



FCC COMPLIANCE TEST REPORT

Technical Statement of Conformity
in accordance with 47 CFR Part 15 Subpart C

The product

Equipment Under Test	: powerlineECCO+
Model Number	: powerlineECCO+
Product Series	: N/A
Report Number	: HA150774-RA
Issue Date	: 01-Oct-2015
Test Result	: Compliance

is produced by
advanced PANMOBIL Systems GmbH & Co. KG
Hansestrasse 91, D-51149 Koeln, Germany



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SL2-IS-E-0023, SL2-R1-E-0023,
SL2-R2-E-0023, SL2-L1-E-0023

FCC Designation No.: TW1071

TAF Accreditation No.: 1163

VCCI Registration No.: R-2156, C-2329, T-219

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Test Result Certification

Applicant	: advanced PANMOBIL Systems GmbH & Co. KG
Address of Applicant	: Hansestrasse 91, D-51149 Koeln, Germany
Manufacturer	: advanced PANMOBIL Systems GmbH & Co. KG
Address of Manufacturer	: Hansestrasse 91, D-51149 Koeln, Germany
Trade Name	: ECCO+
Equipment Under Test	: powerlineECCO+
Model Number	: powerlineECCO+
Product Series	: N/A
FCC ID	: 2AACD-EECCOPLUS
Filing Type	: Certification
Sample Received Date	: 28-Jul-2015
Test Standard	:

☒ FCC Part 15 Subpart C §15.249

Deviations from standard test methods & any other specifications : NONE

Remark:

1. This report details the results of the test carried out on one sample.
2. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in both ANSI C63.10 (2013) and the energy emitted by the sample EUT tested as described in this report is in compliance with the requirements of FCC Rules Part 15.203, 15.207, 15.209, 15.249.
3. This report applies to the above sample only and shall not be reproduced in part without written approval of HongAn Technology Co., Ltd.

Documented by:

Kay Wang/ ADM. Dept Staff

2015-10-01

Tested by:

Eason Hsieh / ENG. Dept. Staff

2015-09-07

Approved by:

Peter Chin / Section Manager

Date: 2015-10-01



Summary of Test Result

	Test Item	Applicable Standard	Test Result
1	Antenna Requirement	FCC part 15 subpart C §203	Compliance
2	Conducted limits	FCC part 15 subpart C §207	Not applicable
3	Radiated emission limits	FCC part 15 subpart C §209	Compliance
4	20dB Bandwidth	FCC part 15 subpart C §215	Compliance
5	Field Strength	FCC part 15 subpart C §249(a)	Compliance
6	Emissions Radiated outside of the specified frequency bands	FCC part 15 subpart C §249(d)	Compliance

1 General Description

1.1 Description of EUT

Equipment Under Test	:	powerlineECCO+							
Model Number of EUT	:	powerlineECCO+							
Product Series	:	N/A							
Power Supply	:	Li-Ploymer Battery DC 3.7 V, 1500mAh							
Frequency Range	:	902~928 MHz							
Transmit Power	:	62.46 dBuV/m @ 902 MHz							
Number of Channels	:	27 Channels							
Carrier Frequency of Each Channel	:	00	902	07	909	14	916	21	923
		01	903	08	910	15	917	22	924
		02	904	09	911	16	918	23	925
		03	905	10	912	17	919	24	926
		04	906	11	913	18	920	25	927
		05	907	12	914	19	921	26	928
		06	908	13	915	20	922		
Antenna Specification	:	Loop PCB Antenna/ Gain: 0 dBi							
Modulation Technique	:	ASK							
Specification	:	Dimensions : 87 mm (L) X 48 mm (W) X 26 mm (H) Weight : 90g Function : The EUT is an UHF RFID reader. ※For more detail specification, please refer to the User Manual.							



1.2 Test Instruments

HA2

Instrument Name	Manufacture Mode	Model Number	Serial Number	Last Cal. Date	Next Cal. Date
RF Amplifier	Schaffner	CPA9231A	0405	01-JUN-2015	31-MAY-2016
EMI Receiver	R&S	ESCI	100931	25-JUL-2015	24-JUL-2016
Spectrum Analyzer	R&S	FSV	101629	27-JAN-2015	26-JAN-2016
Preamplifier	HD	HD17187	004	01-JUN-2015	31-MAY-2016
Bilog Antenna	TESEQ	CBL6111D	38521	04-JUN-2015	03-JUN-2016
Double-Ridged Waveguide Horn	EMCO	3115	9912-5992	01-JUN-2015	31-MAY-2016
Horn Antenna (18-40GHz)	Com-Power	AH-840	101042	02-JUN-2015	01-JUN-2016
Microwave Preamplifier	Com-Power	PAM-840	461269	04-JUN-2015	03-JUN-2016
L.I.S.N.	Rolf Heine Hochfrequenztechnik	NNB-4/32T	00001	18-MAR-2015	17-MAR-2016
L.I.S.N.	EMCO	3810/2NM	9702-1818	20-MAR-2015	19-MAR-2016

※ The test equipments used are calibrated and can be traced to National ITRI and International Standards.

1.3 Auxiliary Equipments

- 1.3.1. Provided by HongAn Technology Co., Ltd. for Emission Test.
N/A
- 1.3.2. Provided by the Manufacturer
N/A

1.4 EUT SETUP



Note: Main Test Sample: powerlineECCO+

1.5 Identifying the Final Test Mode

- 1. Mode 1: TX CH 00 (902MHz).
- 2. Mode 2: TX CH 13 (915MHz).
- 3. Mode 3: TX CH 26 (928MHz).
- 4. Mode 4: RX mode.

Note:

- 1. After pre-test, we identified that the TX (Mode 3) was most likely to cause maximum disturbance and most likely to be susceptible to disturbance. Therefore, the Final Assessment was performed for the worst case.
- 2. The EUT was operated in the engineering mode to fix the TX frequency that was for the purpose of the measurements.
- 3. Channel Low (902 MHz), Mid (915 MHz) and High (928 MHz) were chosen for full testing.
- 4. According to its specifications, the EUT must comply with the requirements of the Section 15.203, 15.207, 15.209 and 15.249 under the FCC Rules Part 15 Subpart C.
- 5. Fully charged Li-polymer Battery has been used during all testing.

1.6 Final Test Mode

Conducted Emission: N/A.

Field Strength: All Mode.

Radiated Emission (30~1000 MHz): Mode 3.

Radiated Emission (1~26.5GHz): All Mode.



1.7 Condition of Power Supply

Li-polymer battery x1, DC 3.7 V, 1500 mAh.

1.8 EUT Configuration

1. Setup the EUT as shown in Sec.1.4 Block Diagram.
2. Turn on the power of all equipments.
3. Activate the selected Final Test Mode.

1.9 Test Methodology

The tests documented in this report were performed in accordance with ANSI C63.10 (2013) and FCC CFR 47 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055, 2.1057, 15.203, 15.207, 15.209 and 15.249.

1.10 General Test Procedures

Conducted Emissions

The EUT is set according to the requirements in Section 6.2 of ANSI C63.10 (2013).

Radiated Emissions

The EUT is set according to the requirements in Section 6.3 of ANSI C63.10 (2013).

1.11 Modification

N/A

1.12 FCC Part 15.205 restricted bands of operations

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
¹ 0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37635-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(²)
13.36-13.41			

¹ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz

² Above 38.6

(b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.



1.13 Qualification of Test Facility

BSMI Certificate No. : SL2-IS-E-0023, SL2-IN-E-0023, SL2-R1-E-0023, SL2-R2-E-0023,
SL2-A1-E-0023, SL2-L1-E-0023.

FCC Designation No. : TW1071

TAF Accreditation No. : 1163

VCCI Certificate No. : R-2156, C-2329, T-219



2 Power line Conducted Emission Measurement

2.1 Test Instruments

Refer to Sec. 1.2 Test Instruments.

2.2 Test Arrangement and Procedure

1. The EUT was placed on a table, which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

2.3 Limit (§ 15.207)

For an intentional radiator which 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 250 microvolts (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range is listed as follows:

Frequency (MHz)	Limits (dBuV)	
	Q.P. (Quasi-Peak)	A.V. (Average)
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5.0	56	46
5.0 to 30	60	50

Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

2.4 Test Result

Not applicable.

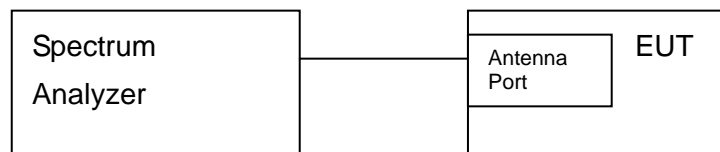


3 20 dB Bandwidth of the Emission

3.1 Test Instruments

Refer to Sec. 1.2 Test Instruments.

3.2 Test Arrangement and Procedure



3.3 Test Result

Channel	Frequency (MHz)	20 dB Bandwidth (kHz)
00	902	254.7
13	915	289.4
26	928	285.1

Note: if the 20 dB Bandwidths are over 1MHz, the RBW setting of measuring Field strength of Fundamental should be at 3 MHz, and VBW should be at 10 MHz.

The final test data are shown on the following page(s).



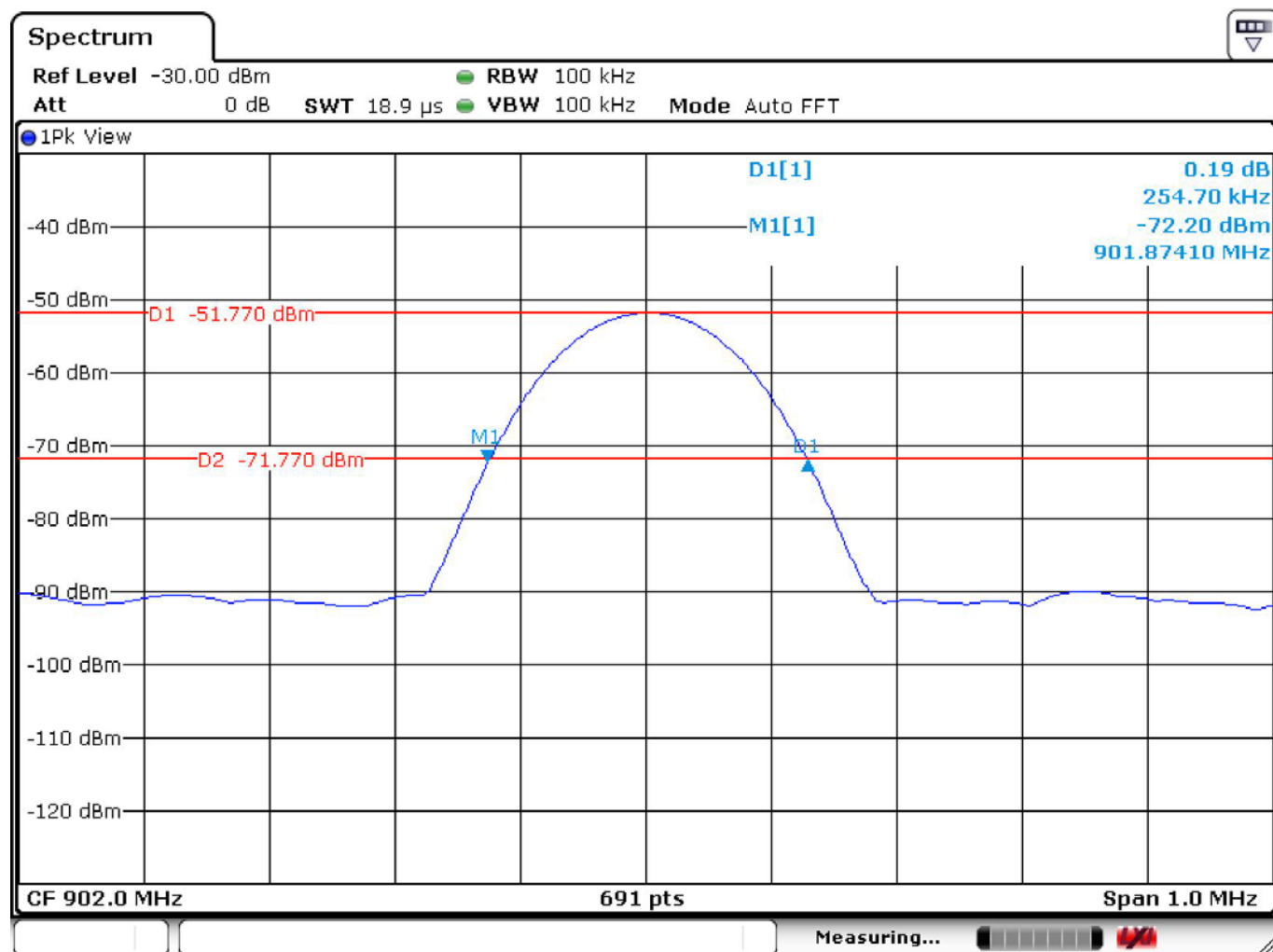
Temperature : 28.1°C

Humidity : 35%

Test Date : 07-Sep-2015

Tested by : Eason Hsieh

Channel : CH00 (902MHz)





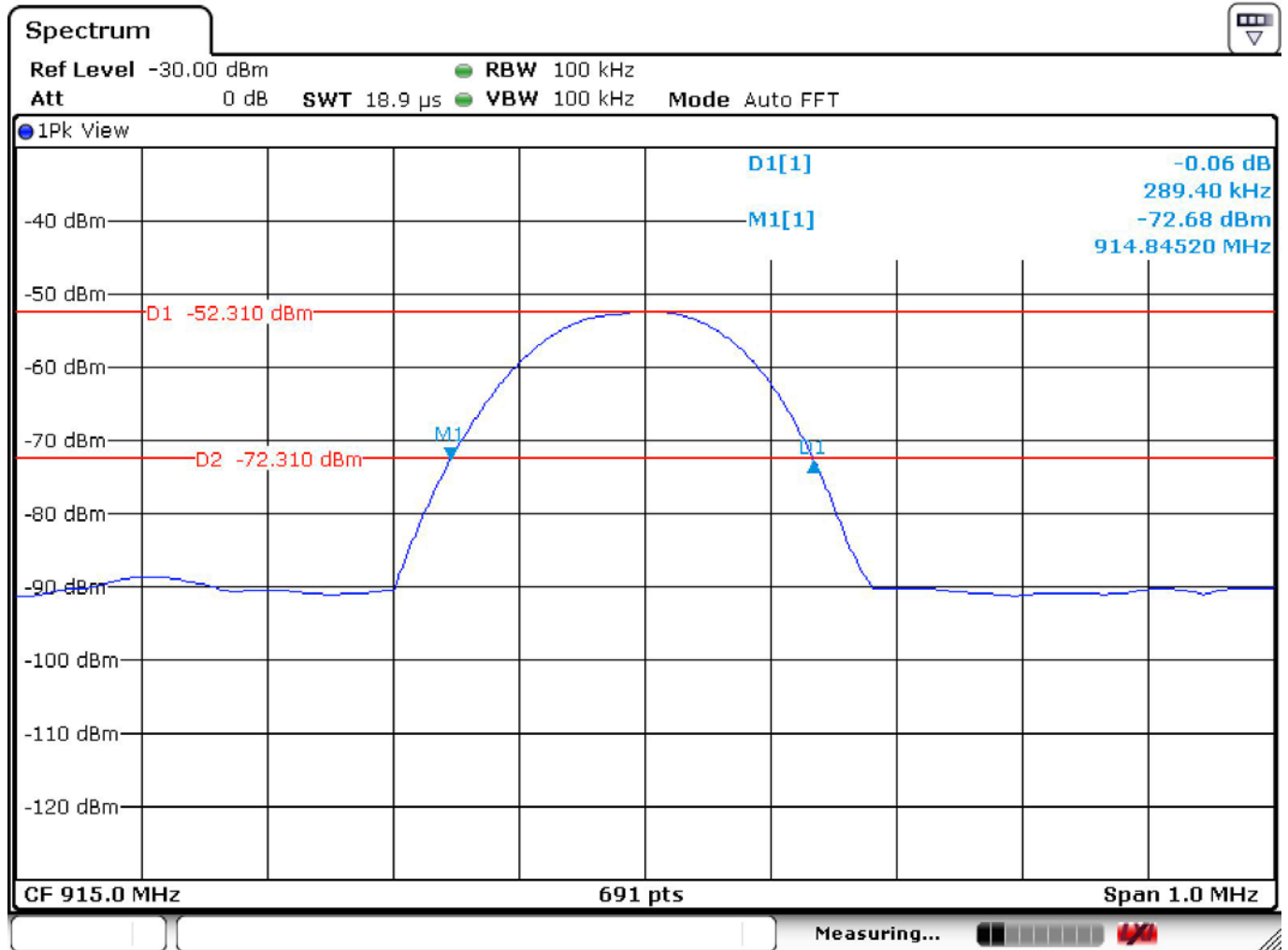
Temperature : 28.1°C

Humidity : 35%

Test Date : 07-Sep-2015

Tested by : Eason Hsieh

Channel : CH13 (915MHz)





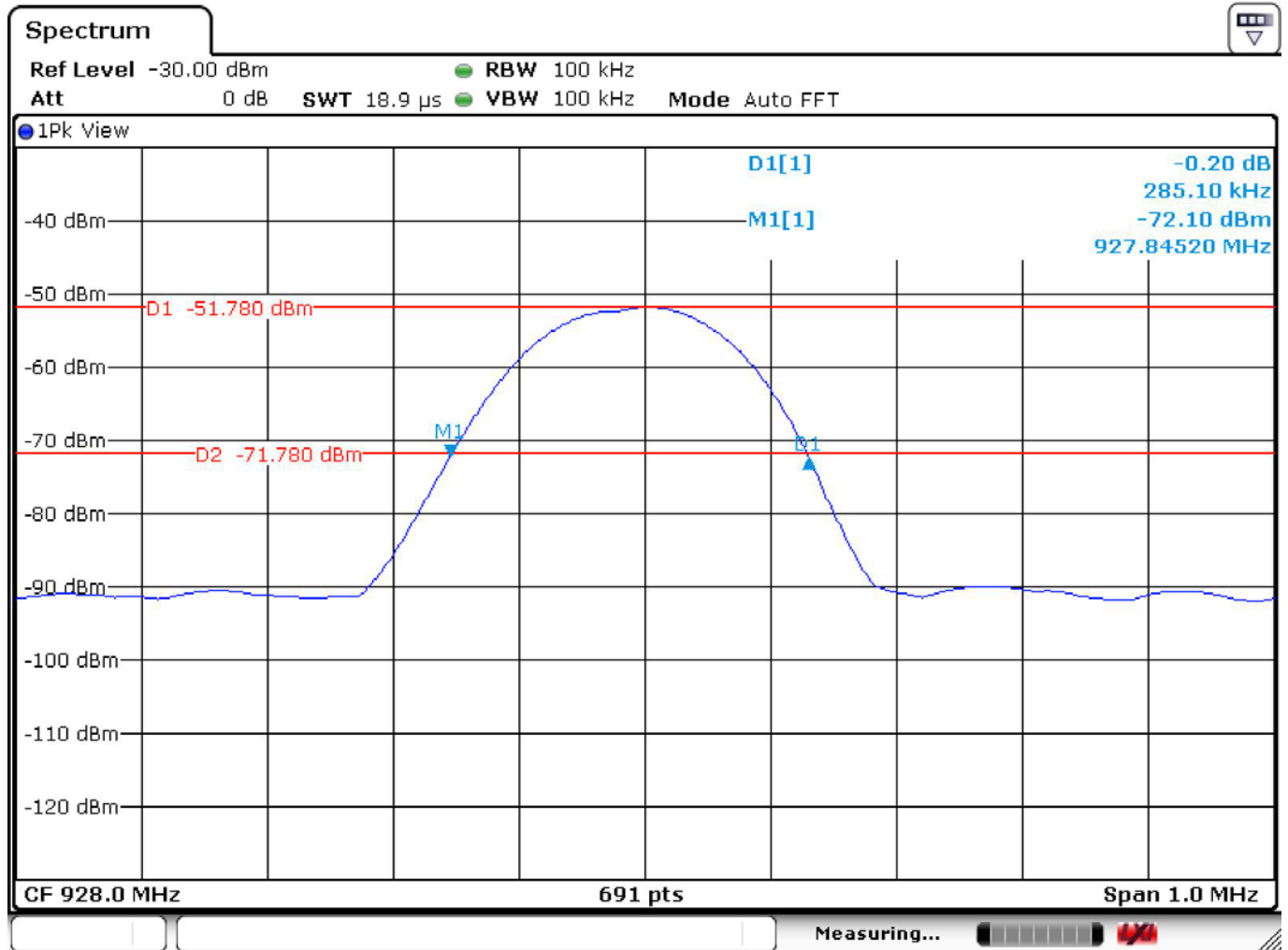
Temperature : 28.1°C

Humidity : 35%

Test Date : 07-Sep-2015

Tested by : Eason Hsieh

Channel : CH26 (928MHz)

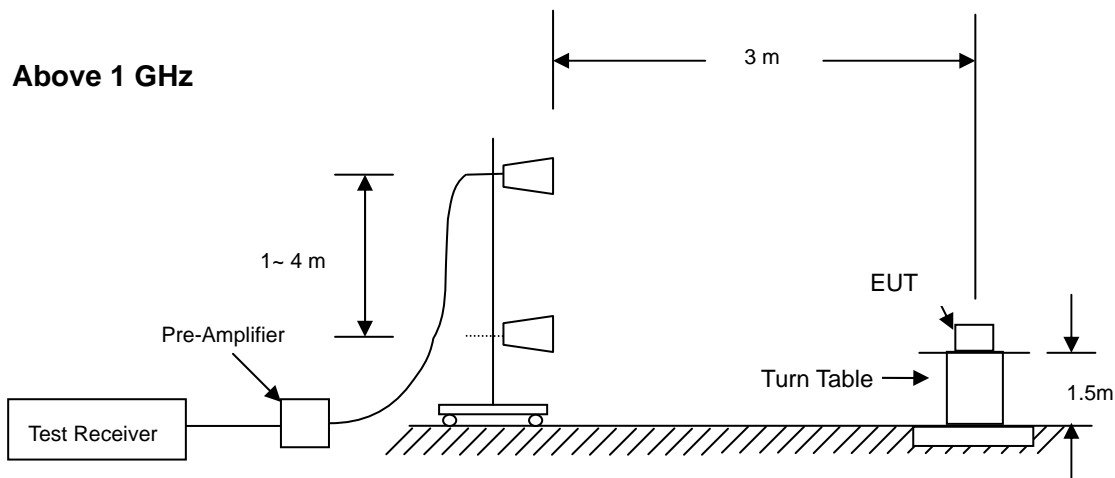
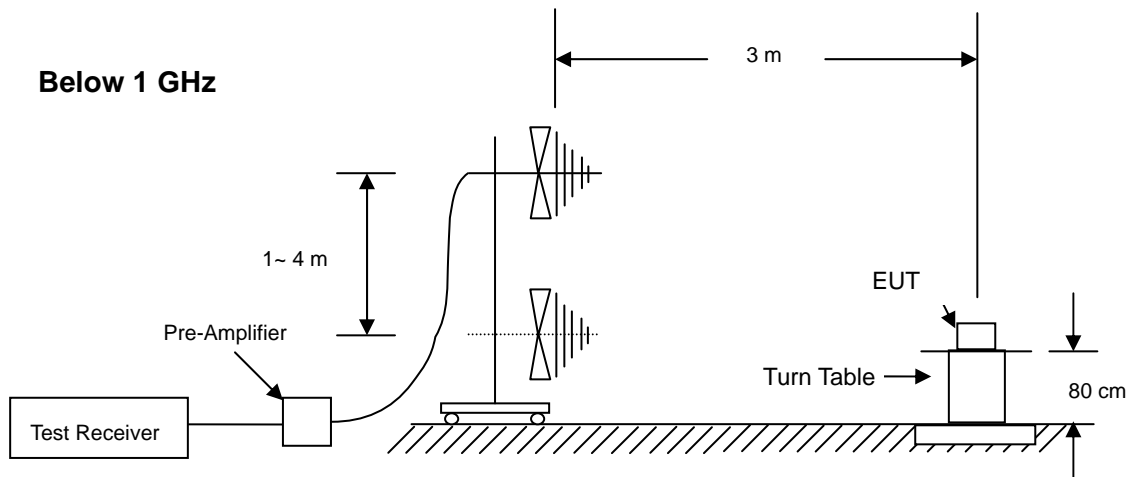


4 Radiated Emission Test

4.1 Test Instruments

Refer to Sec. 1.2 Test Instruments.

4.2 Test Arrangement and Procedure



1. The EUT is placed on a turntable, which is 0.8 m (below 1GHz) and 1.5m (above 1GHz) above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3 m away from the receiving antenna, which is varied from 1 m to 4 m to find out the highest emissions.
4. Maxium procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Set the spectrum analyzer in the following setting as:
 - (a) Below 1 GHz: RBW =100 kHz/ VBW = 1 MHz/ Sweep = AUTO.



(b) Above 1 GHz: Peak: RBW = VBW = 1MHz/ Sweep = AUTO; Average: RBW = 1MHz/ VBW = 10Hz/ Sweep = AUTO.

7. Repeat above procedures until the measurements for all frequencies are complete.

4.3 Limit of Field Strength of Fundamental (§ 15.249(a))

(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

4.4 Limit (§ 15.205 & § 15.209 & § 15.249(d))

4.4.1. Limit of Restricted Band of Operation (§ 15.205)

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

Frequency Band			
MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
¹ 0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2



8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	
13.36-13.41			



4.4.2. Limit of Spurious Emission (§ 15.209)

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 lesser attenuation.

Frequency (MHz)	Field strength (microvolts/ meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	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.

4.4.3. Limit of Spurious Emission (§ 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.

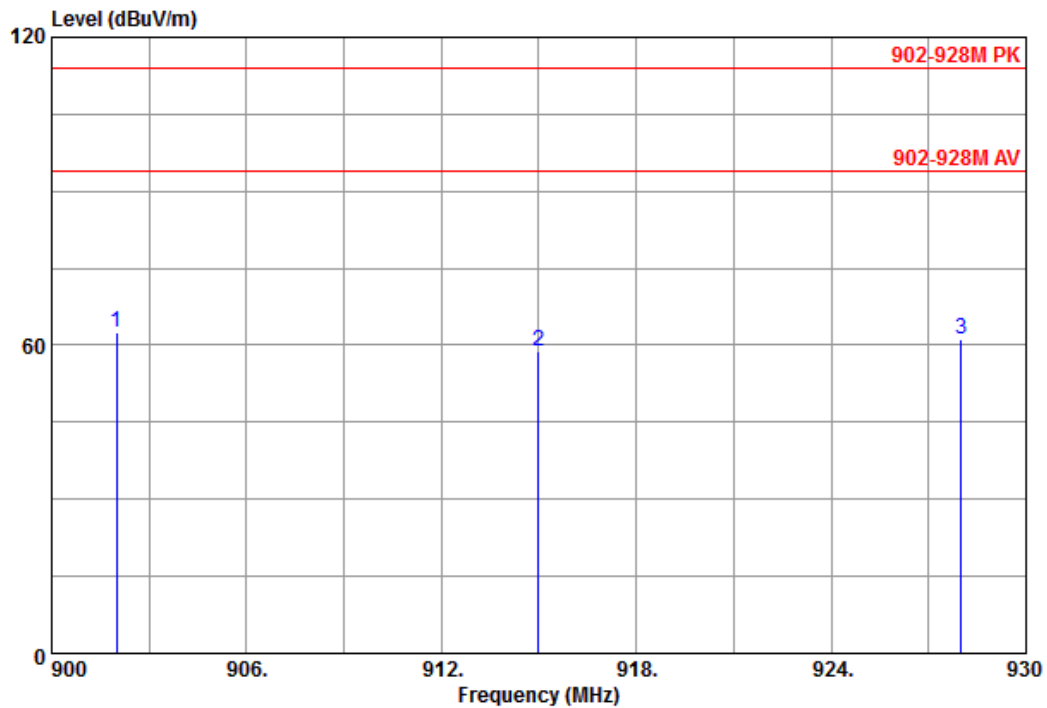
4.5 Test Result

Compliance

The final test data are shown on the following page(s).

Radiated Emission Test Data (Field Strength of Fundamental)

Temperature	: 28.1°C	Humidity	: 35%
Test Date	: 07-Sep-2015	Tested by	: Eason Hsieh
Polarization	: Vertical	Channel	: CH 00, 13, 26 (902, 915, 928 MHz)
Test Mode	: Mode 1		



Freq	Reading	C.F	Result	Limit	Margin	A/pos	T/pos	Remark
MHz	dBuV	dB	dBuV/m	dBuV/m	dB			
1 @ 902.000	66.86	-4.40	62.46	94.00	-31.54	---	---	
2 915.000	62.93	-4.22	58.71	94.00	-35.29	---	---	
3 928.000	65.17	-4.02	61.15	94.00	-32.85	---	---	

C.F = Antenna Factor + Cable Loss - Preamp gain
 Result = Reading + C.F ; Margin = Result - Limit

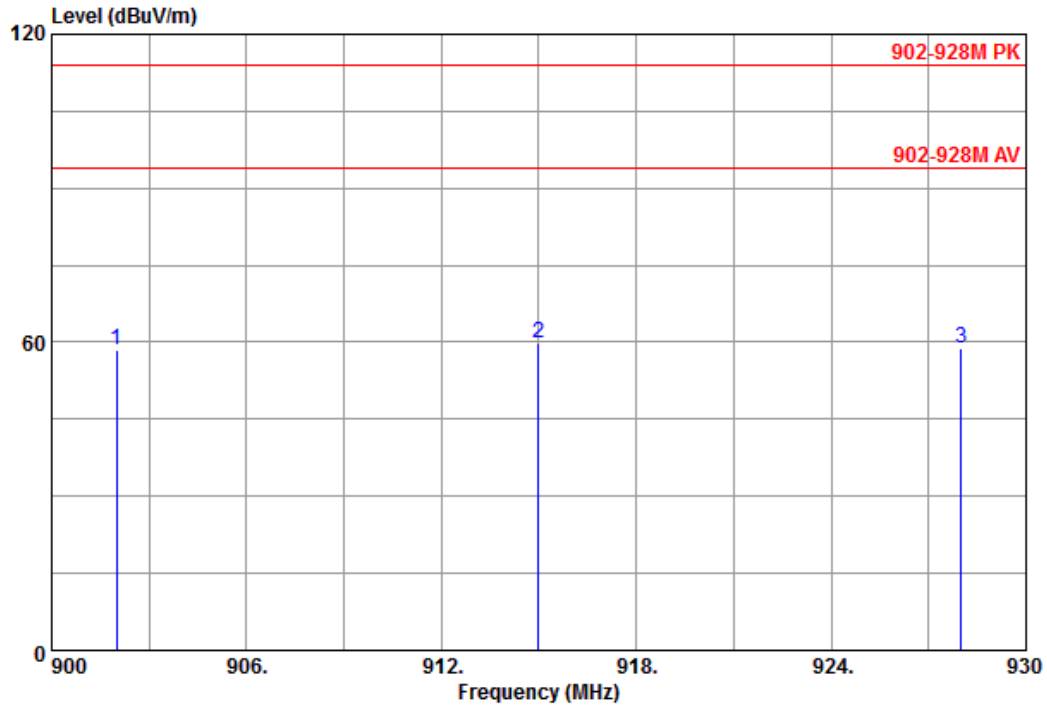
@ : Maximum Data x : Over Limit

Remark :

- All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
- Spectrum setting: Peak Setting, RBW = 100kHz, VBW = 300kHz

Radiated Emission Test Data (Field Strength of Fundamental)

Temperature	: 28.1°C	Humidity	: 35%
Test Date	: 07-Sep-2015	Tested by	: Eason Hsieh
Polarization	: Horizontal	Channel	: CH 00, 13, 26 (902, 915, 928 MHz)
Test Mode	: Mode 1		



	Freq	Reading	C.F	Result	Limit	Margin	A/pos	T/pos	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB			
1	902.000	62.86	-4.40	58.46	94.00	-35.54	---	---	
2 @	915.000	64.09	-4.22	59.87	94.00	-34.13	---	---	
3	928.000	62.97	-4.02	58.95	94.00	-35.05	---	---	

C.F = Antenna Factor + Cable Loss - Preamp gain
 Result = Reading + C.F ; Margin = Result - Limit

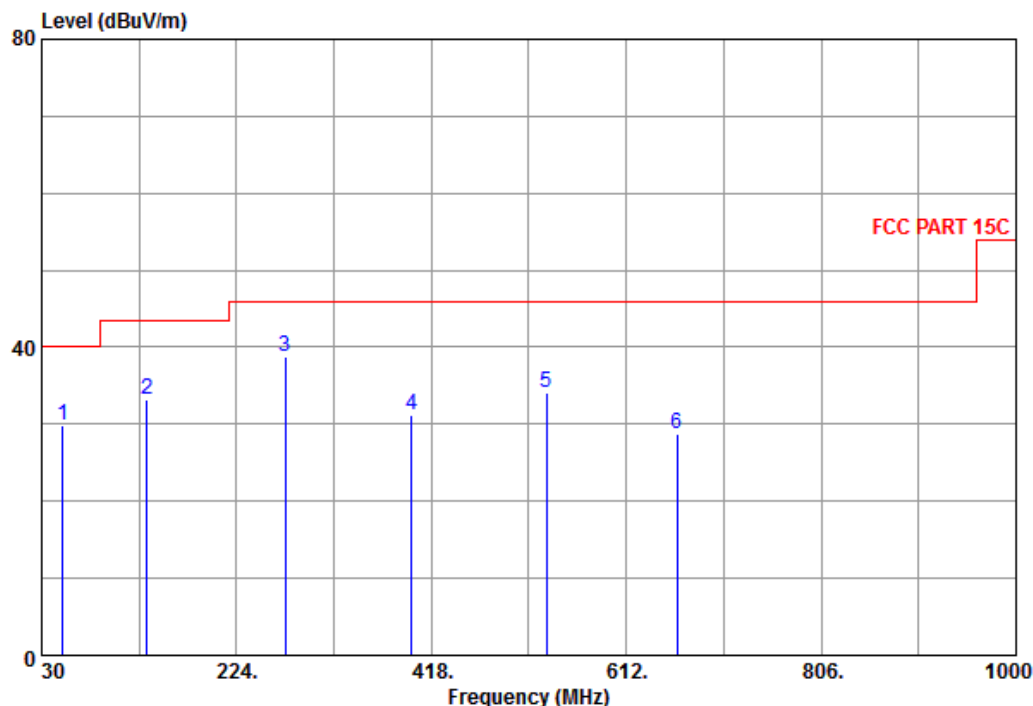
@ : Maximum Data x : Over Limit

Remark :

1. All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
2. Spectrum setting: Peak Setting, RBW = 100kHz, VBW = 300kHz

Radiated Emission Test Data (Below 1 GHz)

Temperature	: 28.1℃	Humidity	: 35%
Test Date	: 07-Sep-2015	Tested by	: Eason Hsieh
Polarization	: Vertical	Channel	: CH26 (928MHz)
EUT Position	: Vertical		



	Freq	Reading	C.F	Result	Limit	Margin	A/pos	T/pos	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB			
1	51.340	45.43	-15.53	29.90	40.00	-10.10	---	---	
2	134.760	56.49	-23.30	33.19	43.50	-10.31	---	---	
3 @	272.500	59.01	-20.27	38.74	46.00	-7.26	---	---	
4	398.600	46.65	-15.39	31.26	46.00	-14.74	---	---	
5	532.460	46.43	-12.42	34.01	46.00	-11.99	---	---	
6	662.440	38.19	-9.51	28.68	46.00	-17.32	---	---	

C.F = Antenna Factor + Cable Loss - Preamp gain
Result = Reading + C.F ; Margin = Result - Limit

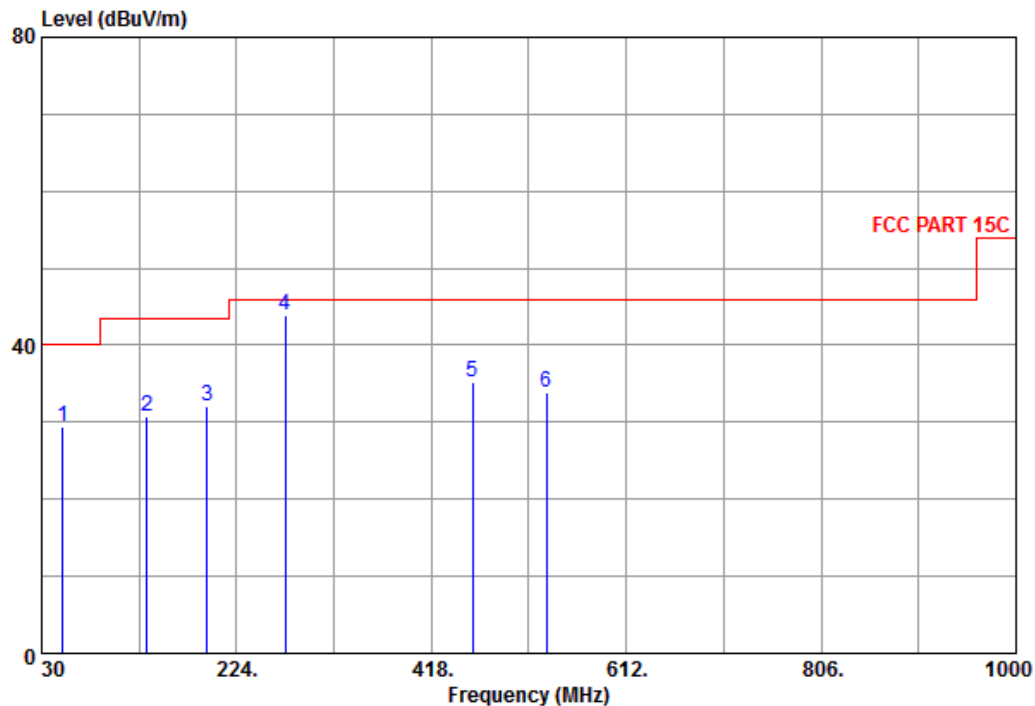
@ :Maximum Data x :Over Limit

Remark :

- Measuring frequencies from 30 MHz to 1 GHz.
- Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Peak detector mode.
- Data of measurement within this frequency range shown "---" in the table above means the reading of emissions are attenuated more than 20 dB below the permissible limits or the field strength is too small to be measured.
- All readings are Peak values. None of the peak value reading exceeds the Q.P. limit. Hence, Q.P. reading was not measured.
- The IF bandwidth of SPA between 30 MHz to 1 GHz was 100 kHz.

Radiated Emission Test Data (Below 1 GHz)

Temperature	: 28.1°C	Humidity	: 35%
Test Date	: 07-Sep-2015	Tested by	: Eason Hsieh
Polarization	: Horizontal	Channel	: CH26 (928MHz)
EUT Position	: Vertical		



	Freq	Reading	C.F	Result	Limit	Margin	A/pos	T/pos	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB			
1	51.340	44.88	-15.53	29.35	40.00	-10.65	---	---	
2	134.760	54.08	-23.30	30.78	43.50	-12.72	---	---	
3	194.900	51.08	-19.02	32.06	43.50	-11.44	---	---	
4	272.500	64.16	-20.27	43.89	46.00	-2.11	---	---	
5	458.740	49.77	-14.64	35.13	46.00	-10.87	---	---	
6	532.460	46.24	-12.42	33.82	46.00	-12.18	---	---	

C.F = Antenna Factor + Cable Loss - Preamp gain
Result = Reading + C.F ; Margin = Result - Limit

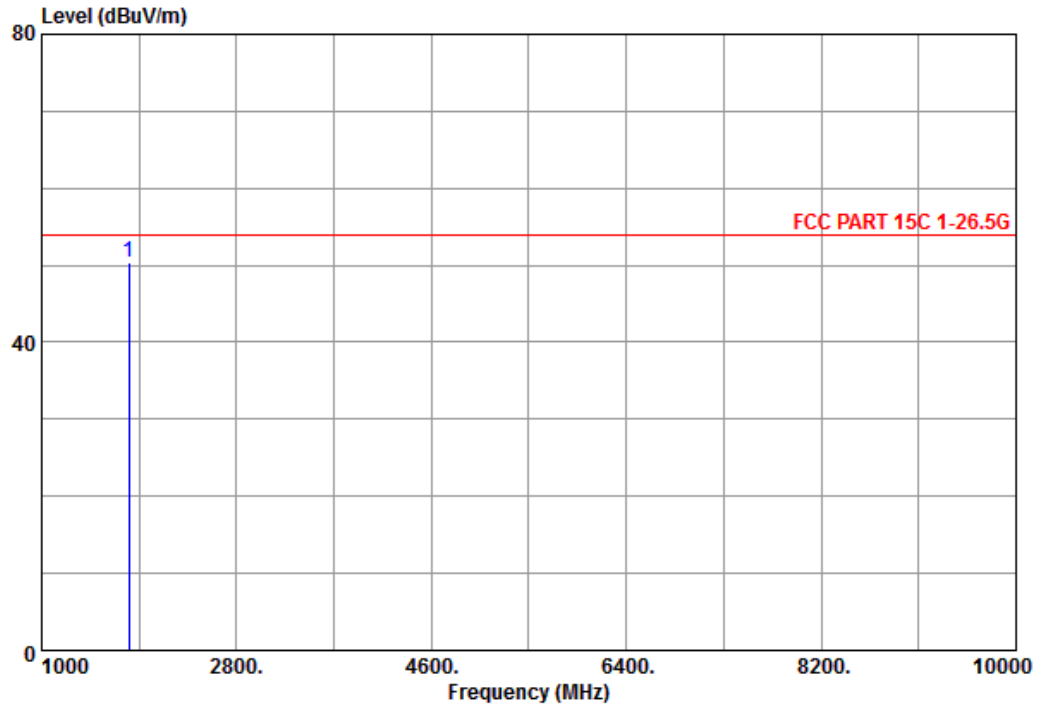
@ : Maximum Data x : Over Limit

Remark :

1. Measuring frequencies from 30 MHz to 1 GHz.
2. Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Peak detector mode.
3. Data of measurement within this frequency range shown "---" in the table above means the reading of emissions are attenuated more than 20 dB below the permissible limits or the field strength is too small to be measured.
4. All readings are Peak values. None of the peak value reading exceeds the Q.P. limit. Hence, Q.P. reading was not measured.
5. The IF bandwidth of SPA between 30 MHz to 1 GHz was 100 kHz.

**Radiated Emission Test Data (Above 1G and Field Strength to 10th Harmonic)**

Temperature	: 28.1℃	Humidity	: 35%
Test Date	: 07-Sep-2015	Tested by	: Eason Hsieh
Polarization	: Vertical	Channel	: CH00 (902MHz)
EUT Position	: Vertical		



Freq	Reading	C.F	Result	Limit	Margin	A/pos	T/pos	Remark
MHz	dBuV	dB	dBuV/m	dBuV/m	dB			
1 @1804.000	60.02	-9.70	50.32	54.00	-3.68	---	---	

C.F = Antenna Factor + Cable Loss - Preamp gain
Result = Reading + C.F ; Margin = Result - Limit

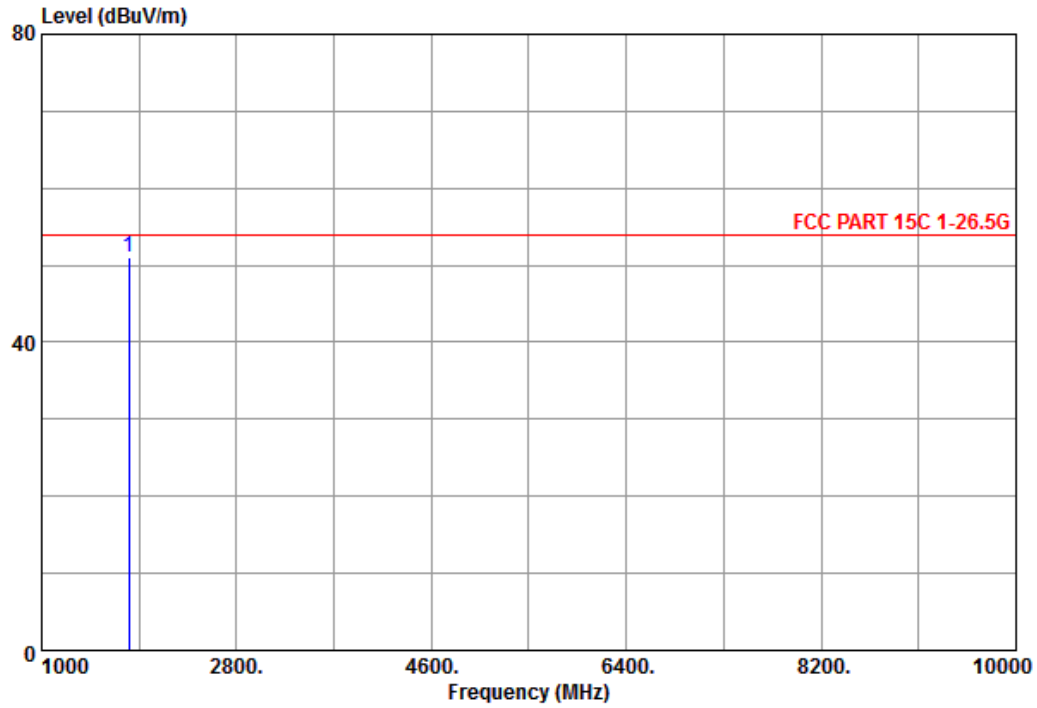
@ : Maximum Data x : Over Limit

Remark :

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode.
4. All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
5. Spectrum setting:
 - (a) Peak Setting 1GHz to 10th harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.

**Radiated Emission Test Data (Above 1G and Field Strength to 10th Harmonic)**

Temperature	: 28.1°C	Humidity	: 35%
Test Date	: 07-Sep-2015	Tested by	: Eason Hsieh
Polarization	: Horizontal	Channel	: CH00 (902MHz)
EUT Position	: Vertical		



Freq	Reading	C.F	Result	Limit	Margin	A/pos	T/pos	Remark
MHz	dBuV	dB	dBuV/m	dBuV/m	dB			
1 @1804.000	60.65	-9.70	50.95	54.00	-3.05	---	---	

C.F = Antenna Factor + Cable Loss - Preamp gain
Result = Reading + C.F ; Margin = Result - Limit

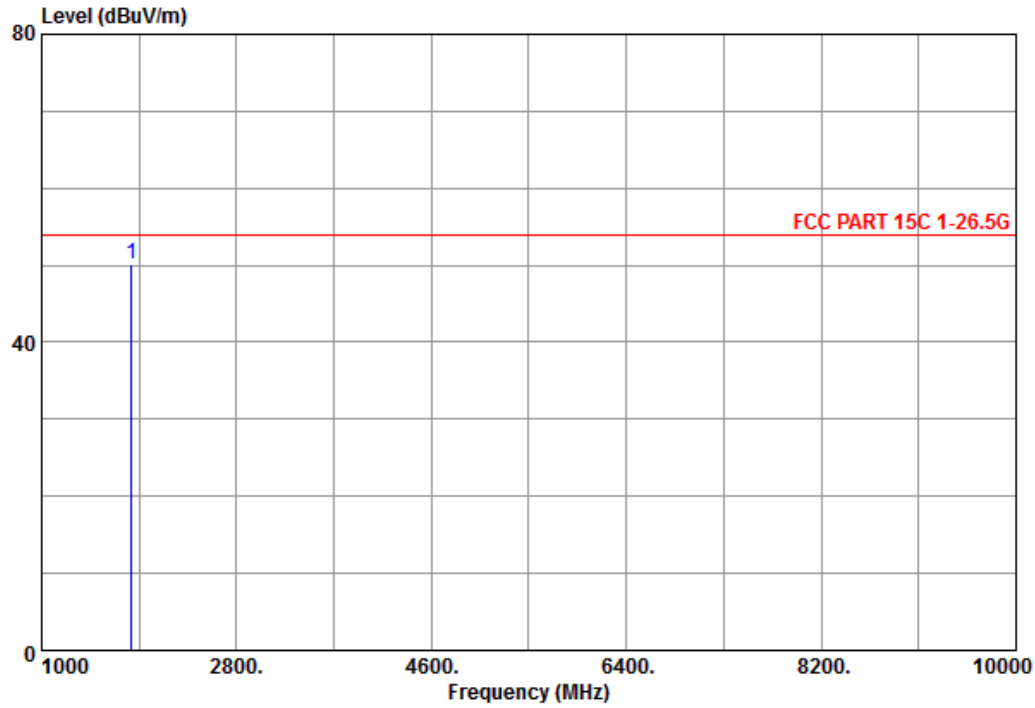
@ : Maximum Data x : Over Limit

Remark :

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode.
4. All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
5. Spectrum setting:
 - (a) Peak Setting 1GHz to 10th harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.

Radiated Emission Test Data (Above 1G and Field Strength to 10th Harmonic)

Temperature	: 28.1℃	Humidity	: 35%
Test Date	: 07-Sep-2015	Tested by	: Eason Hsieh
Polarization	: Vertical	Channel	: CH13 (915MHz)
EUT Position	: Vertical		



Freq	Reading	C.F	Result	Limit	Margin	A/pos	T/pos	Remark
MHz	dBuV	dB	dBuV/m	dBuV/m	dB			
1 @1830.000	59.70	-9.54	50.16	54.00	-3.84	---	---	

C.F = Antenna Factor + Cable Loss - Preamp gain
 Result = Reading + C.F ; Margin = Result - Limit

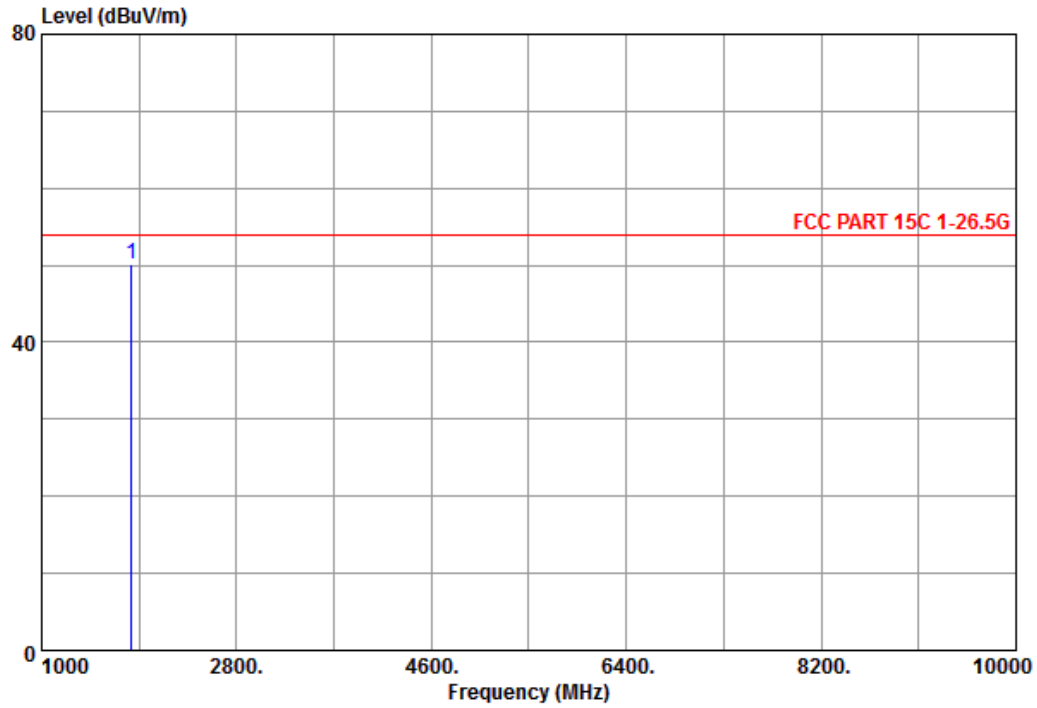
@ : Maximum Data x : Over Limit

Remark :

- Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
- Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode.
- All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
- Spectrum setting:
 - Peak Setting 1GHz to 10th harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.

**Radiated Emission Test Data (Above 1G and Field Strength to 10th Harmonic)**

Temperature	: 28.1℃	Humidity	: 35%
Test Date	: 07-Sep-2015	Tested by	: Eason Hsieh
Polarization	: Horizontal	Channel	: CH13 (915MHz)
EUT Position	: Vertical		



Freq	Reading	C.F	Result	Limit	Margin	A/pos	T/pos	Remark
MHz	dBuV	dB	dBuV/m	dBuV/m	dB			
1 @1830.000	59.75	-9.54	50.21	54.00	-3.79	---	---	

C.F = Antenna Factor + Cable Loss - Preamp gain
Result = Reading + C.F ; Margin = Result - Limit

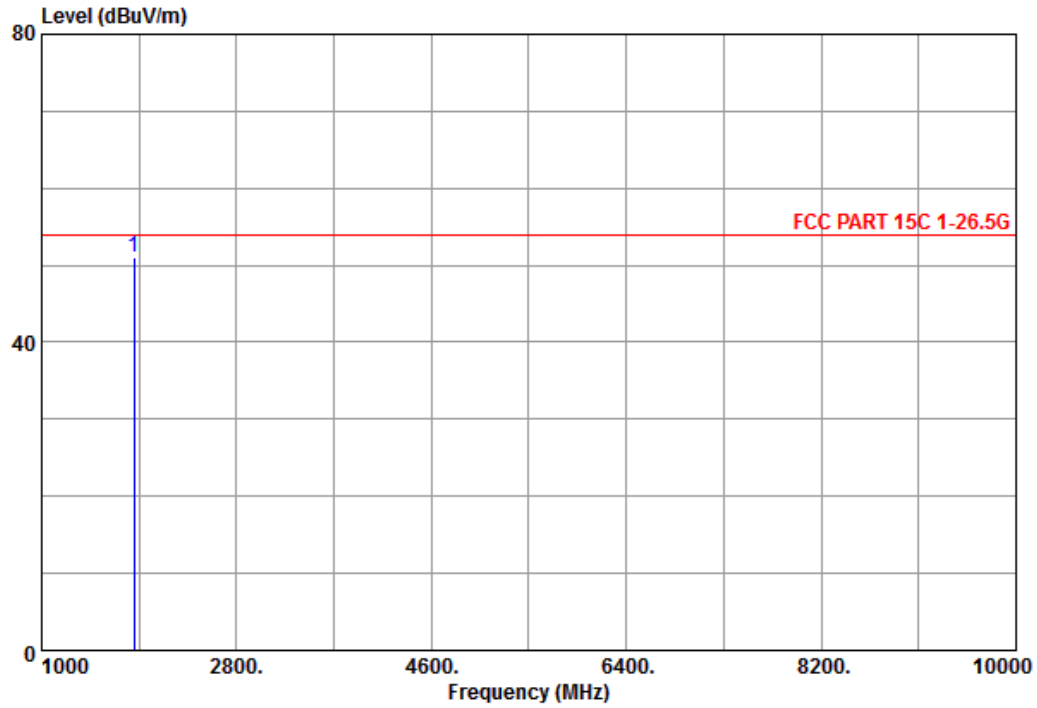
@ : Maximum Data x : Over Limit

Remark :

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode.
4. All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
5. Spectrum setting:
 - (a) Peak Setting 1GHz to 10th harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.

**Radiated Emission Test Data (Above 1G and Field Strength to 10th Harmonic)**

Temperature	: 28.1℃	Humidity	: 35%
Test Date	: 07-Sep-2015	Tested by	: Eason Hsieh
Polarization	: Vertical	Channel	: CH26 (928MHz)
EUT Position	: Vertical		



Freq	Reading	C.F	Result	Limit	Margin	A/pos	T/pos	Remark
MHz	dBuV	dB	dBuV/m	dBuV/m	dB			
1 @1856.000	60.55	-9.47	51.08	54.00	-2.92	---	---	

C.F = Antenna Factor + Cable Loss - Preamp gain
Result = Reading + C.F ; Margin = Result - Limit

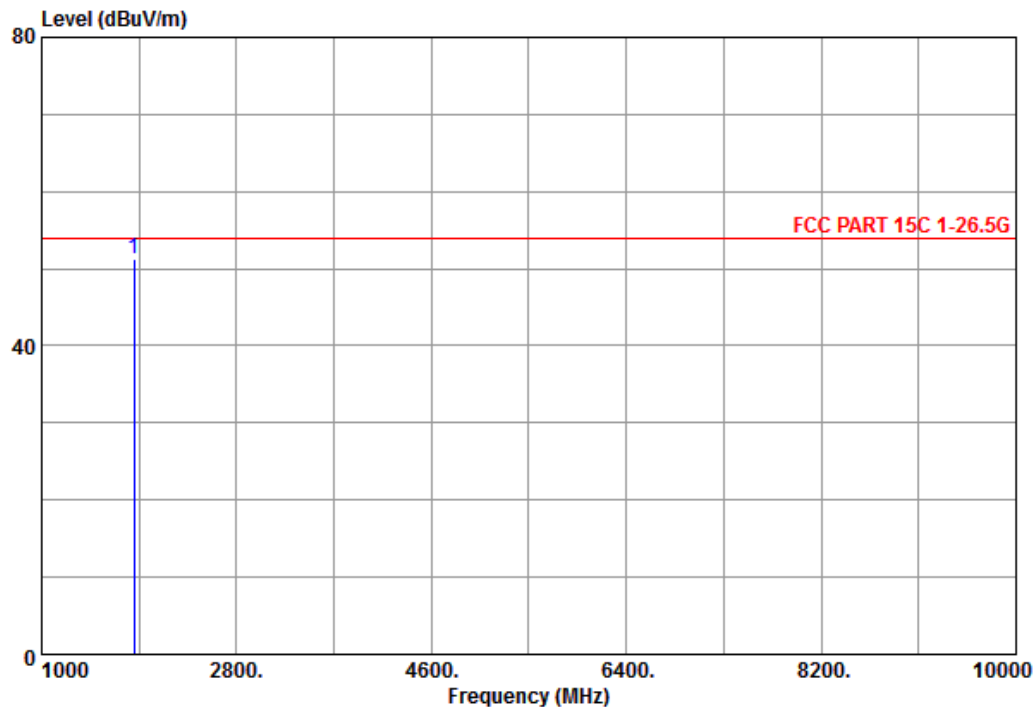
@ : Maximum Data x : Over Limit

Remark :

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode.
4. All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
5. Spectrum setting:
 - (a) Peak Setting 1GHz to 10th harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.

**Radiated Emission Test Data (Above 1G and Field Strength to 10th Harmonic)**

Temperature	: 28.1℃	Humidity	: 35%
Test Date	: 07-Sep-2015	Tested by	: Eason Hsieh
Polarization	: Horizontal	Channel	: CH26 (928MHz)
EUT Position	: Vertical		



Freq	Reading	C.F	Result	Limit	Margin	A/pos	T/pos	Remark
MHz	dBuV	dB	dBuV/m	dBuV/m	dB			
1 @1856.000	60.73	-9.47	51.26	54.00	-2.74	---	---	

C.F = Antenna Factor + Cable Loss - Preamp gain
Result = Reading + C.F ; Margin = Result - Limit

@ : Maximum Data x : Over Limit

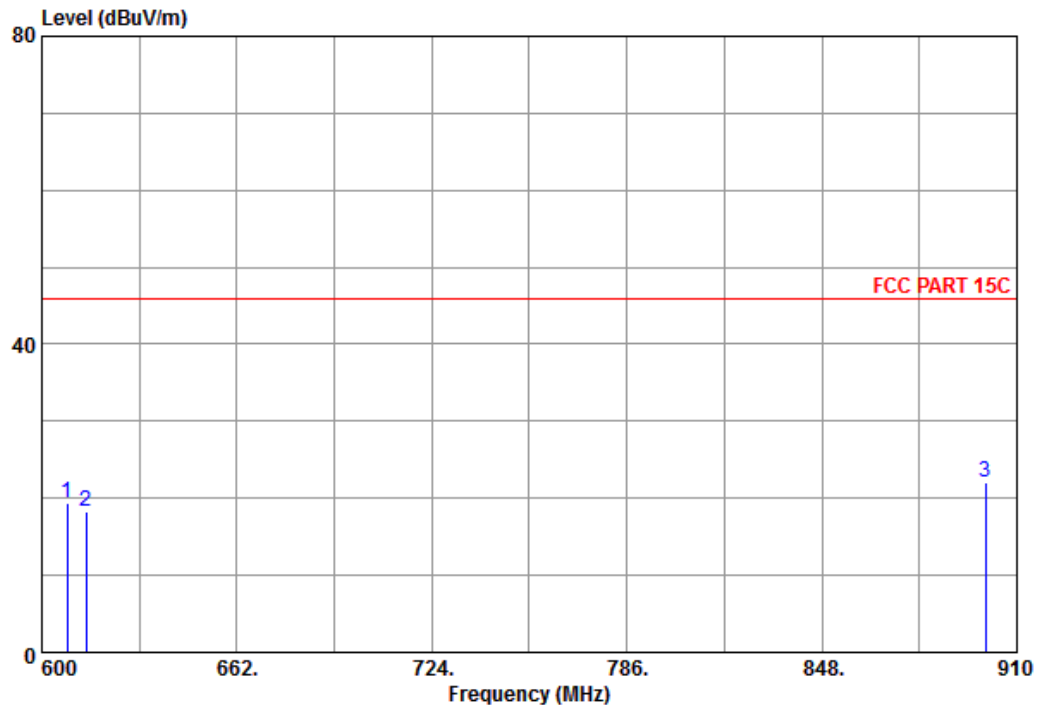
Remark :

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode.
4. All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
5. Spectrum setting:

(a) Peak Setting 1GHz to 10th harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO

Radiated Emission Test Data (outside of the specified frequency bands)

Temperature	: 28.1°C	Humidity	: 35%
Test Date	: 07-Sep-2015	Tested by	: Eason Hsieh
Polarization	: Horizontal	Channel	: CH00 (902MHz)
EUT Position	: Vertical		



	Freq	Reading	C.F	Result	Limit	Margin	A/pos	T/pos	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB			
1	608.060	30.03	-10.75	19.28	46.00	-26.72	---	---	Peak
2	614.000	28.86	-10.63	18.23	46.00	-27.77	---	---	Peak
3 @	900.000	26.52	-4.42	22.10	46.00	-23.90	---	---	Peak

C.F = Antenna Factor + Cable Loss - Preamp gain
Result = Reading + C.F ; Margin = Result - Limit

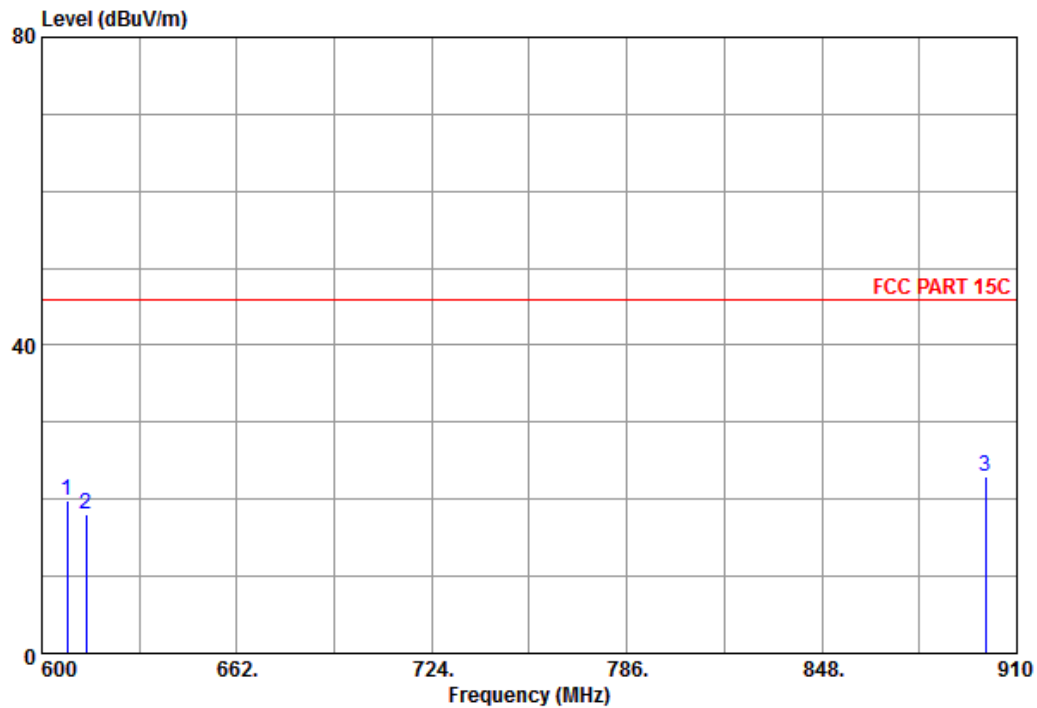
@ :Maximum Data x :Over Limit

Remark :

- 1.All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
- 2.Spectrum setting: Peak Setting, RBW = 100kHz, VBW = 300kHz

Radiated Emission Test Data (outside of the specified frequency bands)

Temperature	: 28.1°C	Humidity	: 35%
Test Date	: 07-Sep-2015	Tested by	: Eason Hsieh
Polarization	: Vertical	Channel	: CH00 (902MHz)
EUT Position	: Vertical		



	Freq	Reading	C.F	Result	Limit	Margin	A/pos	T/pos	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB			
1	608.060	30.52	-10.75	19.77	46.00	-26.23	---	---	Peak
2	614.000	28.59	-10.63	17.96	46.00	-28.04	---	---	Peak
3 @	900.000	27.29	-4.42	22.87	46.00	-23.13	---	---	Peak

C.F = Antenna Factor + Cable Loss - Preamp gain
Result = Reading + C.F ; Margin = Result - Limit

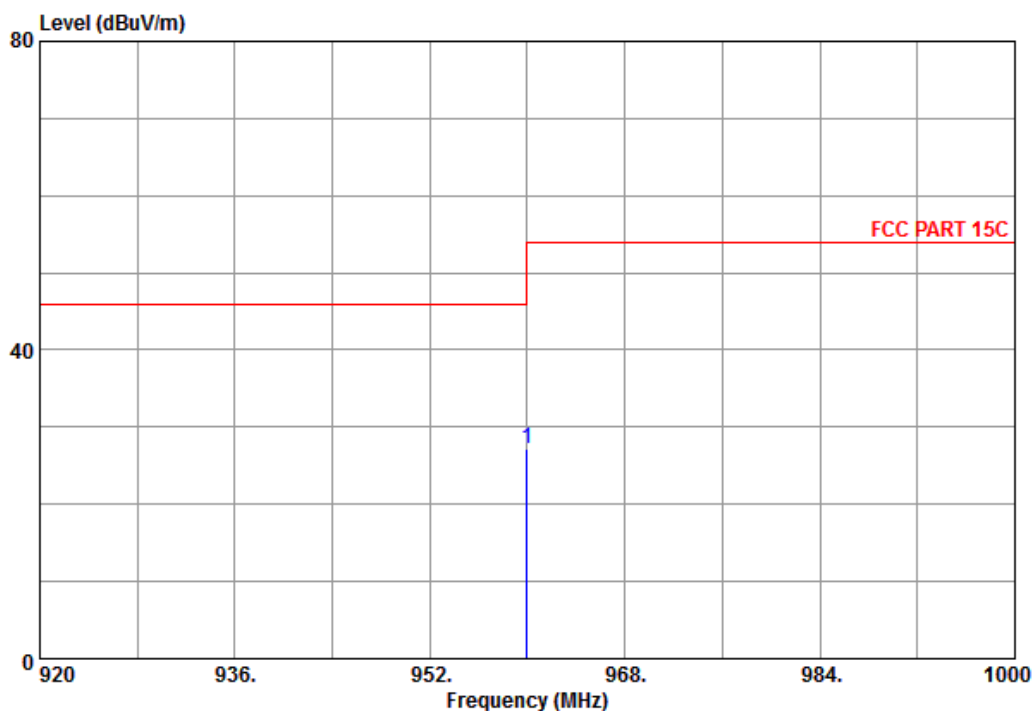
@ : Maximum Data x : Over Limit

Remark :

- 1.All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
- 2.Spectrum setting: Peak Setting, RBW = 100kHz, VBW = 300kHz

Radiated Emission Test Data (outside of the specified frequency bands)

Temperature	: 28.1°C	Humidity	: 35%
Test Date	: 07-Sep-2015	Tested by	: Eason Hsieh
Polarization	: Horizontal	Channel	: CH26 (928MHz)
EUT Position	: Vertical		



Freq	Reading	C.F	Result	Limit	Margin	A/pos	T/pos	Remark
MHz	dBuV	dB	dBuV/m	dBuV/m	dB			
1 @ 960.000	30.75	-3.58	27.17	46.00	-18.83	---	---	Peak

C.F = Antenna Factor + Cable Loss - Preamp gain
Result = Reading + C.F ; Margin = Result - Limit

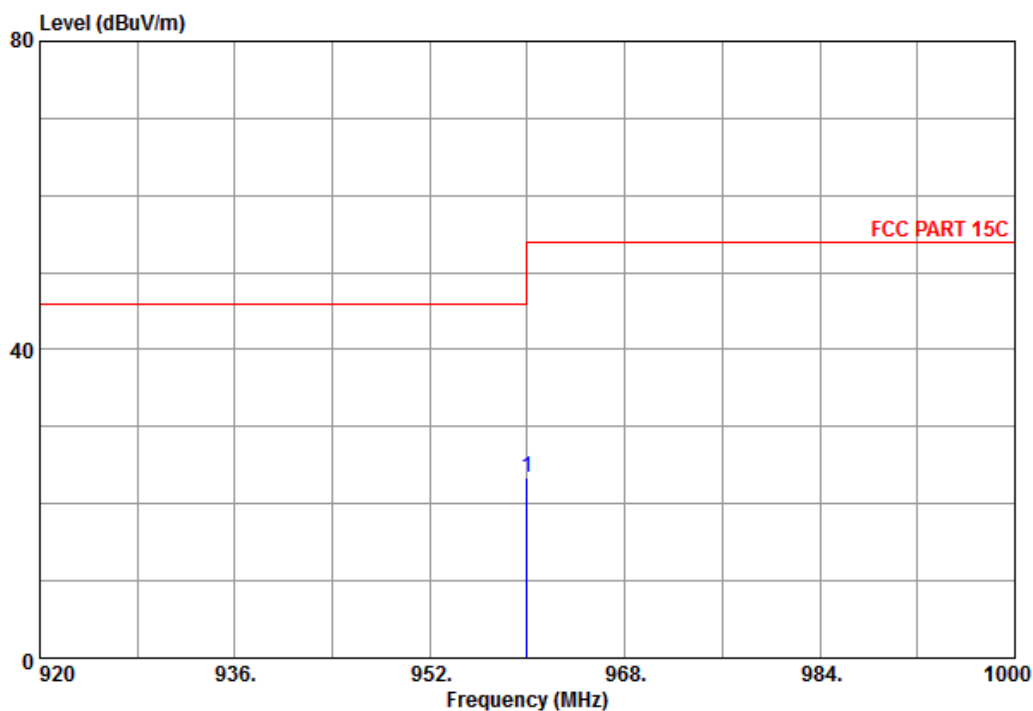
@ :Maximum Data x :Over Limit

Remark :

- 1.All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
- 2.Spectrum setting: Peak Setting, RBW = 100kHz, VBW = 300kHz

**Radiated Emission Test Data (outside of the specified frequency bands)**

Temperature	: 28.1℃	Humidity	: 35%
Test Date	: 07-Sep-2015	Tested by	: Eason Hsieh
Polarization	: Vertical	Channel	: CH26 (928MHz)
EUT Position	: Vertical		



Freq	Reading	C.F	Result	Limit	Margin	A/pos	T/pos	Remark
MHz	dBuV	dB	dBuV/m	dBuV/m	dB			
1 @ 960.000	27.04	-3.58	23.46	46.00	-22.54	---	---	Peak

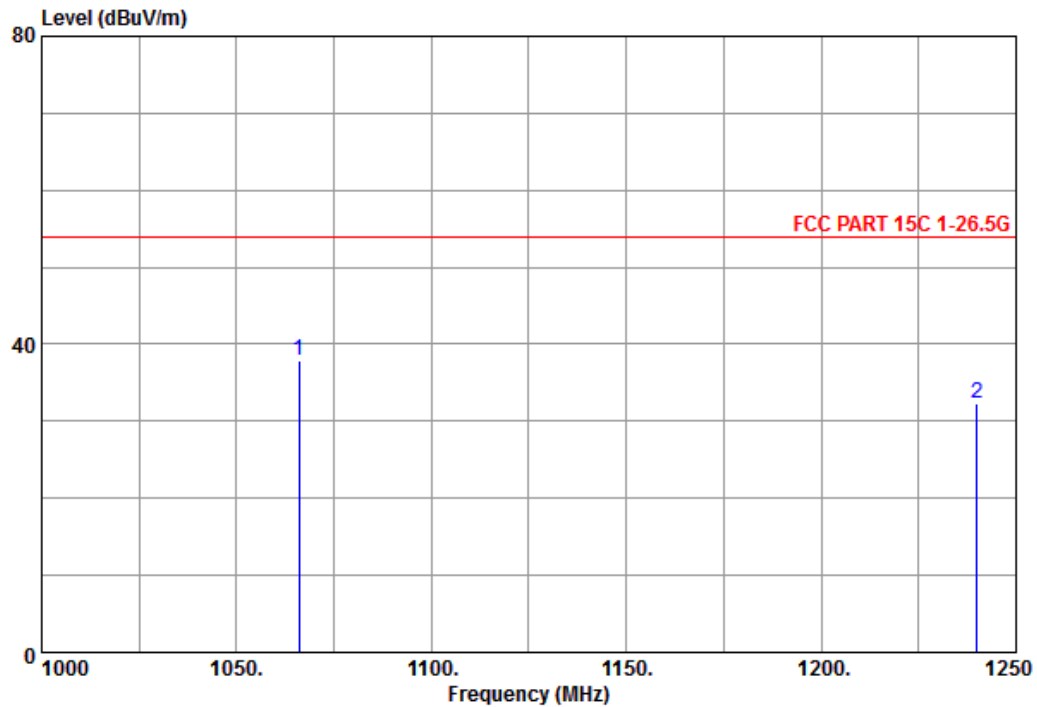
C.F = Antenna Factor + Cable Loss - Preamp gain
Result = Reading + C.F ; Margin = Result - Limit
@ : Maximum Data x : Over Limit

Remark :

- 1.All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
- 2.Spectrum setting: Peak Setting, RBW = 100kHz, VBW = 300kHz

Radiated Emission Test Data (outside of the specified frequency bands)

Temperature	: 28.1℃	Humidity	: 35%
Test Date	: 07-Sep-2015	Tested by	: Eason Hsieh
Polarization	: Horizontal	Channel	: CH26 (928MHz)
EUT Position	: Vertical		



Freq	Reading	C.F	Result	Limit	Margin	A/pos	T/pos	Remark
MHz	dBuV	dB	dBuV/m	dBuV/m	dB			
1 @1066.000	50.79	-13.01	37.78	54.00	-16.22	---	---	Peak
2 1240.000	44.64	-12.25	32.39	54.00	-21.61	---	---	Peak

C.F = Antenna Factor + Cable Loss - Preamp gain
Result = Reading + C.F ; Margin = Result - Limit

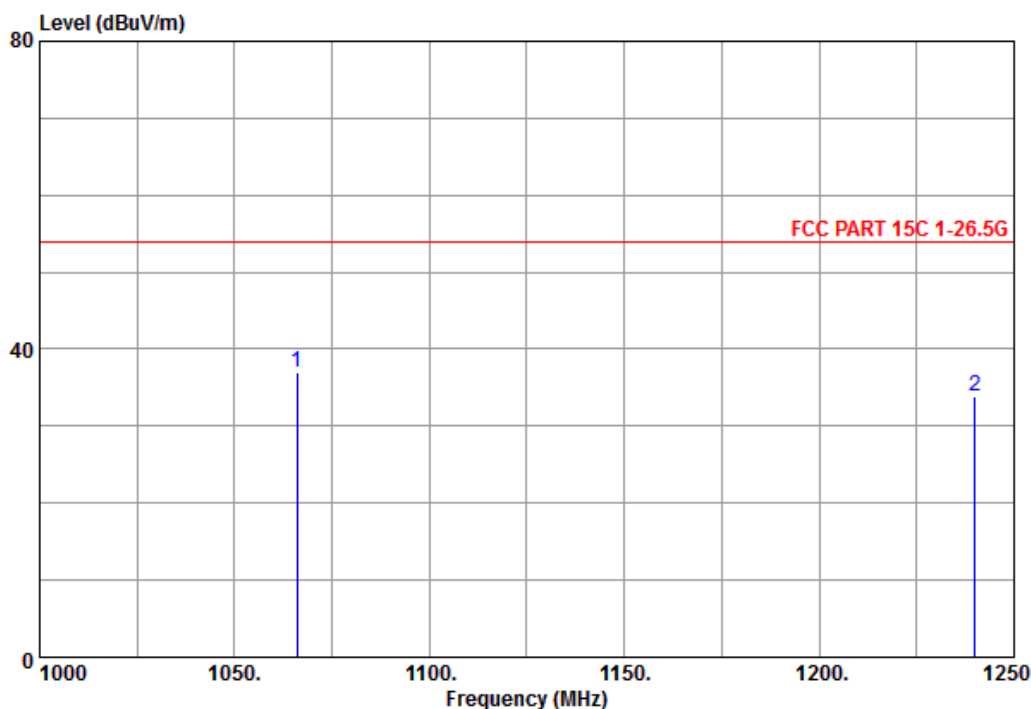
@ :Maximum Data x :Over Limit

Remark :

- 1.All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
- 2.Spectrum setting: Peak Setting, RBW = VBW = 1MHz

Radiated Emission Test Data (outside of the specified frequency bands)

Temperature	: 28.1℃	Humidity	: 35%
Test Date	: 07-Sep-2015	Tested by	: Eason Hsieh
Polarization	: Vertical	Channel	: CH26 (928MHz)
EUT Position	: Vertical		



Freq	Reading	C.F	Result	Limit	Margin	A/pos	T/pos	Remark
MHz	dBuV	dB	dBuV/m	dBuV/m	dB			
1 @1066.000	49.92	-13.01	36.91	54.00	-17.09	---	---	Peak
2 1240.000	46.22	-12.25	33.97	54.00	-20.03	---	---	Peak

C.F = Antenna Factor + Cable Loss - Preamp gain
Result = Reading + C.F ; Margin = Result - Limit

@ :Maximum Data x :Over Limit

Remark :

1.All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.

2.Spectrum setting: Peak Setting, RBW =VBW = 1MHz



5 Antenna requirement

5.1 Limit (§ 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. This requirement does not apply to carrier current devices or to devices operated under the provisions of § 15.211, § 15.213, § 15.217, § 15.219, or § 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with § 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

5.2 Test Result

Compliance.

The EUT applies a Loop PCB antenna.

-----End Of Test Report-----