



Test report No:
22B0905R-RF-US-P06V02

FCC & ISED TEST REPORT

Product Name	iCG160 GNSS Receiver
Trademark	Leica
Model and /or type reference	iCG160
FCC ID	RFD-iCG160
IC	3177A-iCG160
Applicant's name / address	LEICA GEOSYSTEMS AG Heinrich-Wild-Strasse, 9435 Heerbrugg, Switzerland
Test method requested, standard	CFR 47, FCC Part 15 C ANSI C63.10: 2013 RSS-Gen Issue 5 /RSS-247 Issue 2
Verdict Summary	IN COMPLIANCE
Tested by (name / position & signature)	Tim Cao/Project Engineer 
Approved by (name / position & signature)	Jack Zhang/ Supervisor 
Date of issue	2023-03-14
Report Version	V1.0
Report template No	Template_FCC 15.247-RF-V1.0

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COMPETENCES AND GUARANTEES

DEKRA is a testing laboratory competent to carry out the tests described in this report.

In order to assure the traceability to other national and international laboratories, DEKRA has a calibration and maintenance program for its measurement equipment.

DEKRA guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated in the report and it is based on the knowledge and technical facilities available at DEKRA at the time of performance of the test.

DEKRA is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The results presented in this Test Report apply only to the particular item under test established in this document.

IMPORTANT: No parts of this report may be reproduced or quoted out of context, in any form or by any means, except in full, without the previous written permission of DEKRA.

GENERAL CONDITIONS

Test Location	No. 99, Hongye Road, Suzhou Industrial Park Suzhou, 215006, P.R. China
Date(receive sample)	Dec. 08, 2022
Date (start test)	Dec. 15, 2022
Date (finish test)	Jan. 04, 2023

1. This report is only referred to the item that has undergone the test.
2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or Competent Authorities.
3. This document is only valid if complete; no partial reproduction can be made without previous written permission of DEKRA.
4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of DEKRA.

ENVIRONMENTAL CONDITIONS

The climatic conditions during the tests are within the limits specified by the manufacturer for the operation of the EUT and the test equipment. The climatic conditions during the tests were within the following limits:

Ambient temperature	15 °C – 35 °C
Relative Humidity air	30% - 60%

If explicitly required in the basic standard or applied product / product family standard the climatic values are recorded and documented separately in this test report.

POSSIBLE TEST CASE VERDICTS

Test case does not apply to test object	N/A
Test object does meet requirement	P (Pass) / PASS
Test object does not meet requirement	F (Fail) / FAIL
Not measured	N/M

ABBREVIATIONS

For the purposes of the present document, the following abbreviations apply:

EUT	: Equipment Under Test
QP	: Quasi-Peak
CAV	: CISPR Average
AV	: Average
CDN	: Coupling Decoupling Network
SAC	: Semi-Anechoic Chamber
OATS	: Open Area Test Site
BW	: Bandwidth
AM	: Amplitude Modulation
PM	: Pulse Modulation
HCP	: Horizontal Coupling Plane
VCP	: Vertical Coupling Plane
U_N	: Nominal voltage
T_x	: Transmitter
R_x	: Receiver
N/A	: Not Applicable
N/M	: Not Measured

DOCUMENT HISTORY

Report No.	Version	Description	Issued Date
22B0905R-RF-US-P06V02	V1.0	Initial issue of report.	2023-03-14

REMARKS AND COMMENTS

1. The equipment under test (EUT) does meet the essential requirements of the stated standard(s)/test(s).
2. These test results on a sample of the device are for the purpose of demonstrating Compliance with Part 15 Subpart C Paragraph 15.247, RSS-Gen Issue 5, RSS-247 Issue 2.
3. The measurement result is considered in conformance with the requirement if it is within the prescribed limit, it is not necessary to account the uncertainty associated with the measurement result.
4. The test results presented in this report relate only to the object tested.
5. The test report shall not be reproduced without the written approval of DEKRA Testing and Certification (Suzhou) Co., Ltd.
6. This report will not be used for social proof function in China market.
7. DEKRA declines any responsibility with the following test data provided by customer that may affect the validity of result:
 - Chapter 1.1 General Description of the Item(s);
 - Chapter 1.2 Antenna Information ;
 - Chapter 1.3 Channel List ;
 - Chapter 1.3 Power Setting.

USED EQUIPMENT

Radiated Emission(30MHz-1GHz) / AC3

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
EMI Test Receiver	R&S	ESCI	100573	2022.09.17	2023.09.16
Loop Antenna	R&S	HFH2-Z2	833799/003	2022.04.15	2023.04.14
Bilog Antenna	Teseq GmbH	CBL6112D	27611	2022.11.21	2023.11.20
Temperature/Humidity Meter	RTS	RTS-8S	AC3-TH	2022.07.09	2023.07.08
Coaxial Cable	Huber+Suhner	RG 214	AC3-C	2022.03.30	2023.03.29
Dekra test software	Dekra	-	-	-	-

Radiated Emission(1GHz-40GHz) / AC5

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
EXA Spectrum Analyzer	Keysight	N9010A	MY55370495	2022.08.12	2023.08.11
Pre-Amplifier	SKET	LNPA_0118G-45	SK2021090101	2022.04.15	2023.04.14
Preamplifier	CHENGYI	EMC184045SE	980263	2022.05.21	2023.05.20
DRG Horn	ETS-Lindgren	3117	00123988	2022.11.01	2023.10.31
Broad-Band Horn Antenna	Schwarzbeck	BBHA9170	294	2022.05.19	2023.05.18
Temperature/Humidity Meter	RTS	RTS-8S	AC5-TH	2022.07.07	2023.07.06
Temperature/Humidity Meter	RTS	RTS-8S	AC5-TH	2022.07.07	2023.07.06
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C1	2022.03.21	2023.03.20
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C2	2022.03.21	2023.03.20
Coaxial Cable	Huber+Suhner	SUCOFLEX 102	AC5-C3	2022.03.21	2023.03.20
Dekra test software	Dekra	-	-	-	-

UNCERTAINTY

Uncertainties have been calculated according to the DEKRA internal document. The reported expanded uncertainties are based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95%. The Uncertainties is comply with standard required as below.

Test item	Uncertainty
Emissions in restricted frequency bands	above 1G : ± 3.9 dB below 1G : ± 3.8 dB

1 GENERAL INFORMATION

1.1 General Description of the Item(s)

Product Name..... :	iCG160 GNSS Receiver
Model No. :	iCG160
FCC ID :	RFD-iCG160
IC..... :	3177A-iCG160
Hardware Version :	3
Software Version..... :	0.1.248
Manufacturer..... :	LEICA GEOSYSTEMS AG
Manufacturer Address..... :	Heinrich-Wild-Strasse, 9435 Heerbrugg, Switzerland

Wireless specification..... :	Bluetooth V5.2 - BR/EDR			
Operating frequency range(s)..... :	2400~2483.5MHz			
Type of Modulation..... :	<input checked="" type="checkbox"/> GFSK	<input checked="" type="checkbox"/> Pi/4 DQPSK	<input checked="" type="checkbox"/> 8DPSK	
Data Rate :	<input checked="" type="checkbox"/> 1Mbit/s	<input checked="" type="checkbox"/> 2Mbit/s	<input checked="" type="checkbox"/> 3Mbit/s	
Number of channel..... :	79			

Rated power supply	Voltage and Frequency			
	<input type="checkbox"/>	AC: 220 – 240 V, 50/60 Hz		
	<input checked="" type="checkbox"/>	DC: 12.0Vdc		
	<input type="checkbox"/>	Adapter:		
	<input type="checkbox"/>	Battery:.....		
Mounting position	<input type="checkbox"/>	Table top equipment		
	<input type="checkbox"/>	Wall/Ceiling mounted equipment		
	<input checked="" type="checkbox"/>	Floor standing equipment		
	<input type="checkbox"/>	Head-mounted equipment		
	<input type="checkbox"/>	Other: Module		

1.2 Antenna Information

Antenna serial number	CU21007			
Antenna Delivery	<input checked="" type="checkbox"/>	1TX + 1RX		
	<input type="checkbox"/>	2TX + 2RX		
	<input type="checkbox"/>	Others:.....		
Antenna technology.....	<input checked="" type="checkbox"/>	SISO		
	<input type="checkbox"/>	MIMO	<input type="checkbox"/>	CDD
			<input type="checkbox"/>	Beam-forming
Antenna Type.....	<input type="checkbox"/>	External	<input type="checkbox"/>	Dipole
			<input type="checkbox"/>	Sectorized
			<input type="checkbox"/>	PCB
	<input checked="" type="checkbox"/>	Internal	<input type="checkbox"/>	PIFA
			<input checked="" type="checkbox"/>	FPC
			<input type="checkbox"/>	Dipole
			<input type="checkbox"/>	Others.....
Antenna Gain	2.80 dBi			

1.3 Channel List

Bluetooth Working Frequency of Each Channel: (For BR/EDR)							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
00	2402 MHz	01	2403 MHz	02	2404 MHz	03	2405 MHz
04	2406 MHz	05	2407 MHz	06	2408 MHz	07	2409 MHz
08	2410 MHz	09	2411 MHz	10	2412 MHz	11	2413 MHz
12	2414 MHz	13	2415 MHz	14	2416 MHz	15	2417 MHz
16	2418 MHz	17	2419 MHz	18	2420 MHz	19	2421 MHz
20	2422 MHz	21	2423 MHz	22	2424 MHz	23	2425 MHz
24	2426 MHz	25	2427 MHz	26	2428 MHz	27	2429 MHz
28	2430 MHz	29	2431 MHz	30	2432 MHz	31	2433 MHz
32	2434 MHz	33	2435 MHz	34	2436 MHz	35	2437 MHz
36	2438 MHz	37	2439 MHz	38	2440 MHz	39	2441 MHz
40	2442 MHz	41	2443 MHz	42	2444 MHz	43	2445 MHz
44	2446 MHz	45	2447 MHz	46	2448 MHz	47	2449 MHz
48	2450 MHz	49	2451 MHz	50	2452 MHz	51	2453 MHz
52	2454 MHz	53	2455 MHz	54	2456 MHz	55	2457 MHz
56	2458 MHz	57	2459 MHz	58	2460 MHz	59	2461 MHz
60	2462 MHz	61	2463 MHz	62	2464 MHz	63	2465 MHz
64	2466 MHz	65	2467 MHz	66	2468 MHz	67	2469 MHz
68	2470 MHz	69	2471 MHz	70	2472 MHz	71	2473 MHz
72	2474 MHz	73	2475 MHz	74	2476 MHz	75	2477 MHz
76	2478 MHz	77	2479 MHz	78	2480 MHz	N/A	N/A

Note: The general description of the Item(s), antenna information, channel list and Power Setting in clause 1 are provided and confirmed by the client.

2 DESCRIPTION OF TEST SETUP

2.1 Operating mode(s) used for tests

During the tests the following operating mode(s) has(have) been used.

Test Mode For Bluetooth	Mode 1: Transmitter-1Mbps(GFSK_DH5)
	Mode 2: Transmitter-2Mbps(Pi/4 DQPSK_DH5)
	Mode 3: Transmitter-3Mbps(8DPSK_DH5)

Note : For client device, radiated tests was verified over X, Y, Z axis, and shown the worst case Z axis on this report.

2.2 Accessories Information

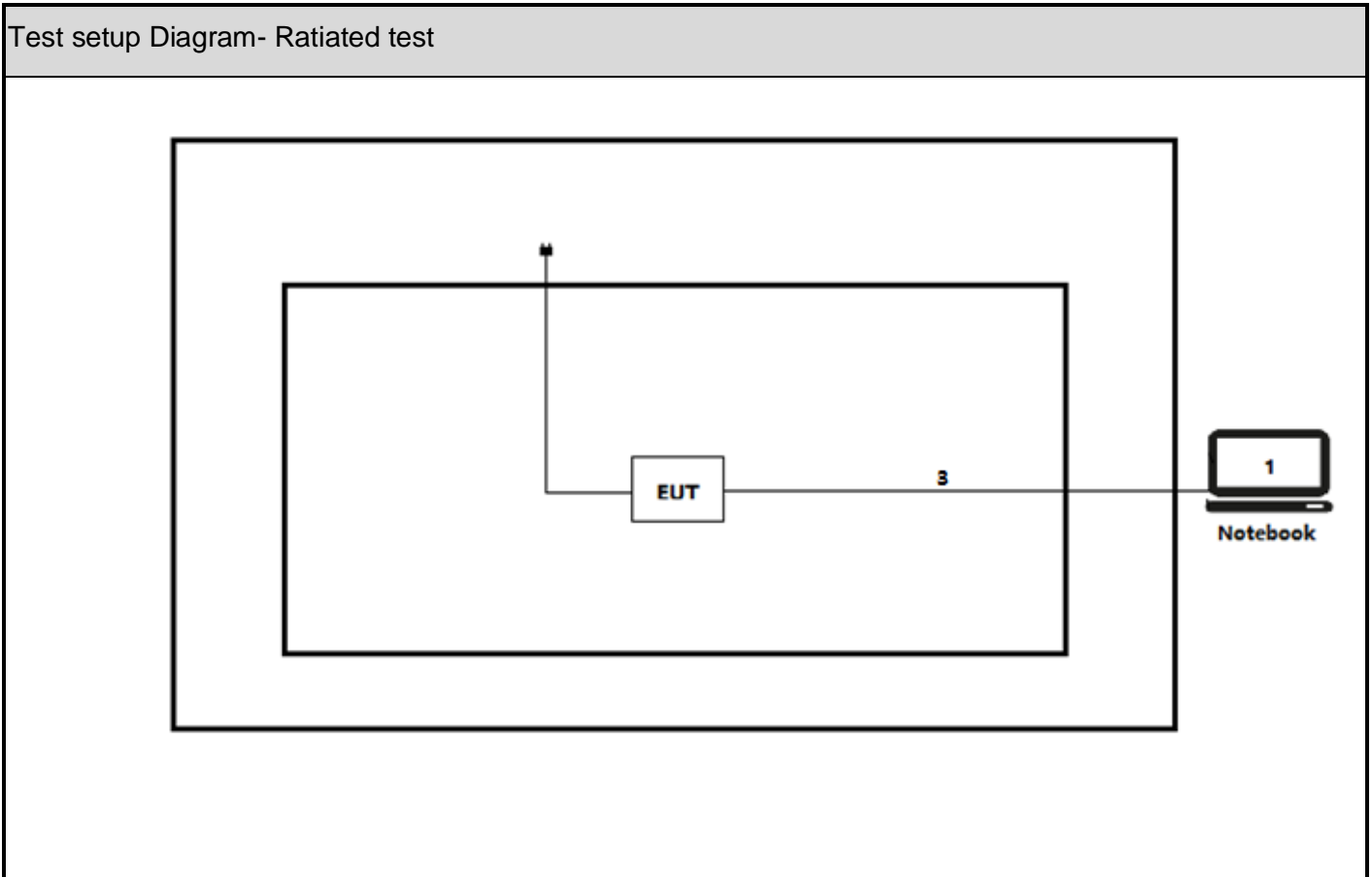
Accessories Information	Brand/model name	Cable		
		Length used during test [m]	Attached during test	Shielded
USB Cable	N/A	10	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
USB Cable	N/A	0.5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

2.3 Auxiliary equipment / Test software for the EUT

Auxiliary equipment	Type / Version	Manufacturer	Supplied by
Notebook	2526	Think Pad	N/A
Software	Type / Version	Manufacturer	Supplied by
Putty	N/A	N/A	N/A

2.4 Test Configuration / Block diagram used for tests

The following test setup / configuration / block diagram has been used during the tests:



2.5 Testing process

1	Setup the EUT as shown in Section 2.3
2	Run the software "Putty" on the notebook computer.
3	Open the serial port and enter the corresponding commands to configure the test mode, test channel, test power and data rate.
4	Verify that the EUT works properly.

3 VERDICT SUMMARY SECTION

This chapter presents an overview of standards and results. Refer to the next chapters for details of measured test results and applied test levels.

3.1 Standards

Standard	Year	Description
FCC CFR Title 47 Part 15 Subpart C Section 15.247	2021	Operation within the bands 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz.
ANSI C63.10	2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
KDB558074 D01 v05r02	2019	Guidance for performing compliance measurements on Digital Transmission System (DTS) operating under section 15.247
RSS-Gen Issue 5 Amendment 2	2021	General Requirements for Compliance of Radio Apparatus
RSS-247 Issue 2	2017	Digital Transmission Systems (DTSS), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices

3.2 Deviation(s) from the Standard(s) / Test Specification(s)

The following deviation(s) was / were made from the published requirements of the listed standards: N/A.

(Please define the deviations from the standard(s) if applicable)

3.3 Overview of results

For FCC

Requirement – Test case	Basic standard(s)	Verdict	Remark
Emissions in restricted frequency bands	FCC 15.247(b)(3)	PASS	---
Maximum conducted output power	FCC 15.247(b)(3)	PASS	---

For ISED

Requirement – Test case	Basic standard(s)	Verdict	Remark
Radiated Emission	RSS-Gen Issue 5 Section 8.9	PASS	---
Maximum conducted output power	RSS-247 Issue 2 Section 5.4	PASS	---

3.4 Test Facility

USA	:	FCC Designation Number: CN1199
CA	:	ISED CAB identifier: CN0040

4 TEST RESULTS

4.1 Emissions in restricted frequency bands	VERDICT: PASS
--	----------------------

4.1.1 Limit			
Standard		FCC Part 15 Subpart C Paragraph 15.209	
Restricted Bands of operation for FCC			
Frequency (MHz)	Frequency (MHz)	Frequency (MHz)	Frequency (GHz)
0.090 – 0.110	16.42 – 16.423	399.9 – 410	4.5 – 5.15
0.495 – 0.505	16.69475 – 16.69525	608 – 614	5.35 – 5.46
2.1735 – 2.1905	16.80425 – 16.80475	960 – 1240	7.25 – 7.75
4.125 – 4.128	25.5 – 25.67	1300 – 1427	8.025 – 8.5
4.17725 – 4.17775	37.5 – 38.25	1435 – 1626.5	9.0 – 9.2
4.20725 – 4.20775	73 – 74.6	1645.5 – 1646.5	9.3 – 9.5
6.215 – 6.218	74.8 – 75.2	1660 – 1710	10.6 – 12.7
6.26775 – 6.26825	108 – 121.94	1718.8 – 1722.2	13.25 – 13.4
6.31175 – 6.31225	123 – 138	2200 – 2300	14.47 – 14.5
8.291 – 8.294	149.9 – 150.05	2310 – 2390	15.35 – 16.2
8.362 – 8.366	156.52475 – 156.52525	2483.5 – 2500	17.7 – 21.4
8.37625 – 8.38675	156.7 – 156.9	2690 – 2900	22.01 – 23.12
8.81425 – 8.81475	162.0125 – 167.17	3260 – 3267	23.6 – 24.0
12.29 – 12.293	167.72 – 173.2	3332 – 3339	31.2 – 31.8
12.51975 – 12.52025	240 – 285	3345.8 – 3358	36.43 – 36.5
12.57675 – 12.57725	322 – 335.4	3600 – 4400	
13.36 – 13.41			
Restricted Bands of operation for ISED			
0.090 - 0.110	13.36 - 13.41	960 - 1427	9.0 - 9.2
0.495 - 0.505	16.42 - 16.423	1435 - 1626.5	9.3 - 9.5
2.1735 - 2.1905	16.69475 - 16.69525	1645.5 - 1646.5	10.6 - 12.7
3.020 - 3.026	16.80425 - 16.80475	1660 - 1710	13.25 - 13.4
4.125 - 4.128	25.5 - 25.67	1718.8 - 1722.2	14.47 - 14.5
4.17725 - 4.17775	37.5 - 38.25	2200 - 2300	15.35 - 16.2
4.20725 - 4.20775	73 - 74.6	2310 - 2390	17.7 - 21.4
5.677 - 5.683	74.8 - 75.2	2483.5 - 2500	22.01 - 23.12
6.215 - 6.218	108 - 138	2655 - 2900	23.6 - 24.0
6.26775 - 6.26825	149.9 - 150.05	3260 - 3267	31.2 - 31.8
6.31175 - 6.31225	156.52475 - 156.52525	3332 - 3339	36.43 - 36.5
8.291 - 8.294	156.7 - 156.9	3345.8 - 3358	Above 38.6
8.362 - 8.366	162.0125 - 167.17	3500 - 4400	
8.37625 - 8.38675	167.72 - 173.2	4500 - 5150	
8.81425 - 8.81475	240 - 285	5350 - 5460	
12.29 - 12.293	322 - 335.4	7250 - 7750	
12.51975 - 12.52025	399.9 - 410	8025 - 8500	
12.57675 - 12.57725	608 - 614	--	

Restricted Band Emissions Limit			
Frequency (MHz)	Field strength (μ V/m)	Field strength (dB μ V/m)	Measurement distance (m)
0.009 - 0.49	2400/F(kHz)	48.5 – 13.8	300 _(Note 1)
0.49 - 1.705	24000/F(kHz)	33.8 - 23	30 _(Note 1)
1.705 - 30	30	29.5	30 _(Note 1)
30 -88	100	40	3 _(Note 2)
88-216	150	43.5	3 _(Note 2)
216 - 960	200	46	3 _(Note 2)
Above 960	500	54	3 _(Note 2)

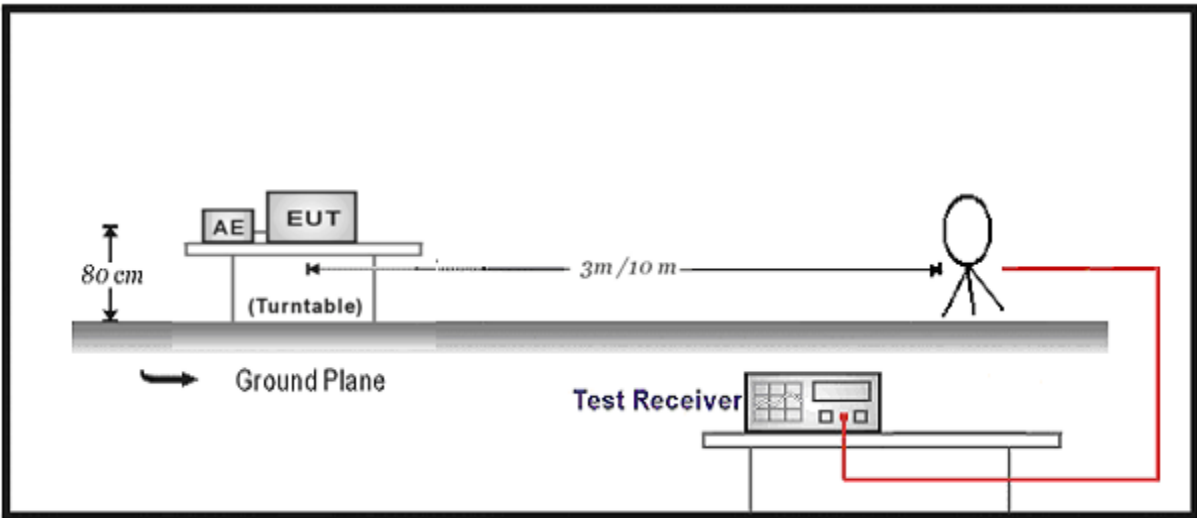
Note 1: At frequencies below 30 MHz, measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field. Pending the development of an appropriate measurement procedure for measurements performed below 30 MHz, when performing measurements at a closer distance than specified, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade).

Note 2: At frequencies at or above 30 MHz, measurements may be performed at a distance other than what is specified provided: measurements are not made in the near field except where it can be shown that near field measurements are appropriate due to the characteristics of the device; and it can be demonstrated that the signal levels needed to be measured at the distance employed can be detected by the measurement equipment.

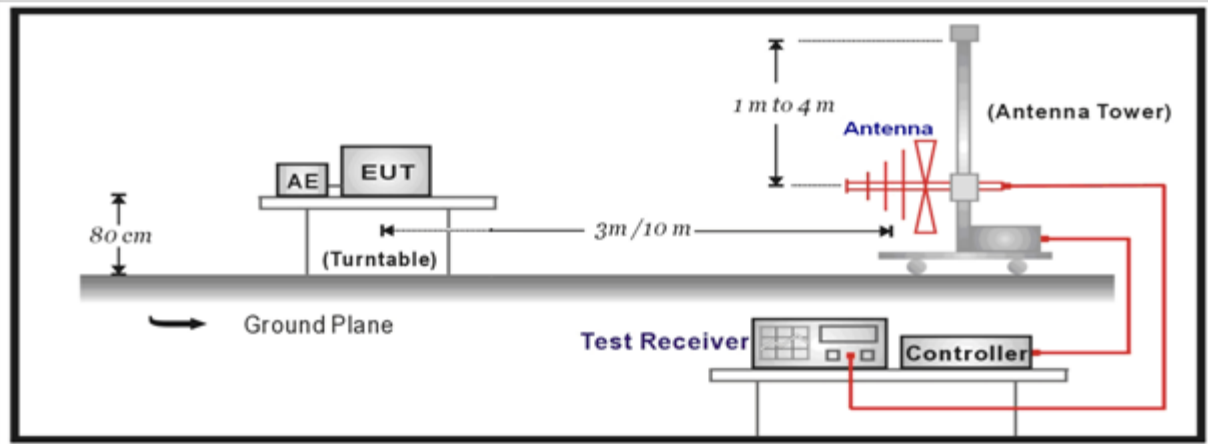
Measurements shall not be performed at a distance greater than 30 meters unless it can be further demonstrated that measurements at a distance of 30 meters or less are impractical. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse linear-distance for field strength measurements; inverse-linear-distance-squared for power density measurements).

4.1.2 Test Setup

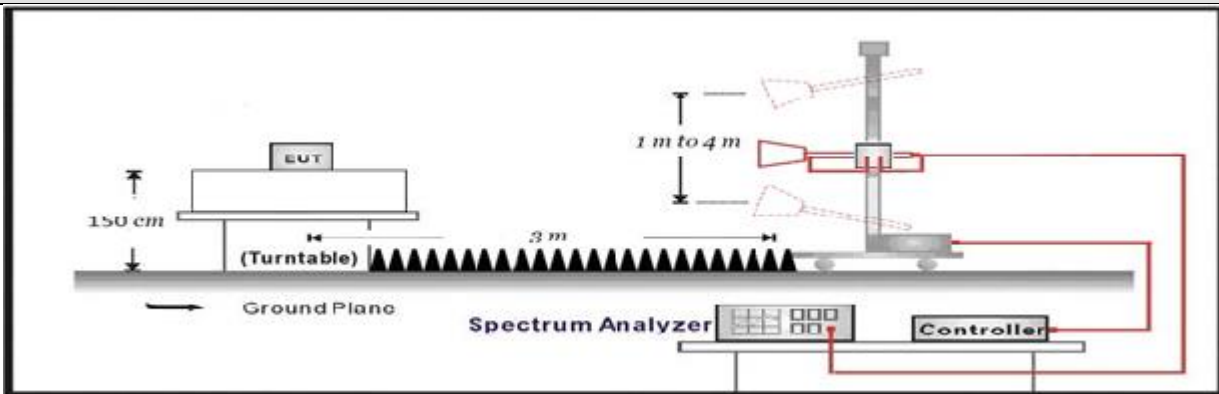
Below 30MHz Test Setup:



30MHz-1GHz Test Setup:



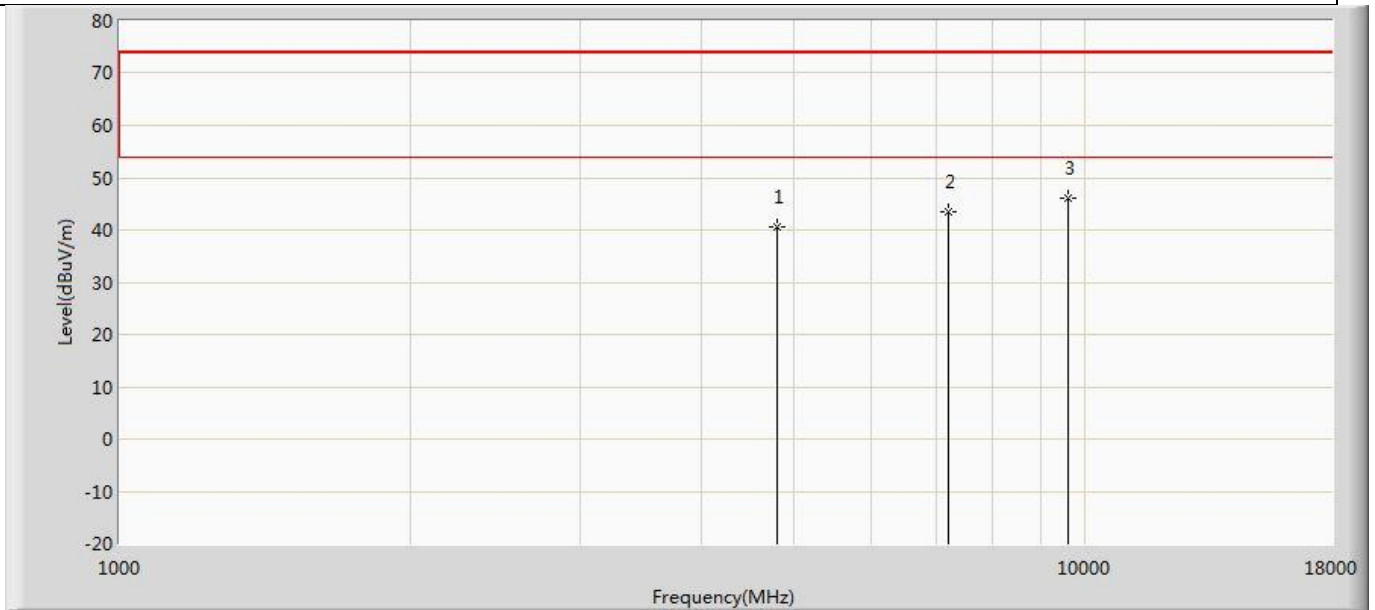
Above 1GHz Test Setup:



4.1.3 Test Procedure			
	References Rule	Chapter	Description
<input checked="" type="checkbox"/>	ANSI C63.10	11.12	Emissions in restricted frequency bands
	<input checked="" type="checkbox"/> ANSI C63.10	11.12.1	Radiated emission measurements
	<input checked="" type="checkbox"/> ANSI C63.10	11.12.2.7	Radiated spurious emission test
	<input checked="" type="checkbox"/> ANSI C63.10	6.4	Radiated emissions from unlicensed wireless devices below 30 MHz
	<input checked="" type="checkbox"/> ANSI C63.10	6.5	Radiated emissions from unlicensed wireless devices in the frequency range of 30 MHz to 1000 MHz
	<input checked="" type="checkbox"/> ANSI C63.10	6.6	Radiated emissions from unlicensed wireless devices above 1 GHz

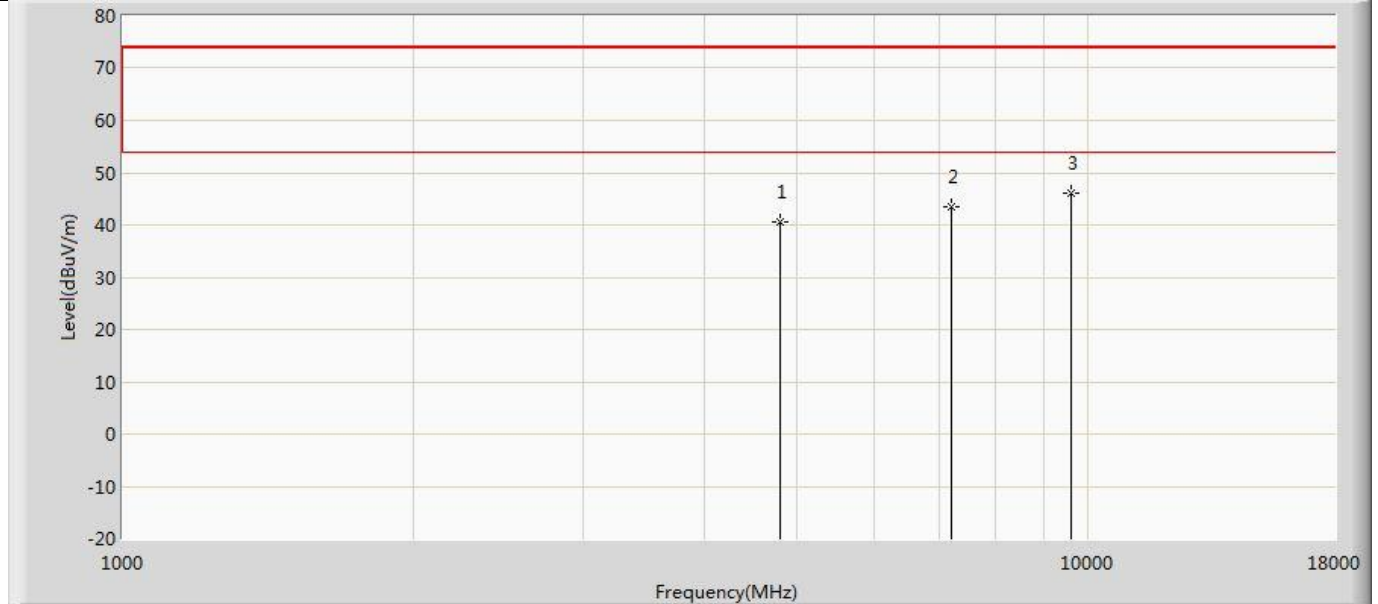
4.1.4 Test Data

Profile: 22B0905R	Page No.: 19
Engineer: Yu Liu	
Site: AC5	Time: 2022/12/13 - 23:28
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)2022	Polarity: Horizontal
EUT: ICG160	Power: DC 12Vdc
Note: Mode 1 : Transmit at 2402MHz by DH5	



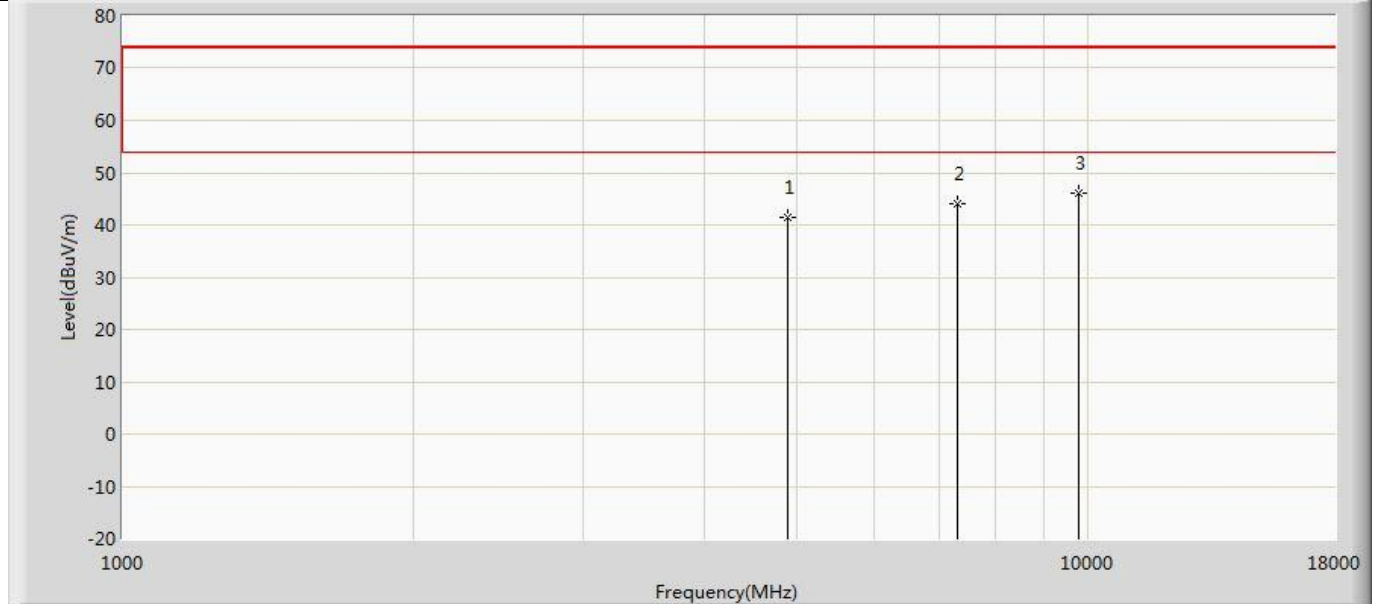
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4804.000	40.691	55.671	-33.309	74.000	-14.981	PK
2		7206.000	43.610	54.430	-30.390	74.000	-10.820	PK
3	*	9608.000	46.225	54.319	-27.775	74.000	-8.094	PK

Profile: 22B0905R	Page No.: 20
Engineer: Yu Liu	
Site: AC5	Time: 2022/12/13 - 23:28
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)2022	Polarity: Vertical
EUT: ICG160	Power: DC 12Vdc
Note: Mode 1 : Transmit at 2402MHz by DH5	



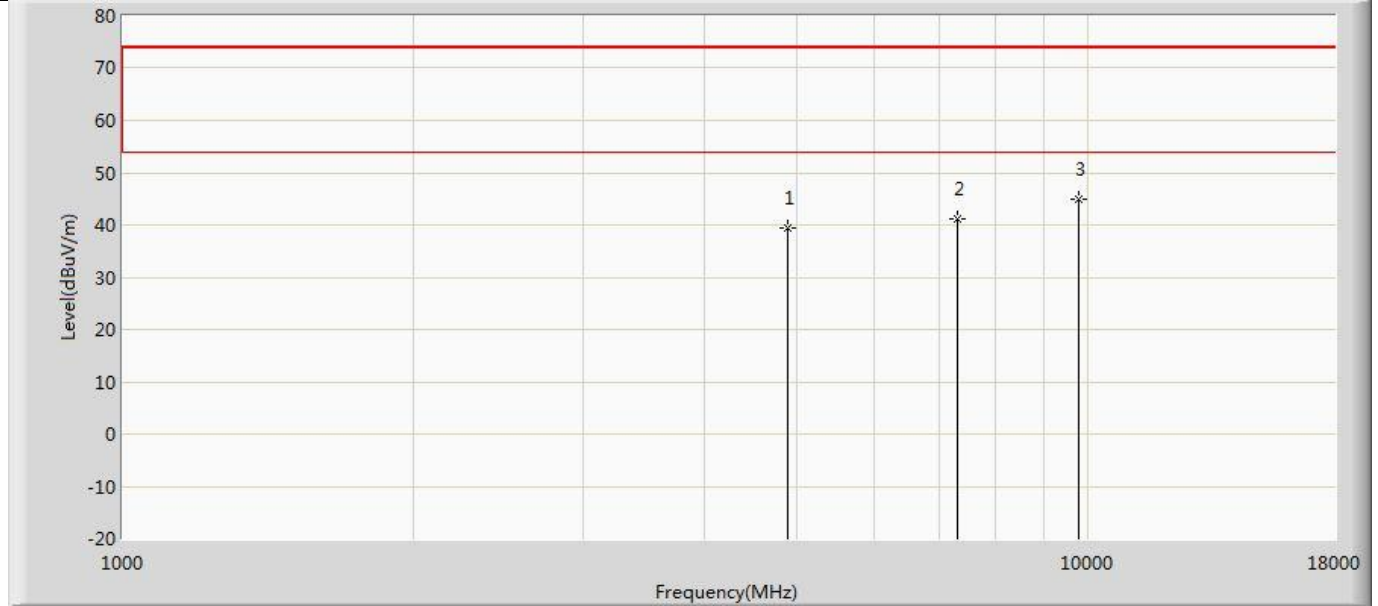
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4804.000	40.454	55.434	-33.546	74.000	-14.981	PK
2		7206.000	43.530	54.350	-30.470	74.000	-10.820	PK
3	*	9608.000	45.945	54.039	-28.055	74.000	-8.094	PK

Profile: 22B0905R	Page No.: 21
Engineer: Yu Liu	
Site: AC5	Time: 2022/12/13 - 23:28
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)2022	Polarity: Horizontal
EUT: ICG160	Power: DC 12Vdc
Note: Mode 1 : Transmit at 2441MHz by DH5	



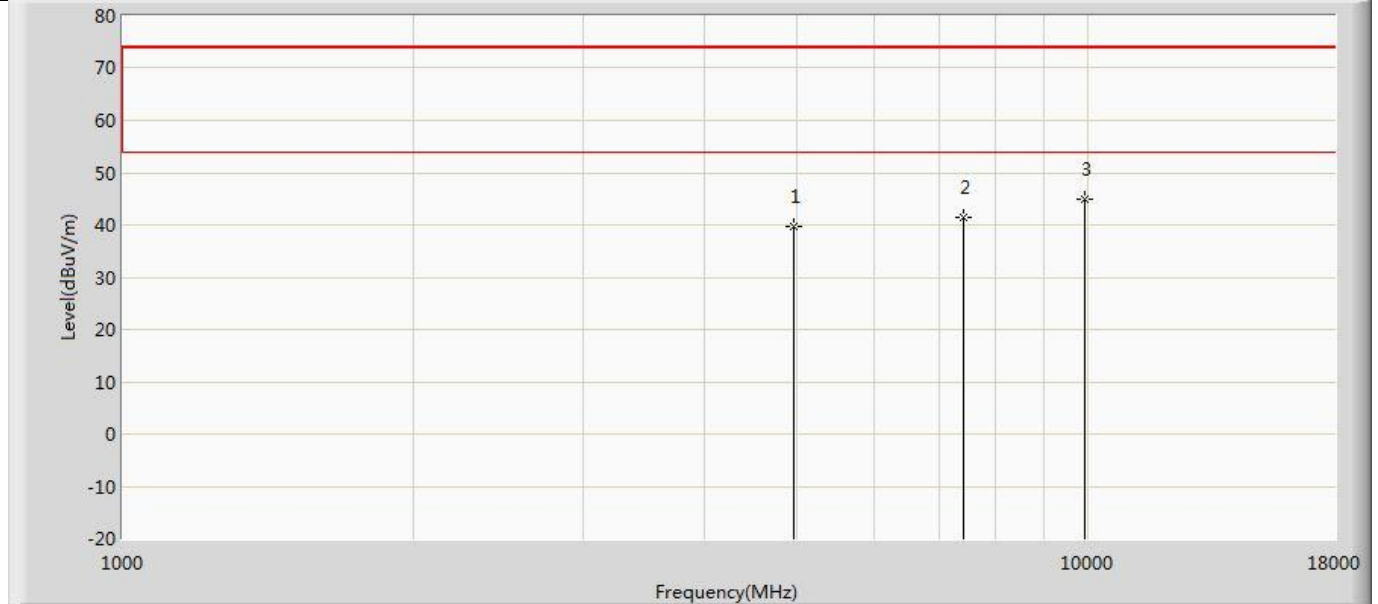
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4882.000	41.334	55.934	-32.666	74.000	-14.600	PK
2		7323.000	44.147	55.015	-29.853	74.000	-10.868	PK
3	*	9764.000	45.980	53.777	-28.020	74.000	-7.797	PK

Profile: 22B0905R	Page No.: 22
Engineer: Yu Liu	
Site: AC5	Time: 2022/12/13 - 23:29
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)2022	Polarity: Vertical
EUT: ICG160	Power: DC 12Vdc
Note: Mode 1 : Transmit at 2441MHz by DH5	



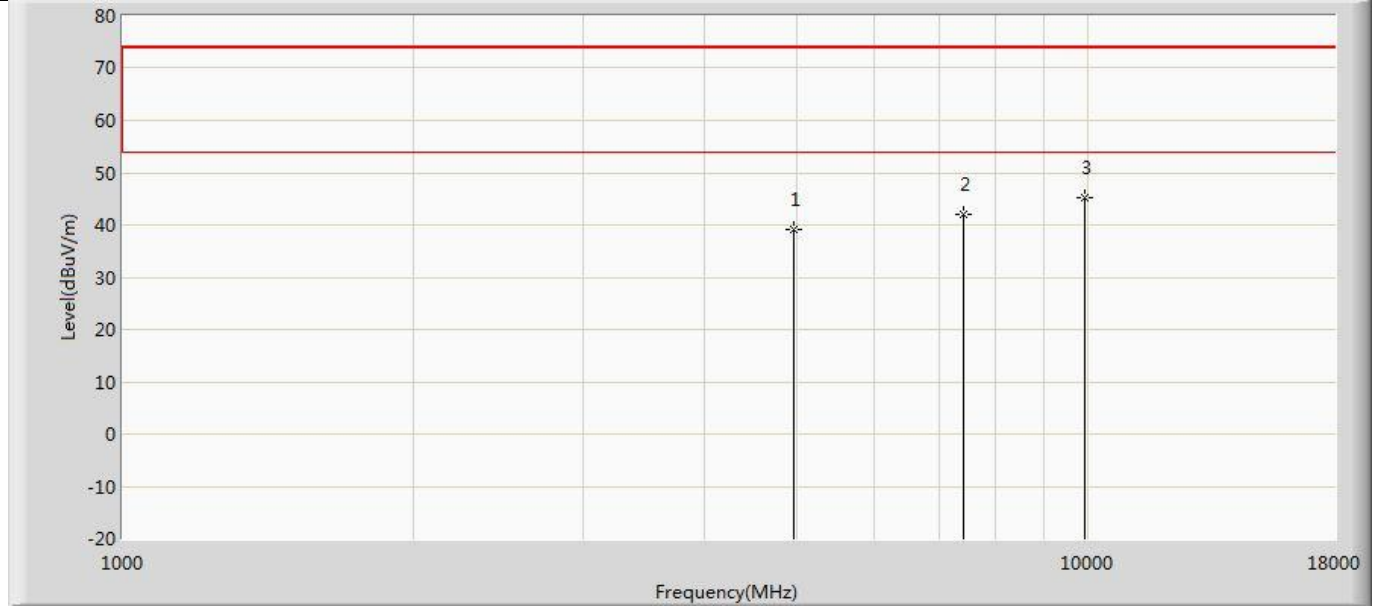
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4882.000	39.287	53.887	-34.713	74.000	-14.600	PK
2		7323.000	41.201	52.069	-32.799	74.000	-10.868	PK
3	*	9764.000	44.885	52.682	-29.115	74.000	-7.797	PK

Profile: 22B0905R	Page No.: 23
Engineer: Yu Liu	
Site: AC5	Time: 2022/12/13 - 23:29
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)2022	Polarity: Horizontal
EUT: ICG160	Power: DC 12Vdc
Note: Mode 1 : Transmit at 2480MHz by DH5	



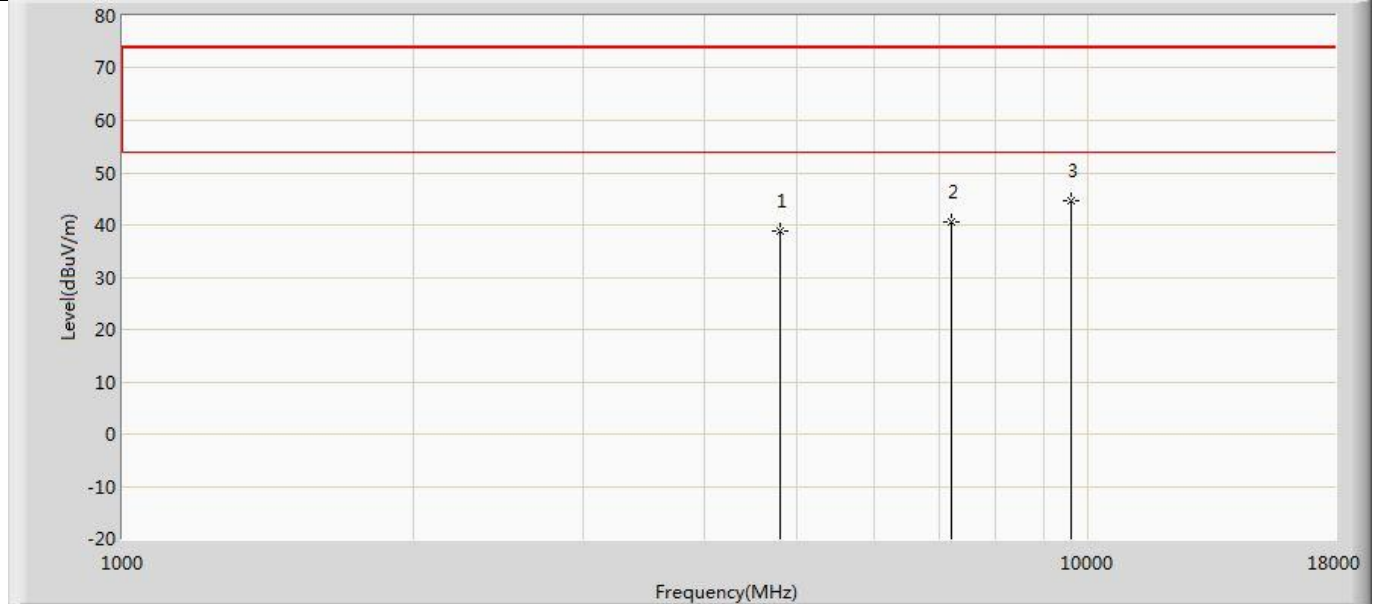
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4960.000	39.693	54.257	-34.307	74.000	-14.565	PK
2		7440.000	41.429	52.160	-32.571	74.000	-10.731	PK
3	*	9920.000	44.806	52.383	-29.194	74.000	-7.578	PK

Profile: 22B0905R	Page No.: 24
Engineer: Yu Liu	
Site: AC5	Time: 2022/12/13 - 23:29
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)2022	Polarity: Vertical
EUT: ICG160	Power: DC 12Vdc
Note: Mode 1 : Transmit at 2480MHz by DH5	



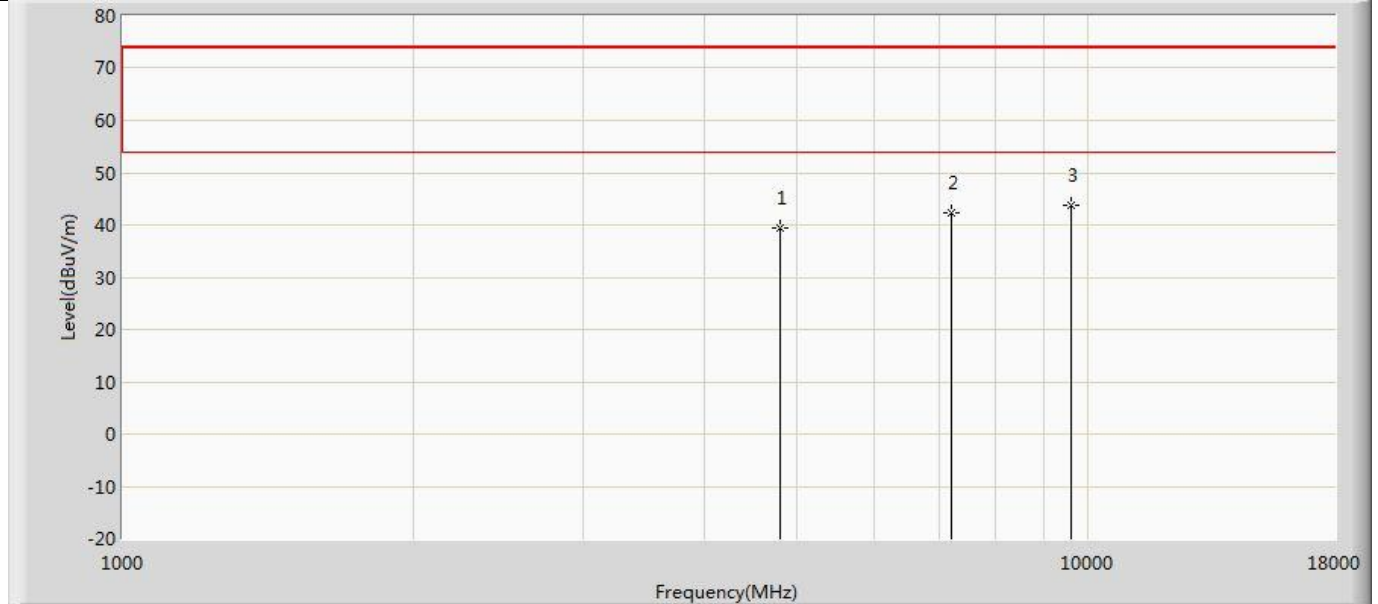
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4960.000	39.117	53.681	-34.883	74.000	-14.565	PK
2		7440.000	41.958	52.689	-32.042	74.000	-10.731	PK
3	*	9920.000	45.091	52.668	-28.909	74.000	-7.578	PK

Profile: 22B0905R	Page No.: 25
Engineer: Yu Liu	
Site: AC5	Time: 2022/12/13 - 23:29
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)2022	Polarity: Horizontal
EUT: ICG160	Power: DC 12Vdc
Note: Mode 2 : Transmit at 2402MHz by 2DH5	



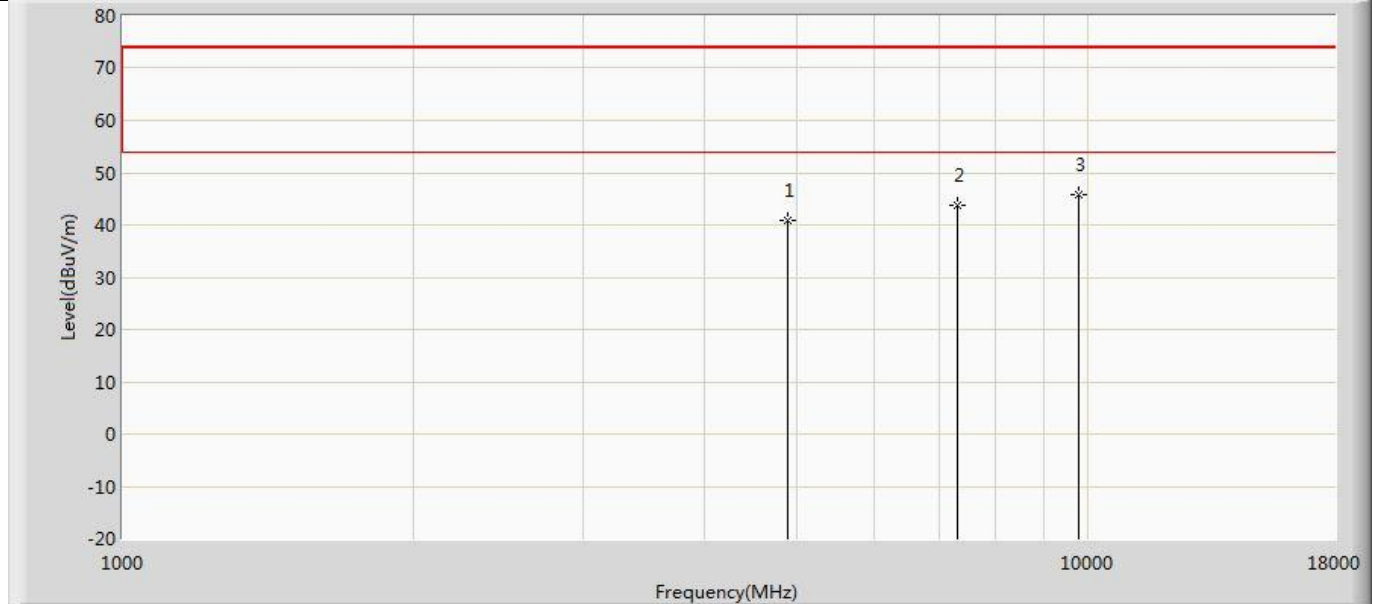
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4804.000	38.961	53.941	-35.039	74.000	-14.981	PK
2		7206.000	40.695	51.515	-33.305	74.000	-10.820	PK
3	*	9608.000	44.528	52.622	-29.472	74.000	-8.094	PK

Profile: 22B0905R	Page No.: 26
Engineer: Yu Liu	
Site: AC5	Time: 2022/12/13 - 23:29
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)2022	Polarity: Vertical
EUT: ICG160	Power: DC 12Vdc
Note: Mode 2 : Transmit at 2402MHz by 2DH5	



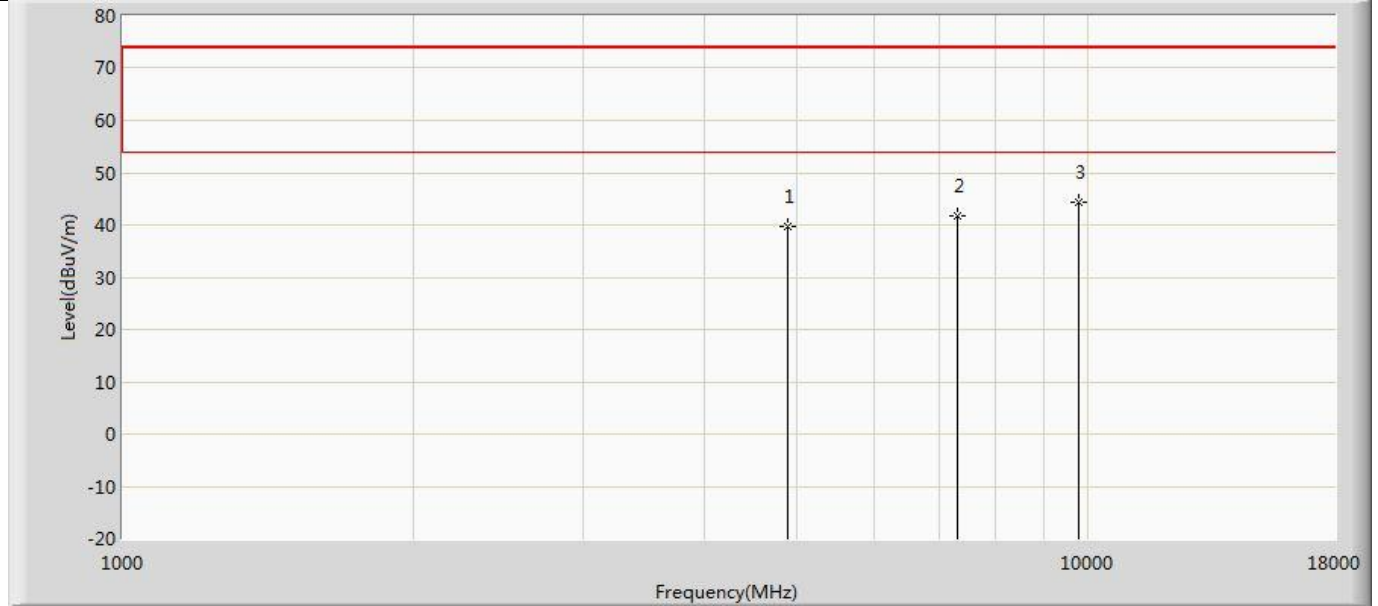
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4804.000	39.353	54.333	-34.647	74.000	-14.981	PK
2		7206.000	42.328	53.148	-31.672	74.000	-10.820	PK
3	*	9608.000	43.699	51.793	-30.301	74.000	-8.094	PK

Profile: 22B0905R	Page No.: 27
Engineer: Yu Liu	
Site: AC5	Time: 2022/12/13 - 23:29
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)2022	Polarity: Horizontal
EUT: ICG160	Power: DC 12Vdc
Note: Mode 2 : Transmit at 2441MHz by 2DH5	



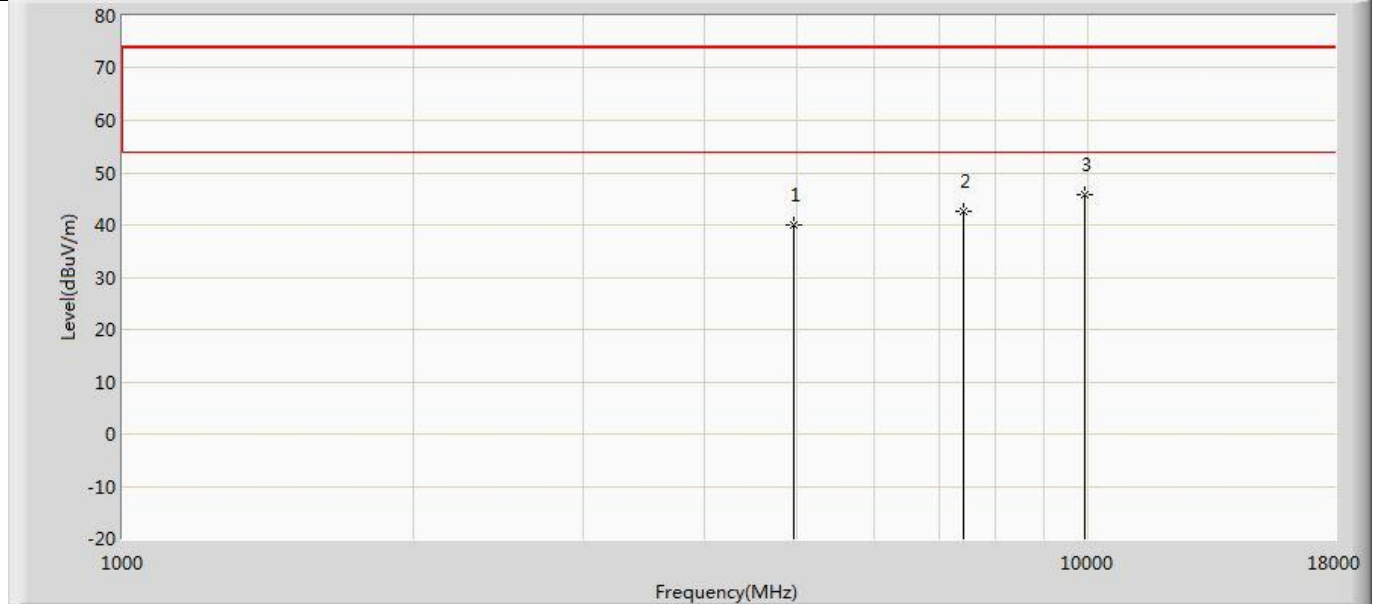
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4882.000	40.855	55.455	-33.145	74.000	-14.600	PK
2		7323.000	43.848	54.716	-30.152	74.000	-10.868	PK
3	*	9764.000	45.922	53.719	-28.078	74.000	-7.797	PK

Profile: 22B0905R	Page No.: 28
Engineer: Yu Liu	
Site: AC5	Time: 2022/12/13 - 23:29
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)2022	Polarity: Vertical
EUT: ICG160	Power: DC 12Vdc
Note: Mode 2 : Transmit at 2441MHz by 2DH5	



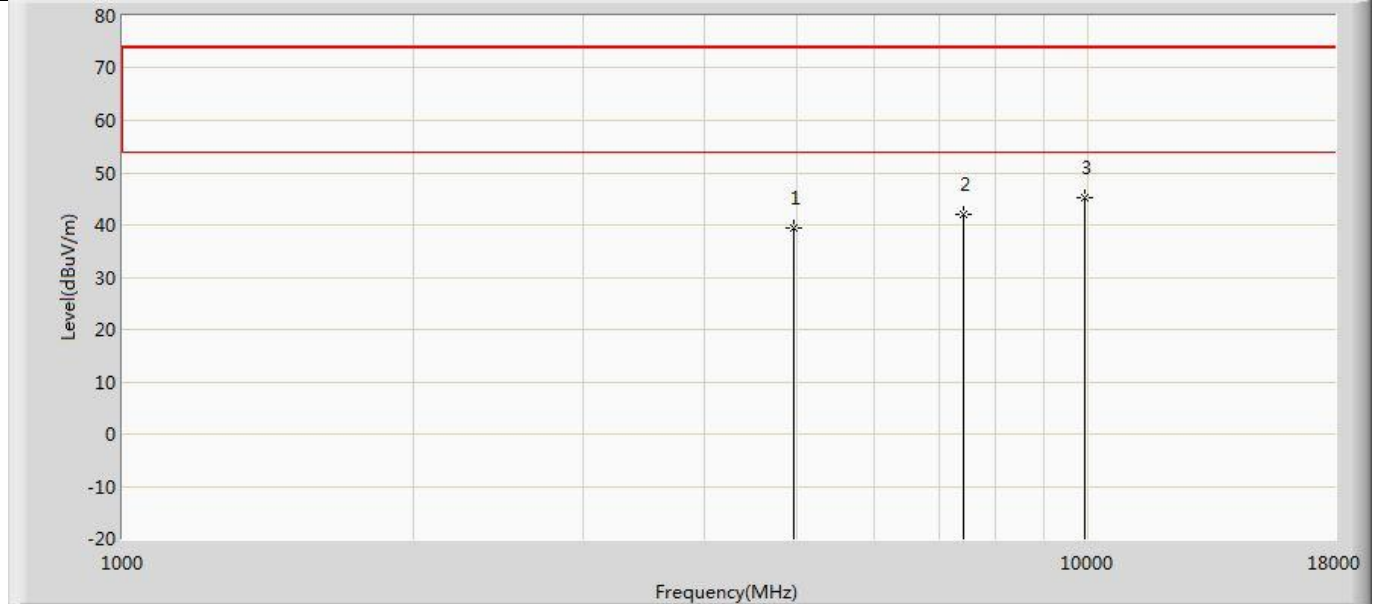
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4882.000	39.604	54.204	-34.396	74.000	-14.600	PK
2		7323.000	41.824	52.692	-32.176	74.000	-10.868	PK
3	*	9764.000	44.321	52.118	-29.679	74.000	-7.797	PK

Profile: 22B0905R	Page No.: 29
Engineer: Yu Liu	
Site: AC5	Time: 2022/12/13 - 23:29
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)2022	Polarity: Horizontal
EUT: ICG160	Power: DC 12Vdc
Note: Mode 2 : Transmit at 2480MHz by 2DH5	



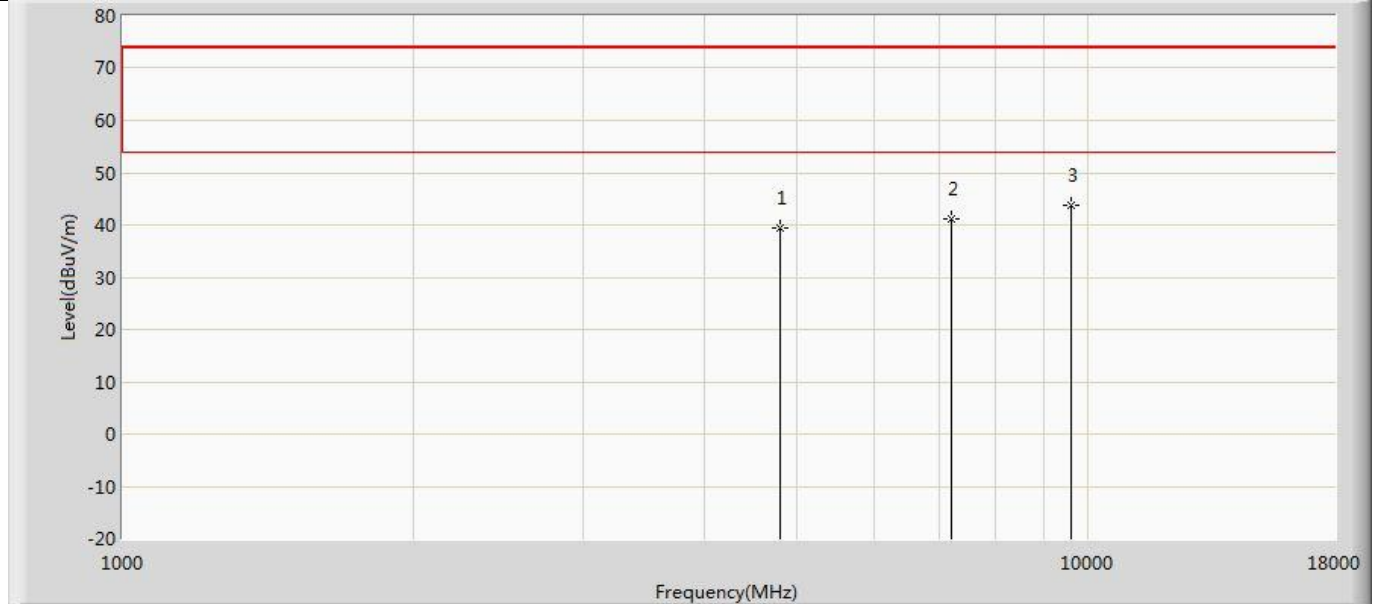
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4960.000	40.129	54.693	-33.871	74.000	-14.565	PK
2		7440.000	42.531	53.262	-31.469	74.000	-10.731	PK
3	*	9920.000	45.717	53.294	-28.283	74.000	-7.578	PK

Profile: 22B0905R	Page No.: 30
Engineer: Yu Liu	
Site: AC5	Time: 2022/12/13 - 23:29
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)2022	Polarity: Vertical
EUT: ICG160	Power: DC 12Vdc
Note: Mode 2 : Transmit at 2480MHz by 2DH5	



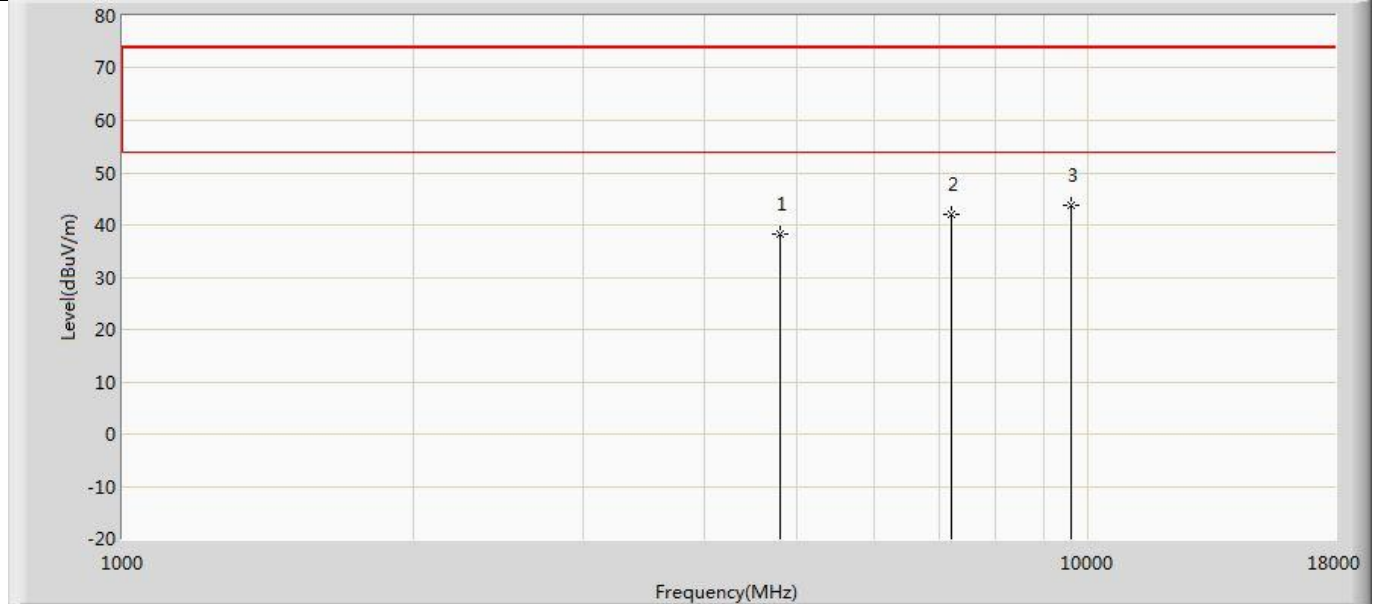
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4960.000	39.490	54.054	-34.510	74.000	-14.565	PK
2		7440.000	41.927	52.658	-32.073	74.000	-10.731	PK
3	*	9920.000	45.265	52.842	-28.735	74.000	-7.578	PK

Profile: 22B0905R	Page No.: 31
Engineer: Yu Liu	
Site: AC5	Time: 2022/12/13 - 23:29
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)2022	Polarity: Horizontal
EUT: ICG160	Power: DC 12Vdc
Note: Mode 3 : Transmit at 2402MHz by 3DH5	



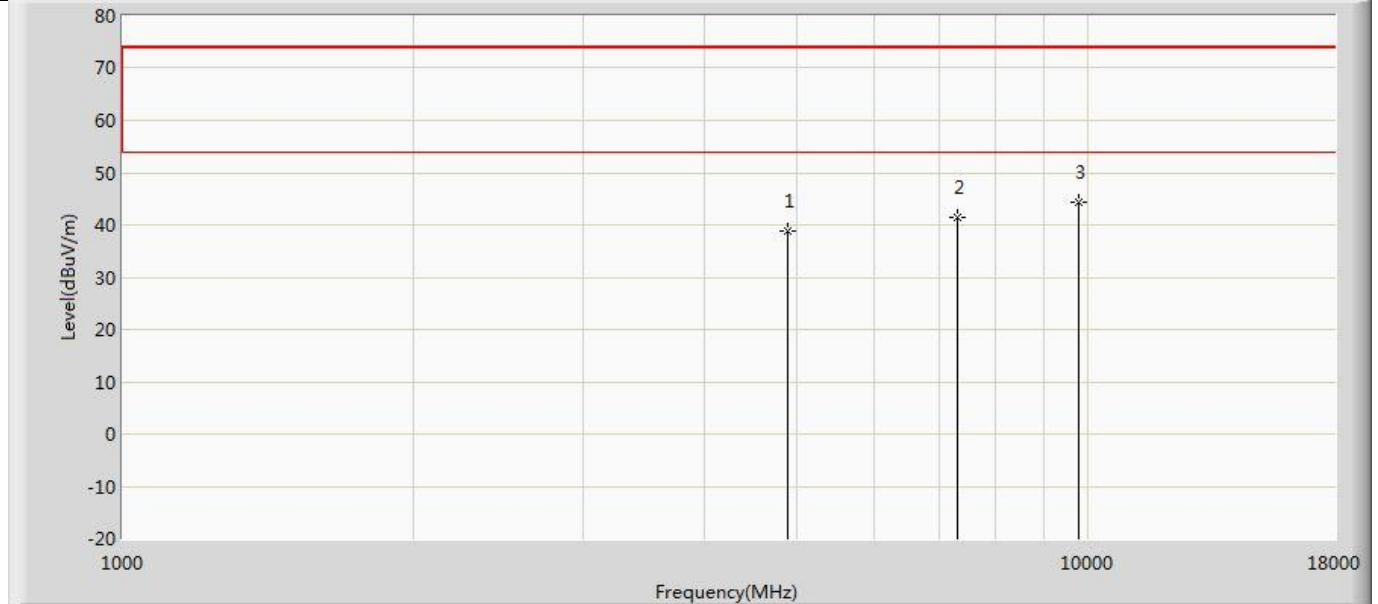
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4804.000	39.441	54.421	-34.559	74.000	-14.981	PK
2		7206.000	41.147	51.967	-32.853	74.000	-10.820	PK
3	*	9608.000	43.863	51.957	-30.137	74.000	-8.094	PK

Profile: 22B0905R	Page No.: 32
Engineer: Yu Liu	
Site: AC5	Time: 2022/12/13 - 23:30
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)2022	Polarity: Vertical
EUT: ICG160	Power: DC 12Vdc
Note: Mode 3 : Transmit at 2402MHz by 3DH5	



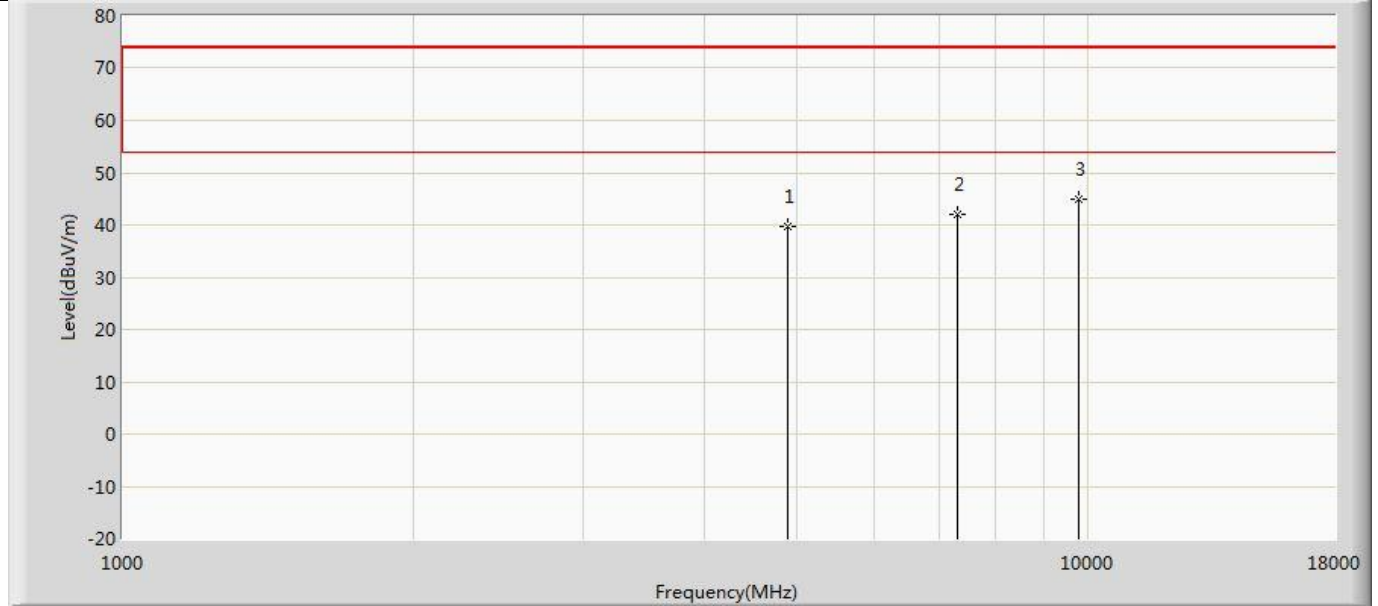
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4804.000	38.185	53.165	-35.815	74.000	-14.981	PK
2		7206.000	41.912	52.732	-32.088	74.000	-10.820	PK
3	*	9608.000	43.904	51.998	-30.096	74.000	-8.094	PK

Profile: 22B0905R	Page No.: 33
Engineer: Yu Liu	
Site: AC5	Time: 2022/12/13 - 23:30
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)2022	Polarity: Horizontal
EUT: ICG160	Power: DC 12Vdc
Note: Mode 3 : Transmit at 2441MHz by 3DH5	



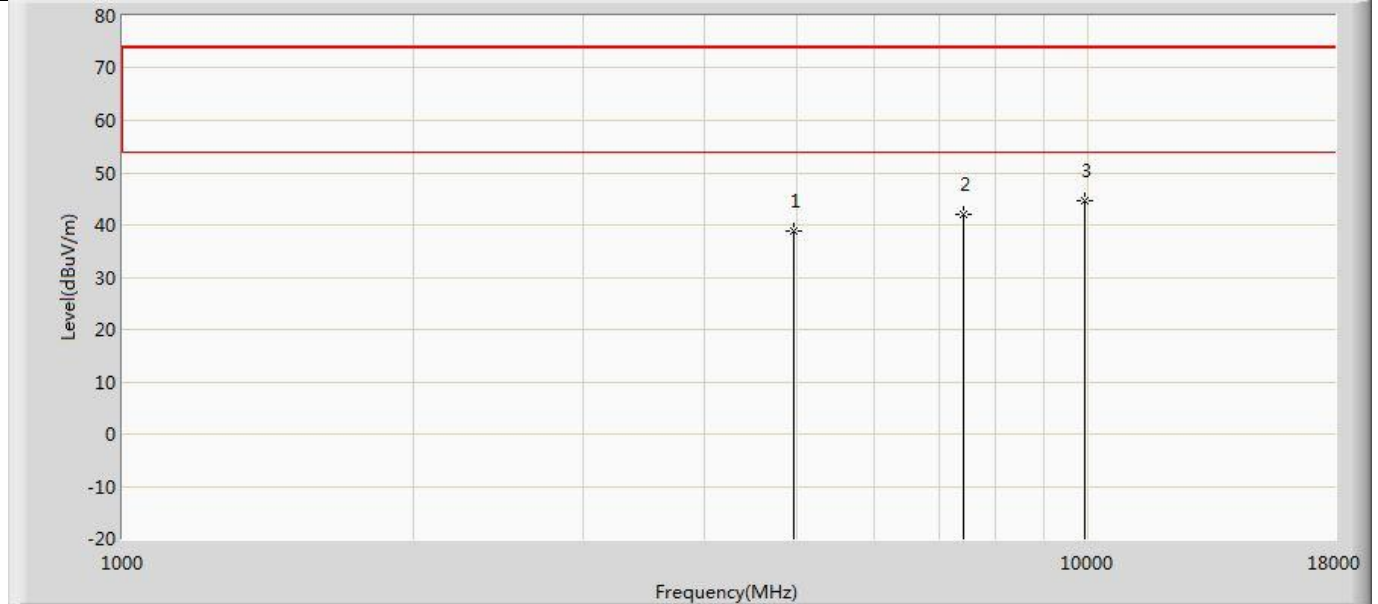
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4882.000	38.719	53.319	-35.281	74.000	-14.600	PK
2		7323.000	41.589	52.457	-32.411	74.000	-10.868	PK
3	*	9764.000	44.271	52.068	-29.729	74.000	-7.797	PK

Profile: 22B0905R	Page No.: 34
Engineer: Yu Liu	
Site: AC5	Time: 2022/12/13 - 23:30
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)2022	Polarity: Vertical
EUT: ICG160	Power: DC 12Vdc
Note: Mode 3 : Transmit at 2441MHz by 3DH5	



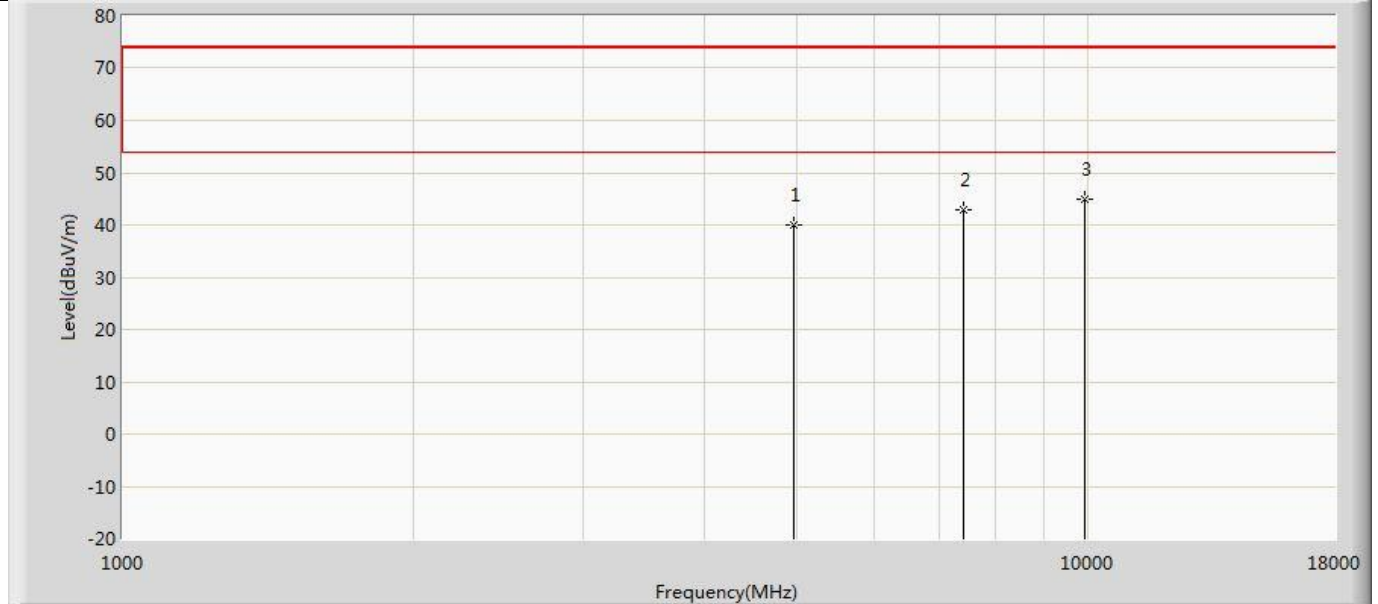
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4882.000	39.793	54.393	-34.207	74.000	-14.600	PK
2		7323.000	41.959	52.827	-32.041	74.000	-10.868	PK
3	*	9764.000	45.071	52.868	-28.929	74.000	-7.797	PK

Profile: 22B0905R	Page No.: 35
Engineer: Yu Liu	
Site: AC5	Time: 2022/12/13 - 23:30
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)2022	Polarity: Horizontal
EUT: ICG160	Power: DC 12Vdc
Note: Mode 3 : Transmit at 2480MHz by 3DH5	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4960.000	38.859	53.423	-35.141	74.000	-14.565	PK
2		7440.000	42.037	52.768	-31.963	74.000	-10.731	PK
3	*	9920.000	44.636	52.213	-29.364	74.000	-7.578	PK

Profile: 22B0905R	Page No.: 36
Engineer: Yu Liu	
Site: AC5	Time: 2022/12/13 - 23:30
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)2022	Polarity: Vertical
EUT: ICG160	Power: DC 12Vdc
Note: Mode 3 : Transmit at 2480MHz by 3DH5	



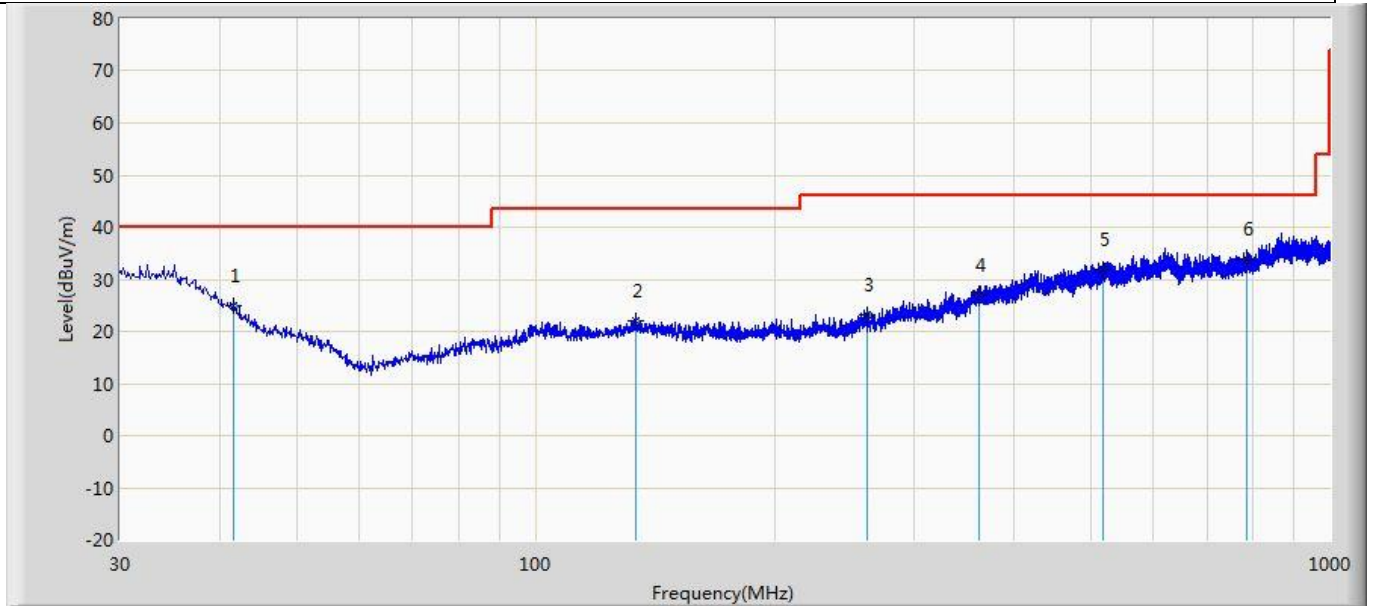
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4960.000	39.868	54.432	-34.132	74.000	-14.565	PK
2		7440.000	42.869	53.600	-31.131	74.000	-10.731	PK
3	*	9920.000	44.915	52.492	-29.085	74.000	-7.578	PK

Note:

1. Measured Level = Reading Level + Factor.
2. The test frequency range, 9kHz~30MHz, worst case are at least 20dB below the limits, therefore no data appear in the report.
3. This limit applies for both peak and average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.
4. The points in graph are the highest data in test frequency range.

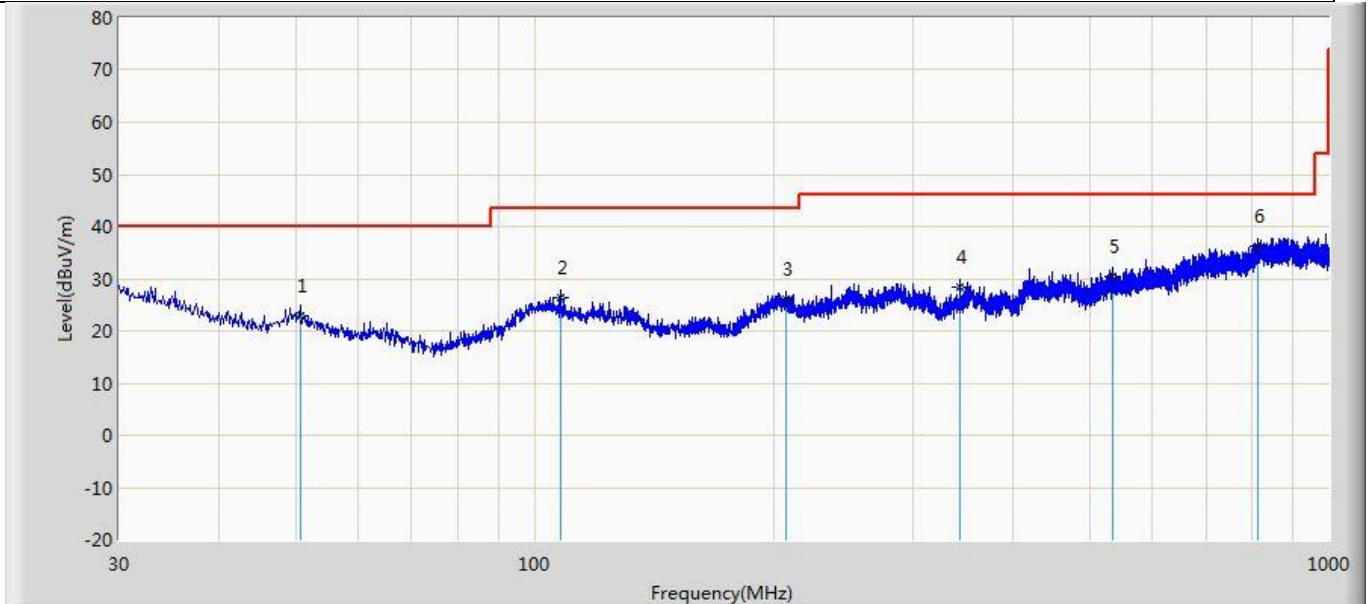
The worst case of Radiated Emission below 1GHz:

Profile: 22B0905R	Page No.: 3
Engineer: Yuliu	
Site: AC3	Time: 2023/01/05 - 20:39
Limit: FCC_Part15.109_RE(3m)_ClassB	Margin: 0
Probe: AC3_3M(30-1000M)	Polarity: Horizontal
EUT: ICG160	Power: DC 12Vdc
Note: Mode 1 Transmit at 2402MHz by DH5	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		41.761	24.838	4.518	-15.162	40.000	20.321	QP
2		133.548	21.904	4.170	-21.596	43.500	17.734	QP
3		262.073	23.198	4.308	-22.802	46.000	18.890	QP
4		362.467	26.971	2.629	-19.029	46.000	24.343	QP
5		519.122	31.973	3.692	-14.027	46.000	28.281	QP
6	*	785.630	33.960	3.478	-12.040	46.000	30.482	QP

Profile: 22B0905R	Page No.: 4
Engineer: Yuliu	
Site: AC3	Time: 2023/01/05 - 20:40
Limit: FCC_Part15.109_RE(3m)_ClassB	Margin: 0
Probe: AC3_3M(30-1000M)	Polarity: Vertical
EUT: ICG160	Power: DC 12Vdc
Note: Mode 1 Transmit at 2402MHz by DH5	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		50.734	22.990	3.692	-17.010	40.000	19.298	QP
2		107.842	26.468	4.919	-17.032	43.500	21.549	QP
3		207.146	26.162	2.773	-17.338	43.500	23.390	QP
4		343.916	28.430	4.519	-17.570	46.000	23.911	QP
5		533.551	30.556	3.486	-15.444	46.000	27.070	QP
6	*	814.003	36.157	3.362	-9.843	46.000	32.794	QP

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Factor(Probe+Cable-Amp)

4.2 Maximum Conducted Output Power	VERDICT: PASS
---	----------------------

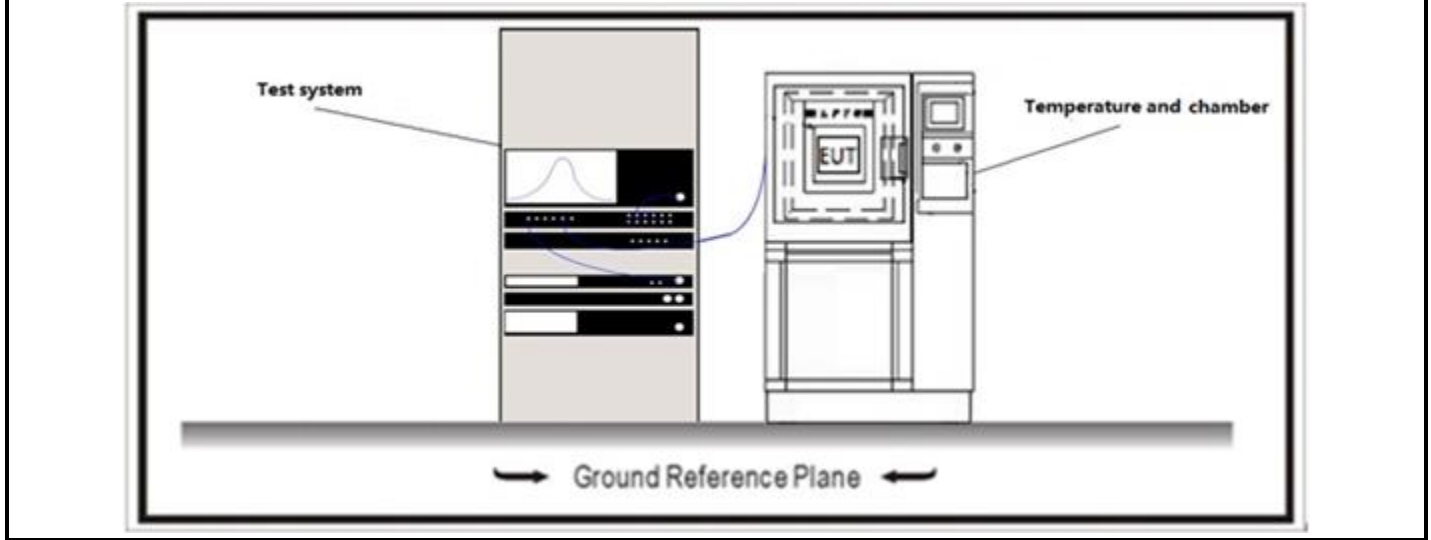
4.2.1 Limit

	Standard	FCC Part 15 Subpart C Paragraph 15.247 (b)(3);
<input checked="" type="checkbox"/>	GTX < 6dBi	Pout ≤ 30dBm
<input type="checkbox"/>	GTX > 6dBi	
<input type="checkbox"/>	Non-Fix point-point	$P_{out} \leq 30 - (GTX - 6)$
<input type="checkbox"/>	Fix point-point	$P_{out} \leq 30 - [(GTX - 6)] / 3$
<input type="checkbox"/>	Point-to-multipoint	$P_{out} \leq 30 - (GTX - 6)$
<input type="checkbox"/>	Overlap Beams	$P_{out} \leq 30 - [(GTX - 6)] / 3$
<input type="checkbox"/>	Aggregate power transmitted simultaneously on all beams	$P_{out} \leq 30 - [(GTX - 6)] / 3$
<input type="checkbox"/>	single directional beam	$P_{out} \leq 30 - [(GTX - 6)] / 3 + 8dB$

Note 1 : GTX directional gain of transmitting antennas.

Note 2 : Pout is maximum peak conducted output power .

4.2.2 Test Setup



4.2.3 Test Procedure

	References Rule	Chapter	Description
<input checked="" type="checkbox"/>	ANSI C63.10	11.9	Fundamental emission output power
<input checked="" type="checkbox"/>	ANSI C63.10	11.9.1	Maximum peak conducted output power
<input type="checkbox"/>	<input type="checkbox"/> ANSI C63.10	11.9.1.1	RBW ≥ DTS bandwidth
<input type="checkbox"/>	<input type="checkbox"/> ANSI C63.10	11.9.1.2	Integrated band power method
<input type="checkbox"/>	<input type="checkbox"/> ANSI C63.10	11.9.1.3	PKPM1 Peak power meter method
<input type="checkbox"/>	ANSI C63.10	11.9.2	Maximum conducted (average) output power
<input type="checkbox"/>	<input type="checkbox"/> ANSI C63.10	11.9.2.2	Measurement using a spectrum analyzer (SA)
<input type="checkbox"/>	<input type="checkbox"/> ANSI C63.10	11.9.2.2.2	Method AVGSA-1(Duty cycle ≥98%)
<input type="checkbox"/>	<input type="checkbox"/> ANSI C63.10	11.9.2.2.3	Method AVGSA-1A(Duty cycle ≥98%)
<input type="checkbox"/>	<input type="checkbox"/> ANSI C63.10	11.9.2.2.4	Method AVGSA-2(Duty cycle ≤98%)
<input type="checkbox"/>	<input type="checkbox"/> ANSI C63.10	11.9.2.2.5	Method AVGSA-2A(Duty cycle ≤98%)
<input type="checkbox"/>	<input type="checkbox"/> ANSI C63.10	11.9.2.2.4	Method AVGSA-3
<input type="checkbox"/>	<input type="checkbox"/> ANSI C63.10	11.9.2.2.5	Method AVGSA-3A
<input checked="" type="checkbox"/>	ANSI C63.10	11.9.2.3	Measurement using a power meter (PM)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> ANSI C63.10	11.9.2.3.1	Method AVGPM
<input type="checkbox"/>	<input type="checkbox"/> ANSI C63.10	11.9.2.3.2	Method AVGPM-G

4.2.4 Test Data

Bluetooth Mode

Test Mode	Test Conditions	Frequency (MHz)	Avg Power Conducted (dBm)	EIRP (dBm)	Conducted Power Limit (dBm)	EIRP Limit (dBm)
Mode1	Tnom (25°C)	2402	0.71	3.51	≤ 30	≤ 36
		2441	1.32	4.12	≤ 30	≤ 36
		2480	1.59	4.39	≤ 30	≤ 36
Mode2	Tnom (25°C)	2402	1.19	3.99	≤ 30	≤ 36
		2441	2.03	4.83	≤ 30	≤ 36
		2480	2.23	5.03	≤ 30	≤ 36
Mode3	Tnom (25°C)	2402	0.63	3.43	≤ 30	≤ 36
		2441	1.55	4.35	≤ 30	≤ 36
		2480	1.74	4.54	≤ 30	≤ 36

Note 1: EIRP=Measured power+Antenna gain

Note 2: The antenna gain please refer to clause 1.2

Note 3: This report is published based on RF Module Original Test Report 69743RRF.011. Just change the antenna, the antenna gain is relatively reduced compared to before. These changes have no effect on RF performance. After technical evaluation, no items need to be retested. All test data are taken from the RF module, and the original test report is 69743RRF.011.

5 TEST SETUP PHOTO AND EUT PHOTO

Remark: The test setup photo and EUT Photo please see appendix.

_____ The End _____