



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

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Report No.: GZEM190101035102
Page: 1 of 28
FCC ID: PX8CP-AMS

TEST REPORT

Application No.: GZEM1901010351CR
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 Systems(China) Ltd.
Address of Factory: No.6, Jinbi Road, Economics and Technology Development District, Guangzhou, Guangdong, China
Equipment Under Test (EUT):
FCC ID: PX8CP-AMS
EUT Name: Critical Point Antenna Monitoring System
Model No.: CP-AMS
Trade Mark: COMBA
Standard(s) : 47 CFR Part 15, Subpart C 15.249
Date of Receipt: 2019-01-18
Date of Test: 2019-01-23 to 2019-02-20
Date of Issue: 2019-04-19

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



Kobe Jian
Lab Manager

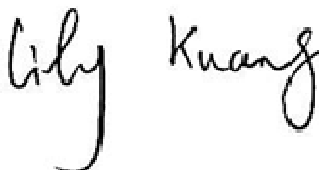
The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.



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Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2019-04-19		Original

Authorized for issue by:			
Tested By	 Lily_Kuang /Project Engineer	2019-01-23 to 2019-02-20	Date
Checked By	 Ricky Liu /Reviewer	2019-03-14	Date



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Guangzhou Branch, CMAA, CNAS, CEEL, CEEC Laboratory

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2 Test Summary

Radio Spectrum Technical Requirement				
Item	Standard	Method	Requirement	Result
Antenna Requirement	47 CFR Part 15, Subpart C 15.249	N/A	47 CFR Part 15, Subpart C 15.203	Pass

Radio Spectrum Matter Part				
Item	Standard	Method	Requirement	Result
Conducted Emissions at AC Power Line (150kHz-30MHz)	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.2	47 CFR Part 15, Subpart C 15.207	N/A*
20dB Bandwidth	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.9	47 CFR Part 15, Subpart C 15.215	Pass
Field Strength of the Fundamental Signal (15.249(a))	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.5&6.6	47 CFR Part 15, Subpart C 15.249(a)	Pass
Restricted Band Around Fundamental Frequency	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.4&6.5&6.6	47 CFR Part 15, Subpart C 15.205 & 15.249(d) & 15.209	Pass
Radiated Emissions	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.4&6.5&6.6	47 CFR Part 15, Subpart C 15.209 & 15.249 (a),(d)	Pass

*N/A: it is not applicable for DC power supply.





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4 General Information

4.1 Details of E.U.T.

Power Supply:	DC 48V
Antenna Type	Dedicated Antenna
Antenna Gain:	12.5dBi
Modulation Type	ASK
Number of Channels	2
Operation Frequency	910MHz, 915MHz

4.2 Description of Support Units

The dedicated antenna didn't sold with the EUT.

Description	Manufacturer	Model No.	Serial No.
DC Power SUPPLY	SGS	XFR 60-20	/
Dedicated Antenna	Sunwave	TXD-V-HU04-1N-1	/

4.3 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	$\pm 5.5 \times 10^{-8}$
2	Duty cycle	$\pm 0.57\%$
3	Occupied Bandwidth	$\pm 3\%$
4	RF Conducted power	$\pm 0.68\text{dB}$
5	RF Power Density	$\pm 1.50\text{dB}$
6	Conducted Spurious Emissions	$\pm 1.04\text{dB}$
7	RF Radiated Power	$\pm 4.5\text{dB}$ (below 1GHz) $\pm 4.8\text{dB}$ (above 1GHz)
8	Radiated Spurious Emission Test	$\pm 4.5\text{dB}$ (30MHz-1GHz) $\pm 4.8\text{dB}$ (1GHz-18GHz)
9	Temperature	$\pm 0.4^\circ\text{C}$
10	Humidity	$\pm 1.3\%$
11	Supply Voltages	$\pm 1.5\%$
12	Time	$\pm 3\%$

4.4 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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4.5 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-12460, C-12584, G-10449 and T-11179)**

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-12460, C-12584, G-10449 and T-11179 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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4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None



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5 Equipment List

Conducted Emissions at AC Power Line (150kHz-30MHz)					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Shielding Room	Zhong Yu	8m x 3m x 3.8m	EMC0306	N/A	N/A
Two-Line V-Network	R&S	ENV216	EMC0118	2019-01-11	2020-01-10
LISN	R&S	ENV216	EMC2135	2018-09-21	2019-09-20
EMI Test Receiver	Rohde & Schwarz	ESCS30	EMC0506	2018-11-19	2019-11-18
Coaxial Cable	HangTianXing	2m	EMC0107	2017-07-23	2019-07-22
Voltage Probe	SGS	N/A	EMC0106	2018-04-04	2020-04-03
Conical Metal Housing	SGS-EMC	N/A	EMC0167	2018-04-19	2020-04-18
Test Software E3c	Audix	Ver. 5.4.1221b	GZE100-62	N/A	N/A

20dB Bandwidth					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
EXA Signal Analyzer	Agilent Technologies	N9010A	EMC2138	2018-11-19	2019-11-18
6dB Attenuator	HP	8491A	EMC2062	2018-04-04	2020-04-03
Test Software JS1120-3	HangTianXing	V2.6	GZE100-69	N/A	N/A



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Field Strength of the Fundamental Signal (15.249(a))					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
EMI Test Receiver	Rohde & Schwarz	ESIB26	EMC0522	2019-01-20	2020-01-19
EMI Test Receiver	Rohde & Schwarz	ESCI	EMC0056	2019-01-20	2020-01-19
Chamber cable	HangTianXing	N/A	EMC0542	2017-06-30	2019-06-30
Trilog Broadband Antenna 30MHz-1GHz	SCHWARZBECKME SS-ELEKTRONIK	VULB 9160	EMC2025	2016-09-08	2019-09-07
Bi-log Type Antenna	Schaffner -Chase	CBL6112B	EMC0524	2016-09-08	2019-09-07
Bi-log Type Antenna	Schaffner -Chase	CBL6143	EMC0519	2017-05-04	2020-05-03
Horn Antenna 1GHz-18GHz	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120D	EMC2026	2016-09-09	2019-09-08
1GHz-26.5 GHz Pre-Amplifier	Agilent	8449B	EMC0521	2019-01-07	2020-01-08
Amplifier	HP	8447F	EMC2065	2018-06-01	2019-05-31
Pre-Amplifier MH648A	ANRITSU CORP	MH648A	EMC2086	2018-11-19	2019-11-18
Active Loop Antenna	EMCO	6502	EMC0523	2018-02-24	2019-02-23
High Pass Filter(915MHz)	FSY MICROWAVE	HM1465-9SS	EMC2079	2019-01-11	2020-01-10
2.4GHz Filter	Micro-Tronics	BRM 50702	EMC2069	2019-01-11	2020-01-10
10m Semi-Anechoic Chamber	ETS	N/A	EMC0530	2017-06-18	2019-06-18
966 Anechoic Chamber	C.R.T	9m x 6m x 6m	EMC2142	2017-12-19	2019-12-18
MXE EMI Receiver	Keysight	N9038A	EMC2139	2018-11-19	2019-11-18
EXA Signal Analyzer	Keysight	N9010A	EMC2138	2018-11-19	2019-11-18
Trilog Broadband Antenna 30MHz-1GHz	SCHWARZBECKME SS-ELEKTRONIK	VULB 9168	SEM003-18	2016-06-29	2019-06-28
Test Software E3	Audix	Ver.6.120110a	GZE100-61	N/A	N/A



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Restricted Band Around Fundamental Frequency					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
EMI Test Receiver	Rohde & Schwarz	ESIB26	EMC0522	2019-01-20	2020-01-19
EMI Test Receiver	Rohde & Schwarz	ESCI	EMC0056	2019-01-20	2020-01-19
Chamber cable	HangTianXing	N/A	EMC0542	2017-06-30	2019-06-30
Trilog Broadband Antenna 30MHz-1GHz	SCHWARZBECKME SS-ELEKTRONIK	VULB 9160	EMC2025	2016-09-08	2019-09-07
Bi-log Type Antenna	Schaffner -Chase	CBL6112B	EMC0524	2016-09-08	2019-09-07
Bi-log Type Antenna	Schaffner -Chase	CBL6143	EMC0519	2017-05-04	2020-05-03
Horn Antenna 1GHz-18GHz	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120D	EMC2026	2016-09-09	2019-09-08
1GHz-26.5 GHz Pre-Amplifier	Agilent	8449B	EMC0521	2019-01-07	2020-01-08
Amplifier	HP	8447F	EMC2065	2018-06-01	2019-05-31
Pre-Amplifier MH648A	ANRITSU CORP	MH648A	EMC2086	2018-11-19	2019-11-18
Active Loop Antenna	EMCO	6502	EMC0523	2018-02-24	2019-02-23
High Pass Filter(915MHz)	FSY MICROWAVE	HM1465-9SS	EMC2079	2019-01-11	2020-01-10
2.4GHz Filter	Micro-Tronics	BRM 50702	EMC2069	2019-01-11	2020-01-10
10m Semi-Anechoic Chamber	ETS	N/A	EMC0530	2017-06-18	2019-06-18
966 Anechoic Chamber	C.R.T	9m x 6m x 6m	EMC2142	2017-12-19	2019-12-18
MXE EMI Receiver	Keysight	N9038A	EMC2139	2018-11-19	2019-11-18
EXA Signal Analyzer	Keysight	N9010A	EMC2138	2018-11-19	2019-11-18
Trilog Broadband Antenna 30MHz-1GHz	SCHWARZBECKME SS-ELEKTRONIK	VULB 9168	SEM003-18	2016-06-29	2019-06-28
Test Software E3	Audix	Ver.6.120110a	GZE100-61	N/A	N/A



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Radiated Emissions					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
EMI Test Receiver	Rohde & Schwarz	ESIB26	EMC0522	2019-01-20	2020-01-19
EMI Test Receiver	Rohde & Schwarz	ESCI	EMC0056	2019-01-20	2020-01-19
Chamber cable	HangTianXing	N/A	EMC0542	2017-06-30	2019-06-30
Trilog Broadband Antenna 30MHz-1GHz	SCHWARZBECKME SS-ELEKTRONIK	VULB 9160	EMC2025	2016-09-08	2019-09-07
Bi-log Type Antenna	Schaffner -Chase	CBL6112B	EMC0524	2016-09-08	2019-09-07
Bi-log Type Antenna	Schaffner -Chase	CBL6143	EMC0519	2017-05-04	2020-05-03
Horn Antenna 1GHz-18GHz	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120D	EMC2026	2016-09-09	2019-09-08
1GHz-26.5 GHz Pre-Amplifier	Agilent	8449B	EMC0521	2019-01-07	2020-01-08
Amplifier	HP	8447F	EMC2065	2018-06-01	2019-05-31
Pre-Amplifier MH648A	ANRITSU CORP	MH648A	EMC2086	2018-11-19	2019-11-18
Active Loop Antenna	EMCO	6502	EMC0523	2018-02-24	2019-02-23
High Pass Filter(915MHz)	FSY MICROWAVE	HM1465-9SS	EMC2079	2019-01-11	2020-01-10
2.4GHz Filter	Micro-Tronics	BRM 50702	EMC2069	2019-01-11	2020-01-10
10m Semi-Anechoic Chamber	ETS	N/A	EMC0530	2017-06-18	2019-06-18
966 Anechoic Chamber	C.R.T	9m x 6m x 6m	EMC2142	2017-12-19	2019-12-18
MXE EMI Receiver	Keysight	N9038A	EMC2139	2018-11-19	2019-11-18
EXA Signal Analyzer	Keysight	N9010A	EMC2138	2018-11-19	2019-11-18
Trilog Broadband Antenna 30MHz-1GHz	SCHWARZBECKME SS-ELEKTRONIK	VULB 9168	SEM003-18	2016-06-29	2019-06-28
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	2018-07-20	2019-07-19
DMM	Fluke	73	EMC0007	2018-07-19	2019-07-18



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6 Radio Spectrum Technical Requirement

6.1 Antenna Requirement

6.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.203

Limit: 15.203 requirement:

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, 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.

6.1.2 Conclusion

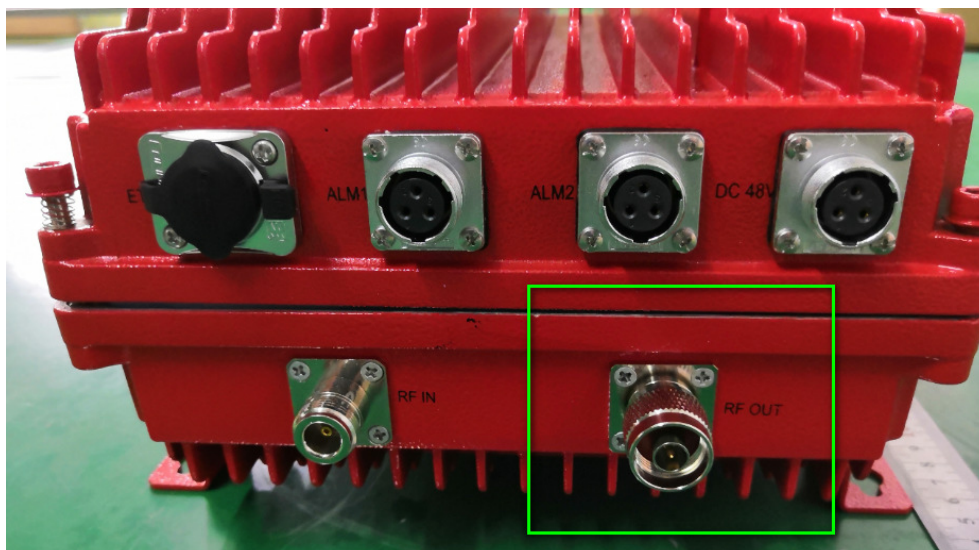
Standard Requirement:

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, 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.

EUT Antenna:

The antenna is an external antenna. The antennas is not sold with products. The best case gain of the antenna is 12.5dBi. The frequency scope of the antenna is from 806 to 960MHz.

The port of EUT:



External antenna(The antennas is not sold with products)



7 Radio Spectrum Matter Test Results

7.1 20dB Bandwidth

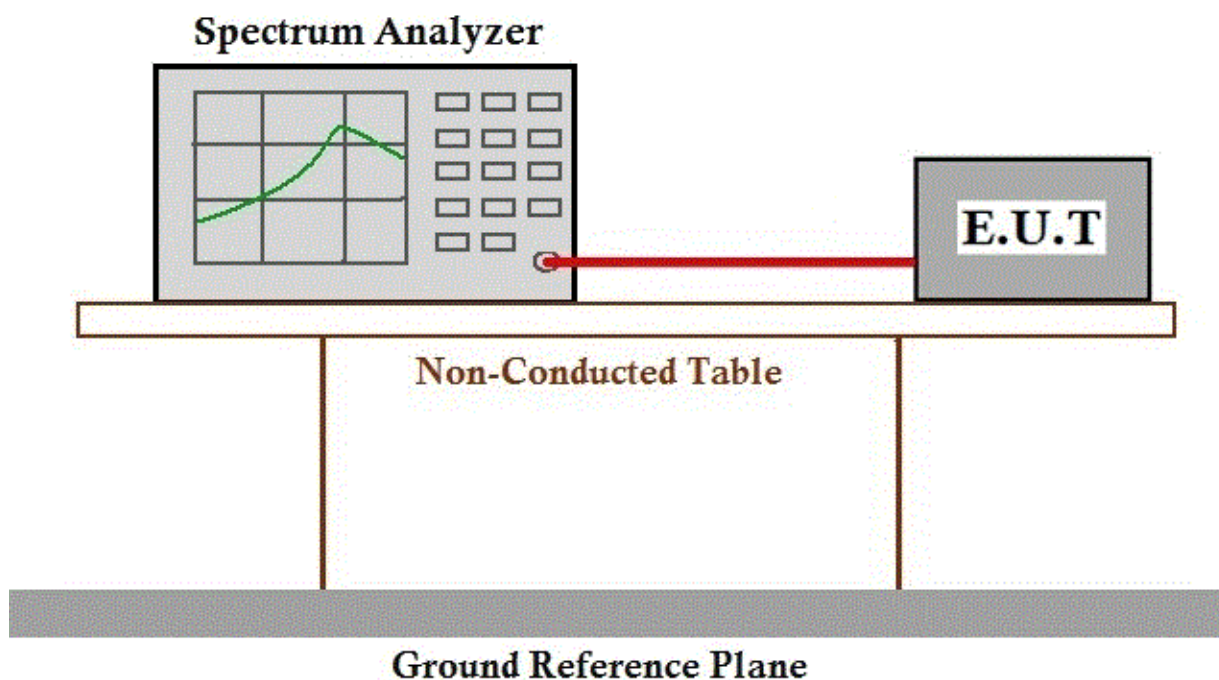
Test Requirement 47 CFR Part 15, Subpart C 15.215
Test Method: ANSI C63.10 (2013) Section 6.9
Limit: N/A

7.1.1 E.U.T. Operation

Operating Environment:

Temperature: 24.6 °C Humidity: 50 % RH Atmospheric Pressure: 1020 mbar
Test mode a:TX mode_Keep the EUT in transmitting with modulation mode.

7.1.2 Test Setup Diagram



7.1.3 Measurement Procedure and Data



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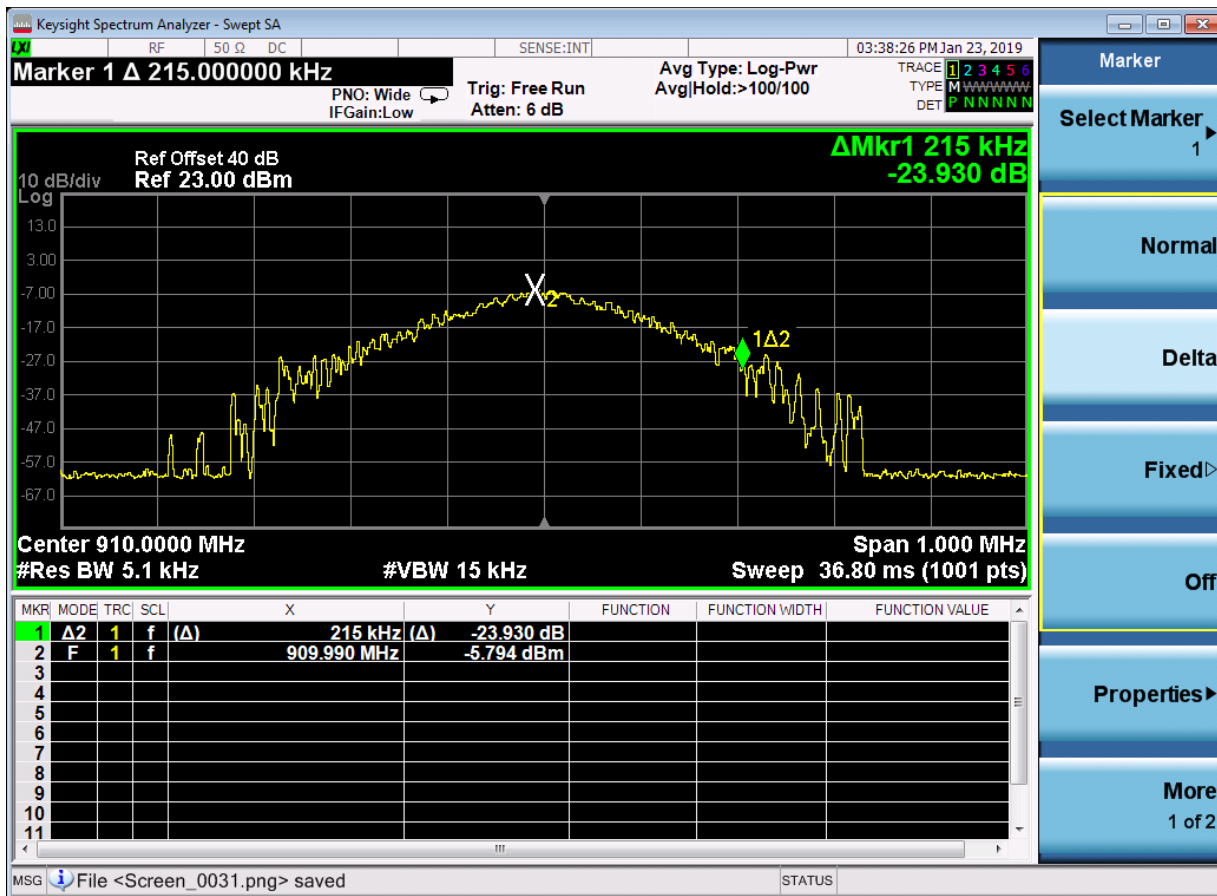
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Channel:910MHz:

Left:



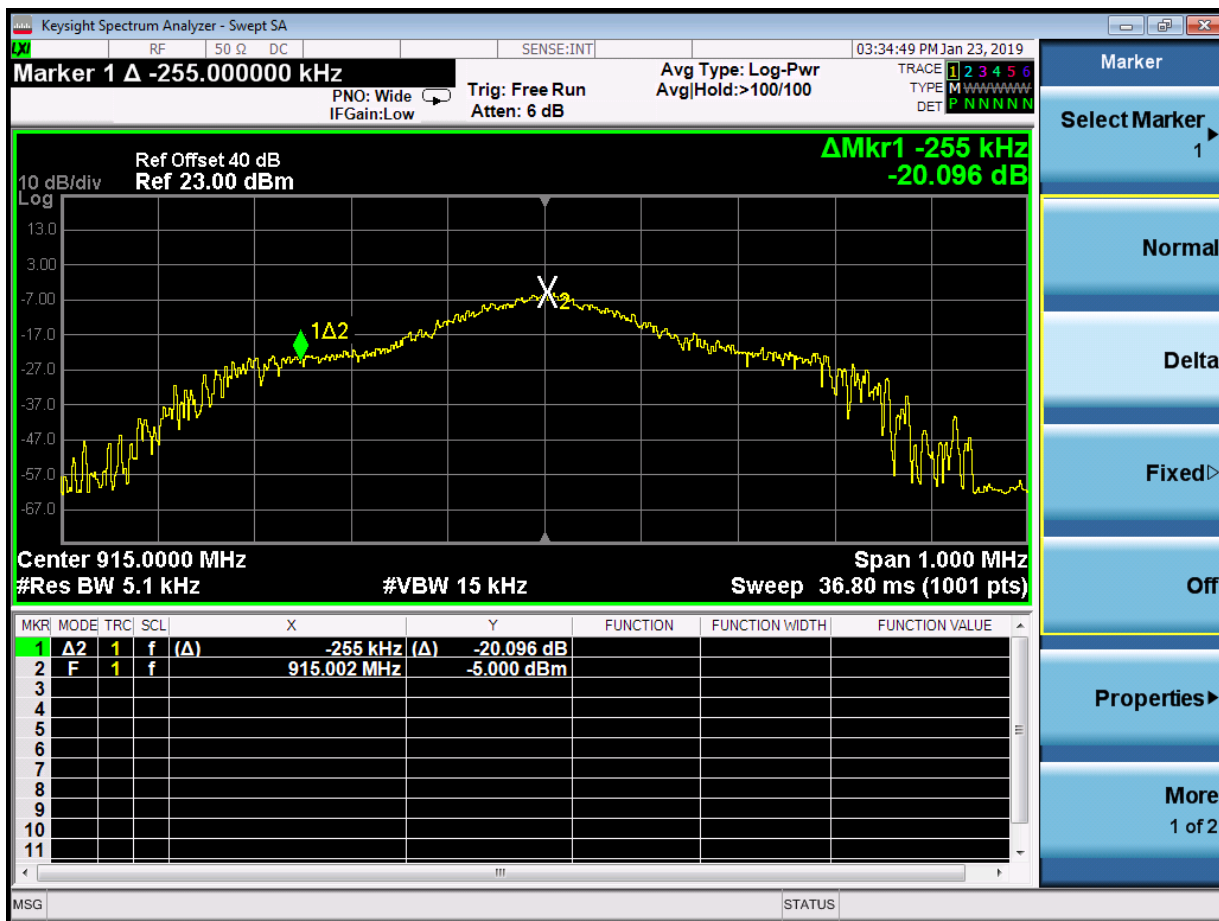
Right



So: the 20dB Bandwidth = 400kHz

Channel:915MHz:

Left:



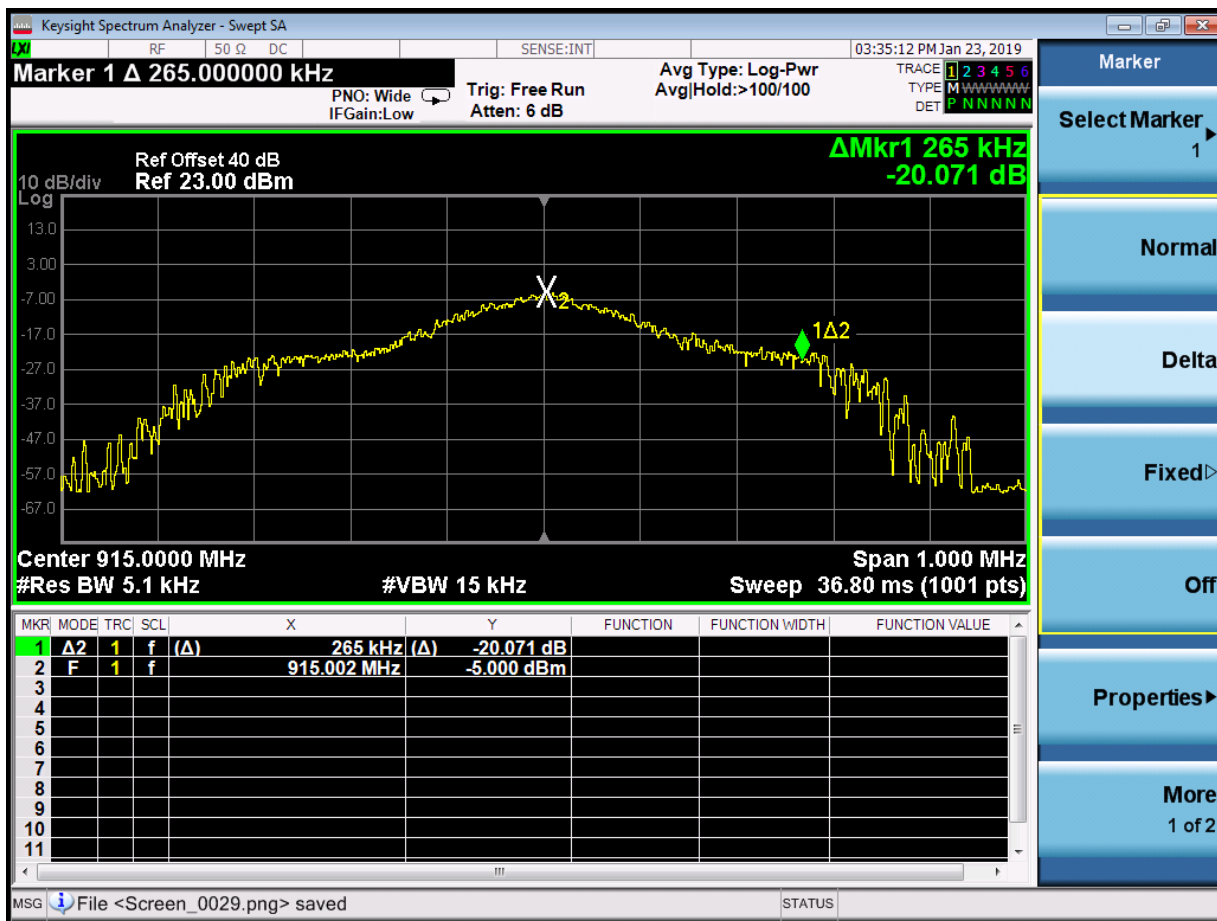
Right:



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So: the 20dB Bandwidth = 520kHz

7.2 Field Strength of the Fundamental Signal (15.249(a))

Test Requirement: 47 CFR Part 15, Subpart C 15.249(a)
Test Method: ANSI C63.10 (2013) Section 6.5&6.6
Measurement Distance: 3m
Limit:

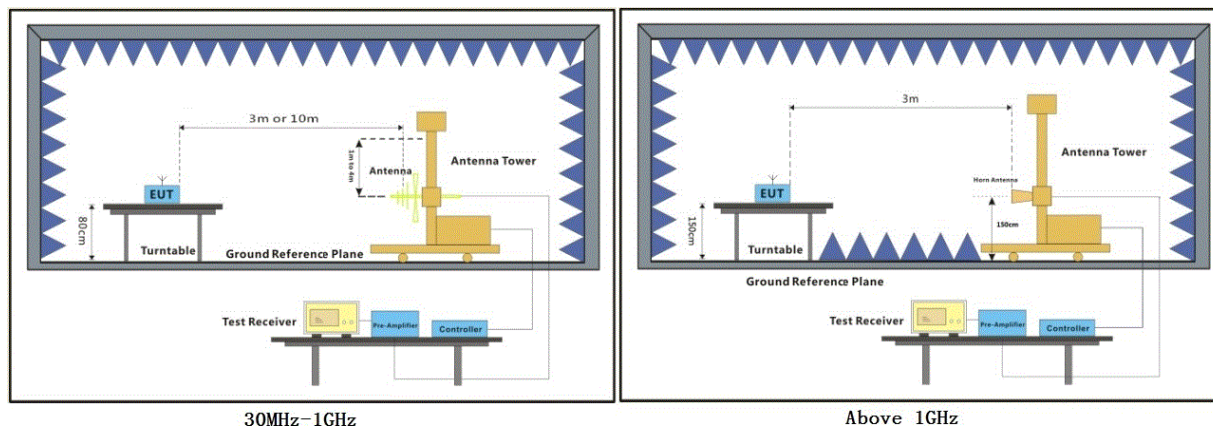
Frequency	Limit (dBuV/m @3m)	Remark
902MHz-928MHz	94.0	Average Value
	114.0	Peak Value

7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 65.4 % RH Atmospheric Pressure: 1020 mbar
Test mode a:TX mode_Keep the EUT in transmitting with modulation mode.

7.2.2 Test Setup Diagram



7.2.3 Measurement Procedure and Data

- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
- h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- j. Repeat above procedures until all frequencies measured was complete.

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



Channel: 910MHz:

Mode:a; Polarization:Horizontal; Modulation:ASK;

	Freq	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	910.002	80.60	21.76	3.13	27.00	78.49	94.00	-15.51	HORIZONTAL	Average
2	910.002	84.06	21.76	3.13	27.00	81.95	114.00	-32.05	HORIZONTAL	Peak

Mode:a; Polarization:Vertical; Modulation:ASK;

	Freq	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	910.002	80.10	21.76	3.13	27.00	77.99	94.00	-16.01	VERTICAL	Average
2	910.002	85.54	21.76	3.13	27.00	83.43	114.00	-30.57	VERTICAL	Peak

Channel: 915MHz:

Mode:a; Polarization:Horizontal; Modulation:ASK; ;

	Freq	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	915.039	77.40	21.85	3.13	26.99	75.39	94.00	-18.61	HORIZONTAL	Average
2	915.039	80.57	21.85	3.13	26.99	78.56	114.00	-35.44	HORIZONTAL	Peak

Mode:a; Polarization:Vertical; Modulation:ASK;

	Freq	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	915.000	78.80	21.85	3.13	26.99	76.79	94.00	-17.21	VERTICAL	Average
2	915.000	78.83	21.85	3.13	26.99	76.82	114.00	-37.18	VERTICAL	Peak



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7.3 Restricted Band Around Fundamental Frequency

Test Requirement: 47 CFR Part 15, Subpart C 15.205 & 15.249(d) & 15.209
Test Method: ANSI C63.10 (2013) Section 6.4&6.5&6.6
Measurement Distance: 3m
Limit:

Frequency	Limit (dBuV/m @3m)	Remark
30MHz-88MHz	40.0	Quasi-peak Value
88MHz-216MHz	43.5	Quasi-peak Value
216MHz-960MHz	46.0	Quasi-peak Value
960MHz-1GHz	54.0	Quasi-peak Value
Above 1GHz	54.0	Average Value
Above 1GHz	74.0	Peak Value

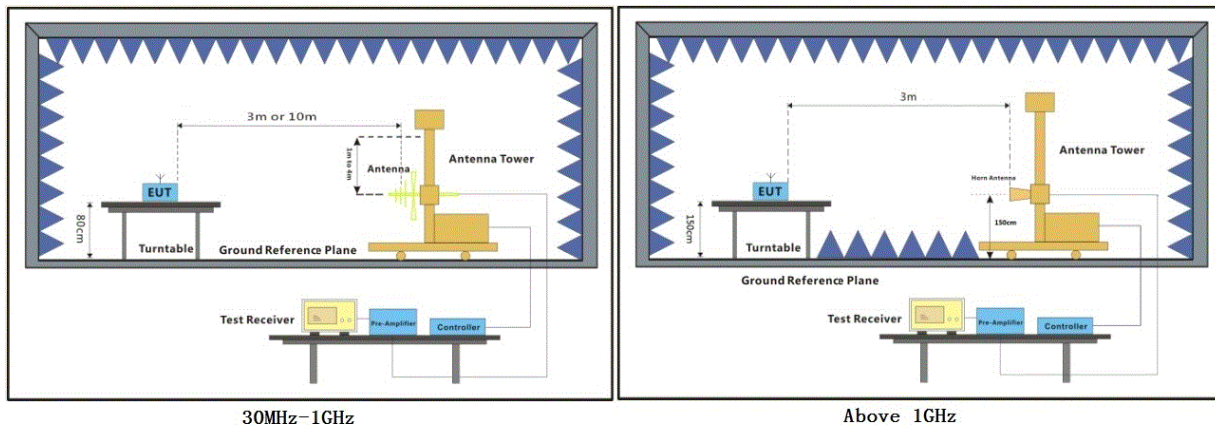
Emission radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

7.3.1 E.U.T. Operation

Operating Environment:

Temperature: 20.9 °C Humidity: 55.3 % RH Atmospheric Pressure: 1020 mbar
Test mode a:TX mode_Keep the EUT in transmitting with modulation mode.

7.3.2 Test Setup Diagram



7.3.3 Measurement Procedure and Data

- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
- h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- j. Repeat above procedures until all frequencies measured was complete.

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



Channel:910MHz:

Mode:a; Polarization:Horizontal; Modulation:ASK;

	Freq	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	523.000	28.75	16.93	2.42	27.46	20.64	46.00	-25.36	HORIZONTAL	Peak
2	950.000	29.26	22.14	3.20	26.90	27.70	46.00	-18.30	HORIZONTAL	Peak

Mode:a; Polarization:Vertical; Modulation:ASK;

	Freq	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	523.000	33.54	16.93	2.42	27.46	25.43	46.00	-20.57	VERTICAL	Peak
2	950.000	28.83	22.14	3.20	26.90	27.27	46.00	-18.73	VERTICAL	Peak

Channel:915MHz:

Mode:a; Polarization:Horizontal; Modulation:ASK;

	Freq	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	523.000	28.45	16.93	2.42	27.46	20.34	46.00	-25.66	HORIZONTAL	Peak
2	957.000	29.80	22.16	3.20	26.89	28.27	46.00	-17.73	HORIZONTAL	Peak

Mode:a; Polarization:Vertical; Modulation:ASK;

	Freq	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	521.000	35.53	16.91	2.42	27.46	27.40	46.00	-18.60	VERTICAL	Peak
2	957.000	29.35	22.16	3.20	26.89	27.82	46.00	-18.18	VERTICAL	Peak



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7.4 Radiated Emissions

Test Requirement 47 CFR Part 15, Subpart C 15.209 & 15.249 (a),(d)
Test Method: ANSI C63.10 (2013) Section 6.4&6.5&6.6
Measurement Distance: 3m
Limit:

Frequency (MHz)	Field strength (microvolts/meter)	Limit (dBuV/m)	Detector	Measurement Distance (meters)
0.009-0.490	2400/F(kHz)	-	-	300
0.490-1.705	24000/F(kHz)	-	-	30
1.705-30	30	-	-	30
30-88	100	40.0	QP	3
88-216	150	43.5	QP	3
216-960	200	46.0	QP	3
960-1000	500	54.0	QP	3
Above 1000	500	54.0	AV	3

7.4.1 E.U.T. Operation

Operating Environment:

Temperature: 20.9 °C Humidity: 55.3 % RH Atmospheric Pressure: 1020 mbar
Test mode a:TX mode_Keep the EUT in transmitting with modulation mode.

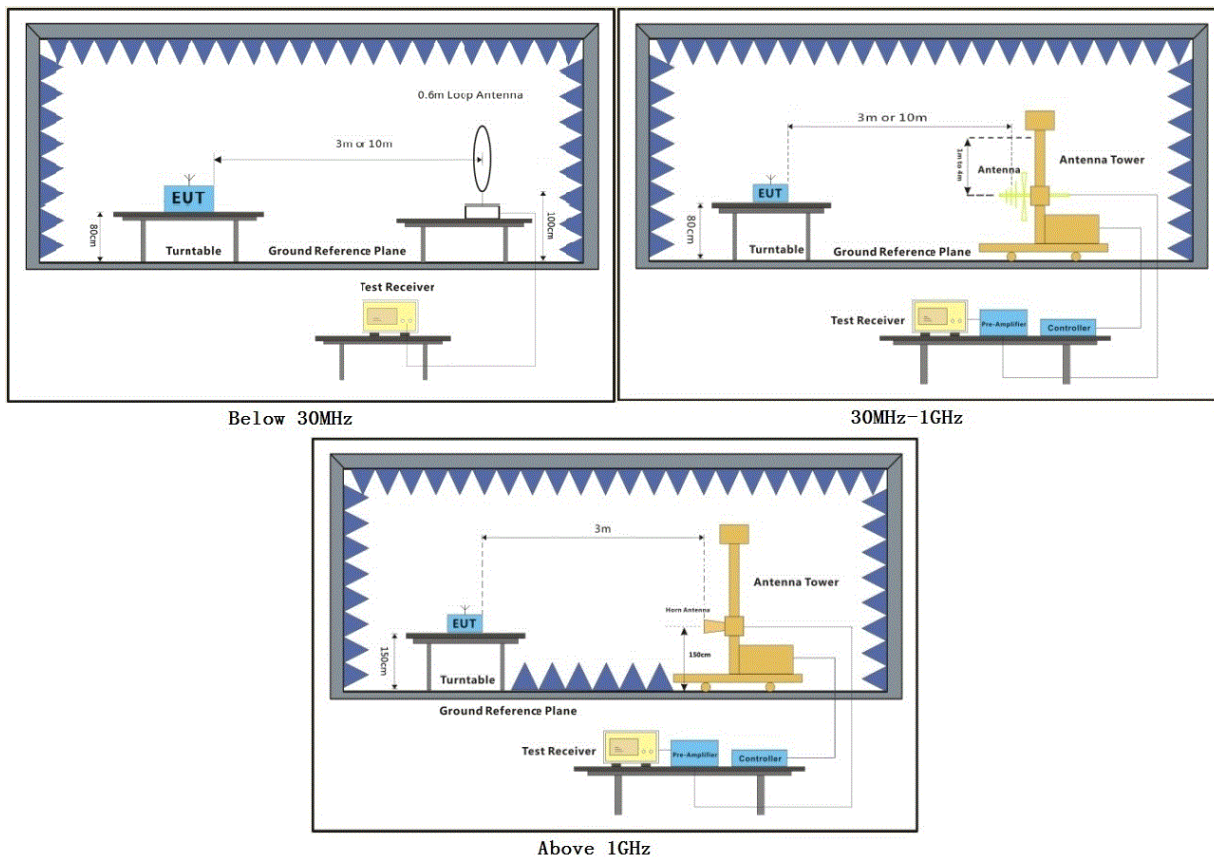


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7.4.2 Test Setup Diagram



7.4.3 Measurement Procedure and Data

For testing performed with the loop antenna, the center of the loop was positioned 1 m above the ground and positioned with its plane vertical at the specified distance from the EUT. During testing the loop was rotated about its vertical axis for maximum response at each azimuth and also investigated with the loop positioned in the horizontal plane. Only the worst position of vertical was shown in the report.

Measured Level $I = \text{Read Level} + \text{Antenna Factor} + \text{Cable Loss} - \text{Preamp Factor}$

Channel:910MHz:

Mode:a; Polarization:Horizontal; Modulation:ASK;

		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	2009.093	31.46	25.21	11.00	37.50	30.17	54.00	-23.83	HORIZONTAL	Average
2	2009.093	46.82	25.21	11.00	37.50	45.53	74.00	-28.47	HORIZONTAL	Peak
3	3365.116	33.14	27.90	5.53	36.97	29.60	54.00	-24.40	HORIZONTAL	Average
4	3365.116	49.06	27.90	5.53	36.97	45.52	74.00	-28.48	HORIZONTAL	Peak
5	4446.313	35.45	30.06	6.24	36.92	34.83	54.00	-19.17	HORIZONTAL	Average
6	4446.313	50.51	30.06	6.24	36.92	49.89	74.00	-24.11	HORIZONTAL	Peak
7	5794.287	26.91	32.16	7.47	37.00	29.54	54.00	-24.46	HORIZONTAL	Average
8	5794.287	44.53	32.16	7.47	37.00	47.16	74.00	-26.84	HORIZONTAL	Peak
9	7194.490	26.16	35.45	7.34	36.93	32.02	54.00	-21.98	HORIZONTAL	Average
10	7194.490	42.55	35.45	7.34	36.93	48.41	74.00	-25.59	HORIZONTAL	Peak
11	9506.048	27.08	37.40	8.22	37.07	35.63	54.00	-18.37	HORIZONTAL	Average
12	9506.048	42.26	37.40	8.22	37.07	50.81	74.00	-23.19	HORIZONTAL	Peak

Mode:a; Polarization: Vertical; Modulation:ASK

	Freq	ReadAntenna Level Factor	Cable Preamp Loss Factor	Limit Line	Over Limit	Pol/Phase	Remark			
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2009.093	33.09	25.21	11.00	37.50	31.80	54.00	-22.20	VERTICAL	Average
2	2009.093	46.59	25.21	11.00	37.50	45.30	74.00	-28.70	VERTICAL	Peak
3	3365.116	35.27	27.90	5.53	36.97	31.73	54.00	-22.27	VERTICAL	Average
4	3365.116	49.98	27.90	5.53	36.97	46.44	74.00	-27.56	VERTICAL	Peak
5	4446.313	41.57	30.06	6.24	36.92	40.95	54.00	-13.05	VERTICAL	Average
6	4446.313	52.63	30.06	6.24	36.92	52.01	74.00	-21.99	VERTICAL	Peak
7	6622.165	31.86	34.46	7.14	36.98	36.48	54.00	-17.52	VERTICAL	Average
8	6622.165	44.45	34.46	7.14	36.98	49.07	74.00	-24.93	VERTICAL	Peak
9	8109.610	28.50	36.43	8.31	36.91	36.33	54.00	-17.67	VERTICAL	Average
10	8109.610	42.20	36.43	8.31	36.91	50.03	74.00	-23.97	VERTICAL	Peak
11	9727.473	27.21	37.66	8.29	37.09	36.07	54.00	-17.93	VERTICAL	Average
12	9727.473	42.15	37.66	8.29	37.09	51.01	74.00	-22.99	VERTICAL	Peak



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Channel:915MHz:

Mode:a; Polarization:Vertical; Modulation:ASK;

	Freq	ReadAntenna Level Factor	Cable Preamp Loss Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dB	
1	1270.574	35.17	24.73	2.96	38.14	24.72	54.00	-29.28 HORIZONTAL Average
2	1270.574	47.33	24.73	2.96	38.14	36.88	74.00	-37.12 HORIZONTAL Peak
3	2786.121	34.95	27.49	4.70	37.25	29.89	54.00	-24.11 HORIZONTAL Average
4	2786.121	46.22	27.49	4.70	37.25	41.16	74.00	-32.84 HORIZONTAL Peak
5	4497.798	40.96	30.10	6.54	36.92	40.68	54.00	-13.32 HORIZONTAL Average
6	4497.798	52.04	30.10	6.54	36.92	51.76	74.00	-22.24 HORIZONTAL Peak
7	5902.011	33.84	32.24	7.42	37.00	36.50	54.00	-17.50 HORIZONTAL Average
8	5902.011	44.84	32.24	7.42	37.00	47.50	74.00	-26.50 HORIZONTAL Peak
9	8184.648	28.16	36.37	8.26	36.91	35.88	54.00	-18.12 HORIZONTAL Average
10	8184.648	42.51	36.37	8.26	36.91	50.23	74.00	-23.77 HORIZONTAL Peak
11	9484.185	28.34	37.36	8.24	37.07	36.87	54.00	-17.13 HORIZONTAL Average
12	9484.185	42.42	37.36	8.24	37.07	50.95	74.00	-23.05 HORIZONTAL Peak

Mode:a; Polarization:Vertical; Modulation:ASK;

	Freq	ReadAntenna Level Factor	Cable Preamp Loss Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dB	
1	2065.380	34.11	25.32	10.00	37.49	31.94	54.00	-22.06 VERTICAL Average
2	2065.380	46.57	25.32	10.00	37.49	44.40	74.00	-29.60 VERTICAL Peak
3	3917.419	35.74	29.32	7.51	36.91	35.66	54.00	-18.34 VERTICAL Average
4	3917.419	47.55	29.32	7.51	36.91	47.47	74.00	-26.53 VERTICAL Peak
5	4539.416	39.25	30.16	6.75	36.92	39.24	54.00	-14.76 VERTICAL Average
6	4539.416	53.37	30.16	6.75	36.92	53.36	74.00	-20.64 VERTICAL Peak
7	5902.011	32.15	32.24	7.42	37.00	34.81	54.00	-19.19 VERTICAL Average
8	5902.011	45.26	32.24	7.42	37.00	47.92	74.00	-26.08 VERTICAL Peak
9	7852.356	28.52	36.39	8.32	36.90	36.33	54.00	-17.67 VERTICAL Average
10	7852.356	43.25	36.39	8.32	36.90	51.06	74.00	-22.94 VERTICAL Peak
11	9246.981	26.26	36.95	8.38	37.05	34.54	54.00	-19.46 VERTICAL Average
12	9246.981	41.89	36.95	8.38	37.05	50.17	74.00	-23.83 VERTICAL Peak

--End of Report--



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