RF TEST REPORT

Product Name: Ikko ActiveBuds

Model Name: AB-02

FCC ID: 2AWCQ-AB02-2350-IK1

Issued For : Ikko audio technology (sz) co., LTD

805, 8th Floor, Heungkong Financial Center, Intersection of Linhai Avenue and Xinghai Avenue, Nanshan, Shenzhen, China

Issued By : Shenzhen LGT Test Service Co., Ltd.

Room 205, Building 13, Zone B, Zhenxiong Industrial Park, No.177, Renmin West Road, Jinsha, Kengzi Street, Pingshan District, Shenzhen, Guangdong, China

Report Number:	LGT23K031RF05
Sample Received Date:	Nov. 10, 2023
Date of Test:	Nov. 10, 2023 – Dec. 18, 2023
Date of Issue:	Dec. 18, 2023

The test report is effective only with both signature and specialized stamp. This report shall not be reproduced except in full without the written approval of the Laboratory. The results in this report only apply to the tested sample.

TEST REPORT CERTIFICATION

Applicant:	Ikko audio technology (sz) co., LTD
Address:	805, 8th Floor, Heungkong Financial Center, Intersection of Linhai Avenue and Xinghai Avenue, Nanshan, Shenzhen, China
Manufacturer:	Ikko audio technology (sz) co., LTD
Address:	805, 8th Floor, Heungkong Financial Center, Intersection of Linhai Avenue and Xinghai Avenue, Nanshan, Shenzhen, China
Product Name:	Ikko ActiveBuds
Trademark:	Ikko
Model Name:	AB-02
Sample Status:	Normal

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC Part 15.247, Subpart C ANSI C63.10-2013	PASS

Prepared by:

Zane Shan

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Engineer

Approved by:

Vita Li
Technical Director

SHENZHEN LGT TEST SERVICE CO., LTD. LGT 领冠检测

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Revision History

Rev.	Issue Date	Contents
00	Dec. 18, 2023	Initial Issue

1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:
KDB 558074 D01 15.247 Meas Guidance v05r02.

FCC Part 15.247,Subpart C			
Standard Section	Test Item	Judgment	Remark
15.207	Conducted Emission	PASS	--
15.247 (a)(2)	6dB Bandwidth	PASS	--
15.247 (b)(3)	Output Power	PASS	--
15.209	Radiated Spurious Emission	PASS	--
15.247 (d)	Conducted Spurious & Band Edge Emission	PASS	--
15.247 (e)	Power Spectral Density	PASS	--
15.205	Restricted Band Edge Emission	PASS	--
Part 15.247(d)/ Part 15.209(a)	Band Edge Emission	PASS	--
15.203	Antenna Requirement	PASS	--

NOTE:

(1) 'N/A' denotes test is not applicable in this Test Report.

(2) All tests are according to ANSI C63.10-2013.

1.1 TEST FACTORY

Company Name:	Shenzhen LGT Test Service Co., Ltd.
Address:	Room 205, Building 13, Zone B, Zhenxiong Industrial Park, No.177, Renmin West Road, Jinsha, Kengzi Street, Pingshan District, Shenzhen, Guangdong, China
Accreditation Certificate	A2LA Certificate No.: 6727.01
	FCC Registration No.: 746540
	CAB ID: CN0136

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement **y ± U**, where expended uncertainty **U** is based on a standard uncertainty multiplied by a coverage factor of **k=2**, providing a level of confidence of approximately **95** %.

No.	Item	Uncertainty
1	RF output power, conducted	±0.68dB
2	Unwanted Emissions, conducted	±2.988dB
3	All emissions, radiated 9K-30MHz	±2.84dB
4	All emissions, radiated 30M-1GHz	±4.39dB
5	All emissions, radiated 1G-6GHz	±5.10dB
6	All emissions, radiated>6G	±5.48dB
7	Conducted Emission (9KHz-150KHz)	±2.79dB
8	Conducted Emission (150KHz-30MHz)	±2.80dB
9	Occupied Channel Bandwidth	±3.2 %

Note: The measurement uncertainty is not included in the test result.

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF THE EUT

<table>
<tr><td>Product Name:</td><td>Ikko ActiveBuds</td></tr>
<tr><td>Trademark:</td><td>ikko</td></tr>
<tr><td>Model Name:</td><td>AB-02</td></tr>
<tr><td>Series Model:</td><td>N/A</td></tr>
<tr><td>Model Difference:</td><td>N/A</td></tr>
<tr><td>Product Description:</td><td>
<table>
<tr><td>Operation Frequency:</td><td>802.11b/g/n: 2412~2462 MHz</td></tr>
<tr><td>Modulation Type:</td><td>802.11b(DSSS):CCK,DQPSK,DBPSK
802.11g(OFDM):BPSK,QPSK,16-QAM,64-QAM
802.11n(OFDM):BPSK,QPSK,16-QAM,64-QAM</td></tr>
<tr><td>Number of Channel:</td><td>802.11b/g/n: 11CH</td></tr>
<tr><td>Antenna Designation:</td><td>FPC</td></tr>
<tr><td>Antenna Gain(dBi):</td><td>1.37dBi</td></tr>
</table>
</td></tr>
<tr><td>Channel List:</td><td>Please refer to the Note 3.</td></tr>
<tr><td>Rating:</td><td>Input: DC 5V, 500mA</td></tr>
<tr><td>Battery:</td><td>Capacity: 900mAh
Rated Voltage: 3.7V</td></tr>
<tr><td>Hardware Version:</td><td>E20_MB_V3.0</td></tr>
<tr><td>Software Version:</td><td>DW_8541E_E20E_V30_HXL_AB02_00_GB_FL_4.2V_256X16_G2358_W1258_FDD12357820_TDD3438394041_368X448_202309131903</td></tr>
<tr><td>Connecting I/O Port(s):</td><td>Please refer to the Note 1.</td></tr>
</table>

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User Manual.
2. The antenna information refers to the manufacturer provide report, applicable only to the tested sample identified in the report. Due to the incorrect antenna information, a series of problems such as the accuracy of the test results will be borne by the customer.

3.

Operation Frequency of channel	
802.11b/g/n(20MHz)	
Channel	Frequency
01	2412
02	2417
03	2422
04	2427
05	2432
06	2437
07	2442
08	2447
09	2452
10	2457
11	2462

Note:
In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, themiddle frequency, and the highest frequency of channel were selected to perform the test, and the selectedchannel see below:
Carrier Frequency Channel

2.4GHz Test Frequency:

For 802.11b/g/n (HT20)	
Channel	Freq.(MHz)
01	2412
06	2437
11	2462

2.2 DESCRIPTION OF THE TEST MODES

Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Worst Mode	Description	Data Rate
Mode 1	TX IEEE 802.11b CH1	1 Mbps
Mode 2	TX IEEE 802.11b CH6	1 Mbps
Mode 3	TX IEEE 802.11 b CH11	1 Mbps
Mode 4	TX IEEE 802.11g CH1	6 Mbps
Mode 5	TX IEEE 802.11g CH6	6 Mbps
Mode 6	TX IEEE 802.11g CH11	6 Mbps
Mode 7	TX IEEE 802.11n HT20 CH1	MCS 0
Mode 8	TX IEEE 802.11n HT20 CH6	MCS 0
Mode 9	TX IEEE 802.11n HT20 CH11	MCS 0

Note:

(1) The measurements are performed at all Bit Rate of Transmitter, the worst data was reported.

AC Conducted Emission

Test Case	
AC Conducted Emission	Mode 10: Keeping TX + WLAN Link

2.3 TEST SOFTWARE AND POWER LEVEL

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level.

Test software Version	Test program: 2.4G WIFI	
Engineering Mode	Mode Or Modulation type	Power setting
	b	14
	g	8
	n20	8

2.4 DESCRIPTION OF NECESSARY ACCESSORIES AND SUPPORT UNITS

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level.

Accessories Equipment

Description	Manufacturer	Model	S/N	Rating

Auxiliary Equipment

Description	Manufacturer	Model	S/N	Rating
Laptop	Lenovo	HKF-16	N/A	N/A

Note:

(1) For detachable type I/O cable should be specified the length in cm in『Length』column.

2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

Conducted Emission					
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Cal. Date**	**Cal. Until**
EMI Test Receiver	R&S	ESU8	100372	2023.04.13	2024.04.12
LISN	COM-POWER	LI-115	02032	2023.04.07	2024.04.06
LISN	SCHWARZBECK	NNLK 8122	00160	2023.04.07	2024.04.06
Transient Limiter	CYBERTEK	EM5010A	E2250100049	2023.04.07	2024.04.06
Temperature & Humidity	KTJ	TA218B	N.A	2023.04.24	2024.04.23
Testing Software	EMC-I_V1.4.0.3_SKET				

Radiated Test equipment					
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Cal. Date**	**Cal. Until**
EMI Test Receiver	R&S	ESU8	100372	2023.04.13	2024.04.12
Active loop Antenna	ETS	6502	00049544	2022.06.02	2025.06.01
Spectrum Analyzer	Keysight	N9010B	MY60242508	2023.04.10	2024.04.09
Bilog Antenna(30M-1G)	SCHWARZBECK	VULB 9168	2705	2022.06.05	2025.06.04
Horn Antenna(1-18G)	SCHWARZBECK	3115	10SL0060	2022.06.02	2025.06.01
Horn Antenna(18-40G)	A-INFO	LB-180400-KF	J211060273	2022.06.08	2025.06.07
Pre-amplifier(30M-1G)	EMtrace	RP01A	02019	2023.04.07	2024.04.06
Pre-amplifier(1-26.5G)	Agilent	8449B	3008A4722	2023.04.07	2024.04.06
Pre-amplifier(18-40G)	com-mw	LNPA_18-40-01	18050003	2023.04.07	2024.04.06
Wireless Communications Test Set	R&S	CMW 500	137737	2023.04.13	2024.04.12
Temperature & Humidity	KTJ	TA218B	N.A	2023.04.24	2024.04.23
Testing Software	EMC-I_V1.4.0.3_SKET				

RF Connected Test equipment					
Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Until
Signal Generator	Keysight	N5182B	MY59100717	2023.04.10	2024.04.09
Signal Analyzer	Keysight	N9010B	MY60242508	2023.04.13	2024.04.12
Wireless Communications Test Set	R&S	CMW 500	137737	2023.04.13	2024.04.12
Temperature & Humidity	KTJ	TA218B	N/A	2023.04.24	2024.04.23
Temperature& Humidity test chamber	AISRY	LX-1000L	171200018	2023.05.10	2024.05.09
Attenuator	eastsheep	90db	N/A	2023.04.10	2024.04.09
Testing Software	MTS 8310_2.0.0.0_MWRF-TEST				

3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION LIMITS

The radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table.

FREQUENCY (MHz)	Conducted Emissionlimit (dBuV)	
	Quasi-peak	Average
0.15 -0.5	66 - 56 *	56 - 46 *
0.50 -5.0	56.00	46.00
5.0 -30.0	60.00	50.00

Note:

(1) The tighter limit applies at the band edges.

(2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

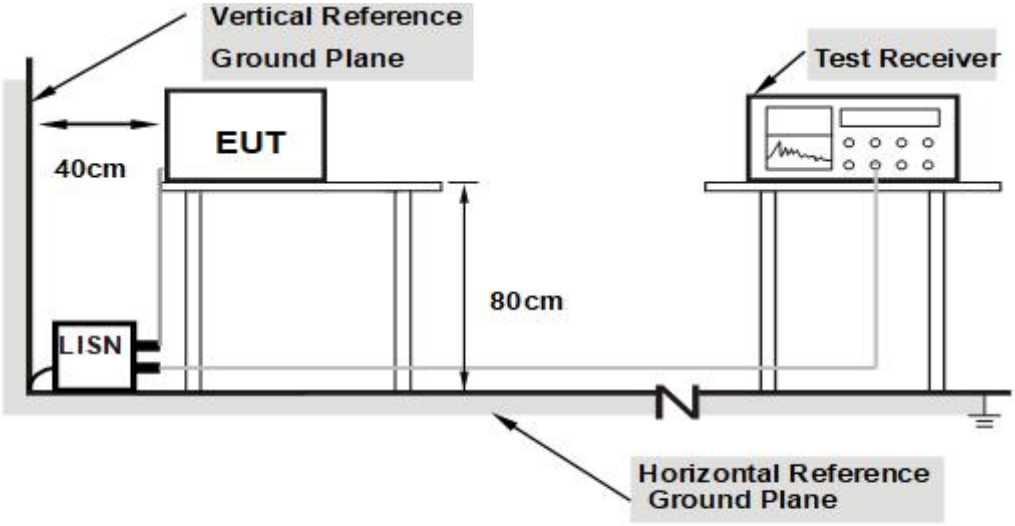
The following table is the setting of the receiver

Receiver Parameters	**Setting**
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

3.1.2 TEST PROCEDURE

a. The EUT is 0.8 m from the horizontal ground plane and 0.4 m from the vertical ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments are powered from additional LISN(s). The LISN provides 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
d. LISN is at least 80 cm from the nearest part of EUT chassis.
e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.1.3 TEST SETUP



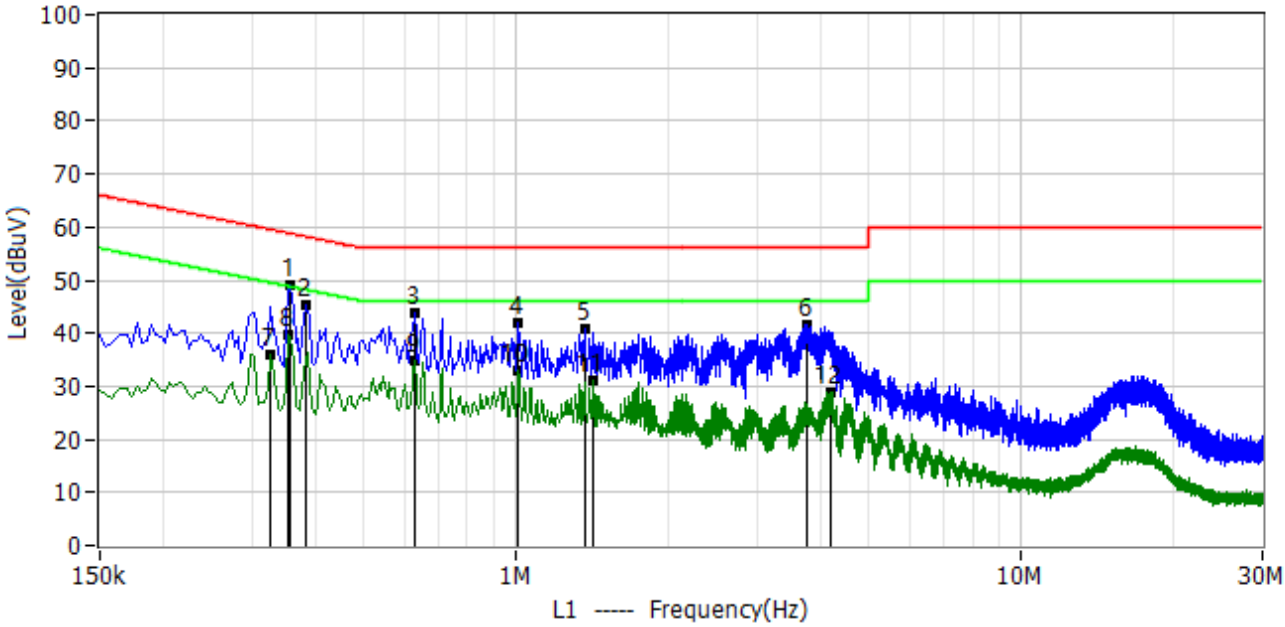
Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes support units.

3.1.4 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

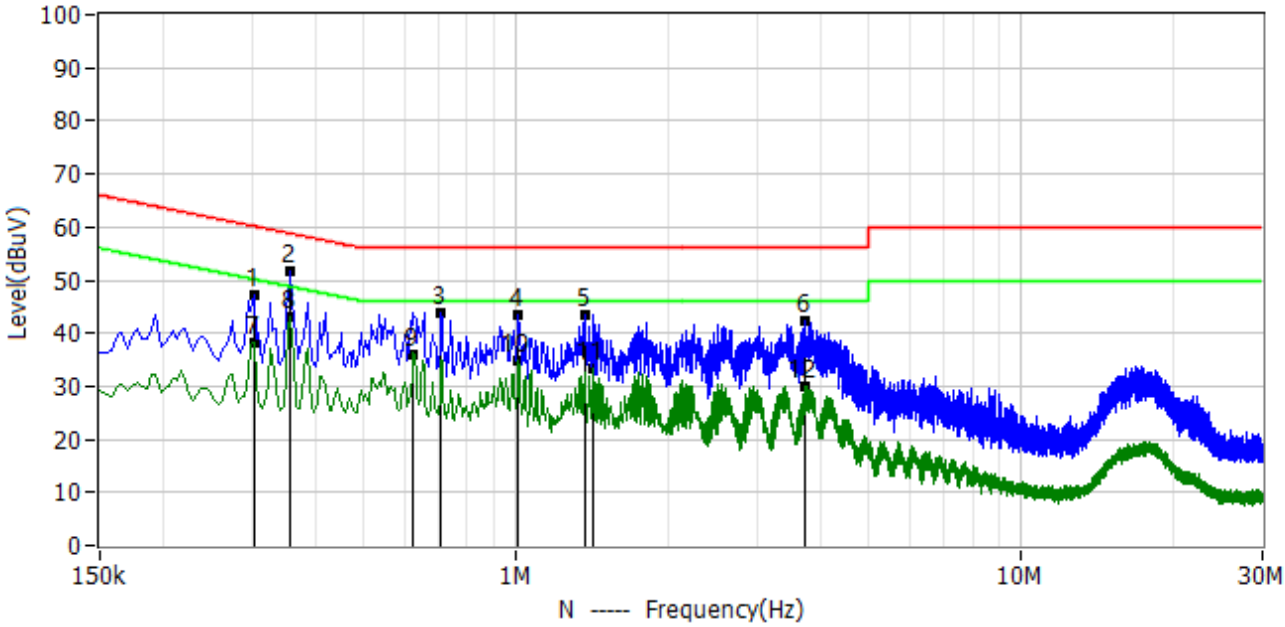
3.1.5 TEST RESULT

Project: LGT23K031	Test Engineer: LiuH
EUT: Ikko ActiveBuds	Temperature: 25.1℃
M/N: AB-02	Humidity: 46%RH
Test Voltage: AC 120V/60Hz	Test Data: 2023-11-13
Test Mode: TX 802.11b 2412	
Note:	



No.	Frequency MHz	Reading dBuV	Factor dB	Level dBuV	Limit dBuV	Margin dB	Detector	Polar
1*	0.358	38.31	10.59	48.90	58.77	-9.88	QP	L1
2*	0.382	34.64	10.59	45.23	58.24	-13.00	QP	L1
3*	0.630	33.12	10.58	43.70	56.00	-12.30	QP	L1
4*	1.010	31.29	10.59	41.88	56.00	-14.12	QP	L1
5*	1.366	30.22	10.65	40.87	56.00	-15.13	QP	L1
6*	3.778	30.96	10.72	41.68	56.00	-14.32	QP	L1
7*	0.326	25.54	10.59	36.13	49.55	-13.42	AV	L1
8*	0.354	29.06	10.59	39.65	48.87	-9.22	AV	L1
9*	0.630	24.20	10.58	34.78	46.00	-11.22	AV	L1
10*	1.010	22.44	10.59	33.03	46.00	-12.97	AV	L1
11*	1.426	20.25	10.66	30.91	46.00	-15.09	AV	L1
12*	4.182	18.28	10.71	28.99	46.00	-17.01	AV	L1

Project: LGT23K031	Test Engineer: LiuH
EUT: Ikko ActiveBuds	Temperature: 25.1℃
M/N: AB-02	Humidity: 46%RH
Test Voltage: AC 120V/60Hz	Test Data: 2023-11-13
Test Mode: TX 802.11b 2412	
Note:	



No.	Frequency MHz	Reading dBuV	Factor dB	Level dBuV	Limit dBuV	Margin dB	Detector	Polar
1*	0.302	36.52	10.59	47.11	60.19	-13.07	QP	N
2*	0.358	41.02	10.59	51.61	58.77	-7.16	QP	N
3*	0.710	33.34	10.58	43.92	56.00	-12.08	QP	N
4*	1.010	32.84	10.59	43.43	56.00	-12.57	QP	N
5*	1.370	32.62	10.65	43.27	56.00	-12.73	QP	N
6*	3.730	31.43	10.72	42.15	56.00	-13.85	QP	N
7*	0.302	27.79	10.59	38.38	50.19	-11.81	AV	N
8*	0.358	32.33	10.59	42.92	48.77	-5.86	AV	N
9*	0.626	25.56	10.58	36.14	46.00	-9.86	AV	N
10*	1.010	24.38	10.59	34.97	46.00	-11.03	AV	N
11*	1.426	22.74	10.66	33.40	46.00	-12.60	AV	N
12*	3.722	19.36	10.72	30.08	46.00	-15.92	AV	N

3.2 RADIATED EMISSION MEASUREMENT

3.2.1 RADIATED EMISSION LIMITS

In any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the Restricted band specified on Part15.205(a)&209(a) limit in the table and according to ANSI C63.10-2013 below has to be followed.

LIMITS OF RADIATED EMISSION MEASUREMENT (0.009MHz - 1000MHz)

Frequencies (MHz)	Field Strength (micorvolts/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

LIMITS OF RADIATED EMISSION MEASUREMENT (1000MHz-25GHz)

FREQUENCY (MHz)	(dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

Notes:

(1) The limit for radiated test was performed according to FCC PART 15C.

(2) The tighter limit applies at the band edges.

(3) Emission level (dBuV/m)=20log Emission level (uV/m).

LIMITS OF RESTRICTED FREQUENCY BANDS

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
8.41425-8.41475	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	Above 38.6
13.36-13.41			

For Radiated Emission

Spectrum Parameter	Setting
Attenuation	Auto
Detector	Peak/QP/AV
Start Frequency	9 KHz/150KHz(Peak/QP/AV)
Stop Frequency	150KHz/30MHz(Peak/QP/AV)
RB / VB (emission in restricted band)	200Hz (From 9kHz to 0.15MHz)/ 9KHz (From 0.15MHz to 30MHz); 200Hz (From 9kHz to 0.15MHz)/ 9KHz (From 0.15MHz to 30MHz)

Spectrum Parameter	Setting
Attenuation	Auto
Detector	Peak/QP
Start Frequency	30 MHz(Peak/QP)
Stop Frequency	1000 MHz (Peak/QP)
RB / VB (emission in restricted band)	120 KHz / 300 KHz

Spectrum Parameter	Setting
Attenuation	Auto
Detector	Peak
Start Frequency	1000 MHz(Peak/AV)
Stop Frequency	10th carrier hamonic(Peak/AV)
RB / VB (emission in restricted band)	1 MHz / 3 MHz(Peak) 1 MHz/1/T MHz(AVG)

For Restricted band

Spectrum Parameter	Setting
Detector	Peak
Start/Stop Frequency	Lower Band Edge: 2310 to 2430 MHz Upper Band Edge: 2445 to 2500 MHz
RB / VB	1 MHz / 3 MHz(Peak) 1 MHz/1/T MHz(AVG)

Receiver Parameter	**Setting**
Start ~ Stop Frequency	9kHz~90kHz / RB 200Hz for PK & AV
Start ~ Stop Frequency	90kHz~110kHz / RB 200Hz for QP
Start ~ Stop Frequency	110kHz~490kHz / RB 200Hz for PK & AV
Start ~ Stop Frequency	490kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

3.2.2 TEST PROCEDURE

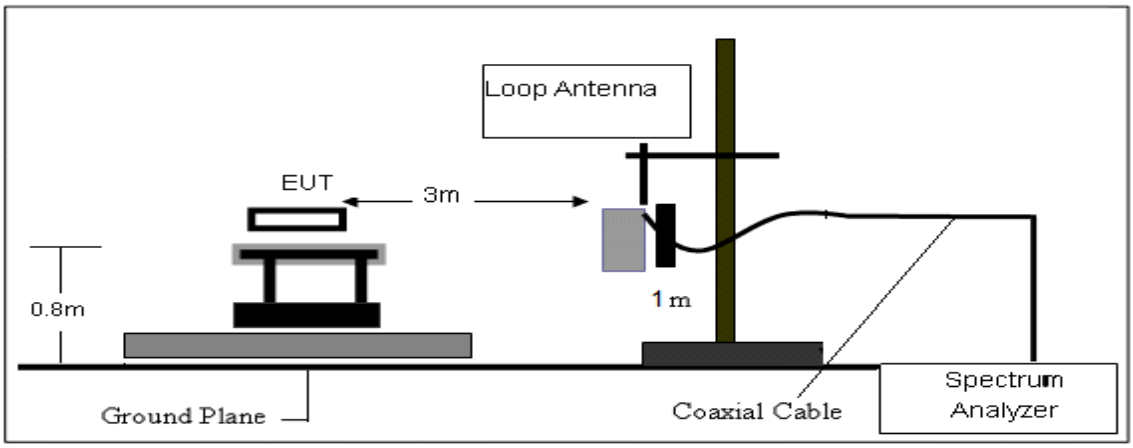
a. The measuring distance at 3 m shall be used for measurements at frequency 0.009MHz up to 1GHz, and above 1GHz.
b. The EUT was placed on the top of a rotating table 0.8 m (above 1GHz is 1.5 m) above the ground at a 3 m anechoic chamber test site. The table was rotated 360 degree to determine the position of the highest radiation.
c. The height of the equipment shall be 0.8 m (above 1GHz is 1.5 m); the height of the test antenna shall vary between 1 m to 4 m. Horizontal and vertical polarization of the antenna are set to make the measurement.
d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and QuasiPeak detector mode will be re-measured.
e. If the Peak Mode measured value is compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and no additional QP Mode measurement was performed.
f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

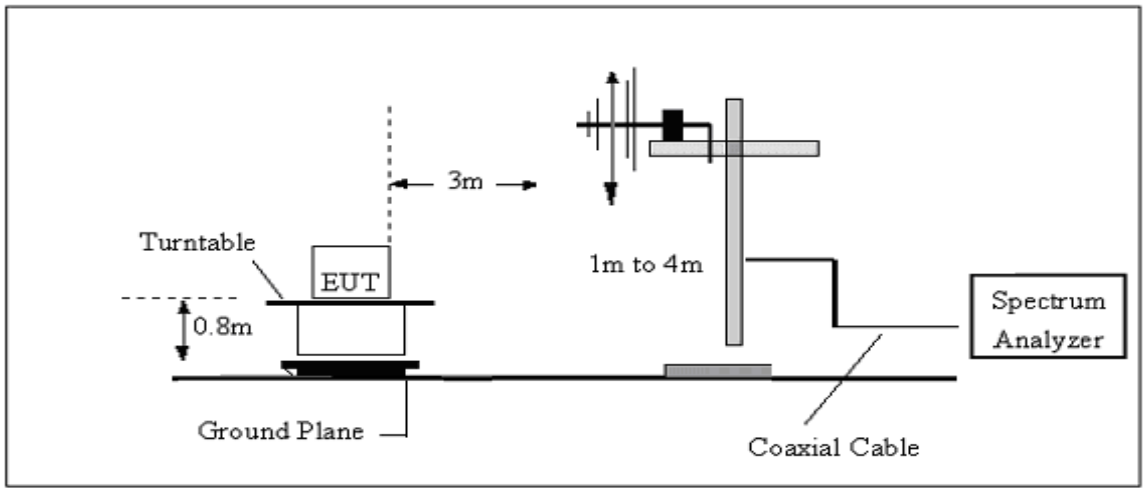
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported.

3.2.3 TEST SETUP

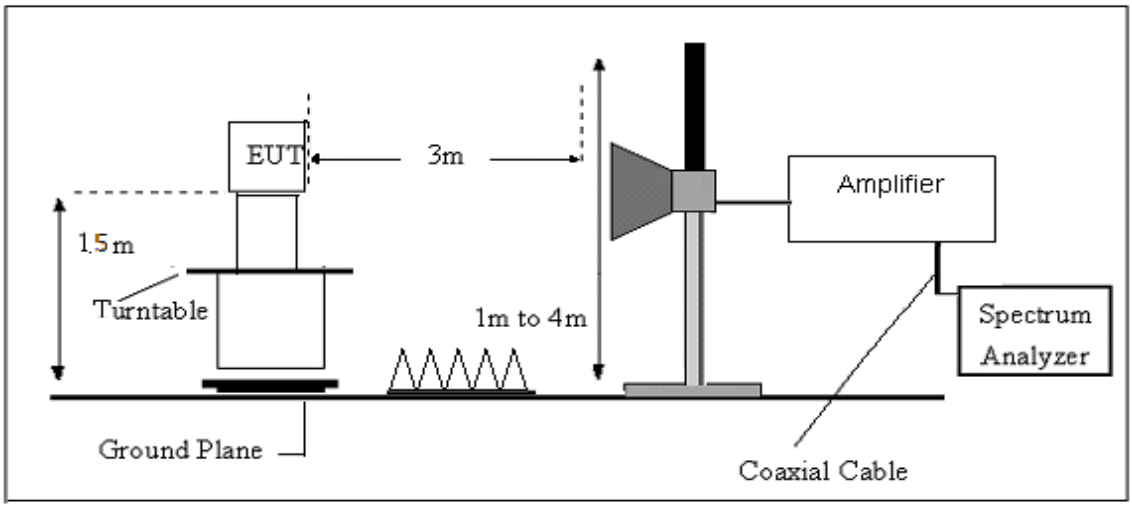
(A) Radiated Emission Test-Up Frequency Below 30MHz



(B) Radiated Emission Test-Up Frequency 30MHz~1GHz



(C) Radiated Emission Test-Up Frequency Above 1GHz



3.2.4 EUT OPERATING CONDITIONS

Please refer to section 3.1.4 of this report.

3.2.5 FIELD STRENGTH CALCULATION

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting theAmplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL - AG

Where

FS = Field Strength

CL = Cable Attenuation Factor (Cable Loss)

RA = Reading Amplitude

AG = Amplifier Gain

AF = Antenna Factor

For example

Frequency	FS	RA	AF	CL	AG	Factor
(MHz)	(dBμV/m)	(dBμV/m)	(dB)	(dB)	(dB)	(dB)
300	40	58.1	12.2	1.6	31.9	-18.1

Factor=AF+CL-AG

3.2.6 TEST RESULT

Results of Radiated Emissions (9 KHz~30MHz)

No.	Frequency	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Detector	Remark
1*	-	-	-	-	-	-	-	See Note

Note:

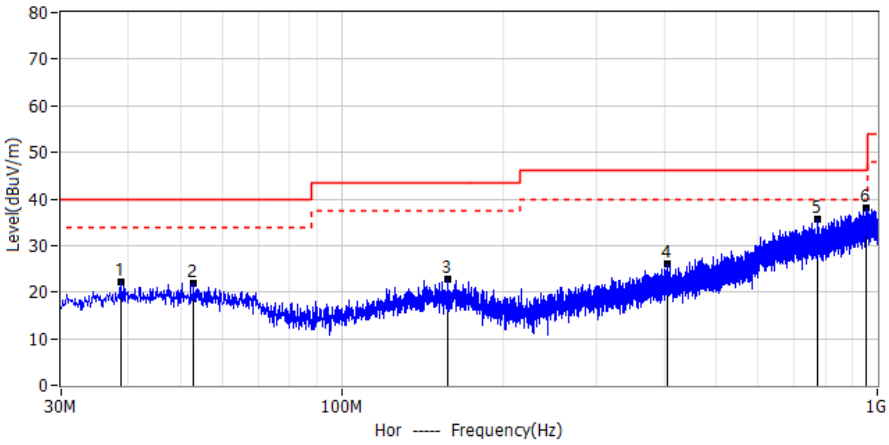
The emission from 9 kHz to 30MHz was pre-tested and found the result was 20dB lower than the limit, and the permissible value has no need to be reported.

Distance extrapolation factor = 40 log (specific distance / test distance) (dB);

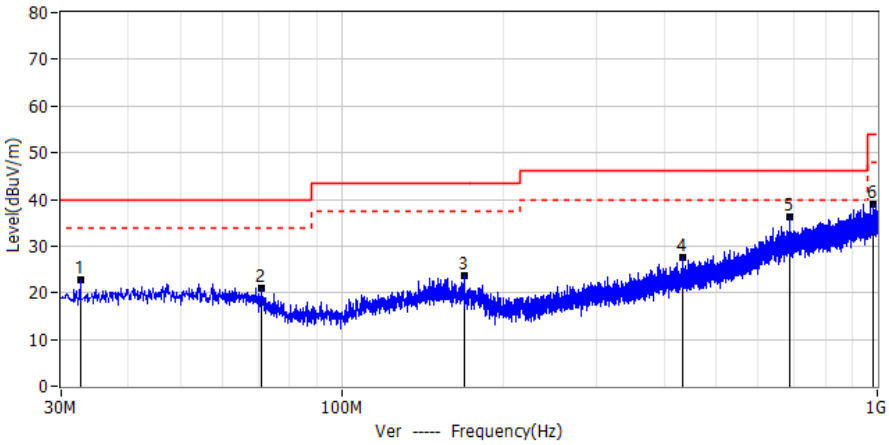
Limit line = specific limits (dBuV) + distance extrapolation factor.

Results of Radiated Emissions (30MHz~1000MHz)

Project: LGT23K031	Test Engineer: Xiangdong Ma
EUT: Ikko ActiveBuds	Temperature: 28.6℃
M/N: AB-02	Humidity: 50%RH
Test Voltage: Battery	Test Data: 2023-11-13
Test Mode: TX 802.11b 2412	
Note:	



No.	Frequency MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Detector	Polar
1*	38.730	3.04	19.17	22.21	40.00	-17.79	QP	Hor
2*	53.038	2.85	19.14	21.99	40.00	-18.01	QP	Hor
3*	157.434	2.75	19.88	22.63	43.50	-20.87	QP	Hor
4*	406.360	3.07	22.94	26.01	46.00	-19.99	QP	Hor
5*	773.384	4.83	30.83	35.66	46.00	-10.34	QP	Hor
6*	951.015	4.14	33.98	38.12	46.00	-7.88	QP	Hor

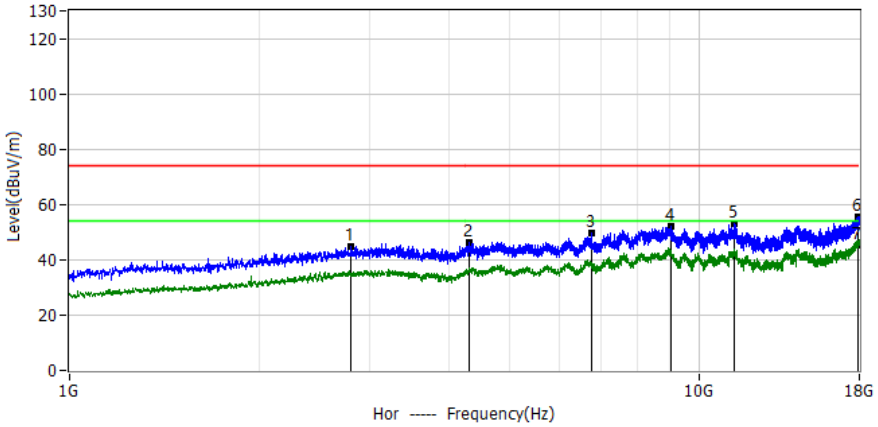


No.	Frequency MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Detector	Polar
1*	32.546	4.26	18.37	22.63	40.00	-17.37	QP	Ver
2*	71.104	3.35	17.71	21.06	40.00	-18.94	QP	Ver
3*	169.801	3.96	19.79	23.75	43.50	-19.75	QP	Ver
4*	433.884	4.00	23.42	27.42	46.00	-18.58	QP	Ver
5*	687.539	6.46	29.69	36.15	46.00	-9.85	QP	Ver
6*	985.086	4.39	34.50	38.89	54.00	-15.11	QP	Ver

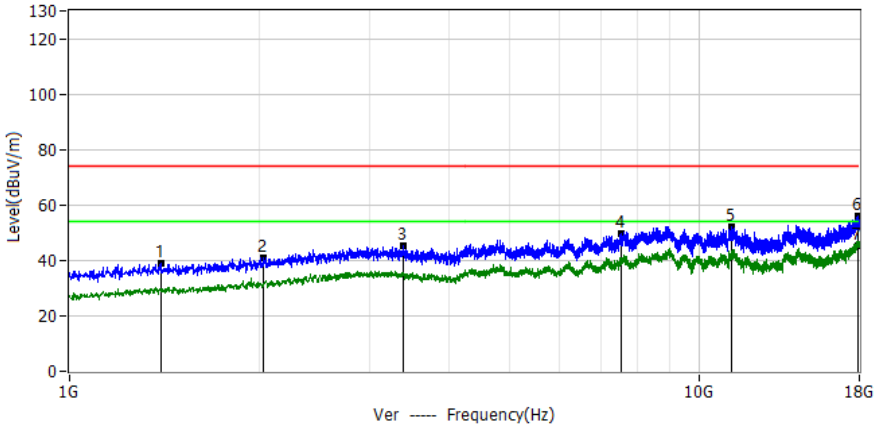
Results of Radiated Emissions (Above 1000MHz)

Note: All the modes have been tested, found worst case at IEEE 802.11n40, recorded the worst case results in this report.

Project: LGT23K031	Test Engineer: Xiangdong Ma
EUT: Ikko ActiveBuds	Temperature: 22.7℃
M/N: AB-02	Humidity: 37%RH
Test Voltage: Battery	Test Data: 2023-11-19
Test Mode: 802.11b 2412	
Note: Worst Case	

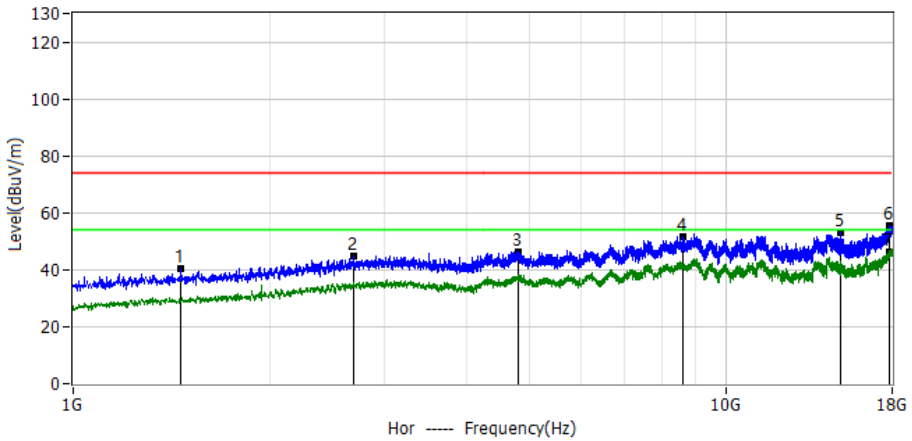


No.	Frequency MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Detector	Polar
1*	2795.6000	54.29	-9.42	44.87	74.00	-29.13	PK	Hor
2*	4312.9000	53.03	-6.55	46.48	74.00	-27.52	PK	Hor
3*	6763.0000	55.73	-6.10	49.63	74.00	-24.37	PK	Hor
4*	9013.4000	53.09	-1.17	51.92	74.00	-22.08	PK	Hor
5*	11389.1000	51.11	1.86	52.97	74.00	-21.03	PK	Hor
6*	17946.9000	46.86	8.48	55.34	74.00	-18.66	PK	Hor
7*	17946.9000	36.82	8.48	45.30	54.00	-8.70	AV	Hor

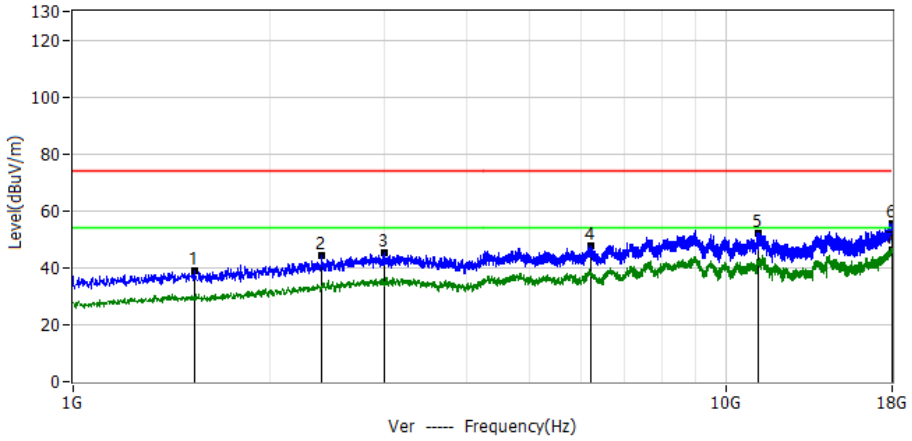


No.	Frequency MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Detector	Polar
1*	1395.2000	60.19	-21.42	38.77	74.00	-35.23	PK	Ver
2*	2034.9000	56.97	-15.86	41.11	74.00	-32.89	PK	Ver
3*	3397.0000	53.94	-8.47	45.47	74.00	-28.53	PK	Ver
4*	7534.4000	53.90	-4.27	49.63	74.00	-24.37	PK	Ver
5*	11278.6000	50.49	1.79	52.28	74.00	-21.72	PK	Ver
6*	17908.6000	47.42	8.46	55.88	74.00	-18.12	PK	Ver
7*	17908.6000	37.04	8.46	45.50	54.00	-8.50	AV	Ver

Project: LGT23K031	Test Engineer: Xiangdong Ma
EUT: Ikko ActiveBuds	Temperature: 22.7℃
M/N: AB-02	Humidity: 37%RH
Test Voltage: Battery	Test Data: 2023-11-19
Test Mode: 802.11b 2437	
Note: Worst Case	

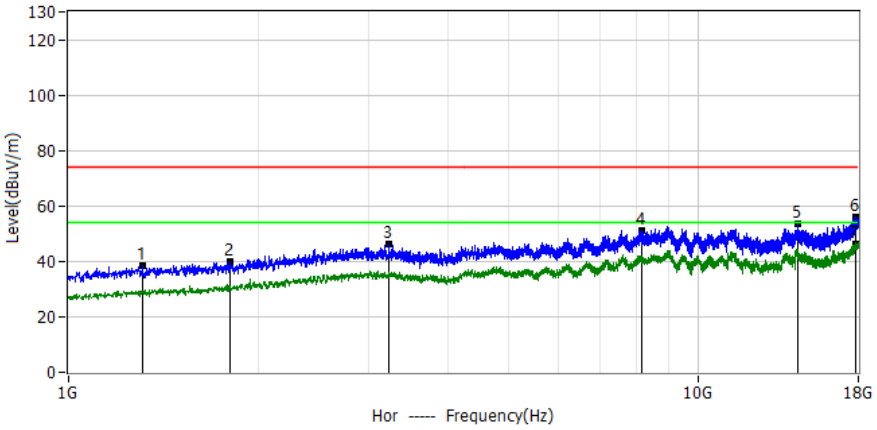


No.	Frequency MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Detector	Polar
1*	1463.2000	61.55	-21.04	40.51	74.00	-33.49	PK	Hor
2*	2689.4000	54.71	-9.98	44.73	74.00	-29.27	PK	Hor
3*	4808.0000	52.18	-5.99	46.19	74.00	-27.81	PK	Hor
4*	8618.1000	53.81	-2.25	51.56	74.00	-22.44	PK	Hor
5*	14984.6000	46.95	5.96	52.91	74.00	-21.09	PK	Hor
6*	17851.2000	47.27	8.42	55.69	74.00	-18.31	PK	Hor
7*	17851.2000	37.68	8.42	46.10	54.00	-7.90	AV	Hor

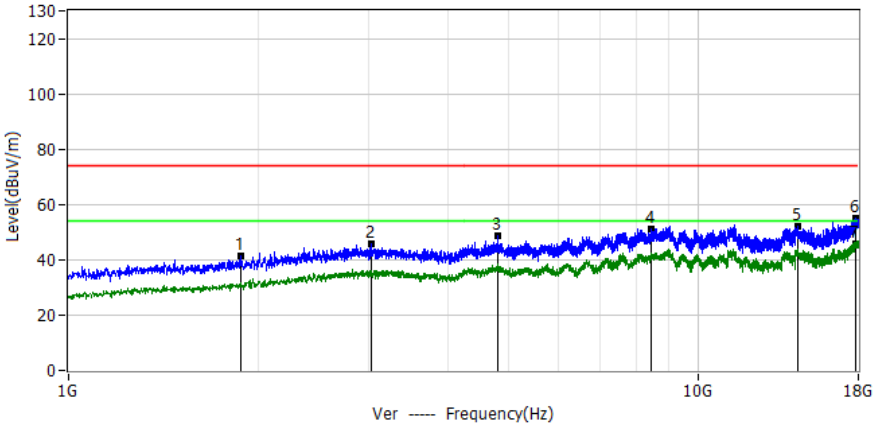


No.	Frequency MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Detector	Polar
1*	1537.6000	59.31	-20.59	38.72	74.00	-35.28	PK	Ver
2*	2402.5000	56.22	-12.01	44.21	74.00	-29.79	PK	Ver
3*	2995.4000	53.59	-8.36	45.23	74.00	-28.77	PK	Ver
4*	6223.2000	54.81	-7.10	47.71	74.00	-26.29	PK	Ver
5*	11225.5000	50.55	1.76	52.31	74.00	-21.69	PK	Ver
6*	17995.7000	46.98	8.52	55.50	74.00	-18.50	PK	Ver
7*	17995.7000	37.78	8.52	46.30	54.00	-7.70	AV	Ver

Project: LGT23K031	Test Engineer: Xiangdong Ma
EUT: Ikko ActiveBuds	Temperature: 22.7℃
M/N: AB-02	Humidity: 37%RH
Test Voltage: Battery	Test Data: 2023-11-19
Test Mode: 802.11b 2462	
Note: Worst Case	



No.	Frequency MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Detector	Polar
1*	1310.2000	60.71	-22.09	38.62	74.00	-35.38	PK	Hor
2*	1807.5000	57.91	-18.18	39.73	74.00	-34.27	PK	Hor
3*	3224.9000	54.57	-8.41	46.16	74.00	-27.84	PK	Hor
4*	8133.6000	54.85	-3.62	51.23	74.00	-22.77	PK	Hor
5*	14427.9000	47.62	5.91	53.53	74.00	-20.47	PK	Hor
6*	17847.0000	47.48	8.41	55.89	74.00	-18.11	PK	Hor
7*	17847.0000	37.69	8.41	46.10	54.00	-7.90	AV	Hor



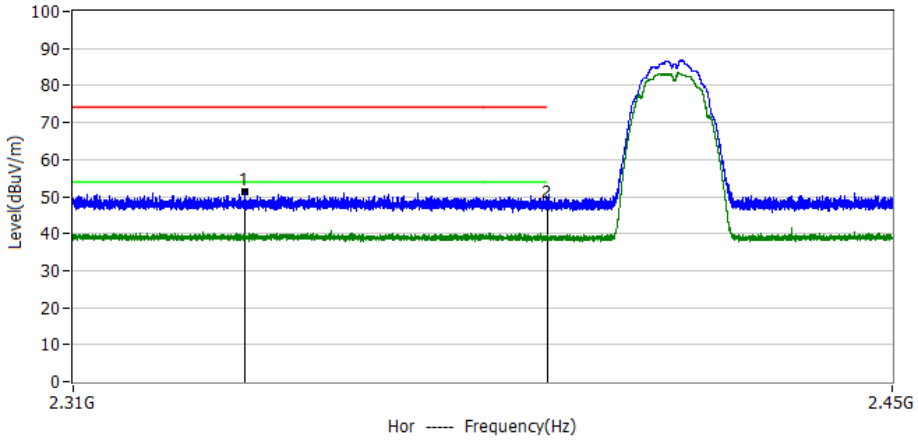
No.	Frequency MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Detector	Polar
1*	1875.5000	58.82	-17.49	41.33	74.00	-32.67	PK	Ver
2*	3020.9000	54.17	-8.35	45.82	74.00	-28.18	PK	Ver
3*	4803.7000	54.53	-5.99	48.54	74.00	-25.46	PK	Ver
4*	8431.1000	53.99	-2.78	51.21	74.00	-22.79	PK	Ver
5*	14410.9000	45.96	5.91	51.87	74.00	-22.13	PK	Ver
6*	17855.5000	46.61	8.42	55.03	74.00	-18.97	PK	Ver
7*	17855.5000	37.38	8.42	45.80	54.00	-8.20	AV	Ver

Remark:
In frequency ranges 18~25GHz no any other harmonic emissions detected which are tested to compliance with the limit. No recording in the test report. No any other emissions level which are attenuated less than 20dB below the limit. No recording in the test report.
Average measurement was not performed if peak level lower than average limit. No any other emissions level which are attenuated less than 20dB below the limit. The amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators which are attenuated more than 20 dB below the permissible value need not be reported unless specifically required elsewhere in this Part. Hence there no other emissions have been reported.

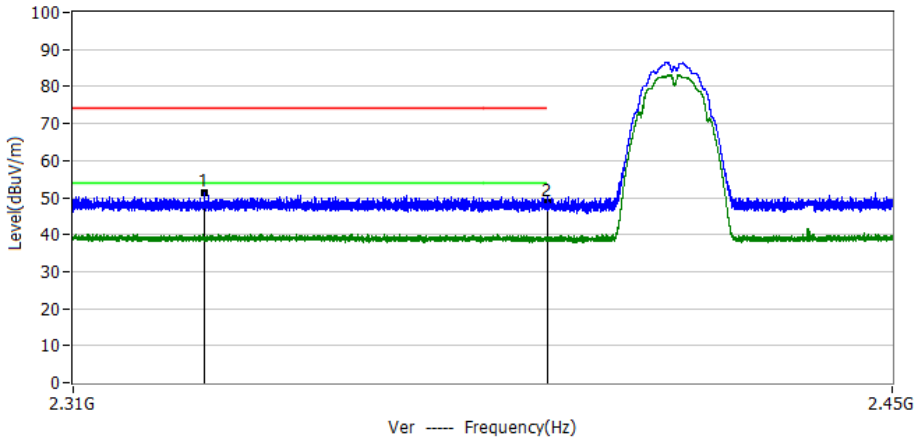
3.2.7 TEST RESULTS(Band edge Requirements)

Note: All the modes have been tested, found worst case at IEEE 802.11n40, recorded the worst case results in this report.

Project: LGT23K031	Test Engineer: Xiangdong Ma
EUT: Ikko ActiveBuds	Temperature: 22.7℃
M/N: AB-02	Humidity: 37%RH
Test Voltage: Battery	Test Data: 2023-11-19
Test Mode: 802.11b 2412	
Note:	

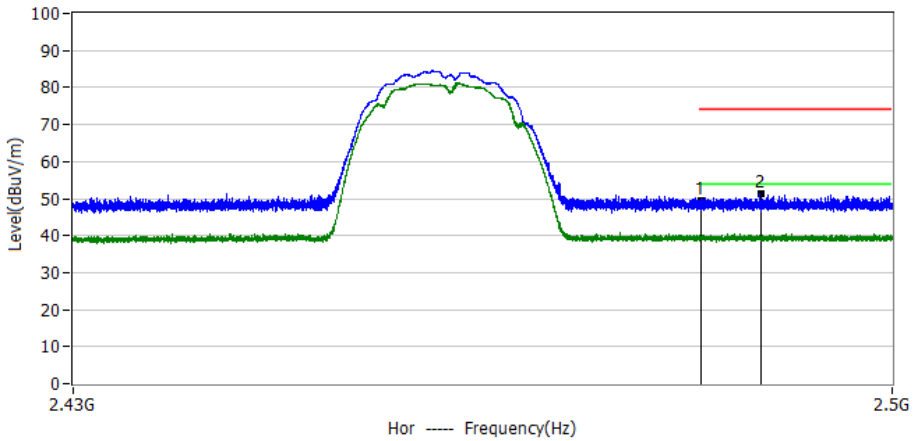


No.	Frequency	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Detector	Polar
1*	2.3386GHz	17.19	34.07	51.26	74.00	-22.74	PK	Hor
2*	2.3900GHz	14.15	33.95	48.10	74.00	-25.90	PK	Hor

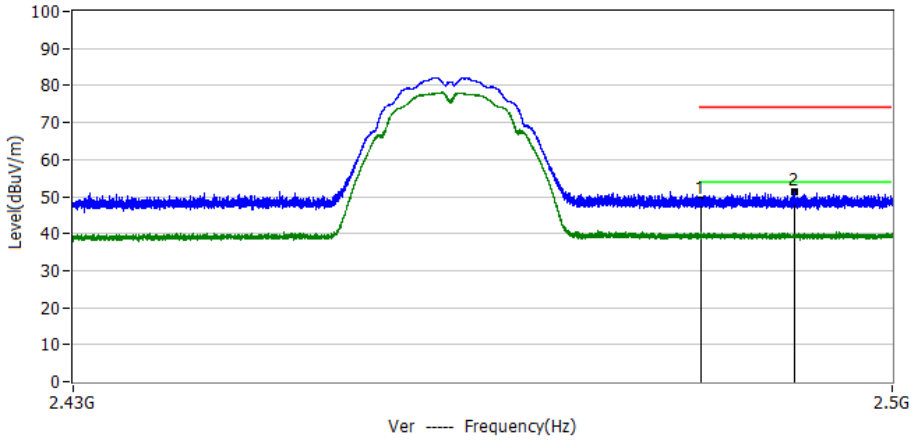


No.	Frequency	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Detector	Polar
1*	2.3319GHz	17.15	34.09	51.24	74.00	-22.76	PK	Ver
2*	2.3900GHz	14.65	33.95	48.60	74.00	-25.40	PK	Ver

Project: LGT23K031	Test Engineer: Xiangdong Ma
EUT: Ikko ActiveBuds	Temperature: 22.7℃
M/N: AB-02	Humidity: 37%RH
Test Voltage: Battery	Test Data: 2023-11-19
Test Mode: 802.11b 2462	
Note:	



No.	Frequency	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Detector	Polar
1*	2.4835GHz	15.17	34.13	49.30	74.00	-24.70	PK	Hor
2*	2.4886GHz	17.34	34.14	51.48	74.00	-22.52	PK	Hor



No.	Frequency	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Detector	Polar
1*	2.4835GHz	15.07	34.13	49.20	74.00	-24.80	PK	Ver
2*	2.4916GHz	17.29	34.15	51.44	74.00	-22.56	PK	Ver

Remark:
Average measurement was not performed if peak level lower than average limit. No any other emissions level which are attenuated less than 20dB below the limit. The amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators which are attenuated more than 20 dB below the permissible value need not be reported unless specifically required elsewhere in this Part. Hence there no other emissions have been reported.

4. CONDUCTED SPURIOUS & BAND EDGE EMISSION

4.1 LIMIT

According to FCC section 15.247(d), in any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

4.2 TEST PROCEDURE

Spectrum Parameter	Setting
Detector	Peak
Start/Stop Frequency	30 MHz to 10th carrier harmonic
RB / VB (emission in restricted band)	100 KHz/300 KHz
Trace-Mode:	Max hold

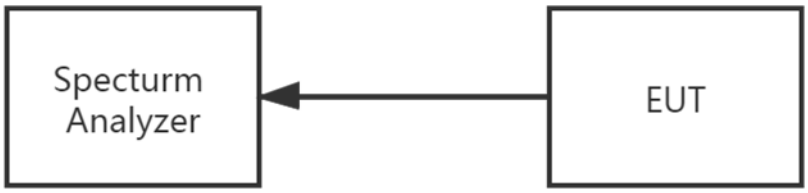
For Band edge

Spectrum Parameter	Setting
Detector	Peak
Start/Stop Frequency	Lower Band Edge: 2300 to 2432 MHz Upper Band Edge: 2442 to 2500 MHz
RB / VB (emission in restricted band)	100 KHz/300 KHz
Trace-Mode:	Max hold

4.3 DEVIATION FROM STANDARD

No deviation.

4.4 TEST SETUP



The EUT is connected to the Spectrum Analyzer; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading.
Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. In order to make an accurate measurement, set the span greater than RBW.

4.5 EUT OPERATION CONDITIONS

Please refer to section 3.1.4 of this report.

4.6 TEST RESULTS

For the measurement records, refer to the appendix I.

5. POWER SPECTRAL DENSITY TEST

5.1 LIMIT

FCC Part15.247 , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(e)	Power Spectral Density	≤8 dBm (RBW ≥3KHz)	2400-2483.5	PASS

5.2 TEST PROCEDURE

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS channel bandwidth.
3. Set the 100 kHz ≥ RBW ≥3 kHz.
4. Set the VBW ≥ 3 x RBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

5.3 DEVIATION FROM STANDARD

No deviation.

5.4 TEST SETUP

5.5 EUT OPERATION CONDITIONS

Please refer to section 3.1.4 of this report.

5.6 TEST RESULTS

For the measurement records, refer to the appendix I.

6. BANDWIDTH TEST

6.1 LIMIT

FCC Part15.247,Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(a)(2)	Bandwidth	≥500KHz (6dB bandwidth)	2400-2483.5	PASS

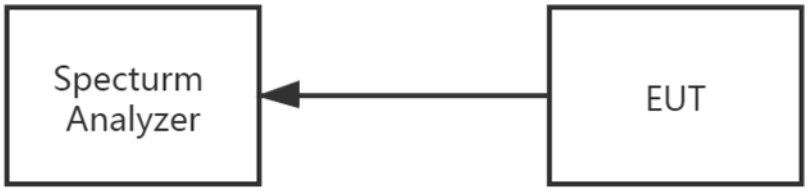
6.2 TEST PROCEDURE

The automatic bandwidth measurement capability of an instrument may be employed using the X dB bandwidth mode with X set to 6 dB, if the functionality described above (i.e., RBW = 100 kHz, VBW≥3RBW, peak detector with maximum hold) is implemented by the instrumentation function. When using this capability, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be≥6 dB.

6.3 DEVIATION FROM STANDARD

No deviation.

6.4 TEST SETUP



6.5 EUT OPERATION CONDITIONS

Please refer to section 3.1.4 of this report.

6.6 TEST RESULTS

For the measurement records, refer to the appendix I.

7. PEAK OUTPUT POWER TEST

7.1 LIMIT

FCC Part15.247,Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(b)(3)	Output Power	1 watt or 30dBm	2400-2483.5	PASS

7.2 TEST PROCEDURE

One of the following procedures may be used to determine the maximum peak conducted output power of a DTS EUT.

RBW ≥ DTS bandwidth

The following procedure shall be used when an instrument with a resolution bandwidth that is greater than the DTS bandwidth is available to perform the measurement:

a) Set the RBW ≥ DTS bandwidth.
b) Set VBW ≥ [3 × RBW].
c) Set span ≥ [3 × RBW].
d) Sweep time = auto couple.
e) Detector = peak.
f) Trace mode = max hold.
g) Allow trace to fully stabilize.
h) Use peak marker function to determine the peak amplitude level.

Integrated band power method:

The following procedure can be used when the maximum available RBW of the instrument is less than the

DTS bandwidth:

a) Set the RBW = 1 MHz.
b) Set the VBW ≥ [3 × RBW].
c) Set the span ≥ [1.5 × DTS bandwidth].
d) Detector = peak.
e) Sweep time = auto couple.
f) Trace mode = max hold.
g) Allow trace to fully stabilize.
h) Use the instrument's band/channel power measurement function with the band limits set equal to the DTS bandwidth edges (for some instruments, this may require a manual override to select the peak detector). If the instrument does not have a band power function, then sum the spectrum levels (in linear power units) at intervals equal to the RBW extending across the DTS channel bandwidth.

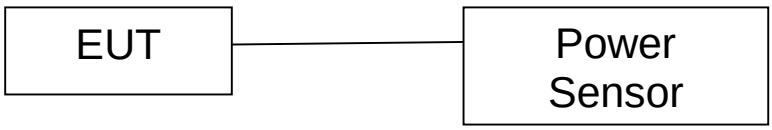
PKPM1 Peak power meter method:

The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall use a fast-responding diode detector.

7.3 DEVIATION FROM STANDARD

No deviation.

7.4 TEST SETUP



7.5 EUT OPERATION CONDITIONS

Please refer to section 3.1.4 of this report.

7.6 TEST RESULTS

For the measurement records, refer to the appendix I.

8. ANTENNA REQUIREMENT

8.1 STANDARD REQUIREMENT

15.203 requirement: For intentional device, according to 15.203: an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible partyshall be used with the device.

8.2 EUT ANTENNA

The EUT antenna is FPC Antenna. It comply with the standard requirement.

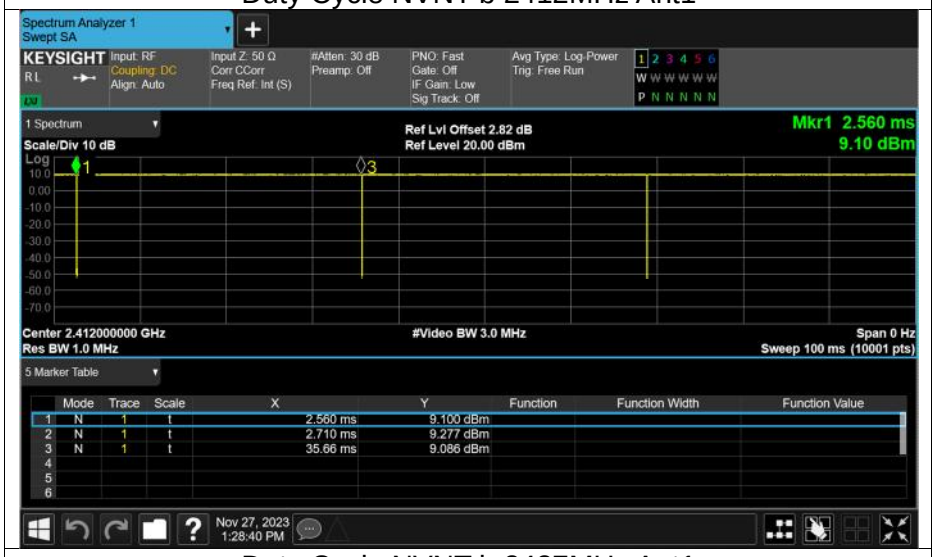
APPENDIX I - TEST RESULTS

Duty Cycle

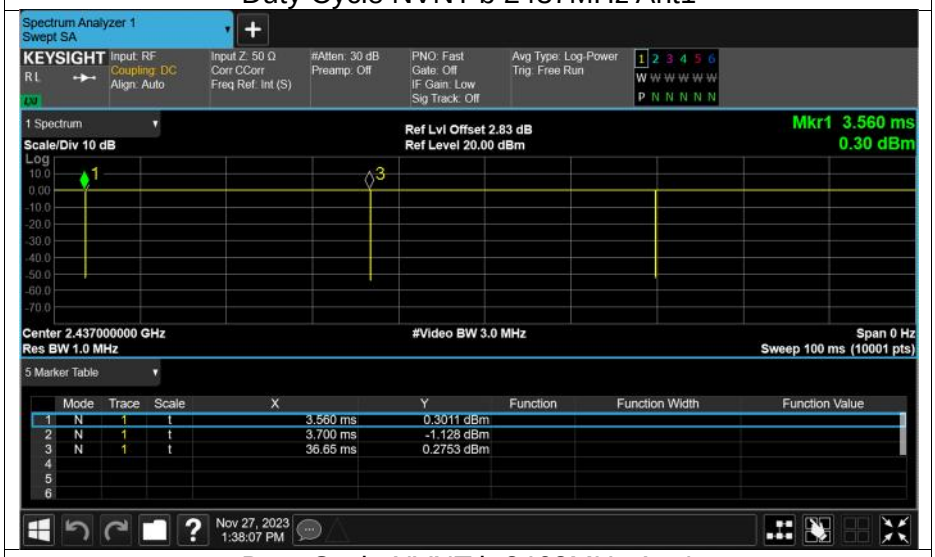
Condition	Mode	Frequency (MHz)	Antenna	Duty Cycle (%)	Correction Factor (dB)	1/T (kHz)
NVNT	b	2412	Ant1	99.55	0	0.03
NVNT	b	2437	Ant1	99.58	0	0.03
NVNT	b	2462	Ant1	99.58	0	0.03
NVNT	g	2412	Ant1	99.28	0	0.18
NVNT	g	2437	Ant1	99.28	0	0.18
NVNT	g	2462	Ant1	99.46	0	0.18
NVNT	n20	2412	Ant1	94.29	0.26	1.83
NVNT	n20	2437	Ant1	94.29	0.26	1.83
NVNT	n20	2462	Ant1	94.13	0.26	1.83

Test Graphs

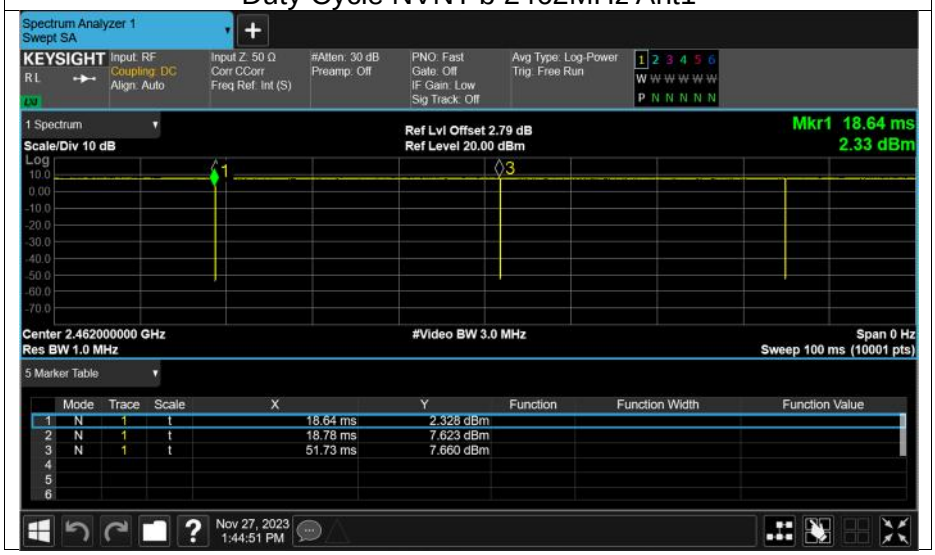
Duty Cycle NVNT b 2412MHz Ant1



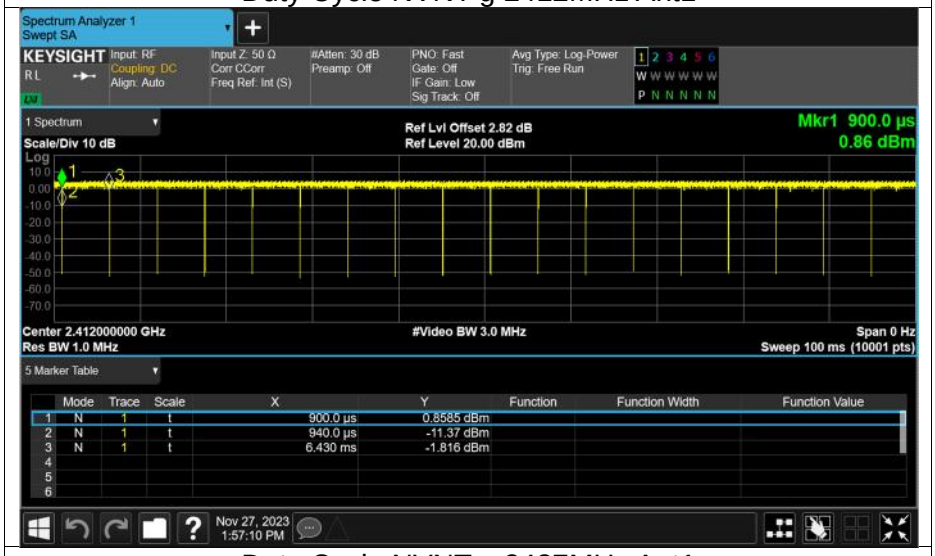
Duty Cycle NVNT b 2437MHz Ant1



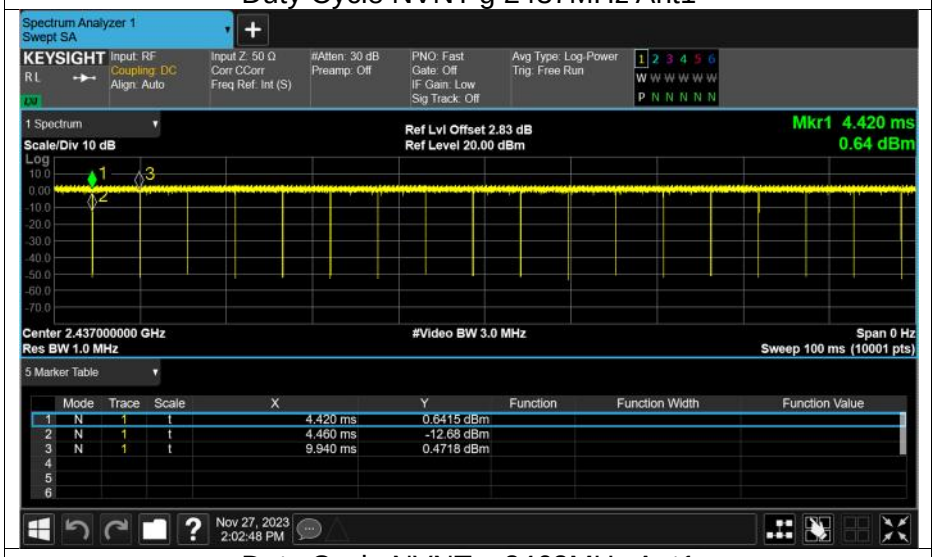
Duty Cycle NVNT b 2462MHz Ant1



Duty Cycle NVNT g 2412MHz Ant1



Duty Cycle NVNT g 2437MHz Ant1



Duty Cycle NVNT g 2462MHz Ant1

Duty Cycle NVNT n20 2412MHz Ant1

Duty Cycle NVNT n20 2437MHz Ant1

Duty Cycle NVNT n20 2462MHz Ant1

Maximum Peak Conducted Output Power

Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	b	2412	Ant1	16.15	30	Pass
NVNT	b	2437	Ant1	15.03	30	Pass
NVNT	b	2462	Ant1	14.96	30	Pass
NVNT	g	2412	Ant1	14.05	30	Pass
NVNT	g	2437	Ant1	13.38	30	Pass
NVNT	g	2462	Ant1	13.59	30	Pass
NVNT	n20	2412	Ant1	11.9	30	Pass
NVNT	n20	2437	Ant1	12.36	30	Pass
NVNT	n20	2462	Ant1	11.11	30	Pass

-6dB Bandwidth

Condition	Mode	Frequency (MHz)	Antenna	-6 dB Bandwidth (MHz)	Limit -6 dB Bandwidth (MHz)	Verdict
NVNT	b	2412	Ant1	8.594	0.5	Pass
NVNT	b	2437	Ant1	9.098	0.5	Pass
NVNT	b	2462	Ant1	9.091	0.5	Pass
NVNT	g	2412	Ant1	16.402	0.5	Pass
NVNT	g	2437	Ant1	16.456	0.5	Pass
NVNT	g	2462	Ant1	16.442	0.5	Pass
NVNT	n20	2412	Ant1	16.899	0.5	Pass
NVNT	n20	2437	Ant1	17.634	0.5	Pass
NVNT	n20	2462	Ant1	17.653	0.5	Pass

Test Graphs

-6dB Bandwidth NVNT b 2412MHz Ant1

-6dB Bandwidth NVNT b 2437MHz Ant1

-6dB Bandwidth NVNT b 2462MHz Ant1

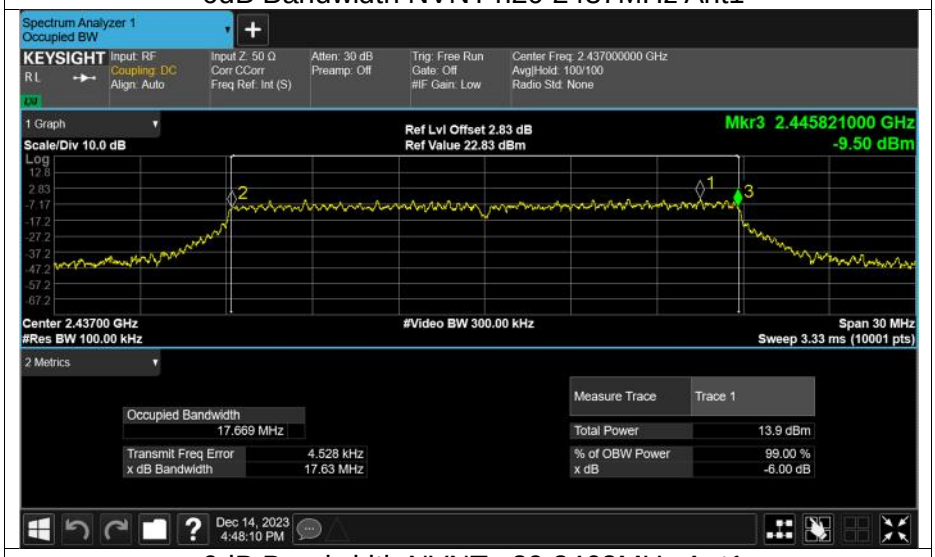
-6dB Bandwidth NVNT g 2412MHz Ant1

-6dB Bandwidth NVNT g 2437MHz Ant1

-6dB Bandwidth NVNT g 2462MHz Ant1

-6dB Bandwidth NVNT n20 2412MHz Ant1

-6dB Bandwidth NVNT n20 2437MHz Ant1



-6dB Bandwidth NVNT n20 2462MHz Ant1

Occupied Channel Bandwidth

Condition	Mode	Frequency (MHz)	Antenna	99% OBW (MHz)
NVNT	b	2412	Ant1	11.307
NVNT	b	2437	Ant1	11.968
NVNT	b	2462	Ant1	12.115
NVNT	g	2412	Ant1	16.613
NVNT	g	2437	Ant1	16.811
NVNT	g	2462	Ant1	16.889
NVNT	n20	2412	Ant1	17.613
NVNT	n20	2437	Ant1	17.746
NVNT	n20	2462	Ant1	17.757

Test Graphs

OBW NVNT b 2412MHz Ant1

OBW NVNT b 2437MHz Ant1

OBW NVNT b 2462MHz Ant1

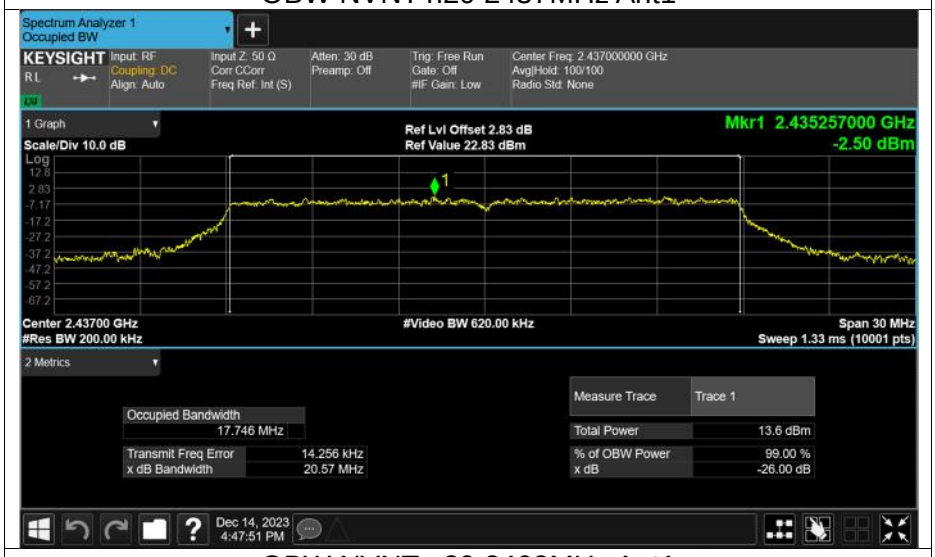
OBW NVNT g 2412MHz Ant1

OBW NVNT g 2437MHz Ant1

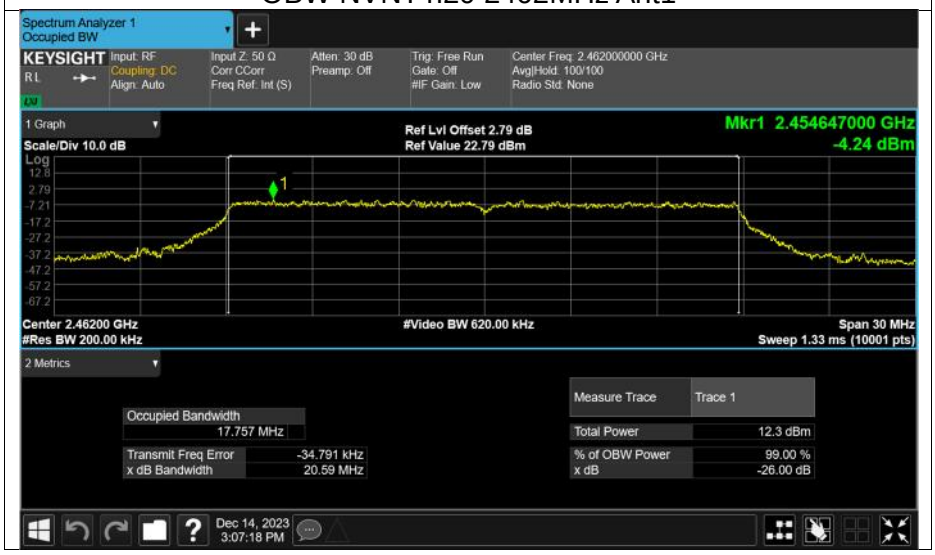
OBW NVNT g 2462MHz Ant1

OBW NVNT n20 2412MHz Ant1

OBW NVNT n20 2437MHz Ant1



OBW NVNT n20 2462MHz Ant1

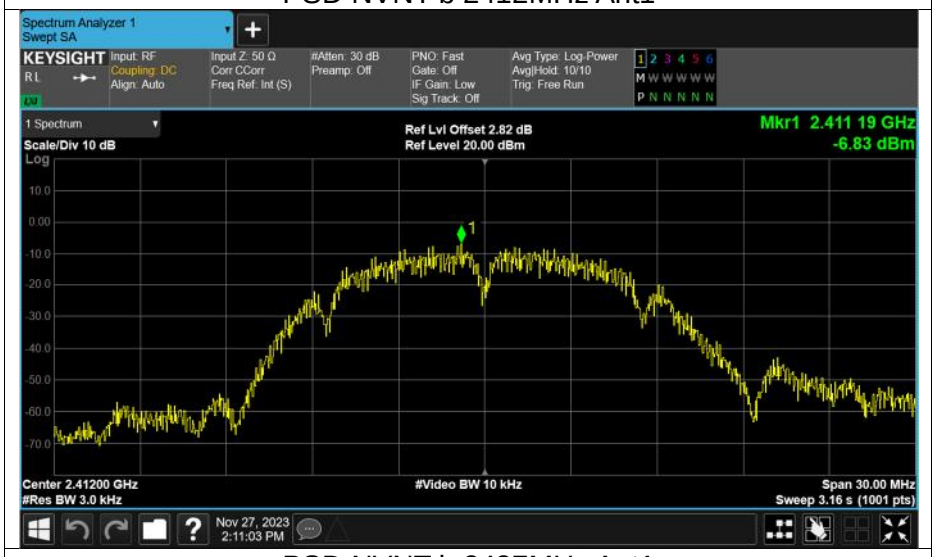


Maximum Power Spectral Density Level

Condition	Mode	Frequency (MHz)	Antenna	Conducted PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
NVNT	b	2412	Ant1	-6.83	8	Pass
NVNT	b	2437	Ant1	-8.77	8	Pass
NVNT	b	2462	Ant1	-8.59	8	Pass
NVNT	g	2412	Ant1	-16.68	8	Pass
NVNT	g	2437	Ant1	-18.81	8	Pass
NVNT	g	2462	Ant1	-17.99	8	Pass
NVNT	n20	2412	Ant1	-15.27	8	Pass
NVNT	n20	2437	Ant1	-15.53	8	Pass
NVNT	n20	2462	Ant1	-20.28	8	Pass

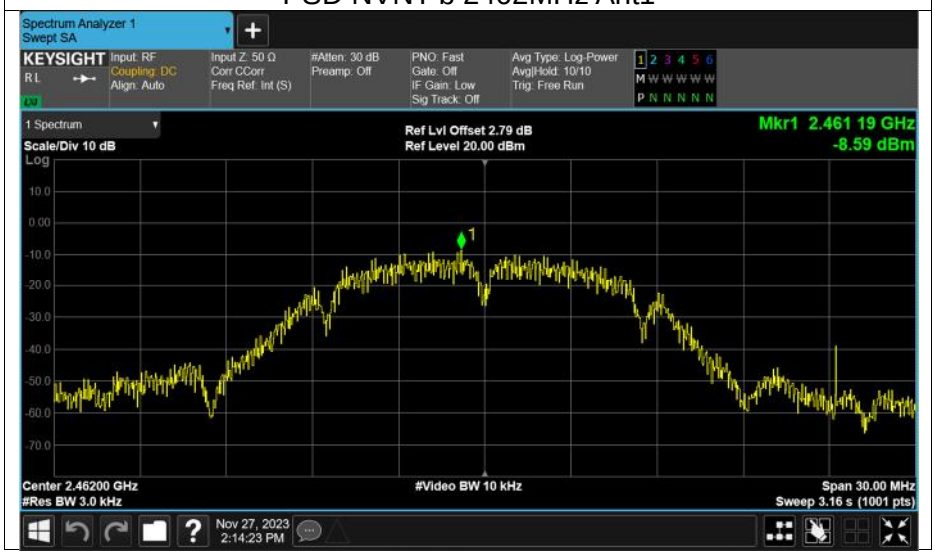
Test Graphs

PSD NVNT b 2412MHz Ant1

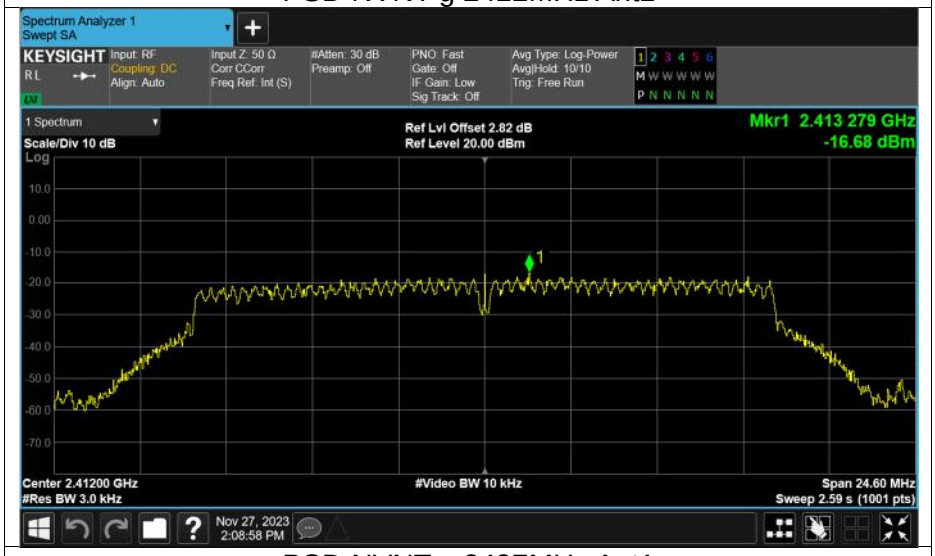


PSD NVNT b 2437MHz Ant1

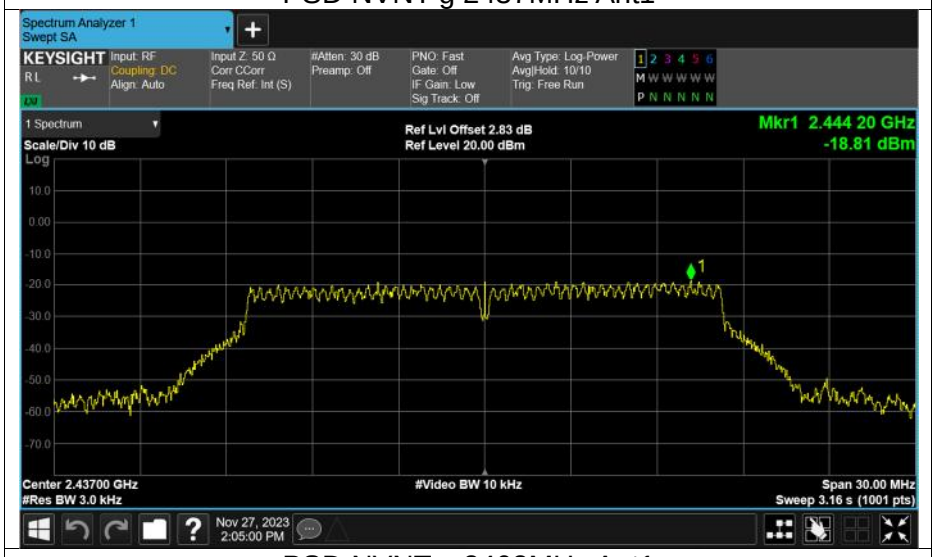
PSD NVNT b 2462MHz Ant1



PSD NVNT g 2412MHz Ant1

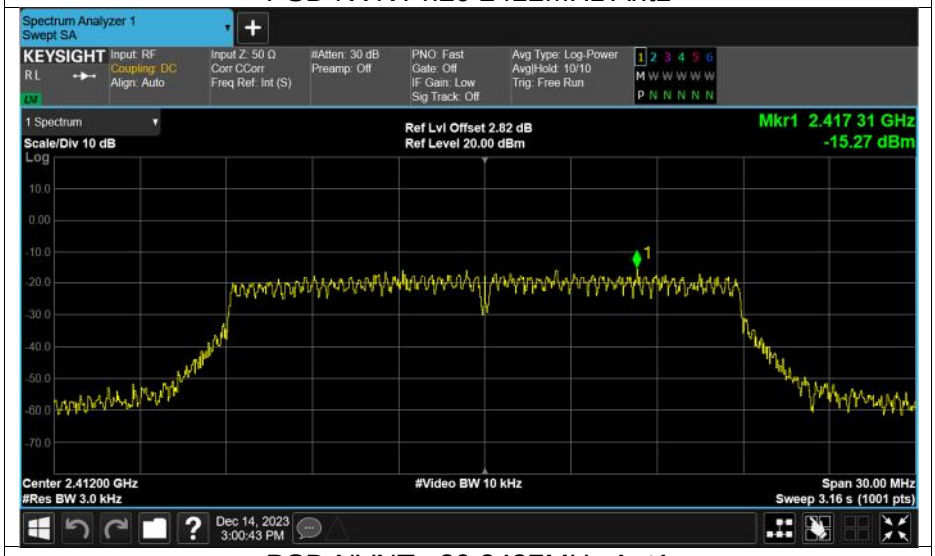


PSD NVNT g 2437MHz Ant1

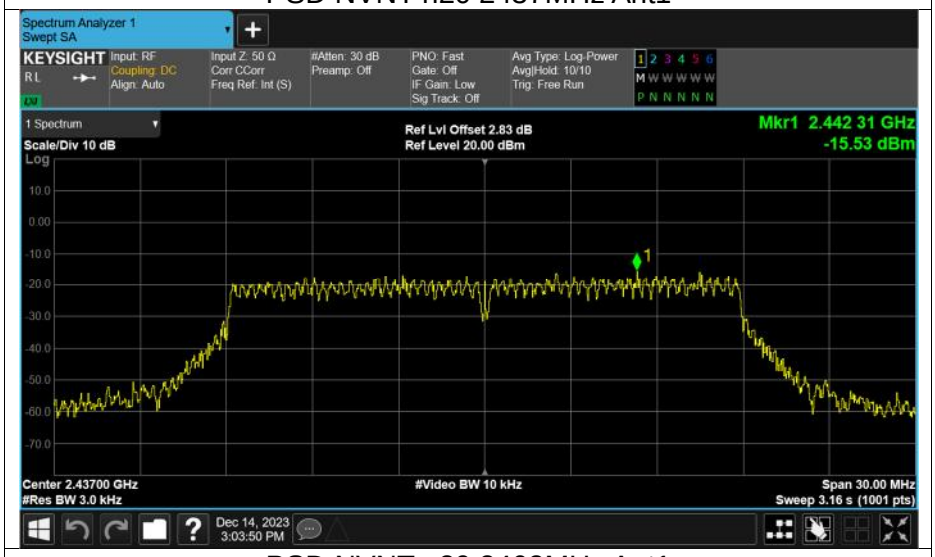


PSD NVNT g 2462MHz Ant1

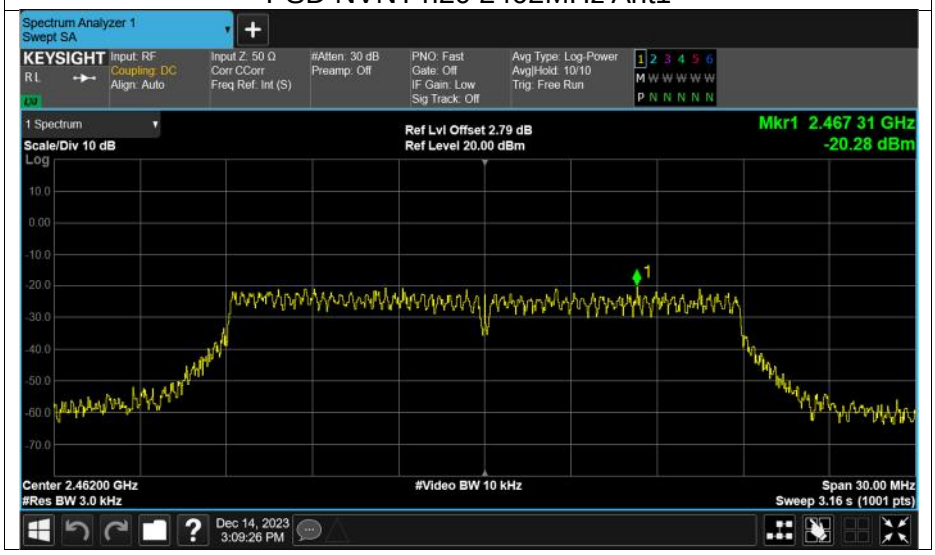
PSD NVNT n20 2412MHz Ant1



PSD NVNT n20 2437MHz Ant1



PSD NVNT n20 2462MHz Ant1



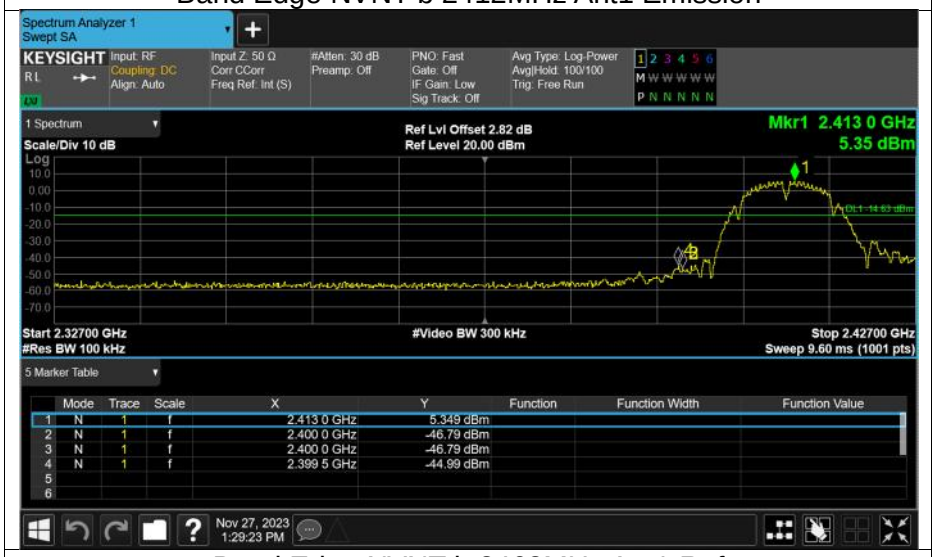
Band Edge

Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	b	2412	Ant1	-50.35	-20	Pass
NVNT	b	2462	Ant1	-57.49	-20	Pass
NVNT	g	2412	Ant1	-34.17	-20	Pass
NVNT	g	2462	Ant1	-44.14	-20	Pass
NVNT	n20	2412	Ant1	-38.01	-20	Pass
NVNT	n20	2462	Ant1	-46.16	-20	Pass

Test Graphs

Band Edge NVNT b 2412MHz Ant1 Ref

Band Edge NVNT b 2412MHz Ant1 Emission

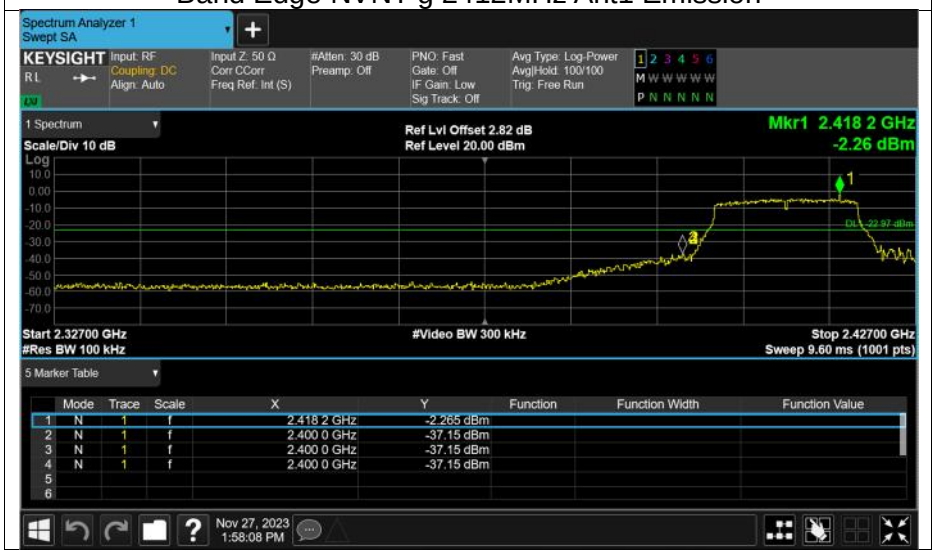


Band Edge NVNT b 2462MHz Ant1 Ref

Band Edge NVNT b 2462MHz Ant1 Emission

Band Edge NVNT g 2412MHz Ant1 Ref

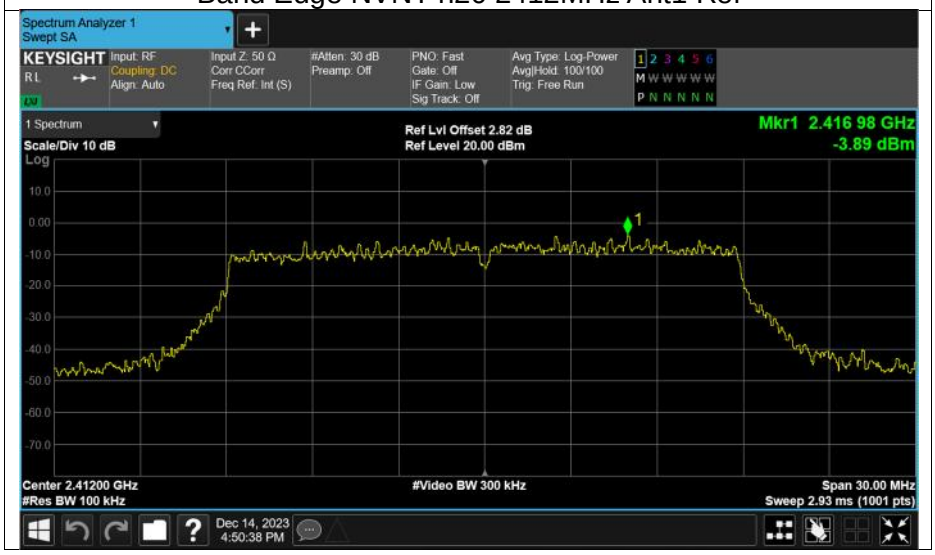
Band Edge NVNT g 2412MHz Ant1 Emission



Band Edge NVNT g 2462MHz Ant1 Ref

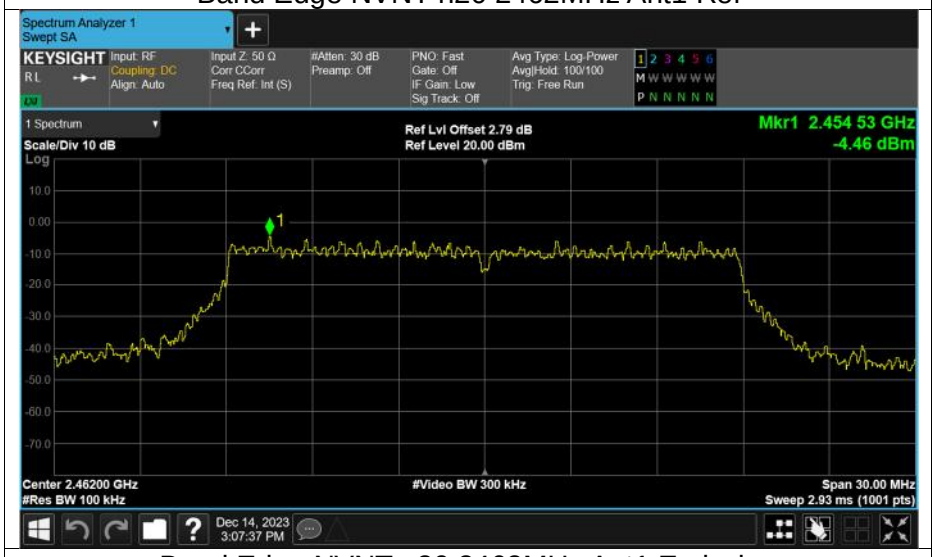
Band Edge NVNT g 2462MHz Ant1 Emission

Band Edge NVNT n20 2412MHz Ant1 Ref



Band Edge NVNT n20 2412MHz Ant1 Emission

Band Edge NVNT n20 2462MHz Ant1 Ref



Band Edge NVNT n20 2462MHz Ant1 Emission

Conducted RF Spurious Emission

Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	b	2412	Ant1	-49.71	-20	Pass
NVNT	b	2437	Ant1	-52.98	-20	Pass
NVNT	b	2462	Ant1	-52.52	-20	Pass
NVNT	g	2412	Ant1	-46.79	-20	Pass
NVNT	g	2437	Ant1	-46.54	-20	Pass
NVNT	g	2462	Ant1	-46.35	-20	Pass
NVNT	n20	2412	Ant1	-44.48	-20	Pass
NVNT	n20	2437	Ant1	-44.83	-20	Pass
NVNT	n20	2462	Ant1	-42.97	-20	Pass

Test Graphs

Tx. Spurious NVNT b 2412MHz Ant1 Ref

Tx. Spurious NVNT b 2412MHz Ant1 Emission

Tx. Spurious NVNT b 2437MHz Ant1 Ref

Tx. Spurious NVNT b 2437MHz Ant1 Emission

Tx. Spurious NVNT b 2462MHz Ant1 Ref

Tx. Spurious NVNT b 2462MHz Ant1 Emission

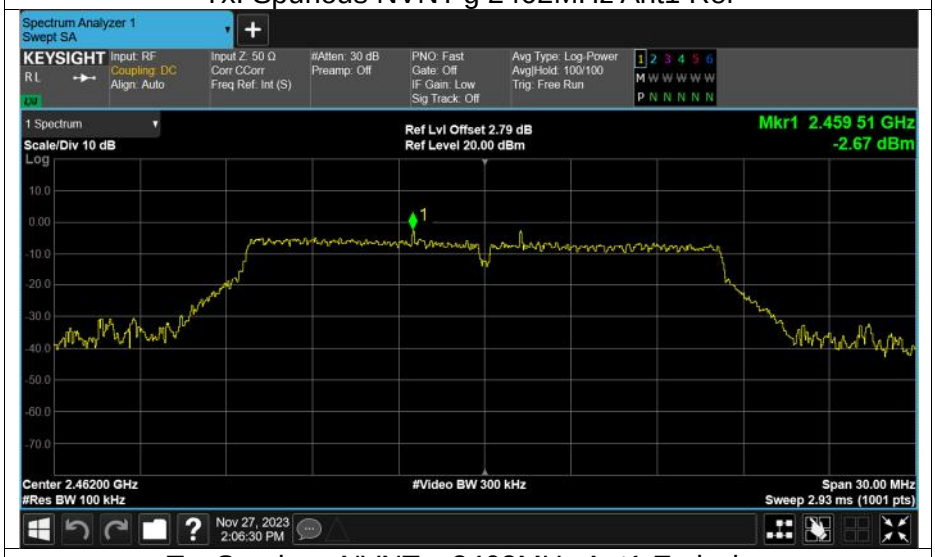
Tx. Spurious NVNT g 2412MHz Ant1 Ref

Tx. Spurious NVNT g 2412MHz Ant1 Emission

Tx. Spurious NVNT g 2437MHz Ant1 Ref

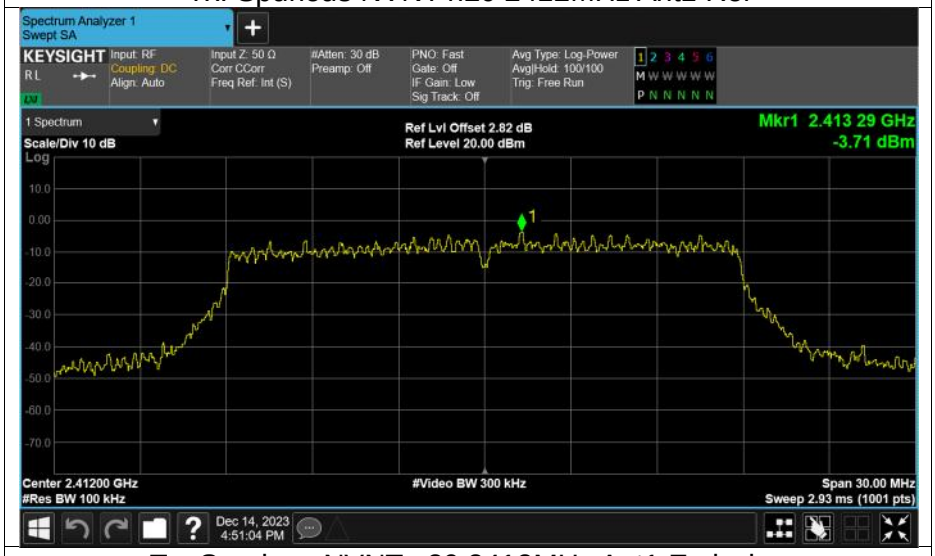
Tx. Spurious NVNT g 2437MHz Ant1 Emission

Tx. Spurious NVNT g 2462MHz Ant1 Ref



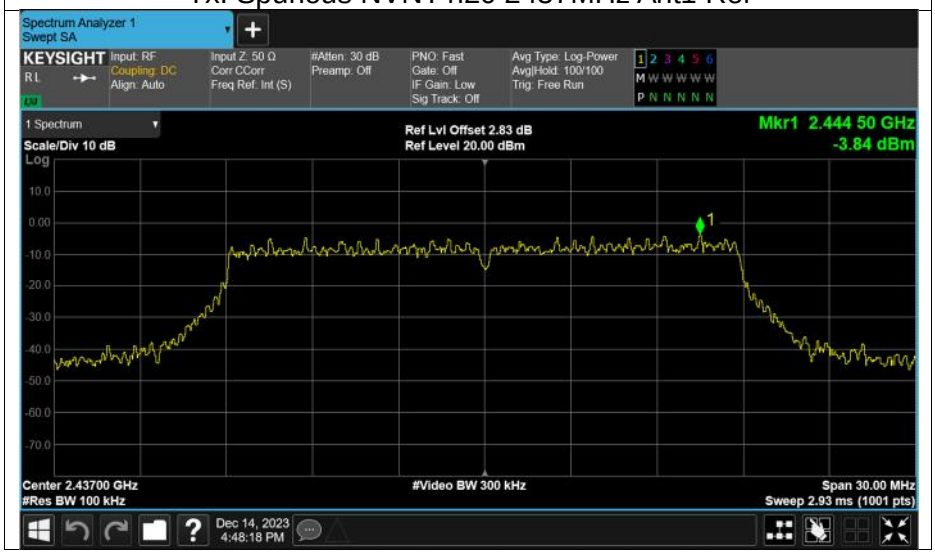
Tx. Spurious NVNT g 2462MHz Ant1 Emission

Tx. Spurious NVNT n20 2412MHz Ant1 Ref



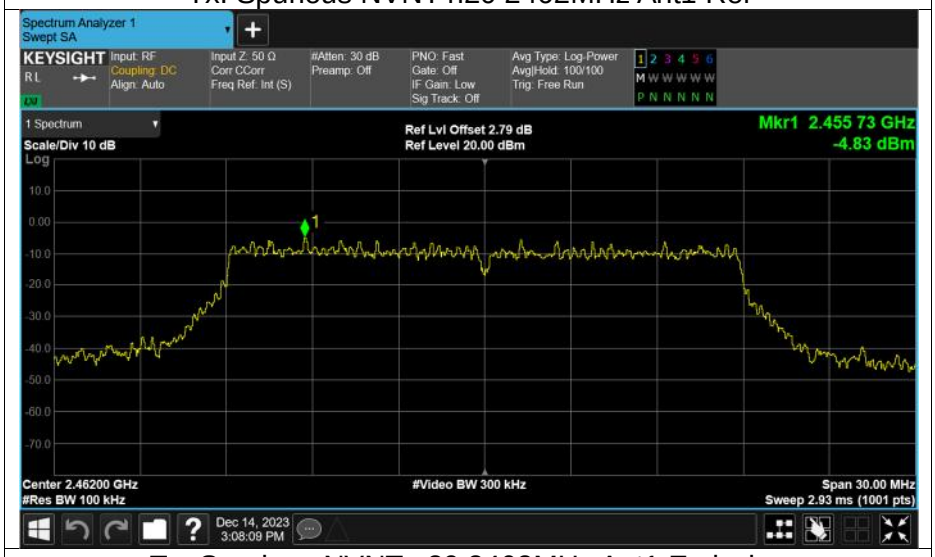
Tx. Spurious NVNT n20 2412MHz Ant1 Emission

Tx. Spurious NVNT n20 2437MHz Ant1 Ref

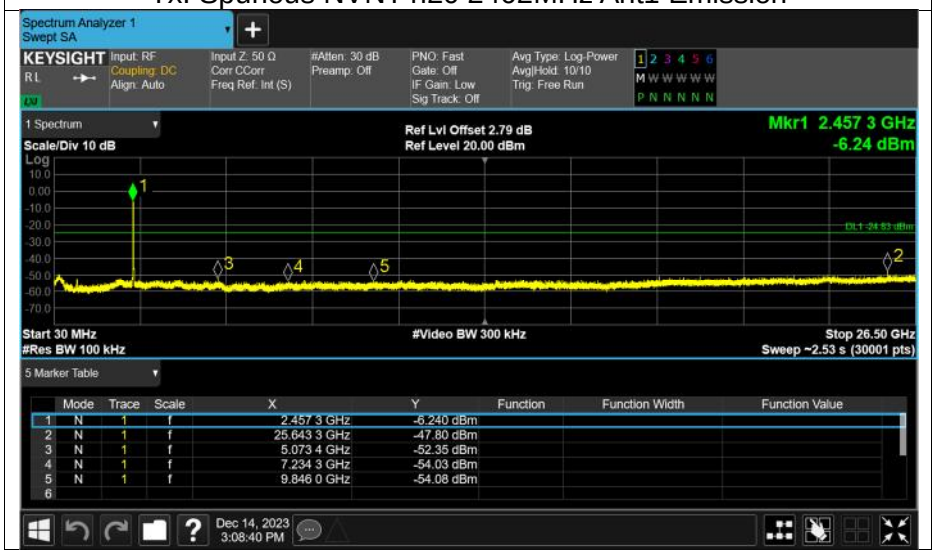


Tx. Spurious NVNT n20 2437MHz Ant1 Emission

Tx. Spurious NVNT n20 2462MHz Ant1 Ref

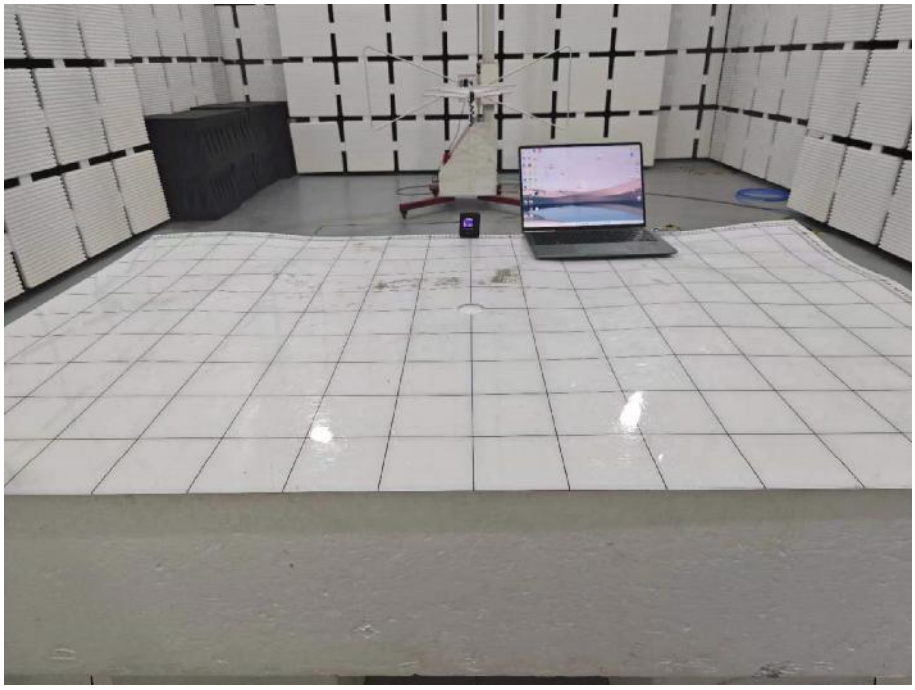


Tx. Spurious NVNT n20 2462MHz Ant1 Emission

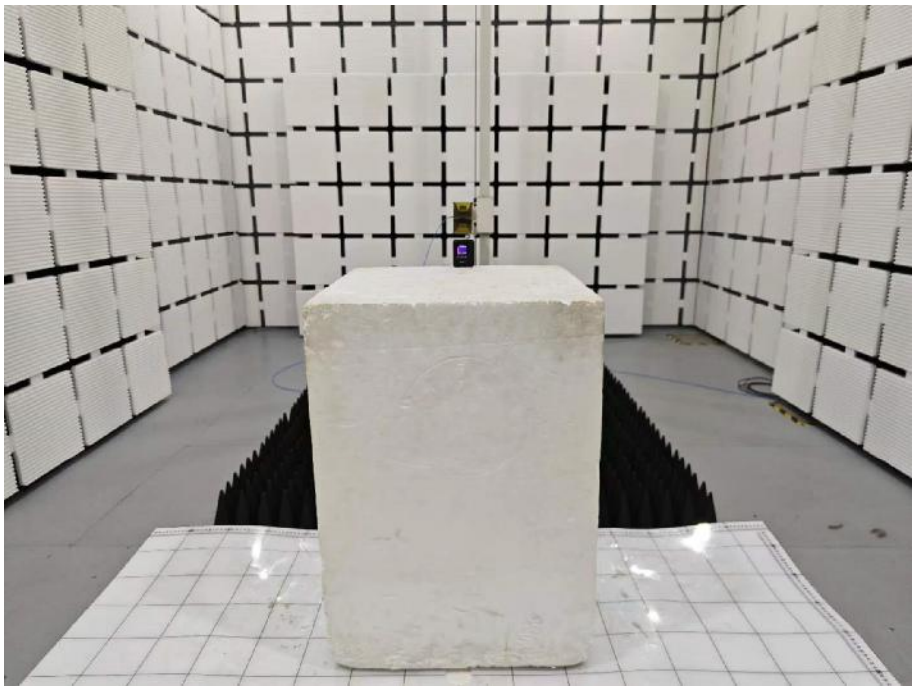


Appendix II - Test Setup photos

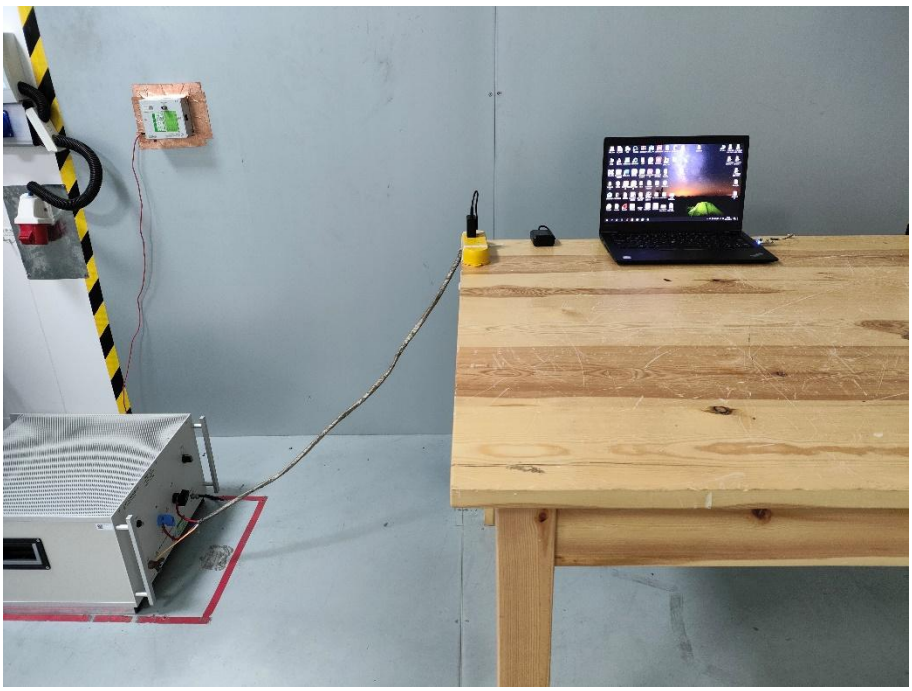
Set-up for Radiated Spurious Emission, Below 1GHz



Set-up for Radiated Spurious Emission, Above 1GHz



Set-up for Conducted Emission



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