

FCC CERTIFICATION TEST REPORT

FOR

Applicant	:	JSW Pacific Corporation
Address	:	3F-3, No.700, Chung Cheng Rd, Chung-Ho Dist., New Taipei City 235, Taiwan
Equipment under Test	:	Smart wireless central home control / management center
Model No	:	MSTR51
FCC ID	:	LE2MSTR51
Manufacturer	:	JSW Pacific Corporation
Address	:	3F-3, No.700, Chung Cheng Rd, Chung-Ho Dist., New Taipei City 235, Taiwan

Issued By: Dongguan Dongdian Testing Service Co., Ltd.

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REPORT

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TEST REPORT DECLARE

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Test Standard Used: FCC Rules and Regulations Part 15 Subpart C: 2012

Test procedure used: ANSI C63.10:2009, ANSI C63.4:2009.

We Declare:

The equipment described above is tested by Dongguan Dongdian Testing Service Co., Ltd and in the configuration tested the equipment complied with the standards specified above. The test results are contained in this test report and Dongguan Dongdian Testing Service Co., Ltd is assumed of full responsibility for the accuracy and completeness of these tests.

After test and evaluation, our opinion is that the equipment provided for test compliance with the requirement of the above FCC standards.

Report No:	DDT-R15Q0309-1E1		
Date of Test:	Mar. 17, 2015	Date of Report:	Mar. 18, 2015

Prepared By:


Leo Liu/Engineer

Approved by:


Jamy Yu/EMC Manager

Note: This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Dongguan Dongdian Testing Service Co., Ltd.

1. Summary of test results

EMISSION		
Description of Test Item	Standard	Results
Power Line Conducted Emission Test	FCC Part 15C:15.207 ANSI C63.10:2009	PASS
Radiated Emission Test	FCC Part 15C: 15.209 FCC Part 15C: 15.249 ANSI C63.10:2009 ANSI C63.4:2009	PASS
20dB Bandwidth Test	FCC Part 15: 15.215 ANSI C63.10:2009	PASS
N/A is an abbreviation for Not Applicable.		

2. General test information

2.1. Description of EUT

EUT* Name	:	Smart wireless central home control / management center
Model Number	:	MSTR51
EUT function description	:	Please reference user manual of this device
Power supply	:	DC 12V from adapter
FCC Operation frequency	:	916.8MHz
Modulation	:	FSK
Antenna Type	:	Integrated coil antenna, Maximum Gain:2dBi
Date of Receipt	:	2015/3/17
Sample Type	:	Series production

Note: EUT is the ab. of equipment under test.

2.2. Accessories of EUT

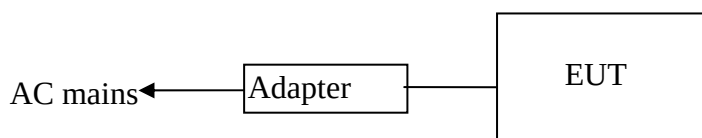
Description of Accessories	Manufacturer	Model number or Type	Other
AC ADAPTOR	Ktec	KSAS0121200100HU	12V/1A
AC ADAPTOR	Csec	CS12F120100FUF	12V/1A

2.3. Assistant equipment used for test

Description of Assistant equipment	Manufacturer	Model number or Type	Other
/	/	/	/

2.4. Block diagram of EUT configuration for test

TX Mode:



The test software was used to control EUT work in Continuous TX mode, and select test channel, wireless mode as blow table.

Tested mode, channel, and data rate information		
Mode	Channel	Frequency (MHz)
Tx Mode	/	916.8

2.5. Test environment conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature range:	21-25℃
Humidity range:	40-75%
Pressure range:	86-106kPa

2.6. Test laboratory

Dongguan Dongdian Testing Service Co., Ltd

Add: No. 17, Zongbu Road 2, Songshan Lake Sci&Tech, Industry Park, Dongguan City, Guangdong

Province, China, 523808 Tel: +86-0769-22891499

FCC Registration Number: 270092 Industry Canada site registration number: 10288A-1

2.7. Measurement uncertainty

Test Item	Uncertainty
Occupied Channel Bandwidth	±1%
Uncertainty for radio frequency	1×10^{-9}
Temperature	±0.2℃
Humidity	±1%
DC and Low frequency voltage	±0.5%
Time	±1%
Duty Cycle	±1%
Uncertainty for Radiation Emission test (30MHz-1GHz)	3.14 dB (Polarize: V)
	3.16 dB (Polarize: H)
Uncertainty for Radiation Emission test (1GHz to 25GHz)	2.08dB(Polarize: V)
	2.56dB (Polarize: H)
Uncertainty for Conduction emission test(150KHz-30MHz)	2.44dB
Uncertainty for Radiation Emission test (9KHz-150KHz)	3.89dB
Uncertainty for Radiation Emission test (150KHz-30MHz)	3.21dB

Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3. 20dB Bandwidth

3.1. Test equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Spectrum analyzer	R&S	FSU	1166.1660.26	2014/10/25	1 Year
2	Attenuator	Mini-Circuits	BW-S10W2	101109	2014/10/25	1 Year
3	RF Cable	Micable	C10-01-01-1	100309	2014/10/25	1 Year

3.2. Block diagram of test setup



3.3. Limits

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in § 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

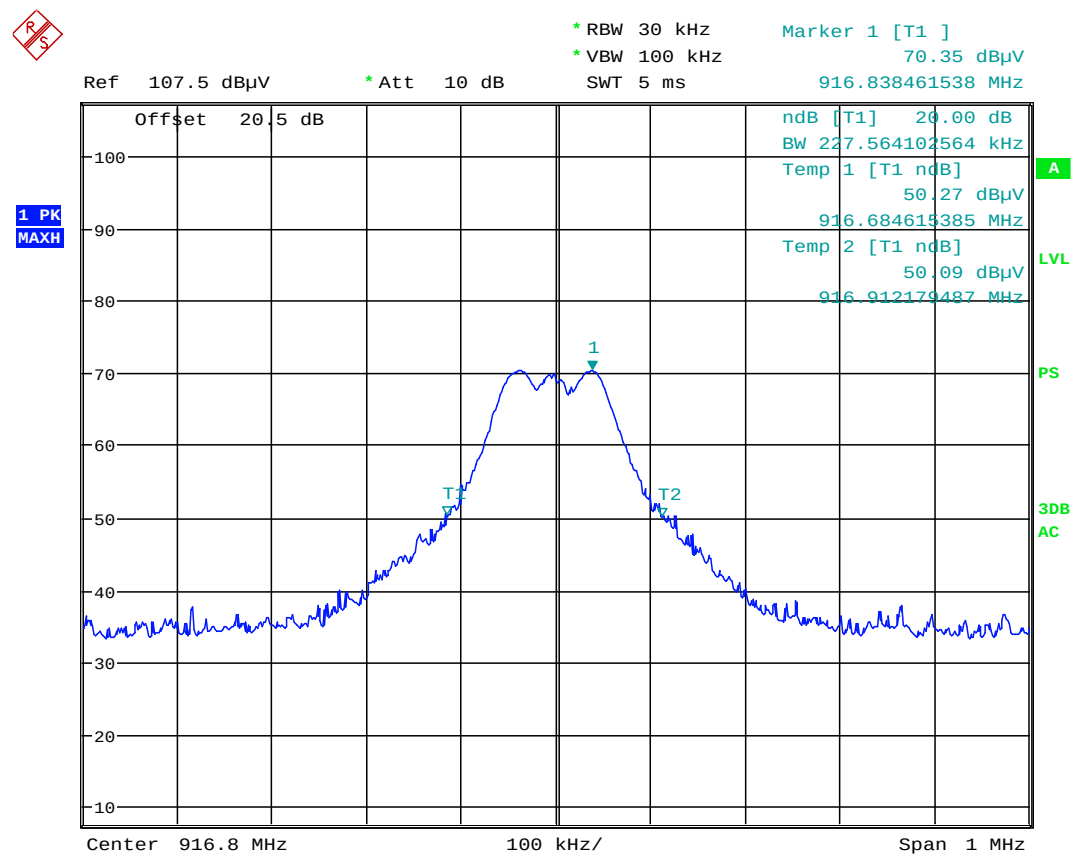
3.4. Test Procedure

- (1) The EUT's RF signal was coupled to spectrum analyzer by a antenna connected to spectrum analyzer.
- (2) Configure EUT work in Tx mode as stated in clause 2.3.
- (3) The bandwidth of the fundamental frequency was measured by spectrum analyzer with 30 kHz RBW and 100 kHz VBW. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

3.5. Test Result

EUT: Smart wireless central home control / management center			M/N: MSTR51		
Mode	Freq (MHz)	Result (MHz)	Limit (MHz)	Margin (MHz)	Conclusion
Tx Mode	916.8	0.228	/	/	PASS
Test Date : 2015/3/17			Test Engineer : Leo Liu		

3.6. Original test data



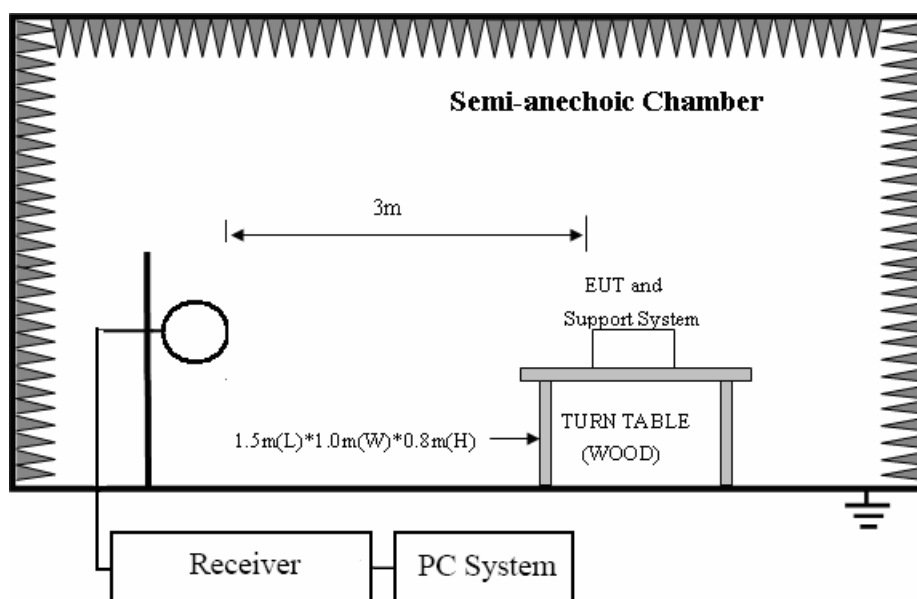
4. Radiated emission

4.1. Test equipment

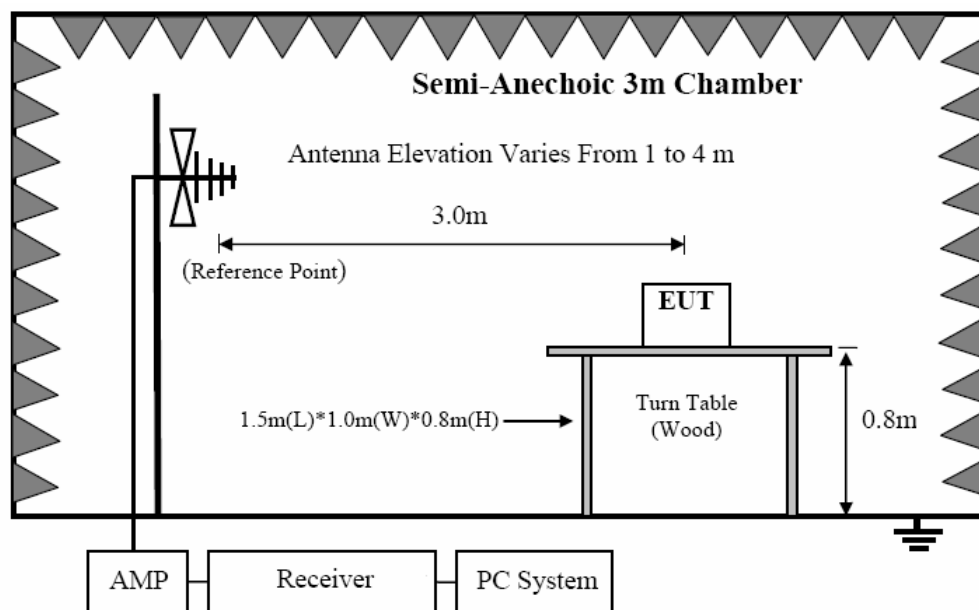
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	EMI Test Receiver	R&S	ESU8	100316	2014/10/25	1 Year
2	Spectrum analyzer	R&S	FSU	1166.1660.26	2014/10/25	1 Year
3	Loop antenna	TESEQ	HLA6120	20129	2014/04/12	1 Year
4	Trilog Broadband Antenna	Schwarzbeck	VULB9163	9163-462	2014/04/12	1 Year
5	Double Ridged Horn Antenna	R&S	HF907	100276	2014/04/12	1 Year
6	Horn Antenna	EMCO	3116	00060095	2014/04/12	1 Year
7	Pre-amplifier	A.H.	PAM-1840VH	562	2014/10/25	1 Year
8	RF Cable	R&S	R01	10403	2014/10/25	1 Year
9	RF Cable	R&S	R02	10512	2014/10/25	1 Year

4.2. Block diagram of test setup

In 3m Anechoic Chamber Test Setup Diagram for 9KHz-30MHz

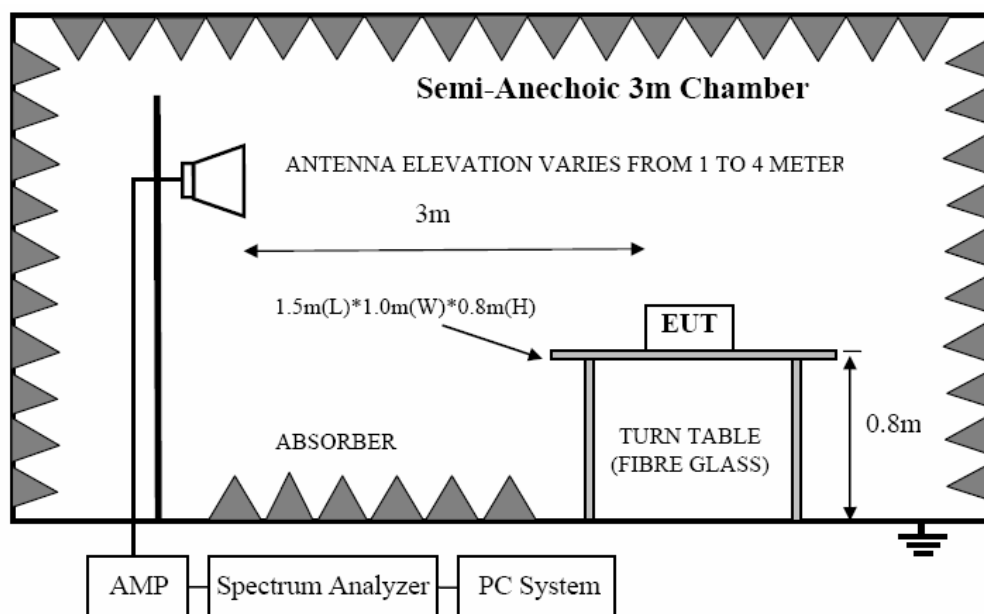


In 3m Anechoic Chamber Test Setup Diagram for 30MHz-1GHz



In 3m Anechoic Chamber Test Setup Diagram for frequency above 1GHz

Note: For harmonic emissions test a appropriate high pass filter was inserted in the input port of AMP.



4.3. Limit

3.3.1 FCC 15.209 limit

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		$\mu\text{V/m}$	$\text{dB}(\mu\text{V})/\text{m}$
0.009 ~ 0.490	300	$2400/\text{F}(\text{KHz})$	$67.6-20\log(\text{F})$
0.490 ~ 1.705	30	$24000/\text{F}(\text{KHz})$	$87.6-20\log(\text{F})$
1.705 ~ 30.0	30	30	29.54
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000	3	74.0 $\text{dB}(\mu\text{V})/\text{m}$ (Peak) 54.0 $\text{dB}(\mu\text{V})/\text{m}$ (Average)	

Remark : (1) Emission level $\text{dB}\mu\text{V} = 20 \log$ Emission level $\mu\text{V/m}$

(2) The smaller limit shall apply at the cross point between two frequency bands.

(3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

(4) The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

(5) At frequencies below 30MHz, measurement may be performed at a distance closer than that specified, and the limit at closer measurement distance can be extrapolated by below formula:

$$\text{Limit}_{3\text{m}}(\text{dB}\mu\text{V/m}) = \text{Limit}_{30\text{m}}(\text{dB}\mu\text{V/m}) + 40\log(30\text{m}/3\text{m})$$

3.3.2 FCC 15.249 limit

FREQUENCY MHz	DISTANCE Meters	Limit
Field Strength of Fundamental emission for 902MHz-928MHz	3	94.0 $\text{dB}(\mu\text{V})/\text{m}$ (QP)
Field Strength of Harmonics	3	54.0 $\text{dB}(\mu\text{V})/\text{m}$ (QP)

Note: 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 Section 15.209, whichever is the lesser attenuation.

4.4. Test Procedure

- (1) EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber.
- (2) Setup EUT and assistant system according clause 2.4 and 8.2
- (3) Test antenna was located 3m from the EUT on an adjustable mast, and the antenna used as below table.

Test frequency range	Test antenna used
9KHz-30MHz	Active Loop antenna
30MHz-1GHz	Trilog Broadband Antenna
1GHz-18GHz	Double Ridged Horn Antenna(1GHz-18GHz)
18GHz-40GHz	Horn Antenna(18GHz-40GHz)

According ANSI C63.10:2009 clause 6.4.4.2 and 6.5.3, for measurements below 30 MHz, the loop antenna was positioned with its plane vertical from the EUT and rotated about its vertical axis for maximum response at each azimuth position around the EUT. And the loop antenna also be positioned with its plane horizontal at the specified distance from the EUT. The center of the loop is 1 m above the ground. for measurement above 30MHz, the Trilog Broadband Antenna or Horn Antenna was located 3m from EUT, Measurements were made with the antenna positioned in both the horizontal and vertical planes of Polarization, and the measurement antenna was varied from 1 m to 4 m. in height above the reference ground plane to obtain the maximum signal strength.

- (4) Below pre-scan procedure was first performed in order to find prominent frequency spectrum radiated emissions from 9KHz to 25GHz:

- (a) Scanning the peak frequency spectrum with the antenna specified in step (3), and the EUT was rotated 360 degree, the antenna height was varied from 1m to 4m(Except loop antenna, it's fixed 1m above ground.)

- (b) Change work frequency or channel of device if practicable.

- (c) Change modulation type of device if practicable.

- (d) Change power supply range from 85% to 115% of the rated supply voltage.

- (e) Rotated EUT though three orthogonal axes to determine the attitude of EUT arrangement produces highest emissions.

Spectrum frequency from 9KHz to 25GHz (tenth harmonic of fundamental frequency) was investigated, and no any obvious emission were detected from 9KHz to 30MHz and 18GHz to 25GHz, so below final test was performed with frequency range from 30MHz to 18GHz.

- (5) For final emissions measurements at each frequency of interest, the EUT was rotated and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.10 2009 on Radiated Emission test.
- (6) The emissions from 9KHz to 1GHz were measured based on CISPR QP detector except for the frequency bands 9-90KHz, 110-490KHz, for emissions from 9KHz-90KHz, 110KHz-490KHz and

above 1GHz were measured based on average detector, for emissions above 1GHz, peak emissions also be measured and need comply with Peak limit.

- (7) The emissions from 9KHz to 1GHz, QP or average values were measured with EMI receiver with below RBW

Frequency band	RBW
9KHz-150KHz	200Hz
150KHz-30MHz	9KHz
30MHz-1GHz	120KHz

- (8) For emissions above 1GHz, and the RBW is set at 1MHz, VBW is set at 3MHz, peak detector for PK, RMS detector for AV. Read the Level in spectrum analyzer and record.

- (9) X axis, Y axis, Z axis are tested, and worse setup X axis is reported.

4.5. Test result

PASS. (See below detailed test result)

All the emissions except fundamental emission from 9 KHz to 10GHz were comply with 4.3.1 limit.

Note1: According exploratory test no any obvious emission were detected from 9kHz to 30MHz, so the final test was performed with frequency range from 30MHz to 10GHz and recorded in below.

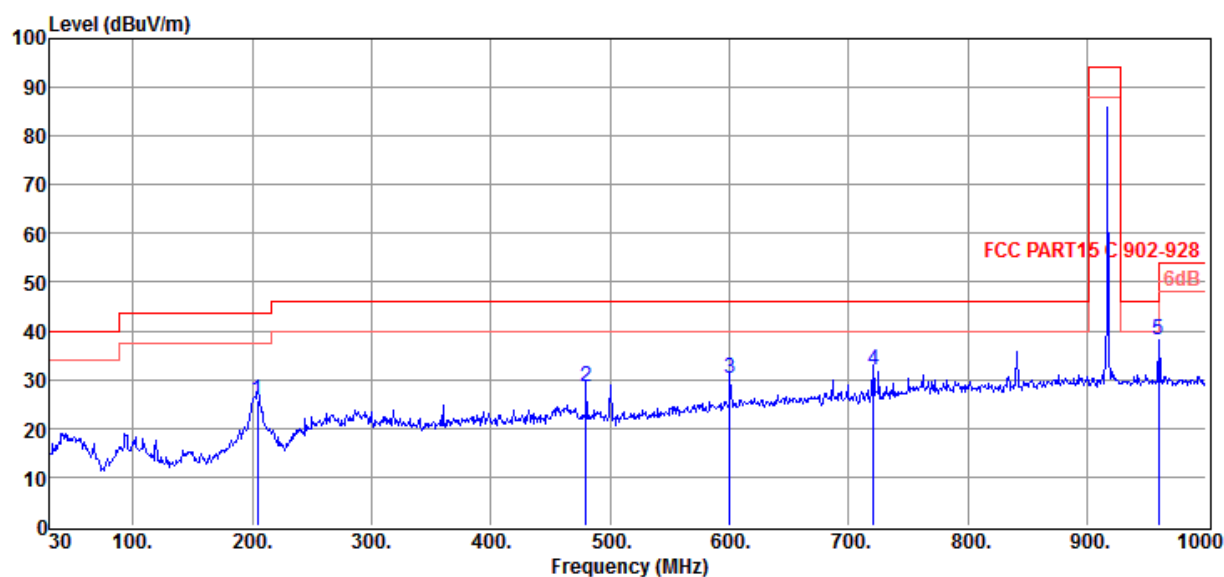
Note2: For emissions above 1GHz. If peak results comply with AV limit, AV Result is deemed to comply with AV limit.

Note3: For emissions above 1GHz. according exploratory explorer test, when change adapter no distinct influence on emissions level, so for emissions above 1GHz, only report worst case with EUT which is working with adapter (Ktec). If peak results comply with AV limit, AV Result is deemed to comply with AV limit.

TR-4-E-009 Radiated Emission Test Result

Test Site	: DDT 3m Chamber	E:\2015 Report Data\15Q0309-1\RE.EM6
Test Date	: 2015-03-17	Tested By : Leo
EUT	: Smart wireless central home control / management center	Model Number : MSTR51
Power Supply	: DC 12V from adapter	Test Mode : Tx mode
Condition	: Temp:24.5'C,Humi:55%, Press:100.1kPa	Antenna/Distance : 2014 VULB 9163/3m/HORIZONTAL
Memo	: adapter: Ktec	

Data: 1



Item (Mark)	Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss dB	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	204.60	14.09	9.50	2.16	25.75	43.50	-17.75	QP	HORIZONTAL
2	480.08	8.99	15.98	3.62	28.59	46.00	-17.41	QP	HORIZONTAL
3	600.36	8.05	18.20	3.97	30.22	46.00	-15.78	QP	HORIZONTAL
4	720.64	8.77	18.87	4.44	32.08	46.00	-13.92	QP	HORIZONTAL
5	960.00	11.58	21.53	5.05	38.16	46.00	-7.84	Peak	HORIZONTAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss.

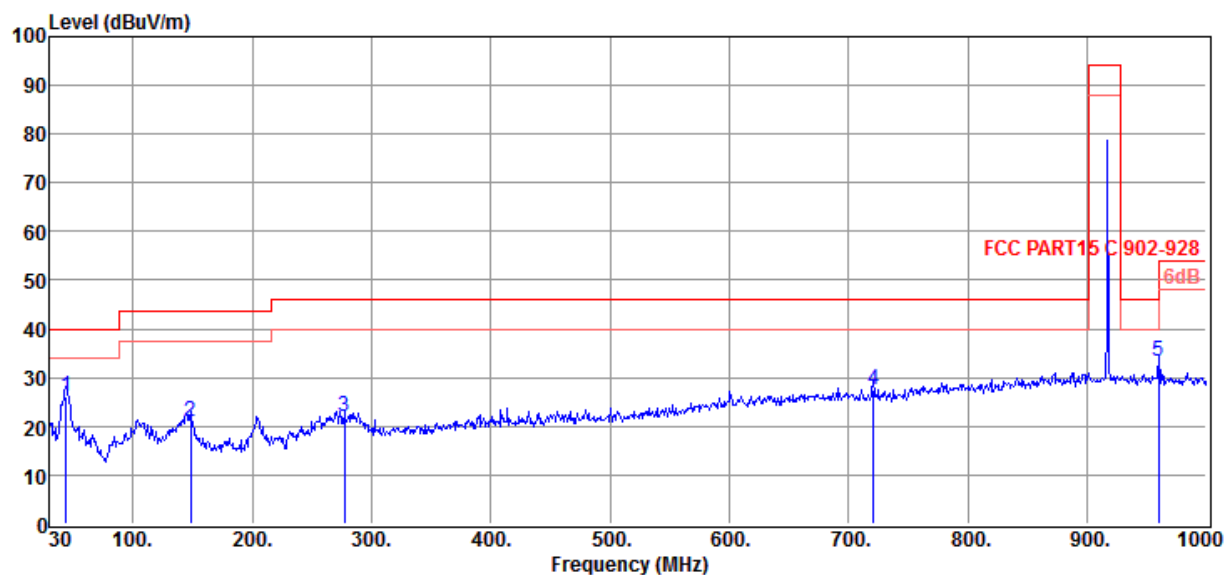
2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.

3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Site : DDT 3m Chamber **E:\2015 Report Data\15Q0309-1\RE.EM6**
Test Date : 2015-03-17 **Tested By** : Leo
EUT : Smart wireless central home control / management center **Model Number** : MSTR51
Power Supply : DC 12V from adapter **Test Mode** : Tx mode
Condition : Temp:24.5'C,Humi:55%, Press:100.1kPa **Antenna/Distance** : 2014 VULB 9163/3m/VERTICAL
Memo : adapter:Ktec

Data: 2



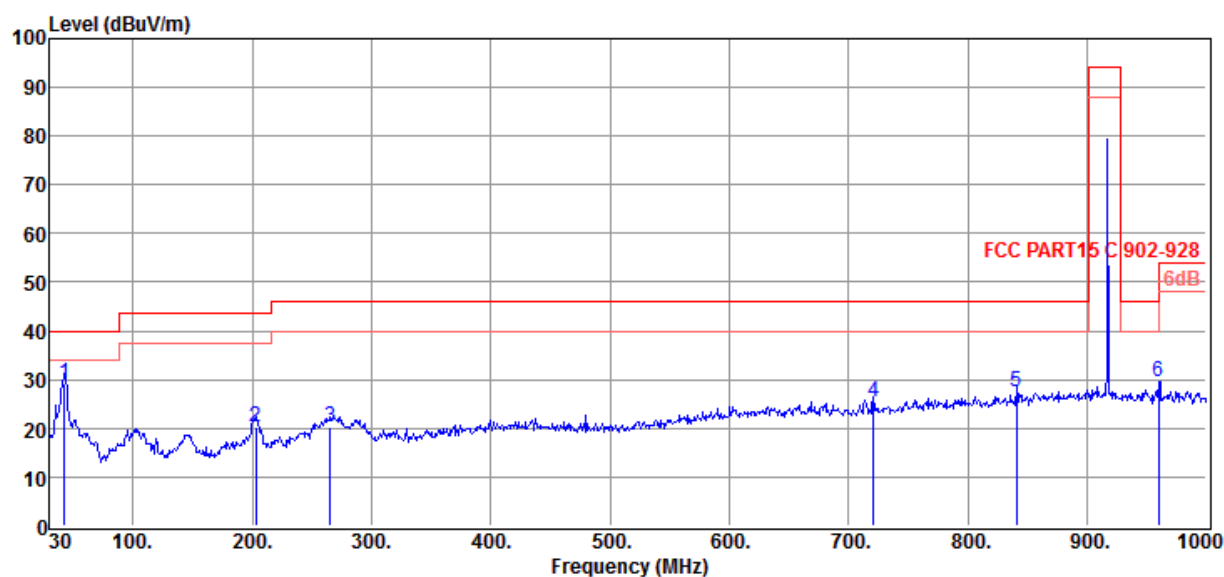
Item (Mark)	Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss dB	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	43.58	10.13	14.90	1.03	26.06	40.00	-13.94	QP	VERTICAL
2	148.34	10.54	8.67	1.79	21.00	43.50	-22.50	QP	VERTICAL
3	277.35	6.48	13.00	2.63	22.11	46.00	-23.89	QP	VERTICAL
4	720.64	4.08	18.87	4.44	27.39	46.00	-18.61	QP	VERTICAL
5	960.00	6.82	21.53	5.05	33.40	46.00	-12.60	QP	VERTICAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss.
 2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.
 3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Site : DDT 3m Chamber **E:\2015 Report Data\15Q0309-1\RE.EM6**
Test Date : 2015-03-17 **Tested By** : Leo
EUT : Smart wireless central home control / management center **Model Number** : MSTR51
Power Supply : DC 12V from adapter **Test Mode** : Tx mode
Condition : Temp:24.5'C,Humi:55%, Press:100.1kPa **Antenna/Distance** : 2014 VULB 9163/3m/VERTICAL
Memo : adapter: Csec

Data: 3



Item (Mark)	Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss dB	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	42.61	13.44	14.90	1.02	29.36	40.00	-10.64	QP	VERTICAL
2	202.66	8.51	9.66	2.16	20.33	43.50	-23.17	QP	VERTICAL
3	265.71	5.10	12.73	2.57	20.40	46.00	-25.60	QP	VERTICAL
4	720.64	1.99	18.87	4.44	25.30	46.00	-20.70	QP	VERTICAL
5	840.92	1.67	21.02	4.78	27.47	46.00	-18.53	QP	VERTICAL
6	960.00	2.88	21.53	5.05	29.46	46.00	-16.54	QP	VERTICAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss.

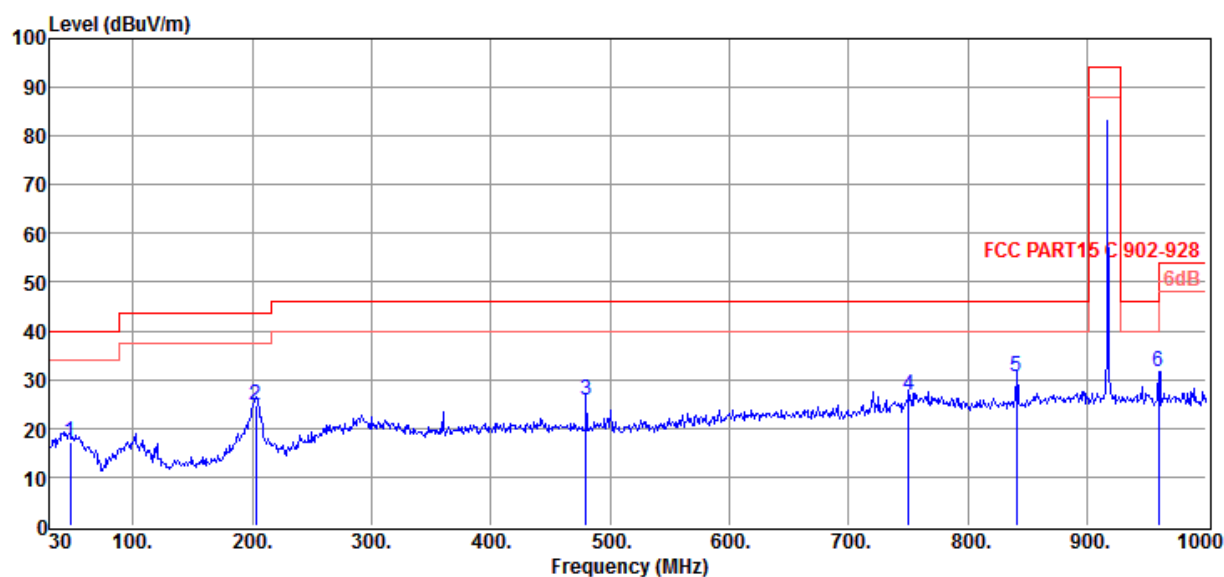
2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.

3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Site : DDT 3m Chamber **E:\2015 Report Data\15Q0309-1\RE.EM6**
Test Date : 2015-03-17 **Tested By** : Leo
EUT : Smart wireless central home control / management center **Model Number** : MSTR51
Power Supply : DC 12V from adapter **Test Mode** : Tx mode
Condition : Temp:24.5'C,Humi:55%, Press:100.1kPa **Antenna/Distance** : 2014 VULB 9163/3m/HORIZONTAL
Memo : adapter: Csec

Data: 4



Item (Mark)	Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss dB	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	47.46	1.55	14.70	1.05	17.30	40.00	-22.70	QP	HORIZONTAL
2	202.66	12.76	9.66	2.16	24.58	43.50	-18.92	QP	HORIZONTAL
3	480.08	6.26	15.98	3.62	25.86	46.00	-20.14	QP	HORIZONTAL
4	750.71	2.83	19.50	4.56	26.89	46.00	-19.11	QP	HORIZONTAL
5	840.92	4.89	21.02	4.78	30.69	46.00	-15.31	QP	HORIZONTAL
6	960.00	5.06	21.53	5.05	31.64	46.00	-14.36	QP	HORIZONTAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss.

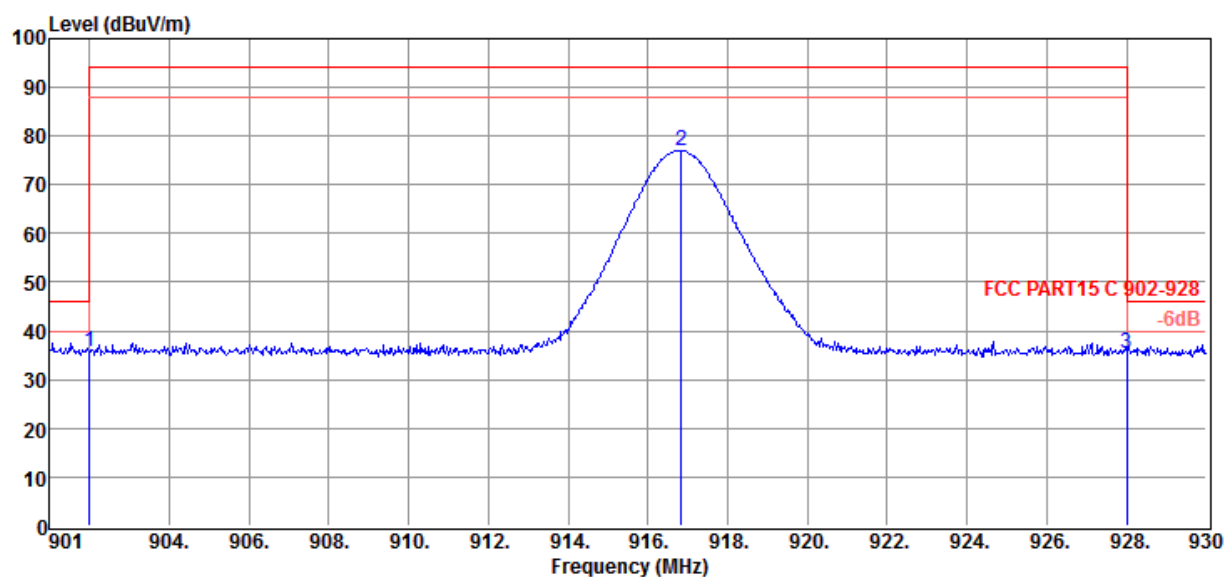
2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.

3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Site	: DDT 3m Chamber	E:\2015 Report Data\15Q0309-1\RE.EM6
Test Date	: 2015-03-17	Tested By : Leo
EUT	: Smart wireless central home control / management center	Model Number : MSTR51
Power Supply	: DC 12V from adapter	Test Mode : Tx mode
Condition	: Temp:24.5'C,Humi:55%, Press:100.1kPa	Antenna/Distance : 2014 VULB 9163/3m/HORIZONTAL
Memo	: adapter: Csec	

Data: 5



Item (Mark)	Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss dB	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	902.00	8.69	22.08	4.96	35.73	46.00	-10.27	Peak	HORIZONTAL
2	916.83	50.00	21.99	4.97	76.96	94.00	-17.04	Peak	HORIZONTAL
3	928.00	8.62	21.89	4.98	35.49	46.00	-10.51	Peak	HORIZONTAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss.

2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.

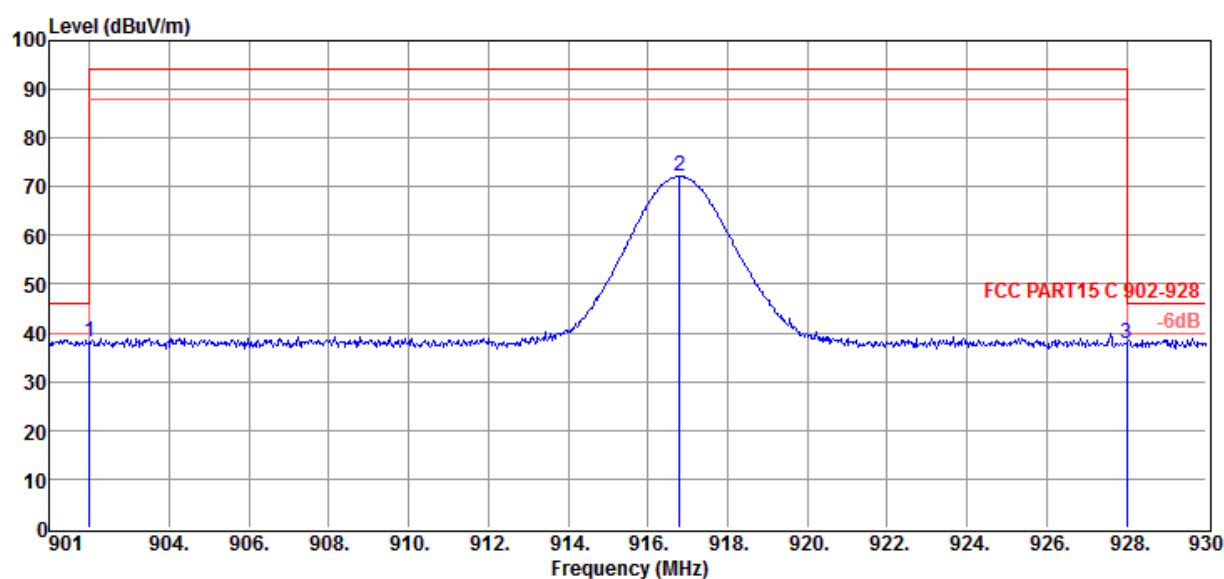
3. Test setup: RBW: 100 kHz, VBW: 300 kHz, Sweep time: auto. But test setup: RBW:300kHz, VBW: 300 kHz, for fundamental test.

4. EUT with adapter Csec or Ktec, all have been tested, only report worst case (with Csec)

TR-4-E-009 Radiated Emission Test Result

Test Site	: DDT 3m Chamber	E:\2015 Report Data\15Q0309-1\RE.EM6
Test Date	: 2015-03-17	Tested By : Leo
EUT	: Smart wireless central home control / management center	Model Number : MSTR51
Power Supply	: DC 12V from adapter	Test Mode : Tx mode
Condition	: Temp:24.5'C,Humi:55%, Press:100.1kPa	Antenna/Distance : 2014 VULB 9163/3m/VERTICAL
Memo	: adapter: Csec	

Data: 6



Item (Mark)	Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss dB	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	902.00	10.97	22.08	4.96	38.01	46.00	-7.99	Peak	VERTICAL
2	916.81	45.11	21.99	4.97	72.07	94.00	-21.93	Peak	VERTICAL
3	928.00	10.86	21.89	4.98	37.73	46.00	-8.27	Peak	VERTICAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss.

2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.

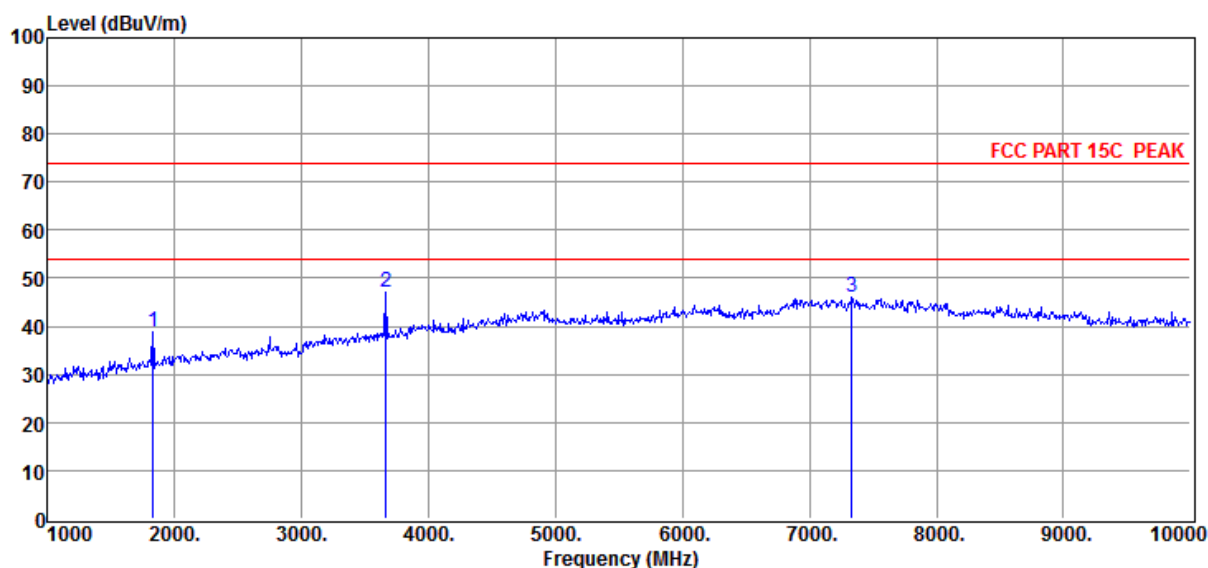
3. Test setup: RBW: 100 kHz, VBW: 300 kHz, Sweep time: auto. But test setup: RBW:300kHz, VBW: 300 kHz, for fundamental test.

4. EUT with adapter Csec or Ktec, all have been tested, only report worst case (with Csec)

TR-4-E-009 Radiated Emission Test Result

Test Site : DDT 3m Chamber **E:** \2015 Report Data\15Q0309-1\RE.EM6
Test Date : 2015-03-17 **Tested By** : Leo
EUT : Smart wireless central home control / management center **Model Number** : MSTR51
Power Supply : DC 12V from adapter **Test Mode** : Tx mode
Condition : Temp:24.5'C,Humi:55%,
Press:100.1kPa **Antenna/Distance** : 2014 HF907/3m/HORIZONTAL
Memo : adapter: Ktec

Data: 11



Item (Mark)	Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	1833.60	36.11	27.97	29.70	4.54	38.92	74.00	-35.08	Peak	HORIZONTAL
2	3667.20	37.00	32.84	29.90	7.04	46.98	74.00	-27.02	Peak	HORIZONTAL
3	7336.00	28.54	37.31	29.88	9.99	45.96	74.00	-28.04	Peak	HORIZONTAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.

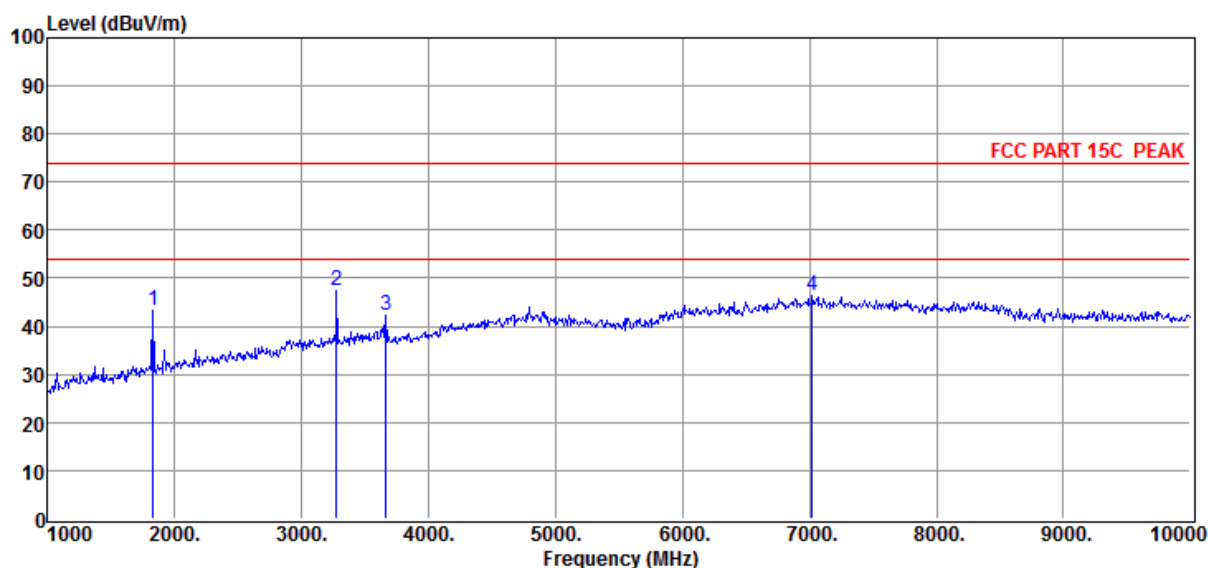
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Site : DDT 3m Chamber **E:\2015 Report Data\15Q0309-1\RE.EM6**
Test Date : 2015-03-17 **Tested By** : Leo
EUT : Smart wireless central home control / management center **Model Number** : MSTR51
Power Supply : DC 12V from adapter **Test Mode** : Tx mode
Condition : Temp:24.5'C,Humi:55%,
 Press:100.1kPa **Antenna/Distance** : 2014 HF907/3m/VERTICAL
Memo : adapter: Ktec

Data: 12



Item (Mark)	Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	1833.60	40.59	27.97	29.70	4.54	43.40	74.00	-30.60	Peak	VERTICAL
2	3277.00	39.05	32.33	30.26	6.25	47.37	74.00	-26.63	Peak	VERTICAL
3	3667.20	32.25	32.84	29.90	7.04	42.23	74.00	-31.77	Peak	VERTICAL
4	7021.00	28.78	37.11	29.42	9.86	46.33	74.00	-27.67	Peak	VERTICAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

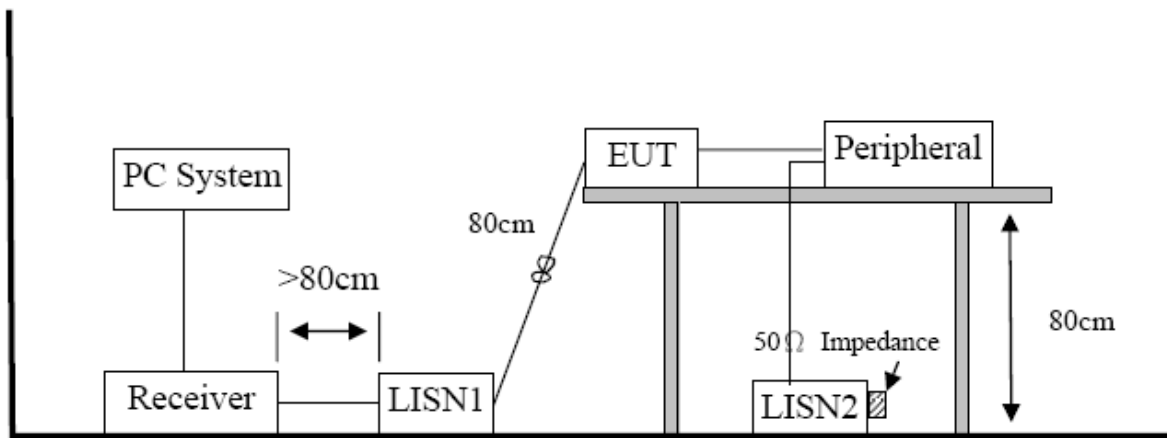
3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

5. Power Line Conducted Emission

5.1. Test equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Test Receiver	R&S	ESU8	100316	2014/10/25	1 Year
2	LISN 1	R&S	ENV216	101109	2014/10/25	1 Year
3	LISN 2	R&S	ESH2-Z5	100309	2014/10/25	1 Year
4	Pulse Limiter	R&S	ESH3-Z2	101242	2014/10/25	1 Year

5.2. Block diagram of test setup



5.3. Power Line Conducted Emission Limits(Class B)

Frequency	Quasi-Peak Level dB(μV)	Average Level dB(μV)
150kHz ~ 500kHz	66 ~ 56*	56 ~ 46*
500kHz ~ 5MHz	56	46
5MHz ~ 30MHz	60	50

Note 1: * Decreasing linearly with logarithm of frequency.

Note 2: The lower limit shall apply at the transition frequencies.

5.4. Test Procedure

The EUT and Support equipment, if needed, were put placed on a non-metallic table, 80cm above the ground plane.

Configuration EUT to simulate typical usage as described in clause 2.4 and test equipment as described in clause 10.2 of this report.

All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4:2009.

All support equipment power received from a second LISN.

Emissions were measured on each current carrying line of the EUT using an EMI Test Receiver connected to the LISN powering the EUT.

The Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.

During the above scans, the emissions were maximized by cable manipulation.

The test mode(s) described in clause 2.4 were scanned during the preliminary test.

After the preliminary scan, we found the test mode producing the highest emission level.

The EUT configuration and worse cable configuration of the above highest emission levels were recorded for reference of the final test.

EUT and support equipment were set up on the test bench as per the configuration with highest emission level in the preliminary test.

A scan was taken on both power lines, Neutral and Line, recording at least the six highest emissions.

Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit.

The test data of the worst-case condition(s) was recorded.

The bandwidth of test receiver is set at 9 KHz.

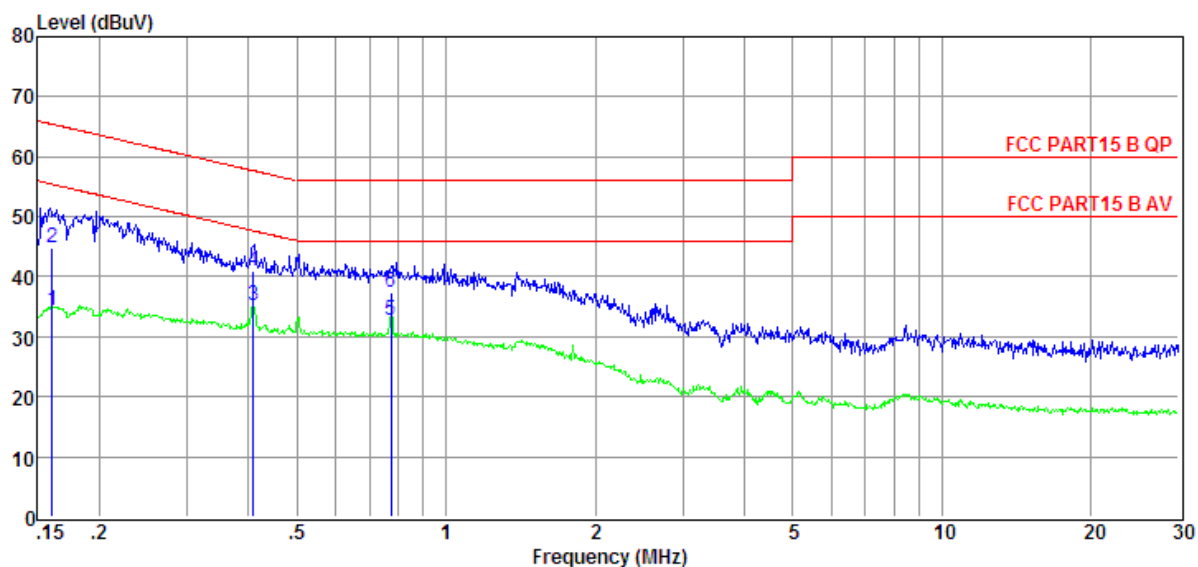
5.5. Test Result

PASS. (See below detailed test result)

TR-4-E-010 Conducted Emission Test Result

Test Site : DDT 1# Shield Room **E:\2015 report data\15Q0309-1\CE.EM6**
Test Date : 2015-03-17 **Tested By** : Leo
EUT : Smart wireless central home control / management center **Model Number** : MSTR51
Power Supply : DC 12V from adapter **Test Mode** : Tx mode
Condition : Temp:24.5'C,Humi:55%, Press:100.1kPa **LISN** : 2014 ENV216/NEUTRAL
Memo : adapter: Ktec

Data: 2



Item	Freq	Read Level	LISN Factor	Cable Loss	Pulse Limiter Factor	Result Level	Limit Line	Over Limit	Detector	Phase
(Mark)	(MHz)	(dBμV)	(dB)	(dB)	(dB)	(dBμV)	(dBμV)	(dB)		
1	0.16	14.85	9.60	0.01	9.84	34.30	55.43	-21.13	Average	NEUTRAL
2	0.16	25.26	9.60	0.01	9.84	44.71	65.43	-20.72	QP	NEUTRAL
3	0.41	15.70	9.61	0.03	9.86	35.20	47.68	-12.48	Average	NEUTRAL
4	0.41	21.44	9.61	0.03	9.86	40.94	57.68	-16.74	QP	NEUTRAL
5	0.78	13.22	9.61	0.08	9.86	32.77	46.00	-13.23	Average	NEUTRAL
6	0.78	17.72	9.61	0.08	9.86	37.27	56.00	-18.73	QP	NEUTRAL

Note: 1. Result Level = Read Level + LISN Factor + Pulse Limiter Factor + Cable loss.

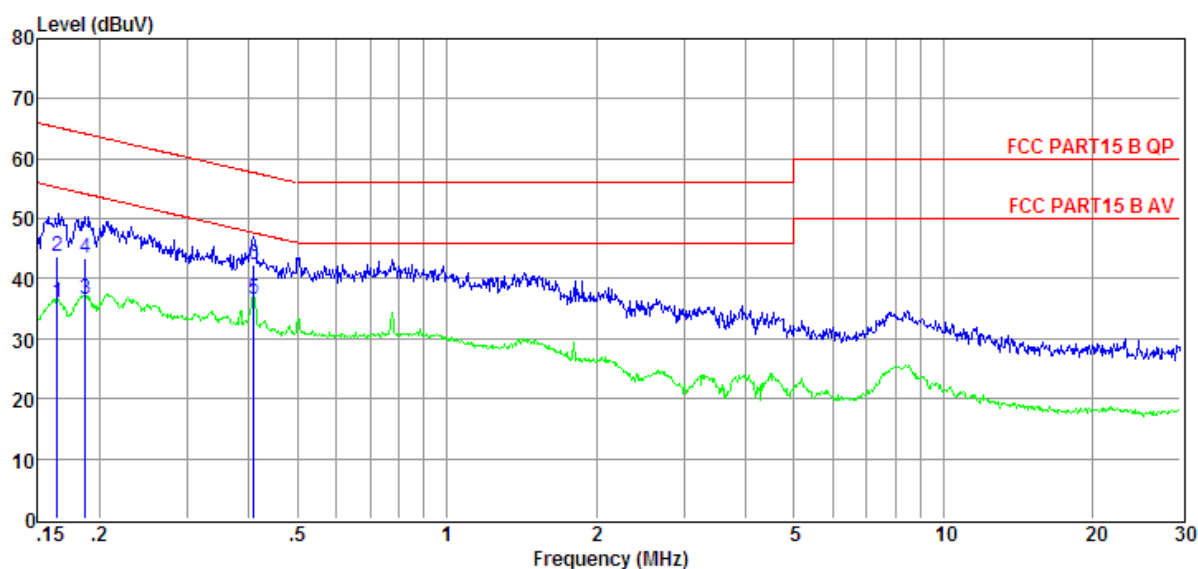
2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Test setup: RBW: 200 Hz (9 kHz—150 kHz), 9 kHz (150 kHz—30 MHz), Step size: 4 kHz, Scan time: auto.

TR-4-E-010 Conducted Emission Test Result

Test Site : DDT 1# Shield Room **E:\2015 report data\15Q0309-1\CE.EM6**
Test Date : 2015-03-17 **Tested By** : Leo
EUT : Smart wireless central home control / management center **Model Number** : MSTR51
Power Supply : DC 12V from adapter **Test Mode** : Tx mode
Condition : Temp:24.5'C,Humi:55%, Press:100.1kPa **LISN** : 2014 ENV216/LINE
Memo : adapter: Ktec

Data: 4



Item	Freq	Read Level	LISN Factor	Cable Loss	Pulse Limiter Factor	Result Level	Limit Line	Over Limit	Detector	Phase
(Mark)	(MHz)	(dBμV)	(dB)	(dB)	(dB)	(dBμV)	(dBμV)	(dB)		
1	0.16	16.43	9.61	0.01	9.84	35.89	55.25	-19.36	Average	LINE
2	0.16	24.23	9.61	0.01	9.84	43.69	65.25	-21.56	QP	LINE
3	0.19	17.20	9.62	0.02	9.85	36.69	54.15	-17.46	Average	LINE
4	0.19	23.88	9.62	0.02	9.85	43.37	64.15	-20.78	QP	LINE
5	0.41	17.05	9.63	0.03	9.86	36.57	47.68	-11.11	Average	LINE
6	0.41	22.70	9.63	0.03	9.86	42.22	57.68	-15.46	QP	LINE

Note: 1. Result Level = Read Level + LISN Factor + Pulse Limiter Factor + Cable loss.

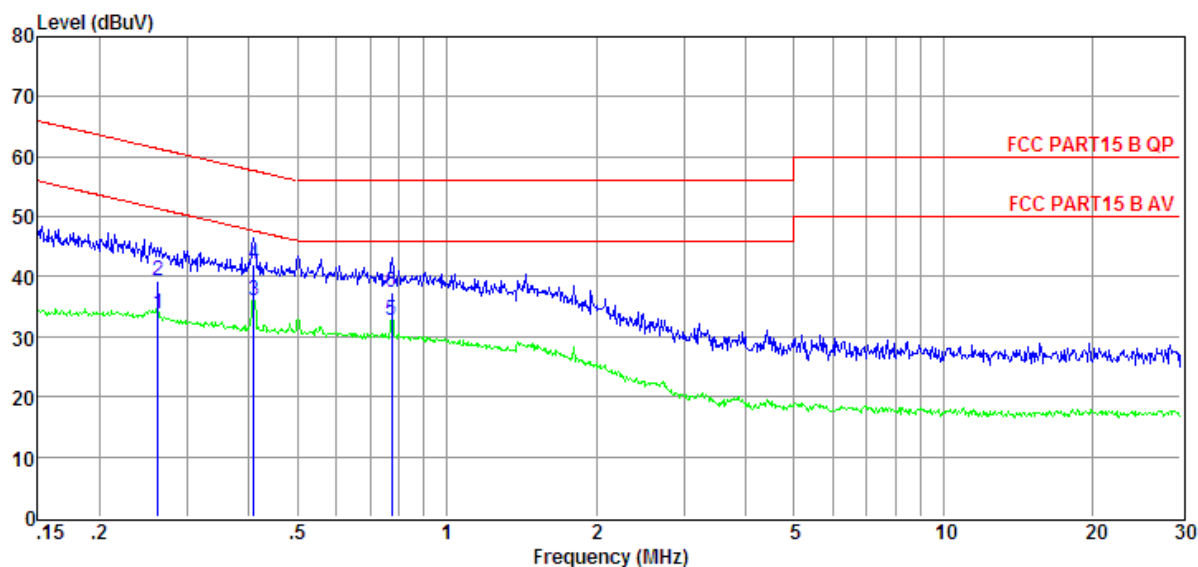
2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Test setup: RBW: 200 Hz (9 kHz—150 kHz), 9 kHz (150 kHz—30 MHz), Step size: 4 kHz, Scan time: auto.

TR-4-E-010 Conducted Emission Test Result

Test Site : DDT 1# Shield Room **E:\2015 report data\15Q0309-1\CE.EM6**
Test Date : 2015-03-17 **Tested By** : Leo
EUT : Smart wireless central home control / management center **Model Number** : MSTR51
Power Supply : DC 12V from adapter **Test Mode** : Tx mode
Condition : Temp:24.5'C,Humi:55%, Press:100.1kPa **LISN** : 2014 ENV216/LINE
Memo : adapter: Csec

Data: 6



Item	Freq	Read Level	LISN Factor	Cable Loss	Pulse Limiter Factor	Result Level	Limit Line	Over Limit	Detector	Phase
(Mark)	(MHz)	(dBμV)	(dB)	(dB)	(dB)	(dBμV)	(dBμV)	(dB)		
1	0.26	14.38	9.62	0.02	9.85	33.87	51.38	-17.51	Average	LINE
2	0.26	19.73	9.62	0.02	9.85	39.22	61.38	-22.16	QP	LINE
3	0.41	16.58	9.63	0.03	9.86	36.10	47.68	-11.58	Average	LINE
4	0.41	22.66	9.63	0.03	9.86	42.18	57.68	-15.50	QP	LINE
5	0.78	13.12	9.62	0.08	9.86	32.68	46.00	-13.32	Average	LINE
6	0.78	17.74	9.62	0.08	9.86	37.30	56.00	-18.70	QP	LINE

Note: 1. Result Level = Read Level + LISN Factor + Pulse Limiter Factor + Cable loss.

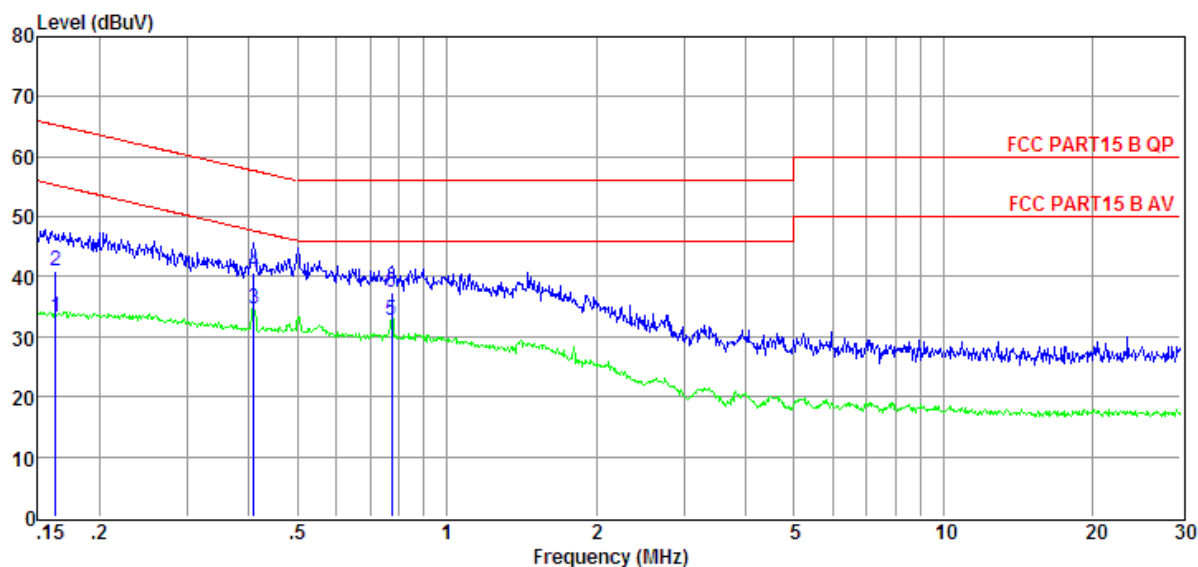
2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Test setup: RBW: 200 Hz (9 kHz—150 kHz), 9 kHz (150 kHz—30 MHz), Step size: 4 kHz, Scan time: auto.

TR-4-E-010 Conducted Emission Test Result

Test Site : DDT 1# Shield Room **E:\2015 report data\15Q0309-1\CE.EM6**
Test Date : 2015-03-17 **Tested By** : Leo
EUT : Smart wireless central home control / management center **Model Number** : MSTR51
Power Supply : DC 12V from adapter **Test Mode** : Tx mode
Condition : Temp:24.5'C,Humi:55%, Press:100.1kPa **LISN** : 2014 ENV216/NEUTRAL
Memo : adapter: Csec

Data: 8



Item	Freq	Read Level	LISN Factor	Cable Loss	Pulse Limiter Factor	Result Level	Limit Line	Over Limit	Detector	Phase
(Mark)	(MHz)	(dBμV)	(dB)	(dB)	(dB)	(dBμV)	(dBμV)	(dB)		
1	0.16	13.94	9.60	0.01	9.84	33.39	55.30	-21.91	Average	NEUTRAL
2	0.16	21.41	9.60	0.01	9.84	40.86	65.30	-24.44	QP	NEUTRAL
3	0.41	15.15	9.61	0.03	9.86	34.65	47.68	-13.03	Average	NEUTRAL
4	0.41	21.14	9.61	0.03	9.86	40.64	57.68	-17.04	QP	NEUTRAL
5	0.78	13.18	9.61	0.08	9.86	32.73	46.00	-13.27	Average	NEUTRAL
6	0.78	17.90	9.61	0.08	9.86	37.45	56.00	-18.55	QP	NEUTRAL

Note: 1. Result Level = Read Level + LISN Factor + Pulse Limiter Factor + Cable loss.

2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Test setup: RBW: 200 Hz (9 kHz—150 kHz), 9 kHz (150 kHz—30 MHz), Step size: 4 kHz, Scan time: auto.

6. Antenna Requirements

6.1. Limit

For intentional device, according to FCC 47 CFR Section 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.

6.2. Result

The antennas used for this product are integral coil Antenna and that no antenna other than that furnished by the responsible party shall be used with the device, the maximum peak gain of the transmit antenna is only 2dBi.

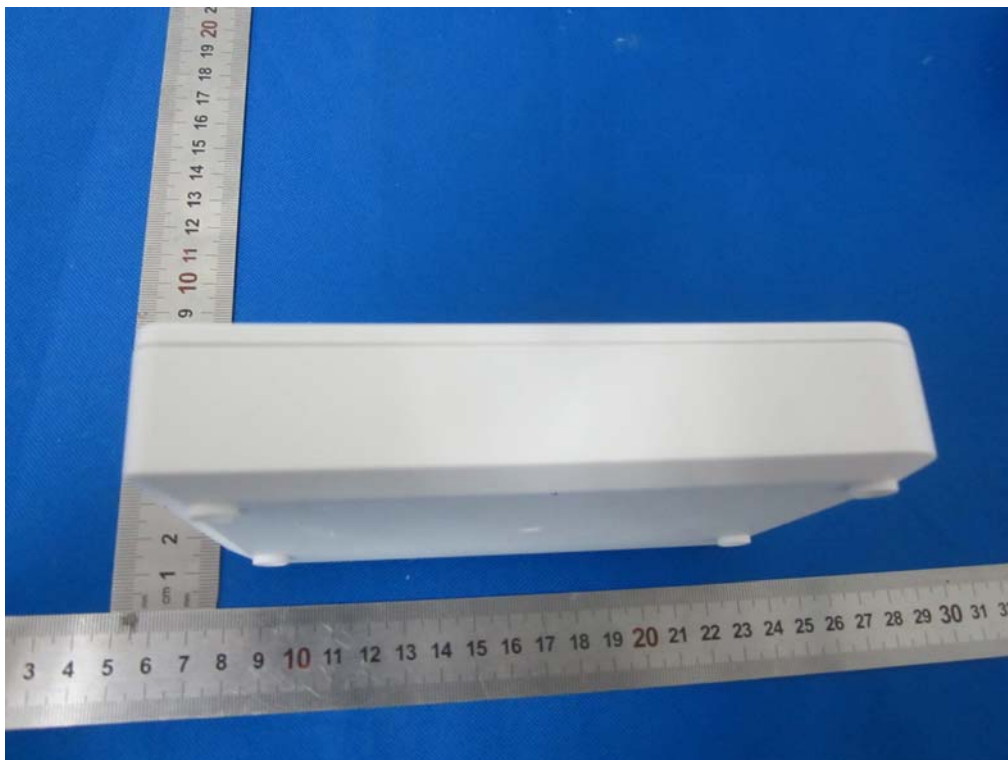
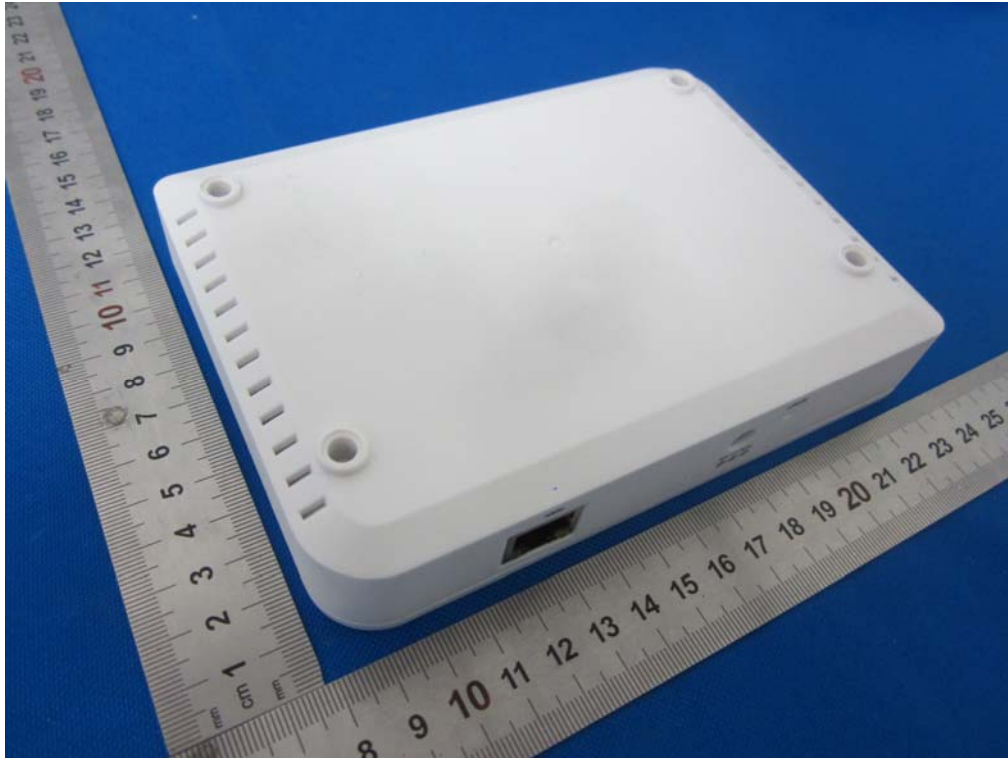
7. Test setup photograph

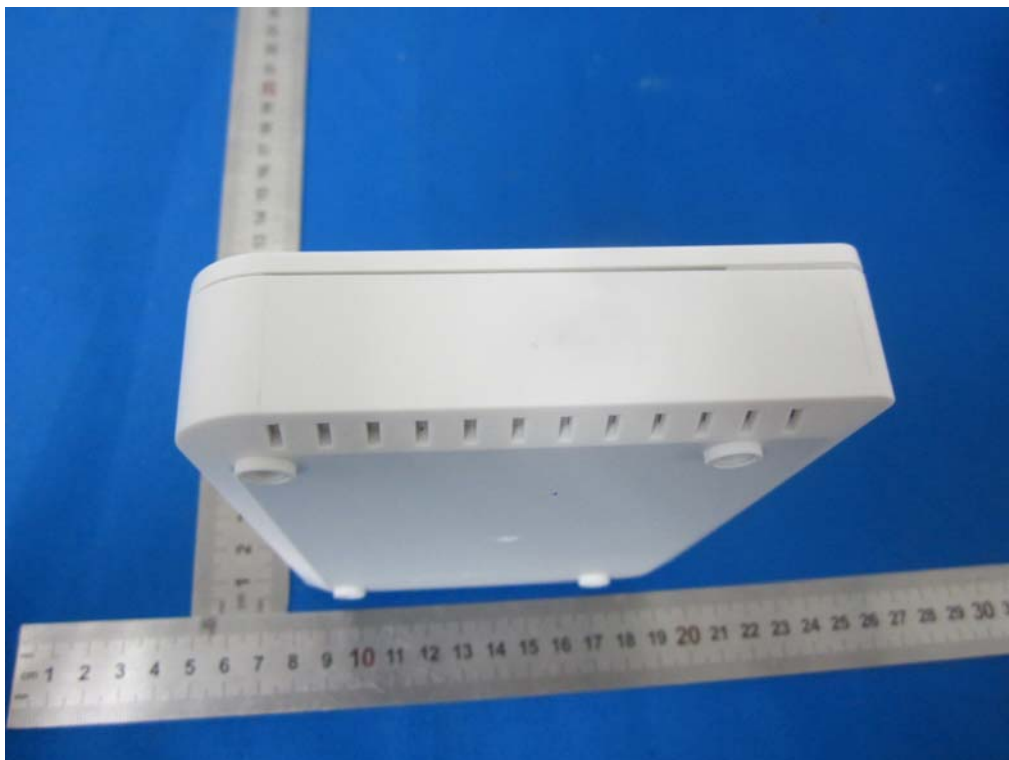




8. Photos of the EUT

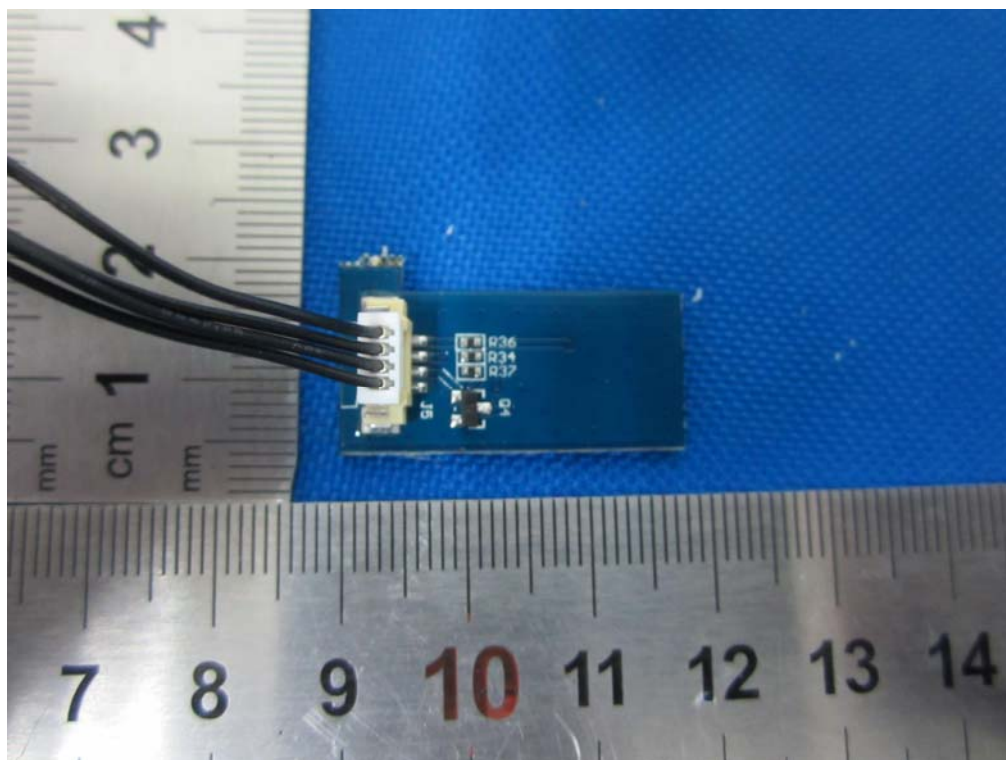


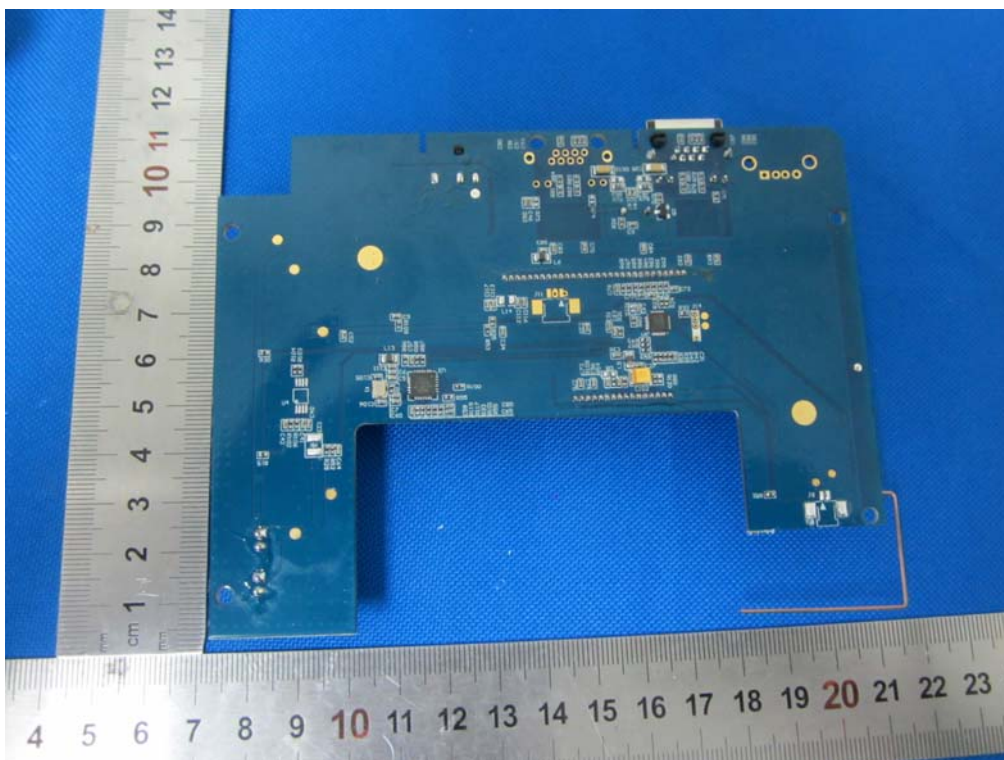
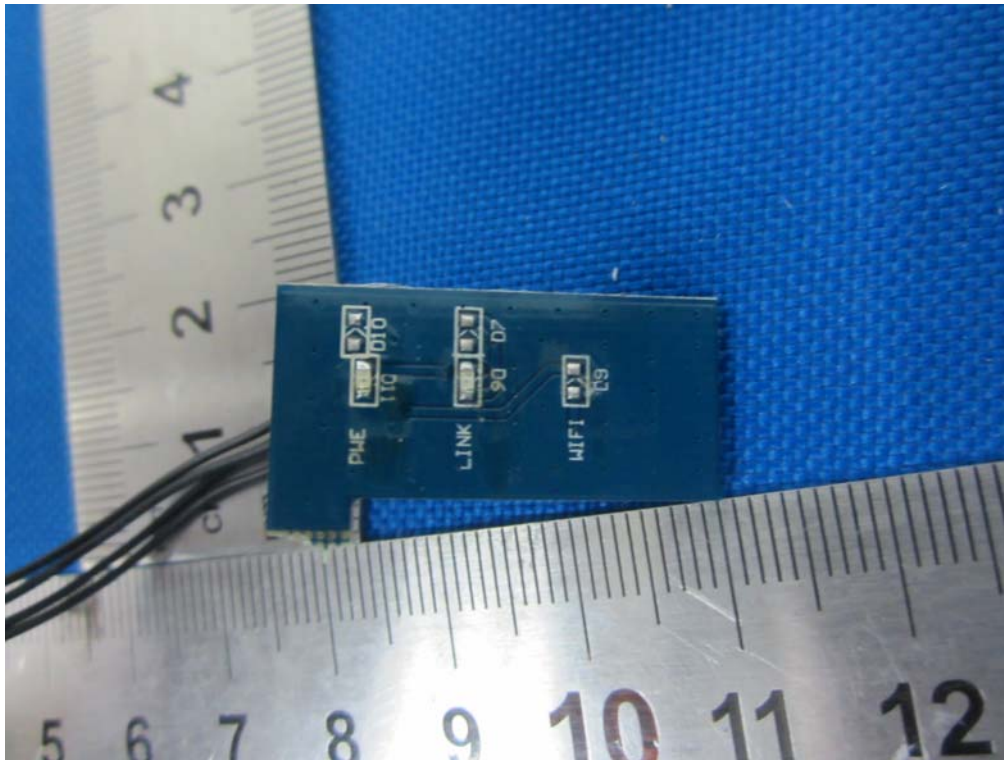


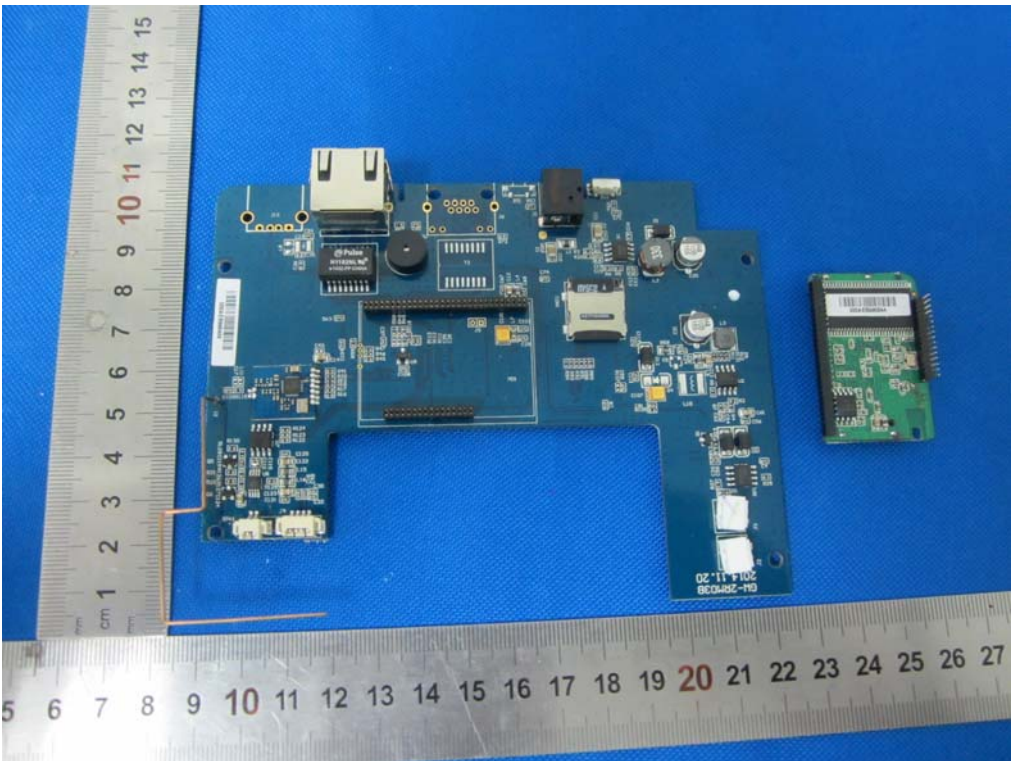
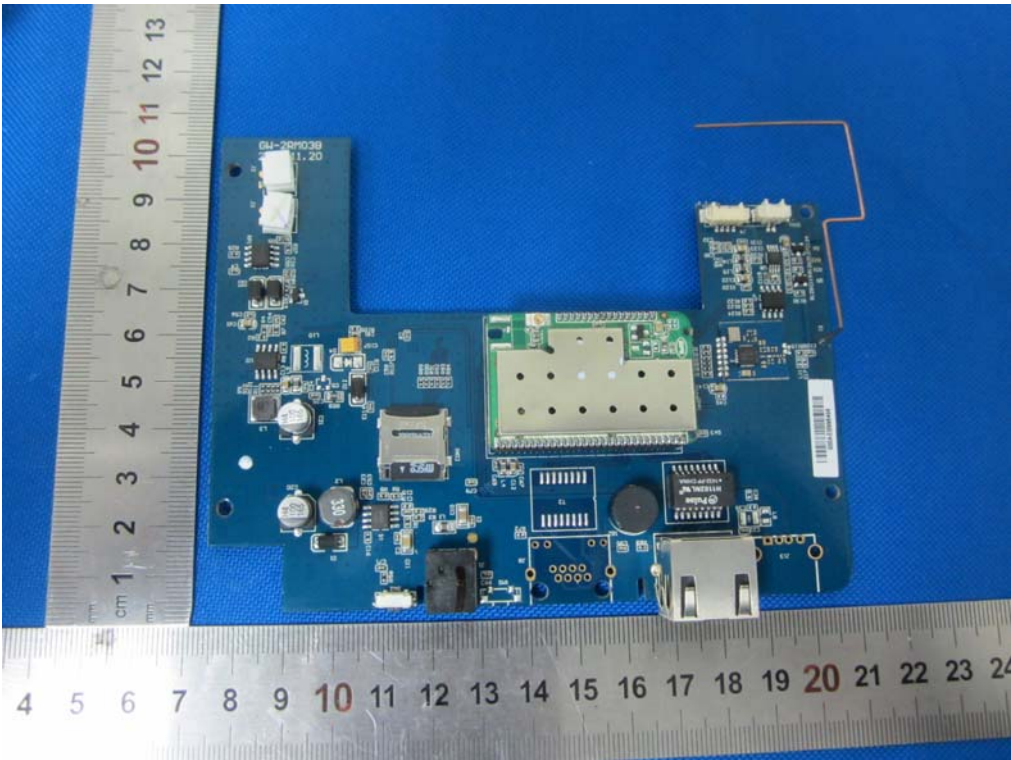


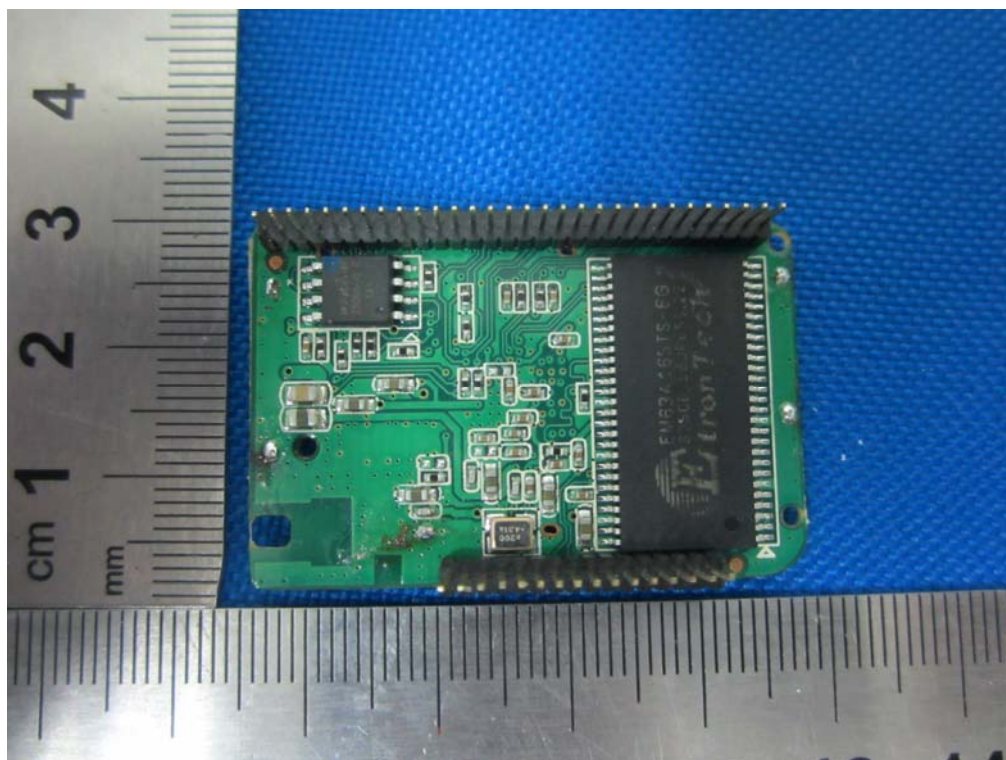


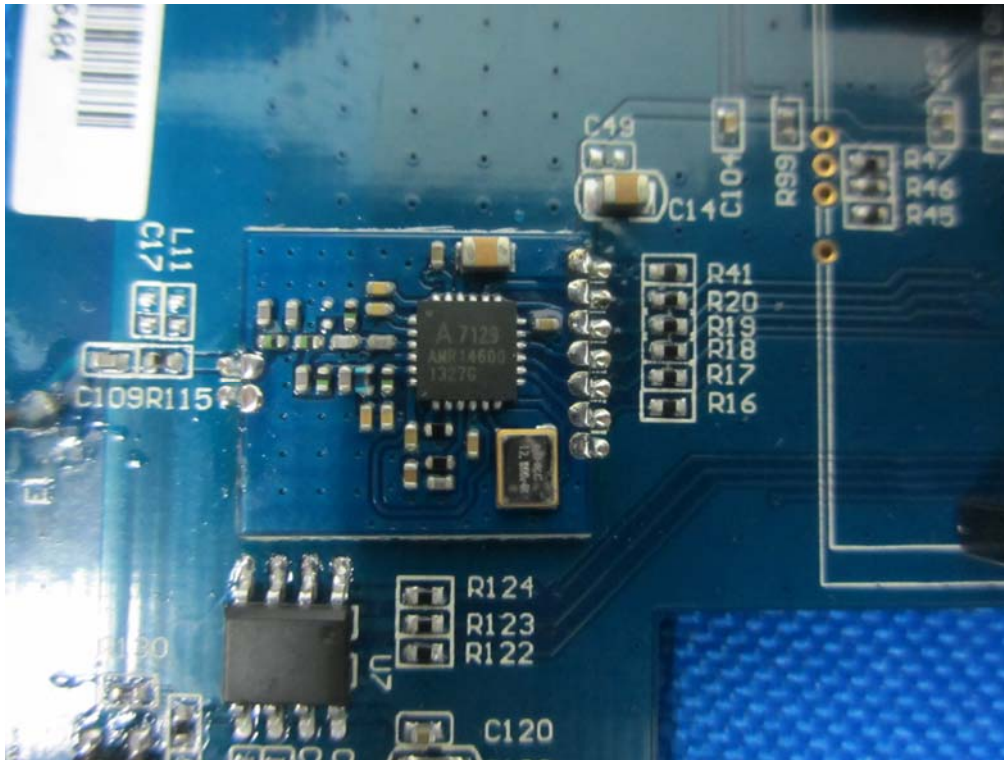












END OF REPORT