FCC PART 15.247

TEST REPORT

For

ZIONCOM ELECTRONICS (SHENZHEN) LTD.

Building A1-A2, Lantian Science and Technology Park, Xinyu Road,Xinqiao Henggang Block
Shajing Street, Baoan District, Shenzhen, Guangdong, China

FCC ID: X7DIP04304

Report Type:	**Product Name:**
Original Report	AC1200 Mini Dual Band Wireless Router

Report Number:	RDG170927005-00B
Report Date:	2017-10-30
Reviewed By:	Jerry Zhang EMC Manager
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Dongguan) No.69 Pulongcun, Puxinhu Industry Area, Tangxia, Dongguan, Guangdong, China Tel: +86-769-86858888 Fax: +86-769-86858891 www.baclcorp.com.cn

TABLE OF CONTENTS

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The ***ZIONCOM ELECTRONICS (SHENZHEN) LTD.***'s product, model number: ***A3 (FCC ID: X7DIP04304)*** (the "EUT") in this report was a ***AC1200 Mini Dual Band Wireless Router,*** which was measured approximately: 9.1cm(L)*8.0cm(W)*3.8cm(H) without antenna, 9.1cm(L)*16.0cm(W)*20.8cm(H) with antenna, rated power: DC 9V from adapter.

Adapter Information:
Model: DCP005C09080U
Input: AC100-240V, 50/60Hz, 0.2A
Output: DC9V, 0.8A

Note: The series product, model IP04304 is electrically identical with model A3, the difference between them is the model name, we selected A3 for fully testing, the detail was explained in the attached declaration letter.

**All measurement and test data in this report was gathered from production sample serial number: 170927005 (Assigned by BACL,Dongguan). The EUT was received on 2017-09-27.*

Objective

This report is prepared on behalf of ***ZIONCOM ELECTRONICS (SHENZHEN) 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 Rules Part 15-Subpart C, section 15.203, 15.205, 15.207, 15.209 and 15.247 rules.

Related Submittal(s)/Grant(s)

FCC Part 15E NII submissions with FCC ID: X7DIP04304.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices and KDB 558074 D01 DTS Meas Guidance v04.

All emissions measurement was performed and Bay Area Compliance Laboratories Corp. (Dongguan).

Measurement Uncertainty

Parameter	Measurement Uncertainty
Occupied Channel Bandwidth	±5 %
RF output power, conducted	±0.61dB
Power Spectral Density, conducted	±0.61 dB
Unwanted Emissions, radiated	30M~200MHz: 4.58 dB for Horizontal, 4.59 dB for Vertical 200M~1GHz: 4.83 dB for Horizontal, 5.85 dB for Vertical 1G~6GHz: 4.45 dB, 6G~26.5GHz: 5.23 dB
Unwanted Emissions, conducted	±1.5 dB
Temperature	±1℃
Humidity	±5%
DC and low frequency voltages	±0.4%
Duty Cycle	1%
AC Power Lines Conducted Emission	3.12 dB (150 kHz to 30 MHz)

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.69 Pulongcun, Puxinhu Industry Area, Tangxia, Dongguan, Guangdong, China.

Bay Area Compliance Laboratories Corp. (Dongguan) has been accredited to ISO/IEC 17025 by CNAS(Lab code: L5662). And accredited to ISO/IEC 17025 by NVLAP(Test Laboratory Accreditation Certificate Number 500069-0), the FCC Designation No. CN5002 under the KDB 974614 D01.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 273710. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

Bay Area Compliance Laboratories Corp. (Dongguan) was registered with ISED Canada under ISED Canada Registration Number 3062D.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in Engineering Mode, which was provided by the manufacturer.

The device has 2 external antennas for 2.4GHz and 5GHz. For 2.4GHz band, 11 channels are provided:

Channel	Frequency(MHz)	Channel	Frequency(MHz)
1	2412	7	2442
2	2417	8	2447
3	2422	9	2452
4	2427	10	2457
5	2432	11	2462
6	2437	/	/

For 802.11b, 802.11g, and 802.11n ht20 modes were test with channel 1,6,11.
For 802.11n ht40 mode was test with channel 3,6, 9.

The device supports SISO and MIMO mode at 802.11n ht20 and 802.11n ht40 mode, per pre-test, MIMO mode was the worst and reported.

Equipment Modifications

No modification was made to the EUT tested.

EUT Exercise Software

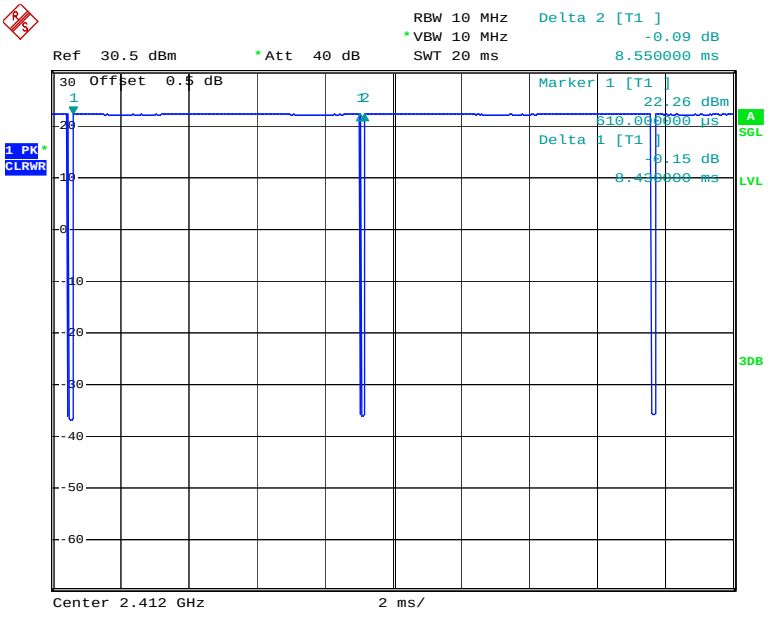
The software "QATool_Dbg" was used for testing, which was provided by manufacturer. The worst-case data rates are determined to be as follows for each mode based upon investigations by measuring the average power and PSD across all date rates bandwidths, and modulations. The maximum power was configured as below table, that provided by the manufacturer:

Test Mode	Test Software Version	QATool_Dbg		
802.11b	Test Frequency	2412MHz	2437MHz	2462MHz
	Data Rate	1Mbps	1Mbps	1Mbps
	Chain 0	26	26	26
	Chain 1	26	26	26
802.11g	Test Frequency	2412MHz	2437MHz	2462MHz
	Data Rate	6Mbps	6Mbps	6Mbps
	Chain 0	44	44	44
	Chain 1	44	44	44
802.11n ht20	Test Frequency	2412MHz	2437MHz	2462MHz
	Data Rate	MCS8	MCS8	MCS8
	Chain 0	30	30	30
	Chain 1	30	30	30
802.11n ht40	Test Frequency	2422MHz	2437MHz	2452MHz
	Data Rate	MCS8	MCS8	MCS8
	Chain 0	39	39	39
	Chain 1	39	39	39

The duty cycle as below:

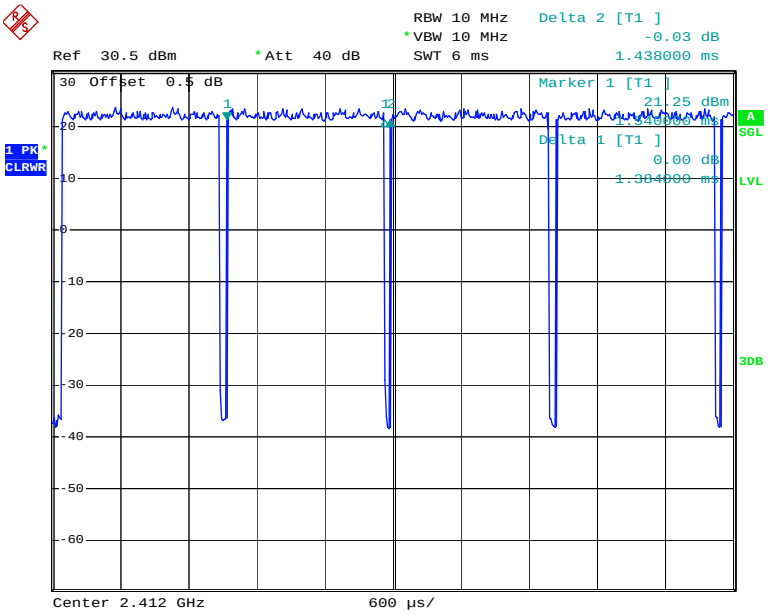
Mode	T_{on} (ms)	T_{on+off} (ms)	Duty Cycle (%)
802.11b	8.43	8.55	98.6
802.11g	1.38	1.44	95.8
802.11n ht20	1.31	1.41	93.0
802.11n ht40	0.652	0.752	86.7

802.11b



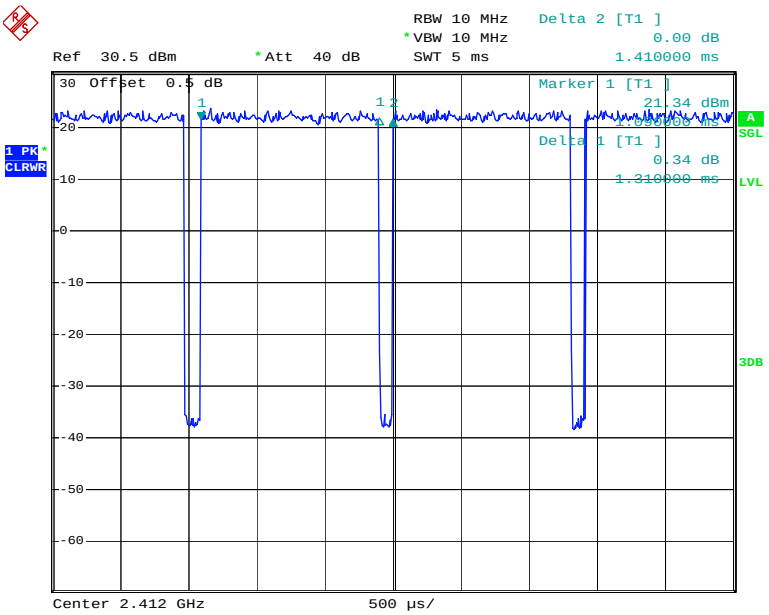
Date: 17.OCT.2017 21:58:56

802.11g



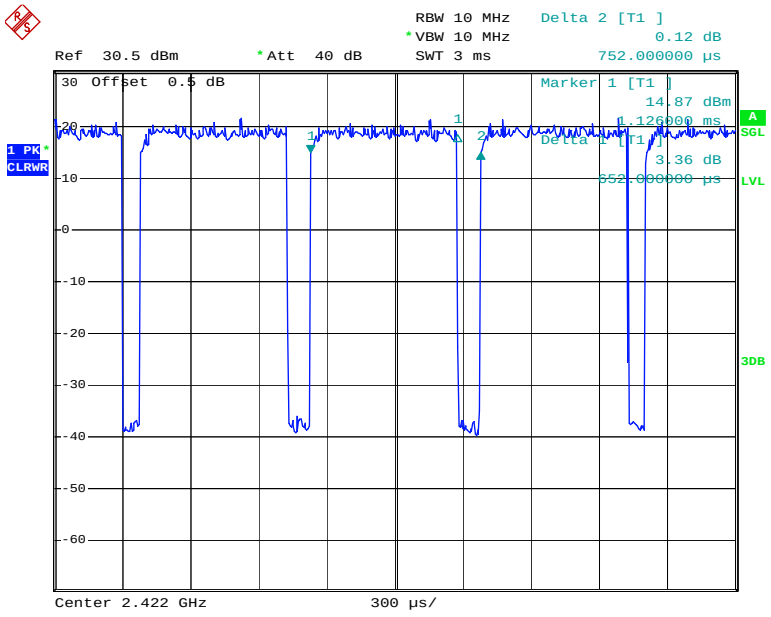
Date: 17.OCT.2017 22:07:56

802.11n ht20



Date: 17.OCT.2017 21:55:59

802.11n ht40



Date: 17.OCT.2017 22:10:13

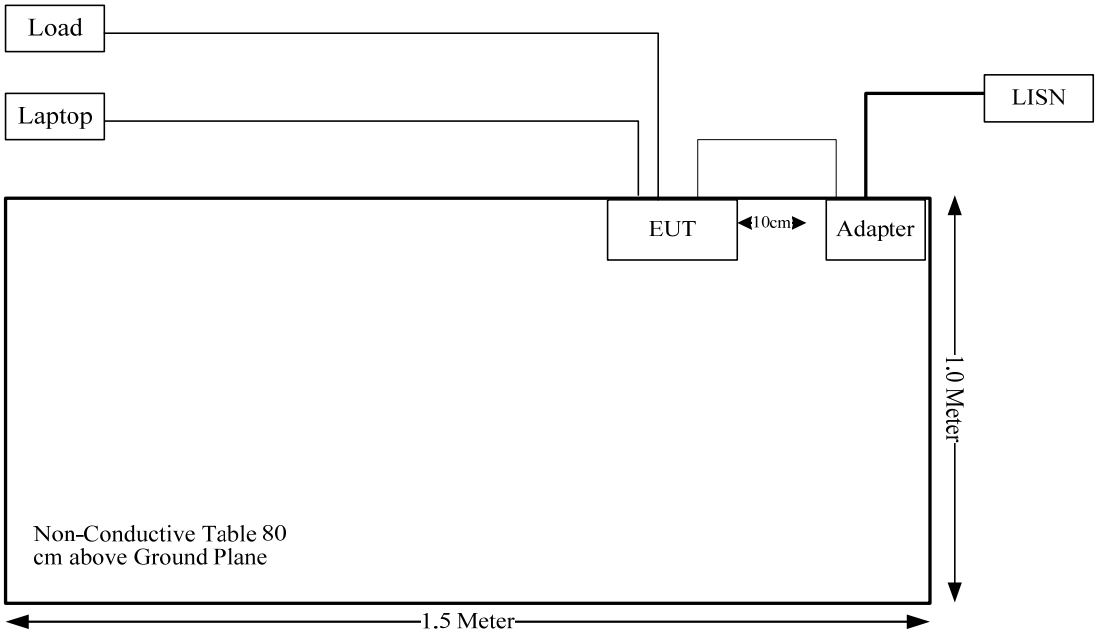
Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
DELL	Laptop	PP11L	QDS-BRCM1017
N/A	Load	N/A	N/A

Support Cable List and Details

Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
RJ45 Cable	yes	No	10.0	RJ45 Port of Laptop	EUT
RJ45 Cable*2	yes	No	10.0	Load	EUT
Adapter Cable	no	no	1.3	Adapter	EUT

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
FCC §15.247 (i) & §1.1310 & §2.1091	Maximum Permissable Exposure (MPE)	Compliance
§15.203	Antenna Requirement	Compliant
§15.207 (a)	AC Line Conducted Emissions	Compliant
§15.205, §15.209, §15.247(d)	Spurious Emissions	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

FCC §15.247 (i) & §1.1310 & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

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

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

(B) Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	**Electric Field Strength (V/m)**	**Magnetic Field Strength (A/m)**	**Power Density (mW/cm^2)**	**Averaging Time (minutes)**
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f^2)	30
30–300	27.5	0.073	0.2	30
300–1500	/	/	f/1500	30
1500–100,000	/	/	1.0	30

f = frequency in MHz; * = Plane-wave equivalent power density;

According to §1.1310 and §2.1091 RF exposure is calculated.

Calculation formula:

Prediction of power density at the distance of the applicable MPE limit
$S = PG/4\pi R^2$ = power density (in appropriate units, e.g. mW/cm^2);
P = power input to the antenna (in appropriate units, e.g., mW);
G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

For simultaneously transmit system, the calculated power density should comply with:

$$\sum_i \frac{S_i}{S_{Limit,i}} \leq 1$$

Calculated Data:

Frequency (MHz)	Antenna Gain		Conducted output power including Tune-up Tolerance		Evaluation Distance (cm)	Power Density (mW/cm^2)	MPE Limit (mW/cm^2)
	(dBi)	(numeric)	(dBm)	(mW)			
2412-2462	5	3.16	27	501.19	20.00	0.3155	1.0
5180-5825	5	3.16	17	50.12	20.00	0.0315	1.0

The 2.4GHz band and 5GHz band can transmit simultaneously:

$$\sum_i \frac{S_i}{S_{Limit,i}}$$

$=S_{2.4}/S_{limit-2.4} + S_5/S_{limit-5}$

=0.3155/1+0.0315/1

=0.347

< 1.0

Result: The device meet FCC MPE at 20 cm distance

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.

Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

Antenna Connector Construction

The EUT have 2 external antennas for 2.4G and 5GHz band, which was permanently attached to the Unit, both antenna gains are 5dBi in 2.4G and 5GHz range. Please refer to the EUT photo.

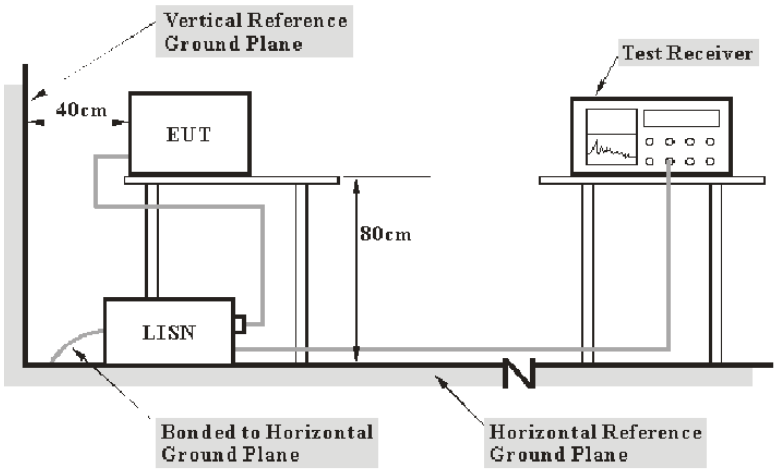
Result: Compliance.

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

FCC§15.207(a)

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 C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.207 limits.

The spacing between the peripherals was 10 cm.

The adapter was connected to the main lisn with AC 120 V/60 Hz power source.

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 was connected to the first LISN.

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:

Margin = Limit – Corrected Amplitude

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCS 30	830245/006	2016-12-08	2017-12-08
R&S	L.I.S.N	ESH2-Z5	892107/021	2017-09-01	2018-09-01
R&S	Two-line V-network	ENV 216	3560.6550.12	2017-09-05	2018-09-05
R&S	Test Software	EMC32	Version8.53.0	N/A	N/A
Unknown	Coaxial Cable	2m	Con-1	2017-09-01	2018-09-01

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

Test Data

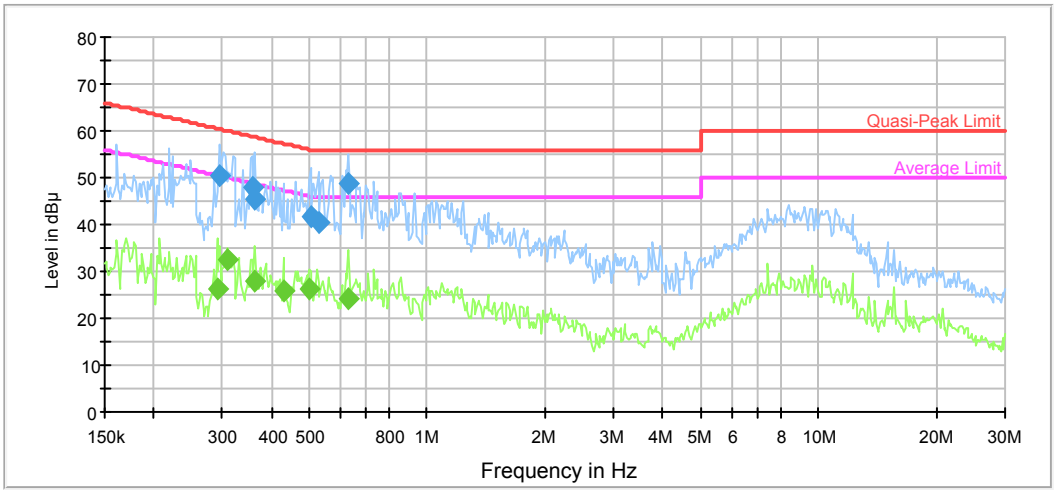
Environmental Conditions

Temperature:	28.8 °C
Relative Humidity:	48 %
ATM Pressure:	100.6kPa

The testing was performed by Alex You on 2017-10-10.

Test Mode: Transmitting

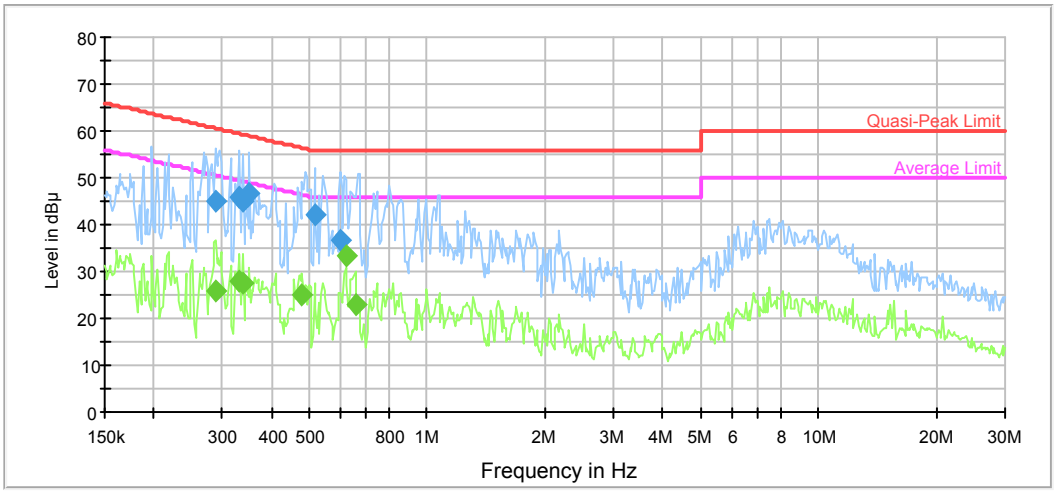
AC120 V, 60 Hz, Line:



Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.295282	50.3	9.000	L1	10.2	10.1	60.4	Compliance
0.357511	47.9	9.000	L1	10.0	10.9	58.8	Compliance
0.363254	45.7	9.000	L1	10.0	13.0	58.7	Compliance
0.503608	41.6	9.000	L1	9.9	14.4	56.0	Compliance
0.528270	40.3	9.000	L1	9.9	15.7	56.0	Compliance
0.629488	48.9	9.000	L1	9.8	7.1	56.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.290613	26.1	9.000	L1	10.2	24.4	50.5	Compliance
0.309742	32.4	9.000	L1	10.1	17.6	50.0	Compliance
0.363254	28.1	9.000	L1	10.0	20.6	48.7	Compliance
0.429420	25.8	9.000	L1	9.9	21.5	47.3	Compliance
0.499611	26.3	9.000	L1	9.9	19.7	46.0	Compliance
0.629488	24.4	9.000	L1	9.8	21.6	46.0	Compliance

AC120 V, 60 Hz, Neutral:



Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.288307	45.2	9.000	N	10.2	15.4	60.6	Compliance
0.332770	45.7	9.000	N	10.1	13.7	59.4	Compliance
0.338116	44.9	9.000	N	10.1	14.3	59.2	Compliance
0.351859	46.7	9.000	N	10.0	12.2	58.9	Compliance
0.515791	41.9	9.000	N	9.9	14.1	56.0	Compliance
0.600101	36.8	9.000	N	9.8	19.2	56.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.288307	25.8	9.000	N	10.2	24.8	50.6	Compliance
0.332770	27.9	9.000	N	10.1	21.5	49.4	Compliance
0.338116	27.6	9.000	N	10.1	21.6	49.2	Compliance
0.480097	24.9	9.000	N	9.9	21.4	46.3	Compliance
0.619536	33.2	9.000	N	9.8	12.8	46.0	Compliance
0.655073	23.0	9.000	N	9.8	23.0	46.0	Compliance

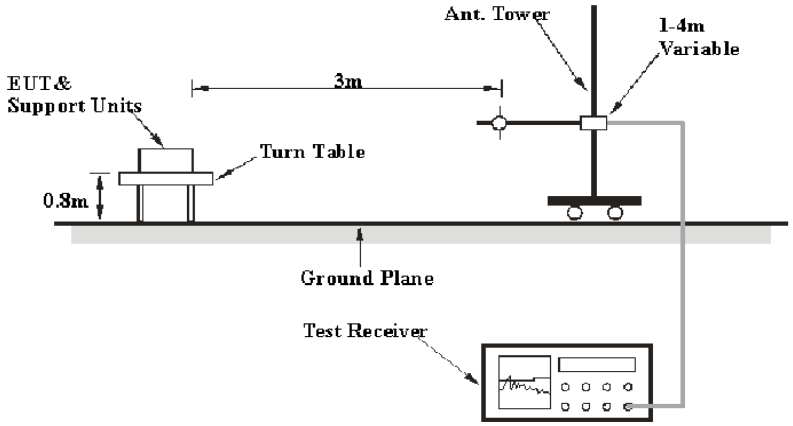
FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS

Applicable Standard

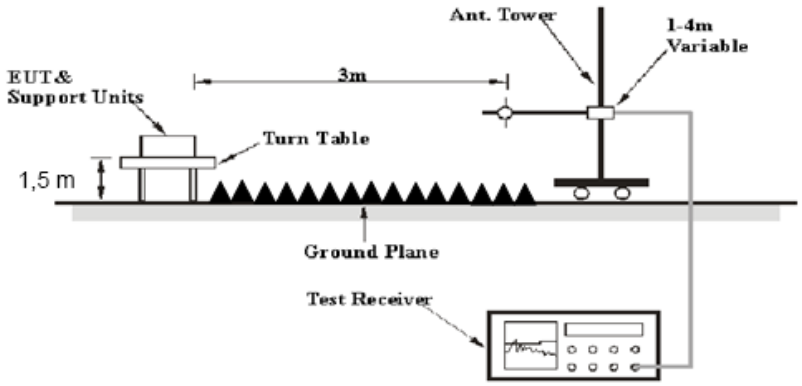
FCC §15.247 (d); §15.209; §15.205;

EUT Setup

Below 1GHz:



Above 1GHz:



The radiated emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.10-2013. 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 & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 25 GHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

30MHz-1000MHz:

Measurement	RBW	Video B/W	IF B/W
QP	120 kHz	300 kHz	120kHz

1GHz- 25GHz:

Measurement	Duty cycle	RBW	Video B/W
PK	Any	1MHz	3 MHz
Ave.	>98%	1MHz	10 Hz
	<98%	1MHz	1/T

Note: T is minimum transmission duration

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 Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

Corrected Amplitude = Meter Reading + Antenna Factor + Cable Loss - 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:

Margin = Limit –Corrected Amplitude

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCS 30	830245/006	2016-12-08	2017-12-08
Agilent	Spectrum Analyzer	E4440A	SG43360054	2016-12-08	2017-12-08
HP	Amplifier	8447E	2434A02181	2017-09-05	2018-09-05
R&S	Spectrum Analyzer	FSU 26	200256	2016-12-08	2017-12-08
ETS-Lindgren	Horn Antenna	3115	000 527 35	2016-01-05	2019-01-04
Ducommun Technolagies	Horn Antenna	ARH-4223-02	1007726-02 1304	2017-06-16	2020-06-15
MITEQ	Amplifier	AFS42-00101800-25-S-42	2001271	2017-09-05	2018-09-05
Quinstar	Amplifier	QLW-18405536-JO	15964001001	2017-06-27	2018-06-27
Unknown	Coaxial Cable	Chamber A-1	4m	2017-09-05	2018-09-05
Unknown	Coaxial Cable	Chamber B-1	0.75m	2017-09-05	2018-09-05
Unknown	Coaxial Cable	Chamber A-2	10m	2017-09-05	2018-09-05
Unknown	Coaxial Cable	Chamber B-2	8m	2017-09-05	2018-09-05
Farad	Test Software	EZ-EMC	V1.1.4.2	N/A	N/A

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

Test Data

Environmental Conditions

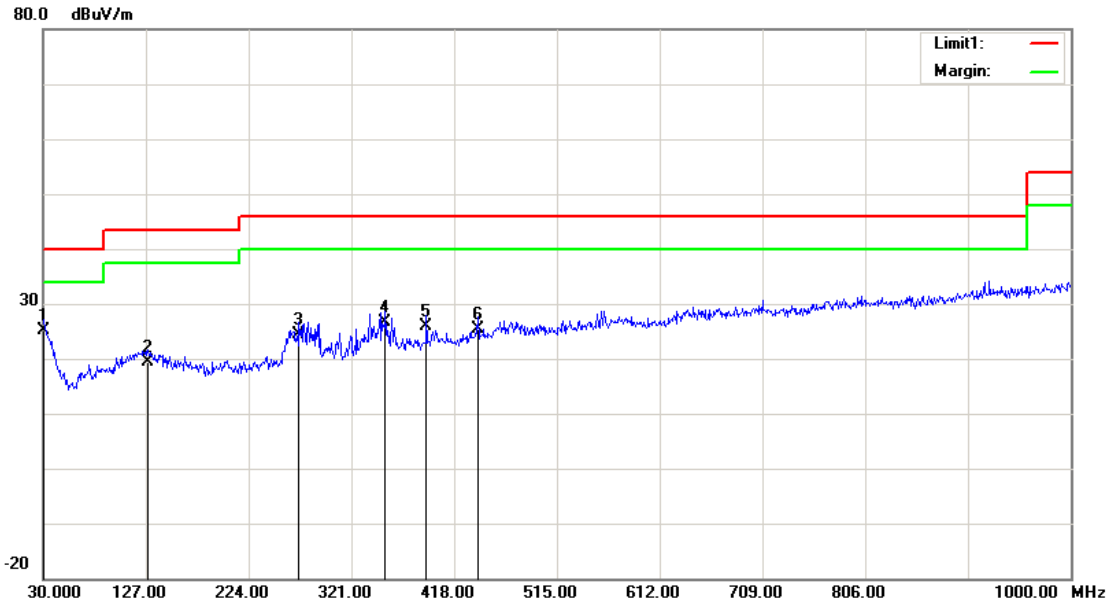
Temperature:	24.3~25.3 °C
Relative Humidity:	36~38 %
ATM Pressure:	100.4~100.8 kPa

** The testing was performed by Sunny Cen from 2017-10-21 to 2017-10-26.*

Test Mode: Transmitting

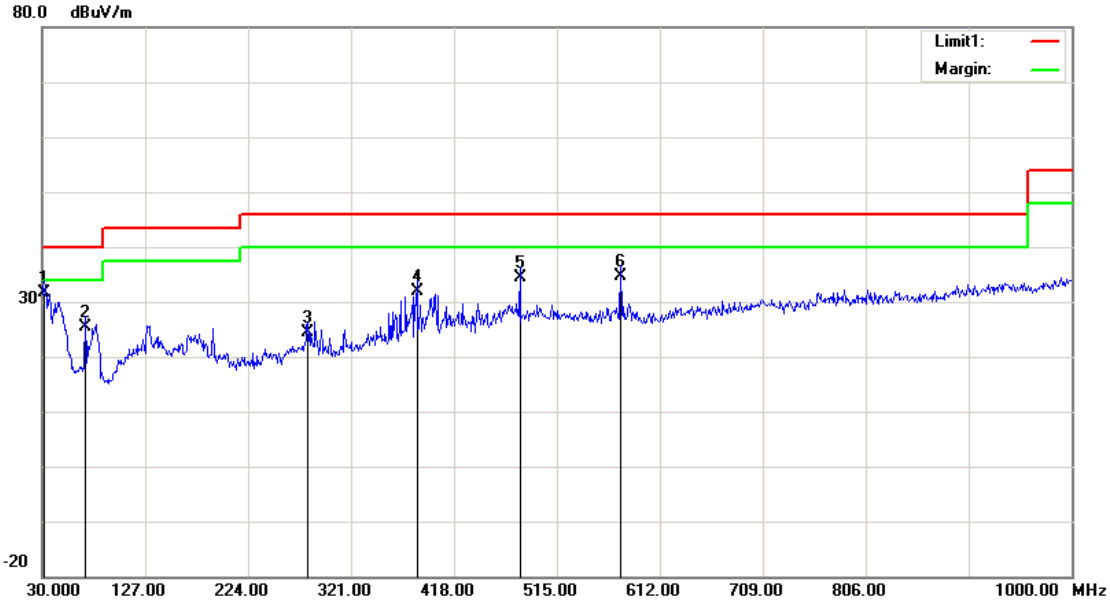
1) Below 1GHz(802.11n ht20 mode middle channel was the worst):

Horizontal



Frequency (MHz)	Receiver Reading (dBµV)	Detector	Correction Factor (dB/m)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
30.0000	24.12	QP	1.08	25.20	40.00	14.80
128.9400	24.58	QP	-5.08	19.50	43.50	24.00
271.5300	28.18	QP	-3.88	24.30	46.00	21.70
353.0100	29.70	QP	-3.10	26.60	46.00	19.40
391.8100	28.35	QP	-2.45	25.90	46.00	20.10
440.3100	27.02	QP	-1.62	25.40	46.00	20.60

Vertical



Frequency (MHz)	Receiver Reading (dBµV)	Detector	Correction Factor (dB/m)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
31.9400	32.05	QP	-0.35	31.70	40.00	8.30
70.7400	36.58	QP	-11.28	25.30	40.00	14.70
280.2600	28.01	QP	-3.61	24.40	46.00	21.60
383.0800	34.51	QP	-2.61	31.90	46.00	14.10
480.0800	35.41	QP	-1.01	34.40	46.00	11.60
575.1400	34.01	QP	0.59	34.60	46.00	11.40

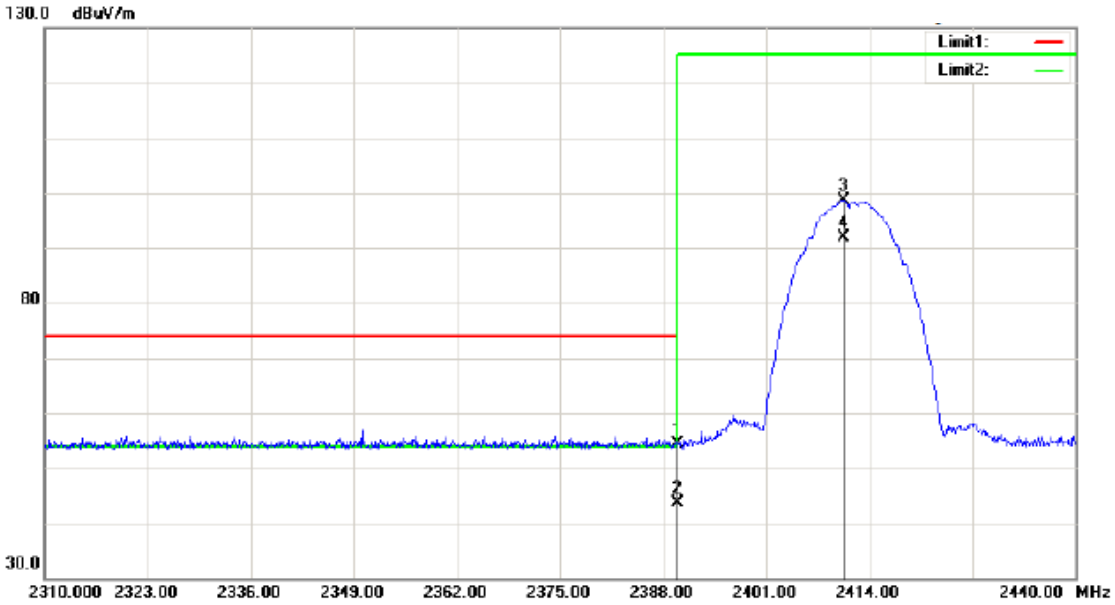
2) 1-25GHz:

802.11b(Chain 0 was the worst)

B mode

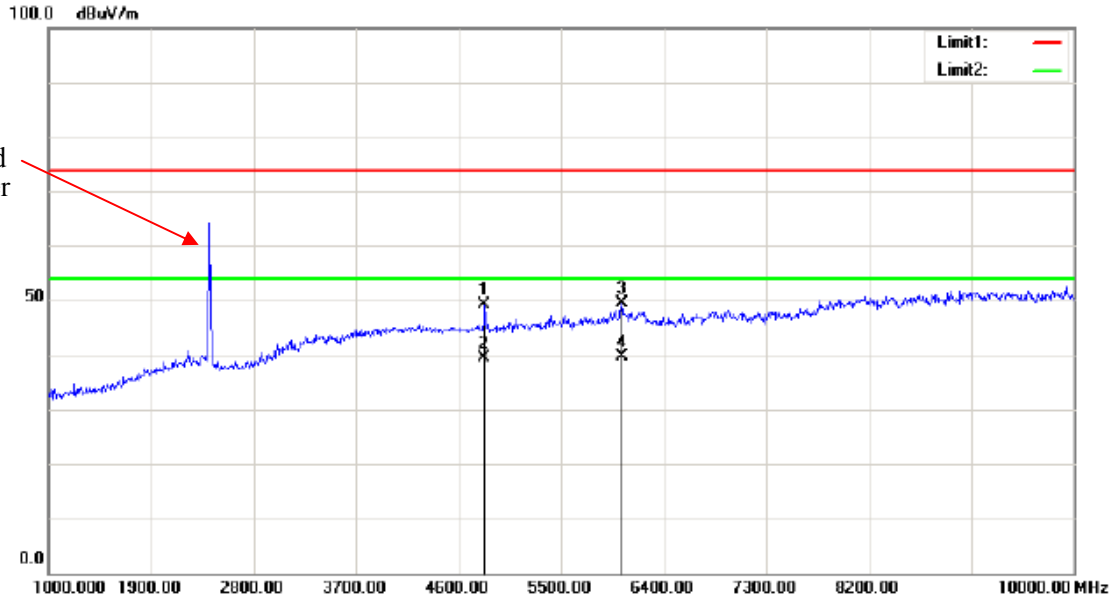
Low Channel

Horizontal

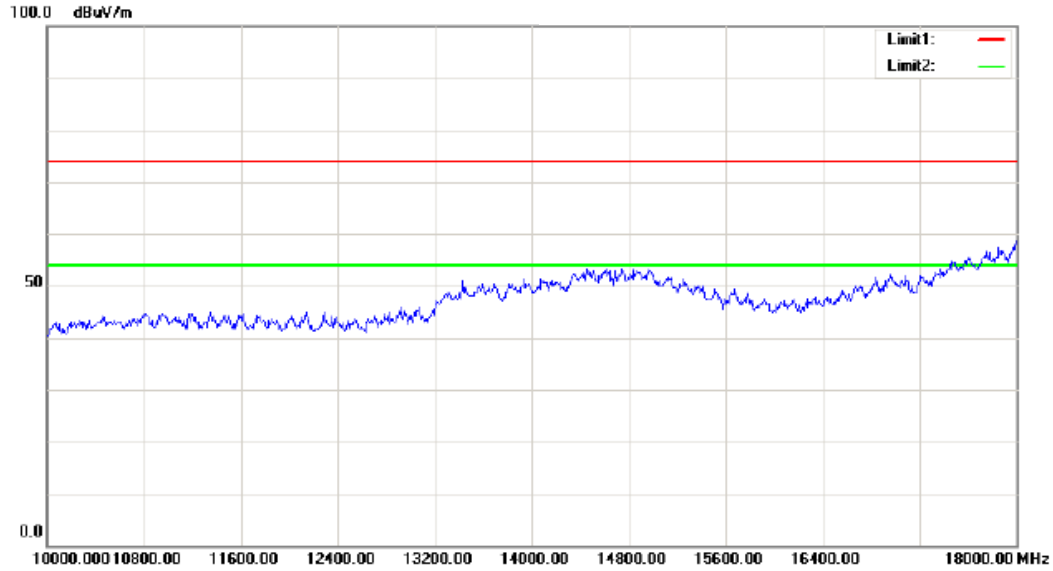


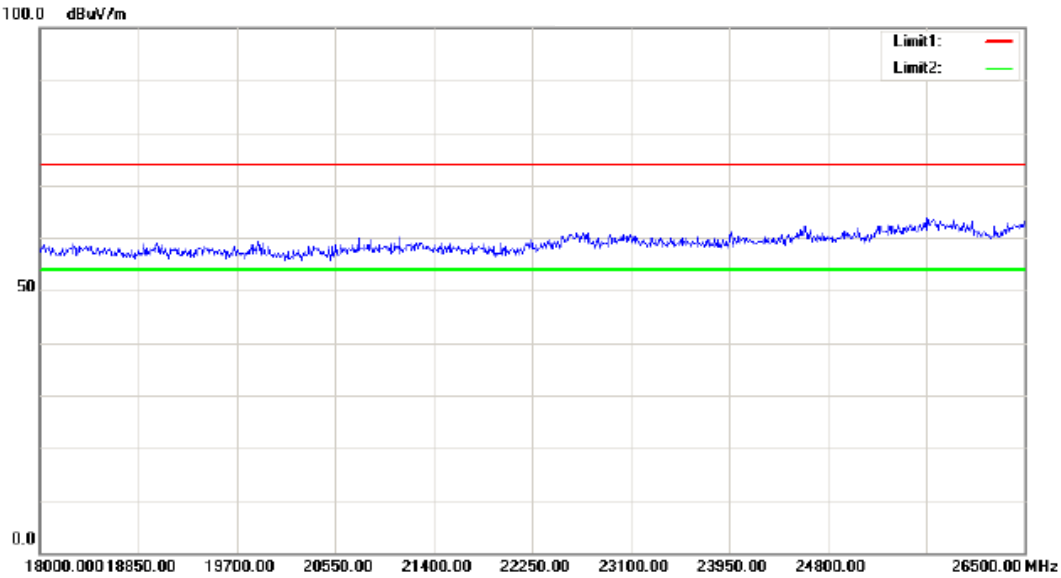
Mk.	No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected factor(dB)	Result (dBµV/m)	Limit (dBµV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	1	2390.000	24.40	peak	29.87	54.27	74.00	153	158	19.73	
*	2	2390.000	13.64	AVG	29.87	43.51	54.00	153	158	10.49	
	3	2410.750	68.71	peak	29.93	98.64	125.20	153	158	26.56	Fundamental
	4	2410.750	61.83	AVG	29.93	91.76	125.20	153	158	33.44	Fundamental

Fundamental Test with Band Rejection Filter

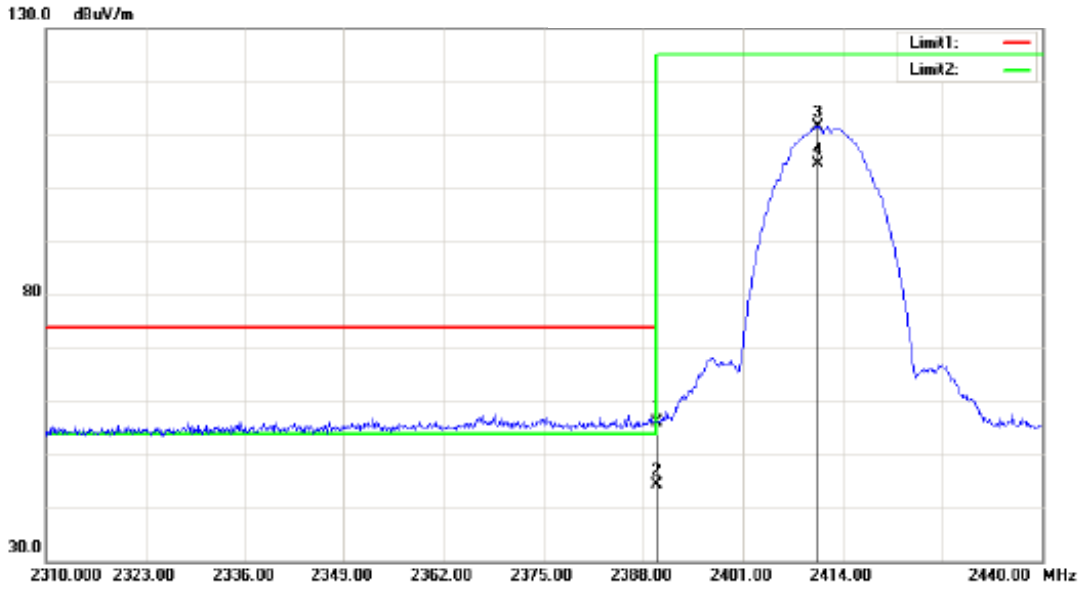


Mk.	No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected factor(dB)	Result (dBµV/m)	Limit (dBµV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	1	4825.000	50.23	peak	-1.05	49.18	74.00	154	56	24.82	
	2	4825.000	40.50	AVG	-1.05	39.45	54.00	154	56	14.55	
	3	6031.000	48.63	peak	0.87	49.50	74.00	154	56	24.50	
*	4	6031.000	38.80	AVG	0.87	39.67	54.00	154	56	14.33	


100.0 dBuV/m
Limit1:
Limit2:
50
0.0
10000.000 10800.00 11600.00 12400.00 13200.00 14000.00 14800.00 15600.00 16400.00 18000.00 MHz

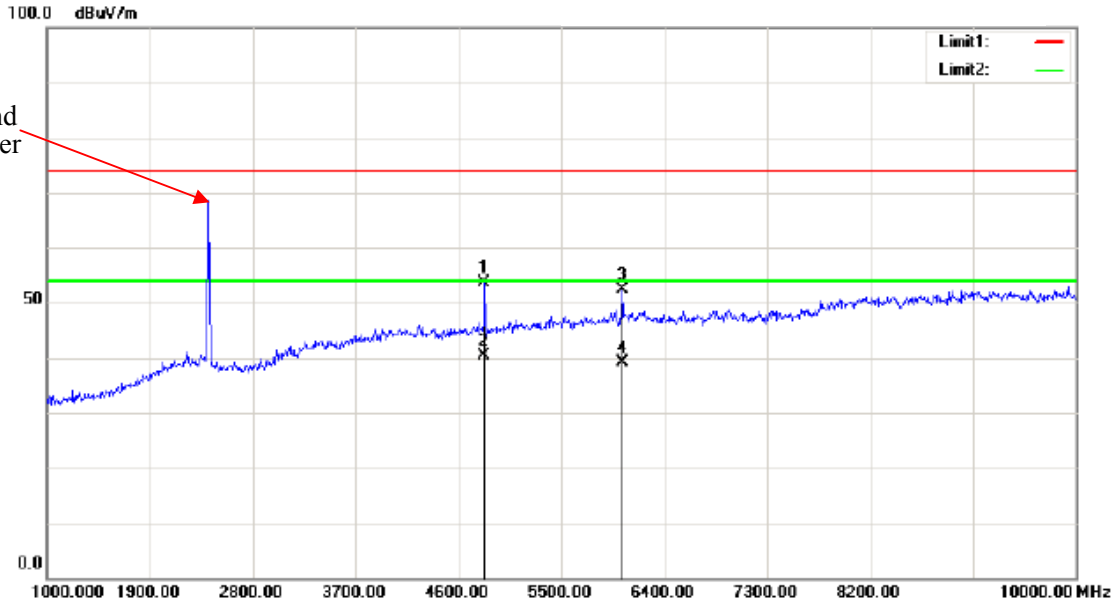

100.0 dBuV/m
Limit1:
Limit2:
50
0.0
18000.000 18850.00 19700.00 20550.00 21400.00 22250.00 23100.00 23950.00 24800.00 26500.00 MHz

Vertical

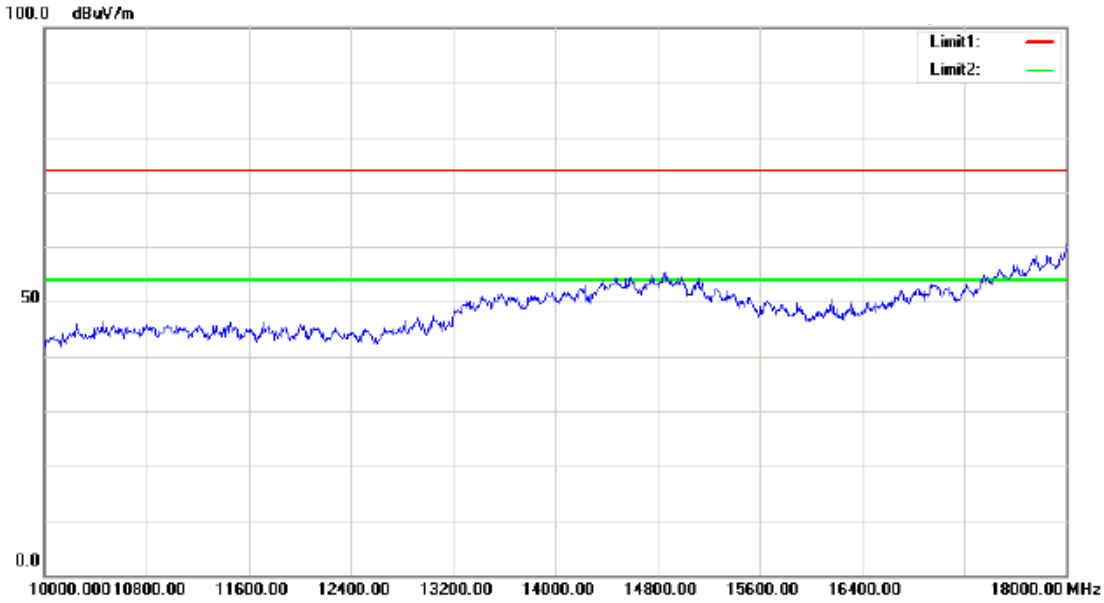


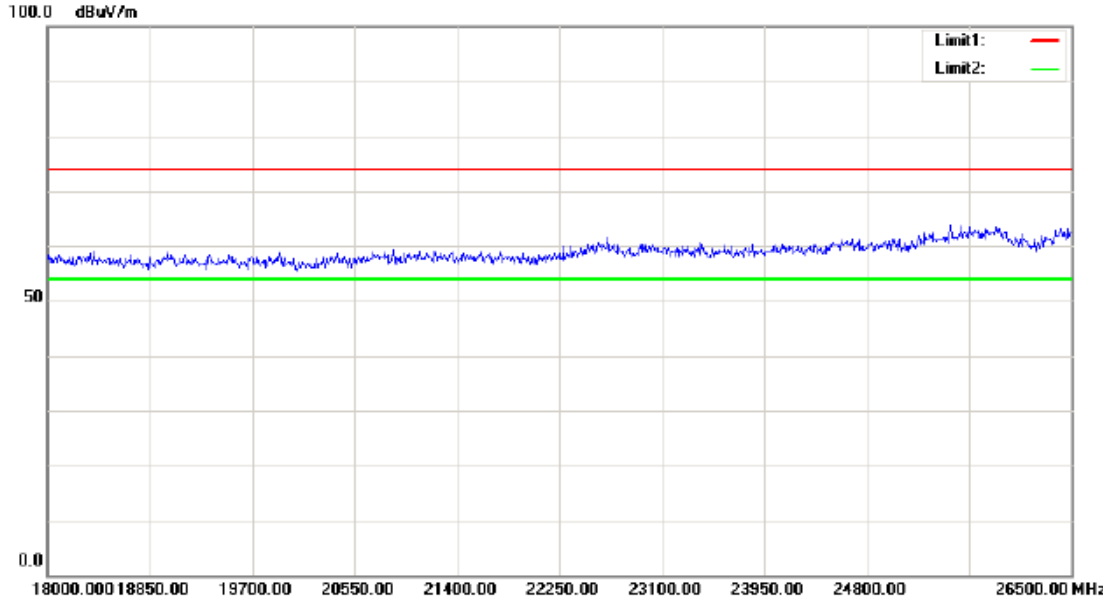
Mk.	No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected factor(dB)	Result (dBµV/m)	Limit (dBµV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	1	2390.000	26.21	peak	29.88	56.09	74.00	145	242	17.91	
*	2	2390.000	14.57	AVG	29.88	44.45	54.00	145	242	9.55	
	3	2410.750	81.67	peak	29.93	111.60	125.20	145	242	13.60	Fundamental
	4	2410.750	74.62	AVG	29.93	104.55	125.20	145	242	20.65	Fundamental

Fundamental Test with Band Rejection Filter



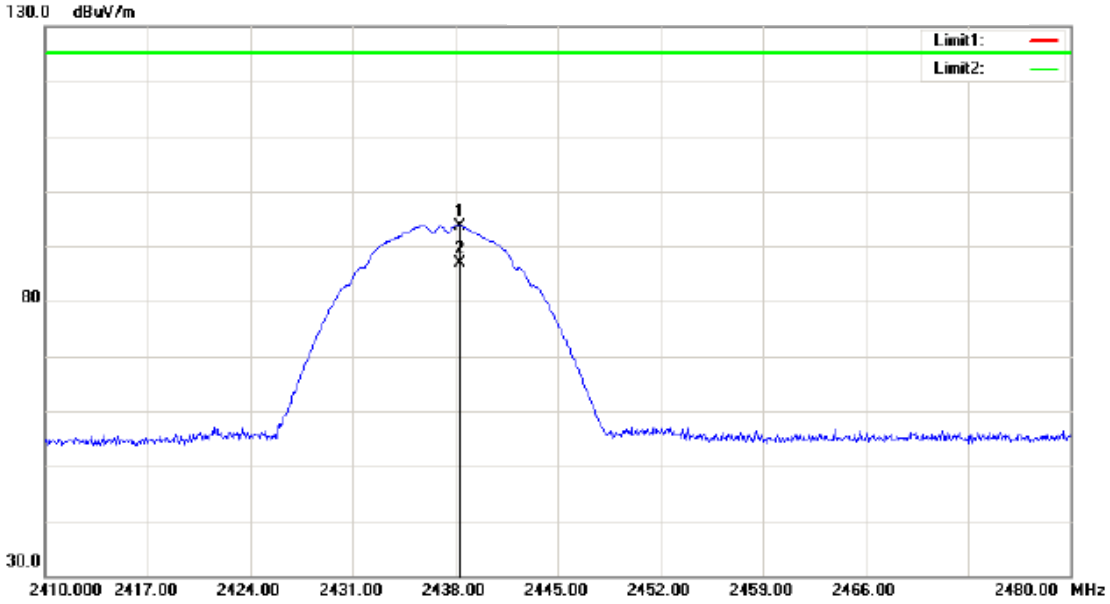
Mk.	No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected factor(dB)	Result (dBµV/m)	Limit (dBµV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	1	4825.000	54.73	peak	-1.05	53.68	74.00	158	125	20.32	
*	2	4825.000	41.39	AVG	-1.05	40.34	54.00	158	125	13.66	
	3	6031.000	51.63	peak	0.87	52.50	74.00	158	125	21.50	
	4	6031.000	38.26	AVG	0.87	39.13	54.00	158	125	14.87	


100.0 dBuV/m
Limit1:
Limit2:
50
0.0
10000.000 10800.00 11600.00 12400.00 13200.00 14000.00 14800.00 15600.00 16400.00 18000.00 MHz


100.0 dBuV/m
Limit1:
Limit2:
50
0.0
18000.000 18850.00 19700.00 20550.00 21400.00 22250.00 23100.00 23950.00 24800.00 26500.00 MHz

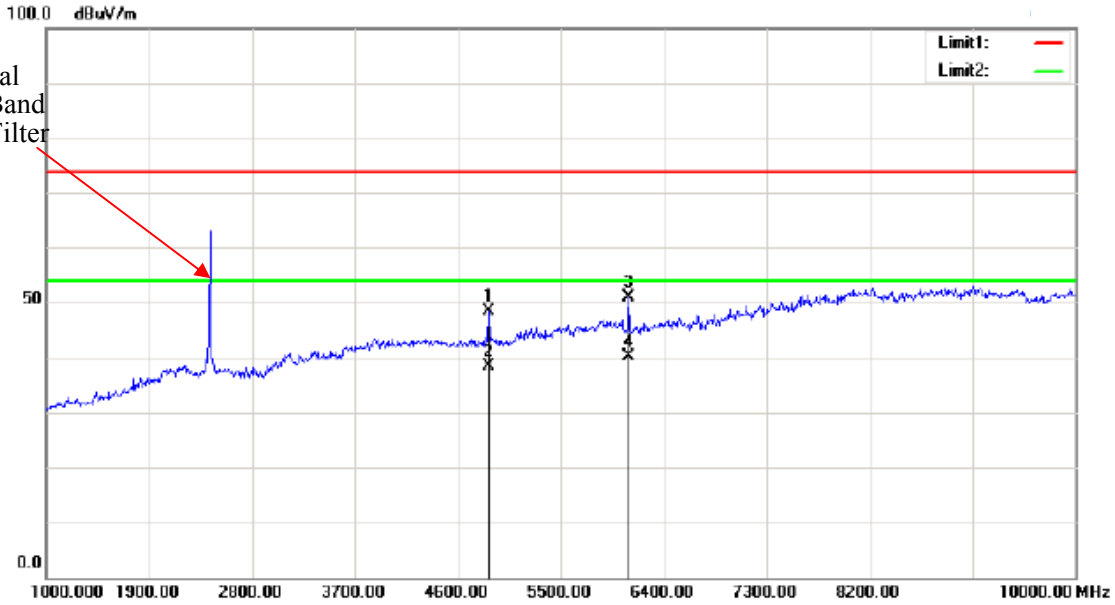
Middle Channel

Horizontal



Mk.	No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected factor(dB)	Result (dBµV/m)	Limit (dBµV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
*	1	2438.280	63.59	peak	30.00	93.59	125.20	139	57	31.61	Fundamental
	2	2438.280	56.84	AVG	30.00	86.84	125.20	139	57	38.36	Fundamental

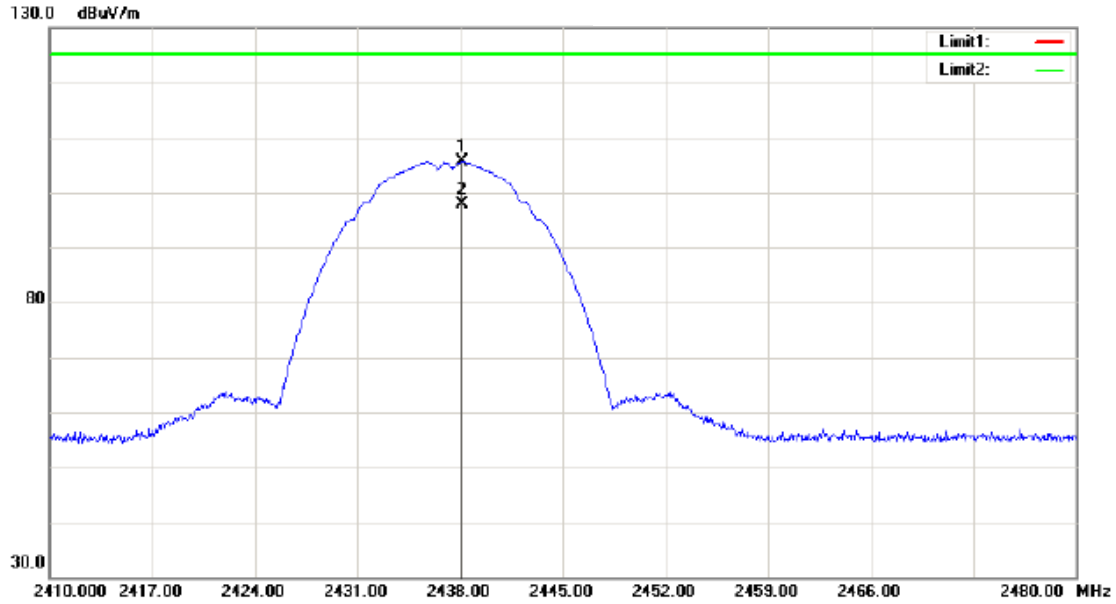
Fundamental Test with Band Rejection Filter



Mk.	No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected factor(dB)	Result (dBµV/m)	Limit (dBµV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	1	4874.500	49.35	peak	-0.90	48.45	74.00	150	100	25.55	
	2	4874.500	39.35	AVG	-0.90	38.45	54.00	150	100	15.55	
	3	6094.000	49.92	peak	1.00	50.92	74.00	150	100	23.08	
*	4	6094.000	39.21	AVG	1.00	40.21	54.00	150	100	13.79	

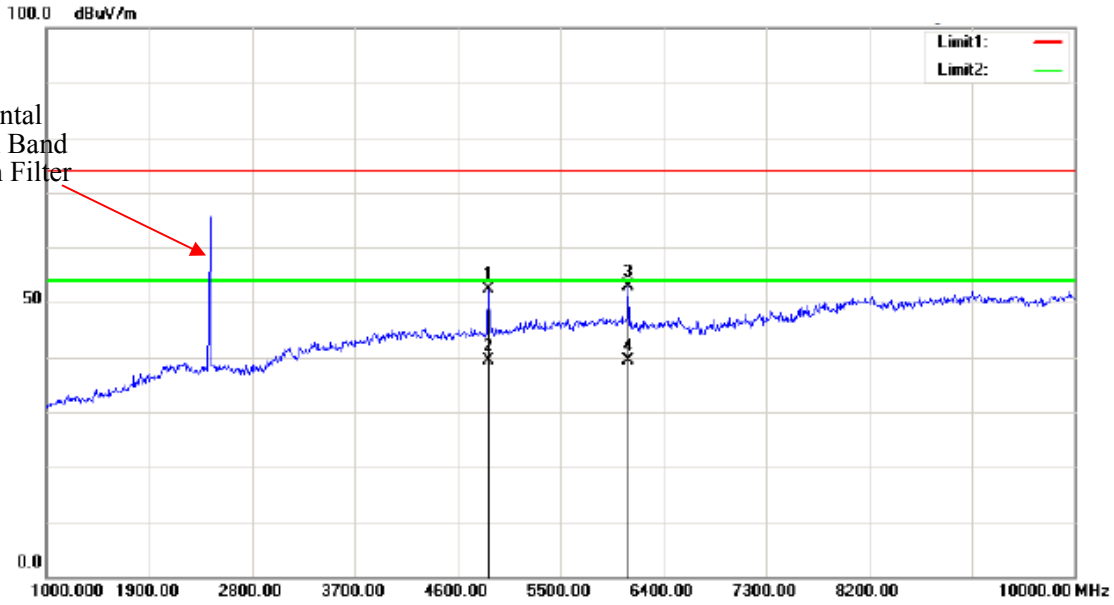
Note: No emission was detected in the range 10-25GHz.

Vertical



Mk.	No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected factor(dB)	Result (dBµV/m)	Limit (dBµV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
*	1	2438.175	75.56	peak	30.00	105.56	125.20	152	37	19.64	
	2	2438.175	67.83	AVG	30.00	97.83	125.20	152	37	27.37	

Fundamental Test with Band Rejection Filter

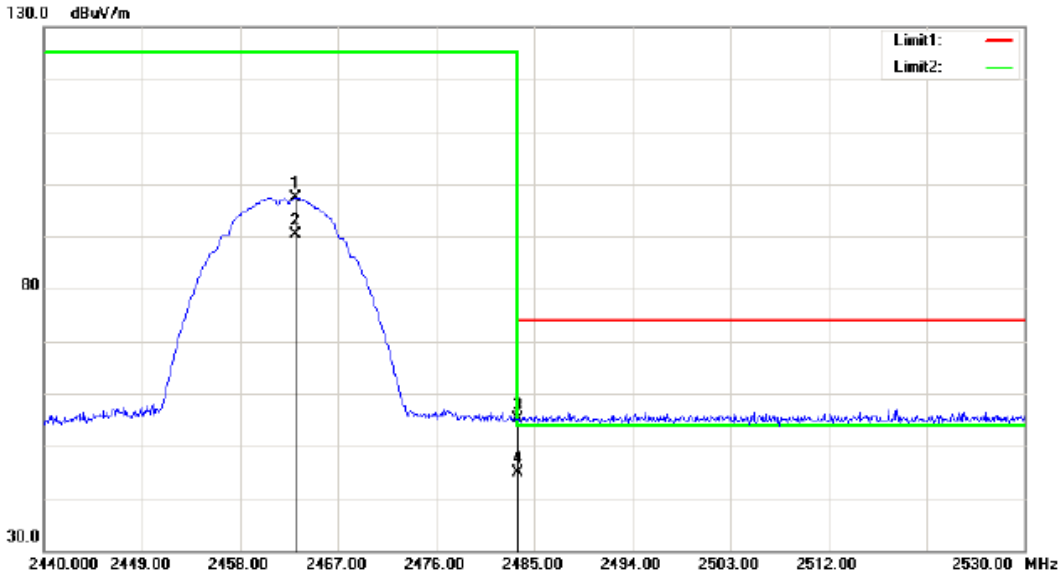


Mk.	No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected factor(dB)	Result (dBµV/m)	Limit (dBµV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	1	4874.500	53.35	peak	-0.90	52.45	74.00	135	222	21.55	
	2	4874.500	40.16	AVG	-0.90	39.26	54.00	135	222	14.74	
	3	6094.000	51.92	peak	1.00	52.92	74.00	135	222	21.08	
*	4	6094.000	38.48	AVG	1.00	39.48	54.00	135	222	14.52	

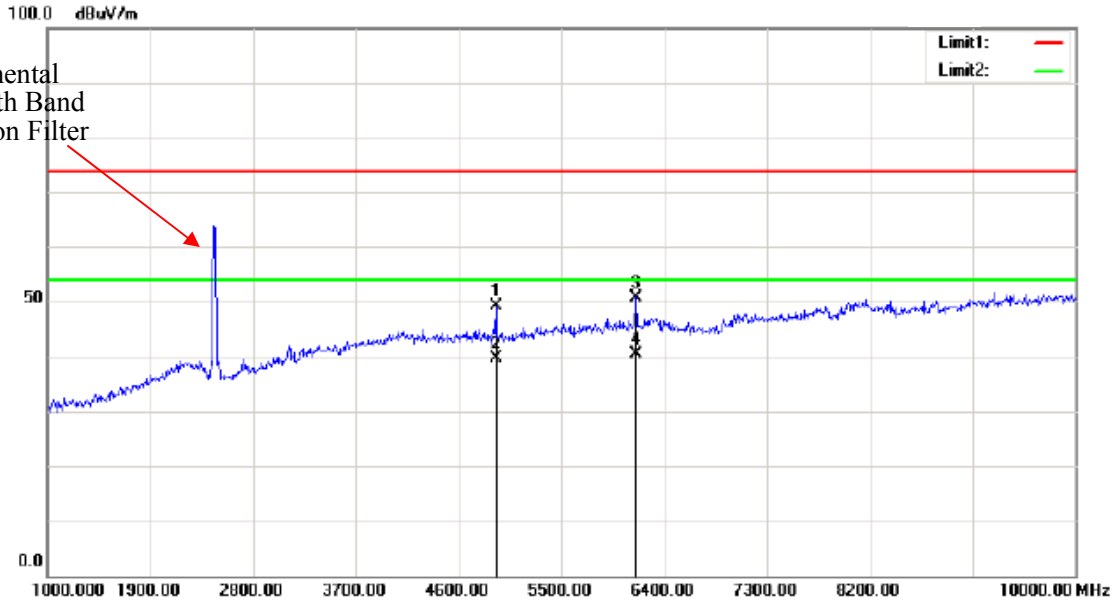
Note: No emission was detected in the range 10-25GHz.

High Channel

Horizontal



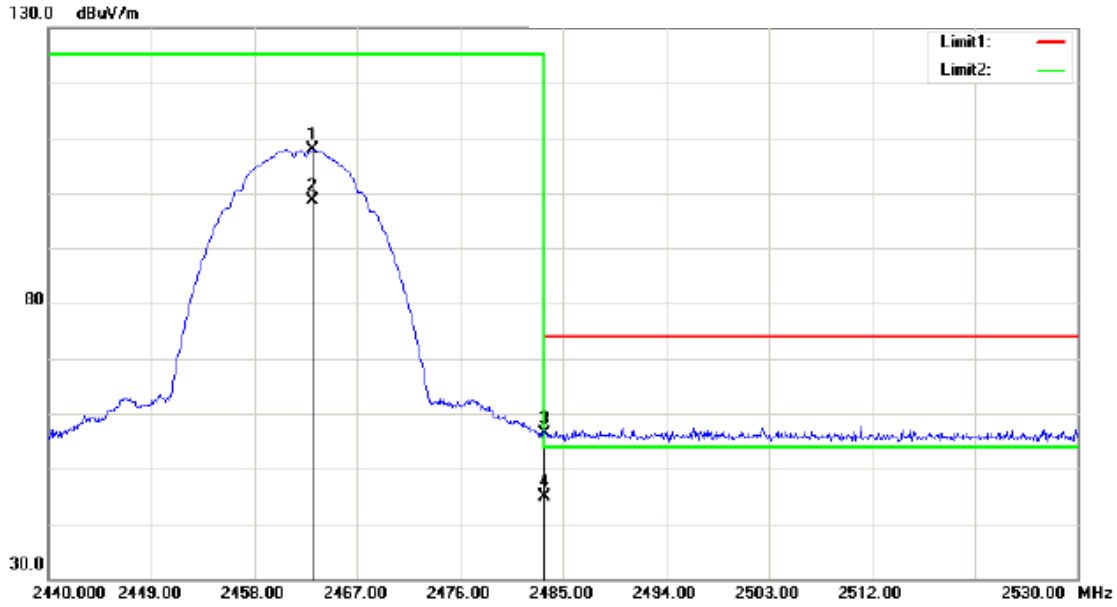
Mk.	No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected factor(dB)	Result (dBµV/m)	Limit (dBµV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	1	2463.130	67.34	peak	30.06	97.40	125.20	155	136	27.80	
	2	2463.130	60.27	AVG	30.06	90.33	125.20	155	136	34.87	
	3	2483.500	24.98	peak	30.11	55.09	74.00	155	136	18.91	Fundamental
*	4	2483.500	14.73	AVG	30.11	44.84	54.00	155	136	9.16	Fundamental



Mk.	No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected factor(dB)	Result (dBµV/m)	Limit (dBµV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	1	4924.000	49.86	peak	-0.80	49.06	74.00	156	60	24.94	
	2	4924.000	40.44	AVG	-0.80	39.64	54.00	156	60	14.36	
	3	6157.000	49.61	peak	1.14	50.75	74.00	156	60	23.25	
*	4	6157.000	39.20	AVG	1.14	40.34	54.00	156	60	13.66	

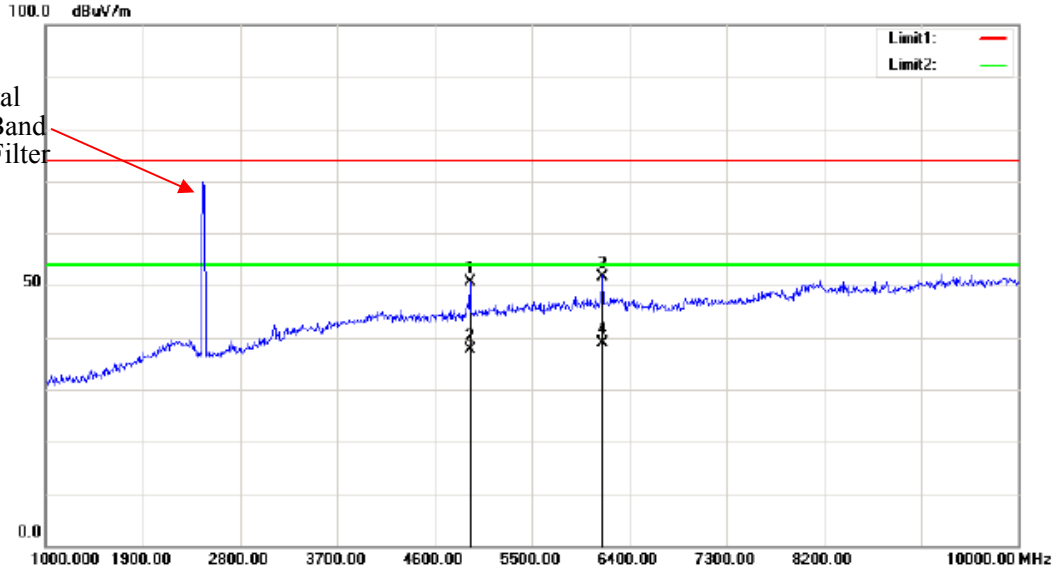
Note: No emission was detected in the range 10-25GHz.

Vertical



Mk.	No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	1	2463.130	77.74	peak	30.06	107.80	125.20	148	88	17.40	
	2	2463.130	68.59	AVG	30.06	98.65	125.20	148	88	26.55	
	3	2483.500	26.17	peak	30.11	56.28	74.00	148	88	17.72	Fundamental
*	4	2483.500	14.67	AVG	30.11	44.78	54.00	148	88	9.22	Fundamental

Fundamental Test with Band Rejection Filter



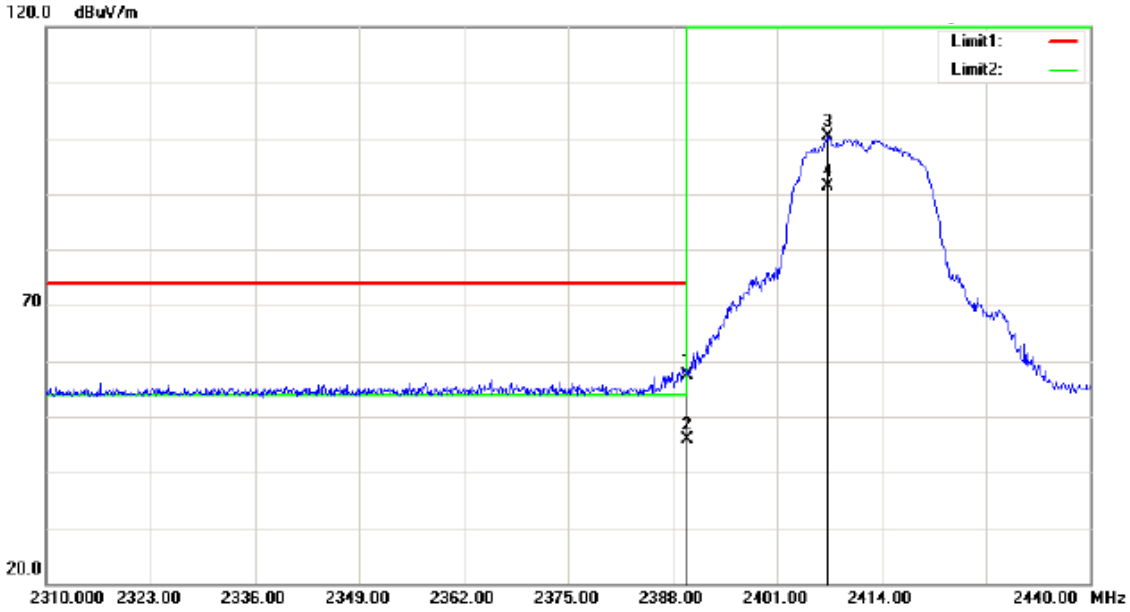
Mk.	No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected factor(dB)	Result (dBµV/m)	Limit (dBµV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	1	4924.000	51.36	peak	-0.80	50.56	74.00	155	223	23.44	
	2	4924.000	38.46	AVG	-0.80	37.66	54.00	155	223	16.34	
	3	6157.000	50.61	peak	1.14	51.75	74.00	155	223	22.25	
*	4	6157.000	37.84	AVG	1.14	38.98	54.00	155	223	15.02	

Note: No emission was detected in the range 10-25GHz.

G mode

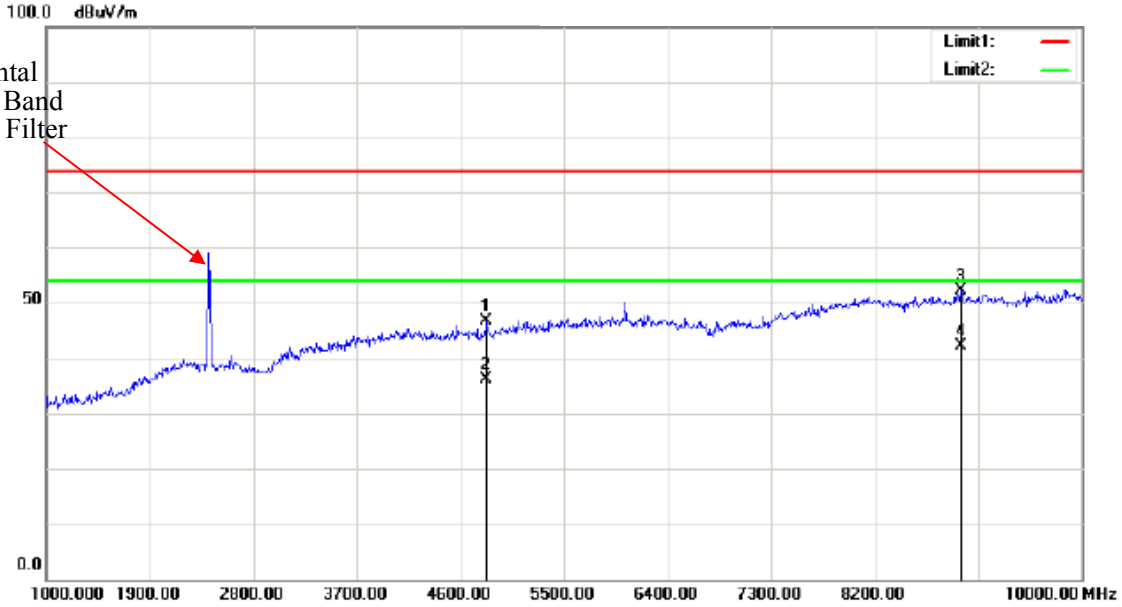
Low Channel

Horizontal



Mk.	No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected factor(dB)	Result (dBµV/m)	Limit (dBµV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	1	2390.000	27.51	peak	29.87	57.38	74.00	157	123	16.62	
*	2	2390.000	15.92	AVG	29.87	45.79	54.00	157	123	8.21	
	3	2407.240	70.37	peak	29.91	100.28	125.20	157	123	24.92	Fundamental
	4	2407.240	61.53	AVG	29.91	91.44	125.20	157	123	33.76	Fundamental

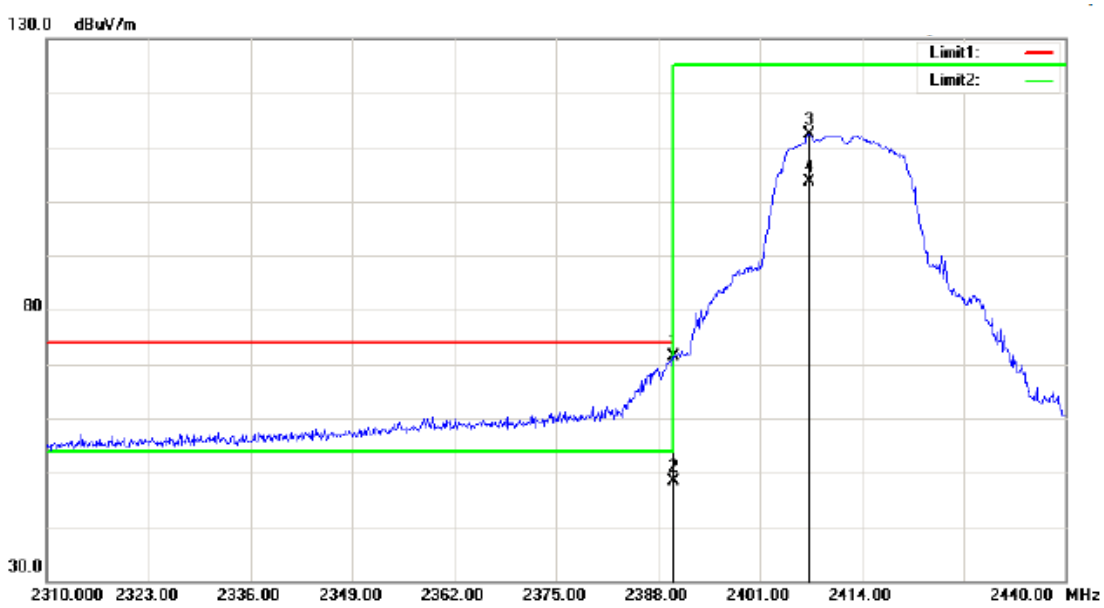
Fundamental Test with Band Rejection Filter



Mk.	No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected factor(dB)	Result (dBµV/m)	Limit (dBµV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	1	4825.000	47.75	peak	-1.05	46.70	74.00	180	200	27.30	
	2	4825.000	37.30	AVG	-1.05	36.25	54.00	180	200	17.75	
	3	8947.000	46.02	peak	6.18	52.20	74.00	180	200	21.80	
*	4	8947.000	35.96	AVG	6.18	42.14	54.00	180	200	11.86	

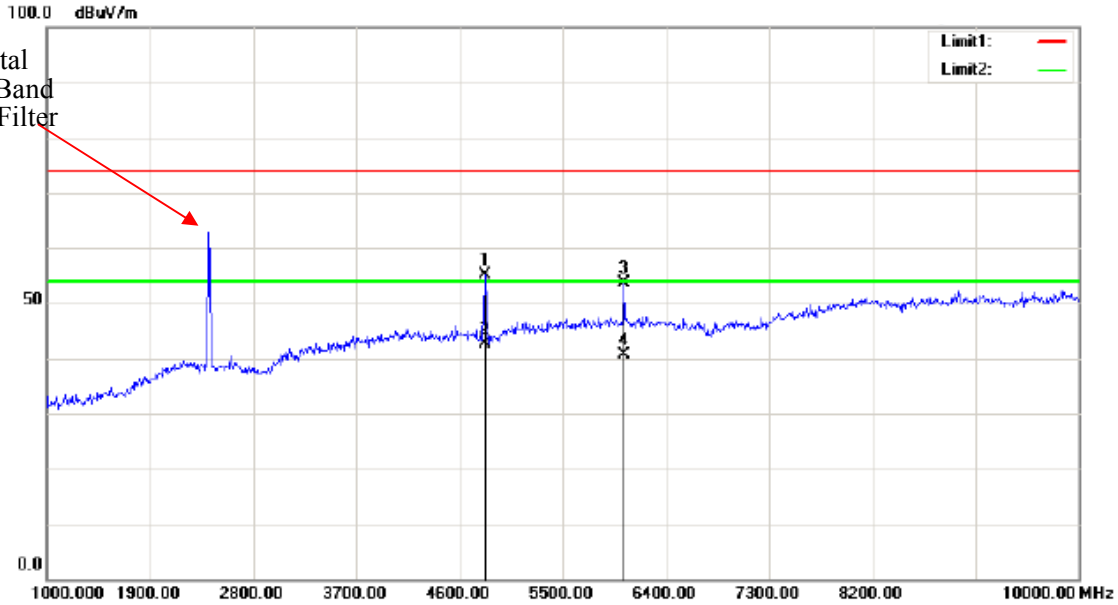
Note: No emission was detected in the range 10-25GHz.

Vertical



Mk.	No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected factor(dB)	Result (dBµV/m)	Limit (dBµV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
*	1	2390.000	41.39	peak	29.87	71.26	74.00	143	22	2.74	
	2	2390.000	18.52	AVG	29.87	48.39	54.00	143	22	5.61	
	3	2407.435	82.52	peak	29.91	112.43	125.20	143	22	12.77	Fundamental
	4	2407.435	73.67	AVG	29.91	103.58	125.20	143	22	21.62	Fundamental

Fundamental
Test with Band
Rejection Filter

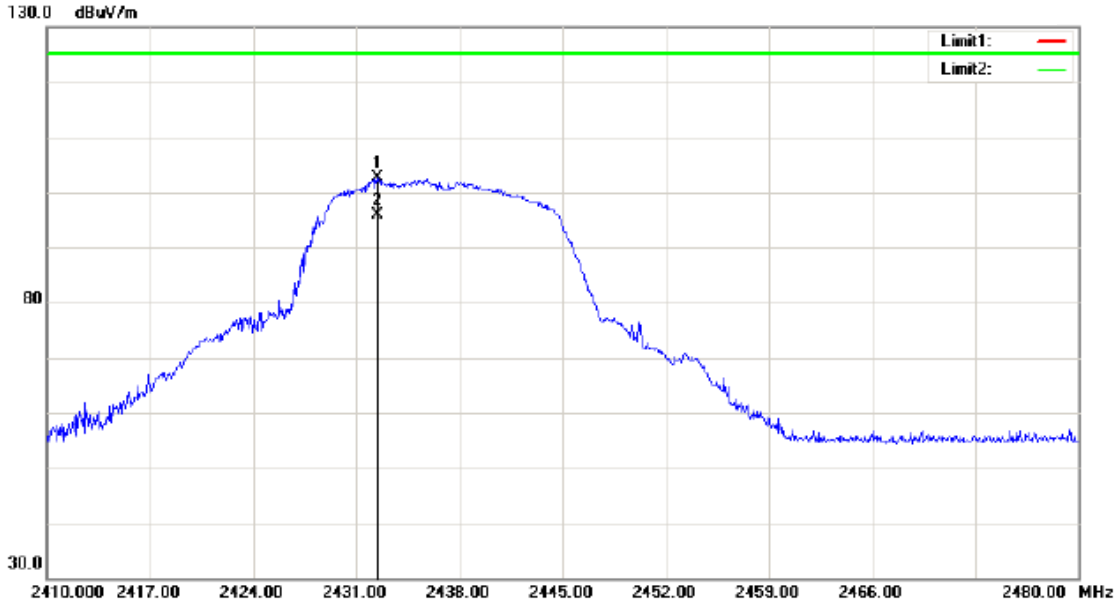


Mk.	No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	1	4825.000	56.25	peak	-1.05	55.20	74.00	152	348	18.80	
*	2	4825.000	43.76	AVG	-1.05	42.71	54.00	152	348	11.29	
	3	6031.000	52.82	peak	0.87	53.69	74.00	152	348	20.31	
	4	6031.000	39.78	AVG	0.87	40.65	54.00	152	348	13.35	

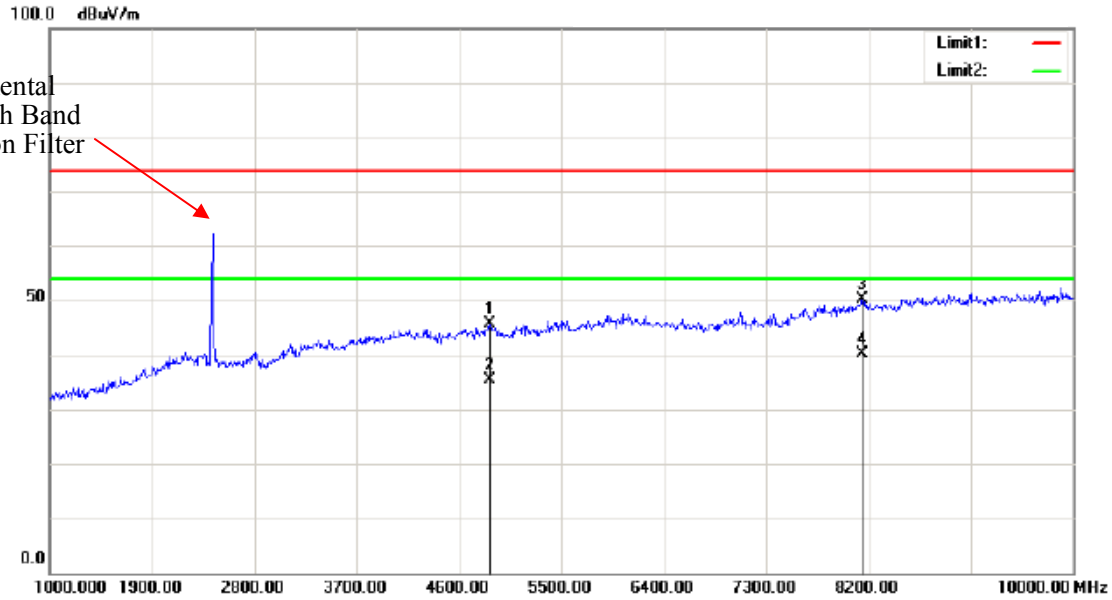
Note: No emission was detected in the range 10-25GHz.

Middle Channel

Horizontal



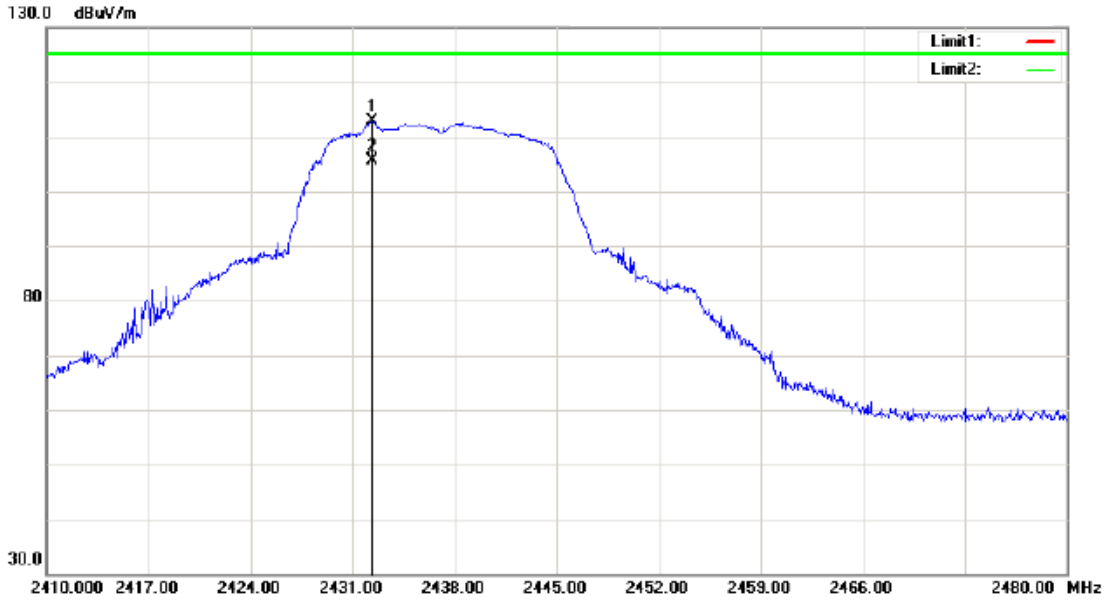
Mk.	No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected factor(dB)	Result (dBµV/m)	Limit (dBµV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
*	1	2432.435	72.57	peak	29.98	102.55	125.20	157	145	22.65	Fundamental
	2	2432.435	65.78	AVG	29.98	95.76	125.20	157	145	29.44	Fundamental



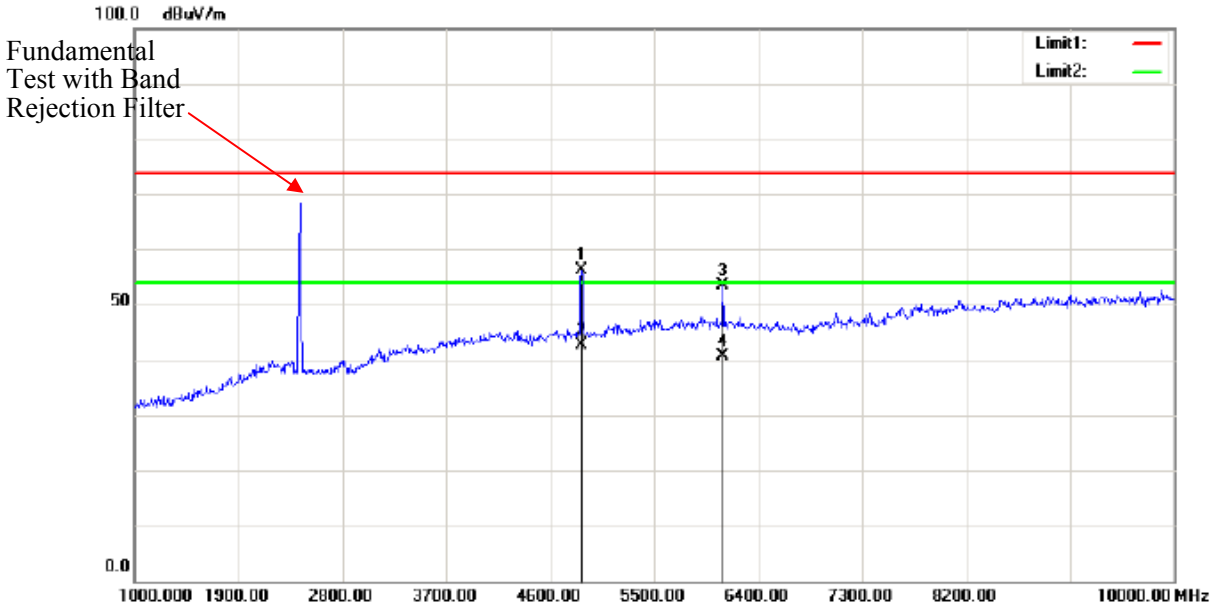
Mk.	No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected factor(dB)	Result (dBµV/m)	Limit (dBµV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	1	4870.000	46.54	peak	-0.91	45.63	74.00	169	220	28.37	
	2	4870.000	36.17	AVG	-0.91	35.26	54.00	169	220	18.74	
	3	8150.500	45.08	peak	5.02	50.10	74.00	169	220	23.90	Fundamental
*	4	8150.500	35.13	AVG	5.02	40.15	54.00	169	220	13.85	Fundamental

Note: No emission was detected in the range 10-25GHz.

Vertical



Mk.	No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected factor(dB)	Result (dBµV/m)	Limit (dBµV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
*	1	2432.330	82.85	peak	29.98	112.83	125.20	145	166	12.37	Fundamental
	2	2432.330	75.69	AVG	29.98	105.67	125.20	145	166	19.53	Fundamental

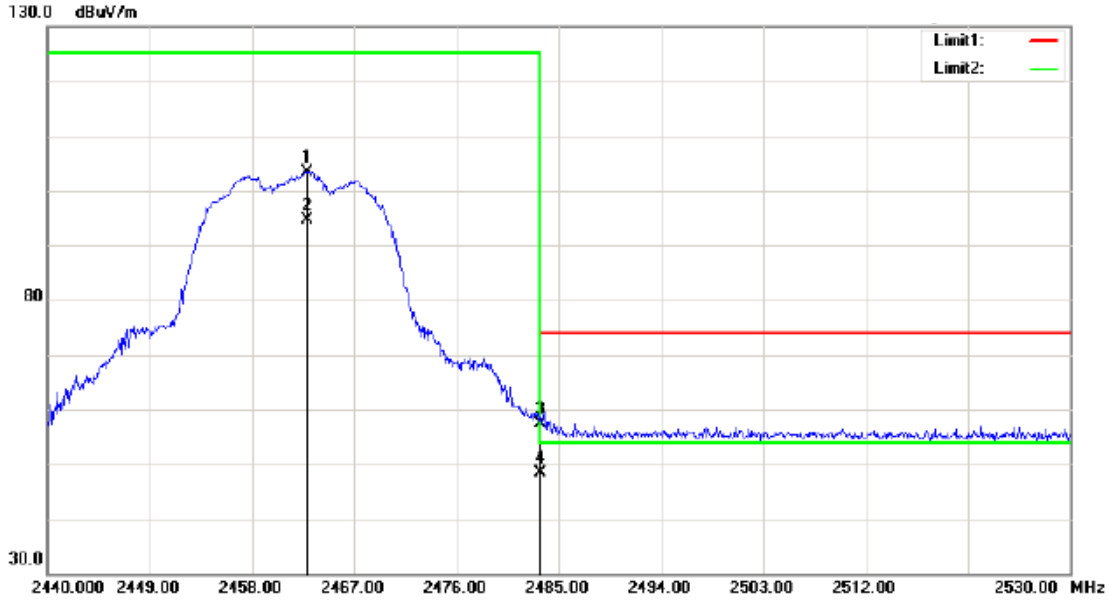


Mk.	No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected factor(dB)	Result (dBµV/m)	Limit (dBµV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	1	4870.000	57.04	peak	-0.91	56.13	74.00	163	24	17.87	
*	2	4870.000	43.65	AVG	-0.91	42.74	54.00	163	24	11.26	
	3	6094.000	52.44	peak	1.00	53.44	74.00	163	24	20.56	
	4	6094.000	39.57	AVG	1.00	40.57	54.00	163	24	13.43	

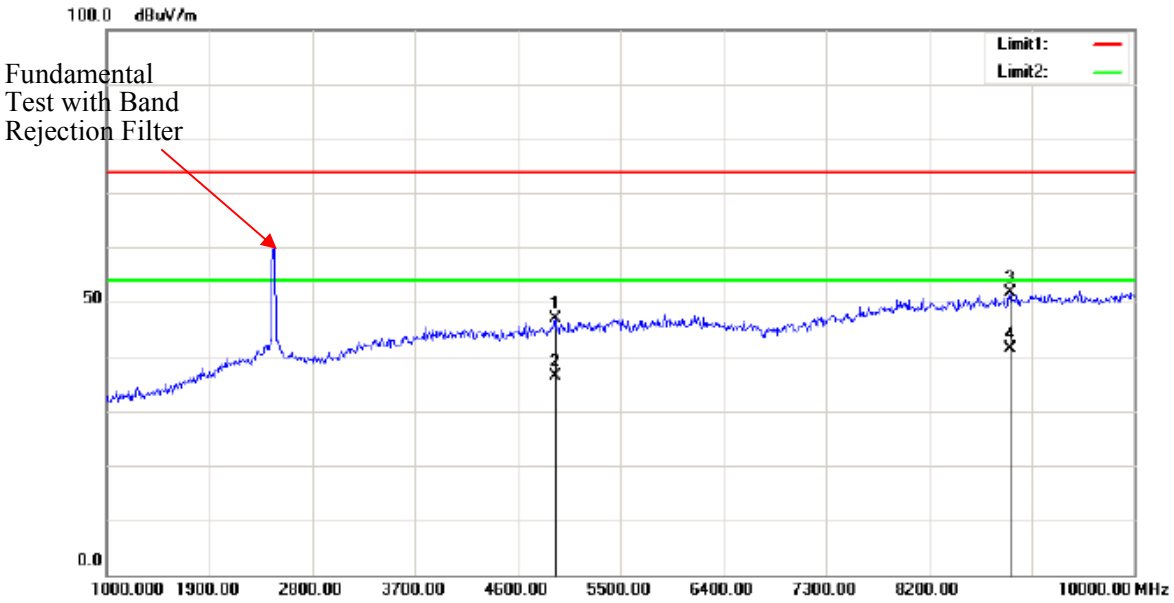
Note: No emission was detected in the range 10-25GHz.

High Channel

Horizontal



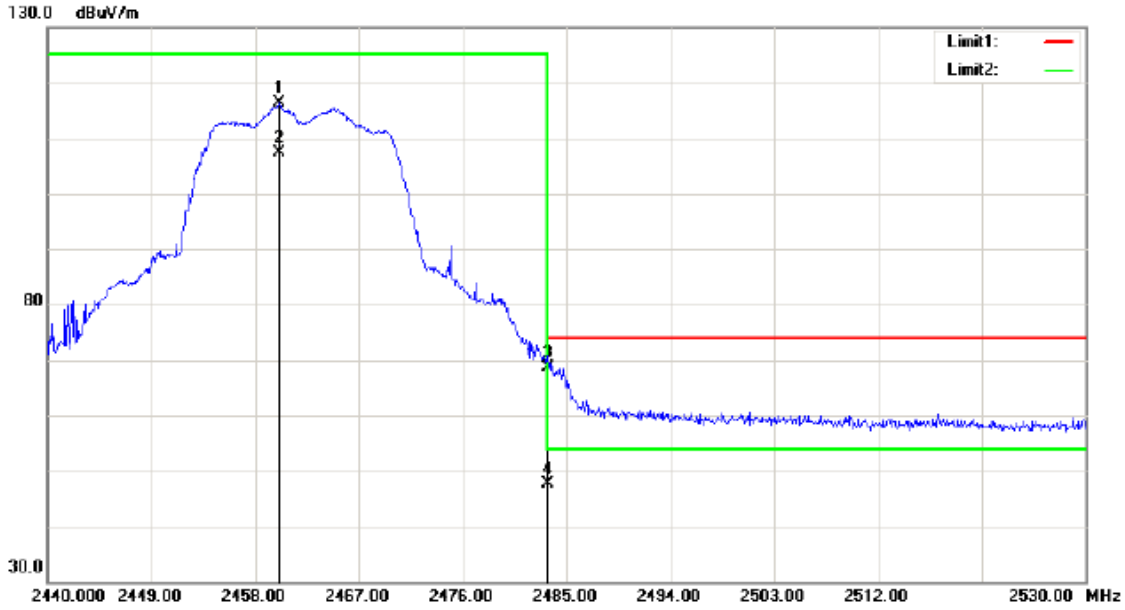
Mk.	No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected factor(dB)	Result (dBµV/m)	Limit (dBµV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	1	2462.860	73.42	peak	30.06	103.48	125.20	137	54	21.72	
	2	2462.860	64.57	AVG	30.06	94.63	125.20	137	54	30.57	
	3	2483.500	27.33	peak	30.11	57.44	74.00	137	54	16.56	Fundamental
*	4	2483.500	18.24	AVG	30.11	48.35	54.00	137	54	5.65	Fundamental



Mk.	No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected factor(dB)	Result (dBµV/m)	Limit (dBµV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	1	4928.500	47.57	peak	-0.80	46.77	74.00	164	155	27.23	
	2	4928.500	37.28	AVG	-0.80	36.48	54.00	164	155	17.52	
	3	8915.500	45.39	peak	6.13	51.52	74.00	164	155	22.48	
*	4	8915.500	35.21	AVG	6.13	41.34	54.00	164	155	12.66	

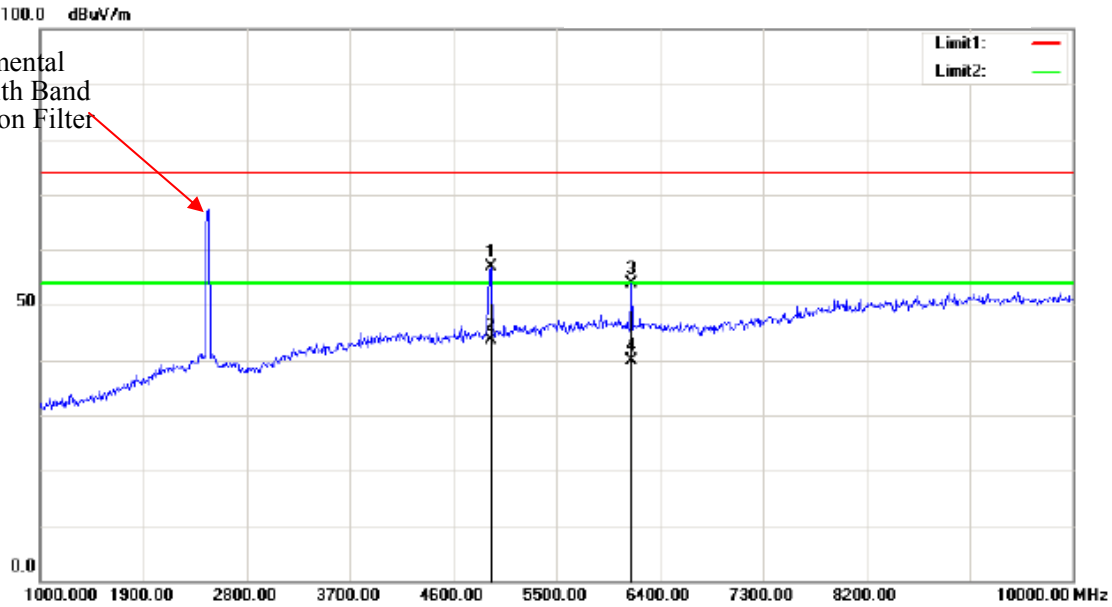
Note: No emission was detected in the range 10-25GHz.

Vertical



Mk.	No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected factor(dB)	Result (dBµV/m)	Limit (dBµV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	1	2460.070	86.21	peak	30.05	116.26	125.20	159	46	8.94	
	2	2460.070	77.35	AVG	30.05	107.40	125.20	159	46	17.80	
*	3	2483.500	38.49	peak	30.11	68.60	74.00	159	46	5.40	Fundamental
	4	2483.500	17.58	AVG	30.11	47.69	54.00	159	46	6.31	Fundamental

Fundamental
Test with Band
Rejection Filter



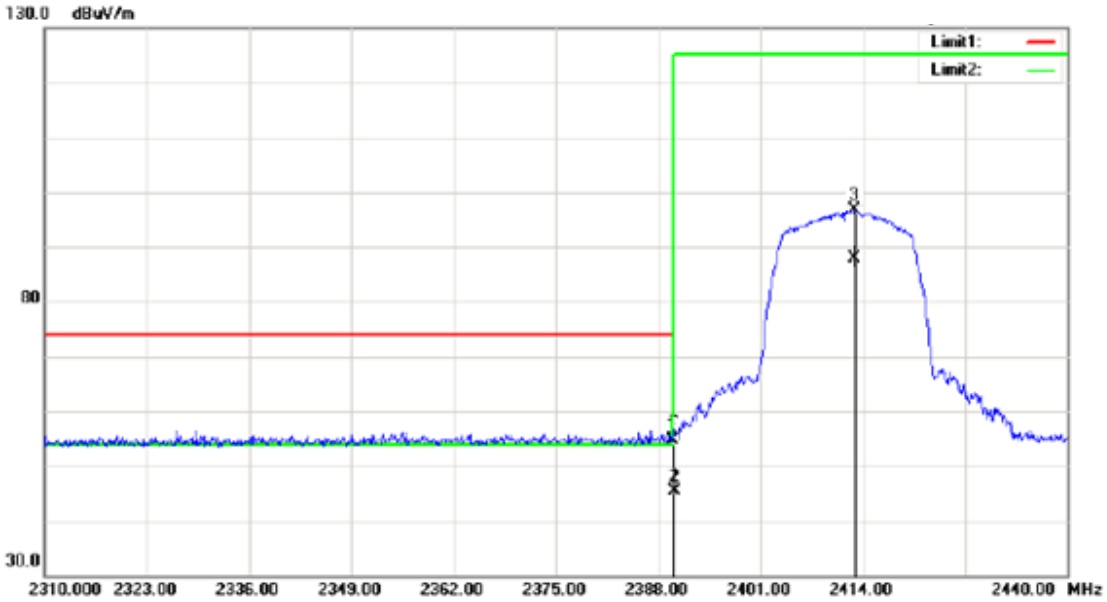
Mk.	No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected factor(dB)	Result (dBµV/m)	Limit (dBµV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	1	4928.500	57.57	peak	-0.80	56.77	74.00	163	228	17.23	
*	2	4928.500	44.35	AVG	-0.80	43.55	54.00	163	228	10.45	
	3	6157.000	52.73	peak	1.14	53.87	74.00	163	228	20.13	
	4	6157.000	38.67	AVG	1.14	39.81	54.00	163	228	14.19	

Note: No emission was detected in the range 10-25GHz.

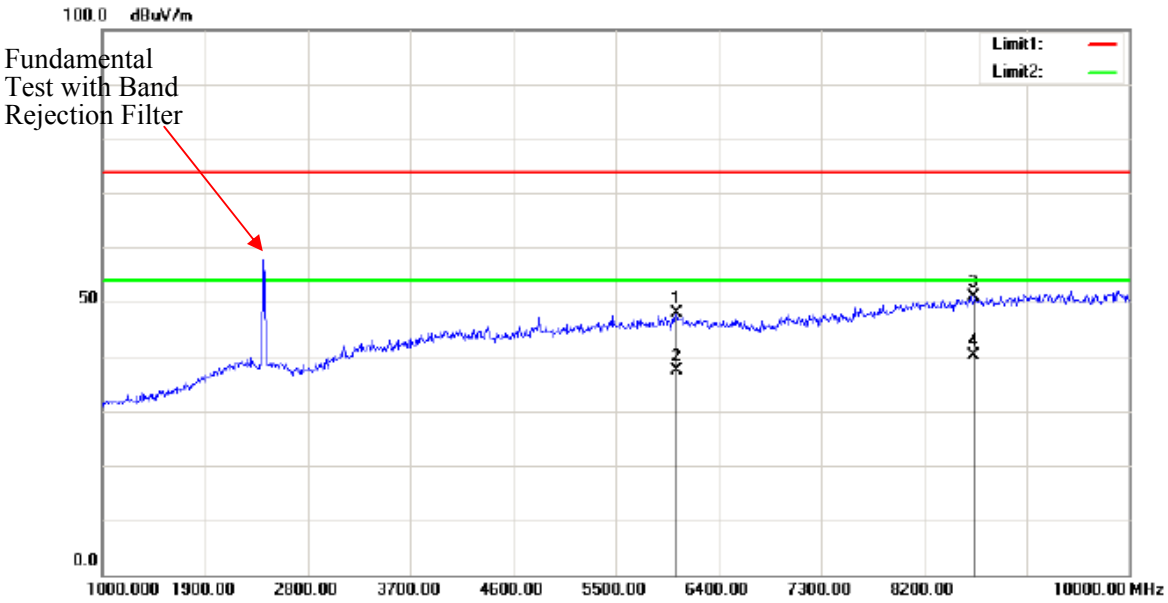
N20 mode

Low Channel

Horizontal



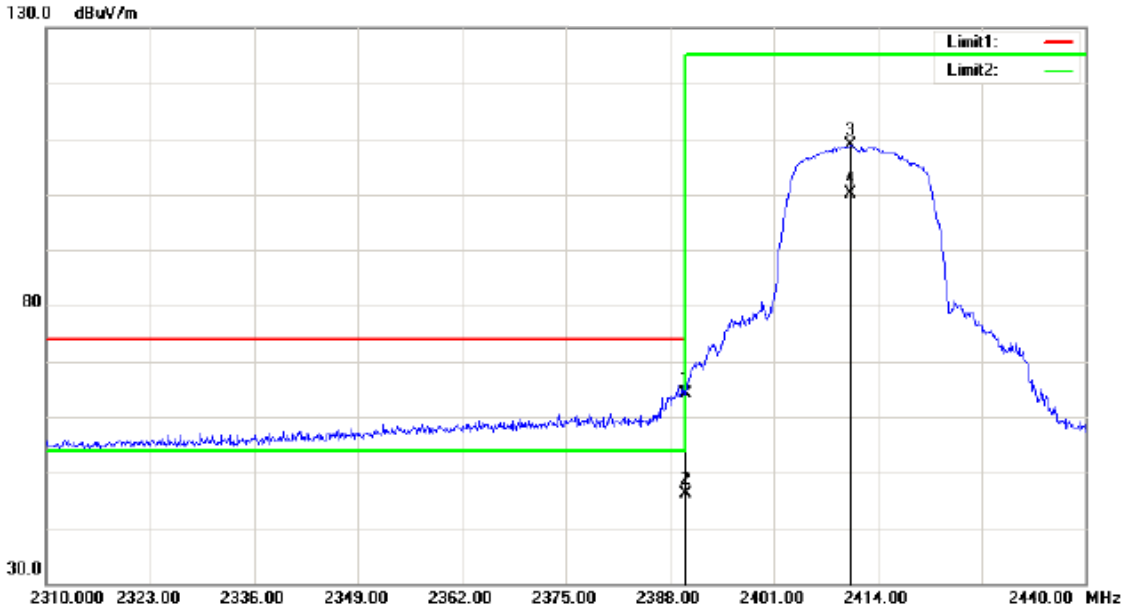
Mk.	No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected factor(dB)	Result (dBµV/m)	Limit (dBµV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
*	1	2390.000	25.55	peak	29.87	55.42	74.00	146	34	18.58	
*	2	2390.000	16.38	AVG	29.87	46.25	54.00	146	34	7.75	
	3	2413.155	66.54	peak	29.94	96.48	125.20	146	34	28.72	Fundamental
	4	2413.155	58.73	AVG	29.94	88.67	125.20	146	34	36.53	Fundamental



Mk.	No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected factor(dB)	Result (dBµV/m)	Limit (dBµV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	1	6031.000	46.99	peak	0.87	47.86	74.00	200	155	26.14	
	2	6031.000	36.59	AVG	0.87	37.46	54.00	200	155	16.54	
	3	8641.000	45.27	peak	5.67	50.94	74.00	200	155	23.06	
*	4	8641.000	34.48	AVG	5.67	40.15	54.00	200	155	13.85	

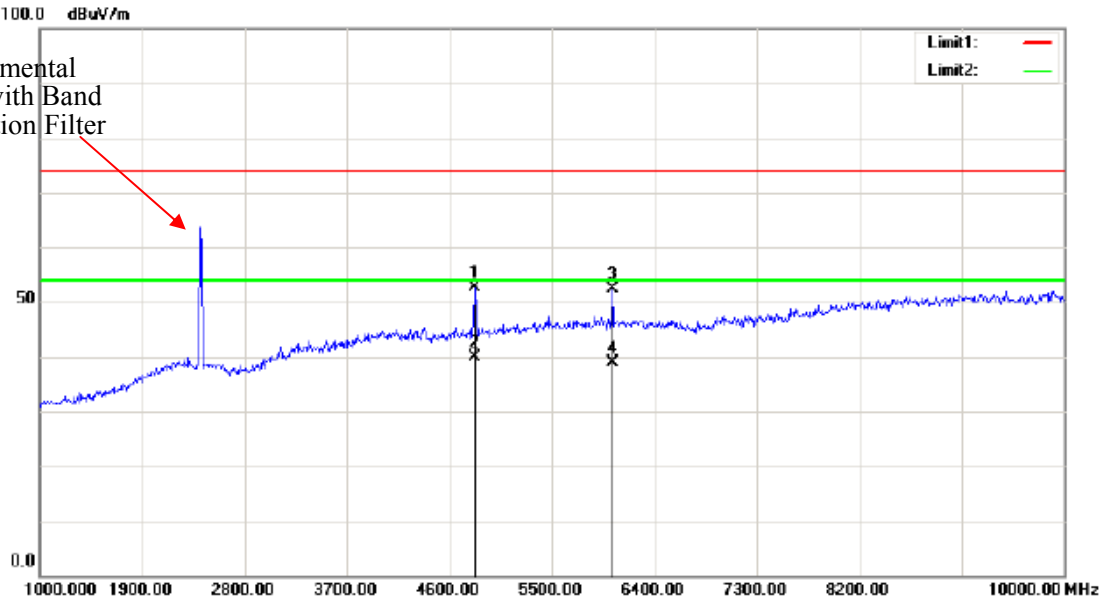
Note: No emission was detected in the range 10-25GHz.

Vertical



Mk.	No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	1	2390.000	34.21	peak	29.87	64.08	74.00	148	79	9.92	
*	2	2390.000	16.38	AVG	29.87	46.25	54.00	148	79	7.75	
	3	2410.685	79.00	peak	29.93	108.93	125.20	148	79	16.27	Fundamental
	4	2410.685	70.12	AVG	29.93	100.05	125.20	148	79	25.15	Fundamental

Fundamental Test with Band Rejection Filter

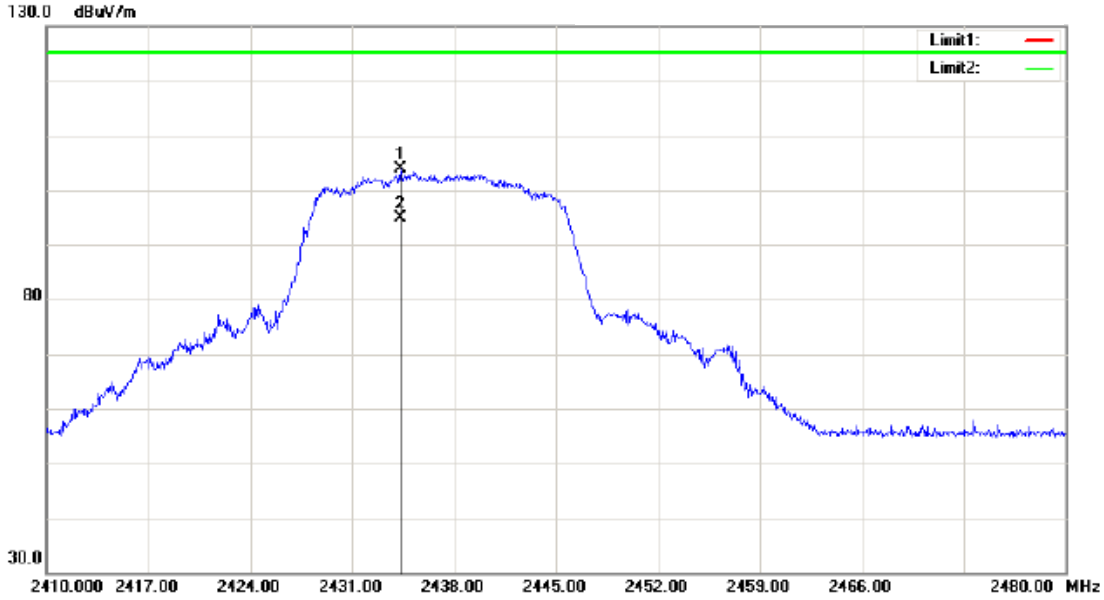


Mk.	No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected factor(dB)	Result (dBµV/m)	Limit (dBµV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	1	4825.000	53.67	peak	-1.05	52.62	74.00	145	133	21.38	
*	2	4825.000	40.86	AVG	-1.05	39.81	54.00	145	133	14.19	
	3	6031.000	51.49	peak	0.87	52.36	74.00	145	133	21.64	
	4	6031.000	37.96	AVG	0.87	38.83	54.00	145	133	15.17	

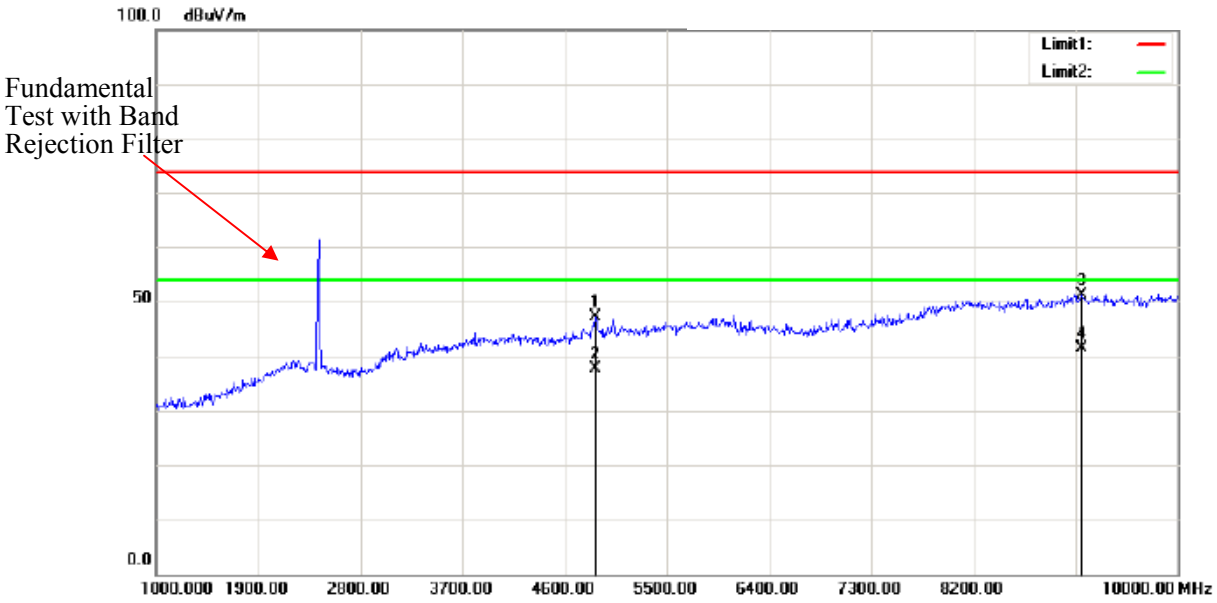
Note: No emission was detected in the range 10-25GHz.

Middle Channel

Horizontal



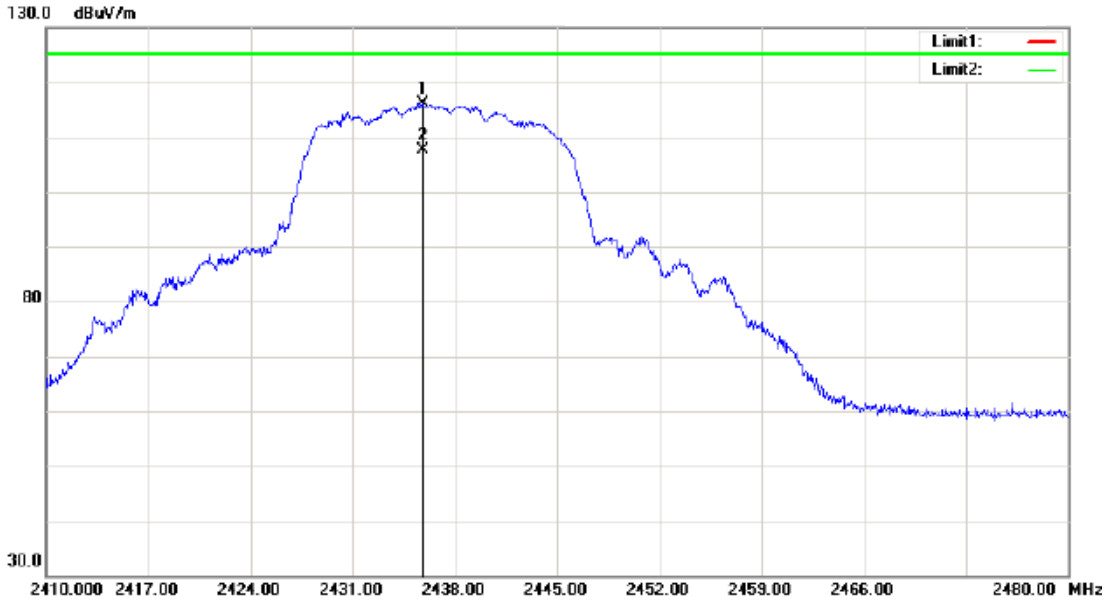
Mk.	No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected factor(dB)	Result (dBµV/m)	Limit (dBµV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
*	1	2434.325	73.89	peak	29.99	103.88	125.20	158	332	21.32	Fundamental
	2	2434.325	64.93	AVG	29.99	94.92	125.20	158	332	30.28	Fundamental



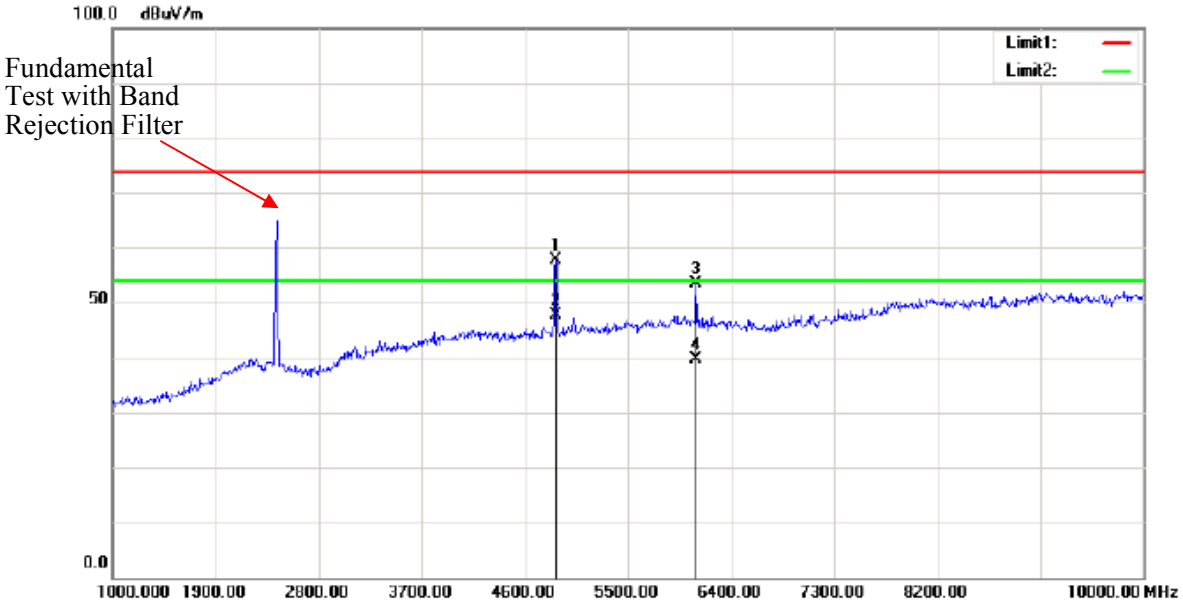
Mk.	No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected factor(dB)	Result (dBµV/m)	Limit (dBµV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	1	4870.000	48.12	peak	-0.91	47.21	74.00	166	70	26.79	
	2	4870.000	38.45	AVG	-0.91	37.54	54.00	166	70	16.46	
	3	9154.000	44.59	peak	6.50	51.09	74.00	166	70	22.91	
*	4	9154.000	34.78	AVG	6.50	41.28	54.00	166	70	12.72	

Note: No emission was detected in the range 10-25GHz.

Vertical



Mk.	No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected factor(dB)	Result (dBµV/m)	Limit (dBµV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
*	1	2435.760	86.19	peak	29.99	116.18	125.20	142	158	9.02	Fundamental
	2	2435.760	77.54	AVG	29.99	107.53	125.20	142	158	17.67	Fundamental

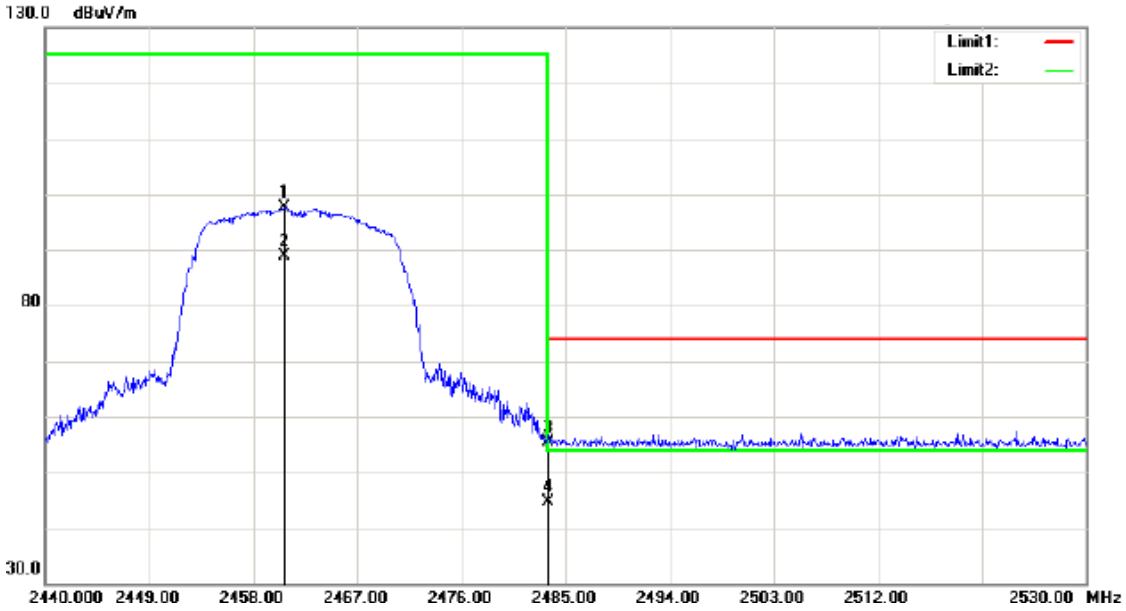


Mk.	No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected factor(dB)	Result (dBµV/m)	Limit (dBµV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	1	4870.000	58.62	peak	-0.91	57.71	74.00	125	112	16.29	
*	2	4870.000	48.48	AVG	-0.91	47.57	54.00	125	112	6.43	
	3	6094.000	52.32	peak	1.00	53.32	74.00	125	112	20.68	
	4	6094.000	38.67	AVG	1.00	39.67	54.00	125	112	14.33	

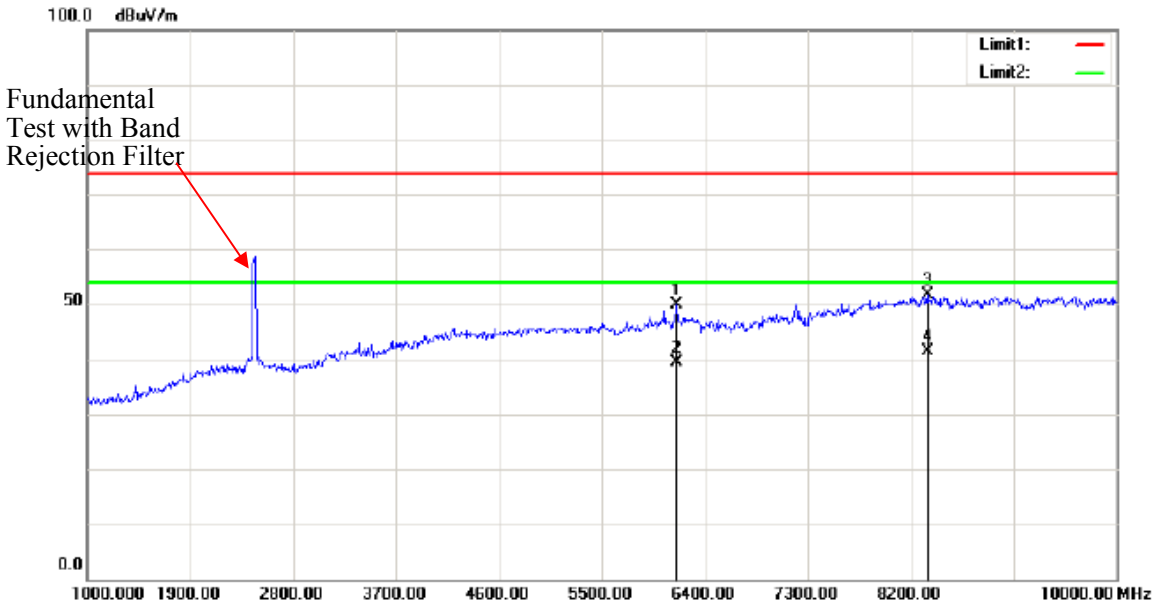
Note: No emission was detected in the range 10-25GHz.

High Channel

Horizontal



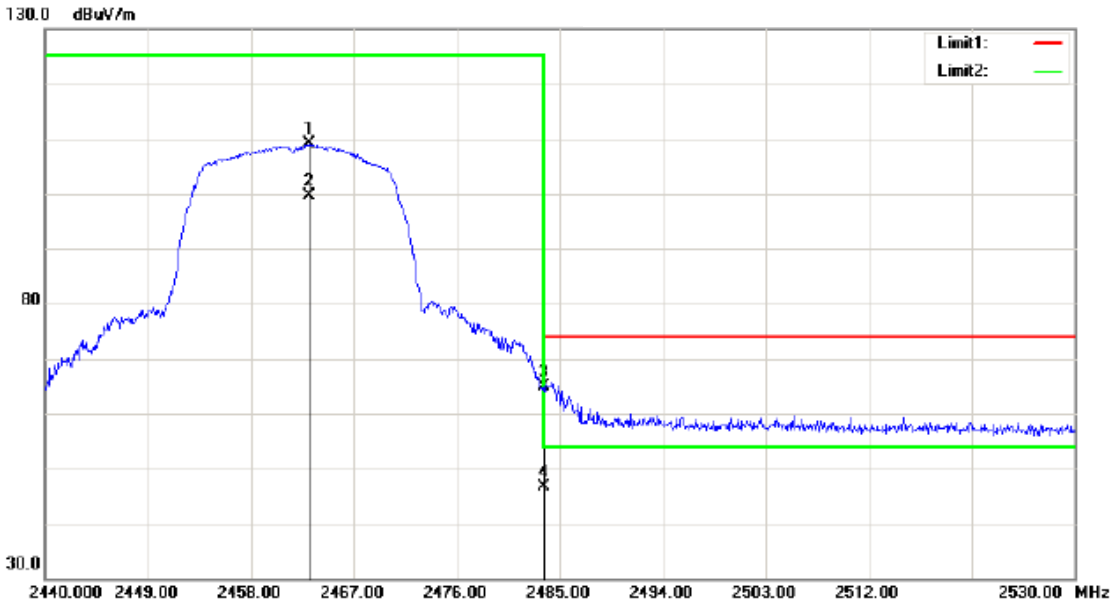
Mk.	No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected factor(dB)	Result (dBµV/m)	Limit (dBµV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	1	2460.700	67.52	peak	30.05	97.57	125.20	163	224	27.63	
	2	2460.700	58.73	AVG	30.05	88.78	125.20	163	224	36.42	
	3	2483.500	25.37	peak	30.11	55.48	74.00	163	224	18.52	Fundamental
*	4	2483.500	14.63	AVG	30.11	44.74	54.00	163	224	9.26	Fundamental



Mk.	No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected factor(dB)	Result (dBµV/m)	Limit (dBµV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	1	6157.000	48.63	peak	1.14	49.77	74.00	180	170	24.23	
	2	6157.000	38.31	AVG	1.14	39.45	54.00	180	170	14.55	
	3	8344.000	46.32	peak	5.25	51.57	74.00	180	170	22.43	
*	4	8344.000	36.22	AVG	5.25	41.47	54.00	180	170	12.53	

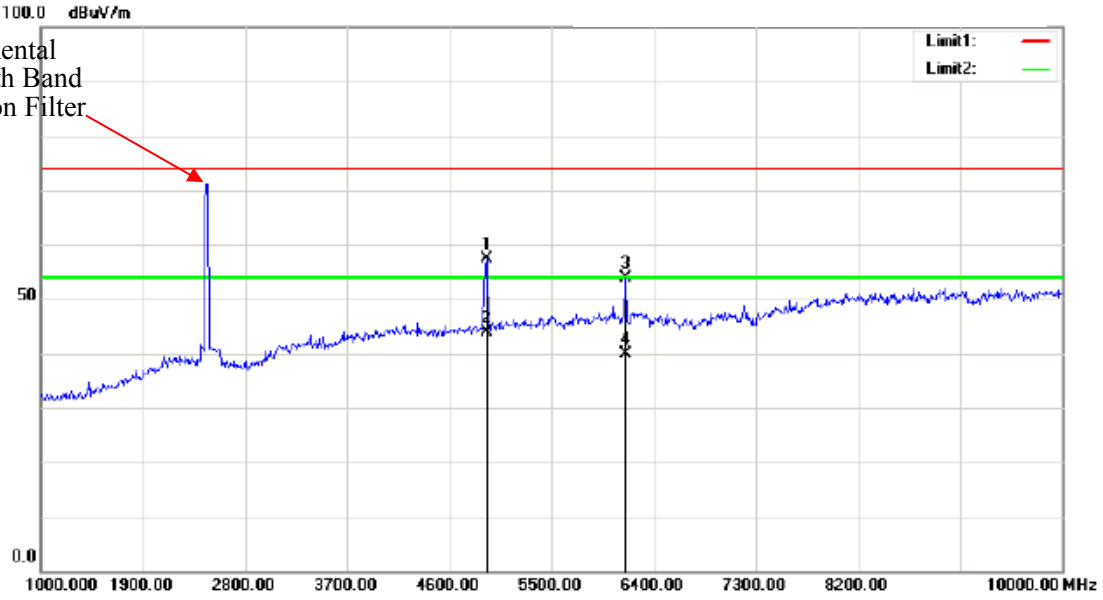
Note: No emission was detected in the range 10-25GHz.

Vertical



Mk.	No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected factor(dB)	Result (dBµV/m)	Limit (dBµV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	1	2463.085	78.96	peak	30.06	109.02	125.20	155	43	16.18	
	2	2463.085	69.52	AVG	30.06	99.58	125.20	155	43	25.62	
	3	2483.500	34.69	peak	30.11	64.80	74.00	155	43	9.20	Fundamental
*	4	2483.500	16.57	AVG	30.11	46.68	54.00	155	43	7.32	Fundamental

Fundamental Test with Band Rejection Filter



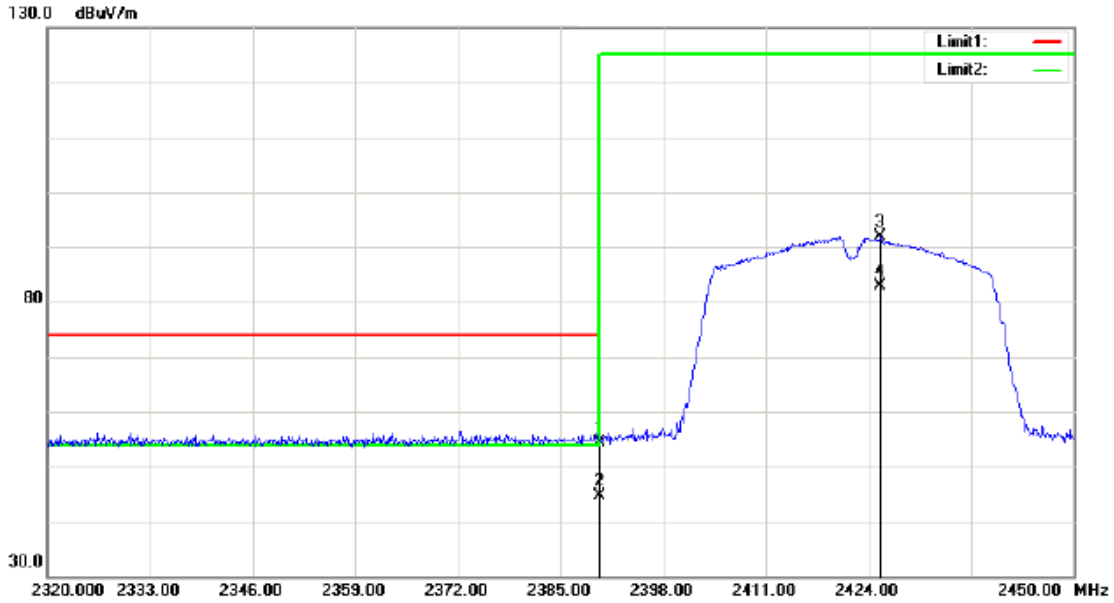
Mk.	No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected factor(dB)	Result (dBµV/m)	Limit (dBµV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	1	4924.000	58.22	peak	-0.80	57.42	74.00	155	24	16.58	
*	2	4924.000	44.65	AVG	-0.80	43.85	54.00	155	24	10.15	
	3	6157.000	52.63	peak	1.14	53.77	74.00	155	24	20.23	
	4	6157.000	38.72	AVG	1.14	39.86	54.00	155	24	14.14	

Note: No emission was detected in the range 10-25GHz.

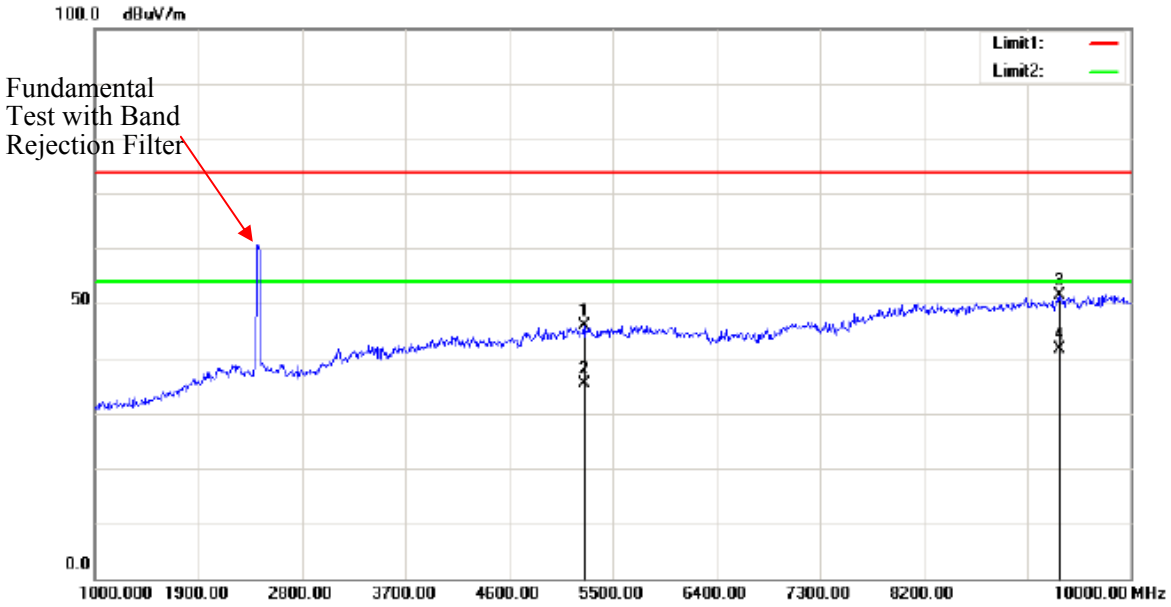
N40 mode

Low Channel

Horizontal



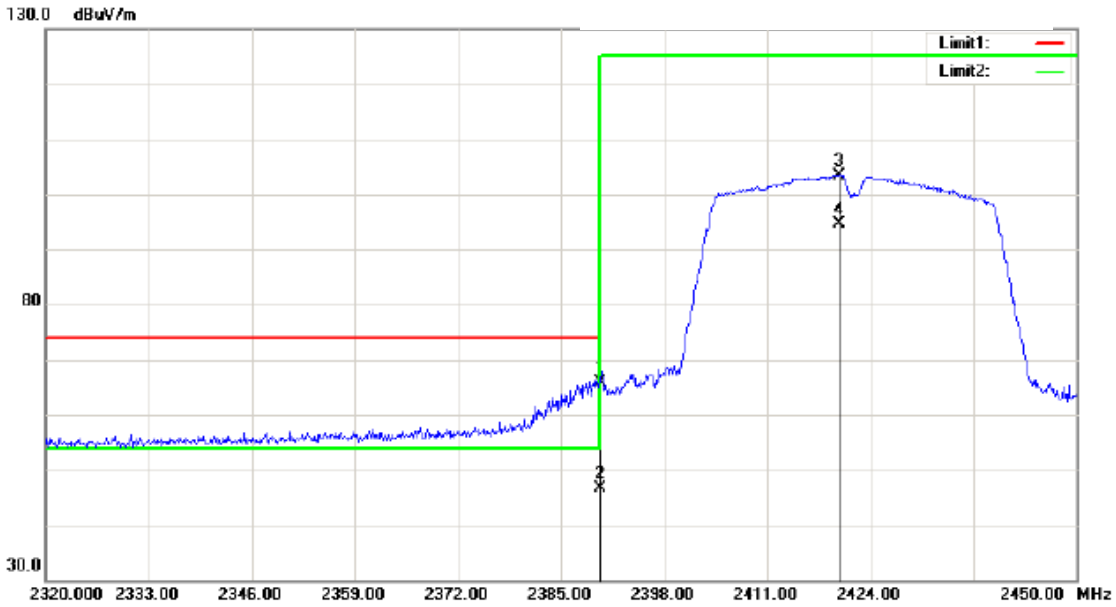
Mk.	No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected factor(dB)	Result (dBµV/m)	Limit (dBµV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	1	2390.000	24.50	peak	29.87	54.37	74.00	144	214	19.63	
*	2	2390.000	14.75	AVG	29.87	44.62	54.00	144	214	9.38	
	3	2425.495	61.95	peak	29.96	91.91	125.20	144	214	33.29	Fundamental
	4	2425.495	52.89	AVG	29.96	82.85	125.20	144	214	42.35	Fundamental



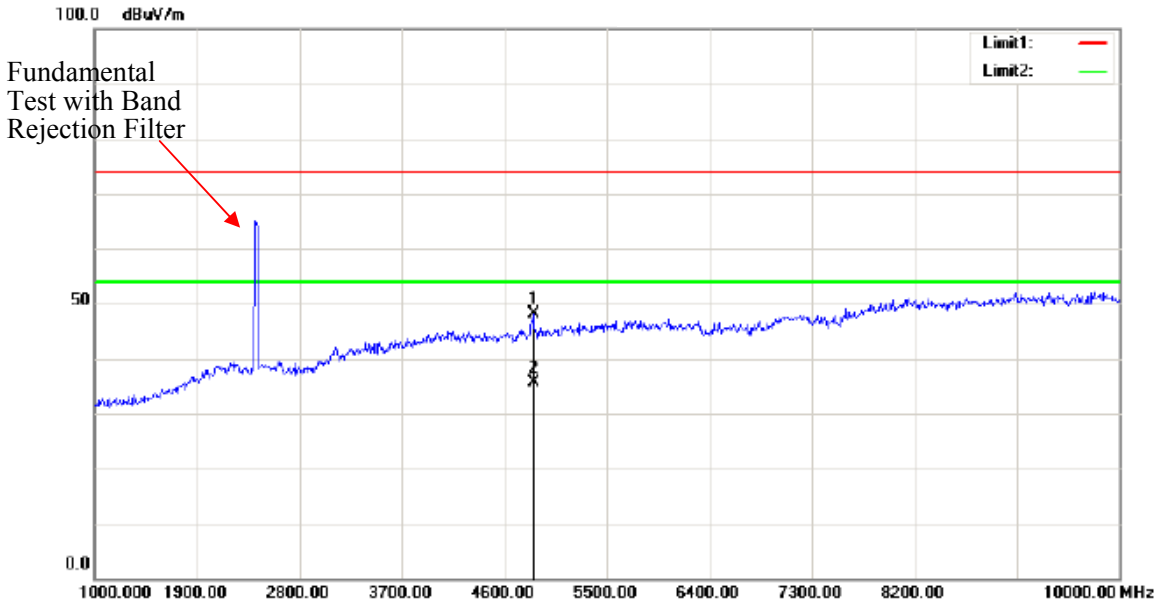
Mk.	No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected factor(dB)	Result (dBµV/m)	Limit (dBµV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	1	5248.000	45.96	peak	-0.17	45.79	74.00	170	260	28.21	
	2	5248.000	35.65	AVG	-0.17	35.48	54.00	170	260	18.52	
	3	9379.000	44.56	peak	6.84	51.40	74.00	170	260	22.60	
*	4	9379.000	34.73	AVG	6.84	41.57	54.00	170	260	12.43	

Note: No emission was detected in the range 10-25GHz.

Vertical



Mk.	No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected factor(dB)	Result (dBµV/m)	Limit (dBµV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	1	2390.000	35.90	peak	29.87	65.77	74.00	138	96	8.23	
*	2	2390.000	16.85	AVG	29.87	46.72	54.00	138	96	7.28	
	3	2420.100	73.55	peak	29.95	103.50	125.20	138	96	21.70	Fundamental
	4	2420.100	64.59	AVG	29.95	94.54	125.20	138	96	30.66	Fundamental

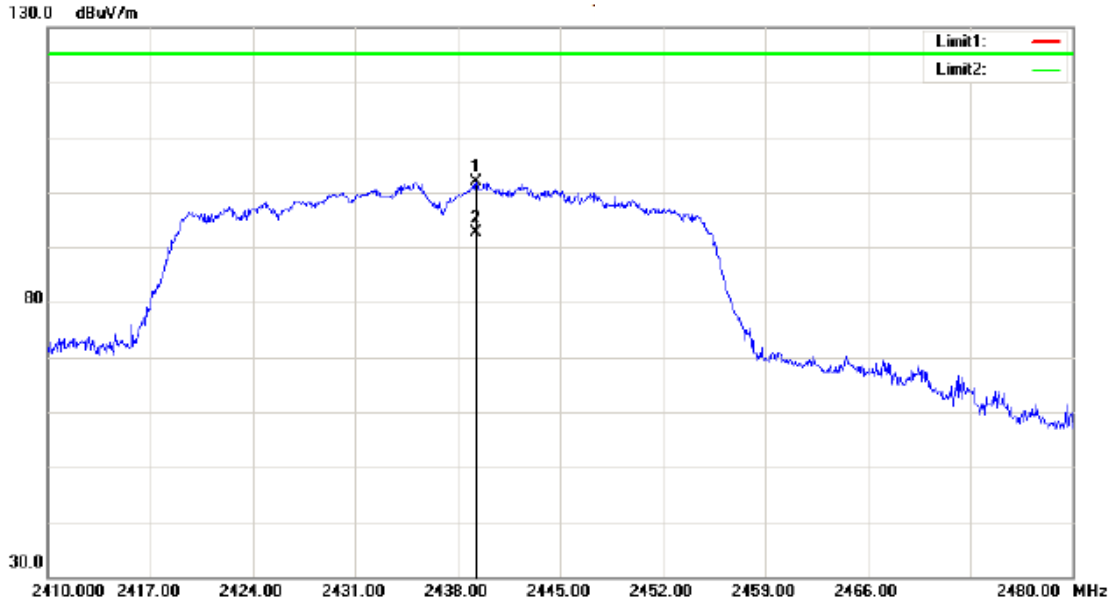


Mk.	No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected factor(dB)	Result (dBµV/m)	Limit (dBµV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	1	4852.000	49.21	peak	-0.98	48.23	74.00	136	24	25.77	
*	2	4852.000	36.52	AVG	-0.98	35.54	54.00	136	24	18.46	

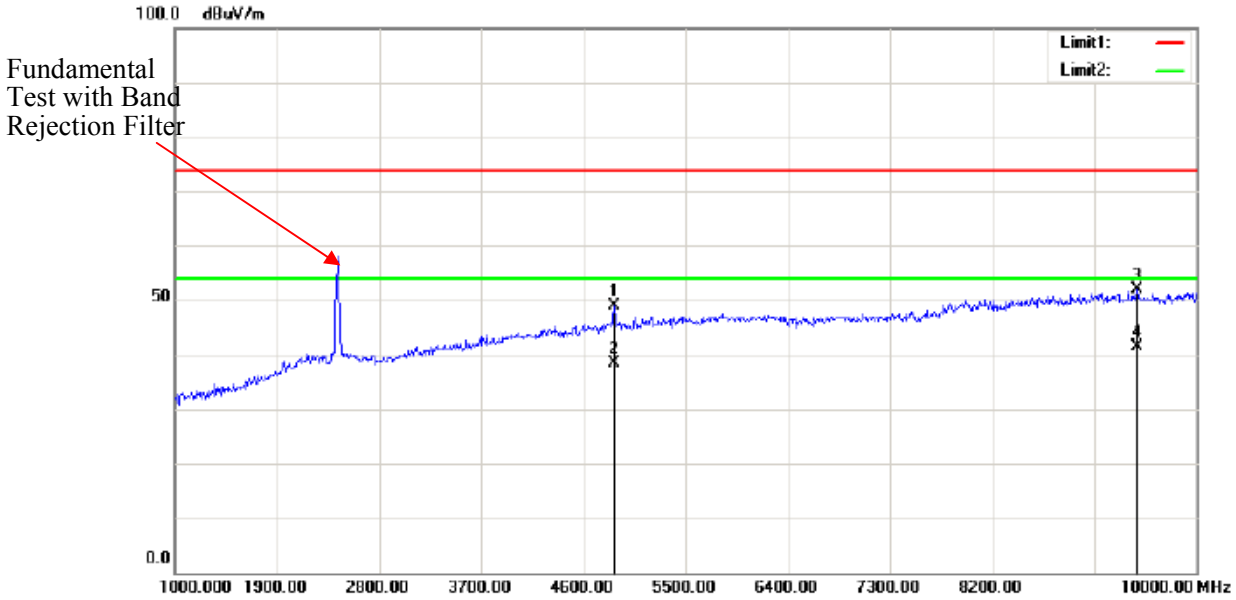
Note: No emission was detected in the range 10-25GHz.

Middle Channel

Horizontal



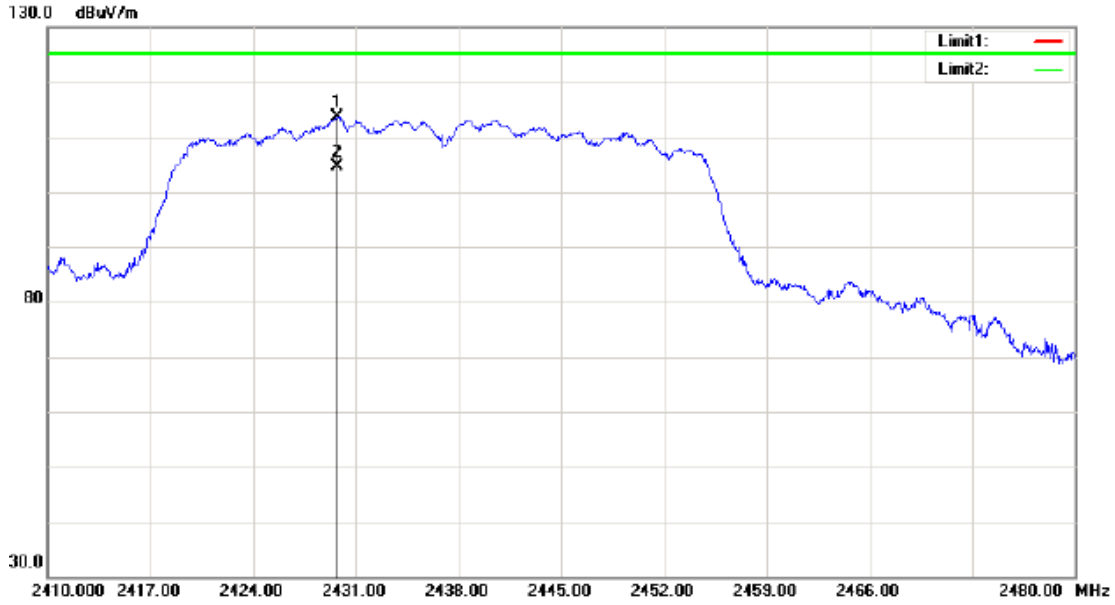
Mk.	No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected factor(dB)	Result (dBµV/m)	Limit (dBµV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
*	1	2439.260	71.87	peak	30.00	101.87	125.20	159	64	23.33	Fundamental
	2	2439.260	62.53	AVG	30.00	92.53	125.20	159	64	32.67	Fundamental



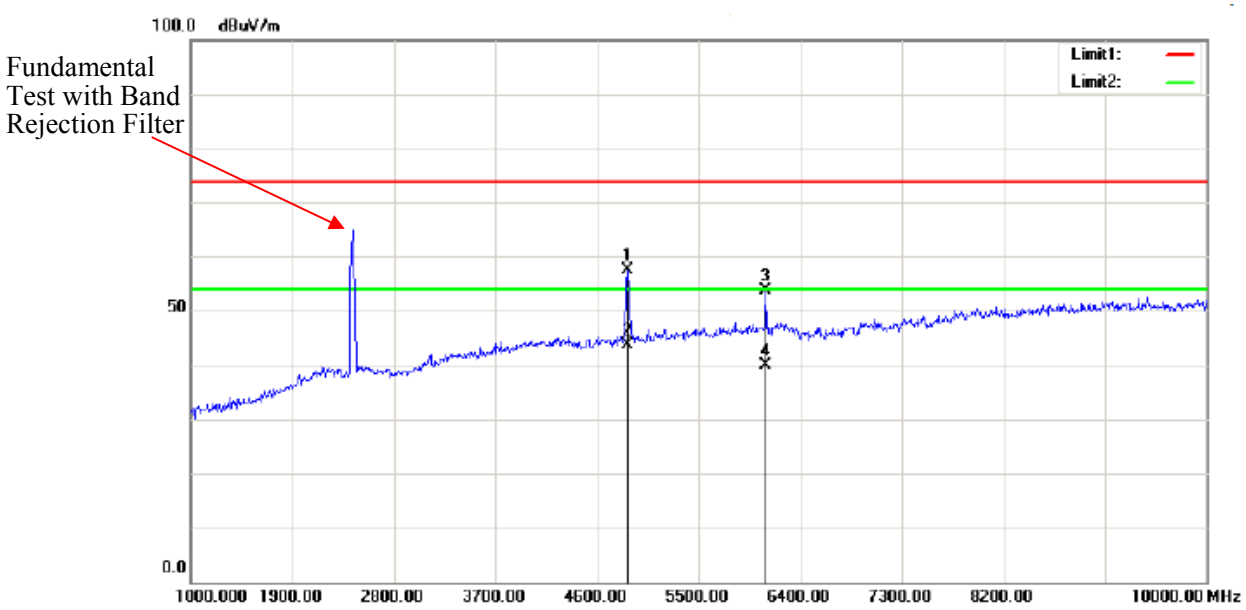
Mk.	No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected factor(dB)	Result (dBµV/m)	Limit (dBµV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	1	4874.500	49.79	peak	-0.90	48.89	74.00	170	200	25.11	
	2	4874.500	39.35	AVG	-0.90	38.45	54.00	170	200	15.55	
	3	9482.500	44.80	peak	7.00	51.80	74.00	170	200	22.20	
*	4	9482.500	34.32	AVG	7.00	41.32	54.00	170	200	12.68	

Note: No emission was detected in the range 10-25GHz.

Vertical



Mk.	No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected factor(dB)	Result (dBµV/m)	Limit (dBµV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
*	1	2429.740	83.69	peak	29.97	113.66	125.20	141	166	11.54	Fundamental
	2	2429.740	74.68	AVG	29.97	104.65	125.20	141	166	20.55	Fundamental

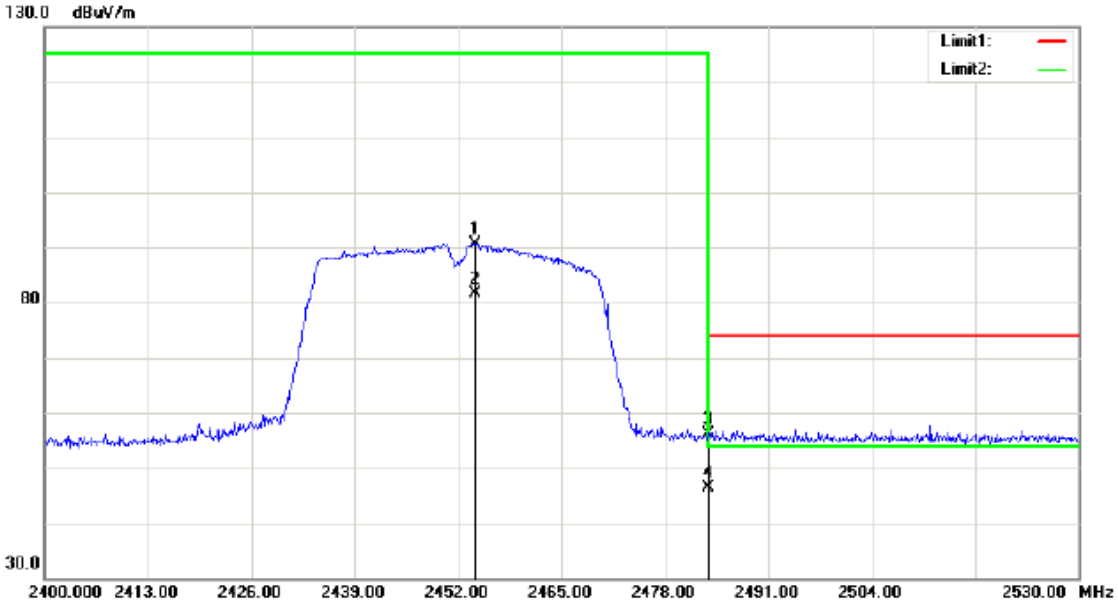


Mk.	No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected factor(dB)	Result (dBµV/m)	Limit (dBµV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	1	4874.500	58.29	peak	-0.90	57.39	74.00	154	33	16.61	
*	2	4874.500	44.62	AVG	-0.90	43.72	54.00	154	33	10.28	
	3	6094.000	52.74	peak	1.00	53.74	74.00	154	33	20.26	
	4	6094.000	38.79	AVG	1.00	39.79	54.00	154	33	14.21	

Note: No emission was detected in the range 10-25GHz.

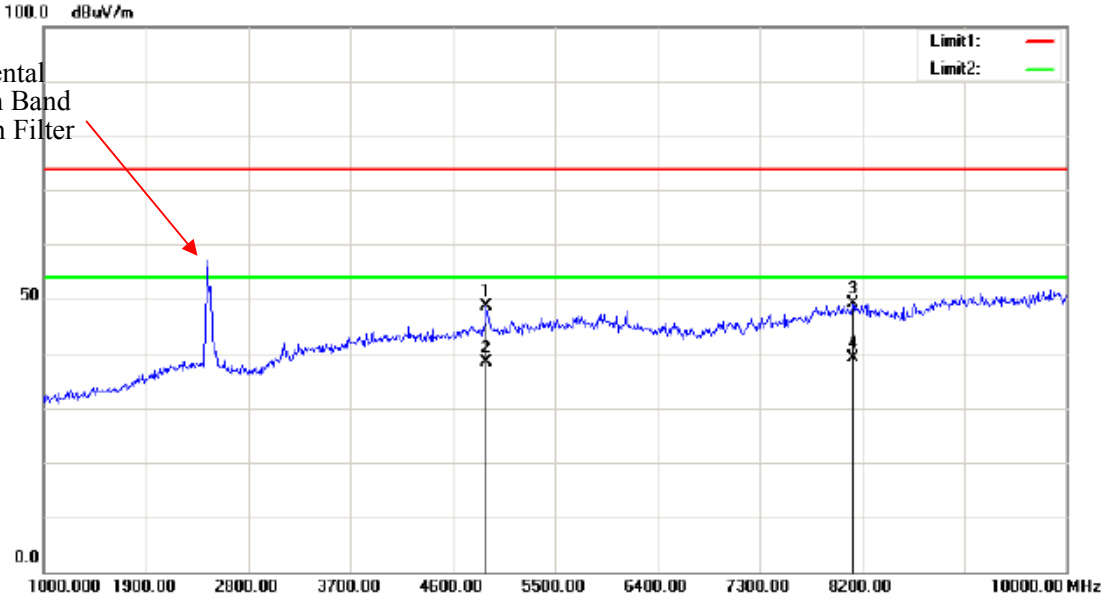
High Channel

Horizontal



Mk.	No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected factor(dB)	Result (dBµV/m)	Limit (dBµV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	1	2454.210	60.66	peak	30.04	90.70	125.20	169	323	34.50	
	2	2454.210	51.49	AVG	30.04	81.53	125.20	169	323	43.67	
	3	2483.500	25.92	peak	30.11	56.03	74.00	169	323	17.97	Fundamental
*	4	2483.500	16.37	AVG	30.11	46.48	54.00	169	323	7.52	Fundamental

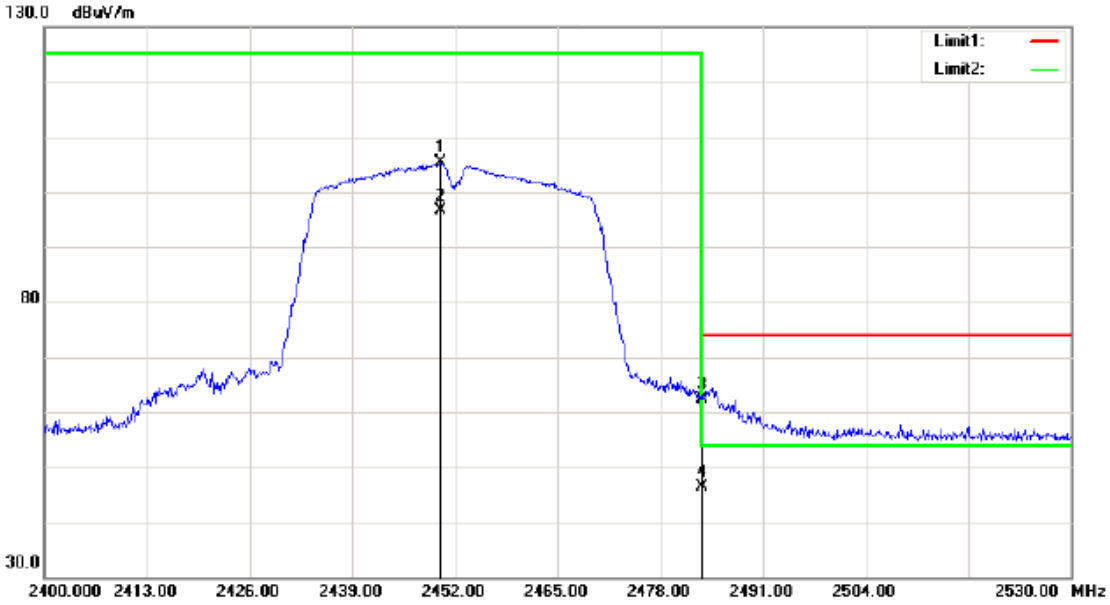
Fundamental Test with Band Rejection Filter



Mk.	No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected factor(dB)	Result (dBµV/m)	Limit (dBµV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	1	4901.500	49.55	peak	-0.81	48.74	74.00	159	100	25.26	
	2	4901.500	39.14	AVG	-0.81	38.33	54.00	159	100	15.67	
	3	8119.000	44.14	peak	4.98	49.12	74.00	159	100	24.88	
*	4	8119.000	34.17	AVG	4.98	39.15	54.00	159	100	14.85	

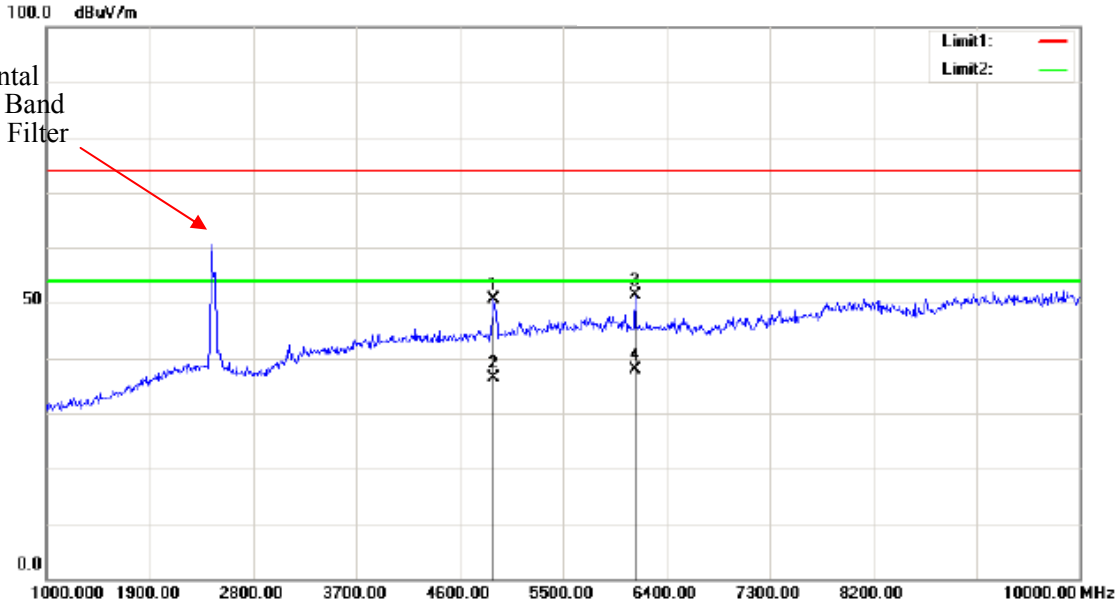
Note: No emission was detected in the range 10-25GHz.

Vertical



Mk.	No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected factor(dB)	Result (dBµV/m)	Limit (dBµV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	1	2450.245	75.23	peak	30.03	105.26	125.20	145	153	19.94	
	2	2450.245	66.52	AVG	30.03	96.55	125.20	145	153	28.65	
	3	2483.500	32.22	peak	30.11	62.33	74.00	145	153	11.67	Fundamental
*	4	2483.500	16.37	AVG	30.11	46.48	54.00	145	153	7.52	Fundamental

Fundamental Test with Band Rejection Filter



Mk.	No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected factor(dB)	Result (dBµV/m)	Limit (dBµV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	1	4901.500	51.55	peak	-0.81	50.74	74.00	145	223	23.26	
	2	4901.500	37.28	AVG	-0.81	36.47	54.00	145	223	17.53	
	3	6130.000	50.28	peak	1.08	51.36	74.00	145	223	22.64	
*	4	6130.000	36.85	AVG	1.08	37.93	54.00	145	223	16.07	

Note: No emission was detected in the range 10-25GHz.

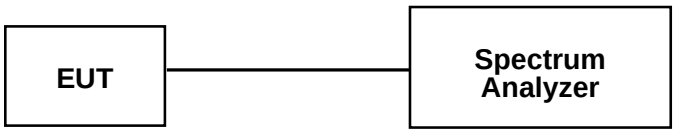
FCC §15.247(a) (2) – 6 dB EMISSION BANDWIDTH

Applicable Standard

Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

Test Procedure

a) Set RBW = 100 kHz.
b) Set the video bandwidth (VBW) ≥ 3×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 Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCI	101121	2017-03-02	2018-03-02
Unknown	RF Cable	Unknown	C-4	Each Time	/

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

Test Data

Environmental Conditions

Temperature:	27.3°C
Relative Humidity:	52 %
ATM Pressure:	100.8 kPa

** The testing was performed by Mark Pan on 2017-10-19.*

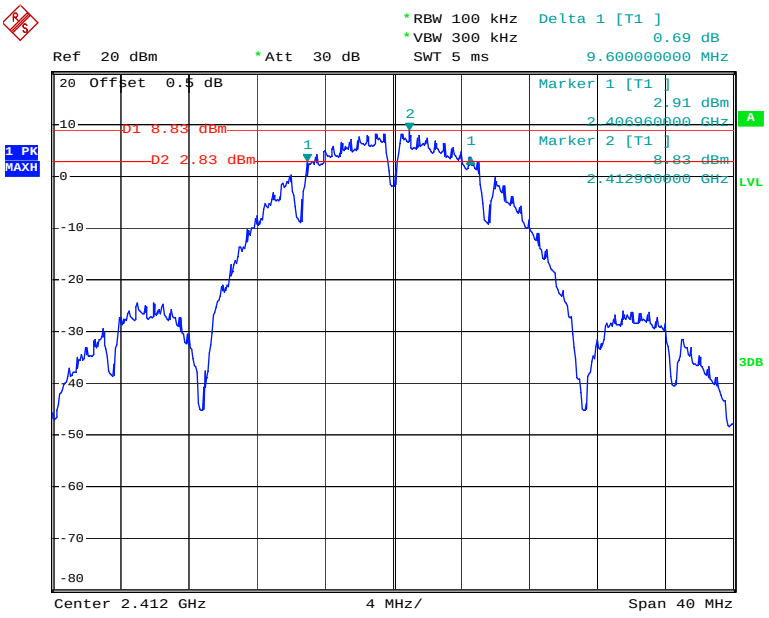
Test Mode: Transmitting

Test Result: Compliant

Test performed at chain 0, please refer to the following table and plots.

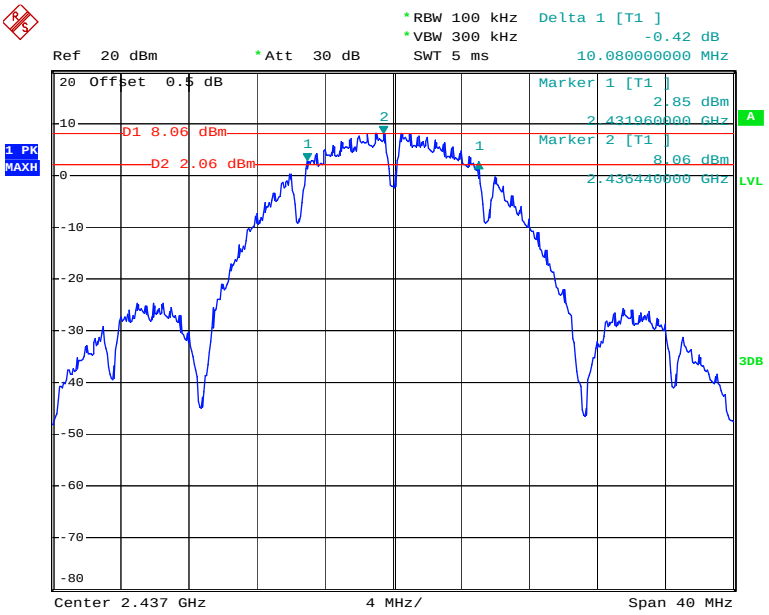
Test mode	Channel	Frequency (MHz)	6 dB Emission Bandwidth (MHz)	Limit (MHz)
802.11b	Low	2412	9.6	≥0.5
	Middle	2437	10.08	≥0.5
	High	2462	10.08	≥0.5
802.11g	Low	2412	15.2	≥0.5
	Middle	2437	15.2	≥0.5
	High	2462	15.12	≥0.5
802.11n ht20	Low	2412	15.2	≥0.5
	Middle	2437	15.2	≥0.5
	High	2462	15.2	≥0.5
802.11n ht40	Low	2422	35.2	≥0.5
	Middle	2437	35.2	≥0.5
	High	2452	35.2	≥0.5

802.11b Low Channel



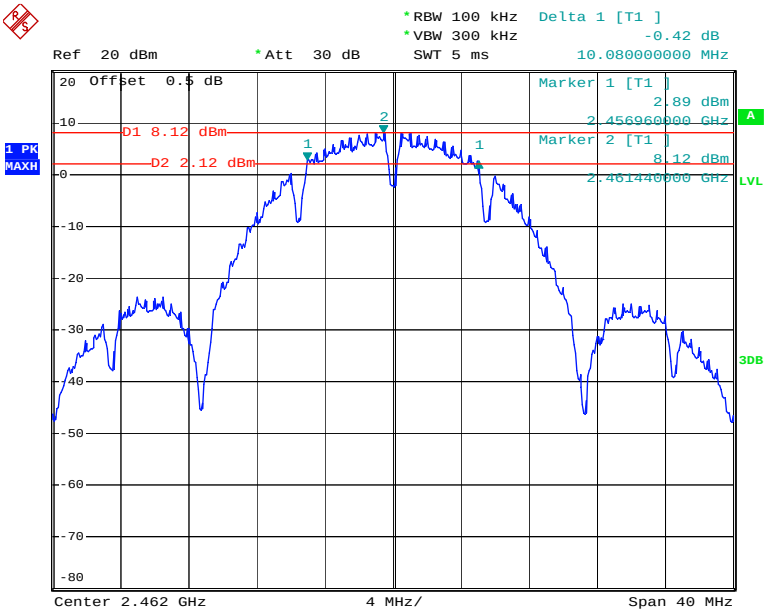
Date: 19.OCT.2017 14:11:21

802.11b Middle Channel



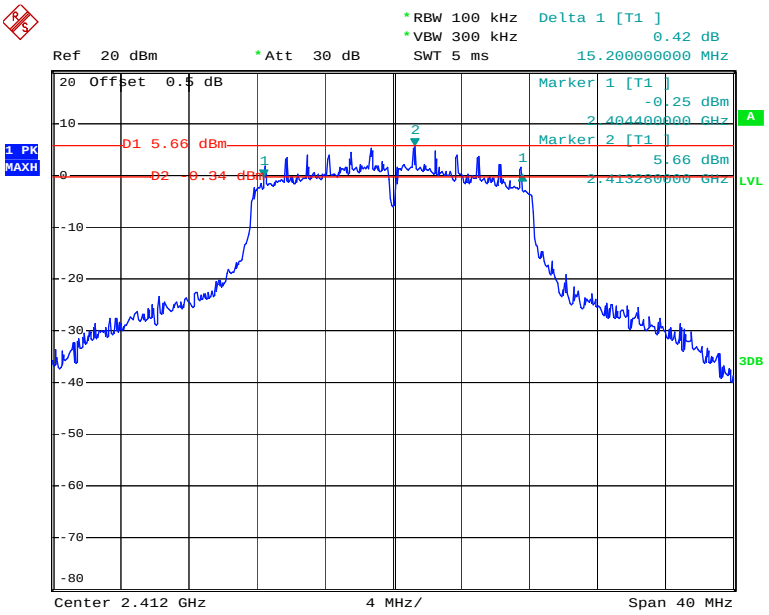
Date: 19.OCT.2017 14:14:00

802.11b High Channel



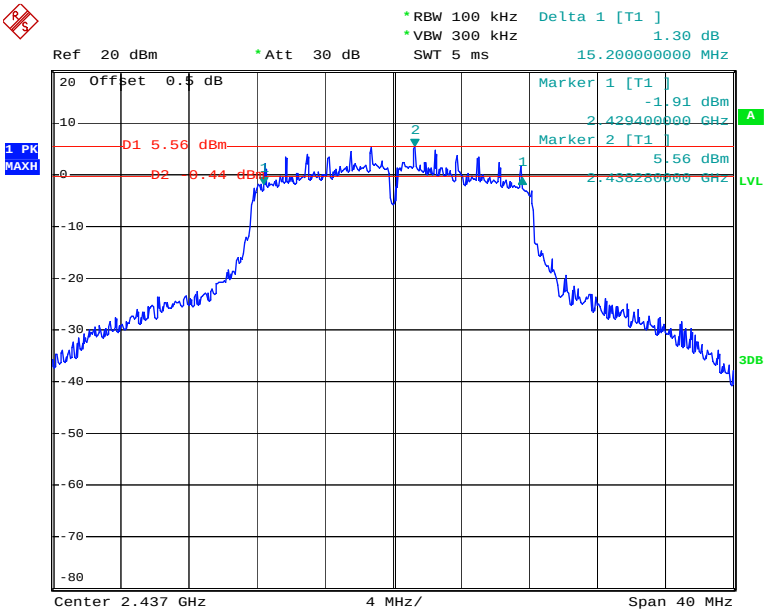
Date: 19.OCT.2017 14:16:44

802.11g Low Channel



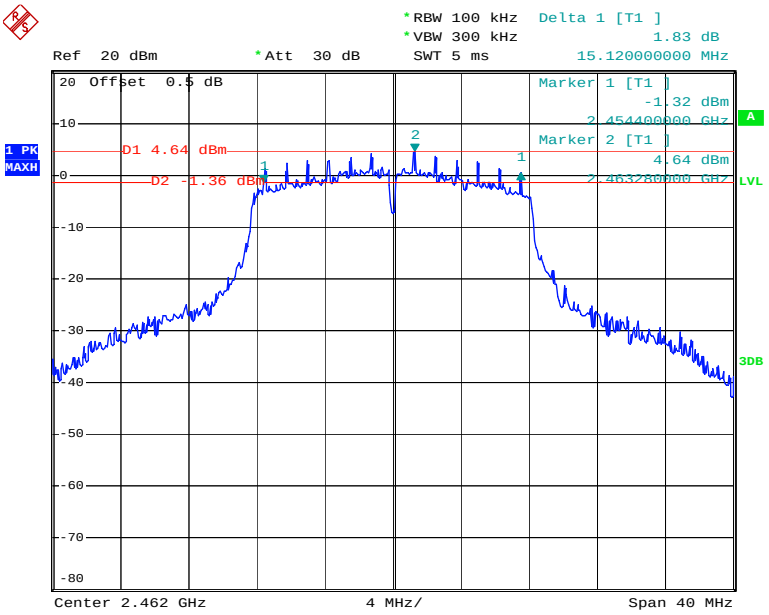
Date: 19.OCT.2017 14:35:20

802.11g Middle Channel



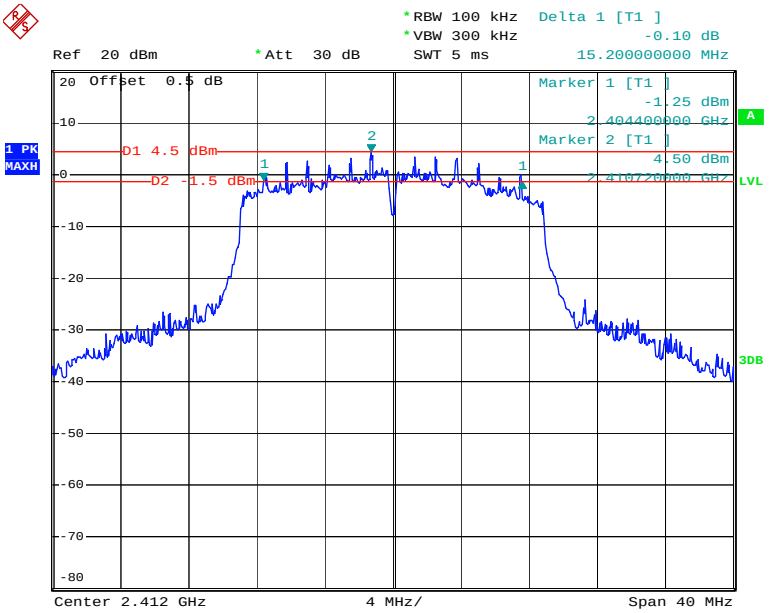
Date: 19.OCT.2017 14:38:11

802.11g High Channel



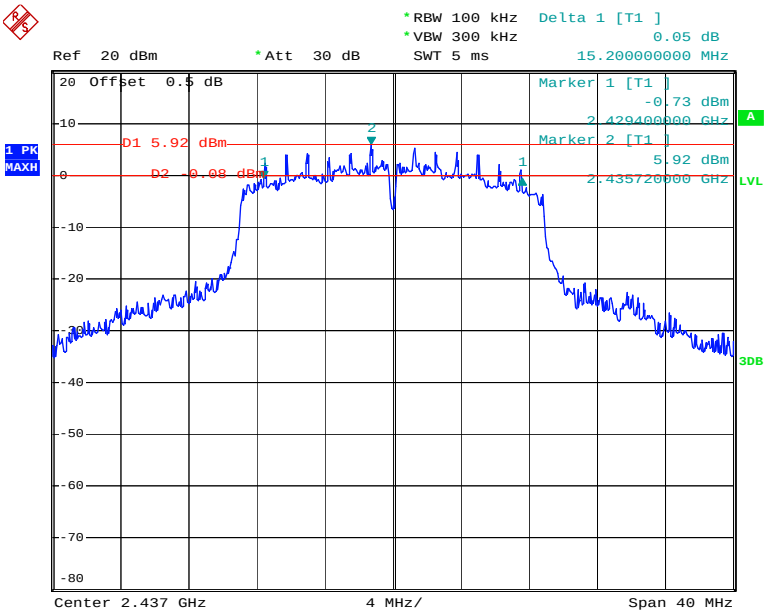
Date: 19.OCT.2017 14:40:53

802.11n ht20 Low Channel



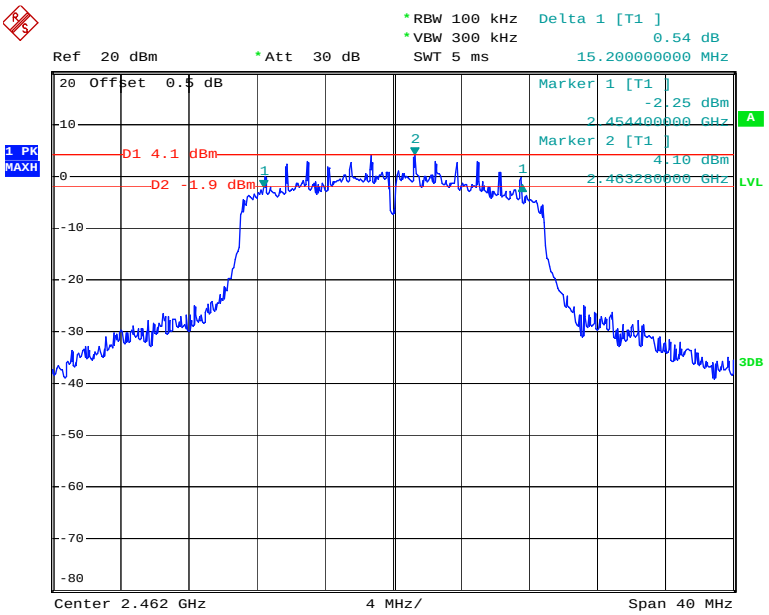
Date: 19.OCT.2017 14:45:32

802.11n ht20 Middle Channel



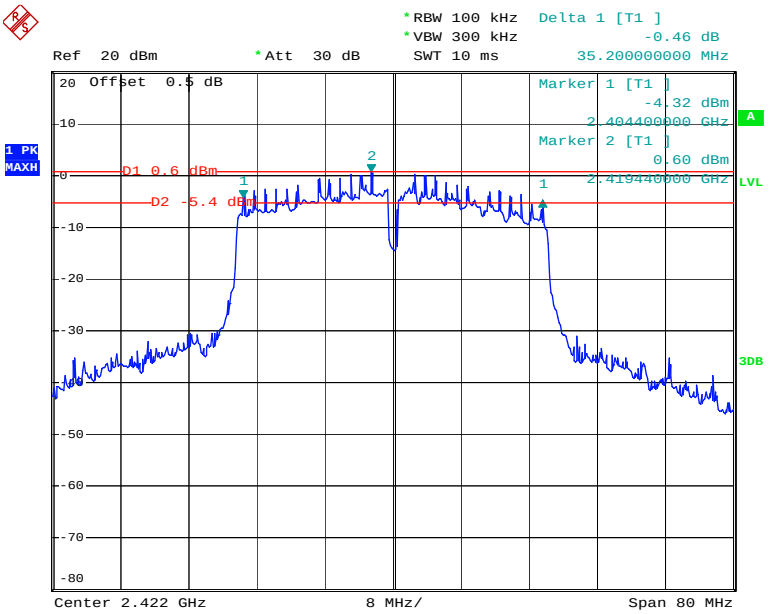
Date: 19.OCT.2017 14:48:25

802.11n ht20 High Channel



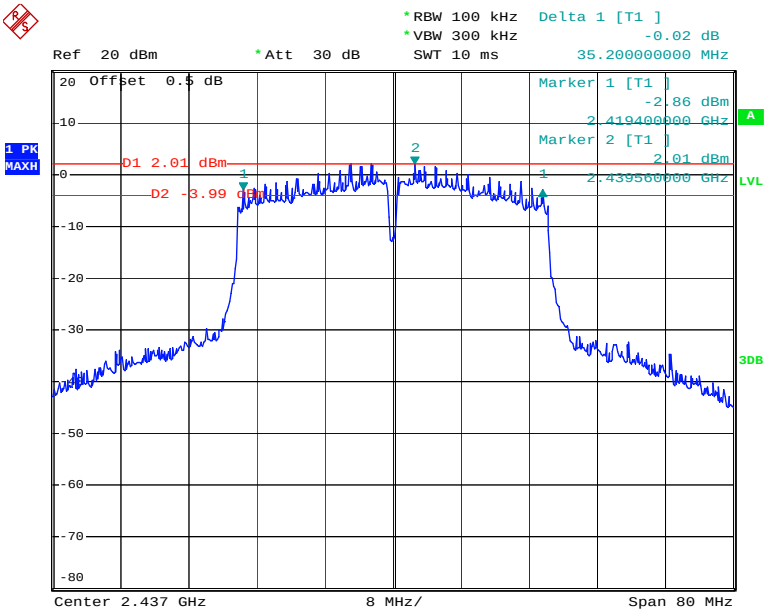
Date: 19.OCT.2017 14:57:45

802.11n ht40 Low Channel



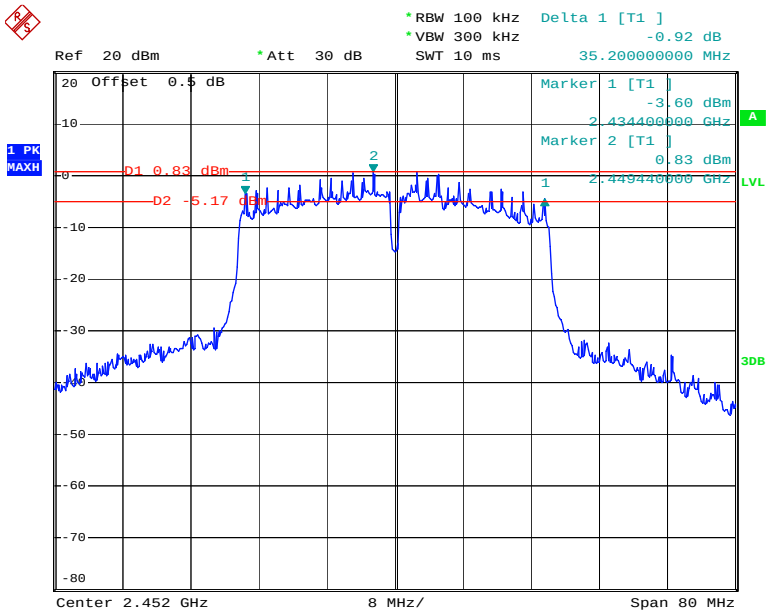
Date: 19.OCT.2017 15:02:28

802.11n ht40 Middle Channel



Date: 19.OCT.2017 16:31:26

802.11n ht40 High Channel



Date: 19.OCT.2017 15:08:41

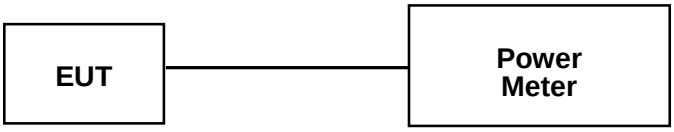
FCC §15.247(b) (3) - MAXIMUM CONDUCTED OUTPUT POWER

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

1. Place the EUT on a bench and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to test equipment.
3. Add a correction factor to the display.
4. Set the power Meter to test Peak output power, record the result as peak power.



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	Wideband Power Sensor	N1921A	MY54210016	2016-11-03	2017-11-03
Agilent	P-Series Power Meter	N1912A	MY5000448	2016-11-03	2017-11-03
Unknown	RF Cable	Unknown	C-4	Each Time	/

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

Test Data

Environmental Conditions

Temperature:	24.4 °C
Relative Humidity:	48 %
ATM Pressure:	100.4 kPa

** The testing was performed by Mark Pan on 2017-10-19.*

Test Mode: Transmitting

Test Result: Compliant. Please refer to the following table.

Test mode	Channel	Frequency (MHz)	Max Peak Conducted Output Power (dBm)			Limit (dBm)
			Chain 0	Chain 1	Total	
802.11b	Low	2412	21.30	21.26	/	30
	Middle	2437	21.31	21.47	/	30
	High	2462	21.35	21.40	/	30
802.11g	Low	2412	23.56	23.61	/	30
	Middle	2437	23.47	23.75	/	30
	High	2462	22.58	23.24	/	30
802.11n ht20	Low	2412	21.10	21.21	24.17	30
	Middle	2437	23.23	24.08	26.69	30
	High	2462	21.87	21.57	24.73	30
802.11n ht40	Low	2422	20.74	21.64	24.22	30
	Middle	2437	22.99	23.18	26.10	30
	High	2452	20.86	21.45	24.18	30

Note: the maximum antenna gain is 5 dBi, the device employed Cyclic Delay Diversity (CDD) for 802.11 MIMO transmitting, per KDB 662911 D01 Multiple Transmitter Output v02r01, for power measurements on IEEE 802.11 devices:

Array Gain = 0 dB (i.e., no array gain) for NANT ≤ 4;

So:

Directional gain = G_{ANT} + Array Gain = 5dBi < 6dBi

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. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. 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.
4. 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.
5. Repeat above procedures until all measured frequencies were complete.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCI	101121	2017-03-02	2018-03-02
Unknown	RF Cable	Unknown	C-4	Each Time	/

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

Test Data

Environmental Conditions

Temperature:	24.4 °C
Relative Humidity:	48 %
ATM Pressure:	100.4 kPa

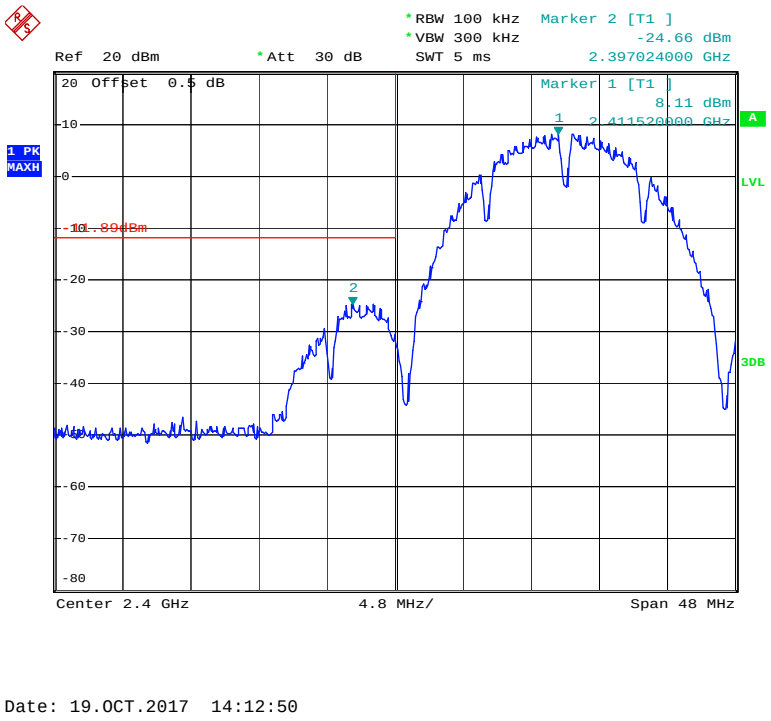
** The testing was performed by Mark Pan on 2017-10-19.*

Test mode: Transmitting

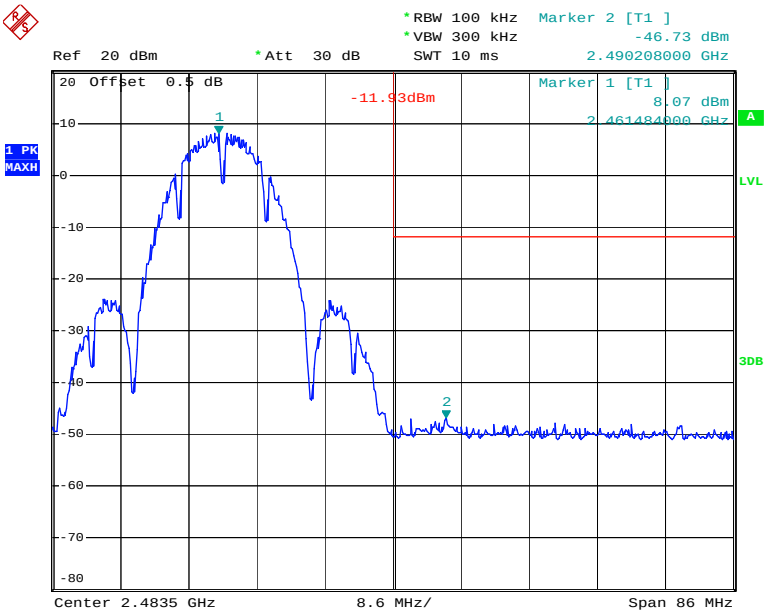
Test Result: Compliant. Please refer to following plots.

Chain 0:

802.11b: Band Edge, Left Side

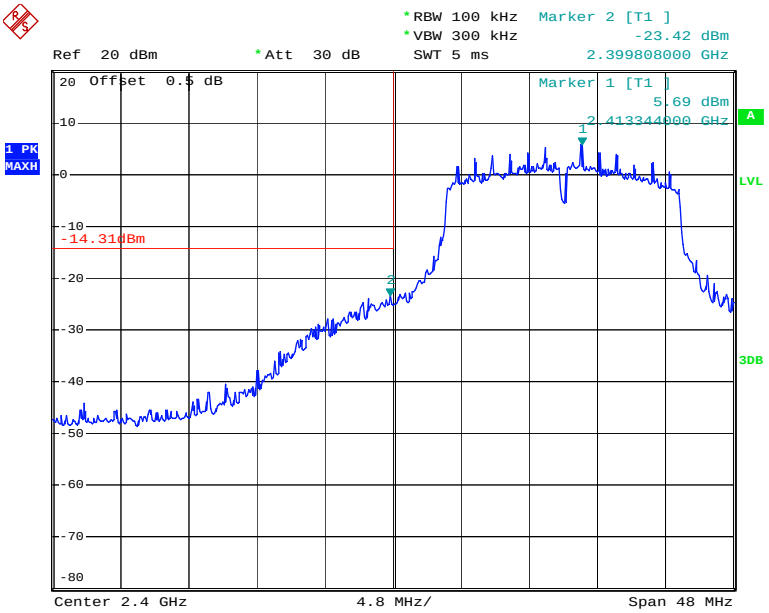


802.11b: Band Edge, Right Side



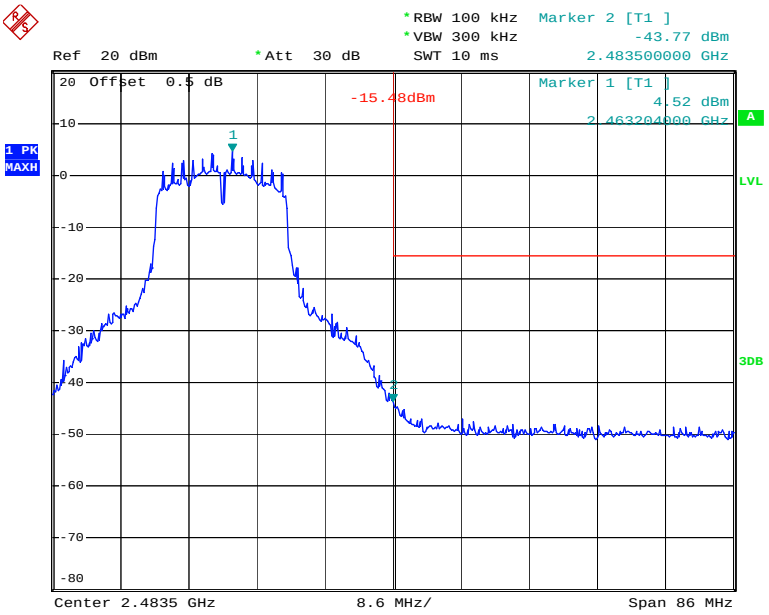
Date: 19.OCT.2017 14:18:22

802.11g: Band Edge, Left Side



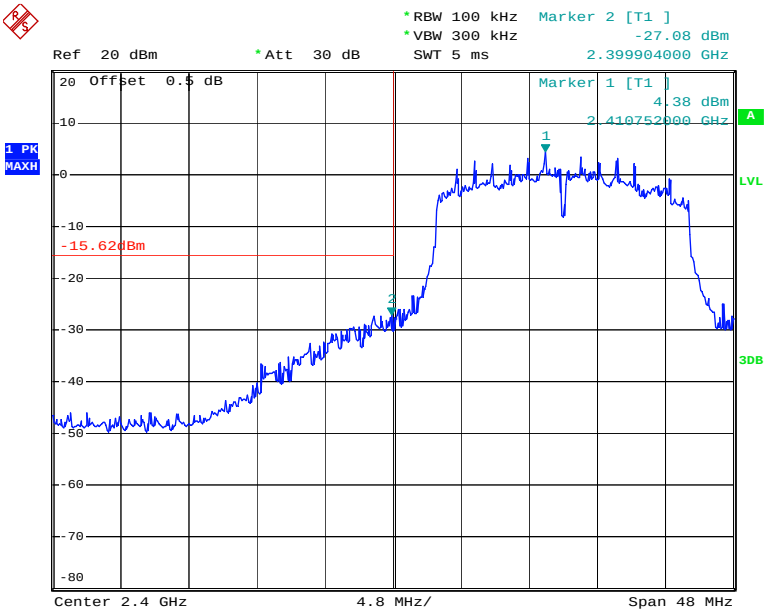
Date: 19.OCT.2017 14:37:01

802.11g: Band Edge, Right Side



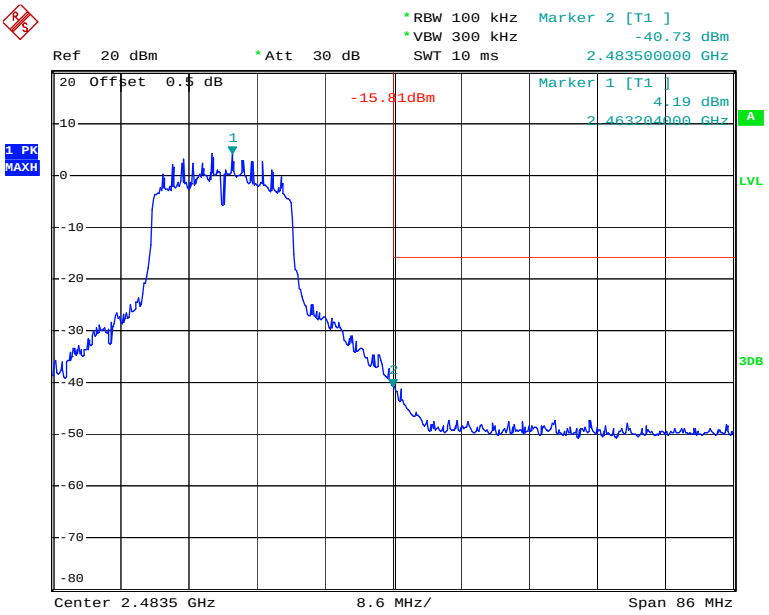
Date: 19.OCT.2017 14:42:30

802.11n ht20 Band Edge, Left Side



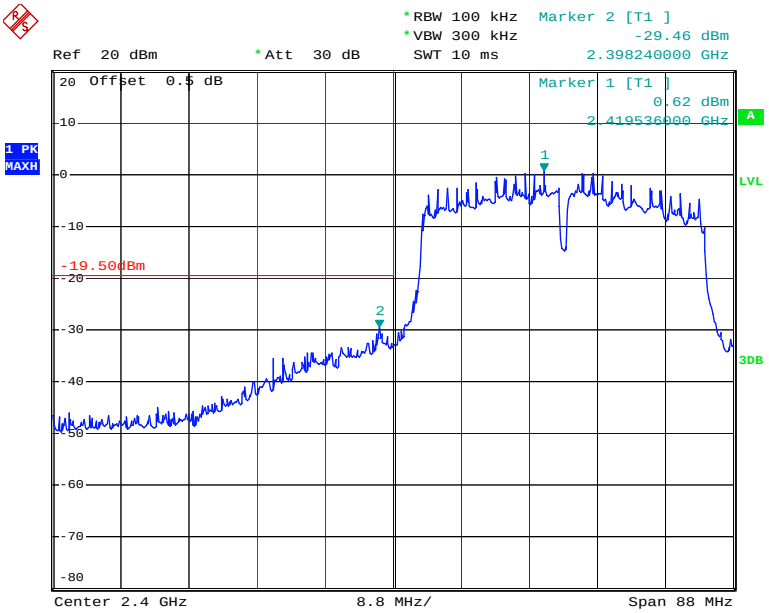
Date: 19.OCT.2017 14:47:06

802.11n ht20 Band Edge, Right Side



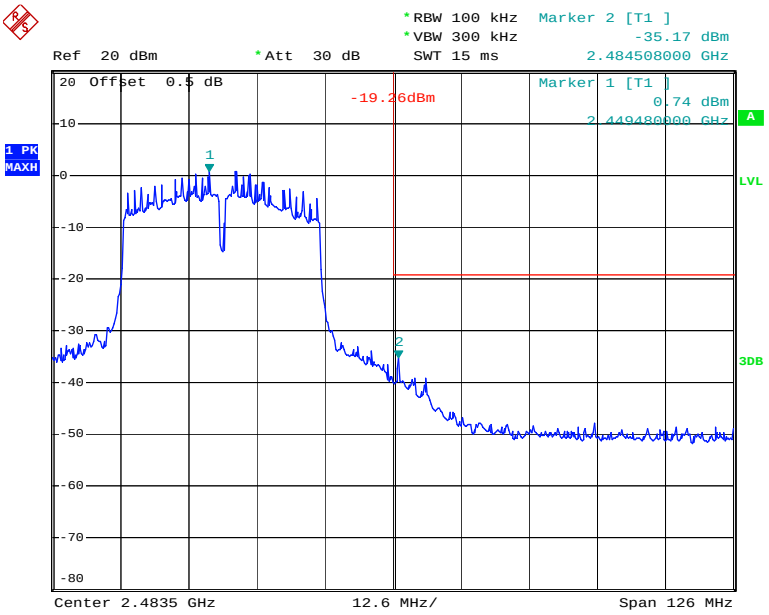
Date: 19.OCT.2017 14:59:34

802.11n ht40 Band Edge, Left Side



Date: 19.OCT.2017 15:04:39

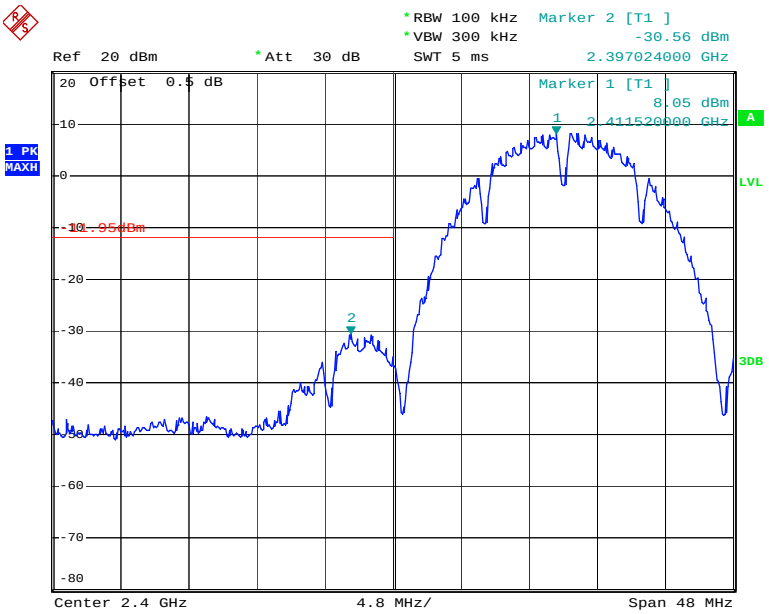
802.11n ht40 Band Edge, Right Side



Date: 19.OCT.2017 15:10:30

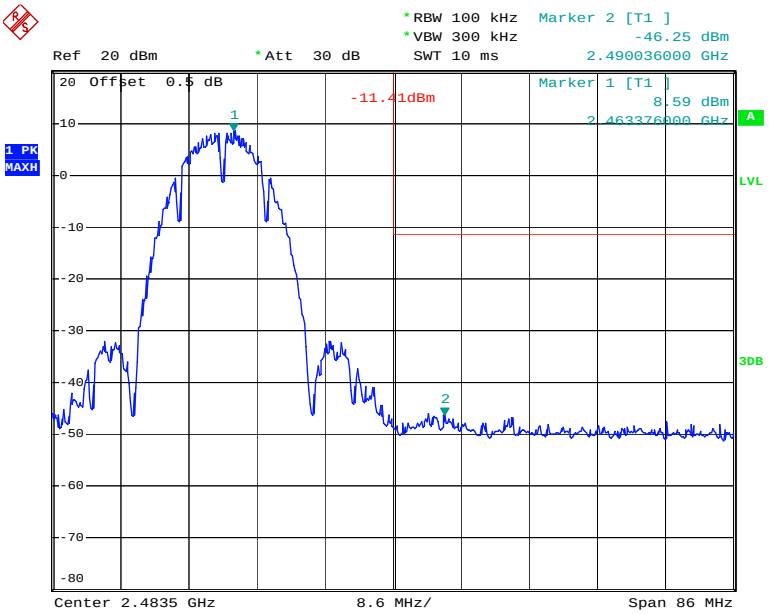
Chain 1:

802.11b: Band Edge, Left Side



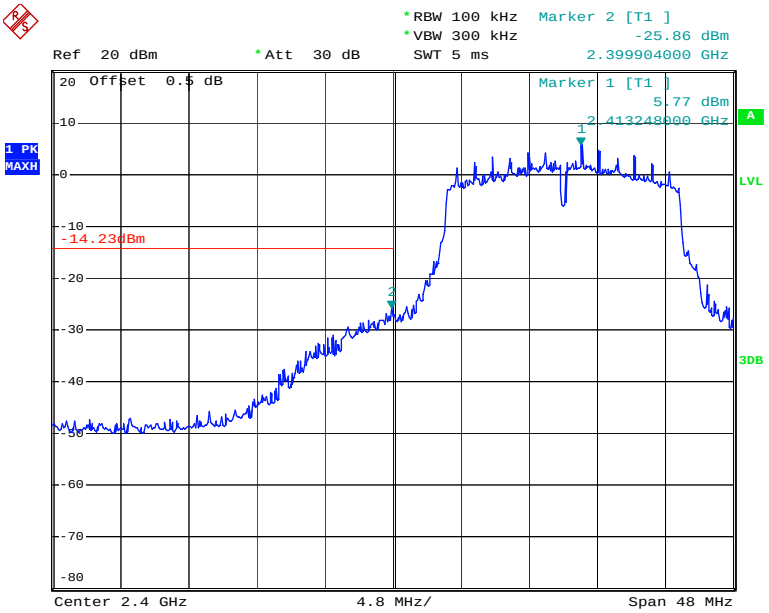
Date: 19.OCT.2017 15:24:45

802.11b: Band Edge, Right Side



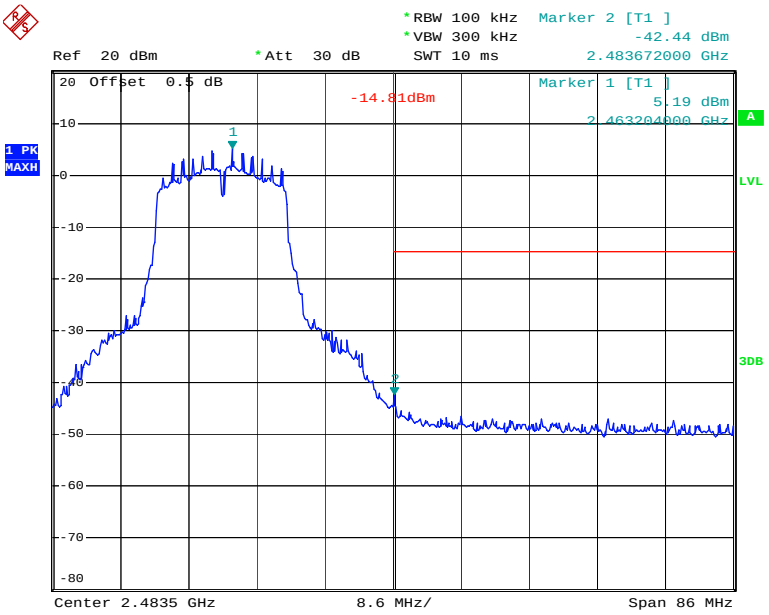
Date: 19.OCT.2017 15:30:28

802.11g: Band Edge, Left Side



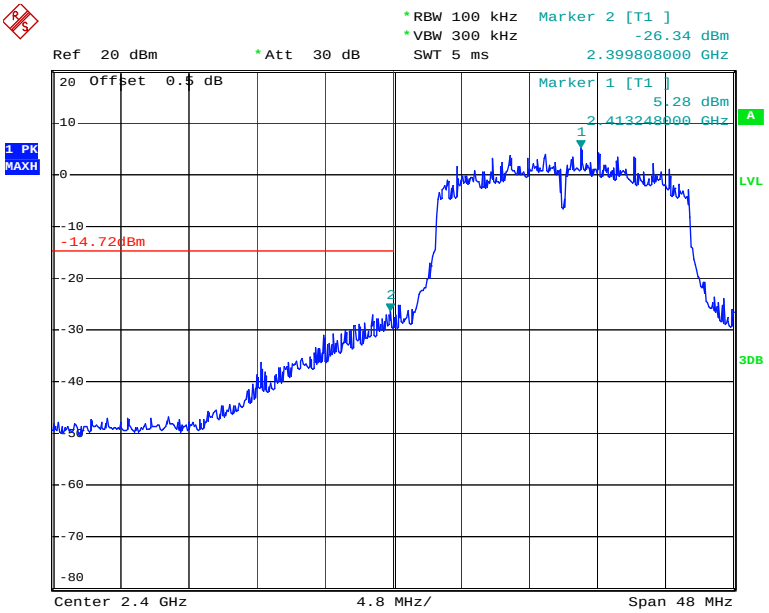
Date: 19.OCT.2017 16:10:11

802.11g: Band Edge, Right Side



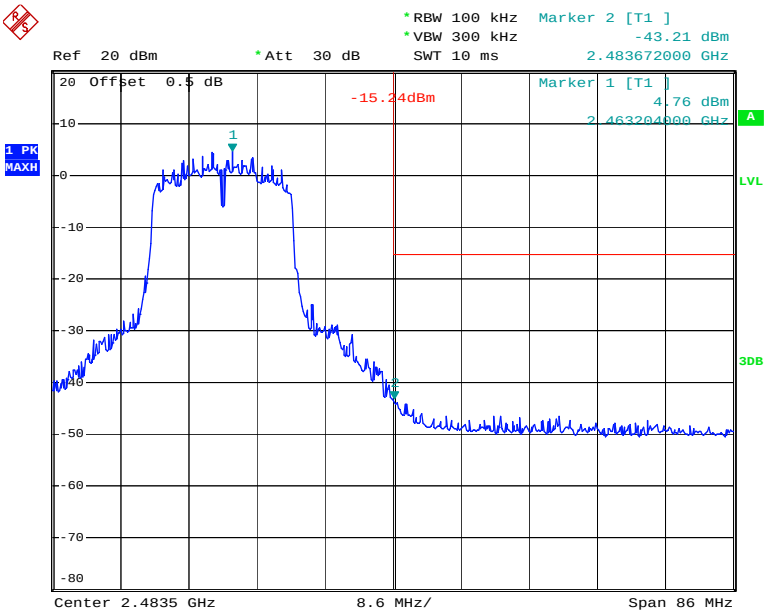
Date: 19.OCT.2017 16:15:27

802.11n ht20 Band Edge, Left Side



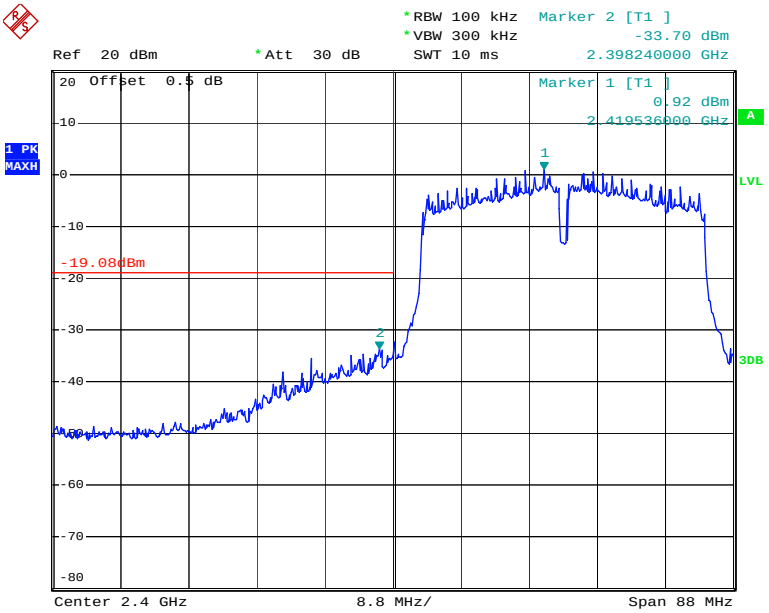
Date: 19.OCT.2017 16:20:30

802.11n ht20 Band Edge, Right Side



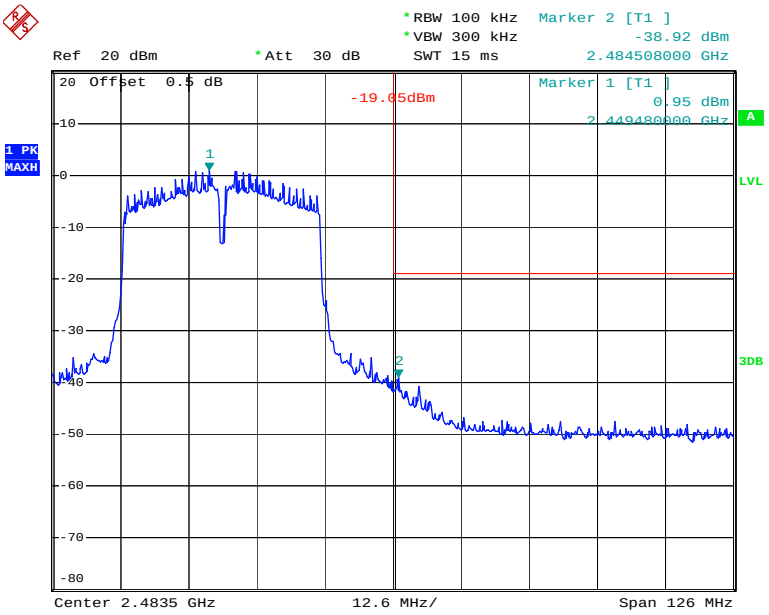
Date: 19.OCT.2017 16:25:10

802.11n ht40 Band Edge, Left Side



Date: 19.OCT.2017 16:30:40

802.11n ht40 Band Edge, Right Side



Date: 19.OCT.2017 16:35:46

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

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 kHz ≤ RBW ≤ 100 kHz.
d) Set the VBW ≥ 3×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 Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCI	101121	2017-03-02	2018-03-02
Unknown	RF Cable	Unknown	C-4	Each Time	/

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

Test Data

Environmental Conditions

Temperature:	24.4 °C
Relative Humidity:	48 %
ATM Pressure:	100.4 kPa

** The testing was performed by Mark Pan on 2017-10-19.*

Test Mode: Transmitting

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

Test mode	Channel	Frequency (MHz)	PSD (dBm/3kHz)		Total (dBm/3kHz)	Limit (dBm/3kHz)
			Chain 0	Chain 1		
802.11b	Low	2412	-9.36	-7.75	/	≤8
	Middle	2437	-8.09	-7.6	/	≤8
	High	2462	-9.31	-6.85	/	≤8
802.11g	Low	2412	-11.25	-10.57	/	≤8
	Middle	2437	-11.21	-10.33	/	≤8
	High	2462	-12.48	-11.65	/	≤8
802.11n ht20	Low	2412	-12.57	-9.75	-7.92	≤6
	Middle	2437	-10.99	-11.03	-8.00	≤6
	High	2462	-12.08	-11.19	-8.60	≤6
802.11n ht40	Low	2422	-14.64	-15.18	-11.89	≤6
	Middle	2437	-13.74	-14.28	-10.99	≤6
	High	2452	-15.72	-15.32	-12.51	≤6

Note: the maximum antenna gain is 5 dBi, the device employed Cyclic Delay Diversity (CDD) for 802.11 MIMO transmitting, per KDB 662911 D01 Multiple Transmitter Output v02r01,for power spectral density (PSD) measurements on the devices:

Array Gain = 10 log(N_{ANT}/N_{SS}) dB.

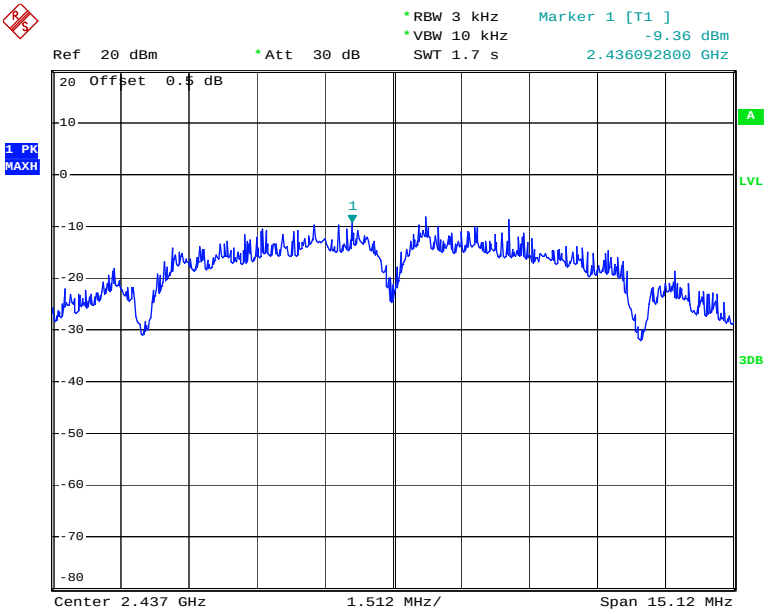
So:

Directional gain = GANT + Array Gain = 5+10*log(2) =8 dBi

The limit should be reduced by 2dB.

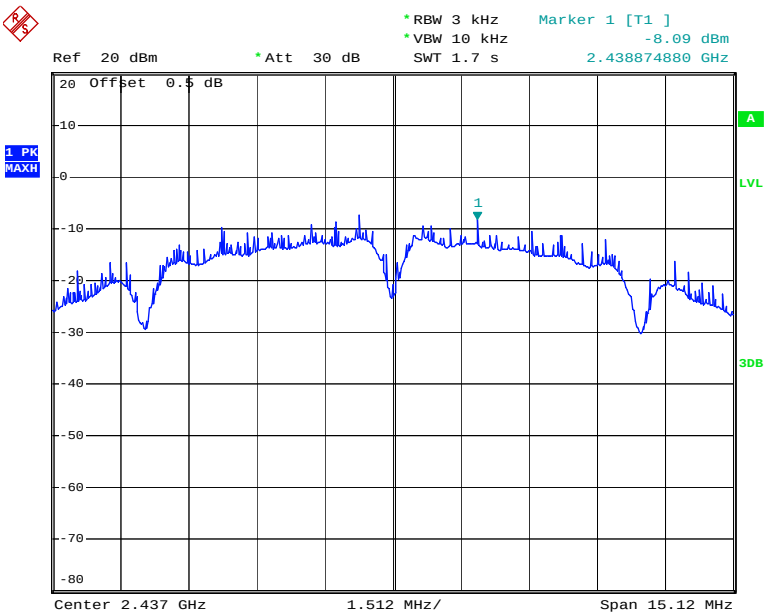
Chain 0:

Power Spectral Density, 802.11b, Low Channel



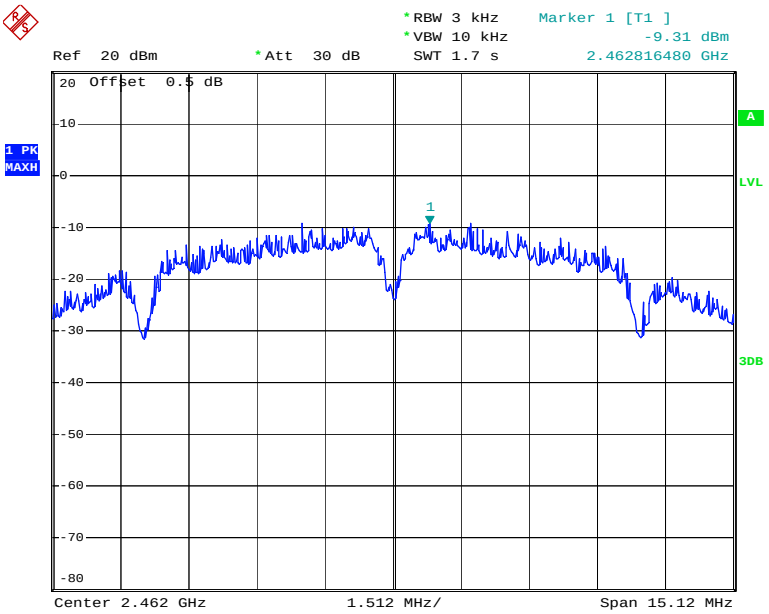
Date: 19.OCT.2017 16:53:01

Power Spectral Density, 802.11b, Middle Channel



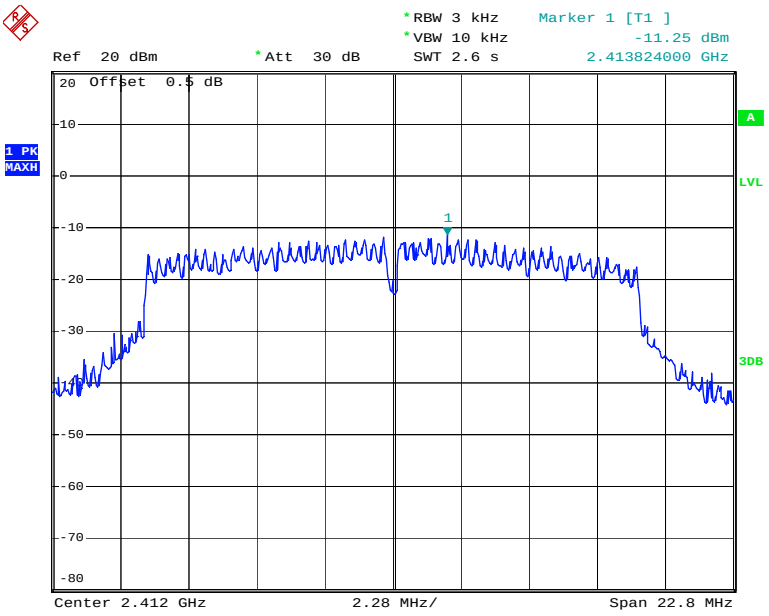
Date: 19.OCT.2017 14:09:33

Power Spectral Density, 802.11b, High Channel



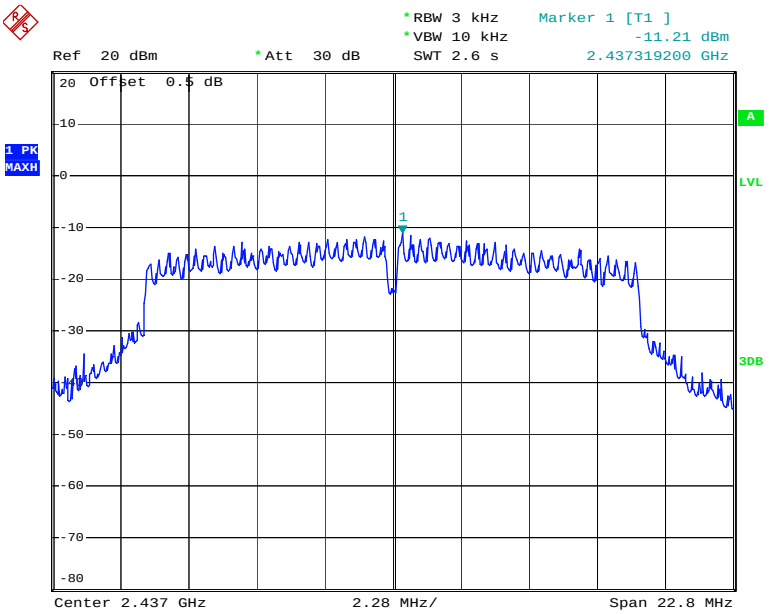
Date: 19.OCT.2017 16:52:01

Power Spectral Density, 802.11g, Low Channel



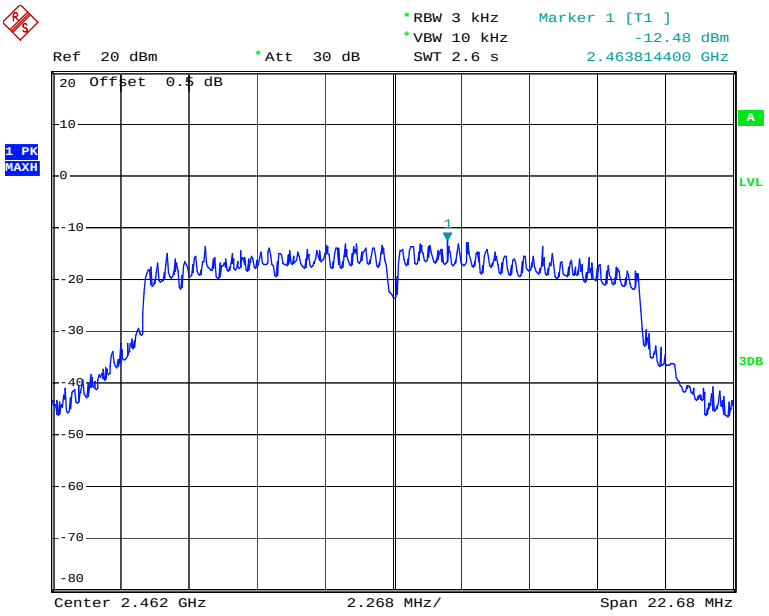
Date: 19.OCT.2017 14:36:15

Power Spectral Density, 802.11g, Middle Channel



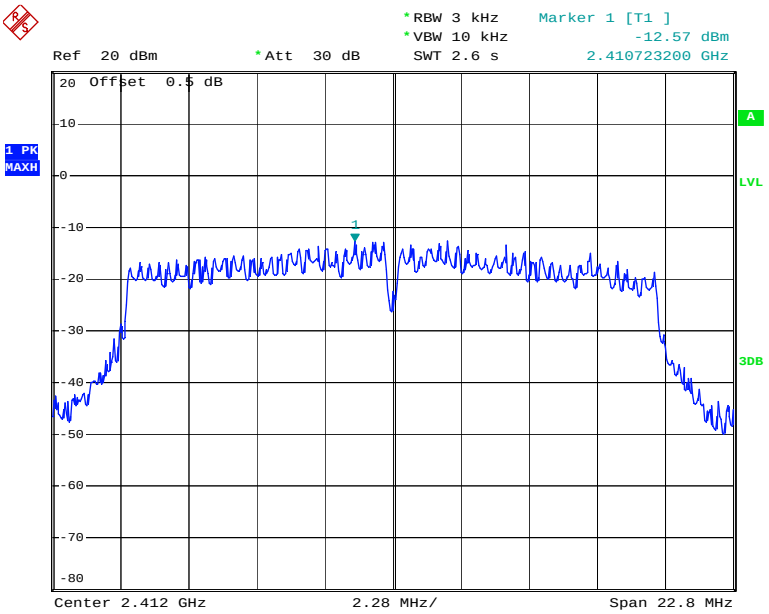
Date: 19.OCT.2017 14:39:04

Power Spectral Density, 802.11g, High Channel



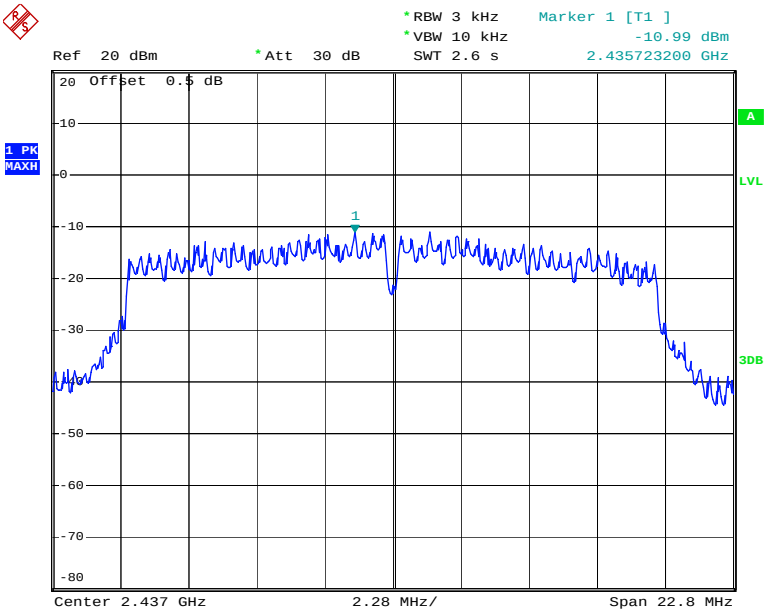
Date: 19.OCT.2017 14:41:47

Power Spectral Density, 802.11n ht20, Low Channel



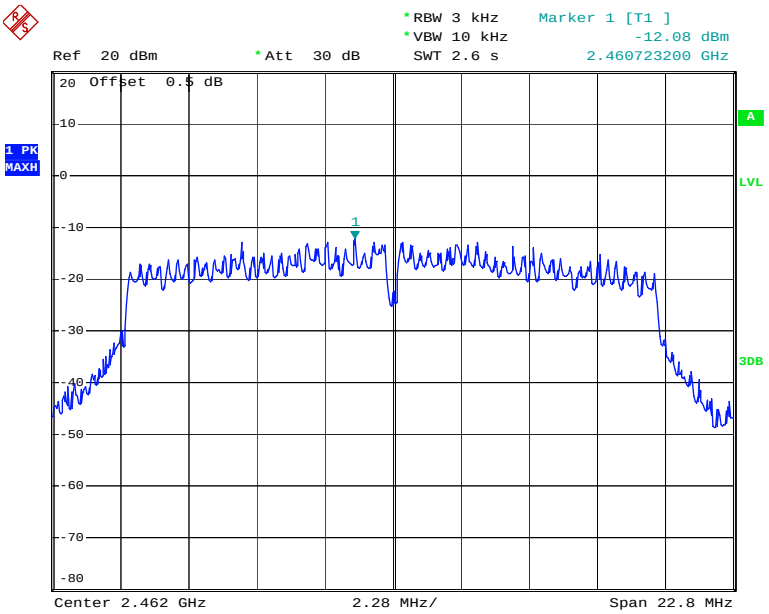
Date: 19.OCT.2017 14:46:26

Power Spectral Density, 802.11n ht20, Middle Channel



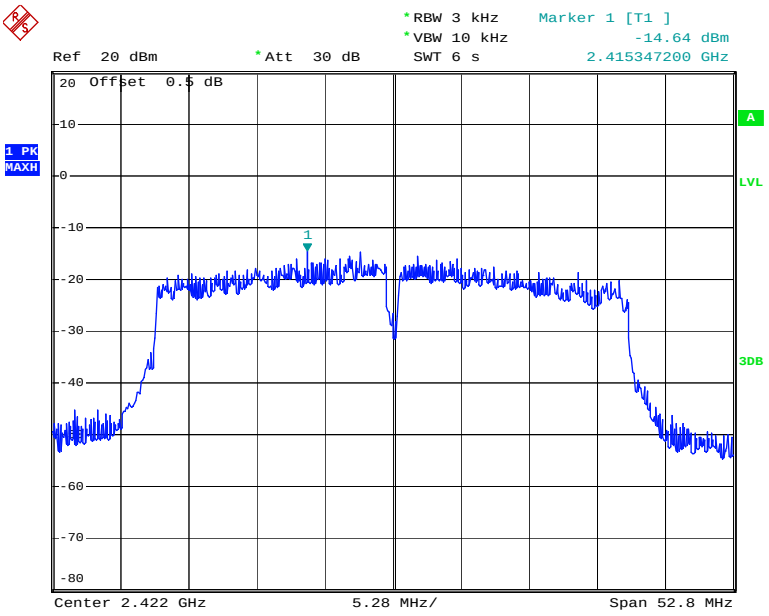
Date: 19.OCT.2017 14:49:24

Power Spectral Density, 802.11n ht20, High Channel



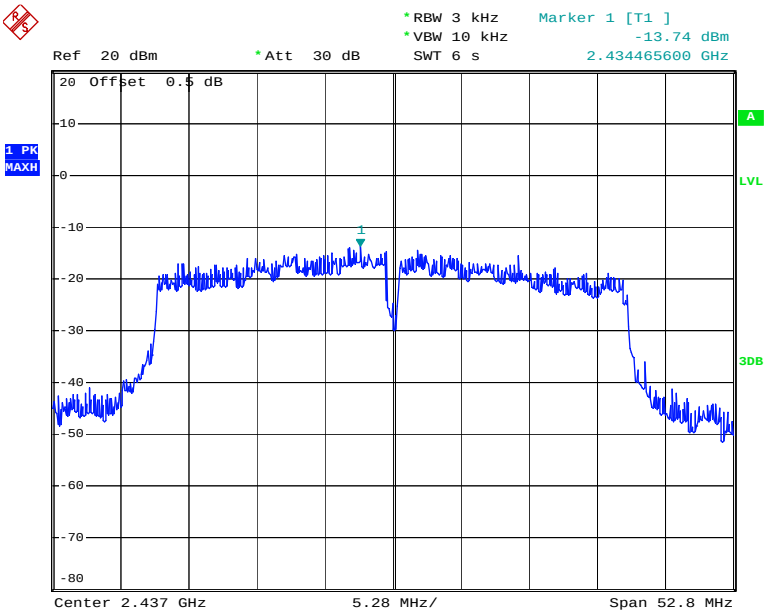
Date: 19.OCT.2017 14:58:38

Power Spectral Density, 802.11n ht40 Low Channel



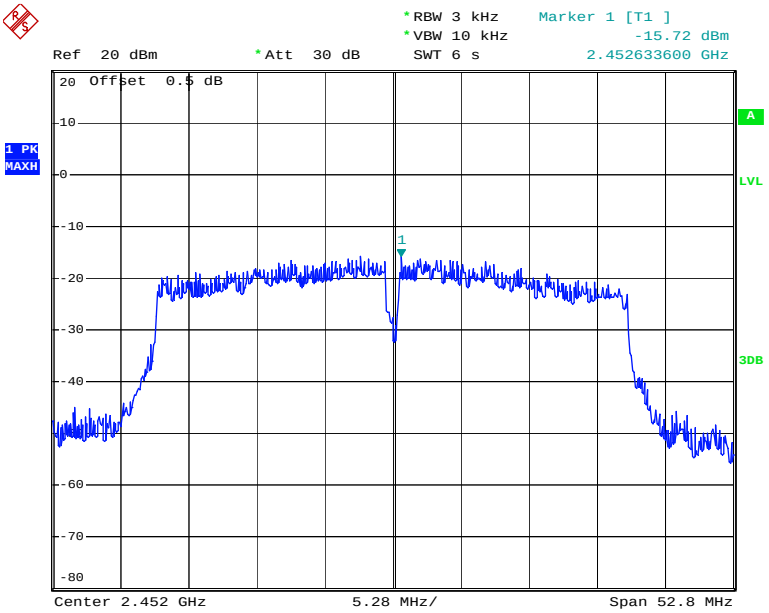
Date: 19.OCT.2017 15:03:48

Power Spectral Density, 802.11n ht40 Middle Channel



Date: 19.OCT.2017 15:07:25

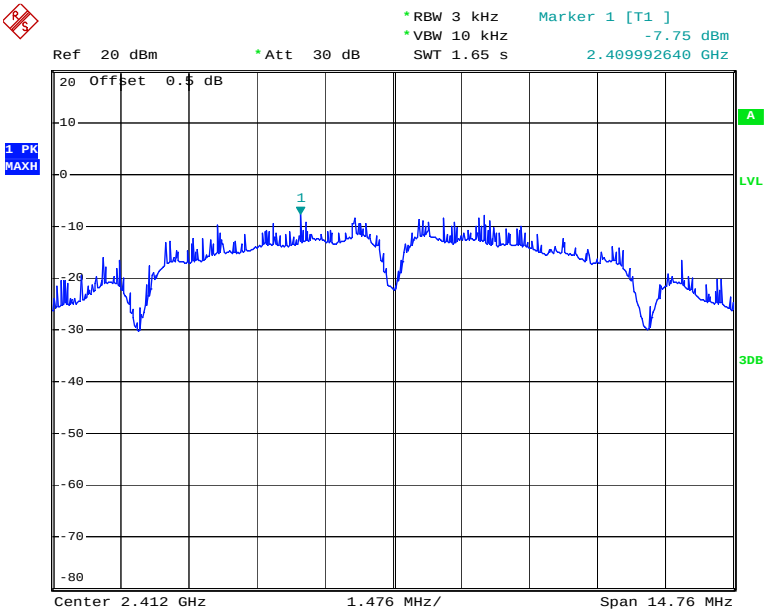
Power Spectral Density, 802.11n ht40 High Channel



Date: 19.OCT.2017 15:09:50

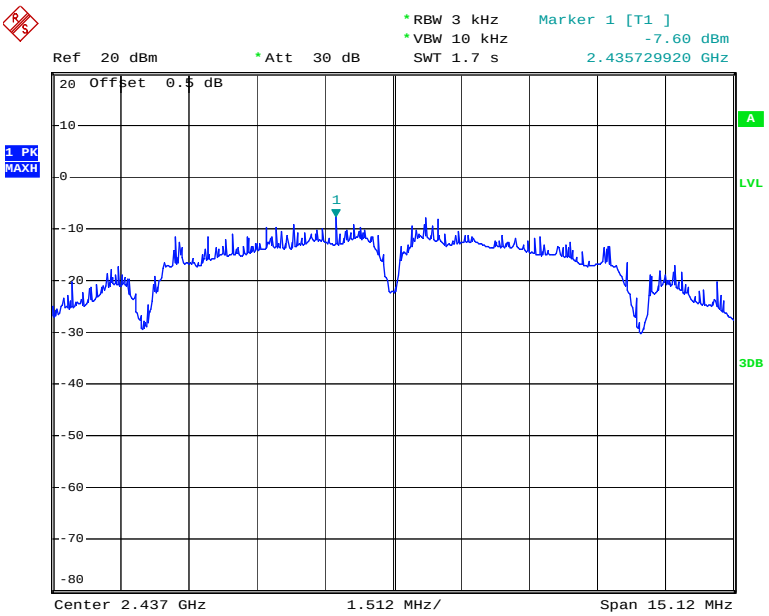
Chain 1:

Power Spectral Density, 802.11b, Low Channel



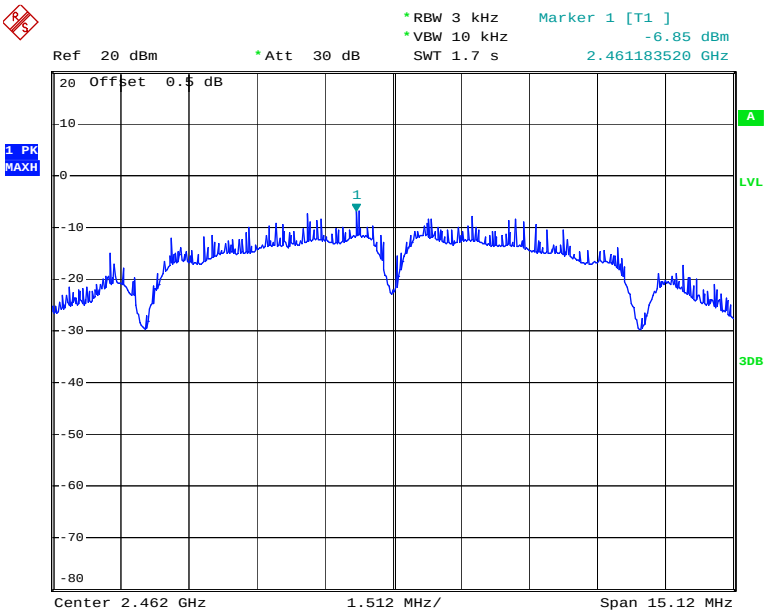
Date: 19.OCT.2017 15:24:01

Power Spectral Density, 802.11b, Middle Channel



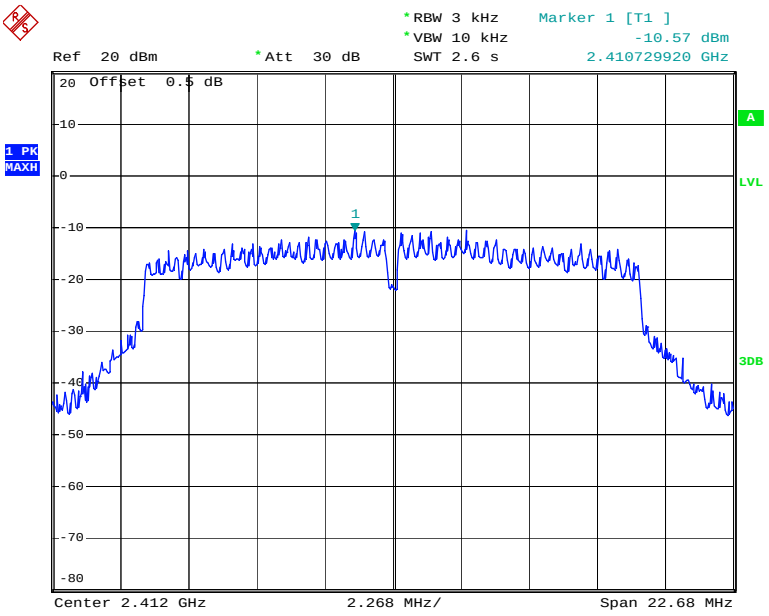
Date: 19.OCT.2017 15:26:46

Power Spectral Density, 802.11b, High Channel



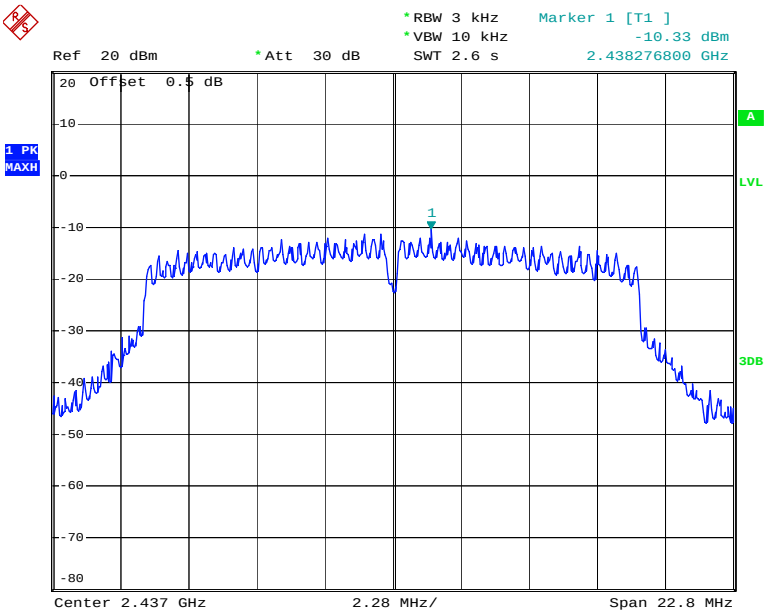
Date: 19.OCT.2017 15:29:45

Power Spectral Density, 802.11g, Low Channel



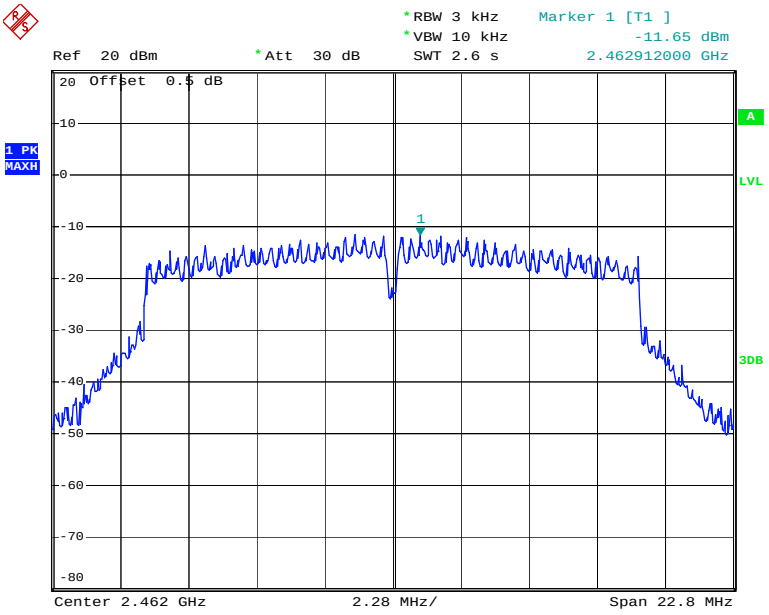
Date: 19.OCT.2017 16:09:34

Power Spectral Density, 802.11g, Middle Channel



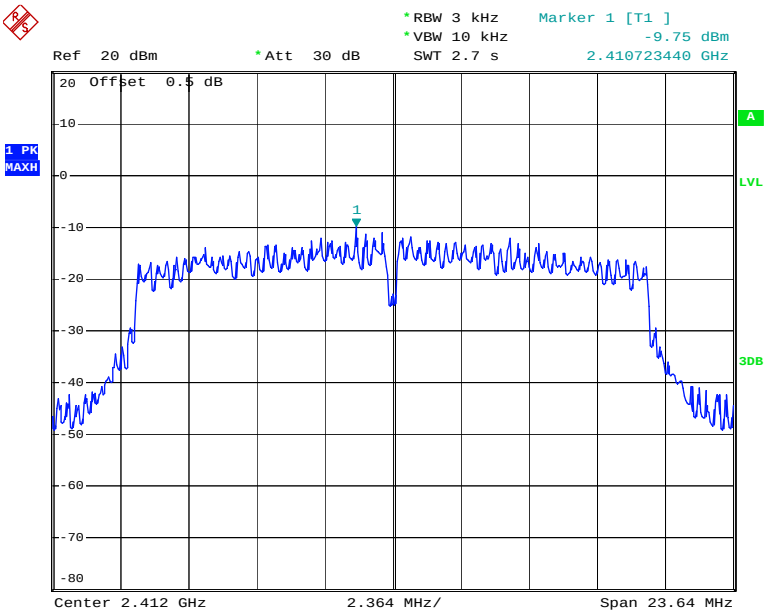
Date: 19.OCT.2017 16:12:06

Power Spectral Density, 802.11g, High Channel



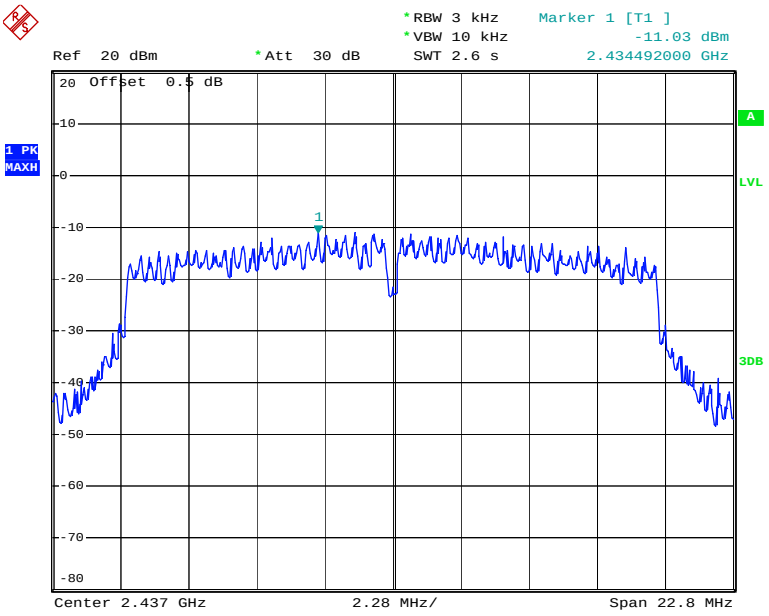
Date: 19.OCT.2017 16:14:42

Power Spectral Density, 802.11n ht20, Low Channel



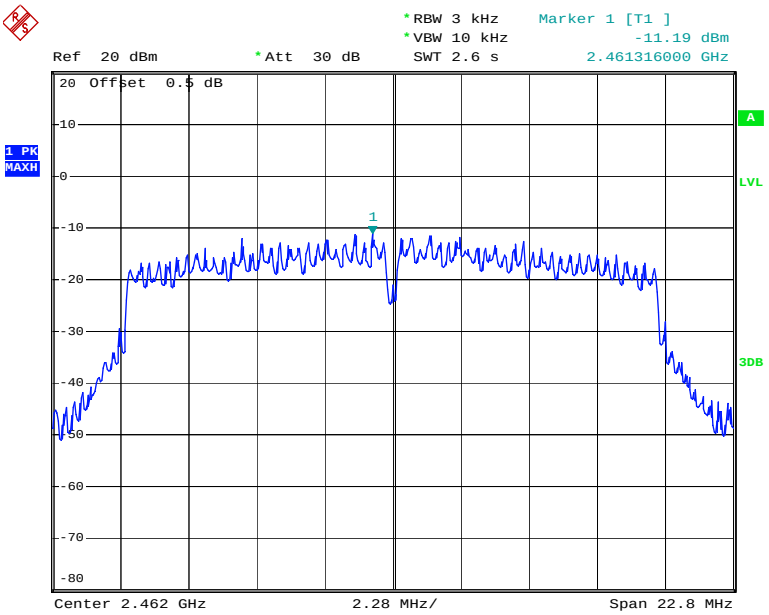
Date: 19.OCT.2017 16:19:52

Power Spectral Density, 802.11n ht20, Middle Channel



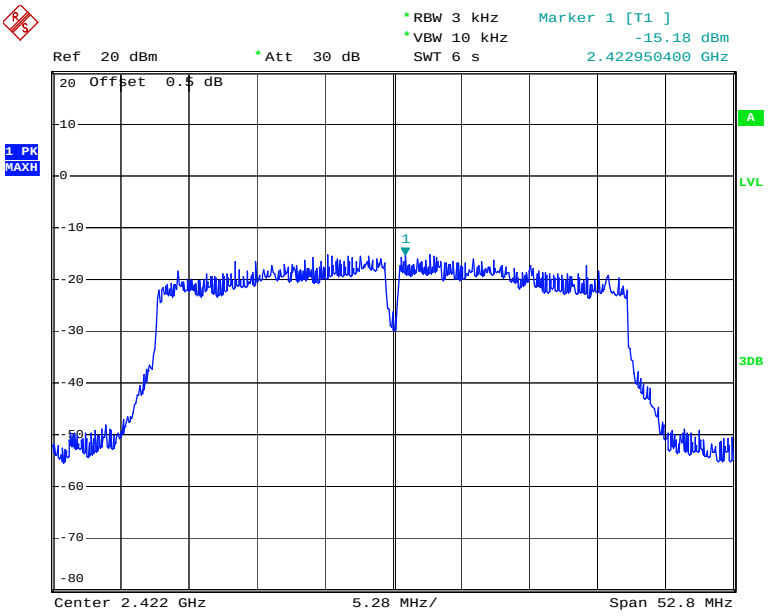
Date: 19.OCT.2017 16:22:21

Power Spectral Density, 802.11n ht20, High Channel



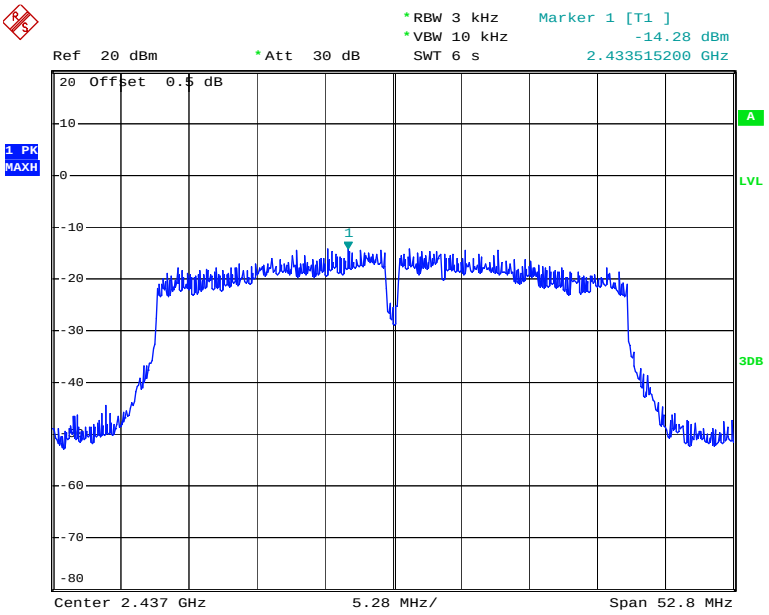
Date: 19.OCT.2017 16:24:32

Power Spectral Density, 802.11n ht40 Low Channel



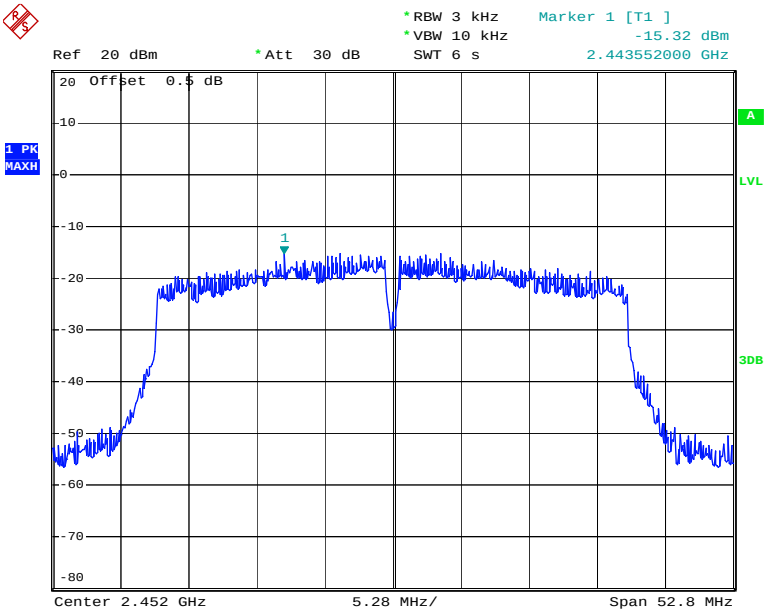
Date: 19.OCT.2017 16:30:03

Power Spectral Density, 802.11n ht40 Middle Channel



Date: 19.OCT.2017 16:32:45

Power Spectral Density, 802.11n ht40 High Channel



Date: 19.OCT.2017 16:35:01

***** END OF REPORT *****