FCC ID TEST REPORT

for

Tablet PC

Model: M702

FCC ID: OI2M7021

Prepared for: ILIFE TECHNOLOGY (HK) LIMITED
3rd Floor, Bld.3, LiJinCheng Industrial Park, The East of Gong Ye Road, Longhua, Shenzhen, China, 518109

Prepared by: Shenzhen TCT Testing Technology Co.,Ltd
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Report Number：TCT131212017F2-2
Date of Test： Jan. 12-Jan. 17, 2014
Date of Report： Jan. 17, 2014

Table of Contents

1.0 General Details

1.1 Test Lab Details

Name:	Shenzhen Tongce Testing Lab
Address:	1F, Leinuo Watch Building, Fuyong Town, Baoan Dist, Shenzhen, China
Telephone:	13410377511
Fax:	--

The test facility is recognized, certified, or accredited by the following organizations:

FCC Registration Number: 572331

Shenzhen TCT Testing Technology Co., Ltd., Shenzhen EMC Laboratory: Shenzhen Tongce Testing Lab

The 3m Semi-anechoic chamber has been registered and fully described in a report with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.

Registration Number: 572331

Industry Canada (IC)

The 3m Semi-anechoic chamber of Shenzhen TCT Testing Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing

Registration Number IC: 10668A-1

1.2 Applicant Details

Applicant:	ILIFE TECHNOLOGY (HK) LIMITED
Address:	3rd Floor, Bld.3, LiJinCheng Industrial Park, The East of Gong Ye Road, Longhua, Shenzhen, China, 518109
Telephone:	0755-22200901
Fax:	0755-22200906

Manufacturer:	ILIFE TECHNOLOGY (HK) LIMITED
Address:	3rd Floor, Bld.3, LiJinCheng Industrial Park, The East of Gong Ye Road, Longhua, Shenzhen, China, 518109
Telephone:	0755-22200901
Fax:	0755-22200906

1.3 Description of EUT

Product:	Tablet PC
Model No.:	M702
Additional Model No.:	M723, M783, M702C, M723C, M783C
Brand Name	N.A.
BT Version	3.0+EDR
Rating:	DC 3.7V via Battery or DC 5V via Adapter
Modulation Type:	GFSK, Pi/4QDPSK, 8DPSK
Transfer Data Rate	1/2/3 Mbps
Channel number:	79
Channel spacing:	1 MHz
Operation Frequency:	2402~2480MHz
Antenna Designation:	An internal antenna, and the maximum antenna gain is 0dBi.

1.4 Statement

All models above are identical in interior structure, electrical circuits and components, and just model names are different for the marketing requirement.

1.5 Test Engineer

The sample tested by 

Printed name: Jack Kang

2.0 Test equipments and Associated Equipment used during the test.

2.1 Test Equipments

Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date
ESPI Test Receiver	ROHDE&SCHWARZ	ESPI 3	100379	July 7, 2013	July 6, 2014
Spectrum Analyzer	ROHDE&SCHWARZ	FSEM	848597/001	July 7, 2013	July 6, 2014
Pre-amplifier	Teseq	LAN6900	--	July 8, 2013	July 7, 2014
Pre-amplifier	Agilent	8447D	83153007374	July 8, 2013	July 7, 2014
Pre-amplifier	Agilent	8449B	3008A01738	July 8, 2013	July 7, 2014
Loop antenna	A.R.A.	PLA-1030/ B	1029	July 8, 2013	July 7, 2014
Ultra Broadband ANT	ROHDE&SCHWARZ	HL562	100157	July 8, 2013	July 7, 2014
Horn Antenna	ETS LINDGREN	3117	--	July 8, 2013	July 7, 2014
Horn Antenna	ETS LINDGREN	3160	--	July 8, 2013	July 7, 2014
EMI Test Receiver	R&S	ESCS30	100139	July 7, 2013	July 6, 2014
LISN	AFJ	LS16C	16010222119	July 7, 2013	July 6, 2014

2.2 AE used during the test

Equipment type	Manufacturer	Model
N/A		
N/A		
N/A		
N/A		

3.0 Technical Details

3.1 Summary of test results

The EUT has been tested according to the following specifications

Requirement	CFR 47 Section	Result
Power Line Conducted Emission Test	**15.207(a)**	**PASS**
20dB Channel Bandwidth	**15.247 (a)(1), 15.215(c)**	**PASS**
Maximum Peak Output Power	**15.247(b)(1)**	**PASS**
Carrier Frequency Separation	**15.247 (a)(1)**	**PASS**
Number of Hopping Channels	**15.247(a)(iii)**	**PASS**
Time of Occupancy (Dwell Time)	**15.247(a)(iii)**	**PASS**
Band edge Measurement, Spurious Emission Test	**15.247 (d), 15.205 (a), 15.209 (a)**	**PASS**
Antenna Requirement	**15.203**	**PASS**

3.2 Test Standards

FCC Part 15:2012 Subpart C, Paragraph 15.247

FCC Public Notice DA 00-705-Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems

4.0 EUT Modification

No modification by Shenzhen TCT Testing Technology Co., Ltd

5.0 Measurement Uncertainty（95% confidence levels, k=2)

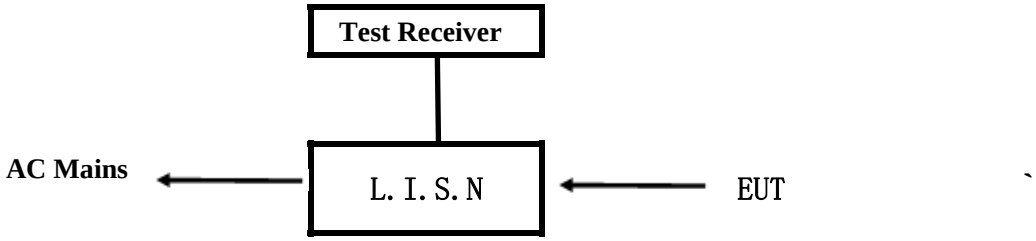
No.	Item	MU
1.	Radio Frequency	$\pm 1\times 10^{-9}$
2.	Temperature	±0.1℃
3.	Humidity	±1.0%
4.	RF power, conducted	±0.34dB
5.	RF power density, conducted	±1.45dB
6.	Spurious emissions, conducted	±3.70dB
7.	All emissions, radiated	±4.50dB

Note: 1) Low channel: 2402MHz, Middle channel: 2441MHz, High channel: 2480MHz

2) The EUT is a portable device, and measurements were conducted in all three axis (X, Y, Z), and the worst case (X axis) was submitted only.

6.0 Power Line Conducted Emission Test

6.1 Schematics of the test



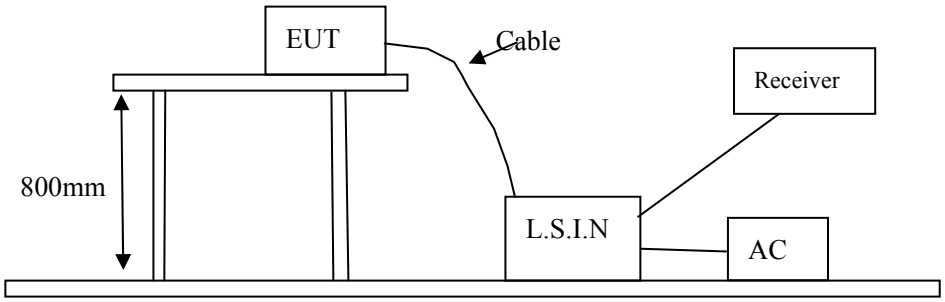
EUT: Equipment Under Test

6.2 Test Method and test Procedure

The EUT was tested according to ANSI C63.10-2009and ANSI C63.4-2003.The Frequency spectrum From 0.15MHz to 30MHz was investigated.

Test Voltage: 120V~, 60Hz

Block diagram of Test setup



6.3 EUT Operating Condition

Operating condition is according to ANSI C63.10 -2009 and ANSI C63.4-2003

1) Setup the EUT and simulators as shown on the following

2) Enable AF signal and confirm EUT active to normal condition

6.4 Test Equipment

Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date
EMI Test Receiver	R&S	ESCS30	100139	July 7, 2013	July 6, 2014
LISN	AFJ	LS16C	16010222119	July 7, 2013	July 6, 2014

6.5 Conducted Emission Limit

Frequency(MHz)	Class A Limits (dB μ V)		Class B Limits (dB μ V)	
	Quasi-peak Level	Average Level	Quasi-peak Level	Average Level
0.15 ～ 0.50	79.0	66.0	66.0～56.0*	56.0～46.0*
0.50 ～ 5.00	73.0	60.0	56.0	46.0
5.00 ～ 30.00	73.0	60.0	60.0	50.0

Notes: 1) *Decreasing linearly with logarithm of frequency.

2）The tighter limit shall apply at the transition frequencies

6.6 Photo documentation of the test set-up

Please refer to the Document Setup photo

6.7 Test specification:

Environmental conditions: Temperature: 22° C Humidity: 52% Atmospheric pressure: 103kPa

Frequency range: 0.15 MHz – 30 MHz

The test was carried out in the following operation mode(s):

- Tx mode

6.8 Test result

Min. limit margin >10 dB from 0.15MHz to 30MHz

The requirements are FULFILLED

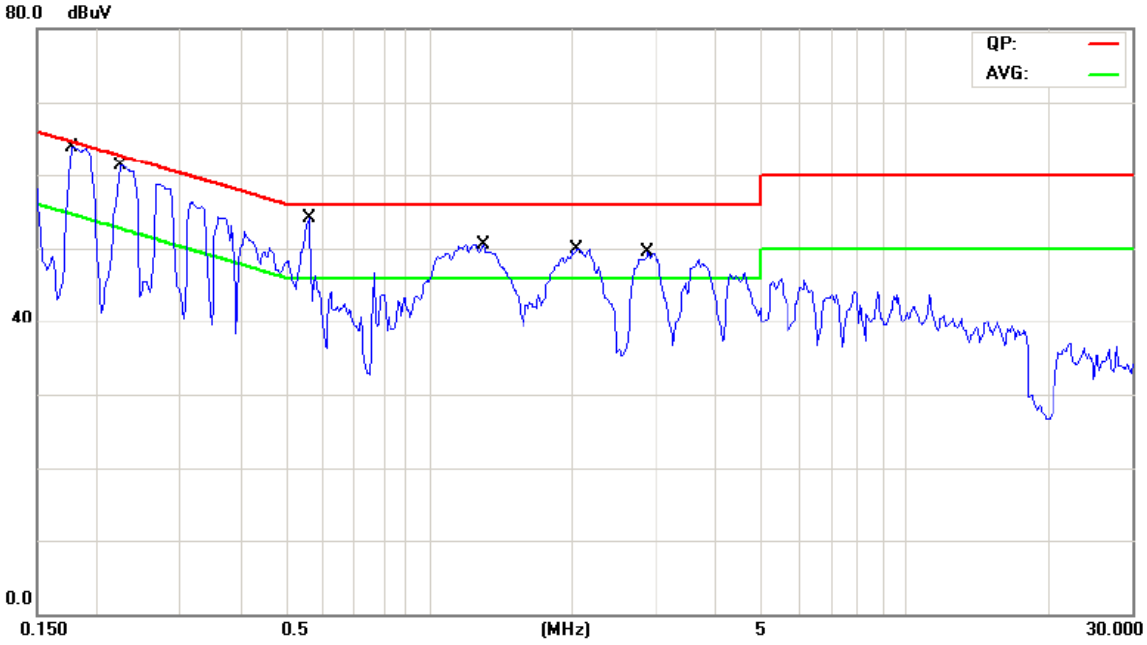
Remarks: _____

_____

A Conducted Emission on Line Terminal of the power line (150kHz to 30MHz)

EUT Description:	Tablet PC
Operation Mode:	Tx mode(Bluetooth)
Tested By:	Beryl Zhao
Test date:	Jan. 14, 2014

Start Frequency	Stop Frequency	Step	IF BW	Detector	Final M-Time
0.15MHz	30MHz	4.5KHz	10KHz	QP+AV	1s

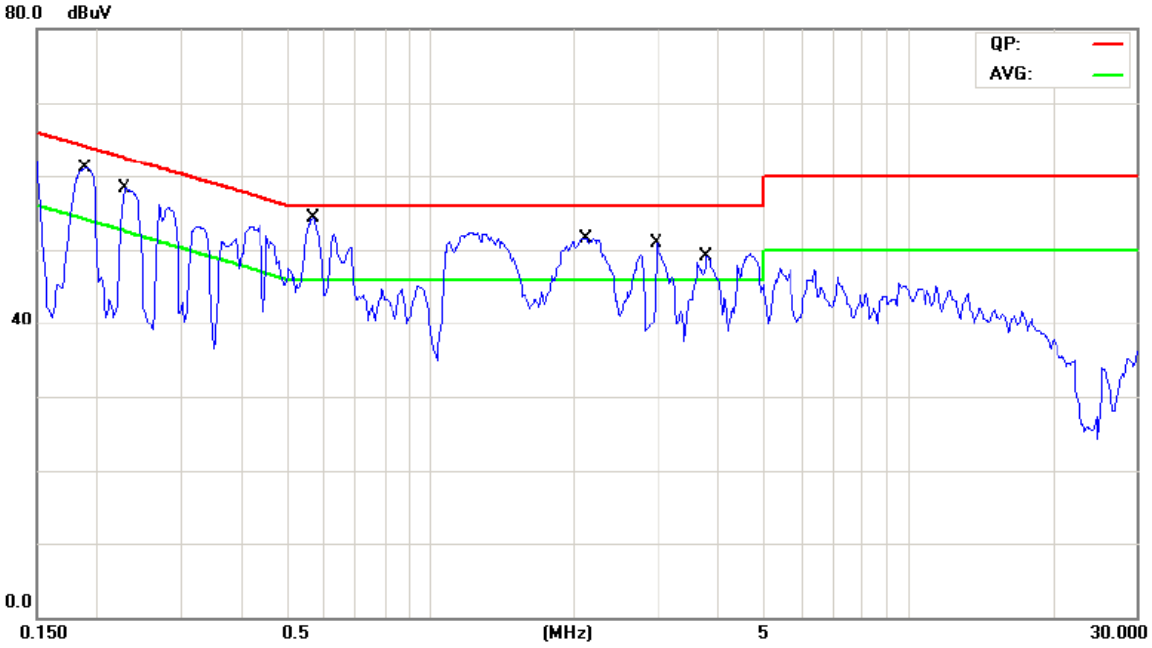


Frequency (MHz)	Reading(dB μ V)				Limit (dB μ V)	
	Live		Neutral			
	Quasi-peak	Average	Quasi-peak	Average	Quasi-peak	Average
0.1773	56.59	33.58	--	--	64.61	54.61
0.2242	56.09	36.62	--	--	62.66	52.66
0.5602	53.03	43.53	--	--	56.00	46.00
1.2984	45.47	35.69	--	--	56.00	46.00
2.0484	45.35	36.51	--	--	56.00	46.00
2.8766	44.79	35.87	--	--	56.00	46.00

B Conducted Emission on Neutral Terminal of the power line (150kHz to 30MHz)

EUT Description:	Tablet PC
Operation Mode:	Tx mode(Bluetooth)
Tested By:	Beryl Zhao
Test Data:	Jan. 14, 2014

Start Frequency	Stop Frequency	Step	IF BW	Detector	Final M-Time
0.15MHz	30MHz	4.5KHz	10KHz	QP+AV	1s



Frequency (MHz)	Reading(dB μ V)				Limit (dB μ V)	
	Live		Neutral			
	Quasi-peak	Average	Quasi-peak	Average	Quasi-peak	Average
0.1891	--	--	57.28	33.78	64.07	54.07
0.2281	--	--	48.93	27.88	62.52	52.52
0.5680	--	--	53.06	34.39	56.00	46.00
2.1187	--	--	46.55	34.16	56.00	46.00
2.9742	--	--	46.02	25.85	56.00	46.00
3.7813	--	--	45.65	26.48	56.00	46.00

7.0 20dB Bandwidth Measurement

7.1 Test Equipment

Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date
Spectrum Analyzer	ROHDE&SCHWARZ	FSEM	848597/001	July 7, 2013	July 6, 2014

7.2 Test Specification:

Environmental conditions: Temperature 23° C Humidity: 51% Atmospheric pressure: 103kPa

7.3 Limit

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

7.4 Test status:

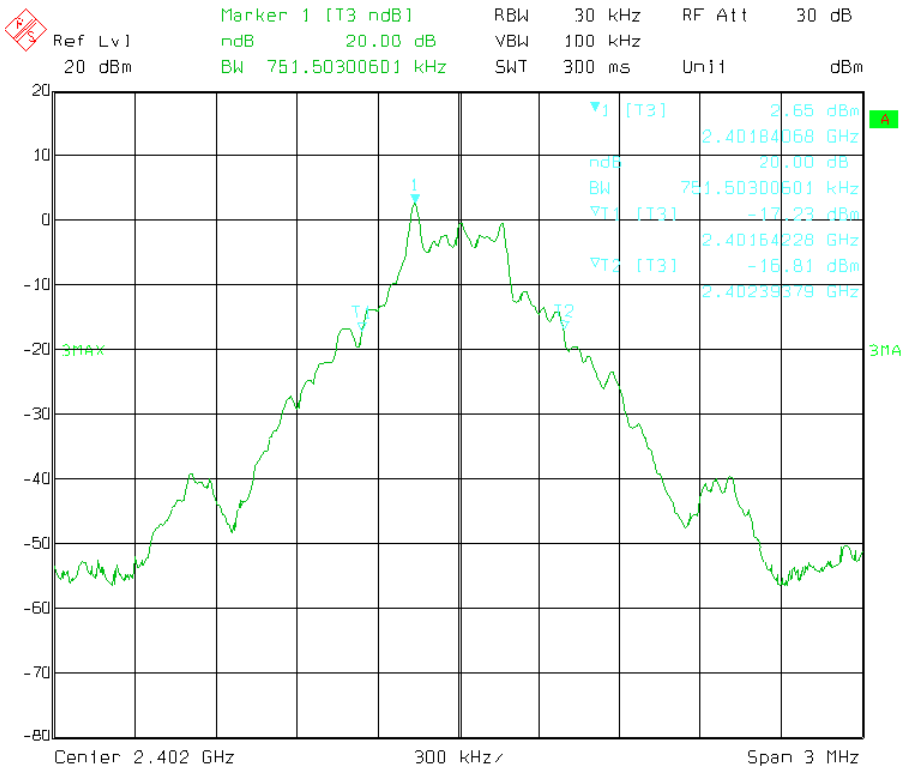
Pre-tests were made in continuous transmitting mode at lowest (2402 MHz), middle (2441 MHz) and highest (2480MHz) channel with GFSK, Pi/4 QDPSK and 8DPSK mode, which indicates that the worst case is 8DPSK mode, so it is reported GFSK and 8DPSK mode only.

7.5 Test Result:

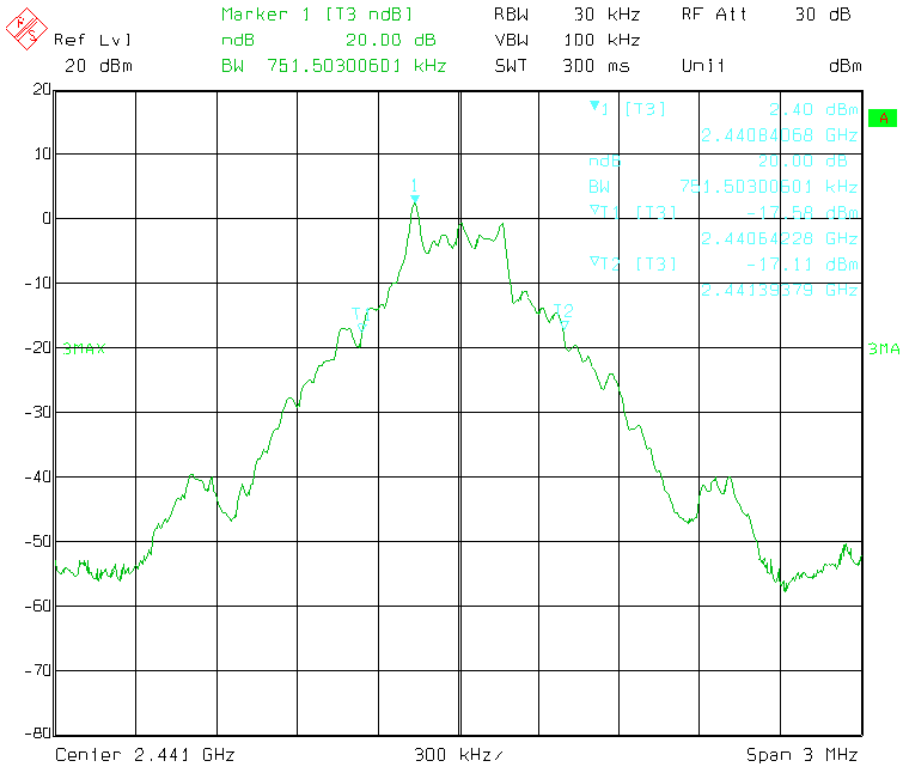
Modulation Type	Channel number	20dB Bandwidth (kHz)	Limit (kHz)	Conclusion
GFSK	Low	751.5	---	PASS
	Middle	751.5	---	PASS
	High	751.5	---	PASS
8DPSK	Low	1137.3	---	PASS
	Middle	1137.3	---	PASS
	High	1137.3	---	PASS

Modulation: GFSK

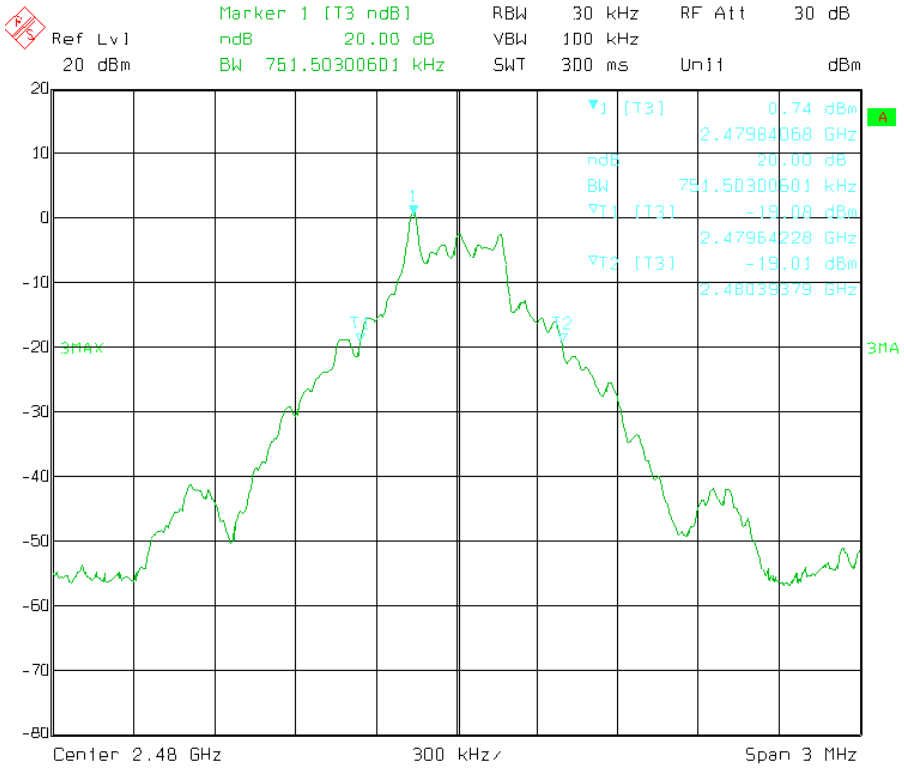
Low channel



Middle channel

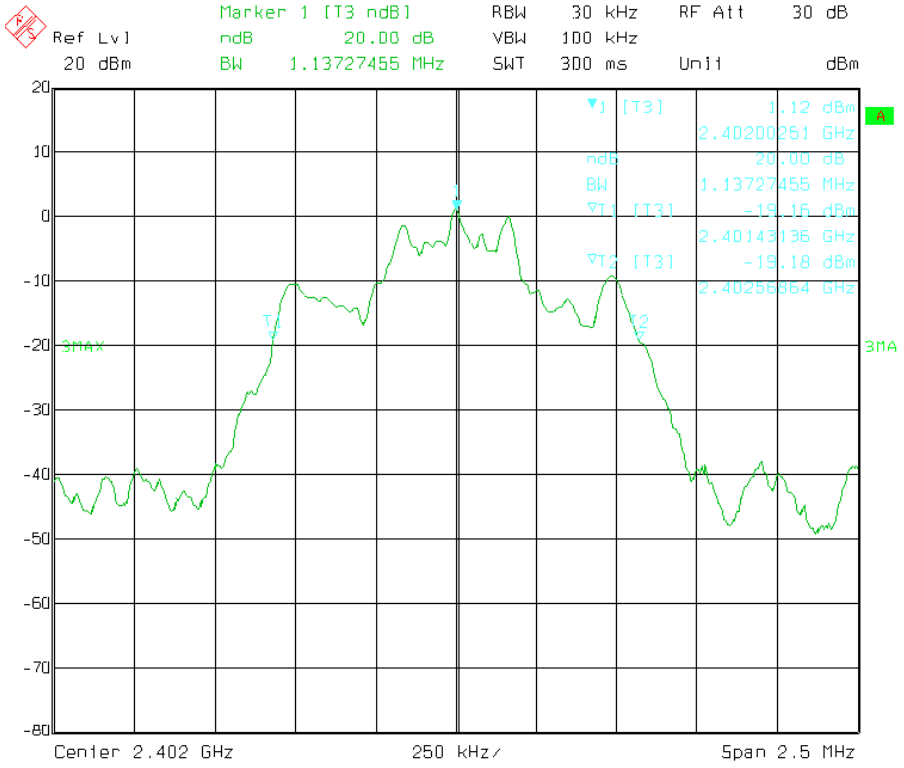


High channel

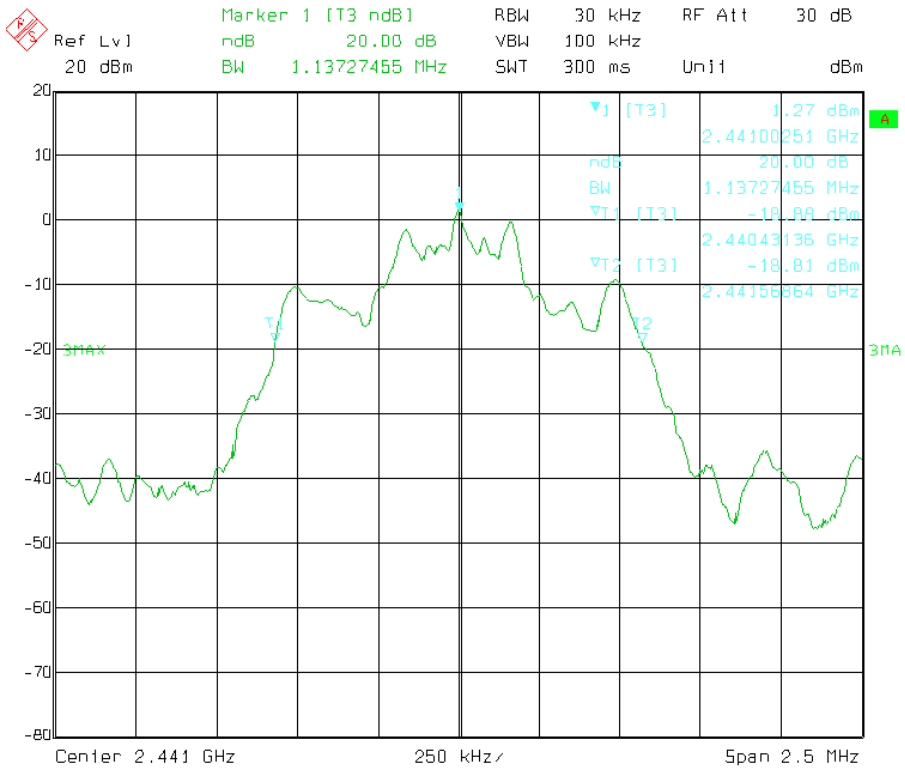


Modulation: 8DPSK

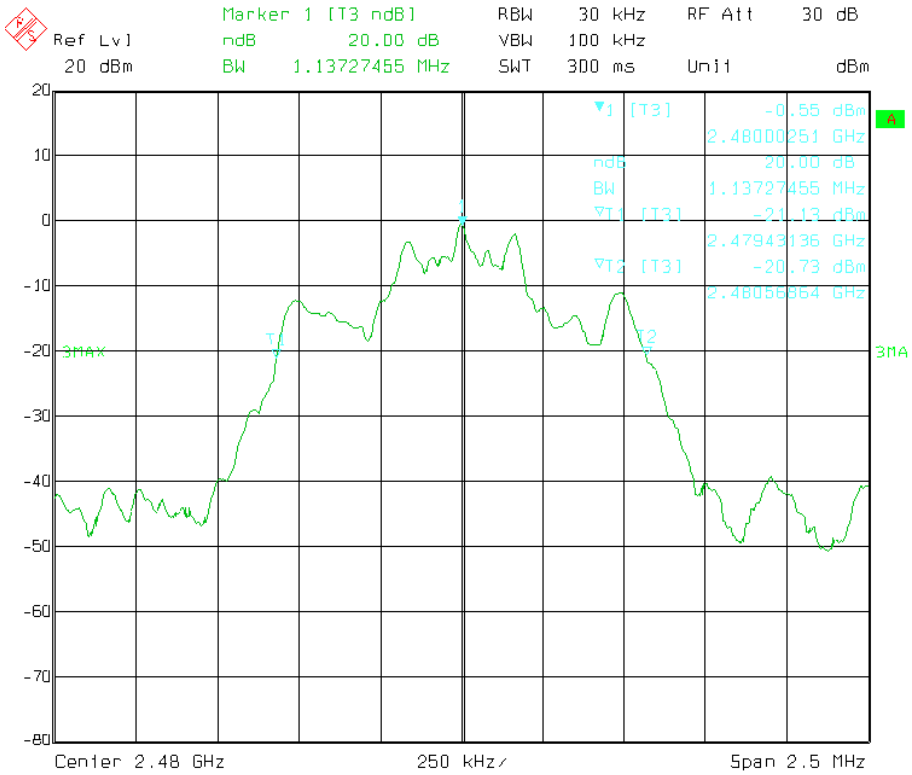
Low channel



Middle channel



High channel



8.0 Maximum Peak Output Power

8.1 Test Equipment

Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date
Spectrum Analyzer	ROHDE&SCHWARZ	FSEM	848597/001	July 7, 2013	July 6, 2014

8.2 Test specification:

Environmental conditions: Temperature 23° C Humidity: 51% Atmospheric pressure: 103kPa

8.3 Test Procedure

1) Check the calibration of the measuring instrument (spectrum analyzer) using either an internal calibrator or a known signal from an external generator.
2) Set the spectrum analyzer as follows: Span = approximately 5 times the 20 dB bandwidth, centred on a hopping channel； RBW > the 20 dB bandwidth of the emission being measured； VBW ≥ RBW； Sweep =auto； Detector function = peak； Trace = max hold
3) Measure the highest amplitude appearing on spectral display and record the level to calculate results.
4) Repeat above procedures until all frequencies measured were complete.

8.4 Limits

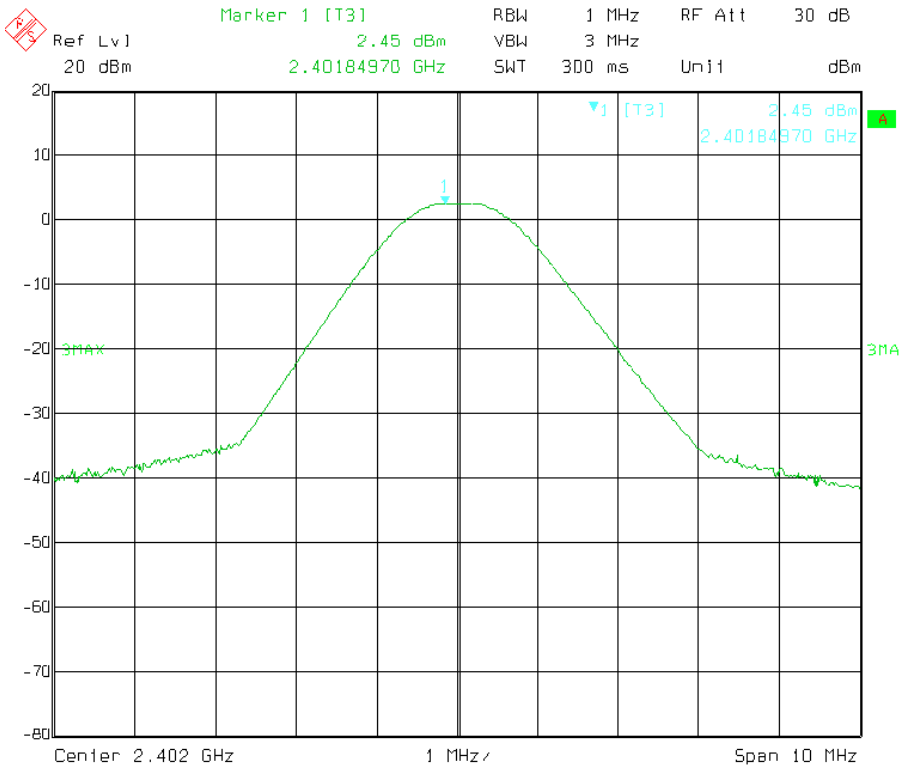
According to §15.247(b)(1), for frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5MHz band: 0.125 watts. According to §15.247(b)(4), the conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

8.5 Test Result

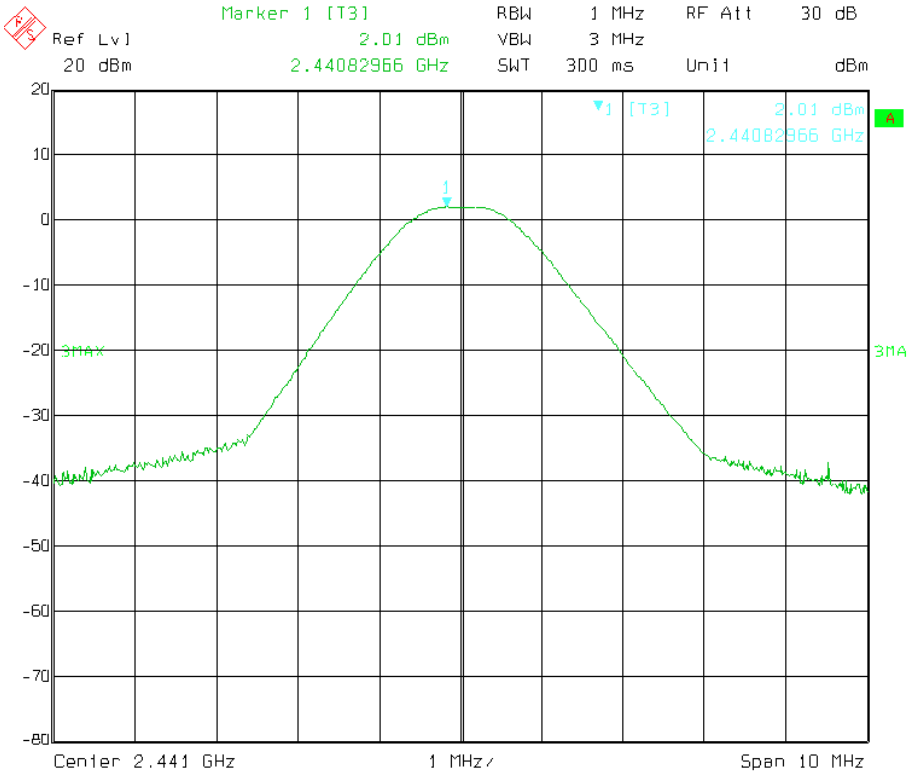
Modulation Type	Channel Frequency (MHz)	Peak Power Output (dBm)	Peak Power Limit (mW)	Peak Power Limit (dBm)	Pass/ Fail
GFSK	2402	2.45	125	20.97	Pass
	2441	2.01	125	20.97	Pass
	2480	0.63	125	20.97	Pass
Pi/4 QDPSK	2402	1.65	125	20.97	Pass
	2441	2.02	125	20.97	Pass
	2480	2.02	125	20.97	Pass
8 DPSK	2402	2.19	125	20.97	Pass
	2441	2.52	125	20.97	Pass
	2480	2.64	125	20.97	Pass

Modulation: GFSK

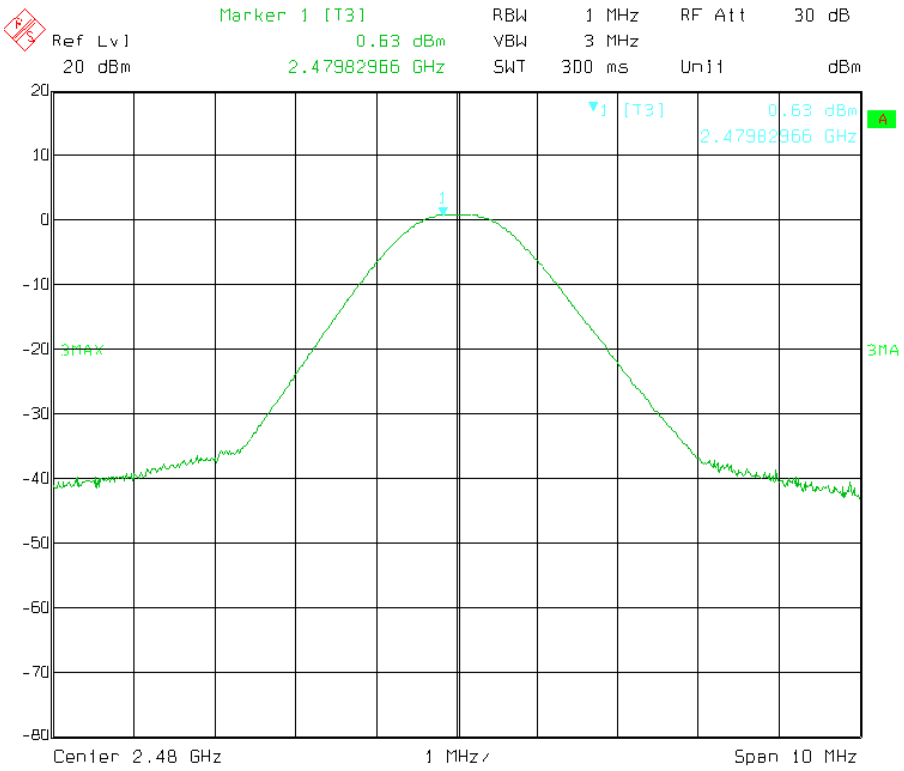
Low channel



Middle channel

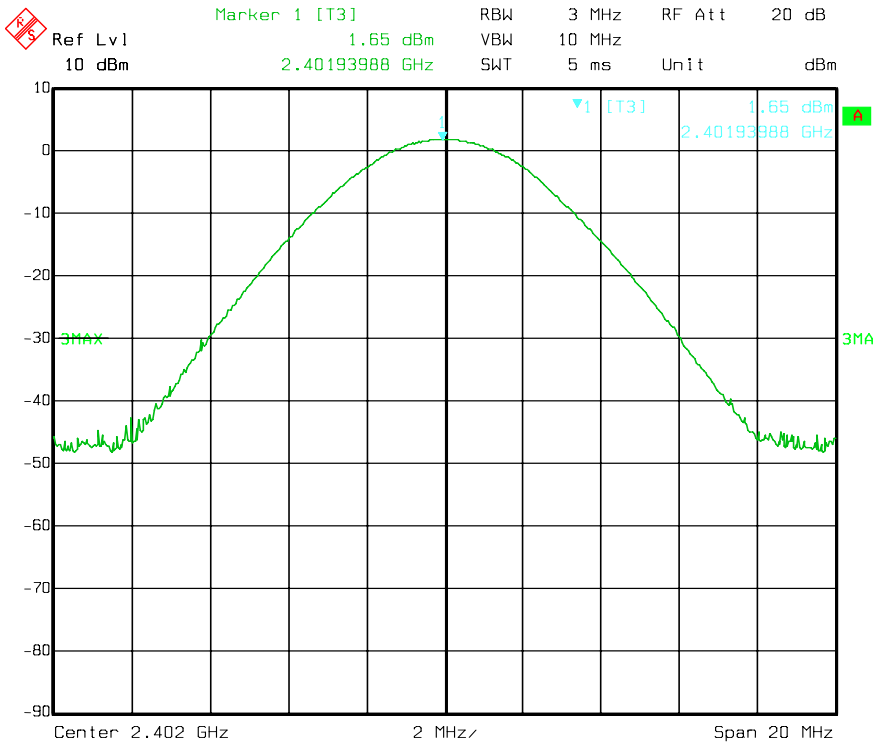


High channel

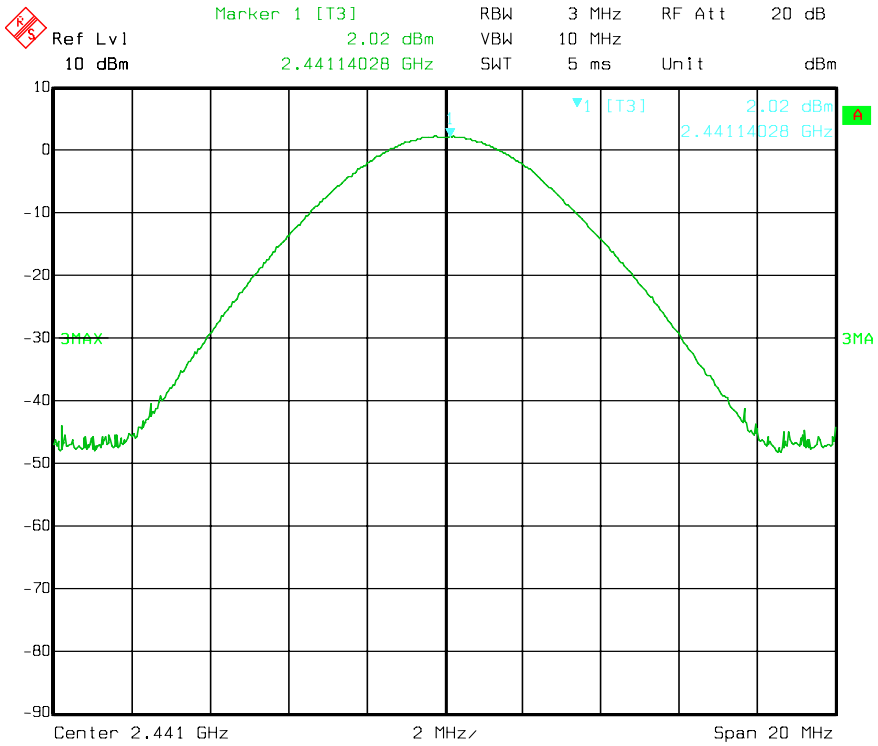


Modulation: Pi/4 DQPSK

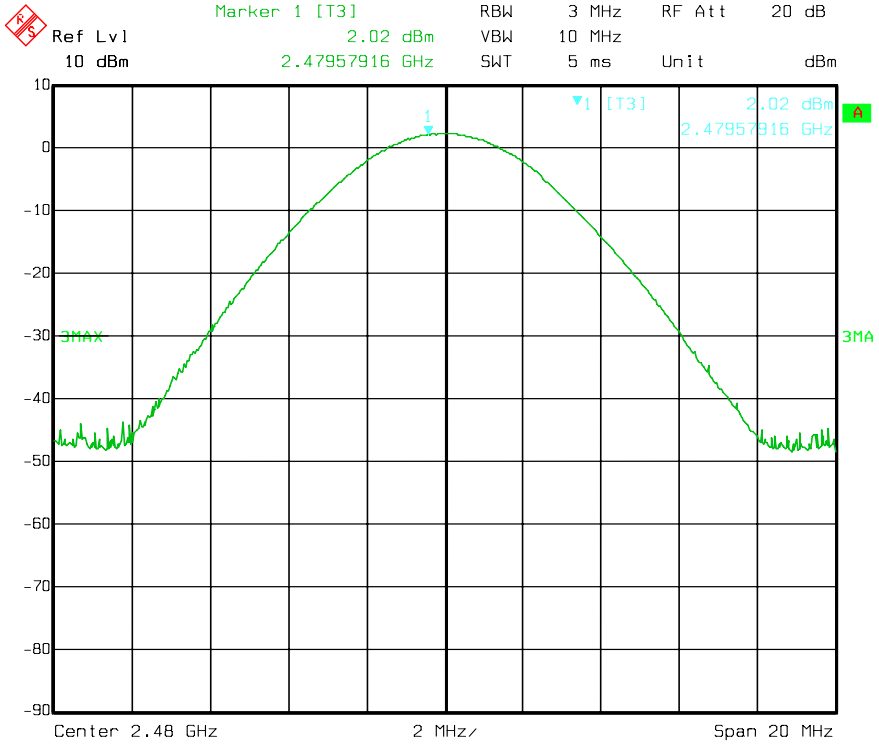
Low channel



Middle channel

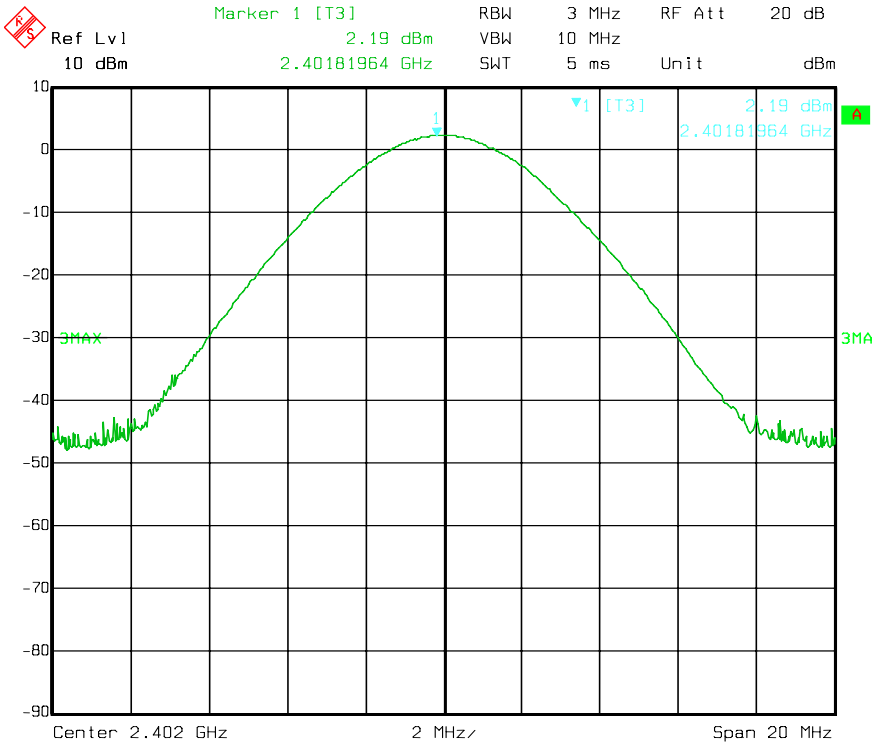


High channel

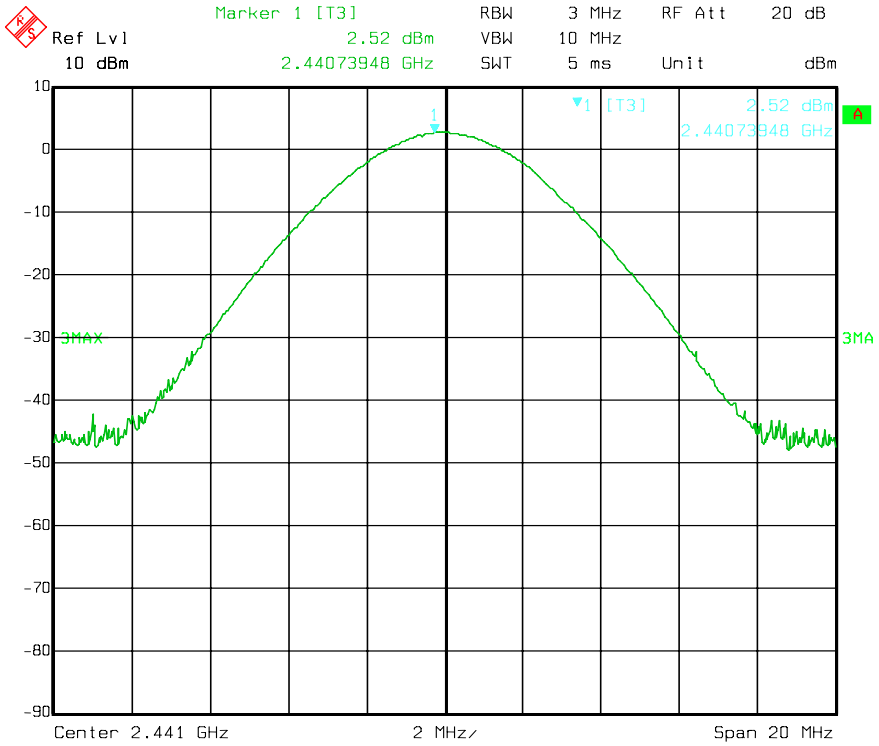


Modulation: 8DPSK

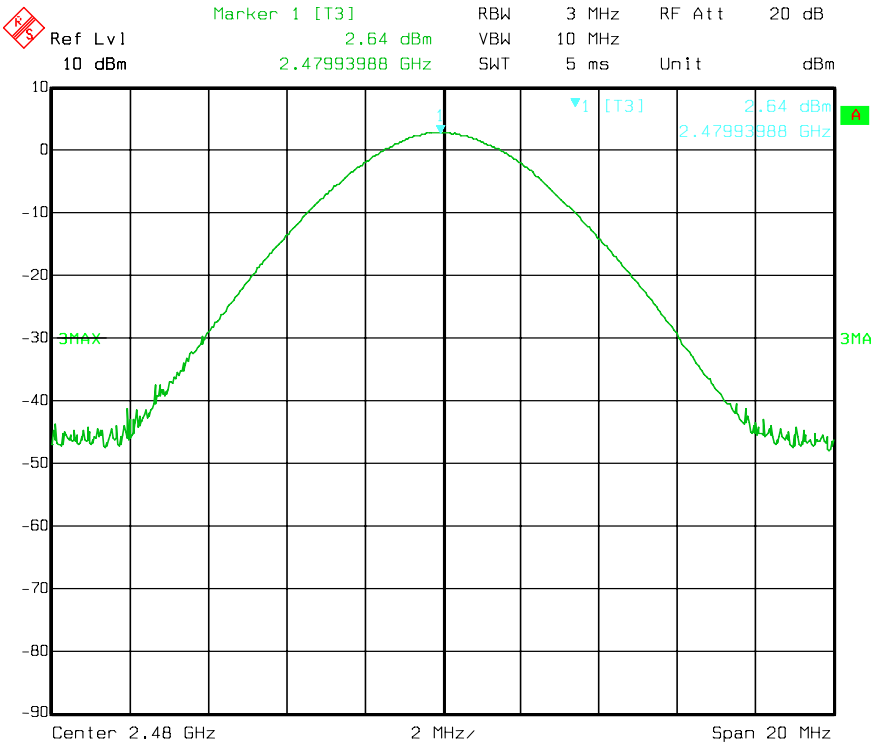
Low channel



Middle channel



High channel



9.0 Carrier Frequency Separation

9.1 Test Equipment

Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date
Spectrum Analyzer	ROHDE&SCHWARZ	FSEM	848597/001	July 7, 2013	July 6, 2014

9.2 Test specification:

Environmental conditions: Temperature 23° C Humidity: 51% Atmospheric pressure: 103kPa

9.3 Test Procedure

1. Set the spectrum analyzer as follows: Span = wide enough to capture the peaks of two adjacent channels: Resolution (or IF) Bandwidth (RBW) ≥ 1% of the span; Video (or Average) Bandwidth (VBW) ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold
2. Measure the separation between the peaks of the adjacent channels using the marker-delta function.
3. Repeat above procedures until all frequencies measured were complete.

9.4 Limits

According to §15.247(a)(1), frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

9.5 Test status:

Pre-tests were made in continuous transmitting mode at lowest (2402 MHz), middle (2441 MHz) and highest (2480MHz) channel with GFSK, Pi/4 QDPSK and 8DPSK mode, which indicates that the worst case is 8DPSK mode, so it is reported GFSK and 8DPSK mode only.

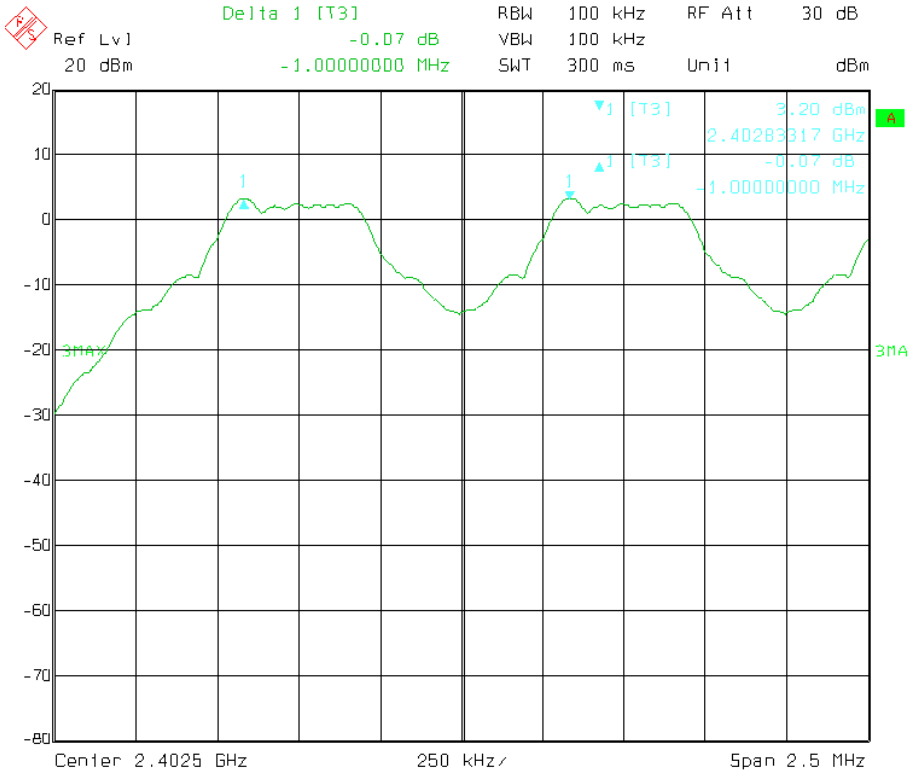
9.6 Test Result

Modulation Type	Channel number	Carrier Frequency Separation	Limit	Pass/ Fail
GFSK	Low	1.000MHz	≥ 25 kHz or two-thirds 20 dB bandwidth	Pass
	Middle	1.000MHz		Pass
	High	1.000MHz		Pass
8DPSK	Low	1.000MHz	≥ 25 kHz or two-thirds 20 dB bandwidth	Pass
	Middle	1.000MHz		Pass
	High	1.000MHz		Pass

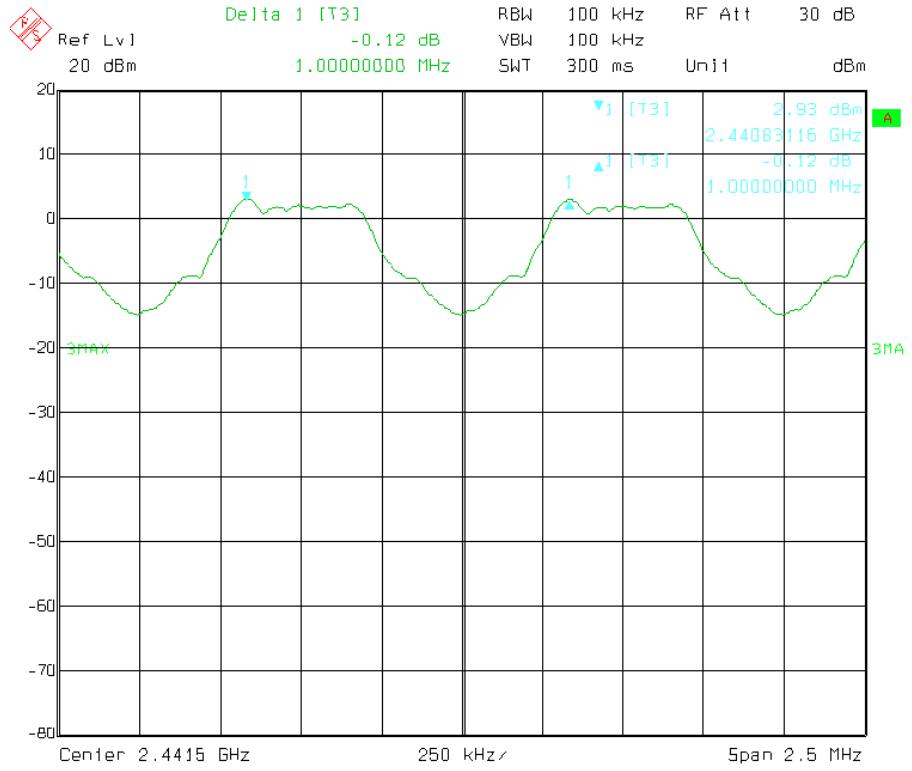
Note: Two-thirds 20 dB bandwidth: GFSK: 501 kHz; 8DPSK: 758.2 kHz

Modulation: GFSK

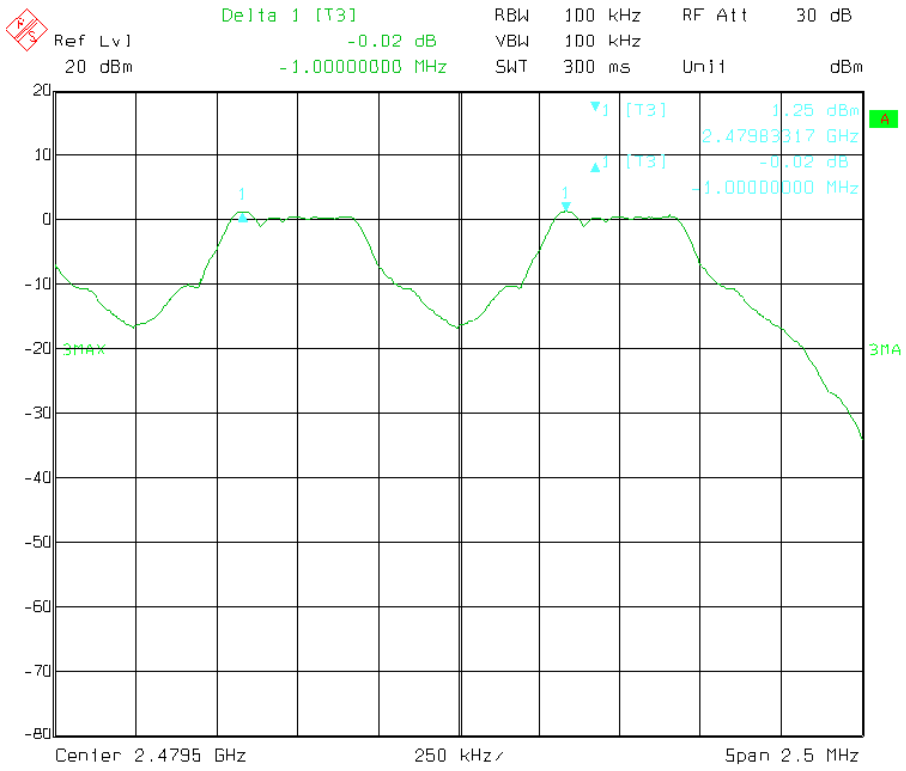
Low channel



Middle channel

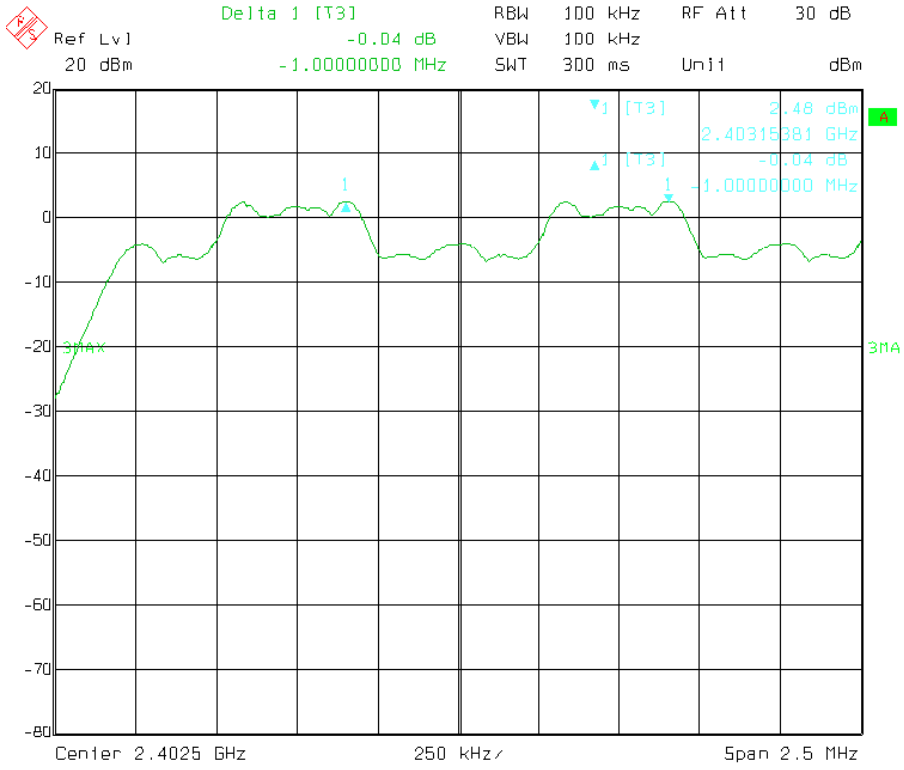


High channel

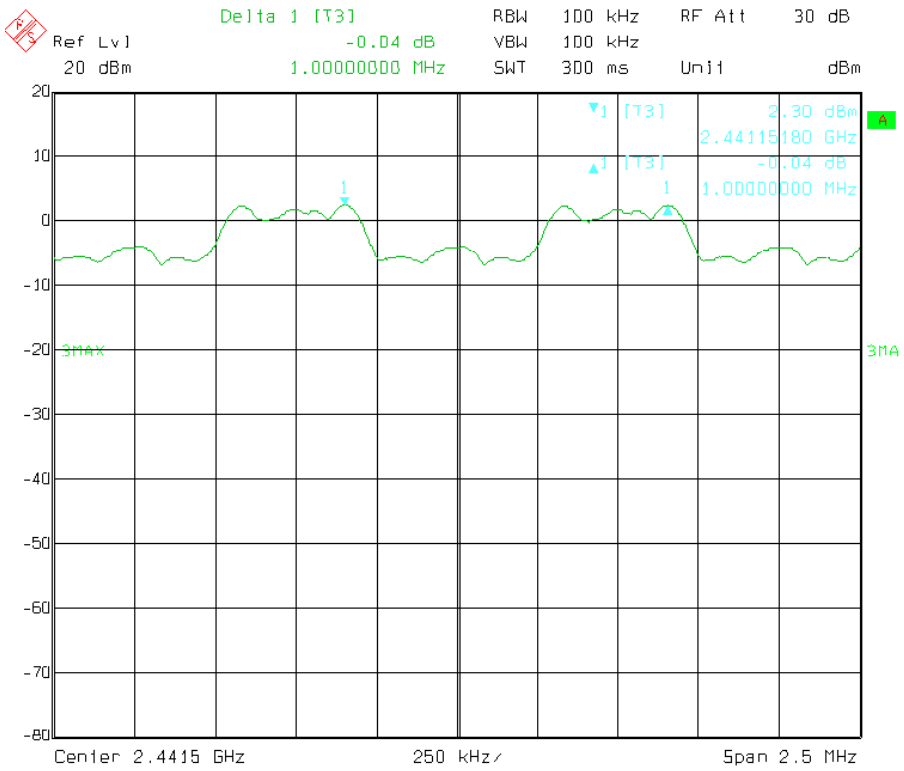


Modulation: 8DPSK

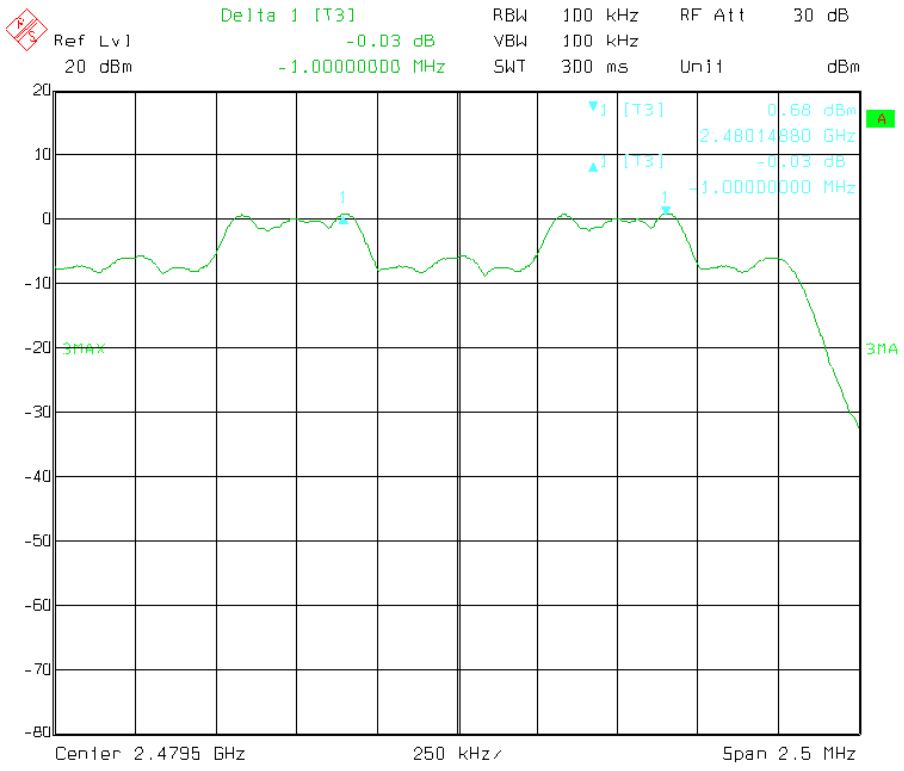
Low channel



Middle channel



High channel



10.0 Number of Hopping Channels

10.1 Test Equipment

Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date
Spectrum Analyzer	ROHDE&SCHWARZ	FSEM	848597/001	July 7, 2013	July 6, 2014

10.2 Test specification:

Environmental conditions: Temperature 22° C Humidity: 51% Atmospheric pressure: 103kPa

10.3 Test Procedure

Set the spectrum analyzer as follows: Span = the frequency band of operation; RBW ≥ 1% of the span; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold

10.4 Limits

According to §15.247(a)(1)(iii), frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

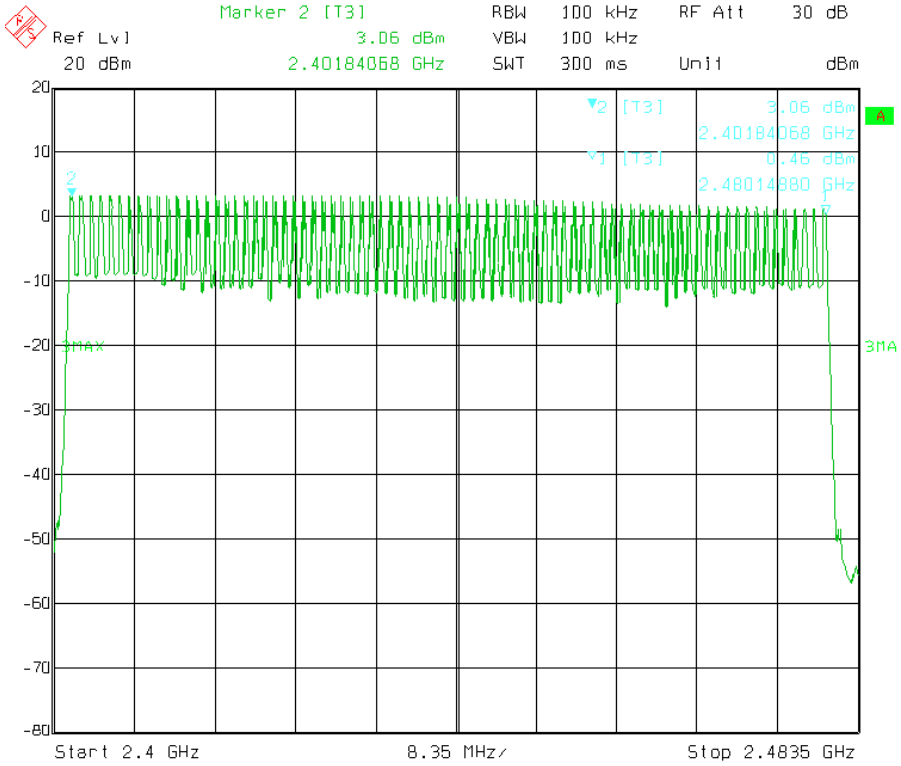
10.5 Test status:

Pre-tests were made in continuous transmitting mode at lowest (2402 MHz), middle (2441 MHz) and highest (2480MHz) channel with GFSK, Pi/4 QDPSK and 8DPSK mode, which indicates that the worst case is 8DPSK mode, so it is reported GFSK and 8DPSK mode only.

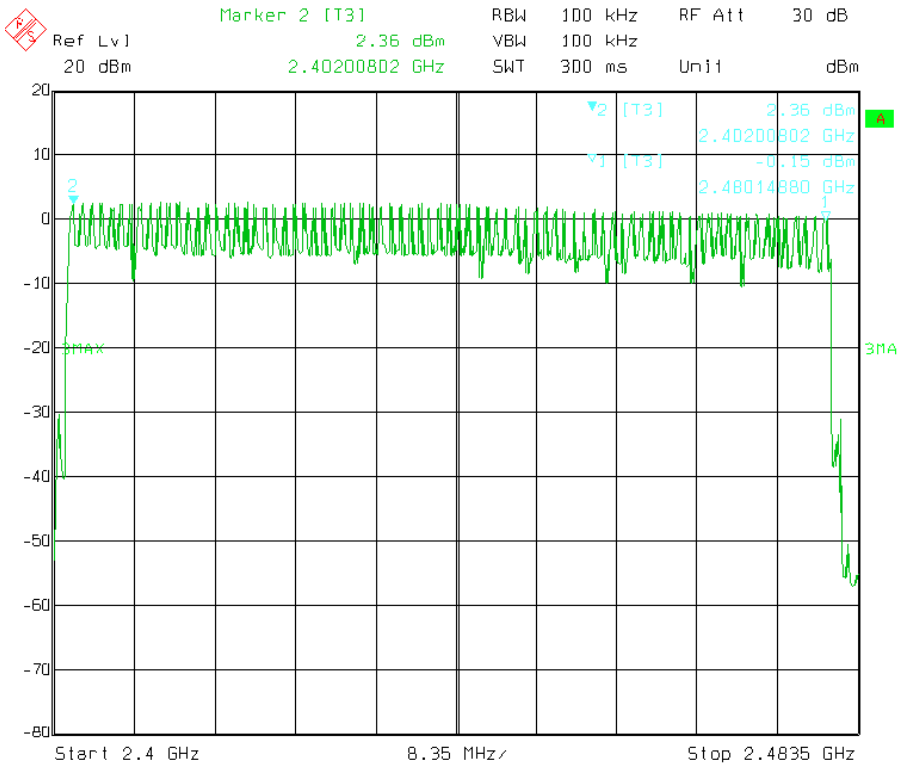
10.6 Test Result

Modulation Type	Operating Frequency	Number of hopping channels	Limit	Pass/ Fail
GFSK	2402-2480MHz	79	≥ 15	Pass
8DPSK	2402-2480MHz	79	≥ 15	Pass

Modulation Type: GFSK



Modulation Type: 8DPSK



11.0 Time of Occupancy (Dwell Time)

11.1 Test Equipment

Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date
Spectrum Analyzer	ROHDE&SCHWARZ	FSEM	848597/001	July 7, 2013	July 6, 2014

11.2 Test specification:

Environmental conditions: Temperature 22° C Humidity: 52% Atmospheric pressure: 103kPa

11.3 Test Procedure

Span = zero span, centred on a hopping channel; RBW = 1 MHz; VBW ≥ RBW; Detector function = peak;
Sweep = as necessary to capture the entire dwell time per hopping channel; Trace = max hold
Measure the dwell time using the marker-delta function.
Repeat this test for different modes of operation (e.g., data rate, modulation format, etc.), if applicable.

11.4 Limits

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

11.5 Test status:

Pre-tests were made in continuous transmitting mode at lowest (2402 MHz), middle (2441 MHz) and highest (2480MHz) channel with GFSK, Pi/4 QDPSK and 8DPSK mode, which indicates that the worst case is 8DPSK mode, so it is reported GFSK and 8DPSK mode only.

11.6 Test Result

Modulation Type	Packet	Reading (ms)	Hoping Rate	Actual (s)	Limit (s)
GFSK	DH1	0.395	800hop/s	0.1264	0.4
	DH3	1.660	400hop/s	0.2656	0.4
	DH5	2.940	266.667hop/s	0.3136	0.4
8DPSK	DH1	0.400	800hop/s	0.1280	0.4
	DH3	1.680	400hop/s	0.2688	0.4
	DH5	2.924	266.667hop/s	0.3119	0.4

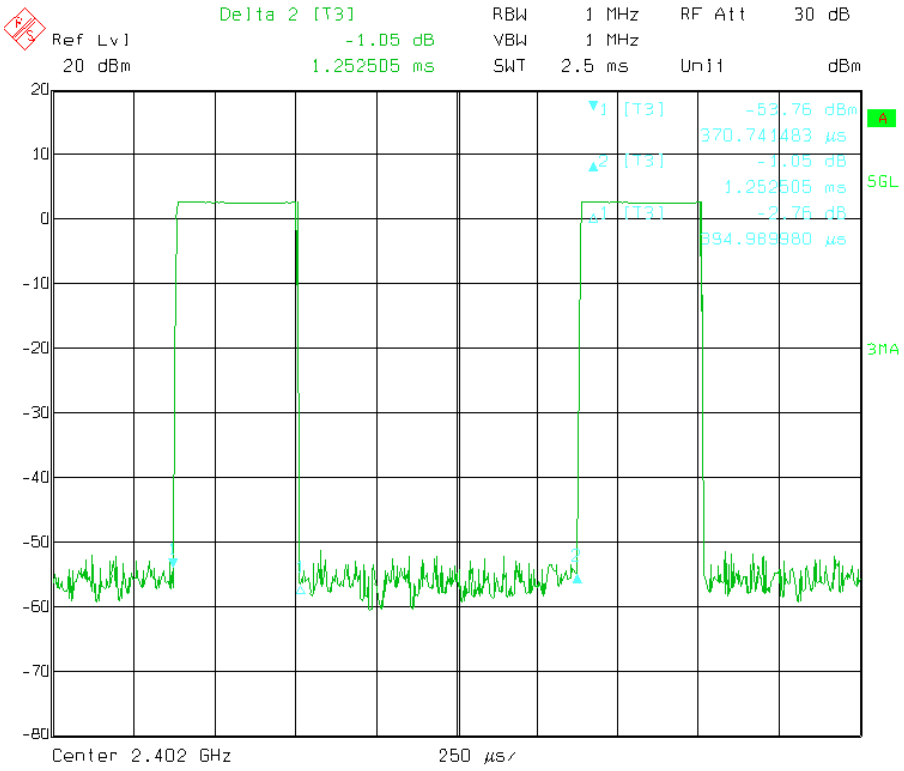
Note: 1) The measurements were conducted in High, Middle, Low channel. The Low channel could represent the character of the other channels, so the low channel measurement was submitted in the report only.

2) Actual = Reading × (Hopping rate / Number of channels) × Test period

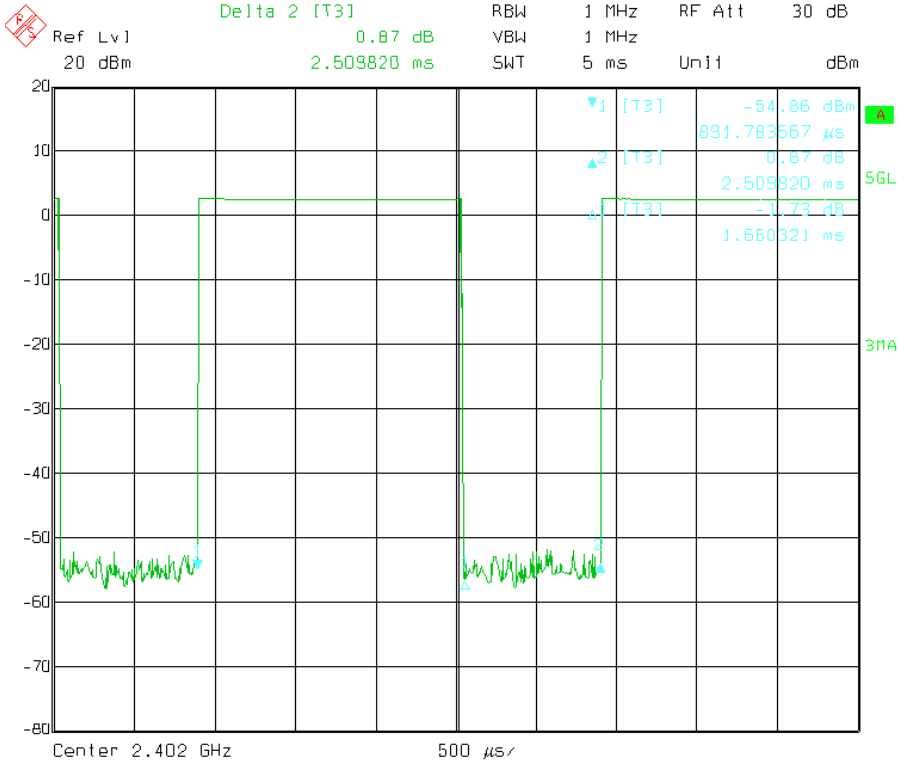
3) The EUT makes worst case 1600 hops per second or 1 time slot has a length of 625μs with 79 channels. A DH5 Packet needs 5 time slot for transmitting and 1 time slot for receiving. So the EUT makes worst case 266.667 hops per second with 79 channels, and the DH5 is the worst case.

Modulation Type: GFSK

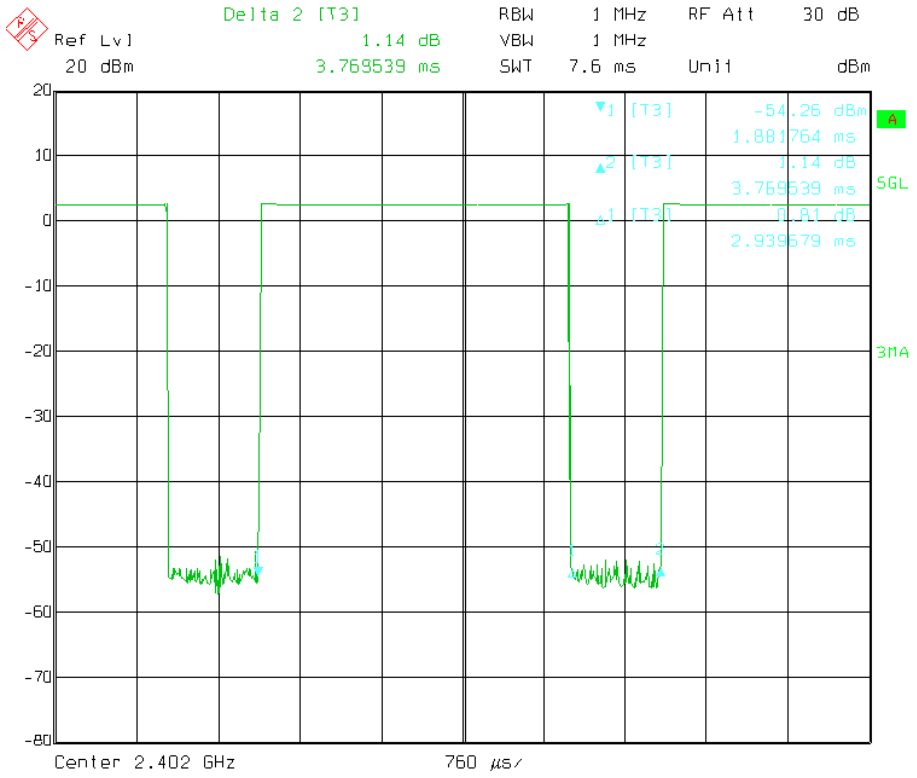
Packet Type: DH1



Packet Type: DH3

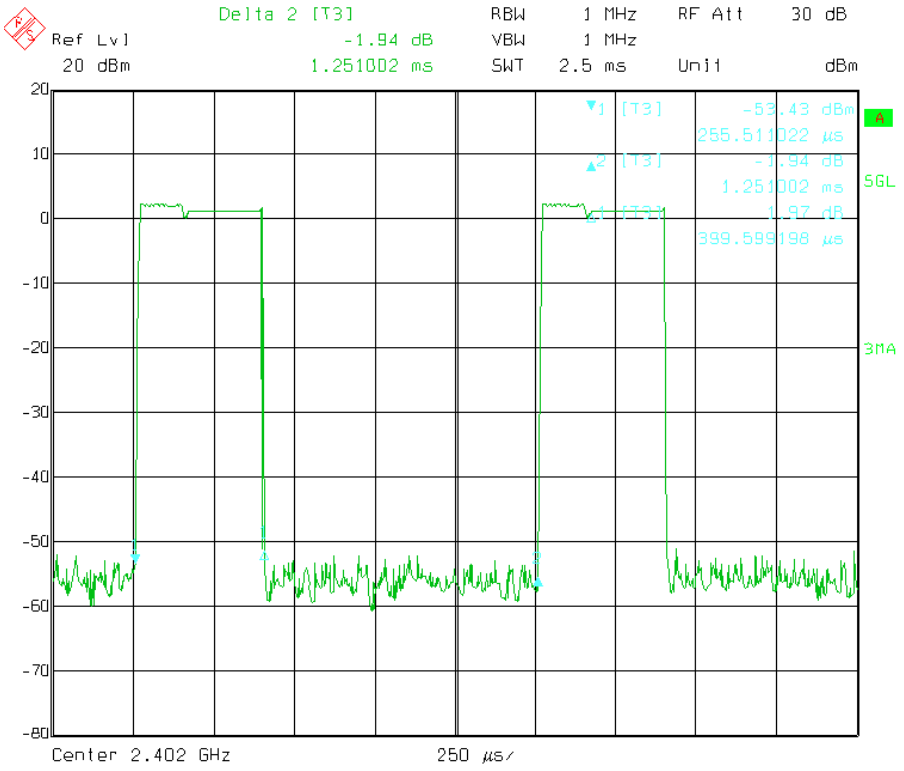


Packet Type: DH5

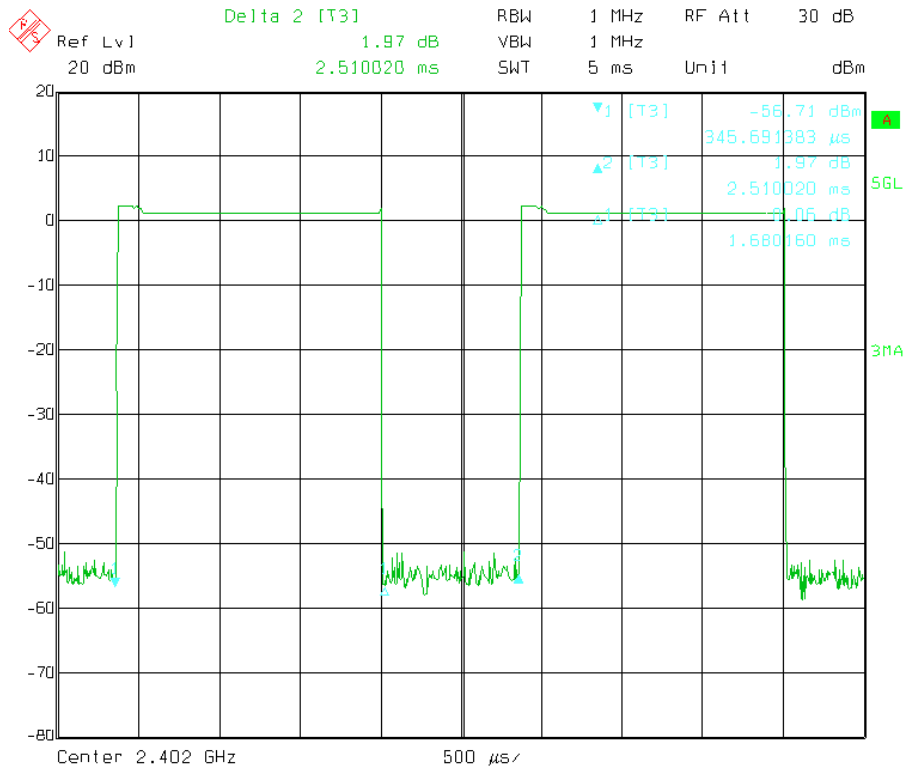


Modulation Type: 8DPSK

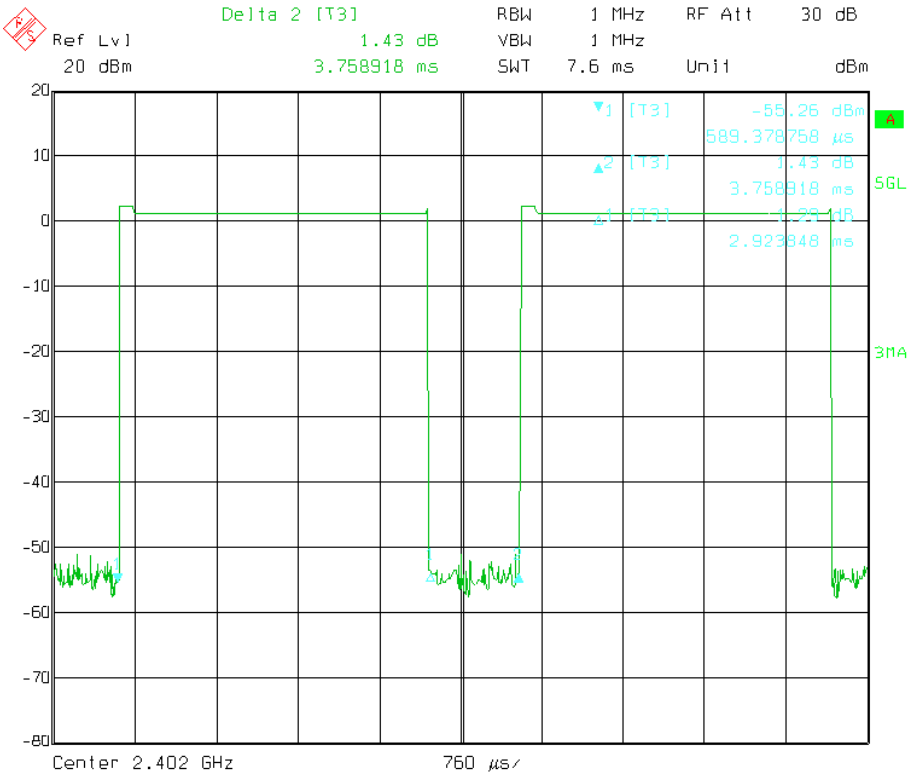
Packet Type: 3-DH1



Packet Type: 3-DH3



Packet Type: 3-DH5



12.0 Band edge Measurement

12.1 Test Equipment

Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date
Spectrum Analyzer	ROHDE&SCHWARZ	FSEM	848597/001	July 7, 2013	July 6, 2014

12.2 Test specification:

Environmental conditions: Temperature 22° C Humidity: 52% Atmospheric pressure: 103kPa

12.3 Test Procedure

For band edge test, the spectrum set as follows: RBW=VBW=100 kHz. A conducted measure method is used
For signals allocated in the restricted bands above and below the 2.4-2.483GHz, a radiated measurement is made (Peak values with RBW=VBW=1MHz and PK detector. AV value with RBW=1MHz, VBW=10Hz and PK detector)

12.4 Limit

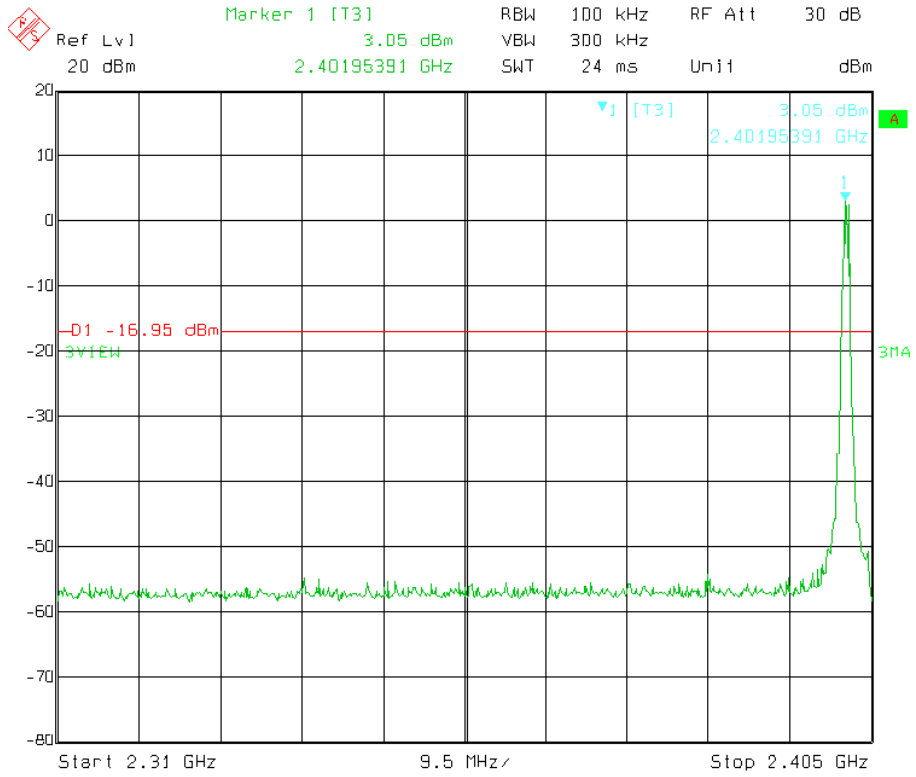
Below –20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).
Fall in the restricted bands listed in section 15.205. The maximum permitted average field strength is listed in section 15.209.

12.5 Test status:

Pre-tests were made in continuous transmitting mode at lowest (2402 MHz), middle (2441 MHz) and highest (2480MHz) channel with GFSK, Pi/4 QDPSK and 8DPSK mode, which indicates that the worst case is 8DPSK mode, so it is reported GFSK and 8DPSK mode only.

Modulation: GFSK

EUT operation mode: Keep transmitting in low channel

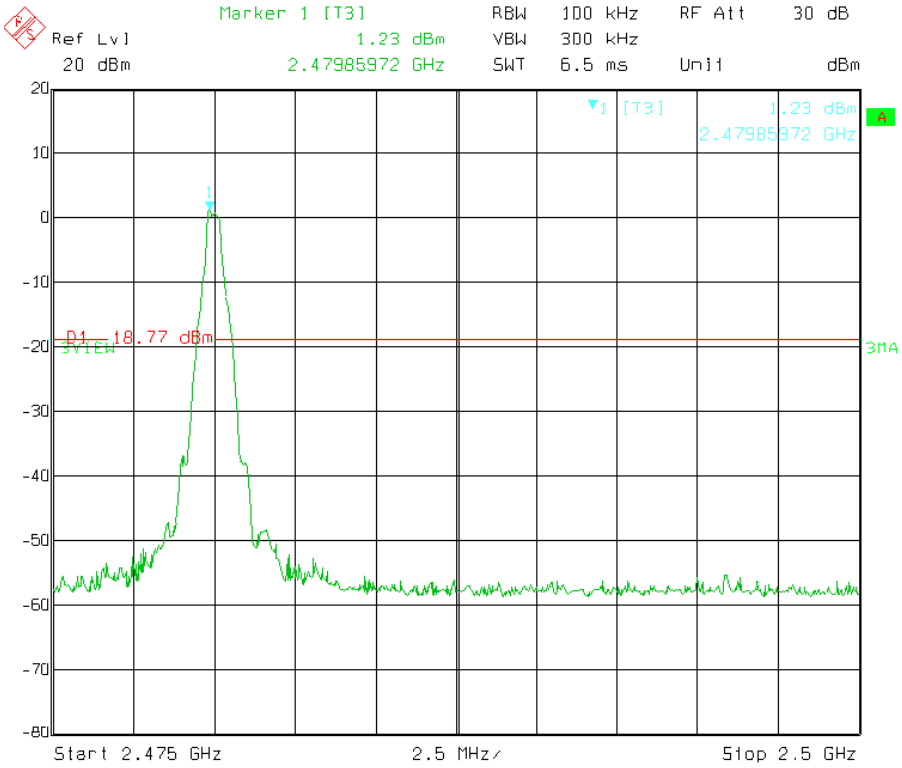


Remark: 1) The radiated measurement was made in horizontal and vertical polarity;

2) The maximum PK emission of restriction band 2310 to 2390 MHz was 52.55dBuV/m@3m at 2386.0MHz, which is less than the Average limit.

3) Radiated emissions which fall in the restricted band, as defined in 15.205(a), comply with the radiated emission limits specified in 15.209(a).

EUT operation mode: Keep transmitting in high channel

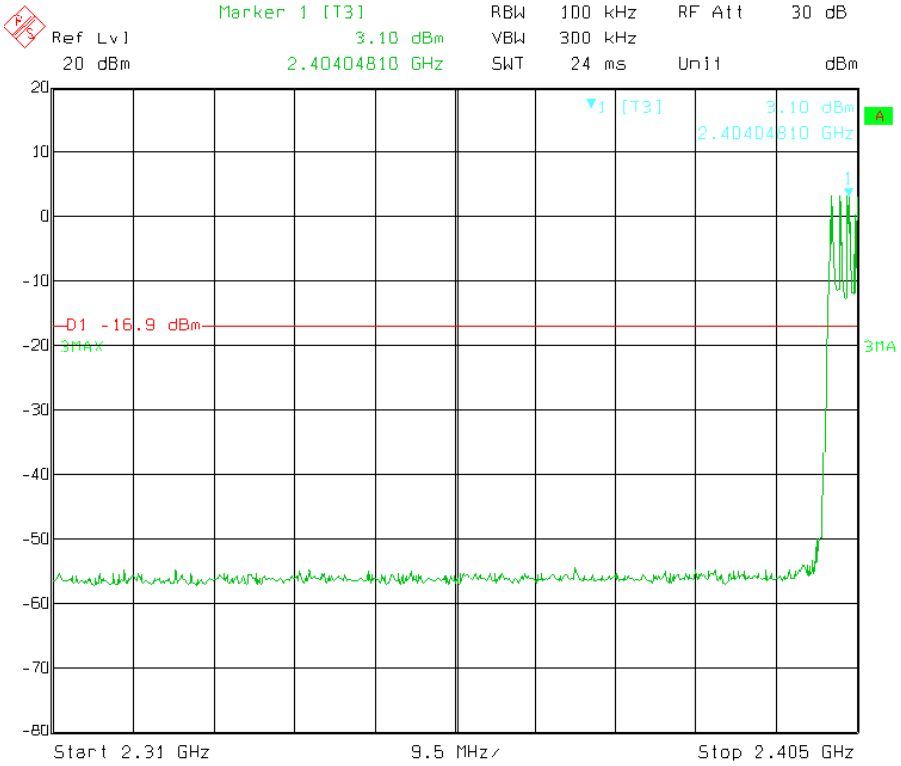


Remark: 1) The radiated measurement was made in horizontal and vertical polarity;

2) The maximum PK emission of restriction band 2483.5 to 2500MHz was 51.39dBuV/m@3m at 2493.9MHz, which is less than the Average limit.

3) Radiated emissions which fall in the restricted band, as defined in 15.205(a), comply with the radiated emission limits specified in 15.209(a).

EUT operation mode: Keep hopping

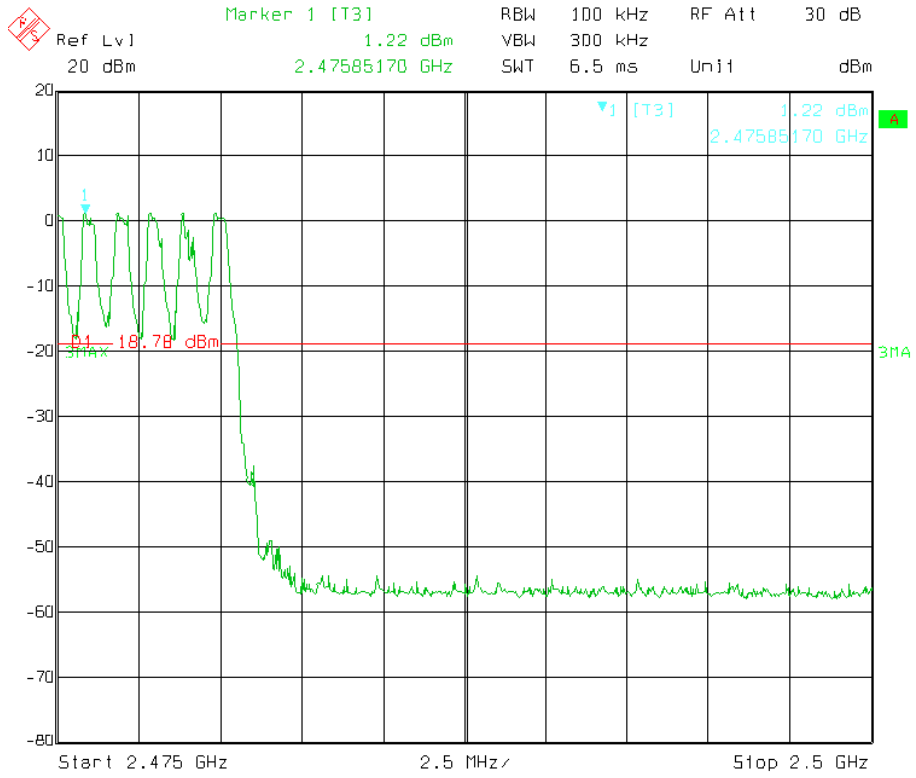


Remark: 1) The radiated measurement was made in horizontal and vertical polarity;

2) The maximum PK emission of restriction band 2310 to 2390 MHz was 51.84dBuV/m@3m at 23671.7MHz, which is less than the Average limit.

3) Radiated emissions which fall in the restricted band, as defined in 15.205(a), comply with the radiated emission limits specified in 15.209(a).

EUT operation mode: Keep hopping



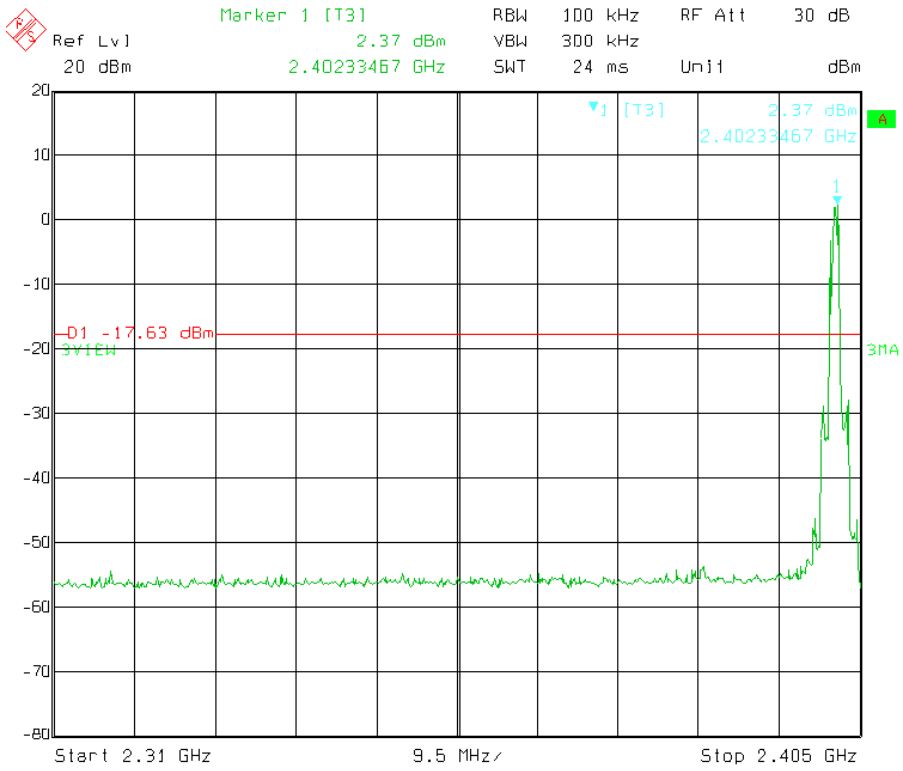
Remark: 1) The radiated measurement was made in horizontal and vertical polarity;

2) The maximum PK emission of restriction band 2483.5 to 2500MHz was 51.96dBuV/m@3m at 2487.8MHz, which is less than the Average limit.

3) Radiated emissions which fall in the restricted band, as defined in 15.205(a), comply with the radiated emission limits specified in 15.209(a).

Modulation: 8DPSK

EUT operation mode: Keep transmitting in low channel

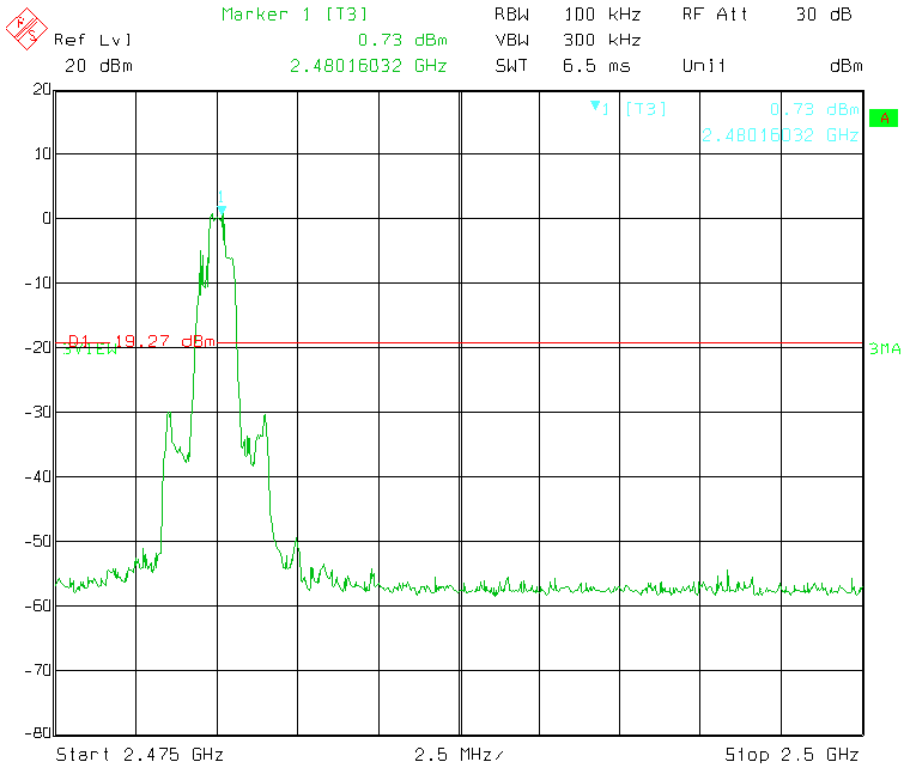


Remark: 1) The radiated measurement was made in horizontal and vertical polarity;

2) The maximum PK emission of restriction band 2310 to 2390 MHz was 50.79 dBuV/m@3m at 2369.8MHz, which is less than the Average limit.

3) Radiated emissions which fall in the restricted band, as defined in 15.205(a), comply with the radiated emission limits specified in 15.209(a).

EUT operation mode: Keep transmitting in high channel

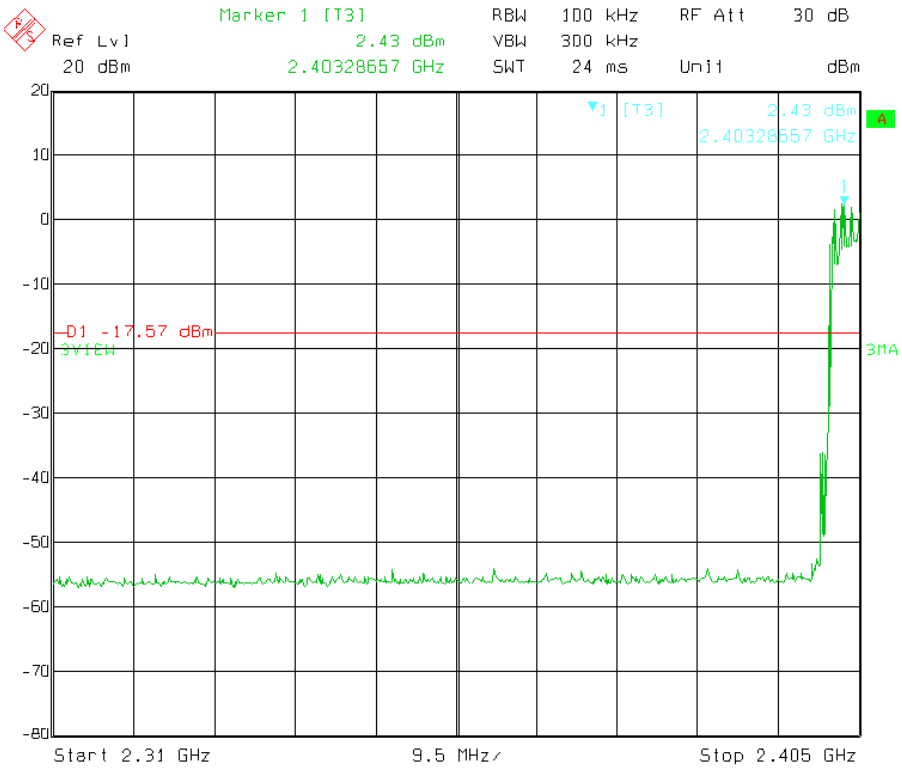


Remark: 1) The radiated measurement was made in horizontal and vertical polarity;

2) The maximum PK emission of restriction band 2483.5 to 2500MHz was 52.85dBuV/m@3m at 2495.9MHz, which is less than the Average limit.

3) Radiated emissions which fall in the restricted band, as defined in 15.205(a), comply with the radiated emission limits specified in 15.209(a).

EUT operation mode: Keep hopping

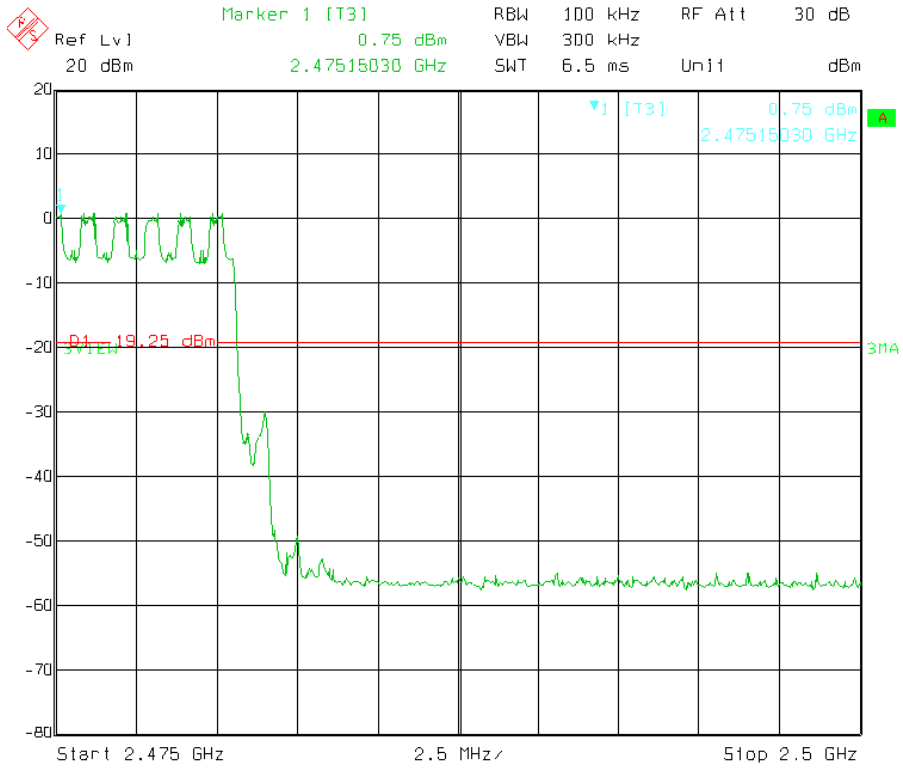


Remark: 1) The radiated measurement was made in horizontal and vertical polarity;

2) The maximum PK emission of restriction band 2310 to 2390 MHz was 52.90dBuV/m@3m at 2361.3MHz, which is less than the Average limit.

3) Radiated emissions which fall in the restricted band, as defined in 15.205(a), comply with the radiated emission limits specified in 15.209(a).

EUT operation mode: Keep hopping



Remark: 1) The radiated measurement was made in horizontal and vertical polarity;

2) The maximum PK emission of restriction band 2483.5 to 2500MHz was 51.83dBuV/m@3m at 2490.5MHz, which is less than the Average limit.

3) Radiated emissions which fall in the restricted band, as defined in 15.205(a), comply with the radiated emission limits specified in 15.209(a).

13.0 Spurious Emission Test

13.1 Radiated emissions

13.1.1 Test Method and test Procedure:

1) The EUT was tested according to ANSI C63.10 –2009 and ANSI C63.4-2003.

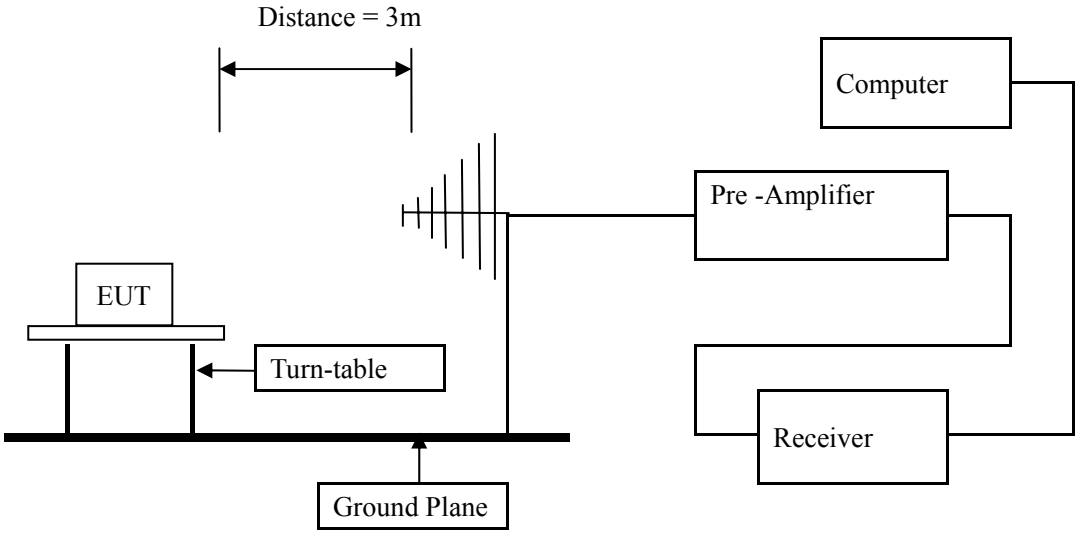
2) The EUT, peripherals were put on the turntable which table size is 1m x 1.5 m, table high 0.8 m. All set up is according to ANSI C63.10-2009 and ANSI C63.4-2003.

3) The frequency spectrum from 9 kHz to 25 GHz was investigated. All readings from 9 kHz to 30 MHz are quasi-peak values with a resolution bandwidth of 9 kHz. All readings from 30 MHz to1 GHz are quasi-peak values with a resolution bandwidth of 120 kHz. All readings are above 1 GHz, peak values with a resolution bandwidth of 1 MHz . Measurements were made at 3 meters.

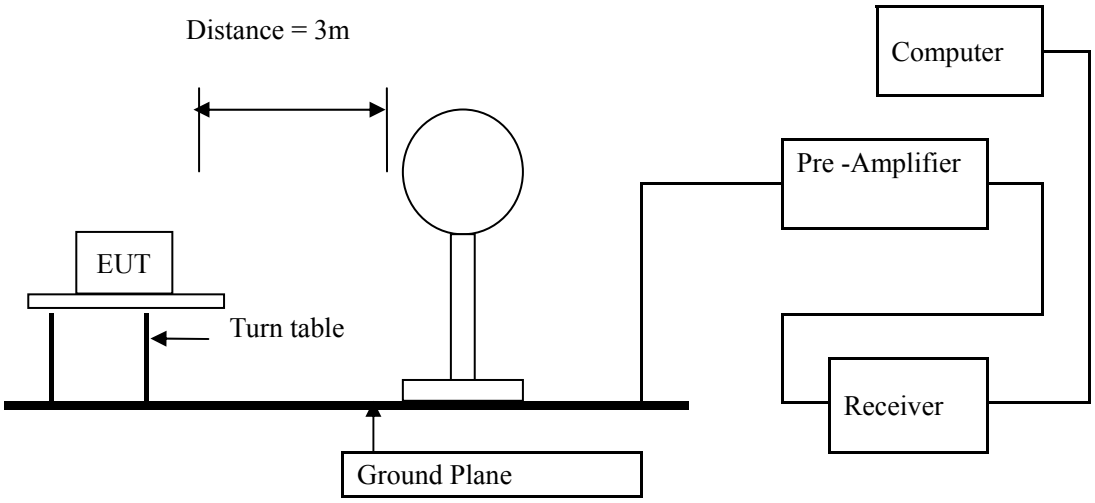
4) The antenna high is varied from 1 m to 4 m high to find the maximum emission for each frequency.

5) The antenna polarization: Vertical polarization and Horizontal polarization.

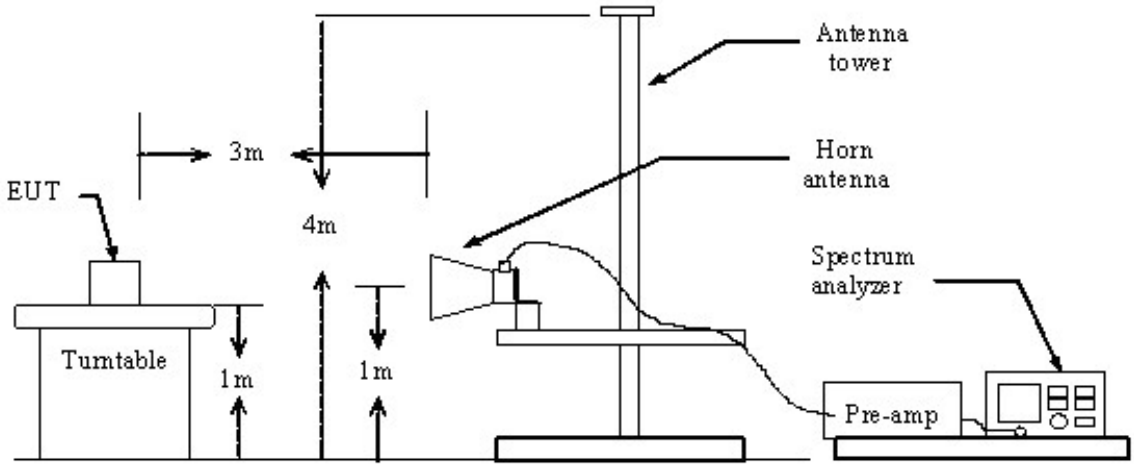
13.1.2 Block diagram of Test setup



Block diagram of Test setup for frequency below 30MHz



Block diagram of Test setup for frequency above 1GHz



13.1.3 EUT Operating Condition

Operating condition is according to ANSI C63.10 -2009 and ANSI C63.4-2003.

13.1.4 Radiated Emission Limit

All emission from a digital device, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strength specified below:

Frequencies in restricted band are complied to limit on Paragraph 15.209.

Frequency Range (MHz)	Distance (m)	Field strength (dB μ V/m)
0.009-0.490	3	20log 2400/F (kHz) + 80
0.490-1.705	3	20log 24000/F (kHz) + 40
1.705-30	3	20log 30 + 40
30-88	3	40.0
88-216	3	43.5
216-960	3	46.0
Above 960	3	54.0

Note: 1) RF Voltage (dBuV) = 20 log RF Voltage (uV)

2) In the Above Table, the tighter limit applies at the band edges.

3) Distance refers to the distance in meters between the measuring instrument antenna and the EUT

4) This is a handhold device. The radiated emissions should be tested under 3-axes position (Lying, Side, and Stand), After pre-test. It was found that the worse radiated emission was get at the lying position.

5) All scanning using PK detector. And the final emission level was get using QP detector for frequency range from 30-1000MHz.As to 1G-25G, the final emission level got using PK and AV detector.

6) If measurement is made at 3m distance, then F.S Limitation at 3m distance is adjusted by using the formula Ld1 = Ld2 * (d2/d1)

13.1.5 Photo documentation of the test set-up

Please refer to the Document Setup photo

13.1.6 Test Equipment:

Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date
ESPI Test Receiver	ROHDE&SCHWARZ	ESPI 3	100379	July 7, 2013	July 6, 2014
Spectrum Analyzer	ROHDE&SCHWARZ	FSEM	848597/001	July 7, 2013	July 6, 2014
Pre-amplifier	Teseq	LNA6900	--	July 8, 2013	July 7, 2014
Pre-amplifier	Agilent	8447D	83153007374	July 8, 2013	July 7, 2014
Pre-amplifier	Agilent	8449B	3008A01738	July 8, 2013	July 7, 2014
Loop antenna	A.R.A.	PLA-1030 /B	1029	July 8, 2013	July 7, 2014
Ultra Broadband ANT	ROHDE&SCHWARZ	HL562	100157	July 8, 2013	July 7, 2014
Horn Antenna	ETS LINDGREN	3117	--	July 8, 2013	July 7, 2014
Horn Antenna	ETS LINDGREN	3160	--	July 8, 2013	July 7, 2014

13.1.7 Test specification:

Environmental conditions: Temperature 23° C Humidity: 50% Atmospheric pressure: 103kPa

13.1.8 Test result

Pass

A Radiated Emission (9 kHz----30 MHz)

Note: 1) Emission Level=Reading+ Cable loss+ Antenna factor-Amp factor

2) The emission levels are 20 dB below the limit value, which are not reported. It is deemed to comply with the requirement

Result: Pass

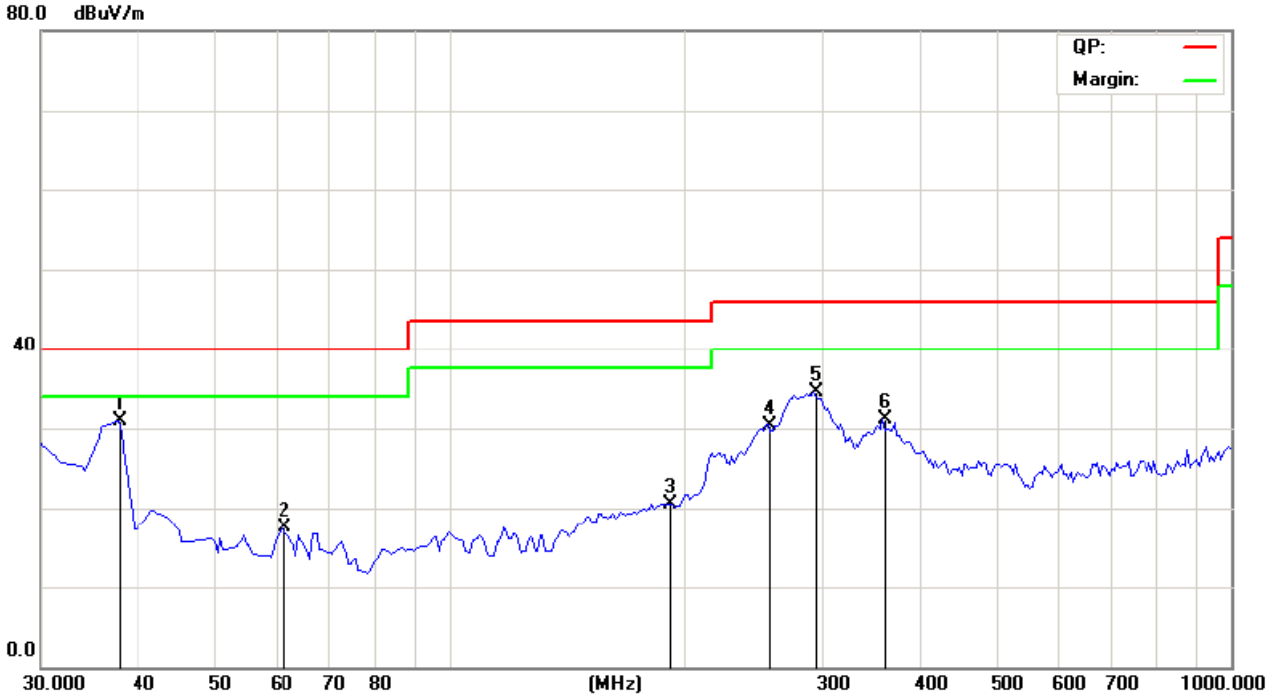
Frequency (MHz)	Level@3m (dBμV/m)	Limit@3m (dBμV/m)
--	--	--
--	--	--
--	--	--
--	--	--

B General Radiated Emissions Data

Radiated Emission In Horizontal (30MHz----1000MHz)

Please refer to following diagram for individual

High channel: 2480 MHz

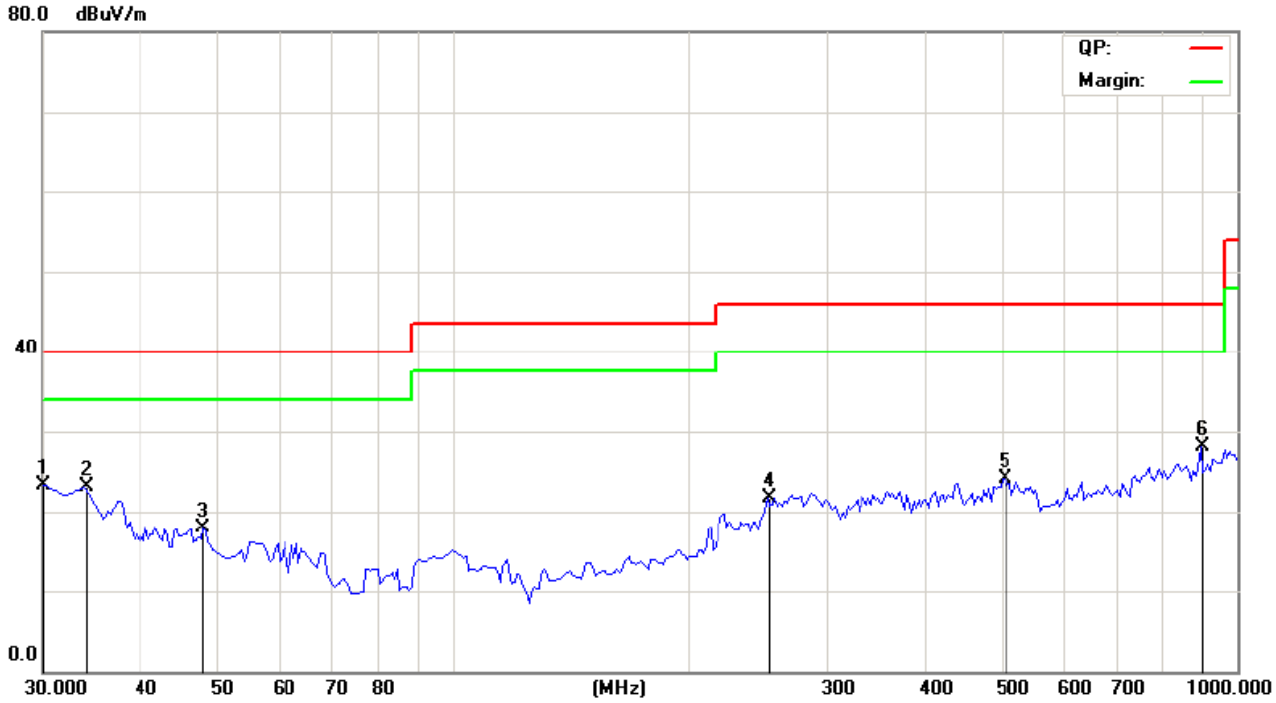


Frequency (MHz)	Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)
37.7754	30.95	H	40.00
61.1022	17.54	H	40.00
191.3427	20.54	H	43.50
257.4350	30.40	H	46.00
292.4248	34.51	H	46.00
360.4607	31.06	H	46.00

Radiated Emission In Vertical (30MHz----1000MHz)

Please refer to following diagram for individual

High channel: 2480 MHz



Frequency (MHz)	Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)
30.0000	23.37	V	40.00
33.8877	23.06	V	40.00
48.0392	17.99	V	40.00
253.5471	21.80	V	46.00
504.3086	24.20	V	46.00
902.8056	28.13	V	46.00

Note: Measurements were conducted in all three channels (high, middle, low), and the worst case (high channel) was submitted only.

C Fundamental & Harmonics Radiated Emission Data (1000MHz-25000MHz)

Pre-tests were made in continuous transmitting mode at lowest (2402 MHz), middle (2441 MHz) and highest (2480MHz) channel with GFSK, Pi/4 QDPSK and 8DPSK mode, which indicates that the worst case is 8DPSK mode, so it is reported GFSK and 8DPSK mode only.

Modulation Type: GFSK

Low channel: 2402 MHz									
Freq. (MHz)	Ant. Pol. H/V	Peak reading (dBuV)	AV reading (dBuV)	Correction Factor (dB)	Emission Level		Peak limit (dBuV/m)	AV limit (dBuV/m)	Margin (dB)
					Peak (dBuV/m)	AV (dBuV/m)			
1303.12	H	51.64	---	-4.20	47.44	---	74	54	-6.56
4804.00	H	50.75	---	-3.94	46.81	---	74	54	-7.19
5600.11	H	49.20	---	-2.83	46.37	---	74	54	-7.63
7206.00	H	45.63	---	0.52	46.15	---	74	54	-7.85
16814.00	H	42.37	---	6.73	49.10	---	74	54	-4.90
24020.00	H	40.58	---	8.11	48.69	---	74	54	-5.31
1304.09	V	52.06	---	-4.25	47.81	---	74	54	-6.19
4804.00	V	50.91	---	-3.94	46.97	---	74	54	-7.03
5604.23	V	50.22	---	-2.87	47.35	---	74	54	-6.65
7206.00	V	45.57	---	0.59	46.16	---	74	54	-7.84
16814.00	V	41.00	---	6.79	47.79	---	74	54	-6.21
24020.00	V	40.50	---	8.18	48.68	---	74	54	-5.32

Notes: 1) Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency.

2) Radiated emissions measured in frequencies above 1GHz were made (Peak values with RBW=VBW=1MHz and PK detector. AV value with RBW=1MHz, VBW=10Hz and PK detector).

3) Average test would be performed if the peak readings were greater than the average limit.

4) Data of measurement shown "---"in the above table mean that the reading of emissions is attenuated more than 20 dB below the limits or the field strength is too small to be measured.

5) Emission Level=Peak (AV) Reading + Correction Factor;

Correction Factor= Antenna Factor + Cable loss – Pre-amplifier

6) Margin (dB) = Emission Level (Peak) (dBuV/m)-Average limit (dBuV/m)

Middle channel: 2441 MHz									
Freq. (MHz)	Ant. Pol. H/V	Peak reading (dBuV)	AV reading (dBuV)	Correction Factor (dB)	Emission Level		Peak limit (dBuV/m)	AV limit (dBuV/m)	Margin (dB)
					Peak (dBuV/m)	AV (dBuV/m)			
1301.67	H	50.92	---	-4.20	46.72	---	74	54	-7.28
4882.00	H	50.13	---	-3.98	46.15	---	74	54	-7.85
5601.01	H	50.82	---	-2.83	47.99	---	74	54	-6.01
7323.00	H	45.62	---	0.56	46.18	---	74	54	-7.82
17087.00	H	40.72	---	6.74	47.46	---	74	54	-6.54
24410.00	H	40.71	---	8.19	48.90	---	74	54	-5.10
1306.45	V	51.6	---	-4.25	47.35	---	74	54	-6.65
4882.00	V	51.56	---	-3.98	47.58	---	74	54	-6.42
5609.33	V	48.61	---	-2.87	45.74	---	74	54	-8.26
7323.00	V	46.28	---	0.57	46.85	---	74	54	-7.15
17087.00	V	42.14	---	6.79	48.93	---	74	54	-5.07
24410.00	V	39.98	---	8.16	48.14	---	74	54	-5.86

Notes: 1) Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency.

2) Radiated emissions measured in frequencies above 1GHz were made (Peak values with RBW=VBW=1MHz and PK detector. AV value with RBW=1MHz, VBW=10Hz and PK detector).

3) Average test would be performed if the peak result were greater than the average limit.

4) Data of measurement shown "---"in the above table mean that the reading of emissions is attenuated more than 20 dB below the limits or the field strength is too small to be measured.

5) Emission Level=Peak (AV) Reading + Correction Factor;

Correction Factor= Antenna Factor + Cable loss – Pre-amplifier

6) Margin (dB) = Emission Level (Peak) (dBuV/m)-Average limit (dBuV/m)

High channel: 2480 MHz									
Freq. (MHz)	Ant. Pol. H/V	Peak reading (dBuV)	AV reading (dBuV)	Correction Factor (dB)	Emission Level		Peak limit (dBuV/m)	AV limit (dBuV/m)	Margin (dB)
					Peak (dBuV/m)	AV (dBuV/m)			
1303.34	H	50.54	---	-4.20	46.34	---	74	54	-7.66
4960.00	H	49.45	---	-3.98	45.47	---	74	54	-8.53
5602.67	H	50.06	---	-2.83	47.23	---	74	54	-6.77
7440.00	H	46.35	---	0.52	46.87	---	74	54	-7.13
17360.00	H	41.66	---	6.74	48.40	---	74	54	-5.60
24800.00	H	40.42	---	8.17	48.59	---	74	54	-5.41
1309.82	V	52.38	---	-4.25	48.13	---	74	54	-5.87
4960.00	V	51.45	---	-3.98	47.47	---	74	54	-6.53
5610.45	V	49.51	---	-2.87	46.64	---	74	54	-7.36
7440.00	V	47.85	---	0.57	48.42	---	74	54	-5.58
17360.00	V	42.86	---	6.79	49.65	---	74	54	-4.35
24800.00	V	39.38	---	8.16	47.54	---	74	54	-6.46

Notes: 1) Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency.

2) Radiated emissions measured in frequencies above 1GHz were made (Peak values with RBW=VBW=1MHz and PK detector. AV value with RBW=1MHz, VBW=10Hz and PK detector).

3) Average test would be performed if the peak result were greater than the average limit.

4) Data of measurement shown "---"in the above table mean that the reading of emissions is attenuated more than 20 dB below the limits or the field strength is too small to be measured.

5) Emission Level=Peak (AV) Reading + Correction Factor;

Correction Factor= Antenna Factor + Cable loss – Pre-amplifier

6) Margin (dB) = Emission Level (Peak) (dBuV/m)-Average limit (dBuV/m)

Modulation Type: 8DPSK

Low channel: 2402 MHz									
Freq. (MHz)	Ant. Pol. H/V	Peak reading (dBuV)	AV reading (dBuV)	Correction Factor (dB)	Emission Level		Peak limit (dBuV/m)	AV limit (dBuV/m)	Margin (dB)
					Peak (dBuV/m)	AV (dBuV/m)			
1305.22	H	51.83	---	-4.20	47.63	---	74	54	-6.37
4804.00	H	51.48	---	-3.94	47.54	---	74	54	-6.46
5606.47	H	49.70	---	-2.83	46.87	---	74	54	-7.13
7206.00	H	46.37	---	0.52	46.89	---	74	54	-7.11
16814.00	H	41.71	---	6.73	48.44	---	74	54	-5.56
24020.00	H	40.31	---	8.11	48.42	---	74	54	-5.58
1310.58	V	50.79	---	-4.25	46.54	---	74	54	-7.46
4804.00	V	51.75	---	-3.94	47.81	---	74	54	-6.19
5609.47	V	52.22	---	-2.87	49.35	---	74	54	-4.65
7206.00	V	46.07	---	0.59	46.66	---	74	54	-7.34
16814.00	V	43.23	---	6.79	50.02	---	74	54	-3.98
24020.00	V	42.00	---	8.18	50.18	---	74	54	-3.82

Notes: 1) Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency.

2) Radiated emissions measured in frequencies above 1GHz were made (Peak values with RBW=VBW=1MHz and PK detector. AV value with RBW=1MHz, VBW=10Hz and PK detector).

3) Average test would be performed if the peak readings were greater than the average limit.

4) Data of measurement shown "---"in the above table mean that the reading of emissions is attenuated more than 20 dB below the limits or the field strength is too small to be measured.

5) Emission Level=Peak (AV) Reading + Correction Factor;

Correction Factor= Antenna Factor + Cable loss – Pre-amplifier

6) Margin (dB) = Emission Level (Peak) (dBuV/m)-Average limit (dBuV/m)

Middle channel: 2441 MHz									
Freq. (MHz)	Ant. Pol. H/V	Peak reading (dBuV)	AV reading (dBuV)	Correction Factor (dB)	Emission Level		Peak limit (dBuV/m)	AV limit (dBuV/m)	Margin (dB)
					Peak (dBuV/m)	AV (dBuV/m)			
1302.56	H	51.51	---	-4.20	47.31	---	74	54	-6.69
4882.00	H	50.65	---	-3.98	46.67	---	74	54	-7.33
5609.34	H	51.08	---	-2.83	48.25	---	74	54	-5.75
7323.00	H	46.07	---	0.56	46.63	---	74	54	-7.37
17087.00	H	42.22	---	6.74	48.96	---	74	54	-5.04
24410.00	H	39.88	---	8.19	48.07	---	74	54	-5.93
1307.34	V	51.98	---	-4.25	47.73	---	74	54	-6.27
4882.00	V	50.33	---	-3.98	46.35	---	74	54	-7.65
5608.90	V	49.79	---	-2.87	46.92	---	74	54	-7.08
7323.00	V	45.52	---	0.57	46.09	---	74	54	-7.91
17087.00	V	43.24	---	6.79	50.03	---	74	54	-3.97
24410.00	V	40.26	---	8.16	48.42	---	74	54	-5.58

Notes: 1) Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency.

2) Radiated emissions measured in frequencies above 1GHz were made (Peak values with RBW=VBW=1MHz and PK detector. AV value with RBW=1MHz, VBW=10Hz and PK detector).

3) Average test would be performed if the peak result were greater than the average limit.

4) Data of measurement shown "---"in the above table mean that the reading of emissions is attenuated more than 20 dB below the limits or the field strength is too small to be measured.

5) Emission Level=Peak (AV) Reading + Correction Factor;

Correction Factor= Antenna Factor + Cable loss – Pre-amplifier

6) Margin (dB) = Emission Level (Peak) (dBuV/m)-Average limit (dBuV/m)

High channel: 2480 MHz									
Freq. (MHz)	Ant. Pol. H/V	Peak reading (dBuV)	AV reading (dBuV)	Correction Factor (dB)	Emission Level		Peak limit (dBuV/m)	AV limit (dBuV/m)	Margin (dB)
					Peak (dBuV/m)	AV (dBuV/m)			
1305.47	H	52.12	---	-4.20	47.92	---	74	54	-6.08
4960.00	H	51.37	---	-3.98	47.39	---	74	54	-6.61
5606.23	H	49.58	---	-2.83	46.75	---	74	54	-7.25
7440.00	H	47.52	---	0.52	48.04	---	74	54	-5.96
17360.00	H	40.73	---	6.74	47.47	---	74	54	-6.53
24800.00	H	39.62	---	8.17	47.79	---	74	54	-6.21
1309.66	V	51.49	---	-4.25	47.24	---	74	54	-6.76
4960.00	V	51.24	---	-3.98	47.26	---	74	54	-6.74
5620.07	V	49.50	---	-2.87	46.63	---	74	54	-7.37
7440.00	V	48.11	---	0.57	48.68	---	74	54	-5.32
17360.00	V	40.71	---	6.79	47.50	---	74	54	-6.50
24800.00	V	40.85	---	8.16	49.01	---	74	54	-4.99

Notes: 1) Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency.

2) Radiated emissions measured in frequencies above 1GHz were made (Peak values with RBW=VBW=1MHz and PK detector. AV value with RBW=1MHz, VBW=10Hz and PK detector).

3) Average test would be performed if the peak result were greater than the average limit.

4) Data of measurement shown "---"in the above table mean that the reading of emissions is attenuated more than 20 dB below the limits or the field strength is too small to be measured.

5) Emission Level=Peak (AV) Reading + Correction Factor;

Correction Factor= Antenna Factor + Cable loss – Pre-amplifier

6) Margin (dB) = Emission Level (Peak) (dBuV/m)-Average limit (dBuV/m)

14.0 Antenna Requirement

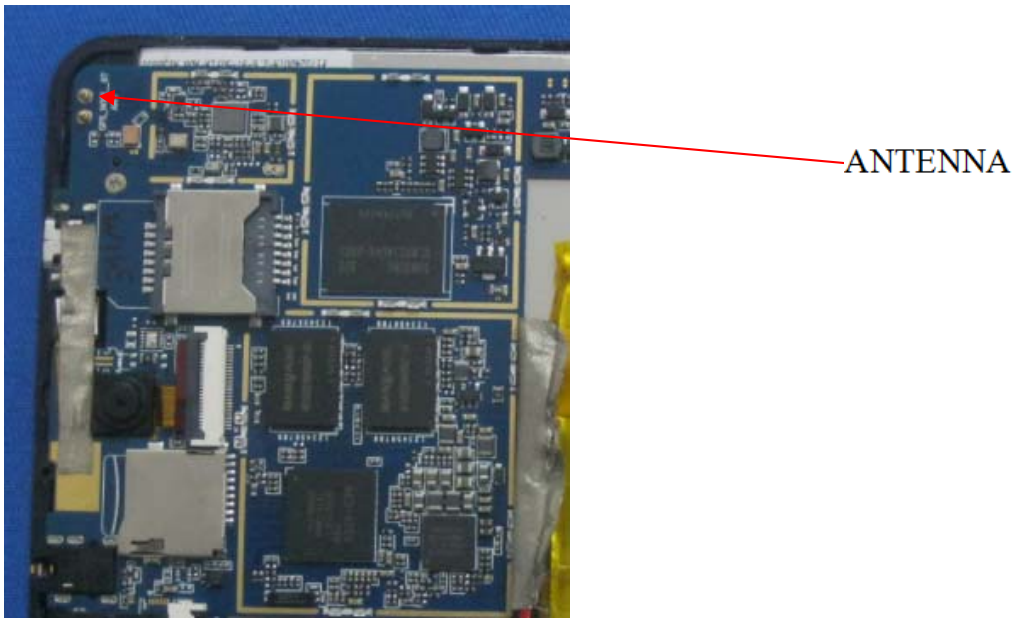
14.1 Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to FCC 47 CFR Section 15.247 (b), if transmitter antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the mount in dB that the directional gain of the antenna exceeds 6 dBi.

14.2 Antenna Specification

According to the manufacturer declared, the EUT has a PCB antenna; the directional gain of antenna is 0 dBi, and no consideration of replacement. Therefore the EUT is considered sufficient to comply with the provision.



END OF REPORT