

TEST REPORT

Application No.: SZCR2306001852ME
Applicant: NormaTec Industries LP
Address of Applicant: 480 Pleasant St. Ste A200 Watertown Massachusetts 02472 United States
Manufacturer: NormaTec Industries LP
Address of Manufacturer: 480 Pleasant St. Ste A200 Watertown Massachusetts 02472 United States
Factory: Ryder Electronics (XinFeng) Ltd.
Address of Factory: East Shuidong Avenue, Industrial Park, Xinfeng County, Ganzhou City, Jiangxi Province, China 341600

Equipment Under Test (EUT):

EUT Name: Normatec Elite
Model No.: JPN11-SH, JPN11-ST, JPN11-TL, JPN11-PH, JPN11-PS, JPN11-PT ♣
♣ Please refer to section 2 of this report which indicates which model was actual tested and which were electrically identical.

Trade Mark:



FCC ID: 2AY3Y-NTE
Standard(s) : 47 CFR Part 15, Subpart C 15.231
Date of Receipt: 2023-10-30
Date of Test: 2023-11-02 to 2023-12-16
Date of Issue: 2023-12-19

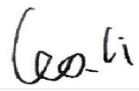
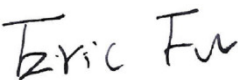
Test Result:	Pass*
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* In the configuration tested, the EUT complied with the standards specified above.

Keny Xu
EMC Laboratory Manager



Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2023-12-19		Original

Authorized for issue by:			
			
		_____ Leo Li/Project Engineer	
			
		_____ Eric Fu/Reviewer	



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2 Test Summary

Radio Spectrum Technical Requirement				
Item	Standard	Method	Requirement	Result
Antenna Requirement	47 CFR Part 15, Subpart C 15.231	N/A	47 CFR Part 15, Subpart C 15.203	Pass

Radio Spectrum Matter Part				
Item	Standard	Method	Requirement	Result
20dB Bandwidth	47 CFR Part 15, Subpart C 15.231	ANSI C63.10 (2013) Section 6.9	47 CFR Part 15, Subpart C 15.231(c)	Pass
Dwell Time (15.231(a))		ANSI C63.10 (2013) Section 7.8.4	47 CFR Part 15, Subpart C 15.231(a)	Pass
Field Strength of the Fundamental Signal (15.231(e))		ANSI C63.10 (2013) Section 6.5	Field Strength of the Fundamental Signal (15.231(e))	Pass
Radiated Emissions below 1GHz		ANSI C63.10 (2013) Section 6.4&6.5	47 CFR Part 15C Section 15.231(e) and 15.209	Pass
Radiated Emissions above 1GHz		ANSI C63.10 (2013) Section 6.6	47 CFR Part 15C Section 15.231(e) and 15.209	Pass
Conducted Emissions at AC Mains Power Port (150kHz-30MHz)		ANSI C63.10 (2013) Section 6.2	47 CFR Part 15, Subpart C 15.207	Pass

Declaration of EUT Family Grouping:

Model No.: JPN11-SH, JPN11-ST, JPN11-TL, JPN11-PH, JPN11-PS, JPN11-PT

Only the model JPN11-ST was tested, since according to the declaration from the applicant, the electrical circuit design, PCB layout, components used and internal wiring and functions were identical for the above models, with difference on Model No. and the leg sizes.

Remark: The product comes with different Air compressor, Solenoid Valves, adapters, pressure sensor and batteries, all the Configurations have been pre-tested, and only record the worst case in the report, here are the different configurations:



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Component	Manufacturer	Type	Specification
Internal battery (BPI 21700 2S1P)	Shenzhen BetterPower Battery Co., Ltd.	BPI 21700 2S1P	7.2V, 5000mAh
Internal battery (J1025)	Hixon (Shenzhen) Technology Limited.	J1025	7.38V,4800mAh
Solenoid Valve	Shenzhen Wei Shengtai Electronics Co., Ltd	WQF6-12A	DC12V
	Dongguan Jing Bofang Precision Electronics Co., LTD	JQF1320-12A	DC12V
Air compressor	DONG GUAN ZHEN TIAN PRECISION ELECTRONIC CO.,LTD	ZTQB12095016	DC12V Flow rate: ≥6L/min, Pressure: >90Kpa
	Dongguan Jing Bofang Precision Electronics Co., LTD	JQB095-12B	DC12V Flow rate: ≥6L/min, Pressure: >80Kpa
Power adapter	Guangdong Shanmusen Technology Co.,Ltd	SMS-01120400-S68	Input:100-240Vac,1.5A,50-60Hz; Output:12V,4A
	GUANGDONG KEERDA ELECTRONICS CO., LTD	DZ048CHL120400 H	Input:100-240Vac,1.5A,50-60Hz; Output:12V,4A
Pressure sensor	Suzhou Novosense Microelectronics Co., Ltd.	MSPDS5F035DT2 4	Operating pressure range:3-3.6V Operating pressure range:0-35KPA
	Shenzhen Hope Microelectronics Co,Ltd.	HCS40D	Operating pressure range: 2.7-5.5V Operating pressure range: 0-40KPA

This product comes in two different combinations.

Combination 1: ZHEN TIAN Air compressor+ Wei Shengtai Valve+BPI Battery+ Novosense Pressure sensor+ Shanmusen Adapter

Combination 2: Jing Bofang Air compressor+ Jing Bofang Valve+ Hixon Battery+ Hope Pressure sensor+ KEERDA Adapter

Only the Combination 1 was tested fully, and the Combination 2 was performed the Conducted Emissions at AC Power Line (150kHz-30MHz)and Radiated Spurious Emissions Below 1GHz test for discrepancy.



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4 General Information

4.1 Details of E.U.T.

Power supply:	BPI Lithium Ion Battery: DC 7.2V 5000mAh rechargeable battery Hixon Lithium Ion Battery: DC 7.38V 4800mAh rechargeable battery DC 12V from adapter input AC 120V/60Hz Adapter 1 Model: DZ048CHL120400H Input:100-240V~50-60Hz 1.5A Output:12.0V = 4.0A 48.0W Adapter 2 Model: SMS-01120400-S68 Input:100-240V ~ 50-60Hz 1.5A MAX Output:12.0V = 4.0A 48.0W MAX
Cable(s):	Adapter 1 DC cable: 310cm unshielded Adapter 2 DC cable: 300cm unshielded
Operation Frequency	433.92MHz
Channel Numbers:	1
Modulation Type:	GFSK
Antenna Type:	Helical Antenna
Antenna Gain:	-8.94dBi

Remark: The information in this section is provided by the applicant or manufacturer, SGS is not liable to the accuracy, suitability, reliability or/and integrity of the information.

4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
RF cable	SGS	N/A(cable loss:-2dB)	REF. No.SEL001A0

4.3 Measurement Uncertainty

Test Item	Measurement Uncertainty
Conducted Emissions at AC Mains Power Port (150kHz-30MHz)	± 3.1dB
20dB Bandwidth	3%
Dwell Time (15.231(a))	3%
Field Strength of the Fundamental Signal (15.231(e))	± 6.0dB
Radiated Emissions below 1GHz	± 6.0dB
Radiated Emissions above 1GHz	± 4.6dB (1-18GHz);± 4.8dB (18-40GHz)

Remark:

The U_{lab} (lab Uncertainty) is less than $U_{CISPR/ETSI}$ (CISPR/ETSI Uncertainty), so the test results

– compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;

– non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.



4.4 Test Location

All tests were performed at:

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

No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Nanshan District, Shenzhen, Guangdong, China. 518057.

Tel: +86 755 2601 2053 Fax: +86 755 2671 0594

No tests were sub-contracted.

4.5 Test Facility

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

• **A2LA (Certificate No. 3816.01)**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

• **VCCI (Member No. 1937)**

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen EMC laboratory have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

• **FCC –Designation Number: CN1336**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1336. Test Firm Registration Number: 787754.

• **Innovation, Science and Economic Development Canada**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0006.

IC#: 4620C.

4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None



5 Equipment List

Conducted Emissions at AC Mains Power Port (150kHz-30MHz)					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Shielding Room	ZhongYu Electron	GB-88	SEM001-06	2022-05-14	2025-05-13
EMI Test Receiver	Rohde&Schwarz	ESCI	SEM004-02	2023-03-20	2024-03-19
Measurement Software	AUDIX	e3 V8.2014-6-27a	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM024-01	2023-07-07	2024-07-06
LISN	Rohde&Schwarz	ENV216	SEM007-01	2023-09-19	2024-09-18
LISN	ETS-LINDGREN	3816/2	SEM007-02	2023-03-20	2024-03-19

20dB Bandwidth					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
DC Power Supply	Chroma	62012P-80-60	SEM011-11	2023-10-19	2024-10-18
MXA Signal Analyzer	KEYSIGHT	N9020A	SEM004-19	2023-03-21	2024-03-20
Measurement Software	TST PASS	TST PASS V2.0	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM031-01	2023-07-07	2024-07-06
Attenuator	Huber+Suhner	6620_SMA-50-1	SEM021-09	2023-03-31	2024-03-30
Programmable Temperature & Humidity Chamber	Votsch Industrietechnik GmbH	VT 4002	SEM002-15	2023-03-21	2024-03-20

Radiated Emissions below 1GHz					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Loop Antenna	ETS-Lindgren	6502	SEM003-08	2021-11-30	2023-11-29
				2023-11-29	2024-11-28
3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEM001-01	2023-06-19	2026-06-18
MXE EMI Receiver	Agilent Technologies	N9038A	SEM004-15	2023-10-19	2024-10-18
BiConiLog Antenna	ETS-LINDGREN	3142C	SEM003-01	2023-09-16	2025-09-15
Pre-Amplifier	Agilent Technologies	8447D	SEM005-01	2023-03-20	2024-03-19
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM025-01	2023-07-07	2024-07-06



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Dwell Time (15.231(a))					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
DC Power Supply	Chroma	62012P-80-60	SEM011-11	2023-10-19	2024-10-18
MXA Signal Analyzer	KEYSIGHT	N9020A	SEM004-19	2023-03-21	2024-03-20
Measurement Software	TST PASS	TST PASS V2.0	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM031-01	2023-07-07	2024-07-06
Attenuator	Huber+Suhner	6620_SMA-50-1	SEM021-09	2023-03-31	2024-03-30
Programmable Temperature & Humidity Chamber	Votsch Industrietechnik GmbH	VT 4002	SEM002-15	2023-03-21	2024-03-20

Field Strength of the Fundamental Signal (15.231(e))					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEM001-01	2023-06-19	2026-06-18
MXE EMI Receiver	Agilent Technologies	N9038A	SEM004-15	2023-10-19	2024-10-18
BiConiLog Antenna	ETS-LINDGREN	3142C	SEM003-01	2023-09-16	2025-09-15
Pre-Amplifier	Agilent Technologies	8447D	SEM005-01	2023-03-20	2024-03-19
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM025-01	2023-07-07	2024-07-06



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Radiated Emissions above 1GHz					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
3m Fully-Anechoic Chamber	AUDIX	N/A	SEM001-02	2023-04-01	2026-03-31
Signal Analyzer	Rohde & Schwarz	FSV40	SEM008-04	2023-03-20	2024-03-19
Horn Antenna	Rohde&Schwarz	HF907	SEM003-07	2023-07-23	2025-07-22
Microwave system amplifier	Agilent	83017A	SEM005-25	2023-09-19	2024-09-18
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM026-01	2023-07-07	2024-07-06

General used equipment					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Humidity/ Temperature Indicator	deli	8838	SEM002-32	2023-07-28	2024-07-27
Humidity/ Temperature Indicator	deli	8838	SEM002-33	2023-07-28	2024-07-27
Barometer	Changchun Meteorological Industry Factory	DYM3	SEM002-01	2023-03-23	2024-03-22



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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 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 integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is -8.94 dBi

Antenna location: Refer to internal photo.



7 Radio Spectrum Matter Test Results

7.1 20dB Bandwidth

Test Requirement 47 CFR Part 15, Subpart C 15.231(c)

Test Method: ANSI C63.10 (2013) Section 6.9

Limit:

Frequency range(MHz)	Limit
70-900	No wider than 0.25% of the center frequency
Above 900	No wider than 0.5% of the center frequency

Remark: For this device, the limit is $433.92\text{MHz} \times 0.25\% = 1.0848\text{MHz}$

7.1.1 E.U.T. Operation

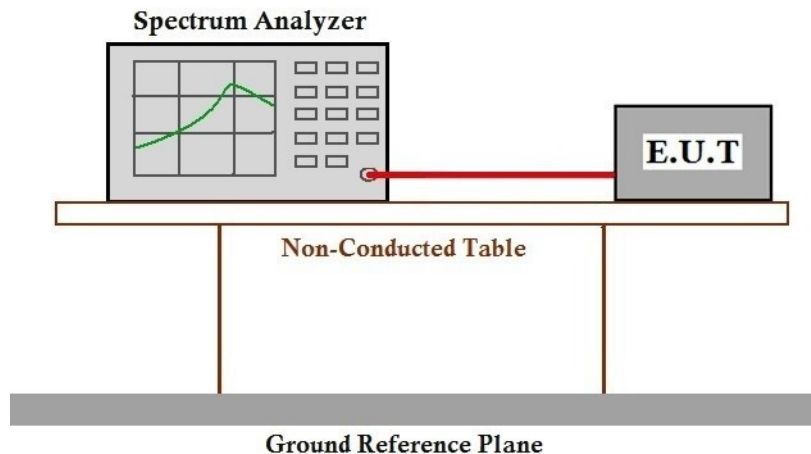
Operating Environment:

Temperature: 22.1 °C Humidity: 50.2 % RH Atmospheric Pressure: 1005 mbar

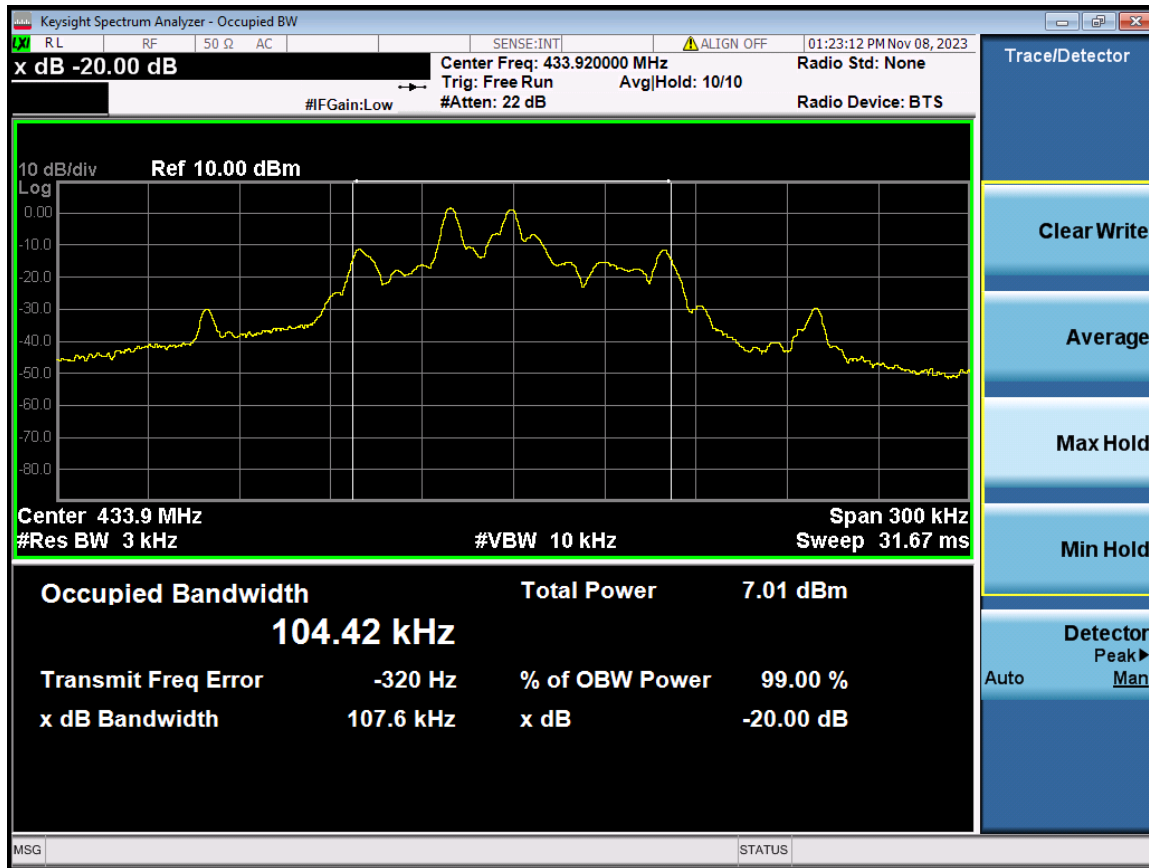
7.1.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	04	TX mode_Keep the EUT in continuously transmitting mode.
Pre-scan	05	Charge+TX mode_Keep the EUT in continuously transmitting mode.

7.1.3 Test Setup Diagram



7.1.4 Measurement Procedure and Data



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7.2 Dwell Time (15.231(a))

Test Requirement 47 CFR Part 15, Subpart C 15.231(a)

Test Method: N/A

Limit:

Device type	Limit
Manually operated transmitter	The switch automatically deactivate the transmitter within not more than 5 seconds of being released
Automatically actived transmitter	Cease transmission within 5 seconds after activation
Periodic transmissions to determine system integrity of transmitters used in security or safety applications	The total transmission time does not exceed 2 seconds per hour

7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 22.3 °C

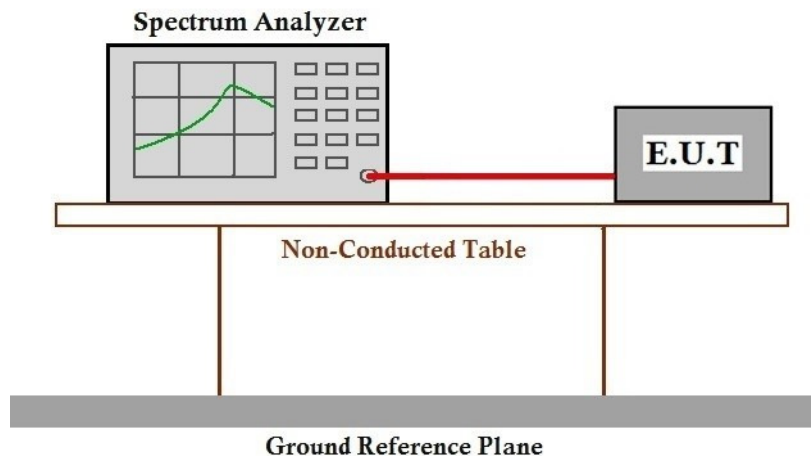
Humidity: 50.9 % RH

Atmospheric Pressure: 1005 mbar

7.2.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	04	TX mode_Keep the EUT in continuously transmitting mode.
Pre-scan	05	Charge+TX mode_Keep the EUT in continuously transmitting mode.

7.2.3 Test Setup Diagram

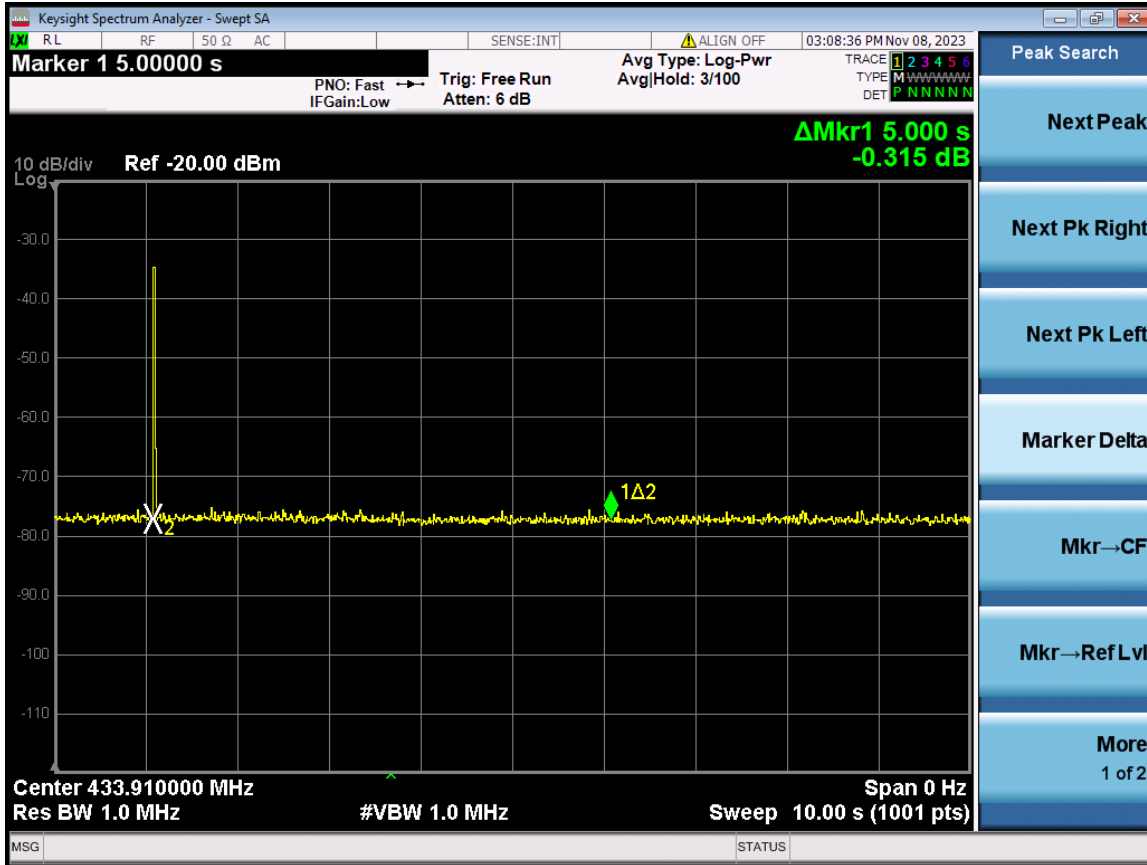


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7.2.4 Measurement Procedure and Data



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7.3 Field Strength of the Fundamental Signal (15.231(e))

Test Requirement Field Strength of the Fundamental Signal (15.231(e))
 Test Method: ANSI C63.10 (2013) Section 6.5
 Measurement Distance: 3m
 Limit:

Fundamental frequency (MHz)	Field strength of fundamental (microvolts/meter)	Field strength of spurious emission (microvolts/meter)
40.66–40.70	1,000	100
70–130	500	50
130–174	500 to 1,500 ¹	50 to 150 ¹
174–260	1,500	150
260–470	1,500 to 5,000 ¹	150 to 500 ¹
Above 470	5,000	500

Remark: the emission limit is based on measurement instrumentation employing an average detector at a distance of 3 meters. The frequencies above 1000MHz are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

** linear interpolations
 [Where F is the frequency in MHz, the formulas for calculating the maximum permitted fundamental field strengths are as follows:
 For 130-174 MHz: Field Strength (μV/m) = (22.73 x f)-2454.55
 • For 260-470 MHz: Field Strength (μV/m) = (16.67 x f)-2833.33
 The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.]

 The fundamental frequency of the EUT is 433.92 MHz
 The limit for average field strength dBuV/m for the fundamental emission= 72.87 dBuV/m
 No fundamental is allowed in the restricted bands.
 The limit for average field strength dBuV/m for the spurious emission=52.87 dBuV/m. Spurious in the restricted bands must be less than 52.87 dBuV/m or 15.209, whichever limit permits a higher field strength.

7.3.1 E.U.T. Operation

Operating Environment:
 Temperature: 22.2 °C Humidity: 51.3 % RH Atmospheric Pressure: 1005 mbar

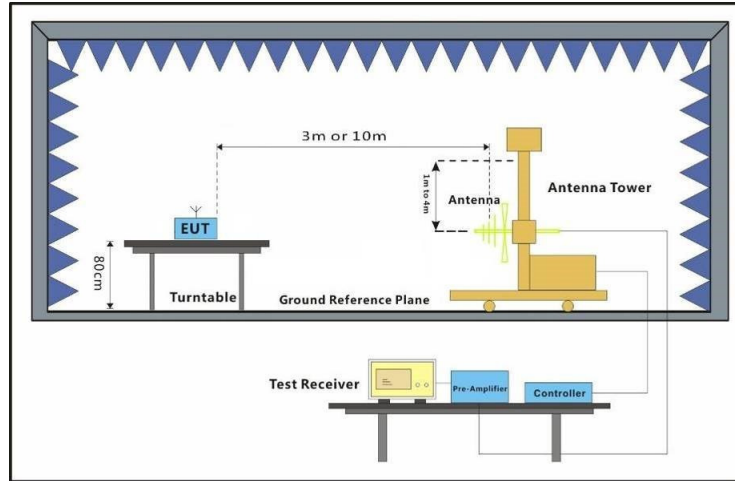
7.3.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Pre-scan	04	TX mode_Keep the EUT in continuously transmitting mode.
Final test	05	Charge+TX mode_Keep the EUT in continuously transmitting mode.



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 中国·广东·深圳市南山区科技园中区M-10栋1号厂房 邮编: 518057 t (86-755) 26012053 f (86-755) 26710594 sgs.china@sgs.com

7.3.3 Test Setup Diagram

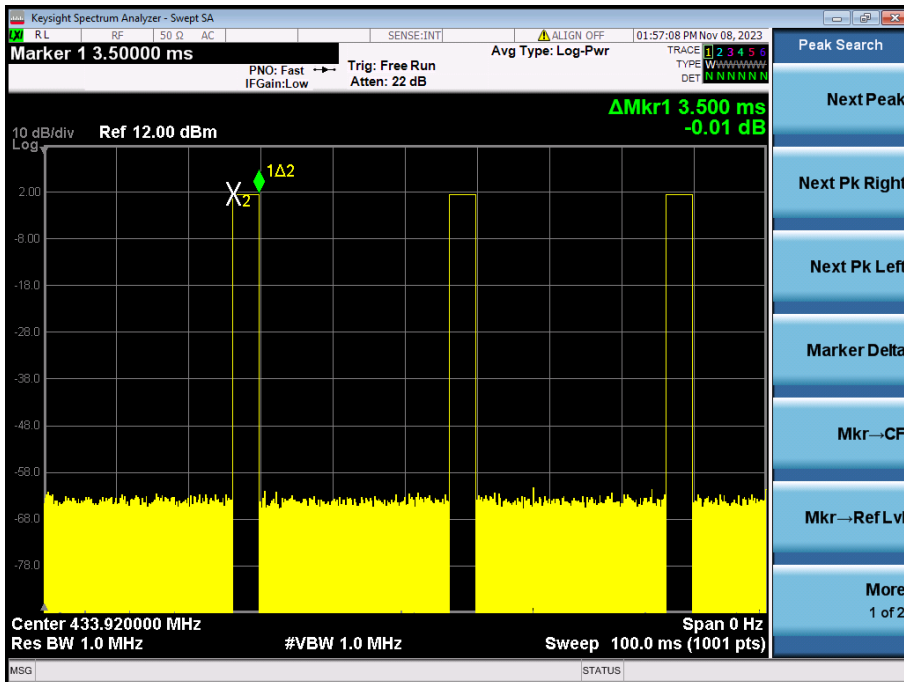
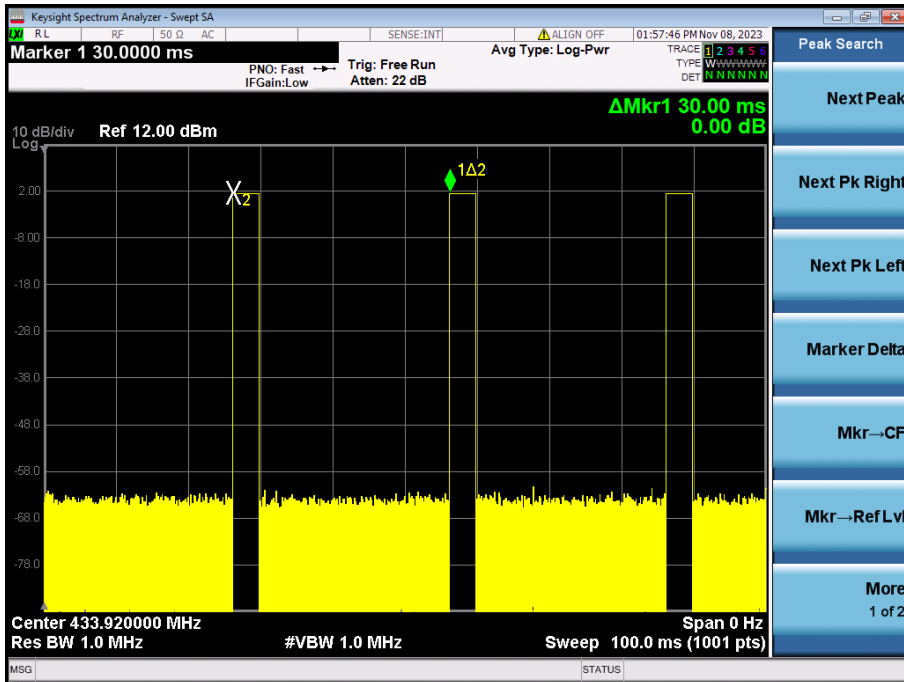


7.3.4 Measurement Procedure and Data

- 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. 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

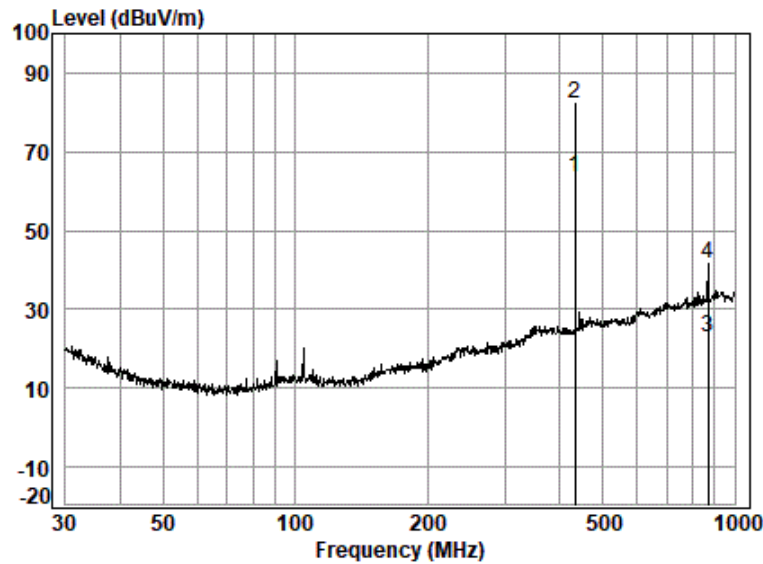




Test data:	Ton time = 3.5ms
	T period = 30ms
	Duty cycle = T on time / T period = 11.7%
	PDCF = 20 log(Duty cycle) = 20 log(11.7%) = -18.6dB



Test Mode: 05; Polarity: Horizontal



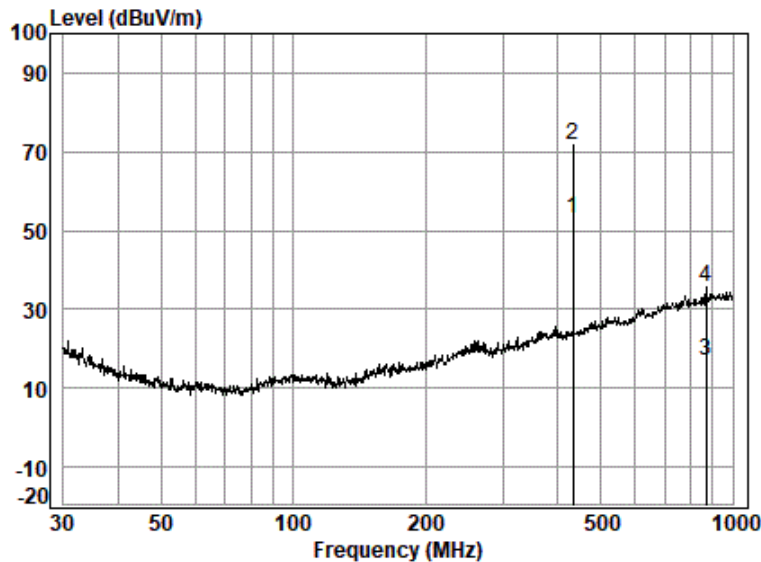
Site : chamber
 Condition: 3m HORIZONTAL
 Job No. : 01852ME
 Test Mode: 05

	Ant Freq	Cable Factor	Preamp Loss	Read Level	Limit Level	Over Line	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	433.920	21.29	2.59	26.60	66.26	72.87	-9.33 Average
2 p	433.920	21.29	2.59	26.60	84.86	92.87	-10.73 Peak
3	867.840	27.97	3.92	26.02	16.98	52.87	-30.02 Average
4	867.840	27.97	3.92	26.02	35.58	72.87	-31.42 Peak



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Test Mode: 05; Polarity: Vertical



Site : chamber
 Condition: 3m VERTICAL
 Job No. : 01852ME
 Test Mode: 05

	Ant Freq	Cable Factor	Preamp Factor	Read Level	Limit Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	433.920	21.29	2.59	26.60	55.78	53.06	72.87	-19.81 Average
2 p	433.920	21.29	2.59	26.60	74.38	71.66	92.87	-21.21 Peak
3	867.840	27.97	3.92	26.02	11.16	17.03	52.87	-35.84 Average
4	867.840	27.97	3.92	26.02	29.76	35.63	72.87	-37.24 Peak



7.4 Radiated Emissions below 1GHz

Test Requirement 47 CFR Part 15C Section 15.231(e) and 15.209

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

Measurement Distance: 3m

Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

7.4.1 E.U.T. Operation

Operating Environment:

Temperature: 22.1 °C Humidity: 51.0 % RH Atmospheric Pressure: 1005 mbar

7.4.2 Test Mode Description

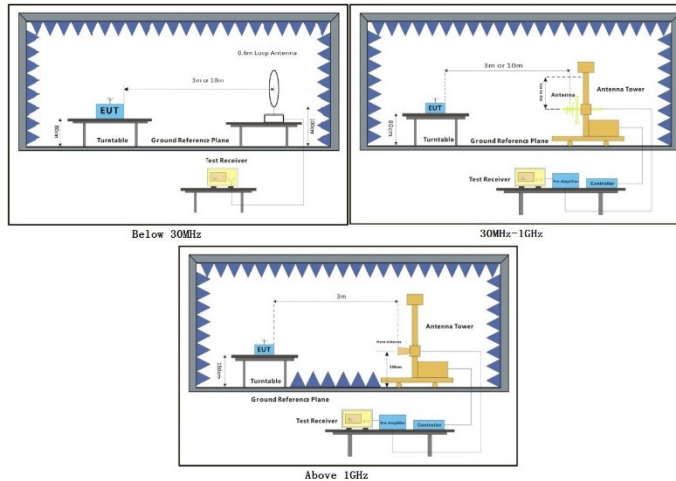
Pre-scan / Final test	Mode Code	Description
Pre-scan	04	TX mode_Keep the EUT in continuously transmitting mode.
Final test	05	Charge+TX mode_Keep the EUT in continuously transmitting mode.



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7.4.3 Test Setup Diagram



7.4.4 Measurement Procedure and Data

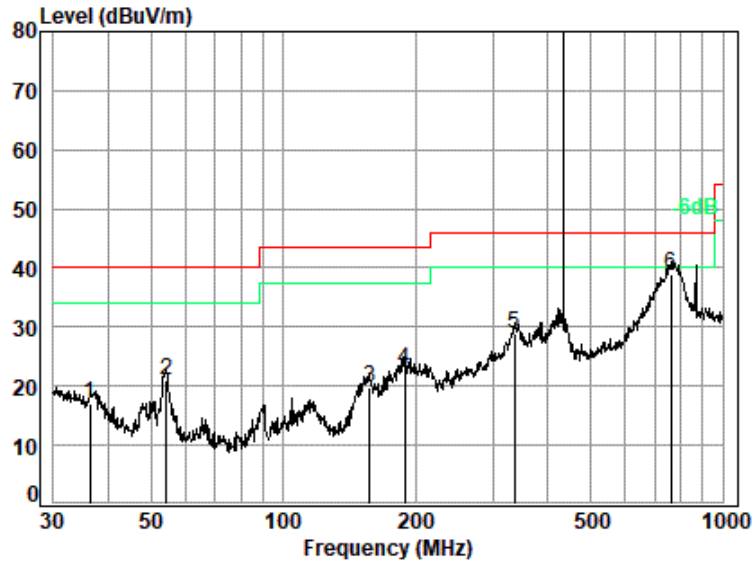
- For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- 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.
- 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.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- 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.
- 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:

- The field strength is calculated by adding the Antenna Factor, Cable Factor & Pre-amplifier. The basic equation with a sample calculation is as follows: Final Test Level = Receiver Reading + Antenna Factor + Cable Factor - Pre-amplifier Factor
- Scan from 9kHz to 1GHz, the disturbance below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.



Test Mode: 05; Polarity: Horizontal



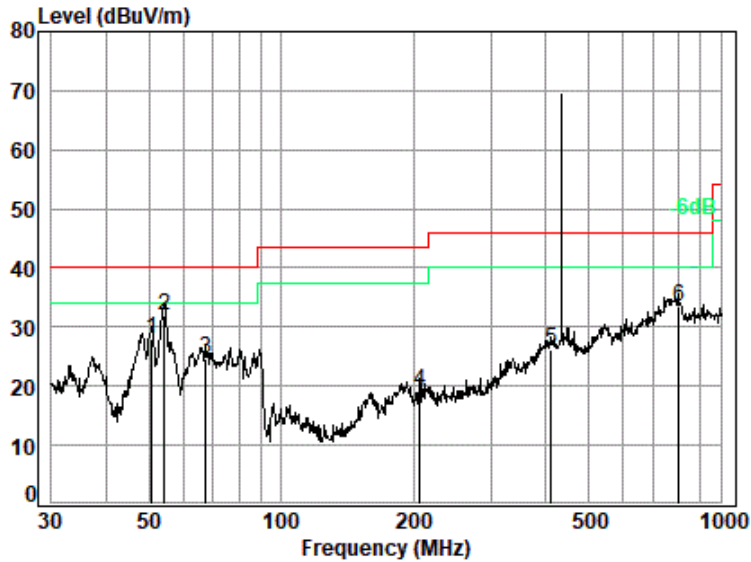
Site : chamber
 Condition: 3m HORIZONTAL
 Job No. : 01852ME/01853ME
 Test Mode: 05
 : adapter 1

	Ant Freq	Cable Factor	Preamp Loss	Read Level	Limit Level	Over Limit	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	36.381	18.12	0.71	27.79	26.14	40.00	-22.82 QP
2	54.261	12.09	0.87	27.74	35.63	40.00	-19.15 QP
3	157.007	13.61	1.50	27.40	32.11	43.50	-23.68 QP
4	189.074	14.30	1.67	27.29	34.17	43.50	-20.65 QP
5	336.035	18.86	2.31	27.05	34.63	46.00	-17.25 QP
6 q	760.704	26.47	3.70	27.73	36.60	46.00	-6.96 QP



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Test Mode: 05; Polarity: Vertical

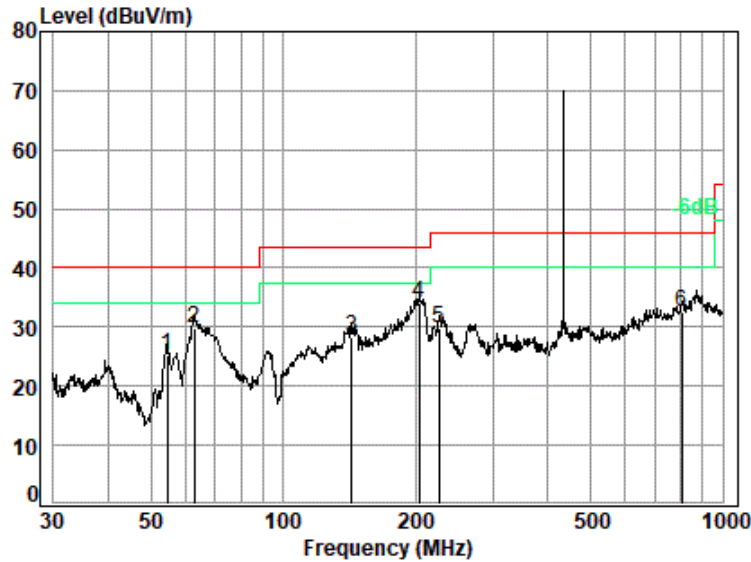


Site : chamber
 Condition: 3m VERTICAL
 Job No. : 01852ME/01853ME
 Test Mode: 05
 : adapter 1

	Ant Freq	Cable Factor	Preamp Loss	Read Level	Limit Level	Over Limit	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	50.764	12.65	0.84	27.75	42.30	28.04	40.00 -11.96 QP
2 q	54.261	12.09	0.87	27.74	46.73	31.95	40.00 -8.05 QP
3	67.438	10.78	0.97	27.70	40.65	24.70	40.00 -15.30 QP
4	207.123	14.67	1.76	27.22	30.06	19.27	43.50 -24.23 QP
5	410.383	20.50	2.59	27.38	30.54	26.25	46.00 -19.75 QP
6	801.786	26.76	3.83	27.60	30.59	33.58	46.00 -12.42 QP



Test Mode: 05; Polarity: Vertical



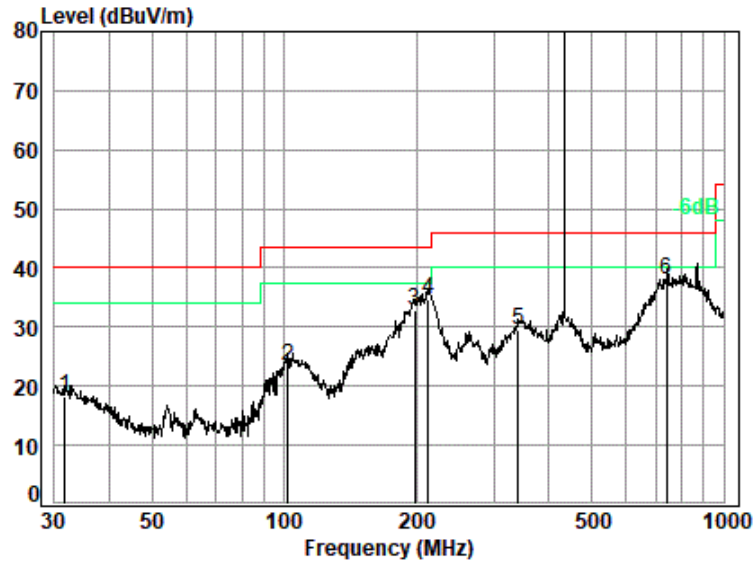
Site : chamber
 Condition: 3m VERTICAL
 Job No. : 01852ME/01853ME
 Test Mode: 05
 : adapter 2

	Ant Freq	Cable Loss	Preamp Factor	Read Level	Limit Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	54.452	12.07	0.87	27.74	40.18	25.38	40.00	-14.62 QP
2	62.871	11.20	0.94	27.71	45.52	29.95	40.00	-10.05 QP
3	142.824	12.13	1.42	27.46	42.24	28.33	43.50	-15.17 QP
4 q	204.238	14.49	1.75	27.23	44.99	34.00	43.50	-9.50 QP
5	226.099	15.87	1.84	27.16	39.33	29.88	46.00	-16.12 QP
6	807.429	26.76	3.85	27.57	29.38	32.42	46.00	-13.58 QP



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Test Mode: 05; Polarity: Horizontal



Site : chamber
 Condition: 3m HORIZONTAL
 Job No. : 01852ME/01853ME
 Test Mode: 05
 : adapter 2

	Ant Freq	Cable Factor	Preamp Loss	Read Level	Limit Level	Over Limit	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	31.620	20.45	0.66	27.80	24.89	18.20	-21.80 QP
2	102.001	12.33	1.20	27.60	37.59	23.52	-19.98 QP
3	197.893	14.08	1.72	27.26	44.25	32.79	-10.71 QP
4	213.015	14.75	1.79	27.20	45.29	34.63	-8.87 QP
5	340.782	19.12	2.32	27.07	34.99	29.36	-16.64 QP
6 q	742.259	26.28	3.65	27.79	35.81	37.95	-8.05 QP



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7.5 Radiated Emissions above 1GHz

Test Requirement 47 CFR Part 15C Section 15.231(e) and 15.209

Test Method: ANSI C63.10 (2013) Section 6.6

Measurement Distance: 3m

7.5.1 E.U.T. Operation

Operating Environment:

Temperature: 22.3 °C

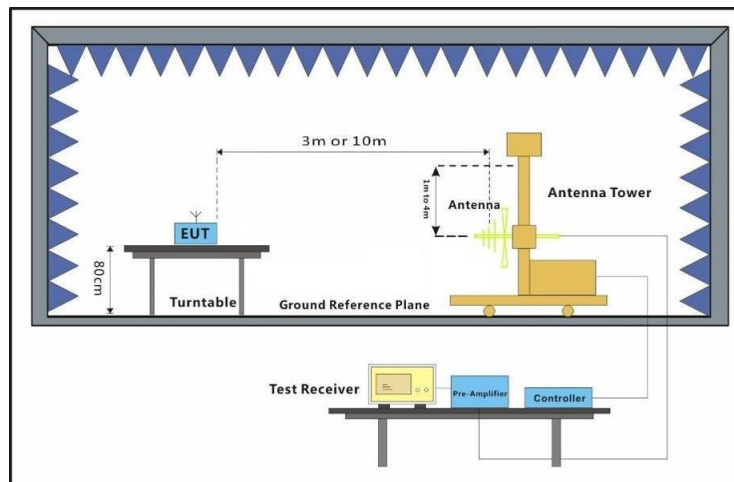
Humidity: 60.5 % RH

Atmospheric Pressure: 1005 mbar

7.5.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	04	Charge+TX mode_Keep the EUT in continuously transmitting mode.
Pre-scan	05	TX mode_Keep the EUT in continuously transmitting mode.

7.5.3 Test Setup Diagram



7.5.4 Measurement Procedure and Data

- a. 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.
- 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 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:

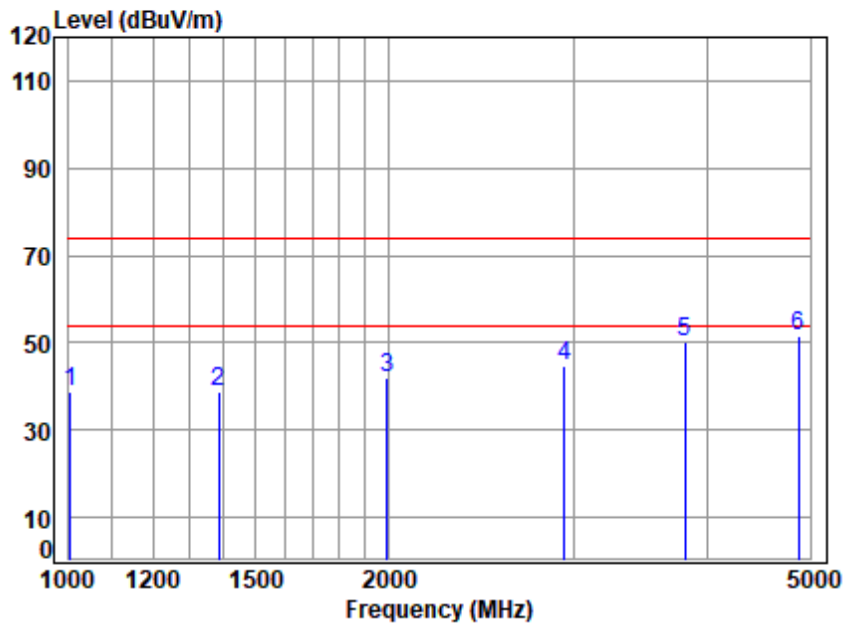
- 1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Pre-amplifier. The basic equation with a sample calculation is as follows: Final Test Level = Receiver Reading + Antenna Factor + Cable Factor - Pre-amplifier Factor
- 2) For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.



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Test Mode: 05; Polarity: Horizontal



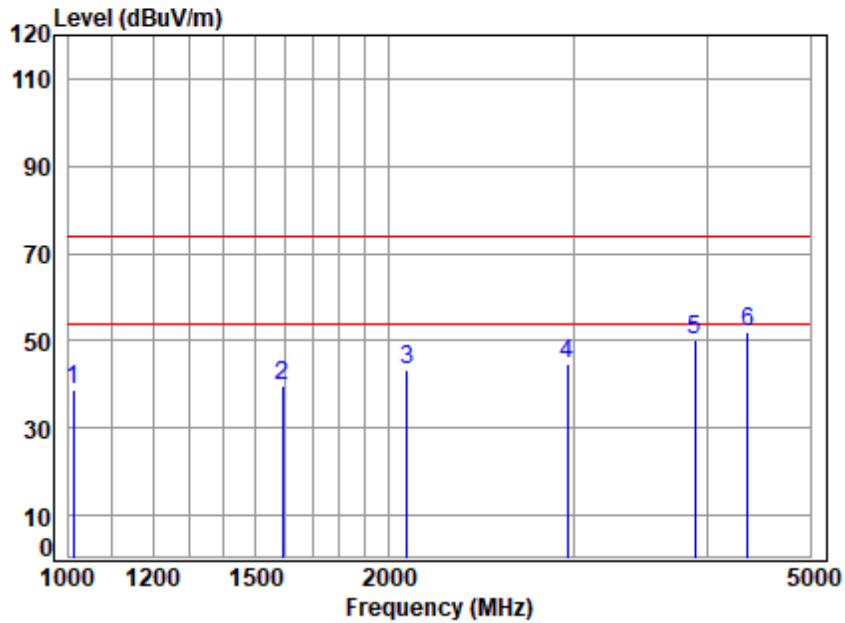
Site : chamber
 Condition: 3m HORIZONTAL
 Job No : 01852ME/01853ME
 Mode : 433.92 TX RSE

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1003.224	2.45	24.96	38.39	49.78	38.80	74.00	-35.20	Peak
2	1384.178	3.08	24.97	37.18	48.02	38.89	74.00	-35.11	Peak
3	1994.611	3.80	28.06	35.80	46.10	42.16	74.00	-31.84	Peak
4	2930.299	4.75	30.14	35.47	45.24	44.66	74.00	-29.34	Peak
5	3809.290	6.03	32.78	34.52	45.84	50.13	74.00	-23.87	Peak
6 q	4872.889	7.10	34.05	34.90	45.25	51.50	74.00	-22.50	Peak



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Test Mode: 05; Polarity: Vertical



Site : chamber
 Condition: 3m VERTICAL
 Job No : 01852ME/01853ME
 Mode : 433.92 TX RSE

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	1009.703	2.46	24.88	38.36	49.89	38.87	74.00	-35.13 Peak
2	1589.657	3.36	26.38	36.65	46.66	39.75	74.00	-34.25 Peak
3	2083.197	3.91	28.47	35.76	46.88	43.50	74.00	-30.50 Peak
4	2949.225	4.77	30.29	35.46	44.94	44.54	74.00	-29.46 Peak
5	3896.096	6.15	32.61	34.43	45.95	50.28	74.00	-23.72 Peak
6 q	4367.737	6.65	33.56	34.59	46.57	52.19	74.00	-21.81 Peak



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7.6 Conducted Emissions at AC Mains Power Port (150kHz-30MHz)

Test Requirement: 47 CFR Part 15, Subpart C 15.231

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

Limit:

Frequency of emission(MHz)	Conducted limit(dBμV)	
	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.

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

7.6.1 E.U.T. Operation

Operating Environment:

Temperature: 23.7 °C

Humidity: 46.8 % RH

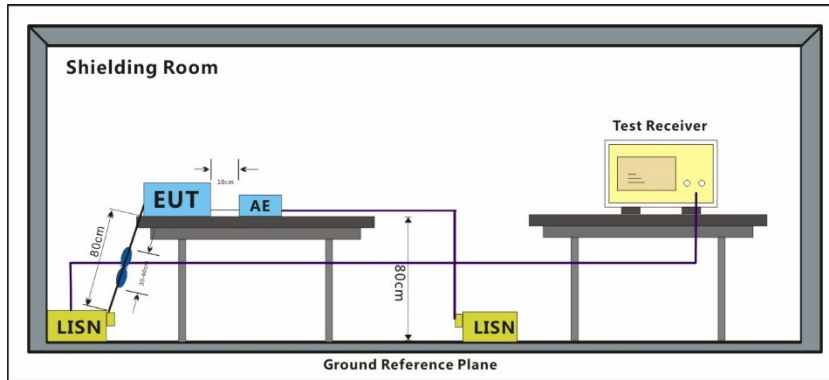
Atmospheric Pressure: 1005 mbar

7.6.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	05	Charge+TX mode_Keep the EUT in continuously transmitting mode.



7.6.3 Test Setup Diagram



7.6.4 Measurement Procedure and Data

Frequency range: 150kHz-30MHz

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.

The red line show in graphic is the limit in standard used in this section.

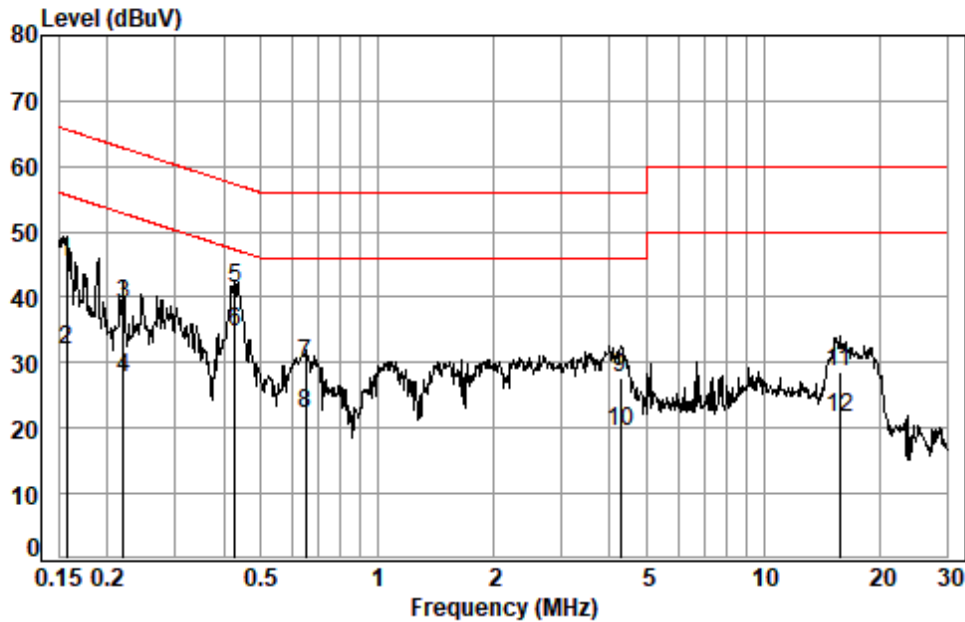
Remark: Measured Level= Read Level+ Cable Loss+ LISN Factor



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Test Mode: 05; Line: Live line



Site : Shielding Room
 Condition: Line
 Job No. : 01852ME
 Test mode: 05

: Adapter 1

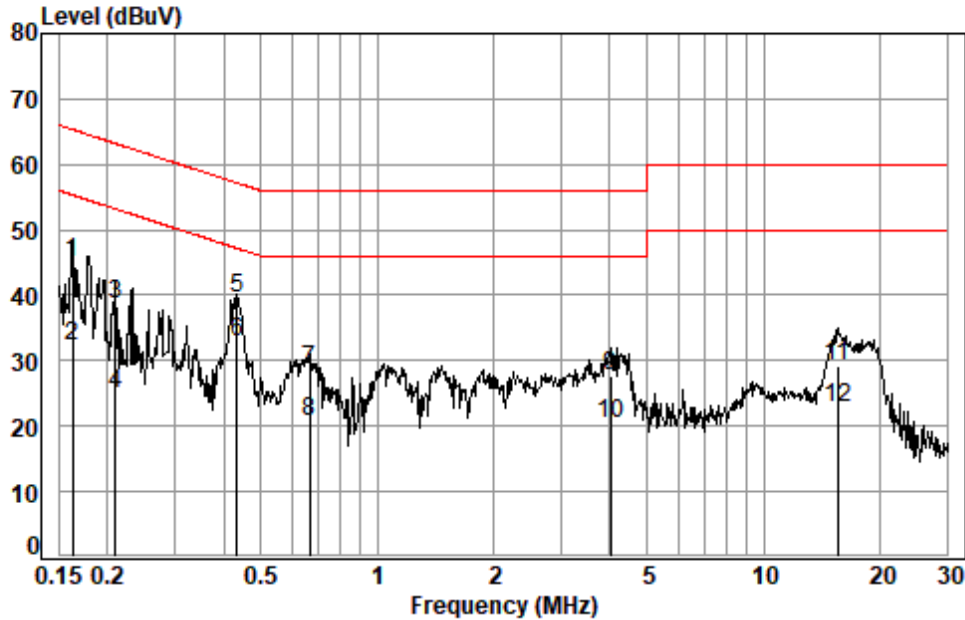
	Cable	LISN	Read	Limit	Over	
Freq	Loss	Factor	Level	Level	Line	Limit Remark
MHz	dB	dB	dBuV	dBuV	dBuV	dB
1	0.1573	0.03	9.76	35.50	45.29	65.60 -20.31 QP
2	0.1573	0.03	9.76	22.00	31.79	55.60 -23.81 Average
3	0.2197	0.04	9.76	29.22	39.02	62.83 -23.81 QP
4	0.2197	0.04	9.76	17.85	27.65	52.83 -25.18 Average
5 *	0.4282	0.05	9.76	31.50	41.31	57.29 -15.98 QP
6 *	0.4282	0.05	9.76	25.01	34.82	47.29 -12.47 Average
7	0.6508	0.06	9.77	20.12	29.95	56.00 -26.05 QP
8	0.6508	0.06	9.77	12.52	22.35	46.00 -23.65 Average
9	4.2692	0.14	9.88	17.63	27.65	56.00 -28.35 QP
10	4.2692	0.14	9.88	9.53	19.55	46.00 -26.45 Average
11	15.7179	0.16	10.63	17.70	28.49	60.00 -31.51 QP
12	15.7179	0.16	10.63	10.77	21.56	50.00 -28.44 Average



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Test Mode: 05; Line: Neutral Line



Site : Shielding Room
 Condition: Neutral
 Job No. : 01852ME
 Test mode: 05

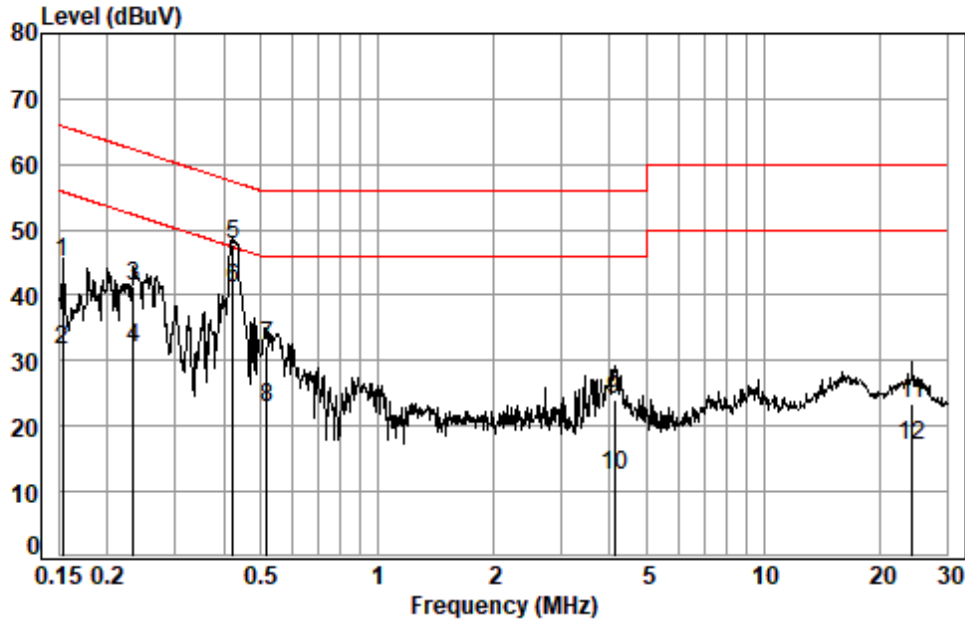
: Adapter 1

	Cable	LISN	Read	Limit	Over	
Freq	Loss	Factor	Level	Level	Line	Limit Remark
MHz	dB	dB	dBuV	dBuV	dBuV	dB
1	0.1624	0.03	9.73	35.14	44.90	65.34 -20.44 QP
2	0.1624	0.03	9.73	22.57	32.33	55.34 -23.01 Average
3	0.2106	0.04	9.73	29.01	38.78	63.18 -24.40 QP
4	0.2106	0.04	9.73	15.18	24.95	53.18 -28.23 Average
5 *	0.4328	0.05	9.74	29.67	39.46	57.20 -17.74 QP
6 *	0.4328	0.05	9.74	23.15	32.94	47.20 -14.26 Average
7	0.6683	0.06	9.75	18.78	28.59	56.00 -27.41 QP
8	0.6683	0.06	9.75	11.01	20.82	46.00 -25.18 Average
9	4.0062	0.14	9.87	17.63	27.64	56.00 -28.36 QP
10	4.0062	0.14	9.87	10.25	20.26	46.00 -25.74 Average
11	15.5523	0.15	10.66	18.36	29.17	60.00 -30.83 QP
12	15.5523	0.15	10.66	12.05	22.86	50.00 -27.14 Average



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Test Mode: 05; Line: Live line



Site : Shielding Room
 Condition: Line
 Job No. : 01852ME
 Test mode: 05

: Adapter 2

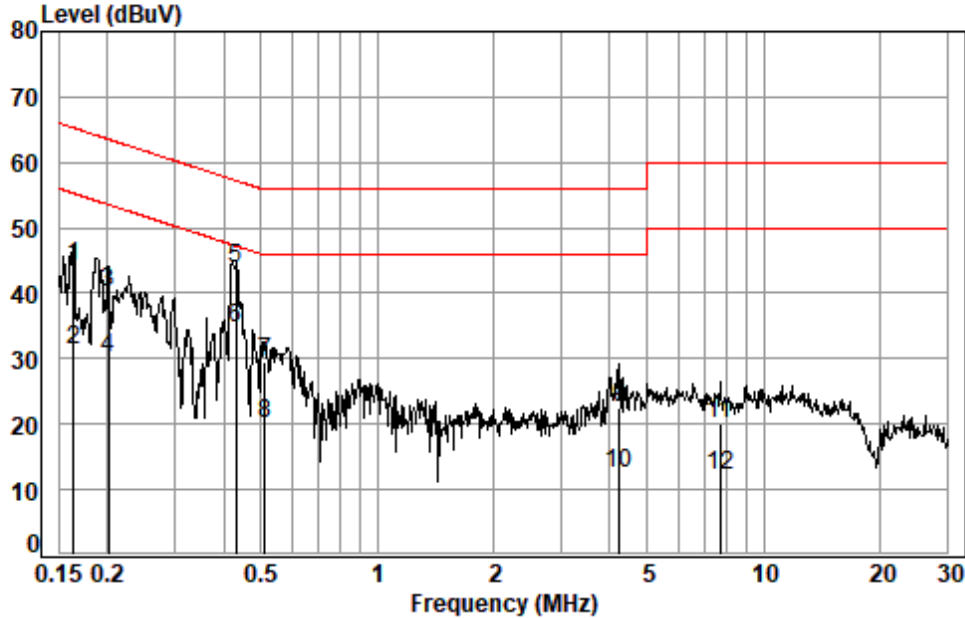
	Freq	Cable Loss	LISN Factor	Read Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dB	
1	0.1532	0.03	9.76	35.10	44.89	65.82	-20.93 QP
2	0.1532	0.03	9.76	21.95	31.74	55.82	-24.08 Average
3	0.2341	0.04	9.76	31.67	41.47	62.30	-20.83 QP
4	0.2341	0.04	9.76	22.28	32.08	52.30	-20.22 Average
5 *	0.4237	0.05	9.76	37.93	47.74	57.37	-9.63 QP
6 *	0.4237	0.05	9.76	31.25	41.06	47.37	-6.31 Average
7	0.5182	0.06	9.76	22.47	32.29	56.00	-23.71 QP
8	0.5182	0.06	9.76	12.86	22.68	46.00	-23.32 Average
9	4.1137	0.14	9.88	13.99	24.01	56.00	-31.99 QP
10	4.1137	0.14	9.88	2.60	12.62	46.00	-33.38 Average
11	24.2706	0.35	11.10	12.10	23.55	60.00	-36.45 QP
12	24.2706	0.35	11.10	5.73	17.18	50.00	-32.82 Average



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Test Mode: 05; Line: Neutral Line



Site : Shielding Room
 Condition: Neutral
 Job No. : 01852ME
 Test mode: 05

: Adapter 2

	Cable	LISN	Read	Limit	Over	
Freq	Loss	Factor	Level	Level	Line	Limit Remark
MHz	dB	dB	dBuV	dBuV	dBuV	dB
1	0.1633	0.03	9.73	34.27	44.03	65.30 -21.27 QP
2	0.1633	0.03	9.73	21.61	31.37	55.30 -23.93 Average
3	0.2018	0.04	9.73	30.30	40.07	63.54 -23.47 QP
4	0.2018	0.04	9.73	20.38	30.15	53.54 -23.39 Average
5 *	0.4305	0.05	9.74	33.89	43.68	57.24 -13.56 QP
6 *	0.4305	0.05	9.74	24.80	34.59	47.24 -12.65 Average
7	0.5128	0.06	9.74	19.84	29.64	56.00 -26.36 QP
8	0.5128	0.06	9.74	10.19	19.99	46.00 -26.01 Average
9	4.2466	0.14	9.88	12.36	22.38	56.00 -33.62 QP
10	4.2466	0.14	9.88	2.49	12.51	46.00 -33.49 Average
11	7.7278	0.19	10.12	9.62	19.93	60.00 -40.07 QP
12	7.7278	0.19	10.12	1.96	12.27	50.00 -37.73 Average



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8 Test Setup Photo

Refer to Setup Photo for SZCR2306001852ME

9 EUT Constructional Details (EUT Photos)

Refer to External and Internal Photos for SZCR2306001852ME

- End of the Report -

