

Appendix D: Test results 5.47 GHz – 5.725 GHz Band

Appendix D Content

DESCRIPTION OF TEST CONDITIONS	93
TEST D.1: 26DB EMISSION BANDWIDTH AND OCCUPIED BANDWIDTH	94
TEST D.2: 6DB EMISSION BANDWIDTH	101
TEST D.3: POWER LIMITS. MAXIMUM OUTPUT POWER	106
TEST D.4: POWER SPECTRAL DENSITY	110
TEST D.5: BAND-EDGE EMISSIONS COMPLIANCE (TRANSMITTER).....	116
TEST D.6: EMISSION LIMITATIONS CONDUCTED (TRANSMITTER).....	121
TEST D.7: UNDESIRABLE RADIATED EMISSIONS (TRANSMITTER)	124

DESCRIPTION OF TEST CONDITIONS

TEST CONDITIONS	DESCRIPTION
TC#01 ⁽¹⁾ (a mode)	<u>Power supply (V):</u> $V_{\text{nominal}} = 3.3 \text{ Vdc}$ <u>Test Frequencies for Conducted/Radiated tests (20 MHz):</u> Lowest channel: 5500 MHz Middle channel: 5600 MHz Highest channel: 5700 MHz
TC#02 ⁽¹⁾ (n mode)	<u>Power supply (V):</u> $V_{\text{nominal}} = 3.3 \text{ Vdc}$ <u>Test Frequencies for Conducted/Radiated tests (20 MHz):</u> Lowest channel: 5500 MHz Middle channel: 5600 MHz Highest channel: 5700 MHz

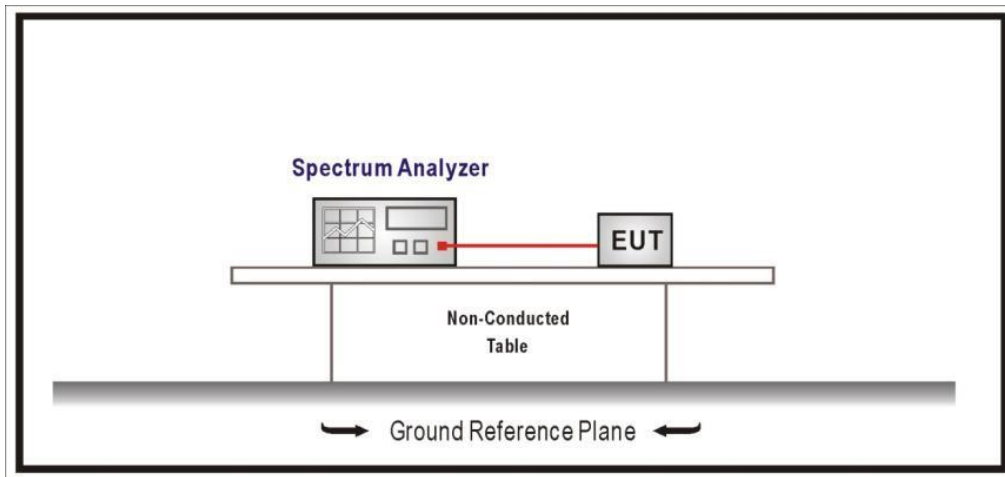
Note (1): For spurious emissions for OFDM modes 802.11a and 802.11n20 a preliminary scan was performed to determine the worst case.
 The data rates of 6Mb/s for 802.11a, HT0 (SISO) for 802.11n20 were selected based on preliminary testing that identified those rates corresponding to the worst cases.

TEST D.1: 26DB EMISSION BANDWIDTH AND OCCUPIED BANDWIDTH

LIMITS:	Product standard:	Part 15 Subpart C §15.403 and RSS-247
	Test standard:	Part 15 Subpart C §15.403 and RSS-247 6.2.1

No requirements requested

TEST SETUP:



TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#01 (a mode)
TEST RESULTS:	PASS

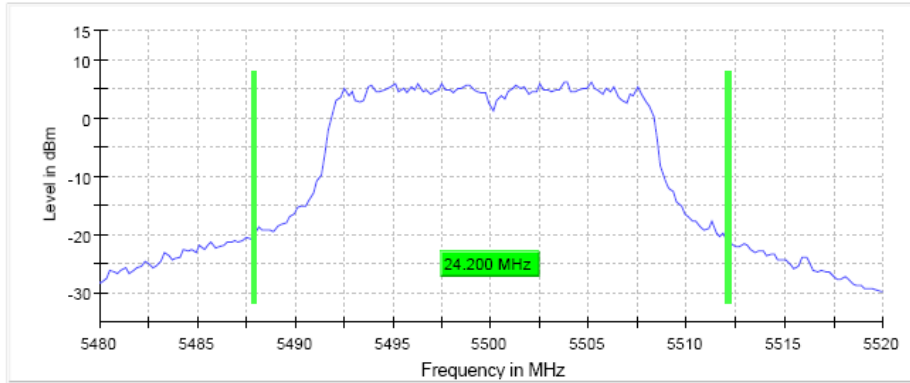
Bandwidth: 20 MHz

	Lowest frequency	Middle frequency	Highest frequency
	5500 MHz	5600 MHz	5700 MHz
26dB Bandwidth (MHz)	24.2	23.4	22.8
Occupied bandwidth (MHz)	16.8	16.6	16.6
Measurement uncertainty (kHz)	<± 8.33		

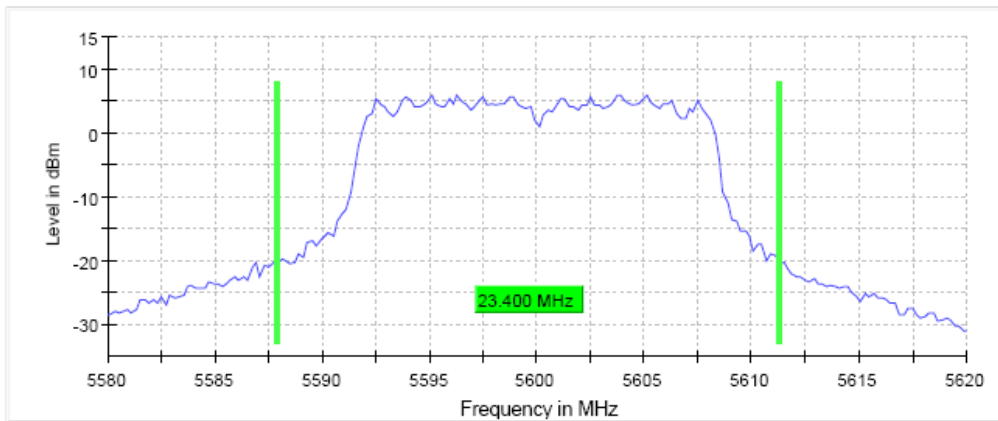
TEST RESULTS (Cont.):

26 dB BANDWIDTH

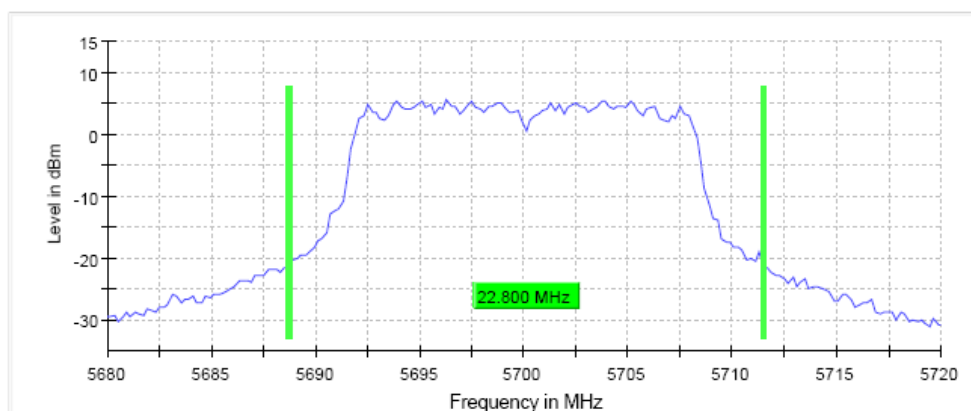
Lowest Channel

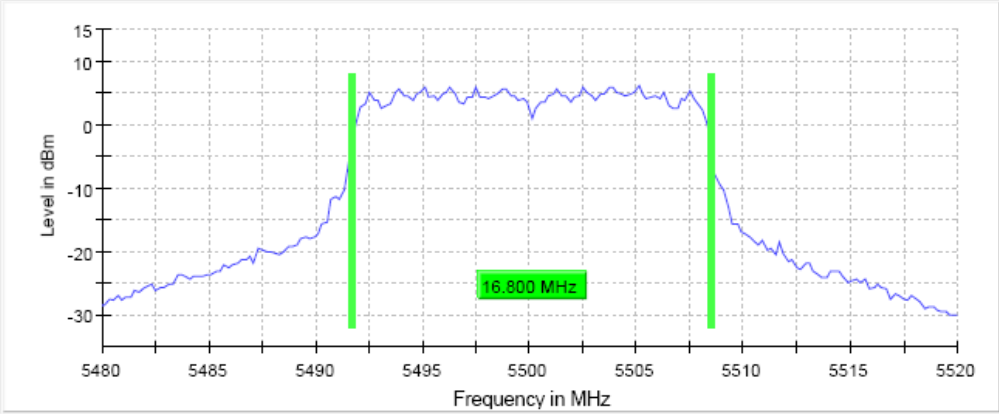
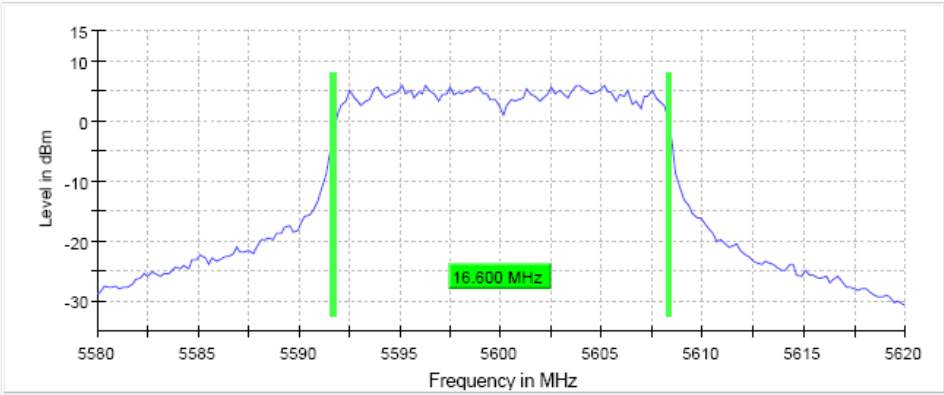
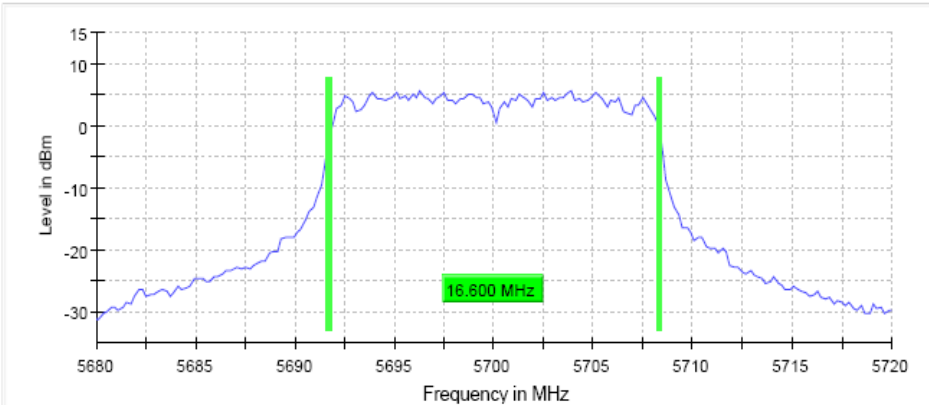


Middle Channel



Highest Channel



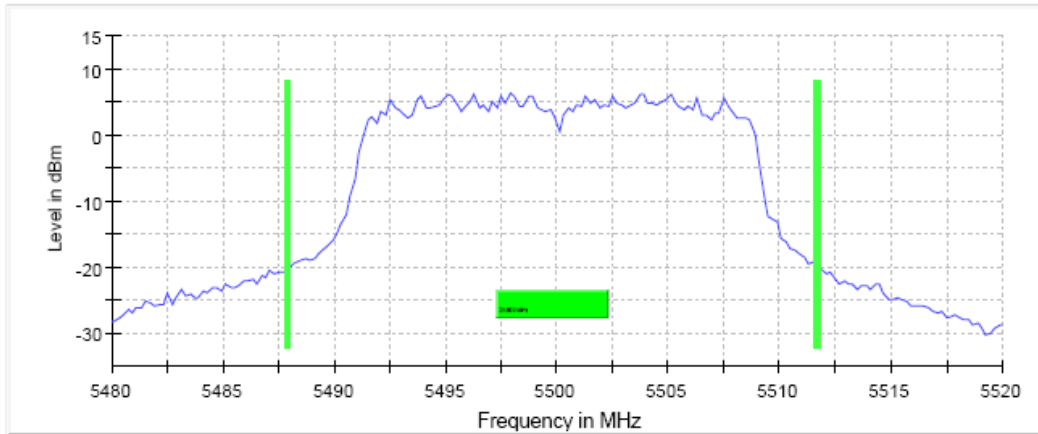
TEST RESULTS (Cont.):	OCCUPIED BANDWIDTH
<p>Lowest Channel</p> 	
<p>Middle Channel</p> 	
<p>Highest Channel</p> 	

TEST RESULTS (Cont.)				
Measurement				
	Setting	Instrument Value	Instrument Value	Instrument Value
	Start Frequency	5.48000 GHz	5.58000 GHz	5.68000 GHz
	Stop Frequency	5.52000 GHz	5.62000 GHz	5.72000 GHz
	Span	40.000 MHz	40.000 MHz	40.000 MHz
	RBW	200.000 kHz	200.000 kHz	200.000 kHz
	VBW	1.000 MHz	1.000 MHz	1.000 MHz
	SweepPoints	200	200	200
	Sweeptime	28.443 μ s	28.443 μ s	28.443 μ s
	Reference Level	20.000 dBm	20.000 dBm	20.000 dBm
	Attenuation	40.000 dB	40.000 dB	40.000 dB
	Detector	MaxPeak	MaxPeak	MaxPeak
	SweepCount	200	200	200
	Filter	3 dB	3 dB	3 dB
	Trace Mode	Max Hold	Max Hold	Max Hold
	Sweeptype	FFT	FFT	FFT
	Preamp	off	off	off
	Stablemode	Trace	Trace	Trace
	Stablevalue	0.30 dB	0.30 dB	0.30 dB
	Run	53 / max. 150	42 / max. 150	35 / max. 150
	Stable	5 / 5	5 / 5	5 / 5
	Max Stable Difference	0.14 dB	0.26 dB	0.00 dB
TESTED SAMPLES:		S/01		
TESTED CONDITIONS MODES:		TC#02 (n Mode)		
TEST RESULTS:		PASS		
Bandwidth: 20 MHz				
		Lowest frequency	Middle frequency	Highest frequency
		5500 MHz	5600 MHz	5700 MHz
	26dB bandwidth (MHz)	23.8	22.2	22.4
	Occupied bandwidth (MHz)	17.8	17.8	17.8
	Measurement uncertainty (kHz)	<± 8.33		

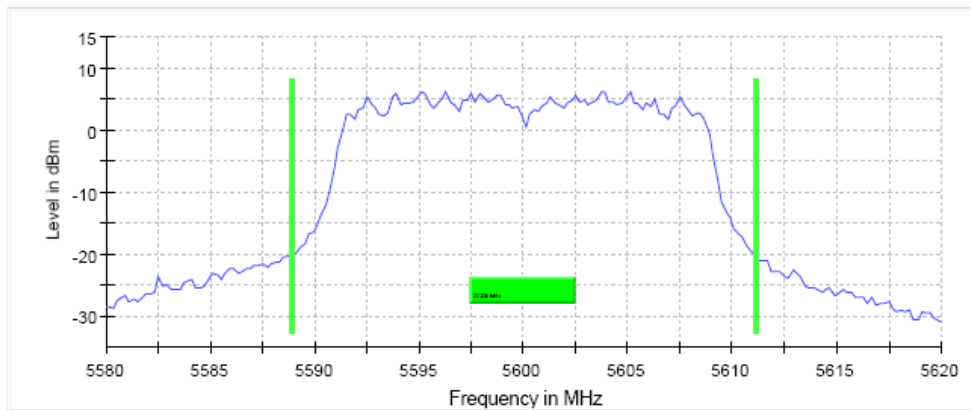
TEST RESULTS (Cont.):

26 dB BANDWIDTH

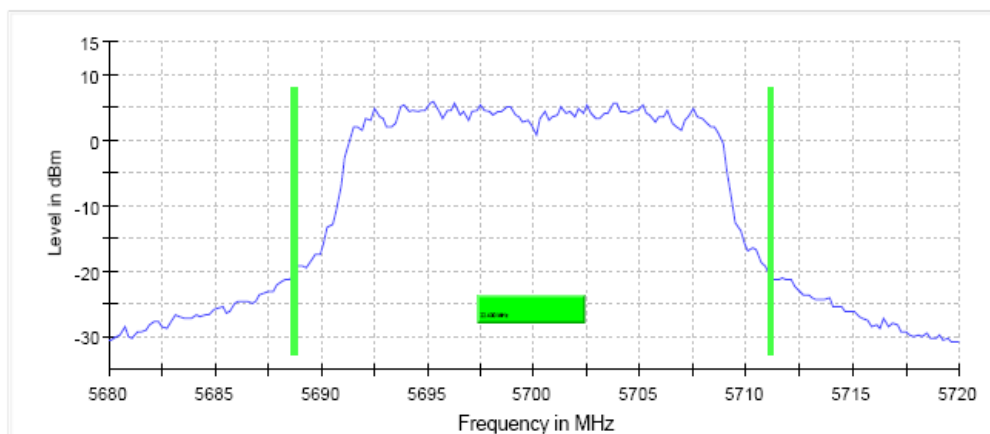
Lowest Channel



Middle Channel



Highest Channel



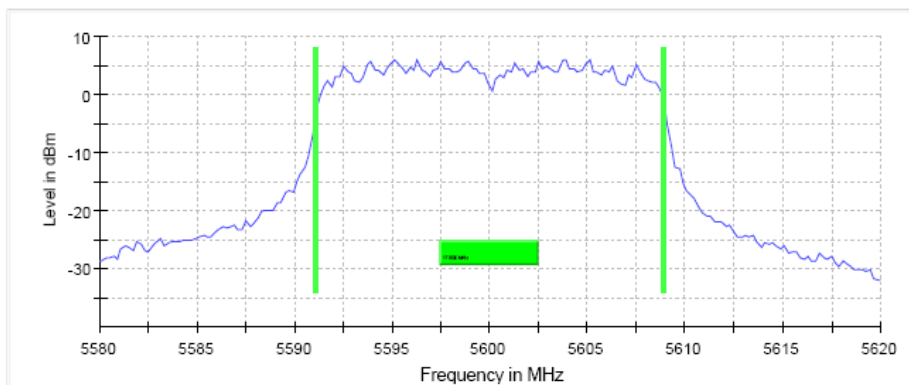
TEST RESULTS (Cont.):

OCCUPIED BANDWIDTH

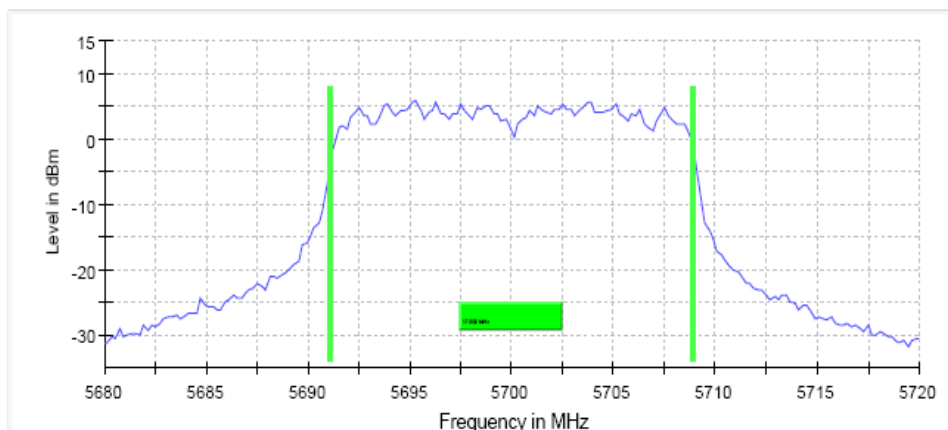
Lowest Channel



Middle Channel



Highest Channel



TEST RESULTS (Cont.)

Measurement

Setting	Instrument Value	Instrument Value	Instrument Value
Start Frequency	5.48000 GHz	5.58000 GHz	5.68000 GHz
Stop Frequency	5.52000 GHz	5.62000 GHz	5.72000 GHz
Span	40.000 MHz	40.000 MHz	40.000 MHz
RBW	200.000 kHz	200.000 KHz	200.000 kHz
VBW	1.000 MHz	1.000 MHz	1.000 MHz
SweepPoints	200	200	200
Sweeptime	28.443 μ s	28.443 μ s	28.443 μ s
Reference Level	20.000 dBm	20.000 dBm	20.000 dBm
Attenuation	40.000 dB	40.000 dB	40.000 dB
Detector	MaxPeak	MaxPeak	MaxPeak
SweepCount	200	200	200
Filter	3 dB	3 dB	3 dB
Trace Mode	Max Hold	Max Hold	Max Hold
Sweeptype	FFT	FFT	FFT
Preamplifier	off	off	off
Stablemode	Trace	Trace	Trace
Stablevalue	0.30 dB	0.30 dB	0.30 dB
Run	48 / max. 150	101 / max. 150	66 / max. 150
Stable	5 / 5	5 / 5	5 / 5
Max Stable Difference	0.18 dB	0.03 dB	0.15 dB

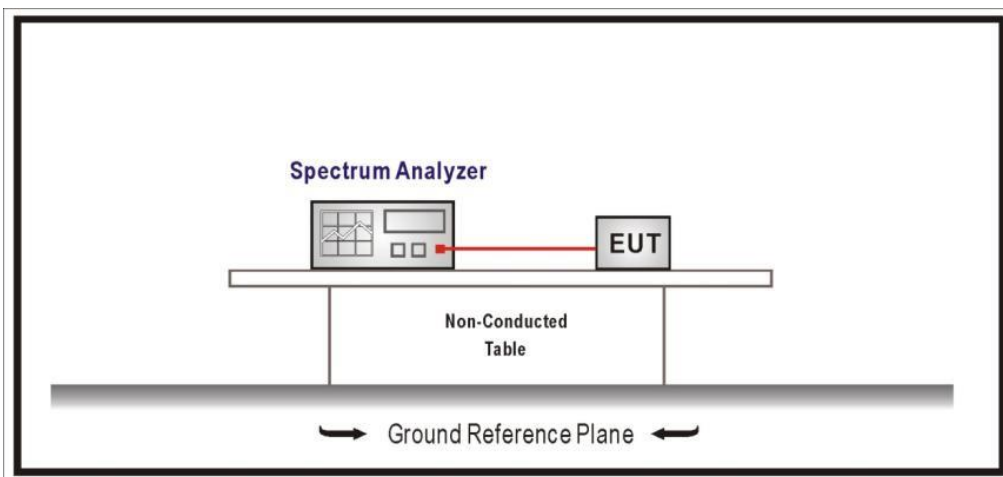
TEST D.2: 6DB EMISSION BANDWIDTH

LIMITS:	Product standard:	Part 15 Subpart C §15.407 and RSS-247
	Test standard:	Part 15 Subpart C §15.407(e) and RSS-247 6.2.4.1

LIMITS:

Within the 5.725 – 5.85 GHz band, the minimum 6dB bandwidth of U-NII devices shall be at least 500 KHz.

TEST SETUP:



TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#01 (a mode)
TEST RESULTS:	PASS

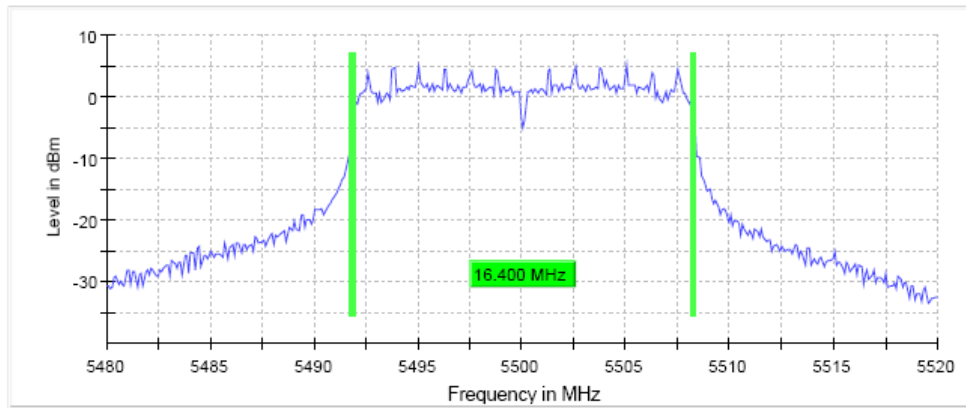
Bandwidth: 20 MHz

	Lowest frequency	Middle frequency	Highest frequency
	5500 MHz	5600 MHz	5700 MHz
6dB Bandwidth (MHz)	16.4	16.4	16.4
Measurement uncertainty (kHz)	<± 8.33		

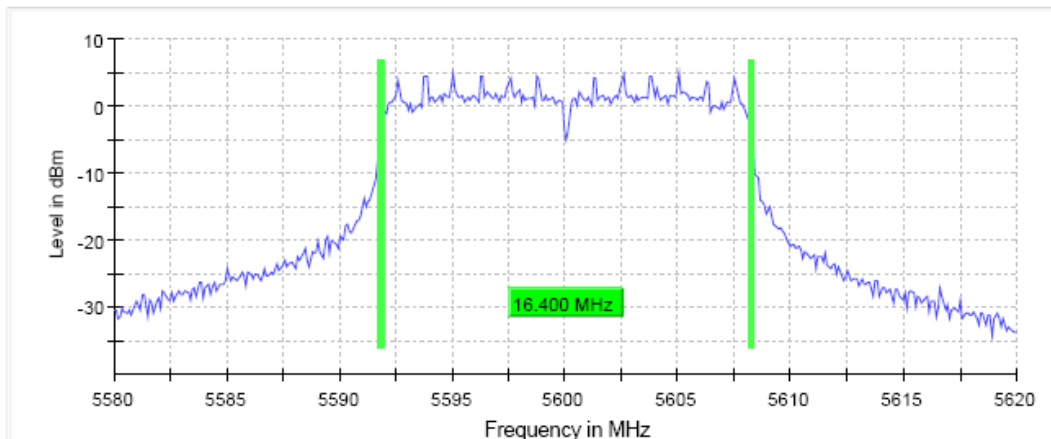
TEST RESULTS (Cont.):

6 dB BANDWIDTH

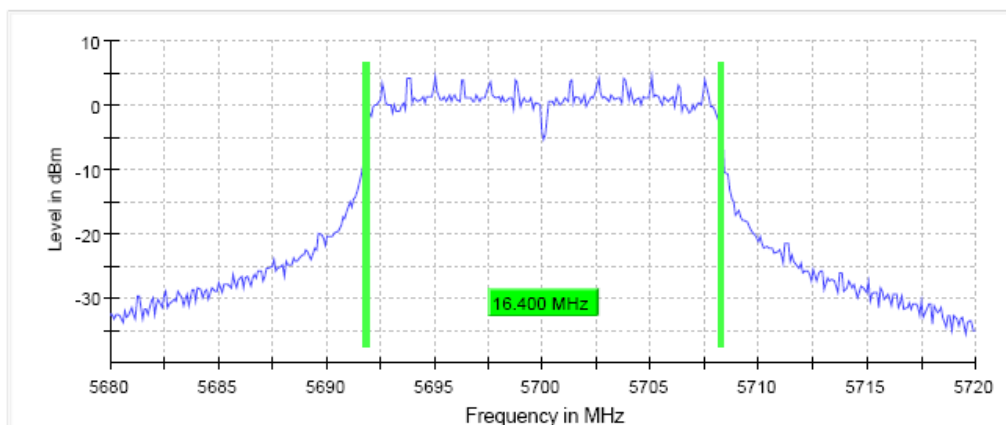
Lowest Channel



Middle Channel



Highest Channel



TEST RESULTS (Cont.)**Measurement**

Setting	Instrument Value	Instrument Value	Instrument Value
Start Frequency	5.48000 GHz	5.58000 GHz	5.68000 GHz
Stop Frequency	5.52000 GHz	5.62000 GHz	5.72000 GHz
Span	40.000 MHz	40.000 MHz	40.000 MHz
RBW	100.000 kHz	100.000 kHz	100.000 kHz
VBW	300.000 kHz	300.000 kHz	300.000 kHz
SweepPoints	400	400	400
SweepTime	56.886 μs	56.886 μs	56.886 μs
Reference Level	20.000 dBm	20.000 dBm	20.000 dBm
Attenuation	40.000 dB	40.000 dB	40.000 dB
Detector	MaxPeak	MaxPeak	MaxPeak
SweepCount	200	200	200
Filter	3 dB	3 dB	3 dB
Trace Mode	Max Hold	Max Hold	Max Hold
SweepType	FFT	FFT	FFT
Preamp	off	off	off
Stablemode	Trace	Trace	Trace
Stablevalue	0.30 dB	0.30 dB	0.30 dB
Run	74 / max. 150	63 / max. 150	75 / max. 150
Stable	5 / 5	5 / 5	5 / 5
Max Stable Difference	0.19 dB	0.11 dB	0.05 dB

TESTED SAMPLES:

S/01

TESTED CONDITIONS MODES:

TC#02 (n Mode)

TEST RESULTS:

PASS

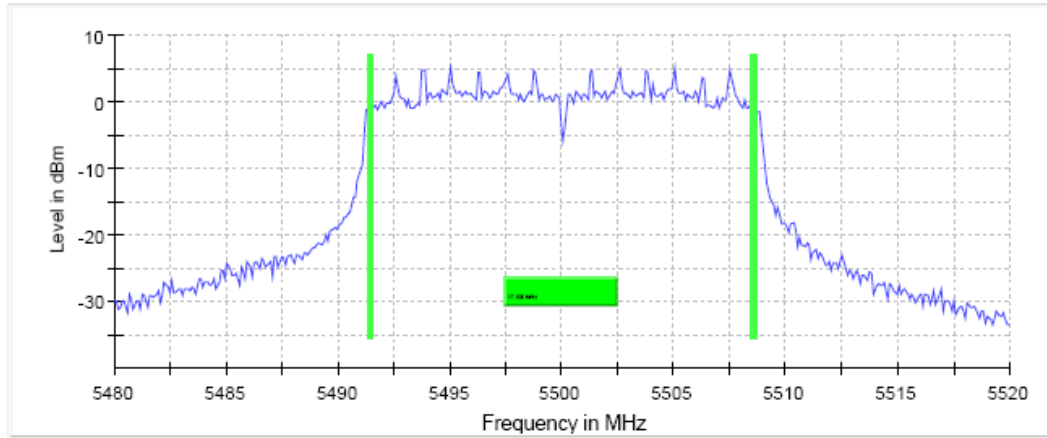
Bandwidth: 20 MHz

	Lowest frequency	Middle frequency	Highest frequency
	5500 MHz	5600 MHz	5700 MHz
6dB bandwidth (MHz)	17.1	16.4	17.1
Measurement uncertainty (kHz)	<± 8.33		

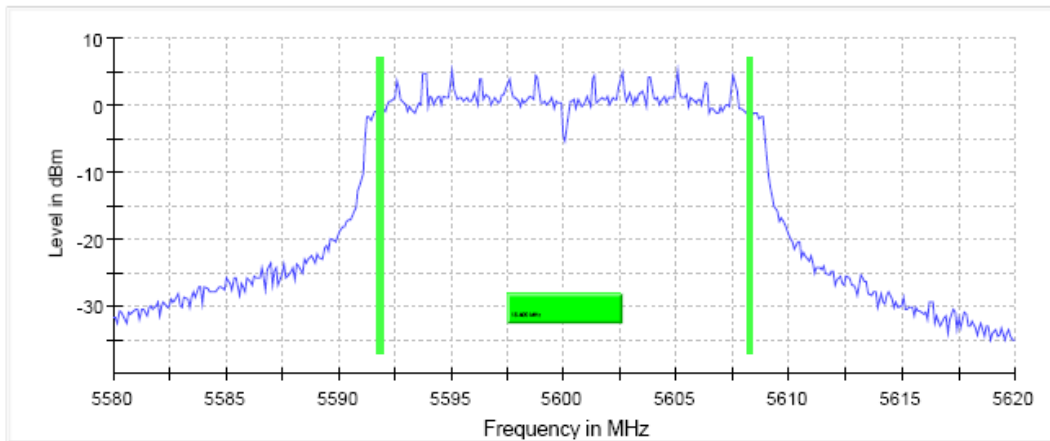
TEST RESULTS (Cont.):

6 dB BANDWIDTH

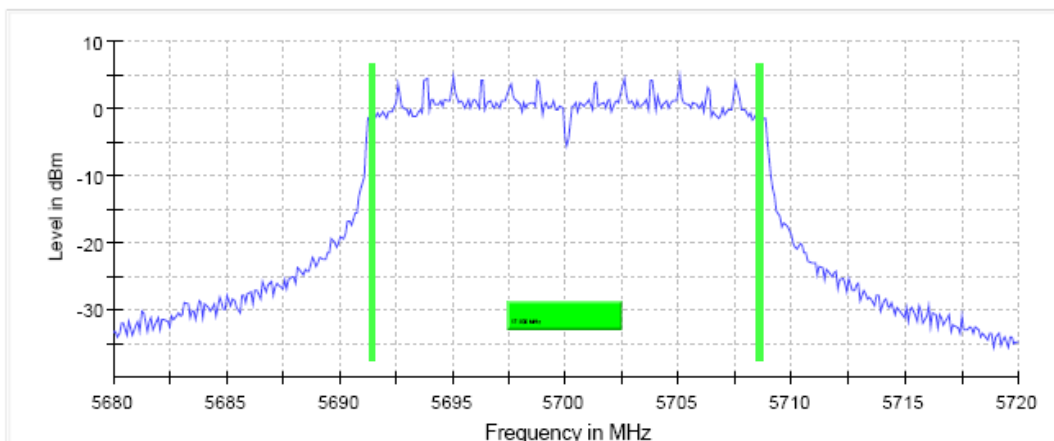
Lowest Channel



Middle Channel



Highest Channel



TEST RESULTS (Cont.)

Measurement

Setting	Instrument Value	Instrument Value	Instrument Value
Start Frequency	5.48000 GHz	5.58000 GHz	5.68000 GHz
Stop Frequency	5.52000 GHz	5.62000 GHz	5.72000 GHz
Span	40.000 MHz	40.000 MHz	40.000 MHz
RBW	100.000 kHz	100.000 kHz	100.000 kHz
VBW	300.000 kHz	300.000 kHz	300.000 kHz
SweepPoints	400	400	400
SweepTime	56.886 μ s	56.886 μ s	56.886 μ s
Reference Level	10.000 dBm	10.000 dBm	20.000 dBm
Attenuation	30.000 dB	30.000 dB	40.000 dB
Detector	MaxPeak	MaxPeak	MaxPeak
SweepCount	200	200	200
Filter	3 dB	3 dB	3 dB
Trace Mode	Max Hold	Max Hold	Max Hold
SweepType	FFT	FFT	FFT
Preamp	off	off	off
Stablemode	Trace	Trace	Trace
Stablevalue	0.30 dB	0.30 dB	0.30 dB
Run	32 / max. 150	73 / max. 150	57 / max. 150
Stable	5 / 5	5 / 5	5 / 5
Max Stable Difference	0.28 dB	0.04 dB	0.02 dB

TEST D.3: POWER LIMITS. MAXIMUM OUTPUT POWER

LIMITS:	Product standard:	Part 15 Subpart C §15.407 and RSS-247
	Test standard:	Part 15 Subpart C §15.407(a) (1) (4) and RSS-247 6.2.1.1

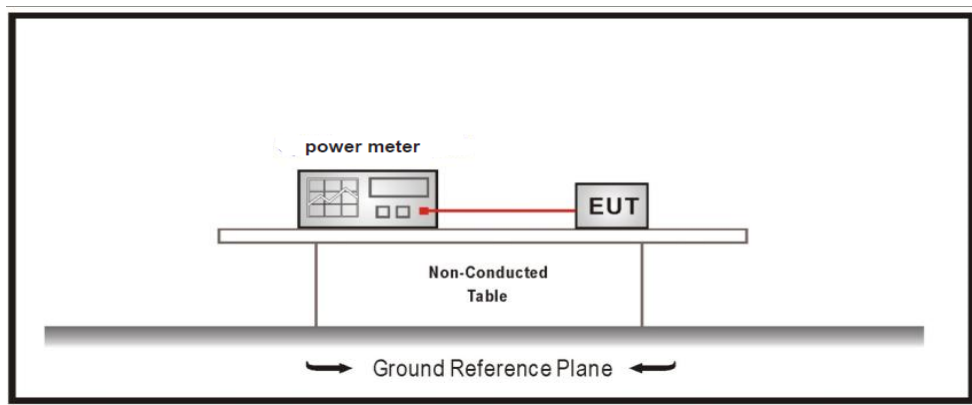
LIMITS

In band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

TEST SETUP

Measured according to ANSI C63.10, Section 11.9.2.3.2 Method AVGPM-G

The EIRP power (dBm) is calculated by adding the declared maximum antenna gain to the measured conducted power



TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#01 (a mode)
TEST RESULTS:	PASS

Bandwidth: 20 MHz

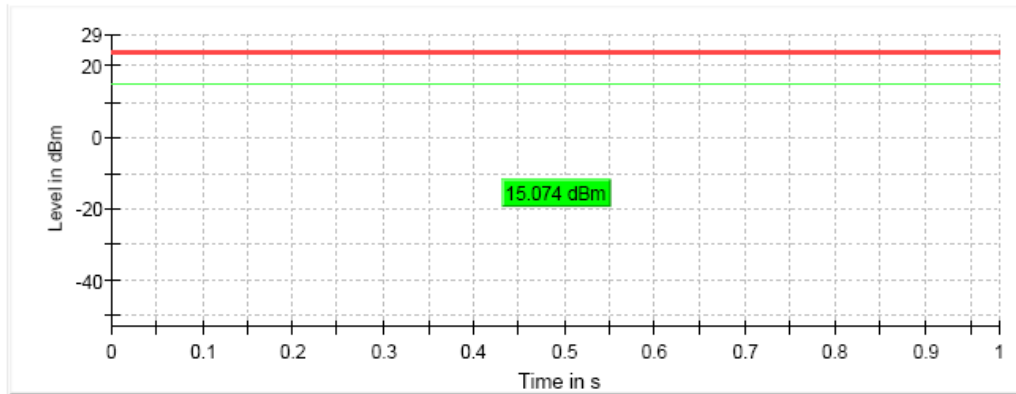
Maximum declared antenna gain: 4.5 dBi

	Lowest frequency 5500 MHz	Middle frequency 5600 MHz	Highest frequency 5700 MHz
Maximum conducted power (dBm)	15.1	15	15
Maximum EIRP power (dBm)	19.6	19.5	19.5
Measurement uncertainty (dB)	<±0.78		

The maximum directional gain of the antenna is less than 6 dBi and therefore the maximum output power is not required to be reduced from the stated values.

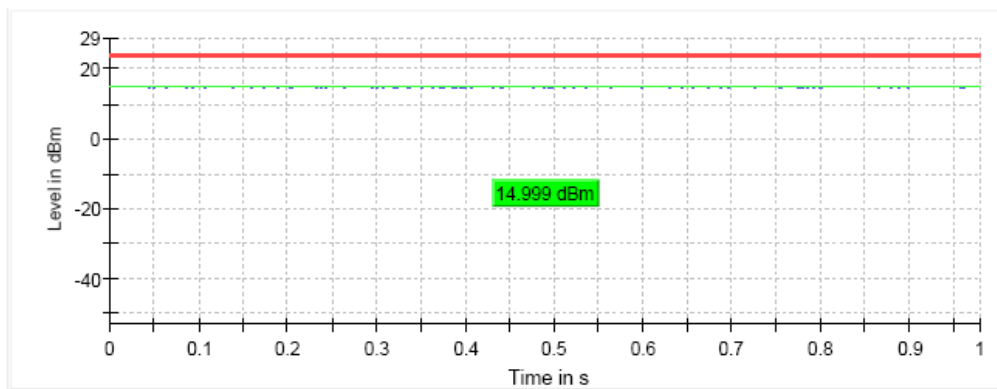
TEST RESULTS (Cont.):	CONDUCTED OUTPUT POWER
------------------------------	-------------------------------

Lowest Channel



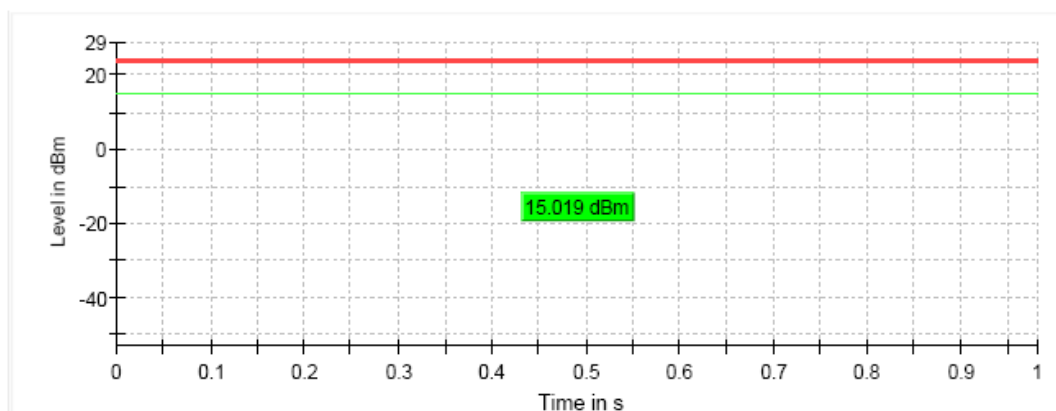
— Gated Trace — Overall — Limit

Middle Channel



— Gated Trace — Overall — Limit

Highest Channel



— Gated Trace — Overall — Limit

TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#02 (n mode)
TEST RESULTS:	PASS

Bandwidth: 20 MHz

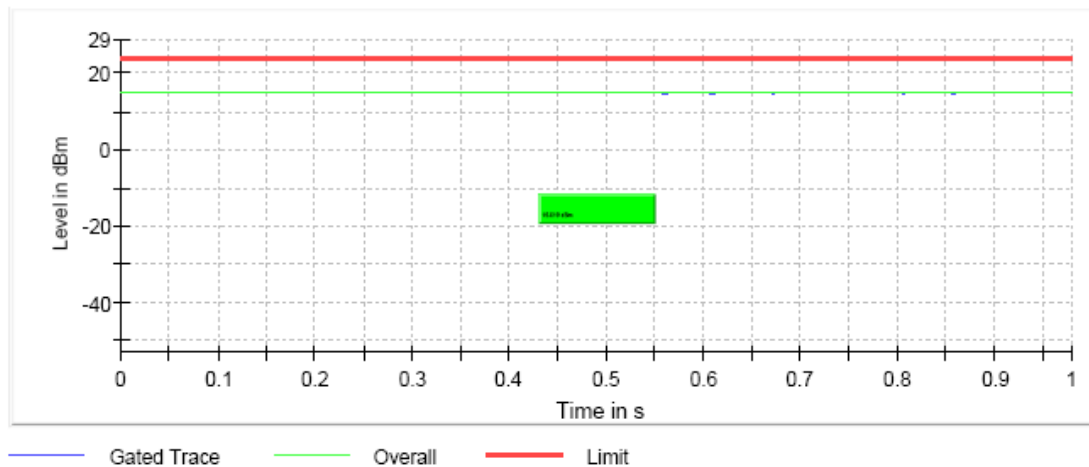
Maximum declared antenna gain: 4.5 dBi

	Lowest frequency 5500 MHz	Middle frequency 5600 MHz	Highest frequency 5700 MHz
Maximum conducted power (dBm)	15	14.8	15
Maximum EIRP power (dBm)	19.5	19.3	19.5
Measurement uncertainty (dB)	<±0.78		

The maximum directional gain of the antenna is less than 6 dBi and therefore the maximum output power is not required to be reduced from the stated values.

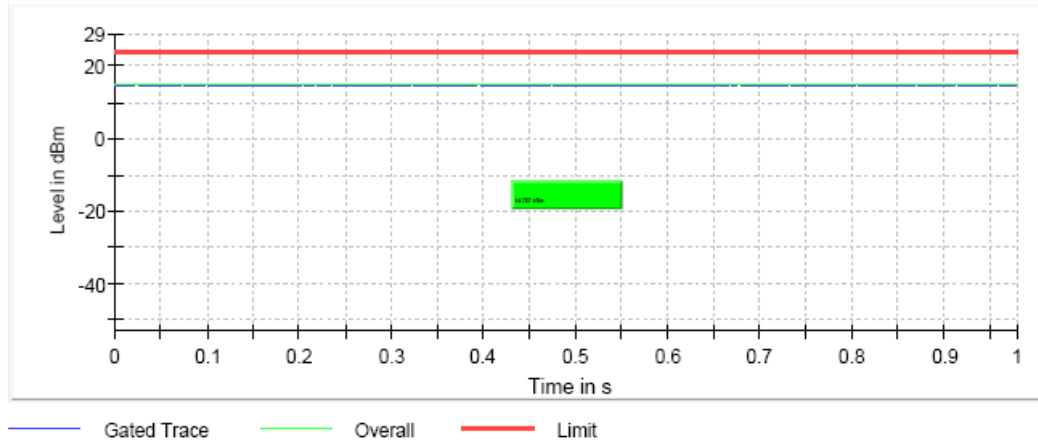
TEST RESULTS (Cont.):	CONDUCTED OUTPUT POWER
------------------------------	-------------------------------

Lowest Channel

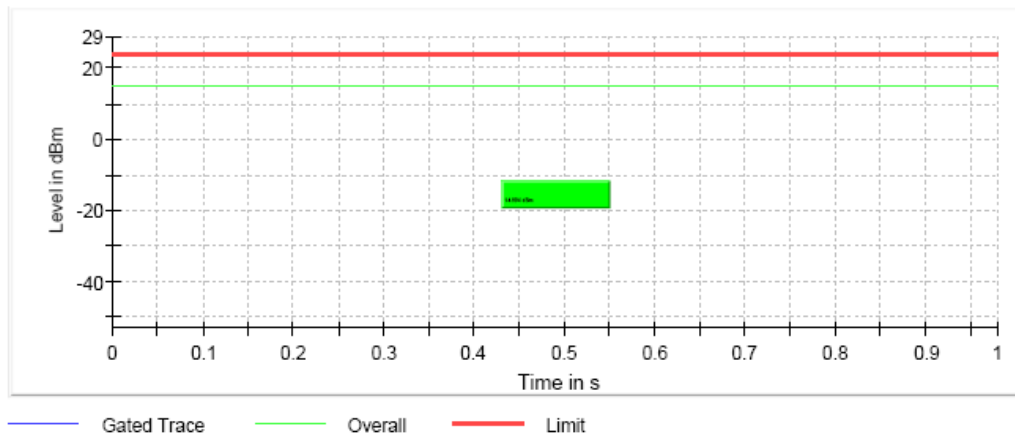


TEST RESULTS (Cont.)

Middle Channel



Highest Channel



TEST D.4: POWER SPECTRAL DENSITY

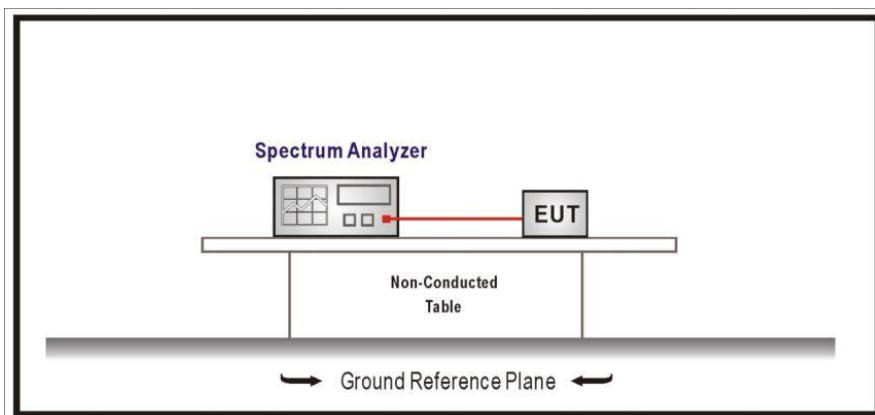
LIMITS:	Product standard:	Part 15 Subpart C §15.407 and RSS-247
	Test standard:	Part 15 Subpart C §15.407(a) (1) (5) and RSS-247 6.2.1.1

LIMITS

In the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

TEST SETUP

For all modes, the maximum power spectral density level in the fundamental emission was measured using the method according to point F) (Method SA-1) of Guidance 789033 D02 General UNII Test Procedures New Rules v01.



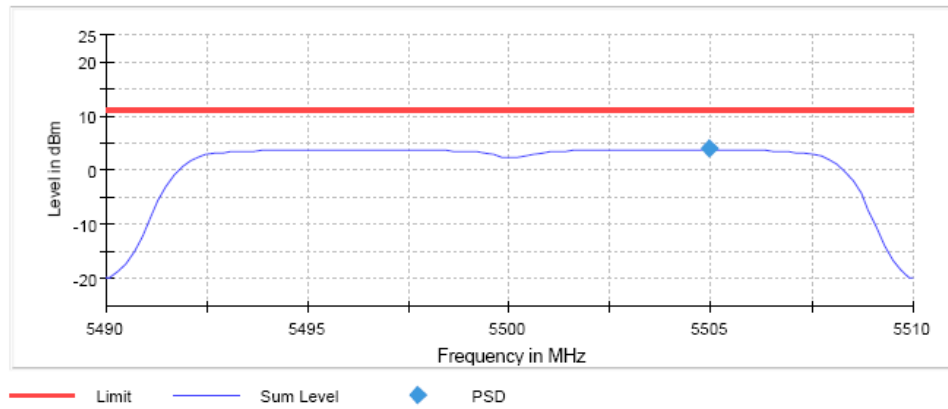
TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#01 (a mode)
TEST RESULTS:	PASS

Bandwidth: 20 MHz

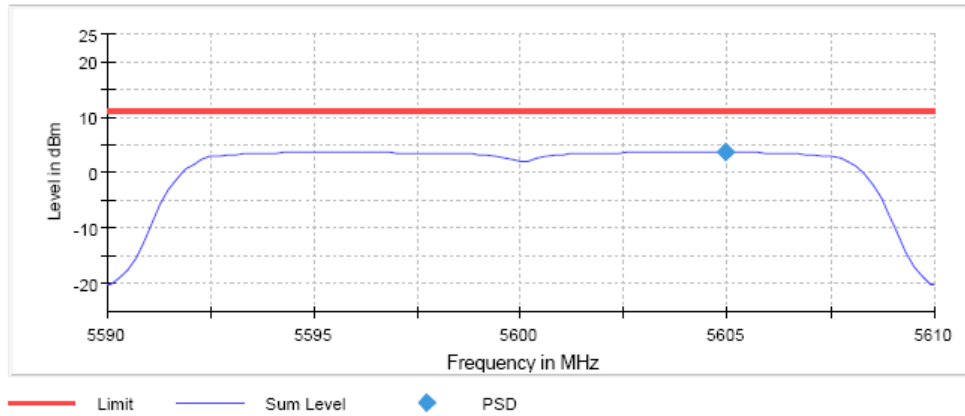
	Lowest frequency	Middle frequency	Highest frequency
	5500 MHz	5600 MHz	5700 MHz
Power spectral density (dBm)	3.844	3.706	3.388
Measurement uncertainty (dB)	<±0.78		

TEST RESULTS (Cont.):

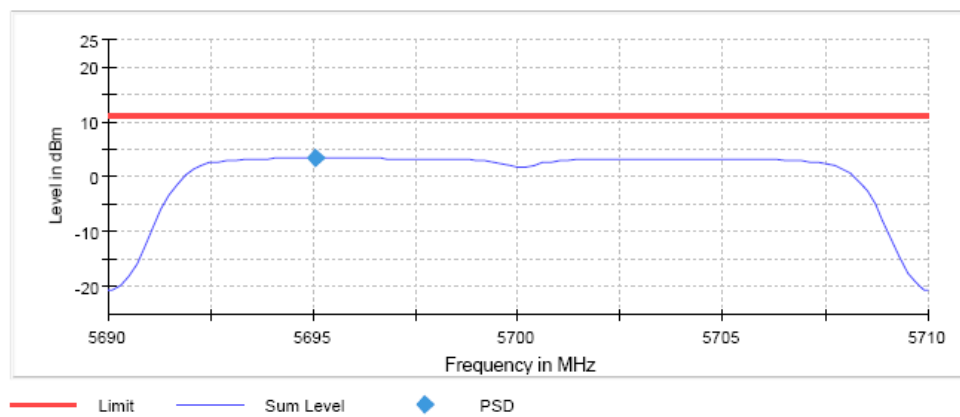
Low Channel



Middle Channel



High Channel



TEST RESULTS (Cont.):

Measurement

Setting	Instrument Value	Instrument Value	Instrument Value
Start Frequency	5.49000 GHz	5.59000 GHz	5.69000 GHz
Stop Frequency	5.51000 GHz	5.61000 GHz	5.71000 GHz
Span	20.000 MHz	20.000 MHz	20.000 MHz
RBW	1.000 MHz	1.000 MHz	1.000 MHz
VBW	3.000 MHz	3.000 MHz	3.000 MHz
SweepPoints	101	101	101
Sweeptime	2.020 s	2.020 s	2.020 s
Reference Level	20.000 dBm	20.000 dBm	20.000 dBm
Attenuation	40.000 dB	40.000 dB	40.000 dB
Detector	RMS	RMS	RMS
SweepCount	3	3	3
Filter	3 dB	3 dB	3 dB
Trace Mode	Max Hold	Max Hold	Max Hold
SweepType	Sweep	Sweep	Sweep
Preamp	off	off	off
Stablemode	Trace	Trace	Trace
Stablevalue	0.30 dB	0.30 dB	0.30 dB
Run	4 / max. 150	4 / max. 150	4 / max. 150
Stable	3 / 3	3 / 3	3 / 3
Max Stable	0.02 dB	0.05 dB	0.02 dB

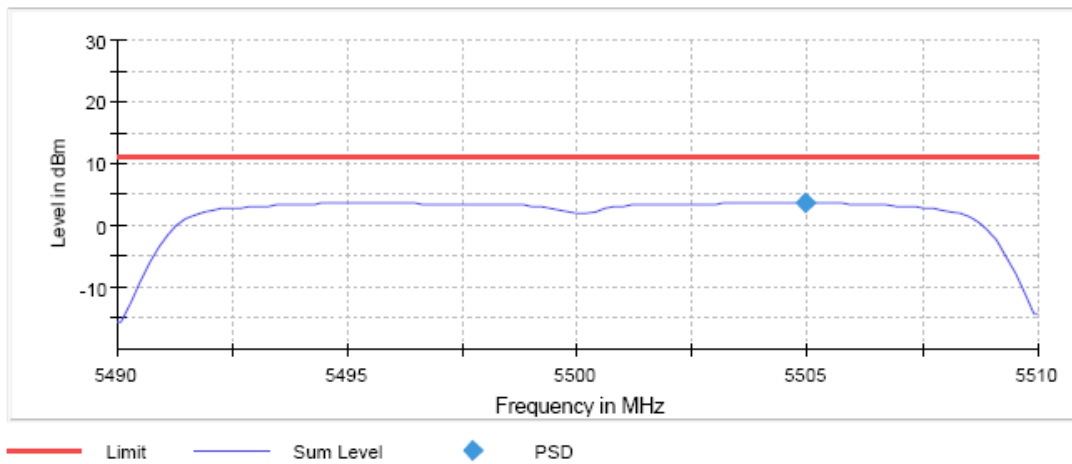
TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#02 (n mode)
TEST RESULTS:	PASS

Bandwidth: 20 MHz

	Lowest frequency 5500 MHz	Middle frequency 5600 MHz	Highest frequency 5700 MHz
Power spectral density (dBm)	3.571	3.146	3.109
Measurement uncertainty (dB)	<±0.78		

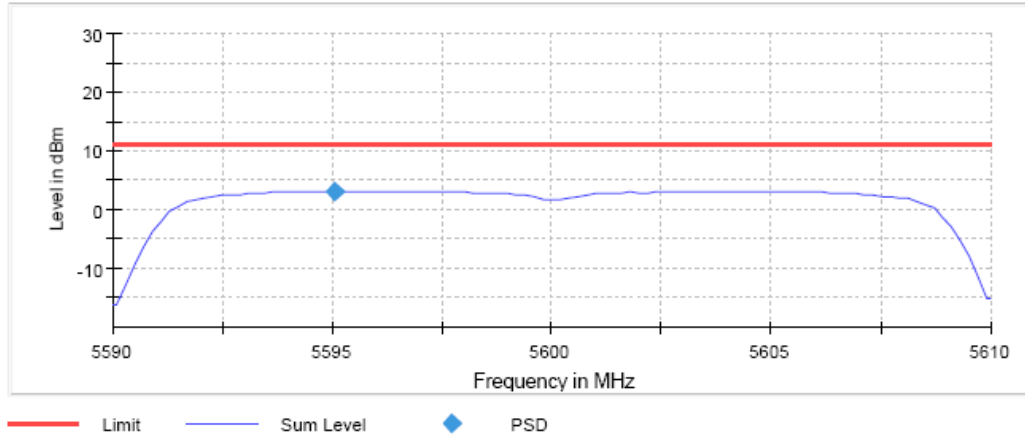
TEST RESULTS (Cont.):	
------------------------------	--

Low Channel

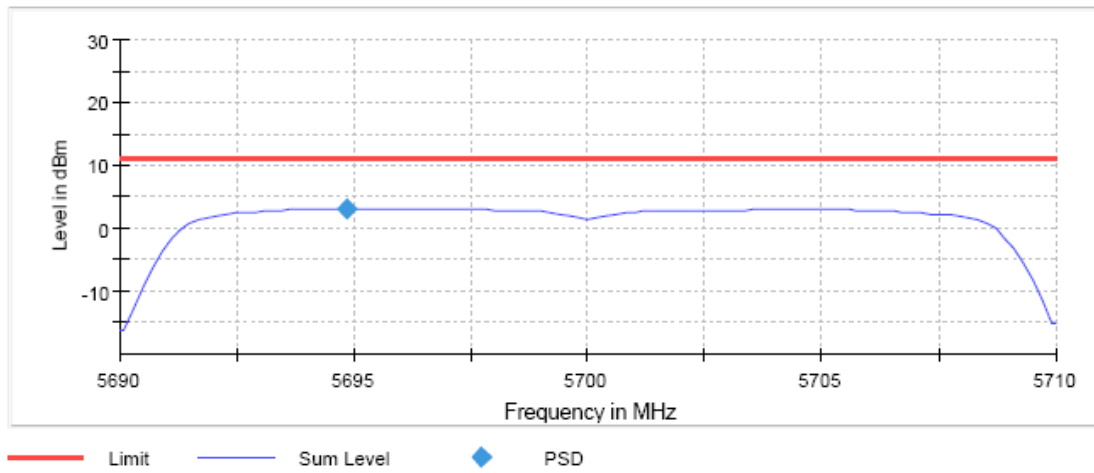


TEST RESULTS (Cont.):

Middle Channel



High Channel



TEST RESULTS (Cont.):

Measurement

Setting	Instrument Value	Instrument Value	Instrument Value
Start Frequency	5.49000 GHz	5.59000 GHz	5.69000 GHz
Stop Frequency	5.51000 GHz	5.61000 GHz	5.71000 GHz
Span	20.000 MHz	20.000 MHz	20.000 MHz
RBW	1.000 MHz	1.000 MHz	1.000 MHz
VBW	3.000 MHz	3.000 MHz	3.000 MHz
SweepPoints	101	101	101
Sweeptime	2.020 s	2.020 s	2.020 s
Reference Level	10.000 dBm	10.000 dBm	20.000 dBm
Attenuation	30.000 dB	30.000 dB	40.000 dB
Detector	RMS	RMS	RMS
SweepCount	3	3	3
Filter	3 dB	3 dB	3 dB
Trace Mode	Max Hold	Max Hold	Max Hold
SweepType	Sweep	Sweep	Sweep
Preamp	off	off	off
Stablemode	Trace	Trace	Trace
Stablevalue	0.30 dB	0.30 dB	0.30 dB
Run	4 / max. 150	4 / max. 150	4 / max. 150
Stable	3 / 3	3 / 3	3 / 3
Max Stable Difference	0.04 dB	0.08 dB	0.02 dB

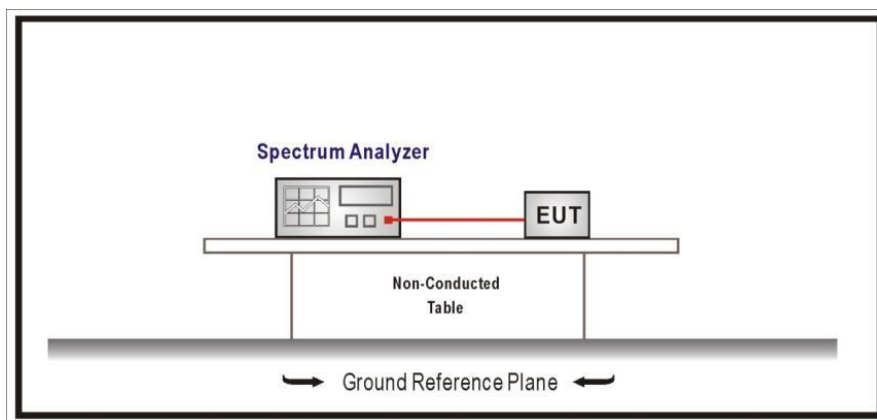
TEST D.5: BAND-EDGE EMISSIONS COMPLIANCE (TRANSMITTER)

LIMITS:	Product standard:	Part 15 Subpart C §15.407 and RSS-247
	Test standard:	Part 15 Subpart C §15.407(b)(1) and RSS-247 6.2.1.2

LIMITS

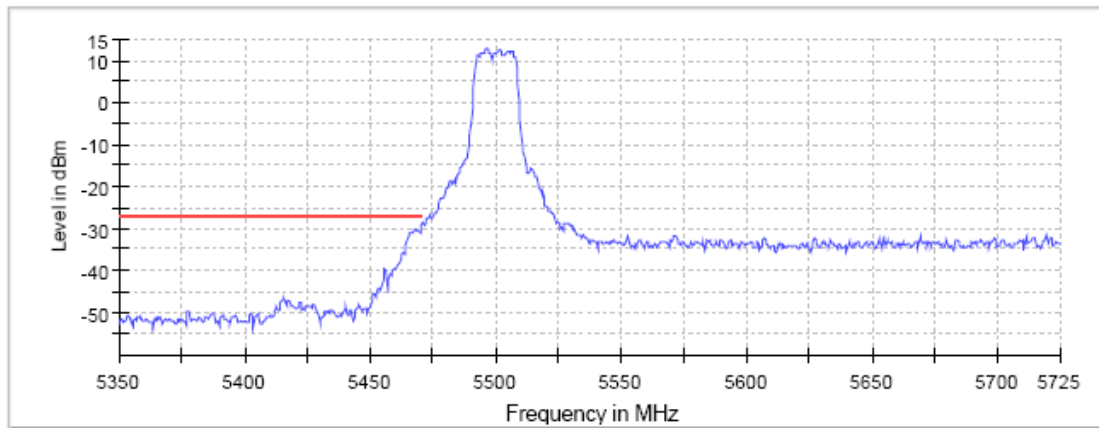
For transmitters operating in the 5.15 – 5.25 GHz band: all emissions outside the frequency band shall not exceed an EIRP of -27 dBm /MHz

TEST SETUP



TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#01 (a mode)
TEST RESULTS:	PASS

Lowest Channel



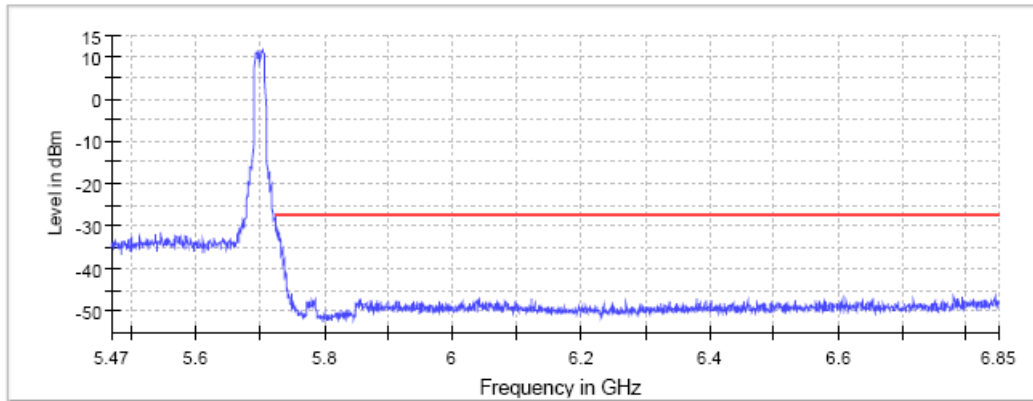
— Limit — Sum Level × Fail

Measurement

Setting	Instrument Value	Instrument Value
Start Frequency	5.47000 GHz	5.35000 GHz
Stop Frequency	5.72500 GHz	5.47000 GHz
Span	255.000 MHz	120.000 MHz
RBW	1.000 MHz	1.000 MHz
VBW	3.000 MHz	3.000 MHz
SweepPoints	510	240
Sweeptime	34.313 μ s	17.156 μ s
Reference Level	20.000 dBm	0.000 dBm
Attenuation	40.000 dB	20.000 dB
Detector	Maxpeak	Maxpeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	FFT	FFT
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	17 / max. 150	6 / max. 150
Stable	3 / 3	3 / 3
Max Stable Difference	0.00 dB	0.00 dB

TEST RESULTS (Cont.):

Highest Channel



— Limit — Sum Level × Fail

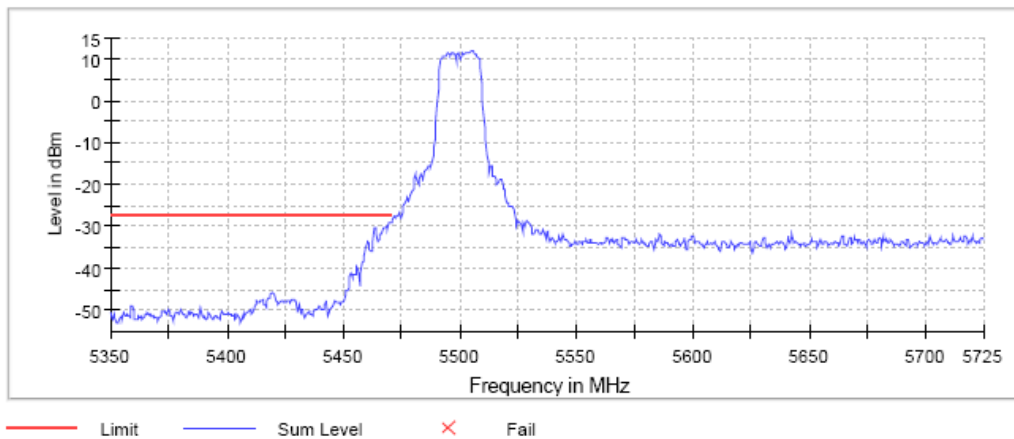
Measurement

Setting	Instrument Value	Instrument Value
Start Frequency	5.47000 GHz	5.72500 GHz
Stop Frequency	5.72500 GHz	6.85000 GHz
Span	255.000 MHz	1.125 GHz
RBW	1.000 MHz	1.000 MHz
VBW	3.000 MHz	3.000 MHz
SweepPoints	510	2250
SweepTime	34.313 μ s	2.25 ms
Reference Level	20.000 dBm	0.000 dBm
Attenuation	40.000 dB	20.000 dB
Detector	Maxpeak	Maxpeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	FFT	FFT
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	10 / max. 150	20 / max. 150
Stable	3 / 3	3 / 3
Max Stable Difference	0.44 dB	0.00 dB

TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#02 (n mode)
TEST RESULTS:	PASS

Bandwidth: 20 MHz

Lowest Channel

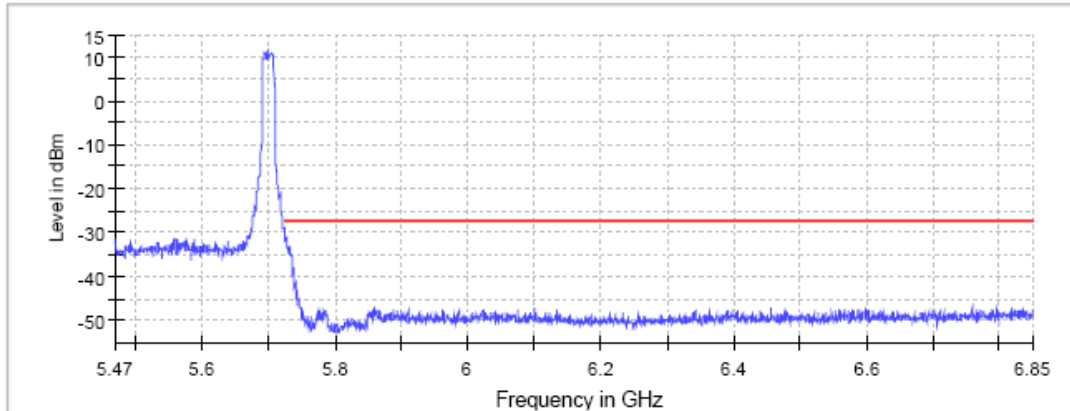


Measurement

Setting	Instrument Value	Instrument Value
Start Frequency	5.47000 GHz	5.35000 GHz
Stop Frequency	5.72500 GHz	5.47000 GHz
Span	255.000 MHz	120.000 MHz
RBW	1.000 MHz	1.000 MHz
VBW	3.000 MHz	3.000 MHz
SweepPoints	510	240
Sweeptime	34.313 μ s	17.156 μ s
Reference Level	20.000 dBm	0.000 dBm
Attenuation	40.000 dB	20.000 dB
Detector	Maxpeak	Maxpeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	FFT	FFT
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	11 / max. 150	9 / max. 150
Stable	3 / 3	3 / 3
Max Stable Difference	0.18 dB	0.00 dB

TEST RESULTS (Cont.):

Highest Channel



— Limit — Sum Level × Fail

Measurement

Setting	Instrument Value	Instrument Value
Start Frequency	5.47000 GHz	5.72500 GHz
Stop Frequency	5.72500 GHz	6.85000 GHz
Span	255.000 MHz	1.125 GHz
RBW	1.000 MHz	1.000 MHz
VBW	3.000 MHz	3.000 MHz
SweepPoints	510	2250
Sweeptime	34.313 μ s	2.25 ms
Reference Level	20.000 dBm	0.000 dBm
Attenuation	40.000 dB	20.000 dB
Detector	Maxpeak	Maxpeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	FFT	FFT
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	12 / max. 150	13 / max. 150
Stable	3 / 3	3 / 3
Max Stable	0.41 dB	0.02 dB

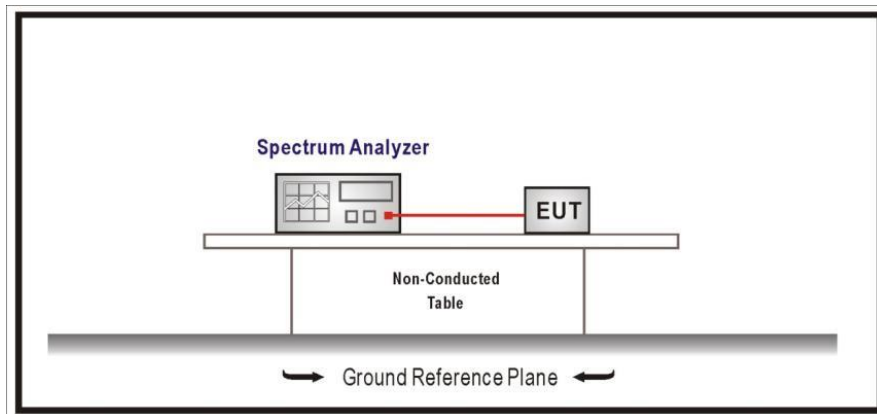
TEST D.6: EMISSION LIMITATIONS CONDUCTED (TRANSMITTER)

LIMITS:	Product standard:	Part 15 Subpart C §15.407, 15.207 and RSS-Gen
	Test standard:	Part 15 Subpart C §15.407(b)(6), 15.207 and RSS-Gen 8.8

LIMITS

In any 100 kHz bandwidth outside the frequency band in which the digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required shall be 30 dB instead of 20 dB.

TEST SETUP

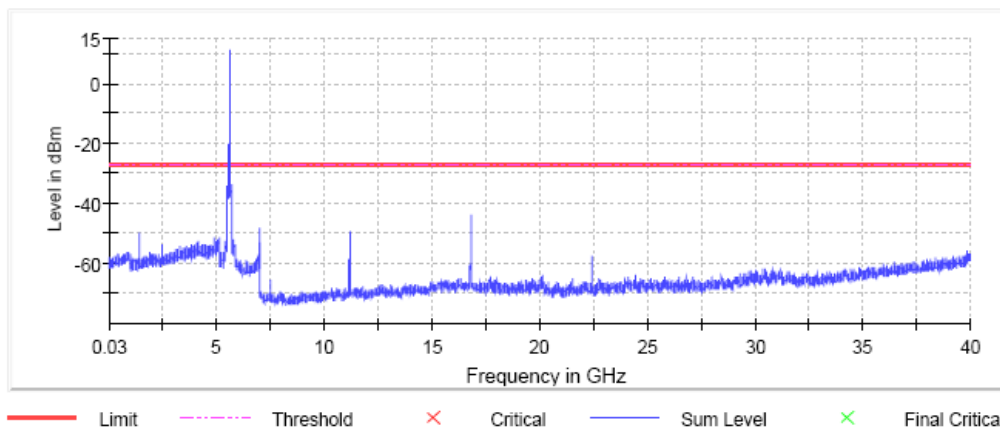


TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#01 (a mode)
TEST RESULTS:	PASS

Bandwidth: 20 MHz

Frequency: 5600 MHz

No spurious signal was detected at 20dB below the limit or above for the channel.



Measurement Settings

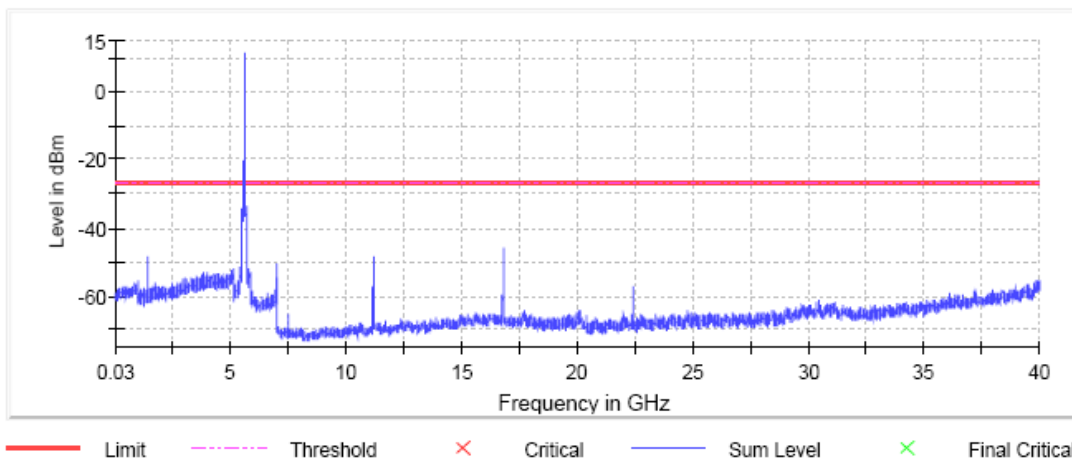
Setting	Instrument Value	Instrument Value
Start Frequency	30.000 MHz	30.000 MHz
Stop Frequency	40 GHz	40 GHz
RBW	1.000 MHz	1.000 MHz
VBW	3.000 MHz	3.000 MHz
Sweep Points	970	4150
Sweep time	194 ms	4.150 ms
Reference Level	-10.000 dBm	-10.000 dBm
Attenuation	20.000 dB	20.000 dB
Detector	MaxPeak	MaxPeak
Sweep Count	30	30
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweep type	sweep	Sweep
Preamp	off	off
Stable mode	Trace	Trace
Stable value	0.50 dB	0.50 dB
Run	4 / max. 150	4 / max. 150
Stable	3 / 3	3 / 3
Max Stable Difference	0.00 dB	0.00 dB

TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#02 (n mode)
TEST RESULTS:	PASS

Bandwidth: 20 MHz

Frequency: 5600 MHz

No spurious signal was detected at 20dB below the limit or above for the channel.



Measurement Settings

Setting	Instrument Value	Instrument Value
Start Frequency	30.000 MHz	30.000 MHz
Stop Frequency	40 GHz	40 GHz
RBW	1.000 MHz	1.000 MHz
VBW	3.000 MHz	3.000 MHz
Sweep Points	970	4150
Sweep time	194 ms	4.150 ms
Reference Level	-10.000 dBm	-10.000 dBm
Attenuation	20.000 dB	20.000 dB
Detector	MaxPeak	MaxPeak
Sweep Count	30	30
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweep type	sweep	Sweep
Preamp	off	off
Stable mode	Trace	Trace
Stable value	0.50 dB	0.50 dB
Run	4 / max. 150	4 / max. 150
Stable	3 / 3	3 / 3
Max Stable Difference	0.00 dB	0.00 dB

TEST D.7: UNDESIRABLE RADIATED EMISSIONS (TRANSMITTER)

LIMITS:	Product standard:	Part 15 Subpart C §15.407 and RSS-247
	Test standard:	Part 15 Subpart C §15.407(b) (1)(6)(7) and RSS-247 6.2.1.2

LIMITS

For transmitters operating in the 5.15 – 5.25 GHz band: all emissions outside of the 5.15 – 5.25 GHz band shall not exceed an EIRP of -27 dBm/MHz (68.23 dBμ V/m at 3m distance).

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) / RSS-Gen):

Frequency Range (MHz)	Field strength (μV/m)	Field strength (dBμV/m)	Measurement distance (m)
0.009-0.490	2400/F(kHz)	-	300
0.490-1.705	24000/F(kHz)	-	30
1.705 - 30.0	30	-	30
30 - 88	100	40	3
88 - 216	150	43.5	3
216 - 960	200	46	3
960 - 25000	500	54	3

The emission limits shown in the above table are based on measurements employing CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

For average radiated emission measurements above 1000 MHz, there is also a limit corresponding to 20 dB above the indicated values in the table is specified when measuring with peak detector function

TEST SETUP

All radiated tests were performed in a semi-anechoic chamber. The measurement antenna is situated at 3 m for the frequency range 30-1000 MHz (Bilog antenna) and at 1m for the frequency range 1-40 GHz (1 GHz-18 GHz and 18 GHz-40 GHz Double ridge horn antennas).

For radiated emissions in the range 1-40 GHz that is performed at a distance closer than the specified distance, an inverse proportionality factor of 20 dB per decade is used to normalize the measured data for determining compliance.

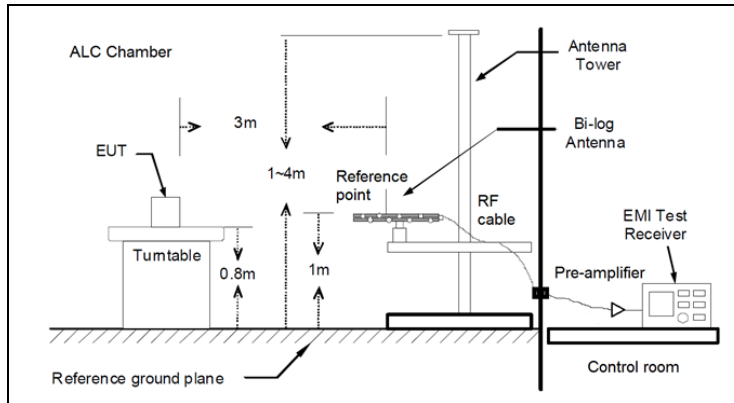
The equipment under test was set up on a non-conductive platform above the ground plane and the situation and orientation was varied to find the maximum radiated emission. It was also rotated 360° and the antenna height was varied from 1 to 4 meters to find the maximum radiated emission.

Measurements were made in both horizontal and vertical planes of polarization.

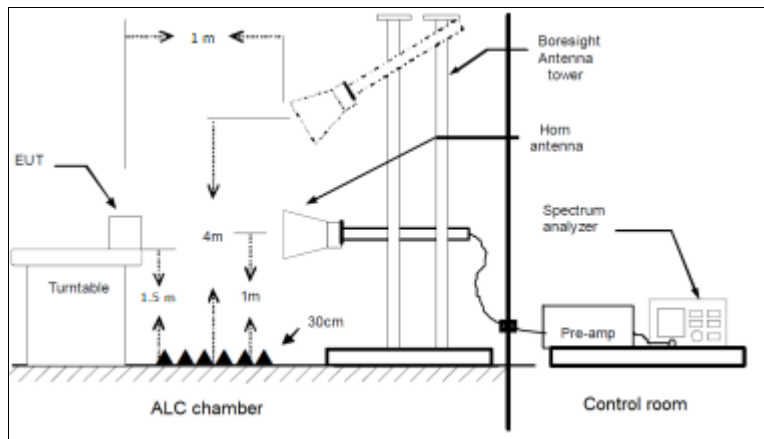
The field strength is calculated by adding correction factor to the measured level from the spectrum analyzer. This correction factor includes antenna factor, cable loss and pre-amplifiers gain.

TEST SETUP (CONT.)

Radiated measurements Setup $f < 1$ GHz



Radiated measurements setup $f > 1$ GHz



TESTED SAMPLES:	S/02
TESTED CONDITIONS MODES:	TC#01 (a mode)
TEST RESULTS:	PASS

Frequency range 30 MHz – 1000 MHz

The results and plots below show the maximum measured levels in the 30 – 1000 MHz and considered the worst case as a20 mode Mid channel.

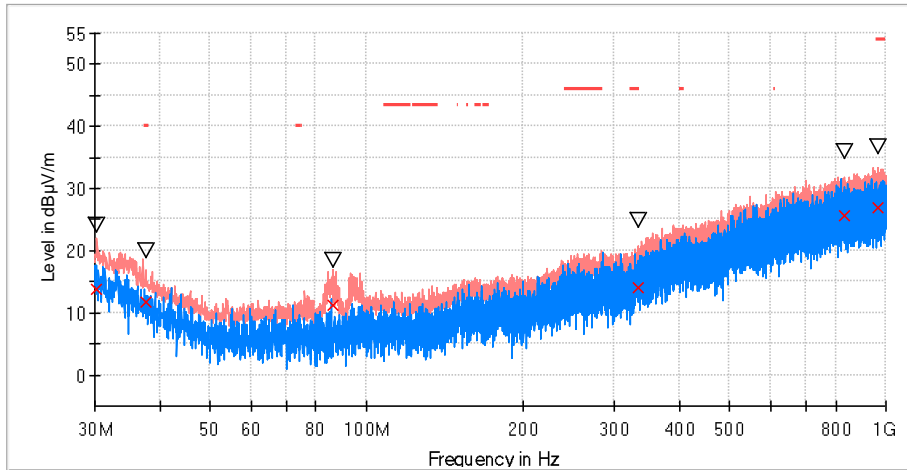
Frequency range 1 GHz – 40 GHz

The results and plots below show the maximum measured levels in the 1- 40 GHz range.

TEST RESULTS (Cont.)	
FREQUENCY RANGE	30 MHz – 1000 MHz

Middle Channel

RF_FCC_15.407_E Field_30MHz_1 GHz

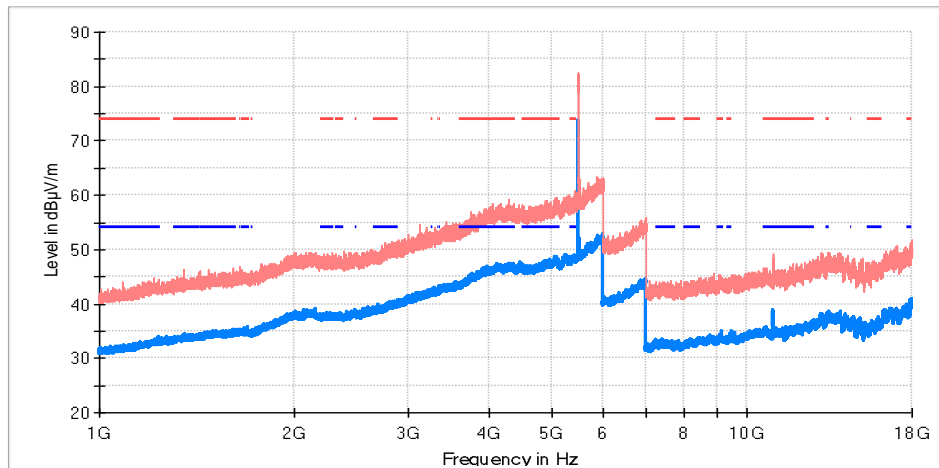


- PK+ _MAXH
- PK+ _CLRWR
- TX limits to Spurious Emission FCC1 5.407 (30MHz to 1 GHz) Restricted Bands QPK Limit
- ▽ MaxPeak-FK+ (Single)
- × QuasiPeak-QPK (Single)
- × RMS (Single)

Frequency (MHz)	MaxPeak (dBµV/m)	QuasiPeak (dBµV/m)	Pol
30.291000	24.06	13.77	V
37.711500	19.98	11.71	V
85.969000	18.53	11.22	V
332.640000	24.80	14.09	H
829.522500	35.96	25.56	H
962.218500	36.80	26.81	H

TEST RESULTS (Cont.)	
FREQUENCY RANGE	1 GHz – 18 GHz

Low Channel

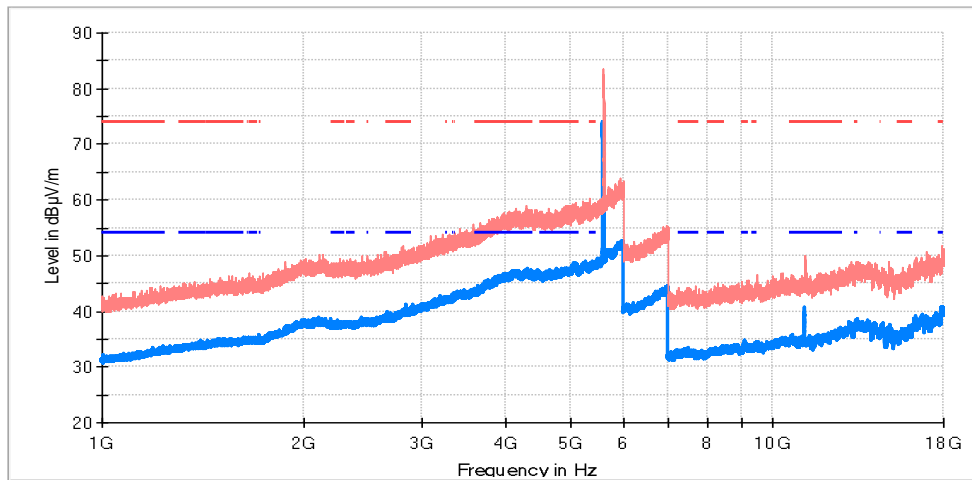


- AVG_MAXH
- PK+_MAXH
- - - TX limits to Spurious Emission FCC1 5.407 (1GHz to 40 GHz) Restricted Bands PK Limit
- - - TX limits to Spurious Emission FCC1 5.407 (1GHz to 40 GHz) Restricted Bands AVG Limit

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Comment
5494.090909	81.33	73.71	V	Fundamental
10999.636364	47.28	38.94	V	

TEST RESULTS (Cont.)	
FREQUENCY RANGE	1 GHz – 18 GHz

Middle Channel

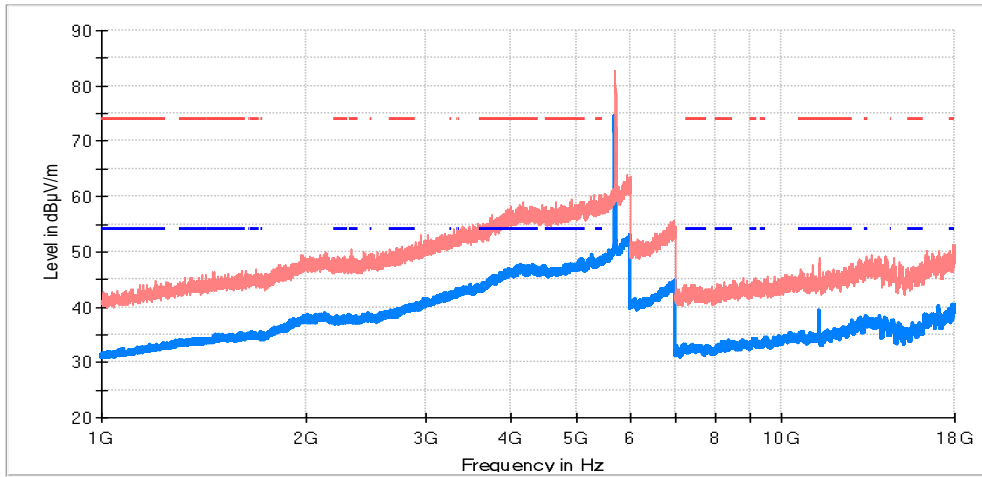


- AVG_MAXH
- PK+_MAXH
- - - TX limits to Spurious Emission FCC15.407 (1 GHz to 40 GHz) Restricted Bands PK Limit
- - - TX limits to Spurious Emission FCC15.407 (1 GHz to 40 GHz) Restricted Bands AVG Limit

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Comment
5605.909091	80.34	73.90	V	Fundamental
11201.454546	49.42	40.68	V	

TEST RESULTS (Cont.)

High Channel

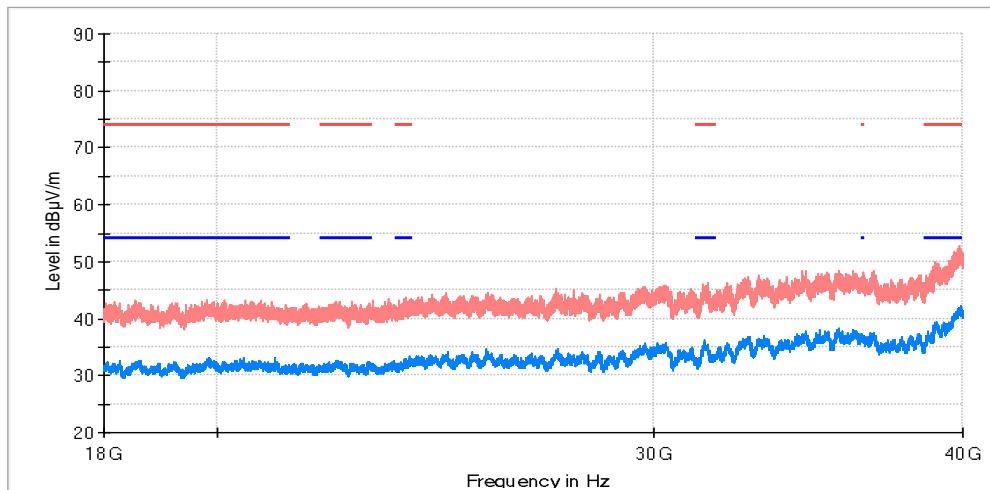


- AVG_MAXH
- PK+ MAXH
- - - TX limits to Spurious Emission FCC1 5.407 (1GHz to 40 GHz) Restricted Bands PK Limit
- - - TX limits to Spurious Emission FCC1 5.407 (1GHz to 40 GHz) Restricted Bands AVG Limit

Frequency (MHz)	PK+ MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Comment
5705.681818	81.99	74.46	V	Fundamental
11401.090909	46.51	39.39	V	

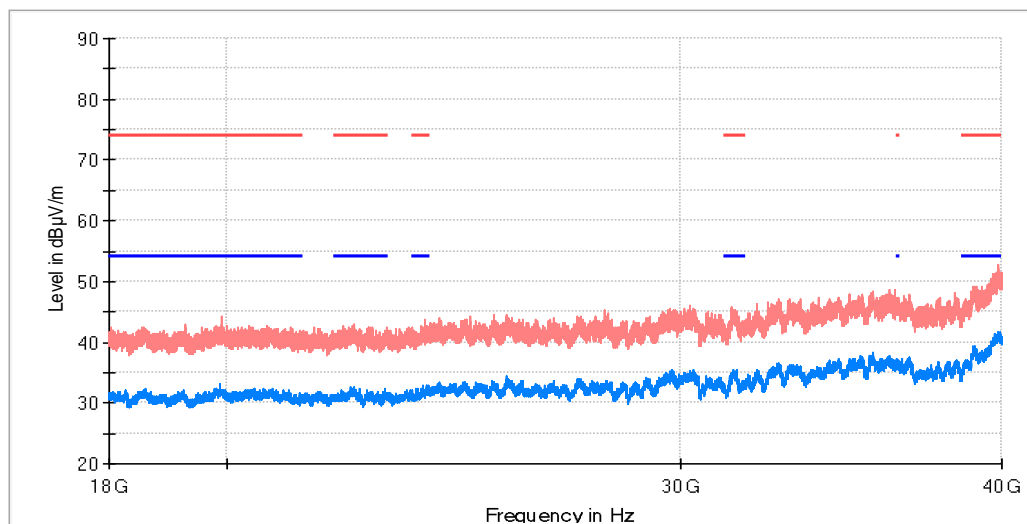
TEST RESULTS (Cont.)	
FREQUENCY RANGE	18 GHz – 40 GHz

Low Channel



- AVG_MAXH
- PK+ MAXH
- - - TX limits to Spurious Emission FCC1 5.407 (1 GHz to 40 GHz) Restricted Bands PK Limit
- - - TX limits to Spurious Emission FCC1 5.407 (1 GHz to 40 GHz) Restricted Bands AVG Limit

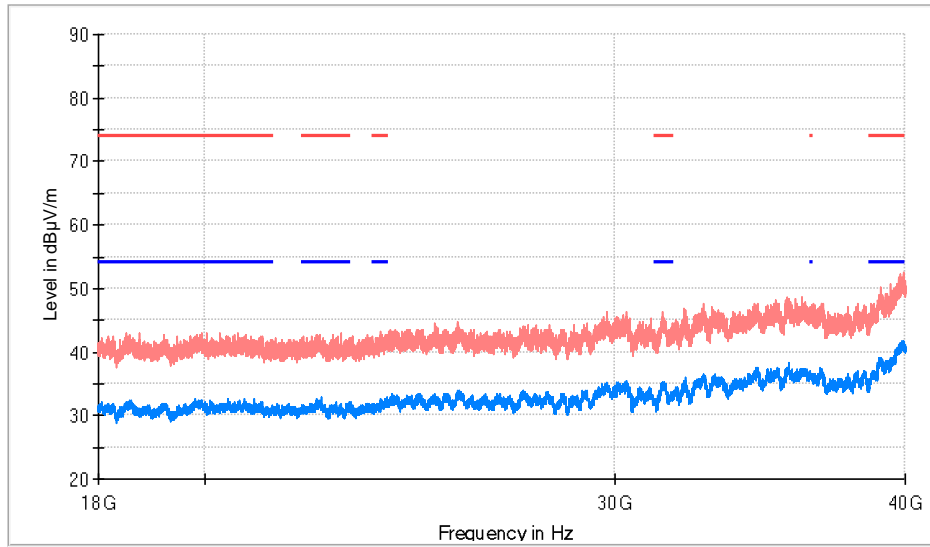
Middle Channel



- AVG_MAXH
- PK+ MAXH
- - - TX limits to Spurious Emission FCC1 5.407 (1 GHz to 40 GHz) Restricted Bands PK Limit
- - - TX limits to Spurious Emission FCC1 5.407 (1 GHz to 40 GHz) Restricted Bands AVG Limit

TEST RESULTS (Cont.)

High Channel



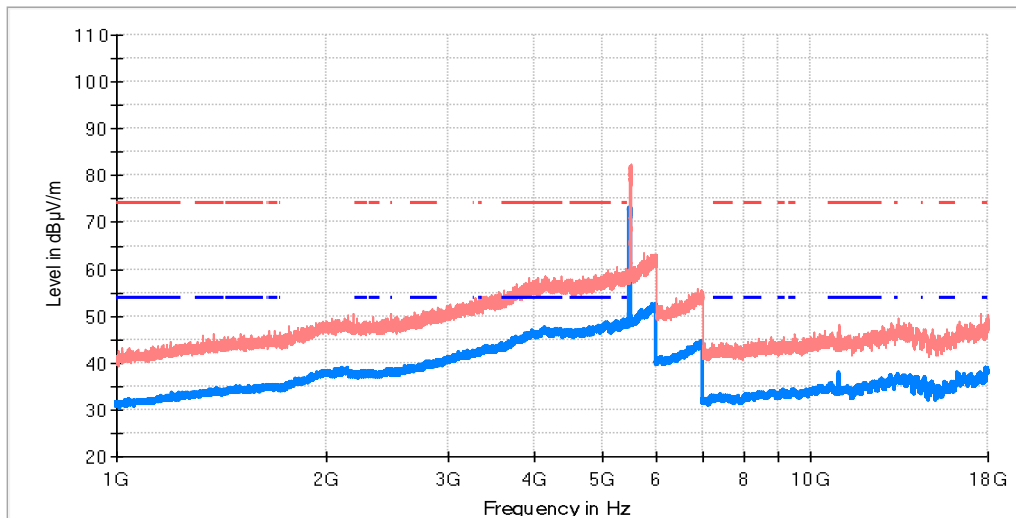
- AVG_MAXH
- PK+_MAXH
- TX limits to Spurious Emission FCC1 5.407 (1GHz to 40 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC1 5.407 (1GHz to 40 GHz) Restricted Bands AVG Limit

TESTED SAMPLES:	S/02
TESTED CONDITIONS MODES:	TC#02 (n mode 20 MHz)
TEST RESULTS:	PASS

Frequency range 1 GHz – 40 GHz

The results and plots below show the maximum measured levels in the 1- 40 GHz range.

FREQUENCY RANGE	1 GHz – 18 GHz
------------------------	-----------------------



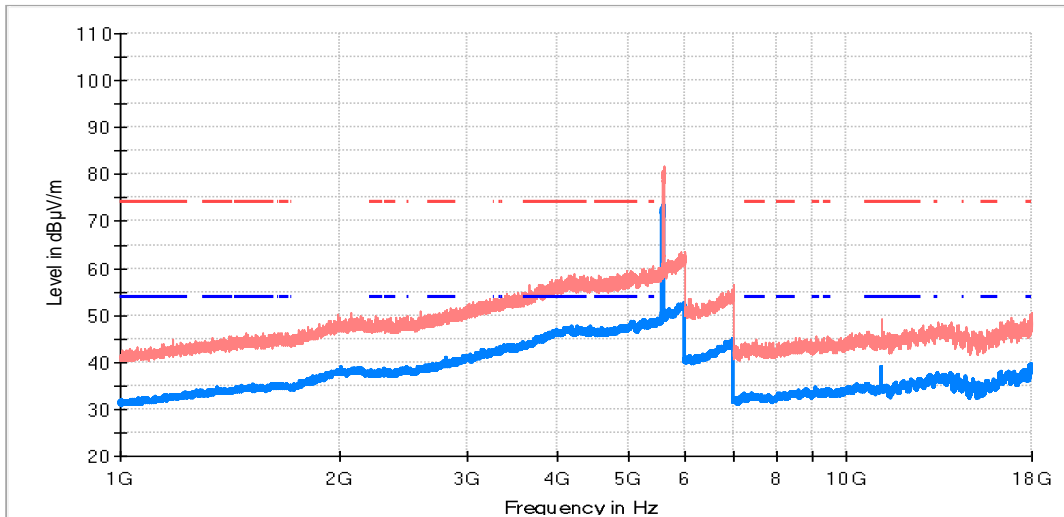
- AVG_MAXH
- PK+_MAXH
- TX limits to Spurious Emission FCC15.407 (1GHz to 40 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC15.407 (1GHz to 40 GHz) Restricted Bands AVG Limit

Maximizations

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	PoI	Comment
5495.454546	81.74	73.24	V	Fundamental
11004.000000	45.67	37.77	V	

TEST RESULTS (Cont.)

Mid Channel



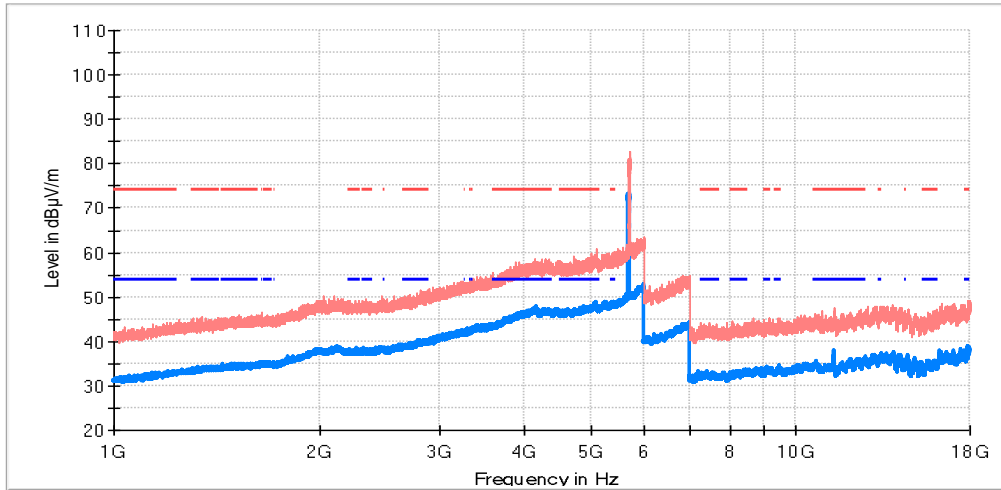
- AVG_MAXH
- PK+_MAXH
- - - TX limits to Spurious Emission FCC1 5.407 (1GHz to 40 GHz) Restricted Bands PK Limit
- - - TX limits to Spurious Emission FCC1 5.407 (1GHz to 40 GHz) Restricted Bands AVG Limit

Maximizations

Frequency (MHz)	PK+_MAXH (dBuV/m)	AVG_MAXH (dBuV/m)	Pol	Comments
5606.590909	81.81	73.34	V	Fundamental
11199.818182	47.82	39.04	V	

TEST RESULTS (Cont.)

High Channel



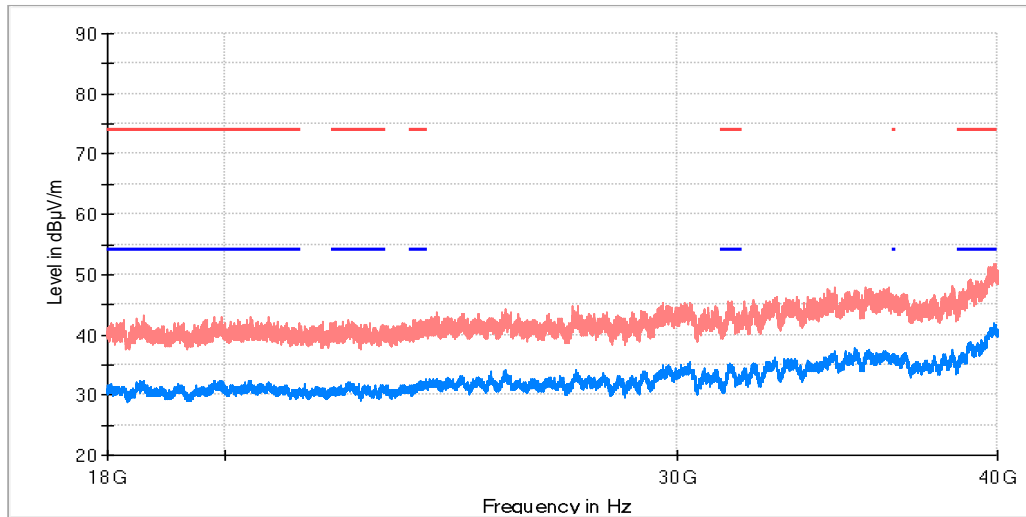
- AVG_MAXH
- PK+_MAXH
- - - TX limits to Spurious Emission FCC1 5.407 (1 GHz to 40 GHz) Restricted Bands PK Limit
- - - TX limits to Spurious Emission FCC1 5.407 (1 GHz to 40 GHz) Restricted Bands AVG Limit

Maximizations

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Comments
5705.000000	79.77	73.35	V	Fundamental
11398.909091	45.33	38.00	V	

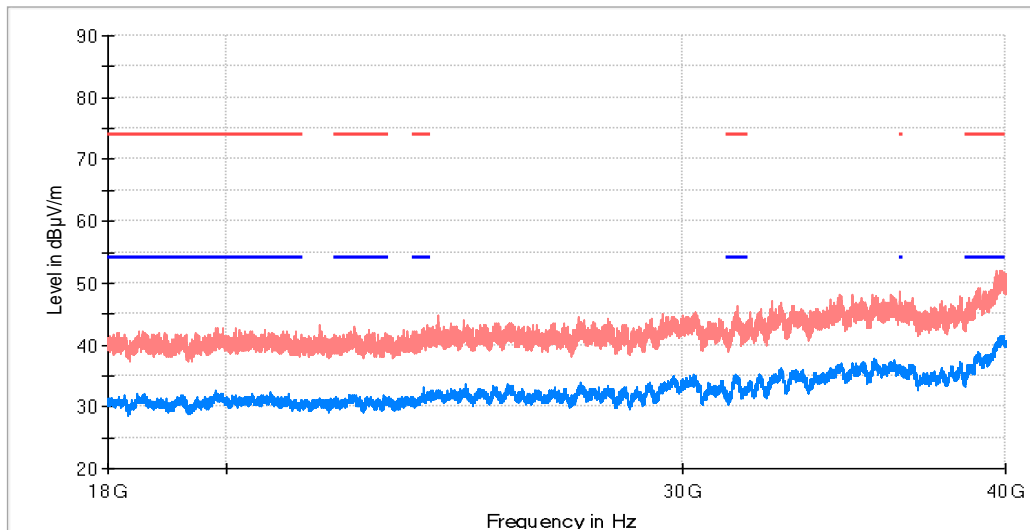
TEST RESULTS (Cont.)	
FREQUENCY RANGE	18 GHz – 40 GHz

Low Channel



- AVG_MAXH
- PK+_MAXH
- - TX limits to Spurious Emission FCC1 5.407 (1GHz to 40 GHz) Restricted Bands PK Limit
- - TX limits to Spurious Emission FCC1 5.407 (1GHz to 40 GHz) Restricted Bands AVG Limit

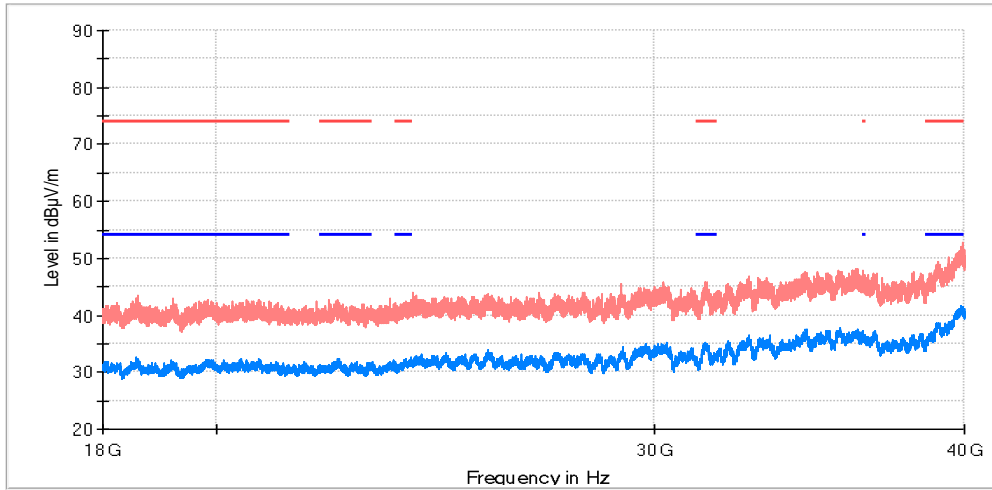
Middle Channel



- AVG_MAXH
- PK+_MAXH
- - TX limits to Spurious Emission FCC1 5.407 (1GHz to 40 GHz) Restricted Bands PK Limit
- - TX limits to Spurious Emission FCC1 5.407 (1GHz to 40 GHz) Restricted Bands AVG Limit

TEST RESULTS (Cont.)

High Channel



- AVG_MAXH
- PK+_MAXH
- TX limits to Spurious Emission FCC1 5.407 (1GHz to 40 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC1 5.407 (1GHz to 40 GHz) Restricted Bands AVG Limit