Registration
No.910917

TEST REPORT FOR BLUETOOTH TESTING

Report No.: SRTC2016-9004(F)-0005

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

Product Model: Philips Xenium V787

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: VQRCTV787

The State Radio_monitoring_center Testing Center (SRTC)

No.80 Beilishi Road Xicheng District Beijing, China

Tel: 86-10-57996181 Fax: 86-10-57996288

CONTENTS

1. GENERAL INFORMATION 2

1.1 Notes of the test report 2
1.2 Information about the testing laboratory 2
1.3 Applicant's details 2
1.4 Manufacturer's details 2
1.5 Test Environment 3

2 DESCRIPTION OF THE DEVICE UNDER TEST 4

2.1 Final Equipment Build Status 4
2.2 Support Equipment 5

3 REFERENCE SPECIFICATION 6

4 KEY TO NOTES AND RESULT CODES 7

5 RESULT SUMMARY 8

6 TEST RESULT 9

6.1 Occupied Bandwidth 9
6.2 Channel Separation 16
6.3 Peak Power Output 18
6.4 Dwell Time 25
6.5 Number of Hopping Frequencies 32
6.6 Conducted out of band emission measurement 34
6.7 Spurious Radiated Emissions 38
6.8 AC Power line Conducted Emission 54

7 MEASUREMENT UNCERTAINTIES 56

8 TEST EQUIPMENTS 57

APPENDIX 58

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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
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Fax:	+86 10 5799 6288
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1.3 Applicant's details

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Grantee Code:	VQRCT
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Fax:	010-68300097
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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
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Contacted person:	linda zhang
Tel:	010-68300097
Fax:	010-68300097
Email:	linda.zhang@sangfei.com

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1.5 Test Environment

Date of Receipt of test sample at SRTC:	2016.01.21
Testing Start Date:	2016.01.26
Testing End Date:	2016.01.27

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

Normal Supply Voltage (V d.c.):	3.80
Maximum Extreme Supply Voltage (V d.c.):	4.35
Minimum Extreme Supply Voltage (V d.c.):	3.50

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2 DESCRIPTION OF THE DEVICE UNDER TEST

2.1 Final Equipment Build Status

Frequency Range	2.4GHz~2.4835GHz
Number of Channel	79
Modulation Type	GFSK, π/4DQPSK, 8DPSK
Duplex Mode	TDD
Channel Spacing	1MHz
Data Rate	1Mbps, 2 Mbps, 3 Mbps
Antenna Type	Fixed Internal
Power Supply	Battery or Charger
Rated Power Supply Voltage	3.8V
HW Version	WMCVc
SW Version	Philips_V787_1553_V01_AG_FCC
IMEI	866636024833570

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2.2 Support Equipment

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

Equipment	Battery
Manufacturer	Zhongshan Tianmao Battery Co.
Model Number	AB5000AWML
Serial Number	---

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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.

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4 KEY TO NOTES AND RESULT CODES

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

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5 RESULT SUMMARY

No.	Test case	FCC reference	Verdict
1	Occupied Bandwidth	15.247(a)(1)	Pass
2	Channel Separation	15.247(a)(1)	Pass
3	Peak Power Output	15.247(b)(1)	Pass
4	Dwell Time	15.247(a)(1)(iii)	Pass
5	Number of Hopping Frequencies	15.247(a)(1)(iii)	Pass
6	Conducted out of band emission measurement	15.247(d)	Pass
7	Spurious Radiated Emissions	15.247(d)/15.35(b)/15.209	Pass
8	AC Power line Conducted Emission	15.207	Pass

This Test Report Is Issued by: Mr. Tao Hongbo	Checked by: Mr. Li Boyu
Tested by: Mr. Jiang Shuo	Issued date: 2016/3/23

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6 TEST RESULT

6.1 Occupied Bandwidth

6.1.1 Ambient condition

Temperature	Relative humidity	Pressure
22°C	40%	101.5kPa

6.1.2 Test Description

The bandwidth at 20dB 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.

6.1.3 Test limit

FCC Part15.247 (a)(1)
For frequency hopping system operating in the 2400-2483.5MHz, If the 20dB bandwidth of hopping channel is greater than 25kHz, two-thirds 20dB bandwidth of hopping channel shell be a minimum limit for the hopping channel separation.

6.1.4 Test settings

a. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
b. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
c. Measure the frequency difference of two frequencies that were attenuated 30dB from the reference level. Record the frequency difference as the emission bandwidth.
d. Repeat above procedures until all frequencies measured were complete.

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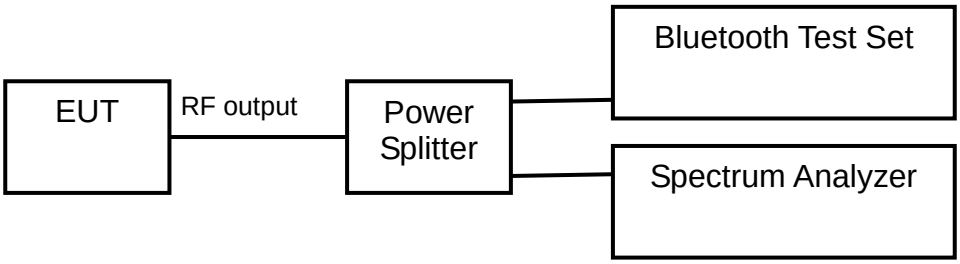
6.1.5 Test Setup



6.1.6 Test result

Modulation type: GFSK

Carrier frequency (MHz)	Channel No.	20 dB bandwidth(kHz)
2402	0	846.3
2441	39	819.7
2480	78	819.7

Modulation type: π/4DQPSK

Carrier frequency (MHz)	Channel No.	20 dB bandwidth(kHz)
2402	0	1226.3
2441	39	1232.7
2480	78	1232.3

Modulation type: 8DPSK

Carrier frequency (MHz)	Channel No.	20 dB bandwidth(kHz)
2402	0	1217.1
2441	39	1216.9
2480	78	1263.9

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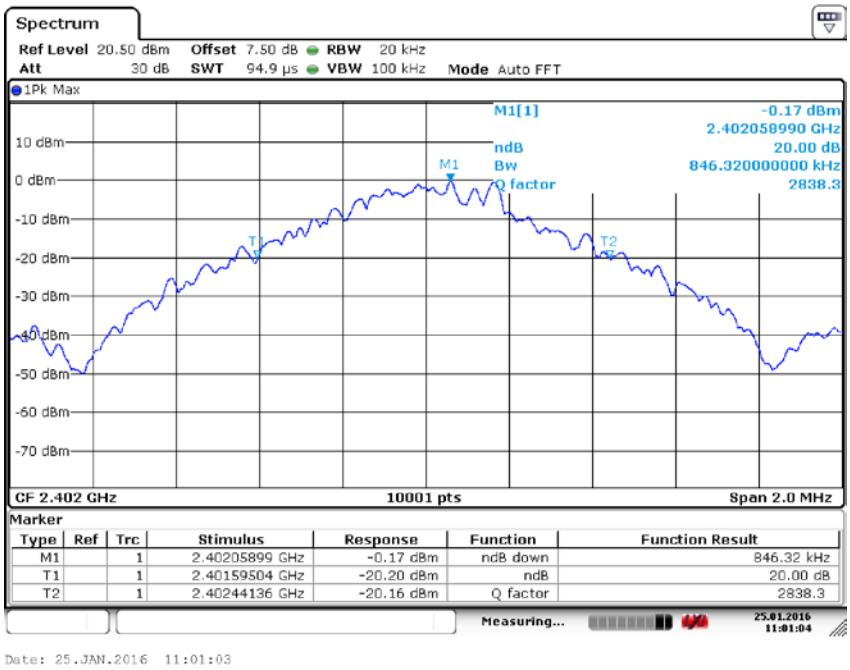
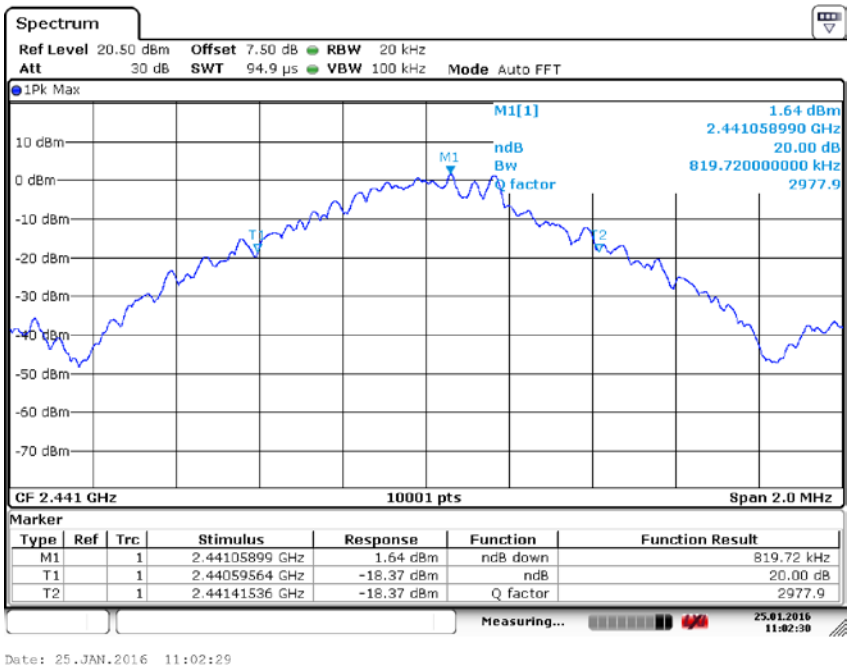


Carrier frequency (MHz): 2402
Channel No.:0
Modulation type: GFSK



Carrier frequency (MHz): 2441
Channel No.:39
Modulation type: GFSK

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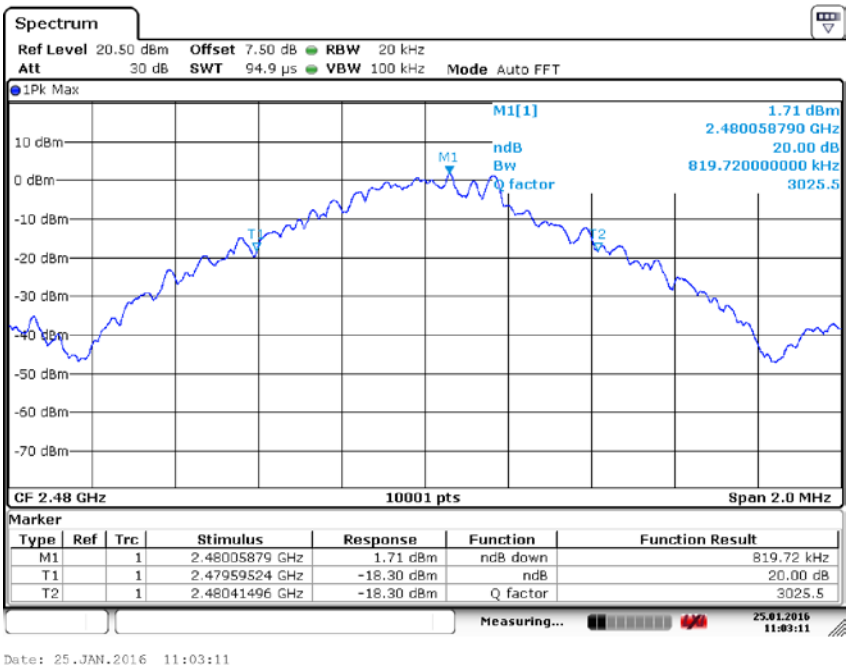
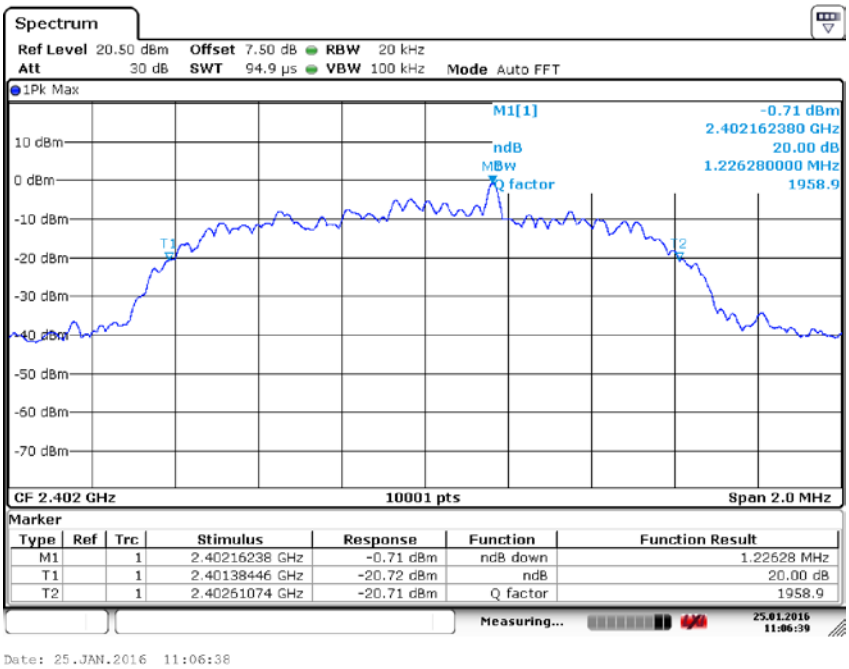


Carrier frequency (MHz): 2480
Channel No.:78
Modulation type: GFSK



Carrier frequency (MHz): 2402
Channel No.:0
Modulation type: π/4DQPSK

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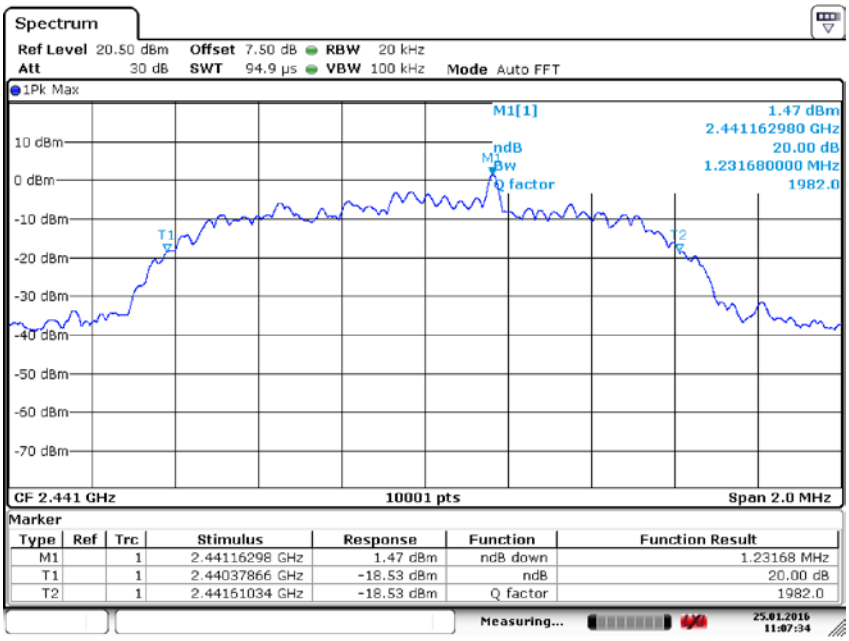
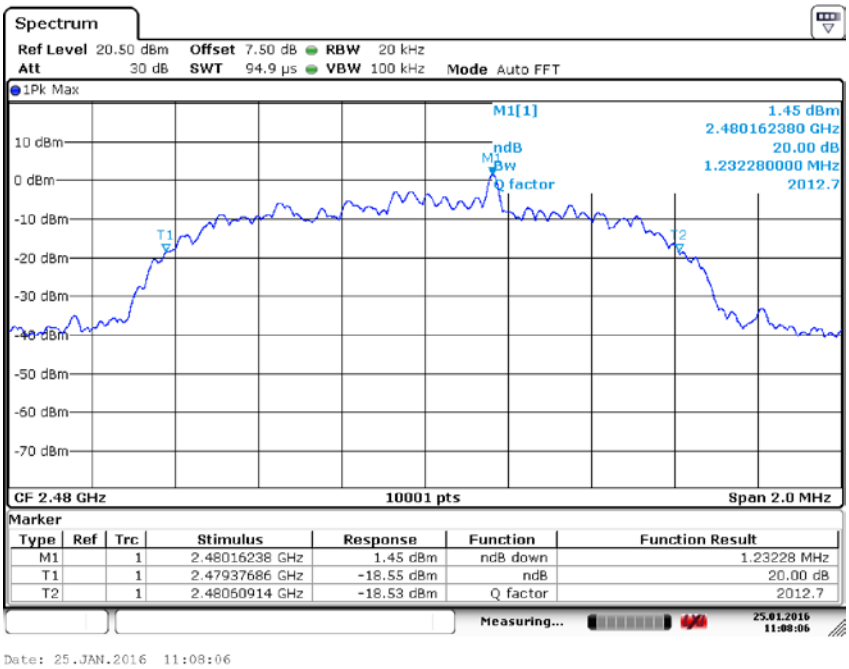


Carrier frequency (MHz): 2441
Channel No.:39
Modulation type: π/4DQPSK



Carrier frequency (MHz): 2480
Channel No.:78
Modulation type: π/4DQPSK

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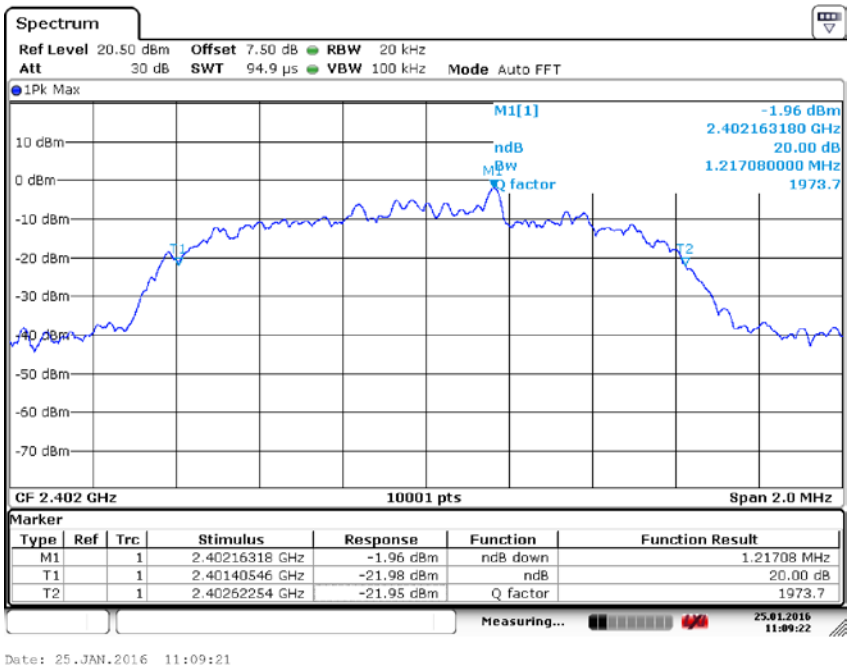
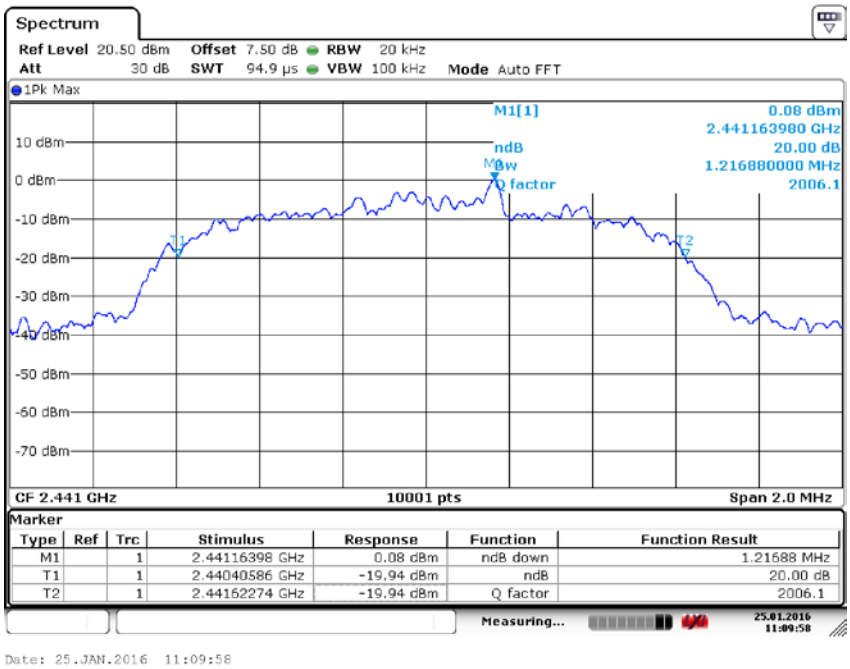


Carrier frequency (MHz): 2402
Channel No.:0
Modulation type: 8DPSK



Carrier frequency (MHz): 2441
Channel No.:39
Modulation type: 8DPSK

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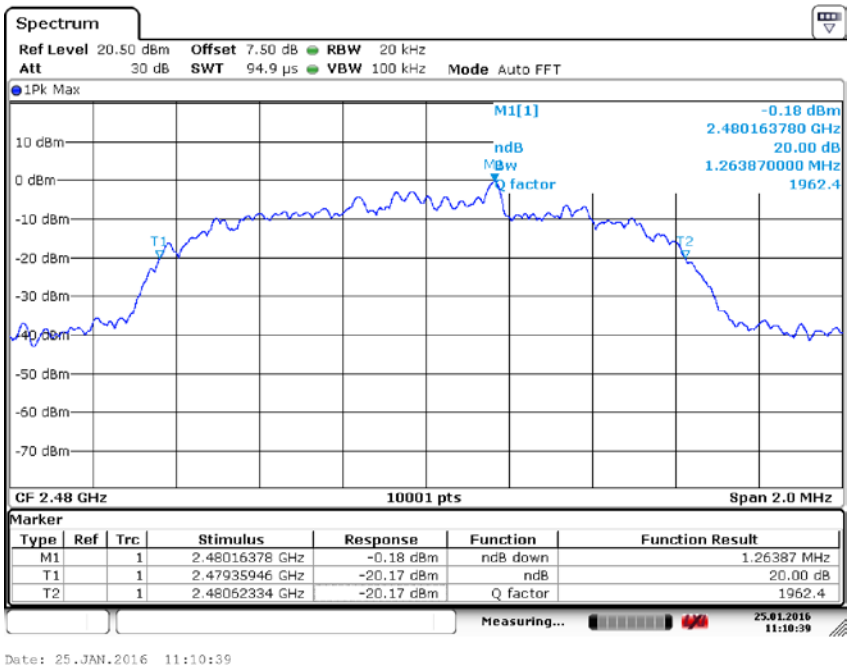

Carrier frequency (MHz): 2480
Channel No.:78
Modulation type: 8DPSK

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6.2 Channel Separation

6.2.1 Ambient condition

Temperature	Relative humidity	Pressure
22°C	40%	101.5kPa

6.2.2 Test Description

The Equipment Under Test (EUT) was set up in a shielded room to perform the channel separation measurements. The EUT was connected to the spectrum analyzer and Bluetooth test set via a power splitter with a known loss.

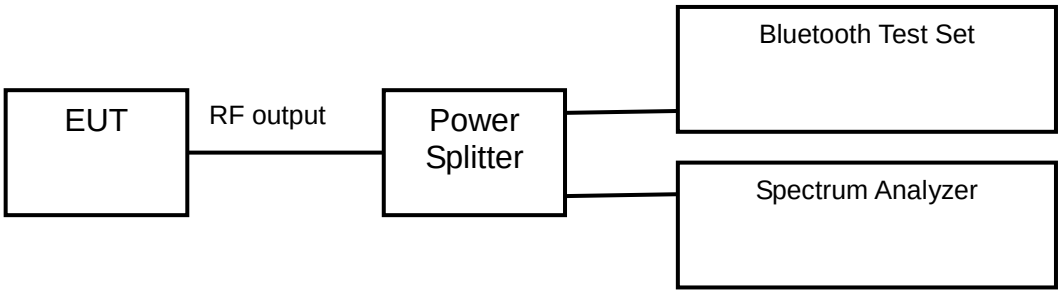
6.2.3 Test limit

FCC Part15.247 (a)(1)
Measurement is made with EUT operating in hopping mode. The minimum permissible channel separation for this system is 2/3 the value of the 20dB BW.

6.2.4 Test Settings

a) Detector: Peak-Max hold
b) Span: 3 MHz
c) Centre Frequency: 2441 MHz
d) Resolution Bandwidth (RBW): 30 kHz
e) Video Bandwidth (VBW): 1 MHz
f) Sweep Time: Coupled

6.2.5 Test Setup



6.2.6 Test result

Op-mode	Channel separation MHz
Hopping mode	1

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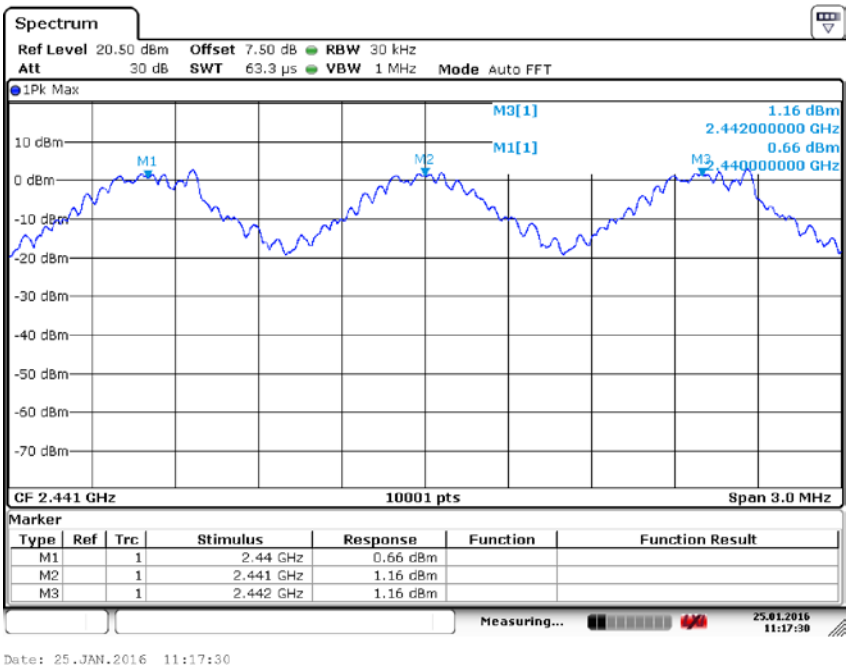

Op-mode: Hopping mode

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6.3 Peak Power Output

6.3.1 Ambient condition

Temperature	Relative humidity	Pressure
22°C	40%	101.5kPa

6.3.2 Test Description

Measurement is made while the EUT is operating in non-hopping transmission mode. The powers shown below were measured using a spectrum analyzer with a Bluetooth signaling test set used only to maintain a Bluetooth link with the EUT.

6.3.3 Test limit

FCC Part15.247(b)(1):
For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt.

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

Modulation type	GFSK	π/4DQPSK	8DPSK
Maximum Output Power	30.0dBm	30.0dBm	30.0dBm

For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

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

Modulation type	GFSK	π/4DQPSK	8DPSK
Maximum Output Power	21.0dBm	21.0dBm	21.0dBm

6.3.4 Test Settings

Hopping Mode	Modulation type	RBW	VBW	Span	Sweep time
Hopping OFF	GFSK	2MHz	3MHz	8MHz	1ms
Hopping OFF	π/4DQPSK	2MHz	3MHz	8MHz	1ms
Hopping OFF	8DPSK	2MHz	3MHz	8MHz	1ms

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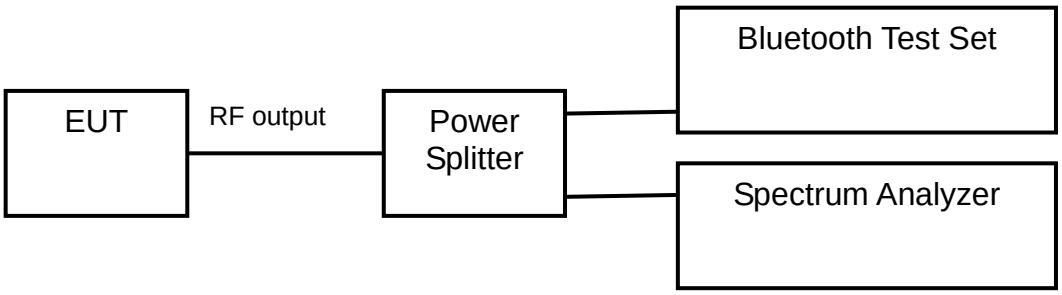
6.3.5 Test Setup



6.3.6 Test result

Modulation type	Average Power Output (dBm)		
	2402MHz (Ch0)	2441MHz (Ch39)	2480MHz (Ch78)
GFSK	3.02	4.51	4.87
π/4DQPSK	2.01	4.02	3.98
8DPSK	3.11	4.17	4.21

Average power data is provided to determine the need for Bluetooth SAR testing according to KDB 447498 D01 v05r01.

Modulation type	Peak Power Output (dBm)		
	2402MHz (Ch0)	2441MHz (Ch39)	2480MHz (Ch78)
GFSK	3.21	4.92	5.07
π/4DQPSK	2.34	4.24	4.19
8DPSK	3.23	4.31	4.48

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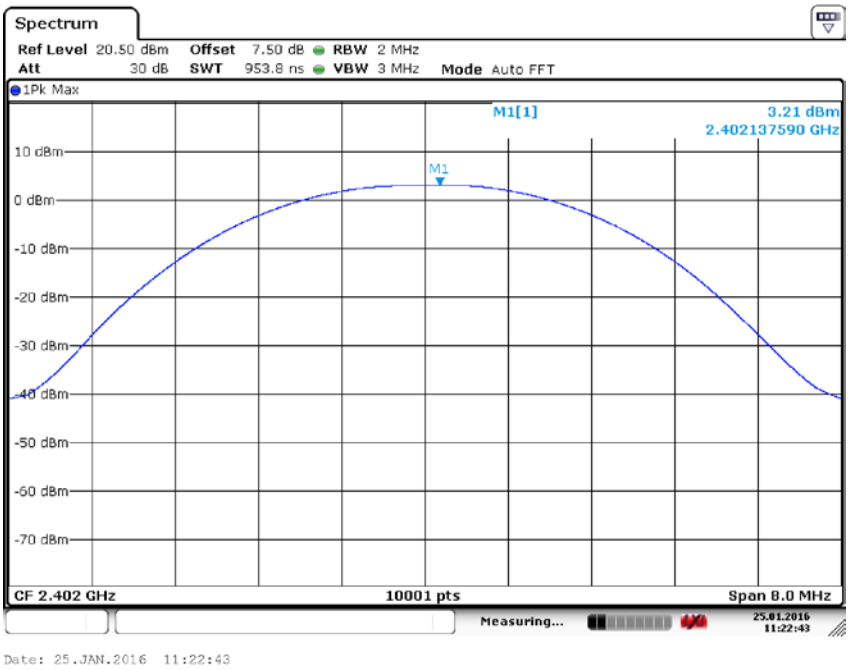
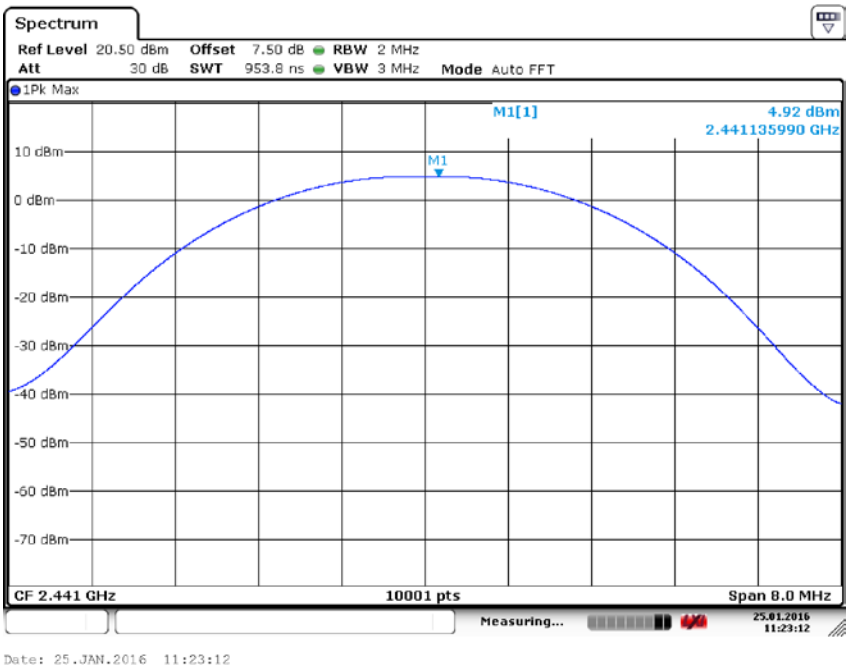


Carrier frequency (MHz): 2402
Channel No.:0
Modulation type: GFSK



Carrier frequency (MHz): 2441
Channel No.:39
Modulation type: GFSK

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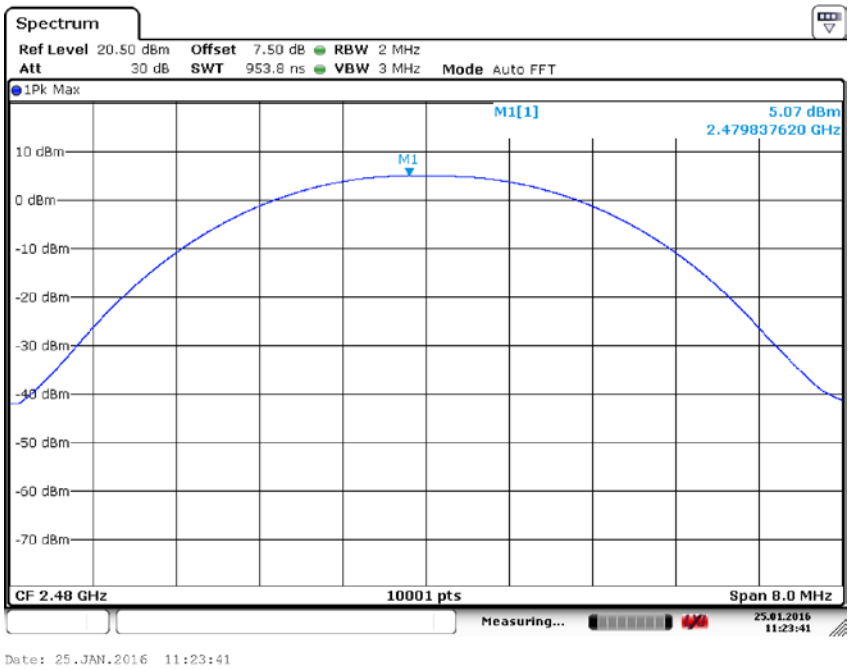
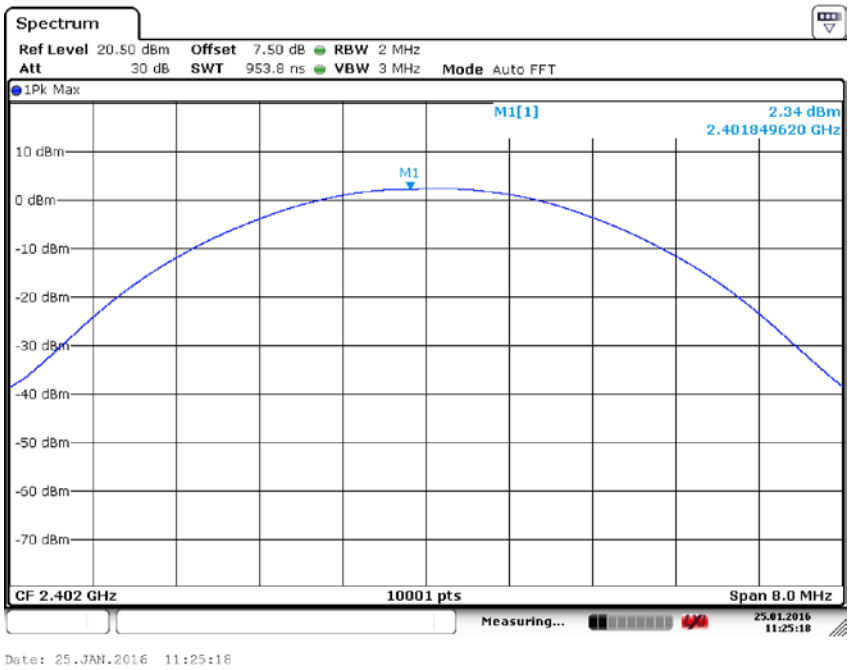


Carrier frequency (MHz): 2480
Channel No.:78
Modulation type: GFSK



Carrier frequency (MHz): 2402
Channel No.:0
Modulation type: π/4DQPSK

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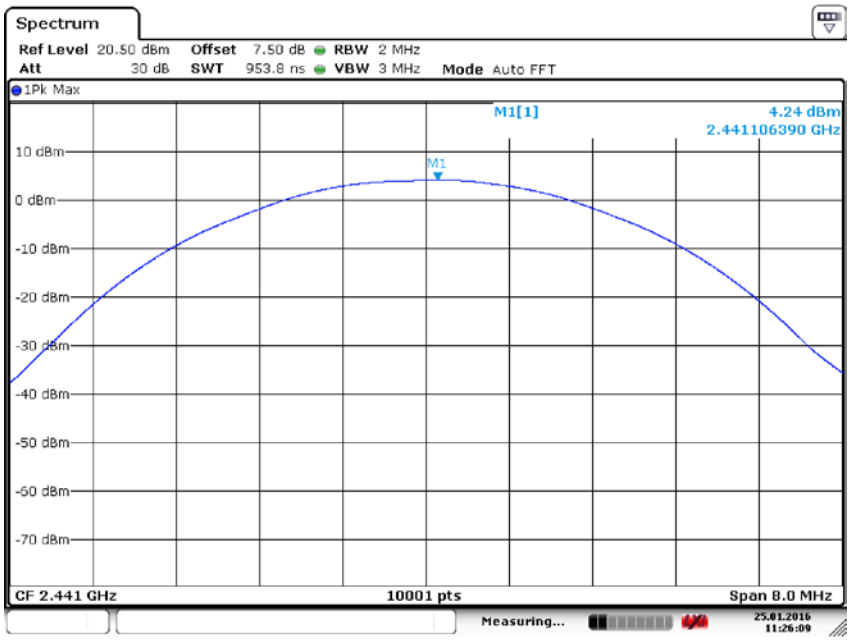
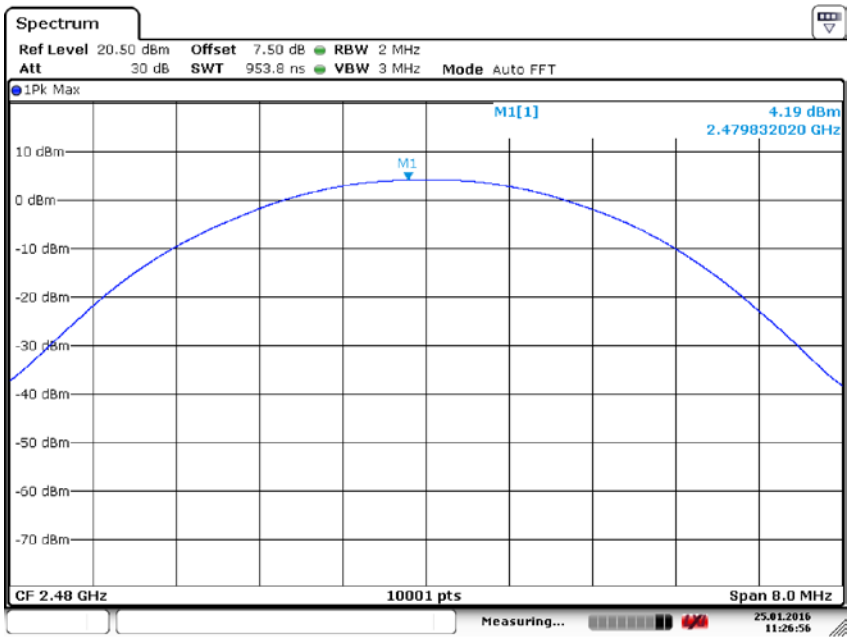


Date: 25.JAN.2016 11:26:09

Carrier frequency (MHz): 2441
Channel No.:39
Modulation type: π/4DQPSK



Date: 25.JAN.2016 11:26:56

Carrier frequency (MHz): 2480
Channel No.:78
Modulation type: π/4DQPSK

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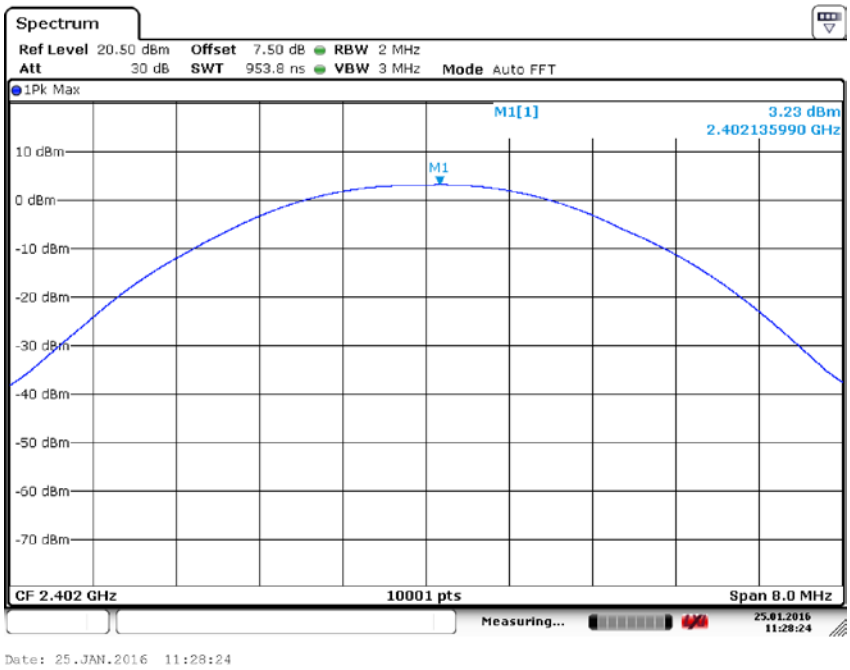
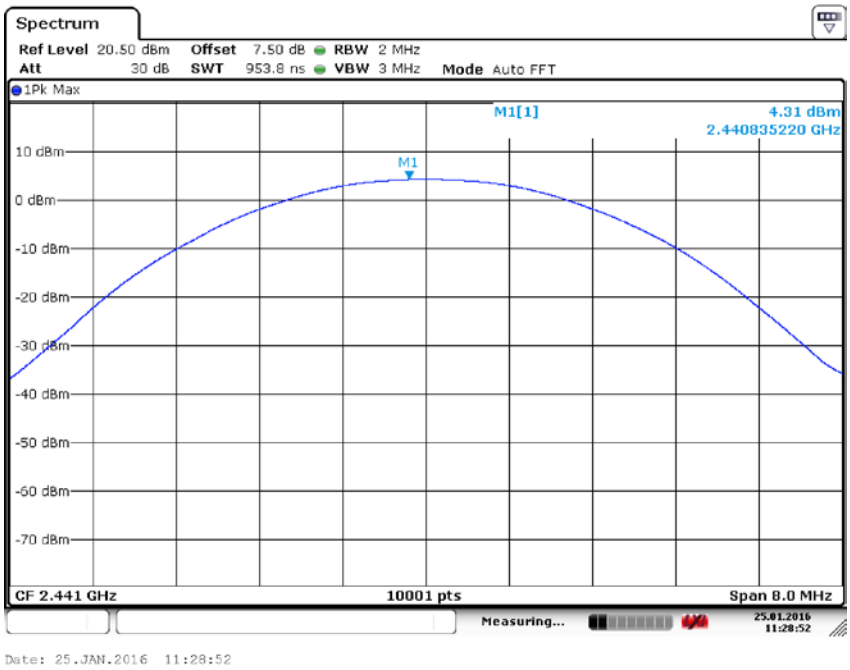


Carrier frequency (MHz): 2402
Channel No.:0
Modulation type: 8DPSK



Carrier frequency (MHz): 2441
Channel No.:39
Modulation type: 8DPSK

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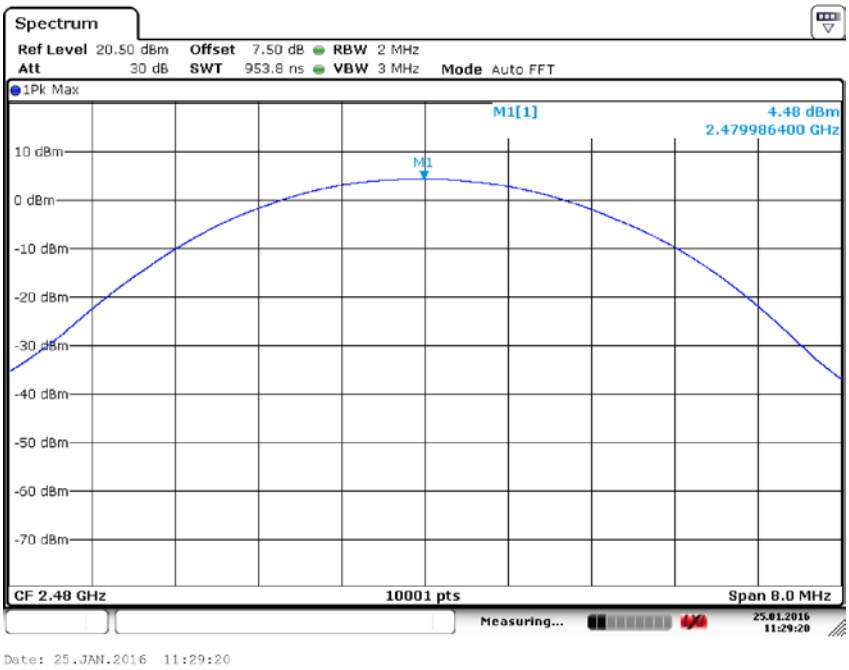

Carrier frequency (MHz): 2480
Channel No.:78
Modulation type: 8DPSK

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6.4 Dwell Time

6.4.1 Ambient condition

Temperature	Relative humidity	Pressure
22°C	40%	101.5kPa

6.4.2 Test Description

The Equipment Under Test (EUT) was set up in a shielded room to perform the dwell time measurements.
The EUT was connected to the spectrum analyzer and Bluetooth test set via a power splitter with a known loss.
The time slot length is measured of three different packet types which are available in the Bluetooth technology. Those are DH1, DH3 and DH5 packets. The dwell time is calculated by:
Dwell time = time slot length * hop rate * 31.6/ number of hopping channels with:
- hop rate=1600/2 * 1/s for DH1 packets =800
- hop rate=1600/4 * 1/s for DH3 packets =400
- hop rate=1600/6 * 1/s for DH5 packets =266.67
- number of hopping channels=79
- 31.6 s=0.4 seconds multiplied by the number of hopping channels=0.4s * 79

6.4.3 Test limit

FCC Part15.247(a)(1)(iii)
Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

6.4.4 Test Test Settings

a. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
b. Turn on the EUT and connect its antenna terminal to measurement via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
c. Adjust the center frequency of SA on any frequency be measured and set SA to zero span mode. And then, set RBW and VBW of spectrum analyzer to proper value.
d. Measure the time duration of one transmission on the measured frequency.
And then plot the result with time difference of this time duration.
e. Repeat above procedures until all different time-slot modes have been completed.

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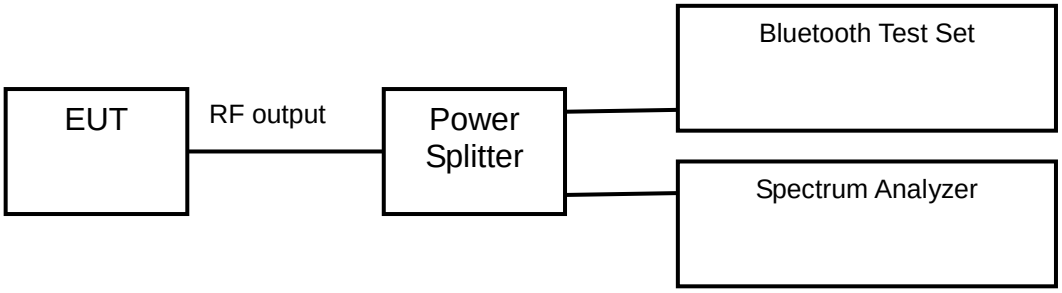
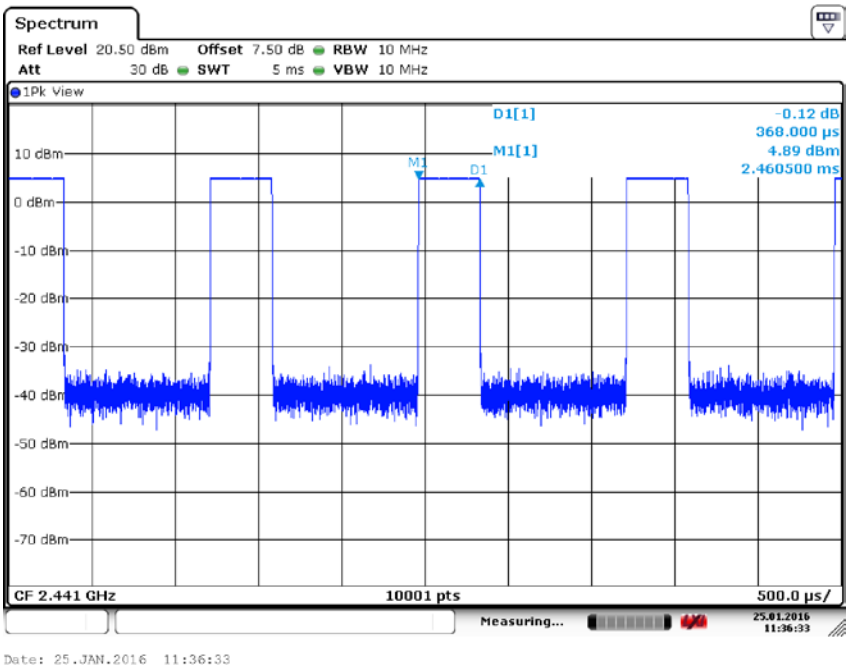
6.4.5 Test Setup



6.4.6 Test result

Modulation type: GFSK

Packet type	Time slot length µs	Dwell time	Dwell time ms
DH1	368	time slot length *31.6 *1600/2 /79	118
DH3	1623	time slot length * 31.6 *1600/4 /79	260
DH5	2862	time slot length * 31.6 *1600/6 /79	305



Carrier frequency (MHz): 2441
Packet type: DH1
Modulation type: GFSK

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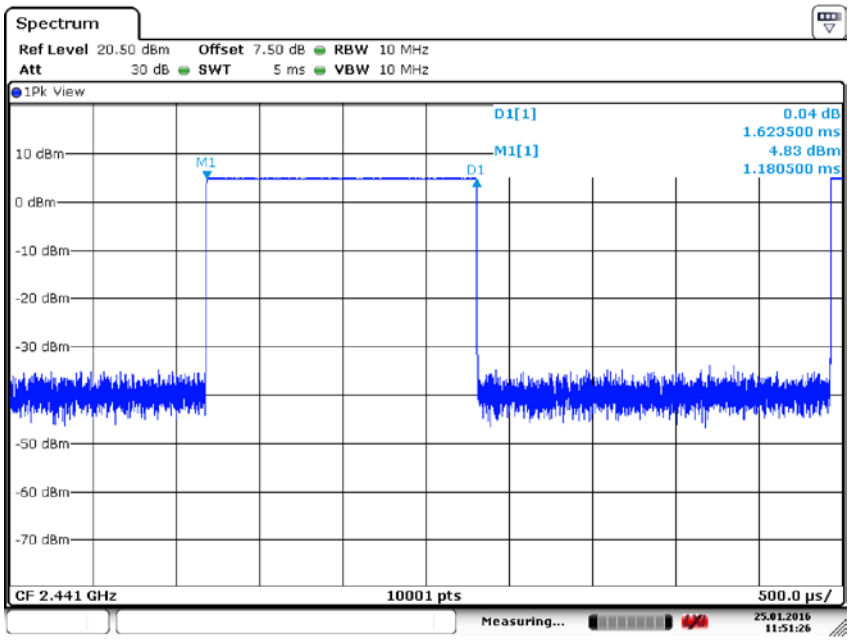
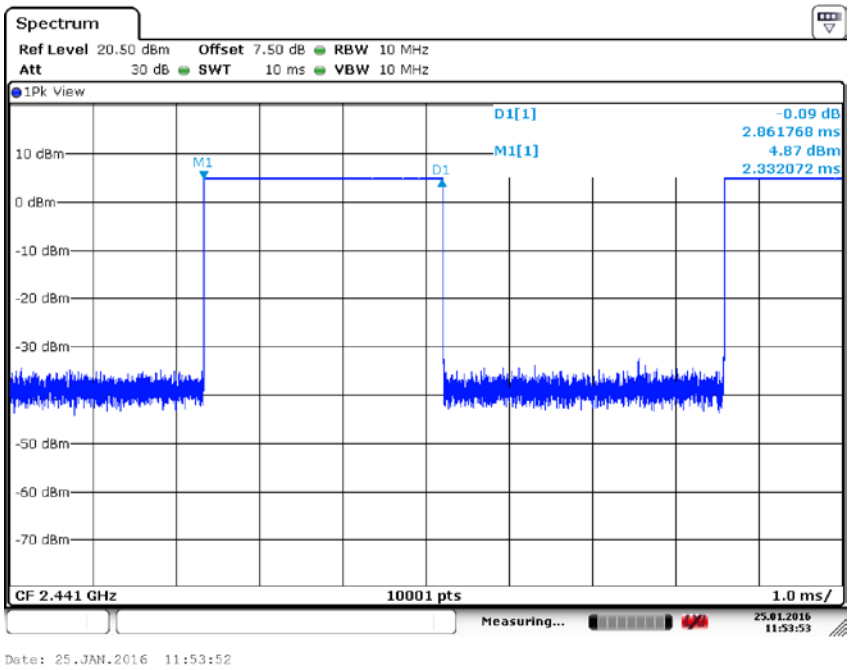


Carrier frequency (MHz): 2441
Packet type: DH3
Modulation type: GFSK



Carrier frequency (MHz): 2441
Packet type: DH5
Modulation type: GFSK

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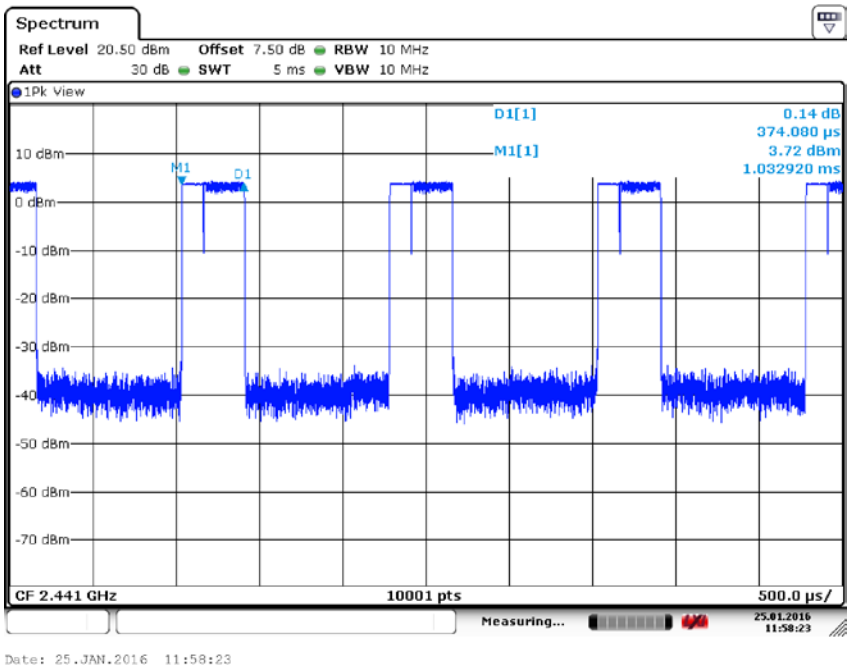
Modulation type: π/4DQPSK

Packet type	Time slot length µs	Dwell time	Dwell time ms
DH1	374	time slot length *31.6 *1600/2 /79	120
DH3	1627	time slot length * 31.6 *1600/4 /79	260
DH5	2871	time slot length * 31.6 *1600/6 /79	306



Carrier frequency (MHz): 2441
Packet type: DH1
Modulation type: π/4DQPSK

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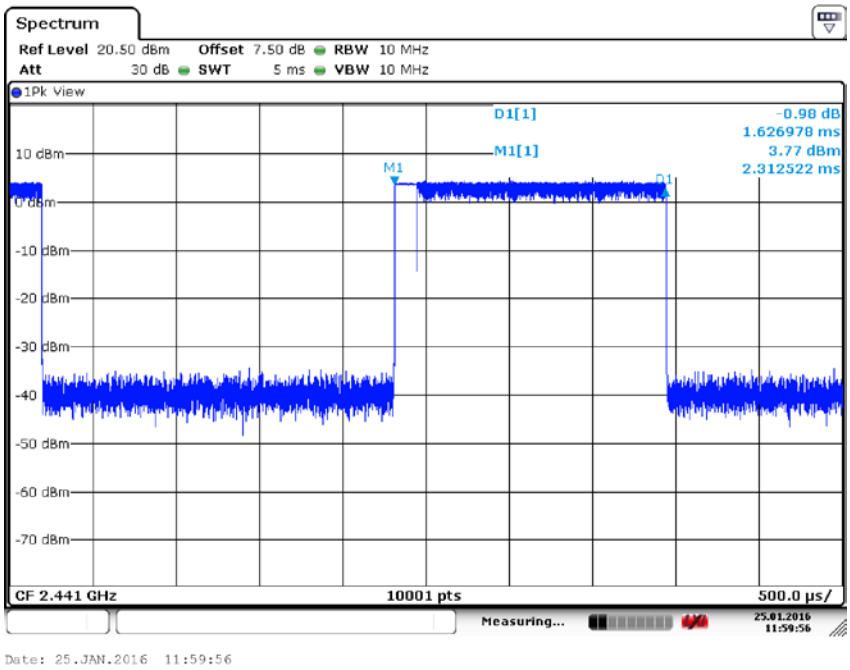
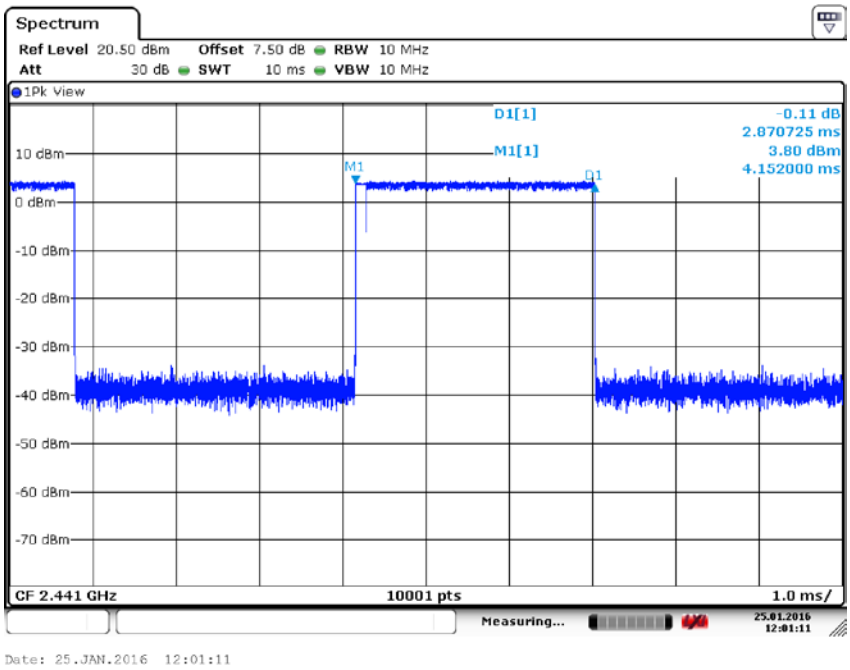


Carrier frequency (MHz): 2441
Packet type: DH3
Modulation type: π/4DQPSK



Carrier frequency (MHz): 2441
Packet type: DH5
Modulation type: π/4DQPSK

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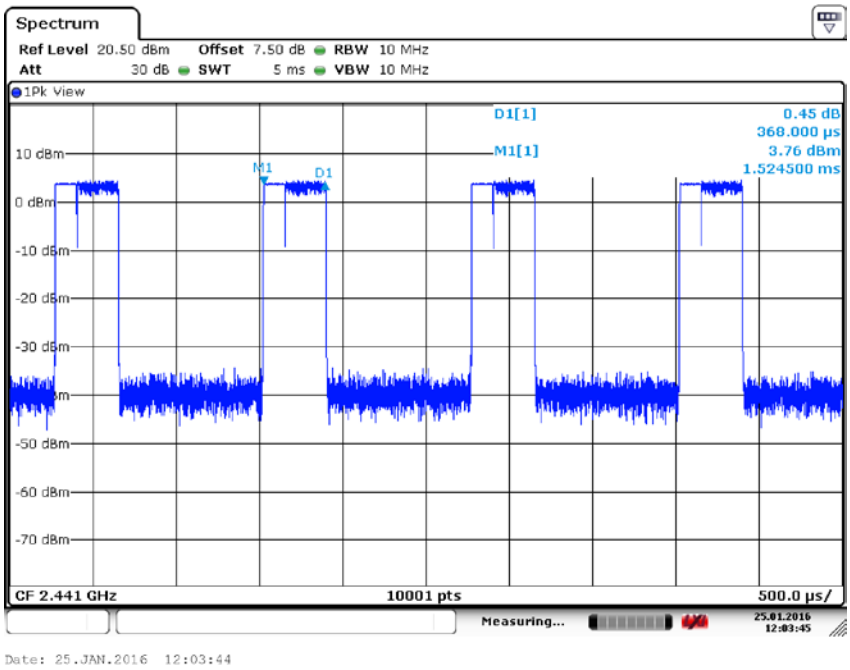
Modulation type: 8DPSK

Packet type	Time slot length µs	Dwell time	Dwell time ms
DH1	368	time slot length *31.6 *1600/2 /79	118
DH3	1626	time slot length * 31.6 *1600/4 /79	260
DH5	2870	time slot length * 31.6 *1600/6 /79	306



Carrier frequency (MHz): 2441
Packet type:DH1
Modulation type: 8DPSK

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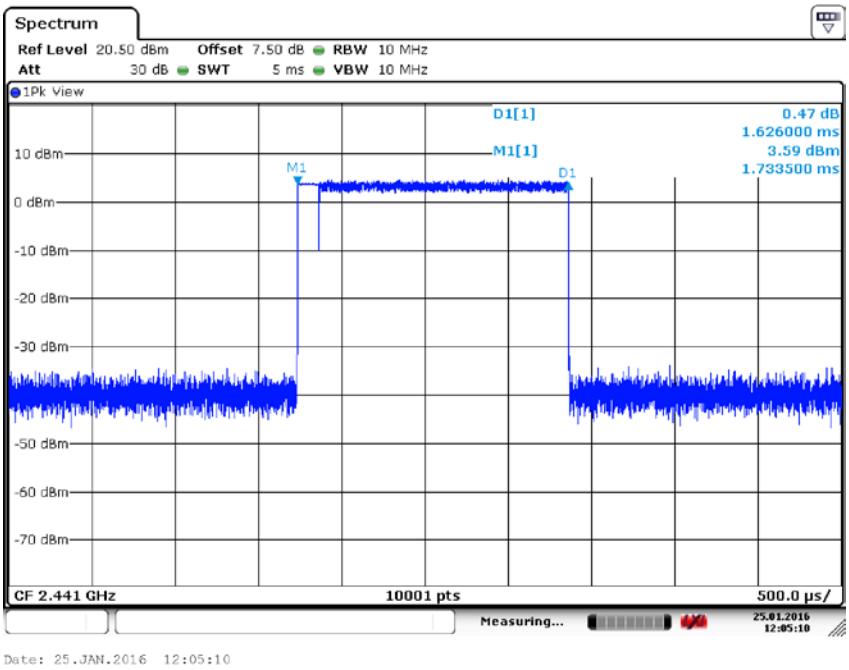
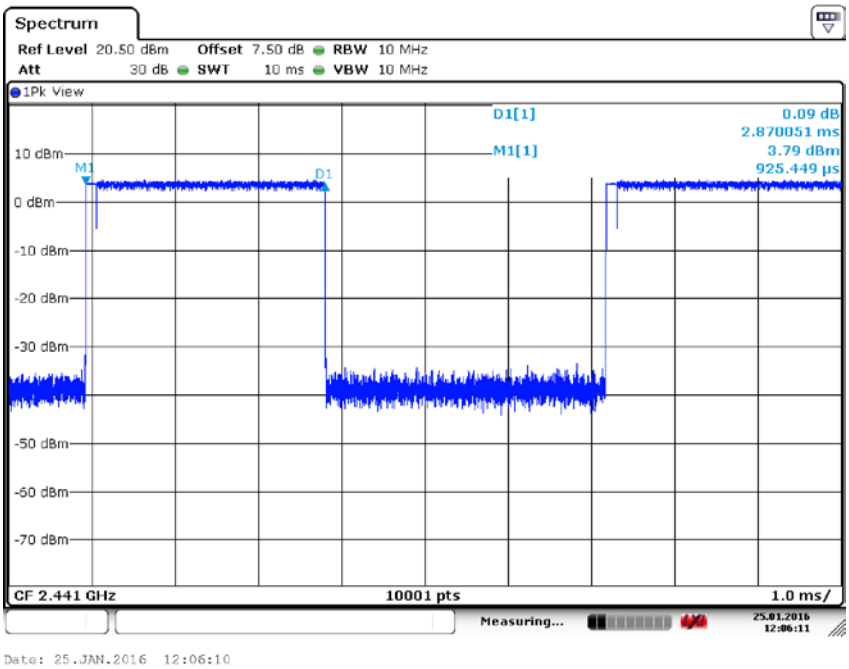


Carrier frequency (MHz): 2441
Packet type:DH3
Modulation type: 8DPSK



Carrier frequency (MHz): 2441
Packet type:DH5
Modulation type: 8DPSK

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6.5 Number of Hopping Frequencies

6.5.1 Ambient condition

Temperature	Relative humidity	Pressure
22°C	40%	101.5kPa

6.5.2 Test Description

The Equipment Under Test (EUT) was set up in a shielded room to perform the number of hopping frequencies measurement.The EUT was connected to the spectrum analyzer and Bluetooth test set via a power splitter with a known loss.

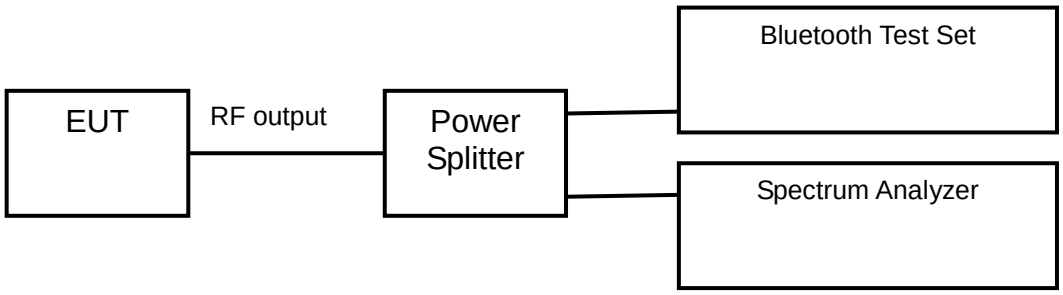
6.5.3 Test limit

FCC Part15.247(a)(1)(iii)
Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

6.5.4 Test Settings

a) Detector: Peak-Maxhold
b) Start frequency: 2400 MHz
c) Stop frequency: 2483.5 MHz
d) Resolution Bandwidth (RBW): 30 kHz
e) Video Bandwidth (VBW): 1 MHz
f) Sweep Time: Coupled

6.5.5 Test Setup



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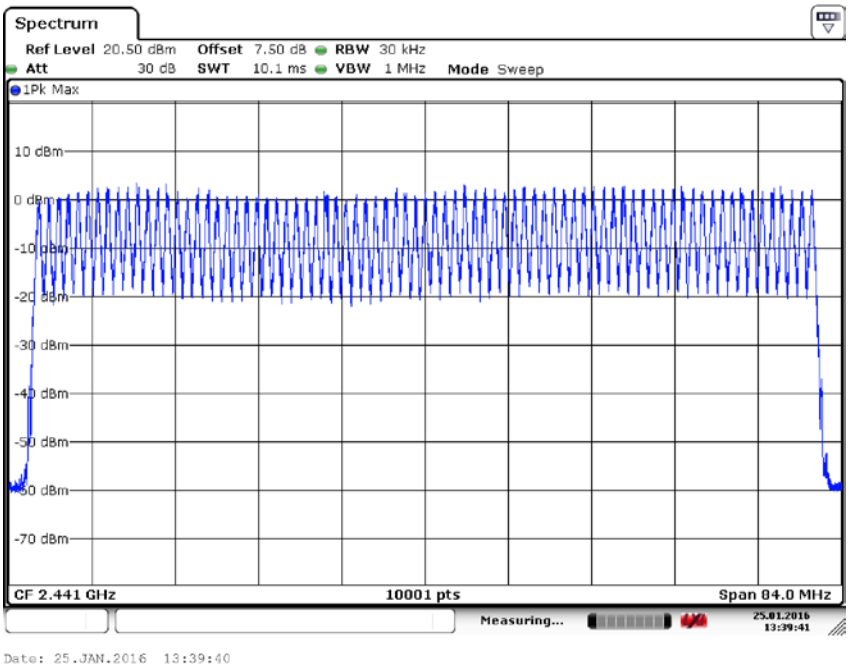
6.5.6 Test result

Op-mode	Result
Hopping mode	79



Op-mode: Hopping mode

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6.6 Conducted out of band emission measurement

6.6.1 Ambient condition

Temperature	Relative humidity	Pressure
22°C	40%	101.5kPa

6.6.2 Test Description

The Equipment Under Test (EUT) was set up in a shielded room to perform the spurious emissions measurements. The EUT was connected to the spectrum analyzer and Bluetooth test set via a power splitter with a known loss.

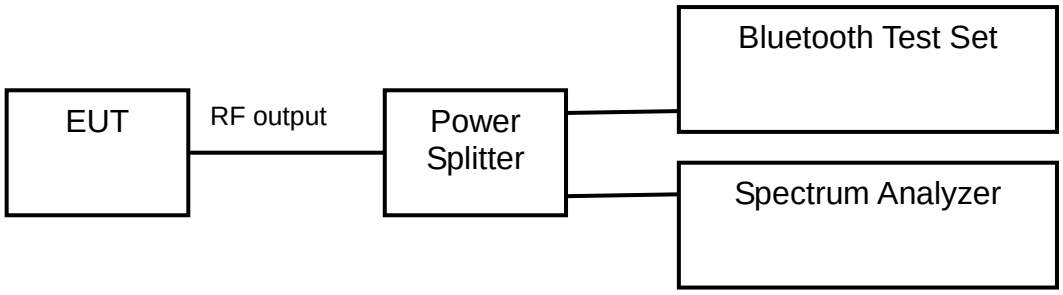
6.6.3 Test limit

FCC Part15.247(d):
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power.

6.6.4 Test Settings

a) Set RBW = 100 kHz.
b) Set VBW =300 kHz.
c) Set span to encompass the spectrum to be examined
d) Detector = peak.
e) Trace Mode = max hold.
f) Sweep = auto couple. Detector: Peak-Maxhold
g) Frequency range: 30 ~25000 MHz

6.6.5 Test Setup



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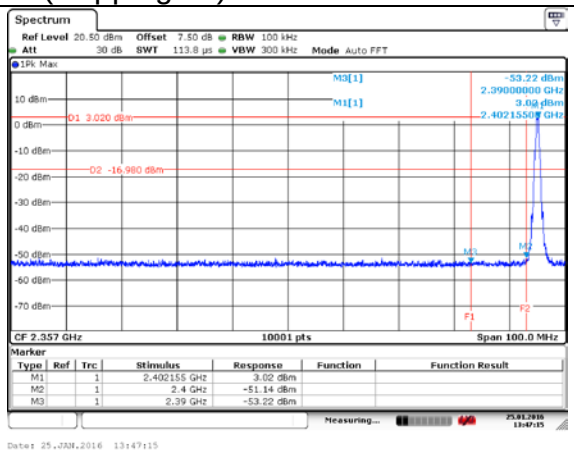
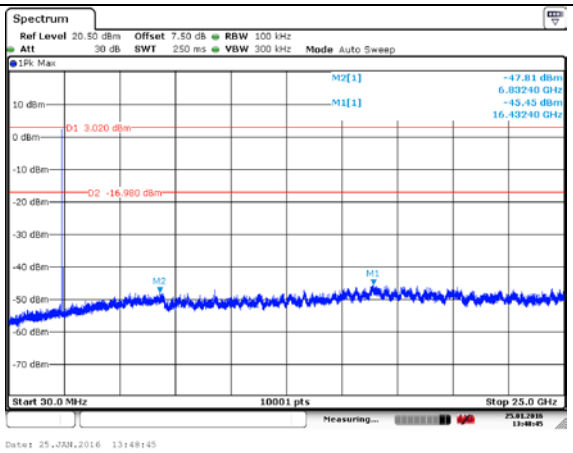
6.6.6 Test result

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

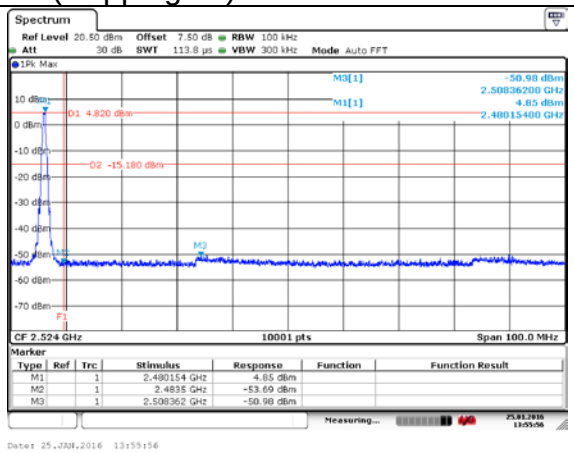
GFSK

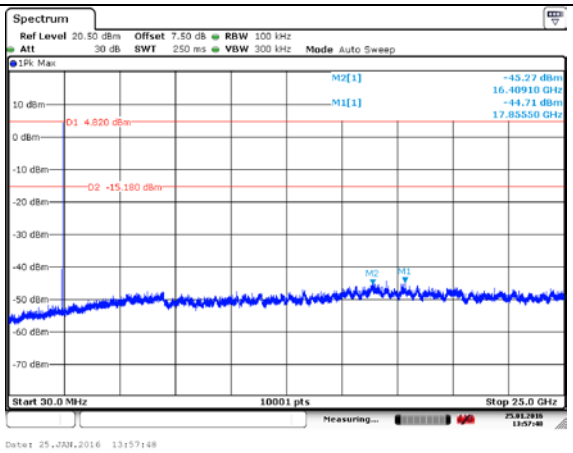
CH0 (Hopping off)



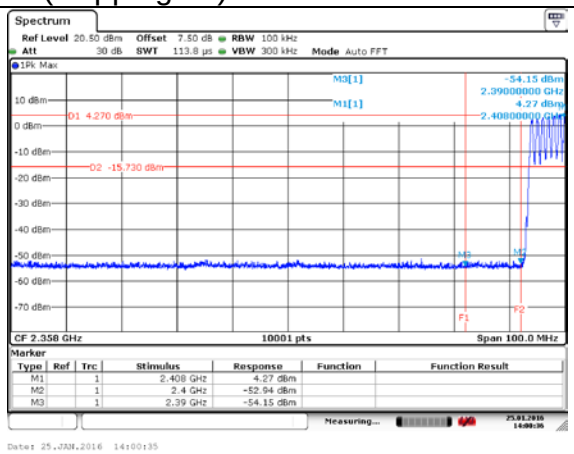


CH78(Hopping off)

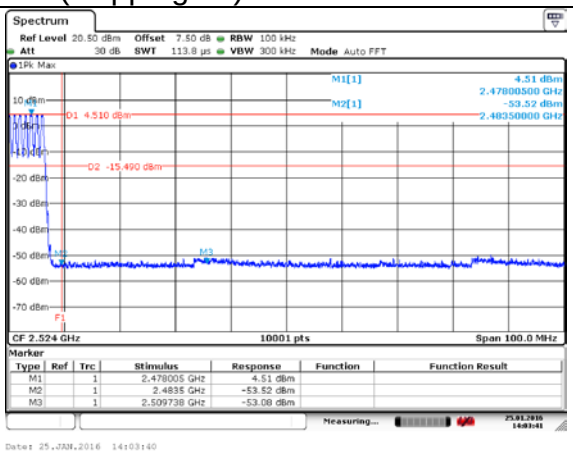




CH0 (Hopping on)



CH78 (Hopping on)



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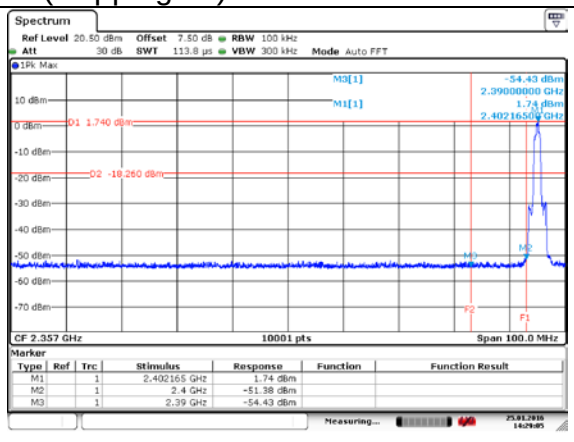
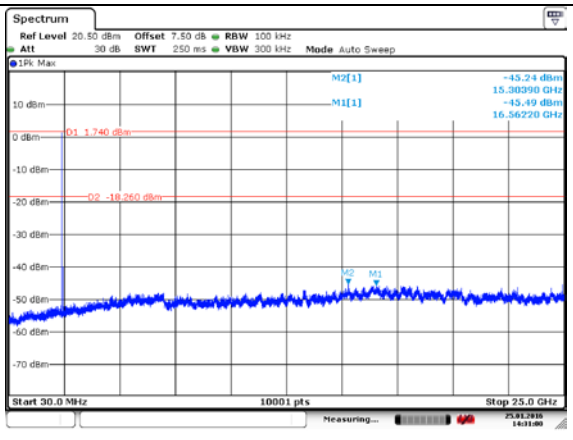
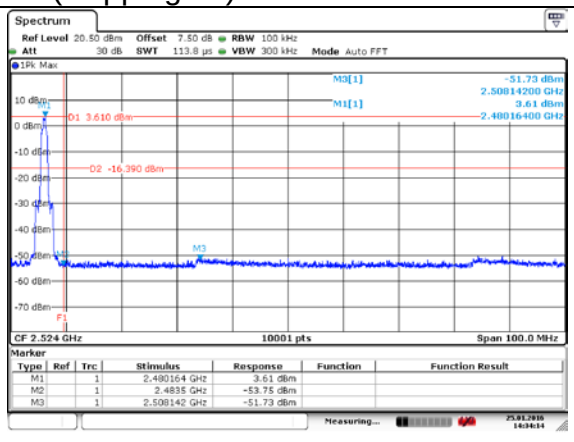
π/4DQPSK

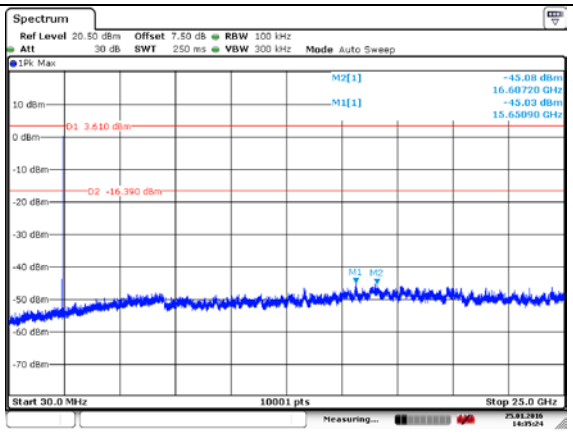
CH0 (Hopping off)



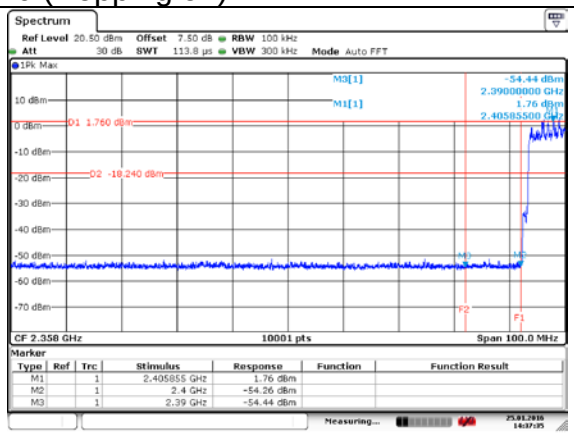


CH78(Hopping off)

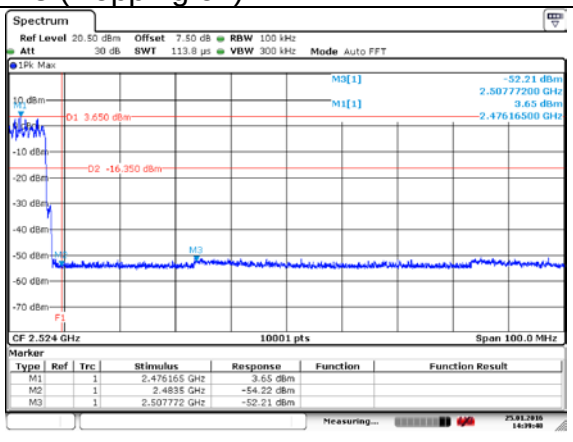




CH0 (Hopping on)



CH78 (Hopping on)



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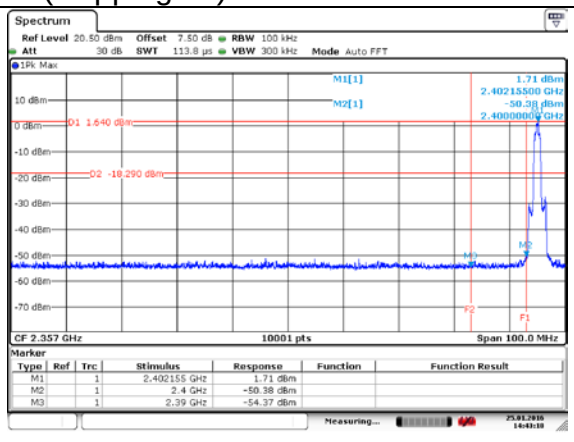
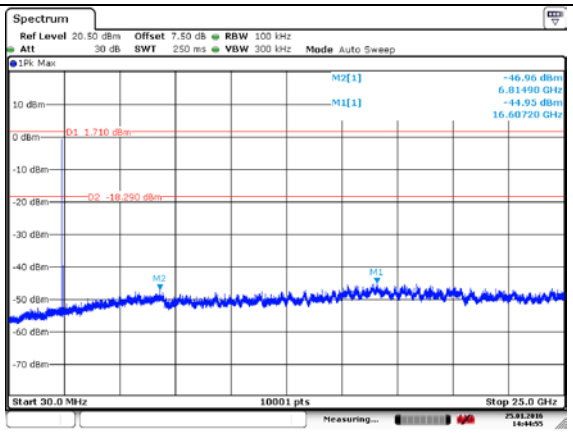
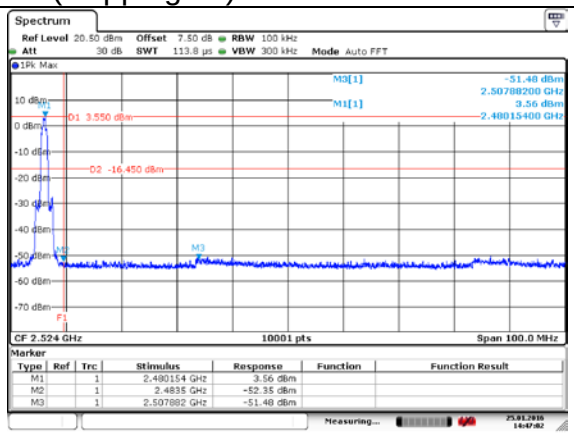
8DPSK

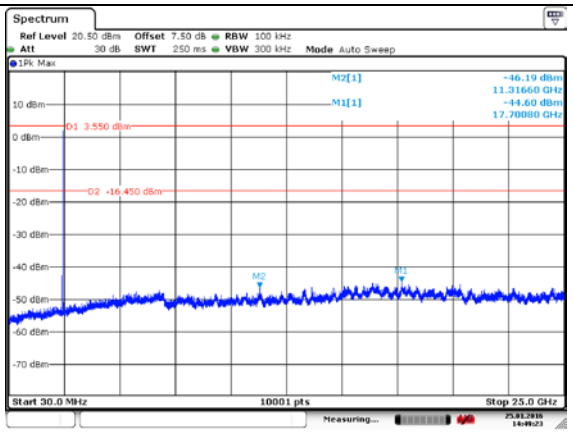
CH0 (Hopping off)



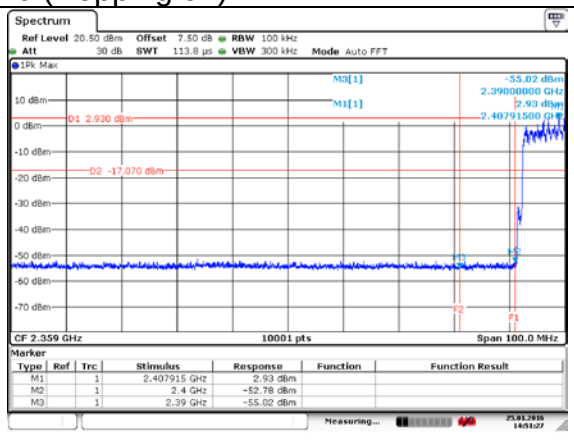


CH78(Hopping off)

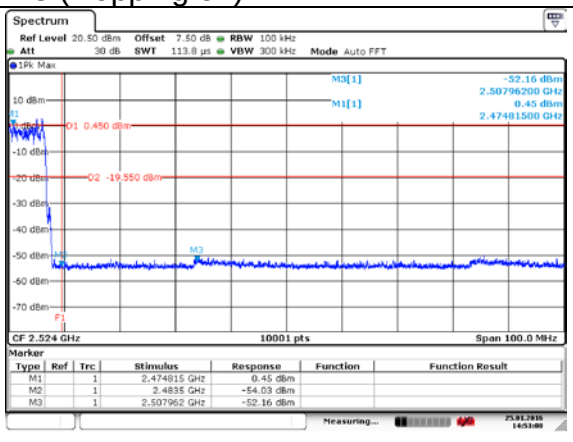




CH0 (Hopping on)



CH78 (Hopping on)



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6.7 Spurious Radiated Emissions

6.7.1 Ambient condition

Temperature	Relative humidity	Pressure
20.8°C	36.5%	100.9kPa

6.7.2 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.

6.7.3 Test limit

FCC Part15.247(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 [μV/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 (dBμV/m) = 20 log (Limit (μV/m)/1μV/m)

Frequency of Emission(MHz)	Limits	
	Detector	Unit (dBμV/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

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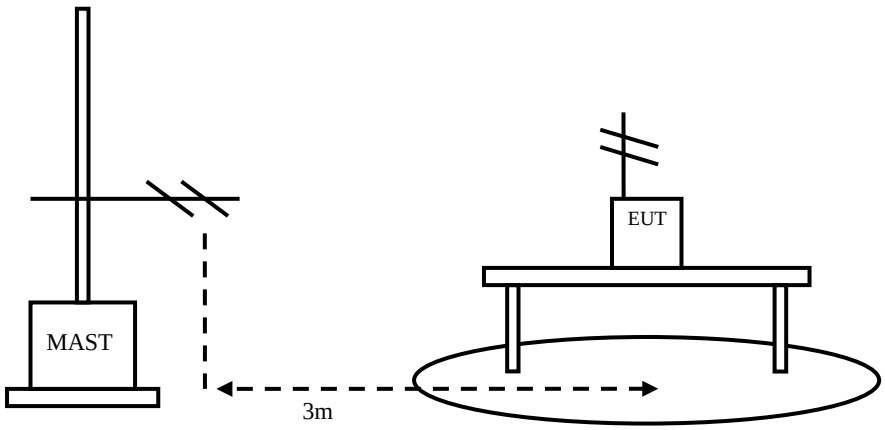
6.7.4 Test Settings

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

6.7.5 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.

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6.7.6 Test result

The worst case attitude: The mobile lay down.

Carrier frequency (MHz): 2402
Channel No.:0
Test Mode: GFSK
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	2402	100.96	66.96	N/A	N/A	8.90	25.10
2	2390	47.82	13.82	-26.18	74.0	8.90	25.10

Carrier frequency (MHz): 2402
Channel No.:0
Test Mode: GFSK
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	2402	94.00	60.00	N/A	N/A	8.90	25.10
2	2390	44.71	10.71	-29.29	74.0	8.90	25.10

Carrier frequency (MHz): 2402
Channel No.:0
Test Mode: GFSK
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	2402	91.40	57.40	N/A	N/A	8.90	25.10
2	2390	40.93	6.93	-13.07	54.0	8.90	25.10

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Carrier frequency (MHz): 2402
Channel No.:0
Test Mode: GFSK
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	2402	87.33	53.33	N/A	N/A	8.90	25.10
2	2390	40.81	6.81	-13.19	54.0	8.90	25.10

Carrier frequency (MHz): 2480
Channel No.:78
Test Mode: GFSK
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	2480	100.14	66.14	N/A	N/A	8.90	25.10
2	2483.5	46.08	12.08	-27.92	74.0	8.90	25.10

Carrier frequency (MHz): 2480
Channel No.:78
Test Mode: GFSK
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	2480	95.16	61.16	N/A	N/A	8.90	25.10
2	2483.5	44.44	10.44	-29.56	74.0	8.90	25.10

Carrier frequency (MHz): 2480
Channel No.:78
Test Mode: GFSK
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	2480	93.03	59.03	N/A	N/A	8.90	25.10
2	2483.5	40.65	6.65	-13.35	54.0	8.90	25.10

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Carrier frequency (MHz): 2480
Channel No.:78
Test Mode: GFSK
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	2480	85.90	51.90	N/A	N/A	8.90	25.10
2	2483.5	39.16	5.16	-14.84	54.0	8.90	25.10

Carrier frequency (MHz): 2402
Channel No.:0
Test Mode: π/4DQPSK
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	2402	100.72	66.72	N/A	N/A	8.90	25.10
2	2390	47.28	13.28	-26.72	74.0	8.90	25.10

Carrier frequency (MHz): 2402
Channel No.:0
Test Mode: π/4DQPSK
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	2402	94.26	60.26	N/A	N/A	8.90	25.10
2	2390	46.38	12.38	-27.62	74.0	8.90	25.10

Carrier frequency (MHz): 2402
Channel No.:0
Test Mode: π/4DQPSK
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	2402	93.32	59.32	N/A	N/A	8.90	25.10
2	2390	40.79	6.79	-13.21	54.0	8.90	25.10

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Carrier frequency (MHz): 2402
Channel No.:0
Test Mode: π/4DQPSK
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	2402	85.51	51.51	N/A	N/A	8.90	25.10
2	2390	39.33	5.33	-14.67	54.0	8.90	25.10

Carrier frequency (MHz): 2480
Channel No.:78
Test Mode: π/4DQPSK
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	2480	99.51	65.51	N/A	N/A	8.90	25.10
2	2483.5	46.56	12.56	-27.44	74.0	8.90	25.10

Carrier frequency (MHz): 2480
Channel No.:78
Test Mode: π/4DQPSK
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	2480	95.49	61.49	N/A	N/A	8.90	25.10
2	2483.5	44.32	10.32	-29.68	74.0	8.90	25.10

Carrier frequency (MHz): 2480
Channel No.:78
Test Mode: π/4DQPSK
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	2480	93.08	59.08	N/A	N/A	8.90	25.10
2	2483.5	39.71	5.71	-14.29	54.0	8.90	25.10

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Carrier frequency (MHz): 2480
Channel No.:78
Test Mode: π/4DQPSK
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	2480	86.58	52.58	N/A	N/A	8.90	25.10
2	2483.5	39.60	5.60	-14.40	54.0	8.90	25.10

Carrier frequency (MHz): 2402
Channel No.:0
Test Mode: 8DPSK
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	2402	100.95	66.95	N/A	N/A	8.90	25.10
2	2390	45.63	11.63	-28.37	74.0	8.90	25.10

Carrier frequency (MHz): 2402
Channel No.:0
Test Mode: 8DPSK
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	2402	95.56	61.56	N/A	N/A	8.90	25.10
2	2390	44.81	10.81	-29.19	74.0	8.90	25.10

Carrier frequency (MHz): 2402
Channel No.:0
Test Mode: 8DPSK
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	2402	93.19	59.19	N/A	N/A	8.90	25.10
2	2390	41.37	7.37	-12.63	54.0	8.90	25.10

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Carrier frequency (MHz): 2402
Channel No.:0
Test Mode: 8DPSK
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	2402	85.79	51.79	N/A	N/A	8.90	25.10
2	2390	40.12	6.12	-13.88	54.0	8.90	25.10

Carrier frequency (MHz): 2480
Channel No.:78
Test Mode: 8DPSK
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	2480	101.64	67.64	N/A	N/A	8.90	25.10
2	2483.5	47.69	13.69	-26.31	74.0	8.90	25.10

Carrier frequency (MHz): 2480
Channel No.:78
Test Mode: 8DPSK
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	2480	95.42	61.42	N/A	N/A	8.90	25.10
2	2483.5	45.10	11.10	-28.90	74.0	8.90	25.10

Carrier frequency (MHz): 2480
Channel No.:78
Test Mode: 8DPSK
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	2480	94.99	60.99	N/A	N/A	8.90	25.10
2	2483.5	40.26	6.26	-13.74	54.0	8.90	25.10

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Carrier frequency (MHz): 2480
Channel No.:78
Test Mode: 8DPSK
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	2480	87.78	53.78	N/A	N/A	8.90	25.10
2	2483.5	39.96	5.96	-14.04	54.0	8.90	25.10

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

Channel No.:39

Frequency (MHz)	Result (dBuV/m)	ARpl (dB)	Pmea (dBuV/m)	Polarity	Limit (dBuV/m)
73.77	17.20	9.00	8.20	Horizontal	40.0
87.42	17.80	10.80	7.00	Vertical	40.0
93.76	30.70	11.20	19.50	Horizontal	43.5
97.23	26.30	11.90	14.40	Vertical	43.5
118.90	22.90	13.00	9.90	Horizontal	43.5
211.47	23.50	11.90	11.60	Vertical	43.5
628.31	24.00	23.70	0.30	Horizontal	46.0
942.67	30.30	28.30	2.00	Vertical	46.0

For π/4DQPSK

Channel No.:39

Frequency (MHz)	Result (dBuV/m)	ARpl (dB)	Pmea (dBuV/m)	Polarity	Limit (dBuV/m)
32.07	18.60	20.10	-1.50	Vertical	40.0
76.43	17.00	8.80	8.20	Horizontal	40.0
88.25	21.90	10.80	11.10	Vertical	43.5
95.66	31.40	11.40	20.00	Vertical	43.5
101.42	25.90	12.20	13.70	Horizontal	43.5
108.99	18.50	12.50	6.00	Vertical	43.5
209.98	23.20	11.90	11.30	Horizontal	46.0
942.74	30.90	28.30	2.60	Vertical	46.0

For 8DPSK

Channel No.:39

Frequency (MHz)	Result (dBuV/m)	ARpl (dB)	Pmea (dBuV/m)	Polarity	Limit (dBuV/m)
32.09	18.30	20.00	-1.70	Vertical	40.0
74.63	18.60	8.90	9.70	Vertical	40.0
75.84	15.10	8.90	6.20	Vertical	43.5
87.83	22.00	10.80	11.20	Horizontal	43.5
95.49	31.20	11.40	19.80	Vertical	43.5
101.60	25.50	12.20	13.30	Vertical	43.5
209.38	23.60	11.90	11.70	Horizontal	46.0
943.16	31.10	28.30	2.80	Vertical	46.0

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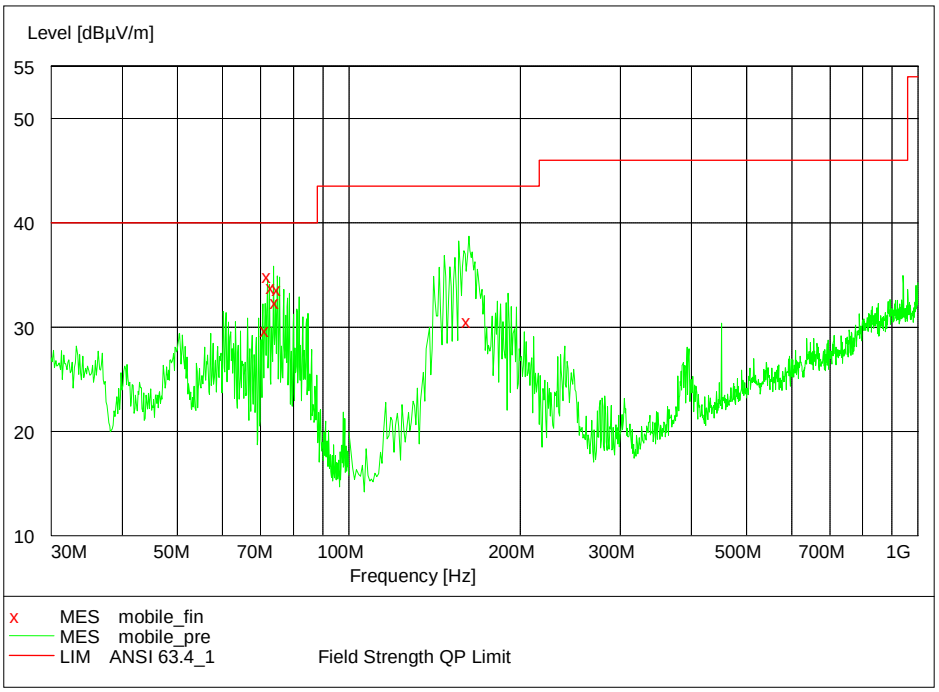
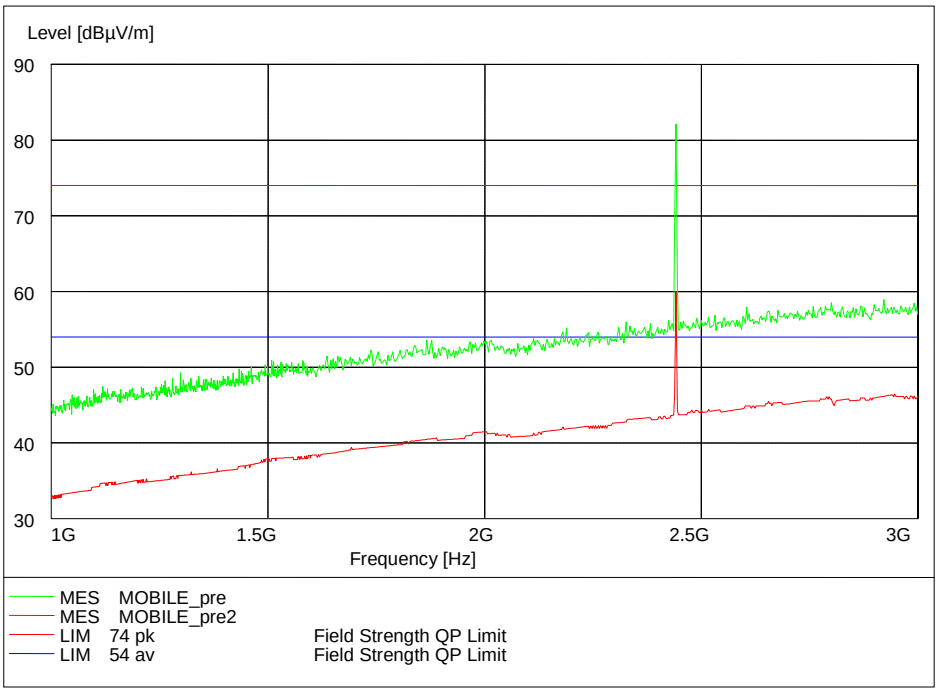
Carrier frequency (MHz): 2441
Channel No.:39



Frequency Range: 30MHz-1000MHz
Detector: QP mode
Modulation type: GFSK



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

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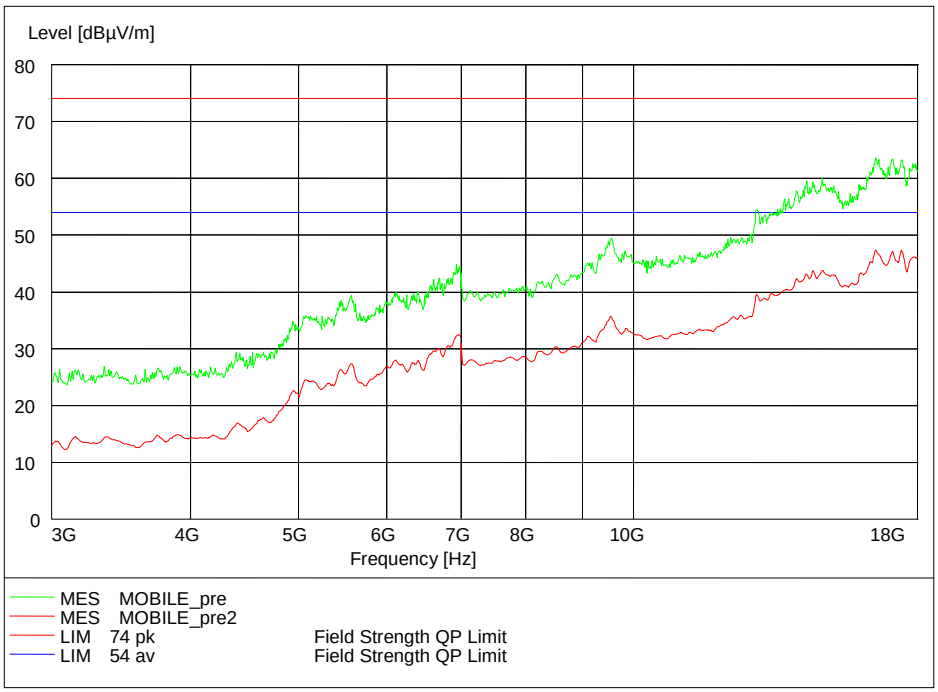
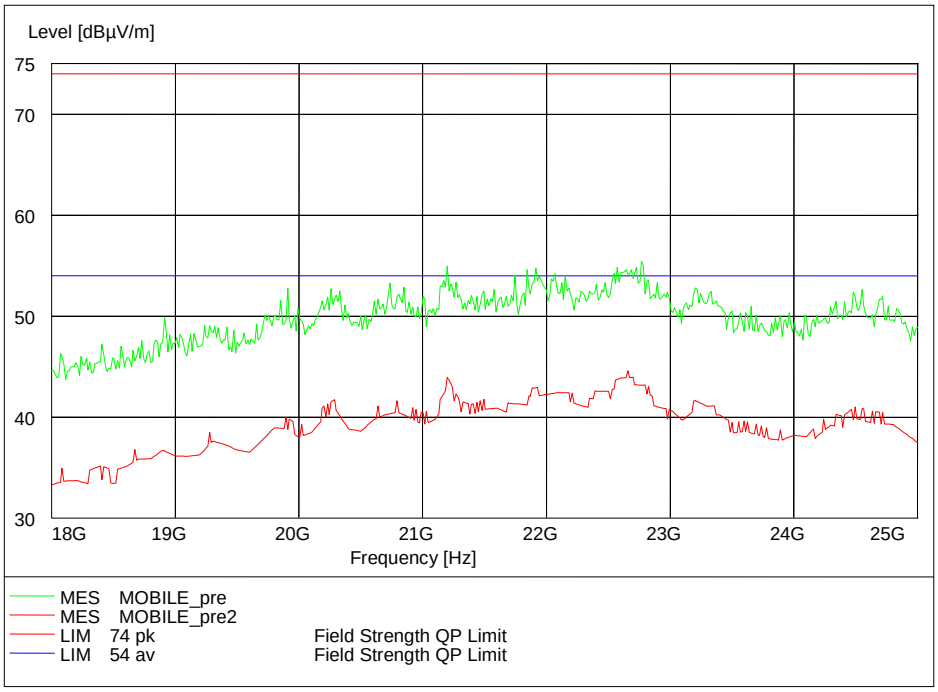


Frequency Range: 3GHz-18GHz
Detector: Av mode and PK mode
Modulation type: GFSK



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

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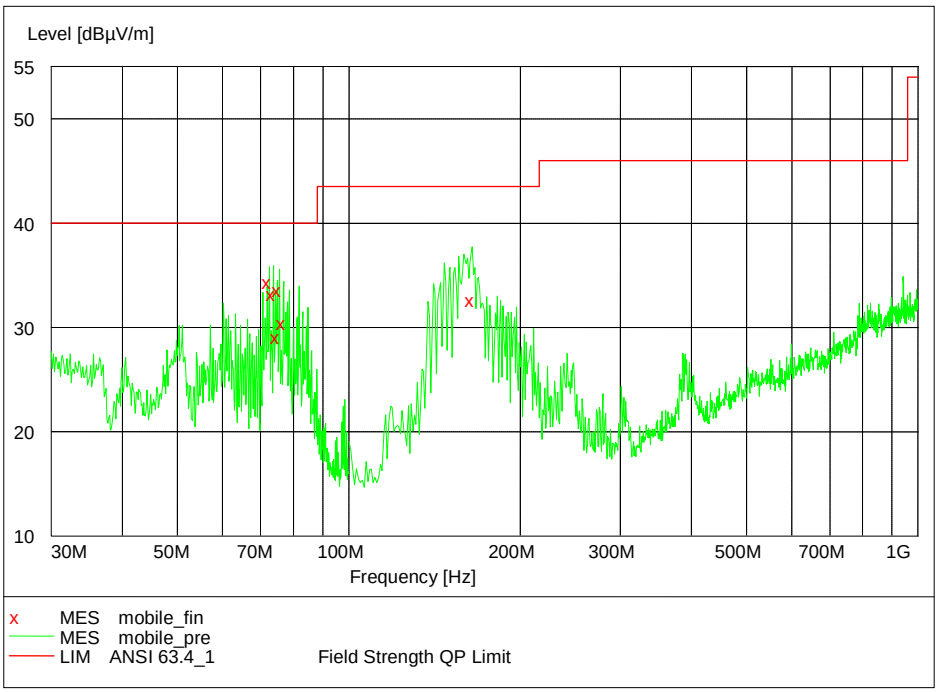
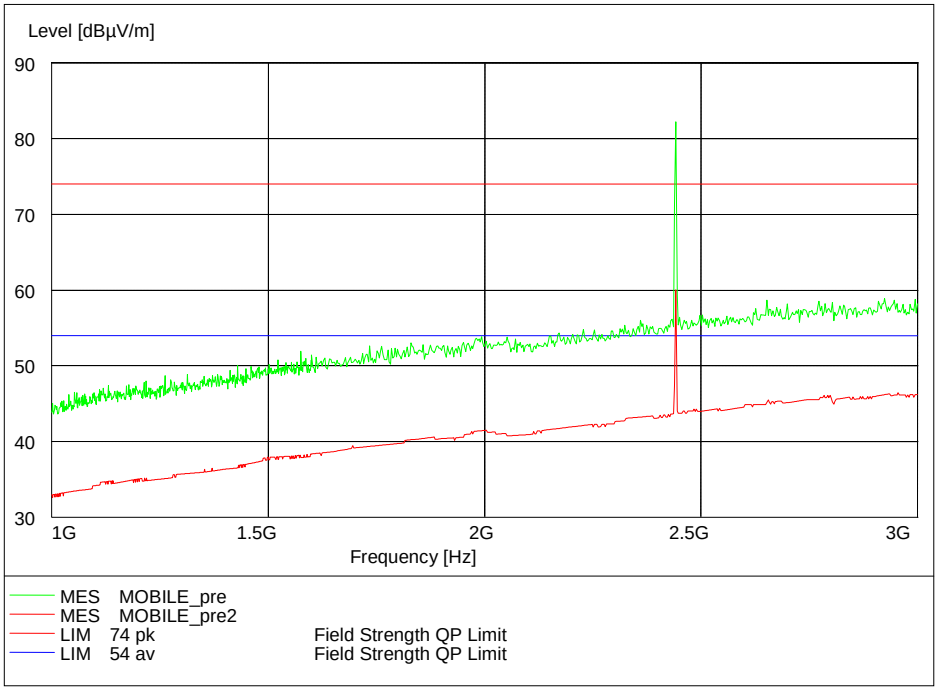


Frequency Range: 30MHz-1000 MHz
Detector: QP mode
Modulation type: π/4DQPSK



Frequency Range: 1GHz-3GHz
Detector: Av mode and PK mode
Modulation type: π/4DQPSK

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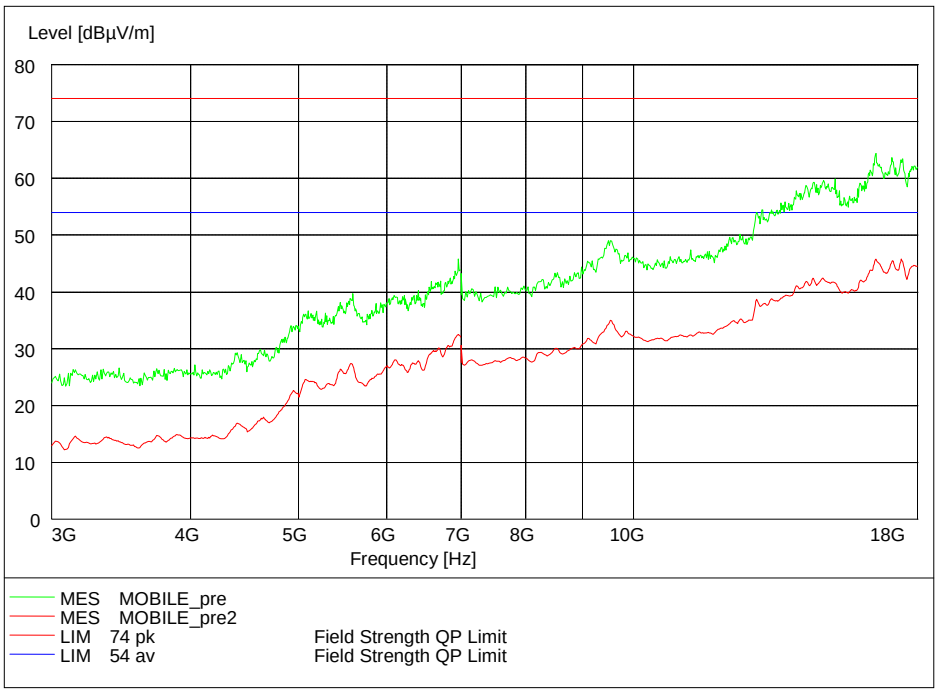
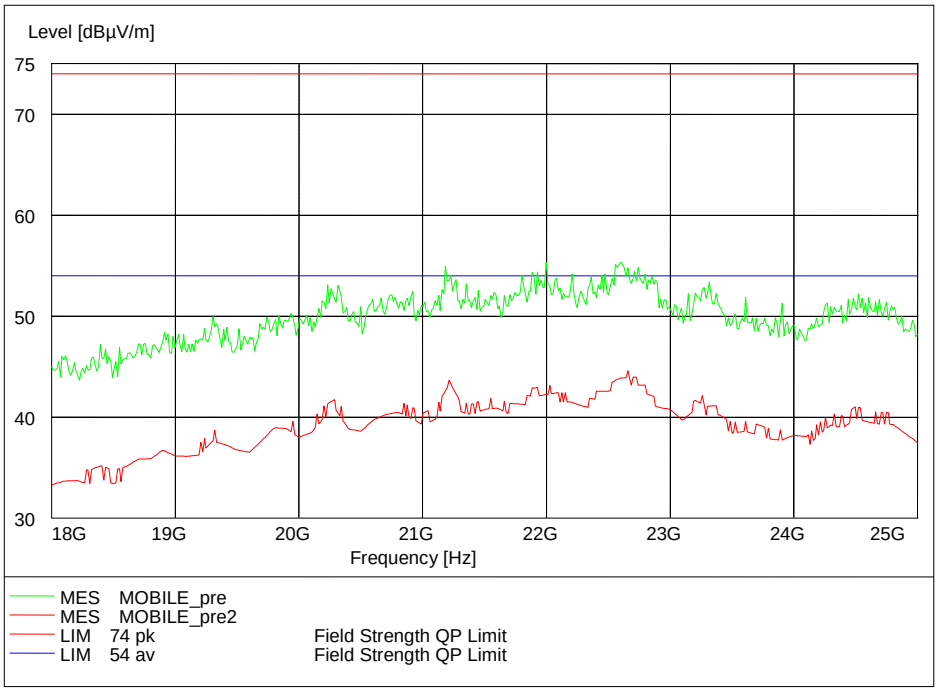


Frequency Range: 3GHz-18GHz
Detector: Av mode and PK mode
Modulation type: π/4DQPSK



Frequency Range: 18GHz-25GHz
Detector: Av mode and PK mode
Modulation type: π/4DQPSK

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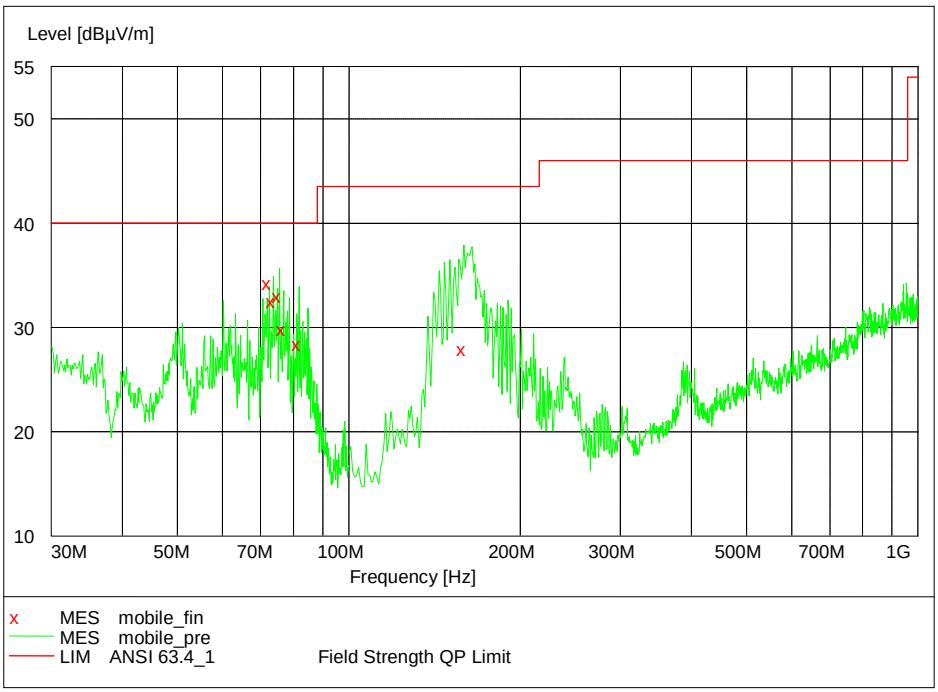
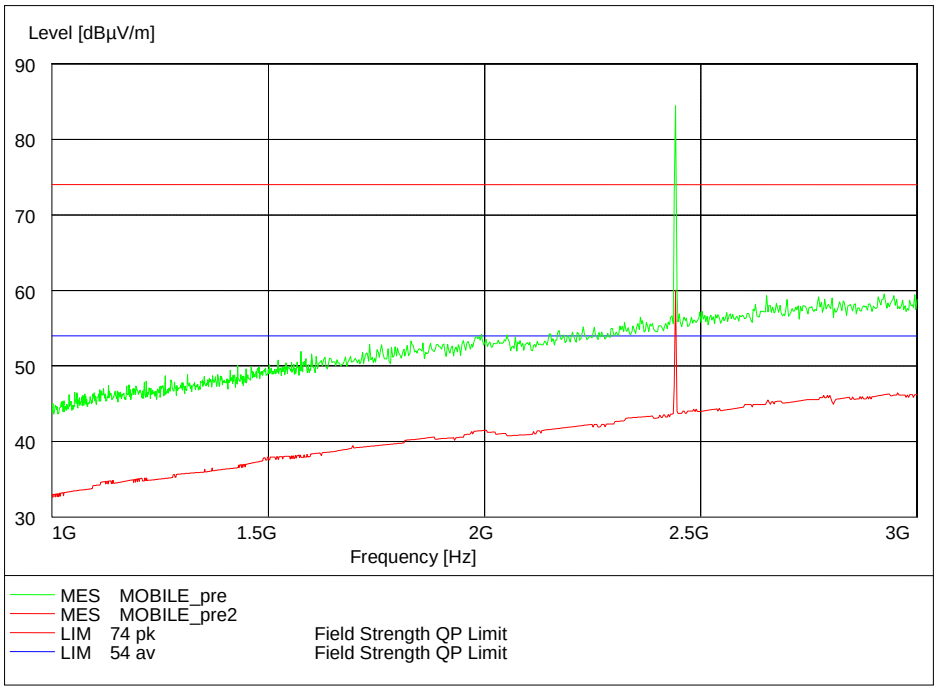


Frequency Range: 30MHz-1000 MHz
Detector: QP mode
Modulation type: 8DPSK



Frequency Range: 1GHz-3GHz
Detector: Av mode and PK mode
Modulation type: 8DPSK

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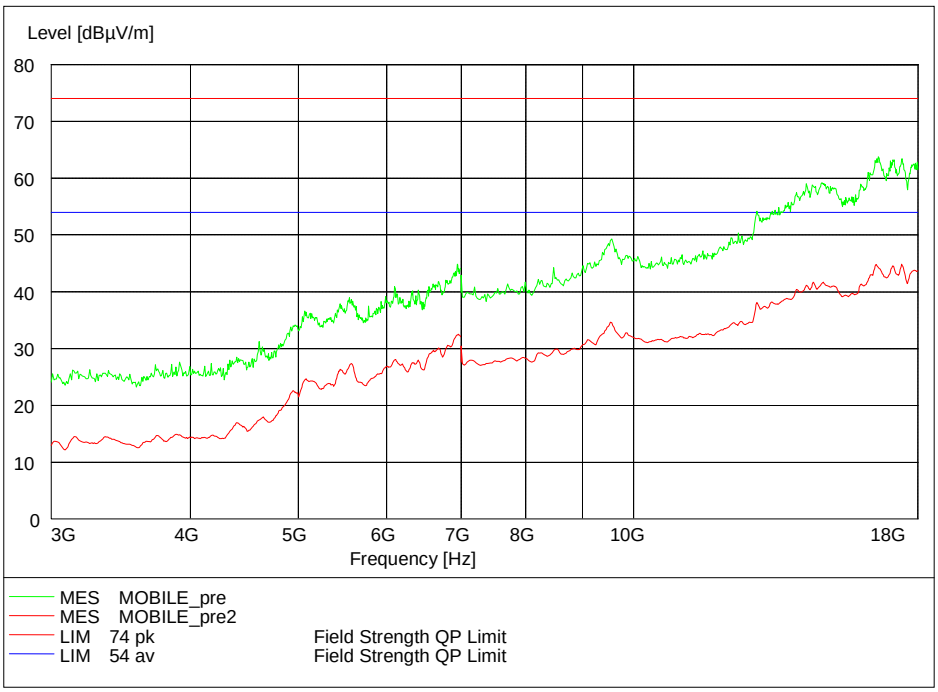
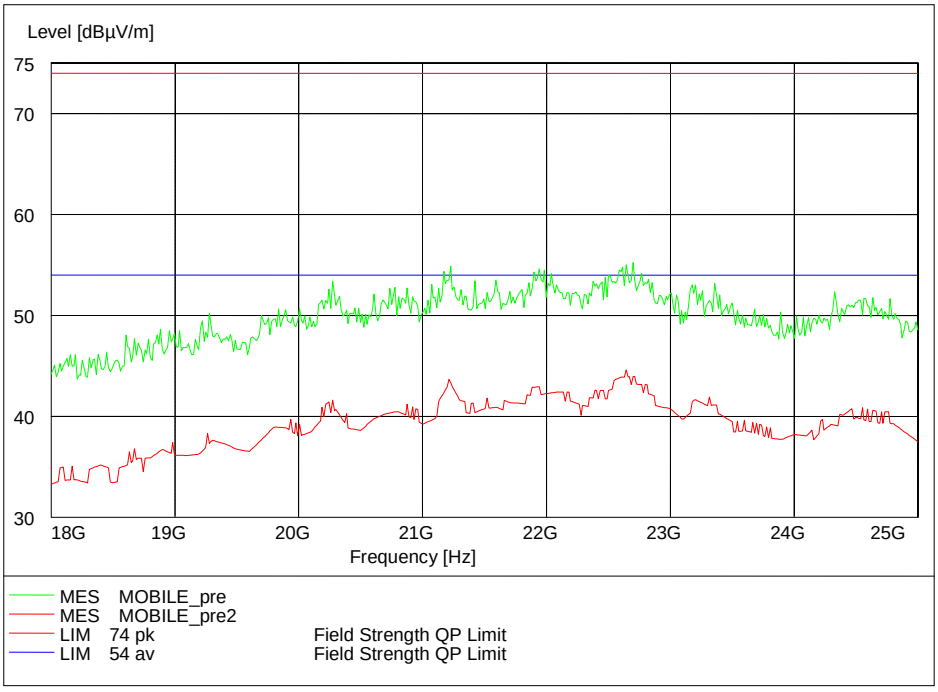


Frequency Range: 3GHz-18GHz
Detector: Av mode and PK mode
Modulation type: 8DPSK



Frequency Range: 18GHz-25GHz
Detector: Av mode and PK mode
Modulation type: 8DPSK

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6.8 AC Power line Conducted Emission

6.8.1 Ambient condition

Temperature	Relative humidity	Pressure
20.8°C	36.5%	100.9kPa

6.8.2 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 C63.4-2014

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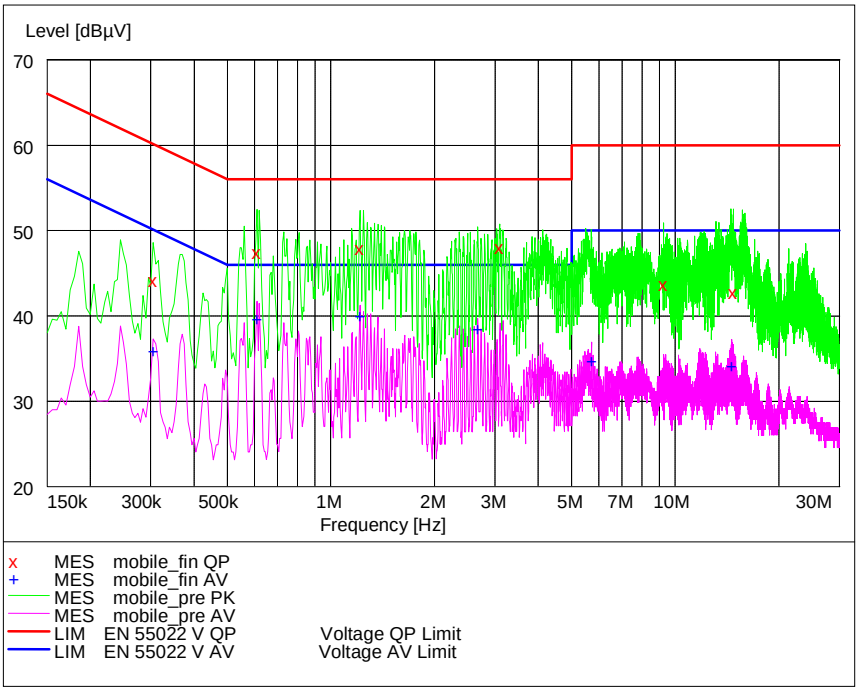
6.8.3 Test result

Noise Level of the Measuring Instrument



L +N Line

MEASUREMENT RESULT: "MOBILE_fin QP"

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line
0.305000	44.40	29.6	60	15.7	L
0.610000	47.70	29.7	56	8.3	N
1.215000	48.10	29.7	56	7.9	L
3.090000	48.30	29.7	56	7.7	L
9.260000	43.90	29.9	60	16.1	N
14.745000	43.00	29.9	60	17.0	L

MEASUREMENT RESULT: "MOBILE_fin AV"

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line
0.305000	36.10	29.6	50	14.0	L
0.610000	39.80	29.7	46	6.2	N
1.215000	40.20	29.7	46	5.8	L
2.670000	38.60	29.7	46	7.4	L
5.715000	34.90	29.8	50	15.1	N
14.600000	34.30	29.9	50	15.7	L

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7 MEASUREMENT UNCERTAINTIES

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

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8 TEST EQUIPMENTS

No.	Name/ Model	Manufacturer	S/N	Cal Due date
1.	Spectrum Analyzer FSV	ROHDE&SCHWARZ	101065	2016.08.20
2.	Bluetooth Test Set MT8852B	Anritsu	1142010	2016.02.29
3.	Cable 104EA	SUCOFLEX	9272/4EA	2016.08.20
4.	Cable 104EA	SUCOFLEX	9266/4EA	2016.08.20
5.	Power Splitter 11850C	Agilent	026057	2016.08.20
6.	12.65m×8.03m×7.50m Fully-Anechoic Chamber	FRANKONIA	-----	-----
7.	23.18m×16.88m×9.60m Semi-Anechoic Chamber	FRANKONIA	---	-----
8.	Turn table Diameter:1m	HD	-----	-----
9.	Turn table Diameter:5m	HD	-----	-----
10.	Antenna master FAC(MA4.0)	MATURO	-----	-----
11.	Antenna master SAC(MA4.0)	MATURO	-----	-----
12.	9.080m×5.255m×3.525m Shielding room	FRANKONIA	-----	-----
13.	HF 906 Double-Ridged Waveguide Horn Antenna	R&S	100030	2016.08.20
14.	HF 906 Double-Ridged Waveguide Horn Antenna	R&S	100029	2016.08.20
15.	HL562 Ultra log antenna	R&S	100016	2016.08.20
16.	3160-09 Receive antenna	SCHWARZ-BECK	002058-002	2016.08.20
17.	ESI 40 EMI test receiver	R&S	100015	2016.08.20
18.	Radio tester	CMU 200	114667	2016.08.20
19.	ESCS30 EMI test receiver	R&S	100029	2016.08.20
20.	HL562 Receive antenna	R&S	100167	2016.08.20
21.	ESH3-Z5 LISN	R&S	100020	2016.08.20

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APPENDIX

Appendix1 Test Setup

---End of Test Report---

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