

Test Report for FCC

FCC ID :2AWCDRP70A-BIO

Report Number		ESTRFC2004-004		
Applicant	Company name	Gen2wave		
	Address	7th fl., Point town B/D, 187-4, Gumi-ro, Bundang-gu, Seongnam-si, Gyeonggi-do, Rep of Korea		
	Telephone	+82 607 7537		
	Contact person	Sungkil Lee		
Product	Product name	Tablet PC		
	Model No.	PR70A BIO	Manufacturer	Gen2wave
	Serial No.	None	Country of origin	KOREA
Test date	16-Mar-20 ~ 20-Mar-20		Date of issue	28-Apr-20
Testing location	140-16, Eongmalli-ro, Majang-myeon, Icheon-si, Gyeonggi-do, Korea			
Standard	FCC PART 15 Subpart C (15.247) , ANSI C 63.10(2013) , KDB 558074 D01(2018)			
Measurement facility registration number		659627		
Tested by	Senior Engineer H.G. Lee		(Signature)	
Reviewed by	Engineering Manager I.K. Hong		(Signature)	
Abbreviation	OK, Pass = Passed, Fail = Failed, N/A = not applicable			
<p>* Note</p> <ul style="list-style-type: none"> - This test report is not permitted to copy partly without our permission - This test result is dependent on only equipment to be used - This test result based on a single evaluation of one sample of the above mentioned - This test report is not related to KOLAS accreditation - Additional models name:MetaDolce MD7200-BIO, RP70 - (Basic and additional Model(s) are same products, only model name are different) 				

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1. Laboratory Information

1.1 General

This EUT (Equipment Under Test) has been shown to be capable of compliance with the applicable technical standards and is tested in accordance with the measurement procedures as indicated in this report.

ESTECH Lab attests to accuracy of test data. All measurement reported herein were performed by ESTECH Co., Ltd.

ESTECH Lab assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

1.2 Test Lab.

Corporation Name : ESTECH Co., Ltd.

Head Office : Suite 1015 World Meridian II, 123 Gasan Digital 2-ro, Geumcheon-gu, Seoul 153-759, R. O. Korea

EMC/Telecom/Safety Test Lab : 347-69, Jungbu-daero 147beon-gil, Majang-myeon, Icheon-si,
Gyeonggi-do 467-811, R. O. Korea

1.3 Official Qualification(s)

MSIP : Granted Accreditation from Ministry of Information & Communication for EMC, Safety and Telecommunication

KOLAS : Accredited Lab By Korea Laboratory Accreditation Schema base on CENELEC requirements

FCC : Conformity Assessment Body(CAB) with registration number 659627 under APEC TEL MRA between the RRA and the FCC

VCCI : Granted Accreditation from Voluntary Control Council for Interference from ITE

2. Description of EUT

2.1 Summary of Equipment Under Test

Modulation Type	:	CCK, OFDM
Transfer Rate	:	11 Mbps , 54 Mbps, MCS7
Number of Channel	:	11 ch
PEAK Output Power	:	7.65 dBm
Rating	:	INPUT: AC(100 – 240) V, (50–60)Hz, 1 A OUTPUT: DC 5 V, 5 A
Receipt Date	:	18–Feb–20
Testing Voltage	:	AC 120 V 1.5 A
X-tal list(s) or Frequencies generated	:	The highest operating frequency is 2 462 MHz

2.2 General descriptions of EUT

Category	Specification	
Performance Characteristics	CPU	Hexa core CPU Cortex A72 Dual-core 1.8GHz, Cortex A53 Quad core 1.4Ghz
	RAM	4GB
	ROM	32GB (64GB / 128GB optional)
	OS	Android 8.1 Oreo
Integrated Radios	Wireless WAN	LTE, HSPA+
	Wireless LAN	IEEE 802.11 a/b/g/n/ac (2.4, 5GHz)
	Bluetooth	Bluetooth 4.2 BLE
	GPS	AGPS (GLONASS optional)
DATA CAPTURE	Camera	Front Camera : 2MP / Rear Camera : 13MP Auto Focus
		LED Flash
	1D/2D Imager	2D Imager (SW Decoder) : Zebra SE4710
	RFID	NXP PN548 HF 13.56MHz, Read Tag : 14443A/B, 15693
	SAM	2 SAM Slot
	OCR(MRZ)	Font : OCR B MRZ Lines : 1 line : IDL, CAN, etc 2 line : ID2 cards, Epp
	Fingerprint	Module : BM–Slim 2 (Suprema) Sensor Type : Optical Sensor Sensing Area : 16.5mm(W) x 21.0mm(L) Pixel Resolution : 500 ppi Gray Scale : 256 level Output Image Format : RAW, BMP, WSQ, ISO 19794–4 Format : FBI PIV certified, FBI Mobile ID FAP 20 certified



Category	Specification	
DATA CAPTURE	Contact Smart Card	Contact type Smart Card Reader (gemalto) : ISO7816
	Iris Recognition (Opal)	Camera : 5MP B&W CMOS sensor Operating Range : 320±0mm (11"~14") Resolution : Above 160 pixel/cm Iris Capture Volume : 130mm x 45mm x 80mm Illumination : IR LED Image : 2592 x 920 x 30 Frame
Physical Characteristics	Demensions	213mm(H) x 195.3mm(W) x 30.55mm / 21mm : Minimum Thickness (D)
	Weight	850g
	Display	7.0Inch / HD(1280x800)
	Display Visibility	700 nits (cd/m2)
	Touchpannel	Capacitive Touch / 10 point multi touch / Gorilla Glass 3
	Keypad	3 Front Key / 5 Side Key (Programmable)
	Battery	Built in Battery : Li-Polymer, 3.7V, 10,050mAh
	Expanslon Slot	MicroSDXC upto 2TB supported Communication
ETC	Communication	Tablet side : USB3.0 Host, USB2.0 Client(OTG) Extension 10pin connector : Serial, USB2.0 Host I/O 25pin connector : USB2.0 Host, HDMI, Serial, Ethernet (with cradle)
	Audio	Dual Speaker, MIC
	Jack	DC jack, USB3.0 Host, USB2.0 Client, 3.5phi Ear-Mic Jack
	IO connector	POGO 25 pin (Power, RS232, USB 3port, HDMI, Ethernet)
	Extention pin	POGO 10 pin
	LED	Front 2 LED : Charging, Power
	Sensor	Acceleration Sensor, Compass, Ambient Light Sensor
	power	DC Jack 5V / 5A Adaptor
User Environment	Use time	Stand-by time : > 150hr Working time : > 8hr
	Operating Temp	-20℃~ 70℃
	storage Temp	-30℃~ 70℃
	umidity	Non-condensing, 93%
	Drop	1.2 m

3. Test Standards

Test Standard : FCC PART 15 Subpart C (15.247)

This Standard sets out the regulations under which an intentional, unintentional, or incidental radiator may be operated without an individual license. It also contains the technical specifications, administrative requirements and other conditions relating to the marketing of Part 15 devices.

Test Method : ANSI C 63.10 (2013) & KDB558074 D01(2018)

This standard sets forth uniform methods of measurement of radio-frequency (RF) signals and noise emitted from both unintentional and intentional emitters of RF energy in the frequency range 9 kHz to 40 GHz. Methods for the measurement of radiated and AC power-line conducted radio noise are covered and may be applied to any such equipment unless otherwise specified by individual equipment requirements. These methods cover measurement of certain devices that deliberately radiate energy, such as intentional emitters, but does not cover licensed transmitters. This standard is not intended for certification/approval of avionic equipment or for industrial, scientific, and medical (ISM) equipment. These methods apply to the measurement of individual units or systems comprised of multiple units.

Summary of Test Results

Applied Standard : 47 CFR Part 15 Subpart C				remark
Standard	Test Type	Result	Remark	Limit
15.207	AC Power Conducted Emission	Pass	Meet the requirement	
15.205 & 15.209	Restricted band / Intentional Radiated Emission	Pass	Meet the requirement	
15.247(a)(2)	6 dB Bandwidth	Pass	Meet the requirement	Min. 500 kHz
	99 % Bandwidth			
15.247(b)(3)	Maximum Peak/average output power	Pass	Meet the requirement	Max. 30 dBm
15.247(c)	Transmitter Radiated Emission	Pass	Meet the requirement	Table 15.209
15.247(e)	Power Spectral Density	Pass	Meet the requirement	Max. 8 dBm
15.247(d)	Band Edge Measurement	Pass	Meet the requirement	20 dB less

4. Measurement Condition

4.1 EUT Operation

a. Channel

Ch.	Frequency	Ch.	Frequency
1	2 412 MHz	7	2 442 MHz
2	2 417 MHz	8	2 447 MHz
3	2 422 MHz	9	2 452 MHz
4	2 427 MHz	10	2 457 MHz
5	2 432 MHz	11	2 462 MHz
6	2 437 MHz		

b. Measurement Channel : WLAN : Low(2 412 MHz), Middle(2 437 MHz), High(2 462 MHz)

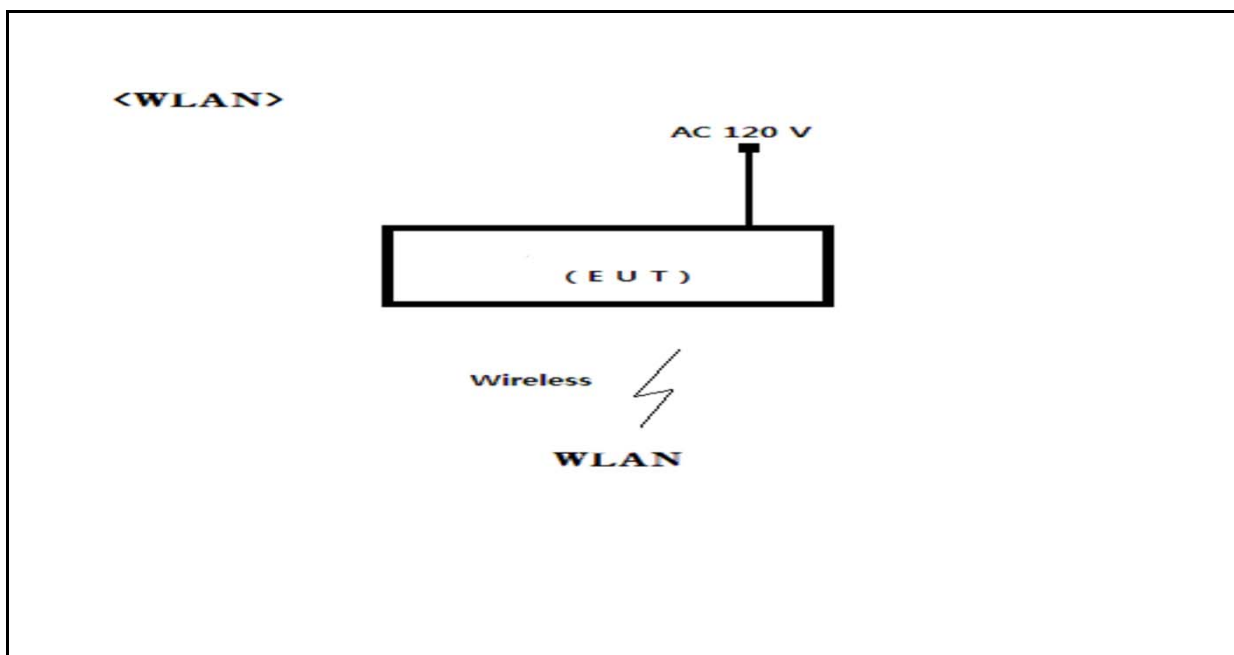
c. Test Mode : Continuous Output, CCK, OFDM

d. Test rate : 11 Mbps, 54 Mbps, Mcs7

4.2 EUT Operation

- The EUT was in the following operation mode during all testing
 - * Wireless LAN 2.4 GHz operation check
 - * Transmit mode were measured each channels(802.11b, 802.11g, 802.11n HT20)

4.3 Configuration and Peripherals



4.4 EUT and Support equipment

Equipment Name	Model Name	S/N	Manufacturer	Remark (FCC ID)
Tablet PC	PR70A BIO	NONE	Gen2wave	EUT
Adapter	ATS036T-P050	NONE	Boayang Electronics Co., Ltd.	

4.5 Cable Connecting

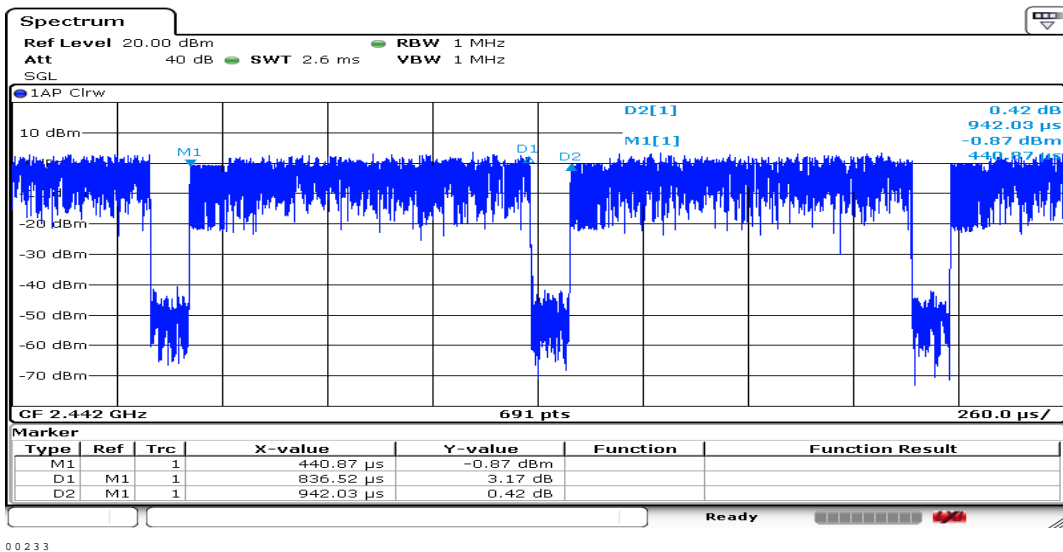
Start Equipment		End Equipment		Cable Standard		Remark
Name	I/O port	Name	I/O port	Length	Shielded	
Tablet PC	Power	Adapter	-	2	Unshielded	

4.6 DUTY CYCLE OF TEST SIGNAL

Duty cycle is > 98 %, duty factor shall be considered.

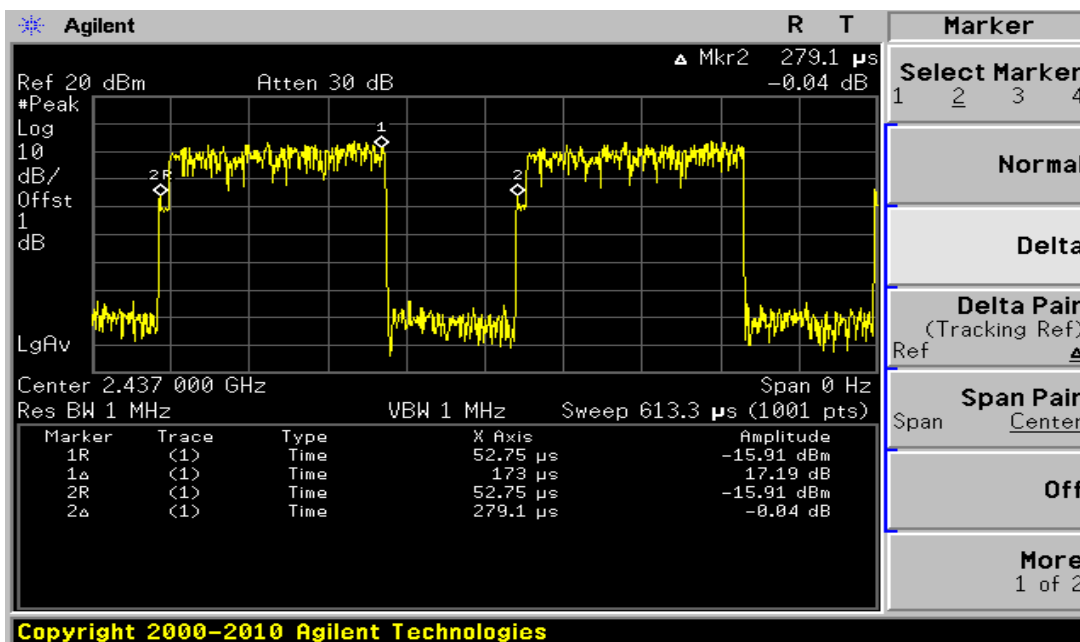
802.11b

duty cycle = 88.7 % , duty factor = $10 \cdot \log(1/0.887) = 0.520$



802.11g

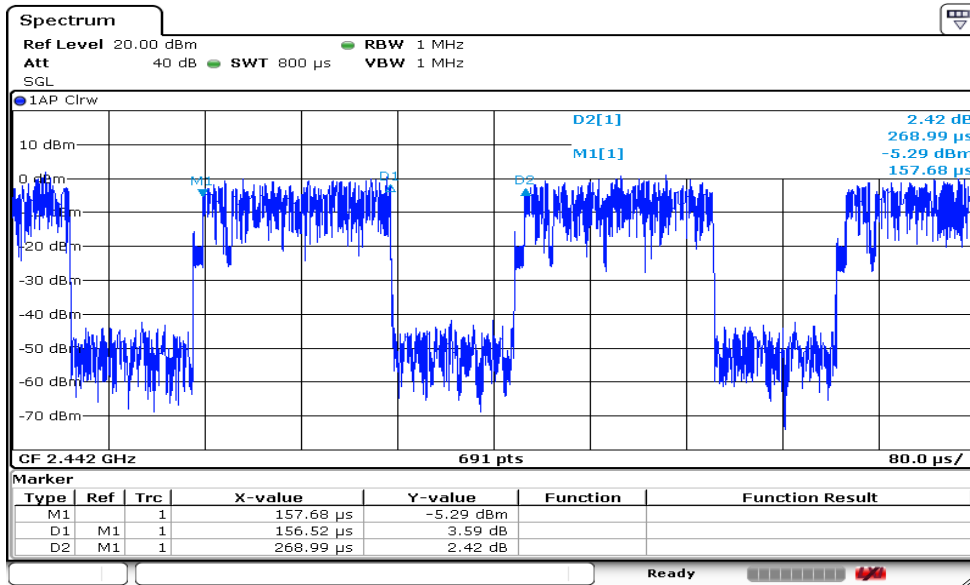
duty cycle = 62.0 % , duty factor = $10 \cdot \log(1/0.62) = 2.076$



Duty cycle is > 98 %, duty factor shall be considered.

802.11n

duty cycle = 58.2 % , duty factor = $10 \cdot \log(1/0.582) = 2.350$



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5. DTS bandwidth

5.1 Test procedure

558074 D01 DTS Meas Guidance v05 8.2 Option 2 :The automatic bandwidth measurement capability of an instrument may be employed using the X dB bandwidth mode with X set to 6 dB, if the functionality described above (i.e., RBW = 100 kHz, VBW ≥ 3 x RBW, peak detector with maximum hold) is implemented by the instrumentation function. When using this capability, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be ≥ 6 dB.

5.2 might be > 6 dB Test instruments and measurement setup

The spectrum analyzer is set to as following.

- . RBW= 100 KHz . VBW≥ 3 x RBW
- . Span= 50 MHz . Sweep= suitable duration based on the EUT specification.

Limits : FCC § 15.247(a)(2)

6dB Bandwidth Test Instruments

Description	Model	Serial Number	Cal. Due Date
Spectrum Analyzer	E4440A	US42041291	2-Dec-20
RF Cable	Length: 30 cm	-	
-Spectrum Analyzer <=> EUT	Loss: 1.0 dB	-	

5.3 Measurement results

EUT	Tablet PC	MODEL	PR70A BIO
MODE	802.11b, g, n20	ENVIRONMENTAL CONDITION	23.0 °C, 47.0 % R.H.
INPUT POWER	DC 3.7 V		

MODE – 802.11b

Channel Frequency (MHz)	Emission bandwidth (MHz)	Bandwidth at 6dB below(MHz)	Minimum Limit (MHz)	PASS/FAIL
2 412	11.15	7.72	0.5	PASS
2 437	11.18	8.26	0.5	PASS
2 462	11.25	8.46	0.5	PASS

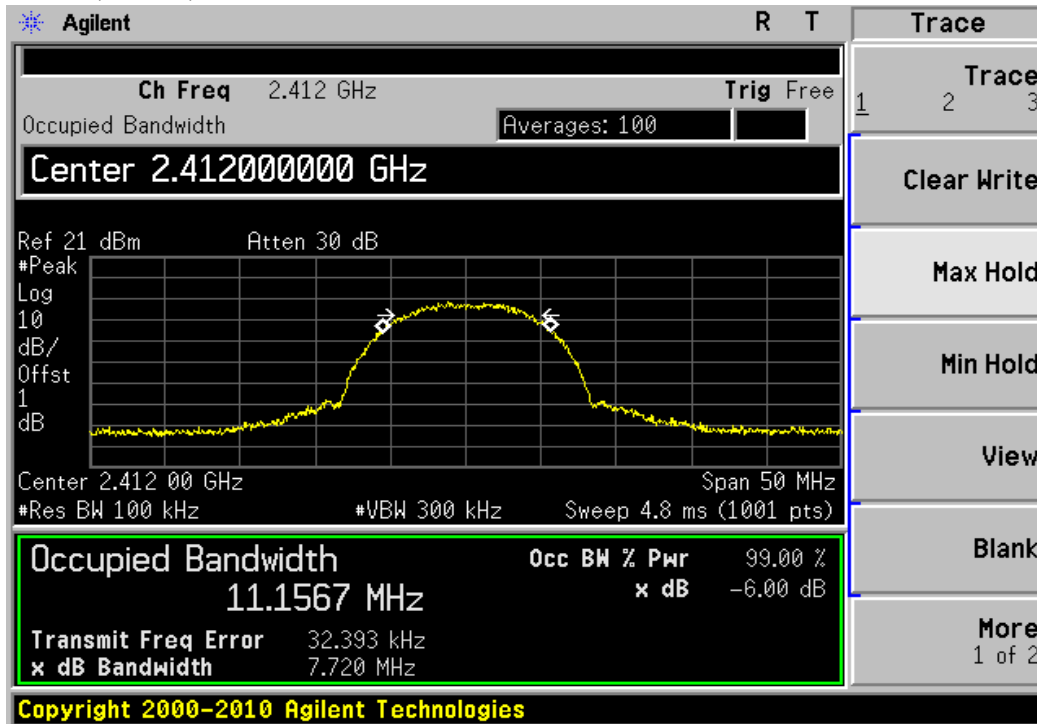
MODE – 802.11g

Channel Frequency (MHz)	Emission bandwidth (MHz)	Bandwidth at 6dB below(MHz)	Minimum Limit (MHz)	PASS/FAIL
2 412	16.33	15.98	0.5	PASS
2 437	16.32	15.80	0.5	PASS
2 462	16.27	15.73	0.5	PASS

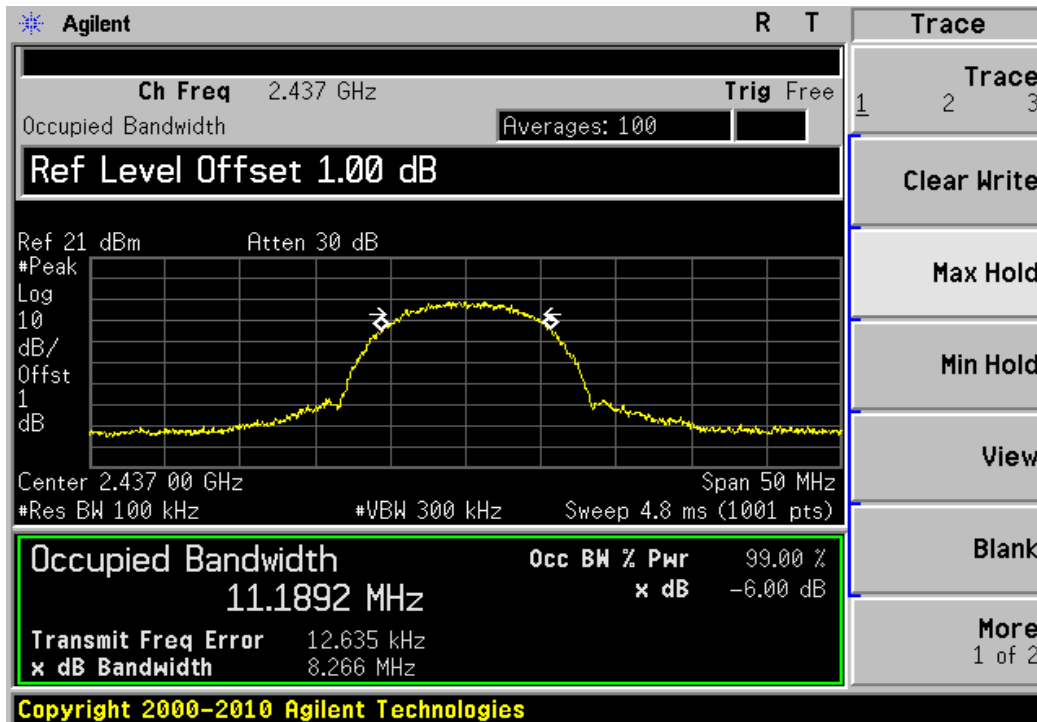
MODE – 802.11n

Channel Frequency (MHz)	Emission bandwidth (MHz)	Bandwidth at 6dB below(MHz)	Minimum Limit (MHz)	PASS/FAIL
2 412	17.59	17.51	0.5	PASS
2 437	17.60	17.28	0.5	PASS
2 462	17.54	16.98	0.5	PASS

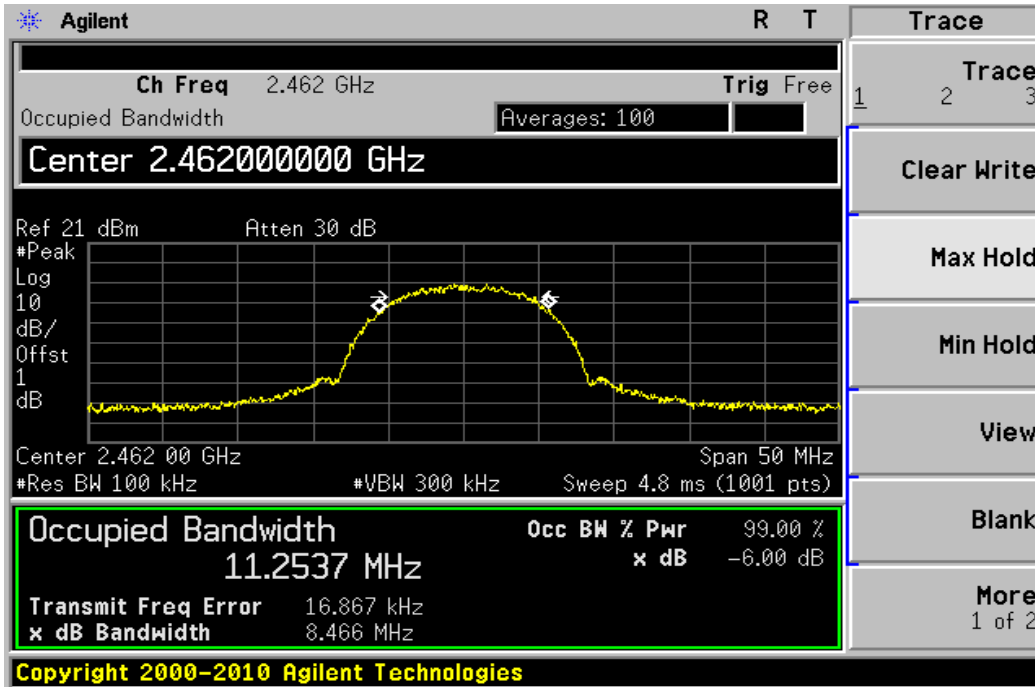
5.4 Trace data – 802.11b (ch_1)



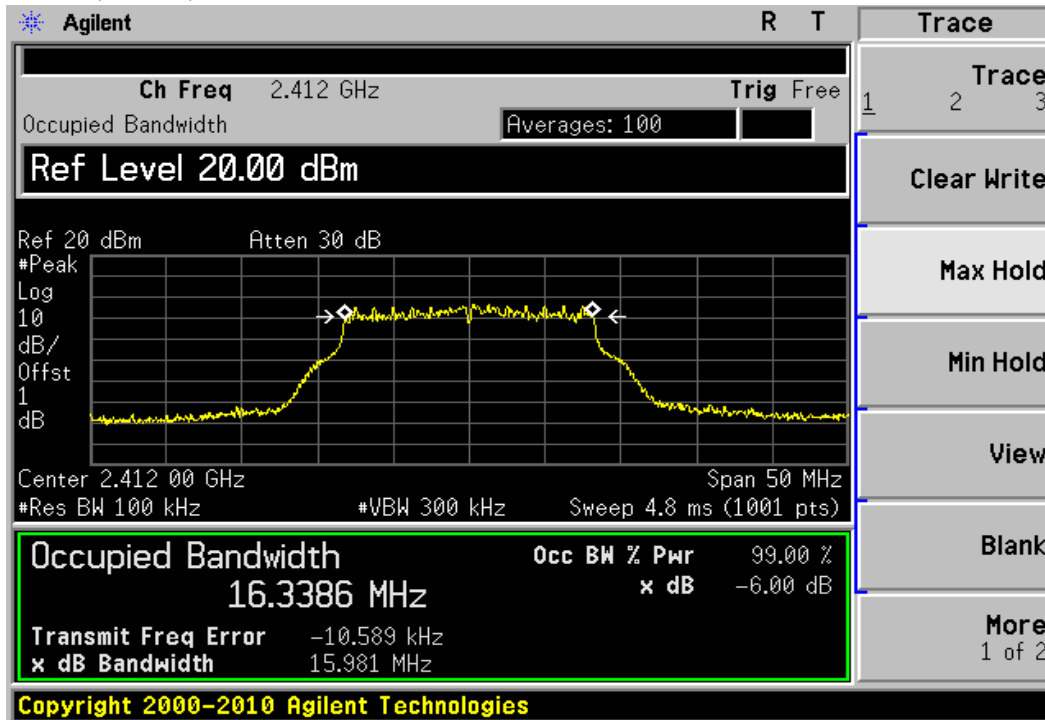
(ch_6)



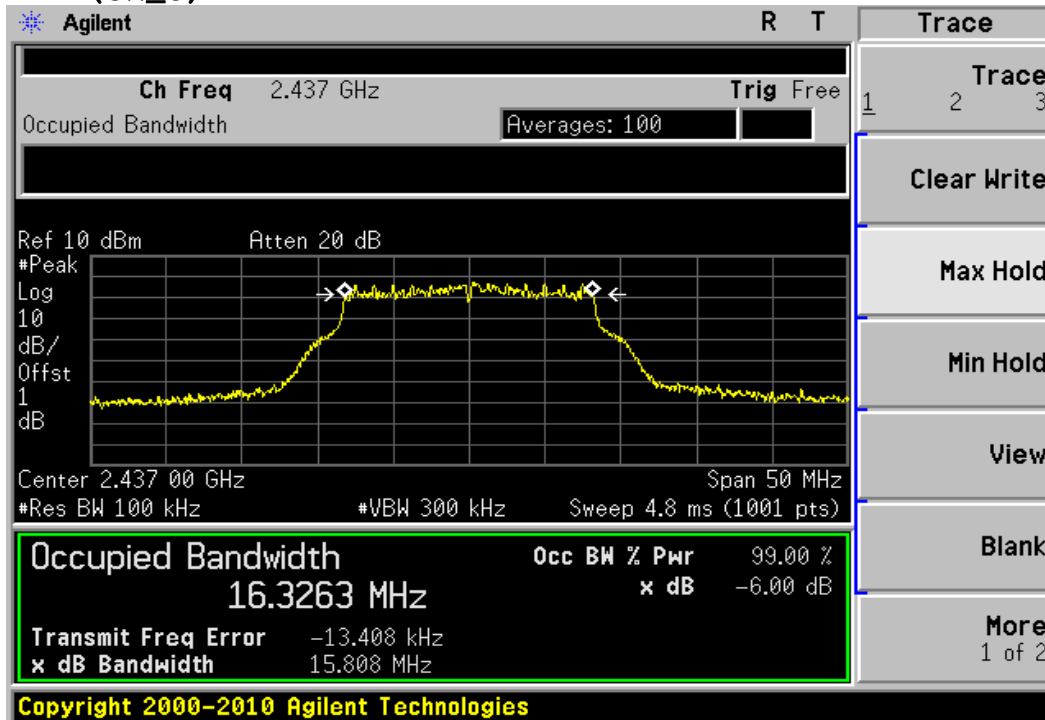
(ch_11)



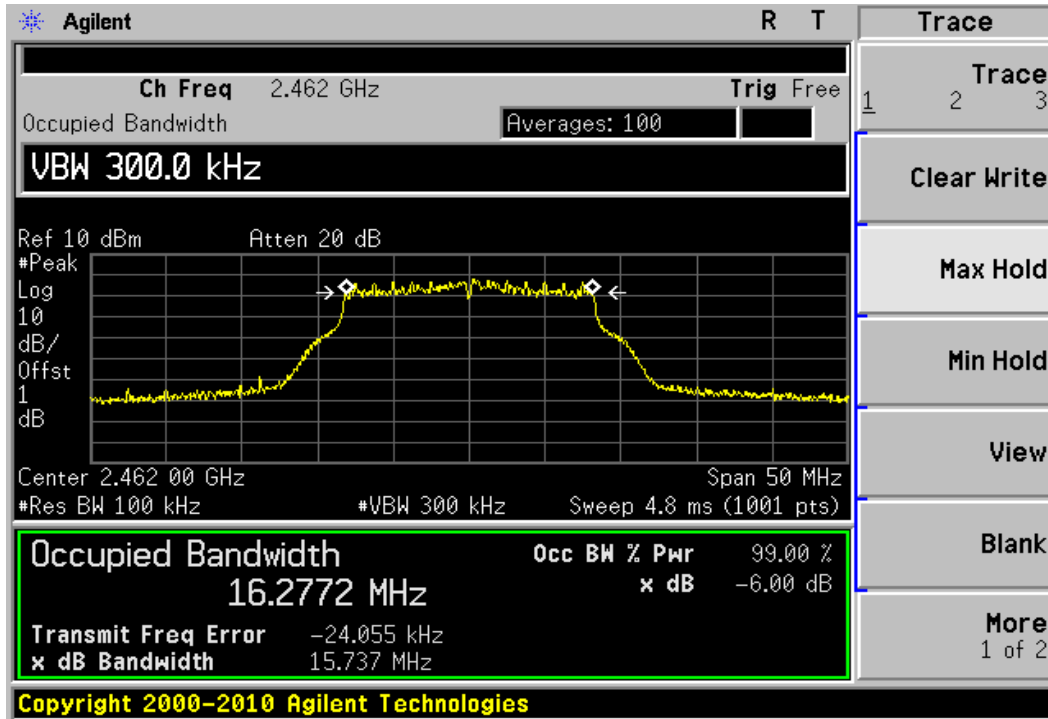
5.4 Trace data – 802.11g (ch_1)



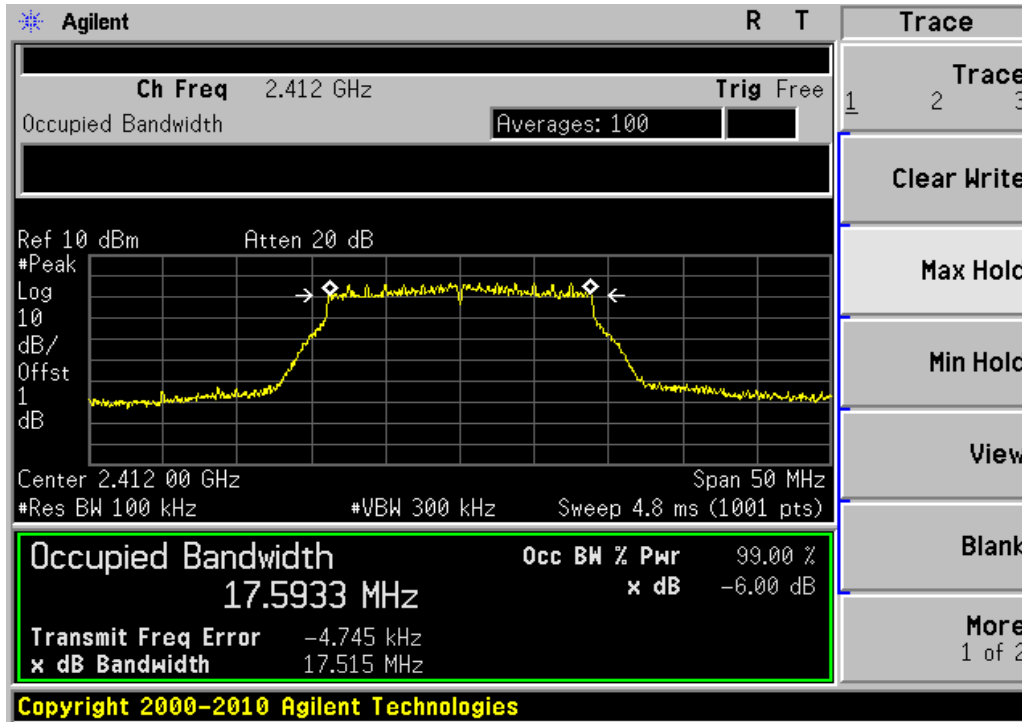
(ch_6)



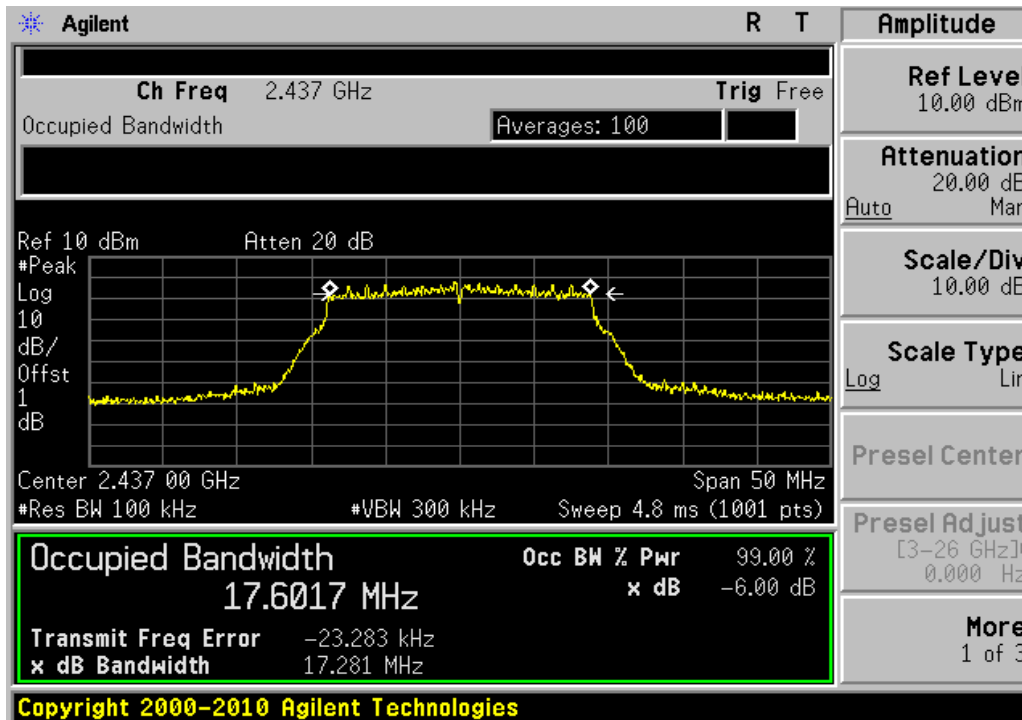
(ch_11)



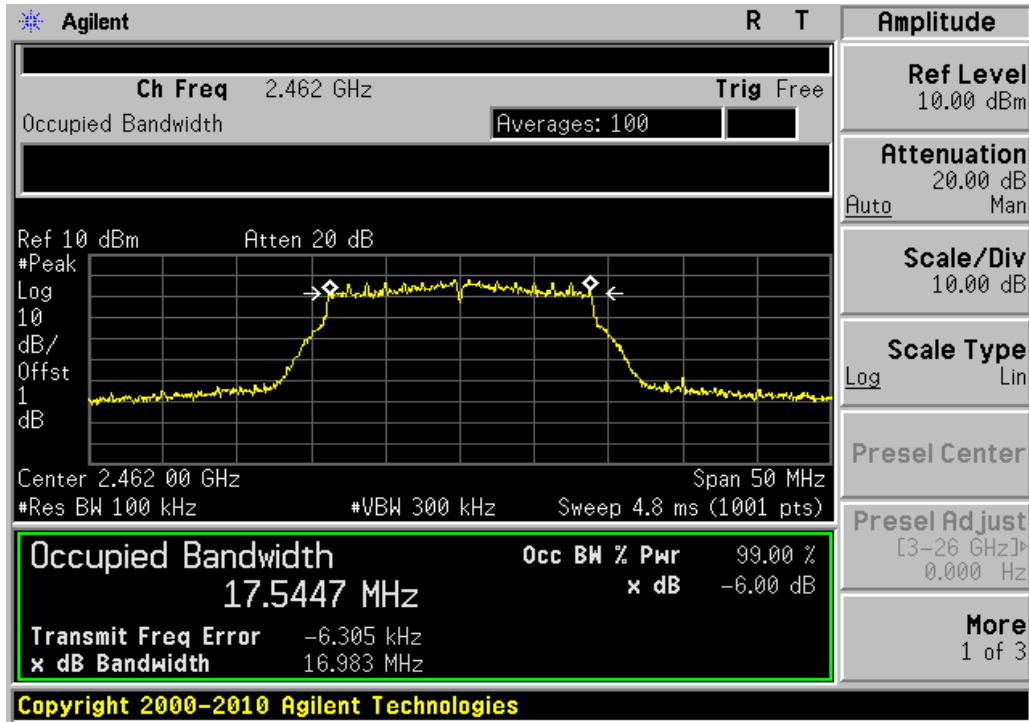
5.4 Trace data – 802.11n (ch_1)



(ch_6)



(ch_11)



6. Maximum peak conducted output power

6.1 Test procedure

The transmitter antenna terminal is connected to the input of a Power Sensor. Measurement is made while EUT is operating in transmission mode at the appropriate center frequency. The maximum peak output power measurement is 30 dBm.

Maximum Peak Output Power Test Instruments

Description	Model	Serial Number	Cal. Due Date
Power Meter	N1921A	MY45100570	2020-12-02
Power Sensor	N1921A	MY45240427	2020-12-02
Power Meter <=> EUT	Loss: 1 dB	-	

6.2 Measurement results

EUT	Tablet PC	MODEL	PR70A BIO
MODE	802.11b, g, n20	ENVIRONMENTAL CONDITION	23.0 °C, 47.0 % R.H.
INPUT POWER	DC 3.7 V		

MODE – 802.11b

CHANNEL	Channel frequency (MHz)	Conducted Power Output(dBm)			Limit[1W] (dBm)	PASS/FAIL
		Detector	(dBm)	(W)		
1	2 412	PEAK	6.42	0.0044	30.0	PASS
6	2 437	PEAK	7.08	0.0051	30.0	PASS
11	2 462	PEAK	7.65	0.0058	30.0	PASS

MODE – 802.11g

CHANNEL	Channel frequency (MHz)	Conducted Power Output(dBm)			Limit[1W] (dBm)	PASS/FAIL
		Detector	(dBm)	(W)		
1	2 412	PEAK	5.73	0.0037	30.0	PASS
6	2 437	PEAK	5.41	0.0035	30.0	PASS
11	2 462	PEAK	6.22	0.0042	30.0	PASS

MODE – 802.11n

CHANNEL	Channel frequency (MHz)	Conducted Power Output(dBm)			Limit[1W] (dBm)	PASS/FAIL
		Detector	(dBm)	(W)		
1	2 412	PEAK	4.09	0.0026	30.0	PASS
6	2 437	PEAK	5.78	0.0038	30.0	PASS
11	2 462	PEAK	5.38	0.0035	30.0	PASS

7. Maximum conducted (average) output power

7.1 Test procedure

The transmitter antenna terminal is connected to the input of a Power Sensor. Measurement is made while EUT is operating in transmission mode at the appropriate center frequency. The maximum Average output power measurement is 30 dBm.

Maximum conducted (average) output power Test Instruments

Description	Model	Serial Number	Cal. Due Date
Power Meter	N1921A	MY45100570	2020-12-02
Power Sensor	N1921A	MY45240427	2020-12-02
Power Meter <=> EUT	Loss: 1 dB	-	

7.2 Measurement results

EUT	Tablet PC	MODEL	PR70A BIO
MODE	802.11b, g, n20	ENVIRONMENTAL CONDITION	23.0 °C, 47.0 % R.H.
INPUT POWER	DC 3.7 V		

MODE – 802.11b

CHANNEL	Channel frequency (MHz)	Conducted Power Output(dBm)			Measured + Duty Cycle(dBm)	Measured + Duty Cycle(W)
		Detector	(dBm)	Duty Cycle		
1	2 412	AVG	-3.30	0.52	-2.78	0.0005
6	2 437	AVG	-2.49	0.52	-1.97	0.0006
11	2 462	AVG	-2.09	0.52	-1.57	0.0007

MODE – 802.11g

CHANNEL	Channel frequency (MHz)	Conducted Power Output(dBm)			Measured + Duty Cycle(dBm)	Measured + Duty Cycle(W)
		Detector	(dBm)	Duty Cycle		
1	2 412	AVG	-4.33	3.87	-0.46	0.0009
6	2 437	AVG	-3.06	3.87	0.81	0.0012
11	2 462	AVG	-2.47	3.87	1.40	0.0014

MODE – 802.11n

CHANNEL	Channel frequency (MHz)	Conducted Power Output(dBm)			Measured + Duty Cycle(dBm)	Measured + Duty Cycle(W)
		Detector	(dBm)	Duty Cycle		
1	2 412	AVG	-3.41	2.35	-1.06	0.0008
6	2 437	AVG	-3.28	2.35	-0.93	0.0008
11	2 462	AVG	-2.52	2.35	-0.17	0.0010

8. Maximum power spectral density level in the fundamental emission

8.1 Test procedure

KDB 558074 D01 DTS Meas Guidance V05 10.2 Method PKPSD (peak PSD)

8.2 Test instruments and measurement setup

The spectrum analyzer is set to as following.

- 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.

Limits FCC § 15.247

The peak power density Test Instruments

Description	Model	Serial Number	Cal. Due Date
Spectrum Analyzer	FSV40	100393	2-Dec-20
Spectrum Analyzer	E440A	US42041291	2-Dec-20
RF Cable	Length: 30 cm	-	
Spectrum Analyzer <=> EUT	Loss: 1.0 dB	-	

8.3 Measurement results

EUT	Tablet PC	MODEL	PR70A BIO
MODE	802.11b, g, n20	ENVIRONMENTAL CONDITION	22.0 °C, 47.0 % R.H.
INPUT POWER	DC 3.7 V		

MODE – 802.11b

CHANNEL	Channel Frequency (MHz)	Measured Power Spectral Density (dBm)	Maximum Permissible Power Density (dBm/3kHz)	Margin
1	2 412	-10.76	8.00	18.76
6	2 437	-10.00	8.00	18.00
11	2 462	-9.20	8.00	17.20

MODE – 802.11g

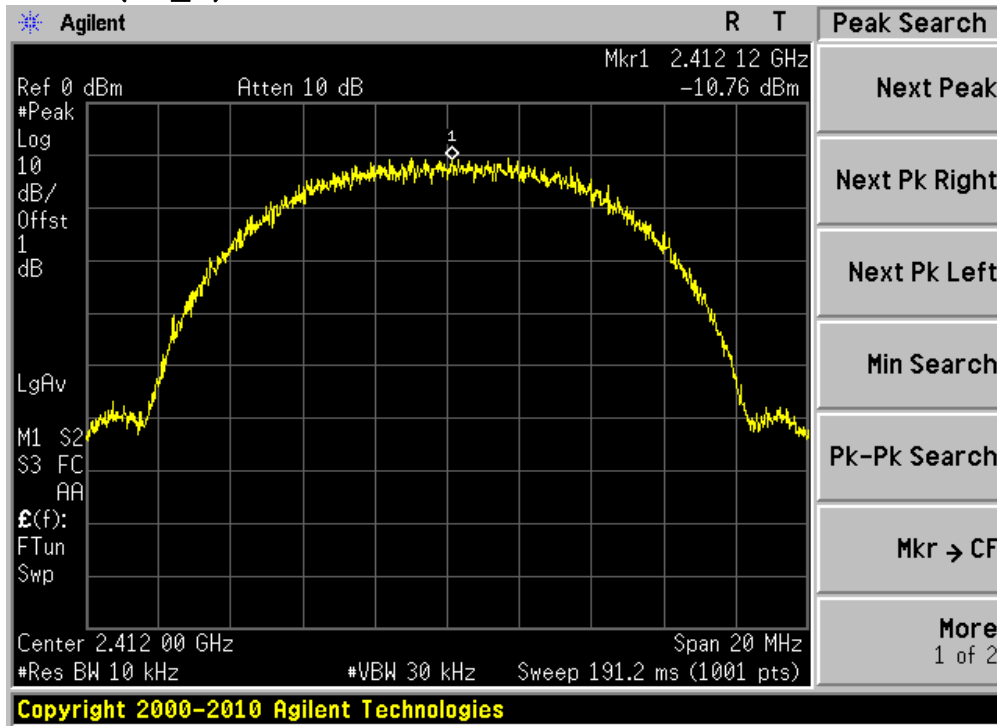
CHANNEL	Channel Frequency (MHz)	Measured Power Spectral Density (dBm)	Maximum Permissible Power Density (dBm/3kHz)	Margin
1	2 412	-11.68	8.00	19.68
6	2 437	-10.91	8.00	18.91
11	2 462	-10.41	8.00	18.41



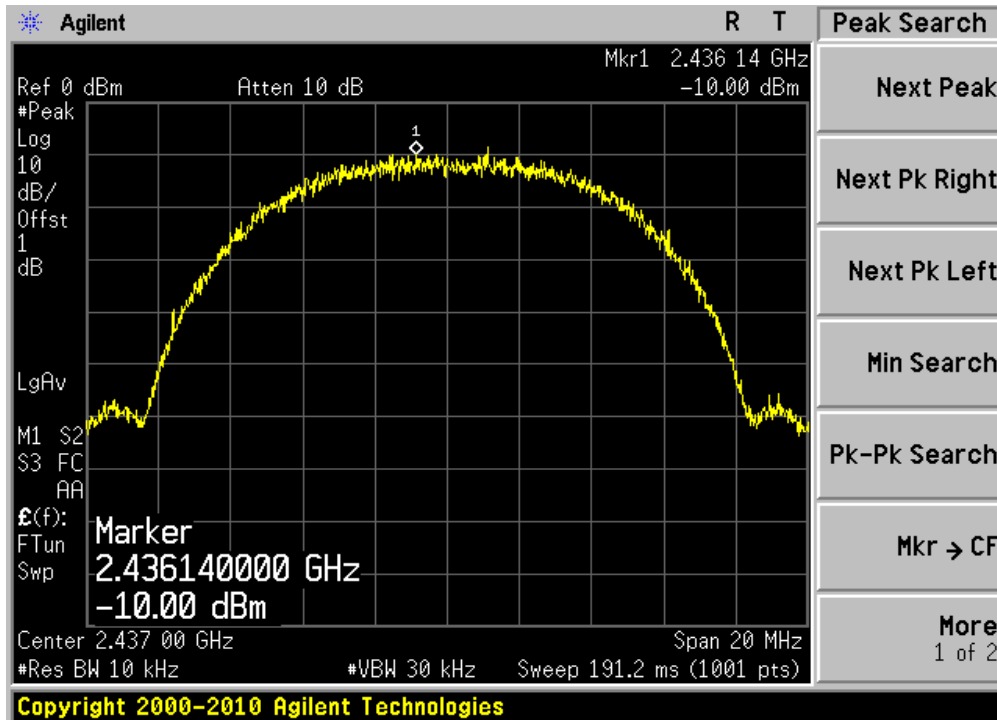
MODE – 802.11n

CHANNEL	Channel Frequency (MHz)	Measured Power Spectral Density (dBm)	Maximum Permissible Power Density (dBm/3kHz)	Margin
1	2 412	-11.93	8.00	19.93
6	2 437	-12.04	8.00	20.04
11	2 462	-11.57	8.00	19.57

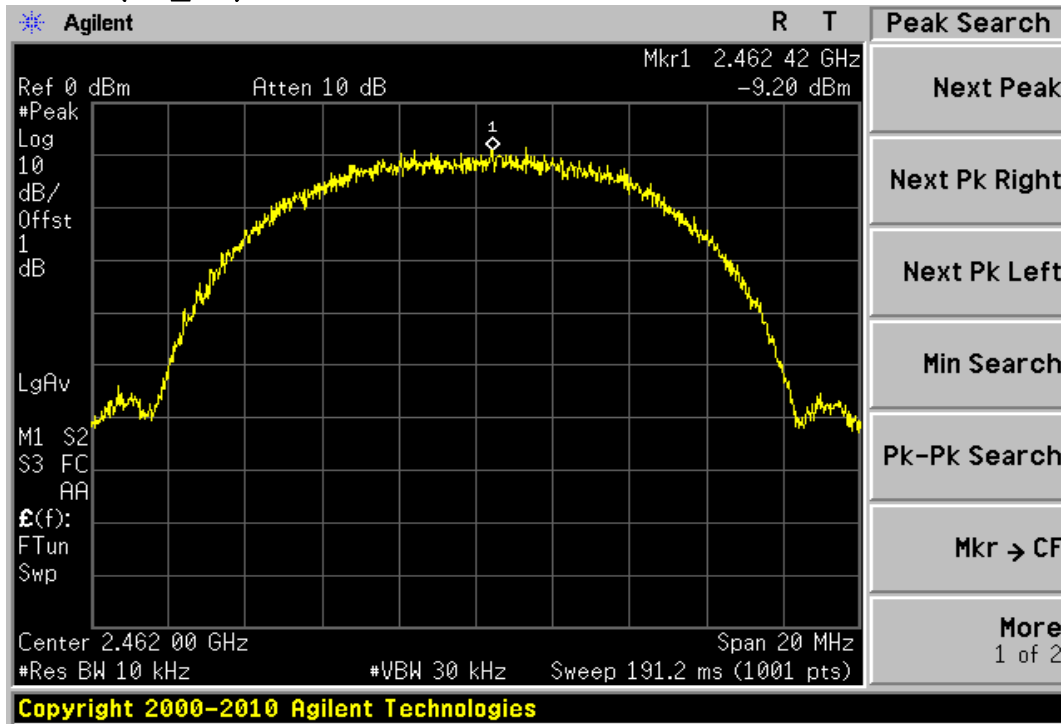
8.4 Trace data – 802.11b mode (ch_1)



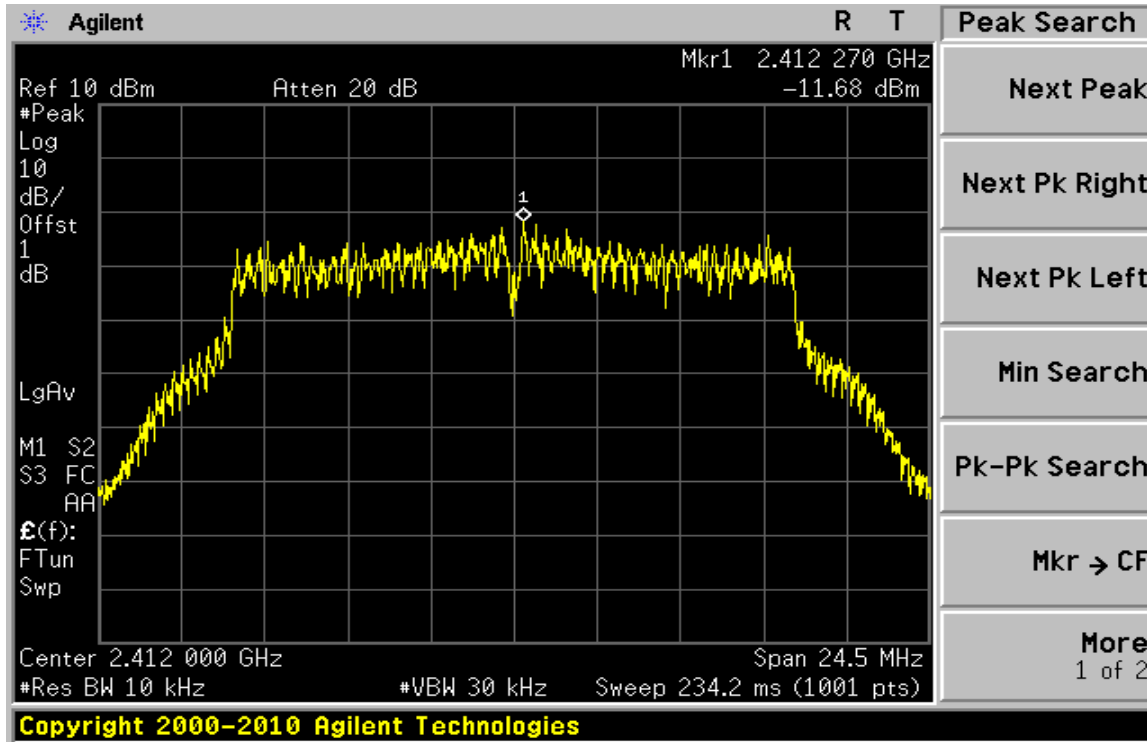
(ch_6)



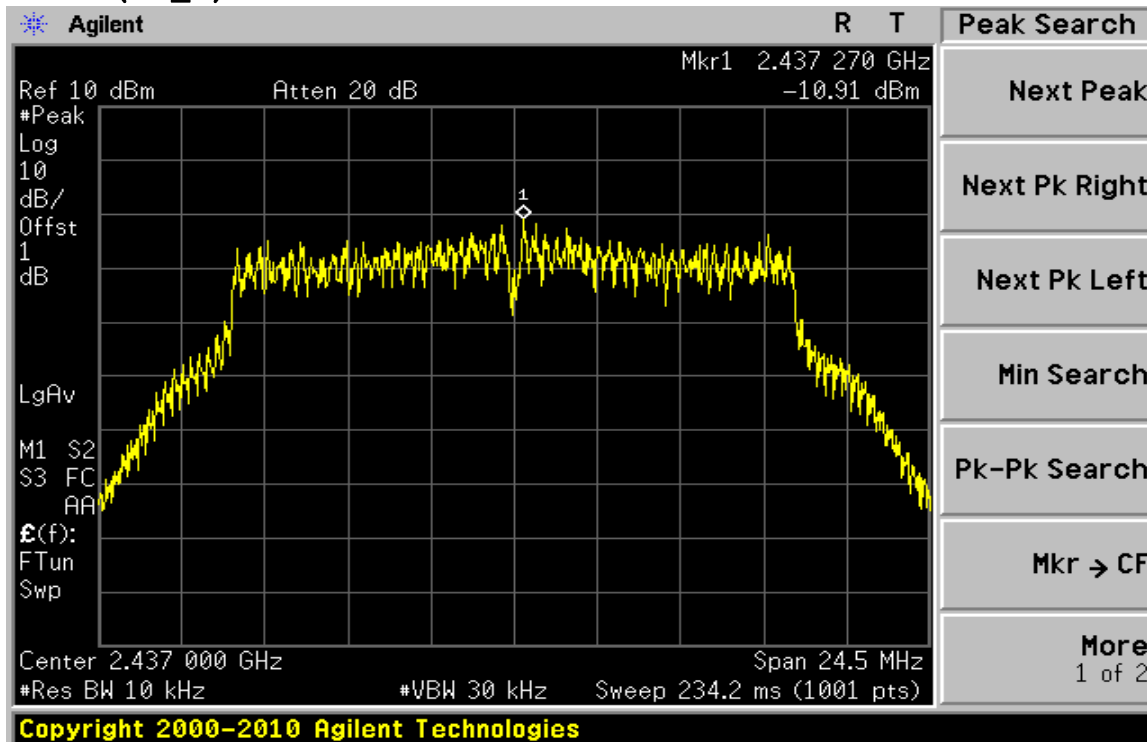
8.4 Trace data – 802.11b (ch_11)



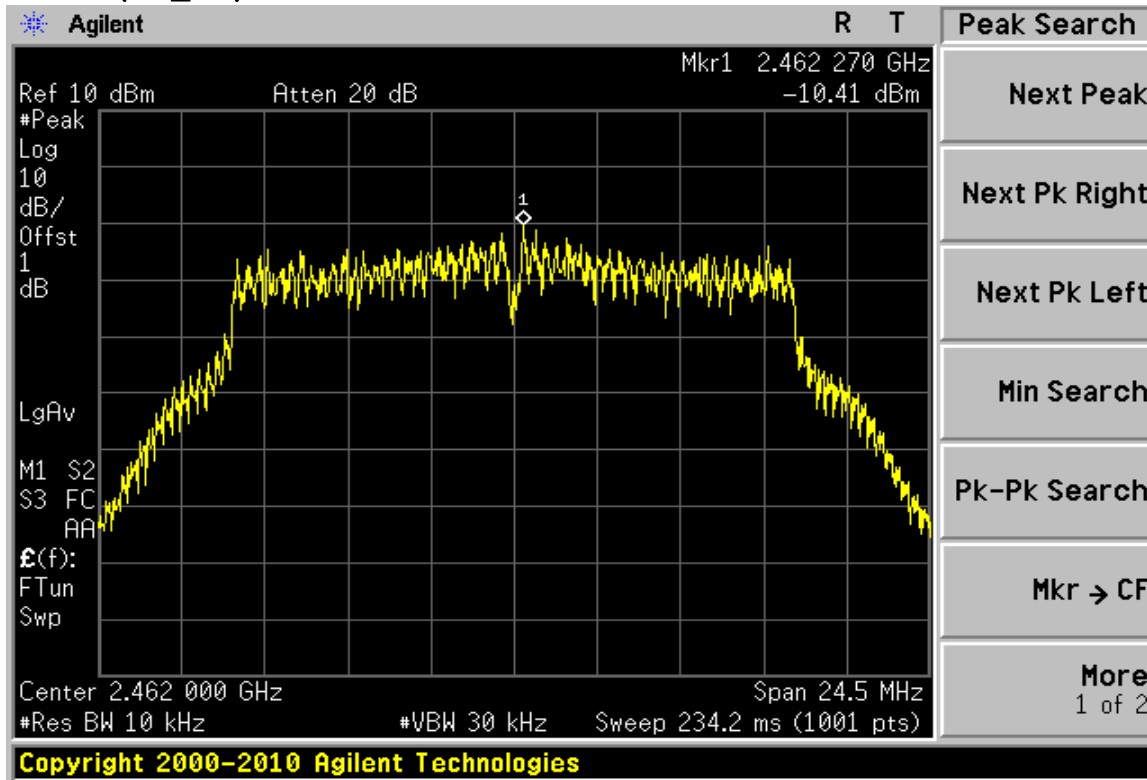
8.4 Trace data – 802.11g mode (ch_1)



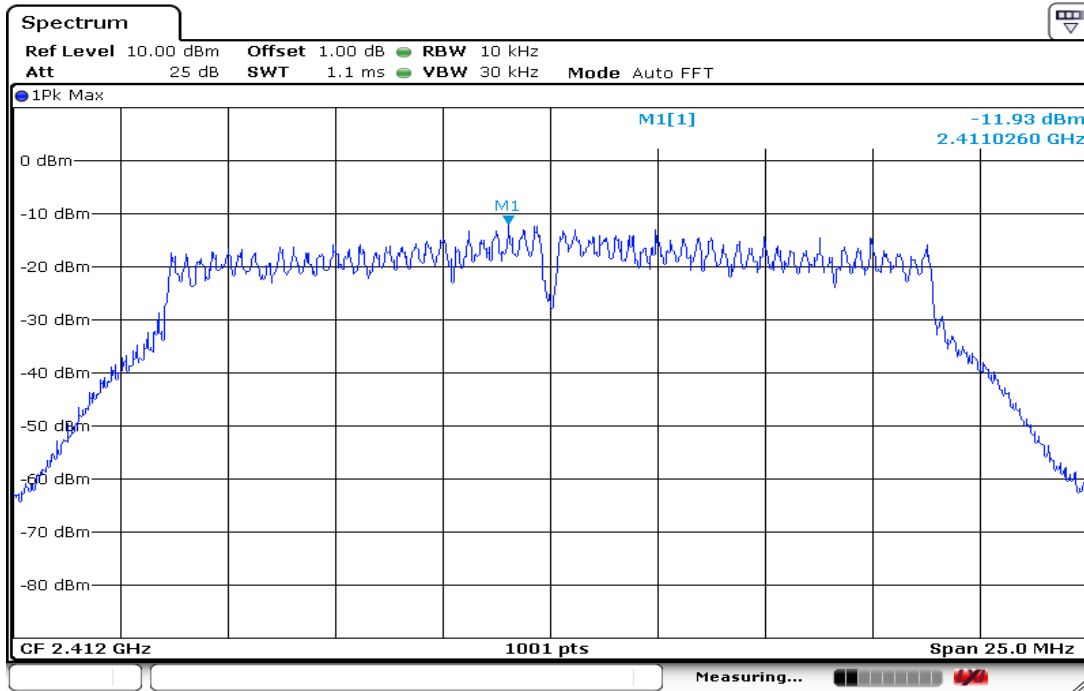
(ch_6)



8.4 Trace data – 802.11g mode (ch_11)

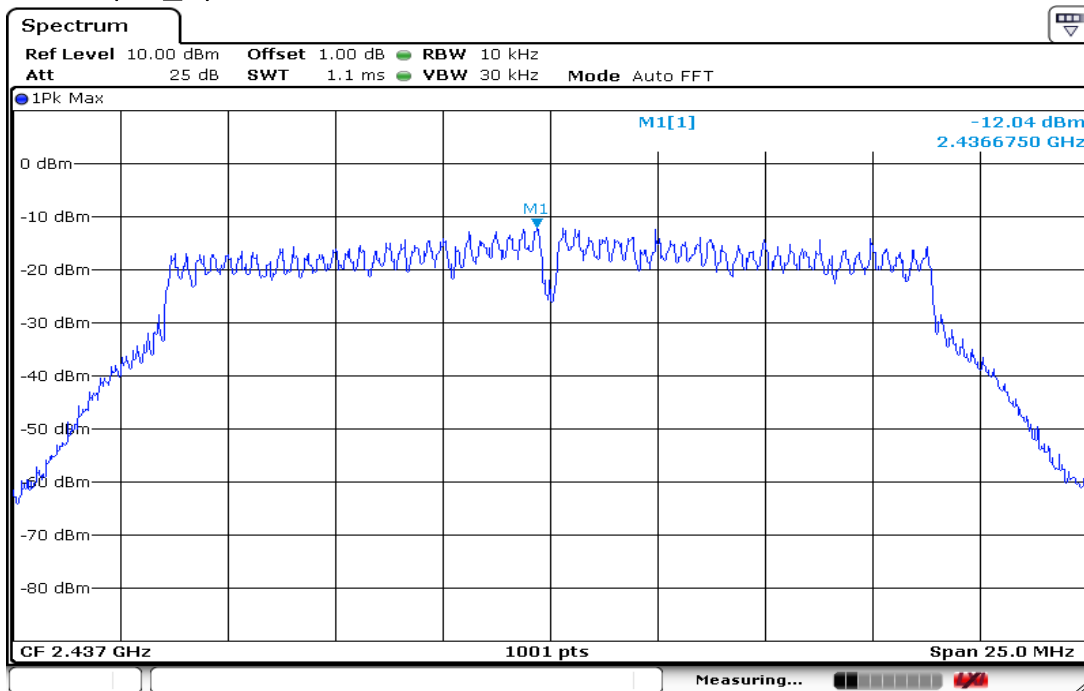


8.4 Trace data – 802.11n mode (ch_1)



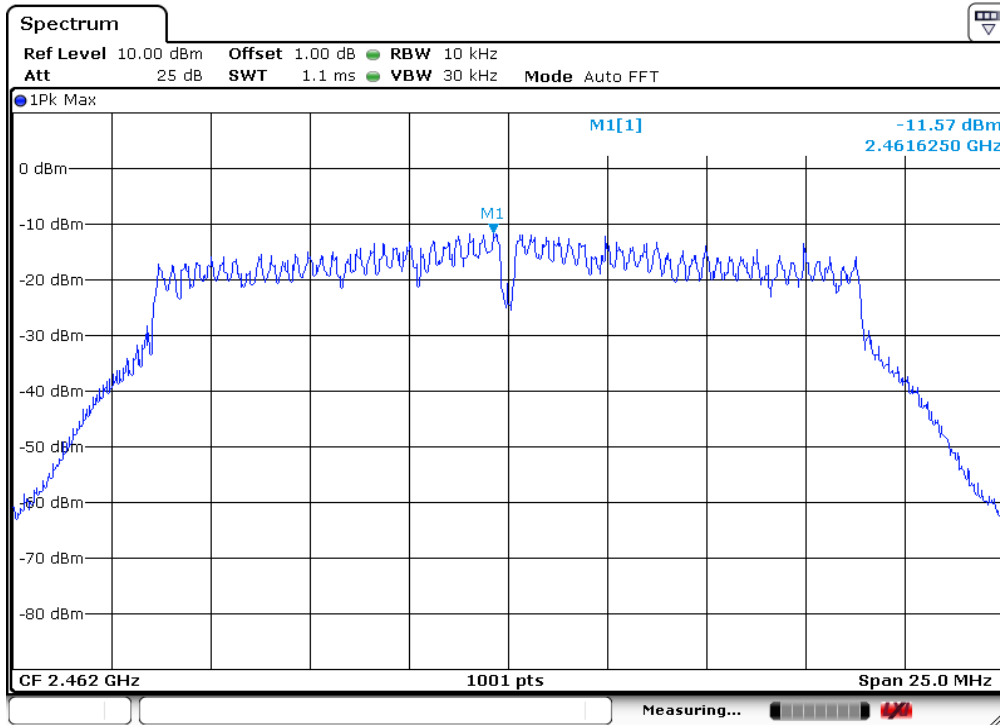
00077

(ch_6)



00077

8.4 Trace data – 802.11g mode (ch_11)



00077



9. Emissions in non-restricted frequency bands

9.1 Test procedure

KDB 558074 D01 DTS Meas Guidance V05

9.2 Test instruments and measurement setup

The spectrum analyzer is set to as following.

- a) Set instrument center frequency to DTS channel center frequency.
- b) Set the span to ≥ 1.5 times the DTS bandwidth.
- c) Set the RBW = 100 kHz.
- d) Set the VBW $\geq 3 \times$ 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 PSD level.

Limits FCC § 15.247

Band Edge&Out of Emission Test Instruments

Description	Model	Serial Number	Cal. Due Date
Spectrum Analyzer	E4440A	US42041291	2-Dec-20
Spectrum Analyzer	FSV40	100939	2-Dec-20
RF Cable	Length: 30 cm		-
-Spectrum Analyzer <=> EUT	Loss: 1.0 dB		-

9.3 Measurement results of band-edge & out of emission – Adapter

EUT	Tablet PC	MODEL	PR70A BIO
MODE	802.11b, g, n20	ENVIRONMENTAL CONDITION	22.0 °C, 47.0 % R.H.
INPUT POWER	DC 3.7 V		

MODE -802.11b

CHANNEL	Channel Frequency (MHz)	limit	PASS/FAIL
1	2 412	20dBc	PASS
11	2 462	20dBc	PASS

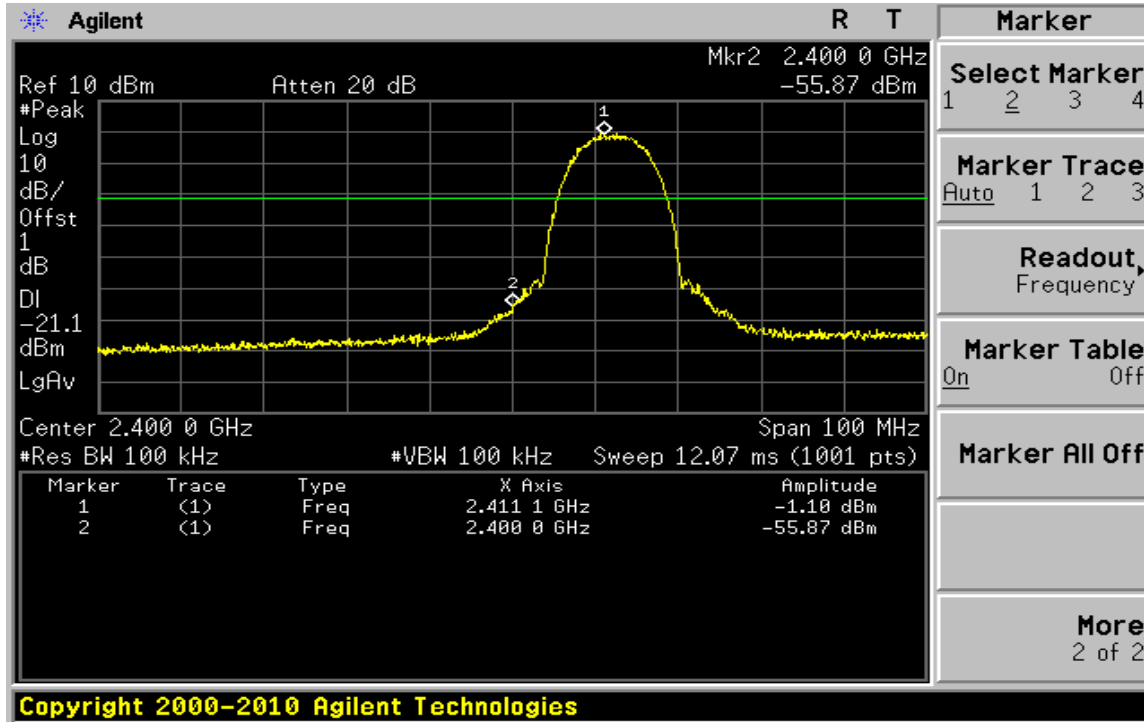
MODE -802.11g

CHANNEL	Channel Frequency (MHz)	limit	PASS/FAIL
1	2 412	20dBc	PASS
11	2 462	20dBc	PASS

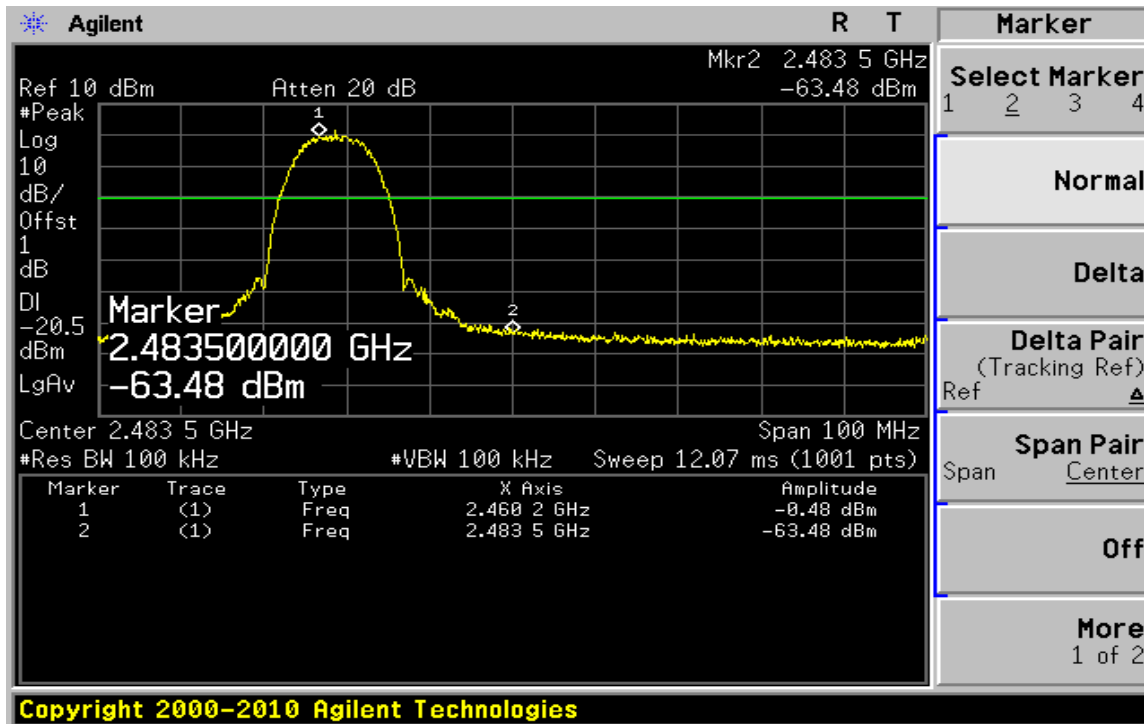
MODE -802.11g

CHANNEL	Channel Frequency (MHz)	limit	PASS/FAIL
1	2 412	20dBc	PASS
11	2 462	20dBc	PASS

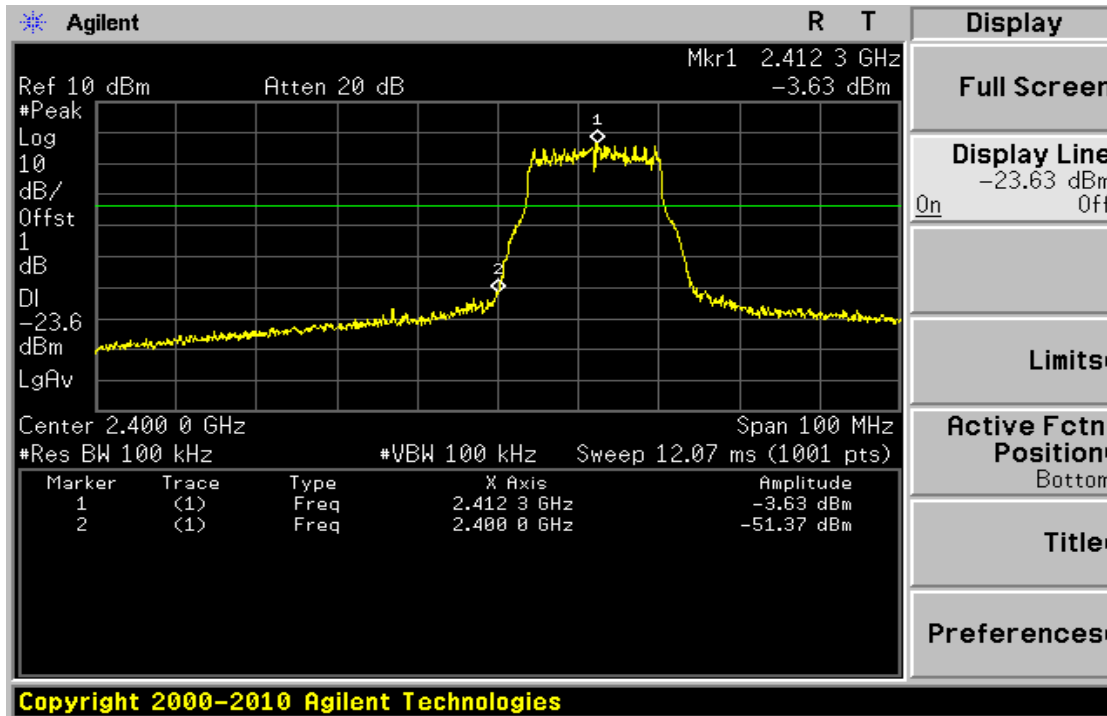
9.4 Trace data of band-edge & Out of Emission – 802.11b mode (ch_1)



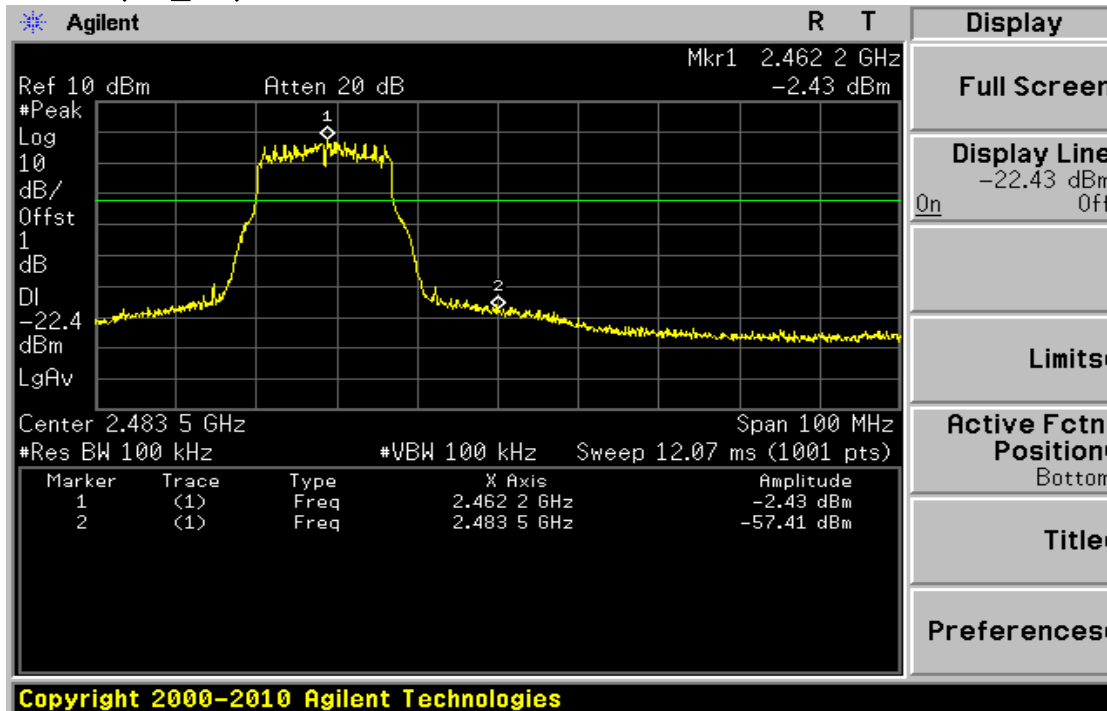
(ch_11)



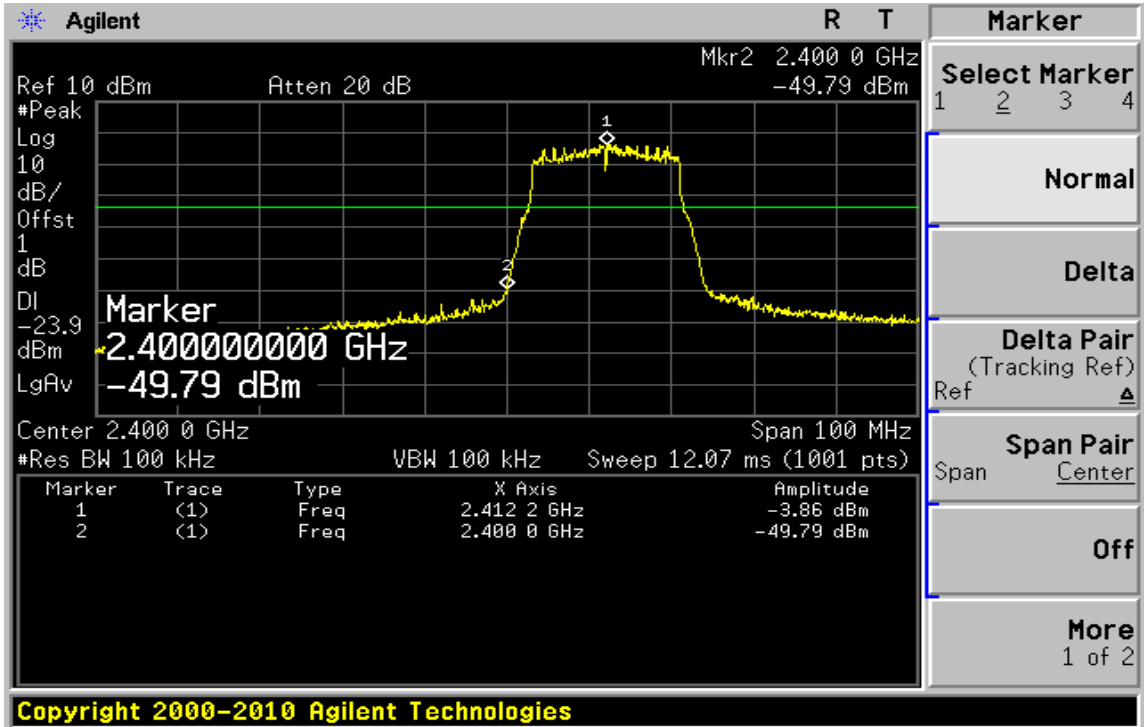
9.4 Trace data of band-edge & Out of Emission – 802.11g mode (ch_1)



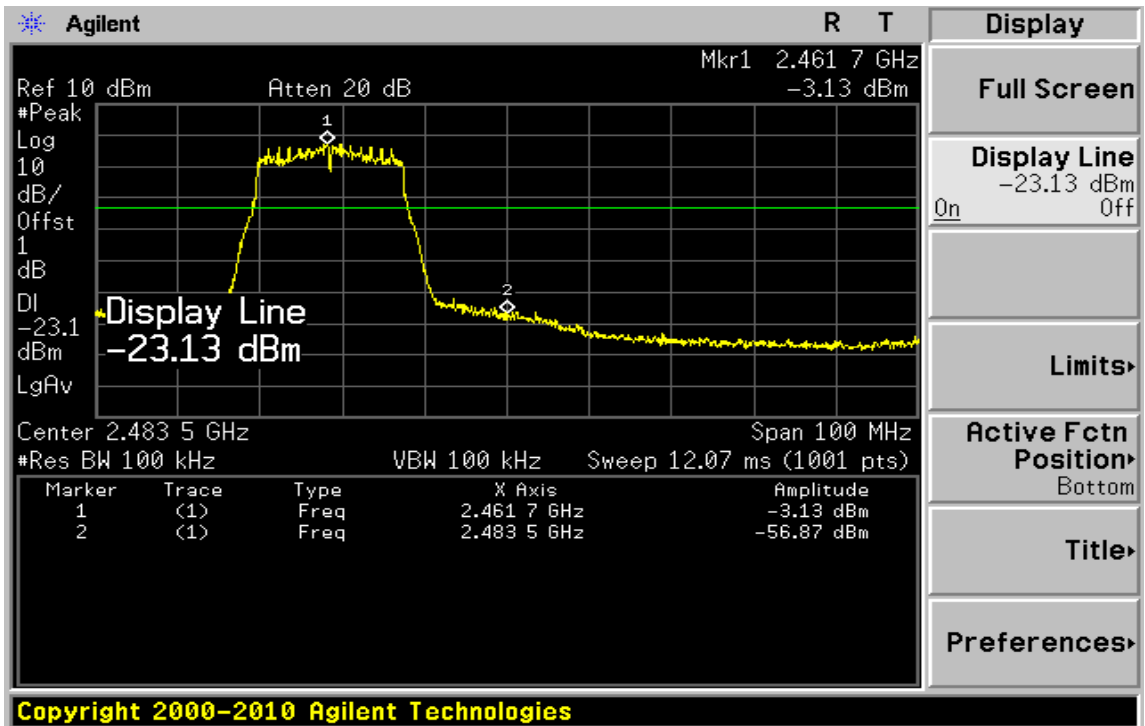
(ch_11)



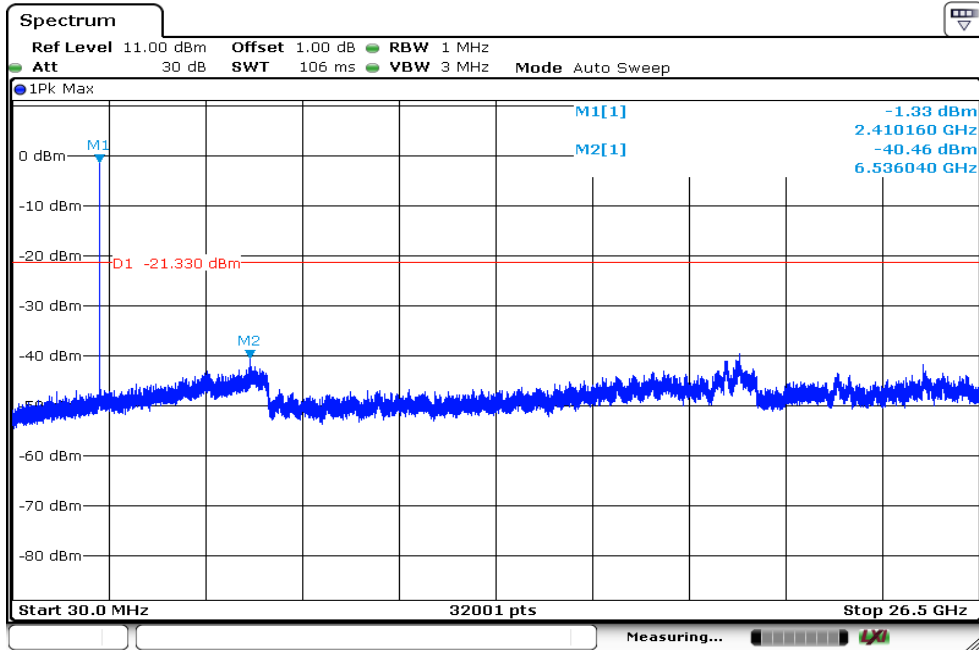
9.4 Trace data of band-edge & Out of Emission – 802.11n mode (ch_1)



(ch_11)

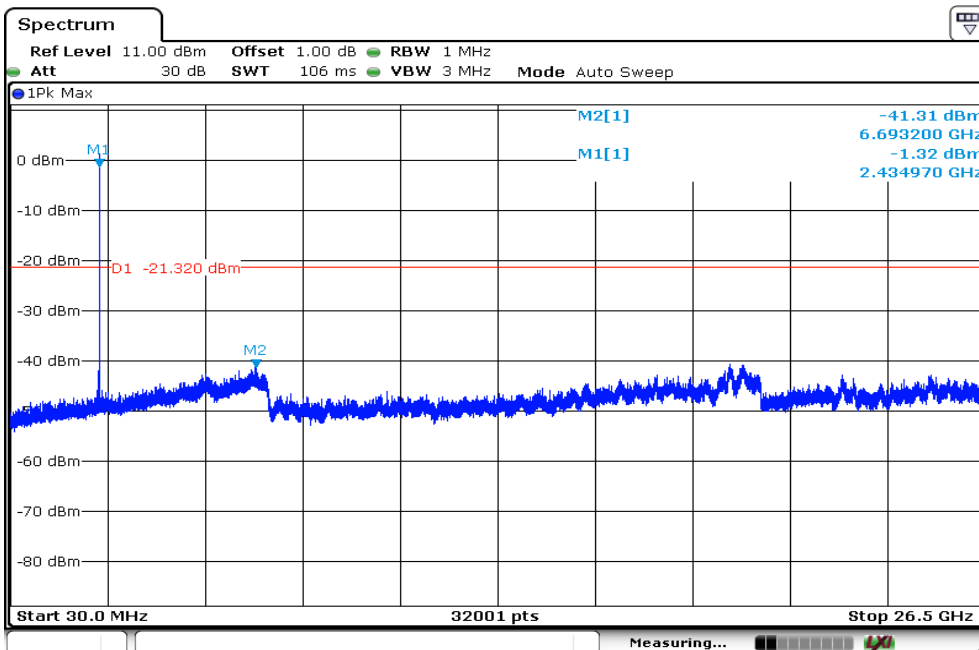


9.4 Trace data of Out of Emission – 802.11b mode
(ch_1)



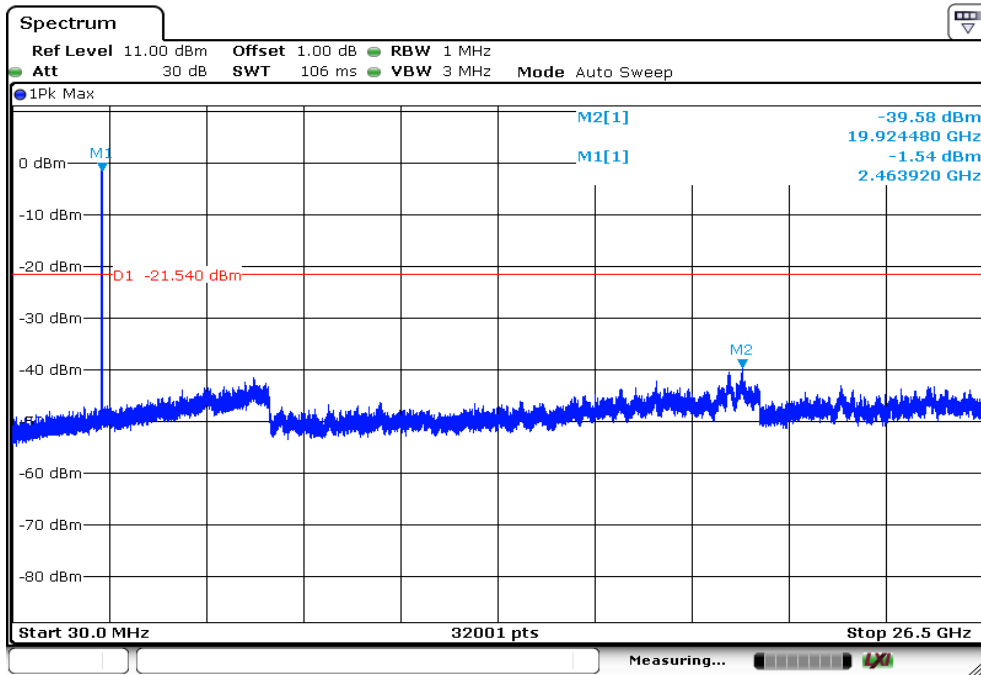
11b

(ch_6)



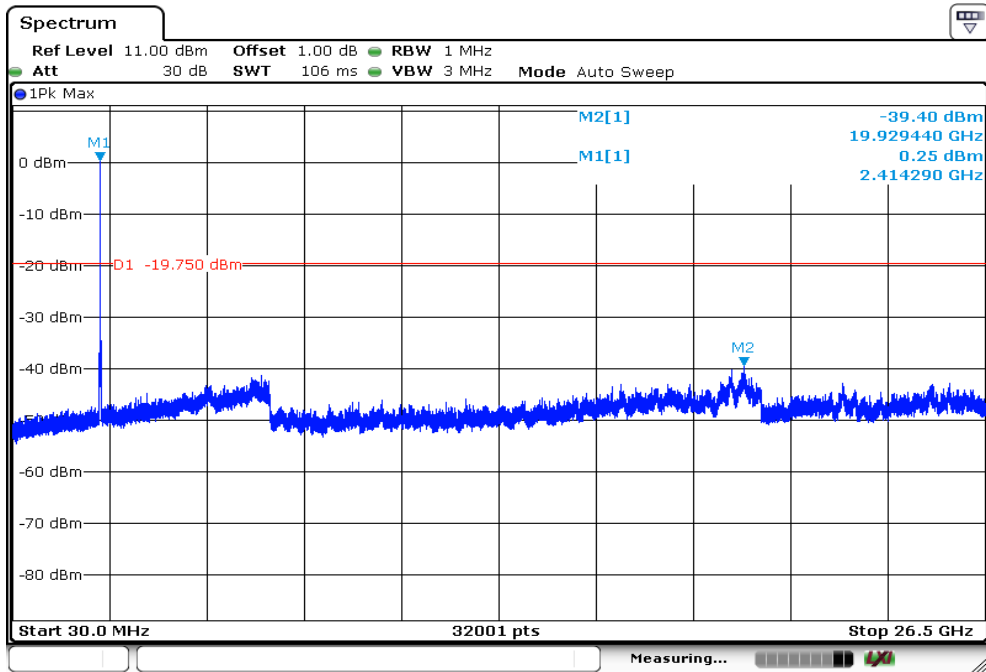
11b

9.4 Trace data of Out of Emission – 802.11b mode
(ch_11)



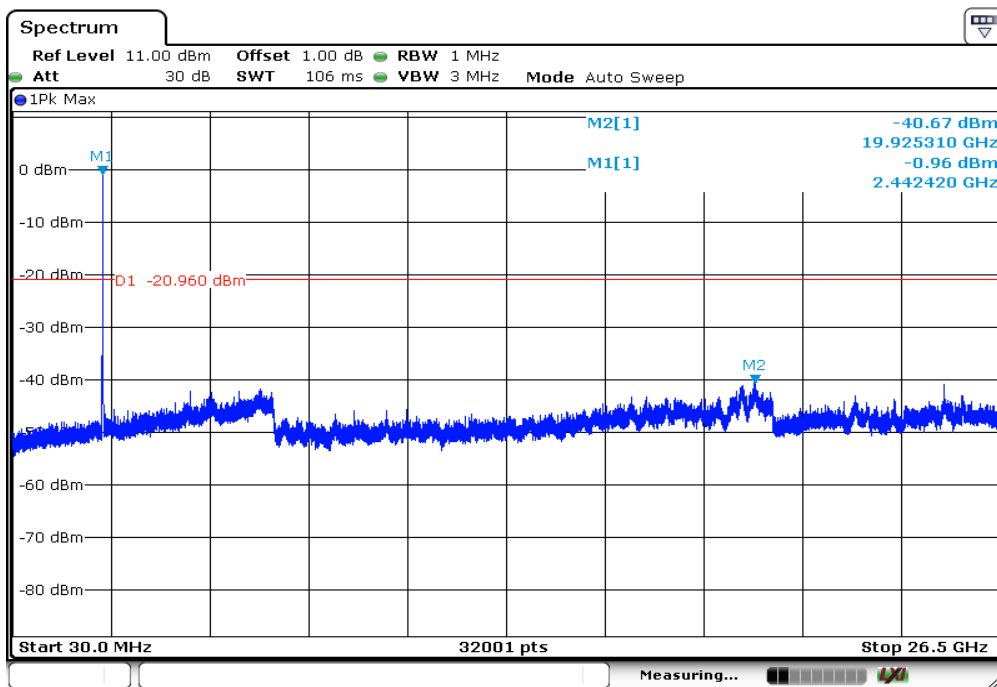
11b

9.4 Trace data of Out of Emission – 802.11g mode
(ch_1)



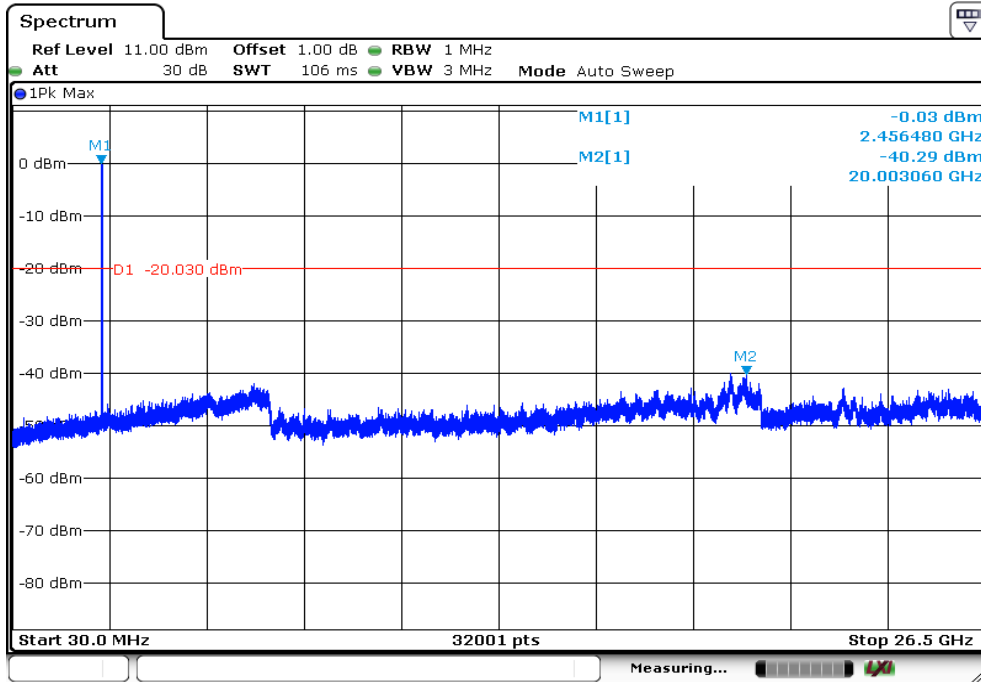
11g

(ch_6)



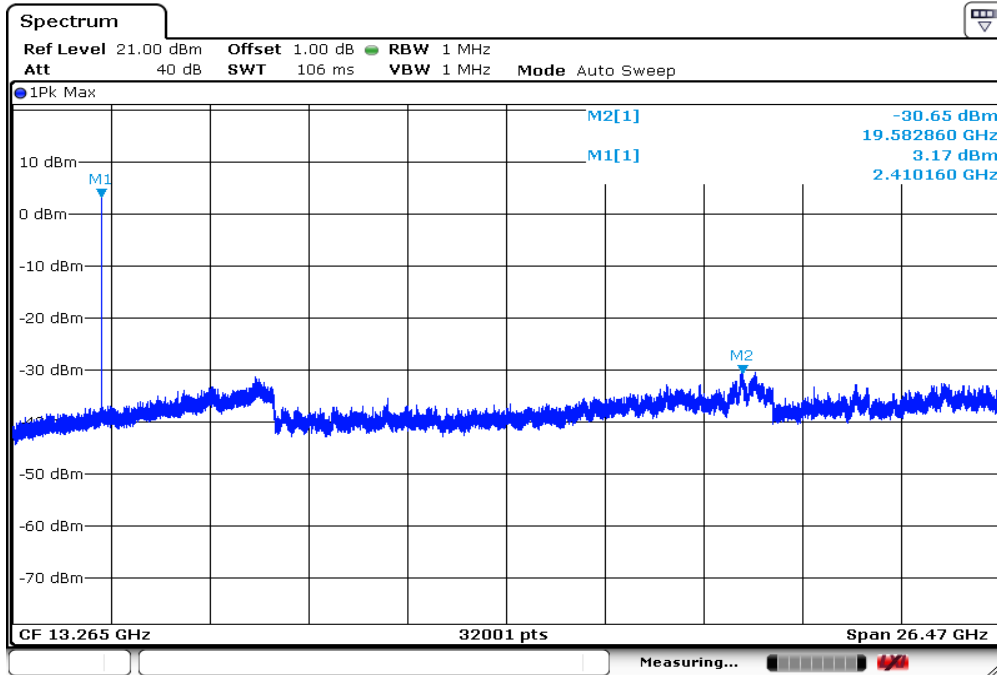
11g

9.4 Trace data of Out of Emission – 802.11g mode
(ch_11)



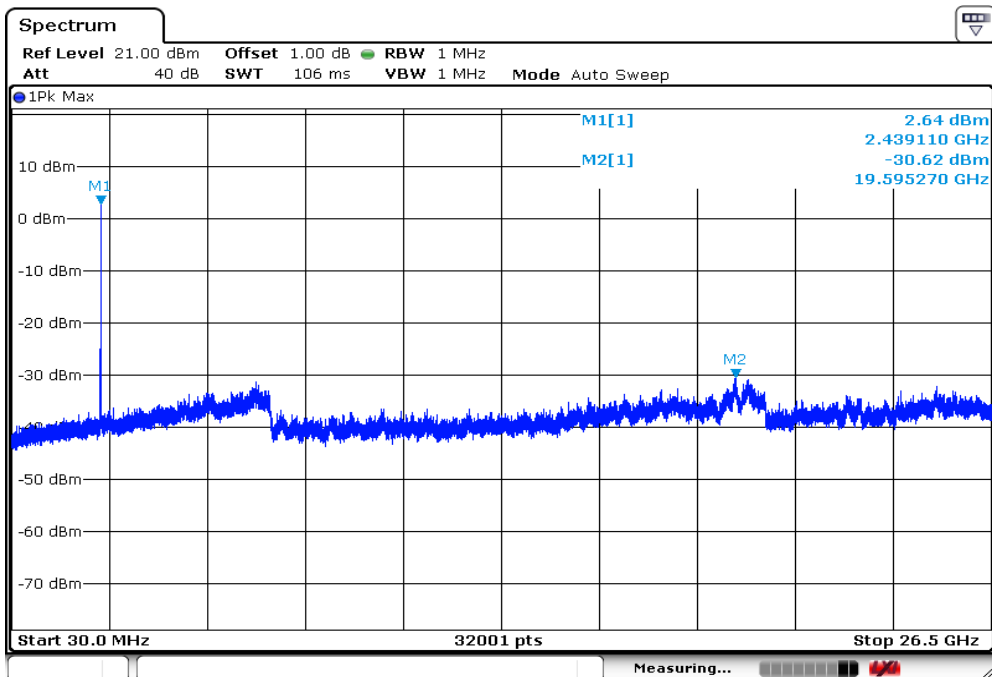
11g

9.4 Trace data of Out of Emission – 802.11n mode (ch_1)



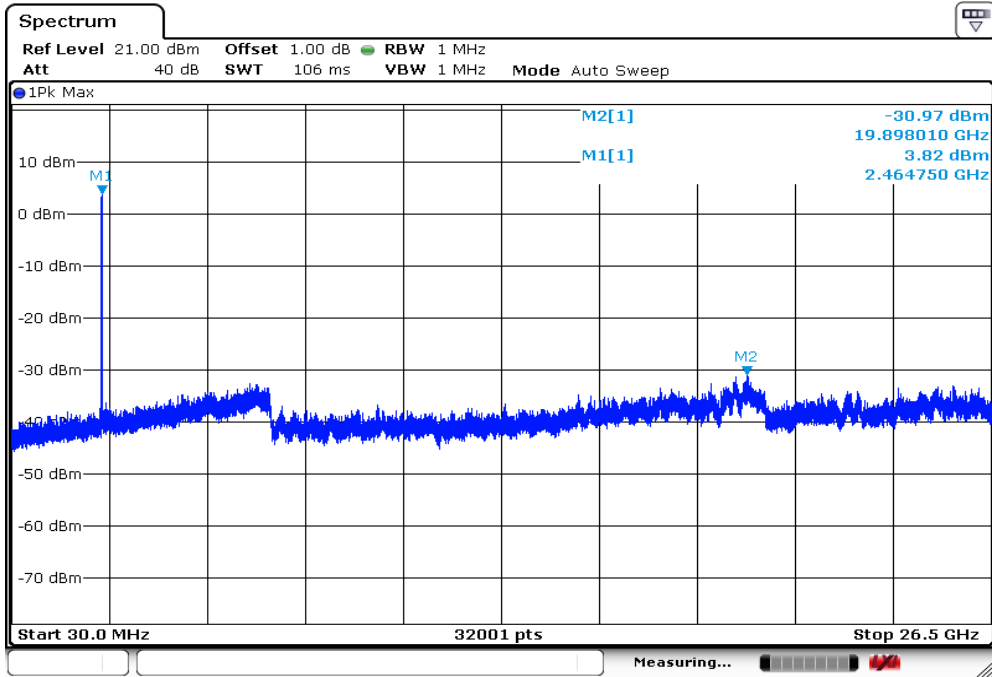
00077

(ch_6)



00077

9.4 Trace data of Out of Emission – 802.11g mode
(ch_11)



00077

10. Measurement of radiated disturbance

Above 30 MHz Electric Field strength was measured in accordance with FCC PART 15.205, 15.209 . The test setup was made according to ANSI C 63.10 (2013) & KDB 558074 D01 Semi-anechoic chamber, which allows a 3 m distance measurement. The EUT was placed in the center of styrofoam. turntable. The height of this table was 0.8 m. The measurement was conducted with both horizontal and vertical antenna polarization. The turntable has fully rotated. For further description of the configuration refer to the picture of the test setup.

10.1 Measurement equipments

Equipment Name	Type	Manufacturer	Serial No.	Next Calibration date
TEST Receiver	ESCI7	ROHDE & SCHWARZ	100916	9-Sep-20
Logbicon Antenna	VULB 9168	SCHWARZBECK	193	14-Jan-22
Turn Table	DT3000-2t	Innco System GmbH	N/A	-
Antenna Mast	MA4000-EP	Innco System GmbH	N/A	-
PREAMPLIFIER	8449B	AGILENT	3008A00581	9-Sep-20
Horn Antenna	BBHA9120D	SCHWARZBECK	469	6-Jan-21
Test Receiver	ESPI7	ROHDE & SCHWARZ	100185	9-Sep-20
Signal Analyzer	FSV40	ROHDE & SCHWARZ	100393	2-Dec-20
Turn Table	DT1500-S	Innco System GmbH	N/A	-
Antenna Mast	MA4000-EP	Innco System GmbH	N/A	-
Horn Antenna	BBHA 9170	SCHWARZBECK	752	1-Nov-20
Antenna Master & Turn table controller	CO2000-P	Innco System GmbH	CO2000/642 /28051111/L	-

10.2 Environmental Condition

Below 1 GHz -Test Place : 10 m Semi-anechoic chamber

WLAN 802.11 b,g,n20 Mode

Temperature (°C) : 22.5 °C

Humidity (% R.H.) : 50.7 % R.H.

Above 1 GHz-Test Place : 3 m Semi-anechoic chamber

WLAN 802.11 b,g,n20 Mode

Temperature (°C) : 24 °C

Humidity (% R.H.) : 49.6 % R.H.

10.3 Measurement Instrument setting for Radiated Emission

10.3.1 Frequency range below 1 GHz

Detector : Quasi-Peak

10.3.2 Frequency range above 1 GHz

Peak Power Measurement Procedure (KDB 558074 section 12.2.4)

- a. RBW : 1 MHz , VBW : 3 MHz
- b. Trace mode = max hold
- c. Detector : Peak
- d. Sweep time = auto

Average Power Measurement Procedures (KDB 558074 section 12.2.5.2)

- a. Set analyzer center frequency to the frequency associated with the emission
- b. RBW : 1 MHz , VBW : 3 MHz
- c. Detector : RMS
- d. Sweep time = auto

* Note

Band	Duty cycle(%)	Ton (ms)	Ton + Toff (ms)	DCF=10*log(1/Duty) (dB)
802.11b	88.0	0.836	0.942	0.520
802.11g	62.0	0.173	0.279	2.076
802.11n	58.2	0.156	0.268	2.350

* This was not applied of duty cycle factor for average value because of measured with the EUT transmitting continuously more than 98 % duty cycle at its maximum power control level.

10.4-1 Test Data (802.11 b)

Test Date : 16-Mar-20

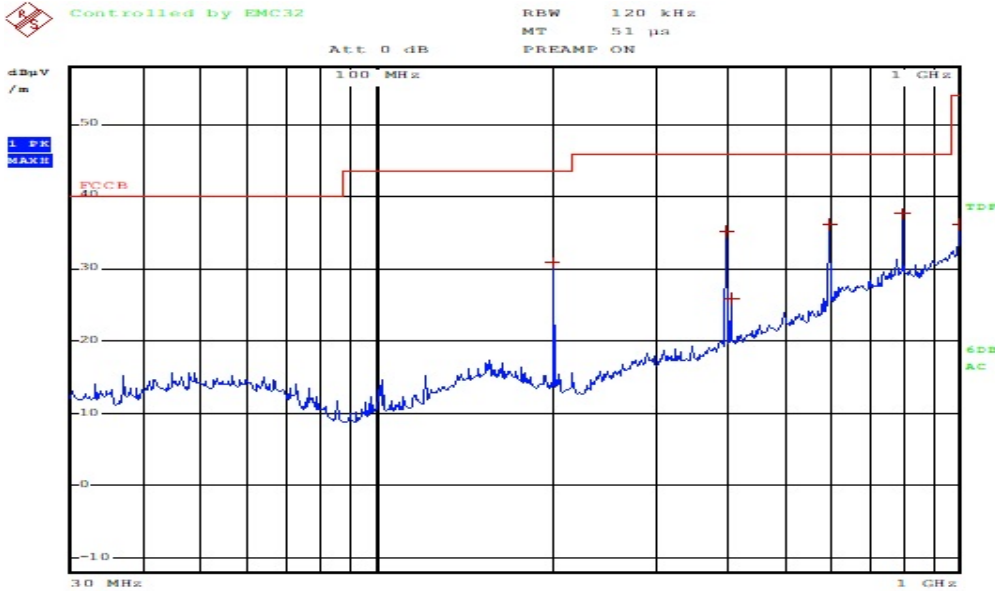
Measurement Distance : 3 m

Frequency (MHz)	Reading (dB μ V)	Position (V/H)	Height (m)	Correction Factor		Result Value		
				Ant Factor (dB)	Cable (dB)	Limit (dB μ V/m)	Result (dB μ V/m)	Margin (dB)
40.70	12.18	V	1.0	12.91	1.51	40.00	26.60	13.40
200.00	18.85	H	1.6	9.90	2.21	43.50	30.96	12.54
400.00	16.72	H	1.4	15.40	3.21	46.00	35.33	10.67
600.00	17.52	V	1.2	19.50	3.96	46.00	40.98	5.02
800.00	12.79	V	1.0	22.40	4.64	46.00	39.83	6.17
1000.00	7.83	V	1.7	24.29	5.22	54.00	37.34	16.66
Remark	<p>H : Horizontal, V : Vertical</p> <p>*Checked in all 3 axis and the maximum measured data were reported.(Worst data is Z axis of position)</p> <p>*CL = Cable Loss(In case of below 1 000 MHz)</p> <p>*Result Value = Reading + Ant Factor + Cable loss</p> <p>*The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection at frequency below 1 GHz.</p>							

10.4-2 radiated Graph(30 MHz ~ 1 GHz)

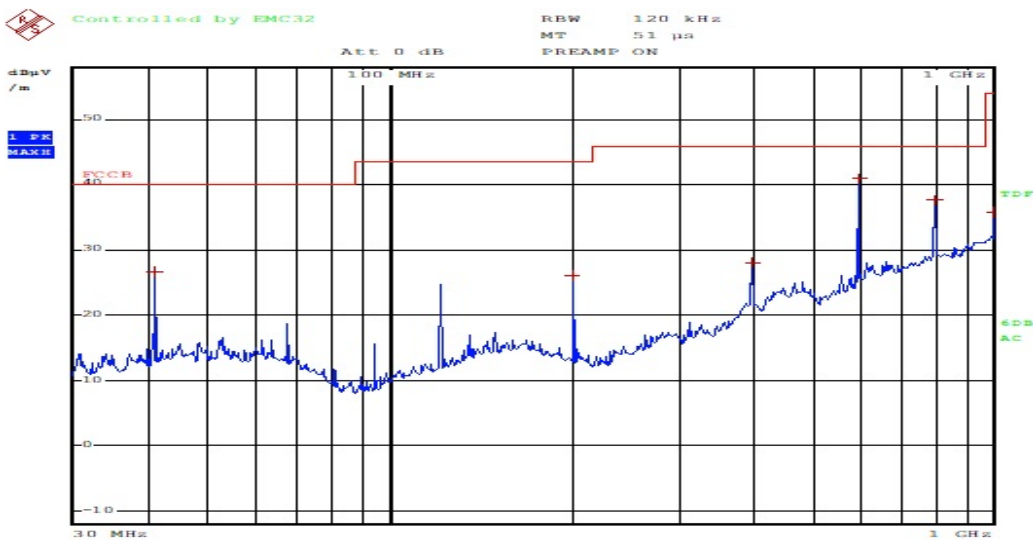
*802.11b Mode

Polarity:Horizontal



ESTR-20-00077_11b_HOR

Polarity:Vertical



ESTR-20-00077_BLE_VER

10.4-3 Test Data

Test Date : 17-Mar-20

Measurement Distance : 3 m

Frequency (MHz)	Reading (dB μ V)	Position (V/H)	Height (m)	Correction Factor		Duty Cycle Correction(dB)	Result Value		
				Ant Factor (dB)	Cable (dB)		Limit (dB μ V/m)	Result (dB μ V/m)	Margin (dB)
PEAK(RBW: 1 MHz VBW: 3 MHz)									
2390.00	50.55	H	1.5	27.98	-30.90	/	74.00	47.63	26.37
2390.00	45.42	V	1.6	27.98	-30.90	/	74.00	42.50	31.50
4824.00	46.25	H	1.5	31.58	-27.50	/	74.00	50.32	23.68
4824.00	46.22	V	1.6	31.58	-27.50	/	74.00	50.29	23.71
AV(RBW: 1 MHz VBW: 3 MHz)									
2390.00	34.42	H	1.5	27.98	-30.90	0.52	54.00	32.02	21.98
2390.00	34.60	V	1.6	27.98	-30.90	0.52	54.00	32.20	21.80
4824.00	33.52	H	1.5	31.58	-27.50	0.52	54.00	38.11	15.89
4824.00	33.41	V	1.6	31.58	-27.50	0.52	54.00	38.00	16.00
Remark	<p>H : Horizontal, V : Vertical TEST MODE : 802.11 b - CH 1(2 412 MHz)</p> <p>*The TX signal wasn't detected from 3th harmonics.</p> <p>*Checked in all 3 axis and the maximum measured data were reported.(Worst data is Z axis of position)</p> <p>*Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Duty Cycle Correction</p> <p>*This test was radiated up to 26.5 GHz but no noise was measured.</p>								

10.4-4 Test Data

Test Date : 17-Mar-20

Measurement Distance : 3 m

Frequency (MHz)	Reading (dB μ W)	Position (V/H)	Height (m)	Correction Factor		Duty Cycle Correction(dB)	Result Value		
				Ant Factor (dB)	Cable (dB)		Limit (dB μ W/m)	Result (dB μ W/m)	Margin (dB)
PEAK(RBW: 100 kHz VBW: 300 kHz)									
4874.00	47.15	H	1.6	31.53	-27.43	/	74.00	51.25	22.75
4874.00	47.05	V	1.5	31.53	-27.43		74.00	51.15	22.85
AV(RBW: 1 MHz VBW: 3 MHz)									
4874.00	34.12	H	1.6	31.53	-27.43	0.52	54.00	38.74	15.26
4874.00	33.58	V	1.5	31.53	-27.43	0.52	54.00	38.20	15.80
Remark	H : Horizontal, V : Vertical TEST MODE : 802.11 b - CH 6(2 437 MHz) *The TX signal wasn't detected from 3th harmonics. *Checked in all 3 axis and the maximum measured data were reported.(Worst data is Z axis of position) *Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Duty Cycle Correction *This test was radiated up to 26.5 GHz but no noise was measured.								

10.4-5 Test Data

Test Date : 17-Mar-20

Measurement Distance : 3 m

Frequency (MHz)	Reading (dB μ V)	Position (V/H)	Height (m)	Correction Factor		Duty Cycle Correction(dB)	Result Value		
				Ant Factor (dB)	Cable (dB)		Limit (dB μ V/m)	Result (dB μ V/m)	Margin (dB)
PEAK(RBW: 100 kHz VBW: 300 kHz)									
2483.50	47.50	H	1.6	27.50	-30.92	/	74.00	44.08	29.92
2483.50	45.87	V	1.5	27.50	-30.92	/	74.00	42.45	31.55
4924.00	46.59	H	1.6	31.55	-27.35	/	74.00	50.79	23.21
4924.00	46.37	V	1.5	31.55	-27.35	/	74.00	50.57	23.43
AV(RBW: 1 MHz VBW: 3 MHz)									
2483.50	34.74	H	1.6	27.50	-30.92	0.52	54.00	31.84	22.16
2483.50	34.42	V	1.5	27.50	-30.92	0.52	54.00	31.52	22.48
4924.00	33.67	H	1.6	31.55	-27.35	0.52	54.00	38.39	15.61
4924.00	33.78	V	1.5	31.55	-27.35	0.52	54.00	38.50	15.50
Remark	<p>H : Horizontal, V : Vertical TEST MODE : 802.11 b - CH 11(2 462 MHz)</p> <p>*The TX signal wasn't detected from 3th harmonics. *Checked in all 3 axis and the maximum measured data were reported.(Worst data is Z axis of position) *Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Duty Cycle Correction *This test was radiated up to 26.5 GHz but no noise was measured.</p>								

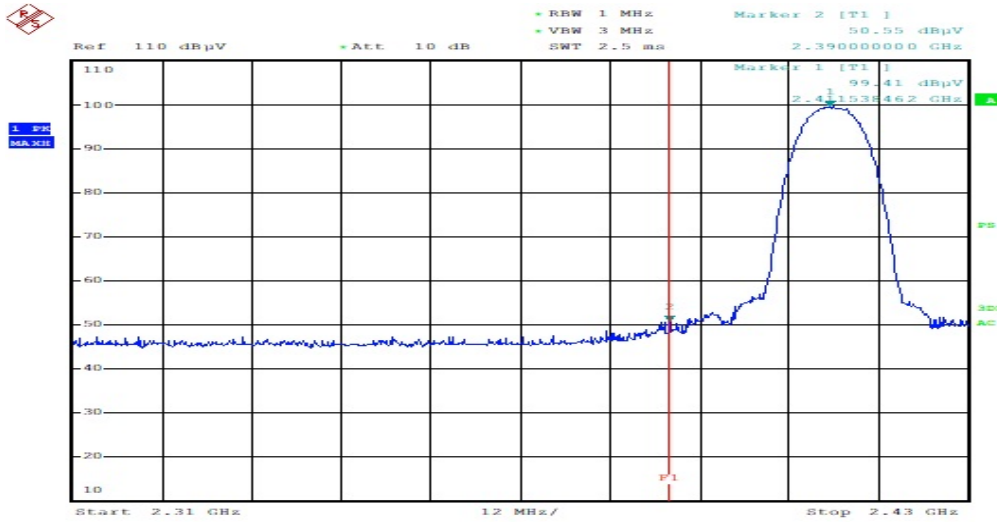
10.4-6 Restricted Band Edges

*802.11b Mode

Band Edges(CH Low)

Detector mode:Peak

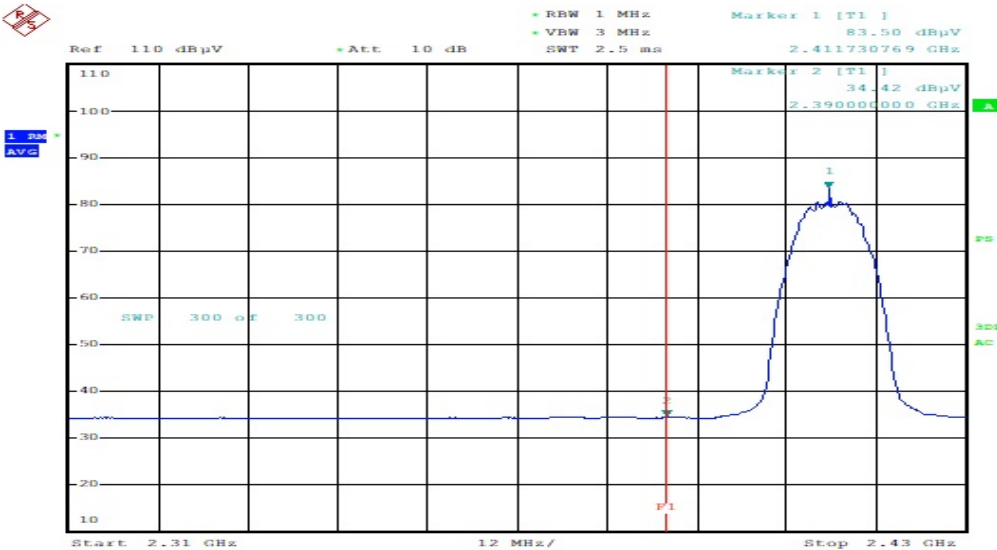
Polarity:Horizontal



RP70A BIO_11b_CH1_PEAK_HOR

Detector mode:Average

Polarity:Horizontal

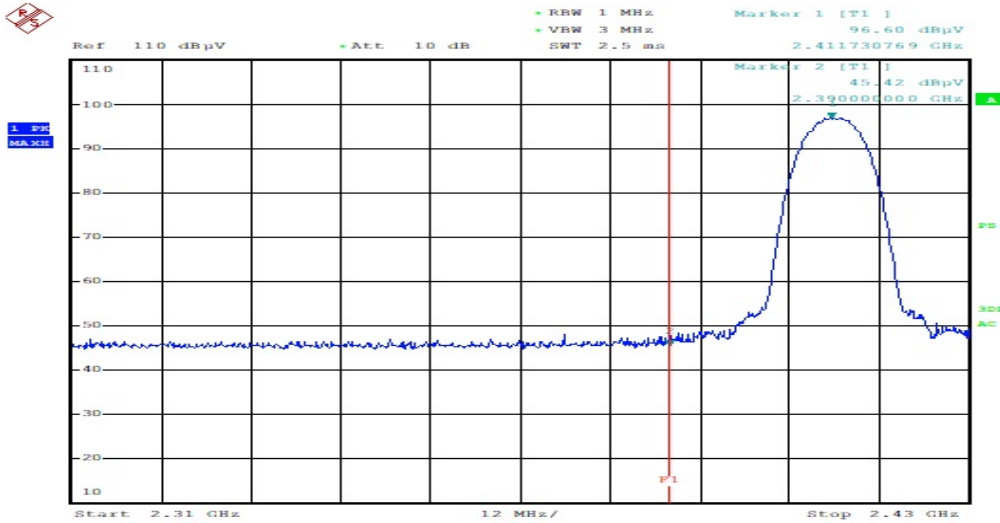


RP70A BIO_11b_CH1_AV_HOR

Band Edges(CH Low)

Detector mode:Peak

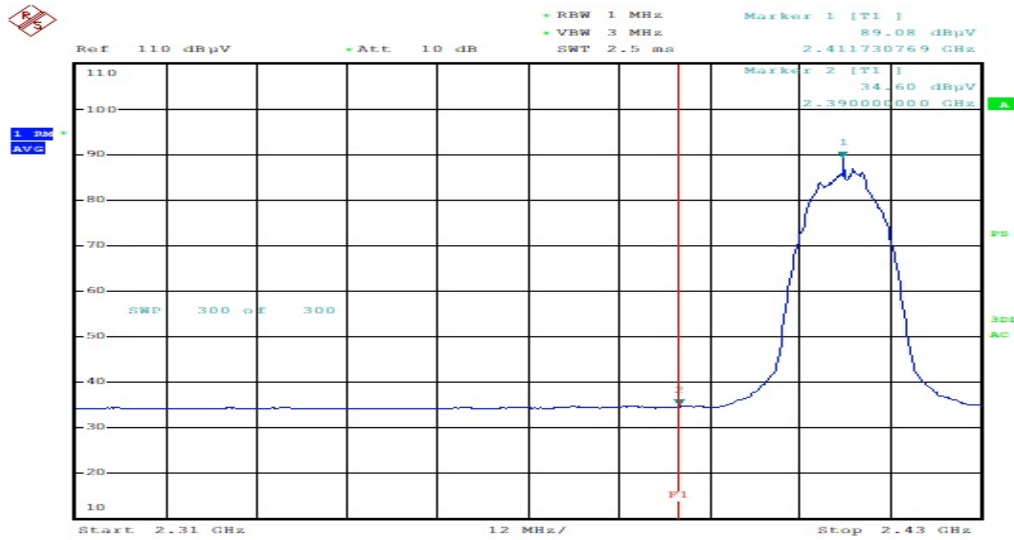
Polarity:Vertical



RF70A BIO_11b_CH1_PEAK_VER

Detector mode:Average

Polarity:Vertical

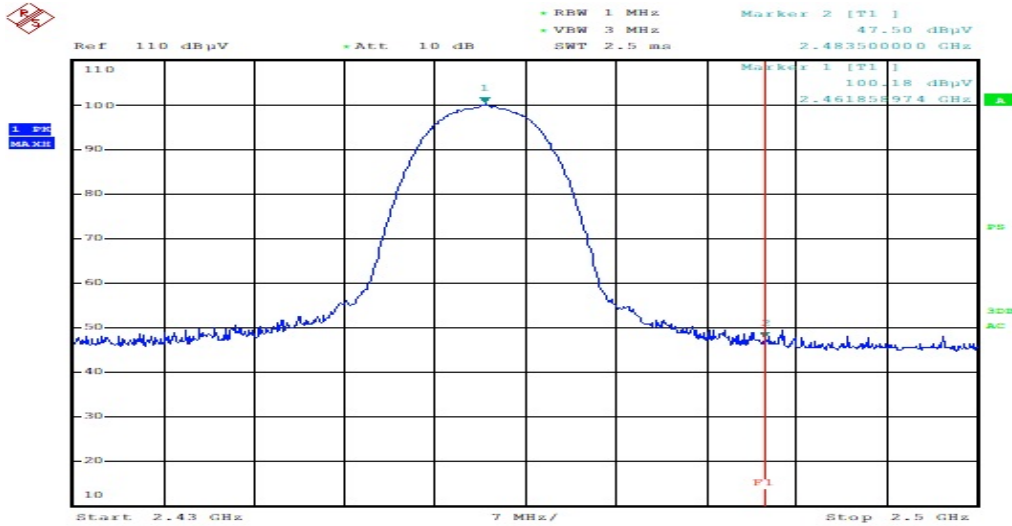


RF70A BIO_11b_CH1_AV_VER

Band Edges(CH High)

Detector mode:Peak

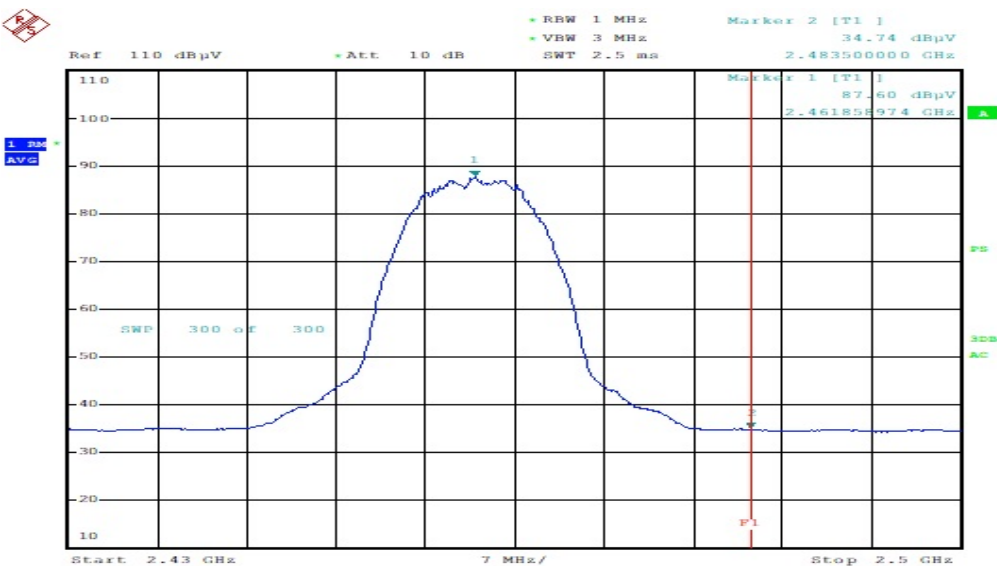
Polarity:Horizontal



RF70A BIO_11b_CH11_PEAK_HOR

Detector mode:Average

Polarity:Horizontal

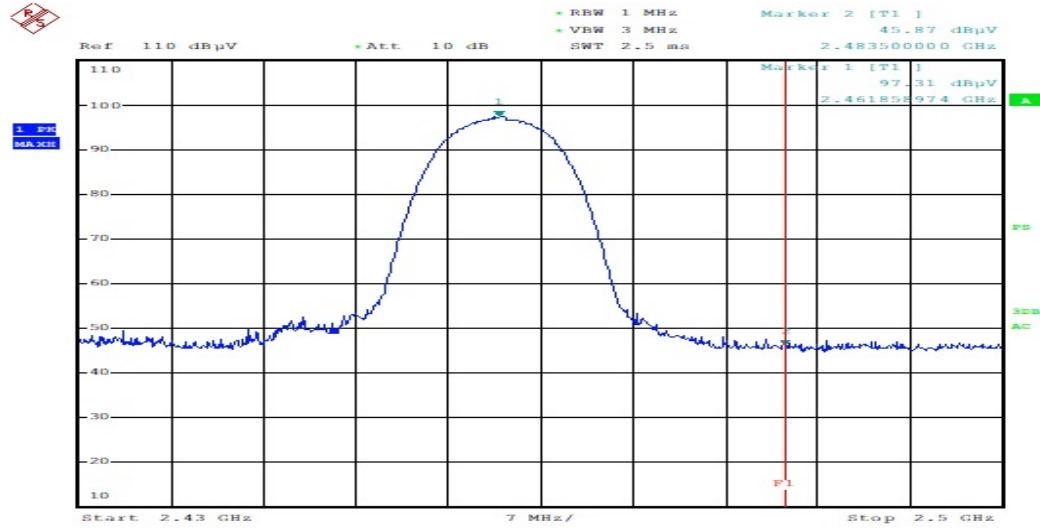


RF70A BIO_11b_CH11_AV_HOR

Band Edges(CH High)

Detector mode:Peak

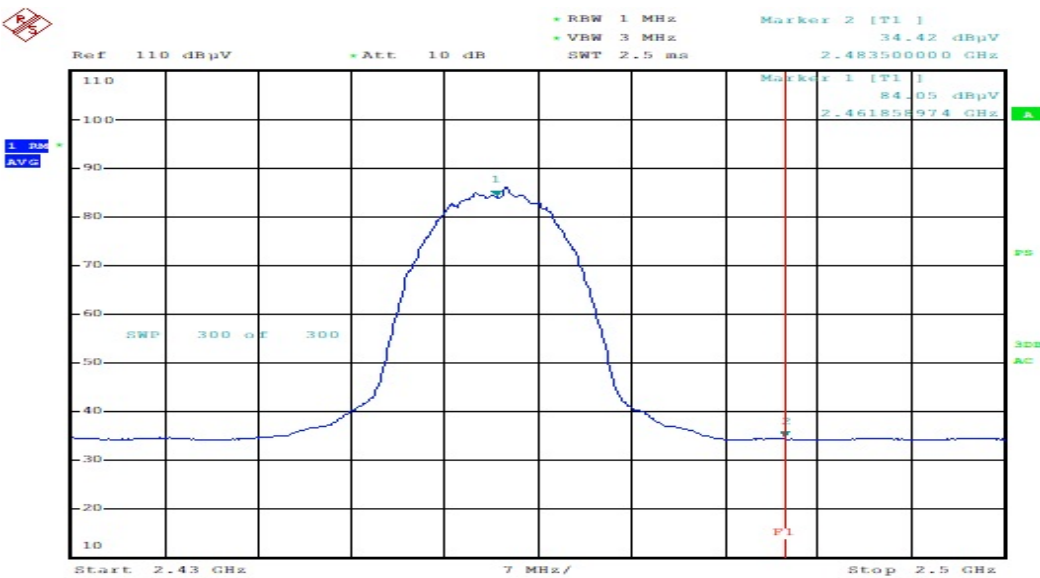
Polarity:Vertical



RP70A BIO_11b_CH11_PEAK_VER

Detector mode:Average

Polarity:Vertical



RP70A BIO_11b_CH11_AV_VER



10.4-7 Restricted Band Edges

*802.11b Mode CH1

Polarity:Horizontal

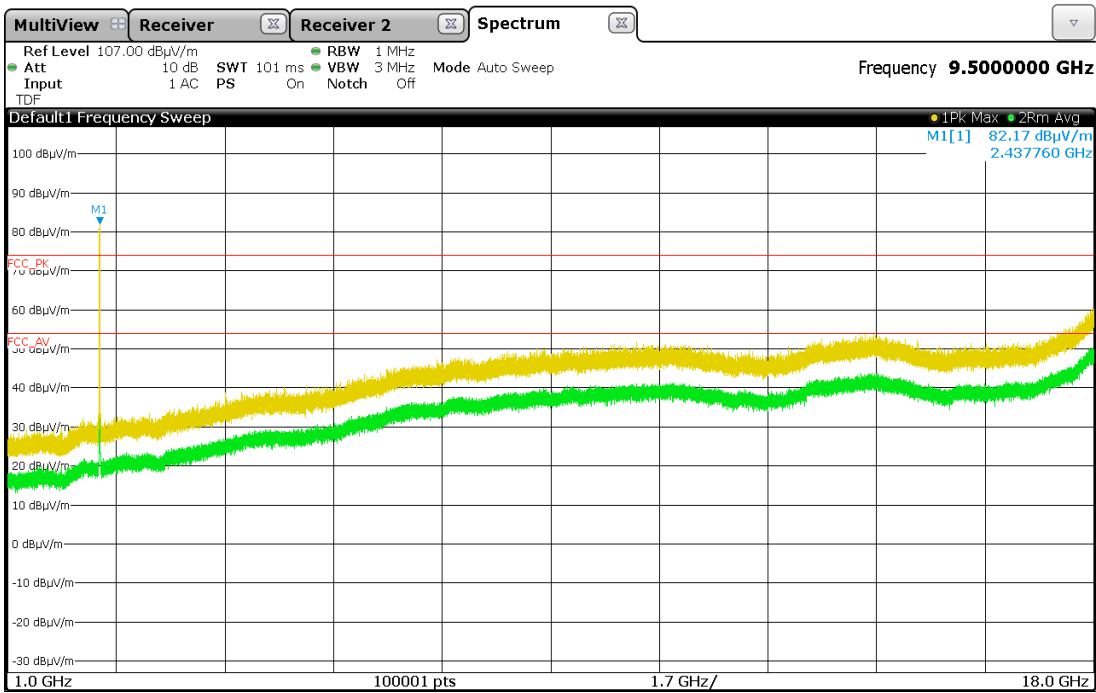


Polarity:Vertical



*802.11b Mode CH6

Polarity:Horizontal



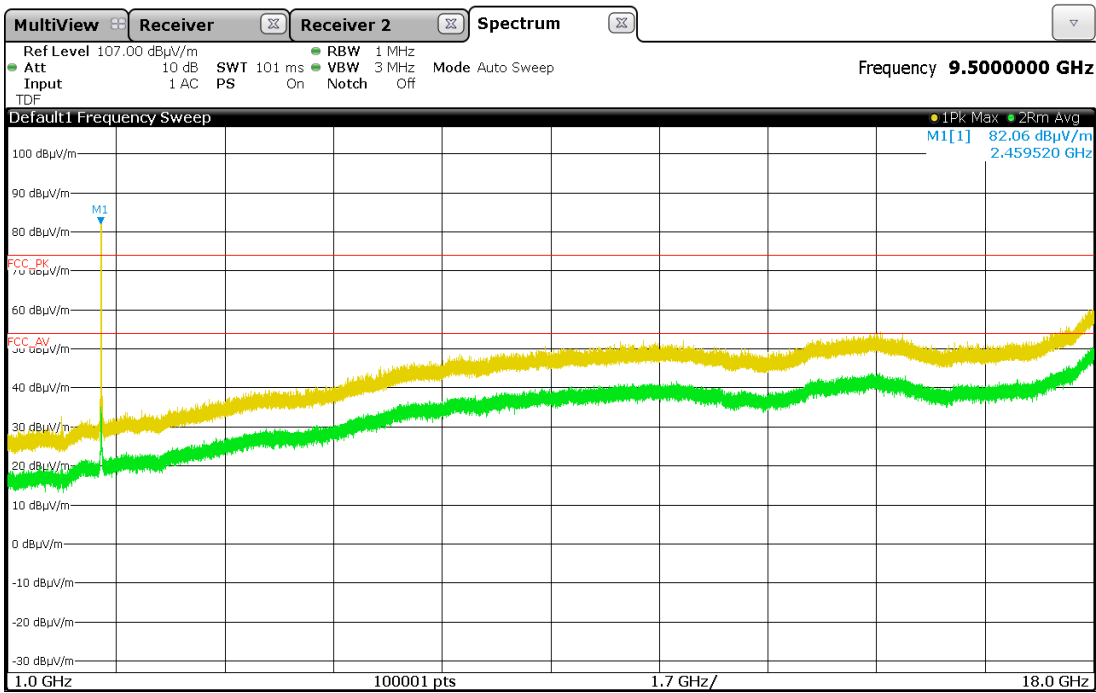
Polarity:Vertical





*802.11b Mode CH11

Polarity:Horizontal



Polarity:Vertical



10.4-8 Test Data (802.11 g)

Test Date : 16-Mar-20

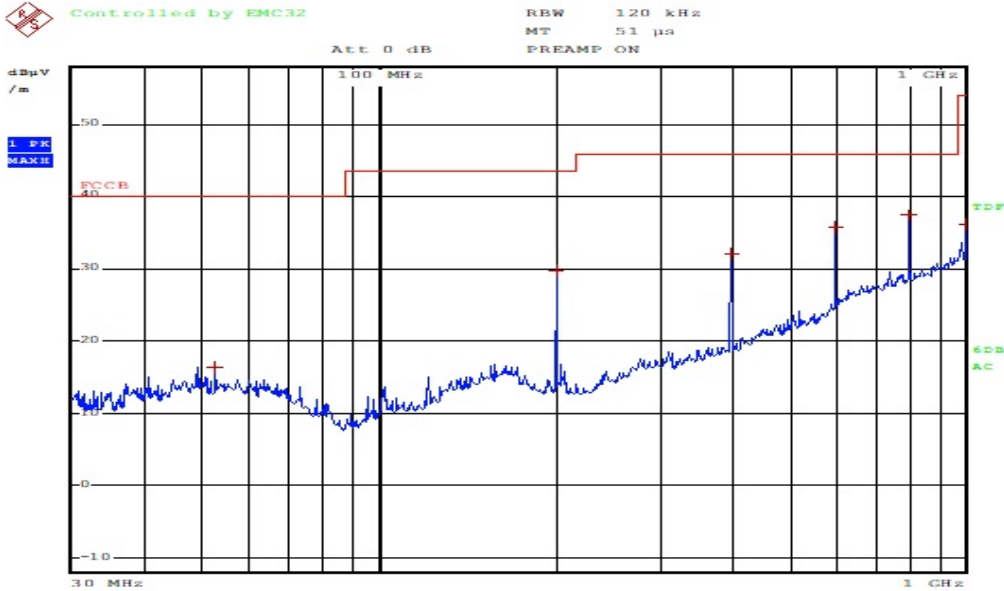
Measurement Distance : 3 m

Frequency (MHz)	Reading (dB μ V)	Position (V/H)	Height (m)	Correction Factor		Result Value		
				Ant Factor (dB)	Cable (dB)	Limit (dB μ V/m)	Result (dB μ V/m)	Margin (dB)
40.70	13.09	V	1.0	12.91	1.51	40.00	27.51	12.49
200.00	17.70	H	1.5	9.90	2.21	43.50	29.81	13.69
400.00	13.62	H	1.4	15.40	3.21	46.00	32.23	13.77
600.00	16.83	V	1.0	19.50	3.96	46.00	40.29	5.71
800.00	12.58	V	1.6	22.40	4.64	46.00	39.62	6.38
1000.00	9.74	V	1.7	24.29	5.22	54.00	39.25	14.75
Remark	<p>H : Horizontal, V : Vertical</p> <p>*Checked in all 3 axis and the maximum measured data were reported.(Worst data is Z axis of position)</p> <p>*CL = Cable Loss(In case of below 1 000 MHz)</p> <p>*Result Value = Reading + Ant Factor + Cable loss</p> <p>*The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection at frequency below 1 GHz.</p>							

10.4-9 radiated Graph(30 MHz ~ 1 GHz)

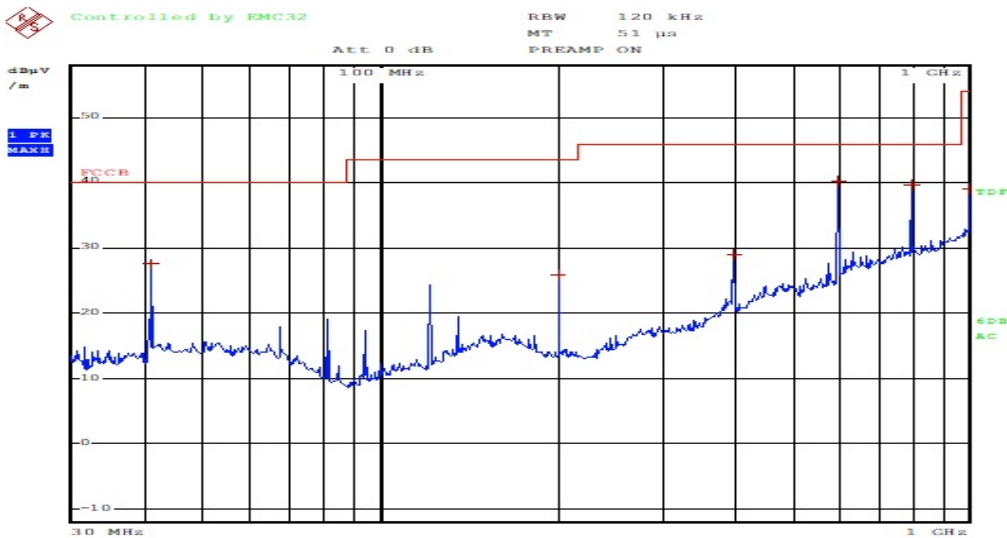
*802.11g Mode

Polarity:Horizontal



ESTR-20-00077_11g_HOR

Polarity:Vertical



ESTR-20-00077_11g_VER

10.4-10 Test Data

Test Date : 18-Mar-20

Measurement Distance : 3 m

Frequency (MHz)	Reading (dB μ V)	Position (V/H)	Height (m)	Correction Factor		Duty Cycle Correction(dB)	Result Value		
				Ant Factor (dB)	Cable (dB)		Limit (dB μ V/m)	Result (dB μ V/m)	Margin (dB)
PEAK(RBW: 100 kHz VBW: 300 kHz)									
2388.00	50.79	H	1.6	27.98	-30.90		74.00	47.87	26.13
2388.00	50.97	V	1.6	27.98	-30.90		74.00	48.05	25.95
2390.00	48.87	H	1.6	27.98	-30.90		74.00	45.95	28.05
2390.00	48.50	V	1.6	27.98	-30.90		74.00	45.58	28.42
4824.00	46.27	H	1.6	31.58	-27.50		74.00	50.34	23.66
4824.00	46.37	V	1.6	31.58	-27.50		74.00	50.44	23.56
AV(RBW: 1 MHz VBW: 3 MHz)									
2390.00	35.94	H	1.6	27.98	-30.90	2.08	54.00	35.10	18.90
2390.00	35.59	V	1.6	27.98	-30.90	2.08	54.00	34.75	19.25
4824.00	33.94	H	1.6	31.58	-27.50	2.08	54.00	40.09	13.91
4824.00	34.12	V	1.6	31.58	-27.50	2.08	54.00	40.27	13.73
Remark	<p>H : Horizontal, V : Vertical TEST MODE : 802.11 g - CH 1(2 412 MHz)</p> <p>*The TX signal wasn't detected from 3th harmonics. *Checked in all 3 axis and the maximum measured data were reported.(Worst data is Z axis of position) *Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Duty Cycle Correction *This test was radiated up to 26.5 GHz but no noise was measured.</p>								

10.4-11 Test Data

Test Date : 18-Mar-20

Measurement Distance : 3 m

Frequency (MHz)	Reading (dB μ W)	Position (V/H)	Height (m)	Correction Factor		Duty Cycle Correction(dB)	Result Value		
				Ant Factor (dB)	Cable (dB)		Limit (dB μ W/m)	Result (dB μ W/m)	Margin (dB)
PEAK(RBW: 100 kHz VBW: 300 kHz)									
4874.00	46.37	H	1.5	31.53	-27.43	/	74.00	50.47	23.53
4874.00	46.32	V	1.5	31.53	-27.43		74.00	50.42	23.58
AV(RBW: 1 MHz VBW: 3 MHz)									
4874.00	33.85	H	1.5	31.53	-27.43	2.08	54.00	40.02	13.98
4874.00	33.74	V	1.5	31.53	-27.43	2.08	54.00	39.91	14.09
Remark	<p>H : Horizontal, V : Vertical TEST MODE : 802.11 g - CH 6(2 437 MHz)</p> <p>*The TX signal wasn't detected from 3th harmonics.</p> <p>*Checked in all 3 axis and the maximum measured data were reported.(Worst data is Z axis of position)</p> <p>*Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Duty Cycle Correction</p> <p>*This test was radiated up to 26.5 GHz but no noise was measured.</p>								

10.4-12 Test Data

Test Date : 18-Mar-20

Measurement Distance : 3 m

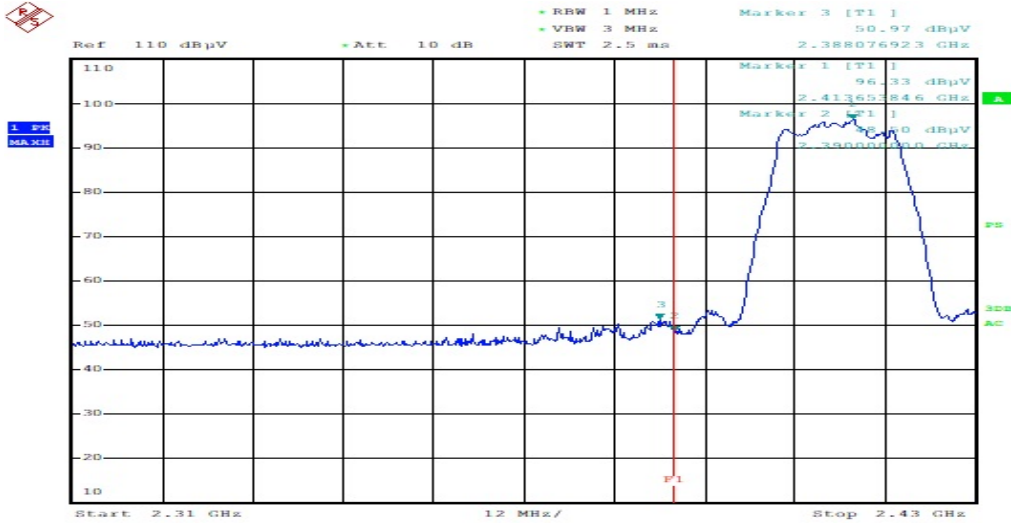
Frequency (MHz)	Reading (dB μ W)	Position (V/H)	Height (m)	Correction Factor		Duty Cycle Correction(dB)	Result Value		
				Ant Factor (dB)	Cable (dB)		Limit (dB μ W/m)	Result (dB μ W/m)	Margin (dB)
PEAK(RBW: 100 kHz VBW: 300 kHz)									
2486.00	51.46	H	1.6	27.50	-30.92		74.00	48.04	25.96
2486.00	49.78	V	1.5	27.50	-30.92		74.00	46.36	27.64
2483.50	49.56	H	1.6	27.50	-30.92		74.00	46.14	27.86
2483.50	47.36	V	1.5	27.50	-30.92		74.00	43.94	30.06
4924.00	47.52	H	1.6	31.55	-27.35		74.00	51.72	22.28
4924.00	46.89	V	1.5	31.55	-27.35		74.00	51.09	22.91
AV(RBW: 1 MHz VBW: 3 MHz)									
2483.50	36.26	H	1.6	27.50	-30.92	2.08	54.00	34.92	19.08
2483.50	35.13	V	1.5	27.50	-30.92	2.08	54.00	33.79	20.21
4924.00	33.69	H	1.6	31.55	-27.35	2.08	54.00	39.97	14.03
4924.00	33.52	V	1.5	31.55	-27.35	2.08	54.00	39.80	14.20
Remark	<p>H : Horizontal, V : Vertical TEST MODE : 802.11g - CH 11(2 462 MHz)</p> <p>*The TX signal wasn't detected from 3th harmonics.</p> <p>*Checked in all 3 axis and the maximum measured data were reported.(Worst data is Z axis of position)</p> <p>*Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Duty Cycle Correction</p> <p>*This test was radiated up to 26.5 GHz but no noise was measured.</p>								

10.4-13 Restricted Band Edges *802.11g Mode

Band Edges(CH Low)

Detector mode:Peak

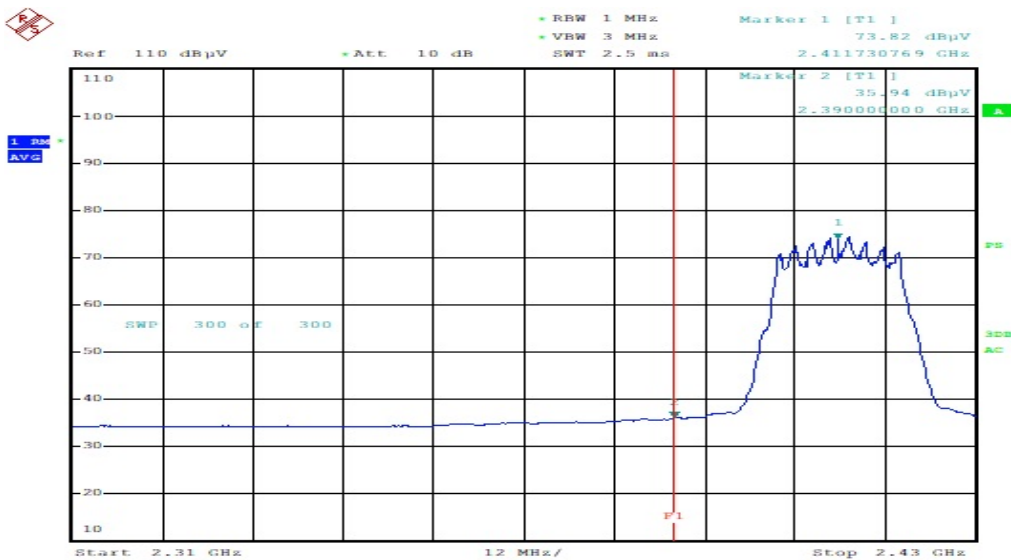
Polarity:Horizontal



RF70A BIO_11g_CH1_PEAK_VER

Detector mode:Average

Polarity:Horizontal

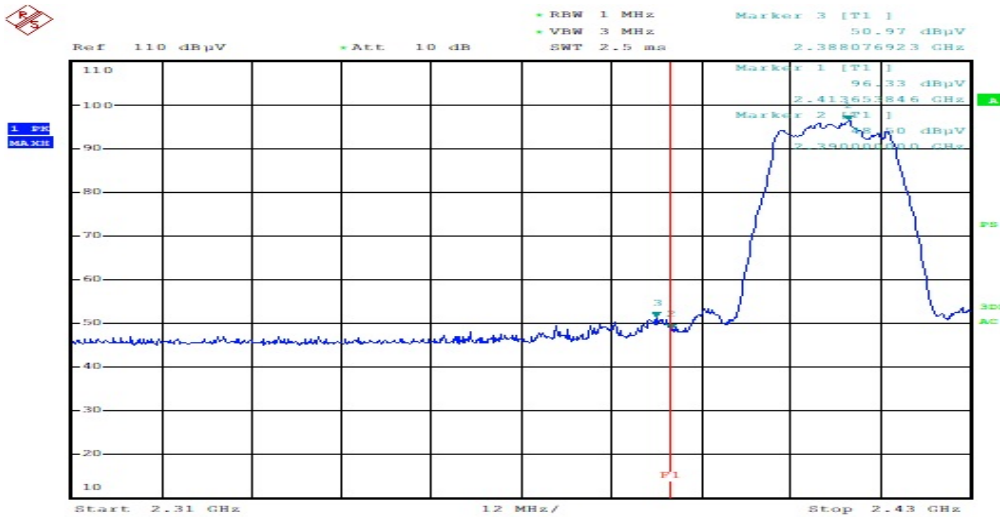


RF70A BIO_11g_CH1_AV_HOR

Band Edges(CH Low)

Detector mode:Peak

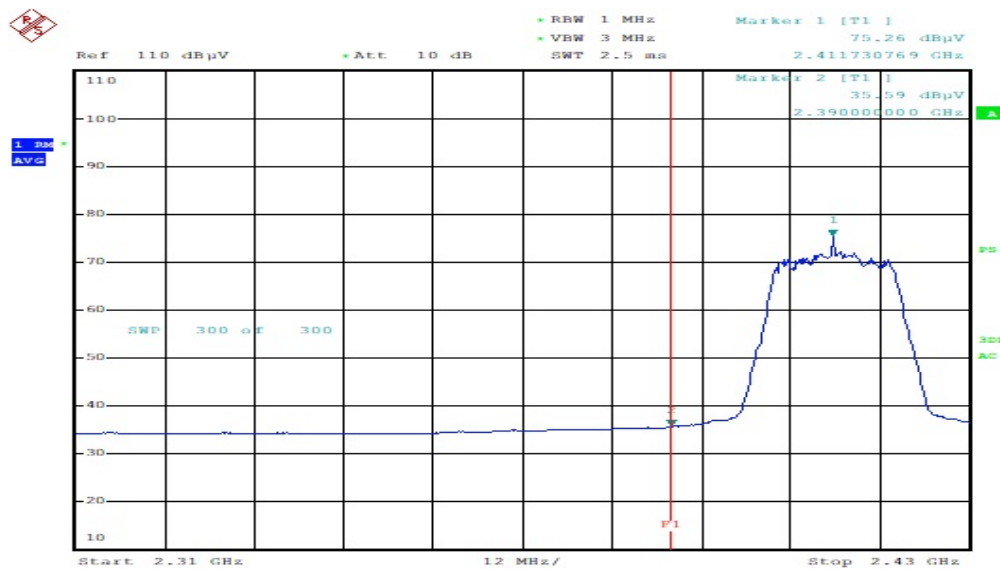
Polarity:Vertical



RP70A BIO_11g_CH1_PEAK_VER

Detector mode:Average

Polarity:Vertical

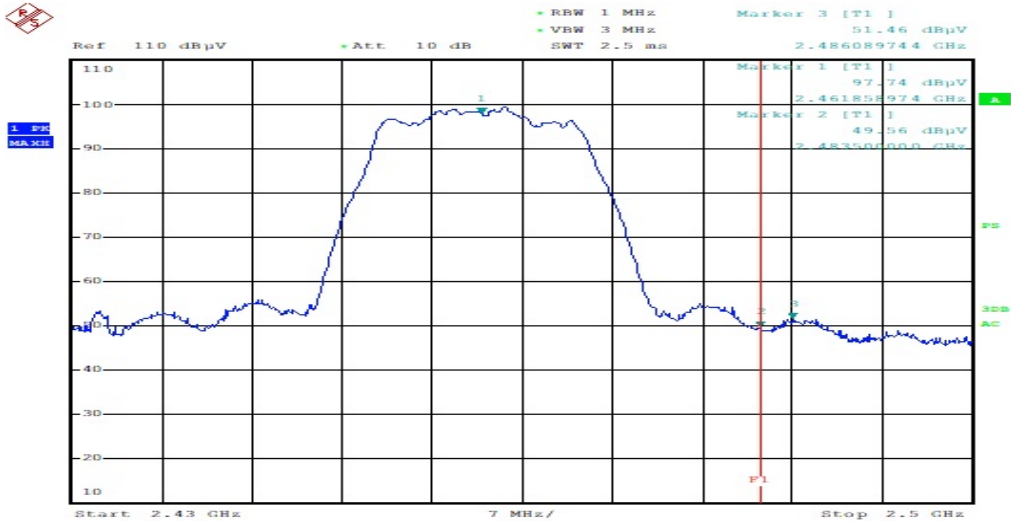


RP70A BIO_11g_CH1_AV_VER

Band Edges(CH High)

Detector mode:Peak

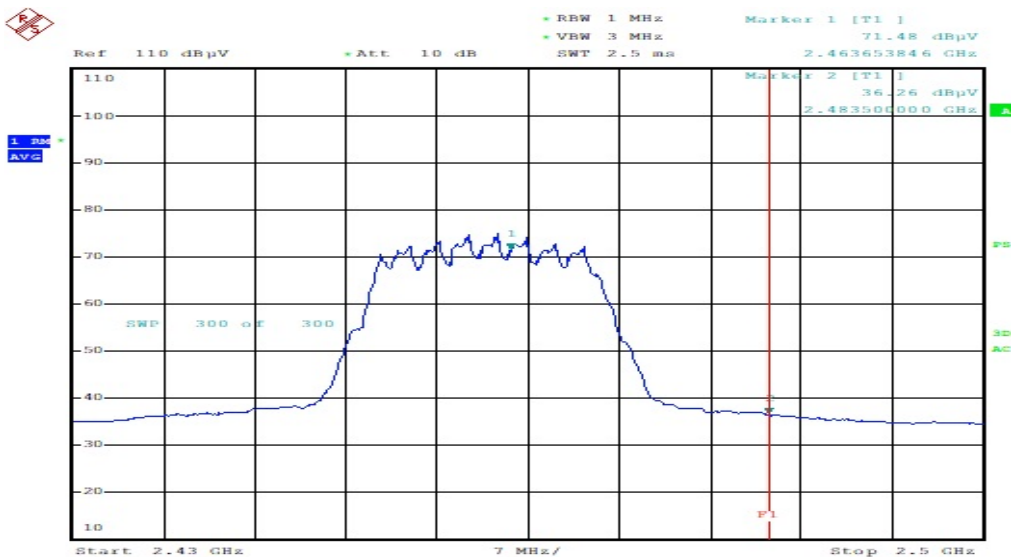
Polarity:Horizontal



RP70A BIO_11g_CH11_PEAK_HOR

Detector mode:Average

Polarity:Horizontal

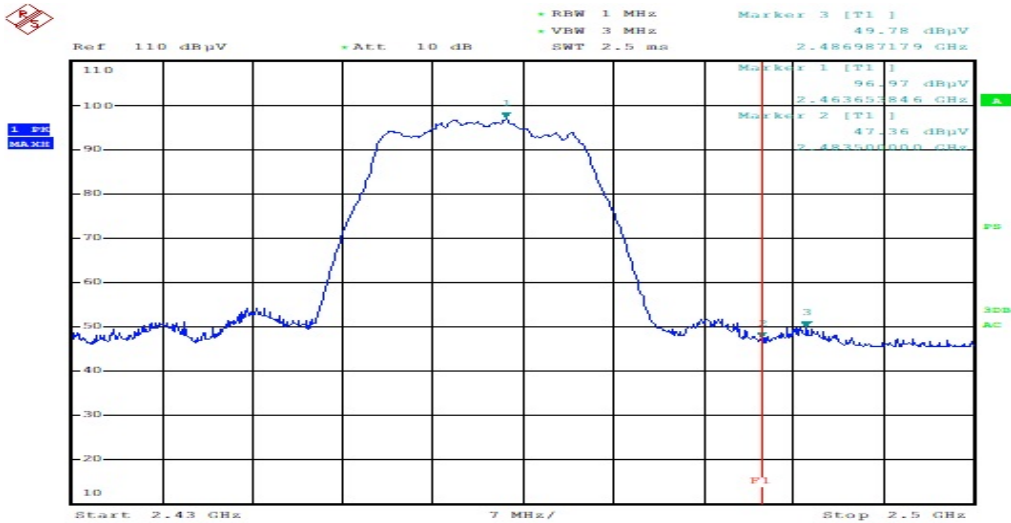


RP70A BIO_11g_CH11_AV_HOR

Band Edges(CH High)

Detector mode:Peak

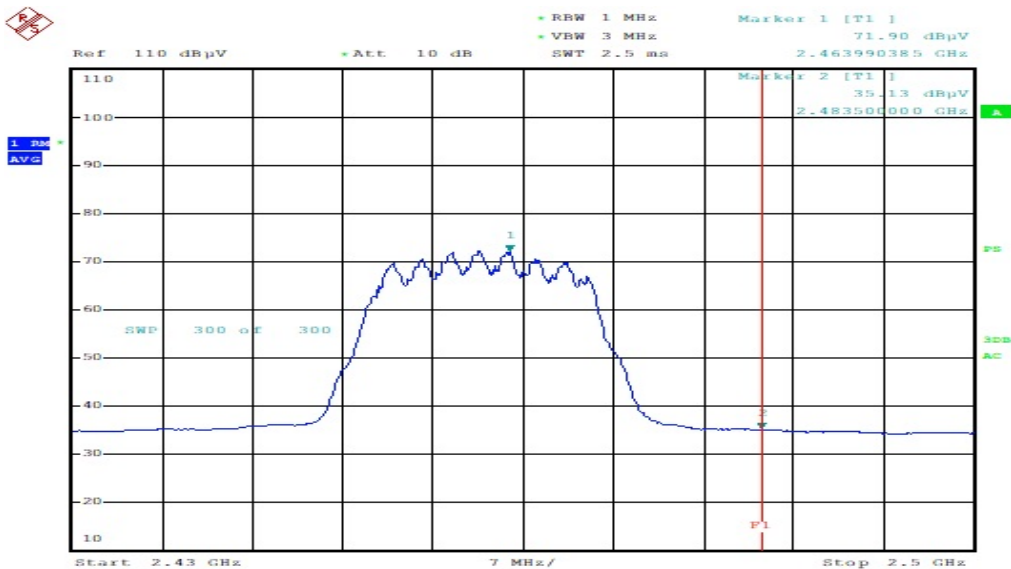
Polarity:Vertical



RP70A BIO_11g_CH11_PEAK_VER

Detector mode:Average

Polarity:Vertical



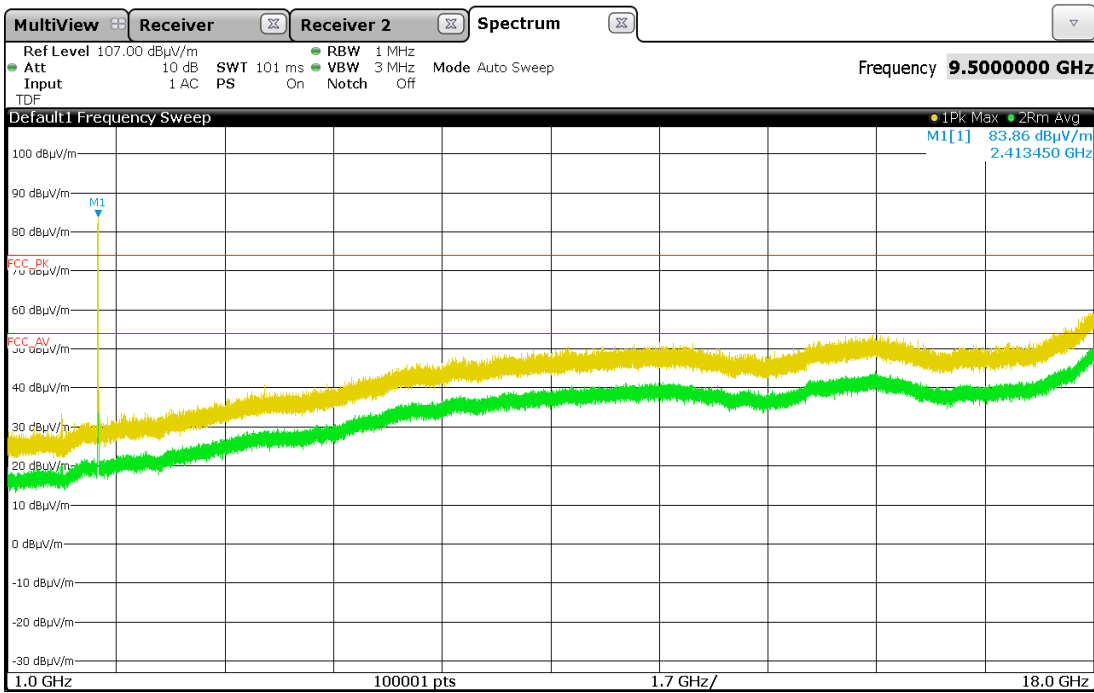
RP70A BIO_11g_CH11_AV_VER



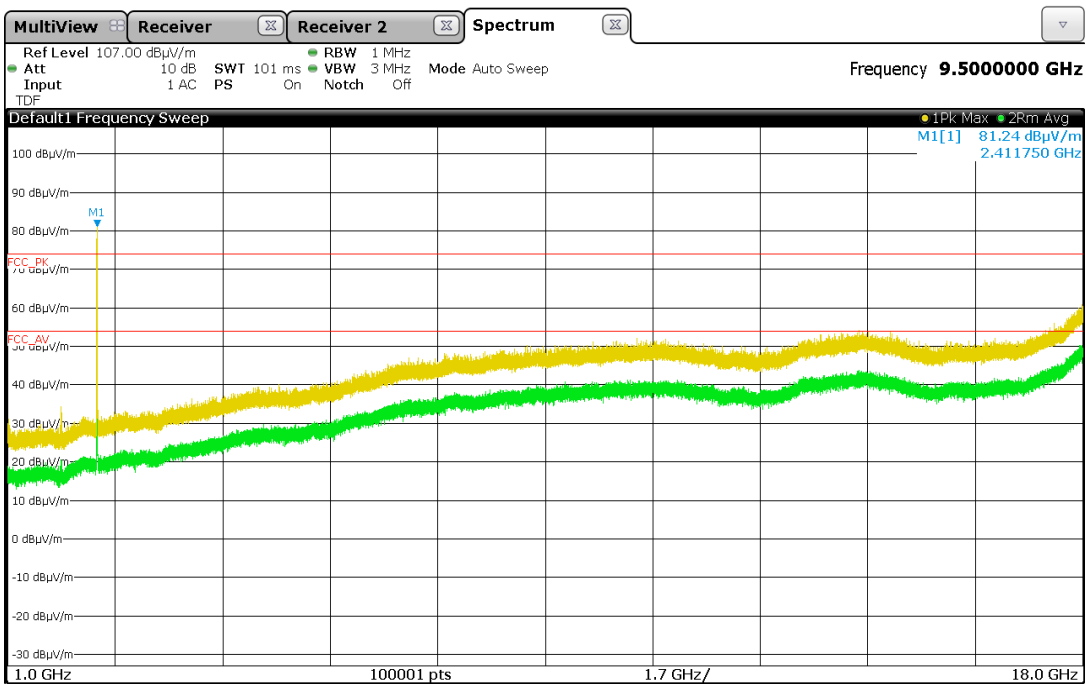
10.4-14 Restricted Band Edges

*802.11g Mode CH1

Polarity:Horizontal

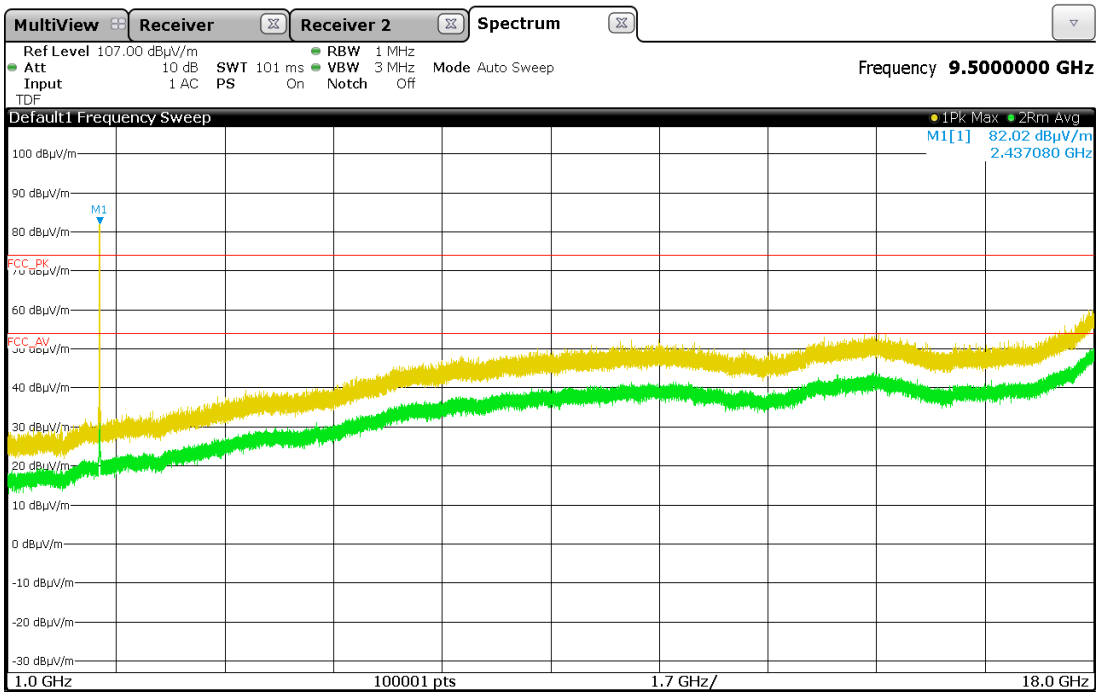


Polarity:Vertical

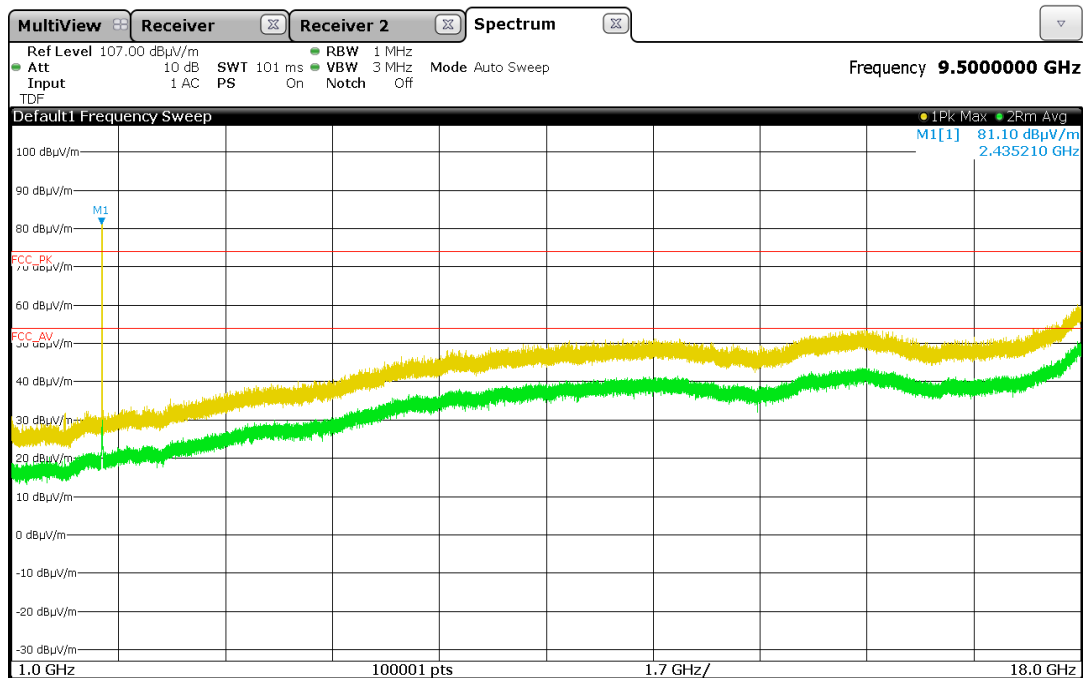


*802.11g Mode CH6

Polarity:Horizontal

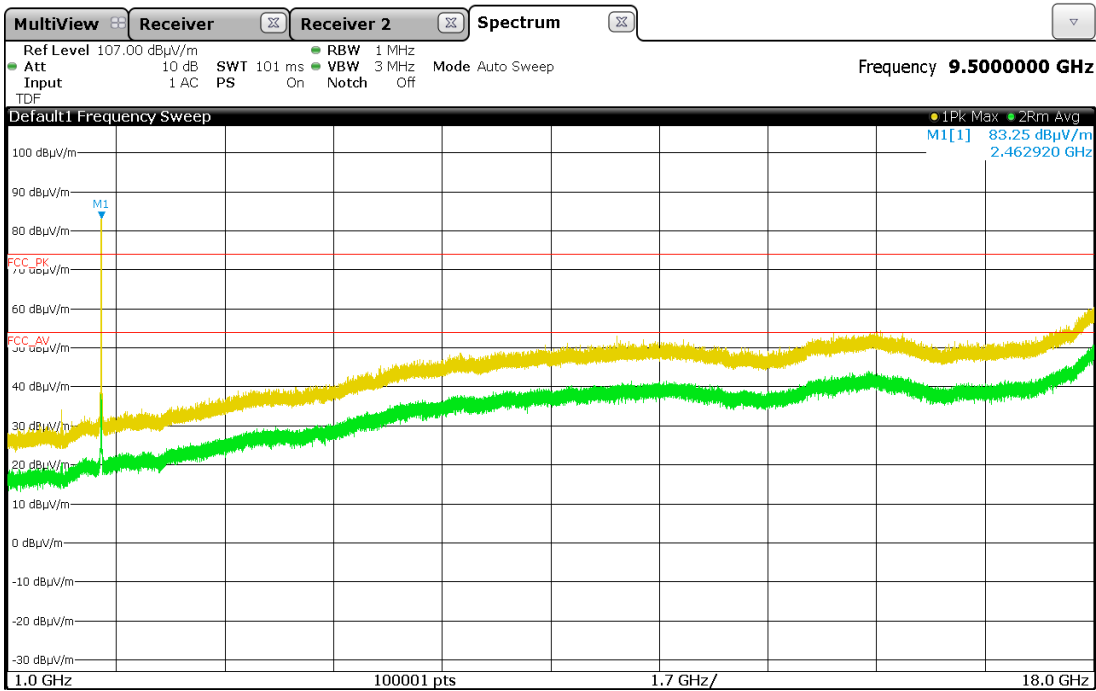


Polarity:Vertical



*802.11g Mode CH11

Polarity:Horizontal



Polarity:Vertical



10.4-15 Test Data (802.11 n)

Test Date : 16-Mar-20

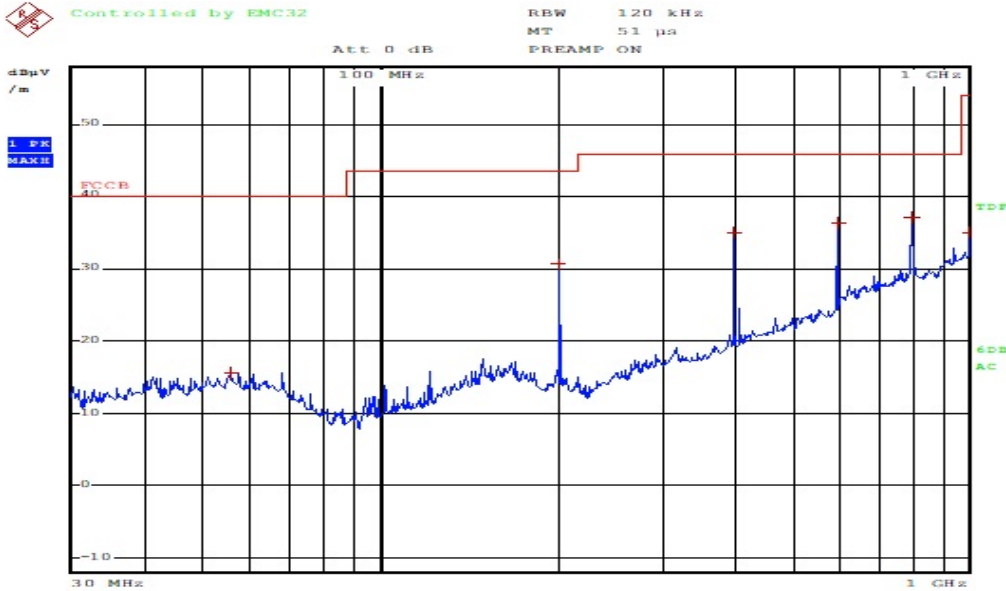
Measurement Distance : 3 m

Frequency (MHz)	Reading (dBμV)	Position (V/H)	Height (m)	Correction Factor		Result Value		
				Ant Factor (dB)	Cable (dB)	Limit (dBμV/m)	Result (dBμV/m)	Margin (dB)
40.70	13.41	V	1.0	12.91	1.51	40.00	27.83	12.17
200.00	18.68	H	1.5	9.90	2.21	43.50	30.79	12.71
400.00	16.59	H	1.4	15.40	3.21	46.00	35.20	10.80
600.00	18.03	V	1.0	19.50	3.96	46.00	41.49	4.51
800.00	13.05	V	1.6	22.40	4.64	46.00	40.09	5.91
1000.00	9.60	V	1.7	24.29	5.22	54.00	39.11	14.89
Remark	<p>H : Horizontal, V : Vertical</p> <p>*Checked in all 3 axis and the maximum measured data were reported.(Worst data is Z axis of position)</p> <p>*CL = Cable Loss(In case of below 1 000 MHz)</p> <p>*Result Value = Reading + Ant Factor + Cable loss</p> <p>*The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection at frequency below 1 GHz.</p>							

10.4-9 radiated Graph(30 MHz ~ 1 GHz)

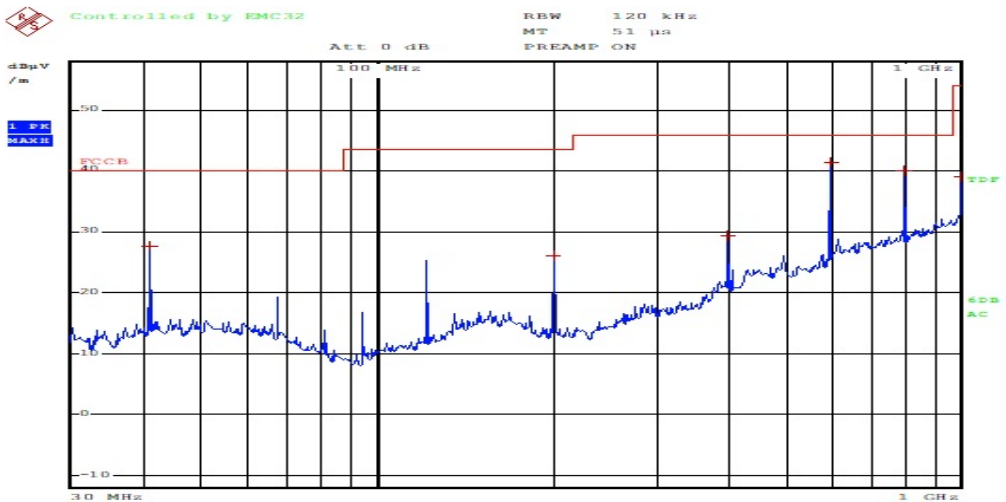
*802.11n Mode

Polarity:Horizontal



ESTR-20-00077_11n20_HOR

Polarity:Vertical



ESTR-20-00077_11n20_VER

10.4-17 Test Data

Test Date : 19-Mar-20

Measurement Distance : 3 m

Frequency (MHz)	Reading (dB μ V)	Position (V/H)	Height (m)	Correction Factor		Duty Cycle Correction(dB)	Result Value		
				Ant Factor (dB)	Cable (dB)		Limit (dB μ V/m)	Result (dB μ V/m)	Margin (dB)
PEAK(RBW: 100 kHz VBW: 300 kHz)									
2387.80	51.18	H	1.5	27.98	-30.90		74.00	48.26	25.74
2387.80	50.36	V	1.6	27.98	-30.90		74.00	47.44	26.56
2390.00	49.99	H	1.5	27.98	-30.90		74.00	47.07	26.93
2390.00	49.34	V	1.6	27.98	-22.91		74.00	54.41	19.59
4824.00	46.34	H	1.5	31.58	-27.50		74.00	50.41	23.59
4824.00	46.18	V	1.6	31.58	-27.50		74.00	50.25	23.75
AV(RBW: 1 MHz VBW: 3 MHz)									
2390.00	34.91	H	1.5	27.98	-30.90	2.08	54.00	34.07	19.93
2390.00	35.30	V	1.6	27.98	-30.90	2.08	54.00	34.46	19.54
4824.00	33.58	H	1.5	31.58	-27.50	2.08	54.00	39.73	14.27
4824.00	33.67	V	1.6	31.58	-27.50	2.08	54.00	39.82	14.18
Remark	<p>H : Horizontal, V : Vertical TEST MODE : 802.11 g - CH 1(2 412 MHz)</p> <p>*The TX signal wasn't detected from 3th harmonics.</p> <p>*Checked in all 3 axis and the maximum measured data were reported.(Worst data is Z axis of position)</p> <p>*Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Duty Cycle Correction</p> <p>*This test was radiated up to 26.5 GHz but no noise was measured.</p>								

10.4-18 Test Data

Test Date : 19-Mar-20

Measurement Distance : 3 m

Frequency (MHz)	Reading (dB μ W)	Position (V/H)	Height (m)	Correction Factor		Duty Cycle Correction(dB)	Result Value		
				Ant Factor (dB)	Cable (dB)		Limit (dB μ W/m)	Result (dB μ W/m)	Margin (dB)
PEAK(RBW: 100 kHz VBW: 300 kHz)									
4874.00	46.71	H	1.5	31.53	-27.43	/	74.00	50.81	23.19
4874.00	46.52	V	1.5	31.53	-27.43	/	74.00	50.62	23.38
AV(RBW: 1 MHz VBW: 3 MHz)									
4874.00	33.71	H	1.5	31.53	-27.43	2.08	54.00	39.88	14.12
4874.00	33.80	V	1.5	31.53	-27.43	2.08	54.00	39.97	14.03
Remark	<p>H : Horizontal, V : Vertical TEST MODE : 802.11 g - CH 6(2 437 MHz)</p> <p>*The TX signal wasn't detected from 3th harmonics.</p> <p>*Checked in all 3 axis and the maximum measured data were reported.(Worst data is Z axis of position)</p> <p>*Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Duty Cycle Correction</p> <p>*This test was radiated up to 26.5 GHz but no noise was measured.</p>								

10.4-19 Test Data

Test Date : 19-Mar-20

Measurement Distance : 3 m

Frequency (MHz)	Reading (dB μ W)	Position (V/H)	Height (m)	Correction Factor		Duty Cycle Correction(dB)	Result Value		
				Ant Factor (dB)	Cable (dB)		Limit (dB μ W/m)	Result (dB μ W/m)	Margin (dB)
PEAK(RBW: 100 kHz VBW: 300 kHz)									
2486.30	51.87	H	1.6	27.50	-30.92		74.00	48.45	25.55
2486.30	48.94	V	1.5	27.50	-30.92		74.00	45.52	28.48
2483.50	49.89	H	1.6	27.50	-30.92		74.00	46.47	27.53
2483.50	47.62	V	1.5	27.50	-30.92		74.00	44.20	29.80
4924.00	47.52	H	1.6	31.55	-27.35		74.00	51.72	22.28
4924.00	46.89	V	1.5	31.55	-27.35		74.00	51.09	22.91
AV(RBW: 1 MHz VBW: 3 MHz)									
2483.50	36.01	H	1.6	27.50	-30.92	2.08	54.00	34.67	19.33
2483.50	35.22	V	1.5	27.50	-30.92	2.08	54.00	33.88	20.12
4924.00	33.69	H	1.6	31.55	-27.35	2.08	54.00	39.97	14.03
4924.00	33.52	V	1.5	31.55	-27.35	2.08	54.00	39.80	14.20
Remark	<p>H : Horizontal, V : Vertical TEST MODE : 802.11g - CH 11(2 462 MHz)</p> <p>*The TX signal wasn't detected from 3th harmonics.</p> <p>*Checked in all 3 axis and the maximum measured data were reported.(Worst data is Z axis of position)</p> <p>*Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Duty Cycle Correction</p> <p>*This test was radiated up to 26.5 GHz but no noise was measured.</p>								



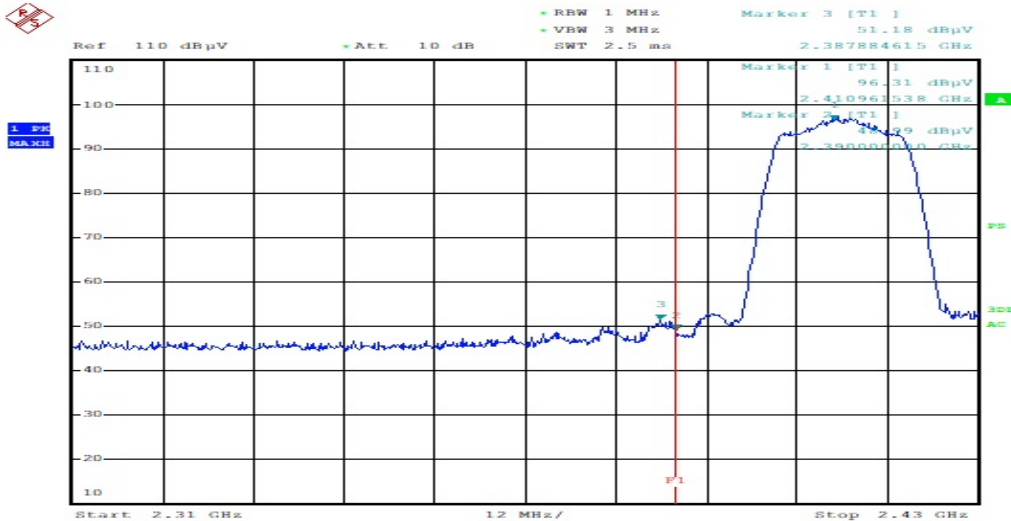
10.4–20 Restricted Band Edges

*802.11n Mode

Band Edges(CH Low)

Detector mode:Peak

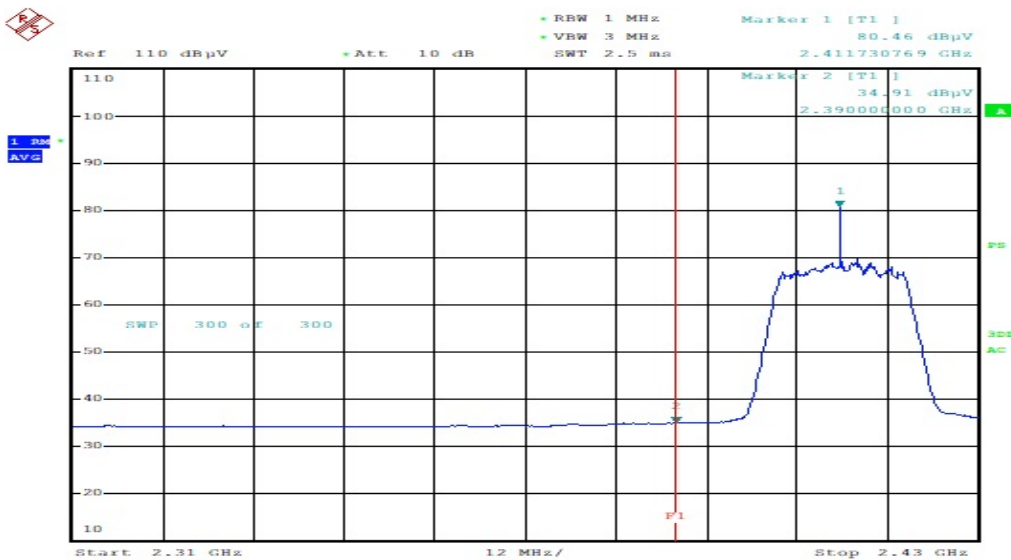
Polarity:Horizontal



RP70A BIO_11n20_CH1_PEAK_HOR

Detector mode:Average

Polarity:Horizontal

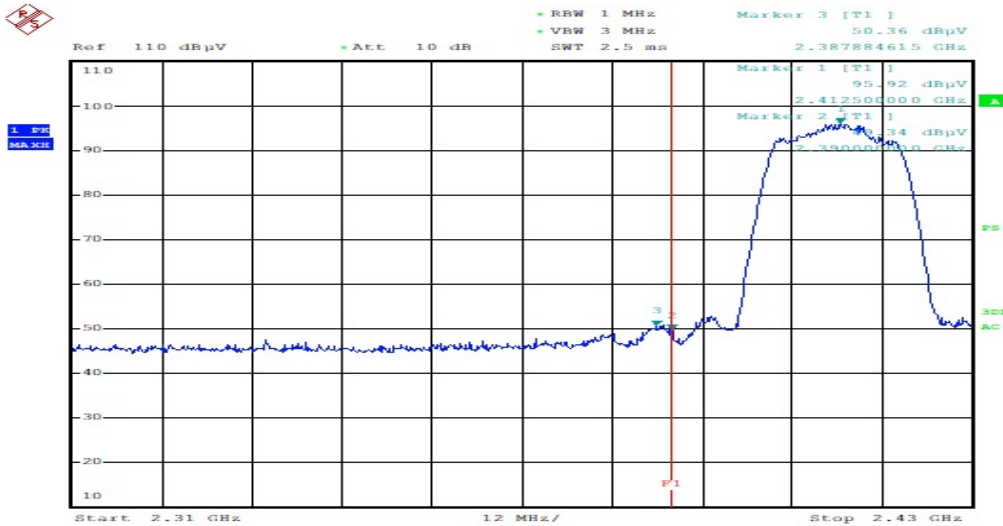


RP70A BIO_11n20_CH1_AV_HOR

Band Edges(CH Low)

Detector mode:Peak

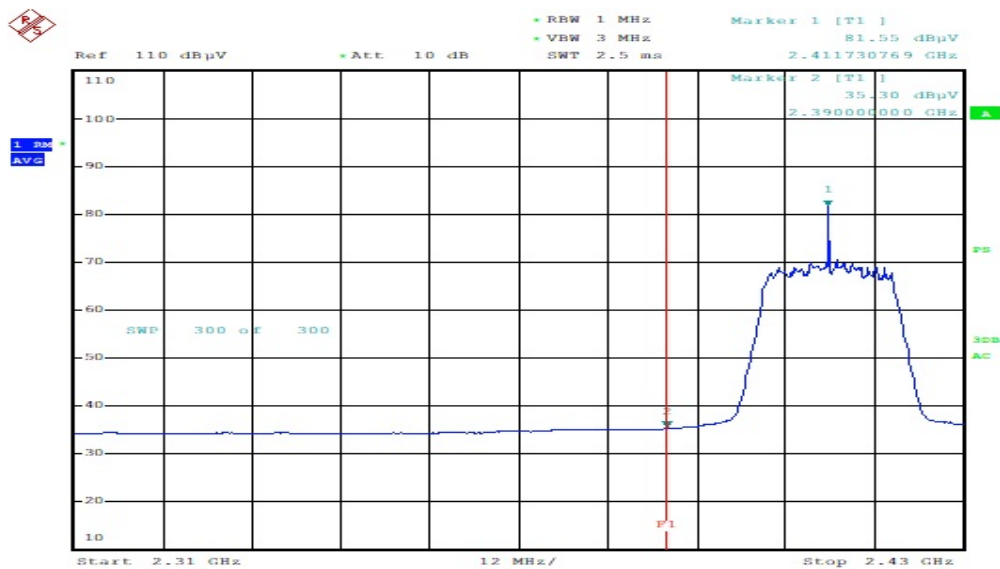
Polarity:Vertical



RP70A BIO_11n20_CH1_PEAK_VER

Detector mode:Average

Polarity:Vertical

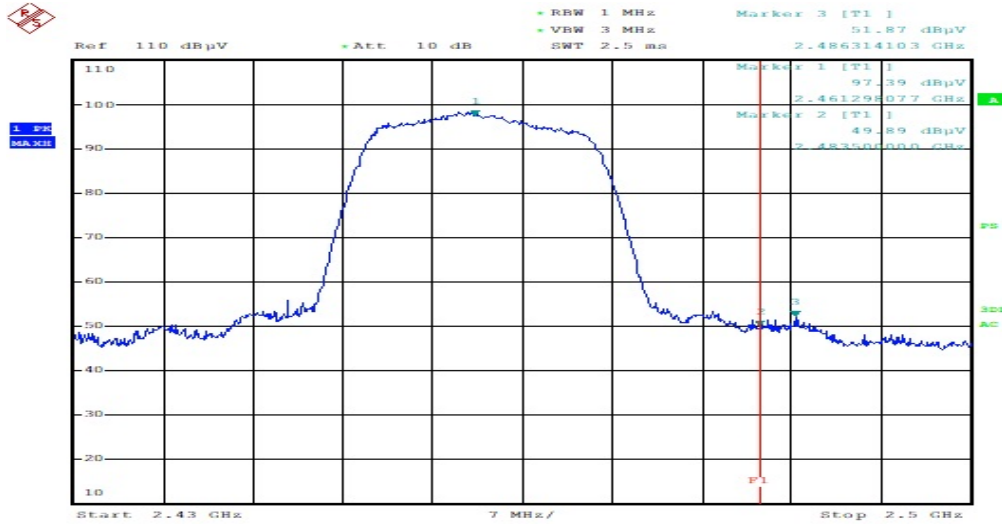


RP70A BIO_11n20_CH1_AV_VER

Band Edges(CH High)

Detector mode:Peak

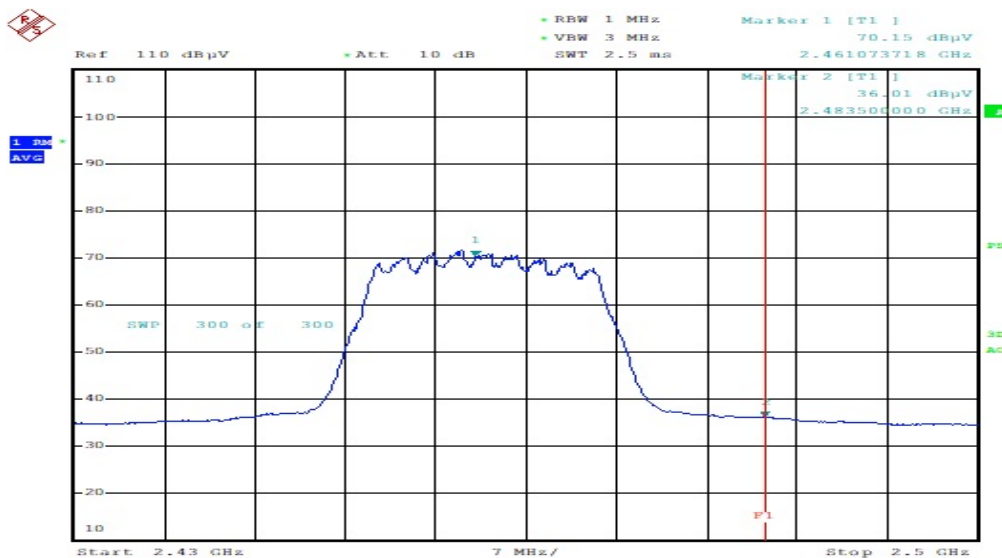
Polarity:Horizontal



RP70A BIO_11n20_CH11_PEAK_HOR

Detector mode:Average

Polarity:Horizontal

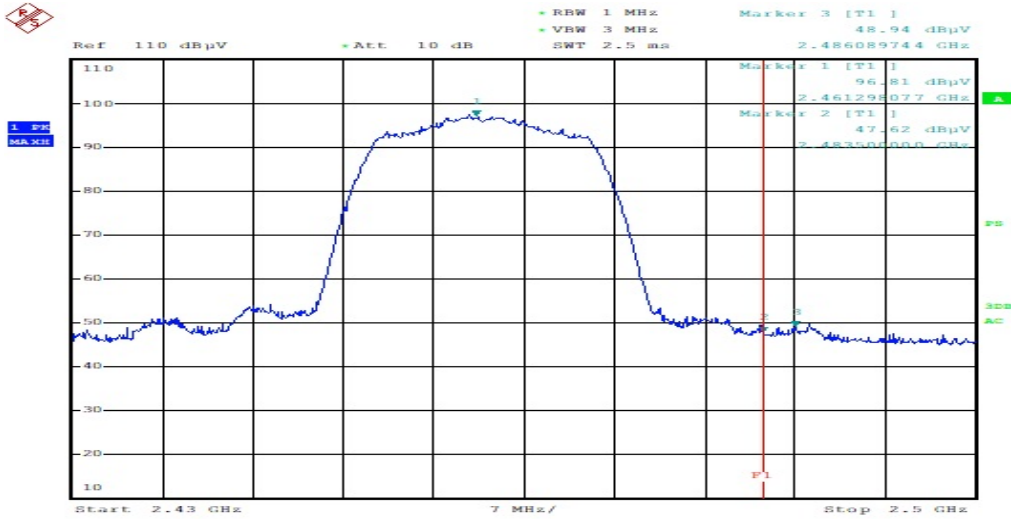


RP70A BIO_11n20_CH11_AV_HOR

Band Edges(CH High)

Detector mode:Peak

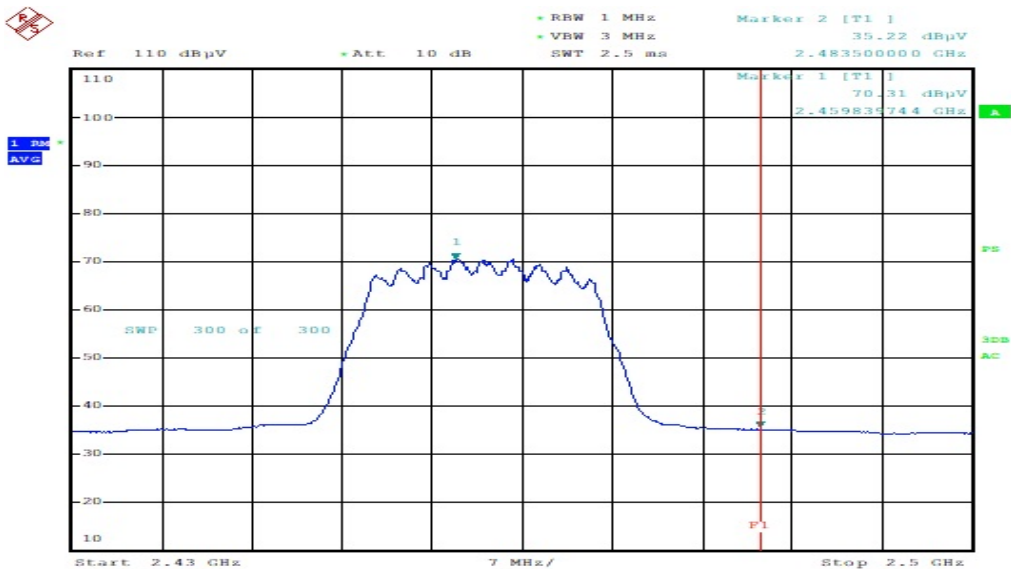
Polarity:Vertical



RP70A BIO_11n20_CH11_PEAK_VER

Detector mode:Average

Polarity:Vertical



RP70A BIO_11n20_CH11_AV_VER



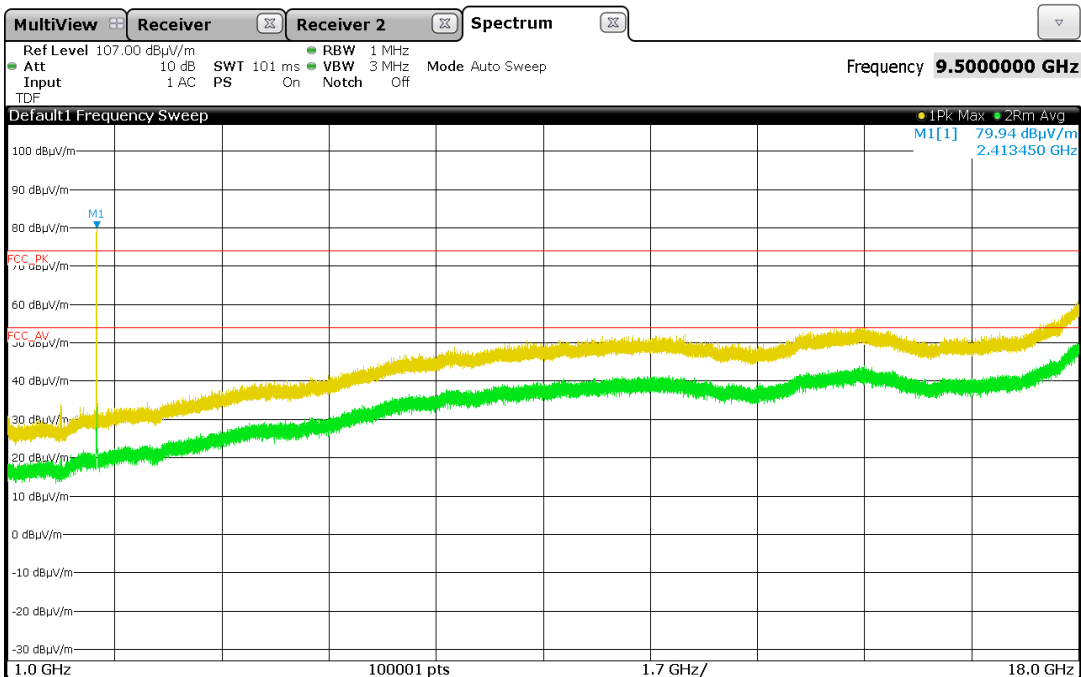
10.4-21 Restricted Band Edges

*802.11n Mode CH1

Polarity:Horizontal

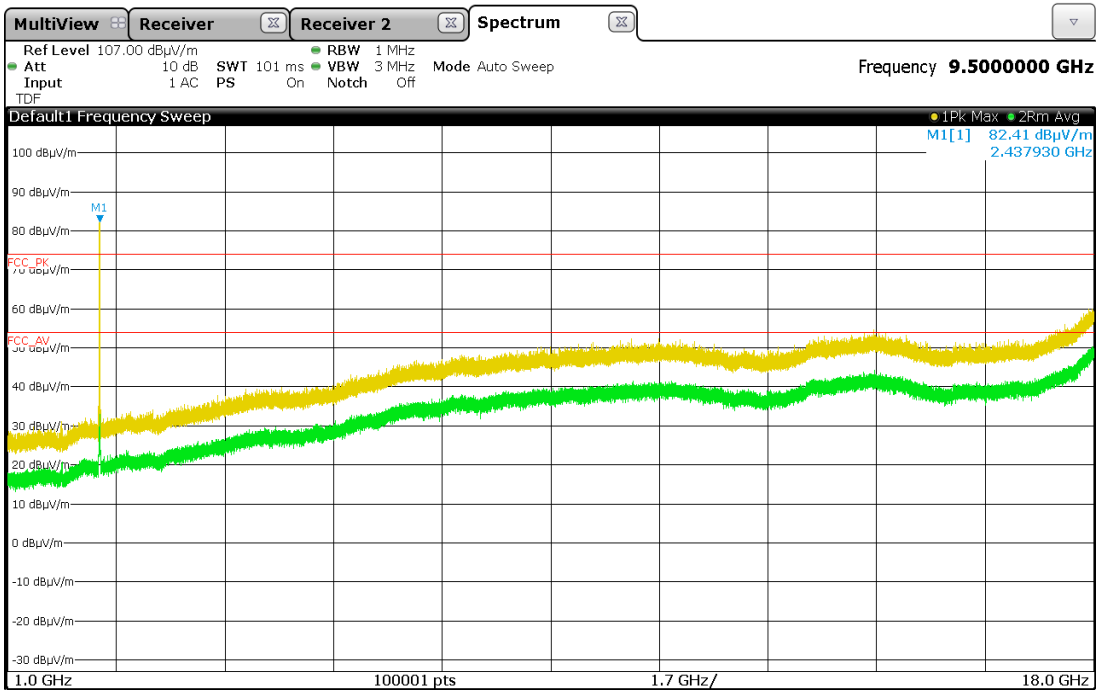


Polarity:Vertical

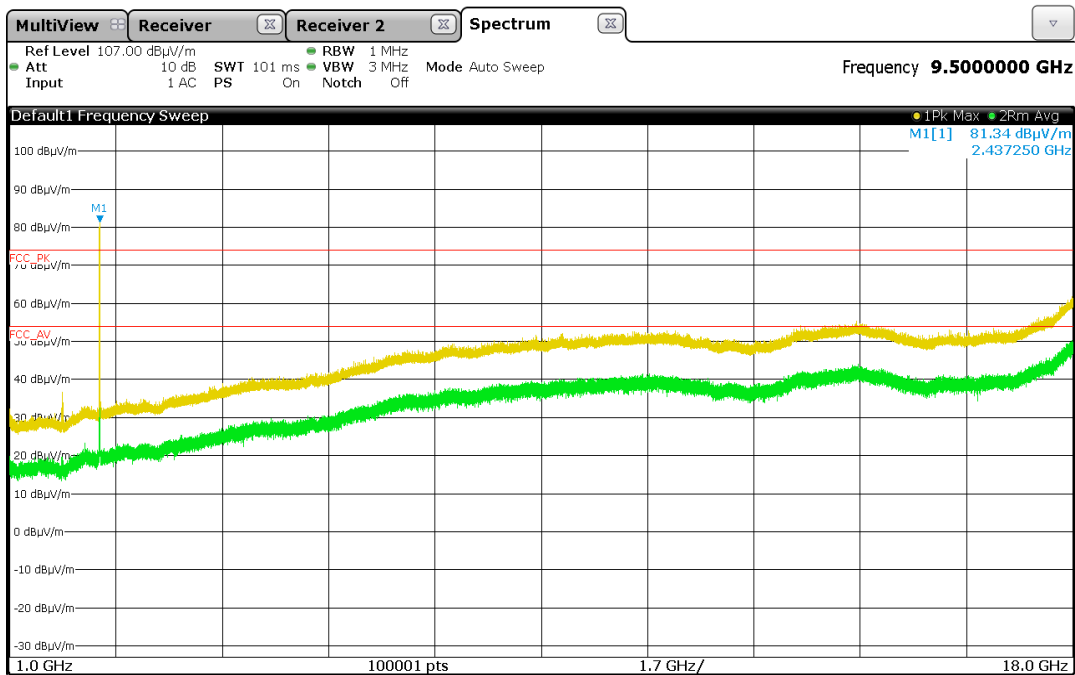


*802.11n Mode CH6

Polarity:Horizontal

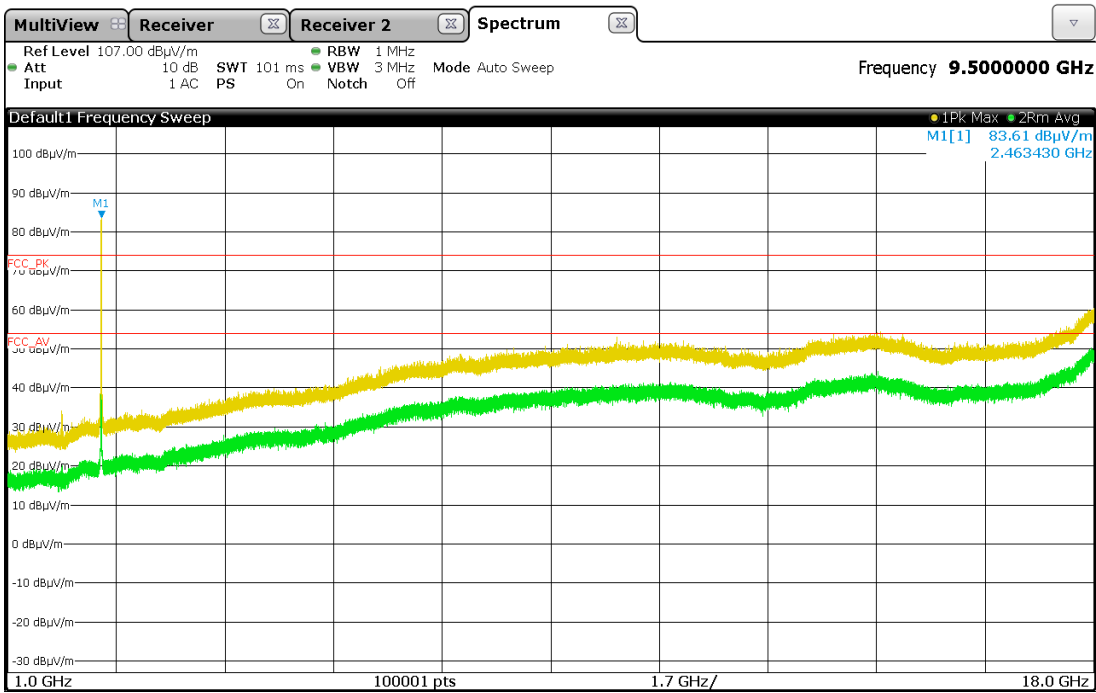


Polarity:Vertical

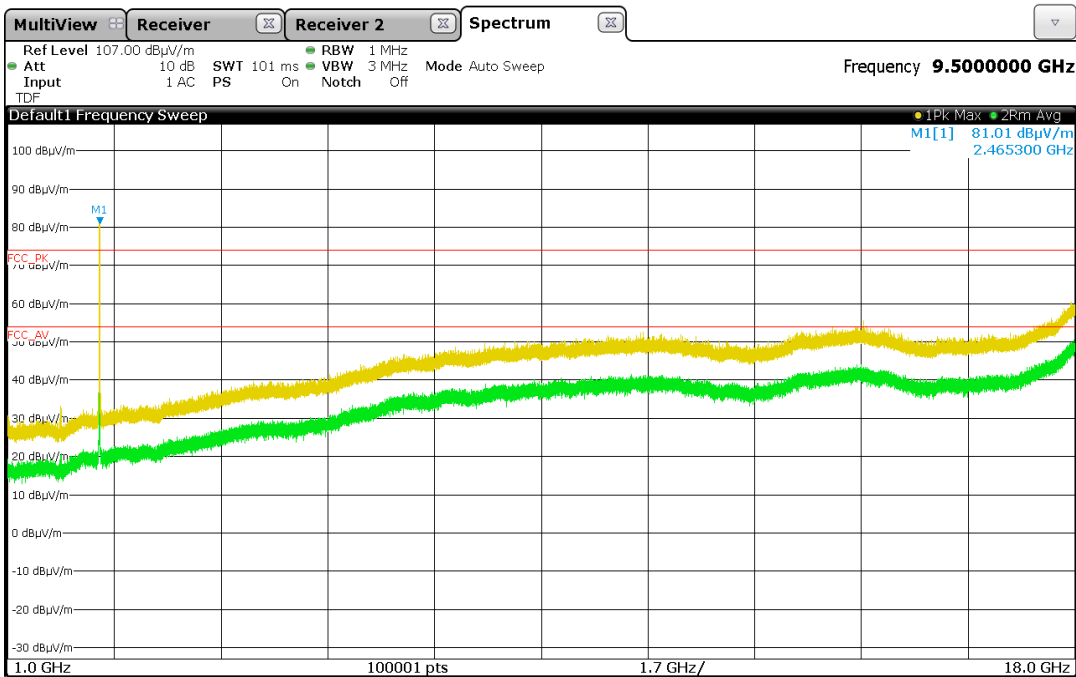


*802.11n Mode CH11

Polarity:Horizontal



Polarity:Vertical



11. Measurement of conducted disturbance

The continuous disturbance voltage of AC Mains in the frequency from 0.15 MHz to 30 MHz was measured in accordance to FCC PART 15.207. The test setup was made according to ANSI C 63.10 (2009) in a shielded room. The EUT was placed on a non-conductive table at least 0.8 m above the ground plan. A grounded vertical reference plane was positioned in a distance of 0.4 m from the EUT. The distance from the EUT to other metal surfaces was at least 0.8 m. The EUT was only earthen by its power cord through the line impedance stabilizing network. The power cord has been bundled to a length of 1.0 m. The test receiver with Quasi Peak detector complies with CISPR 16.

11.1 Measurement equipments

Equipment Name	Type	Manufacturer	Serial No.	Next Calibration date
TEST RECEIVER	ESPI	Rohde & Schwarz	100005	9-Sep-20
LISN	ESH3-Z5	Rohde & Schwarz	836679/025	9-Sep-20
Pulse Limiter	ESH3Z2	Rohde & Schwarz	NONE	9-Sep-20

11.2 Environmental Condition

Test Place : Shielded Room

Temperature (°C) : 21.4 °C

Humidity (% R.H.) : 43.5 % R.H.

11.3-1 Test Data (802.11 b)

Test Date : 20-Mar-20

Frequency (MHz)	Correction Factor		Line (H/N)	Quasi-peak Value			Average Value		
	Lisn (dB)	Cable (dB)		Limit (dB μ V)	Reading (dB μ V)	Result (dB μ V)	Limit (dB μ V)	Reading (dB μ V)	Result (dB)
0.16	0.09	0.14	N	65.36	44.33	44.56	55.36	31.87	32.10
0.17	0.09	0.15	N	64.96	43.63	43.87	54.96	31.42	31.66
0.19	0.09	0.19	N	63.95	39.62	39.90	53.95	26.21	26.49
0.26	0.16	0.20	H	61.59	34.13	34.49	51.59	23.66	24.02
0.40	0.16	0.21	H	57.94	38.30	38.67	47.94	31.00	31.37
13.54	0.57	0.36	H	60.00	39.59	40.53	50.00	23.68	24.62
Remark	H : Hot Line, N : Neutral Line *Correction Factor = Lisn + Cable *Result = Correction Factor + Reading								

11.3-2 Test Data (802.11 g)

Test Date : 20-Mar-20

Frequency (MHz)	Correction Factor		Line (H/N)	Quasi-peak Value			Average Value		
	Lisn (dB)	Cable (dB)		Limit (dB μ V)	Reading (dB μ V)	Result (dB μ V)	Limit (dB μ V)	Reading (dB μ V)	Result (dB)
0.16	0.09	0.14	N	65.36	45.99	46.22	55.36	31.40	31.63
0.17	0.09	0.15	N	64.91	43.91	44.15	54.91	29.91	30.15
0.19	0.09	0.19	N	63.95	39.50	39.78	53.95	26.83	27.11
0.26	0.09	0.20	N	61.59	34.16	34.45	51.59	23.19	23.48
0.40	0.09	0.21	N	57.85	39.84	40.14	47.85	32.34	32.64
13.54	0.57	0.36	H	60.00	38.97	39.91	50.00	30.38	31.32
Remark	H : Hot Line, N : Neutral Line *Correction Factor = Lisn + Cable *Result = Correction Factor + Reading								

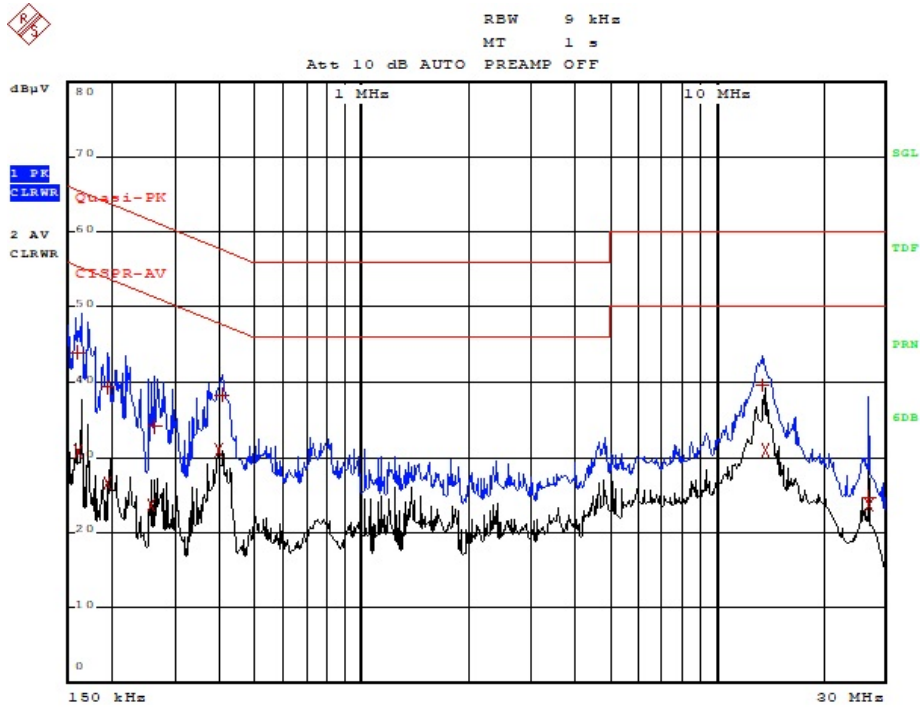
11.3-3 Test Data (802.11 n)

Test Date : 20-Mar-20

Frequency (MHz)	Correction Factor		Line (H/N)	Quasi-peak Value			Average Value		
	Lisn (dB)	Cable (dB)		Limit (dB μ V)	Reading (dB μ V)	Result (dB μ V)	Limit (dB μ V)	Reading (dB μ V)	Result (dB)
0.16	0.09	0.13	N	65.52	45.72	45.94	55.52	31.43	31.65
0.18	0.09	0.16	N	64.63	43.09	43.34	54.63	30.35	30.60
0.20	0.09	0.20	N	63.45	37.46	37.75	53.45	26.05	26.34
0.39	0.09	0.21	N	58.00	40.94	41.24	48.00	33.21	33.51
13.46	0.46	0.36	N	60.00	37.32	38.14	50.00	29.17	29.99
26.98	0.75	0.54	H	60.00	25.20	26.48	50.00	15.65	16.93
Remark	H : Hot Line, N : Neutral Line *Correction Factor = Lisn + Cable *Result = Correction Factor + Reading								

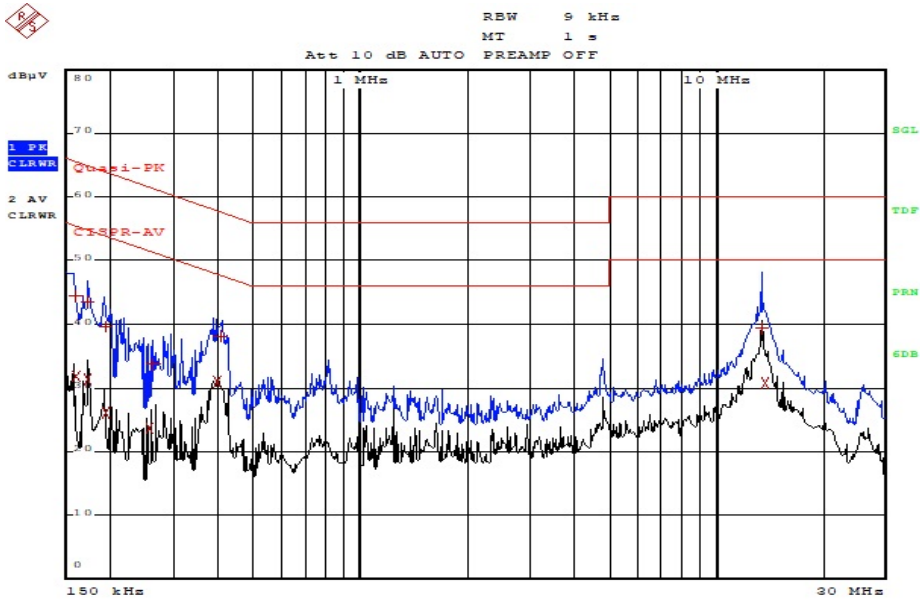
Appendix 1. Special diagram (802.11 b)

* HOT LINE



Comment: ESTR-20-00077_11B_HOT

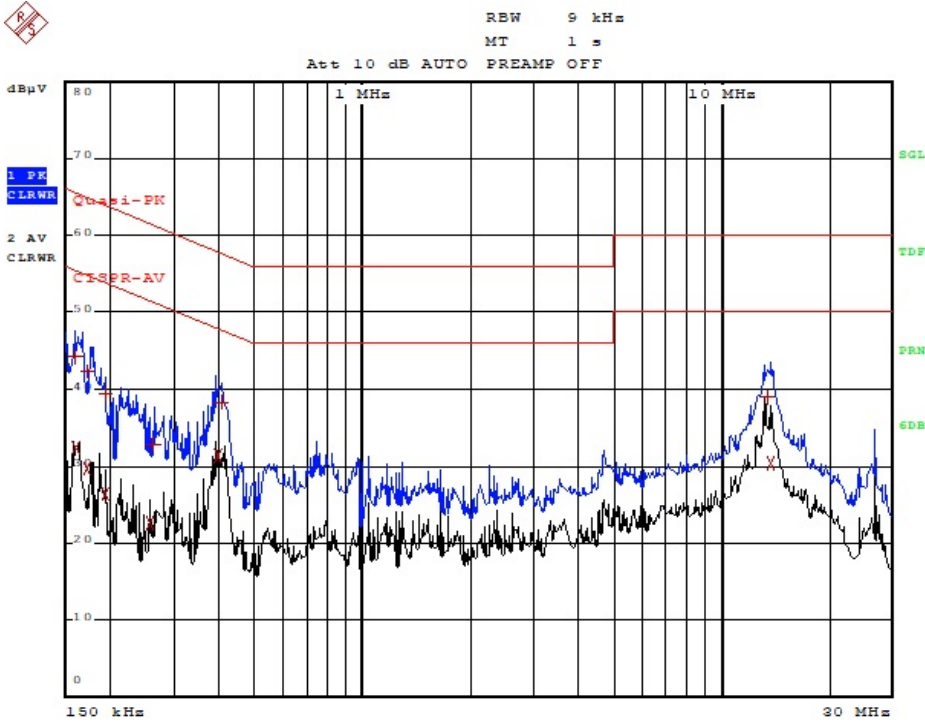
* NEUTRAL LINE



Comment: ESTR-20-00077_11B_NEUTRAL

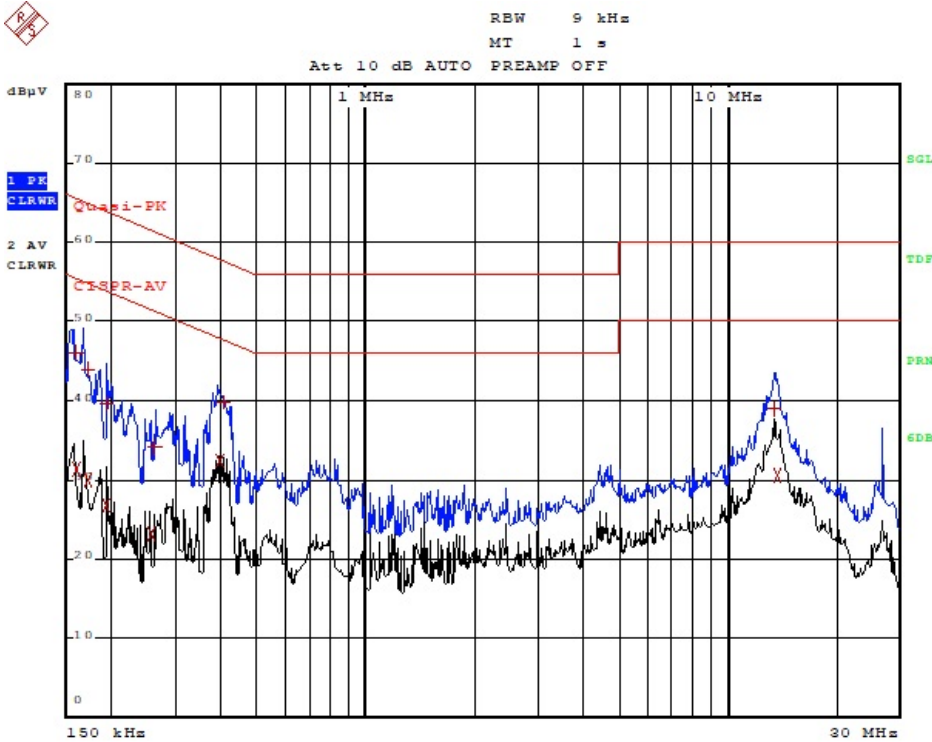
Appendix 1. Special diagram (802.11 g)

* HOT LINE



Comment: ESTR-20-00077_11G_HOT

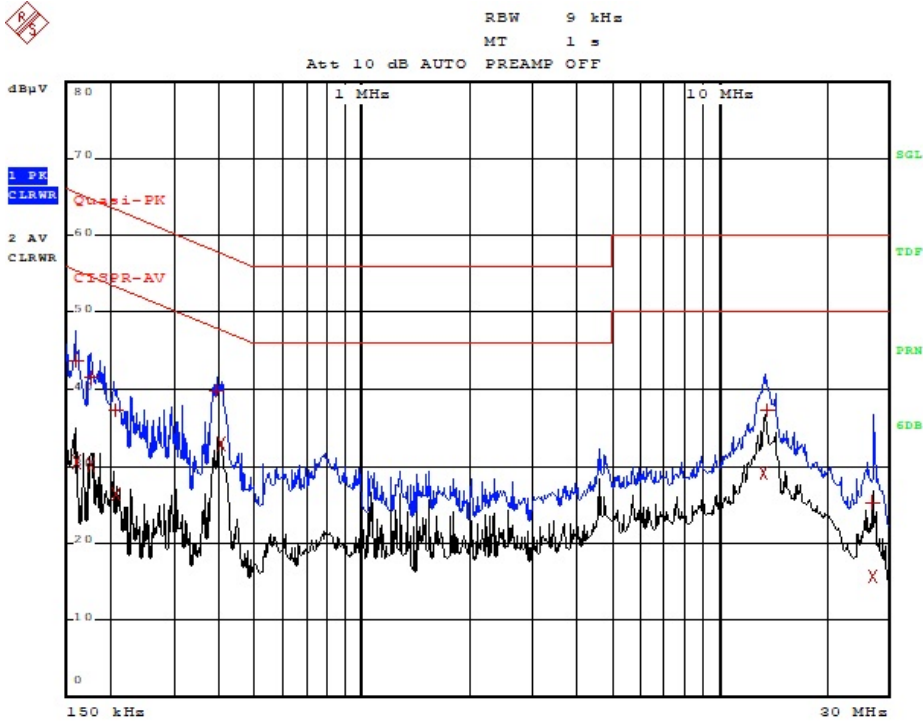
* NEUTRAL LINE



Comment: ESTR-20-00077_11G_NEUTRAL

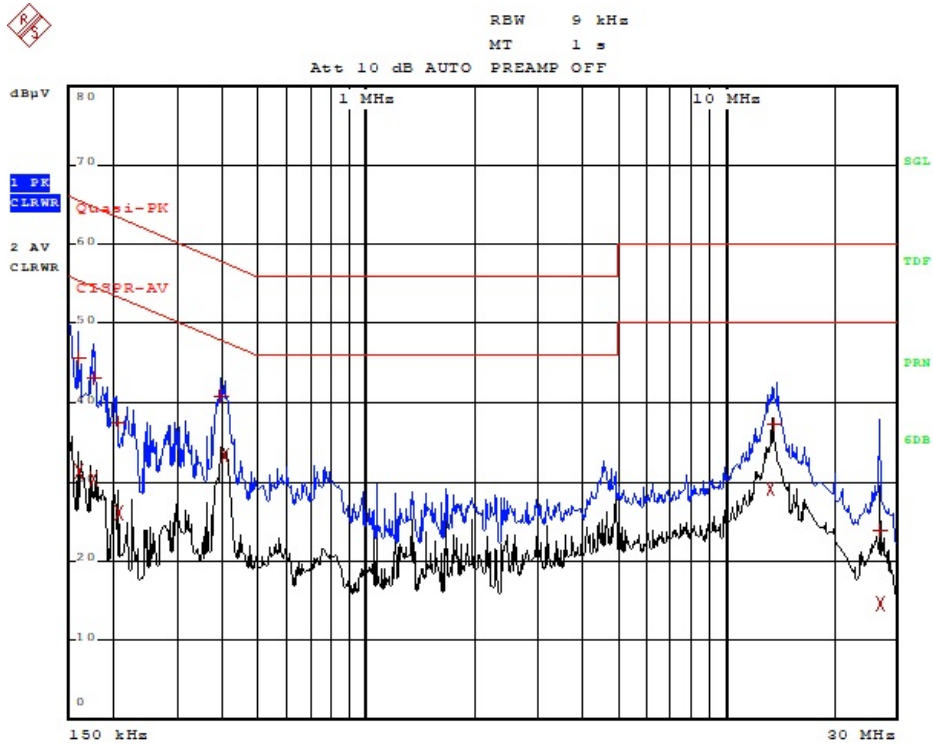
Appendix 1. Special diagram (802.11 n)

* HOT LINE



Comment: ESTR-20-00077_11N_HOT

* NEUTRAL LINE



Comment: ESTR-20-00077_11N_NEUTRAL

Appendix 2. Antenna information

1. Antenna information

antenna type : WIFI Dual Band ANTENNA.

antenna location : Integral

antenna gain : 0.25 dBi

No temporary RF connector provided