



SGS-CSTC Standards Technical Services Co., Ltd.
Guangzhou Branch

Report No.: GZEM200501243701

Page: 1 of 18

FCC ID: PX8IRCU-C414

TEST REPORT

Application No.: GZEM2005012437CR
Applicant: Comba Telecom Ltd.
Address of Applicant: 611 East Wing, No. 8 Science Park West Avenue, Hong Kong Science Park, Tai Po, Hong Kong
Manufacturer: Comba Telecom Systems(China) Ltd.
Address of Manufacturer: No.10 Shenzhou Road, Guangzhou Science City, Guangzhou 510630, Guangdong, P.R. China
Factory: Comba Telecom Technology(Guangzhou) Ltd.
Address of Factory: No.6 Jinbi Road, Economics and Technology Development District, Guangzhou, Guangdong, China
Equipment Under Test (EUT):
EUT Name: Internal Remote Control Unit
FCC ID: PX8IRCU-C414
Model No.: IRCU-C414
Trade Mark: Comba
Standard(s) : 47 CFR Part 15, Subpart B
Date of Receipt: 2020-05-18
Date of Test: 2020-05-19 to 2020-05-22
Date of Issue: 2020-06-01

Test Result:	Pass*
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* In the configuration tested, the EUT complied with the standards specified above.

Kobe Jian
EMC Laboratory Manager



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Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2020-06-01		Original

Authorized for issue by:			
Tested By	 Lily_Kuang /Project Engineer	2020-05-19 to 2020-05-22 Date	
Checked By	 Ricky_Liu /Reviewer	2020-06-01 Date	



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2 Test Summary

Emission Part				
Item	Standard	Method	Requirement	Result
Conducted Emissions at Mains Terminals (150kHz-30MHz)	47 CFR Part 15, Subpart B	ANSI C63.4	Class B	Pass
Radiated Emissions (30MHz-1GHz)	47 CFR Part 15, Subpart B	ANSI C63.4:2014	Class B	Pass
Radiated Emissions (above 1GHz)	47 CFR Part 15, Subpart B	ANSI C63.4:2014	Class B	Pass

InternalSource	UpperFrequency
Below 1.705MHz	30MHz
1.705MHz to 108MHz	1GHz
108MHz to 500MHz	2GHz
500MHz to 1GHz	5GHz
Above 1GHz	5th harmonic of the highest frequency or 40GHz, whichever is lower



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4 General Information

4.1 Details of E.U.T.

Power Supply: DC 10-30V
 Test Voltage: AC 120V,60Hz powered by DC power supply refer to section 4.2 with output DC 24V (the worst case during the pretesting from DC 10-30V)
 Max Internal Source: 120 MHz
 Cable: About 3m×8wires unshielded cable supplied by client for supporting test.

4.2 Description of Support Units

Description	Manufacturer	Model No.	SN/Certificate NO
Mouse	DELL	MOC5UO	G1B02ZP5
Mouse	DELL	M-WDEL1	OT0943
NoteBook	Apple	A1370	C02GR7BPDJYD
DC Power supply(EMC 0008)	Instek	PS-6010	L9905E037.11

4.3 Product Description

Internal control unit IRCU-C414 support 3~4 E-tilt antennas.

4.4 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Conducted Disturbance Voltage at Mains Terminals	3.63dB (9kHz to 150kHz)
		3.22dB (150kHz to 30MHz)
2	Disturbance Power	3.78dB
3	Radiated Emissions	5.0dB (30MHz-1GHz)
		5.0dB (1GHz-6GHz)
4	Temperature	0.4 °C
5	Humidity	1.3%
6	DC power	0.5 %

4.5 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou Branch EMC Laboratory,
 198 Kezhu Road, Sciencetech Park, Guangzhou Economic & Technology Development District,
 Guangzhou, China 510663

Tel: +86 20 82155555 Fax: +86 20 82075059

No tests were sub-contracted.



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4.6 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

● NVLAP (Lab Code: 200611-0)

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP/NIST). NVLAP Code: 200611-0.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

● ACMA

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our NVLAP accreditation.

● SGS UK(Certificate No.: 32), SGS-TUV SAARLAND and SGS-FIMKO

Have approved SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory as a supplier of EMC TESTING SERVICES and SAFETY TESTING SERVICES.

● CNAS (Lab Code: L0167)

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been assessed and in compliance with CNAS-CL01:2006 accreditation criteria for testing laboratories (identical to

ISO/IEC 17025:2005 General Requirements) for the Competence of Testing Laboratories.

● FCC Recognized 2.948 Listed Test Firm(Registration No.: 282399)

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 282399, May 31, 2002.

● FCC Recognized Accredited Test Firm(Registration No.: 486818)

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been accredited and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Designation Number: CN5016, Test Firm Registration Number: 486818, Jul 13, 2017.

● Industry Canada (Registration No.: 4620B-1)

The 3m/10m Alternate Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd., has been registered by Certification and Engineering of Industry Canada for radio equipment testing with Registration No. 4620B-1.

● VCCI (Registration No.: R-2460, C-2584, G-449 and T-1179)

The 10m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-2460, C-2584, G-449 and T-1179 respectively.

● CBTL (Lab Code: TL129)

SGS-CSTC Standards Technical Services Co., Ltd., E&E Laboratory has been assessed and fully comply with the requirements of ISO/IEC 17025:2005, the Basic Rules, IECEE 01 and Rules of procedure IECEE 02, and the relevant IECEE CB-Scheme Operational documents.



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4.7 Deviation from Standards

None

4.8 Abnormalities from Standard Conditions

None



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5 Equipment List

Conducted Emissions at Mains Terminals (150kHz-30MHz)					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Shielding Room	ChangZhou ZhongYu	8m x 3m x 3.8m	EMC0306	N/A	N/A
Two-Line V-Netwok	Rohde & Schwarz	ENV216	EMC0118	2020-01-10	2021-01-09
LISN	Rohde & Schwarz	ENV216	EMC2135	2019-09-16	2020-09-15
EMI Test Receiver	Rohde & Schwarz	ESCS30	EMC0506	2019-11-18	2020-11-17
Coaxial Cable	HangTianXing	2m	EMC0107	2018-09-20	2020-09-19
Voltage Probe	SGS-EMC	N/A	EMC0106	2019-05-10	2021-05-09
Conical Metal Housing	SGS-EMC	N/A	EMC0167	2020-04-19	2022-04-18
Test Software E3c	Audix	Ver. 5.4.1221b	GZE100-62	N/A	N/A

Radiated Emissions (30MHz-1GHz)					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
EMI Test Receiver	Rohde & Schwarz	ESIB26	EMC0522	2020-01-10	2021-01-09
EMI Test Receiver	Rohde & Schwarz	ESCI	EMC0056	2020-01-10	2021-01-09
Chamber cable	HangTianXing	N/A	EMC0542	2019-06-28	2021-06-27
Trilog Broadband Antenna 25MHz-1GHz	SCHWARZBECKME SS-ELEKTRONIK	VULB 9168	EMC2174	2018-09-06	2021-09-05
Trilog Broadband Antenna 30MHz-1GHz	SCHWARZBECKME SS-ELEKTRONIK	VULB 9168	SEM003-18	2019-02-22	2022-02-22
Bi-log Type Antenna	Schaffner Chase	CBL6143	EMC0519	2017-06-01	2020-05-31
Horn Antenna 1GHz-18GHz	Rohde & Schwarz	HF906	EMC0518	2018-09-02	2021-09-01
1GHz-26.5 GHz Pre-Amplifier	Agilent	8449B	EMC0521	2020-01-10	2021-01-09
Amplifier	HP	8447F	EMC2065	2019-05-29	2020-05-28
Pre-Amplifier MH648A	ANRITSU CORP	MH648A	EMC2086	2019-11-18	2020-11-17
Active Loop Antenna	ETS-Lindgren	6502	EMC2190	2019-12-27	2021-12-26
High Pass Filter(915MHz)	FSY MICROWAVE	HM1465-9SS	EMC2079	2020-01-10	2021-01-09
2.4GHz Filter	Micro-Tronics	BRM 50702	EMC2069	2020-01-10	2021-01-09
10m Semi-Anechoic Chamber	ETS	N/A	EMC0530	2019-10-20	2022-10-19
966 Anechoic Chamber	C.R.T	9m x 6m x 6m	EMC2142	2017-12-19	2020-12-18
MXE EMI Receiver	Keysight	N9038A	EMC2139	2019-11-18	2020-11-17



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EXA Signal Analyzer	Keysight	N9010A	EMC2138	2019-11-18	2020-11-17
Test Software E3	Audix	Ver.6.120110a	GZE100-61	N/A	N/A

Radiated Emissions (above 1GHz)					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
EMI Test Receiver	Rohde & Schwarz	ESIB26	EMC0522	2020-01-10	2021-01-09
EMI Test Receiver	Rohde & Schwarz	ESCI	EMC0056	2020-01-10	2021-01-09
Chamber cable	HangTianXing	N/A	EMC0542	2019-06-28	2021-06-27
Trilog Broadband Antenna 25MHz-1GHz	SCHWARZBECKME SS-ELEKTRONIK	VULB 9168	EMC2174	2018-09-06	2021-09-05
Trilog Broadband Antenna 30MHz-1GHz	SCHWARZBECKME SS-ELEKTRONIK	VULB 9168	SEM003-18	2019-02-22	2022-02-22
Bi-log Type Antenna	Schaffner Chase	CBL6143	EMC0519	2017-06-01	2020-05-31
Horn Antenna 1GHz-18GHz	Rohde & Schwarz	HF906	EMC0518	2018-09-02	2021-09-01
1GHz-26.5 GHz Pre-Amplifier	Agilent	8449B	EMC0521	2020-01-10	2021-01-09
Amplifier	HP	8447F	EMC2065	2019-05-29	2020-05-28
Pre-Amplifier MH648A	ANRITSU CORP	MH648A	EMC2086	2019-11-18	2020-11-17
Active Loop Antenna	ETS-Lindgren	6502	EMC2190	2019-12-27	2021-12-26
High Pass Filter(915MHz)	FSY MICROWAVE	HM1465-9SS	EMC2079	2020-01-10	2021-01-09
2.4GHz Filter	Micro-Tronics	BRM 50702	EMC2069	2020-01-10	2021-01-09
10m Semi-Anechoic Chamber	ETS	N/A	EMC0530	2019-10-20	2022-10-19
966 Anechoic Chamber	C.R.T	9m x 6m x 6m	EMC2142	2017-12-19	2020-12-18
MXE EMI Receiver	Keysight	N9038A	EMC2139	2019-11-18	2020-11-17
EXA Signal Analyzer	Keysight	N9010A	EMC2138	2019-11-18	2020-11-17
Test Software E3	Audix	Ver.6.120110a	GZE100-61	N/A	N/A

General used equipment					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
DMM	Fluke	73	EMC0006	2019-07-16	2020-07-15
DMM	Fluke	73	EMC0007	2019-07-16	2020-07-15



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6 Emission Test Results

6.1 Conducted Emissions at Mains Terminals (150kHz-30MHz)

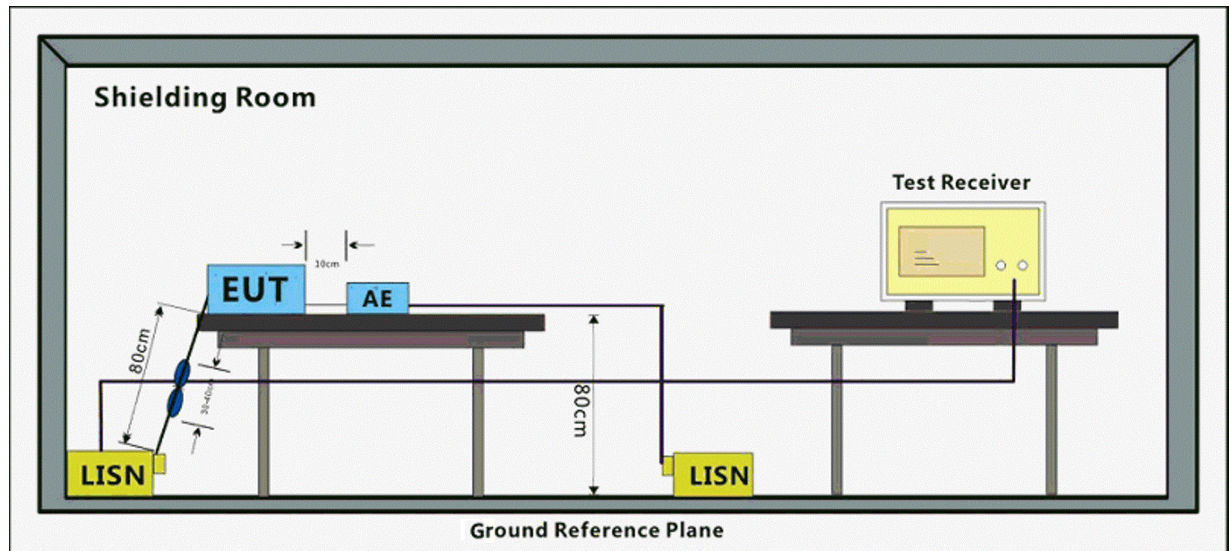
Test Requirement:	47 CFR Part 15, Subpart B
Test Method:	ANSI C63.4
Frequency Range:	150kHz to 30MHz
Limit:	
0.15M-0.5MHz	66dB(μV)-56dB(μV) quasi-peak, 56dB(μV)-46dB(μV) average
0.5M-5MHz	56dB(μV) quasi-peak, 46dB(μV) average
5M-30MHz	60dB(μV) quasi-peak, 50dB(μV) average
Detector:	Peak for pre-scan (9kHz resolution bandwidth) 0.15M to 30MHz

6.1.1 E.U.T. Operation

Operating Environment:

Temperature: 25.1 °C Humidity: 58.8 % RH Atmospheric Pressure: 1020 mbar
Test mode a: Normal working_Keep the EUT continuously running via PC control.

6.1.2 Test Setup Diagram

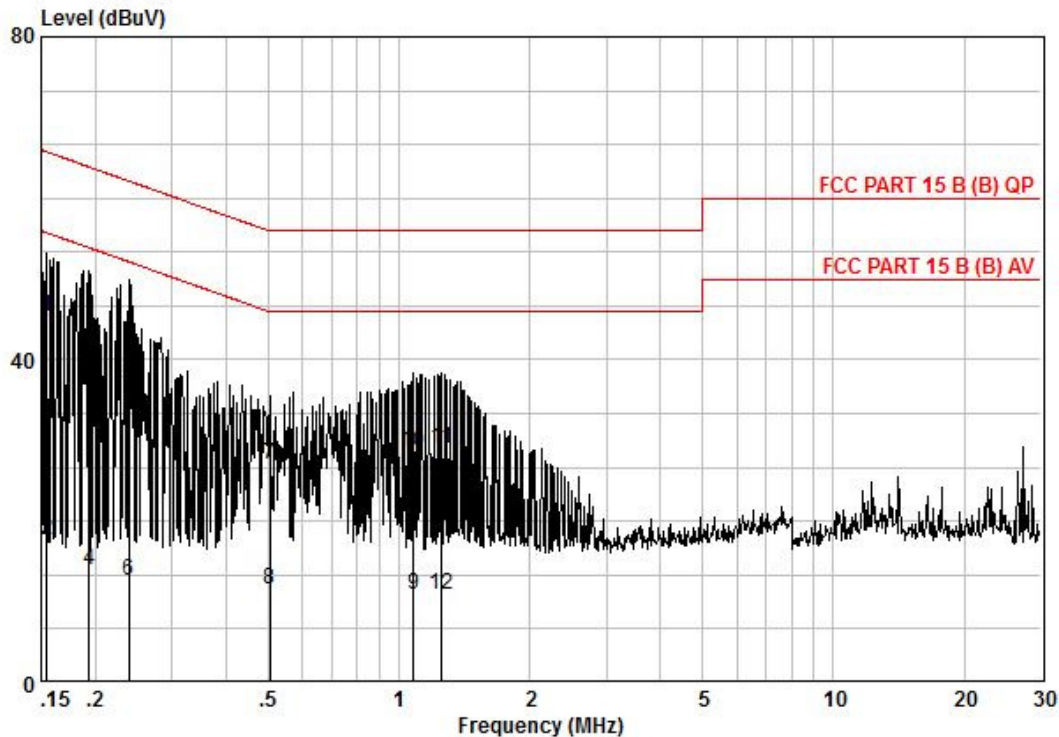


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6.1.3 Measurement Data

An initial pre-scan was performed with peak detector. Quasi-Peak or Average measurement were performed at the frequencies with maximized peak emission were detected.

Mode:a; Line:Live Line



Pol :LIVE
No :
Model :

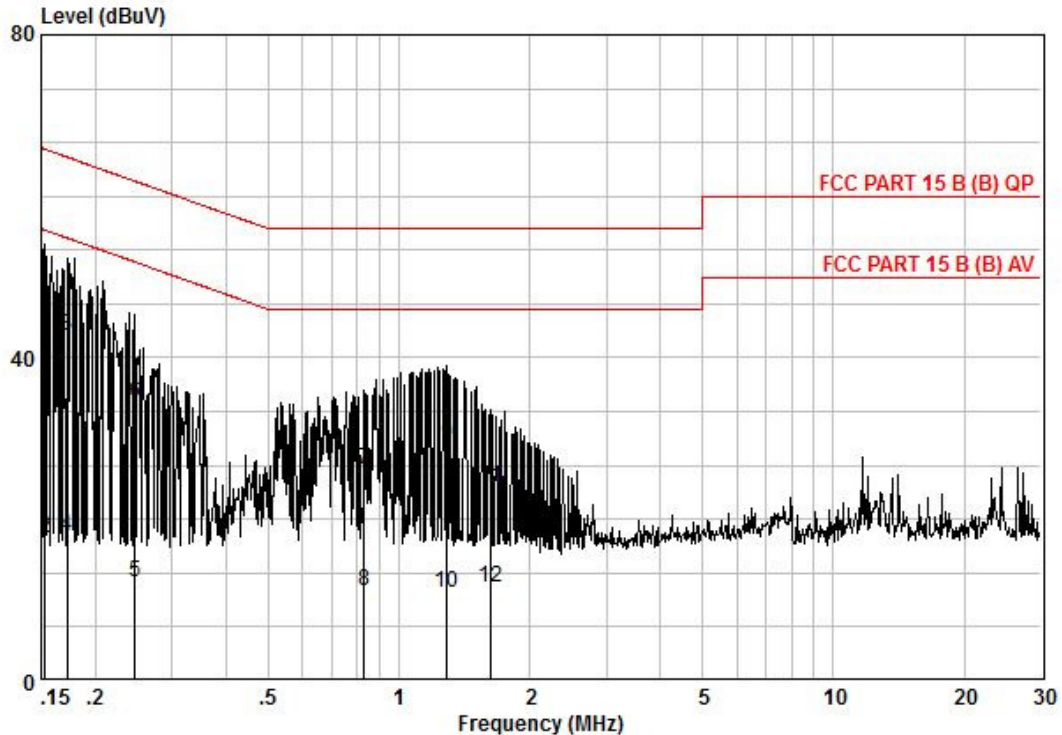
Frequency MHz	read level dBuV	Cable Loss dB	LISN Factor dB	Measured level dBuV	Limit dBuV	Over limit dB	Remark
0.15	35.83	0.10	9.48	45.41	65.74	-20.33	QP
0.15	7.97	0.10	9.48	17.55	55.74	-38.19	AVERAGE
0.19	29.64	0.10	9.60	39.34	63.89	-24.55	QP
0.19	4.29	0.10	9.60	13.99	53.89	-39.90	AVERAGE
0.24	27.01	0.12	9.63	36.76	62.13	-25.37	QP
0.24	2.96	0.12	9.63	12.71	52.13	-39.42	AVERAGE
0.50	17.09	0.20	9.65	26.94	56.00	-29.06	QP
0.50	1.75	0.20	9.65	11.60	46.00	-34.40	AVERAGE
1.08	1.02	0.30	9.63	10.95	46.00	-35.05	AVERAGE
1.08	18.53	0.30	9.63	28.46	56.00	-27.54	QP
1.26	19.03	0.30	9.62	28.95	56.00	-27.05	QP
1.26	1.04	0.30	9.62	10.96	46.00	-35.04	AVERAGE



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Mode:a; Line:Neutral Line



Pol : NEUTRAL
No :
Model :

Frequency MHz	read level dBuV	Cable Loss dB	LISN Factor dB	Measured level dBuV	Limit Line dBuV	Over limit dB	Remark
0,15	37,10	0,10	9,39	46,59	65,82	-19,23	QP
0,15	8,13	0,10	9,39	17,62	55,82	-38,20	AVERAGE
0,17	33,16	0,10	9,48	42,74	64,86	-22,11	QP
0,17	8,38	0,10	9,48	17,96	54,86	-36,89	AVERAGE
0,25	2,60	0,12	9,58	12,30	51,86	-39,56	AVERAGE
0,25	24,71	0,12	9,58	34,41	61,86	-27,45	QP
0,83	16,26	0,27	9,59	26,12	56,00	-29,88	QP
0,83	1,17	0,27	9,59	11,03	46,00	-34,97	AVERAGE
1,29	19,34	0,30	9,56	29,20	56,00	-26,80	QP
1,29	1,01	0,30	9,56	10,87	46,00	-35,13	AVERAGE
1,63	14,19	0,33	9,54	24,06	56,00	-31,94	QP
1,63	1,63	0,33	9,54	11,50	46,00	-34,50	AVERAGE



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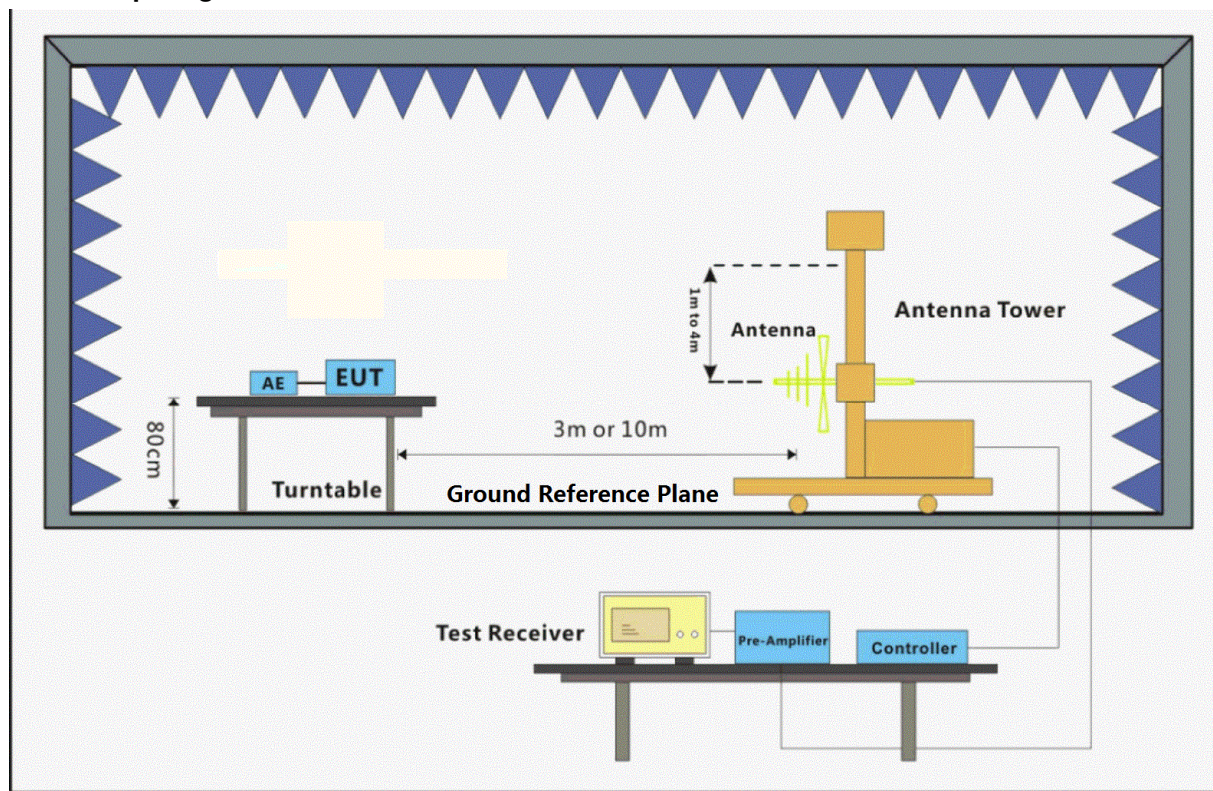
6.2 Radiated Emissions

Test Requirement: 47 CFR Part 15, Subpart B
Test Method: ANSI C63.4
Frequency Range: 30MHz to 1GHz
Measurement Distance: 10m
Limit:
30MHz -88MHz 29.5(dB μ V/m) quasi-peak
88MHz-216MHz 33.1 (dB μ V/m) quasi-peak
216MHz-960MHz 35.6 (dB μ V/m) quasi-peak
960MHz-1000MHz 43.5 (dB μ V/m) quasi-peak
Detector: Peak for pre-scan (120kHz resolution bandwidth) 30M to1000MHz

6.2.1 E.U.T. Operation

Operating Environment:
Temperature: 23 °C Humidity: 55 % RH Atmospheric Pressure: 1020 mbar
Test mode a: Normal working_Keep the EUT continuously running via PC control.

6.2.2 Test Setup Diagram



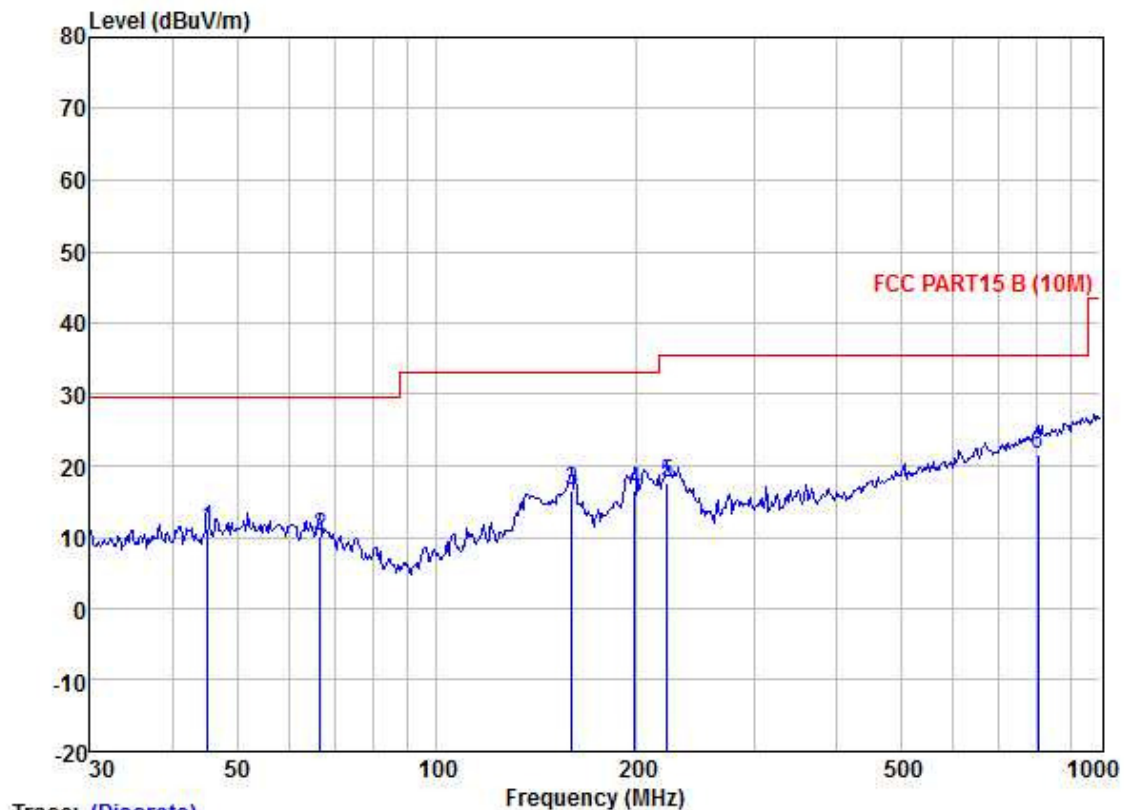
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6.2.3 Measurement Procedure and Data

An initial pre-scan was performed in the chamber using the spectrum analyser in peak detection mode. Quasi-peak measurements were conducted based on the peak sweep graph. The EUT was measured by BiConiLog antenna with 2 orthogonal polarities.

Level=Read Level + Antenna Factor + Cable Loss - Preamp Factor

Mode:a; Polarization:Horizontal



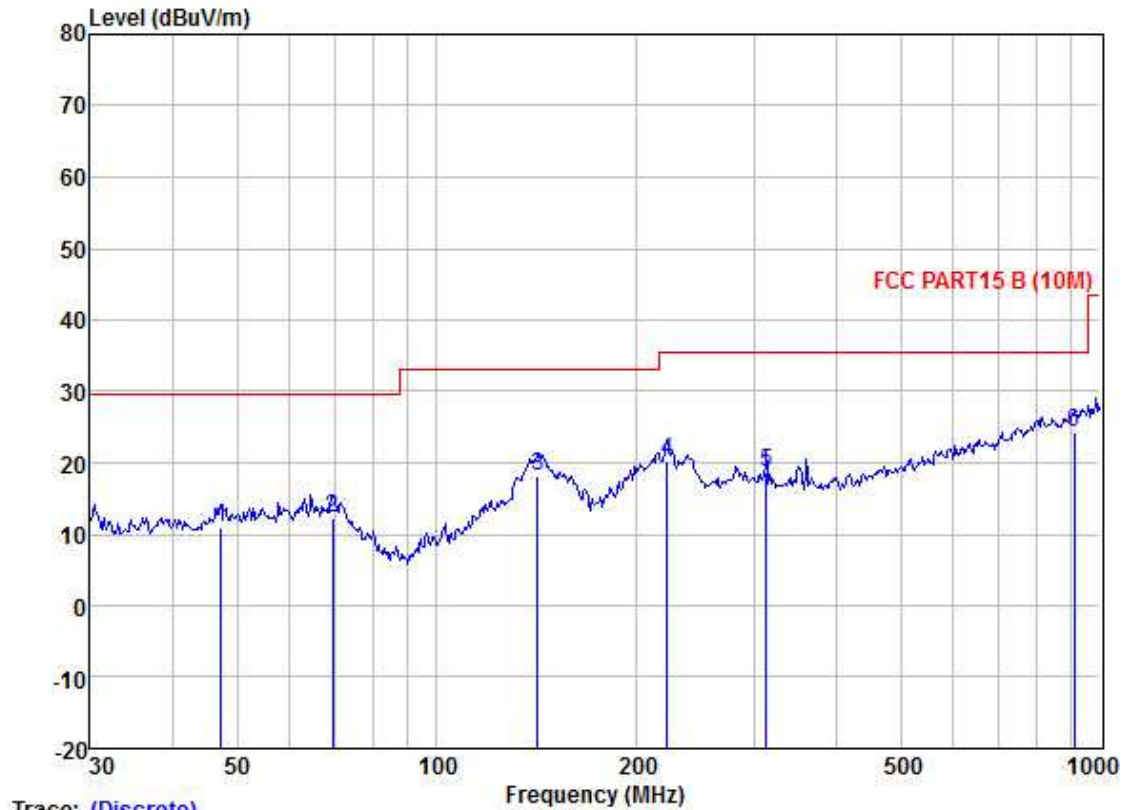
	Freq	Read	Antenna	Cable	Preamp	Limit	Over		
	MHz	Level	Factor	Loss	Factor	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	45.058	23.94	13.48	0.70	27.00	11.12	29.50	-18.38	HORIZONTAL QP
2	66.733	23.79	12.47	0.83	27.00	10.09	29.50	-19.41	HORIZONTAL QP
3	159.784	28.58	13.40	1.33	26.74	16.57	33.10	-16.53	HORIZONTAL QP
4	198.588	31.56	10.18	1.50	26.60	16.64	33.10	-16.46	HORIZONTAL QP
5	222.170	32.37	10.15	1.58	26.49	17.61	35.60	-17.99	HORIZONTAL QP
6	804.603	23.93	22.33	3.00	27.72	21.54	35.60	-14.06	HORIZONTAL QP



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Mode:a; Polarization:Vertical



Trace: (Discrete)

	ReadAntenna	Cable	Preamp		Limit	Over			
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	47.326	23.56	13.80	0.70	27.00	11.06	29.50	-18.44	VERTICAL QP
2	69.600	26.32	12.14	0.90	27.00	12.36	29.50	-17.14	VERTICAL QP
3	141.826	30.96	12.75	1.28	26.83	18.16	33.10	-14.94	VERTICAL QP
4	222.170	35.07	10.15	1.58	26.49	20.31	35.60	-15.29	VERTICAL QP
5	313.276	29.72	13.47	1.85	26.41	18.63	35.60	-16.97	VERTICAL QP
6	912.862	25.54	23.10	3.13	27.63	24.14	35.60	-11.46	VERTICAL QP



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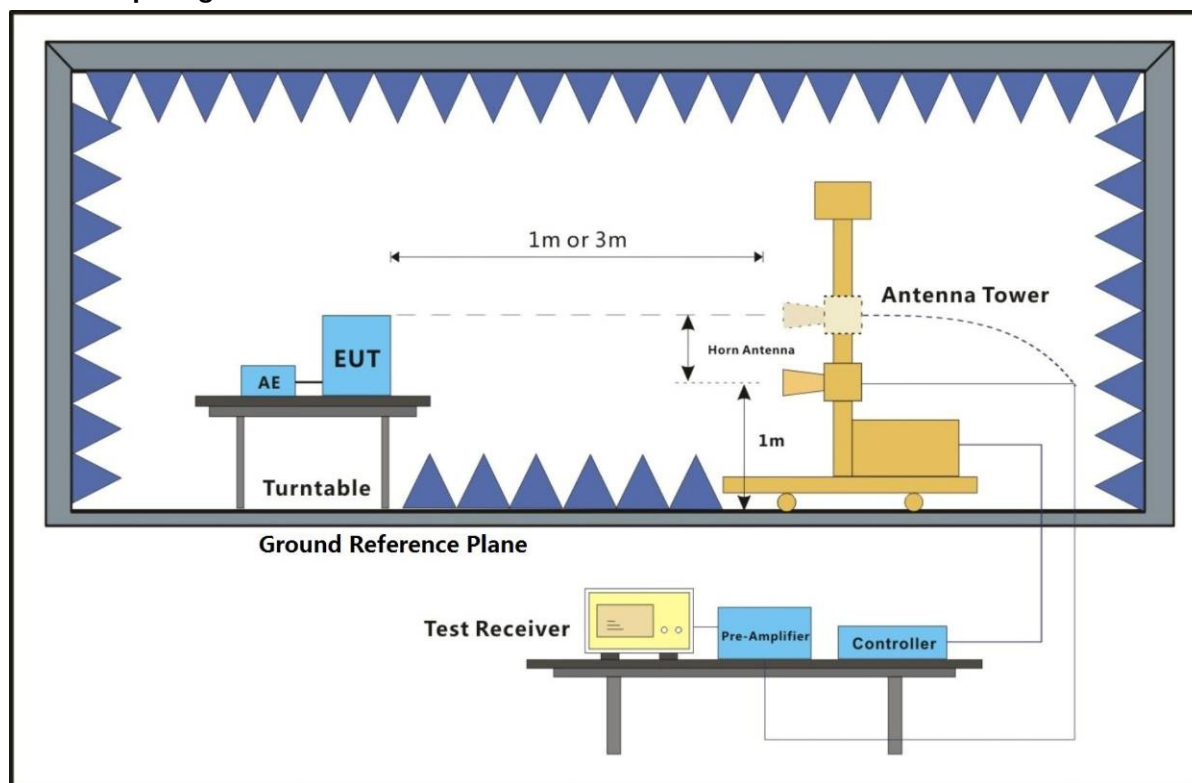
6.3 Radiated Emissions (above 1GHz)

Test Requirement: 47 CFR Part 15, Subpart B
Test Method: ANSI C63.4:2014
Frequency Range: Up to 2 GHz
Measurement Distance: 3m
Limit:
Above 1GHz 74(dBμV/m) peak, 54(dBμV/m) average
Detector: Peak for pre-scan (1000kHz resolution bandwidth) up to 2 GHz

6.3.1 E.U.T. Operation

Operating Environment:
Temperature: 22.6 °C Humidity: 51.7 % RH Atmospheric Pressure: 1020 mbar
Test mode a: Normal working_Keep the EUT continuously running via PC control.

6.3.2 Test Setup Diagram



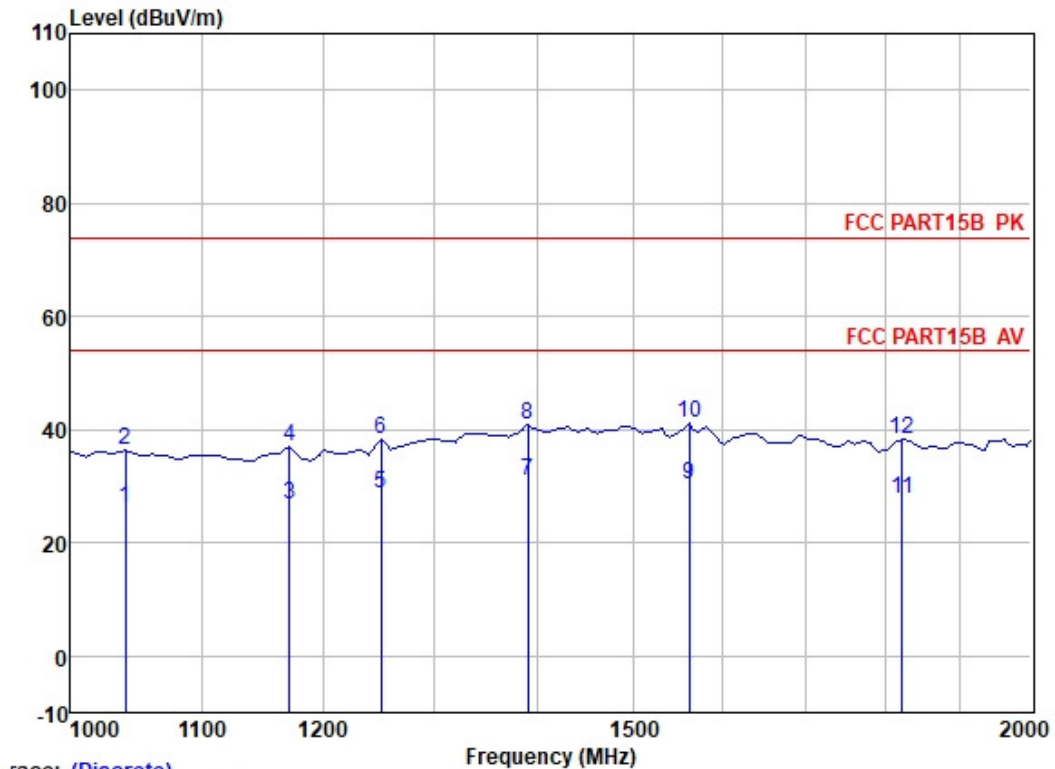
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6.3.3 Measurement Data

An initial pre-scan was performed in the chamber using the spectrum analyser in peak detection mode. Average measurements were conducted based on the peak sweep graph. The EUT was measured by Horn antenna with 2 orthogonal polarities.

Level=Read Level + Antenna Factor + Cable Loss - Preamp Factor

Mode:a; Polarization:Horizontal



Trace: (Discrete)

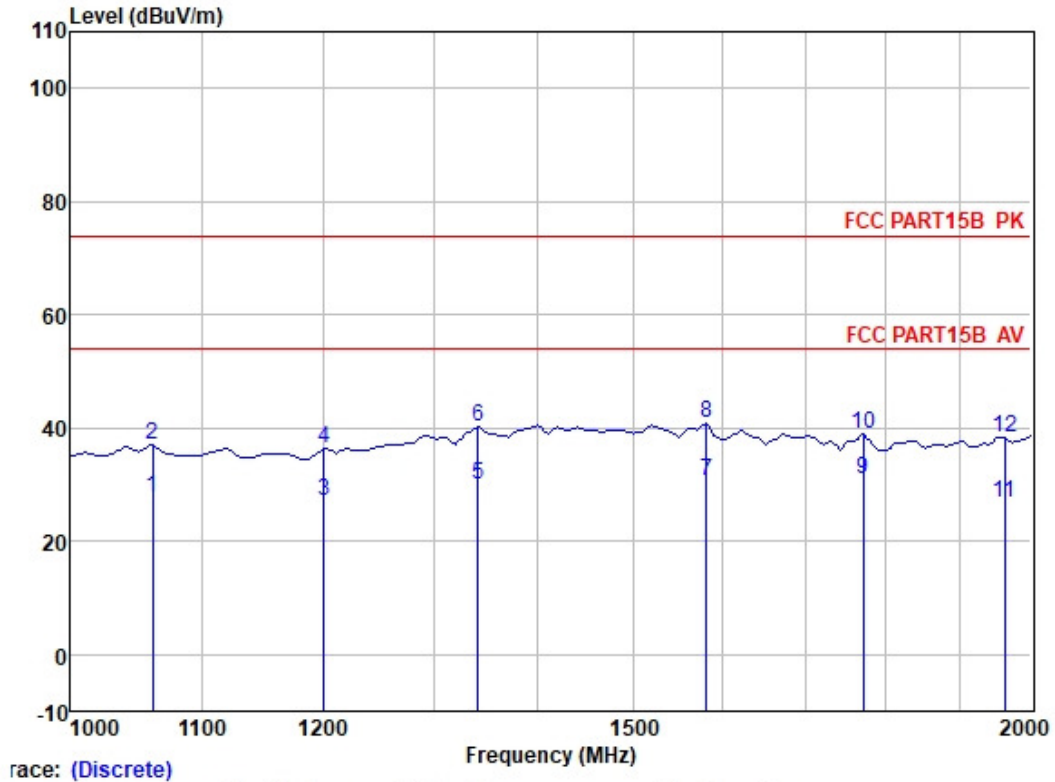
		ReadAntenna		Cable	Preamp		Limit	Over		
	Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1040.206	36.94	24.26	2.37	37.39	26.18	54.00	-27.82	HORIZONTAL	Average
2	1040.206	47.05	24.26	2.37	37.39	36.29	74.00	-37.71	HORIZONTAL	Peak
3	1170.785	37.16	24.56	2.39	37.36	26.75	54.00	-27.25	HORIZONTAL	Average
4	1170.785	47.44	24.56	2.39	37.36	37.03	74.00	-36.97	HORIZONTAL	Peak
5	1251.033	38.56	25.02	2.34	37.33	28.59	54.00	-25.41	HORIZONTAL	Average
6	1251.033	48.37	25.02	2.34	37.33	38.40	74.00	-35.60	HORIZONTAL	Peak
7	1390.528	40.05	25.38	2.60	37.23	30.80	54.00	-23.20	HORIZONTAL	Average
8	1390.528	50.04	25.38	2.60	37.23	40.79	74.00	-33.21	HORIZONTAL	Peak
9	1562.283	39.18	25.54	2.80	37.09	30.43	54.00	-23.57	HORIZONTAL	Average
10	1562.283	49.80	25.54	2.80	37.09	41.05	74.00	-32.95	HORIZONTAL	Peak
11	1822.555	35.88	25.97	2.98	37.02	27.81	54.00	-26.19	HORIZONTAL	Average
12	1822.555	46.47	25.97	2.98	37.02	38.40	74.00	-35.60	HORIZONTAL	Peak



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Mode:a; Polarization:Vertical



Trace: (Discrete)

	ReadAntenna	Cable	Preamp		Limit	Over			
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1060.911	38.55	24.29	2.38	37.39	27.83	54.00	-26.17	VERTICAL
2	1060.911	47.89	24.29	2.38	37.39	37.17	74.00	-36.83	VERTICAL
3	1200.526	37.59	24.68	2.34	37.35	27.26	54.00	-26.74	VERTICAL
4	1200.526	46.81	24.68	2.34	37.35	36.48	74.00	-37.52	VERTICAL
5	1341.581	39.36	25.30	2.60	37.28	29.98	54.00	-24.02	VERTICAL
6	1341.581	49.48	25.30	2.60	37.28	40.10	74.00	-33.90	VERTICAL
7	1582.001	39.29	25.56	2.80	37.08	30.57	54.00	-23.43	VERTICAL
8	1582.001	49.75	25.56	2.80	37.08	41.03	74.00	-32.97	VERTICAL
9	1771.048	39.22	25.90	2.95	37.03	31.04	54.00	-22.96	VERTICAL
10	1771.048	47.18	25.90	2.95	37.03	39.00	74.00	-35.00	VERTICAL
11	1961.484	34.77	26.08	3.03	37.00	26.88	54.00	-27.12	VERTICAL
12	1961.484	46.18	26.08	3.03	37.00	38.29	74.00	-35.71	VERTICAL

--End of Report--

