

TEST REPORT

Application No.: KSCR2112000380AT
FCC ID: 2AL8S-0235C5R4
IC: 25987-0235C5R4
Applicant: ZHEJIANG UNIVIEW TECHNOLOGIES CO., LTD
Address of Applicant: 88 JIANGLING ROAD, XIXING TOWN, BINJIANG DISTRICT, HANGZHOU CITY
Manufacturer: ZHEJIANG UNIVIEW TECHNOLOGIES CO., LTD
Address of Manufacturer: 88 JIANGLING ROAD, XIXING TOWN, BINJIANG DISTRICT, HANGZHOU CITY

Equipment Under Test (EUT):

EUT Name: Face Recognition Access Control Terminal

Model No.: OET-251H-M-NB, OET-251H-M, OET-251H-M-xxxxxxx-yyyyyyy-zzz

('x' can be 0-9, A-Z, a-z, @, or blank, denoting difference in tinterface; 'y' can be 0-9, A-Z, a-z, @, or blank, denoting difference in tinterface; 'y' can be 0-9, A-Z, a-z, @, or blank, denoting difference in tinterface; '-' may be blank)¤

For IC Model No.: OET-251H-M-NB, OET-251H-M

¤

Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.

Standard(s): 47 CFR Part 15, Subpart C 15.225

RSS-210 Issue 10 December 2019

RSS-Gen Issue 5 Amendment 2 (February 2021)

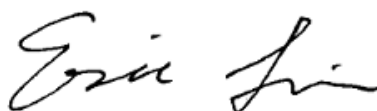
Date of Receipt: 2021-12-21

Date of Test: 2021-12-21 to 2022-01-12

Date of Issue: 2022-01-13

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



Eric Lin
Laboratory Manager



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Revision Record			
Version	Description	Date	Remark
00	Original	2022-01-13	/

Authorized for issue by:			
			
		Damon Zhou / Project Engineer	
			
		Eric Lin / Reviewer	



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2 Test Summary

Radio Spectrum Technical Requirement				
Item	FCC Requirement	IC Requirement	Method	Result
Antenna Requirement	47 CFR Part 15, Subpart C 15.225	N/A	RSS-210 Issue 10 December 2019	Customer Declaration

Radio Spectrum Matter Part				
Item	FCC Requirement	IC Requirement	Method	Result
20dB Bandwidth	47 CFR Part 15, Subpart C 15.225	RSS-210 Issue 10 December 2019	ANSI C63.10 (2013) Section 6.9	Pass
Emission Mask	47 CFR Part 15, Subpart C 15.225	RSS-210 Issue 10 December 2019	ANSI C63.10 (2013) Section 6.4	*Pass
Frequency tolerance	47 CFR Part 15, Subpart C 15.225	RSS-210 Issue 10 December 2019	ANSI C63.10 (2013) Section 6.8	Pass
Radiated Emissions(9kHz-30MHz)	47 CFR Part 15, Subpart C 15.225	RSS-210 Issue 10 December 2019	ANSI C63.10 (2013) Section 6.4&6.5	Pass
Radiated Emissions(30MHz-1GHz)	47 CFR Part 15, Subpart C 15.225	RSS-210 Issue 10 December 2019	ANSI C63.10 (2013) Section 6.4&6.5	Pass
99% Bandwidth	-	RSS-210 Issue 10 December 2019	RSS-Gen Section 6.7	Pass

Declaration of EUT Family Grouping:

Note: There are series models mentioned in this report, and they are the similar in electrical and electronic characters. Only the model OET-251H-M-NB was tested since their differences were the model number and appearance.



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4 General Information

4.1 Details of E.U.T.

Power supply:	DC 12V,2A
Test voltage:	AC 120V/60Hz
Operation Frequency	13.56MHz
Modulation Technique:	ASK
Antenna Type:	Loop antenna
Number of Channel:	1
Serial Number:	210235C5R4321B000007
Firmware Version:	QPTS-B2501.1.70.LJ01.211103

4.2 Description of Support Units

The EUT has been tested as an independent unit.

4.3 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	$\pm 8.4 \times 10^{-8}$
2	Occupied Bandwidth	$\pm 3\%$
3	Radiated Spurious emission test	$\pm 4.2\text{dB}$ (Below 30MHz)
		$\pm 4.4\text{dB}$ (30MHz-1GHz)
		$\pm 4.8\text{dB}$ (1GHz-18GHz)
		$\pm 5.2\text{dB}$ (Above 18GHz)
4	Temperature test	$\pm 1^\circ\text{C}$
5	Humidity test	$\pm 3\%$
6	Supply voltages	$\pm 1.5\%$
7	Time	$\pm 3\%$

Note: The measurement uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.



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4.4 Test Location

All tests were performed at:

Compliance Certification Services (Kunshan) Inc.

All measurement facilities used to collect the measurement data are located at
No.10 Weiye Rd, Innovation park, Eco&Tec, Development Zone, Kunshan City, Jiangsu, China.

No tests were sub-contracted.

4.5 Test Facility

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

- **CNAS (No. CNAS L4354)**

CNAS has accredited Compliance Certification Services (Kunshan) Inc. to ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- **A2LA (Certificate No. 2541.01)**

Compliance Certification Services (Kunshan) Inc. is accredited by the American Association for Laboratory Accreditation (A2LA). Certificate No. 2541.01.

- **FCC (Designation Number: CN1172)**

Compliance Certification Services Inc. has been recognized as an accredited testing laboratory.

Designation Number: CN1172.

- **ISED (CAB Identifier: CN0072)**

Compliance Certification Services (Kunshan) Inc. has been recognized by Innovation, Science and Economic Development (ISED) Canada as an accredited testing laboratory.

CAB Identifier: 2324E

- **VCCI (Member No.: 1938)**

The 3m and 10m Semi-anechoic chamber and Shielded Room of Compliance Certification Services (Kunshan) Inc. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-20134, R-11600, C-11707, T-11499, G-10216 respectively.

None

4.6 Abnormalities from Standard Conditions

None



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5 Equipment List

Item	Equipment	Manufacturer	Model	Serial Number	Cal Date	Cal. Due Date
RF Radiated Test						
1	Spectrum Analyzer	R&S	FSV40	101493	10/11/2021	10/10/2022
2	Signal Generator	Agilent	E8257C	MY43321570	10/18/2021	10/17/2022
3	Loop Antenna	Schwarzbeck	HXYZ9170	9170-108	02/22/2021	02/21/2022
4	Bilog Antenna	TESEQ	CBL 6112D	35403	06/21/2021	06/20/2023
5	Bilog Antenna	SCHWARZBECK	VULB9160	9160-3342	04/13/2021	04/12/2023
6	Horn-antenna(1-18GHz)	Schwarzbeck	BBHA9120D	267	10/26/2020	10/25/2022
7	Horn-antenna(1-18GHz)	ETS-LINDGREN	3117	00143290	02/22/2021	02/21/2023
8	Horn Antenna(18-40GHz)	Schwarzbeck	BBHA9170	BBHA9170171	02/22/2021	02/21/2022
9	Pre-Amplifier(30MHz~18GHz)	LNA	/	/	04/15/2021	04/14/2022
10	Amplifier(18~40GHz)	COM-POWER	PAM-840A	461332	10/18/2021	10/17/2022
11	Low Pass Filter	MICRO-TRONICS	VLFX-950	RV142900829	N.C.R	N.C.R
12	High Pass Filter	Mini-Circuits	VHF-1200	15542	N.C.R	N.C.R
13	Filter (5450MHz~5770 MHz)	MICRO-TRONICS	BRC50704-01	2	N.C.R	N.C.R
14	Filter (5690 MHz~5930 MHz)	MICRO-TRONICS	BRC50705-01	4	N.C.R	N.C.R
15	Filter (5150 MHz~5350 MHz)	MICRO-TRONICS	BRC50703-01	2	N.C.R	N.C.R
16	Filter (885 MHz~915 MHz)	MICRO-TRONICS	BRM14698	1	N.C.R	N.C.R
17	Filter (815 MHz~860 MHz)	MICRO-TRONICS	BRM14697	1	N.C.R	N.C.R
18	Filter (1745 MHz~1910 MHz)	MICRO-TRONICS	BRM14700	1	N.C.R	N.C.R
19	Filter (1922 MHz~1977 MHz)	MICRO-TRONICS	BRM50715	1	N.C.R	N.C.R
20	Filter (2550 MHz)	MICRO-TRONICS	HPM13362	5	N.C.R	N.C.R
21	Filter (1532 MHz~1845 MHz)	MICRO-TRONICS	BRM50713	1	N.C.R	N.C.R
22	Filter (2.4GHz)	MICRO-TRONICS	BRM50701	5	N.C.R	N.C.R
23	RE test cable	/	RE01-RE04	/	04/15/2021	04/14/2022
24	Software	Faratronic	EZ EMC-v 3A1	N/A	N/A	N/A



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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

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 antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit permanently attached antenna or of an 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 loop antenna integrated on the main PCB and no consideration of replacement.

Antenna location: Refer to Appendix (Internal Photos)



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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

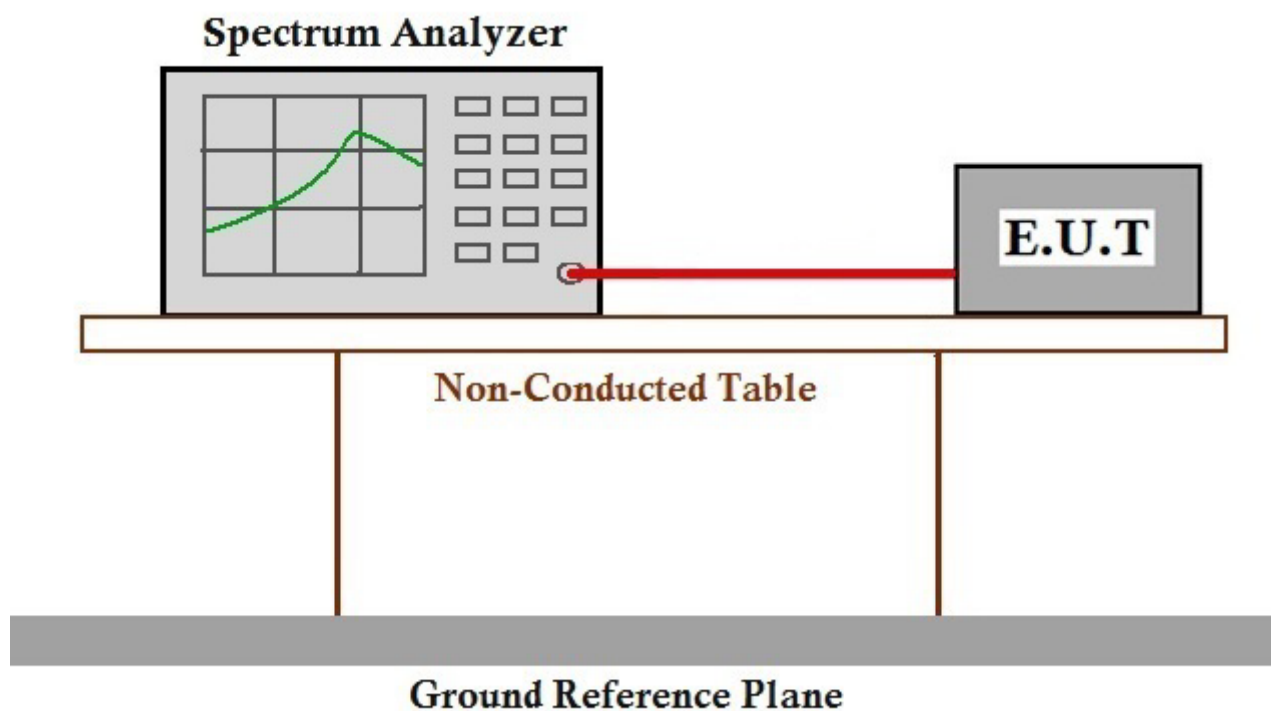
7.1.1 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1002 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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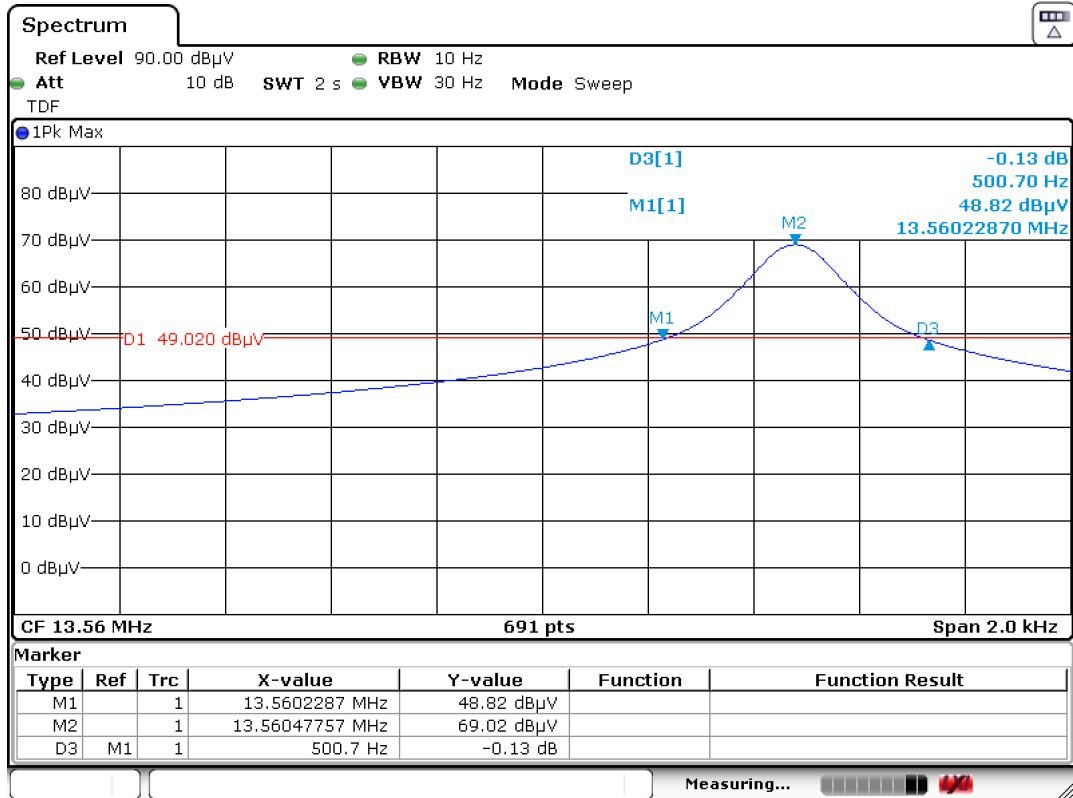
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20dB bandwidth (kHz)	F _L (MHz)	F _H (MHz)	Limit(MHz)	Result
0.5007	13.5602	13.5607	13.110 – 14.010	Pass

Test plot as follows:



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7.2 Emission Mask

Test Requirement 47 CFR Part 15, Subpart C 15.225(a)&(b)&(C)

Test Method: ANSI C63.10 (2013) Section 6.4

Limit:

- (a) The field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 15.848 microvolts/meter at 30 meters.
- (b) Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.
- (c) Within the bands 13.110-13.410 MHz and 13.710-14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.
- (d) The field strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the general radiated emission limits in § 15.209.

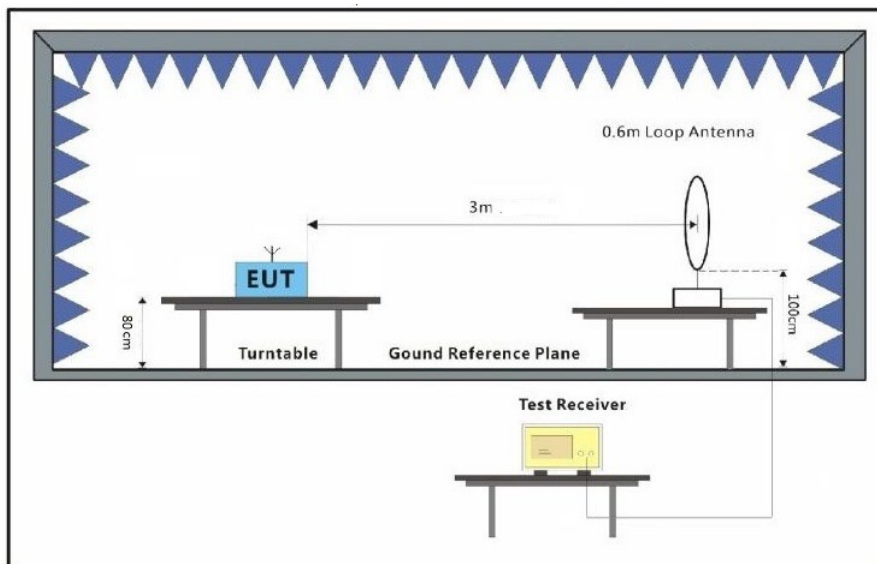
7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1002 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

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.

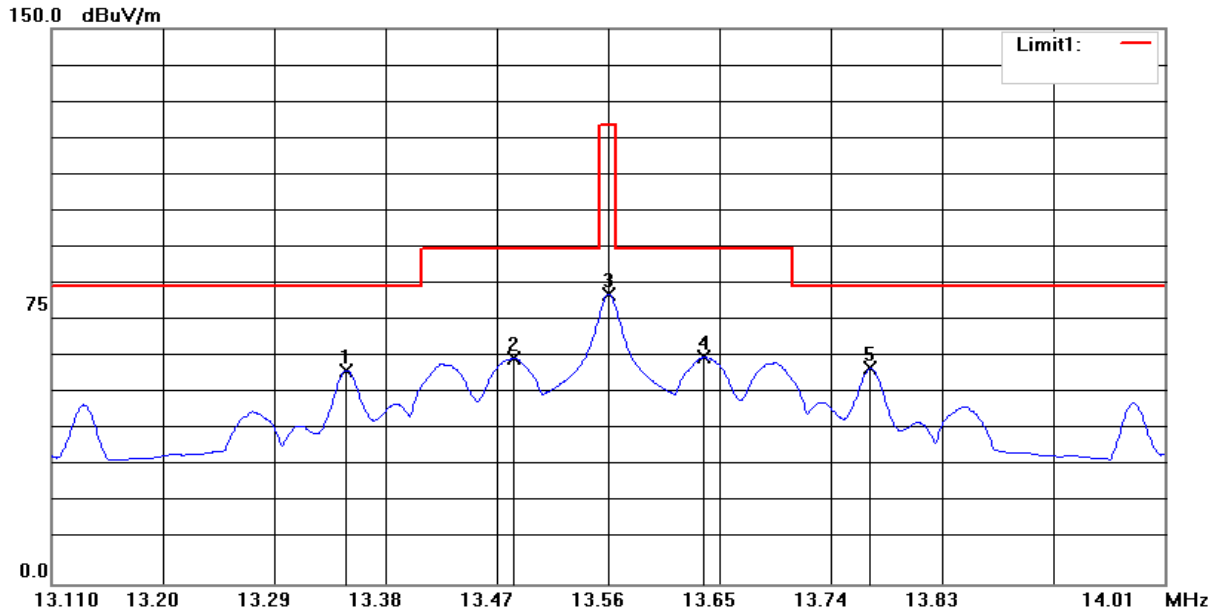


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Horizontal



Item	Freq.	Read Level	Correct Factor	Result Level@3m	Limit Line@3m	Over Limit	Detector
(Mark)	(MHz)	(dBμV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	13.3485	44.64	13.02	57.66	80.50	-22.84	QP
2	13.4835	48.11	13.01	61.12	90.50	-29.38	QP
3	13.5600	65.29	13.00	78.29	124.00	-45.71	Peak
4	13.6374	48.31	12.99	61.30	90.50	-29.20	QP
5	13.7724	45.33	12.98	58.31	80.50	-22.19	QP

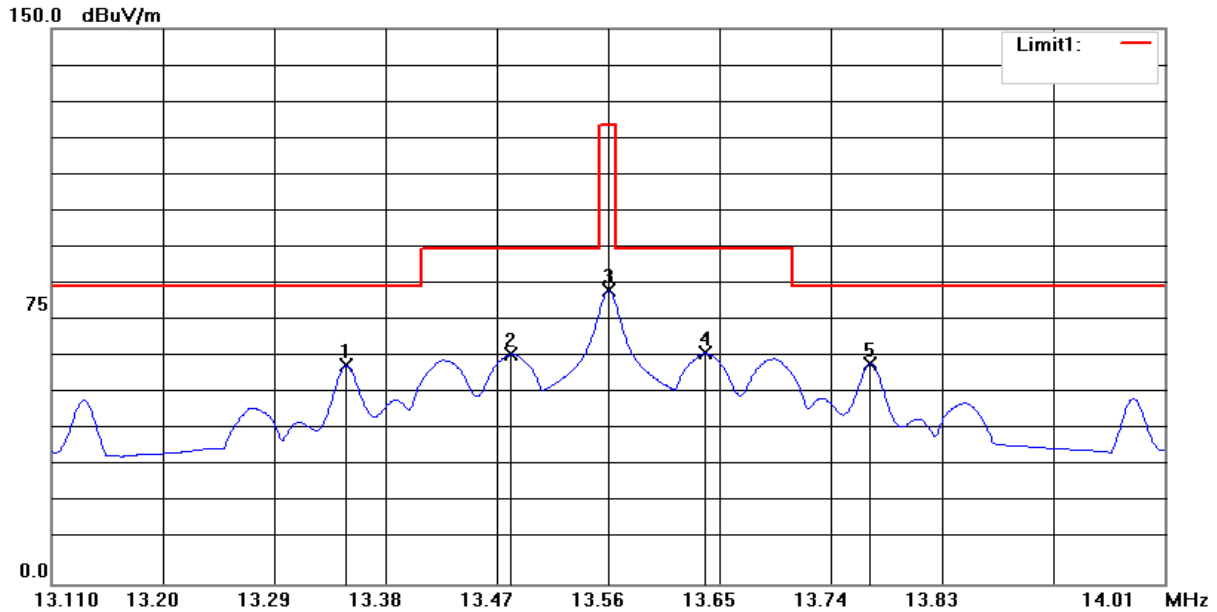


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Vertical



Item	Freq.	Read Level	Correct Factor	Result Level@3m	Limit Line@3m	Over Limit	Detector
(Mark)	(MHz)	(dBμV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	13.3485	45.90	13.02	58.92	80.50	-21.58	QP
2	13.4817	49.12	13.01	62.13	90.50	-28.37	QP
3	13.5600	66.28	13.00	79.28	124.00	-44.72	Peak
4	13.6383	49.32	12.99	62.31	90.50	-28.19	QP
5	13.7724	46.61	12.98	59.59	80.50	-20.91	QP



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7.3 Frequency tolerance

Test Requirement 47 CFR Part 15, Subpart C 15.225(e)
Test Method: ANSI C63.10 (2013) Section 6.8
Limit: 1.356kHz

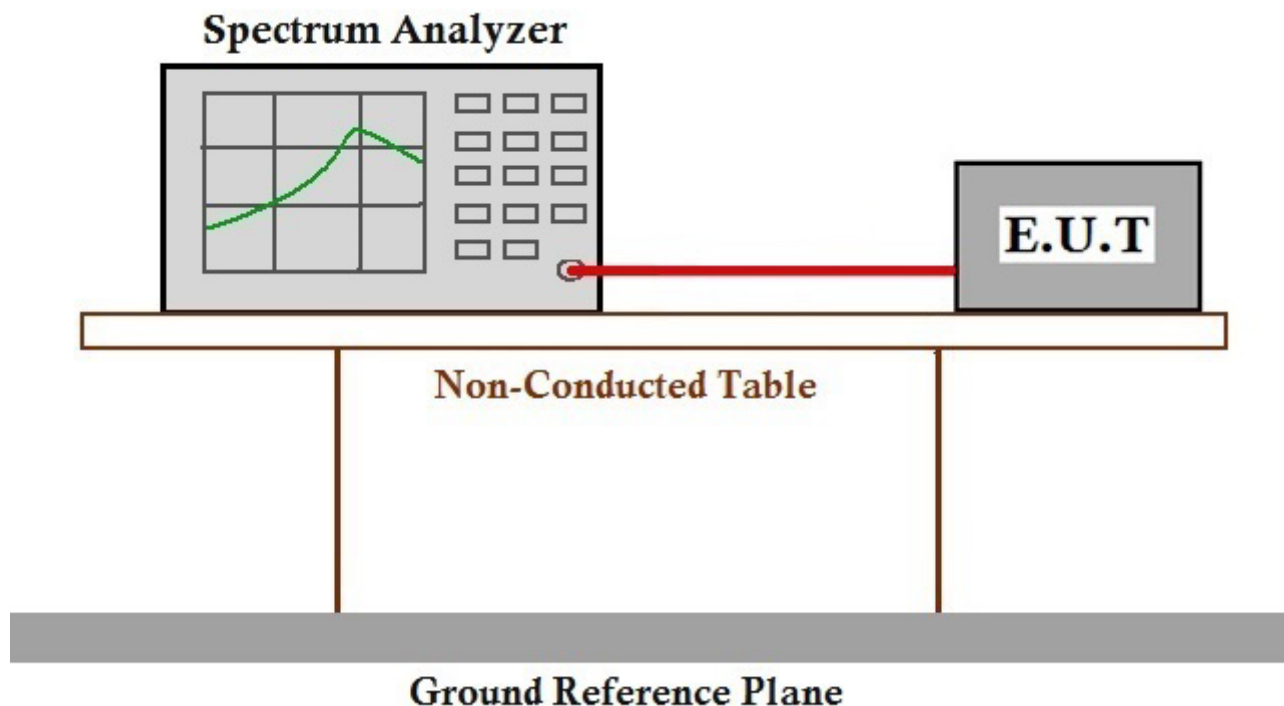
7.3.1 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1002 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



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Nominal Operation Frequency: 13.56MHz

Test Conditions		Test Result (MHz)	Deviation (kHz)	Limit (kHz)	Result
Temp (°C)	Volt (V DC)				
T _{nom} (-20)	V _{nom} (12)	13.56028	0.28	±0.01% (1.3560kHz)	Pass
T _{nom} (-10)	V _{nom} (12)	13.56032	0.32		Pass
T _{nom} (0)	V _{nom} (12)	13.56037	0.37		Pass
T _{nom} (10)	V _{nom} (12)	13.56041	0.41		Pass
T _{nom} (20)	V _{nom} (12)	13.56046	0.46		Pass
T _{nom} (30)	V _{nom} (12)	13.56049	0.49		Pass
T _{nom} (40)	V _{nom} (12)	13.56053	0.53		Pass
T _{nom} (50)	V _{nom} (12)	13.56058	0.58		Pass
T _{nom} (20)	V _{min} (10.8)	13.56043	0.43		Pass
	V _{max} (13.2)	13.56050	0.50		Pass

Note: Deviation (kHz) = (Test Result-13.56MHz)*1000



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7.4 Radiated Emissions(9kHz-30MHz)

Test Requirement 47 CFR Part 15, Subpart C 15.225(d) & 15.209

Test Method: ANSI C63.10 (2013) Section 6.4&6.5

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

NOTE:

- (1) For test distance other than what is specified, but fulfilling the requirements of section 15.31(f) (2) the field strength is calculated by adding additionally an extrapolation factor of 40dB/decade (inverse linear distance for field strength measurements).

So the Distance Extrapolation Factor in dB is $40 \cdot \log(D_{\text{TEST}} / D_{\text{SPEC}})$ where D_{TEST} = Test Distance and D_{SPEC} = Specified Distance.

Field strength limit (dBuV/m)@test distance= Field strength limit (dBuV/m)@specified distance +Distance Extrapolation Factor

- (2) The lower limit shall apply at the transition frequencies.



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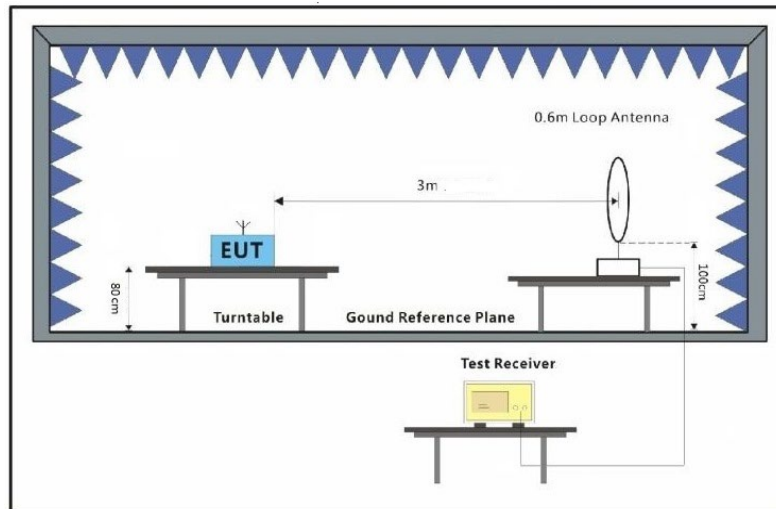
7.4.1 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1002 mbar

Test mode: a:TX mode_Keep the EUT in transmitting with modulation mode.

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.



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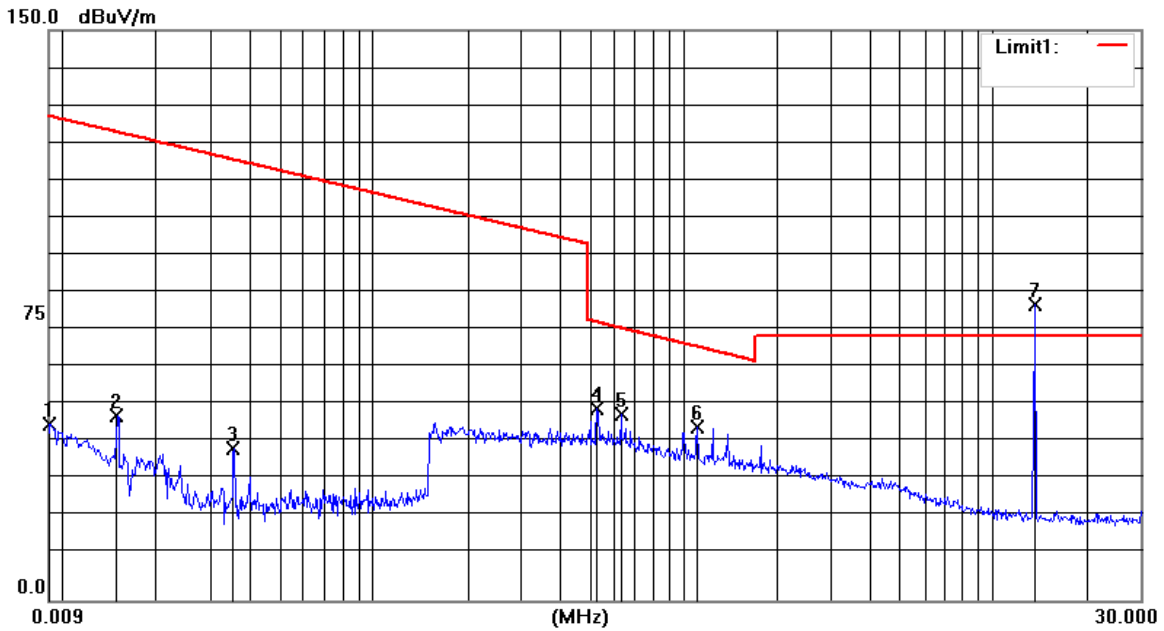
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Mode a:

Horizontal



Item	Freq.	Read Level	Correct Factor	Result Level@3m	Result Level@SP EC	Limit Line@SPE C	Over Limit	Detector
(Mark)	(MHz)	(dBμV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	0.0091	30.49	16.01	46.50	-33.50	47.41	-80.91	QP
2	0.0150	32.61	15.94	48.55	-31.45	43.20	-74.65	QP
3	0.0354	24.19	15.72	39.91	-40.09	35.96	-76.05	QP
4	0.5263	36.21	14.41	50.62	10.62	33.18	-22.56	QP
5	0.6270	34.67	14.40	49.07	9.07	31.66	-22.59	QP
6	1.1054	31.35	14.35	45.70	5.70	26.75	-21.05	QP
7	13.5600	64.77	13.00	77.77	37.77	84.00	-46.23	Peak



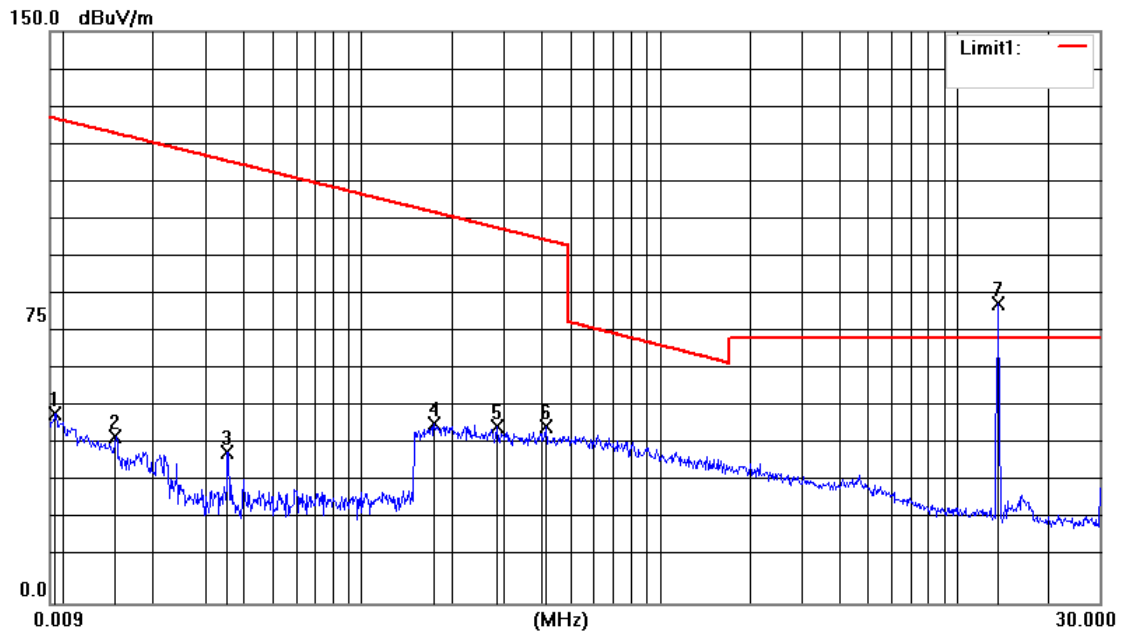
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Vertical



Item	Freq.	Read Level	Correct Factor	Result Level@3m	Result Level@SP EC	Limit Line@SPE C	Over Limit	Detector
(Mark)	(MHz)	(dBμV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	0.0094	33.60	16.01	49.61	-30.39	47.14	-77.53	QP
2	0.0150	27.90	15.94	43.84	-36.16	43.20	-79.36	QP
3	0.0354	23.80	15.72	39.52	-40.48	35.96	-76.44	QP
4	0.1748	32.52	14.45	46.97	-33.03	22.49	-55.52	QP
5	0.2832	31.97	14.44	46.41	-33.59	18.42	-52.01	QP
6	0.4148	31.98	14.42	46.40	-33.60	15.20	-48.80	QP
7	13.5600	65.49	13.00	78.49	38.49	84.00	-45.51	Peak



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7.5 Radiated Emissions(30MHz-1GHz)

Test Requirement 47 CFR Part 15, Subpart C 15.225(d) & 15.209

Test Method: ANSI C63.10 (2013) Section 6.4&6.5

Limit:

Frequency	Field strength (microvolt/meter)	Limit (dBuV/m)	Remark	Measurement distance (m)
30MHz-88MHz	100	40.0	Quasi-peak	3
88MHz-216MHz	150	43.5	Quasi-peak	3
216MHz-960MHz	200	46.0	Quasi-peak	3
960MHz-1GHz	500	54.0	Quasi-peak	3

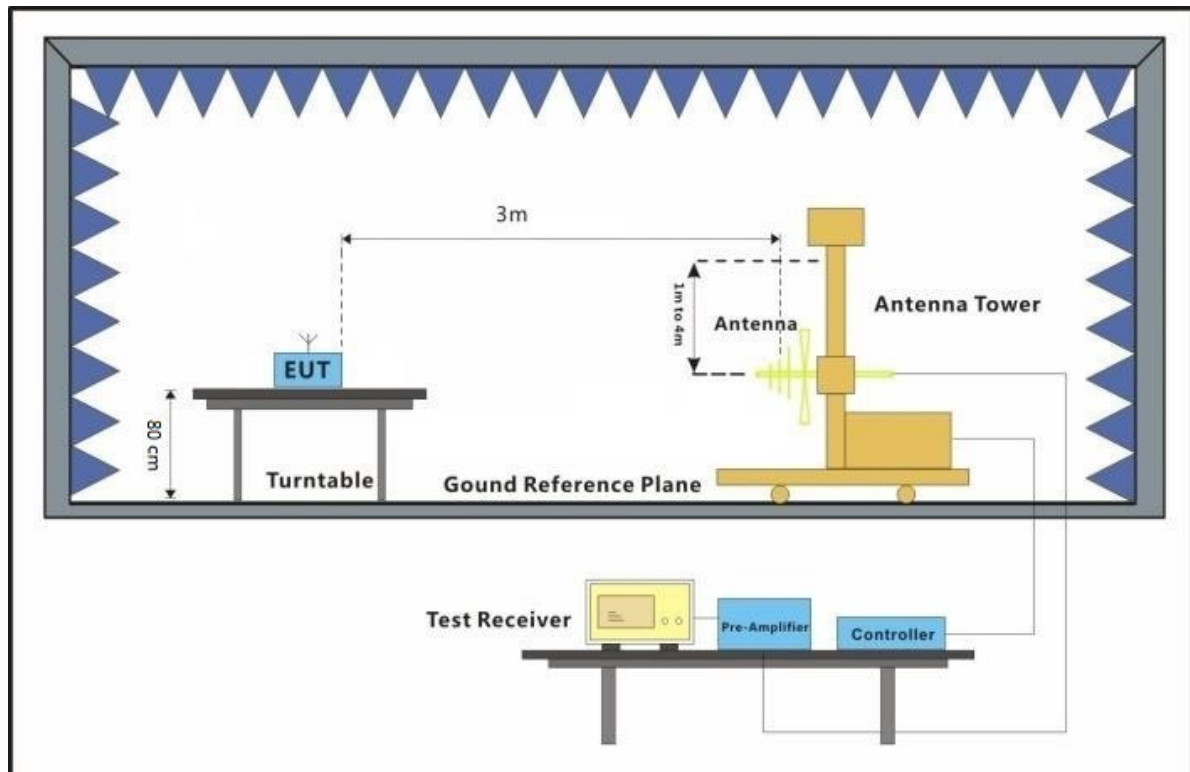
7.5.1 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1002 mbar

Test mode: a:TX mode_Keep the EUT in transmitting with modulation mode.

7.5.2 Test Setup Diagram



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7.5.3 Measurement Procedure and Data

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground for below 1GHz at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. 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.
- d. 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.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. 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.
- g. The radiation measurements are performed in X, Y, Z axis positioning. And found the X axis positioning which it is worse case, only the test worst case mode is recorded in the report.

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



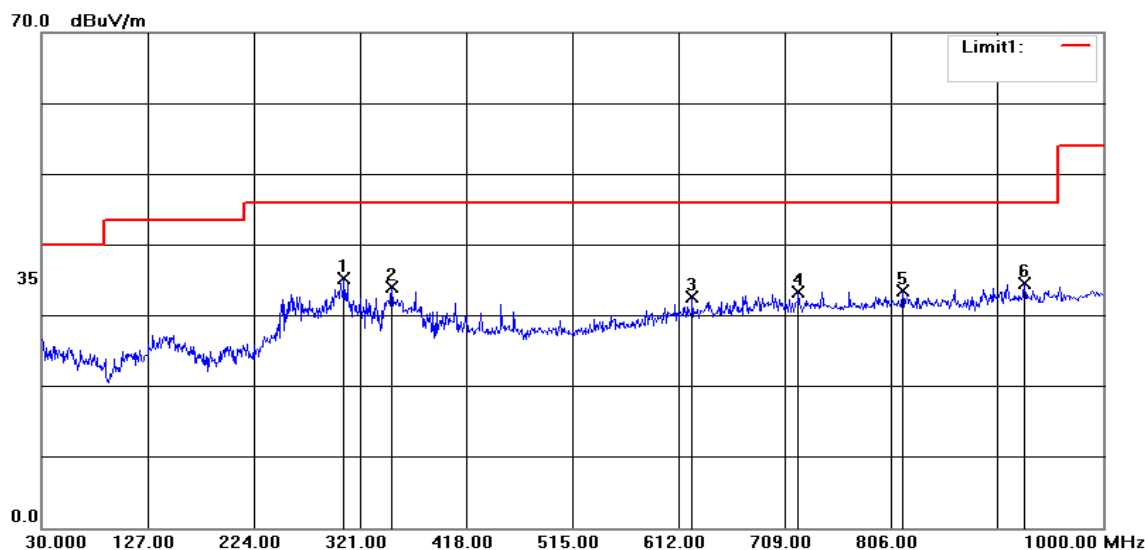
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Mode:a; Polarization:Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	306.4500	14.46	20.85	35.31	46.00	-10.69	QP
2	350.1000	11.69	22.38	34.07	46.00	-11.93	QP
3	624.6100	5.77	26.81	32.58	46.00	-13.42	QP
4	721.6100	5.77	27.49	33.26	46.00	-12.74	QP
5	816.6700	5.57	27.91	33.48	46.00	-12.52	QP
6	928.2200	5.45	29.03	34.48	46.00	-11.52	QP



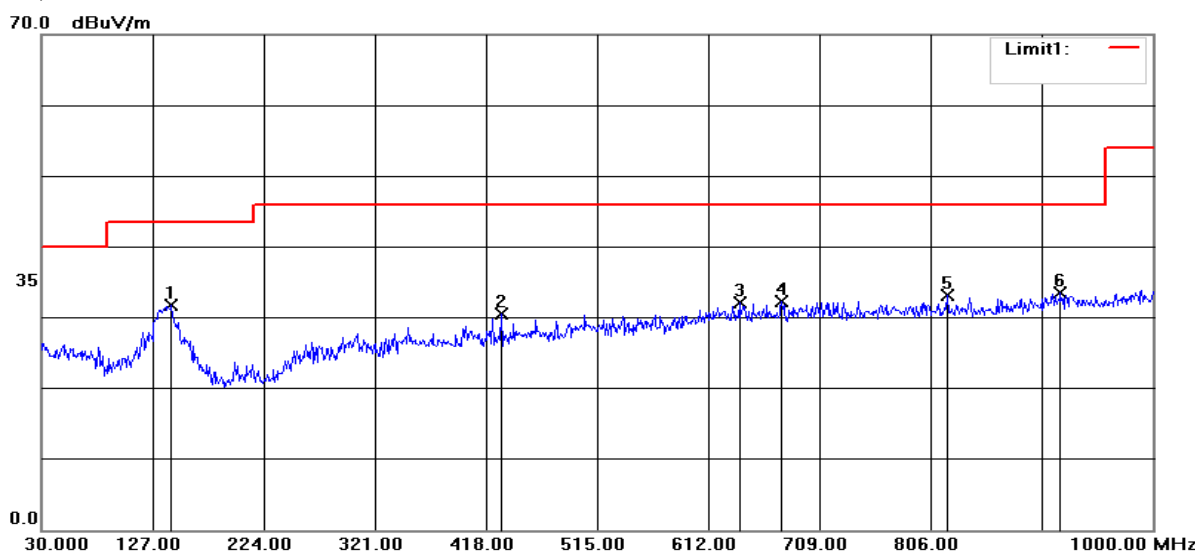
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Mode:a; Polarization:Vertical



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	143.4900	11.81	19.93	31.74	43.50	-11.76	QP
2	431.5800	6.48	24.04	30.52	46.00	-15.48	QP
3	639.1600	5.16	26.98	32.14	46.00	-13.86	QP
4	676.0200	5.06	27.31	32.37	46.00	-13.63	QP
5	820.5500	5.32	27.93	33.25	46.00	-12.75	QP
6	919.4900	4.53	28.92	33.45	46.00	-12.55	QP



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7.6 99% Bandwidth

Test Requirement RSS-Gen section 6.7

Test Method: RSS-Gen Section 6.7

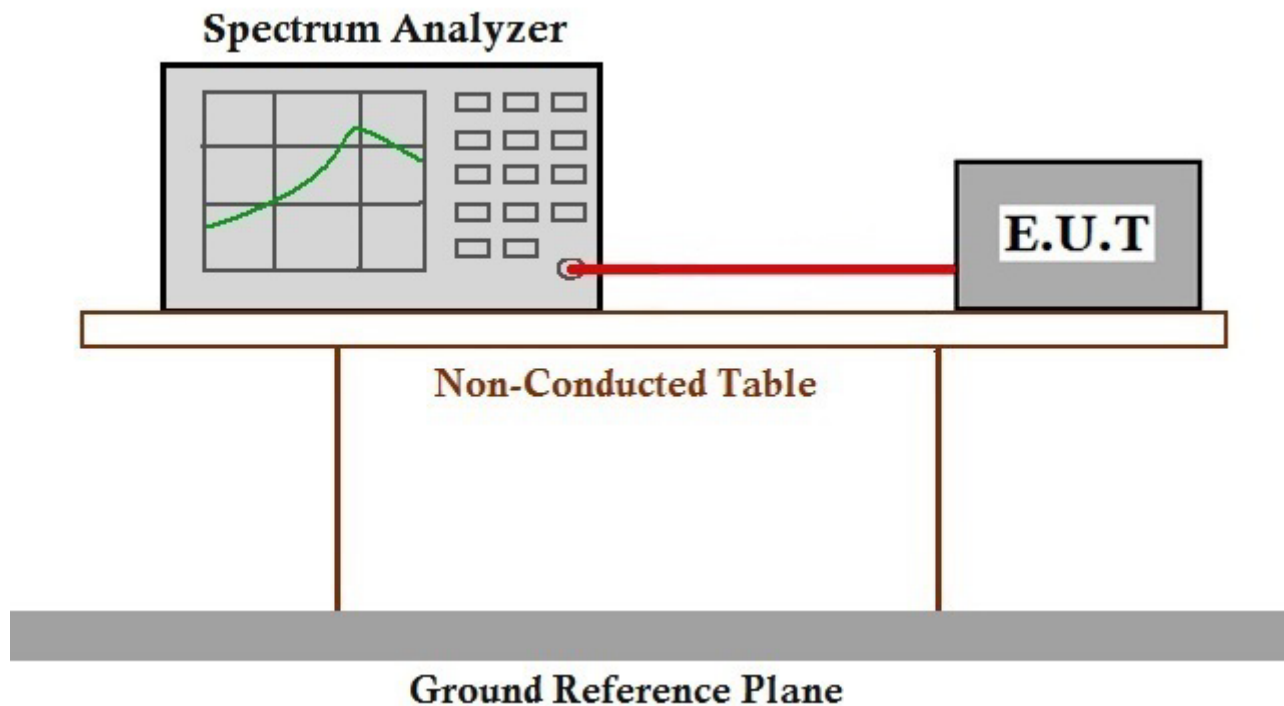
7.6.1 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1002 mbar

Test mode: a:TX mode_Keep the EUT in transmitting with modulation mode.

7.6.2 Test Setup Diagram



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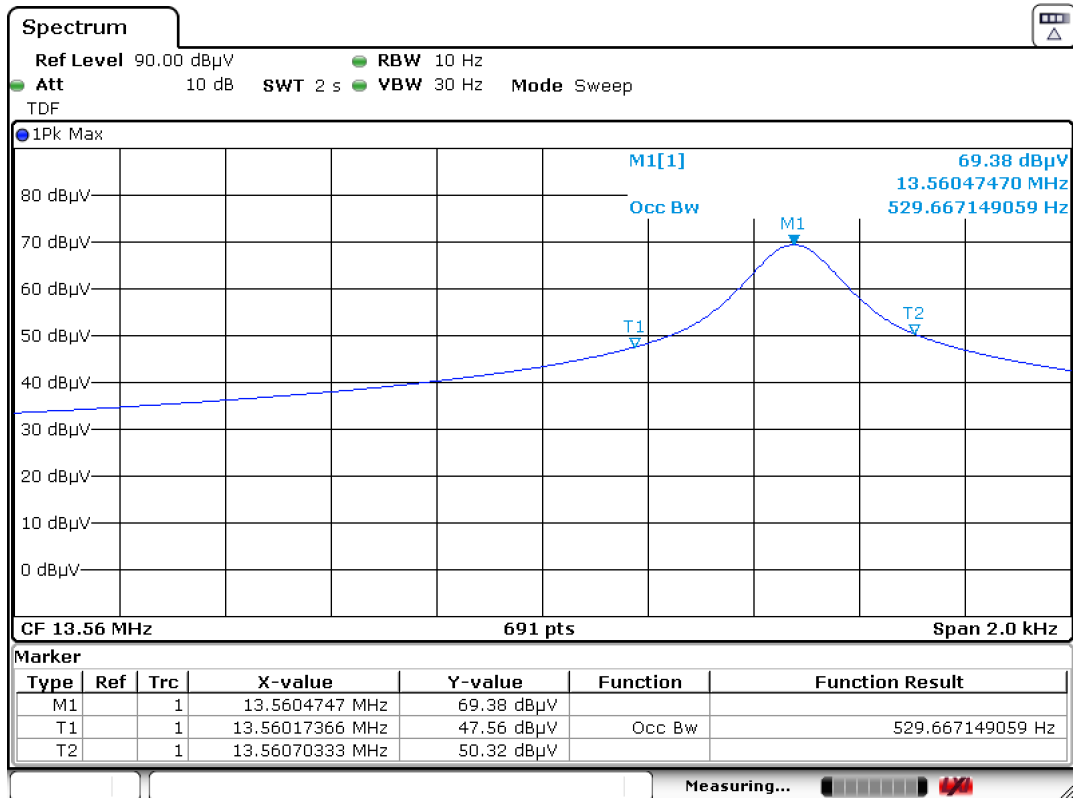
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7.6.3 Measurement Procedure and Data

Frequency (MHz)	99% bandwidth (kHz)
13.56	0.5297



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8 Test Setup Photographs

Refer to the < Test Setup photos-FCC >.

9 EUT Constructional Details

Refer to the < External Photos > & < Internal Photos >.

- End of the Report -



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