

FCC 15.209 Wireless Power Transfer Report

for

Elitegroup Computer Systems Co., Ltd.

**No. 239, Sec. 2, Ti Ding Blvd,
Taipei, Taiwan 11493**

Product Name : WPC Module
Model Name : WCPTI-S
Brand : ECS
FCC ID : WL6WCPTI-S

**Prepared by: : AUDIX Technology Corporation,
EMC Department**



TABLE OF CONTENTS

Description	Page
TEST REPORT CERTIFICATION.....	4
1. REVISION RECORD OF TEST REPORT.....	4
2. SUMMARY OF TEST RESULTS.....	5
3. GENERAL INFORMATION.....	6
3.1. Description of Application.....	6
3.2. Description of EUT.....	6
3.3. EUT Specifications Assessed in Current Report.....	7
3.4. Antenna Information.....	7
3.5. Description of Key Components.....	7
3.6. Test Configuration.....	7
3.7. Tested Supporting System List.....	8
3.8. Setup Configuration.....	8
3.9. Operating Condition of EUT.....	9
3.10. Description of Test Facility.....	9
3.11. Measurement Uncertainty.....	9
4. MEASUREMENT EQUIPMENT LIST.....	10
4.1. Conducted Emission Measurement.....	10
4.2. Radiated Emission Measurement.....	10
4.3. RF Conducted Measurement.....	10
5. CONDUCTED EMISSION.....	11
5.1. Block Diagram of Test Setup.....	11
5.2. Conducted Emission Limit.....	11
5.3. Test Procedure.....	11
5.4. Test Results.....	12
6. RADIATED SPURIOUS EMISSION.....	13
6.1. Block Diagram of Test Setup.....	13
6.2. Radiated Emission Limits.....	14
6.3. Test Procedure.....	14
6.4. Measurement Limit Formula.....	15
6.5. Test Results.....	15
7. 20dB BANDWIDTH.....	16
7.1. Block Diagram of Test Setup.....	16
7.2. Specification Limits.....	16
7.3. Test Procedure.....	16
7.4. Test Results.....	16
8. DEVIATION TO TEST SPECIFICATIONS.....	17

APPENDIX A TEST DATA AND PLOTS

APPENDIX B TEST PHOTOGRAPHS

TEST REPORT CERTIFICATION

Applicant : Elitegroup Computer Systems Co., Ltd.
Manufacture : Golden Elite Technology (SHENZHEN) CO., LTD.
EUT Description
(1) Product : WPC Module
(2) Model : WCPTI-S
(3) Brand : ECS

Applicable Standards:

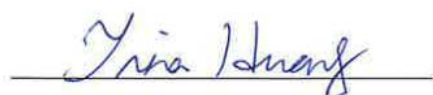
47 CFR FCC Part 15 Subpart C
ANSI C63.10:2013

Audix Technology Corp. tested the equipment mentioned in accordance with the requirements set forth in the above standards. Test results indicate that the equipment tested is capable of demonstrating compliance with the requirements as documented within this report.

Audix Technology Corp. does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens and samples.


Date of Report: 2017. 05. 10

Reviewed by:



(Tina Huang/Administrator)

Approved by:



(Ben Cheng/Manager)

1. REVISION RECORD OF TEST REPORT

Edition No	Issued Data	Revision Summary	Report Number
0	2017. 05. 10	Original Report	EM-F170287

2. SUMMARY OF TEST RESULTS

Rule	Description	Results
15.207	Conducted Emission	PASS
15.209	Radio Spurious Emission	PASS
15.215 (c)	20dB Bandwidth	PASS

3. GENERAL INFORMATION

3.1. Description of Application

Applicant	Elitegroup Computer Systems Co., Ltd. No. 239, Sec. 2., TiDing Blvd., Taipei, Taiwan 11493
Manufacture	Golden Elite Technology (SHENZHEN) CO., LTD. No.1, Nan-Huan Rd., ShaJing, BaoAn, Shenzhen, China
Product	WPC Module
Model	WCPTI-S
Brand	ECS

3.2. Description of EUT

Test Model	WCPTI-S
Serial Number	N/A
Power Rating	DC 19V
RF Features	Wireless Power Transfer
Host	Host Name: Personal Computer, Host Brand: ECS Host Model: SKM-U mPC
Accessories	N/A
Date of Receipt	2017. 04. 07
Date of Test	2017. 04. 25 ~ 05. 16

3.3. EUT Specifications Assessed in Current Report

Mode	Fundamental Range (MHz)	Modulation
WPC	110-205 kHz	FSK

3.4. Antenna Information

No.	Antenna Part Number	Manufacture	Antenna Type	Frequency (MHz)	Max Gain (dBi)
1	---	---	Loop	---	---

3.5. Description of Key Components

None.

3.6. Test Configuration

AC Conduction	
Test Case	Normal operation

Item		Mode	Test Frequency
Radiated Test Case	Radiated Spurious Emission	WPC	115.6kHz
Conducted Test Case	20dB Bandwidth	WPC	123.1kHz

Note 1:

- ☒ Mobile Device:.
- ☐ Portable Device, and 3 axis were assessed.
- ☐ Lie
 - ☐ Side
 - ☐ Stand

3.7. Tested Supporting System List

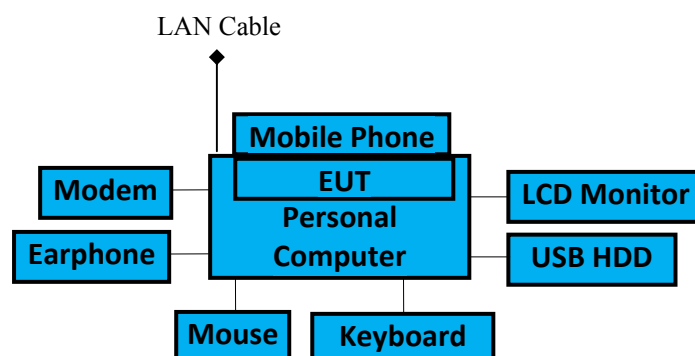
3.7.1. Support Peripheral Unit

No.	Product	Brand	Model No.	Serial No.	Approval
1.	Mobile Phone	SAMSUNG	GT-I9300	RF1C86ATMSV1	FCC ID: A3LGTI9300A
2.	Wireless Charger Receiver Module	Universal	N/A	N/A	N/A
3.	Personal Computer	ECS	SKM-U mPC	N/A	FCC ID: WL6SKM-U-MPCH
4.	TV	LG	22LV2500-DA	N/A	N/A
5.	Keyboard	HHKB Lite 2	KUH0010	N/A	N/A
6.	Mouse	Logitech	M-U0026	N/A	N/A
7.	Modem	ACEEX	DM-1414	980034396	FCC ID: IFAXDM1414
8.	Earphone	APPLE	N/A	N/A	N/A

3.7.2. Cable Lists

No.	Cable Description Of The Above Support Units
1.	N/A
2.	Cable: Unshielded, undetachable, 0.1m
3.	AC Adapter: Asian, WA-65B19R DC Power Cord: Unshielded, Detachable, 1.8m, Bonded a ferrite core AC Power Cord: Unshielded, Detachable, 1.8m
4.	HDMI Cable: Shielded, Detachable, 1.5m AC Power Cord: Nonshielded, Detachable, 1.5m
5.	USB Cable: Shielded, Detachable, 1.8m
6.	USB Cable: Shielded, Detachable, 1.8m
7.	RS232 Cable: Shielded, Detachable, 1.8m AC Power Cord: Unshielded, Detachable, 1.8m
8.	Earphone Cable: Unshielded, Undetachable, 1.1m
9.	LAN Cable: Unshielded, Detachable, 1.8m

3.8. Setup Configuration



3.9. Operating Condition of EUT

To Set EUT on RF function under continues transmitting.

3.10. Description of Test Facility

Name of Test Firm	Audix Technology Corporation / EMC Department No. 53-11, Dingfu, Linkou Dist., New Taipei City 244, Taiwan Tel: +886-2-26092133 Fax: +886-2-26099303 Website : www.audixtech.com Contact e-mail: sales@audixtech.com
Accreditations	The laboratory is accredited by following organizations under ISO/IEC 17025:2005 (1) NVLAP(USA) NVLAP Lab Code 200077-0 (2) TAF(Taiwan) No. 1724 (3) FCC OET Designation No. TW1004 & TW1090
Test Facilities	(1) No. 8 Shielding Room (2) Semi-Anechoic Chamber (IC Test Site Registration No.: 5183B-1) (3) Fully Anechoic Chamber (IC Test Site Registration No.: 5183B-4)

3.11. Measurement Uncertainty

Test Item	Frequency Range	Uncertainty
Conduction Test	150kHz~30MHz	±3.50dB
Radiation Test (Distance: 3m)	30MHz~1000MHz	± 3.68dB
	Above 1GHz	± 5.82dB

Remark : Uncertainty = $ku_c(y)$

Test Item	Uncertainty
20dB Bandwidth	± 0.2kHz

4. MEASUREMENT EQUIPMENT LIST

4.1. Conducted Emission Measurement

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
1.	Test Receiver	R&S	ESR3	101774	2017. 02. 07	2018. 02. 06
2.	A.M.N.	R&S	ENV4200	100169	2016. 11. 11	2017. 11. 10
3.	L.I.S.N.	Kyoritsu	KNW-407	8-855-9	2016. 12. 23	2017. 12. 22
4.	Pulse Limiter	R&S	ESH3-Z2	100354	2017. 01. 16	2018. 01. 15
5.	Test Software	Audix	e3	V.6.120424	N.C.R.	N.C.R.

4.2. Radiated Emission Measurement

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
1.	Spectrum Analyzer	Agilent	N9010A-526	MY53400071	2016. 09. 19	2017. 09. 18
2.	Test Receiver	R & S	ESCS30	100338	2016. 06. 22	2017. 06. 21
3.	Amplifier	HP	8447D	2944A06305	2017. 02. 16	2018. 02. 15
4.	Bilog Antenna	TESEQ	CBL6112D	33821	2017. 01. 21	2018. 01. 20
5.	Loop Antenna	R&S	HFH2-Z2	891847/27	2016. 12. 23	2017. 12. 22
6.	Test Software	Audix	e3	V.6.110601	N.C.R.	N.C.R.

4.3. RF Conducted Measurement

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
1.	Spectrum Analyzer	Agilent	N9030A-526	MY53310269	2017. 01. 03	2018. 01. 02

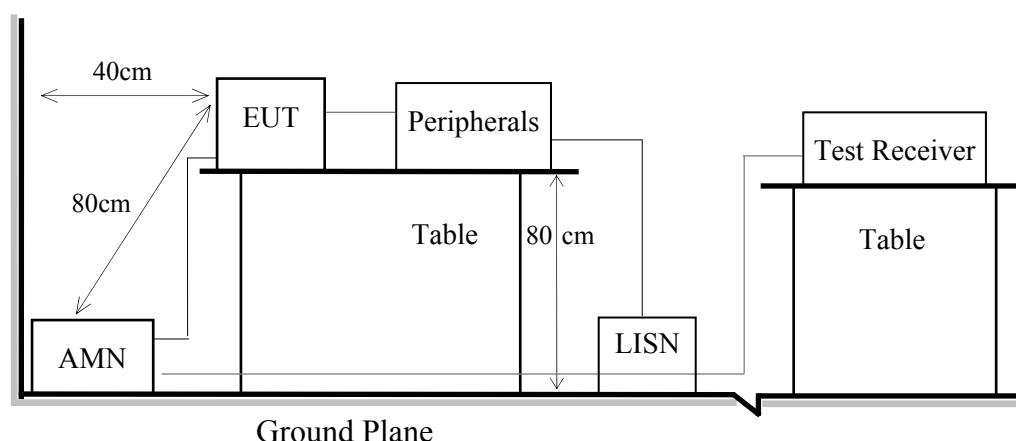
5. CONDUCTED EMISSION

5.1. Block Diagram of Test Setup

5.1.1. Block Diagram of EUT

Indicated as section 3.8

5.1.2. Shielded Room Setup Diagram



5.2. Conducted Emission Limit

Frequency	Conducted Limit	
	Quasi-Peak Level	Average Level
150kHz ~ 500kHz	66 ~ 56 dB μ V	56 ~ 46 dB μ V
500kHz ~ 5MHz	56 dB μ V	46 dB μ V
5MHz ~ 30MHz	60 dB μ V	50 dB μ V

Remark 1.: If the average limit is met when using a Quasi-Peak detector, the measurement using the average detector is not required.

2.: The lower limit applies to the band edges.

5.3. Test Procedure

- 5.3.1. To set up the EUT as indicated in ANSI C 63.10. The EUT was placed on the table which has 80 cm height to the ground and 40 cm distance to the conducting wall.
- 5.3.2. Power supplier of the EUT was connected to the AC mains through an Artificial Mains Network (A.M.N.).
- 5.3.3. The AC power supplies to all peripheral devices must be provided through line impedance stabilization network (L.I.S.N.)
- 5.3.4. Checking frequency range from 150 kHz to 30 MHz and record the emission which does not have 20 dB below limit.

5.4. Test Results

Please refer to Appendix A.

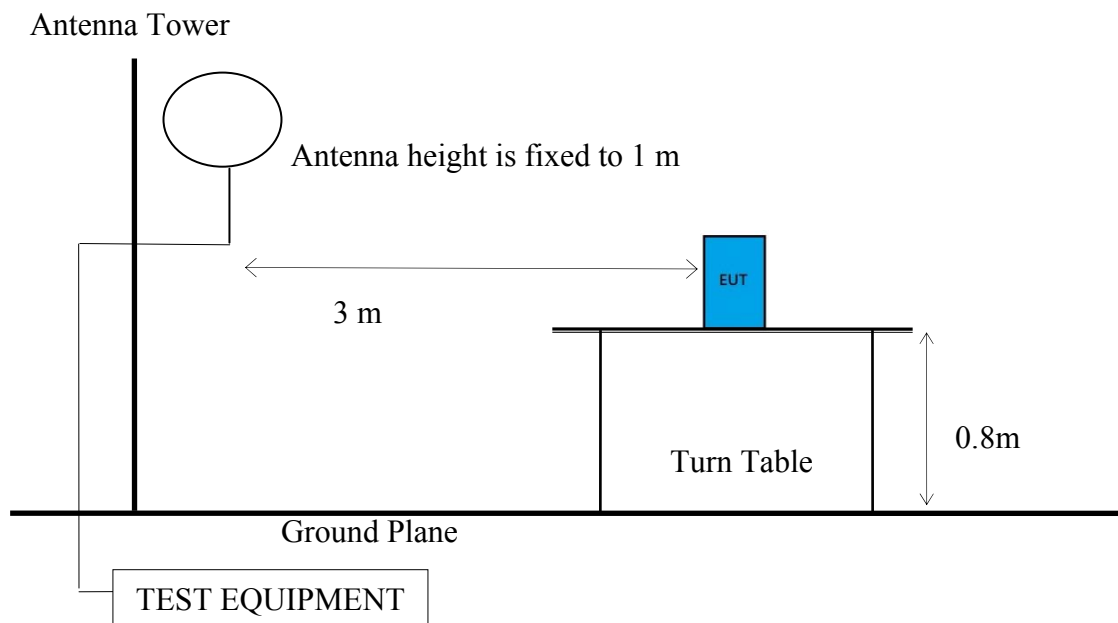
6. RADIATED SPURIOUS EMISSION

6.1. Block Diagram of Test Setup

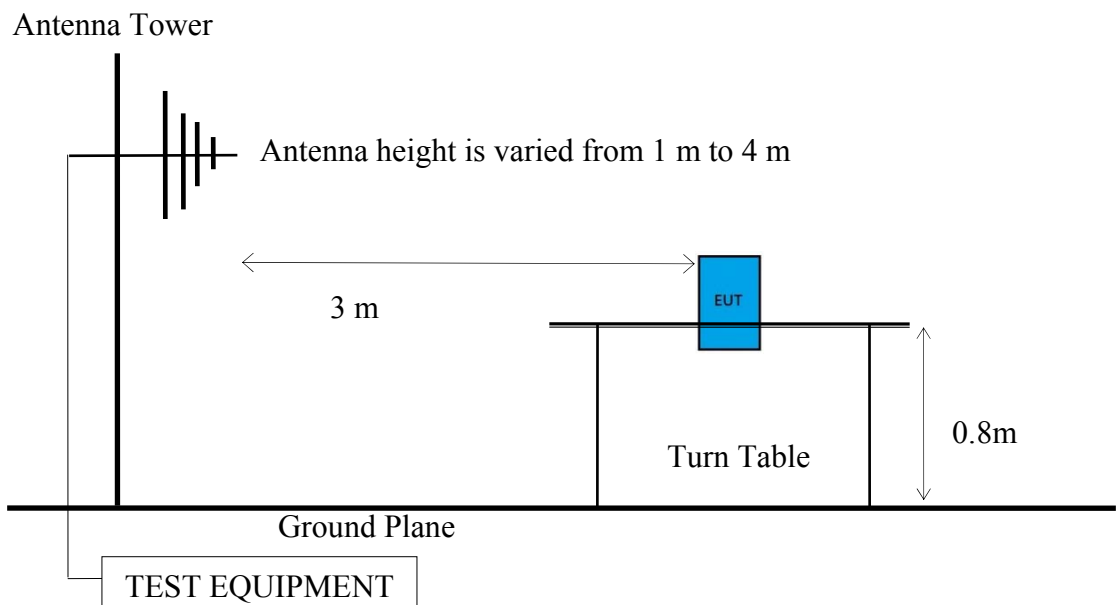
6.1.1. Block Diagram of EUT

Indicated as section 3.8

6.1.2. Setup Diagram for 9kHz-30MHz



6.1.3. Setup Diagram for 30MHz-1000MHz



6.2. Radiated Emission Limits

In any 100kHz bandwidth outside the frequency band, the radio frequency power produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level. In addition, radiated emissions which fall in restricted bands, as defined in Section 15.205 must also comply with the radiated emission limits specified as below.

Frequency (MHz)	Distance (m)	Limits	
		dB μ V/m	μ V/m
0.009 - 0.490	300	67.6	2400/kHz
0.490 - 1.705	30	87.6	24000/kHz
1.705 - 30	30	29.5	30
30 - 88	3	40.0	100
88- 216	3	43.5	150
216- 960	3	46.0	200
Above 960	3	54.0	500
Above 1000	3	74.0 dB μ V/m (Peak) 54.0 dB μ V/m (Average)	

Remark : (1) dB μ V/m = 20 log (μ V/m)

(2) The tighter limit applies to the edge between two frequency bands.

(3) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

(4) Fundamental and emission fall within operation band are exempted from this section.

(5) Pursuant to ANSI C63.10: 6.6.4.3, if the maximized peak measured value complies with the average limit, then it is unnecessary to perform an average measurement.

6.3. Test Procedure

Frequency Range 9kHz~30MHz:

The EUT setup on the turn table which has 0.8 m height to the ground. The turn table rotated 360 degrees and antenna fixed to 1 m to find the maximum emission level.

In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10-2013 regulation.

(1) RBW = 9kHz with peak and average detector.

(2) Detector: average and peak (10kHz-490kHz)

Q.P. (490kHz-30MHz)

Frequency Range 30MHz ~ 1000MHz:

The EUT setup on the turn table which has 0.8 m height to the ground. The turn table rotated 360 degrees and antenna varied from 1 m to 4 m to find the maximum emission level. Both horizontal and vertical polarization are required. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10: 2013 regulation.

Spectrum Analyzer is used for pre-testing with following setting:

- (1) RBW = 120KHz
- (2) VBW $\geq 3 \times$ RBW.
- (3) Detector = Peak.
- (4) Sweep time = auto.
- (5) Trace mode = max hold.
- (6) Allow sweeps to continue until the trace stabilizes.
- (7) When peak-detected value is lower than limit that the measurement using the Q.P. detector is not required. Otherwise using Q.P. for finally measurement.

6.4. Measurement Limit Formula

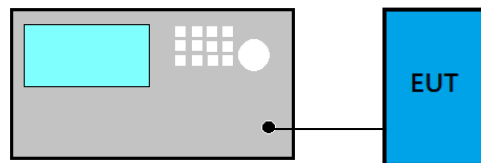
Frequency (MHz)	Formula
0.009 - 0.490MHz	3 Limit (dB μ V/m) = $20\log(2400/F^{\text{Note}}) + 40\log(300\text{m}/3\text{m})$
0.490 - 1.705MHz	3 Limit (dB μ V/m) = $20\log(24000/F^{\text{Note}}) + 40\log(300\text{m}/3\text{m})$
1.750- 30MHz	3 Limit (dB μ V/m) = $20\log(30) + 40\log(300\text{m}/3\text{m})$
Note: F is test frequency	

6.5. Test Results

Please refer to Appendix A.

7. 20dB BANDWIDTH

7.1. Block Diagram of Test Setup



7.2. Specification Limits

The 20dB bandwidth shall be specified in operating frequency band.

7.3. Test Procedure

Following measurement procedure:

- (1) Set RBW close to 1% of OBW.
- (2) Set the video bandwidth (VBW) $\geq 3 \times \text{RBW}$.
- (3) Detector = Peak.
- (4) Trace mode = max hold.
- (5) Sweep = auto couple.
- (6) Allow the trace to stabilize.
- (7) Setting channel bandwidth function x dB to -20 dB to record the final bandwidth.

7.4. Test Results

Please refer to Appendix A

8. DEVIATION TO TEST SPECIFICATIONS

【NONE】



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APPENDIX A

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APPENDIX A

TEST DATA AND PLOTS

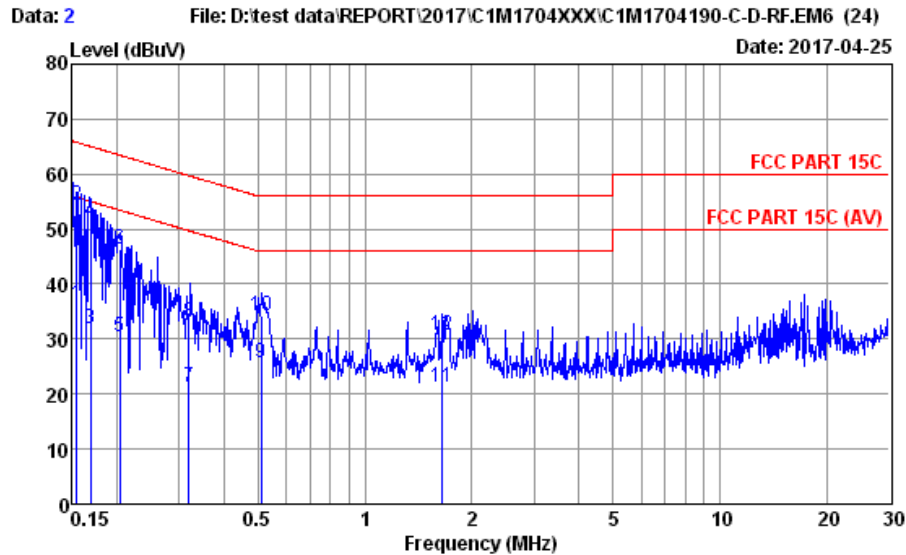
(Model: WCPTI-S)

TABLE OF CONTENTS

A.1 CONDUCTED EMISSION.....	2
A.2 RADIATED SPURIOUS EMISSION	4
A.3 20dB BANDWIDTH	6

A.1 CONDUCTED EMISSION

Test Date	2017/04/25	Temp./Hum.	23°C/56%
Test Voltage	DC 19V (Via Personal Computer)		

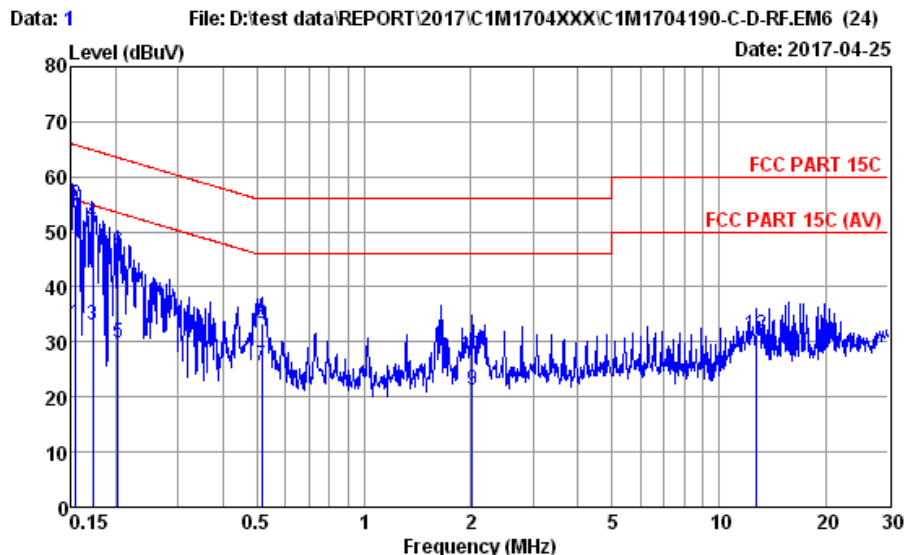


Site no. : No.8 Shielded Room Data no. : 2
Condition : ENV4200 100169 LISN Phase : NEUTRAL
Limit : FCC PART 15C
Env. / Ins. : 23°C / 56% ESR3 (1774) Engineer : Jemy
EUT : WCPTI-S
Power Rating : DC 19V (via PC)
Test Mode : Operating

	Freq. (MHz)	AMN Factor (dB)	Cable Loss (dB)	Pulse Att. (dB)	Reading (dBμV)	Emission Level (dBμV)	Limits (dBμV)	Margin (dB)	Remark
1	0.154	11.49	0.03	9.86	14.87	36.25	55.78	19.53	Average
2	0.154	11.49	0.03	9.86	32.85	54.23	65.78	11.55	QP
3	0.169	11.42	0.03	9.86	10.70	32.01	55.03	23.02	Average
4	0.169	11.42	0.03	9.86	29.93	51.24	65.03	13.79	QP
5	0.204	11.28	0.03	9.86	9.11	30.28	53.45	23.17	Average
6	0.204	11.28	0.03	9.86	25.14	46.31	63.45	17.14	QP
7	0.320	11.13	0.04	9.86	0.25	21.28	49.72	28.44	Average
8	0.320	11.13	0.04	9.86	12.15	33.18	59.72	26.54	QP
9	0.510	11.04	0.05	9.86	4.66	25.61	46.00	20.39	Average
10	0.510	11.04	0.05	9.86	13.38	34.33	56.00	21.67	QP
11	1.656	11.05	0.07	9.86	0.29	21.27	46.00	24.73	Average
12	1.656	11.05	0.07	9.86	9.66	30.64	56.00	25.36	QP

Remarks: 1. Emission Level= AMN Factor + Cable Loss + Pulse Att. + Reading.
2. If the average limit is met when using a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.

Test Date	2017/04/25	Temp./Hum.	23°C/52%
Test Voltage	DC 19V (Via Personal Computer)		



Site no. : No.8 Shielded Room Data no. : 1
Condition : ENV4200 100169 LISN Phase : LINE
Limit : FCC PART 15C
Env. / Ins. : 23°C / 56% ESR3 (1774) Engineer : Jemy
EUT : WCPTI-S
Power Rating : DC 19V (via PC)
Test Mode : Operating

	Freq. (MHz)	AMN Factor (dB)	Cable Loss (dB)	Pulse Att. (dB)	Reading (dBμV)	Emission Level (dBμV)	Limits (dBμV)	Margin (dB)	Remark
1	0.154	10.79	0.03	9.86	12.78	33.46	55.78	22.32	Average
2	0.154	10.79	0.03	9.86	34.22	54.90	65.78	10.88	QP
3	0.172	10.77	0.03	9.86	12.29	32.95	54.85	21.90	Average
4	0.172	10.77	0.03	9.86	30.88	51.54	64.85	13.31	QP
5	0.203	10.75	0.03	9.86	9.12	29.76	53.49	23.73	Average
6	0.203	10.75	0.03	9.86	25.72	46.36	63.49	17.13	QP
7	0.516	10.62	0.05	9.86	5.27	25.80	46.00	20.20	Average
8	0.516	10.62	0.05	9.86	12.89	33.42	56.00	22.58	QP
9	2.023	10.59	0.08	9.86	0.87	21.40	46.00	24.60	Average
10	2.023	10.59	0.08	9.86	6.82	27.35	56.00	28.65	QP
11	12.716	11.93	0.22	9.89	6.75	28.79	50.00	21.21	Average
12	12.716	11.93	0.22	9.89	9.36	31.40	60.00	28.60	QP

Remarks: 1. Emission Level= AMN Factor + Cable Loss + Pulse Att. + Reading.
2. If the average limit is met when using a quasi-peak detector,
the EUT shall be deemed to meet both limits and measurement
with average detector is unnecessary.

A.2 RADIATED SPURIOUS EMISSION

Test Date	2017/05/16	Temp./Hum.	24°C/55%
Test Voltage	DC 19V (Via Personal Computer)		
Test Frequency	TX 115.6kHz		

A.2.1. Frequency 9kHz~30MHz

Antenna at 0 Degree

Test Frequency (MHz)	Test Result (dBμV/m at 3m)	Limits (dBμV/m at 3m)	Margin (dB)	Detector
0.1156	83.90	126.345	42.445	Peak
0.1156	83.60	106.345	22.745	Average
0.3468	64.60	116.802	52.202	Peak
0.3468	64.00	96.802	32.802	Average
0.5780	54.90	72.365	17.465	QP
0.8092	48.80	69.882	21.082	QP
1.0404	44.40	67.260	22.860	QP

Antenna at 90 Degree

Test Frequency (MHz)	Test Result (dBμV/m at 3m)	Limits (dBμV/m at 3m)	Margin (dB)	Detector
0.1156	80.20	126.345	42.445	Peak
0.1156	80.00	106.345	22.745	Average
0.3468	61.30	116.802	52.202	Peak
0.3468	60.70	96.802	32.802	Average
0.5780	56.90	72.365	17.465	QP
0.8092	49.90	69.882	21.082	QP
1.0404	40.90	67.260	22.860	QP

Note: 1. All emissions are lower than the ambient level cannot be measured.

2. The Peak value has been compliance with Q.P. limit, thus measurement with Q.P. is not needed.

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A.2.2. Frequency 30MHz ~ 1000MHz

Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dB μ V)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Detector
30.00	24.78	1.20	0.68	26.66	40.00	13.34	Peak
101.78	17.38	2.29	5.73	25.40	43.50	18.10	Peak
729.37	25.94	7.24	2.06	35.24	46.00	10.76	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dB μ V)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Detector
30.97	24.28	1.22	11.26	36.76	40.00	3.24	Peak
113.42	18.28	2.43	6.93	27.64	43.50	15.86	Peak
623.64	24.97	6.83	4.02	35.82	46.00	10.18	Peak

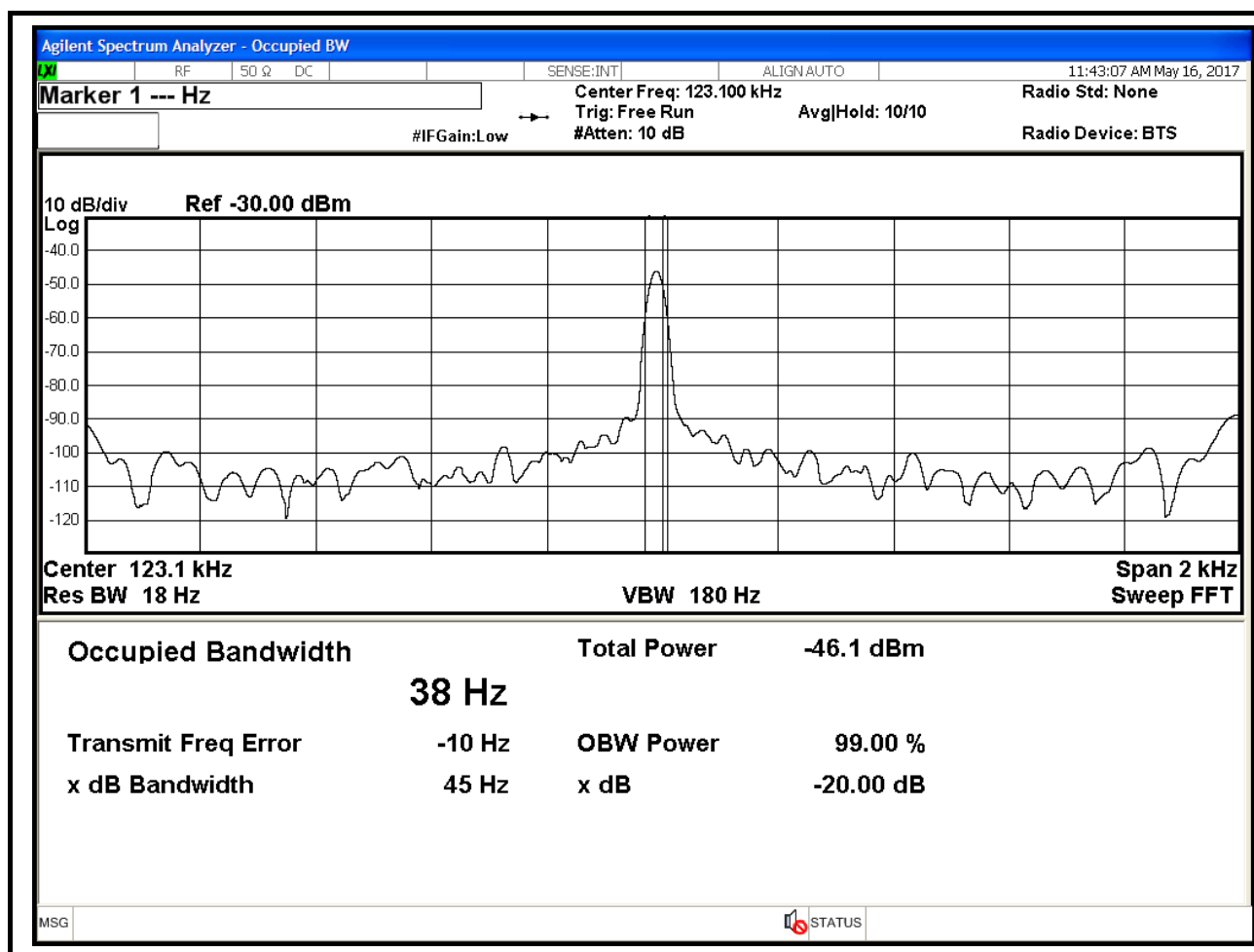
A.3 20dB BANDWIDTH

Test Date	2017/05/16	Temp./Hum.	24°C/55%
Cable Loss	N/A	Test Voltage	DC 19V (Via Personal Computer)

A.4.1.1 20dB Bandwidth Result

Centre Frequency (kHz)	20 dB Bandwidth (Hz)
123.1	45

A.4.1.2 Measurement Plots





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APPENDIX B

TEST PHOTOGRAPHS

(Model: WCPTI-S)