

FCC PART 15.247

TEST REPORT

For

Chengdu Ebyte Electronic Technology Co., Ltd

Building B2, Mould Industrial Park, 199# Xi-Qu Ave, West High-tech Zone, Chengdu, 611731, Sichuan, China

Tested Model: E01-ML01SP4
FCC ID: 2A8C3-E01ML01SP4

Report Type: Amended Report		Product Name: wireless module	
Report Number:		RSC240925001-0M1	
Date of Report Issue:		2024-12-03	
Reviewed By:		Sula Huang	
Test Laboratory:		Bay Area Compliance Laboratories Corp. (Chengdu) No.5040, Huilongwan Plaza, No. 1, Shawan Road, Jinniu District, Chengdu, Sichuan, China Tel: +86-28-65525123 Fax: +86-28-65525125 www.baclcorp.com	

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	RSC240925001-0	Original Report	2024-10-14
1	RSC240925001-0M1	Amended Report (Revised FCC § 2.1091 to § 2.1093)	2024-12-03

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Applicant	Chengdu Ebyte Electronic Technology Co., Ltd
Address	Building B2, Mould Industrial Park, 199# Xi-Qu Ave, West High-tech Zone, Chengdu, 611731, Sichuan, China
Email	157768495@qq.com
Product	wireless module
Tested Model	E01-ML01SP4
FCC ID	2A8C3-E01ML01SP4
Frequency*	2402 MHz – 2480 MHz
Modulation Type*	GFSK (250kbps, 1Mbps, 2Mbps)
Antenna Gain*	4.0dBi(Peak),-2.0dBi(Average)
RF peak output power	1.06 dBm
Voltage*	DC 2V – 3.6V (Typical: 3.3V)
Measure approximately	18mm (L)×14.5mm (W)×3mm (H)
Sample serial number	240925001/01 (RF Radiated Test & RF Conducted Test) (assigned by the BACL, Chengdu)
Sample/EUT Status	The test sample was in good condition and received: 2024-09-25

Note 1: Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.

Note 2: Report no.: RSC240925001-0M1 replaced report no.: RSC240925001-0.

Objective

This report is prepared on behalf of **Chengdu Ebyte Electronic Technology Co., Ltd** in accordance with Part 2, Subpart J, Part 15, Subparts A and C of the Federal Communications Commission's rules.

The tests were performed in order to determine the compliance of the EUT with FCC Part 15-Subpart C, section 15.203, 15.205, 15.207, 15.209 and 15.247 rules.

Measurement Uncertainty

Item			Measurement Uncertainty	U_{Cispr}
AC power line conducted emission			2.79 dB	3.4 dB
Radiated Emission	9kHz-30MHz		4.48dB	-
	30MHz-200MHz	H	4.34dB	6.3dB
	30MHz-200MHz	V	4.59dB	6.3dB
	200MHz-1GHz	H	4.69dB	6.3dB
	200MHz-1GHz	V	5.79dB	6.3dB
	1GHz-6GHz		4.58dB	5.2dB
	6GHz-18GHz		4.58dB	5.5dB
	18GHz-40GHz		5.50dB	-

Item	Measurement Uncertainty
RF output power, conducted	$\pm 0.61\text{dB}$
Occupied Bandwidth	$\pm 1.69\%$
Power Spectrum Density, conducted	$\pm 2.52\text{dB}$
Humidity	$\pm 5\%$
Temperature	$\pm 1^{\circ}\text{C}$
Voltage(DC)	$\pm 0.4\%$
Voltage(AC, <10kHz)	$\pm 1\%$
Time	1%

Note: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the corresponding inclusion factor K when the inclusion probability is about 95%.

Test Methodology

All measurements contained in this report were conducted with:

1. ANSI C63.10-2020 American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.
2. KDB558074 D01 15.247 Meas Guidance v05r02.

Test Facility

The test site used by Bay Area Compliance Laboratories Corp. (Chengdu) to collect test data is located No.5040, Huilongwan Plaza, No. 1, Shawan Road, Jinniu District, Chengdu, Sichuan, China.

Bay Area Compliance Laboratories Corp. (Chengdu) lab is accredited to ISO/IEC 17025 by NVLAP (Lab code: 600346-0) and the FCC designation No.: CN5056. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2014.

SYSTEM TEST CONFIGURATION

Description of Test Configuration*

The system was configured in testing mode, which was provided by manufacturer.

For GFSK (250kbps, 1Mbps, 2Mbps) mode, 79 channels are provided for testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
2	2402	42	2442
3	2403	43	2443
4	2404	44	2444
5	2405	45	2445
6	2406	46	2446
7	2407	47	2447
8	2408	48	2448
9	2409	49	2449
10	2410	50	2450
11	2411	51	2451
12	2412	52	2452
13	2413	53	2453
14	2414	54	2454
15	2415	55	2455
16	2416	56	2456
17	2417	57	2457
18	2418	58	2458
19	2419	59	2459
20	2420	60	2460
21	2421	61	2461
22	2422	62	2462
23	2423	63	2463
24	2424	64	2464
25	2425	65	2465
26	2426	66	2466
27	2427	67	2467
28	2428	68	2468
29	2429	69	2469
30	2430	70	2470
31	2431	71	2471
32	2432	72	2472
33	2433	73	2473
34	2434	74	2474
35	2435	75	2475
36	2436	76	2476
37	2437	77	2477
38	2438	78	2478
39	2439	79	2479
40	2440	80	2480
41	2441	-	-

The EUT was tested with channel 2, 40 and 80.

Equipment Modifications

No modification was made to the EUT tested.

EUT Exercise Software*

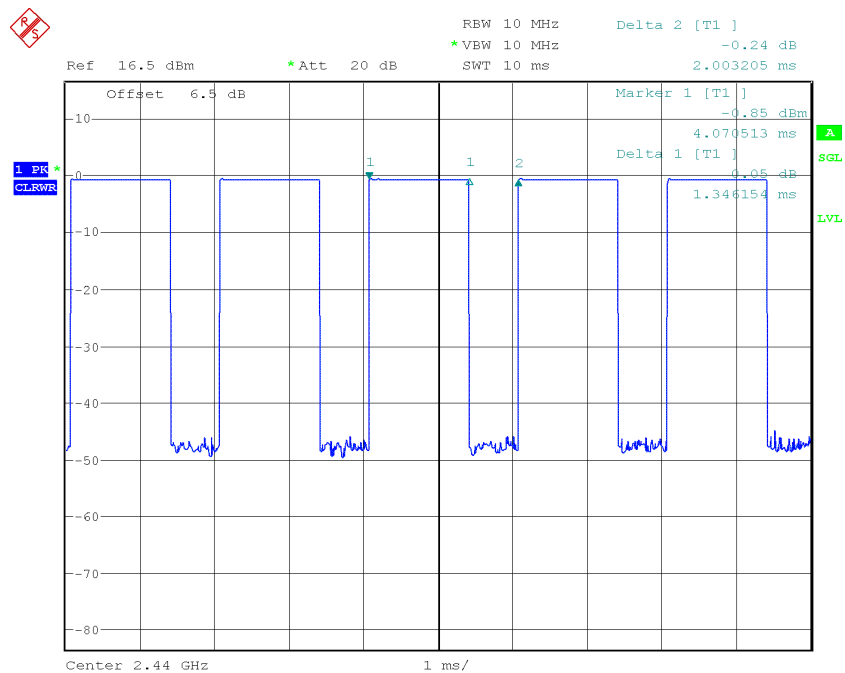
The setting by the software as following table:

Test Mode	Test Software	XCOM V2.6		
250kbps	Test Frequency (MHz)	2402	2440	2480
	Data Rate	250kbps	250kbps	250kbps
	Power Level	0	0	0
1Mbps	Test Frequency (MHz)	2402	2440	2480
	Data Rate	1Mbps	1Mbps	1Mbps
	Power Level	0	0	0
2Mbps	Test Frequency (MHz)	2402	2440	2480
	Data Rate	2Mbps	2Mbps	2Mbps
	Power Level	0	0	0

Duty Cycle information is below:

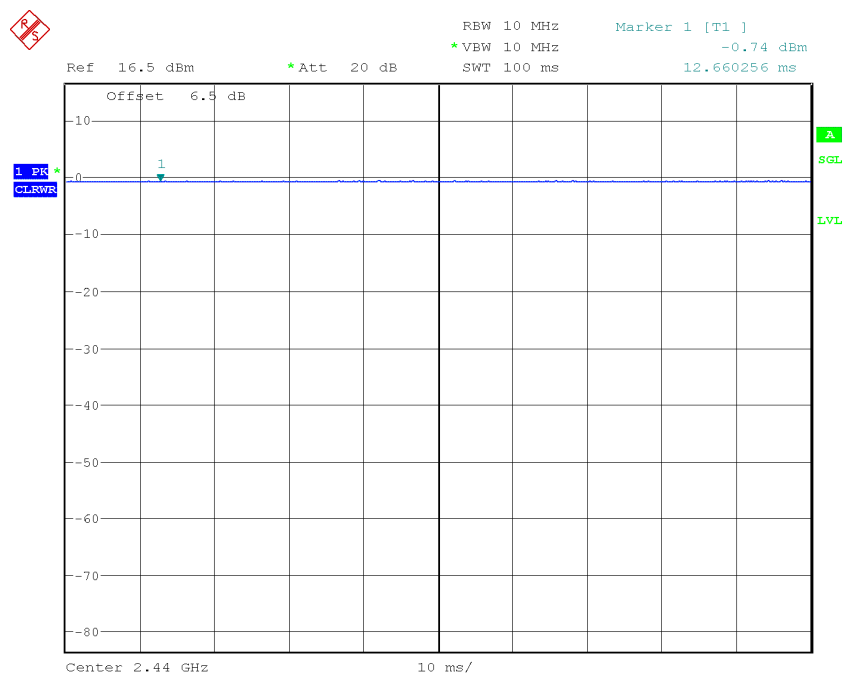
Mode	T _{on}	T _p	Duty Cycle
	(ms)	(ms)	(%)
250kbps	1.34	2.00	67%
1Mbps	100	100	100
2Mbps	100	100	100

Duty Cycle, 250kbps



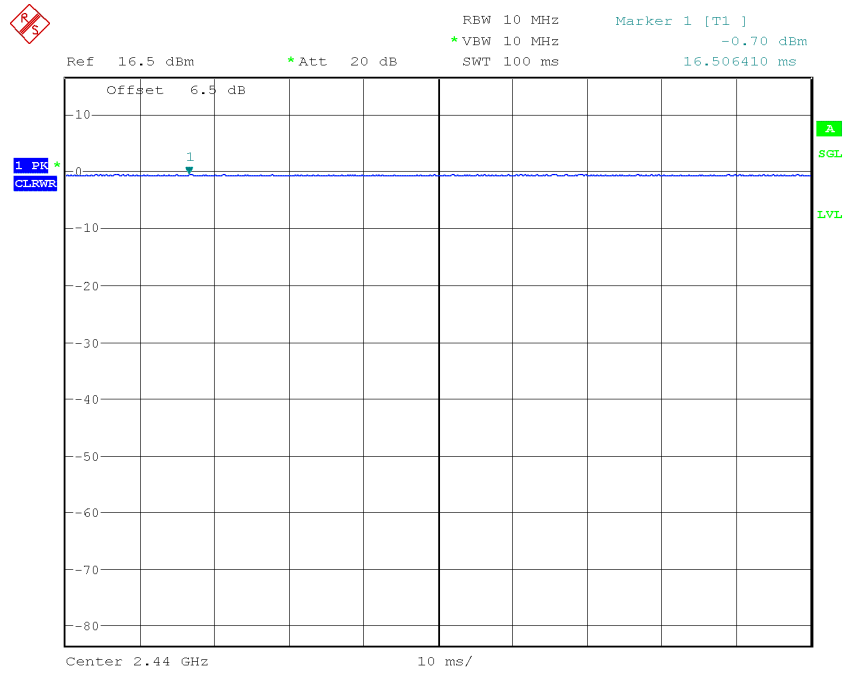
Comment: Project:RSC240925001-0 Tester:Murphy Guo
Date: 29.SEP.2024 18:04:11

Duty Cycle, 1Mbps



Comment: Project:RSC240925001-0 Tester:Murphy Guo
Date: 29.SEP.2024 13:07:01

Duty Cycle, 2Mbps



Comment: Project:RSC240925001-0 Tester:Murphy Guo
 Date: 29.SEP.2024 13:08:25

Support Test Devices Description

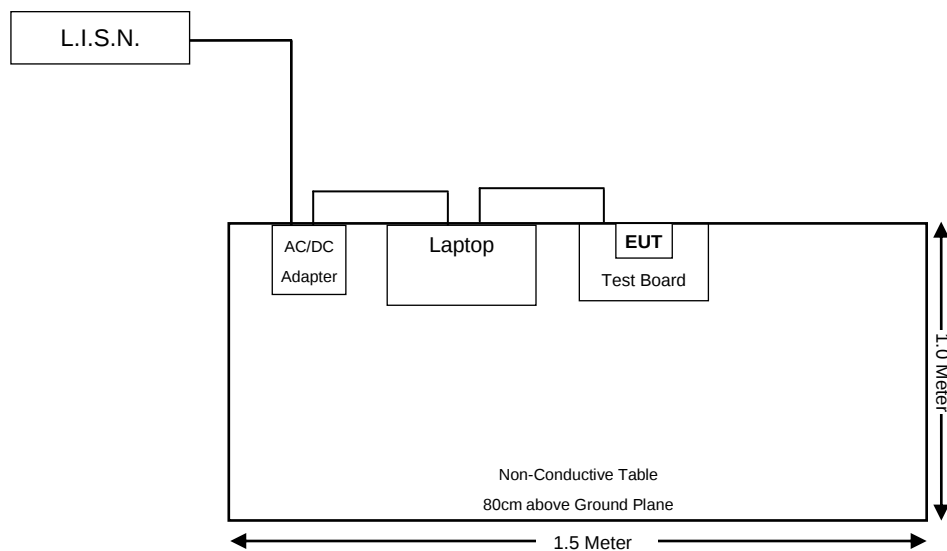
Manufacturer	Device Name	Model	Serial Number
Local			
Lenovo	Laptop	L540	No
Lenovo	AC/DC Adapter	ADLX45NDC2A	SA10E75790
Ebyte	Test Board	V1.0	10578

Support Test Cable Description

Cable Description	Length (m)	From / Port	To
Unshielded AC Power Cable	1.5	L.I.S.N.	AC/DC Adapter
Unshielded DC Power Cable	1.5	Adapter	Laptop
Unshielded USB Power Cable	1.3	Laptop	Test Board

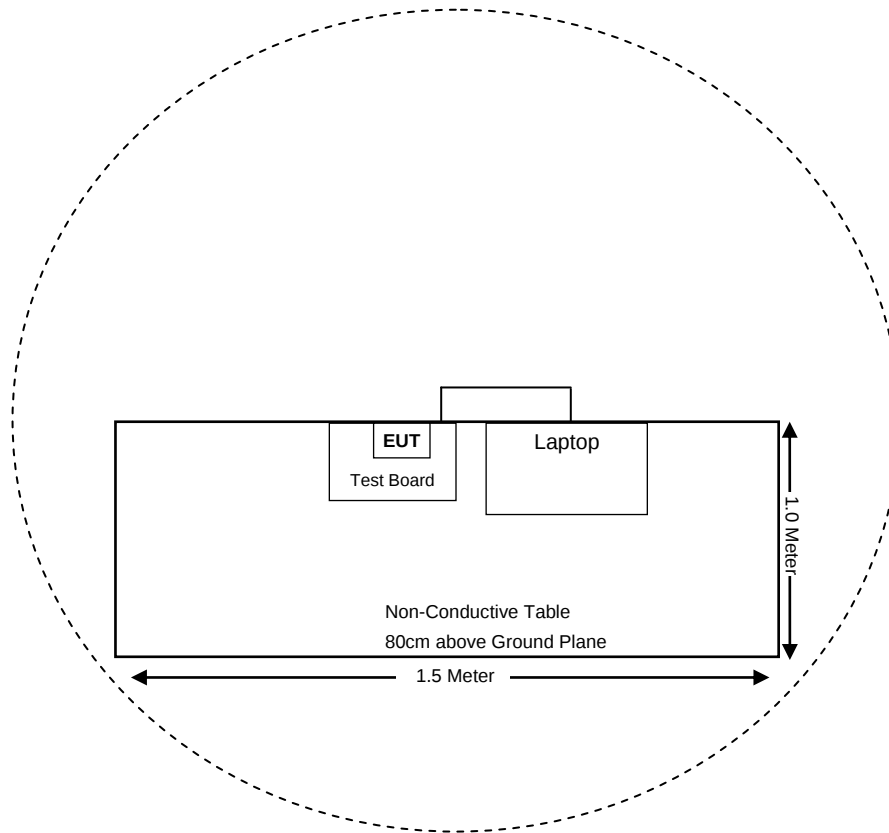
Block Diagram of Test Setup

Conducted Emissions:

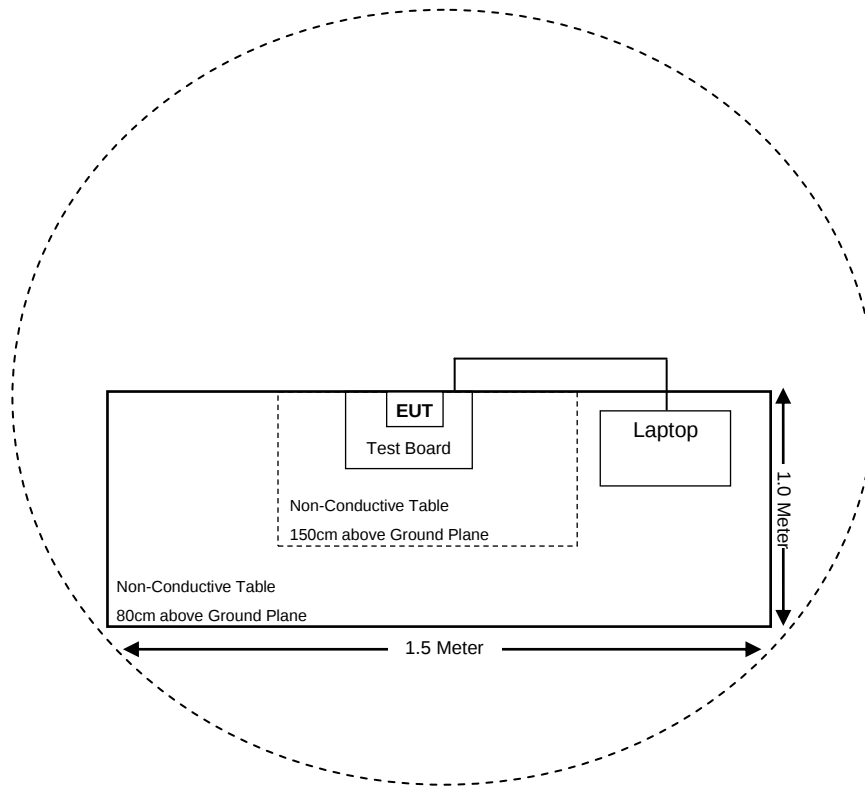


Radiated Emissions

Below 1GHz:



Above 1GHz:



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
<i>FCC §15.247 & §1.1310 & §2.1093</i>	<i>RF Exposure</i>	<i>Compliant</i>
§15.203	Antenna Requirement	Compliant
§15.207 (a)	AC Line Conducted Emissions	Compliant
§15.205, §15.209, §15.247(d)	Raidated Spurious Emissions	Compliant
§15.247(d)	Conducted Spurious Emissions at Antenna Terminal	Compliant
§15.247 (a)(2)	6 dB Emission Bandwidth	Compliant
§15.247(b)(3)	Maximum conducted output power	Compliant
§15.247(d)	100 kHz Bandwidth of Frequency Band Edge	Compliant
§15.247(e)	Power Spectral Density	Compliant

Note: Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

TEST EQUIPMENTS LIST

Manufacturer	Description	Model Number	Serial Number	Calibration Date	Calibration Due Date
Conducted Emissions					
Rohde & Schwarz	EMI Test Receiver	ESCI 3	100028	2024-04-10	2025-04-09
Rohde & Schwarz	L.I.S.N.	ENV216	3560.6550.16	2024-04-10	2025-04-09
HP	RF Limiter	11947A	3107A01270	2024-08-03	2025-08-02
UTIFLEX	Conducted Cable	L-E-003	000003	2024-08-03	2025-08-02
Rohde & Schwarz	EMC32	EMC32	V 8.52.0	NCR	NCR
Radiated Emissions (9kHz-30MHz)					
EMCT	Semi-Anechoic Chamber	966	001	2023-04-15	2028-04-14
Rohde & Schwarz	EMI Test Receiver	ESR3	102456	2024-04-11	2025-04-10
BACL CORP	Active Loop Antenna	1313-1A	4031411	2024-05-20	2025-05-19
Xin Hang Xun Wei Bo	RF Cable (Below 1GHz)	XH500A-N/J- N/J-2Mbps-A	T-E271	2023-11-30	2024-11-29
Xin Hang Xun Wei Bo	RF Cable (Below 1GHz)	XH500A-N/J- N/J-7M-A	T-E268	2023-11-30	2024-11-29
Rohde & Schwarz	EMC32	EMC32	V9.10.00	NCR	NCR
Radiated Emissions (30MHz-1GHz)					
EMCT	Semi-Anechoic Chamber	966	001	2023-04-15	2028-04-14
SONOMA INSTRUMENT	Pre-Amplifier	310 N	186684	2024-08-07	2025-08-06
SUNOL SCIENCES	Broadband Antenna	JB3	A121808	2024-01-24	2025-01-23
INMET	Attenuator	18N-6dB	64671	2024-01-24	2025-01-23
Rohde & Schwarz	EMI Test Receiver	ESR3	102456	2024-04-11	2025-04-10
HUBER+SUHENER	RF Cable (Below 1GHz)	L-E-015	MY4345/EA	2023-11-30	2024-11-29
Xin Hang Xun Wei Bo	RF Cable (Below 1GHz)	XH500A-N/J- N/J-2Mbps-A	T-E271	2023-11-30	2024-11-29
Xin Hang Xun Wei Bo	RF Cable (Below 1GHz)	XH500A-N/J- N/J-7M-A	T-E268	2023-11-30	2024-11-29
Rohde & Schwarz	EMC32	EMC32	V9.10.00	NCR	NCR

Manufacturer	Description	Model Number	Serial Number	Calibration Date	Calibration Due Date
Radiated Emissions (1GHz-18GHz)					
EMCT	Semi-Anechoic Chamber	966	001	2023-04-15	2028-04-14
Rohde & Schwarz	Signal Analyzer	FSV40	101943	2024-04-10	2025-04-09
Rohde & Schwarz	EMI Test Receiver	ESIB40	100215	2024-04-10	2025-04-09
ETS	Horn Antenna	3115	003-6076	2024-08-16	2025-08-15
A.H. Systems, inc.	Pre-Amplifier	PAM-0118P	509	2024-08-07	2025-08-06
MICRO-TRONICS	2.4GHz Notch Filter	BRM50702	G396	2024-05-18	2025-05-17
Xin Hang Xun Wei Bo	RF Cable (Above 1GHz)	XH500A-SMA/J -N/J-2Mbps-A	L-E-016	2024-01-05	2025-01-04
Xin Hang Xun Wei Bo	RF Cable (Above 1GHz)	XH500A-SMA/J -N/J-5M-A	L-E-017	2024-01-05	2025-01-04
Rohde & Schwarz	EMC32	EMC32	V9.10.00	NCR	NCR
Radiated Emissions (18GHz-25GHz)					
EMCT	Semi-Anechoic Chamber	966	001	2023-04-15	2028-04-14
Rohde & Schwarz	EMI Test Receiver	ESIB40	100215	2024-04-10	2025-04-09
A.H. Systems, inc.	Horn Antenna	SAS-574	510	2024-01-19	2025-01-18
EM Electronics Corporation	Pre-Amplifier	EM18G40	060725	2024-04-10	2025-04-09
Xin Hang Xun Wei Bo	RF Cable (Above 18GHz)	T-E302	XH360A- 2.92/J-2.92/ J-1.5M-A	2024-06-03	2025-06-02
Rohde & Schwarz	EMC32	EMC32	V9.10.00	NCR	NCR
RF Conducted Test					
Rohde & Schwarz	Spectrum Analyzer	FSU26	100113	2024-04-10	2025-04-09
MIDWEST	6dB Attenuator	219	AA4305	2024-03-01	2025-03-01
Astrolab	RF Coaxial Cable	MINIREND-5	1206	2023-10-18	2024-10-17

Statement of Traceability: Bay Area Compliance Laboratories Corp. (Chengdu) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

FCC §15.247 & §1.1310 & §2.1093 - RF EXPOSURE

Applicable Standard

According to §15.247(i) and §1.1310, systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

According to KDB447498 D01 General RF Exposure Guidance v06:

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

$[(\text{max. power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$ for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where

- $f(\text{GHz})$ is the RF channel transmit frequency in GHz*
- Power and distance are rounded to the nearest mW and mm before calculation*
- The result is rounded to one decimal place for comparison*
- 3.0 and 7.5 are referred to as the numeric thresholds in the step 2 below*

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm according to 5) in section 4.1 is applied to determine SAR test exclusion.

Measurement Result

The max conducted power including tune-up tolerance is 1.50 dBm (1.41mW).

*$[(\text{max. power of channel, mW})/(\text{min. test separation distance, mm})][\sqrt{f(\text{GHz})}]$
 $= 1.41/5(\sqrt{2.48}) = 0.4 < 3.0$*

So the stand-alone SAR evaluation is not necessary.

FCC §15.203 - ANTENNA REQUIREMENT

Applicable Standard

According to § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

- a. Antenna must be permanently attached to the unit.
- b. Antenna must use a unique type of connector to attach to the EUT.
- c. The unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

Antenna Information*

The EUT has one external antenna with IPEX connector and the maximum antenna gain is 4dBi, which fulfill the requirement of this section. Please refer to the EUT photos.

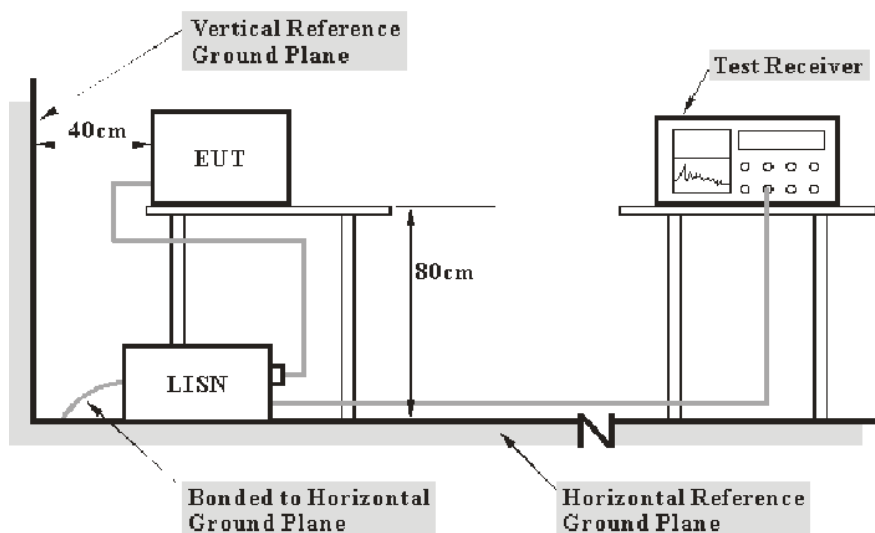
Result: Compliance

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

FCC§15.207

EUT Setup



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

The setup of EUT is according with per ANSI C63.10-2020 measurement procedure. The specification used was with the FCC Part 15.207 limits.

The spacing between the peripherals was 10 cm.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

Test Procedure

During the conducted emission test, the adapter of laptop was connected to the first L.I.S.N.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

Corrected Amplitude & Margin Calculation

The basic equation is as follows:

$$V_C = V_R + A_C + VDF$$

$$C_f = A_C + VDF$$

Herein,

V_C (cord. Reading): corrected voltage amplitude

V_R : reading voltage amplitude

A_C : attenuation caused by cable loss

VDF: voltage division factor of AMN

C_f : Correction Factor

The “**Margin**” column of the following data tables indicates the degree of compliance within the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

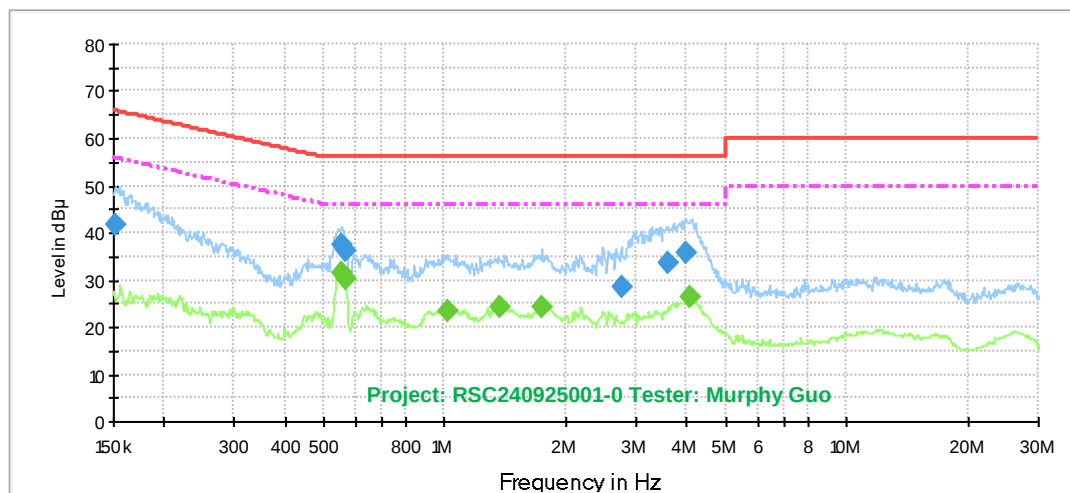
Test Data

Test Environment Conditions

Temperature:	21 °C
Relative Humidity:	66 %
ATM Pressure:	96.2 kPa

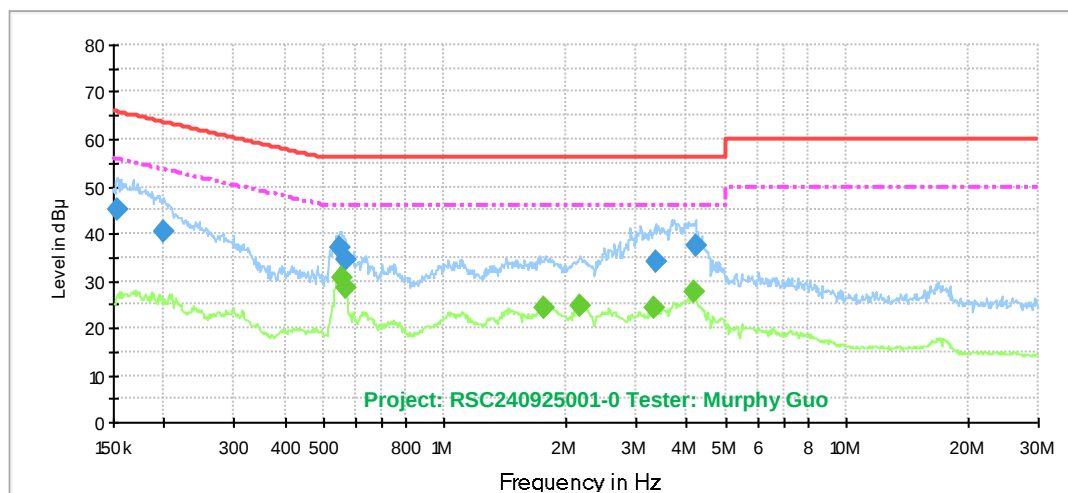
The testing was performed by Murphy Guo on 2024-10-10.

Test Mode: Transmitting_2Mbps_low channel_worst case

AC120V/60Hz, Line:

Frequency (MHz)	Corrected Amplitude QuasiPeak (dBμ V)	Reading QuasiPeak (dBμ V)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμ V)
0.151504	41.7	21.9	5000.0	9.000	L1	19.8	24.2	65.9
0.554115	37.6	18.0	5000.0	9.000	L1	19.6	18.4	56.0
0.565280	36.1	16.5	5000.0	9.000	L1	19.6	19.9	56.0
2.747297	28.4	8.8	5000.0	9.000	L1	19.6	27.6	56.0
3.578548	33.5	13.8	5000.0	9.000	L1	19.7	22.5	56.0
3.973691	35.9	16.2	5000.0	9.000	L1	19.7	20.1	56.0

Frequency (MHz)	Corrected Amplitude Average (dBμ V)	Reading Average (dBμ V)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμ V)
0.554115	31.7	12.1	5000.0	9.000	L1	19.6	14.3	46.0
0.565280	30.2	10.6	5000.0	9.000	L1	19.6	15.8	46.0
1.013195	23.5	3.8	5000.0	9.000	L1	19.7	22.5	46.0
1.373482	24.5	4.9	5000.0	9.000	L1	19.6	21.6	46.0
1.744994	24.4	4.9	5000.0	9.000	L1	19.5	21.6	46.0
4.094402	26.3	6.6	5000.0	9.000	L1	19.7	19.7	46.0

AC120V/60Hz, Neutral:

Frequency (MHz)	Corrected Amplitude QuasiPeak (dBμ V)	Reading QuasiPeak (dBμ V)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμ V)
0.153788	45.3	25.8	5000.0	9.000	N	19.5	20.5	65.8
0.200319	40.3	20.9	5000.0	9.000	N	19.4	23.3	63.6
0.548615	36.8	17.3	5000.0	9.000	N	19.5	19.2	56.0
0.565280	34.4	14.9	5000.0	9.000	N	19.5	21.6	56.0
3.337198	34.2	14.6	5000.0	9.000	N	19.6	21.8	56.0
4.197791	37.6	17.9	5000.0	9.000	N	19.7	18.4	56.0

Frequency (MHz)	Corrected Amplitude Average (dBμ V)	Reading Average (dBμ V)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμ V)
0.551358	30.8	11.3	5000.0	9.000	N	19.5	15.2	46.0
0.565280	28.6	9.1	5000.0	9.000	N	19.5	17.4	46.0
1.771300	24.2	4.7	5000.0	9.000	N	19.5	21.8	46.0
2.173205	24.8	5.3	5000.0	9.000	N	19.5	21.2	46.0
3.320595	24.2	4.6	5000.0	9.000	N	19.6	21.8	46.0
4.176906	27.5	7.8	5000.0	9.000	N	19.7	18.5	46.0

Note:

- 1) Correction Factor = LISN VDF (Voltage Division Factor) + Cable Loss + Transient Limiter Attenuation
The corrected factor has been input into the transducer of the test software.
- 2) Corrected Amplitude = Reading + Correction Factor
- 3) Margin = Limit – Corrected Amplitude

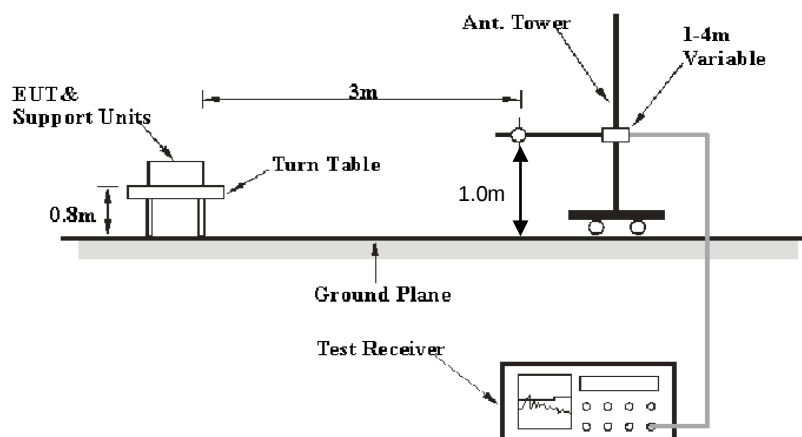
FCC §15.209, §15.205 & §15.247(d) - RADIATED SPURIOUS EMISSIONS & BAND EDGE

Applicable Standard

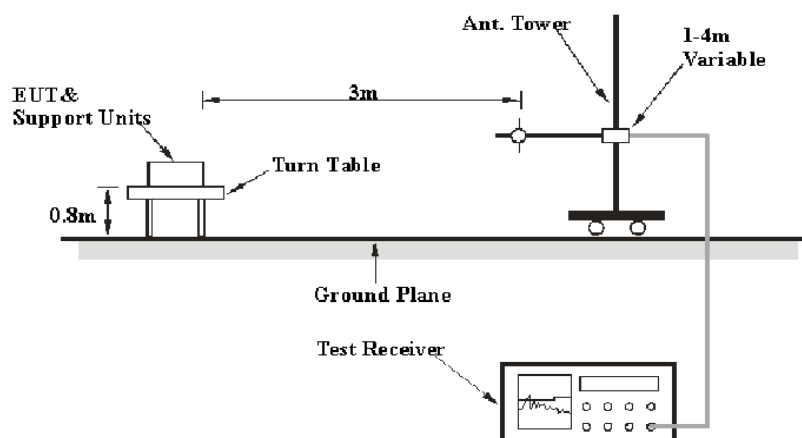
FCC §15.247 (d); §15.209; §15.205;

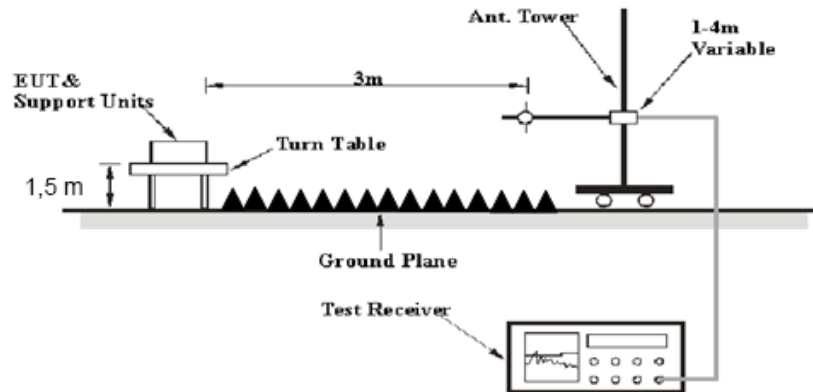
EUT Setup

9kHz - 30MHz:



30MHz - 1GHz:



Above 1GHz:

The radiated emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.10-2020. The specification used was the FCC 15.209, and FCC 15.247 limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

EMI Test Receiver & Signal Analyzer Setup

The system was investigated from 9 kHz to 25 GHz.

During the radiated emission test, the EMI test receiver or Signal Analyzer was set with the following configurations:

Frequency Range	RBW	Video B/W	Measurement
9 kHz – 150 kHz	200 Hz	1 kHz	PK
150 kHz – 30 MHz	9 kHz	30 kHz	PK
30 MHz – 1000 MHz	120 kHz	300 kHz	QP
Above 1 GHz	1 MHz	3 MHz	PK
	1 MHz	3 MHz	CISPR AV

The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

If the maximized peak measured value complies with under the QP/Average limit more than 6dB, then it is unnecessary to perform an QP/Average measurement.

If the peak detected amplitude can be shown to comply with the average limit, then it is not necessary to perform a separate average measurement.

Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

Data was recorded in Quasi-peak detection mode for frequency range of 30 MHz-1 GHz, peak and Average detection modes for frequencies above 1 GHz.

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Loss and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

$$\text{Corrected Amplitude (MaxPeak or QuasiPeak)} = \text{Meter Reading} + \text{Antenna Loss} + \text{Cable Loss} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

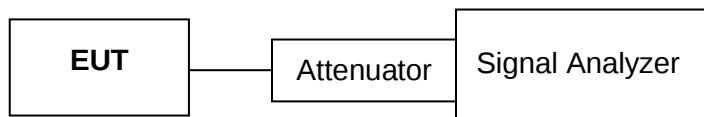
$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

Conducted Spurious Emission At Antenna Port:

Connect the antenna port through an attenuator to the spectrum analyzer input; in the results, account for all losses between the unlicensed wireless device output and the spectrum analyzer. The instrument shall span 30 MHz to 10 times the operating frequency in GHz, with a resolution bandwidth of 100 kHz, video bandwidth of 300 kHz, and a coupled sweep time with a peak detector.

- Set the center frequency and span to encompass frequency range to be measured.
- Set the RBW = 100 kHz.
- Set the VBW $\geq [3 \times \text{RBW}]$.
- Detector = peak.
- Sweep time = No faster than coupled (auto) time.
- Trace mode = max-hold.
- Allow trace to fully stabilize.
- Use the peak marker function to determine the maximum unwanted emissions amplitude level.

Test Setup Block



Test Data

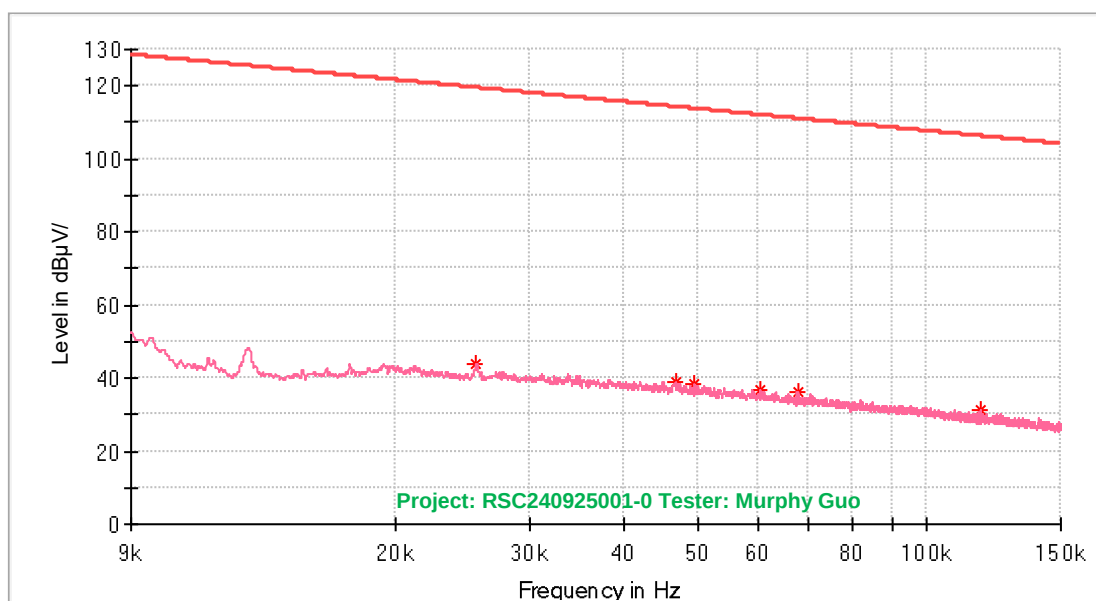
Test Environment Conditions

Test Measurement:	Radiated	Conducted
Test Date:	2024-10-10	2024-09-29
Temperature:	22 °C	25 °C
Relative Humidity:	65 %	63 %
ATM Pressure:	96.1 kPa	96.2 kPa

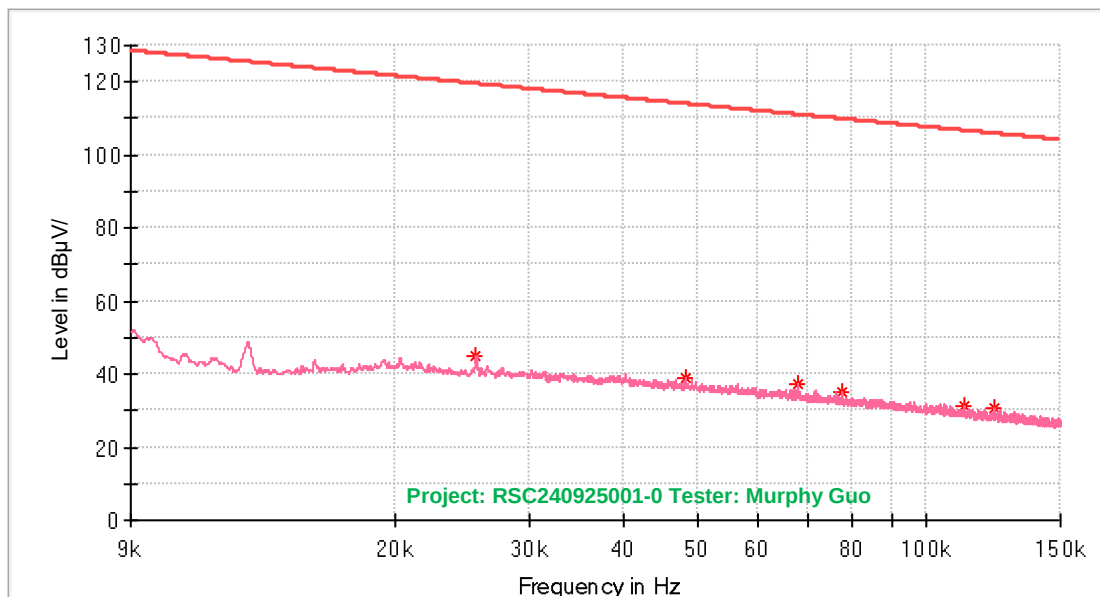
The testing was performed by Murphy Guo.

Test Mode: Transmitting

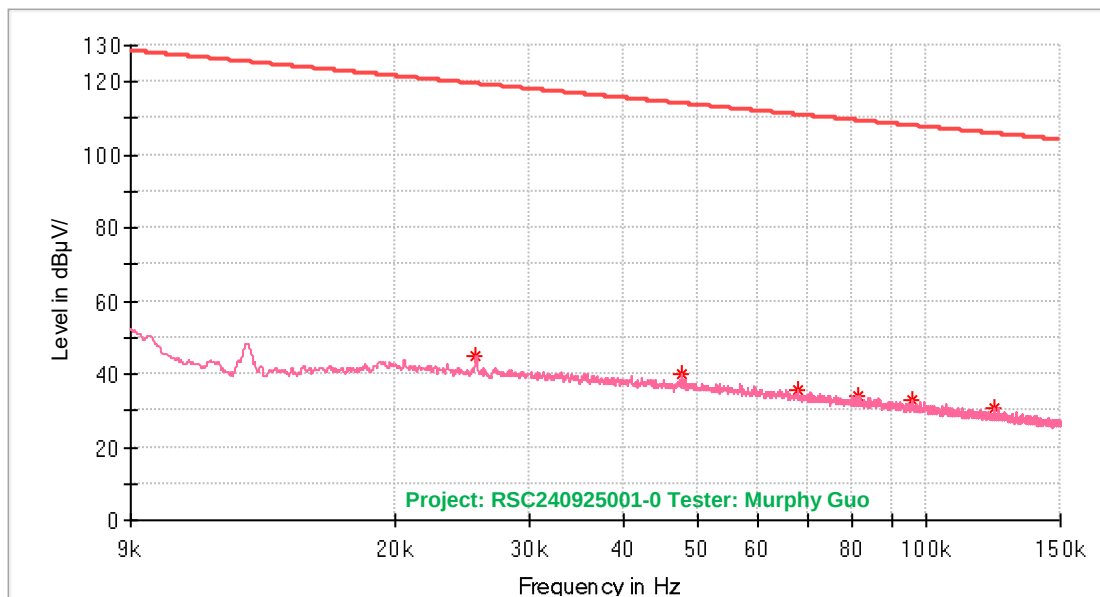
Note: Pre-scan and configuration EUT with X, Y and Z-axis, the Y-axis is the worst case.

Radiated Spurious Emissions:**1) 9 kHz to 150 kHz_2Mbps_low channel_worst case****Parallel**

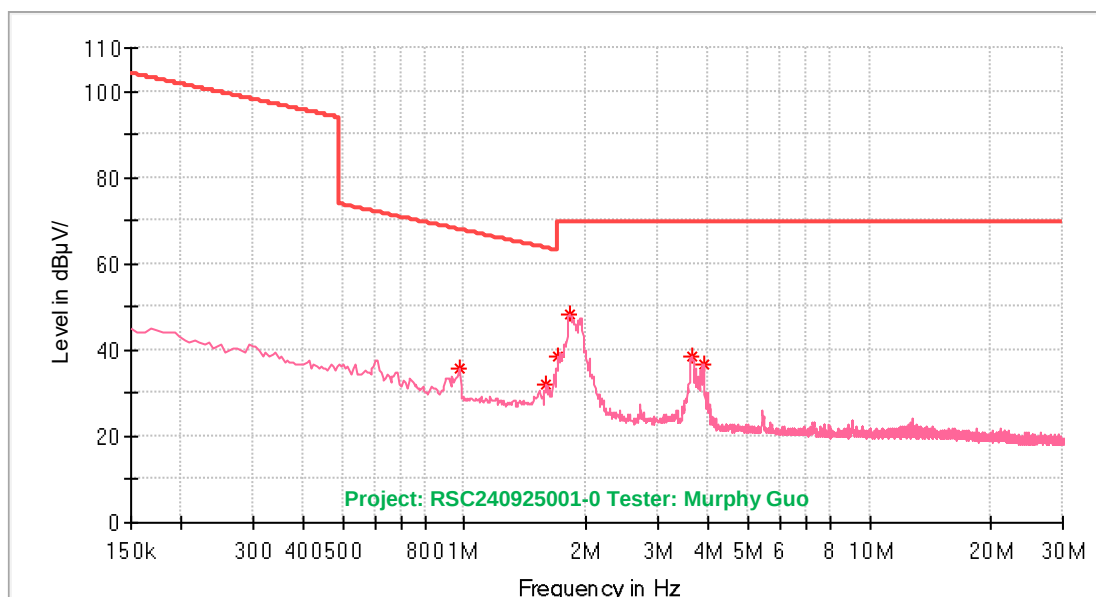
Frequency (MHz)	MaxPeak (dBµ V/m)	Limit (dBµ V/m)	Margin (dB)	Height (cm)	Azimuth (deg)	Corr. (dB)
0.025585	44.05	119.43	75.38	100.0	166.0	22.6
0.046735	38.98	114.20	75.22	100.0	38.0	19.8
0.049573	38.44	113.69	75.25	100.0	238.0	19.4
0.060536	36.66	111.95	75.29	100.0	261.0	17.9
0.067586	36.03	111.00	74.97	100.0	344.0	17.1
0.117623	31.43	106.19	74.76	100.0	355.0	12.7

Perpendicular

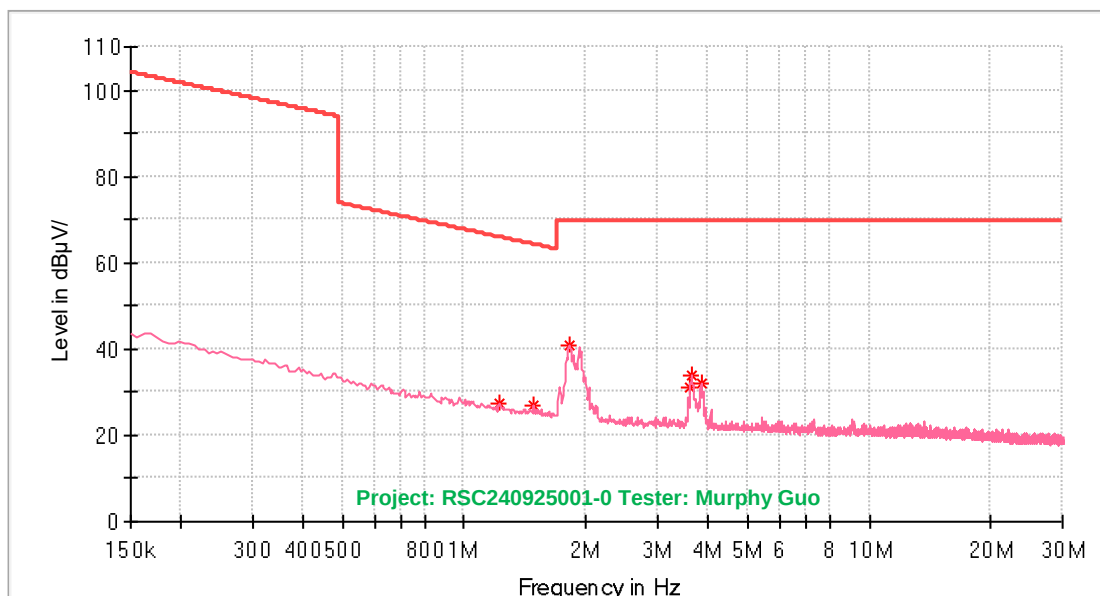
Frequency (MHz)	MaxPeak (dBμ V/m)	Limit (dBμ V/m)	Margin (dB)	Height (cm)	Azimuth (deg)	Corr. (dB)
0.025603	44.83	119.42	74.59	100.0	295.0	22.6
0.048180	39.22	113.94	74.72	100.0	230.0	19.6
0.067726	37.17	110.98	73.81	100.0	272.0	17.0
0.077367	35.21	109.82	74.61	100.0	311.0	16.0
0.112230	31.35	106.59	75.24	100.0	260.0	13.1
0.122523	30.69	105.83	75.14	100.0	42.0	12.3

Ground Parallel

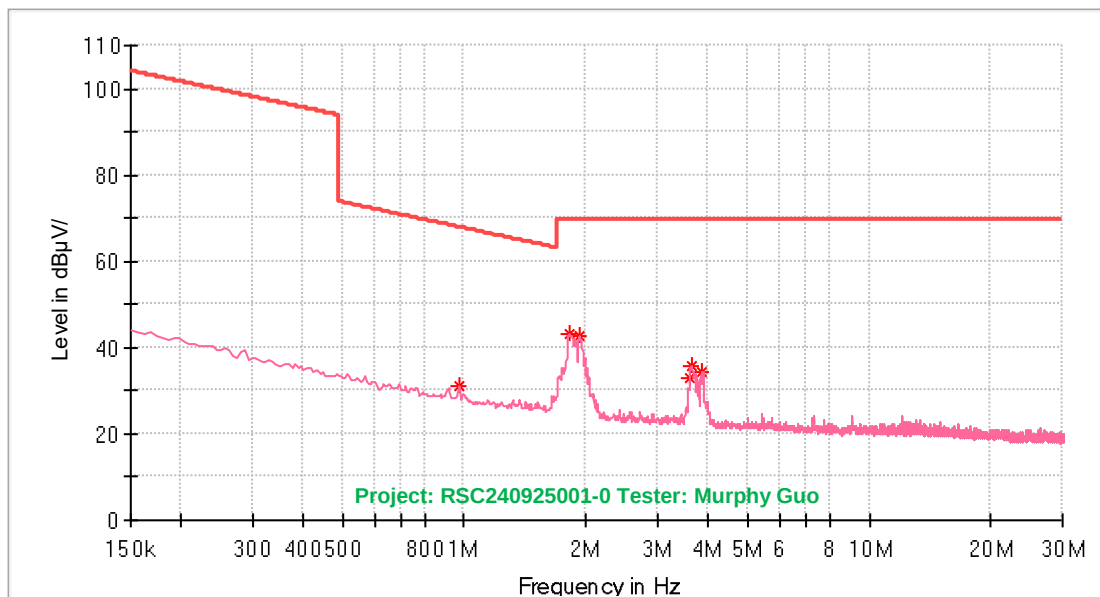
Frequency (MHz)	MaxPeak (dBµ V/m)	Limit (dBµ V/m)	Margin (dB)	Height (cm)	Azimuth (deg)	Corr. (dB)
0.025603	45.19	119.42	74.23	100.0	0.0	22.6
0.047775	40.11	114.01	73.90	100.0	280.0	19.6
0.067709	35.89	110.98	75.09	100.0	0.0	17.0
0.081544	34.16	109.37	75.21	100.0	138.0	15.6
0.095644	32.97	107.98	75.01	100.0	50.0	14.4
0.122540	30.60	105.83	75.23	100.0	134.0	12.3

2) 150 kHz to 30 MHz_2Mbps_low channel_worst case**Parallel**

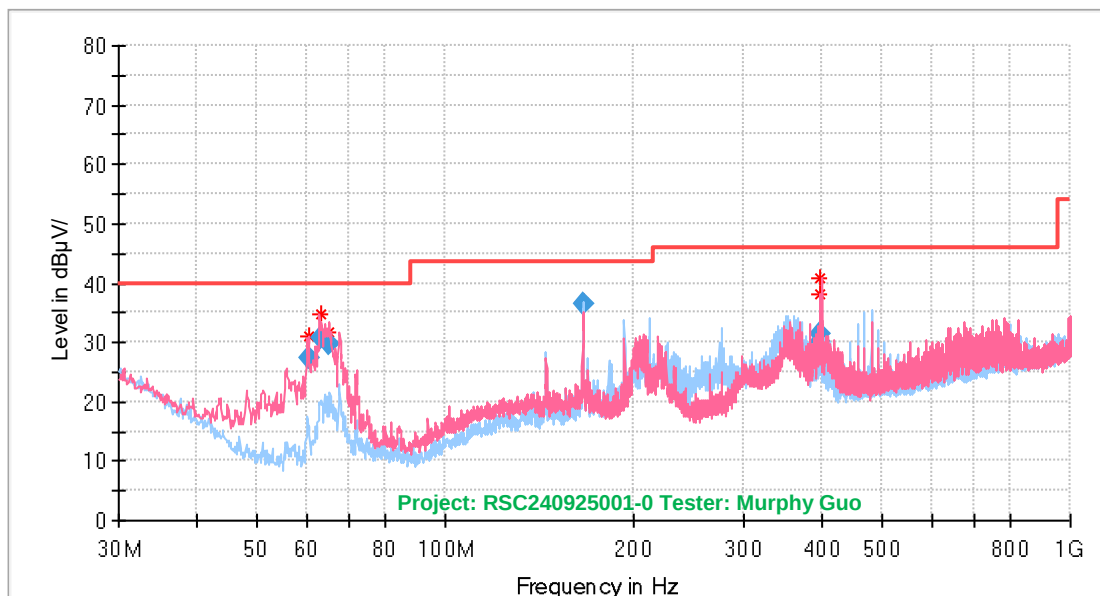
Frequency (MHz)	MaxPeak (dBμ V/m)	Limit (dBμ V/m)	Margin (dB)	Height (cm)	Azimuth (deg)	Corr. (dB)
0.967890	35.69	67.90	32.21	100.0	189.0	-3.9
1.594740	32.16	63.58	31.42	100.0	17.0	-6.3
1.702200	38.50	63.01	24.51	100.0	9.0	-6.6
1.809660	48.29	69.50	21.21	100.0	29.0	-6.9
3.636480	38.52	69.50	30.98	100.0	37.0	-8.4
3.887220	36.75	69.50	32.75	100.0	17.0	-8.5

Perpendicular

Frequency (MHz)	MaxPeak (dBµ V/m)	Limit (dBµ V/m)	Margin (dB)	Height (cm)	Azimuth (deg)	Corr. (dB)
1.224600	27.26	65.87	38.61	100.0	14.0	-5.1
1.481310	26.75	64.22	37.47	100.0	170.0	-5.9
1.815630	41.01	69.50	28.49	100.0	0.0	-6.9
3.600660	30.89	69.50	38.61	100.0	359.0	-8.4
3.636480	33.94	69.50	35.56	100.0	0.0	-8.4
3.845430	32.02	69.50	37.48	100.0	359.0	-8.5

Ground Parallel

Frequency (MHz)	MaxPeak (dBµ V/m)	Limit (dBµ V/m)	Margin (dB)	Height (cm)	Azimuth (deg)	Corr. (dB)
0.973860	31.30	67.85	36.55	100.0	218.0	-4.0
1.821600	43.22	69.50	26.28	100.0	167.0	-6.9
1.917120	42.88	69.50	26.62	100.0	0.0	-7.2
3.600660	32.75	69.50	36.75	100.0	159.0	-8.4
3.630510	35.61	69.50	33.89	100.0	0.0	-8.4
3.875280	34.20	69.50	35.30	100.0	354.0	-8.5

3) 30 MHz to 1 GHz_2Mbps_low channel_worst case

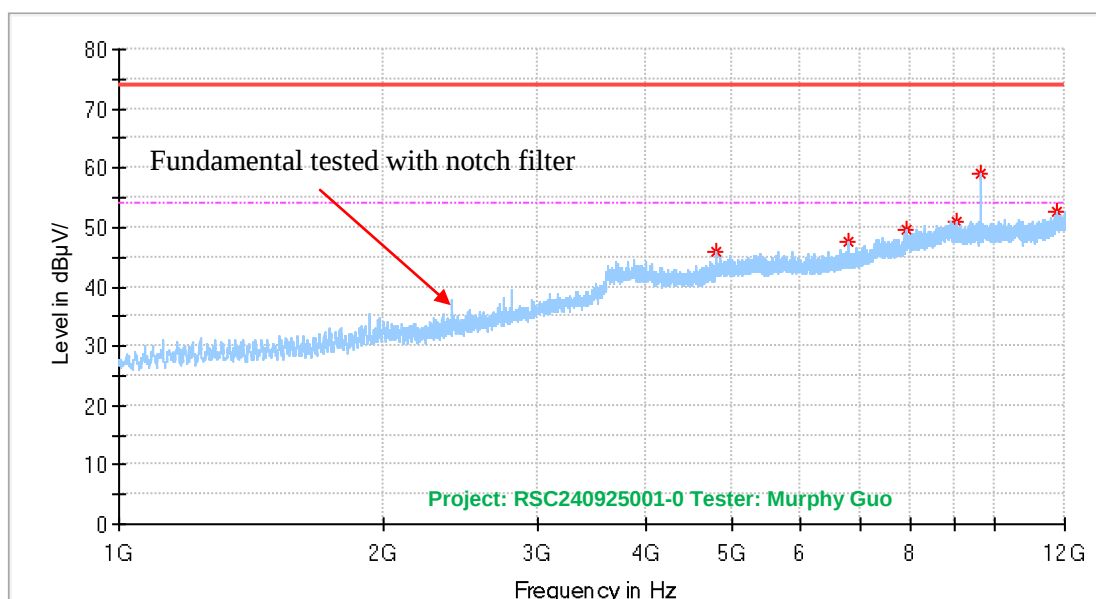
Frequency (MHz)	QuasiPeak (dBμ V/m)	Limit (dBμ V/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
60.385250	27.45	40.00	12.55	1000.0	120.000	105.0	V	84.0	-16.7
63.085500	30.69	40.00	9.31	1000.0	120.000	108.0	V	45.0	-16.4
65.217250	29.55	40.00	10.45	1000.0	120.000	112.0	V	307.0	-16.0
166.572000	36.59	43.50	6.91	1000.0	120.000	169.0	H	41.0	-11.5
398.363250	30.14	46.00	15.86	1000.0	120.000	160.0	V	43.0	-6.9
398.487000	31.43	46.00	14.57	1000.0	120.000	139.0	V	58.0	-6.9

4) 1GHz-12GHz

- Note: 1. The fourth harmonic is non-restricted band and compliance with a relative limit: -20 dB relative to highest fundamental level.
 2. If the peak detected amplitude can be shown to comply with the average limit, then it is not necessary to perform a separate average measurement.

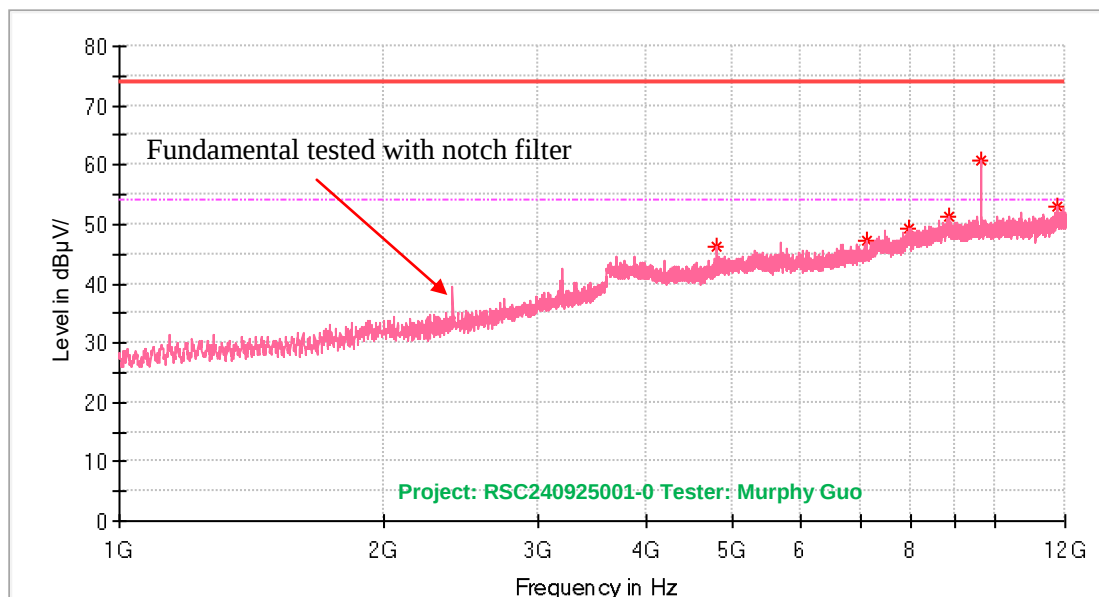
250kbps mode

Low Channel_Horizontal



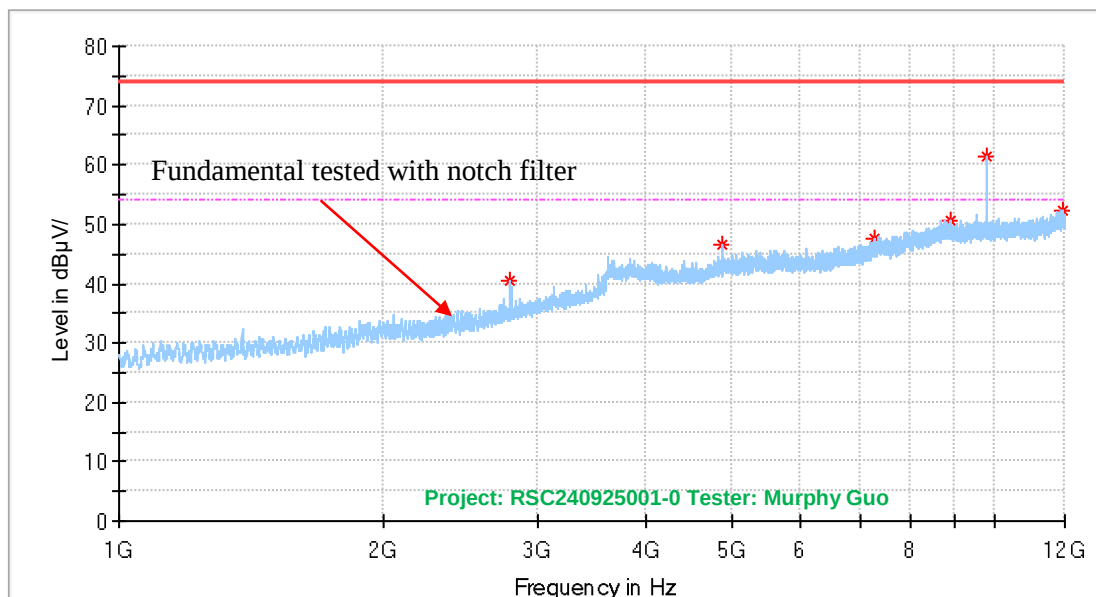
Frequency (MHz)	MaxPeak (dBμ V/m)	Limit (dBμ V/m)	Margin (dB)	Pol	Corr. (dB)
4803.800000	45.77	74.00	28.23	H	-5.1
6799.200000	47.59	74.00	26.41	H	-2.8
7923.400000	49.60	74.00	24.40	H	0.1
9052.000000	50.99	74.00	23.01	H	0.8
9607.500000	59.16	73.54	14.38	H	1.4
11753.600000	52.65	74.00	21.35	H	3.9

Low Channel_Vertical



Frequency (MHz)	MaxPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Pol	Corr. (dB)
4803.800000	46.41	74.00	27.59	V	-5.1
7107.200000	47.38	74.00	26.62	V	-2.6
7953.100000	49.30	74.00	24.70	V	0.2
8839.700000	51.21	74.00	22.79	V	1.5
9607.500000	60.91	69.00	8.09	V	1.4
11739.300000	52.87	74.00	21.13	V	3.7

Middle Channel_Horizontal

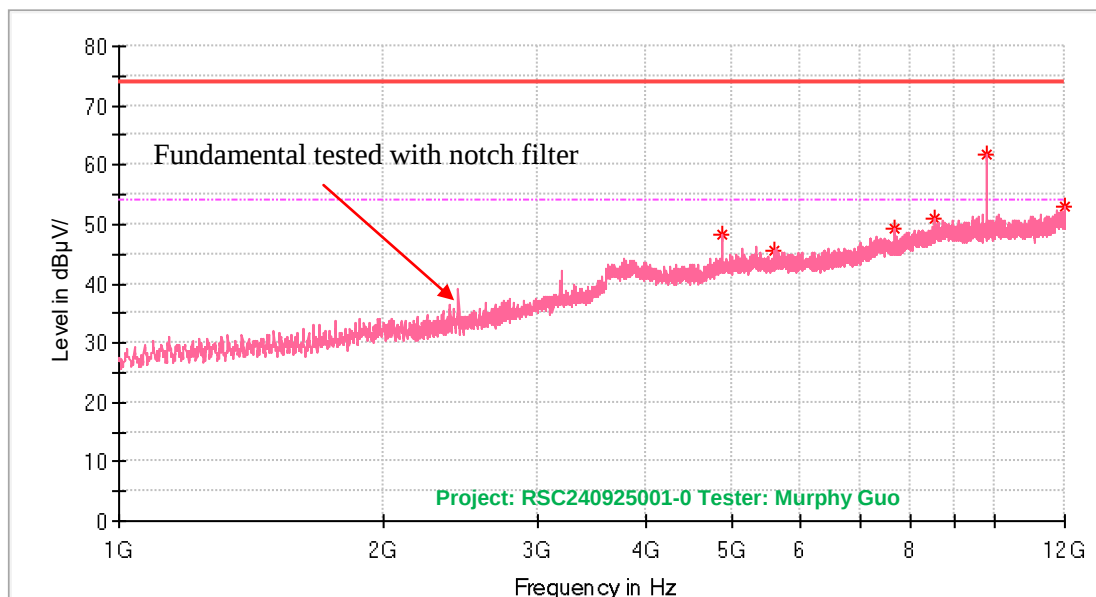


Frequency (MHz)	MaxPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Pol	Corr. (dB)
2790.800000	40.66	74.00	33.34	H	-11.4
4879.700000	46.64	74.00	27.36	H	-5.1
7290.900000	47.55	74.00	26.45	H	-1.7
8870.500000	50.73	74.00	23.27	H	1.5
9760.400000	61.58	69.82	8.24	H	1.6
11949.400000	52.46	74.00	21.54	H	4.6

Fundamental Strength

Frequency (MHz)	MaxPeak (dB μ V/m)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Pol	Corr. (dB)
2440.000000	90.18	89.82	-	-	H	-0.3

Middle Channel_Vertical

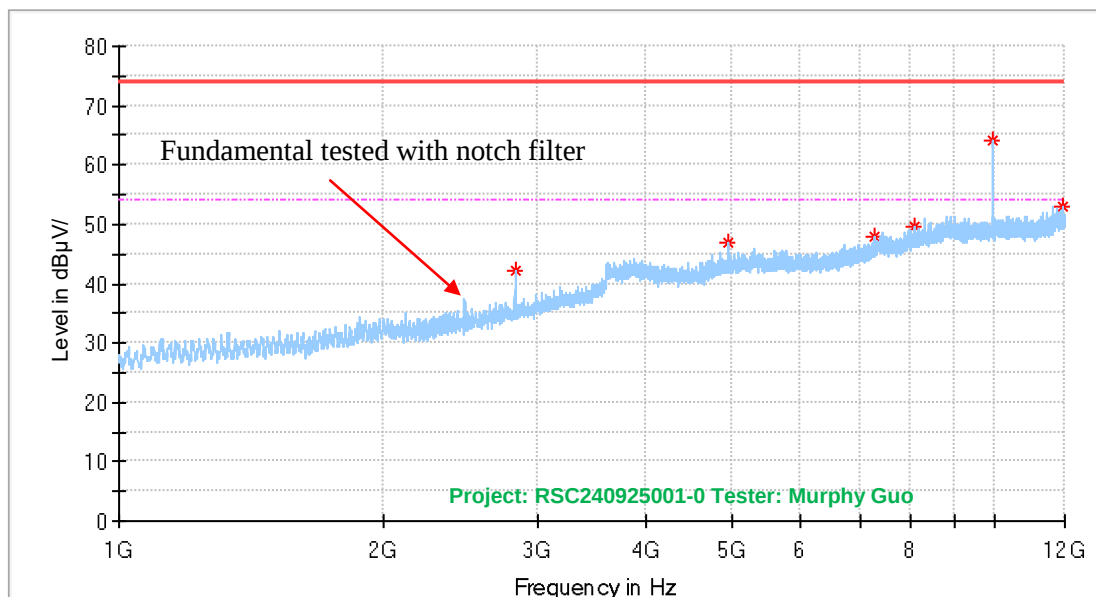


Frequency (MHz)	MaxPeak (dBμ V/m)	Limit (dBμ V/m)	Margin (dB)	Pol	Corr. (dB)
4879.700000	48.15	74.00	25.85	V	-5.1
5581.500000	45.70	74.00	28.30	V	-4.2
7683.600000	49.39	74.00	24.61	V	-1.3
8530.600000	50.97	74.00	23.03	V	0.9
9759.300000	61.76	69.97	8.21	V	1.6
11971.400000	52.87	74.00	21.13	V	4.4

Fundamental Strength

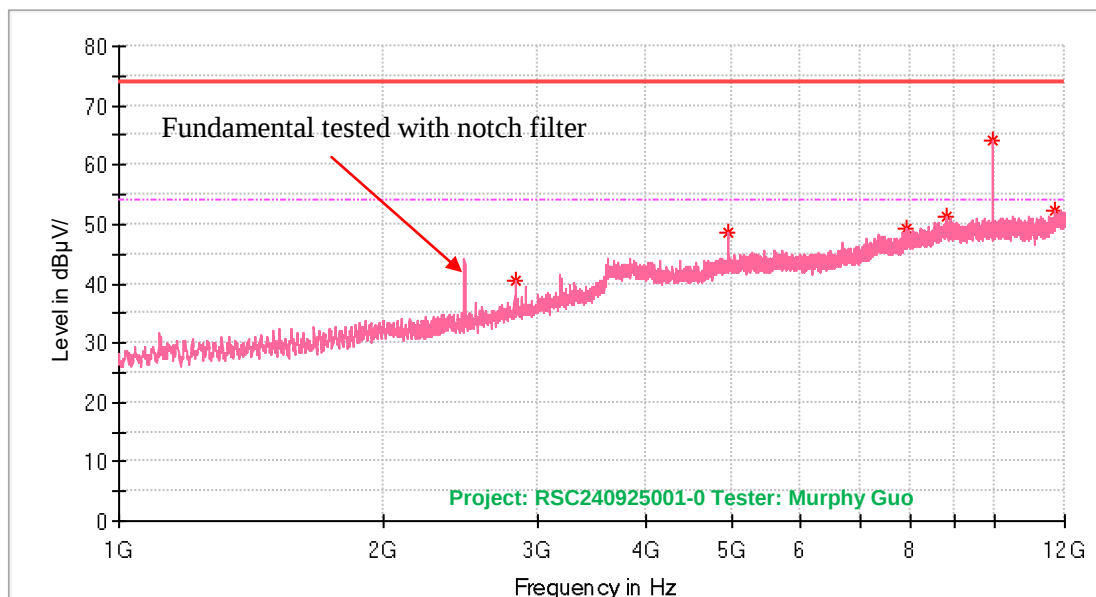
Frequency (MHz)	MaxPeak (dBμ V/m)	Average (dBμ V/m)	Limit (dBμ V/m)	Margin (dB)	Pol	Corr. (dB)
2440.000000	90.96	89.97	-	-	V	-0.3

High Channel_Horizontal

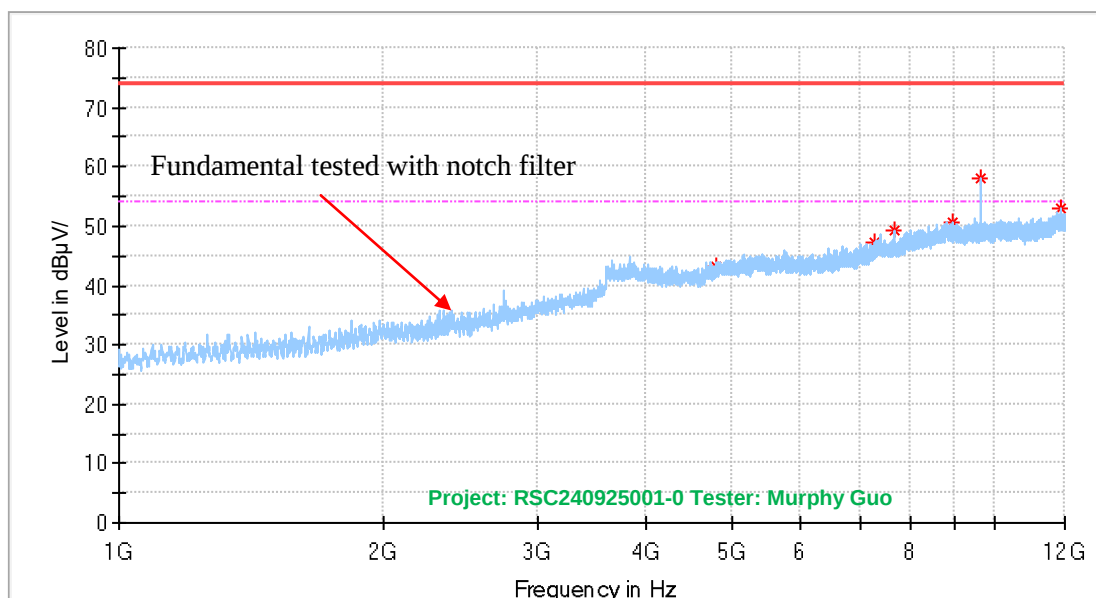


Frequency (MHz)	MaxPeak (dBµ V/m)	Limit (dBµ V/m)	Margin (dB)	Pol	Corr. (dB)
2835.900000	42.13	74.00	31.87	H	-11.1
4960.000000	47.07	74.00	26.93	H	-4.7
7278.800000	47.79	74.00	26.21	H	-1.8
8088.400000	49.54	74.00	24.46	H	0.1
9919.900000	66.32	71.22	4.90	H	1.3
11949.400000	52.98	74.00	21.02	H	4.6

High Channel_Vertical

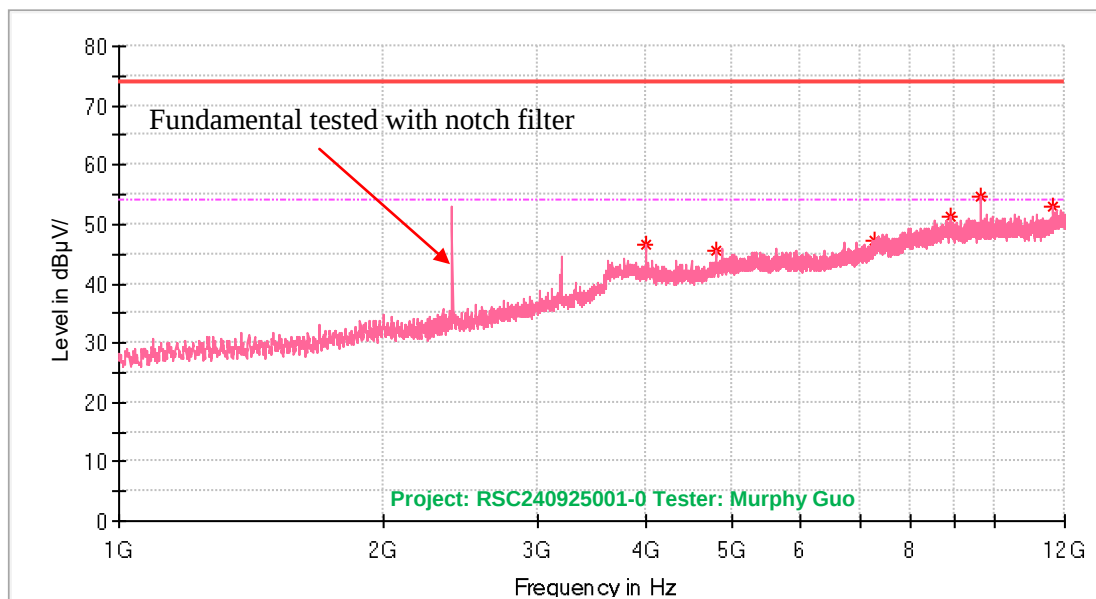


Frequency (MHz)	MaxPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Pol	Corr. (dB)
2835.900000	40.61	74.00	33.39	V	-11.1
4960.000000	48.52	74.00	25.48	V	-4.7
7906.900000	49.36	74.00	24.64	V	0.0
8777.000000	51.37	74.00	22.63	V	1.6
9919.900000	64.19	69.70	5.51	V	1.3
11660.100000	52.40	74.00	21.60	V	3.0

1Mbps mode**Low Channel_Horizontal**

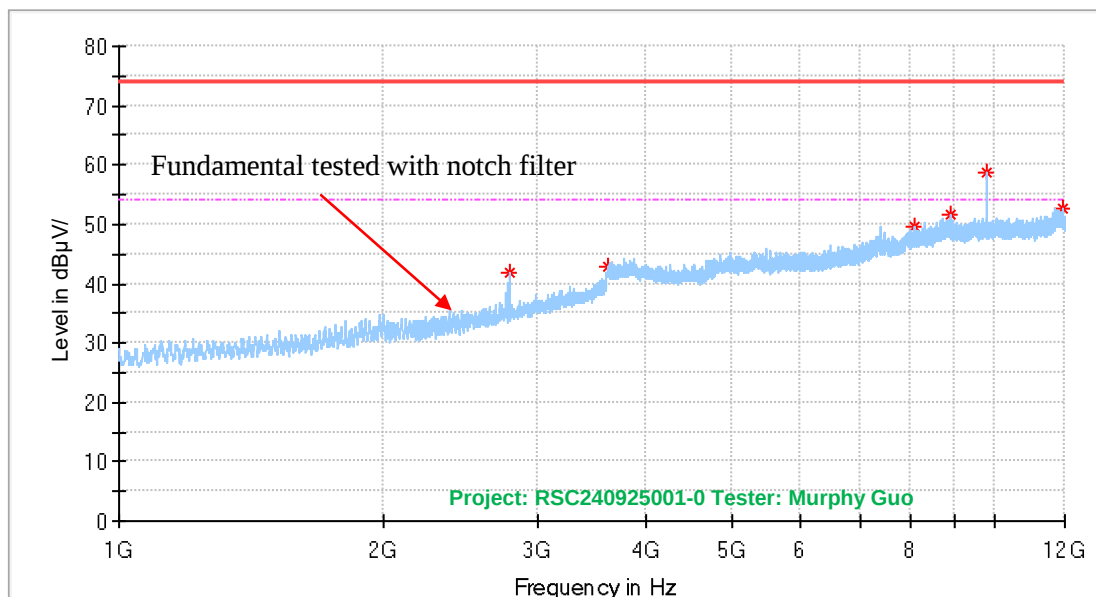
Frequency (MHz)	MaxPeak (dBµ V/m)	Limit (dBµ V/m)	Margin (dB)	Pol	Corr. (dB)
4804.900000	43.35	74.00	30.65	H	-5.1
7277.700000	47.13	74.00	26.87	H	-1.8
7650.600000	49.44	74.00	24.56	H	-1.3
8927.700000	50.71	74.00	23.29	H	1.2
9607.500000	57.91	73.55	15.64	H	1.4
11848.200000	52.97	74.00	21.03	H	4.3

Low Channel_Vertical



Frequency (MHz)	MaxPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Pol	Corr. (dB)
3984.300000	46.45	74.00	27.55	V	-6.2
4804.900000	45.60	74.00	28.40	V	-5.1
7294.200000	47.29	74.00	26.71	V	-1.7
8896.900000	51.47	74.00	22.53	V	1.6
9607.500000	54.60	69.16	14.56	V	1.4
11621.600000	52.96	74.00	21.04	V	2.7

Middle Channel_Horizontal

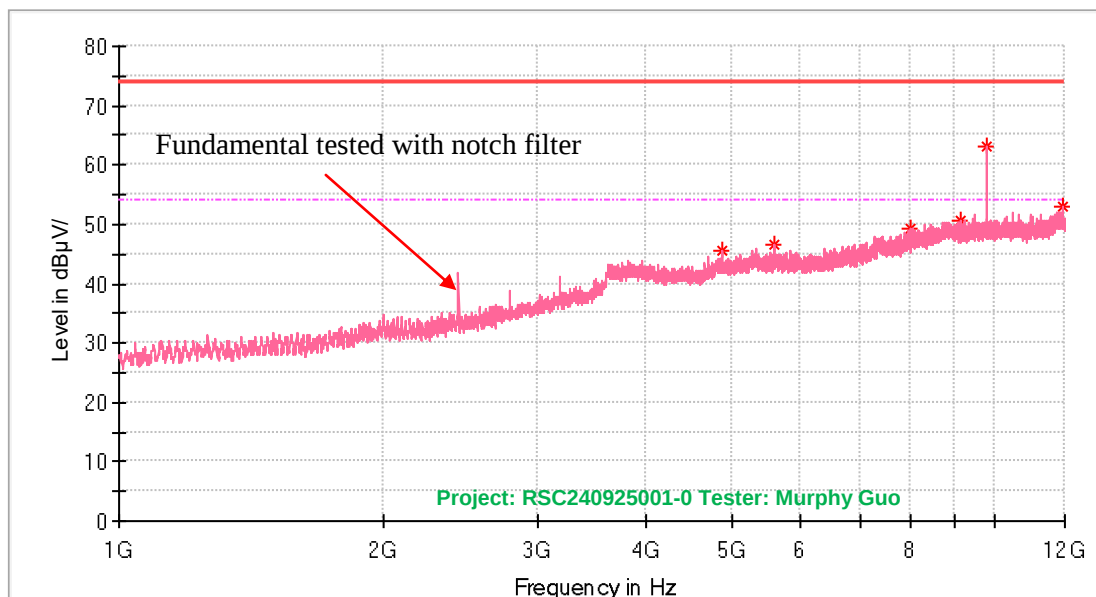


Frequency (MHz)	MaxPeak (dBμ V/m)	Limit (dBμ V/m)	Margin (dB)	Pol	Corr. (dB)
2790.800000	41.92	74.00	32.08	H	-11.4
3608.100000	42.98	74.00	31.02	H	-6.2
8102.700000	49.66	74.00	24.34	H	0.1
8912.300000	51.57	74.00	22.43	H	1.4
9759.300000	58.81	69.66	10.85	H	1.6
11936.200000	52.81	74.00	21.19	H	4.4

Fundamental Strength

Frequency (MHz)	MaxPeak (dBμ V/m)	Average (dBμ V/m)	Limit (dBμ V/m)	Margin (dB)	Pol	Corr. (dB)
2440.000000	90.21	89.66	-	-	H	-0.3

Middle Channel_Vertical

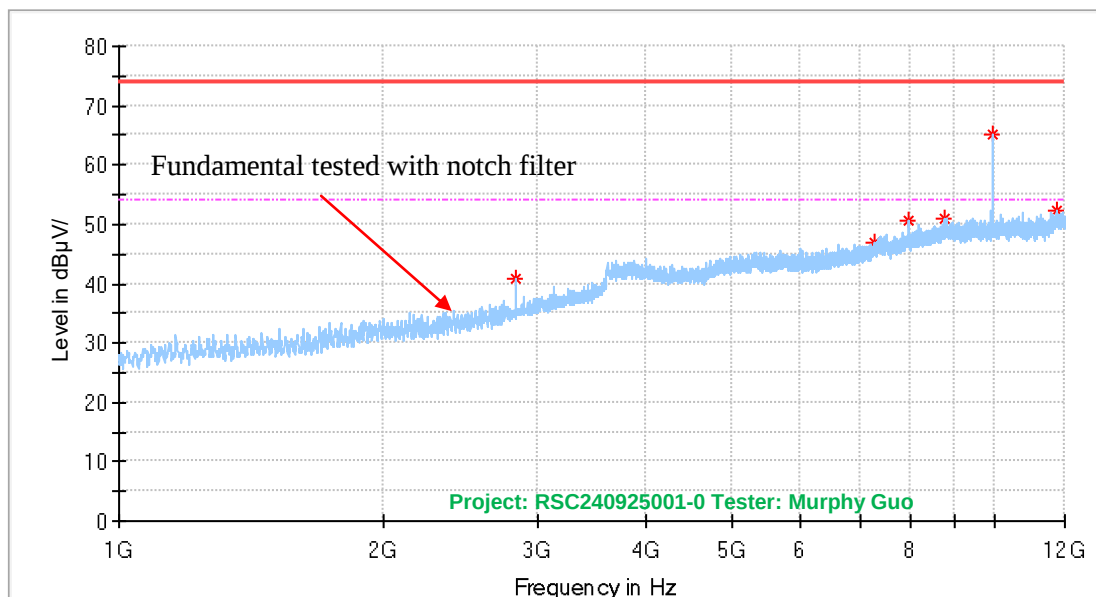


Frequency (MHz)	MaxPeak (dBµ V/m)	Limit (dBµ V/m)	Margin (dB)	Pol	Corr. (dB)
4879.700000	45.59	74.00	28.41	V	-5.1
5581.500000	46.74	74.00	27.26	V	-4.2
7987.200000	49.21	74.00	24.79	V	0.1
9118.000000	50.79	74.00	23.21	V	1.0
9760.400000	63.17	69.93	6.76	V	1.6
11907.600000	52.95	74.00	21.05	V	4.2

Fundamental Strength

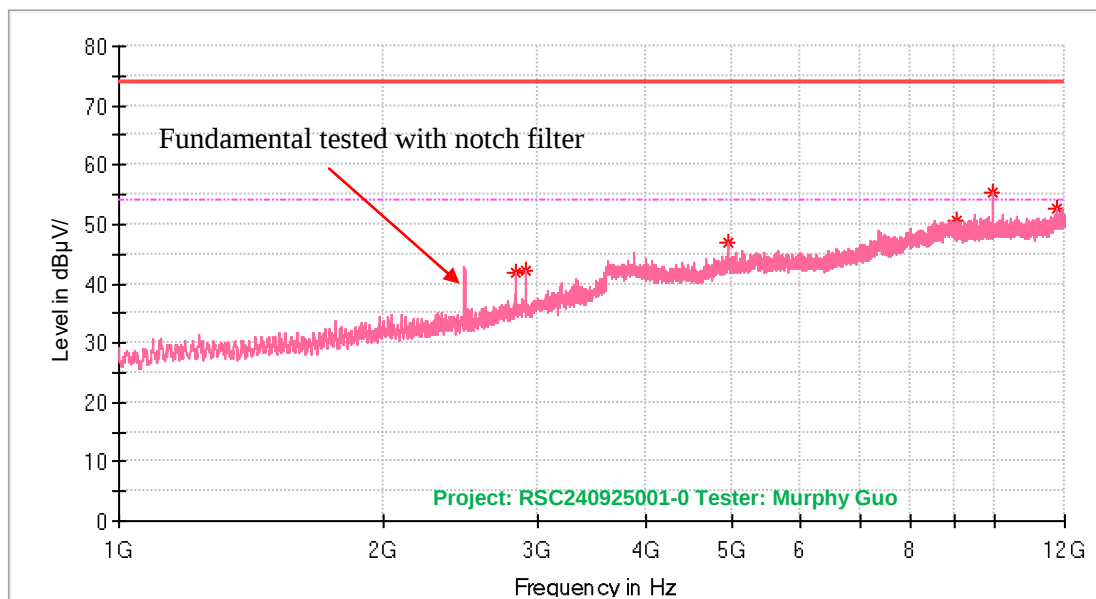
Frequency (MHz)	MaxPeak (dBµ V/m)	Average (dBµ V/m)	Limit (dBµ V/m)	Margin (dB)	Pol	Corr. (dB)
2440.000000	90.46	89.93	-	-	V	-0.3

High Channel_Horizontal

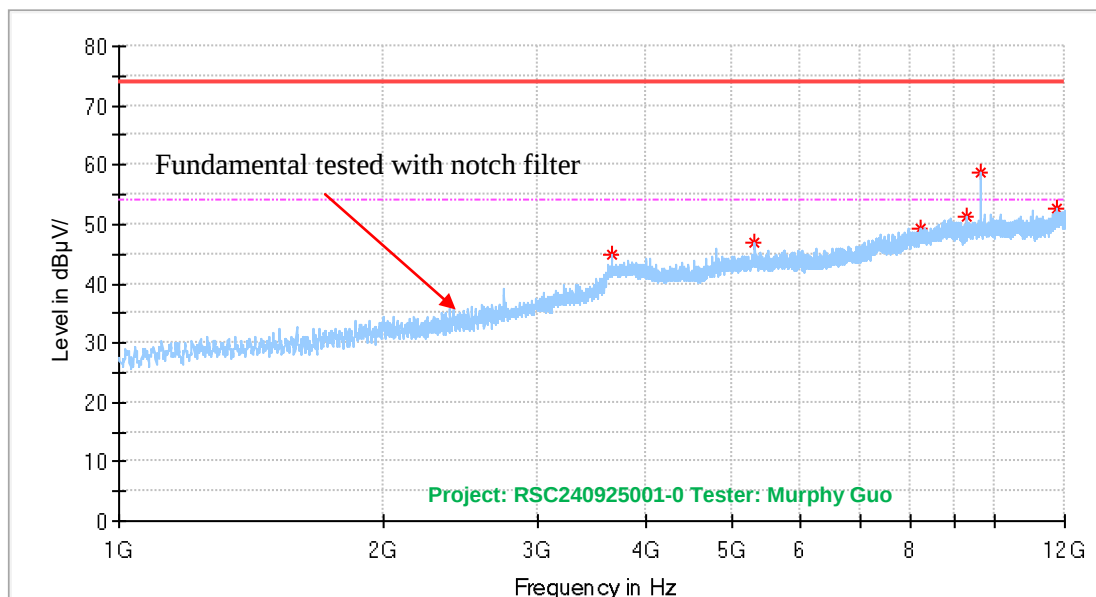


Frequency (MHz)	MaxPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Pol	Corr. (dB)
2835.900000	40.86	74.00	33.14	H	-11.1
7276.600000	47.02	74.00	26.98	H	-1.8
7945.400000	50.56	74.00	23.44	H	0.2
8727.500000	51.06	74.00	22.94	H	1.5
9919.900000	65.06	71.12	6.06	H	1.3
11754.700000	52.21	74.00	21.79	H	3.9

High Channel_Vertical

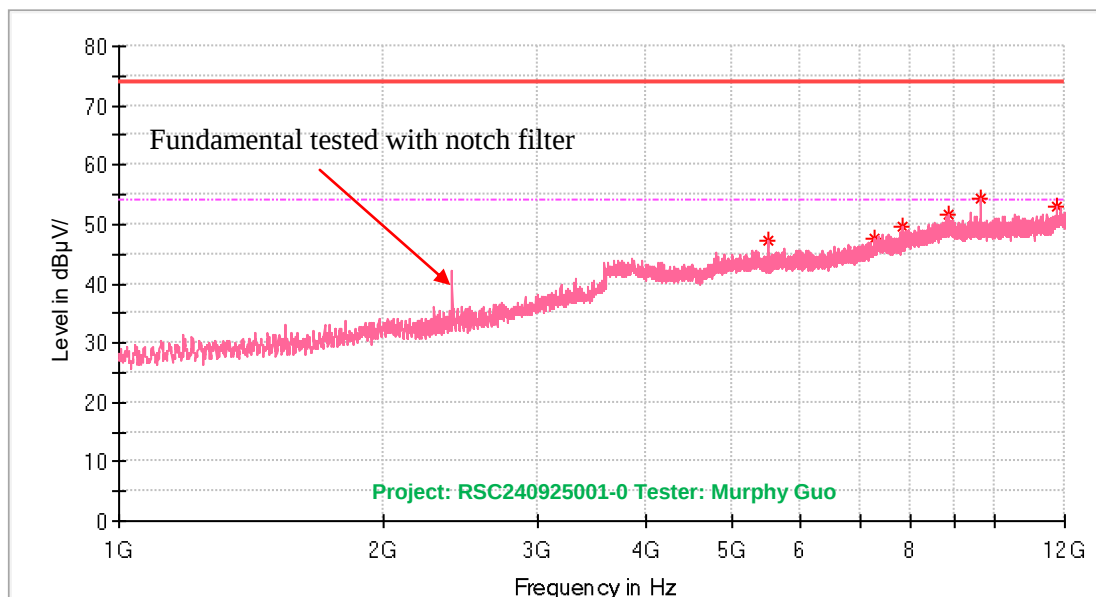


Frequency (MHz)	MaxPeak (dBμ V/m)	Limit (dBμ V/m)	Margin (dB)	Pol	Corr. (dB)
2835.900000	41.81	74.00	32.19	V	-11.1
2915.100000	42.20	74.00	31.80	V	-10.6
4960.000000	46.97	74.00	27.03	V	-4.7
9006.900000	50.80	74.00	23.20	V	0.9
9919.900000	55.31	69.76	14.45	V	1.3
11725.000000	52.79	74.00	21.21	V	3.4

2Mbps mode**Low Channel_Horizontal**

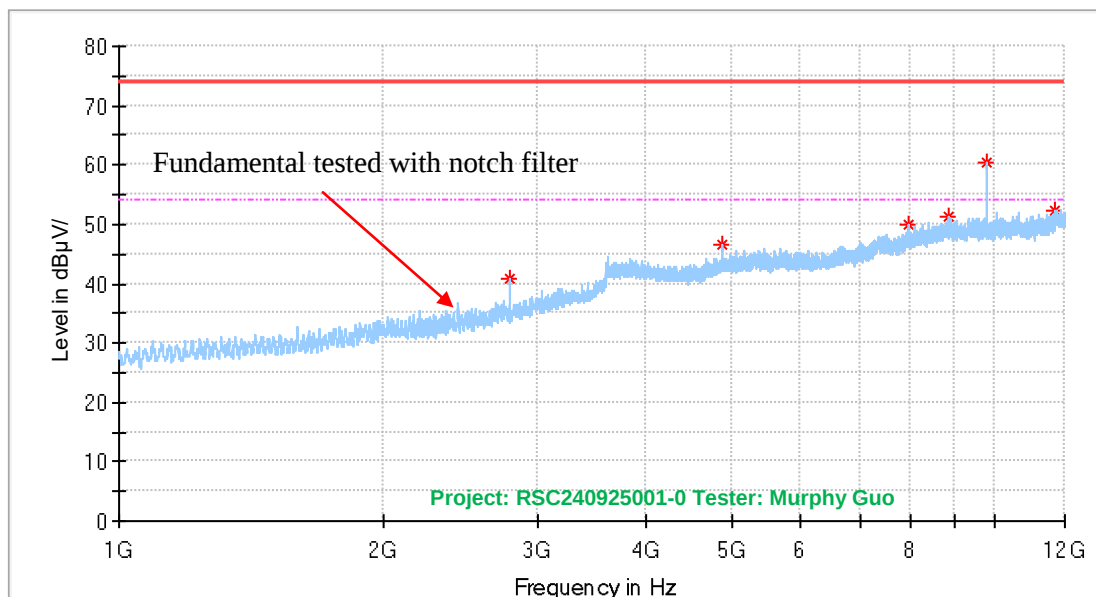
Frequency (MHz)	MaxPeak (dBμ V/m)	Limit (dBμ V/m)	Margin (dB)	Pol	Corr. (dB)
3649.900000	45.04	74.00	28.96	H	-6.1
5319.700000	46.77	74.00	27.23	H	-4.1
8197.300000	49.38	74.00	24.62	H	0.3
9276.400000	51.36	74.00	22.64	H	1.3
9608.600000	58.62	72.86	14.24	H	1.4
11749.200000	52.58	74.00	21.42	H	3.9

Low Channel_Vertical



Frequency (MHz)	MaxPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Pol	Corr. (dB)
5494.600000	47.20	74.00	26.80	V	-4.4
7276.600000	47.50	74.00	26.50	V	-1.8
7850.800000	49.73	74.00	24.27	V	-0.6
8861.700000	51.52	74.00	22.48	V	1.5
9608.600000	54.36	68.19	13.83	V	1.4
11756.900000	52.94	74.00	21.06	V	3.9

Middle Channel_Horizontal

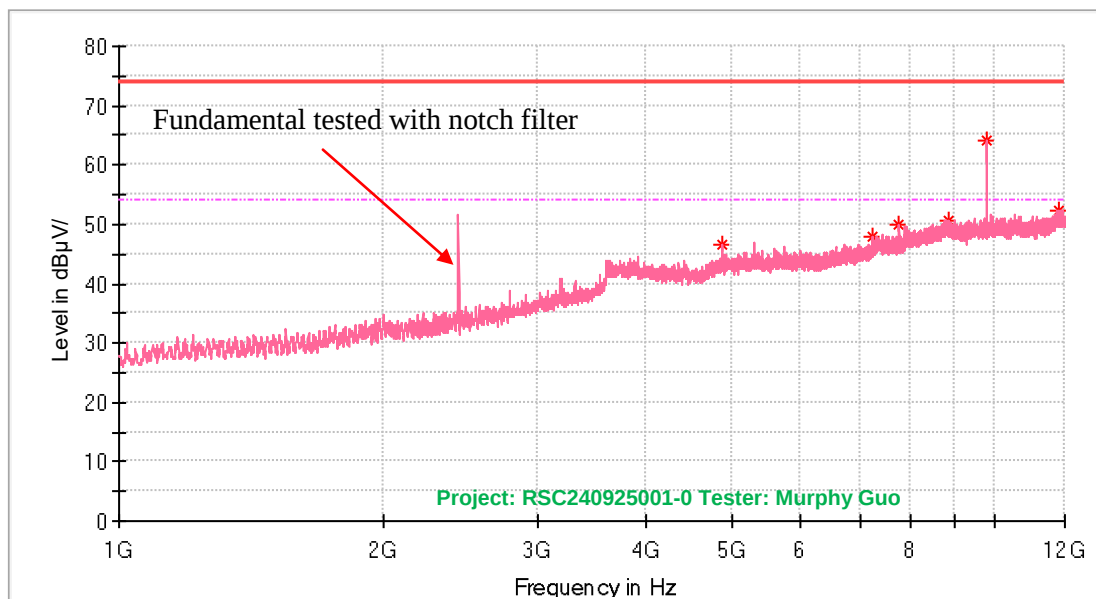


Frequency (MHz)	MaxPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Pol	Corr. (dB)
2790.800000	40.91	74.00	33.09	H	-11.4
4879.700000	46.64	74.00	27.36	H	-5.1
7946.500000	50.00	74.00	24.00	H	0.2
8846.300000	51.27	74.00	22.73	H	1.5
9760.400000	60.55	69.38	8.83	H	1.6
11681.000000	52.34	74.00	21.66	H	3.0

Fundamental Strength

Frequency (MHz)	MaxPeak (dB μ V/m)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Pol	Corr. (dB)
2440.000000	90.33	89.38	-	-	H	-0.3

Middle Channel_Vertical

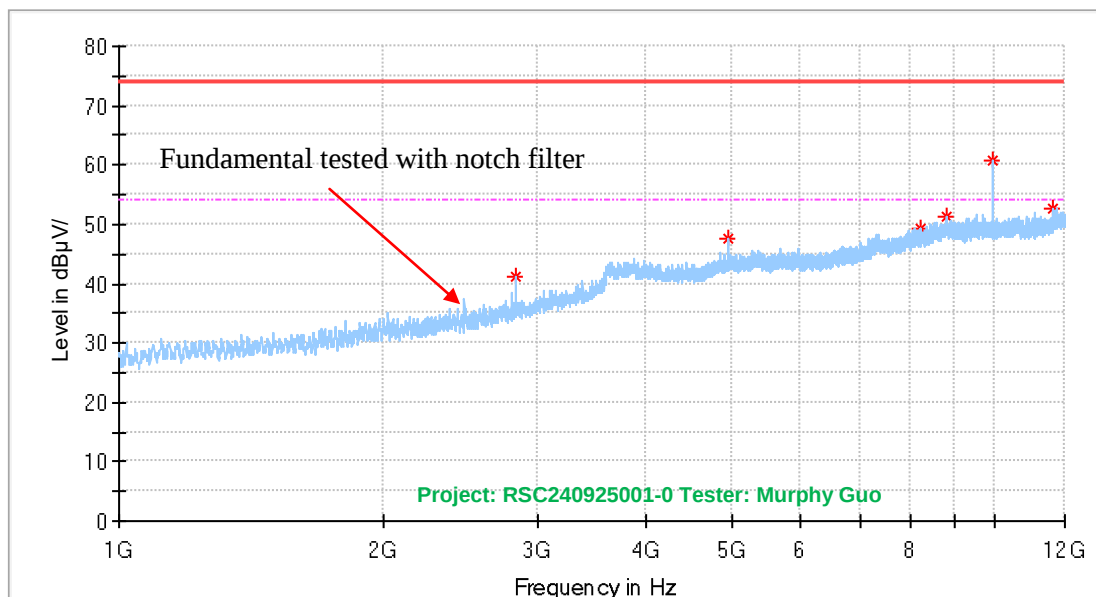


Frequency (MHz)	MaxPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Pol	Corr. (dB)
4879.700000	46.59	74.00	27.41	V	-5.1
7252.400000	48.07	74.00	25.93	V	-2.0
7771.600000	49.85	74.00	24.15	V	-1.2
8825.400000	50.70	74.00	23.30	V	1.6
9760.400000	64.15	69.61	5.46	V	1.6
11819.600000	52.46	74.00	21.54	V	3.9

Fundamental Strength

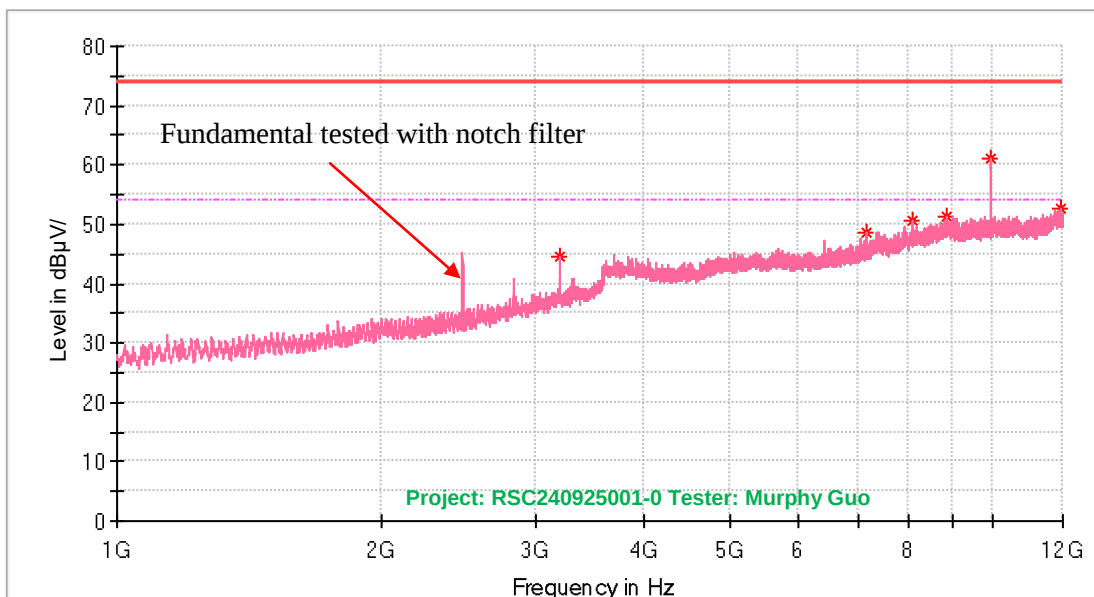
Frequency (MHz)	MaxPeak (dB μ V/m)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Pol	Corr. (dB)
2440.000000	90.45	89.61	-	-	V	-0.3

High Channel_Horizontal



Frequency (MHz)	MaxPeak (dBµ V/m)	Limit (dBµ V/m)	Margin (dB)	Pol	Corr. (dB)
2835.900000	41.33	74.00	32.67	H	-11.1
4958.900000	47.73	74.00	26.27	H	-4.7
8208.300000	49.27	74.00	24.73	H	0.3
8795.700000	51.38	74.00	22.62	H	1.7
9921.000000	60.69	70.41	9.72	H	1.3
11656.800000	52.81	74.00	21.19	H	3.0

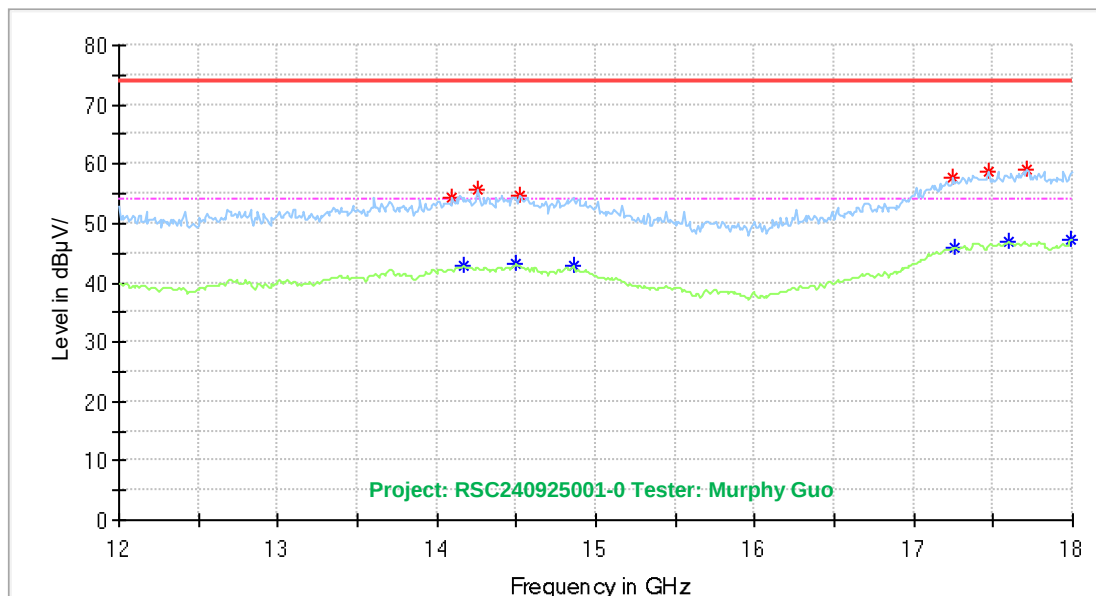
High Channel_Vertical



Frequency (MHz)	MaxPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Pol	Corr. (dB)
3198.900000	44.43	74.00	29.57	V	-9.0
7178.700000	48.52	74.00	25.48	V	-2.3
8081.800000	50.77	74.00	23.23	V	0.1
8837.500000	51.17	74.00	22.83	V	1.6
9922.100000	61.00	68.94	7.94	V	1.3
11960.400000	52.69	74.00	21.31	V	4.5

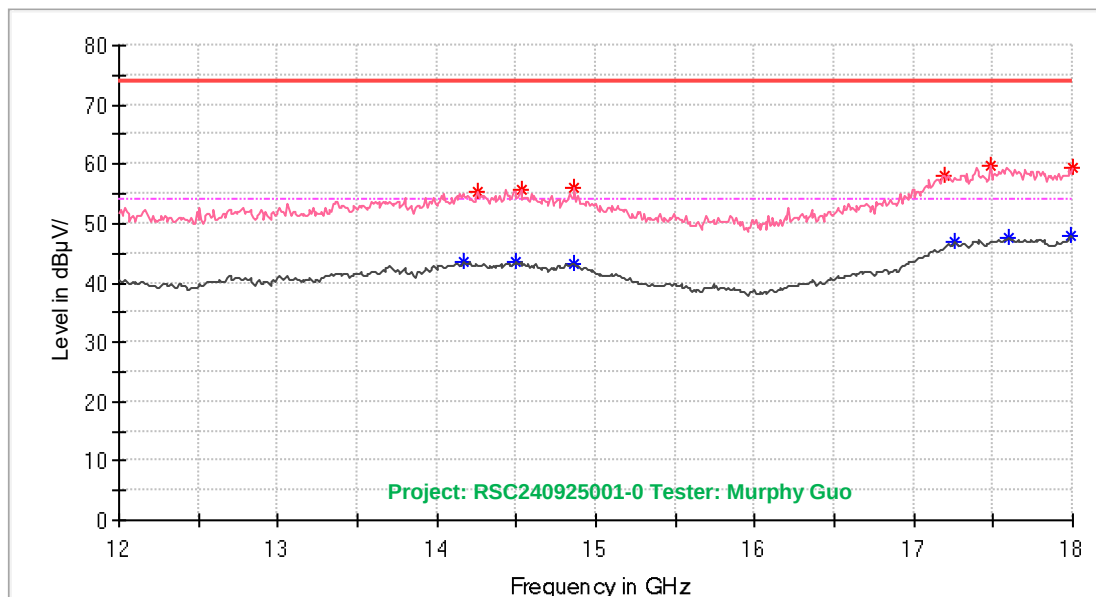
5) 12GHz-18GHz_2Mbps_Low Channel_worst case

Horizontal



Frequency (MHz)	MaxPeak (dBμ V/m)	Average (dBμ V/m)	Limit (dBμ V/m)	Margin (dB)	Pol	Corr. (dB)
14096.153846	54.29	---	74.00	19.71	H	7.3
14173.076923	---	42.89	54.00	11.11	H	7.2
14259.615385	55.72	---	74.00	18.28	H	7.0
14500.000000	---	43.13	54.00	10.87	H	7.6
14519.230769	54.75	---	74.00	19.25	H	7.5
14855.769231	---	42.91	54.00	11.09	H	7.1
17250.000000	57.73	---	74.00	16.27	H	10.3
17259.615385	---	45.97	54.00	8.03	H	10.3
17471.153846	58.75	---	74.00	15.25	H	10.1
17596.153846	---	46.86	54.00	7.14	H	10.8
17711.538462	58.96	---	74.00	15.04	H	10.5
17990.384615	---	47.27	54.00	6.73	H	11.0

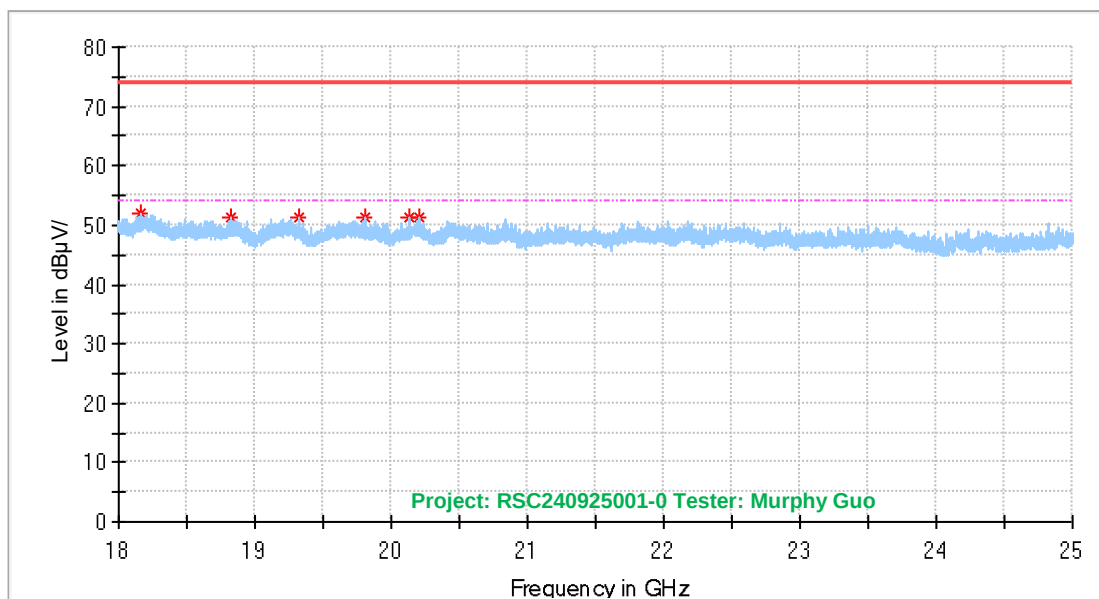
Vertical



Frequency (MHz)	MaxPeak (dBμ V/m)	Average (dBμ V/m)	Limit (dBμ V/m)	Margin (dB)	Pol	Corr. (dB)
14173.076923	---	43.50	54.00	10.50	V	7.2
14259.615385	55.23	---	74.00	18.77	V	7.0
14500.000000	---	43.56	54.00	10.44	V	7.6
14528.846154	55.68	---	74.00	18.32	V	7.5
14855.769231	---	43.14	54.00	10.86	V	7.1
14865.384615	56.08	---	74.00	17.92	V	7.0
17192.307692	58.05	---	74.00	15.95	V	9.9
17259.615385	---	46.79	54.00	7.21	V	10.3
17480.769231	59.67	---	74.00	14.33	V	10.1
17596.153846	---	47.45	54.00	6.55	V	10.8
17990.384615	---	47.82	54.00	6.18	V	11.0
18000.000000	59.44	---	74.00	14.56	V	11.2

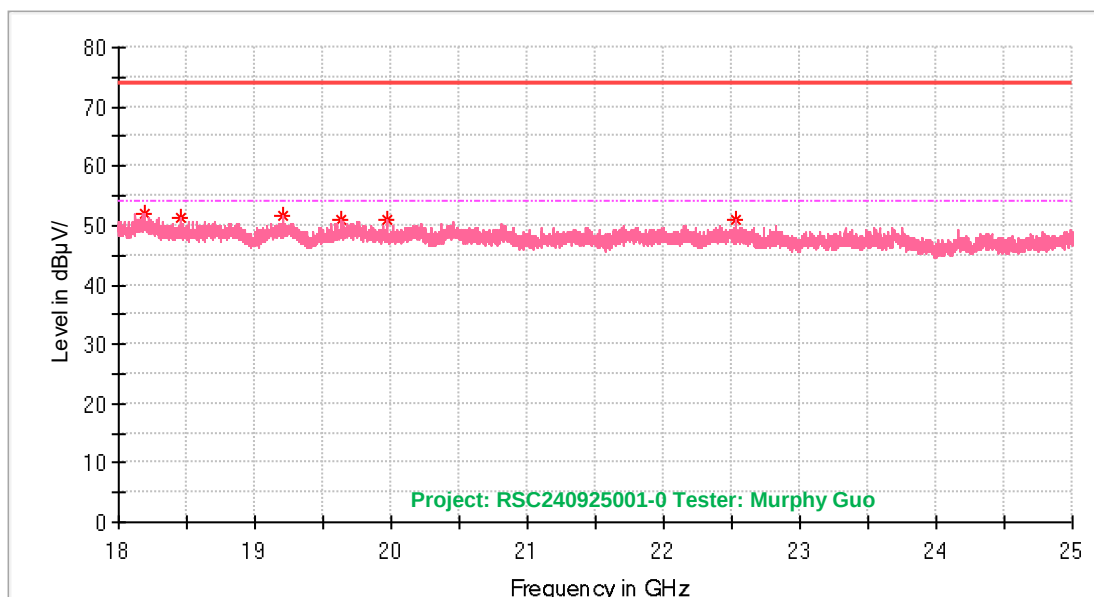
6) 18GHz-25GHz_2Mbps_Low Channel_worst case

Horizontal



Frequency (MHz)	MaxPeak (dBμ V/m)	CAverage (dBμ V/m)	Limit (dBμ V/m)	Margin (dB)	Pol	Corr. (dB)
18168.700000	52.09	---	74.00	21.91	H	6.7
18168.700000	---	42.67	54.00	11.33	H	6.7
18820.400000	51.32	---	74.00	22.68	H	6.2
18820.400000	---	41.81	54.00	12.19	H	6.2
19325.800000	51.20	---	74.00	22.80	H	6.6
19325.800000	---	42.01	54.00	11.99	H	6.6
19811.600000	51.46	---	74.00	22.54	H	7.1
19811.600000	---	41.72	54.00	12.28	H	7.1
20127.300000	51.18	---	74.00	22.82	H	6.8
20127.300000	---	42.07	54.00	11.93	H	6.8
20210.600000	51.15	---	74.00	22.85	H	7.1
20210.600000	---	41.71	54.00	12.29	H	7.1

Vertical



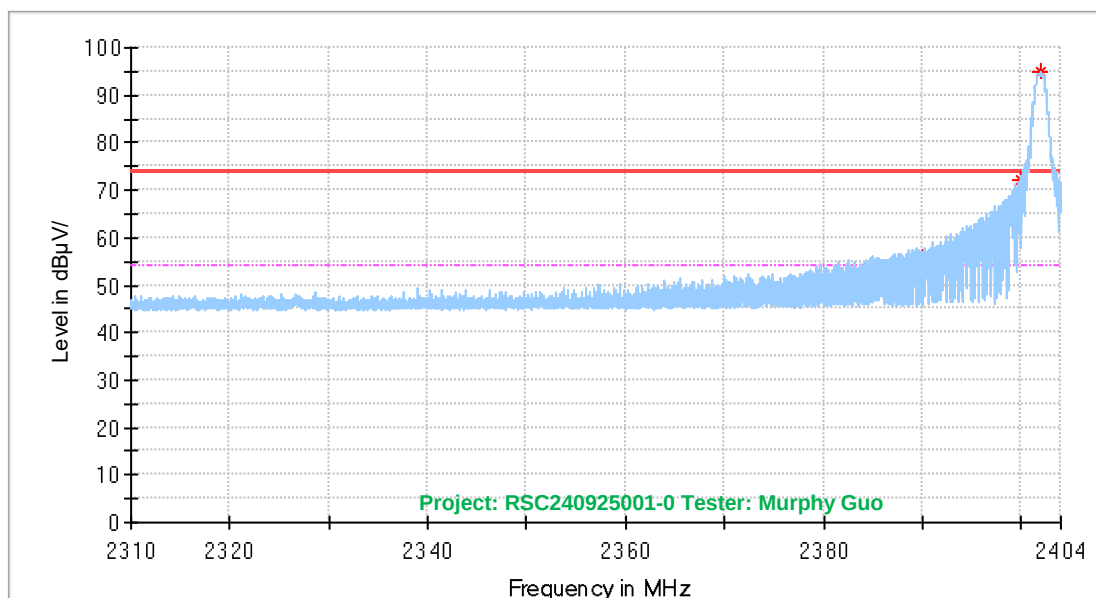
Frequency (MHz)	MaxPeak (dBμ V/m)	CAverage (dBμ V/m)	Limit (dBμ V/m)	Margin (dB)	Pol	Corr. (dB)
18187.600000	52.13	---	74.00	21.87	V	6.7
18187.600000	---	42.55	54.00	11.45	V	6.7
18457.100000	51.20	---	74.00	22.80	V	6.5
18457.100000	---	41.74	54.00	12.26	V	6.5
19211.700000	51.76	---	74.00	22.24	V	6.2
19211.700000	---	41.80	54.00	12.20	V	6.2
19638.700000	50.83	---	74.00	23.17	V	7.0
19638.700000	---	41.84	54.00	12.16	V	7.0
19975.400000	50.94	---	74.00	23.06	V	6.7
19975.400000	---	41.65	54.00	12.35	V	6.7
22531.100000	50.99	---	74.00	23.01	V	6.6
22531.100000	---	41.64	54.00	12.36	V	6.6

Note:

Corrected Amplitude (MaxPeak or QuasiPeak) = Corrected Factor + Reading

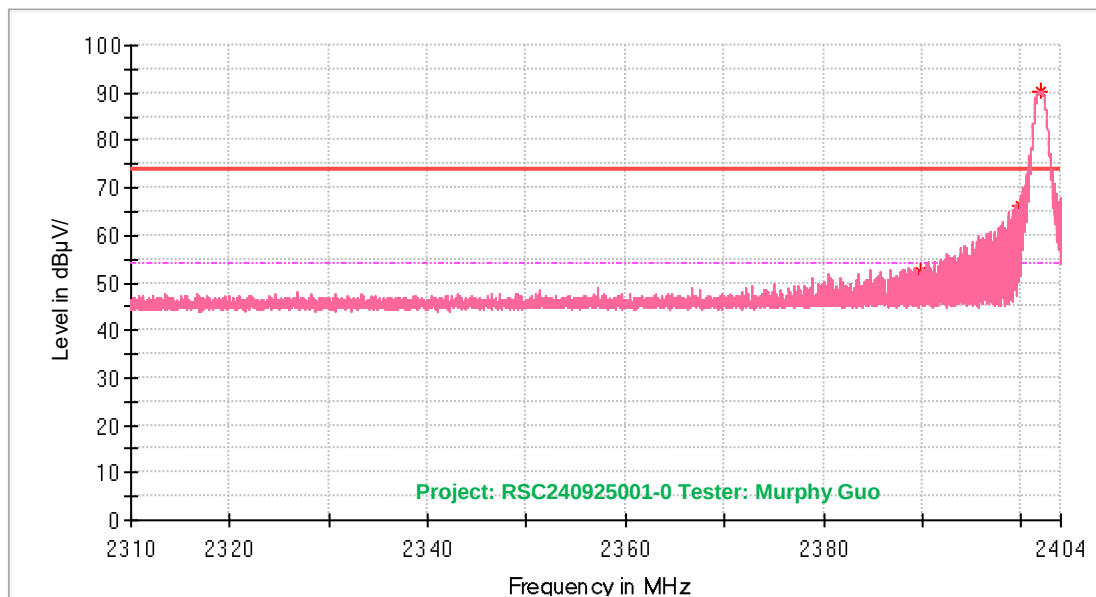
Corrected Factor=Antenna factor (RX) + Cable Loss – Amplifier Factor or Antenna factor (RX) + Cable Loss

Margin = Limit- Corr. Amplitude

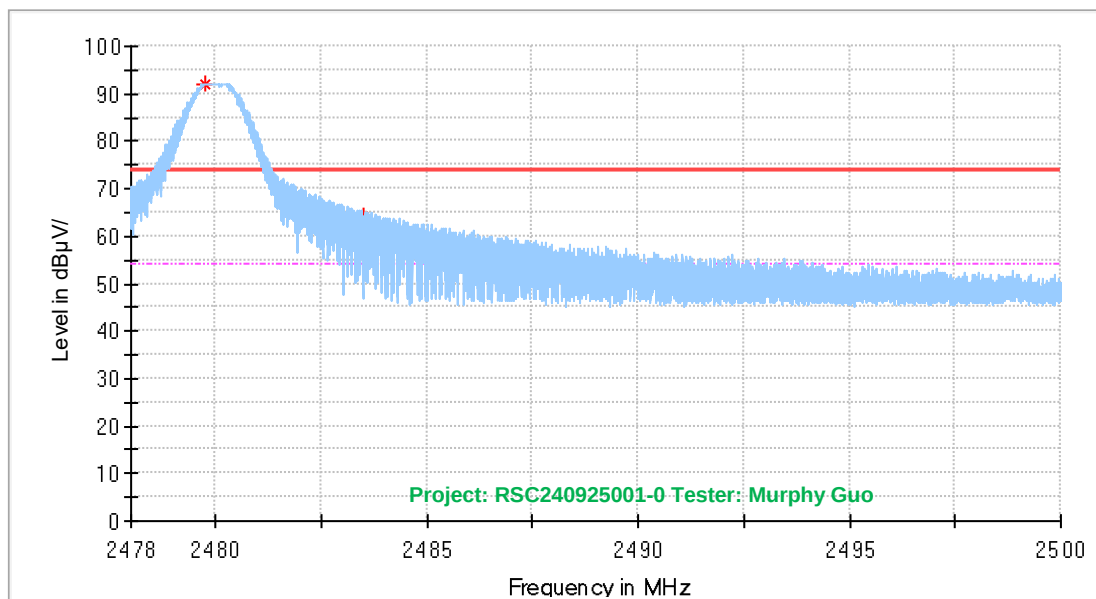
Band Edge:**250kbps mode****Peak, Left_Horizontal**

Frequency (MHz)	MaxPeak (dBμ V/m)	Limit (dBμ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
2389.975200	55.70	74.00	18.30	174.0	H	4.0	-0.3
2399.976800	72.32	74.75	2.43	174.0	H	160.0	-0.2
2402.007200	94.75	---	---	173.0	H	166.0	-0.2

Peak, Left_Vertical

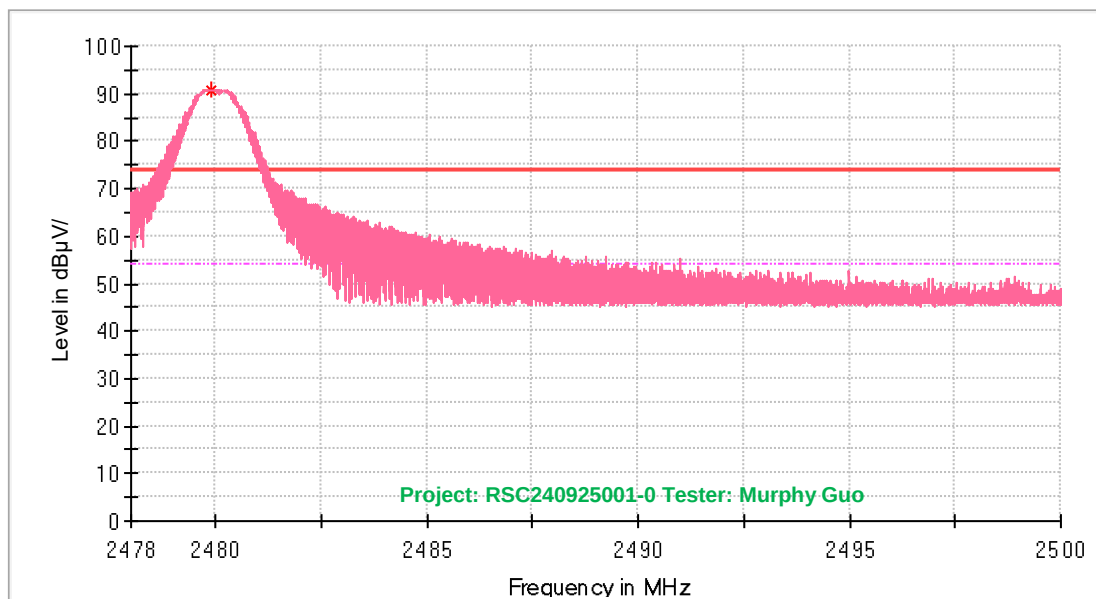


Frequency (MHz)	MaxPeak (dBµ V/m)	Limit (dBµ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
2389.843600	52.45	74.00	21.55	240.0	V	218.0	-0.3
2400.014400	66.04	70.18	4.14	241.0	V	228.0	-0.2
2402.026000	90.18	---	---	240.0	V	242.0	-0.2

Peak, Right_Horizontal

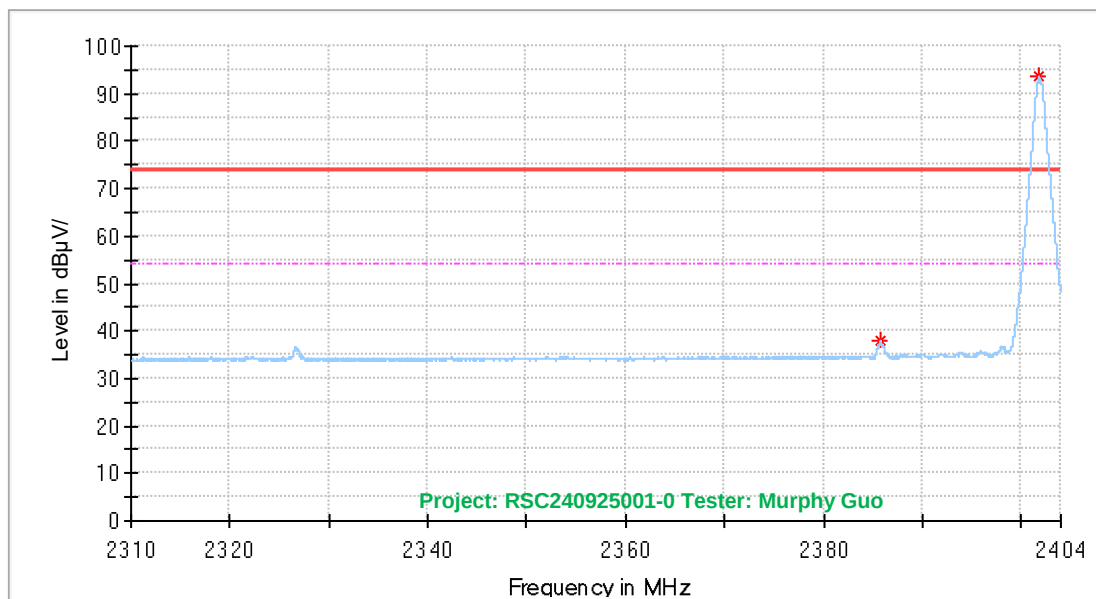
Frequency (MHz)	MaxPeak (dBµ V/m)	Limit (dBµ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
2479.775400	92.18	---	---	199.0	H	175.0	-0.3
2483.519800	64.06	74.00	9.94	200.0	H	167.0	-0.3

Peak, Right_Vertical



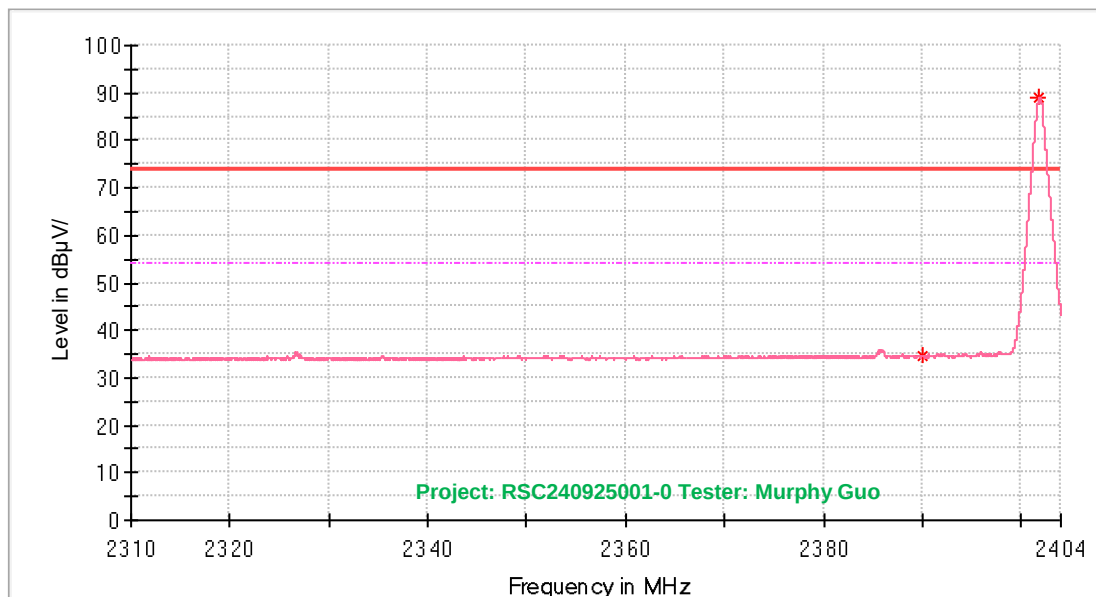
Frequency (MHz)	MaxPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
2479.878800	90.79	---	---	166.0	V	244.0	-0.3
2483.506600	61.17	74.00	12.83	167.0	V	228.0	-0.3

Average, Left_Horizontal

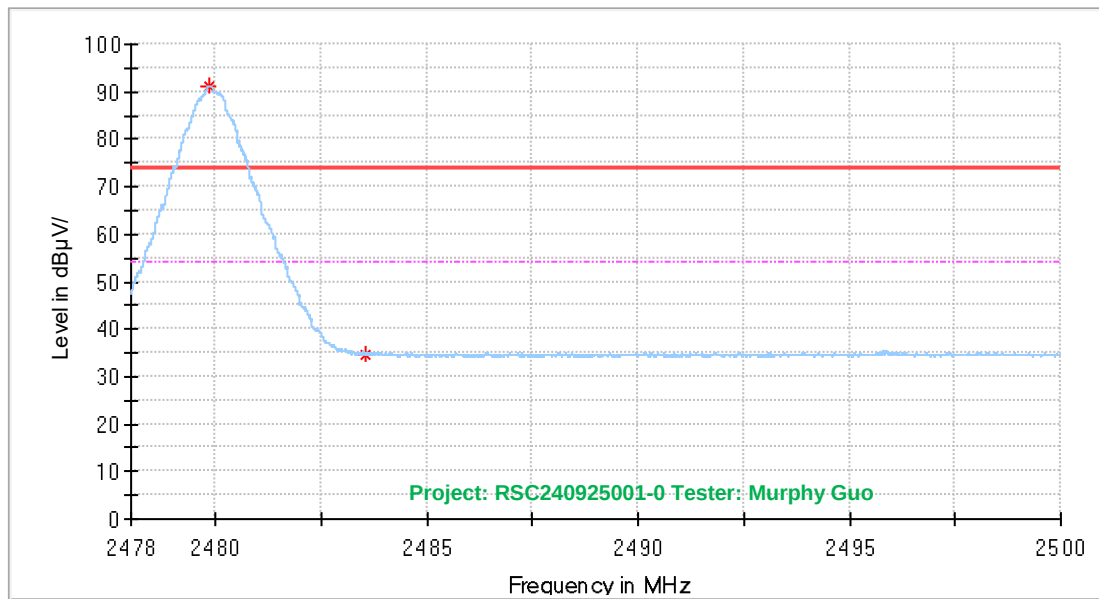


Frequency (MHz)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
2385.820400	37.88	54.00	16.12	173.0	H	162.0	-0.3
2401.866200	93.54	---	---	173.0	H	166.0	-0.2

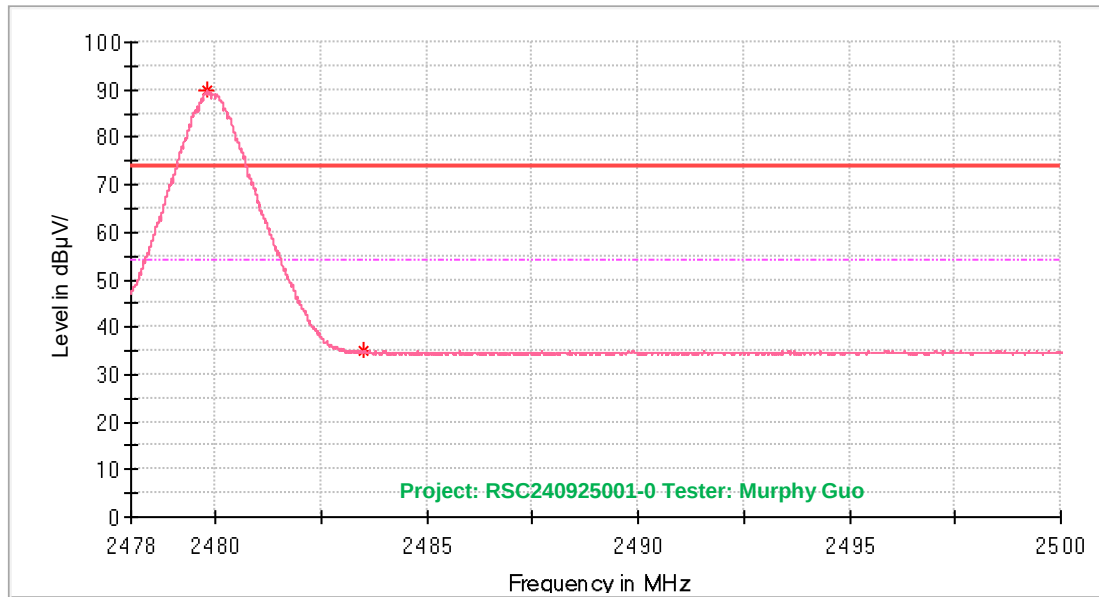
Average, Left_Vertical



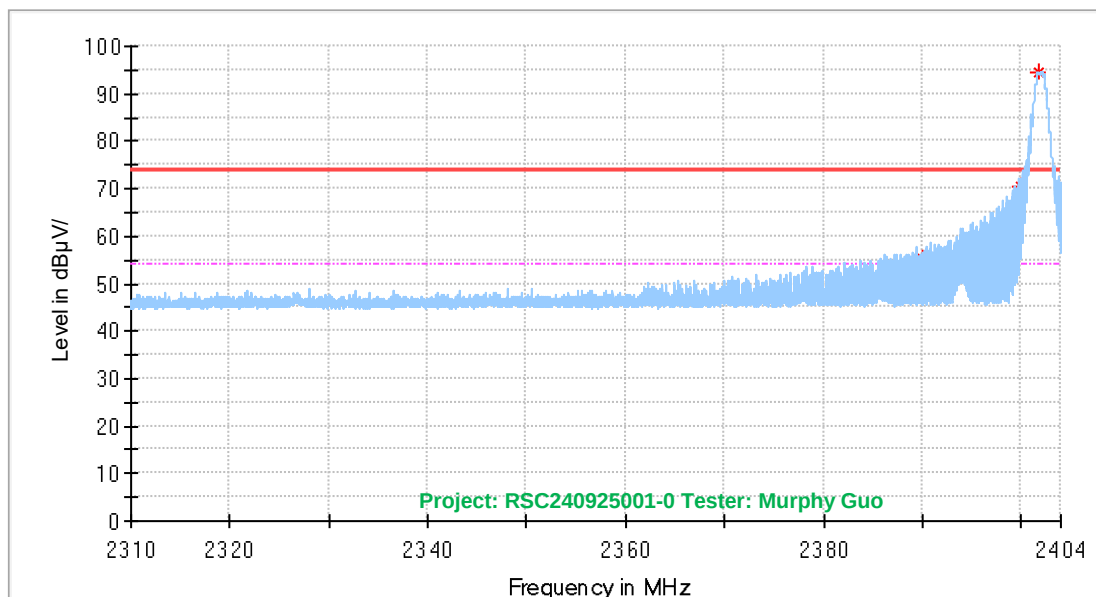
Frequency (MHz)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
2389.994000	34.59	54.00	19.41	240.0	V	146.0	-0.3
2401.838000	89.00	---	---	240.0	V	242.0	-0.2

Average, Right_Horizontal

Frequency (MHz)	Average (dBµ V/m)	Limit (dBµ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
2479.856800	91.22	---	---	199.0	H	175.0	-0.3
2483.550600	34.69	54.00	19.31	199.0	H	172.0	-0.3

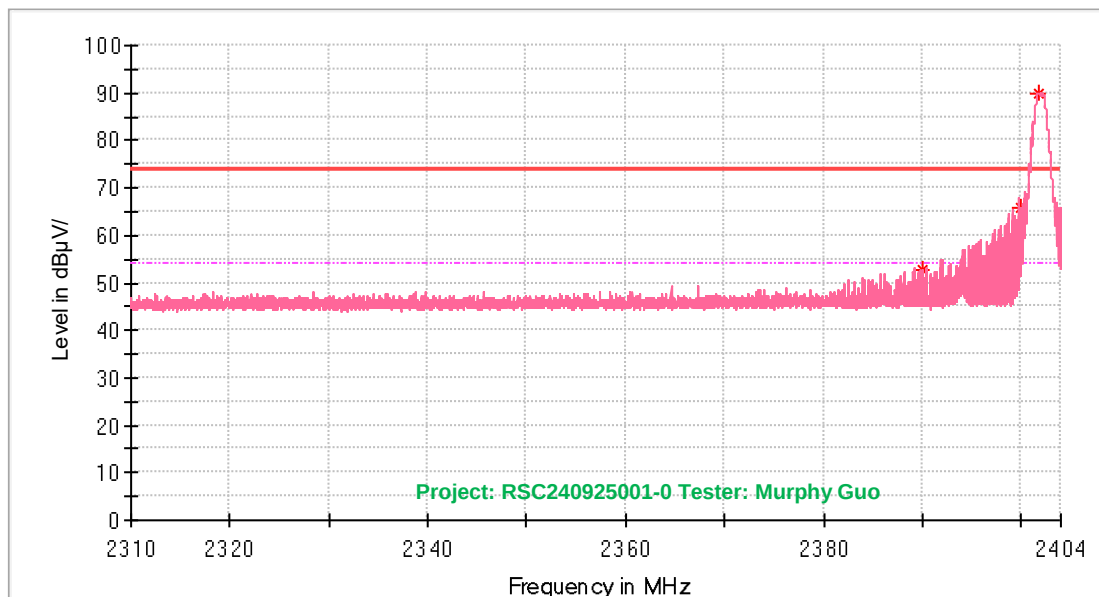
Average, Right_Vertical

Frequency (MHz)	Average (dBμ V/m)	Limit (dBμ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
2479.790800	89.70	---	---	166.0	V	241.0	-0.3
2483.522000	35.05	54.00	18.95	166.0	V	209.0	-0.3

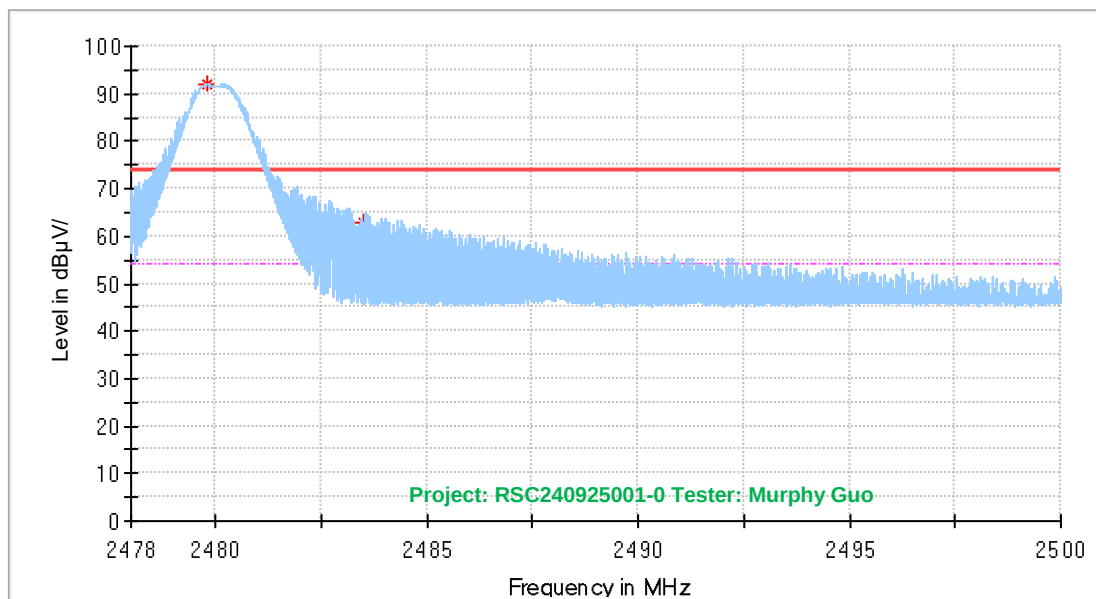
1Mbps mode**Peak, Left_ Horizontal**

Frequency (MHz)	MaxPeak (dBμ V/m)	Limit (dBμ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
2389.975200	55.30	74.00	18.70	173.0	H	252.0	-0.3
2399.986200	70.32	74.56	4.24	174.0	H	174.0	-0.2
2401.734600	94.56	---	---	173.0	H	167.0	-0.2

Peak, Left_Vertical

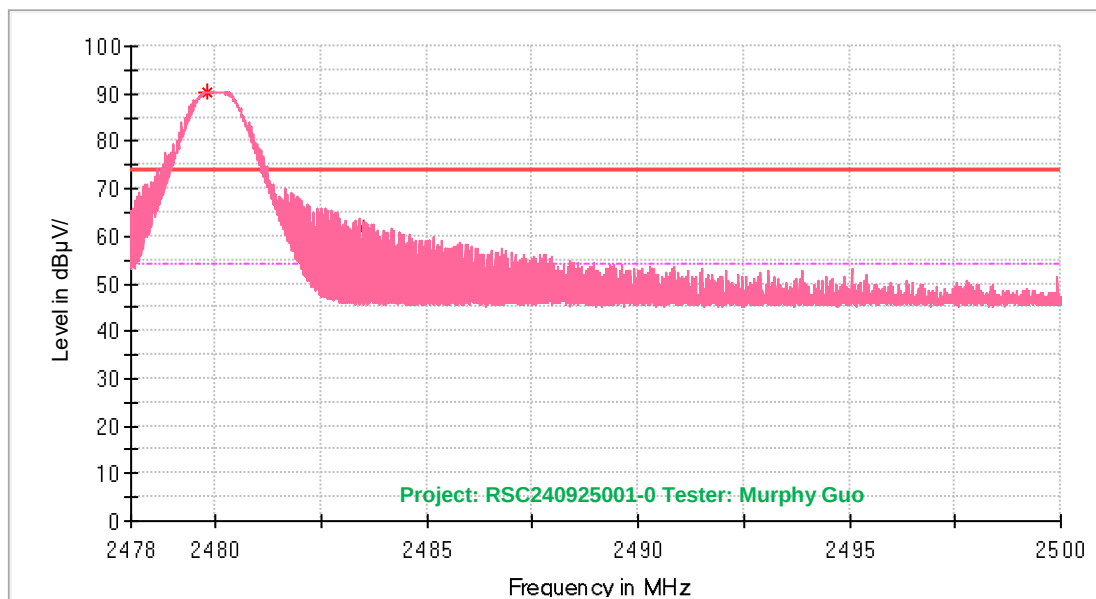


Frequency (MHz)	MaxPeak (dBµ V/m)	Limit (dBµ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
2389.994000	52.55	74.00	21.45	240.0	V	221.0	-0.3
2399.986200	65.85	69.92	4.07	240.0	V	281.0	-0.2
2401.706400	89.92	---	---	241.0	V	242.0	-0.2

Peak, Right_Horizontal

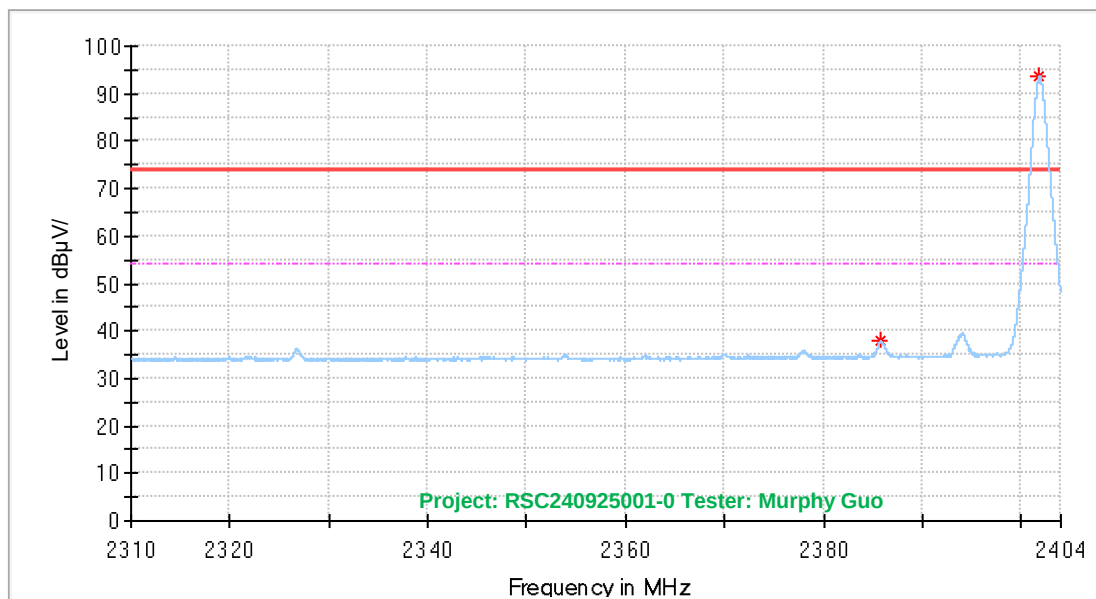
Frequency (MHz)	MaxPeak (dBµ V/m)	Limit (dBµ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
2479.790800	91.90	---	---	199.0	H	176.0	-0.3
2483.504400	62.91	74.00	11.09	199.0	H	352.0	-0.3

Peak, Right_Vertical



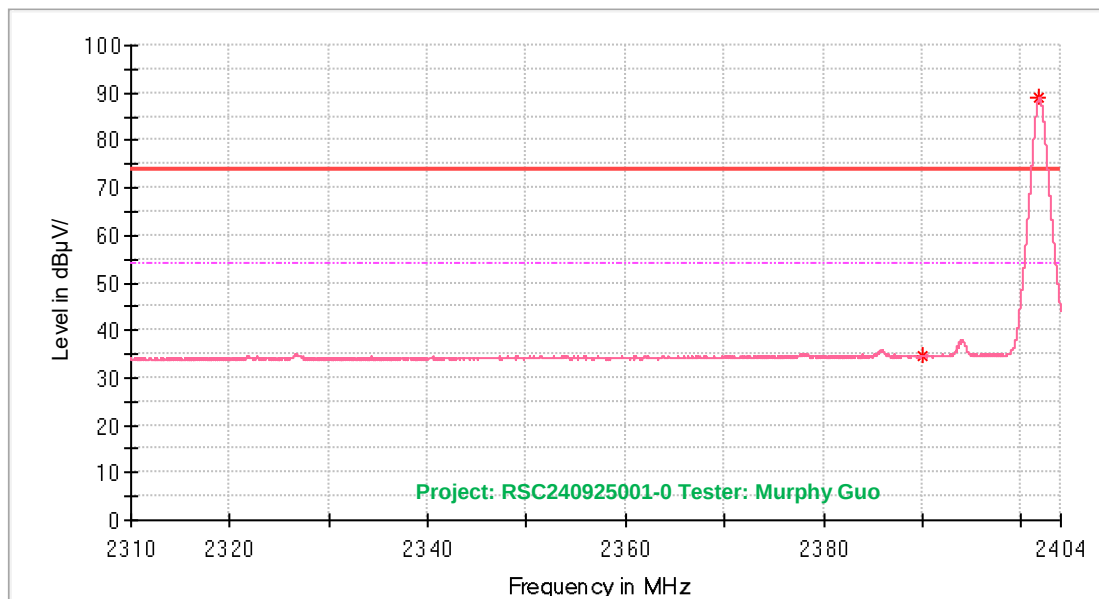
Frequency (MHz)	MaxPeak (dBµ V/m)	Limit (dBµ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
2479.797400	90.48	---	---	166.0	V	243.0	-0.3
2483.511000	61.58	74.00	12.42	167.0	V	227.0	-0.3

Average, Left_Horizontal

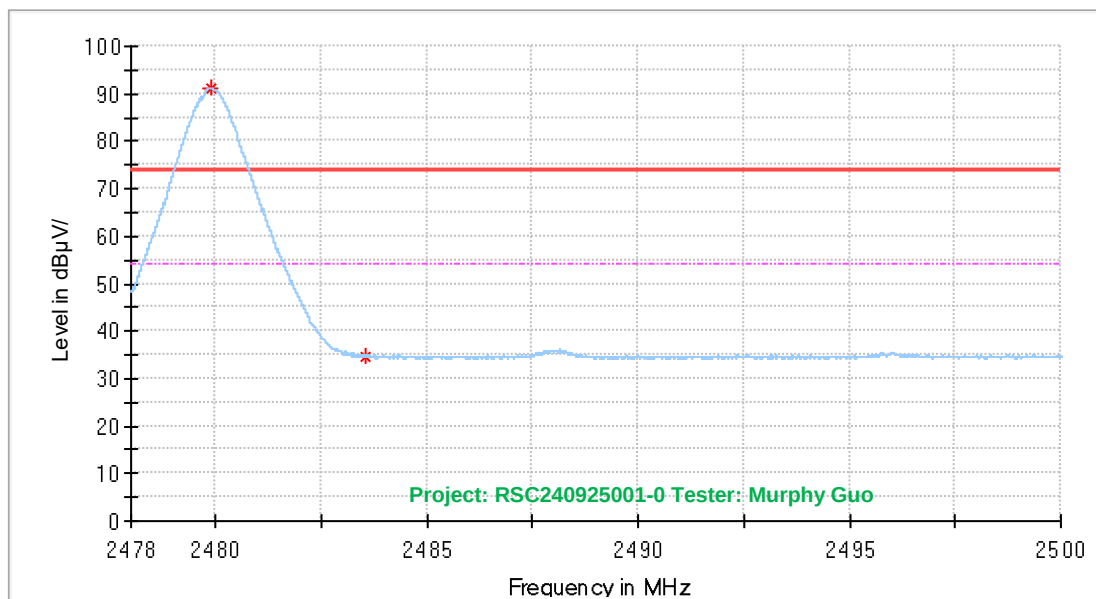


Frequency (MHz)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
2385.839200	37.89	54.00	16.11	173.0	H	170.0	-0.3
2401.866200	93.55	---	---	173.0	H	170.0	-0.2

Average, Left_Vertical

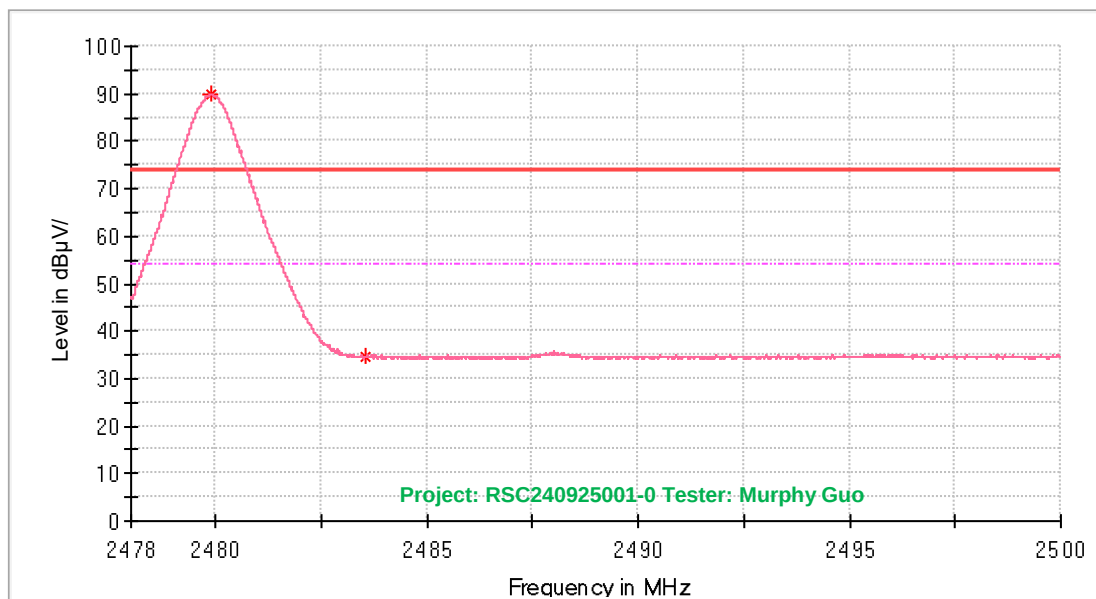


Frequency (MHz)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
2390.012800	34.48	54.00	19.52	241.0	V	83.0	-0.3
2401.856800	89.16	---	---	241.0	V	242.0	-0.2

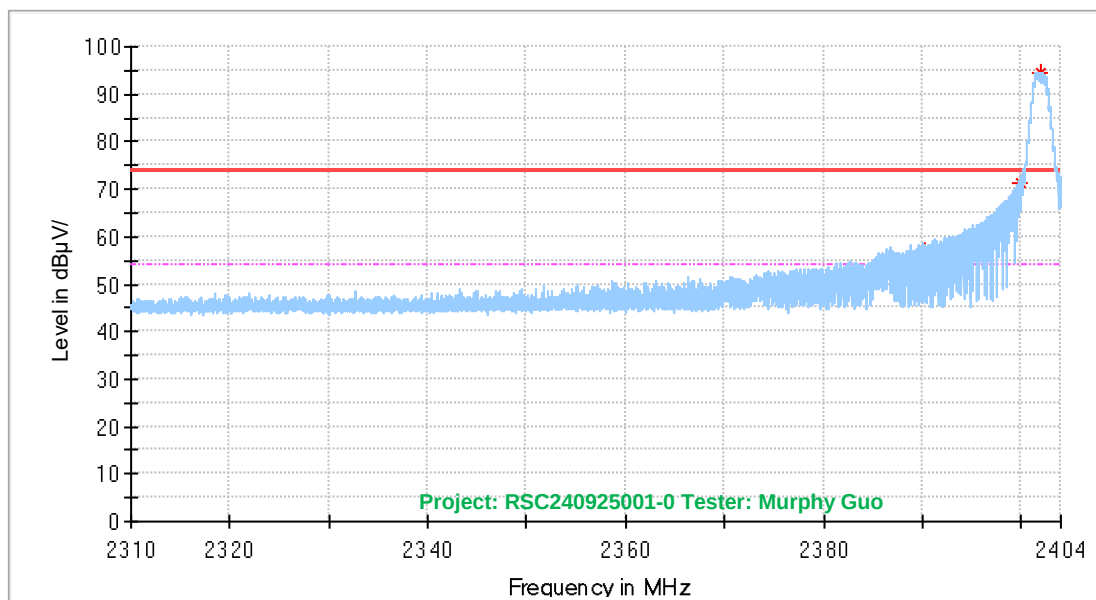
Average, Right_Horizontal

Frequency (MHz)	Average (dBµ V/m)	Limit (dBµ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
2479.900800	91.12	---	---	199.0	H	177.0	-0.3
2483.570400	34.53	54.00	19.47	199.0	H	173.0	-0.3

Average, Right_Vertical

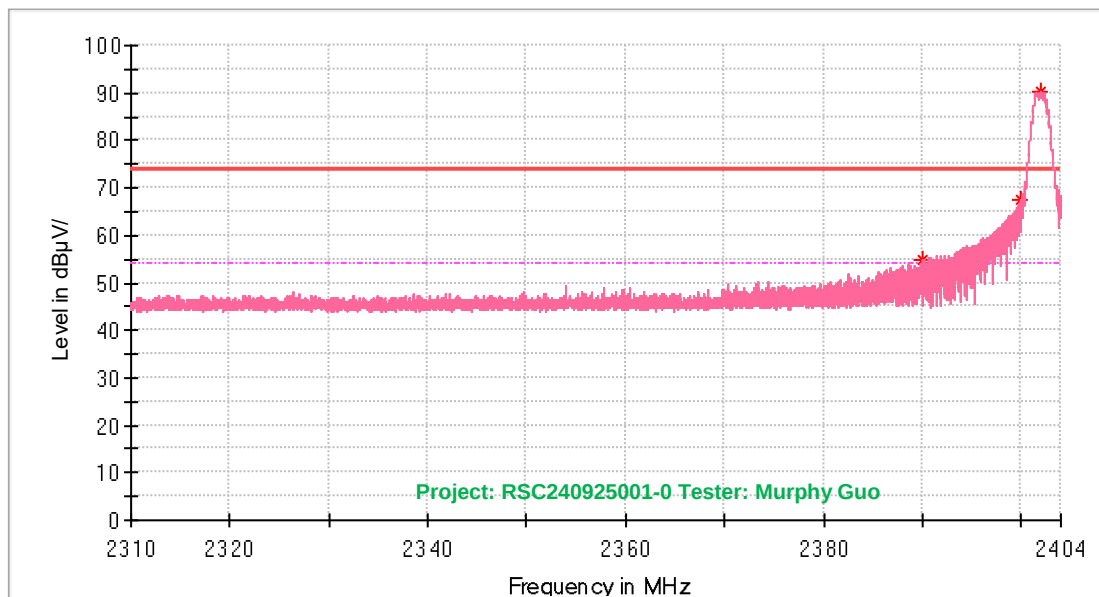


Frequency (MHz)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
2479.894200	89.76	---	---	166.0	V	245.0	-0.3
2483.539600	34.48	54.00	19.52	166.0	V	241.0	-0.3

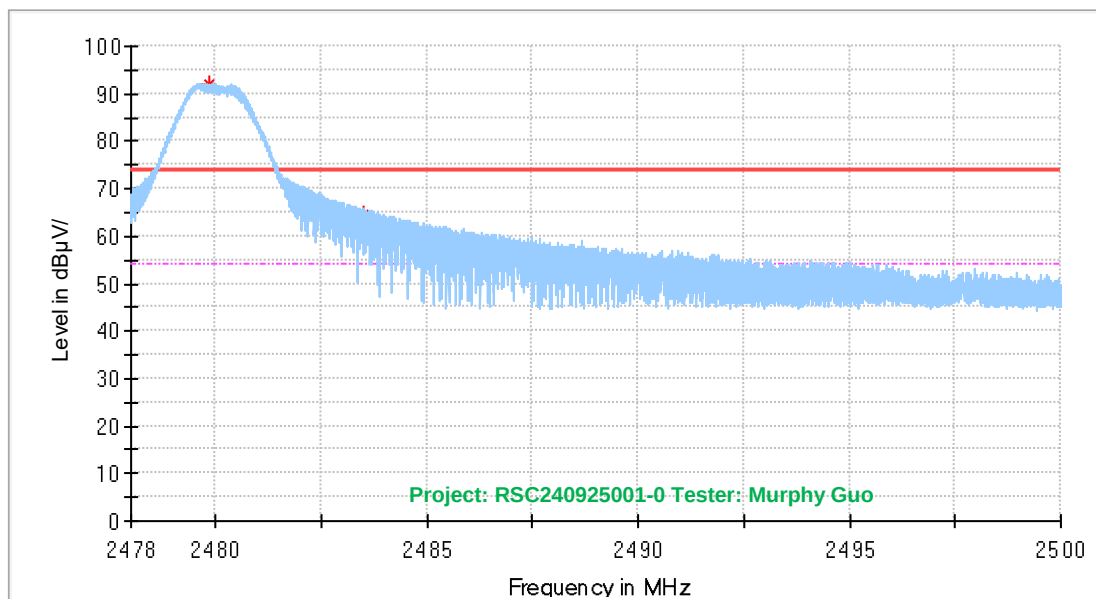
2Mbps mode**Peak, Left_ Horizontal**

Frequency (MHz)	MaxPeak (dBµ V/m)	Limit (dBµ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
2390.172600	56.79	74.00	17.21	173.0	H	358.0	-0.3
2399.948600	71.25	74.63	3.38	173.0	H	168.0	-0.2
2401.997800	94.63	---	---	173.0	H	164.0	-0.2

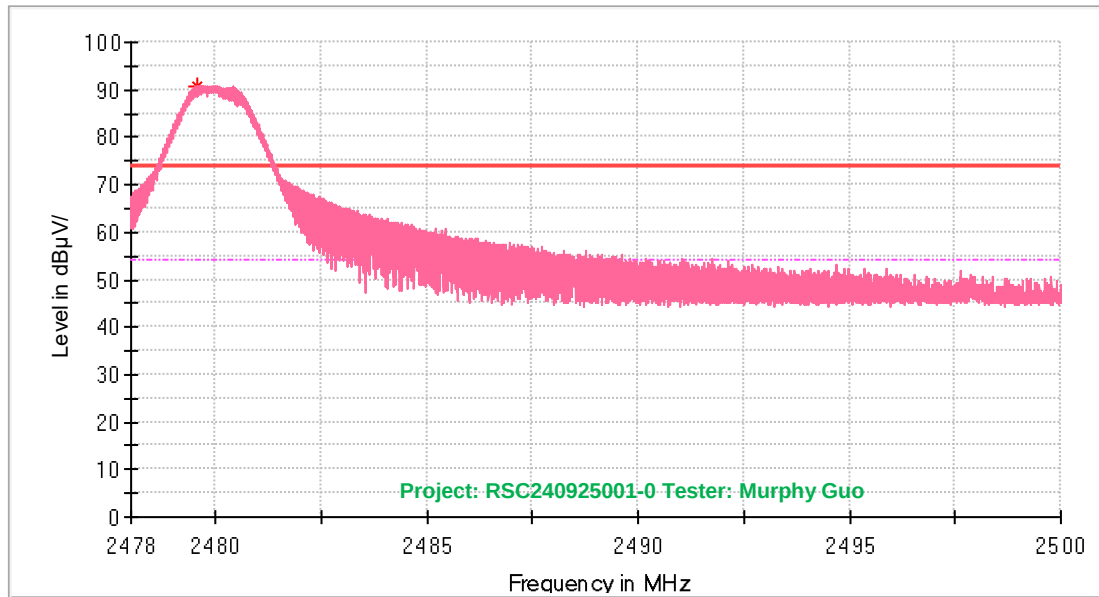
Peak, Left_Vertical



Frequency (MHz)	MaxPeak (dBµ V/m)	Limit (dBµ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
2389.994000	54.84	74.00	19.16	241.0	V	234.0	-0.3
2399.967400	67.67	70.10	2.43	241.0	V	238.0	-0.2
2402.054200	90.10	---	---	241.0	V	238.0	-0.2

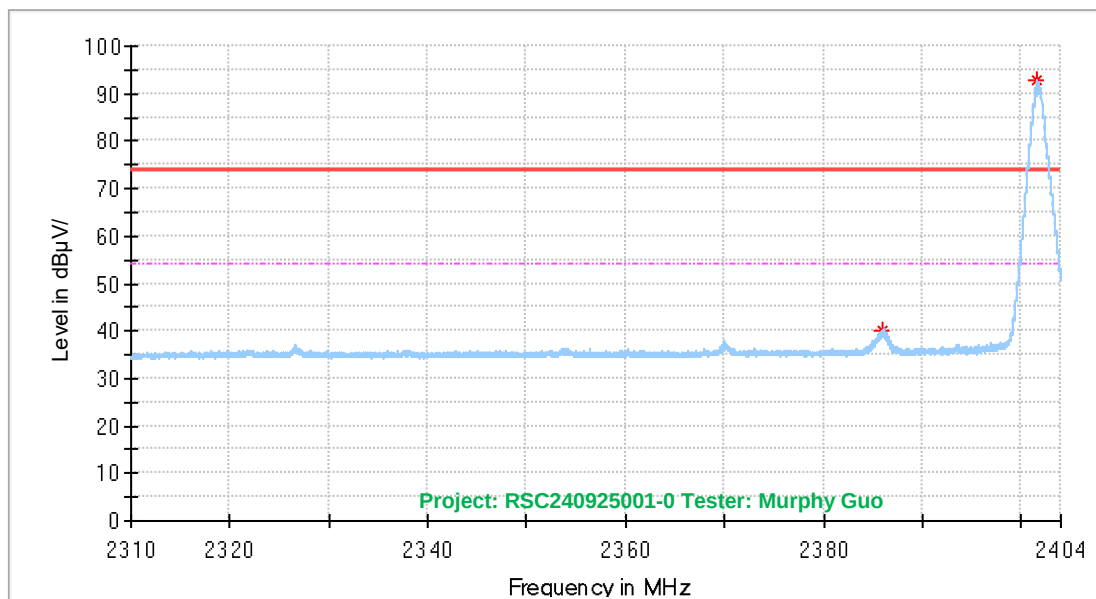
Peak, Right_Horizontal

Frequency (MHz)	MaxPeak (dBµ V/m)	Limit (dBµ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
2479.867800	91.96	---	---	199.0	H	175.0	-0.3
2483.511000	64.36	74.00	9.64	199.0	H	160.0	-0.3

Peak, Right_Vertical

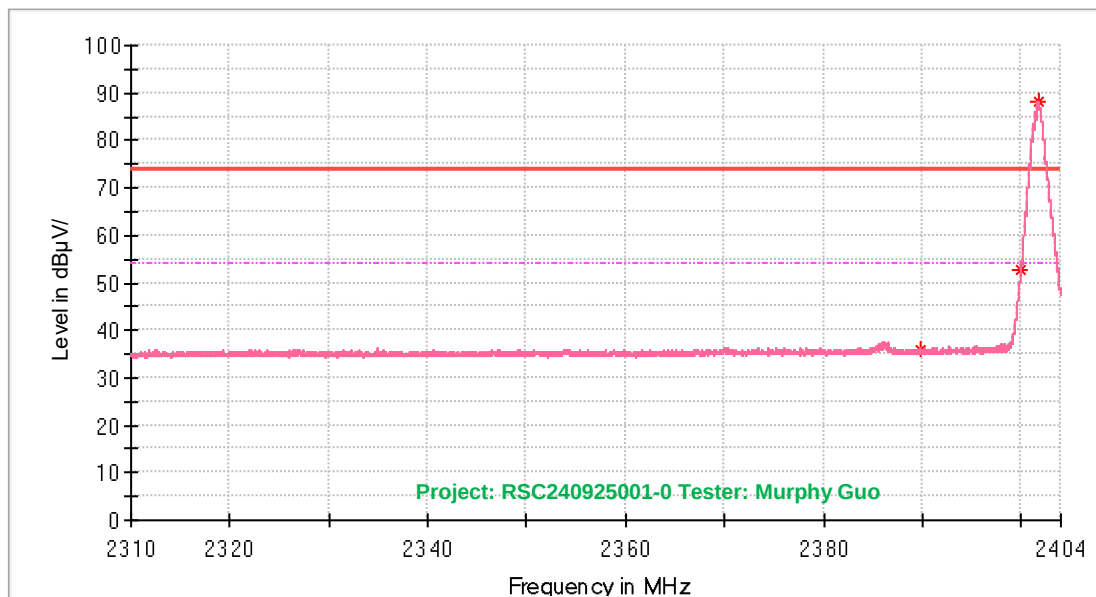
Frequency (MHz)	MaxPeak (dBµ V/m)	Limit (dBµ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
2479.586200	90.73	---	---	166.0	V	245.0	-0.3
2483.502200	60.35	74.00	13.65	166.0	V	222.0	-0.3

Average, Left_Horizontal

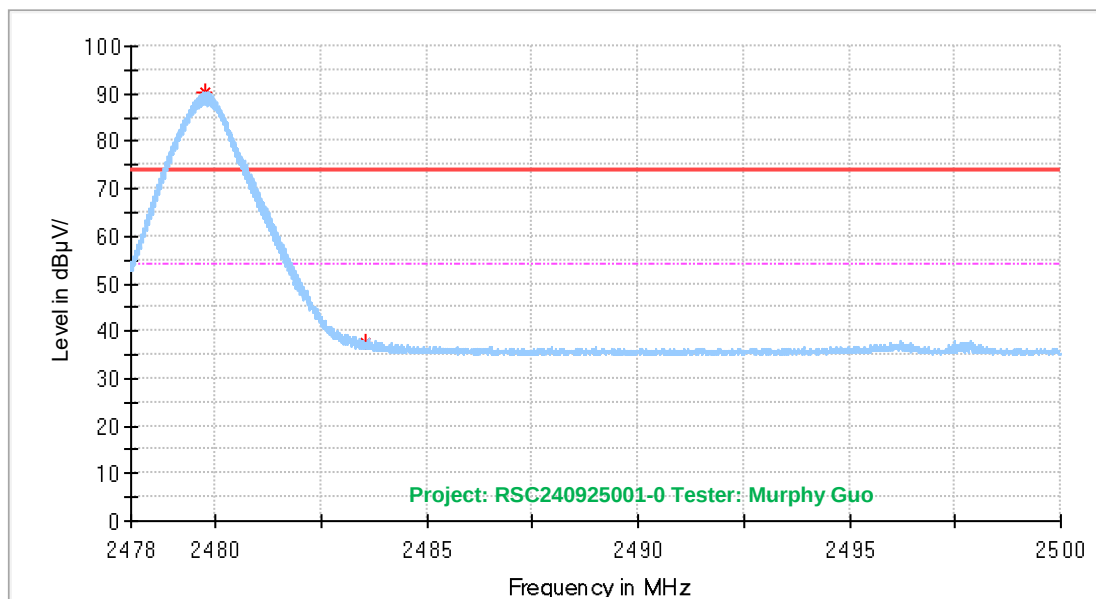


Frequency (MHz)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
2386.036600	39.93	54.00	14.07	173.0	H	355.0	-0.3
2401.650000	92.86	---	---	173.0	H	168.0	-0.2

Average, Left_Vertical

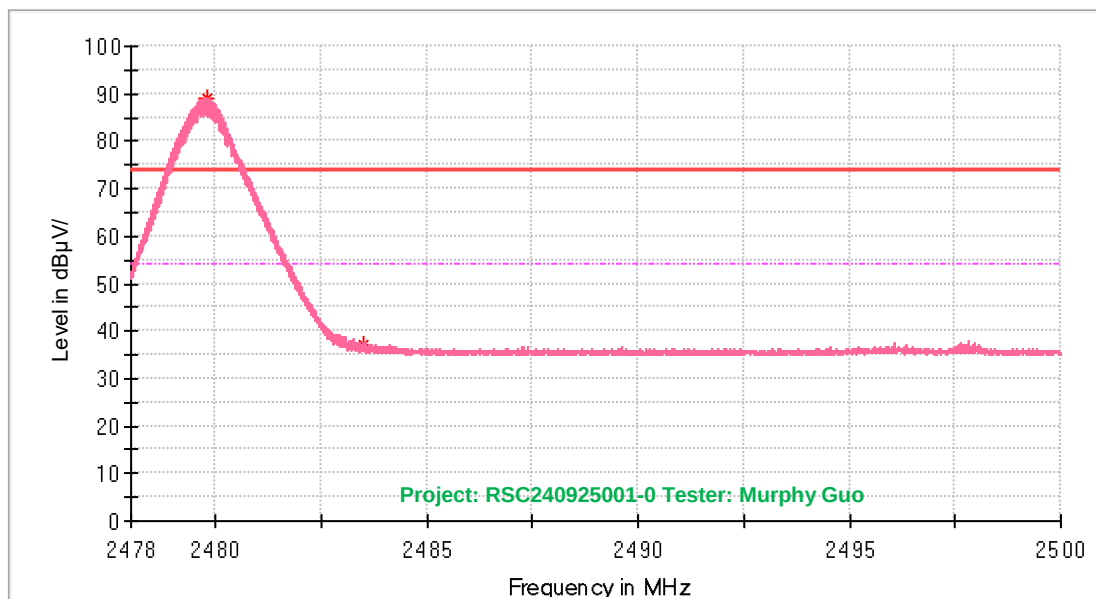


Frequency (MHz)	Average (dBμ V/m)	Limit (dBμ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
2389.815400	35.99	54.00	18.01	241.0	V	263.0	-0.3
2401.687600	88.19	---	---	241.0	V	243.0	-0.2

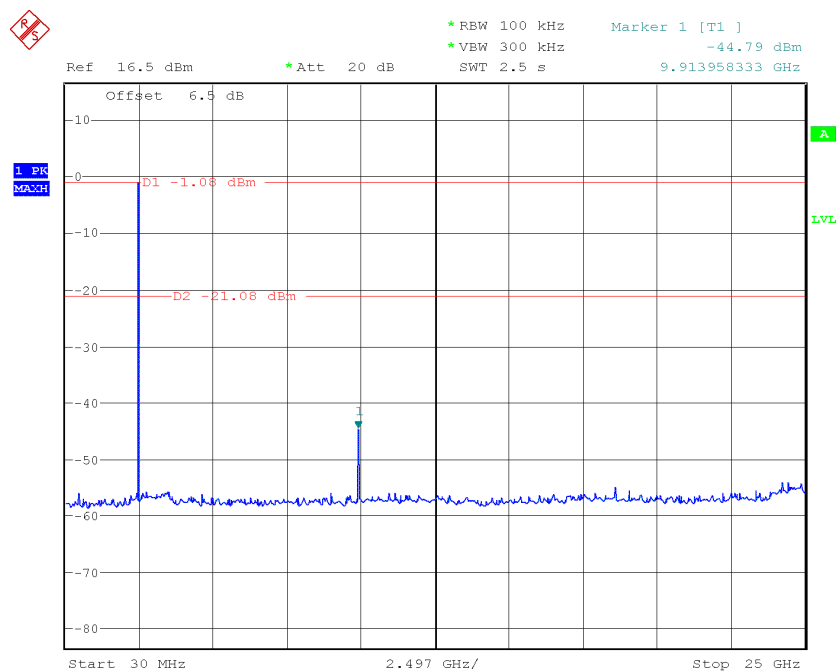
Average, Right_Horizontal

Frequency (MHz)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
2479.755600	90.41	---	---	199.0	H	177.0	-0.3
2483.537400	37.45	54.00	16.55	199.0	H	181.0	-0.3

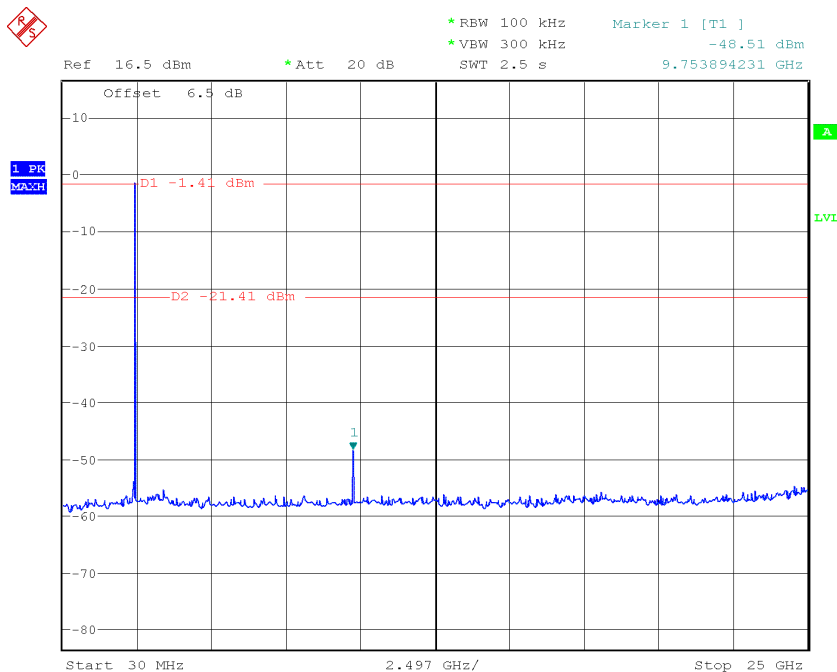
Average, Right_Vertical



Frequency (MHz)	Average (dBμ V/m)	Limit (dBμ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
2479.782000	88.94	---	---	166.0	V	242.0	-0.3
2483.519800	37.24	54	16.76	166.0	V	298.0	-0.3

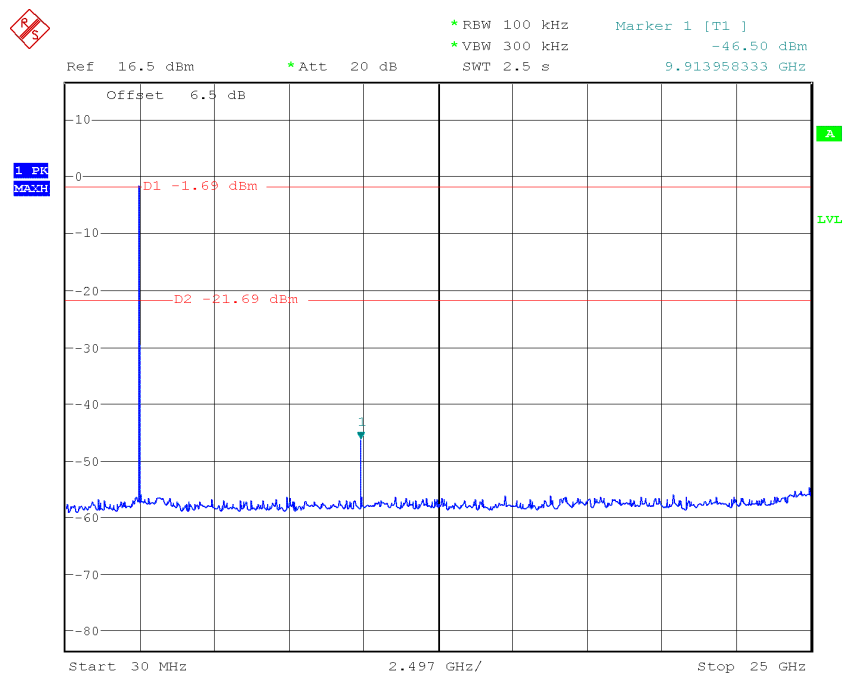
Conducted Spurious Emission At Antenna Port:**250kbps mode****Low Channel**

Comment: Project:RSC240925001-0 Tester:Murphy Guo
Date: 29.SEP.2024 21:30:10

Middle Channel

Comment: Project:RSC240925001-0 Tester:Murphy Guo
Date: 29.SEP.2024 21:24:48

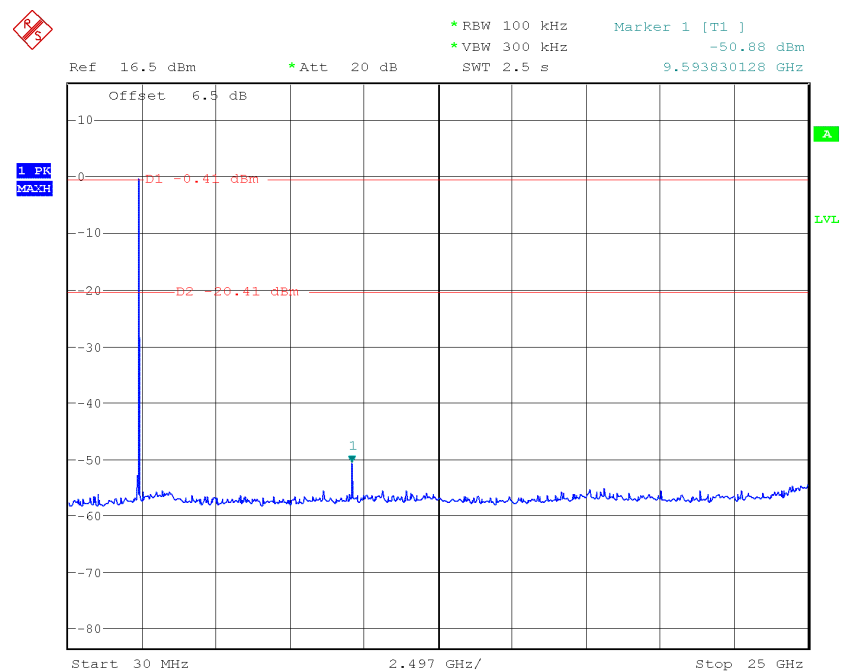
High Channel



Comment: Project:RSC240925001-0 Tester:Murphy Guo
Date: 29.SEP.2024 21:21:40

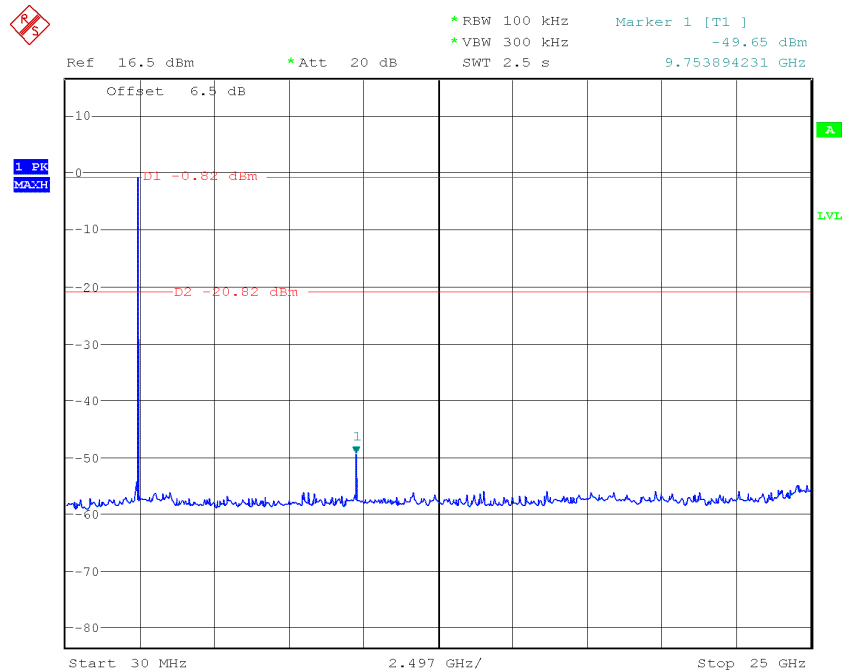
1Mbps mode

Low Channel



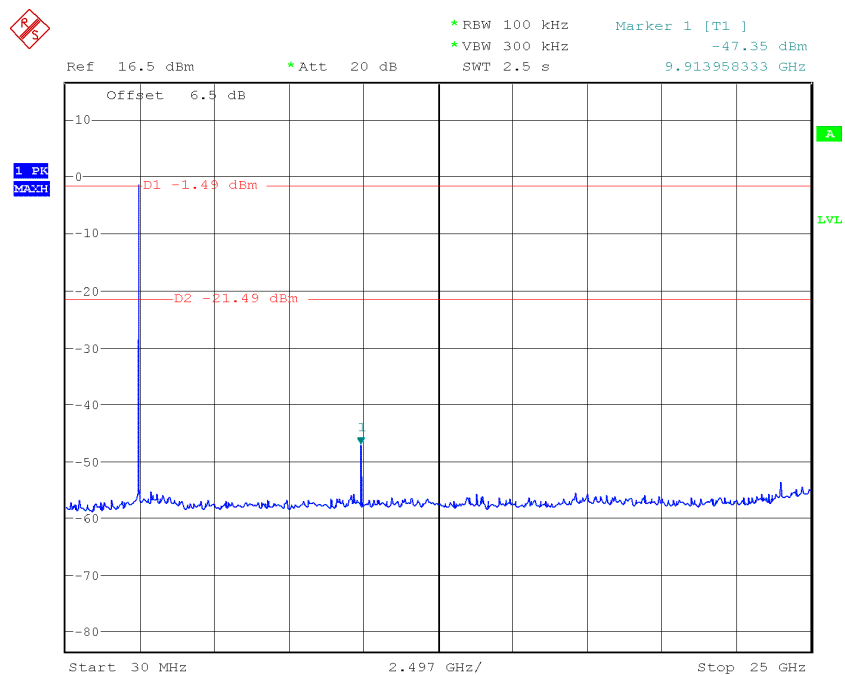
Comment: Project:RSC240925001-0 Tester:Murphy Guo
Date: 29.SEP.2024 21:19:30

Middle Channel



Comment: Project:RSC240925001-0 Tester:Murphy Guo
Date: 29.SEP.2024 21:11:30

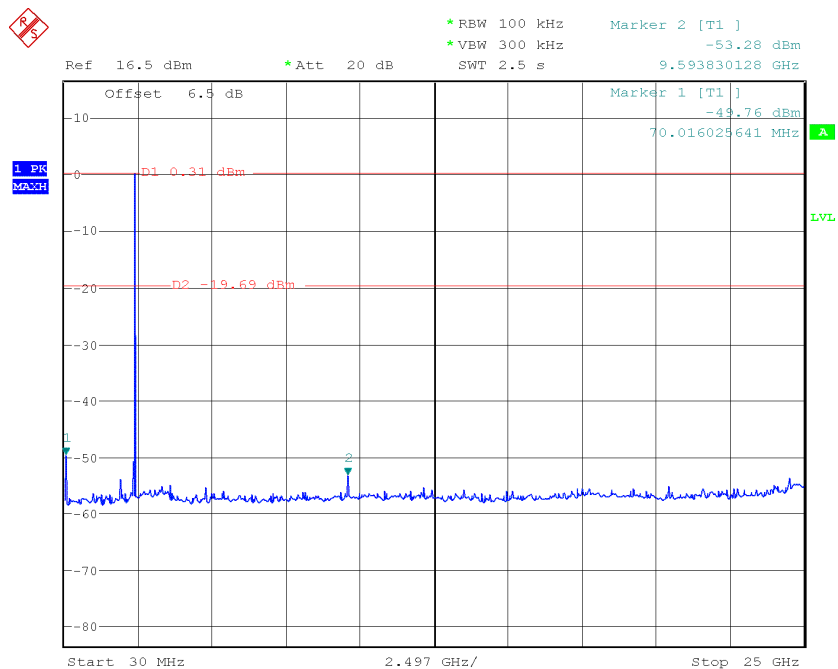
High Channel



Comment: Project:RSC240925001-0 Tester:Murphy Guo
Date: 29.SEP.2024 21:09:29

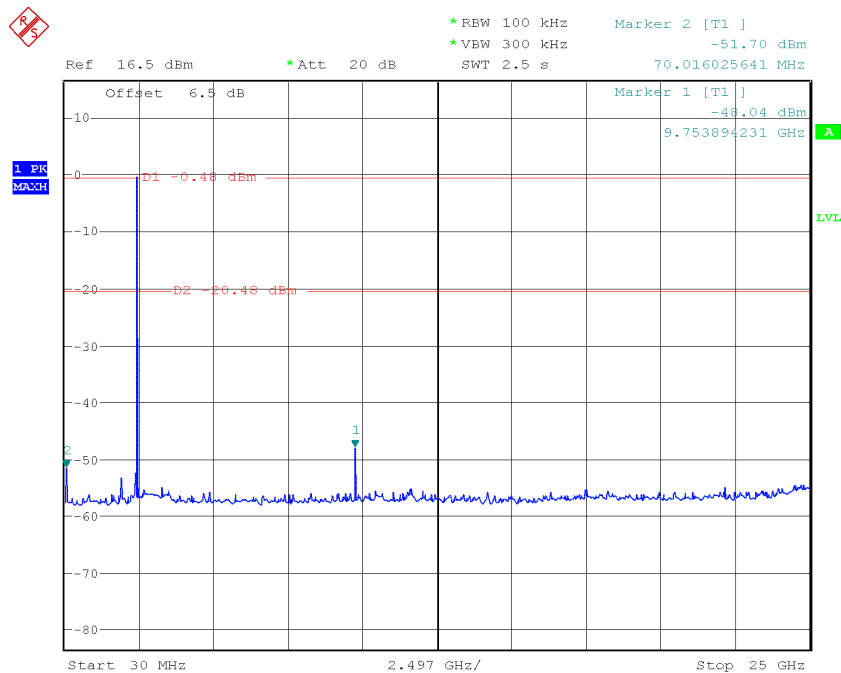
2Mbps mode

Low Channel



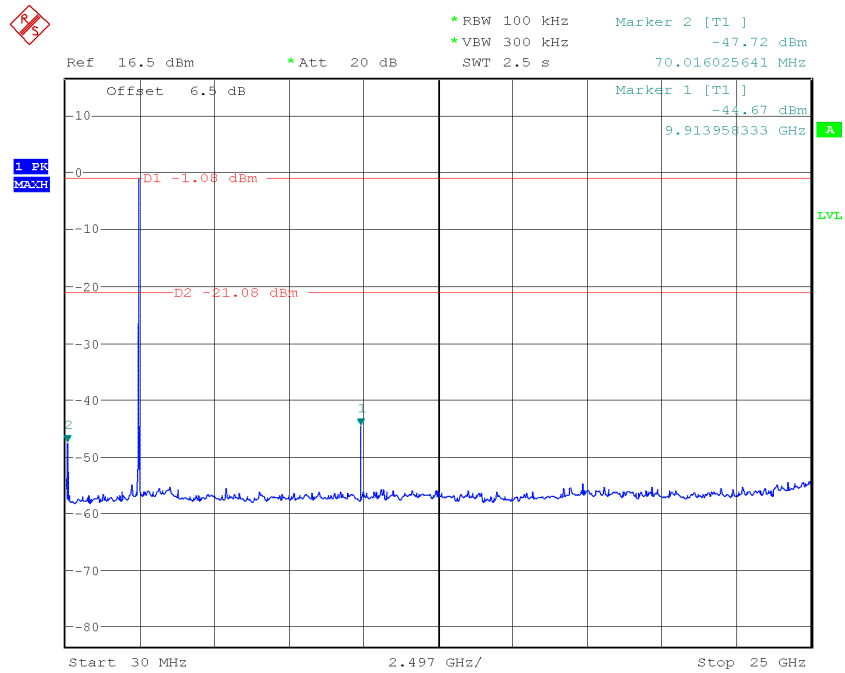
Comment: Project:RSC240925001-0 Tester:Murphy Guo
Date: 29.SEP.2024 14:52:59

Middle Channel



Comment: Project:RSC240925001-0 Tester:Murphy Guo
Date: 29.SEP.2024 15:03:50

High Channel



FCC §15.247(a) (2) – 6 dB EMISSION BANDWIDTH

Applicable Standard

Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, 5725–5850 MHz bands.

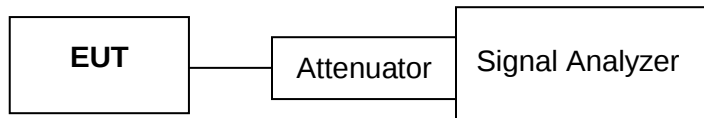
The minimum 6 dB bandwidth shall be at least SRD.

Test Procedure

ANSI C63.10-2020 Clause 11.8.1 Option 1

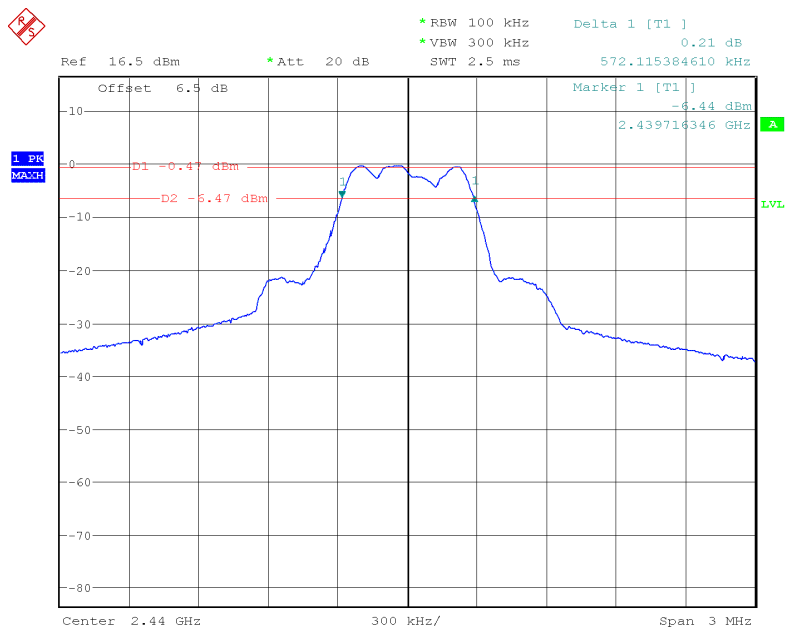
- a) Set RBW = 100 kHz.
- b) Set the video bandwidth (VBW) $\geq 3 \times \text{RBW}$
- c) Detector = Peak.
- d) Trace mode = max hold.
- e) Sweep = auto couple.
- f) Allow the trace to stabilize.
- g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

Test Setup Block



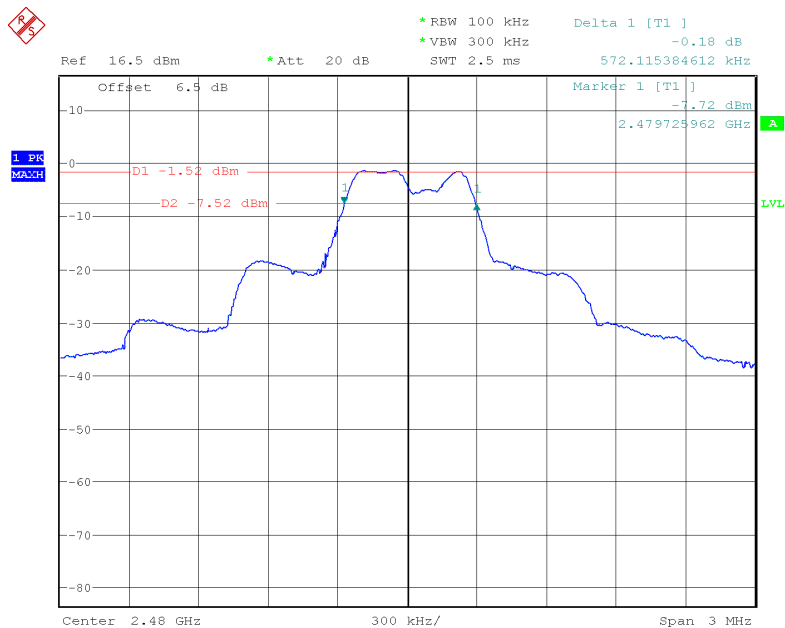
Note: Offset (6.5dB) = 6dB Attenuator(6dB) + RF cable loss(0.5dB)

Middle Channel



Comment: Project:RSC240925001-0 Tester:Murphy Guo
Date: 29.SEP.2024 14:01:44

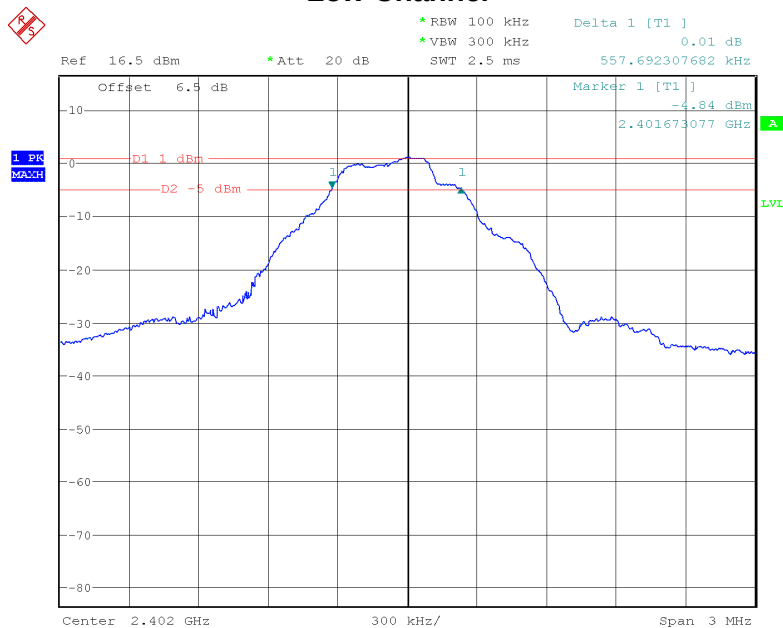
High Channel



Comment: Project:RSC240925001-0 Tester:Murphy Guo
Date: 29.SEP.2024 14:12:36

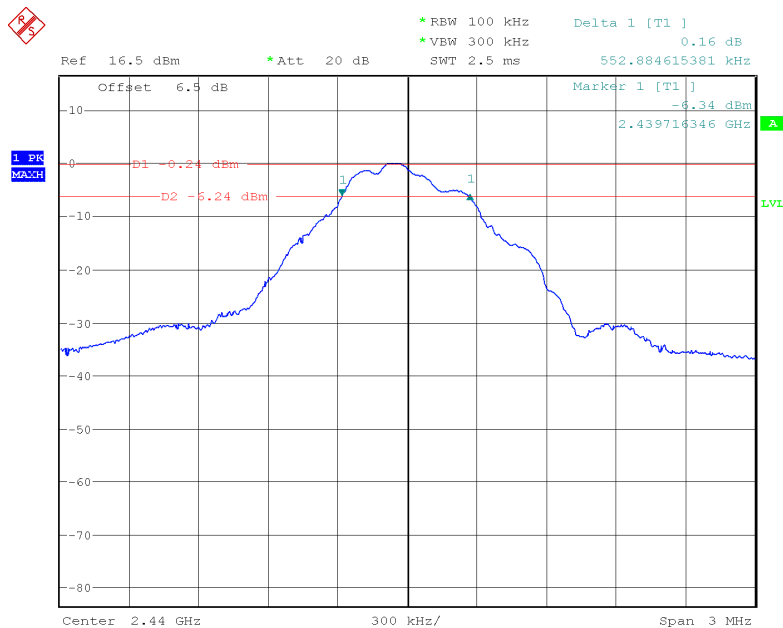
1Mbps mode

Low Channel



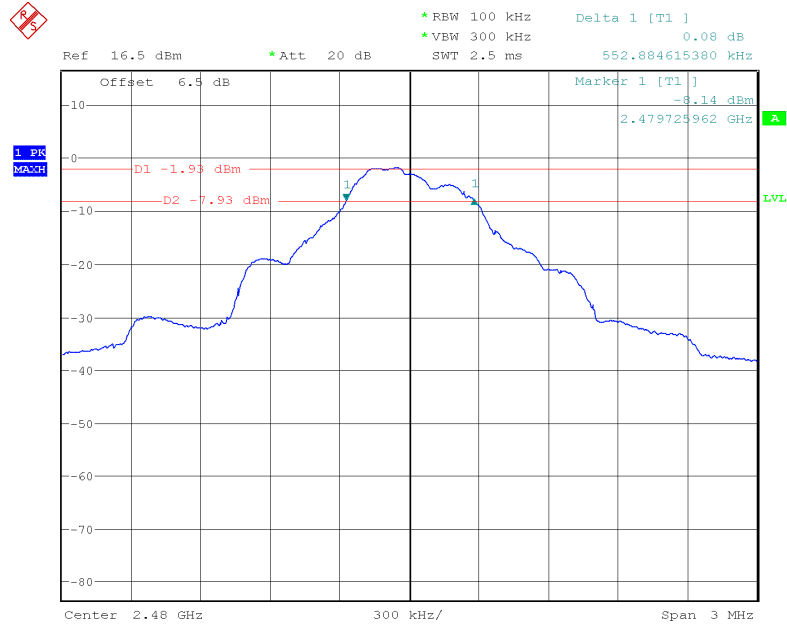
Comment: Project:RSC240925001-0 Tester:Murphy Guo
Date: 29.SEP.2024 13:46:18

Middle Channel



Comment: Project:RSC240925001-0 Tester:Murphy Guo
Date: 29.SEP.2024 13:57:13

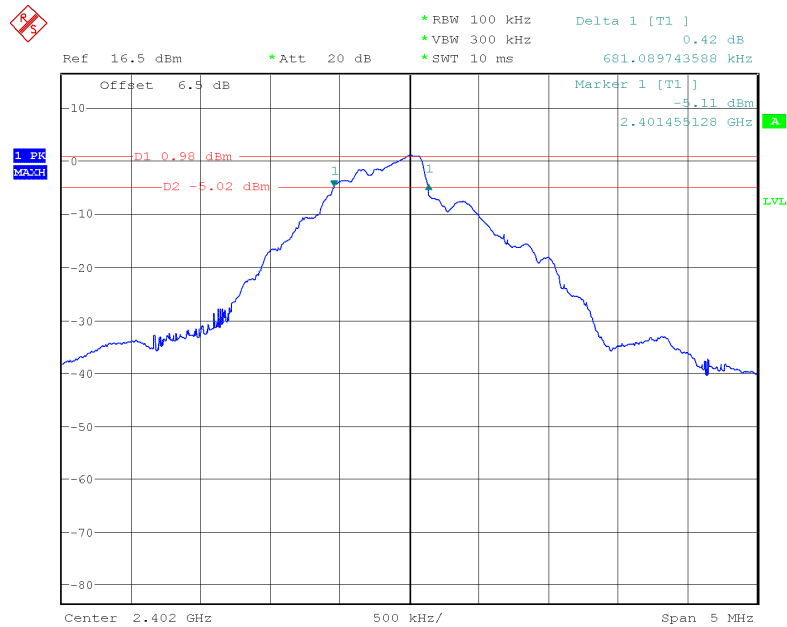
High Channel



Comment: Project:RSC240925001-0 Tester:Murphy Guo
Date: 29.SEP.2024 19:34:40

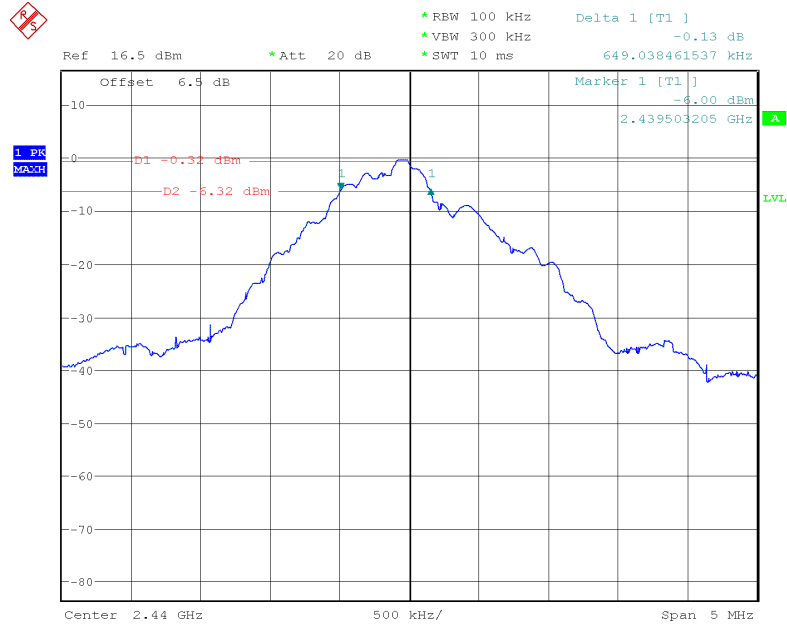
2Mbps mode

Low Channel



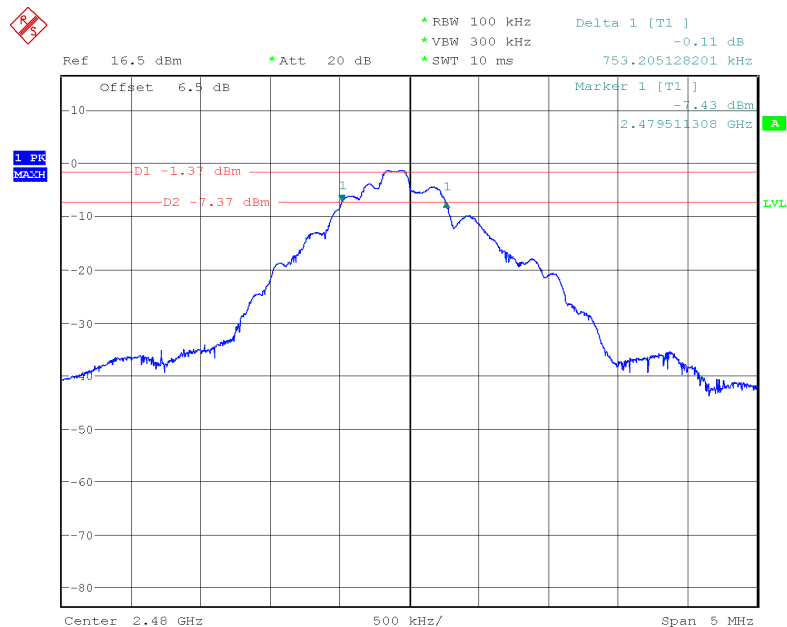
Comment: Project:RSC240925001-0 Tester:Murphy Guo
Date: 29.SEP.2024 16:52:00

Middle Channel



Comment: Project:RSC240925001-0 Tester:Murphy Guo
Date: 29.SEP.2024 16:57:24

High Channel



Comment: Project:RSC240925001-0 Tester:Murphy Guo
Date: 29.SEP.2024 17:18:55

FCC §15.247(b) (3) - MAXIMUM CONDUCTED OUTPUT POWER

Applicable Standard

According to FCC §15.247(b) (3), for systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

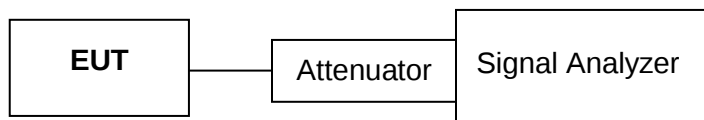
Test Procedure

ANSI C63.10-2020 Clause 11.9.1.1 $RBW \geq DTS$ bandwidth

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

- a) Set the $RBW \geq DTS$ bandwidth.
- b) Set $VBW \geq [3 \times RBW]$.
- c) Set span $\geq [3 \times RBW]$.
- d) Sweep time = No faster than coupled (auto) time.
- e) Detector = peak.
- f) Trace mode = max hold.
- g) Allow trace to fully stabilize.
- h) Use peak marker function to determine the peak amplitude level.

Test Setup Block



Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	63 %
ATM Pressure:	96.2 kPa

The testing was performed by Murphy Guo on 2024-09-29.

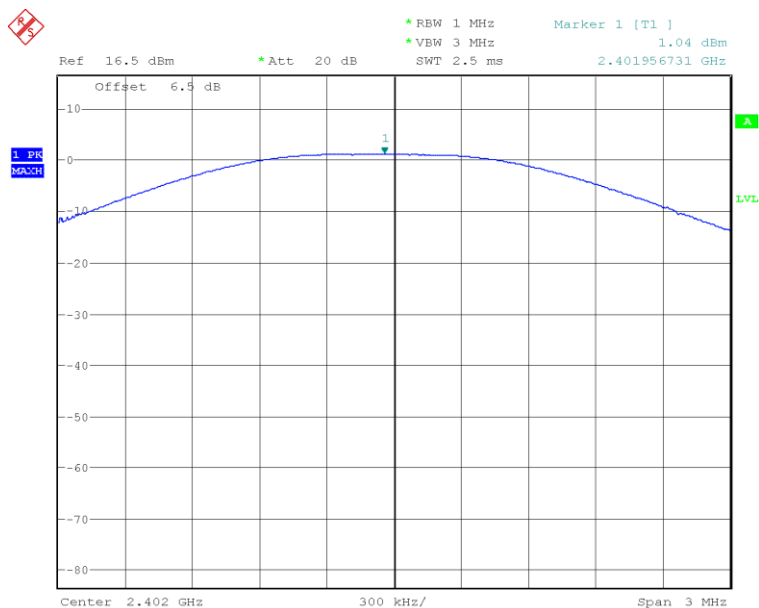
Test Mode: Transmitting

Test Result: Compliance. Please refer to the following table and plots.

Mode	Channel	Frequency (MHz)	Conducted Output Power (dBm)	Limit (dBm)
250kbps	Low	2402	1.04	≤30
	Middle	2440	-0.20	≤30
	High	2480	-1.24	≤30
1Mbps	Low	2402	1.04	≤30
	Middle	2440	-0.35	≤30
	High	2480	-1.34	≤30
2Mbps	Low	2402	1.06	≤30
	Middle	2440	-0.22	≤30
	High	2480	-1.33	≤30

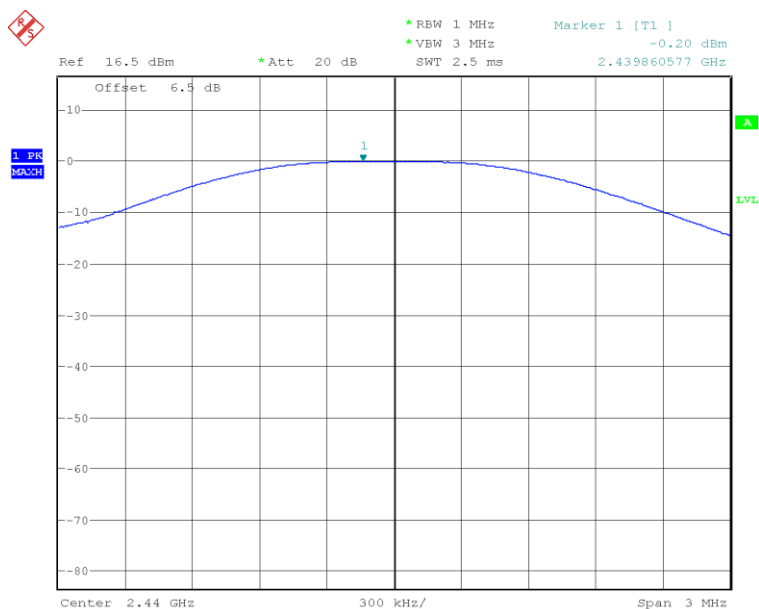
250kbps mode

Low Channel



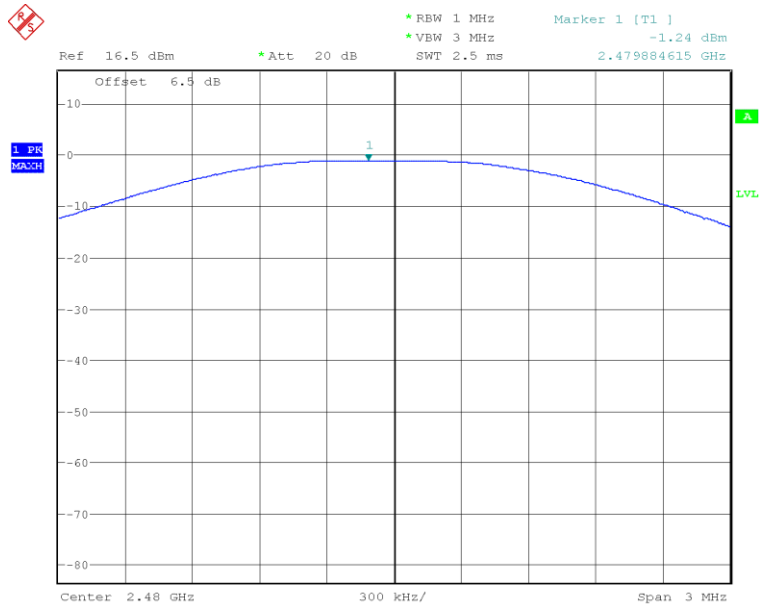
Comment: Project:RSC240925001-0 Tester:Murphy Guo
 Date: 29.SEP.2024 20:40:30

Middle Channel



Comment: Project:RSC240925001-0 Tester:Murphy Guo
 Date: 29.SEP.2024 20:53:28

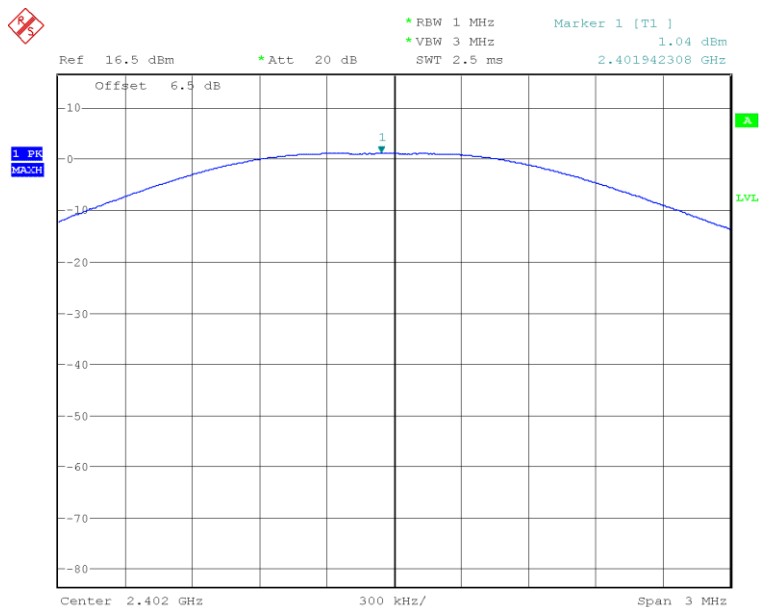
High Channel



Comment: Project:RSC240925001-0 Tester:Murphy Guo
Date: 29.SEP.2024 20:56:36

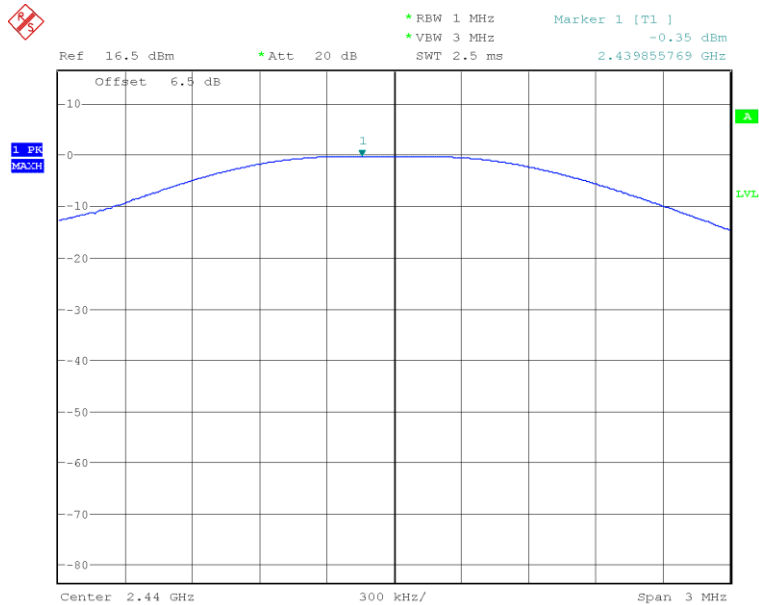
1Mbps mode

Low Channel



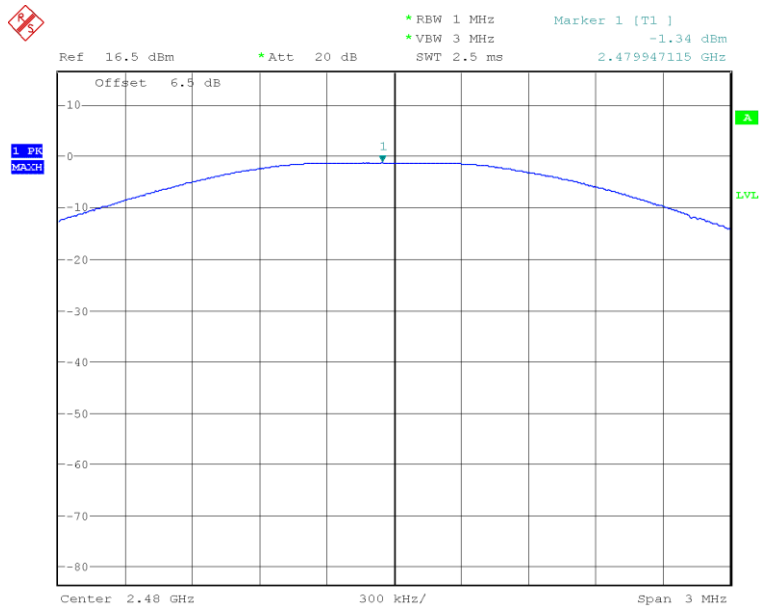
Comment: Project:RSC240925001-0 Tester:Murphy Guo
Date: 29.SEP.2024 20:43:02

Middle Channel

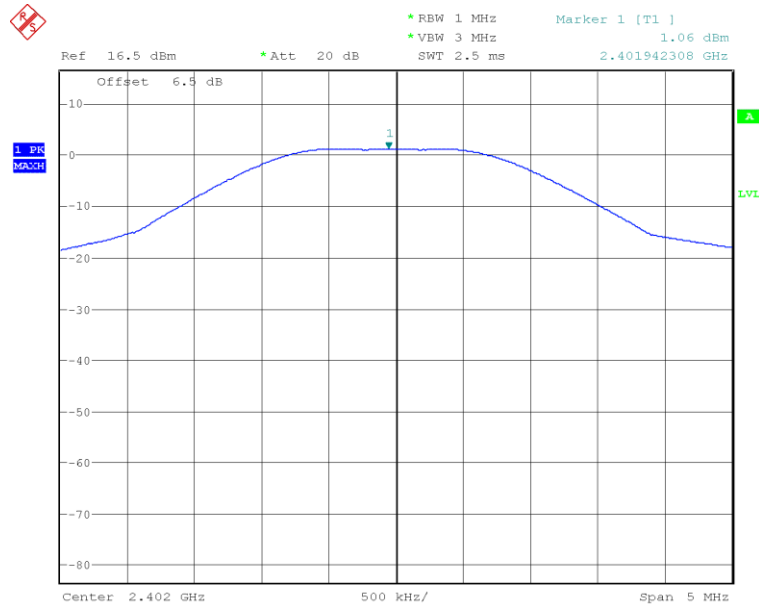


Comment: Project:RSC240925001-0 Tester:Murphy Guo
Date: 29.SEP.2024 20:52:05

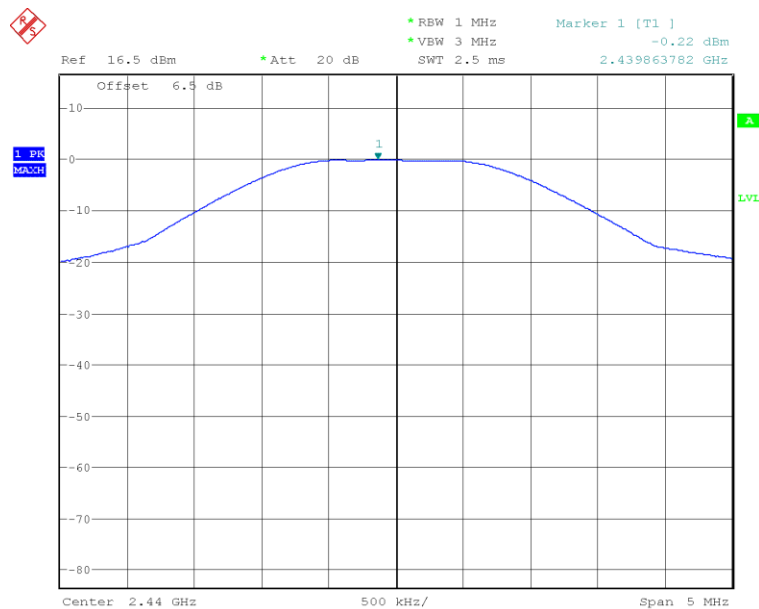
High Channel



Comment: Project:RSC240925001-0 Tester:Murphy Guo
Date: 29.SEP.2024 21:02:19

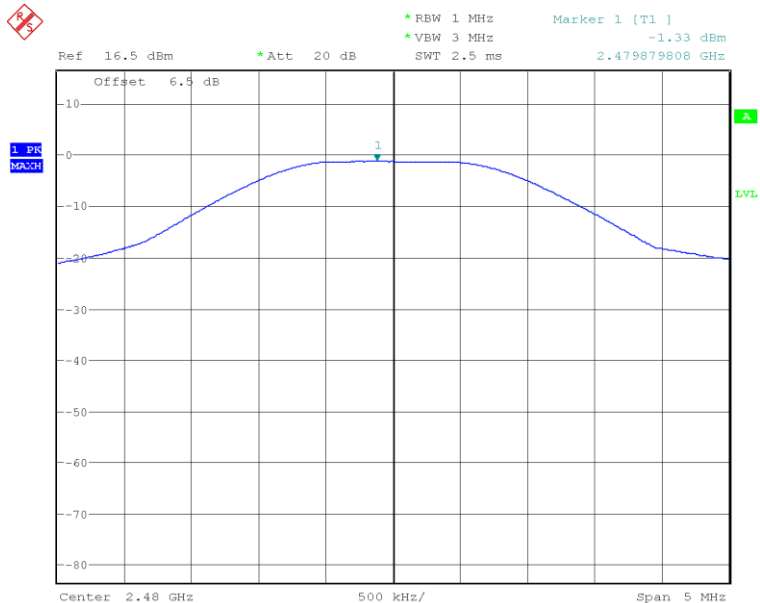
2Mbps mode**Low Channel**

Comment: Project:RSC240925001-0 Tester:Murphy Guo
Date: 29.SEP.2024 20:44:31

Middle Channel

Comment: Project:RSC240925001-0 Tester:Murphy Guo
Date: 29.SEP.2024 20:46:17

High Channel



Comment: Project:RSC240925001-0 Tester:Murphy Guo
Date: 29.SEP.2024 21:03:56

FCC §15.247(d) – 100 kHz BANDWIDTH OF FREQUENCY BAND EDGE

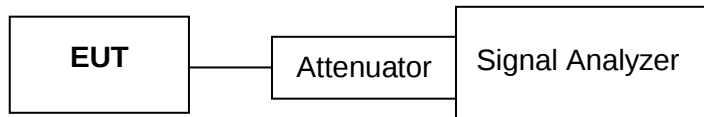
Applicable Standard

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

Test Procedure

1. Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
2. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
3. Repeat above procedures until all measured frequencies were complete.

Test Setup Block



Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	63 %
ATM Pressure:	96.2 kPa

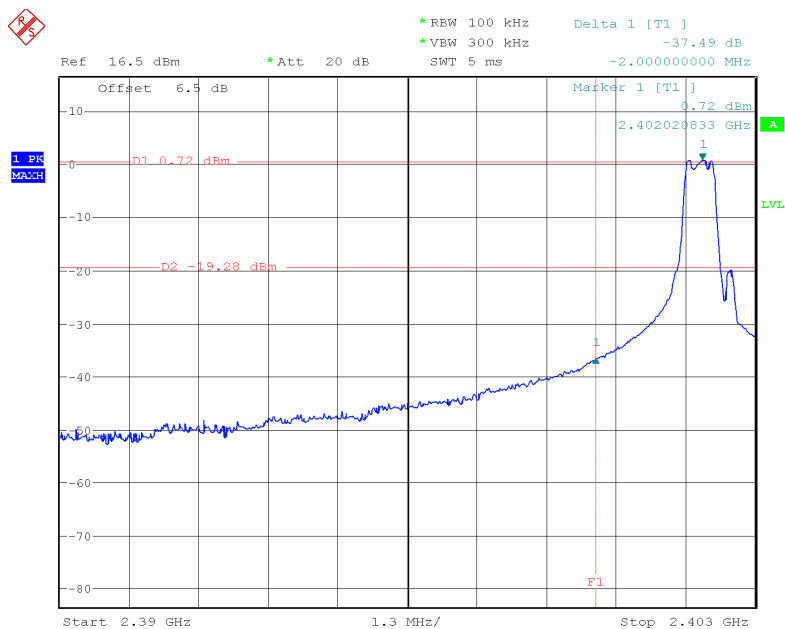
The testing was performed by Murphy Guo on 2024-09-29.

Test mode: Transmitting

Test Result: Compliance. Please refer to following plots.

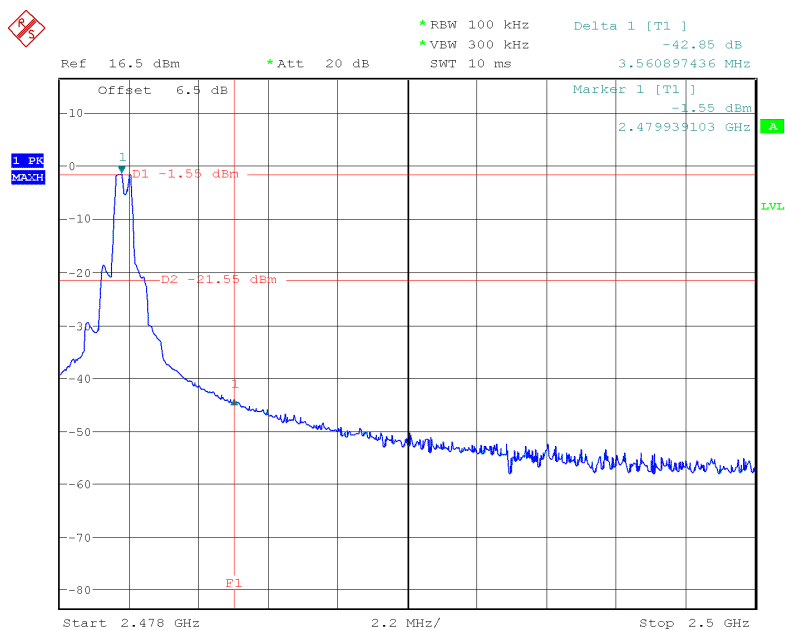
250kbps mode

Band Edge, Left Side



Comment: Project:RSC240925001-0 Tester:Murphy Guo
Date: 29.SEP.2024 21:51:16

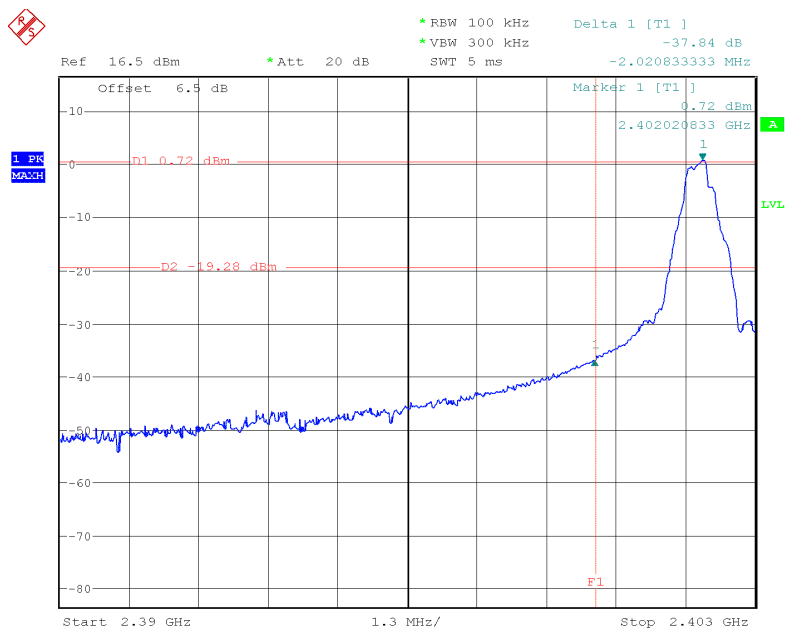
Band Edge, Right Side



Comment: Project:RSC240925001-0 Tester:Murphy Guo
Date: 29.SEP.2024 21:42:06

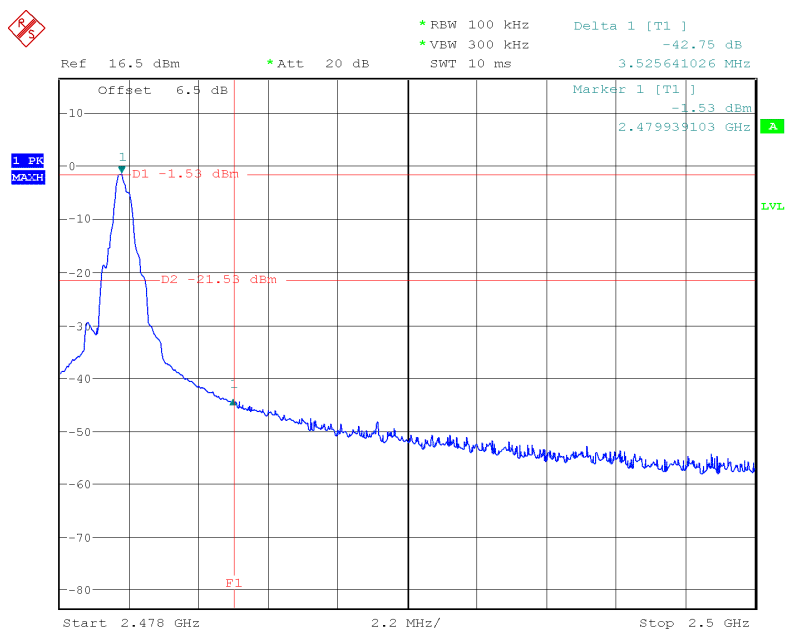
1Mbps mode

Band Edge, Left Side



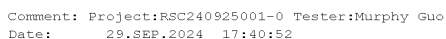
Comment: Project:RSC240925001-0 Tester:Murphy Guo
Date: 29.SEP.2024 21:46:30

Band Edge, Right Side



Comment: Project:RSC240925001-0 Tester:Murphy Guo
Date: 29.SEP.2024 21:37:28

Band Edge, Left Side



Comment: Project:RSC240925001-0 Tester:Murphy Guo
Date: 29.SEP.2024 17:45:14

FCC §15.247(e) - POWER SPECTRAL DENSITY

Applicable Standard

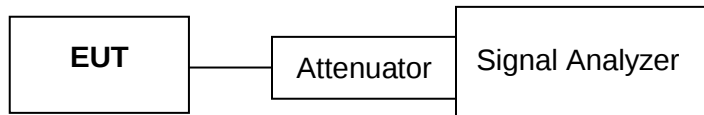
For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

Test Procedure

ANSI C63.10-2020 Clause 11.10.2(PKPSD)

- a) Set analyzer center frequency to DTS channel center frequency.
- b) Set the span to 1.5 times the DTS bandwidth.
- c) Set the RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- d) Set the VBW $\geq 3 \times \text{RBW}$.
- e) Detector = peak.
- f) Sweep time = auto couple.
- g) Trace mode = max hold.
- h) Allow trace to fully stabilize.
- i) Use the peak marker function to determine the maximum amplitude level within the RBW.
- j) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

Test Setup Block



Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	63 %
ATM Pressure:	96.2 kPa

The testing was performed by Murphy Guo on 2024-09-29.

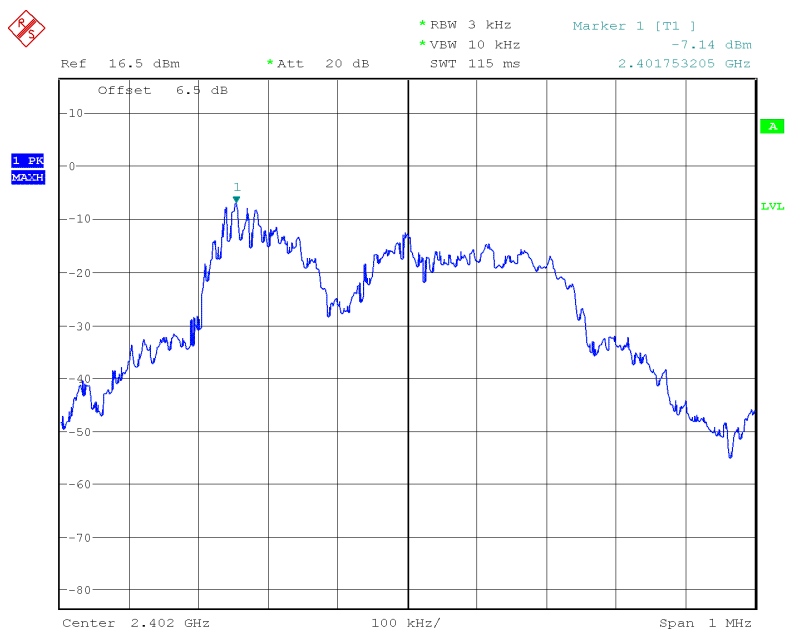
Test Mode: Transmitting

Test Result: Compliance. Please refer to the following table and plots.

Mode	Channel	Frequency (MHz)	PKPSD (dBm/3KHz)	Limit (dBm/3kHz)
250kbps	Low	2402	-7.14	≤8
	Middle	2440	-8.25	≤8
	High	2480	-9.95	≤8
1Mbps	Low	2402	-11.72	≤8
	Middle	2440	-13.14	≤8
	High	2480	-14.96	≤8
2Mbps	Low	2402	-15.01	≤8
	Middle	2440	-15.90	≤8
	High	2480	-18.06	≤8

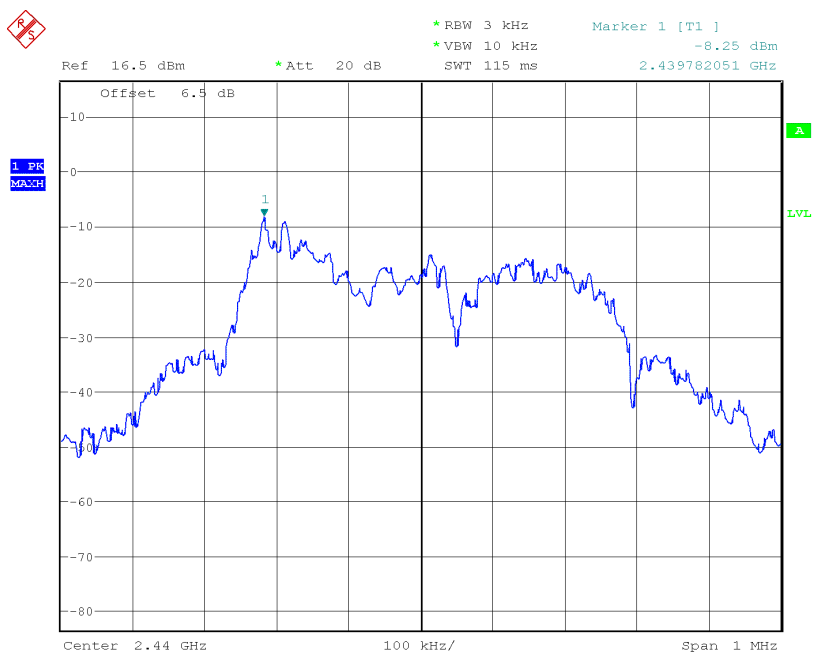
250kbps mode

Power Spectral Density, Low Channel



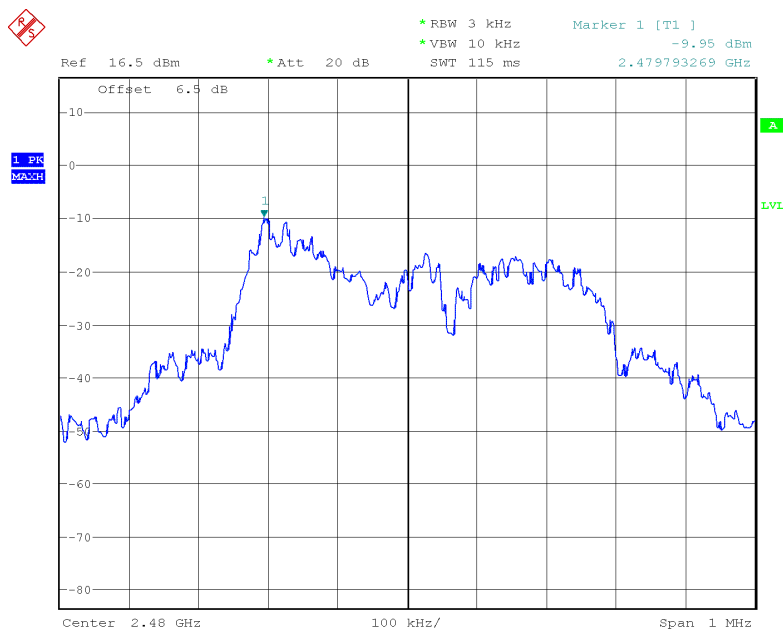
Comment: Project:RSC240925001-0 Tester:Murphy Guo
Date: 29.SEP.2024 20:40:47

Power Spectral Density, Middle Channel



Comment: Project:RSC240925001-0 Tester:Murphy Guo
Date: 29.SEP.2024 20:43:13

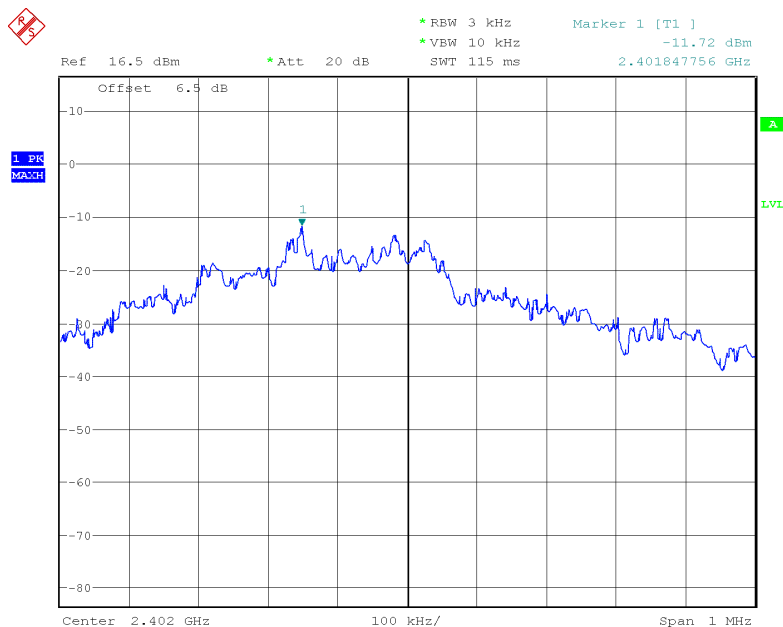
Power Spectral Density, High Channel



Comment: Project:RSC240925001-0 Tester:Murphy Guo
Date: 29.SEP.2024 20:44:21

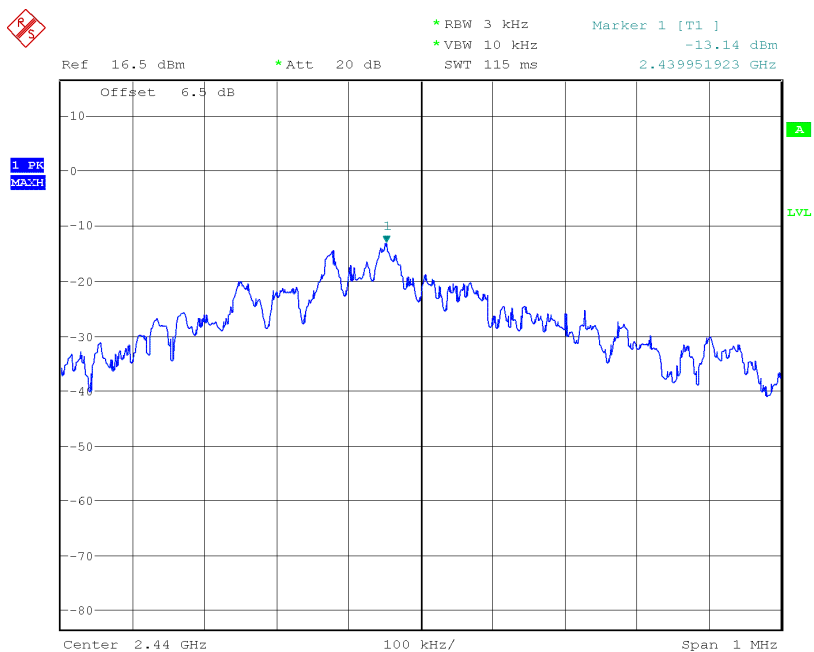
1Mbps mode

Power Spectral Density, Low Channel



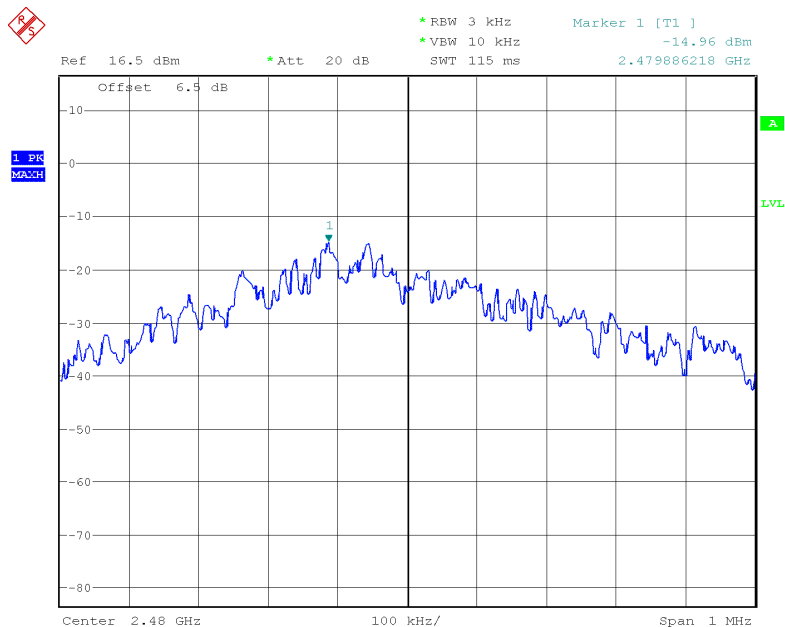
Comment: Project:RSC240925001-0 Tester:Murphy Guo
Date: 29.SEP.2024 20:51:39

Power Spectral Density, Middle Channel



Comment: Project:RSC240925001-0 Tester:Murphy Guo
Date: 29.SEP.2024 20:47:56

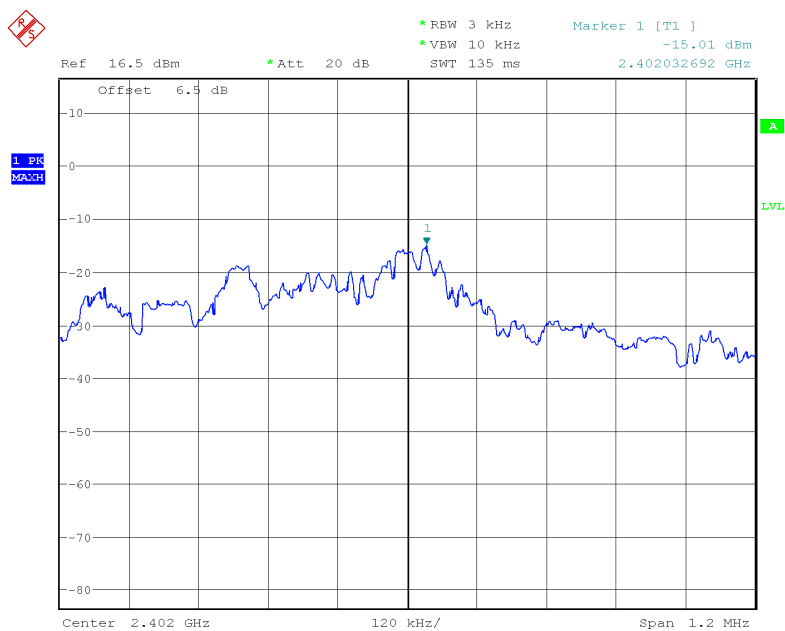
Power Spectral Density, High Channel



Comment: Project:RSC240925001-0 Tester:Murphy Guo
Date: 29.SEP.2024 20:46:12

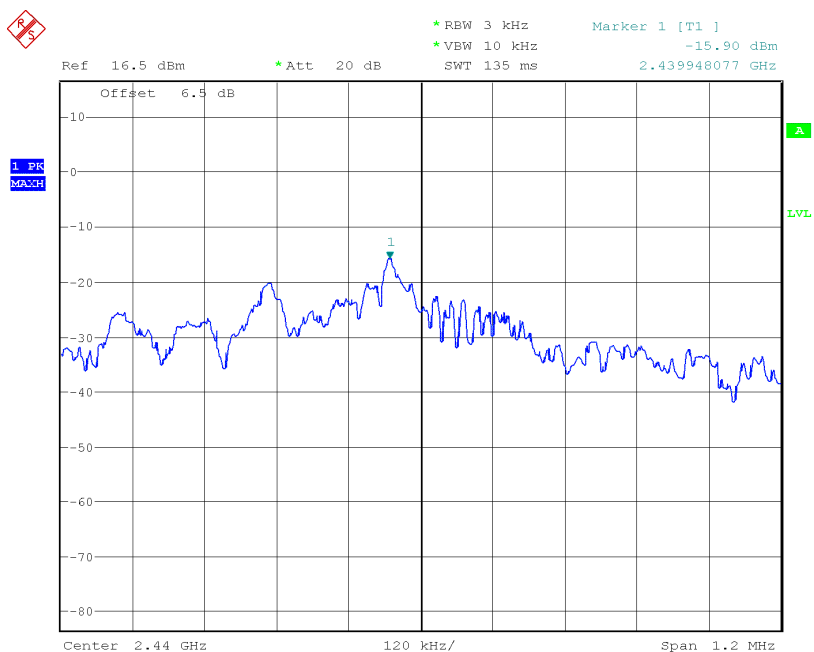
2Mbps mode

Power Spectral Density, Low Channel



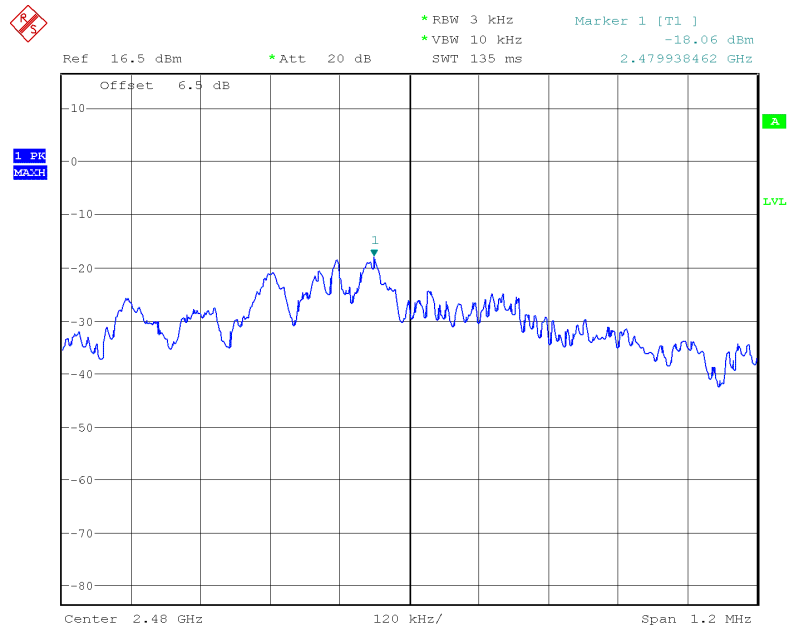
Comment: Project:RSC240925001-0 Tester:Murphy Guo
Date: 29.SEP.2024 14:20:18

Power Spectral Density, Middle Channel



Comment: Project:RSC240925001-0 Tester:Murphy Guo
Date: 29.SEP.2024 14:18:13

Power Spectral Density, High Channel



Comment: Project:RSC240925001-0 Tester:Murphy Guo
Date: 29.SEP.2024 14:14:58

END OF REPORT