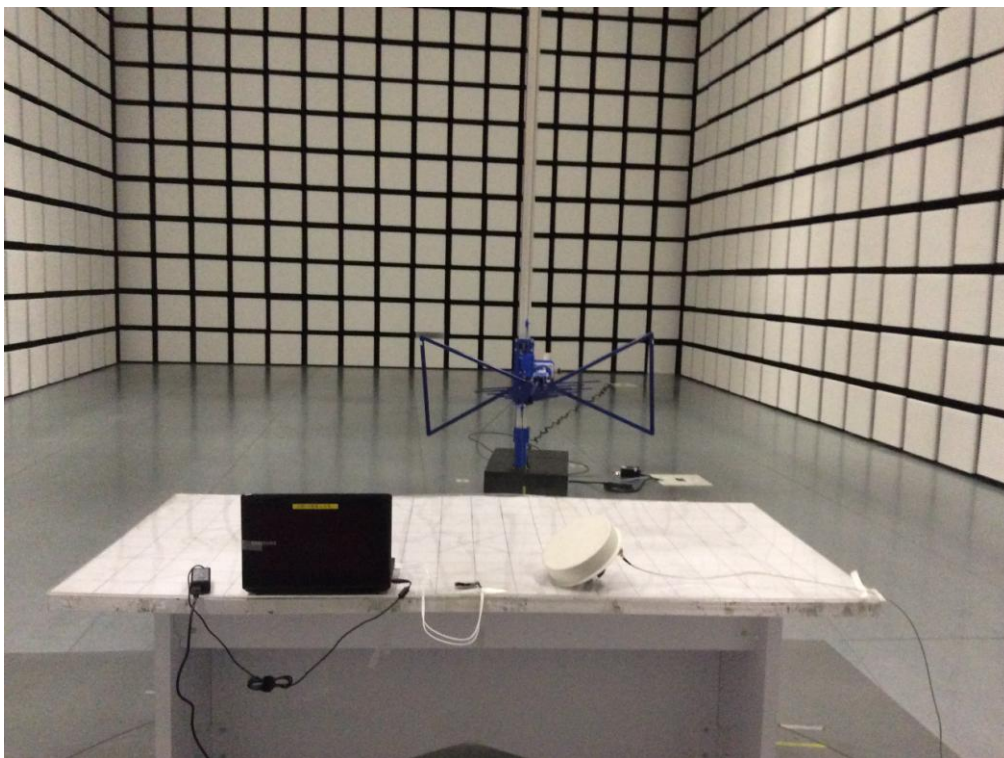
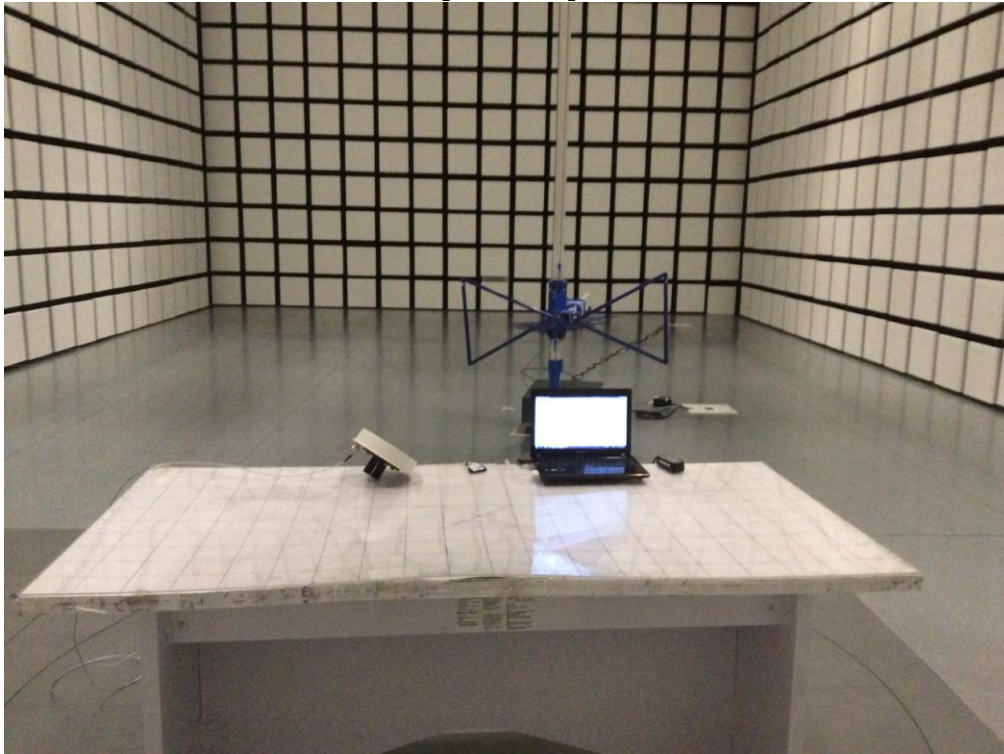


Radiated Electric Field Emissions (Below 1 GHz)

[2.4 GHz WLAN Mode], [5 GHz WLAN Mode]



[BT Mode]



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Radiated Electric Field Emissions (Above 1 GHz)

Not Applicable

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APPENDIX B – EUT Photographs

EUT External Photographs

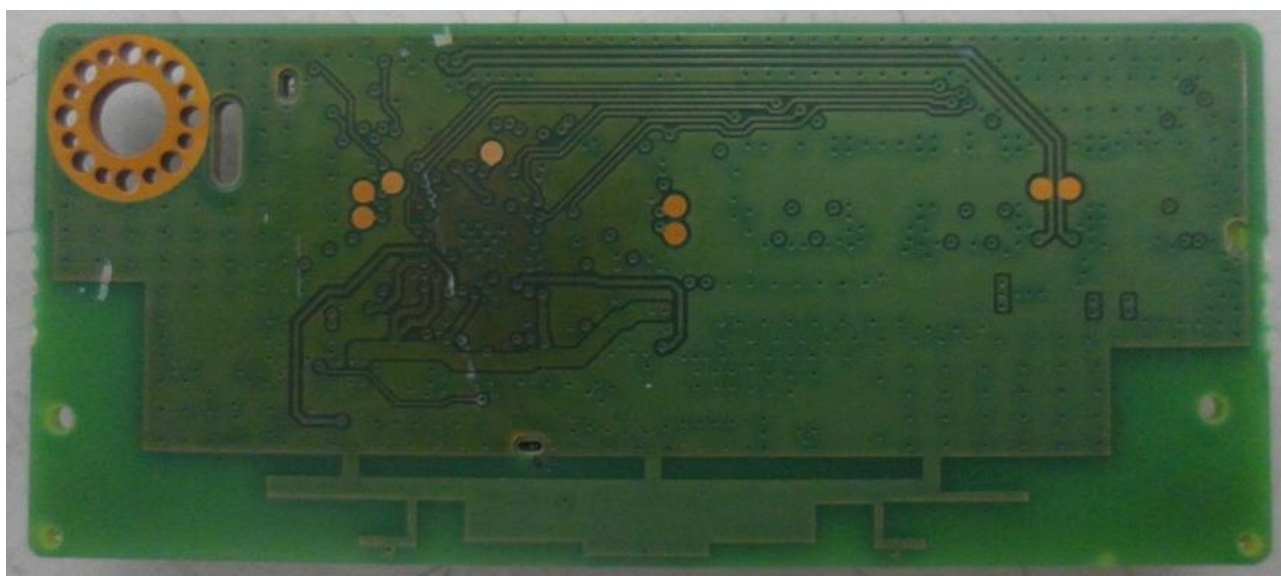
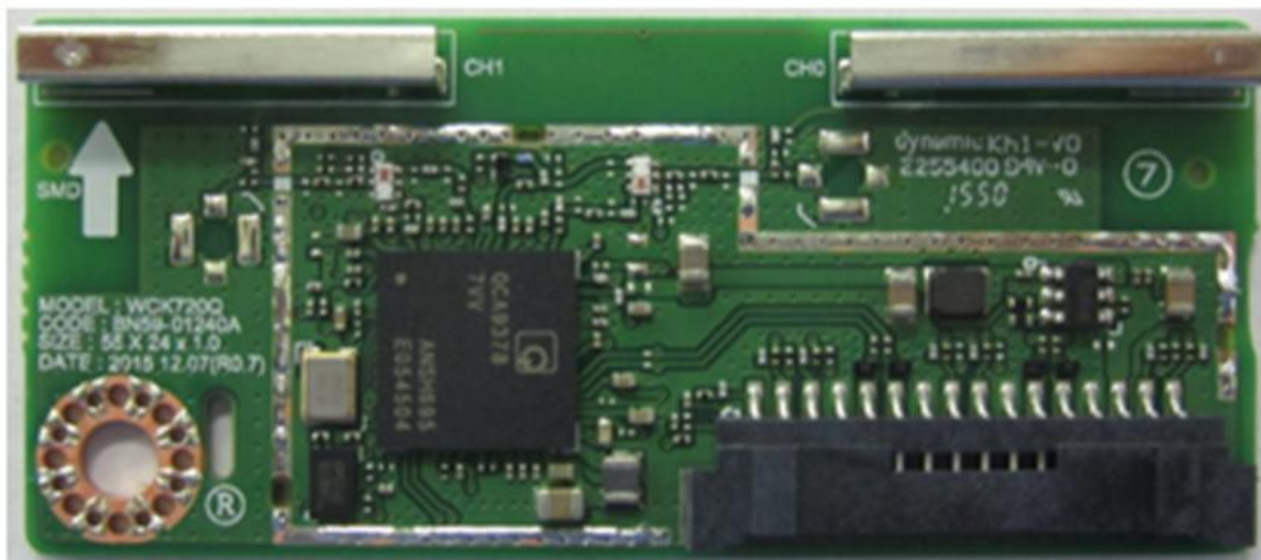




EUT Internal Photographs

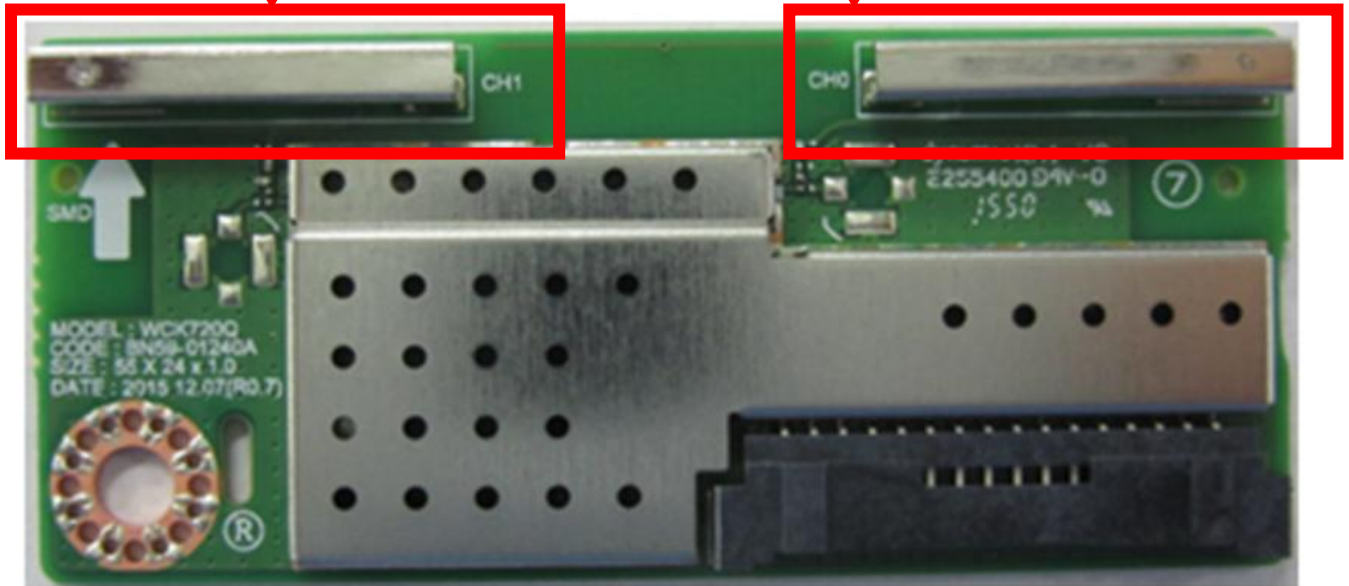


PCB



Antenna

Antenna



Label

