FCC PART 15C
TEST REPORT
No. 2013WLN0834

for

Sony Mobile Communications AB

GSM/WCDMA Mobile Phone

Type: PM-0760-BV

FCC ID: PY7PM-0760

With

Hardware Version: AP1

Software Version: 19.0.D.0.109

Issued Date: 2014-01-17

Test Laboratory:

TMC Beijing, Telecommunication Metrology Center of Ministry of Industry and Information Technology

No. 52, Huayuan Bei Road, Haidian District, Beijing, P. R. China, 100191

Tel: +86(0)10-62304633-2561, Fax: +86(0)10-62304633-2504 Email:welcome@emcite.com. www.emcite.com

CONTENTS

CONTENTS 2

1. TEST LATORATORY 5

1.1. TESTING LOCATION 5
1.2. PROJECT DATA 5
1.3. SIGNATURE 5

2. CLIENT INFORMATION 6

2.1. APPLICANT INFORMATION 6
2.2. MANUFACTURER INFORMATION 6

3. EQUIPMENT UNDER TEST (EUT) AND ANCILLARY EQUIPMENT(AE) 7

3.1. ABOUT EUT 7
3.2. INTERNAL IDENTIFICATION OF EUT USED DURING THE TEST 7
3.3. INTERNAL IDENTIFICATION OF AE USED DURING THE TEST 7
3.4. GENERAL DESCRIPTION 7

4. REFERENCE DOCUMENTS 8

4.1. DOCUMENTS SUPPLIED BY APPLICANT 8
4.2. REFERENCE DOCUMENTS FOR TESTING 8

5. LABORATORY ENVIRONMENT 8

6. SUMMARY OF TEST RESULTS 9

6.1. SUMMARY OF TEST RESULTS 9
6.2. STATEMENTS 9
6.3. TEST CONDITIONS 9

7. TEST EQUIPMENTS UTILIZED 10

ANNEX A: MEASUREMENT RESULTS 11

A.1. MEASUREMENT METHOD 11
A.2. MAXIMUM PEAK OUTPUT POWER 12
A.2.1. OUTPUT POWER VERIFICATION 12
A.2.2. ANTENNA GAIN 12
A.2.3. MAXIMUM PEAK OUTPUT POWER 13
A.3. PEAK POWER SPECTRAL DENSITY 13
A.4. OCCUPIED 6DB BANDWIDTH 14
FIG. 1 OCCUPIED 6DB BANDWIDTH (802.11A, CH 149) 14
FIG. 2 OCCUPIED 6DB BANDWIDTH (802.11A, CH 157) 15
FIG. 3 OCCUPIED 6DB BANDWIDTH (802.11A, CH 165) 15
FIG. 4 OCCUPIED 6DB BANDWIDTH (802.11N-HT20, CH 149) 16
FIG. 5 OCCUPIED 6DB BANDWIDTH (802.11N-HT20, CH 157) 16
FIG. 6 OCCUPIED 6DB BANDWIDTH (802.11N-HT20, CH 165) 17
FIG. 7 OCCUPIED 6DB BANDWIDTH (802.11N-HT40, CH 151) 17

FIG. 8 OCCUPIED 6DB BANDWIDTH (802.11N-HT40, CH 159) 18
A.5. BAND EDGES COMPLIANCE 19
FIG. 9 BAND EDGES (802.11A, CH 149) 20
FIG. 10 BAND EDGES (802.11A, CH 165) 20
FIG. 11 BAND EDGES (802.11N-HT20, CH 149) 21
FIG. 12 BAND EDGES (802.11N-HT20, CH 165) 21
FIG. 13 BAND EDGES (802.11N-HT40, CH 151) 22
FIG. 14 BAND EDGES (802.11N- HT40, CH 159) 22
A.6. TRANSMITTER SPURIOUS EMISSION 23
A.6.1 TRANSMITTER SPURIOUS EMISSION - CONDUCTED 23
FIG. 15 CONDUCTED SPURIOUS EMISSION (802.11A, CH149, CENTER FREQUENCY) 25
FIG. 16 CONDUCTED SPURIOUS EMISSION (802.11A, CH149, 30 MHZ-12 GHZ) 25
FIG. 17 CONDUCTED SPURIOUS EMISSION (802.11A, CH149, 12 GHZ-25 GHZ) 26
FIG. 18 CONDUCTED SPURIOUS EMISSION (802.11A, CH149, 25 GHZ-40 GHZ) 26
FIG. 19 CONDUCTED SPURIOUS EMISSION (802.11A, CH157, CENTER FREQUENCY) 27
FIG. 20 CONDUCTED SPURIOUS EMISSION (802.11A, CH157, 30 MHZ-12 GHZ) 27
FIG. 21 CONDUCTED SPURIOUS EMISSION (802.11A, CH157, 12 GHZ-25 GHZ) 28
FIG. 22 CONDUCTED SPURIOUS EMISSION (802.11A, CH157, 25 GHZ-40 GHZ) 28
FIG. 23 CONDUCTED SPURIOUS EMISSION (802.11A, CH165, CENTER FREQUENCY) 29
FIG. 24 CONDUCTED SPURIOUS EMISSION (802.11A, CH165, 30 MHZ-12 GHZ) 29
FIG. 25 CONDUCTED SPURIOUS EMISSION (802.11A, CH165, 12 GHZ-25 GHZ) 30
FIG. 26 CONDUCTED SPURIOUS EMISSION (802.11A, CH165, 25 GHZ-40 GHZ) 30
FIG. 27 CONDUCTED SPURIOUS EMISSION (802.11N-HT20, CH149, CENTER FREQUENCY) 31
FIG. 28 CONDUCTED SPURIOUS EMISSION (802.11N-HT20, CH149, 30 MHZ-12 GHZ) 31
FIG. 29 CONDUCTED SPURIOUS EMISSION (802.11N-HT20, CH149, 12 GHZ-25 GHZ) 32
FIG. 30 CONDUCTED SPURIOUS EMISSION (802.11N-HT20, CH149, 25 GHZ-40 GHZ) 32
FIG. 31 CONDUCTED SPURIOUS EMISSION (802.11N-HT20, CH157, CENTER FREQUENCY) 33
FIG. 32 CONDUCTED SPURIOUS EMISSION (802.11N-HT20, CH157, 30 MHZ-12 GHZ) 33
FIG. 33 CONDUCTED SPURIOUS EMISSION (802.11N-HT20, CH157, 12 GHZ-25 GHZ) 34
FIG. 34 CONDUCTED SPURIOUS EMISSION (802.11N-HT20, CH157, 25 GHZ-40 GHZ) 34
FIG. 35 CONDUCTED SPURIOUS EMISSION (802.11N-HT20, CH165, CENTER FREQUENCY) 35
FIG. 36 CONDUCTED SPURIOUS EMISSION (802.11N-HT20, CH165, 30 MHZ-12 GHZ) 35
FIG. 37 CONDUCTED SPURIOUS EMISSION (802.11N-HT20, CH165, 12 GHZ-25 GHZ) 36
FIG. 38 CONDUCTED SPURIOUS EMISSION (802.11N-HT20, CH165, 25 GHZ-40 GHZ) 36
FIG. 39 CONDUCTED SPURIOUS EMISSION (802.11N-HT40, CH151, CENTER FREQUENCY) 37
FIG. 40 CONDUCTED SPURIOUS EMISSION (802.11N-HT40, CH151, 30 MHZ-12 GHZ) 37
FIG. 41 CONDUCTED SPURIOUS EMISSION (802.11N-HT40, CH151, 12 GHZ-25 GHZ) 38
FIG. 42 CONDUCTED SPURIOUS EMISSION (802.11N-HT40, CH151, 25 GHZ-40 GHZ) 38
FIG. 43 CONDUCTED SPURIOUS EMISSION (802.11N-HT40, CH159, CENTER FREQUENCY) 39
FIG. 44 CONDUCTED SPURIOUS EMISSION (802.11N-HT40, CH159, 30 MHZ-12 GHZ) 39
FIG. 45 CONDUCTED SPURIOUS EMISSION (802.11N-HT40, CH159, 12 GHZ-25 GHZ) 40
FIG. 46 CONDUCTED SPURIOUS EMISSION (802.11N-HT40, CH159, 25 GHZ-40 GHZ) 40
A.6.2 TRANSMITTER SPURIOUS EMISSION - RADIATED 41
FIG. 47 RADIATED SPURIOUS EMISSION (802.11A, CH149, 30 MHZ-1 GHZ) 45

FIG. 48 RADIATED SPURIOUS EMISSION (802.11A, CH149, 1 GHZ-6 GHZ) 45
FIG. 49 RADIATED SPURIOUS EMISSION (802.11A, CH149, 6 GHZ-18 GHZ) 46
FIG. 50 RADIATED SPURIOUS EMISSION (802.11A, CH157, 30 MHZ-1 GHZ) 46
FIG. 51 RADIATED SPURIOUS EMISSION (802.11A, CH157, 1 GHZ-6 GHZ) 47
FIG. 52 RADIATED SPURIOUS EMISSION (802.11A, CH157, 6 GHZ-18 GHZ) 47
FIG. 53 RADIATED SPURIOUS EMISSION (802.11A, CH165, 30 MHZ-1 GHZ) 48
FIG. 54 RADIATED SPURIOUS EMISSION (802.11A, CH165, 1 GHZ-6 GHZ) 48
FIG. 55 RADIATED SPURIOUS EMISSION (802.11A, CH165, 6 GHZ-18 GHZ) 49
FIG. 56 RADIATED SPURIOUS EMISSION (802.11A, CH157, 18 GHZ-26.5 GHZ) 49
FIG. 57 RADIATED EMISSION: 802.11N, (802.11A, CH157, 26.5 GHZ - 40 GHZ) 50
FIG. 58 RADIATED SPURIOUS EMISSION (802.11N-HT20, CH149, 30 MHZ-1 GHZ) 50
FIG. 59 RADIATED SPURIOUS EMISSION (802.11N-HT20, CH149, 1 GHZ-6 GHZ) 51
FIG. 60 RADIATED SPURIOUS EMISSION (802.11N-HT20, CH149, 6 GHZ-18 GHZ) 51
FIG. 61 RADIATED SPURIOUS EMISSION (802.11N-HT20, CH157, 30 MHZ-1 GHZ) 52
FIG. 62 RADIATED SPURIOUS EMISSION (802.11N-HT20, CH157, 1 GHZ-6 GHZ) 52
FIG. 63 RADIATED SPURIOUS EMISSION (802.11N-HT20, CH157, 6 GHZ-18 GHZ) 53
FIG. 64 RADIATED SPURIOUS EMISSION (802.11N-HT20, CH165, 30 MHZ-1 GHZ) 53
FIG. 65 RADIATED SPURIOUS EMISSION (802.11N-HT20, CH165, 1 GHZ-6 GHZ) 54
FIG. 66 RADIATED SPURIOUS EMISSION (802.11N-HT20, CH165, 6 GHZ-18 GHZ) 54
FIG. 67 RADIATED SPURIOUS EMISSION (802.11N-HT20, CH157, 18 GHZ-26.5 GHZ) 55
FIG. 68 RADIATED EMISSION: 802.11N, (802.11N-HT20, CH157, 26.5 GHZ - 40 GHZ) 55
FIG. 69 RADIATED SPURIOUS EMISSION (802.11N-HT40, CH151, 30 MHZ-1 GHZ) 56
FIG. 70 RADIATED SPURIOUS EMISSION (802.11N-HT40, CH151, 1 GHZ-6 GHZ) 56
FIG. 71 RADIATED SPURIOUS EMISSION (802.11N-HT40, CH151, 6 GHZ-18 GHZ) 57
FIG. 72 RADIATED SPURIOUS EMISSION (802.11N-HT40, CH159, 30 MHZ-1 GHZ) 57
FIG. 73 RADIATED SPURIOUS EMISSION (802.11N-HT40, CH159 1 GHZ-6 GHZ) 58
FIG. 74 RADIATED SPURIOUS EMISSION (802.11N-HT40, CH159, 6 GHZ-18 GHZ) 58
FIG. 75 RADIATED SPURIOUS EMISSION (802.11N-HT40, CH151, 18 GHZ-26.5 GHZ) 59
FIG. 76 RADIATED EMISSION: 802.11N, (802.11N-HT40, CH151, 26.5 GHZ - 40 GHZ) 59
A.7. AC POWERLINE CONDUCTED EMISSION 60
FIG. 77 AC POWERLINE CONDUCTED EMISSION-802.11A 61
FIG. 78 AC POWERLINE CONDUCTED EMISSION-IDLE 62

ANNEX B: PHOTOGRAPHS OF THE TEST SET-UP 63

1. TEST LATORATORY

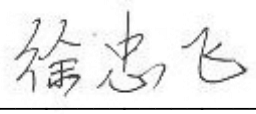
1.1. Testing Location

Company Name:	TMC Beijing, Telecommunication Metrology Center of MIIT
Address:	No. 52, Huayuan Bei Road, Haidian District, Beijing, P. R. China
Postal Code:	100191
Telephone:	+86-10-62304633-2561
Fax:	+86-10-62304633-2504

1.2. Project data

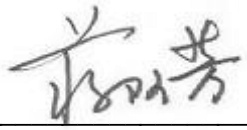
Testing Start Date:	2013-12-19
Testing End Date:	2014-01-17

1.3. Signature



Xu Zhongfei

(Prepared this test report)



Jiang Afang

(Reviewed this test report)

Xiao Li

Deputy Director of the laboratory

(Approved this test report)

2. CLIENT INFORMATION

2.1. Applicant Information

Company Name:	Sony Mobile Communications AB
Address /Post:	Sony Mobile R&D Center, No. 16, Guangshun South Street, Chaoyang District
City:	Beijing
Postal Code:	100102
Country:	China
Contact Person:	Ma, Gang
Telephone:	+86-10-58656312
Fax:	+86-10-58659049

2.2. Manufacturer Information

Company Name:	Sony Mobile Communications AB
Address /Post:	Sony Mobile R&D Center, No. 16, Guangshun South Street, Chaoyang District
City:	Beijing
Postal Code:	100102
Country:	China
Contact Person:	Ma, Gang
Telephone:	+86-10-58656312
Fax:	+86-10-58659049

3. EQUIPMENT UNDER TEST (EUT) AND ANCILLARY EQUIPMENT(AE)

3.1. About EUT

Description	GSM 850/900/1800/1900 quad bands, GPRS, EDGE, WCDMA FDD bands 1/2/5/8, HSDPA, HSUPA, Bluetooth (EDR and 4.0), ANT+, WLAN (802.11 a/b/g/n), NFC, FM, GPS mobile phone
Type	PM-0760-BV
FCC ID	PY7PM-0760
WLAN Frequency Range	ISM Band: 5725MHz~5850MHz
Type of modulation	OFDM
MAX Conducted Power	18.00dBm(OFDM)
MAX Radiated Power	22.47dBm(OFDM)
Extreme Temperature	-20/+55°C
Extreme vol. Limits	3.5VDC to 4.1VDC (nominal: 3.7VDC)

Note: Photographs of EUT are shown in ANNEX C of this test report. Components list, please refer to documents of the manufacturer; it is also included in the original test record of Telecommunication Metrology Center of MIIT of People's Republic of China.

3.2. Internal Identification of EUT used during the test

EUT ID*	S/N	IMEI	HW Version	SW Version
EUT1	CB5126835K	004402147212546	AP1	19.0.D.0.109
EUT2	CB512684ER	004402147214286	AP1	19.0.D.0.109

*EUT ID: is used to identify the test sample in the lab internally.

3.3. Internal Identification of AE used during the test

AE ID*	Description	Type	SN
AE1	Travel Charger	AC-0400-EU	8512W19 100198
AE2	USB Cable	AI-0401	123307DE00365F2

*AE ID: is used to identify the test sample in the lab internally.

3.4. General Description

The Equipment Under Test (EUT) is a model of GSM/WCDMA Mobile Phone with integrated antenna and inbuilt battery.

The EUT supports GSM 850/900/1800/1900MHz bands and WCDMA FDD bands 1/2/5/8. It supports GPRS service with multi-slots class 33 and EGPRS service with multi-slots class 33. The HSDPA and HSUPA (Cat 6) features are also supported.

It has MP3, camera, USB memory, Mobile High-Definition Link (MHL), FM radio, GPS receiver, NFC, Bluetooth (EDR and Bluetooth 4.0), ANT+, WLAN (802.11 a/b/g/n) and Wi-Fi hotspot functions. For WLAN 802.11n, it supports 20MHz and 40MHz bandwidths on both 2.4GHz band

and 5GHz/5.8GHz band.
It consists of normal options: USB cable and travel charger.
Manual and specifications of the EUT were provided to fulfil the test.
Samples undergoing test were selected by the client.

4. REFERENCE DOCUMENTS

4.1. Documents supplied by applicant

EUT feature information is supplied by the applicant or manufacturer, which is the basis of testing.

4.2. Reference Documents for testing

The following documents listed in this section are referred for testing.

FCC Part15	FCC CFR 47, Part 15, Subpart C: 15.205 Restricted bands of operation; 15.209 Radiated emission limits, general requirements; 15.247 Operation within the bands 902–928MHz, 2400–2483.5 MHz, and 5725–5850 MHz.	Oct, 2012
ANSI C63.10	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz	2009
KDB558074	Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247	2013
KDB644545	Guidance for IEEE 802.11ac and Pre-ac Device Emissions Testing	2013

5. LABORATORY ENVIRONMENT

Conducted RF performance testing is performed in shielding room.

EMC performance testing is performed in Semi-anechoic chamber.

6. SUMMARY OF TEST RESULTS

6.1. Summary of Test Results

SUMMARY OF MEASUREMENT RESULTS	Sub-clause of Part15C	Sub-clause of IC	Verdict
Maximum Peak Output Power	15.247 (b)	/	**P**
Peak Power Spectral Density	15.247 (e)	/	**P**
Occupied 6dB Bandwidth	15.247 (a)	/	**P**
Band Edges Compliance	15.247 (b)	/	**P**
Transmitter Spurious Emission - Conducted	15.247	/	**P**
Transmitter Spurious Emission - Radiated	15.247, 15.205, 15.209	/	**P**
AC Powerline Conducted Emission	15.107, 15.207	/	**P**

Please refer to **ANNEX A** for detail.

Terms used in Verdict column

P	Pass, The EUT complies with the essential requirements in the standard.
NM	Not measured, The test was not measured by TMC
NA	Not Applicable, The test was not applicable
F	Fail, The EUT does not comply with the essential requirements in the standard

6.2. Statements

TMC has evaluated the test cases requested by the client/manufacturer as listed in section 6.1 of this report for the EUT specified in section 3 according to the standards or reference documents listed in section 4.1.

This report only deals with the WLAN function among the features described in section 3.

6.3. Test Conditions

For this report, all the test cases are tested under normal temperature and normal voltage, and also under norm humidity, the specific condition is shown as follows:

Temperature	26℃
Voltage	3.7V
Humidity	44%

7. TEST EQUIPMENTS UTILIZED

Conducted test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration date	Calibration Due date
1	Vector Signal Analyzer	FSQ40	200089	Rohde & Schwarz	2013-07-08	2014-07-07
2	Test Receiver	ESS	847151/015	Rohde & Schwarz	2013-10-30	2014-10-29
3	LISN	ESH2-Z5	829991/012	Rohde & Schwarz	2013-4-15	2014-08-12
4	Shielding Room	S81	/	ETS-Lindgren	/	/

Radiated emission test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration date	Calibration Due date
1	Test Receiver	ESU26	100376	Rohde & Schwarz	2013-11-8	2014-11-7
2	BiLog Antenna	VULB9163	9163-514	Schwarzbeck	2011-11-11	2014-11-10
3	Dual-Ridge Waveguide Horn Antenna	3117	00119024	ETS-Lindgren	2011-2-2	2014-2-1
4	Dual-Ridge Waveguide Horn Antenna	3116	2661	EMCO	2011-7-1	2014-06-30
5	Loop antenna	HFH2-Z2	829324/007	Rohde & Schwarz	2011-12-21	2014-12-20
6	Semi-anechoic chamber	/	CT000332-1074	Frankonia German	/	/

ANNEX A: MEASUREMENT RESULTS

A.1. Measurement Method

A.1.1. Conducted Measurements

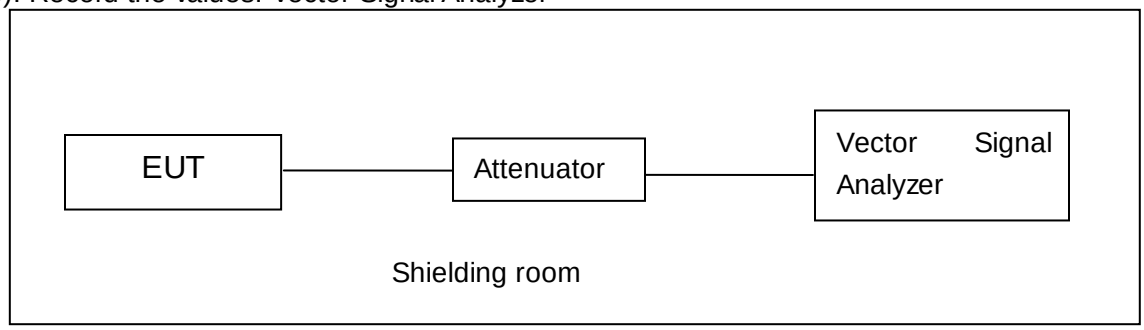
1). Connect the EUT to the test system correctly.

2). Set the EUT to the required work mode.

3). Set the EUT to the required channel.

4). Set the spectrum analyzer to start measurement.

5). Record the values. Vector Signal Analyzer

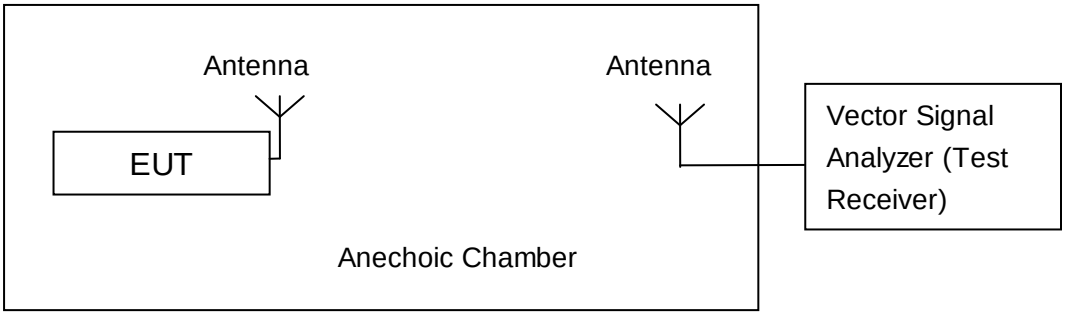


A.1.2. Radiated Emission Measurements

In the case of radiated emission, the used settings are as follows,

Sweep frequency from 30 MHz to 1GHz, RBW = 100 kHz, VBW = 300 kHz;

Sweep frequency from 1 GHz to 26GHz, RBW = 1MHz, VBW = 10Hz;



The measurement is made according to ANSI C63.10 and KDB558074

The radiated emission test is performed in semi-anechoic chamber. The distance from the EUT to the reference point of measurement antenna is 3m. The test is carried out on both vertical and horizontal polarization and only maximization result of both polarizations is kept. During the test, the turntable is rotated 360° and the measurement antenna is moved from 1m to 4m to get the maximization result.

A.2. Maximum Peak Output Power

Measurement Limit and Method:

Standard	Limit (dBm)
FCC CRF Part 15.247(b)	< 30

The measurement is made according to ANSI C63.10 .

Measurement Uncertainty:

Measurement Uncertainty	0.75dB

A.2.1. Output Power Verification

This test is only for mode verification, and the selected mode will be used for the future measurement.

Measurement Results:

OFDM/a mode	Maximum Conducted Power (dBm)							
data rate (Mbps)	6	9	12	18	24	36	48	54
149 (5745 MHz)	12.23	12.17	12.10	11.99	11.84	11.66	11.46	11.39

OFDM/n-HT20 mode	Maximum Conducted Power (dBm)							
data rate (Mbps)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
149 (5745 MHz)	12.25	12.15	12.03	11.92	11.82	11.64	11.44	10.78

OFDM/n-HT40 mode	Maximum Conducted Power (dBm)							
data rate (Mbps)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
151 (5755 MHz)	11.95	11.78	11.71	11.51	11.32	11.14	10.64	10.38

Selected data rate for all measurement:

OFDM /a-mode: 6Mbps

OFDM /n-HT20 mode: MCS0

OFDM /n-HT40 mode: MCS0

A.2.2. Antenna Gain

The antenna gain of the complete system is calculated by the difference of radiated power and the conducted power of the EUT.

Test	Channel		
Tnom,Vnom	149	157	165
Conducted Power(dBm)	14.75	14.81	14.28
Radiated Power(dBm)	19.22	19.05	18.92
Gain(dBi)	4.47	4.24	4.64

Antenna Gain = Radiated value (with radiated sample) - Conducted values (with conducted samples)

A.2.3. Maximum Peak Output Power

Measurement Results:

802.11a

Mode	Test Result (dBm)					
	5745 MHz (Ch149)		5785 MHz (Ch157)		5825 MHz (Ch165)	
	Conducted	Radiated	Conducted	Radiated	Conducted	Radiated
802.11a	17.99	22.46	17.96	22.20	16.78	21.42

802.11n-HT20

Mode	Test Result (dBm)					
	5745 MHz (Ch149)		5785 MHz (Ch157)		5825 MHz (Ch165)	
	Conducted	Radiated	Conducted	Radiated	Conducted	Radiated
802.11n-HT20	18.00	22.47	17.99	22.23	16.88	21.52

802.11n-HT40

Mode	Test Result (dBm)			
	5755 MHz (Ch151)		5795 MHz (Ch159)	
	Conducted	Radiated	Conducted	Radiated
802.11n-HT40	17.25	21.72	17.06	21.70

Conclusion: PASS

A.3. Peak Power Spectral Density

Measurement Limit:

Standard	Limit
FCC CRF Part 15.247(e)	< 8 dBm/3 kHz

The measurement is made according to ANSI C63.10 and KDB558074

Measurement Uncertainty:

Measurement Uncertainty	0.75dB

Measurement Results:

Mode	Channel	Power Spectral Density (dBm/3 kHz)	Conclusion
802.11a	149	-16.06	P
	157	-17.51	P
	165	-18.08	P
802.11n HT20	149	-17.87	P
	157	-17.56	P
	165	-18.54	P
802.11n HT40	151	-19.07	P
	159	-18.73	P

Conclusion: PASS

A.4. Occupied 6dB Bandwidth

Measurement Limit:

Standard	Limit (kHz)
FCC 47 CFR Part 15.247 (a)	≥ 500

The measurement is made according to ANSI C63.10 .

Measurement Uncertainty:

Measurement Uncertainty	60.80Hz

Measurement Result:

Mode	Channel	Occupied 6dB Bandwidth (kHz)		conclusion
802.11a	149	Fig.1	16667	P
	157	Fig.2	16667	P
	165	Fig.3	16587	P
802.11n HT20	149	Fig.4	17788	P
	157	Fig.5	17869	P
	165	Fig.6	17869	P
802.11n HT40	151	Fig.7	36410	P
	159	Fig.8	36731	P

Conclusion: PASS

Test graphs as below:

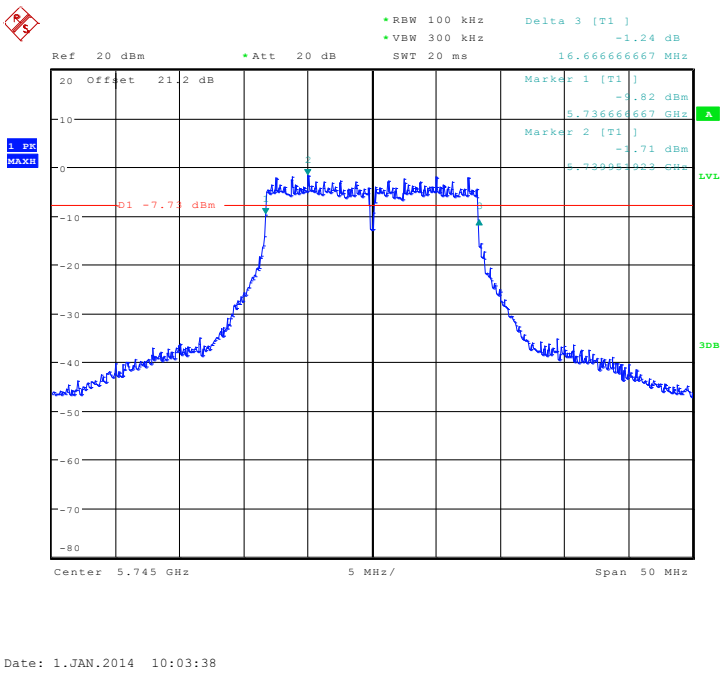
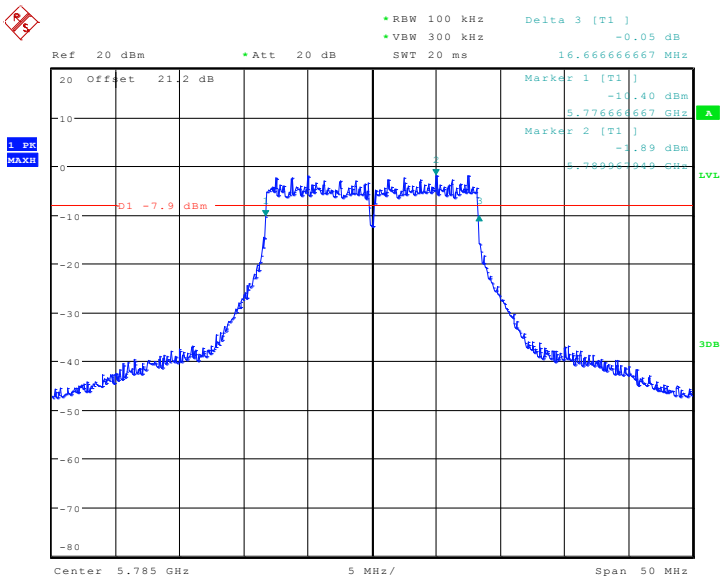
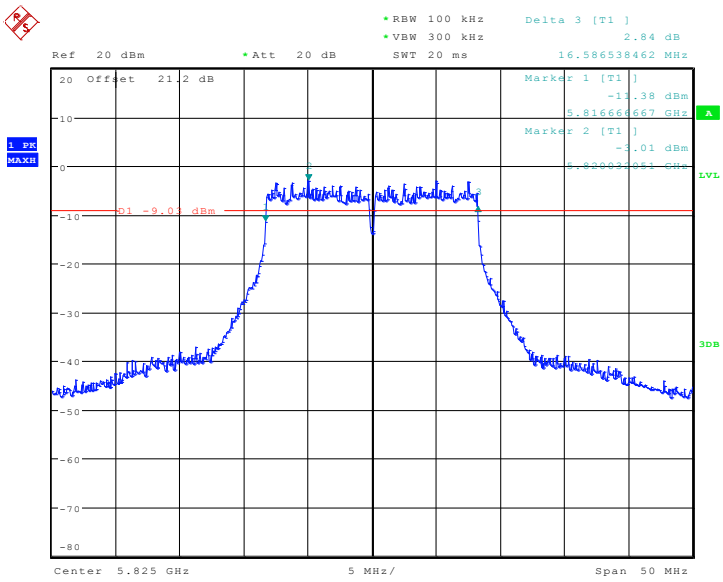


Fig. 1 Occupied 6dB Bandwidth (802.11a, Ch 149)



Date: 1.JAN.2014 10:04:38

Fig. 2 Occupied 6dB Bandwidth (802.11a, Ch 157)



Date: 1.JAN.2014 10:05:43

Fig. 3 Occupied 6dB Bandwidth (802.11a, Ch 165)

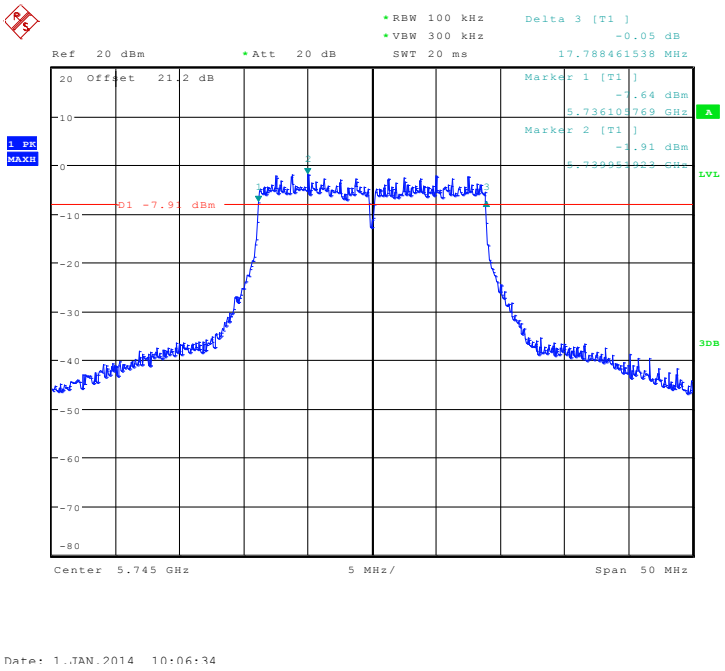


Fig. 4 Occupied 6dB Bandwidth (802.11n-HT20, Ch 149)

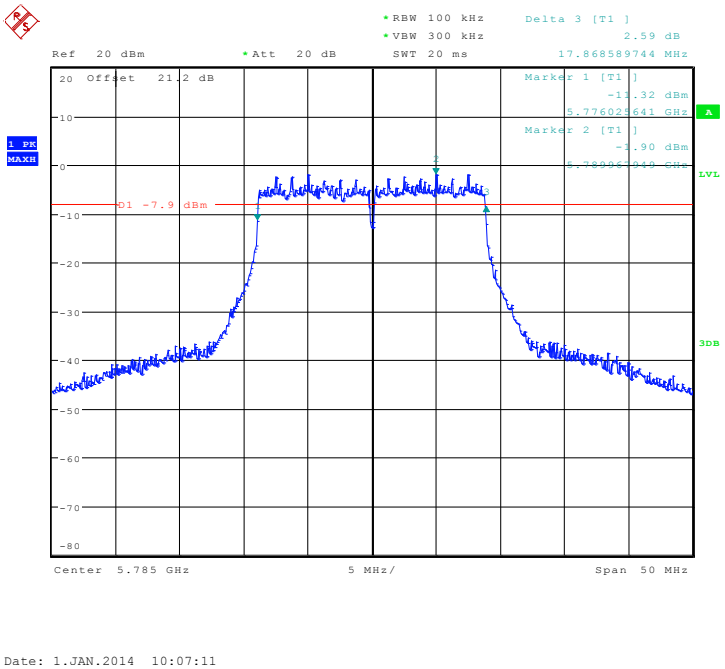


Fig. 5 Occupied 6dB Bandwidth (802.11n-HT20, Ch 157)

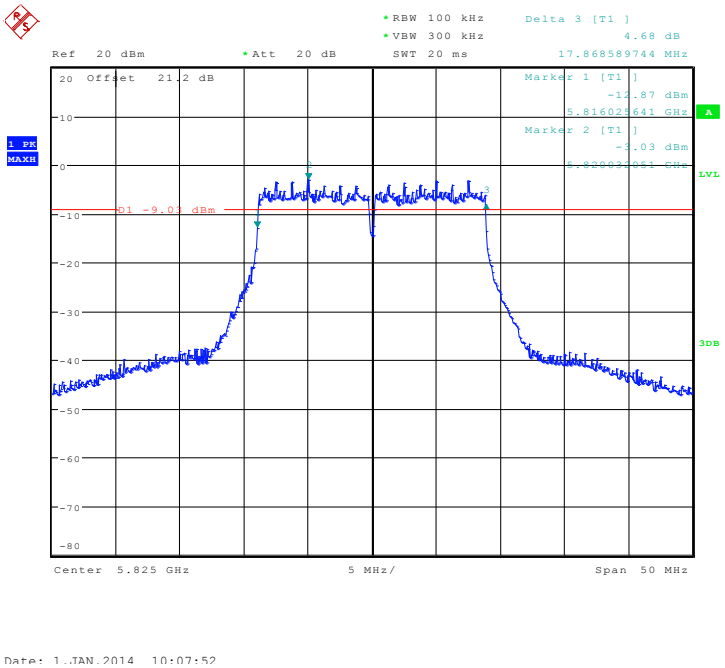


Fig. 6 Occupied 6dB Bandwidth (802.11n-HT20, Ch 165)

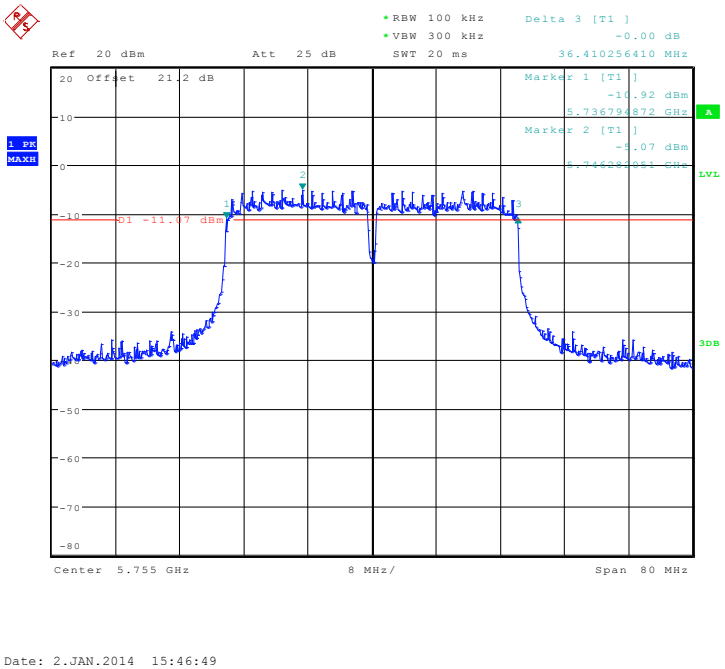


Fig. 7 Occupied 6dB Bandwidth (802.11n-HT40, Ch 151)

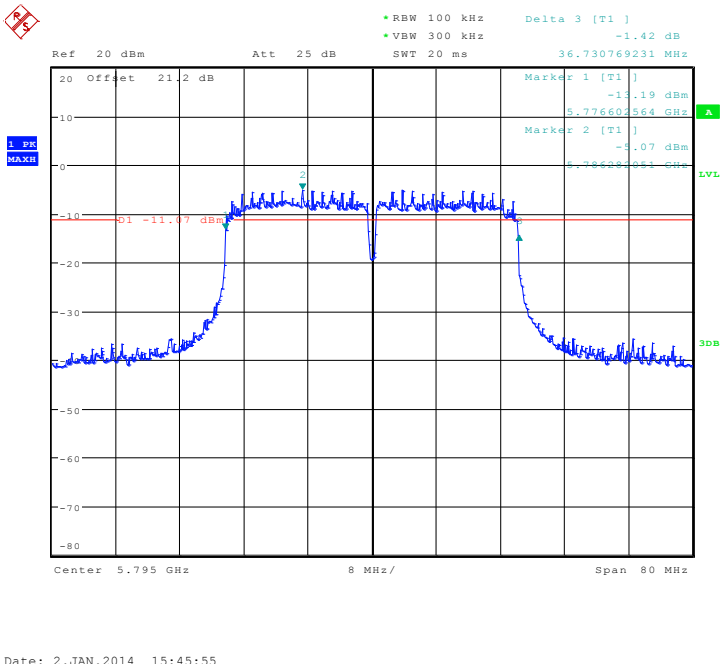


Fig. 8 Occupied 6dB Bandwidth (802.11n-HT40, Ch 159)

A.5. Band Edges Compliance

Measurement Limit:

Standard	Limit (dBc)
FCC 47 CFR Part 15.247 (d)	> 20

The measurement is made according to ANSI C63.10 .

Measurement Result:

802.11a mode

Mode	Channel	Test Results	Conclusion
802.11a	149	Fig.9	**P**
	165	Fig.10	**P**

802.11n-HT20 mode

Mode	Channel	Test Results	Conclusion
802.11n (HT20)	149	Fig.11	**P**
	165	Fig.12	**P**

802.11n-HT40 mode

Mode	Channel	Test Results	Conclusion
802.11n (HT40)	151	Fig.13	**P**
	159	Fig.14	**P**

Conclusion: Pass

Measurement Uncertainty:

Measurement Uncertainty	0.75dB

Test graphs as below:

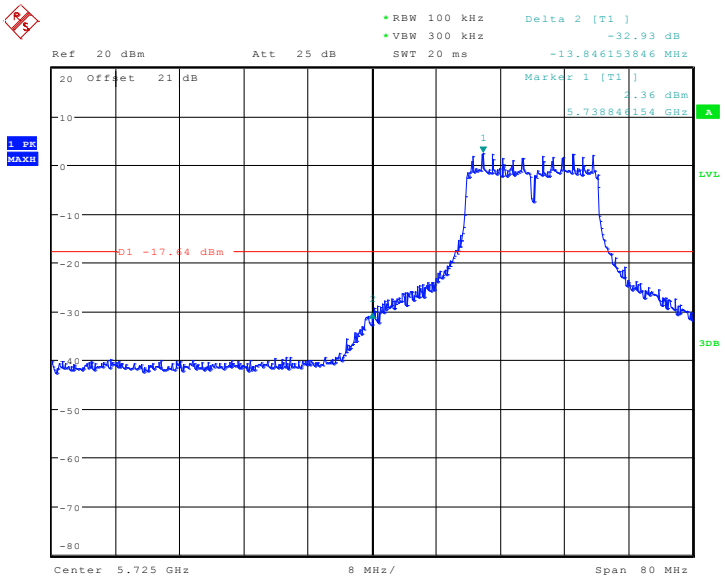


Fig. 9 Band Edges (802.11a, Ch 149)

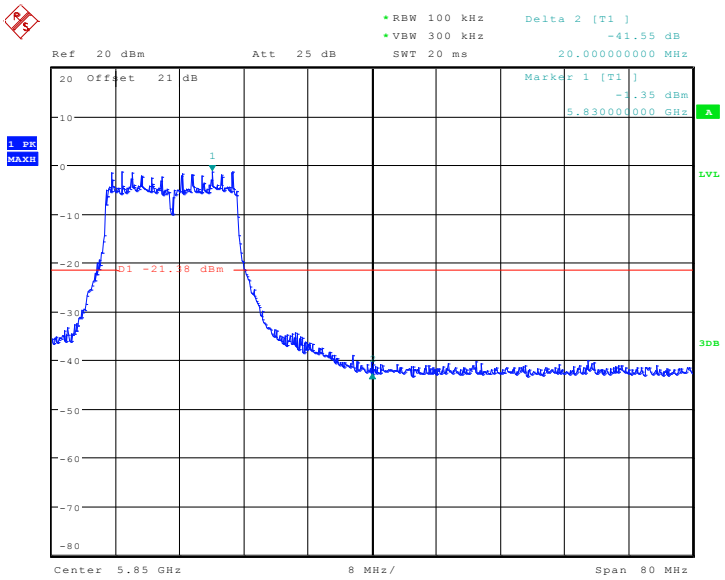


Fig. 10 Band Edges (802.11a, Ch 165)

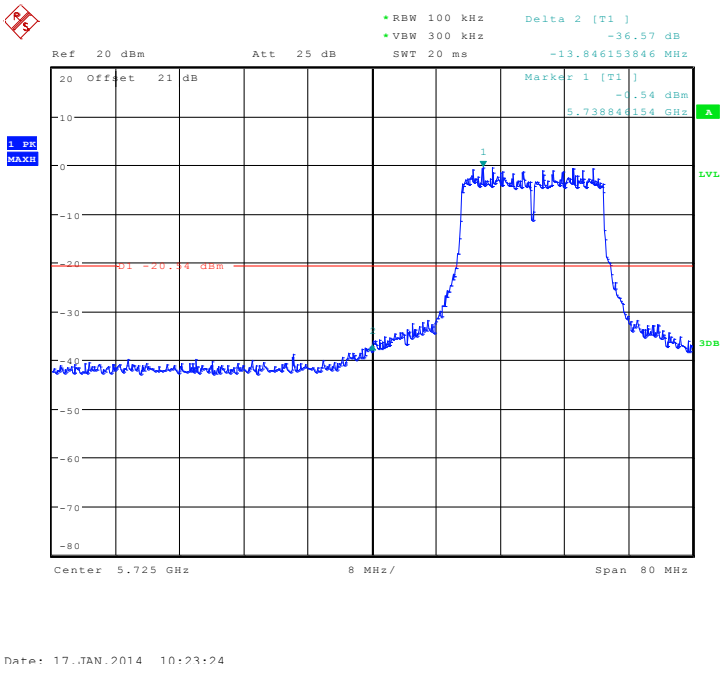


Fig. 11 Band Edges (802.11n-HT20, Ch 149)

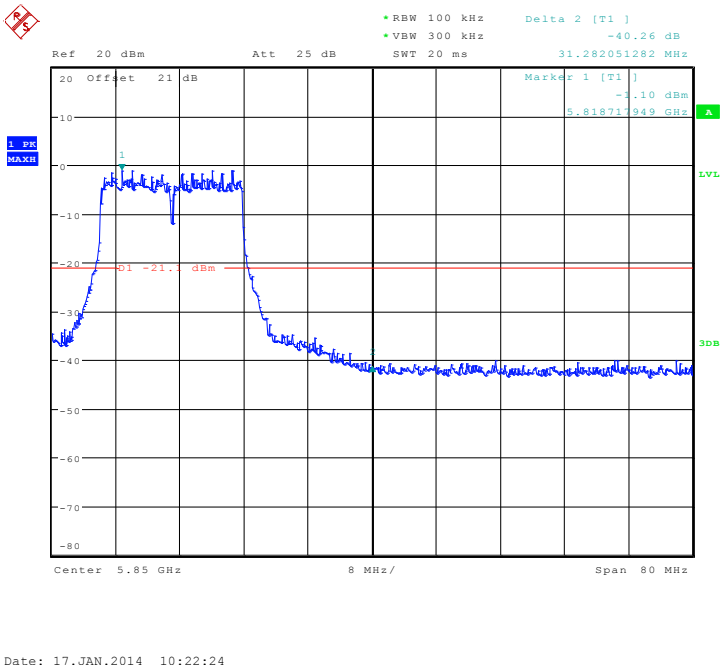


Fig. 12 Band Edges (802.11n-HT20, Ch 165)

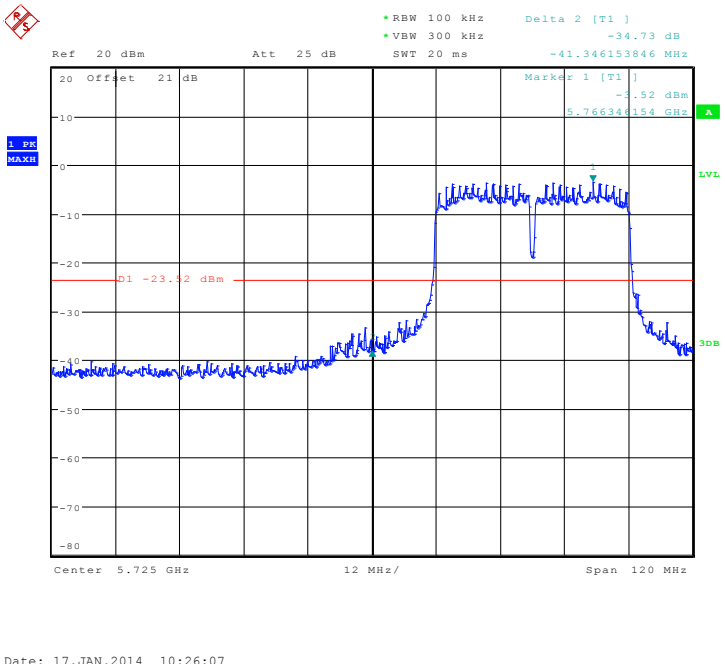


Fig. 13 Band Edges (802.11n-HT40, Ch 151)

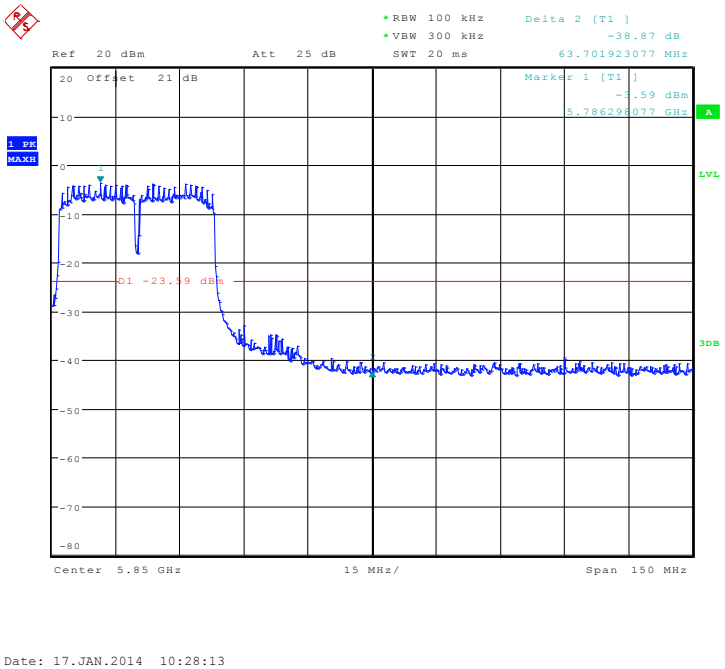


Fig. 14 Band Edges (802.11n- HT40, Ch 159)

A.6. Transmitter Spurious Emission

Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247 (d)	20dB below peak output power in 100 kHz bandwidth

The measurement is made according to ANSI C63.10 .

In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

Frequency of emission (MHz)	Field strength(uV/m)	Field strength(dBuV/m)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

Measurement Uncertainty:

Frequency Range	Uncertainty(dB)
30MHz ≤ f ≤ 2GHz	0.63
2GHz ≤ f ≤3.6GHz	0.82
3.6GHz ≤ f ≤8GHz	1.55
8GHz ≤ f ≤20GHz	1.86
20GHz ≤ f ≤22GHz	1.90
22GHz ≤ f ≤26GHz	2.20

A.6.1 Transmitter Spurious Emission - Conducted

Measurement Results:

802.11a mode

MODE	Channel	Frequency Range	Test Results	Conclusion
802.11a	149	5.745 GHz	Fig.15	P
		30 MHz ~ 12 GHz	Fig.16	P
		12 GHz ~ 25 GHz	Fig.17	P
		25 GHz ~ 40 GHz	Fig.18	P
	157	5.785 GHz	Fig.19	P
		30 MHz ~ 12 GHz	Fig.20	P
		12 GHz ~ 25 GHz	Fig.21	P
		25 GHz ~ 40 GHz	Fig.22	P
	165	5.825 GHz	Fig.23	P
		30 MHz ~ 12 GHz	Fig.24	P
		12 GHz ~ 25 GHz	Fig.25	P
		25 GHz ~ 40 GHz	Fig.26	P

802.11n-HT20 mode

MODE	Channel	Frequency Range	Test Results	Conclusion
802.11n HT20	149	5.745 GHz	Fig.27	P
		30 MHz ~ 12 GHz	Fig.28	P
		12 GHz ~ 25 GHz	Fig.29	P
		25 GHz ~ 40 GHz	Fig.30	P
	157	5.785 GHz	Fig.31	P
		30 MHz ~ 12 GHz	Fig.32	P
		12 GHz ~ 25 GHz	Fig.33	P
		25 GHz ~ 40 GHz	Fig.34	P
	165	5.825 GHz	Fig.35	P
		30 MHz ~ 12 GHz	Fig.36	P
		12 GHz ~ 25 GHz	Fig.37	P
		25 GHz ~ 40 GHz	Fig.38	P

802.11n-HT40 mode

MODE	Channel	Frequency Range	Test Results	Conclusion
802.11n HT40	151	5.755 GHz	Fig.39	P
		30 MHz ~ 12 GHz	Fig.40	P
		12 GHz ~ 25 GHz	Fig.41	P
		25 GHz ~ 40 GHz	Fig.42	P
	159	5.795 GHz	Fig.43	P
		30 MHz ~ 12 GHz	Fig.44	P
		12 GHz ~ 25 GHz	Fig.45	P
		25 GHz ~ 40 GHz	Fig.46	P

Conclusion: PASS

Test graphs as below:

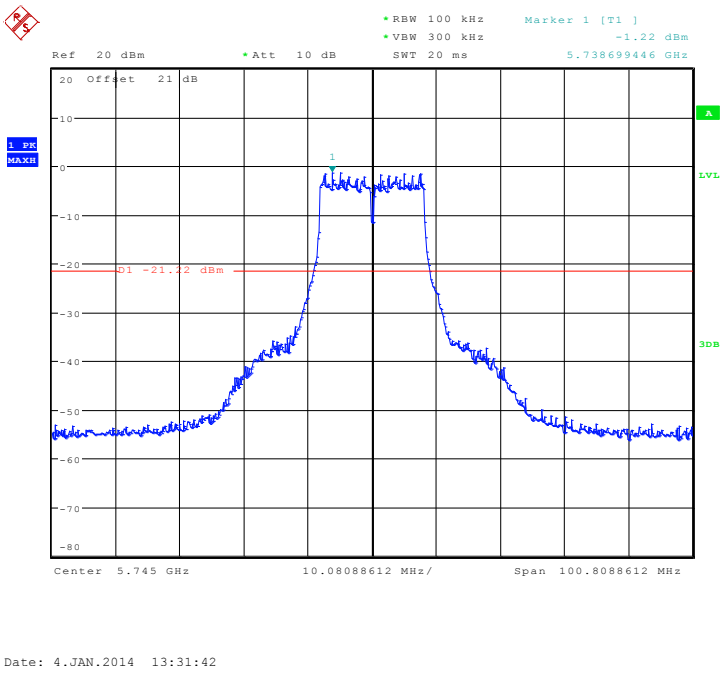


Fig. 15 Conducted Spurious Emission (802.11a, Ch149, Center Frequency)

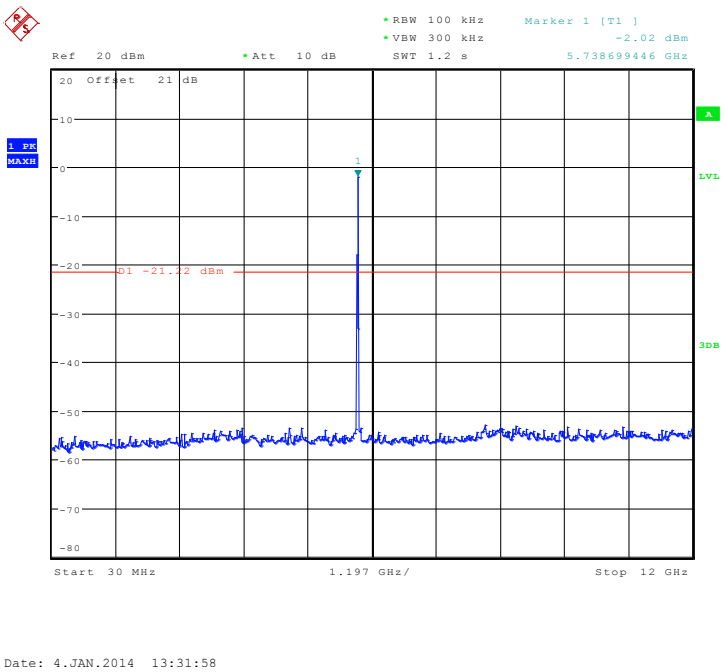


Fig. 16 Conducted Spurious Emission (802.11a, Ch149, 30 MHz-12 GHz)

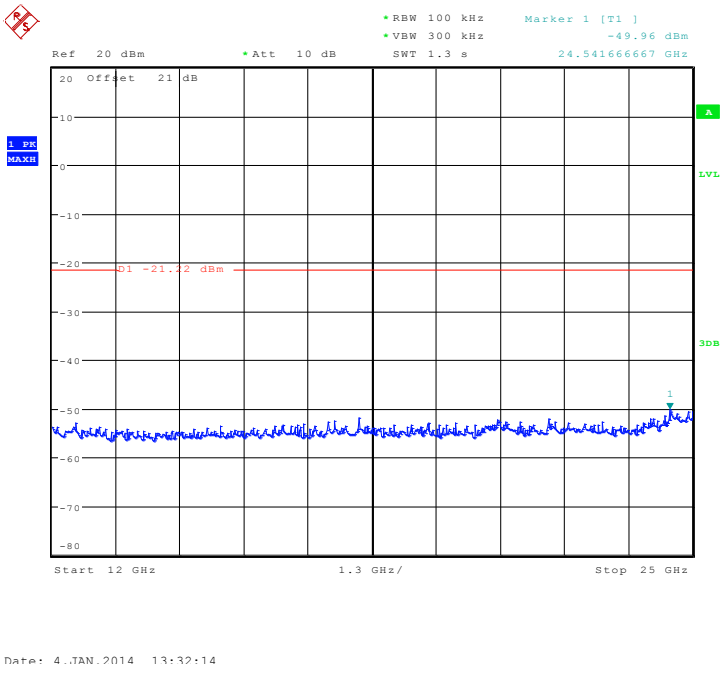


Fig. 17 Conducted Spurious Emission (802.11a, Ch149, 12 GHz-25 GHz)

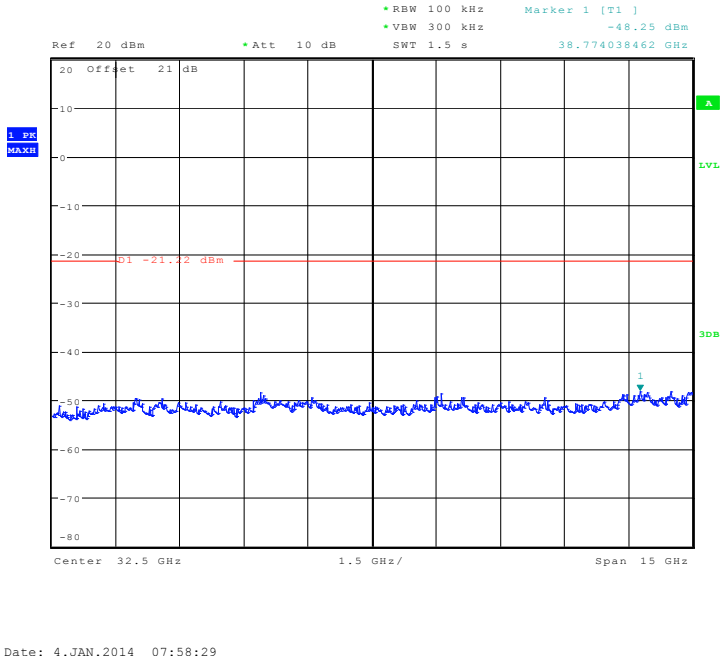


Fig. 18 Conducted Spurious Emission (802.11a, Ch149, 25 GHz-40 GHz)

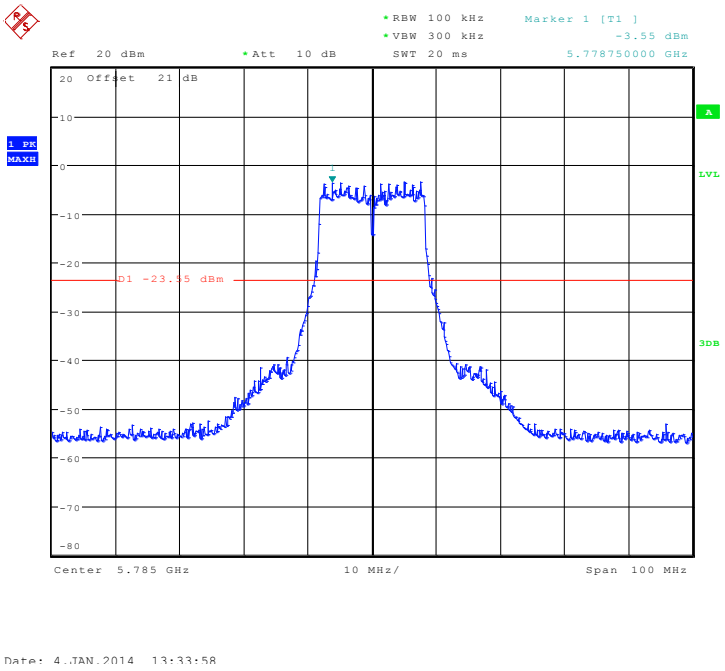


Fig. 19 Conducted Spurious Emission (802.11a, Ch157, Center Frequency)

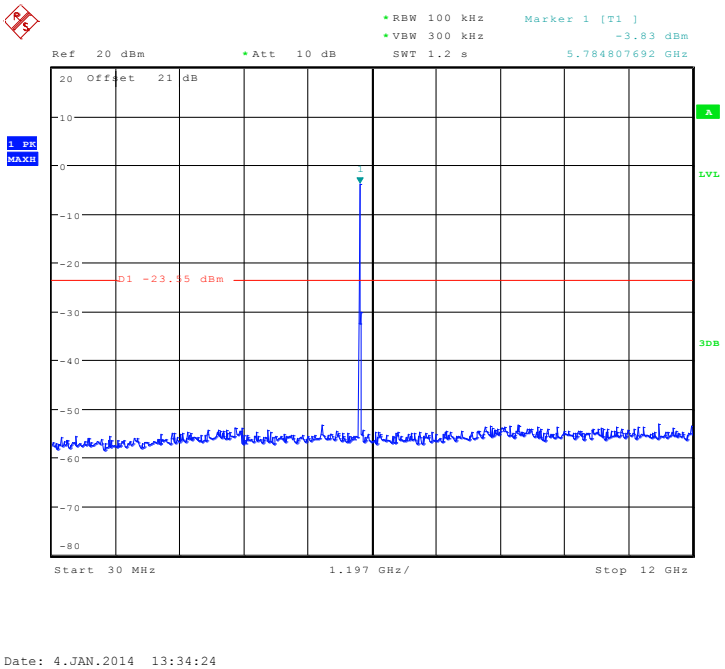


Fig. 20 Conducted Spurious Emission (802.11a, Ch157, 30 MHz-12 GHz)

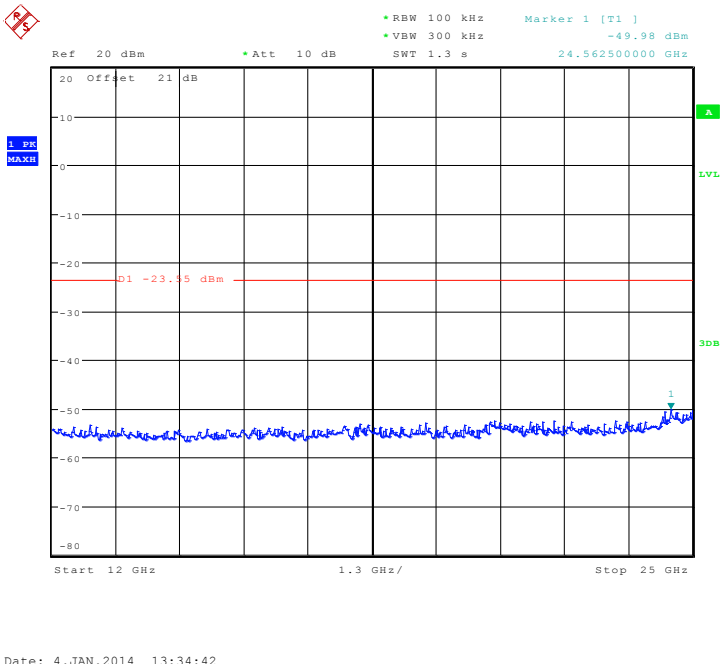


Fig. 21 Conducted Spurious Emission (802.11a, Ch157, 12 GHz-25 GHz)

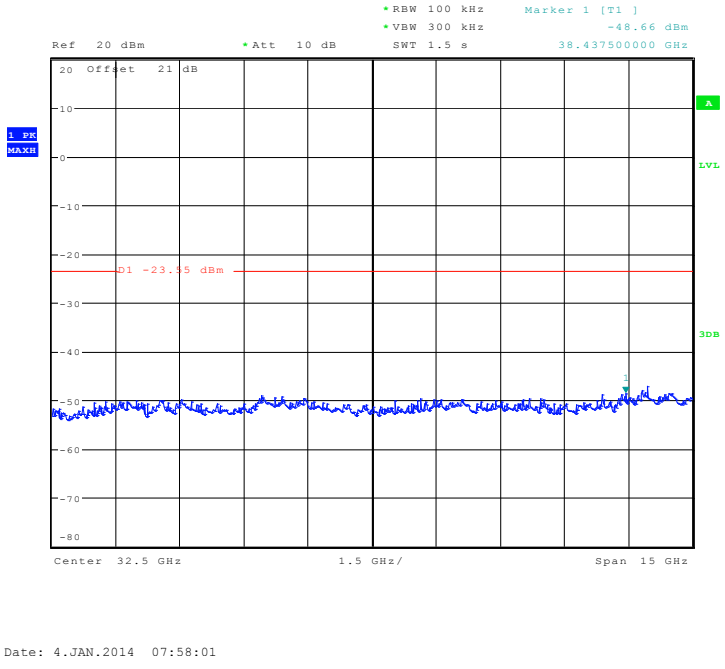


Fig. 22 Conducted Spurious Emission (802.11a, Ch157, 25 GHz-40 GHz)

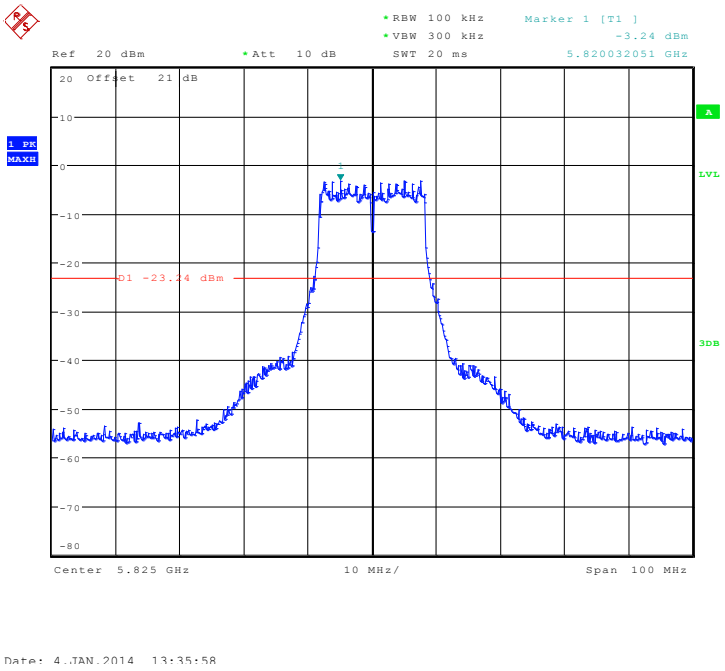


Fig. 23 Conducted Spurious Emission (802.11a, Ch165, Center Frequency)

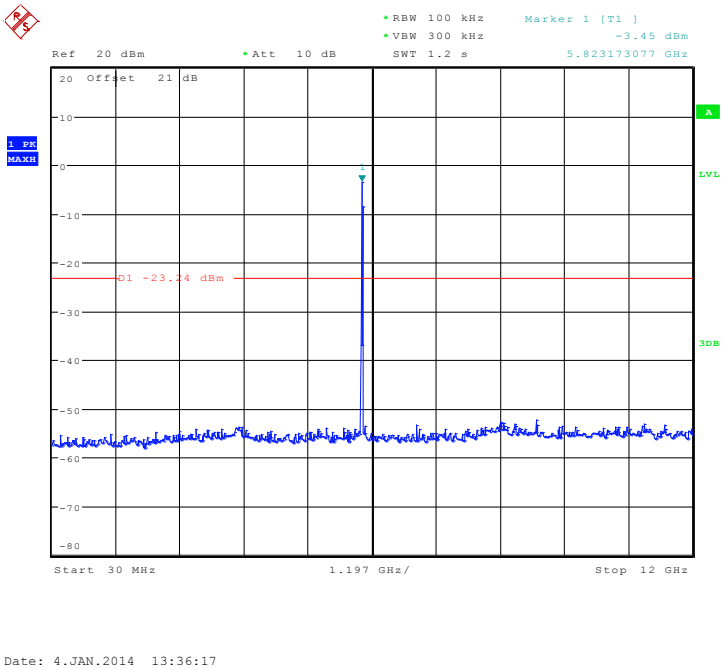


Fig. 24 Conducted Spurious Emission (802.11a, Ch165, 30 MHz-12 GHz)

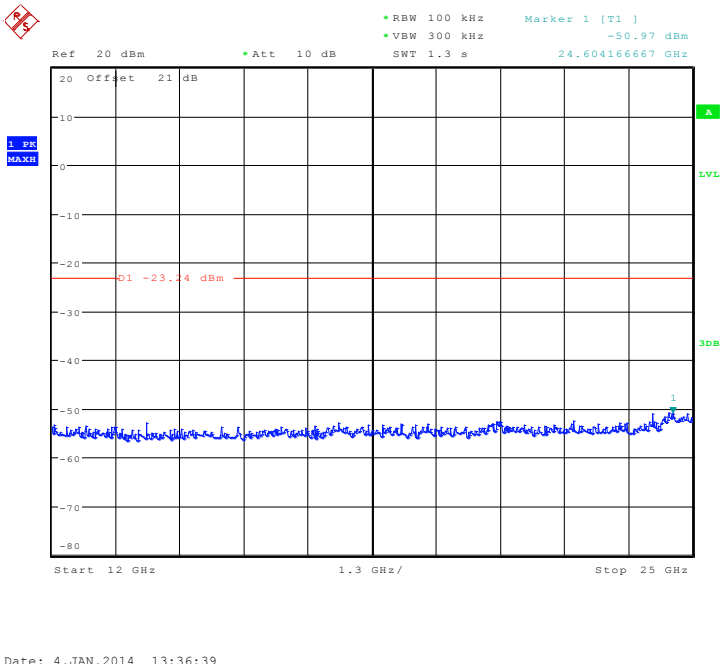


Fig. 25 Conducted Spurious Emission (802.11a, Ch165, 12 GHz-25 GHz)

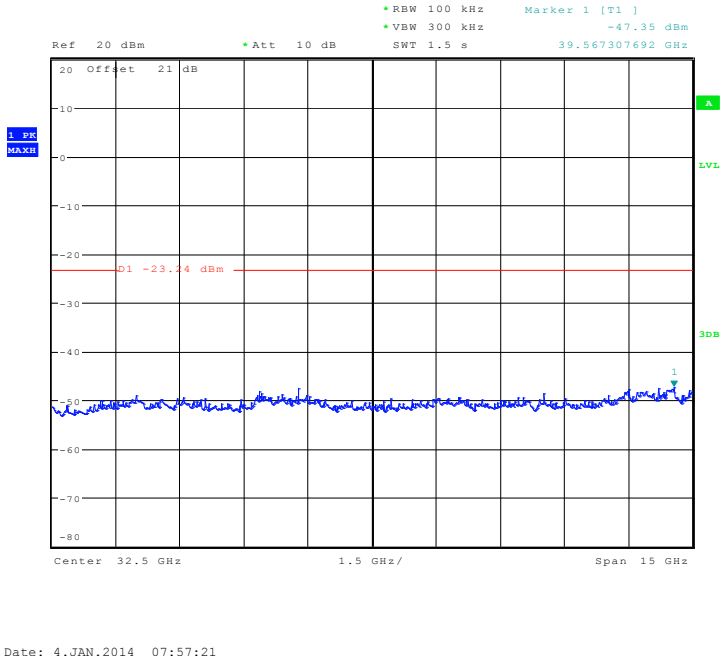


Fig. 26 Conducted Spurious Emission (802.11a, Ch165, 25 GHz-40 GHz)

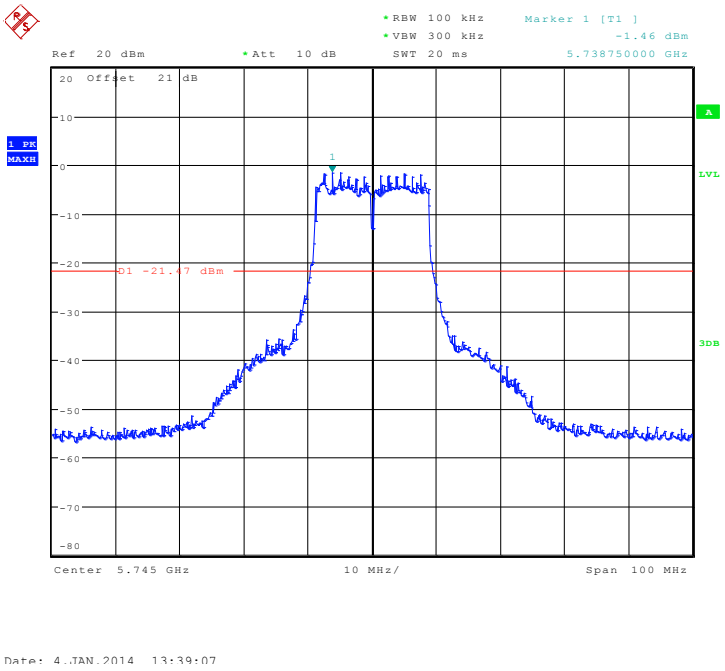


Fig. 27 Conducted Spurious Emission (802.11n-HT20, Ch149, Center Frequency)

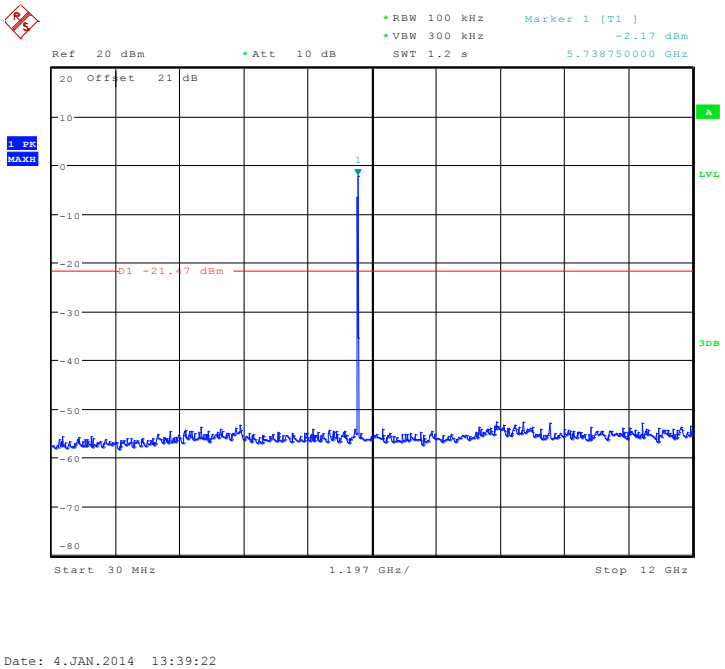


Fig. 28 Conducted Spurious Emission (802.11n-HT20, Ch149, 30 MHz-12 GHz)

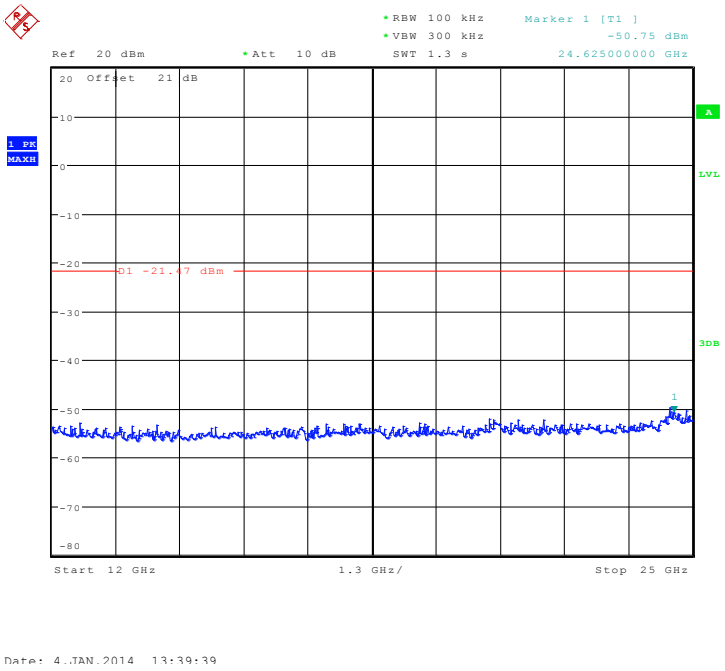


Fig. 29 Conducted Spurious Emission (802.11n-HT20, Ch149, 12 GHz-25 GHz)

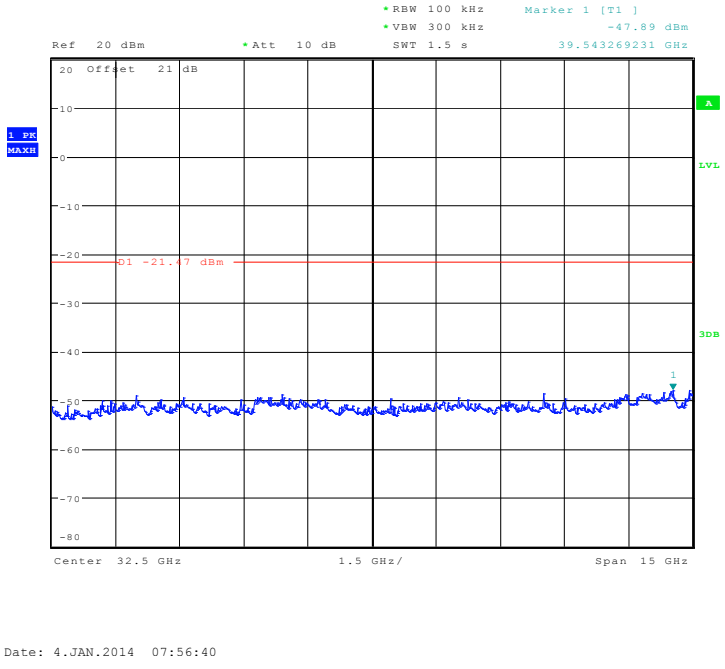


Fig. 30 Conducted Spurious Emission (802.11n-HT20, Ch149, 25 GHz-40 GHz)

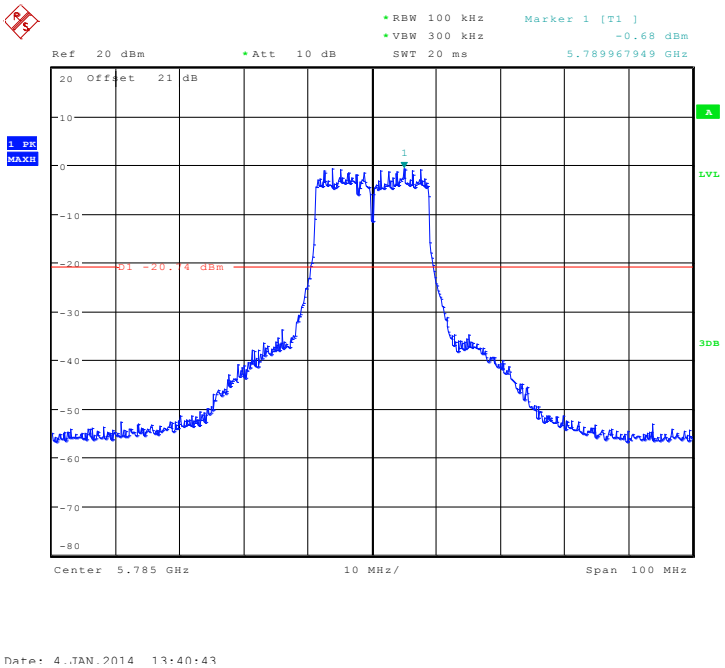


Fig. 31 Conducted Spurious Emission (802.11n-HT20, Ch157, Center Frequency)

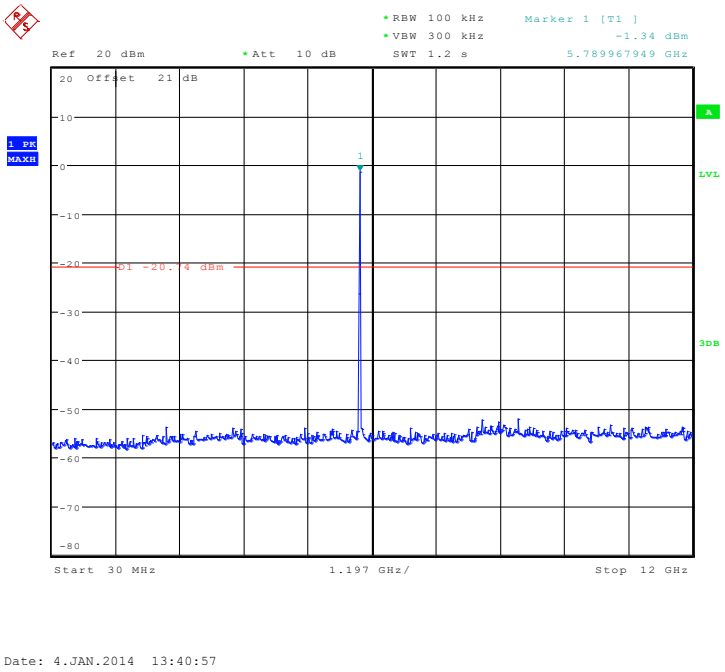


Fig. 32 Conducted Spurious Emission (802.11n-HT20, Ch157, 30 MHz-12 GHz)

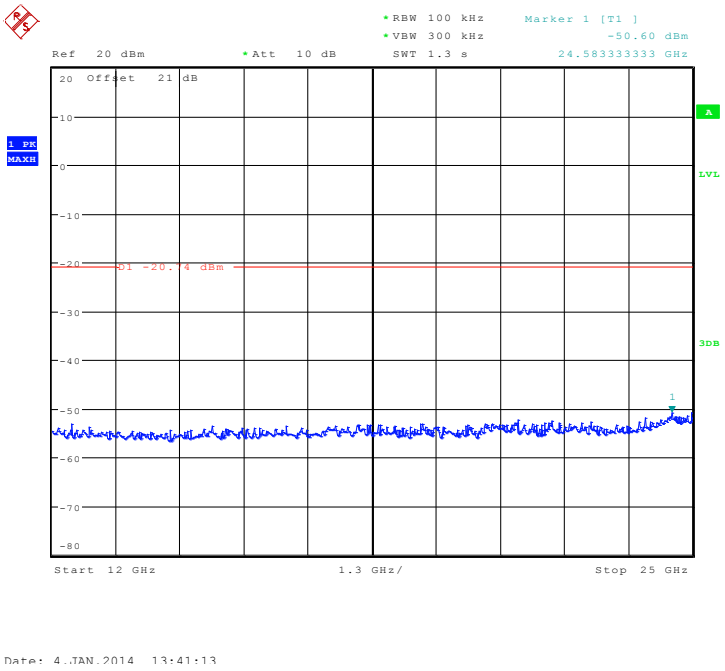


Fig. 33 Conducted Spurious Emission (802.11n-HT20, Ch157, 12 GHz-25 GHz)

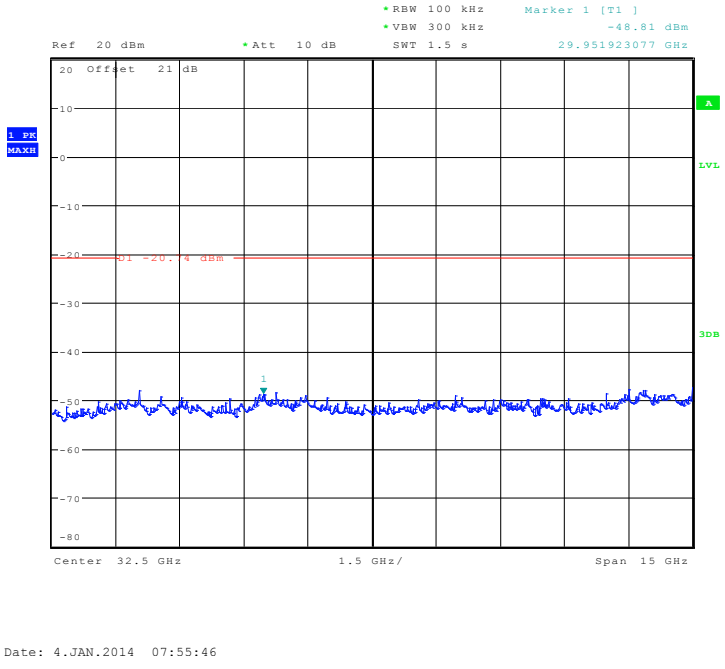


Fig. 34 Conducted Spurious Emission (802.11n-HT20, Ch157, 25 GHz-40 GHz)

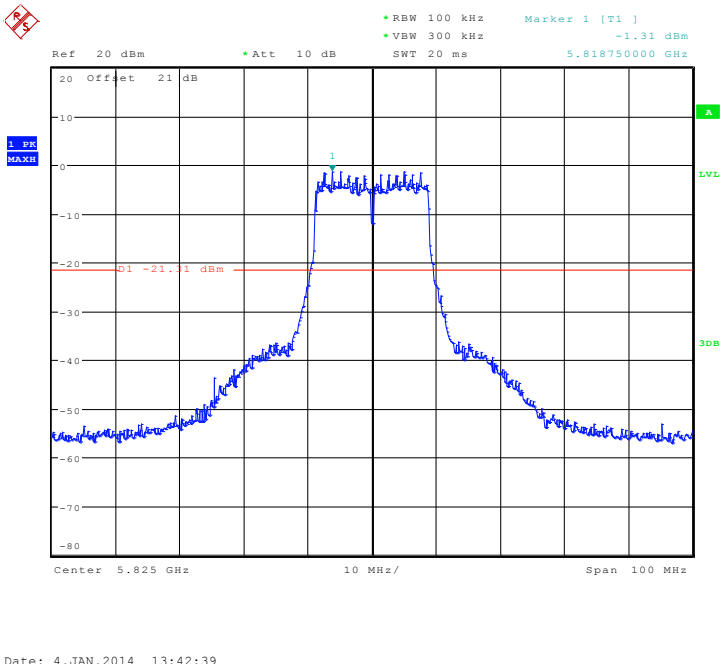


Fig. 35 Conducted Spurious Emission (802.11n-HT20, Ch165, Center Frequency)

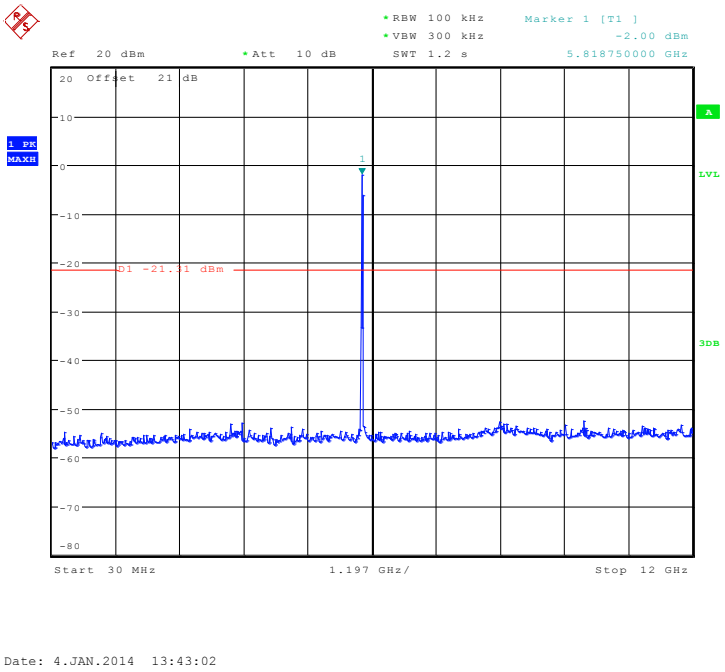


Fig. 36 Conducted Spurious Emission (802.11n-HT20, Ch165, 30 MHz-12 GHz)

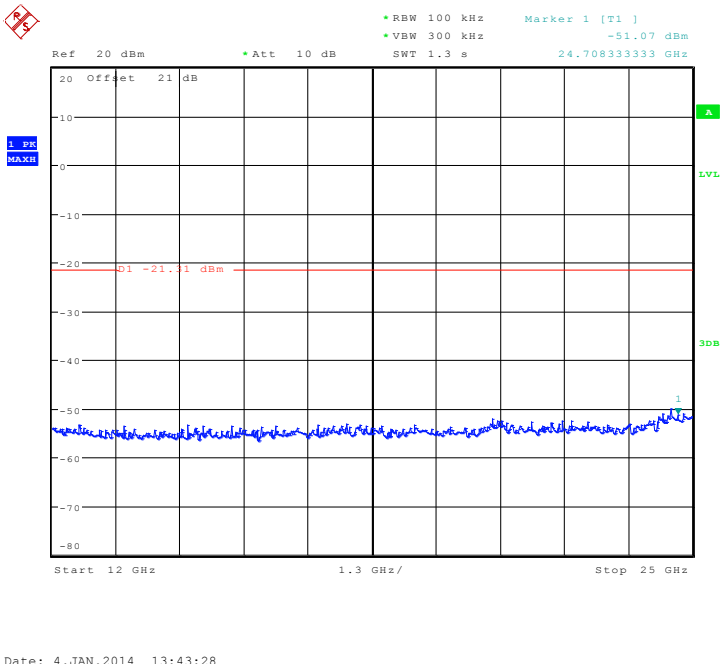


Fig. 37 Conducted Spurious Emission (802.11n-HT20, Ch165, 12 GHz-25 GHz)

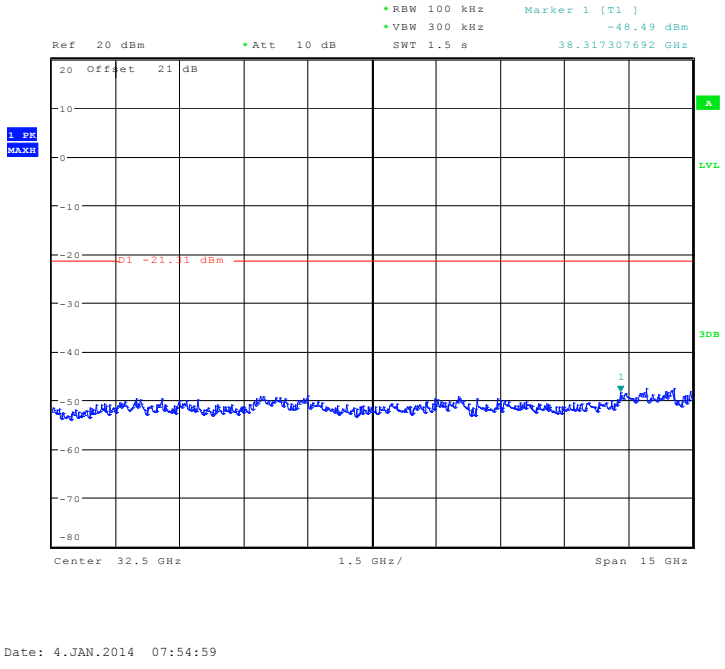


Fig. 38 Conducted Spurious Emission (802.11n-HT20, Ch165, 25 GHz-40 GHz)

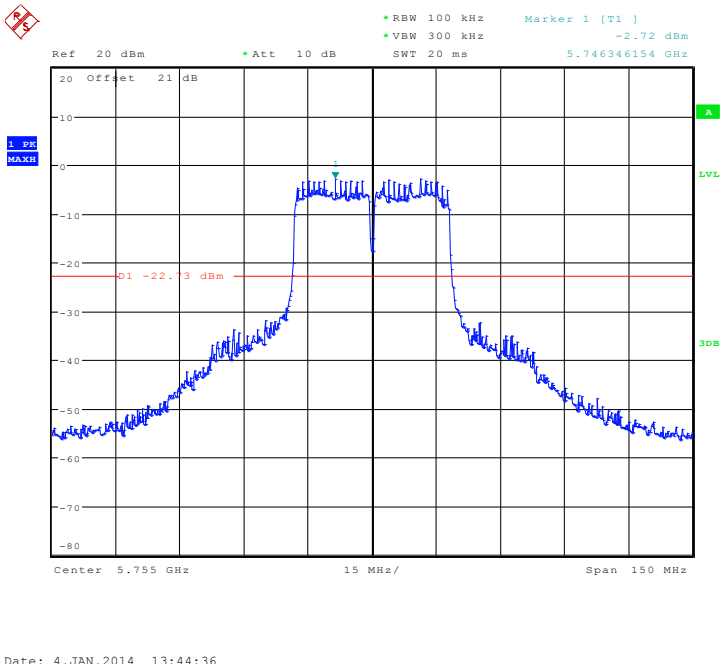


Fig. 39 Conducted Spurious Emission (802.11n-HT40, Ch151, Center Frequency)

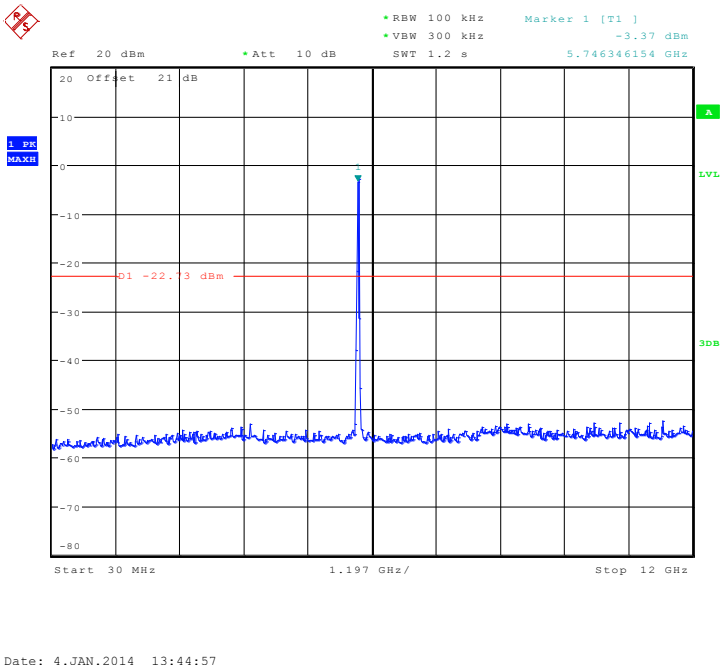


Fig. 40 Conducted Spurious Emission (802.11n-HT40, Ch151, 30 MHz-12 GHz)

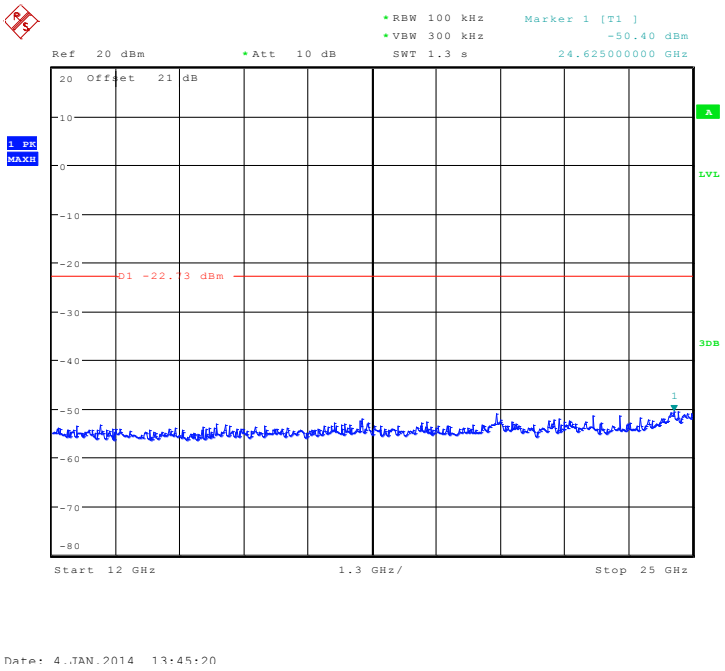


Fig. 41 Conducted Spurious Emission (802.11n-HT40, Ch151, 12 GHz-25 GHz)

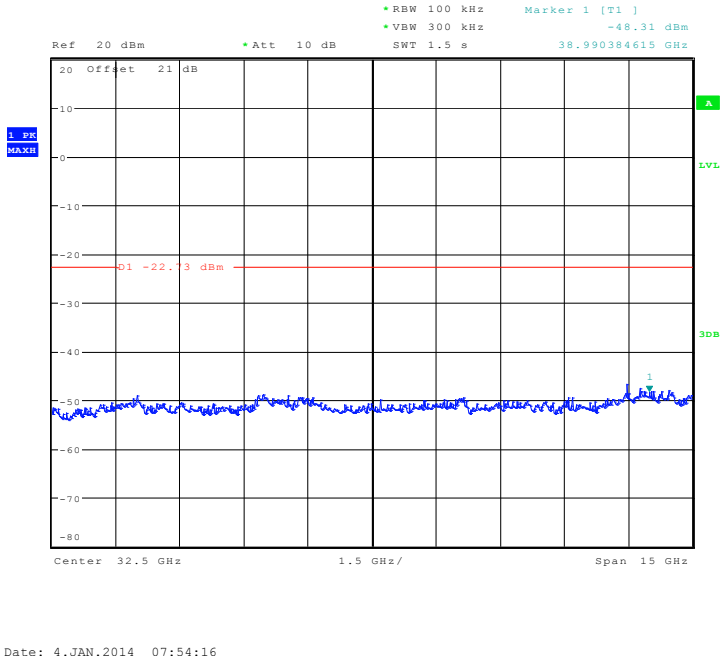


Fig. 42 Conducted Spurious Emission (802.11n-HT40, Ch151, 25 GHz-40 GHz)

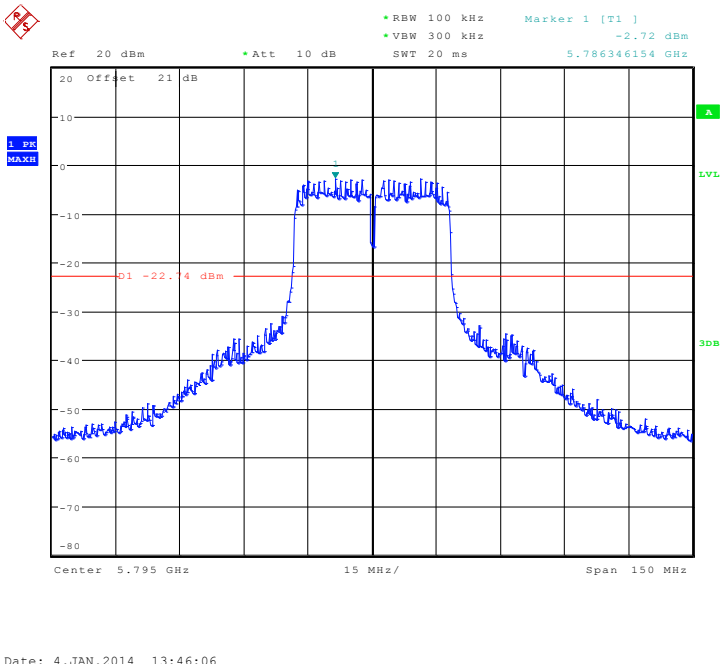


Fig. 43 Conducted Spurious Emission (802.11n-HT40, Ch159, Center Frequency)

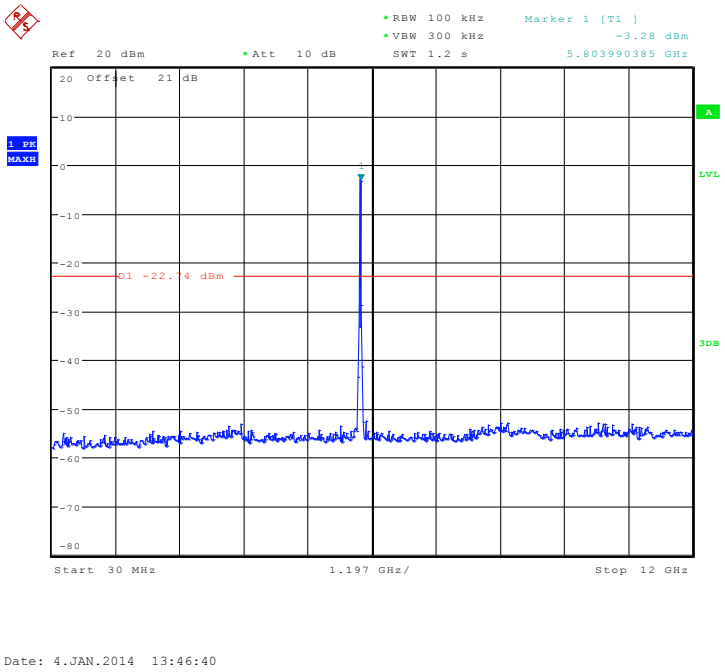


Fig. 44 Conducted Spurious Emission (802.11n-HT40, Ch159, 30 MHz-12 GHz)

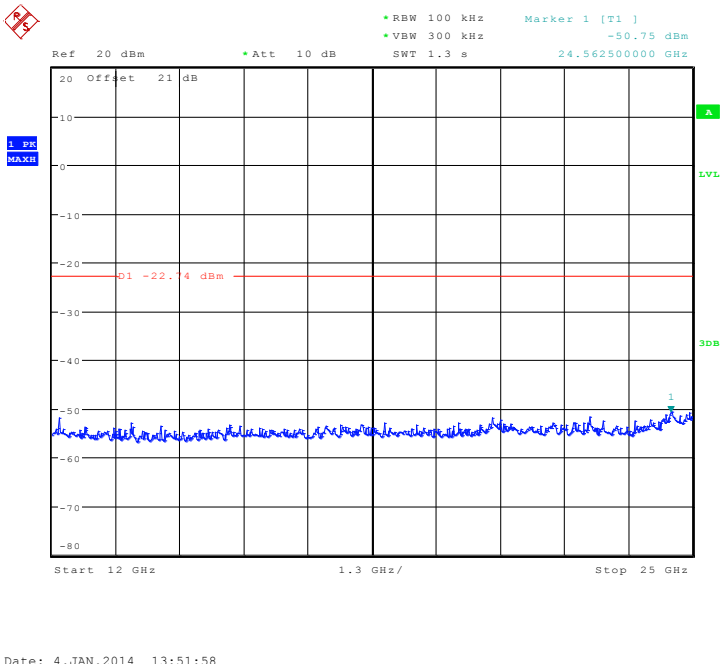


Fig. 45 Conducted Spurious Emission (802.11n-HT40, Ch159, 12 GHz-25 GHz)

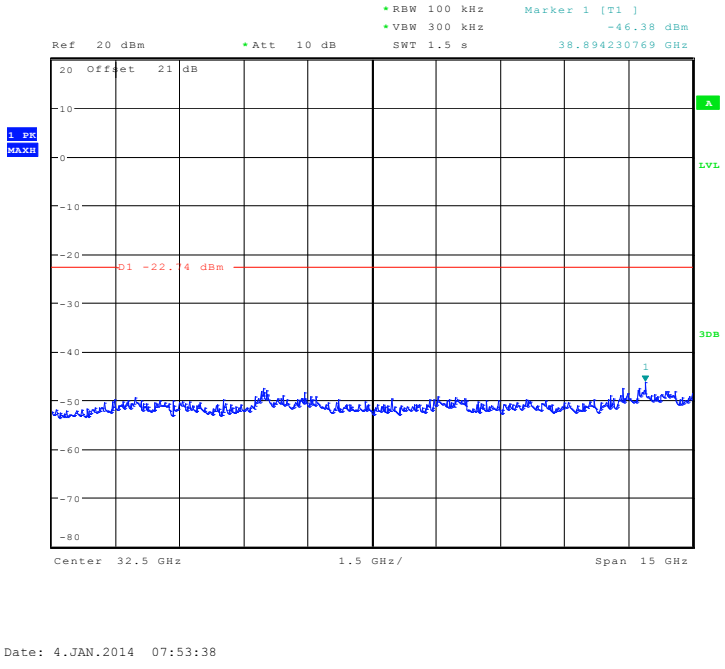


Fig. 46 Conducted Spurious Emission (802.11n-HT40, Ch159, 25 GHz-40 GHz)

A.6.2 Transmitter Spurious Emission - Radiated

Measurement Uncertainty:

Frequency Range	Uncertainty(dB)
f ≤ 1GHz	3.9
f>1GHz	4.3

Measurement Results:

802.11a mode

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11a	149	30 MHz ~1 GHz	Fig.47	P
		1 GHz ~ 6 GHz	Fig.48	P
		6 GHz ~ 18 GHz	Fig.49	P
	157	30 MHz ~1 GHz	Fig.50	P
		1 GHz ~ 6 GHz	Fig.51	P
		6 GHz ~ 18 GHz	Fig.52	P
	165	30 MHz ~1 GHz	Fig.53	P
		1 GHz ~ 6 GHz	Fig.54	P
		6 GHz ~ 18 GHz	Fig.55	P
/	All channels	18 GHz ~ 26.5 GHz	Fig.56	P
		26.5 GHz~ 40 GHz	Fig.57	P

802.11n-HT20 mode

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11n (HT20)	149	30 MHz ~1 GHz	Fig.58	P
		1 GHz ~ 6 GHz	Fig.59	P
		6 GHz ~ 18 GHz	Fig.60	P
	157	30 MHz ~1 GHz	Fig.61	P
		1 GHz ~ 6 GHz	Fig.62	P
		6 GHz ~ 18 GHz	Fig.63	P
	165	30 MHz ~1 GHz	Fig.64	P
		1 GHz ~ 6 GHz	Fig.65	P
		6 GHz ~ 18 GHz	Fig.66	P
/	All channels	18 GHz ~ 26.5 GHz	Fig.67	P
		26.5 GHz~ 40 GHz	Fig.68	P

802.11n-HT40 mode

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11n (HT40)	151	30 MHz ~1 GHz	Fig.69	P
		1 GHz ~ 6 GHz	Fig.70	P
		6 GHz ~ 18 GHz	Fig.71	P
	159	30 MHz ~1 GHz	Fig.72	P
		1 GHz ~ 6 GHz	Fig.73	P
		6 GHz ~ 18 GHz	Fig.74	P
/	All channels	18 GHz ~ 26.5 GHz	Fig.75	P
		26.5 GHz~ 40 GHz	Fig.76	P

Conclusion: PASS

Note:

A "reference path loss" is established and the A_{Rpl} is the attenuation of “reference path loss”, and including the gain of receive antenna, the gain of the preamplifier, the cable loss.

P_{Mea} is the field strength recorded from the instrument.

802.11a

Ch149

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	P_{Mea} (dBuV/m)	Polarization
17996.400	53.1	-17.7	45.6	25.200	HORIZONTAL
18000.000	51.4	-45.6	44.5	52.466	VERTICAL
17922.000	50.4	-17.7	45.6	22.500	VERTICAL
17779.200	50.3	-18.5	45.6	23.200	VERTICAL
17892.000	50.3	-18.5	45.6	23.200	HORIZONTAL
17844.000	49.8	-18.5	45.6	22.700	VERTICAL

Ch157

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	P_{Mea} (dBuV/m)	Polarization
18000.000	53.1	-45.6	44.5	54.166	HORIZONTAL
17882.400	51.1	-18.5	45.6	24.000	HORIZONTAL
17840.400	50.4	-18.5	45.6	23.300	VERTICAL
17713.200	50.3	-18.9	45.6	23.600	HORIZONTAL
17895.600	50.2	-18.5	45.6	23.100	VERTICAL
17914.800	50.1	-17.7	45.6	22.200	HORIZONTAL

Ch165

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	P_{Mea} (dBuV/m)	Polarization
17996.400	53.1	-17.7	45.6	25.200	HORIZONTAL
18000.000	51.8	-45.6	44.5	52.866	VERTICAL
17948.400	51.7	-17.7	45.6	23.800	HORIZONTAL
17923.200	51.2	-17.7	45.6	23.300	VERTICAL
17824.800	50.6	-18.5	45.6	23.500	VERTICAL
17854.800	49.6	-18.5	45.6	22.500	VERTICAL

802.11n-HT20

Ch149

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	P_{Mea} (dBuV/m)	Polarization
17858.400	50.8	-18.5	45.6	23.700	HORIZONTAL
17850.000	50.4	-18.5	45.6	23.300	VERTICAL
17905.200	50.4	-18.5	45.6	23.300	HORIZONTAL
17914.800	50.2	-17.7	45.6	22.300	VERTICAL
17710.800	50.2	-18.9	45.6	23.500	HORIZONTAL
17964.000	50.2	-17.7	45.6	22.300	HORIZONTAL

Ch157

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	P_{Mea} (dBuV/m)	Polarization
17998.800	53.4	-17.7	45.6	25.500	HORIZONTAL
17914.800	50.6	-17.7	45.6	22.700	VERTICAL
17997.600	50.5	-17.7	45.6	22.600	VERTICAL
17902.800	50.4	-18.5	45.6	23.300	HORIZONTAL
17782.800	50.1	-18.5	45.6	23.000	HORIZONTAL
17853.600	50.0	-18.5	45.6	22.900	VERTICAL

Ch165

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	P_{Mea} (dBuV/m)	Polarization
18000.000	54.1	-45.6	44.5	55.166	VERTICAL
17997.600	51.4	-17.7	45.6	23.500	HORIZONTAL
17750.400	50.0	-18.5	45.6	22.900	HORIZONTAL
17805.600	50.0	-18.5	45.6	22.900	VERTICAL
17817.600	49.8	-18.5	45.6	22.700	VERTICAL
17738.400	49.6	-18.5	45.6	22.500	VERTICAL

802.11n-HT40

Ch151

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	P_{Mea} (dBuV/m)	Polarization
17998.800	52.0	-17.7	45.6	24.100	VERTICAL
17842.800	50.3	-18.5	45.6	23.200	VERTICAL
17822.400	50.3	-18.5	45.6	23.200	HORIZONTAL
17938.800	50.0	-17.7	45.6	22.100	VERTICAL
17929.200	49.9	-17.7	45.6	22.000	HORIZONTAL
17764.800	49.8	-18.5	45.6	22.700	VERTICAL

Ch159

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	P_{Mea} (dBuV/m)	Polarization
17832.000	50.9	-18.5	45.6	23.800	HORIZONTAL
17824.800	50.9	-18.5	45.6	23.800	VERTICAL
17894.400	49.8	-18.5	45.6	22.700	HORIZONTAL
17895.600	49.7	-18.5	45.6	22.600	VERTICAL
17864.400	49.4	-18.5	45.6	22.300	HORIZONTAL
17680.800	49.2	-18.9	45.6	22.500	VERTICAL

Test graphs as below:

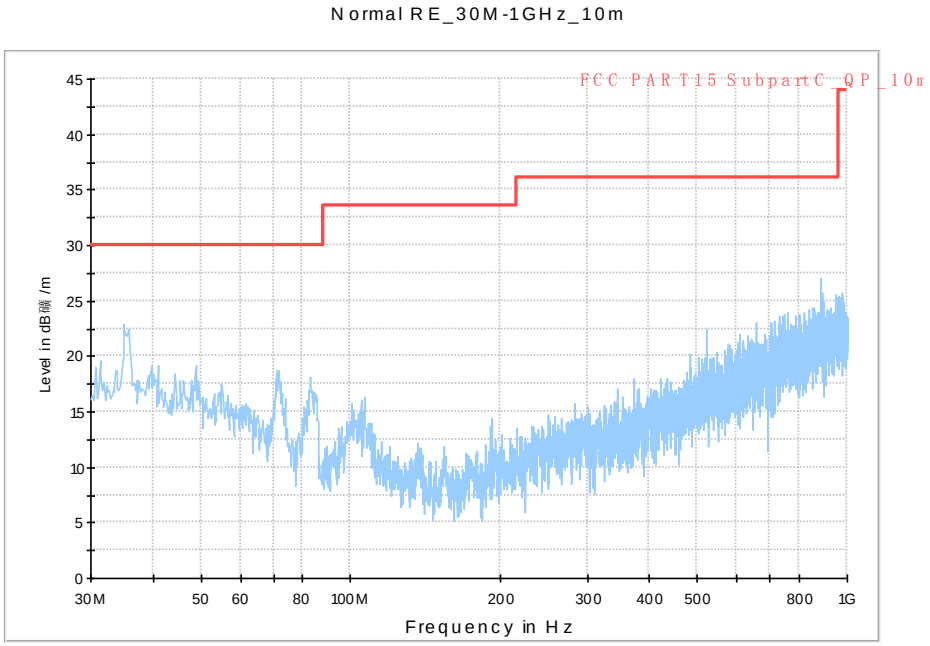


Fig. 47 Radiated Spurious Emission (802.11a, Ch149, 30 MHz-1 GHz)

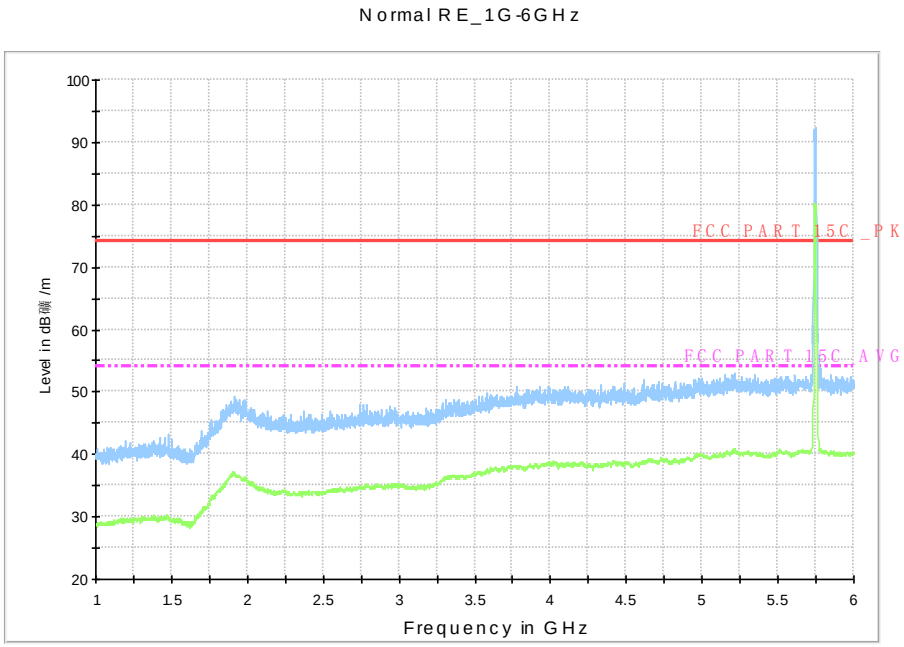


Fig. 48 Radiated Spurious Emission (802.11a, Ch149, 1 GHz-6 GHz)

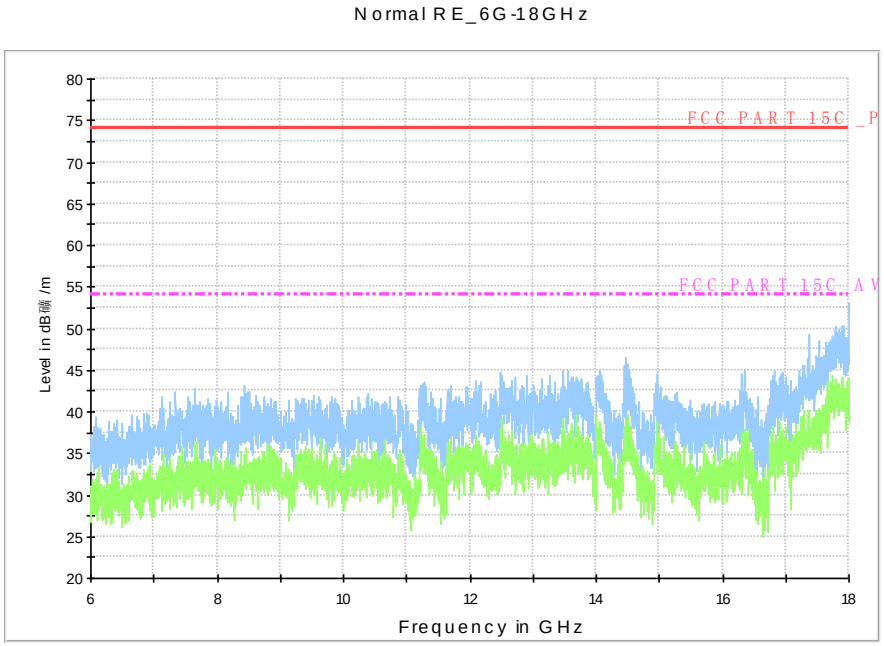


Fig. 49 Radiated Spurious Emission (802.11a, Ch149, 6 GHz-18 GHz)

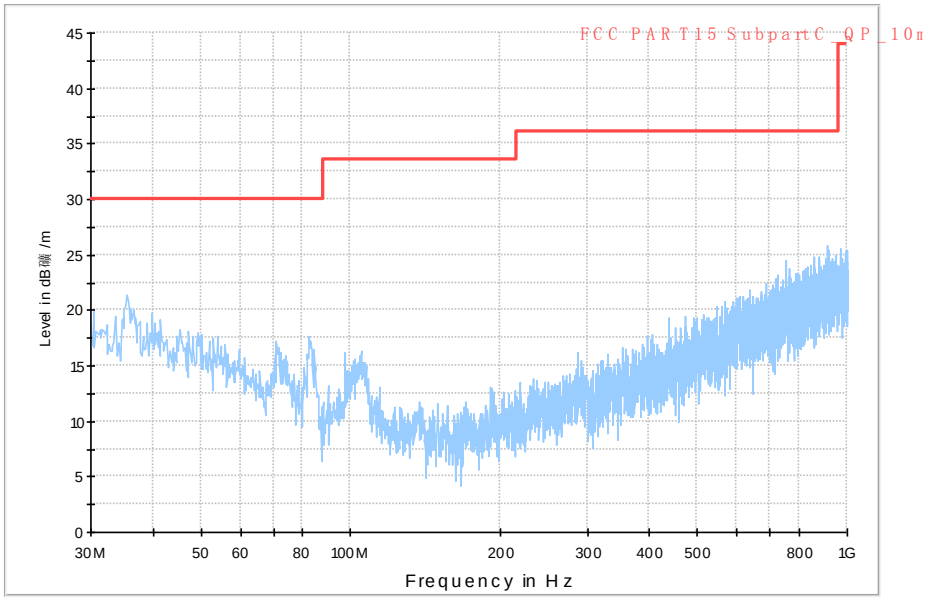


Fig. 50 Radiated Spurious Emission (802.11a, Ch157, 30 MHz-1 GHz)

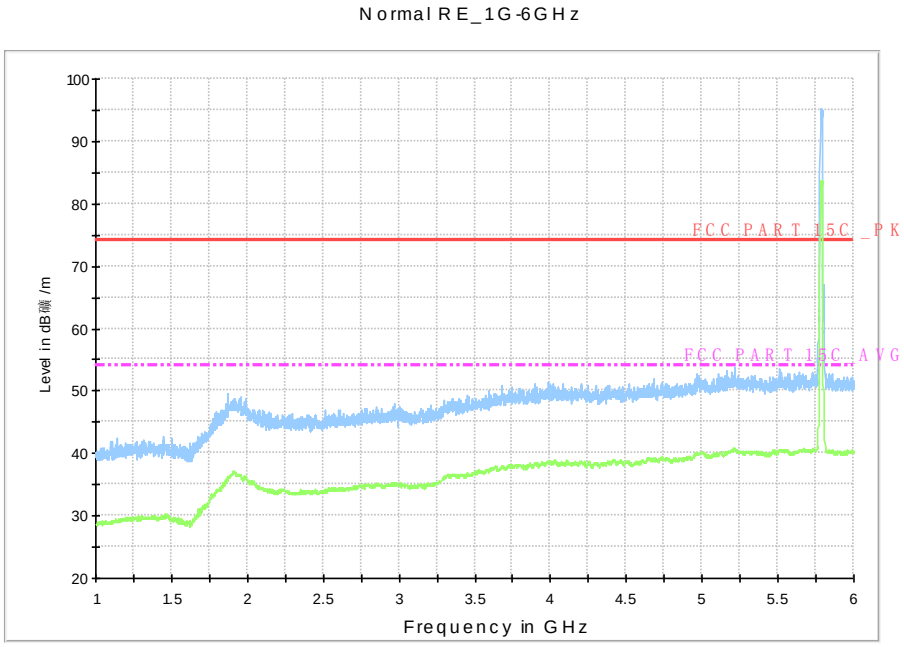


Fig. 51 Radiated Spurious Emission (802.11a, Ch157, 1 GHz-6 GHz)

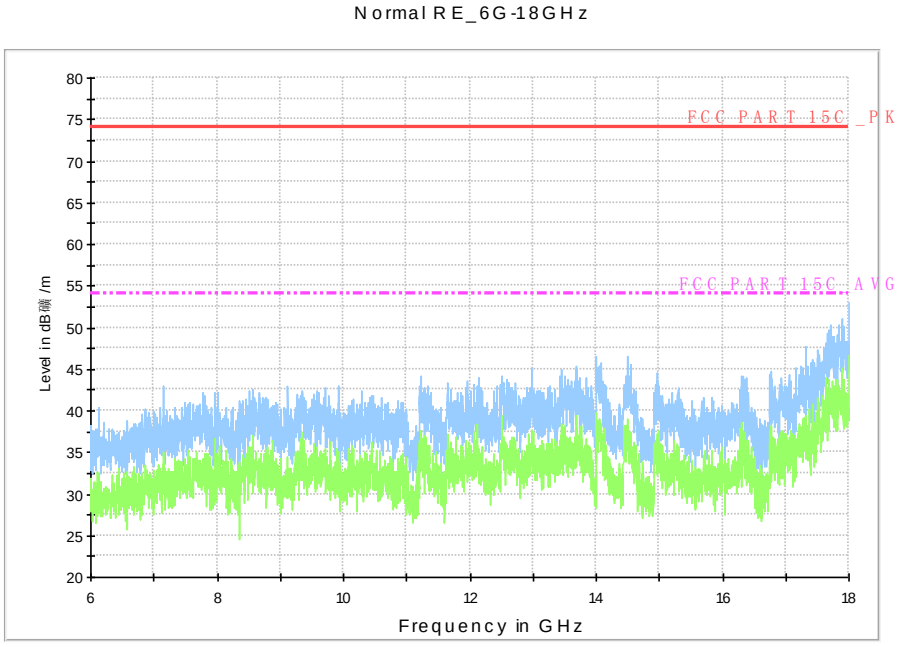


Fig. 52 Radiated Spurious Emission (802.11a, Ch157, 6 GHz-18 GHz)

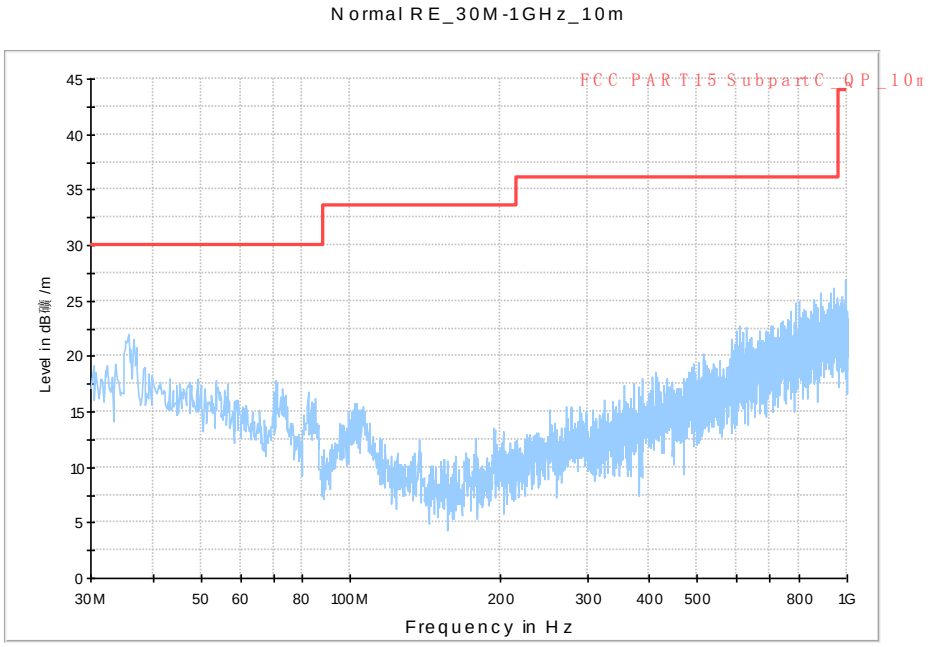


Fig. 53 Radiated Spurious Emission (802.11a, Ch165, 30 MHz-1 GHz)

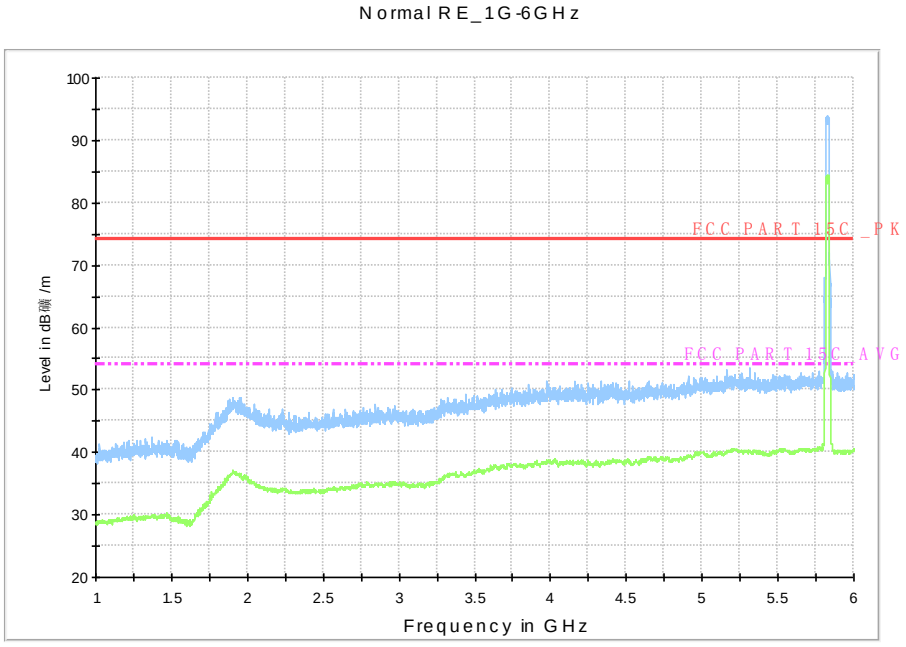


Fig. 54 Radiated Spurious Emission (802.11a, Ch165, 1 GHz-6 GHz)

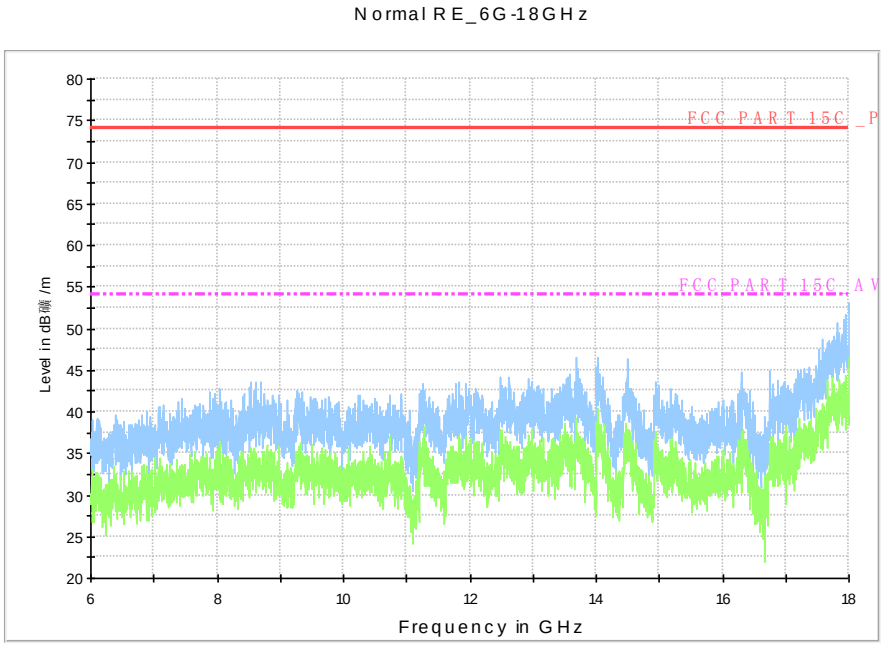


Fig. 55 Radiated Spurious Emission (802.11a, Ch165, 6 GHz-18 GHz)

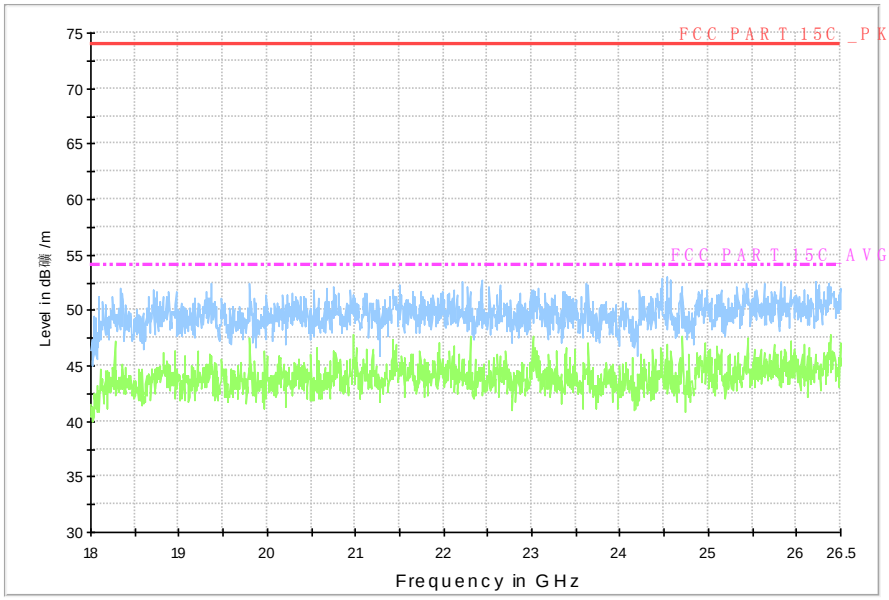


Fig. 56 Radiated Spurious Emission (802.11a, Ch157, 18 GHz-26.5 GHz)

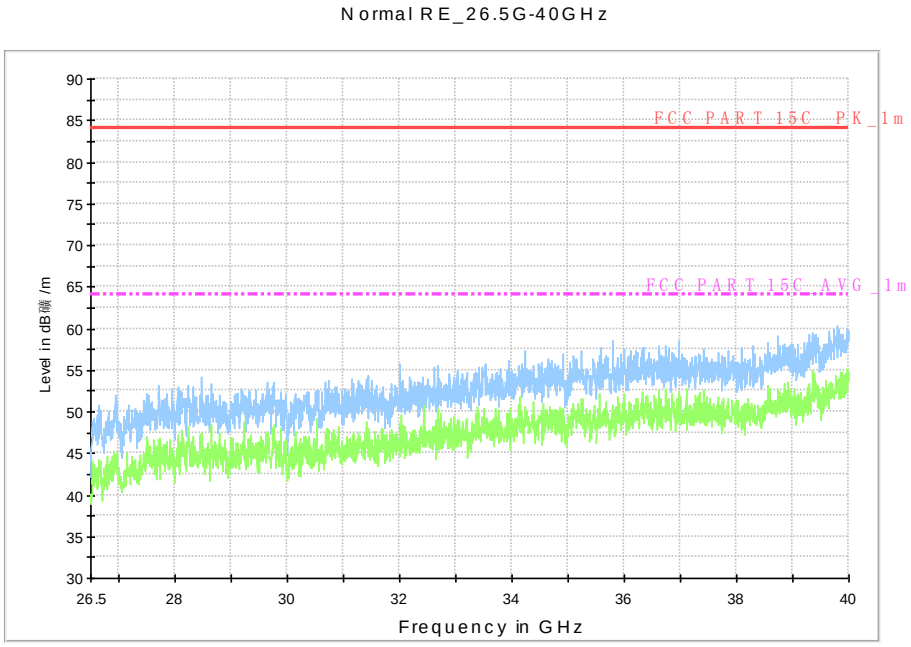


Fig. 57 Radiated emission: 802.11n, (802.11a, Ch157, 26.5 GHz - 40 GHz)

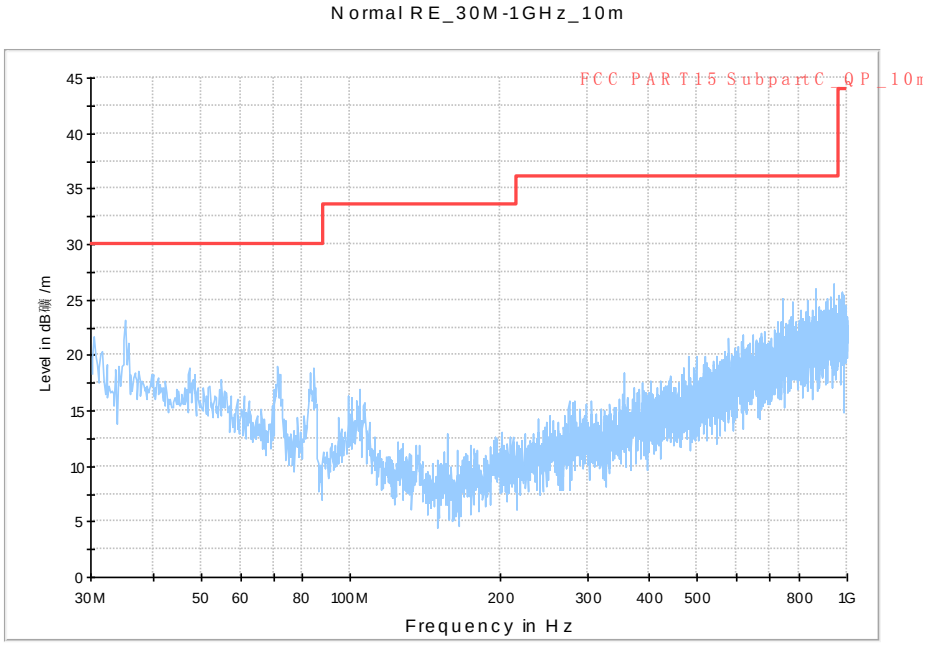


Fig. 58 Radiated Spurious Emission (802.11n-HT20, Ch149, 30 MHz-1 GHz)

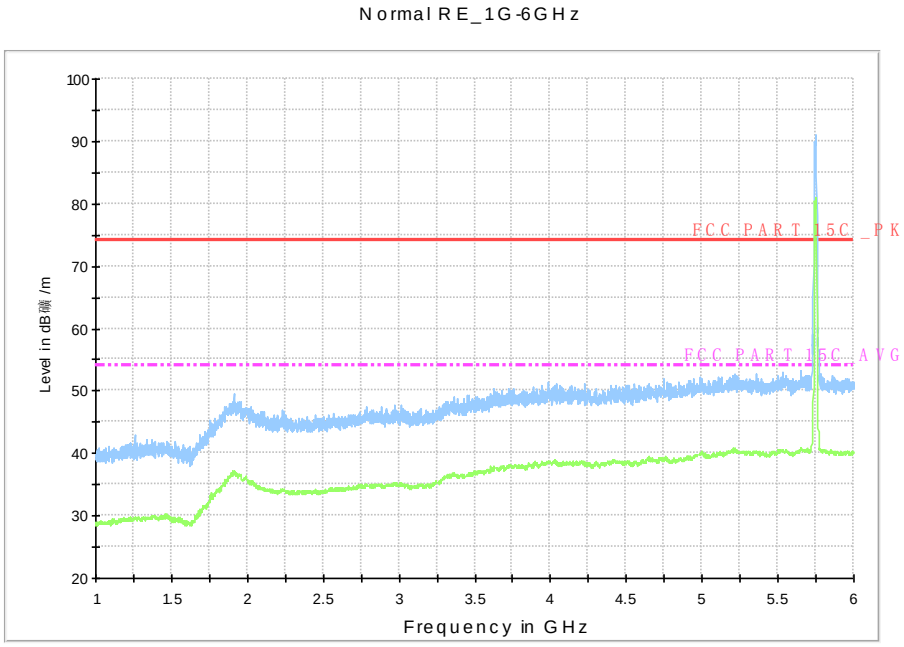


Fig. 59 Radiated Spurious Emission (802.11n-HT20, Ch149, 1 GHz-6 GHz)

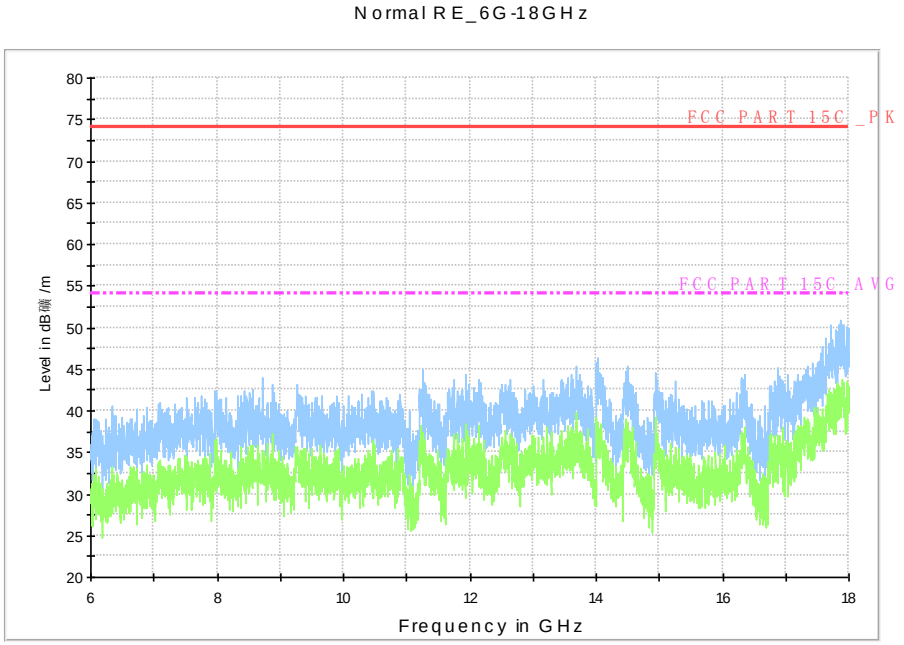


Fig. 60 Radiated Spurious Emission (802.11n-HT20, Ch149, 6 GHz-18 GHz)

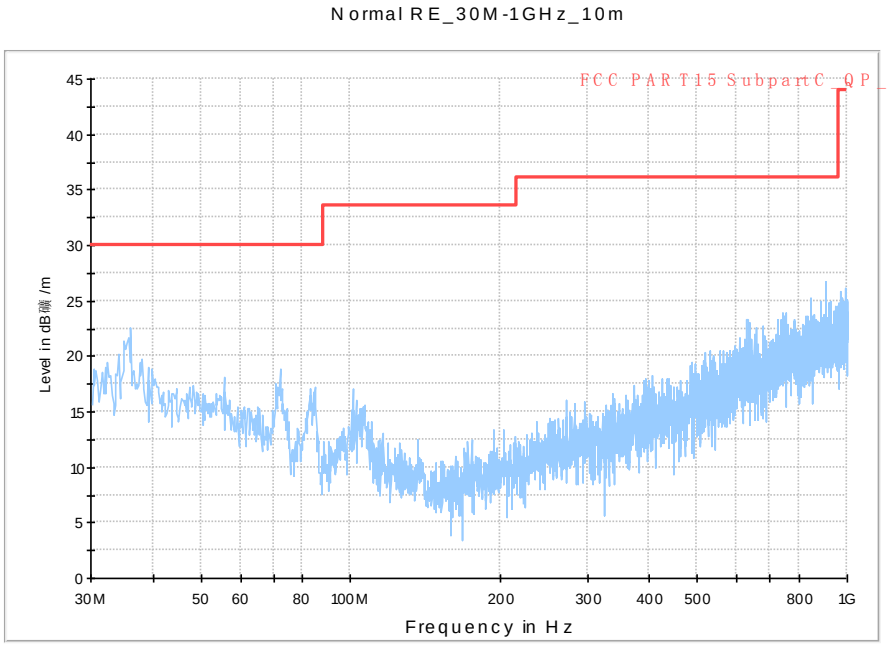


Fig. 61 Radiated Spurious Emission (802.11n-HT20, Ch157, 30 MHz-1 GHz)

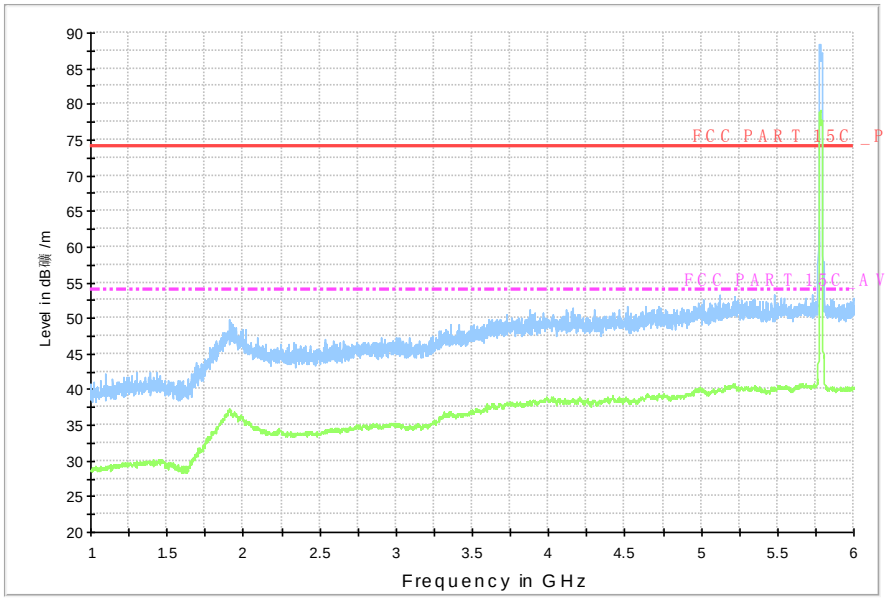


Fig. 62 Radiated Spurious Emission (802.11n-HT20, Ch157, 1 GHz-6 GHz)

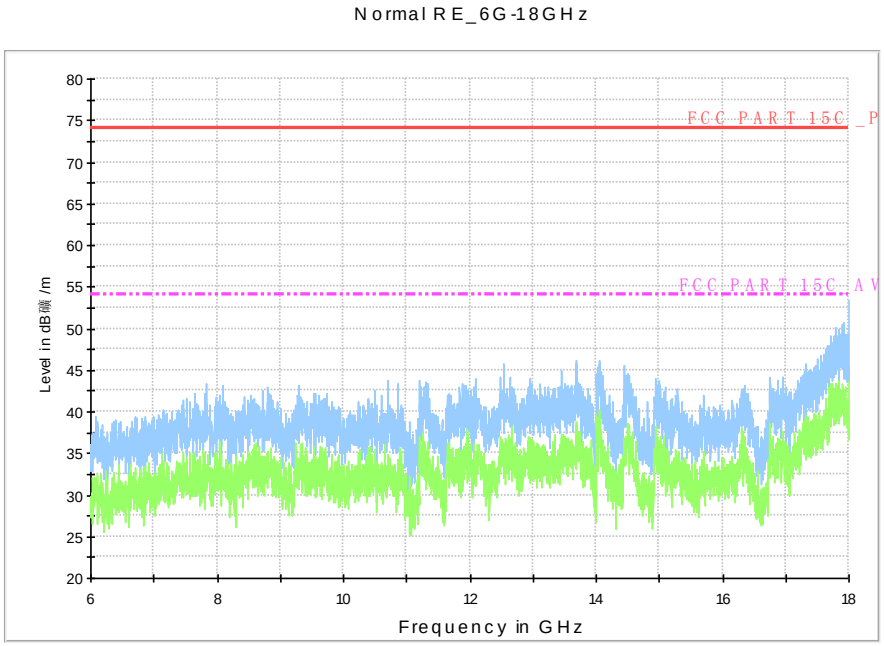


Fig. 63 Radiated Spurious Emission (802.11n-HT20, Ch157, 6 GHz-18 GHz)

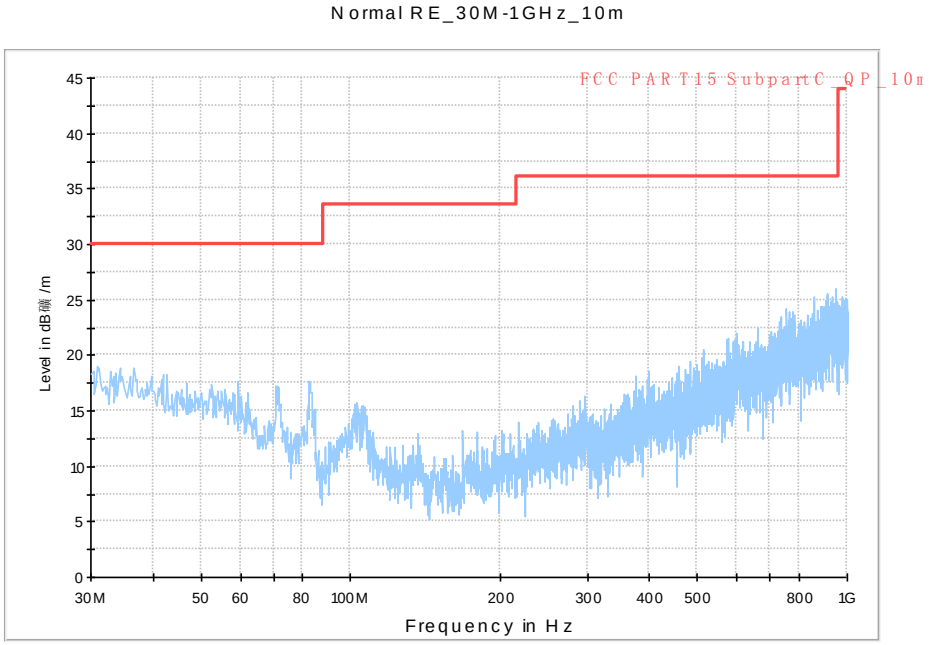


Fig. 64 Radiated Spurious Emission (802.11n-HT20, Ch165, 30 MHz-1 GHz)

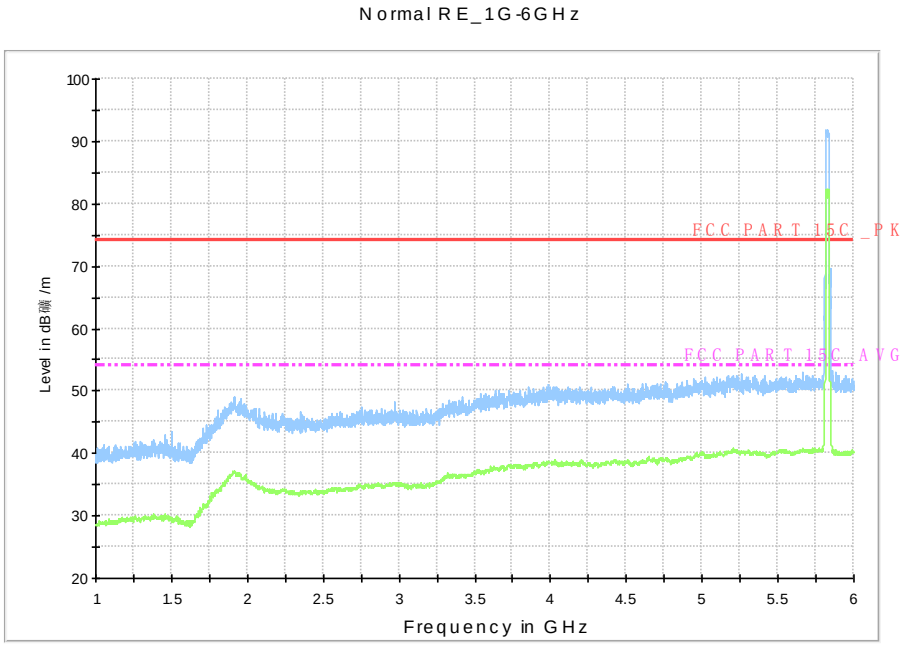


Fig. 65 Radiated Spurious Emission (802.11n-HT20, Ch165, 1 GHz-6 GHz)

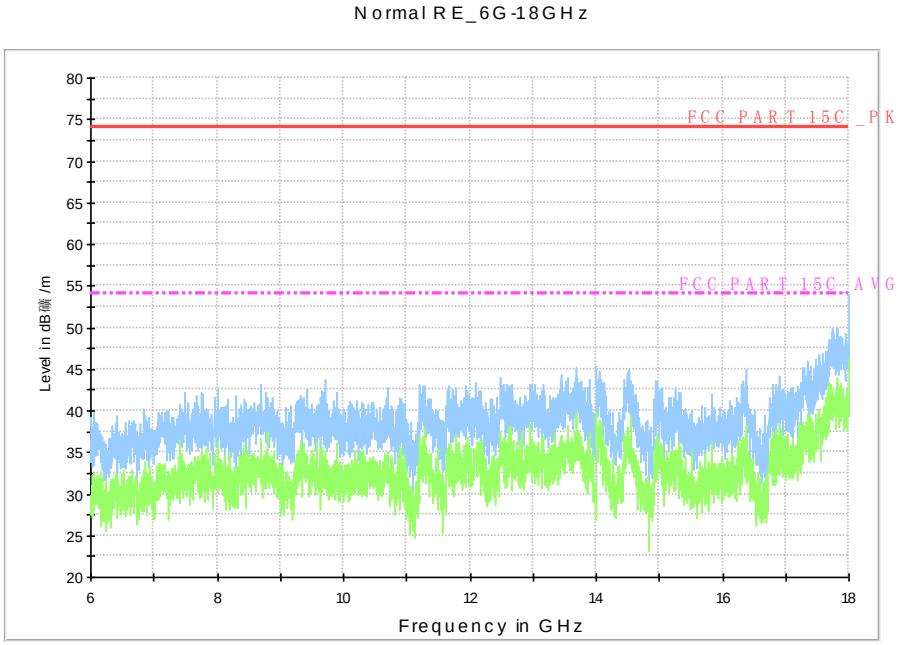


Fig. 66 Radiated Spurious Emission (802.11n-HT20, Ch165, 6 GHz-18 GHz)

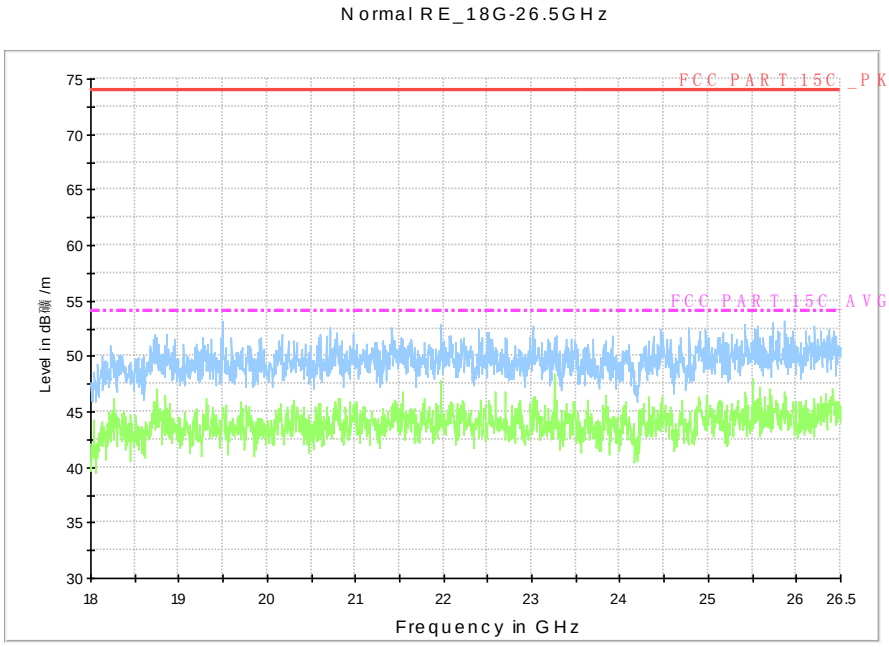


Fig. 67 Radiated Spurious Emission (802.11n-HT20, Ch157, 18 GHz-26.5 GHz)

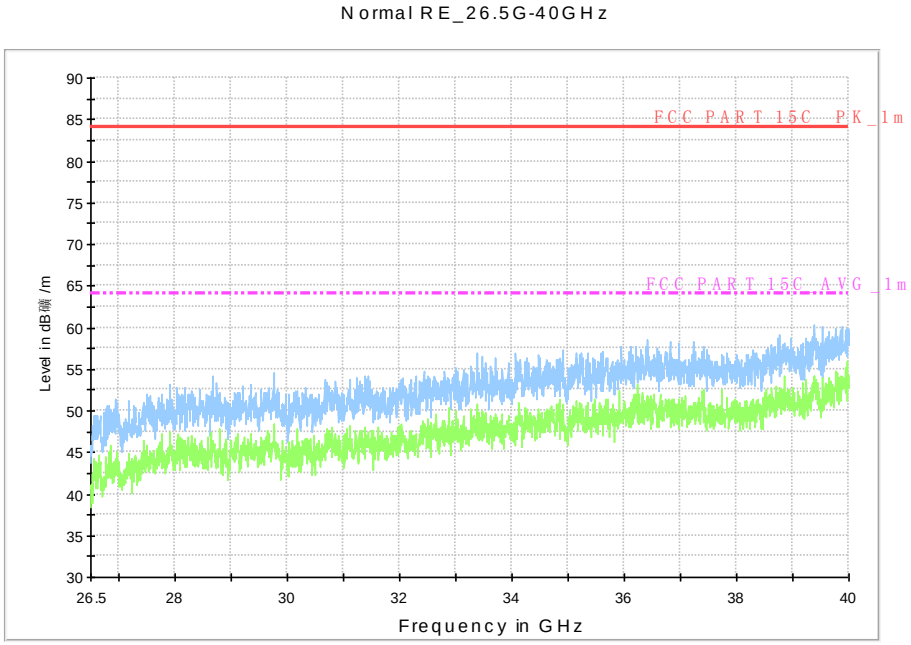


Fig. 68 Radiated emission: 802.11n, (802.11n-HT20, Ch157, 26.5 GHz - 40 GHz)

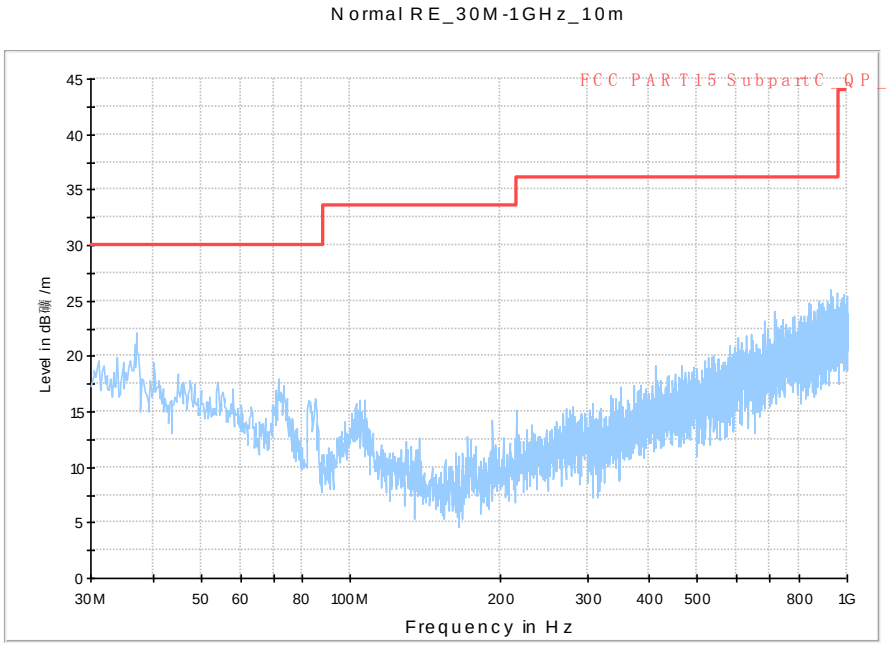


Fig. 69 Radiated Spurious Emission (802.11n-HT40, Ch151, 30 MHz-1 GHz)

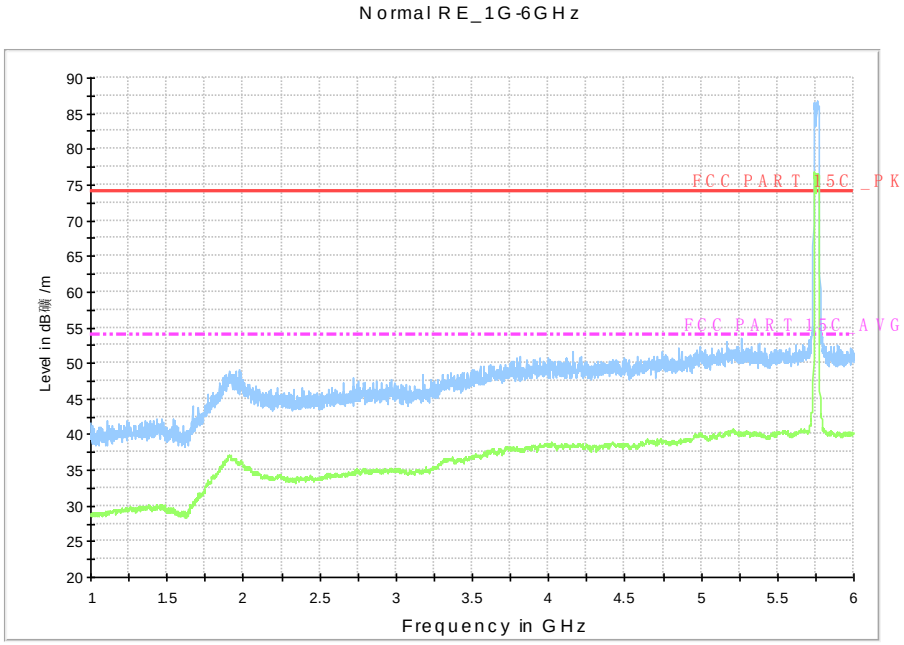


Fig. 70 Radiated Spurious Emission (802.11n-HT40, Ch151, 1 GHz-6 GHz)

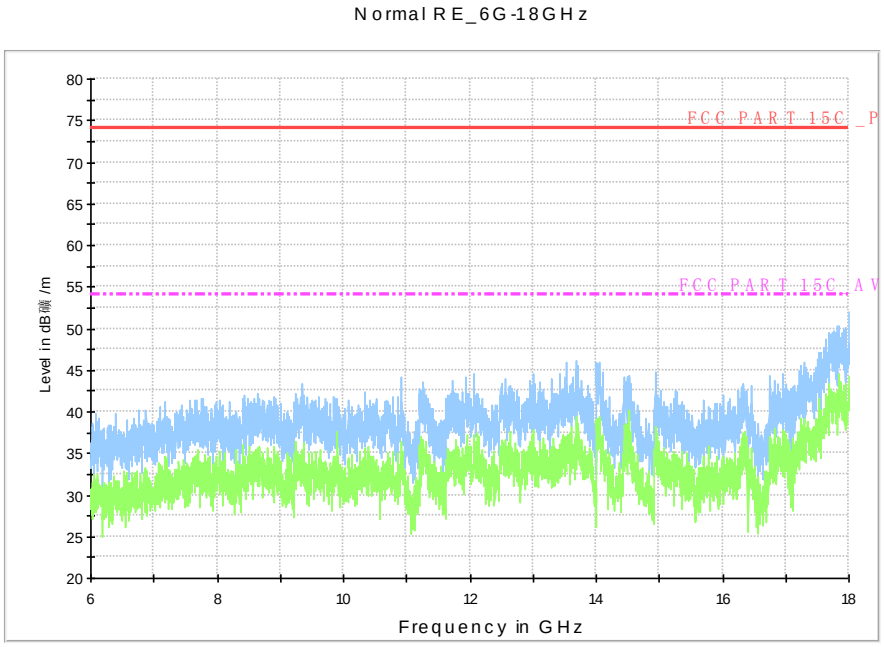


Fig. 71 Radiated Spurious Emission (802.11n-HT40, Ch151, 6 GHz-18 GHz)

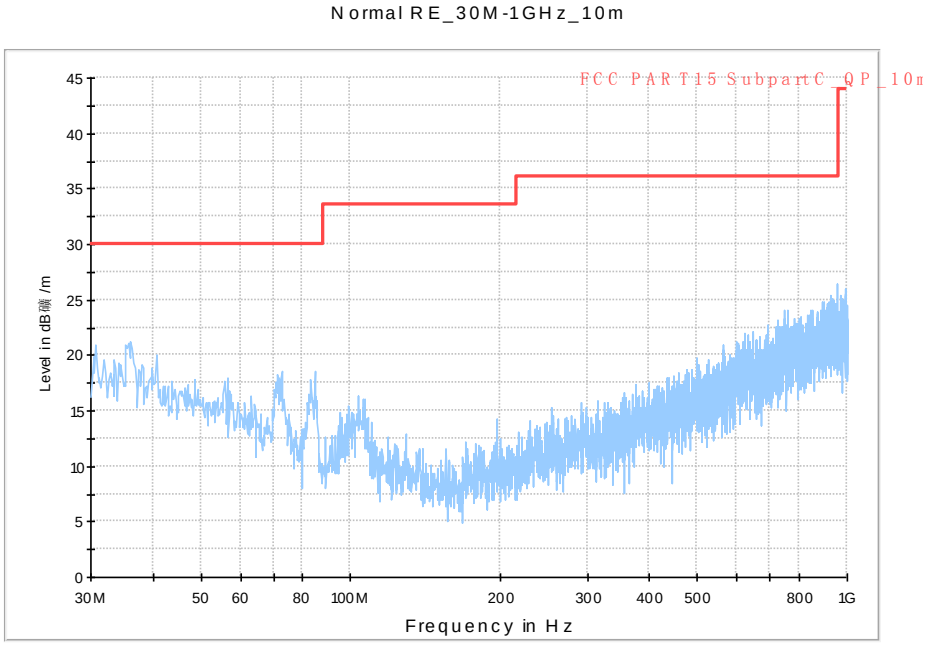


Fig. 72 Radiated Spurious Emission (802.11n-HT40, Ch159, 30 MHz-1 GHz)

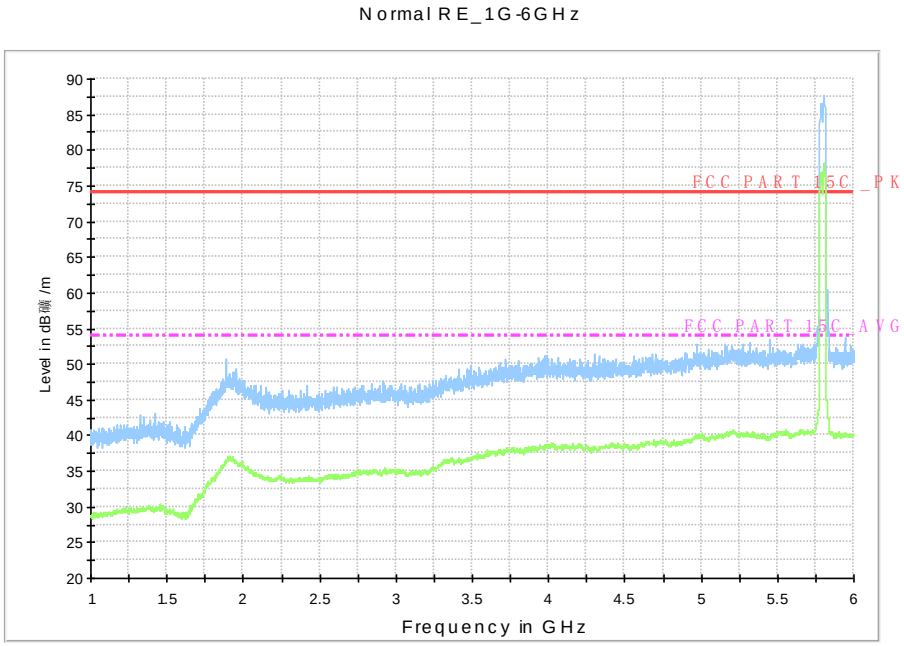


Fig. 73 Radiated Spurious Emission (802.11n-HT40, Ch159 1 GHz-6 GHz)

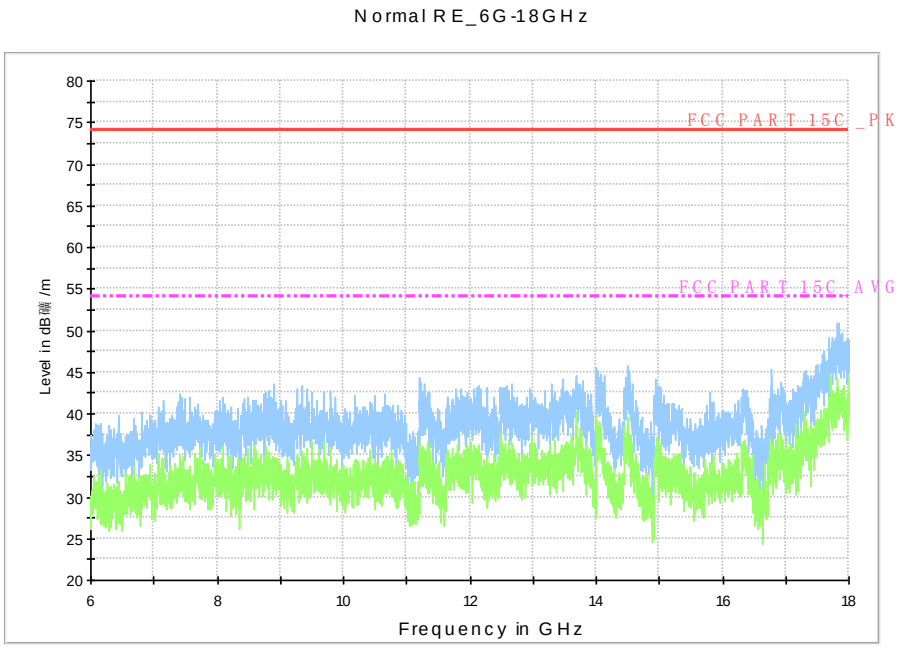


Fig. 74 Radiated Spurious Emission (802.11n-HT40, Ch159, 6 GHz-18 GHz)

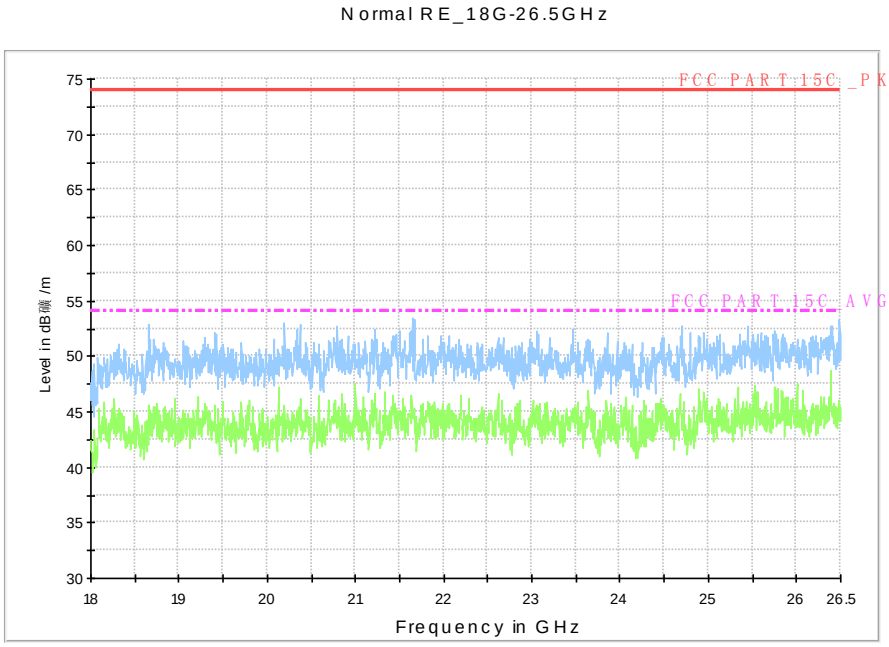


Fig. 75 Radiated Spurious Emission (802.11n-HT40, Ch151, 18 GHz-26.5 GHz)

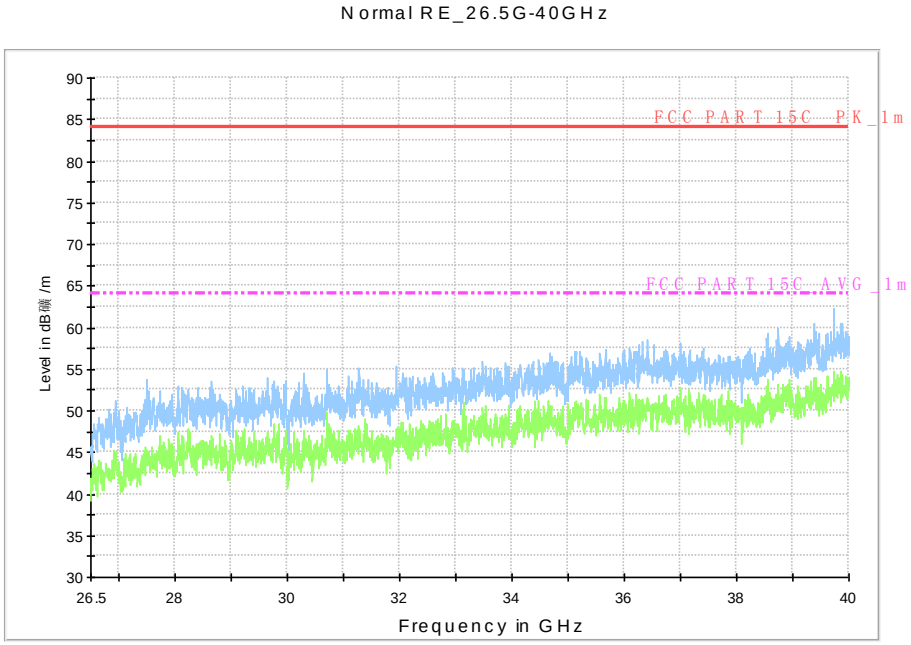


Fig. 76 Radiated emission: 802.11n, (802.11n-HT40, Ch151, 26.5 GHz - 40 GHz)

A.7. AC Powerline Conducted Emission

Test Condition:

Voltage（V）	Frequency（Hz）
110	60

Measurement uncertainty:
Expanded measurement uncertainty for this test item is U =3.2dB, k=2.

Measurement Result and limit:
WLAN (Quasi-peak Limit)

Frequency range (MHz)	Quasi-peak Limit (dBμV)	Result (dBμV)		Conclusion
		With charger		
		802.11a	Idle	
0.15 to 0.5	66 to 56	Fig.77	Fig.78	P
0.5 to 5	56			
5 to 30	60			
NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.				

WLAN (Average Limit)

Frequency range (MHz)	Average Limit (dBμV)	Result (dBμV)		Conclusion
		With charger		
		802.11a	Idle	
0.15 to 0.5	56 to 46	Fig.77	Fig.78	P
0.5 to 5	46			
5 to 30	50			
NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.				

The measurement is made according to ANSI C63.10 .

Conclusion: PASS
Test graphs as below:

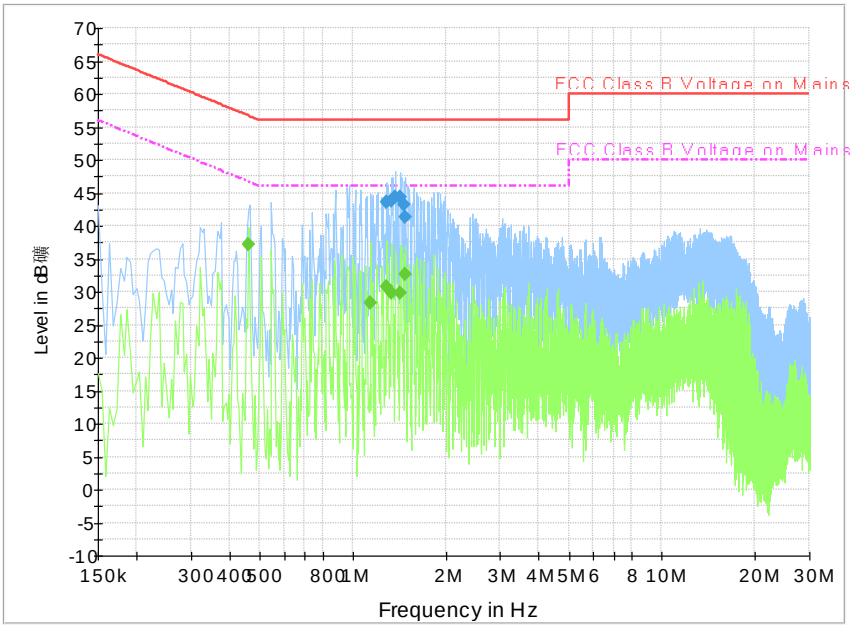


Fig. 77 AC Powerline Conducted Emission-802.11a

Measurement Result 1:

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
1.284000	43.5	GND	L1	9.7	12.5	56.0
1.329000	43.7	GND	L1	9.7	12.3	56.0
1.374000	44.3	GND	L1	9.7	11.7	56.0
1.419000	44.3	GND	L1	9.7	11.7	56.0
1.464000	43.3	GND	L1	9.7	12.7	56.0
1.477500	41.3	GND	L1	9.7	14.7	56.0

Measurement Result 2:

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.460500	37.2	GND	L1	9.8	9.5	46.7
1.144500	28.3	GND	L1	9.7	17.7	46.0
1.284000	30.7	GND	L1	9.7	15.3	46.0
1.329000	29.8	GND	L1	9.7	16.2	46.0
1.419000	29.8	GND	L1	9.7	16.2	46.0
1.477500	32.6	GND	L1	9.7	13.4	46.0

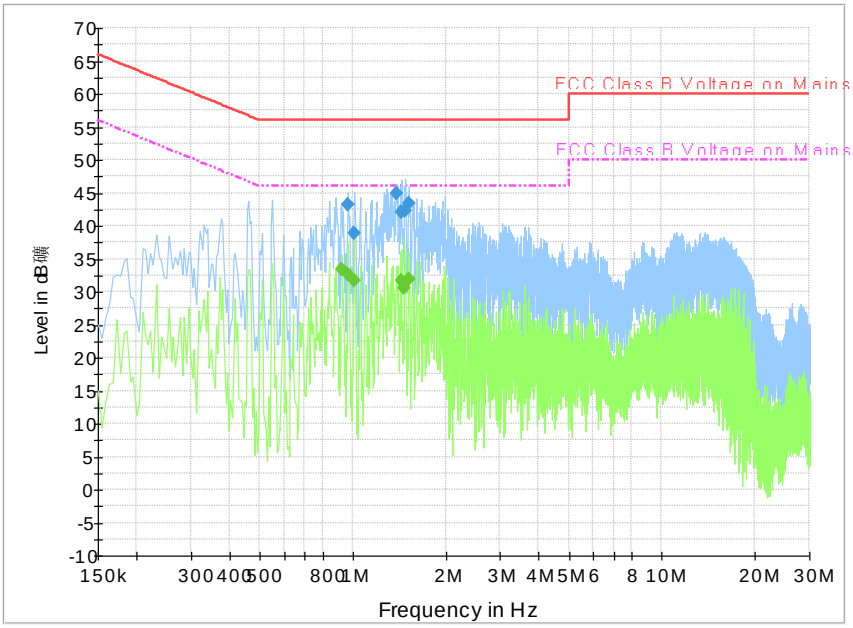


Fig. 78 AC Powerline Conducted Emission-Idle

Measurement Result 1:

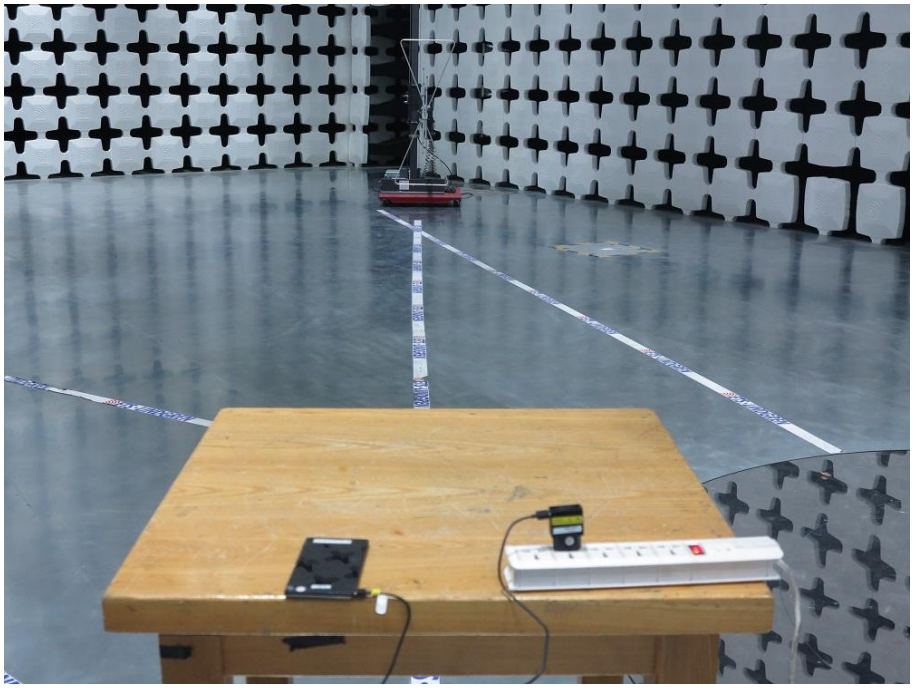
Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.964500	43.1	GND	L1	9.7	12.9	56.0
1.014000	38.8	GND	N	9.7	17.2	56.0
1.383000	44.8	GND	L1	9.7	11.2	56.0
1.437000	42.0	GND	L1	9.7	14.0	56.0
1.482000	42.3	GND	L1	9.7	13.7	56.0
1.513500	43.5	GND	L1	9.7	12.5	56.0

Measurement Result 2:

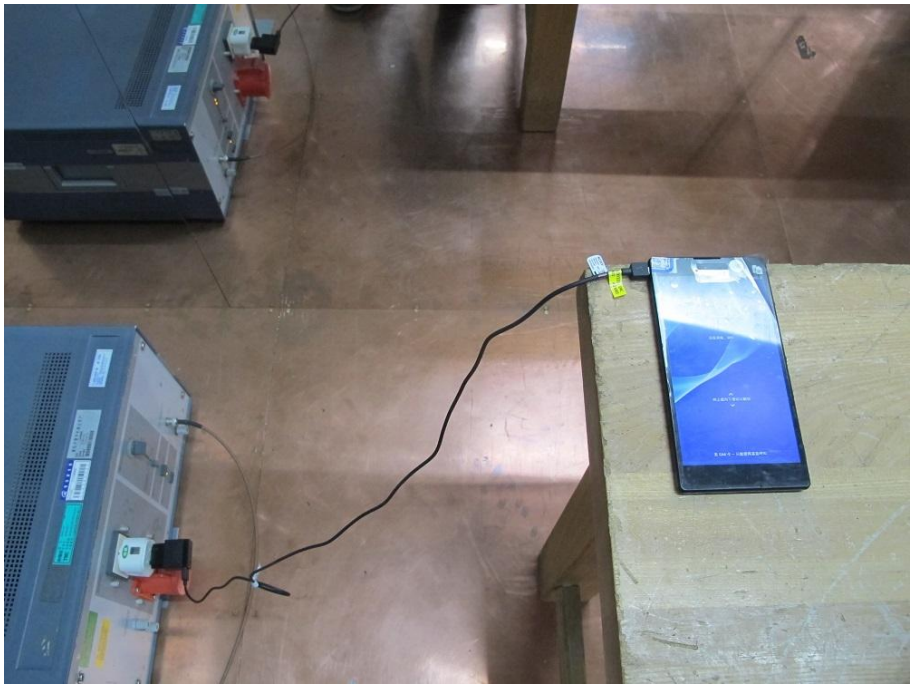
Frequency (MHz)	CAverage (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.924000	33.4	GND	L1	9.7	12.6	46.0
0.964500	32.7	GND	L1	9.7	13.3	46.0
1.009500	31.7	GND	L1	9.7	14.3	46.0
1.437000	31.6	GND	L1	9.7	14.4	46.0
1.468500	30.5	GND	L1	9.7	15.5	46.0
1.522500	31.8	GND	L1	9.7	14.2	46.0

ANNEX B: PHOTOGRAPHS OF THE TEST SET-UP

Layout of Radiated Spurious Emission Test



Layout of AC Powerline Conducted Emission



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