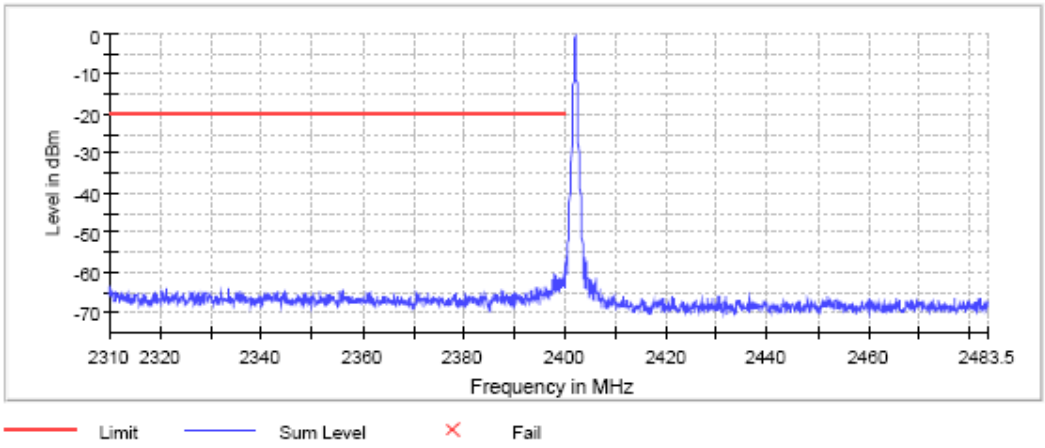
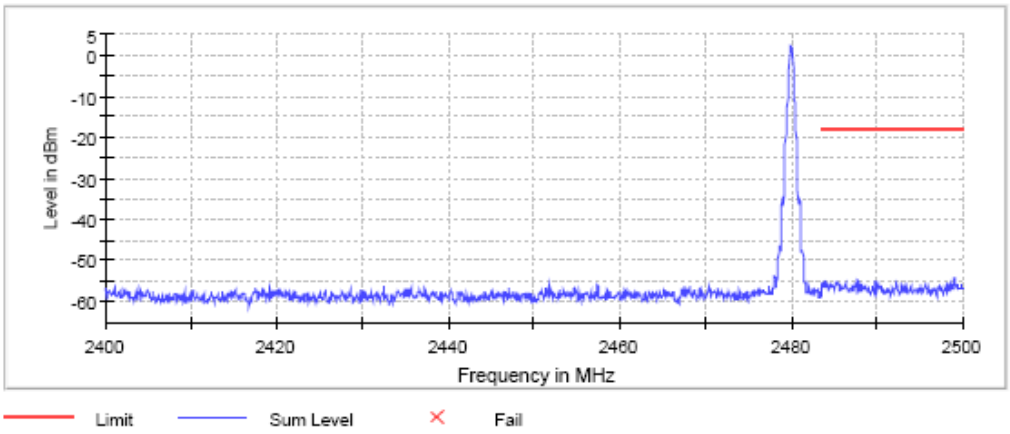
TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#01
TEST RESULTS:	PASS
TEST RESULTS (Cont.)	**HOPPING OFF (Lowest channel)**



Measurement

Setting	Instrument Value	Instrument Value
Start Frequency	2.31000 GHz	2.40000 GHz
Stop Frequency	2.40000 GHz	2.48350 GHz
Span	90.000 MHz	83.500 MHz
RBW	100.000 kHz	100.000 kHz
VBW	300.000 kHz	300.000 kHz
SweepPoints	1800	1670
Sweeptime	113.672 µs	94.727 µs
Reference Level	0.000 dBm	0.000 dBm
Attenuation	20.000 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	4 / max. 150	5 / max. 150
Stable	3 / 3	3 / 3
Max Stable Difference	0.00 dB	0.00 dB

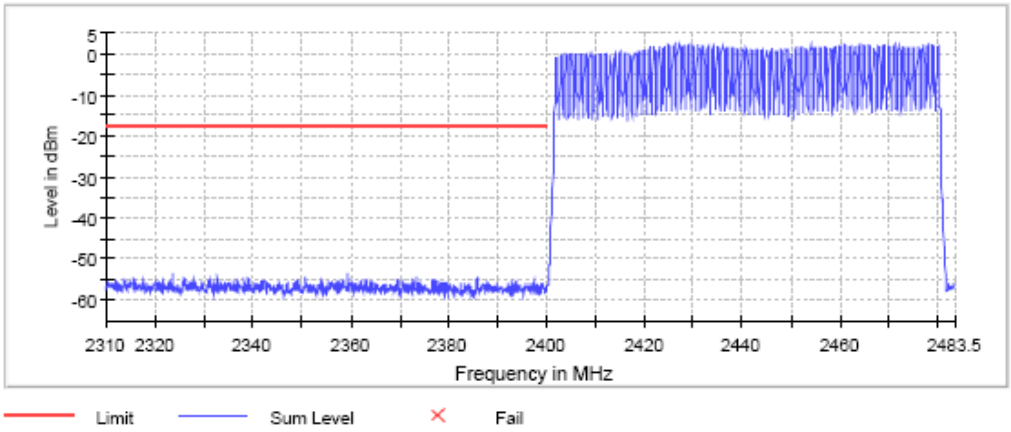
TEST RESULTS (Cont.):	HOPPING OFF (Highest channel)



Measurement

Setting	Instrument Value	Instrument Value
Start Frequency	2.40000 GHz	2.48350 GHz
Stop Frequency	2.48350 GHz	2.50000 GHz
Span	83.500 MHz	16.500 MHz
RBW	100.000 kHz	100.000 kHz
VBW	300.000 kHz	300.000 kHz
SweepPoints	1670	330
Sweeptime	94.727 µs	18.945 µs
Reference Level	10.000 dBm	10.000 dBm
Attenuation	30.000 dB	30.000 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	7 / max. 150	4 / max. 150
Stable	3 / 3	3 / 3
Max Stable Difference	0.25 dB	0.00 dB

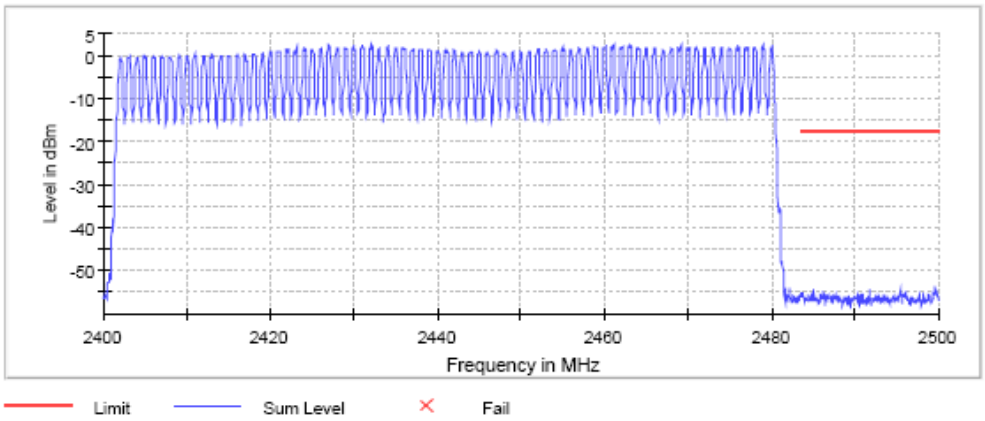
TEST RESULTS (Cont.):	HOPPING ON (Lowest channel)



Measurement

Setting	Instrument Value	Instrument Value
Start Frequency	2.31000 GHz	2.40000 GHz
Stop Frequency	2.40000 GHz	2.48350 GHz
Span	90.000 MHz	83.500 MHz
RBW	100.000 kHz	100.000 kHz
VBW	300.000 kHz	300.000 kHz
SweepPoints	1800	1670
Sweeptime	113.672 µs	94.727 µs
Reference Level	10.000 dBm	10.000 dBm
Attenuation	30.000 dB	30.000 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	4 / max. 150	141 / max. 150
Stable	3 / 3	3/ 3
Max Stable Difference	0.00 dB	0.25 dB

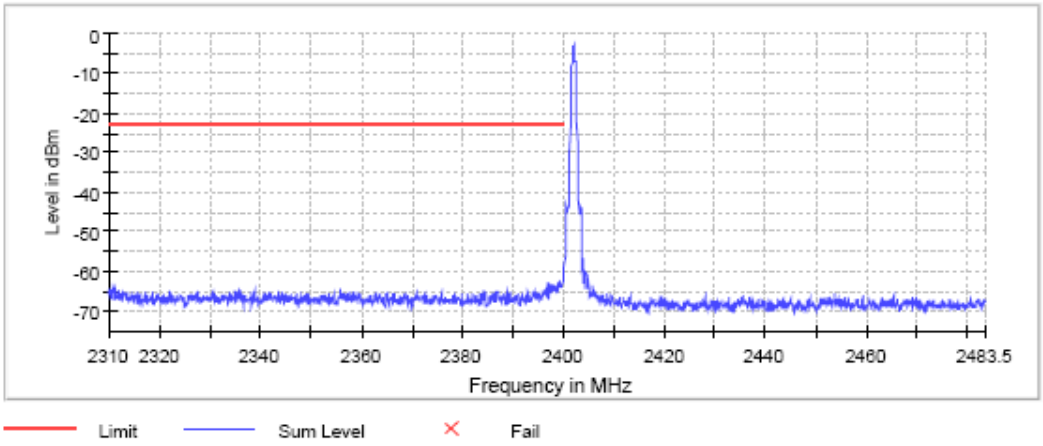
TEST RESULTS (Cont.):	HOPPING ON (Highest channel)



Measurement

Setting	Instrument Value	Instrument Value
Start Frequency	2.40000 GHz	2.48350 GHz
Stop Frequency	2.48350 GHz	2.50000 GHz
Span	83.500 MHz	16.500 MHz
RBW	100.000 kHz	100.000 kHz
VBW	300.000 kHz	300.000 kHz
SweepPoints	1670	330
Sweeptime	94.727 µs	18.945 µs
Reference Level	10.000 dBm	10.000 dBm
Attenuation	30.000 dB	30.000 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	141 / max. 150	4 / max. 150
Stable	3 / 3	3 / 3
Max Stable Difference	0.03 dB	0.00 dB

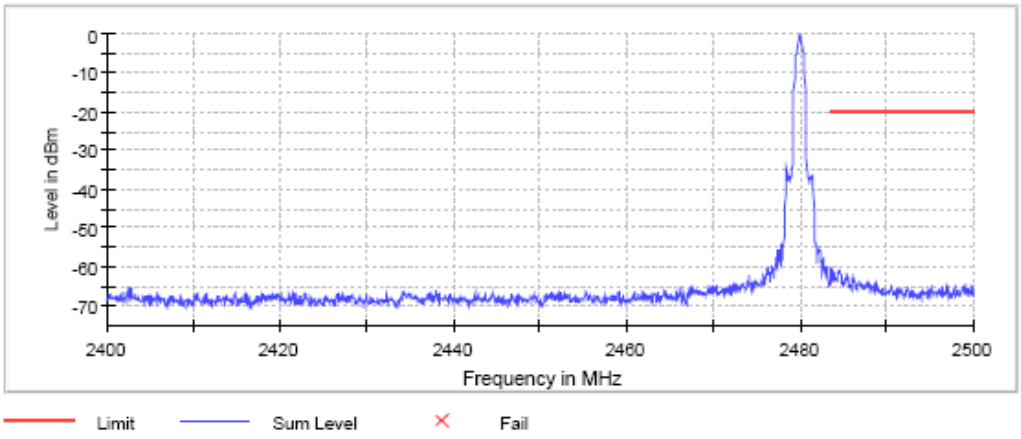
TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#02 (PI4DQPSK)
TEST RESULTS:	PASS
TEST RESULTS (Cont.)	**HOPPING OFF (Lowest channel)**



Measurement

Setting	Instrument Value	Instrument Value
Start Frequency	Instrument	2.40000 GHz
Stop Frequency	2.31000 GHz	2.48350 GHz
Span	2.40000 GHz	83.500 MHz
RBW	90.000 MHz	100.000 kHz
VBW	100.000 kHz	300.000 kHz
SweepPoints	300.000 kHz	1670
Sweeptime	1800	94.727 µs
Reference Level	113.672 µs	0.000 dBm
Attenuation	0.000 dBm	20.000 dB
Detector	20.000 dB	MaxPeak
SweepCount	MaxPeak	100
Filter	100	3 dB
Trace Mode	3 dB	Max Hold
Sweeptype	Max Hold	FFT
Preamp	FFT	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	4 / max. 150	8 / max. 150
Stable	3 / 3	3 / 3
Max Stable Difference	0.00 dB	0.23 dB

TEST RESULTS (Cont.):	HOPPING OFF (Highest channel)

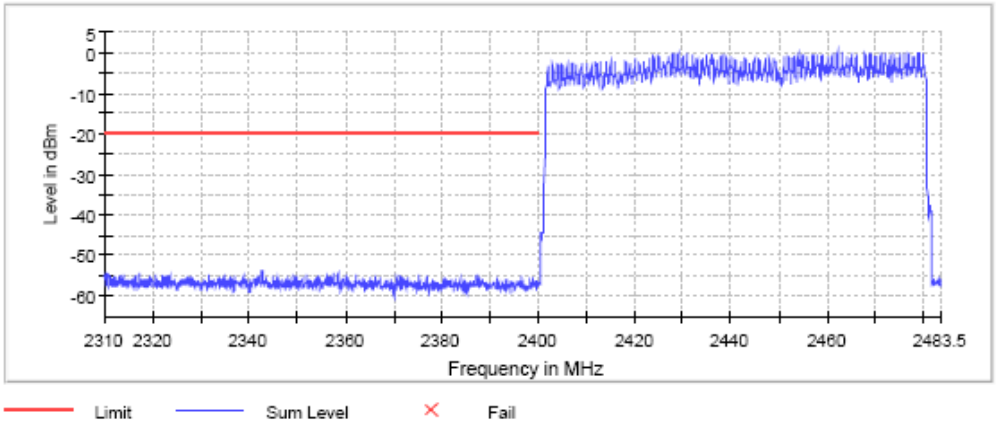


Measurement

Setting	Instrument Value	Instrument Value
Start Frequency	2.40000 GHz	2.48350 GHz
Stop Frequency	2.48350 GHz	2.50000 GHz
Span	83.500 MHz	16.500 MHz
RBW	100.000 kHz	100.000 kHz
VBW	300.000 kHz	300.000 kHz
SweepPoints	1670	330
Sweeptime	94.727 µs	18.945 µs
Reference Level	0.000 dBm	0.000 dBm
Attenuation	20.000 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	4 / max. 150
Stable	3 / 3	3 / 3
Max Stable Difference	0.00 dB	0.00 dB

TEST RESULTS (Cont.):	HOPPING ON (Lowest channel)

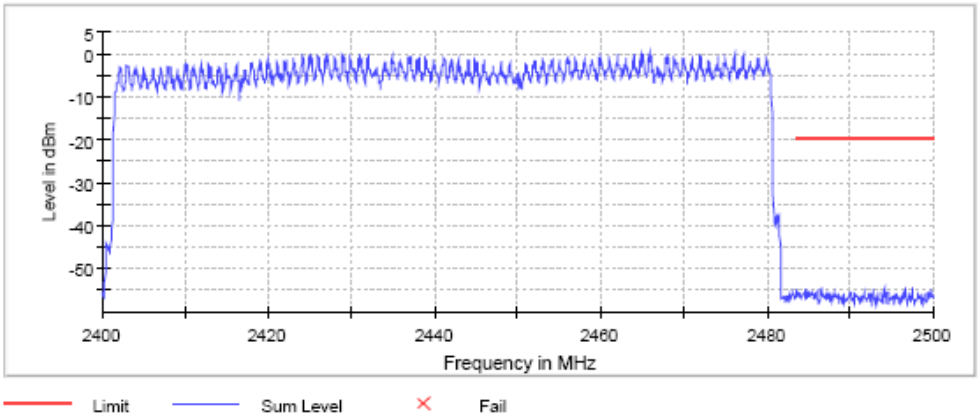
Low**est Channel**



Measurement

Setting	Instrument Value	Instrument Value
Start Frequency	2.31000 GHz	2.40000 GHz
Stop Frequency	2.40000 GHz	2.48350 GHz
Span	90.000 MHz	83.500 MHz
RBW	100.000 kHz	100.000 kHz
VBW	300.000 kHz	300.000 kHz
SweepPoints	1800	1670
Sweeptime	113.672 µs	94.727 µs
Reference Level	10.000 dBm	10.000 dBm
Attenuation	30.000 dB	30.000 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	4 / max. 150	150 / max. 150
Stable	3 / 3	0 / 3
Max Stable Difference	0.00 dB	2.44 dB

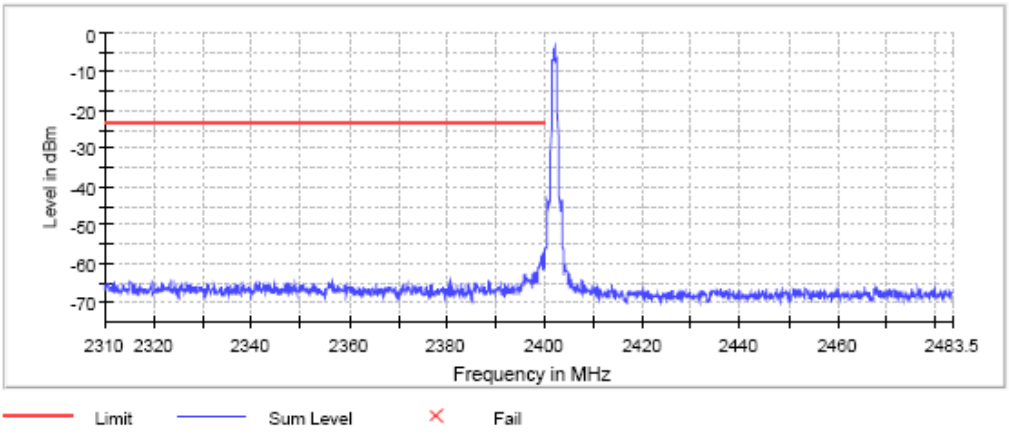
TEST RESULTS (Cont.):	HOPPING ON (Highest channel)



Measurement

Setting	Instrument Value	Instrument Value
Start Frequency	2.40000 GHz	2.48350 GHz
Stop Frequency	2.48350 GHz	2.50000 GHz
Span	83.500 MHz	16.500 MHz
RBW	100.000 kHz	100.000 kHz
VBW	300.000 kHz	300.000 kHz
SweepPoints	1670	330
Sweeptime	94.727 µs	18.945 µs
Reference Level	10.000 dBm	10.000 dBm
Attenuation	30.000 dB	30.000 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	150 / max. 150	4 / max. 150
Stable	0 / 3	3 / 3
Max Stable Difference	1.34 dB	0.00 dB

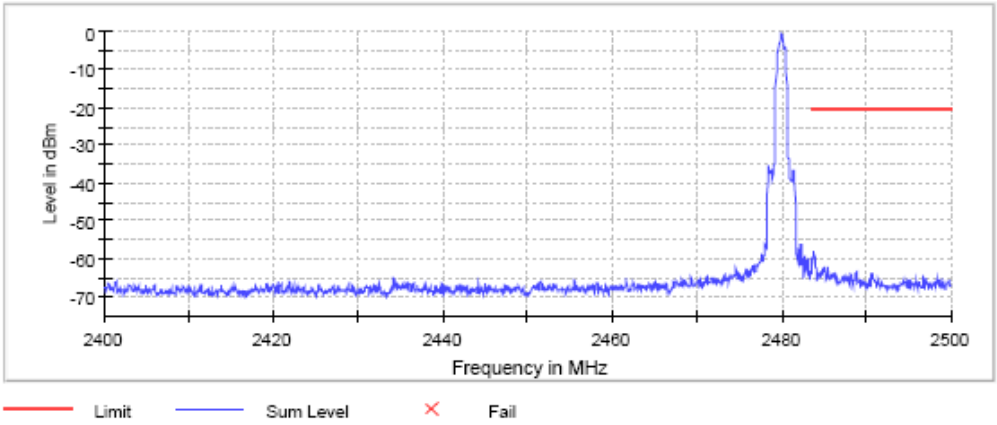
TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#03 (8DPSK)
TEST RESULTS:	PASS
TEST RESULTS (Cont.)	**HOPPING OFF (Lowest channel)**



Measurement

Setting	Instrument Value	Instrument Value
Start Frequency	2.31000 GHz	2.40000 GHz
Stop Frequency	2.40000 GHz	2.48350 GHz
Span	90.000 MHz	83.500 MHz
RBW	100.000 kHz	100.000 kHz
VBW	300.000 kHz	300.000 kHz
SweepPoints	1800	1670
Sweeptime	113.672 µs	94.727 µs
Reference Level	0.000 dBm	0.000 dBm
Attenuation	20.000 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	4 / max. 150	12 / max. 150
Stable	3 / 3	3 / 3
Max Stable Difference	0.00 dB	0.00 dB

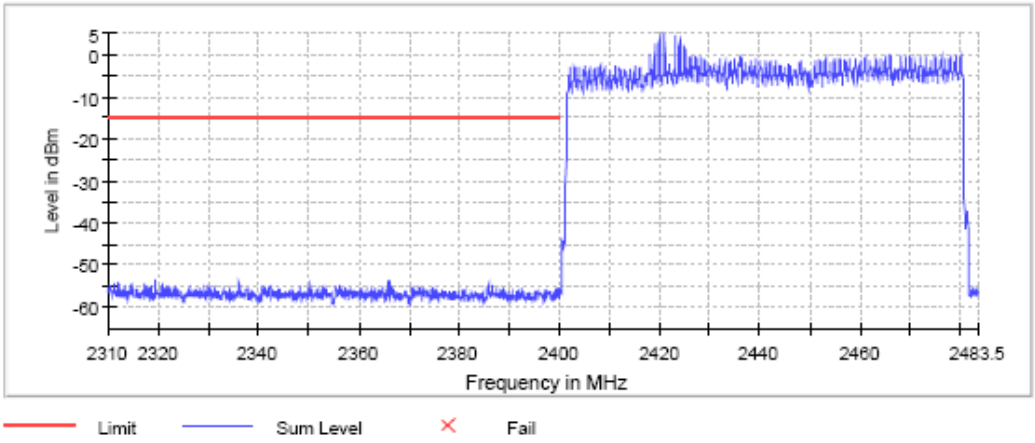
TEST RESULTS (Cont.):	HOPPING OFF (Highest channel)



Measurement

Setting	Instrument Value	Instrument Value
Start Frequency	2.40000 GHz	2.48350 GHz
Stop Frequency	2.48350 GHz	2.50000 GHz
Span	83.500 MHz	16.500 MHz
RBW	100.000 kHz	100.000 kHz
VBW	300.000 kHz	300.000 kHz
SweepPoints	1670	330
Sweeptime	94.727 µs	18.945 µs
Reference Level	0.000 dBm	0.000 dBm
Attenuation	20.000 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	13 / max. 150	4 / max. 150
Stable	3 / 3	3 / 3
Max Stable Difference	0.07 dB	0.00 dB

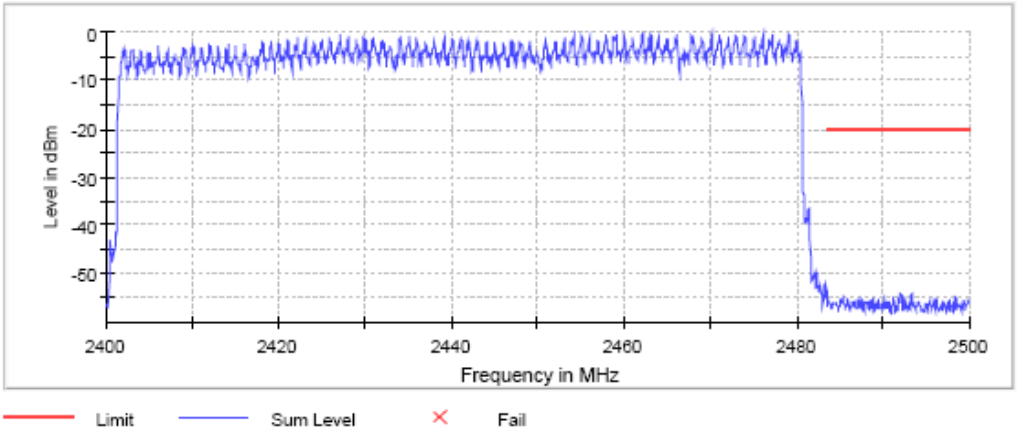
TEST RESULTS (Cont.):	HOPPING ON (Lowest channel)



Measurement

Setting	Instrument Value	Instrument Value
Start Frequency	2.31000 GHz	2.40000 GHz
Stop Frequency	2.40000 GHz	2.48350 GHz
Span	90.000 MHz	83.500 MHz
RBW	100.000 kHz	100.000 kHz
VBW	300.000 kHz	300.000 kHz
SweepPoints	1800	1670
Sweeptime	113.672 µs	94.727 µs
Reference Level	10.000 dBm	10.000 dBm
Attenuation	30.000 dB	30.000 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	4 / max. 150	150 / max. 150
Stable	3 / 3	0 / 3
Max Stable Difference	0.00 dB	0.83 dB

TEST RESULTS (Cont.):	HOPPING ON (Highest channel)



Measurement

Setting	Instrument Value	Instrument Value
Start Frequency	2.40000 GHz	2.48350 GHz
Stop Frequency	2.48350 GHz	2.50000 GHz
Span	83.500 MHz	16.500 MHz
RBW	100.000 kHz	100.000 kHz
VBW	300.000 kHz	300.000 kHz
SweepPoints	1670	330
Sweeptime	94.727 µs	18.945 µs
Reference Level	10.000 dBm	10.000 dBm
Attenuation	30.000 dB	30.000 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	150 / max. 150	4 / max. 150
Stable	0 / 3	3 / 3
Max Stable Difference	1.49 dB	0.00 dB

TEST A.6: EMISSION LIMITATIONS RADIATED (TRANSMITTER)

LIMITS:	Product standard:	Part 15 Subpart C §15.247 and RSS-247
	Test standard:	Part 15 Subpart C §15.247(d) and RSS-247 5.5

LIMITS

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.

RSS-247. Attenuation below the general field strength limits specified in RSS-Gen is not required

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.

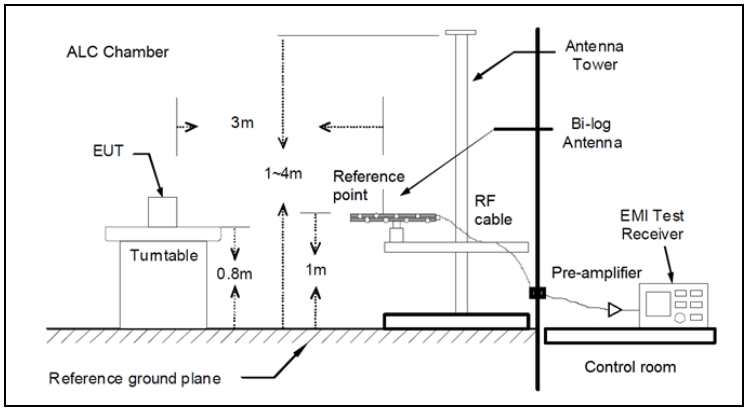
The equipment under test was set up on a non-conductive platform above the ground plane and the situation and orientation was varied to find the maximum radiated emission. It was also rotated 360º and the antenna height was varied from 1 to 4 meters to find the maximum radiated emission.

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

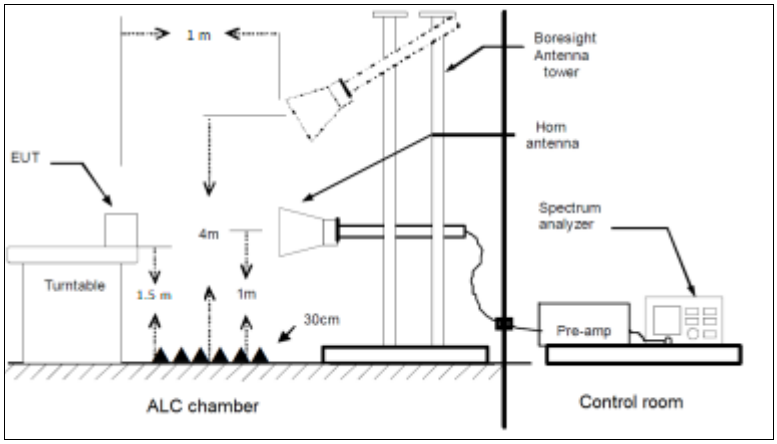
The field strength is calculated by adding correction factor to the measured level from the spectrum analyzer. This correction factor includes antenna factor, cable loss and pre-amplifiers gain.

TEST SETUP (CONT.)	

Radiated measurements Setup f < 1 GHz



Radiated measurements setup f > 1 GHz



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

Co-Location

The test was performed with the equipment transmitting first with only the 2.4 GHz BT-EDR radio and repeated with the WiFi 2.4GHz (WLAN0 CORE1), and WiFi 5 GHz (WLAN0 CORE0) radios transmitting simultaneously to check the impact of the co-location of the other radio interfaces. The results and plots below show the worst results obtained.

Frequency range 30 MHz – 1000 MHz

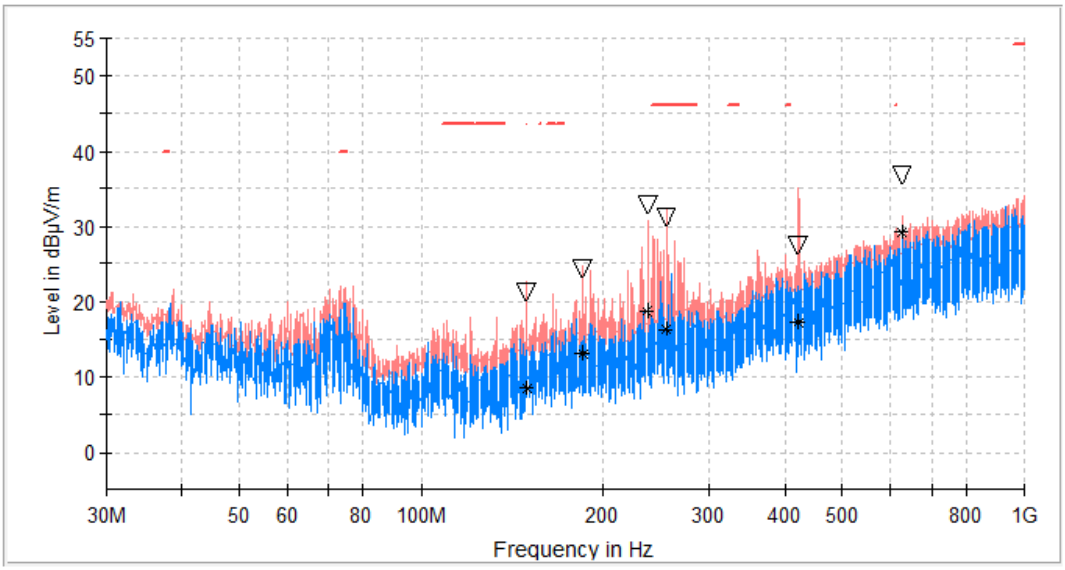
The spurious emissions below 1 GHz do not depend on the operating channel or modulation selected in the EUT. Tested only in GFSK Modulation for Low channel.

Frequency range 1 GHz – 26 GHz

The results in the next tables show the maximum measured levels in the 1-26 GHz range including the restricted bands 2.31-2.39 GHz and 2.4835-2.5 GHz (see next plots).

The radiated spurious signals detected at less than 10 dB respect to the limit for the lowest, middle and highest operating channels are showed in the tables below of each frequency range.

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



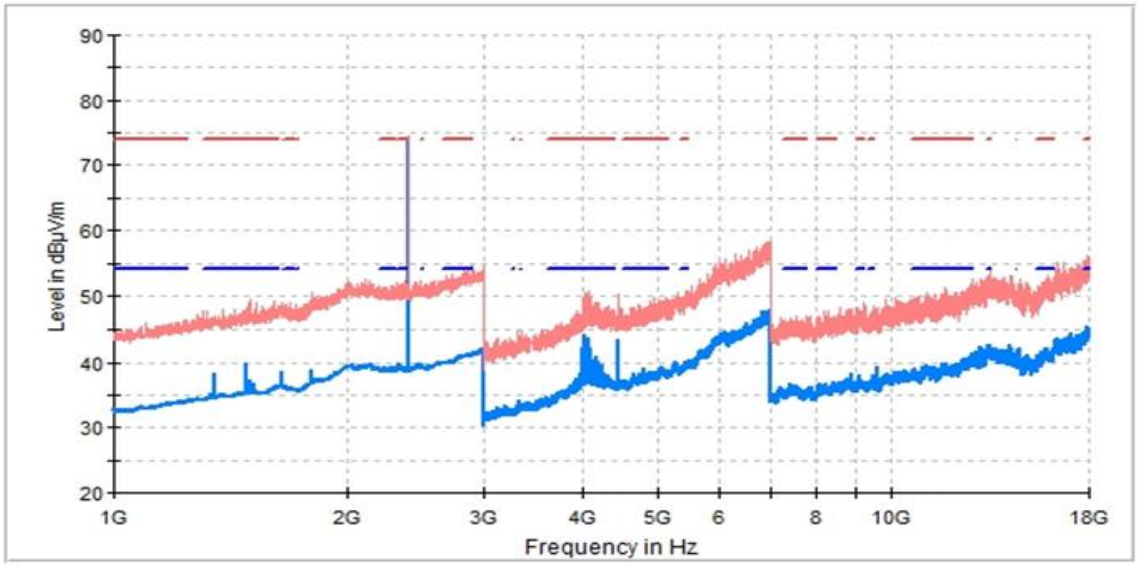
PK+_MAXH
PK+_CLRWR
TX limits to Spurious Emission FCC15.247 (30MHz to 1GHz) Restricted Bands QPK Limit
MaxPeak-PK+ (Single)
QuasiPeak-QPK (Single)

Result Table_Single

Frequency (MHz)	MaxPeak (dBµV/m)	QuasiPeak (dBµV/m)	Pol
237.337500	32.7	18.7	H
255.137000	31.2	16.1	H
421.686000	27.4	17.3	H
149.407000	21.1	8.4	V
184.715000	24.4	13.1	V
624.998000	36.8	29.1	V

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

CHANNEL: Lowest (2402 MHz).

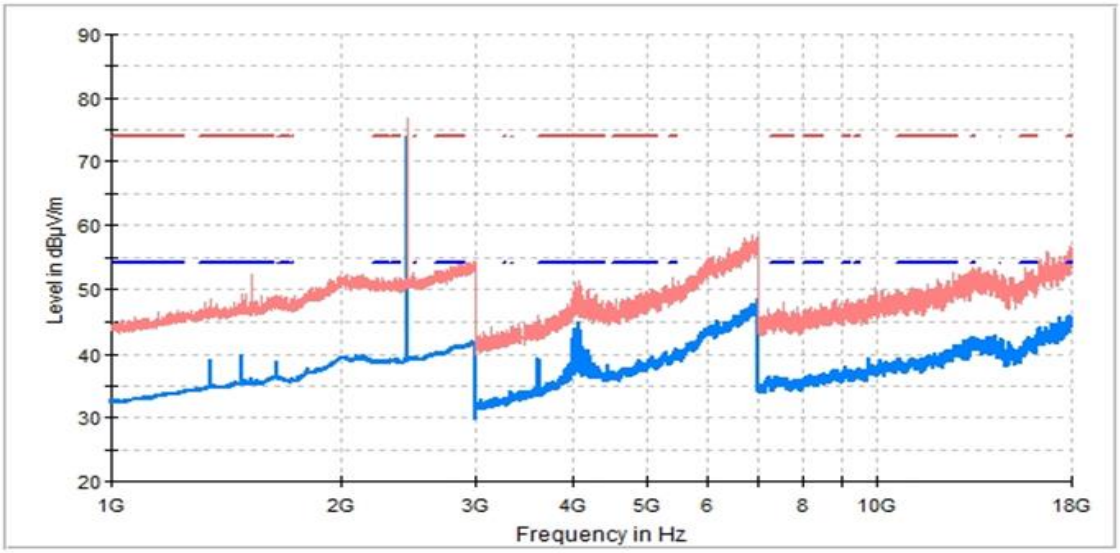


Maximizations

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Comments
1350.000000	46.93	38.37	V	
1485.000000	48.07	39.98	H	
2402.000000	74.55	73.71	V	Fundamental
4032.500000	50.38	44.17	V	
4455.000000	50.33	43.57	H	

TEST RESULTS (Cont.)	

CHANNEL: Middle (2441 MHz).



AVG_MAXH
PK+_MAXH
TX limits to Spurious Emission FCC15.247 (1GHz to 26 GHz) Restricted Bands PK Limit
TX limits to Spurious Emission FCC15.247 (1GHz to 26 GHz) Restricted Bands AVG Limit

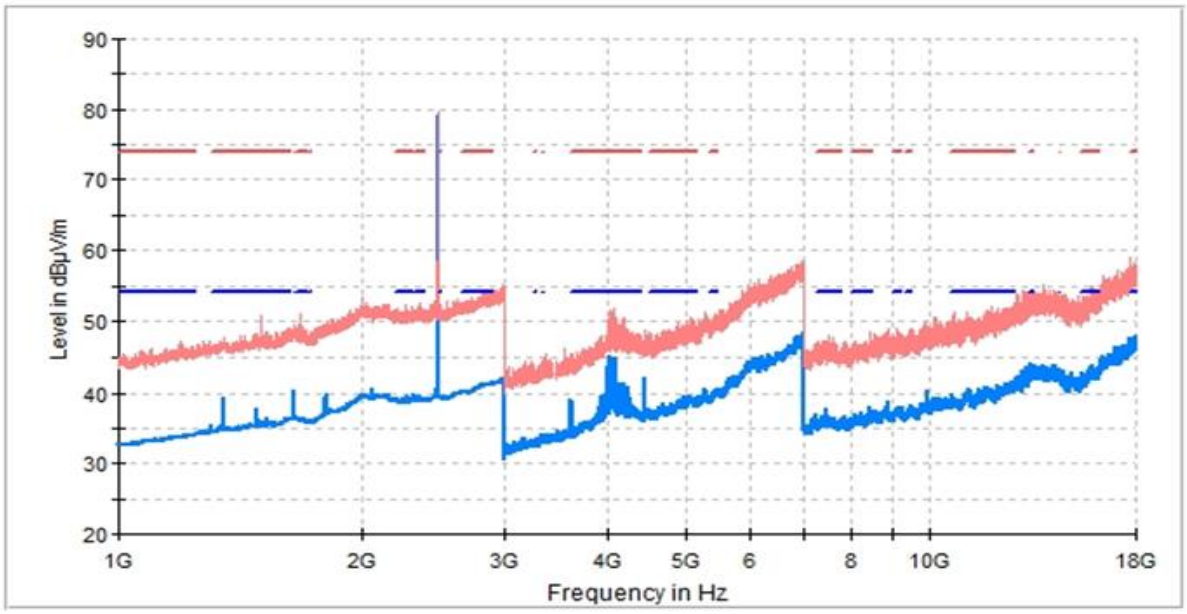
.

Maximizations

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Comments
1350.000000	46.88	39.22	H	
1484.500000	47.90	39.87	V	
2441.000000	76.90	73.88	V	Fundamental
3609.500000	46.06	39.40	V	
3609.500000	46.06	39.40	V	
4063.000000	49.93	44.97	V	

TEST RESULTS (Cont.)	

CHANNEL: Highest (2480 MHz).



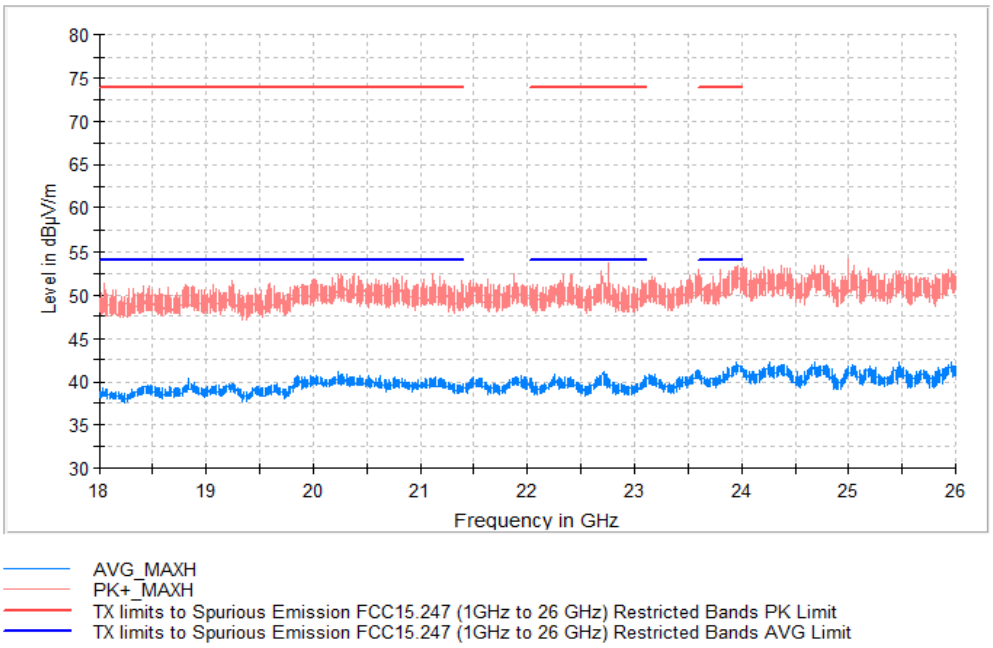
AVG_MAXH
PK+_MAXH
TX limits to Spurious Emission FCC15.247 (1GHz to 26 GHz) Restricted Bands PK Limit
TX limits to Spurious Emission FCC15.247 (1GHz to 26 GHz) Restricted Bands AVG Limit

Maximizations

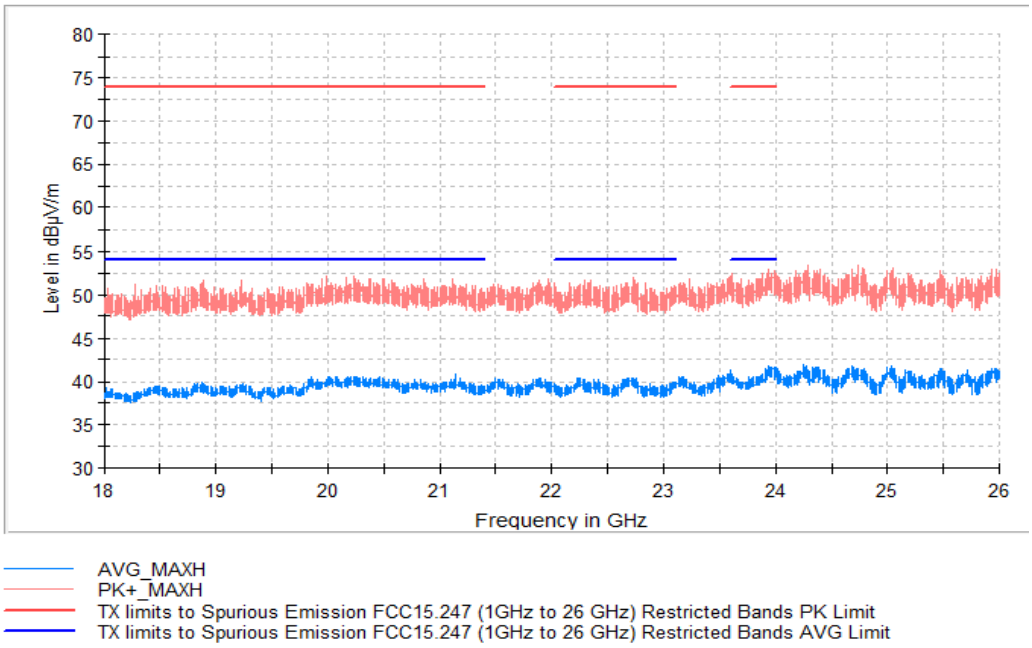
Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Comments
1350.000000	47.59	39.34	H	
1650.000000	48.92	40.37	V	
2480.000000	79.76	79.06	V	Fundamental
3609.000000	45.12	39.07	V	
4035.000000	51.48	45.42	H	
4455.000000	48.41	42.12	V	

TEST RESULTS (Cont.)	
FREQUENCY RANGE	**18 GHz – 26 GHz (GFSK)**

CHANNEL: Lowest (2402 MHz).

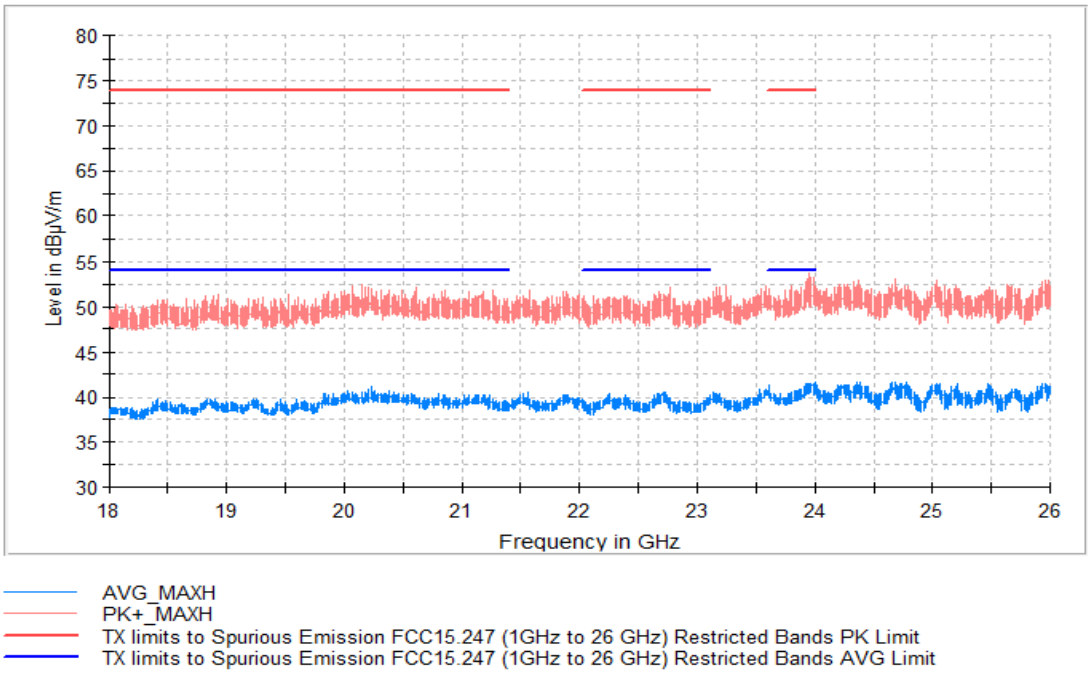


CHANNEL: Middle (2441 MHz).



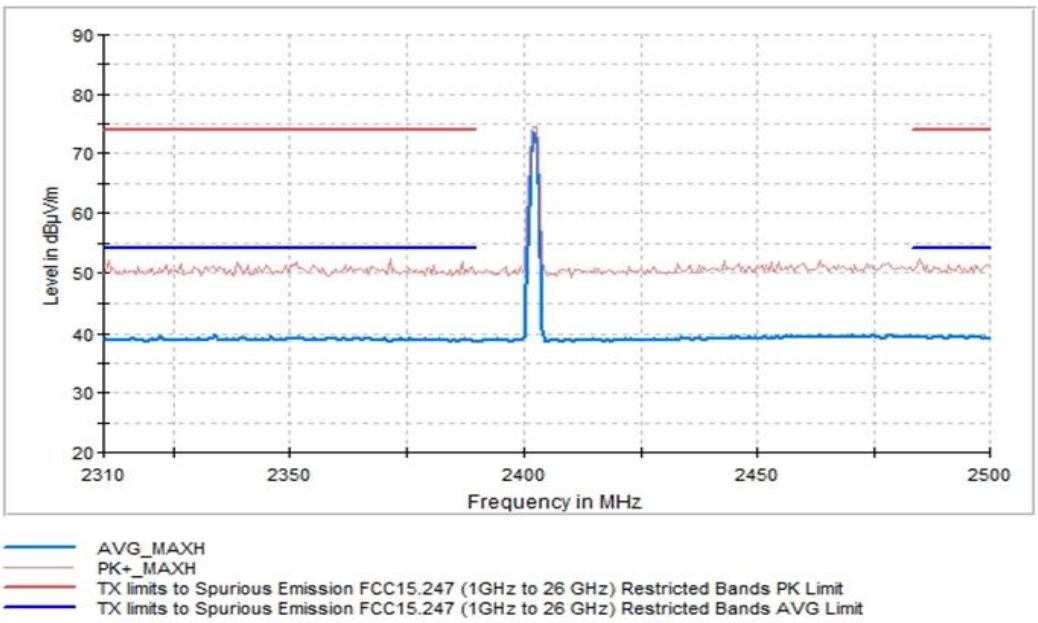
TEST RESULTS (Cont.)	

CHANNEL: Highest (2480 MHz).



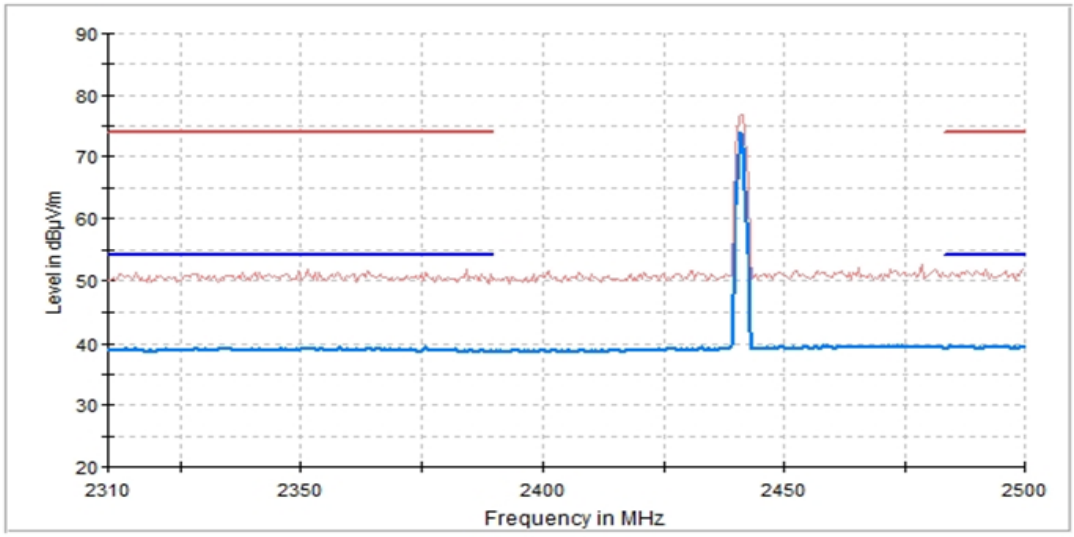
RESTRICTED BANDS	2.31 GHz – 2.5 GHz (GFSK)

CHANNEL: Lowest (2402 MHz)



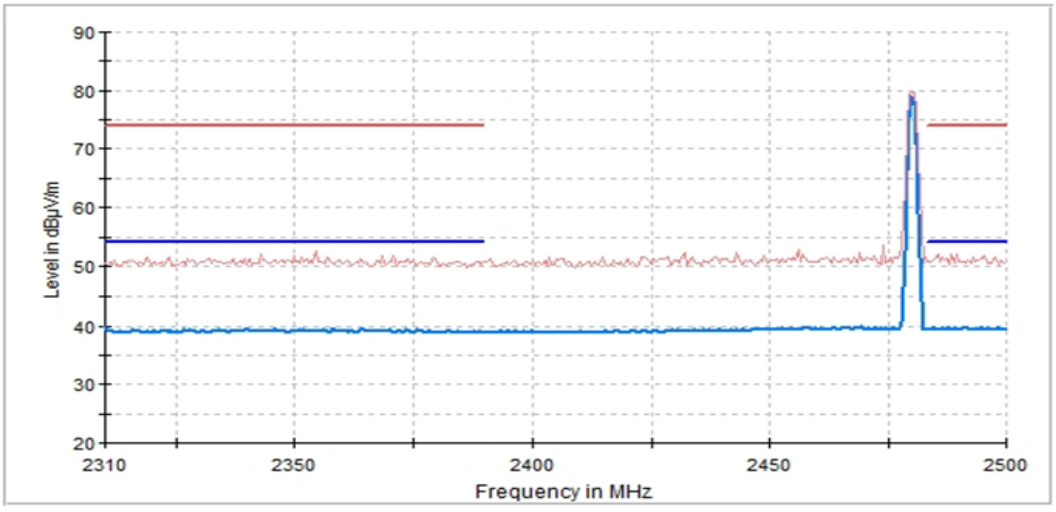
TEST RESULTS (Cont.)	

CHANNEL: Middle (2441 MHz)



AVG_MAXH
PK+_MAXH
TX limits to Spurious Emission FCC15.247 (1GHz to 26 GHz) Restricted Bands PK Limit
TX limits to Spurious Emission FCC15.247 (1GHz to 26 GHz) Restricted Bands AVG Limit

CHANNEL: Highest (2480 MHz)



AVG_MAXH
PK+_MAXH
TX limits to Spurious Emission FCC15.247 (1GHz to 26 GHz) Restricted Bands PK Limit
TX limits to Spurious Emission FCC15.247 (1GHz to 26 GHz) Restricted Bands AVG Limit

TEST RESULTS (Cont.)	
TESTED SAMPLES:	S/02
TESTED CONDITIONS MODES:	TC#02 (PI4DQPSK)
TEST RESULTS:	PASS

Co-Location

The test was performed with the equipment transmitting first with only the 2.4 GHz BT-EDR radio and repeated with the WiFi 2.4GHz (WLAN0 CORE1), and WiFi 5 GHz (WLAN0 CORE0) radios transmitting simultaneously to check the impact of the co-location of the other radio interfaces. The results and plots below show the worst results obtained.

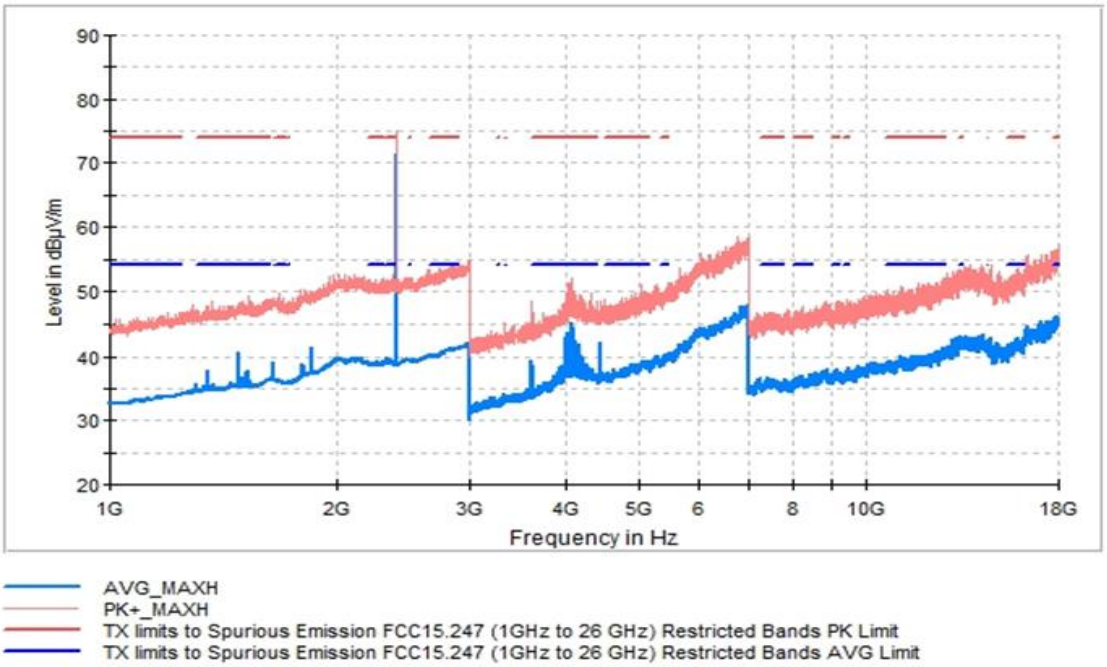
Frequency range 1 GHz – 26 GHz

The results in the next tables show the maximum measured levels in the 1-26 GHz range including the restricted bands 2.31-2.39 GHz and 2.4835-2.5 GHz (see next plots).

The radiated spurious signals detected at less than 10 dB respect to the limit for the lowest, middle and highest operating channels are showed in the tables below of each frequency range

TEST RESULTS (Cont.)	
FREQUENCY RANGE	**1 GHz – 18 GHz (PI4DQPSK)**

CHANNEL: Lowest (2402 MHz).



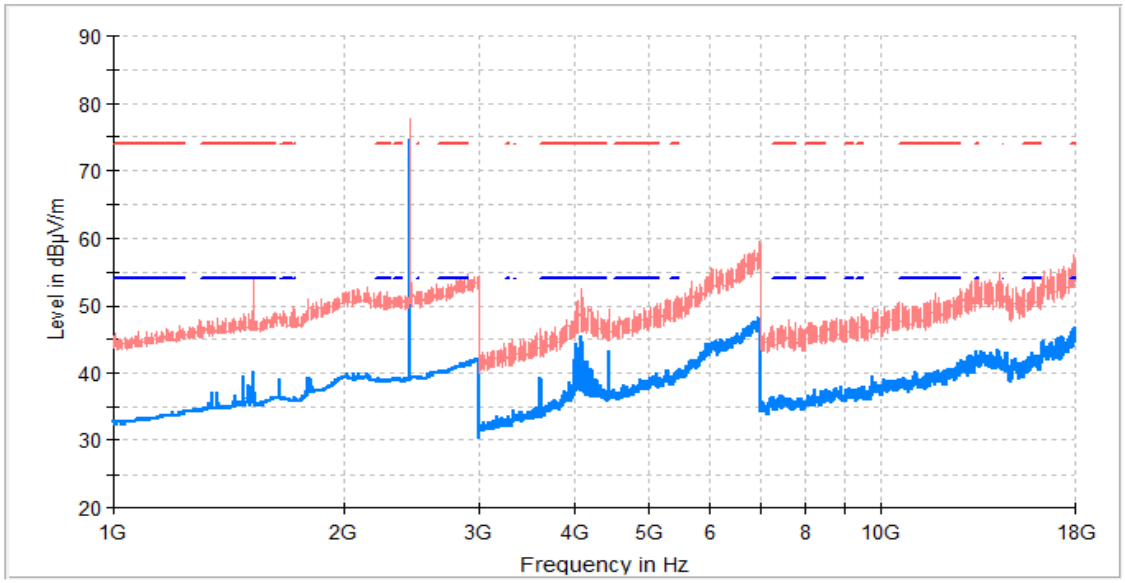
.

Maximizations

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Comments
1485.000000	48.13	40.73	H	
1851.000000	49.57	41.56	V	
2402.000000	74.54	71.34	V	Fundamental
3609.000000	46.51	39.50	H	
4062.000000	52.10	45.24	H	
4455.000000	48.42	42.30	H	

TEST RESULTS (Cont.)	

CHANNEL: Middle (2440 MHz).



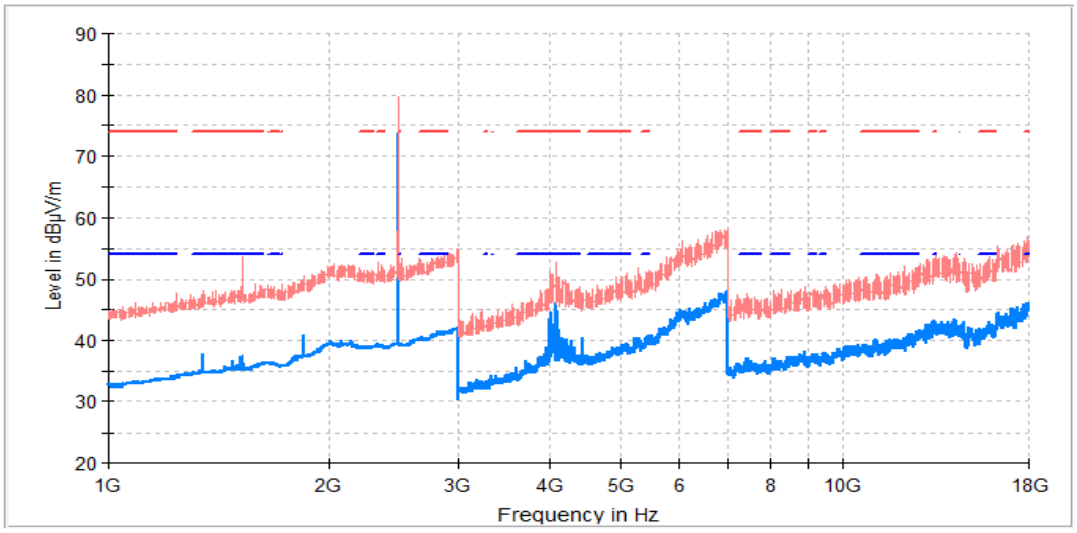
AVG_MAXH
PK+_MAXH
TX limits to Spurious Emission FCC15.247 (1GHz to 26 GHz) Restricted Bands PK Limit
TX limits to Spurious Emission FCC15.247 (1GHz to 26 GHz) Restricted Bands AVG Limit

Maximizations

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Comments
1526.000000	50.77	40.13	H	
2441.000000	77.75	74.69	V	Fundamental
3609.000000	46.69	39.36	V	
4061.000000	51.00	45.67	V	
4454.500000	49.51	43.27	H	

TEST RESULTS (Cont.)	

CHANNEL: Highest (2480 MHz)



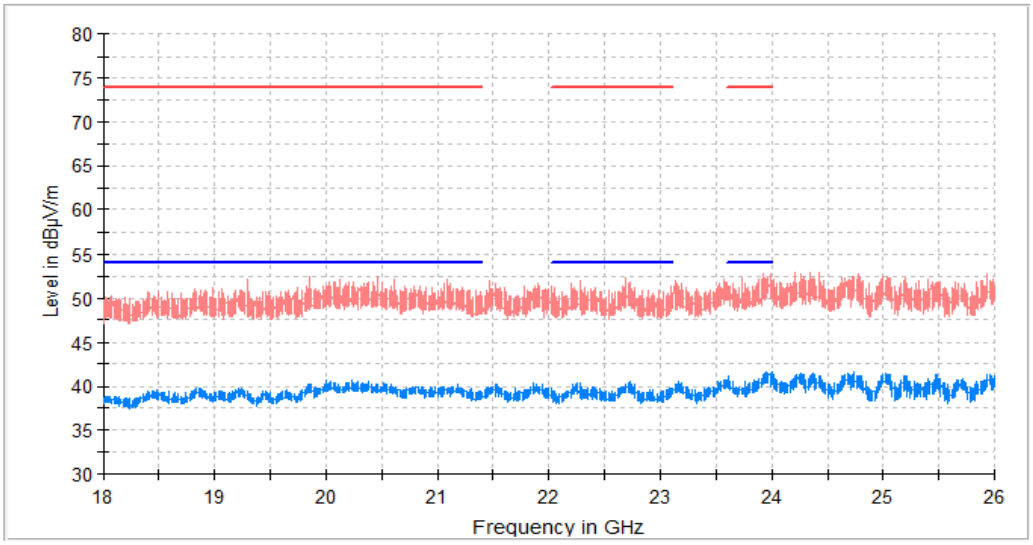
AVG_MAXH
PK+_MAXH
TX limits to Spurious Emission FCC15.247 (1GHz to 26 GHz) Restricted Bands PK Limit
TX limits to Spurious Emission FCC15.247 (1GHz to 26 GHz) Restricted Bands AVG Limit

Maximizations

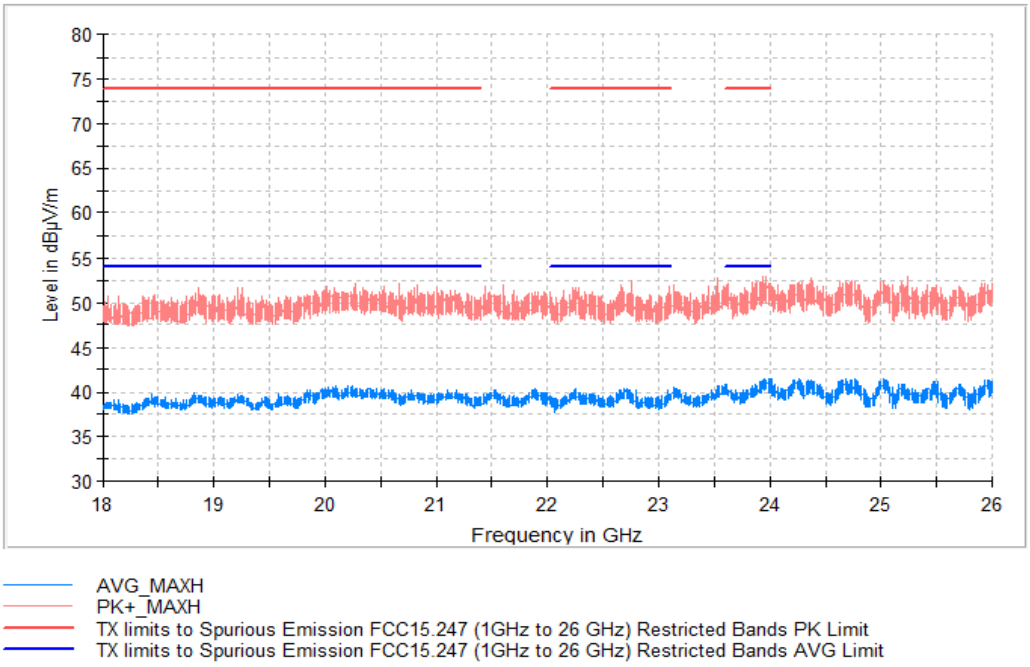
Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Comments
1350.000000	46.92	37.81	H	
1852.500000	49.38	40.99	V	
2480.500000	79.17	73.76	V	Fundamental
4061.000000	51.27	46.03	H	
4455.000000	47.61	40.36	V	

TEST RESULTS (Cont.)	
FREQUENCY RANGE	**18 GHz – 26 GHz (PI4DQPSK)**

CHANNEL: Lowest (2402 MHz)

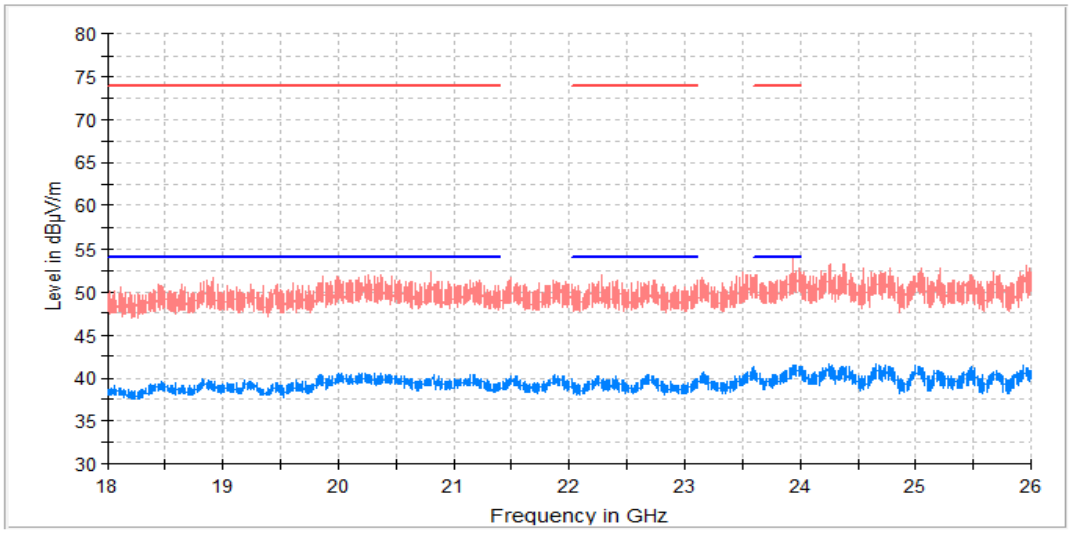


CHANNEL: Middle (2441 MHz)



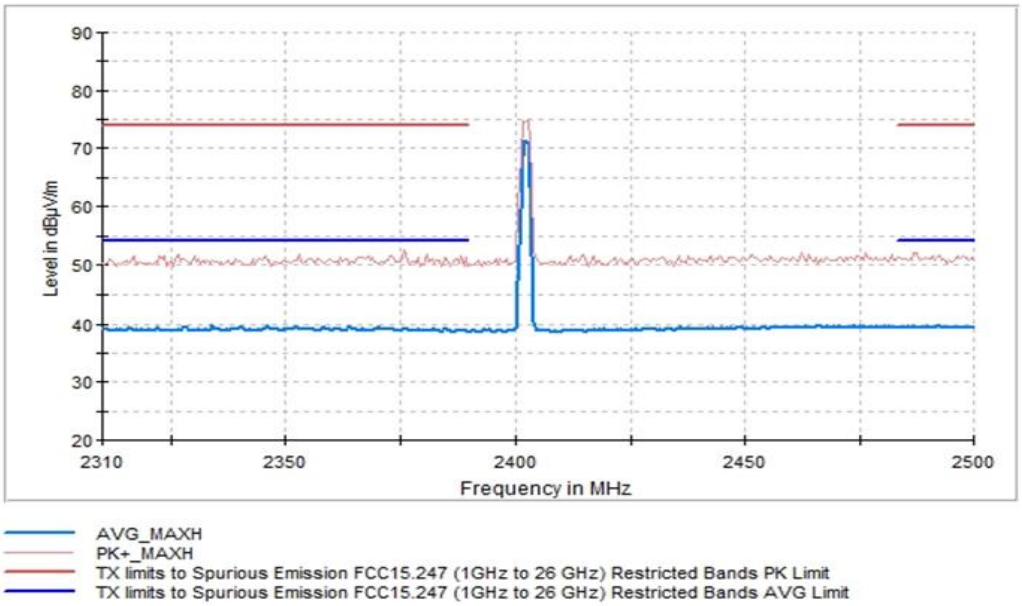
TEST RESULTS (Cont.)	

CHANNEL: Highest (2480 MHz)



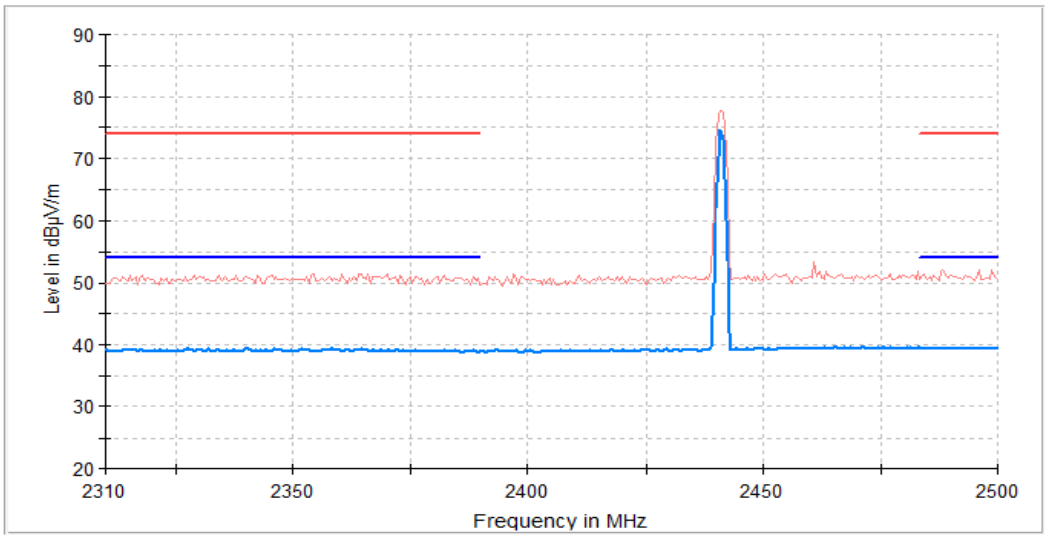
RESTRICTED BANDS	2.31 GHz – 2.5 GHz (PI4DQPSK)

CHANNEL: Lowest (2402 MHz)



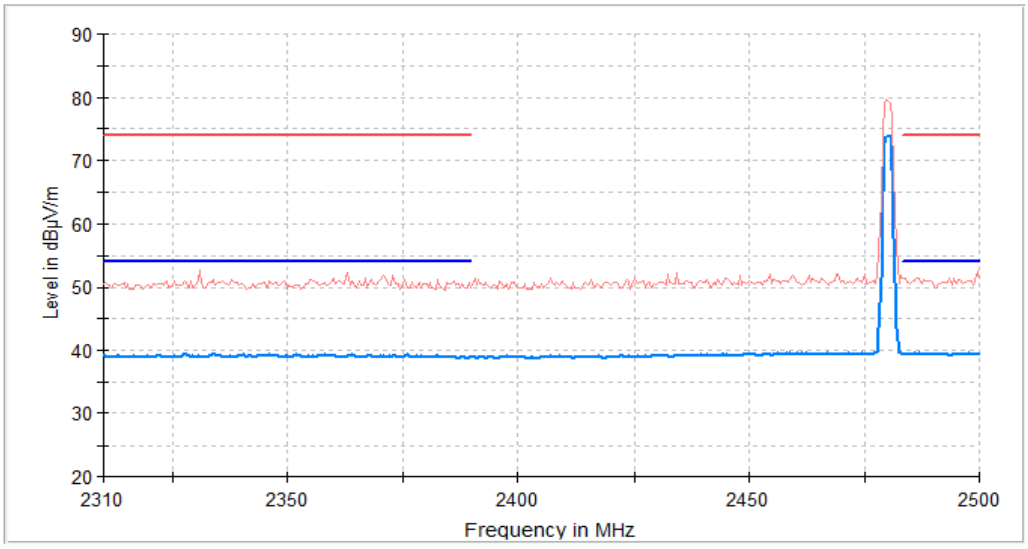
TEST RESULTS (Cont.)	

CHANNEL: Middle (2441 MHz)



AVG_MAXH
PK+_MAXH
TX limits to Spurious Emission FCC15.247 (1GHz to 26 GHz) Restricted Bands PK Limit
TX limits to Spurious Emission FCC15.247 (1GHz to 26 GHz) Restricted Bands AVG Limit

CHANNEL: Highest (2480 MHz)



AVG_MAXH
PK+_MAXH
TX limits to Spurious Emission FCC15.247 (1GHz to 26 GHz) Restricted Bands PK Limit
TX limits to Spurious Emission FCC15.247 (1GHz to 26 GHz) Restricted Bands AVG Limit

TEST RESULTS (Cont.)	
TESTED SAMPLES:	S/02
TESTED CONDITIONS MODES:	TC#03 (8DPSK)
TEST RESULTS:	PASS

Co-Location

The test was performed with the equipment transmitting first with only the 2.4 GHz BT-EDR radio and repeated with the WiFi 2.4GHz (WLAN0 CORE1), and WiFi 5 GHz (WLAN0 CORE0) radios transmitting simultaneously to check the impact of the co-location of the other radio interfaces. The results and plots below show the worst results obtained.

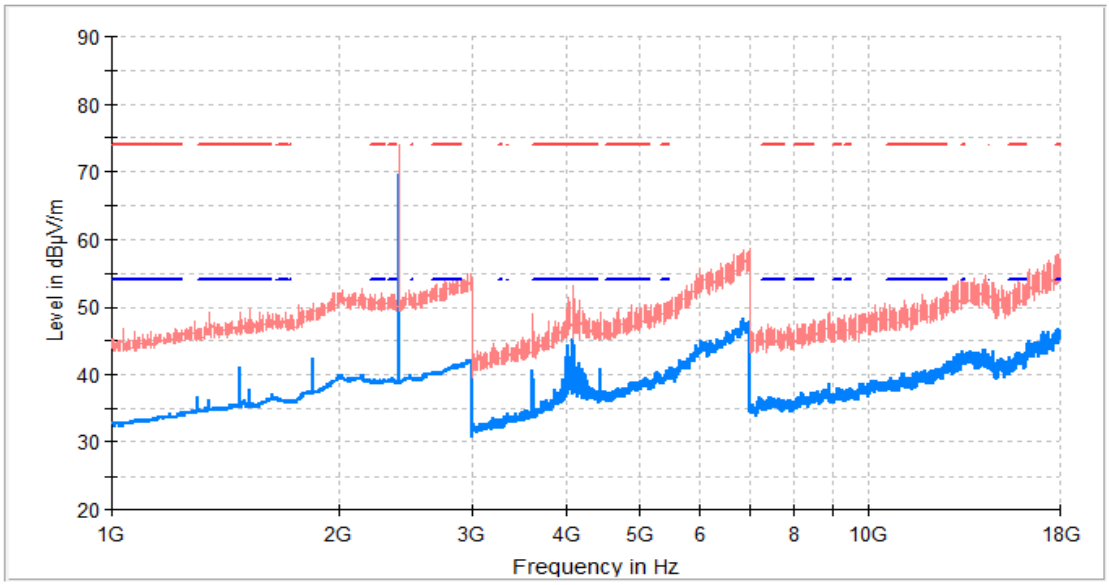
Frequency range 1 GHz – 26 GHz

The results in the next tables show the maximum measured levels in the 1-26 GHz range including the restricted bands 2.31-2.39 GHz and 2.4835-2.5 GHz (see next plots).

The radiated spurious signals detected at less than 10 dB respect to the limit for the lowest, middle and highest operating channels are showed in the tables below of each frequency range.

TEST RESULTS (Cont.)	
FREQUENCY RANGE	**1 GHz – 18 GHz (8DPSK)**

CHANNEL: Lowest (2402 MHz)



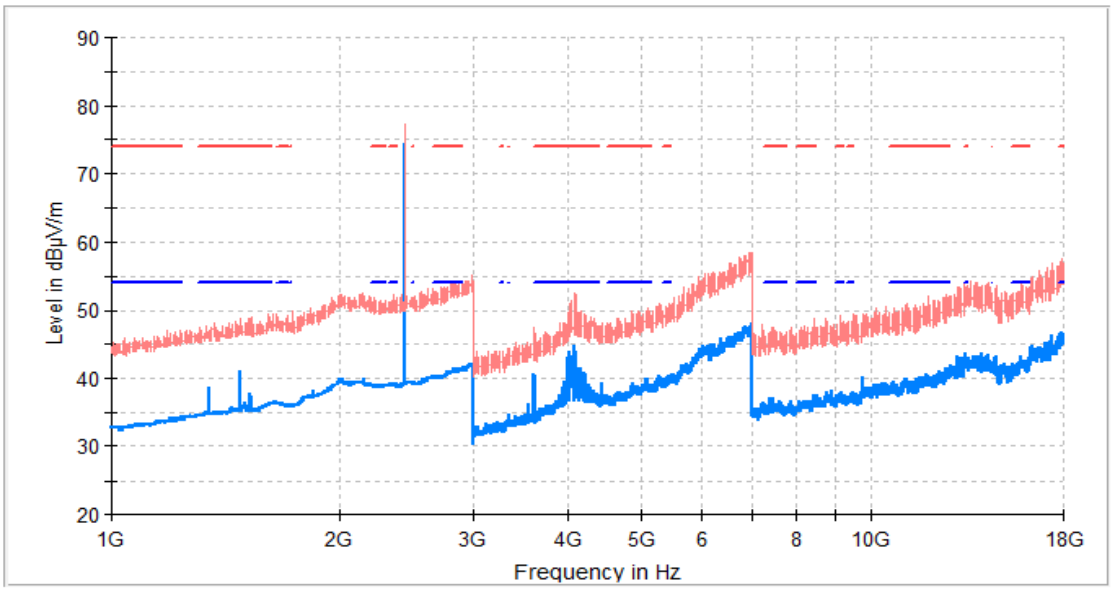
AVG_MAXH
PK+_MAXH
TX limits to Spurious Emission FCC15.247 (1GHz to 26 GHz) Restricted Bands PK Limit
TX limits to Spurious Emission FCC15.247 (1GHz to 26 GHz) Restricted Bands AVG Limit

Maximizations

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Comments
1485.000000	49.20	41.15	H	
1851.000000	50.47	42.44	V	
2402.500000	74.06	69.71	V	Fundamental
3609.000000	48.17	40.59	V	
4063.500000	52.13	45.39	V	
4455.000000	49.22	40.99	V	

TEST RESULTS (Cont.)	

CHANNEL: Middle (2441 MHz)



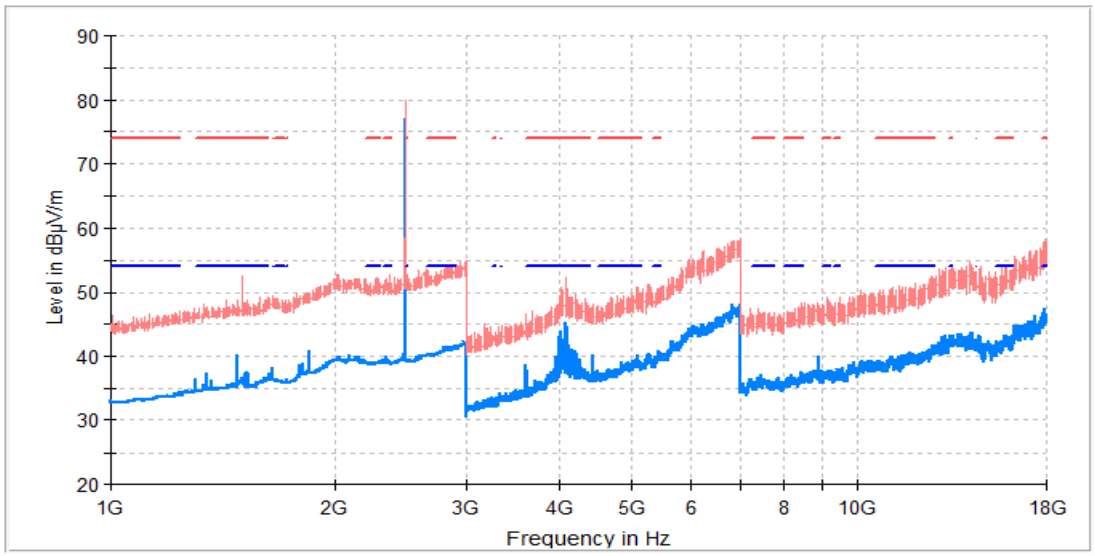
AVG_MAXH
PK+_MAXH
TX limits to Spurious Emission FCC15.247 (1GHz to 26 GHz) Restricted Bands PK Limit
TX limits to Spurious Emission FCC15.247 (1GHz to 26 GHz) Restricted Bands AVG Limit

Maximizations

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Comments
1350.000000	47.00	38.51	H	
1485.000000	48.58	41.31	V	
2441.000000	77.44	74.42	V	Fundamental
3609.500000	47.38	40.58	V	
4064.000000	51.54	44.73	V	

TEST RESULTS (Cont.)	

CHANNEL: Highest (2480 MHz)



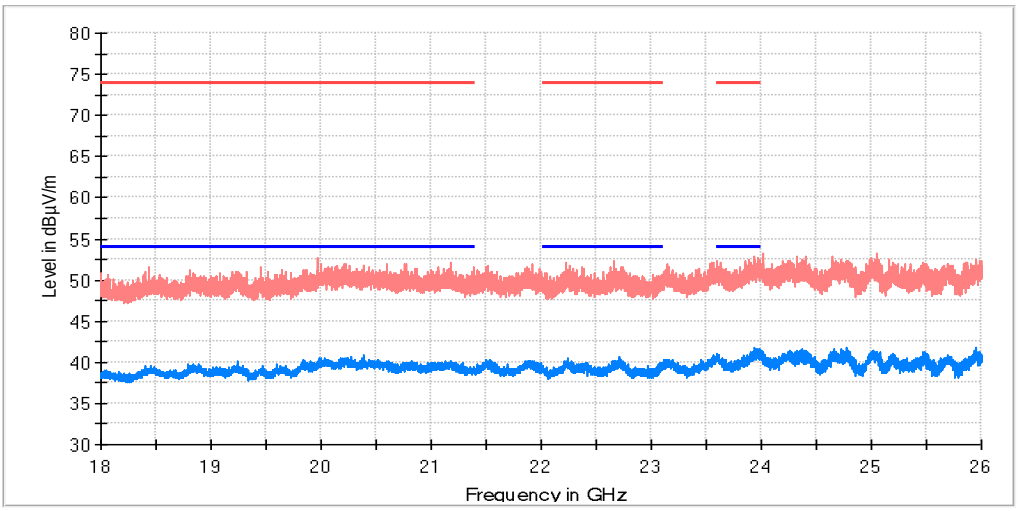
AVG_MAXH
PK+_MAXH
TX limits to Spurious Emission FCC15.247 (1GHz to 26 GHz) Restricted Bands PK Limit
TX limits to Spurious Emission FCC15.247 (1GHz to 26 GHz) Restricted Bands AVG Limit

Maximizations

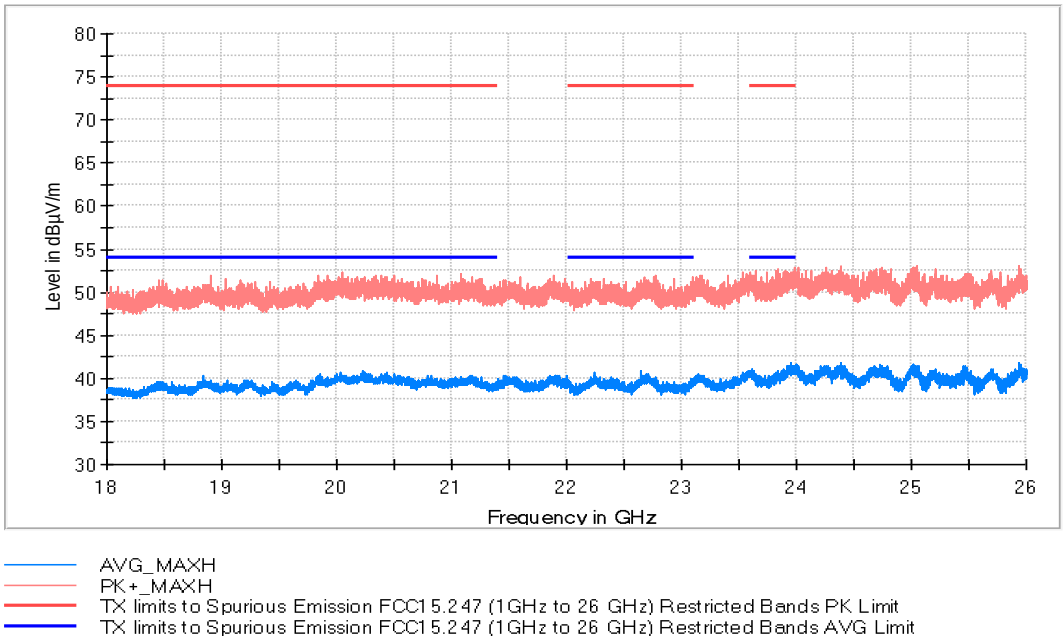
Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Comments
1485.000000	48.71	40.16	H	
1852.500000	49.60	41.03	V	
2480.000000	79.96	77.00	V	Fundamental
3609.000000	45.31	38.49	V	
4063.000000	52.40	45.28	V	
8909.500000	47.82	39.91	V	

TEST RESULTS (Cont.)	
FREQUENCY RANGE	**18 GHz – 26 GHz (8DPSK)**

CHANNEL: Lowest (2402 MHz)

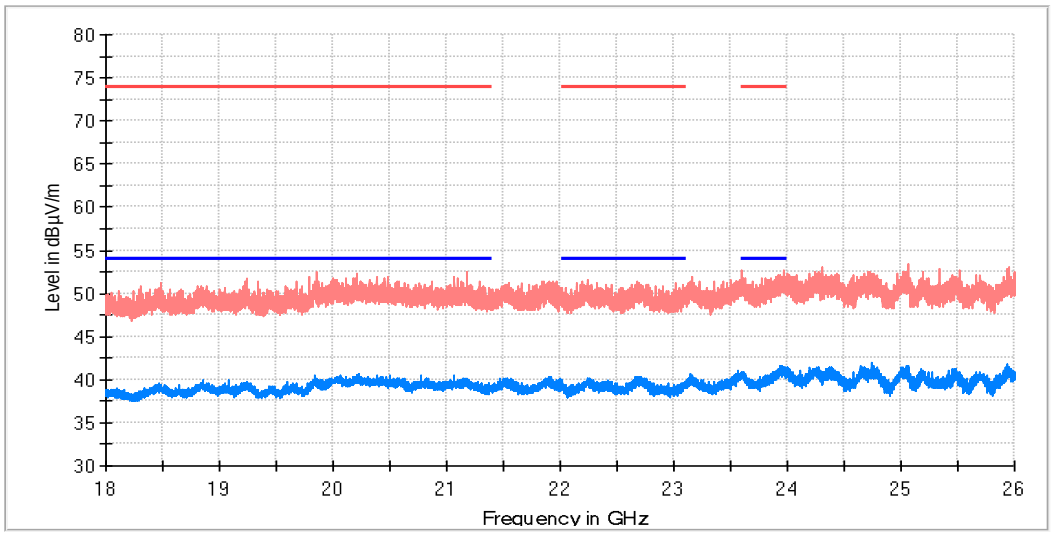


CHANNEL: Middle (2441 MHz)



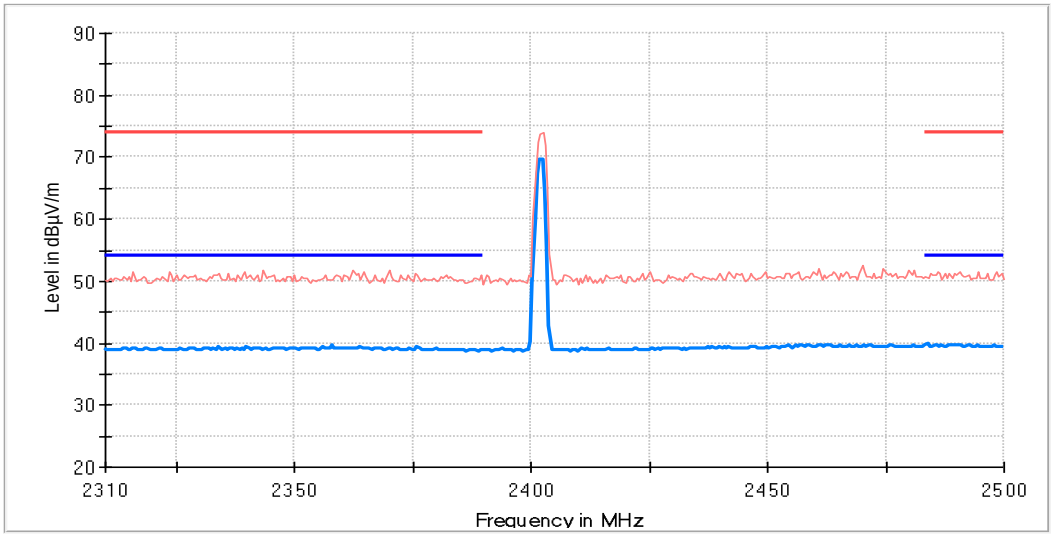
TEST RESULTS (Cont.)	

CHANNEL: Highest (2480 MHz)



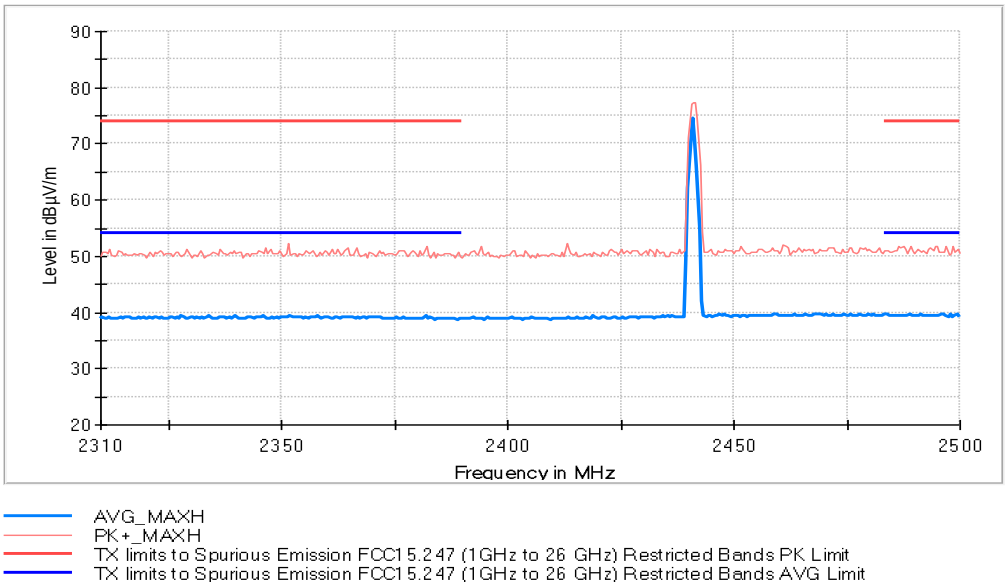
RESTRICTED BANDS	2.31 GHz – 2.5 GHz (8DPSK)

CHANNEL: Lowest (2402 MHz)

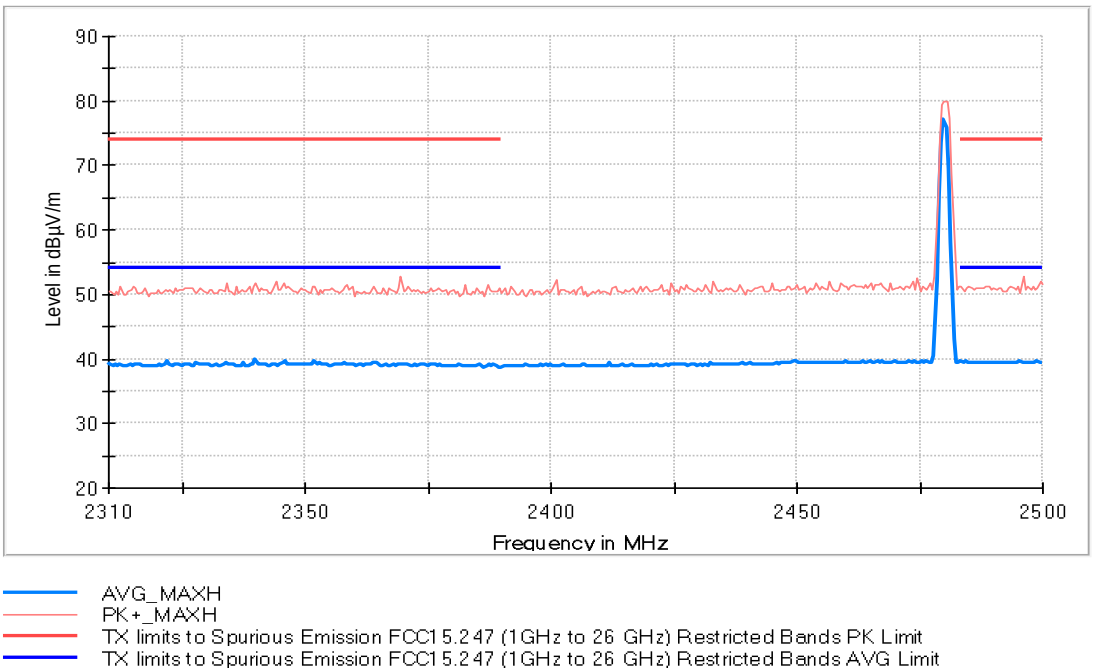


TEST RESULTS (Cont.)	

CHANNEL: Middle (2441 MHz)



CHANNEL: Highest (2480 MHz)



Appendix B: Test results (WIFI 2.4GHz)

Appendix B Content

PRODUCT INFORMATION

The following information is provided by the supplier, in accordance with clause 5.4.1:

Information	**Description**
Modulation	DSSS/OFDM
Maximum RF Output Power	15 dBm
Operation mode 1: Single Antenna Equipment	Equipment with only one antenna
- Operating Frequency Range	2412 – 2480 MHz
- Nominal Channel Bandwidth	20 MHz/40 MHz
Extreme operating conditions	
- Temperature range	-40 ºC to +85 ºC
Antenna type	Integral Antenna
Antenna gain	-3.5 dBi
Nominal Voltage	
- Supply Voltage	14.4 Vdc
- Type of power source	DC voltage
Equipment type	WIFI 2.4GHz b/g/n20/n40
Geo-location capability	No

DESCRIPTION OF TEST CONDITIONS

TEST CONDITIONS[(1)(2)]	DESCRIPTION
TC#01 **(WIFI 2.4GHz b mode)**	Power supply (V): $V_{nominal}$ = 14.4 Vdc Channel Bandwidth: 20 MHz Test Frequencies for Conducted/Radiated tests: Lowest channel (1): 2412 MHz Middle channel (6): 2437 MHz Highest channel (11): 2462 MHz
TC#02 **(WIFI 2.4GHz g mode)**	Power supply (V): $V_{nominal}$ = 14.4 Vdc Channel Bandwidth: 20 MHz Test Frequencies for Conducted/Radiated tests: Lowest channel (1): 2412 MHz Middle channel (6): 2437 MHz Highest channel (11): 2462 MHz
TC#03 **(WIFI 2.4GHz n mode)**	Power supply (V): $V_{nominal}$ = 14.4 Vdc Channel Bandwidth: **20 MHz** Test Frequencies for Conducted/Radiated tests: Lowest channel (1): 2412 MHz Middle channel (6): 2437 MHz Highest channel (11): 2462 MHz

TC#04 **(WIFI 2.4GHz n mode)**	Power supply (V): $V_{nominal}$ = 14.4 Vdc Channel Bandwidth: **40 MHz** Test Frequencies for Conducted/Radiated tests: Lowest channel (3): 2422 MHz Middle channel (6): 2437 MHz Highest channel (9): 2452 MHz

Note (1): For radiated spurious emissions for OFDM modes 802.11g, 802.11n20 and 802.11n40 a preliminary scan was performed to determine the worst case. The tables and plots show the results for the worst case of DSSS modulation (802.11b) and OFDM modulation (802.11g).

Note (2): For radiated/conducted measurements, a preliminary scan was performed to determine the worst case. The data rates of 1Mb/s for 802.11b, 6Mb/s for 802.11g, MSC0 for 802.11n20 and n40 were selected based on preliminary testing that identified those rates corresponding to the worst cases.

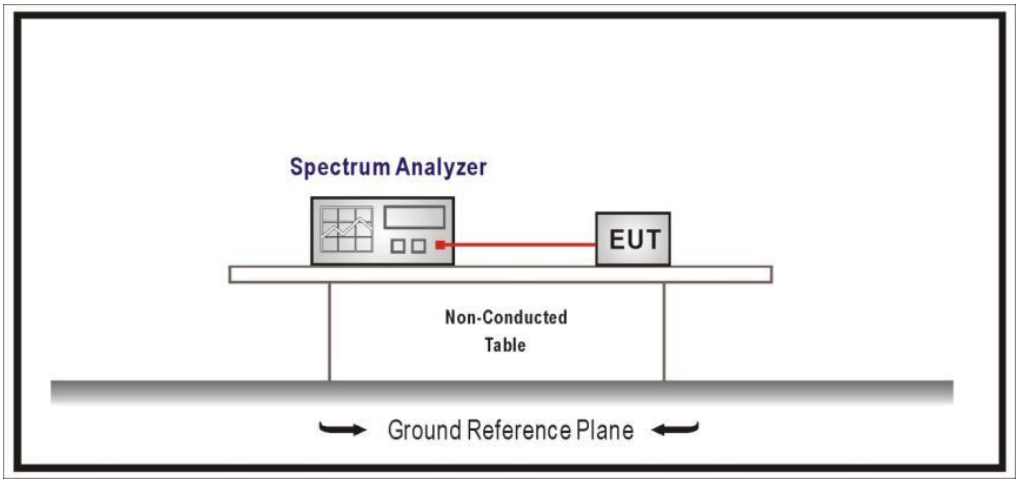
TEST B.1: 99% OCCUPIED BANDWIDTH AND 6DB BANDWIDTH

LIMITS:	Product standard:	Part 15 Subpart C §15.247 and RSS-247
	Test standard:	Part 15 Subpart C §15.247(a)(2) and RSS-247 5.2(a)

LIMITS

Systems using digital modulation techniques may operate in the 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 KHz.

TEST SETUP	



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

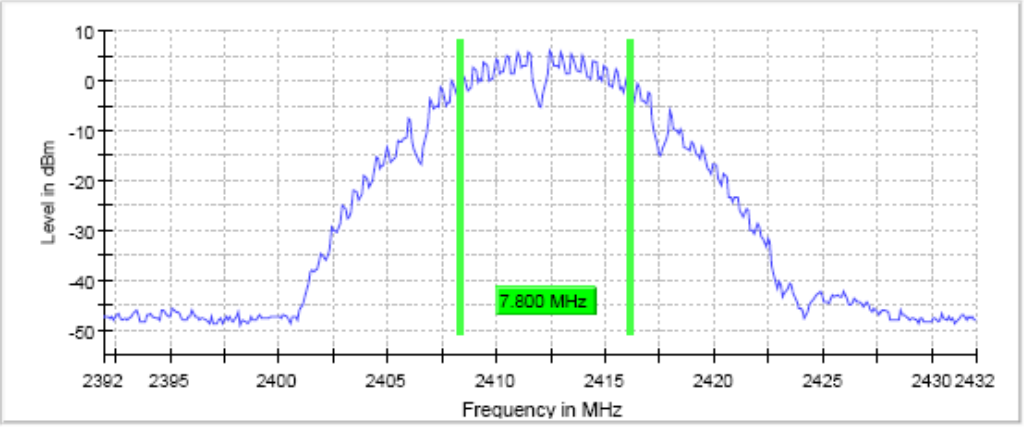
	Lowest frequency 2412 MHz	Middle frequency 2437 MHz	Highest frequency 2462 MHz
6dB Bandwidth (MHz)	7.8	7.8	8.8
Occupied bandwidth (MHz)	12.6	13.2	13.6
Measurement uncertainty (kHz)	<± 1.80		

6 dB Measurement

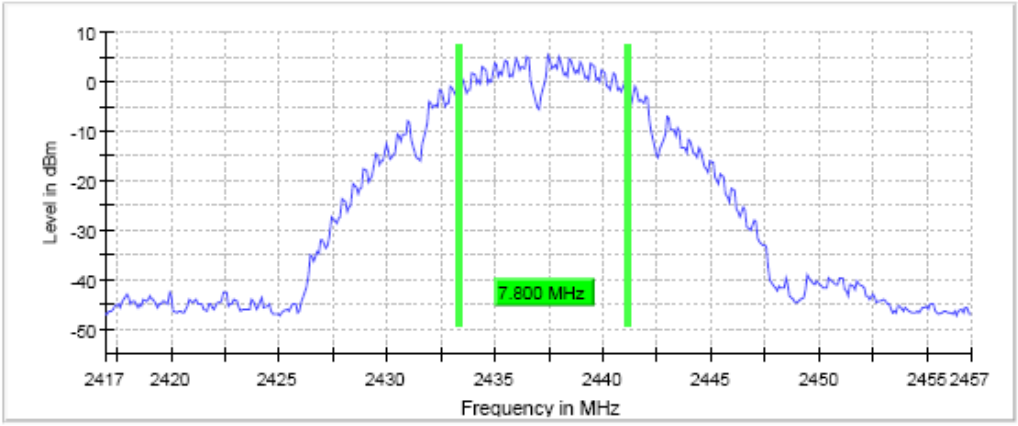
Setting	Instrument Value	Instrument Value	Instrument Value
Start Frequency	2.39200 GHz	2.41700 GHz	2.44200 GHz
Stop Frequency	2.43200 GHz	2.45700 GHz	2.48200 GHz
Span	40.00 MHz	40.000 MHz	40.000 MHz
RBW	100.000 kHz	100.000 kHz	100.000 kHz
VBW	300.000 kHz	300.000 kHz	300.000 kHz
SweepPoints	400	400	400
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	100	100	100
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	0.50 dB	0.50 dB	0.50 dB
Run	9 / max. 150	11 / max. 150	8 / max. 150
Stable	5 / 5	5 / 5	5 / 5
Max Stable Difference	0.06 dB	0.00 dB	0.29 dB

TEST RESULTS (Cont.):	6 dB BANDWIDTH

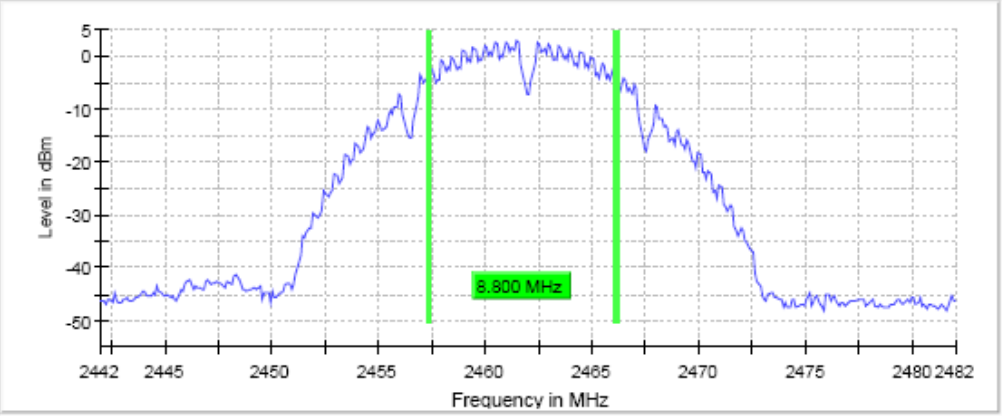
Lowest Channel



Middle Channel



Highest Channel



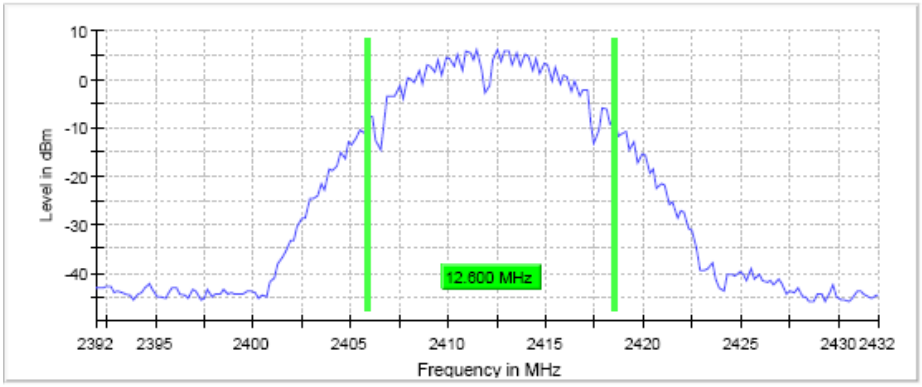
TEST RESULTS (Cont.):	OCCUPIED BANDWIDTH

99% OBW Measurement

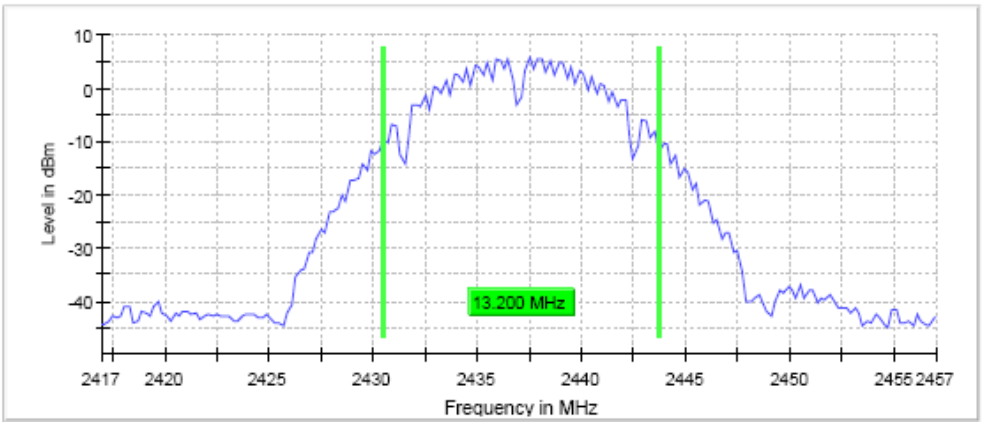
Setting	Instrument Value	Instrument Value	Instrument Value
Start Frequency	2.39200 GHz	2.41700 GHz	2.44200 GHz
Stop Frequency	2.43200 GHz	2.45700 GHz	2.48200 GHz
Span	40.00 MHz	40.000 MHz	40.000 MHz
RBW	200.000 kHz	200.000 kHz	200.000 kHz
VBW	1.000 MHz	1.000 MHz	1.000 MHz
SweepPoints	200	200	200
Sweeptime	28.443 µs	28.443 µs	28.443 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	100	100	100
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	5 / max. 150	4 / max. 150	4 / max. 150
Stable	3 / 3	3 / 3	3 / 3
Max Stable Difference	0.02 dB	0.06 dB	0.06 dB

TEST RESULTS (Cont.):	OCCUPIED BANDWIDTH

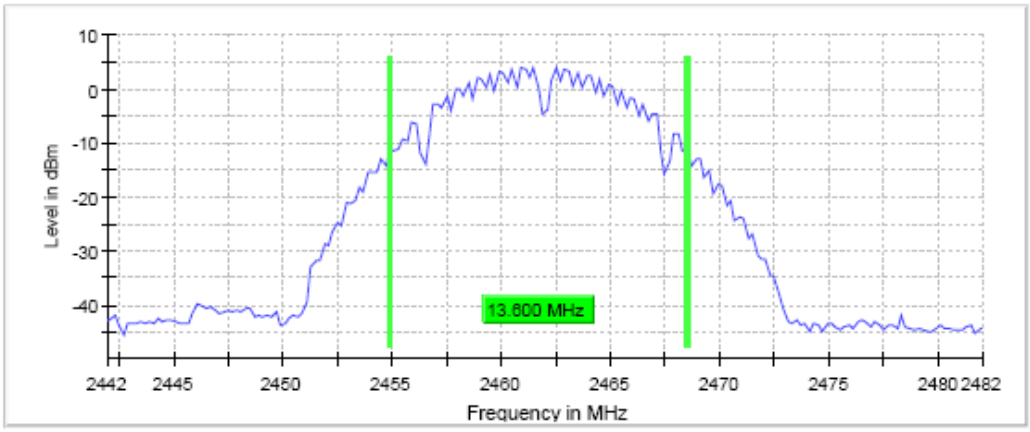
Lowest Channel



Middle Channel



Highest Channel



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

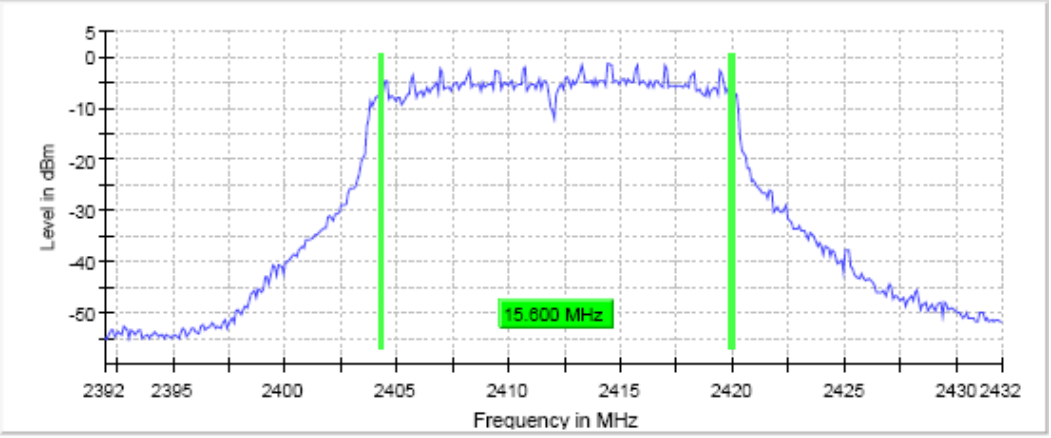
	Lowest frequency 2412 MHz	Middle frequency 2437 MHz	Highest frequency 2462 MHz
6dB Bandwidth (MHz)	15.6	16.1	16.1
Occupied bandwidth (MHz)	16.4	16.6	16.8
Measurement uncertainty (kHz)	<± 1.80		

6 dB Measurement

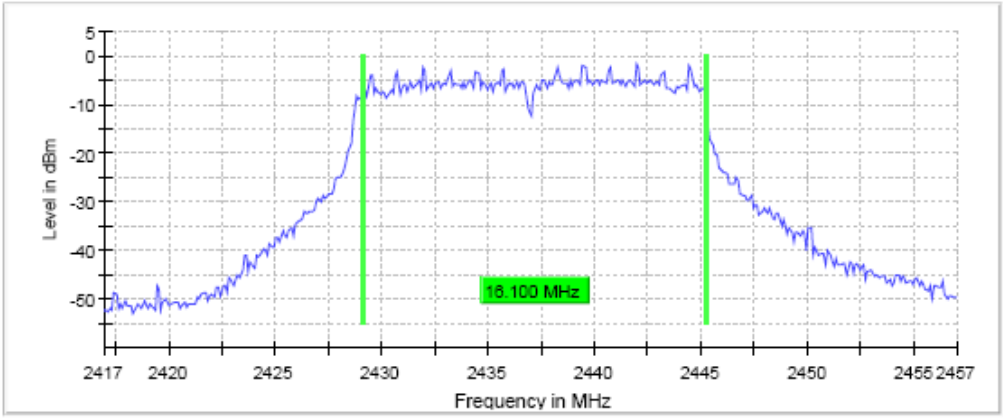
Setting	Instrument Value	Instrument Value	Instrument Value
Start Frequency	2.39200 GHz	2.41700 GHz	2.44200 GHz
Stop Frequency	2.43200 GHz	2.45700 GHz	2.48200 GHz
Span	40.00 MHz	40.000 MHz	40.000 MHz
RBW	100.000 kHz	100.000 kHz	100.000 kHz
VBW	300.000 kHz	300.000 kHz	300.000 kHz
SweepPoints	400	400	400
Sweeptime	56.886 µs	56.886 µs	56.886 µs
Reference Level	10.000 dBm	10.000 dBm	10.000 dBm
Attenuation	30.000 dB	30.000 dB	30.000 dB
Detector	MaxPeak	MaxPeak	MaxPeak
SweepCount	100	100	100
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	0.50 dB	0.50 dB	0.50 dB
Run	30 / max. 150	33 / max. 150	28 / max. 150
Stable	5 / 5	5 / 5	5 / 5
Max Stable Difference	0.07 dB	0.41 dB	0.48 dB

TEST RESULTS (Cont.):	6 dB BANDWIDTH

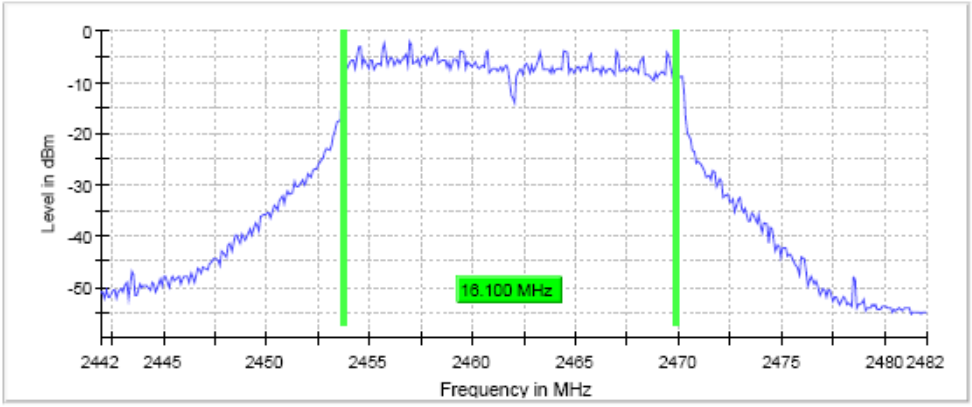
Lowest Channel



Middle Channel



Highest Channel



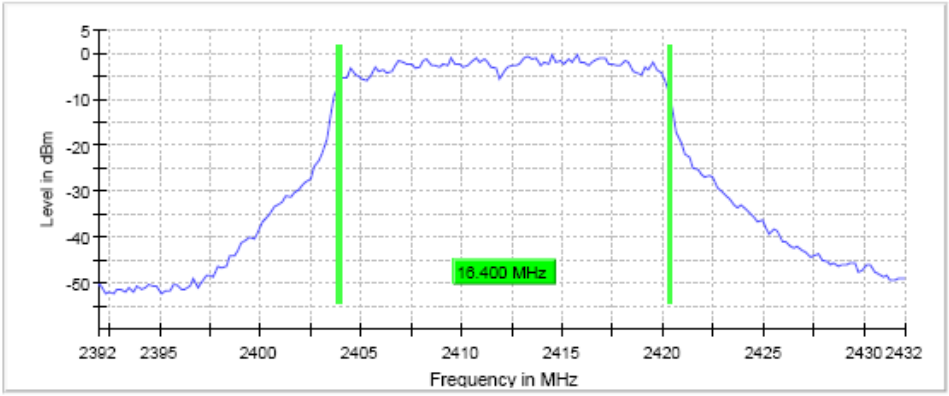
TEST RESULTS (Cont.):	OCCUPIED BANDWIDTH

99% OBW Measurement

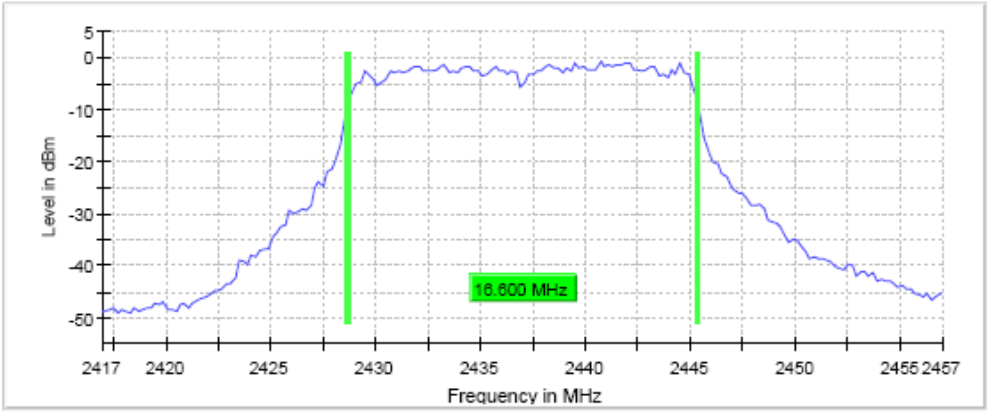
Setting	Instrument Value	Instrument Value	Instrument Value
Start Frequency	2.39200 GHz	2.41700 GHz	2.44200 GHz
Stop Frequency	2.43200 GHz	2.45700 GHz	2.48200 GHz
Span	40.00 MHz	40.000 MHz	40.000 MHz
RBW	200.000 kHz	200.000 kHz	200.000 kHz
VBW	1.000 MHz	1.000 MHz	1.000 MHz
SweepPoints	200	200	200
Sweeptime	28.443 µs	28.443 µs	28.443 µs
Reference Level	10.000 dBm	10.000 dBm	10.000 dBm
Attenuation	30.000 dB	30.000 dB	30.000 dB
Detector	MaxPeak	MaxPeak	MaxPeak
SweepCount	100	100	100
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	17 / max. 150	39 / max. 150	32 / max. 150
Stable	3 / 3	3 / 3	3 / 3
Max Stable Difference	0.25 dB	0.00 dB	0.04 dB

TEST RESULTS (Cont.):	OCCUPIED BANDWIDTH

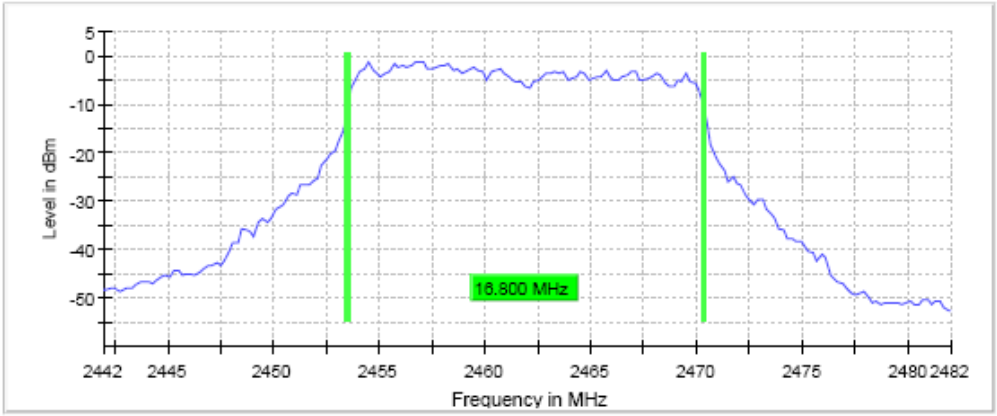
Lowest Channel



Middle Channel



Highest Channel



TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#03 (n Mode)
TEST RESULTS:	PASS

Bandwidth: 20 MHz

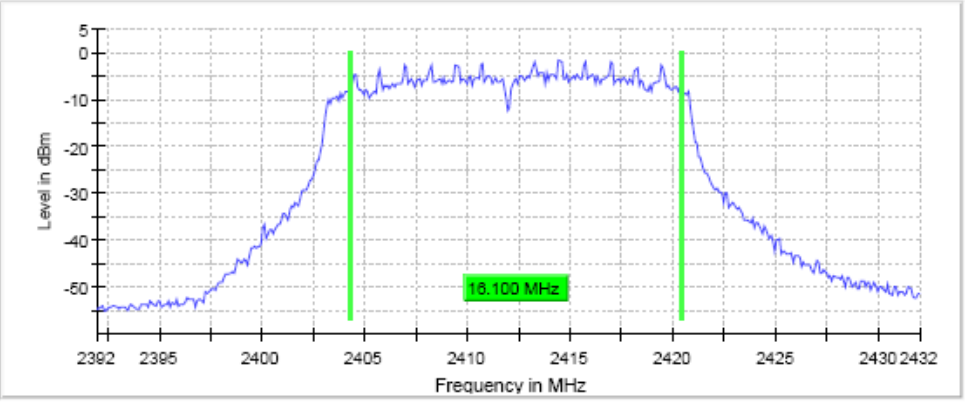
	Lowest frequency 2412 MHz	Middle frequency 2437 MHz	Highest frequency 2462 MHz
6dB bandwidth (MHz)	16.1	17.1	16.5
Occupied bandwidth (MHz)	17.4	17.8	17.8
Measurement uncertainty (kHz)	<± 1.80		

6 dB Measurement

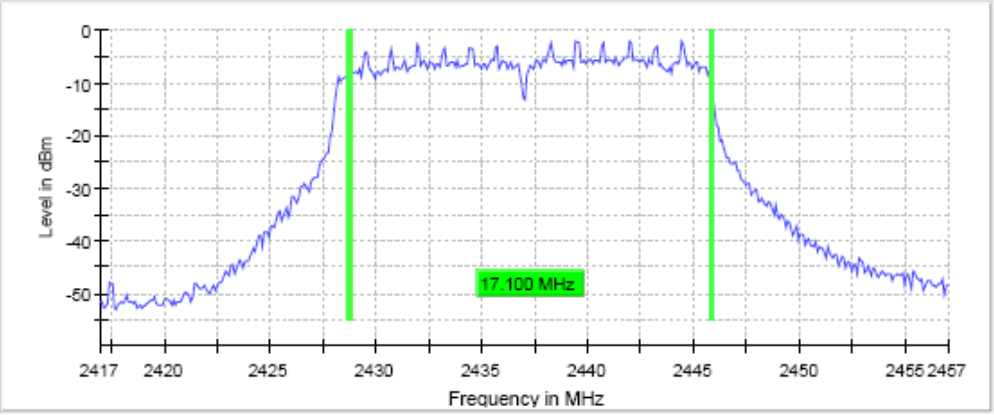
Setting	Instrument Value	Instrument Value	Instrument Value
Start Frequency	2.39200 GHz	2.41700 GHz	2.44200 GHz
Stop Frequency	2.43200 GHz	2.45700 GHz	2.48200 GHz
Span	40.00 MHz	40.000 MHz	40.000 MHz
RBW	100.000 kHz	100.000 kHz	100.000 kHz
VBW	300.000 kHz	300.000 kHz	300.000 kHz
SweepPoints	400	400	400
Sweeptime	56.886 µs	56.886 µs	56.886 µs
Reference Level	10.000 dBm	20.000 dBm	10.000 dBm
Attenuation	30.000 dB	40.000 dB	30.000 dB
Detector	MaxPeak	MaxPeak	MaxPeak
SweepCount	100	100	100
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	0.50 dB	0.50 dB	0.50 dB
Run	31 / max. 150	23 / max. 150	25 / max. 150
Stable	5 / 5	5 / 5	5 / 5
Max Stable Difference	0.18 dB	0.49 dB	0.17 dB

TEST RESULTS (Cont.):	6 dB BANDWIDTH

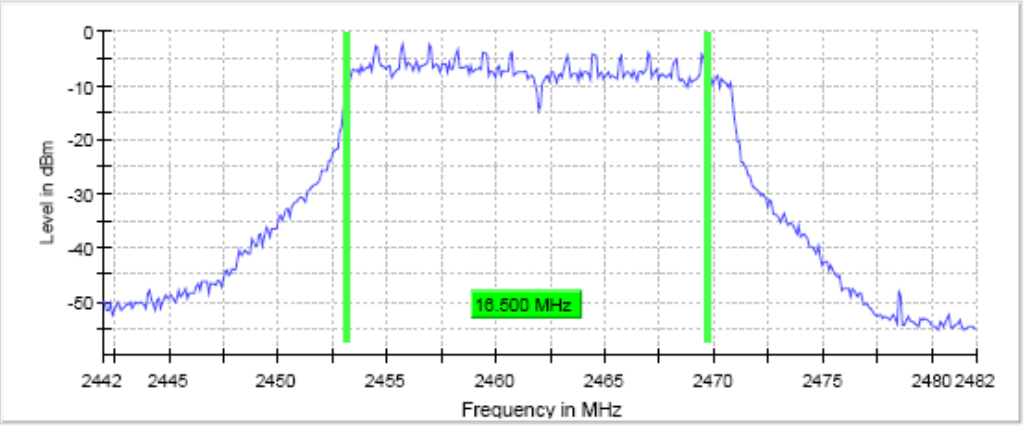
Lowest Channel



Middle Channel



Highest Channel



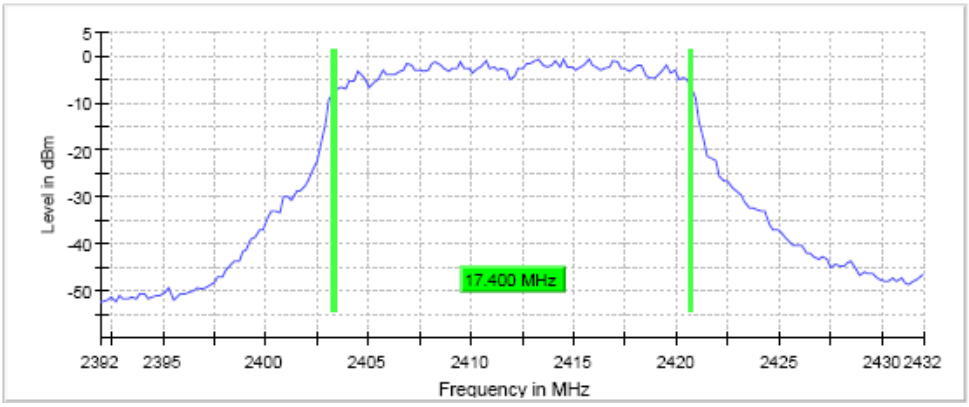
TEST RESULTS (Cont.):	OCCUPIED BANDWIDTH

99% OBW Measurement

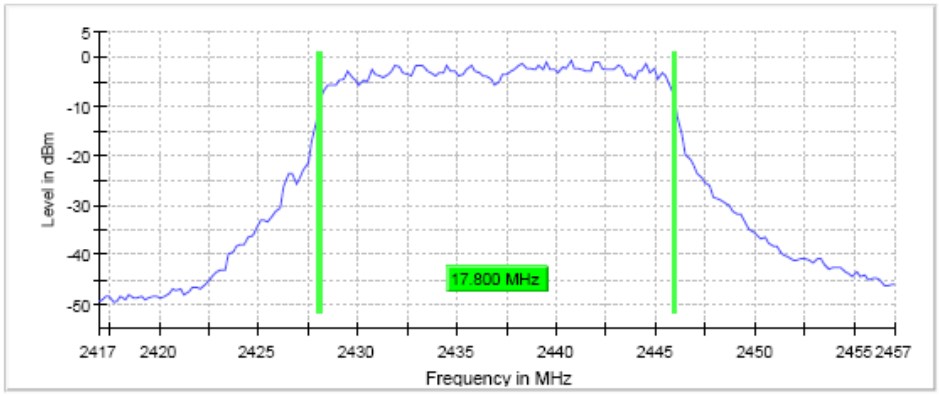
Setting	Instrument Value	Instrument Value	Instrument Value
Start Frequency	2.39200 GHz	2.41700 GHz	2.44200 GHz
Stop Frequency	2.43200 GHz	2.45700 GHz	2.48200 GHz
Span	40.00 MHz	40.000 MHz	40.000 MHz
RBW	200.000 kHz	200.000 kHz	200.000 kHz
VBW	1.000 MHz	1.000 MHz	1.000 MHz
SweepPoints	200	200	200
Sweeptime	28.443 µs	28.443 µs	28.443 µs
Reference Level	10.000 dBm	10.000 dBm	10.000 dBm
Attenuation	30.000 dB	30.000 dB	30.000 dB
Detector	MaxPeak	MaxPeak	MaxPeak
SweepCount	100	100	100
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	37 / max. 150	35 / max. 150	26 / max. 150
Stable	3 / 3	3 / 3	3 / 3
Max Stable Difference	0.00 dB	0.29 dB	0.23 dB

TEST RESULTS (Cont.):	OCCUPIED BANDWIDTH

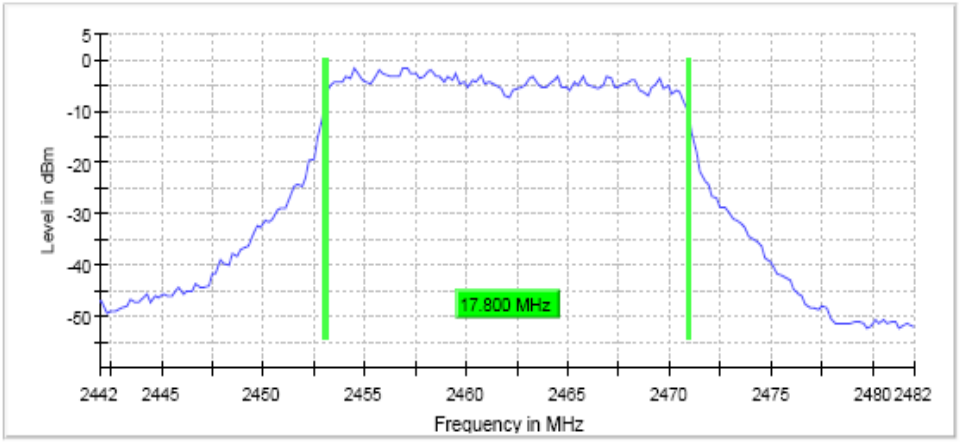
Lowest Channel



Middle Channel



Highest Channel



TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#04 (n Mode)
TEST RESULTS:	PASS

Bandwidth: 40 MHz

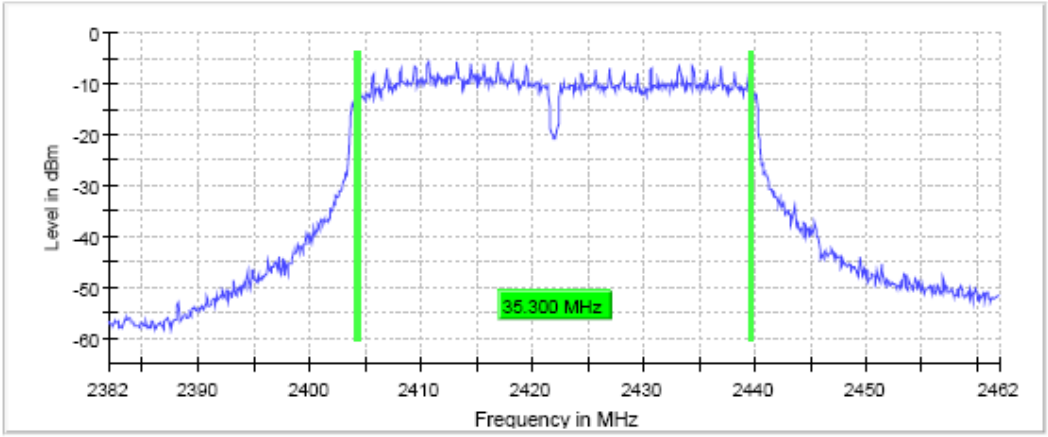
	Lowest frequency 2422 MHz	Middle frequency 2437 MHz	Highest frequency 2452 MHz
6dB bandwidth (MHz)	35.3	35.3	35.3
Occupied bandwidth (MHz)	36.5	36.5	36.5
Measurement uncertainty (kHz)	<± 1.80		

6 dB Measurement

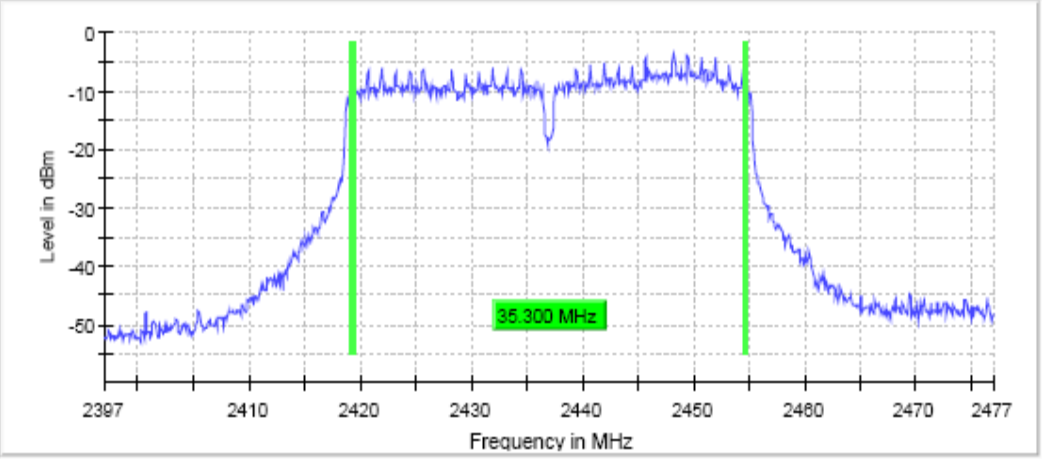
Setting	Instrument Value	Instrument Value	Instrument Value
Start Frequency	2.38200 GHz	2.39700 GHz	2.41200 GHz
Stop Frequency	2.46200 GHz	2.47700 GHz	2.49200 GHz
Span	80.00 MHz	80.00 MHz	80.00 MHz
RBW	100.000 kHz	100.000 kHz	100.000 kHz
VBW	300.000 kHz	300.000 kHz	300.000 kHz
SweepPoints	800	800	800
Sweeptime	94.810 µs	94.810 µs	94.810 µs
Reference Level	10.000 dBm	10.000 dBm	10.000 dBm
Attenuation	30.000 dB	30.000 dB	30.000 dB
Detector	MaxPeak	MaxPeak	MaxPeak
SweepCount	100	100	100
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	0.50 dB	0.50 dB	0.50 dB
Run	35 / max. 150	54 / max. 150	53 / max. 150
Stable	5 / 5	5 / 5	5 / 5
Max Stable Difference	0.41 dB	0.40 dB	0.42 dB

TEST RESULTS (Cont.):	6 dB BANDWIDTH

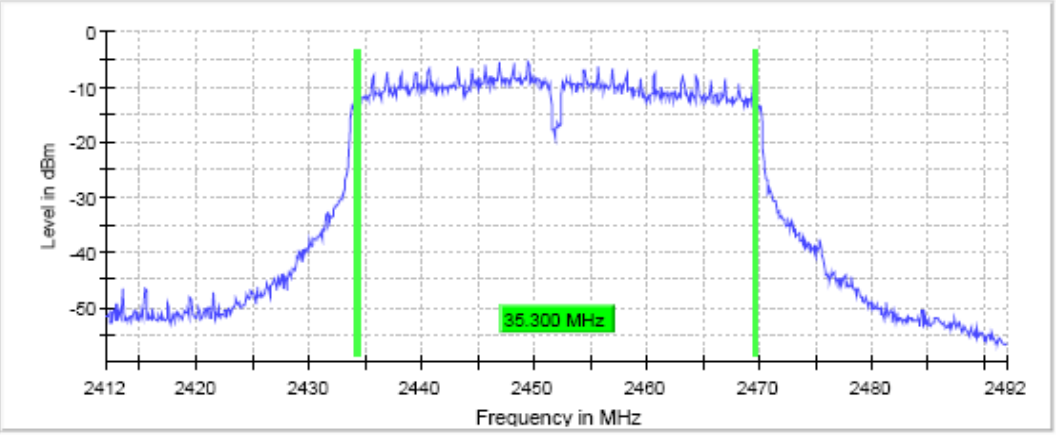
Lowest Channel



Middle Channel



Highest Channel



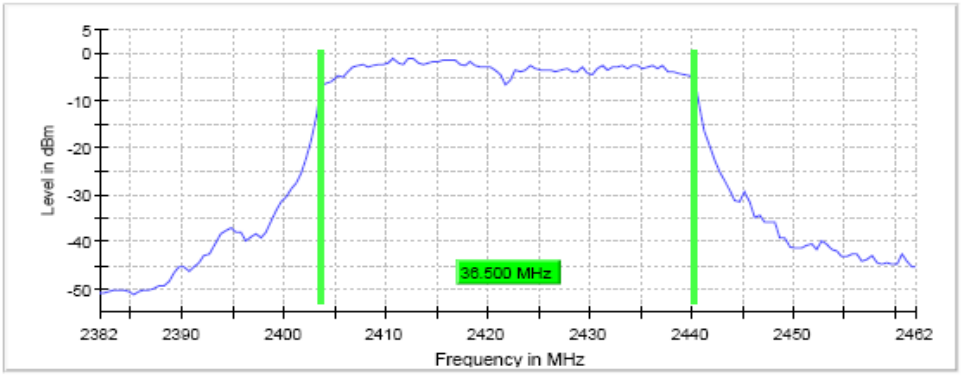
TEST RESULTS (Cont.):	OCCUPIED BANDWIDTH

99% OBW Measurement

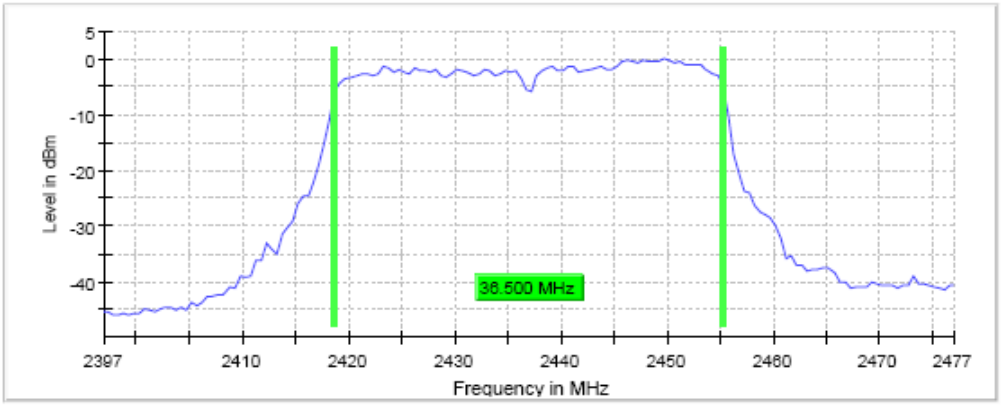
Setting	Instrument Value	Instrument Value	Instrument Value
Start Frequency	2.38200 GHz	2.39700 GHz	2.41200 GHz
Stop Frequency	2.46200 GHz	2.47700 GHz	2.49200 GHz
Span	80.00 MHz	80.00 MHz	80.00 MHz
RBW	500.000 kHz	500.000 kHz	500.000 kHz
VBW	2.000 MHz	2.000 MHz	2.000 MHz
SweepPoints	160	160	160
Sweeptime	18.962 µs	18.962 µs	18.962 µs
Reference Level	10.000 dBm	10.000 dBm	10.000 dBm
Attenuation	30.000 dB	30.000 dB	30.000 dB
Detector	MaxPeak	MaxPeak	MaxPeak
SweepCount	100	100	100
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	42 / max. 150	32/ max. 150	42 / max. 150
Stable	3 / 3	3 / 3	3 / 3
Max Stable Difference	0.07 dB	0.16 dB	0.00 dB

TEST RESULTS (Cont.):	OCCUPIED BANDWIDTH

Lowest Channel



Middle Channel



Highest Channel