

Report No.: SZEM210300217903

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TEST REPORT

Application No.: SZEM2103002179CR **Applicant:** DT Research, Inc.

Address of Applicant: 3RD FL NO 36 WUQUAN 7TH RD WUGU DISTRICT, NEW TAIPEI, Taiwan

Manufacturer: DT Research, Inc.

Address of Manufacturer: 2000 Concourse Drive, San Jose, CA 95131, USA

Factory: DT Research, Inc. Taiwan Branch

Address of Factory: 6F., No.36 Wuquan 7 th Rd., Wugu Dist. New Taipei City 248 Taiwan

Equipment Under Test (EUT):

EUT Name: Medical-Grade Integrated LCD System

Model No.: 507T, 507XXX-XXX (X=blank, A~Z or 0~9) ♣

Please refer to section 2 of this report which indicates which model was

actually tested and which were electrically identical.

Trade Mark: DT Research, Inc. FCC ID YE3600-AX200NG

Standard(s): 47 CFR Part 15, Subpart C 15.247

Date of Receipt: 2021-03-01

Date of Test: 2021-03-02 to 2021-04-11

Date of Issue: 2021-04-19

Test Result: Pass*

Keny Xu EMC Laboratory Manager

Ceny. xu



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



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Revision Record						
Version	Chapter	Date	Modifier	Remark		
01		2021-04-19		Original		

Authorized for issue by:		
	Bolisonti	
	Edison Li/Project Engineer	
	Exic Fu	
	Eric Fu/Reviewer	



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2 Test Summary

Radio Spectrum Technical Requirement							
Item	Standard	Method	Requirement	Result			
Antenna Requirement		N/A	47 CFR Part 15, Subpart C 15.203 & 15.247(b)(4)	Pass			
Other requirements Frequency Hopping Spread Spectrum System Hopping Sequence	47 CFR Part 15, Subpart C 15.247	N/A	47 CFR Part 15, Subpart C 15.247(a)(1),(g),(h)	Pass			

Radio Spectrum Matter Part							
Item	Standard	Method	Requirement	Result			
Radiated Spurious Emissions	47 CED Dor# 45	ANSI C63.10 (2013) Section 6.4,6.5,6.6	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass			
Radiated Emissions which fall in the restricted bands	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.10.5	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass			

Emission Part				
Item	Standard	Method	Requirement	Result
Conducted Emissions at AC Power Line (150kHz-30MHz)	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.2	47 CFR Part 15, Subpart C 15.207	Pass

Remark:

Model No.: 507T, 507XXX-XXX (X=blank, A~Z or 0~9)

Only the model 507T was tested, since according to the declaration from the applicant, the electrical circuit design, layout, components used, internal wiring and functions were identical for all the above models, with only difference on model No..

This report is prepared for FCC class II permissive change.

The modular approval by TCB, FCC ID: YE3600-AX200NG, Granted on 05/25/2020.

The module installed into host platform mentioned above is electronically and mechanically identical to the original certified module. The Original FCC testing on module under FCC ID: YE3600-AX200NG was performed with an antenna of higher gain, and the antenna was connected to the module in an open environment. The current host platform under application uses a new antenna of the different type, Lower gain and is installed inside the host platform enclosure.

Therefore in this report Conducted Emissions at AC Power Line (150kHz-30MHz), Radiated Emissions which fall in the restricted bands and Radiated Spurious Emissions were fully retested on Model 507T and shown the data in this report.



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General Information

Details of E.U.T.

AC Adapter
Model: EM11011M-190
Input: AC 100-240V, 2.0~1.0A, 50/60Hz
Output: DC 19V, 6.31A, 120W
DC cable:114cm with a ferrite core
More than 108MHz
Fixed device
2402MHz to 2480MHz
Bluetooth V5.0
Frequency Hopping Spread Spectrum(FHSS)
GFSK, π/4DQPSK, 8DPSK
79
1MHz
PIFA Antenna
3.5dBi

4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.			
The EUT has been tested as an independent unit.						

4.3 Measurement Uncertainty

Test Item	Measurement Uncertainty
Conducted Emissions at AC Power Line (150kHz-30MHz)	± 3.0dB (150kHz to 30MHz)
Radiated Spurious Emissions	± 4.5dB
Radiated Emissions which fall in the restricted bands	± 4.5dB (Below 1GHz);± 4.8dB (Above 1GHz)



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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, 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

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. 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: CN1178

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

Designation Number: CN1178. Test Firm Registration Number: 406779.

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

4.7 Abnormalities from Standard Conditions

None



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5 Equipment List

Conducted Emissions at AC Power Line (150kHz-30MHz)						
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date	
Shielding Room	ZhongYu Electron	GB-88	SEM001-06	2019-06-13	2022-06-12	
EMI Test Receiver	Rohde&Schwarz	ESCI	SEM004.02	2020-03-26	2021-03-25	
EIVII Test Receiver	RondeaSchwarz	e&Schwarz ESCI SEM004-02	SEIVI004-02	2021-03-24	2022-03-23	
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A	
Coaxial Cable	SGS	N/A	SEM024-01	2020-07-10	2021-07-09	
LISN	Rohde&Schwarz	ENV216	SEM007-01	2020-09-23	2021-09-22	
LISN	ETC LINDODEN	2016/2	SEM007.02	2020-03-26	2021-03-25	
	ETS-LINDGREN 3816/2	3010/2	SEM007-02	2021-03-24	2022-03-23	

RE in Chamber					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date	Cal. Due date
3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEM001-01	2020-07-19	2023-07-18
MXE EMI receiver(3Hz-3.6GHz)	KEYSIGHT	N9038A	SEM004-15	2020-11-02	2021-11-01
BiConiLog Antenna (26-3000MHz)	ETS-LINDGREN	3142C	SEM003-02	2019-05-24	2022-05-23
Pre-amplifier	Agilent Technologies	8447D	SEM005-01	2020-03-26	2021-03-25
(0.1-1300MHz)	Agiletit Technologies	0447 D	3EIVI003-01	2021-03-24	2022-03-23
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM025-01	2020-07-10	2021-07-09

Radiated Spurious Emissions						
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date	
3m Semi-Anechoic	AUDIX	N/A	SEM001-02	2018-03-28	2021-03-27	
Chamber	AUDIX	IN/A	SEIVIUU1-02	2021-03-26	2024-03-25	
EXA Signal Analyzer	Agilent Technologies Inc	N9010A	SEM004-12	2021-02-01	2022-01-31	
Horn Antenna	Rohde & Schwarz	HF906	SHEM009-2	2020-07-30	2021-07-29	
Pre-Amplifier	Compliance Directions Systems Inc.	PAP-0126	SEM004-11	2020-09-23	2021-09-22	
Measurement Software	AUDIX	e3 V8.2014-6- 27	N/A	N/A	N/A	
Coaxial Cable	SGS	N/A	SEM026-01	2020-07-10	2021-07-09	
Horn Antenna	Schwarzbeck	BBHA 9170	SEM003-15	2020-11-14	2023-11-13	
Dro Amplifior	Compliance Directions	DAD 0040 50	SEM005-08	2020-03-26	2021-03-25	
Pre-Amplifier	Systems Inc.	PAP-2640-50	3EIVIUU5-06	2021-03-24	2022-03-23	



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Radiated Emissions wh	ich fall in the restricte	ed bands			
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
3m Semi-Anechoic	AUDIX	N/A	SEM001-02	2018-03-28	2021-03-27
Chamber	AUDIX	IN/A	3EM001-02	2021-03-26	2024-03-25
EXA Signal Analyzer	Analyzer Agilent Technologies Inc		SEM004-12	2021-02-01	2022-01-31
Horn Antenna	Rohde & Schwarz	HF906	SHEM009-2	2020-07-30	2021-07-29
Pre-Amplifier	Compliance Directions Systems Inc.	tions Systems PAP-0126 SEM004		2020-09-23	2021-09-22
Measurement Software	AUDIX	e3 V8.2014-6- 27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM026-01	2020-07-10	2021-07-09
Horn Antenna	Schwarzbeck	BBHA 9170	SEM003-15	2020-11-14	2023-11-13
	Compliance			2020-03-26	2021-03-25
Pre-Amplifier	Directions Systems Inc.	PAP-2640-50	SEM005-08	2021-03-24	2022-03-23

General used equipmen	t				
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-04	2020-09-15	2021-09-14
Humidity/ Temperature Indicator	Mingle	N/A	SEM002-08	2020-09-15	2021-09-14
	Changchun			2020-04-01	2021-03-31
Barometer	Meteorological Industry Factory	DYM3	SEM002-01	2021-03-30	2022-03-29



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Radio Spectrum Technical Requirement 6

6.1 Antenna Requirement

6.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.203 & 15.247

Limit:

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.

15.247(b) (4) requirement:

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

EUT Antenna:

The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 3.5dBi.

Antenna location: Refer to Internal photos.





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6.2 Other requirements Frequency Hopping Spread Spectrum System Hopping Sequence

6.2.1 Test Requirement:

47 CFR Part 15, Subpart C 15.247 Limit:

Standard Requirement:

The system shall hop to channel frequencies that are selected at the system hopping rate from a Pseudorandom ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

Frequency hopping spread spectrum systems are not required to employ all available hopping channels during each transmission. However, the system, consisting of both the transmitter and the receiver, must be designed to comply with all of the regulations in this section should the transmitter be presented with a continuous data (or information) stream. In addition, a system employing short transmission bursts must comply with the definition of a frequency hopping system and must distribute its transmissions over the minimum number of hopping channels specified in this section.

The incorporation of intelligence within a frequency hopping spread spectrum system that permits the system to recognize other users within the spectrum band so that it individually and independently chooses and adapts its hopsets to avoid hopping on occupied channels is permitted. The coordination of frequency hopping systems in any other manner for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters is not permitted.

Compliance for section 15.247(a)(1):

According to Technical Specification, the pseudorandom sequence may be generated in a nine-stage shift register whose 5th and 9th stage outputs are added in a modulo-two addition stage. And the result is fed back to the input of the first stage. The sequence begins with the first ONE of 9 consecutive ONEs; i.e. the shift register is initialized with nine ones.

- > Number of shift register stages: 9
- > Length of pseudo-random sequence: 29 -1 = 511 bits
- > Longest sequence of zeros: 8 (non-inverted signal)

Linear Feedback Shift Register for Generation of the PRBS sequence

An example of Pseudorandom Frequency Hopping Sequence as follow:



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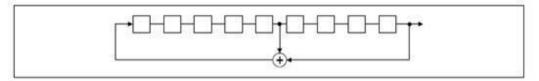
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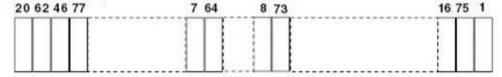
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Linear Feedback Shift Register for Generation of the PRBS sequence

An example of Pseudorandom Frequency Hopping Sequence as follow:



Each frequency used equally on the average by each transmitter.

According to Technical Specification, the receivers are designed to have input and IF bandwidths that match the hopping channel bandwidths of any transmitters and shift frequencies in synchronization with the transmitted signals.

Compliance for section 15.247(g):

According to Technical Specification, the system transmits the packet with the pseudorandom hopping frequency with a continuous data and the short burst transmission from the Bluetooth system is also transmitted under the frequency hopping system with the pseudorandom hopping frequency system.

Compliance for section 15.247(h):

According to Technical specification, the system incorporates with an adaptive system to detect other user within the spectrum band so that it individually and independently to avoid hopping on the occupied channels.

The system is designed not have the ability to coordinated with other FHSS System in an effort to avoid the simultaneous occupancy of individual hopping frequencies by multiple transmitter.



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Radio Spectrum Matter Test Results

Radiated Spurious Emissions

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209 Test Method: ANSI C63.10 (2013) Section 6.4,6.5,6.6

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.

7.1.1 E.U.T. Operation

Operating Environment:

Temperature: 25.3 °C Atmospheric Pressure: 1010 mbar Humidity: 45.1 % RH

7.1.1 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Pre-scan	14	TX_non-Hop mode_Keep the EUT in continuously transmitting mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.
Final test	15	Charge + TX_non-Hop mode_Keep the EUT in charging and continuously transmitting mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.



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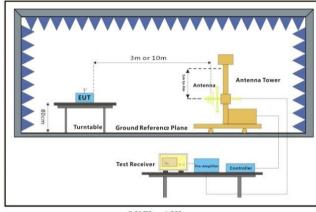
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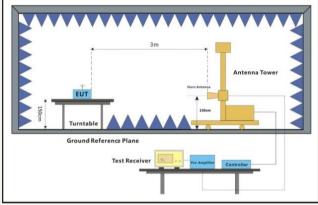


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7.1.2 Test Setup Diagram





30MHz-1GHz Above 1GHz

7.1.3 Measurement Procedure and Data

- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. 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.
- 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 quasi-peak method as specified and then reported in a data sheet.
- g. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- i. Repeat above procedures until all frequencies measured was complete.

Remark:

- 1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor
- 2. Scan from 9kHz to 30MHz, 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.
- 3. The disturbance below 1GHz was very low and the harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.



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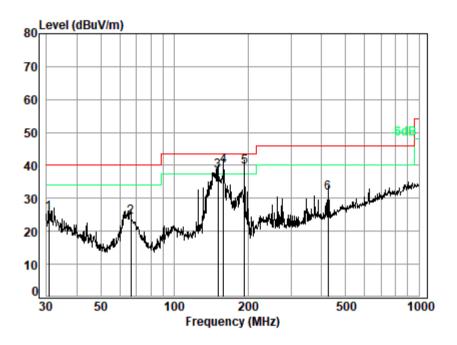
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Test Mode: 15; Polarity: Horizontal; Modulation: GFSK; Channel:Low



Site : chamber

Condition: 3m HORIZONTAL

Job No. : 02179CR

Test Mode: 15

	Freq			Preamp Factor					Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	30.64	0.61	22.51	27.73	30.29	25.68	40.00	-14.32	QP
2	66.27	0.80	12.77	27.65	38.57	24.49	40.00	-15.51	QP
3	150.54	1.16	14.74	27.33	49.69	38.26	43.50	-5.24	QP
4	158.67	1.17	15.31	27.30	50.71	39.89	43.50	-3.61	QP
5	193.77	1.20	15.61	27.16	49.78	39.43	43.50	-4.07	QP
6	425.03	2.35	22.10	27.50	34.68	31.63	46.00	-14.37	OP



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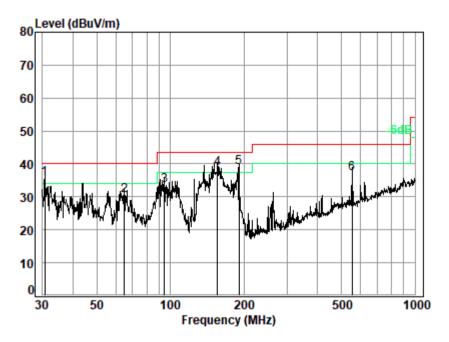
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Test Mode: 15; Polarity: Vertical; Modulation: GFSK; Channel:Low



Site : chamber Condition: 3m VERTICAL Job No. : 02179CR

Test Mode: 15

		Cable	Ant	Preamp	Read		Limit	0ver	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	30.64	0.61	22.51	27.73	40.18	35.5/	40.00	-4.43	QР
2	64.89	0.80	12.74	27.66	44.61	30.49	40.00	-9.51	QP
3	94.43	1.21	13.56	27.62	46.34	33.49	43.50	-10.01	QP
4	155.91	1.16	15.12	27.31	49.54	38.51	43.50	-4.99	QP
5	190.41	1.19	15.51	27.18	49.47	38.99	43.50	-4.51	QP
6	552.88	2.61	25.07	27.98	37.38	37.08	46.00	-8.92	QP



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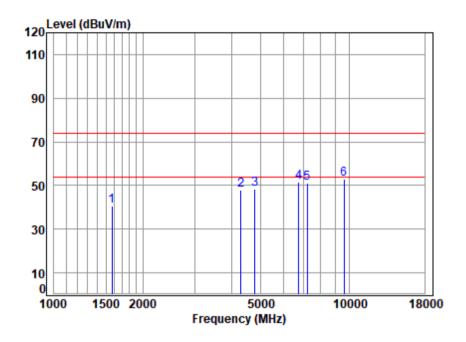
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Test Mode: 15; Polarity: Horizontal; Modulation: GFSK; Channel: Low



Site : chamber

Condition: 3m HORIZONTAL

Job No : 02179CR Mode : 2402 TX SE

Note : BT

		Cable	Ant	Preamp	Read		Limit	0ver	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
4	4574 265	2 22	26.44	20.00	F4 43	40.64	74.00	22.20	
1	1574.265	3.33	26.14	39.99	51.13	40.61	74.00	-33.39	реак
2	4304.400	6.58	33.26	41.70	49.64	47.78	74.00	-26.22	peak
3	4804.000	7.10	33.97	42.14	49.22	48.15	74.00	-25.85	peak
4	6737.207	8.41	35.75	41.87	49.34	51.63	74.00	-22.37	peak
5	7206.000	8.74	36.07	41.50	47.91	51.22	74.00	-22.78	peak
6	9608.000	10.81	37.67	37.76	42.17	52.89	74.00	-21.11	peak



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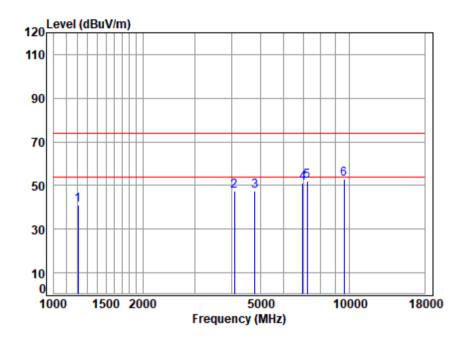
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Test Mode: 15; Polarity: Vertical; Modulation: GFSK; Channel: Low



Site : chamber

Condition: 3m VERTICAL

Job No : 02179CR Mode : 2402 TX SE

Note : BT

		Cable	Ant	Preamp	Read		Limit	0ver	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1206.682	2.78	24.62	39.76	53.61	41.25	74.00	-32.75	peak
2	4086.182	6.37	32.86	41.49	49.83	47.57	74.00	-26.43	peak
3	4804.000	7.10	33.97	42.14	48.34	47.27	74.00	-26.73	peak
4	6954.852	8.52	35.87	41.73	48.38	51.04	74.00	-22.96	peak
5	7206.000	8.74	36.07	41.50	48.63	51.94	74.00	-22.06	peak
6	9608.000	10.81	37.67	37.76	42.25	52.97	74.00	-21.03	peak



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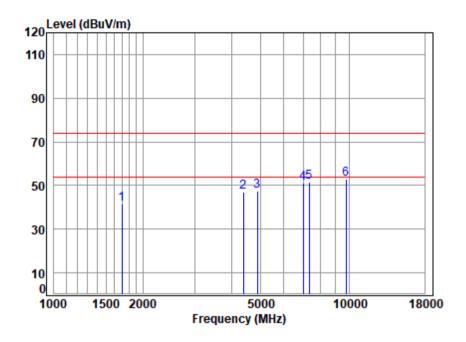
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Test Mode: 15; Polarity: Horizontal; Modulation: GFSK; Channel: middle



Site : chamber

Condition: 3m HORIZONTAL

Job No : 02179CR Mode : 2441 TX SE

Note : BT

		Cable	Ant	Preamp	Read		Limit	0ver	
	Freq			Factor					Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1697.129	3.43	26.66	40.06	51.53	41.56	74.00	-32.44	peak
2	4392.376	6.66	33.42	41.78	48.56	46.86	74.00	-27.14	peak
3	4882.000	7.18	34.06	42.20	48.47	47.51	74.00	-26.49	peak
4	6974.982	8.53	35.89	41.72	48.54	51.24	74.00	-22.76	peak
5	7323.000	8.85	36.16	41.40	48.07	51.68	74.00	-22.32	peak
	9764.000								•



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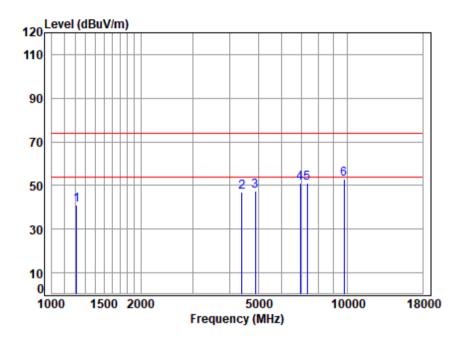
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Test Mode: 15; Polarity: Vertical; Modulation:GFSK; Channel:middle



Site : chamber

Condition: 3m VERTICAL

Job No : 02179CR Mode : 2441 TX SE

Note : BT

	Freq			Preamp Factor					Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1213.677	2.79	24.65	39.77	53.18	40.85	74.00	-33.15	peak
2	4405.090	6.67	33.44	41.79	48.58	46.90	74.00	-27.10	peak
3	4882.000	7.18	34.06	42.20	48.40	47.44	74.00	-26.56	peak
4	6934.778	8.51	35.86	41.74	48.38	51.01	74.00	-22.99	peak
5	7323.000	8.85	36.16	41.40	47.68	51.29	74.00	-22.71	peak
6	9764.000	10.76	37.76	37.50	41.75	52.77	74.00	-21.23	peak



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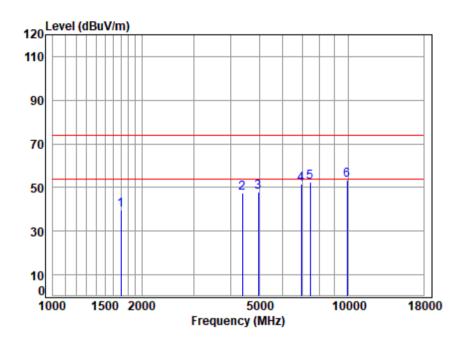
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Test Mode: 15; Polarity: Horizontal; Modulation: GFSK; Channel: High



Site : chamber

Condition: 3m HORIZONTAL

Job No : 02179CR Mode : 2480 TX SE

Note : BT

		Cable	Ant	Preamp	Read		Limit	0ver	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1702.042	3.43	26.68	40.06	49.81	39.86	74.00	-34.14	peak
2	4379.699	6.65	33.39	41.77	49.07	47.34	74.00	-26.66	peak
3	4960.000	7.26	34.15	42.27	48.62	47.76	74.00	-26.24	peak
4	6934.778	8.51	35.86	41.74	48.71	51.34	74.00	-22.66	peak
5	7440.000	8.96	36.25	41.29	48.51	52.43	74.00	-21.57	peak
6	9920.000	10.71	37.85	37.23	41.83	53.16	74.00	-20.84	peak



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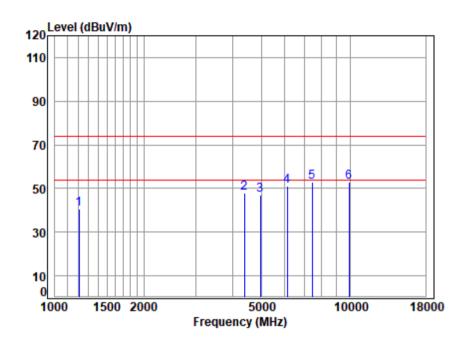
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Test Mode: 15; Polarity: Vertical; Modulation:GFSK; Channel:High



Site : chamber

Condition: 3m VERTICAL

Job No : 02179CR Mode : 2480 TX SE

Note : BT

		Cable	Ant	Preamp	Read		Limit	0ver	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
4	1206 602	2 70	24.62	20.76	F2 70	40 42	74.00	22 57	
1	1206.682	2./8	24.62	39.76	52.79	40.43	74.00	-33.5/	реак
2	4379.699	6.65	33.39	41.77	49.73	48.00	74.00	-26.00	peak
3	4960.000	7.26	34.15	42.27	48.07	47.21	74.00	-26.79	peak
4	6124.292	8.27	35.23	42.31	49.71	50.90	74.00	-23.10	peak
5	7440.000	8.96	36.25	41.29	48.86	52.78	74.00	-21.22	peak
6	9920.000	10.71	37.85	37.23	41.52	52.85	74.00	-21.15	peak



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7.2 Radiated Emissions which fall in the restricted bands

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209

Test Method: ANSI C63.10 (2013) Section 6.10.5

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.

7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 22.3 °C Humidity: 52.3 % RH Atmospheric Pressure: 1010 mbar

7.2.2 Test Mode Description

7.2.2 1 CSt IV		
Pre-scan / Final test	Mode Code	Description
Pre-scan	14	TX_non-Hop mode_Keep the EUT in continuously transmitting mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.
Final test	15	Charge + TX_non-Hop mode_Keep the EUT in charging and continuously transmitting mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.



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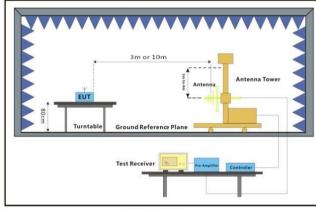
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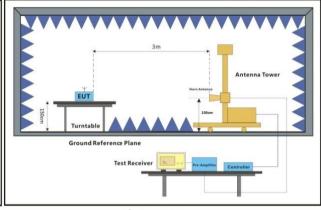


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7.2.3 Test Setup Diagram





30MHz-1GHz Above 1GHz

7.2.4 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. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- j. Repeat above procedures until all frequencies measured was complete.

Remark 1: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

Remark 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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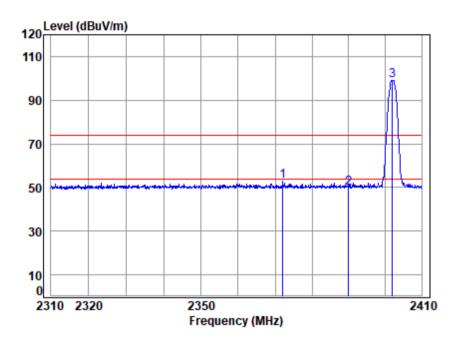
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Test Mode: 15; Polarity: Horizontal; Modulation: GFSK; Channel: Low



Site : chamber

Condition: 3m HORIZONTAL

Job No : 02179CR

Mode : 2402 Band edge

Note : BT

	Freq		Ant Factor						Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2372.103	4.32	28.49	40.41	60.32	52.72	74.00	-21.28	peak
2	2390.000	4.34	28.52	40.42	57.43	49.87	74.00	-24.13	peak
3 ;	* 2402.000	4.36	28.54	40.43	106.73	99.20	74.00	25.20	peak



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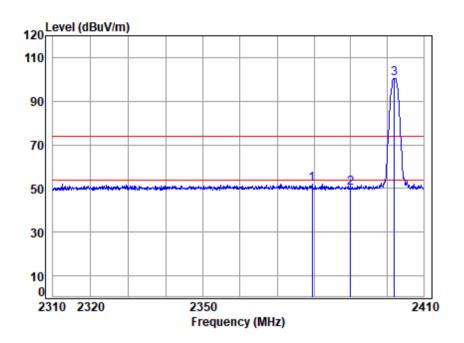
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Test Mode: 15; Polarity: Vertical; Modulation: GFSK; Channel: Low



Site : chamber

Condition: 3m VERTICAL

Job No : 02179CR

Mode : 2402 Band edge

Note : BT

	Freq					Level			Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2379.453	4.33	28.50	40.41	59.68	52.10	74.00	-21.90	peak
2	2390.000	4.34	28.52	40.42	57.57	50.01	74.00	-23.99	peak
3 *	2402.000	4.36	28.54	40.43	108.07	100.54	74.00	26.54	peak



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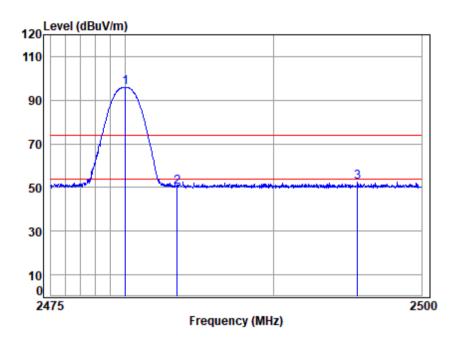
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Test Mode: 15; Polarity: Horizontal; Modulation: GFSK; Channel: High



Site : chamber

Condition: 3m HORIZONTAL

Job No : 02179CR

Mode : 2480 Band edge

Note : BT

	Freq				Read Level				Remark
_	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 * 2	2480.000	4.49	28.67	40.47	103.02	95.71	74.00	21.71	peak
2 2	2483.500	4.49	28.67	40.47	57.70	50.39	74.00	-23.61	peak
3 2	2495.657	4.51	28.69	40.47	59.92	52.65	74.00	-21.35	peak



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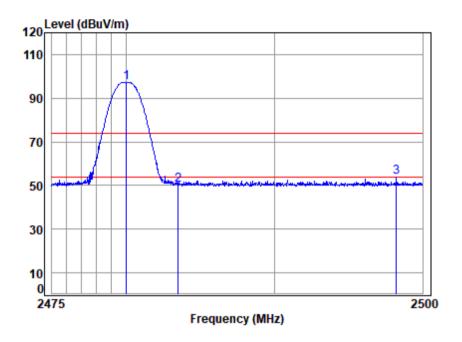
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Test Mode: 15; Polarity: Vertical; Modulation: GFSK; Channel: High



Site : chamber

Condition: 3m VERTICAL Job No : 02179CR

Mode : 2480 Band edge

Note

10 CE	. 01									
		Cable	Ant	Preamp	Read		Limit	0ver		
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark	
										_
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1 *	2480.000	4.49	28.67	40.47	104.71	97.40	74.00	23.40	peak	
2	2483.500	4.49	28.67	40.47	57.72	50.41	74.00	-23.59	peak	
3	2498.217	4.52	28.70	40.47	60.90	53.65	74.00	-20.35	peak	



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Emission Test Results 8

8.1 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 of	Conducted limit(dBµV)						
emission(MHz)	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 o	f the frequency.						
Detector: Peak for pre-scan (9kl	Hz resolution bandwidth) 0.15M to 30	MHz					

8.1.1 E.U.T. Operation

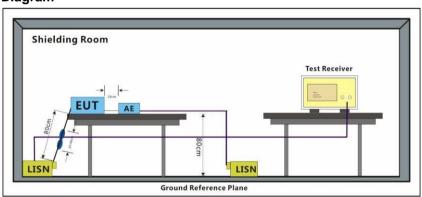
Operating Environment:

Temperature: 24.3 °C Humidity: 63.9 % RH Atmospheric Pressure: 1010 mbar

8.1.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	15	Charge + TX_non-Hop mode_Keep the EUT in charging and continuously transmitting mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

8.1.3 Test Setup Diagram





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8.1.4 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.

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

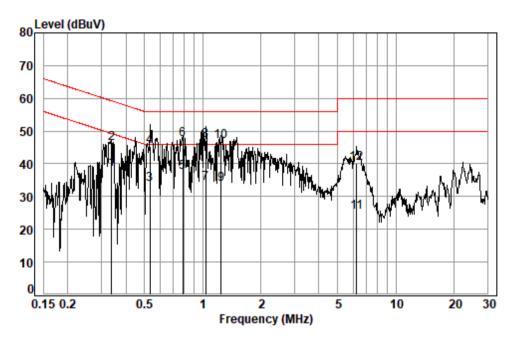




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Test Mode: 15; Line: Live line



: Shielding Room

Condition: Line Job No. : 02179CR

Test mode: 15

		Cable	LISN	Read		Limit	0ver	
	Freq	Loss	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.3374	0.06	9.67	28.56	38.29	49.27	-10.98	Average
2	0.3374	0.06	9.67	36.50	46.23	59.27	-13.04	QP
3	0.5350	0.08	9.69	24.04	33.81	46.00	-12.19	Average
4	0.5350	0.08	9.69	35.47	45.24	56.00	-10.76	QP
5	0.7876	0.09	9.68	27.49	37.26	46.00	-8.74	Average
6	0.7876	0.09	9.68	37.83	47.60	56.00	-8.40	QP
7	1.0375	0.10	9.68	24.23	34.01	46.00	-11.99	Average
8	1.0375	0.10	9.68	37.41	47.19	56.00	-8.81	QP
9	1.2488	0.11	9.68	24.06	33.85	46.00	-12.15	Average
10	1.2488	0.11	9.68	37.05	46.84	56.00	-9.16	QP
11	6.2852	0.16	9.82	15.14	25.12	50.00	-24.88	Average
12	6.2852	0.16	9.82	30.21	40.19	60.00	-19.81	QP



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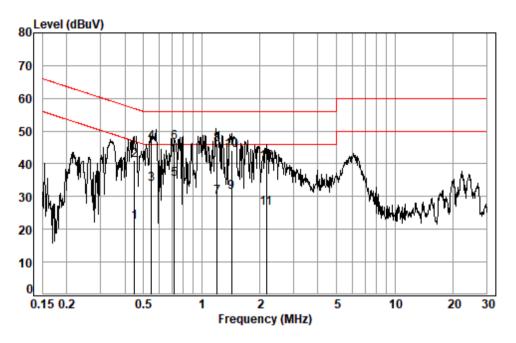
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Test Mode: 15; Line: Neutral Line



: Shielding Room

Condition: Neutral Job No. : 02179CR

Test mode: 15

	Freq	Cable Loss	LISN Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.4492	0.07	9.67	12.55	22.29			Average
2	0.4492	0.07	9.67	31.47	41.21	56.89	-15.68	QP
3	0.5505	0.08	9.67	24.16	33.91	46.00	-12.09	Average
4	0.5505	0.08	9.67	36.78	46.53	56.00	-9.47	QP
5	0.7236	0.09	9.67	25.43	35.19	46.00	-10.81	Average
6	0.7236	0.09	9.67	36.75	46.51	56.00	-9.49	QP
7	1.2034	0.11	9.67	20.18	29.96	46.00	-16.04	Average
8	1.2034	0.11	9.67	36.29	46.07	56.00	-9.93	QP
9	1.4257	0.11	9.67	21.43	31.21	46.00	-14.79	Average
10	1.4257	0.11	9.67	34.36	44.14	56.00	-11.86	QP
11	2.1668	0.13	9.68	16.64	26.45	46.00	-19.55	Average
12	2.1668	0.13	9.68	30.52	40.33	56.00	-15.67	QP



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Test Setup Photo 9

Refer to setup photos for SZEM2103002179CR

10 EUT Constructional Details (EUT Photos)

Refer to external and internal photos for SZEM2103002179CR

- End of the Report -



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