
TEST REPORT FOR WLAN TSETING

Report No.: SRTC2015-9004(F)-0017

Product Name: GSM/GPRS/EDGE/UMTS Digital Mobile Phone
with Bluetooth and WiFi

Product Model: Philips S358

Applicant: Shenzhen Sang Fei Consumer Communications Co.,Ltd.

Manufacturer: Shenzhen Sang Fei Consumer Communications Co.,Ltd

Specification: FCC Part 15, Subpart C (August 20, 2015 edition)

FCC ID: VQRCTS358

The State Radio_monitoring_center Testing Center (SRTC)

No.80 Beilishi Road Xicheng District Beijing, China

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1. GENERAL INFORMATION

1.1 Notes of the test report

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The test results relate only to individual items of the samples which have been tested.

1.2 Information about the testing laboratory

Company:	The State Radio_monitoring_center Testing Center (SRTC)
Address:	No.80 Beilishi Road, Xicheng District
City:	Beijing
Country or Region:	P.R.China
Contacted person:	Liu jia
Tel:	+86 10 5799 6181
Fax:	+86 10 5799 6288
Email:	liujiaf@srtc.org.cn

1.3 Applicant's details

Company:	Shenzhen Sang Fei Consumer Communications Co.,Ltd.
Address:	11 Science & Technology Rd., Shenzhen Hi-tech Industrial Park, Nanshan District
City:	Shenzhen
Country or Region:	P.R.China
Grantee Code:	VQRCT
Contacted person:	Helen.Lin
Tel:	0755-33308888
Fax:	0755-26614979
Email:	Helen.Lin@sangfei.com

1.4 Manufacturer's details

Company:	Shenzhen Sang Fei Consumer Communications Co.,Ltd.
Address:	11 Science & Technology Rd., Shenzhen Hi-tech Industrial Park, Nanshan District
City:	Shenzhen
Country or Region:	P.R.China
Contacted person:	Helen.Lin
Tel:	0755-33308888
Fax:	0755-26614979
Email:	Helen.Lin@sangfei.com

1.5 Test Environment

Date of Receipt of test sample at SRTC:	2015.08.20
Testing Start Date:	2015.08.21
Testing End Date:	2015.08.27

Environmental Data:	Temperature (°C)	Humidity (%)
Ambient	25	38
Maximum Extreme	55	80
Minimum Extreme	-10	---

Normal Supply Voltage (V d.c.):	3.8
Maximum Extreme Supply Voltage (V d.c.):	4.2
Minimum Extreme Supply Voltage (V d.c.):	3.5

2 DESCRIPTION OF THE DEVICE UNDER TEST

2.1 Final Equipment Build Status

Frequency Range	2.4GHz~2.4835GHz
Number of Channel	11
Modulation Type	DBPSK/DQPSK/CCK/BPSK/QPSK/16QAM/64QAM
Duplex Mode	TDD
Channel Spacing	5MHz
Data Rate	1Mbps/2Mbps/5.5Mbps/11Mbps/6Mbps/9Mbps/12Mbps /18Mbps/24Mbps/36Mbps/48Mbps/54Mbps/6.5Mbps /13.0Mbps/13.5Mbps/19.5Mbps/26.0Mbps/27.0Mbps /39.0Mbps/40.5Mbps/52.0Mbps/58.5Mbps/65Mbps /81.0Mbps/108.0Mbps/121.5Mbps/135.0Mbps
Duty Cycles	98%
Antenna Type	Fixed Internal
Power Supply	Battery or Charger
Rated Power Supply Voltage	3.8V
HW Version	WMCVc
SW Version	Philips_S358_1530_V06_VN
IMEI	866636024004792

2.2 Support Equipment

The following support equipment was used to exercise the DUT during testing:

Equipment	Battery
Manufacturer	Shenzhen tour Kelon Power Technology Co. Ltd.
Model Number	AB2300AWML
Serial Number	-----

3 REFERENCE SPECIFICATION

Specification	Version	Title
15.35	Mar. 6, 2014	Measurement detector functions and bandwidths.
15.209	Oct. 30, 1997	Radiated emission limits; general requirements.
15.247	May 1, 2014	Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz.

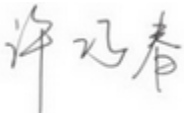
4 KEY TO NOTES AND RESULT CODES

The following are the definition of the test result.

Code	Meaning
PASS	Test result shows that the requirements of the relevant specification have been met.
FAIL	Test result shows that the requirements of the relevant specification have not been met.
N/T	Test case is not tested.
NTC	Nominal voltage, Normal Temperature
HV	High voltage, Normal Temperature
LV	Low voltage, Normal Temperature
HTHV	high voltage, High Temperature
LTHV	High voltage, Low Temperature
HTLV	Low voltage, High Temperature
LTLV	Low voltage, Low Temperature

5 RESULT SUMMARY

No.	Test case	FCC reference	Verdict
1	Peak Power Output	15.247(b)(3)	Pass
2	Occupied Bandwidth	15.247(a)(2)	Pass
3	Transmitter Power Spectral Density	15.247(e)	Pass
4	Conducted Out of band emission measurement	15.247(d)	Pass
5	Spurious Radiated Emissions	15.247(d)/15.35(b)/15.209	Pass
6	AC Power line Conducted Emission	15.207	Pass

This Test Report Is Issued by: Ms. Xu Qiaochun 	Checked by: Mr. Li Boyu 
Tested by: Mr. Jiang Shuo 	Issued date: 20150831

6 TEST RESULT

6.1 Peak Power Output

6.1.1 Ambient condition

Temperature	Relative humidity	Pressure
22°C	40%	101.5kPa

6.1.2 Test Description

A transmitter antenna terminal of EUT is connected to the power meter. Measurement is made using a broadband power meter capable of making peak and average measurements while the EUT is operating at its maximum duty cycle (>98%), at maximum power, and at the appropriate frequencies.

6.1.3 Test limit

Fcc Part15.247(b)(3)

The maximum permissible conducted output power is 1 Watt.

Used conversion factor: Limit (dBm) = 10 log (Limit (W)/1mW)

==> Maximum Output Power: 30 dBm

6.1.4 Test Procedure Used

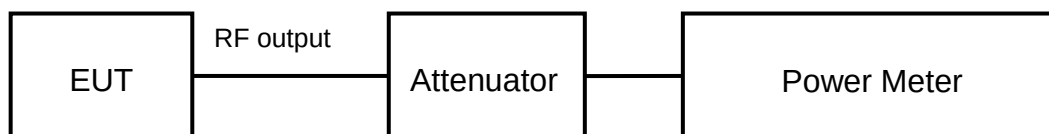
KDB 558074 D01 v03r02 – Section 9.1.2

6.1.5 Test Settings

The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall utilize a fast-responding diode detector.

6.1.6 Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.



6.1.7 Test result

Modulation type		Average power output (dBm)		
		2412MHz (Ch1)	2437MHz (Ch6)	2462MHz (Ch11)
11b	1 Mbps	15.80	15.92	16.05
	2 Mbps	15.51	15.71	15.97
	5.5 Mbps	15.43	15.69	16.02
	11 Mbps	15.75	15.80	16.01
11g	6 Mbps	11.65	13.59	14.03
	9 Mbps	11.59	13.51	13.98
	12 Mbps	11.51	13.46	13.81
	18 Mbps	11.49	13.32	13.67
	24 Mbps	11.41	13.24	13.43
	36 Mbps	11.32	13.11	13.24
	48 Mbps	11.17	12.98	13.04
	54 Mbps	11.00	12.72	12.90
11n HT20	6.5 Mbps	11.63	13.68	14.02
	13 Mbps	11.56	13.51	13.92
	19.5 Mbps	11.51	13.49	13.82
	26 Mbps	11.45	13.41	13.71
	39 Mbps	11.36	13.13	13.57
	52 Mbps	11.29	12.91	13.21
	58.5 Mbps	11.15	12.47	12.94
	65 Mbps	11.02	12.13	12.44

Modulation type		Average power output (dBm)		
		2422MHz (Ch3)	2437MHz (Ch6)	2462MHz (Ch11)
11n HT40	13.5 Mbps	10.19	13.46	13.38
	27 Mbps	10.11	13.12	13.00
	40.5 Mbps	9.89	12.94	12.67
	54 Mbps	9.72	12.67	12.05
	81 Mbps	9.54	12.11	11.87
	108 Mbps	9.21	11.57	11.46
	121.5 Mbps	8.92	10.88	10.99
	135 Mbps	8.73	10.52	10.59

Modulation type		Peak power output (dBm)		
		2412MHz (Ch1)	2437MHz (Ch6)	2462MHz (Ch11)
11b	1 Mbps	18.12	18.08	18.35
	2 Mbps	18.02	18.02	18.31
	5.5 Mbps	18.04	18.07	18.22
	11 Mbps	18.10	18.01	18.26
11g	6 Mbps	20.30	20.80	21.04
	9 Mbps	20.13	20.41	21.00
	12 Mbps	20.09	20.56	20.87
	18 Mbps	19.57	20.72	20.91
	24 Mbps	20.01	20.14	20.75
	36 Mbps	19.92	20.71	20.96
	48 Mbps	20.00	20.11	20.68
	54 Mbps	19.99	20.12	20.98
11n HT20	6.5 Mbps	19.86	20.81	20.98
	13 Mbps	19.71	20.43	20.41
	19.5 Mbps	19.67	20.58	20.61
	26 Mbps	19.47	20.71	20.57
	39 Mbps	19.82	20.14	20.54
	52 Mbps	19.68	20.77	20.34
	58.5 Mbps	19.75	20.31	20.22
	65 Mbps	19.73	20.12	20.31

Modulation type		Peak power output (dBm)		
		2422MHz (Ch3)	2437MHz (Ch6)	2462MHz (Ch11)
11n HT40	13.5 Mbps	17.79	19.90	19.95
	27 Mbps	17.72	19.32	19.45
	40.5 Mbps	17.56	19.57	19.64
	54 Mbps	17.43	19.53	19.42
	81 Mbps	17.54	19.47	19.61
	108 Mbps	17.23	19.39	19.21
	121.5 Mbps	17.58	19.19	19.68
	135 Mbps	17.67	19.00	19.14

* The data rate 1Mbps, 6Mbps, 6.5Mbps, 13.5Mbps are selected as worse condition, and the following cases are performed with this condition.

6.2 Occupied Bandwidth

6.2.1 Ambient condition

Temperature	Relative humidity	Pressure
22°C	40%	101.5kPa

6.2.2 Test Description

The bandwidth at 6dB down from the highest in-band spectral density is measured with a spectrum analyzer and Bluetooth test set via a power splitter with a known loss. Which connected to the transmitter antenna terminal of the EUT while the EUT is operating at maximum power and at the appropriate frequencies. All modes of operation were investigated and the worst case configuration results are reported in this section.

6.2.3 Test limit

FCC Part15.247(a)(2)

The minimum permissible 6dB bandwidth is 500 kHz

6.2.4 Test Procedure Used

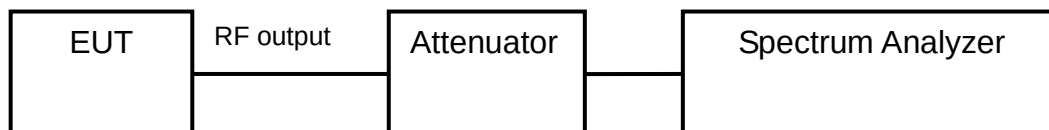
KDB 558074 D01 v03r02 – Section 8.1 Option 1

6.2.5 Test Settings

- Set RBW = 100 kHz.
- Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
- Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- Allow the trace to stabilize.
- Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

6.2.6 Test Setup

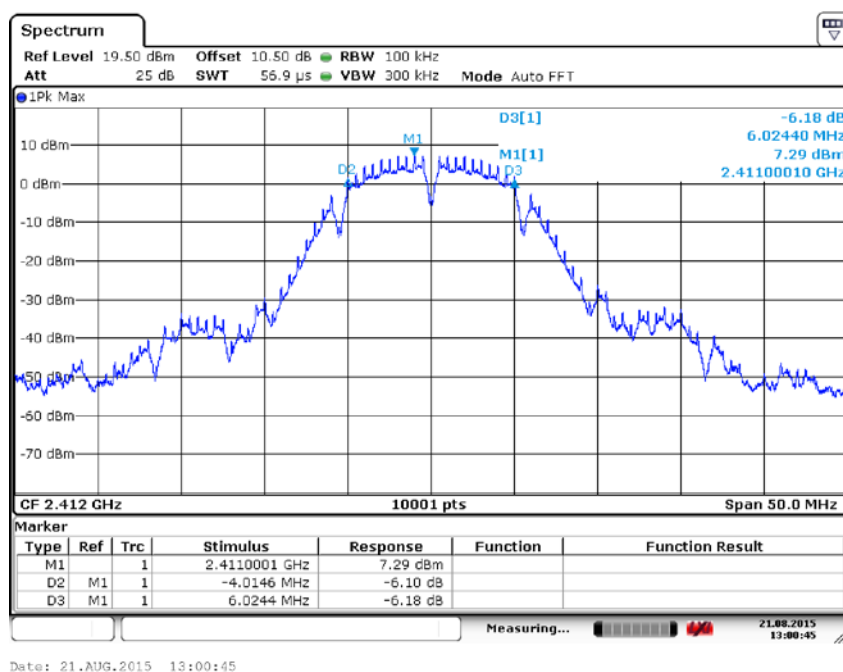
The EUT and measurement equipment were set up as shown in the diagram below.



6.2.7 Test result

Test Mode: 802.11b

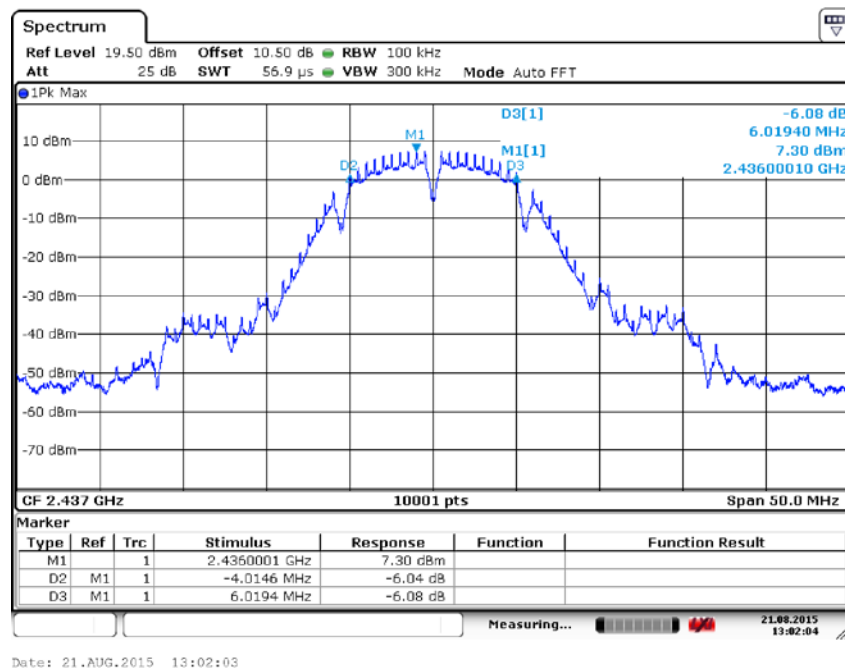
Carrier frequency (MHz)	Channel No.	6 dB bandwidth(MHz)
2412	1	10.03
2437	6	10.03
2462	11	10.03



Carrier frequency (MHz): 2412

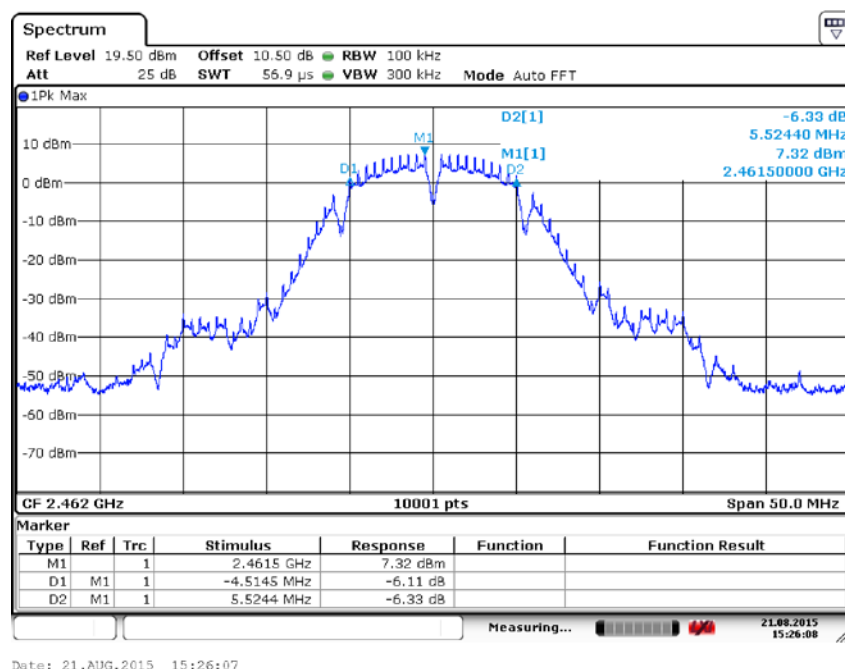
Channel No.:1

Test Mode: 802.11b



Date: 21.AUG.2015 13:02:03

Carrier frequency (MHz): 2437
Channel No.:6
Test Mode: 802.11b

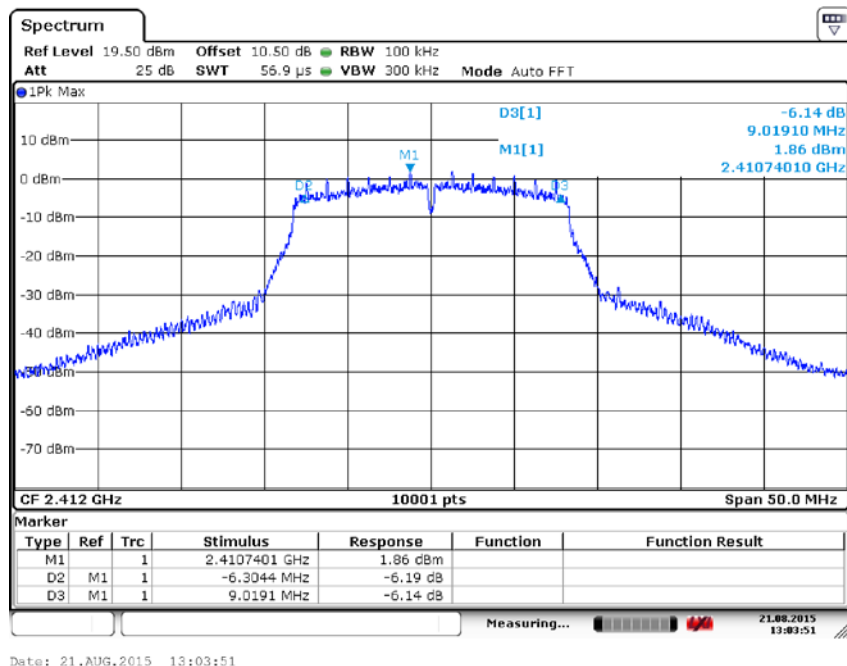


Date: 21.AUG.2015 15:26:07

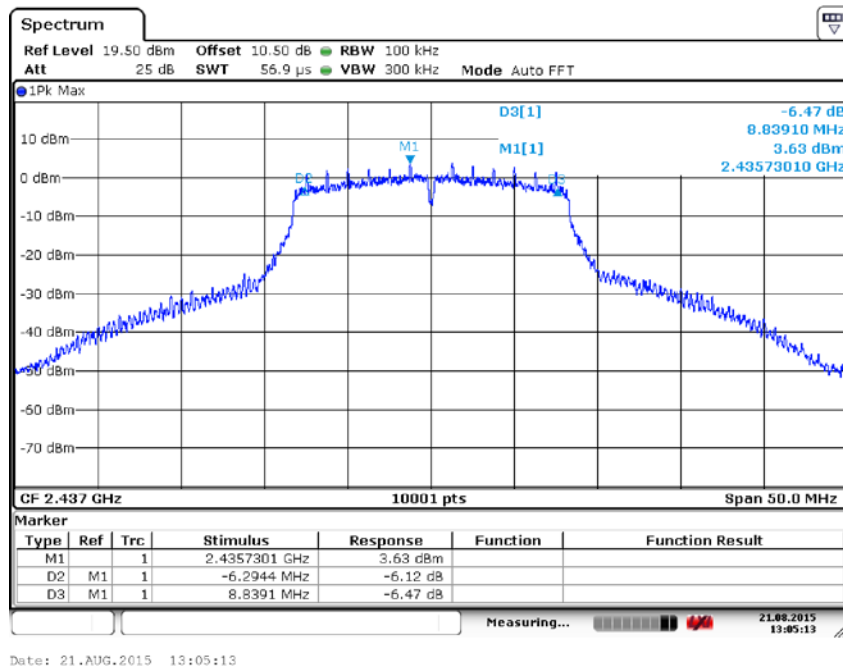
Carrier frequency (MHz): 2462
Channel No.:11
Test Mode: 802.11b

Test Mode: 802.11g

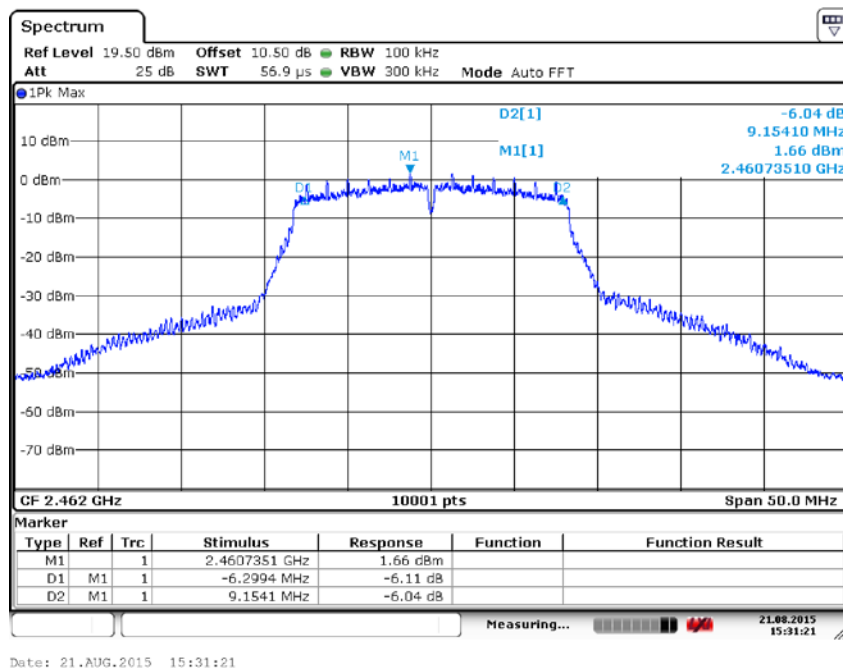
Carrier frequency (MHz)	Channel No.	6 dB bandwidth(MHz)
2412	1	15.32
2437	6	15.13
2462	11	15.45



Carrier frequency (MHz): 2412
Channel No.:1
Test Mode: 802.11g



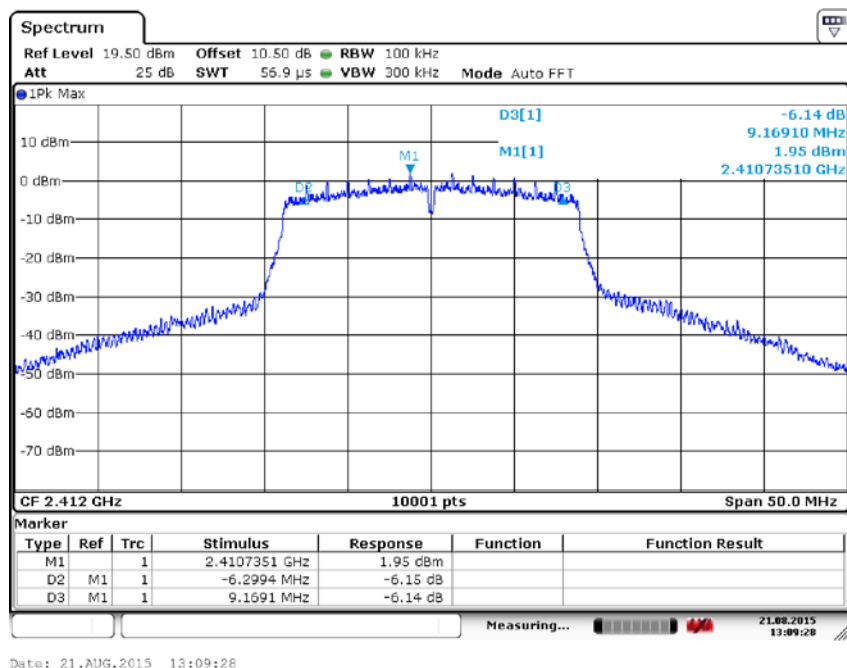
Carrier frequency (MHz): 2437
Channel No.:6
Test Mode: 802.11g



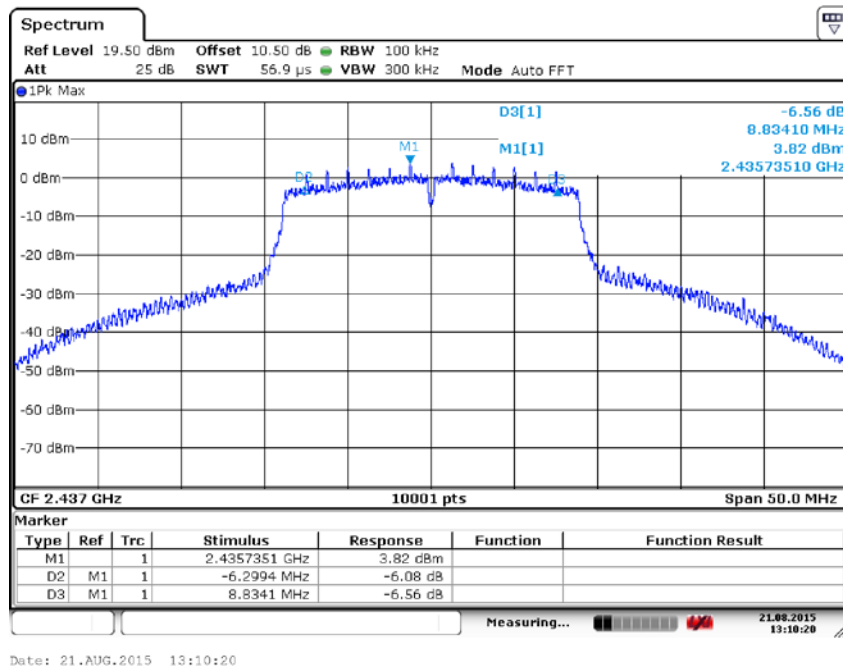
Carrier frequency (MHz): 2462
Channel No.:11
Test Mode: 802.11g

Test Mode: 802.11n (HT20)

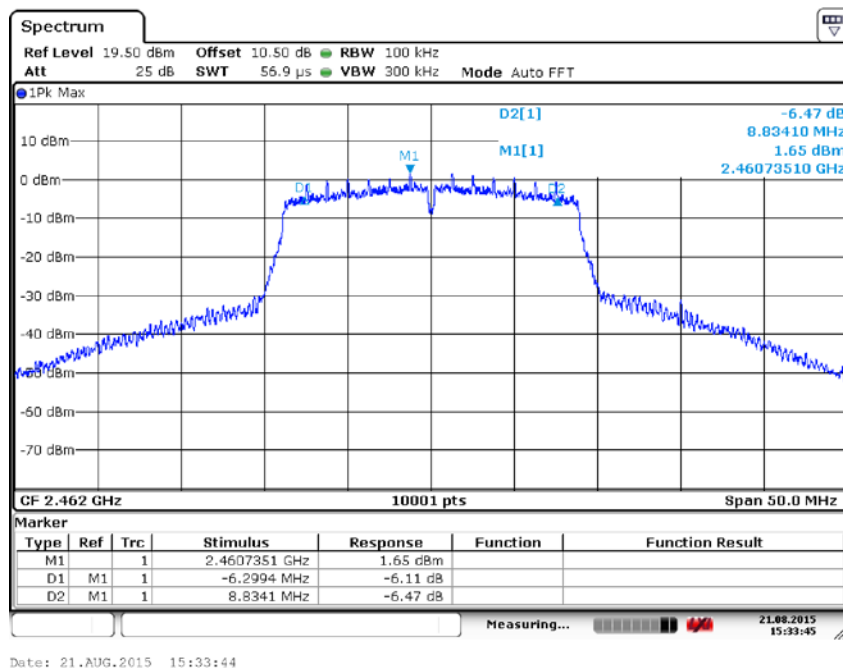
Carrier frequency (MHz)	Channel No.	6 dB bandwidth(MHz)
2412	1	15.46
2437	6	15.13
2462	11	15.13



Carrier frequency (MHz): 2412
Channel No.:1
Test Mode: 802.11n (HT20)



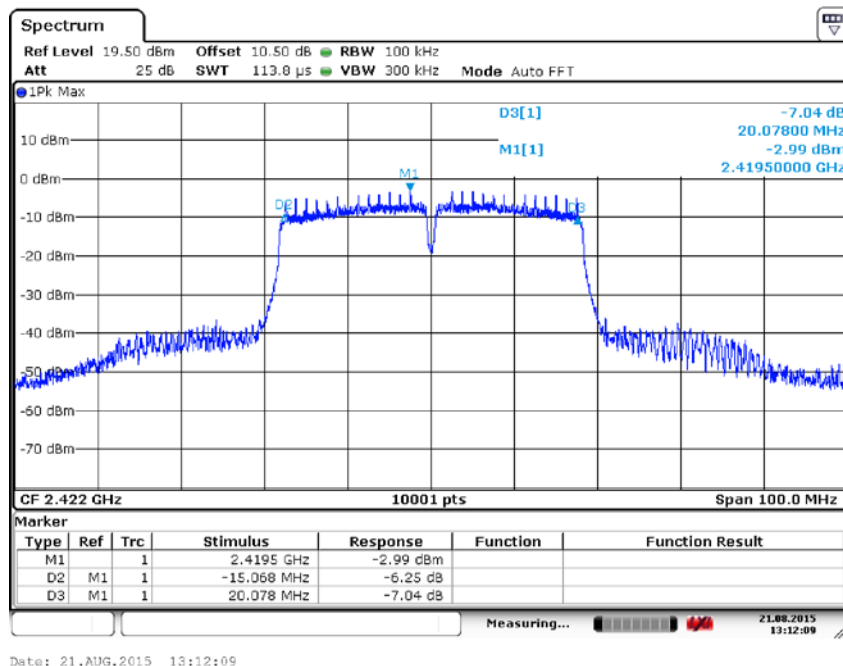
Carrier frequency (MHz): 2437
Channel No.:6
Test Mode: 802.11n(HT20)



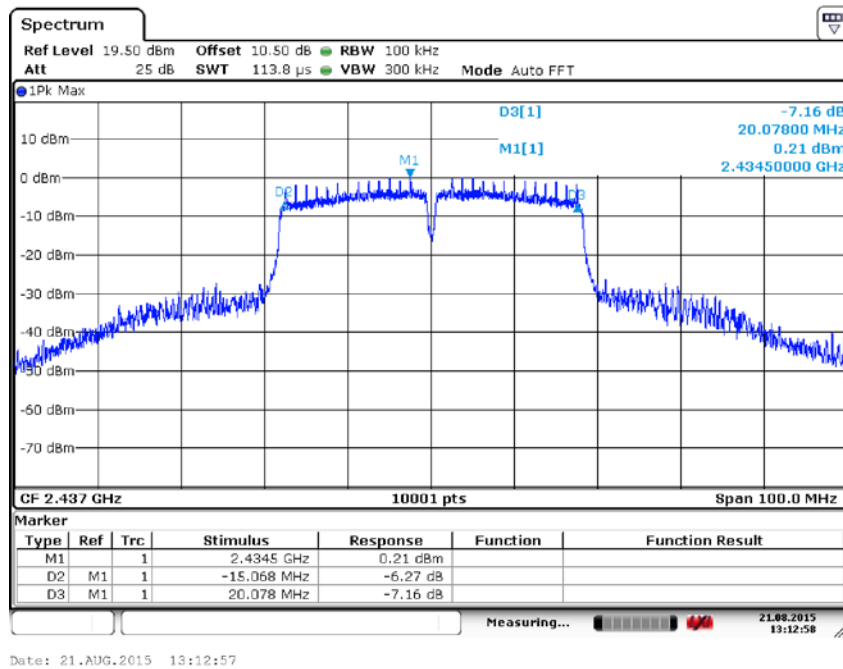
Carrier frequency (MHz): 2462
Channel No.:11
Test Mode: 802.11n(HT20)

Test Mode: 802.11n(HT40)

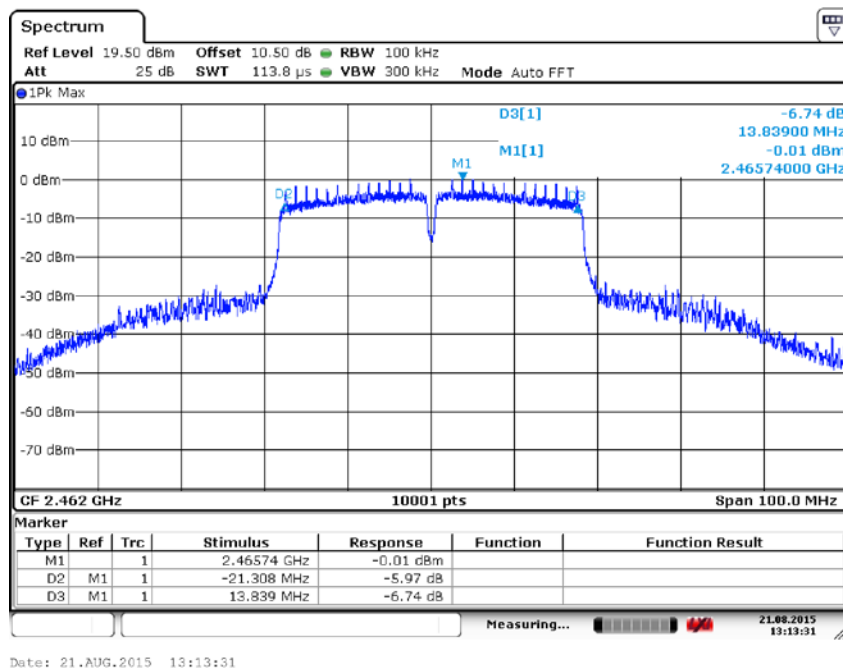
Carrier frequency (MHz)	Channel No.	6 dB bandwidth(MHz)
2422	3	35.14
2437	6	35.14
2462	11	35.14



Carrier frequency (MHz): 2422
Channel No.:3
Test Mode: 802.11n(HT40)



Carrier frequency (MHz): 2437
Channel No.:6
Test Mode: 802.11n(HT40)



Carrier frequency (MHz): 2462
Channel No.:11
Test Mode: 802.11n(HT40)

6.3 Transmitter Power Spectral Density

6.3.1 Ambient condition

Temperature	Relative humidity	Pressure
22°C	40%	101.5kPa

6.3.2 Test Description

The peak power density is measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle (>98%), at maximum power, and at the appropriate frequencies. All data rates were investigated and the worst case configuration results are reported in this section.

6.3.3 Test limit

Fcc Part15.247(e)

The maximum permissible power spectral density is 8 dBm in any 3 kHz band.

6.3.4 Test Procedure Used

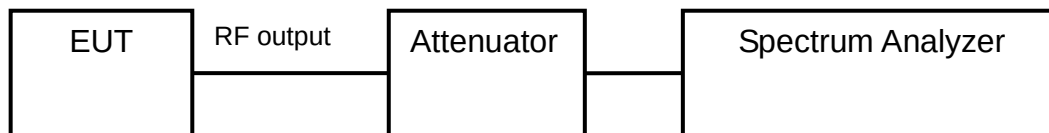
KDB 558074 D01 v03r02 Section 10.2.

6.3.5 Test Settings

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

6.3.6 Test Setup

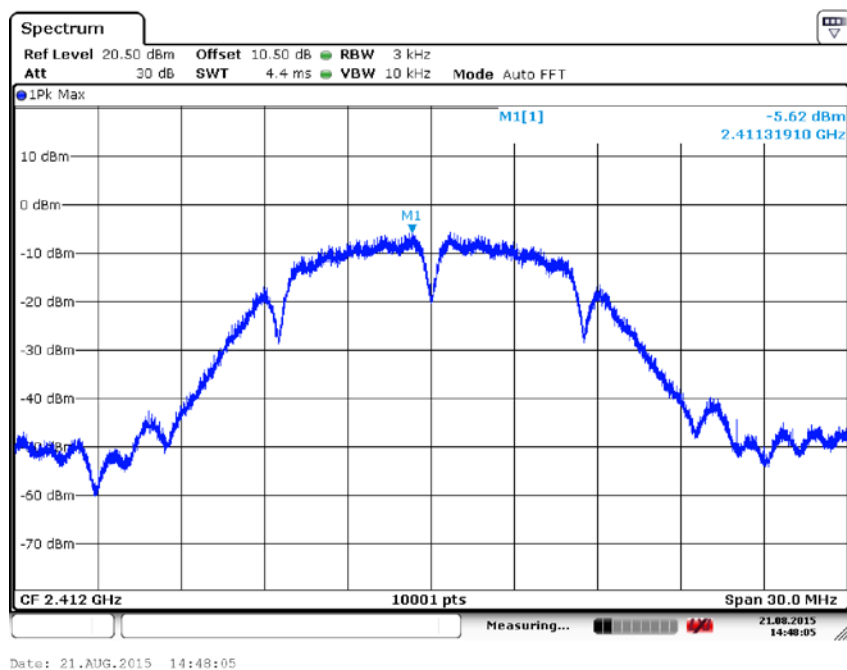
The EUT and measurement equipment were set up as shown in the diagram below.



6.3.7 Test result

Test Mode: 802.11b

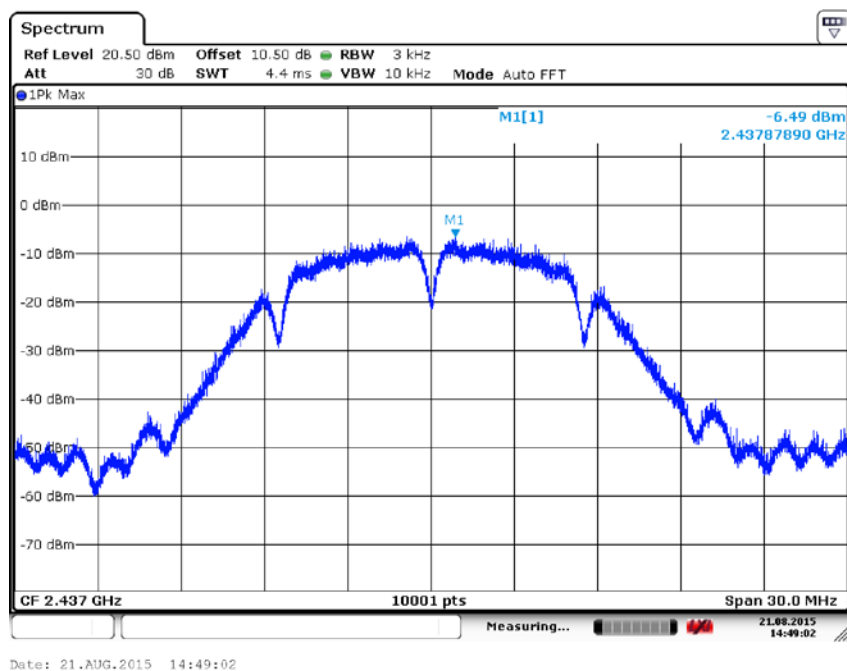
Carrier frequency (MHz)	Channel No	Power Density (dBm)
2412	1	-5.62
2437	6	-6.49
2462	11	-6.78



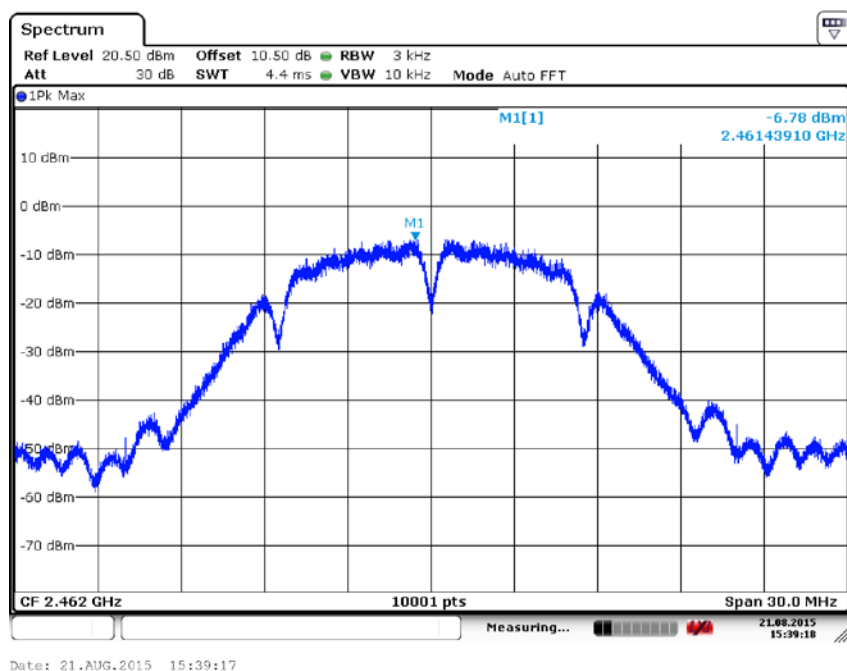
Carrier frequency (MHz): 2412

Channel No.1

Test Mode: 802.11b



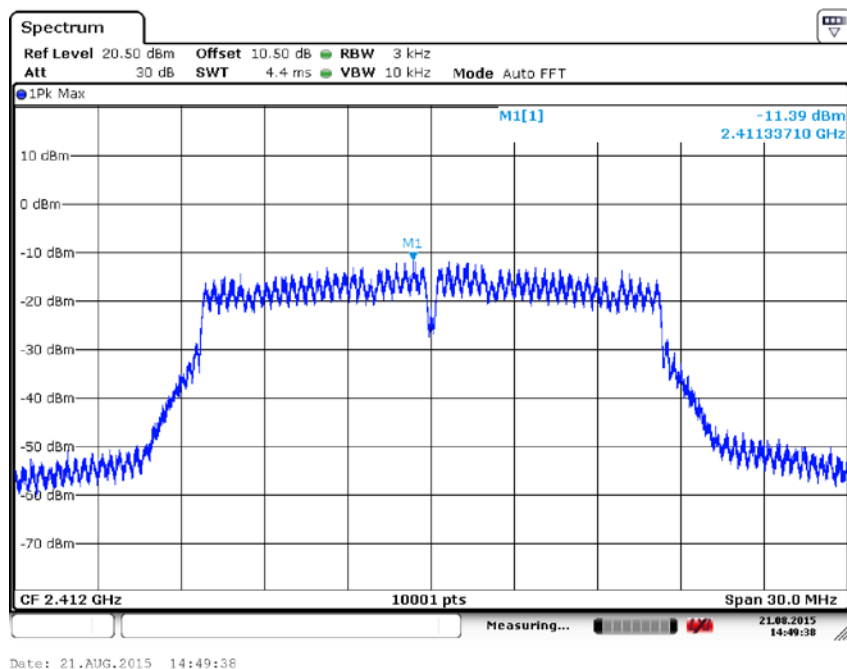
Carrier frequency (MHz): 2437
Channel No.6
Test Mode: 802.11b



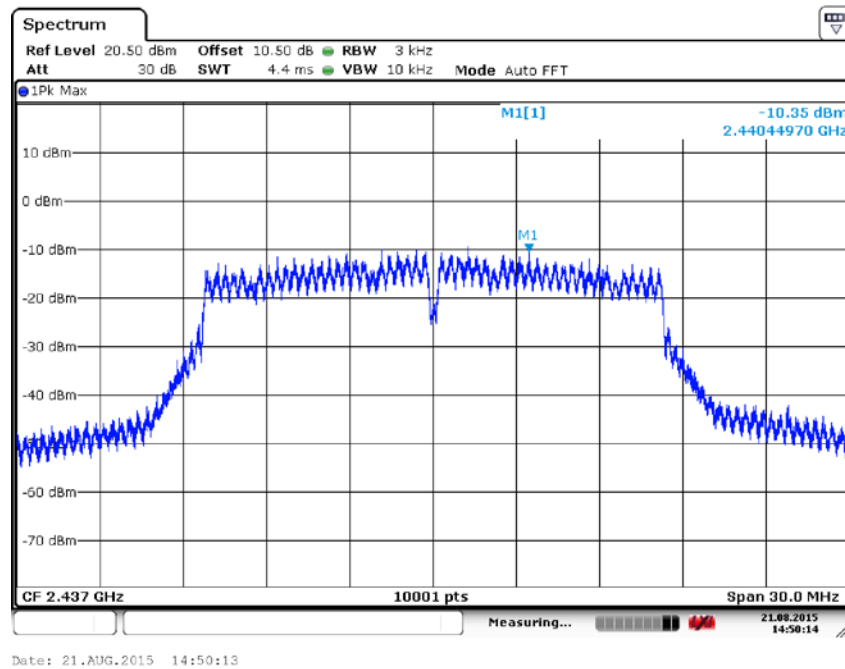
Carrier frequency (MHz): 2462
Channel No.11
Test Mode: 802.11b

Test Mode: 802.11g

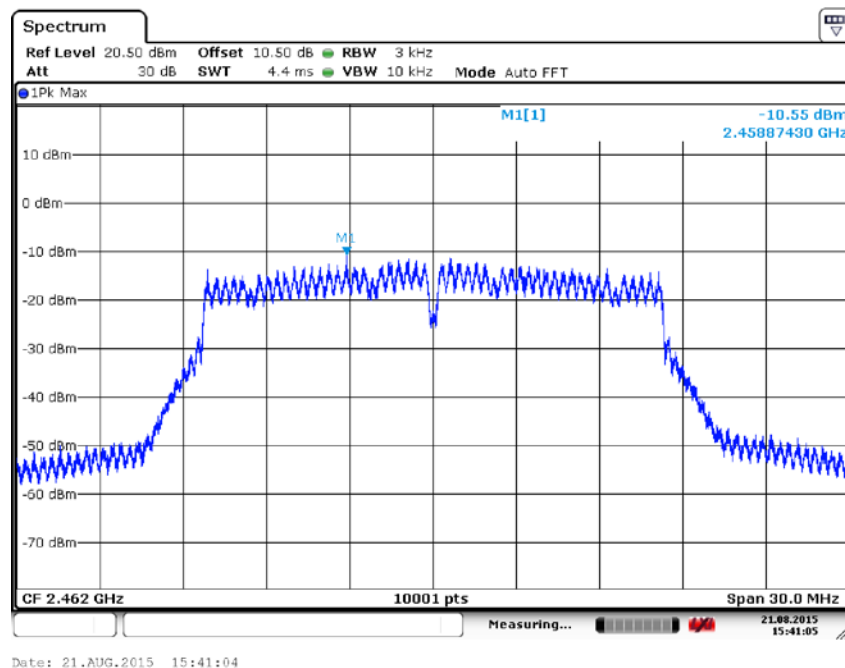
Carrier frequency (MHz)	Channel No	Power Density (dBm)
2412	1	-11.39
2442	6	-10.35
2472	11	-10.55



Carrier frequency (MHz): 2412
Channel No.1
Test Mode: 802.11g



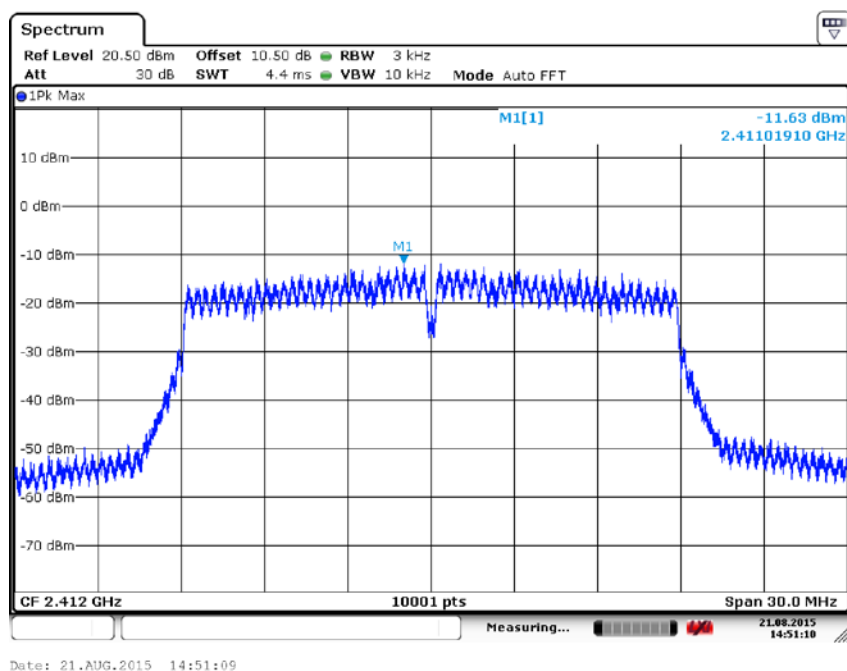
Carrier frequency (MHz): 2437
Channel No.6
Test Mode: 802.11g



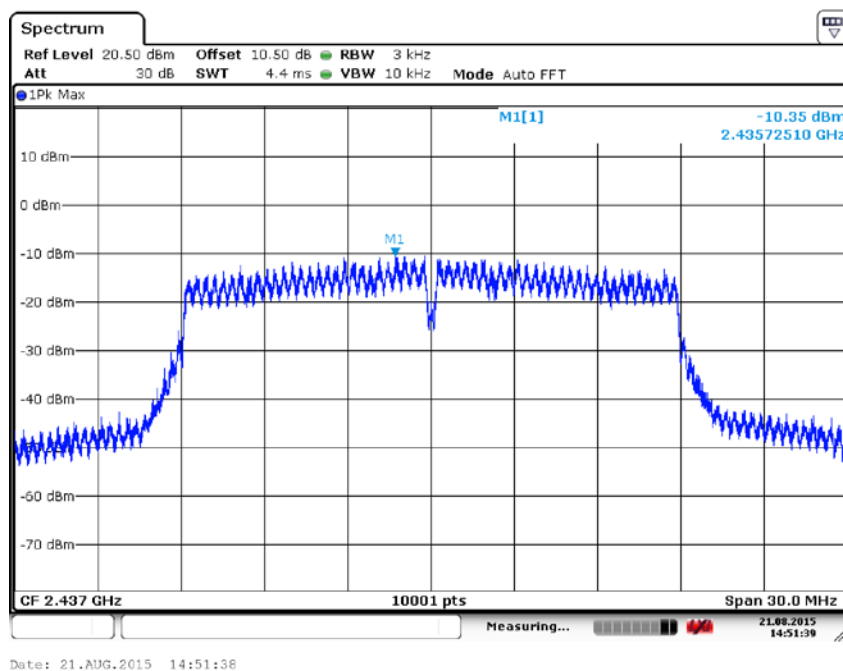
Carrier frequency (MHz): 2462
Channel No.11
Test Mode: 802.11g

Test Mode: 802.11n(HT20)

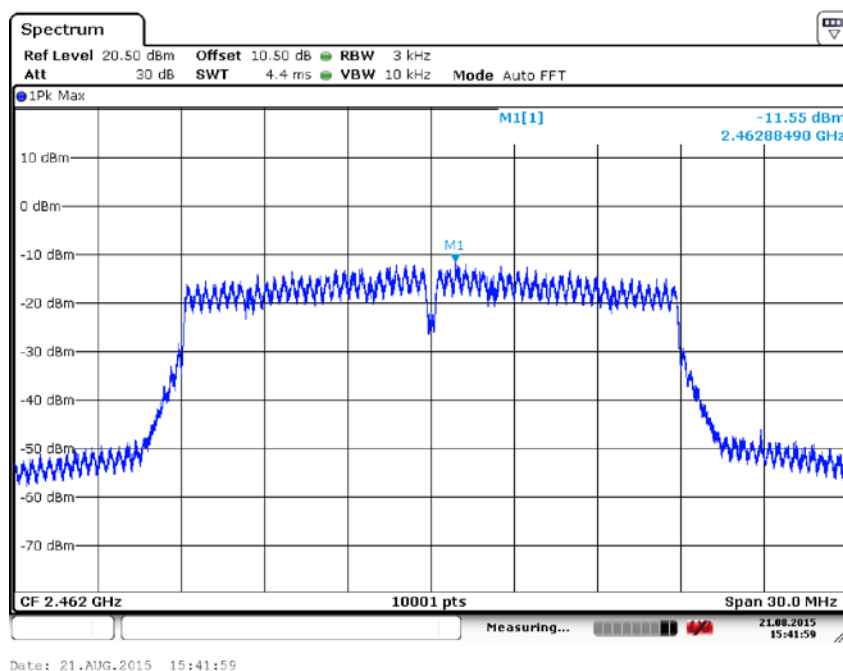
Carrier frequency (MHz)	Channel No	Power Density (dBm)
2412	1	-11.63
2437	6	-10.35
2462	11	-11.55



Carrier frequency (MHz): 2412
Channel No.1
Test Mode: 802.11n(HT20)



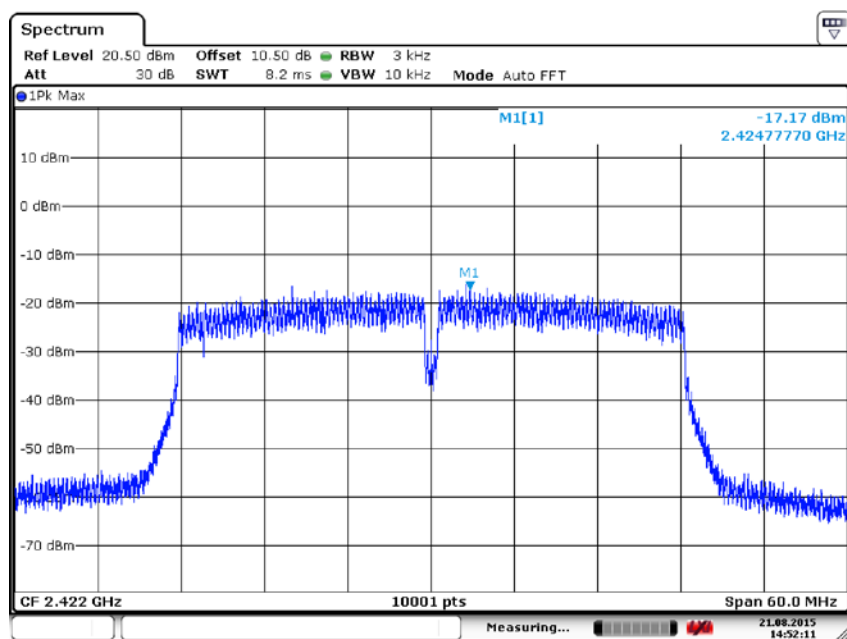
Carrier frequency (MHz): 2437
Channel No.6
Test Mode: 802.11n(HT20)



Carrier frequency (MHz): 2462
Channel No.11
Test Mode: 802.11n(HT20)

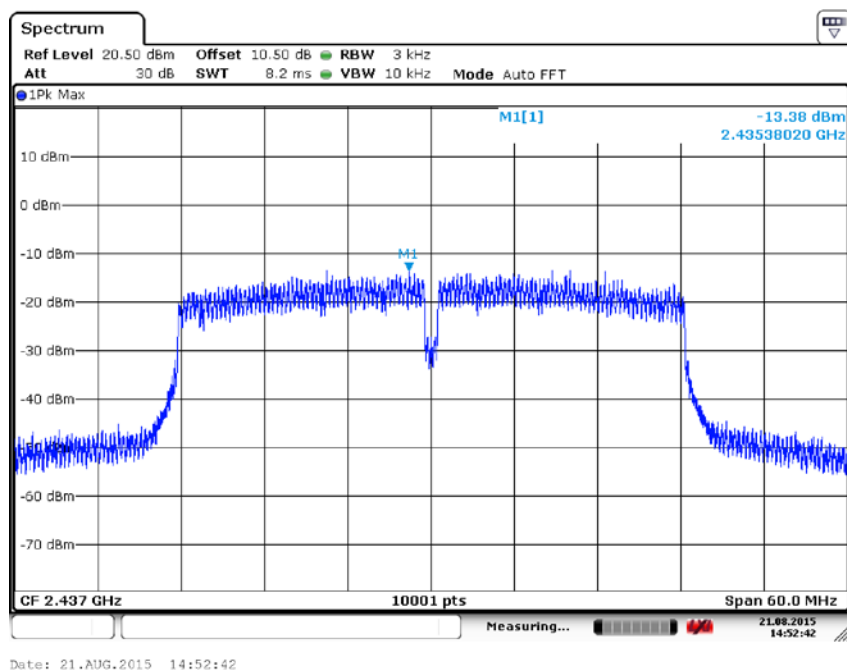
Test Mode: 802.11n(HT40)

Carrier frequency (MHz)	Channel No	Power Density (dBm)
2422	3	-17.17
2437	6	-13.38
2462	11	-14.29

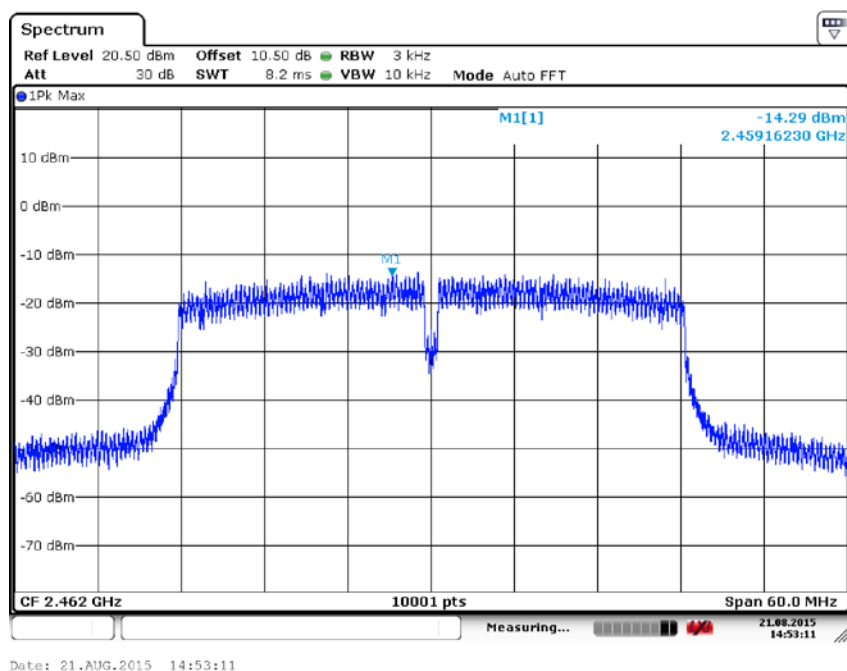


Date: 21.AUG.2015 14:52:11

Carrier frequency (MHz): 2422
Channel No.3
Test Mode: 802.11n(HT40)



Carrier frequency (MHz): 2437
Channel No.6
Test Mode: 802.11n(HT40)



Carrier frequency (MHz): 2462
Channel No.11
Test Mode: 802.11n(HT40)

6.4 Conducted Out of band emission measurement

6.4.1 Ambient condition

Temperature	Relative humidity	Pressure
22°C	40%	101.5kPa

6.4.2 Test Description

All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle (>98%), at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration.

6.4.3 Test limit

FCC Part 15.247(d)

The limit for out-of-band spurious emissions at the band edge is 20dB below the fundamental emission level, as determined from the in-band power measurement of the DTS channel performed in a 100kHz bandwidth.

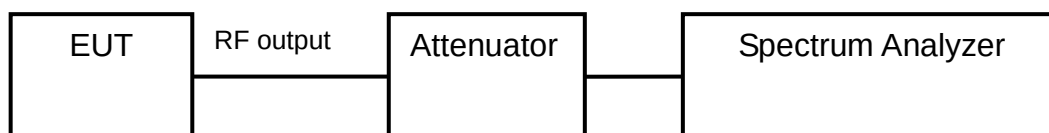
6.4.4 Test Procedure Used

KDB 558074 D01 v03r02 Section 11.3

6.4.5 Test Settings

- Set the center frequency and span to encompass frequency range to be measured.
- Set the RBW = 100kHz.
- Set the VBW $\geq$ 300kHz.
- Detector = peak.
- Set span to encompass the spectrum to be examined
- Sweep time = auto couple.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use the peak marker function to determine the maximum amplitude level.

6.4.6 Test Setup

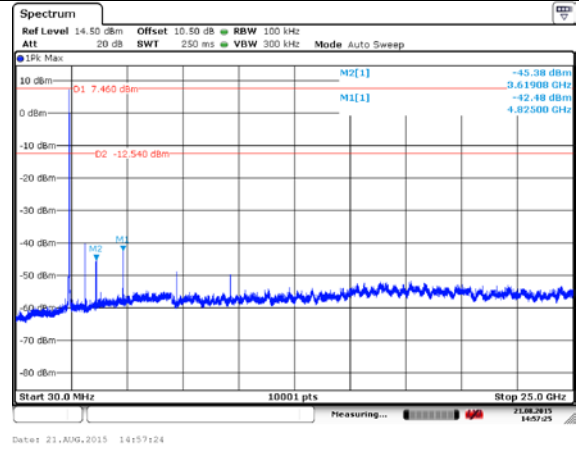
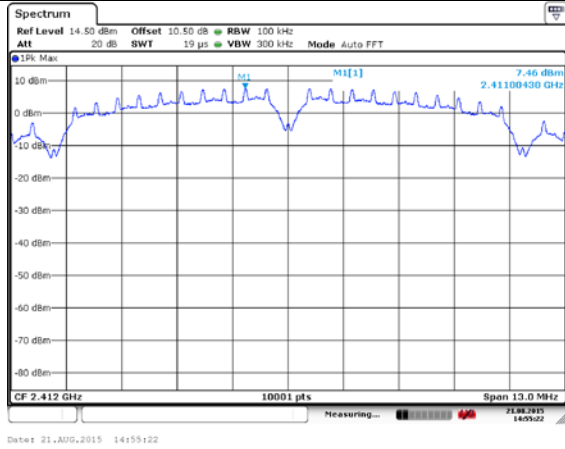


6.4.7 Test result

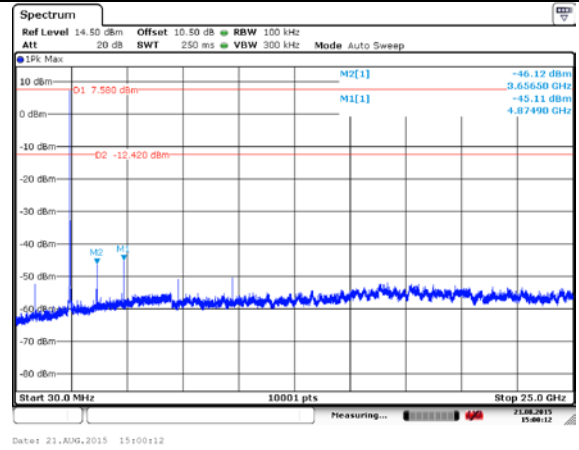
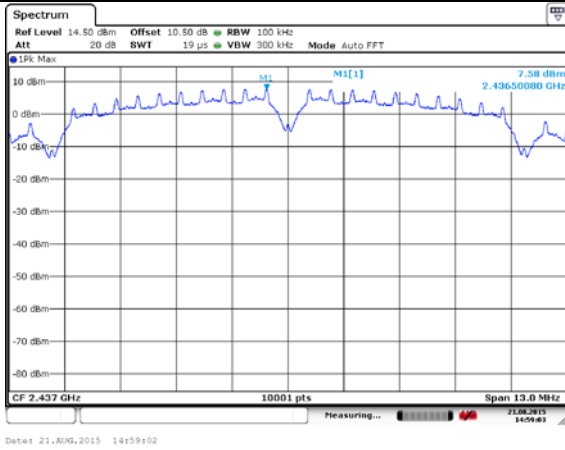
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.

802.11b

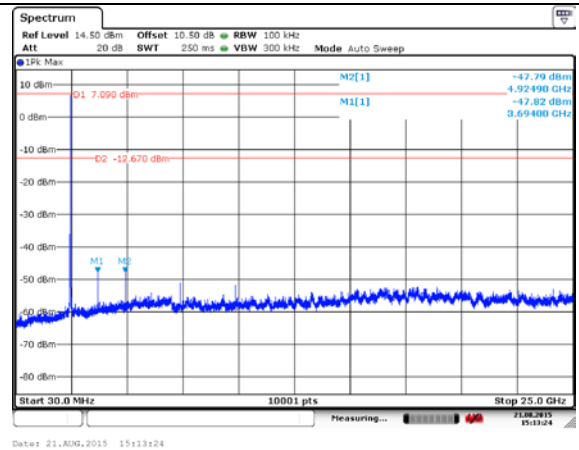
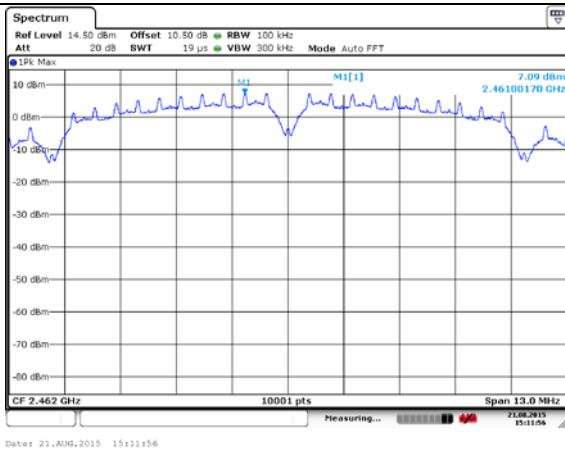
CH1



CH6

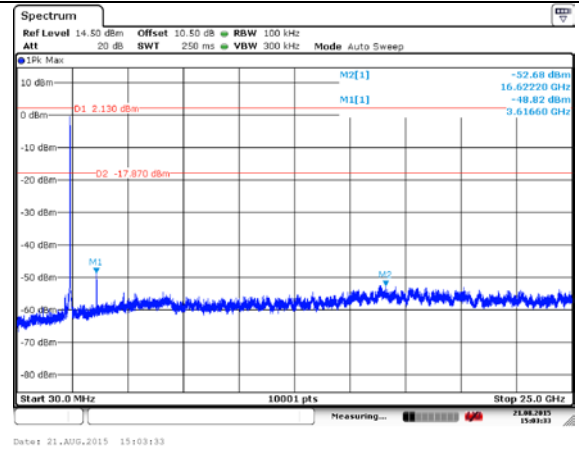
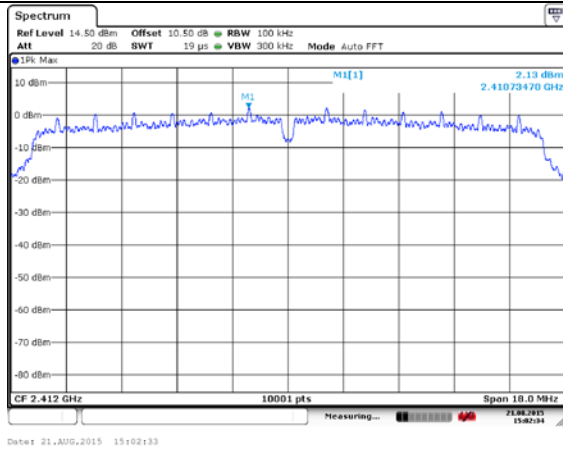


CH11

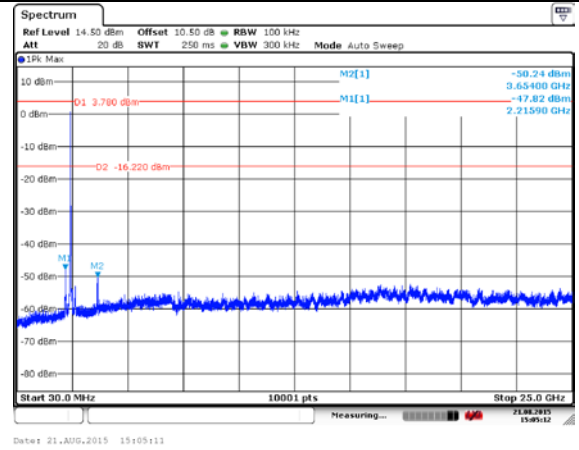
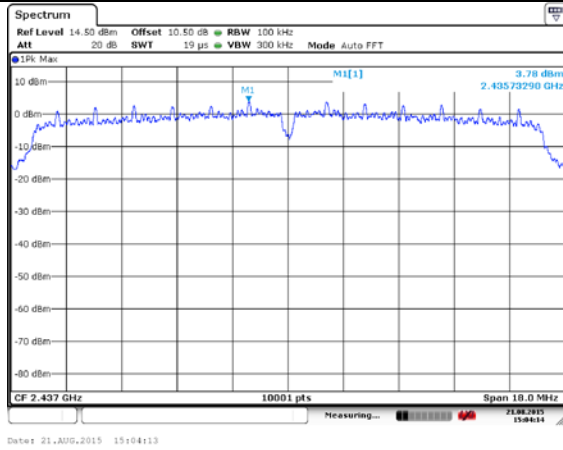


802.11g

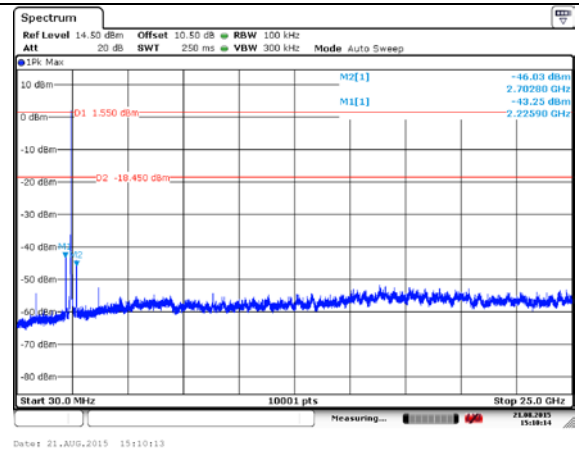
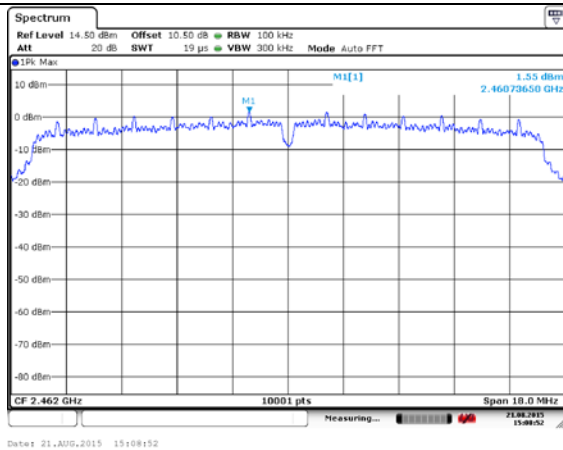
CH1



CH6

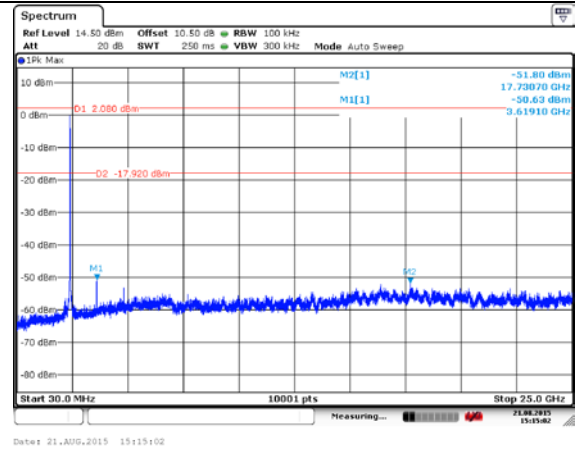
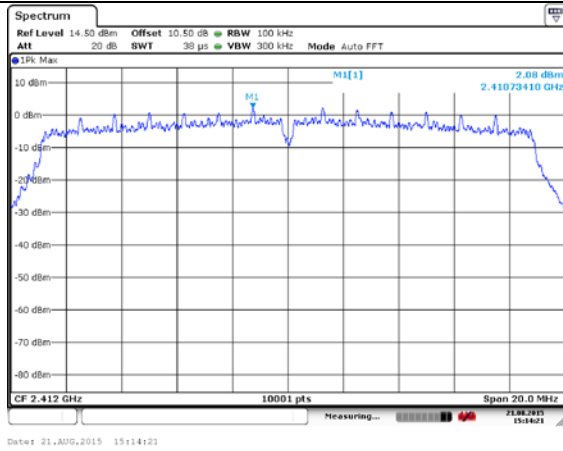


CH11

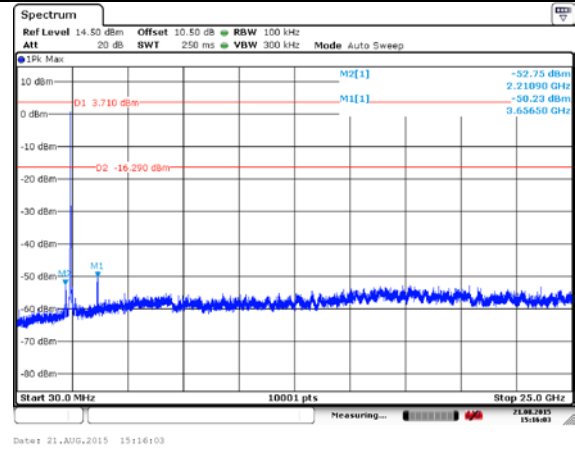
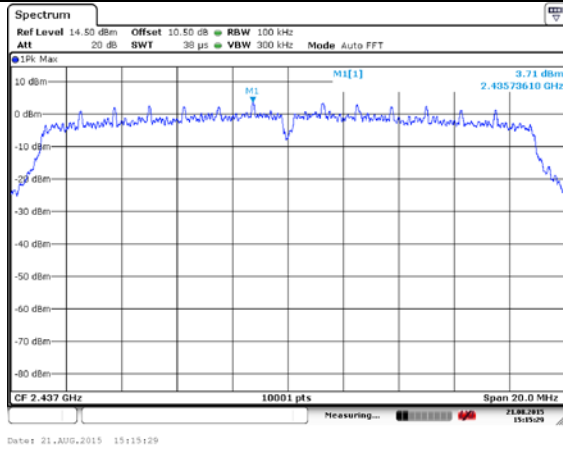


802.11n(20MHz)

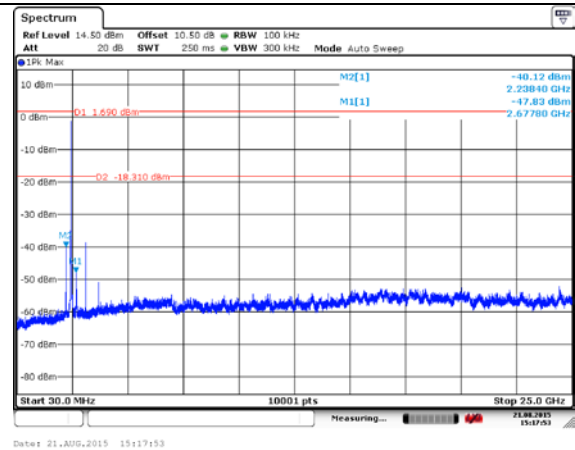
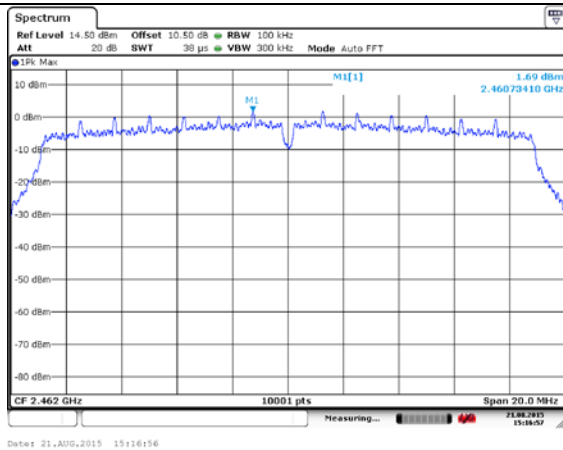
CH1



CH6

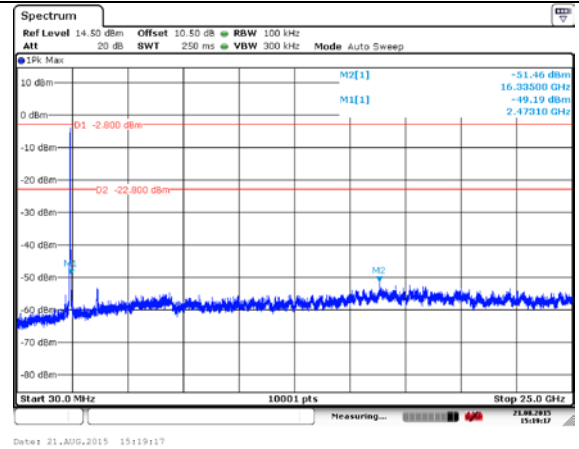
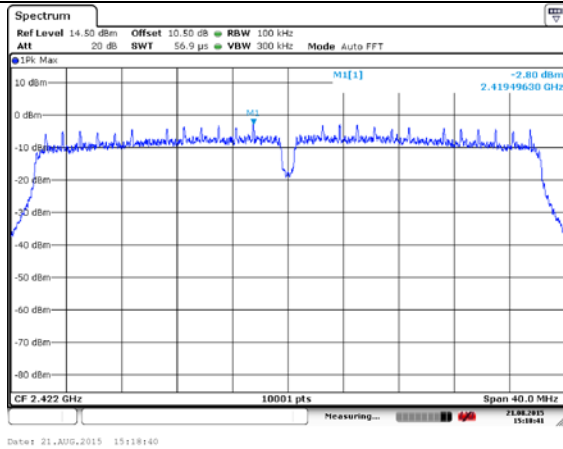


CH11

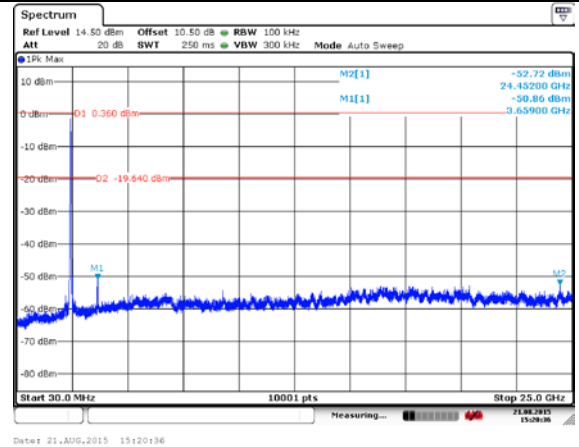
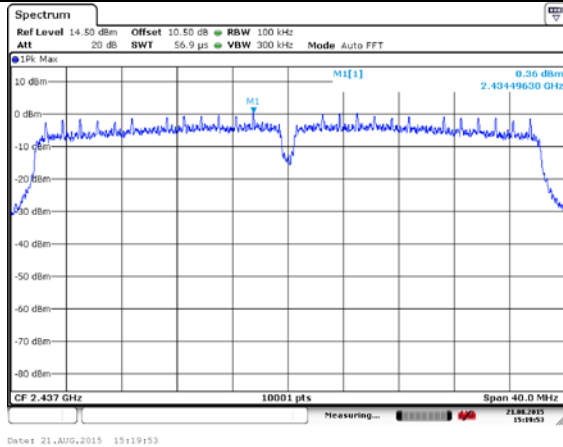


802.11n(40MHz)

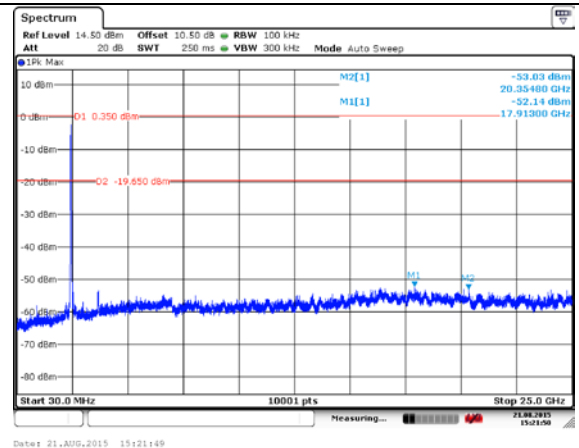
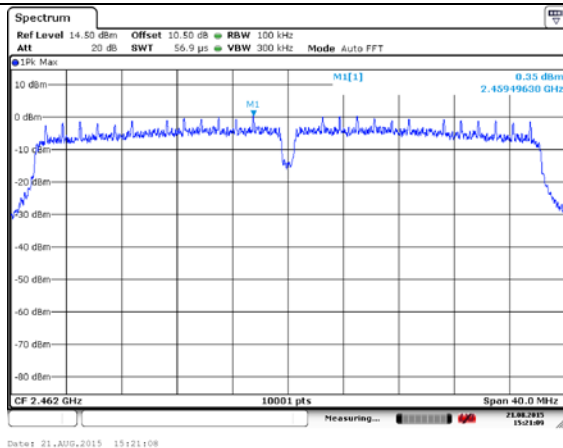
CH1



CH6



CH11



6.5 Spurious Radiated Emissions

6.5.1 Ambient condition

Temperature	Relative humidity	Pressure
20.8°C	36.5%	100.9kPa

6.5.2 Test Description

All out of band radiated spurious emissions are measured with a spectrum analyzer connected to a receive antenna while the EUT is operating at maximum power and at the appropriate frequencies. Only the radiated emissions of the configuration that produced the worst case emissions are reported in this section.

6.5.3 Test limit

FCC Part15.205, 15.209, 15.247(d);

In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)). All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR must not exceed the limits shown in below Table per Section 15.209.

Frequency [MHz]	Field strength [$\mu\text{V/m}$]	Measured Distance [meters]
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

Radiated Limits

FCC Part15.35(b):

There is also a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit

Used conversion factor: Limit (dB $\mu\text{V/m}$) = 20 log (Limit ($\mu\text{V/m}$)/1 $\mu\text{V/m}$)

Frequency [MHz]	Detector	Unit (dB $\mu\text{V/m}$)
30~88	Quasi-peak	40.0
88~216	Quasi-peak	43.5
216~960	Quasi-peak	46.0
960~1000	Quasi-peak	54.0
1000~5th harmonic of the highest frequency or 40GHz, whichever is lower	Average	54.0
	Peak	74.0

Conversion Radiated limits

6.5.4 Test Procedure Used

KDB 558074 D01 v03r02 – Section 12.2.5 (average power measurements)

KDB 558074 D01 v03r02 – Section 12.2.4 (peak power measurements)

6.5.5 Test Settings

Average Field Strength Measurements per Section 12.2.5.1 of KDB 558074 v03r01

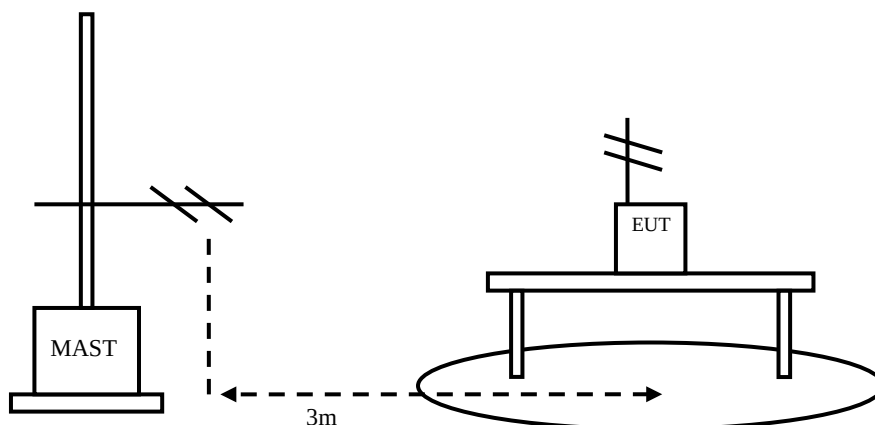
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = power average (RMS)
5. Number of measurement points = 1001 (Number of points must be $> 2 \times \text{span}/\text{RBW}$)
6. Sweep time = auto
7. Trace (RMS) averaging was performed over at least 100 traces

Peak Field Strength Measurements per Section 12.2.4 of KDB 558074 v03r01

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

6.5.6 Test Setup

The EUT and measurement equipment were set up as shown in the diagram below



The Equipment Under Test (EUT) was set up on a non-conductive table in the semi-anechoic chamber. The test was performed at the distance of 3 m between the EUT and the receiving antenna. The radiated emissions measurements were made in a typical installation configuration. Then start the test software ES-K1. Sweep the whole frequency band through the range from 30MHz to 1GHz or above, using receive log period antenna

HL562 or Ridge horn antenna HF906.

During the test, the antenna height and EUT azimuth were varied in order to identify the maximum level of emission from the EUT. The height of receive antenna shall be moved from 1 to 4 meters, and the antenna shall be performed under horizontal and vertical polarization. The turn table shall be rotated from 0 to 360 degrees. The measurements shall be repeated with orthogonal polarization of the test antenna. The results shall be showed the worst case of the three orthogonal axes.

The data of cable loss and antenna factor has been calibrated in full testing frequency range before the testing.

6.5.7 Test result

The worst case attitude: The mobile lay down.

Peak detector: RBW=1MHz,VBW=3MHz,sweep time=200ms;

Average detector: RBW=1MHz,VBW=10Hz,sweep time=auto;

Carrier frequency (MHz): 2412

Channel No.:1

Test Mode: 802.11b

Polarity:Vertical

Detector: Peak

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2412	102.85	68.85	NA	N/A	8.90	25.10
2	2390	57.82	23.82	-16.18	74.00	8.90	25.10

Carrier frequency (MHz): 2412

Channel No.:1

Test Mode: 802.11b

Polarity:Horizontal

Detector: Peak

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2412	101.20	67.2	NA	N/A	8.90	25.10
2	2390	56.68	22.68	-17.32	74.00	8.90	25.10

Carrier frequency (MHz): 2412
Channel No.:1
Test Mode: 802.11b
Polarity:Vertical
Detector: Average

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2412	93.11	59.11	NA	N/A	8.90	25.10
2	2390	36.58	2.58	-17.42	54.00	8.90	25.10

Carrier frequency (MHz): 2412
Channel No.:1
Test Mode: 802.11b
Polarity:Horizontal
Detector: Average

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2412	89.28	55.28	NA	N/A	8.90	25.10
2	2390	36.01	2.01	-17.99	54.00	8.90	25.10

Carrier frequency (MHz): 2462
Channel No.:11
Test Mode: 802.11b
Polarity:Vertical
Detector: Peak

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2462	104.20	70.2	NA	N/A	8.90	25.10
2	2483.5	55.50	21.5	-18.5	74.00	8.90	25.10

Carrier frequency (MHz): 2462
Channel No.:11
Test Mode: 802.11b
Polarity:Horizontal
Detector: Peak

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2462	99.10	65.1	NA	N/A	8.90	25.10
2	2483.5	56.20	22.2	-17.8	74.00	8.90	25.10

Carrier frequency (MHz): 2462
Channel No.:11
Test Mode: 802.11b
Polarity:Vertical
Detector: Average

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2462	92.39	58.39	NA	N/A	8.90	25.10
2	2483.5	38.21	4.21	-15.79	54.00	8.90	25.10

Carrier frequency (MHz): 2462
Channel No.:11
Test Mode: 802.11b
Polarity:Horizontal
Detector: Average

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2462	92.99	58.99	NA	N/A	8.90	25.10
2	2483.5	37.40	3.4	-16.6	54.00	8.90	25.10

Carrier frequency (MHz): 2412
Channel No.:1
Test Mode: 802.11g
Polarity: Vertical
Detector: Peak

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2412	106.39	72.39	NA	N/A	8.90	25.10
2	2390	58.04	24.04	-15.96	74.00	8.90	25.10

Carrier frequency (MHz): 2412
Channel No.:1
Test Mode: 802.11g
Polarity:Horizontal
Detector: Peak

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2412	98.02	64.02	NA	N/A	8.90	25.10
2	2390	55.41	21.41	-18.59	74.00	8.90	25.10

Carrier frequency (MHz): 2412
Channel No.:1
Test Mode: 802.11g
Polarity: Vertical
Detector: Average

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2412	95.89	61.89	NA	N/A	8.90	25.10
2	2390	35.66	1.66	-18.34	54.00	8.90	25.10

Carrier frequency (MHz): 2412
Channel No.:1
Test Mode: 802.11g
Polarity:Horizontal
Detector: Average

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2412	92.39	58.39	NA	N/A	8.90	25.10
2	2390	37.56	3.56	-16.44	54.00	8.90	25.10

Carrier frequency (MHz): 2462
Channel No.:11
Test Mode: 802.11g
Polarity: Vertical
Detector: Peak

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2462	103.98	69.98	NA	N/A	8.90	25.10
2	2483.5	60.15	26.15	-13.85	74.00	8.90	25.10

Carrier frequency (MHz): 2462
Channel No.:11
Test Mode: 802.11g
Polarity:Horizontal
Detector: Peak

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2462	99.04	65.04	NA	N/A	8.90	25.10
2	2483.5	57.28	23.28	-16.72	74.00	8.90	25.10

Carrier frequency (MHz): 2462
Channel No.:11
Test Mode: 802.11g
Polarity: Vertical
Detector: Average

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2462	93.76	59.76	NA	N/A	8.90	25.10
2	2483.5	39.07	5.07	-14.93	54.00	8.90	25.10

Carrier frequency (MHz): 2462
Channel No.:11
Test Mode: 802.11g
Polarity:Horizontal
Detector: Average

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2462	91.60	57.6	NA	N/A	8.90	25.10
2	2483.5	34.61	0.61	-19.39	54.00	8.90	25.10

Carrier frequency (MHz): 2412
Channel No.:1
Test Mode: 802.11n(HT20)
Polarity: Vertical
Detector: Peak

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2412	104.15	70.15	NA	N/A	8.90	25.10
2	2390	58.12	24.12	-15.88	74.00	8.90	25.10

Carrier frequency (MHz): 2412
Channel No.:1
Test Mode: 802.11n(HT20)
Polarity:Horizontal
Detector: Peak

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2412	96.28	62.28	NA	N/A	8.90	25.10
2	2390	60.14	26.14	-13.86	74.00	8.90	25.10

Carrier frequency (MHz): 2412
Channel No.:1
Test Mode: 802.11n(HT20)
Polarity: Vertical
Detector: Average

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2412	97.04	63.04	NA	N/A	8.90	25.10
2	2390	39.36	5.36	-14.64	54.00	8.90	25.10

Carrier frequency (MHz): 2412
Channel No.:1
Test Mode: 802.11n(HT20)
Polarity:Horizontal
Detector: Average

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2412	87.64	53.64	NA	N/A	8.90	25.10
2	2390	37.68	3.68	-16.32	54.00	8.90	25.10

Carrier frequency (MHz): 2462
Channel No.:11
Test Mode: 802.11n(HT20)
Polarity: Vertical
Detector: Peak

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2462	100.62	66.62	NA	N/A	8.90	25.10
2	2483.5	58.37	24.37	-15.63	74.00	8.90	25.10

Carrier frequency (MHz): 2462
Channel No.:11
Test Mode: 802.11n(HT20)
Polarity:Horizontal
Detector: Peak

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2462	97.18	63.18	NA	N/A	8.90	25.10
2	2483.5	54.02	20.02	-19.98	74.00	8.90	25.10

Carrier frequency (MHz): 2462
Channel No.:11
Test Mode: 802.11n(HT20)
Polarity: Vertical
Detector: Average

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2462	96.63	62.63	NA	N/A	8.90	25.10
2	2483.5	37.84	3.84	-16.16	54.00	8.90	25.10

Carrier frequency (MHz): 2462
Channel No.:11
Test Mode: 802.11n(HT20)
Polarity:Horizontal
Detector: Average

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2462	90.43	56.43	NA	N/A	8.90	25.10
2	2483.5	36.69	2.69	-17.31	54.00	8.90	25.10

Carrier frequency (MHz): 2422
Channel No.:3
Test Mode: 802.11n(HT40)
Polarity: Vertical
Detector: Peak

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2422	103.14	69.14	NA	N/A	8.90	25.10
2	2390	58.25	24.25	-15.75	74.00	8.90	25.10

Carrier frequency (MHz): 2422
Channel No.:3
Test Mode: 802.11n(HT40)
Polarity:Horizontal
Detector: Peak

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2422	97.51	63.51	NA	N/A	8.90	25.10
2	2390	55.00	21	-19	74.00	8.90	25.10

Carrier frequency (MHz): 2422
Channel No.:3
Test Mode: 802.11n(HT40)
Polarity: Vertical
Detector: Average

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2422	97.14	63.14	NA	N/A	8.90	25.10
2	2390	40.26	6.26	-13.74	54.00	8.90	25.10

Carrier frequency (MHz): 2422
Channel No.:3
Test Mode: 802.11n(HT40)
Polarity:Horizontal
Detector: Average

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2422	87.43	53.43	NA	N/A	8.90	25.10
2	2390	38.63	4.63	-15.37	54.00	8.90	25.10

Carrier frequency (MHz): 2462
Channel No.:11
Test Mode: 802.11n(HT40)
Polarity: Vertical
Detector: Peak

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2462	101.59	67.59	NA	N/A	8.90	25.10
2	2483.5	61.13	27.13	-12.87	74.00	8.90	25.10

Carrier frequency (MHz): 2462
Channel No.:11
Test Mode: 802.11n(HT40)
Polarity:Horizontal
Detector: Peak

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2462	98.96	64.96	NA	N/A	8.90	25.10
2	2483.5	57.14	23.14	-16.86	74.00	8.90	25.10

Carrier frequency (MHz): 2462
Channel No.:11
Test Mode: 802.11n(HT40)
Polarity: Vertical
Detector: Average

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2462	93.47	59.47	NA	N/A	8.90	25.10
2	2483.5	38.64	4.64	-15.36	54.00	8.90	25.10

Carrier frequency (MHz): 2462
Channel No.11
Test Mode: 802.11n(HT40)
Polarity:Horizontal
Detector: Average

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2462	90.57	56.57	NA	N/A	8.90	25.10
2	2483.5	37.23	3.23	-16.77	54.00	8.90	25.10

Sample Calculations

Determining Spurious Emissions Levels

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

The measurement results are obtained as described below:

Result= $P_{mea} + A_{Rpl}$

The worst case attitude: The mobile lay down.

For 802.11b

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	Pmea (dBuV/m)	Polarity
33.787575	29.06	19.1	9.96	Vertical
39.95992	25.95	15.4	10.55	Horizontal
87.094188	17.41	10.8	6.61	Horizontal
450.300601	25.3	20	5.30	Vertical
533.066132	25.35	21.9	3.45	Vertical
908.817635	36.44	28.3	8.14	Vertical

For 802.11g

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	Pmea (dBuV/m)	Polarity
33.647295	29.26	19.2	10.06	Vertical
79.93988	17.59	10	7.59	Vertical
96.913828	15.84	11.7	4.14	Vertical
491.182365	23.78	21.2	2.58	Vertical
502.004008	25.51	21.2	4.31	Vertical
929.859719	32.84	28.3	4.54	Horizontal

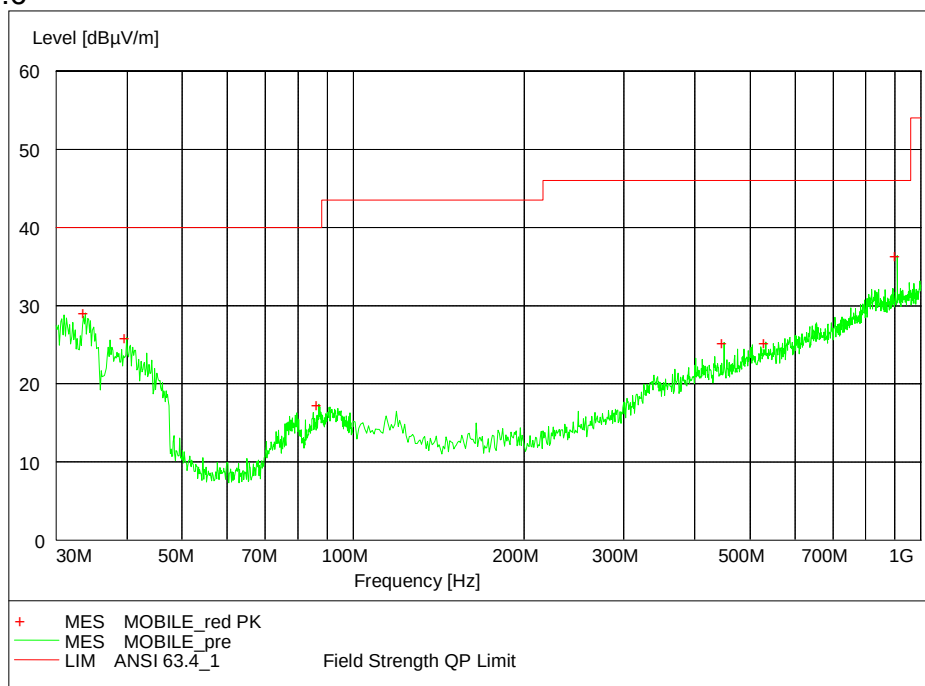
For 802.11n(HT20)

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	Pmea (dBuV/m)	Polarity
31.122244	29.68	20.5	9.18	Vertical
79.519038	16.49	9.9	6.59	Vertical
97.054108	16.42	11.7	4.72	Horizontal
491.983968	23.85	21.2	2.65	Vertical
531.062124	24.74	21.8	2.94	Vertical
901.803607	32.62	28.4	4.22	Vertical

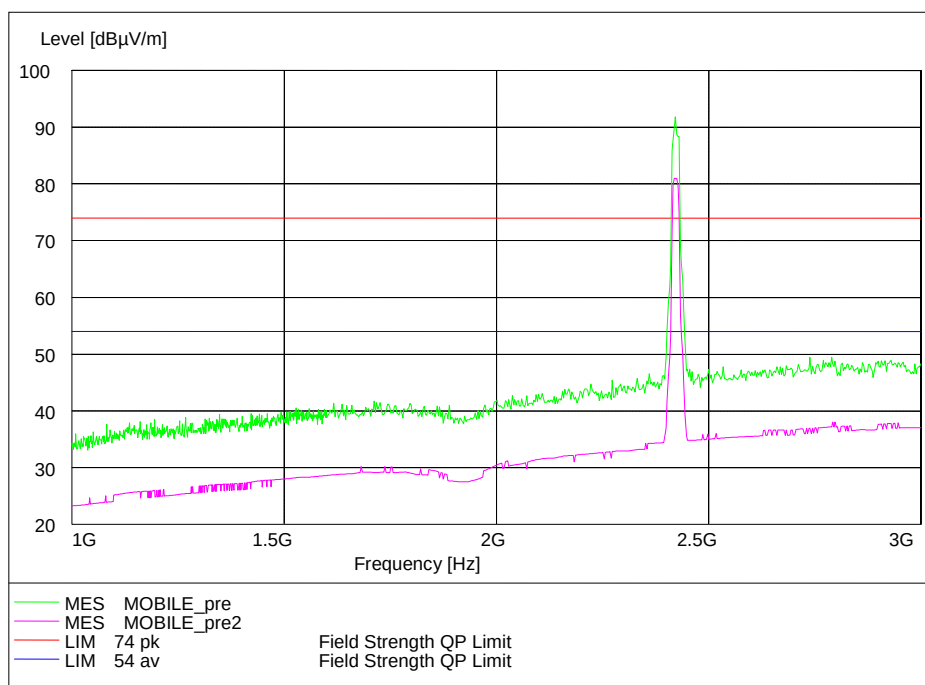
For 802.11n(HT40)

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	Pmea (dBuV/m)	Polarity
33.647295	23.73	19.2	4.53	Vertical
45.290581	20.74	13	7.74	Vertical
87.234469	17.36	10.8	6.56	Vertical
496.793587	24.2	21.2	3.00	Vertical
531.062124	24.7	21.8	2.90	Vertical
948.897796	32.99	28.4	4.59	Vertical

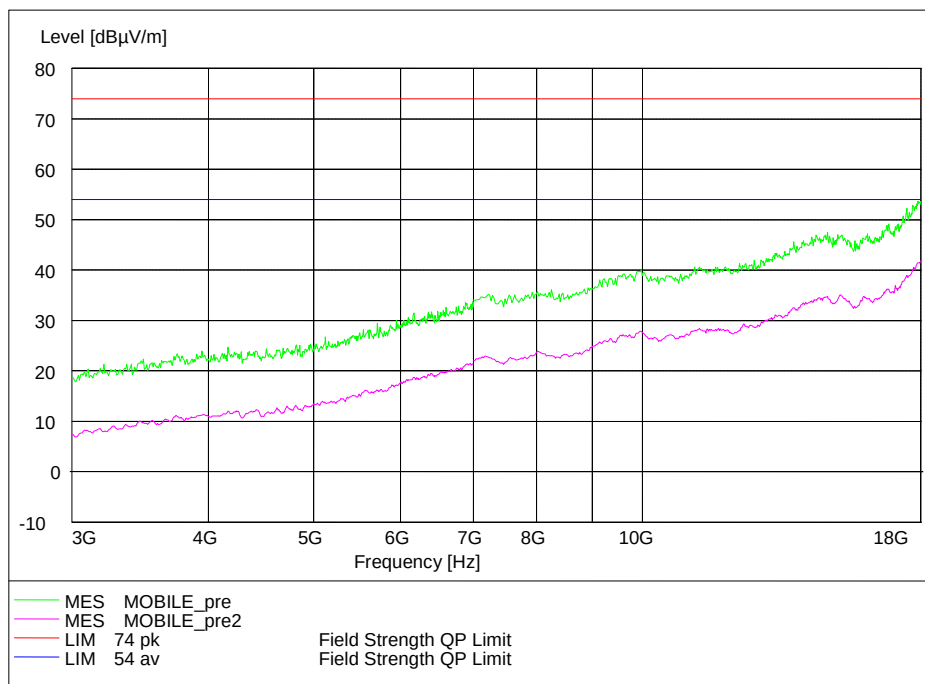
Carrier frequency (MHz): 2437
Channel No.:6



Frequency Range: 30MHz -1GHz
Detector: QP mode
Test Mode: 802.11b



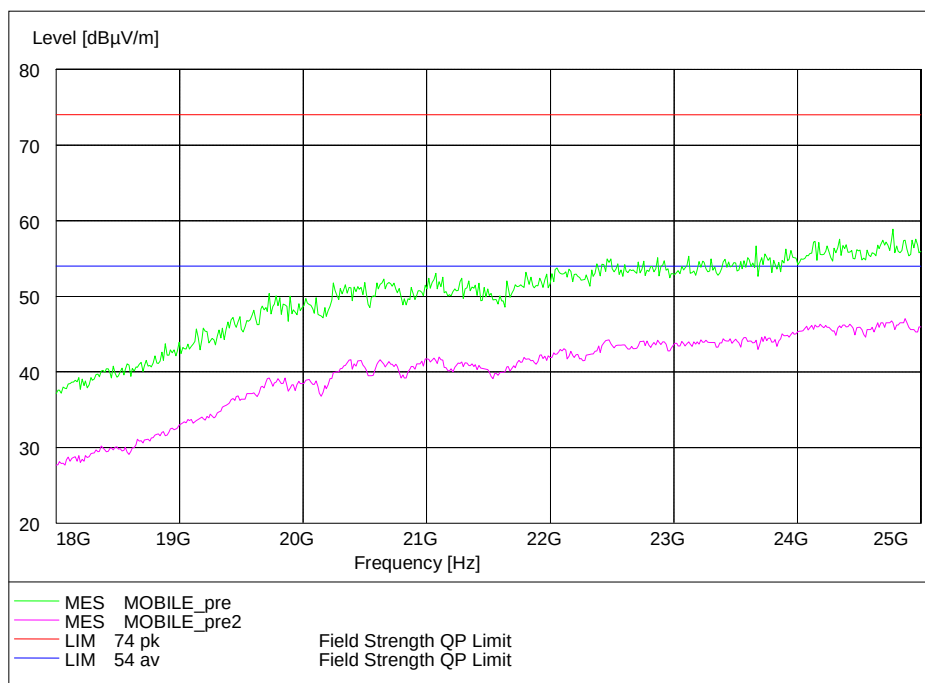
Frequency Range: 1GHz -3GHz
Detector: Av mode and PK mode
Modulation type: 802.11b



Frequency Range: 3GHz -18GHz

Detector: Av mode and PK mode

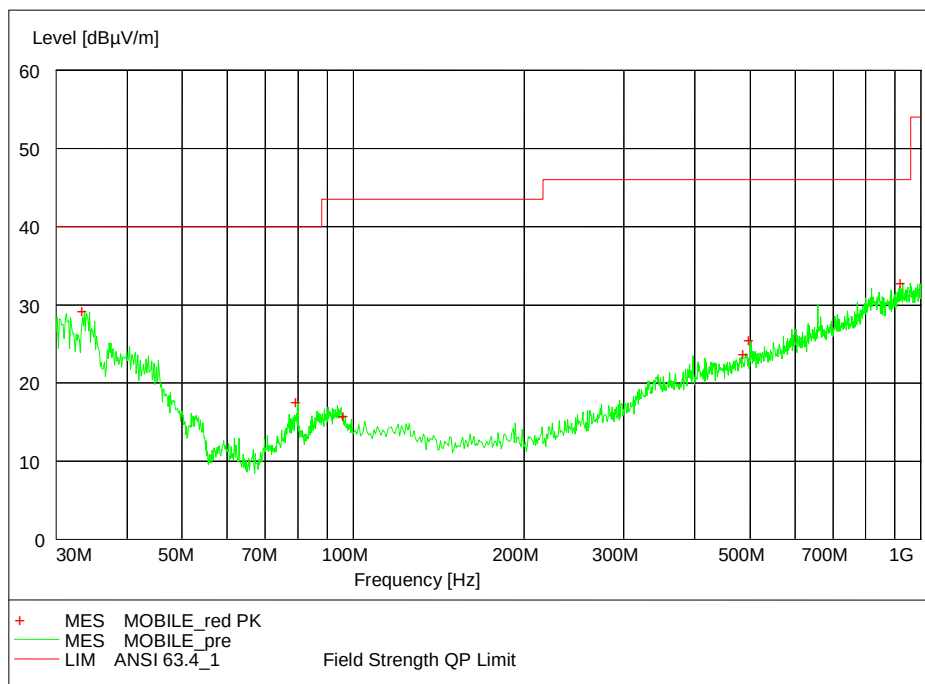
Modulation type: 802.11b



Frequency Range: 18GHz -25GHz

Detector: Av mode and PK mode

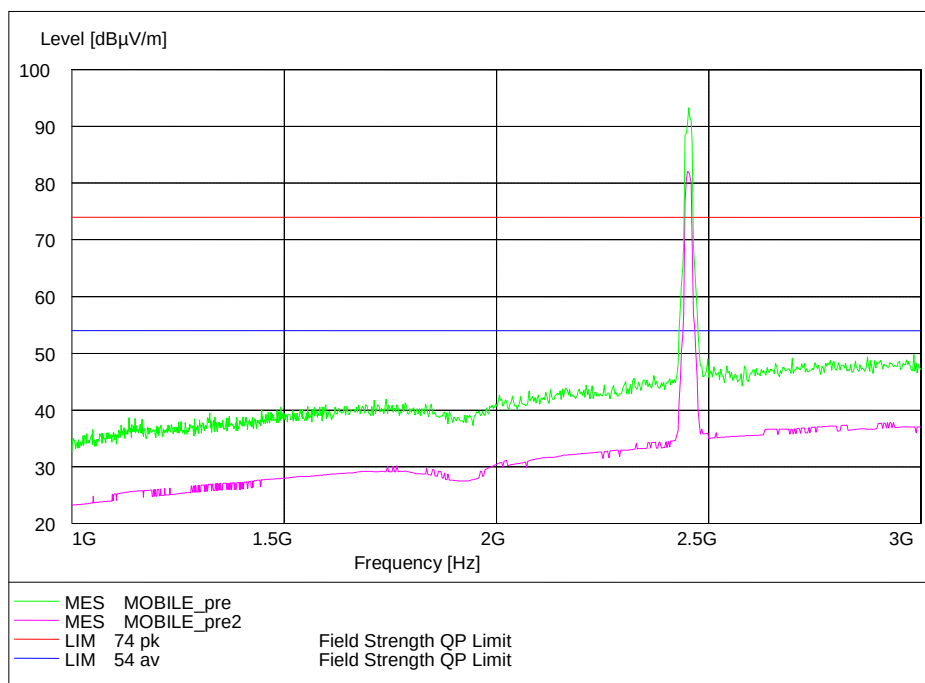
Modulation type: 802.11b



Frequency Range: 30MHz -1GHz

Detector: QP mode

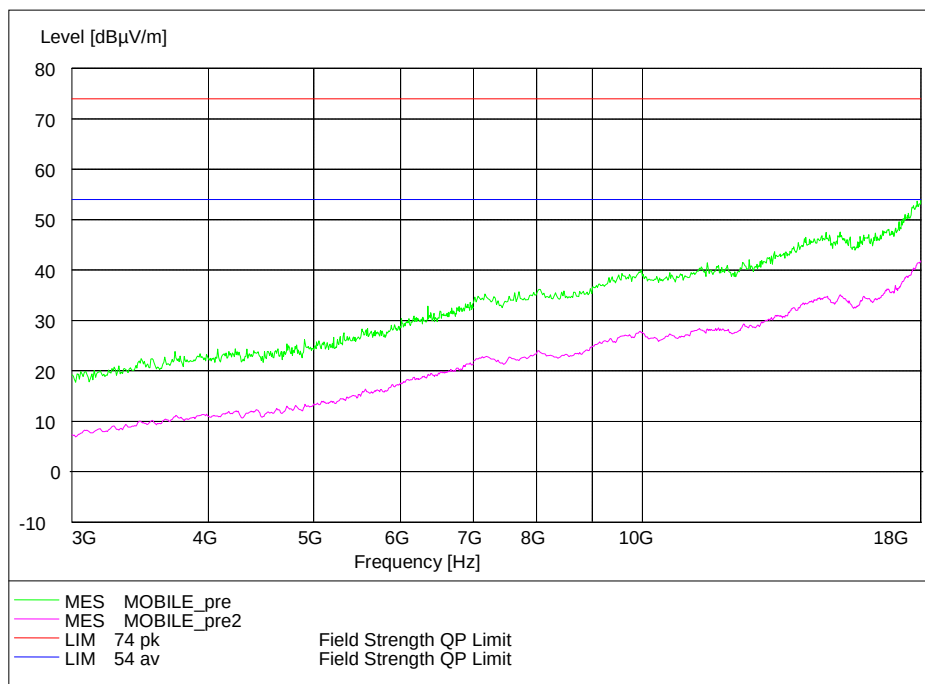
Modulation type: 802.11g



Frequency Range: 1GHz -3GHz

Detector: Av mode and PK mode

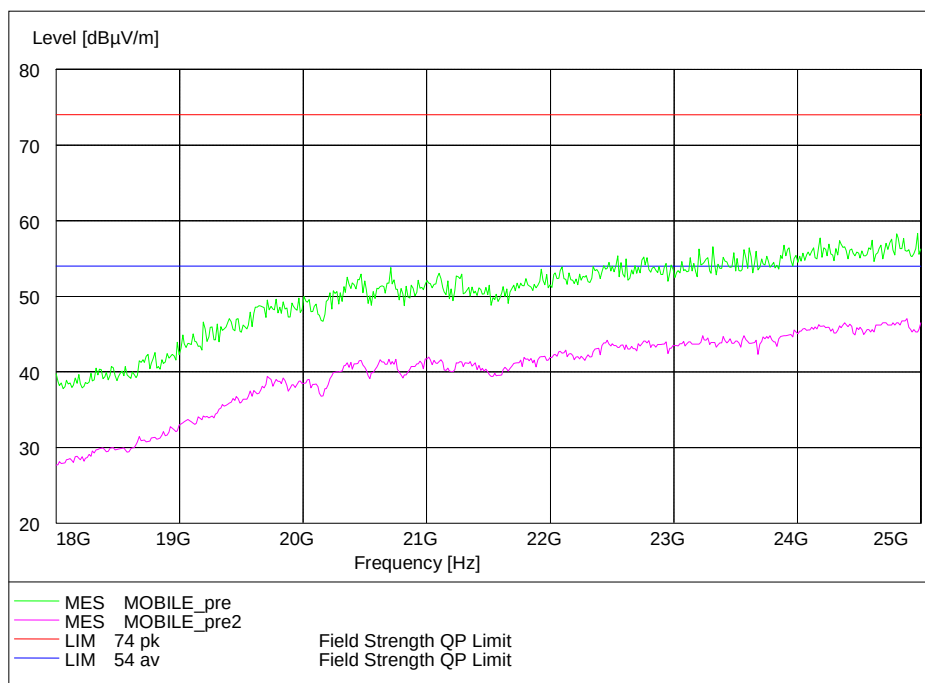
Modulation type: 802.11g



Frequency Range: 3GHz -18GHz

Detector: Av mode and PK mode

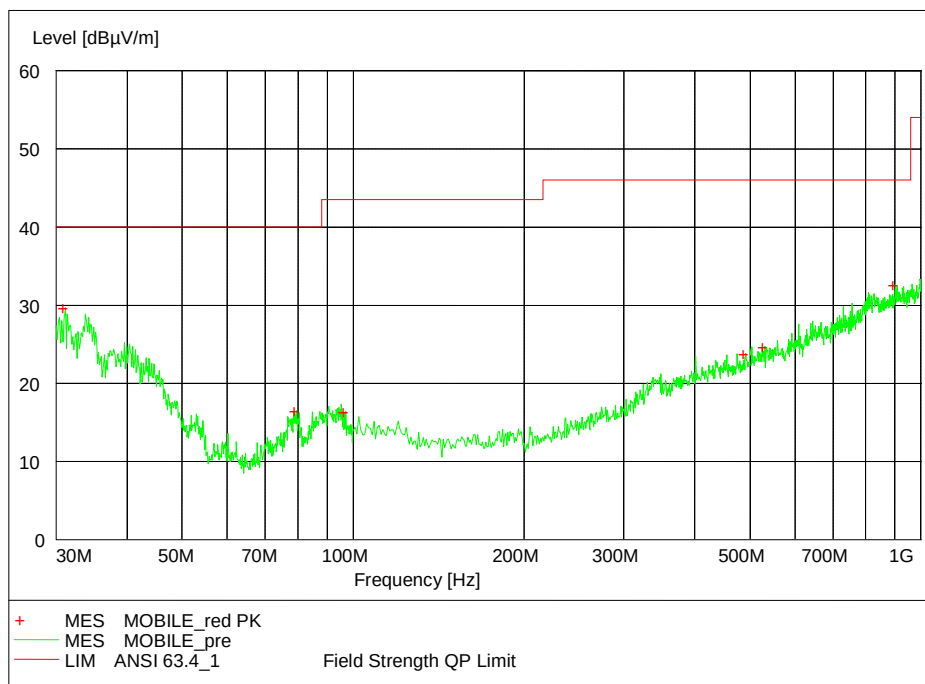
Modulation type: 802.11g



Frequency Range: 18GHz -25GHz

Detector: Av mode and PK mode

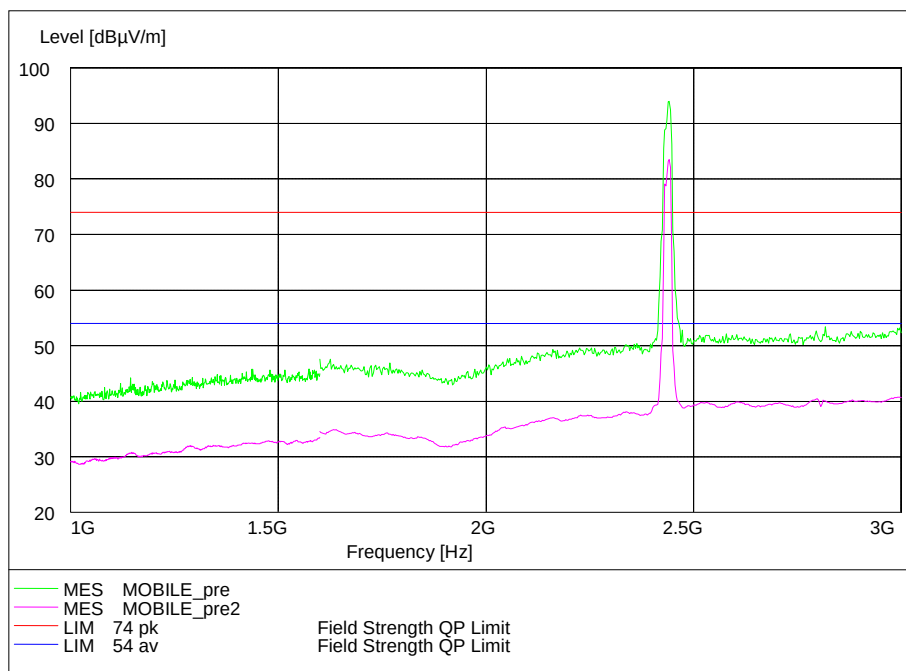
Modulation type: 802.11g



Frequency Range: 30MHz -1GHz

Detector: QP mode

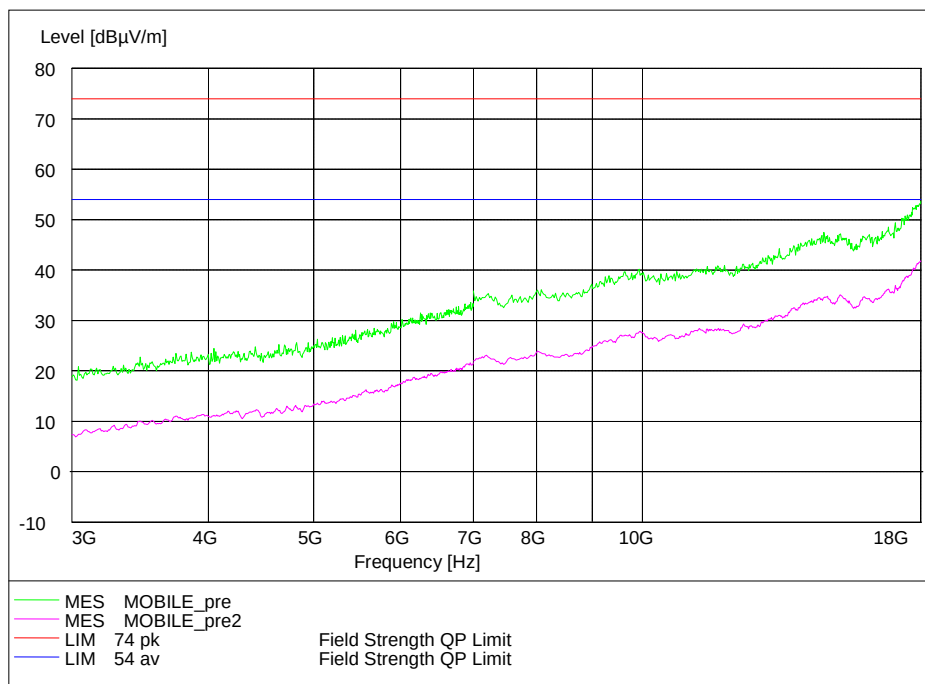
Test Mode: 802.11n(HT20)



Frequency Range: 1GHz -3GHz

Detector: Av mode and PK mode

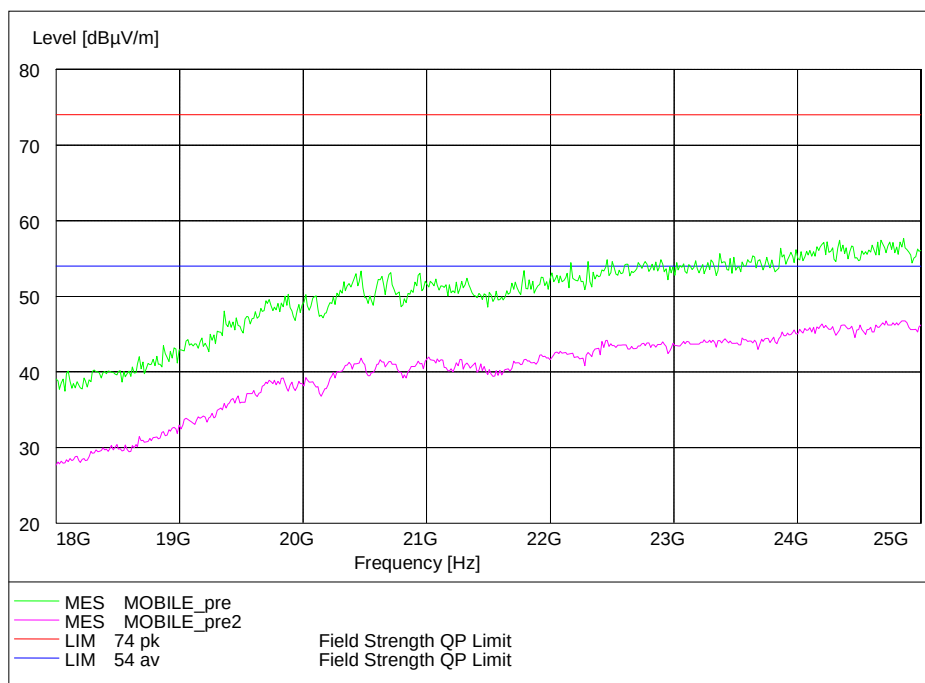
Modulation type: 802.11n(HT20)



Frequency Range: 3GHz -18GHz

Detector: Av mode and PK mode

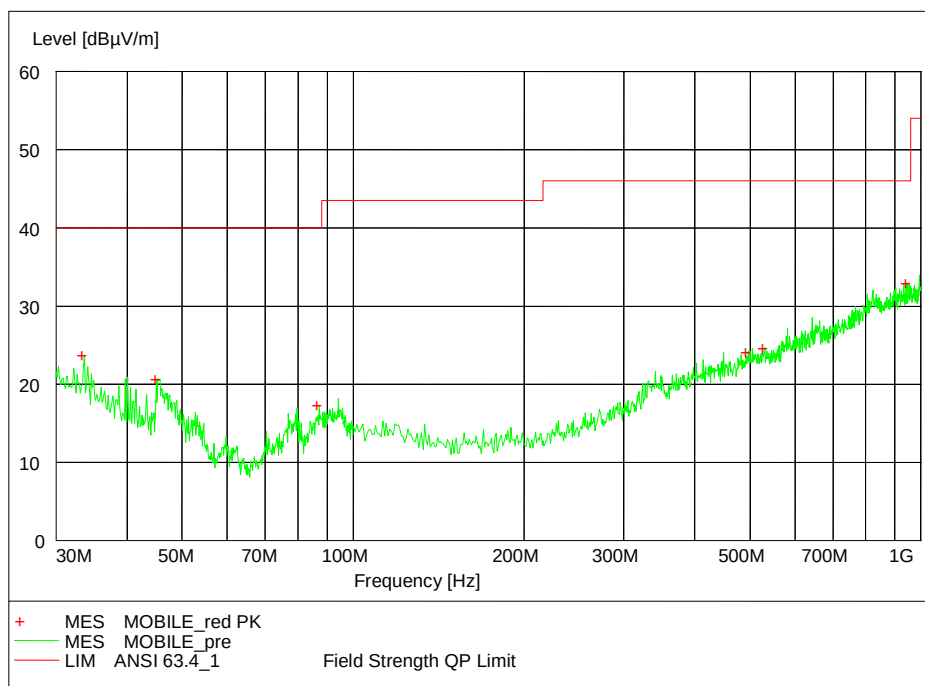
Modulation type: 802.11n(HT20)



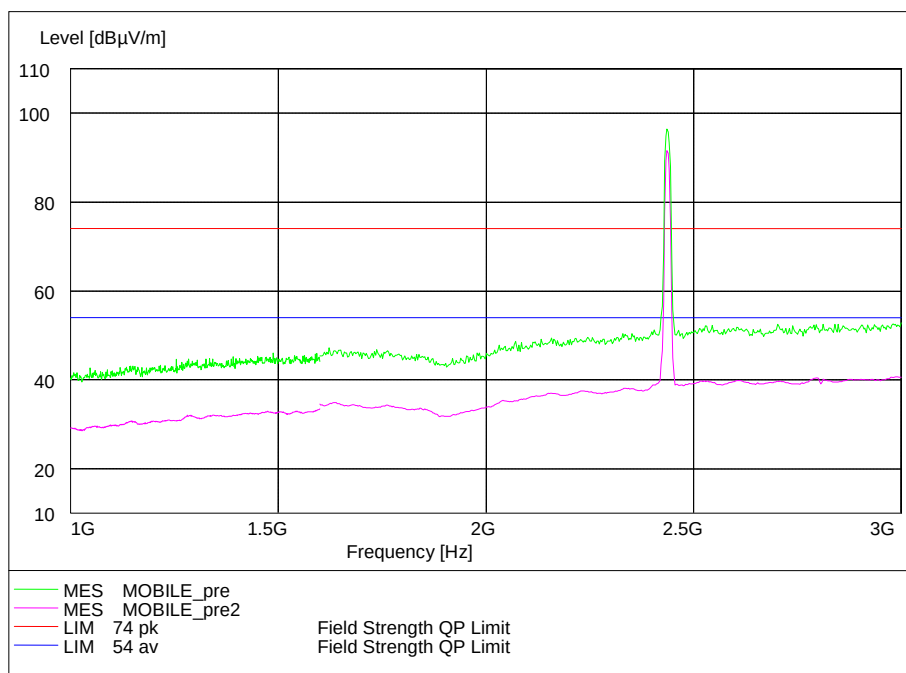
Frequency Range: 18GHz -25GHz

Detector: Av mode and PK mode

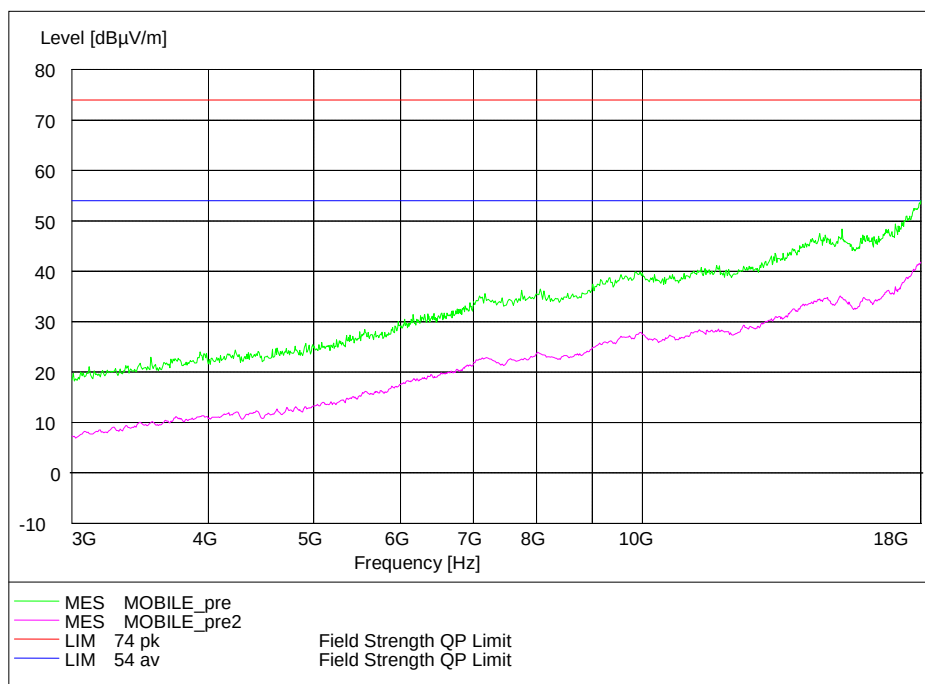
Modulation type: 802.11n(HT20)



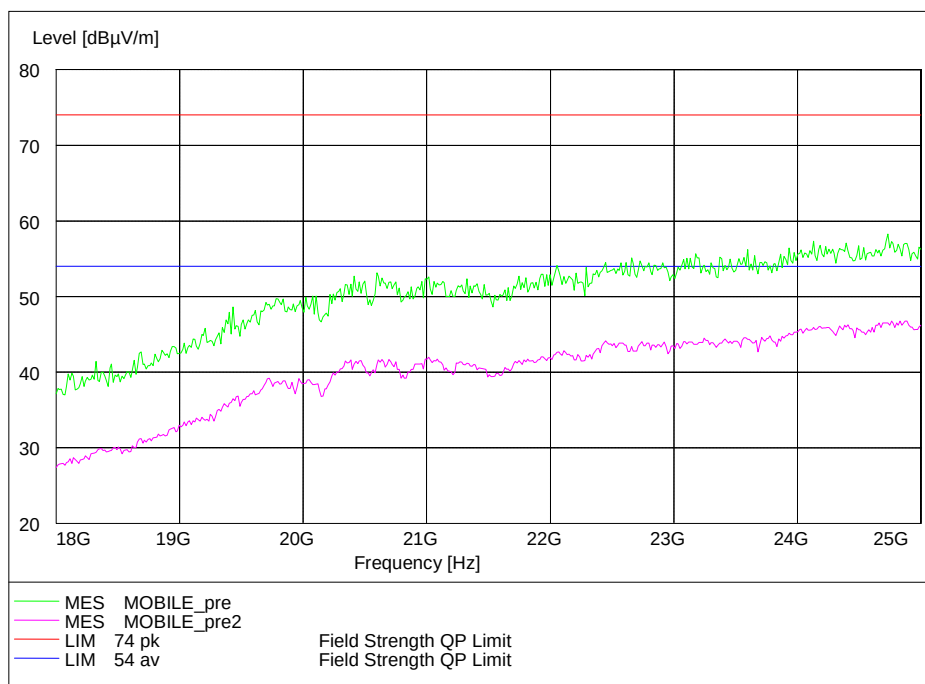
Frequency Range: 30MHz -1GHz
Detector: QP mode
Modulation type: 802.11n(HT40)



Frequency Range: 1GHz -3GHz
Detector: Av mode and PK mode
Modulation type: 802.11n(HT40)



Frequency Range: 3GHz -18GHz
Detector: Av mode and PK mode
Modulation type: 802.11n(HT40)



Frequency Range: 18GHz -25GHz
Detector: Av mode and PK mode

6.6 AC Power line Conducted Emission

6.6.1 Ambient condition

Temperature	Relative humidity	Pressure
20.8°C	36.5%	100.9kPa

6.6.2 Test limit

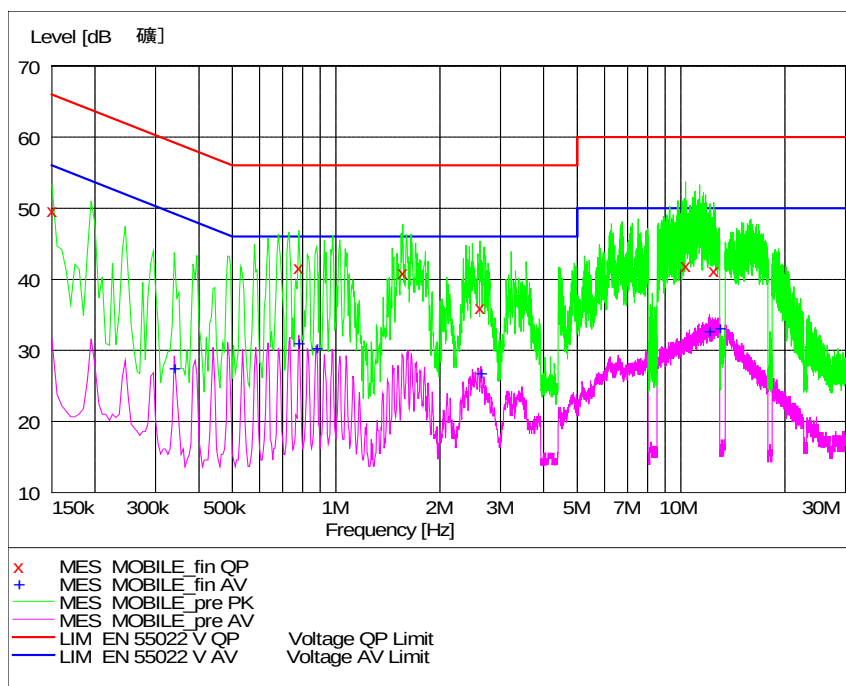
FCC Part15.207

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

The measurement is made according to ANSI C63.4-2009

6.6.3 Test result



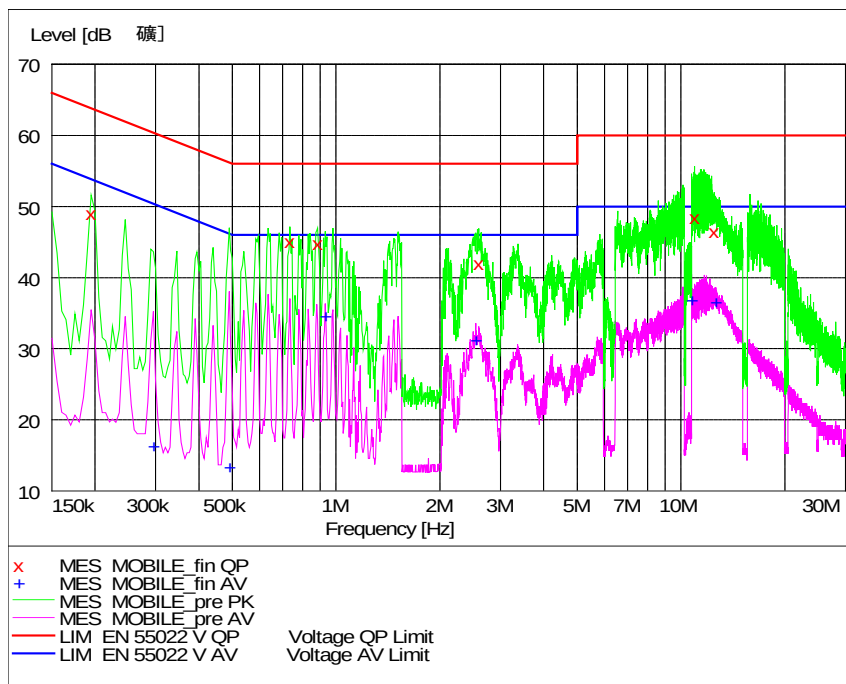
L Line

MEASUREMENT RESULT: "MOBILE_fin AV"

Frequency MHz	Level dBμV	Transd	Limit dB	Margin dBμV	Line dB	PE
0.340000	27.70	20.1	49	21.5	---	---
0.780000	31.20	20.1	46	14.8	---	---
0.880000	30.50	20.2	46	15.5	---	---
2.630000	27.00	20.2	46	19.0	---	---
12.110000	32.90	20.7	50	17.1	---	---
12.935000	33.30	20.7	50	16.7	---	---

MEASUREMENT RESULT: "MOBILE_fin QP"

Frequency MHz	Level dBμV	Transd	Limit dB	Margin dBμV	Line dB	PE
0.150000	49.90	20.1	66	16.1	---	---
0.780000	41.80	20.1	56	14.2	---	---
1.560000	41.20	20.2	56	14.8	---	---
2.615000	36.20	20.2	56	19.8	---	---
10.315000	42.10	20.6	60	17.9	---	---
12.450000	41.40	20.7	60	18.6	---	---



N Line

MEASUREMENT RESULT: "MOBILE_fin AV"

Frequency MHz	Level dBμV	Transd	Limit dB	Margin dBμV	Line dB	PE
0.295000	16.40	20.2	50	34.0	---	---
0.490000	13.50	20.2	46	32.7	---	---
0.930000	34.70	20.2	46	11.3	---	---
2.540000	31.30	20.2	46	14.7	---	---
10.730000	36.90	20.6	50	13.1	---	---
12.635000	36.70	20.7	50	13.3	---	---

MEASUREMENT RESULT: "MOBILE_fin QP"

Frequency MHz	Level dBμV	Transd	Limit dB	Margin dBμV	Line dB	PE
0.195000	49.20	20.2	64	14.7	---	---
0.735000	45.30	20.1	56	10.7	---	---
0.885000	45.00	20.2	56	11.0	---	---
2.590000	42.20	20.2	56	13.8	---	---
10.935000	48.70	20.6	60	11.3	---	---
12.500000	46.60	20.7	60	13.4	---	---

7 MEASUREMENT UNCERTAINTIES

Items	Uncertainty	
Occupied Bandwidth	3kHz	
Peak power output	0.67dB	
Band edge compliance	1.20dB	
Transmitter Power Spectral Density	0.75dB	
Spurious emissions	30MHz~1GHz	2.83dB
	1GHz~12.75GHz	2.50dB
	12.75GHz~25GHz	2.75dB

8 TEST EQUIPMENTS

No.	Name/Model	Manufacturer	S/N	Cal Due date
1.	Spectrum Analyzer FSV	ROHDE&SCHWARZ	101065	2016.08.20
2.	Attenuation 6810.17.B	HUBER+SUHNER	768710	2016.08.20
3.	Cable 104EA	SUCOFLEX	9272/4EA	2016.08.20
4.	Cable 104EA	SUCOFLEX	9266/4EA	2016.08.20
5.	Power Meter E4416A	Agilent	MY52370013	2016.03.01
6.	Peak Power Sensor E9327A	Agilent	MY52420006	2016.03.01
7.	12.65m×8.03m×7.50m Fully-Anechoic Chamber	FRANKONIA	----	----
8.	23.18m×16.88m×9.60m Semi-Anechoic Chamber	FRANKONIA	---	----
9.	Turn table Diameter:1m	HD	----	----
10.	Turn table Diameter:5m	HD	----	----
11.	Antenna master FAC(MA4.0)	MATURO	----	----
12.	Antenna master SAC(MA4.0)	MATURO	----	----
13.	9.080m×5.255m×3.525m Shielding room	FRANKONIA	----	----
14.	HF 906 Double-Ridged Waveguide Horn Antenna	R&S	100030	2016.08.20
15.	HF 906 Double-Ridged Waveguide Horn Antenna	R&S	100029	2016.08.20
16.	HL562 Ultra log antenna	R&S	100016	2016.08.20
17.	3160-09 Receive antenna	SCHWARZ-BECK	002058-002	2016.08.20
18.	ESI 40 EMI test receiver	R&S	100015	2016.08.20
19.	Radio tester	CMU 200	114667	2016.08.20
20.	ESCS30 EMI test receiver	R&S	100029	2016.08.20
21.	HL562 Receive antenna	R&S	100167	2016.08.20
22.	ESH3-Z5 LISN	R&S	100020	2016.08.20

APPENDIX

Appendix Test Setup

---End of Test Report---