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Wireless test report – 358506-2TRFWL

Applicant:

Redline Communications

Product name:

RDL-3000-RMH

Model:

RDL-3000 Ellipse

Model variant:

RDL-3000 Enterprise

FCC ID:

QC8-RDL3000RMH

Specifications:

- FCC 47 CFR Part 15 Subpart H, §15.709

  White Space devices; General technical requirements.

Date of issue: January 23, 2019

Test engineer(s):	Andrey Adelberg, Senior Wireless/EMC Specialist	Signature:	
Reviewed by:	Kevin Rose, Wireless/EMC Specialist	Signature:	

Test location(s)

Company name	Nemko Canada Inc.
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Province	Ontario
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Country	Canada
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Website	www.nemko.com
Site number	FCC: CA2040; IC: 2040A-4 (3 m SAC)

Limits of responsibility

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.
This test report has been completed in accordance with the requirements of ISO/IEC 17025. All results contain in this report are within Nemko Canada's ISO/IEC 17025 accreditation.

Copyright notification

Table of contents

Section 1. Report summary

1.1 Applicant and manufacturer

Company name	Redline Communications
Address	302 Town Centre Blvd
City	Markham
Province/State	ON
Postal/Zip code	L3R 0E8
Country	Canada

1.2 Test specifications

FCC 47 CFR Part 15, Subpart H	White Space devices

1.3 Test methods

ANSI C63.10 v2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
416721 D01 (Dec. 2015)	Certification test procedures for white space devices authorized under subpart h of the part 15 rules

1.4 Statement of compliance

In the configuration tested, the EUT was found compliant.

Testing was performed against all relevant requirements of the test standard except as noted in section 1.5 below. Results obtained indicate that the product under test complies in full with the requirements tested. The test results relate only to the items tested.

See "Summary of test results" for full details.

1.5 Exclusions

None

1.6 Test report revision history

Revision #	Date of issue	Details of changes made to test report
TRF	January 23, 2019	Original report issued

Section 2. Summary of test results

2.1 FCC Part 15 Subpart H requirements test results

Table 2.1-1: *FCC 15.709 results*

Part	Test description	Verdict
§15.709(a)(2)	Radiated power limits	Pass
§15.709(b)(1), (c)(1–3)	Conducted power and PSD	Pass
§15.709(b)(1), (d)(1), (d)(3)	Adjacent Channel Emissions – Band-edge Measurement	Pass
§15.709(b)(1), (d)(1), (d)(3)	Adjacent Channel Emissions – Adjacent Channel Measurement	Pass
§15.709(d)(2)	Radiated Emissions beyond Adjacent-Channel (15.209)	Pass
§15.709(c)(4)	AC power line conducted emissions	Pass

Notes: EUT is an AC powered device.

Section 3. Equipment under test (EUT) details

3.1 Sample information

Receipt date	October 15, 2018
Nemko sample ID number	1 and 2

3.2 EUT information

Product name	RDL-3000-RMH
Model (Base station)	RDL-3000 Ellipse
Model variant (Subscriber)	RDL-3000 Enterprise
Serial number	400SC18350005 (Base station), 399RM18390005 (Subscriber)

3.3 Technical information

Frequency band	470–614 MHz
Frequency Min	473 MHz (6 MHz), 476 MHz (12 MHz), 479 MHz (18 MHz), 482 MHz (24 MHz)
Frequency Max (MHz)	611 MHz (6 MHz), 608 MHz (12 MHz), 605 MHz (18 MHz), 602 MHz (24 MHz)
RF power Max (W)	0.115 (20.59 dBm)
Channel BW	6, 12, 18, 24 MHz
Type of modulation	BPSK to 264-QAM
Power requirements	120 V_{AC} 60 Hz or 48 V_{DC} via PoE
Antenna information	Redline AFD-DB-600-2ft-02 Panel antenna, 470-698MHz, 11 dBi, dual polarity Redline ALP-SB-60055-D1 Log-P antenna, 470-698MHz, 11 dBi, single polarity

3.4 Product description and theory of operation

The RDL-3000-RMH is a 2x2 MIMO broadband radio that provides high capacity, long range communications link. Operating in 470-698MHz band, RDL-3000-RMH is configured via firmware options and electronic product keys.
RDL-3000-RMH is a Fixed WSD that supports PAWS Protocol to Access White Space Database. It operates with Nominet, FCC approved database provider. It fully complies with WSDB channel availability and EIRP information that includes scheduled changes in channel availability by making a re-check contact with DB every 20 minutes.

3.5 EUT exercise details

EUT was controlled from Laptop with WebGUI at the IP addresses: 192.168.3.210 for Base station unit and 192.168.3.253 for Subscriber unit.

3.6 EUT setup diagram

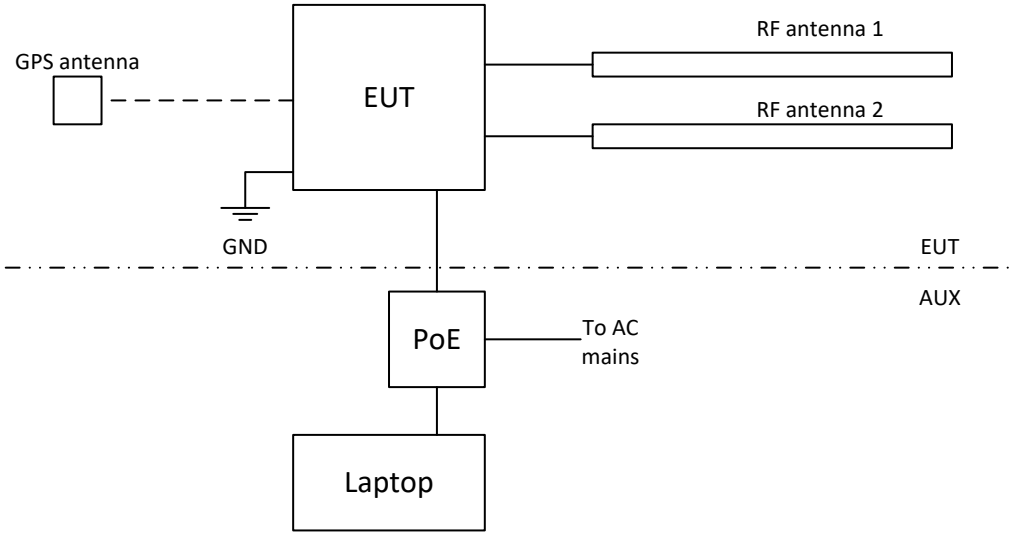


Figure 3.6-1: *Setup diagram with Log-P antennas (GPS antenna and cable are only with Base Station unit)*

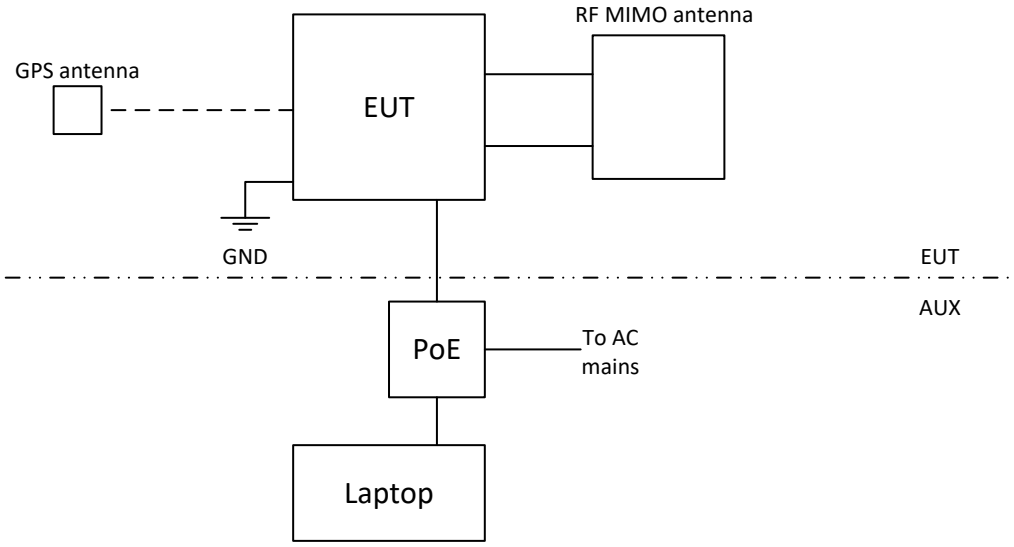


Figure 3.6-2: *Setup diagram with Flat MIMO antenna (GPS antenna and cable are only with Base Station unit)*

Section 4. Engineering considerations

4.1 Modifications incorporated in the EUT

There were no modifications performed to the EUT during this assessment.

4.2 Technical judgment

None

4.3 Deviations from laboratory tests procedures

No deviations were made from laboratory procedures.

Section 5. Test conditions

5.1 Atmospheric conditions

Temperature	15–30 °C
Relative humidity	20–75 %
Air pressure	860–1060 mbar

When it is impracticable to carry out tests under these conditions, a note to this effect stating the ambient temperature and relative humidity during the tests shall be recorded and stated.

5.2 Power supply range

The normal test voltage for equipment to be connected to the mains shall be the nominal mains voltage. For the purpose of the present document, the nominal voltage shall be the declared voltage, or any of the declared voltages ±5 %, for which the equipment was designed.

Section 6. Measurement uncertainty

6.1 Uncertainty of measurement

UKAS Lab 34 and TIA-603-B have been used as guidance for measurement uncertainty reasonable estimations with regards to previous experience and validation of data. Nemko Canada, Inc. follows these test methods in order to satisfy ISO/IEC 17025 requirements for estimation of uncertainty of measurement for wireless products.

Measurement uncertainty budgets for the tests are detailed below. Measurement uncertainty calculations assume a coverage factor of K = 2 with 95% certainty.

Table 6.1-1: *Measurement uncertainty*

Test name	Measurement uncertainty, dB
All antenna port measurements	0.55
Conducted spurious emissions	1.13
Radiated spurious emissions	3.78
AC power line conducted emissions	3.55

Section 7. Test equipment

7.1 Test equipment list

Table 7.1-1: *Equipment list*

Equipment	Manufacturer	Model no.	Asset no.	Cal cycle	Next cal.
3 m EMI test chamber	TDK	SAC-3	FA002047	1 year	Feb. 15/19
Flush mount turntable	Sunol	FM2022	FA002082	—	NCR
Controller	Sunol	SC104V	FA002060	—	NCR
Antenna mast	Sunol	TLT2	FA002061	—	NCR
AC Power source	Chenwa	2700M-10k	FA002716	—	VOU
Receiver/spectrum analyzer	Rohde & Schwarz	ESU 26	FA002043	1 year	Mar 26/19
Spectrum analyzer	Rohde & Schwarz	FSU	FA001877	1 year	Oct 26/19
Preamp (1–18 GHz)	ETS-Lindgren	124334	FA002873	1 year	Nov. 4/19
Bilog antenna (20–2000 MHz)	Sun AR	JB1	FA003009	1 year	Sept. 6/19
Horn antenna (1–18 GHz)	EMCO	3115	FA000825	1 year	Oct. 8/19
LISN	Rohde & Schwarz	ENV216	FA002023	1 year	Aug 13/19

Note: NCR - no calibration required, VOU - verify on use

Section 8. Testing data

8.1 FCC 15.31(e) Variation of power source

8.1.1 Definitions and limits

For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. For battery operated equipment, the equipment tests shall be performed using a new battery.

8.1.2 Test date

Start date	January 7, 2019

8.1.3 Observations, settings and special notes

The testing was performed as per ANSI C63.10 Section 5.13.

a) Where the device is intended to be powered from an external power adapter, the voltage variations shall be applied to the input of the adapter provided with the device at the time of sale. If the device is not marketed or sold with a specific adapter, then a typical power adapter shall be used.
b) For devices where operating at a supply voltage deviating ±15% from the nominal rated value may cause damages or loss of intended function, test to minimum and maximum allowable voltage per manufacturer's specification and document in the report.
c) For devices with wide range of rated supply voltage, test at 15% below the lowest and 15% above the highest declared nominal rated supply voltage.
d) For devices obtaining power from an input/output (I/O) port (USB, firewire, etc.), a test jig is necessary to apply voltage variation to the device from a support power supply, while maintaining the functionalities of the device.

For battery-operated equipment, the equipment tests shall be performed using a variable power supply.

8.1.4 Test data

EUT Power requirements:	☒ AC	☐ DC	☐ Battery
If EUT is an AC or a DC powered, was the noticeable output power variation observed?	☐ YES	☒ NO	☐ N/A
If EUT is battery operated, was the testing performed using fresh batteries?	☐ YES	☐ NO	☒ N/A
If EUT is rechargeable battery operated, was the testing performed using fully charged batteries?	☐ YES	☐ NO	☒ N/A

8.2 FCC 15.31(m) Number of frequencies

8.2.1 Definitions and limits

Measurements on intentional radiators or receivers shall be performed and, if required, reported for each band in which the device can be operated with the device operating at the number of frequencies in each band specified in the following table.

Table 8.2-1: *Frequency Range of Operation*

Frequency range over which the device operates (in each band)	Number of test frequencies required	Location of measurement frequency inside the operating frequency range
1 MHz or less	1	Center (middle of the band)
1–10 MHz	2	1 near high end, 1 near low end
Greater than 10 MHz	3	1 near high end, 1 near center and 1 near low end

Note: "near" means as close as possible to or at the centre / low end / high end of the frequency range over which the device operates.

8.2.2 Test date

Start date	January 7, 2019

8.2.3 Observations, settings and special notes

Per ANSI C63.10 Subclause 5.6.2.1:
The number of channels tested can be reduced by measuring the center channel bandwidth first and then applying the following relaxations as appropriate:

a) For each operating mode, if the measured channel bandwidth on the middle channel is at least 150% of the minimum permitted bandwidth, then it is not necessary to measure the bandwidth on the high and low channels.
b) For multiple-input multiple-output (MIMO) systems, if the measured channel bandwidth on testing the middle channel exceeds the minimum permitted bandwidth by more than 50% on one transmit chain, then it is not necessary to repeat testing on the other chains.
c) If the measured channel bandwidth on the middle channel is less than 50% of the maximum permitted bandwidth, then it is not necessary to measure the bandwidth on the high and low channels.

Per ANSI C63.10 Subclause 5.6.2.2:
For devices with multiple operating modes, measurements on the middle channel can be used to determine the worst-case mode(s). The worst-case modes are as follows:

a) Band edge requirements—Measurements on the mode with the widest bandwidth can be used to cover the same channel (center frequency) on modes with narrower bandwidth that have the same or lower output power for each modulation family (e.g., OFDM and direct sequence spread spectrum).
b) Spurious emissions—Measure the mode with the highest output power and the mode with the highest output power spectral density for each modulation family (e.g., OFDM and direct sequence spread spectrum).
c) In-band PSD—Measurements on the mode with the narrowest bandwidth can be used to cover all modes within the same modulation family of an equal or lower output power provided the result is less than 50% of the limit.

8.2.4 Test data

Table 8.2-2: *Test channels selection*

Start of Frequency range, MHz	End of Frequency range, MHz	Frequency range bandwidth, MHz	Low channel, MHz	Mid channel, MHz	High channel, MHz
470	614	144	473	545	611

8.3 FCC 15.203 Antenna requirement

8.3.1 Definitions and limits

15.203
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.
KDB 1416721 D01,v03,II.2.c)i.
The maximum gain of the transmitting antenna used with a Fixed WSD must be declared by the manufacturer in the certification application.

8.3.2 Test date

Start date	January 7, 2019

8.3.3 Observations, settings and special notes

If the transmitting antenna gain exceeds 6 dBi for fixed white space device operating at up to 36 dBm EIRP or exceeds 10 dBi for fixed white space device operating at up to 40 dBm EIRP, the conducted output power, power spectral density, band edge emissions, and adjacent channel emissions limits shall all be reduced by the amount in dB by which the gain exceeds 6 dBi or 10 dBi respectively.

8.3.4 Test data

Antenna gain: 11 dBi

Must the EUT be professionally installed?	☒ YES	☐ NO	
Does the EUT have detachable antenna(s)?	☐ YES	☐ NO	☒ N/A (if professionally installed)
If detachable, is the antenna connector(s) non-standard?	☐ YES	☐ NO	☒ N/A

8.4 FCC 15.709(c)(4) AC power line conducted emissions limits

8.4.1 Definitions and limits

White space devices connected to the AC power line are required to comply with the conducted limits set forth in §15.207.
15.207: Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 µH/50 Ω line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

ANSI: C63.10 subclause 6.2
If the EUT normally receives power from another device that in turn connects to the public utility ac power lines, measurements shall be made on that device with the EUT in operation to demonstrate that the device continues to comply with the appropriate limits while providing the EUT with power. If the EUT is
operated only from internal or dedicated batteries, with no provisions for connection to the public utility ac power lines (600 VAC or less) to operate the EUT (such as an adapter), then ac power-line conducted measurements are not required.
For direct current (dc) powered devices where the ac power adapter is not supplied with the device, an "off-the-shelf" unmodified ac power adapter shall be used. If the device is supposed to be installed in a host (e.g., the device is a module or PC card), then it is tested in a typical compliant host.

Table 8.4-1: *Conducted emissions limit*

Frequency of emission, MHz	Conducted limit, dBµV	
	Quasi-peak	Average**
0.15–0.5	66 to 56*	56 to 46*
0.5–5	56	46
5–30	60	50

Note: * - The level decreases linearly with the logarithm of the frequency.
** - A linear average detector is required.

8.4.2 Test date

Start date	October 22, 2018

8.4.3 Observations, settings and special notes

The EUT was set up as tabletop configuration.

The spectral scan has been corrected with transducer factors (i.e. cable loss, LISN factors, and attenuators) for determination of compliance.

A preview measurement was generated with the receiver in continuous scan mode. Emissions detected within 6 dB or above limit were re-measured with the appropriate detector against the correlating limit and recorded as the final measurement.

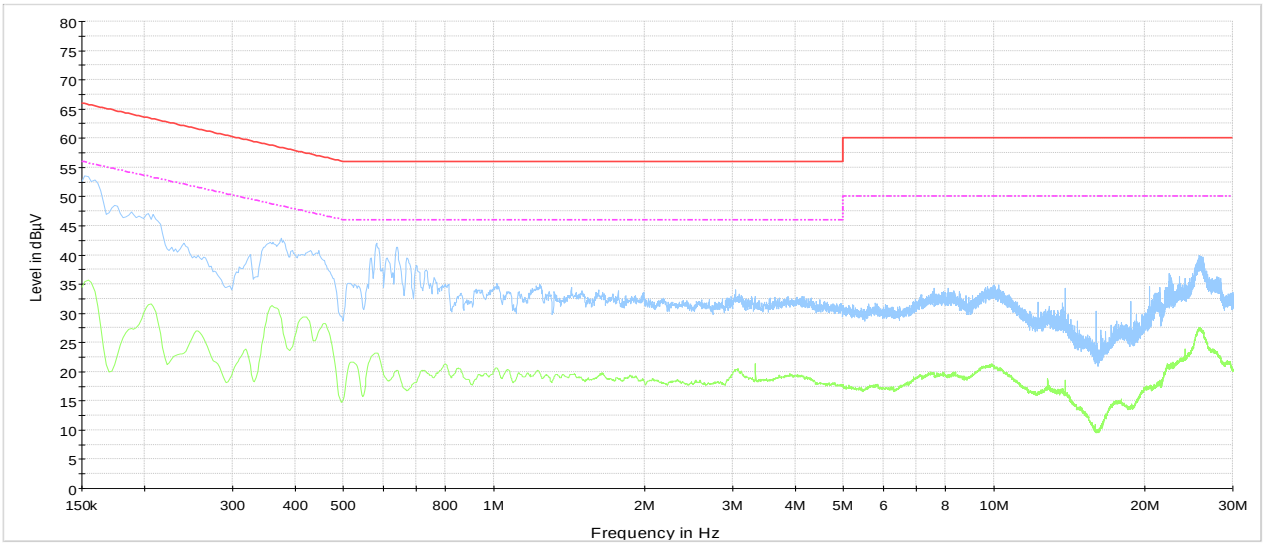
Receiver settings for preview measurements:

Resolution bandwidth	9 kHz
Video bandwidth	30 kHz
Detector mode	Peak and Average
Trace mode	Max Hold
Measurement time	1000 ms

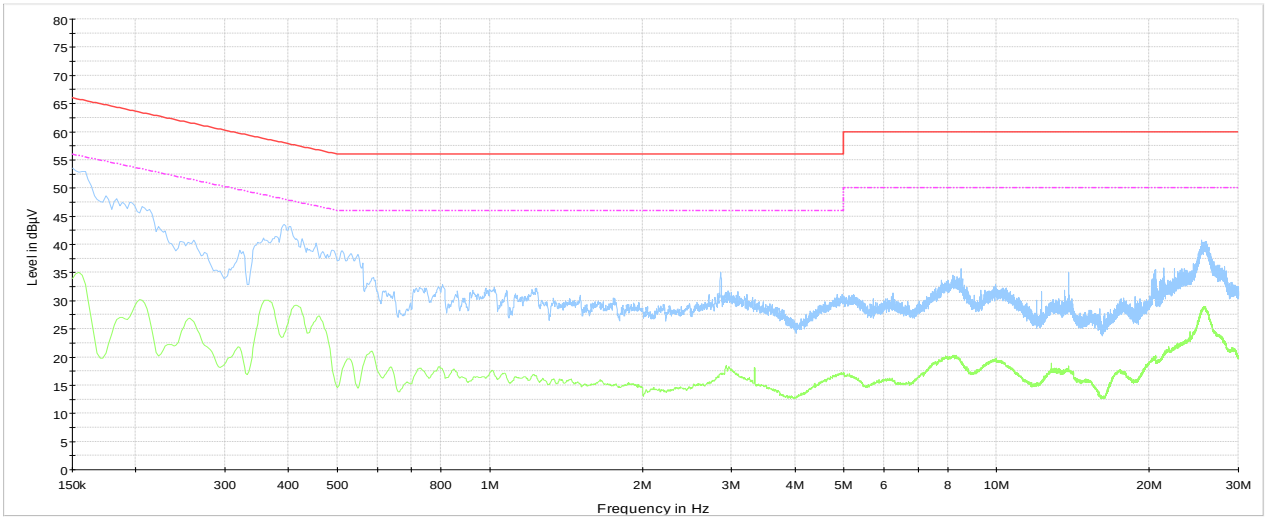
Receiver settings for final measurements:

Resolution bandwidth	9 kHz
Video bandwidth	30 kHz
Detector mode	Quasi-Peak and Average
Trace mode	Max Hold
Measurement time	1000 ms

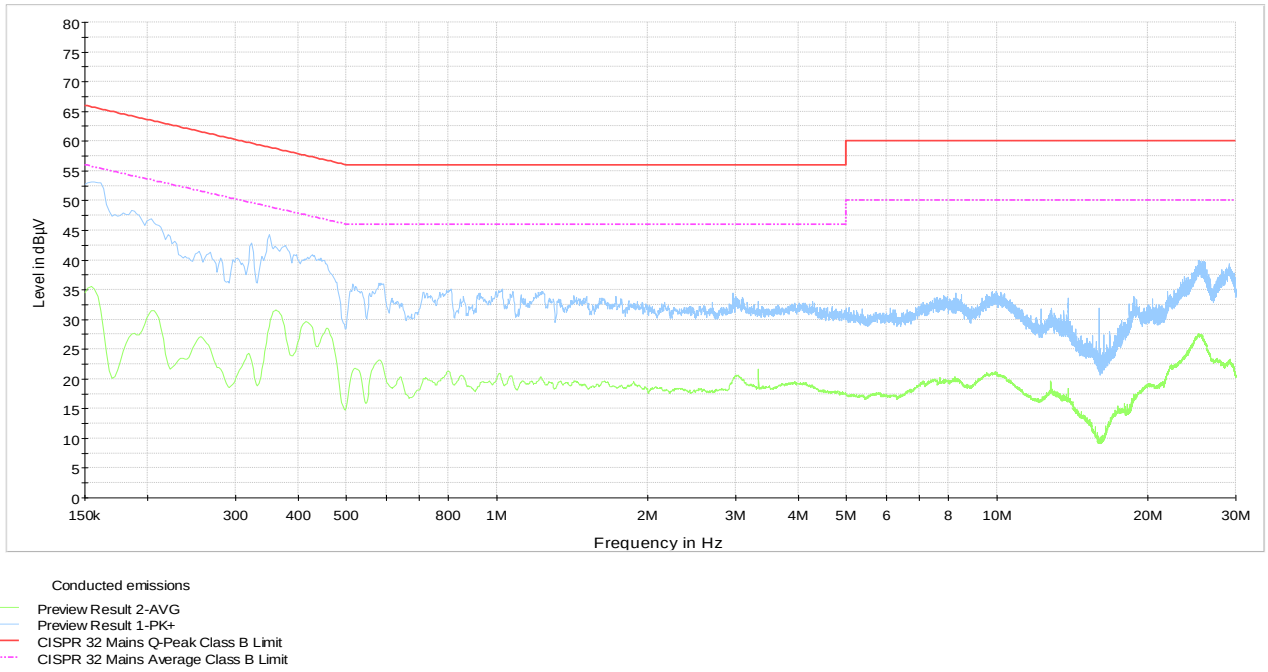
8.4.4 Test data



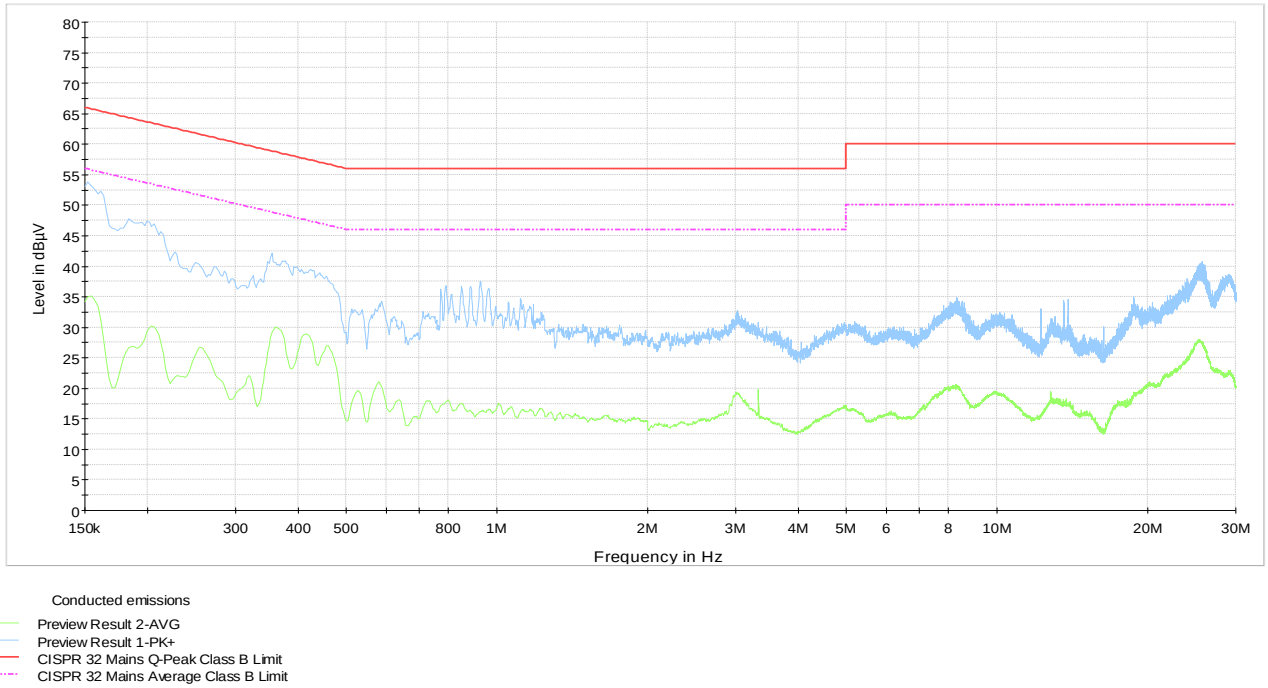
Plot 8.4-1: *Conducted emissions on phase line with Flat antenna setup*



Plot 8.4-2: *Conducted emissions on neutral line with Flat antenna setup*



Plot 8.4-3: *Conducted emissions on phase line with Log-P antenna setup*



Plot 8.4-4: *Conducted emissions on neutral line with Log-P antenna setup*

8.5 FCC 15.709(b)(1), (c)(1), (c)(2), (c)(3) Conducted Power and PSD

8.5.1 Definitions and limits

(b)(1) For operation at EIRP levels of 36 dBm (4000 mW) or less, fixed white space devices may operate at EIRP levels between the values shown in the table provided that the conducted power and the conducted power spectral density (PSD) limits are linearly interpolated between the values shown and the adjacent channel emission limit of the higher value shown in the table is met. Operation at EIRP levels above 36 dBm (4000 mW) shall follow the requirements for 40 dBm (10,000 mW).

Table 8.5-1: *Output power and PSD limits for Fixed WSD*

EIRP, dBm/6 MHz	Conducted power limit*, dBm/6 MHz	Conducted PSD limit, dBm/100 kHz
16	10	–7.4
20	14	–3.4
24	18	0.6
28	22	4.6
32	26	8.6
36	30	12.6
40	30	12.6

Note: *The conducted power spectral density from a fixed white space device shall not be greater than the values shown in the table when measured in any 100 kHz band during any time interval of continuous transmission, except that a 40 mW fixed white space device operating in a four megahertz channel within a seven megahertz guard band must comply with a conducted power spectral density limit of –5.4 dBm.*

(c)(1) The conducted power, PSD and adjacent channel limits for fixed white space devices operating at up to 36 dBm (4000 milliwatts) EIRP shown in the table above are based on a maximum transmitting antenna gain of 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(c)(2) The conducted power, PSD and adjacent channel limits for fixed white space devices operating at greater than 36 dBm (4000 milliwatts) EIRP shown in the table above are based on a maximum transmitting antenna gain of 10 dBi. If transmitting antennas of directional gain greater than 10 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 10 dBi.

(c)(3) Maximum conducted output power is the total transmit power over the occupied bandwidth delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

8.5.1 Test date

Start date	January 3, 2019

8.5.2 Observations, settings and special notes

Output power andSpectrum analyser settings:

Resolution bandwidth	100 kHz
Video bandwidth	300 kHz
Frequency span	>10 MHz
Detector mode	RMS
Trace mode	Power averaging over 10 sweeps (minimum)
Power integration	Use the integrated band/channel power analyzer function to determine the average power within the 6-MHz channel bandwidth.

8.5.3 Test data

Output power and PSD limit calculation for 6 MHz channel.

Declared channel maximum power is 100 mW. There are two antenna ports in the system. Total power is 20 dBm + 3 dB = 23 dBm

Antenna gain is 11 dBi, cable loss is 1 dB, total system gain is 10 dBi, therefore EIRP = 23 dBm + 10 dBi = 33 dBm. Output power and PSD limits are based on the EIRP level.

For 33 dBm EIRP output power limit is 27 dBm/6 MHz and PSD limit is 9.6 dBm/100 kHz.

Since antenna gain is 4 dB higher than 6 dBi maximum limit, the output power limit must be reduced by 4 dB: 27 dBm/6 MHz – 4 dB = 23 dBm/6 MHz and PSD limit must be reduced by 4 dB: 9.6 dBm/100 kHz – 4 dB = 5.6 dBm/100 kHz.

Declared output power for 12 MHz channel is 19 dBm. EIRP is 19 dBm + 3 dB + 10 dBi = 32 dBm, therefore Output power limit is 22 dBm/6 MHz and PSD limit is 4.6 dBm/100 kHz

Declared output power for 18 MHz channel is 18 dBm. EIRP is 18 dBm + 3 dB + 10 dBi = 31 dBm, therefore Output power limit is 21 dBm/6 MHz and PSD limit is 3.6 dBm/100 kHz

Declared output power for 24 MHz channel is 17 dBm. EIRP is 17 dBm + 3 dB + 10 dBi = 30 dBm, therefore Output power limit is 20 dBm/6 MHz and PSD limit is 2.6 dBm/100 kHz

Table 8.5-2: *Output power results for 6 MHz channel*

Frequency, MHz	Modulation	Output power measurement at Ant 1, dBm/6 MHz	Output power measurement at Ant 2, dBm/6 MHz	Total output power, dBm/6 MHz	Output power limit, dBm/6 MHz	Margin, dB
473	BPSK	17.81	17.02	20.44	23.00	2.56
473	256QAM	17.70	17.24	20.49	23.00	2.51
545	BPSK	17.73	17.15	20.46	23.00	2.54
545	256QAM	17.94	17.19	20.59	23.00	2.41
611	BPSK	17.87	17.04	20.49	23.00	2.51
611	256QAM	17.85	17.10	20.50	23.00	2.50

Table 8.5-3: *PSD results for 6 MHz channel*

Frequency, MHz	Modulation	PSD measurement at Ant 1, dBm/100 kHz	PSD measurement at Ant 2, dBm/100 kHz	Total PSD, dBm/100 kHz	PSD limit, dBm/100 kHz	Margin, dB
473	BPSK	2.64	2.04	5.36	5.60	0.24
473	256QAM	2.74	2.14	5.46	5.60	0.14
545	BPSK	2.81	2.02	5.44	5.60	0.16
545	256QAM	2.71	2.26	5.50	5.60	0.10
611	BPSK	2.76	2.01	5.41	5.60	0.19
611	256QAM	2.79	1.88	5.37	5.60	0.23

Table 8.5-4: *Output power results for 12 MHz channel*

Frequency, MHz	Modulation	Output power measurement at Ant 1, dBm/6 MHz	Output power measurement at Ant 2, dBm/6 MHz	Total output power, dBm/6 MHz	Output power limit, dBm/6 MHz	Margin, dB
476	BPSK	16.58	16.82	19.71	22.00	2.29
476	256QAM	16.55	16.85	19.71	22.00	2.29
542	BPSK	16.46	16.80	19.64	22.00	2.36
542	256QAM	16.54	16.84	19.70	22.00	2.30
608	BPSK	16.59	16.60	19.61	22.00	2.39
608	256QAM	16.55	16.65	19.61	22.00	2.39

Table 8.5-5: *PSD results for 12 MHz channel*

Frequency, MHz	Modulation	PSD measurement at Ant 1, dBm/100 kHz	PSD measurement at Ant 2, dBm/100 kHz	Total PSD, dBm/100 kHz	PSD limit, dBm/100 kHz	Margin, dB
476	BPSK	0.20	0.57	3.40	4.60	1.20
476	256QAM	0.24	0.45	3.36	4.60	1.24
542	BPSK	0.21	0.46	3.35	4.60	1.25
542	256QAM	0.22	0.46	3.35	4.60	1.25
608	BPSK	0.34	0.22	3.29	4.60	1.31
608	256QAM	0.23	0.33	3.29	4.60	1.31

Table 8.5-6: *Output power results for 18 MHz channel*

Frequency, MHz	Modulation	Output power measurement at Ant 1, dBm/6 MHz	Output power measurement at Ant 2, dBm/6 MHz	Total output power, dBm/6 MHz	Output power limit, dBm/6 MHz	Margin, dB
479	BPSK	15.14	15.19	18.18	21.00	2.82
479	256QAM	15.13	15.13	18.14	21.00	2.86
545	BPSK	15.03	15.09	18.07	21.00	2.93
545	256QAM	15.11	15.16	18.15	21.00	2.85
605	BPSK	15.01	14.98	18.01	21.00	2.99
605	256QAM	15.07	15.01	18.05	21.00	2.95

Table 8.5-7: *PSD results for 18 MHz channel*

Frequency, MHz	Modulation	PSD measurement at Ant 1, dBm/100 kHz	PSD measurement at Ant 2, dBm/100 kHz	Total PSD, dBm/100 kHz	PSD limit, dBm/100 kHz	Margin, dB
479	BPSK	-0.57	-0.37	2.54	3.60	1.06
479	256QAM	-0.35	-0.38	2.65	3.60	0.95
545	BPSK	-0.54	-0.27	2.61	3.60	0.99
545	256QAM	-0.44	-0.47	2.56	3.60	1.04
605	BPSK	-0.47	-0.40	2.58	3.60	1.02
605	256QAM	-0.47	-0.44	2.56	3.60	1.04

Table 8.5-8: *Output power results for 24 MHz channel*

Frequency, MHz	Modulation	Output power measurement at Ant 1, dBm/6 MHz	Output power measurement at Ant 2, dBm/6 MHz	Total output power, dBm/6 MHz	Output power limit, dBm/6 MHz	Margin, dB
482	BPSK	12.79	13.67	16.26	20.00	3.74
482	256QAM	12.74	13.75	16.28	20.00	3.72
542	BPSK	13.32	12.70	16.03	20.00	3.97
542	256QAM	13.33	12.69	16.03	20.00	3.97
602	BPSK	13.78	13.76	16.78	20.00	3.22
602	256QAM	13.72	13.76	16.75	20.00	3.25

Table 8.5-9: *PSD results for 24 MHz channel*

Frequency, MHz	Modulation	PSD measurement at Ant 1, dBm/100 kHz	PSD measurement at Ant 2, dBm/100 kHz	Total PSD, dBm/100 kHz	PSD limit, dBm/100 kHz	Margin, dB
482	BPSK	-2.28	-1.13	1.34	2.60	1.26
482	256QAM	-2.18	-1.02	1.45	2.60	1.15
542	BPSK	-1.43	-2.16	1.23	2.60	1.37
542	256QAM	-1.38	-2.18	1.25	2.60	1.35
602	BPSK	-1.35	-1.28	1.70	2.60	0.90
602	256QAM	-1.33	-1.18	1.76	2.60	0.84

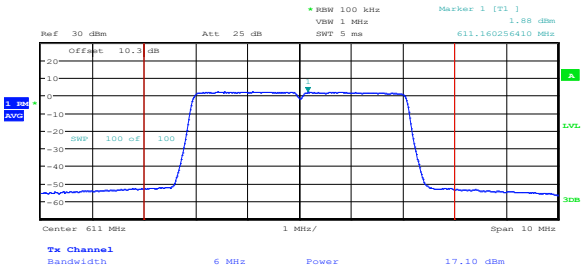


Figure 8.5-1: *Output power and PSD on 6 MHz channel, sample plot*

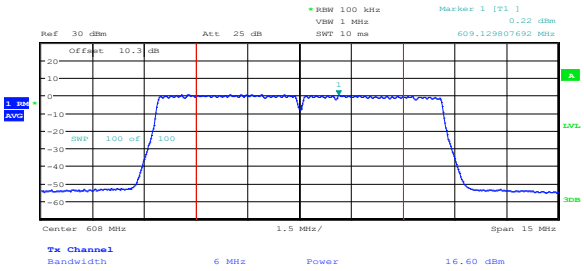


Figure 8.5-2: *Output power and PSD on 12 MHz channel, sample plot*

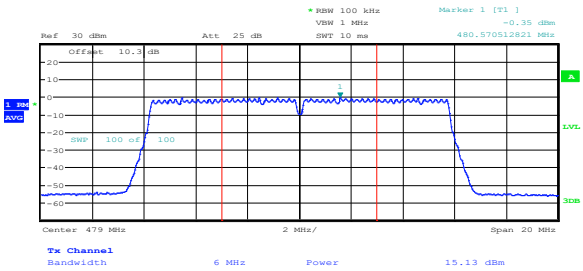


Figure 8.5-3: *Output power and PSD on 18 MHz channel, sample plot*

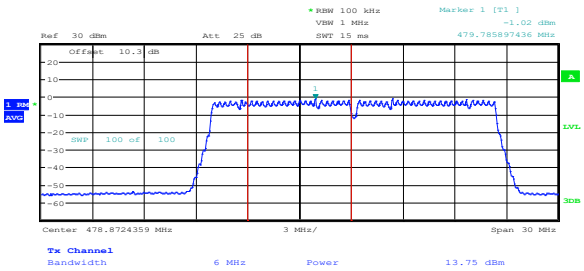


Figure 8.5-4: *Output power and PSD on 24 MHz channel, sample plot*

8.6 FCC 15.709(b)(1), (d)(1), (d)(3) Adjacent Channel Emissions – Band-edge Measurement

8.6.1 Definitions and limits

(d)(1) The adjacent channel emission limits shown in the tables in paragraphs (b)(1) and (2) of this section apply in the six-megahertz channel immediately adjacent to each white space channel or group of contiguous white space channels in which the white space device is operating.

(d)(3) Emission measurements in the adjacent bands shall be performed using a minimum resolution bandwidth of 100 kHz with an average detector. A narrower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 100 kHz.

Table 8.6-1: *Adjacent channel emission limits for Fixed WSD*

EIRP, dBm/6 MHz	Conducted adjacent channel emission limit, dBm/100 kHz
16	−62.8
20	−58.8
24	−54.8
28	−50.8
32	−46.8
36	−42.8
40	−42.8

8.6.1 Test date

Start date	January 7, 2019

8.6.2 Observations, settings and special notes

Check that the reported DUT transmit antenna gain complies with §15.709(c). If required, reduce the band-edge and adjacent channel limits by the amount in dB that the transmit antenna gain exceeds 6 dBi.
Spectrum analyser settings:

Resolution bandwidth	10 kHz
Video bandwidth	30 kHz
Frequency span	200 kHz
Detector mode	RMS
Trace mode	Power averaging over 10 sweeps (minimum)
Power integration	Use the integrated band/channel power analyzer function to determine the average power within the 100-kHz channel bandwidth.

8.6.3 Test data

Conducted band edge limit calculation.

Declared channel maximum power is 100 mW. There are two antenna ports in the system. Total power is 20 dBm + 3 dB = 23 dBm

Antenna gain is 11 dBi, cable loss is 1 dB, total system gain is 10 dBi, therefore EIRP = 23 dBm + 10 dBi = 33 dBm. Band edge limit is based on the EIRP level.

For 33 dBm EIRP, the band edge limit is −46.8 dBm/100 kHz.

For lower than 33 dBm EIRP, the band edge limit is −50.8 dBm/100 kHz.

Table 8.6-2: *Band edge measurement results for 6 MHz channel*

Channel	Modulation	Frequency, MHz	Band edge measurement at Ant 1, dBm/100 kHz	Band edge measurement at Ant 2, dBm/100 kHz	Total band edge measurement, dBm/100 kHz	Band edge limit, dBm/100 kHz	Margin, dB
Low	BPSK	476	-56.24	-56.60	-53.41	-46.80	6.61
Low	256QAM	476	-56.18	-56.56	-53.36	-46.80	6.56
Low	BPSK	482	-58.05	-57.77	-54.90	-46.80	8.10
Low	256QAM	482	-57.68	-57.71	-54.68	-46.80	7.88
Mid	BPSK	542	-54.60	-56.12	-52.28	-46.80	5.48
Mid	256QAM	542	-54.32	-55.79	-51.98	-46.80	5.18
Mid	BPSK	548	-55.17	-57.16	-53.04	-46.80	6.24
Mid	256QAM	548	-55.30	-57.21	-53.14	-46.80	6.34
High	BPSK	602	-54.25	-55.88	-51.98	-46.80	5.18
High	256QAM	602	-54.09	-55.86	-51.88	-46.80	5.08
High	BPSK	608	-54.73	-56.26	-52.42	-46.80	5.62
High	256QAM	608	-54.90	-56.41	-52.58	-46.80	5.78

Table 8.6-3: *Band edge measurement results for 12 MHz channel*

Channel	Modulation	Frequency, MHz	Band edge measurement at Ant 1, dBm/100 kHz	Band edge measurement at Ant 2, dBm/100 kHz	Total band edge measurement, dBm/100 kHz	Band edge limit, dBm/100 kHz	Margin, dB
Low	BPSK	476	-58.44	-58.55	-55.48	-50.80	4.68
Low	256QAM	476	-58.44	-58.40	-55.41	-50.80	4.61
Low	BPSK	488	-60.49	-60.17	-57.32	-50.80	6.52
Low	256QAM	488	-60.42	-60.39	-57.39	-50.80	6.59
Mid	BPSK	536	-56.89	-57.98	-54.39	-50.80	3.59
Mid	256QAM	536	-56.95	-57.89	-54.38	-50.80	3.58
Mid	BPSK	548	-58.98	-60.19	-56.53	-50.80	5.73
Mid	256QAM	548	-58.98	-60.15	-56.52	-50.80	5.72
High	BPSK	596	-56.06	-57.55	-53.73	-50.80	2.93
High	256QAM	596	-56.10	-57.56	-53.76	-50.80	2.96
High	BPSK	608	-57.57	-58.42	-54.96	-50.80	4.16
High	256QAM	608	-57.50	-58.27	-54.86	-50.80	4.06

Table 8.6-4: *Band edge measurement results for 18 MHz channel*

Channel	Modulation	Frequency, MHz	Band edge measurement at Ant 1, dBm/100 kHz	Band edge measurement at Ant 2, dBm/100 kHz	Total band edge measurement, dBm/100 kHz	Band edge limit, dBm/100 kHz	Margin, dB
Low	BPSK	476	-60.22	-59.24	-56.69	-50.80	5.89
Low	256QAM	476	-60.51	-59.27	-56.84	-50.80	6.04
Low	BPSK	494	-61.74	-61.68	-58.70	-50.80	7.90
Low	256QAM	494	-61.79	-60.39	-58.02	-50.80	7.22
Mid	BPSK	536	-58.01	-59.22	-55.56	-50.80	4.76
Mid	256QAM	536	-57.99	-59.17	-55.53	-50.80	4.73
Mid	BPSK	554	-60.55	-61.48	-57.98	-50.80	7.18
Mid	256QAM	554	-60.60	-61.58	-58.05	-50.80	7.25
High	BPSK	590	-57.74	-59.35	-55.46	-50.80	4.66
High	256QAM	590	-57.60	-59.33	-55.37	-50.80	4.57
High	BPSK	608	-59.69	-60.36	-57.00	-50.80	6.20
High	256QAM	608	-59.63	-60.36	-56.97	-50.80	6.17

Table 8.6-5: *Band edge measurement results for 24 MHz channel*

Channel	Modulation	Frequency, MHz	Band edge measurement at Ant 1, dBm/100 kHz	Band edge measurement at Ant 2, dBm/100 kHz	Total band edge measurement, dBm/100 kHz	Band edge limit, dBm/100 kHz	Margin, dB
Low	BPSK	476	-59.78	-59.23	-56.49	-50.80	5.69
Low	256QAM	476	-59.71	-59.08	-56.37	-50.80	5.57
Low	BPSK	500	-61.83	-61.08	-58.43	-50.80	7.63
Low	256QAM	500	-61.91	-60.92	-58.38	-50.80	7.58
Mid	BPSK	530	-63.22	-57.51	-56.48	-50.80	5.68
Mid	256QAM	530	-63.37	-57.26	-56.31	-50.80	5.51
Mid	BPSK	554	-60.95	-61.01	-57.97	-50.80	7.17
Mid	256QAM	554	-60.85	-61.04	-57.93	-50.80	7.13
High	BPSK	584	-57.60	-59.00	-55.23	-50.80	4.43
High	256QAM	584	-57.65	-59.02	-55.27	-50.80	4.47
High	BPSK	608	-59.78	-60.51	-57.12	-50.80	6.32
High	256QAM	608	-59.81	-60.46	-57.11	-50.80	6.31

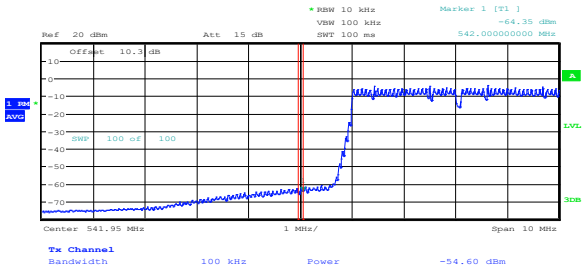


Figure 8.6-1: *Lower band edge for 6 MHz channel, sample plot*

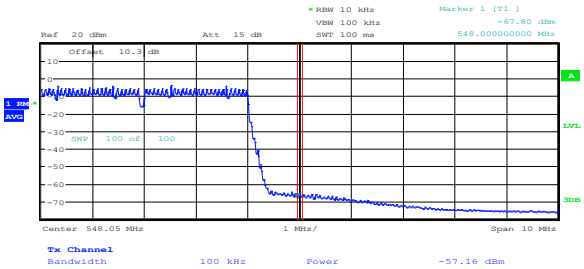


Figure 8.6-2: *Upper band edge for 6 MHz channel, sample plot*

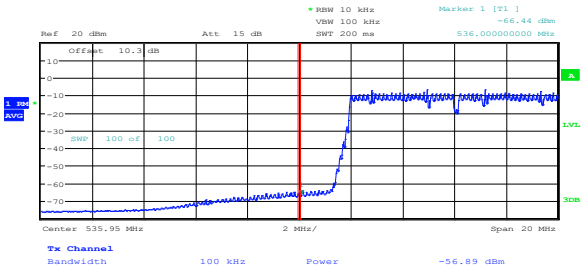


Figure 8.6-3: *Lower band edge for 12 MHz channel, sample plot*

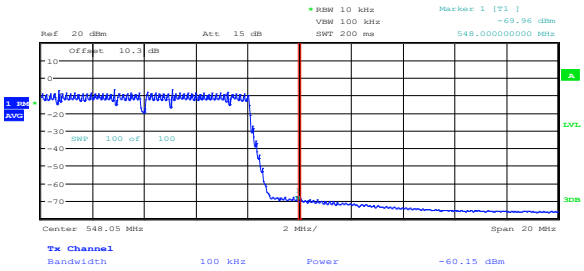


Figure 8.6-4: *Upper band edge for 12 MHz channel, sample plot*

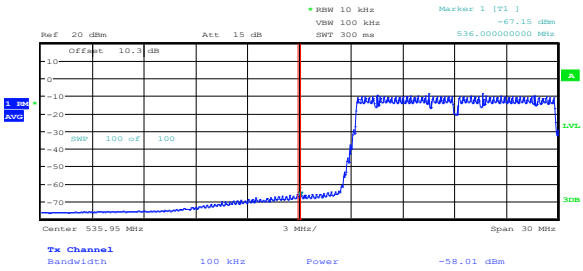


Figure 8.6-5: *Lower band edge for 18 MHz channel, sample plot*

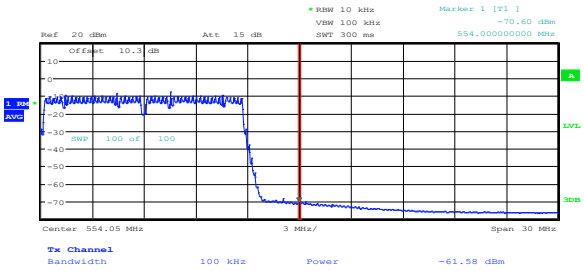


Figure 8.6-6: *Upper band edge for 18 MHz channel, sample plot*

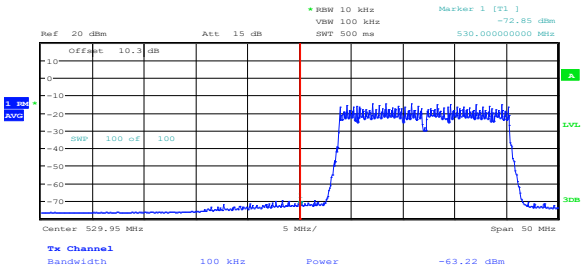


Figure 8.6-7: *Lower band edge for 24 MHz channel, sample plot*

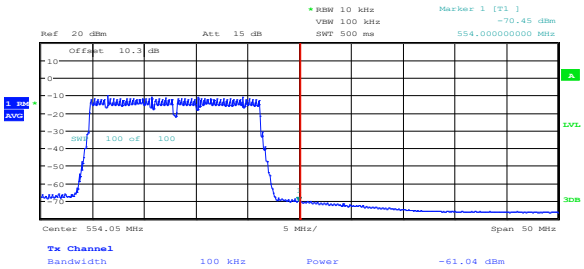


Figure 8.6-8: *Upper band edge for 24 MHz channel, sample plot*

8.7 FCC 15.709(b)(1), (d)(1), (d)(3) Adjacent Channel Emissions – Adjacent Channel Measurement

8.7.1 Definitions and limits

(d)(1) The adjacent channel emission limits shown in the tables in paragraphs (b)(1) and (2) of this section apply in the six-megahertz channel immediately adjacent to each white space channel or group of contiguous white space channels in which the white space device is operating.

(d)(3) Emission measurements in the adjacent bands shall be performed using a minimum resolution bandwidth of 100 kHz with an average detector. A narrower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 100 kHz.

Table 8.7-1: *Adjacent channel emission limits for Fixed WSD*

EIRP, dBm/6 MHz	Conducted adjacent channel emission limit, dBm/100 kHz
16	−62.8
20	−58.8
24	−54.8
28	−50.8
32	−46.8
36	−42.8
40	−42.8

8.7.2 Test date

Start date	January 7, 2019

8.7.3 Observations, settings and special notes

Check that the reported DUT transmit antenna gain complies with §15.709(c). If required, reduce the band-edge and adjacent channel limits by the amount in dB that the transmit antenna gain exceeds 6 dBi.
Spectrum analyser settings:

Resolution bandwidth	100 kHz
Video bandwidth	300 kHz
Frequency span	6 MHz
Detector mode	RMS
Trace mode	Power averaging over 10 sweeps (minimum)

8.7.4 Test data

Conducted adjacent channel limit calculation.
Declared channel maximum power is 100 mW. There are two antenna ports in the system. Total power is 20 dBm + 3 dB = 23 dBm
Antenna gain is 11 dBi, cable loss is 1 dB, total system gain is 10 dBi, therefore EIRP = 23 dBm + 10 dBi = 33 dBm. Adjacent channel limit is based on the EIRP level.
For 33 dBm EIRP, the adjacent channel limit is −46.8 dBm/100 kHz.
For lower than 33 dBm EIRP, the adjacent channel limit is −50.8 dBm/100 kHz.

Table 8.7-2: *Adjacent channel measurement results for 6 MHz channel*

Channel	Modulation	Frequency, MHz	Adjacent channel measurement at Ant 1, dBm/100 kHz	Adjacent channel measurement at Ant 2, dBm/100 kHz	Total Adjacent channel measurement, dBm/100 kHz	Adjacent channel limit, dBm/100 kHz	Margin, dB
Low	BPSK	470.0–475.9	-56.27	-56.83	-53.53	-46.80	6.73
Low	256QAM	470.0–475.9	-56.43	-56.79	-53.60	-46.80	6.80
Low	BPSK	482.1–488.0	-57.94	-58.38	-55.14	-46.80	8.34
Low	256QAM	482.1–488.0	-58.03	-58.28	-55.14	-46.80	8.34
Mid	BPSK	536.0–541.9	-54.11	-56.42	-52.10	-46.80	5.30
Mid	256QAM	536.0–541.9	-54.21	-56.15	-52.06	-46.80	5.26
Mid	BPSK	548.1–554.0	-55.26	-58.01	-53.41	-46.80	6.61
Mid	256QAM	548.1–554.0	-55.19	-57.81	-53.30	-46.80	6.50
High	BPSK	596.0–601.9	-54.18	-55.92	-51.95	-46.80	5.15
High	256QAM	596.0–601.9	-54.19	-55.83	-51.92	-46.80	5.12
High	BPSK	608.1–614.0	-54.88	-56.39	-52.56	-46.80	5.76
High	256QAM	608.1–614.0	-54.91	-56.43	-52.59	-46.80	5.79

Table 8.7-3: *Adjacent channel measurement results for 12 MHz channel*

Channel	Modulation	Frequency, MHz	Adjacent channel measurement at Ant 1, dBm/100 kHz	Adjacent channel measurement at Ant 2, dBm/100 kHz	Total Adjacent channel measurement, dBm/100 kHz	Adjacent channel limit, dBm/100 kHz	Margin, dB
Low	BPSK	470.0–475.9	-59.34	-59.31	-56.31	-50.80	5.51
Low	256QAM	470.0–475.9	-59.21	-59.32	-56.25	-50.80	5.45
Low	BPSK	488.1–494.0	-61.04	-61.05	-58.03	-50.80	7.23
Low	256QAM	488.1–494.0	-61.03	-60.97	-57.99	-50.80	7.19
Mid	BPSK	530.0–535.9	-57.46	-58.89	-55.11	-50.80	4.31
Mid	256QAM	530.0–535.9	-57.45	-58.82	-55.07	-50.80	4.27
Mid	BPSK	548.1–554.0	-59.67	-61.57	-57.51	-50.80	6.71
Mid	256QAM	548.1–554.0	-59.79	-61.60	-57.59	-50.80	6.79
High	BPSK	590.0–601.9	-56.86	-58.42	-54.56	-50.80	3.76
High	256QAM	590.0–601.9	-56.88	-58.25	-54.50	-50.80	3.70
High	BPSK	608.1–614.0	-58.21	-59.62	-55.85	-50.80	5.05
High	256QAM	608.1–614.0	-58.28	-59.53	-55.85	-50.80	5.05

Table 8.7-4: *Adjacent channel measurement results for 18 MHz channel*

Channel	Modulation	Frequency, MHz	Adjacent channel measurement at Ant 1, dBm/100 kHz	Adjacent channel measurement at Ant 2, dBm/100 kHz	Total Adjacent channel measurement, dBm/100 kHz	Adjacent channel limit, dBm/100 kHz	Margin, dB
Low	BPSK	470.0–475.9	-59.84	-59.81	-56.81	-50.80	6.01
Low	256QAM	470.0–475.9	-59.82	-59.82	-56.81	-50.80	6.01
Low	BPSK	494.1–500.0	-61.93	-61.80	-58.85	-50.80	8.05
Low	256QAM	494.1–500.0	-61.87	-61.77	-58.81	-50.80	8.01
Mid	BPSK	530.0–535.9	-57.87	-59.12	-55.44	-50.80	4.64
Mid	256QAM	530.0–535.9	-57.91	-59.14	-55.47	-50.80	4.67
Mid	BPSK	554.1–560.0	-60.19	-62.04	-58.01	-50.80	7.21
Mid	256QAM	554.1–560.0	-60.17	-62.02	-57.99	-50.80	7.19
High	BPSK	584.0–589.9	-57.43	-58.85	-55.07	-50.80	4.27
High	256QAM	584.0–589.9	-57.38	-58.80	-55.02	-50.80	4.22
High	BPSK	608.1–614.0	-58.69	-59.87	-56.23	-50.80	5.43
High	256QAM	608.1–614.0	-58.78	-59.88	-56.28	-50.80	5.48

Table 8.7-5: *Adjacent channel measurement results for 24 MHz channel*

Channel	Modulation	Frequency, MHz	Adjacent channel measurement at Ant 1, dBm/100 kHz	Adjacent channel measurement at Ant 2, dBm/100 kHz	Total Adjacent channel measurement, dBm/100 kHz	Adjacent channel limit, dBm/100 kHz	Margin, dB
Low	BPSK	470.0–475.9	-59.09	-58.76	-55.91	-50.80	5.11
Low	256QAM	470.0–475.9	-58.92	-58.68	-55.79	-50.80	4.99
Low	BPSK	500.1–506.0	-62.47	-60.96	-58.64	-50.80	7.84
Low	256QAM	500.1–506.0	-62.47	-60.96	-58.64	-50.80	7.84
Mid	BPSK	524.0–529.9	-57.63	-57.98	-54.79	-50.80	3.99
Mid	256QAM	524.0–529.9	-57.66	-57.92	-54.78	-50.80	3.98
Mid	BPSK	554.1–560.0	-61.10	-61.14	-58.11	-50.80	7.31
Mid	256QAM	554.1–560.0	-61.08	-61.23	-58.14	-50.80	7.34
High	BPSK	578.0–583.9	-57.36	-58.68	-54.96	-50.80	4.16
High	256QAM	578.0–583.9	-57.34	-58.62	-54.92	-50.80	4.12
High	BPSK	608.1–614.0	-59.53	-59.75	-56.63	-50.80	5.83
High	256QAM	608.1–614.0	-59.61	-59.87	-56.73	-50.80	5.93

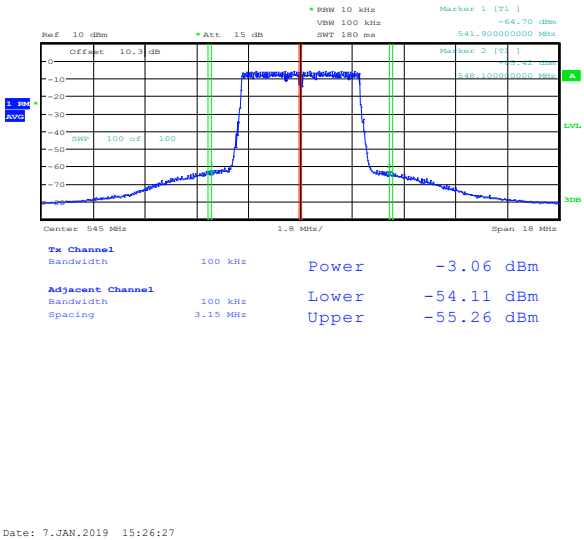


Figure 8.7-1: *Adjacent channel for 6 MHz channel, sample plot*

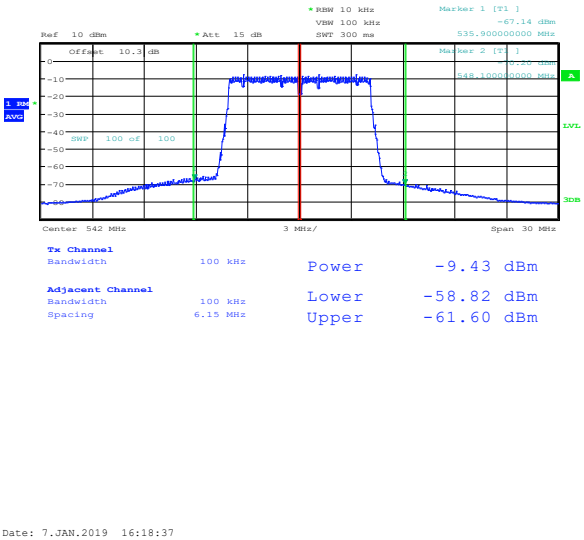


Figure 8.7-2: *Adjacent channel for 12 MHz channel, sample plot*

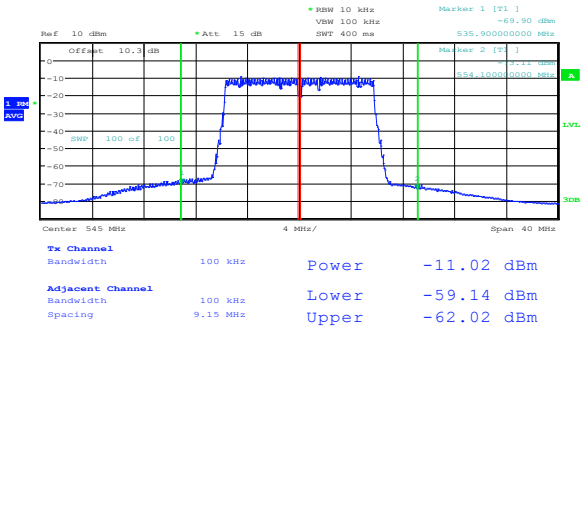


Figure 8.7-3: *Adjacent channel for 18 MHz channel, sample plot*

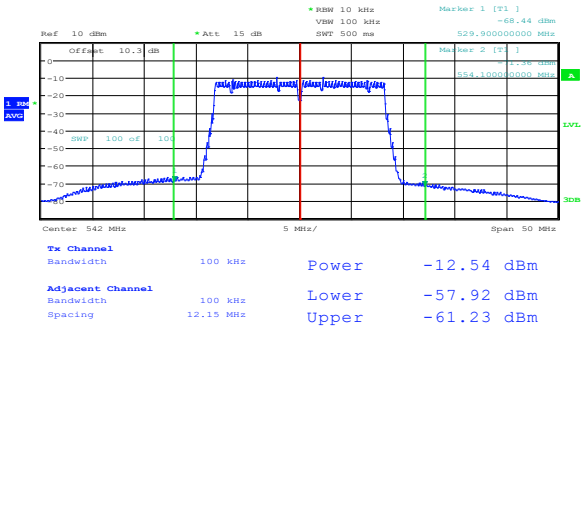


Figure 8.7-4: *Adjacent channel for 24 MHz channel, sample plot*

8.8 FCC 15.709(d)(2) Radiated emissions beyond adjacent channel

8.8.1 Definitions and limits

(d)(2) At frequencies beyond the six-megahertz channel immediately adjacent to each white space channel or group of contiguous white space channels in which the white space device is operating the white space device shall meet the requirements of §15.209.

Table 8.8-1: *FCC §15.209 – Radiated emission limits*

Frequency, MHz	Field strength of emissions		Measurement distance, m
	µV/m	dBµV/m	
0.009–0.490	2400/F	$67.6 - 20 \times \log_{10}(F)$	300
0.490–1.705	24000/F	$87.6 - 20 \times \log_{10}(F)$	30
1.705–30.0	30	29.5	30
30–88	100	40.0	3
88–216	150	43.5	3
216–960	200	46.0	3
above 960	500	54.0	3

Notes: In the emission table above, the tighter limit applies at the band edges.
For frequencies above 1 GHz the limit on peak RF emissions is 20 dB above the maximum permitted average emission limit applicable to the equipment under test

Table 8.8-2: *FCC restricted frequency bands*

MHz	MHz	MHz	GHz
0.090–0.110	16.42–16.423	399.9–410	4.5–5.15
0.495–0.505	16.69475–16.69525	608–614	5.35–5.46
2.1735–2.1905	16.80425–16.80475	960–1240	7.25–7.75
4.125–4.128	25.5–25.67	1300–1427	8.025–8.5
4.17725–4.17775	37.5–38.25	1435–1626.5	9.0–9.2
4.20725–4.20775	73–74.6	1645.5–1646.5	9.3–9.5
6.215–6.218	74.8–75.2	1660–1710	10.6–12.7
6.26775–6.26825	108–121.94	1718.8–1722.2	13.25–13.4
6.31175–6.31225	123–138	2200–2300	14.47–14.5
8.291–8.294	149.9–150.05	2310–2390	15.35–16.2
8.362–8.366	156.52475–156.52525	2483.5–2500	17.7–21.4
8.37625–8.38675	156.7–156.9	2690–2900	22.01–23.12
8.41425–8.41475	162.0125–167.17	3260–3267	23.6–24.0
12.29–12.293	167.72–173.2	3332–3339	31.2–31.8
12.51975–12.52025	240–285	3345.8–3358	36.43–36.5
12.57675–12.57725	322–335.4	3600–4400	Above 38.6
13.36–13.41			

8.8.1 Test date

Start date	December 24, 2018

8.8.2 Observations, settings and special notes

The spectrum was searched from 30 MHz to the 10th harmonic. EUT was set to transmit with 100 % duty cycle.
Radiated measurements were performed at a distance of 3 m, the EUT was transmitting on both MIMO chains simultaneously. The testing was performed on both samples separately: Base station unit and Subscriber unit. Only the worst-case emissions presented in this report.
Radiated emissions in non-restricted frequency bands test was performed as per ANSI C63.10 subclause 11.11.
Radiated emissions in restricted frequency bands test was performed as per ANSI C63.10 subclause 11.12.

Spectrum analyser settings for radiated measurements within restricted bands below 1 GHz:

Resolution bandwidth:	100 kHz
Video bandwidth:	300 kHz
Detector mode:	Peak
Trace mode:	Max Hold

Spectrum analyser settings for peak radiated measurements within restricted bands above 1 GHz:

Resolution bandwidth:	1 MHz
Video bandwidth:	3 MHz
Detector mode:	Peak
Trace mode:	Max Hold

Spectrum analyser settings for average radiated measurements within restricted bands above 1 GHz:

Resolution bandwidth:	1 MHz
Video bandwidth:	10 Hz
Detector mode:	Peak
Trace mode:	Max Hold

8.8.4 Test data

Table 8.8-3: *Radiated field strength measurement results for Flat antenna, 6 MHz channel*

Channel	Frequency, MHz	Peak Field strength, dBµV/m		Margin, dB	Average Field strength, dBµV/m		Margin, dB
		Measured	Limit		Measured	Limit	
Low	1437.0	51.21	74.00	22.79	51.21	54.00	2.79
Mid	1636.0	50.48	74.00	23.52	50.48	54.00	3.52
High	1816.5	52.43	74.00	21.57	52.43	54.00	1.57

Table 8.8-4: *Radiated field strength measurement results for Flat antenna, 12 MHz channel*

Channel	Frequency, MHz	Peak Field strength, dBµV/m		Margin, dB	Average Field strength, dBµV/m		Margin, dB
		Measured	Limit		Measured	Limit	
Low	1448.0	48.91	74.00	25.09	48.91	54.00	5.09
Mid	1628.0	47.41	74.00	26.59	47.41	54.00	6.59
High	1805.0	51.23	74.00	22.77	51.23	54.00	2.77

Table 8.8-5: *Radiated field strength measurement results for Flat antenna, 18 MHz channel*

Channel	Frequency, MHz	Peak Field strength, dBµV/m		Margin, dB	Average Field strength, dBµV/m		Margin, dB
		Measured	Limit		Measured	Limit	
Low	1451.0	46.51	74.00	27.49	46.51	54.00	7.49
Mid	1637.0	46.69	74.00	27.31	46.69	54.00	7.31
High	1793.0	46.46	74.00	27.54	46.46	54.00	7.54

Table 8.8-6: *Radiated field strength measurement results for Flat antenna, 24 MHz channel*

Channel	Frequency, MHz	Peak Field strength, dBµV/m		Margin, dB	Average Field strength, dBµV/m		Margin, dB
		Measured	Limit		Measured	Limit	
Low	1471.5	44.90	74.00	29.10	44.90	54.00	9.10
Mid	1633.0	44.43	74.00	29.57	44.43	54.00	9.57
High	1787.0	45.64	74.00	28.36	45.64	54.00	8.36

Table 8.8-7: *Radiated field strength measurement results for Log-P antenna, 6 MHz channel*

Channel	Frequency, MHz	Peak Field strength, dBµV/m		Margin, dB	Average Field strength, dBµV/m		Margin, dB
		Measured	Limit		Measured	Limit	
Low	1419.5	59.34	74.00	14.66	46.71	54.00	7.29
Mid	1635.0	49.71	74.00	24.29	49.71	54.00	4.29
High	1834.0	53.94	74.00	20.06	53.94	54.00	0.06

Table 8.8-8: *Radiated field strength measurement results for Log-P antenna, 12 MHz channel*

Channel	Frequency, MHz	Peak Field strength, dBµV/m		Margin, dB	Average Field strength, dBµV/m		Margin, dB
		Measured	Limit		Measured	Limit	
Low	1424.5	54.85	74.00	19.15	42.32	54.00	11.68
Mid	1626.5	45.75	74.00	28.25	45.75	54.00	8.25
High	1821.0	50.13	74.00	23.87	50.13	54.00	3.87

Table 8.8-9: *Radiated field strength measurement results for Log-P antenna, 18 MHz channel*

Channel	Frequency, MHz	Peak Field strength, dBµV/m		Margin, dB	Average Field strength, dBµV/m		Margin, dB
		Measured	Limit		Measured	Limit	
Low	1441.5	51.09	74.00	22.91	51.09	54.00	2.91
Mid	1637.0	44.78	74.00	29.22	44.78	54.00	9.22
High	1816.5	50.27	74.00	23.73	50.27	54.00	3.73

Table 8.8-10: *Radiated field strength measurement results for Log-P antenna, 24 MHz channel*

Channel	Frequency, MHz	Peak Field strength, dBµV/m		Margin, dB	Average Field strength, dBµV/m		Margin, dB
		Measured	Limit		Measured	Limit	
Low	1453.5	49.66	74.00	24.34	49.66	54.00	4.34
Mid	1629.5	43.72	74.00	30.28	43.72	54.00	10.28
High	1807.5	45.38	74.00	28.62	45.38	54.00	8.62

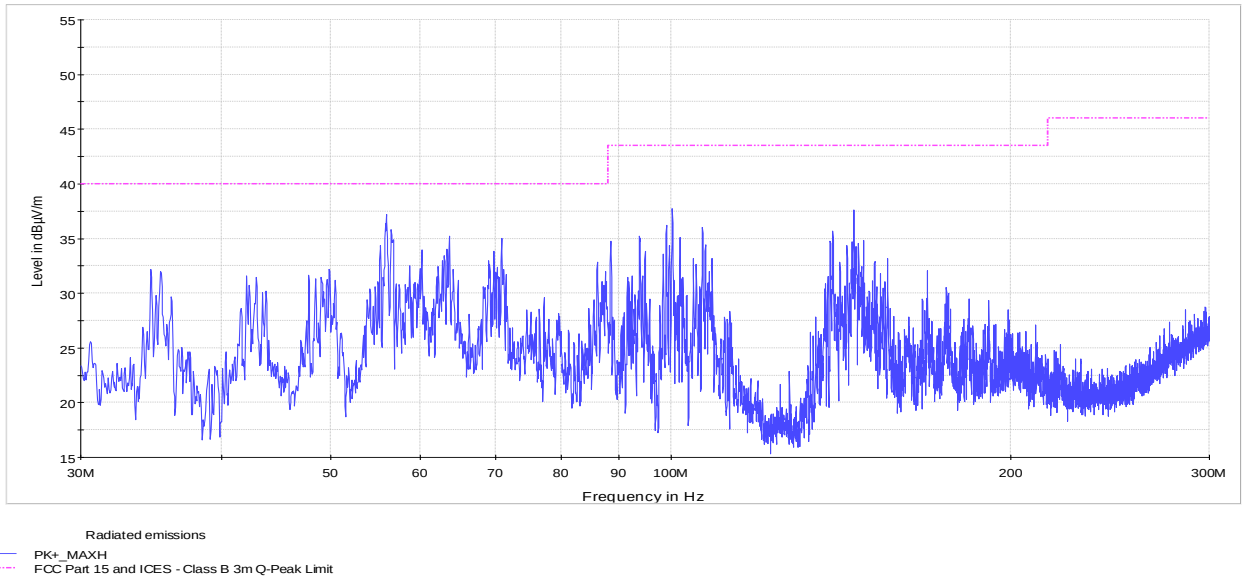


Figure 8.8-1: *Radiated spurious emissions below 300 MHz with Flat antenna, sample plot*

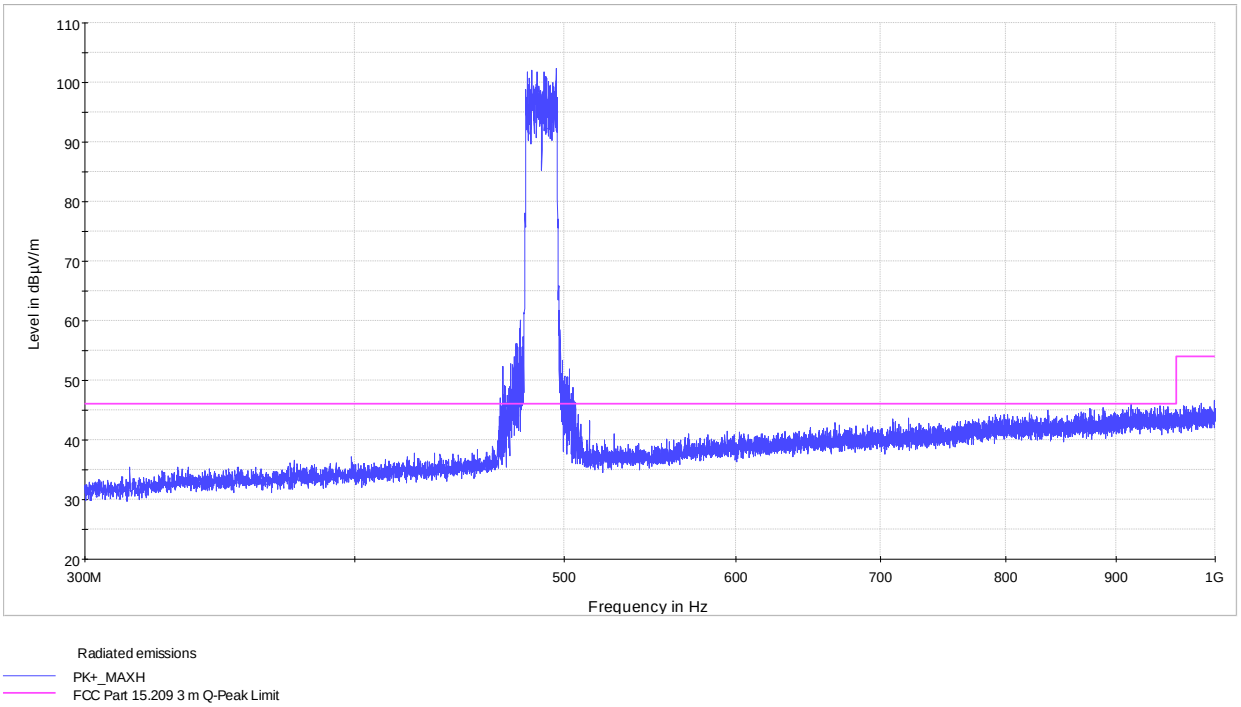


Figure 8.8-2: *Radiated spurious emissions within 300–1000 MHz with Flat antenna, sample plot*

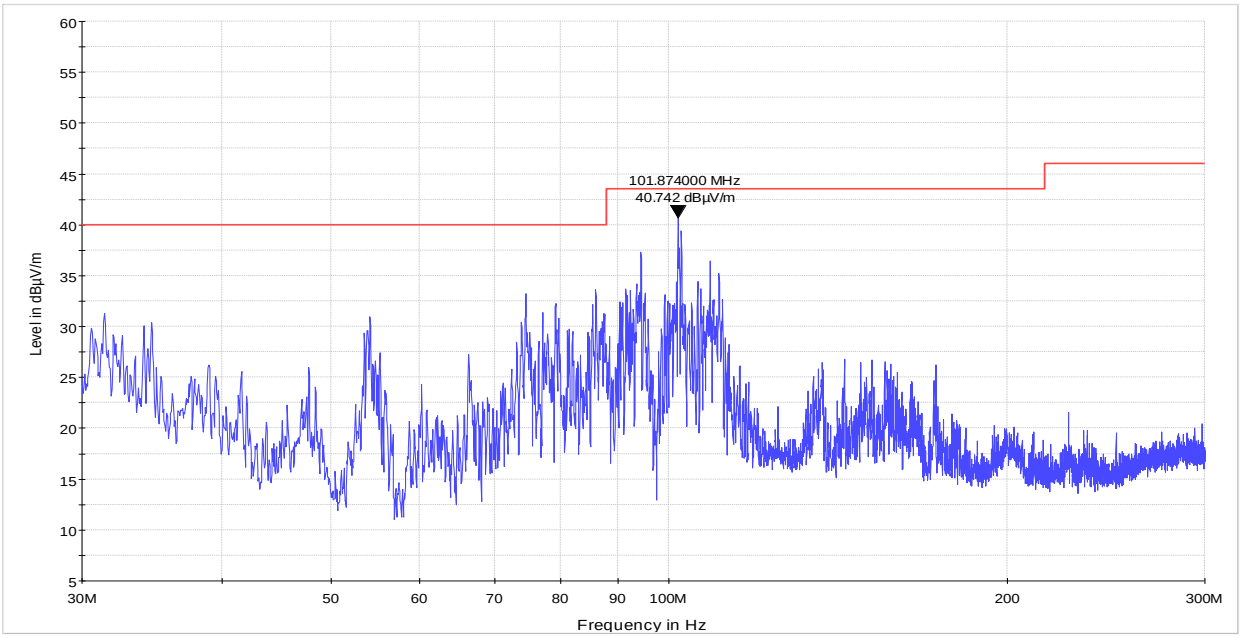


Figure 8.8-3: *Radiated spurious emissions below 300 MHz with Log-P antenna, sample plot*

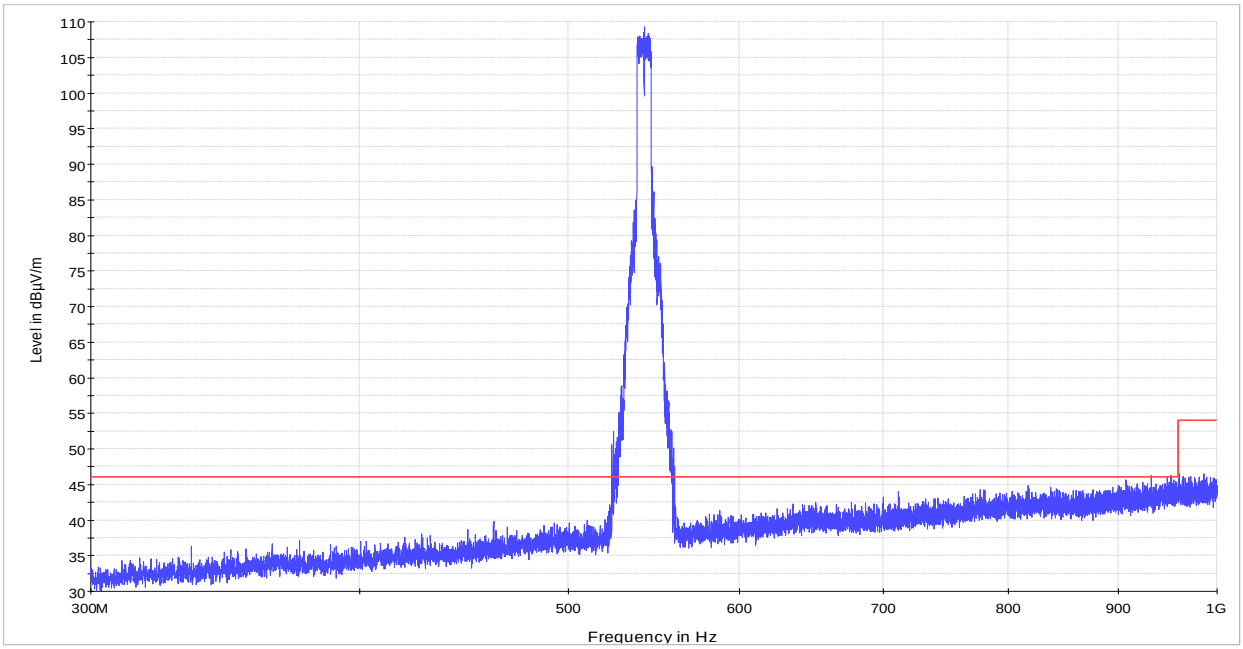


Figure 8.8-4: *Radiated spurious emissions within 300–1000 MHz with Log-P antenna, sample plot*

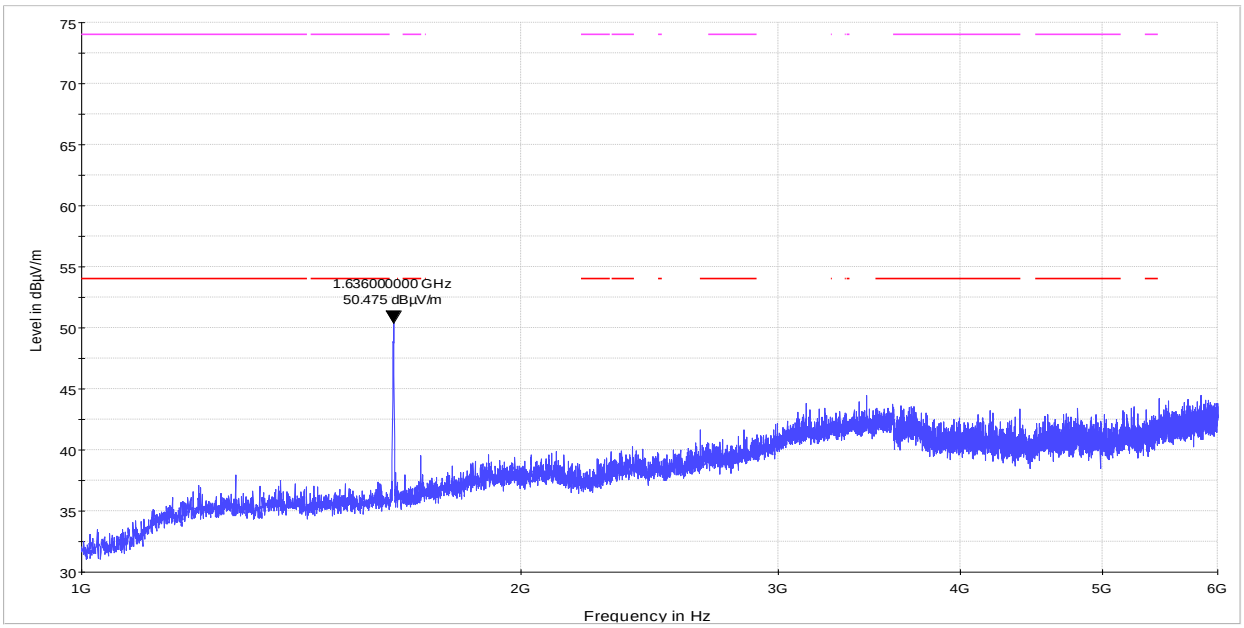


Figure 8.8-5: *Radiated spurious emissions above 1 GHz with Flat antenna, sample plot*

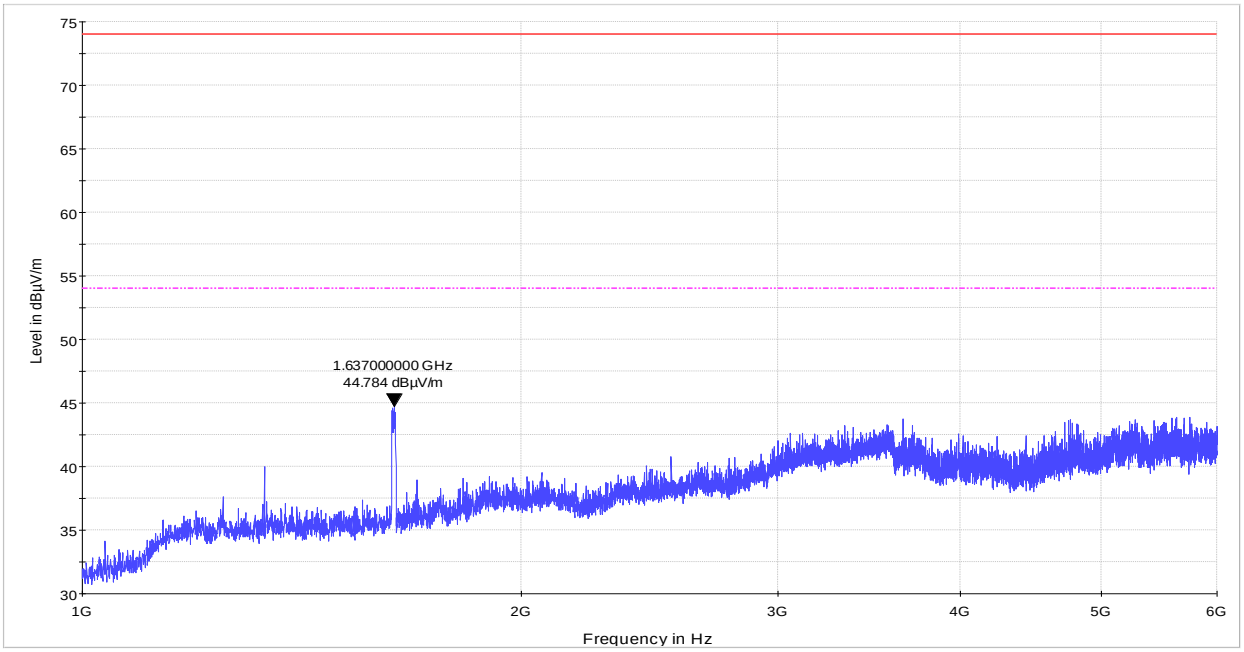
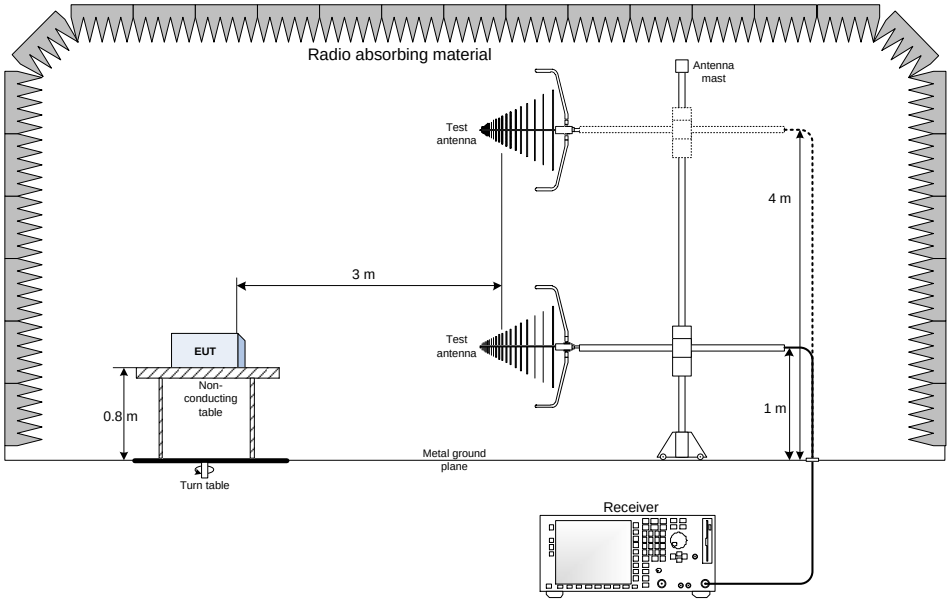


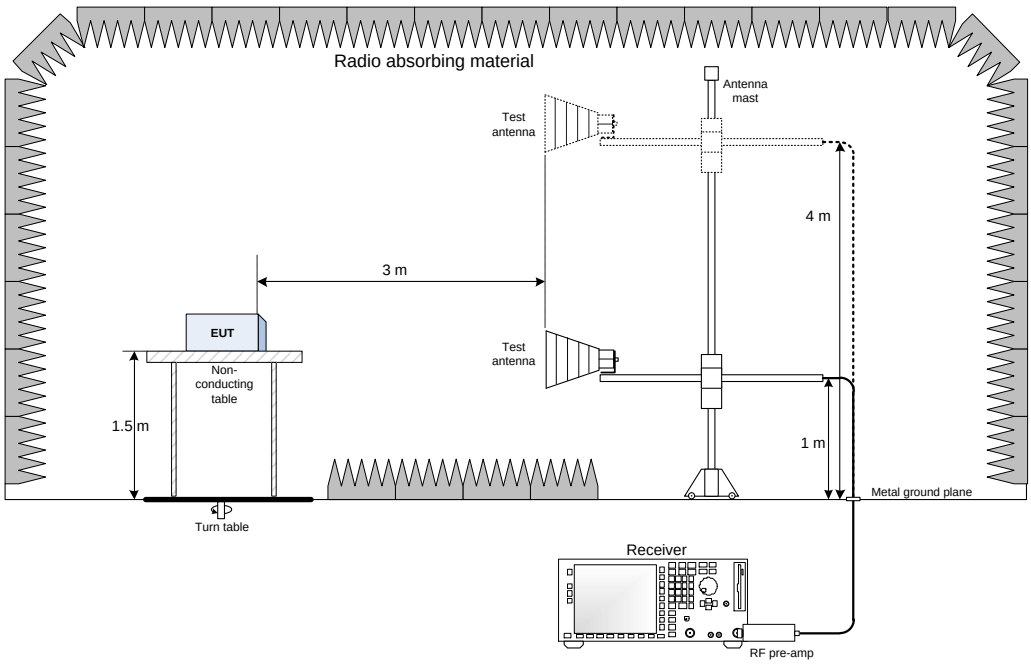
Figure 8.8-6: *Radiated spurious emissions above 1 GHz with Log-P antenna, sample plot*

Section 9. Block diagrams of test set-ups

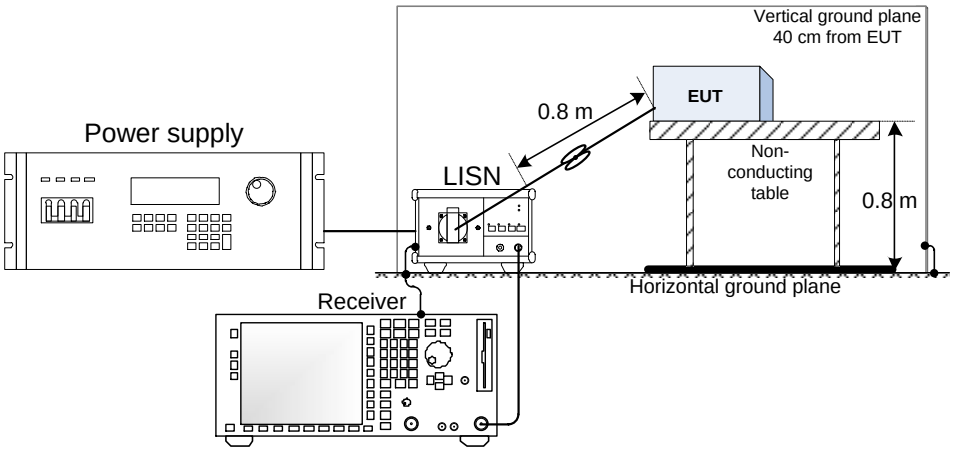
9.1 Radiated emissions set-up for frequencies below 1 GHz



9.2 Radiated emissions set-up for frequencies above 1 GHz



9.3 Conducted emissions set-up



9.4 Antenna port set-up