TEST REPORT

Application No.:	GZCR2204000437AT
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:	Mobile Tablet
Model No.:	316T, 316T/MD, 316xxxxx(x= 0-9, A-Z, - or null, or .,or /) ♣
♣	Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.
Trade Mark:	DT Research
Standard(s) :	47 CFR Part 15, Subpart C 15.247
Date of Receipt:	2022-04-13
Date of Test:	2022-04-14 to 2022-04-29
Date of Issue:	2022-05-05
Test Result:	**Pass***

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

Kobe Jian
EMC Laboratory Manager

Revision Record				
Version	**Chapter**	**Date**	**Modifier**	**Remark**
01		*2022-05-05*		*Original*

Authorized for issue by				
		Curry Wu/Project Engineer		
		Ricky Liu/Reviewer		

2 Test Summary

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

Radio Spectrum Matter Part				
Item	**Standard**	**Method**	**Requirement**	**Result**
Conducted Emissions at AC Power Line (150kHz-30MHz)	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.2	47 CFR Part 15, Subpart C 15.207	Pass
Radiated Emissions which fall in the restricted bands		ANSI C63.10 (2013) Section 6.10.5	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass
Radiated Spurious Emissions (Below 1GHz)		ANSI C63.10 (2013) Section 6.4,6.5,6.6	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass
Radiated Spurious Emissions (Above 1GHz)		ANSI C63.10 (2013) Section 6.4,6.5,6.6	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass

Note:

E.U.T./EUT means Equipment Under Test.

Pass means the test result passed the test standard requirement, please find the detailed decision rule in the report relative section.

Declaration of EUT Family Grouping:

Model No.: 316xxxxx(x= 0-9, A-Z, - or null, or .,or /)

Only the model 316T 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 lower gain, and the antenna was connected to the module in an open environment. The current host platform under application uses a new antenna, lower gain and is installed outside 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 316T and shown the data in this report.

3 Contents

4 General Information

4.1 Details of E.U.T.

Power supply:	AC Adapter Model: A11-065N1A Input: AC 100-240V, 50/60Hz, 1.7A Output: DC 19V, 3.42A, 65W Rechargeable Lithium-Ion Polymer Battery Model: ACC-006-60K(3ICP9/36/115) Rated Capacity: 5400mAh Voltage: DC 11.4V Watt-Hour: 61.56Wh Max Charge Voltage: 13.05V Wall Cradle: ACC-WM210-16TMA
Cable(s):	DC cable: 175cm with a ferrite core
Internal Source:	More than 108MHz
Operation Frequency:	2402MHz to 2480MHz
Bluetooth Version:	V5.0
Spectrum Spread Technology:	Frequency Hopping Spread Spectrum(FHSS)
Modulation Type:	GFSK, π/4DQPSK, 8DPSK
Number of Channels:	79
Channel Spacing:	1MHz
Antenna Type:	PIFA Antenna
Antenna Gain:	Antenna0: 2.0dBi

4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
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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)	±2.76dB
Radiated Emissions which fall in the restricted bands	±5.08dB (1GHz-6GHz); ±5.14dB (above 6GHz)
Radiated Spurious Emissions (Below 1GHz)	±5.06dB (3m);±4.46dB (10m)
Radiated Spurious Emissions (Above 1GHz)	±5.08dB (1GHz-6GHz); ±5.14dB (above 6GHz)

4.4 Test Location

All tests were performed at:

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

198 Kezhu Road, Scientech Park, Guangzhou Economic & Technology Development District, Guangzhou, China 510663

Tel: +86 20 82155555 Fax: +86 20 82075059

No tests were sub-contracted.

4.5 Test Facility

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

- **NVLAP (Lab Code: 200611-0)**

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP/NIST). NVLAP Code: 200611-0.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

- **ACMA**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory can also perform testing for the Australian/New Zealand Regulatory Compliance Mark (RCM).

- **SGS UK(Certificate No.: 32), SGS-TUV SAARLAND and SGS-FIMKO**

Have approved SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory as a supplier of EMC TESTING SERVICES and SAFETY TESTING SERVICES.

- **CNAS (Lab Code: L0167)**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been assessed and in compliance with CNAS-CL01:2018 accreditation criteria for testing laboratories (identical to ISO/IEC 17025:2017 General Requirements) for the Competence of Testing Laboratories.

- **FCC Recognized Accredited Test Firm(Registration No.: 486818)**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been accredited and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Designation Number: CN5016, Test Firm Registration Number: 486818.

- **ISED (Registration No.: 4620B, CAB identifier: CN0052)**

SGS-CSTC Standards Technical Services Co., Ltd., has been registered by Innovation Science and Economic Development Canada for Wireless Device Testing laboratories to test to Canadian radio equipment requirements. Registration No. 4620B, CAB identifier: CN0052.

- **VCCI (Registration No.: R-12460, C-12584, G-20107 and T-11179)**

The 10m Semi-anechoic chamber, 966 Anechoic Chamber and Shielded Room of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-12460, C-12584, G-20107 and T-11179 respectively.

- **CBTL (Lab Code: TL129)**

SGS-CSTC Standards Technical Services Co., Ltd., E&E Laboratory has been assessed and fully comply with the requirements of ISO/IEC 17025:2017, the Basic Rules, IECEE 01 and Rules of procedure IECEE 02, and the relevant IECEE CB-Scheme Operational documents.

4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None

5 Equipment List

Conducted Emissions at AC Power Line (150kHz-30MHz)					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
Shielding Room	ChangZhou ZhongYu	8m x 3m x 3.8m	EMC0306	N/A	N/A
Two-Line V-Network	Rohde & Schwarz	ENV216	EMC0118	2021-12-23	2022-12-22
Two-Line V-Network-GZ	Rohde & Schwarz	ENV216	EMC2135	2021-09-24	2022-09-23
Coaxial Cable	HangTianXing	2m	EMC0107	2020-09-09	2022-09-08
Test Software E3c	Audix	Ver. 5.4.1221b	GZE100-62	N/A	N/A
EMI Test Receiver(9kHz-3.6GHz)	Rohde & Schwarz	ESR3	EMC2221	2021-06-01	2022-05-31

Radiated Spurious Emissions Below 1GHz					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
EMI Test Receiver (10Hz-26.5GHz)	Rohde & Schwarz	ESIB26	EMC0522	2021-12-17	2022-12-16
Chamber cable	HangTianXing	N/A	EMC0542	2020-09-09	2022-09-08
Trilog Broadband Antenna (25MHz-1GHz)- Lab	SCHWARZBECK MESS-ELEKTRONIK	VULB 9168	SEM003-18	2022-03-03	2025-03-02
Amplifier(9kHz-1.3GHz)	HP	8447F	EMC2065	2021-05-19	2022-05-18
High Pass Filter (915MHz)	FSY MICROWAVE	HM1465-9SS	EMC2079	2021-12-17	2022-12-16
10m Semi-Anechoic Chamber	ETS	N/A	EMC0530	2019-10-20	2022-10-19
Test Software E3	Audix	Ver.6.120110a	GZE100-61	N/A	N/A

Radiated Emissions which fall in the restricted bands					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
EMI Test Receiver (20Hz-26.5GHz)	Rohde & Schwarz	ESIB26	EMC0522	2021-12-17	2022-12-16
Chamber cable (Above 1GHz)	Scoflex	KMKM-8.0m	EMC0545	2020-09-09	2022-09-08
Horn Antenna (1GHz-18GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120D	EMC2026	2019-09-25	2022-09-24
1GHz-26.5 GHz Pre-Amplifier	Agilent	8449B	EMC0521	2021-12-17	2022-12-16
2.4GHz Filter	Micro-Tronics	BRM 50702	EMC2069	2021-12-17	2022-12-16
966 Anechoic Chamber	C.R.T	9m x 6m x 6m	EMC2142	2020-12-20	2023-12-19
MXE EMI Receiver (10Hz-8.4GHz)	Keysight	N9038A	EMC2139	2021-11-01	2022-10-31

EXA Signal Analyzer (10Hz-44GHz)	Keysight	N9010A	EMC2138	2021-09-16	2022-09-15
Test Software E3	Audix	Ver.6.120110a	GZE100-61	N/A	N/A
Notch Filter (5150-5880)	Mico-Tronics	BRM50716	EMC2168	2021-07-29	2022-07-28
Horn Antenna (14-40GHz)	SCHWARZBECK	BBHA 9170	EMC2041	2020-06-28	2023-06-27
Microwave Broadband Preamplifier (18-40GHz)	SCHWARZBECK	BBV 9721	EMC2172	2021-08-30	2022-08-29

Radiated Spurious Emissions (Above 1GHz)					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
EMI Test Receiver (20Hz-26.5GHz)	Rohde & Schwarz	ESIB26	EMC0522	2021-12-17	2022-12-16
Chamber cable (Above 1GHz)	Scoflex	KMKM-8.0m	EMC0545	2020-09-09	2022-09-08
Horn Antenna (1GHz-18GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120D	EMC2026	2019-09-25	2022-09-24
1GHz-26.5 GHz Pre-Amplifier	Agilent	8449B	EMC0521	2021-12-17	2022-12-16
2.4GHz Filter	Micro-Tronics	BRM 50702	EMC2069	2021-12-17	2022-12-16
966 Anechoic Chamber	C.R.T	9m x 6m x 6m	EMC2142	2020-12-20	2023-12-19
MXE EMI Receiver(10Hz-8.4GHz)	Keysight	N9038A	EMC2139	2021-11-01	2022-10-31
EXA Signal Analyzer (10Hz-44GHz)	Keysight	N9010A	EMC2138	2021-09-16	2022-09-15
Test Software E3	Audix	Ver.6.120110a	GZE100-61	N/A	N/A
Notch Filter (5150-5880)	Mico-Tronics	BRM50716	EMC2168	2021-07-29	2022-07-28
Horn Antenna(14-40GHz)	SCHWARZBECK	BBHA 9170	EMC2041	2020-06-28	2023-06-27
Microwave Broadband Preamplifier (18-40GHz)	SCHWARZBECK	BBV 9721	EMC2172	2021-08-30	2022-08-29

General used equipment					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
DMM	Fluke	73	EMC0006	2021-07-05	2022-07-05
DMM	Fluke	73	EMC0007	2021-07-05	2022-07-05

6 Radio Spectrum Technical Requirement

6.1 Antenna Requirement

6.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.203 & 15.247(b)(4)

6.1.2 Conclusion

15.203 Requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. 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. This requirement does not apply to carrier current devices or to devices operated under the provisions of 15.211, 15.213, 15.217, 15.219, 15.221, or 15.236. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

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 connector is a IPEX type that comply with Part15.203, the best case gain of the antenna0 is 2.0dBi.

Antenna location: Refer to internal photo.

6.2 Other requirements Frequency Hopping Spread Spectrum System Hopping Sequence

6.2.1 Test Requirement:

47 CFR Part 15, Subpart C 15.247(a)(1),(g),(h)

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.

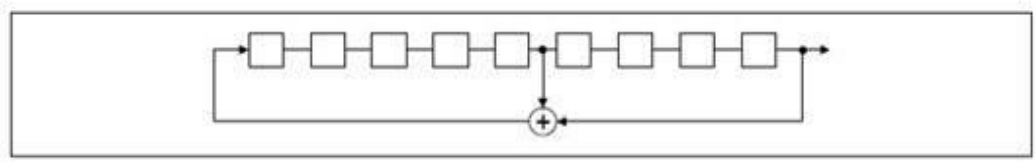
> Number of shift register stages: 9

> Length of pseudo-random sequence: 29 -1 = 511 bits

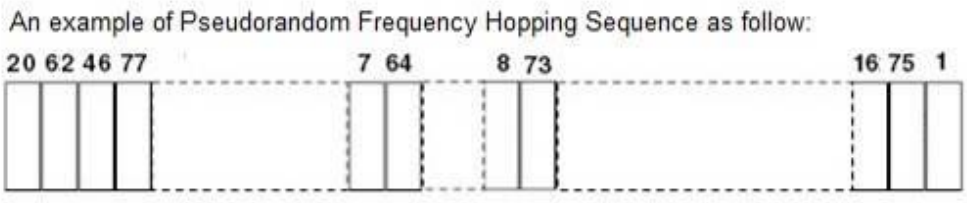
> Longest sequence of zeros: 8 (non-inverted signal)

Linear Feedback Shift Register for Generation of the PRBS sequence

An example of Pseudorandom Frequency Hopping Sequence as follow:



Linear Feedback Shift Register for Generation of the PRBS sequence



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.

6.2.2 Conclusion

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

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.

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 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) 0.15M to 30MHz		

7.1.1 E.U.T. Operation

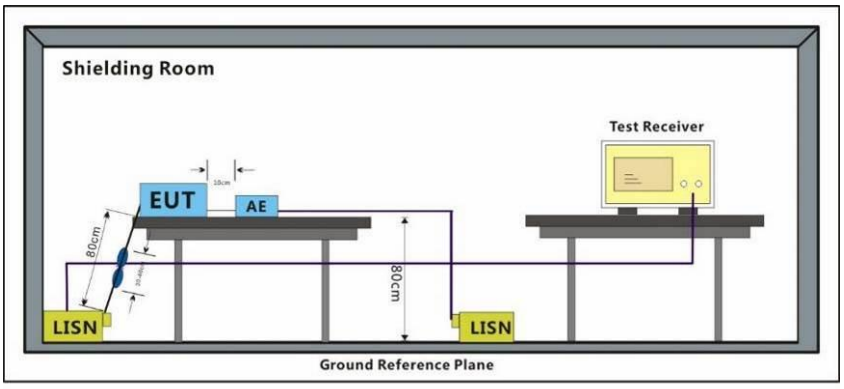
Operating Environment:

Temperature: 22.3 °C Humidity: 47.2 % RH Atmospheric Pressure: 1015 mbar

7.1.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	09	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.

7.1.3 Test Setup Diagram



7.1.4 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.

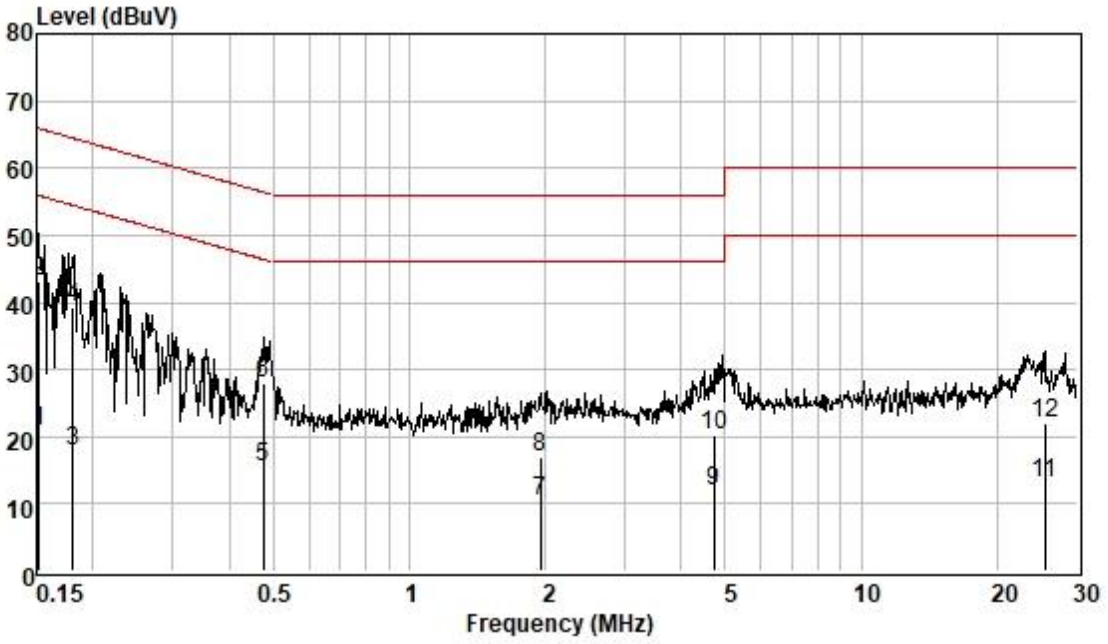
3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane.

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

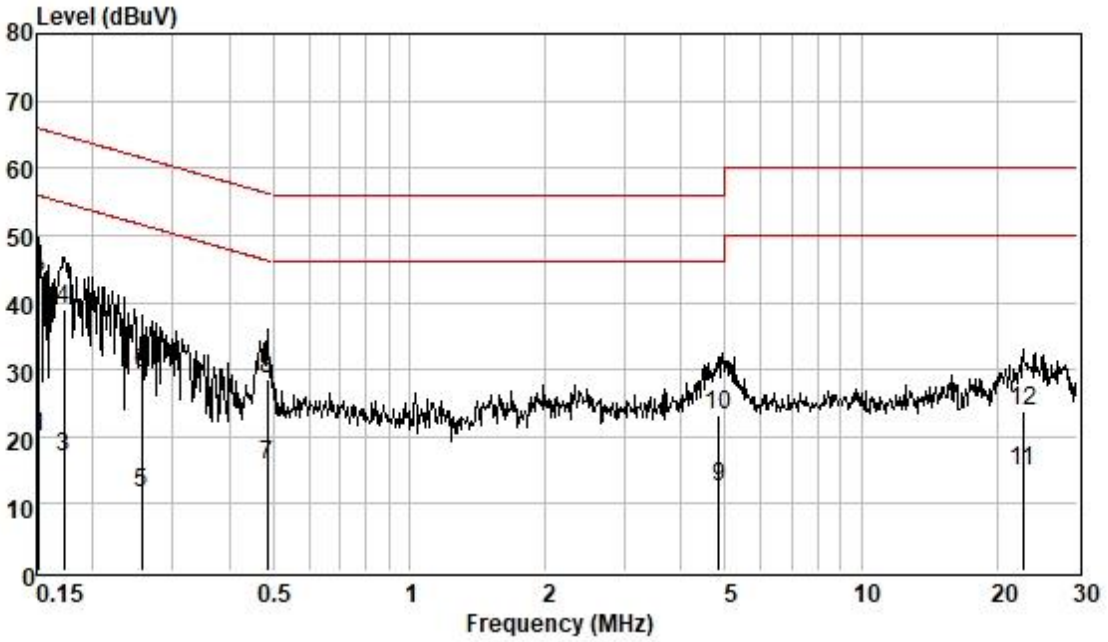
Test Mode: 09; Line: Live line



Pol :LINE
Mode :
Model :

	Frequenc MHz	Read Level dBuV	Cable Loss dB	LISN Factor dB	Measured Level dBuV	Limit Line dBuV	Over Limit dB	Remark
1	0.152	11.31	0.06	9.54	20.91	55.91	-35.00	Average
2	0.152	33.45	0.06	9.54	43.05	65.91	-22.86	QP
3	0.181	8.19	0.06	9.55	17.80	54.46	-36.66	Average
4	0.181	29.61	0.06	9.55	39.22	64.46	-25.24	QP
5	0.476	5.69	0.07	9.59	15.35	46.41	-31.06	Average
6	0.476	18.15	0.07	9.59	27.81	56.41	-28.60	QP
7	1.949	0.59	0.12	9.60	10.31	46.00	-35.69	Average
8	1.949	7.19	0.12	9.60	16.91	56.00	-39.09	QP
9	4.721	2.06	0.18	9.65	11.89	46.00	-34.11	Average
10	4.721	10.28	0.18	9.65	20.11	56.00	-35.89	QP
11	25.456	3.03	0.41	9.78	13.22	50.00	-36.78	Average
12	25.456	11.96	0.41	9.78	22.15	60.00	-37.85	QP

Test Mode: 09; Line: Neutral Line



Pol :NEUTRAL
Mode :
Model :

	Frequenc MHz	Read Level dBuV	Cable Loss dB	LISN Factor dB	Measured Level dBuV	Limit Line dBuV	Over Limit dB	Remark
1	0.152	10.32	0.06	9.53	19.91	55.91	-36.00	Average
2	0.152	32.92	0.06	9.53	42.51	65.91	-23.40	QP
3	0.172	7.44	0.06	9.54	17.04	54.86	-37.82	Average
4	0.172	29.39	0.06	9.54	38.99	64.86	-25.87	QP
5	0.256	1.86	0.06	9.56	11.48	51.56	-40.08	Average
6	0.256	19.68	0.06	9.56	29.30	61.56	-32.26	QP
7	0.486	6.13	0.07	9.58	15.78	46.23	-30.45	Average
8	0.486	18.82	0.07	9.58	28.47	56.23	-27.76	QP
9	4.848	2.79	0.18	9.66	12.63	46.00	-33.37	Average
10	4.848	13.39	0.18	9.66	23.23	56.00	-32.77	QP
11	22.775	4.44	0.39	9.90	14.73	50.00	-35.27	Average
12	22.775	13.64	0.39	9.90	23.93	60.00	-36.07	QP

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
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.		

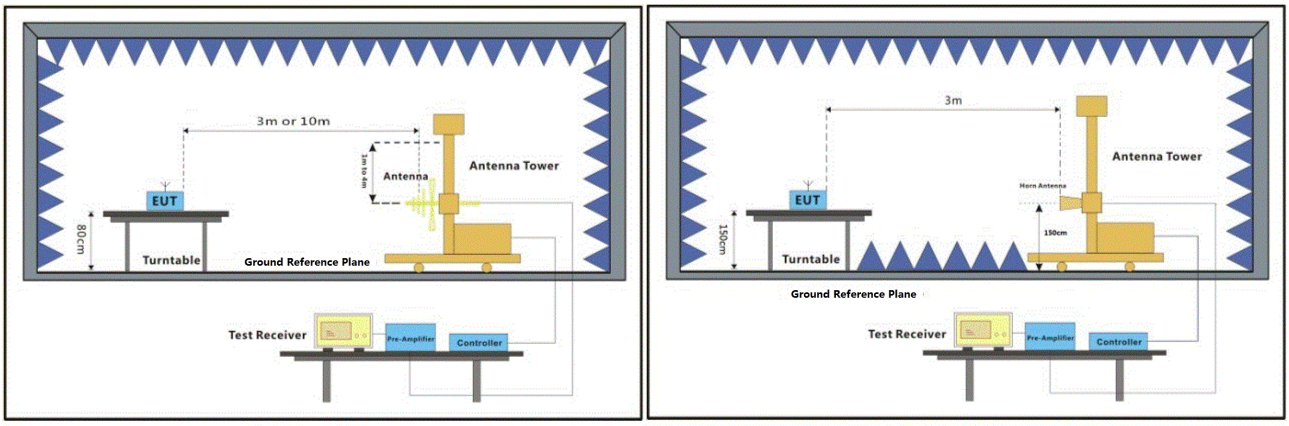
7.2.1 E.U.T. Operation

Operating Environment:
Temperature: 22.3 °C Humidity: 56.3 % RH Atmospheric Pressure: 1015 mbar

7.2.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Pre-scan	08	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	09	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.

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 Highest channel.

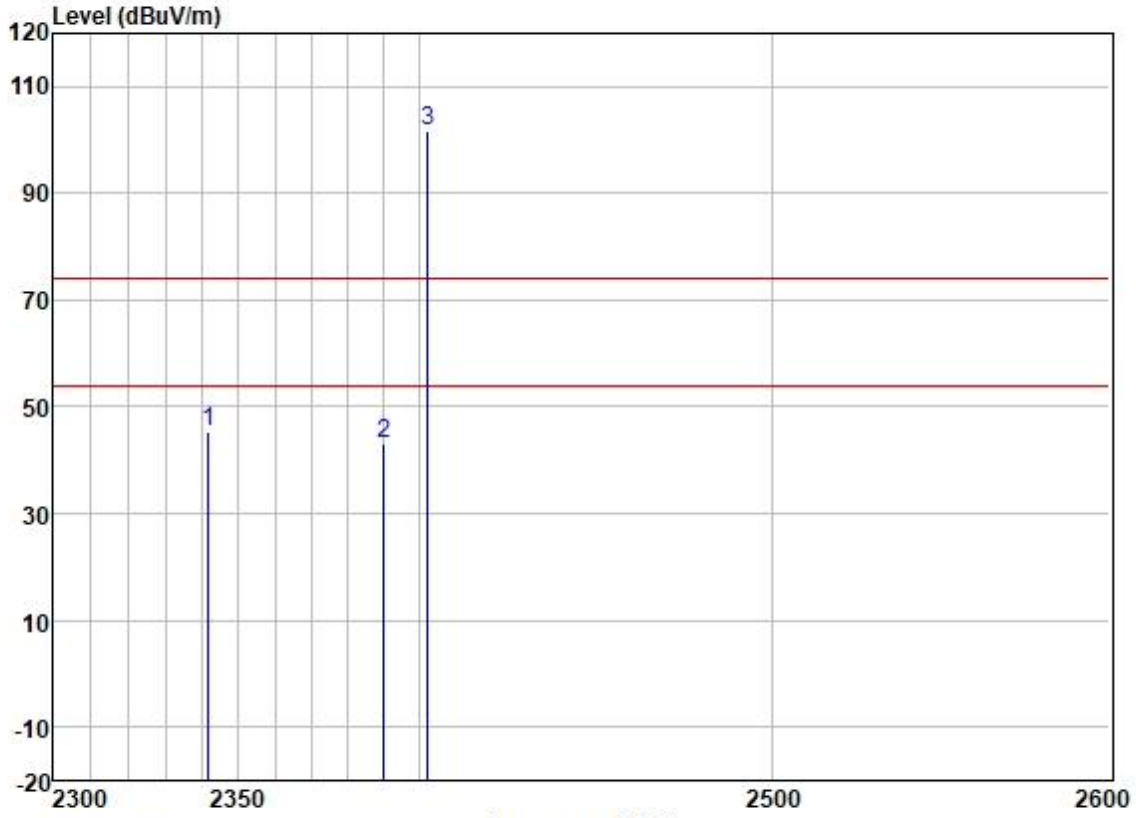
i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

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.

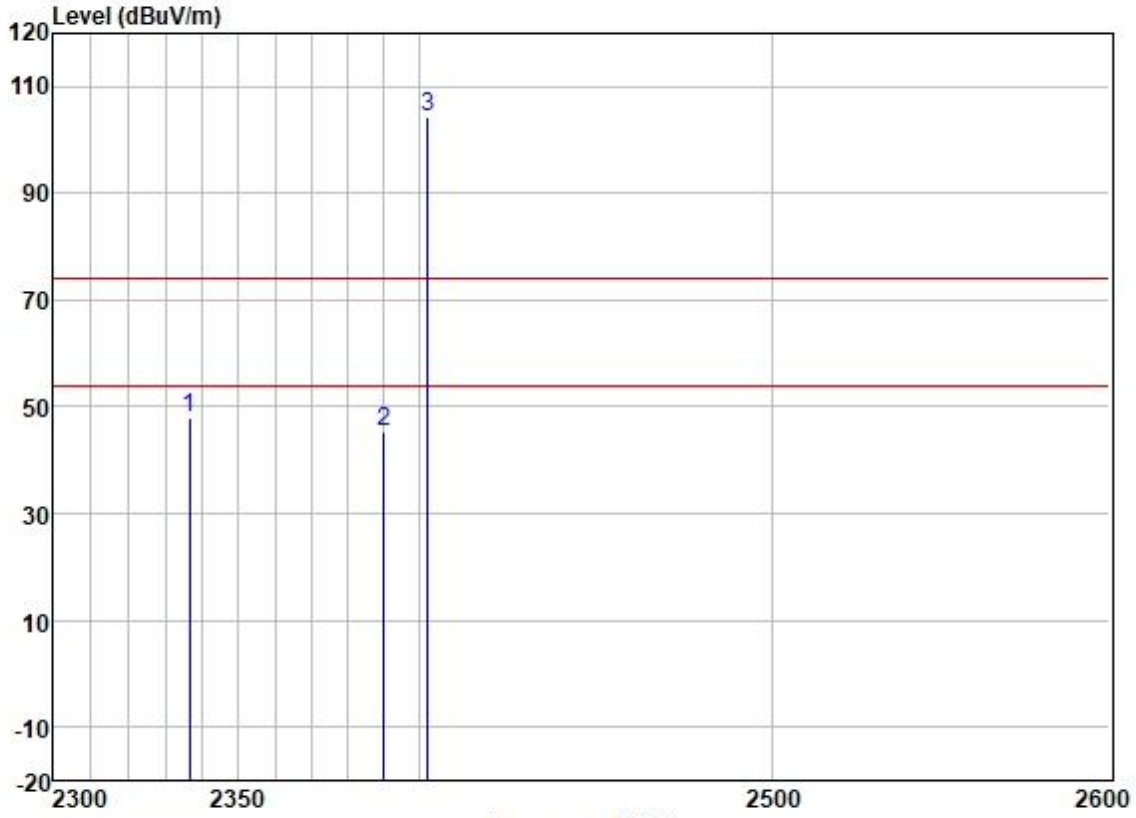
Test Mode: 09; Polarity: Horizontal; Modulation:GFSK; Channel:Low



race: (Discrete)

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2341.739	52.46	27.22	3.37	37.61	45.44	74.00	-28.56	HORIZONTAL	Peak
2	2390.000	49.88	27.33	3.48	37.59	43.10	74.00	-30.90	HORIZONTAL	Peak
3 *	2402.000	108.44	27.35	3.50	37.59	101.70	74.00	27.70	HORIZONTAL	Peak

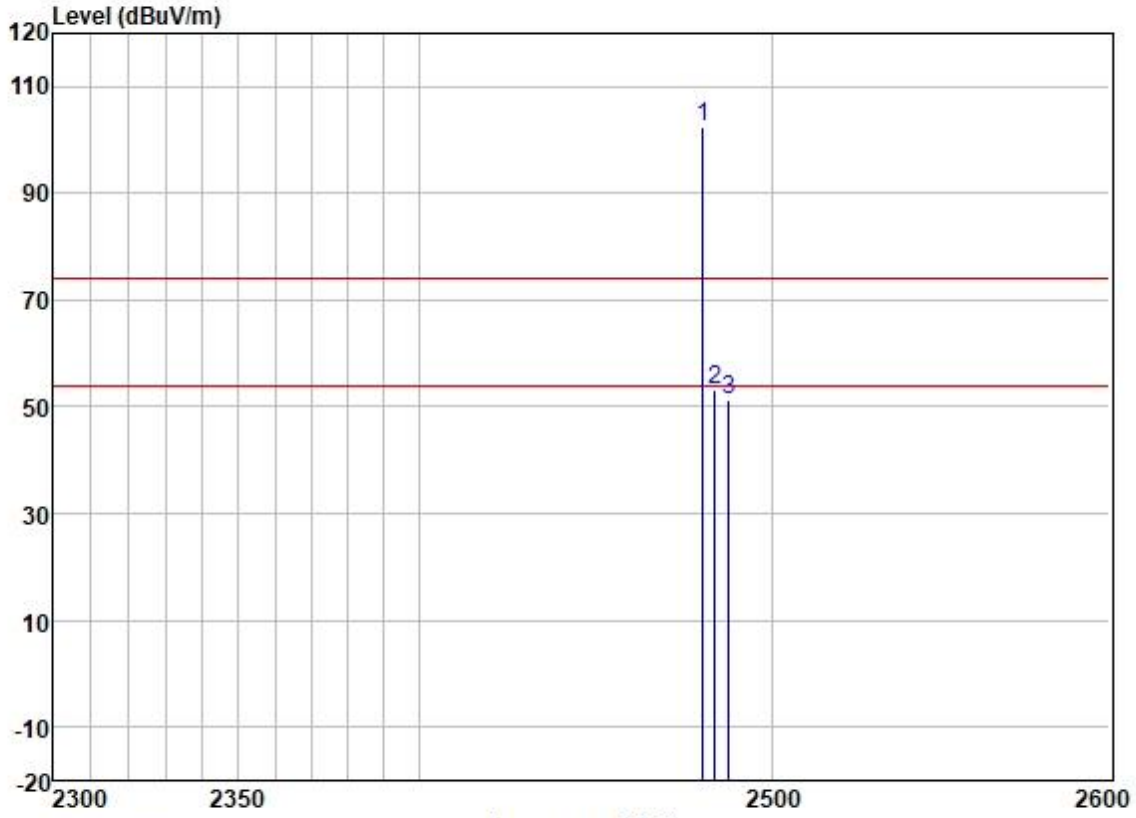
Test Mode: 09; Polarity: Vertical; Modulation:GFSK; Channel:Low



race: (Discrete)

		Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
		MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1		2336.485	54.87	27.22	3.37	37.62	47.84	74.00	-26.16	VERTICAL	Peak
2		2390.000	52.14	27.33	3.48	37.59	45.36	74.00	-28.64	VERTICAL	Peak
3	*	2402.000	110.92	27.35	3.50	37.59	104.18	74.00	30.18	VERTICAL	Peak

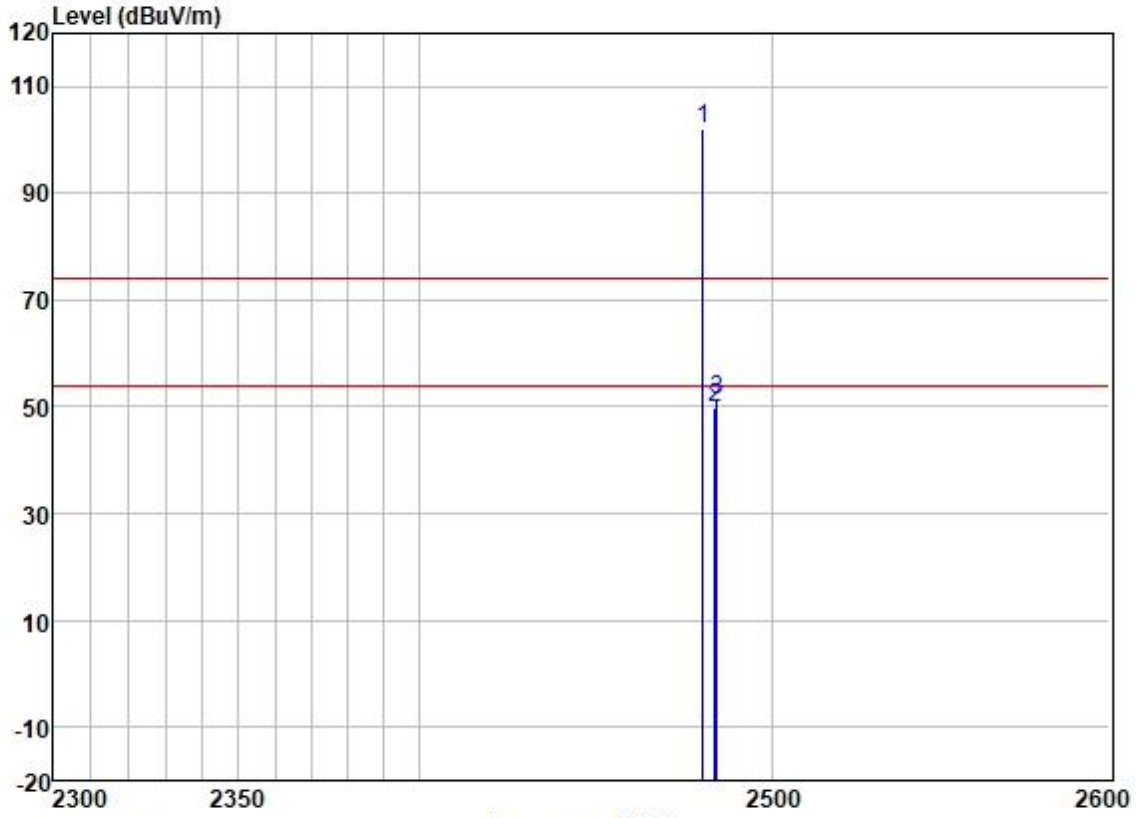
Test Mode: 09; Polarity: Horizontal; Modulation:GFSK; Channel:High



race: (Discrete)

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1 *	2480.000	108.86	27.47	3.60	37.57	102.36	74.00	28.36	HORIZONTAL	Peak
2	2483.500	59.58	27.48	3.53	37.57	53.02	74.00	-20.98	HORIZONTAL	Peak
3	2487.494	57.73	27.48	3.53	37.57	51.17	74.00	-22.83	HORIZONTAL	Peak

Test Mode: 09; Polarity: Vertical; Modulation:GFSK; Channel:High



race: (Discrete)

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1 *	2480.000	108.46	27.47	3.60	37.57	101.96	74.00	27.96	VERTICAL	Peak
2	2483.500	56.45	27.48	3.53	37.57	49.89	74.00	-24.11	VERTICAL	Peak
3	2483.996	57.72	27.48	3.53	37.57	51.16	74.00	-22.84	VERTICAL	Peak

7.3 Radiated Spurious Emissions (Below 1GHz)

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.		

7.3.1 E.U.T. Operation

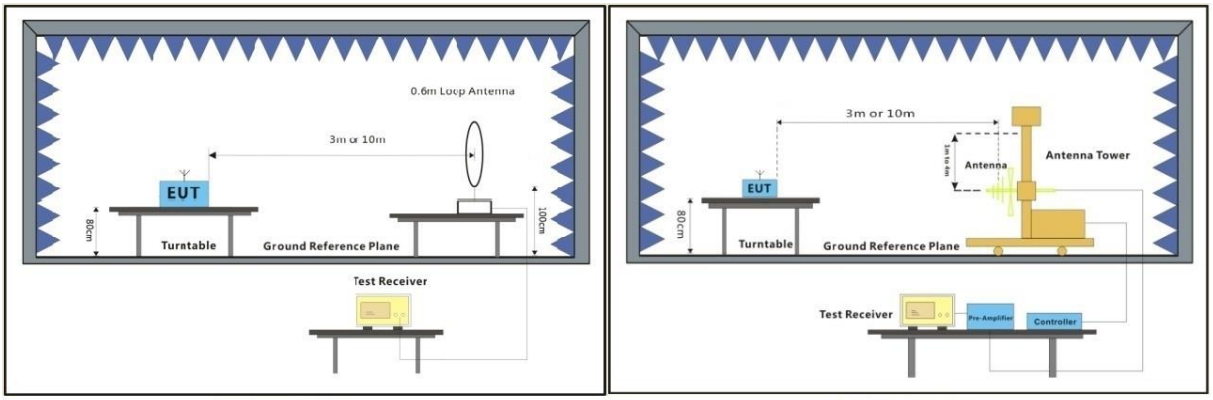
Operating Environment:

Temperature: 20.1 °C Humidity: 45.1 % RH Atmospheric Pressure: 1015 mbar

7.3.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Pre-scan	08	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	09	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.

7.3.3 Test Setup Diagram



Below 30MHz 30MHz-1GHz

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. 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 peak, quasi-peak or average 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:

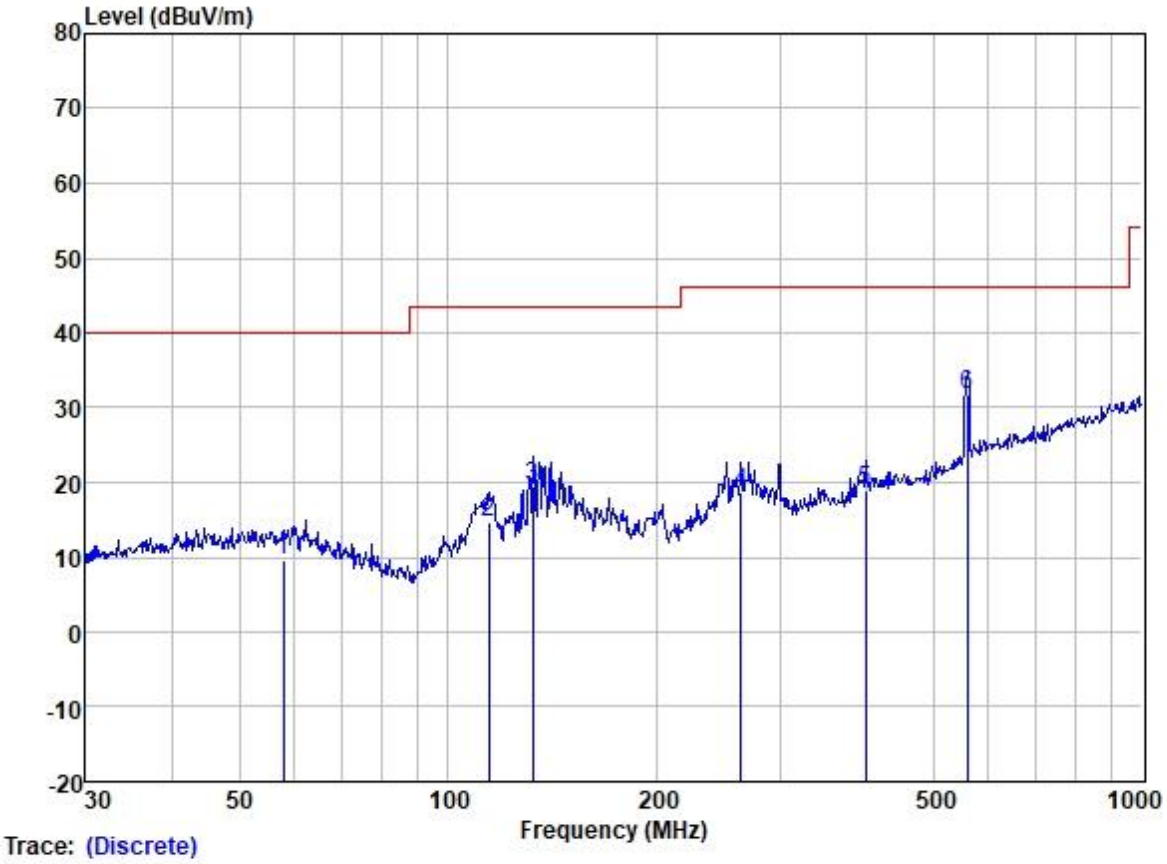
1) Through pre-scan found the worst case is the lowest channel. Only the worst case is recorded in the report.

2) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level =Receiver Reading + Antenna Factor + Cable Factor - Preamplifier Factor

3) Scan from 9kHz to 1 GHz, 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: 09; Polarity: Horizontal; Modulation:GFSK; Channel:Low

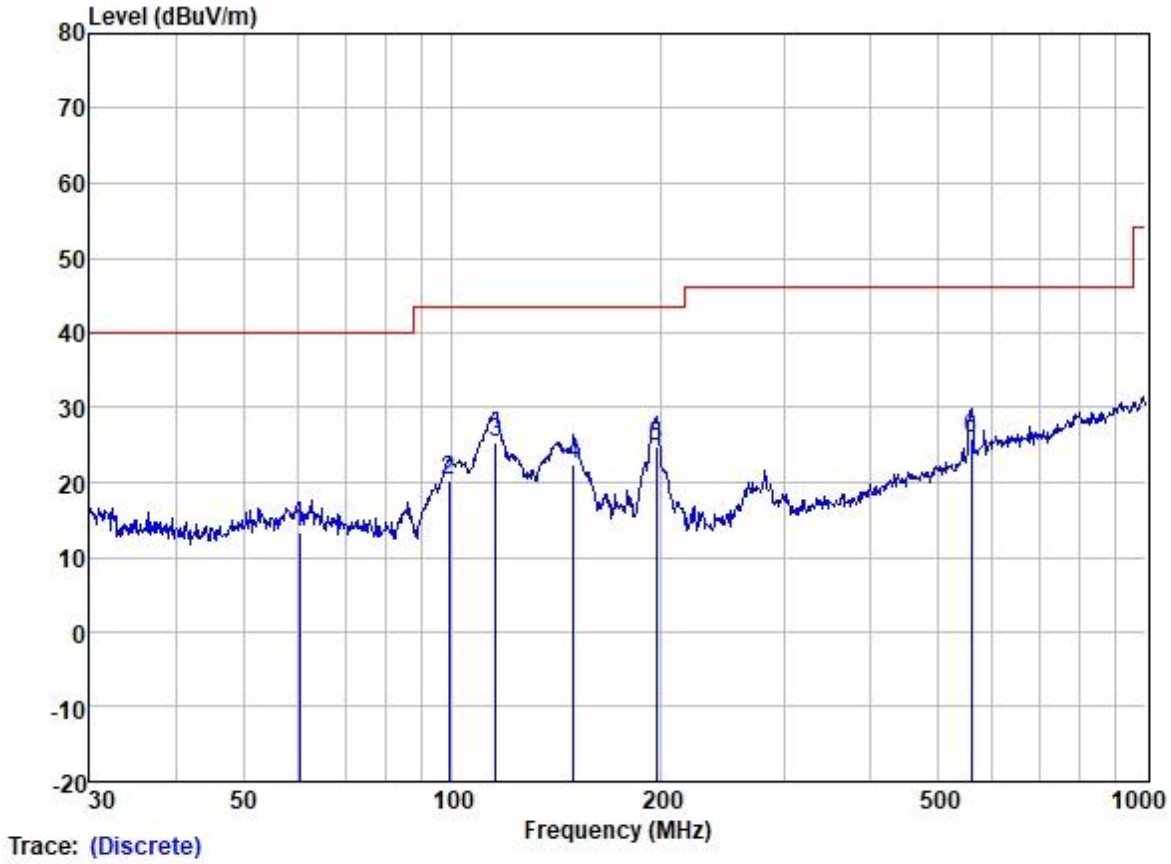


Trace: (Discrete)

Site : SGS
Job :
Model :
Power :
Test Mode : 09

	Freq	Read Level	Anterna Factor	Cable Loss	Preamp Factor	Measured Level	Limit Line	Over Limit	Pol/ Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	57.796	22.46	13.12	1.23	27.16	9.65	40.00	-30.35	HORIZONTAL	QP
2	114.515	29.55	10.45	1.82	27.05	14.77	43.50	-28.73	HORIZONTAL	QP
3	132.221	32.31	12.08	1.99	26.98	19.40	43.50	-24.10	HORIZONTAL	QP
4	263.819	30.34	11.96	3.00	26.59	18.71	46.00	-27.29	HORIZONTAL	QP
5	399.030	26.86	15.38	3.93	27.32	18.85	46.00	-27.15	HORIZONTAL	QP
6	558.730	36.38	18.48	4.88	28.13	31.61	46.00	-14.39	HORIZONTAL	QP

Test Mode: 09; Polarity: Vertical; Modulation:GFSK; Channel:Low



Site : SGS
Job :
Model :
Power :
Test Mode : 09

	Freq	Read Level	Anterna Factor	Cable Loss	Preamp Factor	Measured Level	Limit Line	Over Limit	Pol/ Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	60.280	26.43	12.87	1.26	27.16	13.40	40.00	-26.60	VERTICAL	QP
2	98.833	37.11	8.49	1.72	27.08	20.24	43.50	-23.26	VERTICAL	QP
3	115.321	40.04	10.51	1.83	27.04	25.34	43.50	-18.16	VERTICAL	QP
4	149.486	33.68	13.32	2.22	26.84	22.38	43.50	-21.12	VERTICAL	QP
5	196.510	39.12	9.84	2.51	26.73	24.74	43.50	-18.76	VERTICAL	QP
6	558.730	30.55	18.48	4.88	28.13	25.78	46.00	-20.22	VERTICAL	QP

7.4 Radiated Spurious Emissions (Above 1GHz)

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
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.		

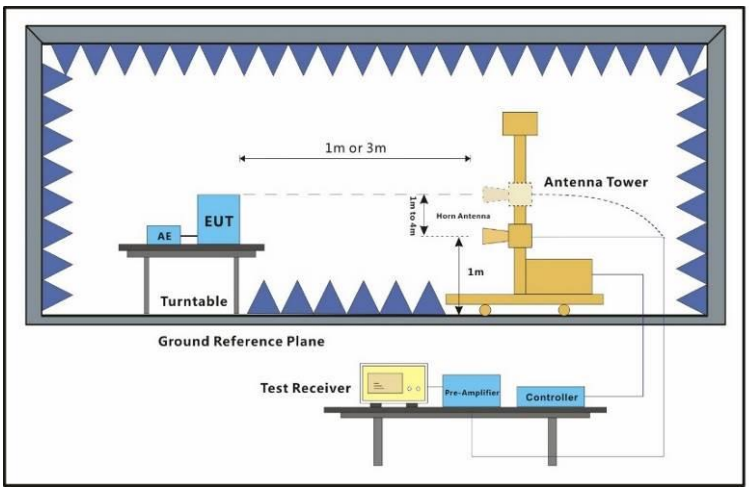
7.4.1 E.U.T. Operation

Operating Environment:
Temperature: 22.3 °C Humidity: 56.3 % RH Atmospheric Pressure: 1015 mbar

7.4.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Pre-scan	08	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	09	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.

7.4.3 Test Setup Diagram



7.4.4 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. 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:

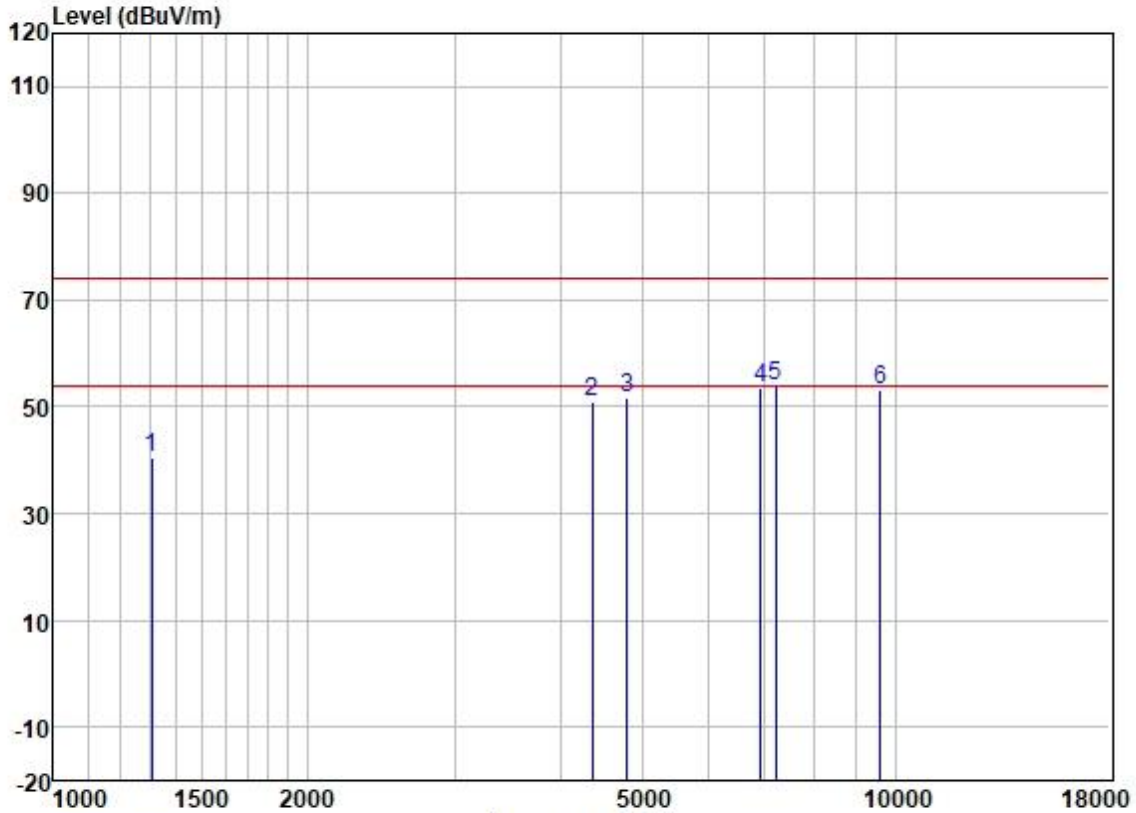
1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level =Receiver Reading + Antenna Factor + Cable Factor - Preamplifier Factor

2) Scan from 1GHz to 25GHz, the disturbance above 18GHz 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 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.

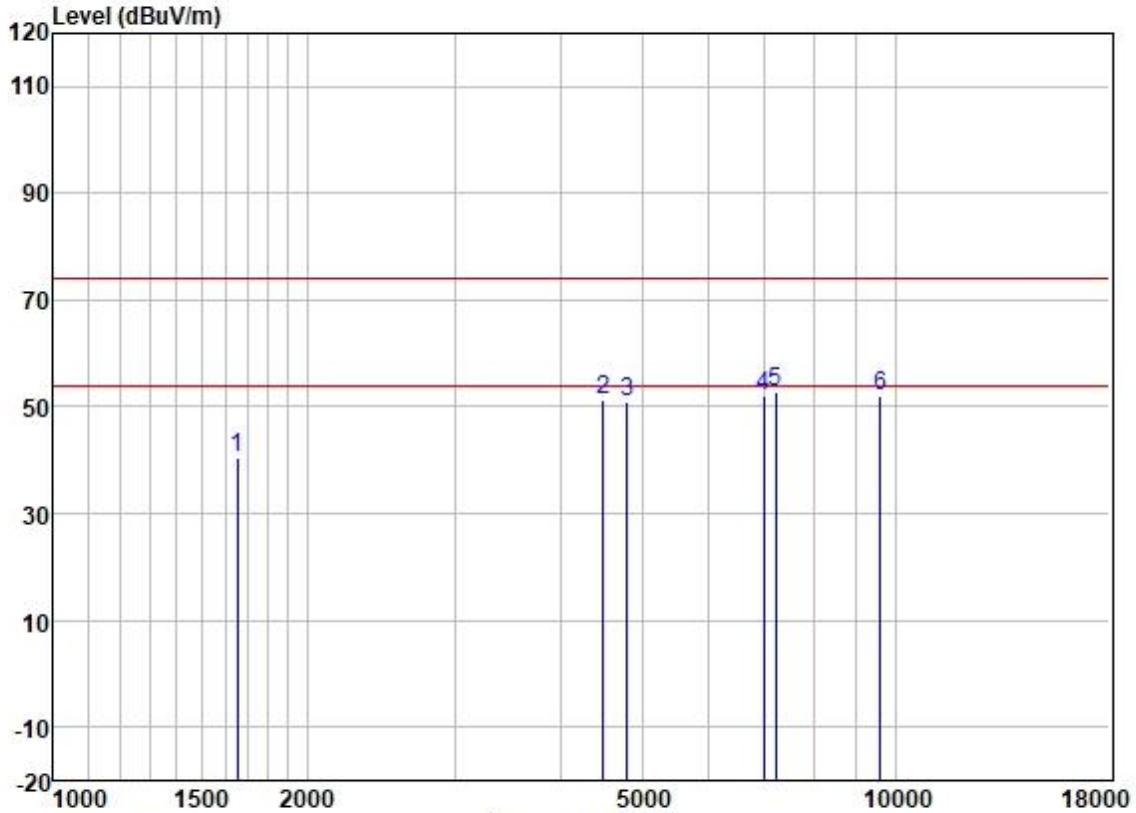
Test Mode: 09; Polarity: Horizontal; Modulation:GFSK; Channel:Low



race: (Discrete)

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1308.399	51.03	25.22	2.60	38.31	40.54	74.00	-33.46	HORIZONTAL	Peak
2	4367.058	52.44	30.62	4.68	36.81	50.93	74.00	-23.07	HORIZONTAL	Peak
3	4804.000	51.65	31.42	5.40	36.83	51.64	74.00	-22.36	HORIZONTAL	Peak
4	6914.763	49.94	34.89	5.81	37.19	53.45	74.00	-20.55	HORIZONTAL	Peak
5	7206.000	49.63	35.54	5.98	37.38	53.77	74.00	-20.23	HORIZONTAL	Peak
6	9608.000	44.98	38.37	7.07	37.42	53.00	74.00	-21.00	HORIZONTAL	Peak

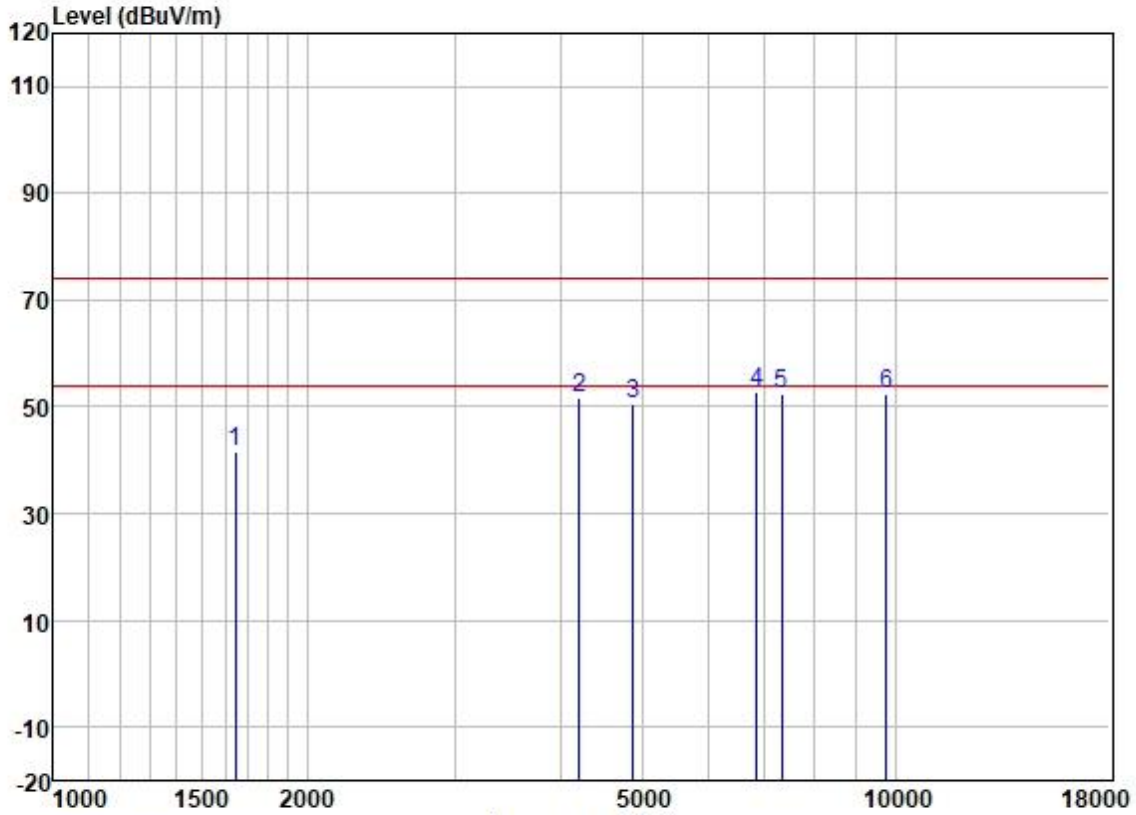
Test Mode: 09; Polarity: Vertical; Modulation:GFSK; Channel:Low



race: (Discrete)

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1653.550	50.08	25.64	2.80	37.93	40.59	74.00	-33.41	VERTICAL	Peak
2	4495.125	52.11	30.80	5.05	36.82	51.14	74.00	-22.86	VERTICAL	Peak
3	4804.000	51.06	31.42	5.40	36.83	51.05	74.00	-22.95	VERTICAL	Peak
4	6974.982	48.61	34.97	5.81	37.23	52.16	74.00	-21.84	VERTICAL	Peak
5	7206.000	48.70	35.54	5.98	37.38	52.84	74.00	-21.16	VERTICAL	Peak
6	9608.000	44.19	38.37	7.07	37.42	52.21	74.00	-21.79	VERTICAL	Peak

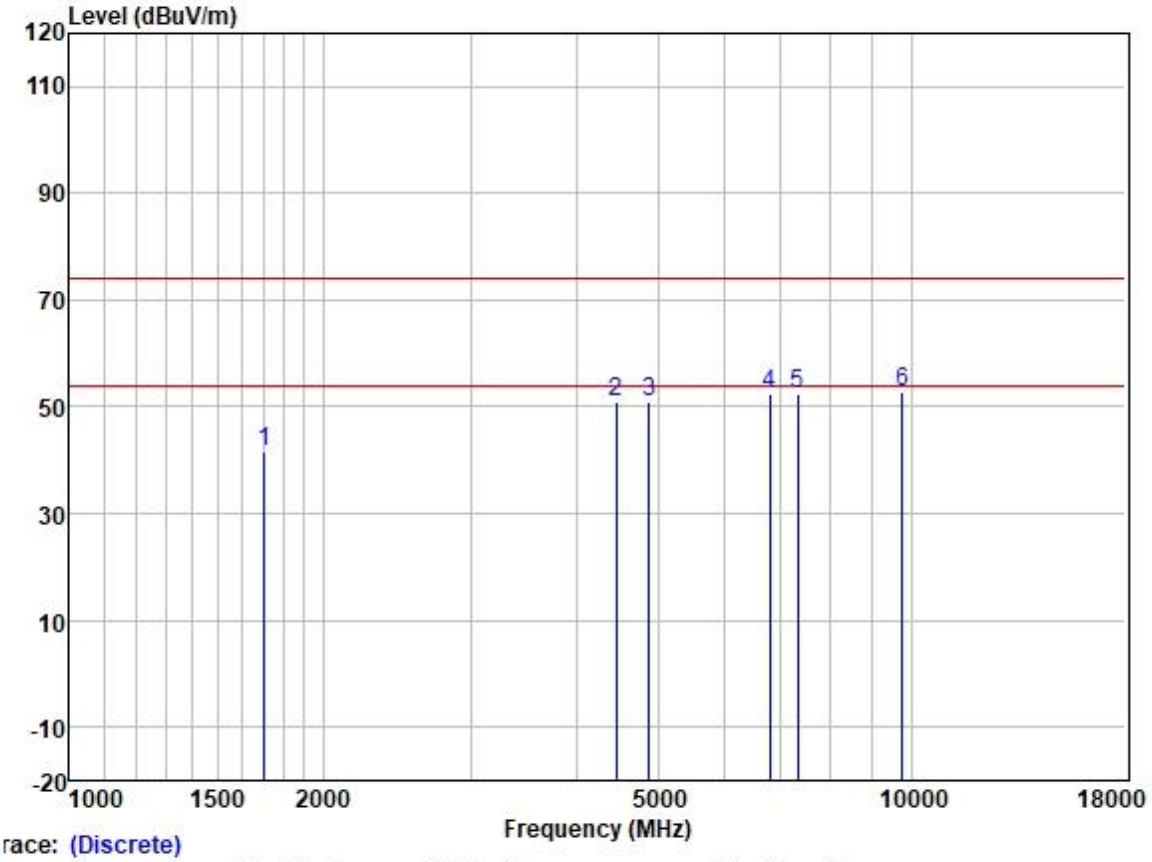
Test Mode: 09; Polarity: Horizontal; Modulation:GFSK; Channel:middle



race: (Discrete)

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1644.019	51.06	25.63	2.80	37.93	41.56	74.00	-32.44	HORIZONTAL	Peak
2	4218.186	53.54	30.22	4.60	36.81	51.55	74.00	-22.45	HORIZONTAL	Peak
3	4882.000	50.42	31.56	5.52	36.84	50.66	74.00	-23.34	HORIZONTAL	Peak
4	6855.063	49.48	34.78	5.82	37.15	52.93	74.00	-21.07	HORIZONTAL	Peak
5	7323.000	47.88	36.00	6.13	37.43	52.58	74.00	-21.42	HORIZONTAL	Peak
6	9764.000	44.47	38.50	7.02	37.41	52.58	74.00	-21.42	HORIZONTAL	Peak

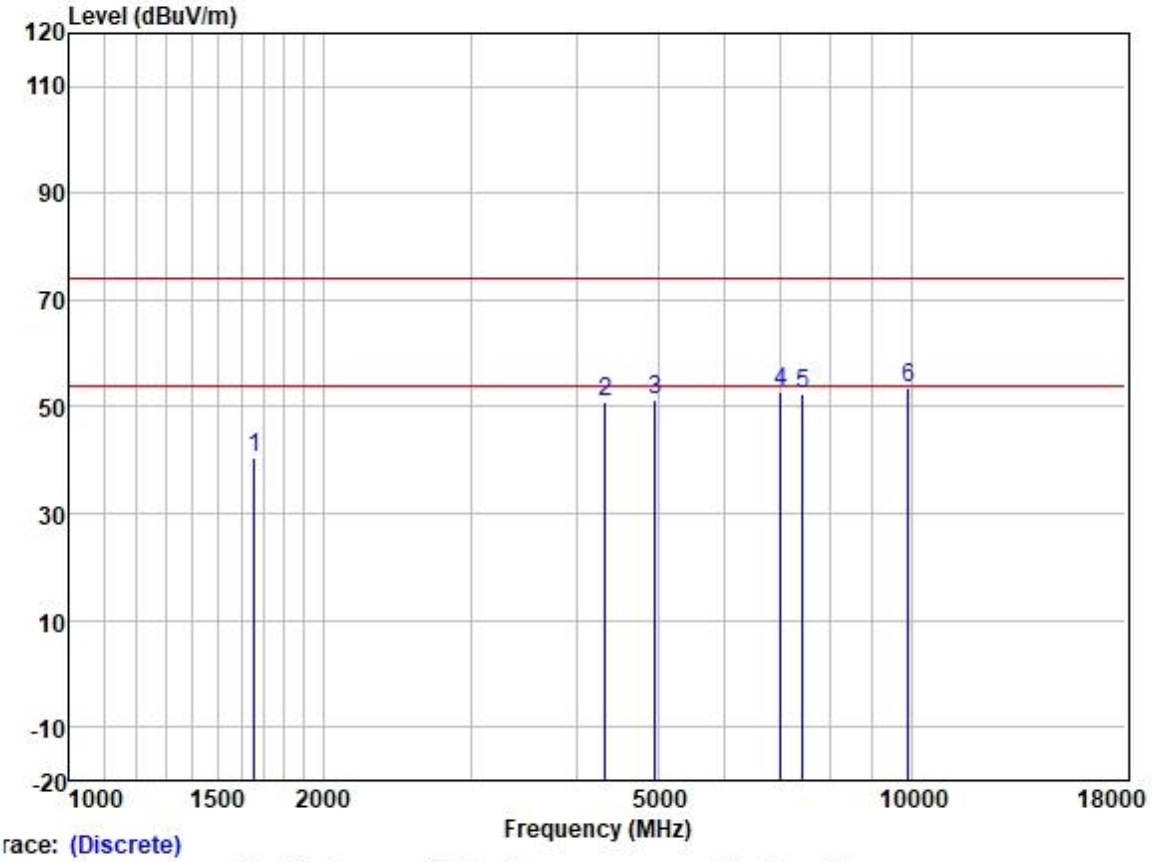
Test Mode: 09; Polarity: Vertical; Modulation:GFSK; Channel:middle



race: (Discrete)

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1702.042	51.14	25.72	2.80	37.89	41.77	74.00	-32.23	VERTICAL	Peak
2	4456.315	52.17	30.75	4.88	36.81	50.99	74.00	-23.01	VERTICAL	Peak
3	4882.000	50.80	31.56	5.52	36.84	51.04	74.00	-22.96	VERTICAL	Peak
4	6795.879	49.20	34.66	5.82	37.12	52.56	74.00	-21.44	VERTICAL	Peak
5	7323.000	47.82	36.00	6.13	37.43	52.52	74.00	-21.48	VERTICAL	Peak
6	9764.000	44.57	38.50	7.02	37.41	52.68	74.00	-21.32	VERTICAL	Peak

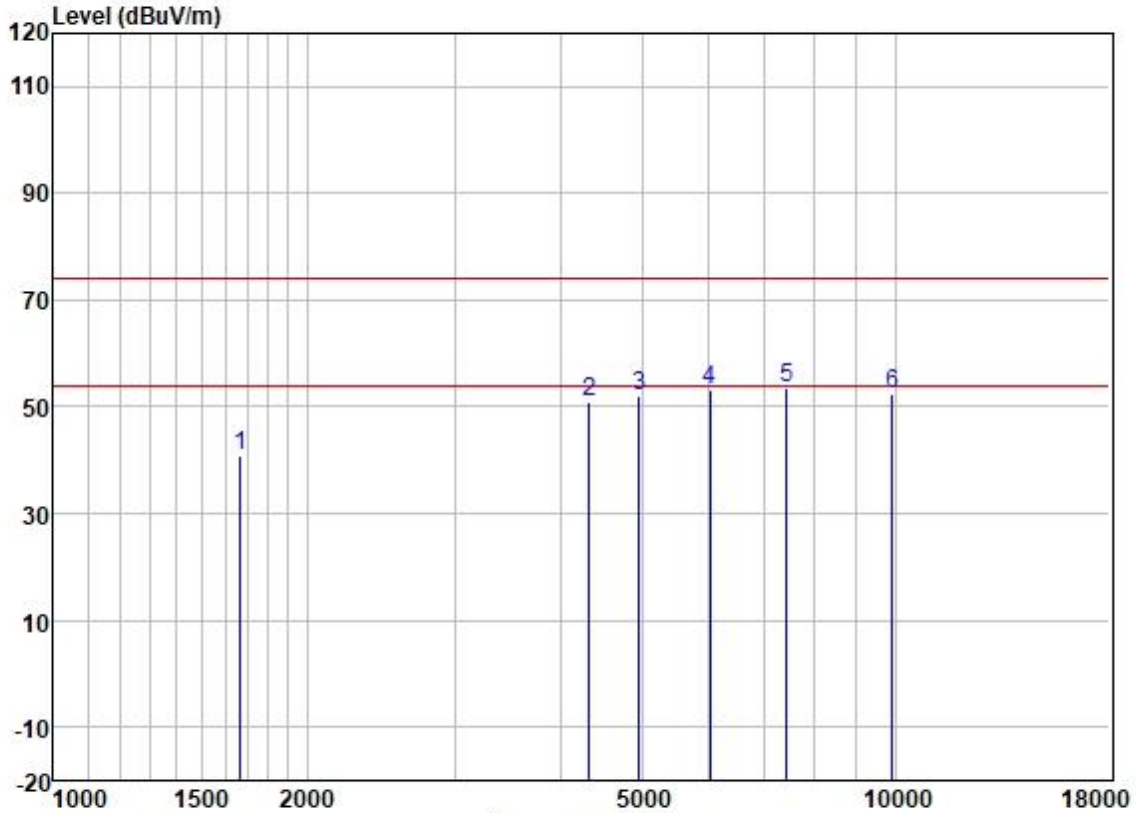
Test Mode: 09; Polarity: Horizontal; Modulation:GFSK; Channel:High



race: (Discrete)

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1658.337	50.14	25.65	2.80	37.93	40.66	74.00	-33.34	HORIZONTAL	Peak
2	4329.354	52.42	30.54	4.67	36.81	50.82	74.00	-23.18	HORIZONTAL	Peak
3	4960.000	50.82	31.65	5.65	36.84	51.28	74.00	-22.72	HORIZONTAL	Peak
4	6995.172	49.33	35.00	5.81	37.25	52.89	74.00	-21.11	HORIZONTAL	Peak
5	7440.000	47.48	36.27	6.22	37.47	52.50	74.00	-21.50	HORIZONTAL	Peak
6	9920.000	45.23	38.65	6.96	37.40	53.44	74.00	-20.56	HORIZONTAL	Peak

Test Mode: 09; Polarity: Vertical; Modulation:GFSK; Channel:High



race: (Discrete)

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1667.951	50.31	25.66	2.80	37.91	40.86	74.00	-33.14	VERTICAL	Peak
2	4329.354	52.55	30.54	4.67	36.81	50.95	74.00	-23.05	VERTICAL	Peak
3	4960.000	51.68	31.65	5.65	36.84	52.14	74.00	-21.86	VERTICAL	Peak
4	6018.999	51.35	32.44	6.19	36.90	53.08	74.00	-20.92	VERTICAL	Peak
5	7440.000	48.56	36.27	6.22	37.47	53.58	74.00	-20.42	VERTICAL	Peak
6	9920.000	44.28	38.65	6.96	37.40	52.49	74.00	-21.51	VERTICAL	Peak

8 Test Setup Photo

Refer to Appendix - Test Setup Photo for GZCR2204000437AT

9 EUT Constructional Details (EUT Photos)

Refer to External and Internal Photos for GZCR2204000437AT

- End of the Report -

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