



Test Report No.:
FCC2023-0002-RF

RF Test Report

EUT	:	Robot Vacuum Cleaner
MODEL	:	H1
BRAND NAME	:	N/A
APPLICANT	:	Huizhou Hai Hong Xin Chuang Technology Co., Ltd
CLASSIFICATION OF TEST	:	N/A

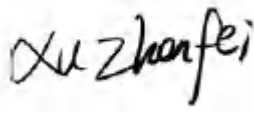
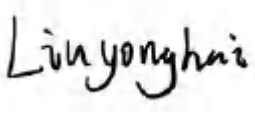
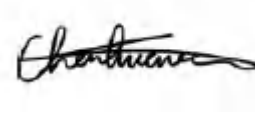
CVC Testing Technology Co., Ltd.



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Test Report No.: FCC2023-0002-RF

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Applicant		Name: Huizhou Hai Hong Xin Chuang Technology Co., Ltd Address: Second Floor, No. 268-1, Zhongkai Road 6, Chenjiang Street, Zhongkai High-tech Zone, Huizhou	
Manufacturer		Name: Huizhou Hai Hong Xin Chuang Technology Co., Ltd Address: Second Floor, No. 268-1, Zhongkai Road 6, Chenjiang Street, Zhongkai High-tech Zone, Huizhou	
Equipment Under Test		Name: Robot Vacuum Cleaner Model/Type: H1 Additional Models/Types: See Section 2.2 Brand: N/A Serial NO.: N/A Sampe NO.: 3-1	
Date of Receipt.	2023.02.14	Date of Testing	2023.02.15~2023.04.21
Test Specification		Test Result	
FCC Part 15, Subpart C, Section 15.247		PASS	
Evaluation of Test Result		The equipment under test was found to comply with the requirements of the standards applied. Seal of CVC Issue Date: 2023.04.22	
Tested by:  Xu ZhenFei Name Signature		Reviewed by:  Liu YongHai Name Signature	Approved by:  Chen HuaWen Name Signature
Other Aspects: NONE.			
Abbreviations: OK, Pass= passed Fail = failed N/A= not applicable EUT= equipment, sample(s) under tested			

This test report relates only to the EUT, and shall not be reproduced except in full, without written approval of CVC.



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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
FCC2023-0002-RF	Original release	2023.04.22



1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15 Subpart C			
STANDARD SECTION	TEST TYPE AND LIMIT	RESULT	REMARK
FCC Part 15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit.
FCC Part 15.247(d) FCC Part 15.209	Radiated Emission and Restricted bands Measurements	PASS	Meet the requirement of limit.
FCC Part 15.247(d)	Out of band Emission and Band edge measurements	PASS	Meet the requirement of limit.
FCC Part 15.247(a)(2)	6dB Bandwidth Measurement	PASS	Meet the requirement of limit.
---	Occupied Channel Bandwidth	N/A	For reference
FCC Part 15.247(b)	Conducted Output power	PASS	Meet the requirement of limit.
FCC Part 15.247(e)	Power Spectral Density	PASS	Meet the requirement of limit.
FCC Part 15.203 FCC Part 15.247(b)	Antenna Requirement	PASS	Meet the requirement of limit.



1.1 LIST OF TEST AND MEASUREMENT INSTRUMENTS

Test Equipment	Type/Mode	SERIAL NO.	Equipment No.	Manufacturer	Cal. Due
WIFI & Bluetooth Test System 1					/
Communication Shielded Room 2	4m*3m*3m	CRTDSWKSR 44301	VGDS-0700	CRT	2024/04/24
Bluetooth system integration	/	/	-	Tonscend	/
Spectrum Analyzer	FSV40	101580	DZ-000238-3	R&S	2024/04/22
Comprehensive Test Instrument	CMW500	137779	DZ-000220	R&S	2023/07/10
Analog Signal Generator	SMB100A	181858	DZ-000238-2	R&S	2023/06/05
Vector Signal Generator	SGT100A	111661	DZ-000238-1	R&S	2023/06/05
RF Radio Frequency Switch	JS0806-2	19H9080187	`	Tonscend	2023/06/05
Programmable DC Power Supply	E3644A	MY58036222	DZ-000178	KEYSIGHT	2024/04/12
Radiation Spurious Test System					/
3m Semi-Anechoic Chamber	FACT-4	ST08035	WKNA-0024	ETS	2024/12/12
Spectrum Analyzer	N9010B	MY57470323	DZ-000174	KEYSIGHT	2024/02/22
EMI Test Receiver	N9038A-508	MY532290079	EM-000397	Agilent	2024/02/22
Broadband Antenna	VULB 9163	9163-530	EM-000342	SCHWARZBECK	2023/06/25
Waveguide Horn Antenna	HF906	360306/008	EM-000093	R&S	2024/02/24
Waveguide Horn Antenna	BBHA9170	00949	DZ-000209-2	SCHWARZBECK	2023/07/31
Preamplifier	BBV 9721	9721-050	DZ-000209-1	SCHWARZBECK	2023/06/05
Conducted emission					/
EMI Test Receiver	ESW44	103123	EM-000698	R&S	2023-06-17
EMI Test Receiver	ESR3	102394	VG DY-0705	R&S	2024-02-22
LISN	NSLK 8127	8127644	VG DY-0150	SCHWARZBECK	2023-09-03
LISN	NSLK 8128	8128-316	VG DY-0149	SCHWARZBECK	2023-09-03
DC LISN	PVDC8301-017	PVDC8301#17	VG DY-0692	SCHWARZBECK	2023-10-07
LISN	NSLK 8129	8129-268	EM-000388	SCHWARZBECK	2024-02-22
Plus Limiter (＃1)	VTSD 9561 F-N	00515	VG DY-0808	SCHWARZBECK	2024-03-03
Plus Limiter (＃2)	VTSD 9561	9561-F017	VG DY-0152	SCHWARZBECK	2024-09-03
Impedance Stabilization Network	ISN T800	27095	WKNE-0195	TESEQ	2023-09-03
Impedance Stabilization Network	NTFM8158	8158-0092	VG DY-0356	SCHWARZBECK	2023-06-06
ImpedanceStabilizationNetwork	NTFM8131	#184	EM-000498	SCHWARZBECK	2023-06-06
Voltage Probe	TK9420	9420-499	VG DY-0128	SCHWARZBECK	2024-02-22
Power Divider	4901.17.B	22643830	DB-0016	HUBER+SUHNER	2023-08-31
Video Signal Generator	GV-798+	151064920001	VGDS-0215	PROMAX	2023-05-29
Shielding Room(#1)	GP1A	001	WKNF-0001	LEINING	2024-08-07



1.2 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

No.	ITEM	FREQUENCY	UNCERTAINTY
1	Conducted emissions	9kHz~30MHz	±2.66dB
2	Radiated emissions	9KHz ~ 30MHz	±0.769dB
		30MHz ~ 1GMHz	±0.877dB
		1GHz ~ 18GHz	±0.777dB
		18GHz ~ 40GHz	±1.315dB

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

1.3 TEST LOCATION

The tests and measurements refer to this report were performed by EMC testing Lab. of CVC Testing Technology Co., Ltd.

Address: No.3,TiantaiyiRoad,KaitaiAvenue,ScienceCity,Guangzhou,China

Post Code: 510663 Tel: 020-32293888

FAX: 020-32293889 E-mail: office@cvc.org.cn



2 GENERAL INFORMATION

2.1 GENERAL PRODUCT INFORMATION

PRODUCT	Robot Vacuum Cleaner										
BRAND	N/A										
MODEL	H1										
ADDITIONAL MODEL	See Section 2.2										
FCC ID	2BBE5-H1										
POWER SUPPLY	DC 14.8V From Rechargeable Li-ion Battery										
MODULATIONTECHNOLOGY	DSSS, GFSK, OFDM										
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 16QAM, QPSK, BPSK for OFDM GFSK for DTS										
OPERATING FREQUENCY	2412MHz ~ 2462MHz for 11b/g/n(HT20) 2402MHz ~ 2480MHz for BT-LE (1Mbps)										
NUMBER OF CHANNEL	802.11b/g/n (HT20): 11 BT-LE GFSK (1Mbps): 40										
PEAK OUTPUT POWER	WLAN: 15.46dBm (Maximum) BLE: 5.19dBm (Maximum)										
ANTENNA TYPE (Remark 4)	WLAN: PCB Antenna, with 2.54dBi gain BT-LE: PCB Antenna, with 2.54dBi gain										
HARDWARE VERSION:	V1.1										
SOFTWARE VERSION:	V1.2.0										
I/O PORTS	Refer to user's manual										
CABLE SUPPLIED	N/A										
Remark: - For more detailed features description, please refer to the manufacturer's specifications or the User's Manual. - For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report. - Please refer to the EUT photo document for detailed product photo. (Report NO.: FCC2023-0002-E) - Please refer to the antenna report. - The EUT have SISO function, provides 1 completed transmitter and 1 receiver.<table><tr><th>MODULATION MODE</th><th>TX FUNCTION</th></tr><tr><td>802.11b</td><td>1TX/1RX</td></tr><tr><td>802.11g</td><td>1TX/1RX</td></tr><tr><td>802.11n (HT20)</td><td>1TX/1RX</td></tr><tr><td>BT-LE (1Mbps)</td><td>1TX/1RX</td></tr></table>		MODULATION MODE	TX FUNCTION	802.11b	1TX/1RX	802.11g	1TX/1RX	802.11n (HT20)	1TX/1RX	BT-LE (1Mbps)	1TX/1RX
MODULATION MODE	TX FUNCTION										
802.11b	1TX/1RX										
802.11g	1TX/1RX										
802.11n (HT20)	1TX/1RX										
BT-LE (1Mbps)	1TX/1RX										



2.2 ADDITIONAL MODELS/TYPES

Models
H1 pro, H2, H2 pro, XS2230, XS2230-P, H120, X6, X6S, S860, T880
Note: Just difference is the model name and brand, others are the same.

2.3 DESCRIPTION OF ACCESSORIES

Rechargeable Li-ion Battery			
Typical Capacity	No.	Specification	
2200mAh	1	Brand:	BOFUNENG
		Model No.:	4Li-ion18650NP
		Charge:	16.8V±0.05V
		Discharge:	10.80±0.08V
	2	Brand:	HUAFULIYUAN
		Model No.:	HFLY-18650
		Charge:	16.8±0.1V
		Discharge:	10.8±0.1V
	3	Brand:	Grand-Pro
		Model No.:	INR18650 4S1P
		Charge:	16.8V
		Discharge:	11.0V
2600mAh	4	Brand:	HUAFULIYUAN
		Model No.:	HFLY-18650
		Charge:	16.8±0.1V
		Discharge:	10.8±0.1V
	5	Brand:	CVE
		Model No.:	EVE-INR18650
		Charge:	16.7V
		Discharge:	11V
2550mAh	6	Brand:	Grand-Pro
		Model No.:	ICR18650 4S1P
		Charge:	16.8V
		Discharge:	11V



Fan			
Wind Pressure	No.	Specification	
1700Pa	1	Brand:	XINMINDA
		Model No.:	XYX-GB0515HGP
		Rated Voltage:	DC 14.4V
		Speed:	17000RPM±10%
	2	Brand:	SUPERNOVA
		Model No.:	QYC20A13F - 21
		Rated Voltage:	DC 14.4V
		Speed:	17800 RPM±10%
2500Pa	3	Brand:	SUPERNOVA
		Model No.:	QYC20A16F - 41
		Charge:	DC 14.4V
		Speed:	18000 RPM±10%

2.4 OTHER INFORMATION

Operating frequency of each channel

2.4G WIFI					
802.11b/g/n (HT20)					
CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)
1	2412	5	2432	9	2452
2	2417	6	2437	10	2457
3	2422	7	2442	11	2462
4	2427	8	2447		
BT-LE (1Mbps)					
CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)
0	2402	10	2422	20	2442
1	2404	11	2424	21	2444
2	2406	12	2426	22	2446
3	2408	13	2428	23	2448
4	2410	14	2430	24	2450
5	2412	15	2432	25	2452
6	2414	16	2434	26	2454
7	2416	17	2436	27	2456
8	2418	18	2438	28	2458
9	2420	19	2440	29	2460
				39	2480

The channels which were indicated in bold type of the above channel list were selected as representative test channel. Therefore, only the data of the test channels were recorded in this report.



2.5 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

Pre-scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, xyz axis and antenna ports

EUT CONFIGURE MODE	APPLICABLE TEST ITEMS				DESCRIPTION
	RE<1G	RE≥1G	PLC	APCM	
A	√	√	√	√	2.4G WIFI Function
B	√	√	√	√	BT-LE Function

Where **RE < 1G**: Radiated Emission below 1GHz
PLC: Power Line Conducted Emission

RE ≥ 1G: Radiated Emission above 1GHz
APCM: Antenna Port Conducted Measurement

RADIATED EMISSION TEST (BELOW 1 GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, XYZ axis, antenna ports (if EUT with antenna diversity architecture) and packet type.
- ☒ The worst case was found when positioned on x axis for radiated emission. Following channel(s) was (were) selected for the final test as listed below:

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	802.11b	1 to 11	1	DSSS	DBPSK	1.0

For the test results, only the worst case was shown in test report.

RADIATED EMISSION TEST (ABOVE 1 GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, XYZ axis, antenna ports (if EUT with antenna diversity architecture) and packet type.
- ☒ The worst case was found when positioned on x axis for radiated emission. Following channel(s) was (were) selected for the final test as listed below:

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE PARAMETER
A	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0 Mbps
A	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0 Mbps
A	802.11n(HT20)	1 to 11	1, 6, 11	OFDM	BPSK	MCS0
B	BT-LE	0 to 39	0,19, 39	DTS	GFSK	1.0 Mbps



POWER LINE CONDUCTED EMISSION TEST:

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, antenna ports (if EUT with antenna diversity architecture), and packet types.
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	TESTED CONDITION
A	WIFI (2.4G) Link
B	BT Link

ANTENNA PORT CONDUCTED MEASUREMENT:

- ☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, antenna ports (if EUT with antenna diversity architecture), and packet types.
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE PARAMETER
A	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0 Mbps
A	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0 Mbps
A	802.11n(HT20)	1 to 11	1, 6, 11	OFDM	BPSK	MCS0
B	BT-LE	0 to 39	0,19, 39	DTS	GFSK	1.0 Mbps

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	TEST VOLTAGE (SYSTEM)	TESTED BY
RSE<1G	25.3deg. C, 59%RH	DC 14.8V From Rechargeable Li-ion Battery	Liu ShiWei
RSE≥1G	25.3deg. C, 59%RH	DC 14.8V From Rechargeable Li-ion Battery	Liu ShiWei
PLC	25.7deg. C, 54%RH	DC 14.8V From Rechargeable Li-ion Battery	Liu ShiWei
APCM	25.7deg. C, 54%RH	DC 14.8V From Rechargeable Li-ion Battery	Liu ShiWei



2.6 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF product, according to the specifications of the manufacturers. It must comply with the requirements of the following standards:

FCC PART 15, Subpart C. Section 15.247

KDB 558074 D01 15.247 Meas Guidance v05r02

ANSI C63.10-2013

All test items have been performed and recorded as per the above standards

2.7 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Support Equipment							
NO	Description	Brand		Model No.	Serial Number		Supplied by
1	N/A	N/A		N/A	N/A		N/A
Support Cable							
NO	Description	Quantity (Number)	Length (cm)	Detachable (Yes/ No)	Shielded (Yes/ No)	Cores (Number)	Supplied by
1	N/A	N/A	N/A	N/A	N/A	N/A	N/A

3 TEST TYPES AND RESULTS

3.1 CONDUCTED EMISSION

3.1.1 Limits

TEST STANDARD: FCC Part 15, Subpart B (Section: 15.107) and ICES-003 (Class A: section 6.1)

Frequency (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	79	66	66 - 56	56 - 46
0.50 - 5.0	73	60	56	46
5.0 - 30.0	73	60	60	50

NOTE: 1. The lower limit shall apply at the transition frequencies.
 NOTE: 2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.
 NOTE: 3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

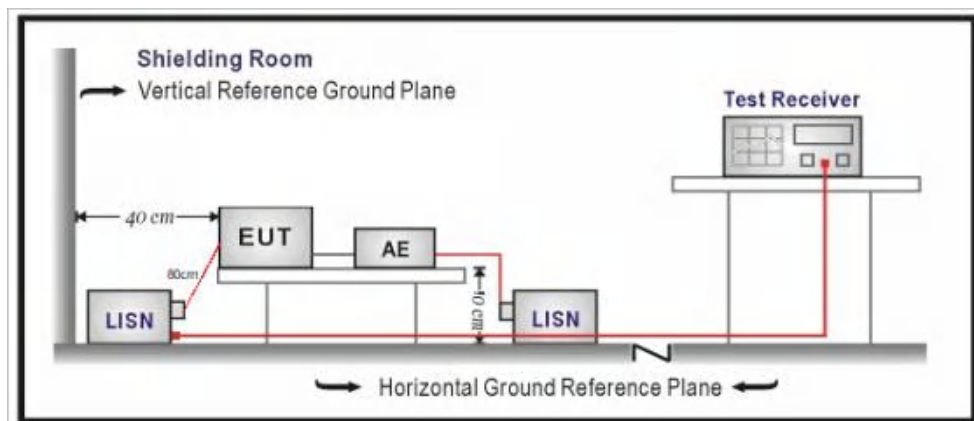
3.1.2 Test Procedures

The basic test procedure was in accordance with ANSI C63.4:2014 (section 7).

- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The test results of conducted emissions at mains ports are recorded of six worst margins for quasi-peak (mandatory) [and average (if necessary)] values against the limits at frequencies of interest unless the margin is 20 dB or greater.

Note: The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.

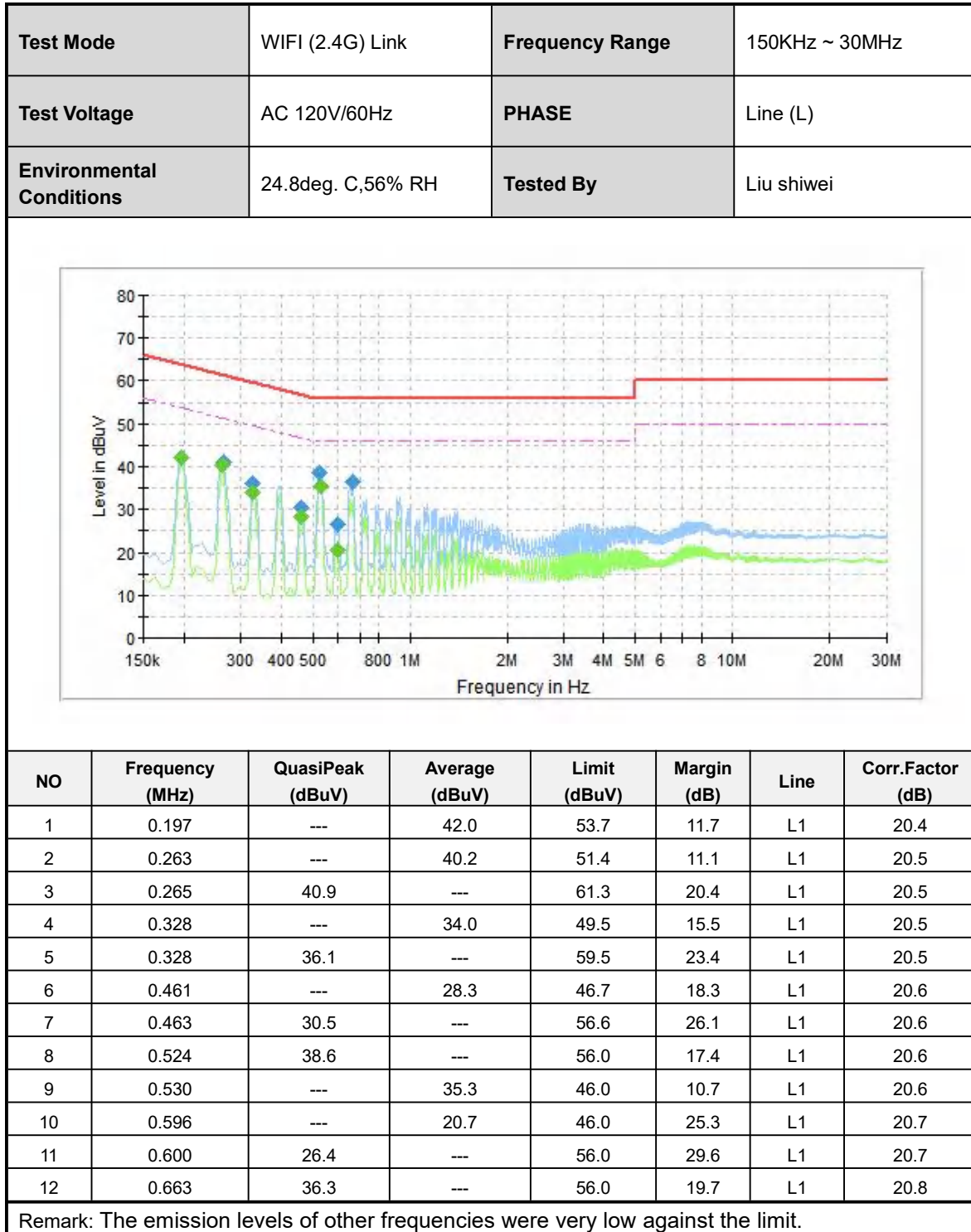
3.1.3 Test setup





3.1.4 Test Results

CONDUCTED WORST-CASE DATA:



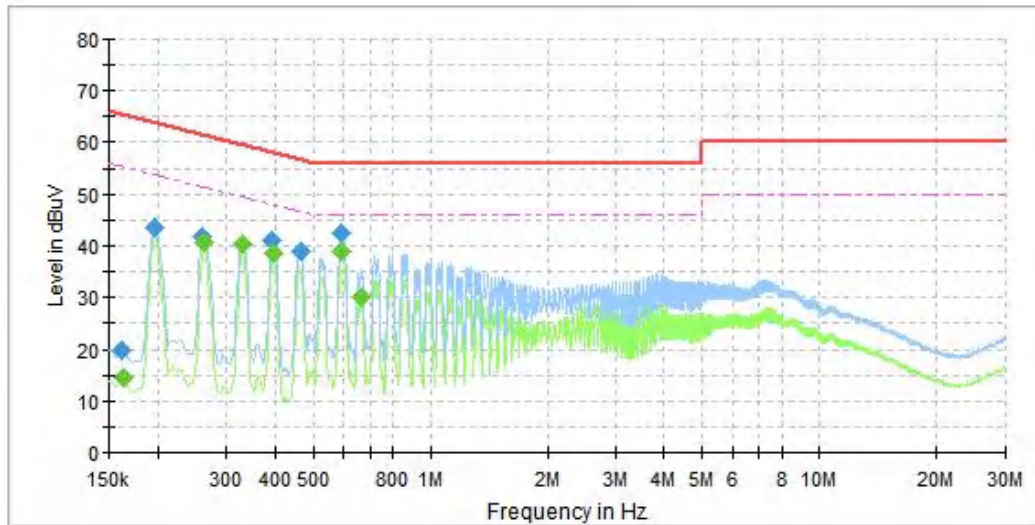


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Test Mode	WIFI (2.4G) Link	Frequency Range	150KHz ~ 30MHz
Test Voltage	AC 120V/60Hz	PHASE	Line (N)
Environmental Conditions	24.8deg. C,56% RH	Tested By	Liu shiwei



NO	Frequency (MHz)	QuasiPeak (dBuV)	Average (dBuV)	Limit (dBuV)	Margin (dB)	Line	Corr.Factor (dB)
1	0.161	19.8	---	65.4	45.6	N	20.5
2	0.164	---	14.5	55.3	40.8	N	20.5
3	0.197	43.4	---	63.7	20.3	N	20.5
4	0.260	41.8	---	61.4	19.7	N	20.6
5	0.263	---	40.8	51.4	10.5	N	20.6
6	0.330	---	40.2	49.5	9.3	N	20.7
7	0.393	40.9	---	58.0	17.1	N	20.6
8	0.395	---	38.5	48.0	9.5	N	20.6
9	0.465	39.0	---	56.6	17.6	N	20.6
10	0.589	---	39.1	46.0	6.9	N	20.6
11	0.589	42.4	---	56.0	13.6	N	20.6
12	0.663	---	30.1	46.0	15.9	N	20.7

Remark: The emission levels of other frequencies were very low against the limit.



3.2 RADIATED EMISSION AND RESTRICTED BANDS MEASUREMENTS

3.2.1 Limit

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

FREQUENCIES (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

NOTE: 1. The lower limit shall apply at the transition frequencies.
NOTE: 2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
NOTE: 3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

3.2.2 Measurement procedure

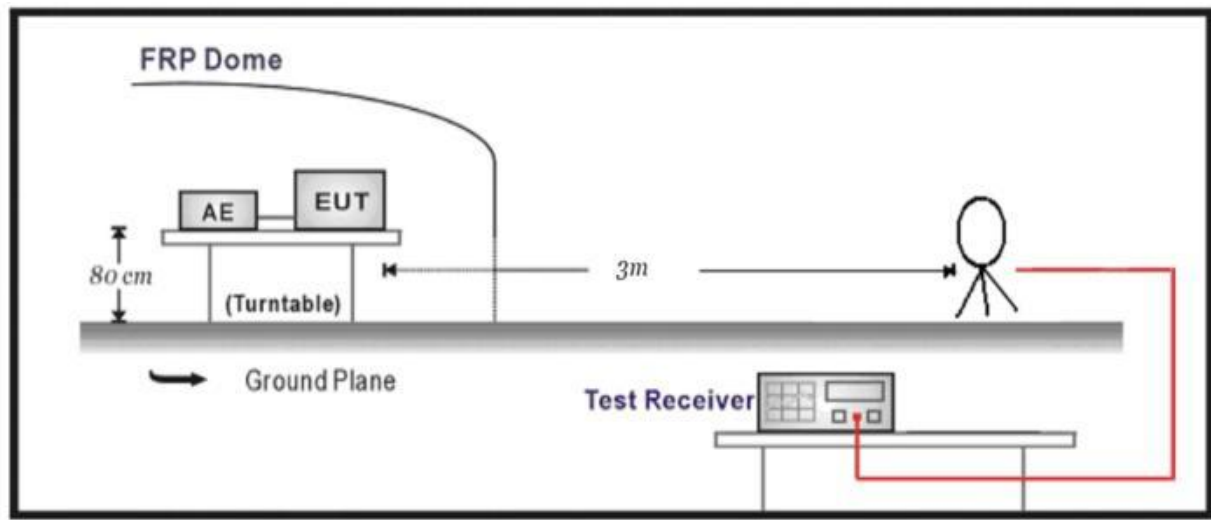
- The EUT was placed on the top of a rotating table 1.5 meters(above 1GHz) and 0.8 meters(below 1GHz) above the ground at a 3 meters semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- For below 1GHz was used bilog antenna, and above 1GHz was used horn antenna, and its 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.
- For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- For below 30MHz, a loop antenna with its vertical plane is place 3m from the EUT and rotated about its vertical axis for maximum response at each azimuth about the EUT. And the centre of the loop shall be 1m above the ground.
- During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, For battery operated equipment, the equipment tests shall be perform using fresh batteries. The turntable was rotated to maximize the emission level.

NOTE:

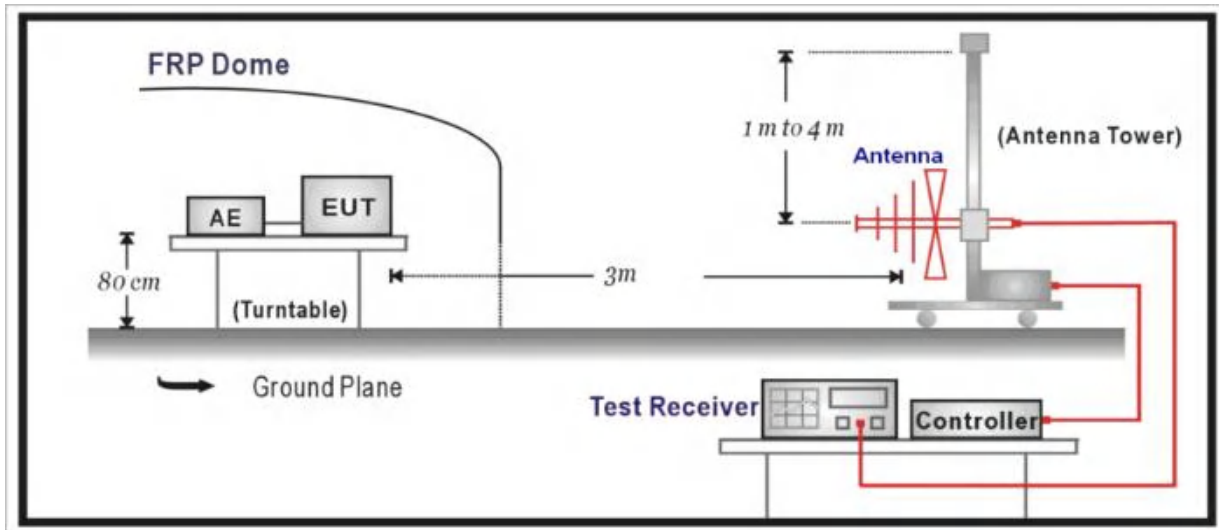
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98%) or 10Hz(Duty cycle > 98%) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.
5. The testing of the EUT was performed on all 3 orthogonal axes; the worst-case test configuration was reported on the file test setup photo.

3.2.3 Test setup

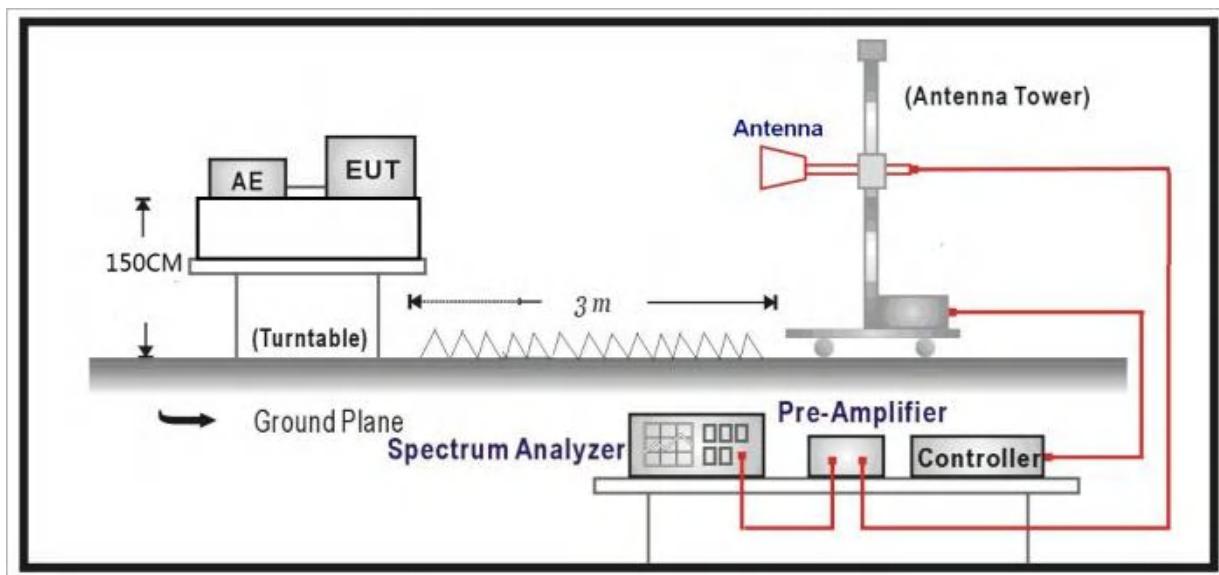
Below 30MHz Test Setup:



Below 1GHz Test Setup:



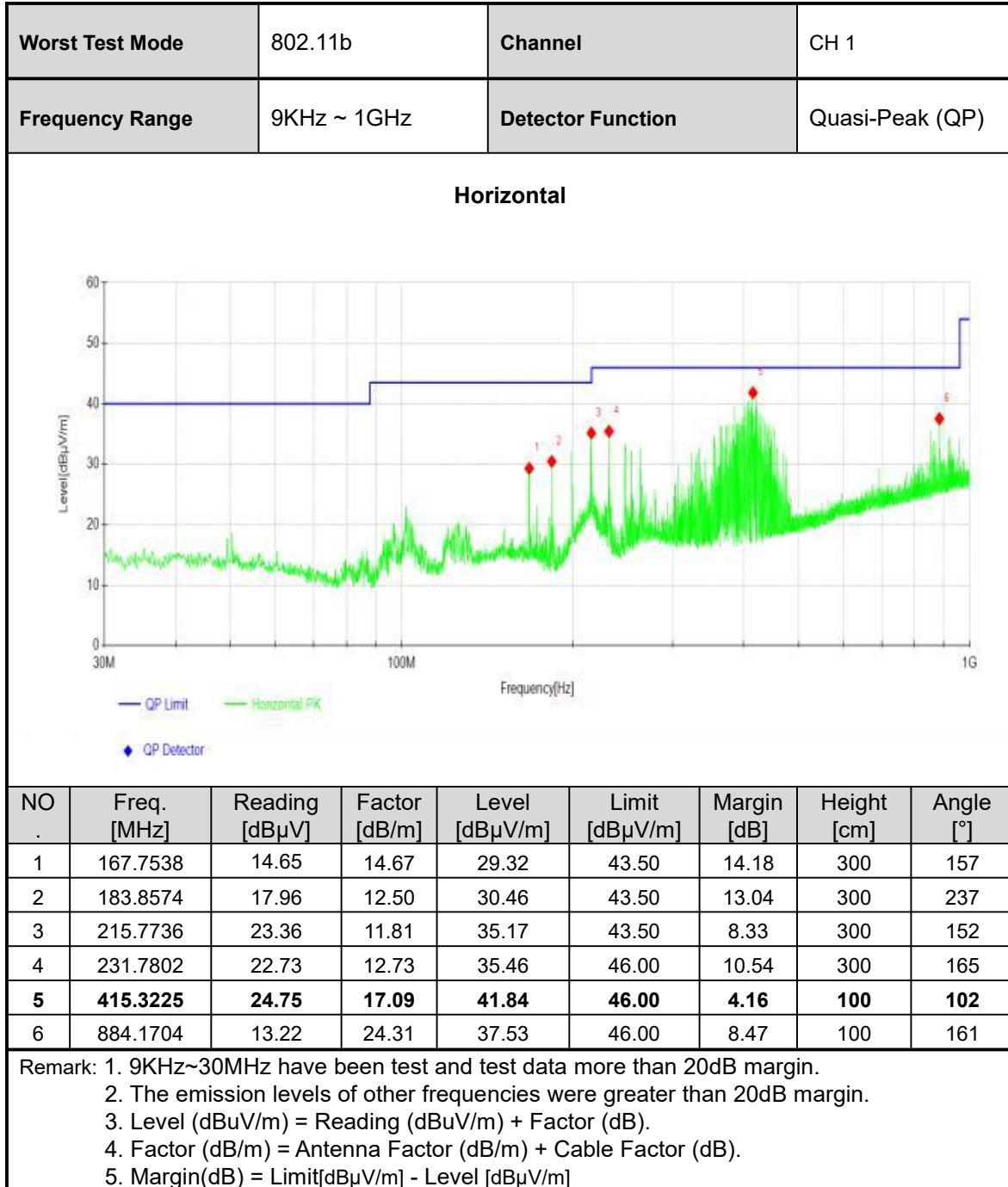
Above 1GHz Test Setup:

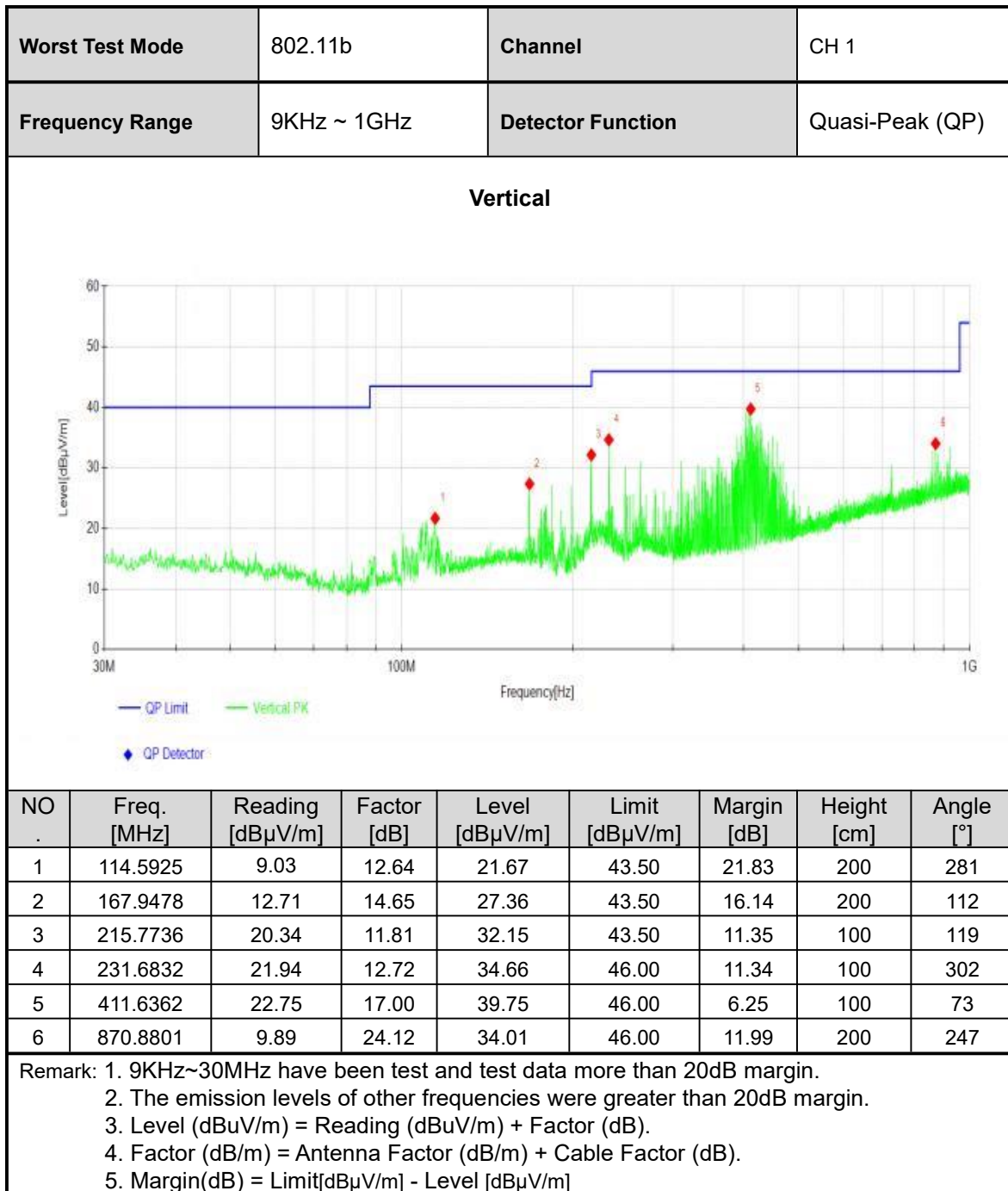




3.2.4 Test results

BELOW 1GHz WORST-CASE DATA:







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ABOVE 1GHz DATA

Channel		802.11b CH 1			Frequency		2412MHz		
Frequency Range		Above 1G			Detector Function		PK/AV		
Horizontal									
NO	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector
1	2390.0000	36.57	-0.15	36.42	54.00	17.58	164	349	AV
2	2390.0000	44.83	-0.15	44.68	74.00	29.32	202	1	PK
3	2411.1851	89.47	0.14	89.61			238	213	AV
4	2412.0022	92.04	0.15	92.19			243	213	PK
5	4824.0000	40.62	9.68	50.30	54.00	3.70	233	231	AV
6	4824.0000	45.66	9.68	55.34	74.00	18.66	218	236	PK
7	7236.0000	29.47	12.39	41.86	74.00	32.14	185	211	PK
8	7236.0000	20.88	12.39	33.27	54.00	20.73	210	206	AV
9	9648.0000	19.67	13.13	32.80	54.00	21.20	167	99	AV
10	9648.0000	28.11	13.13	41.24	74.00	32.76	220	113	PK
Vertical									
NO	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	2390.0000	44.52	-0.15	44.37	54.00	9.63	177	111	PK
2	2390.0000	37.28	-0.15	37.13	54.00	16.87	185	9	AV
3	2411.0331	91.68	0.14	91.82			210	246	AV
4	2411.7172	93.91	0.15	94.06			168	240	PK
5	4824.0000	39.73	9.68	49.41	54.00	4.59	188	274	AV
6	4824.0000	46.37	9.68	56.05	74.00	17.95	206	274	PK
7	7236.0000	28.30	12.39	40.69	74.00	33.31	166	281	PK
8	7236.0000	20.58	12.39	32.97	54.00	21.03	211	237	AV
9	9648.0000	19.51	13.13	32.64	54.00	21.36	240	116	AV
10	9648.0000	28.64	13.13	41.77	74.00	32.23	207	116	PK
Remark: 1. The emission levels of other frequencies were greater than 20dB margin. 2. Level (dBuV/m) = Reading (dBuV/m) + Factor (dB). 3. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB). 4. Margin(dB) = Limit[dBuV/m] - Level [dBuV/m]									



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Channel		802.11b CH 6		Frequency		2437MHz			
Frequency Range		Above 1G		Detector Function		PK/AV			
Horizontal									
NO	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector
1	4874.0000	40.04	9.70	49.74	54.00	4.26	196	232	AV
2	4874.0000	44.53	9.70	54.23	74.00	19.77	215	232	PK
3	7311.0000	29.96	11.03	40.99	74.00	33.01	249	298	PK
4	7311.0000	21.81	11.03	32.84	54.00	21.16	204	216	AV
5	9748.0000	20.06	13.23	33.29	54.00	20.71	187	241	AV
6	9748.0000	28.83	13.23	42.06	74.00	31.94	155	186	PK
Vertical									
NO	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	4874.0000	39.73	9.70	49.43	54.00	4.57	238	280	AV
2	4874.0000	45.65	9.70	55.35	74.00	18.65	169	280	PK
3	7311.0000	29.55	11.03	40.58	74.00	33.42	186	144	PK
4	7311.0000	21.30	11.03	32.33	54.00	21.67	216	324	AV
5	9748.0000	20.57	13.23	33.80	54.00	20.20	185	319	AV
6	9748.0000	28.59	13.23	41.82	74.00	32.18	243	280	PK
Remark: 1. The emission levels of other frequencies were greater than 20dB margin. 2. Level (dBuV/m) = Reading (dBuV/m) + Factor (dB). 3. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB). 4. Margin(dB) = Limit[dBuV/m] - Level [dBuV/m]									



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Channel		802.11b CH 11			Frequency		2462MHz		
Frequency Range		Above 1G			Detector Function		PK/AV		
Horizontal									
NO	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector
1	2462.1102	91.71	0.62	92.33			248	234	PK
2	2462.9653	89.21	0.65	89.86			211	234	AV
3	2483.5000	37.17	0.46	37.63	54.00	16.37	209	45	AV
4	2483.5000	45.85	0.46	46.31	74.00	27.69	201	299	PK
5	4926.0000	40.07	10.14	50.21	54.00	3.79	235	231	AV
6	4926.0000	44.87	10.92	55.79	74.00	18.21	162	265	PK
7	7386.0000	20.68	9.80	30.48	54.00	23.52	178	196	AV
8	7386.0000	29.04	9.80	38.84	74.00	35.16	182	196	PK
9	9848.0000	19.79	13.24	33.03	54.00	20.97	191	93	AV
10	9848.0000	28.10	13.24	41.34	74.00	32.66	207	93	PK
Vertical									
NO	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	2462.1672	91.77	0.62	92.39			150	342	PK
2	2462.9653	89.46	0.65	90.11			203	342	AV
3	2483.5000	36.89	0.46	37.35	54.00	16.65	158	122	AV
4	2483.5000	45.93	0.46	46.39	74.00	27.61	238	160	PK
5	4926.0000	46.61	10.14	56.75	74.00	17.25	168	277	PK
6	4926.0000	39.54	10.14	49.68	54.00	4.32	241	277	AV
7	7386.0000	20.20	9.80	30.00	54.00	24.00	166	290	AV
8	7386.0000	28.57	9.80	38.37	74.00	35.63	156	183	PK
9	9848.0000	19.30	13.24	32.54	54.00	21.46	221	260	AV
10	9848.0000	27.40	13.24	40.64	74.00	33.36	194	61	PK
Remark: 1. The emission levels of other frequencies were greater than 20dB margin. 2. Level (dBuV/m) = Reading (dBuV/m) + Factor (dB). 3. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB). 4. Margin(dB) = Limit[dBuV/m] - Level [dBuV/m]									



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Channel		802.11g CH 1			Frequency		2412MHz		
Frequency Range		Above 1G			Detector Function		PK/AV		
Horizontal									
NO	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector
1	2390.0000	37.65	-0.15	37.50	54.00	16.50	231	267	AV
2	2390.0000	48.32	-0.15	48.17	74.00	25.83	150	174	PK
3	2412.6888	83.62	0.08	83.70			229	214	AV
4	2412.8026	90.89	0.20	91.09			158	214	PK
5	4824.0000	34.70	9.68	44.38	54.00	9.62	151	264	AV
6	4824.0000	42.62	9.68	52.30	74.00	21.70	166	102	PK
7	7236.0000	28.36	12.39	40.75	74.00	33.25	162	137	PK
8	7236.0000	20.04	12.39	32.43	54.00	21.57	215	186	AV
9	9648.0000	22.67	13.14	35.81	54.00	18.19	176	244	AV
10	9648.0000	27.76	13.13	40.89	74.00	33.11	190	360	PK
Vertical									
NO	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	2390.0000	37.61	-0.15	37.46	54.00	16.54	213	2	AV
2	2390.0000	48.94	-0.15	48.79	74.00	25.21	220	232	PK
3	2410.5391	92.01	0.13	92.14			243	232	PK
4	2410.9571	84.95	0.14	85.09			241	239	AV
5	4824.0000	42.28	9.68	51.96	74.00	22.04	150	119	PK
6	4824.0000	34.97	9.68	44.65	54.00	9.35	215	200	AV
7	7236.0000	20.43	12.39	32.82	54.00	21.18	176	324	AV
8	7236.0000	28.81	12.39	41.20	74.00	32.80	208	290	PK
9	9648.0000	27.32	13.13	40.45	74.00	33.55	187	129	PK
10	9648.0000	19.60	13.13	32.73	54.00	21.27	175	236	AV
Remark: 1. The emission levels of other frequencies were greater than 20dB margin. 2. Level (dBuV/m) = Reading (dBuV/m) + Factor (dB). 3. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB). 4. Margin(dB) = Limit[dBμV/m] - Level [dBuV/m]									



Channel		802.11g CH 6		Frequency		2437MHz			
Frequency Range		Above 1G		Detector Function		PK/AV			
Horizontal									
NO	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector
1	4874.0000	42.75	9.70	52.45	74.00	21.55	231	118	PK
2	4874.0000	34.53	9.70	44.23	54.00	9.77	217	354	AV
3	7311.0000	20.54	11.03	31.57	54.00	22.43	163	49	AV
4	7311.0000	29.10	11.03	40.13	74.00	33.87	177	257	PK
5	9748.0000	28.14	13.23	41.37	74.00	32.63	197	146	PK
6	9748.0000	20.73	13.23	33.96	54.00	20.04	233	238	AV
Vertical									
NO	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	4874.0000	42.33	9.70	52.03	74.00	21.97	225	260	PK
2	4874.0000	35.66	9.70	45.36	54.00	8.64	178	212	AV
3	7311.0000	20.89	11.03	31.92	54.00	22.08	230	4	AV
4	7311.0000	28.31	11.03	39.34	74.00	34.66	180	184	PK
5	9748.0000	27.78	13.23	41.01	74.00	32.99	161	188	PK
6	9748.0000	19.67	13.23	32.90	54.00	21.10	180	174	AV
Remark: 1. The emission levels of other frequencies were greater than 20dB margin. 2. Level (dBuV/m) = Reading (dBuV/m) + Factor (dB). 3. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB). 4. Margin(dB) = Limit[dBuV/m] - Level [dBuV/m]									



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Channel		802.11g CH 11			Frequency		2462MHz		
Frequency Range		Above 1G			Detector Function		PK/AV		
Horizontal									
NO	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector
1	2462.7753	90.29	0.64	90.93			225	233	PK
2	2466.1766	83.11	0.74	83.85			205	233	AV
3	2483.5000	37.31	0.46	37.77	54.00	16.23	194	259	AV
4	2483.5000	45.73	0.46	46.19	74.00	27.81	160	233	PK
5	4926.0000	34.36	10.07	44.43	54.00	9.57	159	134	AV
6	4926.0000	42.16	10.07	52.23	74.00	21.77	198	174	PK
7	7386.0000	28.16	9.80	37.96	74.00	36.04	183	16	PK
8	7386.0000	20.15	9.80	29.95	54.00	24.05	195	153	AV
9	9848.0000	18.87	13.24	32.11	54.00	21.89	197	7	AV
10	9848.0000	27.30	13.24	40.54	74.00	33.46	213	1	PK
Vertical									
NO	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	2457.8728	89.98	0.56	90.54			203	342	PK
2	2460.3430	82.91	0.57	83.48			236	342	RMS
3	2483.5000	46.69	0.46	47.15	54.00	6.85	160	359	PK
4	2483.5000	37.82	0.46	38.28	54.00	15.72	216	250	AV
5	4926.0000	43.85	10.07	53.92	74.00	20.08	242	260	PK
6	4926.0000	34.05	10.07	44.12	54.00	9.88	231	251	AV
7	7386.0000	20.31	9.80	30.11	54.00	23.89	176	246	AV
8	7386.0000	28.33	9.80	38.13	74.00	35.87	153	354	PK
9	9848.0000	27.55	13.24	40.79	74.00	33.21	199	236	PK
10	9848.0000	18.99	13.24	32.23	54.00	21.77	171	36	AV
Remark: 1. The emission levels of other frequencies were greater than 20dB margin. 2. Level (dBuV/m) = Reading (dBuV/m) + Factor (dB). 3. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB). 4. Margin(dB) = Limit[dBμV/m] - Level [dBuV/m]									



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Channel		802.11n20 CH 1			Frequency		2412MHz		
Frequency Range		Above 1G			Detector Function		PK/AV		
Horizontal									
NO	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector
1	2390.0000	37.13	-0.15	36.98	54.00	17.02	218	31	AV
2	2390.0000	45.67	-0.15	45.52	74.00	28.48	158	37	PK
3	2407.6128	90.35	0.08	90.43			160	207	PK
4	2413.2183	82.97	0.17	83.14			152	207	AV
5	4824.0000	43.89	9.68	53.57	74.00	20.43	212	171	PK
6	4824.0000	34.71	9.68	44.39	54.00	9.61	233	291	AV
7	7236.0000	20.70	12.39	33.09	54.00	20.91	158	311	AV
8	7236.0000	29.24	12.39	41.63	74.00	32.37	245	282	PK
9	9648.0000	29.27	13.13	42.40	74.00	31.60	164	171	PK
10	9648.0000	20.17	13.13	33.30	54.00	20.70	215	171	AV
Vertical									
NO	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	2390.0000	40.59	-0.15	40.44	54.00	13.56	211	251	AV
2	2390.0000	50.54	-0.15	50.39	74.00	23.61	209	251	PK
3	2409.8550	93.07	0.12	93.19			228	238	PK
4	2413.5604	85.61	0.17	85.78			219	245	AV
5	4824.0000	34.79	9.68	44.47	54.00	9.53	232	103	AV
6	4824.0000	43.43	9.68	53.11	74.00	20.89	153	54	PK
7	7236.0000	28.34	12.39	40.73	74.00	33.27	222	120	PK
8	7236.0000	20.25	12.39	32.64	54.00	21.36	180	154	AV
9	9648.0000	19.32	13.13	32.45	54.00	21.55	245	237	AV
10	9648.0000	27.38	13.13	40.51	74.00	33.49	249	47	PK
Remark: 1. The emission levels of other frequencies were greater than 20dB margin. 2. Level (dBuV/m) = Reading (dBuV/m) + Factor (dB). 3. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB). 4. Margin(dB) = Limit[dBuV/m] - Level [dBuV/m]									



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Channel		802.11n20 CH 6			Frequency		2437MHz		
Frequency Range		Above 1G			Detector Function		PK/AV		
Horizontal									
NO	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector
1	4874.0000	34.75	9.70	44.45	54.00	9.55	171	111	AV
2	4874.0000	42.82	9.70	52.52	74.00	21.48	213	290	PK
3	7311.0000	29.19	11.03	40.22	74.00	33.78	246	240	PK
4	7311.0000	20.40	11.03	31.43	54.00	22.57	153	108	AV
5	9748.0000	20.27	13.23	33.50	54.00	20.50	238	288	AV
6	9748.0000	26.74	13.23	39.97	74.00	34.03	192	84	PK
Vertical									
NO	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	4874.0000	43.16	9.70	52.86	74.00	21.14	250	284	PK
2	4874.0000	34.58	9.70	44.28	54.00	9.72	201	192	AV
3	7311.0000	20.54	11.03	31.57	54.00	22.43	150	227	AV
4	7311.0000	28.72	11.03	39.75	74.00	34.25	217	72	PK
5	9748.0000	27.66	13.23	40.89	74.00	33.11	172	276	PK
6	9748.0000	20.38	13.23	33.61	54.00	20.39	210	169	AV
Remark: 1. The emission levels of other frequencies were greater than 20dB margin. 2. Level (dBuV/m) = Reading (dBuV/m) + Factor (dB). 3. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB). 4. Margin(dB) = Limit[dBuV/m] - Level [dBuV/m]									



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Channel		802.11n20 CH 11			Frequency		2462MHz		
Frequency Range		Above 1G			Detector Function		PK/AV		
Horizontal									
NO	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector
1	2464.0864	89.99	0.68	90.67			170	238	PK
2	2465.6066	82.63	0.72	83.35			238	224	AV
3	2483.5000	38.38	0.46	38.84	54.00	15.16	180	158	AV
4	2483.5000	47.29	0.46	47.75	74.00	26.25	213	305	PK
5	4926.0000	34.74	10.07	44.81	54.00	9.19	181	334	AV
6	4926.0000	42.11	10.07	52.18	74.00	21.82	163	277	PK
7	7386.0000	28.35	9.80	38.15	74.00	35.85	179	282	PK
8	7386.0000	20.21	9.80	30.01	54.00	23.99	244	113	AV
9	9848.0000	18.97	13.24	32.21	54.00	21.79	191	132	AV
10	9848.0000	27.90	13.24	41.14	74.00	32.86	158	185	PK
Vertical									
NO	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	2460.7801	82.76	0.59	83.35			199	341	RMS
2	2463.8394	90.02	0.67	90.69			189	226	PK
3	2483.5000	37.91	0.46	38.37	54.00	15.63	249	357	AV
4	2483.5000	51.37	0.46	51.83	74.00	22.17	230	233	PK
5	4926.0000	42.45	10.07	52.52	74.00	21.48	156	213	PK
6	4926.0000	34.21	10.07	44.28	54.00	9.72	236	170	AV
7	7386.0000	20.53	9.80	30.33	54.00	23.67	164	40	AV
8	7386.0000	28.84	9.80	38.64	74.00	35.36	155	35	PK
9	9848.0000	26.84	13.24	40.08	74.00	33.92	165	185	PK
10	9848.0000	18.87	13.24	32.11	54.00	21.89	226	26	AV
Remark: 1. The emission levels of other frequencies were greater than 20dB margin. 2. Level (dBuV/m) = Reading (dBuV/m) + Factor (dB). 3. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB). 4. Margin(dB) = Limit[dBuV/m] - Level [dBuV/m]									



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Channel		BT-LE(1Mbps) CH0			Frequency		2402MHz		
Frequency Range		Above 1G			Detector Function		PK/AV		
Horizontal									
NO	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector
1	2390.0000	36.04	-0.15	35.89	54.00	18.11	180	65	AV
2	2390.0000	43.93	-0.15	43.78	74.00	30.22	235	6	PK
3	2401.7412	90.62	-0.04	90.58			209	308	PK
4	2401.9692	90.09	-0.03	90.06			246	315	AV
5	4804.0000	42.46	9.29	51.75	74.00	22.25	170	112	PK
6	4804.0000	34.65	9.29	43.94	54.00	10.06	221	296	AV
7	7206.0000	20.85	12.81	33.66	54.00	20.34	172	360	AV
8	7206.0000	27.86	12.81	40.67	74.00	33.33	172	343	PK
9	9608.0000	23.34	13.32	36.66	54.00	17.34	216	228	AV
10	9608.0000	29.09	13.32	42.41	74.00	31.59	228	233	PK
Vertical									
NO	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	2390.0000	36.53	-0.15	36.38	54.00	17.62	229	48	AV
2	2390.0000	44.26	-0.15	44.11	74.00	29.89	167	0	PK
3	2401.9692	91.96	-0.03	91.93			189	282	AV
4	2402.2542	92.60	-0.03	92.57			198	276	PK
5	4804.0000	43.82	9.29	53.11	74.00	20.89	190	171	PK
6	4804.0000	35.29	9.29	44.58	54.00	9.42	242	123	AV
7	7206.0000	20.17	12.81	32.98	54.00	21.02	249	141	AV
8	7206.0000	28.66	12.81	41.47	74.00	32.53	239	330	PK
9	9608.0000	27.39	13.32	40.71	74.00	33.29	241	54	PK
10	9608.0000	19.73	13.32	33.05	54.00	20.95	203	141	AV
Remark: 1. The emission levels of other frequencies were greater than 20dB margin. 2. Level (dBuV/m) = Reading (dBuV/m) + Factor (dB). 3. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB). 4. Margin(dB) = Limit[dBuV/m] - Level [dBuV/m]									



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Channel		BT-LE(1Mbps) CH19			Frequency		2440MHz		
Frequency Range		Above 1G			Detector Function		PK/AV		
Horizontal									
NO	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector
1	4880.0000	34.93	9.80	44.73	54.00	9.27	167	90	AV
2	4880.0000	42.85	9.80	52.65	74.00	21.35	239	260	PK
3	7320.0000	28.44	11.01	39.45	74.00	34.55	150	113	PK
4	7320.0000	20.71	11.01	31.72	54.00	22.28	201	132	AV
5	9760.0000	21.42	13.25	34.67	54.00	19.33	228	225	AV
6	9760.0000	28.03	13.25	41.28	74.00	32.72	167	225	PK
Vertical									
NO	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	4880.0000	35.92	9.80	45.72	54.00	8.28	204	1	AV
2	4880.0000	42.13	9.80	51.93	74.00	22.07	205	162	PK
3	7320.0000	29.24	11.01	40.25	74.00	33.75	173	251	PK
4	7320.0000	20.96	11.01	31.97	54.00	22.03	220	251	AV
5	9760.0000	20.92	13.25	34.17	54.00	19.83	234	256	AV
6	9760.0000	28.04	13.25	41.29	74.00	32.71	226	256	PK
Remark: 1. The emission levels of other frequencies were greater than 20dB margin. 2. Level (dBuV/m) = Reading (dBuV/m) + Factor (dB). 3. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB). 4. Margin(dB) = Limit[dBuV/m] - Level [dBuV/m]									



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Channel		BT-LE(1Mbps) CH39			Frequency		2480MHz		
Frequency Range		Above 1G			Detector Function		PK/AV		
Horizontal									
NO	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector
1	2479.8770	88.95	0.32	89.27			219	149	AV
2	2480.2760	89.58	0.33	89.91			243	149	PK
3	2483.5000	36.26	0.46	36.72	54.00	17.28	231	130	AV
4	2483.5000	44.95	0.46	45.41	74.00	28.59	237	3	PK
5	4960.0000	43.03	9.80	52.83	74.00	21.17	160	7	PK
6	4960.0000	34.45	9.80	44.25	54.00	9.75	164	60	AV
7	7440.0000	20.90	11.01	31.91	54.00	22.09	211	154	AV
8	7440.0000	29.46	11.01	40.47	74.00	33.53	234	212	PK
9	9920.0000	27.24	13.25	40.49	74.00	33.51	214	36	PK
10	9920.0000	18.81	13.25	32.06	54.00	21.94	238	31	AV
Vertical									
NO	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	2479.7440	91.90	0.33	92.23			216	265	PK
2	2479.9150	91.38	0.32	91.70			197	265	AV
3	2483.5000	36.94	0.46	37.40	54.00	16.60	250	225	AV
4	2483.5000	44.77	0.46	45.23	74.00	28.77	222	50	PK
5	4960.0000	43.02	9.80	52.82	74.00	21.18	164	360	PK
6	4960.0000	35.14	9.80	44.94	54.00	9.06	226	187	AV
7	7440.0000	20.67	11.01	31.68	54.00	22.32	191	305	AV
8	7440.0000	29.18	11.01	40.19	74.00	33.81	175	11	PK
9	9920.0000	27.31	13.25	40.56	74.00	33.44	242	104	PK
10	9920.0000	19.03	13.25	32.28	54.00	21.72	160	51	AV
Remark: 1. The emission levels of other frequencies were greater than 20dB margin. 2. Level (dBuV/m) = Reading (dBuV/m) + Factor (dB). 3. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB). 4. Margin(dB) = Limit[dBuV/m] - Level [dBuV/m]									



3.3 6dB BANDWIDTH MEASUREMENT

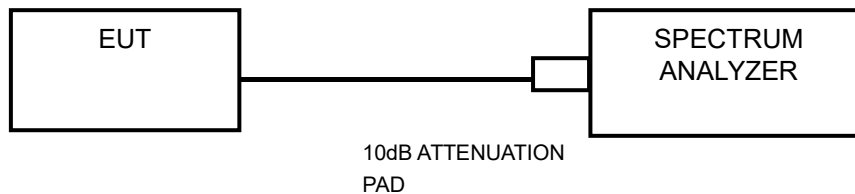
3.3.1 Limits

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

3.3.2 Measurement procedure

- Set resolution bandwidth (RBW) = 100KHz
- Set the video bandwidth (VBW) $\geq 3 \times$ RBW, Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

3.3.3 Test setup



3.3.4 Test result

Please refer Annex A



3.4 CONDUCTED OUTPUT POWER

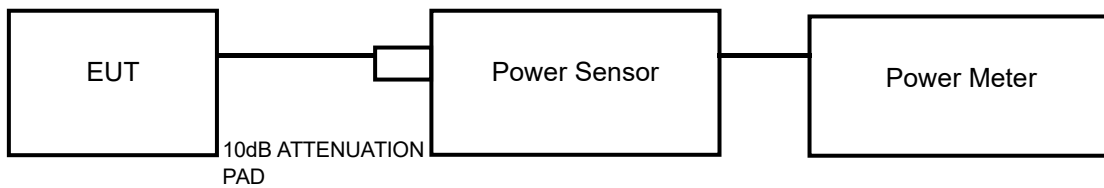
3.4.1 Limits

For systems using digital modulation in the 2400–2483.5 MHz band: 1 Watt (30dBm).

3.4.2 Measurement procedure

- A peak power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak power sensor and set the detector to PEAK. Record the power level.
- An average power sensor was used on the output port of the EUT. A power meter was used to read the response of the average power sensor and set the detector to AVERAGE. Record the power level.

3.4.3 Test setup



3.4.4 Test result

Please refer Annex A.



3.5 POWER SPECTRAL DENSITY MEASUREMENT

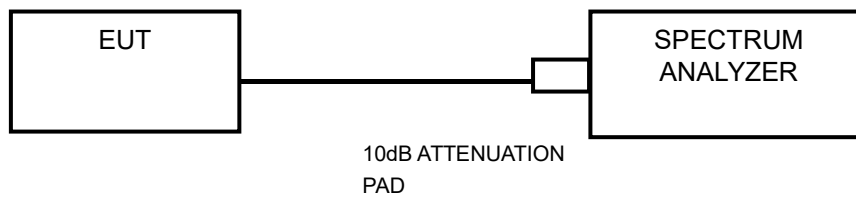
3.5.1 Limits

The Maximum of Power Spectral Density Measurement is 8dBm/3KHz.

3.5.2 Measurement procedure

- Set instrument center frequency to DTS channel center frequency.
- Set the span to 1.5 times the DTS bandwidth.
- Set RBW to: 3KHz
- Set VBW $\geq 3 \times$ RBW.
- Detector = peak
- Ensure that the number of measurement points in the sweep $\geq 2 \times$ span/RBW.
- Sweep time = auto couple.
- Use the peak marker function to determine the maximum amplitude level.

3.5.3 Test setup



3.5.4 Test result

Please refer Annex A.



3.6 OUT OF BAND EMISSION AND BAND EDGE MEASUREMENTS

3.6.1 Limits

Below -20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

3.6.2 Measurement procedure

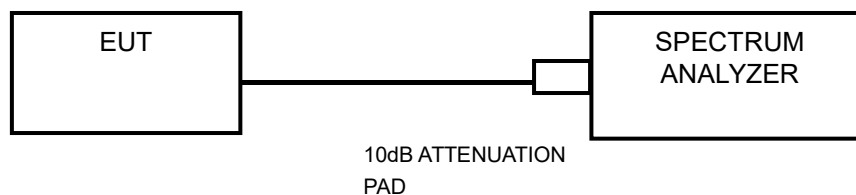
Measurement Procedure -Reference Level

- Set the RBW = 100 kHz.
- Set the VBW $\geq$ 300 kHz.
- Detector = peak.
- Sweep time = auto couple.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use the peak marker function to determine the maximum power level in any 100 kHzband segment within the fundamental EBW.

Measurement Procedure –Unwanted Emission Level

- Set RBW = 100 kHz.
- Set VBW $\geq$ 300 kHz.
- Set span to encompass the spectrum to be examined
- Detector = peak.
- Trace Mode = max hold.
- Sweep = auto couple.

3.6.3 Test setup



3.6.4 Test result

Please refer Annex A.



3.7 OCCUPIED BANDWIDTH MEASUREMENT

3.7.1 Measurement procedure

The transmitter antenna output was connected to the spectrum analyzer through an attenuator. The resolution bandwidth shall be set to the range of 1% to 5% of the anticipated emission bandwidth, and a video bandwidth at least 3x the resolution bandwidth.

below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 %of the total mean power of a given emission.

3.7.2 Test setup



3.7.3 Test result

Please refer Annex A.



4 PHOTOGRAPHS OF TEST SETUP

Please refer to the attached file (Test Setup Photo).



5 PHOTOGRAPHS OF THE EUT

Please refer to the attached file (External Photos report and Internal Photos).



6 Appendix A (Please refer to the following pages for test results.)

6.1 6DB BANDWIDTH MEASUREMENT

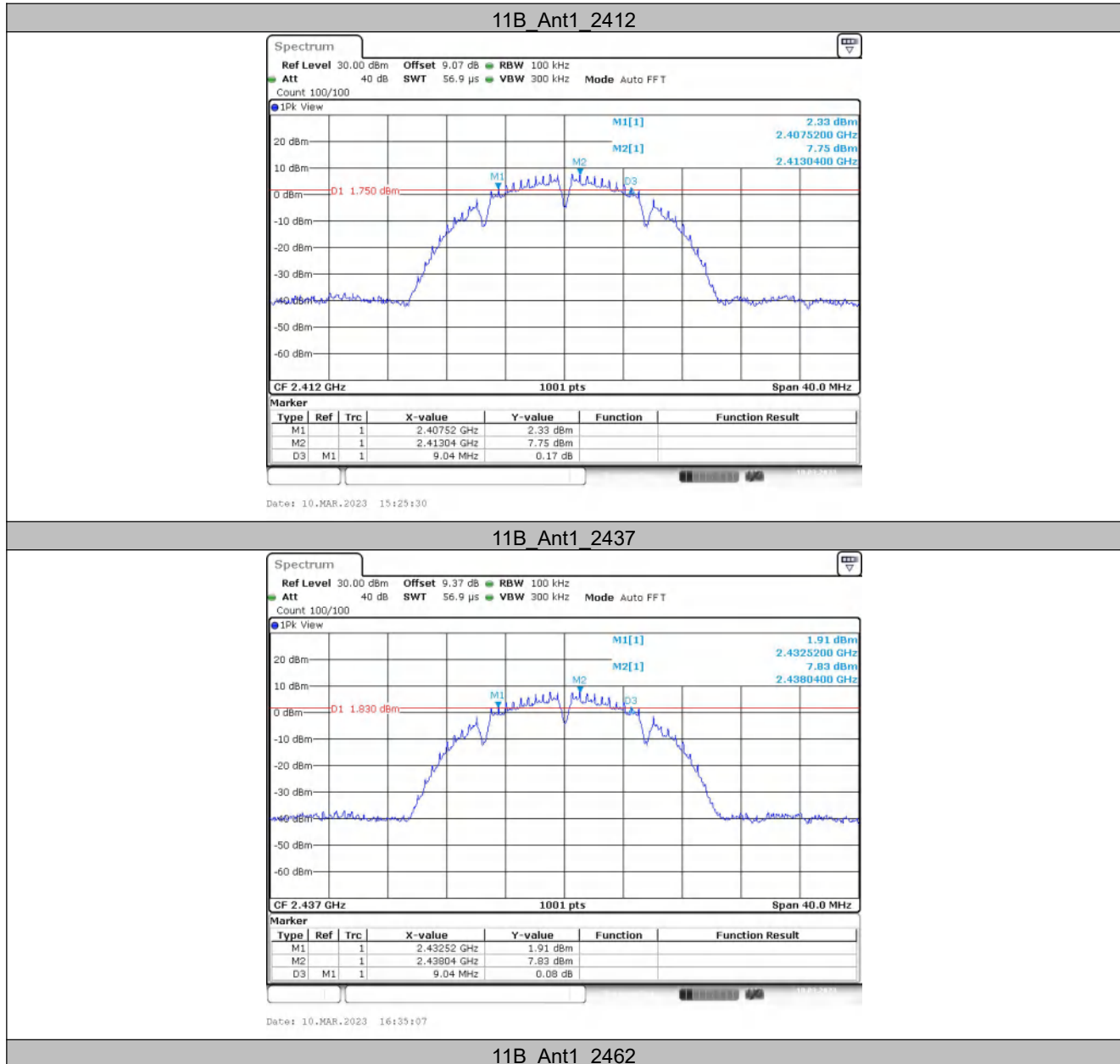
6.1.1 Test Result

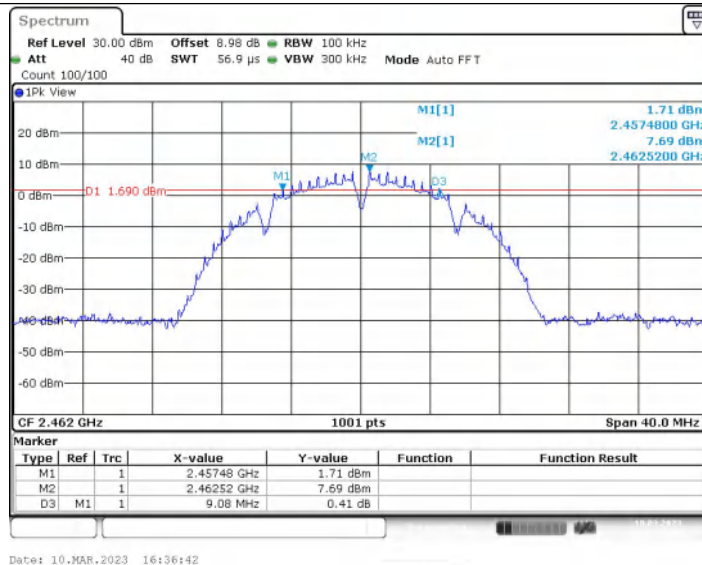
TestMode	Antenna	Frequency[MHz]	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	9.04	2407.52	2416.56	0.5	PASS
		2437	9.04	2432.52	2441.56	0.5	PASS
		2462	9.08	2457.48	2466.56	0.5	PASS
11G	Ant1	2412	16.32	2403.88	2420.20	0.5	PASS
		2437	16.32	2428.88	2445.20	0.5	PASS
		2462	16.32	2453.88	2470.20	0.5	PASS
11N20SISO	Ant1	2412	17.56	2403.24	2420.80	0.5	PASS
		2437	17.52	2428.28	2445.80	0.5	PASS
		2462	17.60	2453.24	2470.84	0.5	PASS

TestMode	Antenna	Freq(MHz)	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	0.66	2401.66	2402.31	0.5	PASS
		2440	0.65	2439.66	2440.31	0.5	PASS
		2480	0.66	2479.66	2480.31	0.5	PASS

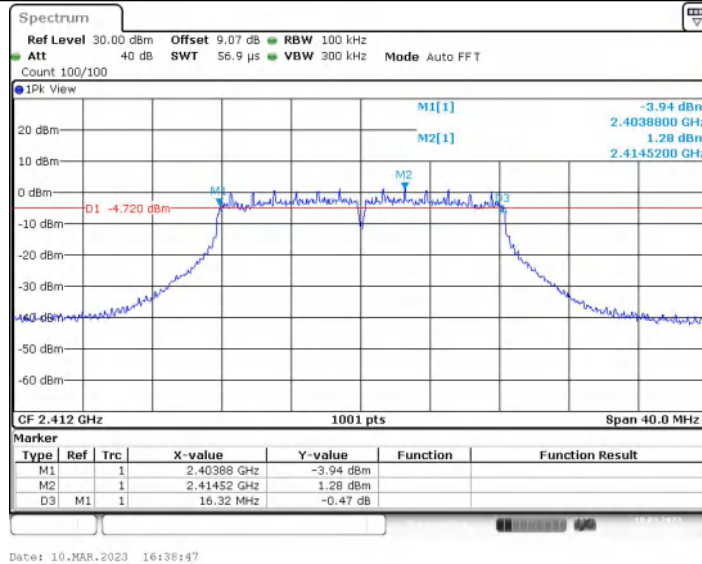


6.1.2 Test Graphs

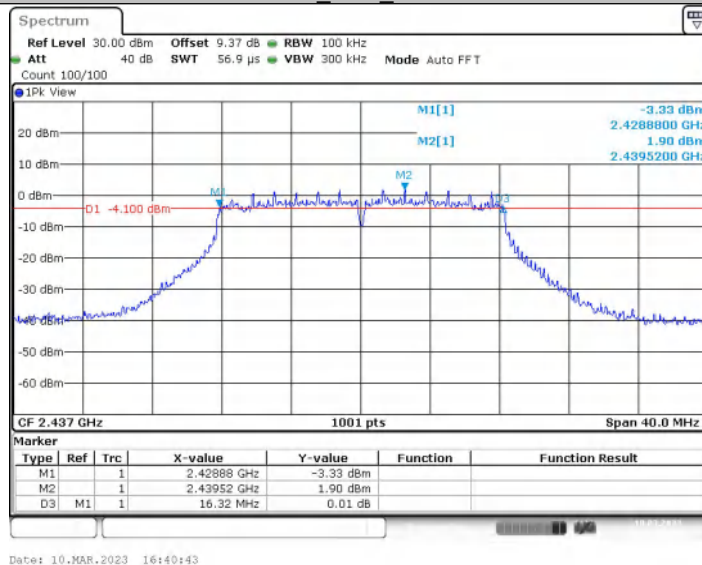




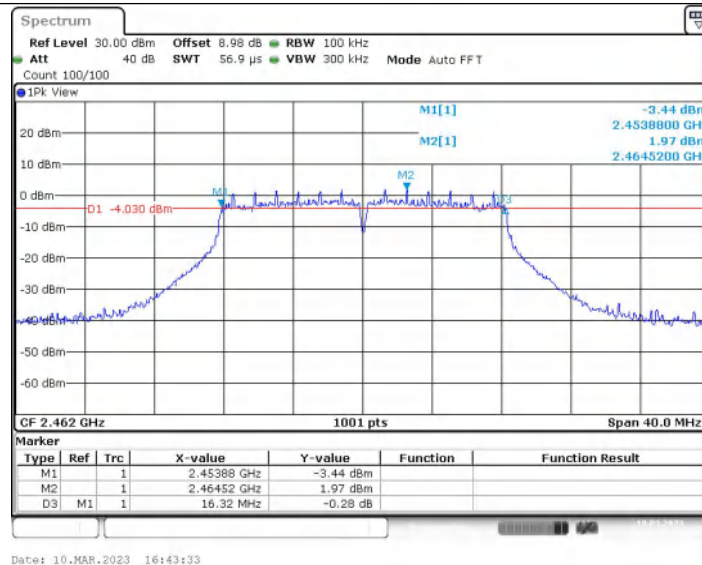
11G_Ant1_2412



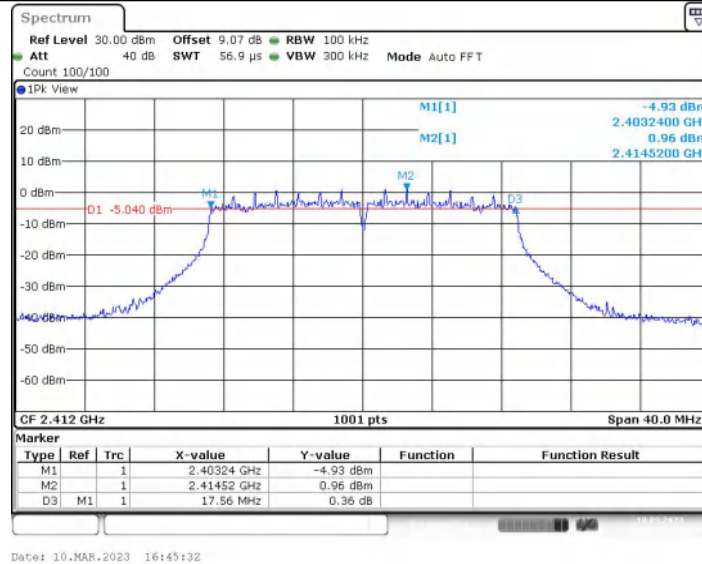
11G_Ant1_2437



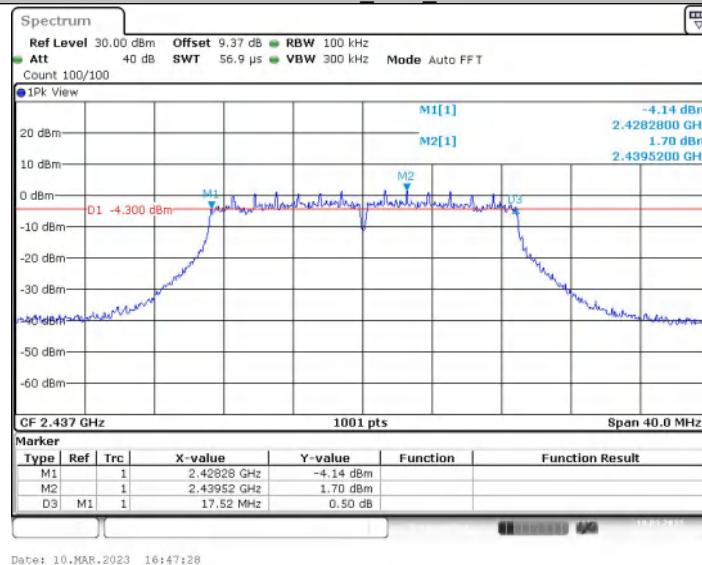
11G_Ant1_2462



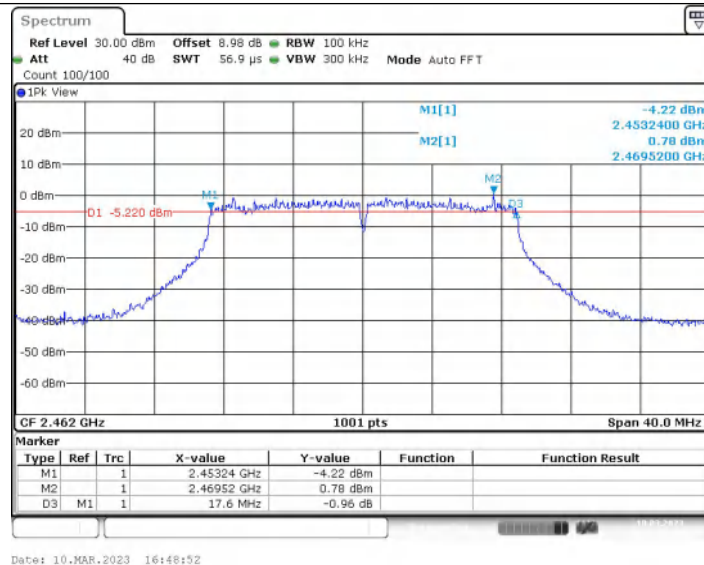
11N20SISO_Ant1_2412



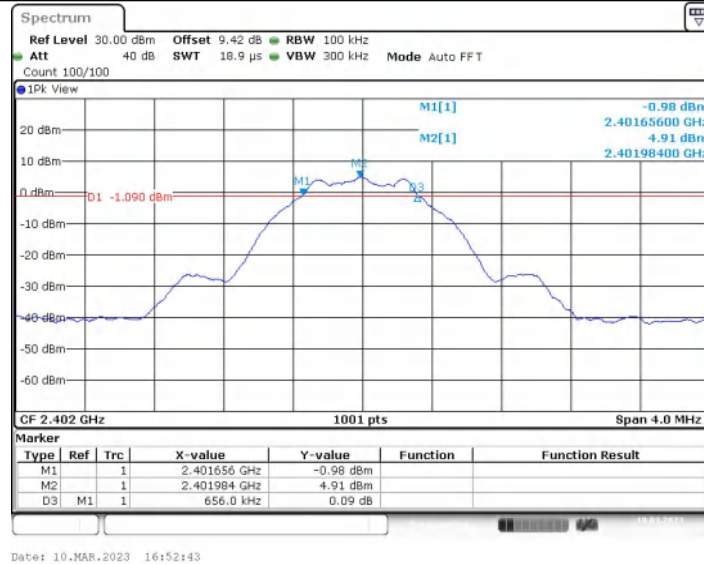
11N20SISO_Ant1_2437



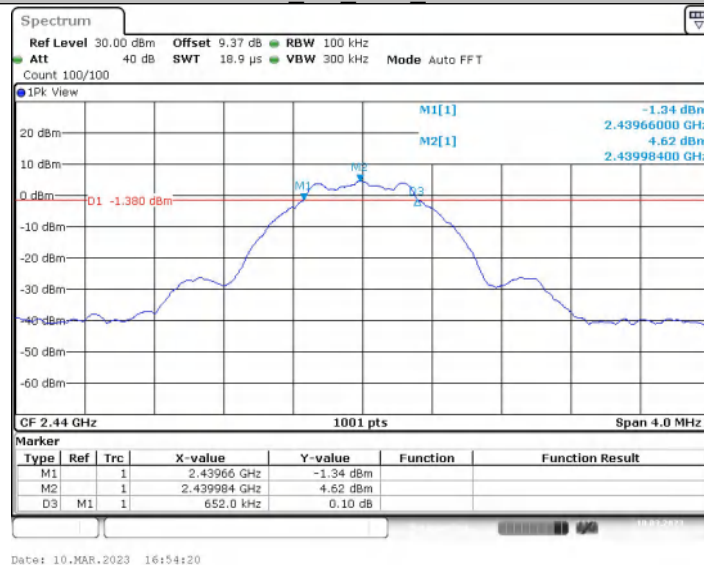
11N20SISO_Ant1_2462



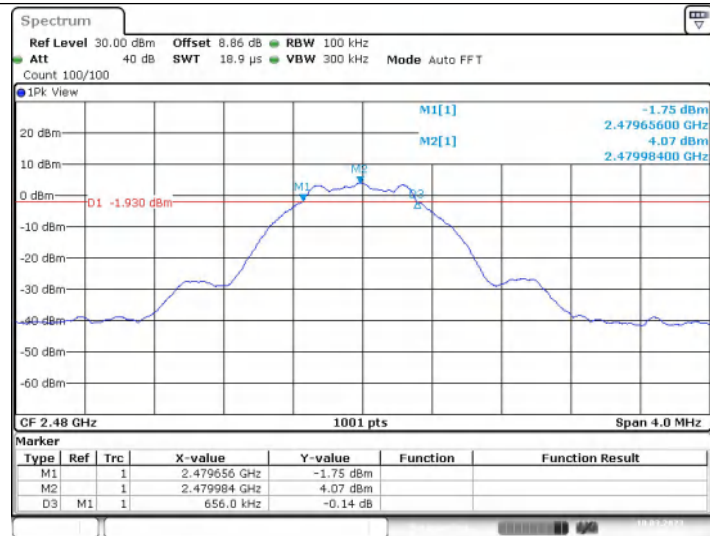
BLE 1M Ant1 2402



BLE 1M Ant1 2440



BLE 1M Ant1 2480



Date: 10.MAR.2023 16:55:48



6.2 Occupied Channel Bandwidth (For reference)

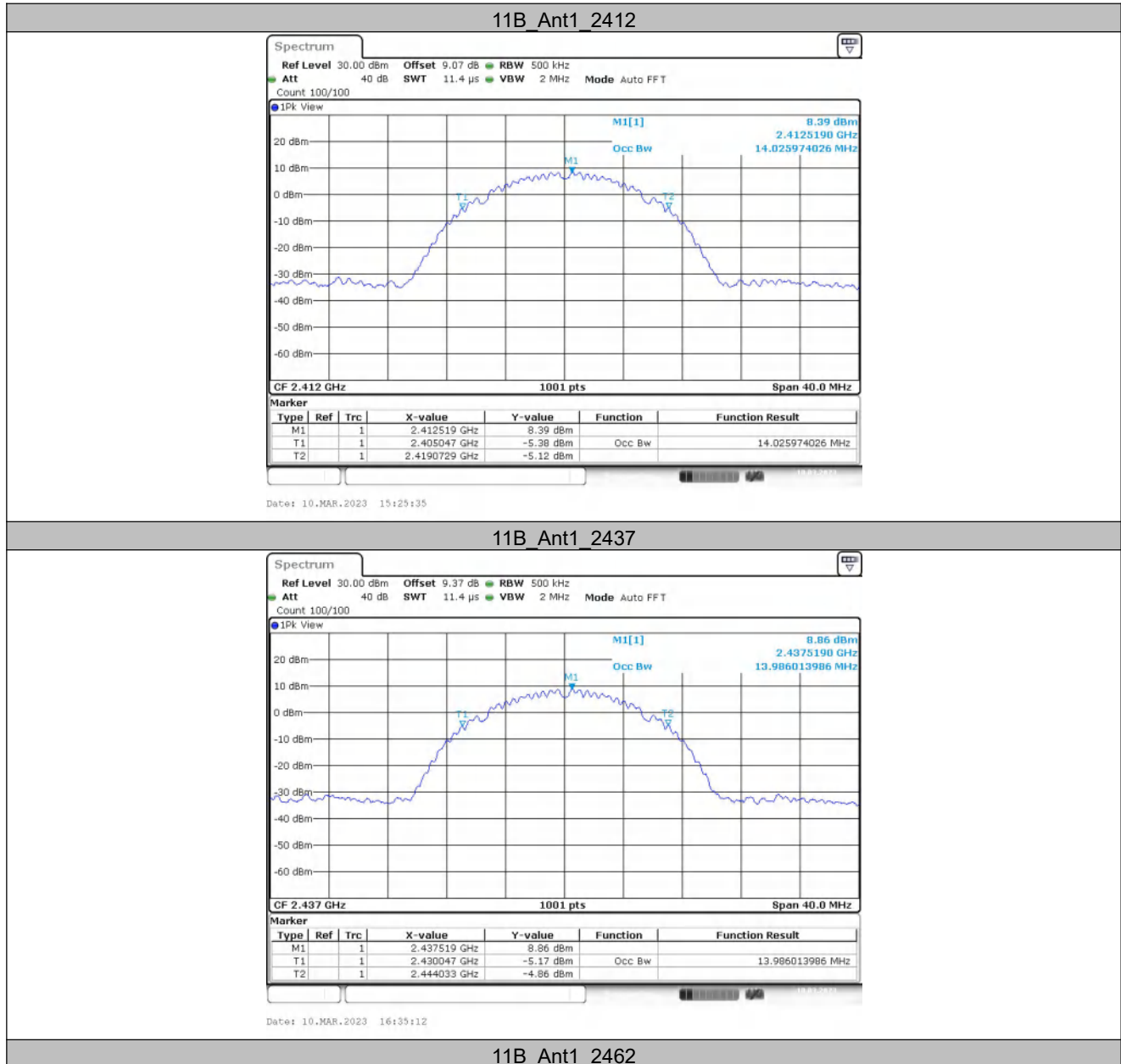
6.2.1 Test Result

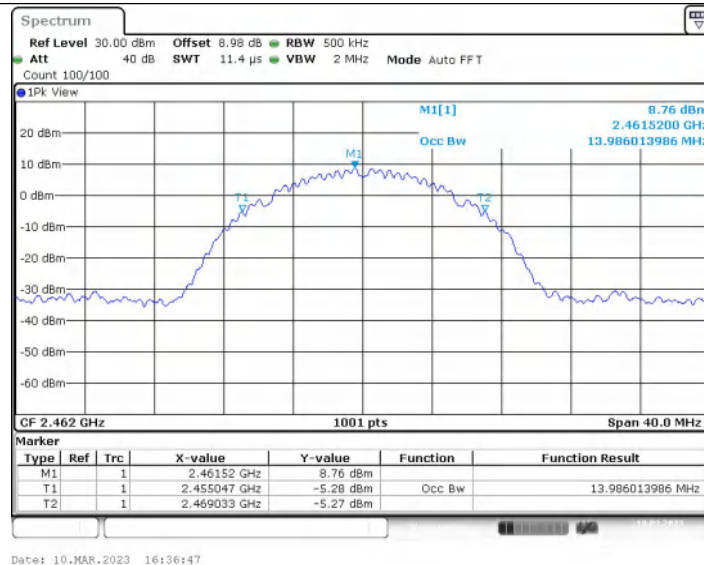
TestMode	Antenna	Channel Frequency [MHz]	OCB [MHz]	FL [MHz]	FH [MHz]	Limit [MHz]	Verdict
11B	Ant1	2412	14.026	2405.0470	2419.0729	---	---
		2437	13.986	2430.0470	2444.0330	---	---
		2462	13.986	2455.0470	2469.0330	---	---
11G	Ant1	2412	17.423	2403.2887	2420.7113	---	---
		2437	17.662	2428.1688	2445.8312	---	---
		2462	17.662	2453.3287	2470.9910	---	---
11N20SISO	Ant1	2412	18.262	2402.8891	2421.1508	---	---
		2437	18.462	2427.8092	2446.2707	---	---
		2462	18.661	2452.7293	2471.3906	---	---

TestMode	Antenna	Freq (MHz)	OCB [MHz]	FL [MHz]	FH [MHz]	Limit [MHz]	Verdict
BLE_1M	Ant1	2402	1.027	2401.4805	2402.5075	---	---
		2440	1.031	2439.4765	2440.5075	---	---
		2480	1.031	2479.4805	2480.5115	---	---

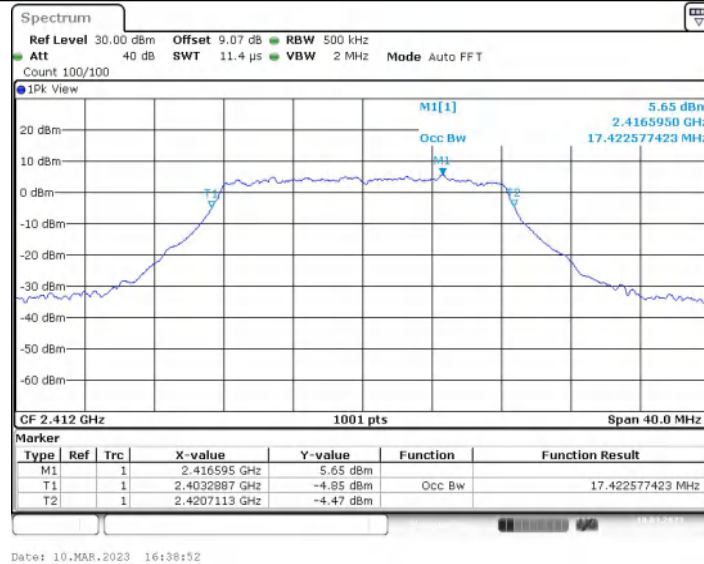


6.2.2 Test Graphs

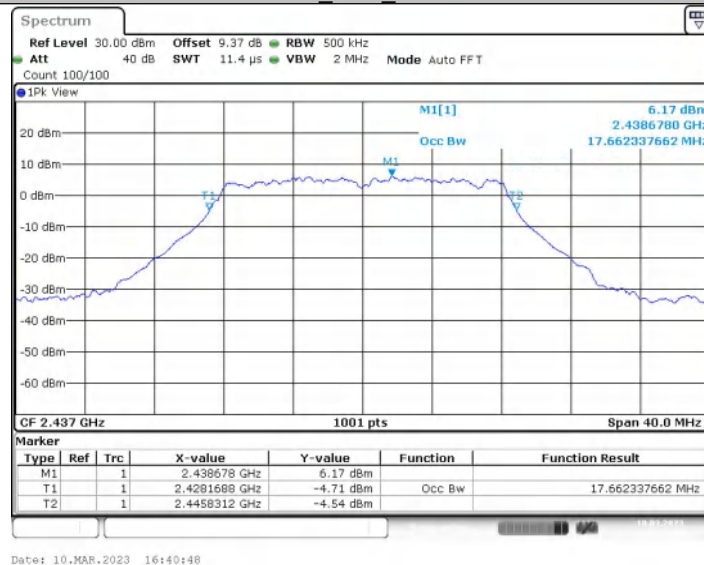




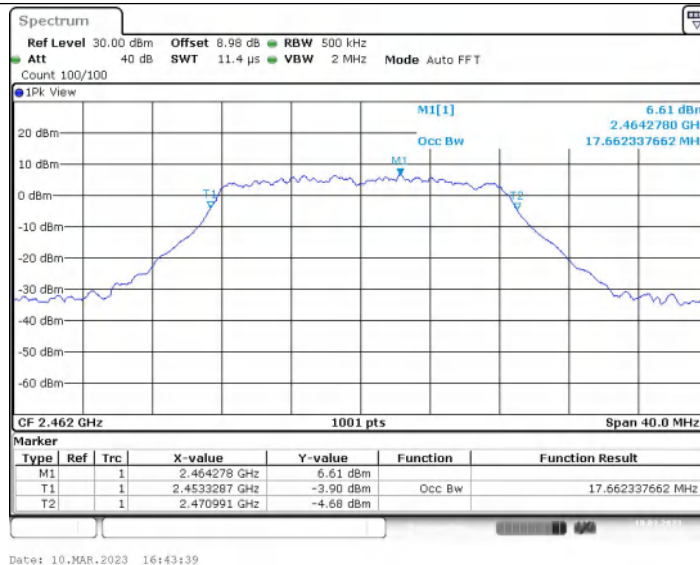
11G_Ant1_2412



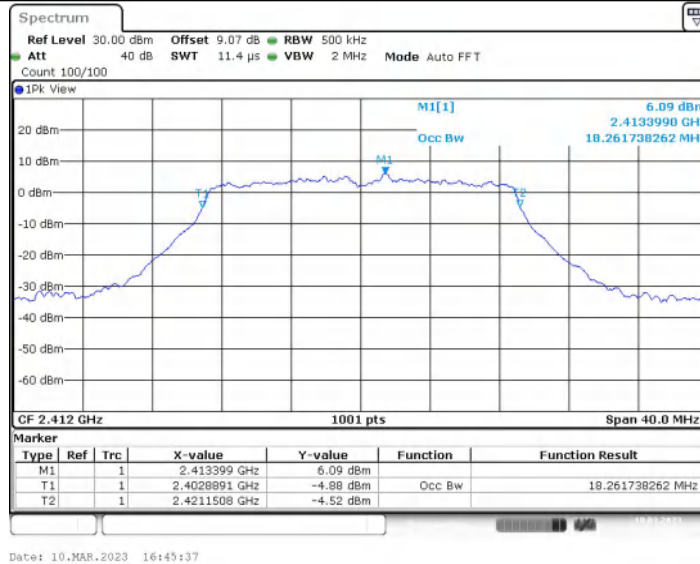
11G_Ant1_2437



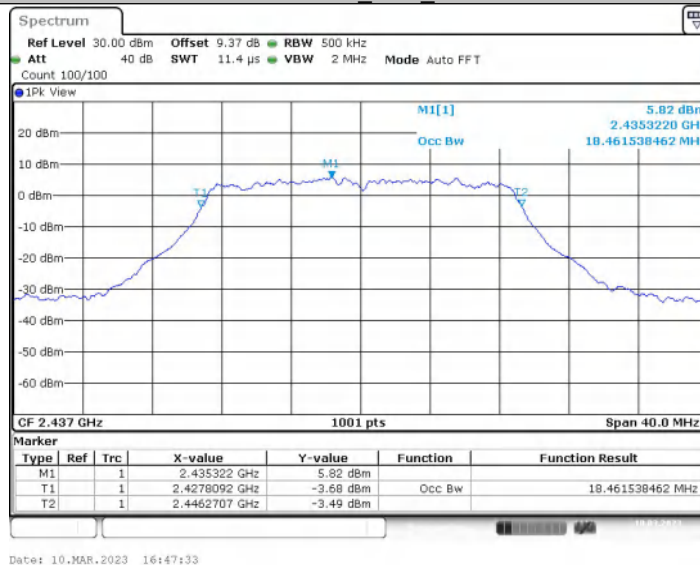
11G_Ant1_2462



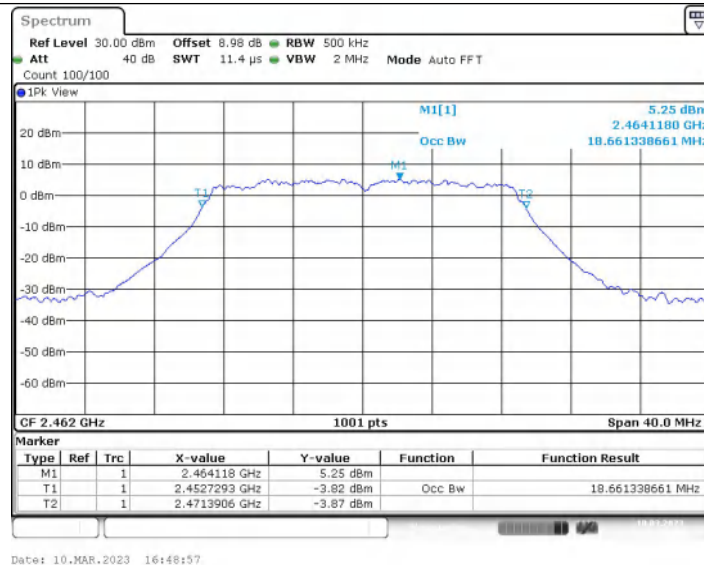
11N20SISO_Ant1_2412



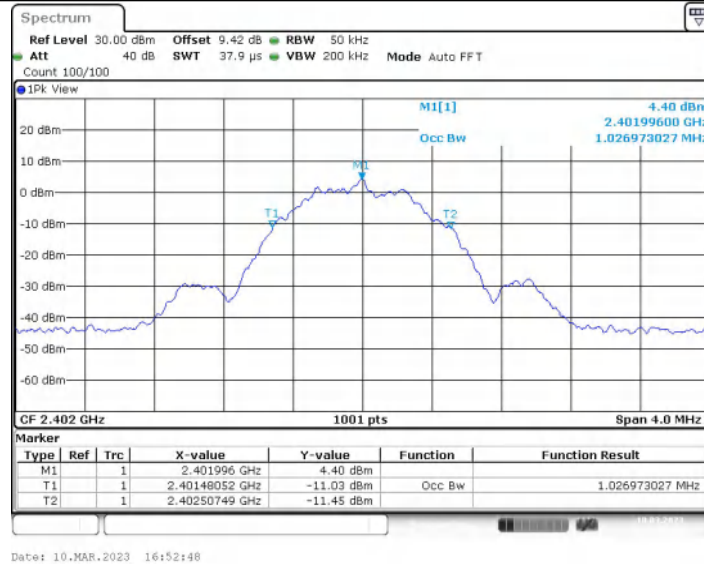
11N20SISO_Ant1_2437



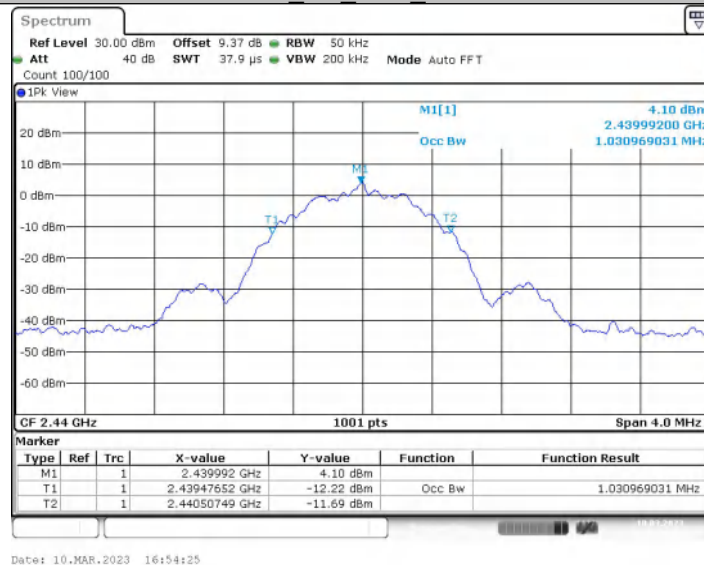
11N20SISO_Ant1_2462



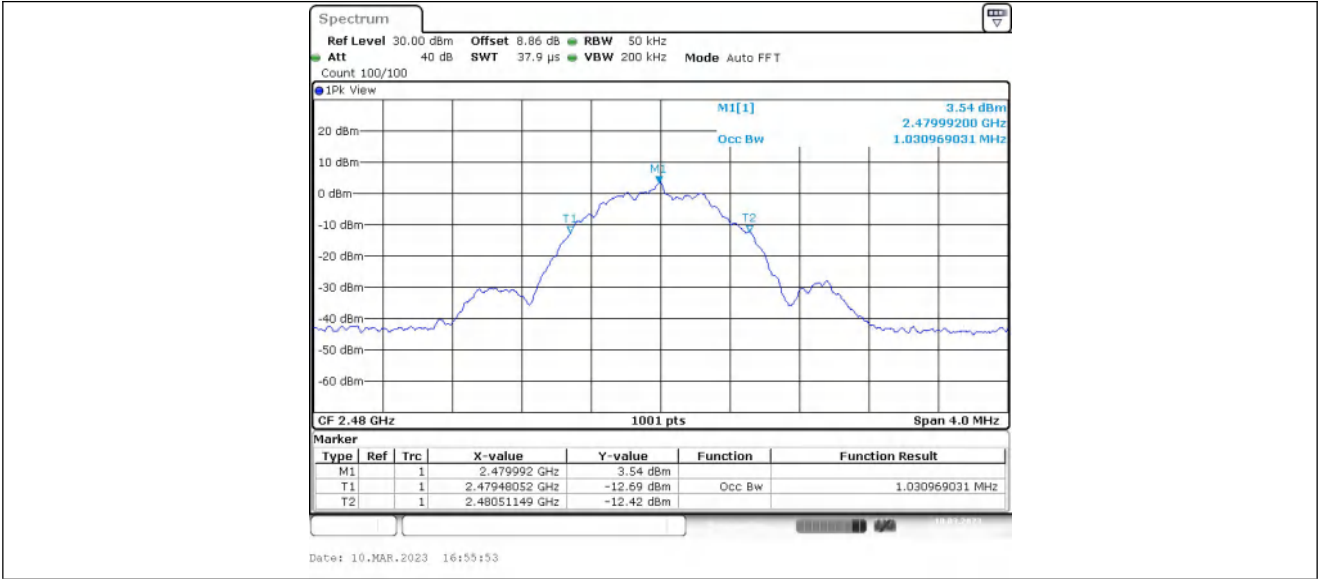
BLE 1M Ant1 2402



BLE 1M Ant1 2440



BLE 1M Ant1 2480





6.3 CONDUCTED OUTPUT POWER

6.3.1 Test Result Peak

TestMode	Antenna	Frequency[MHz]	Conducted Peak Power[dBm]	Conducted Limit[dBm]	Gain [dBi]	EIRP [dBm]	EIRP Limit[dBm]	Verdict
11B	Ant1	2412	14.71	≤30.00	2.54	17.25	≤36.00	PASS
		2437	15.65	≤30.00	2.54	18.19	≤36.00	PASS
		2462	15.46	≤30.00	2.54	18.00	≤36.00	PASS
11G	Ant1	2412	11.25	≤30.00	2.54	13.79	≤36.00	PASS
		2437	12.25	≤30.00	2.54	14.79	≤36.00	PASS
		2462	12.09	≤30.00	2.54	14.63	≤36.00	PASS
11N20SISO	Ant1	2412	11.24	≤30.00	2.54	13.78	≤36.00	PASS
		2437	12.2	≤30.00	2.54	14.74	≤36.00	PASS
		2462	12.05	≤30.00	2.54	14.59	≤36.00	PASS

TestMode	Antenna	Frequency[MHz]	Conducted Peak Power[dBm]	Gain [dBi]	EIRP[dBm]	EIRP Limit[dBm]	Verdict
BLE_1M	Ant1	2402	5.19	2.54	7.73	≤36	PASS
		2440	4.92	2.54	7.46	≤36	PASS
		2480	4.34	2.54	6.88	≤36	PASS

6.3.2 Test Result Average

TestMode	Antenna	Frequency[MHz]	Conducted Peak Power[dBm]	Conducted Limit[dBm]	Gain [dBi]	EIRP [dBm]	EIRP Limit[dBm]	Verdict
11B	Ant1	2412	13.03	≤30.00	2.54	16.57	≤36.00	PASS
		2437	14.19	≤30.00	2.54	16.73	≤36.00	PASS
		2462	14.03	≤30.00	2.54	16.57	≤36.00	PASS
11G	Ant1	2412	9.75	≤30.00	2.54	12.29	≤36.00	PASS
		2437	10.60	≤30.00	2.54	13.14	≤36.00	PASS
		2462	10.55	≤30.00	2.54	13.09	≤36.00	PASS
11N20SISO	Ant1	2412	9.94	≤30.00	2.54	12.48	≤36.00	PASS
		2437	10.85	≤30.00	2.54	13.39	≤36.00	PASS
		2462	10.72	≤30.00	2.54	13.26	≤36.00	PASS

TestMode	Antenna	Frequency[MHz]	Conducted Peak Power[dBm]	Gain [dBi]	EIRP[dBm]	EIRP Limit[dBm]	Verdict
BLE_1M	Ant1	2402	3.52	2.54	6.06	≤36	PASS
		2440	3.45	2.54	5.99	≤36	PASS
		2480	2.94	2.54	5.48	≤36	PASS



6.4 POWER SPECTRAL DENSITY MEASUREMENT

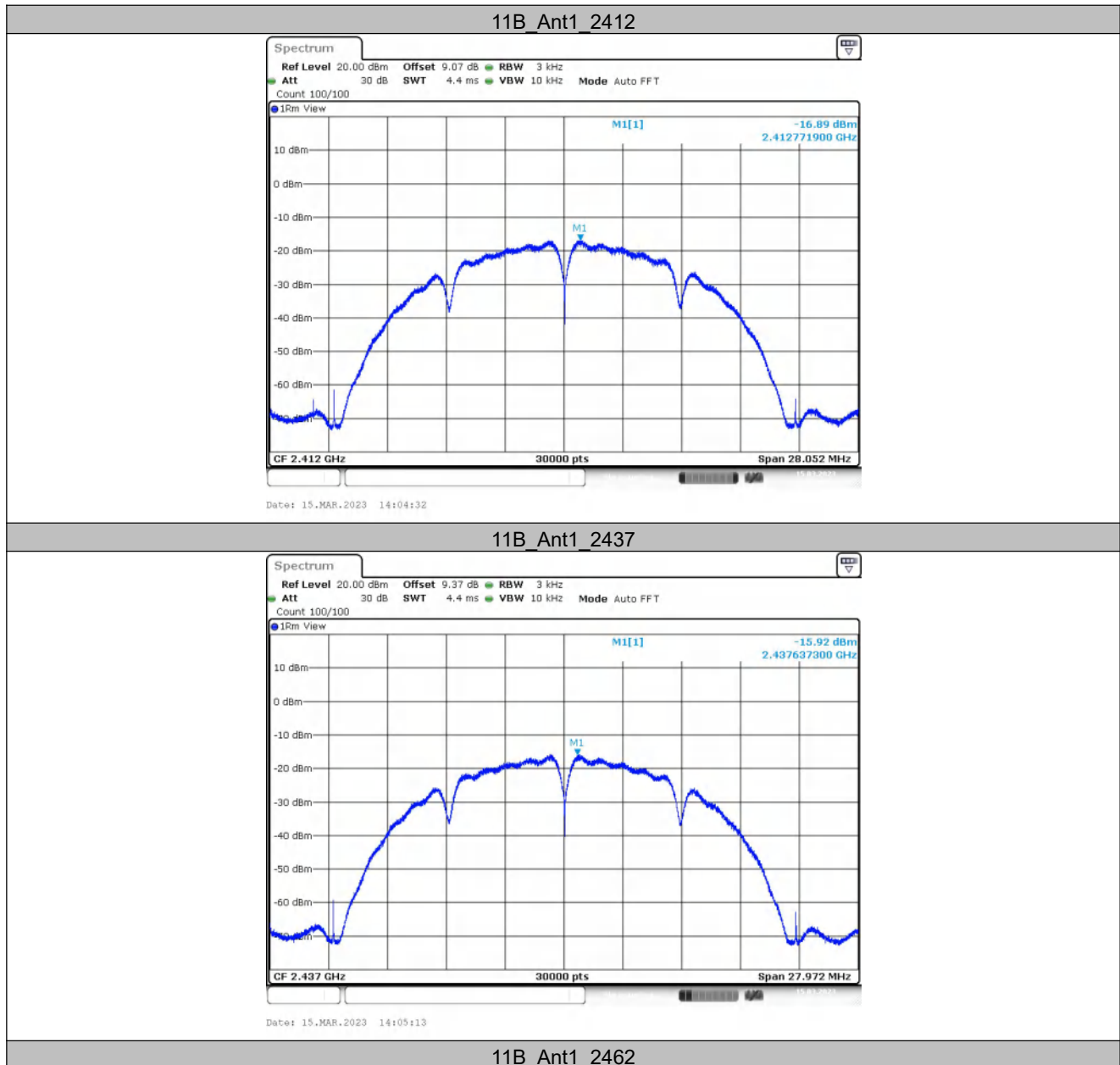
6.4.1 Test Result

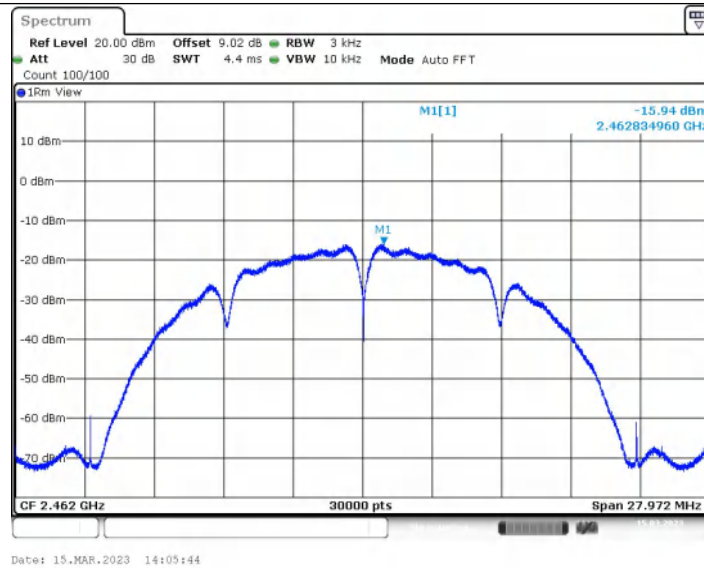
TestMode	Antenna	Frequency[MHz]	Result[dBm/3-100kHz]	Limit[dBm/3kHz]	Verdict
11B	Ant1	2412	-16.89	≤8.00	PASS
		2437	-15.92	≤8.00	PASS
		2462	-15.94	≤8.00	PASS
11G	Ant1	2412	-22.58	≤8.00	PASS
		2437	-21.94	≤8.00	PASS
		2462	-21.9	≤8.00	PASS
11N20SISO	Ant1	2412	-23.31	≤8.00	PASS
		2437	-21.95	≤8.00	PASS
		2462	-22.14	≤8.00	PASS

TestMode	Antenna	Freq(MHz)	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
BLE_1M	Ant1	2402	-9.96	≤8.00	PASS
		2440	-11.67	≤8.00	PASS
		2480	-12.16	≤8.00	PASS

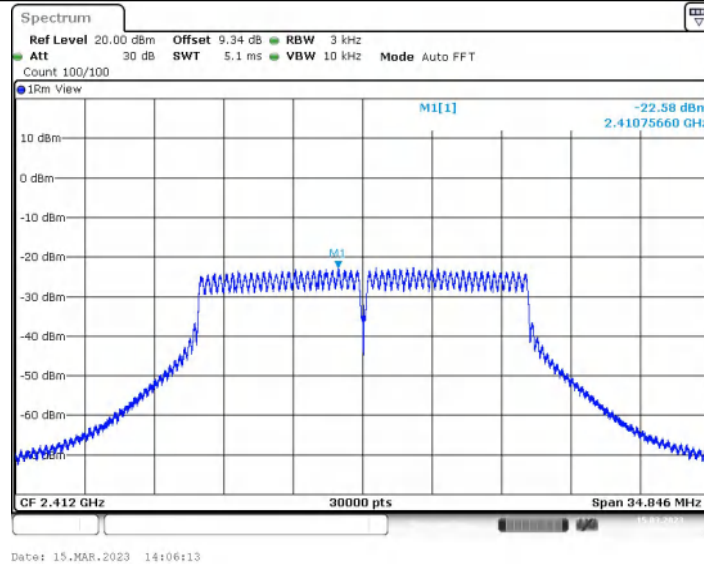


6.4.2 Test Graphs

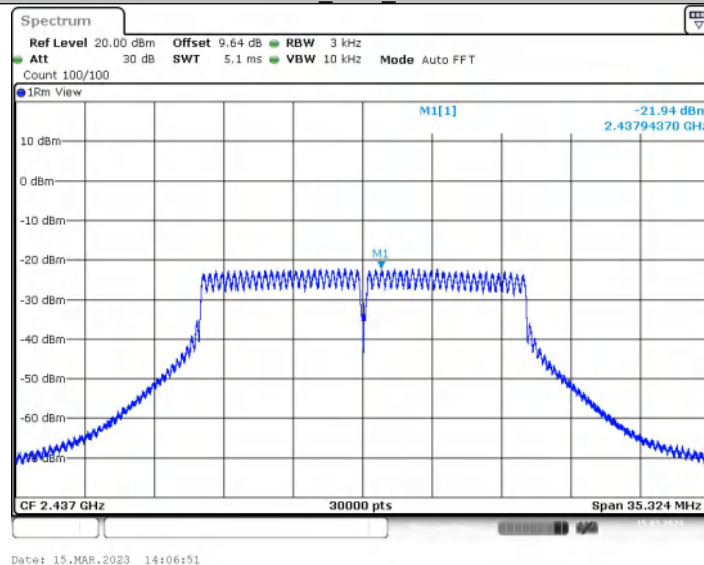




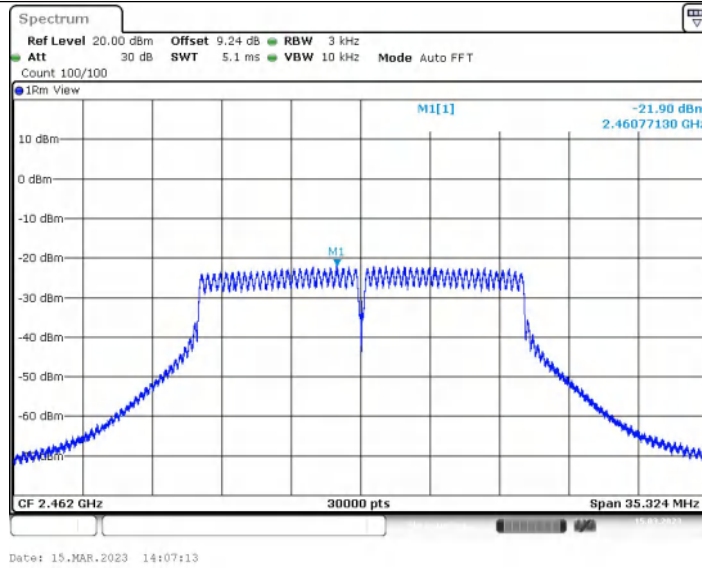
11G_Ant1_2412



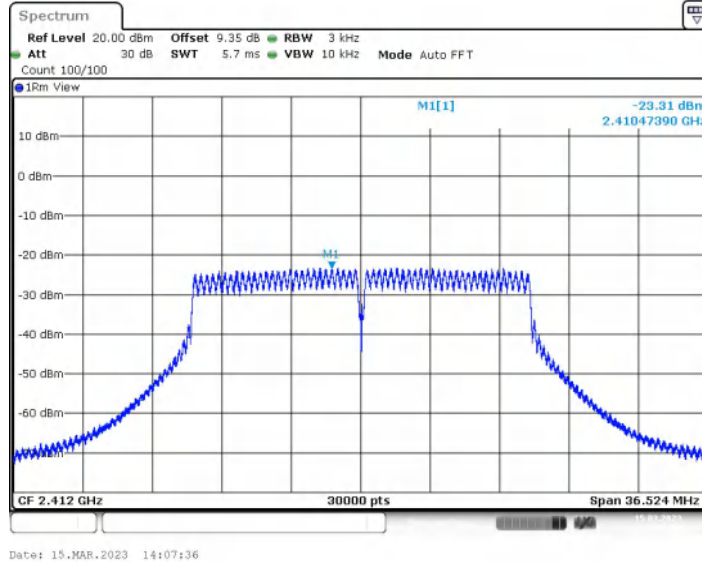
11G_Ant1_2437



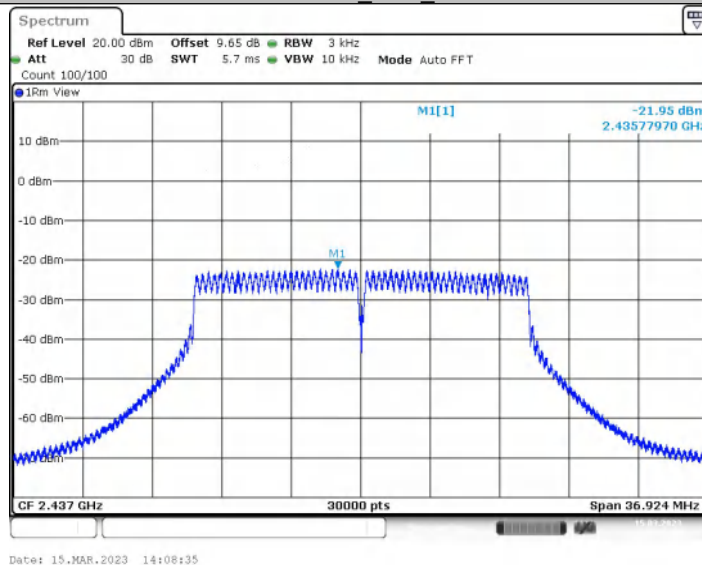
11G_Ant1_2462



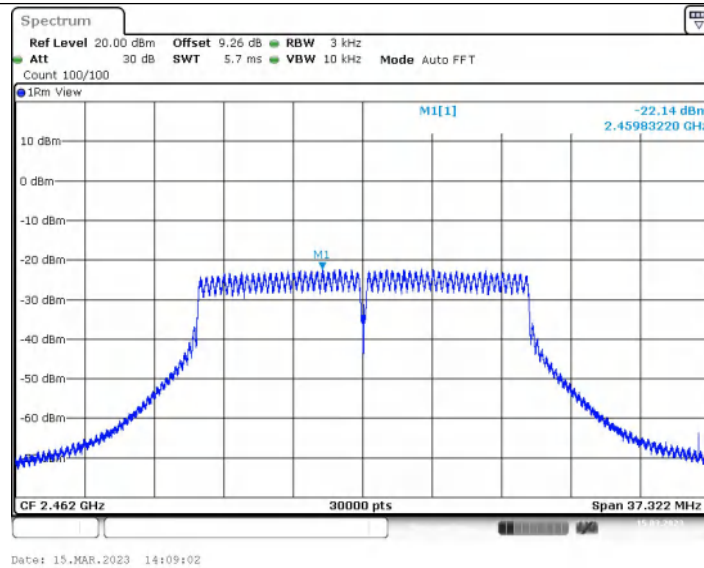
11N20SISO_Ant1_2412



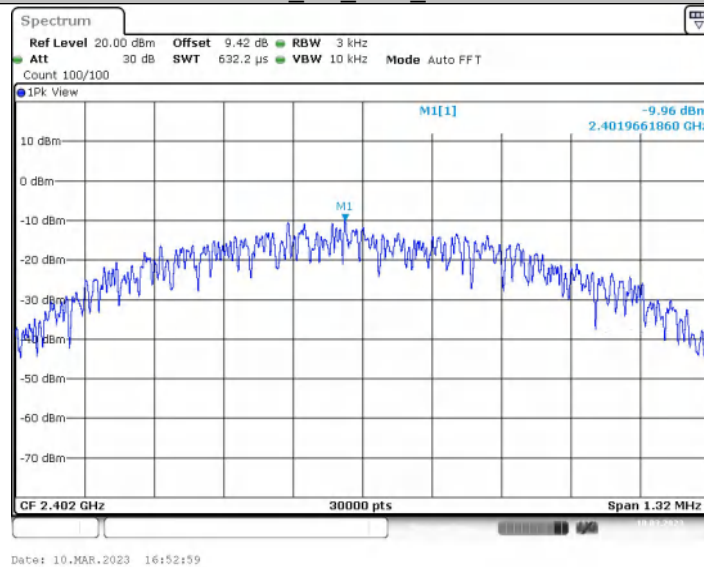
11N20SISO_Ant1_2437



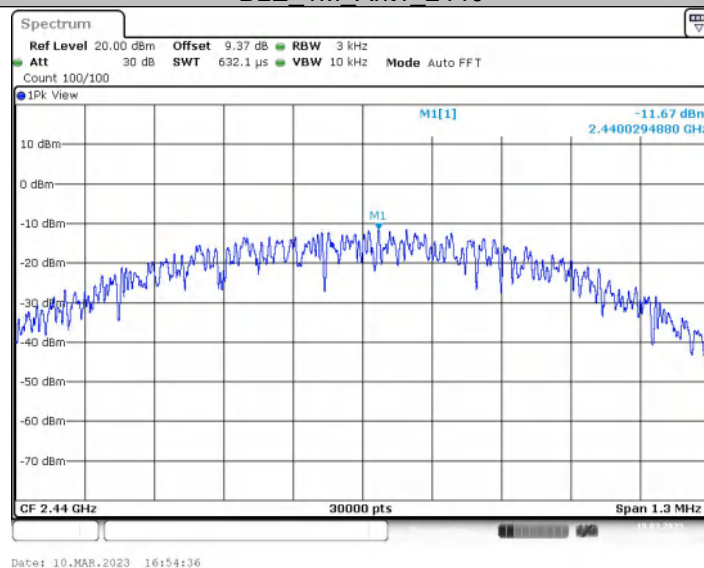
11N20SISO_Ant1_2462



BLE_1M_Ant1_2402



BLE_1M_Ant1_2440



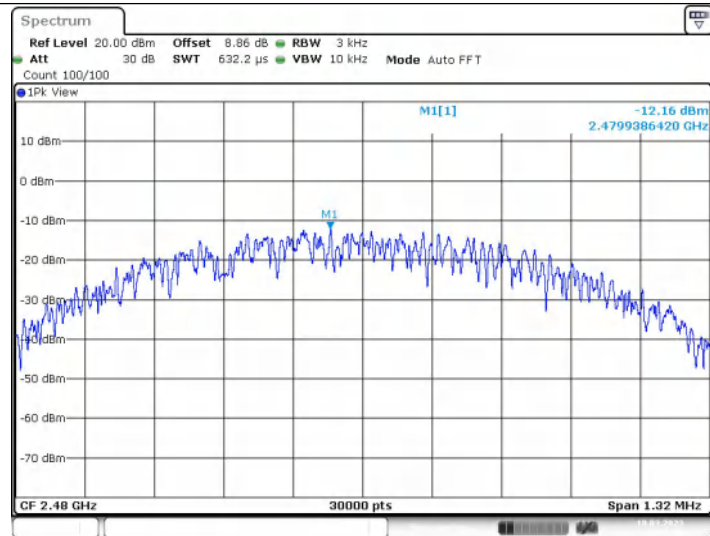
BLE_1M_Ant1_2480



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6.5 Band edge measurements

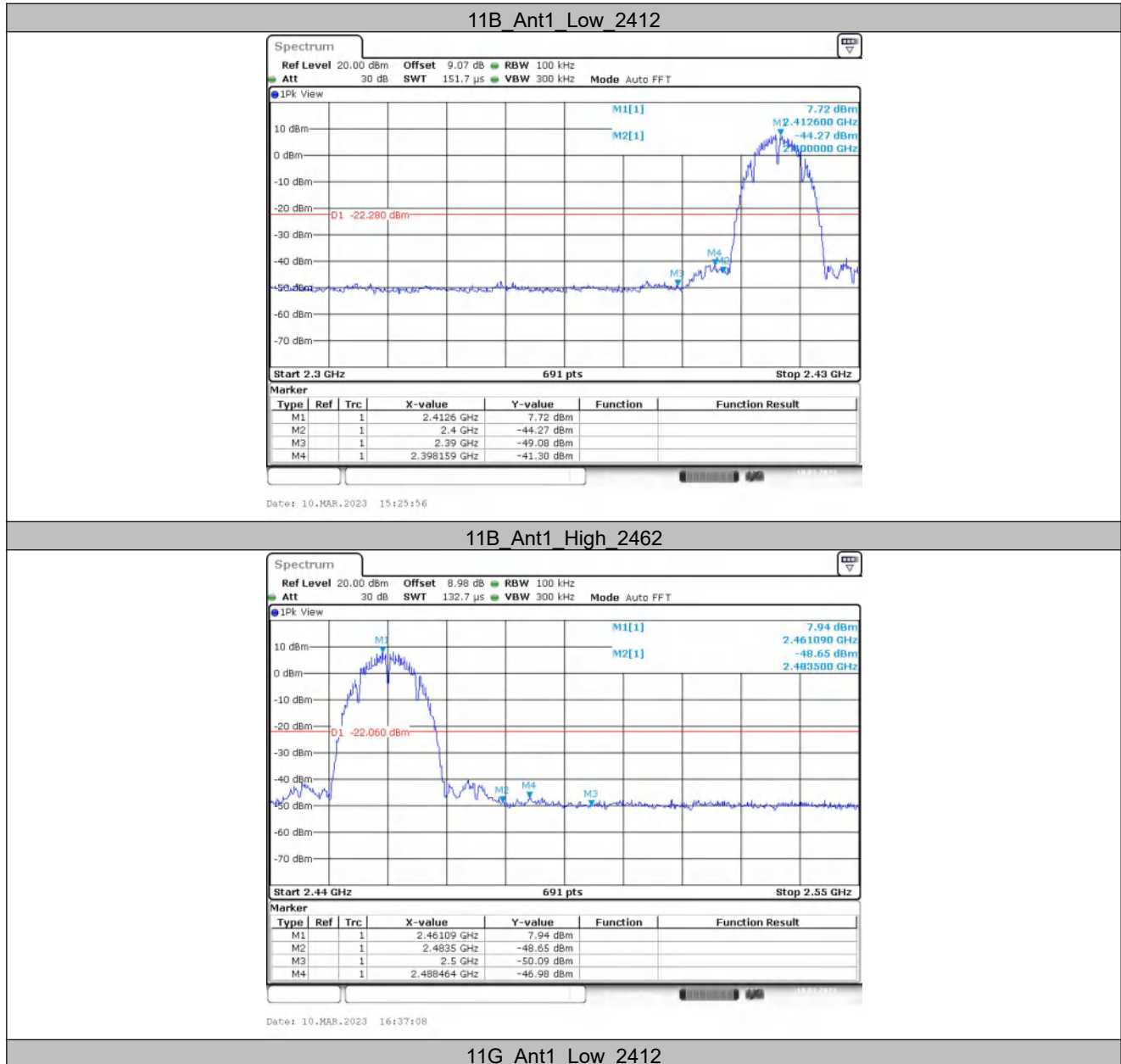
6.5.1 Test Result

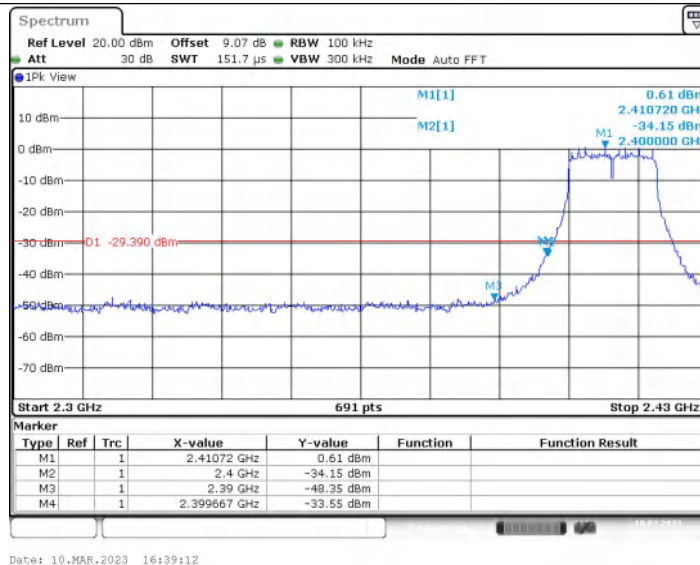
TestMode	Antenna	ChName	Frequency[MHz]	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
11B	Ant1	Low	2412	7.72	-41.3	≤ -22.28	PASS
		High	2462	7.94	-46.98	≤ -22.06	PASS
11G	Ant1	Low	2412	0.61	-33.55	≤ -29.39	PASS
		High	2462	2.08	-46.22	≤ -27.92	PASS
11N20SISO	Ant1	Low	2412	1.13	-33.86	≤ -28.87	PASS
		High	2462	1.77	-45.58	≤ -28.23	PASS

TestMode	Antenna	ChName	Freq(MHz)	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	Low	2402	5.00	-48.01	≤ -15	PASS
		High	2480	4.15	-47.95	≤ -15.85	PASS

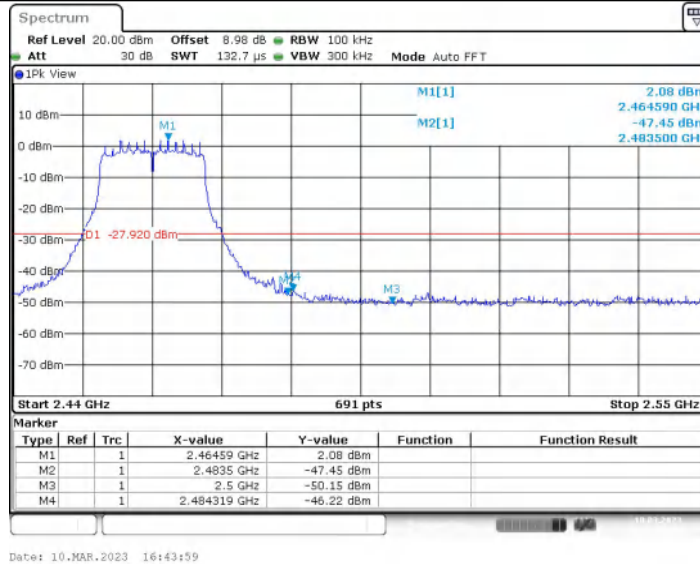


6.5.2 Test Graphs

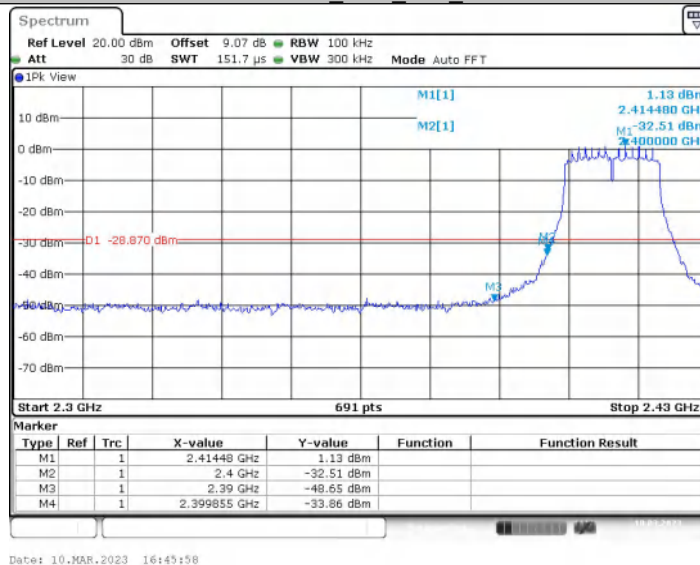




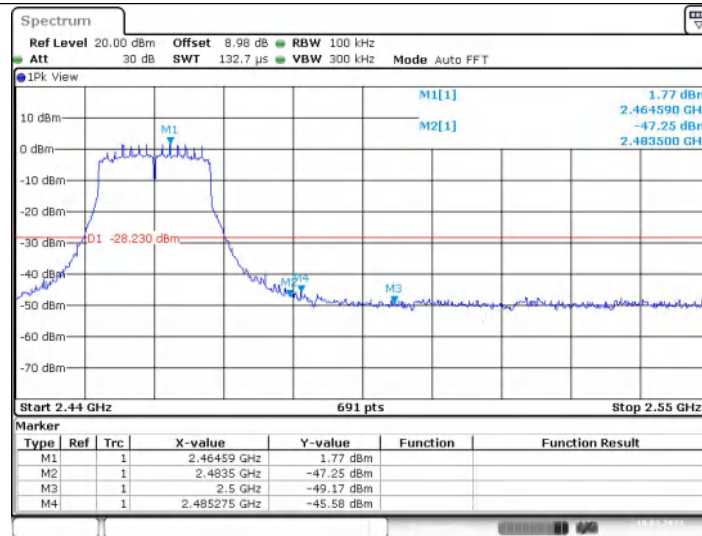
11G_Ant1_High_2462



11N20SISO_Ant1_Low_2412

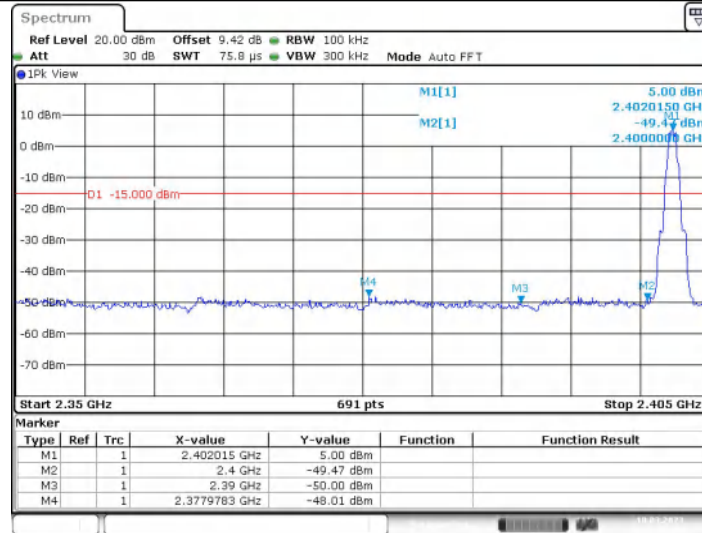


11N20SISO_Ant1_High_2462



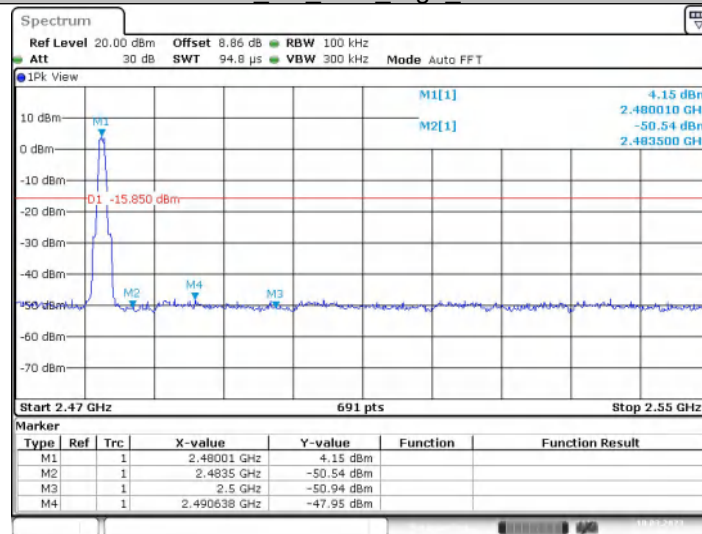
Date: 10.MAR.2023 16:49:17

BLE 1M Ant1 Low 2402



Date: 10.MAR.2023 16:53:08

BLE 1M Ant1 High 2480



Date: 10.MAR.2023 16:56:13



6.6 OUT OF BAND EMISSION MEASUREMENT

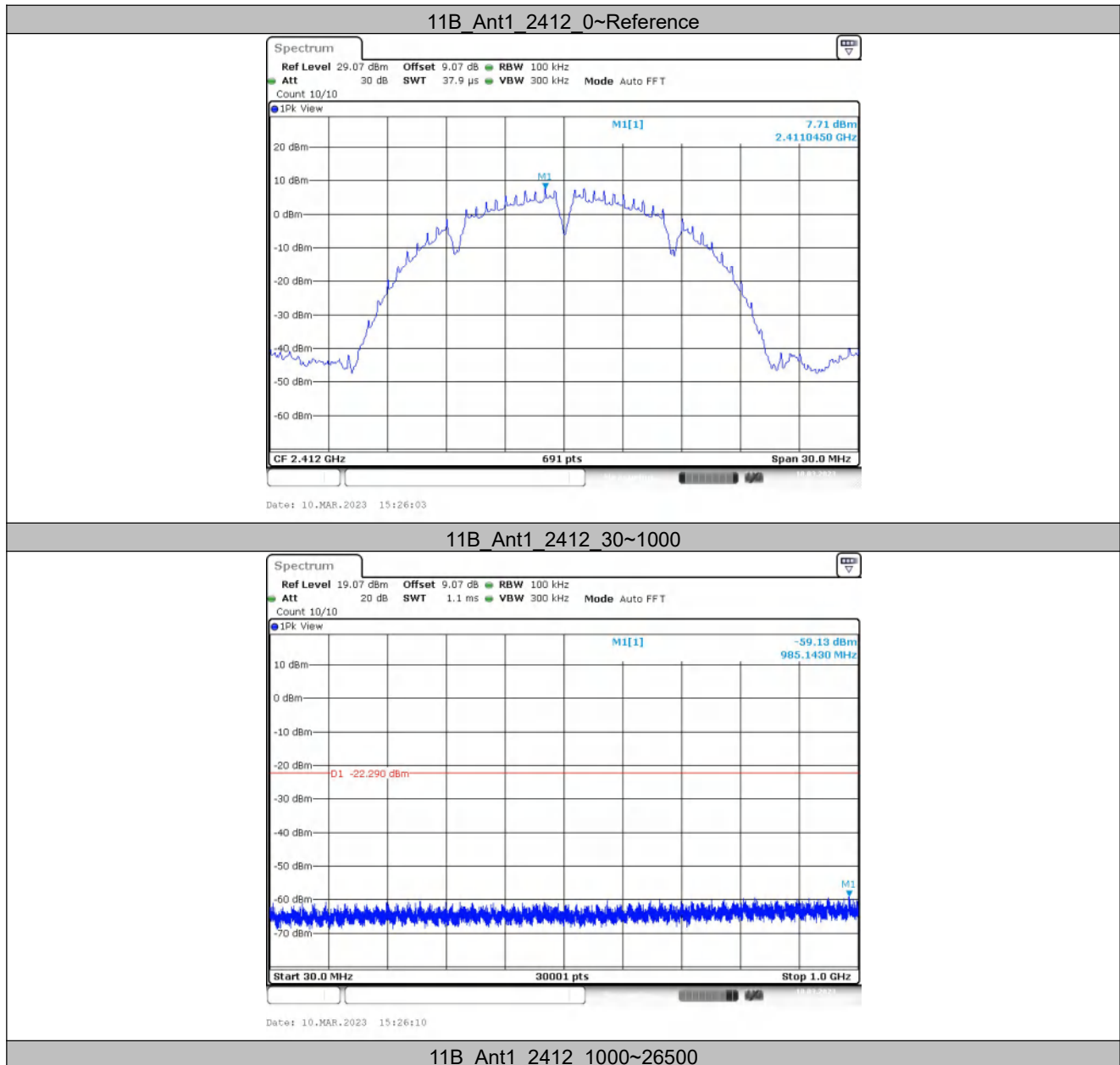
6.6.1 Test Result

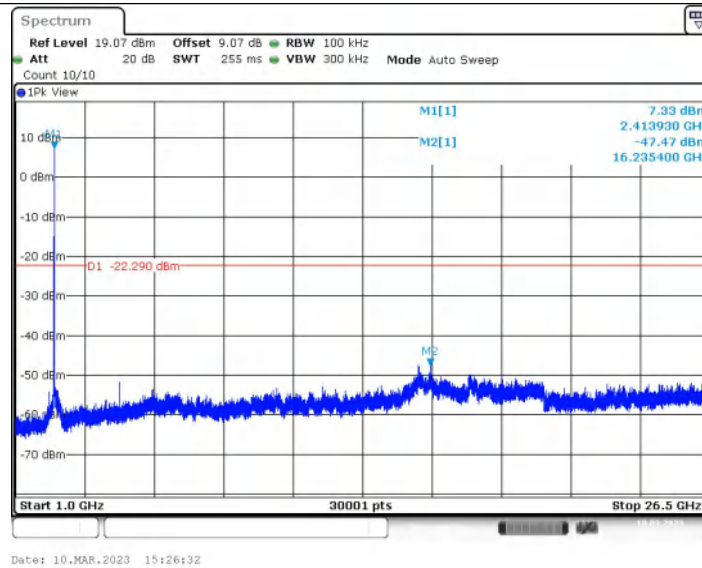
TestMode	Antenna	Frequency[MHz]	FreqRange [Mhz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
11B	Ant1	2412	Reference	7.71	7.71	---	PASS
			30~1000	7.71	-59.13	≤-22.29	PASS
			1000~26500	7.71	-47.47	≤-22.29	PASS
		2437	Reference	7.99	7.99	---	PASS
			30~1000	7.99	-58.84	≤-22.01	PASS
			1000~26500	7.99	-48.37	≤-22.01	PASS
		2462	Reference	8.03	8.03	---	PASS
			30~1000	8.03	-58.89	≤-21.97	PASS
			1000~26500	8.03	-48.71	≤-21.97	PASS
11G	Ant1	2412	Reference	1.42	1.42	---	PASS
			30~1000	1.42	-58.69	≤-28.58	PASS
			1000~26500	1.42	-47.72	≤-28.58	PASS
		2437	Reference	1.92	1.92	---	PASS
			30~1000	1.92	-57.69	≤-28.08	PASS
			1000~26500	1.92	-47.94	≤-28.08	PASS
		2462	Reference	2.10	2.10	---	PASS
			30~1000	2.10	-58.96	≤-27.9	PASS
			1000~26500	2.10	-48.8	≤-27.9	PASS
11N20SISO	Ant1	2412	Reference	1.18	1.18	---	PASS
			30~1000	1.18	-59.26	≤-28.82	PASS
			1000~26500	1.18	-47.42	≤-28.82	PASS
		2437	Reference	1.56	1.56	---	PASS
			30~1000	1.56	-58.3	≤-28.44	PASS
			1000~26500	1.56	-48.23	≤-28.44	PASS
		2462	Reference	1.84	1.84	---	PASS
			30~1000	1.84	-57.39	≤-28.16	PASS
			1000~26500	1.84	-48.6	≤-28.16	PASS

TestMode	Antenna	Freq(MHz)	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	Reference	5.01	5.01	---	PASS
			30~1000	5.01	-58.66	≤-14.99	PASS
			1000~26500	5.01	-46.67	≤-14.99	PASS
		2440	Reference	4.70	4.70	---	PASS
			30~1000	4.70	-59.16	≤-15.3	PASS
			1000~26500	4.70	-47.89	≤-15.3	PASS
		2480	Reference	4.10	4.10	---	PASS
			30~1000	4.10	-58.86	≤-15.9	PASS
			1000~26500	4.10	-48.33	≤-15.9	PASS

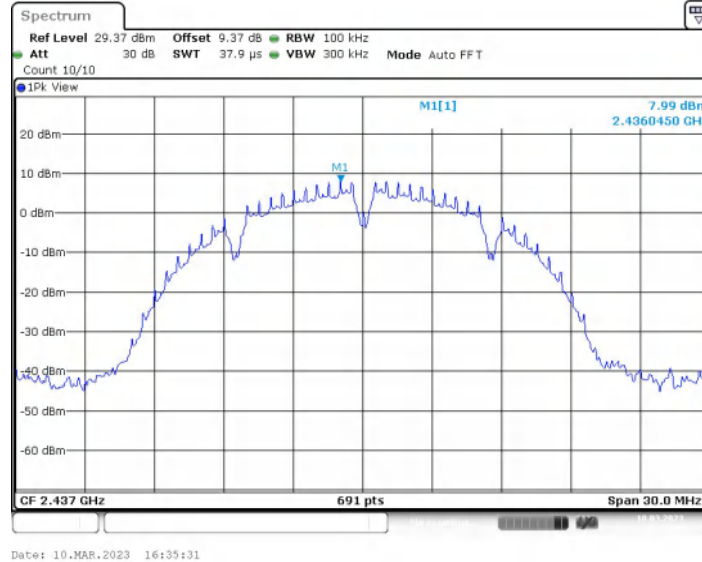


6.6.2 Test Graphs

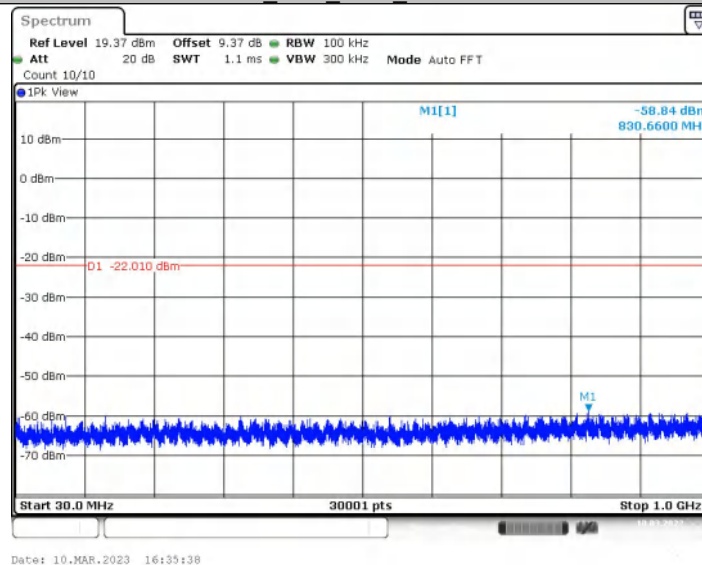




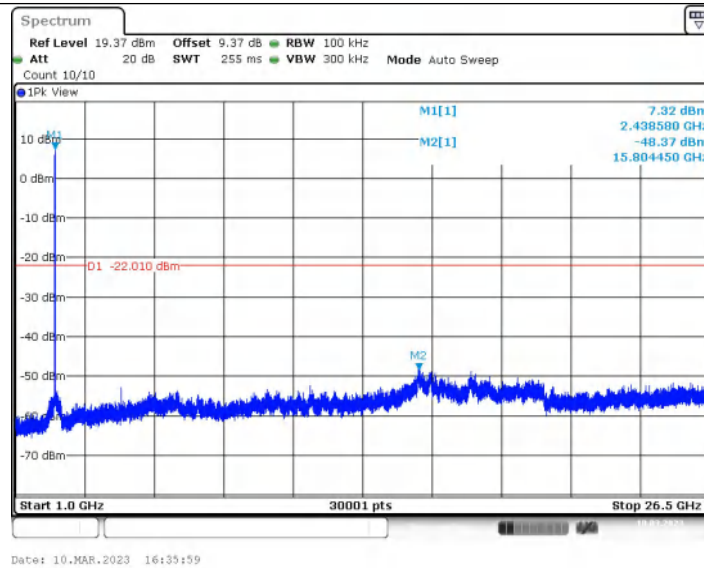
11B_Ant1_2437_0~Reference



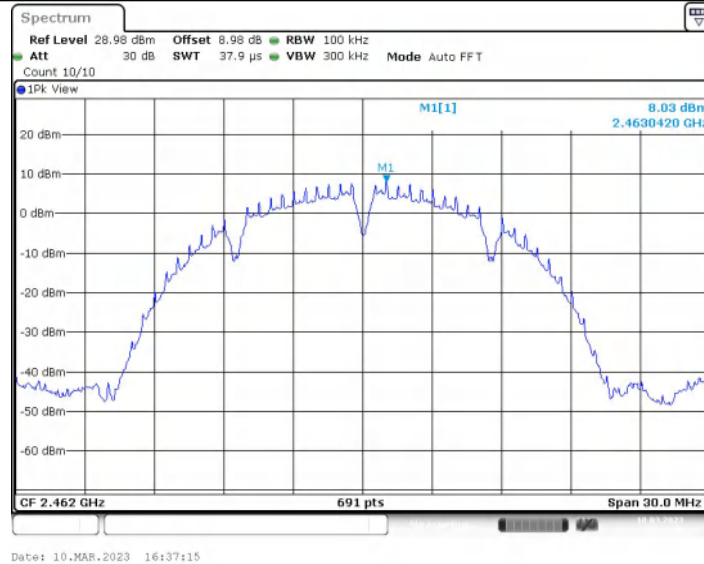
11B_Ant1_2437_30~1000



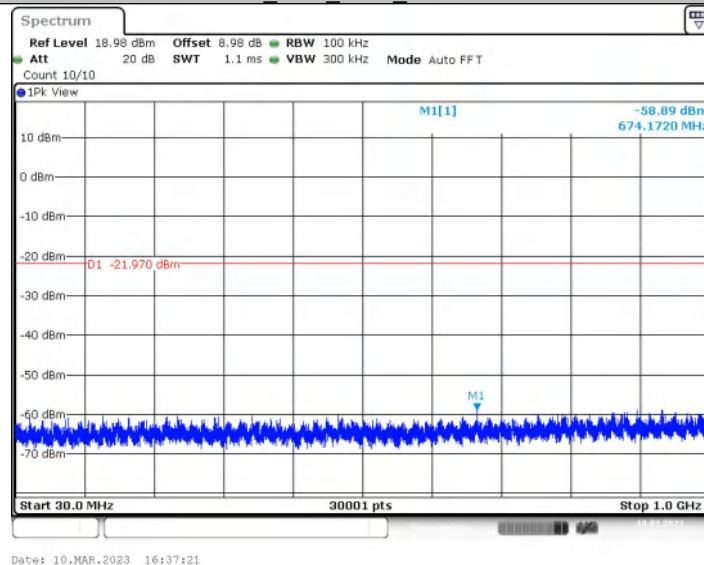
11B_Ant1_2437_1000~26500



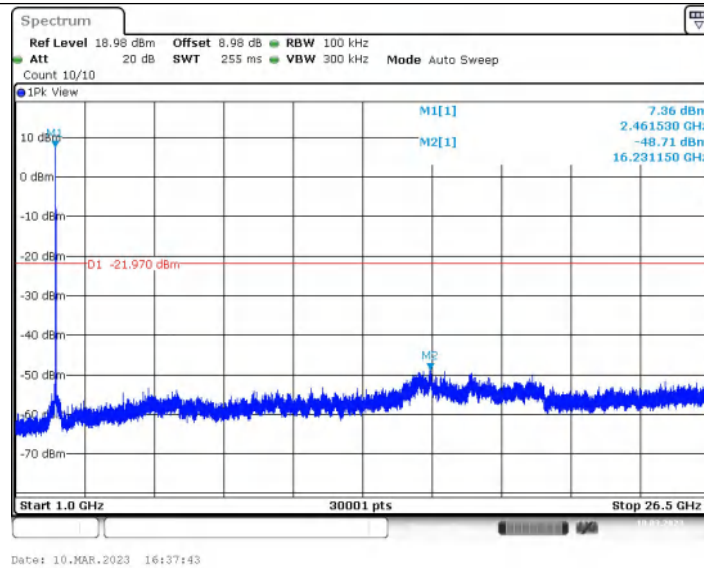
11B_Ant1_2462_0~Reference



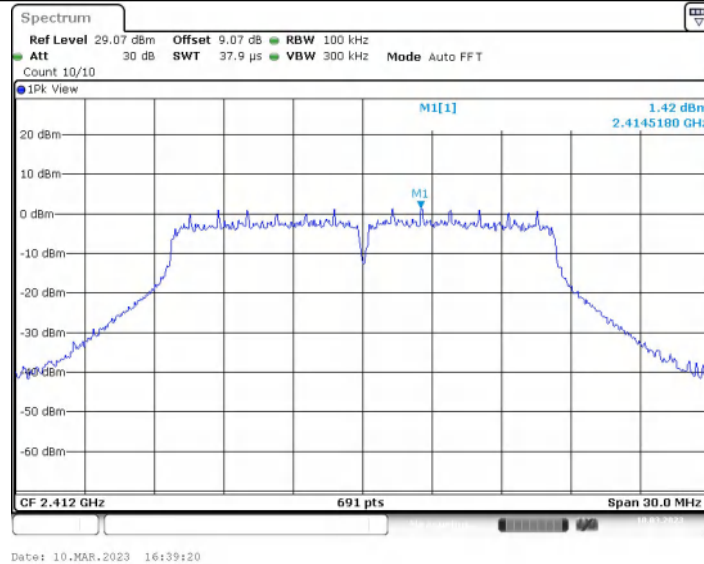
11B_Ant1_2462_30~1000



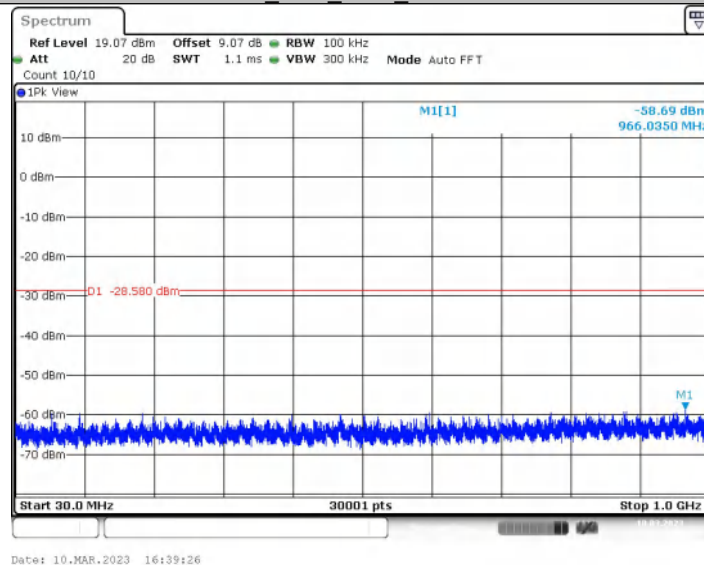
11B_Ant1_2462_1000~26500



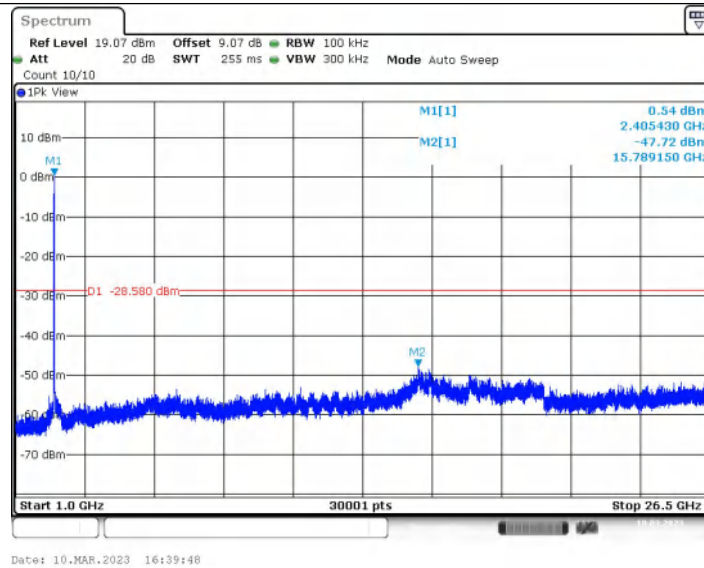
11G_Ant1_2412_0~Reference



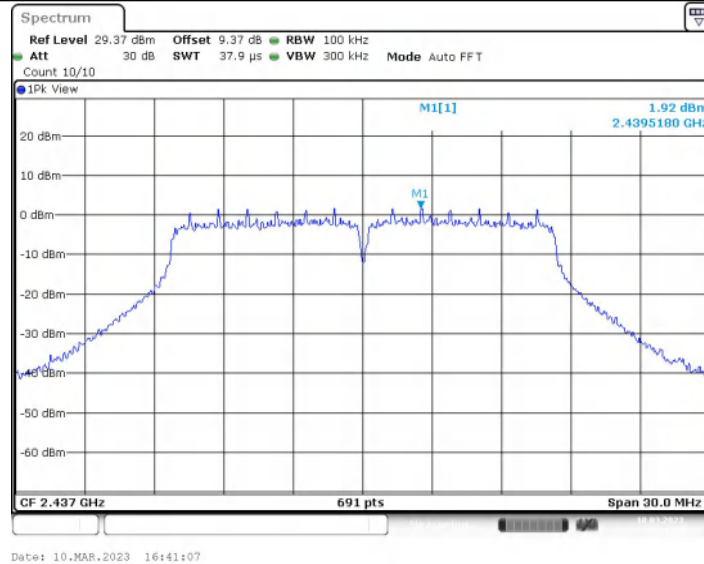
11G_Ant1_2412_30~1000



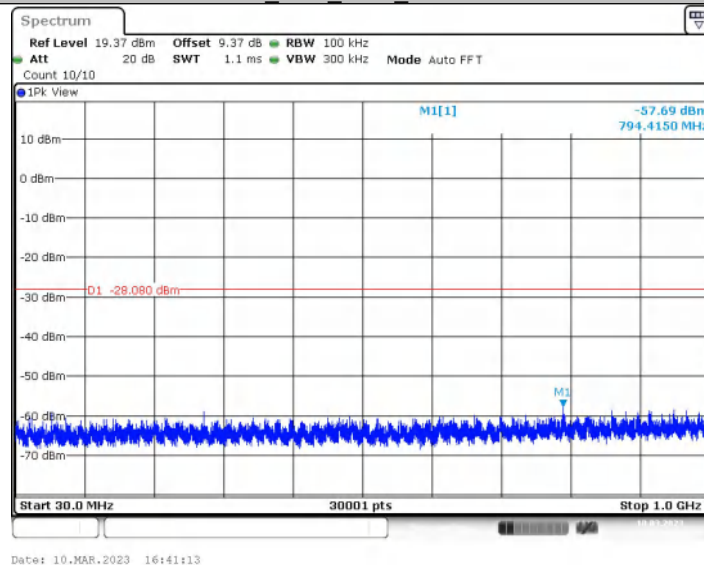
11G_Ant1_2412_1000~26500



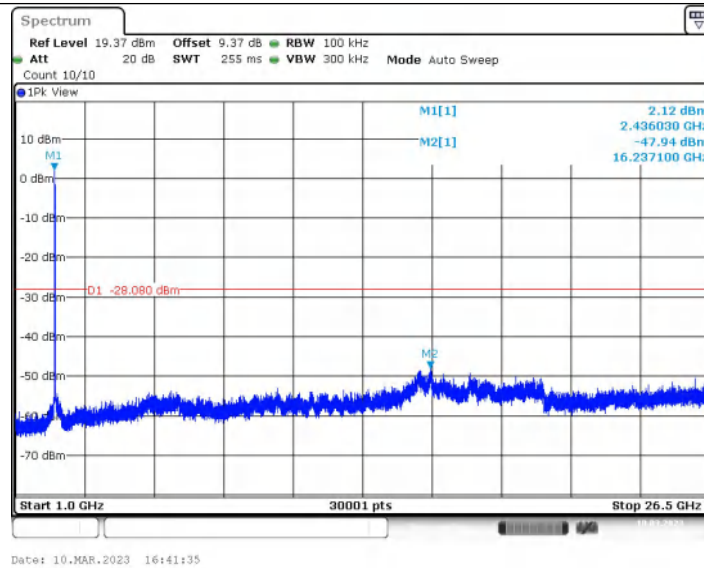
11G_Ant1_2437_0~Reference



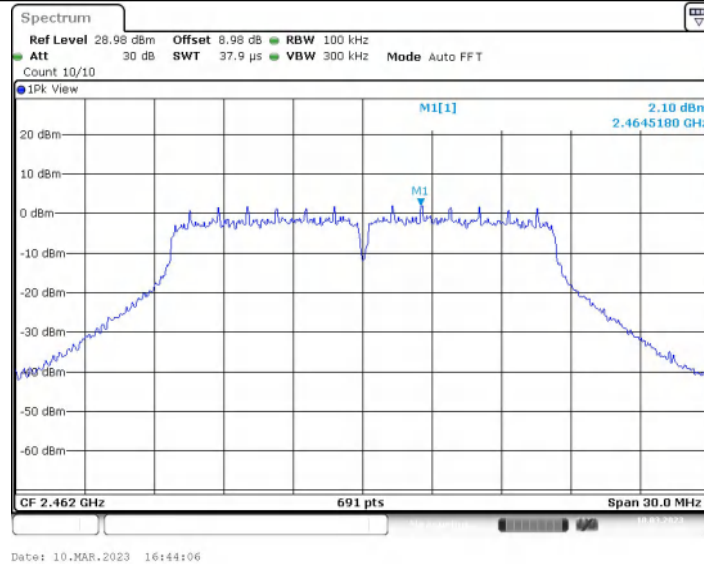
11G_Ant1_2437_30~1000



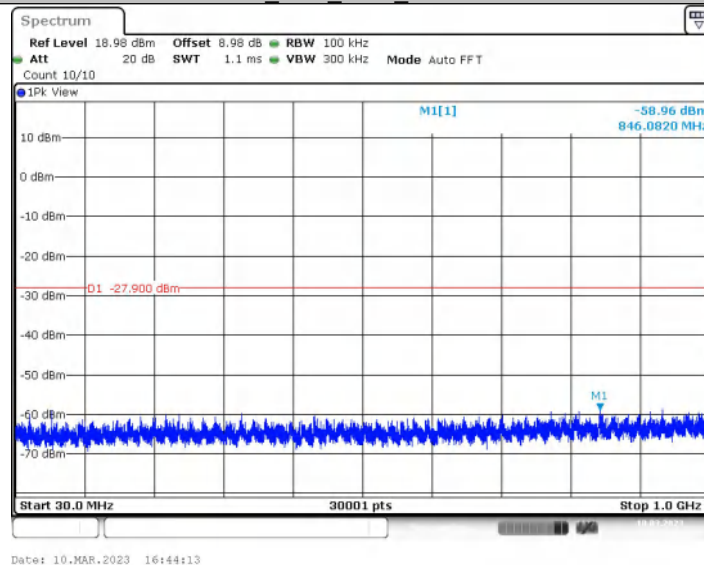
11G_Ant1_2437_1000~26500



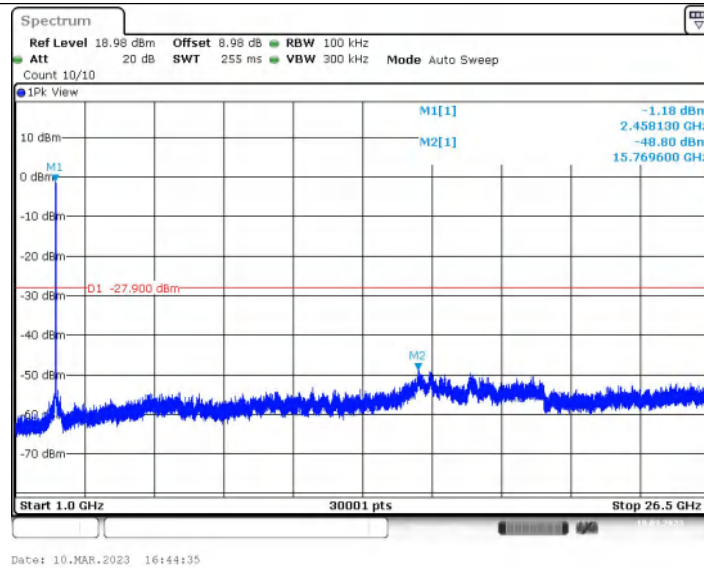
11G_Ant1_2462_0~Reference



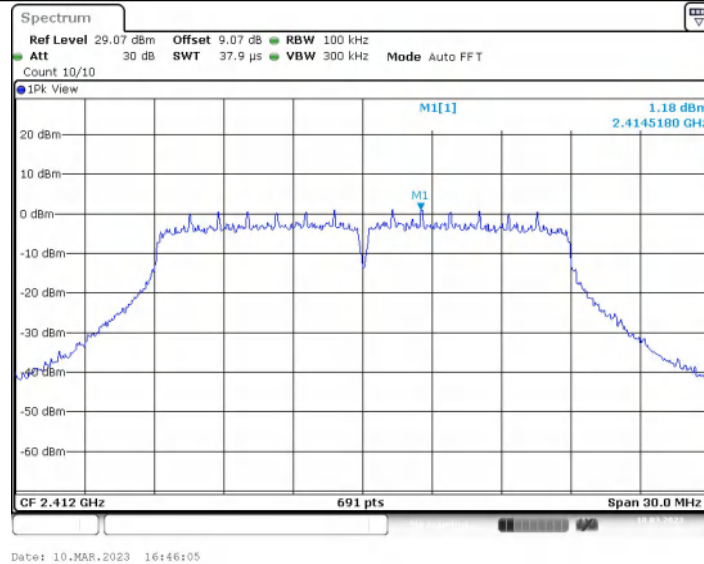
11G_Ant1_2462_30~1000



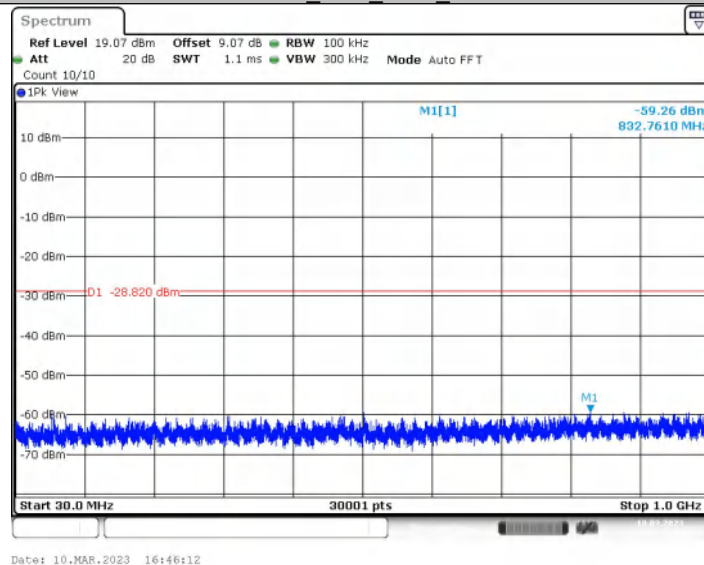
11G_Ant1_2462_1000~26500



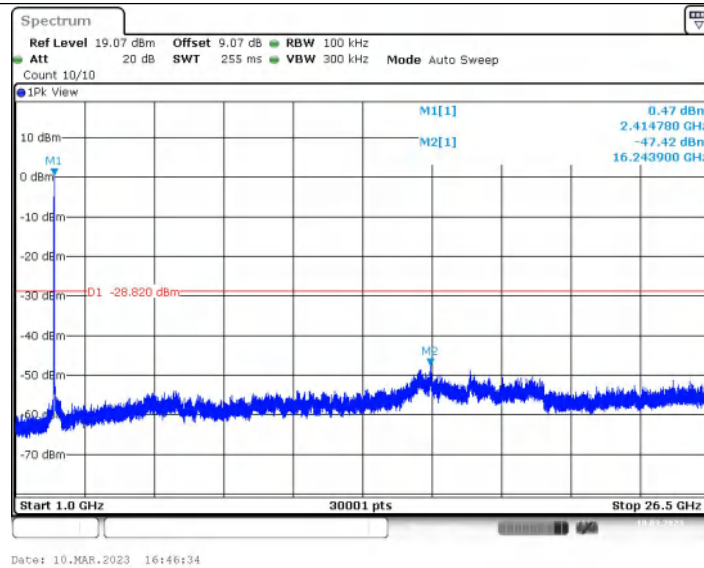
11N20SISO_Ant1_2412_0~Reference



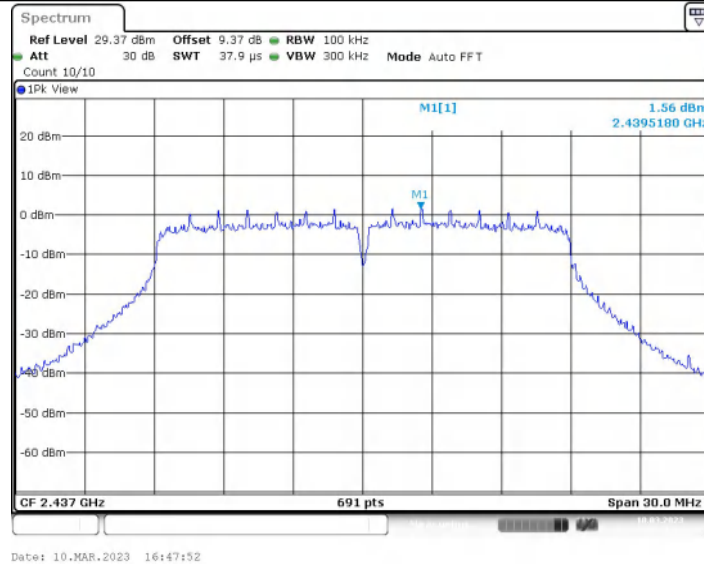
11N20SISO_Ant1_2412_30~1000



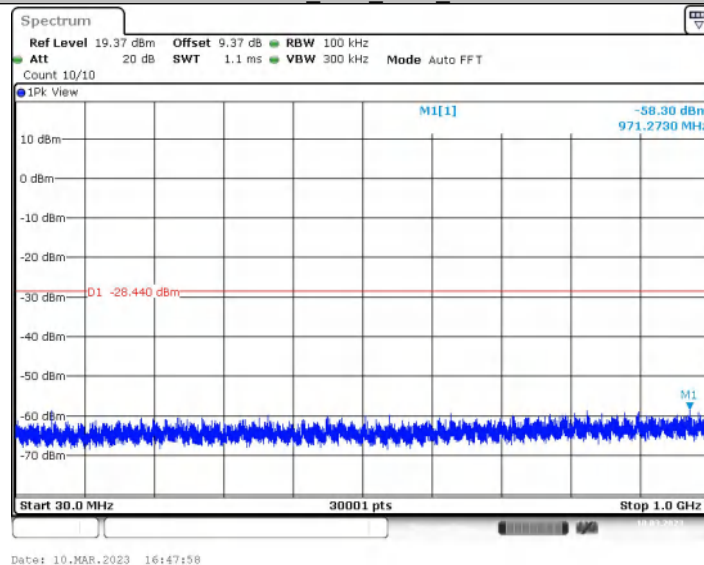
11N20SISO_Ant1_2412_1000~26500



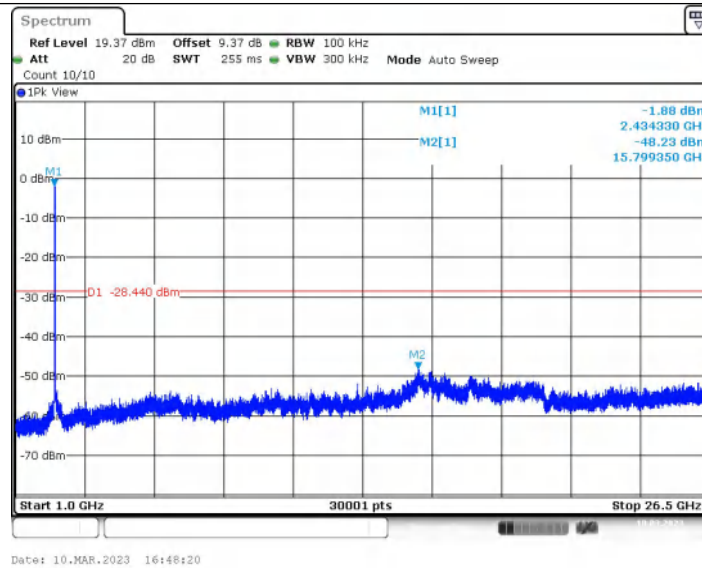
11N20SISO_Ant1_2437_0~Reference



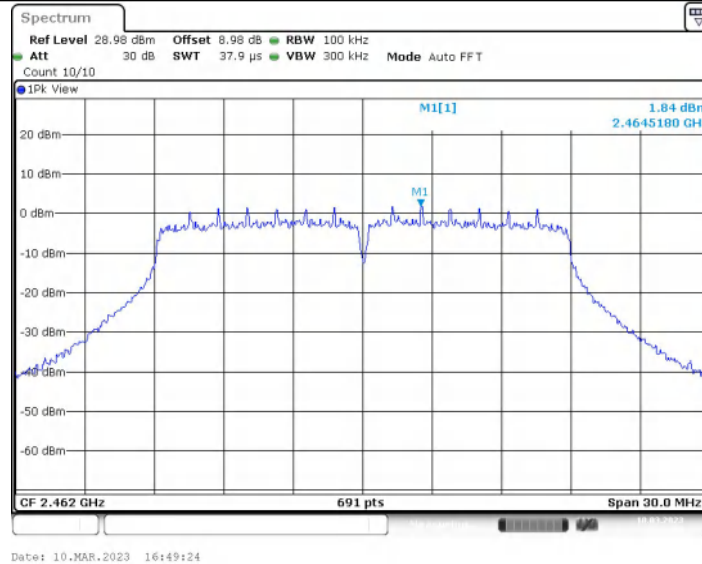
11N20SISO_Ant1_2437_30~1000



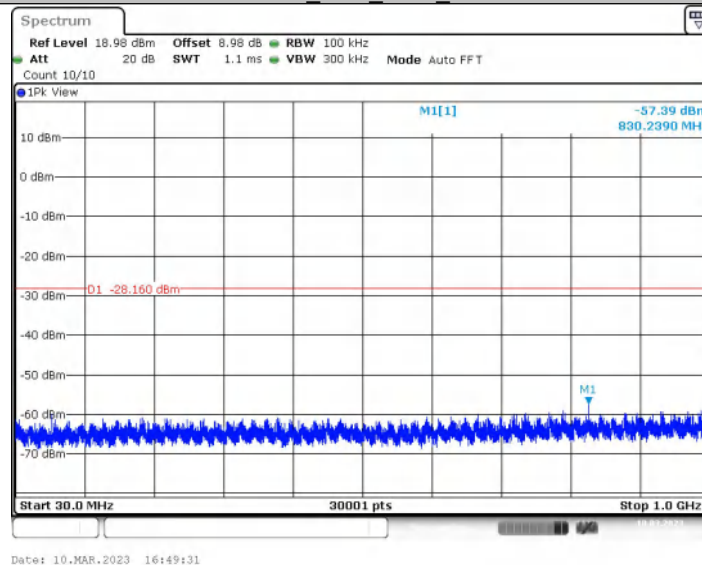
11N20SISO_Ant1_2437_1000~26500



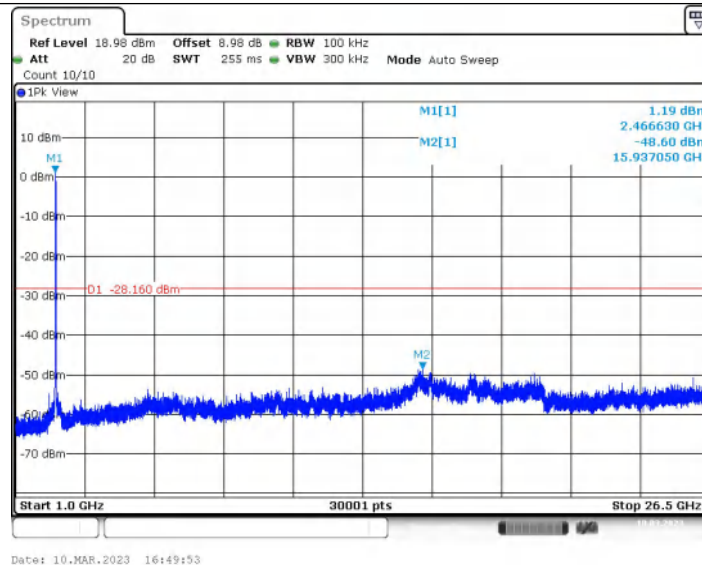
11N20SISO_Ant1_2462_0~Reference



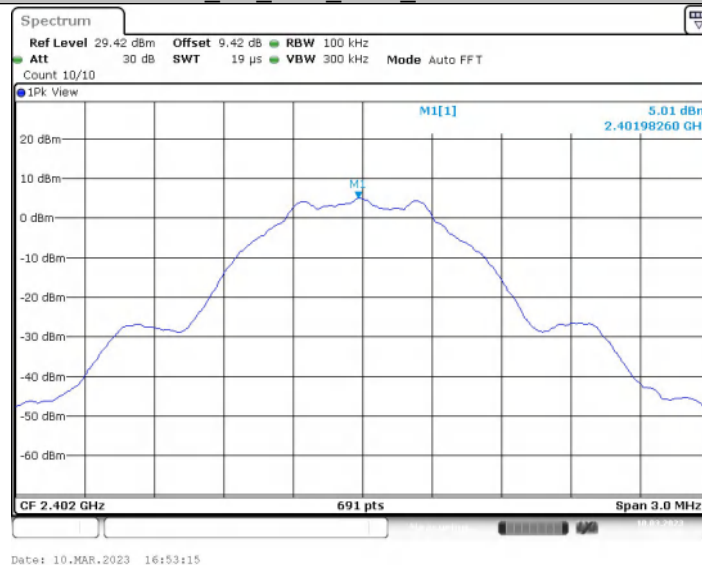
11N20SISO_Ant1_2462_30~1000



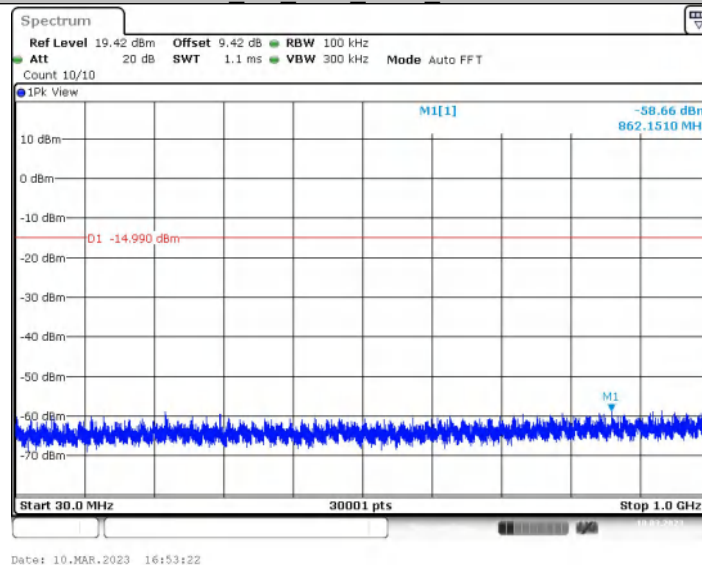
11N20SISO_Ant1_2462_1000~26500



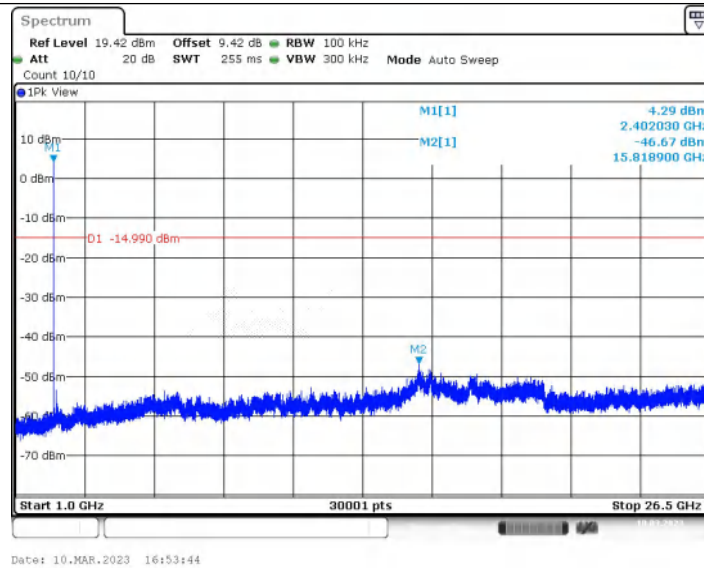
BLE_1M_Ant1_2402_0~Reference



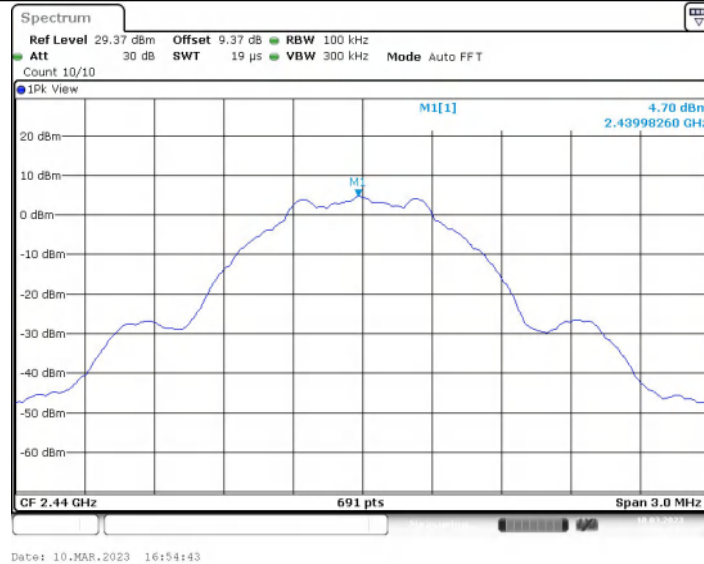
BLE_1M_Ant1_2402_30~1000



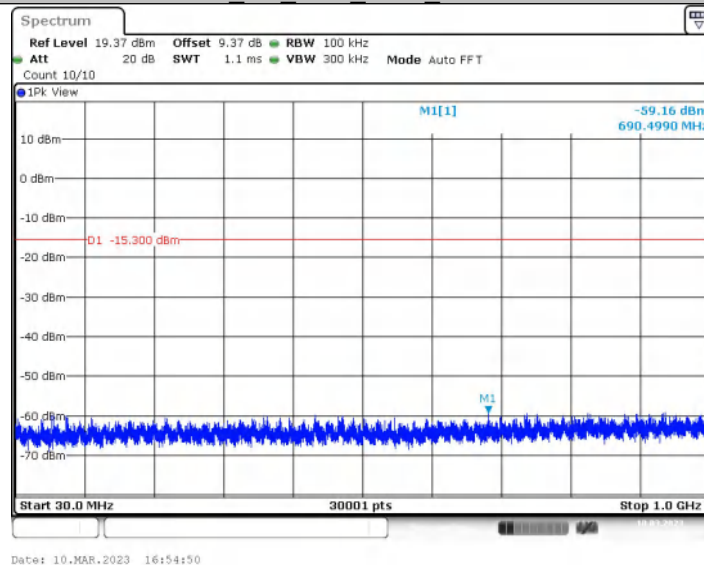
BLE_1M_Ant1_2402_1000~26500



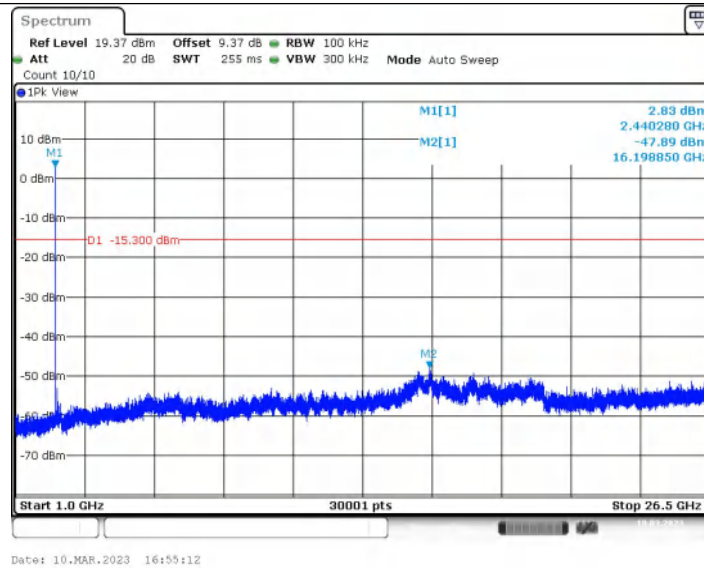
BLE_1M_Ant1_2440_0~Reference



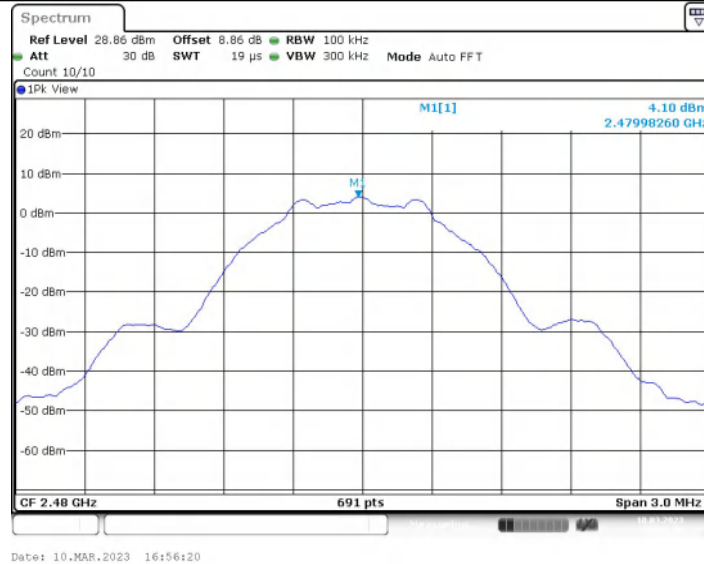
BLE_1M_Ant1_2440_30~1000



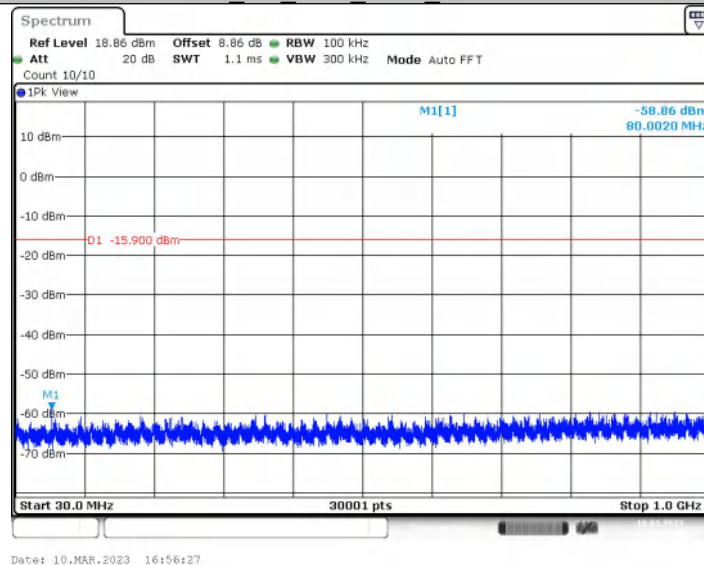
BLE_1M_Ant1_2440_1000~26500



BLE_1M_Ant1_2480_0~Reference



BLE_1M_Ant1_2480_30~1000



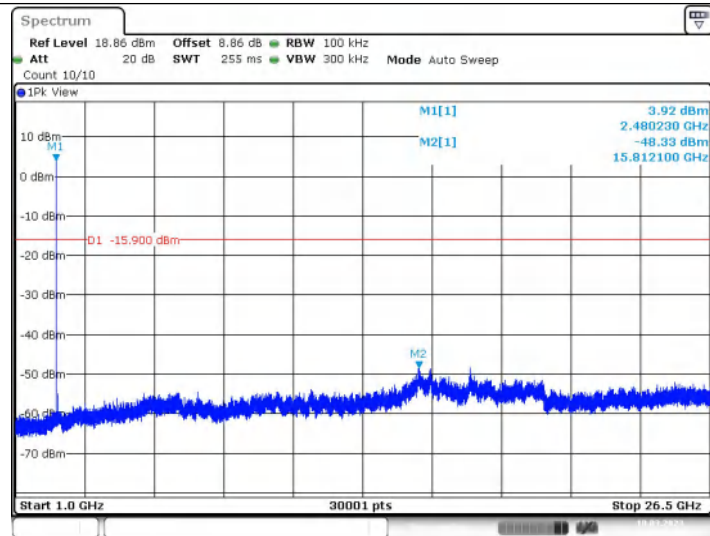
BLE_1M_Ant1_2480_1000~26500



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Important

- (1) The test report is valid without the official stamp of CVC;
- (2) Any part photocopies of the test report are forbidden without the written permission from CVC;
- (3) The test report is invalid without the signatures of Approval and Reviewer;
- (4) The test report is invalid if altered;
- (5) Objections to the test report must be submitted to CVC within 15 days.
- (6) Generally, commission test is responsible for the tested samples only.
- (7) As for the test result “-” or “N” means “not applicable”, “/” means “not test”, “P” means “pass” and “F” means “fail”

The test data and test results given in this test report should only be used for purposes of scientific research, teaching and internal quality control when the CMA symbol is not presented.

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