

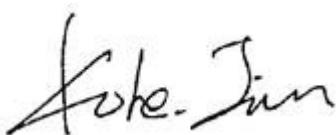
Report No.: GZEM200501243801
Page: 1 of 18
FCC ID: PX8IRCU-C814

TEST REPORT

Application No.:	GZEM2005012438CR
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 510663, 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-C814
Model No.:	IRCU-C814
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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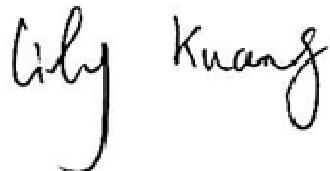
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Revision Record

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

Internal Source	Upper Frequency
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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3 Contents

	Page
1 Cover Page	1
2 Test Summary	3
3 Contents	4
4 General Information	5
4.1 Details of E.U.T	5
4.2 Description of Support Units	5
4.3 Product Description	5
4.4 Measurement Uncertainty	5
4.5 Test Location	5
4.6 Test Facility	6
4.7 Deviation from Standards	7
4.8 Abnormalities from Standard Conditions	7
5 Equipment List	8
6 Emission Test Results	10
6.1 Conducted Emissions at Mains Terminals (150kHz-30MHz)	10
6.1.1 E.U.T. Operation	10
6.1.2 Test Setup Diagram	10
6.1.3 Measurement Data	11
6.2 Radiated Emissions (30MHz-1GHz)	13
6.2.1 E.U.T. Operation	13
6.2.2 Test Setup Diagram	13
6.2.3 Measurement Data	14
6.3 Radiated Emissions (above 1GHz)	16
6.3.1 E.U.T. Operation	16
6.3.2 Test Setup Diagram	16
6.3.3 Measurement Data	17



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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 5~8 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, Scientechn 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-Network	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
EXA Signal Analyzer	Keysight	N9010A	EMC2138	2019-11-18	2020-11-17

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Test Software E3	Audix	Ver.6.120110a	GZE100-61	N/A	N/A
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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(μ V)-56dB(μ V) quasi-peak, 56dB(μ V)-46dB(μ V) average

0.5M-5MHz 56dB(μ V) quasi-peak, 46dB(μ V) average

5M-30MHz 60dB(μ V) quasi-peak, 50dB(μ V) average

Detector: Peak for pre-scan (9kHz resolution bandwidth) 0.15M to 30MHz

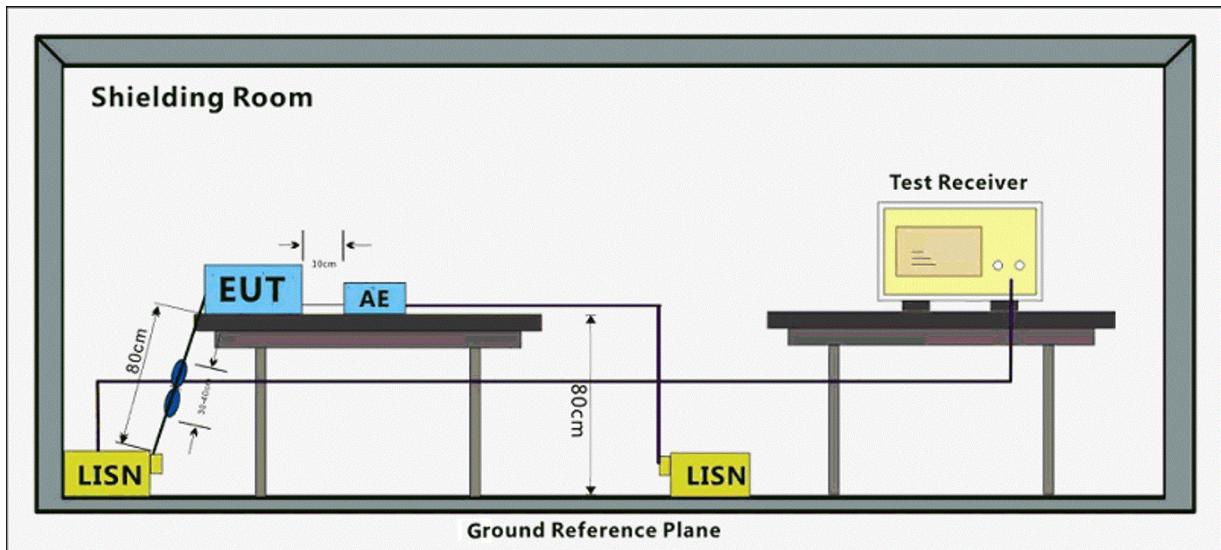
6.1.1 E.U.T. Operation

Operating Environment:

Temperature: 25.1 °C Humidity: 58.9 % RH Atmospheric Pressure: 1020 mbar

a: Normal working Keep the EUT continuously running via PC control.

6.1.2 Test Setup Diagram



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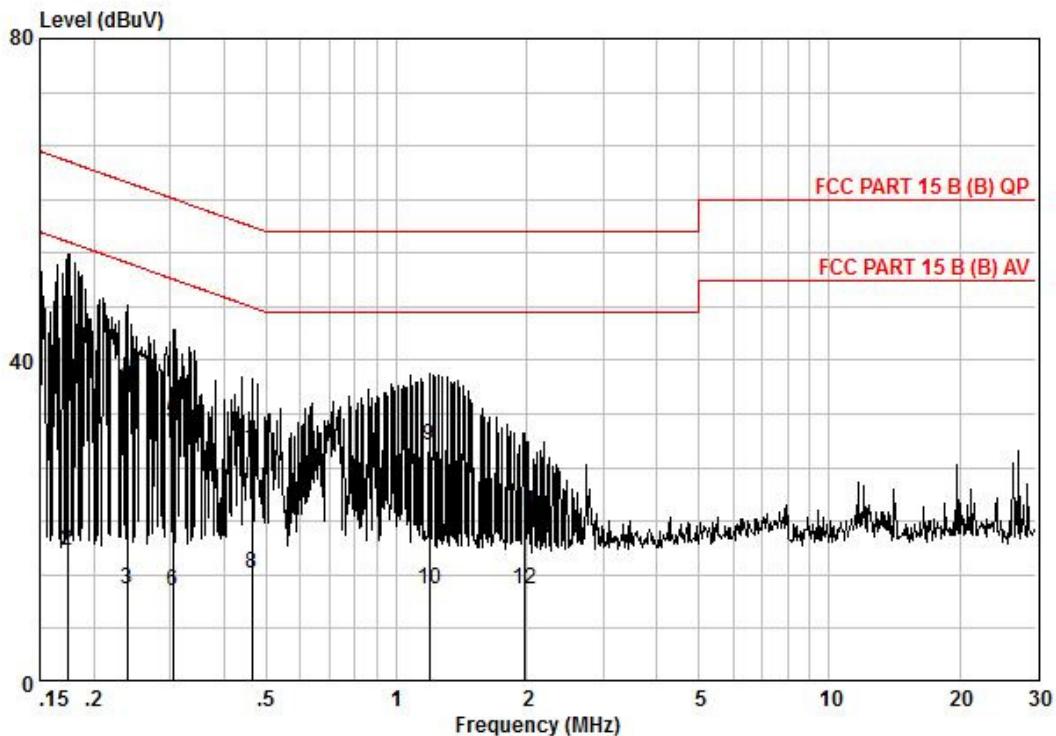
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6.1.3 Measurement Data

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		Cable	LISN	Measured	Limit	Over	Limit	Remark
No	Model	:	read	level	Loss	Factor	Line	dB	QP
Frequency	0.17		31.77	0.10	9.54	41.41	64.77	-23.36	QP
MHz									
0.17			6.77	0.10	9.54	16.41	54.77	-38.36	AVERAGE
0.24			1.75	0.12	9.63	11.50	52.13	-40.63	AVERAGE
0.24			27.46	0.12	9.63	37.21	62.13	-24.92	QP
0.31			22.46	0.15	9.63	32.24	60.10	-27.86	QP
0.31			1.60	0.15	9.63	11.38	50.10	-38.72	AVERAGE
0.46			18.79	0.19	9.65	28.63	56.63	-28.00	QP
0.46			3.67	0.19	9.65	13.51	46.63	-33.12	AVERAGE
1.19			19.47	0.30	9.63	29.40	56.00	-26.60	QP
1.19			1.73	0.30	9.63	11.66	46.00	-34.34	AVERAGE
1.98			11.16	0.40	9.61	21.17	56.00	-34.83	QP
1.98			1.55	0.40	9.61	11.56	46.00	-34.44	AVERAGE

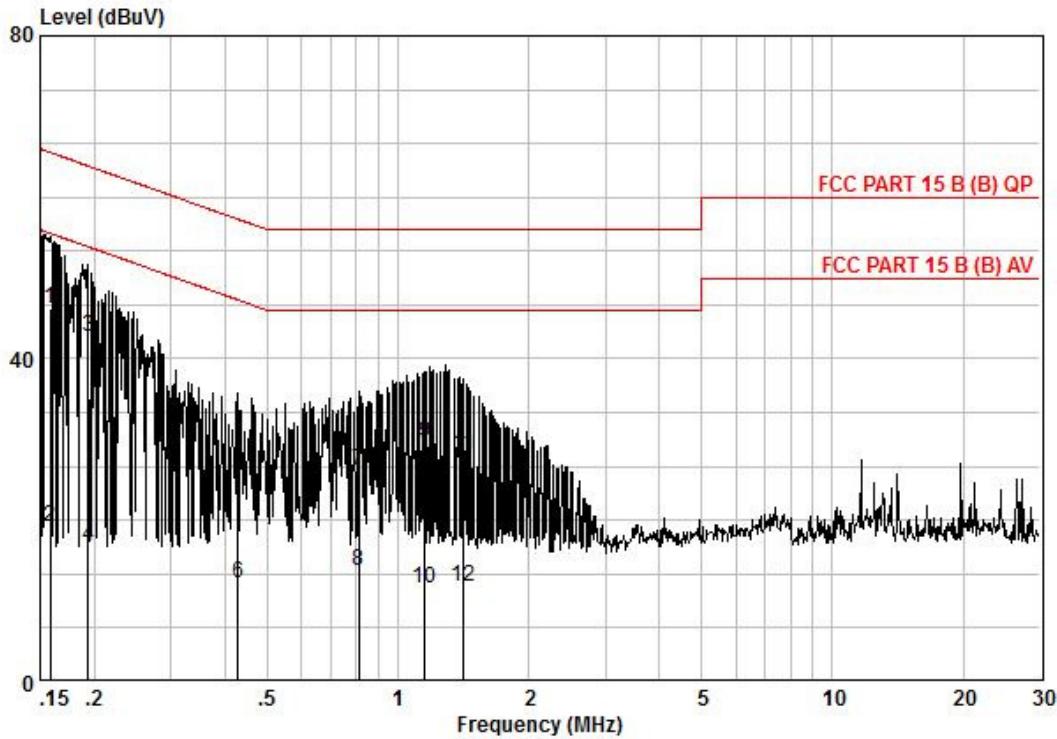
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Mode:a; Line:Neutral Line



Pol No Model	:NEUTRAL							
Frequency MHz	read level dBuV	Cable Loss dB	LISN Factor dB	Measured level dBuV	Limit Line dBuV	Over limit dB	Remark	
0.16	36.59	0.10	9.42	46.11	65.56	-19.45	QP	
0.16	9.76	0.10	9.42	19.28	55.56	-36.28	AVERAGE	
0.19	33.09	0.10	9.57	42.76	63.89	-21.13	QP	
0.19	7.20	0.10	9.57	16.87	53.89	-37.02	AVERAGE	
0.43	15.89	0.18	9.56	25.63	57.29	-31.66	QP	
0.43	2.58	0.18	9.56	12.27	47.29	-35.02	AVERAGE	
0.81	16.32	0.27	9.59	26.18	56.00	-29.82	QP	
0.81	3.82	0.27	9.59	13.68	46.00	-32.32	AVERAGE	
1.15	19.77	0.30	9.58	29.65	56.00	-26.35	QP	
1.15	1.62	0.30	9.58	11.50	46.00	-34.50	AVERAGE	
1.42	18.34	0.30	9.55	28.19	56.00	-27.81	QP	
1.42	1.94	0.30	9.55	11.79	46.00	-34.21	AVERAGE	

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6.2 Radiated Emissions (30MHz-1GHz)

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-2000MHz 43.5(dB μ V/m) quasi-peak

Detector: Peak for pre-scan (120kHz resolution bandwidth) 30M to1000MHz

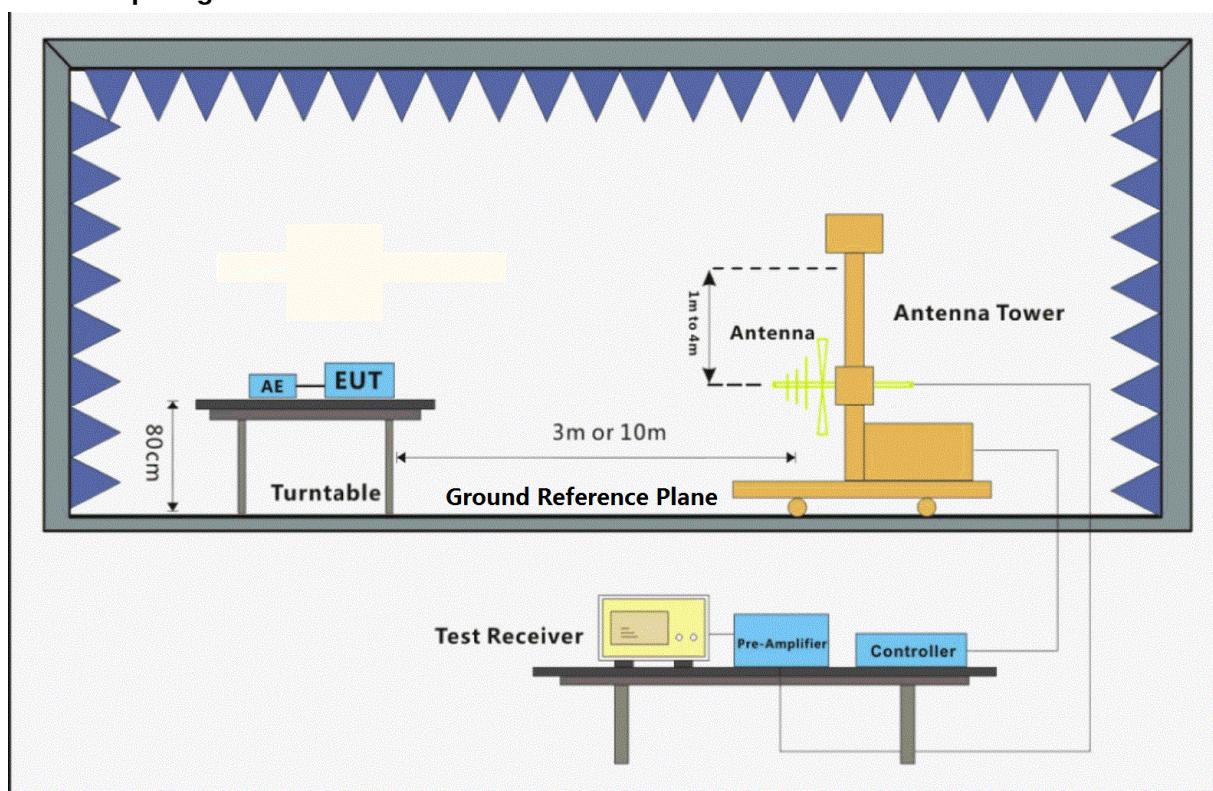
6.2.1 E.U.T. Operation

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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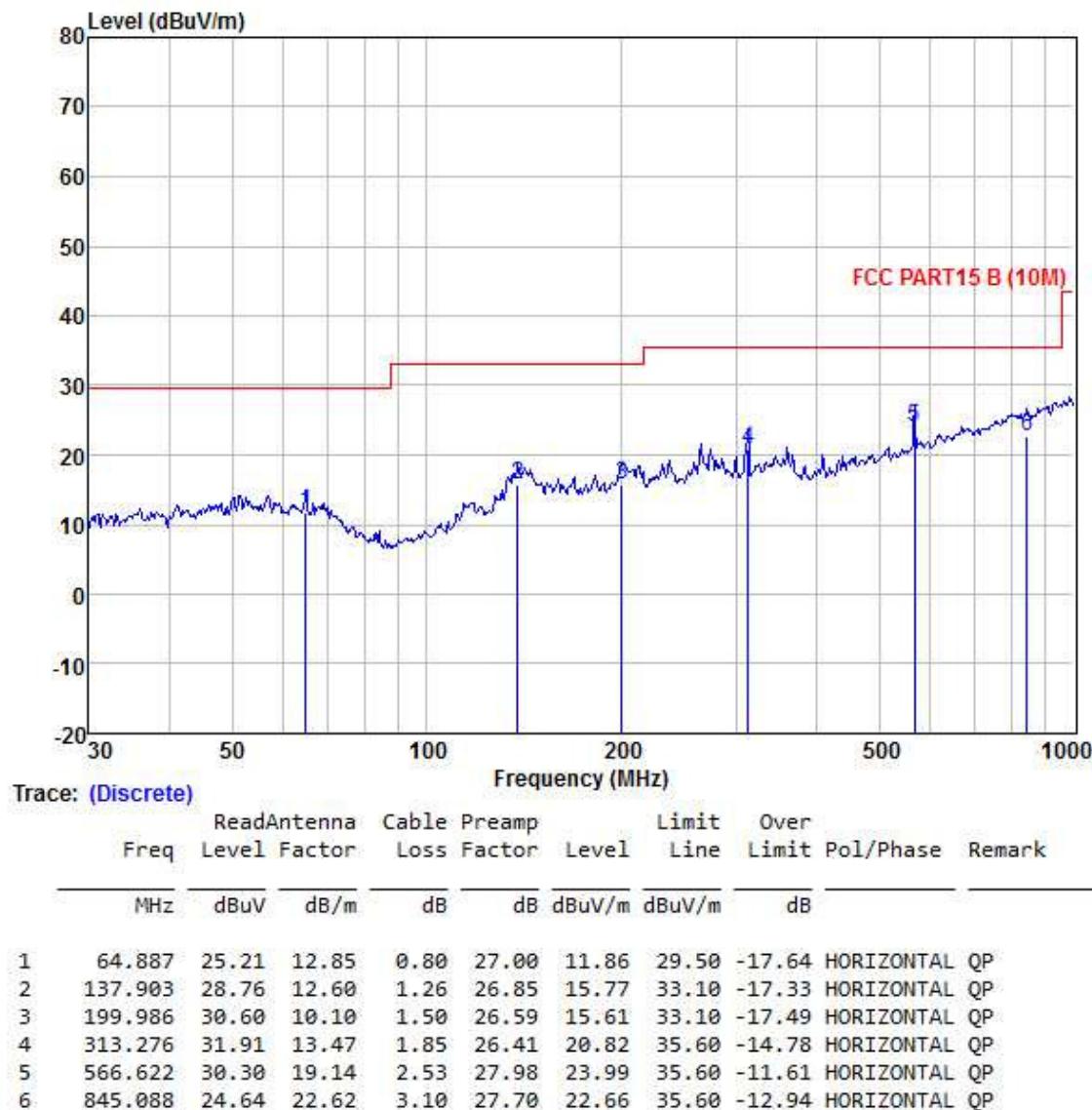


6.2.3 Measurement Data

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

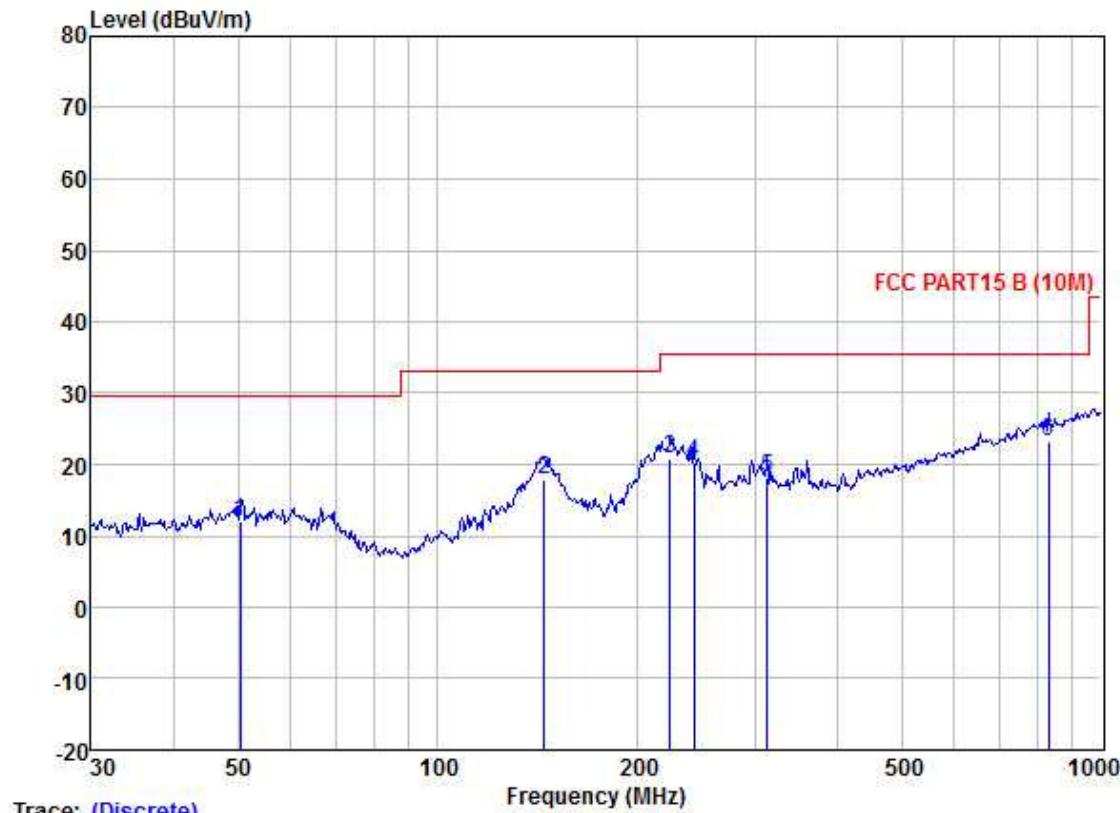
Mode:a; Polarization:Horizontal



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Mode:a; Polarization:Vertical



Freq	ReadAntenna		Cable		Preamp		Limit	Over	Over	Pol/Phase	Remark
	Freq	Level	Factor	Loss	Factor	Level					
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB			
1	50.409	24.33	13.99	0.71	27.00	12.03	29.50	-17.47	VERTICAL	QP	
2	144.842	30.69	12.84	1.29	26.82	18.00	33.10	-15.10	VERTICAL	QP	
3	223.733	35.37	10.26	1.58	26.49	20.72	35.60	-14.88	VERTICAL	QP	
4	243.377	33.28	11.67	1.63	26.40	20.18	35.60	-15.42	VERTICAL	QP	
5	313.276	29.13	13.47	1.85	26.41	18.04	35.60	-17.56	VERTICAL	QP	
6	833.317	25.22	22.51	3.10	27.70	23.13	35.60	-12.47	VERTICAL	QP	

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6.3 Radiated Emissions (above 1GHz)

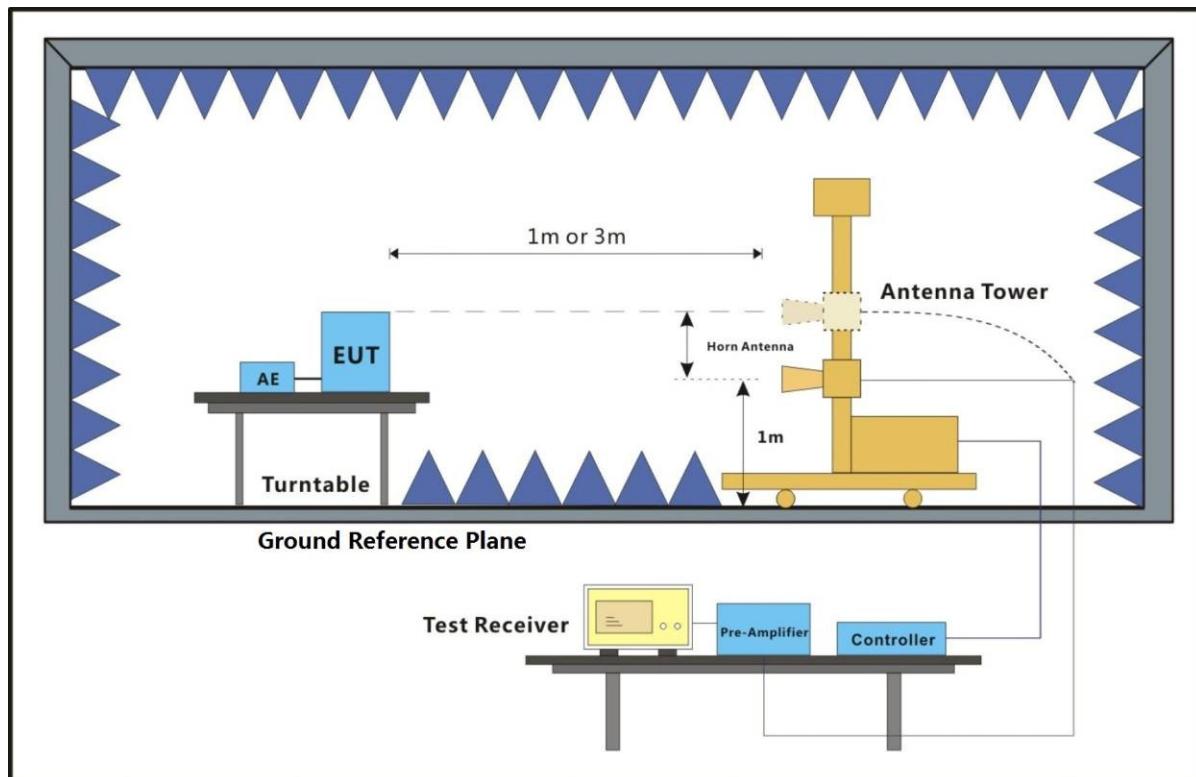
Test Requirement: 47 CFR Part 15, Subpart B
Test Method: ANSI C63.4:2014
Frequency Range: Up to 2 GHz
Measurement Distance: 3m
Limit:
Above 1GHz 74(dB μ V/m) peak, 54(dB μ V/m) average
Detector: Peak for pre-scan (1000kHz resolution bandwidth) up to 2 GHz

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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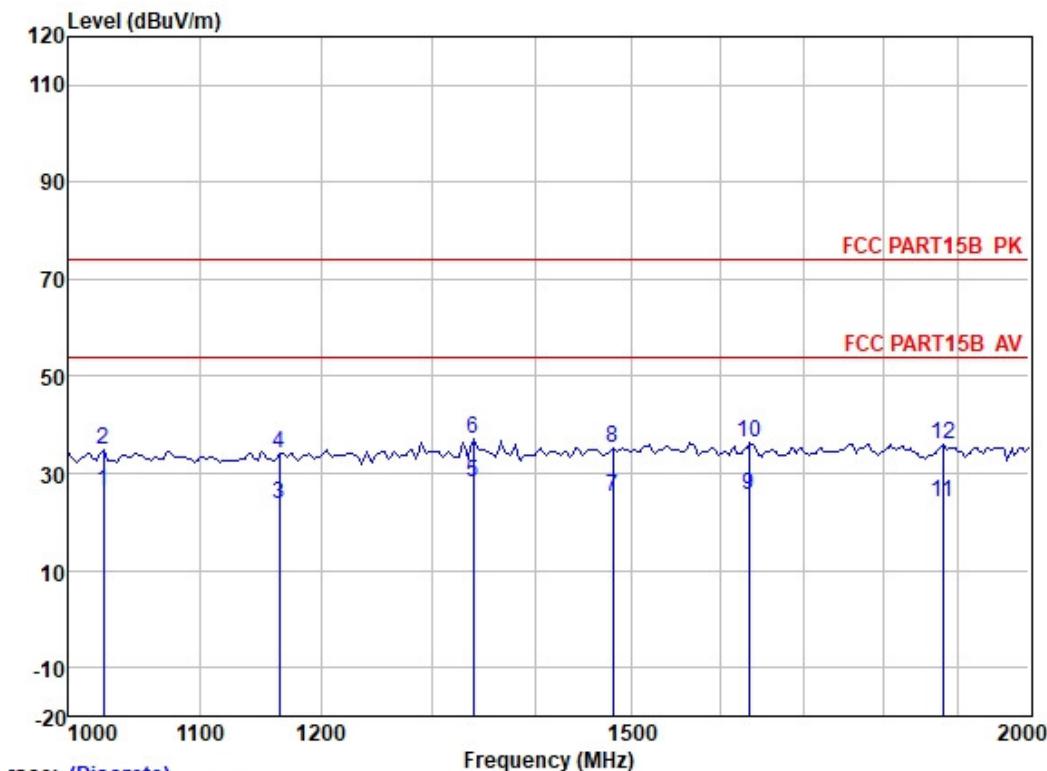
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6.3.3 Measurement Data

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



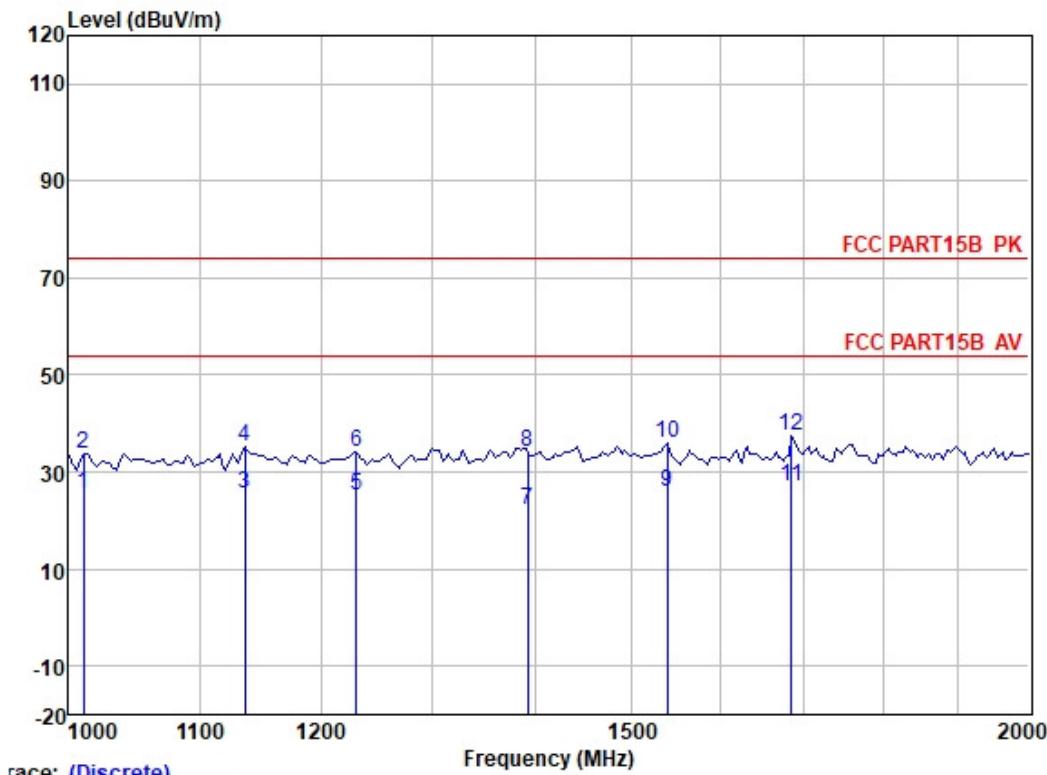
Race: (Discrete)	ReadAntenna		Cable		Preamp		Limit	Over	Over	Remark
	Freq	Level	Factor	Loss	Factor	Level				
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1025.402	36.97	24.24	2.32	37.39	26.14	54.00	-27.86	HORIZONTAL	Average
2	1025.402	45.53	24.24	2.32	37.39	34.70	74.00	-39.30	HORIZONTAL	Peak
3	1164.509	34.17	24.54	2.39	37.36	23.74	54.00	-30.26	HORIZONTAL	Average
4	1164.509	44.72	24.54	2.39	37.36	34.29	74.00	-39.71	HORIZONTAL	Peak
5	1339.179	37.58	25.29	2.60	37.28	28.19	54.00	-25.81	HORIZONTAL	Average
6	1339.179	46.56	25.29	2.60	37.28	37.17	74.00	-36.83	HORIZONTAL	Peak
7	1480.523	34.14	25.48	2.77	37.13	25.26	54.00	-28.74	HORIZONTAL	Average
8	1480.523	44.03	25.48	2.77	37.13	35.15	74.00	-38.85	HORIZONTAL	Peak
9	1633.855	34.15	25.62	2.80	37.06	25.51	54.00	-28.49	HORIZONTAL	Average
10	1633.855	44.85	25.62	2.80	37.06	36.21	74.00	-37.79	HORIZONTAL	Peak
11	1878.924	32.02	26.02	2.92	37.01	23.95	54.00	-30.05	HORIZONTAL	Average
12	1878.924	44.23	26.02	2.92	37.01	36.16	74.00	-37.84	HORIZONTAL	Peak

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Mode:a; Polarization:Vertical



Race: (Discrete)

Freq	ReadAntenna		Cable		Preamp		Limit	Over	Pol/Phase	Remark
	MHz	Level	Factor	Loss	Factor	Level				
1	1010.809	36.65	24.22	2.25	37.40	25.72	54.00	-28.28	VERTICAL	Average
2	1010.809	44.72	24.22	2.25	37.40	33.79	74.00	-40.21	VERTICAL	Peak
3	1135.661	36.28	24.45	2.25	37.37	25.61	54.00	-28.39	VERTICAL	Average
4	1135.661	45.82	24.45	2.25	37.37	35.15	74.00	-38.85	VERTICAL	Peak
5	1231.021	35.27	24.91	2.31	37.33	25.16	54.00	-28.84	VERTICAL	Average
6	1231.021	44.43	24.91	2.31	37.33	34.32	74.00	-39.68	VERTICAL	Peak
7	1393.022	31.30	25.38	2.60	37.23	22.05	54.00	-31.95	VERTICAL	Average
8	1393.022	43.31	25.38	2.60	37.23	34.06	74.00	-39.94	VERTICAL	Peak
9	1540.049	34.68	25.53	2.80	37.09	25.92	54.00	-28.08	VERTICAL	Average
10	1540.049	44.61	25.53	2.80	37.09	35.85	74.00	-38.15	VERTICAL	Peak
11	1684.388	35.46	25.68	2.80	37.05	26.89	54.00	-27.11	VERTICAL	Average
12	1684.388	46.00	25.68	2.80	37.05	37.43	74.00	-36.57	VERTICAL	Peak

--End of Report--

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