

FCC 15.247 & RSS-247 2.4 GHz Test Report

for

LG Electronics Inc.

**222, LG-ro Jinwi-myeon, Pyeongtaek-Si, Gyeonggi-Do,
451-713, Korea**

Product Name : Notebook Computer
**Model Name : (1)14Z990 (2)14ZD990 (3)14ZB990
(4)14ZG990 (5)LG14Z99**
Brand : LG
FCC ID : BEJNT-14Z990
IC : 2703H-14Z990

**Prepared by: : AUDIX Technology Corporation,
EMC Department**



The test report is based on a single evaluation of one sample of the above-mentioned products. It does not imply an assessment of the whole production and does not permit the use of the test lab logo.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government.

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Audix Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City 244, Taiwan

Tel: +886 2 26099301
Fax: +886 2 26099303

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TEST REPORT CERTIFICATION

Applicant : LG Electronics Inc.
Factory : LG Electronics Nanjing New Technology Co., Ltd.
EUT Description
(1) Product : Notebook Computer
(2) Model : (1)14Z990 (2)14ZD990 (3)14ZB990 (4)14ZG990 (5)LG14Z99
(3) Brand : LG
(4) Power Rating : DC 19V, 2.53A

Applicable Standards:

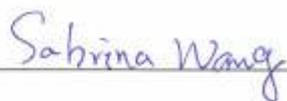
47 CFR FCC Part 15 Subpart C
RSS-Gen (Issue 5), April 2018
RSS-247 (Issue 2), February 2017
ANSI C63.10:2013
KDB 558074 D01 DTS Meas Guidance v05

Audix Technology Corp. tested the equipment mentioned in accordance with the requirements set forth in the above standards. Test results indicate that the equipment tested is capable of demonstrating compliance with the requirements as documented within this report.

Audix Technology Corp. does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens and samples.

Date of Report: 2018. 11. 02

Reviewed by:



(Sabrina Wang/Administrator)

Approved by:



(Ben Cheng/Manager)

1. REVISION RECORD OF TEST REPORT

Edition No	Issued Data	Revision Summary	Report Number
0	2018. 11. 02	Original Report	EM-F180456

2. SUMMARY OF TEST RESULTS

Rule		Description	Results
FCC	IC		
15.207	RSS-Gen §8.8	Conducted Emission	PASS
15.247(d)/ 15.205	RSS-Gen §8.9 RSS-247 §5.5	Radiated Band Edge and Radiated Spurious Emission	PASS
15.247(a)(2)	RSS-247 §5.2(1)	6dB Bandwidth	PASS
15.247(b)(3)	RSS-247 §5.4(4)	Maximum Peak Output	PASS
15.247(d)	RSS-247 §5.5	Conducted Band Edges and Conducted Spurious Emission	PASS
15.247 (e)	RSS-247 §5.2(2)	Peak Power Spectral Density	PASS
15.203	RSS-Gen §8.3	Antenna Requirement	Compliance

3. GENERAL INFORMATION

3.1. Description of Application

Applicant	LG Electronics Inc. 222, LG-ro, Jinwi-myeon, Pyeongtaek-si, Gyeonggi-do 451-713 Korea.
Manufacturer	LG Electronics Nanjing New Technology Co., Ltd. No.346,Yaoxin Road, Economic & Technical Development Zone, Nanjing, China.
Product	Notebook Computer
Brand	LG
Model	(1)14Z990 (2)14ZD990 (3)14ZB990 (4)14ZG990 (5)LG14Z99 The difference between all models is different in the sales customers.

3.2. Description of EUT

Test Model	14Z990	
Serial Number	N/A	
Power Rating	DC 19V, 2.53A	
RF Features	WLAN:802.11a/b/g/n/ac Bluetooth: BT and BLE	
Transmit Type	2.4 GHz	
	802.11b	1T1R
	802.11g	1T1R
	802.11n-HT20	2T2R
	802.11n-HT40	2T2R
	BT/BLE	1T1R
	UNII Bands	
	802.11a	1T1R
	802.11n-HT20/ 802.11ac-VHT20	2T2R
	802.11n-HT40/ 802.11ac-VHT40	2T2R
	802.11ac-VHT80	2T2R
	802.11ac-VHT160	2T2R
Sample Status	Production	
Date of Receipt	2018. 10. 15	
Date of Test	2018. 10. 23 ~ 11. 02	
Interface Ports of EUT	<ul style="list-style-type: none"> • One Micro SD Card Slot • One Earphone Port • Two USB 3.0 Ports • One USB Type C Port • One HDMI Port • One DC Input Port 	
Accessories Supplied	<ul style="list-style-type: none"> • AC Adapter • LAN Gender 	

3.3. Antenna Information

2.4G Antenna					
No.	Antenna Part Number	Manufacture	Antenna Type	Frequency (MHz)	Max Gain (dBi)
1	WA-F-LBLB-04-058 (Main)	INPAQ	FPCB	2400	1.94
				2450	2.72
				2500	1.20
2	WA-F-LBLB-04-058 (AUX)	INPAQ	FPCB	2400	2.79
				2450	2.29
				2500	1.90

5G Antenna					
No.	Antenna Part Number	Manufacture	Antenna Type	Frequency (MHz)	Max Gain (dBi)
1	WA-F-LBLB-04-058 (Main)	INPAQ	FPCB	5100	1.35
				5400	3.06
				5800	2.10
2	WA-F-LBLB-04-058 (AUX)	INPAQ	FPCB	5100	2.82
				5400	1.12
				5800	0.58

3.4. EUT Specifications Assessed in Current Report

Mode	Fundamental Range (MHz)	Channel Number	Modulation	Data Rate (Mbps)
802.11b	2412-2472	13	DSSS (DBPSK/DQPSK/CCK)	Up to 11
802.11g		13	OFDM (BPSK/QPSK/16QAM/64QAM)	Up to 54
802.11n-HT20				Up to 144.4
802.11n-HT40	2422-2462	9		Up to 300
BLE	2402-2480	40	GFSK	1

Channel List			
802.11 b/g/n-HT20		802.11n-HT40	
Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)
1	2412	3	2422
2	2417	4	2427
3	2422	5	2432
4	2427	6	2437
5	2432	7	2442
6	2437	8	2447
7	2442	9	2452
8	2447	10	2457
9	2452	11	2462
10	2457		
11	2462		
12	2467		
13	2472		

Channel List							
BLE							
Channel Number	Frequency (MHz)						
37	2402	09	2422	18	2442	28	2462
00	2404	10	2424	19	2444	29	2464
01	2406	38	2426	20	2446	30	2466
02	2408	11	2428	21	2448	31	2468
03	2410	12	2430	22	2450	32	2470
04	2412	13	2432	23	2452	33	2472
05	2414	14	2434	24	2454	34	2474
06	2416	15	2436	25	2456	35	2476
07	2418	16	2438	26	2458	36	2478
08	2420	17	2440	27	2460	39	2480

RMS Output Power (dBm)				
Channel	802.11b	802.11g	802.11n-HT20	802.11n-HT40
1	18.52	16.19	18.27	---
2	19.04	16.82	19.44	
3	19.58	17.49	19.92	16.38
4	20.46	18.58	20.06	16.96
5	20.98	19.24	20.48	17.08
6	21.06	20.49	20.64	17.41
7	21.02	18.85	20.45	17.32
8	20.95	18.24	20.05	16.95
9	20.42	17.92	19.58	16.35
10	19.36	16.82	18.75	12.08
11	18.74	16.47	17.87	4.43
12	13.34	12.11	15.53	---
13	12.16	-5.57	-3.29	

3.5. Descriptions of Key Components

3.5.1. For the All Component Lists

Item	Supplier	Model / Type	Character
System	Microsoft	Win10 Home	---
		Win10 Pro	---
Main Board	LG	14/15Z990 Main B/D PCB	(without Thunderbolt) Manufacturer: #1 Hannstar Board Tech (Jiang Yin) Corp., Ltd. #2 Elec & Eltek Company (MCO) Limited
	LG	14/15Z990 Main B/D PCB	(with Thunderbolt) Manufacturer: #1 Hannstar Board Tech (Jiang Yin) Corp., Ltd. #2 Elec & Eltek Company (MCO) Limited
SUB Board	LG	14Z990 WLAN SUB B/D	(without Finger Print) Manufacturer: #1 Hannstar Board Tech (Jiang Yin) Corp., Ltd. #2 Elec & Eltek Company (MCO) Limited
	LG	14Z990 WLAN SUB B/D	(with Finger Print) Manufacturer: #1 Hannstar Board Tech (Jiang Yin) Corp., Ltd. #2 Elec & Eltek Company (MCO) Limited
CPU (Socket: BGA1528)	Intel	i5-8265U	1.6GHz, up to 3.9GHz
		i7-8565U	1.8GHz, up to 4.6GHz
14" LCD Panel	LG Display	LP140WF7-SPG1	Resolution: 1920 x 1080, 60Hz FHD IPS (Normal Non touch)
		LP140WF5-SPG2	Resolution: 1920 x 1080, 60Hz FHD IPSW/ Touch (AIT Including touch)
Storage (SSD)	Samsung	MZ-VLB5120 (P/N MZVLB512HAJQ-0000)	512GB (NVMe)
		MZ-NLN128C (P/N MZNLN128HAHQ-0000)	128GB (SATA)
	SK hynix	P/N HFS256G39TNF	256GB (SATA)
Memory (RAM)	Samsung	K4AAG16 5WB MCRC	8GB DDR4 (On Board).
		K4A8G16 5WB-BCTD	4GB DDR4 (On Board).
	SK hynix	H5ANAG6NAMR	8GB DDR4 (On Board).
		H5AN8G6NAFR	4GB DDR4 (On Board).
	Samsung	M471A5244CB0-CRC	4GB DDR4 SODIMM (On Card)
		M471A5244CB0-CTD	4GB DDR4 SODIMM (On Card)
		M471A1K43CB1-CRC	8GB DDR4 SODIMM (On Card)
		M471A1K43CB1-CTD	8GB DDR4 SODIMM (On Card)
SK hynix	HMA851S6AFR6N-UH	4GB DDR4 SODIMM (On Card)	
	HMA81GS6AFR8N-UH	8GB DDR4 SODIMM (On Card)	
Battery Pack	LG	LBS1224E	DC 7.7V, 72Wh, Typ 9450mAh

Item	Supplier	Model / Type	Character
WLAN Combo Card	Intel	9560D2W	802.11a/b/g/n/ac 2.4GHz/5GHz+BT 5.0 BLE
WLAN Combo Antenna	LG (INPAQ)	WA-F-LBLB-04-058	FPCB Type, Main: Black, Aux: Gray
Web Camera	Chicony	CKFIH2821005290LH	With two microphones
		CKFIH28-121005290LH	With one microphone
	Luxvisions	7BF109N2DC	With two microphones
		7BF109N2DD	With one microphone
Keyboard	LG	SN3871BL1 (White)	---
		SN3871BL (Black)	---
		Above model have the same circuit and hardware. The model SN3871BL1 (White) is tested in this report.	
Finger Print	SUNTEL	SFPA-L002STA (White)	---
		SFPA-L002STB (Black)	---
		Above model have the same circuit and hardware. The model SFPA-L002STA (White) is tested in this report.	
LAN Gender (Type C to LAN)	SUZHOU MEC ELECTRONICS	80-5946-111 (White)	10/100 Megabit Ethernet
		80-5946-101 (Black)	
		Above model have the same circuit and hardware. The model 80-5946-111 (White) is tested in this report.	
	ARIN TECH CO. LTD	GD-08MF-36-WH-LP05 (White)	10/100 Megabit Ethernet
		GD-08MF-36-BK-LP06 (Black)	
		Above model have the same circuit and hardware. The model GD-08MF-36-WH-LP05 (White) is tested in this report.	
Type C to LAN: Shielded, Undetached, 0.12m			
AC Adapter (48W)	LG (HONOR)	ADS-48MS-19-2 19048E	BSMI ID: R3C189 I/P: AC 100-240V, 50-60Hz, 1.5A, O/P: DC 19V, Max. 2.53A
		DC Power Cord: Non-Shielded, Undetached, 1.8m	
		AC Power Cord: Non-Shielded, Detached, 1.0m (2C) (For Other Countries) AC Power Cord: Non-Shielded, Detached, 1.55m (2C) (For US, Canada, Mexico)	

Remark: For more detailed features description, please refer to the manufacturer's specifications or the user manual.

3.5.2. The EUT collocates with following worst components, which are used to establish a basic configuration of system during test:

SKU	
Main Board	LG, 14/15Z990 Main B/D PCB (with Thunderbolt)
SUB Board	LG, 14Z990 WLAN SUB B/D (with Finger Print)
CPU	Intel, i7-8565U
14" LCD Panel	LG Display, LP140WF5-SPG2 (AIT Including touch)
Storage (SSD)	Samsung, 512GB (NVMe)
	Samsung, 128GB (SATA)
Memory (RAM)	8GB (On Board)
	8GB (On Card)
Battery Pack	LG, LBS1224E
WLAN Combo Card	Intel, 8265D2W
WLAN Combo Antenna	LG (INPAQ), WA-F-LBLB-04-058
Web Camera	Chicony, CKFIH2821005290LH (With two microphones)
Keyboard	LG,SN3871BL1(White)
Finger Print	SUNTEL, SFPA-L002STA(White)
LAN Gender (Type C to LAN)	MEC, 80-5946-111 (White)
AC Adapter	HONOR, ADS-48MS-19-2 19048E
Display	HDMI, 1920 x 1080, 60Hz ("H" Pattern)

3.6. Data Rate Relative to Output Power

802.11b			
Channel	Modulation	Date Rate(Mbps)	Power(dBm)
1	DBPSK	1	20.23
1	DQPSK	2	20.04
1	CCK	5.5	19.89
1	CCK	11	19.74

802.11g			
Channel	Modulation	Date Rate(Mbps)	Power(dBm)
1	BPSK	6	22.57
1	BPSK	9	22.41
1	QPSK	12	22.28
1	QPSK	18	22.13
1	16-QAM	24	22.04
1	16-QAM	36	19.94
1	64-QAM	48	19.78
1	64-QAM	54	19.62

802.11n-HT20				802.11n-HT40			
Channel	Modulation	Date Rate (Mbps)	Power (dBm)	Channel	Modulation	Date Rate (Mbps)	Power (dBm)
1	BPSK	MCS8	23.20	3	BPSK	MCS8	21.94
1	QPSK	MCS9	23.02	3	QPSK	MCS9	21.78
1	QPSK	MCS10	22.92	3	QPSK	MCS10	21.56
1	16-QAM	MCS11	22.79	3	16-QAM	MCS11	21.32
1	16-QAM	MCS12	22.67	3	16-QAM	MCS12	21.18
1	64-QAM	MCS13	22.54	3	64-QAM	MCS13	21.02
1	64-QAM	MCS14	22.42	3	64-QAM	MCS14	20.85
1	64-QAM	MCS15	22.31	3	64-QAM	MCS15	20.68

BLE			
Channel	Modulation	Date Rate(Mbps)	Power(dBm)
0	GFSK	1	8.32

Note: Above results are assessed in peak power.

3.7. Test Configuration

Mode	Duty Cycle (x)	T (ms)	Duty Cycle Factor (dB)
802.11b	0.99	12.320	0
802.11g	0.98	2.050	0
802.11n-HT20	0.96	0.980	0.19
802.11n-HT40	0.92	0.495	0.38
BLE	0.62	0.390	2.08

Note: When duty cycle is less than 98% (0.98) that duty cycle factor $10\log(1/x)$ is needed to add in conducted test items measured in average detector.

Mode	Duty Cycle (x)	
	TX _{on}	TX _{on+off}
802.11b		
802.11g		
802.11n-HT20		
802.11n-HT40		
BLE		

AC Conduction	
Test Case	Normal operation

Item	Mode	Data Rate	Test Channel	
Radiated Test Case	Radiated Band Edge ^{Note 1}	802.11b	1Mbps	1/11/12/13
		802.11g	6Mbps	1/11/12/13
		802.11n-HT20	MCS8	1/11/12/13
		802.11n-HT40	MCS8	3/9/10/11
		BLE	1Mbps	37/39
	Radiated Spurious Emission ^{Note 1 & 2}	802.11b	1Mbps	1/6/11
		802.11g	6Mbps	1/6/11
		802.11n-HT20	MCS8	1/6/11
		802.11n-HT40	MCS8	3/6/9
		BLE	1Mbps	37/17/39
Conducted Test Case	6dB Bandwidth	802.11b	1Mbps	1/6/11/13
		802.11g	6Mbps	1/6/11/13
		802.11n-HT20	MCS8	1/6/11/13
		802.11n-HT40	MCS8	3/6/9/11
		BLE	1Mbps	37/17/39
	Peak Output Power	802.11b	1Mbps	1/6/11/13
		802.11g	6Mbps	1/6/11/13
		802.11n-HT20	MCS8	1/6/11/13
		802.11n-HT40	MCS8	3/6/9/11
		BLE	1Mbps	37/17/39
	Band Edge	802.11b	1Mbps	1/11/13
		802.11g	6Mbps	1/11/13
		802.11n-HT20	MCS8	1/11/13
		802.11n-HT40	MCS8	3/9/11
		BLE	1Mbps	37/39
	Spurious Emission	802.11b	1Mbps	1/6/11/13
		802.11g	6Mbps	1/6/11/13
		802.11n-HT20	MCS8	1/6/11/13
		802.11n-HT40	MCS8	3/6/9/11
		BLE	1Mbps	37/17/39
Peak Power Spectral Density	802.11b	1Mbps	1/6/11/13	
	802.11g	6Mbps	1/6/11/13	
	802.11n-HT20	MCS8	1/6/11/13	
	802.11n-HT40	MCS8	3/6/9/11	
	BLE	1Mbps	37/17/39	

Note 1: Mobile Device

Portable Device, and 3 axis were assessed. The worst scenario for Radiated Spurious Emission as follow: Lie Side Stand

Note 2: Low, mid, and high channels were measured, only the worst channel of each modulation was presented in this report.

3.8. Tested Supporting System List

3.8.1. Support Peripheral Unit

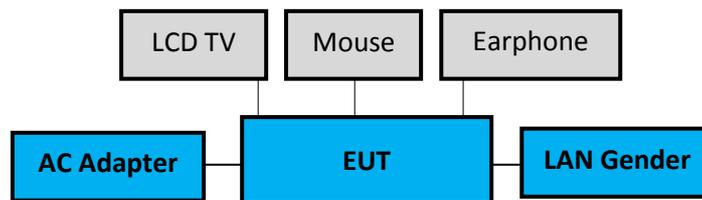
No.	Product	Brand	Model No.	Serial No.	Approval
1.	LCD TV	LG	22LK330-DB	N/A	N/A
2.	USB Mouse	DELL	MS111-L	CN-09RRC7-48723-2B7-0H3M	FCC By DoC
3.	Earphone	SAMPO	EK-Y1251MP	N/A	N/A

3.8.2. Cable Lists

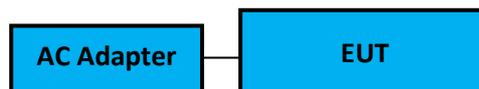
No.	Cable Description Of The Above Support Units
1.	HDMI Cable: Shielded, Detachable, 1.8m AC Power Cord: Unshielded, Detachable, 1.8m
2.	USB Cable: Unshielded, Undetachable, 1.8m
3.	Earphone Cable: Unshielded, Undetachable, 2.0m

3.9. Setup Configuration

3.9.1. EUT Configuration for Power Line & Radiated Emission



3.9.2. EUT Configuration for RF Conducted Test Items



3.10. Operating Condition of EUT

Test program “DRTU” is used for enabling EUT BT or WLAN function under continues transmitting and choosing data rate/ channel.

3.11. Description of Test Facility

Name of Test Firm	Audix Technology Corporation / EMC Department No. 53-11, Dingfu, Linkou Dist., New Taipei City 244, Taiwan Tel: +886-2-26092133 Fax: +886-2-26099303 Website : www.audixtech.com Contact e-mail: attemc_report@audixtech.com
Accreditations	The laboratory is accredited by following organizations under ISO/IEC 17025:2005 (1) NVLAP(USA) NVLAP Lab Code 200077-0 (2) TAF(Taiwan) No. 1724
Test Facilities	FCC OET Designation Number under APEC MRA by NCC is : TW1724 (1) No. 8 Shielding Room (2) Semi-Anechoic Chamber (IC Test Site Registration No.:5183B-1)

3.12. Measurement Uncertainty

Test Item	Frequency Range	Uncertainty
Conduction Test	150kHz~30MHz	±3.50dB
Radiation Test (Distance: 3m)	30MHz~1000MHz	± 3.68dB
	Above 1GHz	±5.82dB

Remark : Uncertainty = $ku_c(y)$

Test Item	Uncertainty
6dB Bandwidth	± 0.05kHz
Maximum peak output power	± 0.33dB
Power spectral density	± 0.13dB
Conducted Emission Limitations	± 0.13dB

4. MEASUREMENT EQUIPMENT LIST

4.1. Conducted Emission Measurement

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Test Receiver	R&S	ESR3	101774	2018. 01. 24	1 Year
2.	A.M.N.	R&S	ENV4200	100169	2017. 11. 12	1 Year
3.	L.I.S.N.	Kyoritsu	KNW-407	8-855-9	2017. 12. 14	1 Year
4.	Pulse Limiter	R&S	ESH3-Z2	100354	2018. 01. 16	1 Year
5.	Signal Cable	Yeida	RG/58AU	CE-08	2018. 09. 21	1 Year
6.	Digital Thermo- Hygro Meter	iMax	HTC-1	No.8 S/R	2018. 04. 20	1 Year

4.2. Radiated Emission Measurement

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Agilent	N9010A-526	MY53400071	2018. 09. 12	1 Year
2.	Test Receiver	R & S	ESCS30	100338	2018. 06. 20	1 Year
3.	Amplifier	HP	8447D	2944A06305	2018. 01. 30	1 Year
4.	Amplifier	HP	8449B	3008A00529	2018. 01. 24	1 Year
5.	Loop Antenna	R&S	HFH2-Z2	891847/27	2017. 12. 18	1 Year
6.	Bilog Antenna	CHASE	CBL6112D	33821	2018. 01. 21	1 Year
7.	Horn Antenna	COM-POWER	AH-840	101092	2018 .05. 07	1 Year
8.	Horn Antenna	EMCO	3115	9609-4927	2018. 06. 22	1 Year
9.	2.4GHz Notch Filter	K&L	7NSL10-2441. 5E130.5-00	1	2018. 07. 24	1 Year
10.	High-Pass Filter	Microwave	H3G018G1	484796	2018. 08. 22	1 Year
11.	Digital Thermo-Hygro Meter	iMax	HTC-1	No.1 3m A/C	2018. 04. 20	1 Year
12.	Test Software	Audix	e3	V.6.110601	N.C.R.	N.C.R.

4.3. RF Conducted Measurement

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Keysight	N9010B-544	MY55460198	2018. 04. 26	1 Year
2.	Power Meter	Anritsu	ML2495A	1145008	2017. 11. 03	1 Year
3.	Power Sensor	Anritsu	MA2411B	1126096	2017. 11. 03	1 Year
4.	Digital Thermo-Hygro Meter	Shenzhen Datronn Electronics	KT-905	RF	2018. 04. 20	1 Year

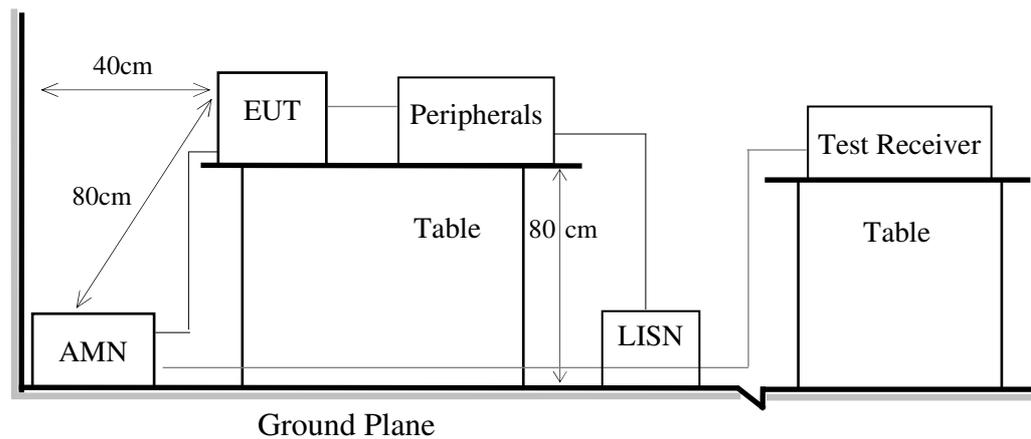
5. CONDUCTED EMISSION

5.1. Block Diagram of Test Setup

5.1.1. Block Diagram of EUT

Indicated as section 3.9

5.1.2. Shielded Room Setup Diagram



5.2. Conducted Emission Limit

Frequency	Conducted Limit	
	Quasi-Peak Level	Average Level
150kHz ~ 500kHz	66 ~ 56 dB μ V	56 ~ 46 dB μ V
500kHz ~ 5MHz	56 dB μ V	46 dB μ V
5MHz ~ 30MHz	60 dB μ V	50 dB μ V

Remark 1.: If the average limit is met when using a Quasi-Peak detector, the measurement using the average detector is not required.

2.: The lower limit applies to the band edges.

5.3. Test Procedure

- 5.3.1. To set up the EUT as indicated in ANSI C 63.10. The EUT was placed on the table which has 80 cm height to the ground and 40 cm distance to the conducting wall.
- 5.3.2. Power supplier of the EUT was connected to the AC mains through an Artificial Mains Network (A.M.N.).
- 5.3.3. The AC power supplies to all peripheral devices must be provided through line impedance stabilization network (L.I.S.N.)
- 5.3.4. Checking frequency range from 150 kHz to 30 MHz and record the emission which does not have 20 dB below limit.

5.4. Test Results

Please refer to Appendix A.

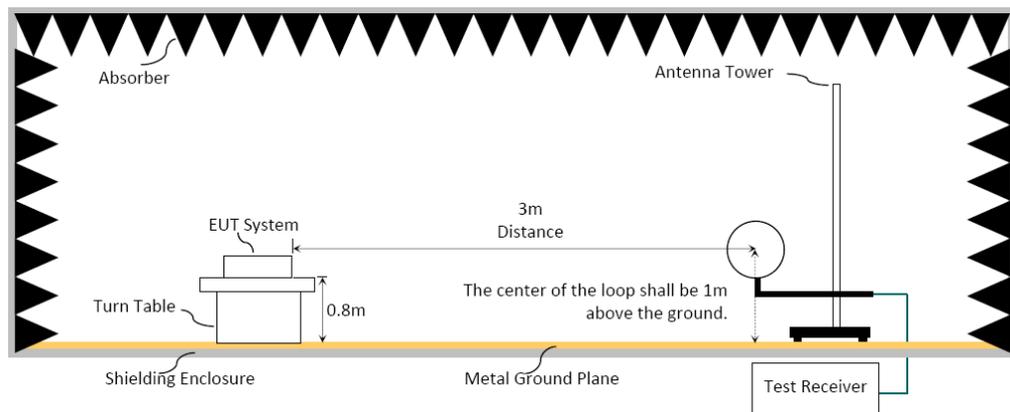
6. RADIATED EMISSION

6.1. Block Diagram of Test Setup

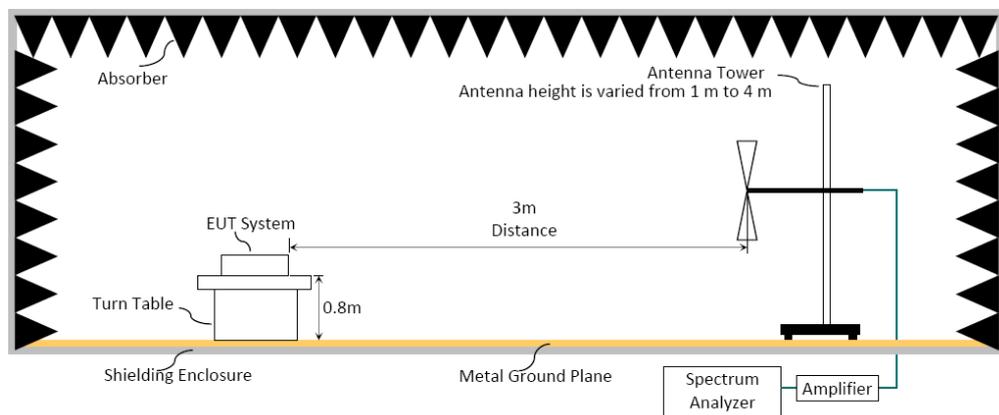
6.1.1. Block Diagram of EUT

Indicated as section 3.9

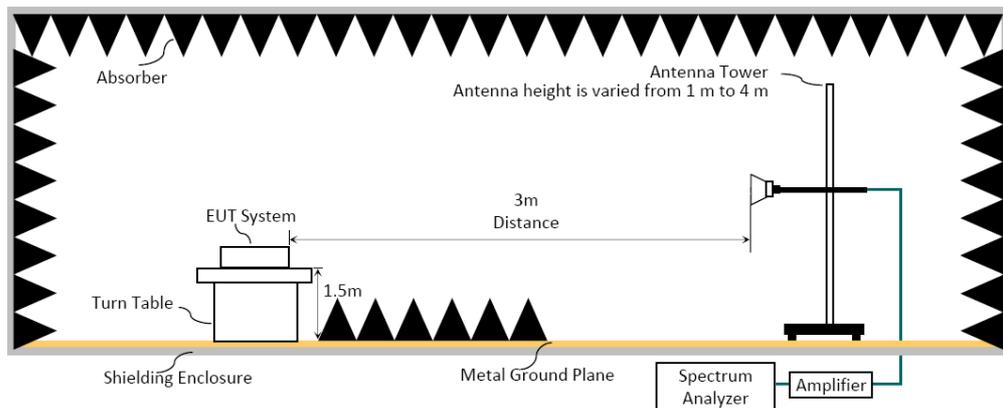
6.1.2. Setup Diagram for 9kHz-30MHz



6.1.3. Setup Diagram for 30-1000 MHz



6.1.4. Setup Diagram for above 1GHz



6.2. Radiated Emission Limits

In any 100kHz bandwidth outside the frequency band, the radio frequency power produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level. In addition, radiated emissions which fall in restricted bands, as defined in Section 15.205/RSS-Gen Section 8.10 table 6, must also comply with the radiated emission limits specified as below.

Frequency (MHz)	Distance (m)	Limits	
		dB μ V/m	μ V/m
0.009 - 0.490	300	67.6-20 log f(kHz)	2400/f kHz
0.490 - 1.705	30	87.6-20 log f(kHz)	24000/f kHz
1.705 - 30	30	29.5	30
30 - 88	3	40.0	100
88- 216	3	43.5	150
216- 960	3	46.0	200
Above 960	3	54.0	500
Above 1000	3	74.0 dB μ V/m (Peak) 54.0 dB μ V/m (Average)	

Remark : (1) dB μ V/m = 20 log (μ V/m)

- (2) The tighter limit applies to the edge between two frequency bands.
- (3) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
- (4) Fundamental and emission fall within operation band are exempted from this section.
- (5) Pursuant to ANSI C63.10: 6.6.4.3, if the maximized peak measured value complies with the average limit, then it is unnecessary to perform an average measurement.

6.3. Test Procedure

Frequency Range 9kHz~30MHz:

The EUT setup on the turn table which has 0.8 m height to the ground. The turn table rotated 360 degrees and antenna fixed to 1 m to find the maximum emission level. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10-2013 regulation.

- (1) RBW = 9kHz with peak and average detector.
- (2) Detector: average and peak (9kHz-490kHz)
Q.P. (490kHz-30MHz)

Frequency Range 30MHz ~ 25GHz:

The EUT setup on the turn table which has 80 cm (for 30-1000 MHz) and 1.5m (for above 1GHz) height to the ground. The turn table rotated 360 degrees and antenna varied from 1 m to 4 m to find the maximum emission level. Both horizontal and vertical polarization are required. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10-2013 regulation.

Frequency below 1 GHz:

Spectrum Analyzer is used for pre-testing with following setting:

- (1)RBW = 120KHz
- (2)VBW \geq 3 x RBW.
- (3)Detector = Peak.
- (4)Sweep time = auto.
- (5)Trace mode = max hold.
- (6)Allow sweeps to continue until the trace stabilizes.
- (7)When peak-detected value is lower than limit that the measurement using the Q.P. detector is not required, otherwise using Q.P. for final measurement.

Frequency above 1GHz to 10th harmonic (up to 25 GHz):

Peak Detector:

- (1)RBW = 1MHz
- (2)VBW \geq 3 x RBW.
- (3)Detector = Peak.
- (4)Sweep time = auto.
- (5)Trace mode = max hold.
- (6)Allow sweeps to continue until the trace stabilizes.
- (7)When peak-detected value is lower than limit that the measurement using the average detector is not required, otherwise using average detector for final measurement.

Average Detector:

Option 1:

(1) RBW = 1MHz

(2) VBW \geq 1/ T.

Modulation Type	T (ms)	1/ T (kHz)	VBW Setting (kHz)
802.11b	12.320	0.081	10Hz
802.11g	2.050	0.488	10Hz
802.11n-HT20	0.980	1.020	1kHz
802.11n-HT40	0.495	2.020	2.7kHz
BLE	0.390	2.564	470Hz

N/A: 1/ T is not implemented when duty cycle presented in section 3.7 is \geq 98 %.

(1) Detector = Peak.

(2) Sweep time = auto.

(3) Trace mode = max hold.

(4) Allow sweeps to continue until the trace stabilizes.

Option 2:

Average Emission Level= Peak Emission Level+ D.C.C.F.

6.4. Measurement Result Explanation

Peak Emission Level=Antenna Factor + Cable Loss + Meter Reading

Average Emission Level=Antenna Factor + Cable Loss + Meter Reading

Average Emission Level= Peak Emission Level+ DCCF

Duty Cycle Correction Factor (DCCF)= $20\log(TX_{on}/TX_{on+off})$ presented in section 3.7

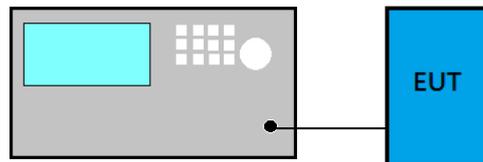
ERP= Peak Emission Level-95.2dB-2.14dB

6.5. Test Results

Please refer to Appendix A.

7. 6dB BANDWIDTH

7.1. Block Diagram of Test Setup



7.2. Specification Limits

The minimum 6dB bandwidth shall be at least 500kHz.

7.3. Test Procedure

Following measurement procedure is reference to KDB 558074 D01 DTS Meas Guidance v05:

- (1) Set RBW = 100 kHz.
- (2) Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
- (3) Detector = Peak.
- (4) Trace mode = max hold.
- (5) Sweep = auto couple.
- (6) Allow the trace to stabilize.
- (7) Setting channel bandwidth function x dB to -6 dB to record the final bandwidth.

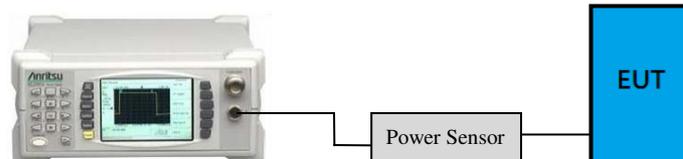
7.4. Test Results

Please refer to Appendix A

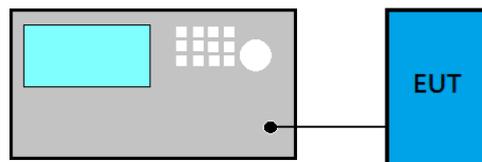
8. MAXIMUM PEAK OUTPUT POWER

8.1. Block Diagram of Test Setup

- For WLAN Function



- For BLE Function



8.2. Specification Limits

The Limits of maximum Peak Output Power for digital modulation in 2400-2483.5MHz is : 1Watt. (30dBm), and E.I.R.P.: 4Watt (36dBm)

8.3. Test Procedure

Following measurement procedure is reference to KDB 558074 D01 DTS Meas Guidance v05:

■ PKPM1 Peak power meter method:

EUT is connected to power sensor and record the maximum output power.

■ Maximum peak conducted output power method:

- (1) Set the RBW \geq DTS bandwidth
- (2) Set VBW $\geq 3 \times$ RBW
- (3) Set span $\geq 3 \times$ RBW.
- (4) Sweep time = auto couple
- (5) Detector = peak.
- (6) Trace mode = max hold.
- (7) Allow trace to fully stabilize.
- (8) Use peak marker function to determine the peak amplitude level.

■ Method AVGPM (Measurement using an RF average power meter):

EUT is connected to power sensor and record the maximum average output power and duty cycle factor is added when duty cycle presented in section 3.7 is $< 98\%$.

Method AVGSA-2 (Spectrum channel power)

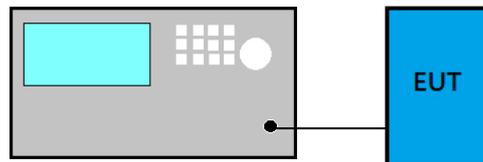
- (1) Set span to at least 1.5 times the OBW
- (2) Set RBW = 1 -5% of OBW
- (3) Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
- (4) Detector = RMS.
- (5) Trace mode = trace average at least 100 traces
- (6) Sweep = auto couple.
- (7) Compute power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function with band limits set equal to the OBW band edges.
- (8) Duty cycle factor is added when duty cycle presented in section 3.7 is $< 98\%$.

8.4. Test Results

Please refer to Appendix A

9. EMISSION LIMITATIONS

9.1. Block Diagram of Test Setup



9.2. Specification Limits

In any 100kHz 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 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, that the required attenuation shall be 30 dB instead of 20 dB.

Attenuation below the general limits specified in Section 15.209(a)/RSS-Gen Section 8.9 table 4 is not required. In addition, radiated emissions which fall in restricted bands, as defined in Section 15.205(a)/RSS-Gen Section 8.10 table 6, must also comply with the radiated emission limits specified in Section 15.209(a)/RSS-Gen Section 8.9 table 4 (See Section 15.205(c)).

9.3. Test Procedure

Following measurement procedure is reference to KDB 558074 D01 DTS Meas Guidance v05:

■ Reference Level

- (1) Set analyzer center frequency to DTS channel center frequency.
- (2) Set the span to 1.5 times the DTS bandwidth.
- (3) Set the RBW to: 100 kHz.
- (4) Set the VBW $\geq 3 \times$ RBW.
- (5) Detector = peak.
- (6) Sweep time = auto couple.
- (7) Trace mode = max hold.
- (8) Allow trace to fully stabilize to find the max PSD as reference level.

■ Emission Level Measurement

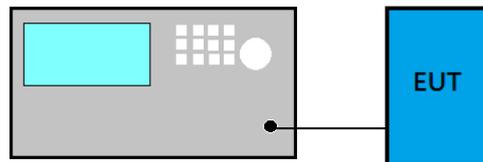
- (1) Set analyzer center frequency to DTS channel center frequency.
- (2) Set the span to 1.5 times the DTS bandwidth.
- (3) Set the RBW to: 100 kHz.
- (4) Set the VBW $\geq 3 \times$ RBW.
- (5) Detector = peak.
- (6) Sweep time = auto couple.
- (7) Trace mode = max hold.
- (8) Allow trace to fully stabilize to find the max level.

9.4. Test Results

Please refer to Appendix A

10. POWER SPECTRAL DENSITY

10.1. Block Diagram of Test Setup



10.2. Specification Limits

The peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3kHz band.

10.3. Test Procedure

Following measurement procedure is reference to KDB 558074 D01 DTS Meas Guidance v05:

Method PKPSD (peak PSD)

- (1) Set analyzer center frequency to DTS channel center frequency.
- (2) Set the span to 1.5 times the DTS bandwidth.
- (3) Set the RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- (4) Set the VBW $\geq 3 \times \text{RBW}$.
- (5) Detector = peak.
- (6) Sweep time = auto couple.
- (7) Trace mode = max hold.
- (8) Allow trace to fully stabilize.
- (9) Use the peak marker function to determine the maximum amplitude level.
- (10) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

Method AVGPSD-2

- (1) Using peak PSD procedure step 1 to step 4.
- (2) Detector = RMS detector
- (3) Sweep time = auto couple
- (4) Trace mode = trace averaging over a minimum of 100 traces
- (5) Use the peak marker function to determine the maximum amplitude level.
- (6) Duty cycle factor is added when duty cycle presented in section 3.7 < 98%.
- (7) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

10.4. Test Results

Please refer to Appendix A

11.DEVIATION TO TEST SPECIFICATIONS

【NONE】



Audix Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City 244, Taiwan

Tel: +886 2 26099301
Fax: +886 2 26099303

APPDNDIX A

TEST DATA AND PLOTS

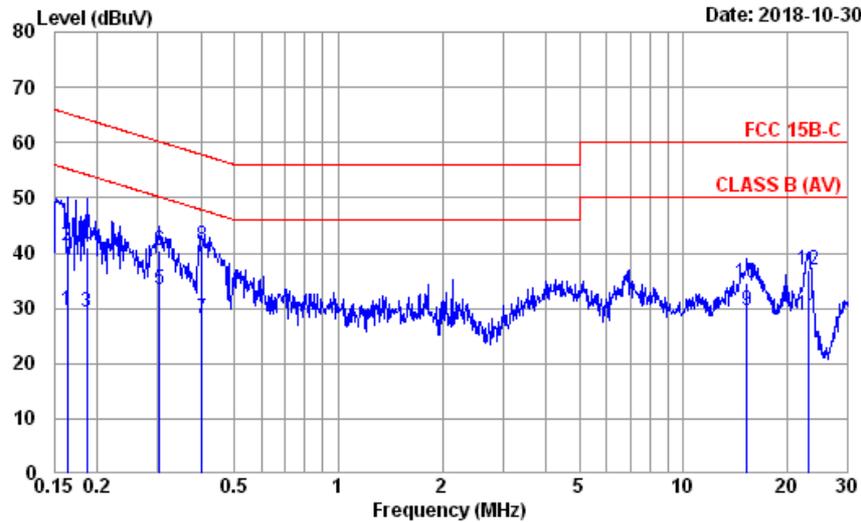
(Model: 14Z990)

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A.1 CONDUCTED EMISSION

Test Date	2018/10/30	Temp./Hum.	24°C/49%
Test Voltage	AC 120V 60Hz (Via AC Adapter)		

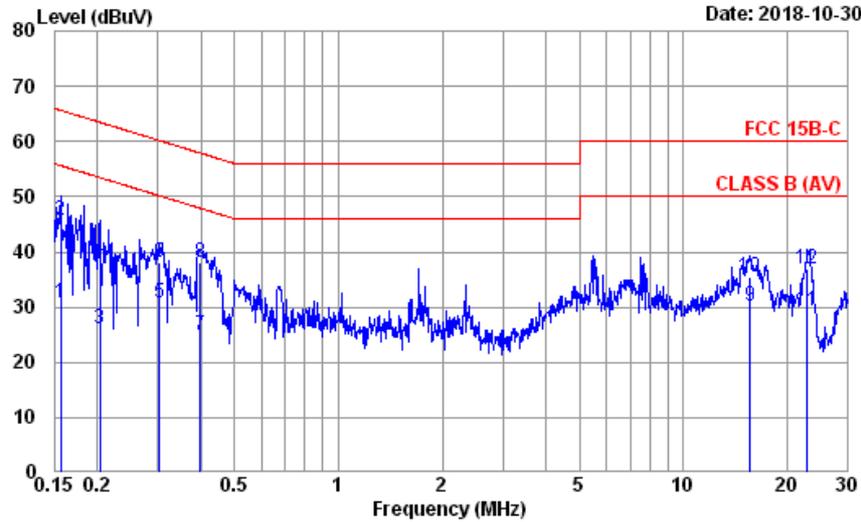


Site no. : No.8 Shielded Room Data no. : 4
 Condition : ENV4200 100169 LISN Phase : NEUTRAL
 Limit : FCC 15B-C
 Env. / Ins. : 24°C / 49% ESR3(1774) Engineer : Nick Du
 EUT : 14Z990
 Power Rating : 120Vac/60Hz
 Test Mode : Operating

	Freq. (MHz)	AMN Factor (dB)	Cable Loss (dB)	Pulse Att. (dB)	Reading (dBµV)	Emission Level (dBµV)	Limits (dBµV)	Margin (dB)	Remark
1	0.163	10.56	0.03	9.98	8.99	29.56	55.30	25.74	Average
2	0.163	10.56	0.03	9.98	20.75	41.32	65.30	23.98	QP
3	0.186	10.53	0.03	9.98	8.77	29.31	54.20	24.89	Average
4	0.186	10.53	0.03	9.98	20.54	41.08	64.20	23.12	QP
5	0.303	10.47	0.04	9.98	12.97	33.46	50.15	16.69	Average
6	0.303	10.47	0.04	9.98	20.02	40.51	60.15	19.64	QP
7	0.402	10.43	0.04	9.98	7.60	28.05	47.81	19.76	Average
8	0.402	10.43	0.04	9.98	20.77	41.22	57.81	16.59	QP
9	15.307	12.65	0.23	10.05	6.60	29.53	50.00	20.47	Average
10	15.307	12.65	0.23	10.05	11.62	34.55	60.00	25.45	QP
11	23.018	14.47	0.29	10.08	3.85	28.69	50.00	21.31	Average
12	23.018	14.47	0.29	10.08	12.15	36.99	60.00	23.01	QP

Remarks: 1. Emission Level= AMN Factor + Cable Loss + Pulse Att. + Reading.

Test Date	2018/10/30	Temp./Hum.	24°C/49%
Test Voltage	AC 120V 60Hz (Via AC Adapter)		



Site no. : No.8 Shielded Room Data no. : 3
 Condition : ENV4200 100169 LISN Phase : LINE
 Limit : FCC 15B-C
 Env. / Ins. : 24°C / 49% ESR3(1774) Engineer : Nick Du
 EUT : 14Z990
 Power Rating : 120Vac/60Hz
 Test Mode : Operating

	Freq. (MHz)	AMN Factor (dB)	Cable Loss (dB)	Pulse Att. (dB)	Reading (dBμV)	Emission Level (dBμV)	Limits (dBμV)	Margin (dB)	Remark
1	0.156	10.62	0.03	9.98	10.20	30.83	55.65	24.82	Average
2	0.156	10.62	0.03	9.98	25.14	45.77	65.65	19.88	QP
3	0.204	10.56	0.03	9.98	5.64	26.21	53.45	27.24	Average
4	0.204	10.56	0.03	9.98	18.00	38.57	63.45	24.88	QP
5	0.303	10.49	0.04	9.98	10.32	30.83	50.15	19.32	Average
6	0.303	10.49	0.04	9.98	17.67	38.18	60.15	21.97	QP
7	0.398	10.45	0.04	9.98	4.34	24.81	47.90	23.09	Average
8	0.398	10.45	0.04	9.98	17.64	38.11	57.90	19.79	QP
9	15.635	12.75	0.24	10.05	7.07	30.11	50.00	19.89	Average
10	15.635	12.75	0.24	10.05	12.36	35.40	60.00	24.60	QP
11	22.896	14.50	0.29	10.08	4.46	29.33	50.00	20.67	Average
12	22.896	14.50	0.29	10.08	11.93	36.80	60.00	23.20	QP

Remarks: 1. Emission Level= AMN Factor + Cable Loss + Pulse Att. + Reading.

A.2 RADIATED EMISSION

Test Date	2018/10/30	Temp./Hum.	23°C/50%
Test Voltage	AC 120V, 60Hz (via AC Adapter)		

A.2.1 Emissions within Restricted Frequency Bands

A.2.1.1 Frequency 9kHz~30MHz

The emissions (9kHz~30MHz) not reported for there is no emission be found.

A.2.1.2 Frequency Below 1 GHz

Mode	802.11n-HT20	Frequency	TX 2437MHz
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Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dB μ V)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Detector
30.9700	24.27	1.22	3.83	29.32	40.00	10.68	Peak
101.7800	17.60	2.29	8.87	28.76	43.50	14.74	Peak
217.2100	17.03	3.52	6.52	27.07	46.00	18.93	Peak
352.0400	20.91	5.00	3.33	29.24	46.00	16.76	Peak
472.3200	22.87	6.20	2.01	31.08	46.00	14.92	Peak
626.5500	24.71	6.85	1.64	33.20	46.00	12.80	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dB μ V)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Detector
30.9700	24.27	1.22	11.86	37.35	40.00	2.65	Peak
94.0200	16.36	2.20	12.62	31.18	43.50	12.32	Peak
163.8600	16.17	2.97	8.85	27.99	43.50	15.51	Peak
248.2500	19.05	3.80	4.78	27.63	46.00	18.37	Peak
325.8500	20.21	4.66	7.05	31.92	46.00	14.08	Peak
489.7800	23.04	6.34	2.73	32.11	46.00	13.89	Peak

Mode	BLE	Frequency	TX 2440MHz
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Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dB μ V)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Detector
31.9400	23.76	1.25	3.71	28.72	40.00	11.28	Peak
101.7800	17.60	2.29	9.11	29.00	43.50	14.50	Peak
214.3000	16.82	3.49	7.57	27.88	43.50	15.62	Peak
504.3300	23.23	6.44	1.52	31.19	46.00	14.81	Peak
663.4100	24.79	6.97	2.51	34.27	46.00	11.73	Peak
877.7800	26.62	8.05	2.90	37.57	46.00	8.43	Peak

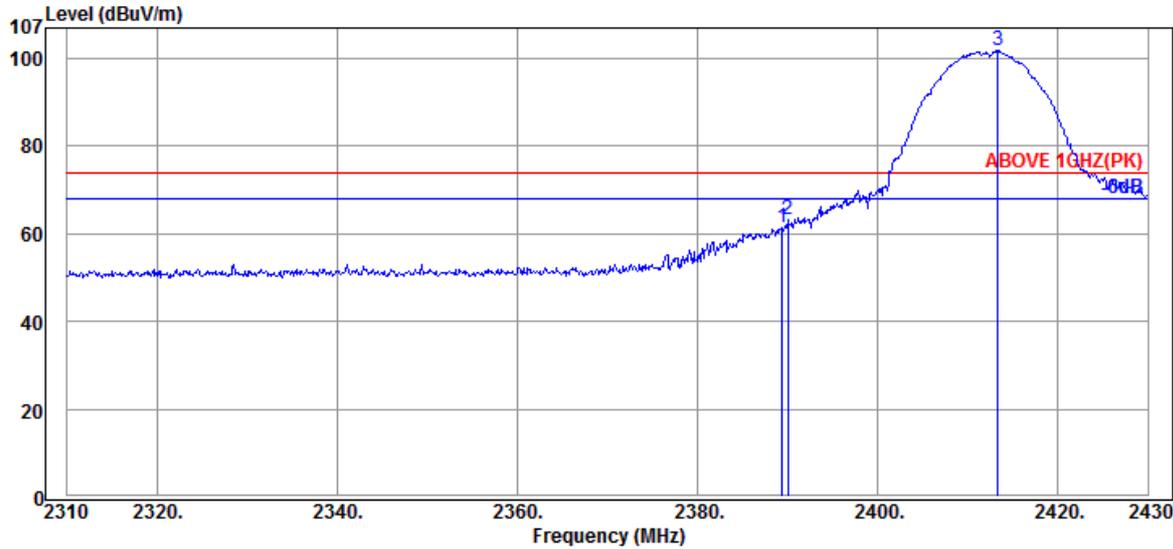
Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dB μ V)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Detector
30.9700	24.27	1.22	12.33	37.82	40.00	2.18	Peak
94.0200	16.36	2.20	11.96	30.52	43.50	12.98	Peak
165.8000	16.06	2.99	8.71	27.76	43.50	15.74	Peak
322.9400	20.15	4.63	6.87	31.65	46.00	14.35	Peak
431.5800	22.43	5.85	4.22	32.50	46.00	13.50	Peak
526.6400	23.57	6.52	3.03	33.12	46.00	12.88	Peak

A.2.1.3 Frequency Above 1 GHz to 10th harmonics

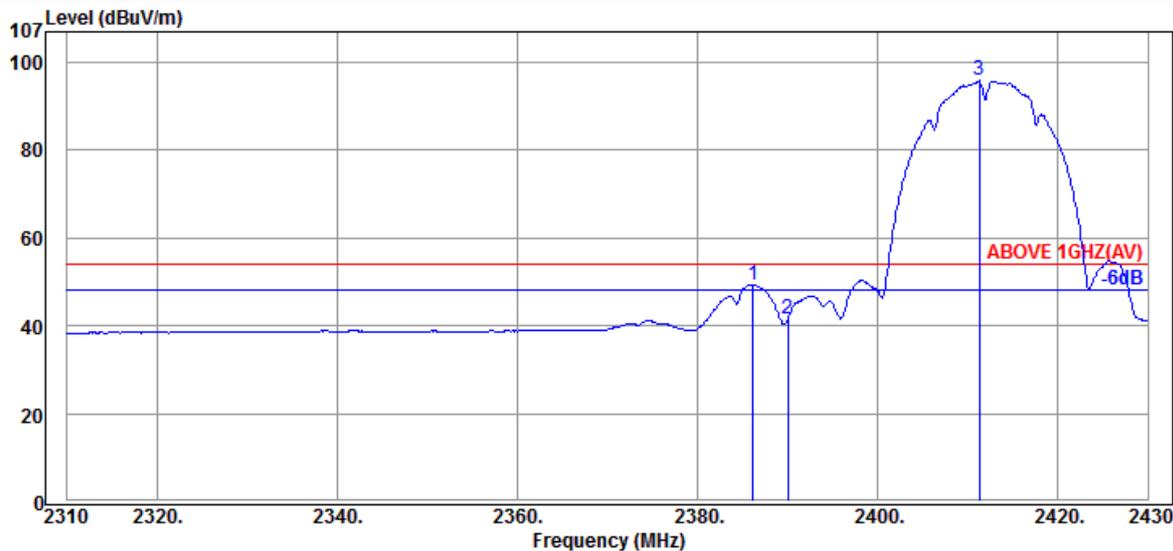
Band Edge:

Mode	802.11b	Frequency	TX 2412MHz
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Antenna at Horizontal Polarization

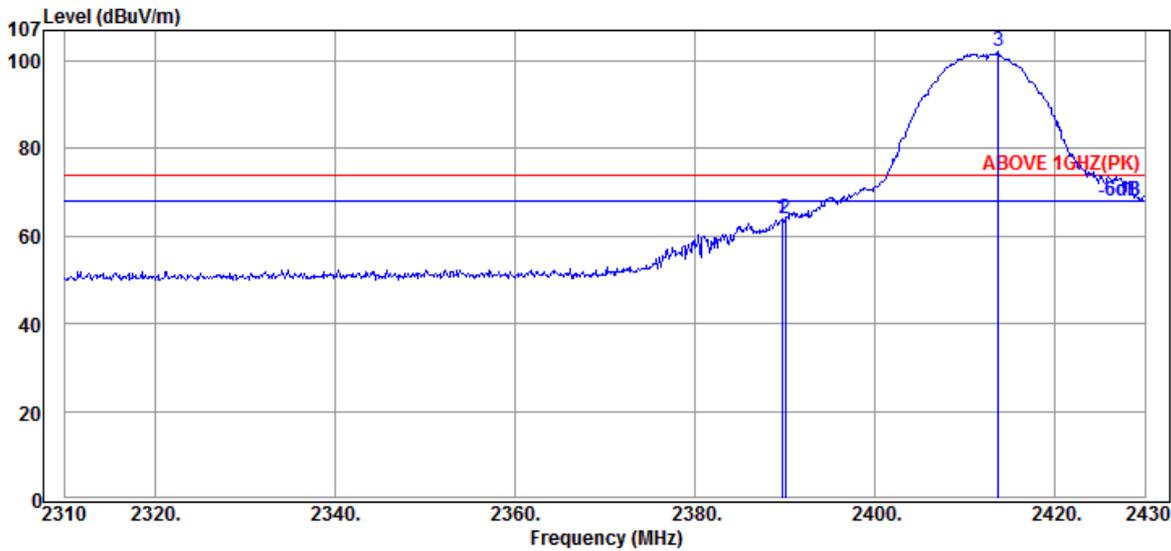
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2389.44	28.28	5.24	27.94	61.46	74.00	12.54	Peak
2390.04	28.28	5.24	29.67	63.19	74.00	10.81	Peak
2413.32	28.31	5.26	68.29	101.86	---	---	Peak



Antenna at Horizontal Polarization

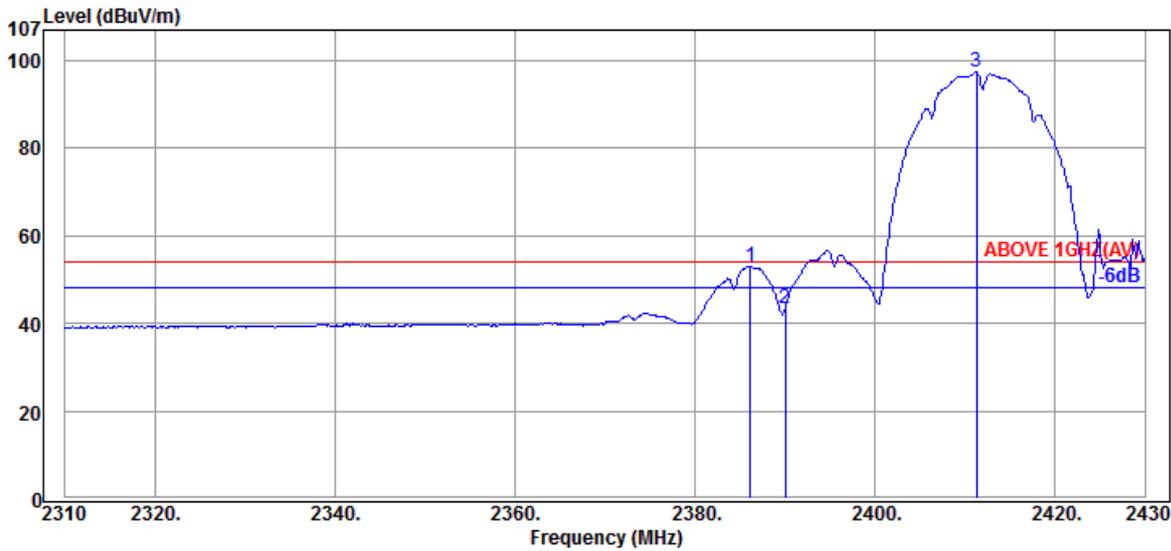
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2386.20	28.28	5.23	15.81	49.32	54.00	4.68	Average
2390.04	28.28	5.24	8.01	41.53	54.00	12.47	Average
2411.28	28.31	5.26	62.25	95.82	---	---	Average

Mode	802.11b	Frequency	TX 2412MHz
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Antenna at Vertical Polarization

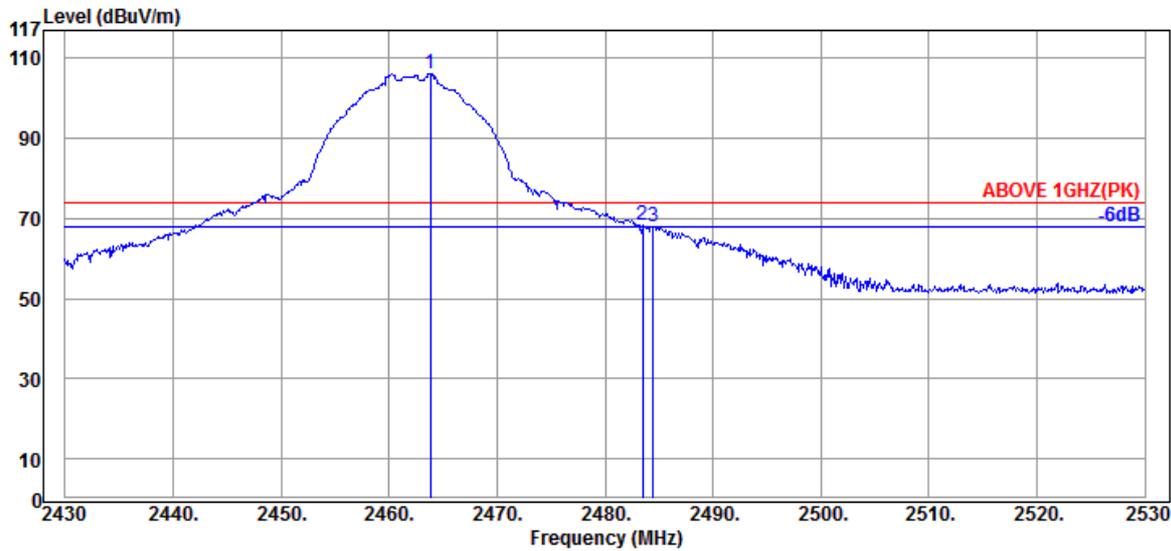
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2389.68	28.28	5.24	30.50	64.02	74.00	9.98	Peak
2390.04	28.28	5.24	30.29	63.81	74.00	10.19	Peak
2413.68	28.31	5.26	68.60	102.17	---	---	Peak



Antenna at Vertical Polarization

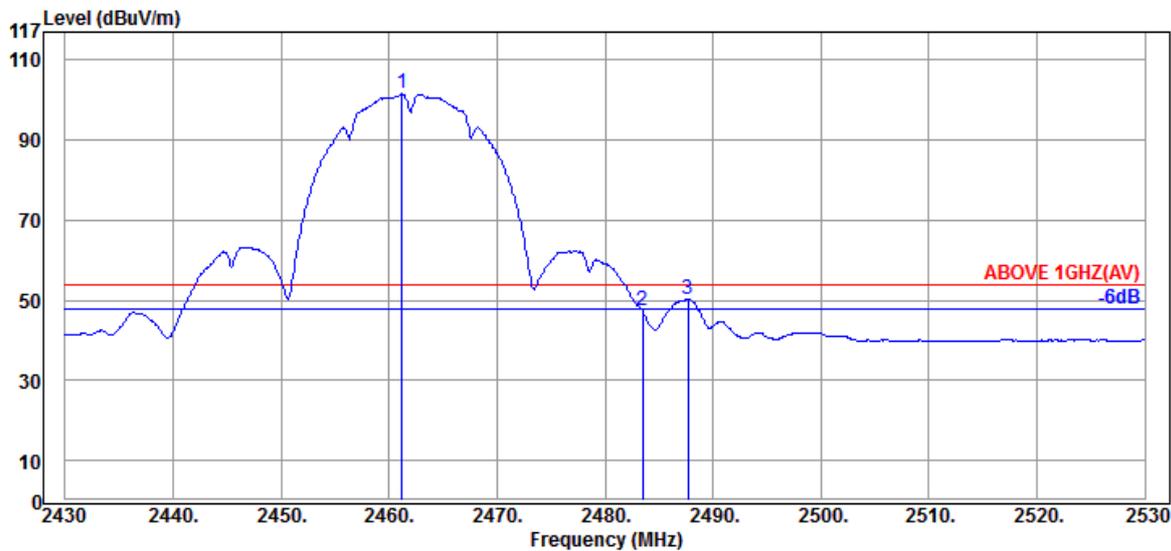
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2386.20	28.28	5.23	19.46	52.97	54.00	1.03	Average
2390.04	28.28	5.24	9.93	43.45	54.00	10.55	Average
2411.28	28.31	5.26	63.74	97.31	---	---	Average

Mode	802.11b	Frequency	TX 2462MHz
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Antenna at Horizontal Polarization

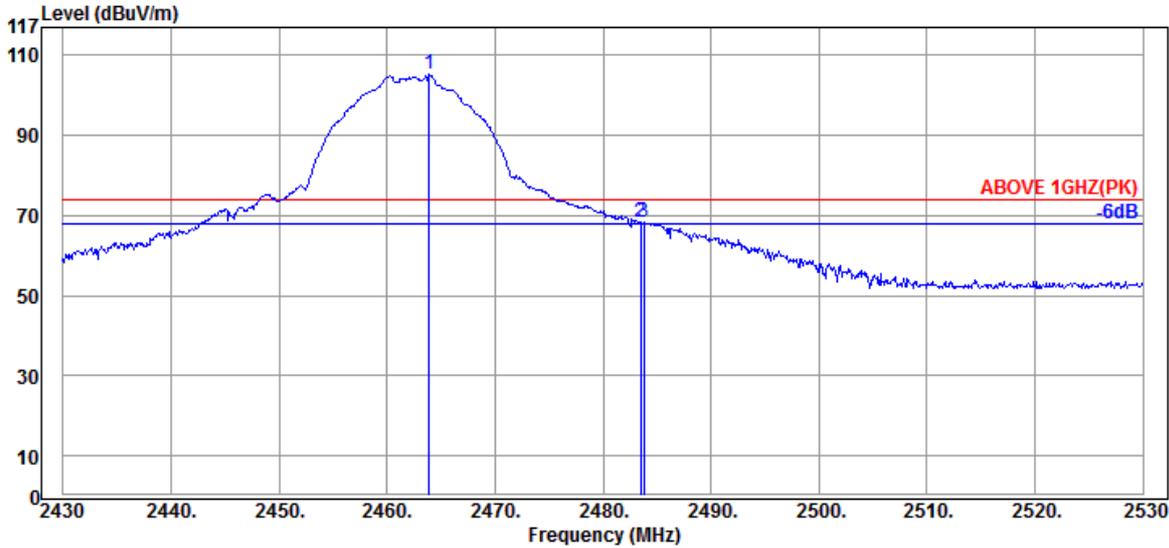
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2463.80	28.36	5.29	72.57	106.22	---	---	Peak
2483.50	28.38	5.31	34.62	68.31	74.00	5.69	Peak
2484.50	28.38	5.31	34.39	68.08	74.00	5.92	Peak



Antenna at Horizontal Polarization

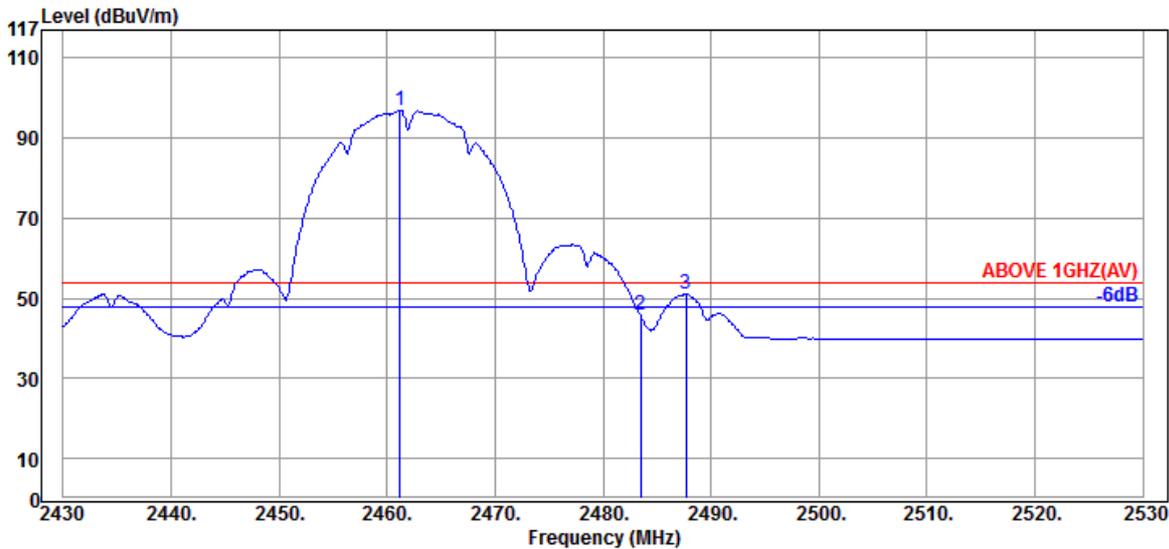
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2461.20	28.36	5.29	67.94	101.59	---	---	Average
2483.50	28.38	5.31	13.64	47.33	54.00	6.67	Average
2487.70	28.38	5.31	16.58	50.27	54.00	3.73	Average

Mode	802.11b	Frequency	TX 2462MHz
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Antenna at Vertical Polarization

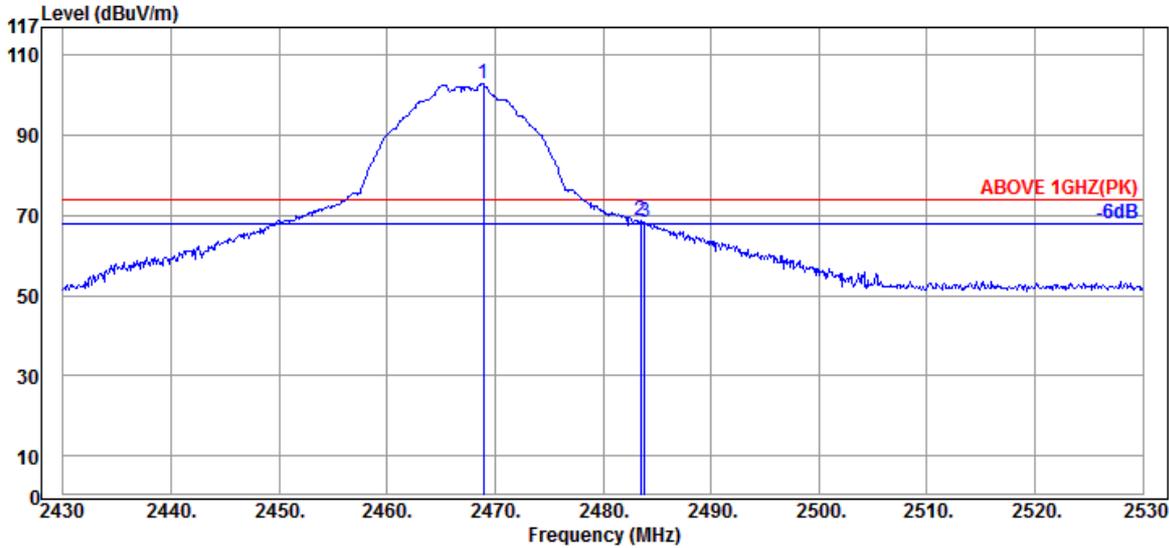
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2463.90	28.36	5.29	71.55	105.20	---	---	Peak
2483.50	28.38	5.31	34.80	68.49	74.00	5.51	Peak
2483.80	28.38	5.31	34.50	68.19	74.00	5.81	Peak



Antenna at Vertical Polarization

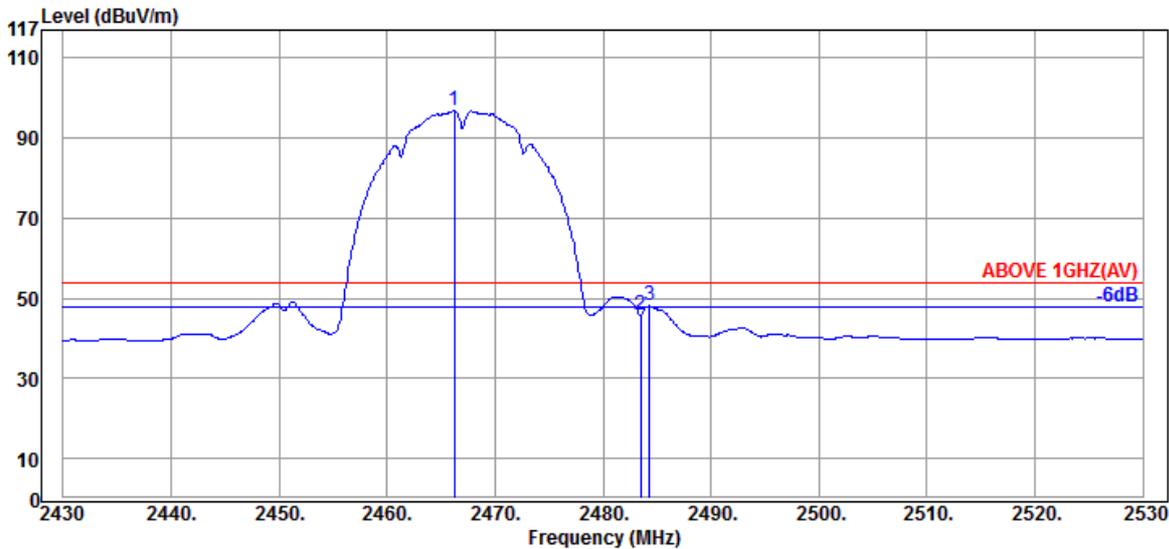
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2461.20	28.36	5.29	63.32	96.97	---	---	Average
2483.50	28.38	5.31	12.11	45.80	54.00	8.20	Average
2487.70	28.38	5.31	17.35	51.04	54.00	2.96	Average

Mode	802.11b	Frequency	TX 2467MHz
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Antenna at Horizontal Polarization

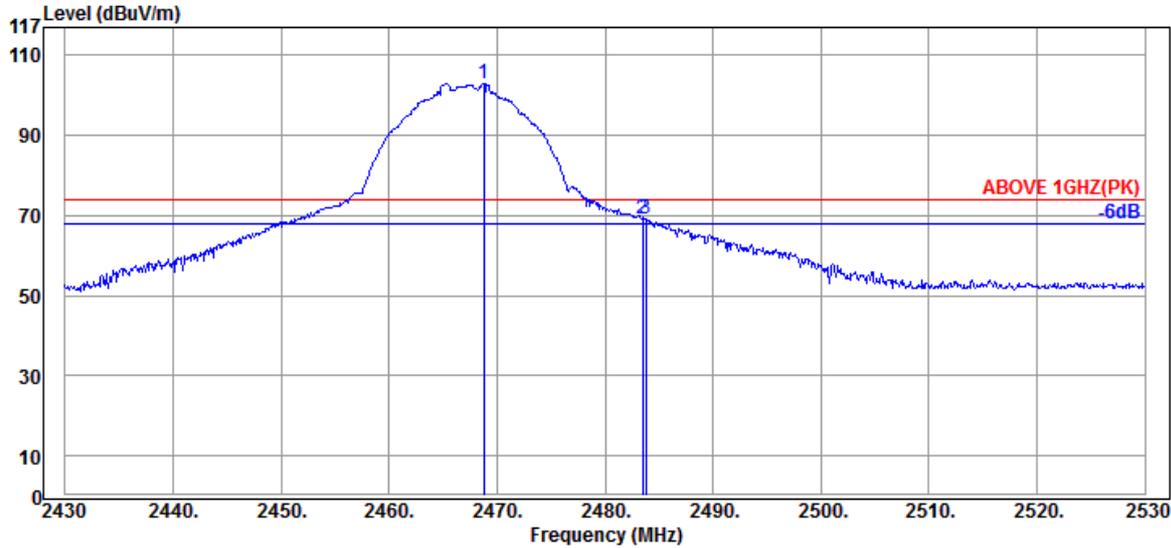
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2468.90	28.37	5.30	69.16	102.83	---	---	Peak
2483.50	28.38	5.31	35.22	68.91	74.00	5.09	Peak
2483.90	28.38	5.31	34.71	68.40	74.00	5.60	Peak



Antenna at Horizontal Polarization

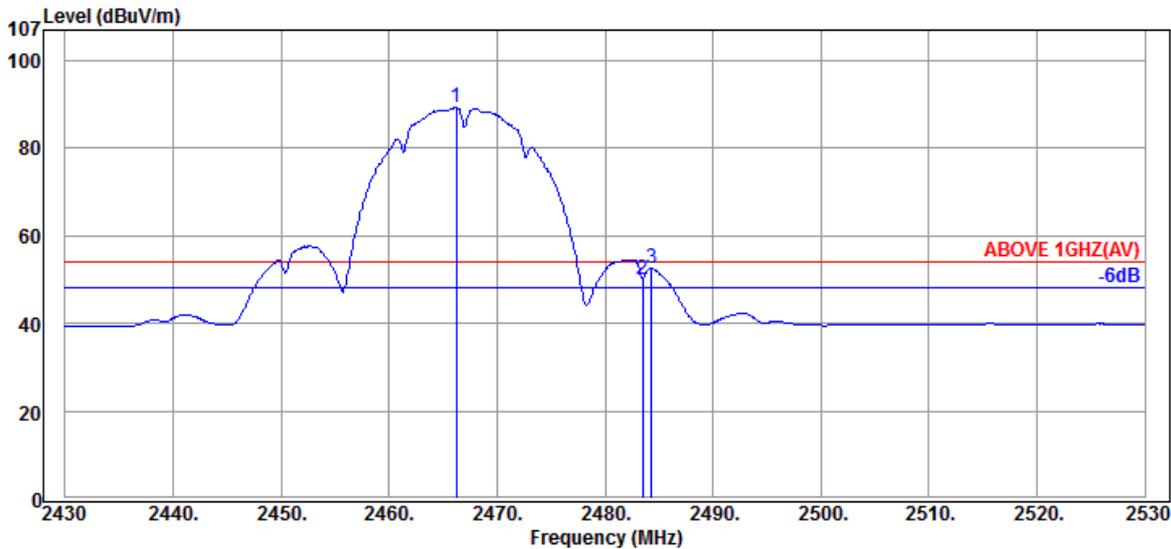
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2466.20	28.36	5.29	63.28	96.93	---	---	Average
2483.50	28.38	5.31	12.05	45.74	54.00	8.26	Average
2484.30	28.38	5.31	14.36	48.05	54.00	5.95	Average

Mode	802.11b	Frequency	TX 2467MHz
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Antenna at Vertical Polarization

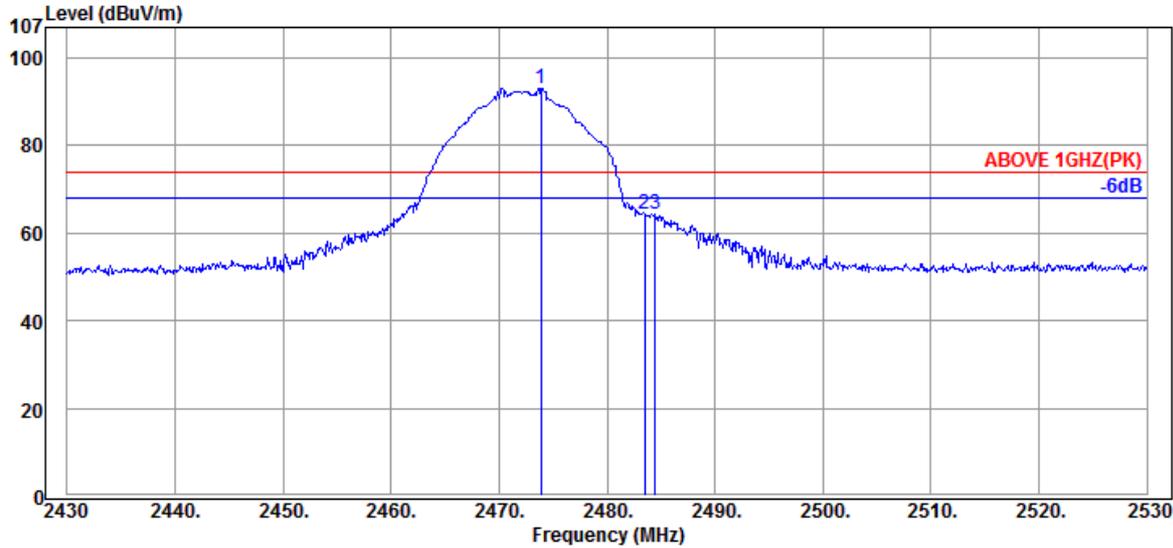
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2468.80	28.37	5.30	69.39	103.06	---	---	Peak
2483.50	28.38	5.31	35.51	69.20	74.00	4.80	Peak
2483.80	28.38	5.31	35.44	69.13	74.00	4.87	Peak



Antenna at Vertical Polarization

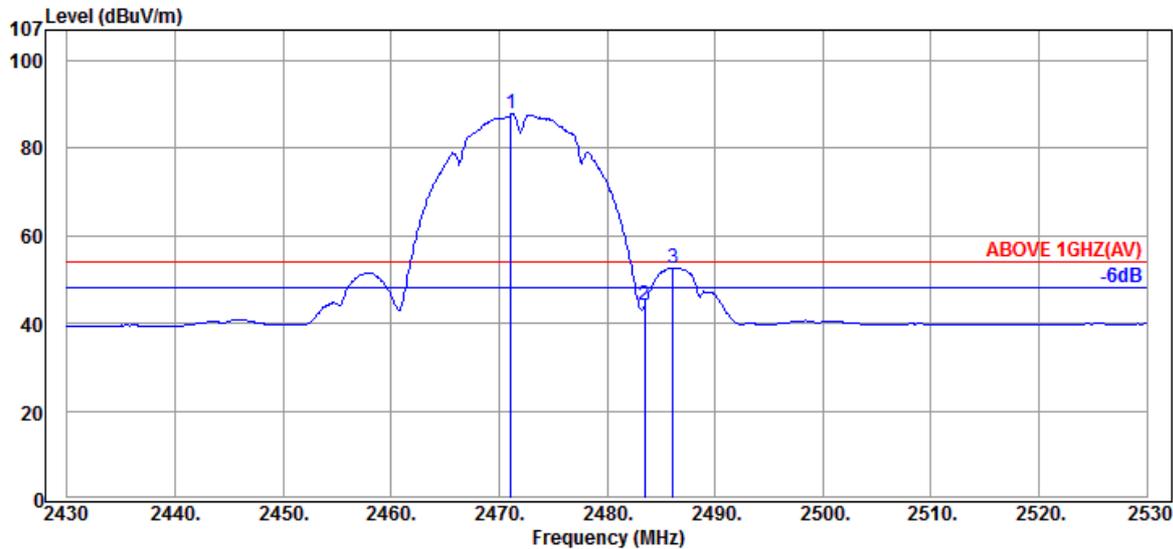
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2466.20	28.36	5.29	55.81	89.46	---	---	Average
2483.50	28.38	5.31	16.34	50.03	54.00	3.97	Average
2484.30	28.38	5.31	19.05	52.74	54.00	1.26	Average

Mode	802.11b	Frequency	TX 2472MHz
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Antenna at Horizontal Polarization

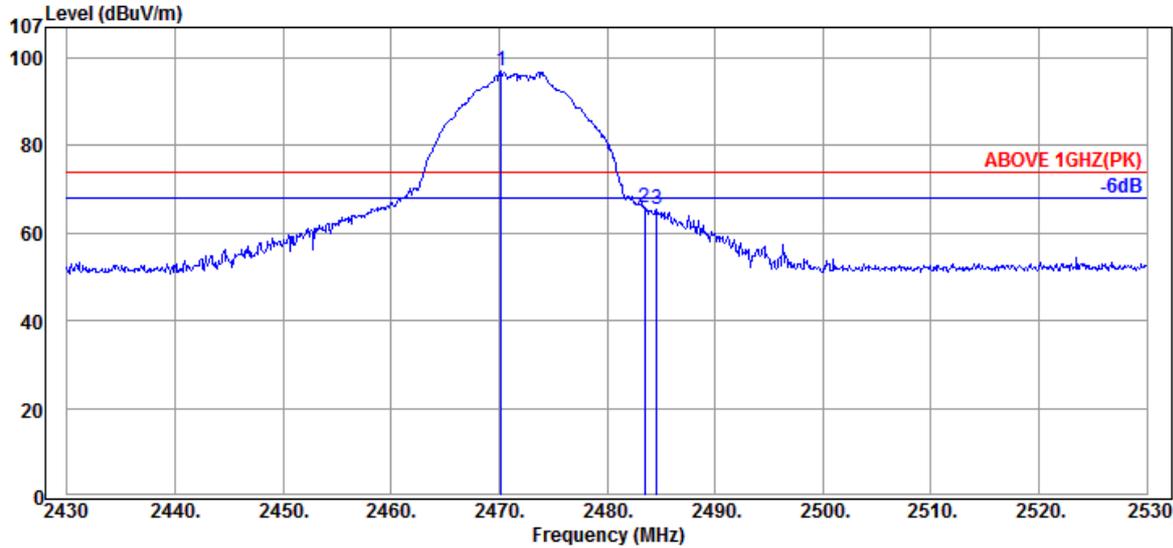
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2473.90	28.37	5.30	59.48	93.15	---	---	Peak
2483.50	28.38	5.31	30.54	64.23	74.00	9.77	Peak
2484.50	28.38	5.31	30.73	64.42	74.00	9.58	Peak



Antenna at Horizontal Polarization

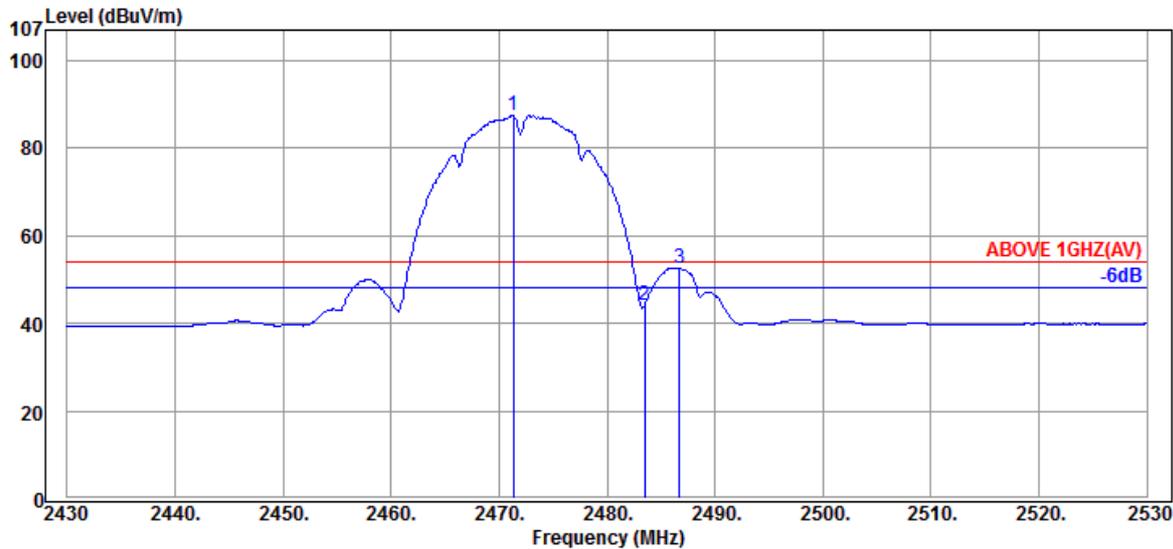
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2471.10	28.37	5.30	54.07	87.74	---	---	Average
2483.50	28.38	5.31	10.40	44.09	54.00	9.91	Average
2486.10	28.38	5.31	19.06	52.75	54.00	1.25	Average

Mode	802.11b	Frequency	TX 2472MHz
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Antenna at Vertical Polarization

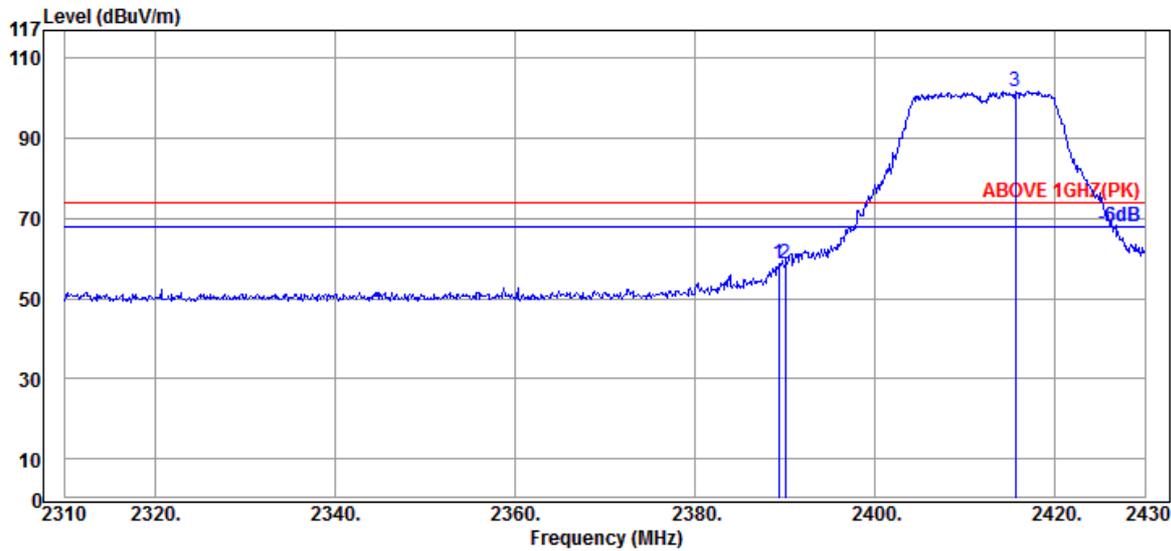
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2470.20	28.37	5.30	63.32	96.99	---	---	Peak
2483.50	28.38	5.31	32.06	65.75	74.00	8.25	Peak
2484.60	28.38	5.31	31.78	65.47	74.00	8.53	Peak



Antenna at Vertical Polarization

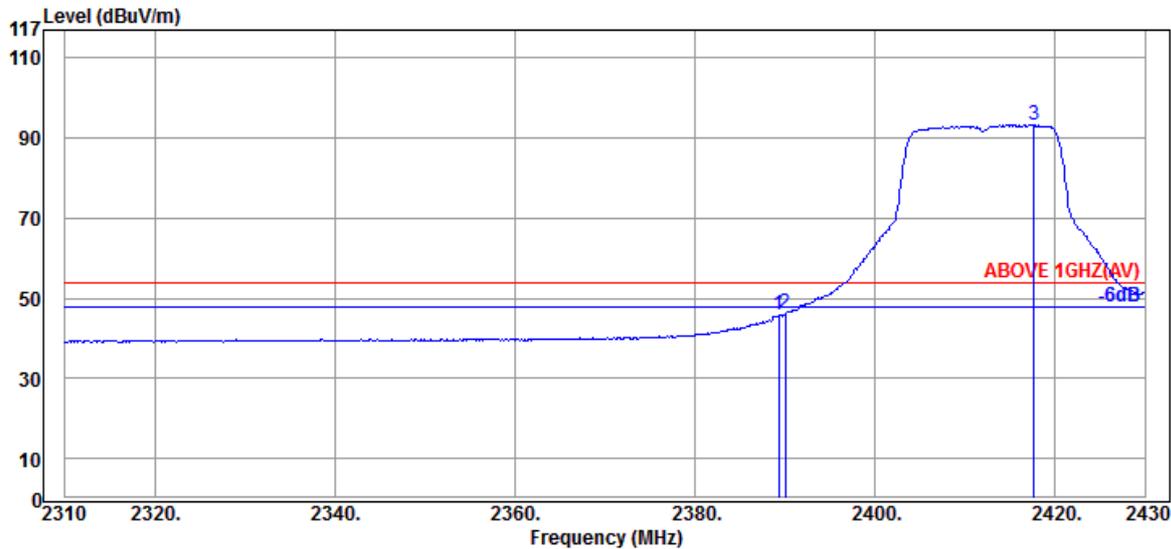
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2471.30	28.37	5.30	53.81	87.48	---	---	Average
2483.50	28.38	5.31	10.31	44.00	54.00	10.00	Average
2486.70	28.38	5.31	18.87	52.56	54.00	1.44	Average

Mode	802.11g	Frequency	TX 2412MHz
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Antenna at Horizontal Polarization

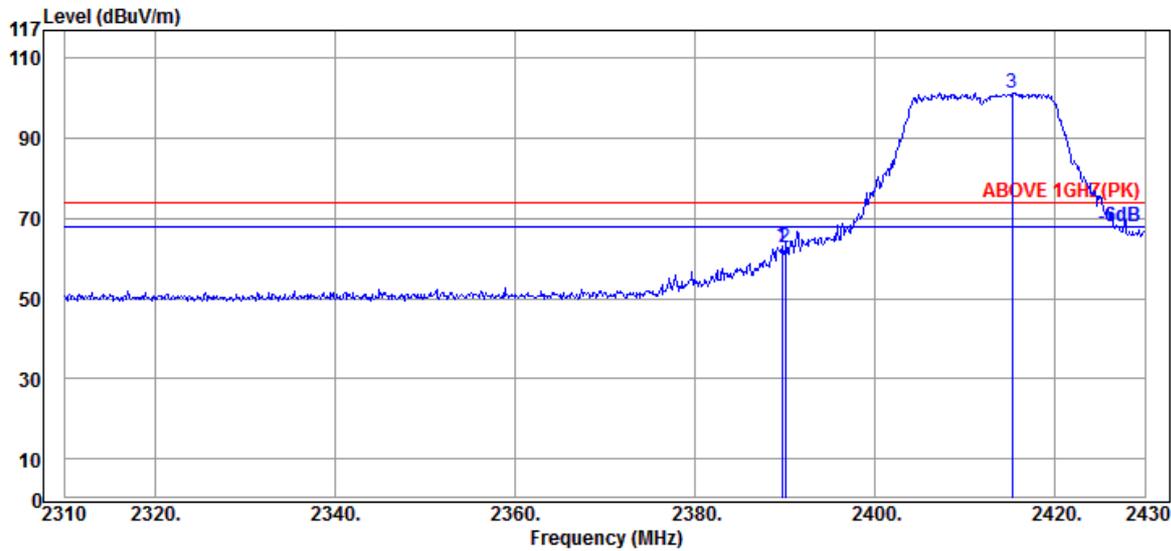
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2389.32	28.28	5.24	25.04	58.56	74.00	15.44	Peak
2390.04	28.28	5.24	25.30	58.82	74.00	15.18	Peak
2415.60	28.31	5.26	68.14	101.71	---	---	Peak



Antenna at Horizontal Polarization

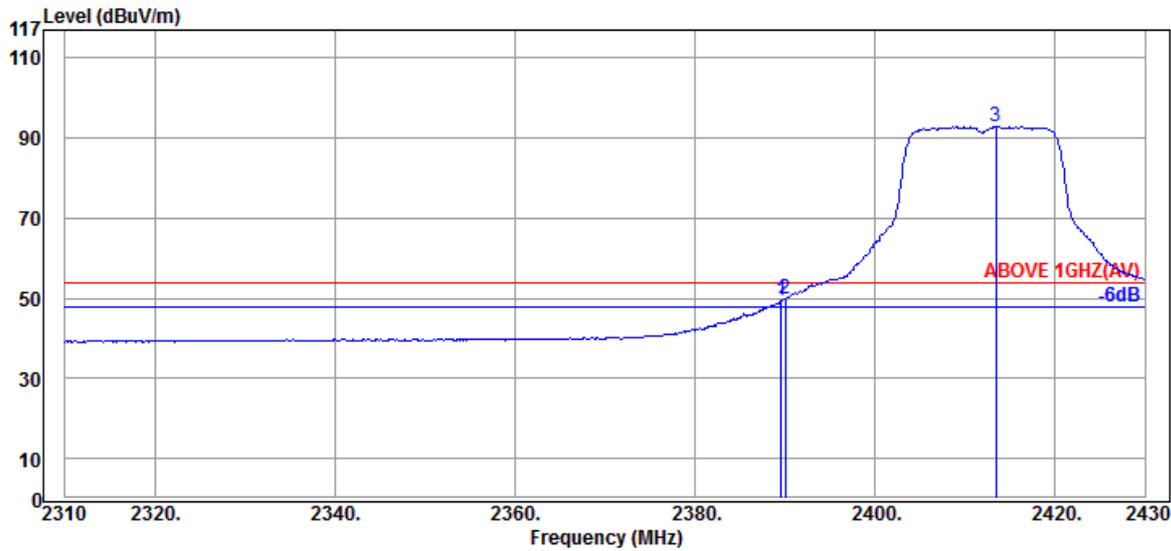
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2389.32	28.28	5.24	12.36	45.88	54.00	8.12	Average
2390.04	28.28	5.24	12.84	46.36	54.00	7.64	Average
2417.64	28.31	5.26	59.69	93.26	---	---	Average

Mode	802.11g	Frequency	TX 2412MHz
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Antenna at Vertical Polarization

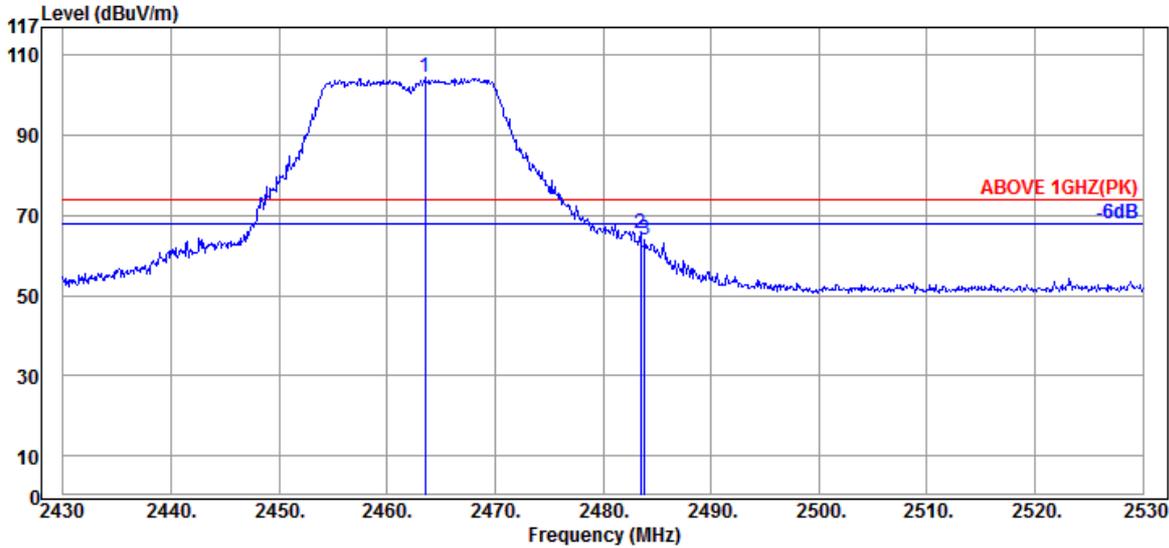
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2389.68	28.28	5.24	29.49	63.01	74.00	10.99	Peak
2390.04	28.28	5.24	29.07	62.59	74.00	11.41	Peak
2415.24	28.31	5.26	67.83	101.40	---	---	Peak



Antenna at Vertical Polarization

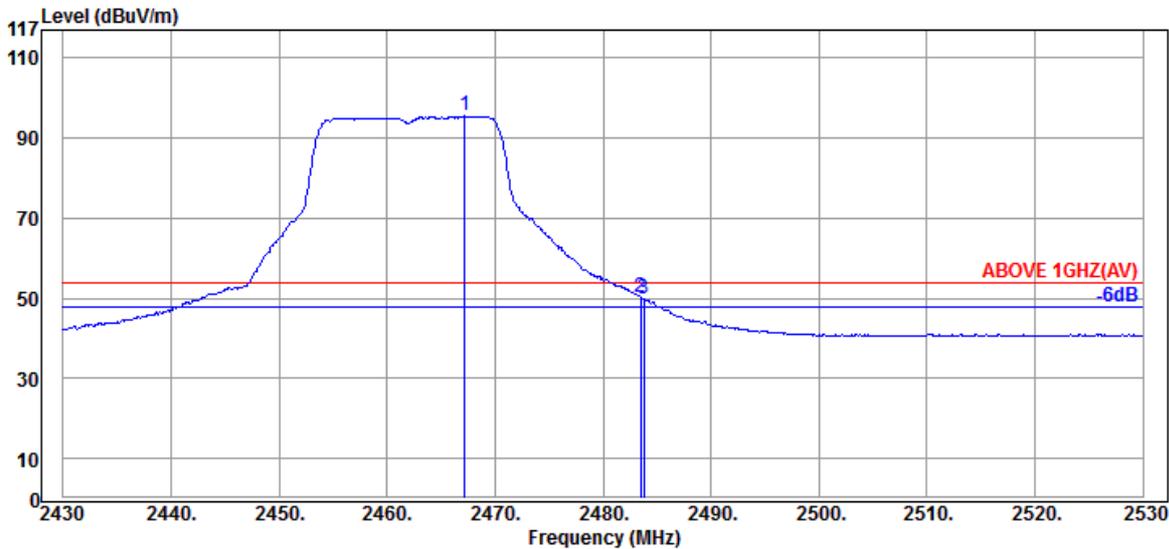
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2389.56	28.28	5.24	16.03	49.55	54.00	4.45	Average
2390.04	28.28	5.24	16.50	50.02	54.00	3.98	Average
2413.44	28.31	5.26	59.43	93.00	---	---	Average

Mode	802.11g	Frequency	TX 2462MHz
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Antenna at Horizontal Polarization

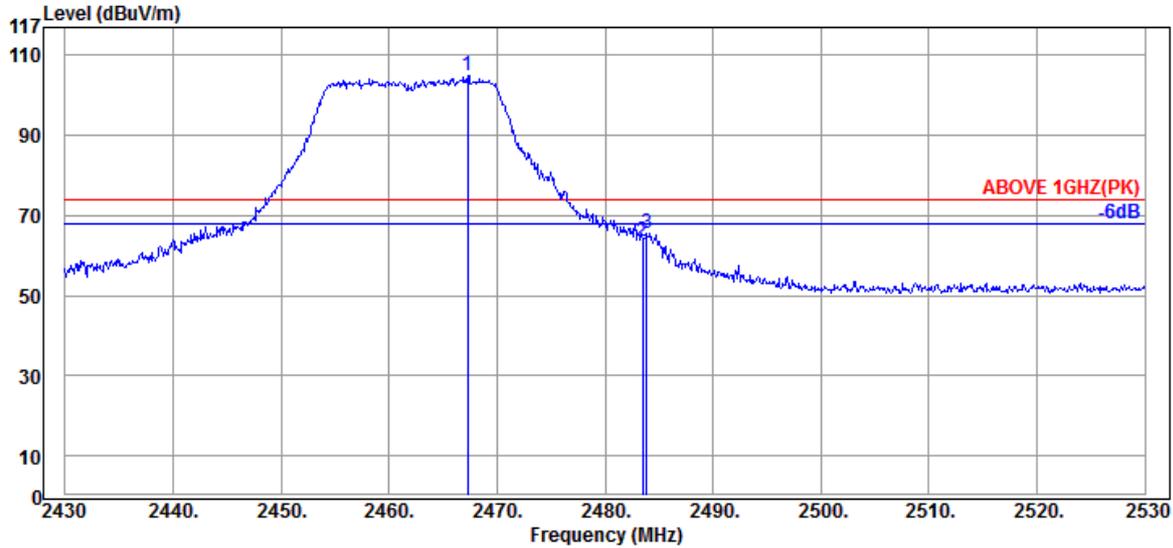
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2463.50	28.36	5.29	70.76	104.41	---	---	Peak
2483.50	28.38	5.31	32.00	65.69	74.00	8.31	Peak
2483.90	28.38	5.31	30.04	63.73	74.00	10.27	Peak



Antenna at Horizontal Polarization

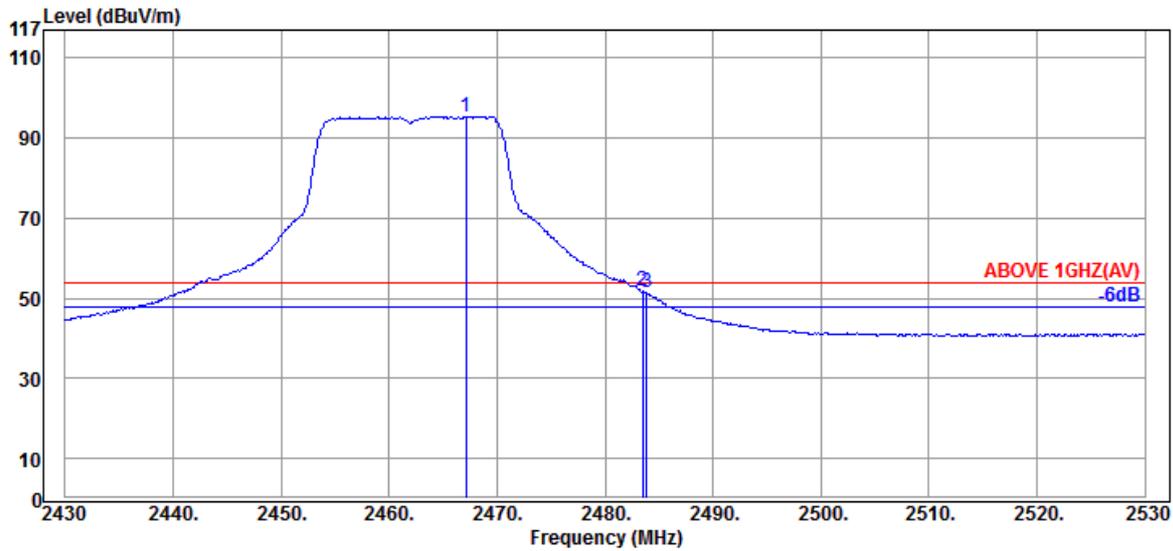
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2467.20	28.36	5.29	61.88	95.53	---	---	Average
2483.50	28.38	5.31	16.71	50.40	54.00	3.60	Average
2483.80	28.38	5.31	16.21	49.90	54.00	4.10	Average

Mode	802.11g	Frequency	TX 2462MHz
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Antenna at Vertical Polarization

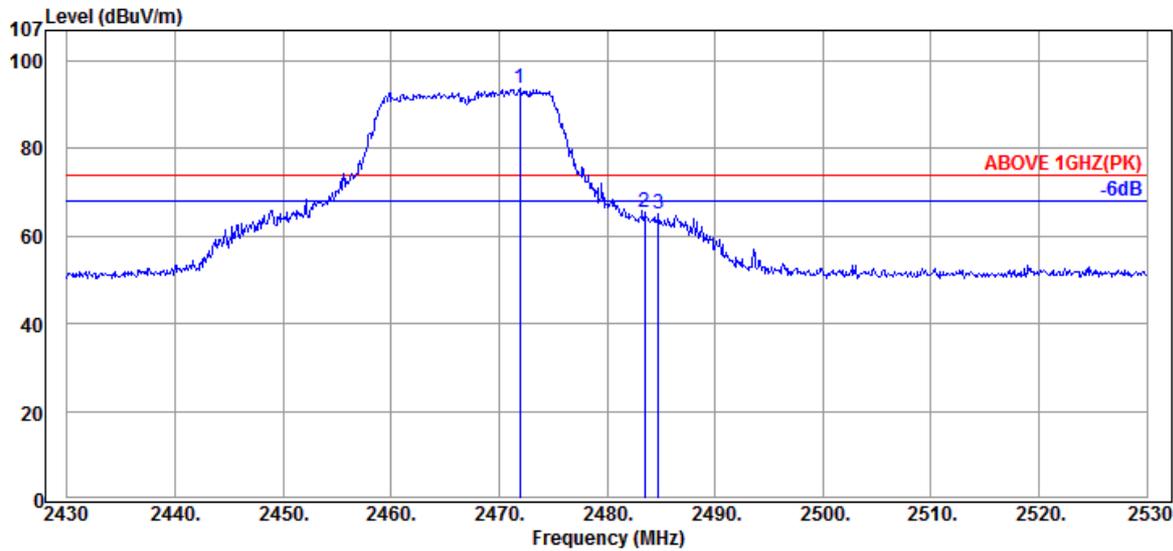
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2467.30	28.36	5.29	71.48	105.13	---	---	Peak
2483.50	28.38	5.31	29.91	63.60	74.00	10.40	Peak
2483.90	28.38	5.31	31.98	65.67	74.00	8.33	Peak



Antenna at Vertical Polarization

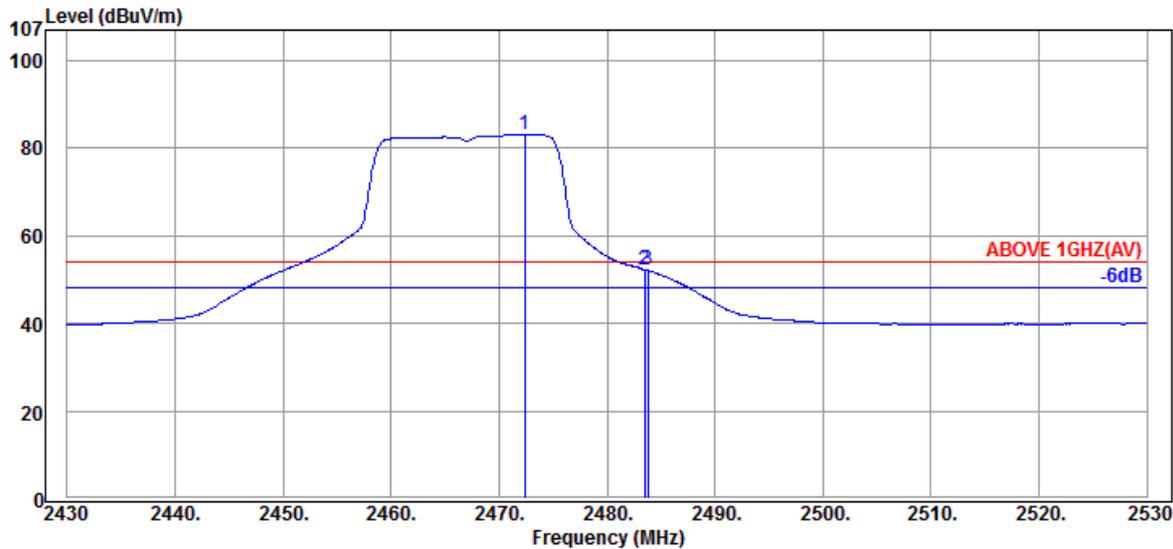
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2467.10	28.36	5.29	61.84	95.49	---	---	Average
2483.50	28.38	5.31	18.16	51.85	54.00	2.15	Average
2483.90	28.38	5.31	17.59	51.28	54.00	2.72	Average

Mode	802.11g	Frequency	TX 2467MHz
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Antenna at Horizontal Polarization

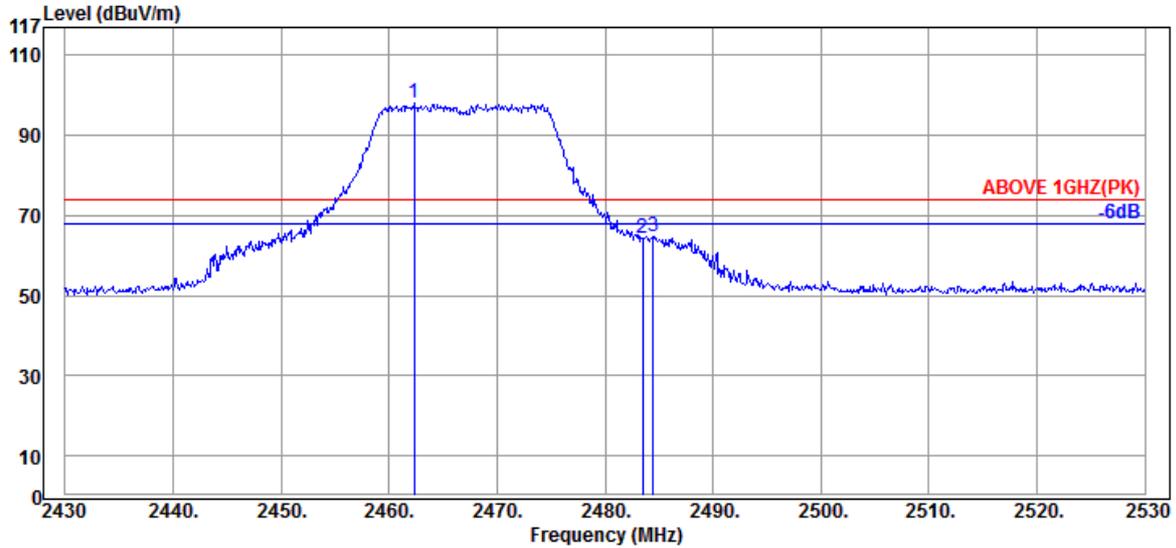
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2471.90	28.37	5.30	59.93	93.60	---	---	Peak
2483.50	28.38	5.31	31.86	65.55	74.00	8.45	Peak
2484.80	28.38	5.31	31.36	65.05	74.00	8.95	Peak



Antenna at Horizontal Polarization

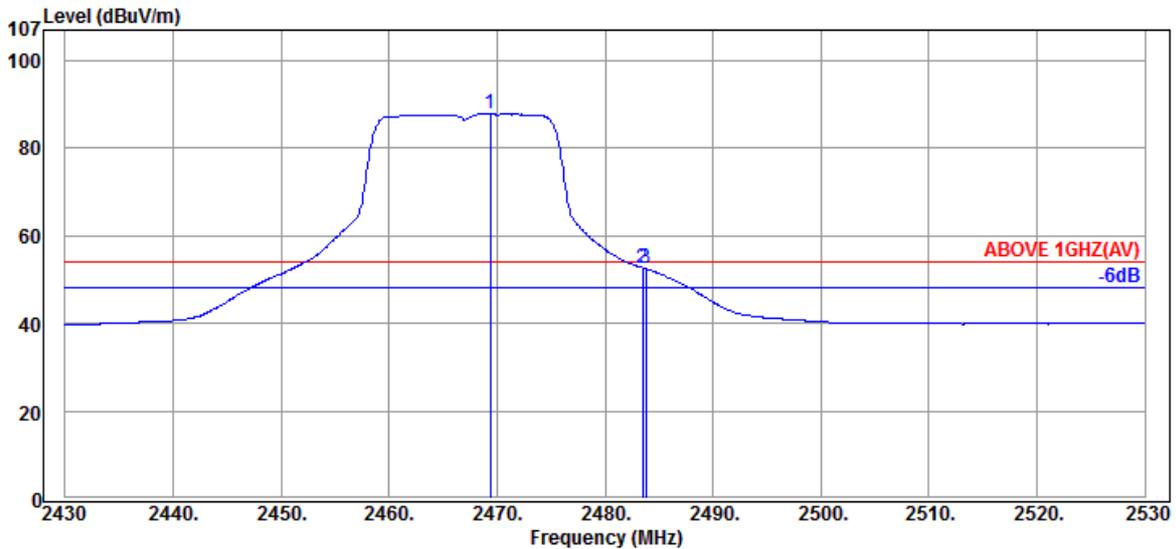
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2472.40	28.37	5.30	49.42	83.09	---	---	Average
2483.50	28.38	5.31	18.62	52.31	54.00	1.69	Average
2483.80	28.38	5.31	18.38	52.07	54.00	1.93	Average

Mode	802.11g	Frequency	TX 2467MHz
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Antenna at Vertical Polarization

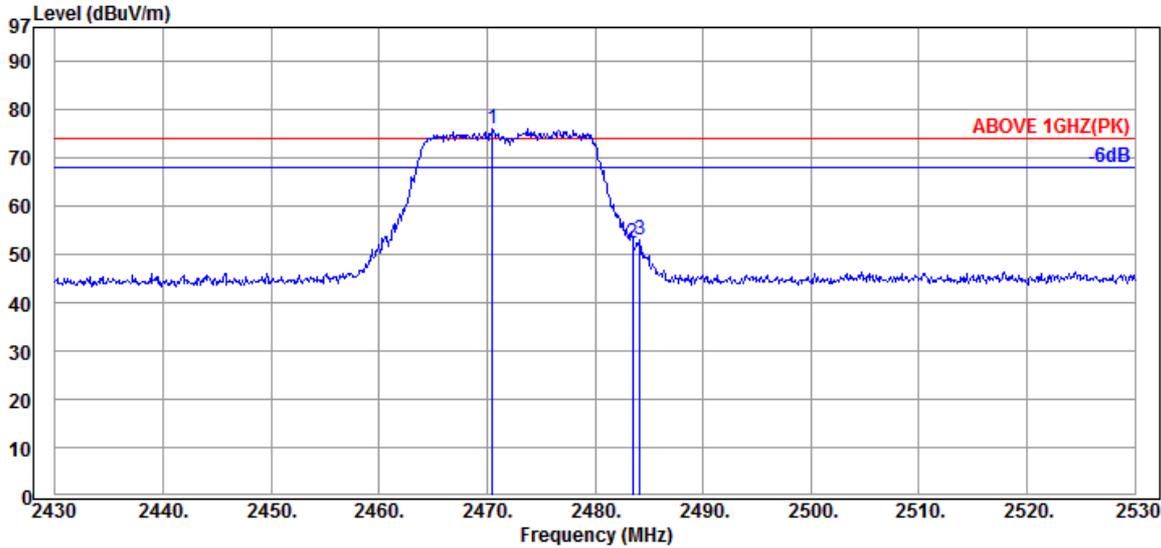
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2462.30	28.36	5.29	64.26	97.91	---	---	Peak
2483.50	28.38	5.31	30.52	64.21	74.00	9.79	Peak
2484.50	28.38	5.31	31.23	64.92	74.00	9.08	Peak



Antenna at Vertical Polarization

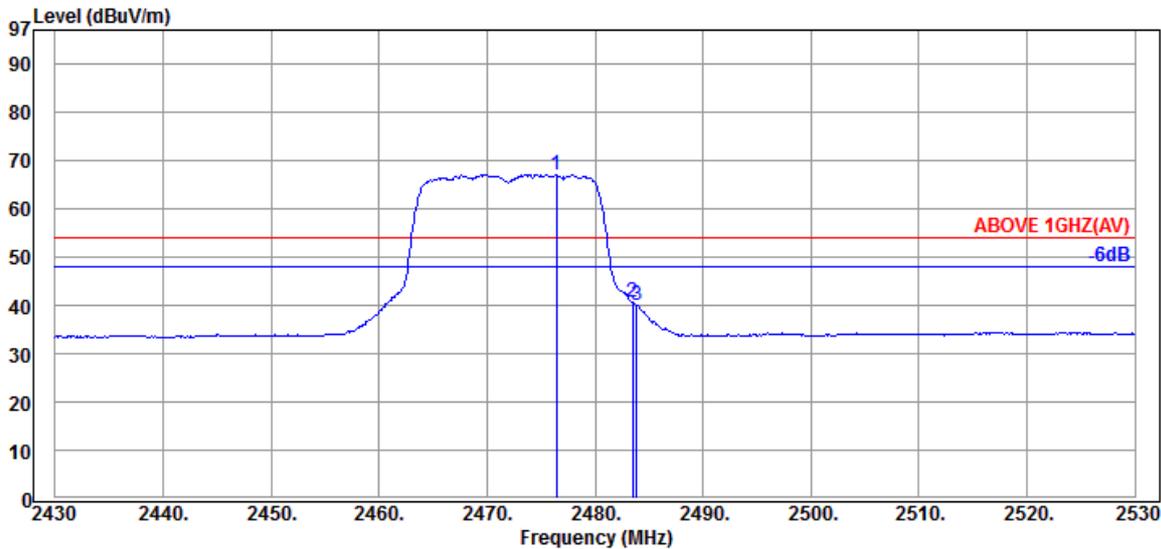
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2469.40	28.37	5.30	54.11	87.78	---	---	Average
2483.50	28.38	5.31	19.07	52.76	54.00	1.24	Average
2483.80	28.38	5.31	18.84	52.53	54.00	1.47	Average

Mode	802.11g	Frequency	TX 2472MHz
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Antenna at Horizontal Polarization

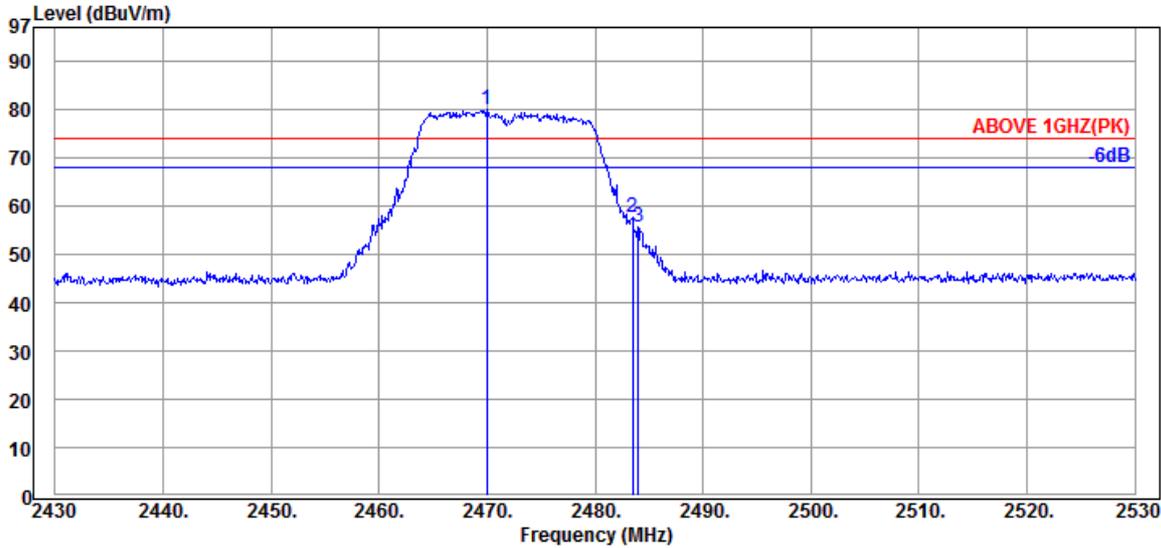
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2470.50	28.37	5.30	42.23	75.90	---	---	Peak
2483.50	28.38	5.31	18.68	52.37	74.00	21.63	Peak
2484.20	28.38	5.31	19.39	53.08	74.00	20.92	Peak



Antenna at Horizontal Polarization

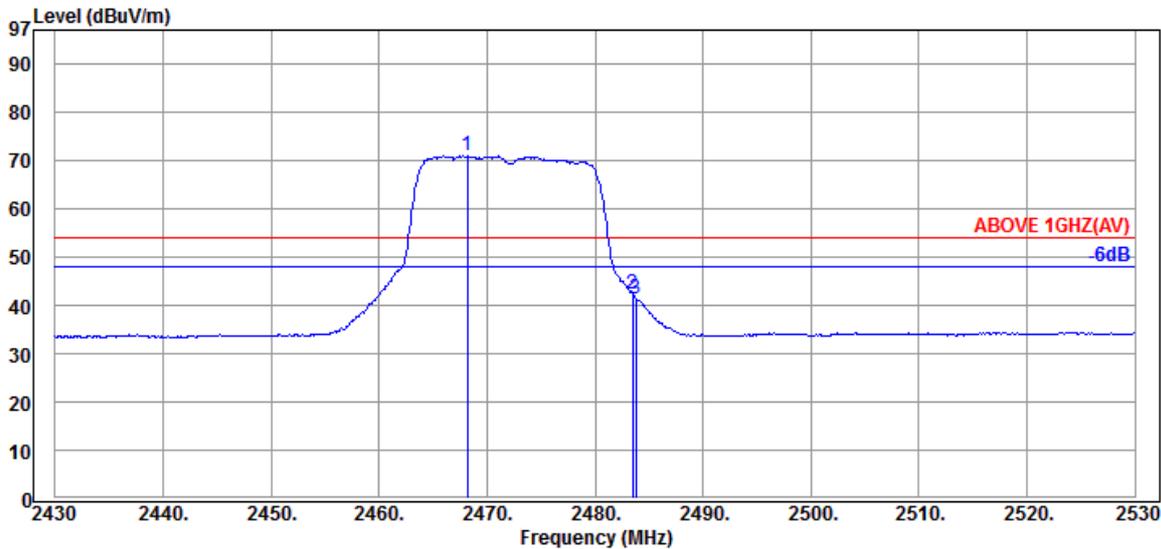
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2476.40	28.38	5.30	33.41	67.09	---	---	Average
2483.50	28.38	5.31	6.91	40.60	54.00	13.40	Average
2483.90	28.38	5.31	6.32	40.01	54.00	13.99	Average

Mode	802.11g	Frequency	TX 2472MHz
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Antenna at Vertical Polarization

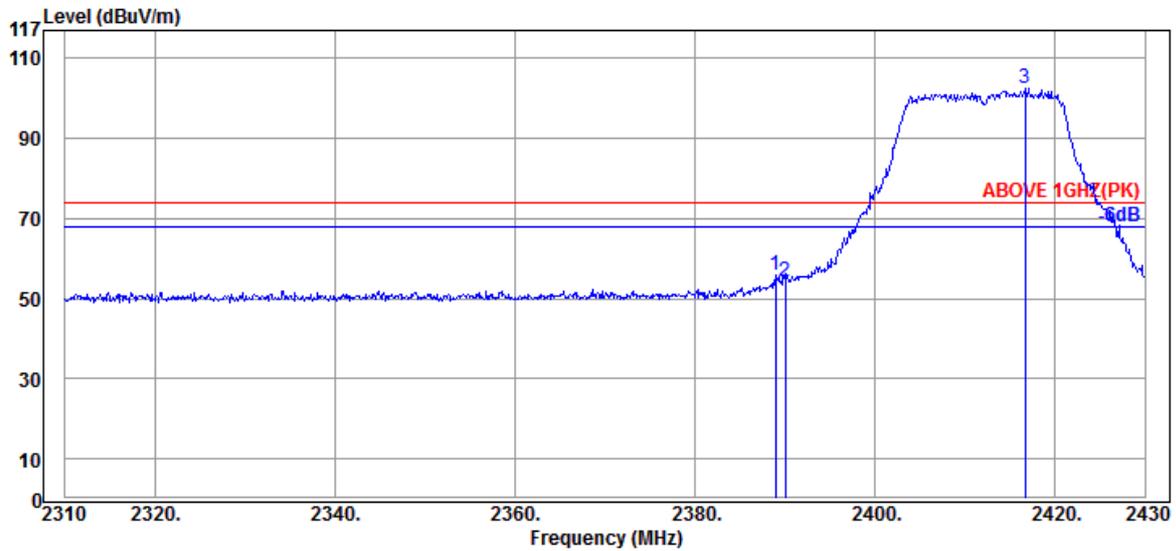
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2470.00	28.37	5.30	46.40	80.07	---	---	Peak
2483.50	28.38	5.31	23.88	57.57	74.00	16.43	Peak
2484.00	28.38	5.31	21.97	55.66	74.00	18.34	Peak



Antenna at Vertical Polarization

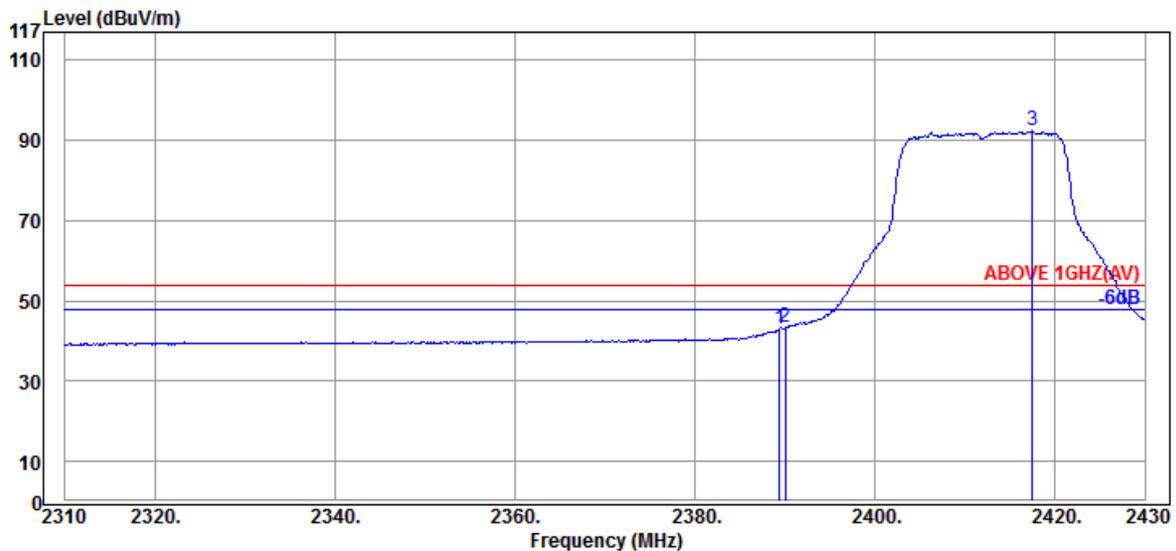
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2468.20	28.37	5.30	37.29	70.96	---	---	Average
2483.50	28.38	5.31	8.58	42.27	54.00	11.73	Average
2483.80	28.38	5.31	7.81	41.50	54.00	12.50	Average

Mode	802.11n-HT20	Frequency	TX 2412MHz
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Antenna at Horizontal Polarization

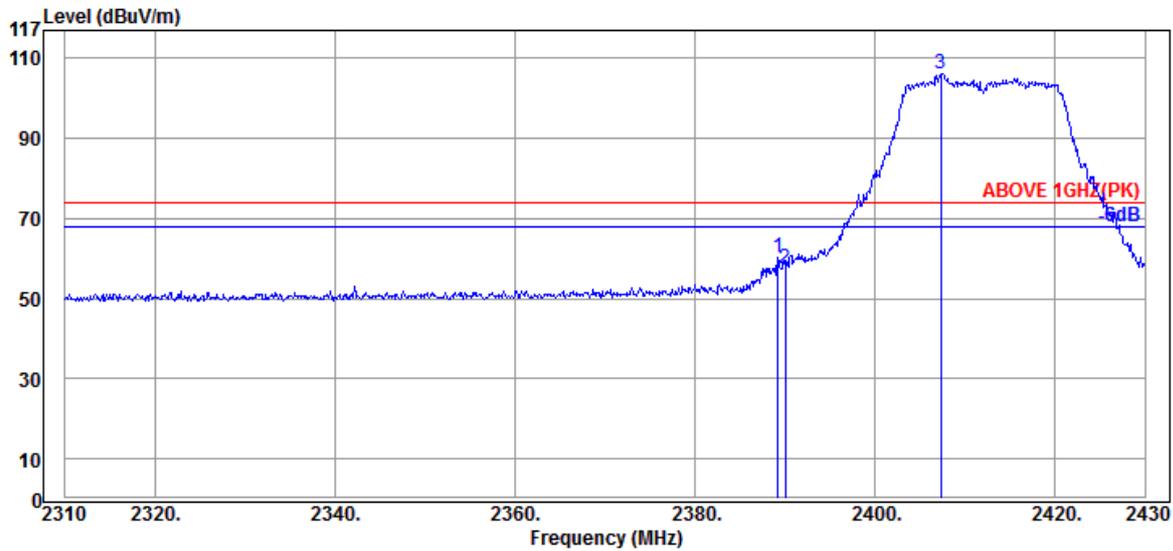
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2388.96	28.28	5.24	22.19	55.71	74.00	18.29	Peak
2390.04	28.28	5.24	20.89	54.41	74.00	19.59	Peak
2416.68	28.31	5.26	69.02	102.59	---	---	Peak



Antenna at Horizontal Polarization

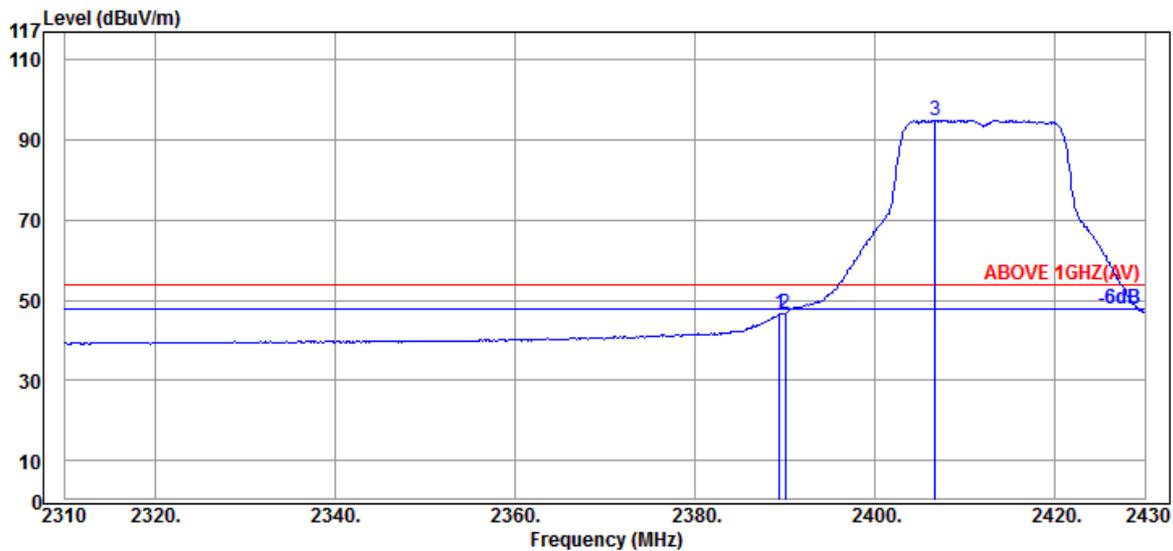
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2389.44	28.28	5.24	9.42	42.94	54.00	11.06	Average
2390.04	28.28	5.24	9.77	43.29	54.00	10.71	Average
2417.52	28.31	5.26	58.73	92.30	---	---	Average

Mode	802.11n-HT20	Frequency	TX 2412MHz
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Antenna at Vertical Polarization

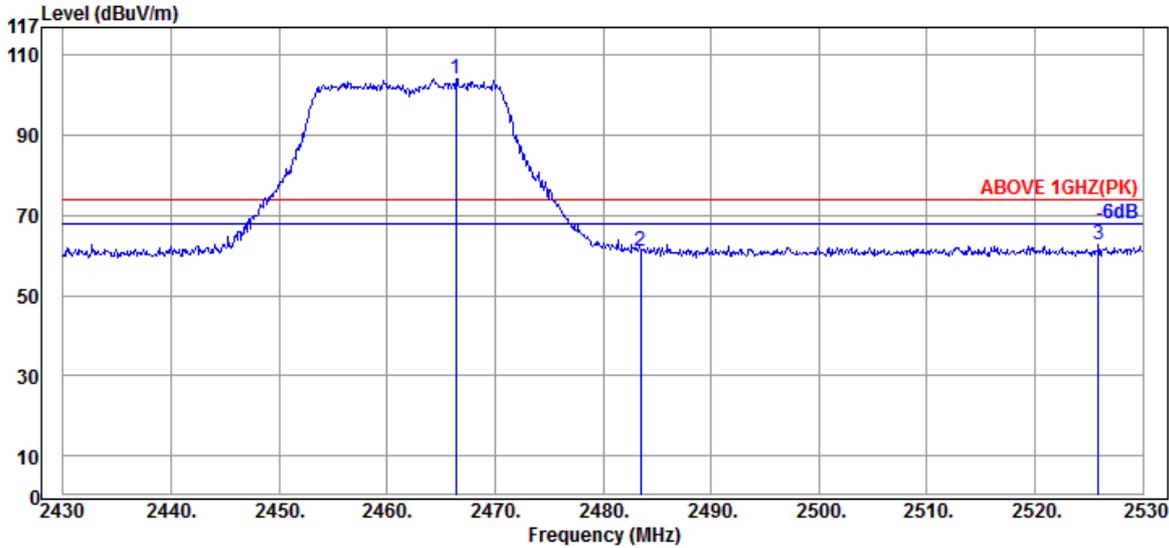
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2389.20	28.28	5.24	26.73	60.25	74.00	13.75	Peak
2390.04	28.28	5.24	23.82	57.34	74.00	16.66	Peak
2407.32	28.30	5.25	72.73	106.28	---	---	Peak



Antenna at Vertical Polarization

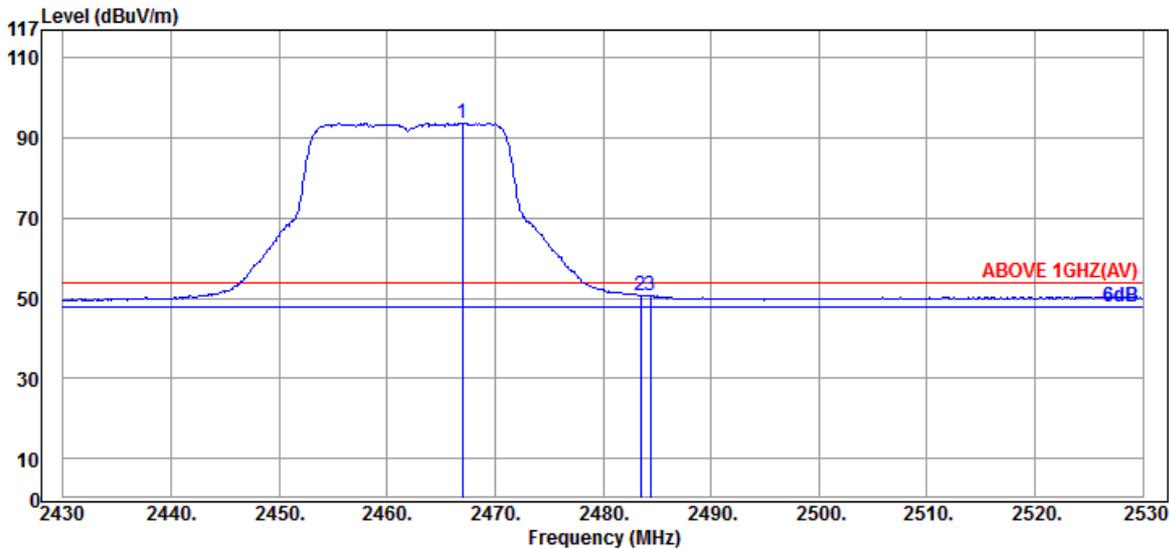
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2389.44	28.28	5.24	13.09	46.61	54.00	7.39	Average
2390.04	28.28	5.24	13.28	46.80	54.00	7.20	Average
2406.72	28.30	5.25	61.46	95.01	---	---	Average

Mode	802.11n-HT20	Frequency	TX 2462MHz
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Antenna at Horizontal Polarization

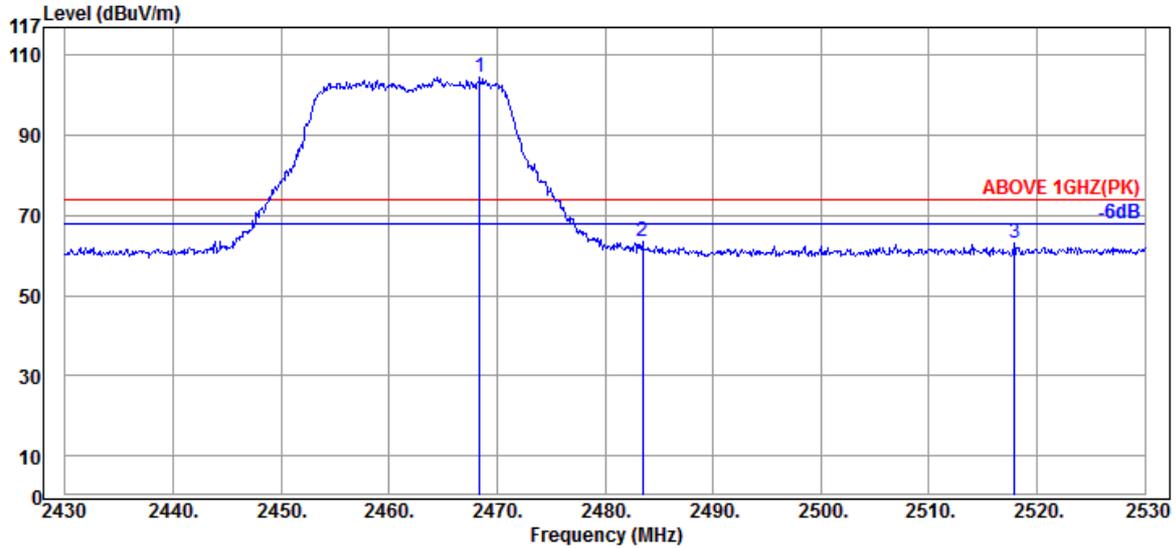
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2466.40	28.36	5.29	70.55	104.20	---	---	Peak
2483.50	28.38	5.31	27.48	61.17	74.00	12.83	Peak
2525.90	28.51	5.34	28.93	62.78	74.00	11.22	Peak



Antenna at Horizontal Polarization

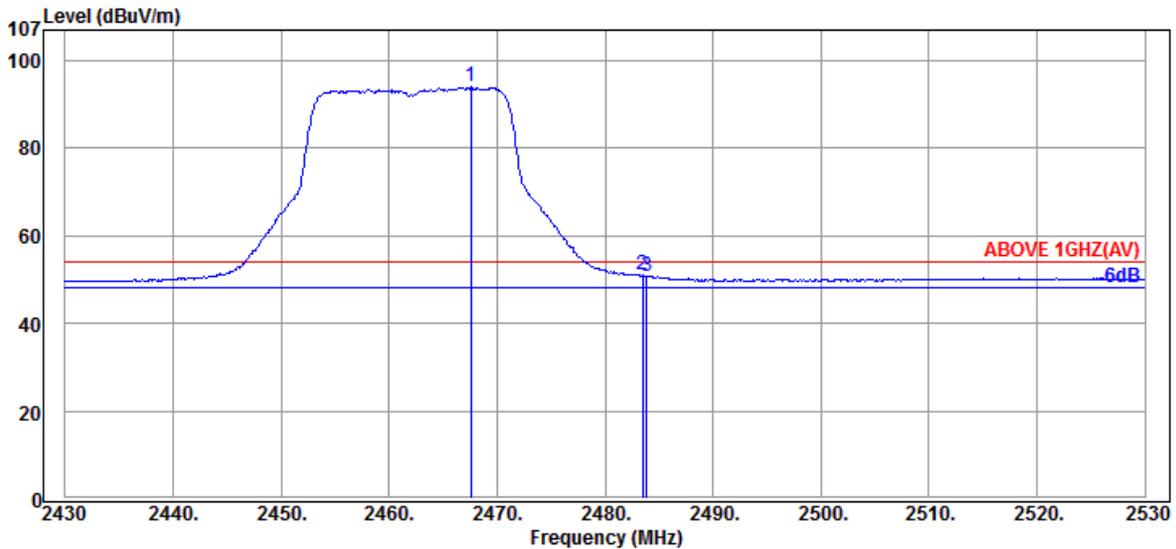
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2467.00	28.36	5.29	60.09	93.74	---	---	Average
2483.50	28.38	5.31	17.12	50.81	54.00	3.19	Average
2484.40	28.38	5.31	17.16	50.85	54.00	3.15	Average

Mode	802.11n-HT20	Frequency	TX 2462MHz
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Antenna at Vertical Polarization

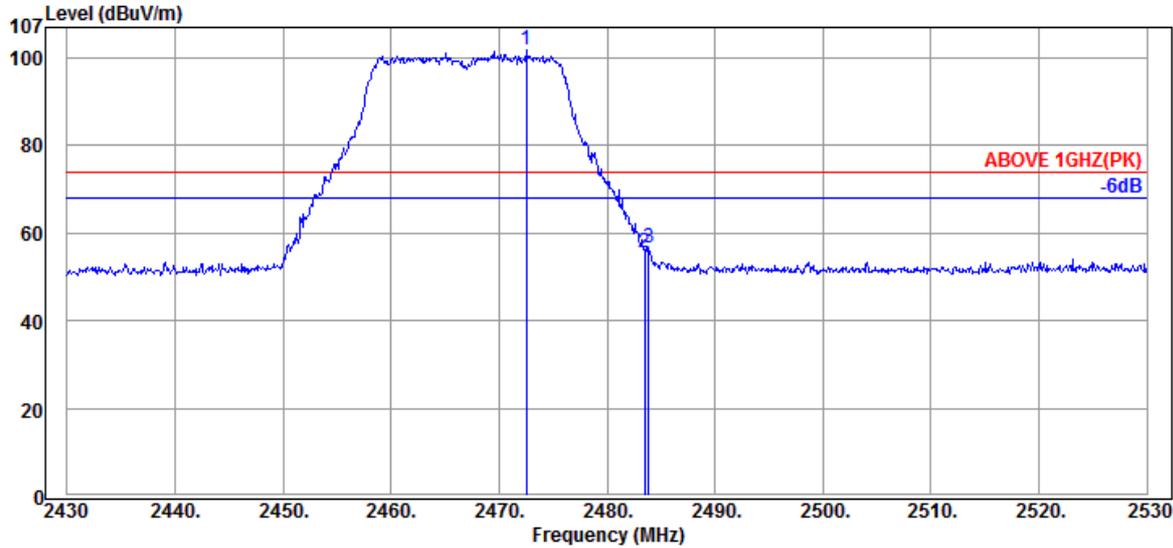
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2468.40	28.37	5.30	70.85	104.52	---	---	Peak
2483.50	28.38	5.31	29.92	63.61	74.00	10.39	Peak
2517.90	28.45	5.33	29.36	63.14	74.00	10.86	Peak



Antenna at Vertical Polarization

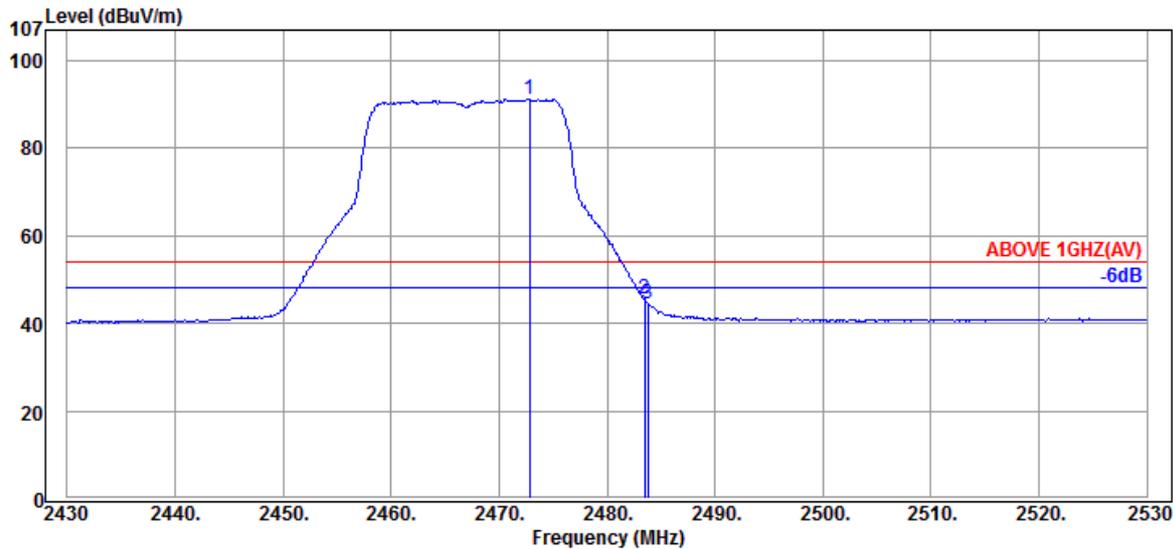
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2467.60	28.37	5.30	60.34	94.01	---	---	Average
2483.50	28.38	5.31	17.25	50.94	54.00	3.06	Average
2483.90	28.38	5.31	17.17	50.86	54.00	3.14	Average

Mode	802.11n-HT20	Frequency	TX 2467MHz
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Antenna at Horizontal Polarization

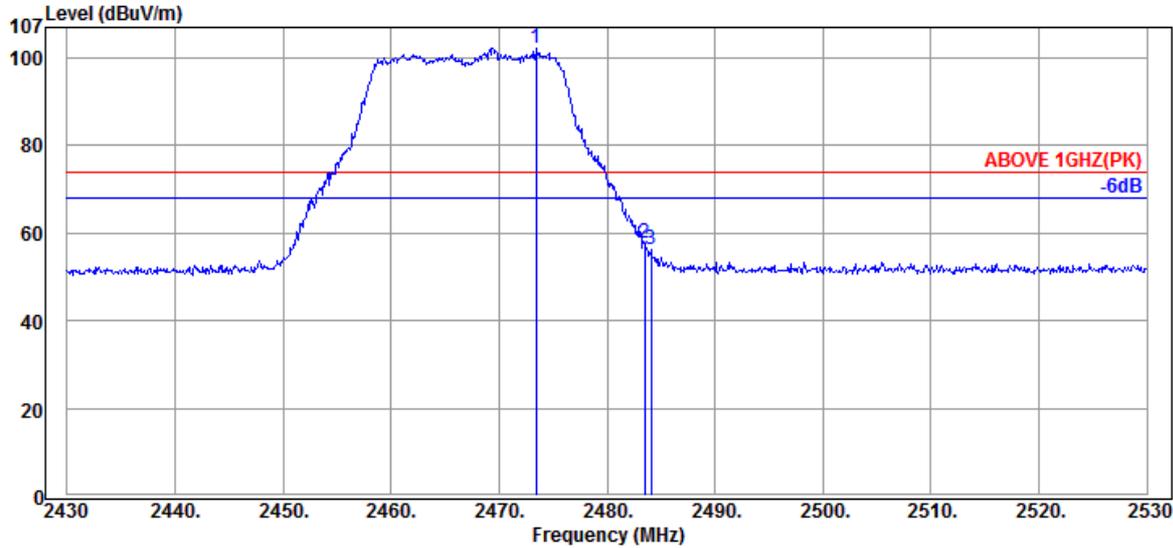
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2472.50	28.37	5.30	68.05	101.72	---	---	Peak
2483.50	28.38	5.31	21.83	55.52	74.00	18.48	Peak
2483.90	28.38	5.31	22.79	56.48	74.00	17.52	Peak



Antenna at Horizontal Polarization

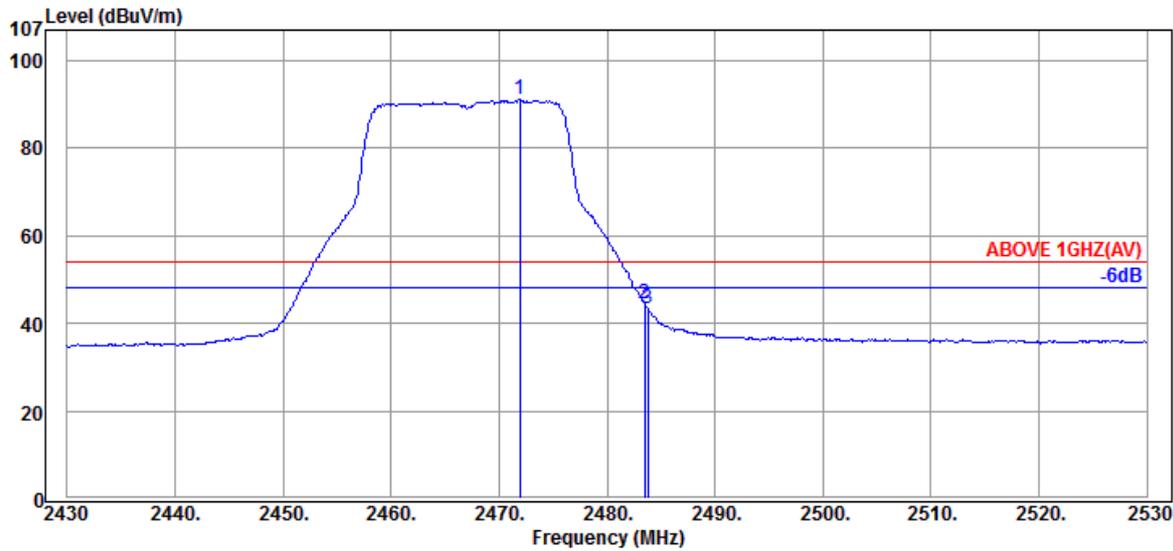
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2472.80	28.37	5.30	57.64	91.31	---	---	Average
2483.50	28.38	5.31	11.90	45.59	54.00	8.41	Average
2483.80	28.38	5.31	10.75	44.44	54.00	9.56	Average

Mode	802.11n-HT20	Frequency	TX 2467MHz
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Antenna at Vertical Polarization

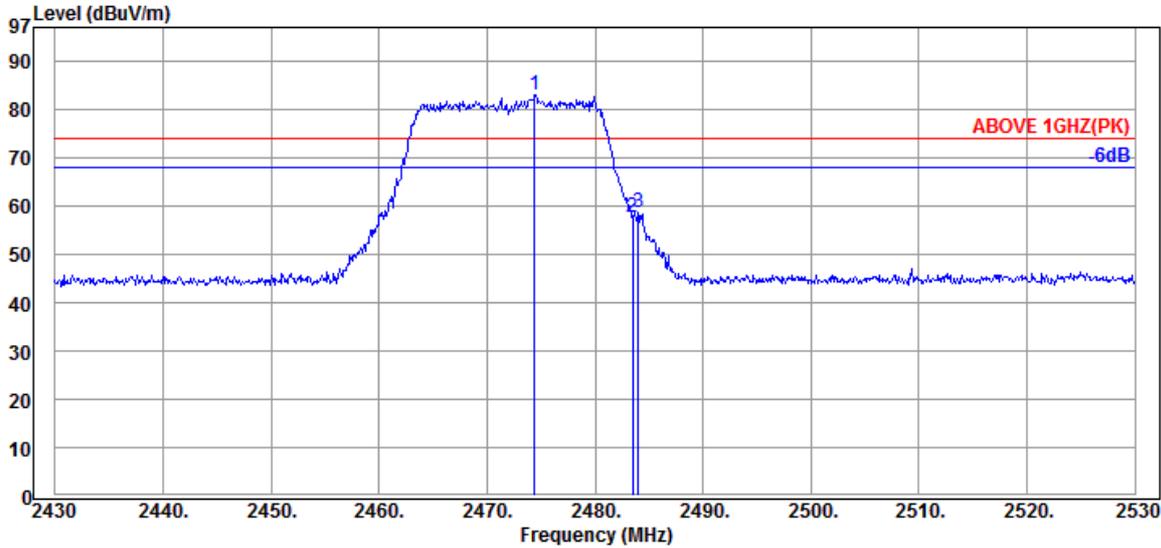
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2473.40	28.37	5.30	68.57	102.24	---	---	Peak
2483.50	28.38	5.31	24.05	57.74	74.00	16.26	Peak
2484.10	28.38	5.31	22.52	56.21	74.00	17.79	Peak



Antenna at Vertical Polarization

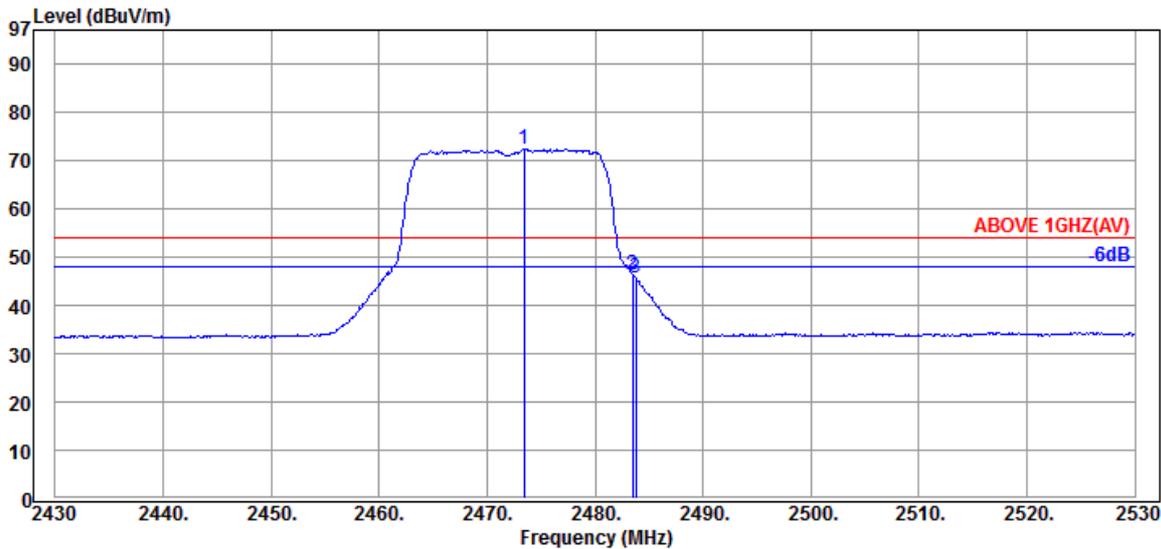
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2471.90	28.37	5.30	57.49	91.16	---	---	Average
2483.50	28.38	5.31	10.79	44.48	54.00	9.52	Average
2483.80	28.38	5.31	9.77	43.46	54.00	10.54	Average

Mode	802.11n-HT20	Frequency	TX 2472MHz
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Antenna at Horizontal Polarization

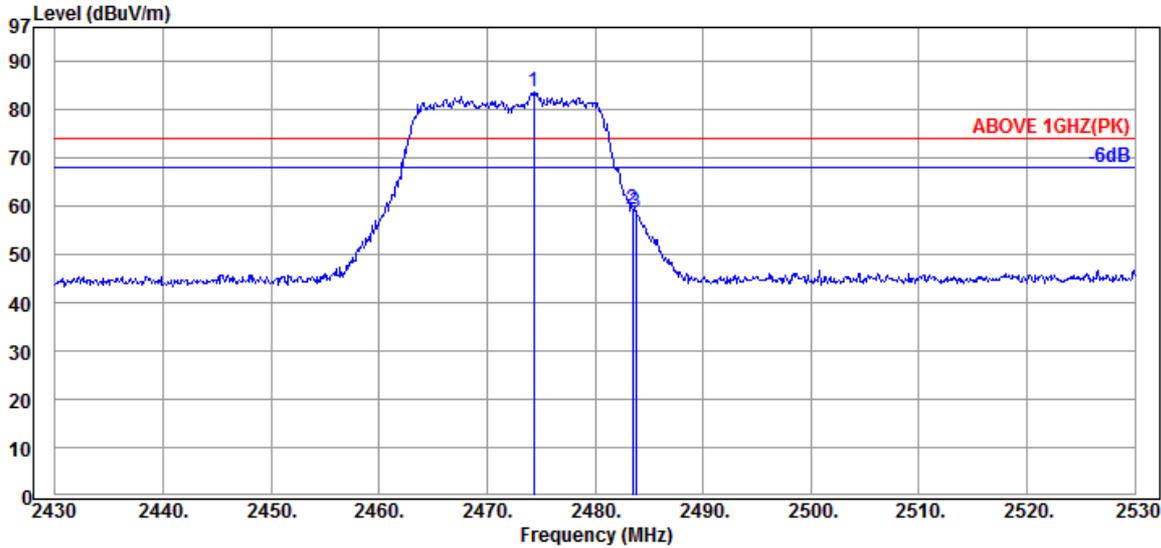
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2474.40	28.37	5.30	49.27	82.94	---	---	Peak
2483.50	28.38	5.31	24.14	57.83	74.00	16.17	Peak
2484.00	28.38	5.31	24.96	58.65	74.00	15.35	Peak



Antenna at Horizontal Polarization

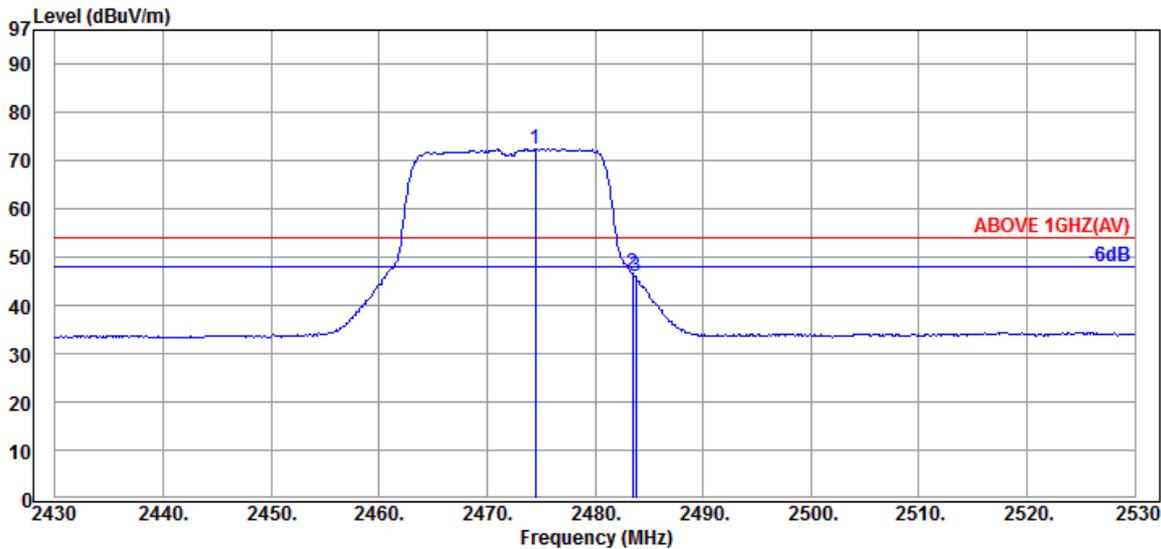
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2473.40	28.37	5.30	38.64	72.31	---	---	Average
2483.50	28.38	5.31	12.80	46.49	54.00	7.51	Average
2483.80	28.38	5.31	11.84	45.53	54.00	8.47	Average

Mode	802.11n-HT20	Frequency	TX 2472MHz
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Antenna at Vertical Polarization

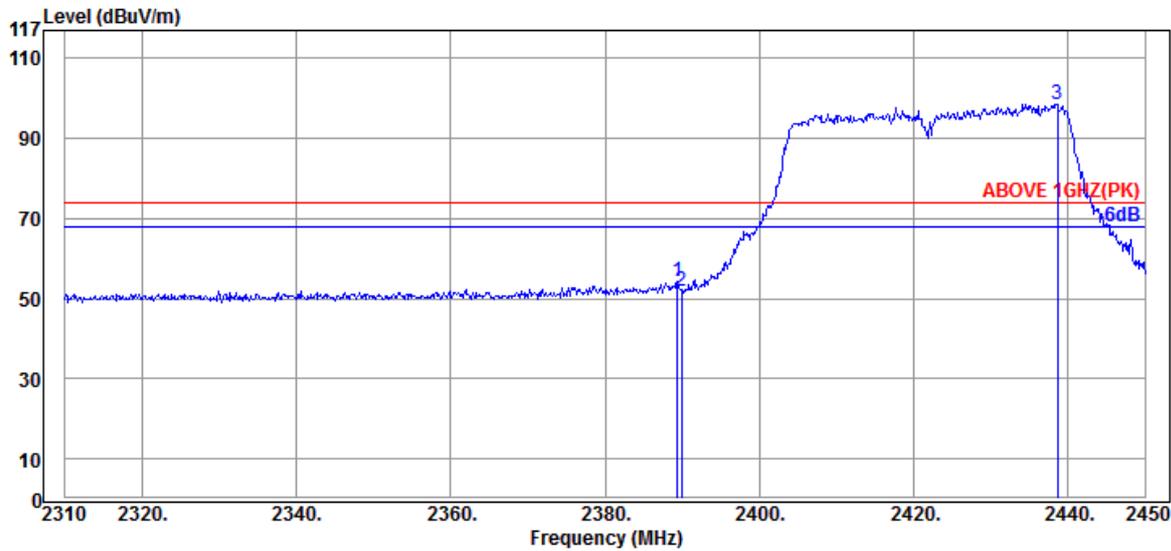
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2474.30	28.37	5.30	49.94	83.61	---	---	Peak
2483.50	28.38	5.31	25.69	59.38	74.00	14.62	Peak
2483.80	28.38	5.31	25.08	58.77	74.00	15.23	Peak



Antenna at Vertical Polarization

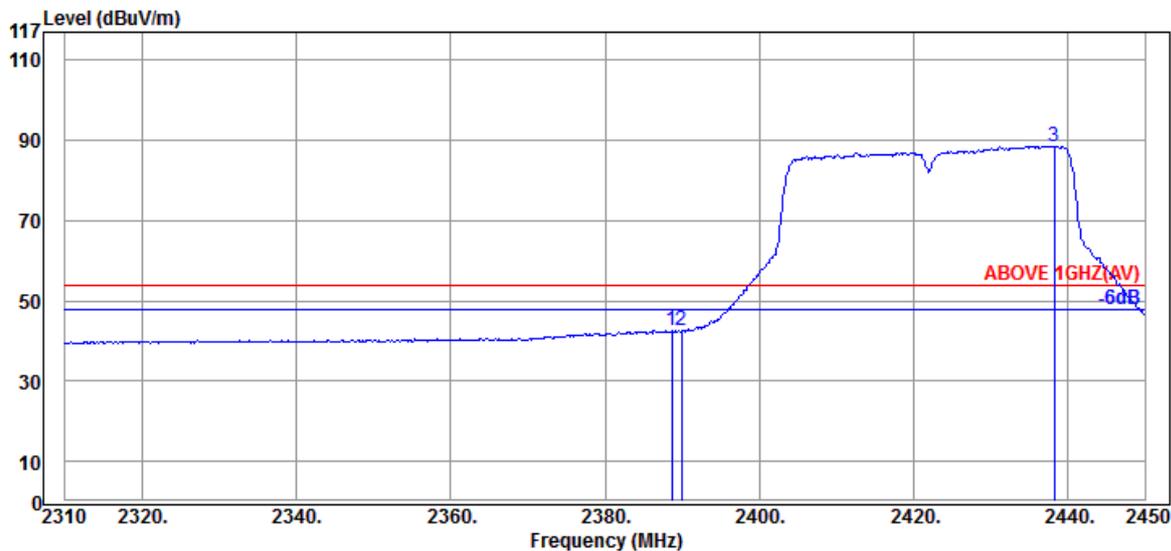
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2474.50	28.37	5.30	38.82	72.49	---	---	Average
2483.50	28.38	5.31	13.00	46.69	54.00	7.31	Average
2483.80	28.38	5.31	12.26	45.95	54.00	8.05	Average

Mode	802.11n-HT40	Frequency	TX 2422MHz
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Antenna at Horizontal Polarization

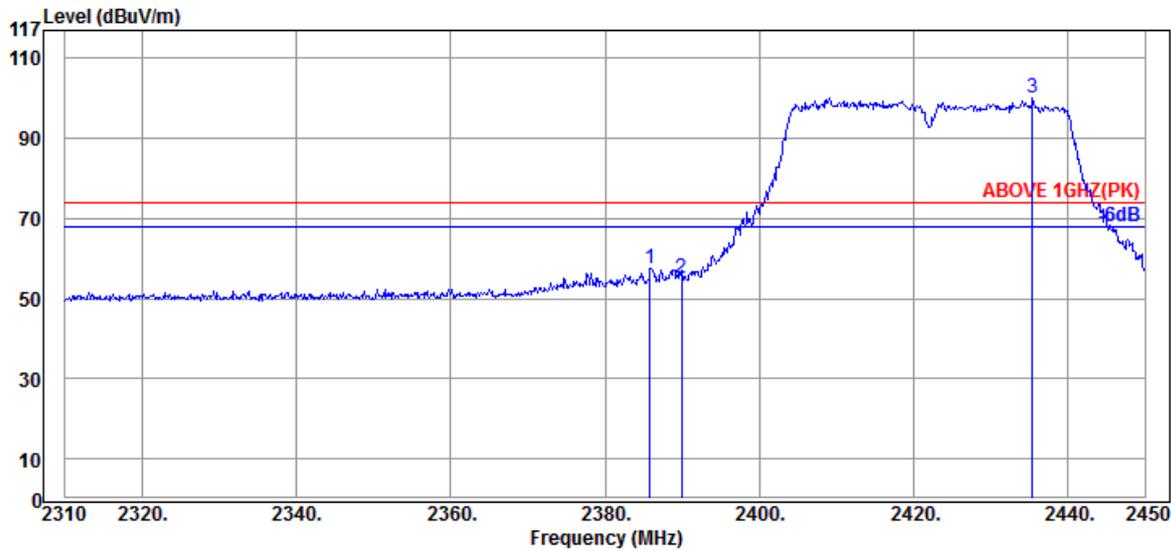
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2389.38	28.28	5.24	20.87	54.39	74.00	19.61	Peak
2389.94	28.28	5.24	18.36	51.88	74.00	22.12	Peak
2438.66	28.33	5.28	65.09	98.70	---	---	Peak



Antenna at Horizontal Polarization

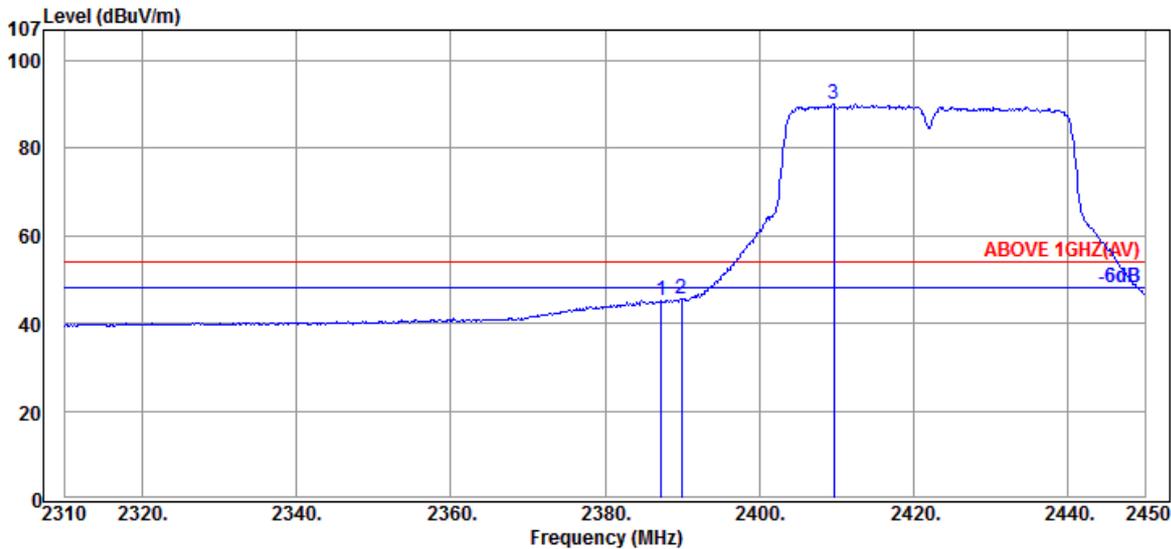
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2388.68	28.28	5.24	9.09	42.61	54.00	11.39	Average
2389.94	28.28	5.24	9.02	42.54	54.00	11.46	Average
2438.24	28.33	5.28	55.04	88.65	---	---	Average

Mode	802.11n-HT40	Frequency	TX 2422MHz
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Antenna at Vertical Polarization

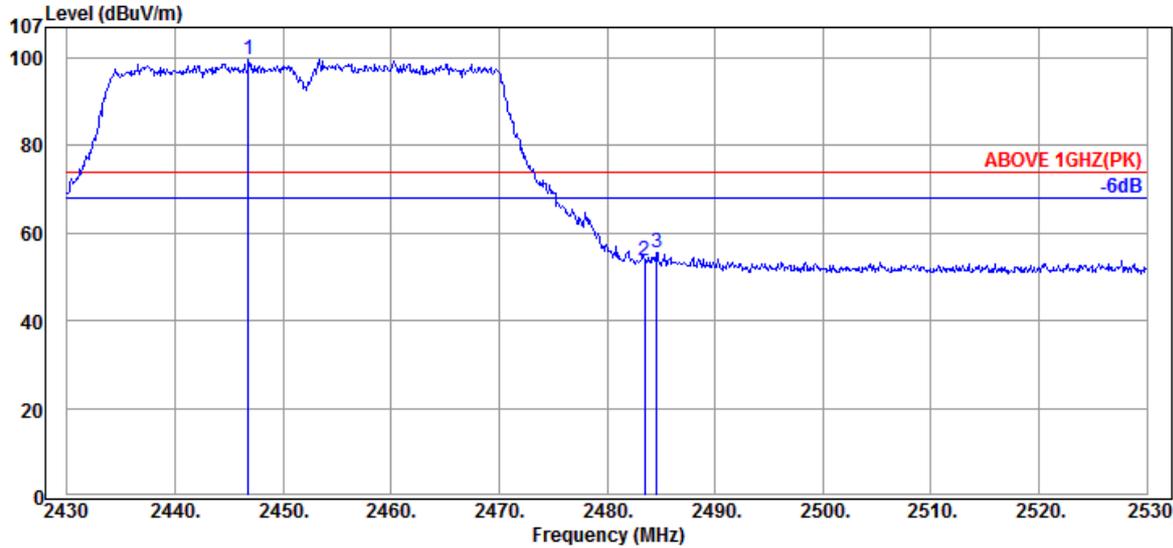
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2385.88	28.28	5.23	24.11	57.62	74.00	16.38	Peak
2389.94	28.28	5.24	21.42	54.94	74.00	19.06	Peak
2435.44	28.33	5.27	66.48	100.08	---	---	Peak



Antenna at Vertical Polarization

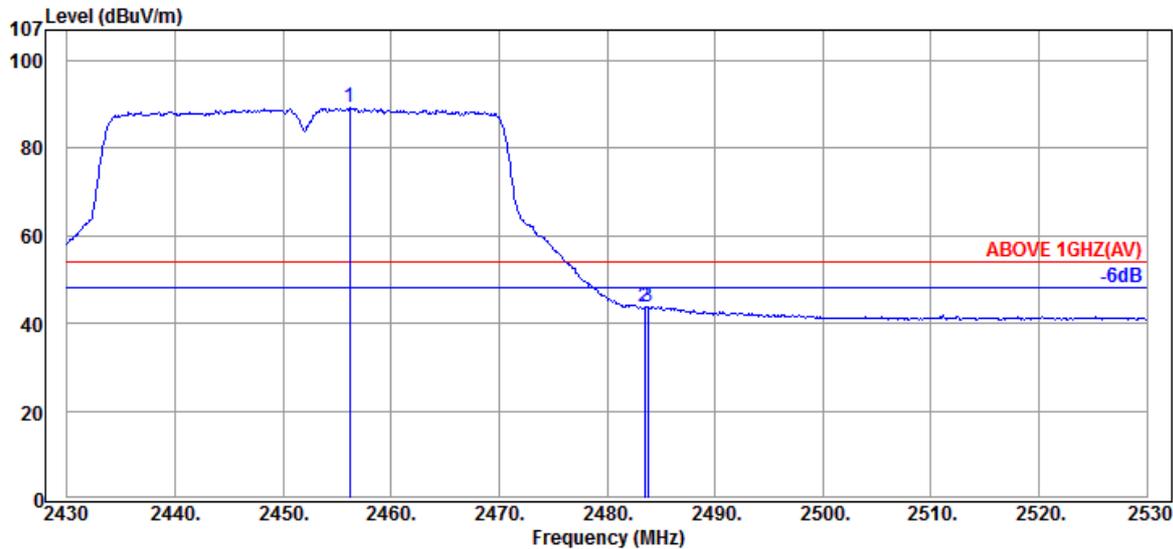
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2387.28	28.28	5.23	11.85	45.36	54.00	8.64	Average
2389.94	28.28	5.24	11.91	45.43	54.00	8.57	Average
2409.68	28.30	5.26	56.44	90.00	---	---	Average

Mode	802.11n-HT40	Frequency	TX 2452MHz
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Antenna at Horizontal Polarization

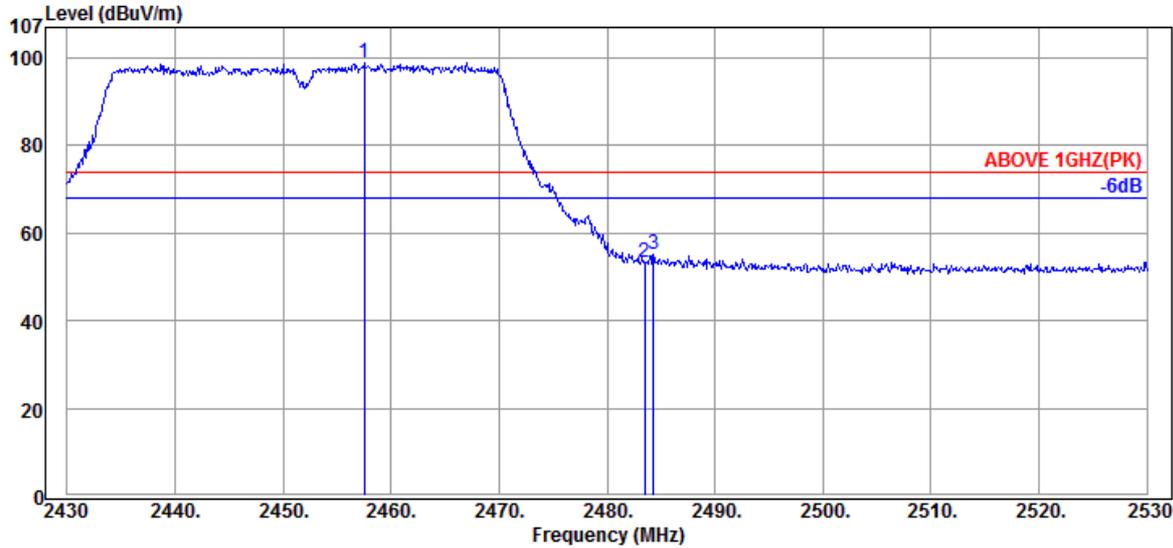
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2446.80	28.35	5.28	65.91	99.54	---	---	Peak
2483.50	28.38	5.31	20.03	53.72	74.00	20.28	Peak
2484.60	28.38	5.31	21.76	55.45	74.00	18.55	Peak



Antenna at Horizontal Polarization

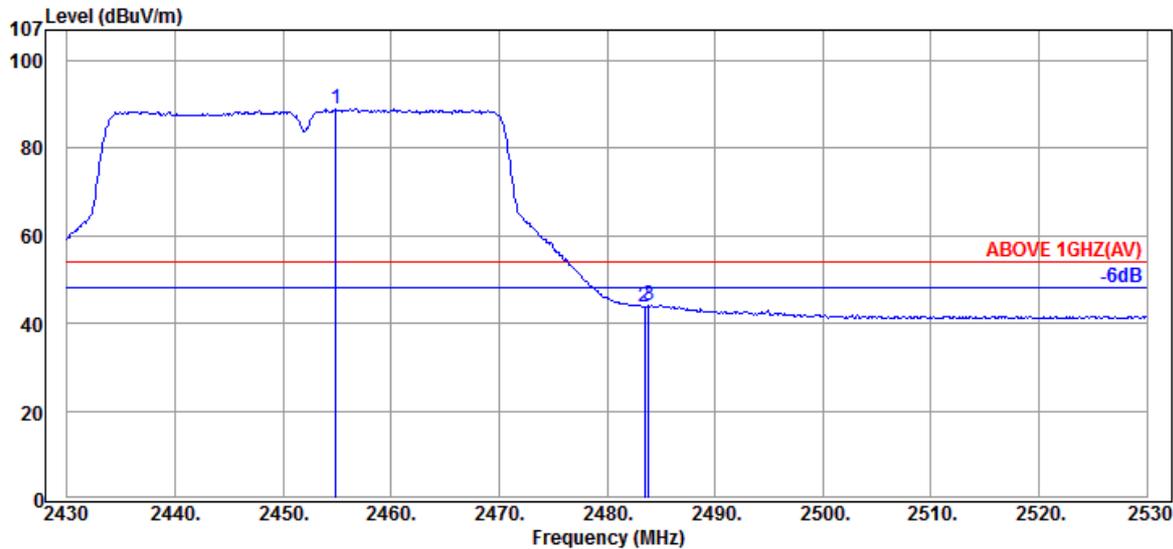
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2456.20	28.35	5.29	55.58	89.22	---	---	Average
2483.50	28.38	5.31	10.05	43.74	54.00	10.26	Average
2483.80	28.38	5.31	10.02	43.71	54.00	10.29	Average

Mode	802.11n-HT40	Frequency	TX 2452MHz
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Antenna at Vertical Polarization

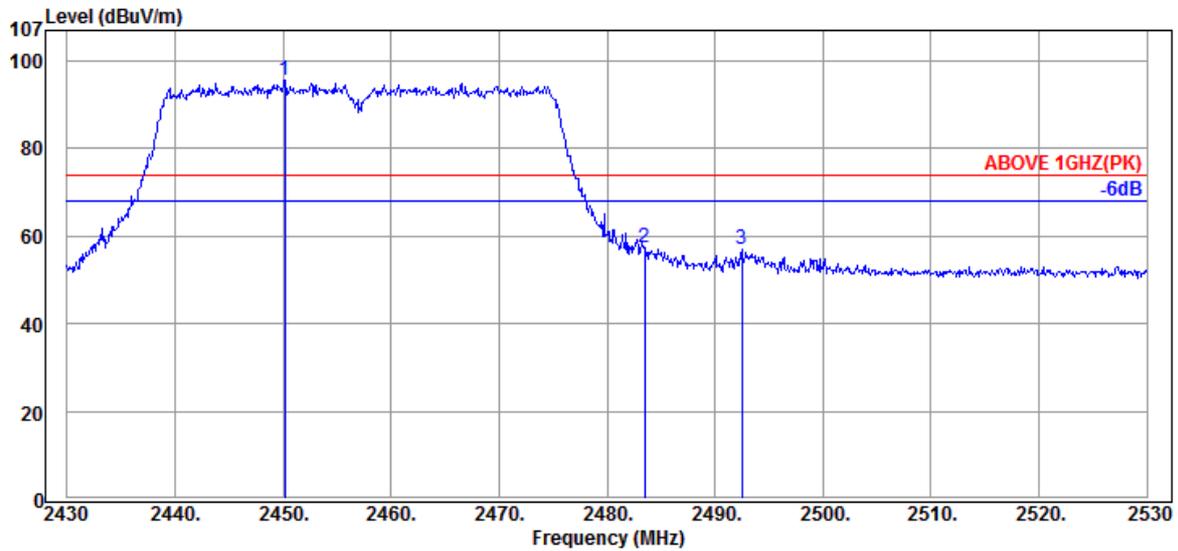
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2457.50	28.35	5.29	65.36	99.00	---	---	Peak
2483.50	28.38	5.31	19.45	53.14	74.00	20.86	Peak
2484.30	28.38	5.31	21.29	54.98	74.00	19.02	Peak



Antenna at Vertical Polarization

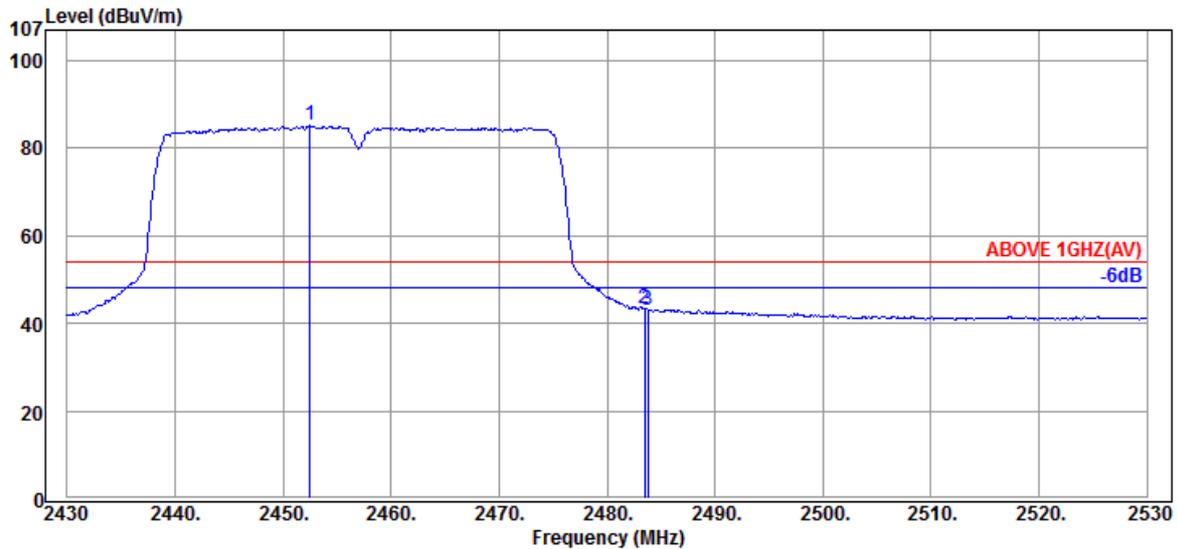
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2454.90	28.35	5.29	55.28	88.92	---	---	Average
2483.50	28.38	5.31	10.18	43.87	54.00	10.13	Average
2483.90	28.38	5.31	10.43	44.12	54.00	9.88	Average

Mode	802.11n-HT40	Frequency	TX 2457MHz
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Antenna at Horizontal Polarization

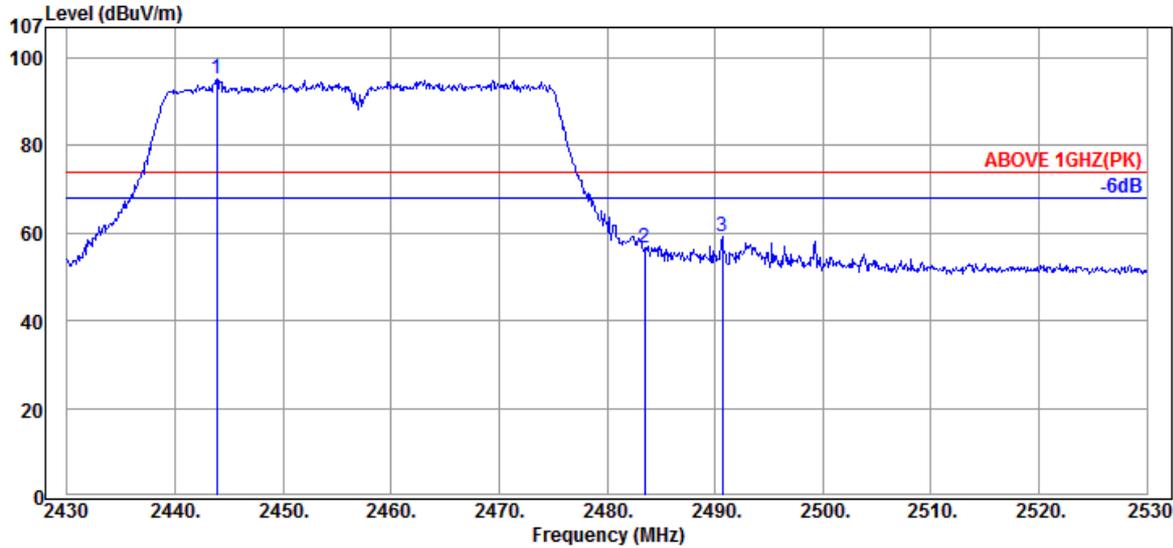
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2450.20	28.35	5.28	61.99	95.62	---	---	Peak
2483.50	28.38	5.31	23.59	57.28	74.00	16.72	Peak
2492.50	28.39	5.31	23.37	57.07	74.00	16.93	Peak



Antenna at Horizontal Polarization

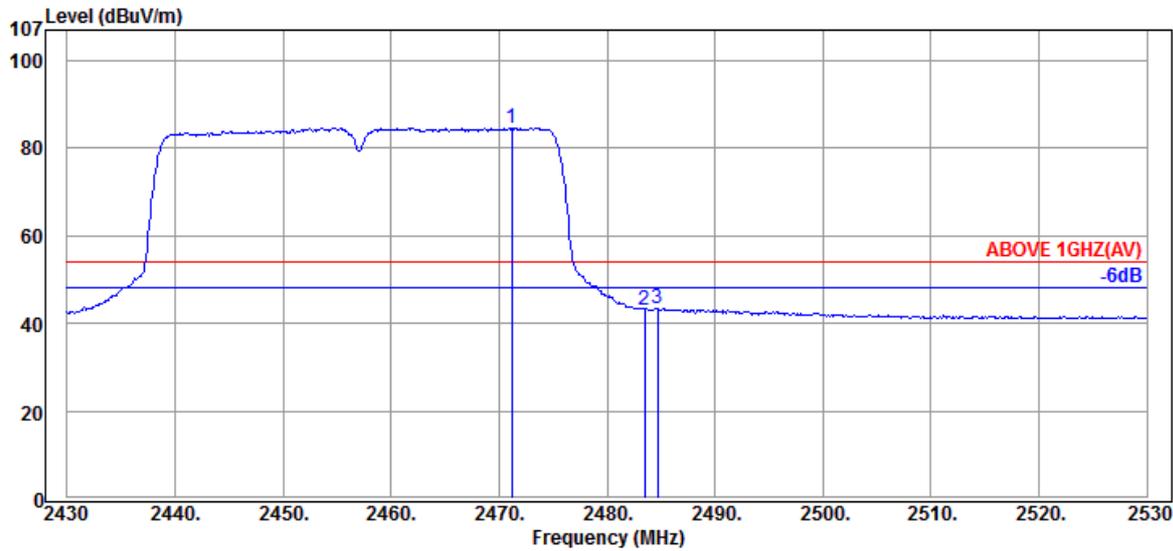
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2452.50	28.35	5.28	51.51	85.14	---	---	Average
2483.50	28.38	5.31	9.52	43.21	54.00	10.79	Average
2483.80	28.38	5.31	9.43	43.12	54.00	10.88	Average

Mode	802.11n-HT40	Frequency	TX 2457MHz
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Antenna at Vertical Polarization

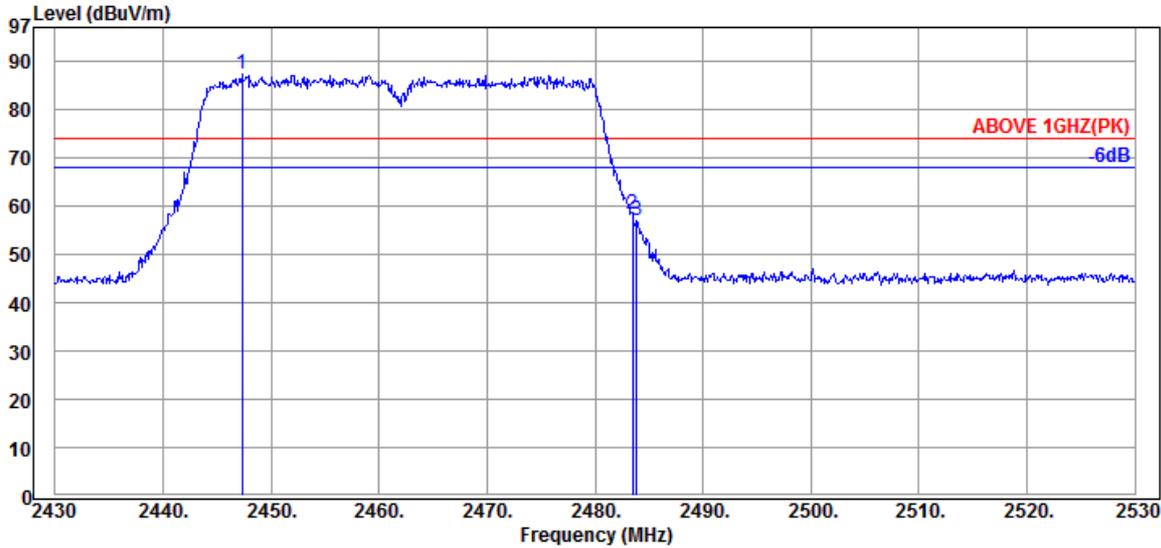
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2443.90	28.34	5.28	61.50	95.12	---	---	Peak
2483.50	28.38	5.31	22.96	56.65	74.00	17.35	Peak
2490.70	28.39	5.31	25.49	59.19	74.00	14.81	Peak



Antenna at Vertical Polarization

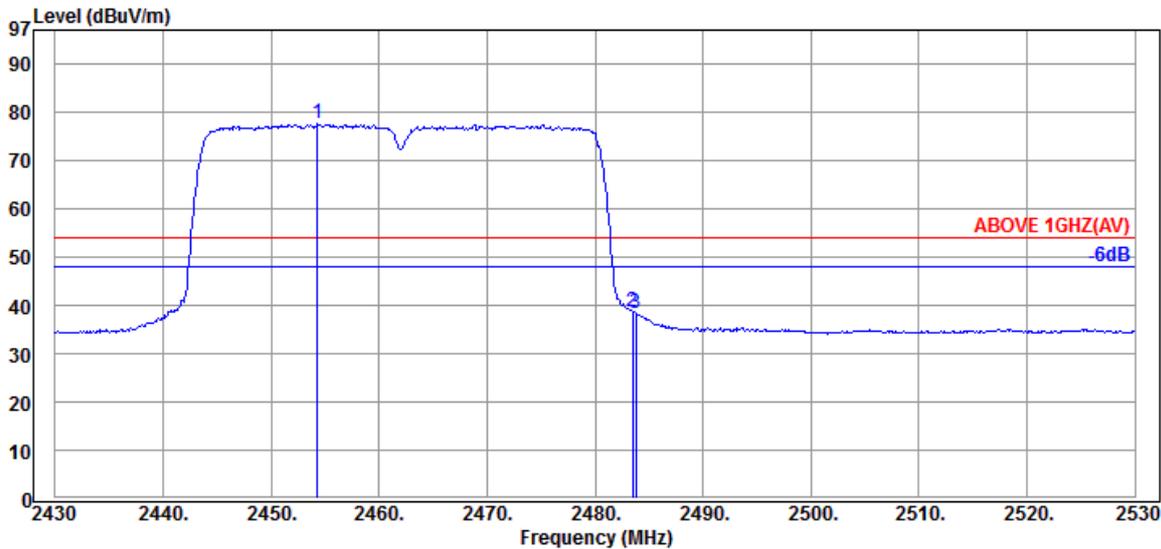
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2471.20	28.37	5.30	51.00	84.67	---	---	Average
2483.50	28.38	5.31	9.47	43.16	54.00	10.84	Average
2484.70	28.38	5.31	9.72	43.41	54.00	10.59	Average

Mode	802.11n-HT40	Frequency	TX 2462MHz
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Antenna at Horizontal Polarization

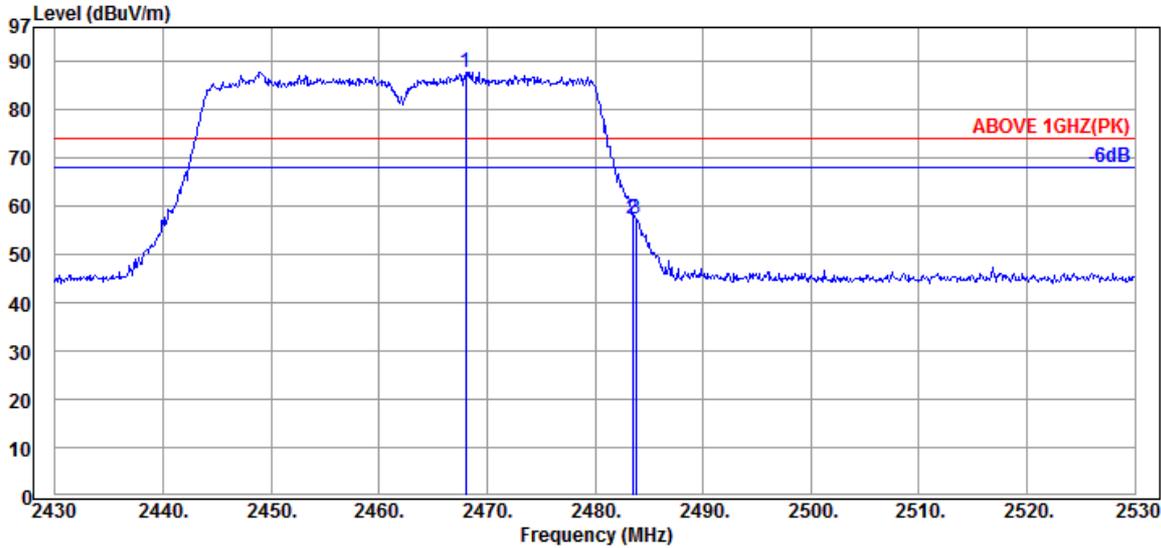
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2447.30	28.35	5.28	53.65	87.28	---	---	Peak
2483.50	28.38	5.31	24.72	58.41	74.00	15.59	Peak
2483.90	28.38	5.31	23.40	57.09	74.00	16.91	Peak



Antenna at Horizontal Polarization

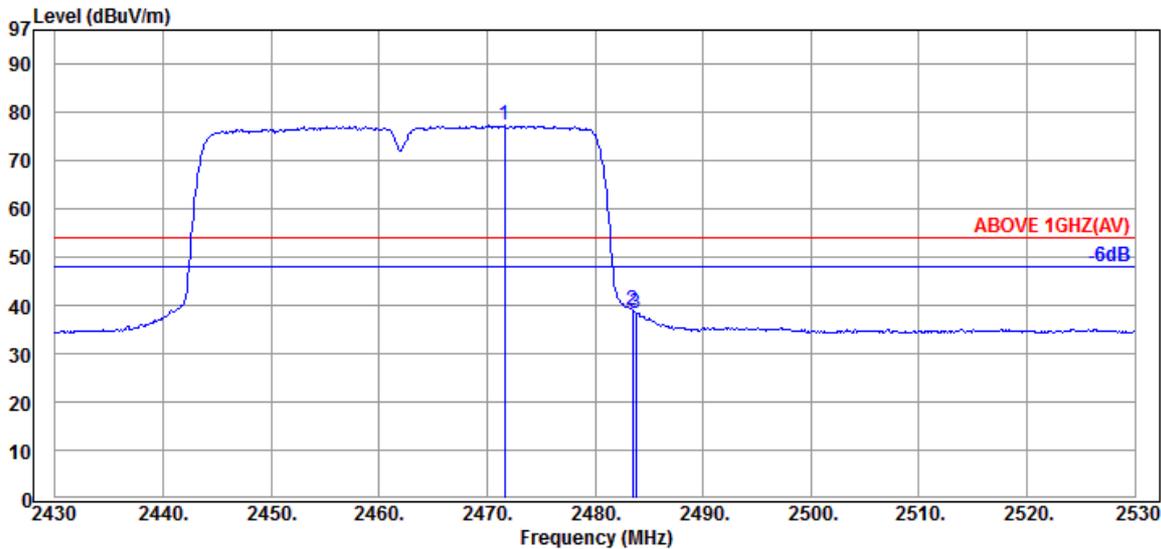
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2454.30	28.35	5.29	43.87	77.51	---	---	Average
2483.50	28.38	5.31	4.99	38.68	54.00	15.32	Average
2483.80	28.38	5.31	4.48	38.17	54.00	15.83	Average

Mode	802.11n-HT40	Frequency	TX 2462MHz
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Antenna at Vertical Polarization

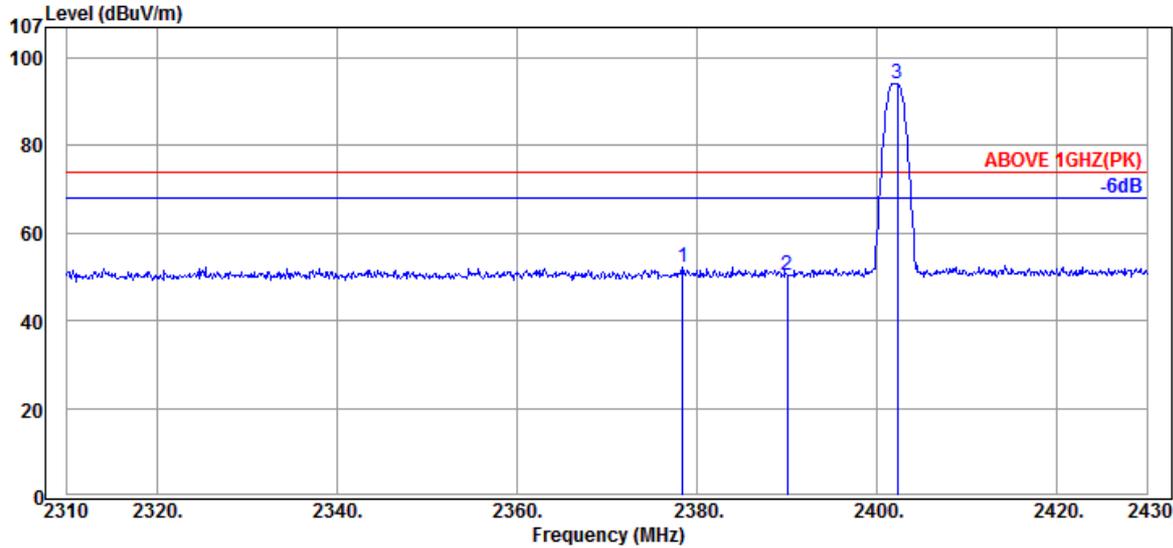
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2468.00	28.37	5.30	54.14	87.81	---	---	Peak
2483.50	28.38	5.31	23.76	57.45	74.00	16.55	Peak
2483.80	28.38	5.31	23.56	57.25	74.00	16.75	Peak



Antenna at Vertical Polarization

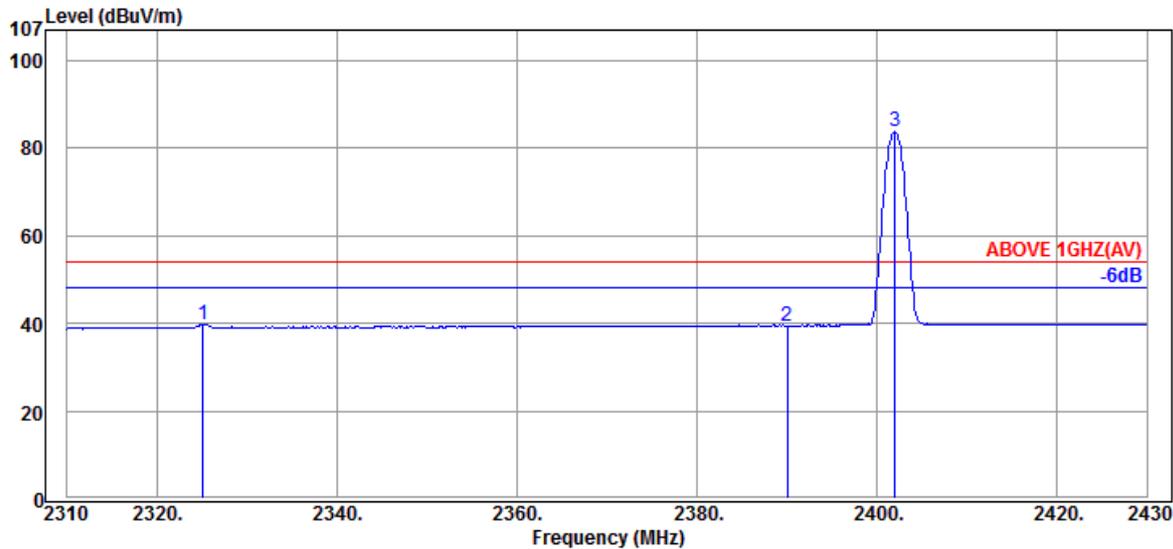
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2471.60	28.37	5.30	43.62	77.29	---	---	Average
2483.50	28.38	5.31	5.14	38.83	54.00	15.17	Average
2483.80	28.38	5.31	4.71	38.40	54.00	15.60	Average

Mode	BLE	Frequency	TX 2402MHz
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Antenna at Horizontal Polarization

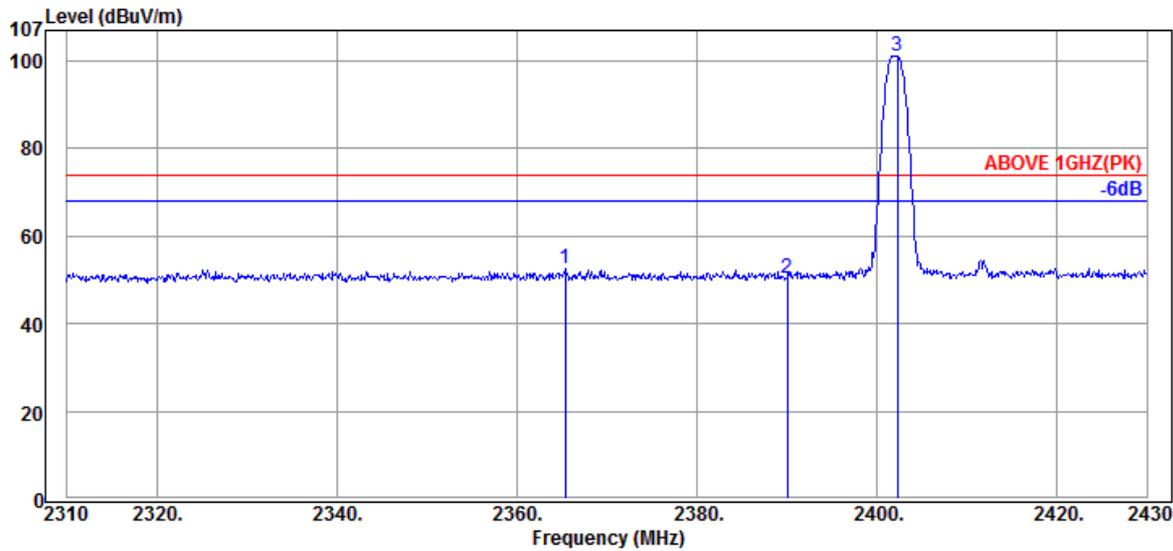
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2378.40	28.27	5.23	18.76	52.26	74.00	21.74	Peak
2390.04	28.28	5.24	17.02	50.54	74.00	23.46	Peak
2402.28	28.29	5.25	60.70	94.24	---	---	Peak



Antenna at Horizontal Polarization

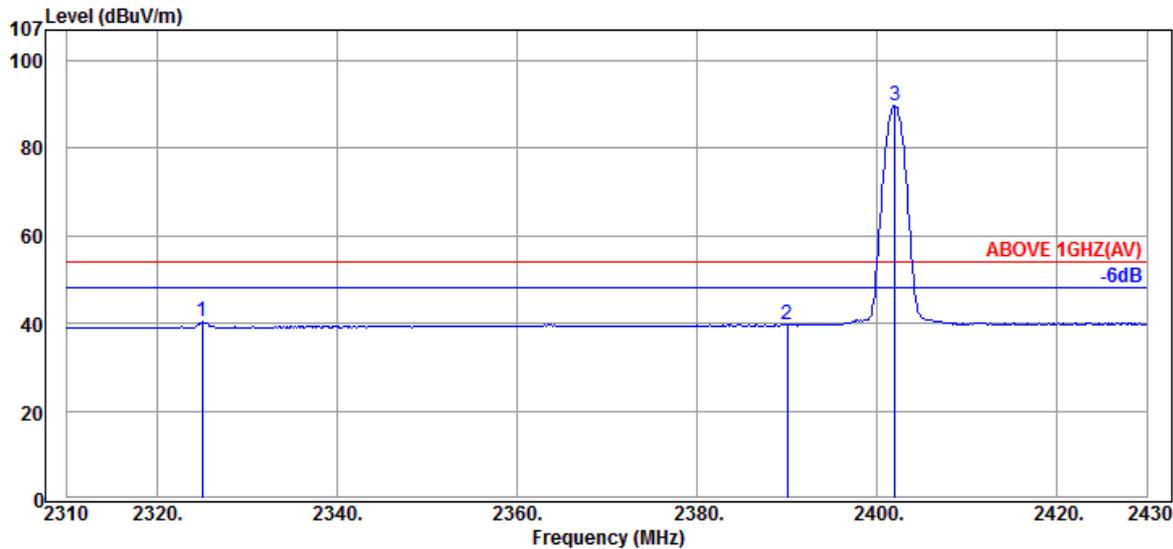
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2325.12	28.21	5.19	6.46	39.86	54.00	14.14	Average
2390.04	28.28	5.24	5.81	39.33	54.00	14.67	Average
2402.04	28.29	5.25	50.30	83.84	---	---	Average

Mode	BLE	Frequency	TX 2402MHz
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Antenna at Vertical Polarization

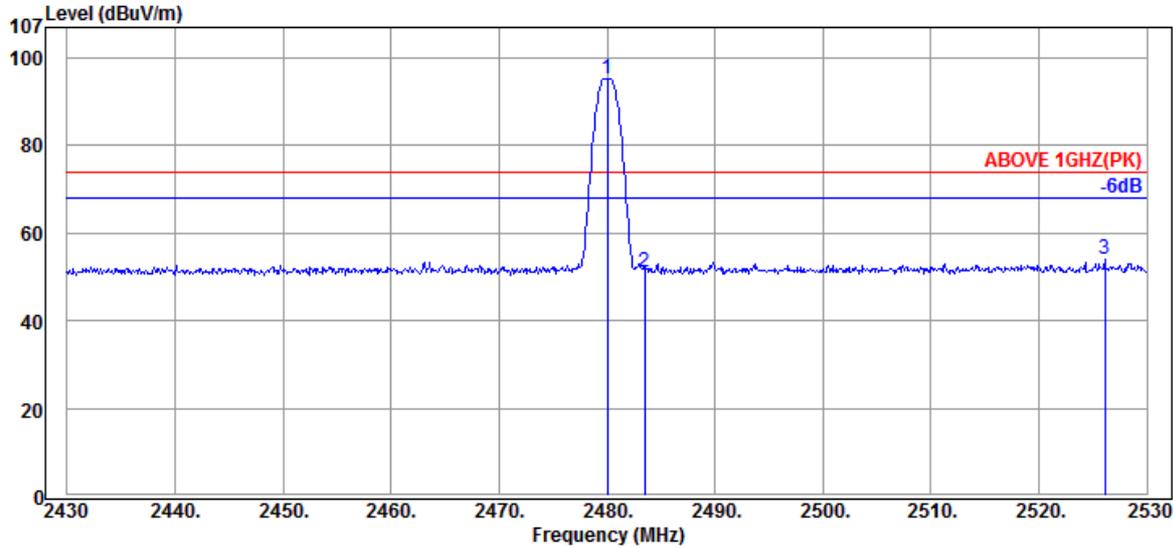
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2365.32	28.25	5.22	19.04	52.51	74.00	21.49	Peak
2390.04	28.28	5.24	17.03	50.55	74.00	23.45	Peak
2402.28	28.29	5.25	67.59	101.13	---	---	Peak



Antenna at Vertical Polarization

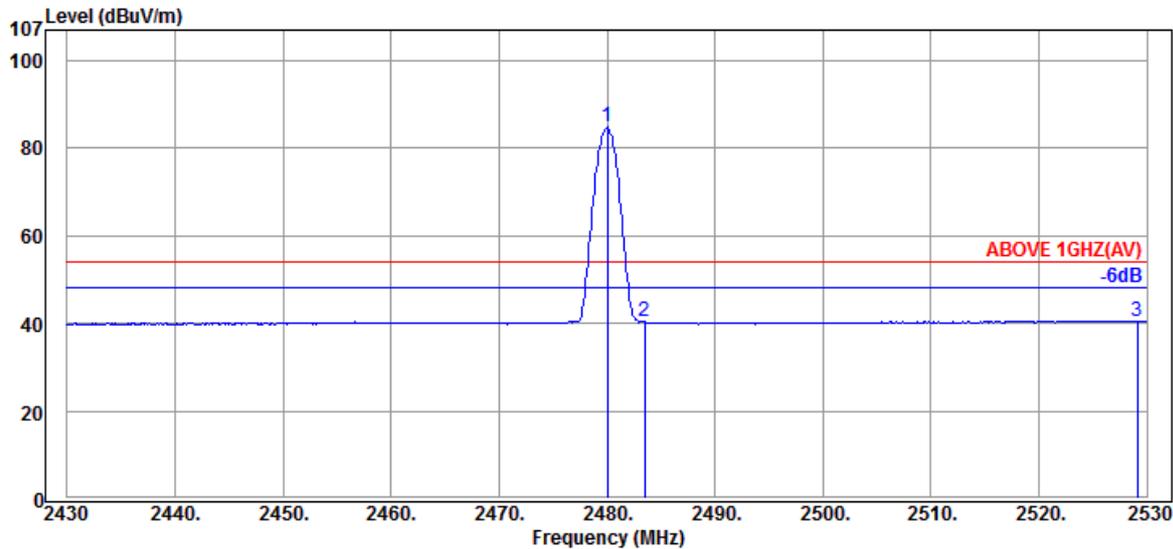
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2325.00	28.21	5.19	6.91	40.31	54.00	13.69	Average
2390.04	28.28	5.24	6.03	39.55	54.00	14.45	Average
2402.04	28.29	5.25	56.19	89.73	---	---	Average

Mode	BLE	Frequency	TX 2480MHz
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Antenna at Horizontal Polarization

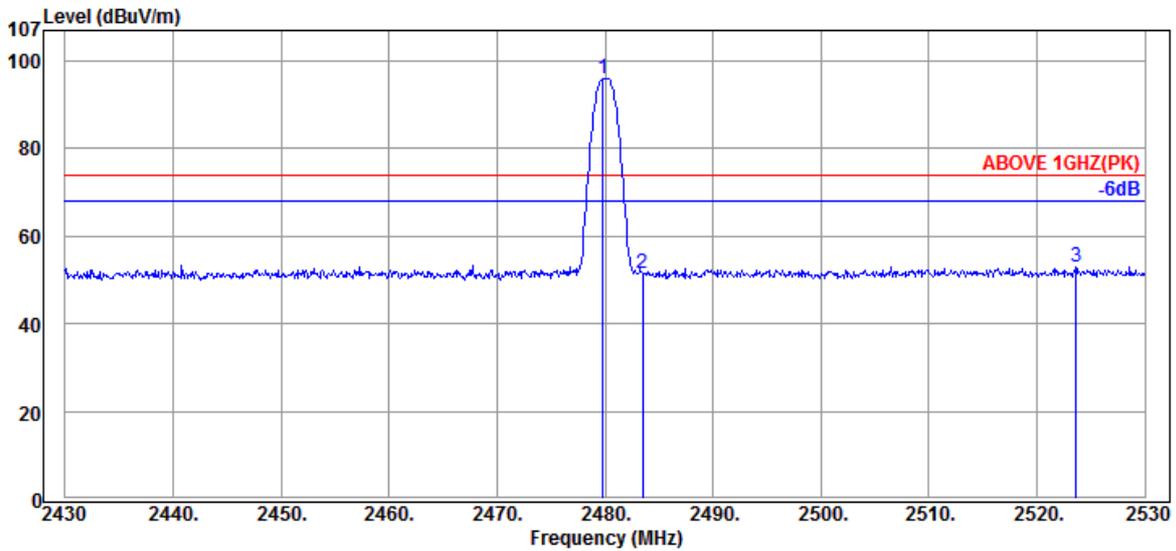
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2480.00	28.38	5.30	61.62	95.30	---	---	Peak
2483.50	28.38	5.31	17.50	51.19	74.00	22.81	Peak
2526.10	28.51	5.34	20.20	54.05	74.00	19.95	Peak



Antenna at Horizontal Polarization

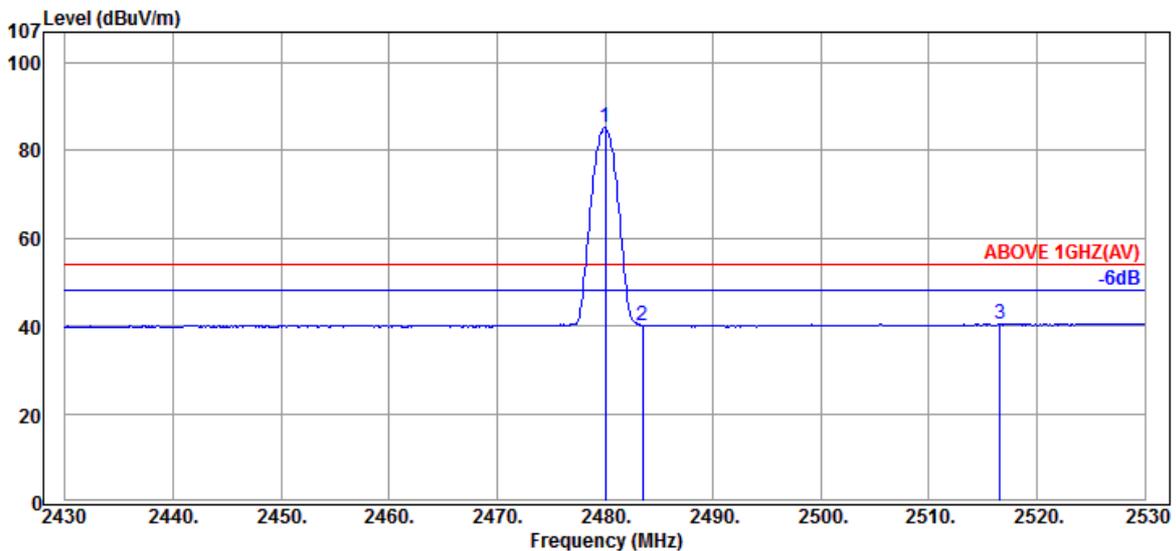
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2480.00	28.38	5.30	51.18	84.86	---	---	Average
2483.50	28.38	5.31	6.60	40.29	54.00	13.71	Average
2529.10	28.51	5.35	6.70	40.56	54.00	13.44	Average

Mode	BLE	Frequency	TX 2480MHz
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Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2479.80	28.38	5.30	62.31	95.99	---	---	Peak
2483.50	28.38	5.31	17.66	51.35	74.00	22.65	Peak
2523.60	28.48	5.34	19.25	53.07	74.00	20.93	Peak



Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2480.00	28.38	5.30	51.72	85.40	---	---	Average
2483.50	28.38	5.31	6.53	40.22	54.00	13.78	Average
2516.60	28.45	5.33	6.81	40.59	54.00	13.41	Average

A.2.2 Emissions outside the frequency band:

The emissions (up to 25GHz) not reported for there is no emission be found.

Mode	802.11b	Frequency	TX 2437MHz
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Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
4874.00	32.96	9.08	5.00	47.04	54.00	6.96	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
4874.00	32.96	9.08	5.28	47.32	54.00	6.68	Peak

Mode	802.11g	Frequency	TX 2437MHz
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Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
4874.00	32.96	9.08	7.17	49.21	54.00	4.79	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
4874.00	32.96	9.08	5.27	47.31	54.00	6.69	Peak

Mode	802.11n-HT20	Frequency	TX 2437MHz
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Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
4874.00	32.96	9.08	4.99	47.03	54.00	6.97	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
4874.00	32.96	9.08	5.43	47.47	54.00	6.53	Peak

Mode	802.11n-HT40	Frequency	TX 2437MHz
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Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
4874.00	32.96	9.08	4.63	46.67	54.00	7.33	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
4874.00	32.96	9.08	5.49	47.53	54.00	6.47	Peak

Mode	BLE	Frequency	TX 2402MHz				
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Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
4805.00	34.22	9.54	-1.88	41.88	54.00	12.12	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
4805.00	34.22	9.54	0.09	43.85	54.00	10.15	Peak

Mode	BLE	Frequency	TX 2440MHz				
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Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
4880.00	34.25	9.56	-0.60	43.21	54.00	10.79	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
4880.00	34.25	9.56	0.88	44.69	54.00	9.31	Peak

Mode	BLE	Frequency	TX 2480MHz				
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Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
4960.00	34.29	9.60	-3.35	40.54	54.00	13.46	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
4960.00	34.29	9.60	-2.20	41.69	54.00	12.31	Peak

A.2.3 Emissions in Non-restricted Frequency Bands:

Pursuant to KDB 558074 D01 DTS Meas Guidance v04 that emission levels below the FCC 15.209(a)/RSS-Gen Section 8.9 table 4 general radiated emissions limits is not required.

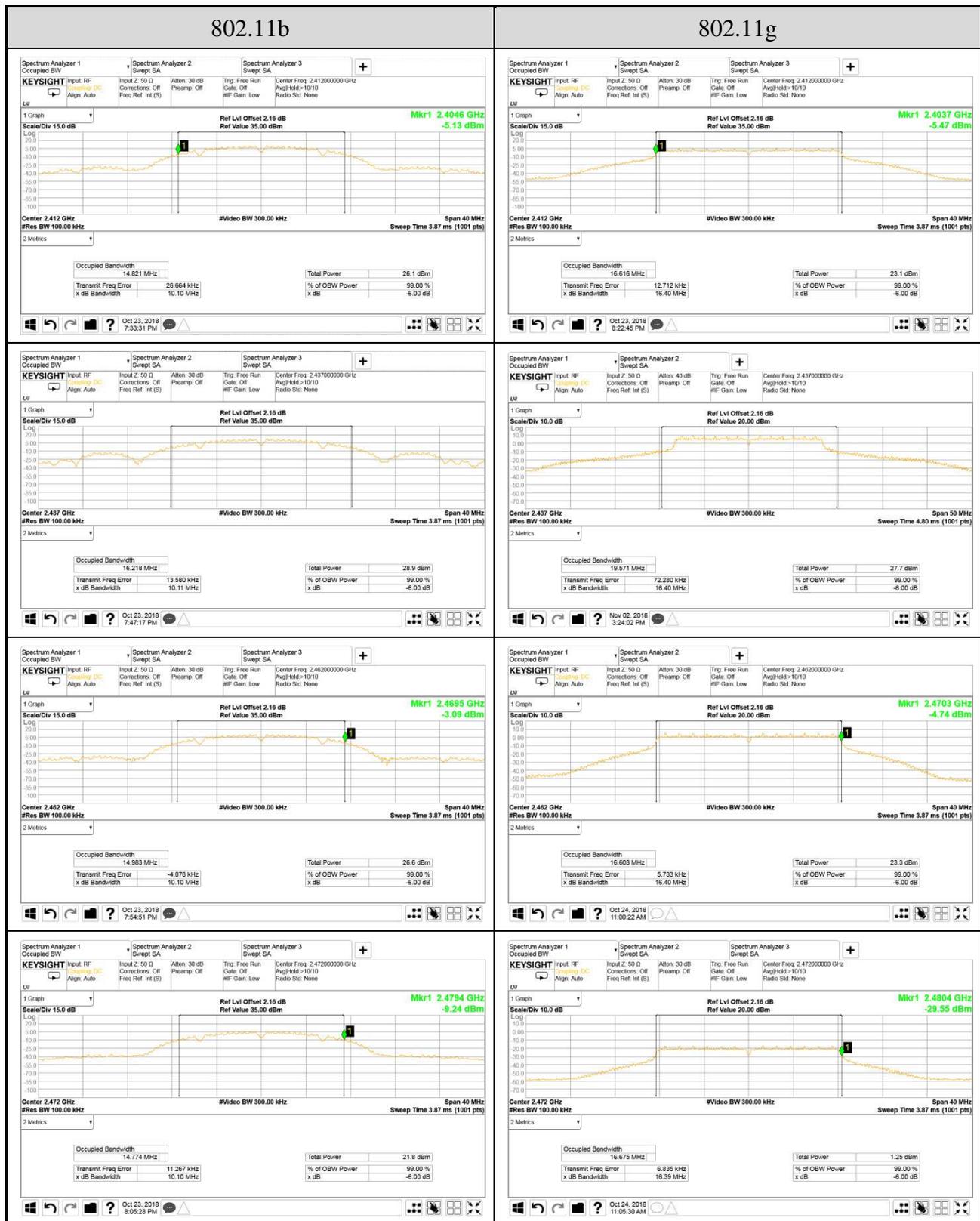
A.3 6dB BANDWIDTH

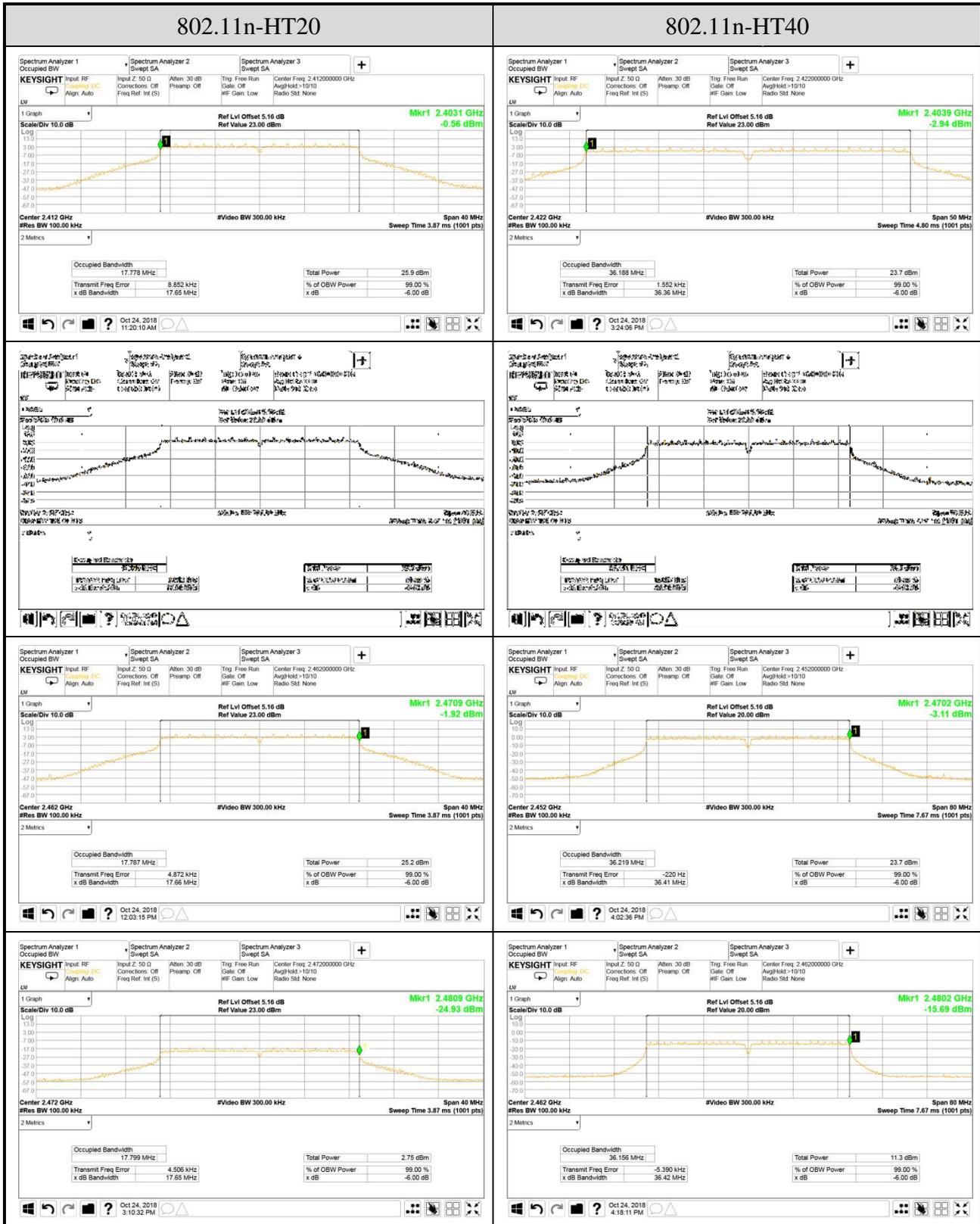
Test Date	2018/10/23~11/02	Temp./Hum.	23~24°C /52~55%
Cable Loss	2.16dB	Test Voltage	AC 120V, 60Hz (via AC Adapter)

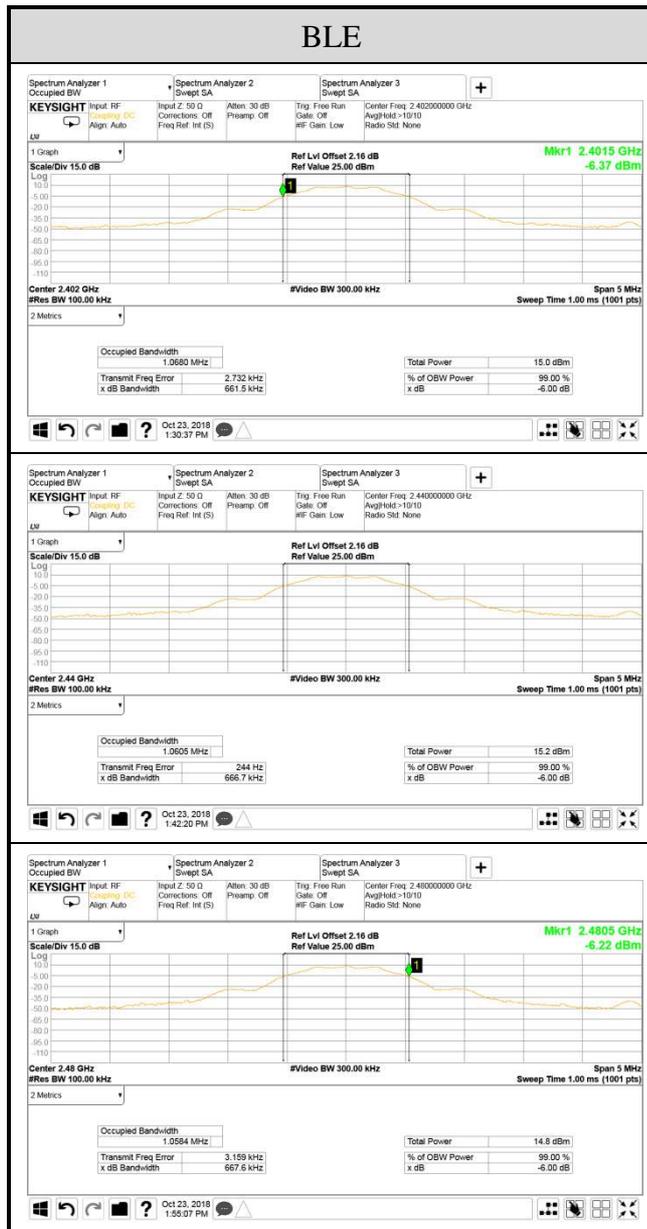
A.3.1 6dB Bandwidth Result

Mode	Centre Frequency (MHz)	6 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz) (Reference only)	Limit
802.11b	2412	10.10	14.821	>500kHz
	2437	10.11	16.218	
	2462	10.10	14.983	
	2472	10.10	14.774	
802.11g	2412	16.40	16.616	
	2437	16.40	19.571	
	2462	16.40	16.603	
	2472	16.39	16.675	
802.11n-HT20	2412	17.65	17.778	
	2437	17.66	17.816	
	2462	17.66	17.787	
	2472	17.65	17.799	
802.11n-HT40	2422	36.36	36.188	
	2437	36.36	36.181	
	2452	36.41	36.219	
	2462	36.42	36.156	
BLE	2402	0.6615	1.0680	
	2440	0.6667	1.0605	
	2480	0.6676	1.0584	

A.3.2 Measurement Plots







A.4 MAXIMUM PEAK OUTPUT POWER

Test Date	2018/10/23~24	Temp./Hum.	23~24°C /52~55%
Cable Loss	2.16dB	Test Voltage	AC 120V, 60Hz (via AC Adapter)

A.4.1 Peak Output Power

Mode	Centre Frequency (MHz)	Peak Output Power (dBm)		Max. Peak Output Power		Antenna Gain (dBi)	Output Power (E.I.R.P.)		Limit
		Chain 0	Chain 1	(dBm)	(W)		(dBm)	(W)	
802.11b	2412	19.65	20.23	20.23	0.105	2.79	23.02	0.200	< 30dBm (1W) (Maximum Peak Output Power) < 36dBm (4W) (E.I.R.P)
	2437	22.57	21.77	22.57	0.181		25.36	0.344	
	2462	19.85	20.48	20.48	0.112		23.27	0.212	
	2467	15.20	16.35	16.35	0.043		19.14	0.082	
	2472	14.24	14.89	14.89	0.031		17.68	0.059	

Mode	Centre Frequency (MHz)	Peak Output Power (dBm)		Max. Peak Output Power		Antenna Gain (dBi)	Output Power (E.I.R.P.)		Limit
		Chain 0	Chain 1	(dBm)	(W)		(dBm)	(W)	
802.11g	2412	21.03	21.00	21.03	0.127	2.79	23.82	0.241	< 30dBm (1W) (Maximum Peak Output Power) < 36dBm (4W) (E.I.R.P)
	2437	23.52	22.70	23.52	0.225		26.31	0.428	
	2462	21.22	21.25	21.25	0.133		24.04	0.254	
	2467	17.29	18.33	18.33	0.068		21.12	0.129	
	2472	-0.51	-0.94	-0.51	0.001		2.28	0.002	

Mode	Centre Frequency (MHz)	Peak Output Power (dBm)		Max. Peak Output Power		Antenna Gain (dBi)	Output Power (E.I.R.P.)		Limit
		Chain 0	Chain 1	(dBm)	(W)		(dBm)	(W)	
802.11n- HT20	2412	20.11	20.27	23.20	0.209	2.79	25.99	0.397	< 30dBm (1W) (Maximum Peak Output Power) < 36dBm (4W) (E.I.R.P)
	2437	22.03	22.04	25.05	0.320		27.84	0.608	
	2462	20.04	19.78	22.92	0.196		25.71	0.372	
	2467	17.89	17.44	20.68	0.117		23.47	0.222	
	2472	-0.53	-1.29	2.12	0.002		4.91	0.003	

Mode	Centre Frequency (MHz)	Peak Output Power (dBm)		Max. Peak Output Power		Antenna Gain (dBi)	Output Power (E.I.R.P.)		Limit
		Chain 0	Chain 1	(dBm)	(W)		(dBm)	(W)	
802.11n- HT40	2422	19.17	18.67	21.94	0.156	2.79	24.73	0.297	< 30dBm (1W) (Maximum Peak Output Power) < 36dBm (4W) (E.I.R.P)
	2437	20.02	20.06	23.05	0.202		25.84	0.384	
	2452	19.03	18.72	21.89	0.155		24.68	0.294	
	2457	16.71	15.82	19.30	0.085		22.09	0.162	
	2462	10.11	10.04	13.09	0.020		15.88	0.039	

Mode	Centre Frequency (MHz)	Peak Output Power (dBm)		Max. Peak Output Power		Antenna Gain (dBi)	Output Power (E.I.R.P.)		Limit
		Chain 0	Chain 1	(dBm)	(W)		(dBm)	(W)	
BLE	2402	8.32	--	8.32	0.007	2.72	11.04	0.013	< 30dBm (1W) (Maximum Peak Output Power) < 36dBm (4W) (E.I.R.P)
	2440	8.39	--	8.39	0.007		11.11	0.013	
	2480	8.07	--	8.07	0.006		10.79	0.012	

Note: The results have been included cable loss.

A.4.2 Average Output Power (Reporting only)

Mode	Centre Frequency (MHz)	Average Output Power (dBm)		10log (1/X)	Max. Average Output Power		Antenna Gain (dBi)	Total Average Output Power (E.I.R.P.)		Limit
		Chain 0	Chain 1		(dBm)	(W)		(dBm)	(W)	
802.11b	2412	17.96	18.52	0	18.52	0.071	2.79	21.31	0.135	< 30dBm (1W) (Maximum Peak Output Power) < 36dBm (4W) (E.I.R.P)
	2437	21.06	20.61		21.06	0.128		23.85	0.243	
	2462	18.19	18.74		18.74	0.075		21.53	0.142	
	2467	13.34	14.31		14.31	0.027		17.10	0.051	
	2472	12.16	12.80		12.80	0.019		15.59	0.036	

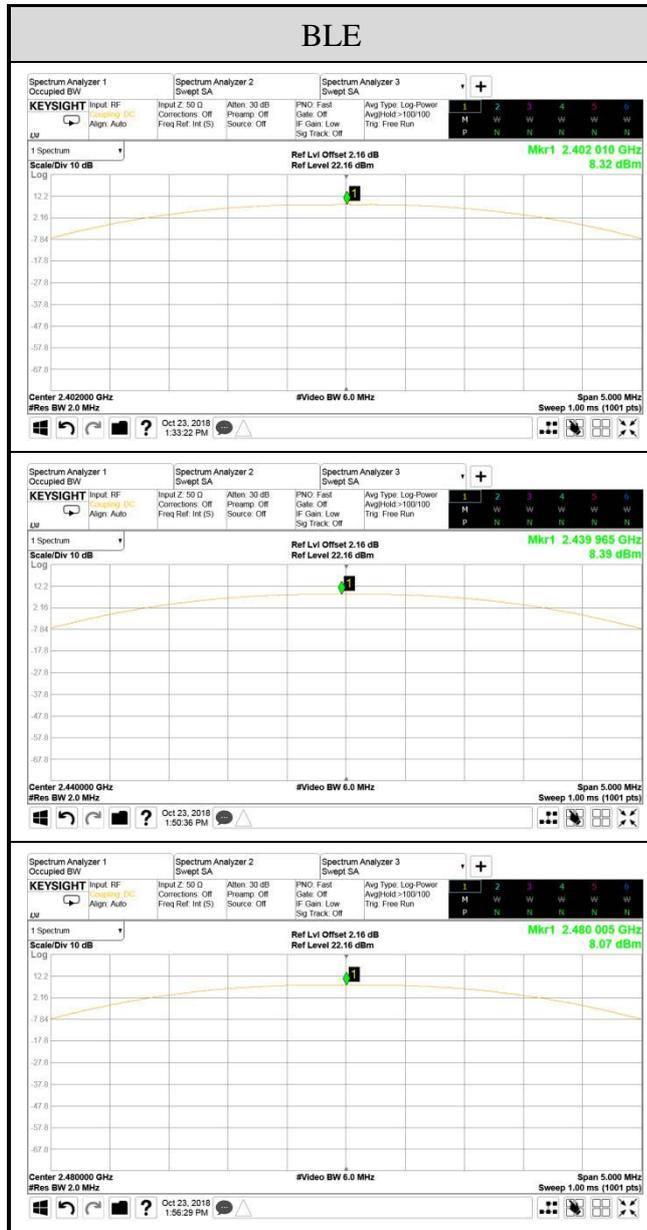
Mode	Centre Frequency (MHz)	Average Output Power (dBm)		10log (1/X)	Max. Average Output Power		Antenna Gain (dBi)	Total Average Output Power (E.I.R.P.)		Limit
		Chain 0	Chain 1		(dBm)	(W)		(dBm)	(W)	
802.11g	2412	16.10	16.19	0	16.19	0.042	2.79	18.98	0.079	< 30dBm (1W) (Maximum Peak Output Power) < 36dBm (4W) (E.I.R.P)
	2437	20.49	19.57		20.49	0.112		23.28	0.213	
	2462	16.24	16.47		16.47	0.044		19.26	0.084	
	2467	12.11	13.25		13.25	0.021		16.04	0.040	
	2472	-5.57	-6.47		-5.57	0.000		-2.78	0.001	

Mode	Centre Frequency (MHz)	Average Output Power (dBm)		10log (1/X)	Max. Average Output Power		Antenna Gain (dBi)	Total Average Output Power (E.I.R.P.)		Limit
		Chain 0	Chain 1		(dBm)	(W)		(dBm)	(W)	
802.11n-HT20	2412	14.95	15.18	0.19	18.27	0.067	2.79	21.06	0.128	< 30dBm (1W) (Maximum Peak Output Power) < 36dBm (4W) (E.I.R.P)
	2437	17.24	17.62		20.64	0.116		23.43	0.220	
	2462	14.77	14.56		17.87	0.061		20.66	0.116	
	2467	12.49	12.15		15.53	0.036		18.32	0.068	
	2472	-6.08	-6.95		-3.29	0.000		-0.50	0.001	

Mode	Centre Frequency (MHz)	Average Output Power (dBm)		10log (1/X)	Max. Average Output Power		Antenna Gain (dBi)	Total Average Output Power (E.I.R.P.)		Limit
		Chain 0	Chain 1		(dBm)	(W)		(dBm)	(W)	
802.11n-HT40	2422	13.18	12.80	0.38	16.38	0.043	2.79	19.17	0.083	< 30dBm (1W) (Maximum Peak Output Power) < 36dBm (4W) (E.I.R.P)
	2437	13.99	14.05		17.41	0.055		20.20	0.105	
	2452	13.13	12.78		16.35	0.043		19.14	0.082	
	2457	8.95	8.42		12.08	0.016		14.87	0.031	
	2462	1.09	0.99		4.43	0.003		7.22	0.005	

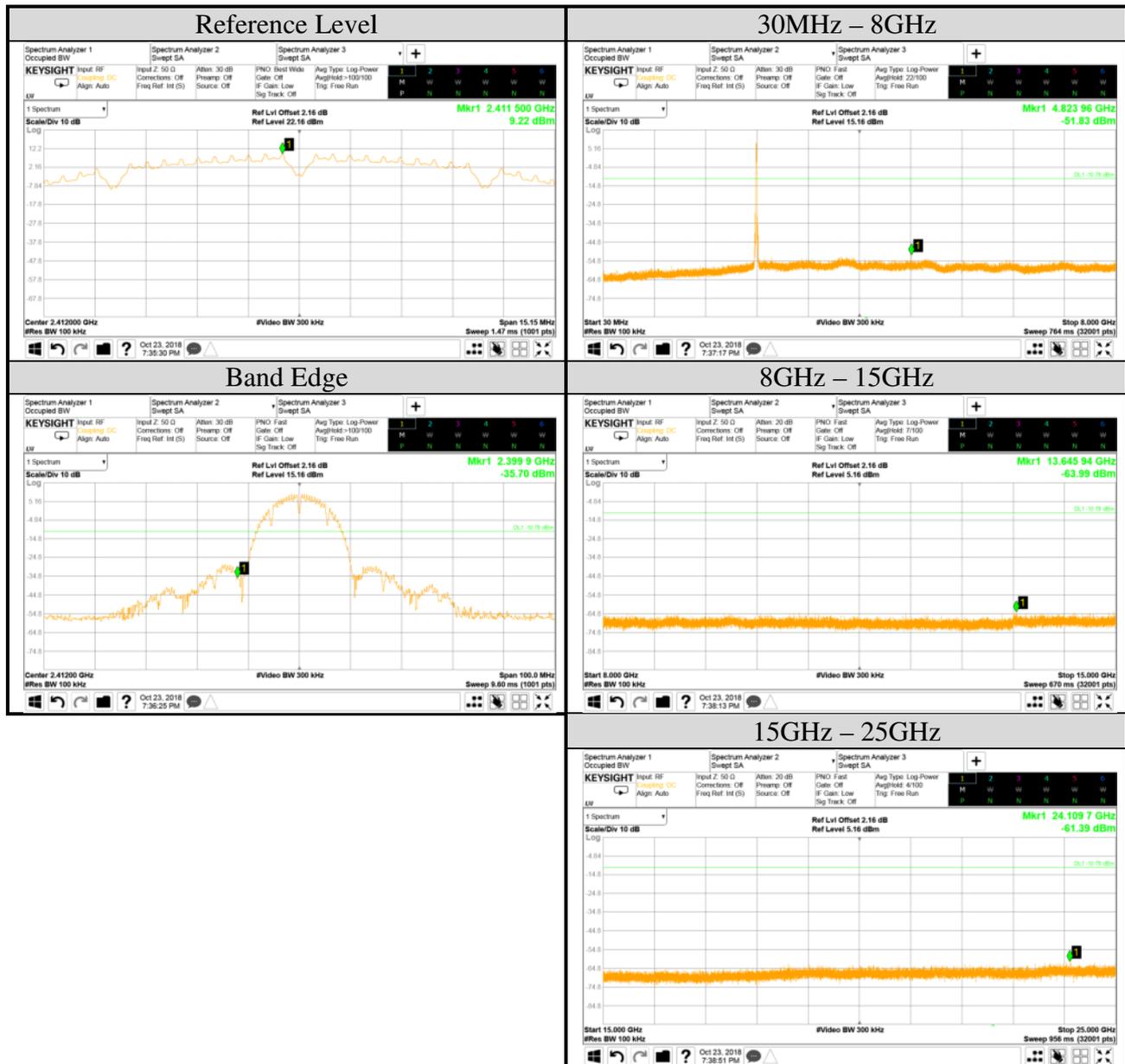
Note: The results have been included cable loss.

A.4.3 Measurement Plots

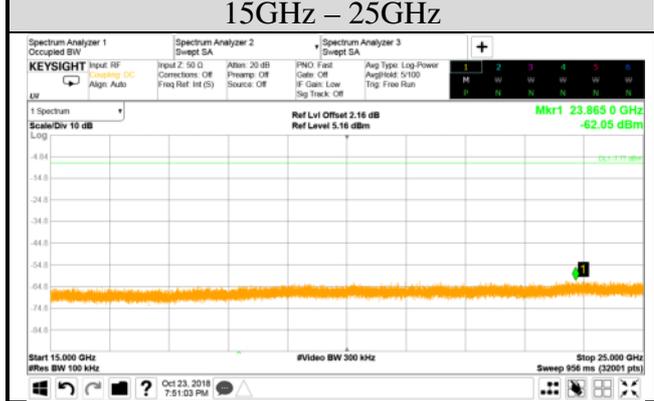
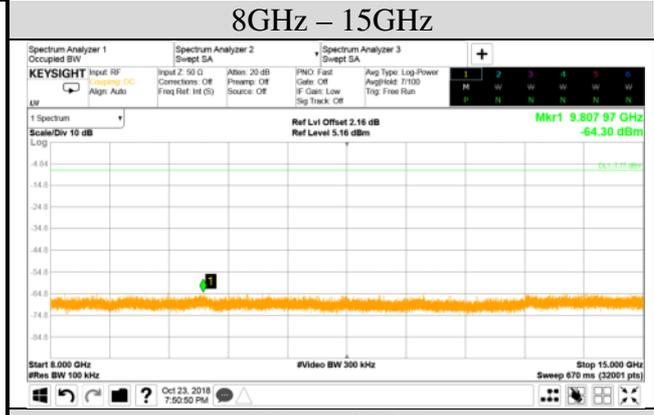
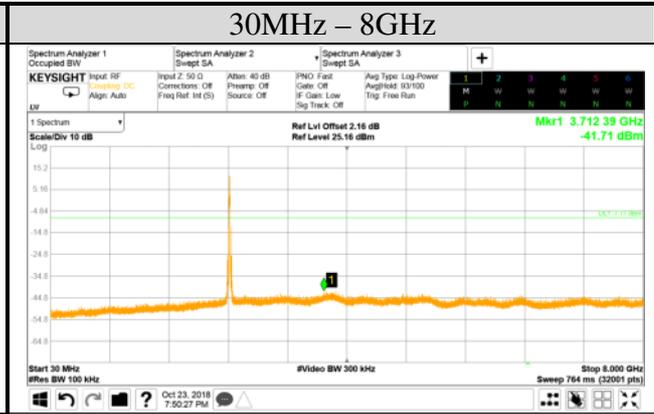
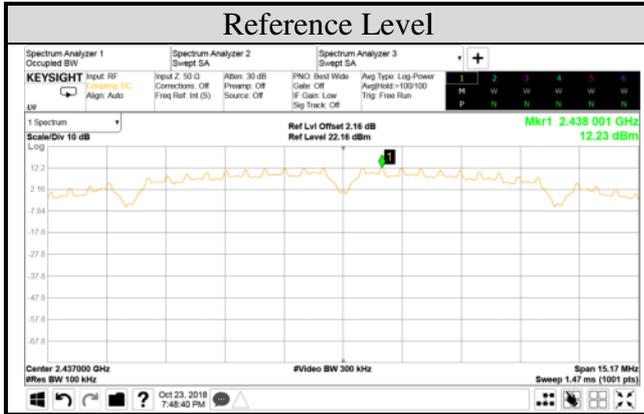


A.5 EMISSION LIMITATIONS

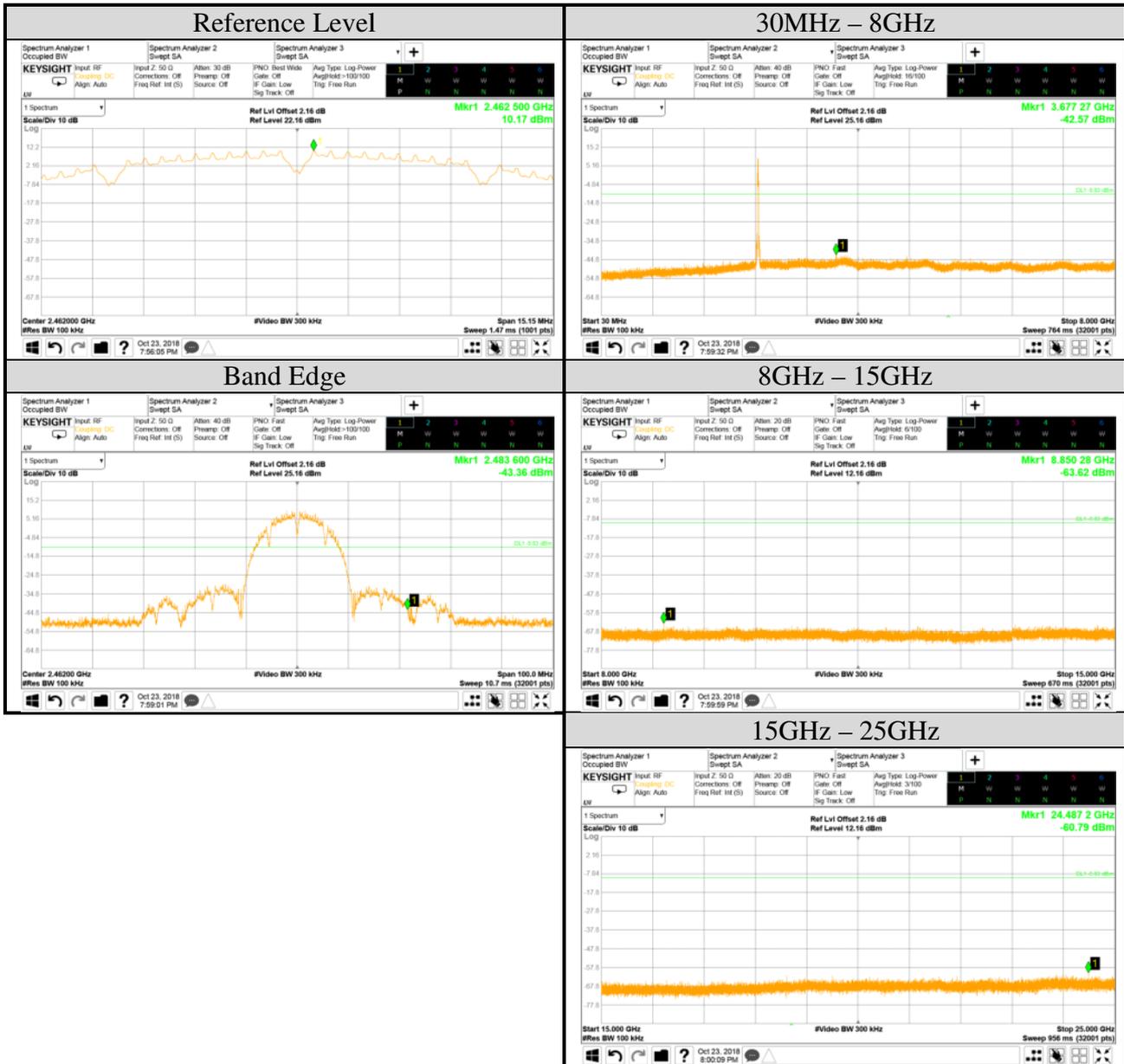
Test Date	2018/10/23	Temp./Hum.	23°C/55%
Cable Loss	2.16dB	Test Voltage	AC 120V, 60Hz (via AC Adapter)
Mode	802.11b	Frequency	TX 2412MHz
Simultaneous Factor10 log(n) (Note: “n” is antenna number)	0		



Test Date	2018/10/23	Temp./Hum.	23°C/55%
Cable Loss	2.16dB	Test Voltage	AC 120V, 60Hz (via AC Adapter)
Mode	802.11b	Frequency	TX 2437MHz
Simultaneous Factor10 log(n) (Note: "n" is antenna number)			0



Test Date	2018/10/23	Temp./Hum.	23°C/55%
Cable Loss	2.16dB	Test Voltage	AC 120V, 60Hz (via AC Adapter)
Mode	802.11b	Frequency	TX 2462MHz
Simultaneous Factor10 log(n) (Note: "n" is antenna number)	0		



Test Date	2018/10/23	Temp./Hum.	23°C/55%
Cable Loss	2.16dB	Test Voltage	AC 120V, 60Hz (via AC Adapter)
Mode	802.11b	Frequency	TX 2472MHz
Simultaneous Factor10 log(n) (Note: "n" is antenna number)			0

