TEST REPORT

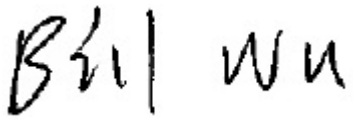
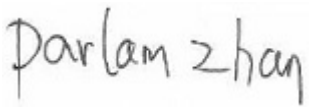
Application No.:	SHCR2109000250CO
FCC ID:	2A3IU-ABBCDJUNO15-A
IC:	27886-ABBJUNO15
Applicant:	ABB B.V.
Address of Applicant:	George Hintzenweg 81, 3068 AX, Rotterdam, The Netherlands
Manufacturer:	ABB Chargedot Shanghai New Energy Technology Co., Ltd.
Address of Manufacturer:	Unit C,D,E, 12th Floor, WESTLINK Tower D, No.2337, Gudai Road, Minhang District, Shanghai, China
Factory:	Zhejiang Chargedot New Energy Technology Co., Ltd.
Address of Factory:	No. 2368, Hongjian Road, Jiaxing Pinghu City, Zhejiang Province, China
Equipment Under Test (EUT):	
EUT Name:	Terra AC Wallbox Charging Station
Model No.:	Terra AC W9-P8-R-D-0, Terra AC W9-P8-R-CD-0, Terra AC W9-P8-RD-MCD-0, Terra AC W19-P8-R-D-0, Terra AC W19-P8-R-CD-0, Terra AC W19-P8-RD-MCD-0 ¤
¤	Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.
Trade mark:	ABB
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:	2021-09-22
Date of Test:	2021-10-12 to 2021-10-21
Date of Issue:	2021-10-27
Test Result:	**Pass***

* In the configuration tested, the EUT complied with the standards specified above.

Parlam Zhan
Laboratory 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.

Revision Record			
Version	**Description**	**Date**	**Remark**
00	Original	2021-10-27	/

Authorized for issue by:				
				
		Bill Wu / Project Engineer		
				
		Parlam Zhan / Reviewer		

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**
Conducted Emissions at AC Power Line (150kHz-30MHz)	47 CFR Part 15, Subpart C 15.225	RSS-210 Issue 10 December 2019	ANSI C63.10 (2013) Section 6.2	Pass
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

Remark *: The test level of the fundamental signal is below the limit of general spurious emission, so the test item doesn't be performed.

Declaration of EUT Family Grouping:

Note: There are series models mentioned in this report, and they are the similar in electrical and electronic characters,the difference was show as below table,consider the difference only the Terra AC W19-P8-RD-MCD-0 and Terra AC W9-P8-RD-MCD-0 was test.

Model	4G module	Display	Max output power
Terra AC W9-P8-R-D-0	Without 4G module	Measuring Module without Display	40A,9.6kW
Terra AC W9-P8-R-CD-0	With 4G module	Measuring Module without Display	40A,9.6kW
Terra AC W9-P8-RD-MCD-0	With 4G module	Measuring Module with Display	40A,9.6kW
Terra AC W19-P8-R-D-0	Without 4G module	Measuring Module without Display	80A,19.2kW
Terra AC W19-P8-R-CD-0	With 4G module	Measuring Module without Display	80A,19.2kW
Terra AC W19-P8-RD-MCD-0	With 4G module	Measuring Module with Display	80A,19.2kW

3 Contents

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4 General Information

4.1 Details of E.U.T.

Power supply:	AC 208V/240V,50/60Hz
Test voltage:	AC 240V,60Hz
Operation Frequency	13.56MHz
Modulation Technique:	ASK
Antenna Type:	Loop antenna
Number of Channel:	1
S/N:	TACW19-4-2621-G0001
Firmware:	V1.4.5

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	8.4 x 10-8
2	Timeout	2s
3	Duty cycle	0.4%
4	Occupied Bandwidth	3%
5	RF conducted power	0.6dB
6	RF power density	2.9dB
7	Conducted Spurious emissions	0.75dB
8	RF Radiated power	5.1dB (Below 1GHz)
		5.9dB (Above 1GHz)
9	Radiated Spurious emission test	4.2dB (Below 30MHz)
		4.5dB (30MHz-1GHz)
		5.1dB (1GHz-6GHz)
		5.4dB (6GHz-18GHz)
10	Temperature test	1°C
11	Humidity test	3%
12	Supply voltages	1.5%
13	Time	3%

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

NO.588 West Jindu Road,Songjiang District,Shanghai,China 201612 t(86-21)61915666 f(86-21)61915678 www.sgsgroup.com.cn
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4.4 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. E&E Lab

588 West Jindu Road, Xinqiao, Songjiang, 201612 Shanghai, China

Tel: +86 21 6191 5666 Fax: +86 21 6191 5678

No tests were sub-contracted.

4.5 Test Facility

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

• CNAS (No. CNAS L0599)

CNAS has accredited SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. 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. 6332.01)

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. is accredited by the American Association for Laboratory Accreditation(A2LA).

• FCC (Designation Number: CN1301)

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been recognized as an accredited testing laboratory.

• ISED (CAB Identifier: CN0020)

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. EMC Laboratory has been recognized by Innovation, Science and Economic Development Canada (ISED) as an accredited testing laboratory. Company Number: 8617A

• VCCI (Member No.: 3061)

The 3m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-13868, C-14336, T-12221, G-10830 respectively.

4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None

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5 Equipment List

Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Conducted Emission at Mains Terminals (150kHz-30MHz)					
EMI test receiver	R&S	ESR7	SHEM162-1	2020-12-20	2021-12-19
LISN	Schwarzbeck	NSLK8127	SHEM061-1	2020-12-20	2021-12-19
LISN	EMCO	3816/2	SHEM019-1	2020-12-20	2021-12-19
Pulse limiter	R&S	ESH3-Z2	SHEM029-1	2020-12-20	2021-12-19
Shielding Room	ZHONGYU	8*4*3M	SHEM079-2	2020-12-20	2021-12-19
CE test Cable	/	CE01	/	2020-12-20	2021-12-19
Test software	ESE	E3	Version: 6.111221a	/	/
RF Conducted Test					
Spectrum Analyzer	R&S	FSP-30	SHEM002-1	2020-12-20	2021-12-19
Spectrum Analyzer	Agilent	N9020A	SHEM181-1	2021-08-13	2022-08-12
Signal Generator	R&S	SMR20	SHEM006-1	2021-08-13	2022-08-12
Signal Generator	Agilent	N5182A	SHEM182-1	2021-08-13	2022-08-12
Communication Tester	R&S	CMW270	SHEM183-1	2021-07-28	2022-07-27
Switcher	Tonscend	JS0806	SHEM184-1	2021-08-13	2022-08-12
Power Sensor	Keysight	U2021XA * 4	SHEM184-1	2021-08-13	2022-08-12
Splitter	Anritsu	MA1612A	SHEM185-1	/	/
Coupler	e-meca	803-S-1	SHEM186-1	/	/
High-low Temp Cabinet	Suzhou Zhihe	TL-40	SHEM087-1	2018-09-25	2021-09-24
AC Power Stabilizer	APC	KDF-31020T-V0-F0	SHEM216-1	2020-12-20	2021-12-19
DC Power Supply	MCH	MCH-303A	SHEM210-1	2020-12-20	2021-12-19
Conducted test Cable	/	RF01~RF04	/	2020-12-20	2021-12-19
Test software	Tonscend	JS Tonscend BT/WIFI System	Version: 2.6	/	/
RF Radiated Test					
EMI test Receiver	R&S	ESU40	SHEM051-1	2020-12-20	2021-12-19
Spectrum Analyzer	R&S	FSP-30	SHEM002-1	2020-12-20	2021-12-19
Loop Antenna (9kHz-30MHz)	Schwarzbeck	FMZB1519	SHEM135-1	2020-12-20	2021-12-19
Antenna (25MHz-2GHz)	Schwarzbeck	VULB9168	SHEM048-1	2021-09-11	2023-09-10
Antenna (25MHz-2GHz)	Schwarzbeck	VULB9168	SHEM202-1	2020-04-30	2022-04-29
Horn Antenna (1-18GHz)	Schwarzbeck	HF906	SHEM009-1	2018-10-24	2021-10-23
Horn Antenna (1-18GHz)	Schwarzbeck	BBHA9120D	SHEM050-1	2021-09-18	2023-09-17
Horn Antenna (14-40GHz)	Schwarzbeck	BBHA 9170	SHEM049-1	2021-09-18	2023-09-17
Pre-Amplifier	HP	8447D	SHEM236-1	2021-05-27	2022-05-26
Pre-Amplifier	PANSHAN	LNA 1-18G	SHEM235-1	2021-05-27	2022-05-26
High-amplifier (14-40GHz)	Schwarzbeck	10001	SHEM049-2	2020-12-20	2021-12-19
Band Filter	LORCH	9BRX-875/X150	SHEM156-1	/	/
Band Filter	LORCH	13BRX-1950/X500	SHEM083-2	/	/
Band Filter	LORCH	5BRX-2400/X200	SHEM155-1	/	/
Band Filter	LORCH	5BRX-5500/X1000	SHEM157-2	/	/
High pass Filter	Wainwright	WHK3.0/18G	SHEM157-1	/	/
High pass Filter	Wainwright	WHKS1700	SHEM157-3	/	/
Semi/Fully Anechoic	ST	11*6*6M	SHEM078-2	2020-05-25	2023-05-24
RE test Cable	/	RE01, RE02, RE06	/	2020-12-20	2021-12-19
Test software	ESE	E3	Version: 6.111221a	/	/

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)

7 Radio Spectrum Matter Test Results

7.1 Conducted Emissions at AC Power Line (150kHz-30MHz)

Test Requirement 47 CFR Part 15, Subpart C 15.207

Test Method: ANSI C63.10 (2013) Section 6.2

Limit:

Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

7.1.1 E.U.T. Operation

Operating Environment:

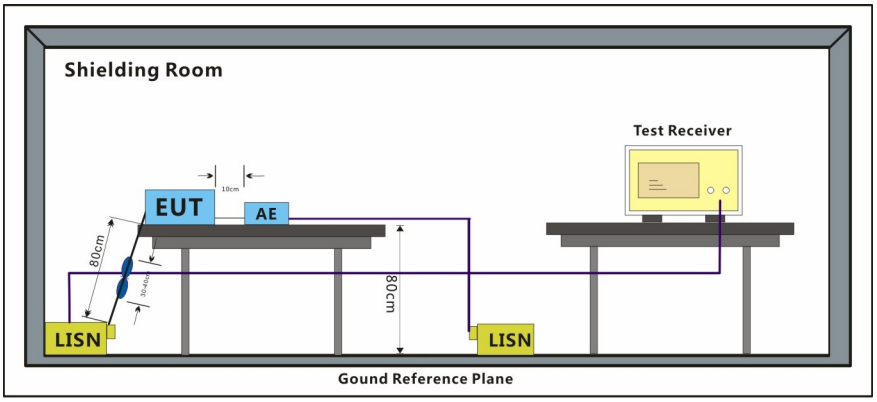
Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1020 mbar

Prescan test mode: b:TX mode_Keep the Terra AC W19-P8-RD-MCD-0 in continuously transmitting mode with GFSK modulation

c: TX mode_Keep the Terra AC W9-P8-RD-MCD-0 in continuously transmitting mode with GFSK modulation

Worst case test mode: b:TX mode_Keep the Terra AC W19-P8-RD-MCD-0 in continuously transmitting mode with GFSK modulation

7.1.2 Test Setup Diagram



7.1.3 Measurement Procedure and Data

1) The mains terminal disturbance voltage test was conducted in a shielded room.

2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50ohm/50μH + 5ohm linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.

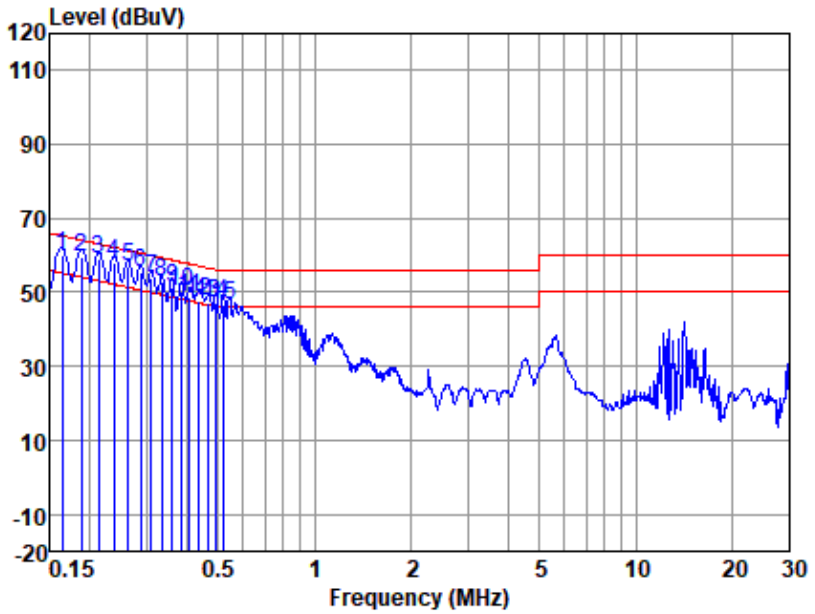
3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,

4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.

5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.

1. LISN=Read Level+ Cable Loss+ LISN Factor
2. This test item was investigated while operating in each channel mode, however, it was determined that channel 11 operation for b modulation produced the worst conducted emissions. So the conducted emissions produced from other operation are not report.

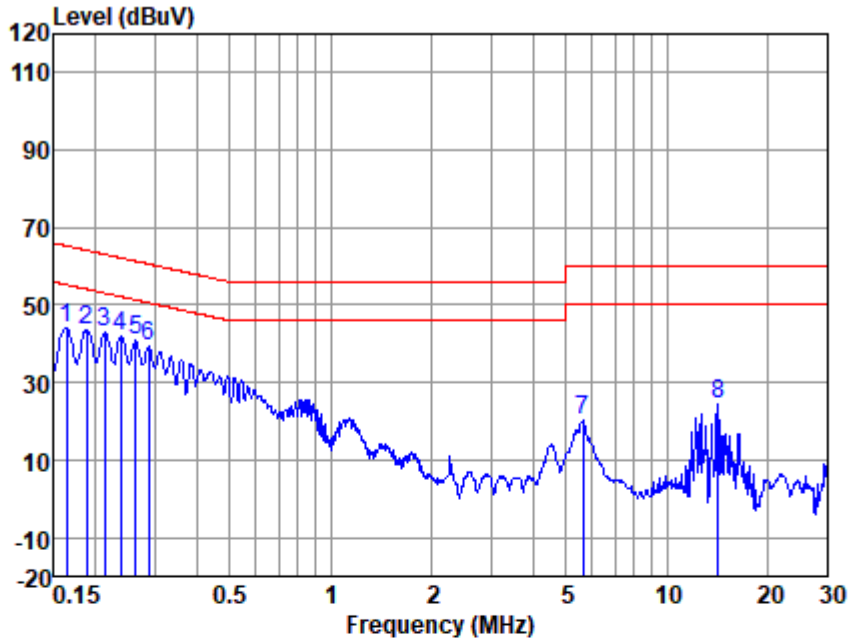
Mode:b; Line:Live Line



LISN : LINE
EUT/Project No : 00250CO
Test Mode : b

	Freq (MHz)	Read level (dBuV)	LISN Factor (dB)	Cable Loss (dB)	Emission Level (dBuV)	Limit (dBuV)	Over Limit (dB)	Remark
1	0.16	50.06	0.20	9.90	60.16	65.30	-5.14	QP
2	0.19	49.64	0.20	9.92	59.76	64.11	-4.35	QP
3	0.21	48.97	0.20	9.93	59.10	63.10	-4.00	QP
4	0.24	48.00	0.20	9.93	58.13	62.17	-4.04	QP
5	0.26	46.71	0.20	9.94	56.85	61.34	-4.49	QP
6	0.29	45.14	0.20	9.94	55.28	60.59	-5.31	QP
7	0.31	43.70	0.20	9.94	53.84	59.97	-6.13	QP
8	0.33	42.45	0.20	9.94	52.59	59.35	-6.76	QP
9	0.36	41.25	0.20	9.93	51.38	58.74	-7.36	QP
10	0.38	40.17	0.20	9.93	50.30	58.21	-7.91	QP
11	0.41	38.71	0.20	9.93	48.84	57.68	-8.84	QP
12	0.44	37.32	0.20	9.93	47.45	57.11	-9.66	QP
13	0.47	37.14	0.20	9.93	47.27	56.58	-9.31	QP
14	0.49	36.98	0.20	9.93	47.11	56.10	-8.99	QP
15	0.52	36.52	0.20	9.92	46.64	56.00	-9.36	QP

Notes: Emission Level = Read Level +LISN Factor + Cable loss

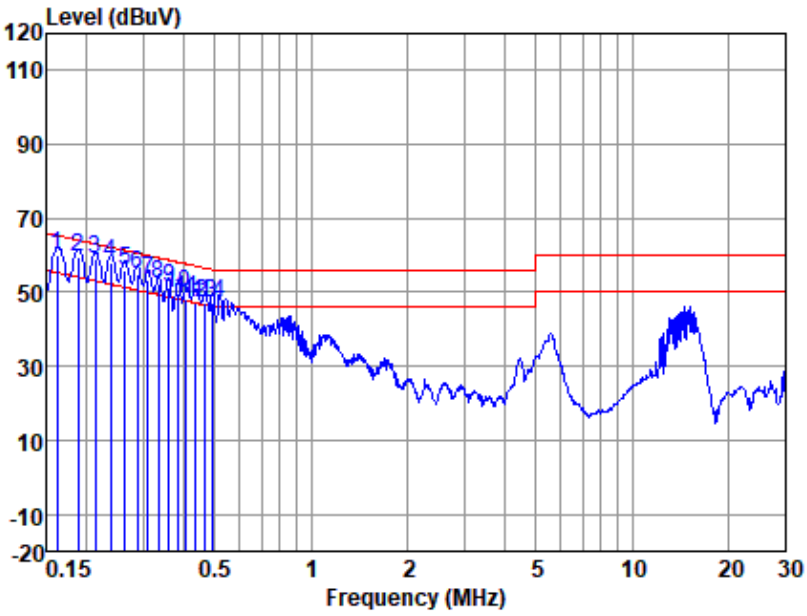


LISN : LINE
EUT/Project No : 00250CO
Test Mode : b

	Freq (MHz)	Read level (dBuV)	LISN Factor (dB)	Cable Loss (dB)	Emission Level (dBuV)	Limit (dBuV)	Over Limit (dB)	Remark
1	0.16	34.02	0.20	9.90	44.12	55.30	-11.18	Average
2	0.19	33.58	0.20	9.92	43.70	54.11	-10.41	Average
3	0.21	32.76	0.20	9.93	42.89	53.10	-10.21	Average
4	0.24	31.80	0.20	9.93	41.93	52.17	-10.24	Average
5	0.26	30.63	0.20	9.94	40.77	51.34	-10.57	Average
6	0.29	29.13	0.20	9.94	39.27	50.59	-11.32	Average
7	5.65	9.88	0.20	10.05	20.13	50.00	-29.87	Average
8	14.21	13.58	0.47	10.13	24.18	50.00	-25.82	Average

Notes: Emission Level = Read Level +LISN Factor + Cable loss

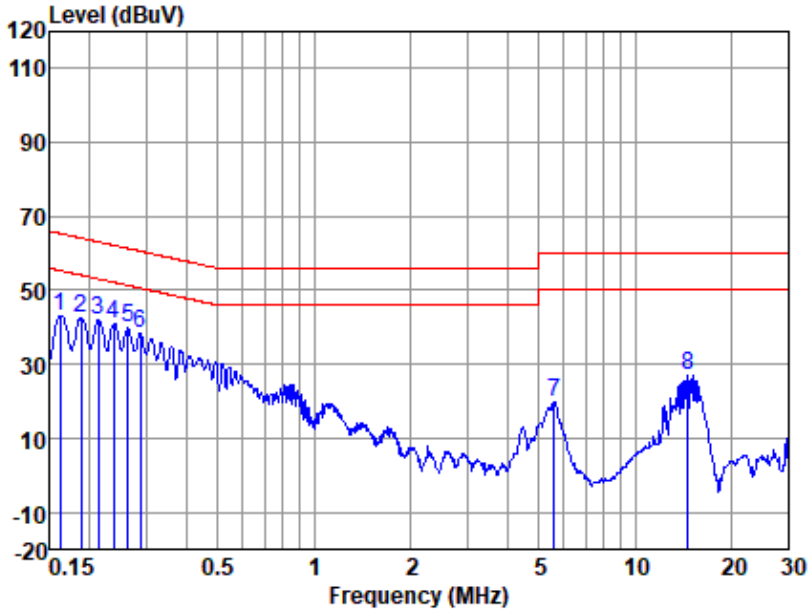
Mode:b; Line:Neutral Line



LISN : NEUTRAL
EUT/Project No : 00250CO
Test Mode : b

	Freq (MHz)	Read level (dBuV)	LISN Factor (dB)	Cable Loss (dB)	Emission Level (dBuV)	Limit (dBuV)	Over Limit (dB)	Remark
1	0.16	50.01	0.20	9.90	60.11	65.38	-5.27	QP
2	0.19	49.65	0.20	9.92	59.77	64.11	-4.34	QP
3	0.21	49.00	0.20	9.93	59.13	63.10	-3.97	QP
4	0.24	48.02	0.20	9.93	58.15	62.17	-4.02	QP
5	0.26	46.00	0.20	9.94	56.14	61.34	-5.20	QP
6	0.29	44.79	0.20	9.94	54.93	60.59	-5.66	QP
7	0.31	43.38	0.20	9.94	53.52	59.97	-6.45	QP
8	0.33	42.13	0.20	9.94	52.27	59.35	-7.08	QP
9	0.36	40.91	0.20	9.93	51.04	58.74	-7.70	QP
10	0.38	39.80	0.20	9.93	49.93	58.21	-8.28	QP
11	0.41	38.00	0.20	9.93	48.13	57.68	-9.55	QP
12	0.44	37.28	0.20	9.93	47.41	57.11	-9.70	QP
13	0.47	37.13	0.20	9.93	47.26	56.58	-9.32	QP
14	0.49	36.88	0.20	9.93	47.01	56.14	-9.13	QP

Notes: Emission Level = Read Level +LISN Factor + Cable loss



LISN : NEUTRAL
EUT/Project No : 00250CO
Test Mode : b

	Freq (MHz)	Read level (dBuV)	LISN Factor (dB)	Cable Loss (dB)	Emission Level (dBuV)	Limit (dBuV)	Over Limit (dB)	Remark
1	0.16	33.16	0.20	9.90	43.26	55.38	-12.12	Average
2	0.19	32.60	0.20	9.92	42.72	54.11	-11.39	Average
3	0.21	31.81	0.20	9.93	41.94	53.10	-11.16	Average
4	0.24	30.90	0.20	9.93	41.03	52.17	-11.14	Average
5	0.26	29.61	0.20	9.94	39.75	51.34	-11.59	Average
6	0.29	28.17	0.20	9.94	38.31	50.59	-12.28	Average
7	5.59	9.50	0.20	10.05	19.75	50.00	-30.25	Average
8	14.59	16.49	0.48	10.13	27.10	50.00	-22.90	Average

Notes: Emission Level = Read Level +LISN Factor + Cable loss

7.2 20dB Bandwidth

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

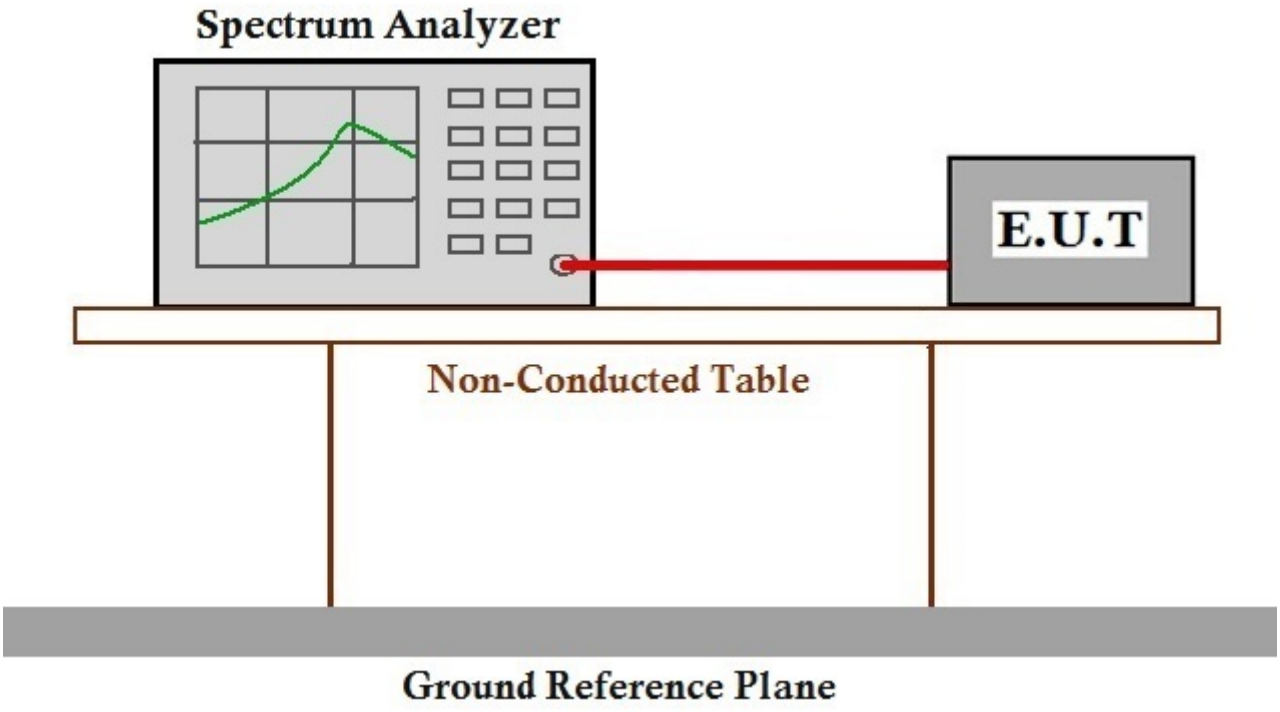
7.2.1 E.U.T. Operation

Operating Environment:

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

Test mode b:TX mode_Keep the Terra AC W19-P8-RD-MCD-0 in continuously transmitting mode with GFSK modulation

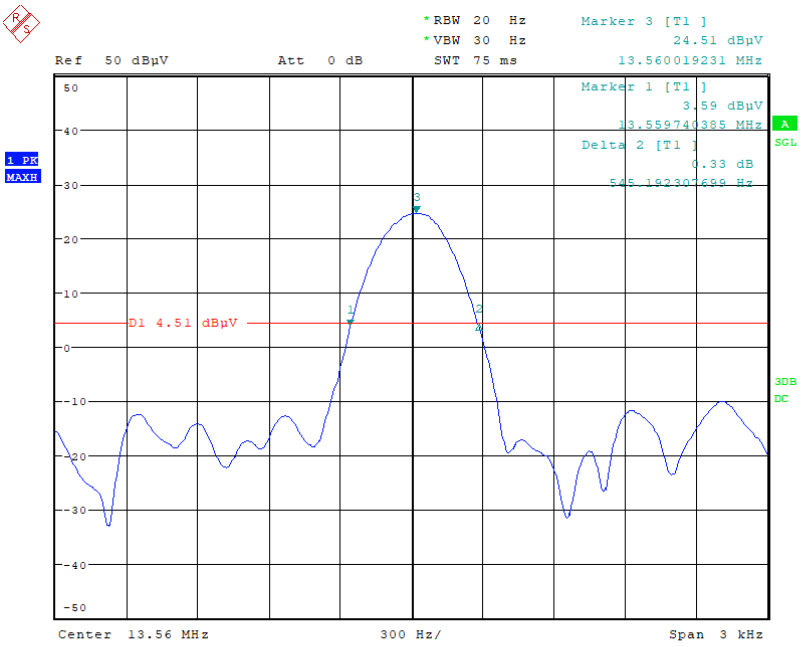
7.2.2 Test Setup Diagram



7.2.3 Measurement Procedure and Data

20dB bandwidth (kHz)	F_L (MHz)	F_H (MHz)	Limit(MHz)	Result
0.545	13.559740	13.560285	13.110 – 14.010	Pass

Test plot as follows:



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7.3 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.

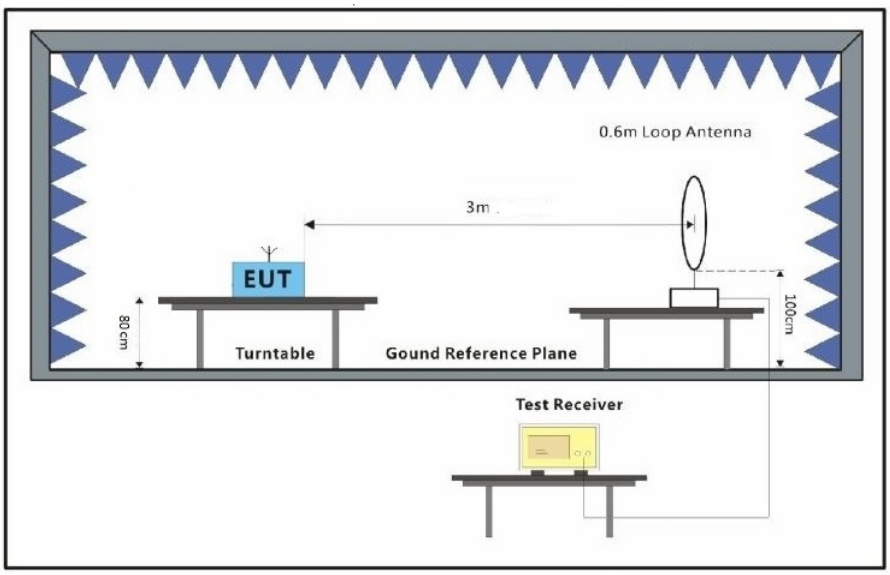
7.3.1 E.U.T. Operation

Operating Environment:

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

Test mode b:TX mode_Keep the Terra AC W19-P8-RD-MCD-0 in continuously transmitting mode with GFSK modulation

7.3.2 Test Setup Diagram



7.3.3 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.

Note: The test level of the fundamental signal is below the limit of general spurious emission, so the test item doesn't be performed.

7.4 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

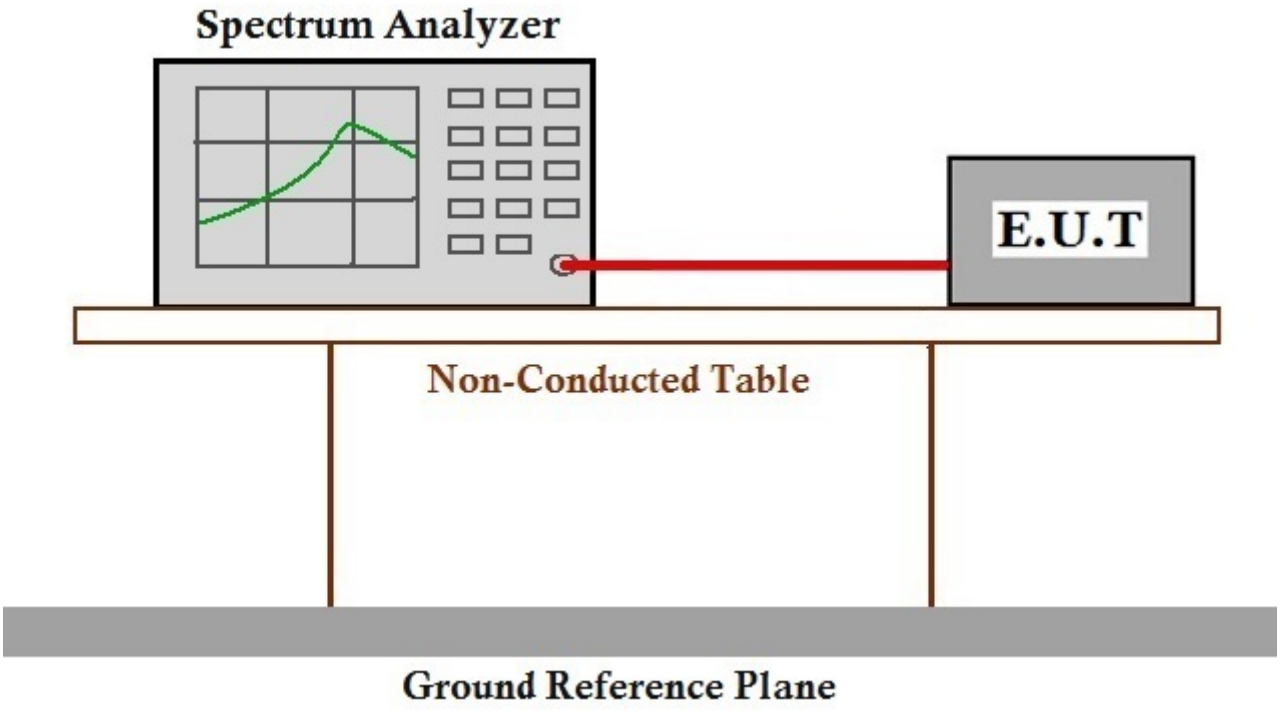
7.4.1 E.U.T. Operation

Operating Environment:

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

Test mode b:TX mode_Keep the Terra AC W19-P8-RD-MCD-0 in continuously transmitting mode with GFSK modulation

7.4.2 Test Setup Diagram



7.4.3 Measurement Procedure and Data

Nominal Operation Frequency: 13.56MHz

Test Conditions		Test Result (MHz)	Deviation (kHz)	Limit (kHz)	Result
Temp (℃)	Volt (V AC)				
T_{nom} (-20)	V_{nom} (240)	13.56008	0.08	±0.01% (1.3560kHz)	Pass
T_{nom} (-10)	V_{nom} (240)	13.56008	0.08		Pass
T_{nom} (0)	V_{nom} (240)	13.56008	0.08		Pass
T_{nom} (10)	V_{nom} (240)	13.56008	0.08		Pass
T_{nom} (20)	V_{nom} (240)	13.56008	0.08		Pass
T_{nom} (30)	V_{nom} (240)	13.56008	0.08		Pass
T_{nom} (40)	V_{nom} (240)	13.56008	0.08		Pass
T_{nom} (50)	V_{nom} (240)	13.56008	0.08		Pass
T_{nom} (20)	V_{min} (176.8)	13.56007	0.07		Pass
	V_{max} (276)	13. 56005	0.05		Pass

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

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7.5 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*log (D_{TEST} / D_{SPEC}) where D_{TEST} = Test Distance and D_{SPEC} = Specified Distance.

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

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

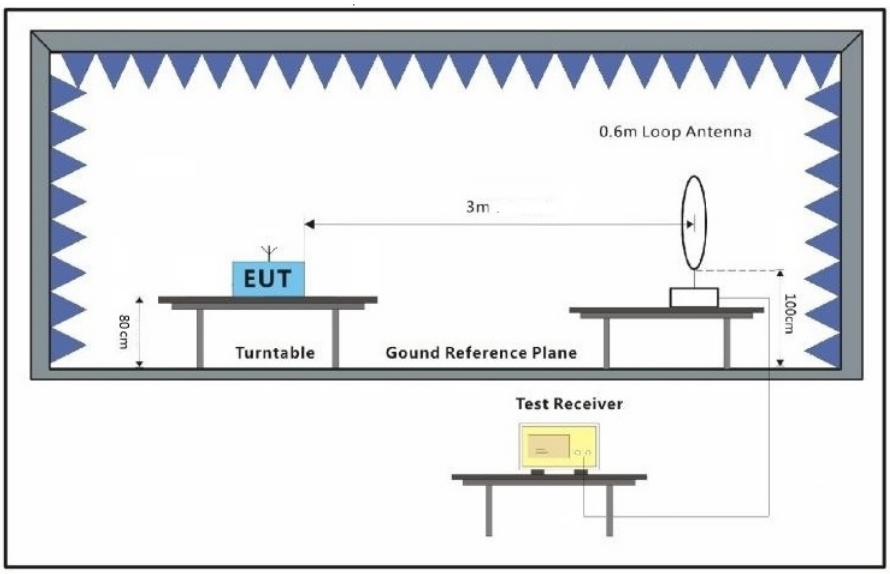
7.5.1 E.U.T. Operation

Operating Environment:

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

Test mode b:TX mode_Keep the Terra AC W19-P8-RD-MCD-0 in continuously transmitting mode with GFSK modulation

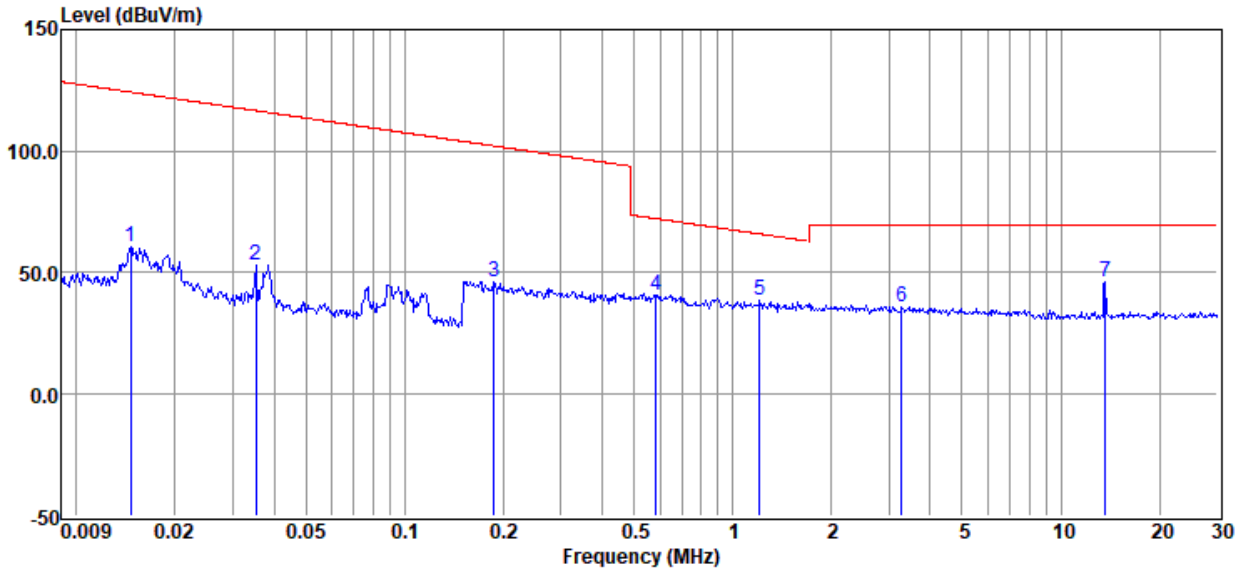
7.5.2 Test Setup Diagram



7.5.3 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.

Mode:b; Polarization:Horizontal



Item	Freq.	Read Level	Antenna Factor	Cable Loss	Result Level@3m	Result Level@SPEC	Limit Line@SPEC	Over Limit	Detector
(Mark)	(MHz)	(dBμV)	(dB/m)	(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	0.015	40.67	20	0.02	60.69	-19.31	44.27	-63.58	QP
2	0.035	33.38	19.9	0.02	53.3	-26.7	36.67	-63.37	QP
3	0.187	26.23	20	0.04	46.27	-33.73	22.16	-55.89	QP
4	0.582	20.78	20.1	0.1	40.98	0.98	32.31	-31.33	QP
5	1.208	18.23	20.23	0.12	38.58	-1.42	25.98	-27.4	QP
6	3.276	15.28	20.3	0.18	35.76	-4.24	29.5	-33.74	QP
7	13.658	25.4	20.05	0.54	45.99	5.99	29.5	-23.51	Peak

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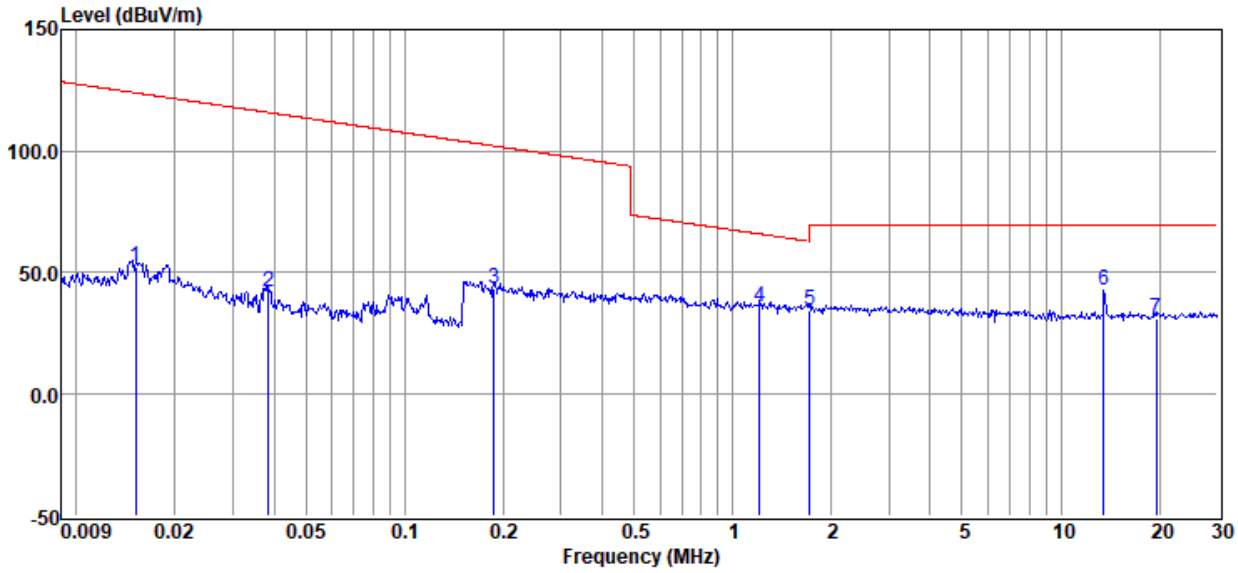
Mode:b; Polarization:Vertical



Item	Freq.	Read Level	Antenna Factor	Cable Loss	Result Level@3m	Result Level@SPEC	Limit Line@SPEC	Over Limit	Detector
(Mark)	(MHz)	(dBμV)	(dB/m)	(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	0.015	32.60	20.00	0.02	52.62	-27.38	43.99	-71.37	QP
2	0.038	22.07	19.90	0.02	41.99	-38.01	35.9	-73.91	QP
3	0.187	23.23	20.00	0.04	43.27	-36.73	22.16	-58.89	QP
4	1.208	15.23	20.23	0.12	35.58	-4.42	25.98	-30.40	QP
5	1.712	13.97	20.28	0.13	34.38	-5.62	29.5	-35.12	QP
6	13.548	22.06	20.05	0.53	42.64	2.64	29.5	-26.86	Peak
7	19.517	9.97	20.19	0.67	30.83	-9.17	29.5	-38.67	QP

7.6 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

7.6.1 E.U.T. Operation

Operating Environment:

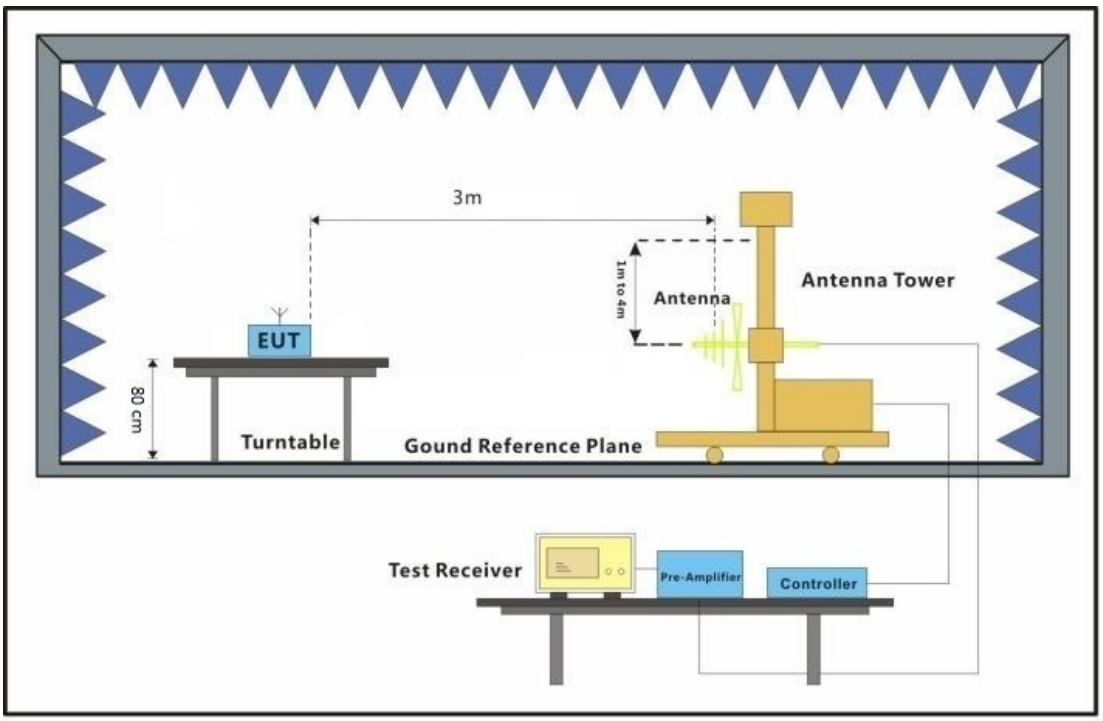
Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1002 mbar

Prescan test mode: b:TX mode_Keep the Terra AC W19-P8-RD-MCD-0 in continuously transmitting mode with GFSK modulation

c: TX mode_Keep the Terra AC W9-P8-RD-MCD-0 in continuously transmitting mode with GFSK modulation

Worst case test mode: b:TX mode_Keep the Terra AC W19-P8-RD-MCD-0 in continuously transmitting mode with GFSK modulation

7.6.2 Test Setup Diagram



7.6.3 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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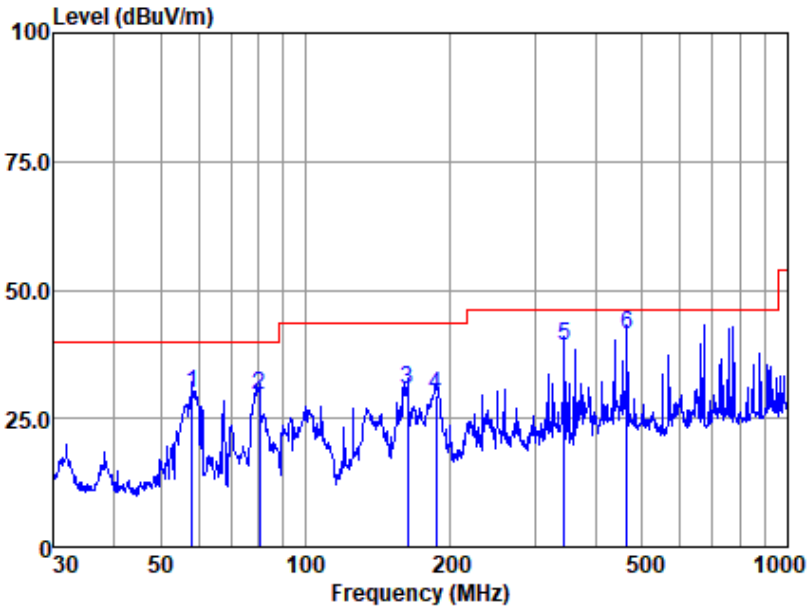
Mode:b; Polarization:Horizontal

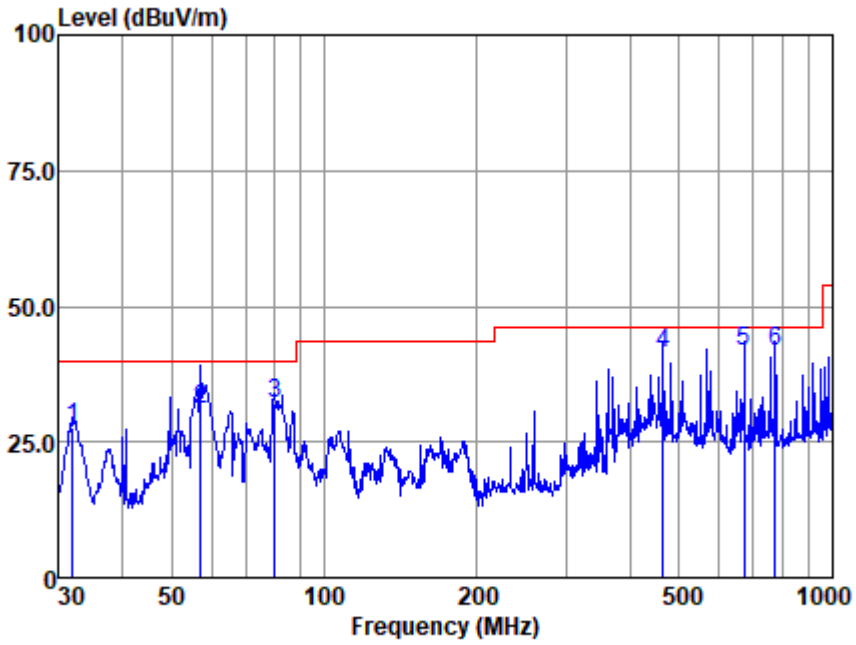


Antenna Polarity :HORIZONTAL
EUT/Project :00249CO
Test mode :b

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	58.203	47.16	13.42	1.10	31.69	29.99	40.00	-10.01	QP
2	80.081	50.39	9.36	1.31	31.44	29.62	40.00	-10.38	QP
3	162.611	46.89	13.21	1.94	31.23	30.81	43.50	-12.69	QP
4	187.096	47.89	11.05	2.13	31.72	29.35	43.50	-14.15	QP
5	344.386	52.52	14.45	2.96	30.91	39.02	46.00	-6.98	QP
6	465.599	51.77	17.29	3.40	31.18	41.28	46.00	-4.72	QP

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Mode:b; Polarization:Vertical



Antenna Polarity :VERTICAL
EUT/Project :00249CO
Test mode :b

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	31.955	46.13	12.43	0.80	31.80	27.56	40.00	-12.44	QP
2	57.191	48.19	13.52	1.09	31.76	31.04	40.00	-8.96	QP
3	79.800	52.63	9.42	1.31	31.44	31.92	40.00	-8.08	QP
4	465.599	51.92	17.29	3.40	31.18	41.43	46.00	-4.57	QP
5	672.845	48.08	20.41	4.13	30.95	41.67	46.00	-4.33	QP
6	774.158	46.82	22.42	4.43	32.02	41.65	46.00	-4.35	QP

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

7.7 99% Bandwidth

Test Requirement RSS-210 A1.3

Test Method: RSS-Gen Section 6.7

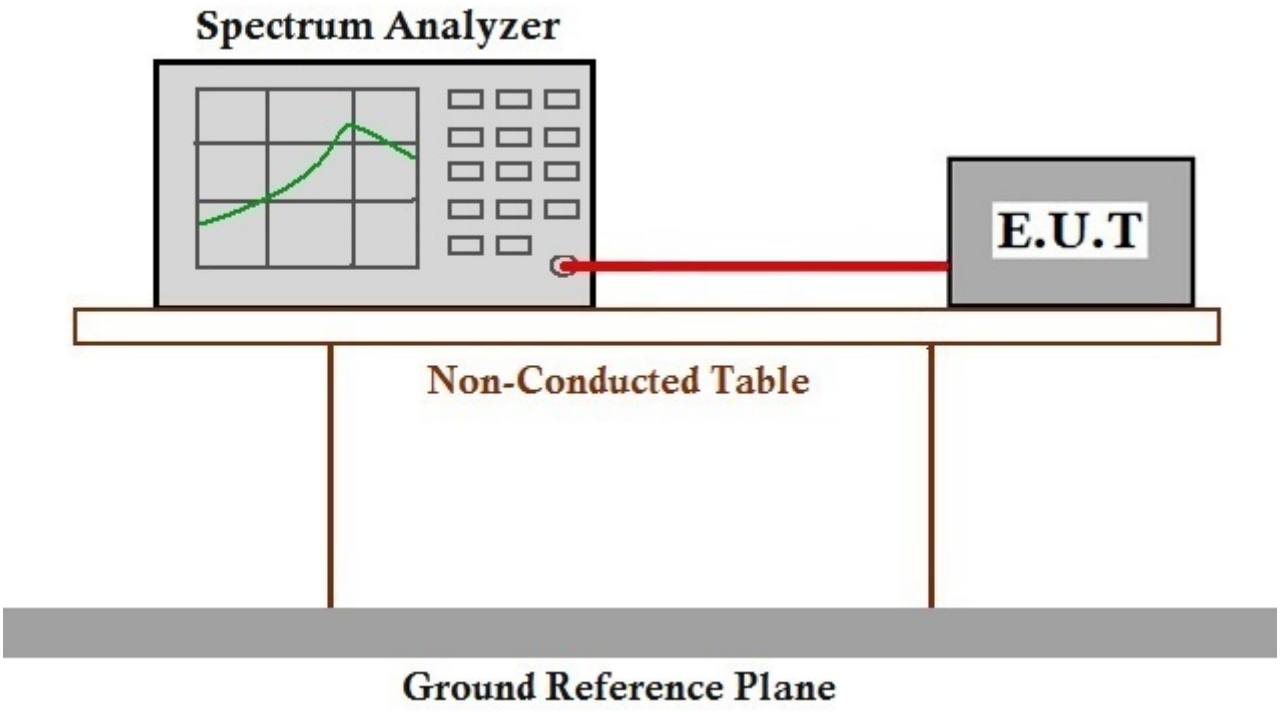
7.7.1 E.U.T. Operation

Operating Environment:

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

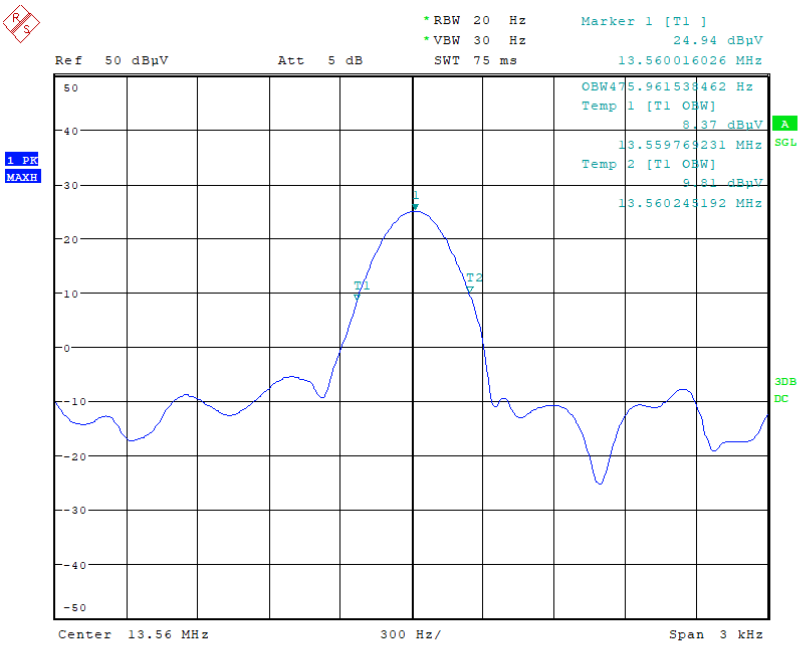
Test mode b:TX mode_Keep the Terra AC W19-P8-RD-MCD-0 in continuously transmitting mode with GFSK modulation

7.7.2 Test Setup Diagram



7.7.3 Measurement Procedure and Data

Frequency (MHz)	20dB bandwidth (kHz)
13.56	0.475



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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 -

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.
Testing Center EMC Laboratory
NO.588 West Jindu Road,Songjiang District,Shanghai,China 201612
中国・上海・松江区金都西路588号 邮编: 201612
t(86-21) 61915666 f(86-21)61915678 www.sgsgroup.com.cn
t(86-21) 61915666 f(86-21)61915678 e sgs.china@sgs.com