TEST REPORT

Product Name	:	Skin Hydration Detector
Brand Mark	:	hwiote
Model No.	:	SkinDr400-Hydro-TB
Report Number	:	BLA-EMC-202404-A1502
FCC ID	:	2BFDL-SKINDR400
Date of Sample Receipt	:	2024/4/10
Date of Test	:	2024/4/10 to 2024/4/19
Date of Issue	:	2024/4/19
Test Standard	:	47 CFR Part 15, Subpart C 15.247
Test Result	:	Pass

Prepared for:

Shenzhen Hanwei IoT Co., Ltd.
Unit 801, University Town Venture Park, No.10 Lishan Road, Taoyuan Street, Nanshan District, Shenzhen, Guangdong Province

Prepared by:

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Approved by: Blue Zheng

Date: 2024/4/19

Report Revise Record

Version No.	Date	Description
00	2024/4/19	Original

TABLE OF CONTENTS

1 Test summary

Test item	Test Requirement	Test Method	Class/Severity	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
Conducted Band Edges Measurement	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.8 & Section 11.13.3.2	47 CFR Part 15, Subpart C 15.247(d)	Pass
Radiated Spurious Emissions	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.4,6.5,6.6	47 CFR Part 15, Subpart C 15.209 & 15.247(d)	Pass
Radiated Emissions which fall in the restricted bands	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.10.5	47 CFR Part 15, Subpart C 15.209 & 15.247(d)	Pass
Conducted Spurious Emissions	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.6 & Section 11.11	47 CFR Part 15, Subpart C 15.247(d)	Pass
Power Spectrum Density	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.10.2	47 CFR Part 15, Subpart C 15.247(e)	Pass
Conducted Peak Output Power	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.5	47 CFR Part 15, Subpart C 15.247(b)(3)	Pass
Minimum 6dB Bandwidth	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.8.1	47 CFR Part 15, Subpart C 15.247a(2)	Pass
Antenna Requirement	47 CFR Part 15, Subpart C 15.247	N/A	47 CFR Part 15, Subpart C 15.203 & 15.247(c)	Pass

N/A: Not Applicable

2 General information

Applicant	Shenzhen Hanwei IoT Co., Ltd.
Address	Unit 801, University Town Venture Park, No.10 Lishan Road, Taoyuan Street, Nanshan District, Shenzhen, Guangdong Province
Manufacturer	Shenzhen Hanwei IoT Co., Ltd.
Address	Unit 801, University Town Venture Park, No.10 Lishan Road, Taoyuan Street, Nanshan District, Shenzhen, Guangdong Province
Factory	Shenzhen Hanwei IoT Co., Ltd.
Address	Unit 801, University Town Venture Park, No.10 Lishan Road, Taoyuan Street, Nanshan District, Shenzhen, Guangdong Province
Product Name	Skin Hydration Detector
Test Model No.	SkinDr400-Hydro-TB

3 General description of EUT

Hardware Version	V1.0.0
Software Version	V1.0.0

Operation Frequency:	2402MHz-2480MHz
Modulation Type:	GFSK
Rate data:	1Mbps
Channel Spacing:	2MHz
Number of Channels:	40
Antenna Type:	PCB Antenna
Antenna Gain:	1.5dBi (Provided by the applicant)

4 Operation frequency each of channel

Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2402MHz	11	2422MHz	21	2442MHz	31	2462MHz
2	2404MHz	12	2424MHz	22	2444MHz	32	2464MHz
….	….	….	….	….	….	….	….
9	2418MHz	19	2438MHz	29	2458MHz	39	2478MHz
10	2420MHz	20	2440MHz	30	2460MHz	40	2480MHz

Note:

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

Channel	Frequency
The lowest channel	2402MHz
The middle channel	2442MHz
The Highest channel	2480MHz

5 Test environment

Environment	Temperature	Voltage
Normal	25℃	3.7Vdc

6 Test mode

TEST MODE	TEST MODE DESCRIPTION
TX	Keep the EUT in continuously transmitting mode with modulation.

7 Measurement uncertainty

Parameter	Expanded Uncertainty (Confidence of 95%)
Occupied Channel Bandwidth	±5 %
RF output power, conducted	±1.5 dB
Power Spectral Density, conducted	±3.0 dB
Unwanted Emissions, conducted	±3.0 dB
Temperature	±3 °C
Supply voltages	±3 %
Time	±5 %
Radiated Emission(9kHz-30MHz)	±4.34dB
AC Power Line Conducted Emission(150kHz-30MHz)	±3.45dB
Unwanted Radiated Emission (30MHz ~ 1000MHz)	±4.35 dB
Unwanted Radiated Emission (1GHz ~ 18GHz)	±4.44 dB

8 Description of support unit

Device Type	Manufacturer	Model Name	Serial No.	Remark
AC Adapter	UGREEN	CD112	N/A	N/A

9 Laboratory location

All tests were performed at:
BlueAsia of Technical Services(Shenzhen) Co.,Ltd.
Building C, No. 107, Shihuan Road, Shiyan Sub-District, Baoan District, Shenzhen, Guangdong Province, China
Telephone: TEL: +86-755-28682673 FAX: +86-755-28682673

10 Test instruments list

Test equipment of radiated spurious emissions					
Equipment	**Manufacturer**	**Model**	**S/N**	**Cal.Date**	**Cal.Due**
Chamber 1	SKET	966	N/A	2023/11/16	2026/11/15
Chamber 2	SKET	966	N/A	2021/07/20	2024/07/19
Spectrum	R&S	FSP40	100817	2023/08/30	2024/08/29
Receiver	R&S	ESR7	101199	2023/08/30	2024/08/29
Receiver	R&S	ESPI7	101477	2023/07/07	2024/07/06
broadband Antenna	Schwarzbeck	VULB9168	00836 P:00227	2022/10/12	2025/10/11
Horn Antenna	Schwarzbeck	BBHA9120D	01892 P:00331	2022/09/13	2025/09/12
Horn Antenna	Schwarzbeck	BBHA 9170	1106	2022/04/24	2024/04/23
Amplifier	SKET	LNPA_30M01G-30	SK2021060801	2023/07/07	2024/07/06
Amplifier	SKET	PA-000318G-45	N/A	2023/08/30	2024/08/29
Amplifier	SKET	LNPA_18G40G-50	SK2022071301	2023/07/14	2024/07/13
Filter group	SKET	2.4G/5G Filter group r	N/A	2023/07/07	2024/07/06
EMI software	EZ	EZ-EMC	EEMC-3A1	N/A	N/A
Loop antenna	SCHNARZBECK	FMZB1519B	00102	2022/09/14	2025/09/13
1kHZ calibration audio source	SKET	MCS-ABT-C35	N/A	2023/09/04	2024/09/03
Free Field Microphone	SKET	MGS MP 663	0414	2023/09/04	2024/09/03
Audio shielding box	SKET	SB-ABT-C35	N/A	2023/03/30	2024/03/29
Controller	SKET	N/A	N/A	N/A	N/A
Coaxial Cable	BlueAsia	BLA-XC-02	N/A	N/A	N/A
Coaxial Cable	BlueAsia	BLA-XC-03	N/A	N/A	N/A
Coaxial Cable	BlueAsia	BLA-XC-01	N/A	N/A	N/A
Signal Generator DTV	ECREDIX	DSG-1000	N/A	N/A	N/A

Test equipment of conducted emissions at AC power line (150kHz-30MHz)					
Equipment	**Manufacturer**	**Model**	**S/N**	**Cal.Date**	**Cal.Due**
Shield room	SKET	833	N/A	2023/11/16	2025/11/15
Receiver	R&S	ESPI3	101082	2023/08/30	2024/08/29
LISN	R&S	ENV216	3560.6550.15	2023/08/30	2024/08/29
LISN	AT	AT166-2	AKK1806000003	2023/08/30	2024/08/29
ISN	TESEQ	ISNT8-cat6	53580	2023/08/30	2024/08/29
Single-channel vehicle artificial power network	Schwarzbeck	NNBM 8124	01045	2023/07/07	2024/07/06
Single-channel vehicle artificial power network	Schwarzbeck	NNBM 8124	01075	2023/07/07	2024/07/06
EMI software	EZ	EZ-EMC	EEMC-3A1	N/A	N/A

Test equipment of RF conducted test					
Equipment	**Manufacturer**	**Model**	**S/N**	**Cal.Date**	**Cal.Due**
Spectrum	R&S	FSP40	100817	2023/08/30	2024/08/29
Spectrum	Agilent	N9020A	MY49100060	2023/08/30	2024/08/29
Spectrum	Agilent	N9020A	MY54420161	2023/08/30	2024/08/29
Signal Generator	Agilent	N5182A	MY47420955	2023/08/30	2024/08/29
Signal Generator	Agilent	N5181A	MY46240904	2023/07/07	2024/07/06
Signal Generator	R&S	CMW500	132429	2023/08/30	2024/08/29
BluetoothTester	Anritsu	MT8852B	06262047872	2023/08/30	2024/08/29
Power probe	DARE	RPR3006W	14I00889SN042	2023/09/01	2024/08/31
Power detection box	CDKMV	MW100-PSB	MW201020JYT	2023/07/07	2024/07/06
DCPowersupply	zhaoxin	KXN-305D	20K305D1221363	2023/08/30	2024/08/29
DCPowersupply	zhaoxin	RXN-1505D	19R1505D050168	2023/08/30	2024/08/29
2.4GHz/5GHz RF Test software	MTS	MTS 8310	Version 2.0.0.0	N/A	N/A
Audio Analyzer	Audio Precision	ATS-1	ATS141094	2023/07/07	2024/07/06

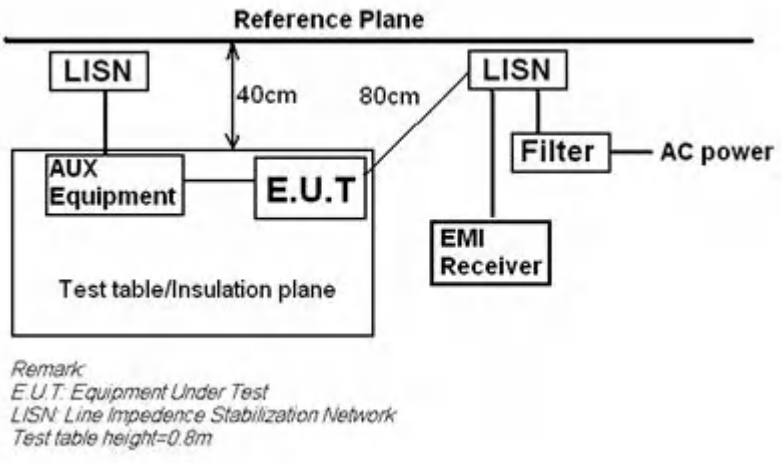
11 Conducted emissions at AC power line (150kHz-30MHz)

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 6.2
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Jozu
Temperature	25℃
Humidity	60%

11.1 Limits

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.		

11.2 Test setup



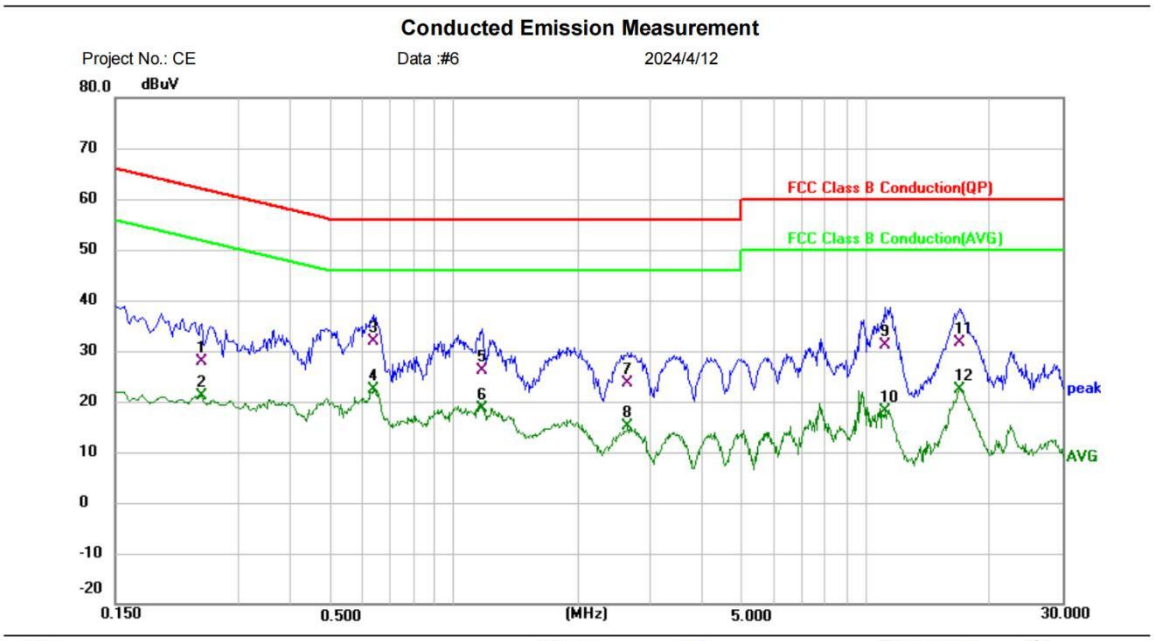
11.3 Procedure

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/50H + 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

11.4 Test data

[TestMode: Tx]; [Line: Line] ;[Power:AC120V/60Hz]



Site	Phase: L1	Temperature: (C)
Limit: FCC Class B Conduction(QP)	Power:	Humidity: %RH
EUT: Skin Hydration Detector	Distance: RBW: 9 KHz	
M/N: SkinDr400-Hydro-TB	VBW: 30 KHz	Sweep Time: 10 ms
Mode: BLE TX Mode		
Note:		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	cm	degree	Comment
1		0.2419	17.39	10.51	27.90	62.03	-34.13	QP			
2		0.2419	10.62	10.51	21.13	52.03	-30.90	AVG			
3		0.6340	21.95	9.95	31.90	56.00	-24.10	QP			
4	*	0.6340	12.35	9.95	22.30	46.00	-23.70	AVG			
5		1.1659	16.17	9.85	26.02	56.00	-29.98	QP			
6		1.1659	8.79	9.85	18.64	46.00	-27.36	AVG			
7		2.6419	13.59	10.10	23.69	56.00	-32.31	QP			
8		2.6419	4.94	10.10	15.04	46.00	-30.96	AVG			
9		11.0980	30.25	0.77	31.02	60.00	-28.98	QP			
10		11.0980	17.44	0.77	18.21	50.00	-31.79	AVG			
11		16.8500	17.94	13.73	31.67	60.00	-28.33	QP			
12		16.8500	8.56	13.73	22.29	50.00	-27.71	AVG			

*:Maximum data x:Over limit !:over margin 〈Reference Only

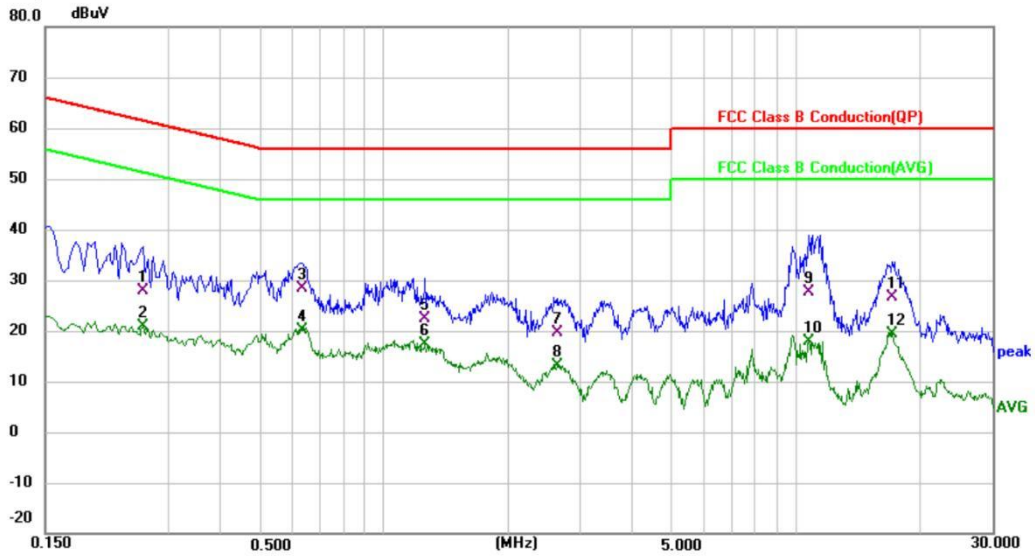
Receiver: ESPI_1 Spectrum Analyzer: ESPI

L.I.S.N: Engineer Signature:

Test Result: Pass

[TestMode: Tx]; [Line: Neutral] ;[Power:AC120V/60Hz]

Conducted Emission Measurement



Site	Phase:	*N*	Temperature: (C)
Limit: FCC Class B Conduction(QP)	Power:		Humidity: %RH
EUT: Skin Hydration Detector	Distance:	RBW: 9 KHz	
M/N: SkinDr400-Hydro-TB		VBW: 30 KHz	Sweep Time: 10 ms
Mode: BLE TX Mode			
Note:			

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	cm	degree	Comment
1		0.2580	17.42	10.40	27.82	61.50	-33.68	QP			
2		0.2580	10.40	10.40	20.80	51.50	-30.70	AVG			
3		0.6300	18.51	9.89	28.40	56.00	-27.60	QP			
4	*	0.6300	10.28	9.89	20.17	46.00	-25.83	AVG			
5		1.2579	12.59	9.90	22.49	56.00	-33.51	QP			
6		1.2579	7.47	9.90	17.37	46.00	-28.63	AVG			
7		2.6380	9.61	10.04	19.65	56.00	-36.35	QP			
8		2.6380	3.04	10.04	13.08	46.00	-32.92	AVG			
9		10.7420	26.74	0.97	27.71	60.00	-32.29	QP			
10		10.7420	16.90	0.97	17.87	50.00	-32.13	AVG			
11		17.1220	12.91	13.73	26.64	60.00	-33.36	QP			
12		17.1220	5.58	13.73	19.31	50.00	-30.69	AVG			

*:Maximum data x:Over limit !:over margin 〈Reference Only

Receiver: ESPI_1 Spectrum Analyzer: ESPI

L.I.S.N: Engineer Signature:

Test Result: Pass

Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level =Receiver Read level + LISN Factor + Cable Loss.

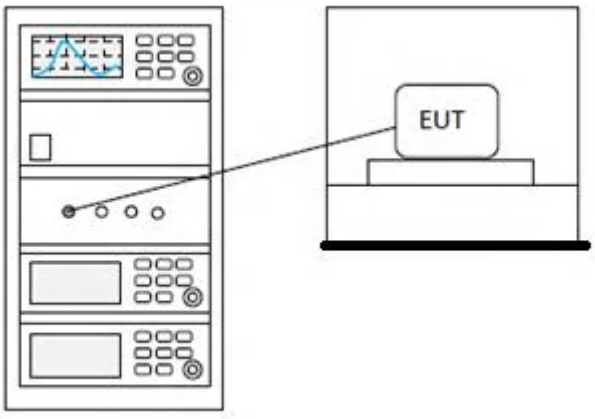
12 Conducted band edges measurement

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 7.8.8 & Section 11.13.3.2
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Jozu
Temperature	25℃
Humidity	60%

12.1 Limits

Limit:	In any 100 kHz 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 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

12.2 Test setup



12.3 Test data

Pass: Please Refer To Appendix: Appendix1 For Details

13 Radiated spurious emissions

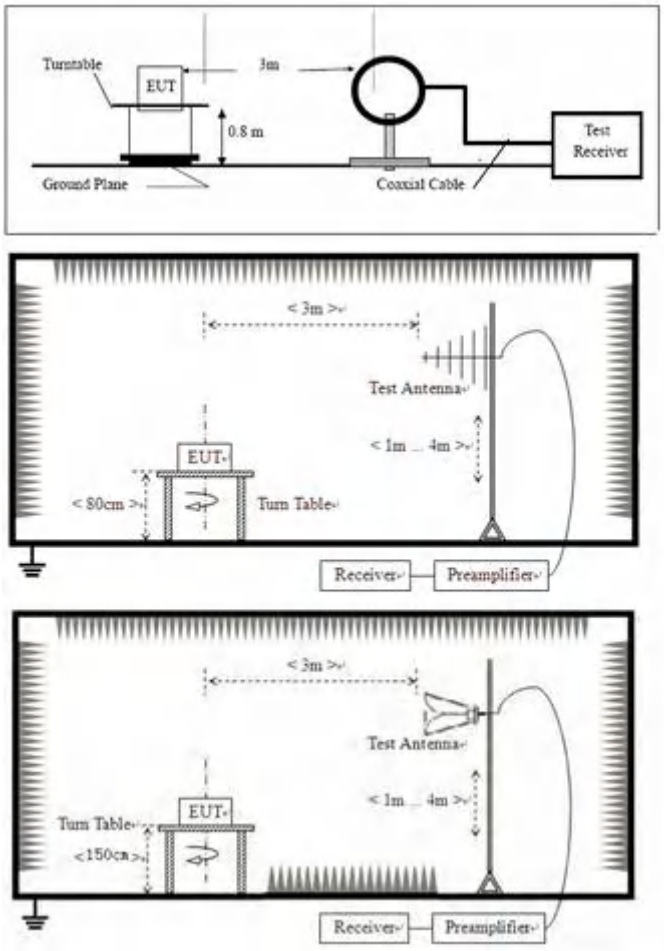
Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 6.4,6.5,6.6
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Jozu
Temperature	25℃
Humidity	60%

13.1 Limits

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 1000MHz. 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.

13.2 Test setup



13.3 Procedure

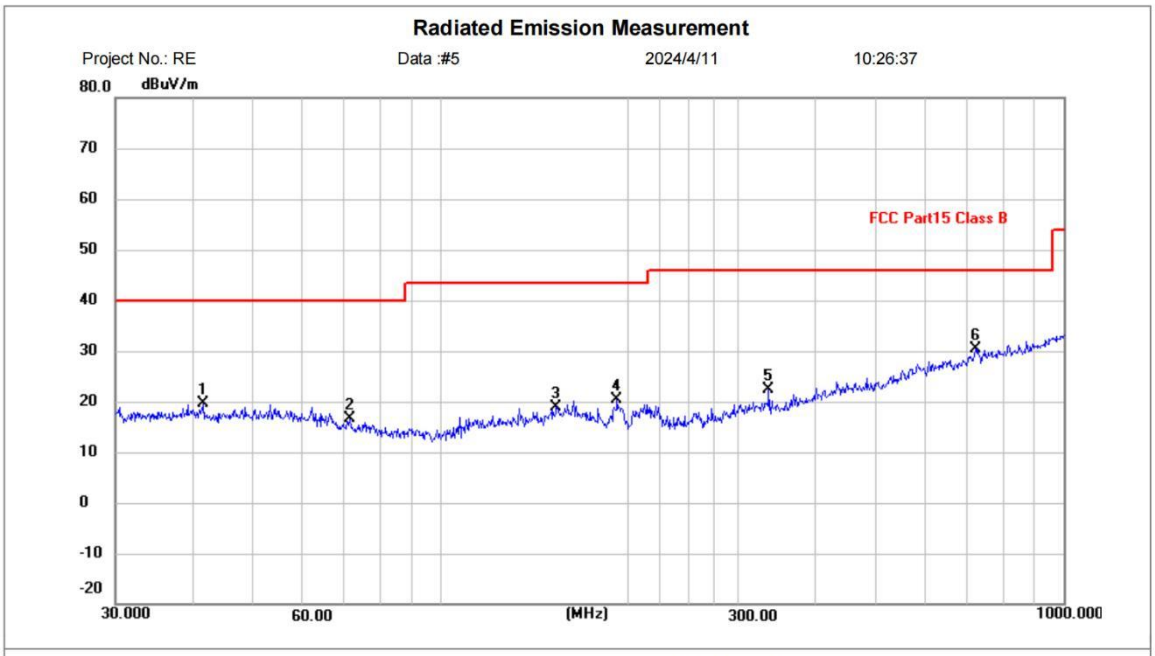
a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

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

Remark:
1) For emission below 1GHz, 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 9 kHz to 25GHz, the disturbance above 12.75GHz and 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. Fundamental frequency is blocked by filter, and only spurious emission is shown.
4) 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.

13.4 Test data

[TestMode: TX below 1G]; [Polarity: Horizontal]



Site
Limit: FCC Part15 Class B
EUT: Skin Hydration Detector
M/N: SkinDr400-Hydro-TB
Mode: BLE1M TX Mode
Note:

Polarization: *Horizontal*
Power:

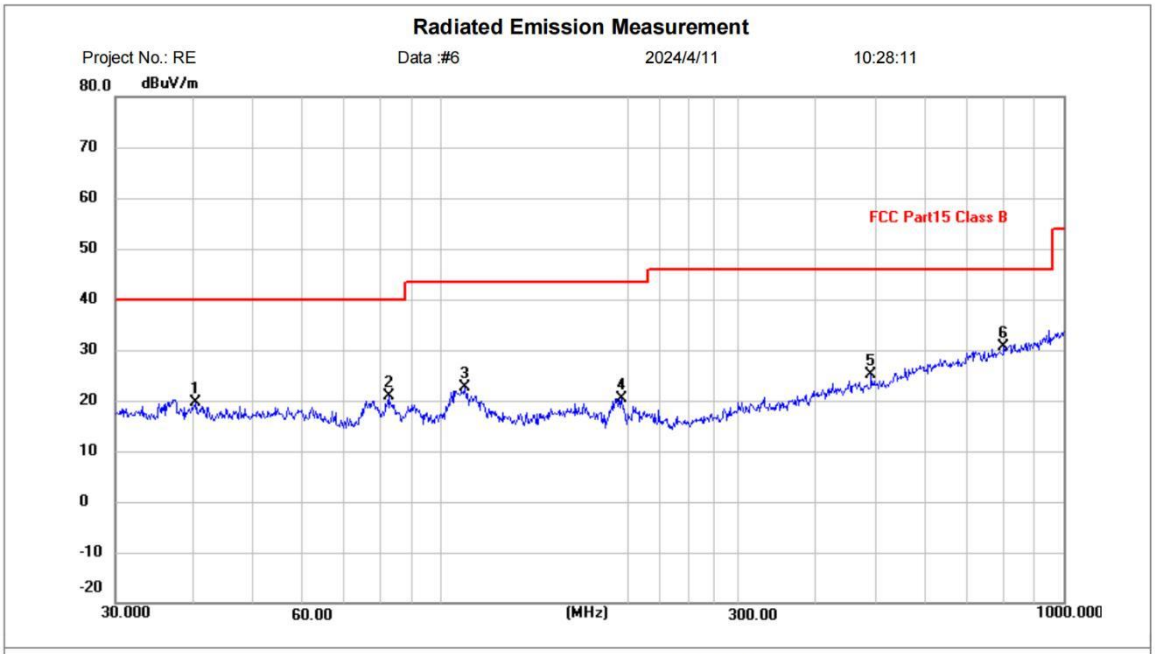
Temperature: (C)
Humidity: %RH

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	41.5670	0.17	19.41	19.58	40.00	-20.42	peak	P	
2	71.3300	-0.05	16.80	16.75	40.00	-23.25	peak	P	
3	153.2003	-0.74	19.70	18.96	43.50	-24.54	peak	P	
4	191.7450	4.38	16.08	20.46	43.50	-23.04	peak	P	
5	336.0351	2.31	19.96	22.27	46.00	-23.73	peak	P	
6 *	721.7258	1.77	28.56	30.33	46.00	-15.67	peak	P	

*:Maximum data x:Over limit !:over margin

Test Result: Pass

[TestMode: TX below 1G]; [Polarity: Vertical]



Site
Limit: FCC Part15 Class B
EUT: Skin Hydration Detector
M/N: SkinDr400-Hydro-TB
Mode: BLE1M TX Mode
Note:

Polarization: *Vertical*
Power:

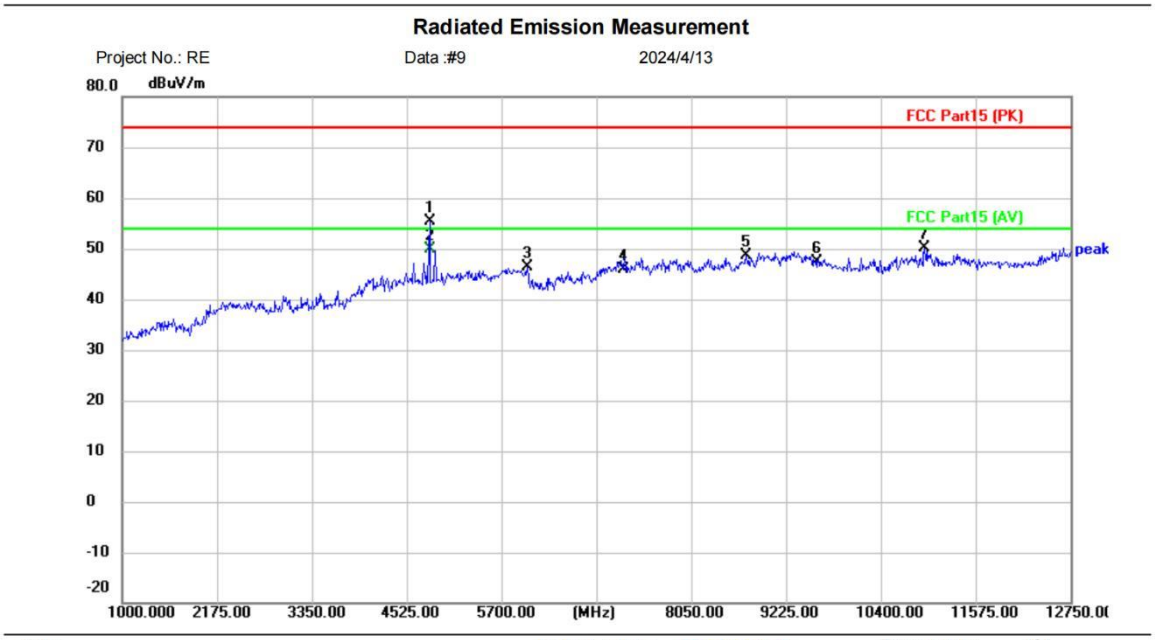
Temperature: (C)
Humidity: %RH

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	40.4172	-0.24	19.80	19.56	40.00	-20.44	peak	P	
2	82.3588	5.88	14.96	20.84	40.00	-19.16	peak	P	
3	109.4116	6.56	16.08	22.64	43.50	-20.86	peak	P	
4	195.1365	4.07	16.29	20.36	43.50	-23.14	peak	P	
5	490.7447	1.25	23.93	25.18	46.00	-20.82	peak	P	
6 *	801.7863	0.72	29.98	30.70	46.00	-15.30	peak	P	

*:Maximum data x:Over limit !:over margin

Test Result: Pass

[TestMode: TX low channel]; [Polarity: Horizontal]



Site
Limit: FCC Part15 (PK)
EUT: Skin Hydration Detector
M/N: SkinDr400-Hydro-TB
Mode: TX-2402
Note:

Polarization: ***Horizontal***
Power:

Temperature: (C)
Humidity: %RH

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4807.000	49.70	5.64	55.34	74.00	-18.66	peak	
2	*	4807.000	44.35	5.64	49.99	54.00	-4.01	AVG	
3		6017.250	40.74	5.63	46.37	74.00	-27.63	peak	
4		7206.000	36.52	9.24	45.76	74.00	-28.24	peak	
5		8731.500	36.97	11.56	48.53	74.00	-25.47	peak	
6		9608.000	34.97	12.31	47.28	74.00	-26.72	peak	
7		10940.50	36.96	13.25	50.21	74.00	-23.79	peak	

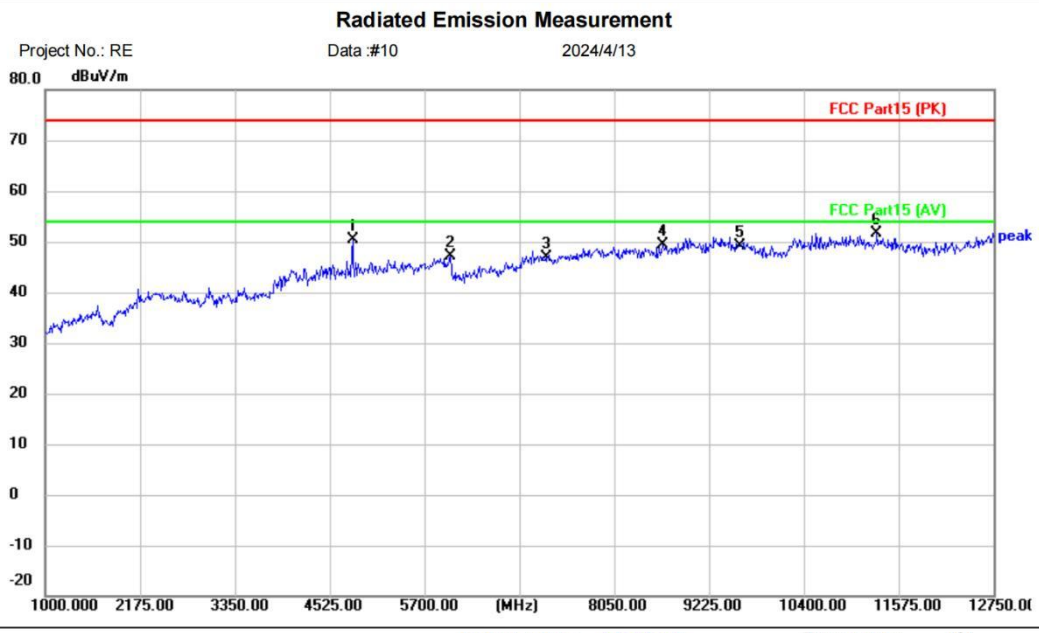
*:Maximum data x:Over limit !:over margin 〈Reference Only

Receiver: ESR_1
Antenna: EZ 9120D 1G-18G

Spectrum Analyzer: FSP40
Engineer Signature:

Test Result: Pass

[TestMode: TX low channel]; [Polarity: Vertical]



Site
Limit: FCC Part15 (PK)
EUT: Skin Hydration Detector
M/N: SkinDr400-Hydro-TB
Mode: TX-2402
Note:

Polarization: *Vertical*
Power:

Temperature: (C)
Humidity: %RH

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4807.000	44.77	5.64	50.41	74.00	-23.59	peak	
2		6017.250	41.46	5.63	47.09	74.00	-26.91	peak	
3		7206.000	37.72	9.24	46.96	74.00	-27.04	peak	
4		8649.250	38.11	11.30	49.41	74.00	-24.59	peak	
5		9608.000	36.71	12.31	49.02	74.00	-24.98	peak	
6	*	11304.75	38.87	12.70	51.57	74.00	-22.43	peak	

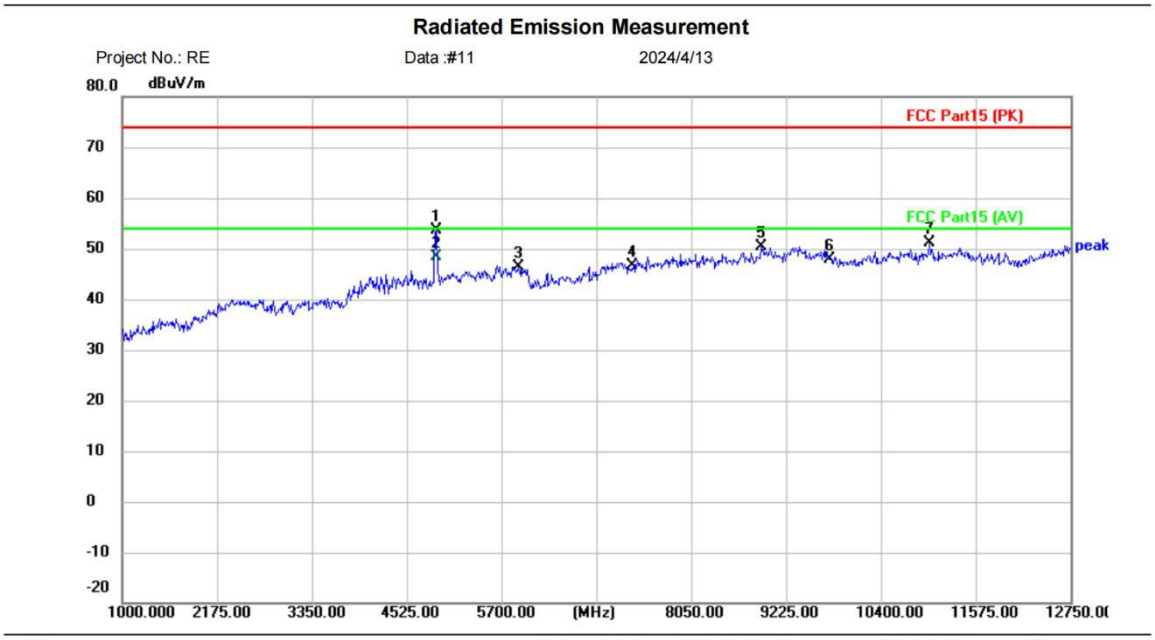
*:Maximum data x:Over limit !:over margin 〈Reference Only

Receiver: ESR_1
Antenna: EZ 9120D 1G-18G

Spectrum Analyzer: FSP40
Engineer Signature:

Test Result: Pass

[TestMode: TX mid channel]; [Polarity: Horizontal]



Site
Limit: FCC Part15 (PK)
EUT: Skin Hydration Detector
M/N: SkinDr400-Hydro-TB
Mode: TX-2442
Note:

Polarization: ***Horizontal***
Power:

Temperature: (C)
Humidity: %RH

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4889.250	47.98	5.75	53.73	74.00	-20.27	peak	
2	*	4889.250	42.52	5.75	48.27	54.00	-5.73	AVG	
3		5911.500	37.72	8.68	46.40	74.00	-27.60	peak	
4		7326.000	37.24	9.43	46.67	74.00	-27.33	peak	
5		8919.500	38.13	12.14	50.27	74.00	-23.73	peak	
6		9768.000	35.67	12.22	47.89	74.00	-26.11	peak	
7		10999.25	37.65	13.48	51.13	74.00	-22.87	peak	

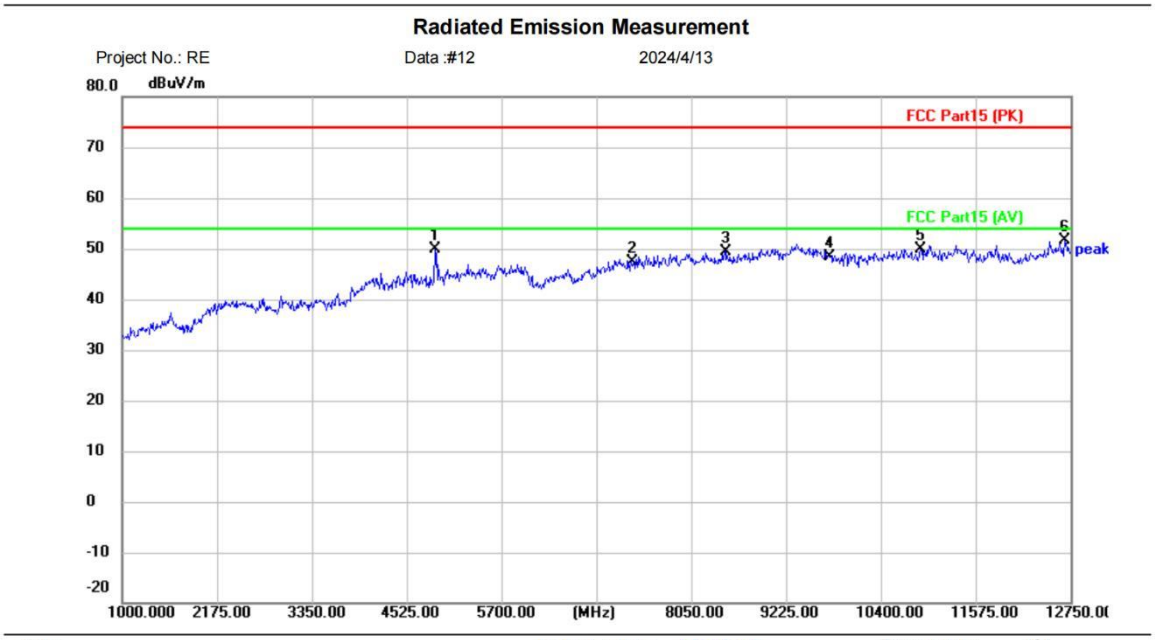
*:Maximum data x:Over limit !:over margin 〈Reference Only

Receiver: ESR_1
Antenna: EZ 9120D 1G-18G

Spectrum Analyzer: FSP40
Engineer Signature:

Test Result: Pass

[TestMode: TX mid channel]; [Polarity: Vertical]



Site
Limit: FCC Part15 (PK)
EUT: Skin Hydration Detector
M/N: SkinDr400-Hydro-TB
Mode: TX-2442
Note:

Polarization: *Vertical*
Power:

Temperature: (C)
Humidity: %RH

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4877.500	44.10	5.72	49.82	74.00	-24.18	peak	
2		7326.000	37.84	9.43	47.27	74.00	-26.73	peak	
3		8473.000	38.62	10.77	49.39	74.00	-24.61	peak	
4		9768.000	36.27	12.22	48.49	74.00	-25.51	peak	
5		10893.50	36.75	13.08	49.83	74.00	-24.17	peak	
6	*	12679.50	38.35	13.27	51.62	74.00	-22.38	peak	

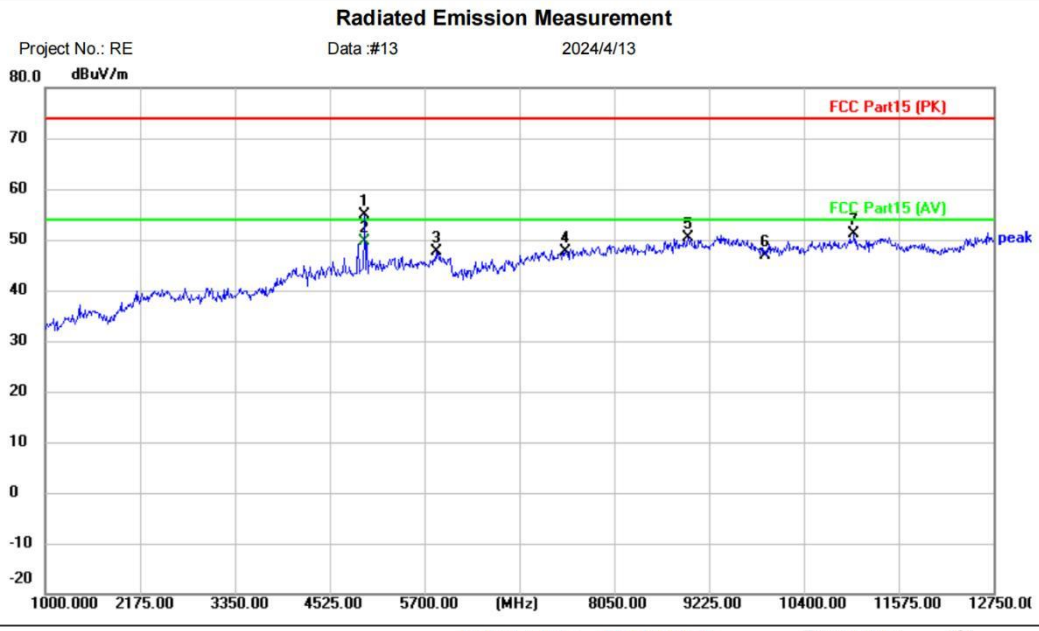
*:Maximum data x:Over limit !:over margin 〈Reference Only

Receiver: ESR_1
Antenna: EZ 9120D 1G-18G

Spectrum Analyzer: FSP40
Engineer Signature:

Test Result: Pass

[TestMode: TX high channel]; [Polarity: Horizontal]



Site
Limit: FCC Part15 (PK)
EUT: Skin Hydration Detector
M/N: SkinDr400-Hydro-TB
Mode: TX-2480
Note:

Polarization: ***Horizontal***
Power:

Temperature: (C)
Humidity: %RH

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4959.750	48.29	6.60	54.89	74.00	-19.11	peak	
2	*	4959.750	42.98	6.60	49.58	54.00	-4.42	AVG	
3		5841.000	39.44	8.31	47.75	74.00	-26.25	peak	
4		7440.000	37.87	9.64	47.51	74.00	-26.49	peak	
5		8966.500	37.96	12.32	50.28	74.00	-23.72	peak	
6		9920.000	34.75	12.14	46.89	74.00	-27.11	peak	
7		11022.75	37.85	13.32	51.17	74.00	-22.83	peak	

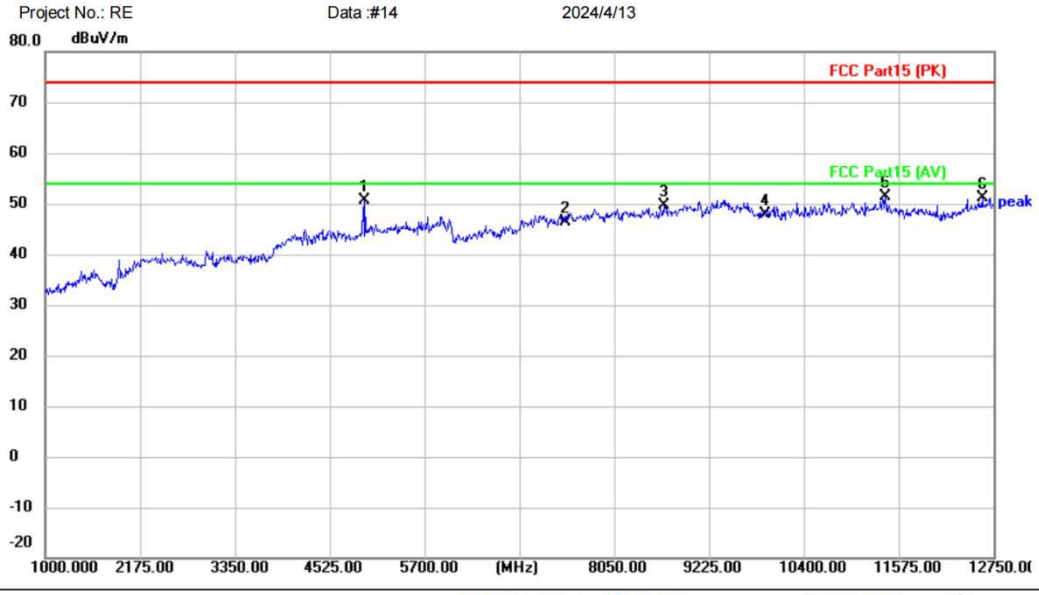
*:Maximum data x:Over limit !:over margin 〈Reference Only

Receiver: ESR_1
Antenna: EZ 9120D 1G-18G

Spectrum Analyzer: FSP40
Engineer Signature:

Test Result: Pass

[TestMode: TX high channel]; [Polarity: Vertical]



Site
Limit: FCC Part15 (PK)
EUT: Skin Hydration Detector
M/N: SkinDr400-Hydro-TB
Mode: TX-2480
Note:

Polarization: *Vertical*
Power:

Temperature: (C)
Humidity: %RH

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4959.750	44.07	6.60	50.67	74.00	-23.33	peak	
2		7440.000	36.70	9.64	46.34	74.00	-27.66	peak	
3		8661.000	38.23	11.34	49.57	74.00	-24.43	peak	
4		9920.000	35.86	12.14	48.00	74.00	-26.00	peak	
5	*	11410.50	38.83	12.61	51.44	74.00	-22.56	peak	
6		12609.00	38.21	12.99	51.20	74.00	-22.80	peak	

*:Maximum data x:Over limit !:over margin 〈Reference Only

Receiver: ESR_1
Antenna: EZ 9120D 1G-18G

Spectrum Analyzer: FSP40
Engineer Signature:

Test Result: Pass

Remark:

1. Final Level =Receiver Read level + Correct factor
2. Correct factor = Antenna Factor + Cable Loss – Preamplifier Factor
3. The emission levels of other frequencies are very lower than the limit and not show in test report.

14 Radiated emissions which fall in the restricted bands

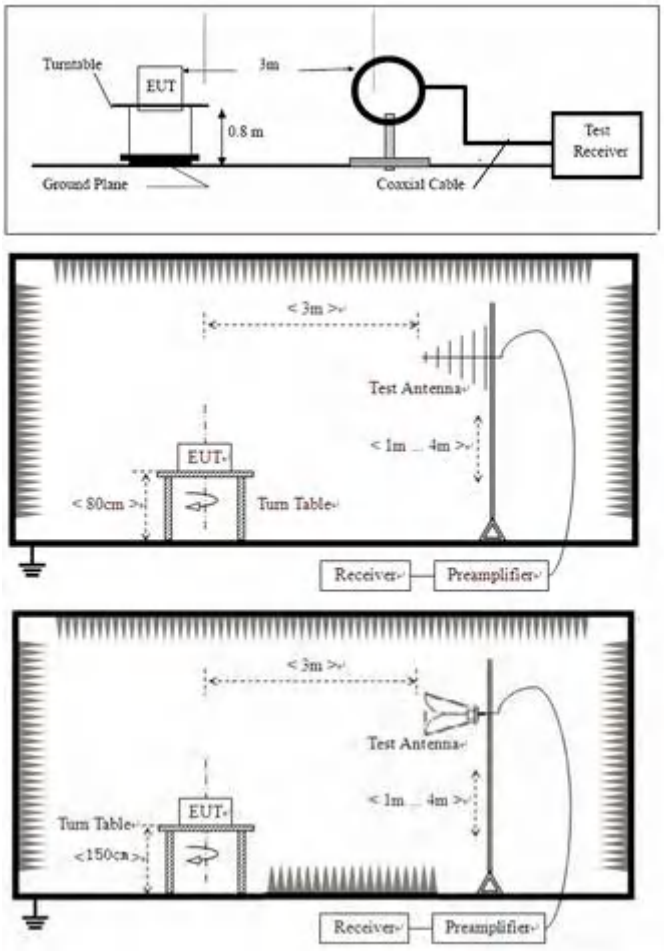
Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 6.10.5
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Jozu
Temperature	25℃
Humidity	60%

14.1 Limits

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.

14.2 Test setup



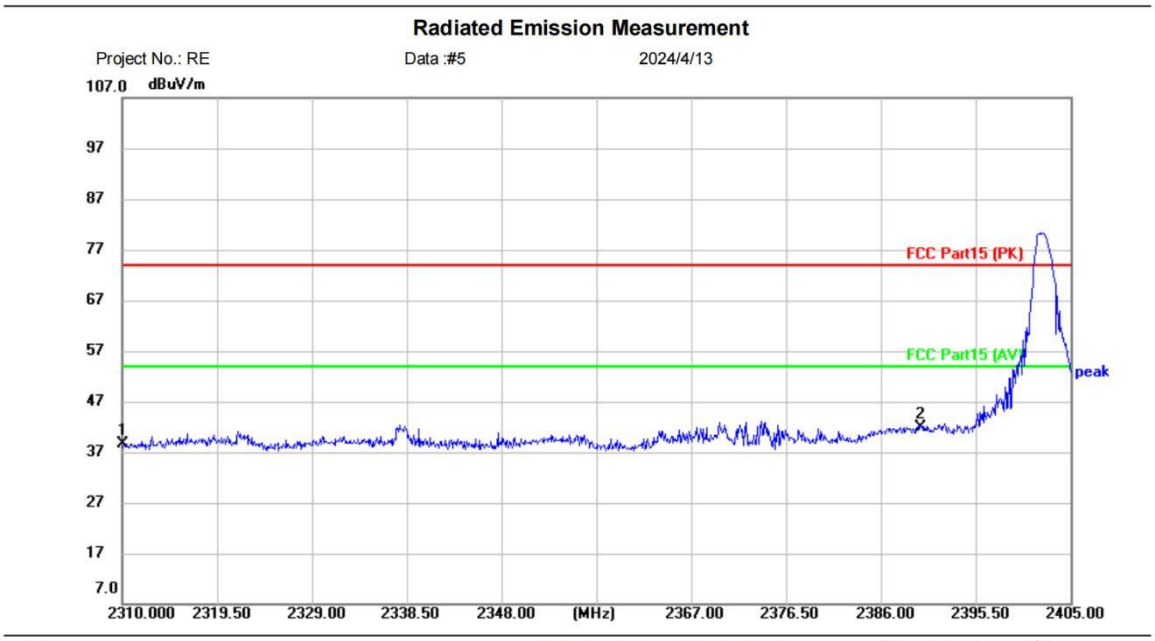
14.3 Procedure

a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

h. Test the EUT in the lowest channel, the middle channel, the highest channel.
i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
j. Repeat above procedures until all frequencies measured was complete.
Remark 1: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor
Remark 2: For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.

14.4 Test data

[TestMode: TX low channel]; [Polarity: Horizontal]



Site
Limit: FCC Part15 (PK)
EUT: Skin Hydration Detector
M/N: SkinDr400-Hydro-TB
Mode: TX-2402
Note:

Polarization: ***Horizontal***
Power:

Temperature: (C)
Humidity: %RH

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		2310.000	41.59	-2.89	38.70	74.00	-35.30	peak	
2	*	2390.000	44.57	-2.70	41.87	74.00	-32.13	peak	

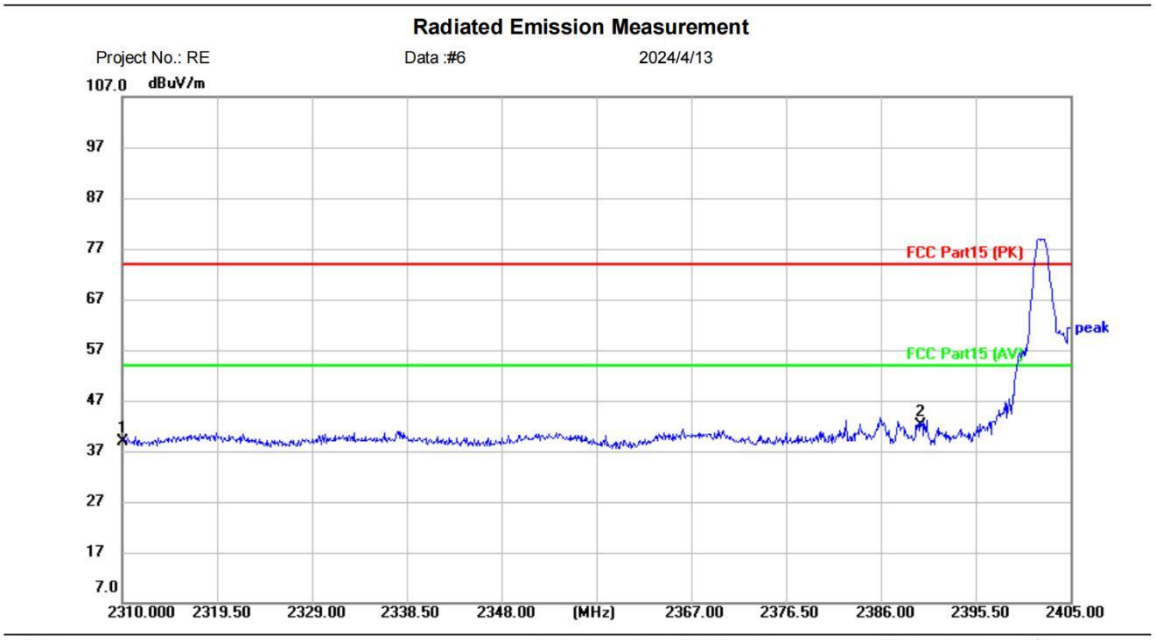
*:Maximum data x:Over limit !:over margin 〈Reference Only

Receiver: ESR_1
Antenna: EZ 9120D 1G-18G

Spectrum Analyzer: FSP40
Engineer Signature:

Test Result: Pass

[TestMode: TX low channel]; [Polarity: Vertical]



Site
Limit: FCC Part15 (PK)
EUT: Skin Hydration Detector
M/N: SkinDr400-Hydro-TB
Mode: TX-2402
Note:

Polarization: *Vertical*
Power:

Temperature: (C)
Humidity: %RH

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		2310.000	41.84	-2.89	38.95	74.00	-35.05	peak	
2	*	2390.000	44.79	-2.70	42.09	74.00	-31.91	peak	

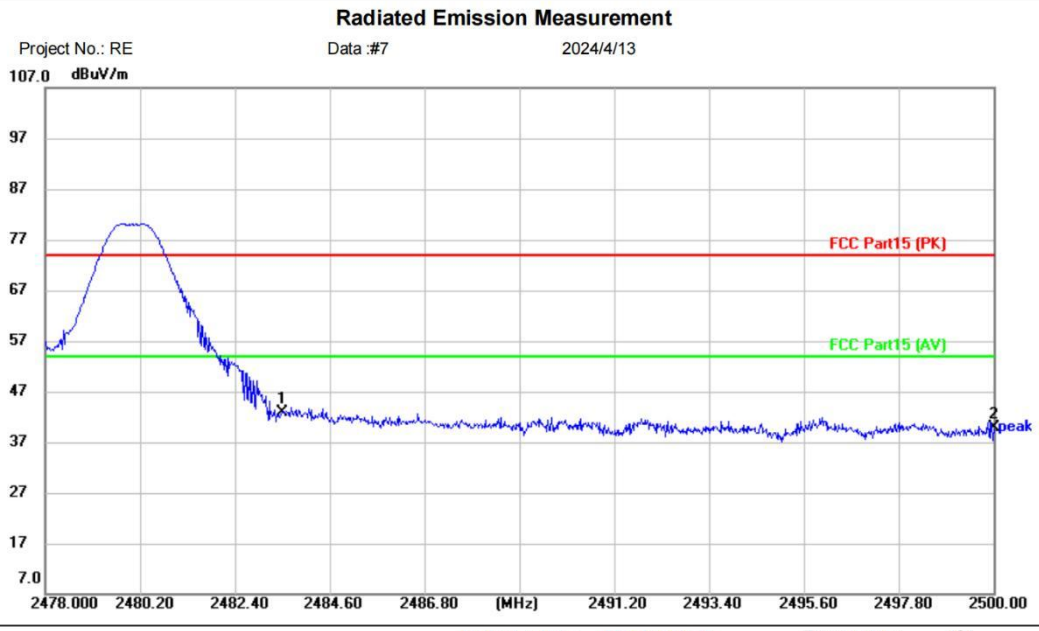
*:Maximum data x:Over limit !:over margin 〈Reference Only

Receiver: ESR_1
Antenna: EZ 9120D 1G-18G

Spectrum Analyzer: FSP40
Engineer Signature:

Test Result: Pass

[TestMode: TX high channel]; [Polarity: Horizontal]



Site
Limit: FCC Part15 (PK)
EUT: Skin Hydration Detector
M/N: SkinDr400-Hydro-TB
Mode: TX-2480
Note:

Polarization: ***Horizontal***
Power:

Temperature: (C)
Humidity: %RH

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	2483.500	45.88	-2.91	42.97	74.00	-31.03	peak	
2		2500.000	42.81	-3.00	39.81	74.00	-34.19	peak	

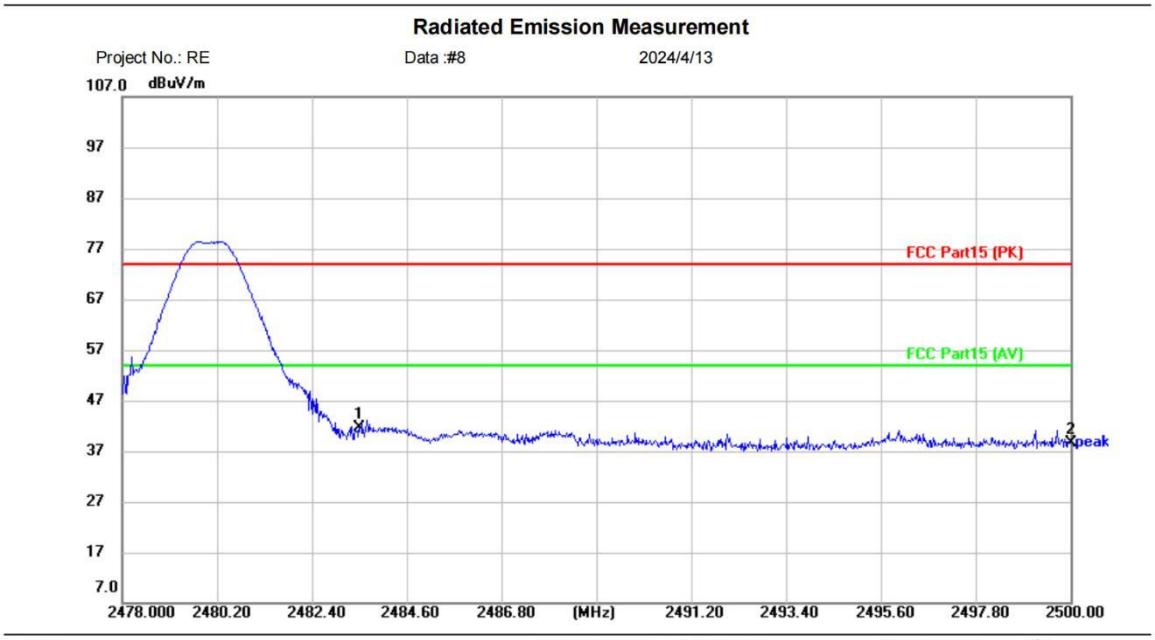
*:Maximum data x:Over limit !:over margin 〈Reference Only

Receiver: ESR_1
Antenna: EZ 9120D 1G-18G

Spectrum Analyzer: FSP40
Engineer Signature:

Test Result: Pass

[TestMode: TX high channel]; [Polarity: Vertical]



Site
Limit: FCC Part15 (PK)
EUT: Skin Hydration Detector
M/N: SkinDr400-Hydro-TB
Mode: TX-2480
Note:

Polarization: *Vertical*
Power:

Temperature: (C)
Humidity: %RH

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	2483.500	44.63	-2.91	41.72	74.00	-32.28	peak	
2		2500.000	41.63	-3.00	38.63	74.00	-35.37	peak	

*:Maximum data x:Over limit !:over margin 〈Reference Only

Receiver: ESR_1
Antenna: EZ 9120D 1G-18G
Spectrum Analyzer: FSP40
Engineer Signature:

Test Result: Pass

Remark:

1. Final Level =Receiver Read level + Correct factor
2. Correct factor = Antenna Factor + Cable Loss – Preamplifier Factor
3. The emission levels of other frequencies are very lower than the limit and not show in test report.

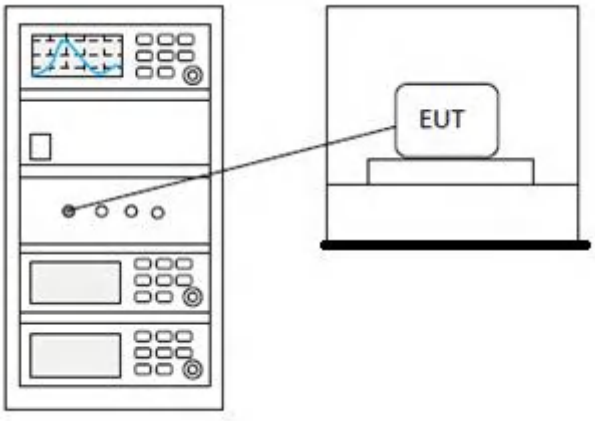
15 Conducted spurious emissions

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 7.8.6 & Section 11.11
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Jozu
Temperature	25℃
Humidity	60%

15.1 Limits

Limit:	In any 100 kHz 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 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

15.2 Test setup



15.3 Test data

Pass: Please Refer To Appendix: Appendix1 For Details

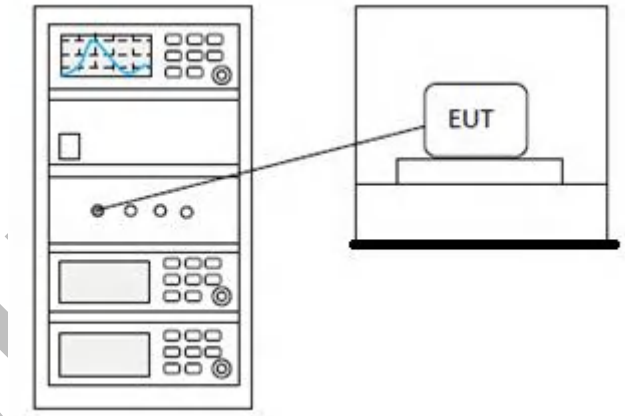
16 Power spectrum density

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 11.10.2
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Jozu
Temperature	25℃
Humidity	60%

16.1 Limits

Limit:	≤8dBm in any 3 kHz band during any time interval of continuous transmission

16.2 Test setup



16.3 Test data

Pass: Please Refer To Appendix: Appendix1 For Details

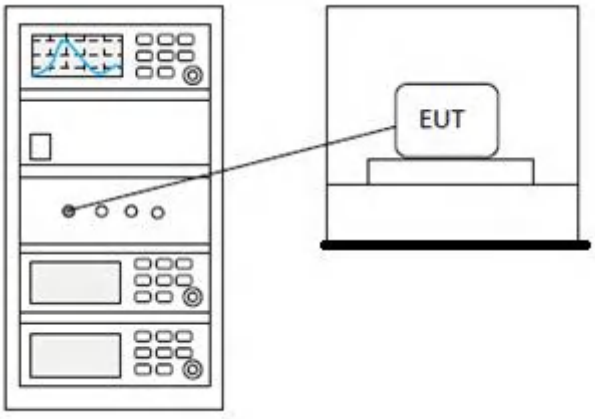
17 Conducted peak output power

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 7.8.5
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Jozu
Temperature	25℃
Humidity	60%

17.1 Limits

Frequency range(MHz)	Output power of the intentional radiator(watt)
902-928	1 for ≥50 hopping channels
	0.25 for 25≤ hopping channels <50
	1 for digital modulation
2400-2483.5	1 for ≥75 non-overlapping hopping channels
	0.125 for all other frequency hopping systems
	1 for digital modulation
5725-5850	1 for frequency hopping systems and digital modulation

17.2 Test setup



17.3 Test data

Pass: Please Refer To Appendix: Appendix1 For Details

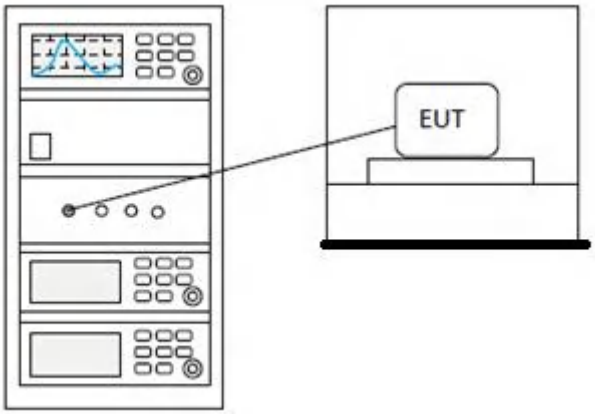
18 Minimum 6dB bandwidth

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 11.8.1
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Jozu
Temperature	25℃
Humidity	60%

18.1 Limits

Limit:	≥500 kHz

18.2 Test setup



18.3 Test data

Pass: Please Refer To Appendix: Appendix1 For Details

19 Antenna requirement

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	N/A

19.1 Conclusion

Standard Requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit permanently attached antenna or of an so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

EUT Antenna:

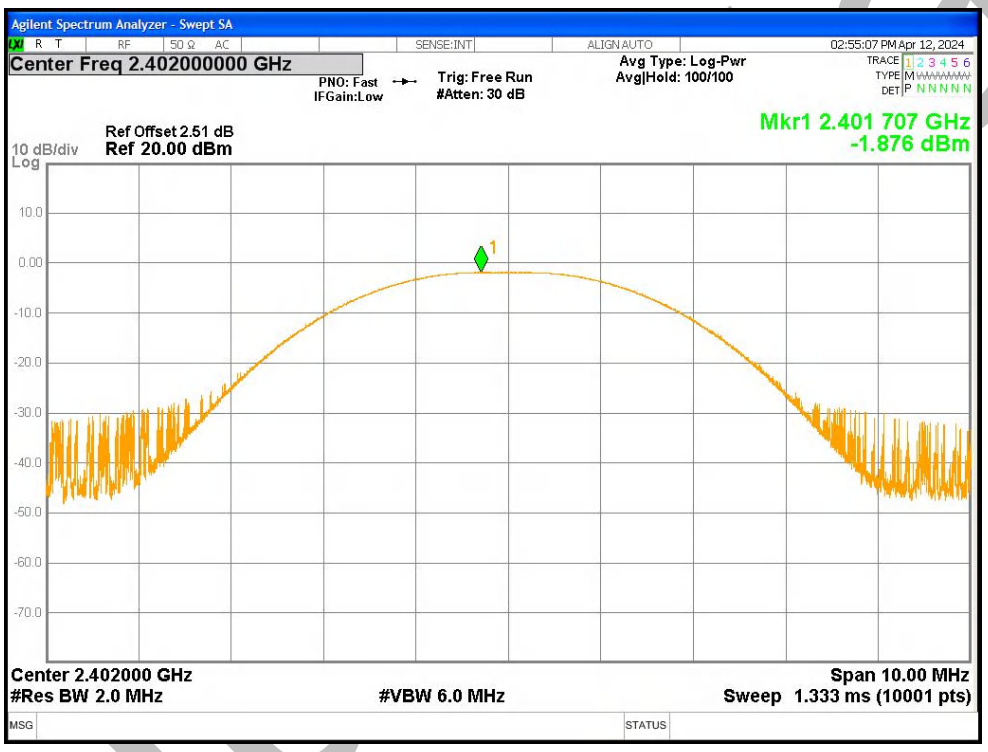
The best case gain of the antenna is 1.5dBi.

20 Appendix1

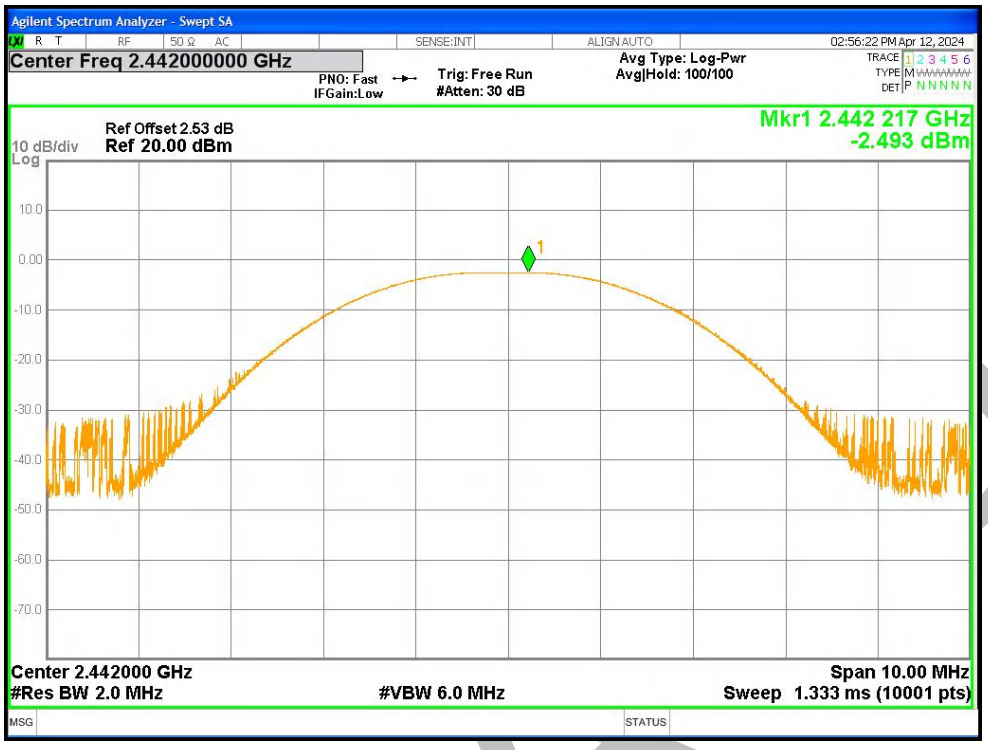
Maximum Conducted Output Power

Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	BLE	2402	Ant1	-1.876	30	Pass
NVNT	BLE	2442	Ant1	-2.493	30	Pass
NVNT	BLE	2480	Ant1	-2.675	30	Pass

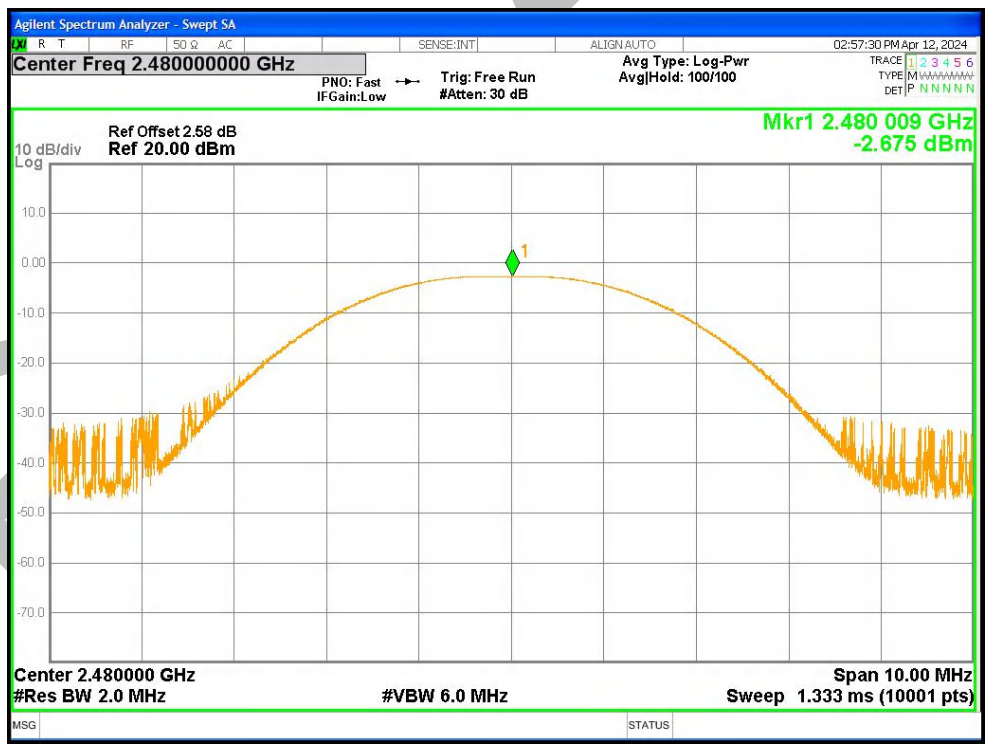
Power NVNT BLE 2402MHz Ant1



Power NVNT BLE 2442MHz Ant1



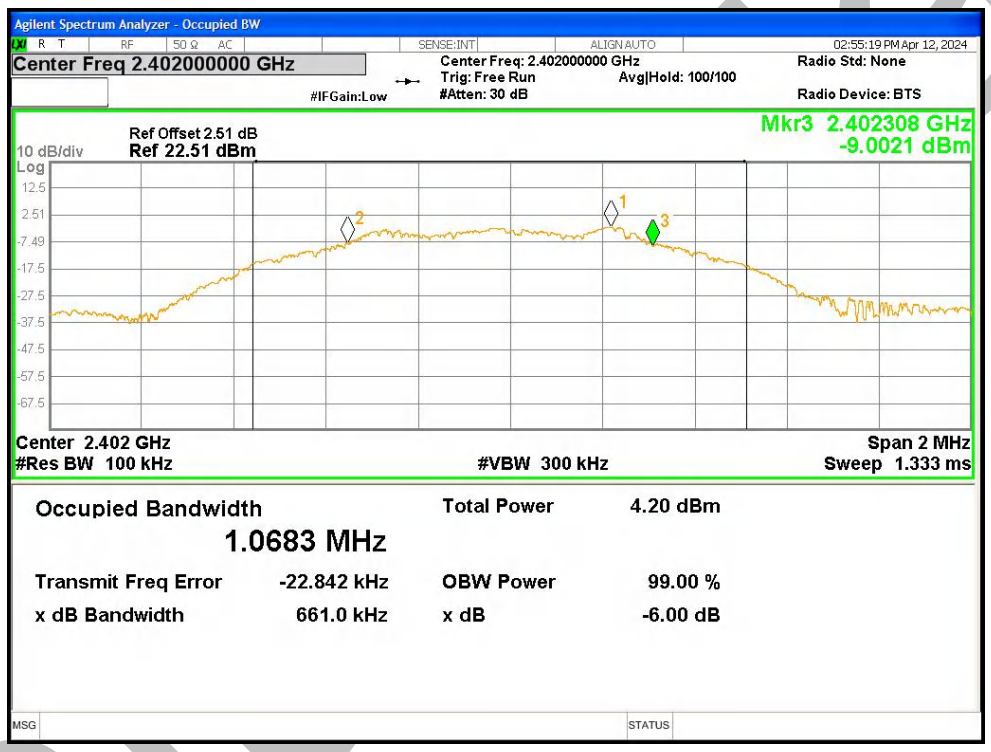
Power NVNT BLE 2480MHz Ant1



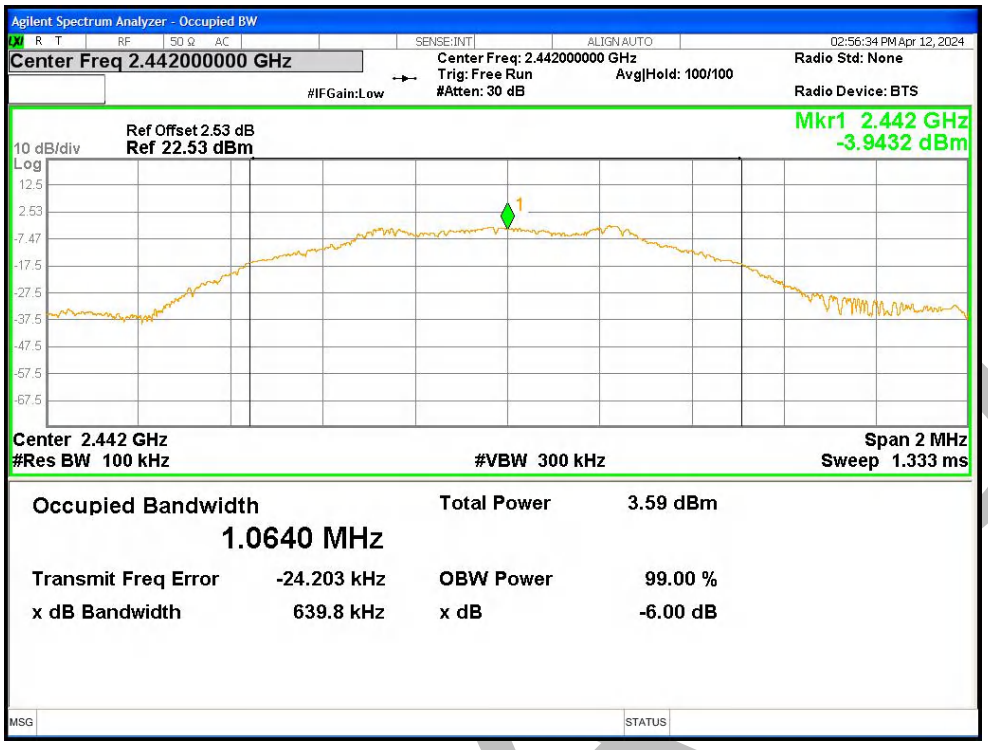
-6dB Bandwidth

Condition	Mode	Frequency (MHz)	Antenna	-6 dB Bandwidth (MHz)	Limit -6 dB Bandwidth (MHz)	Verdict
NVNT	BLE	2402	Ant1	0.661	0.5	Pass
NVNT	BLE	2442	Ant1	0.64	0.5	Pass
NVNT	BLE	2480	Ant1	0.702	0.5	Pass

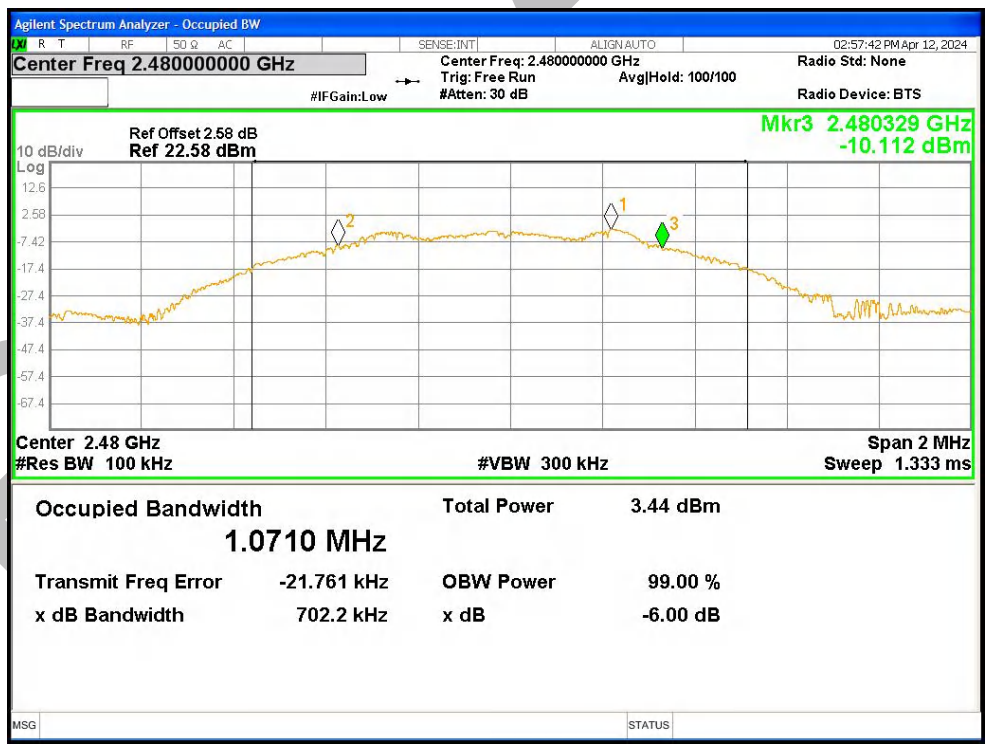
-6dB Bandwidth NVNT BLE 2402MHz Ant1



-6dB Bandwidth NVNT BLE 2442MHz Ant1



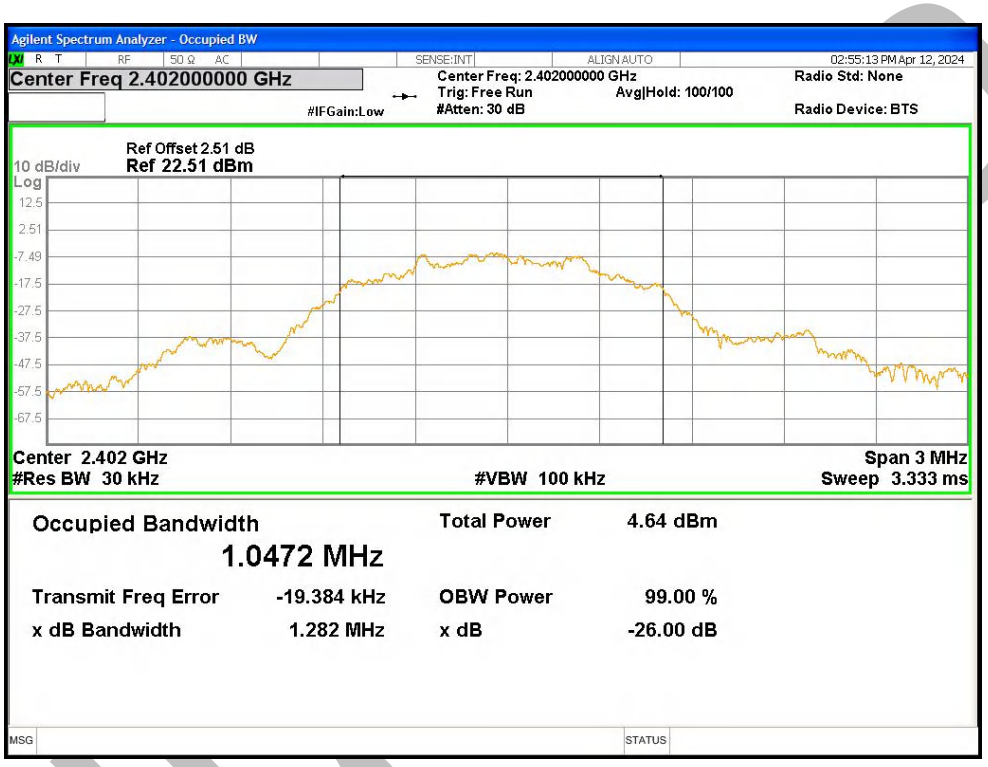
-6dB Bandwidth NVNT BLE 2480MHz Ant1



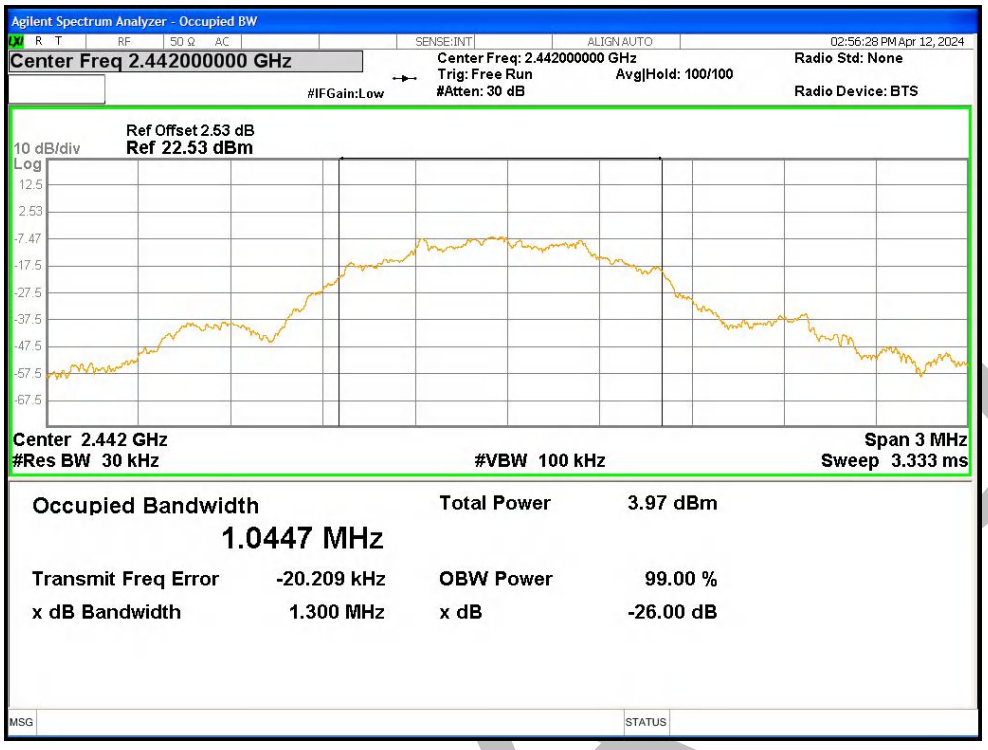
Occupied Channel Bandwidth

Condition	Mode	Frequency (MHz)	Antenna	99% OBW (MHz)
NVNT	BLE	2402	Ant1	1.047242051
NVNT	BLE	2442	Ant1	1.044711763
NVNT	BLE	2480	Ant1	1.053355892

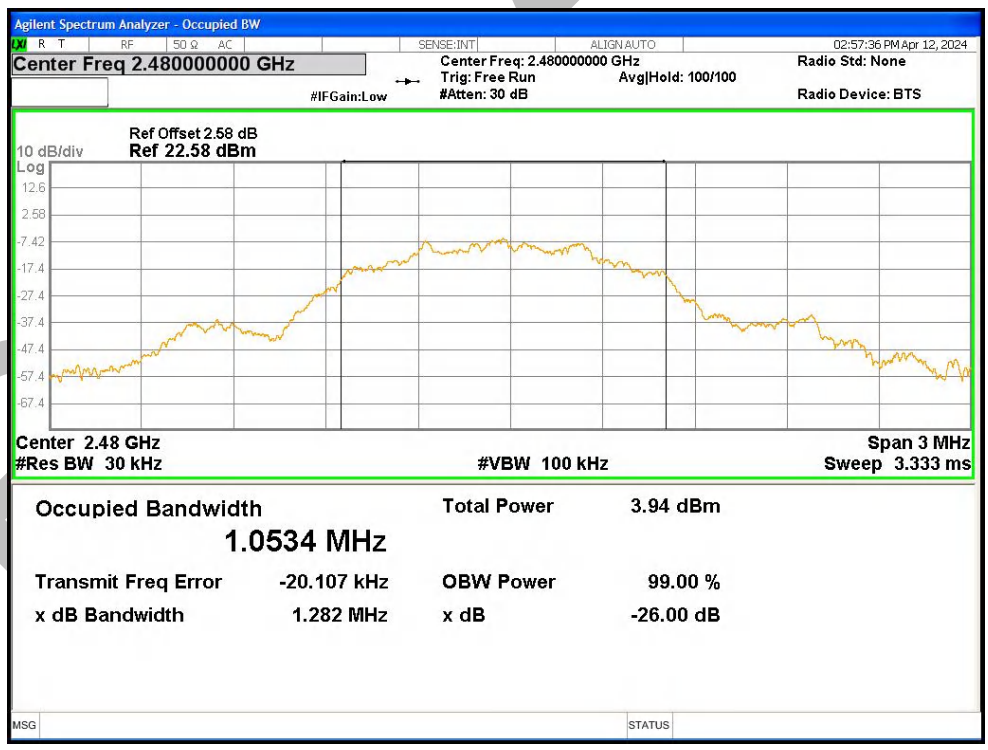
OBW NVNT BLE 2402MHz Ant1



OBW NVNT BLE 2442MHz Ant1



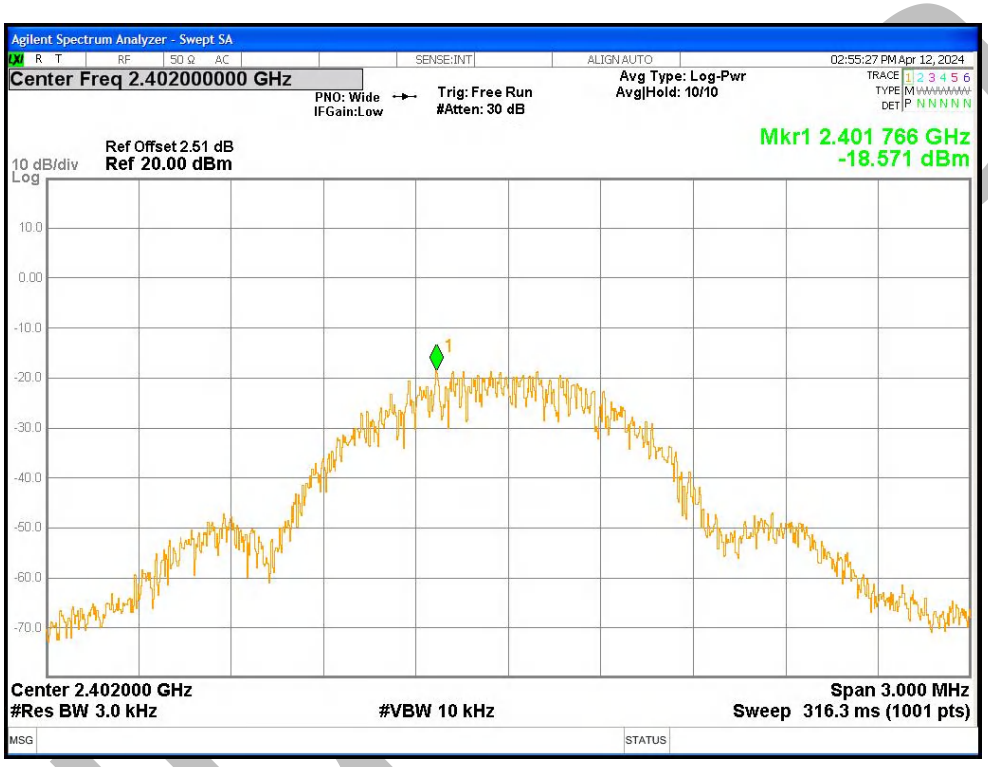
OBW NVNT BLE 2480MHz Ant1



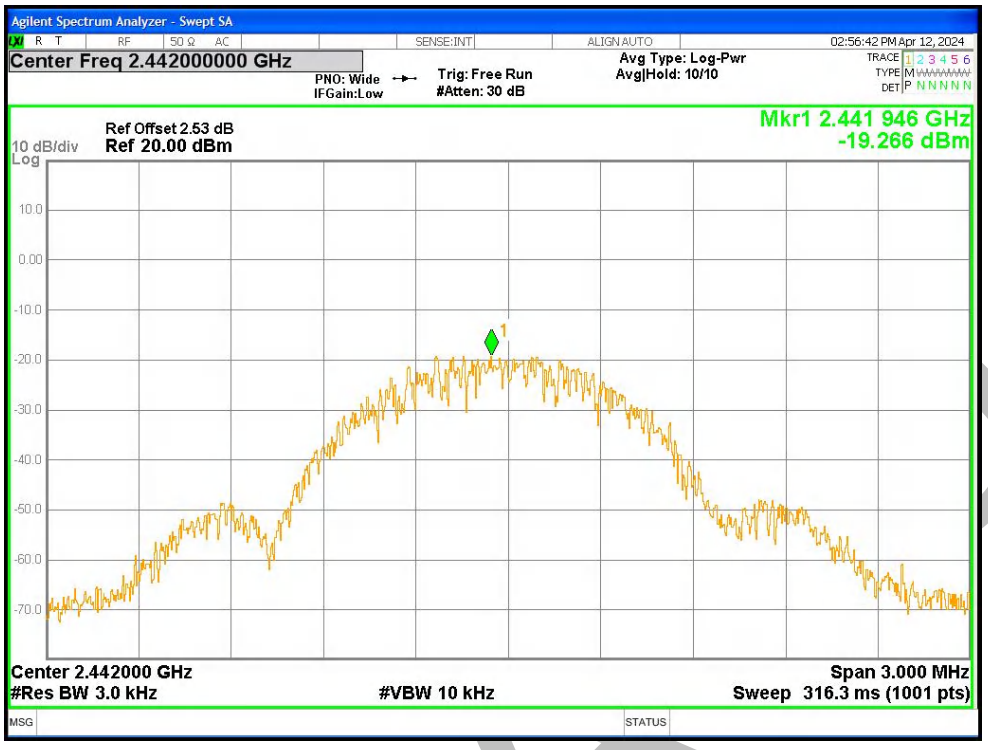
Maximum Power Spectral Density Level

Condition	Mode	Frequency (MHz)	Antenna	Max PSD (dBm)	Limit (dBm)	Verdict
NVNT	BLE	2402	Ant1	-18.571	8	Pass
NVNT	BLE	2442	Ant1	-19.266	8	Pass
NVNT	BLE	2480	Ant1	-19.7	8	Pass

PSD NVNT BLE 2402MHz Ant1



PSD NVNT BLE 2442MHz Ant1



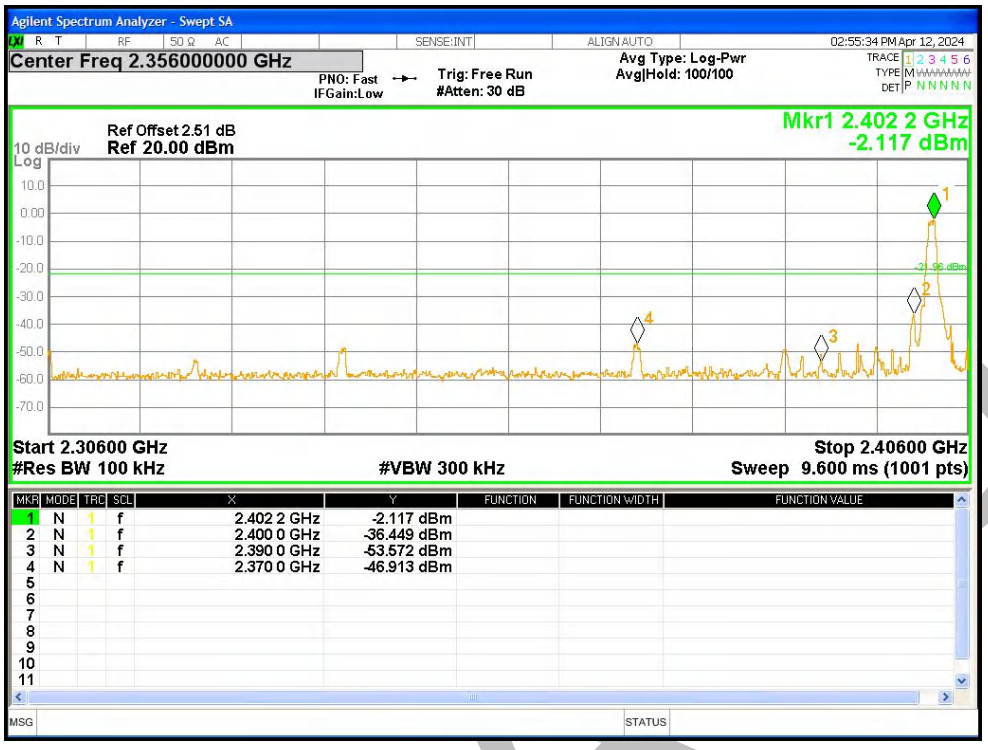
PSD NVNT BLE 2480MHz Ant1

Band Edge

Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	BLE	2402	Ant1	-44.96	-20	Pass
NVNT	BLE	2480	Ant1	-42.83	-20	Pass

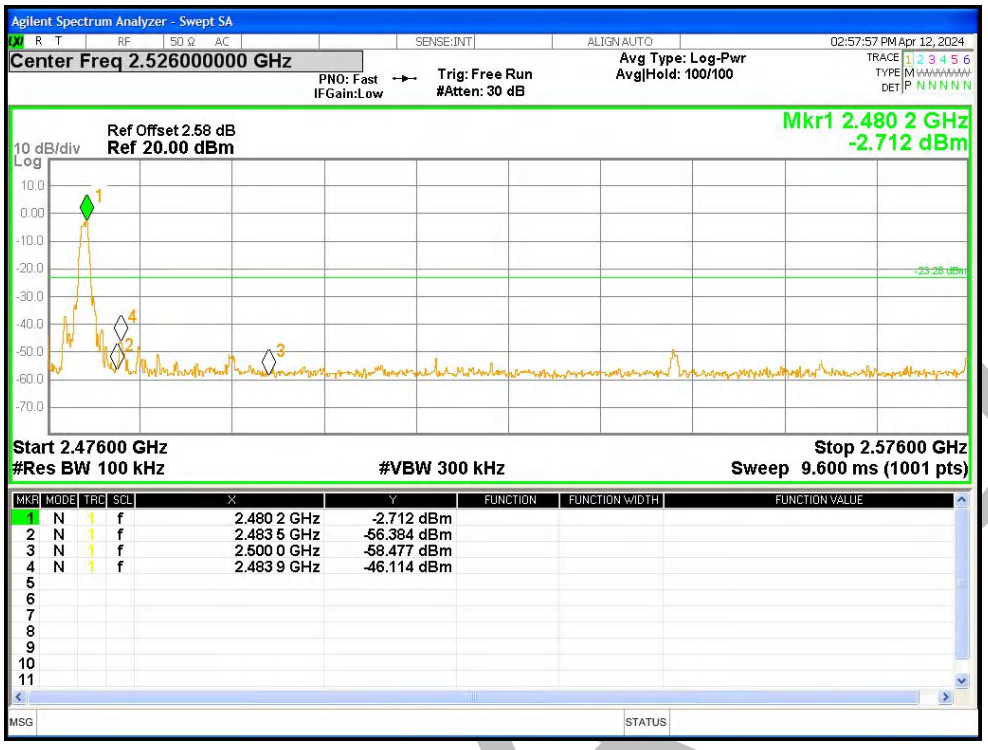
Band Edge NVNT BLE 2402MHz Ant1 Ref

Band Edge NVNT BLE 2402MHz Ant1 Emission



Band Edge NVNT BLE 2480MHz Ant1 Ref

Band Edge NVNT BLE 2480MHz Ant1 Emission

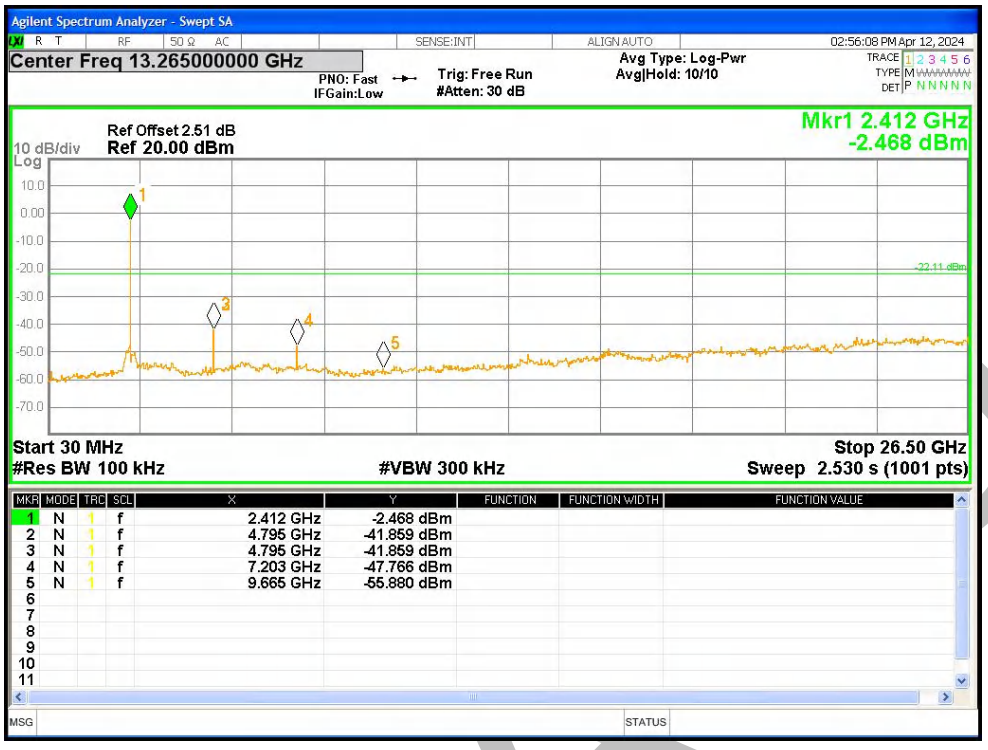

Agilent Spectrum Analyzer - Swept SA
Center Freq 2.526000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 100/100
02:57:57 PM Apr 12, 2024
Ref Offset 2.58 dB
10 dB/div
Log
Ref 20.00 dBm
Mkr1 2.480 2 GHz
-2.712 dBm
-23.28 dBm
Start 2.47600 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.57600 GHz
Sweep 9.600 ms (1001 pts)
1 N 1 f 2.480 2 GHz -2.712 dBm
2 N 1 f 2.483 5 GHz -56.384 dBm
3 N 1 f 2.500 0 GHz -58.477 dBm
4 N 1 f 2.483 9 GHz -46.114 dBm

Conducted RF Spurious Emission

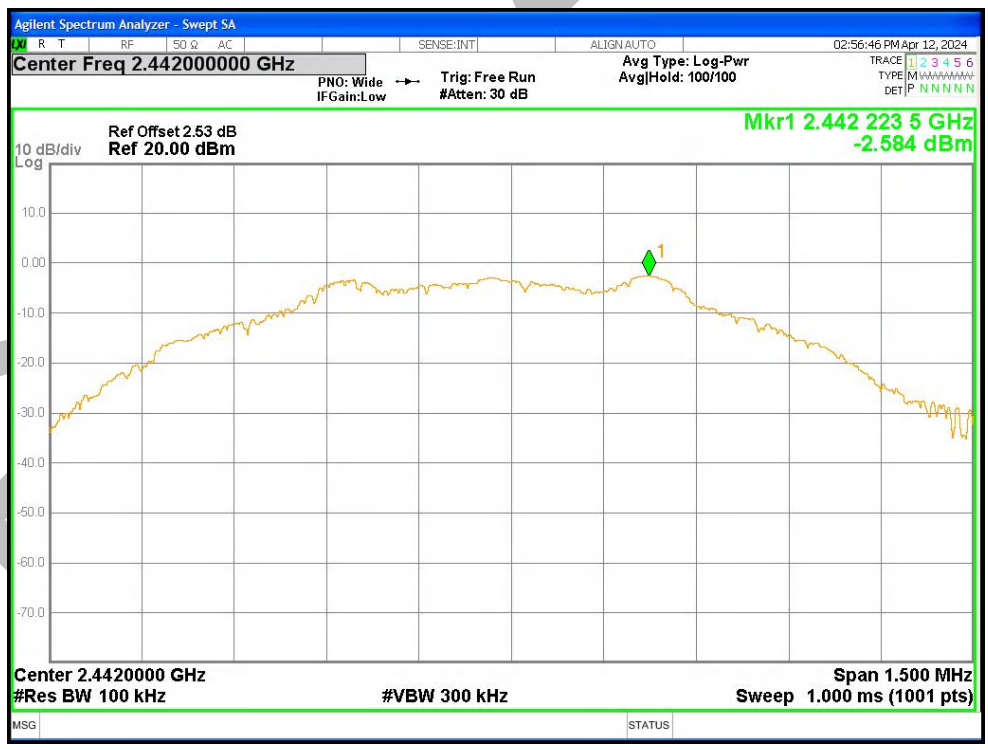
Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	BLE	2402	Ant1	-39.75	-20	Pass
NVNT	BLE	2442	Ant1	-38.2	-20	Pass
NVNT	BLE	2480	Ant1	-36.52	-20	Pass

Tx. Spurious NVNT BLE 2402MHz Ant1 Ref

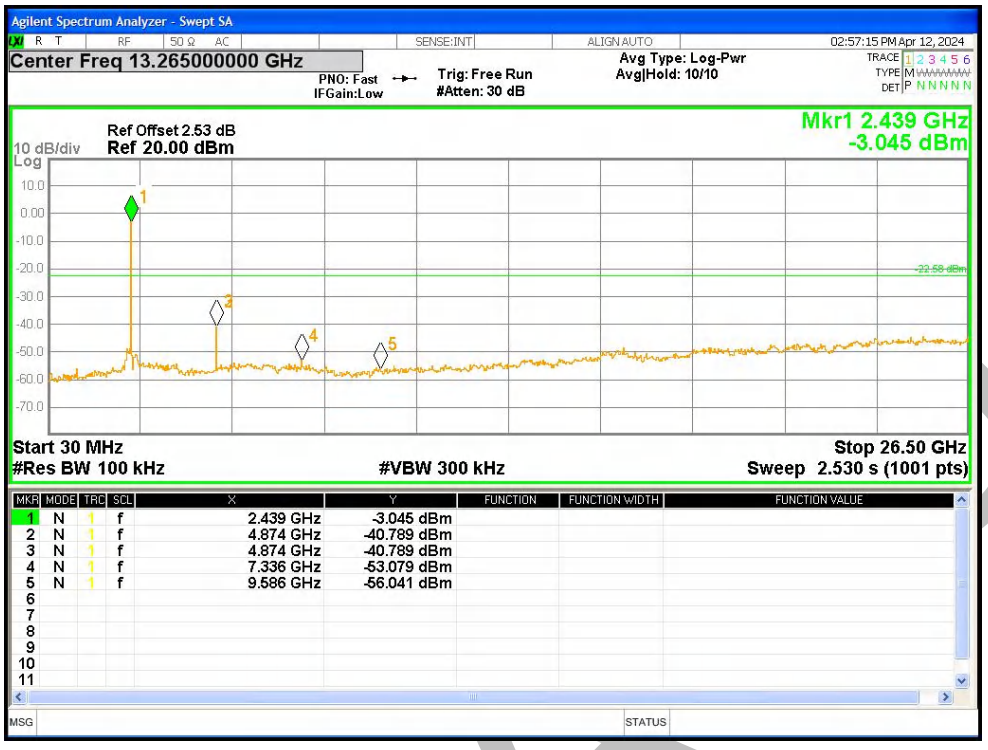
Tx. Spurious NVNT BLE 2402MHz Ant1 Emission



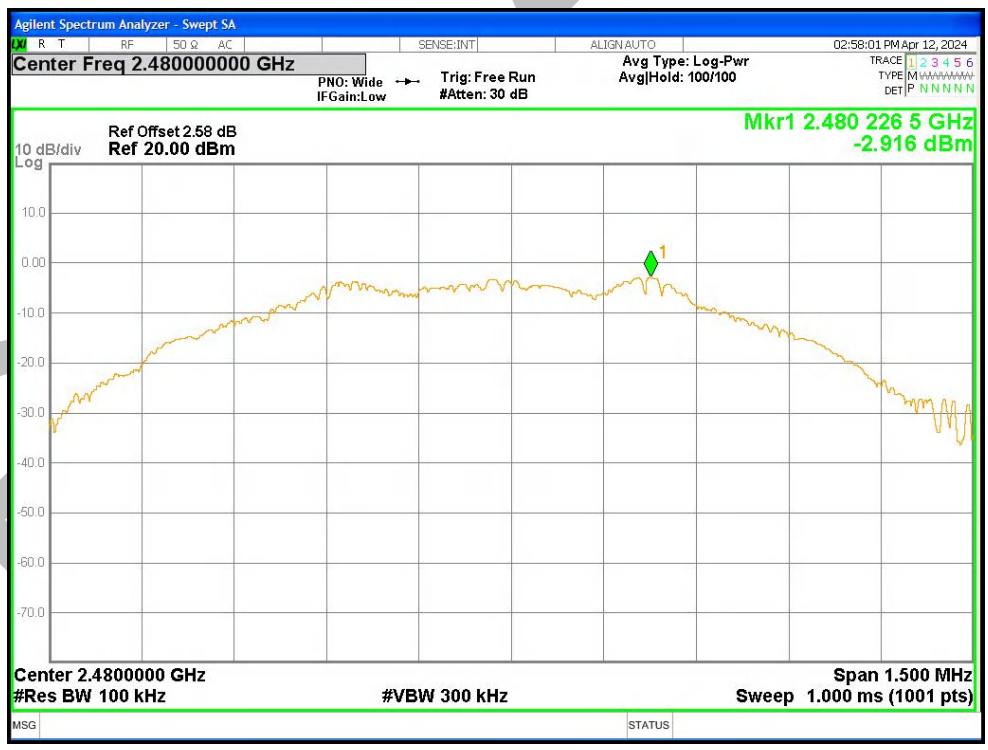
Tx. Spurious NVNT BLE 2442MHz Ant1 Ref



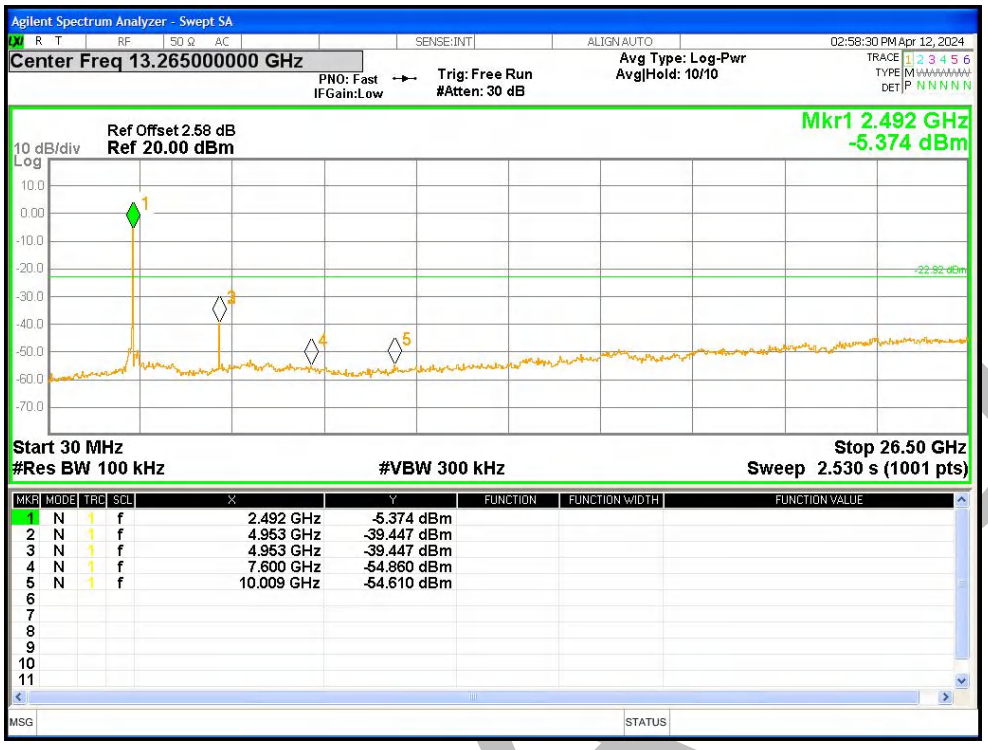
Tx. Spurious NVNT BLE 2442MHz Ant1 Emission



Tx. Spurious NVNT BLE 2480MHz Ant1 Ref

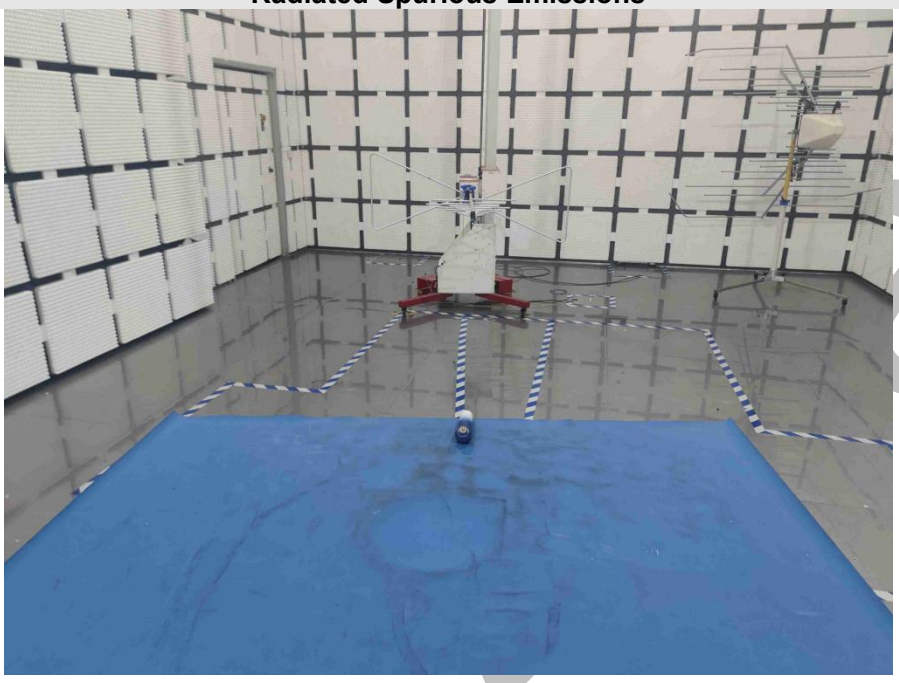


Tx. Spurious NVNT BLE 2480MHz Ant1 Emission

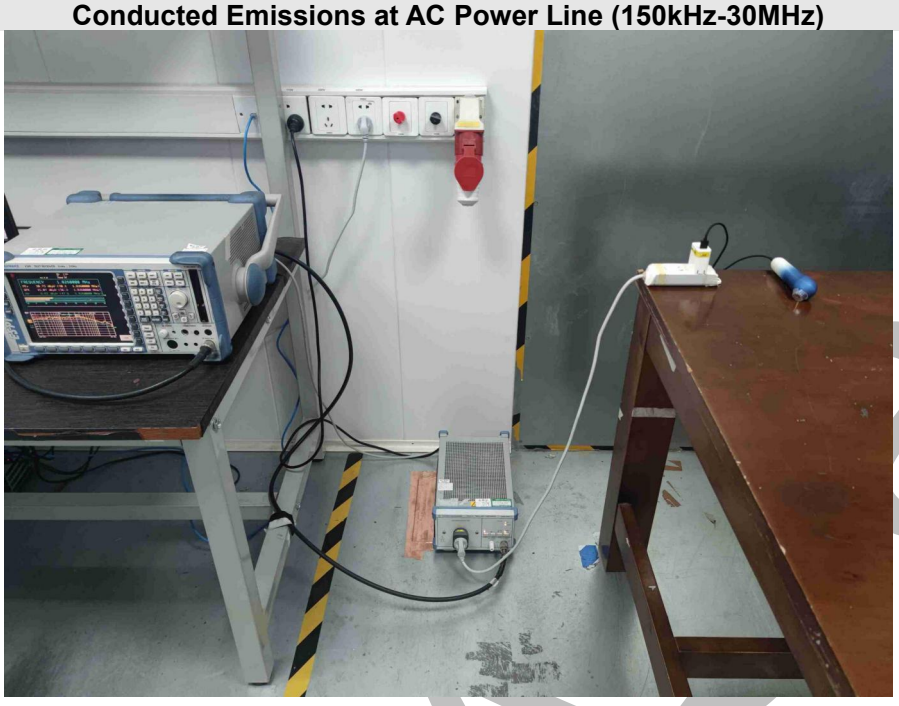

Agilent Spectrum Analyzer - Swept SA
Center Freq 13.265000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 10/10
02:58:30 PM Apr 12, 2024
Ref Offset 2.58 dB
10 dB/div
Log
Ref 20.00 dBm
Mkr1 2.492 GHz
-5.374 dBm
-22.92 dBm
Start 30 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 26.50 GHz
Sweep 2.530 s (1001 pts)
1 N 1 f 2.492 GHz -5.374 dBm
2 N 1 f 4.953 GHz -39.447 dBm
3 N 1 f 4.953 GHz -39.447 dBm
4 N 1 f 7.600 GHz -54.860 dBm
5 N 1 f 10.009 GHz -54.610 dBm
MSG
STATUS

APPENDIX A: PHOTOGRAPHS OF TEST SETUP

Radiated Spurious Emissions



Conducted Emissions at AC Power Line (150kHz-30MHz)



APPENDIX B: PHOTOGRAPHS OF EUT

Reference to the test report No. BLA-EMC-2024-A1501

----END OF REPORT----