

Test Report No.:
FCC2022-0014-RF2

RF Test Report

EUT : 15.6-inch Computer
MODEL : VT-HMI-156-TEL
BRAND NAME : N/A
CLIENT : Chengdu Vantron Technology Co., Ltd.
Classification Of Test : N/A

CVC Testing Technology Co., Ltd.



Client		Name : Chengdu Vantron Technology Co., Ltd.	
		Address : No.5 GaoPeng Road, Hi-Tech Zone, Chengdu, SiChuan, P.R. China	
Manufacturer		Name : Chengdu Vantron Technology Co., Ltd.	
		Address : No.5 GaoPeng Road, Hi-Tech Zone, Chengdu, SiChuan, P.R. China	
Equipment Under Test		Name : 15.6-inch Computer	
		Model/Type: VT-HMI-156-TEL	
		Trade mark : N/A	
		Serial NO.:N/A	
		Sampe NO.:4-1	
Date of Receipt.	2022.03.10	Date of Testing	2022.03.10~2022.03.31
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.	
		Issue Date: 2022.03.10	
Tested by:		Reviewed by:	Approved by:
			
Xu ZhenFei		Liu YongHai	Chen HuaWen
Name Signature		Name Signature	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
FCC2022-0014-RF2	Original release	2022.03.31



1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

PPLIED STANDARD: FCC Part 15, Subpart C			
STANDARD SECTION	TEST TYPE AND LIMIT	RESULT	REMARK
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit.
15.247(d) 15.209	Radiated Emissions	PASS	Meet the requirement of limit.
15.247(d)	Band Edge Measurement	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted Output power	PASS	Meet the requirement of limit.
15.247(e)	Power Spectral Density	PASS	Meet the requirement of limit.
15.203	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 1	4m*3m*3m	CRTDSWKS44301	VGDS-0699	CRT	2024/04/24
Spectrum Analyzer	FSV30	104337	DZ-000235	R&S	2022/11/03
Comprehensive Test Instrument	CMW500	137779	DZ-000220	R&S	2022/06/30
Comprehensive Test Instrument	CMW500	169888	DZ-000342	R&S	2022/12/01
LTE Comprehensive Test Instrument	E7515A	MY58010639	DZ-000173	KEYSIGHT	2022/04/14
Analog Signal Generator	SMA100B	103663	DZ-000239-2	R&S	2022/06/30
Vector Signal Generator	SMBV100B	101757	DZ-000239-1	R&S	2022/06/30
Programmable DC Power Supply	E3642A	MY59108106	DZ-000242-2	KEYSIGHT	2022/08/05
Radiation Spurious Test System					/
3m Semi-Anechoic Chamber	FACT-4	ST08035	WKNA-0024	ETS	2024/12/12
Spectrum Analyzer	N9010B	MY57470323	DZ-000174	KEYSIGHT	2023/03/02
EMI Test Receiver	N9038A-508	MY532290079	EM-000397	Agilent	2023/03/02
Broadband Antenna	VULB 9163	9163-530	EM-000342	SCHWARZBECK	2022/06/26
Waveguide Horn Antenna	HF906	360306/008	WKNA-0024-8	R&S	2023/03/04
Waveguide Horn Antenna	BBHA9170	00949	DZ-000209-2	SCHWARZBECK	2022/08/27
Preamplifier	BBV 9721	9721-050	DZ-000209-1	SCHWARZBECK	2022/06/30
5G Bandstop Filters	WRCJV12-4 900-5100-5 900-6100-5 0EE	1	DZ-000186	WI	2022/12/20
Comprehensive tester	CMW500	159000	DZ-000240-2	R&S	2022/12/20

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	15.6-inch Computer										
BRAND	N/A										
MODEL	VT-HMI-156-TEL										
ADDITIONAL MODEL	N/A										
FCC ID	2AAGE156TEL6256										
POWER SUPPLY	DC 12V From Adapter or DC 48V from POE										
MODULATIONTECHNOLOGY	DSSS, OFDM, GFSK										
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM BT-LE for DTS										
OPERATING FREQUENCY	2412MHz ~ 2462MHz for 11b/g/n(HT20) 2422-2452MHz for 11n(HT40) 2402-2480MHz for BT-LE(GFSK)										
PEAK OUTPUT POWER	WLAN: 24.72dBm (Maximum) BLE: 5.86dBm (Maximum)										
ANTENNA TYPE	WLAN: External antenna , 2dBi Gain BLE: External antenna , 3dBi Gain										
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. - 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</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	1TX/1RX
MODULATION MODE	TX FUNCTION										
802.11b	1TX/1RX										
802.11g	1TX/1RX										
802.11n (HT20)	1TX/1RX										
BT-LE	1TX/1RX										

2.2 Description of Accessories

N/A



2.3 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(GFSK)					
CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)
0	2402	14	2430	28	2458
1	2404	15	2432	29	2460
2	2406	16	2434	30	2462
3	2408	17	2436	31	2464
4	2410	18	2438	32	2466
5	2412	19	2440	33	2468
6	2414	20	2442	34	2470
7	2416	21	2444	35	2472
8	2418	22	2446	36	2474
9	2420	23	2448	37	2476
10	2422	24	2450	38	2478
11	2424	25	2452	39	2480
12	2426	26	2454		
13	2428	27	2456		

Note: 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.



2.4 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 or BT link

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	6	DSSS	DBPSK	6.0
A	BT-LE	0 to 39	39	DTS	BT-LE	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 (Mbps)
A	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
A	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
A	802.11n(HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
A	BT-LE	0 to 39	0,19, 39	DTS	BT-LE	1.0

**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
-	WIFI (2.4G) Link + 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 (Mbps)
A	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
A	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
A	802.11n(HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
A	BT-LE	0 to 39	0,19, 39	DTS	BT-LE	1.0

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	TEST VOLTAGE (SYSTEM)	TESTED BY
RE<1G	24deg. C, 55%RH	AC 120V/60Hz	Liu shiwei
RE≥1G	24deg. C, 55%RH	AC 120V/60Hz	Liu shiwei
PLC	24deg. C, 55%RH	AC 120V/60Hz	Liu shiwei
APCM	25deg. C, 58%RH	AC 120V/60Hz	Liu shiwei



2.5 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 C63.10-2020

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

2.6 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.

During the tests:

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

3 TEST TYPES AND RESULTS

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 Limit

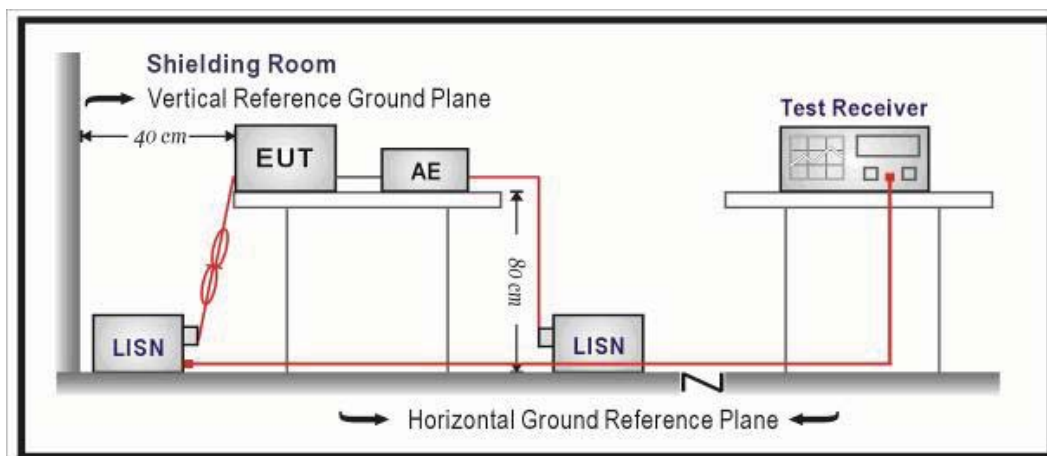
Frequency (MHz)	Conducted Limits(dBμV)	
	Quasi-peak	Average
0.15 - 0.5	66 to 56 *	56 to 46*
0.5 - 5	56	46
5 - 30	60	50

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.

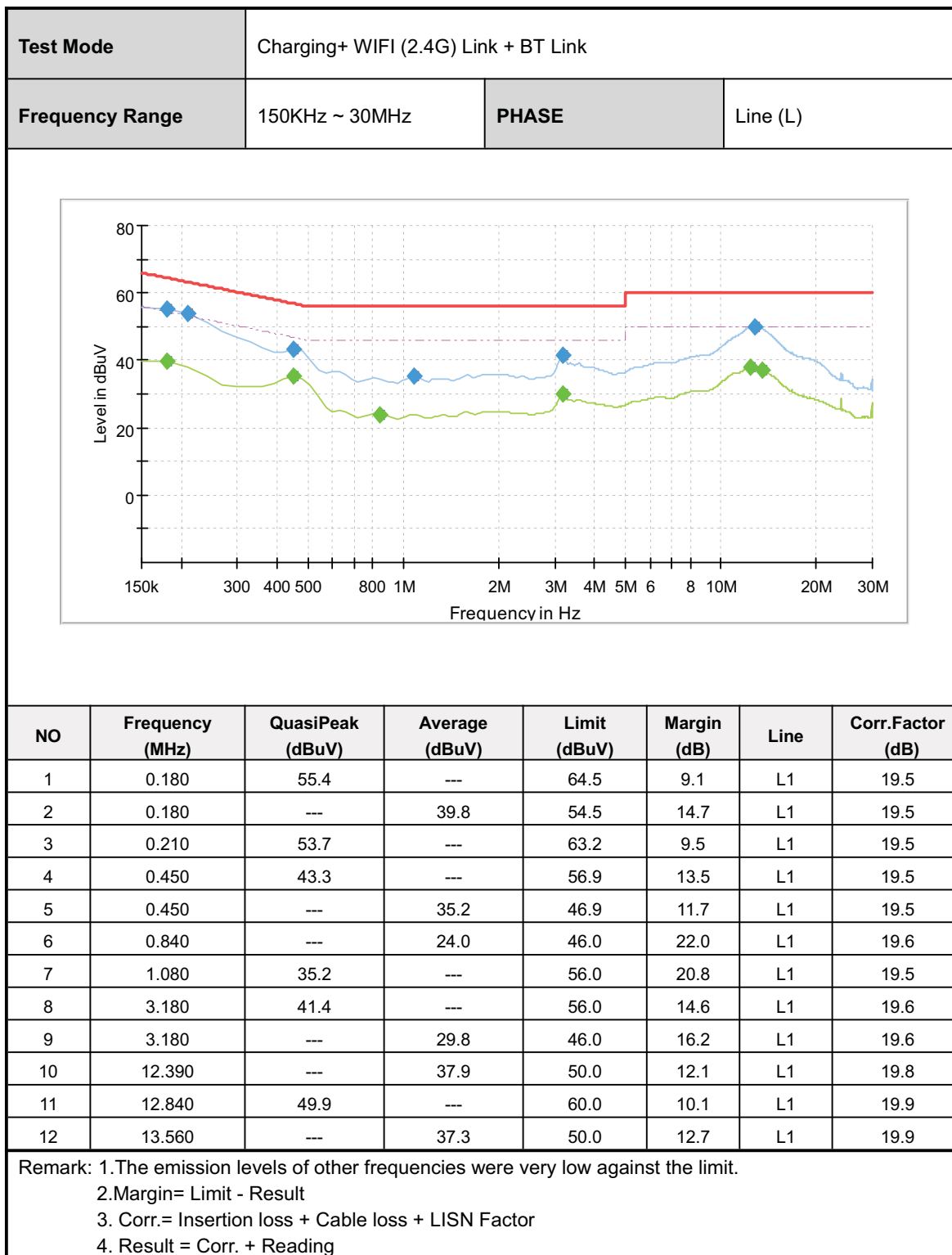
3.1.2 Measurement procedure

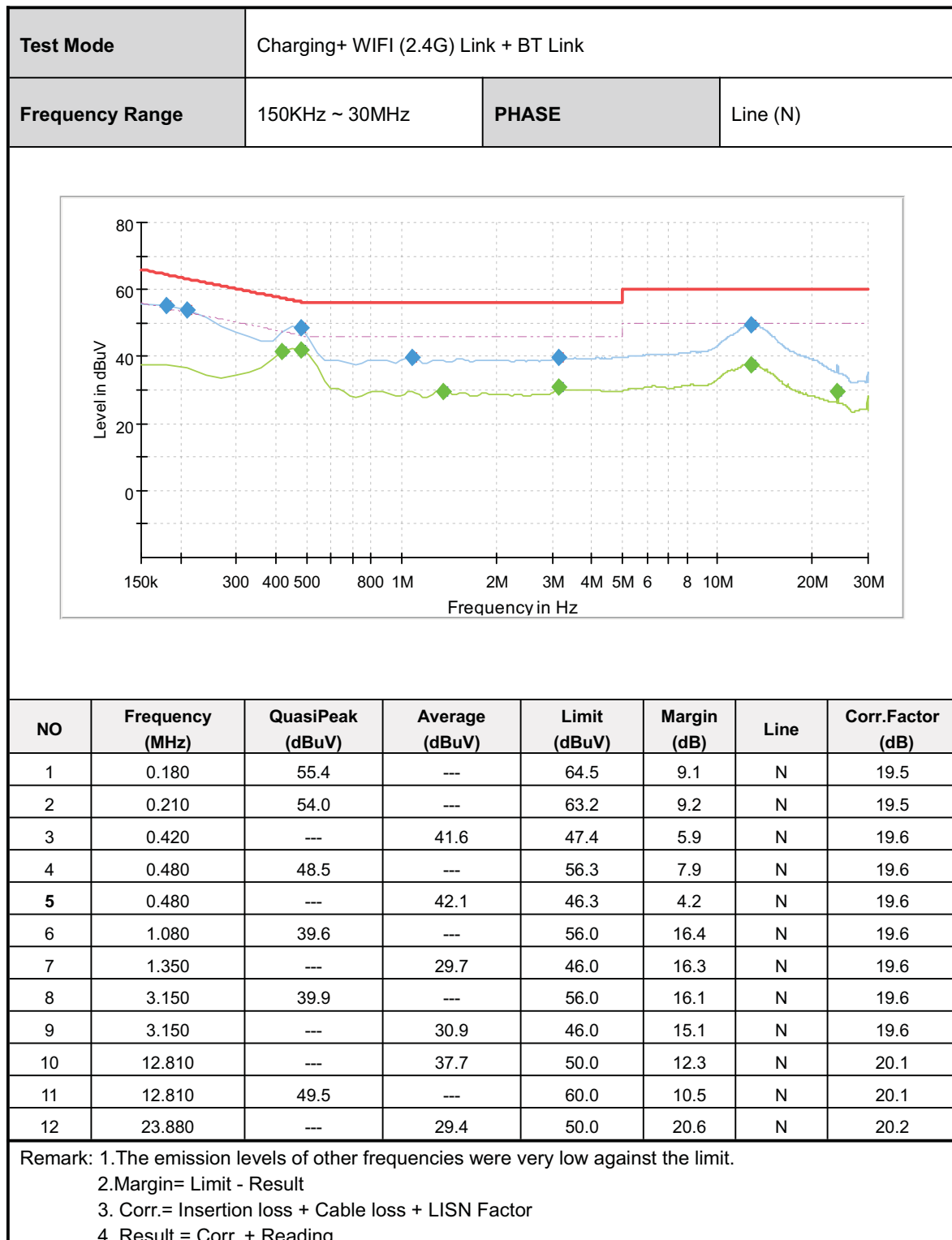
- The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface. The EUT and simulators are connected to the main power through a line impedance stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN. (Please refer to the Test photographs) Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source. The equipment under test shall be placed on a support of non-metallic material, the height of which shall be 1.5m above the ground,
- The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.
- Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.

3.1.3 Test setup



3.1.4 Test results







3.2 RADIATED EMISSION AND BANDEDGE MEASUREMENT

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

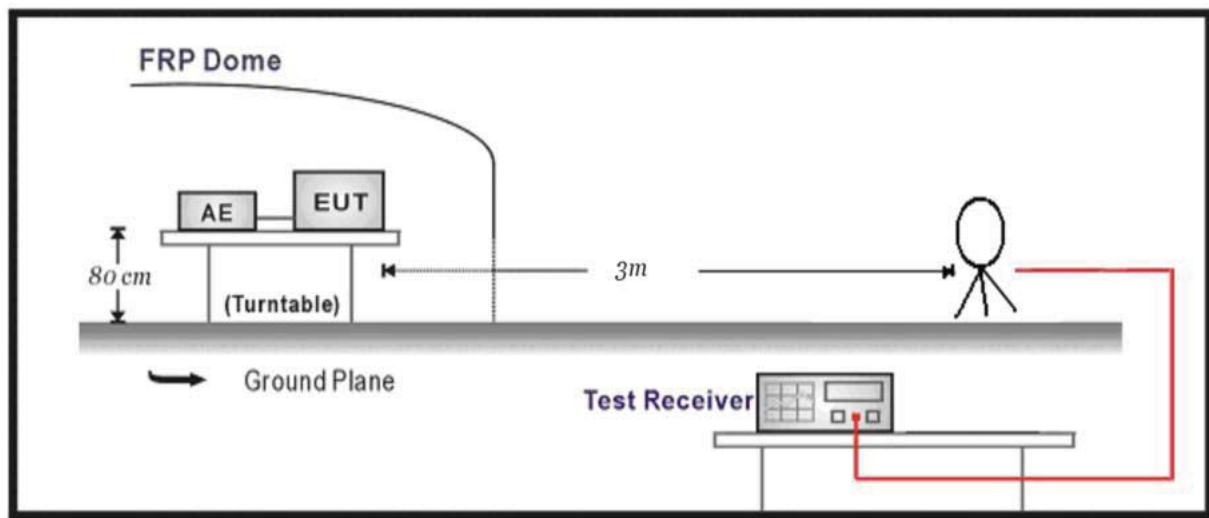
- The EUT was placed on the top of a rotating table 1.5 meters(above 1GHz) and 0.8 meters(below 1GHz) above the ground at a 3 meters semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving 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:

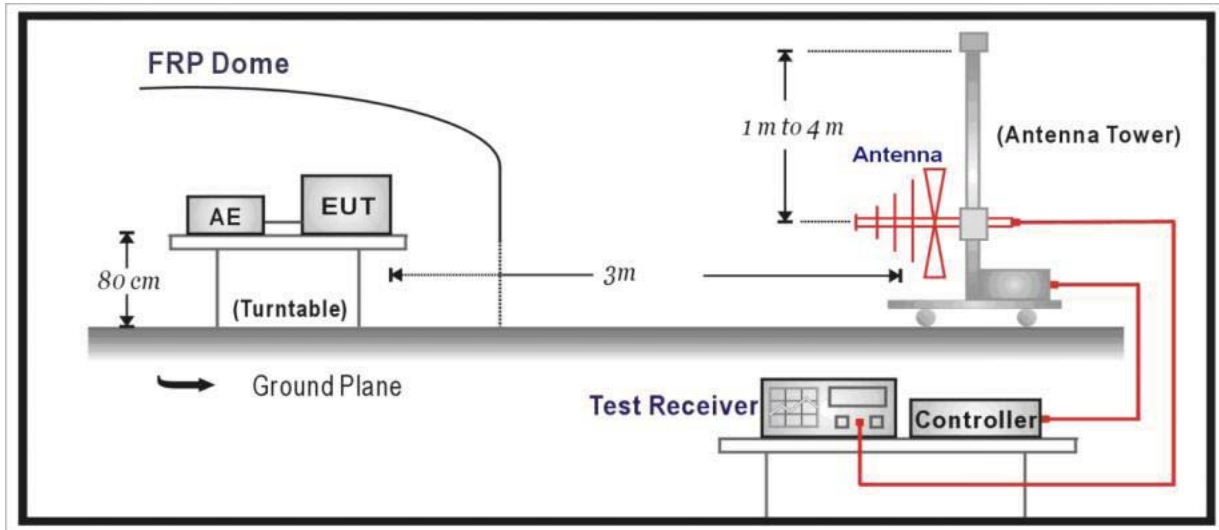
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution 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

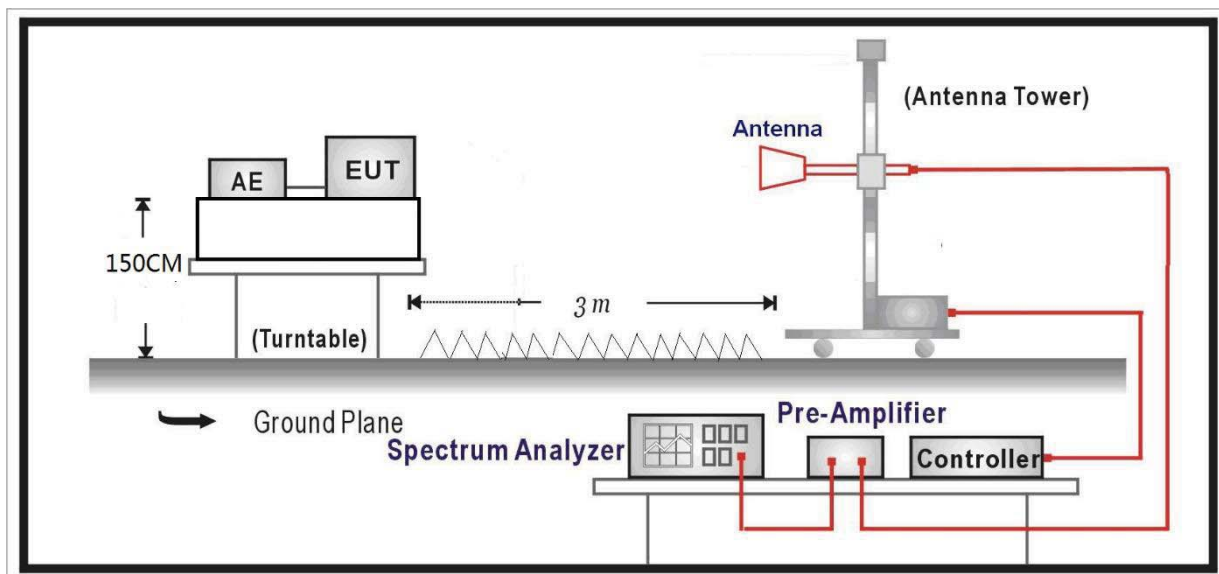
Below 30MHz Test Setup:



Below 1GHz Test Setup:

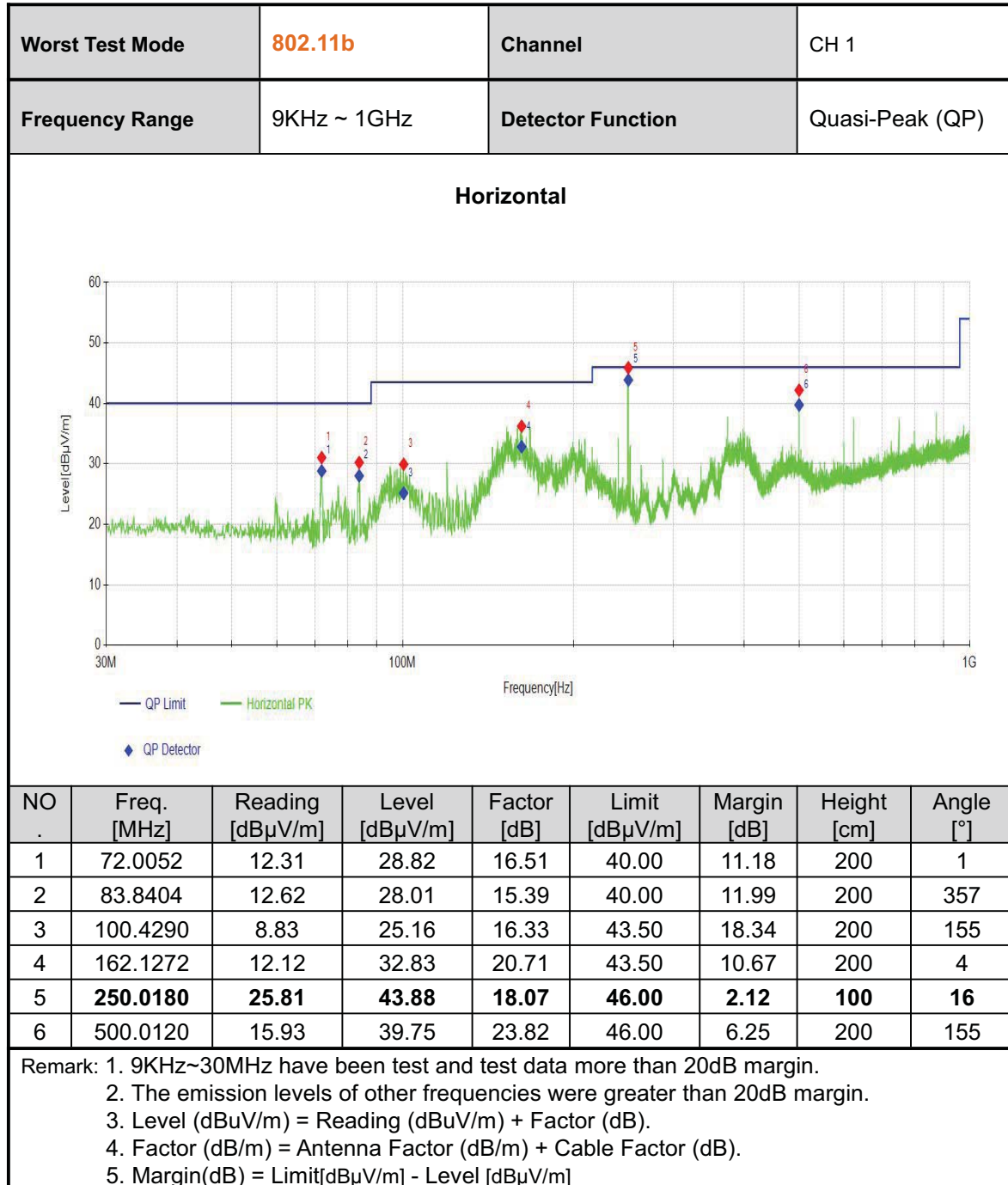


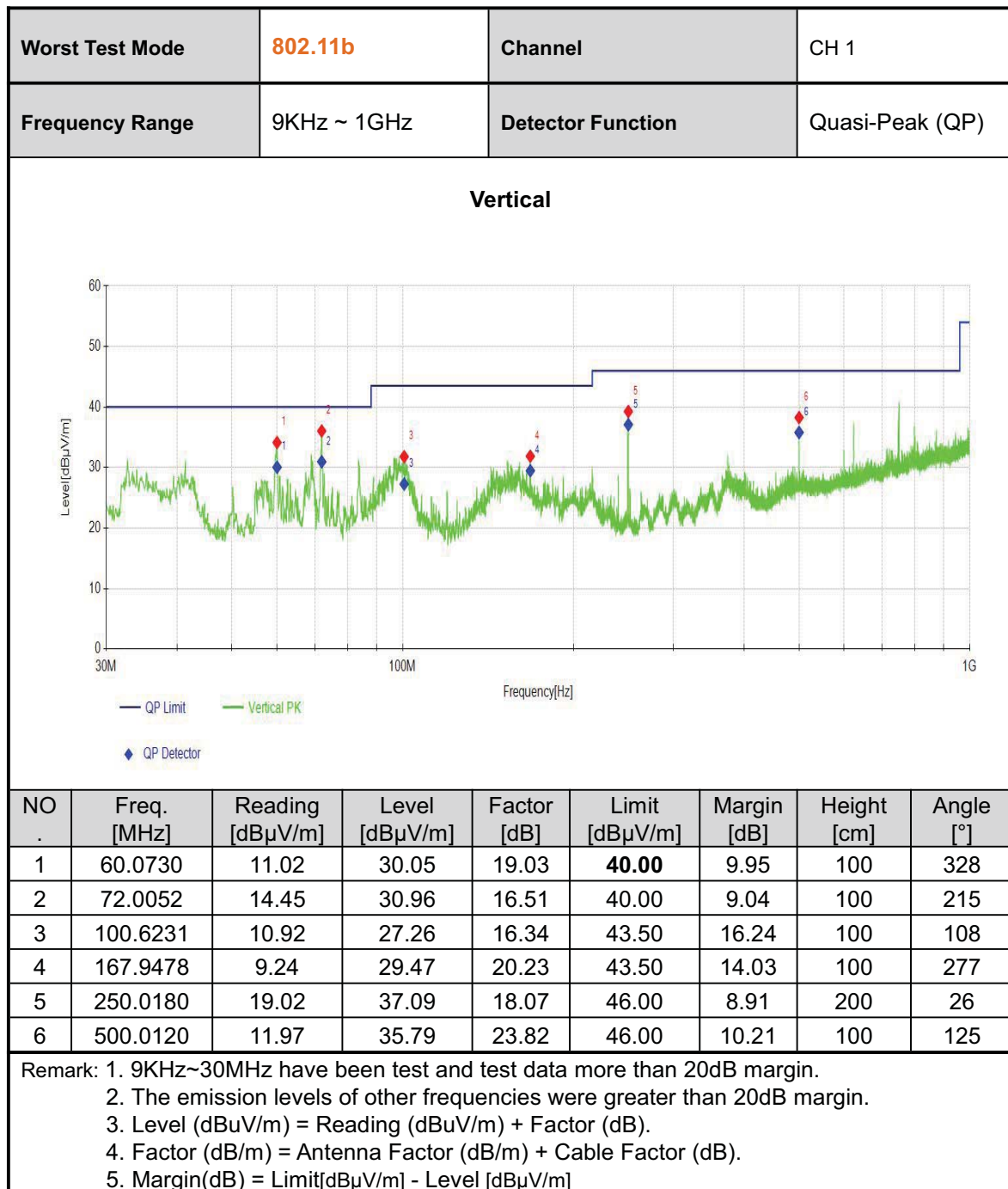
Above 1GHz Test Setup:



3.2.4 Test results

BELOW 1GHz WORST-CASE DATA:







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	36.50	-0.15	36.35	54.00	17.65	115	266	AV
2	2390	44.69	-0.15	44.54	74.00	29.46	115	184	PK
3	2412	79.97	0.14	80.11			115	177	AV
4	2412	81.74	0.14	81.88			115	177	PK
5	4824	43.45	9.68	53.13	74.00	20.87	164	162	PK
6	4824	35.07	9.68	44.75	54.00	9.25	164	135	AV
7	7236	26.41	12.39	38.80	54.00	15.20	164	117	AV
8	7236	32.46	12.39	44.85	74.00	29.15	164	124	PK
9	9648	27.51	13.13	40.64	74.00	33.36	164	198	PK
10	9648	20.78	13.13	33.91	54.00	20.09	164	205	AV
Vertical									
NO	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	2390	45.86	-0.15	45.71	74.00	28.29	291	360	PK
2	2390	37.89	-0.15	37.74	54.00	16.26	291	122	AV
3	2412	92.47	0.14	92.61			291	88	PK
4	2412	90.54	0.14	90.68			291	95	AV
5	4824	35.14	9.68	44.82	54.00	9.18	227	36	AV
6	4824	44.93	9.68	54.61	74.00	19.39	227	205	PK
7	7236	30.63	12.39	43.02	74.00	30.98	227	263	PK
8	7236	24.23	12.39	36.62	54.00	17.38	227	263	AV
9	9648	21.93	13.13	35.06	54.00	18.94	227	196	AV
10	9648	28.66	13.13	41.79	74.00	32.21	227	332	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]									



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	44.04	9.70	53.74	74.00	20.26	222	87	PK
2	4874	34.82	9.70	44.52	54.00	9.48	222	188	AV
3	7311	26.67	11.03	37.70	54.00	16.30	222	63	AV
4	7311	31.77	11.03	42.80	74.00	31.20	222	63	PK
5	9748	27.01	13.23	40.24	74.00	33.76	222	293	PK
6	9748	21.53	13.23	34.76	54.00	19.24	222	300	AV
Vertical									
NO	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	4874	43.75	9.70	53.45	74.00	20.55	114	2	PK
2	4874	36.78	9.70	46.48	54.00	7.52	114	42	AV
3	7311	33.77	11.03	44.80	54.00	9.20	114	269	AV
4	7311	36.90	11.03	47.93	74.00	26.07	114	269	PK
5	9748	27.13	13.23	40.36	74.00	33.64	114	209	PK
6	9748	20.12	13.23	33.35	54.00	20.65	114	60	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]									



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	88.20	0.65	88.85			177	177	PK
2	2462	86.28	0.65	86.93			177	177	AV
3	2483.5	39.69	0.46	40.15	54.00	13.85	177	163	AV
4	2483.5	46.37	0.46	46.83	74.00	27.17	177	163	PK
5	4924	44.02	10.07	54.09	74.00	19.91	170	265	PK
6	4924	34.51	10.07	44.58	54.00	9.42	170	265	AV
7	7386	27.22	9.80	37.02	54.00	16.98	170	127	AV
8	7386	31.32	9.80	41.12	74.00	32.88	170	135	PK
9	9848	26.86	13.24	40.10	74.00	33.90	170	251	PK
10	9848	20.20	13.24	33.44	54.00	20.56	170	162	AV
Vertical									
NO	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	2462	102.25	0.65	102.90			209	88	PK
2	2462	100.43	0.65	101.08			209	81	AV
3	2483.5	49.93	0.46	50.39	54.00	3.61	209	115	AV
4	2483.5	54.63	0.46	55.09	74.00	18.91	209	123	PK
5	4924	41.99	10.07	52.06	74.00	21.94	131	272	PK
6	4924	34.07	10.07	44.14	54.00	9.86	131	108	AV
7	7386	33.53	9.80	43.33	54.00	10.67	131	259	AV
8	7386	36.33	9.80	46.13	74.00	27.87	131	253	PK
9	9848	26.16	13.24	39.40	74.00	34.60	131	103	PK
10	9848	20.03	13.24	33.27	54.00	20.73	131	342	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]									



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	37.42	-0.15	37.27	54.00	16.73	102	245	AV
2	2390	45.63	-0.15	45.48	74.00	28.52	102	68	PK
3	2412	78.26	0.14	78.40			102	197	AV
4	2412	84.77	0.16	84.93			102	197	PK
5	4824	34.87	9.68	44.55	54.00	9.45	121	73	AV
6	4824	43.66	9.68	53.34	74.00	20.66	121	228	PK
7	7236	32.23	12.39	44.62	74.00	29.38	121	77	PK
8	7236	25.76	12.39	38.15	54.00	15.85	121	70	AV
9	9648	21.09	13.13	34.22	54.00	19.78	121	172	AV
10	9648	26.98	13.13	40.11	74.00	33.89	121	357	PK
Vertical									
NO	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	2390	45.45	-0.15	45.30	54.00	8.70	213	115	AV
2	2390	53.92	-0.15	53.77	74.00	20.23	213	115	PK
3	2412	96.06	0.13	96.19			213	108	PK
4	2412	89.42	0.14	89.56			213	101	AV
5	4824	48.61	11.98	60.59	74.00	13.41	241	42	PK
6	4824	40.59	11.98	52.57	54.00	1.43	241	42	AV
7	7236	42.83	12.35	55.18	74.00	18.82	241	40	PK
8	7236	34.21	12.35	46.56	54.00	7.44	241	40	AV
9	9648	21.45	13.13	34.58	54.00	19.42	241	209	AV
10	9648	27.46	13.13	40.59	74.00	33.41	241	121	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]									



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	43.18	9.70	52.88	74.00	21.12	150	1	PK
2	4874	34.35	9.70	44.05	54.00	9.95	150	174	AV
3	7311	33.64	11.04	44.68	74.00	29.32	150	124	PK
4	7311	27.05	11.02	38.07	54.00	15.93	150	117	RMS
5	9748	20.44	13.23	33.67	54.00	20.33	150	124	AV
6	9748	27.26	13.23	40.49	74.00	33.51	150	178	PK
Vertical									
NO	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	4874	42.65	9.70	52.35	74.00	21.65	248	259	PK
2	4874	35.52	9.70	45.22	54.00	8.78	248	130	AV
3	7311	32.99	11.03	44.02	54.00	9.98	248	242	AV
4	7311	39.73	11.03	50.76	74.00	23.24	248	242	PK
5	9748	26.86	13.23	40.09	74.00	33.91	248	360	PK
6	9748	20.12	13.23	33.35	54.00	20.65	248	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]									



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	91.50	0.64	92.14			238	82	AV
2	2462	98.49	0.64	99.13			238	82	PK
3	2483.5	59.25	0.46	59.71	74.00	14.29	238	279	PK
4	2483.5	50.83	0.46	51.29	54.00	2.71	238	42	AV
5	4924	33.86	10.07	43.93	54.00	10.07	134	250	AV
6	4924	41.88	10.07	51.95	74.00	22.05	134	40	PK
7	7386	29.34	9.80	39.14	74.00	34.86	134	192	PK
8	7386	22.38	9.80	32.18	54.00	21.82	134	199	AV
9	9848	20.22	13.24	33.46	54.00	20.54	134	9	AV
10	9848	25.95	13.24	39.19	74.00	34.81	134	9	PK
Vertical									
NO	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	2462	98.39	0.64	99.03			130	87	PK
2	2462	91.61	0.64	92.25			130	87	AV
3	2483.5	50.23	0.46	50.69	54.00	3.31	130	46	AV
4	2483.5	59.51	0.46	59.97	74.00	14.03	130	1	PK
5	4924	42.77	10.07	52.84	74.00	21.16	130	0	PK
6	4924	34.02	10.07	44.09	54.00	9.91	130	170	AV
7	7386	28.07	9.80	37.87	54.00	16.13	130	175	AV
8	7386	35.53	9.80	45.33	74.00	28.67	130	190	PK
9	9848	27.70	13.24	40.94	74.00	33.06	130	333	PK
10	9848	19.43	13.24	32.67	54.00	21.33	130	258	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]									



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	47.20	-0.15	47.05	74.00	26.95	161	158	PK
2	2390	38.71	-0.15	38.56	54.00	15.44	161	239	AV
3	2412	83.73	0.14	83.87			161	259	PK
4	2412	77.00	0.14	77.14			161	266	AV
5	4824	42.53	9.68	52.21	74.00	21.79	279	101	PK
6	4824	34.99	9.68	44.67	54.00	9.33	279	60	AV
7	7236	23.20	12.39	35.59	54.00	18.41	279	124	AV
8	7236	29.18	12.39	41.57	74.00	32.43	279	124	PK
9	9648	28.05	13.13	41.18	74.00	32.82	279	357	PK
10	9648	20.96	13.13	34.09	54.00	19.91	279	357	AV
Vertical									
NO	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	2390	56.09	-0.15	55.94	74.00	18.06	248	74	PK
2	2390	47.23	-0.15	47.08	54.00	6.92	248	107	AV
3	2412	90.09	0.13	90.22			248	107	AV
4	2412	97.49	0.18	97.67			248	107	PK
5	4824	35.55	9.68	45.23	54.00	8.77	227	9	AV
6	4824	43.78	9.68	53.46	74.00	20.54	227	293	PK
7	7236	35.02	12.39	47.41	74.00	26.59	227	26	PK
8	7236	28.25	12.39	40.64	54.00	13.36	227	290	AV
9	9648	20.70	13.13	33.83	54.00	20.17	227	66	AV
10	9648	28.66	13.13	41.79	74.00	32.21	227	66	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]									



Channel		802.11n20 CH 6		Frequency		2437MHz _z			
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	34.75	9.70	44.45	54.00	9.55	169	334	AV
2	4874	42.60	9.70	52.30	74.00	21.70	169	158	PK
3	7311	34.37	11.11	45.48	74.00	28.52	169	148	PK
4	7311	25.63	11.03	36.66	54.00	17.34	169	142	AV
5	9748	26.93	13.23	40.16	74.00	33.84	169	223	PK
6	9748	20.84	13.23	34.07	54.00	19.93	169	256	AV
Vertical									
NO	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	4874	42.91	9.70	52.61	74.00	21.39	275	310	PK
2	4874	34.74	9.70	44.44	54.00	9.56	275	60	AV
3	7311	33.27	11.03	44.30	54.00	9.70	275	28	AV
4	7311	40.02	11.03	51.05	74.00	22.95	275	22	PK
5	9748	26.50	13.23	39.73	74.00	34.27	275	204	PK
6	9748	19.81	13.23	33.04	54.00	20.96	275	306	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]									



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	2462	91.50	0.64	92.14			150	82	RMS
2	2462	98.49	0.64	99.13			150	82	PK
3	2483.5	59.25	0.46	59.71	74.00	14.29	150	279	PK
4	2483.5	50.83	0.46	51.29	54.00	2.71	150	42	AV
5	4924	32.24	9.80	42.04	74.00	31.96	160	74	PK
6	4924	25.70	9.80	35.50	54.00	18.50	160	136	AV
7	7386	19.73	13.24	32.97	54.00	21.03	160	236	AV
8	7386	26.02	13.24	39.26	74.00	34.74	160	236	PK
9	9848	33.80	10.07	43.87	54.00	10.13	160	186	AV
10	9848	42.62	10.07	52.69	74.00	21.31	160	186	PK
Vertical									
NO	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	2462	98.39	0.64	99.03			150	87	PK
2	2462	91.61	0.64	92.25			150	87	AV
3	2483.5	50.23	0.46	50.69	54.00	3.31	150	46	AV
4	2483.5	59.51	0.46	59.97	74.00	14.03	150	1	PK
5	4924	42.36	10.07	52.43	74.00	21.57	190	40	PK
6	4924	33.96	10.07	44.03	54.00	9.97	190	155	AV
7	7386	33.06	9.80	42.86	54.00	11.14	190	15	AV
8	7386	40.00	9.80	49.80	74.00	24.20	190	15	PK
9	9848	25.30	13.24	38.54	74.00	35.46	190	279	PK
10	9848	19.77	13.24	33.01	54.00	20.99	190	103	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]									



Channel		BT-LE CH 0			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	36.50	-0.15	36.35	54.00	17.65	217	241	AV
2	2390	44.81	-0.15	44.66	74.00	29.34	217	315	PK
3	2402	74.15	-0.03	74.12			217	26	PK
4	2402	73.20	-0.03	73.17			217	26	RMS
5	4804	34.69	9.29	43.98	54.00	10.02	108	314	AV
6	4804	42.81	9.29	52.10	74.00	21.90	108	334	PK
7	7206	29.41	12.81	42.22	74.00	31.78	108	289	PK
8	7206	22.14	12.81	34.95	54.00	19.05	108	282	AV
9	9608	20.51	13.32	33.83	54.00	20.17	108	74	AV
10	9608	26.84	13.32	40.16	74.00	33.84	108	67	PK
Vertical									
NO	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	2390	36.04	-0.15	35.89	54.00	18.11	138	87	AV
2	2390	44.34	-0.15	44.19	74.00	29.81	138	94	PK
3	2402	85.99	-0.03	85.96			138	87	RMS
4	2402	86.70	-0.03	86.67			138	87	PK
5	4804	43.19	9.29	52.48	74.00	21.52	189	32	PK
6	4804	36.48	9.29	45.77	54.00	8.23	189	40	AV
7	7206	22.24	12.81	35.05	54.00	18.95	189	280	AV
8	7206	27.85	12.81	40.66	74.00	33.34	189	72	PK
9	9608	28.21	13.32	41.53	74.00	32.47	189	199	PK
10	9608	21.19	13.32	34.51	54.00	19.49	189	199	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]									



Channel		BL-LE CH 19		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	42.34	9.80	52.14	74.00	21.86	214	168	PK
2	4880	34.74	9.80	44.54	54.00	9.46	214	168	AV
3	7320	22.20	11.01	33.21	54.00	20.79	214	6	AV
4	7320	28.90	11.01	39.91	74.00	34.09	214	6	PK
5	9760	26.81	13.25	40.06	74.00	33.94	214	238	PK
6	9760	21.99	13.25	35.24	54.00	18.76	214	118	AV
Vertical									
NO	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	4880	42.36	9.80	52.16	74.00	21.84	256	300	PK
2	4880	34.74	9.80	44.54	54.00	9.46	256	39	AV
3	7320	23.02	11.01	34.03	54.00	19.97	256	168	AV
4	7320	29.17	11.01	40.18	74.00	33.82	256	188	PK
5	9760	26.30	13.25	39.55	74.00	34.45	256	294	PK
6	9760	20.12	13.25	33.37	54.00	20.63	256	321	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]									



Channel		BT-LE CH 39			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	2480	89.51	0.33	89.84			110	172	PK
2	2480	88.64	0.32	88.96			110	53	RMS
3	2483.5	37.01	0.46	37.47	54.00	16.53	110	245	AV
4	2483.5	44.42	0.46	44.88	74.00	29.12	110	72	PK
5	4960	34.58	10.69	45.27	54.00	8.73	245	328	AV
6	4960	41.92	10.69	52.61	74.00	21.39	245	254	PK
7	7440	31.10	9.75	40.85	74.00	33.15	245	259	PK
8	7440	23.59	9.75	33.34	54.00	20.66	245	147	AV
9	9920	19.40	13.83	33.23	54.00	20.77	245	19	AV
10	9920	26.41	13.83	40.24	74.00	33.76	245	80	PK
Vertical									
NO	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	2480	100.78	0.33	101.11			102	67	PK
2	2480	100.08	0.32	100.40			102	74	RMS
3	2483.5	37.61	0.46	38.07	54.00	15.93	102	107	AV
4	2483.5	45.69	0.46	46.15	74.00	27.85	102	94	PK
5	4960	34.42	10.69	45.11	54.00	8.89	237	39	AV
6	4960	43.19	10.69	53.88	74.00	20.12	237	1	PK
7	7440	29.77	9.75	39.52	74.00	34.48	237	359	PK
8	7440	23.16	9.75	32.91	54.00	21.09	237	167	AV
9	9920	19.69	13.83	33.52	54.00	20.48	237	114	AV
10	9920	26.85	13.83	40.68	74.00	33.32	237	60	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]									

3.3 6dB BANDWIDTH MEASUREMENT

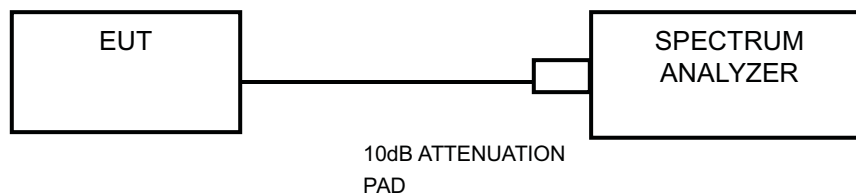
3.3.1 Limits

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

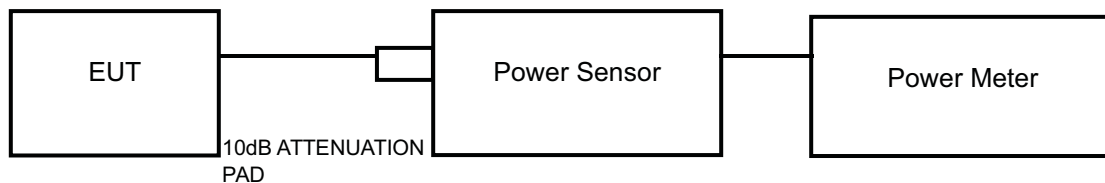
3.4.1 Limits

Forsystems 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

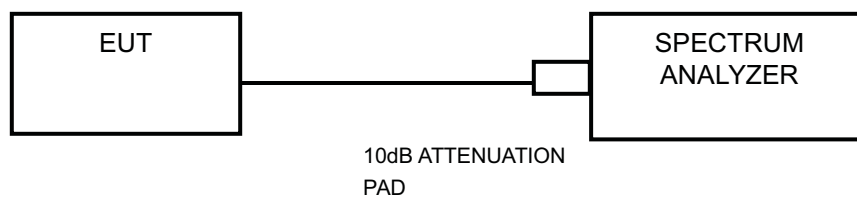
3.5.1 Limits

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 MEASUREMENT AND BAND EDGE MEASUREMENT

3.6.1 Limits

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

3.6.2 Measurement procedure

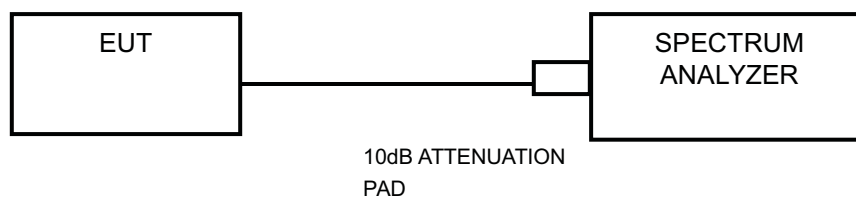
Measurement Procedure -Reference Level

- 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.



4 PHOTOGRAPHS OF TEST SETUP

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

,



5 Appendix A

Please refer to the following pages for test results.

5.1 6DB BANDWIDTH MEASUREMENT

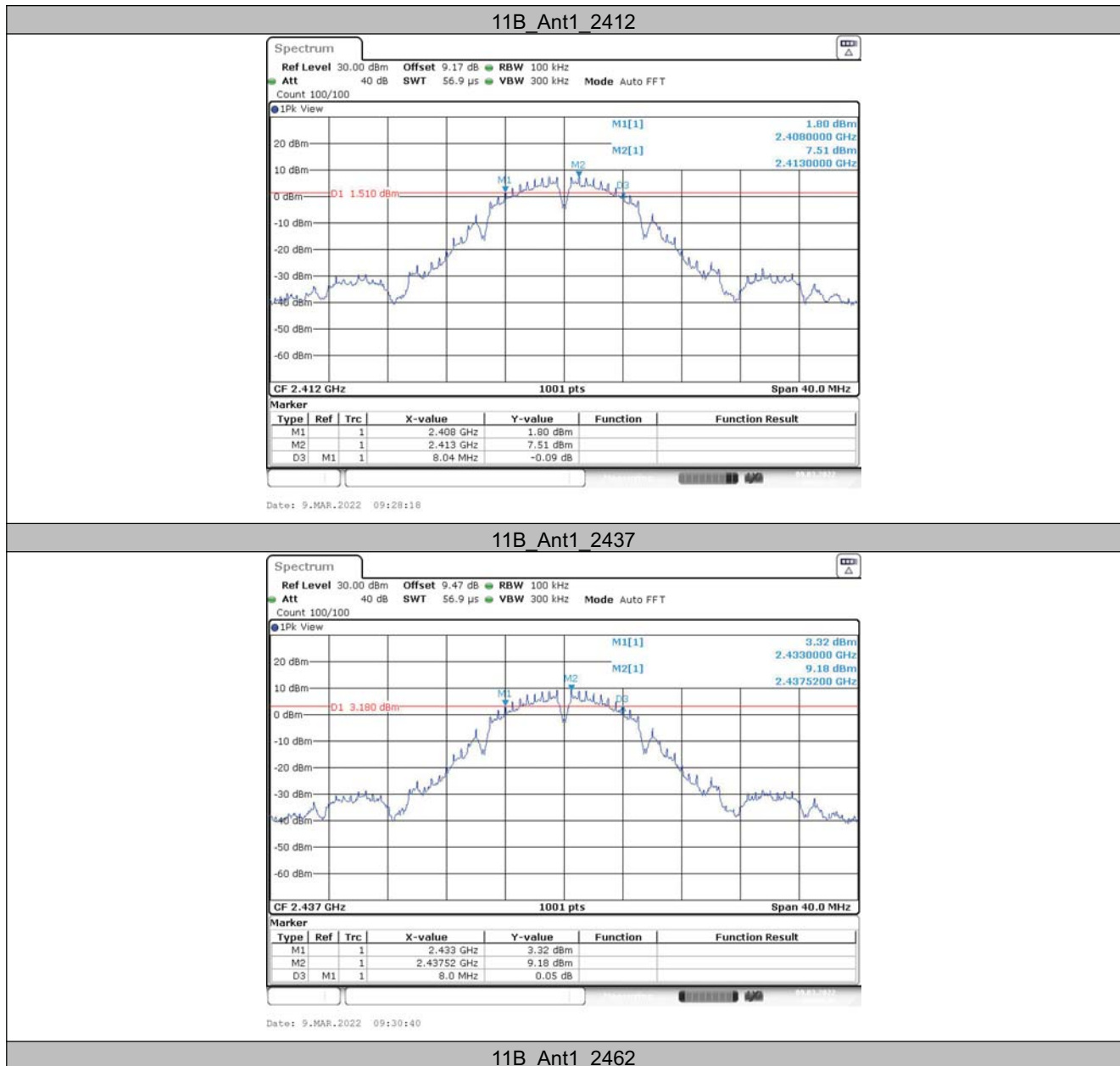
5.1.1 Test Result

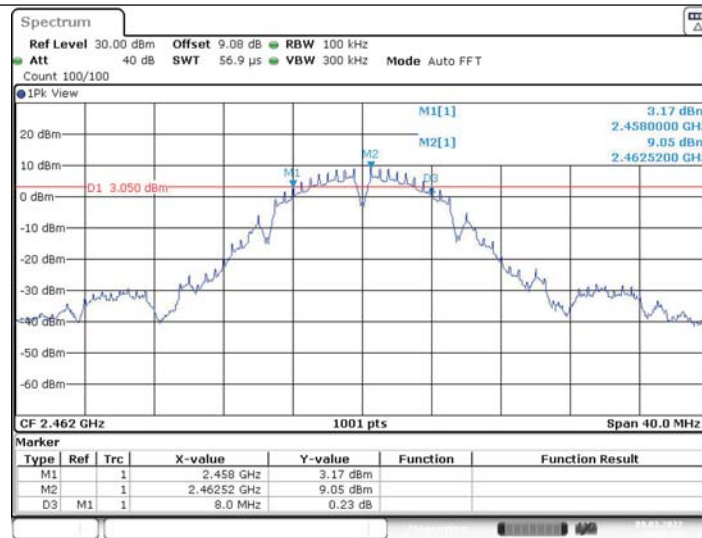
TestMode	Antenna	Frequency[MHz]	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	8.04	2408.00	2416.04	0.5	PASS
		2437	8.00	2433.00	2441.00	0.5	PASS
		2462	8.00	2458.00	2466.00	0.5	PASS
11G	Ant1	2412	15.52	2404.40	2419.92	0.5	PASS
		2437	15.48	2429.40	2444.88	0.5	PASS
		2462	15.16	2454.44	2469.60	0.5	PASS
11N20SISO	Ant1	2412	15.52	2404.40	2419.92	0.5	PASS
		2437	15.20	2429.40	2444.60	0.5	PASS
		2462	15.16	2454.44	2469.60	0.5	PASS

TestMode	Antenna	Frequency[MHz]	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	0.72	2401.64	2402.36	0.5	PASS
		2440	0.72	2439.65	2440.37	0.5	PASS
		2480	0.72	2479.66	2480.38	0.5	PASS



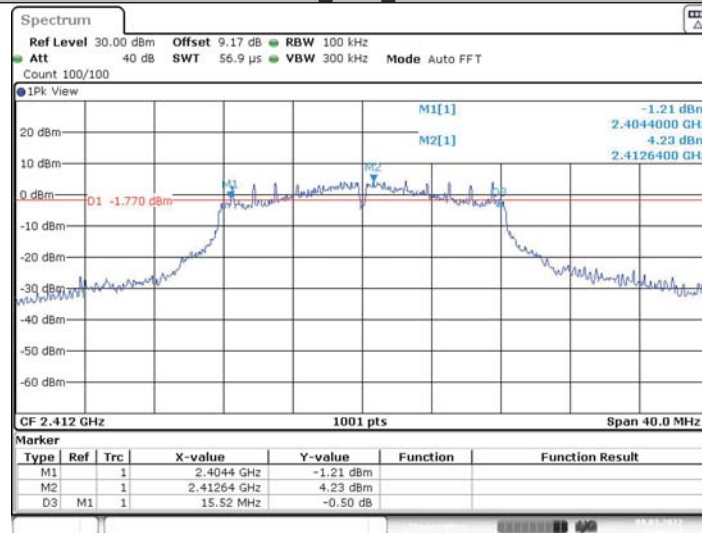
5.1.2 Test Graphs





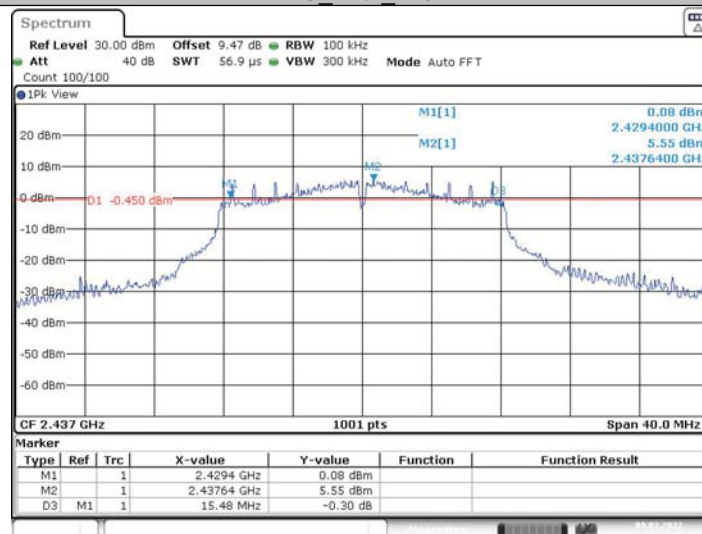
Date: 9.MAR.2022 09:32:52

11G_Ant1_2412



Date: 9.MAR.2022 10:41:11

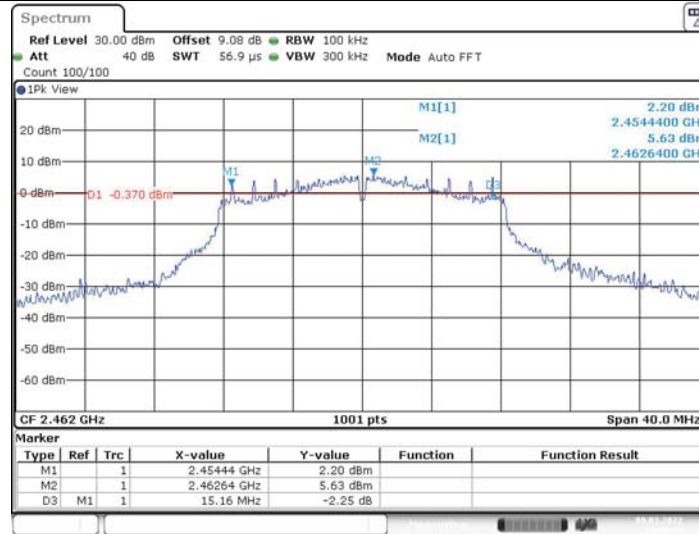
11G_Ant1_2437



Date: 9.MAR.2022 10:43:44

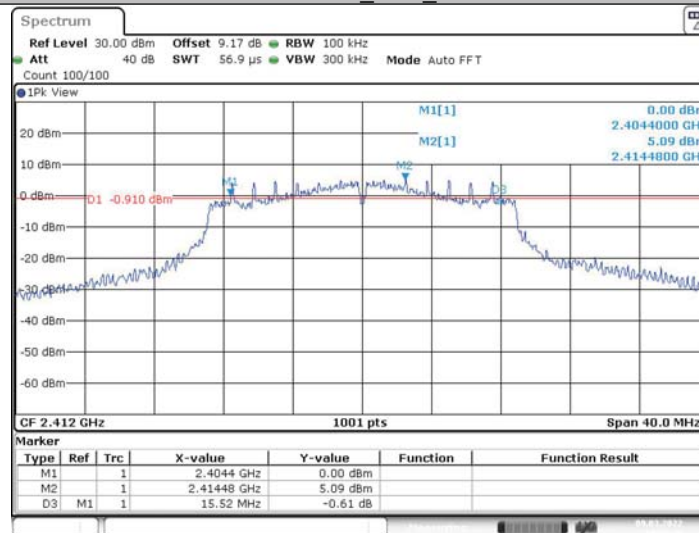


11G_Ant1_2462



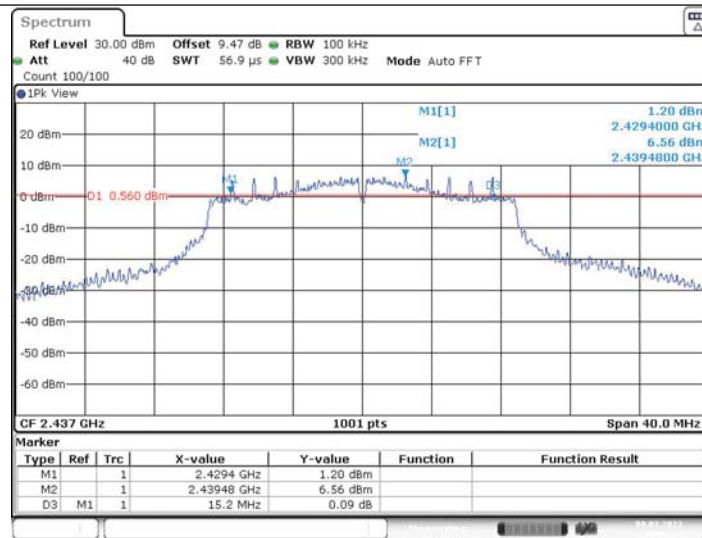
Date: 9.MAR.2022 10:48:44

11N20SISO_Ant1_2412

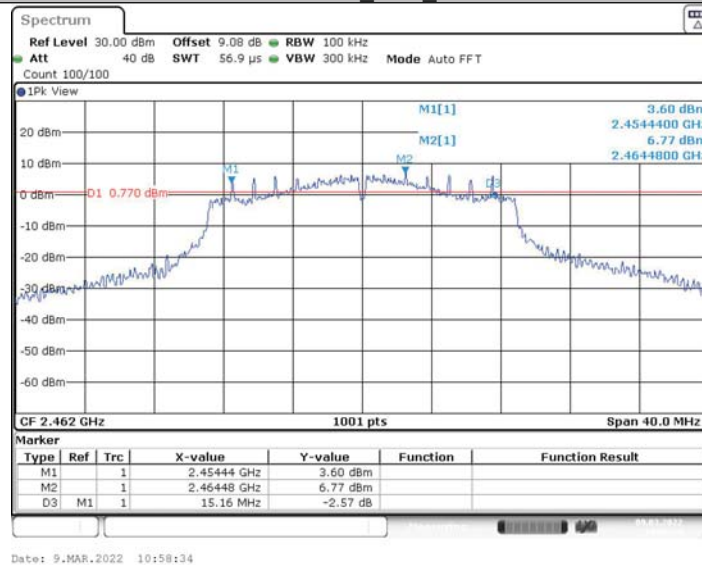


Date: 9.MAR.2022 10:53:19

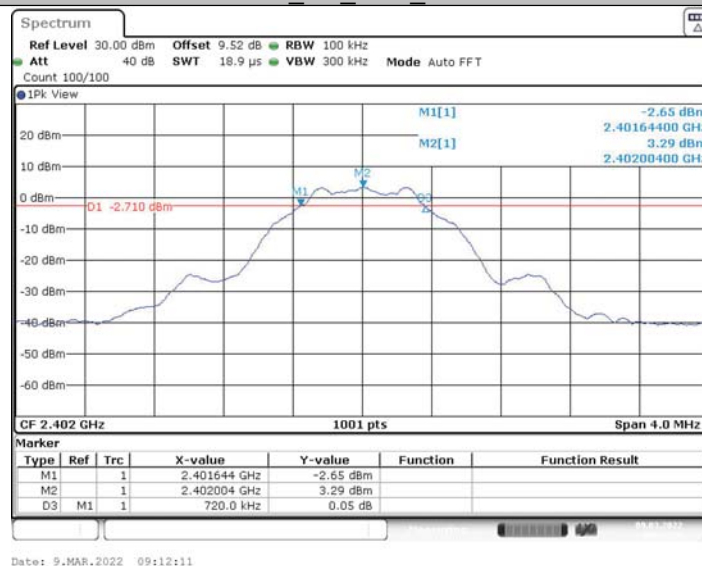
11N20SISO_Ant1_2437



11N20SISO_Ant1_2462

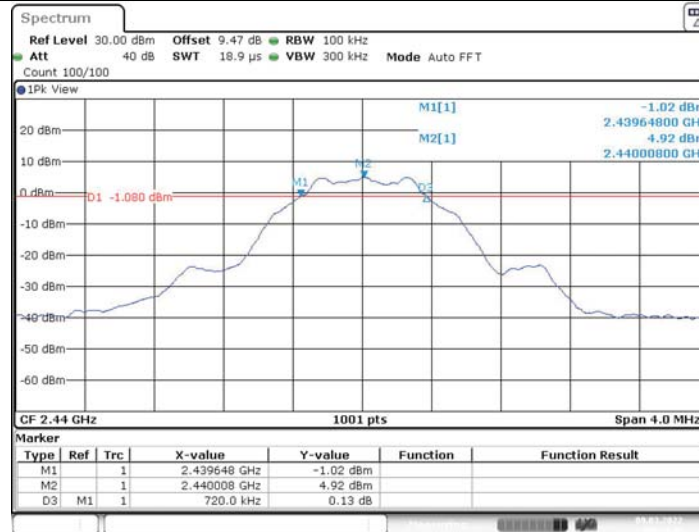


BLE_1M_Ant1_2402



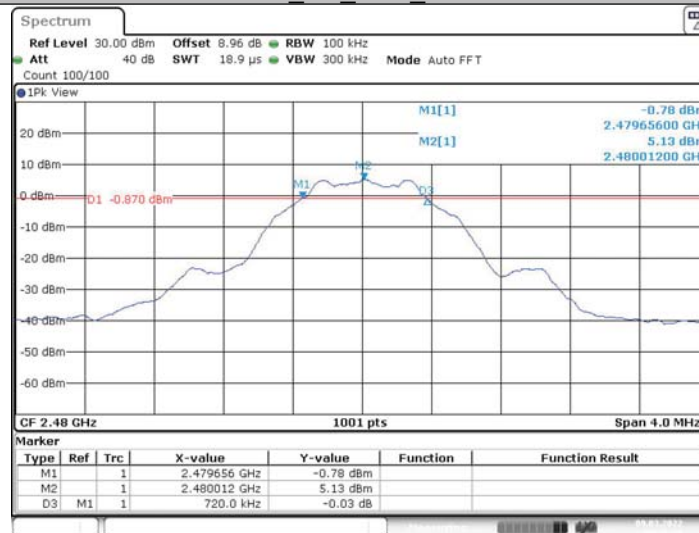


BLE_1M_Ant1_2440



Date: 9.MAR.2022 09:14:30

BLE_1M_Ant1_2480



Date: 9.MAR.2022 09:16:39



5.2 Occupied Channel Bandwidth

5.2.1 Test Result

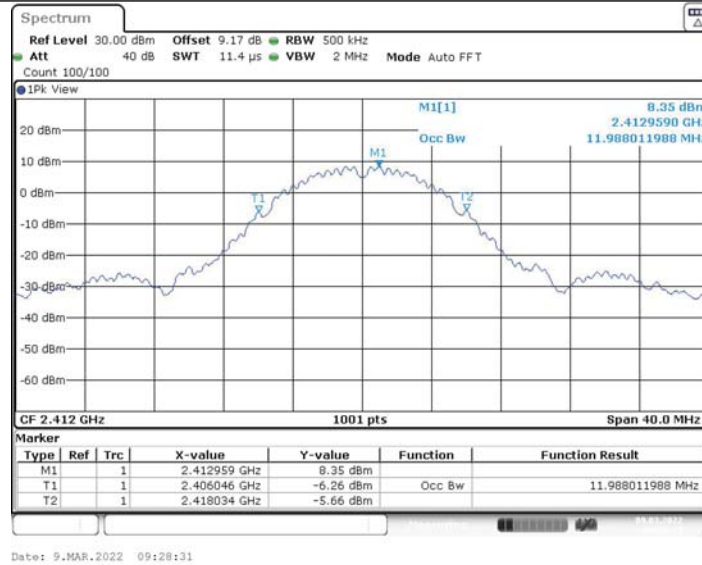
TestMode	Antenna	Channel Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	11.988	2406.046	2418.034	---	---
		2437	11.908	2431.086	2442.994	---	---
		2462	11.988	2456.086	2468.074	---	---
11G	Ant1	2412	17.622	2403.289	2420.911	---	---
		2437	17.662	2428.209	2445.871	---	---
		2462	17.103	2453.608	2470.711	---	---
11N20SISO	Ant1	2412	18.821	2402.769	2421.590	---	---
		2437	18.741	2427.769	2446.510	---	---
		2462	18.462	2452.969	2471.431	---	---

TestMode	Antenna	Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	1.067	2401.481	2402.547	---	---
		2440	1.063	2439.489	2440.551	---	---
		2480	1.063	2479.493	2480.555	---	---

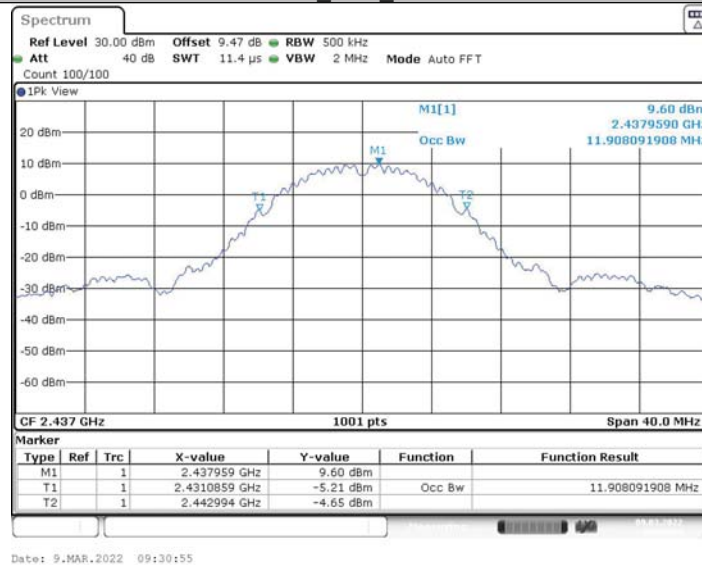


5.2.1 Test Graphs

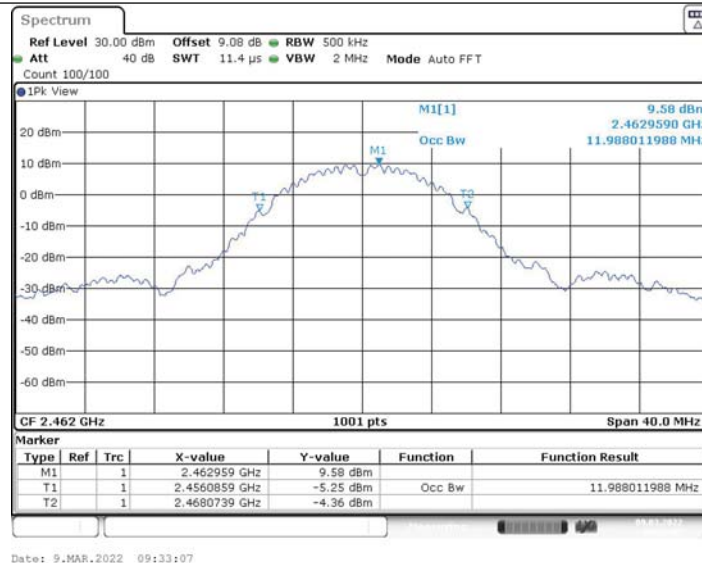
11B_Ant1_2412



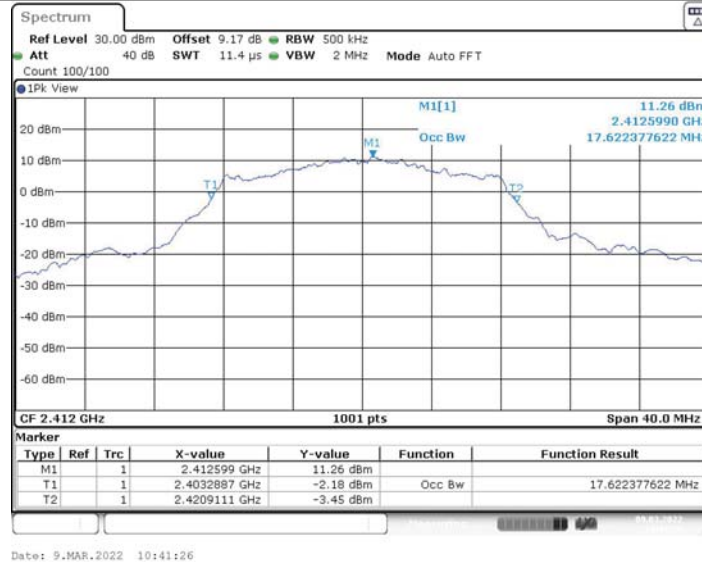
11B_Ant1_2437



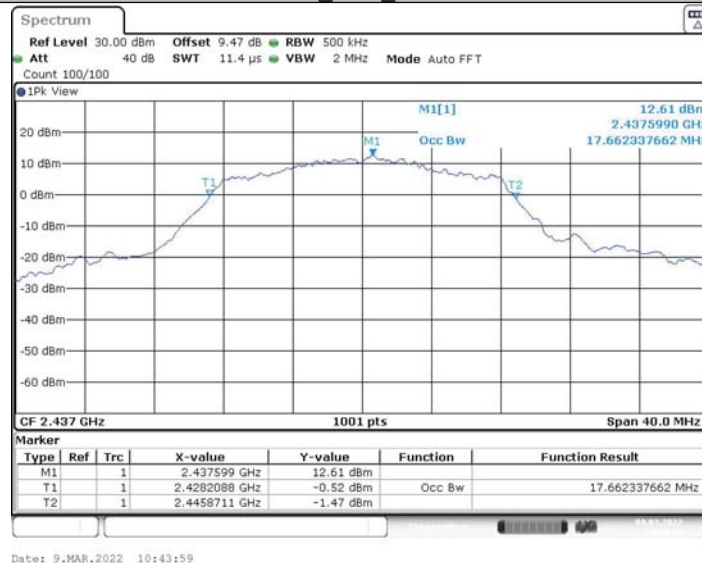
11B_Ant1_2462



11G_Ant1_2412

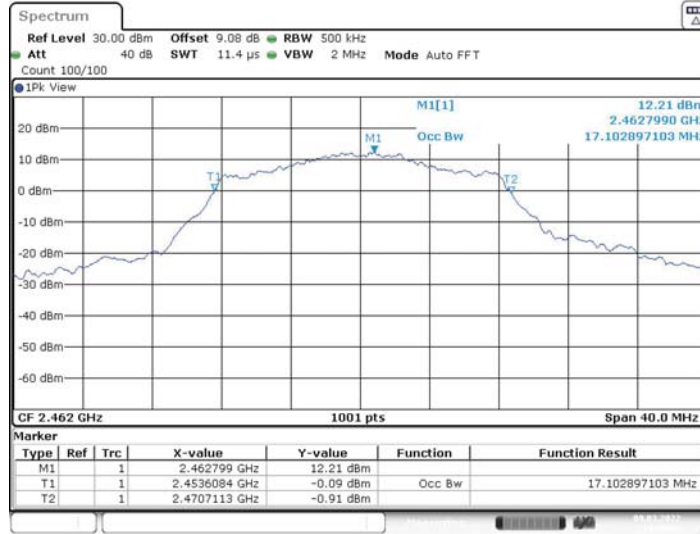


11G_Ant1_2437





11G_Ant1_2462



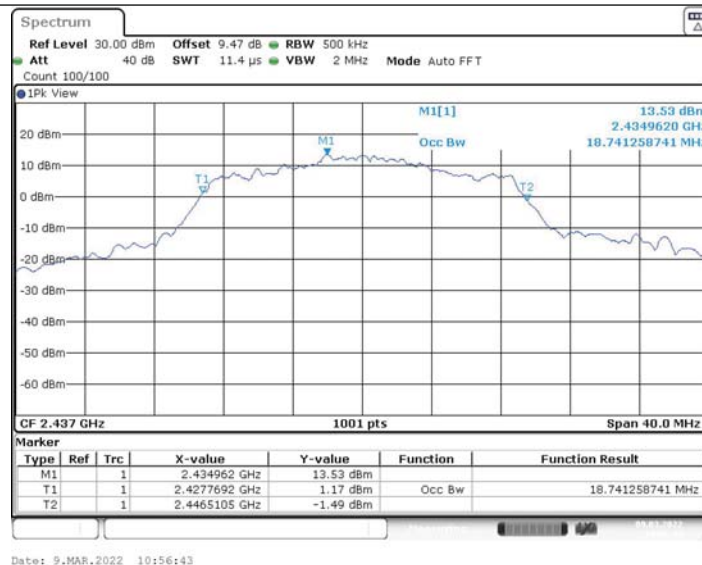
Date: 9.MAR.2022 10:48:59

11N20SISO_Ant1_2412



Date: 9.MAR.2022 10:53:34

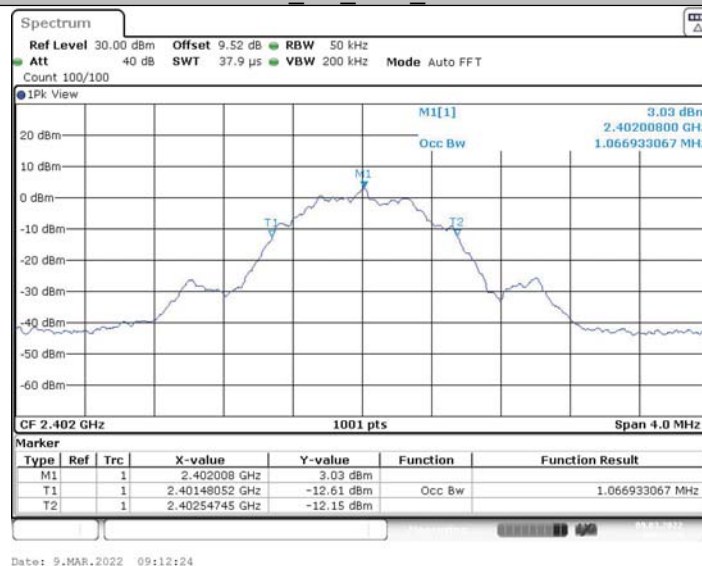
11N20SISO_Ant1_2437



11N20SISO_Ant1_2462

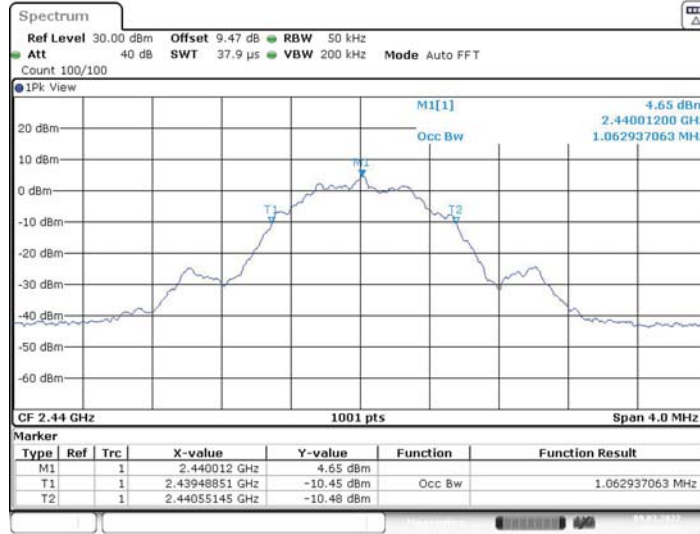


BLE_1M_Ant1_2402



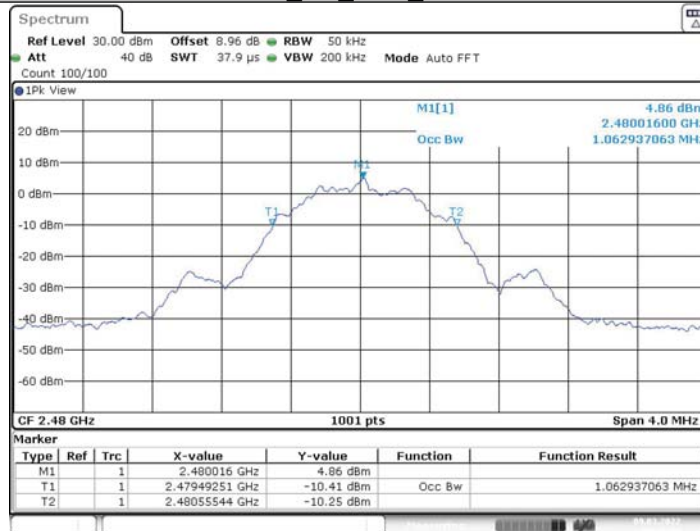


BLE_1M_Ant1_2440



Date: 9.MAR.2022 09:14:46

BLE_1M_Ant1_2480



Date: 9.MAR.2022 09:16:54



5.3 CONDUCTED OUTPUT POWER

5.3.1 Test Result

TestMode	Antenna	Frequency [MHz]	Peak Power[dBm]	Conducted Limit[dBm]	EIRP [dBm]	EIRP Limit[dBm]	Verdict
11B	Ant1	2412	18.46	≤30.00	20.46	≤36.00	PASS
		2437	19.72	≤30.00	21.72	≤36.00	PASS
		2462	19.71	≤30.00	21.71	≤36.00	PASS
11G	Ant1	2412	23.00	≤30.00	25.00	≤36.00	PASS
		2437	24.34	≤30.00	26.34	≤36.00	PASS
		2462	24.21	≤30.00	26.21	≤36.00	PASS
11N20SIS	Ant1	2412	23.49	≤30.00	25.49	≤36.00	PASS
		2437	24.72	≤30.00	26.72	≤36.00	PASS
		2462	24.67	≤30.00	26.67	≤36.00	PASS

TestMode	Antenna	Frequency [MHz]	AV Power[dBm]
11B	Ant1	2412	13.17
		2437	13.25
		2462	13.15
11G	Ant1	2412	13.26
		2437	13.45
		2462	13.37
11N20SIS	Ant1	2412	13.83
		2437	14.01
		2462	13.94

TestMode	Antenna	Frequency [MHz]	Peak Power[dBm]	Conducted Limit[dBm]	EIRP [dBm]	EIRP Limit[dBm]	Verdict
BLE_1M	Ant1	2402	4.91	≤30.00	25.49	≤36.00	PASS
		2440	5.86	≤30.00	26.72	≤36.00	PASS
		2480	5.15	≤30.00	26.67	≤36.00	PASS

TestMode	Antenna	Frequency [MHz]	AV Power[dBm]
BLE_1M	Ant1	2402	4.07
		2440	4.78
		2480	4.18



5.4 POWER SPECTRAL DENSITY MEASUREMENT

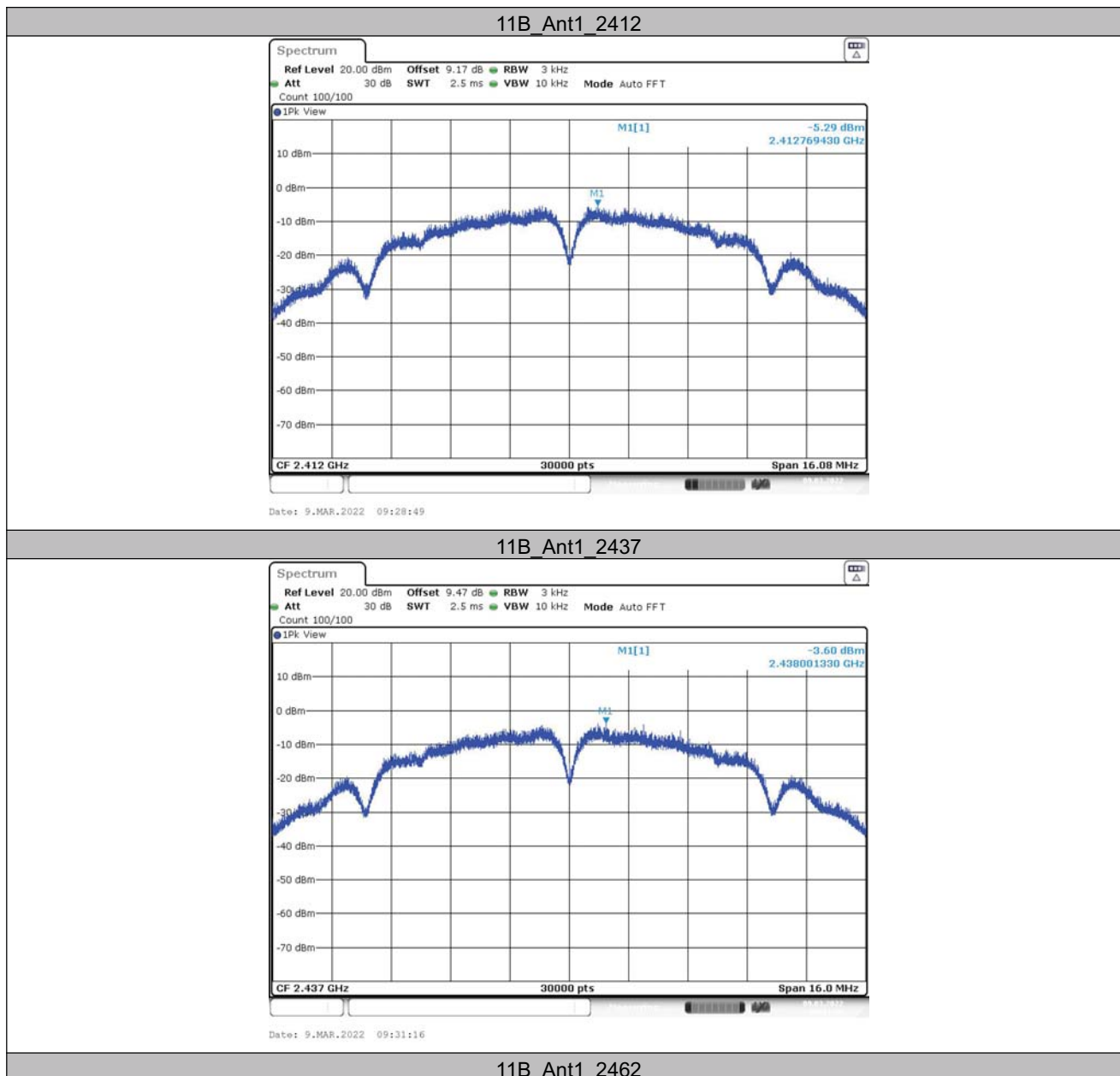
5.4.1 Test Result

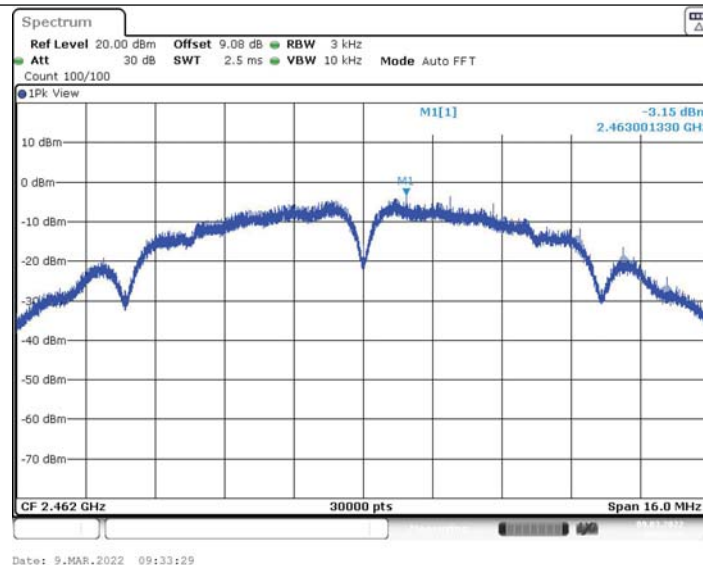
TestMode	Antenna	Frequency[MHz]	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
11B	Ant1	2412	-5.29	≤8.00	PASS
		2437	-3.6	≤8.00	PASS
		2462	-3.15	≤8.00	PASS
11G	Ant1	2412	-6.6	≤8.00	PASS
		2437	-5.34	≤8.00	PASS
		2462	-5.14	≤8.00	PASS
11N20SISO	Ant1	2412	-6.52	≤8.00	PASS
		2437	-4.93	≤8.00	PASS
		2462	-4.63	≤8.00	PASS

TestMode	Antenna	Frequency[MHz]	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
BLE_1M	Ant1	2402	-10.35	≤8.00	PASS
		2440	-8.78	≤8.00	PASS
		2480	-8.69	≤8.00	PASS

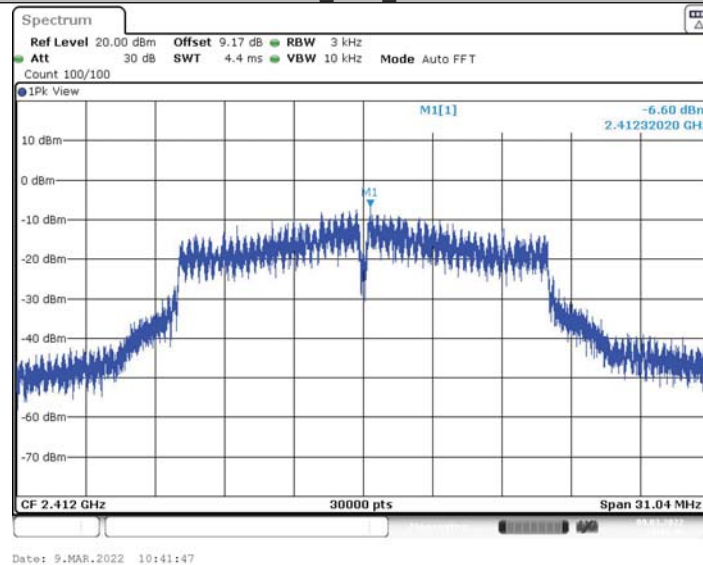


5.4.2 Test Graphs

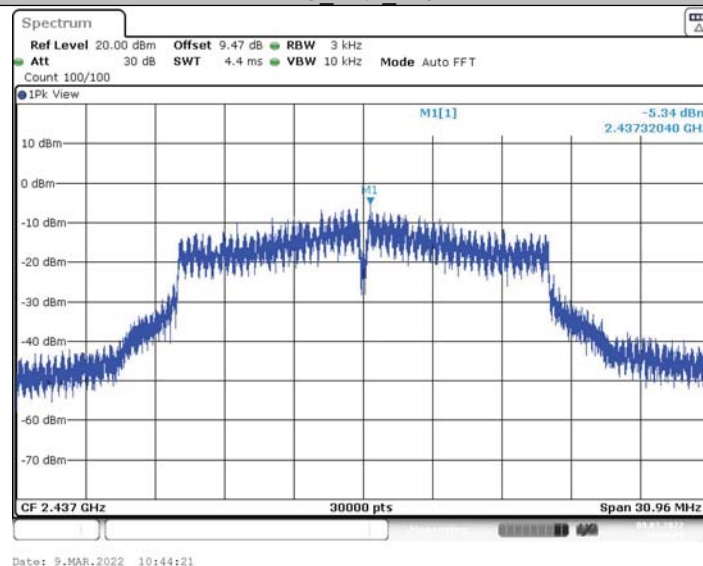




11G_Ant1_2412

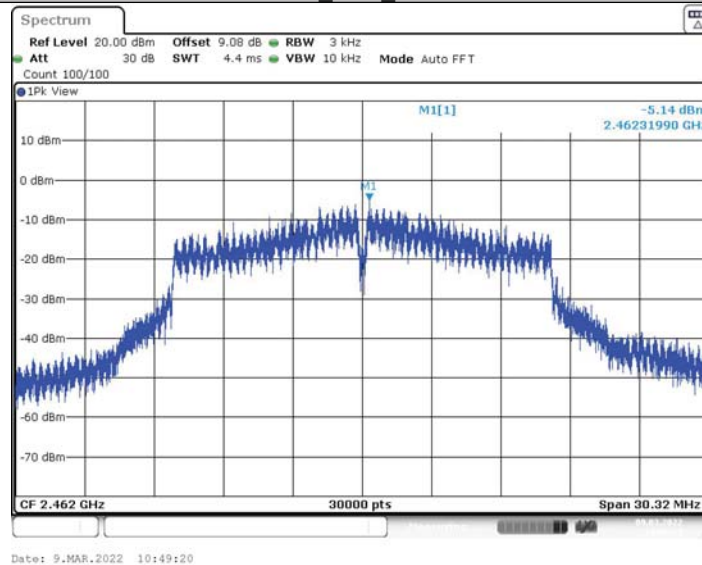


11G_Ant1_2437

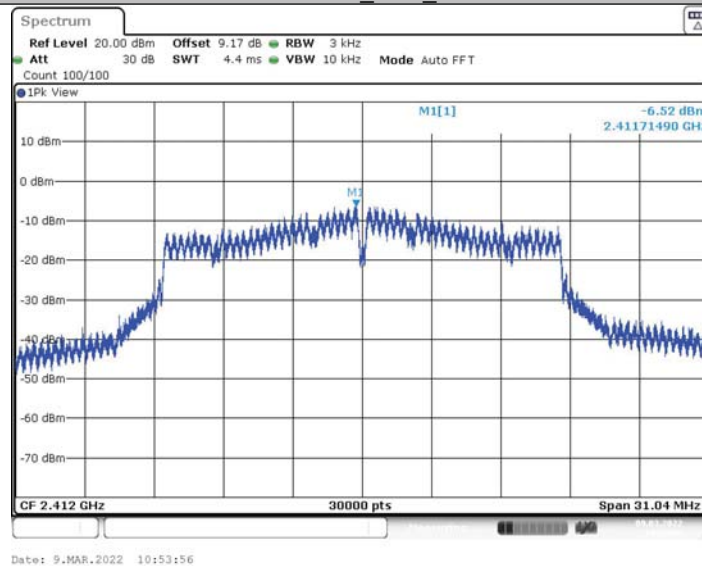




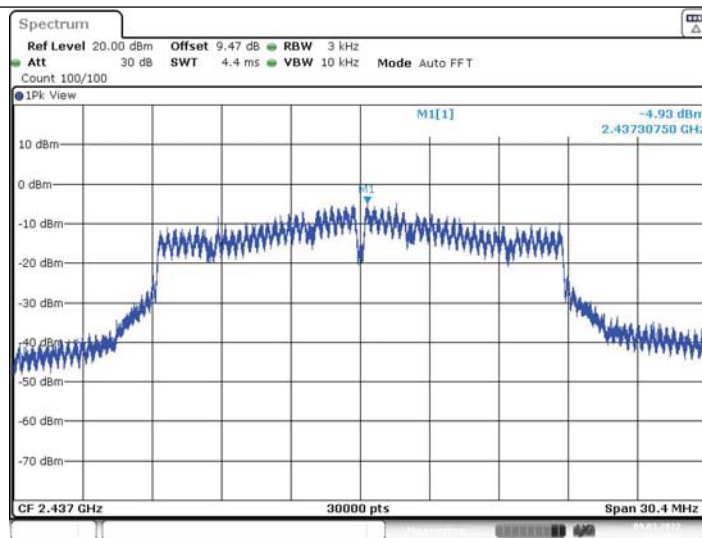
11G_Ant1_2462



11N20SISO_Ant1_2412

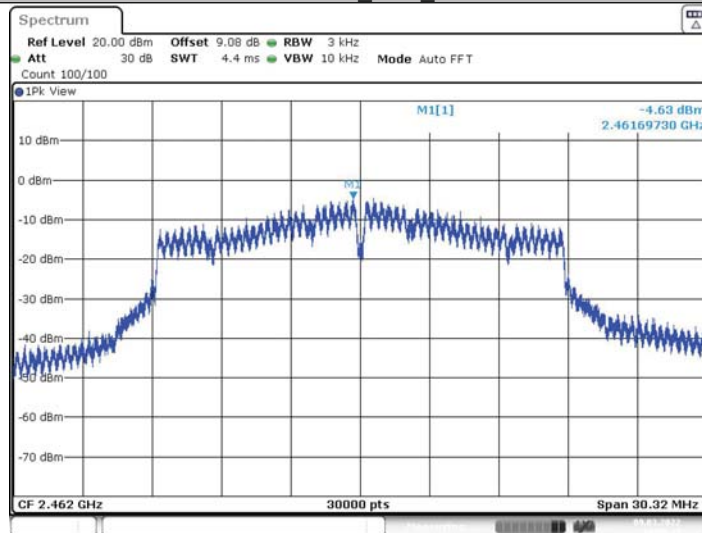


11N20SISO_Ant1_2437



Date: 9.MAR.2022 10:57:04

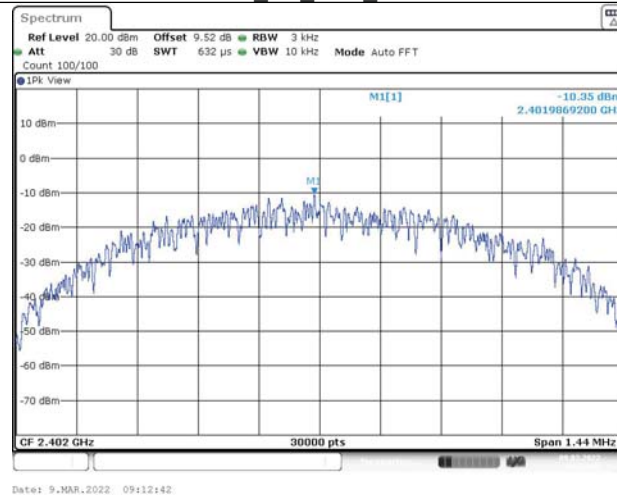
11N20SISO_Ant1_2462



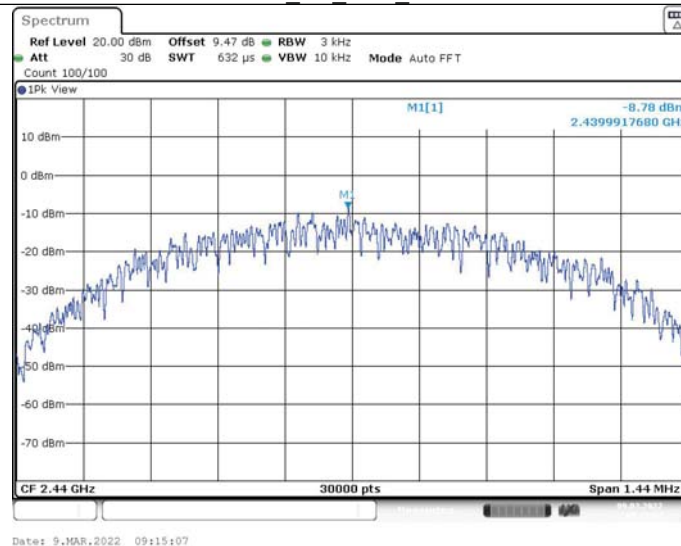
Date: 9.MAR.2022 10:59:11



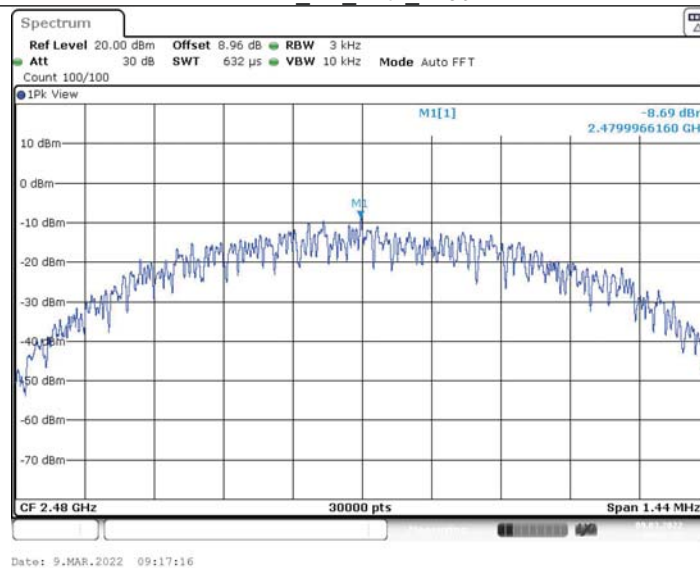
BLE_1M_Ant1_2402



BLE_1M_Ant1_2440



BLE_1M_Ant1_2480





5.5 Reference level measurement

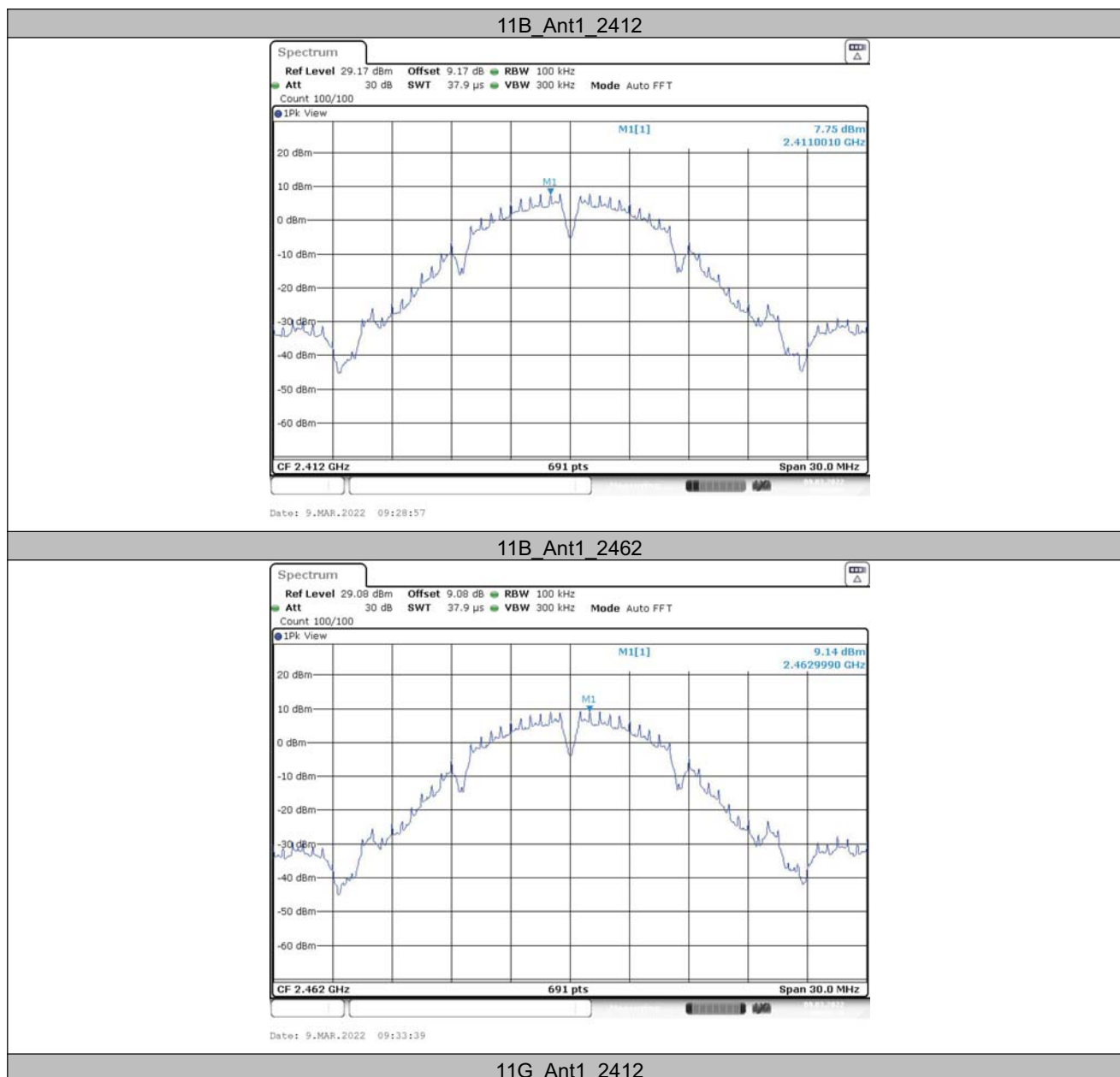
5.5.1 Test Result

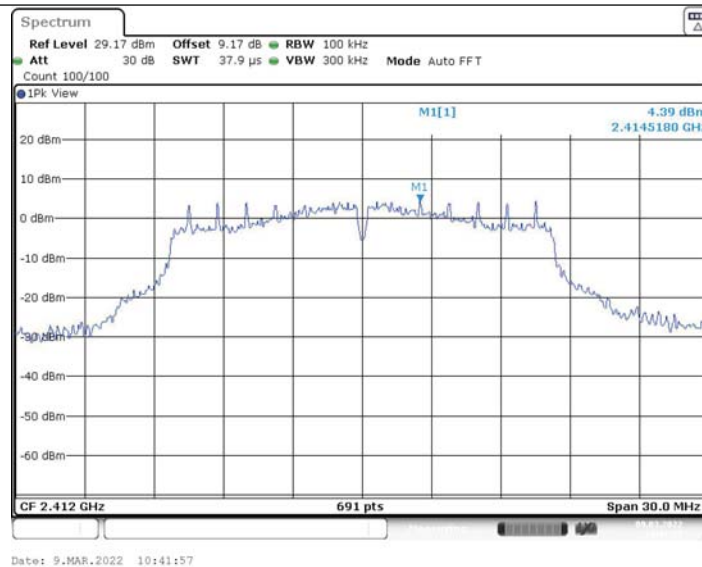
TestMode	Antenna	Freq(MHz)	Max.Point[MHz]	Result[dBm]
11B	Ant1	2412	2411.00	7.75
		2462	2463.00	9.14
11G	Ant1	2412	2414.52	4.39
		2462	2464.48	5.73
11N20SISO	Ant1	2412	2414.48	5.52
		2462	2464.48	6.88

TestMode	Antenna	Freq(MHz)	Max.Point[MHz]	Result[dBm]
BLE_1M	Ant1	2402	2402.00	3.41
		2480	2480.01	5.15

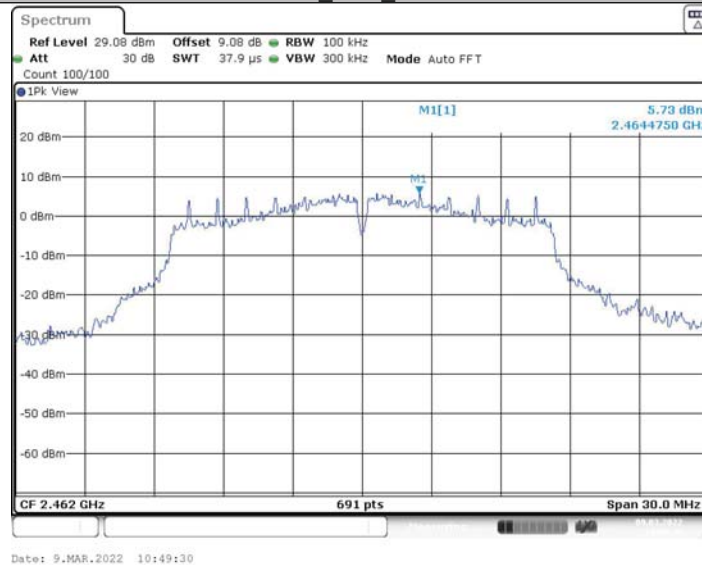


5.5.2 Test Graphs

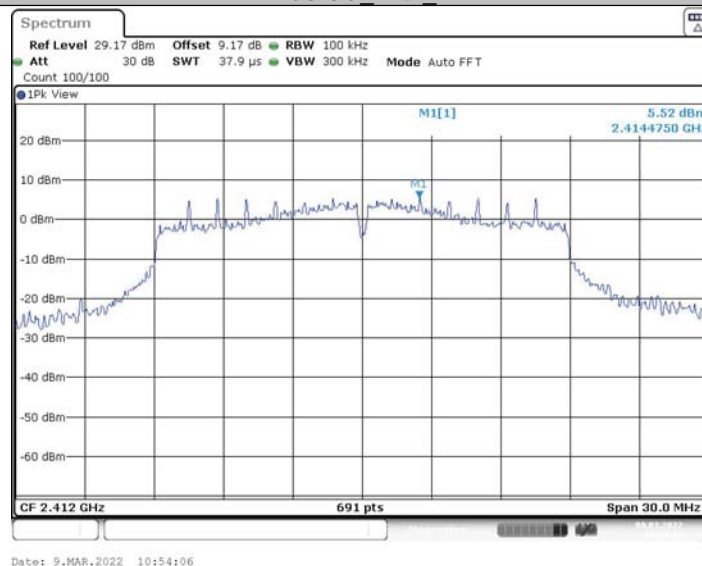




11G_Ant1_2462

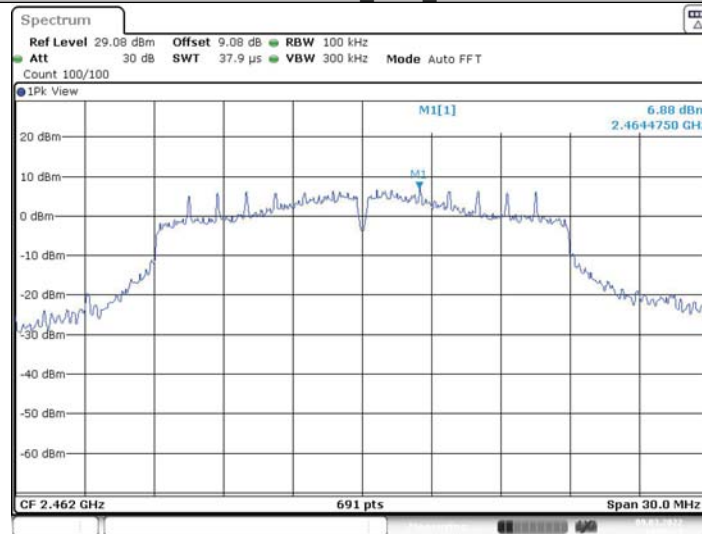


11N20SISO_Ant1_2412





11N20SISO_Ant1_2462



Date: 9.MAR.2022 10:59:21

BLE_1M_Ant1_2402



Date: 9.MAR.2022 09:12:50

BLE_1M_Ant1_2480



Date: 9.MAR.2022 09:17:26



5.6 Band edge measurements

5.6.1 Test Result

TestMode	Antenna	ChName	Frequency[MHz]	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
11B	Ant1	Low	2412	7.75	-29.56	≤ -12.25	PASS
		High	2462	9.14	-42.49	≤ -10.86	PASS
11G	Ant1	Low	2412	4.39	-26.3	≤ -15.61	PASS
		High	2462	5.73	-35.83	≤ -14.27	PASS
11N20SISO	Ant1	Low	2412	5.52	-22.72	≤ -14.48	PASS
		High	2462	6.88	-31.76	≤ -13.12	PASS

TestMode	Antenna	ChName	Frequency[MHz]	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	Low	2402	3.41	-47.86	≤ -16.59	PASS
		High	2480	5.15	-47.07	≤ -14.85	PASS

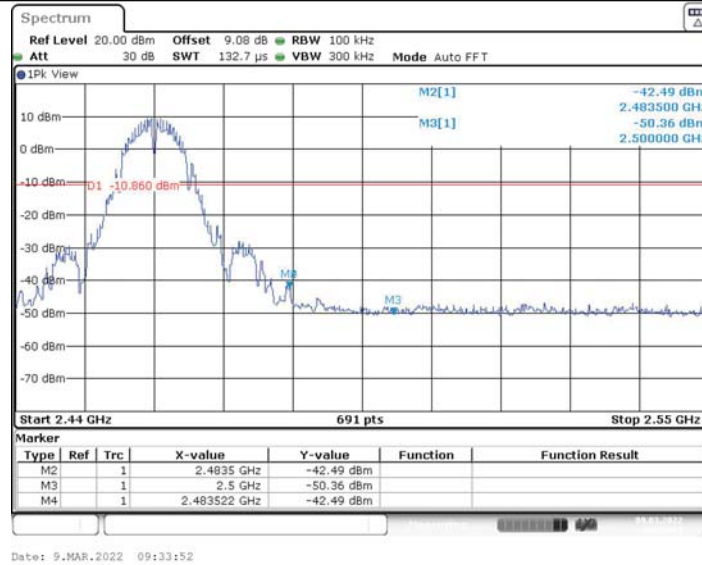


5.6.2 Test Graphs

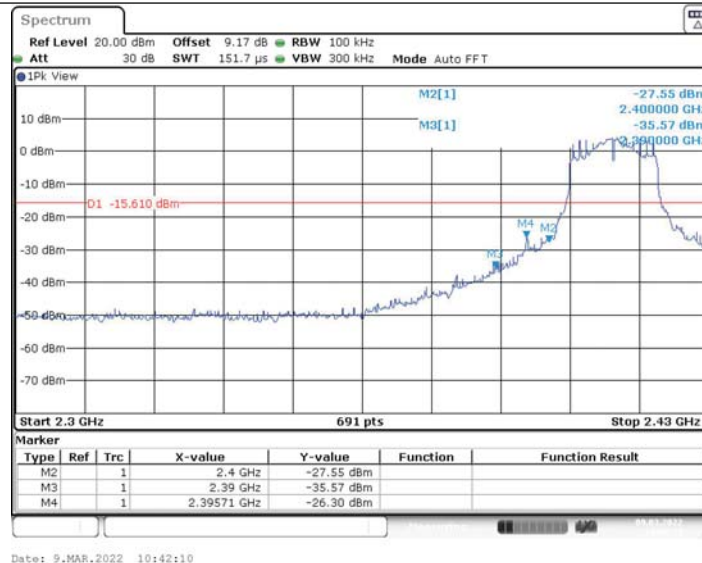
11B_Ant1_Low_2412



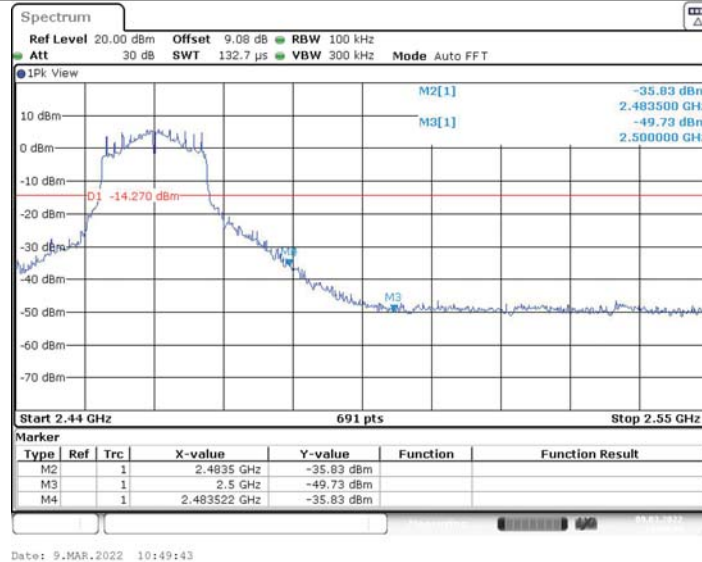
11B_Ant1_High_2462



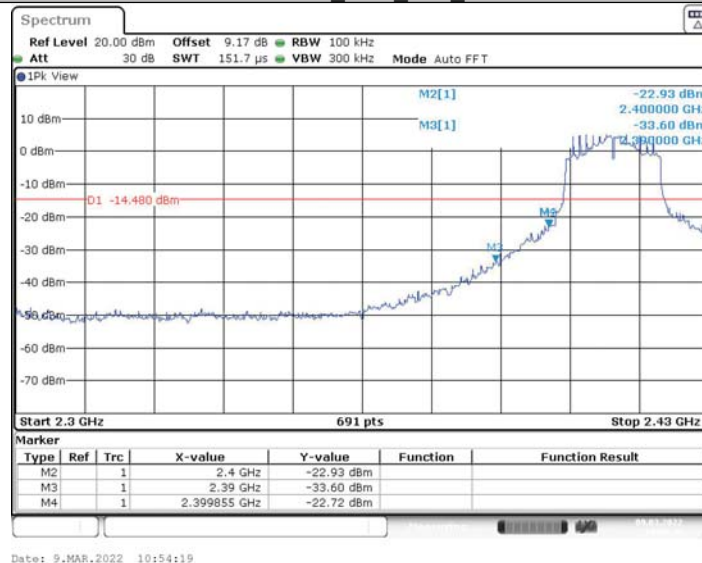
11G_Ant1_Low_2412



11G_Ant1_High_2462



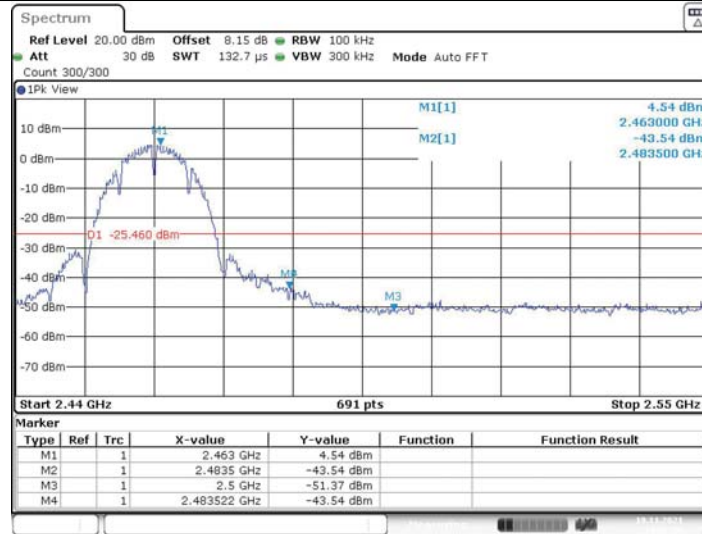
11N20SISO_Ant1_Low_2412



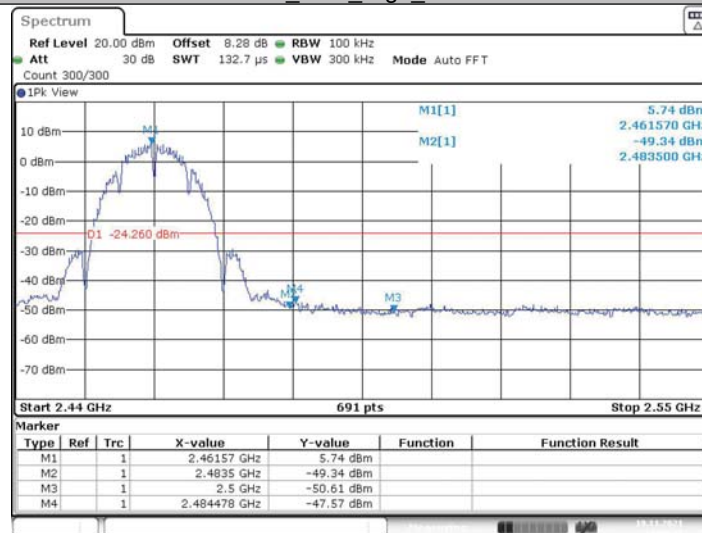




11B_Ant1_High_2462

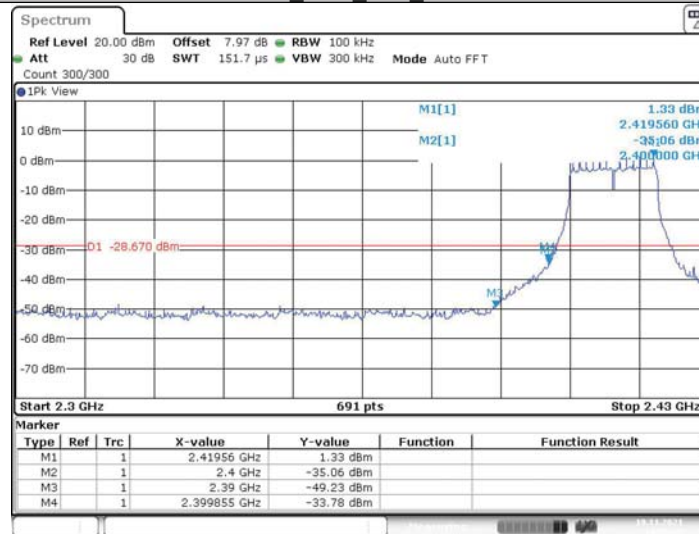


11B_Ant2_High_2462

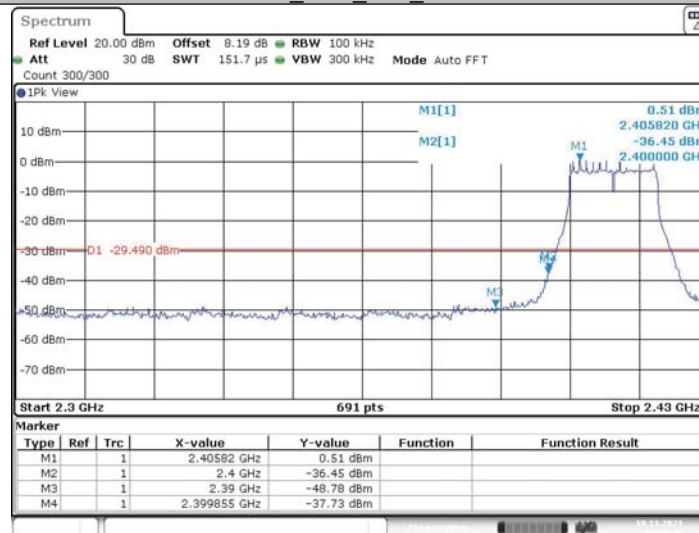




11G_Ant1_Low_2412

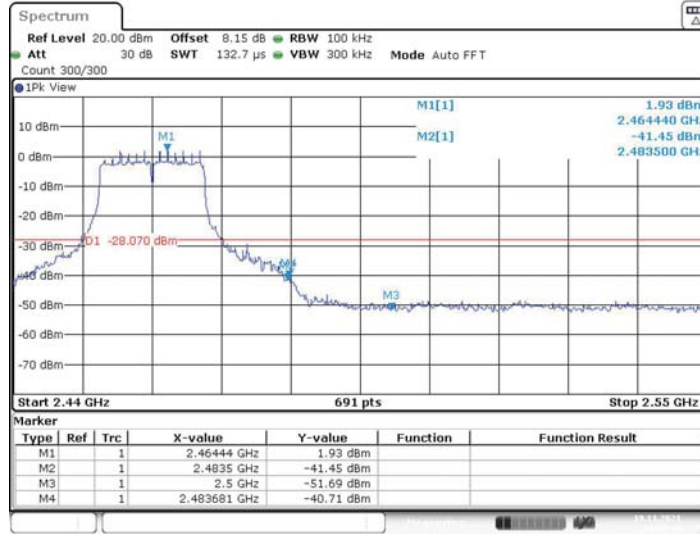


11G_Ant2_Low_2412

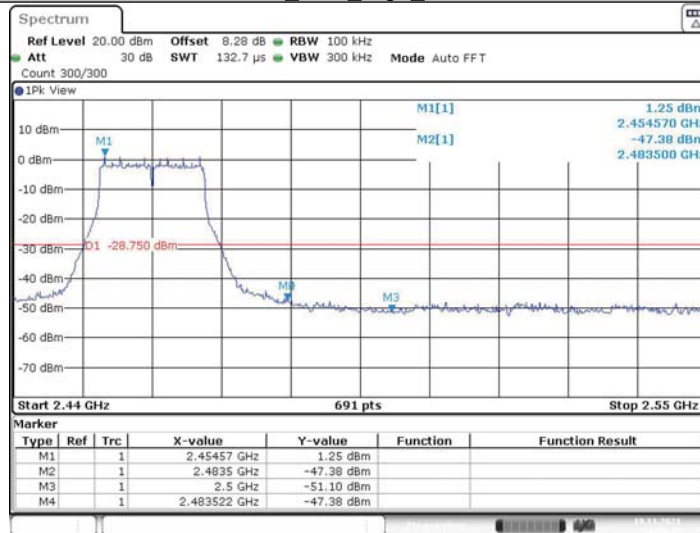




11G_Ant1_High_2462

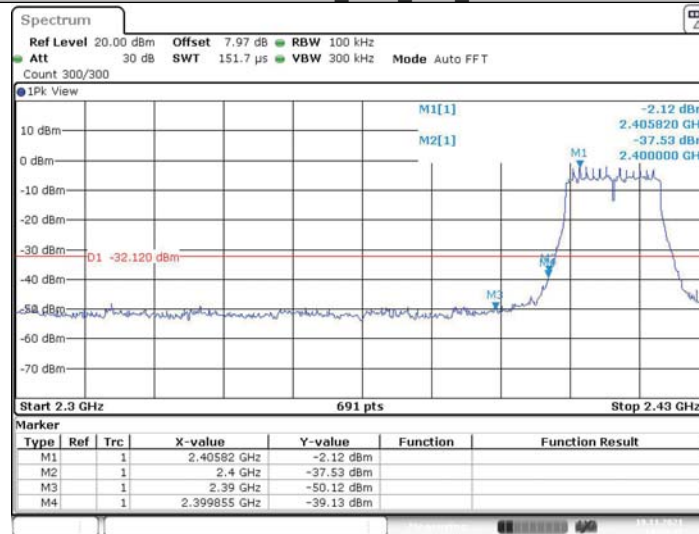


11G_Ant2_High_2462



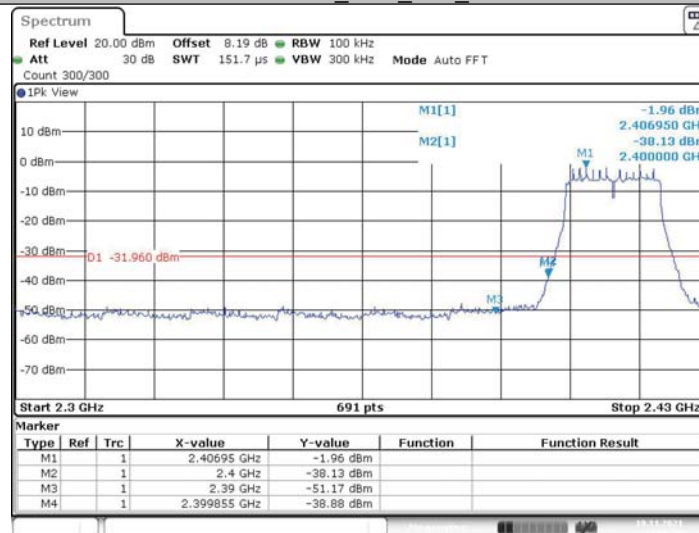


11N20MIMO_Ant1_Low_2412



Date: 19.NOV.2021 14:28:42

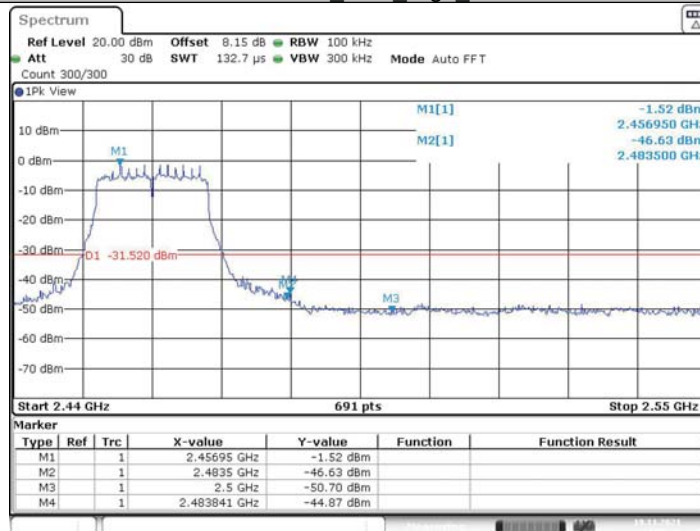
11N20MIMO_Ant2_Low_2412



Date: 19.NOV.2021 14:30:23

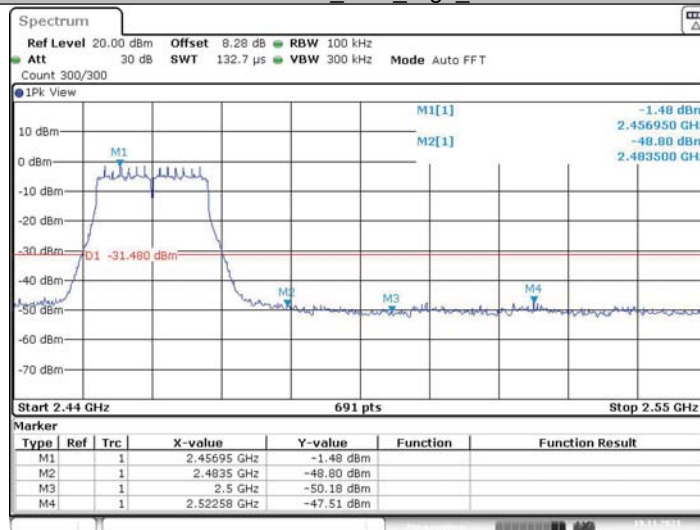


11N20MIMO_Ant1_High_2462



Date: 19.NOV.2021 14:35:29

11N20MIMO_Ant2_High_2462



Date: 19.NOV.2021 14:37:17



5.7 OUT OF BAND EMISSION MEASUREMENT

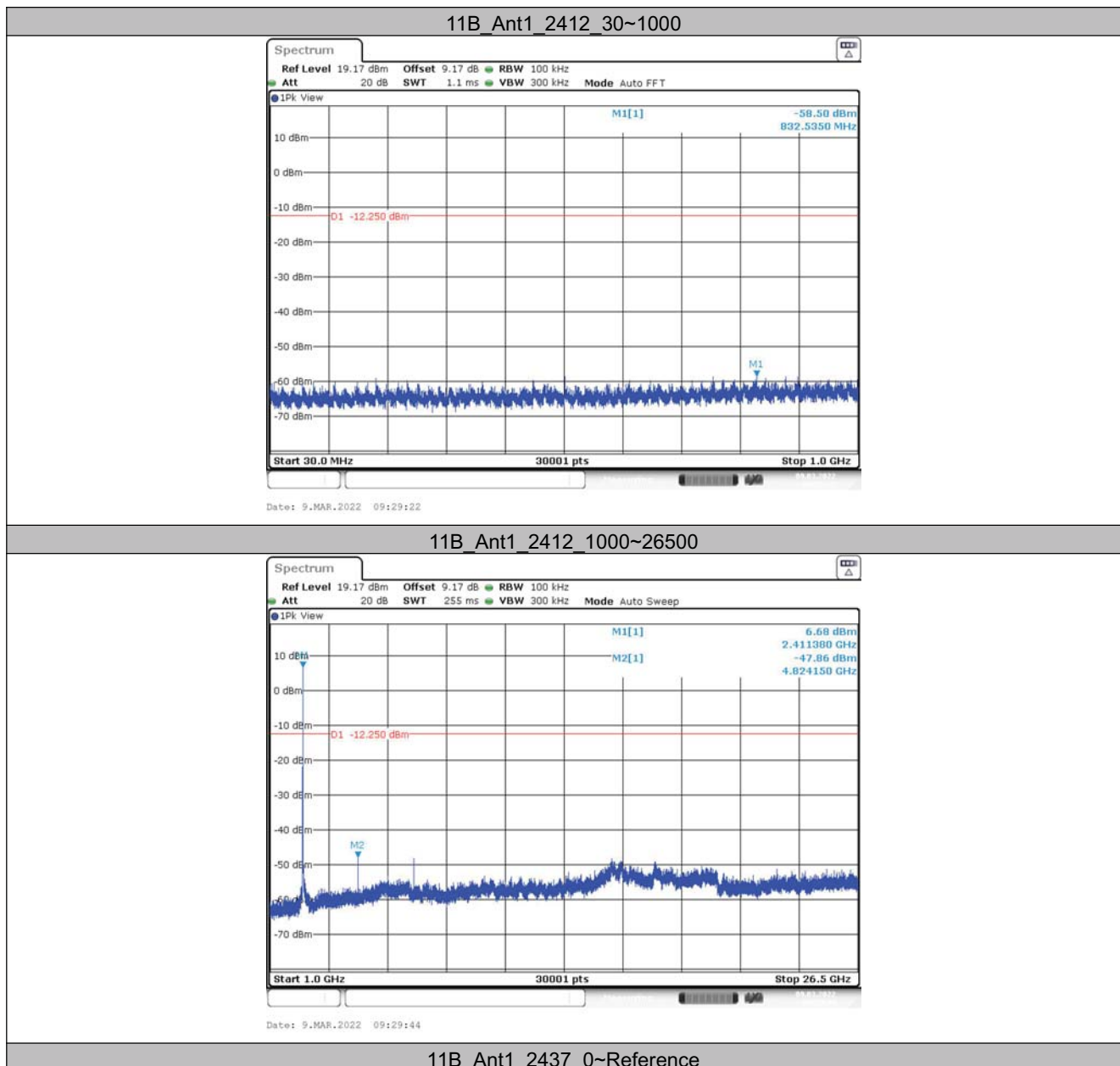
5.7.1 Test Result

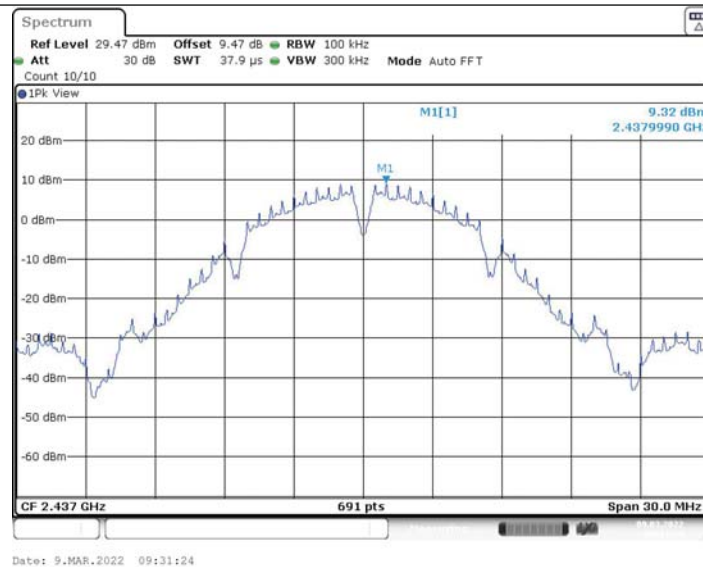
TestMode	Antenna	Frequency[MHz]	FreqRange [Mhz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
11B	Ant1	2412	30~1000	7.75	-58.5	≤-12.25	PASS
			1000~26500	7.75	-47.86	≤-12.25	PASS
		2437	Reference	9.32	9.32	---	PASS
			30~1000	9.32	-57.97	≤-10.68	PASS
			1000~26500	9.32	-47.3	≤-10.68	PASS
		2462	30~1000	9.14	-58.76	≤-10.86	PASS
			1000~26500	9.14	-45.82	≤-10.86	PASS
11G	Ant1	2412	30~1000	4.39	-58.06	≤-15.61	PASS
			1000~26500	4.39	-48.35	≤-15.61	PASS
		2437	Reference	5.45	5.45	---	PASS
			30~1000	5.45	-58.55	≤-14.55	PASS
			1000~26500	5.45	-48.06	≤-14.55	PASS
		2462	30~1000	5.73	-58.72	≤-14.27	PASS
			1000~26500	5.73	-47.64	≤-14.27	PASS
11N20SISO	Ant1	2412	30~1000	5.52	-58.37	≤-14.48	PASS
			1000~26500	5.52	-47.55	≤-14.48	PASS
		2437	Reference	6.63	6.63	---	PASS
			30~1000	6.63	-58.65	≤-13.37	PASS
			1000~26500	6.63	-47.7	≤-13.37	PASS
		2462	30~1000	6.88	-58.59	≤-13.12	PASS
			1000~26500	6.88	-47.11	≤-13.12	PASS

TestMode	Antenna	Frequency[MHz]	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	30~1000	3.41	-58.32	≤-16.59	PASS
			1000~26500	3.41	-46.3	≤-16.59	PASS
		2440	Reference	5.00	5.00	---	PASS
			30~1000	5.00	-58.02	≤-15	PASS
			1000~26500	5.00	-46.64	≤-15	PASS
		2480	30~1000	5.15	-59.08	≤-14.85	PASS
			1000~26500	5.15	-47.72	≤-14.85	PASS

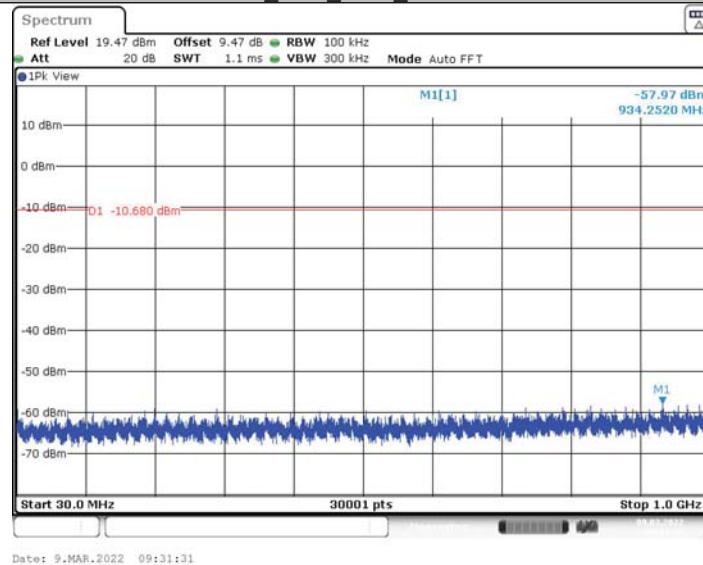


5.7.2 Test Graphs

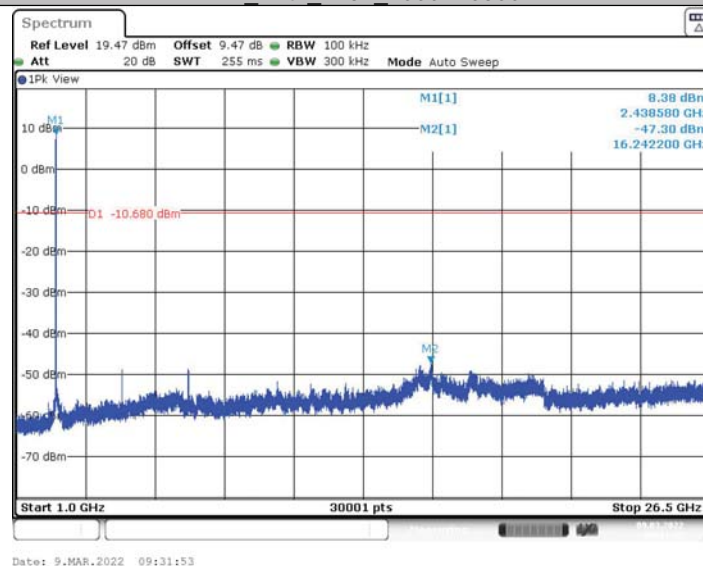




11B_Ant1_2437_30~1000

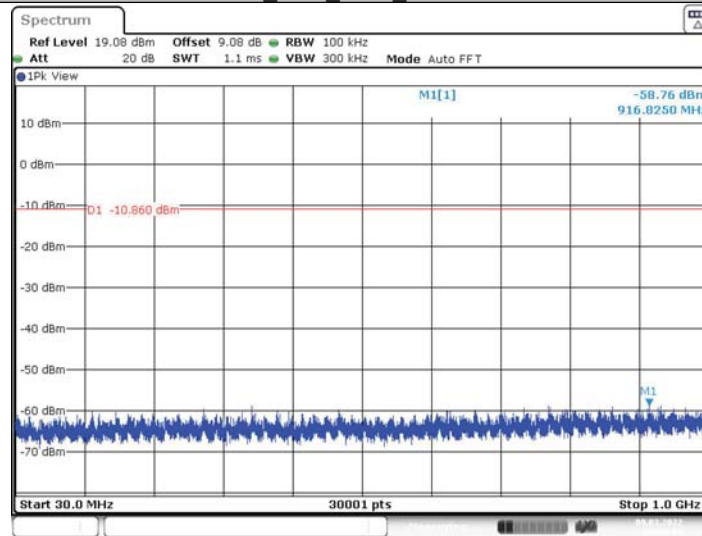


11B_Ant1_2437_1000~26500



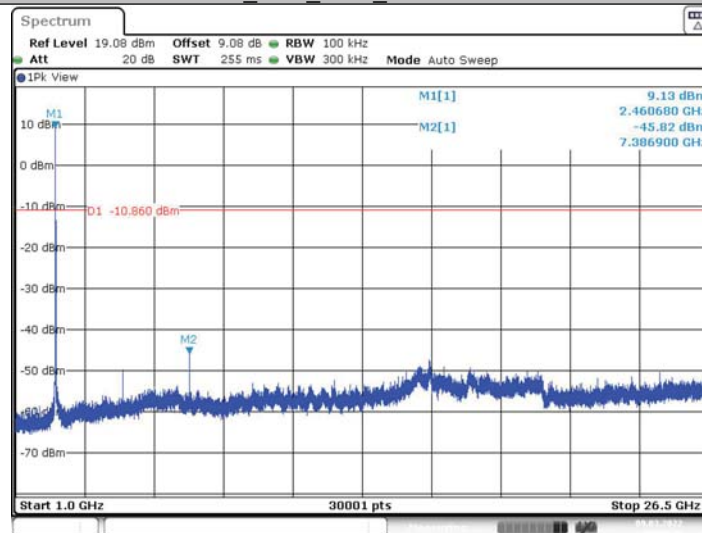


11B_Ant1_2462_30~1000



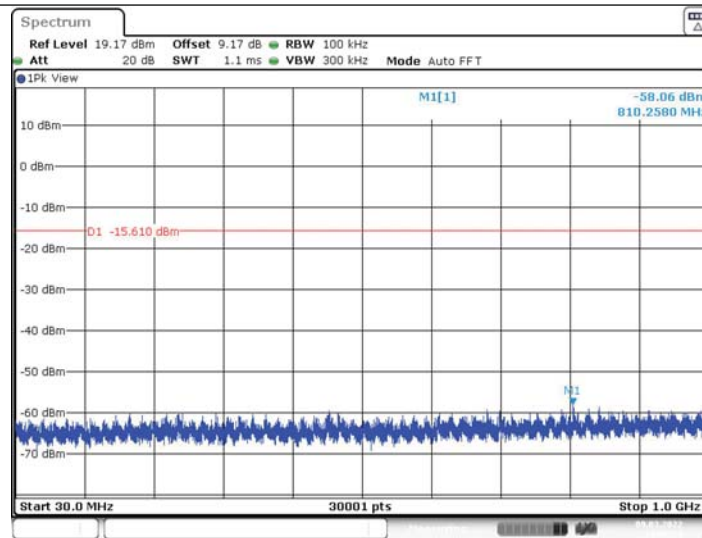
Date: 9.MAR.2022 09:34:04

11B_Ant1_2462_1000~26500



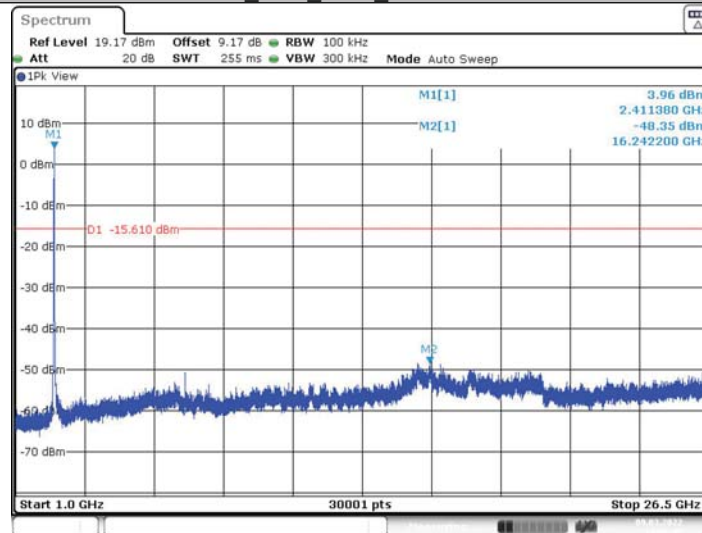
Date: 9.MAR.2022 09:34:26

11G_Ant1_2412_30~1000



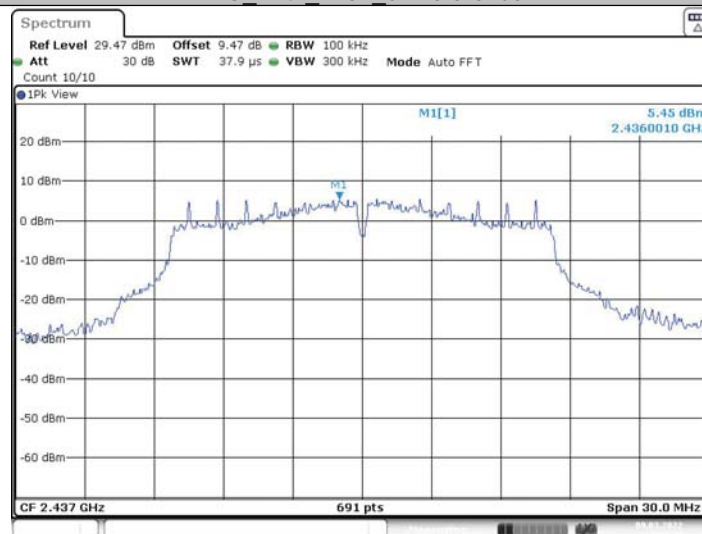
Date: 9.MAR.2022 10:42:23

11G_Ant1_2412_1000~26500



Date: 9.MAR.2022 10:42:45

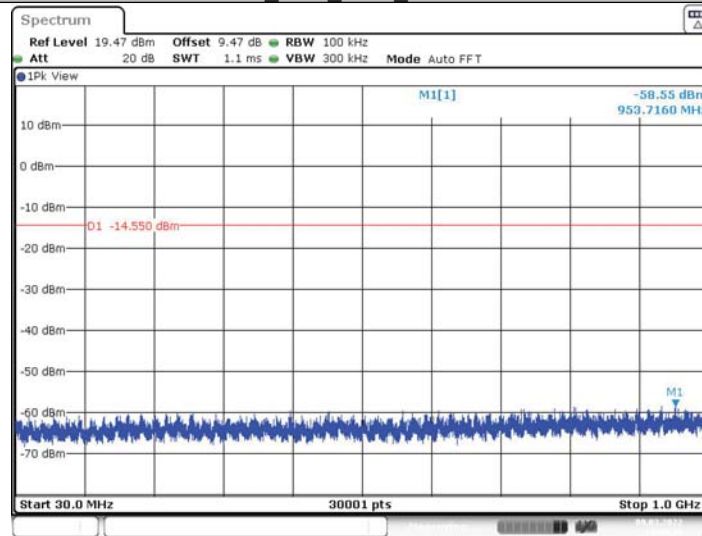
11G_Ant1_2437_0~Reference



Date: 9.MAR.2022 10:44:31

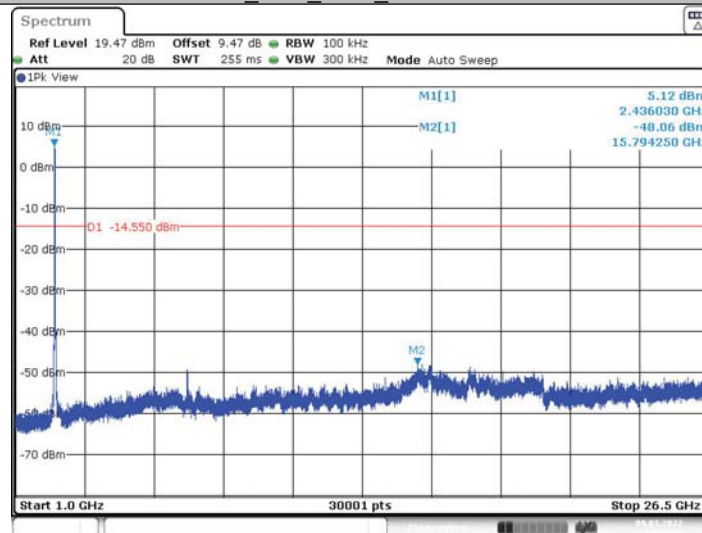


11G_Ant1_2437_30~1000



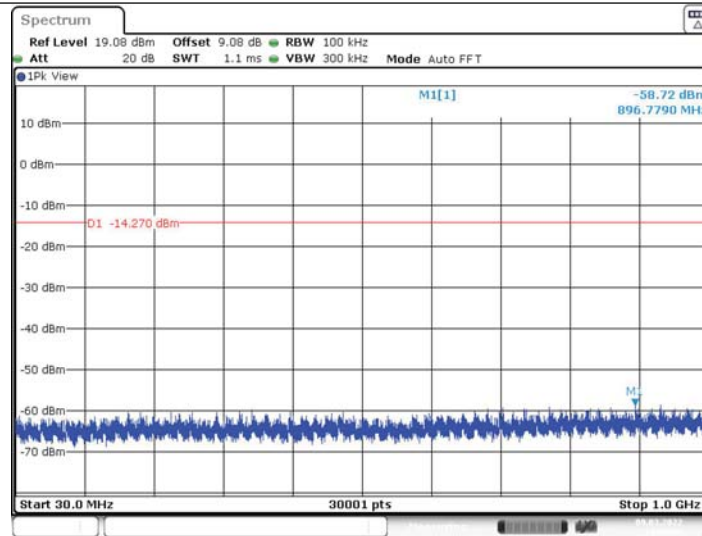
Date: 9.MAR.2022 10:44:37

11G_Ant1_2437_1000~26500



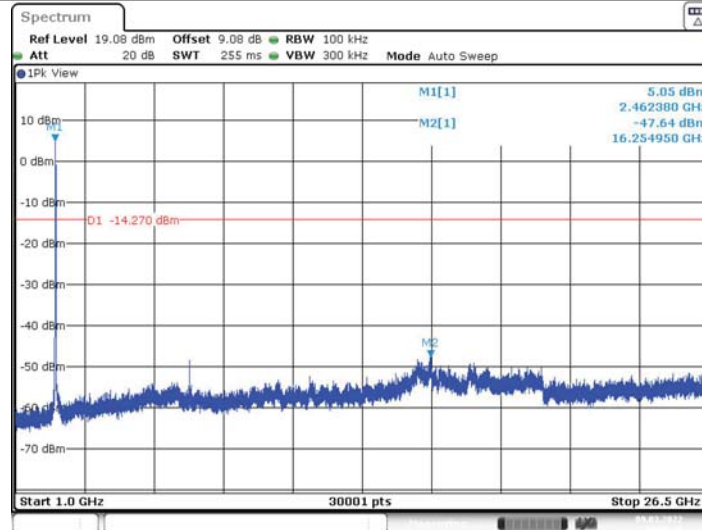
Date: 9.MAR.2022 10:44:59

11G_Ant1_2462_30~1000



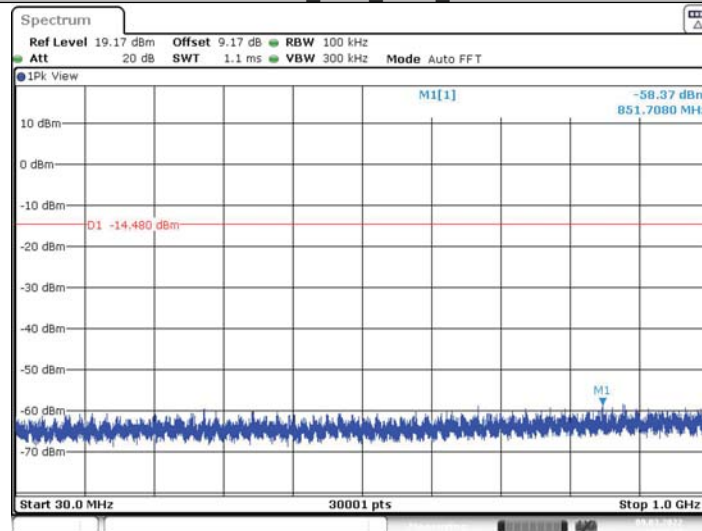
Date: 9.MAR.2022 10:49:56

11G_Ant1_2462_1000~26500



Date: 9.MAR.2022 10:50:18

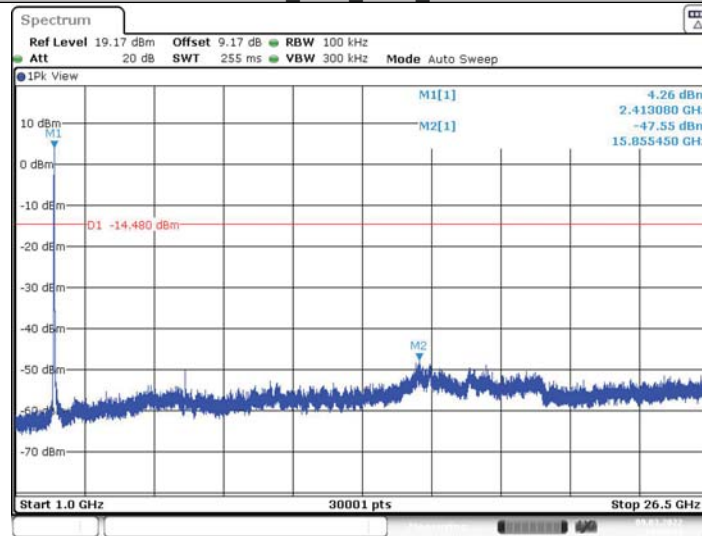
11N20SISO_Ant1_2412_30~1000



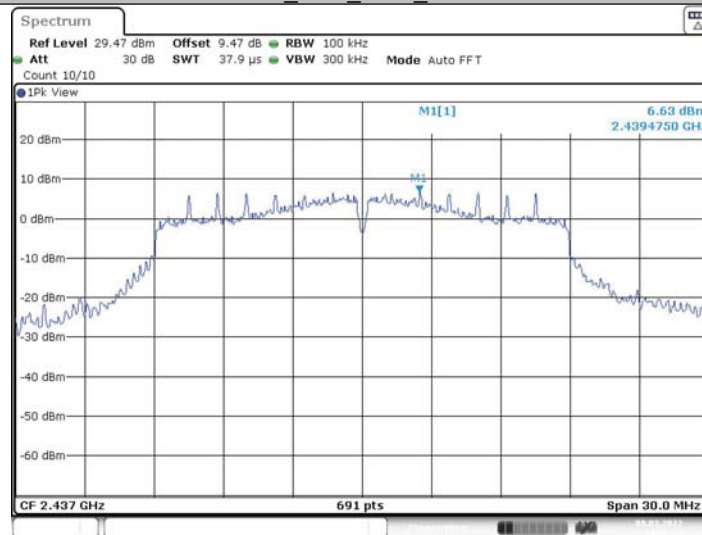
Date: 9.MAR.2022 10:54:31



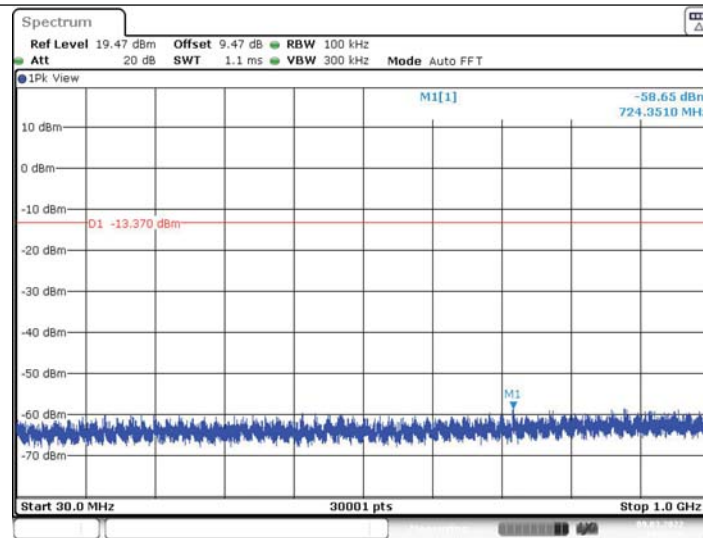
11N20SISO_Ant1_2412_1000~26500



11N20SISO_Ant1_2437_0~Reference

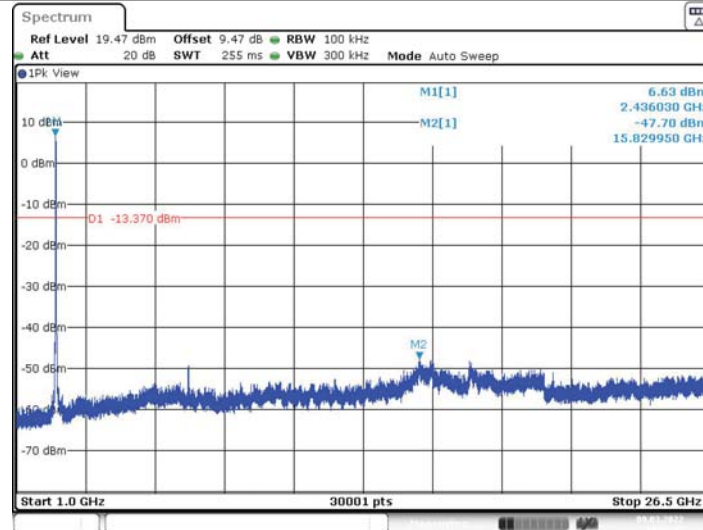


11N20SISO_Ant1_2437_30~1000



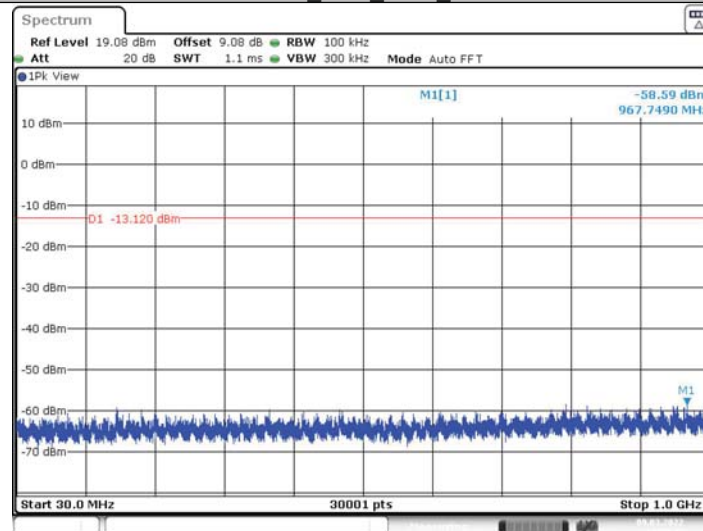
Date: 9.MAR.2022 10:57:20

11N20SISO_Ant1_2437_1000~26500



Date: 9.MAR.2022 10:57:42

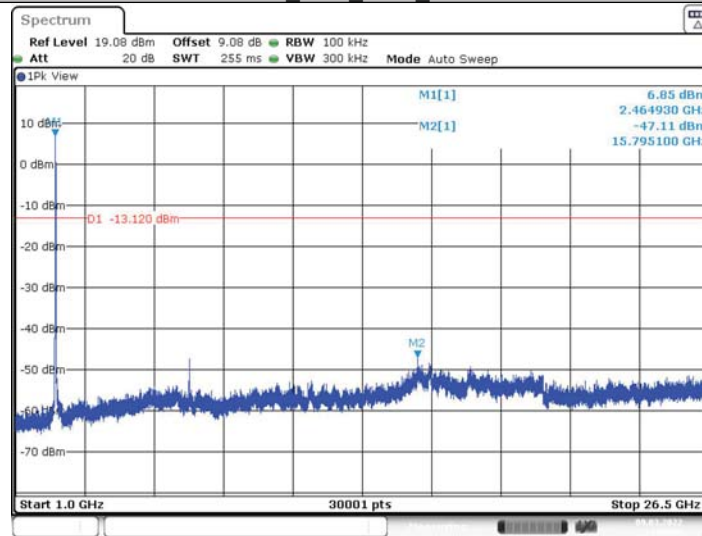
11N20SISO_Ant1_2462_30~1000



Date: 9.MAR.2022 10:59:46

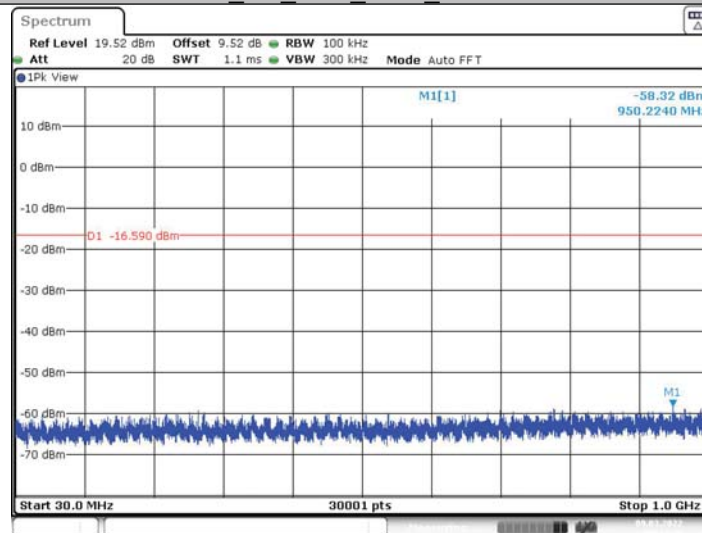


11N20SISO_Ant1_2462_1000~26500



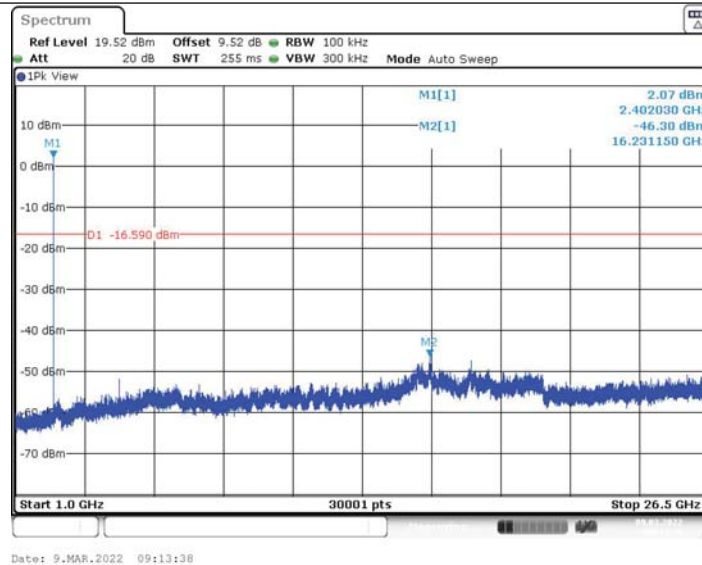
Date: 9.MAR.2022 11:00:08

BLE_1M_Ant1_2402_30~1000



Date: 9.MAR.2022 09:13:16

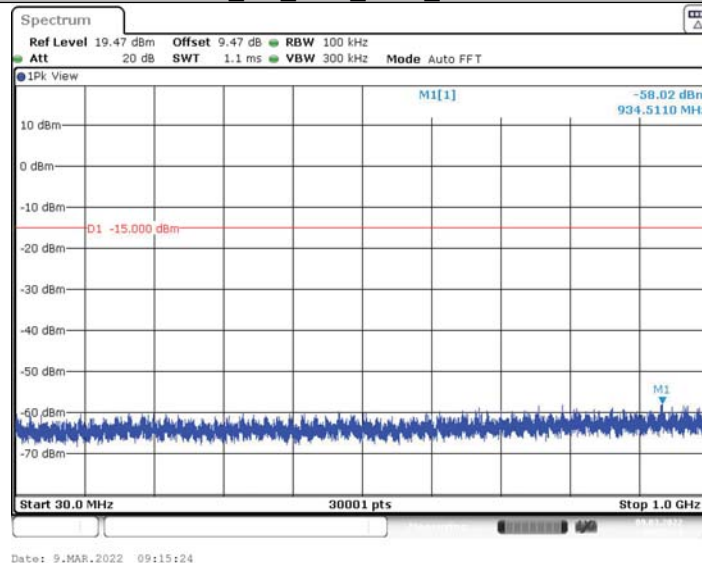
BLE_1M_Ant1_2402_1000~26500



BLE_1M_Ant1_2440_0~Reference

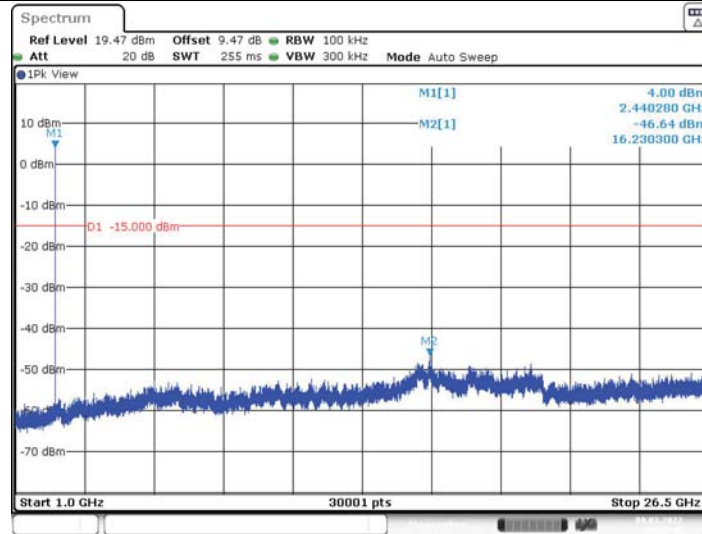


BLE_1M_Ant1_2440_30~1000



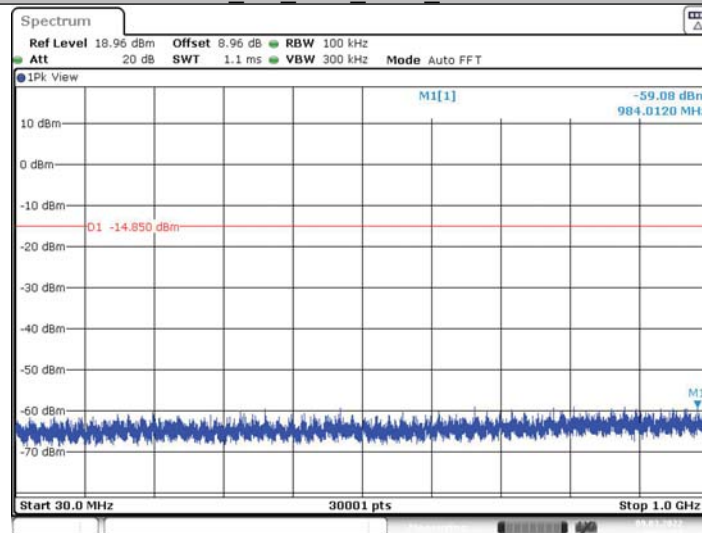


BLE_1M_Ant1_2440_1000~26500



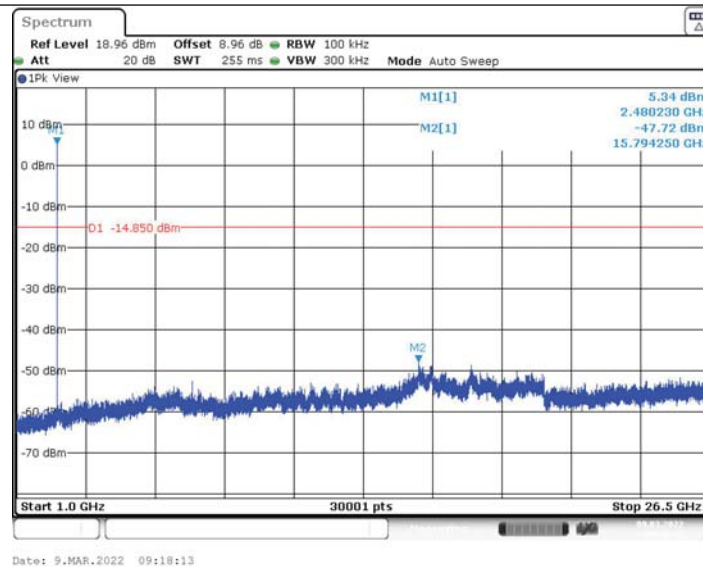
Date: 9.MAR.2022 09:15:46

BLE_1M_Ant1_2480_30~1000



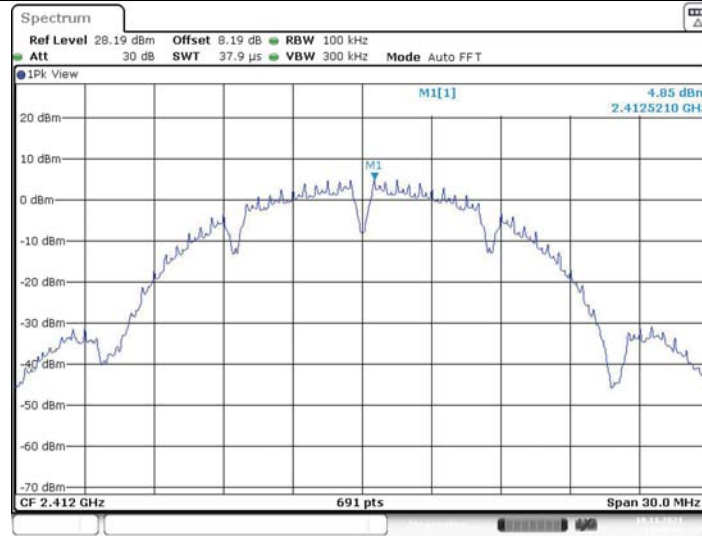
Date: 9.MAR.2022 09:17:51

BLE_1M_Ant1_2480_1000~26500



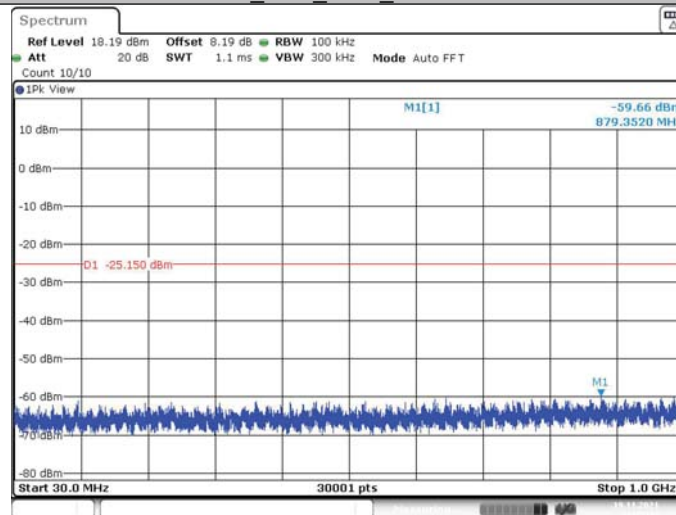


11B_Ant2_2412_0~Reference



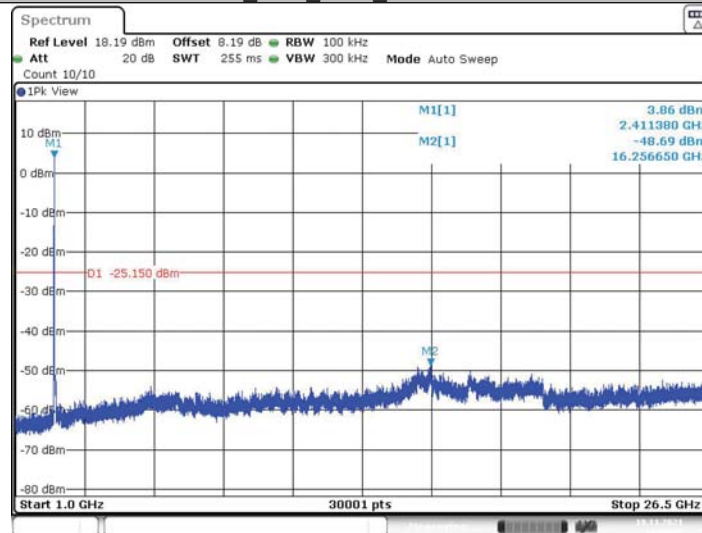
Date: 19.NOV.2021 13:38:39

11B_Ant2_2412_30~1000



Date: 19.NOV.2021 13:38:44

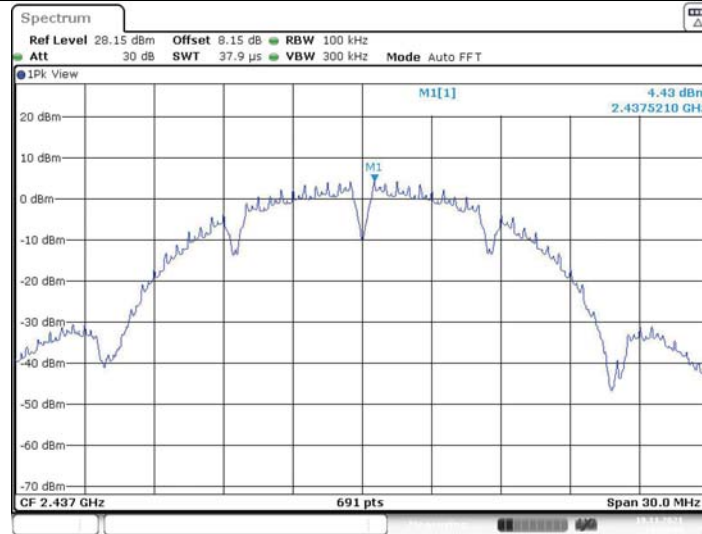
11B_Ant2_2412_1000~26500



Date: 19.NOV.2021 13:39:06

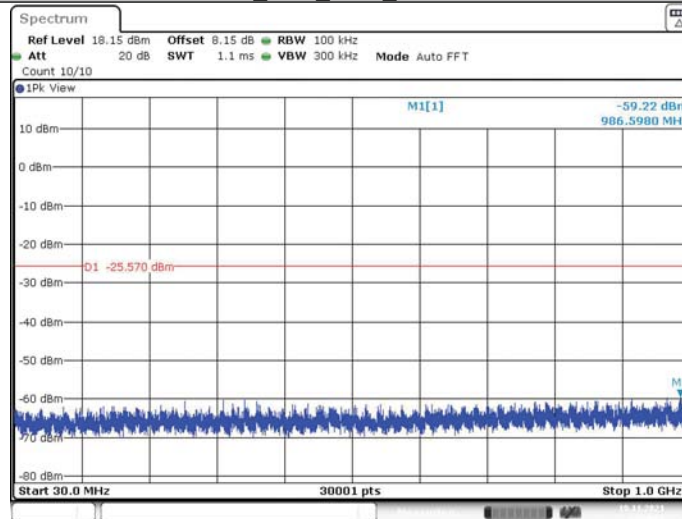


11B_Ant1_2437_0~Reference



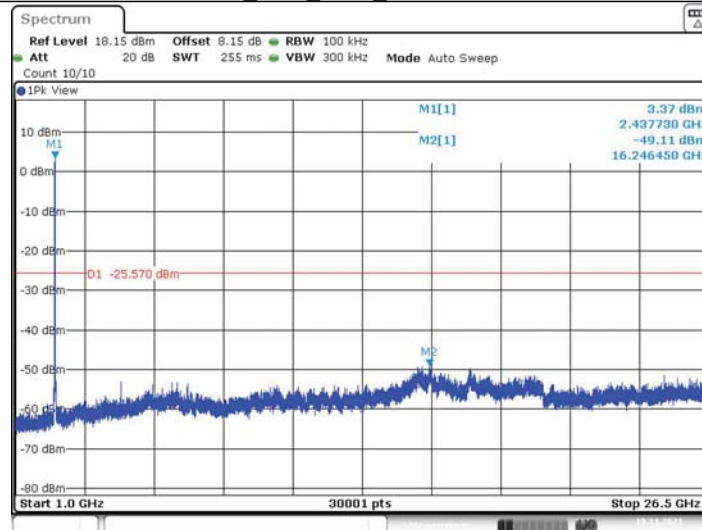
Date: 19.NOV.2021 13:24:55

11B_Ant1_2437_30~1000



Date: 19.NOV.2021 13:24:59

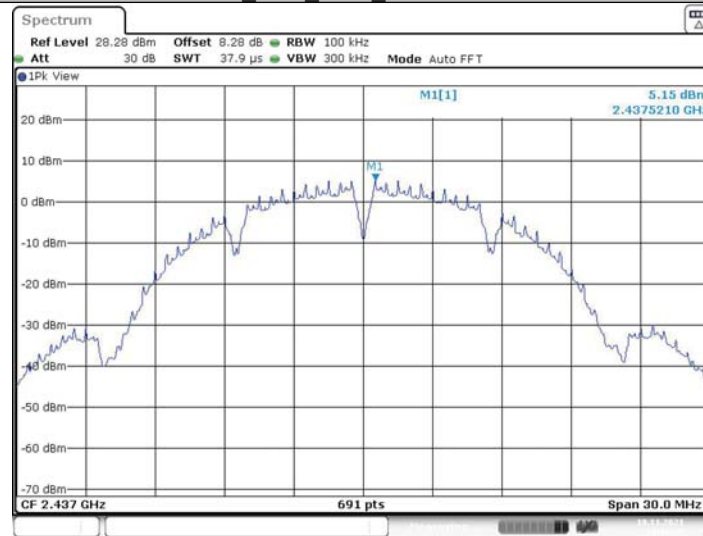
11B_Ant1_2437_1000~26500



Date: 19.NOV.2021 13:25:21

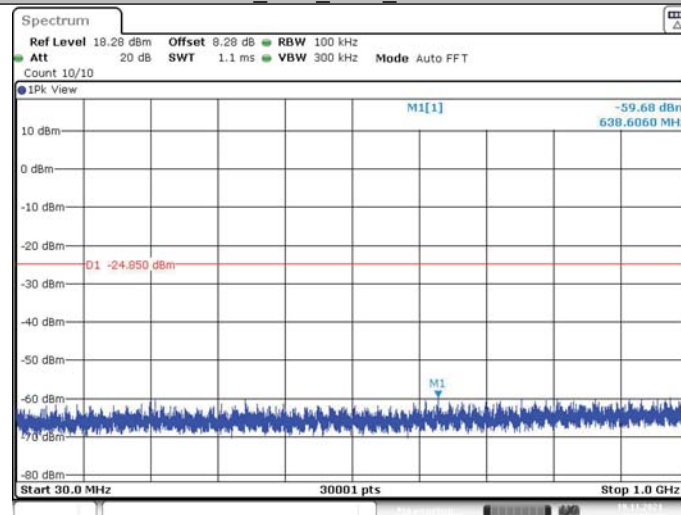


11B_Ant2_2437_0~Reference



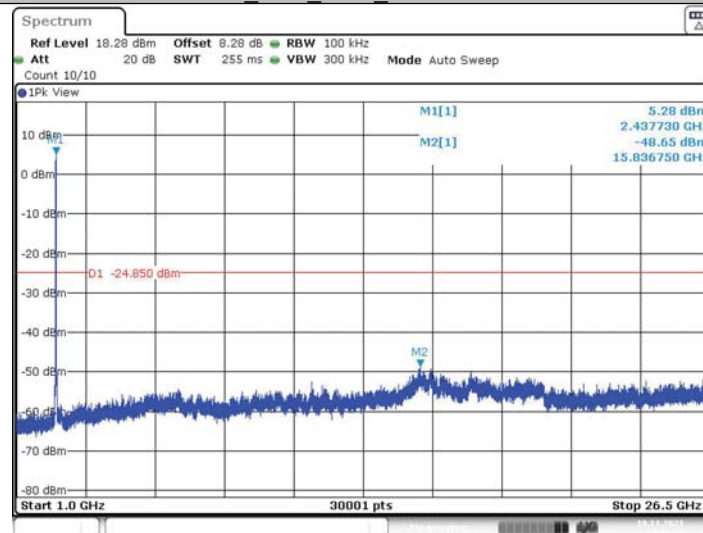
Date: 19.NOV.2021 13:41:26

11B_Ant2_2437_30~1000



Date: 19.NOV.2021 13:41:30

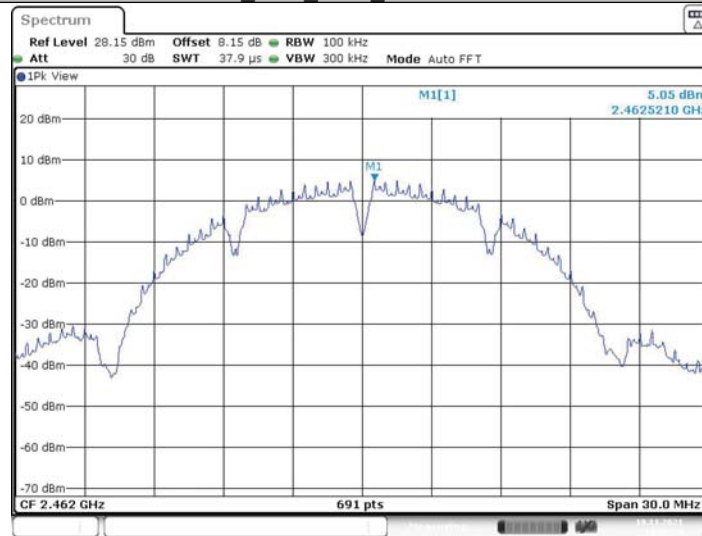
11B_Ant2_2437_1000~26500



Date: 19.NOV.2021 13:41:52

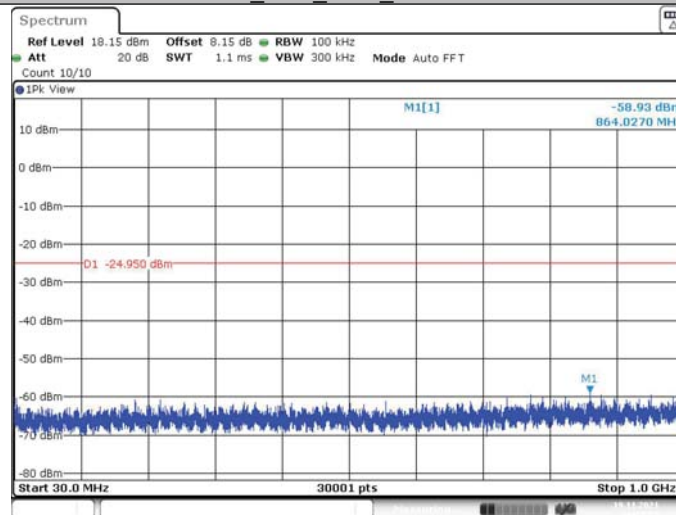


11B_Ant1_2462_0~Reference



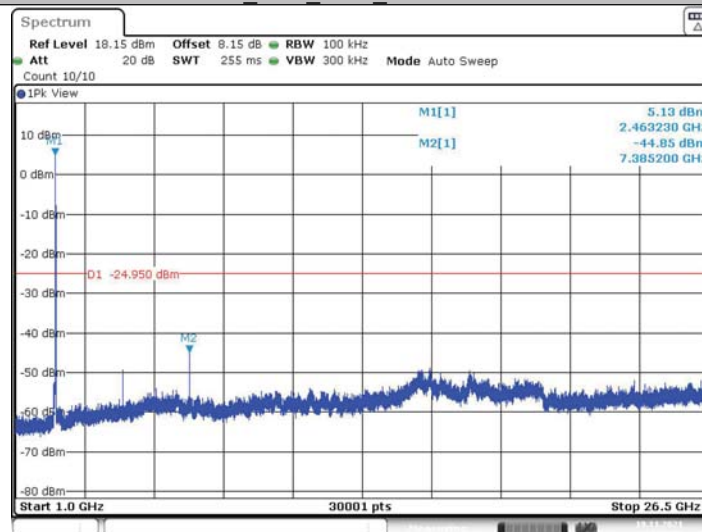
Date: 19.NOV.2021 13:27:24

11B_Ant1_2462_30~1000



Date: 19.NOV.2021 13:27:29

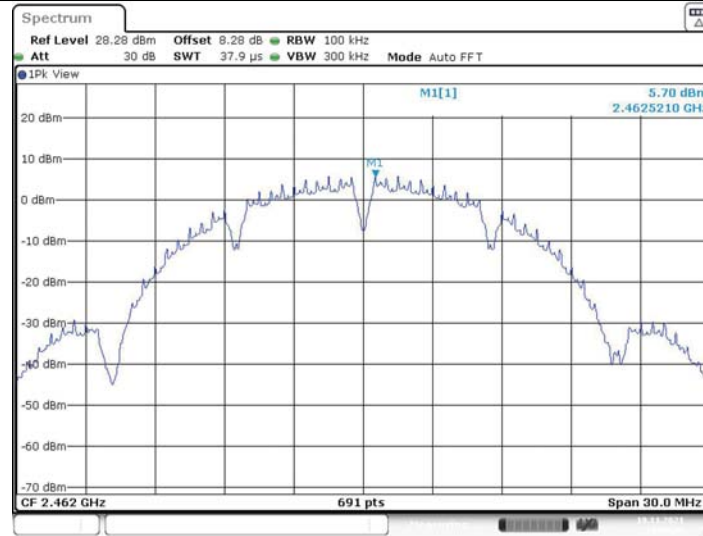
11B_Ant1_2462_1000~26500



Date: 19.NOV.2021 13:27:50

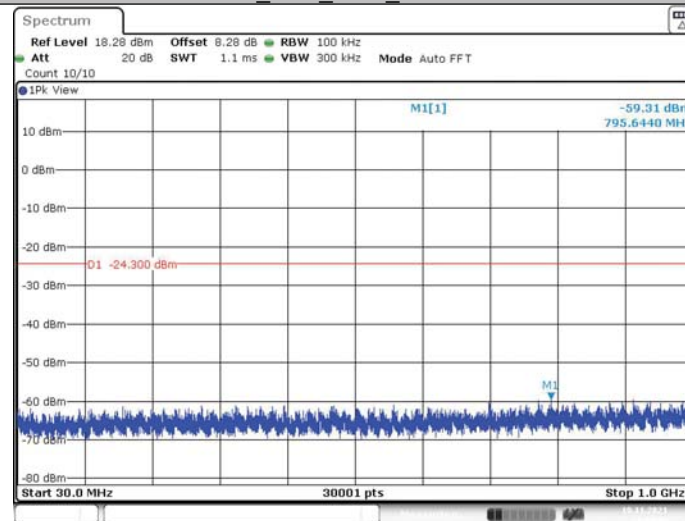


11B_Ant2_2462_0~Reference



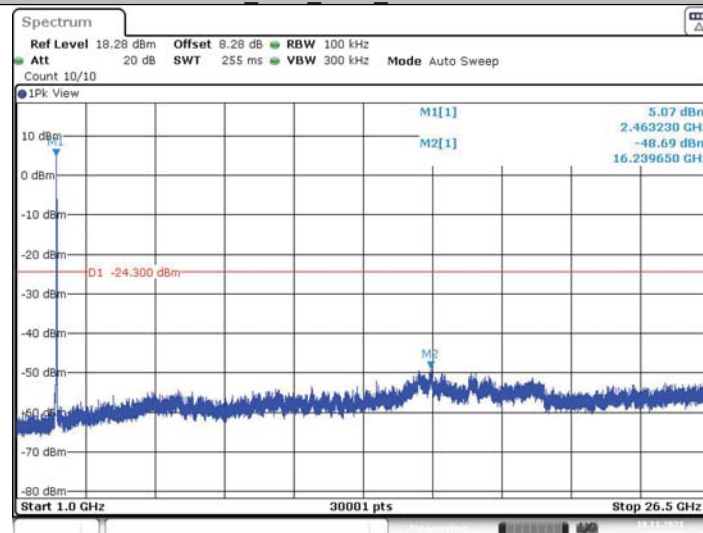
Date: 19.NOV.2021 13:44:26

11B_Ant2_2462_30~1000



Date: 19.NOV.2021 13:44:31

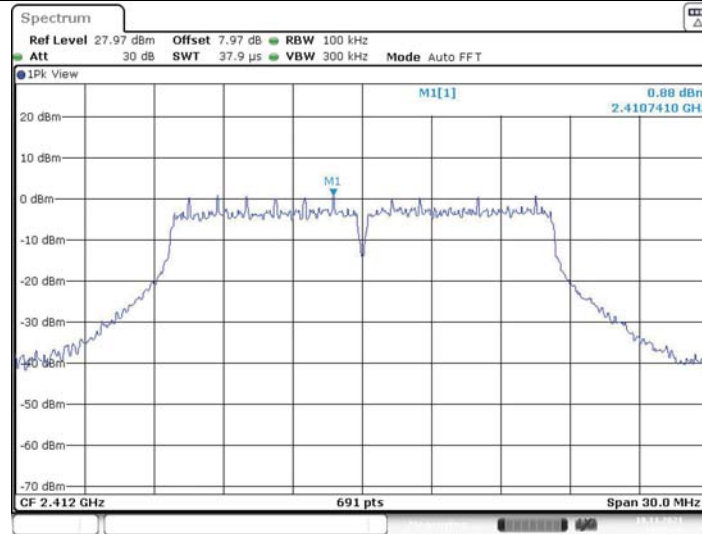
11B_Ant2_2462_1000~26500



Date: 19.NOV.2021 13:44:53

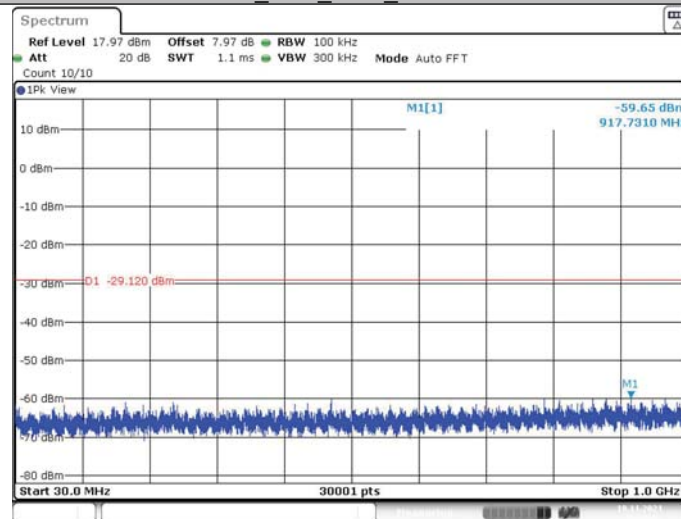


11G_Ant1_2412_0~Reference



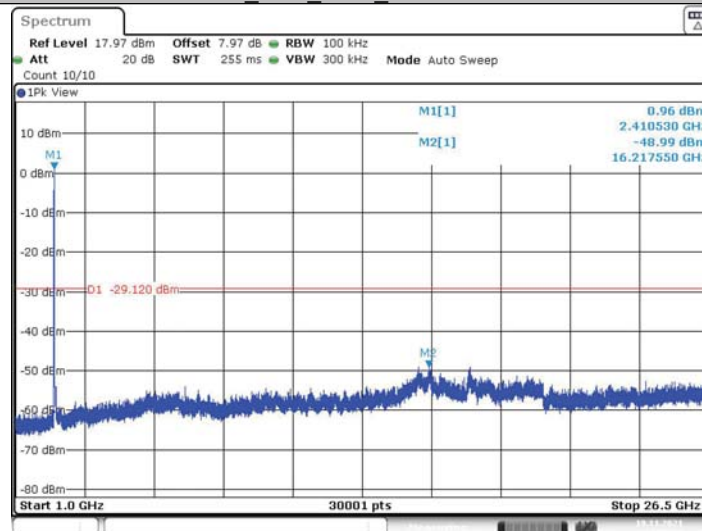
Date: 19.NOV.2021 13:29:28

11G_Ant1_2412_30~1000



Date: 19.NOV.2021 13:29:32

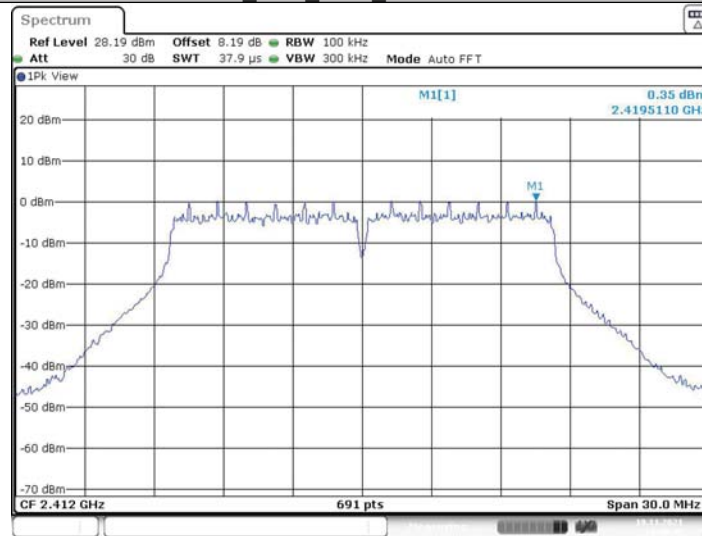
11G_Ant1_2412_1000~26500



Date: 19.NOV.2021 13:29:54

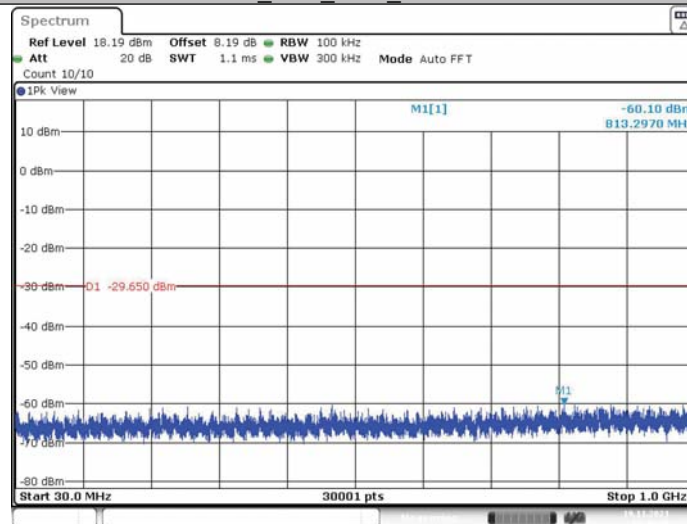


11G_Ant2_2412_0~Reference



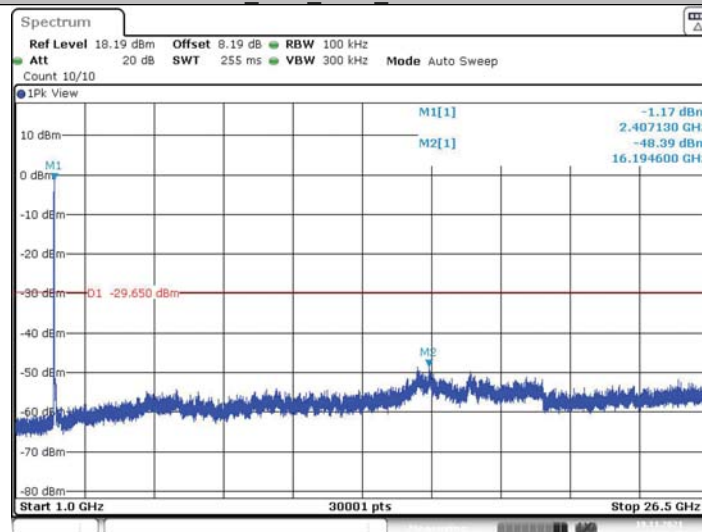
Date: 19.NOV.2021 13:48:45

11G_Ant2_2412_30~1000



Date: 19.NOV.2021 13:48:49

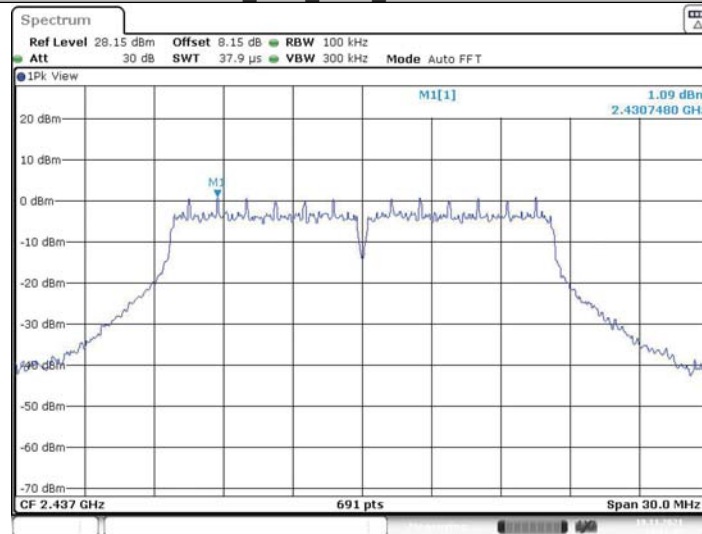
11G_Ant2_2412_1000~26500



Date: 19.NOV.2021 13:49:11

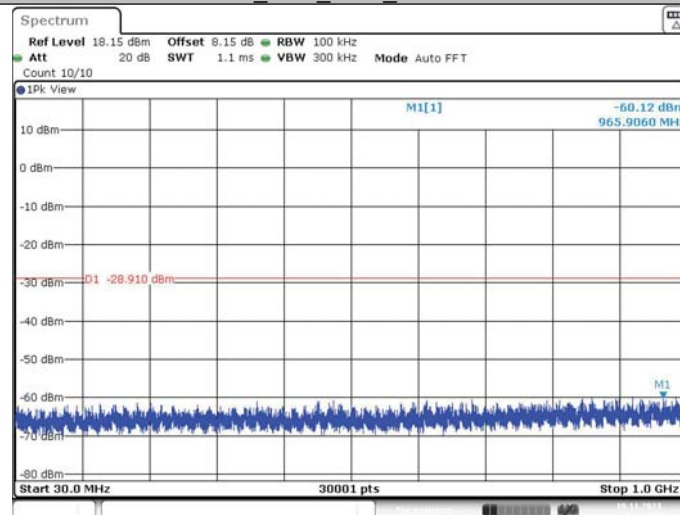


11G_Ant1_2437_0~Reference



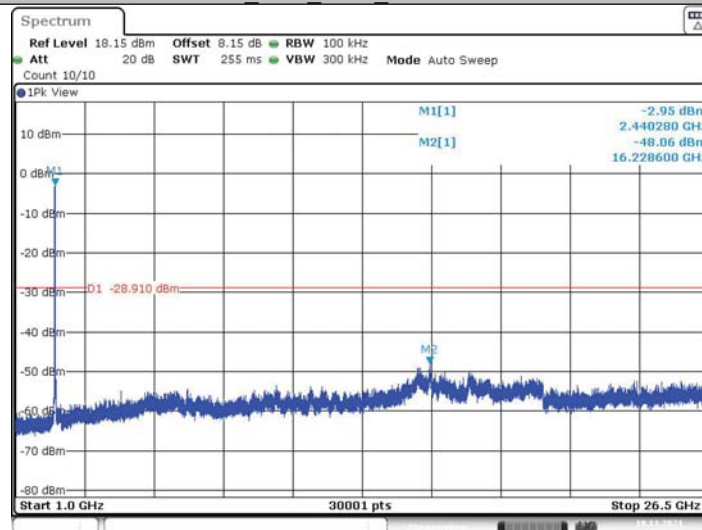
Date: 19.NOV.2021 13:31:42

11G_Ant1_2437_30~1000



Date: 19.NOV.2021 13:31:46

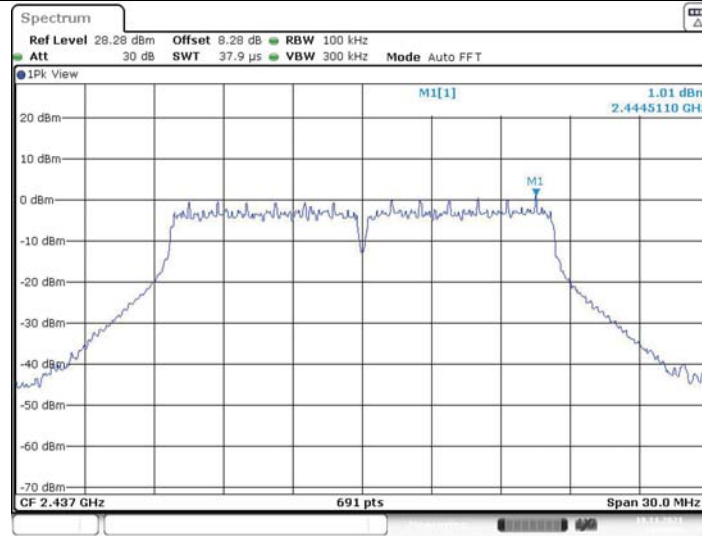
11G_Ant1_2437_1000~26500



Date: 19.NOV.2021 13:32:08

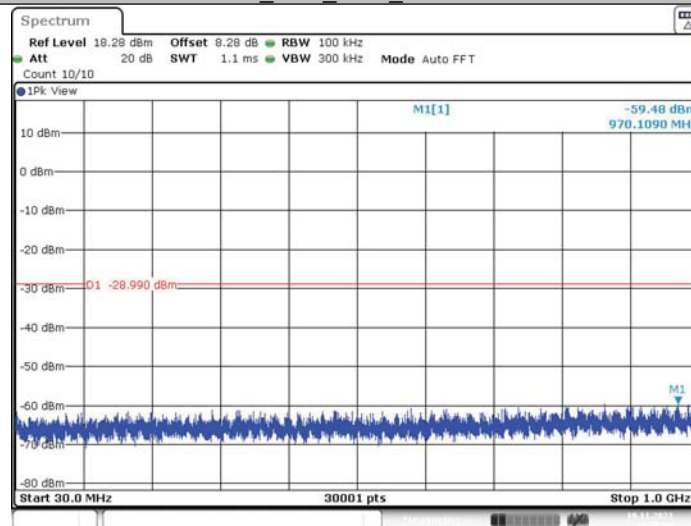


11G_Ant2_2437_0~Reference



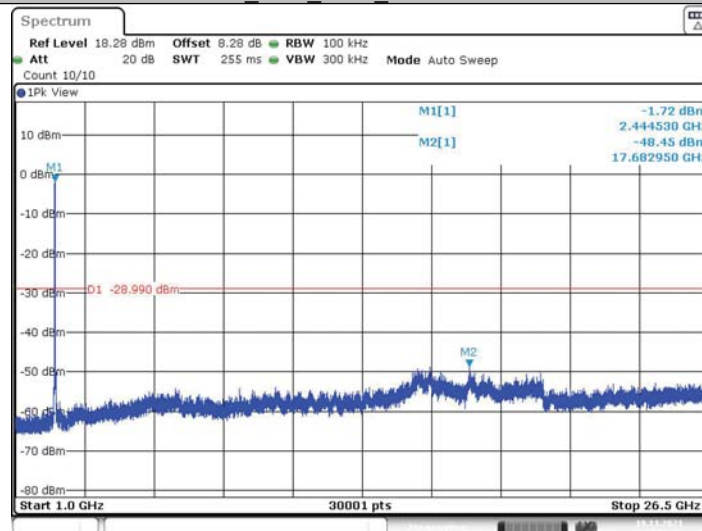
Date: 19.NOV.2021 13:50:50

11G_Ant2_2437_30~1000



Date: 19.NOV.2021 13:50:54

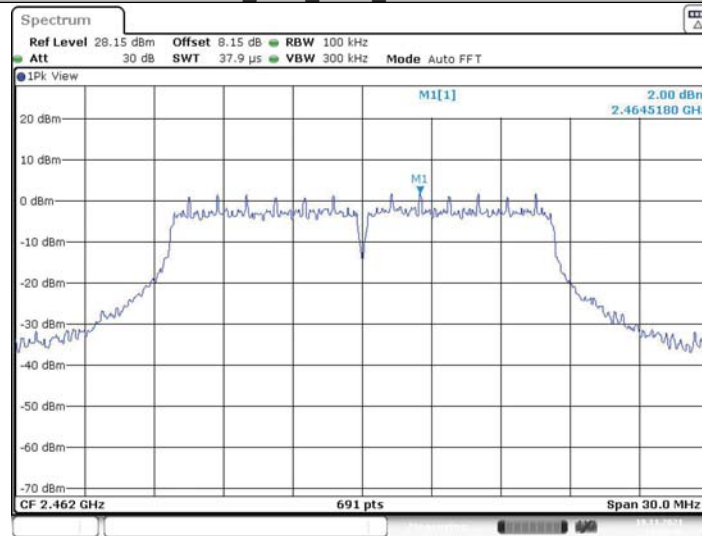
11G_Ant2_2437_1000~26500



Date: 19.NOV.2021 13:51:16

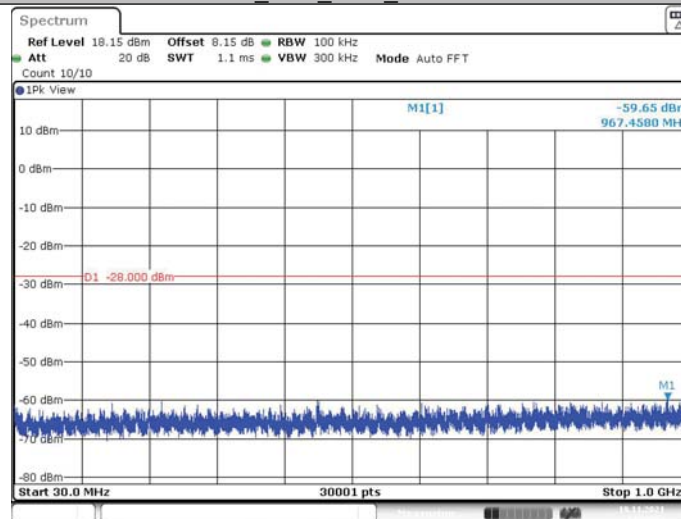


11G_Ant1_2462_0~Reference



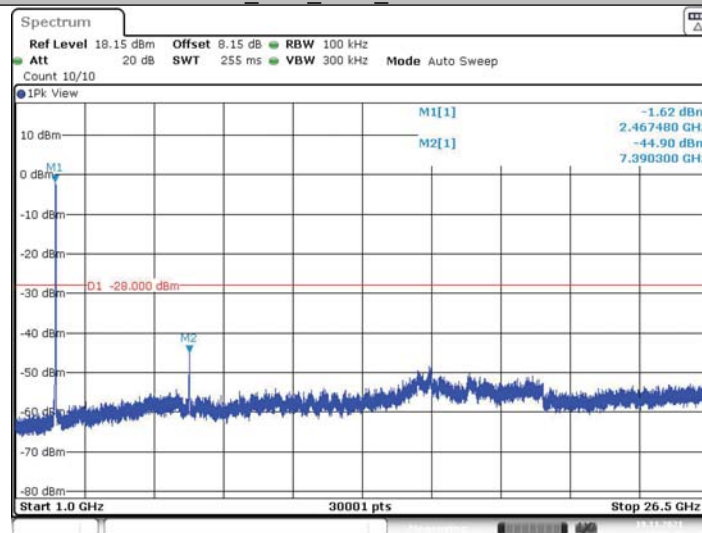
Date: 19.NOV.2021 13:33:49

11G_Ant1_2462_30~1000



Date: 19.NOV.2021 13:33:53

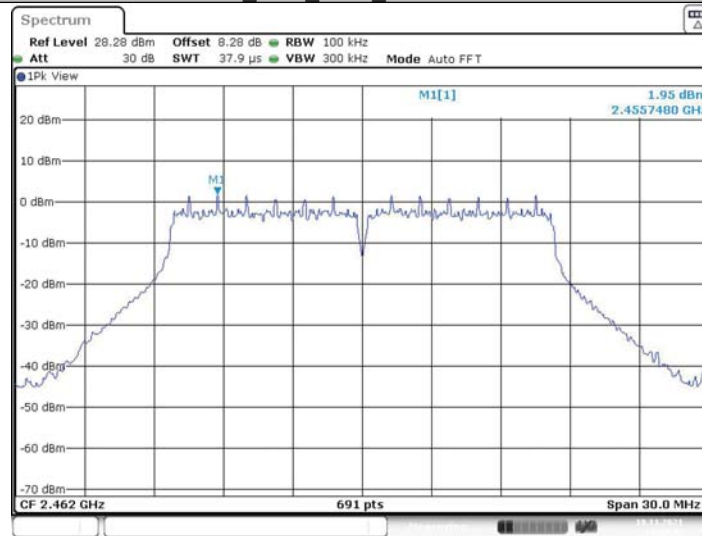
11G_Ant1_2462_1000~26500



Date: 19.NOV.2021 13:34:15

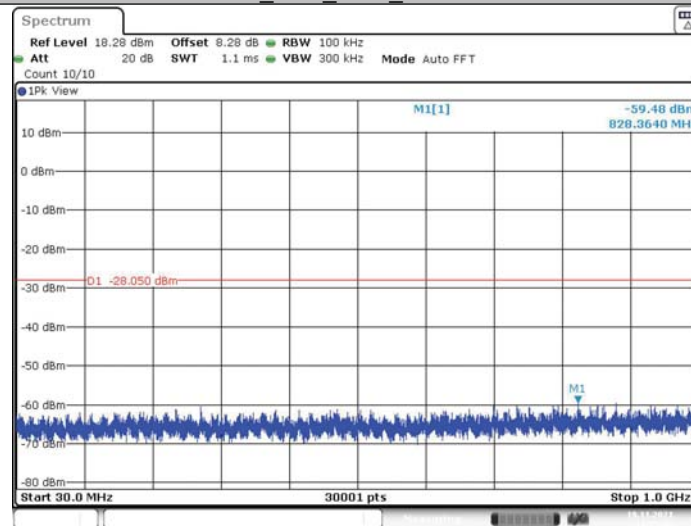


11G_Ant2_2462_0~Reference



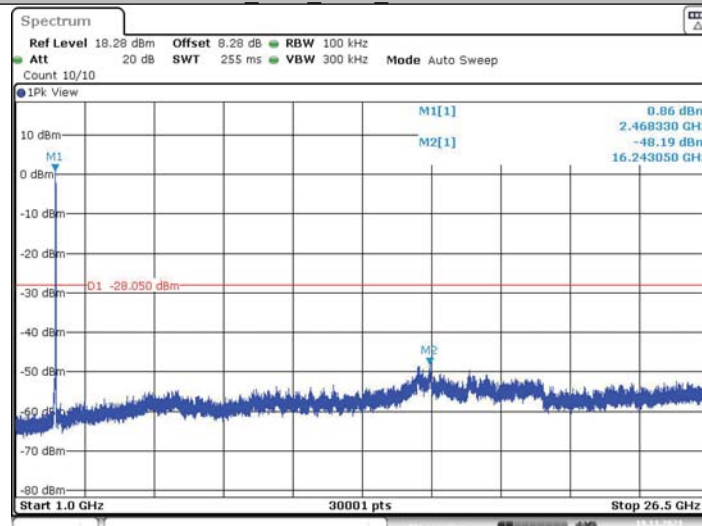
Date: 19.NOV.2021 13:53:48

11G_Ant2_2462_30~1000



Date: 19.NOV.2021 13:53:52

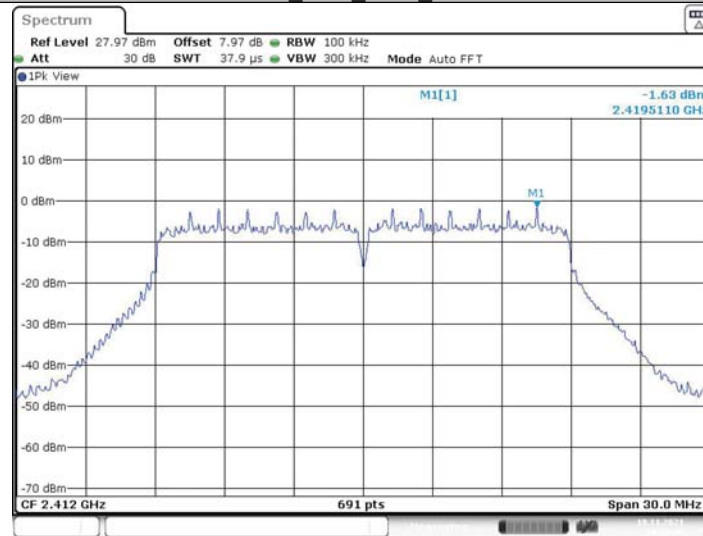
11G_Ant2_2462_1000~26500



Date: 19.NOV.2021 13:54:14

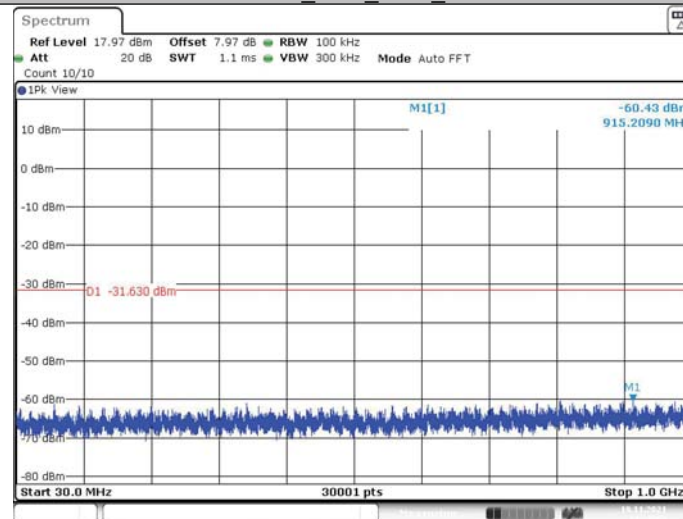


11N20MIMO_Ant1_2412_0~Reference



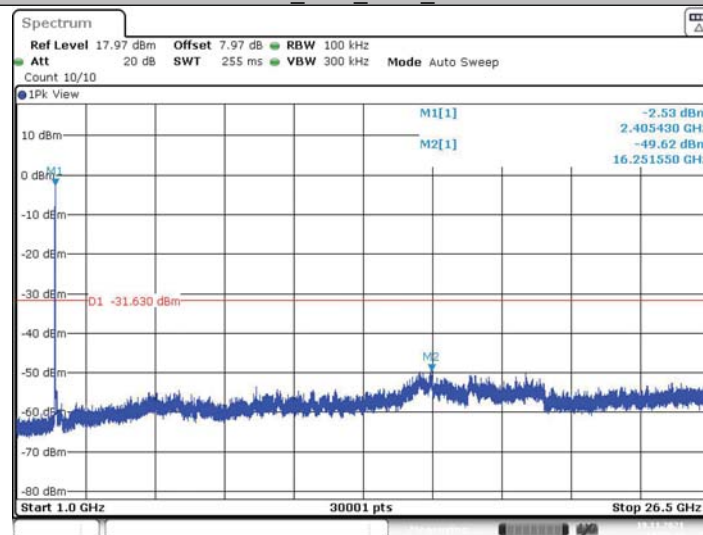
Date: 19.NOV.2021 14:28:47

11N20MIMO_Ant1_2412_30~1000



Date: 19.NOV.2021 14:28:51

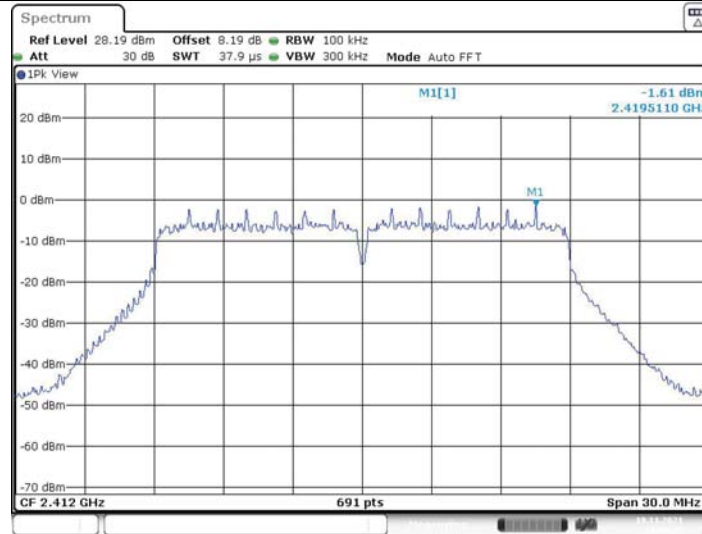
11N20MIMO_Ant1_2412_1000~26500



Date: 19.NOV.2021 14:29:13

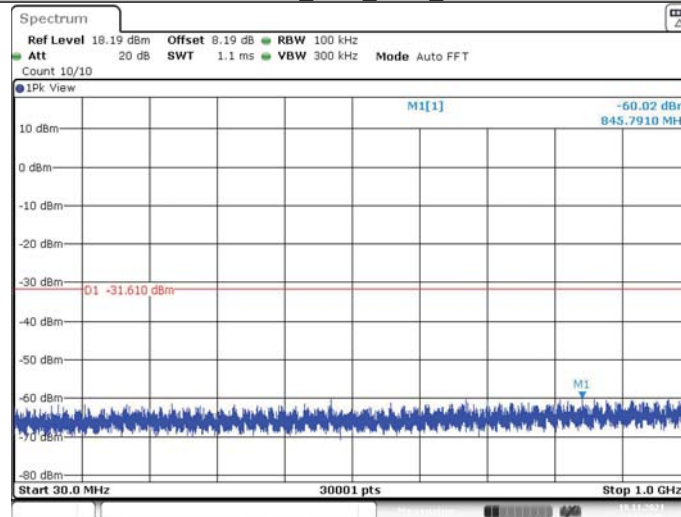


11N20MIMO_Ant2_2412_0~Reference



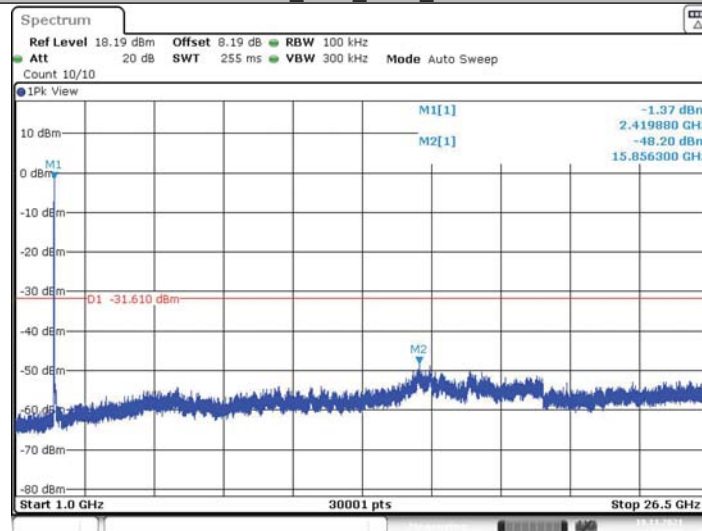
Date: 19.NOV.2021 14:30:28

11N20MIMO_Ant2_2412_30~1000



Date: 19.NOV.2021 14:30:32

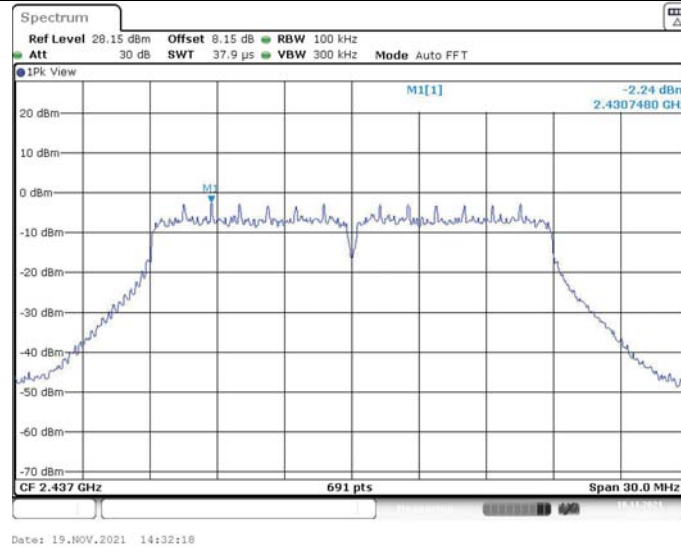
11N20MIMO_Ant2_2412_1000~26500



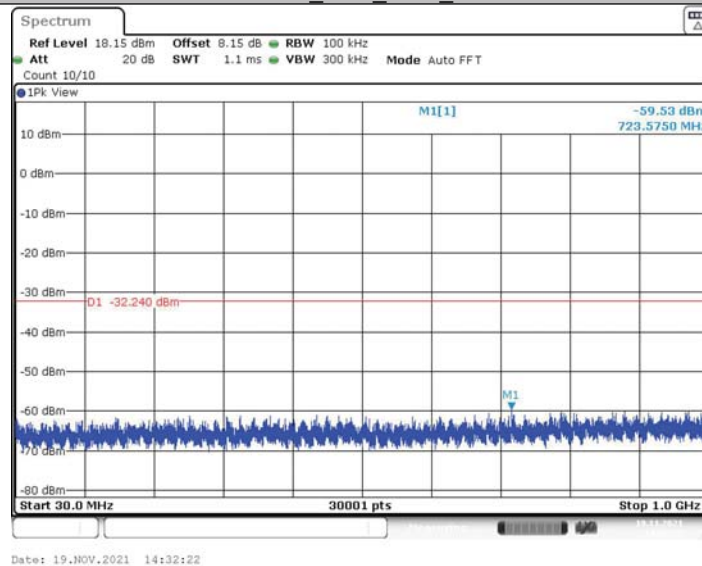
Date: 19.NOV.2021 14:30:54



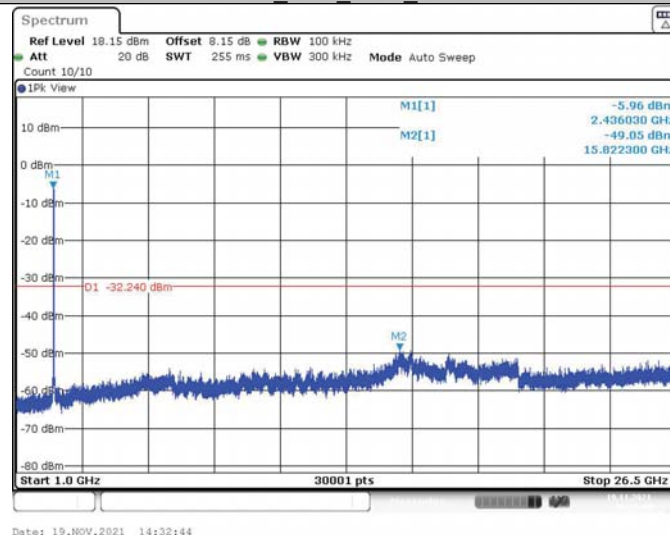
11N20MIMO_Ant1_2437_0~Reference



11N20MIMO_Ant1_2437_30~1000

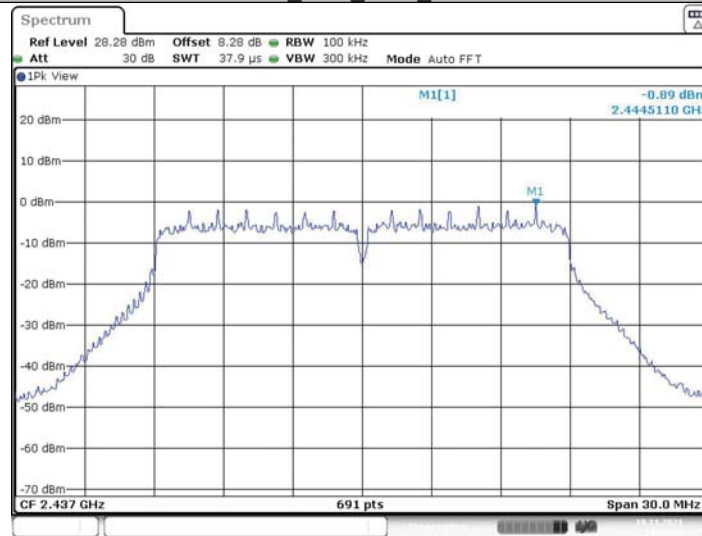


11N20MIMO_Ant1_2437_1000~26500



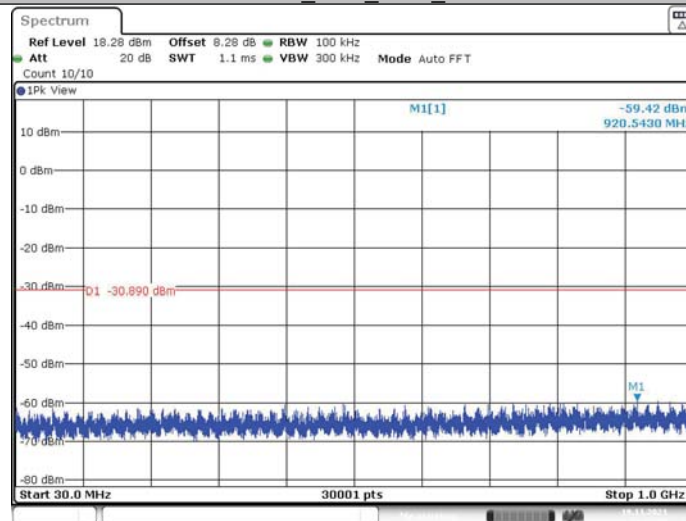


11N20MIMO_Ant2_2437_0~Reference



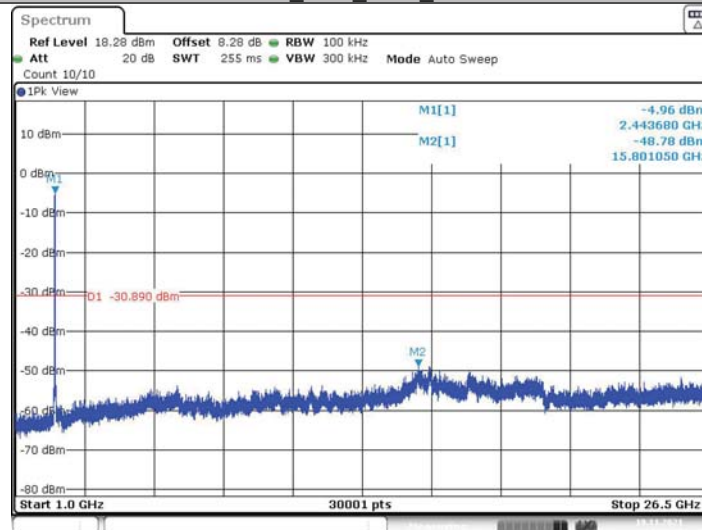
Date: 19.NOV.2021 14:33:55

11N20MIMO_Ant2_2437_30~1000



Date: 19.NOV.2021 14:33:59

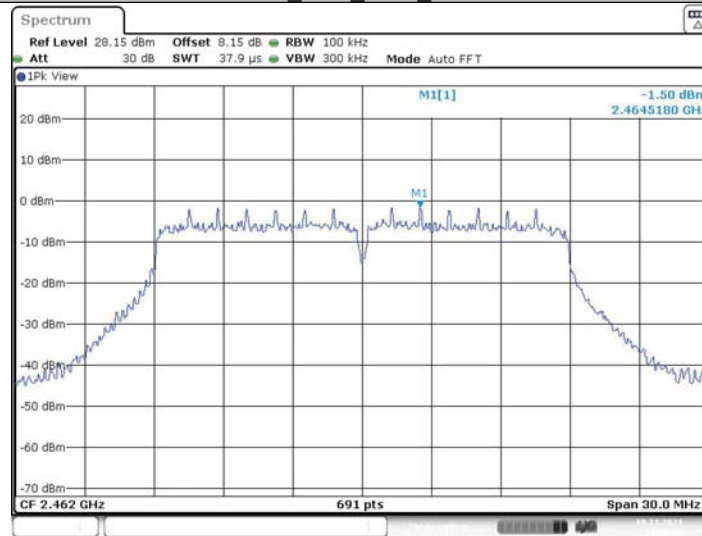
11N20MIMO_Ant2_2437_1000~26500



Date: 19.NOV.2021 14:34:21

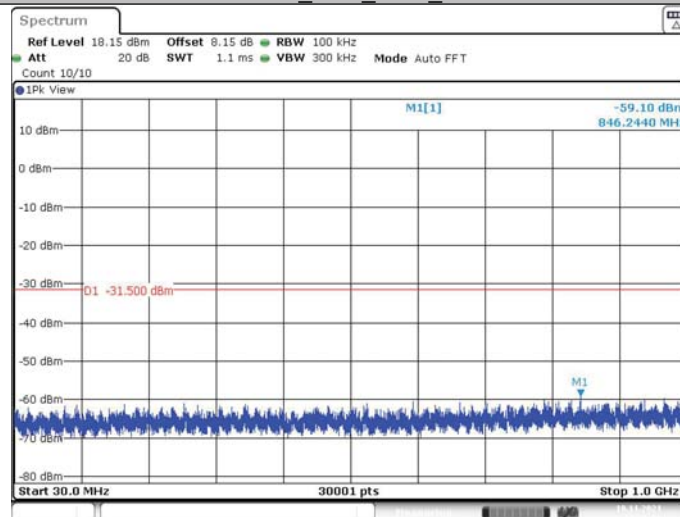


11N20MIMO_Ant1_2462_0~Reference



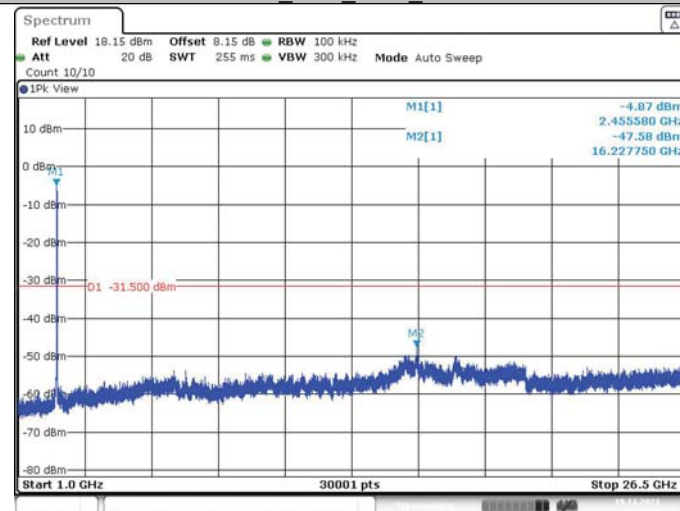
Date: 19.NOV.2021 14:35:34

11N20MIMO_Ant1_2462_30~1000



Date: 19.NOV.2021 14:35:38

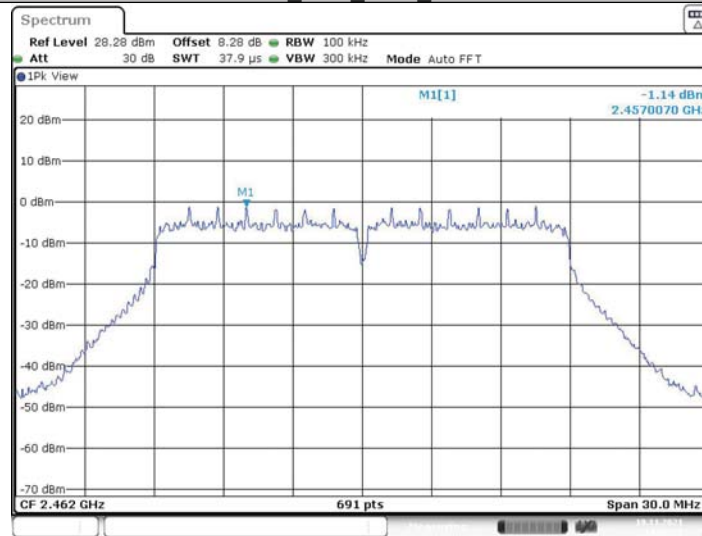
11N20MIMO_Ant1_2462_1000~26500



Date: 19.NOV.2021 14:36:00

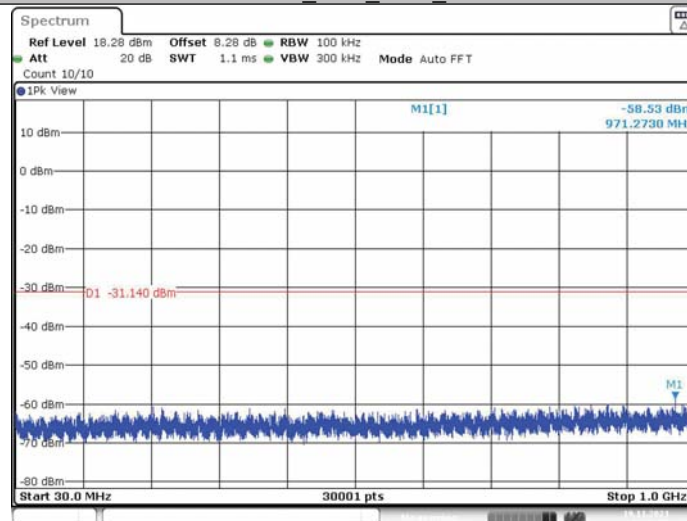


11N20MIMO_Ant2_2462_0~Reference



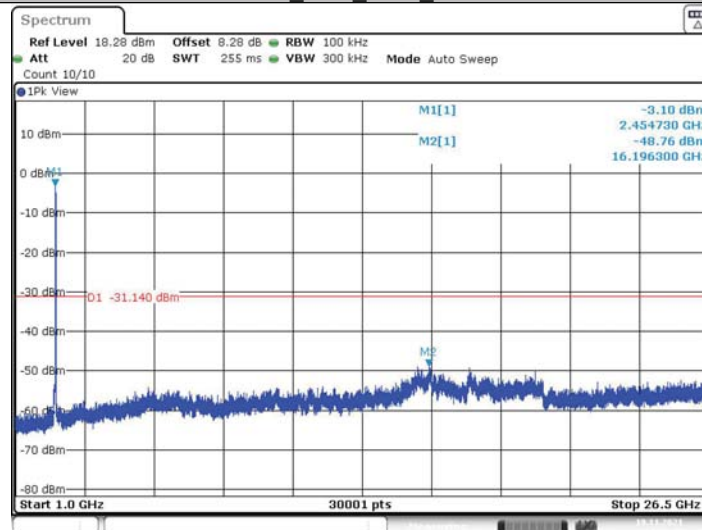
Date: 19.NOV.2021 14:37:22

11N20MIMO_Ant2_2462_30~1000



Date: 19.NOV.2021 14:37:26

11N20MIMO_Ant2_2462_1000~26500



Date: 19.NOV.2021 14:37:48



Important

- (1) The test report is valid with the official seal of the laboratory and the signatures of Test engineer, Author and Reviewer simultaneously.
- (2) The test report is invalid if altered.
- (3) Any photocopies or part photocopies in the test report are forbidden without the written permission from the laboratory.
- (4) Objections to the test report must be submitted to the laboratory within 15 days.
- (5) Generally, commission test is responsible for the tested samples only.

Address of the laboratory:

CVC Testing Technology Co., Ltd.

Address: No.3, Tiantaiyi Road, Kaitai Avenue, Science City, Guangzhou, China

Post Code: 510663

Tel: 020-32293888

FAX: 020-32293889

E-mail: office@cvc.org.cn