APPLICATION CERTIFICATION
On Behalf of
Shenzhen MinDe Electronics Technology Ltd.

Barcode Scanner
Model No.: MS3590, MS35XX(XX stand for 00-99, AA-ZZ)

FCC ID: 2AASG-MS3590

Prepared for	:	Shenzhen MinDe Electronics Technology Ltd.
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Prepared by	:	ACCURATE TECHNOLOGY CO. LTD
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Report Number	:	ATE20140803
Date of Test	:	May 16-July 18,2014
Date of Report	:	July 21,2014

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Test Report Certification

Applicant	:	Shenzhen MinDe Electronics Technology Ltd.
Manufacturer	:	Shenzhen MinDe Electronics Technology Ltd.
EUT Description	:	Barcode Scanner

(A) MODEL NO.: MS3590, MS35XX(XX stand for 00-99, AA-ZZ)

(B) POWER SUPPLY: DC 3.7V (Battery) & DC 5V(USB Port)

(C) Measurement Procedure Used:

FCC Rules and Regulations Part 15 Subpart C Section 15.247
ANSI C63.4- 2009

The device described above is tested by ACCURATE TECHNOLOGY CO. LTD to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C Section 15.247 limits. The measurement results are contained in this test report and ACCURATE TECHNOLOGY CO. LTD is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the Equipment Under Test (EUT) is to be technically compliant with the FCC requirements.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of ACCURATE TECHNOLOGY CO. LTD.

Date of Test : May 16-July 18,2014

Prepared by :

(Engineer)

Approved & Authorized Signer :

(Manager)

1. GENERAL INFORMATION

1.1.Description of Device (EUT)

EUT	:	Barcode Scanner
Model Number	:	MS3590, MS35XX(XX stand for 00-99, AA-ZZ) (Note: These samples are same except for the model number are different. So we prepare the MS3590 for test.)
Frequency Band	:	2402MHz-2480MHz
Number of Channels	:	79
Bluetooth Version	:	2.1+EDR
Modulation type	:	GFSK, Π/4-DQPSK, 8DPSK
Antenna Gain	:	0dBi
Antenna type	:	wire Antenna
Power Supply	:	DC 3.7V(Battery)&DC 5V(USB Port)
Applicant	:	Shenzhen MinDe Electronics Technology Ltd.
Address	:	5th Floor, Section 1,25th Block,No.5,Keji Xi Road,Keji Yuan, Nanshan District, Shenzhen, P.R. China
Manufacturer	:	Shenzhen MinDe Electronics Technology Ltd.
Address	:	5th Floor, Section 1,25th Block,No.5,Keji Xi Road,Keji Yuan, Nanshan District, Shenzhen, P.R. China
Date of sample received	:	May 16, 2014
Date of Test	:	May 16-July 18,2014

1.2.Description of Test Facility

EMC Lab	:	Accredited by TUV Rheinland Shenzhen Listed by FCC The Registration Number is 752051 Listed by Industry Canada The Registration Number is 5077A-2 Accredited by China National Accreditation Committee for Laboratories The Certificate Registration Number is L3193
Name of Firm	:	ACCURATE TECHNOLOGY CO. LTD
Site Location	:	F1, Bldg. A, Changyuan New Material Port, Keyuan Rd. Science & Industry Park, Nanshan, Shenzhen, Guangdong P.R. China

1.3.Measurement Uncertainty

Conducted Emission Expanded Uncertainty	=	2.23dB, k=2
Radiated emission expanded uncertainty (9kHz-30MHz)	=	3.08dB, k=2
Radiated emission expanded uncertainty (30MHz-1000MHz)	=	4.42dB, k=2
Radiated emission expanded uncertainty (Above 1GHz)	=	4.06dB, k=2

2. MEASURING DEVICE AND TEST EQUIPMENT

Table 1: List of Test and Measurement Equipment

Kind of equipment	Manufacturer	Type	S/N	Calibrated dates	Calibrated until
EMI Test Receiver	Rohde&Schwarz	ESCS30	100307	Jan. 11, 2014	Jan. 10, 2015
EMI Test Receiver	Rohde&Schwarz	ESPI3	101526/003	Jan. 11, 2014	Jan. 10, 2015
Spectrum Analyzer	Agilent	E7405A	MY45115511	Jan. 11, 2014	Jan. 10, 2015
Pre-Amplifier	Rohde&Schwarz	CBLU1183540-01	3791	Jan. 11, 2014	Jan. 10, 2015
Loop Antenna	Schwarzbeck	FMZB1516	1516131	Jan. 15, 2014	Jan. 14, 2015
Bilog Antenna	Schwarzbeck	VULB9163	9163-323	Jan. 15, 2014	Jan. 14, 2015
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-655	Jan. 15, 2014	Jan. 14, 2015
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1067	Jan. 15, 2014	Jan. 14, 2015
LISN	Rohde&Schwarz	ESH3-Z5	100305	Jan. 11, 2014	Jan. 10, 2015
LISN	Schwarzbeck	NSLK8126	8126431	Jan. 11, 2014	Jan. 10, 2015

3. OPERATION OF EUT DURING TESTING

3.1.Operating Mode

The mode is used: Transmitting mode
Low Channel: 2402MHz
Middle Channel: 2441MHz
High Channel: 2480MHz
Hopping

3.2.Configuration and peripherals

EUT

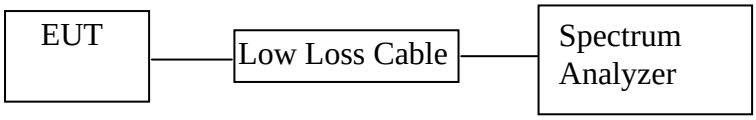
(EUT: Barcode Scanner)

4. TEST PROCEDURES AND RESULTS

FCC Rules	**Description of Test**	**Result**
Section 15.207	Conducted Emission Test	Compliant
Section 15.247(a)(1)	20dB Bandwidth Test	Compliant
Section 15.247(a)(1)	Carrier Frequency Separation Test	Compliant
Section 15.247(a)(1)(iii)	Number Of Hopping Frequency Test	Compliant
Section 15.247(a)(1)(iii)	Dwell Time Test	Compliant
Section 15.247(b)(1)	Maximum Peak Output Power Test	Compliant
Section 15.247(d) Section 15.209	Radiated Emission Test	Compliant
Section 15.247(d)	Band Edge Compliance Test	Compliant
Section 15.203	Antenna Requirement	Compliant

5. 20DB BANDWIDTH TEST

5.1.Block Diagram of Test Setup



(EUT: Barcode Scanner)

5.2.The Requirement For Section 15.247(a)(1)

Section 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.

5.3.EUT Configuration on Measurement

The equipment are installed on the emission measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

5.4.Operating Condition of EUT

5.4.1.Setup the EUT and simulator as shown as Section 5.1.

5.4.2.Turn on the power of all equipment.

5.4.3.Let the EUT work in TX (Hopping off) modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2441MHz, and 2480MHz TX frequency to transmit.

5.5.Test Procedure

5.5.1.The transmitter output was connected to the spectrum analyzer through a low loss cable.

5.5.2.Set RBW of spectrum analyzer to 30 kHz and VBW to 100 kHz.

5.5.3.The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

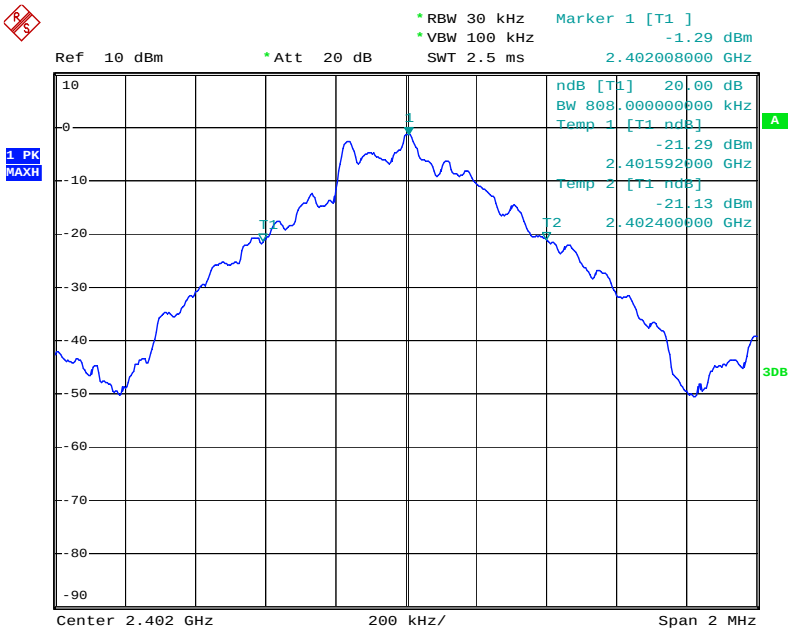
5.6.Test Result

Channel	Frequency (MHz)	GFSK 20dB Bandwidth (MHz)	Π/4-DQPSK 20dB Bandwidth (MHz)	8DPSK 20dB Bandwidth (MHz)	Result
Low	2402	0.808	1.228	1.152	Pass
Middle	2441	0.808	1.224	1.152	Pass
High	2480	0.844	1.224	1.148	Pass

The spectrum analyzer plots are attached as below.

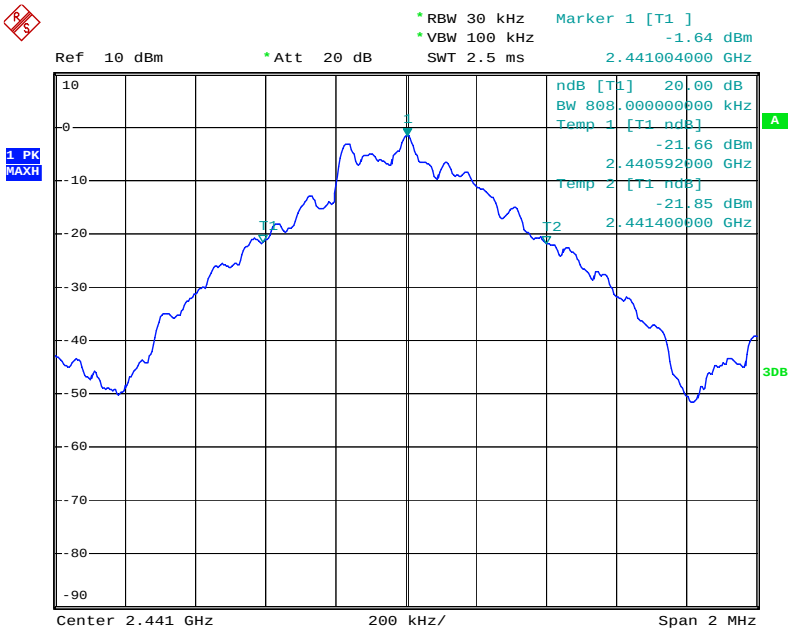
GFSK Mode

Low channel



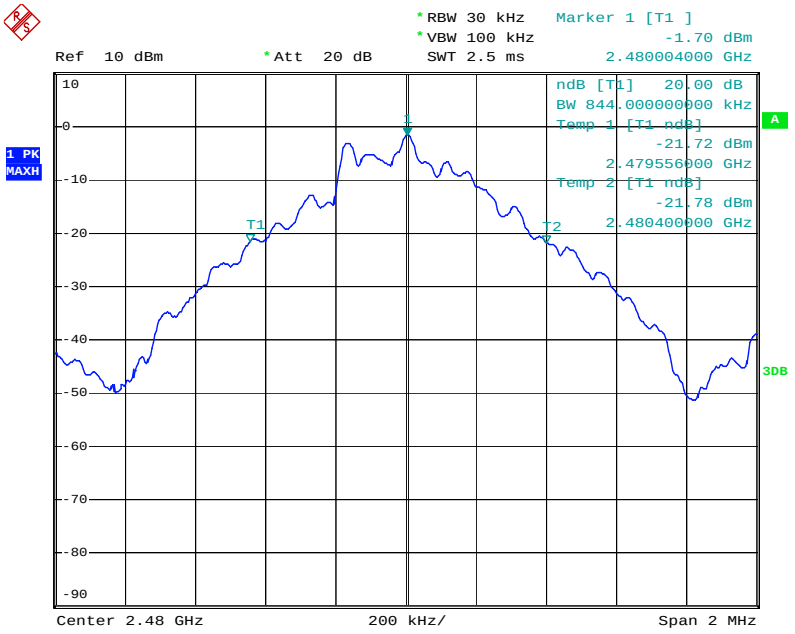
Date: 30.MAY.2014 14:29:42

Middle channel



Date: 30.MAY.2014 14:30:32

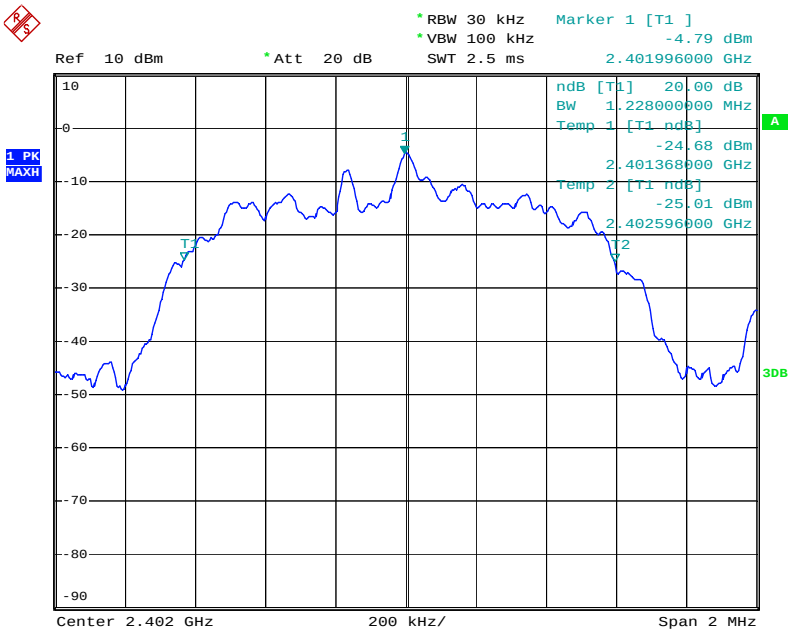
High channel



Date: 30.MAY.2014 14:28:54

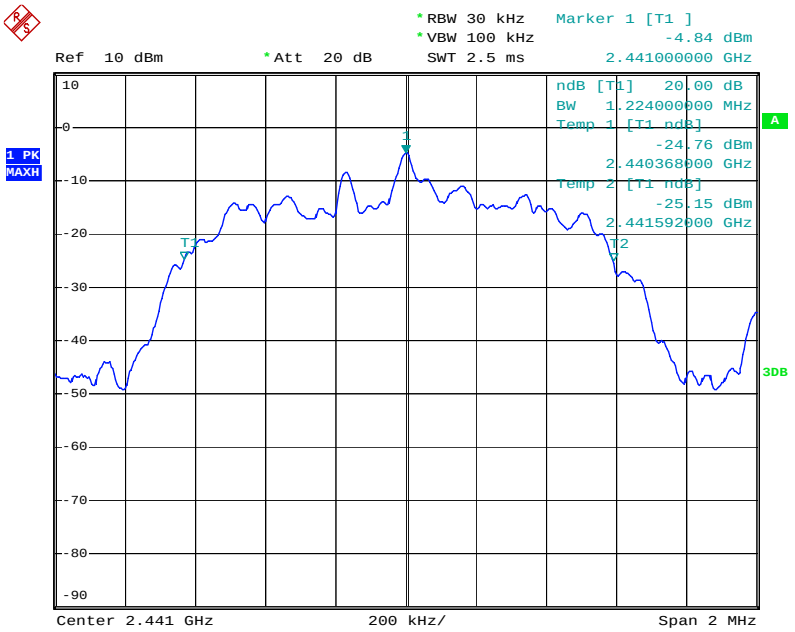
Π/4-DQPSK Mode

Low channel



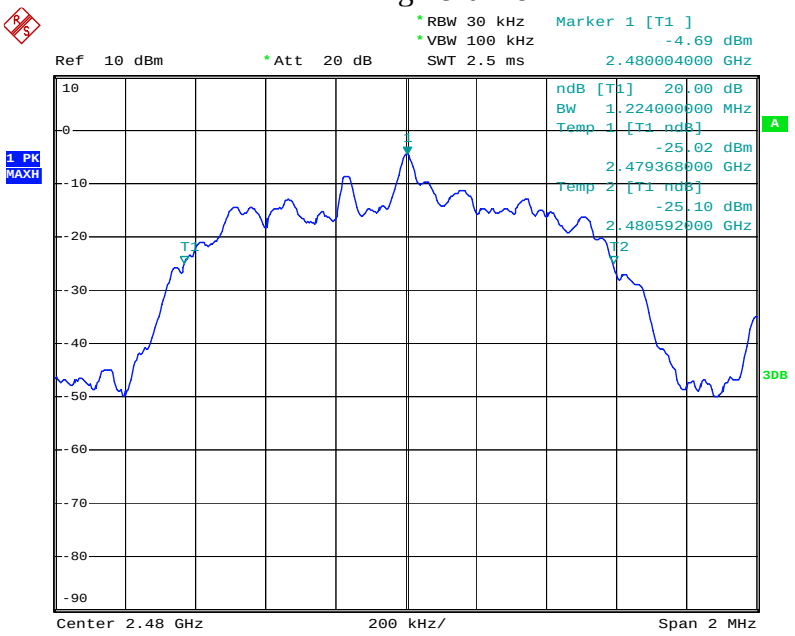
Date: 30.MAY.2014 15:34:24

Middle channel



Date: 30.MAY.2014 15:46:46

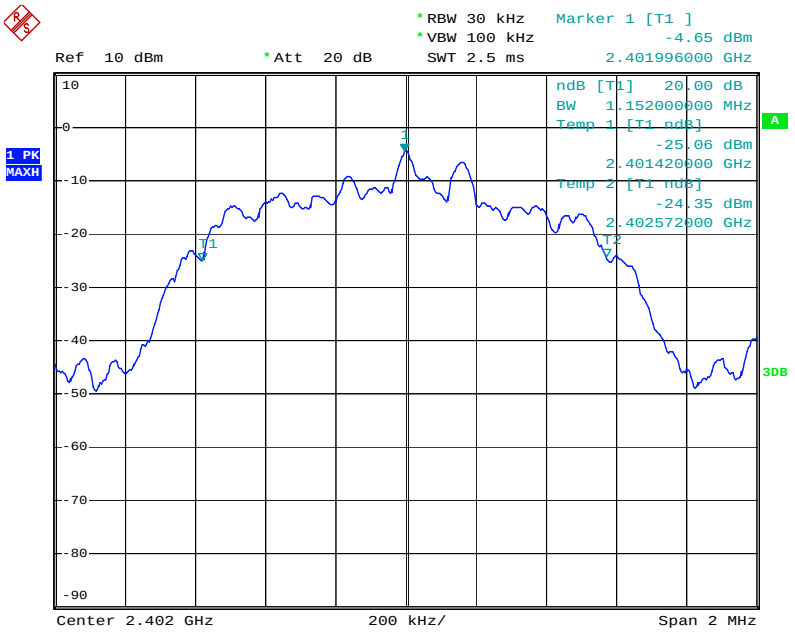
High channel



Date: 30.MAY.2014 15:47:21

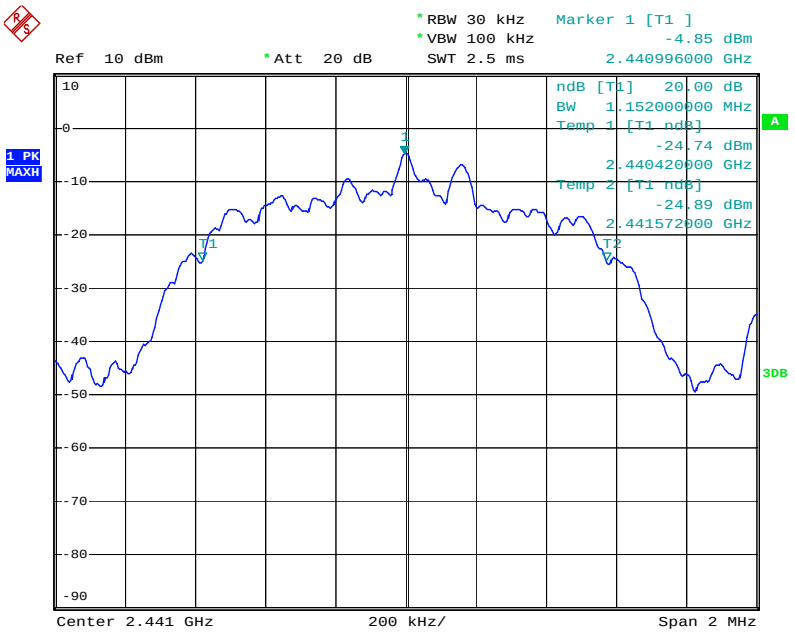
8DPSK Mode

Low channel



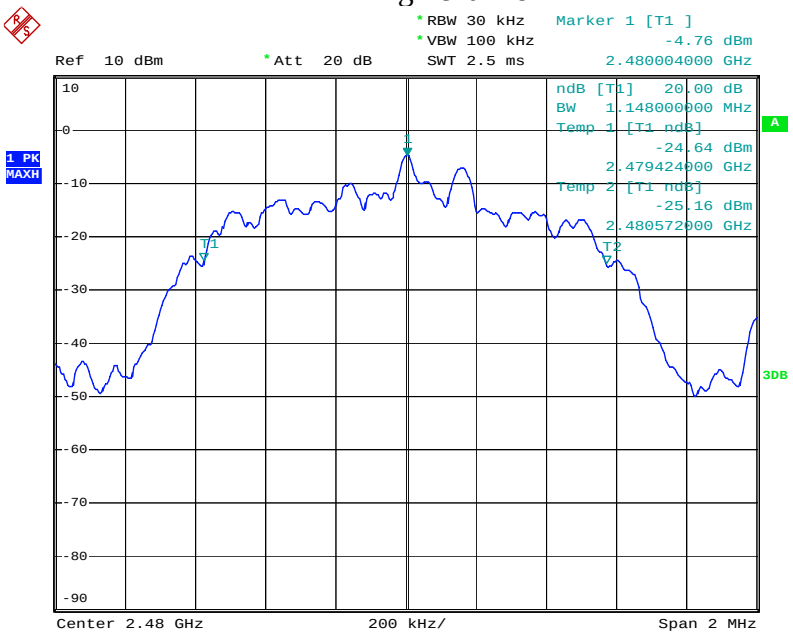
Date: 30.MAY.2014 16:14:45

Middle channel



Date: 30.MAY.2014 16:14:13

High channel



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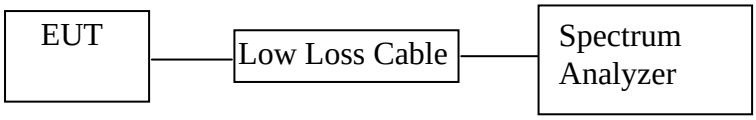
6. CARRIER FREQUENCY SEPARATION TEST

6.1.Block Diagram of Test Setup



(EUT: Barcode Scanner)

6.2.The Requirement For Section 15.247(a)(1)

Section 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. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudorandomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

6.3.EUT Configuration on Measurement

The equipment are installed on the emission measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

6.4.Operating Condition of EUT

6.4.1.Setup the EUT and simulator as shown as Section 6.1.

6.4.2.Turn on the power of all equipment.

6.4.3.Let the EUT work in TX (Hopping on) modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2441MHz, and 2480MHz TX frequency to transmit.

6.5.Test Procedure

6.5.1.The transmitter output was connected to the spectrum analyzer through a low loss cable.

6.5.2.Set RBW of spectrum analyzer to 100 kHz and VBW to 300 kHz. Adjust Span to 3 MHz.

6.5.3.Set the adjacent channel of the EUT maxhold another trace.

6.5.4.Measurement the channel separation

6.6.Test Result

GFSK

Channel	Frequency (MHz)	Channel Separation(MHz)	Limit (MHz)	Result
Low	2402	1.000	25KHz or 20dB bandwidth	PASS
	2403			
Middle	2440	1.000	25KHz or20dB bandwidth	PASS
	2441			
High	2479	1.000	25KHz or 20dB bandwidth	PASS
	2480			

Π/4-DQPSK

Channel	Frequency (MHz)	Channel Separation(MHz)	Limit (MHz)	Result
Low	2402	1.010	25KHz or 2/3*20dB bandwidth	PASS
	2403			
Middle	2440	1.002	25KHz or 2/3*20dB bandwidth	PASS
	2441			
High	2479	1.002	25KHz or 2/3*20dB bandwidth	PASS
	2480			

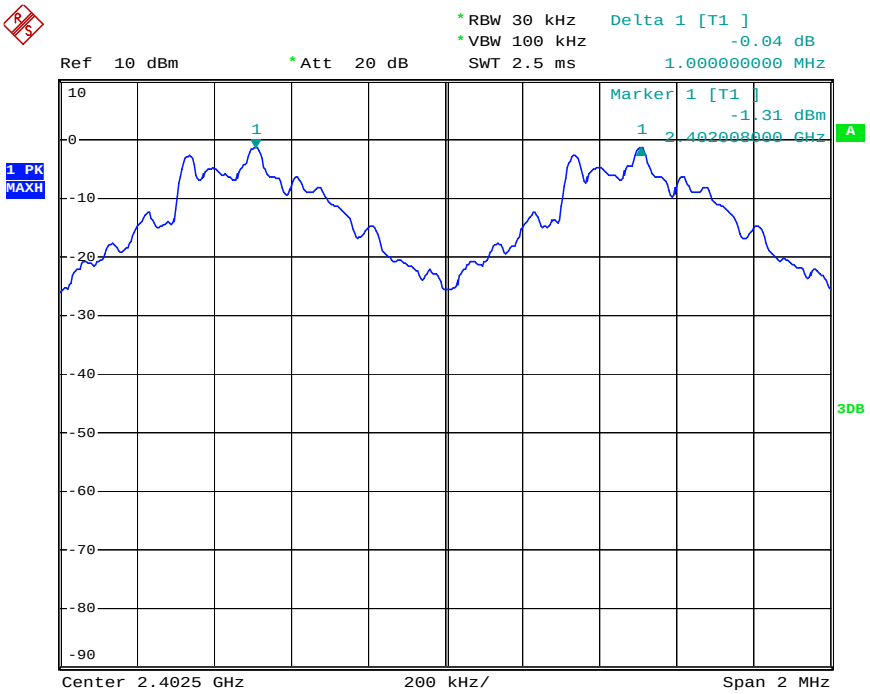
8DPSK

Channel	Frequency (MHz)	Channel Separation(MHz)	Limit (MHz)	Result
Low	2402	1.000	25KHz or 2/3*20dB bandwidth	PASS
	2403			
Middle	2440	1.002	25KHz or 2/3*20dB bandwidth	PASS
	2441			
High	2479	1.002	25KHz or 2/3*20dB bandwidth	PASS
	2480			

The spectrum analyzer plots are attached as below.

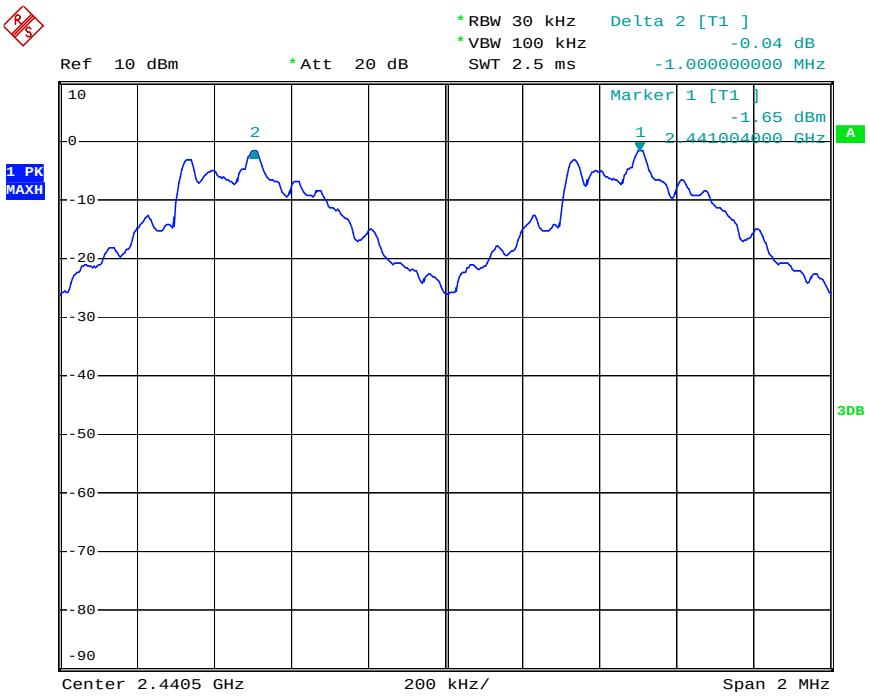
GFSK Mode

Low channel



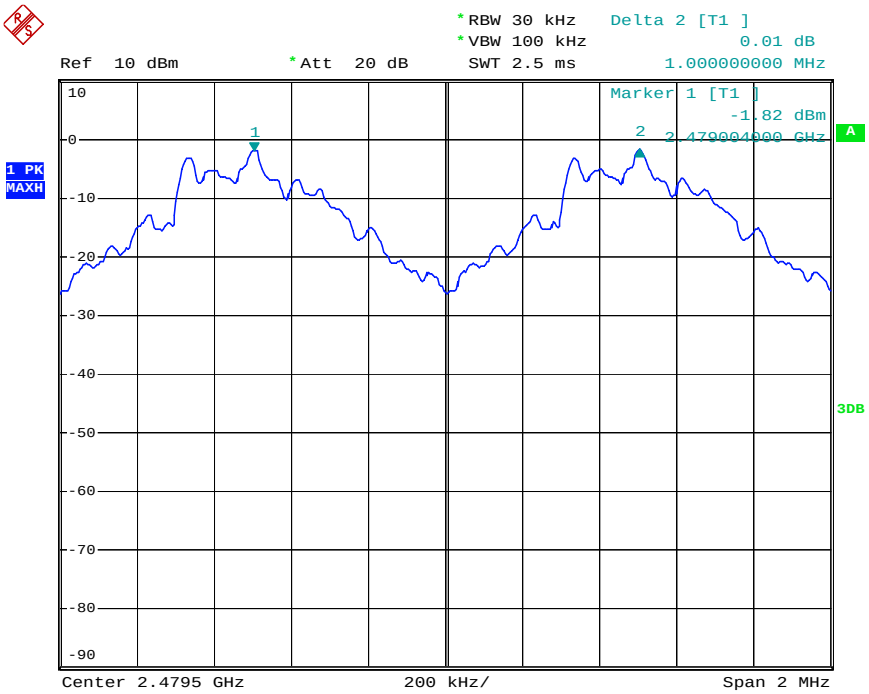
Date: 30.MAY.2014 14:34:48

Middle channel



Date: 30.MAY.2014 14:32:44

High channel



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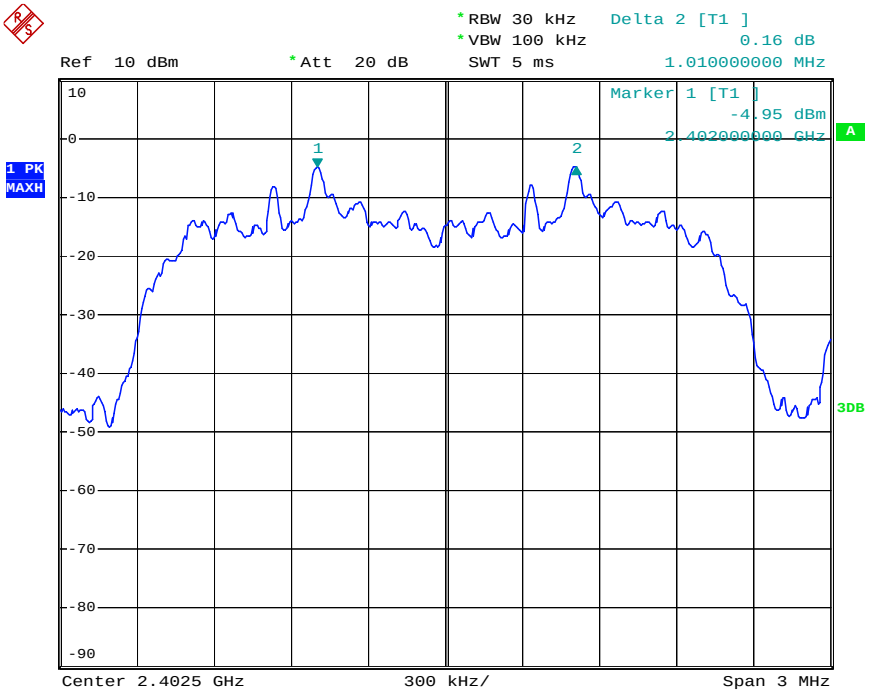
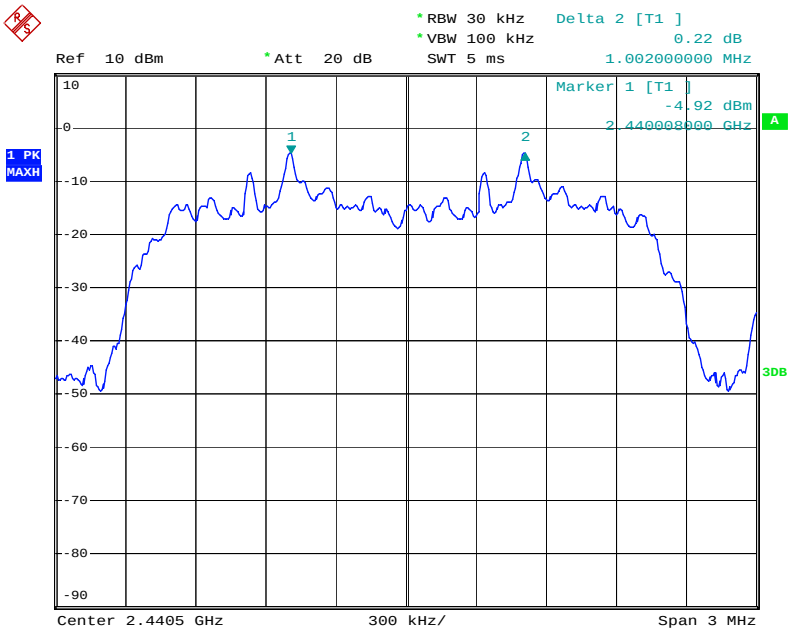
Π/4-DQPSK Mode

Low channel



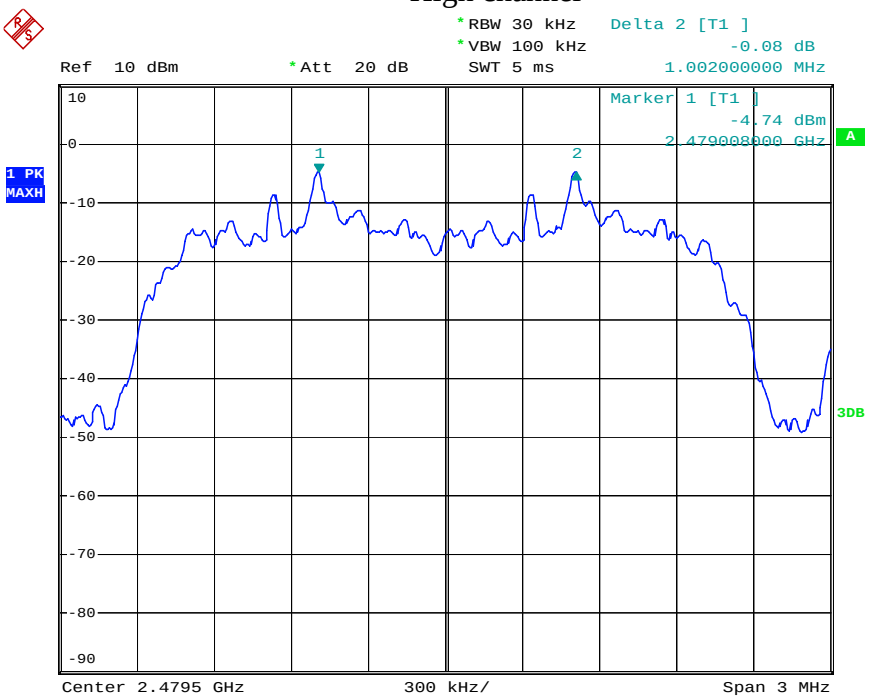
Date: 30.MAY.2014 15:41:03

Middle channel



Date: 30.MAY.2014 15:42:20

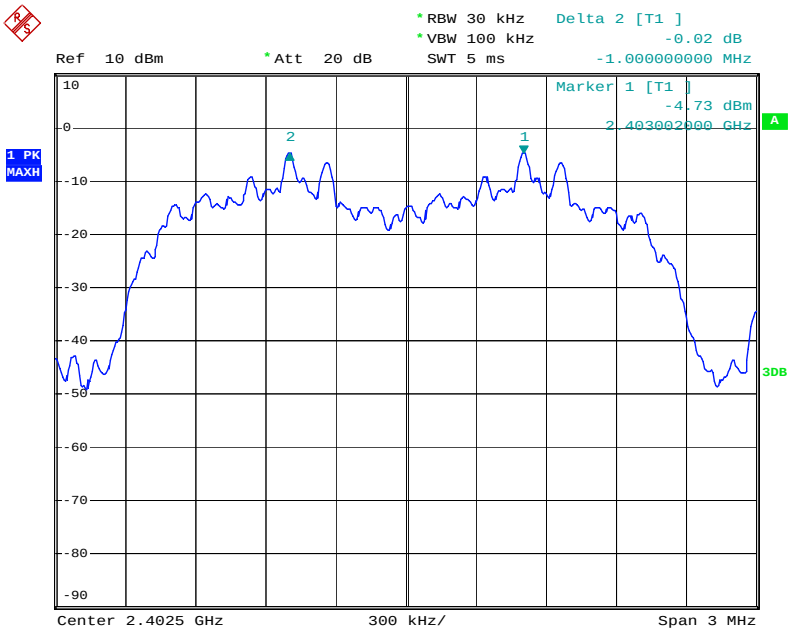
High channel



Date: 30.MAY.2014 15:44:11

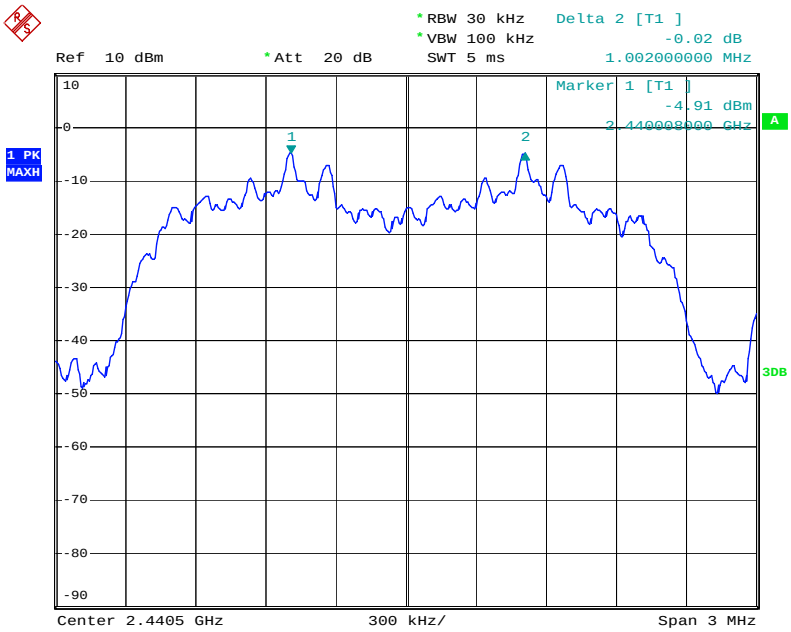
8DPSK Mode

Low channel



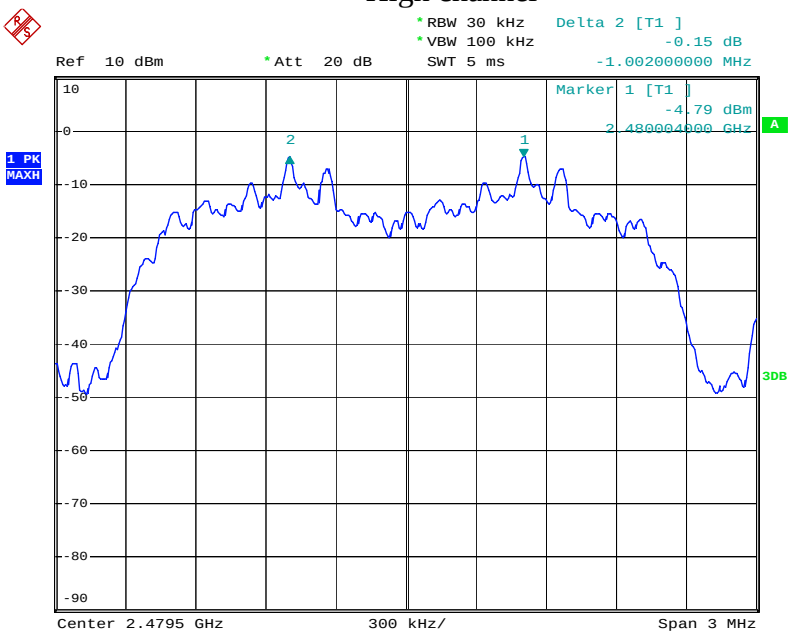
Date: 30.MAY.2014 16:17:47

Middle channel



Date: 30.MAY.2014 16:16:51

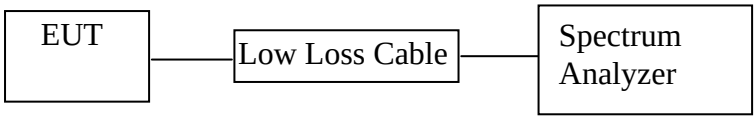
High channel



Date: 30.MAY.2014 16:16:06

7. NUMBER OF HOPPING FREQUENCY TEST

7.1.Block Diagram of Test Setup



(EUT: Barcode Scanner)

7.2.The Requirement For Section 15.247(a)(1)(iii)

Section 15.247(a)(1)(iii): Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

7.3.EUT Configuration on Measurement

The equipment are installed on the emission measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

7.4.Operating Condition of EUT

7.4.1.Setup the EUT and simulator as shown as Section 7.1.

7.4.2.Turn on the power of all equipment.

7.4.3.Let the EUT work in TX (Hopping on) modes measure it.

7.5.Test Procedure

7.5.1.The transmitter output was connected to the spectrum analyzer through a low loss cable.

7.5.2.Set the spectrum analyzer as Span=83.5MHz, RBW=100 kHz, VBW=300 kHz.

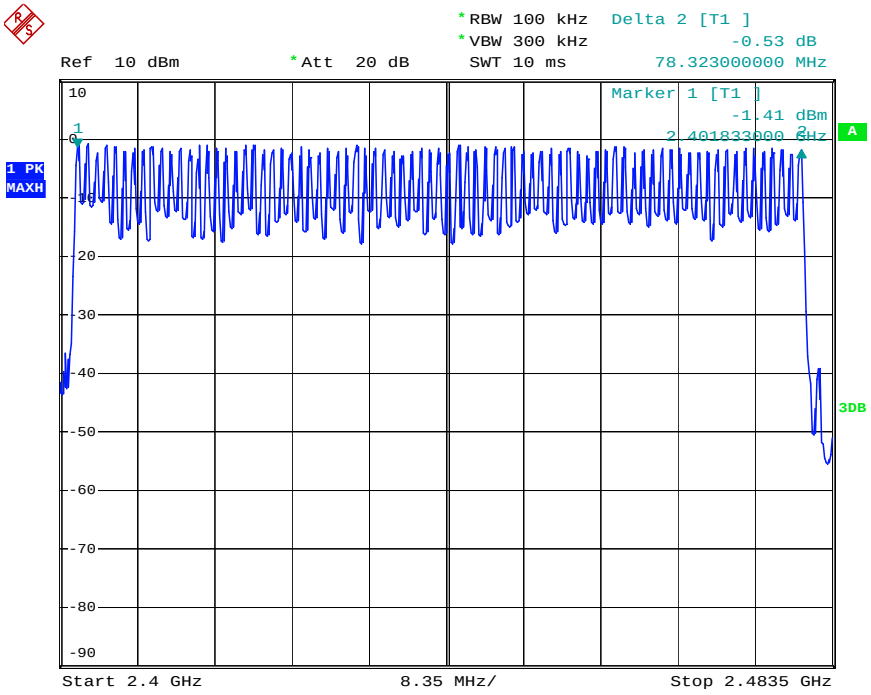
7.5.3.Max hold, view and count how many channel in the band.

7.6.Test Result

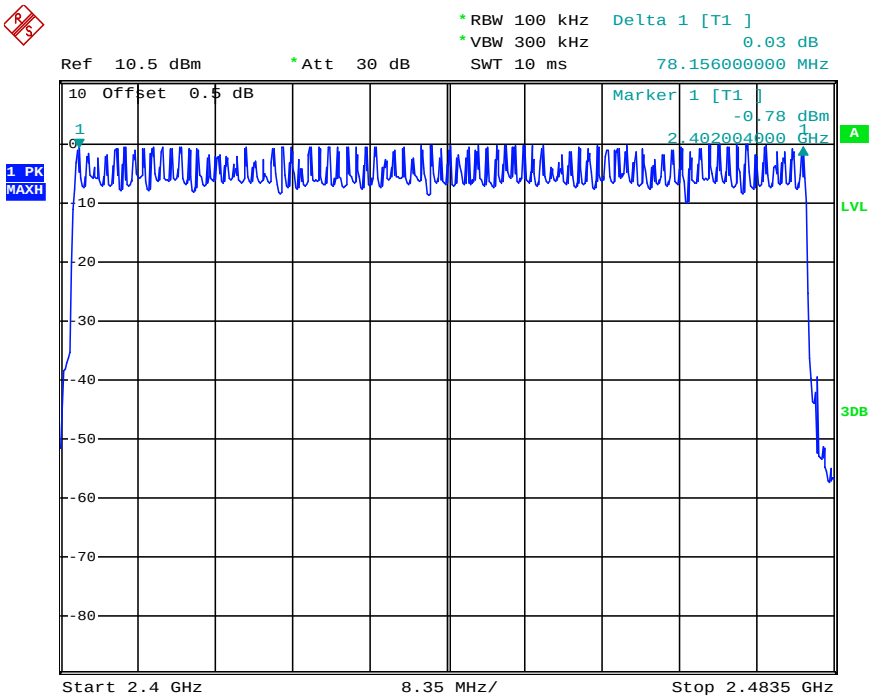
Total number of hopping channel	Measurement result(CH)	Limit(CH)
	79	⩾15

The spectrum analyzer plots are attached as below.

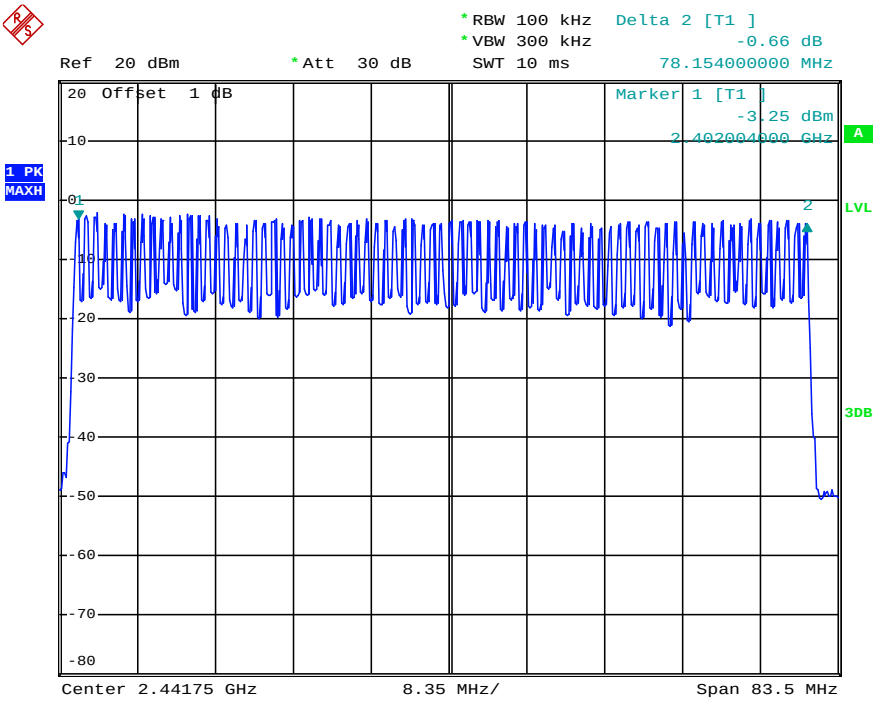
Number of hopping channels(GFSK)



Number of hopping channels(Π/4-DQPSK)

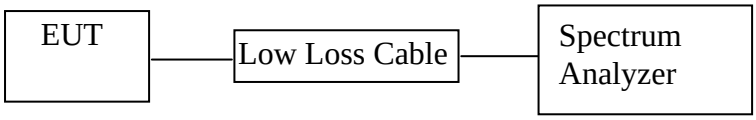


Number of hopping channels(8DPSK)



8. DWELL TIME TEST

8.1.Block Diagram of Test Setup



(EUT: Barcode Scanner)

8.2.The Requirement For Section 15.247(a)(1)(iii)

Section 15.247(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. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

8.3.EUT Configuration on Measurement

The equipment are installed on the emission measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

8.4.Operating Condition of EUT

8.4.1.Setup the EUT and simulator as shown as Section 8.1.

8.4.2.Turn on the power of all equipment.

8.4.3.Let the EUT work in TX (Hopping on) modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2441MHz, and 2480MHz TX frequency to transmit.

8.5.Test Procedure

8.5.1.The transmitter output was connected to the spectrum analyzer through a low loss cable.

8.5.2.Set center frequency of spectrum analyzer = operating frequency.

8.5.3.Set the spectrum analyzer as RBW=100 kHz, VBW=300 kHz, Span=0Hz, Adjust Sweep=1s. Get the burst (in 1 sec.).

8.5.4.Set the spectrum analyzer as RBW=1MHz, VBW=3MHz, Span=0Hz, Adjust Sweep=2ms. Get the pulse time.

8.5.5.Repeat above procedures until all frequency measured were complete.

8.6.Test Result

GFSK Mode

Mode	Channel Frequency (MHz)	Pulse Time (ms)	Dwell Time (ms)	Limit (ms)
DH1	2402	0.530	169.60	400
	2441	0.530	169.60	400
	2480	0.530	169.60	400
A period transmit time = 0.4 × 79 = 31.6 Dwell time = pulse time × (1600/(2*79))×31.6				
DH3	2402	1.650	264.00	400
	2441	1.800	288.00	400
	2480	1.790	286.40	400
A period transmit time = 0.4 × 79 = 31.6 Dwell time = pulse time × (1600/(4*79))×31.6				
DH5	2402	3.070	327.47	400
	2441	3.070	327.47	400
	2480	3.070	327.47	400
A period transmit time = 0.4 × 79 = 31.6 Dwell time = pulse time × (1600/(6*79))×31.6				

Π/4-DQPSK

Mode	Channel Frequency (MHz)	Pulse Time (ms)	Dwell Time (ms)	Limit (ms)
DH1	2402	0.545	174.40	400
	2441	0.545	174.40	400
	2480	0.545	174.40	400
A period transmit time = 0.4 × 79 = 31.6 Dwell time = pulse time × (1600/(2*79))×31.6				
DH3	2402	1.315	210.40	400
	2441	1.325	212.00	400
	2480	1.325	212.00	400
A period transmit time = 0.4 × 79 = 31.6 Dwell time = pulse time × (1600/(4*79))×31.6				
DH5	2402	3.495	372.80	400
	2441	3.075	328.00	400
	2480	3.075	328.00	400
A period transmit time = 0.4 × 79 = 31.6 Dwell time = pulse time × (1600/(6*79))×31.6				

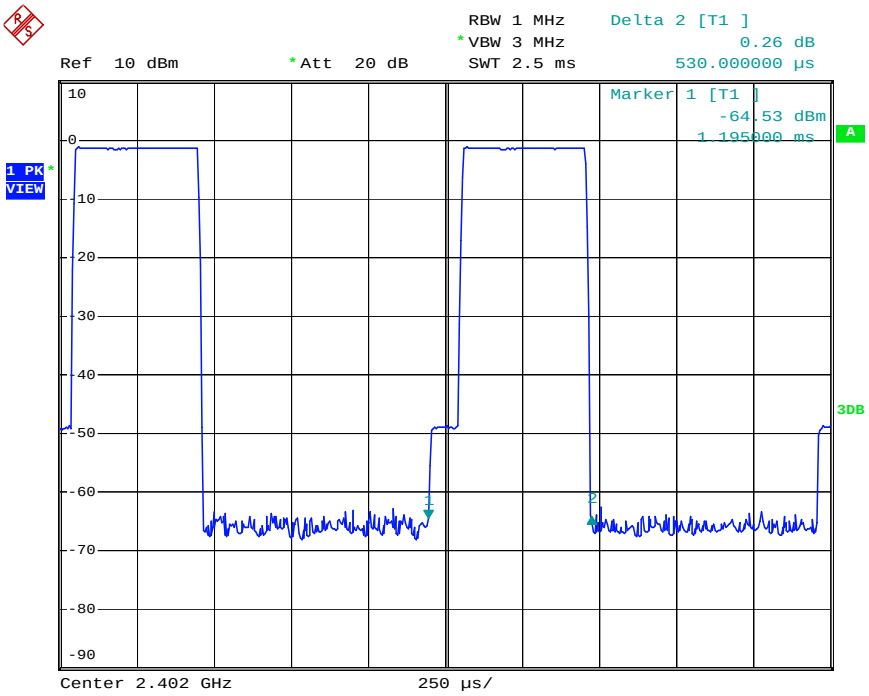
8DPSK Mode

Mode	Channel Frequency (MHz)	Pulse Time (ms)	Dwell Time (ms)	Limit (ms)
DH1	2402	0.540	172.80	400
	2441	0.540	172.80	400
	2480	0.545	174.40	400
A period transmit time = 0.4 × 79 = 31.6 Dwell time = pulse time × (1600/(2*79))×31.6				
DH3	2402	1.890	302.40	400
	2441	1.815	290.40	400
	2480	1.805	288.80	400
A period transmit time = 0.4 × 79 = 31.6 Dwell time = pulse time × (1600/(4*79))×31.6				
DH5	2402	3.075	328.00	400
	2441	3.095	330.13	400
	2480	3.080	328.53	400
A period transmit time = 0.4 × 79 = 31.6 Dwell time = pulse time × (1600/(6*79))×31.6				

The spectrum analyzer plots are attached as below.

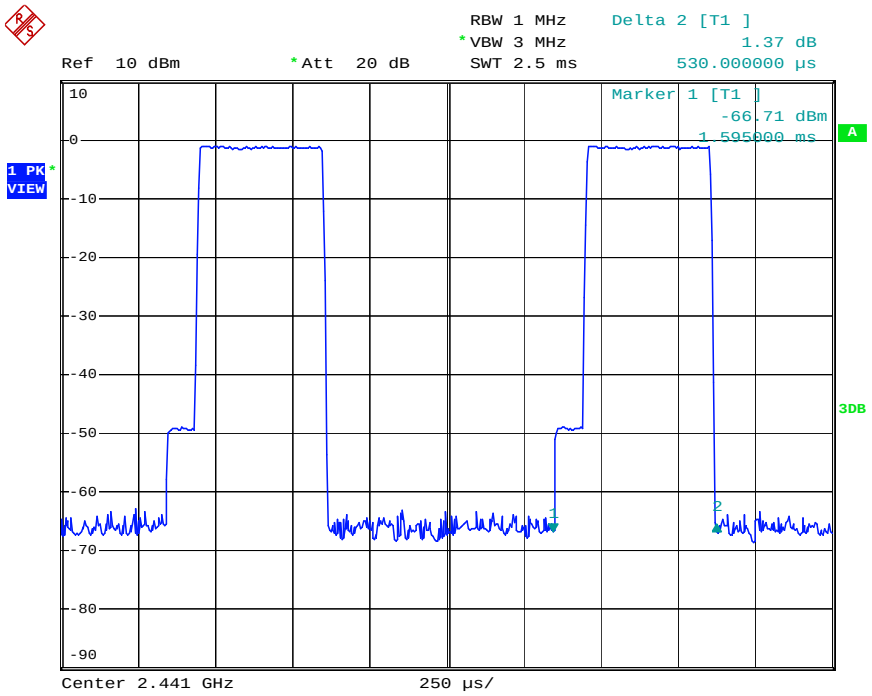
Mode 1: GFSK Link Mode

DH1 Low channel



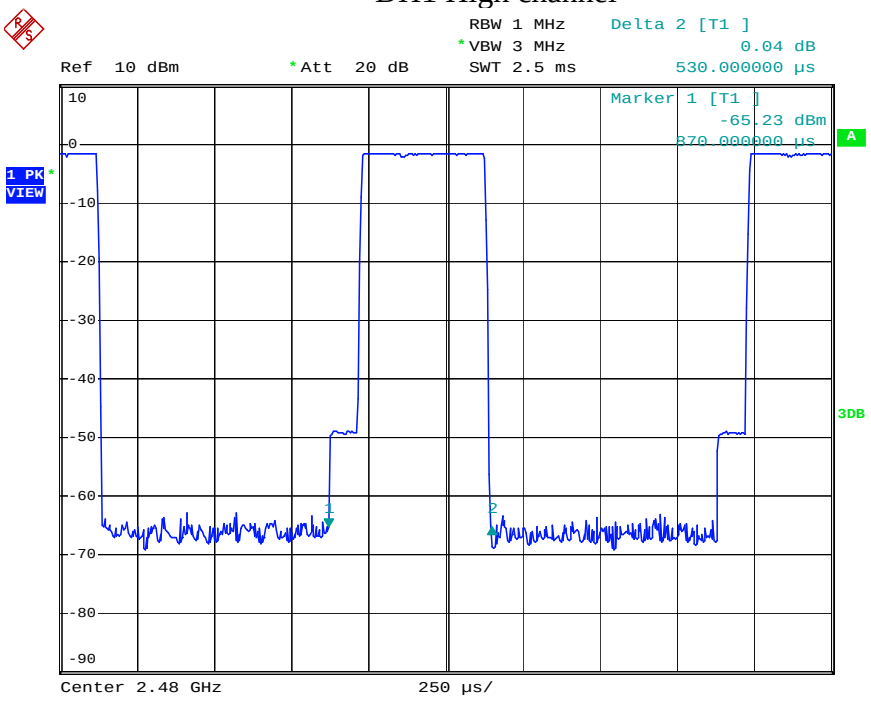
Date: 30.MAY.2014 15:24:48

DH1 Middle channel



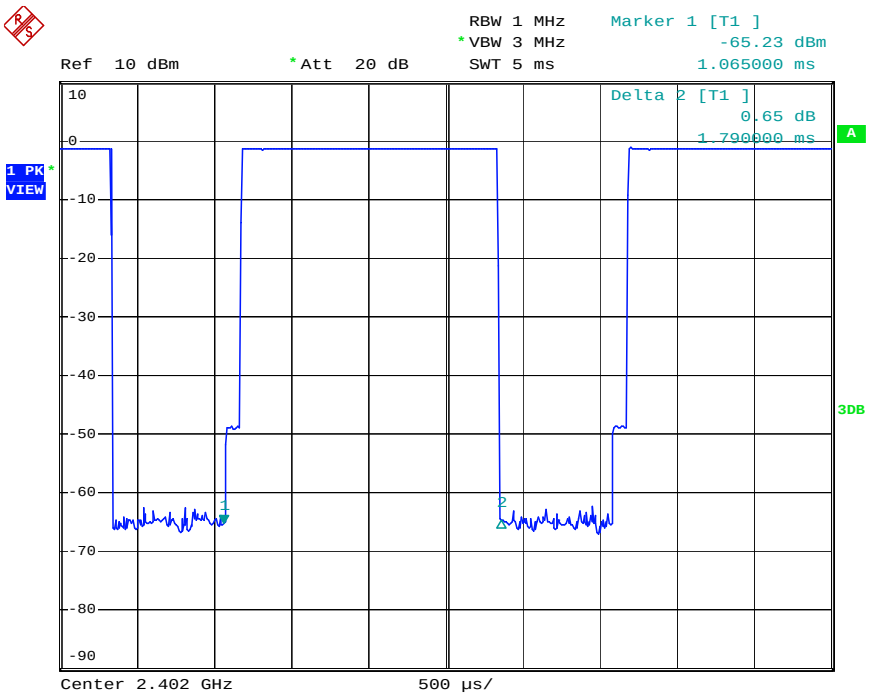
Date: 30.MAY.2014 15:23:59

DH1 High channel



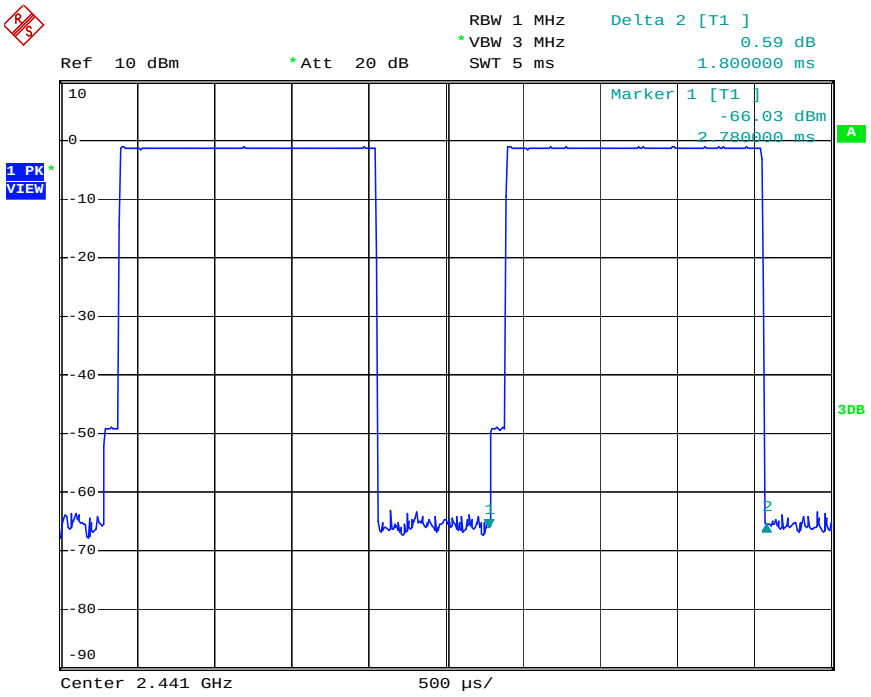
Date: 30.MAY.2014 15:17:48

DH3 Low channel



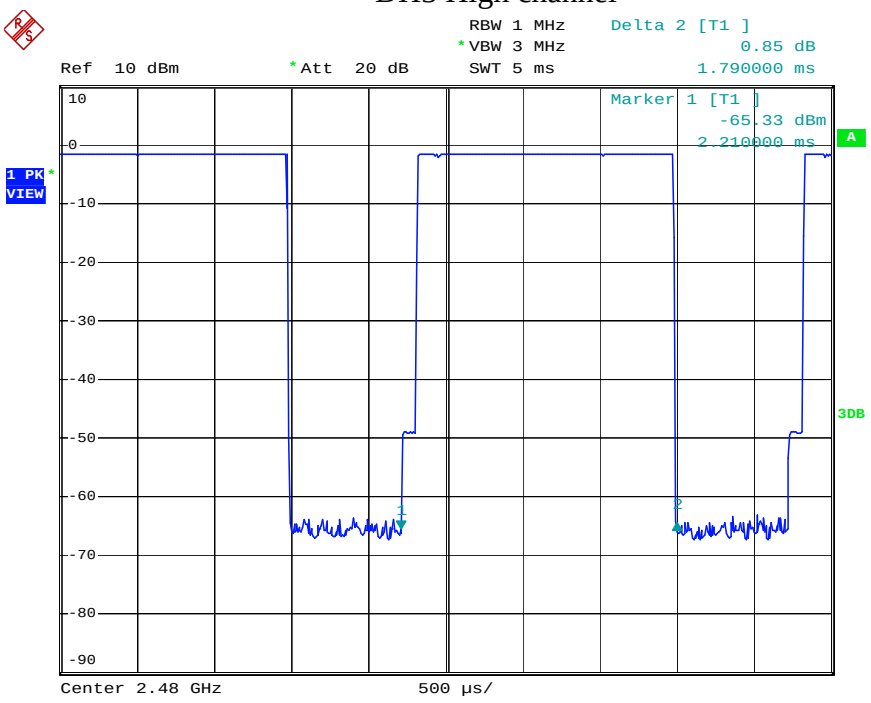
Date: 30.MAY.2014 15:25:38

DH3 Middle channel



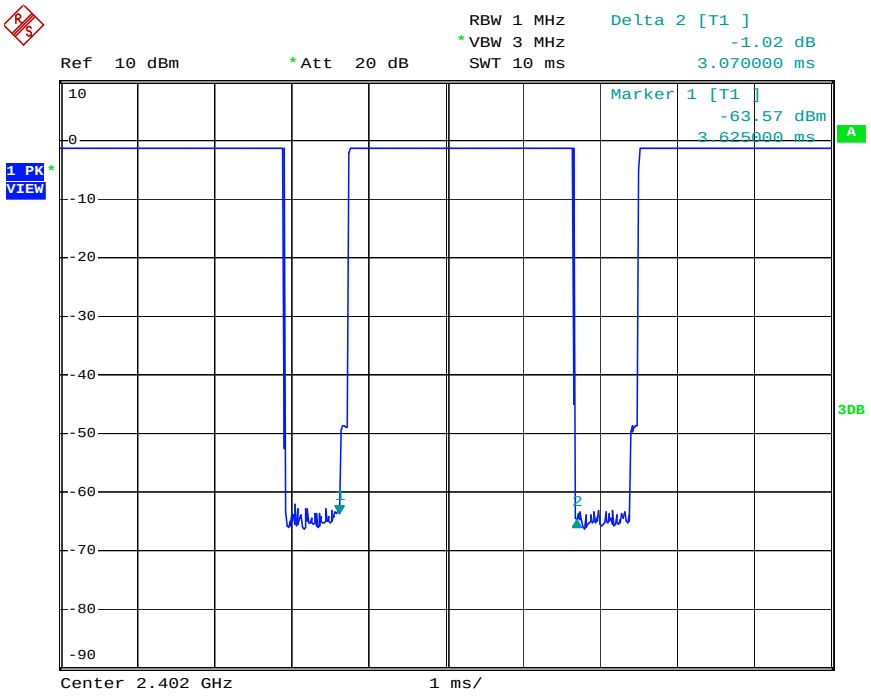
Date: 30.MAY.2014 15:22:34

DH3 High channel



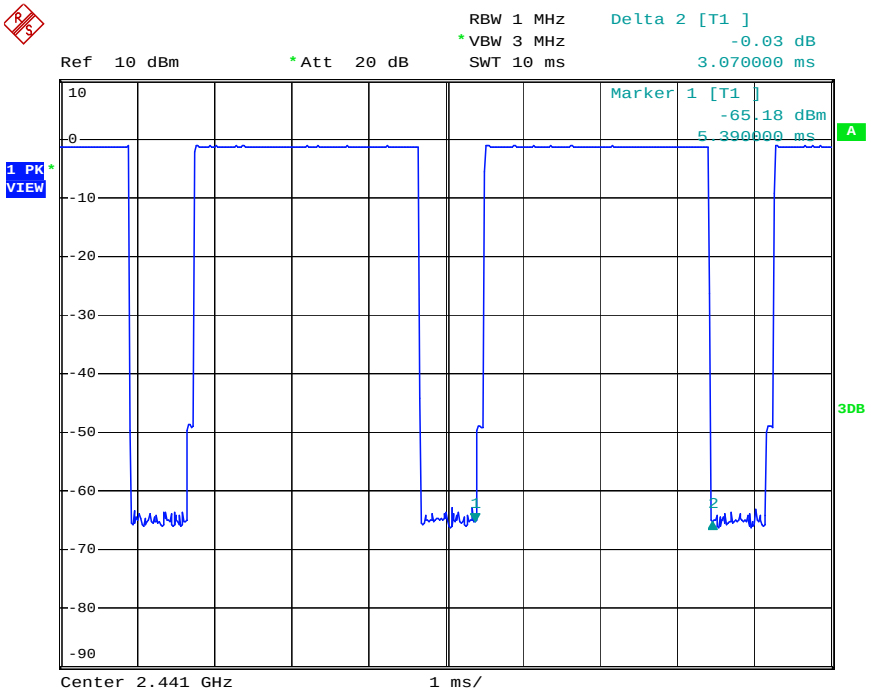
Date: 30.MAY.2014 15:18:38

DH5 Low channel



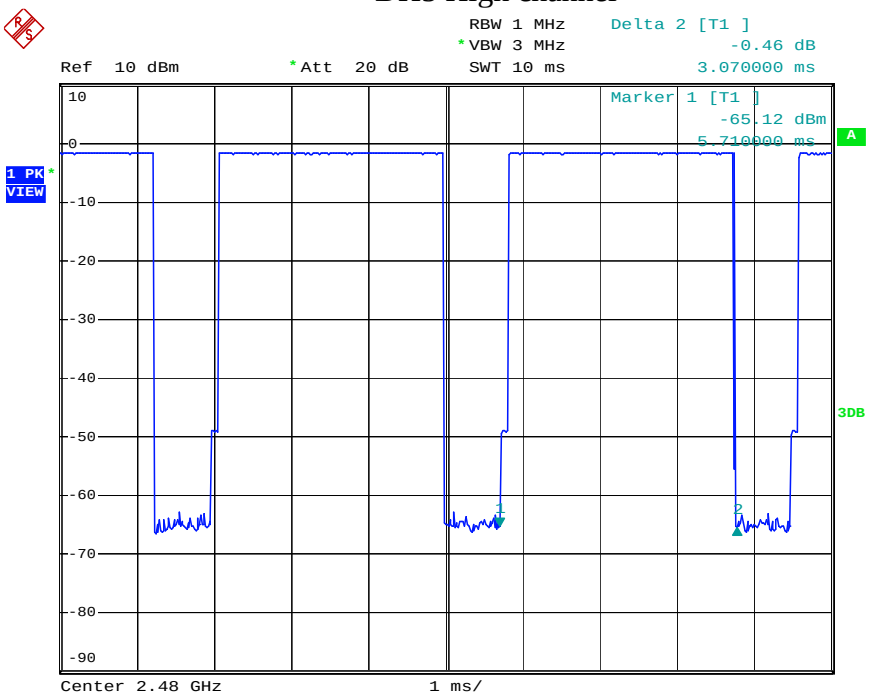
Date: 30.MAY.2014 15:26:28

DH5 Middle channel



Date: 30.MAY.2014 15:21:33

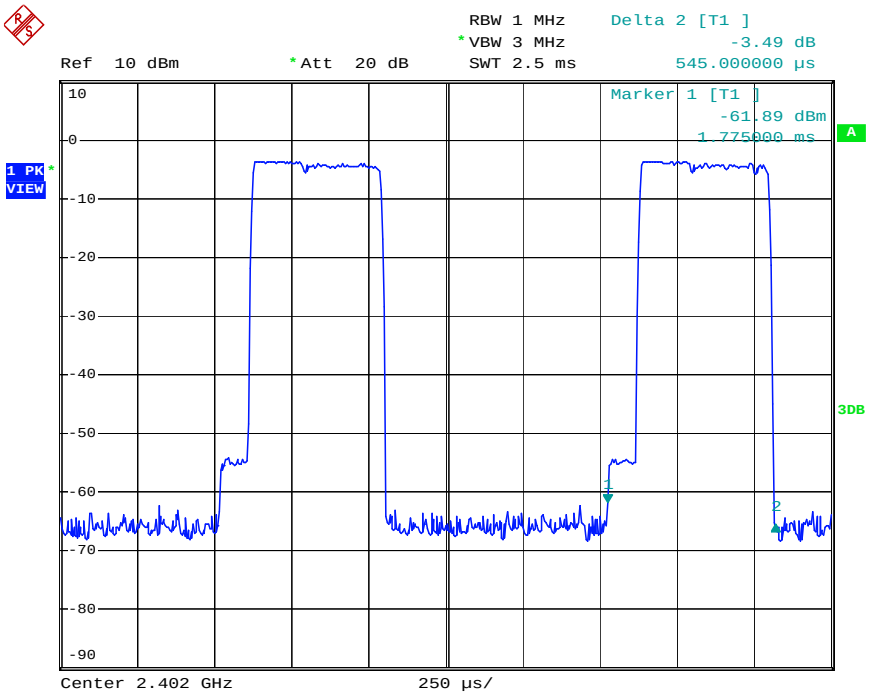
DH5 High channel



Date: 30.MAY.2014 15:20:47

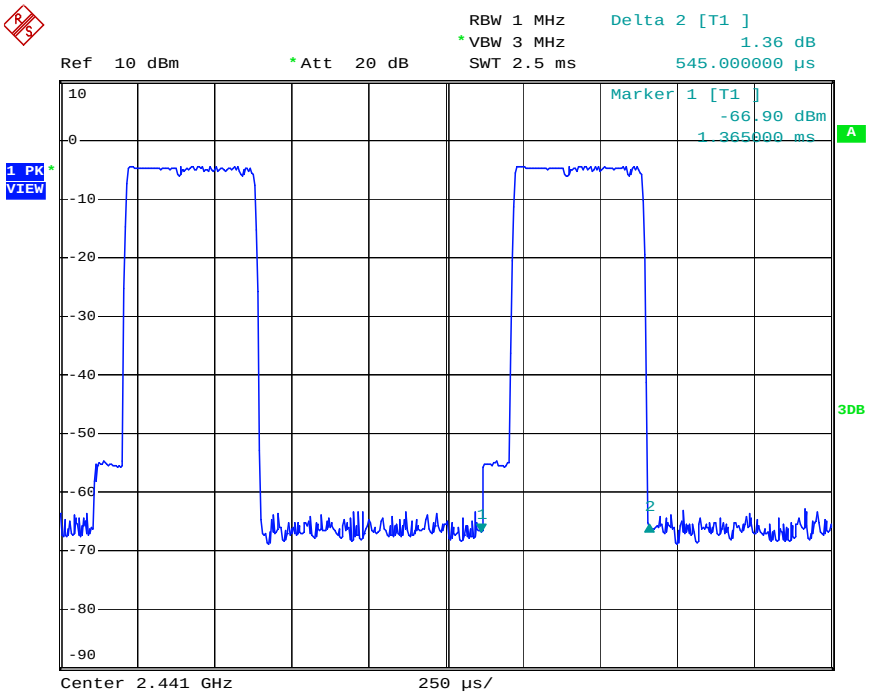
Mode 2: π/4 DQPSK Link Mode

2DH1 Low channel



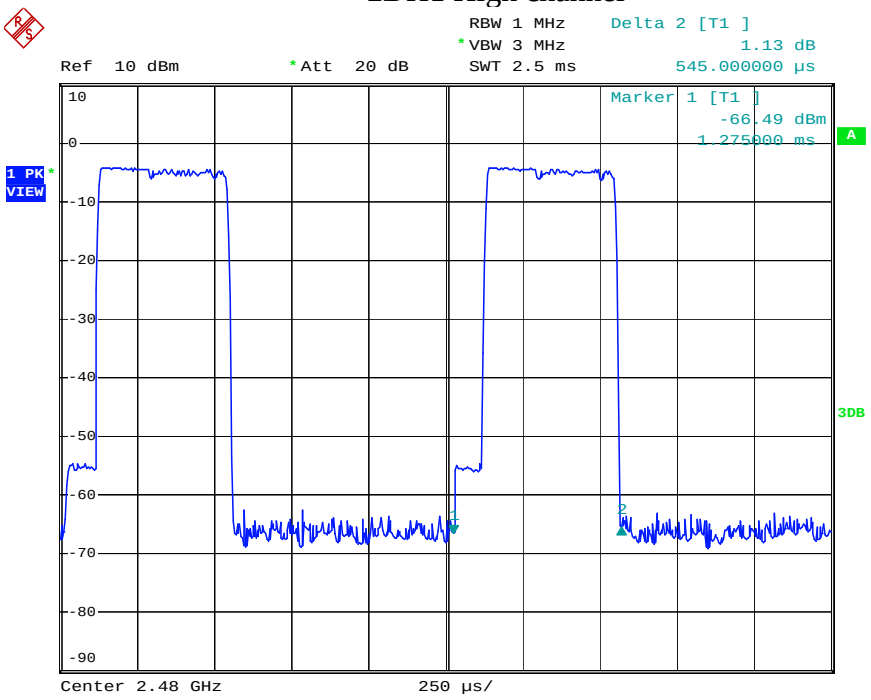
Date: 30.MAY.2014 15:50:42

2DH1 Middle channel



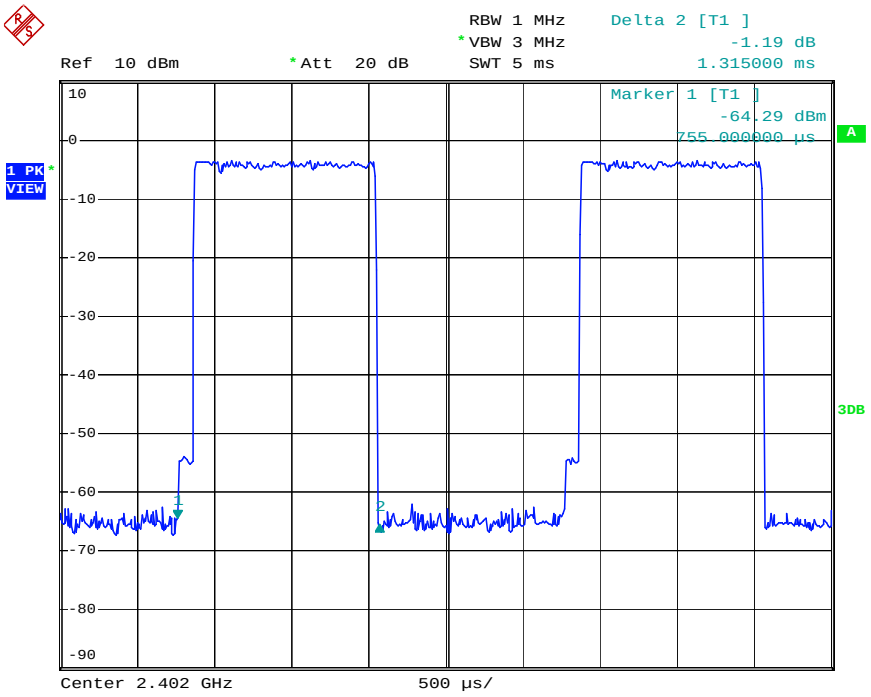
Date: 30.MAY.2014 15:49:54

2DH1 High channel



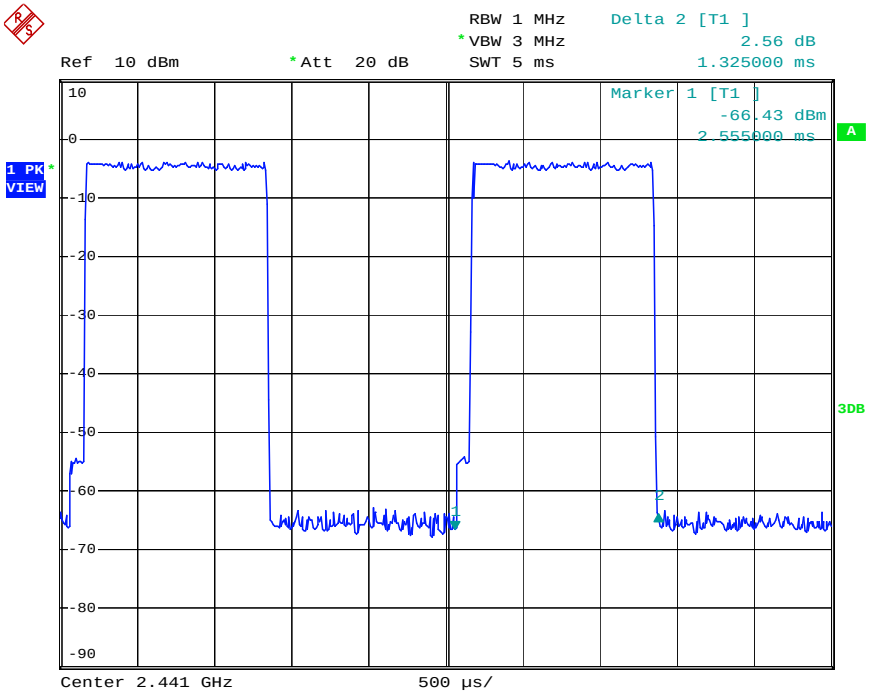
Date: 30.MAY.2014 15:48:38

2DH3 Low channel



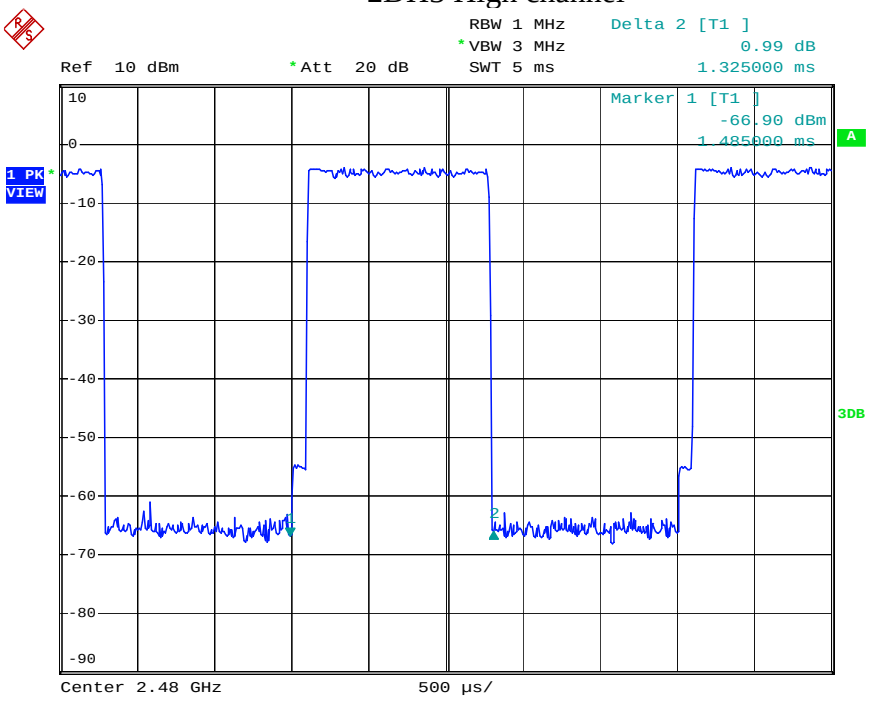
Date: 30.MAY.2014 15:53:41

2DH3 Middle channel



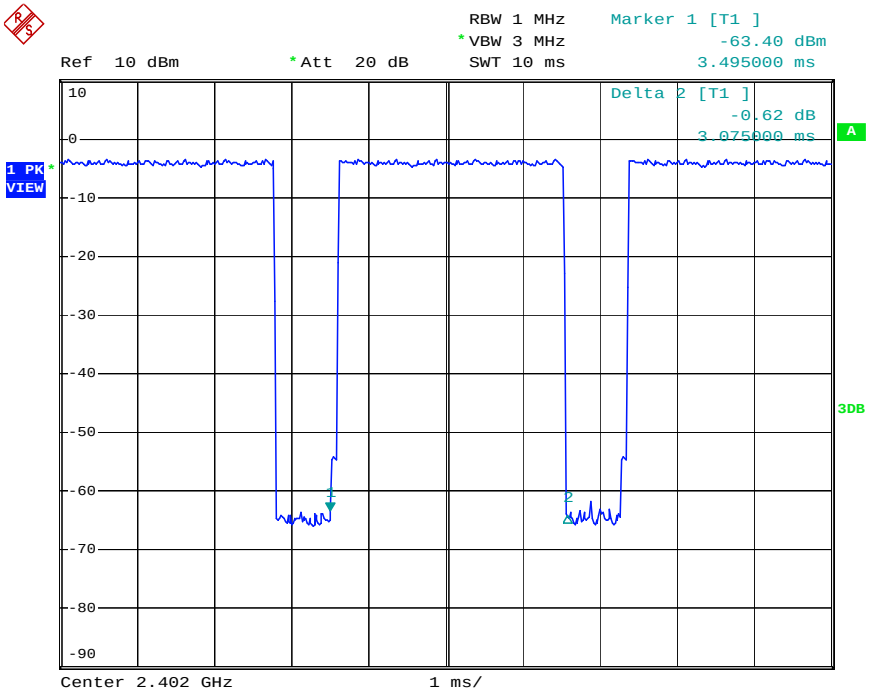
Date: 30.MAY.2014 15:55:04

2DH3 High channel



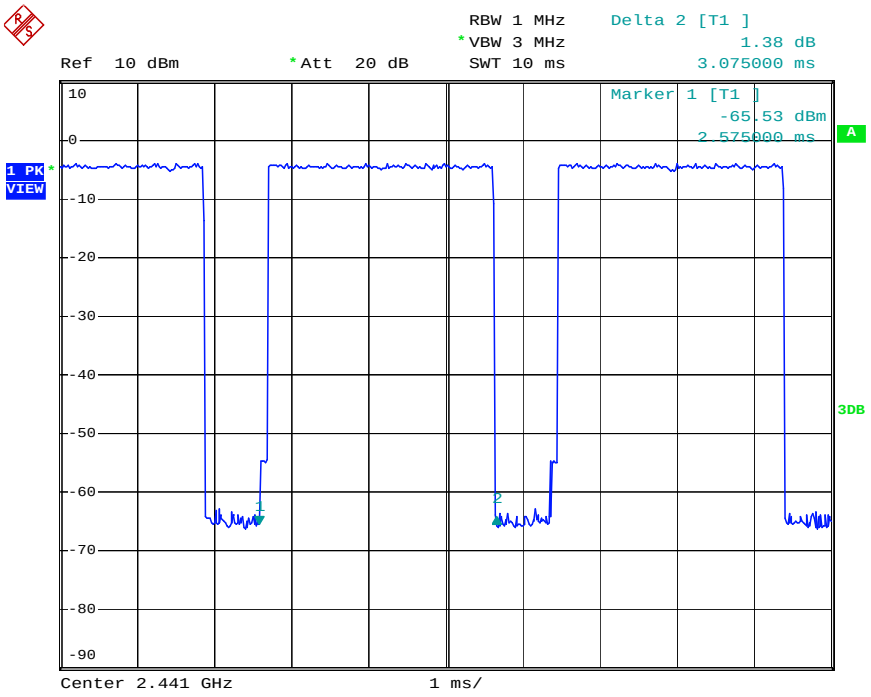
Date: 30.MAY.2014 15:56:05

2DH5 Low channel



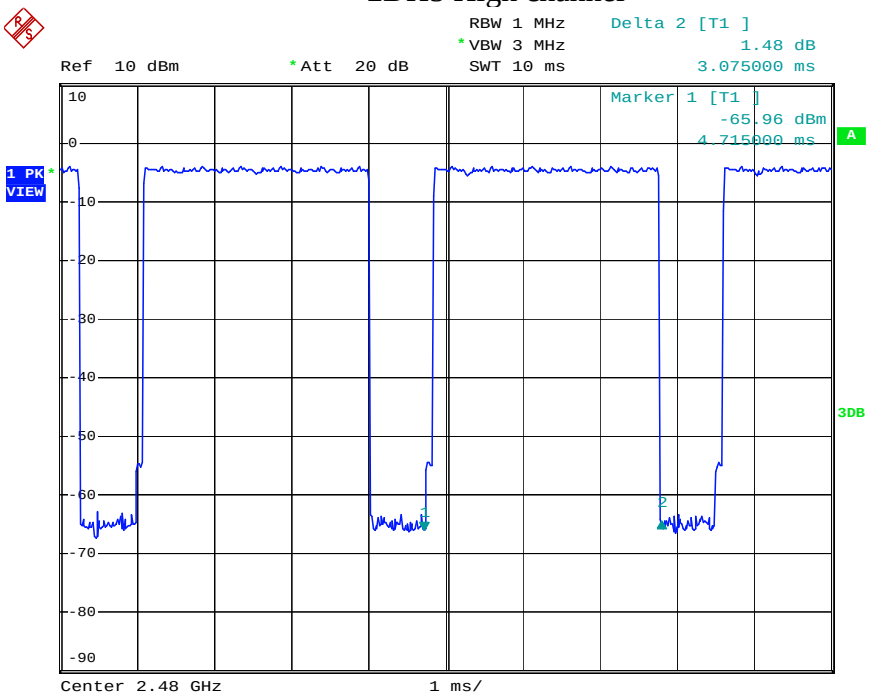
Date: 30.MAY.2014 15:59:17

2DH5 Middle channel



Date: 30.MAY.2014 15:59:56

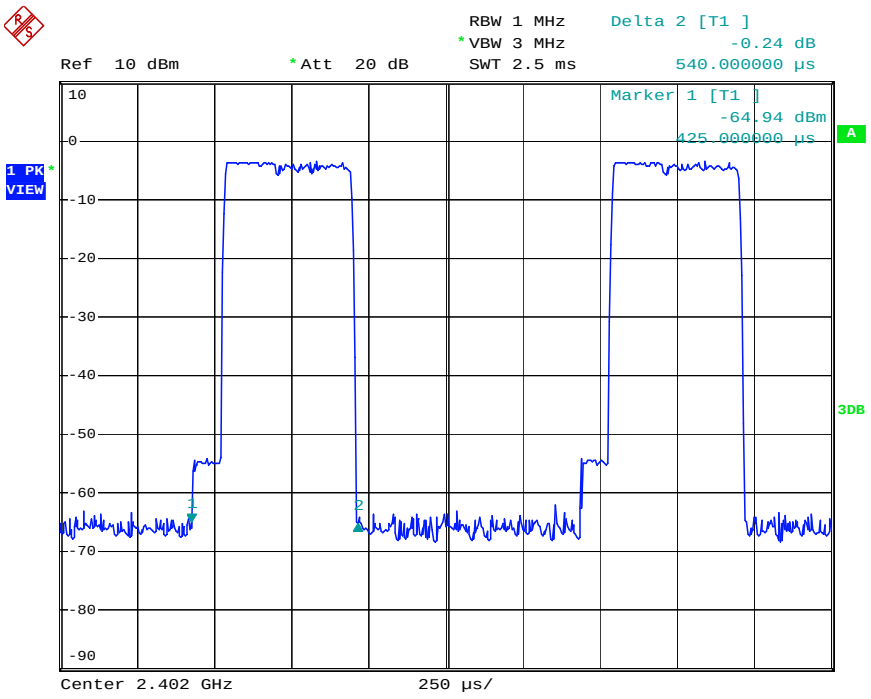
2DH5 High channel



Date: 30.MAY.2014 15:58:34

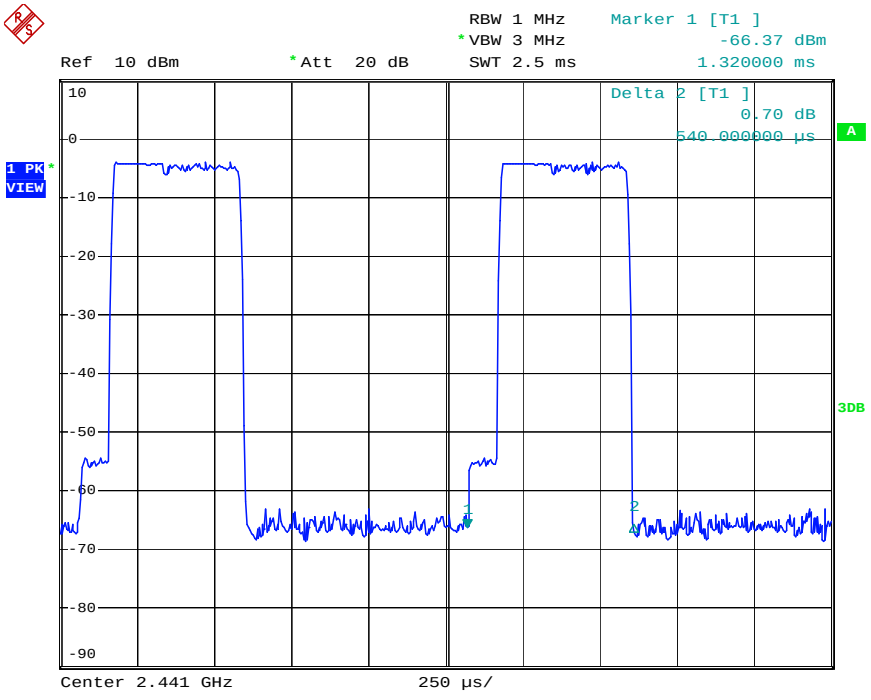
Mode 3: 8DPSK Link Mode

3DH1 Low channel



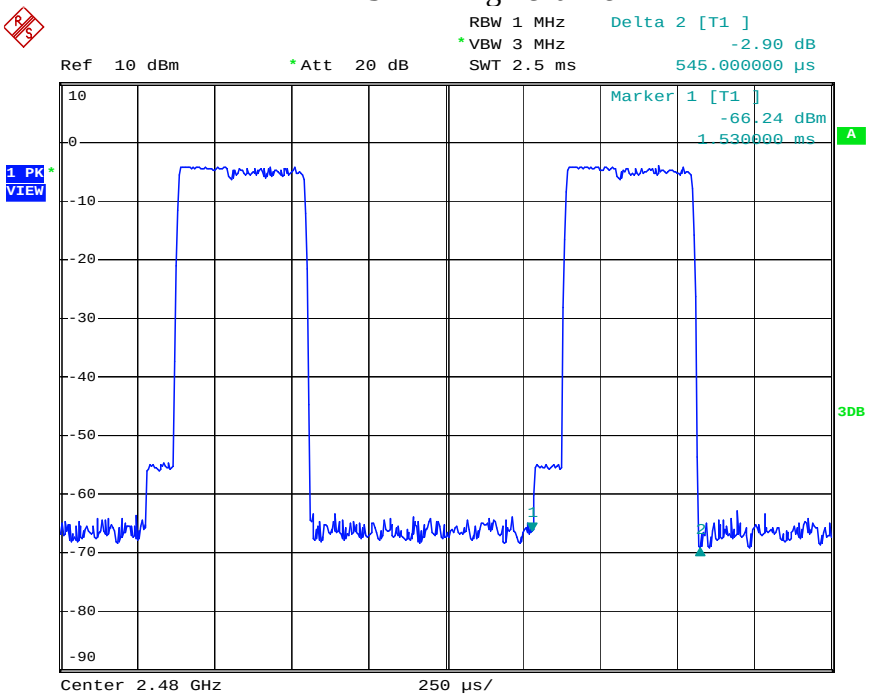
Date: 30.MAY.2014 16:22:50

3DH1 Middle channel



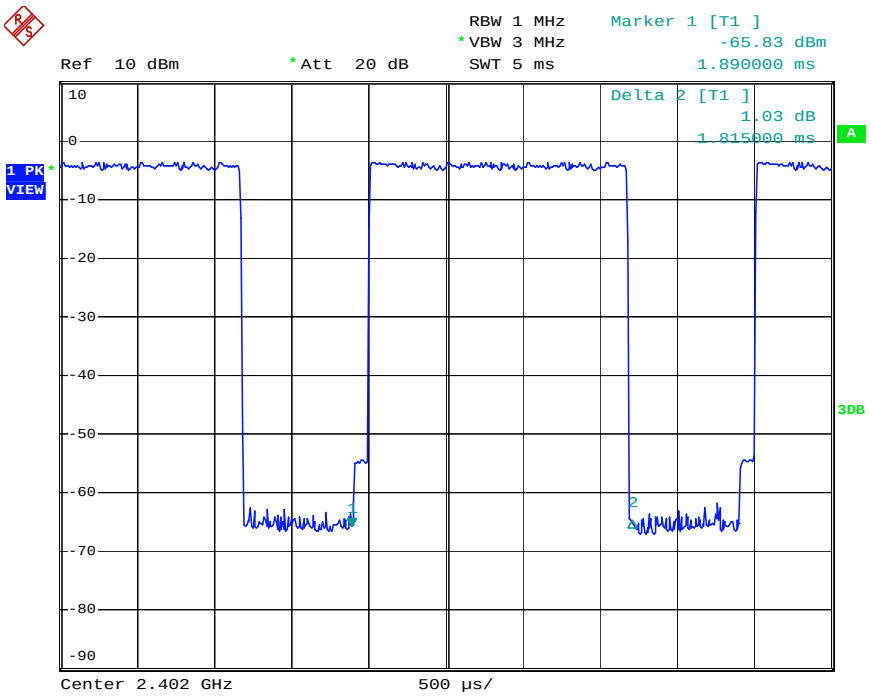
Date: 30.MAY.2014 16:23:37

3DH1 High channel



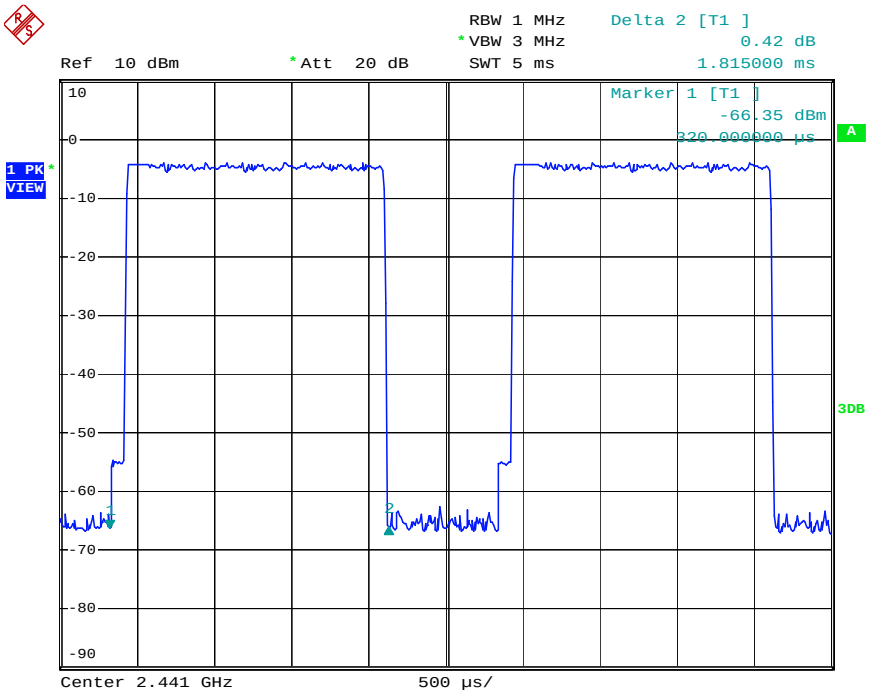
Date: 30.MAY.2014 16:24:07

3DH3 Low channel



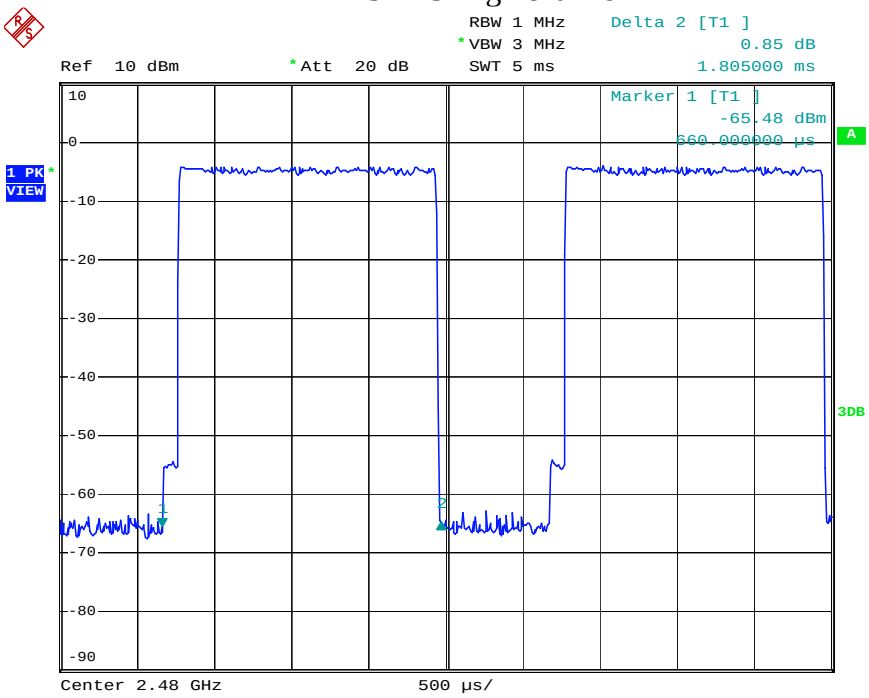
Date: 30.MAY.2014 16:27:15

3DH3 Middle channel



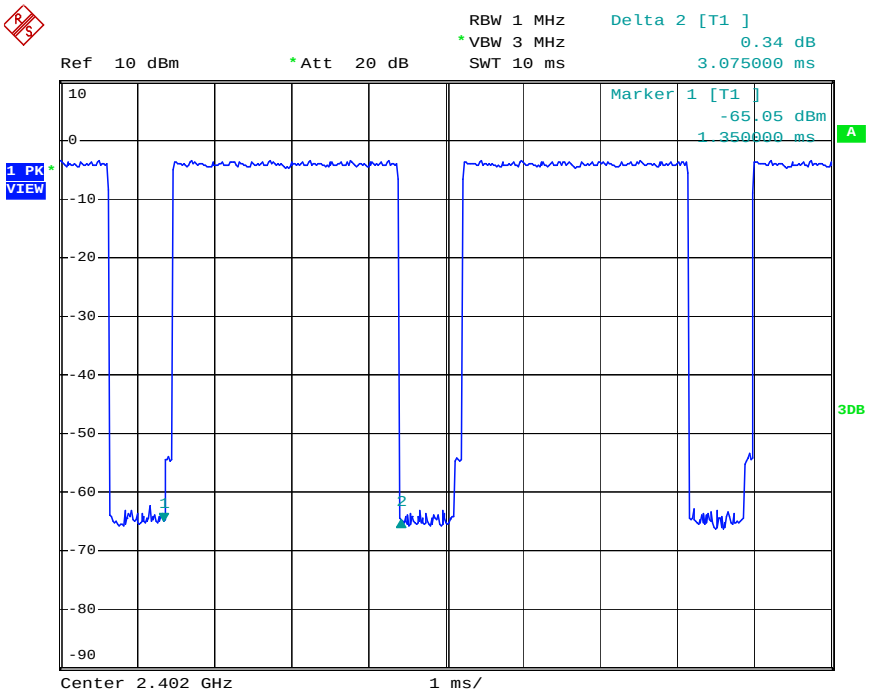
Date: 30.MAY.2014 16:26:31

3DH3 High channel



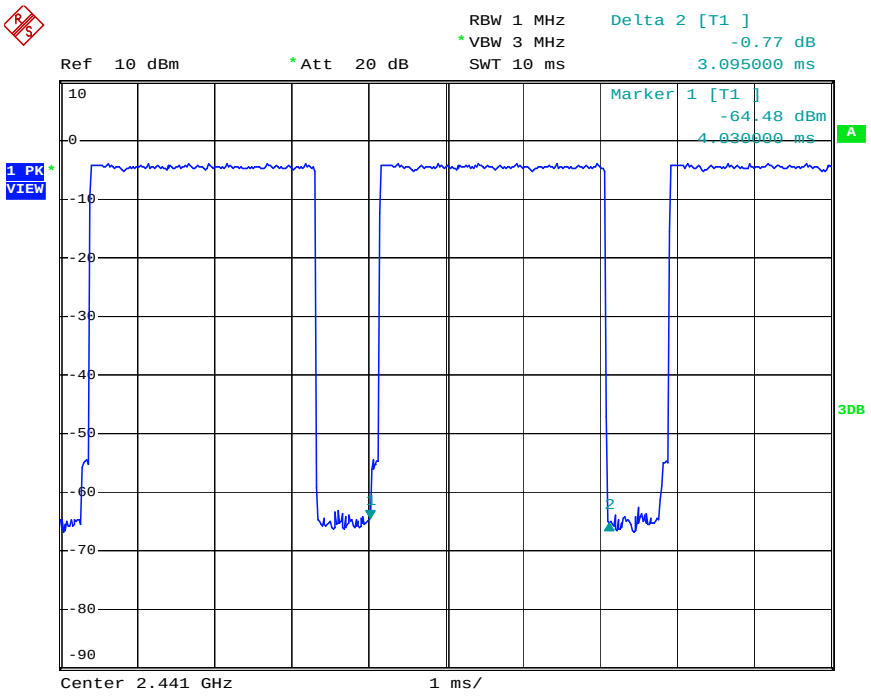
Date: 30.MAY.2014 16:25:15

3DH5 Low channel



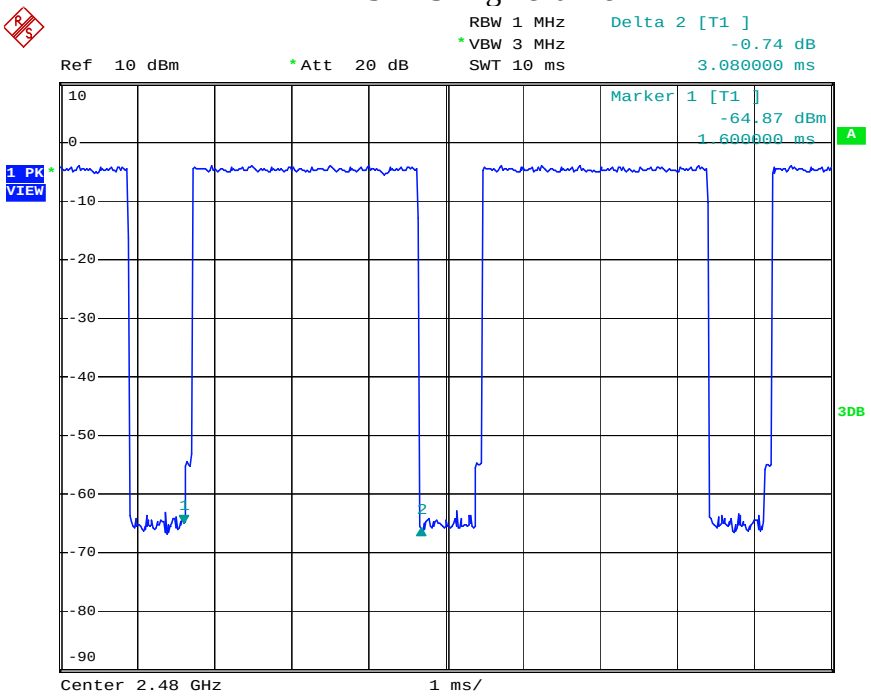
Date: 30.MAY.2014 16:28:17

3DH5 Middle channel



Date: 30.MAY.2014 16:29:07

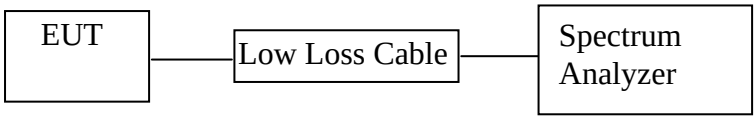
3DH5 High channel



Date: 30.MAY.2014 16:29:51

9. MAXIMUM PEAK OUTPUT POWER TEST

9.1.Block Diagram of Test Setup



(EUT: Barcode Scanner)

9.2.The Requirement For Section 15.247(b)(1)

Section 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 2400-2483.5 MHz band: 0.125 watts.

9.3.EUT Configuration on Measurement

The equipment are installed on the emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

9.4.Operating Condition of EUT

9.4.1.Setup the EUT and simulator as shown as Section 9.1.

9.4.2.Turn on the power of all equipment.

9.4.3.Let the EUT work in TX (Hopping off) modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2441MHz, and 2480MHz TX frequency to transmit.

9.5.Test Procedure

9.5.1.The transmitter output was connected to the spectrum analyzer through a low loss cable.

9.5.2.Set RBW of spectrum analyzer to 1MHz and VBW to 3MHz for GFSK mode

9.5.3.Set RBW of spectrum analyzer to 3MHz and VBW to 3MHz for other mode

9.5.4.Measurement the maximum peak output power.

9.6.Test Result

GFSK Mode

Channel	Frequency (MHz)	Peak Output Power (dBm)	Limits dBm / W
Low	2402	-0.82	30/1.0
Middle	2441	-1.15	30/1.0
High	2480	-1.28	30/1.0

∏/4-DQPSK Mode

Channel	Frequency (MHz)	Peak Output Power (dBm)	Limits dBm / W
Low	2402	-3.43	21 / 0.125
Middle	2441	-3.89	21 / 0.125
High	2480	-3.94	21 / 0.125

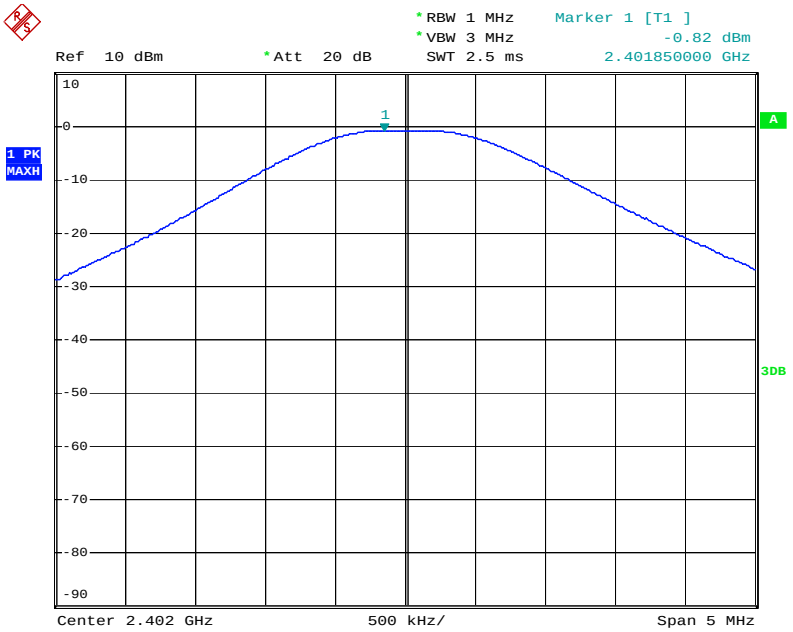
8DPSK Mode

Channel	Frequency (MHz)	Peak Output Power (dBm)	Limits dBm / W
Low	2402	-3.18	21 / 0.125
Middle	2441	-3.59	21 / 0.125
High	2480	-3.72	21 / 0.125

The spectrum analyzer plots are attached as below.

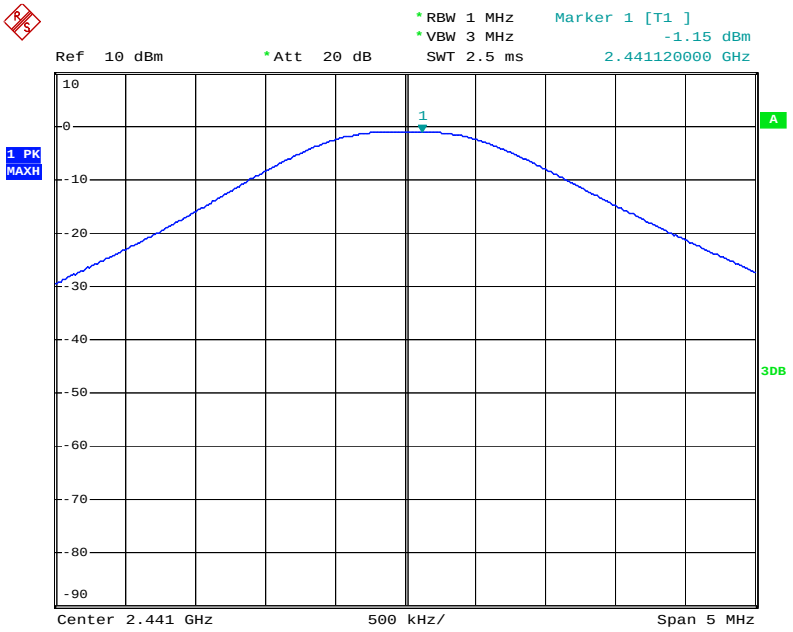
GFSK Mode

Low channel



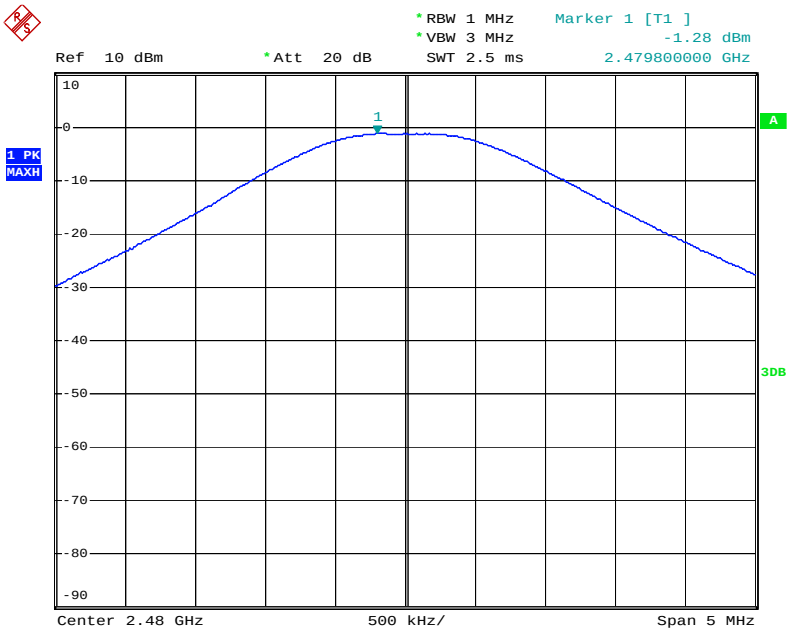
Date: 30.MAY.2014 14:22:39

Middle channel



Date: 30.MAY.2014 14:22:10

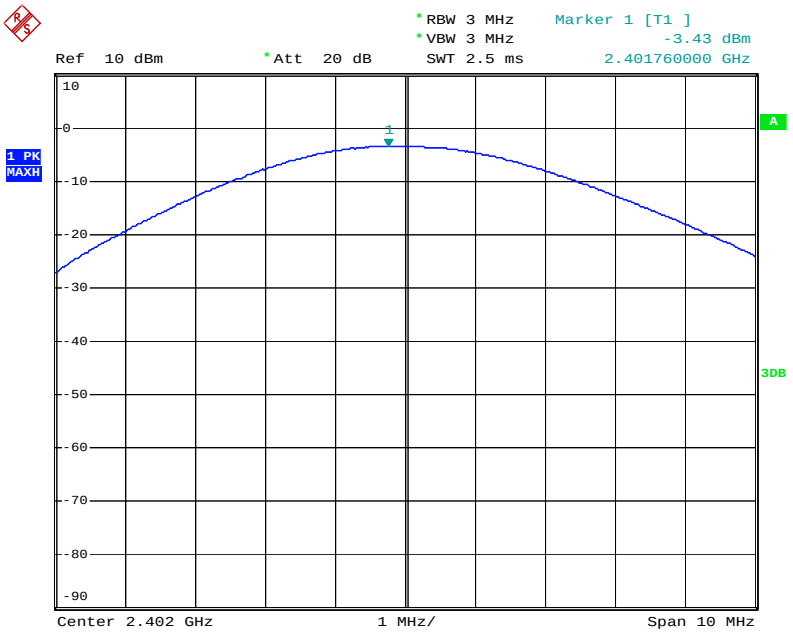
High channel



Date: 30.MAY.2014 14:23:06

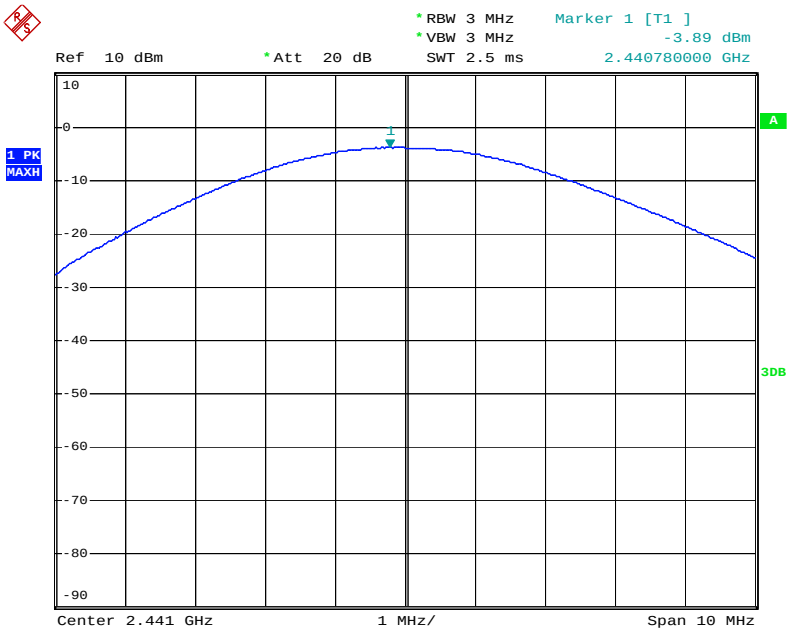
Π/4-DQPSK Mode

Low channel



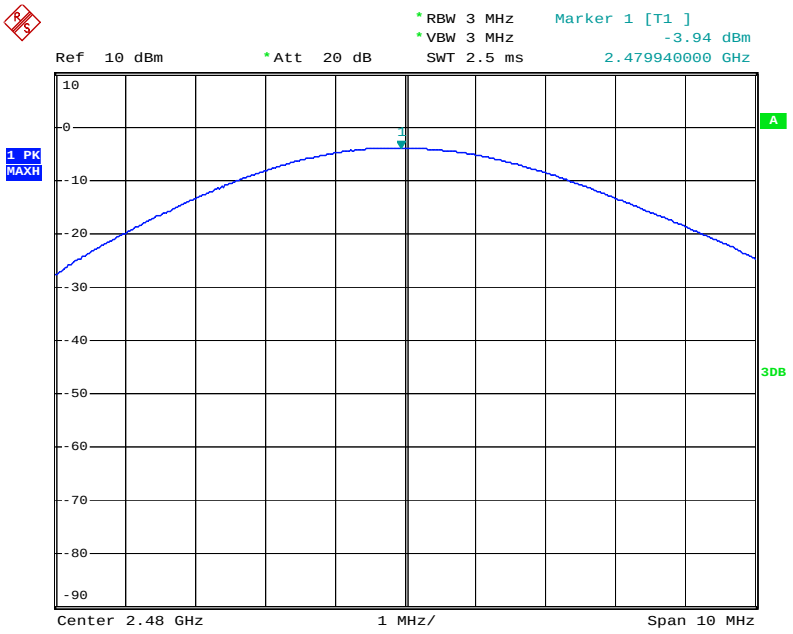
Date: 30.MAY.2014 15:36:40

Middle channel



Date: 30.MAY.2014 15:45:56

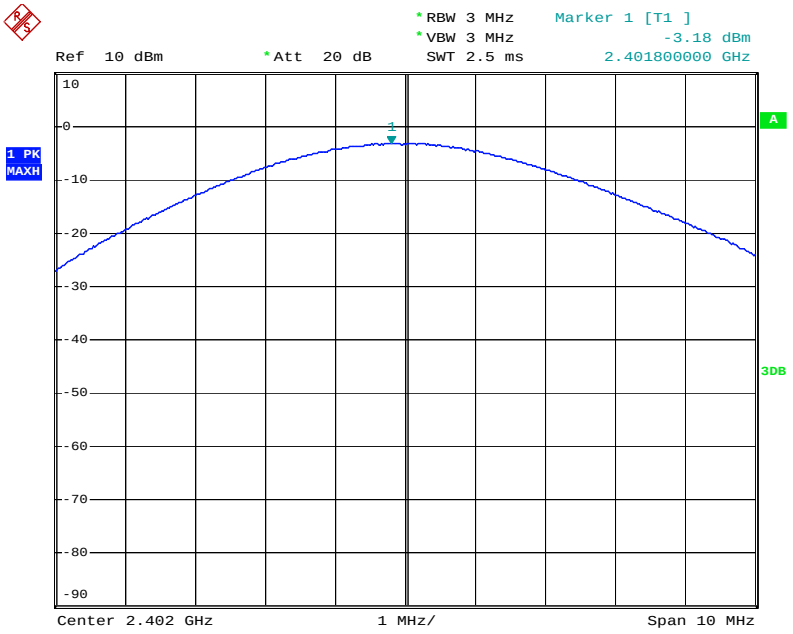
High channel



Date: 30.MAY.2014 15:45:28

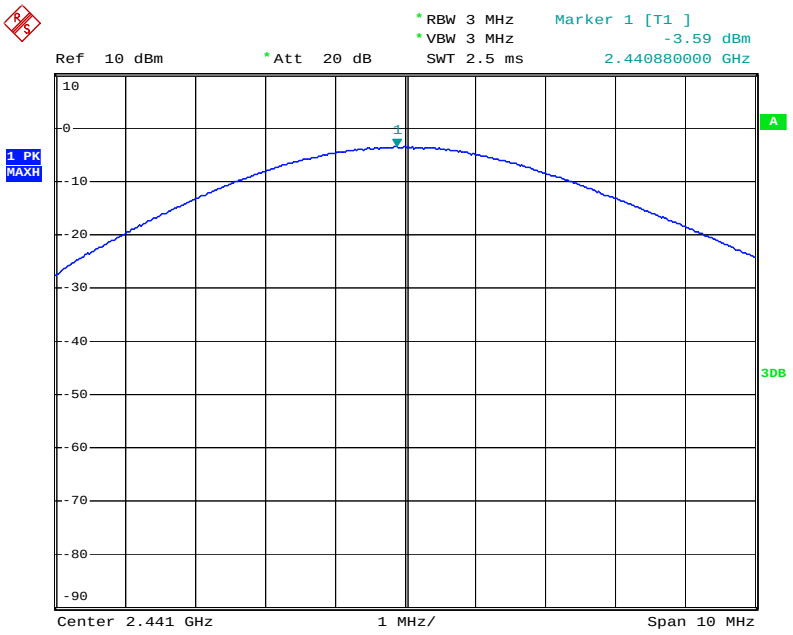
8DPSK Mode

Low channel



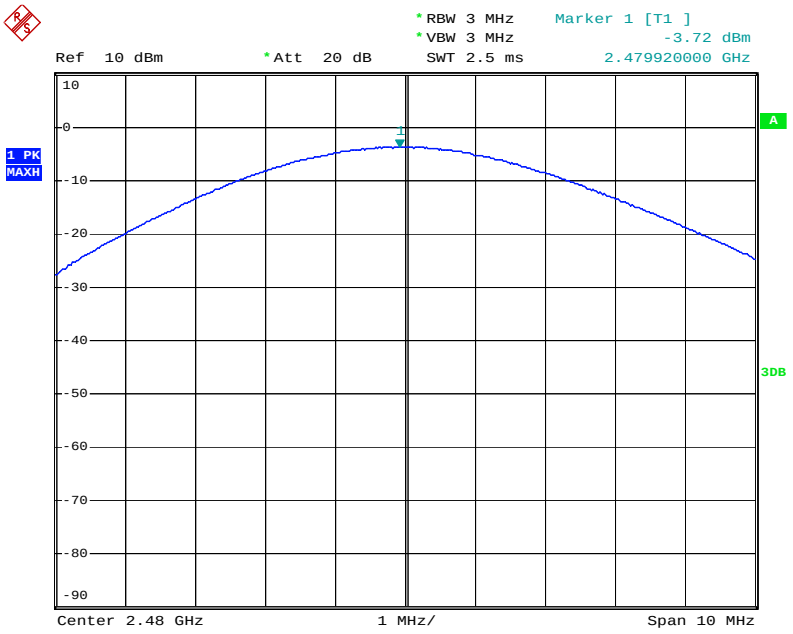
Date: 30.MAY.2014 16:18:38

Middle channel



Date: 30.MAY.2014 16:19:38

High channel



Date: 30.MAY.2014 16:20:03

10.RADIATED EMISSION TEST

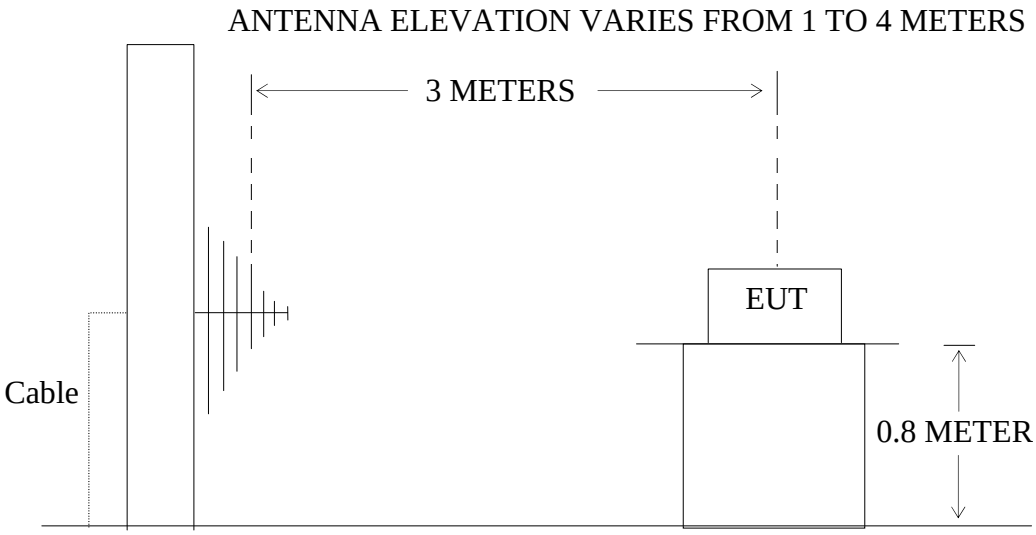
10.1.Block Diagram of Test Setup

10.1.1.Block diagram of connection between the EUT and simulators

EUT

(EUT: Barcode Scanner)

10.1.2.Anechoic Chamber Test Setup Diagram



(EUT: Barcode Scanner)

10.2.The Limit For Section 15.247(d)

Section 15.247(d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. 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).

10.3.Restricted bands of operation

10.3.1.FCC Part 15.205 Restricted bands of operation

(a) Except as shown in paragraph (d) of this section, Only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
[1]0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	([2])
13.36-13.41			

[1]Until February 1, 1999, this restricted band shall be 0.490-0.510
[2]Above 38.6

(b) Except as provided in paragraphs (d) and (e), the field strength of emission appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000MHz, Compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000MHz, compliance with the emission limits in Section15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

10.4.Configuration of EUT on Measurement

The equipment are installed on Radiated Emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

10.5.Test Procedure

The EUT and its simulators are placed on a turntable, which is 0.8 meter high above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3.0 meters away from the receiving antenna, which is mounted on an antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bilog antenna) is used as receiving antenna. Both horizontal and vertical polarizations of the antenna are set on measurement. In order to find the maximum emission levels, all of the interface cables must be manipulated according to ANSI C63.4- 2009 on radiated emission measurement.

The bandwidth of test receiver (R&S ESI26) is set at 120 KHz in 30-1000MHz. and set at 1MHz in above 1000MHz.

The frequency range from 30MHz to 25000MHz is checked.

The final measurement in band 9-90 kHz, 110-490 kHz and above 1000MHz is performed with Average detector. Except those frequency bands mention above, the final measurement for frequencies below 1000MHz is performed with Quasi Peak detector.

The field strength is calculated by adding the antenna factor, and cable loss, and subtracting the amplifier gain from the measured reading. The basic equation calculation is as follows:

Result = Reading + Corrected Factor

Where Corrected Factor = Antenna Factor + Cable Loss – Amplifier Gain

10.6.The Field Strength of Radiation Emission Measurement Results

Note: 1.We tested GFSK mode, Π/4-DQPSK Mode & 8DPSK mode and recorded the worst case data (GFSK mode) for all test mode.

2. The fundamental radiated emissions were reduced by 2.4G Band Reject Filter in the attached plots.

3. The 18-25GHz emissions are not reported, because the levels are too low against the limit.

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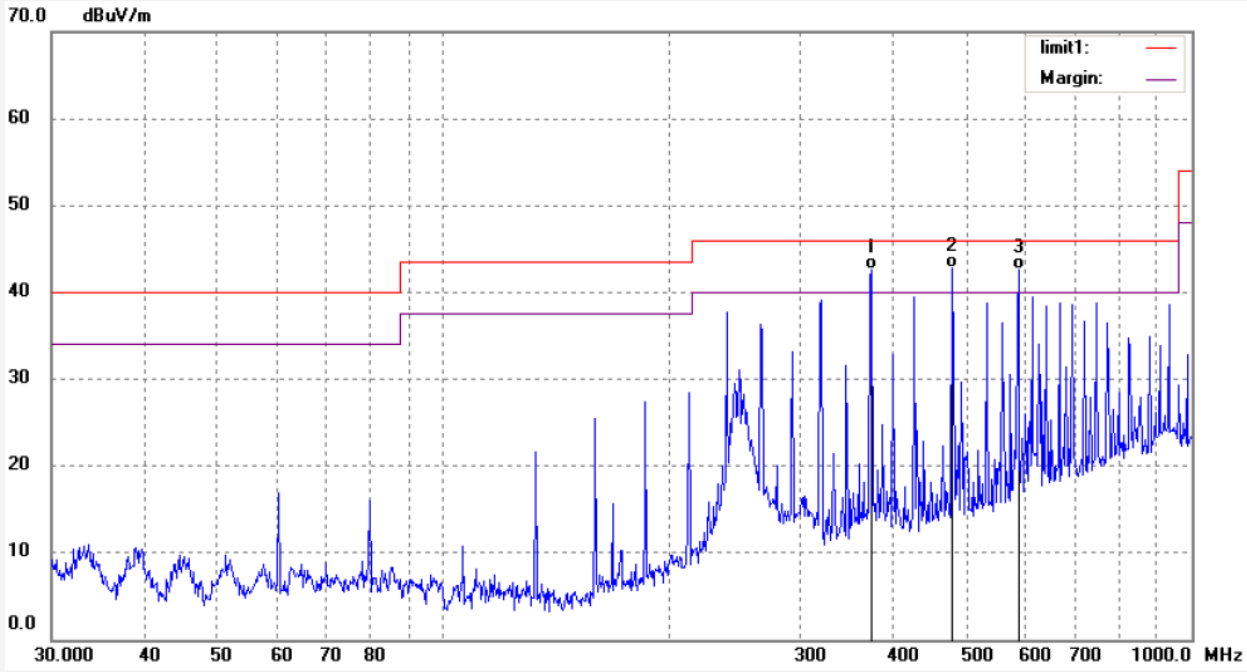
Job No.: RICKY #1374	Polarization: Horizontal
Standard: FCC Class B 3M Radiated	Power Source: DC 3.7V
Test item: Radiation Test	Date: 14/05/26/
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 9/54/36
EUT: Barcode Scanner	Engineer Signature: Carry
Mode: TX 2402MHz	Distance: 3m
Model: MS3590	
Manufacturer: MinDe	

Note: Report No.:ATE20140803



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	373.3112	58.43	-15.82	42.61	46.00	-3.39	QP			
2	478.8456	56.94	-14.17	42.77	46.00	-3.23	QP			
3	586.8437	54.66	-11.97	42.69	46.00	-3.31	QP			

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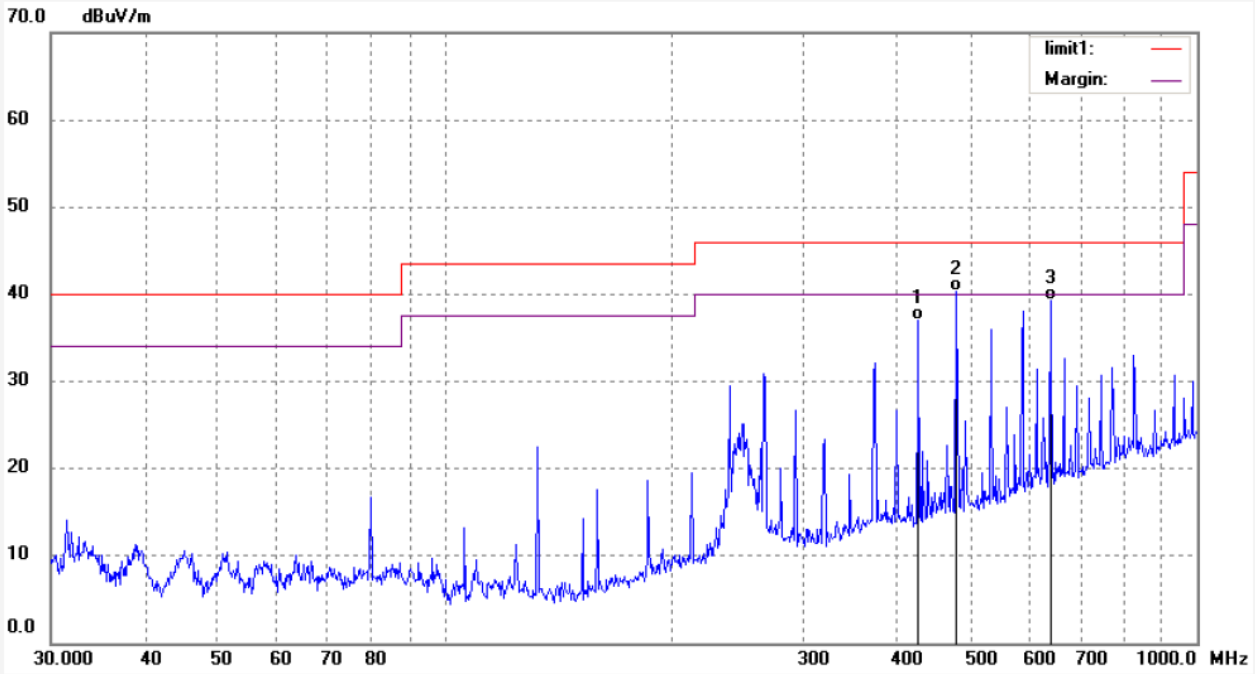
Job No.: RICKY #1375
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Barcode Scanner
Mode: TX 2402MHz
Model: MS3590
Manufacturer: MinDe

Polarization: Vertical
Power Source: DC 3.7V
Date: 14/05/26/
Time: 9/56/39
Engineer Signature: Carry
Distance: 3m

Note: Report No.:ATE20140803



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	426.5210	52.33	-15.27	37.06	46.00	-8.94	QP			
2	478.8456	54.54	-14.17	40.37	46.00	-5.63	QP			
3	638.3686	50.14	-10.88	39.26	46.00	-6.74	QP			

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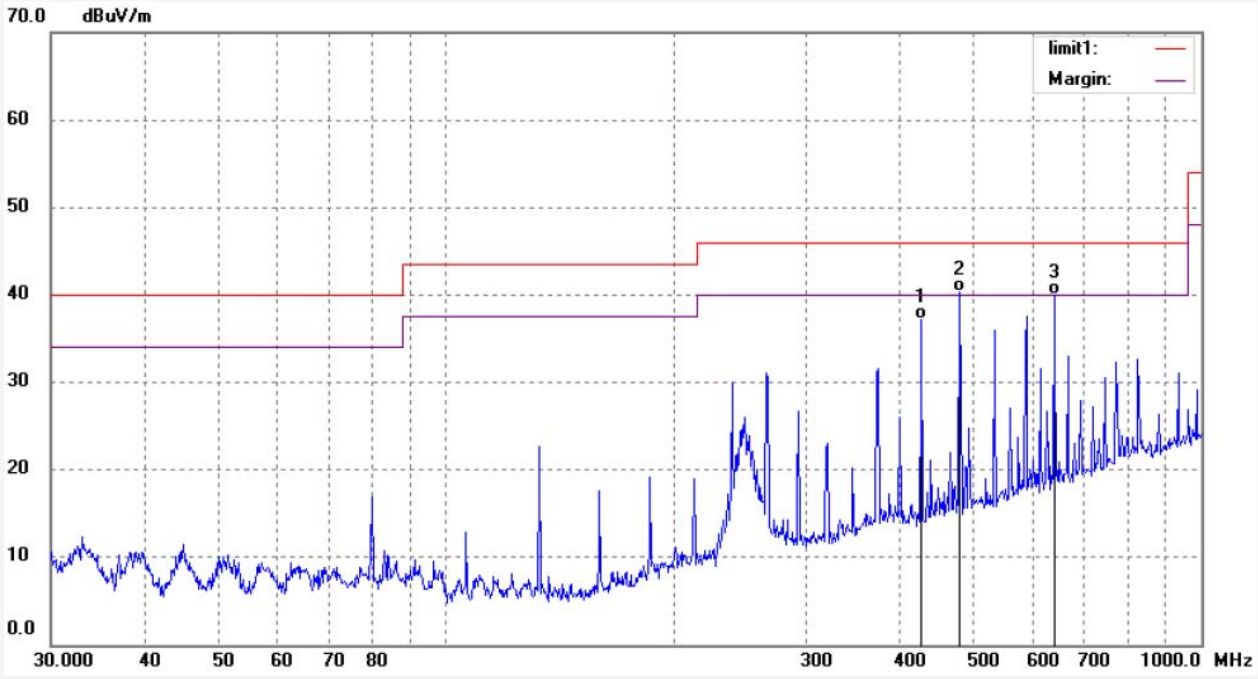
Job No.: RICKY #1376
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Barcode Scanner
Mode: TX 2441MHz
Model: MS3590
Manufacturer: MinDe

Polarization: Vertical
Power Source: DC 3.7V
Date: 14/05/26/
Time: 9/58/24
Engineer Signature: Carry
Distance: 3m

Note: Report No.:ATE20140803



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	426.5210	52.48	-15.27	37.21	46.00	-8.79	QP			
2	478.8456	54.44	-14.17	40.27	46.00	-5.73	QP			
3	638.3686	50.81	-10.88	39.93	46.00	-6.07	QP			

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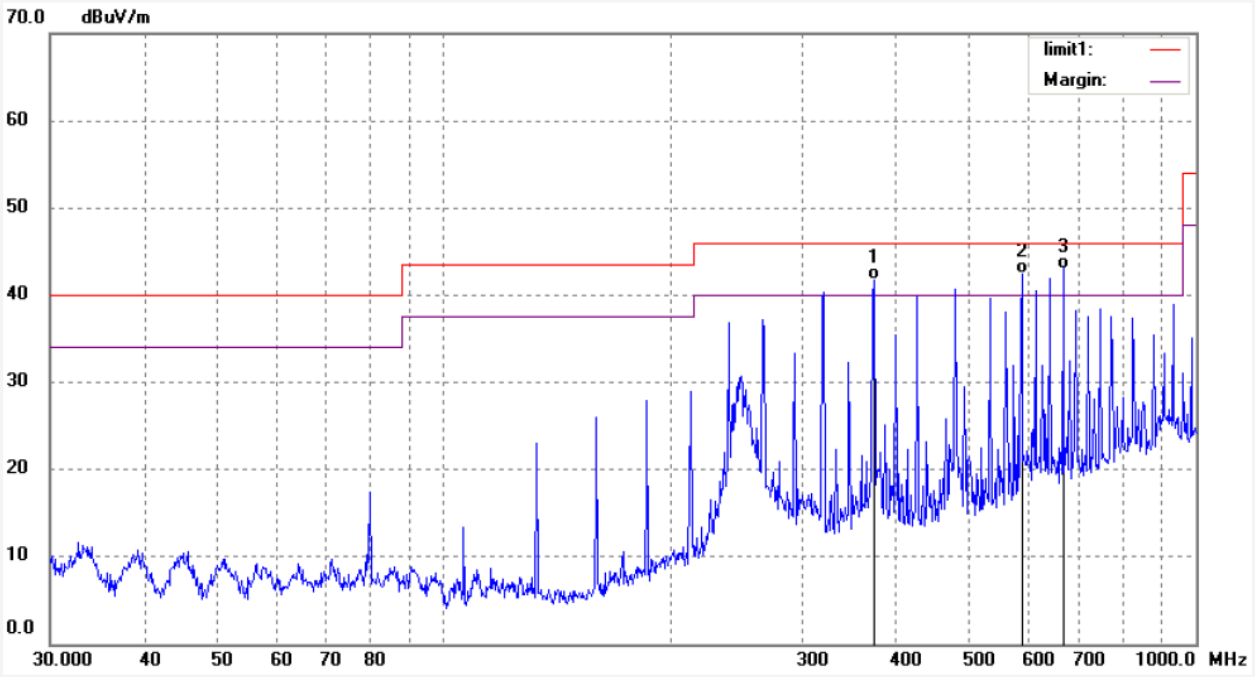
Job No.: RICKY #1377	Polarization: Horizontal
Standard: FCC Class B 3M Radiated	Power Source: DC 3.7V
Test item: Radiation Test	Date: 14/05/26/
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 9/59/30
EUT: Barcode Scanner	Engineer Signature: Carry
Mode: TX 2441MHz	Distance: 3m
Model: MS3590	
Manufacturer: MinDe	

Note: Report No.:ATE20140803



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	373.3112	57.55	-15.82	41.73	46.00	-4.27	QP			
2	586.8437	54.45	-11.97	42.48	46.00	-3.52	QP			
3	665.8035	53.32	-10.35	42.97	46.00	-3.03	QP			

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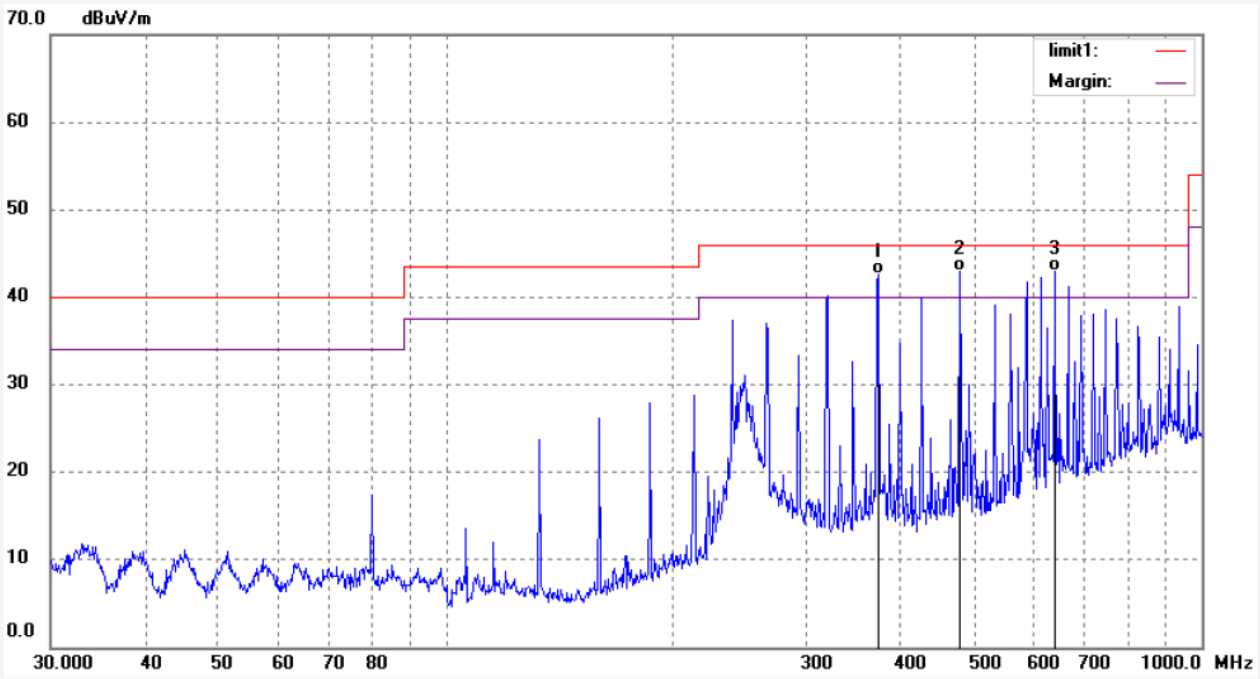
Job No.: RICKY #1378	Polarization: Horizontal
Standard: FCC Class B 3M Radiated	Power Source: DC 3.7V
Test item: Radiation Test	Date: 14/05/26/
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 10/02/18
EUT: Barcode Scanner	Engineer Signature: Carry
Mode: TX 2480MHz	Distance: 3m
Model: MS3590	
Manufacturer: MinDe	

Note: Report No.:ATE20140803



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	373.3112	58.43	-15.82	42.61	46.00	-3.39	QP			
2	478.8456	57.14	-14.17	42.97	46.00	-3.03	QP			
3	638.3686	53.82	-10.88	42.94	46.00	-3.06	QP			

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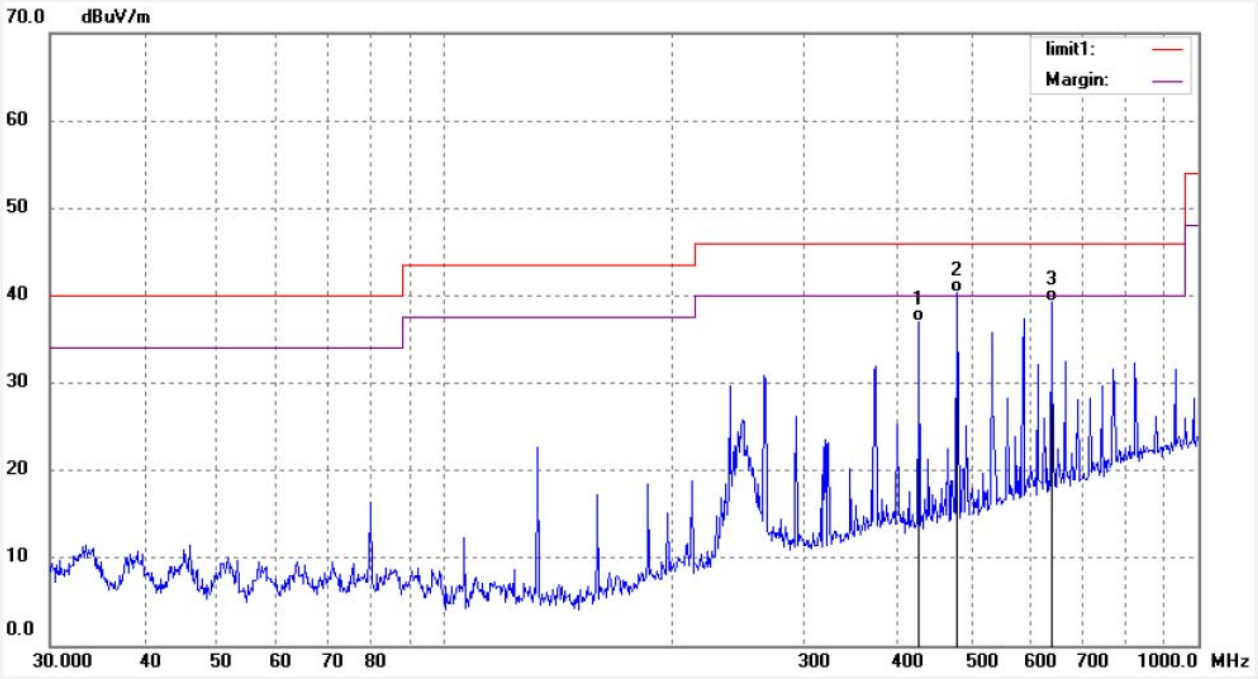
Job No.: RICKY #1379	Polarization: Vertical
Standard: FCC Class B 3M Radiated	Power Source: DC 3.7V
Test item: Radiation Test	Date: 14/05/26/
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 10/03/52
EUT: Barcode Scanner	Engineer Signature: Carry
Mode: TX 2480MHz	Distance: 3m
Model: MS3590	
Manufacturer: MinDe	

Note: Report No.:ATE20140803



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	426.5210	52.34	-15.27	37.07	46.00	-8.93	QP			
2	478.8456	54.44	-14.17	40.27	46.00	-5.73	QP			
3	638.3686	50.15	-10.88	39.27	46.00	-6.73	QP			

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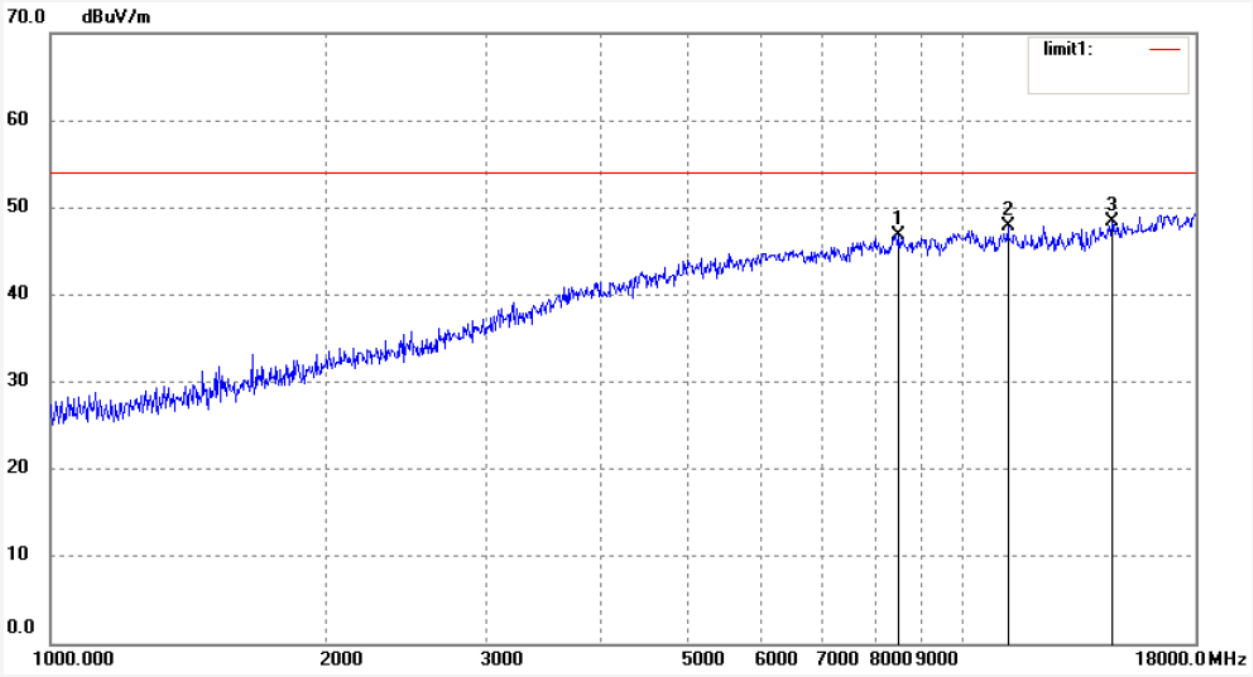
Job No.: RICKY #1390	Polarization: Horizontal
Standard: FCC Class B 3M Radiated	Power Source: DC 3.7V
Test item: Radiation Test	Date: 2014/05/26
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 10:16:05
EUT: Barcode Scanner	Engineer Signature: Ricky
Mode: TX 2402MHz	Distance: 3m
Model: MS3590	
Manufacturer: MinDe	

Note: Report No.:ATE20140803



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	8514.456	37.99	8.87	46.86	54.00	-7.14	peak			
2	11204.896	36.90	10.99	47.89	54.00	-6.11	peak			
3	14575.975	-1.87	50.27	48.40	54.00	-5.60	peak			

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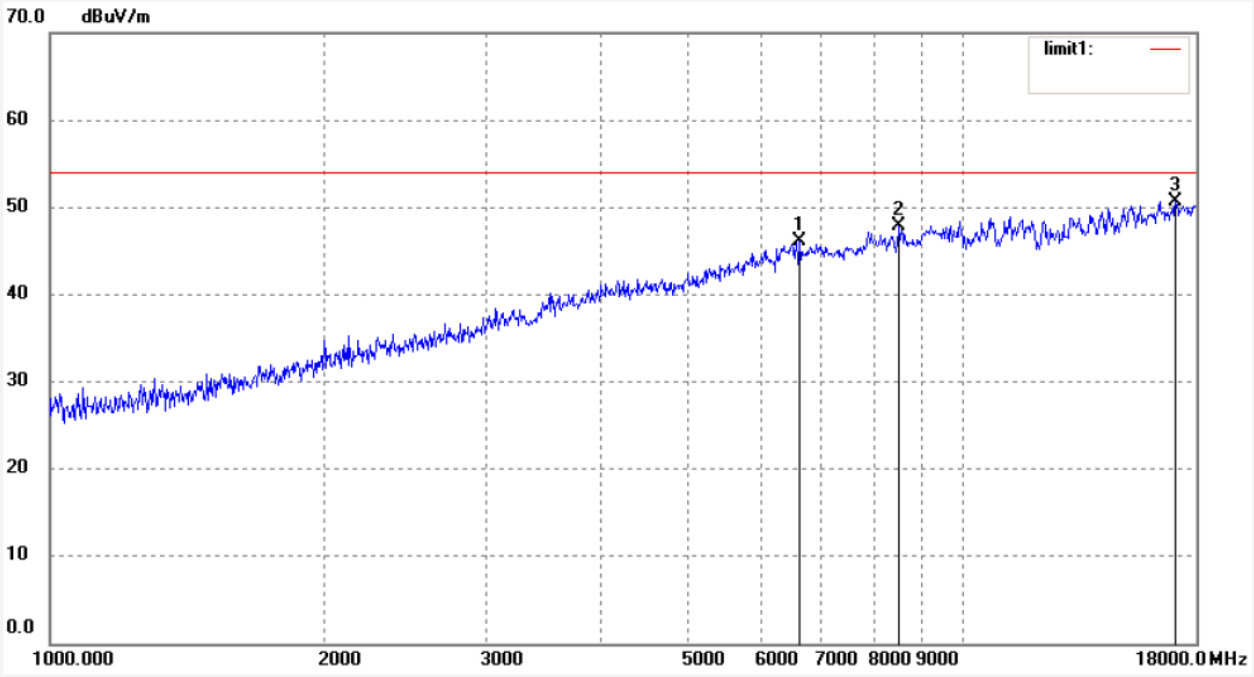
Job No.: RICKY #1391	Polarization: Vertical
Standard: FCC Class B 3M Radiated	Power Source: DC 3.7V
Test item: Radiation Test	Date: 2014/05/26
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 10:17:55
EUT: Barcode Scanner	Engineer Signature: Ricky
Mode: TX 2402MHz	Distance: 3m
Model: MS3590	
Manufacturer: MinDe	

Note: Report No.:ATE20140803



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	6621.376	41.57	4.52	46.09	54.00	-7.91	peak			
2	8514.456	39.05	8.87	47.92	54.00	-6.08	peak			
3	17087.464	-0.57	51.28	50.71	54.00	-3.29	peak			

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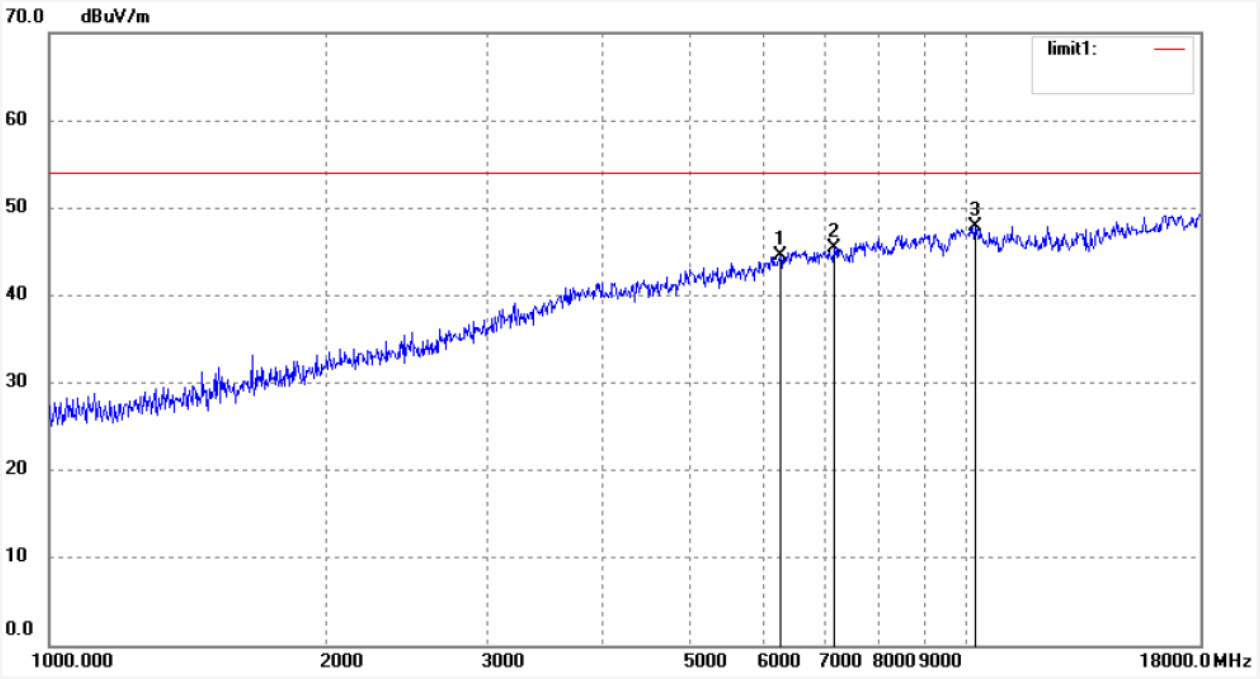
Job No.: RICKY #1392
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Barcode Scanner
Mode: TX 2441MHz
Model: MS3590
Manufacturer: MinDe

Polarization: Horizontal
Power Source: DC 3.7V
Date: 2014/05/26
Time: 10:18:59
Engineer Signature: Ricky
Distance: 3m

Note: Report No.:ATE20140803



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	6267.553	40.59	3.87	44.46	54.00	-9.54	peak			
2	7179.527	40.94	4.46	45.40	54.00	-8.60	peak			
3	10215.017	37.54	10.36	47.90	54.00	-6.10	peak			

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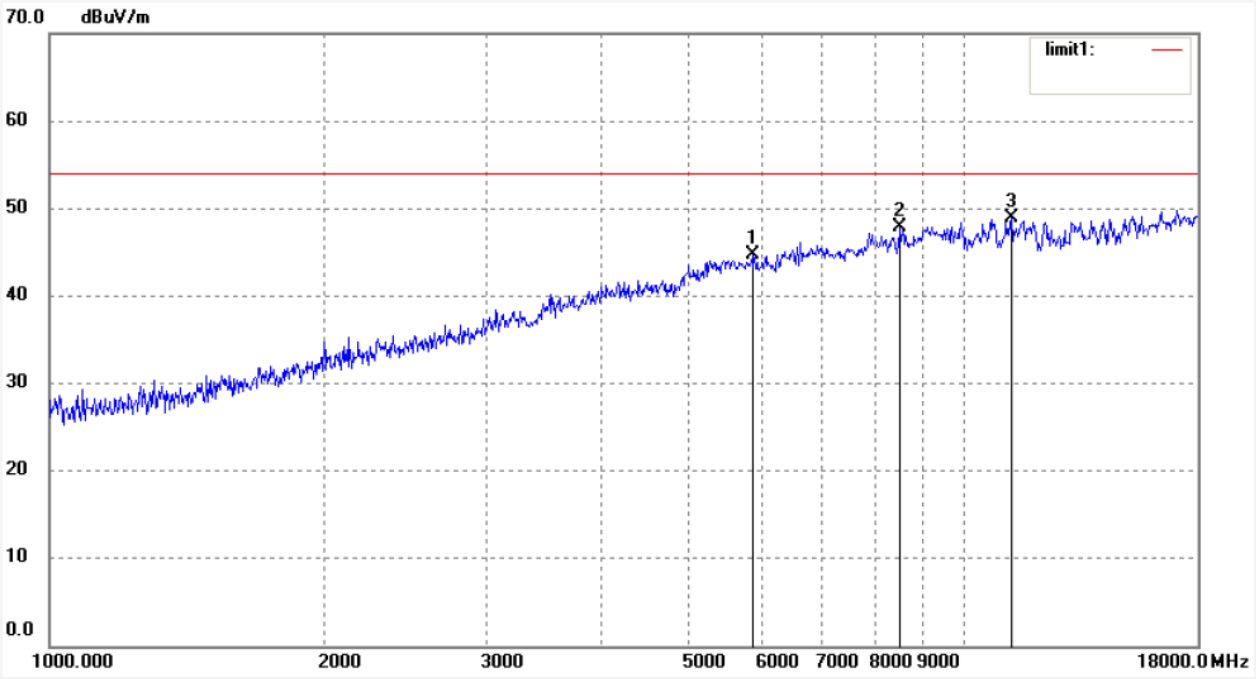
Job No.: RICKY #1393	Polarization: Vertical
Standard: FCC Class B 3M Radiated	Power Source: DC 3.7V
Test item: Radiation Test	Date: 2014/05/26
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 10:20:28
EUT: Barcode Scanner	Engineer Signature: Ricky
Mode: TX 2441MHz	Distance: 3m
Model: MS3590	
Manufacturer: MinDe	

Note: Report No.:ATE20140803



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	5864.443	41.67	3.00	44.67	54.00	-9.33	peak			
2	8514.456	39.05	8.87	47.92	54.00	-6.08	peak			
3	11269.856	37.71	11.26	48.97	54.00	-5.03	peak			

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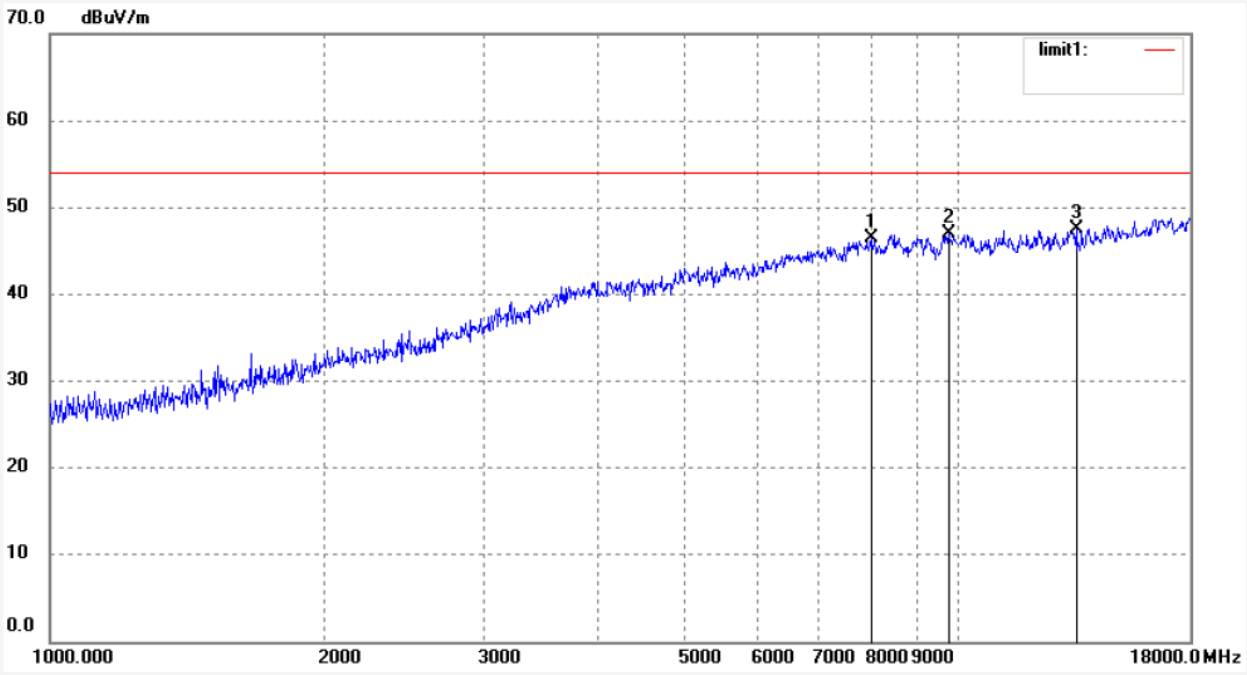
Job No.: RICKY #1394
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Barcode Scanner
Mode: TX 2480MHz
Model: MS3590
Manufacturer: MinDe

Polarization: Horizontal
Power Source: DC 3.7V
Date: 2014/05/26
Time: 10:21:55
Engineer Signature: Ricky
Distance: 3m

Note: Report No.:ATE20140803



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	8013.020	38.18	8.33	46.51	54.00	-7.49	peak			
2	9753.371	36.16	10.81	46.97	54.00	-7.03	peak			
3	13481.719	0.66	46.92	47.58	54.00	-6.42	peak			

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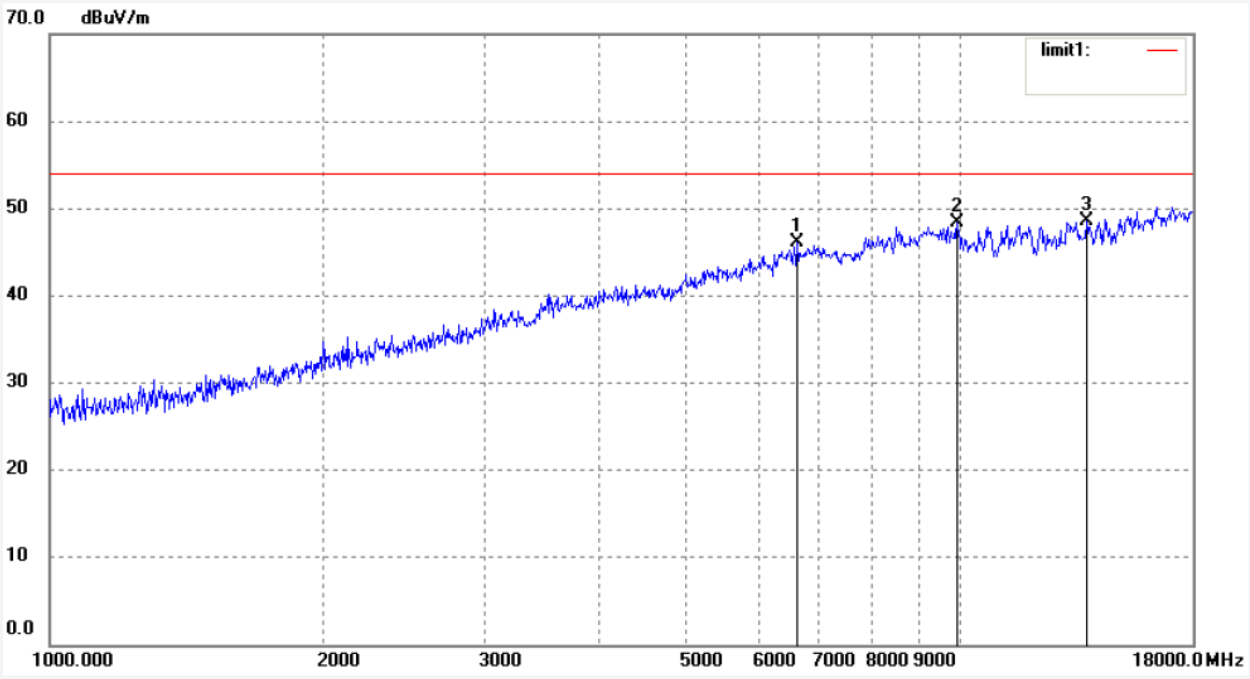
Job No.: RICKY #1395	Polarization: Vertical
Standard: FCC Class B 3M Radiated	Power Source: DC 3.7V
Test item: Radiation Test	Date: 2014/05/26
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 10:23:17
EUT: Barcode Scanner	Engineer Signature: Ricky
Mode: TX 2480MHz	Distance: 3m
Model: MS3590	
Manufacturer: MinDe	

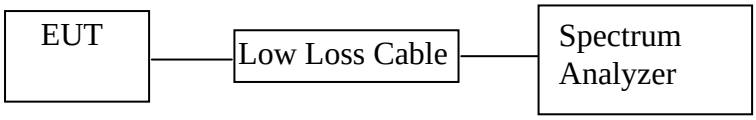
Note: Report No.:ATE20140803



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	6621.376	41.57	4.52	46.09	54.00	-7.91	peak			
2	9923.991	37.43	11.02	48.45	54.00	-5.55	peak			
3	13757.267	1.09	47.44	48.53	54.00	-5.47	peak			

11.BAND EDGE COMPLIANCE TEST

11.1.Block Diagram of Test Setup



(EUT: Barcode Scanner)

11.2.The Requirement For Section 15.247(d)

Section 15.247(d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. 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).

11.3.EUT Configuration on Measurement

The equipment are installed on the emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

11.4.Operating Condition of EUT

11.4.1.Setup the EUT and simulator as shown as Section 11.1.

11.4.2.Turn on the power of all equipment.

11.4.3.Let the EUT work in TX (Hopping off, Hopping on) modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2480MHz TX frequency to transmit.

11.5.Test Procedure

11.5.1.The transmitter output was connected to the spectrum analyzer via a low loss cable.

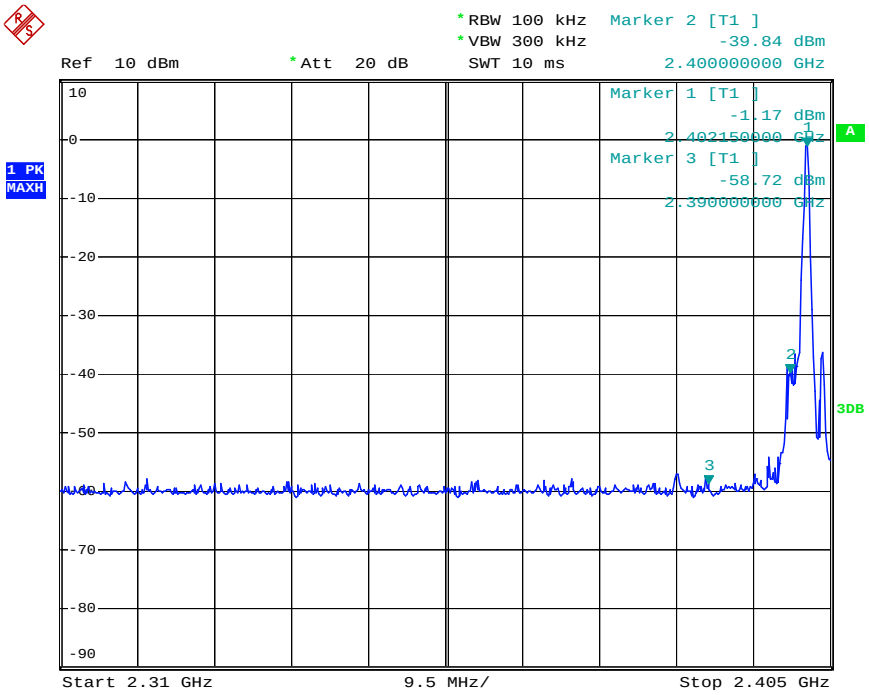
11.5.2.Set RBW of spectrum analyzer to 100 kHz and VBW to 300 kHz with convenient frequency span including 100 kHz bandwidth from band edge.

11.5.3.The band edges was measured and recorded.

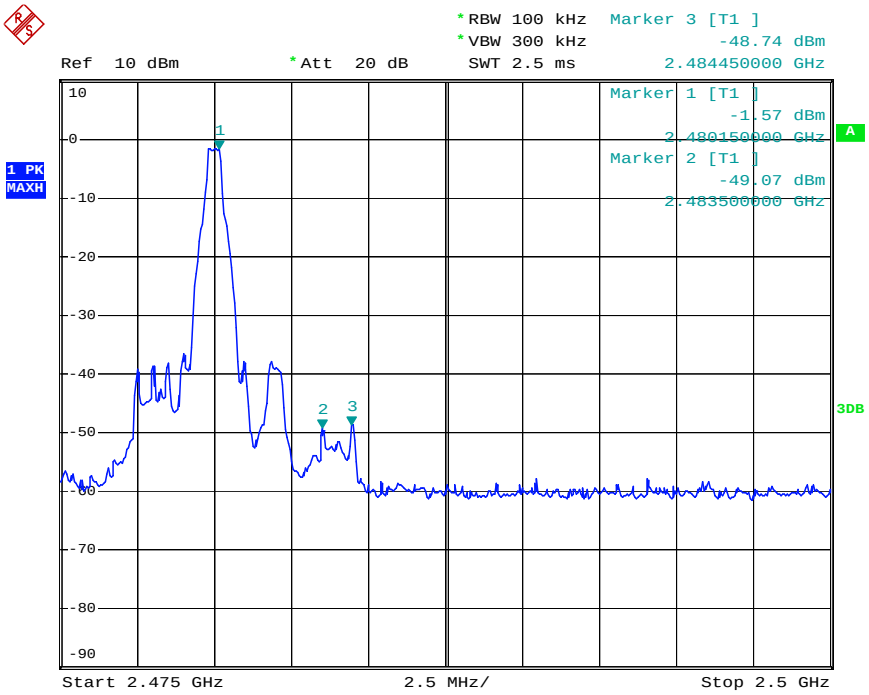
11.6.Test Result

Frequency (MHz)	Result of Band Edge (dBc)	Limit of Band Edge (dBc)
GFSK		
2399.880	57.55	> 20dBc
2483.998	47.17	> 20dBc
Π/4-DQPSK Mode		
2399.802	50.33	> 20dBc
2484.838	43.41	> 20dBc
8DPSK		
2399.750	49.50	> 20dBc
2483.788	43.41	> 20dBc

GFSK



Date: 30.MAY.2014 14:37:55



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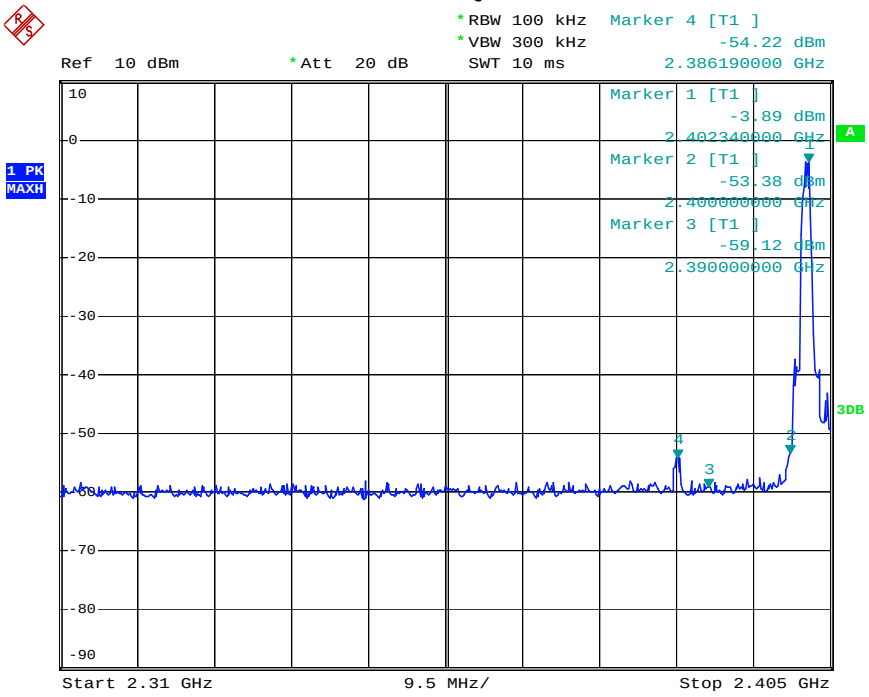
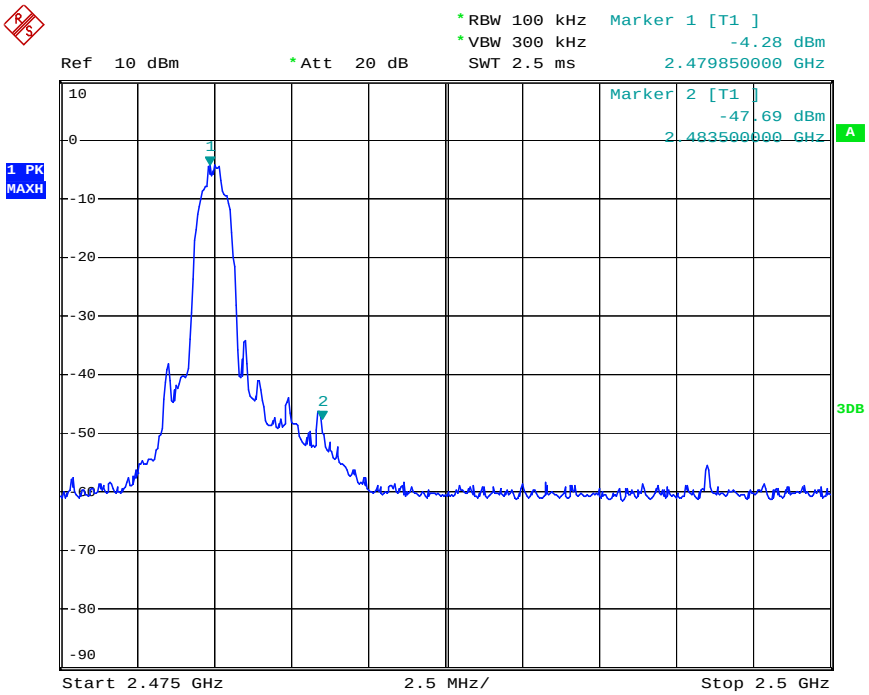
Π/4-DQPSK Mode

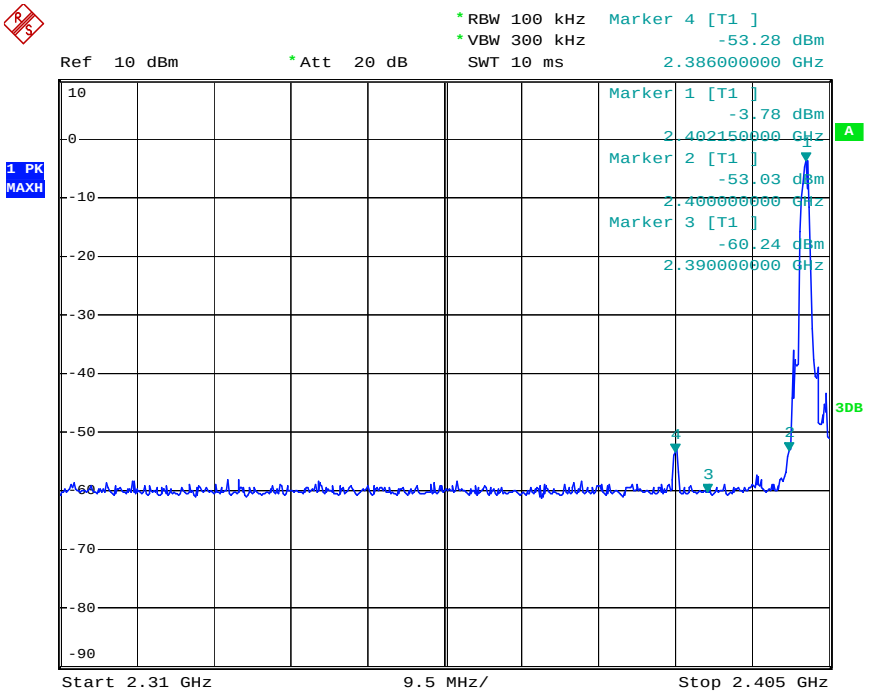


Date: 30.MAY.2014 16:04:45



Date: 30.MAY.2014 16:05:35

8DPSK



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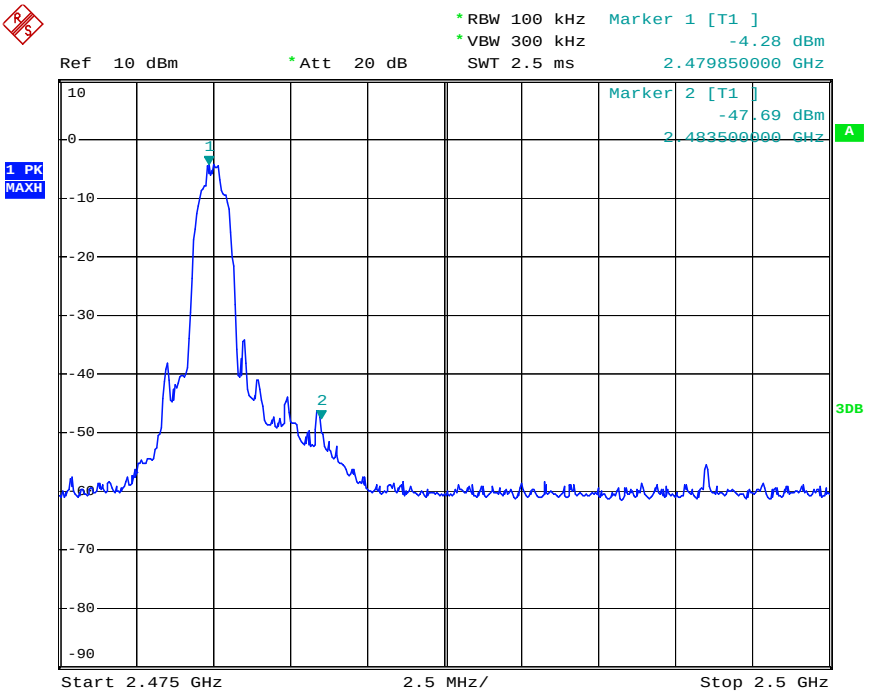

Date: 30.MAY.2014 16:05:35

Radiated Band Edge Result

Note:

1. Emissions attenuated more than 20 dB below the permissible value are not reported.
2. The field strength is calculated by adding the antenna factor, high pass filter loss(if used) and cable loss, and subtracting the amplifier gain(if any)from the measured reading. The basic equation calculation is as follows:

   Result = Reading + Corrected Factor
3. Display the measurement of peak values.

Non-hopping mode

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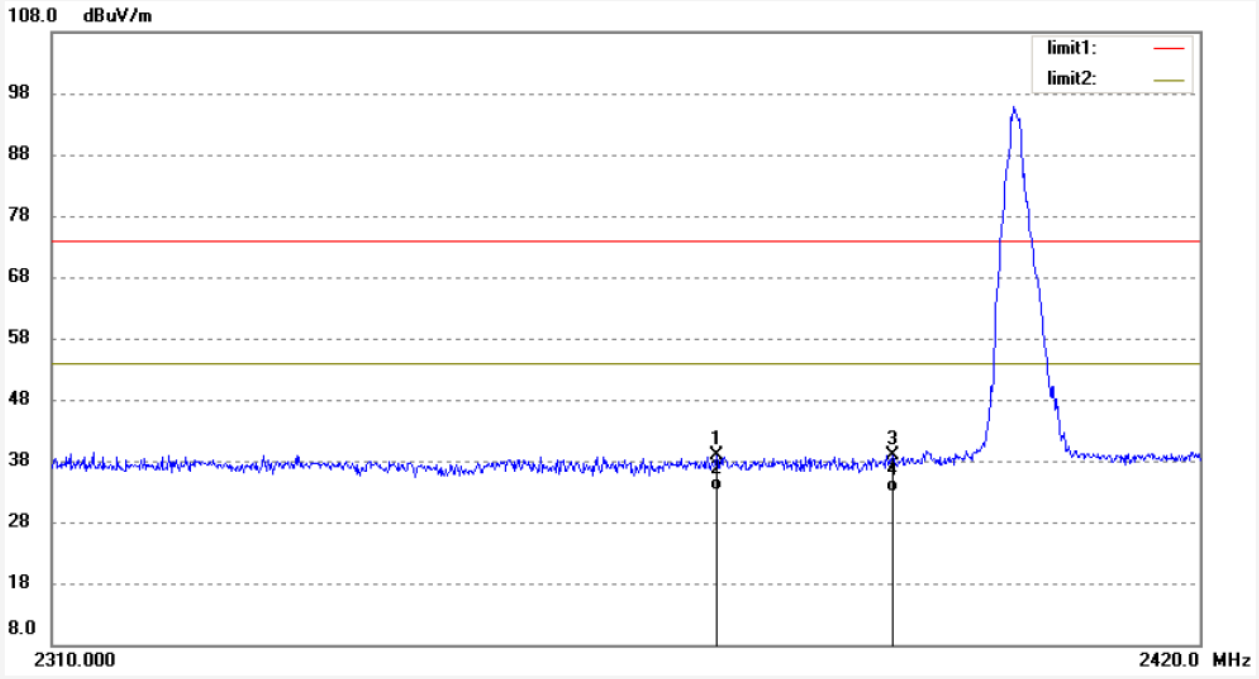
Job No.: RICKY #1455	Polarization: Horizontal
Standard: FCC PK	Power Source: DC 3.7V
Test item: Radiation Test	Date: 14/06/04/
Temp.(C)/Hum.(%) 23 C / 49 %	Time: 10/27/37
EUT: Barcode Scanner	Engineer Signature: Ricky
Mode: TX 2402MHz(GFSK)	Distance: 3m
Model: MS3590	
Manufacturer: MinDe	

Note: Report No.:ATE20140803



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2373.083	46.57	-7.64	38.93	74.00	-35.07	peak			
2	2373.083	40.72	-7.64	33.08	54.00	-20.92	AVG			
3	2390.000	46.43	-7.53	38.90	74.00	-35.10	peak			
4	2390.000	40.45	-7.53	32.92	54.00	-21.08	AVG			

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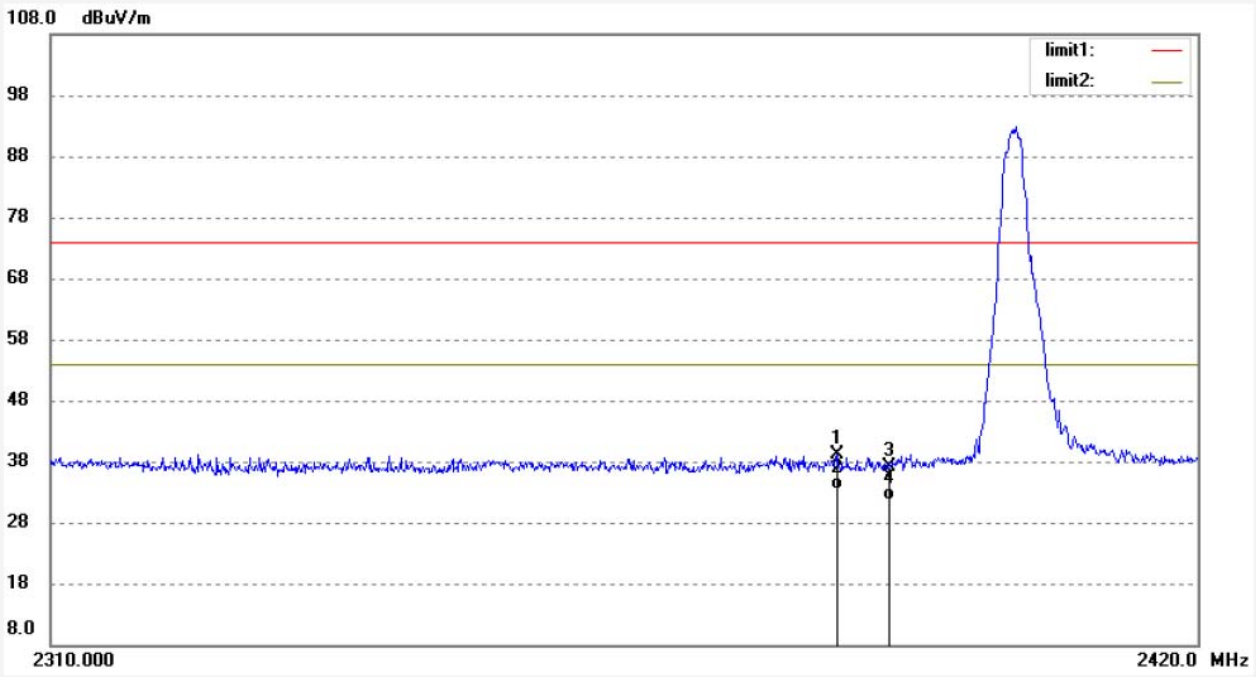
Job No.: RICKY #1454
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 49 %
EUT: Barcode Scanner
Mode: TX 2402MHz(GFSK)
Model: MS3590
Manufacturer: MinDe

Polarization: Vertical
Power Source: DC 3.7V
Date: 14/06/04/
Time: 10/26/11
Engineer Signature: Ricky
Distance: 3m

Note: Report No.:ATE20140803



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2384.838	46.73	-7.56	39.17	74.00	-34.83	peak			
2	2384.838	40.83	-7.56	33.27	54.00	-20.73	AVG			
3	2390.000	44.64	-7.53	37.11	74.00	-36.89	peak			
4	2390.000	39.24	-7.53	31.71	54.00	-22.29	AVG			

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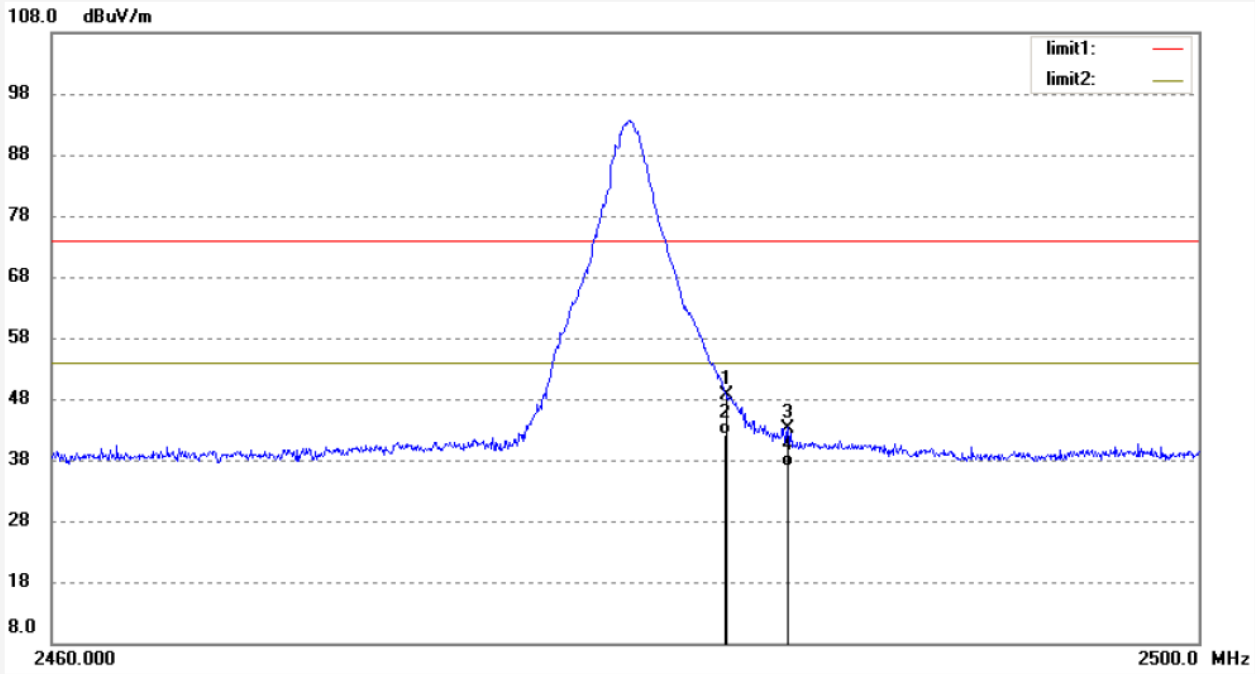
Job No.: RICKY #1453
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 49 %
EUT: Barcode Scanner
Mode: TX 2480MHz(GFSK)
Model: MS3590
Manufacturer: MinDe

Polarization: Vertical
Power Source: DC 3.7V
Date: 14/06/04/
Time: 10/25/20
Engineer Signature: Ricky
Distance: 3m

Note: Report No.:ATE20140803



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.500	55.91	-7.37	48.54	74.00	-25.46	peak			
2	2483.500	49.52	-7.37	42.15	54.00	-11.85	AVG			
3	2485.617	50.59	-7.38	43.21	74.00	-30.79	peak			
4	2485.617	44.30	-7.38	36.92	54.00	-17.08	AVG			

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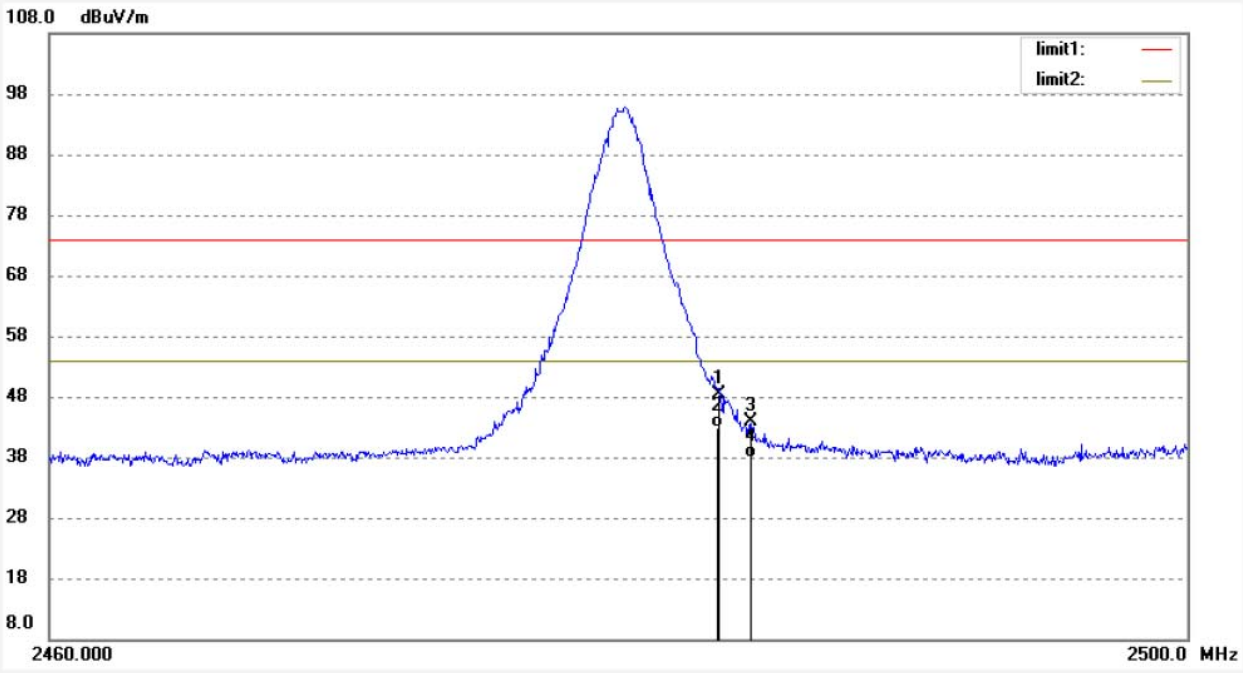
Job No.: RICKY #1452	Polarization: Horizontal
Standard: FCC PK	Power Source: DC 3.7V
Test item: Radiation Test	Date: 14/06/04/
Temp.(C)/Hum.(%) 23 C / 49 %	Time: 10/24/19
EUT: Barcode Scanner	Engineer Signature: Ricky
Mode: TX 2480MHz(GFSK)	Distance: 3m
Model: MS3590	
Manufacturer: MinDe	

Note: Report No.:ATE20140803



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.500	55.83	-7.37	48.46	74.00	-25.54	peak			
2	2483.500	50.24	-7.37	42.87	54.00	-11.13	AVG			
3	2484.573	51.31	-7.38	43.93	74.00	-30.07	peak			
4	2484.573	45.34	-7.38	37.96	54.00	-16.04	AVG			

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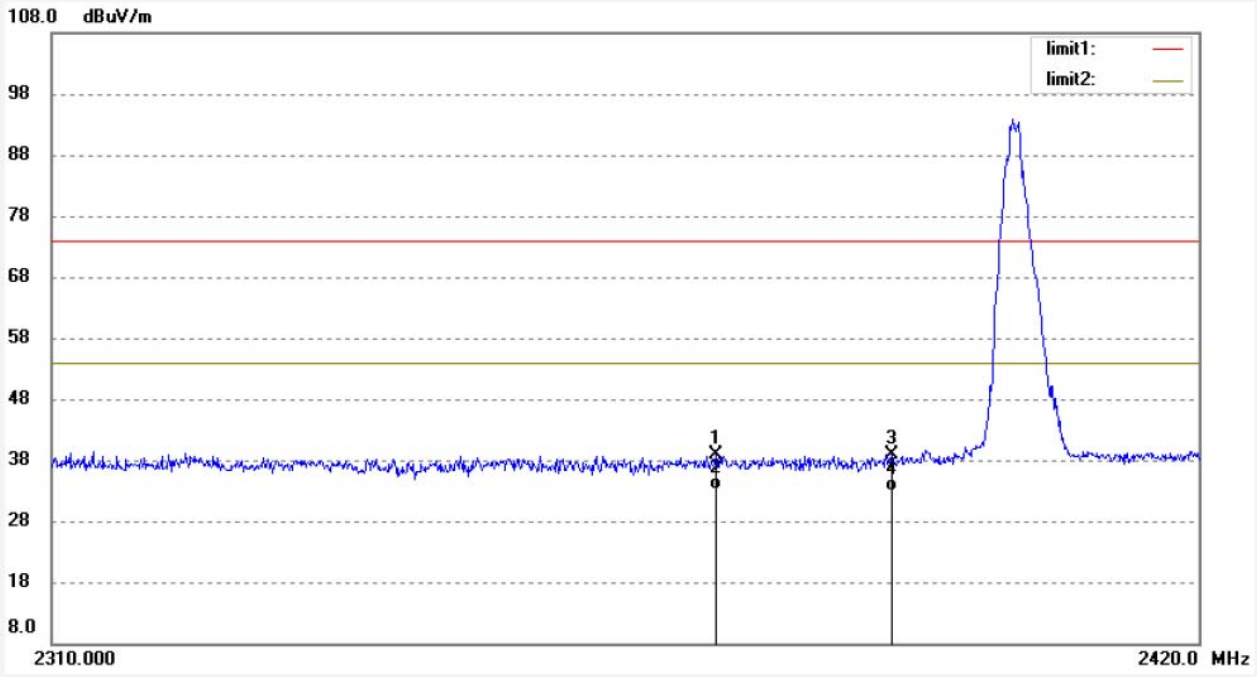
Job No.: RICKY #1451
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 49 %
EUT: Barcode Scanner
Mode: TX 2402MHz(pi/4DQPSK)
Model: MS3590
Manufacturer: MinDe

Polarization: Horizontal
Power Source: DC 3.7V
Date: 14/06/04/
Time: 10/23/25
Engineer Signature: Ricky
Distance: 3m

Note: Report No.:ATE20140803



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2373.083	46.55	-7.64	38.91	74.00	-35.09	peak			
2	2373.083	40.73	-7.64	33.09	54.00	-20.91	AVG			
3	2390.000	46.40	-7.53	38.87	74.00	-35.13	peak			
4	2390.000	40.41	-7.53	32.88	54.00	-21.12	AVG			

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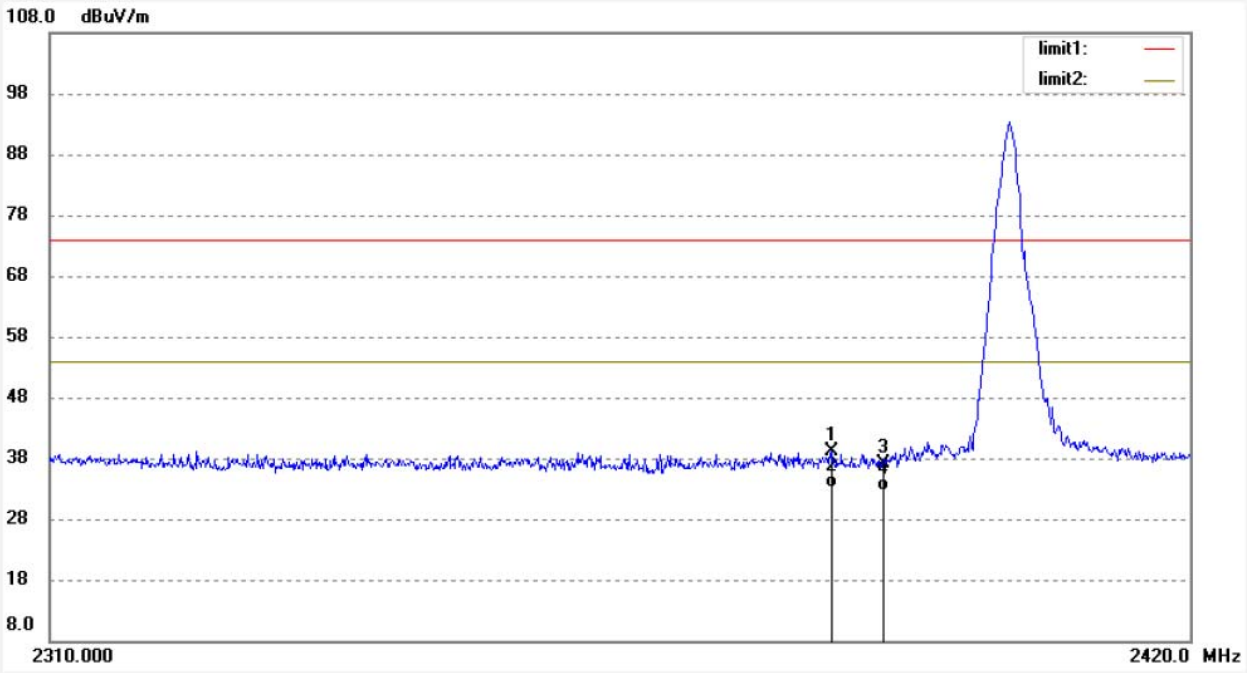
Job No.: RICKY #1450	Polarization: Vertical
Standard: FCC PK	Power Source: DC 3.7V
Test item: Radiation Test	Date: 14/06/04/
Temp.(C)/Hum.(%) 23 C / 49 %	Time: 10/22/24
EUT: Barcode Scanner	Engineer Signature: Ricky
Mode: TX 2402MHz(pi/4DQPSK)	Distance: 3m
Model: MS3590	
Manufacturer: MinDe	

Note: Report No.:ATE20140803



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2384.838	46.78	-7.56	39.22	74.00	-34.78	peak			
2	2384.838	40.65	-7.56	33.09	54.00	-20.91	AVG			
3	2390.000	44.63	-7.53	37.10	74.00	-36.90	peak			
4	2390.000	40.12	-7.53	32.59	54.00	-21.41	AVG			

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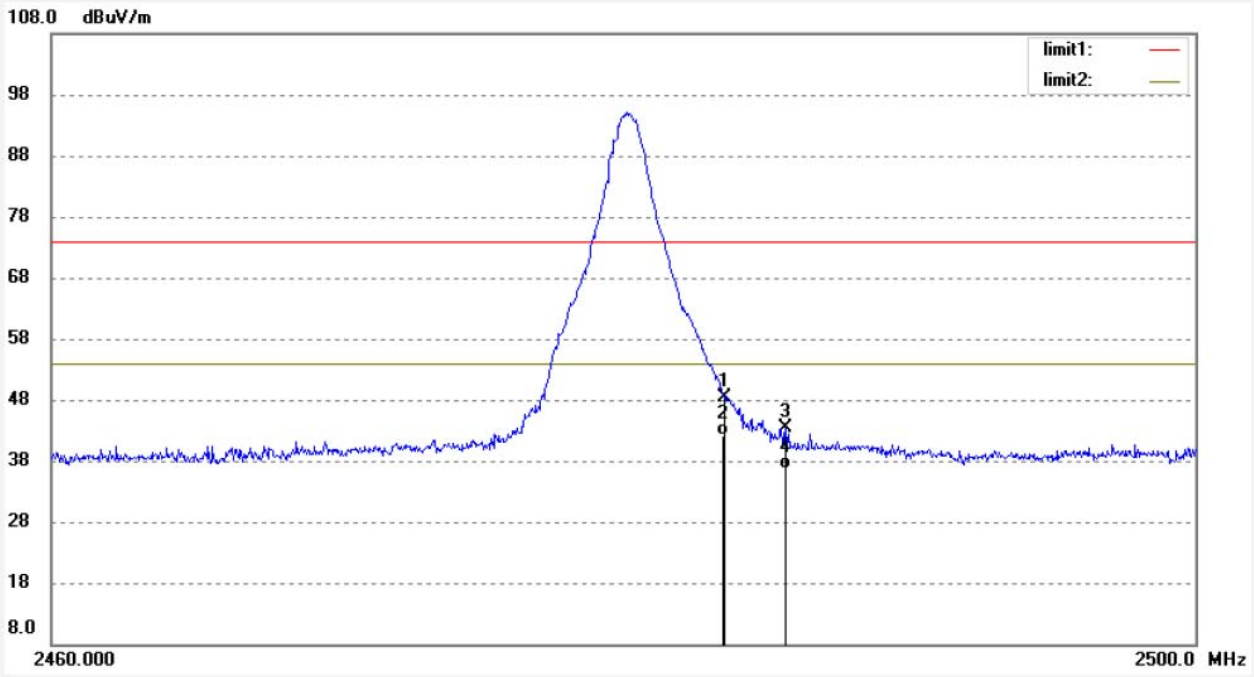
Job No.: RICKY #1449
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 49 %
EUT: Barcode Scanner
Mode: TX 2480MHz(pi/4DQPSK)
Model: MS3590
Manufacturer: MinDe

Polarization: Vertical
Power Source: DC 3.7V
Date: 14/06/04/
Time: 10/21/21
Engineer Signature: Ricky
Distance: 3m

Note: Report No.:ATE20140803



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.500	55.65	-7.37	48.28	74.00	-25.72	peak			
2	2483.500	49.51	-7.37	42.14	54.00	-11.86	AVG			
3	2485.617	50.81	-7.38	43.43	74.00	-30.57	peak			
4	2485.617	44.13	-7.38	36.75	54.00	-17.25	AVG			

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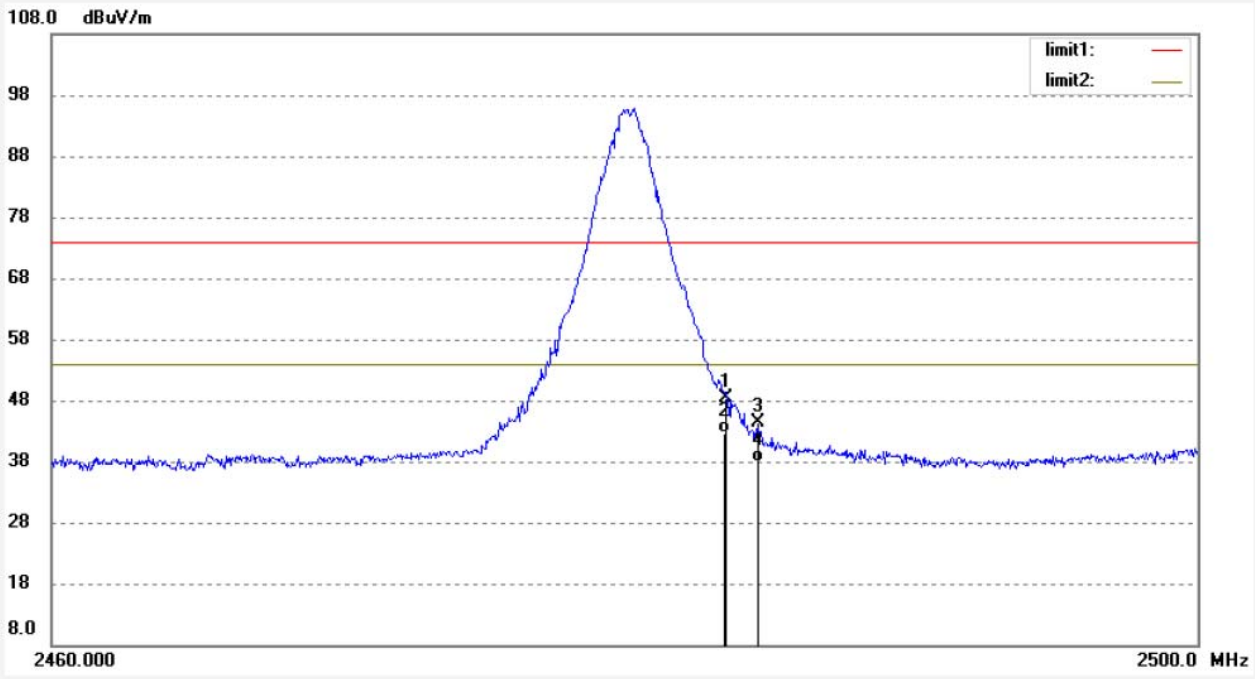
Job No.: RICKY #1448
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 49 %
EUT: Barcode Scanner
Mode: TX 2480MHz(pi/4DQPSK)
Model: MS3590
Manufacturer: MinDe

Polarization: Horizontal
Power Source: DC 3.7V
Date: 14/06/04/
Time: 10/20/54
Engineer Signature: Ricky
Distance: 3m

Note: Report No.:ATE20140803



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.500	55.65	-7.37	48.28	74.00	-25.72	peak			
2	2483.500	50.12	-7.37	42.75	54.00	-11.25	AVG			
3	2484.573	51.74	-7.38	44.36	74.00	-29.64	peak			
4	2484.573	45.30	-7.38	37.92	54.00	-16.08	AVG			

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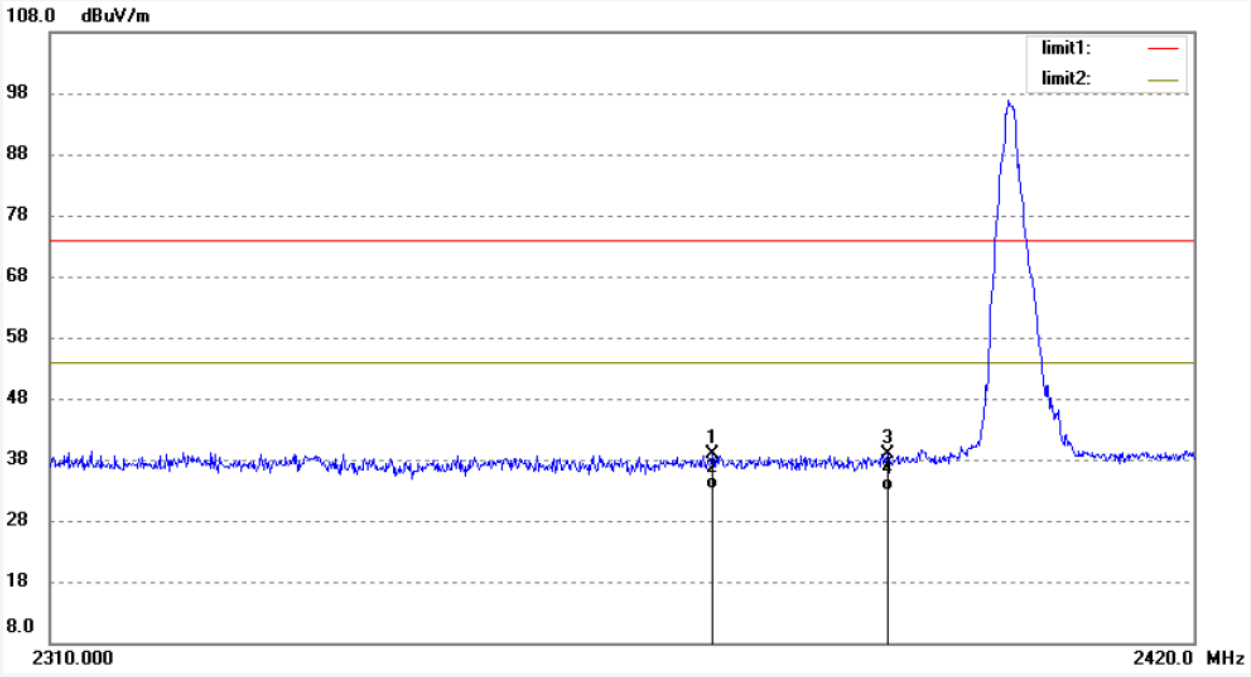
Job No.: RICKY #1447
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 49 %
EUT: Barcode Scanner
Mode: TX 2402MHz(8DPSK)
Model: MS3590
Manufacturer: MinDe

Polarization: Horizontal
Power Source: DC 3.7V
Date: 14/06/04/
Time: 10/19/25
Engineer Signature: Ricky
Distance: 3m

Note: Report No.:ATE20140803



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2373.083	46.43	-7.64	38.79	74.00	-35.21	peak			
2	2373.083	40.67	-7.64	33.03	54.00	-20.97	AVG			
3	2390.000	46.38	-7.53	38.85	74.00	-35.15	peak			
4	2390.000	40.37	-7.53	32.84	54.00	-21.16	AVG			

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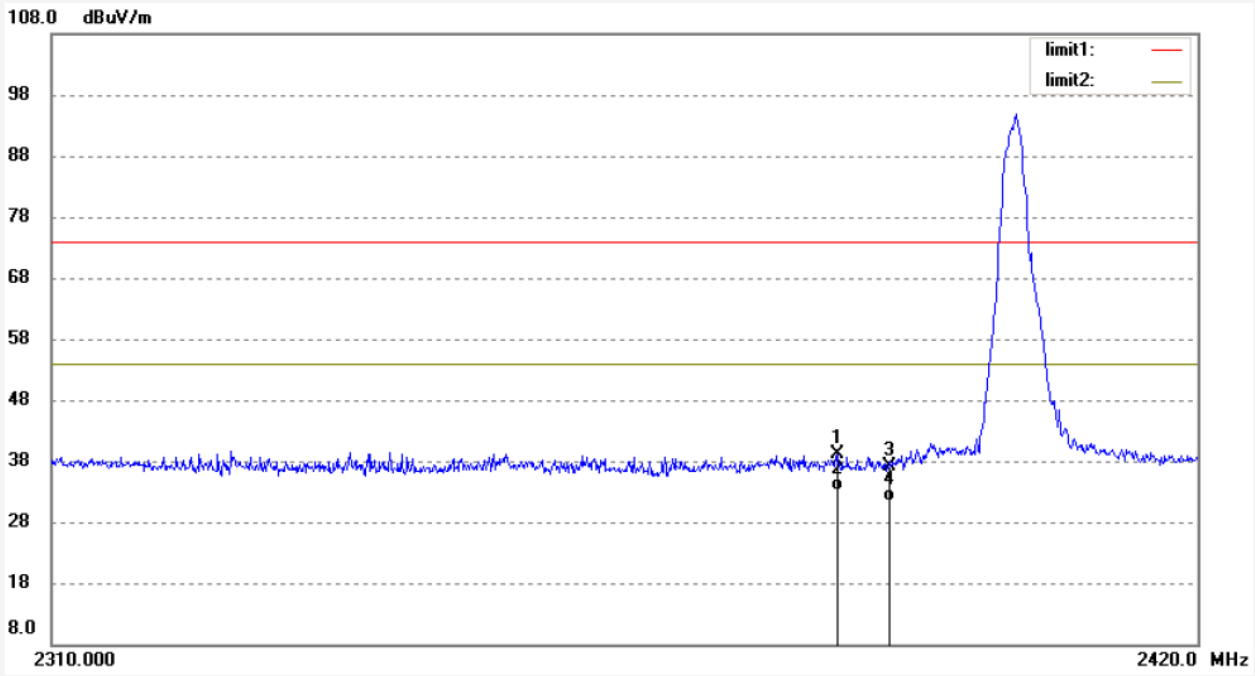
Job No.: RICKY #1446
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 49 %
EUT: Barcode Scanner
Mode: TX 2402MHz(8DPSK)
Model: MS3590
Manufacturer: MinDe

Polarization: Vertical
Power Source: DC 3.7V
Date: 14/06/04/
Time: 10/18/19
Engineer Signature: Ricky
Distance: 3m

Note: Report No.:ATE20140803



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2384.838	46.61	-7.56	39.05	74.00	-34.95	peak			
2	2384.838	40.78	-7.56	33.22	54.00	-20.78	AVG			
3	2390.000	44.56	-7.53	37.03	74.00	-36.97	peak			
4	2390.000	38.97	-7.53	31.44	54.00	-22.56	AVG			

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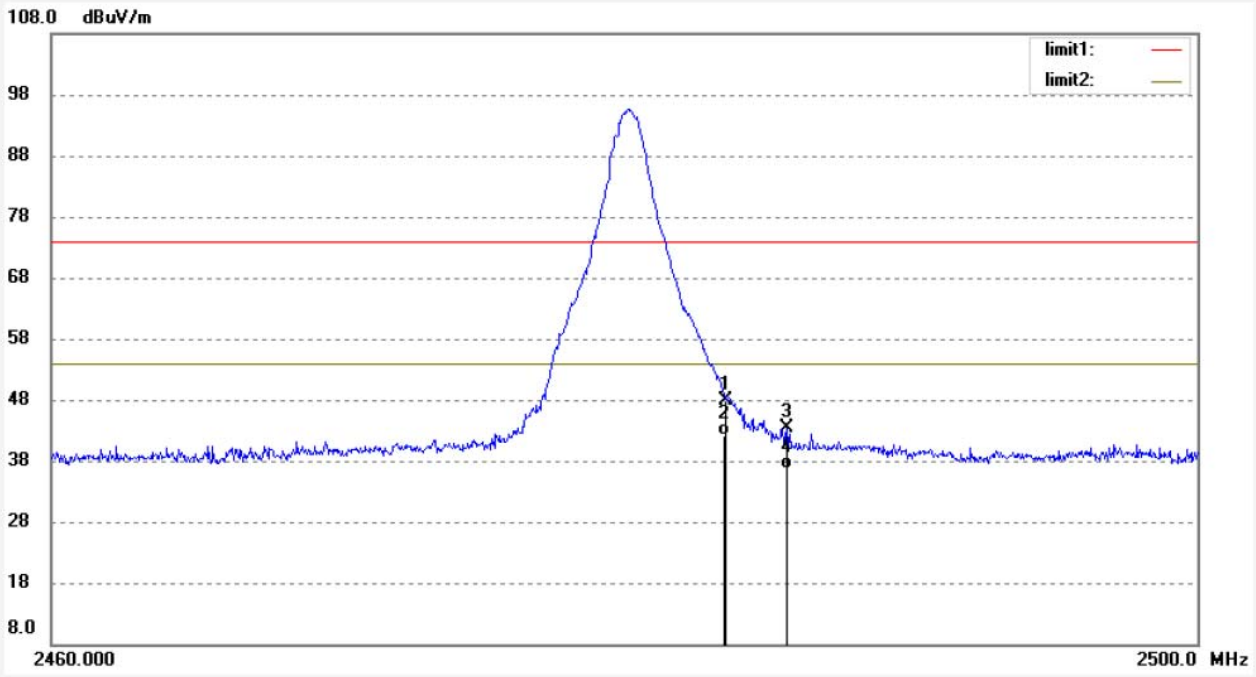
Job No.: RICKY #1445	Polarization: Vertical
Standard: FCC PK	Power Source: DC 3.7V
Test item: Radiation Test	Date: 14/06/04/
Temp.(C)/Hum.(%) 23 C / 49 %	Time: 10/17/24
EUT: Barcode Scanner	Engineer Signature: Ricky
Mode: TX 2480MHz(8DPSK)	Distance: 3m
Model: MS3590	
Manufacturer: MinDe	

Note: Report No.:ATE20140803



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.500	55.33	-7.37	47.96	74.00	-26.04	peak			
2	2483.500	49.48	-7.37	42.11	54.00	-11.89	AVG			
3	2485.617	50.75	-7.38	43.37	74.00	-30.63	peak			
4	2485.617	44.11	-7.38	36.73	54.00	-17.27	AVG			

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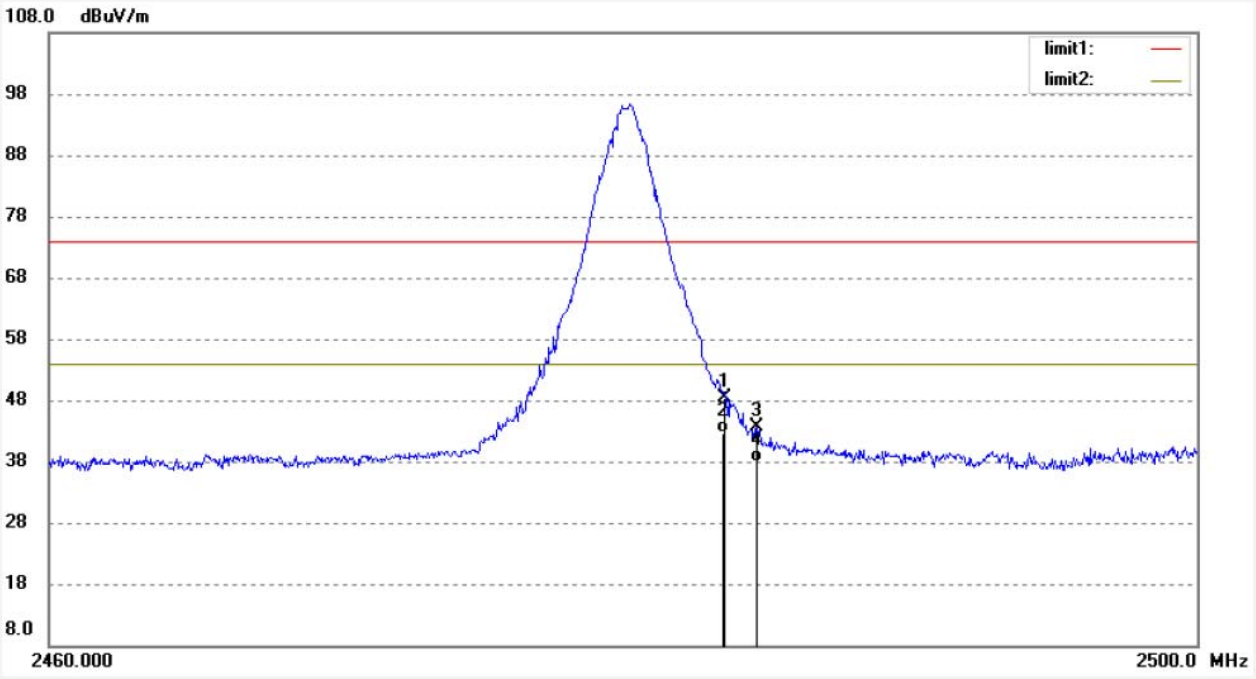
Job No.: RICKY #1444
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 49 %
EUT: Barcode Scanner
Mode: TX 2480MHz(8DPSK)
Model: MS3590
Manufacturer: MinDe

Polarization: Horizontal
Power Source: DC 3.7V
Date: 14/06/04/
Time: 10/16/41
Engineer Signature: Ricky
Distance: 3m

Note: Report No.:ATE20140803



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.500	55.75	-7.37	48.38	74.00	-25.62	peak			
2	2483.500	50.03	-7.37	42.66	54.00	-11.34	AVG			
3	2484.573	51.06	-7.38	43.68	74.00	-30.32	peak			
4	2484.573	45.27	-7.38	37.89	54.00	-16.11	AVG			

Hopping mode

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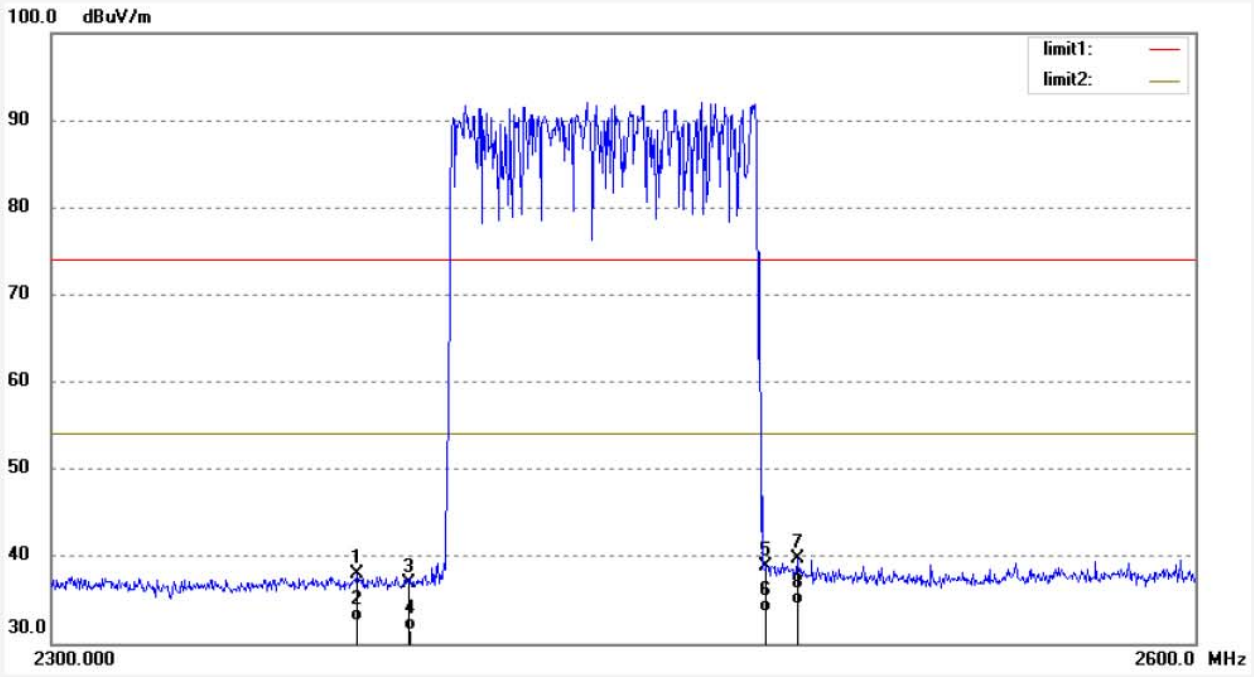
Job No.: RICKY #2027
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Barcode Scanner
Mode: HOPPING(GFSK)
Model: MS3590
Manufacturer: MinDe

Polarization: Horizontal
Power Source: DC 3.7V
Date: 14/06/19/
Time: 19/33/37
Engineer Signature:
Distance: 3m

Note: Report No:ATE20140803



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2376.800	45.59	-7.66	37.93	74.00	-36.07	peak			
2	2376.800	40.21	-7.66	32.55	54.00	-21.45	AVG			
3	2390.000	44.48	-7.57	36.91	74.00	-37.09	peak			
4	2390.000	39.11	-7.57	31.54	54.00	-22.46	AVG			
5	2483.500	46.20	-7.38	38.82	74.00	-35.18	peak			
6	2483.500	41.02	-7.38	33.64	54.00	-20.36	AVG			
7	2491.700	47.05	-7.39	39.66	74.00	-34.34	peak			
8	2491.700	41.93	-7.39	34.54	54.00	-19.46	AVG			

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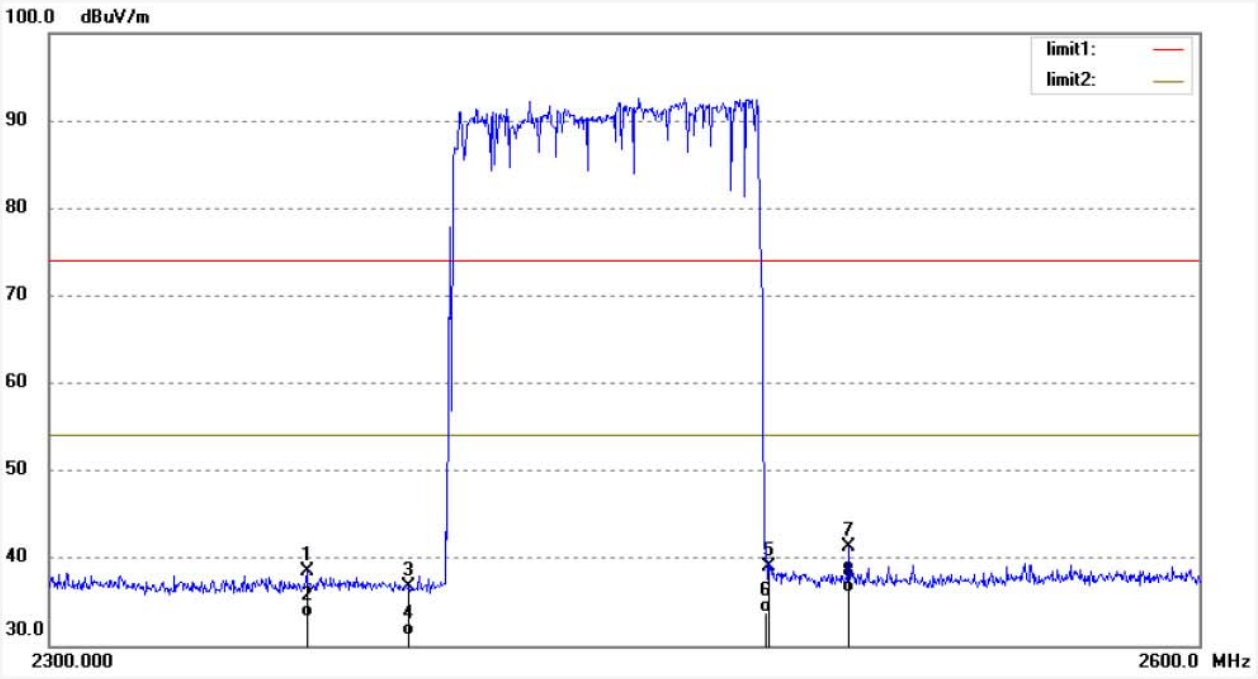
Job No.: RICKY #2028
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Barcode Scanner
Mode: HOPPING(GFSK)
Model: MS3590
Manufacturer: MinDe

Polarization: Vertical
Power Source: DC 3.7V
Date: 14/06/19/
Time: 19/40/50
Engineer Signature:
Distance: 3m

Note: Report No:ATE20140803



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2364.200	46.29	-7.74	38.55	74.00	-35.45	peak			
2	2364.200	41.03	-7.74	33.29	54.00	-20.71	AVG			
3	2390.000	44.26	-7.57	36.69	74.00	-37.31	peak			
4	2390.000	38.67	-7.57	31.10	54.00	-22.90	AVG			
5	2483.500	46.34	-7.38	38.96	74.00	-35.04	peak			
6	2483.500	41.21	-7.38	33.83	54.00	-20.17	AVG			
7	2504.600	48.72	-7.37	41.35	74.00	-32.65	peak			
8	2504.600	43.38	-7.37	36.01	54.00	-17.99	AVG			

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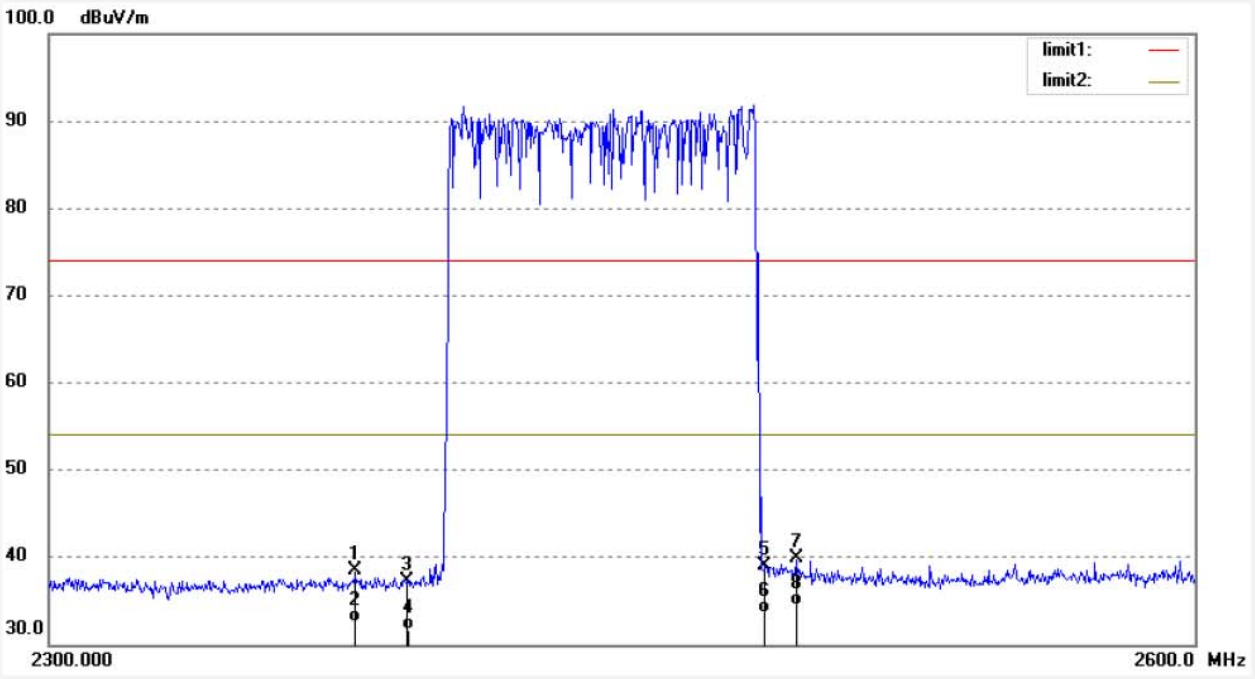
Job No.: RICKY #2029
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Barcode Scanner
Mode: HOPPING(PI/4DQPSK)
Model: MS3590
Manufacturer: MinDe

Polarization: Horizontal
Power Source: DC 3.7V
Date: 14/06/19/
Time: 19/42/32
Engineer Signature:
Distance: 3m

Note: Report No:ATE20140803



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2376.800	46.10	-7.66	38.44	74.00	-35.56	peak			
2	2376.800	40.19	-7.66	32.53	54.00	-21.47	AVG			
3	2390.000	44.85	-7.57	37.28	74.00	-36.72	peak			
4	2390.000	39.17	-7.57	31.60	54.00	-22.40	AVG			
5	2483.500	46.37	-7.38	38.99	74.00	-35.01	peak			
6	2483.500	40.97	-7.38	33.59	54.00	-20.41	AVG			
7	2491.700	47.23	-7.39	39.84	74.00	-34.16	peak			
8	2491.700	41.86	-7.39	34.47	54.00	-19.53	AVG			

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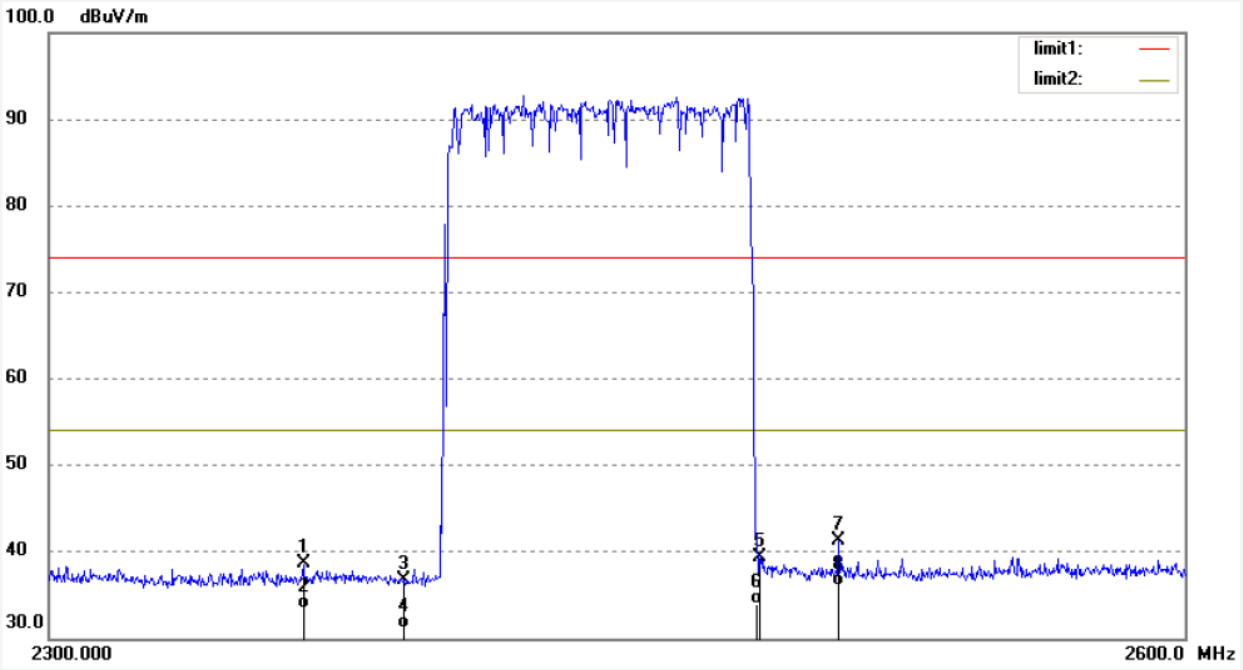
Job No.: RICKY #2030
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Barcode Scanner
Mode: HOPPING(PI/4DQPSK)
Model: MS3590
Manufacturer: MinDe

Polarization: Vertical
Power Source: DC 3.7V
Date: 14/06/19/
Time: 19/43/28
Engineer Signature:
Distance: 3m

Note: Report No:ATE20140803



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2364.200	46.37	-7.74	38.63	74.00	-35.37	peak			
2	2364.200	41.10	-7.74	33.36	54.00	-20.64	AVG			
3	2390.000	44.31	-7.57	36.74	74.00	-37.26	peak			
4	2390.000	38.72	-7.57	31.15	54.00	-22.85	AVG			
5	2483.500	46.67	-7.38	39.29	74.00	-34.71	peak			
6	2483.500	41.30	-7.38	33.92	54.00	-20.08	AVG			
7	2504.600	48.62	-7.37	41.25	74.00	-32.75	peak			
8	2504.600	43.35	-7.37	35.98	54.00	-18.02	AVG			

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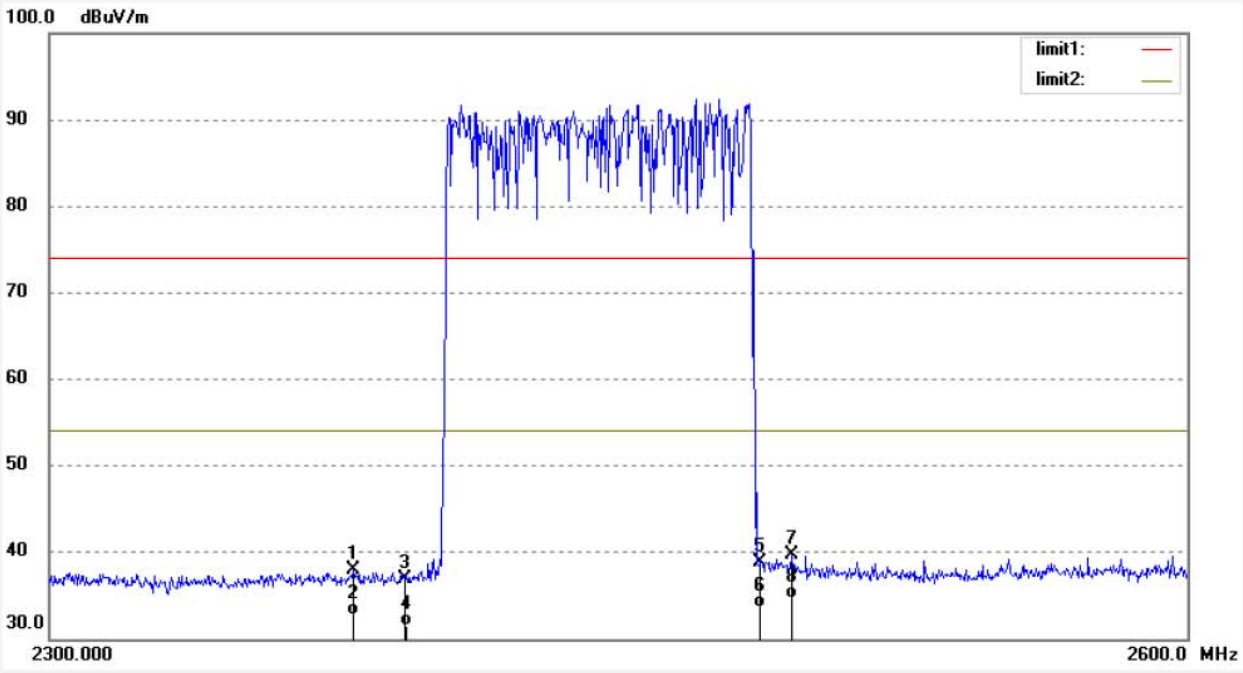
Job No.: RICKY #2031
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Barcode Scanner
Mode: HOPPING(8DPSK)
Model: MS3590
Manufacturer: MinDe

Polarization: Horizontal
Power Source: DC 3.7V
Date: 14/06/19/
Time: 19/44/25
Engineer Signature:
Distance: 3m

Note: Report No:ATE20140803



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2376.800	45.62	-7.66	37.96	74.00	-36.04	peak			
2	2376.800	40.30	-7.66	32.64	54.00	-21.36	AVG			
3	2390.000	44.51	-7.57	36.94	74.00	-37.06	peak			
4	2390.000	39.14	-7.57	31.57	54.00	-22.43	AVG			
5	2483.500	46.19	-7.38	38.81	74.00	-35.19	peak			
6	2483.500	41.00	-7.38	33.62	54.00	-20.38	AVG			
7	2491.700	47.12	-7.39	39.73	74.00	-34.27	peak			
8	2491.700	42.01	-7.39	34.62	54.00	-19.38	AVG			

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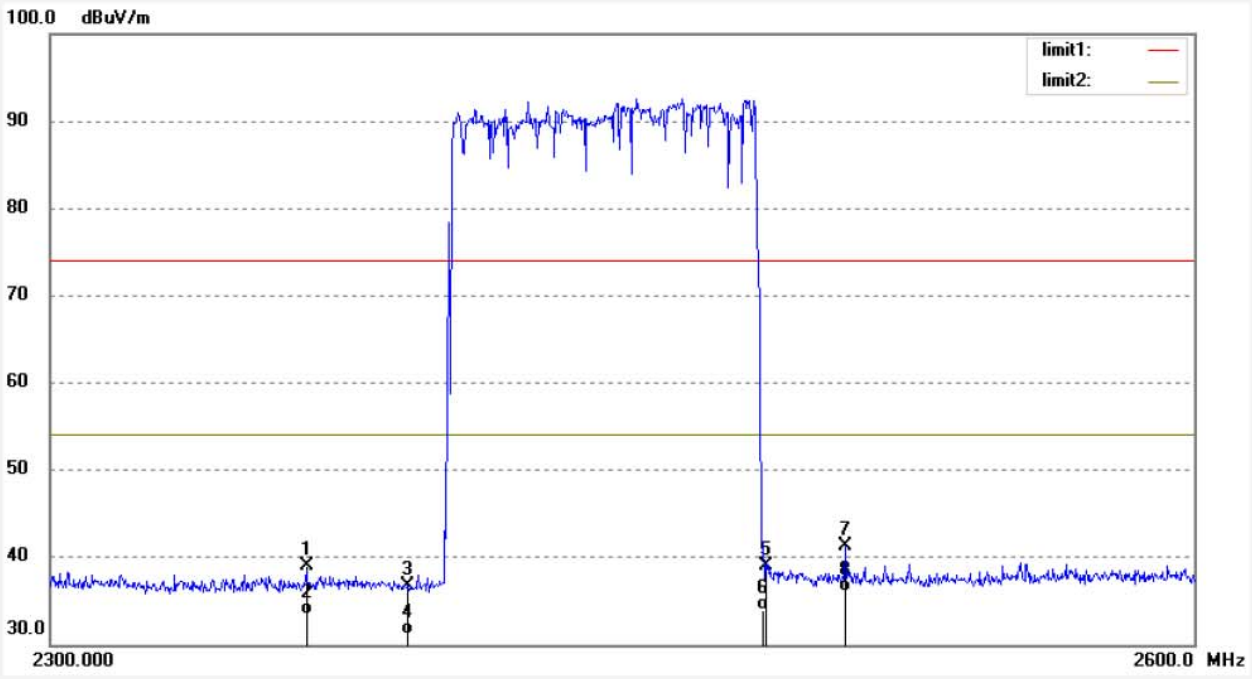
Job No.: RICKY #2032
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Barcode Scanner
Mode: HOPPING(8DPSK)
Model: MS3590
Manufacturer: MinDe

Polarization: Vertical
Power Source: DC 3.7V
Date: 14/06/19/
Time: 19/45/52
Engineer Signature:
Distance: 3m

Note: Report No:ATE20140803



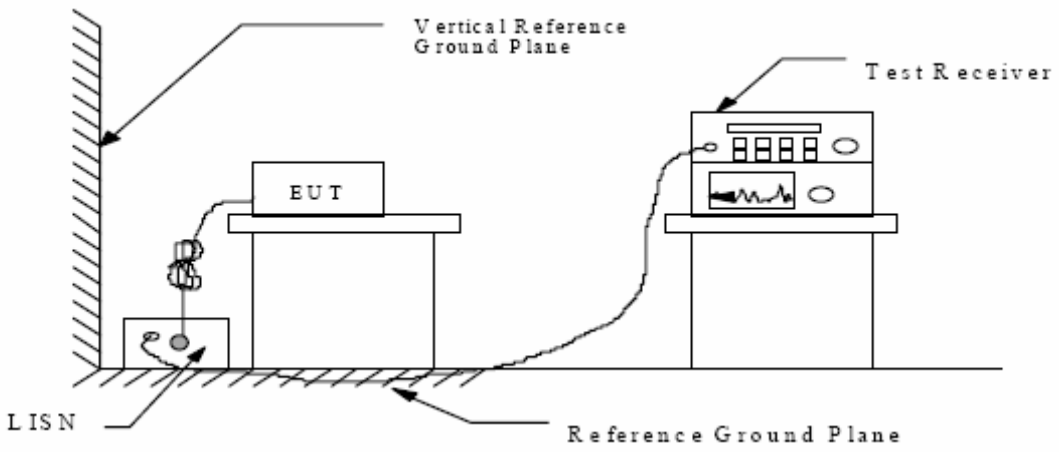
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2364.200	46.68	-7.74	38.94	74.00	-35.06	peak			
2	2364.200	41.11	-7.74	33.37	54.00	-20.63	AVG			
3	2390.000	44.33	-7.57	36.76	74.00	-37.24	peak			
4	2390.000	38.72	-7.57	31.15	54.00	-22.85	AVG			
5	2483.500	46.38	-7.38	39.00	74.00	-35.00	peak			
6	2483.500	41.23	-7.38	33.85	54.00	-20.15	AVG			
7	2504.600	48.61	-7.37	41.24	74.00	-32.76	peak			
8	2504.600	43.35	-7.37	35.98	54.00	-18.02	AVG			

12. AC POWER LINE CONDUCTED EMISSION FOR FCC PART 15 SECTION 15.207(A)

12.1. Block Diagram of Test Setup

12.1.1. Block diagram of connection between the EUT and simulators

12.1.2. Shielding Room Test Setup Diagram



(EUT: Barcode Scanner)

12.2. The Emission Limit

12.2.1. Conducted Emission Measurement Limits According to Section 15.207(a)

Frequency (MHz)	Limit dB(μV)	
	Quasi-peak Level	Average Level
0.15 - 0.50	66.0 – 56.0 *	56.0 – 46.0 *
0.50 - 5.00	56.0	46.0
5.00 - 30.00	60.0	50.0

* Decreases with the logarithm of the frequency.

12.3.Configuration of EUT on Measurement

The equipment are installed on the Conducted Emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

12.4.Operating Condition of EUT

12.4.1.Setup the EUT and simulator as shown as Section 11.1.

12.4.2.Turn on the power of all equipment.

12.4.3.Let the EUT work in TX (Operation) mode measure it.

12.5.Test Procedure

The EUT is put on the plane 0.8m high above the ground by insulating support and is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC lines are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to ANSI C63.4- 2009 on Conducted Emission Measurement.

The bandwidth of test receiver (R & S ESCS30) is set at 9 kHz.

The frequency range from 150 kHz to 30MHz is checked.

12.6.Power Line Conducted Emission Measurement Results

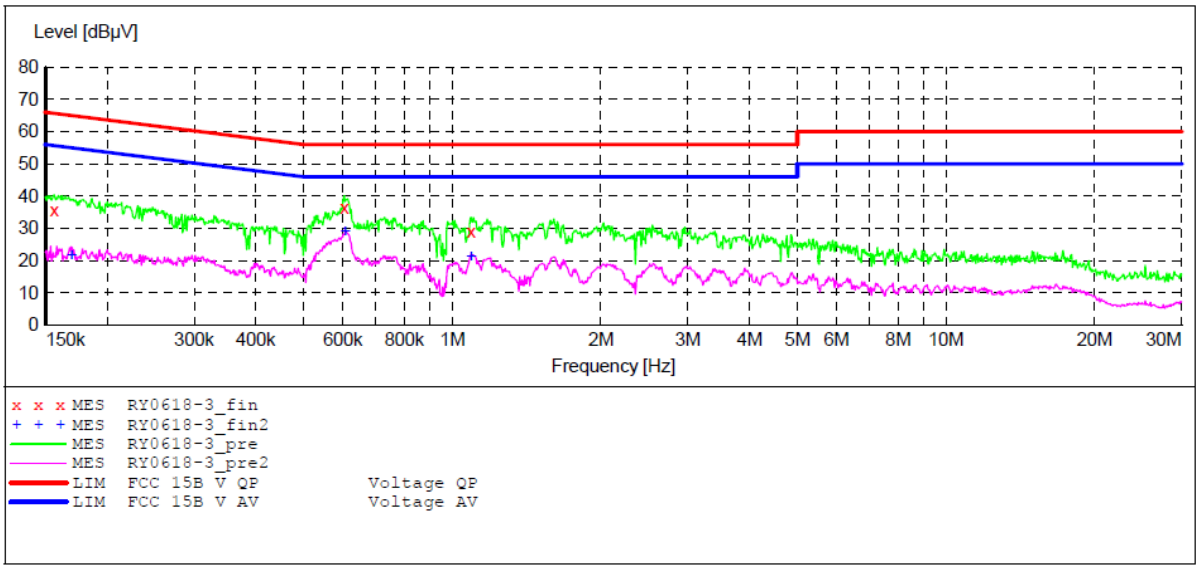
ACCURATE TECHNOLOGY CO.,LTD

CONDUCTED EMISSION STANDARD FCC PART 15 B

```
EUT:                  Barcode Scanner    M/N:MS3590
Manufacturer:         MinDe
Operating Condition:  Operation
Test Site:            1#Shielding Room
Operator:             Ricky
Test Specification:   L 120V/60Hz
Comment:
                      Report No.:ATE20140803
```

SCAN TABLE: "V 150K-30MHz fin"

```
  Short Description:              _SUB_STD_VTERM2 1.70
  Start      Stop       Step      Detector  Meas.     IF       Transducer
  Frequency  Frequency  Width               Time      Bandw.
  150.0 kHz  30.0 MHz   4.5 kHz   QuasiPeak 1.0 s     9 kHz    NSLK8126 2008
                                  Average
```



MEASUREMENT RESULT: "RY0618-3_fin"

6/18/2014 4:45PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.156109	35.50	10.5	66	30.2	QP	L1	GND
0.604167	36.30	10.7	56	19.7	QP	L1	GND
1.090804	28.90	10.9	56	27.1	QP	L1	GND

MEASUREMENT RESULT: "RY0618-3_fin2"

6/18/2014 4:45PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.169084	21.40	10.5	55	33.6	AV	L1	GND
0.606584	28.90	10.7	46	17.1	AV	L1	GND
1.090804	21.00	10.9	46	25.0	AV	L1	GND

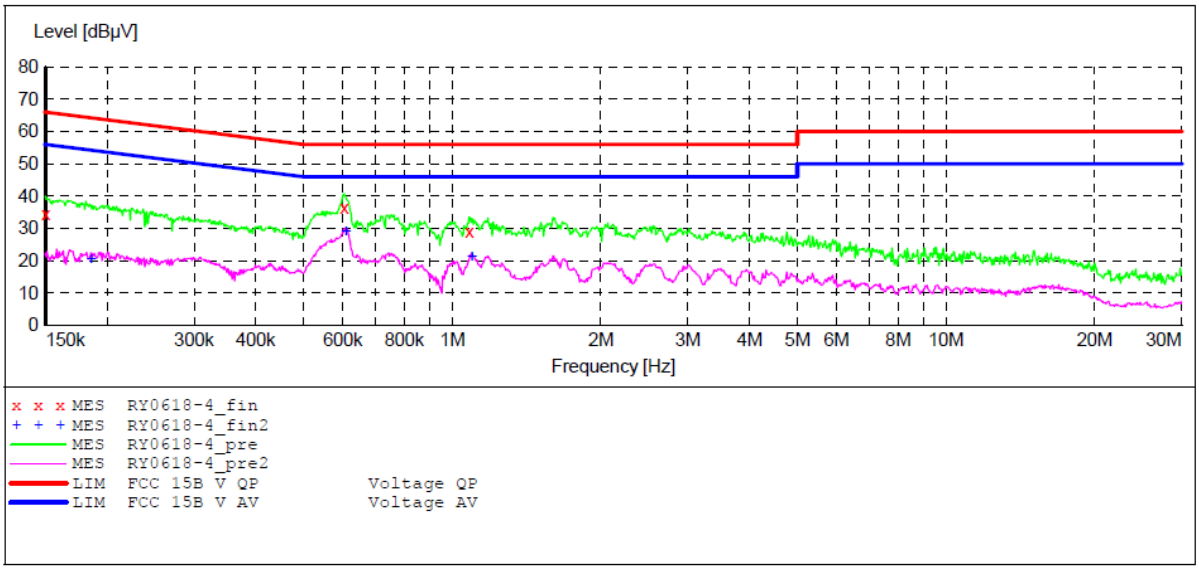
ACCURATE TECHNOLOGY CO.,LTD

CONDUCTED EMISSION STANDARD FCC PART 15 B

```
EUT:                  Barcode Scanner    M/N:MS3590
Manufacturer:         MinDe
Operating Condition:  Operation
Test Site:            1#Shielding Room
Operator:             Ricky
Test Specification:   N 120V/60Hz
Comment:
                      Report No.:ATE20140803
```

SCAN TABLE: "V 150K-30MHz fin"

```
  Short Description:              _SUB_STD_VTERM2 1.70
  Start      Stop       Step      Detector  Meas.     IF      Transducer
  Frequency  Frequency  Width               Time      Bandw.
  150.0 kHz  30.0 MHz   4.5 kHz   QuasiPeak 1.0 s     9 kHz   NSLK8126 2008
                                  Average
```



MEASUREMENT RESULT: "RY0618-4_fin"

6/18/2014 4:49PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.150000	34.50	10.5	66	31.5	QP	N	GND
0.604167	36.50	10.7	56	19.5	QP	N	GND
1.082129	28.90	10.9	56	27.1	QP	N	GND

MEASUREMENT RESULT: "RY0618-4_fin2"

6/18/2014 4:49PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.185344	20.30	10.5	54	33.9	AV	N	GND
0.609010	28.90	10.7	46	17.1	AV	N	GND
1.095167	21.20	10.9	46	24.8	AV	N	GND

13. ANTENNA REQUIREMENT

13.1. The Requirement

According to 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.

13.2. Antenna Construction

The antenna is wire antenna, no consideration of replacement. Therefore, the equipment complies with the antenna requirement of Section 15.203.

Antenna