TEST REPORT OF FCC CFR 47 PART 15 SUBPART C

ON BEHALF OF

Shenzhen Raysgem Electronic Science and Technology Co., LTD
4/5F, Bldg 2, BaoNan Rd. Industrial Park, Nanyue Communities, LongGang, Shenzhen, China

Product Name:	**LOONA**
Model/Type No.:	**RC133N1, RC133N1S, RC133N2, RC133N2S**
FCC ID Number:	**FCC ID: 2AM99-RC133N**
Prepared By:	**Shenzhen Hongcai Testing Technology Co., Ltd.** 1st-3rd Floor, Building C, Shuanghuan Xin Yi Dai Hi-Tech Industrial Park, No.8 Baoqing Road, Baolong Industrial Zone, Longgang District, Shenzhen, Guangdong, China Tel: +86-755-86337020 Fax:+86-755-86337028
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Tested Date:	June 20~July 07, 2017
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Tested By:	John Zeng/

Reviewed By: Owen.Yang
EMC Technical Supervisor

Approved By: Tony Wu
EMC Technical Manager

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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant:	**Shenzhen Raysgem Electronic Science and Technology Co., LTD**
Address of applicant:	4/5F, Bldg 2, BaoNan Rd. Industrial Park, Nanyue Communities, LongGang, Shenzhen, China
Manufacturer :	**Shenzhen Raysgem Electronic Science and Technology Co., LTD**
Address of manufacturer:	4/5F, Bldg 2, BaoNan Rd. Industrial Park, Nanyue Communities, LongGang, Shenzhen, China

General Description of E.U.T

Items	Description
EUT Description:	LOONA
Test Model:	RC133N1
Brand Name:	LOONA
Supplementary Model:	RC133N1S, RC133N2, RC133N2S
BT Version	3.0
Frequency Band:	2.402 ~ 2.480 GHz
Number of Channels:	79
Type of Modulation:	FHSS, GFSK, DPSK, DQPSK
Antenna Gain	2 dBi
Antenna Type:	Internal Antenna
Rated Voltage:	Adapter : Input: AC 100V~240V, 50/60Hz, 1.2A Output: DC 12V, 3A

Remark: ** The test data gathered are from the production sample provided by the manufacturer.*
** All models are with same structure,performance and parameters. Differences are limited to appearance and color.*

1.2 Related Submittal(s) / Grant (s) and Test Methodology

FCC Rules Part 15.247: Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz.

ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices.

DA 00-705: Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems

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1.3 Test Facility

All measurement required was performed at laboratory of Shenzhen CTL Testing Technology Co., Ltd. Floor 1-A, Baisha Technology Park, No. 3011, Shahexi Road, Nanshan, Shenzhen 518055 China There is one 3m semi-anechoic chamber and two line conducted labs for final test. The Test Sites meet the requirements in documents ANSI C63.4 and CISPR 22/EN 55022 requirements.

FCC – Registration No.: 970318

Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 970318, December, 2013.

IC Registration No.: 9618B

The 3m alternate test site of Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration No.: 9618B on November 13, 2013.

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2. SYSTEM TEST CONFIGURATION

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

The calibrated antennas used to sample the radiated field strength are mounted on a non-conductive, motorized antenna mast 3 or 10 meters from the leading edge of the turntable.

2.3 General Test Procedures

Conducted Emissions: The EUT is placed on the table, which is 0.8 m above ground plane According to the requirements in ANSI C63.10-2013 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak detector mode.

Radiated Emissions: The EUT is a placed on as turntable, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in ANSI C63.10-2013.

2.4 Measurement Uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 “Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Shenzhen CTL Testing Technology Co., Ltd. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Parameter	Uncertainty
Transmitter power conducted	+/- 0.57 dB
Transmitter power Radiated	+/- 2.20 dB
Conducted spurious emission 9KHz-40 GHz	+/- 2.20 dB
Power Line Conducted Emission	+/- 3.20 dB
Radiated Emission	+/- 4.32 dB

Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

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2.5 Measure Results Explanation Example

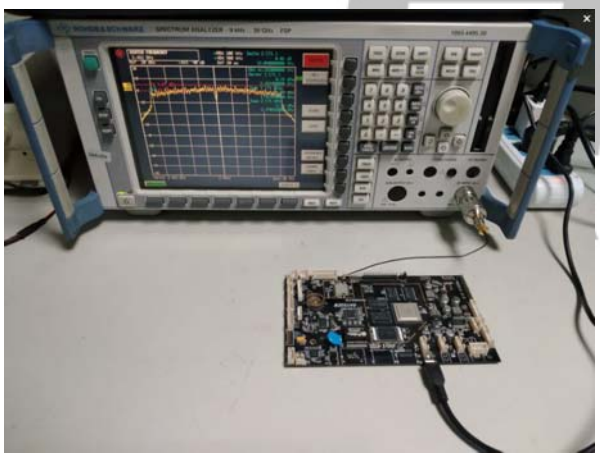
For all conducted test items:

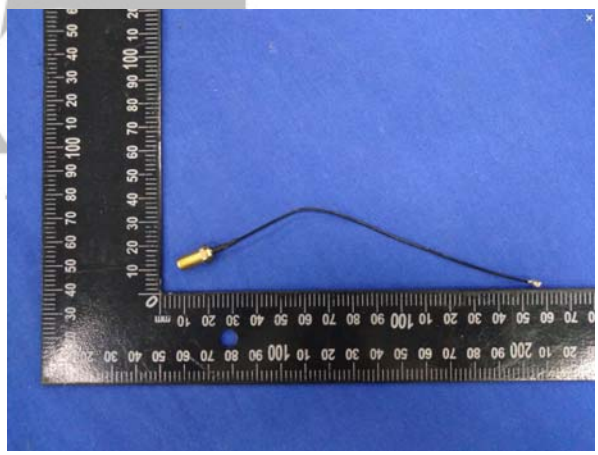
The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

The spectrum analyzer offset is derived from RF cable less and attenuator factor.
Offset= RF cable less+ attenuator factor.

Note: Using a temporary antenna connector for the EUT when the conducted measurements are performed.

Equipment	Manufacturer	Model No.	Frequency range(GHz)	Attenuation values(dBm)
Line	Zhenjiang south electronic	RG316	1-12	0.08
			<1G	0.03
			>12G	1.00
Connector	Zhenjiang south electronic	SMA-K/N-J	1-12	0.01
			<1G	0.005
			>12G	0.03





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2.6Test Equipment List and Details

Test equipments list of Shenzhen CTL Testing Technology Co., Ltd.

No.	Equipment	Manufacturer	Model No.	S/N	Last Calculator	Due Calculator
1	EMI Test Receiver	R&S	ESCI	100687	2016-7-25	2017-7-24
2	EMI Test Receiver	R&S	ESPI	100097	2016-10-1	2017-10-31
3	Amplifier	HP	8447D	1937A02492	2016-7-25	2017-7-24
4	TRILOG Broadband Test-Antenna	SCHWARZBECK	VULB9163	9163-324	2016-7-25	2017-7-24
5	RF POWER AMPLIFIER	FRANKONIA	FLL-75	1020A1109	2016-7-25	2017-7-24
6	6DB Attenuator	FRANKONIA	N/A	1001698	2016-7-25	2017-7-24
7	10dB attenuator	ELECTRO-METRICS	EM-7600	836	2016-7-25	2017-7-24
8	Spectrum Analyzer	R&S	FSP	100397	2016-10-1	2017-10-31
9	Broadband preamplifier	SCH WARZBECK	BBV9718	9718-182	2016-7-25	2017-7-24
10	Power Sensor	Anritsu	ML2438A	1241002	2016-7-25	2017-7-24
11	Power Sensor	Anritsu	MA2411B	1207366	2016-7-25	2017-7-24
12	Horn Antenna	SCHWARZBECK	BBHA 9120D	0437	2016-7-25	2017-7-24
13	Horn Antenna	SCHWARZBECK	BBHA9170	0483	2016-7-25	2017-7-24

2.7 Modulation Configure

Modulation	Packet	Packet Type	Packet Size
GFSK	DH1	4	27
	DH3	11	183
	DH5	15	339
Pi/4 DQPSK	2DH1	20	54
	2DH3	26	367
	2DH5	30	379
8DPSK	3DH1	24	83
	3DH3	27	552
	3DH5	31	1021
Normal mode: the Bluetooth has been tested on the modulation of GFSK, π/4-DQPSK and 8DPSK, compliance test and record the worst case.			

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3. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
FCC §15.207	AC Power Line Conducted Emission	Pass
FCC §15.247(a)(1)	Hopping Channel Bandwidth	Pass
FCC §15.247(a)(1)	Hopping Channel Separation	Pass
FCC §15.247(a)(1)	Number of Hopping Frequency Used	Pass
FCC §15.247(a)(1)(iii)	Dwell Time of Each Frequency	Pass
FCC §15.247(b)(1)	Maximum Peak Output Power	Pass
FCC §15.247(d)	Band Edges Emission	Pass
FCC §15.247(d)	Spurious Radiated Emission	Pass
FCC §15.203/15.247(b)/(c)	Antenna Requirement	Pass

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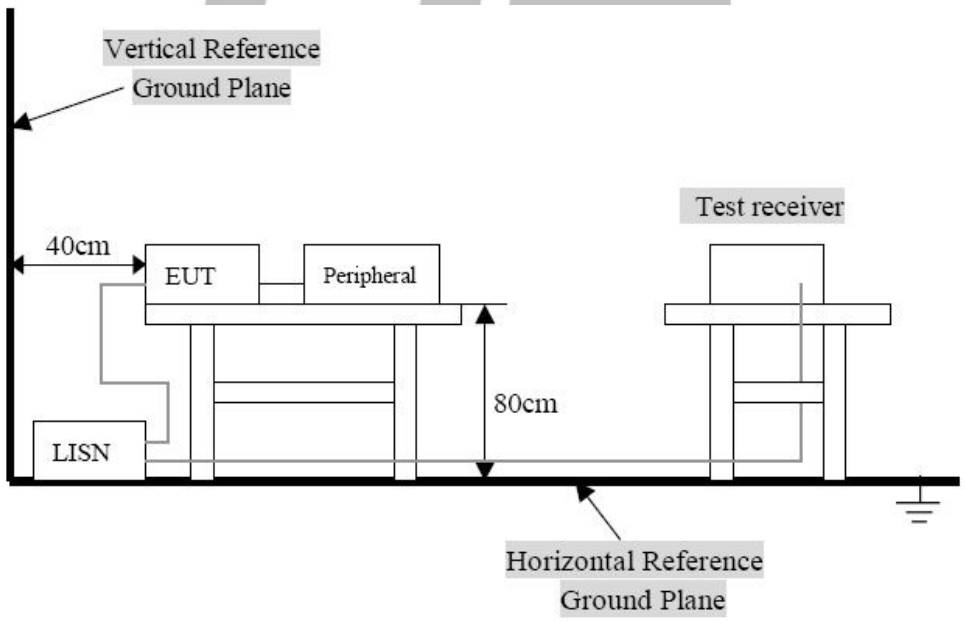
4. TEST OF AC POWER LINE CONDUCTED EMISSION

4.1 Applicable Standard

Refer to FCC §15.207.
For a Low-power Radio-frequency Device is designed to be connected to the AC power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed below limits table.

Frequency Range (MHz)	Limits (dBuV)	
	Quasi-Peak	Average
0.150～0.500	66～56	56～46
0.500～5.000	56	46
5.000～30.00	60	50

4.2 Test Setup Diagram



Remark: The EUT was connected to a 120 VAC/ 60Hz power source.

4.3 Test Result

Temperature (℃) : 23~25	EUT: LOONA
Humidity (%RH): 45~58	M/N: RC133N1
Barometric Pressure (mbar): 950~1000	Operation Condition: Tx Mode

Note: Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports. The BR1M Low Channel was chosen for this result.

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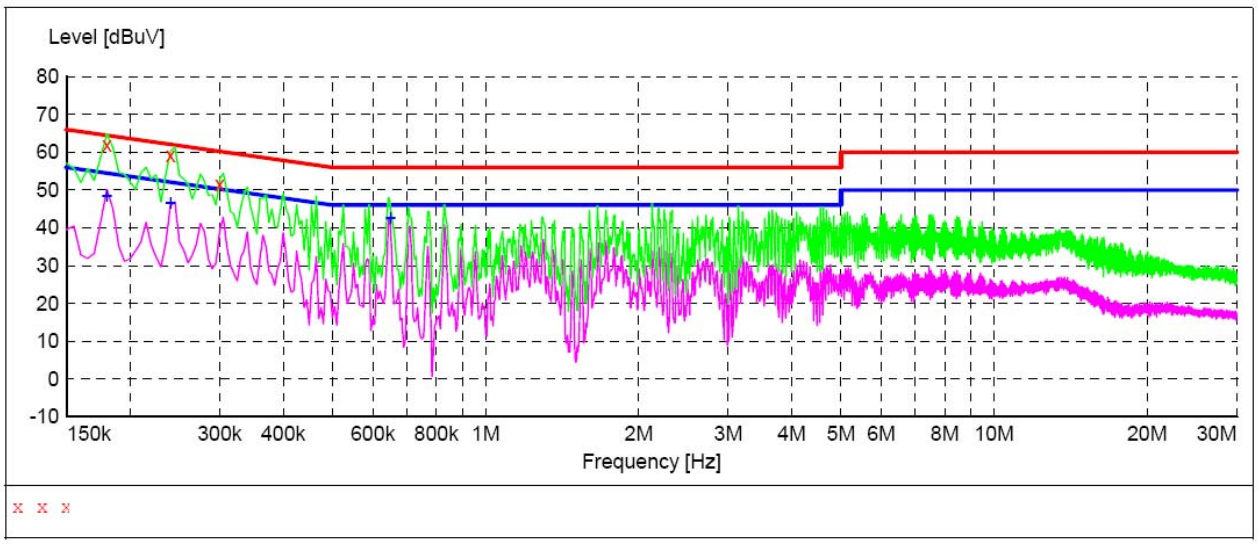
Conducted Emission:

EUT:	LOONA
M/N:	RC133N1
Operating Condition:	Tx Mode
Test Site:	Shielded Room
Operator:	Yang
Test Specification:	AC 120V/60Hz
Comment:	L Line

SCAN TABLE: "Voltage(150K-30M)FIN"

Short Description: 150K-30M Voltage



MEASUREMENT RESULT:

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.180000	61.90	12.0	65	2.6	QP	L1	GND
0.240000	59.00	13.6	62	3.1	QP	L1	GND
0.300000	51.50	11.0	60	8.7	QP	L1	GND

MEASUREMENT RESULT:

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.180000	48.30	12.0	55	6.2	AV	L1	GND
0.240000	46.60	13.6	52	5.5	AV	L1	GND
0.650000	42.70	10.4	46	3.3	AV	L1	GND

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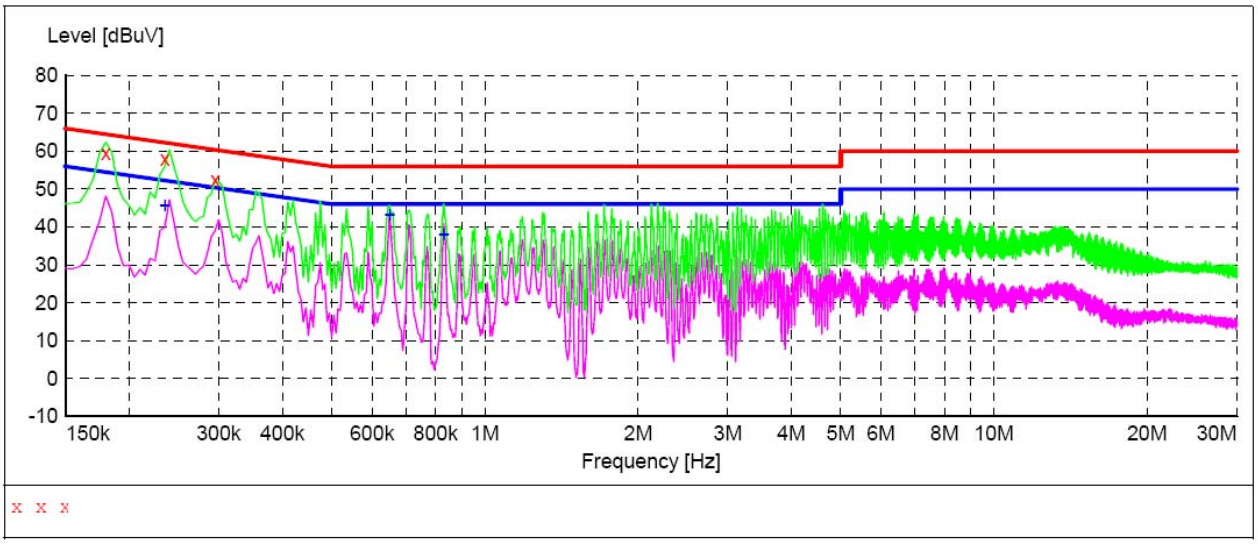
Conducted Emission:

EUT:	LOONA
M/N:	RC133N1
Operating Condition:	Tx Mode
Test Site:	Shielded Room
Operator:	Yang
Test Specification:	AC 120V/60Hz
Comment:	N Line

SCAN TABLE: "Voltage(150K-30M)FIN"

Short Description: 150K-30M Voltage



MEASUREMENT RESULT:

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.180000	59.40	12.0	65	5.1	QP	N	GND
0.235000	58.00	13.4	62	4.3	QP	N	GND
0.295000	52.40	11.2	60	8.0	QP	N	GND

MEASUREMENT RESULT:

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.235000	45.80	13.4	52	6.5	AV	N	GND
0.650000	43.10	10.4	46	2.9	AV	N	GND
0.830000	38.10	10.3	46	7.9	AV	N	GND

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5. Test of Hopping Channel Bandwidth

5.1 Applicable Standard

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.

5.2 EUT Setup

Spectrum Analyzer

5.3 Test Equipment List and Details

See section 2.6.

5.4 Test Procedure

1. The transmitter output was connected to the spectrum analyzer through an attenuator.

2. Use the following spectrum analyzer settings:
   Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel
   RBW ≥ 1% of the 20 dB bandwidth, VBW ≥ RBW
   Sweep = auto
   Detector function = peak
   Trace = max hold

3. The spectrum width with level higher than 20dB below the peak level.

4. Repeat above 1~3 points for the middle and highest channel of the EUT.

5.5 Test Result

Temperature (℃) : 22~23	EUT: LOONA
Humidity (%RH): 50~54	M/N: RC133N1
Barometric Pressure (mbar): 950~1000	Operation Condition: Continuously Tx Mode

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BR 1M

Modulation Type	Channel No.	Frequency (MHz)	20dB Bandwidth (kHz)
GFSK	Low	2402.00	920
GFSK	Middle	2441.00	924
GFSK	High	2480.00	944

EDR 2M

Modulation Type	Channel No.	Frequency (MHz)	20dB Bandwidth (kHz)
DQPSK	Low	2402.00	1212
DQPSK	Middle	2441.00	1228
DQPSK	High	2480.00	1228

EDR 3M

Modulation Type	Channel No.	Frequency (MHz)	20dB Bandwidth (kHz)
DPSK	Low	2402.00	1212
DPSK	Middle	2441.00	1216
DPSK	High	2480.00	1216

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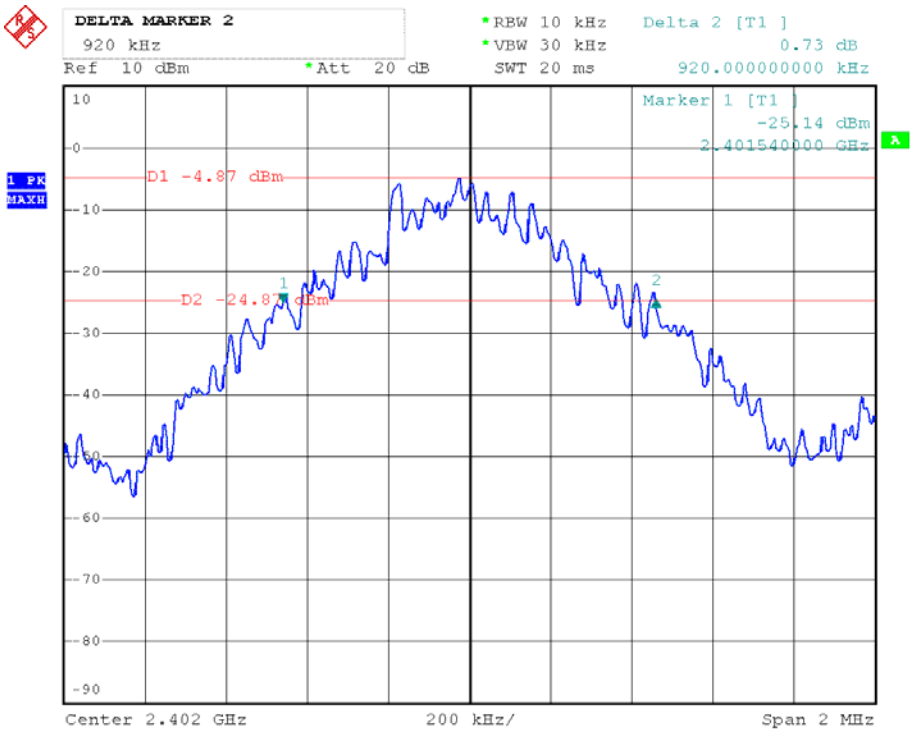
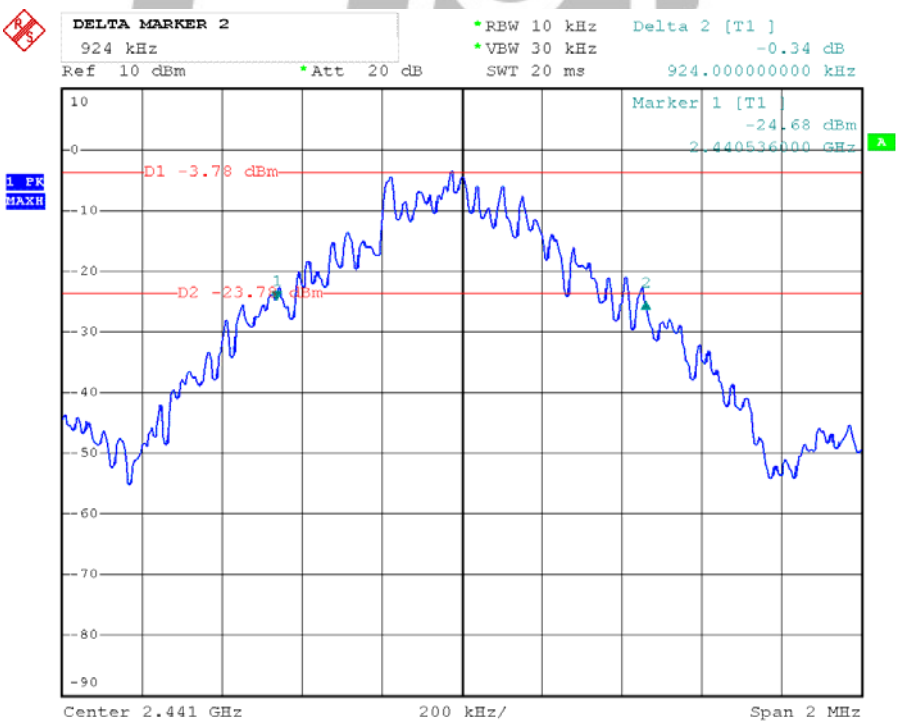
BR 1M
Channel Low



Channel Middle



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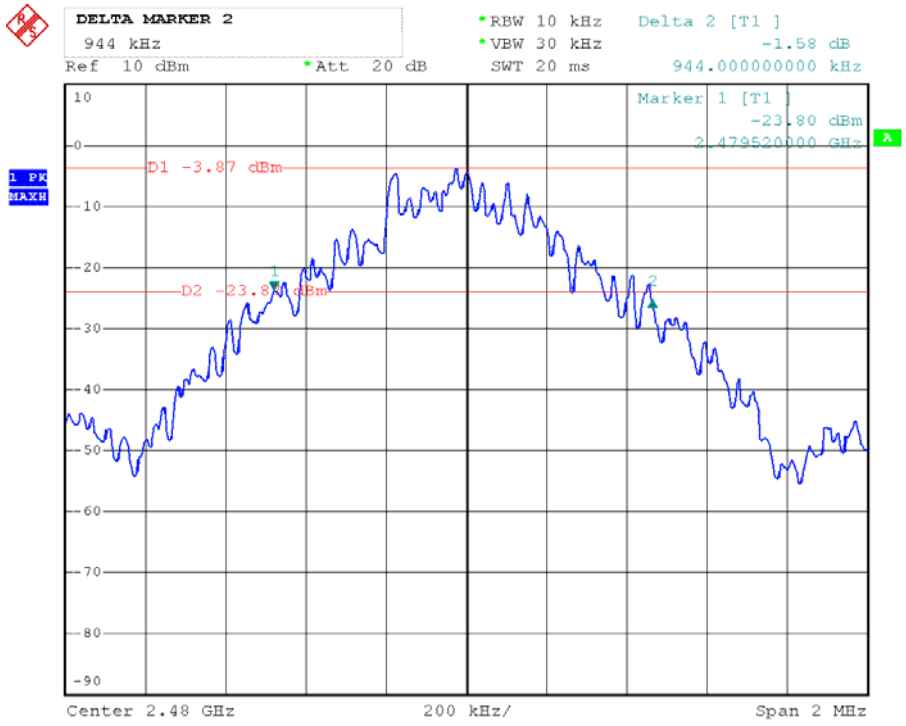
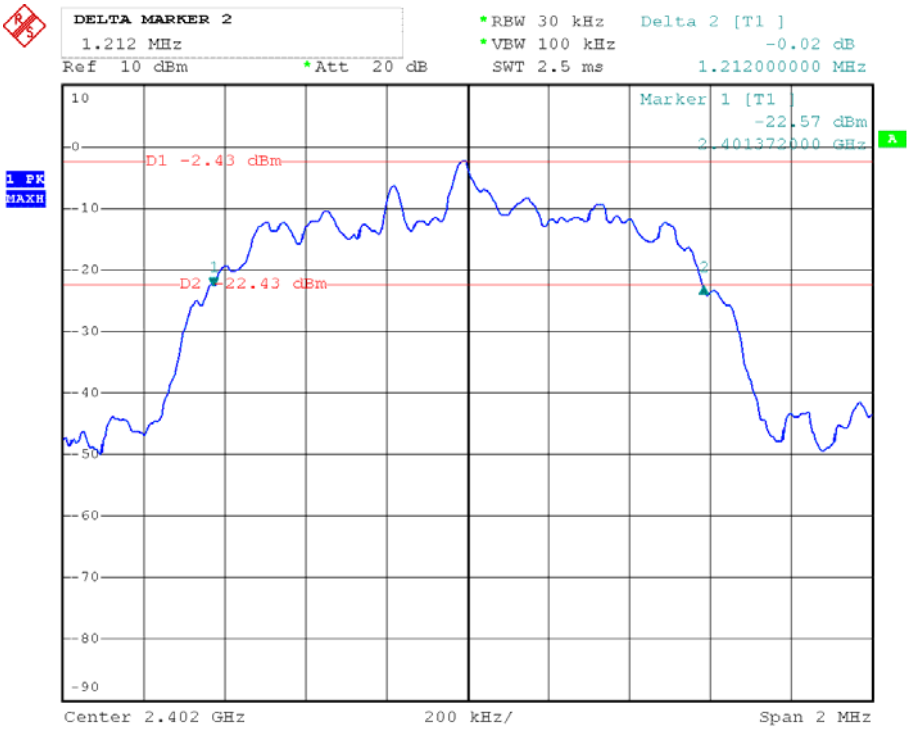
Channel High



EDR 2M
Channel Low



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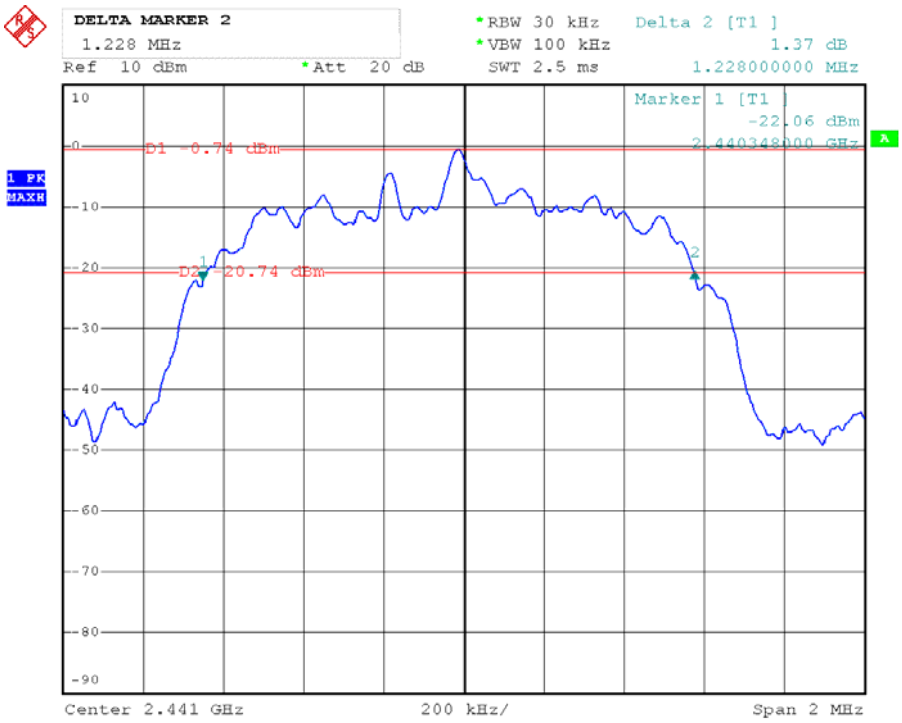
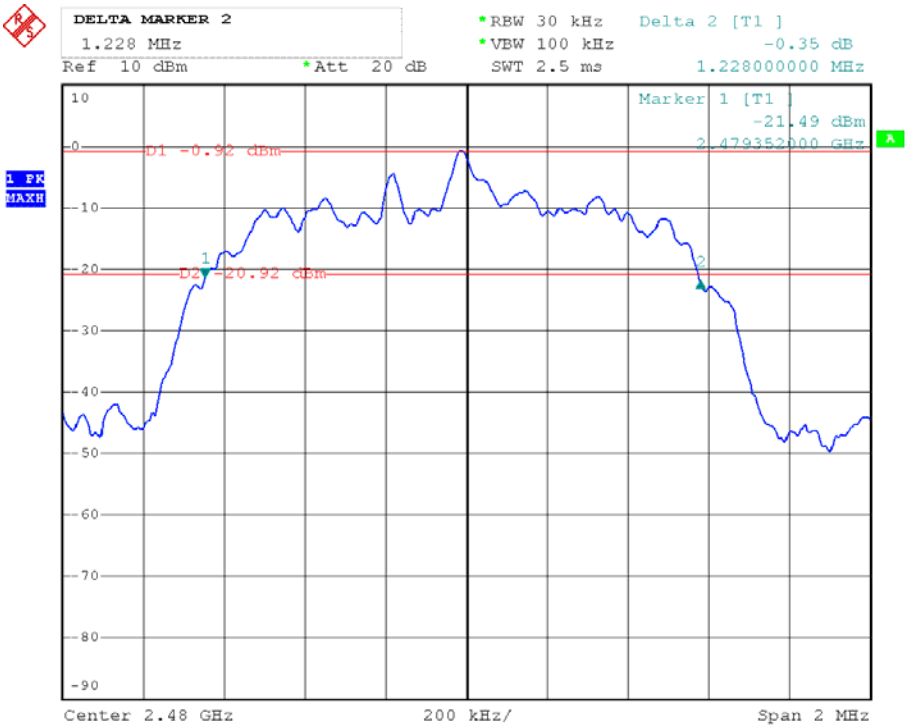
Channel Middle



Channel High



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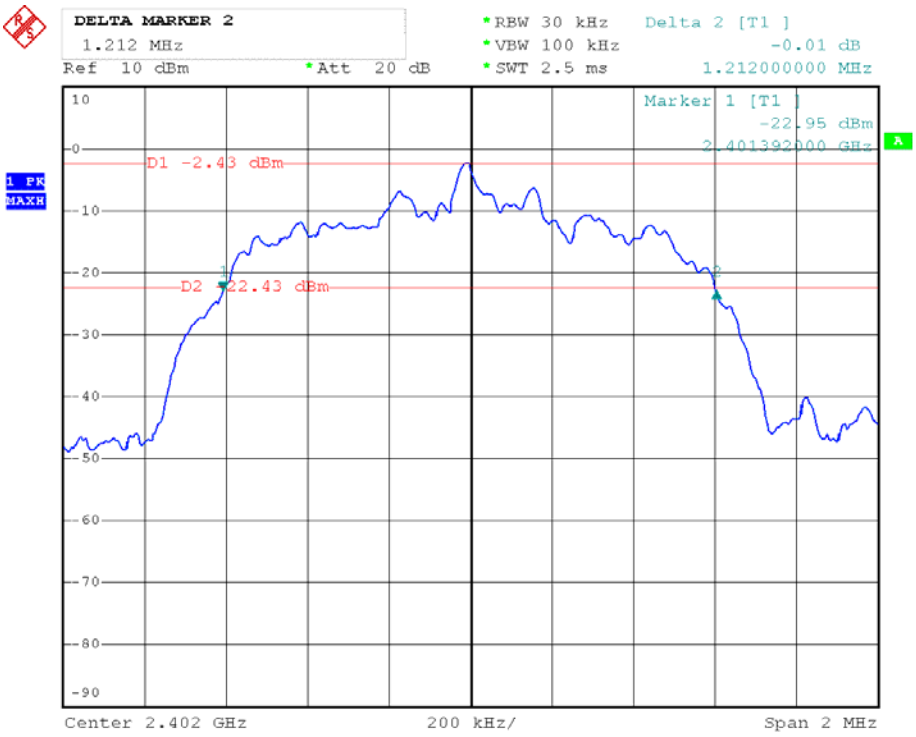
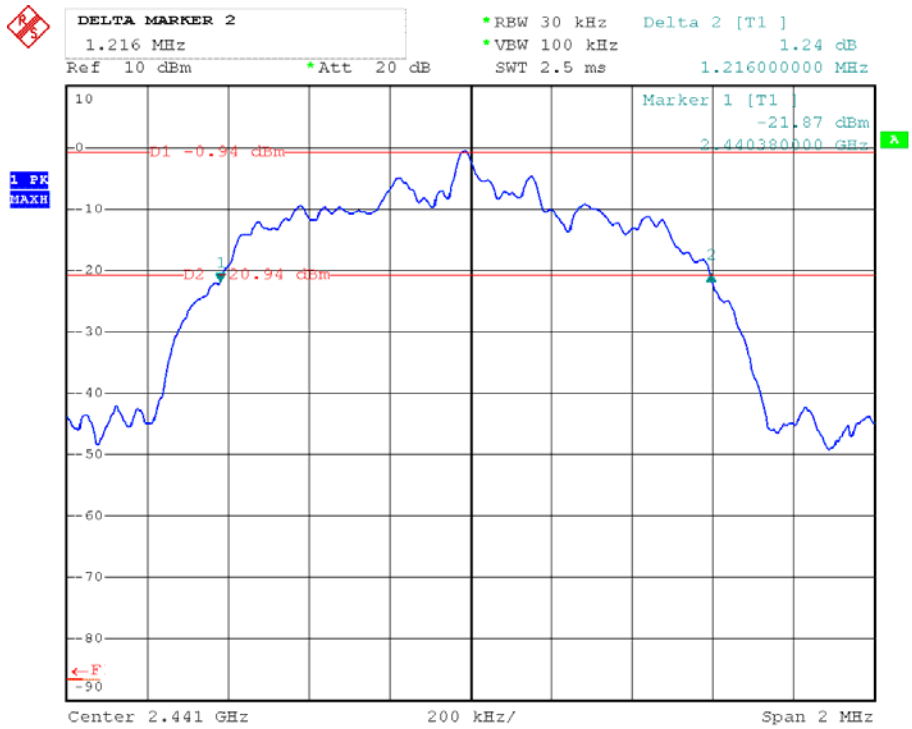
EDR 3M
Channel Low



Channel Middle



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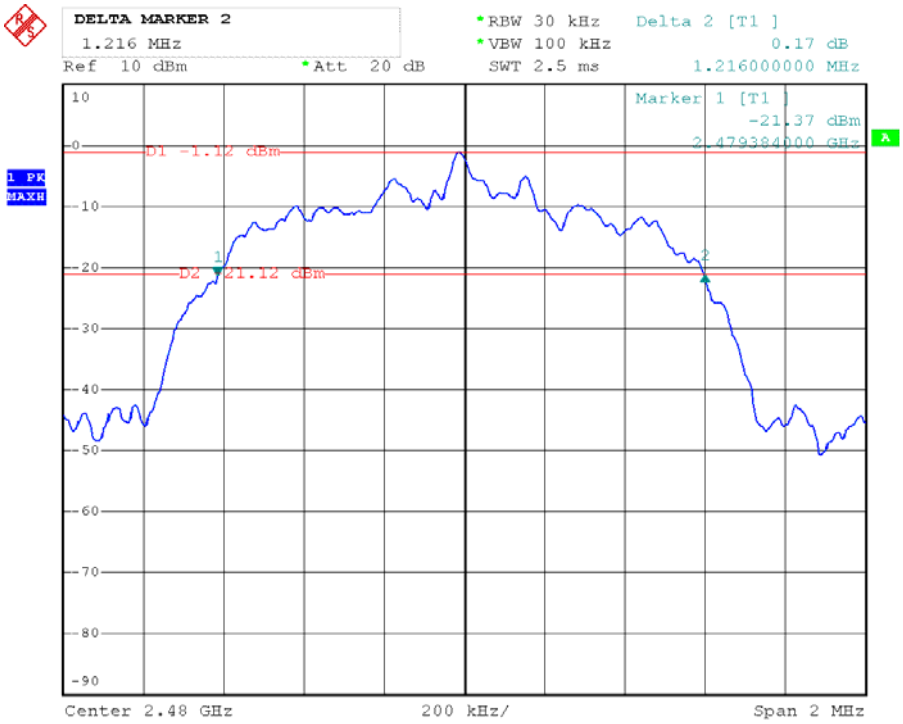
Channel High



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6. Test of Hopping Channel Separation

6.1 Applicable Standard

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.

6.2 EUT Setup

Spectrum Analyzer

6.3 Test Equipment List and Details

See section 2.6.

6.4 Test Procedure

1. The transmitter output was connected to the spectrum analyzer through an attenuator.

2. Set RBW of spectrum analyzer to 30KHz and VBW to 100KHz.

3. Set Detector to Peak, Trace to Max Hold and Sweep Time is Auto.

4. The Hopping Channel Separation is defined as the separation between 2 neighboring hopping frequencies.

5. Repeat above 1~3 points for the middle and highest channel of the EUT.

6.5 Test Result

Temperature (℃) : 22~23	EUT: LOONA
Humidity (%RH): 50~54	M/N: RC133N1
Barometric Pressure (mbar): 950~1000	Operation Condition: Continuously Tx Mode

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BR 1M

Modulation Type	Frequency (MHz)	Channel Separation (MHz)	Min. Limit (kHz)
GFSK	2402~2403	1.008	>613
GFSK	2441~2442	1.000	>616
GFSK	2479~2480	1.004	>629

EDR 2M

Modulation Type	Frequency (MHz)	Channel Separation (MHz)	Min. Limit (kHz)
Pi/4 DQPSK	2402~2403	1.004	>808
Pi/4 DQPSK	2441~2442	1.008	>819
Pi/4 DQPSK	2479~2480	1.000	>819

EDR 3M

Modulation Type	Frequency (MHz)	Channel Separation (MHz)	Min. Limit (kHz)
8-DPSK	2402~2403	1.000	>808
8-DPSK	2441~2442	1.000	>811
8-DPSK	2479~2480	1.000	>811

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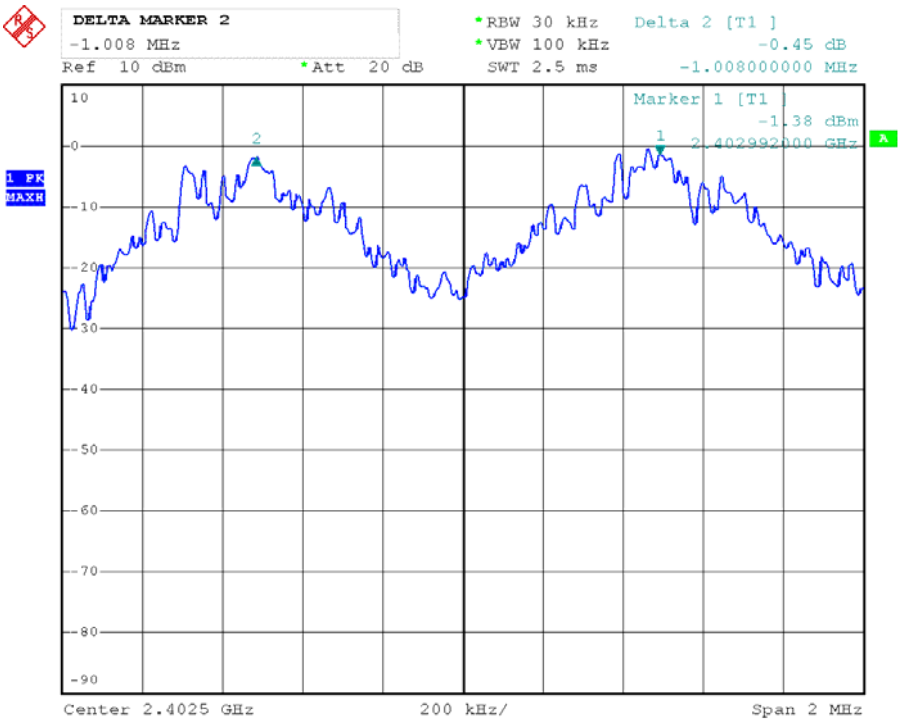
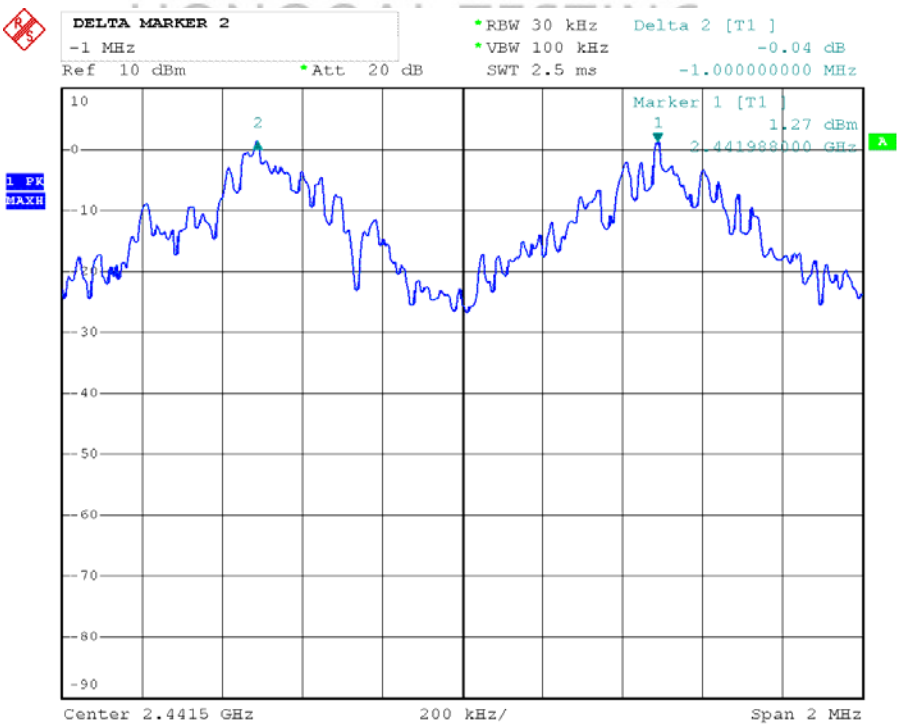
BR 1M
Channel Low



Channel Middle



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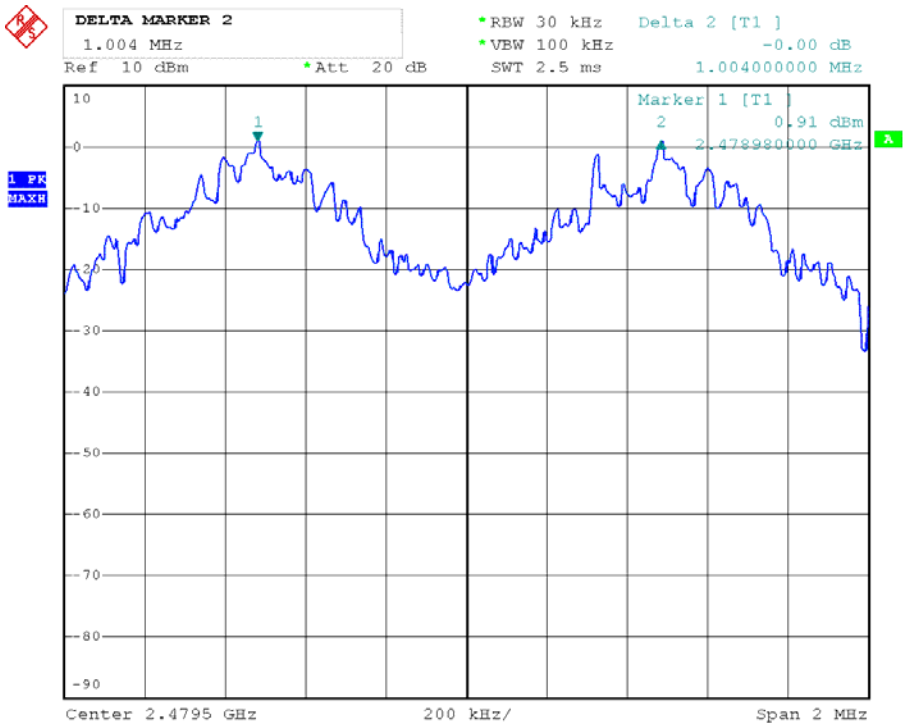
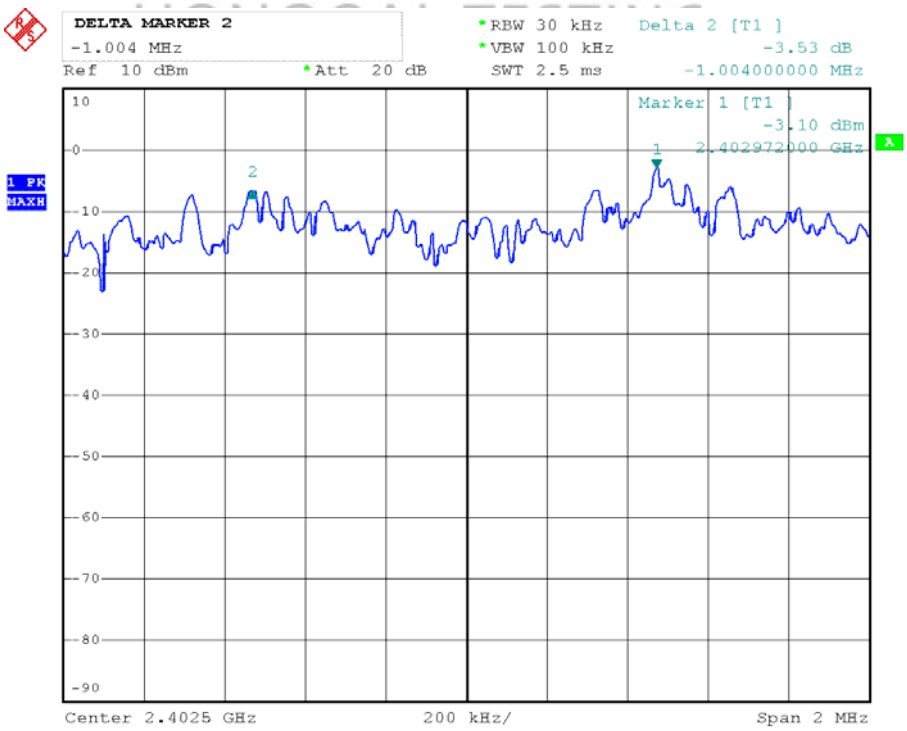
Channel High



EDR 2M
Channel Low



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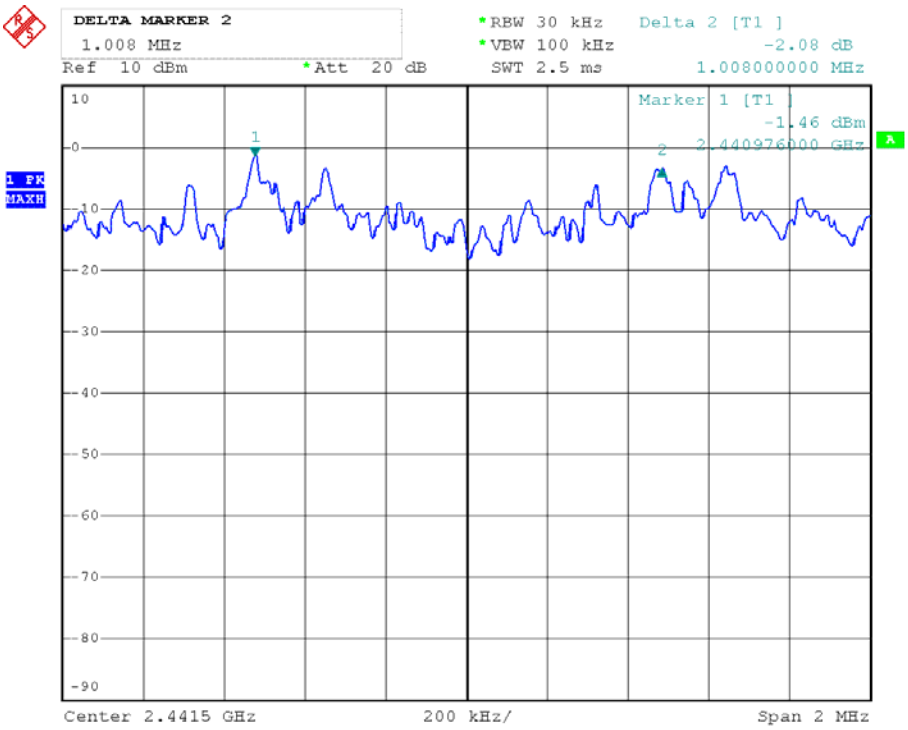
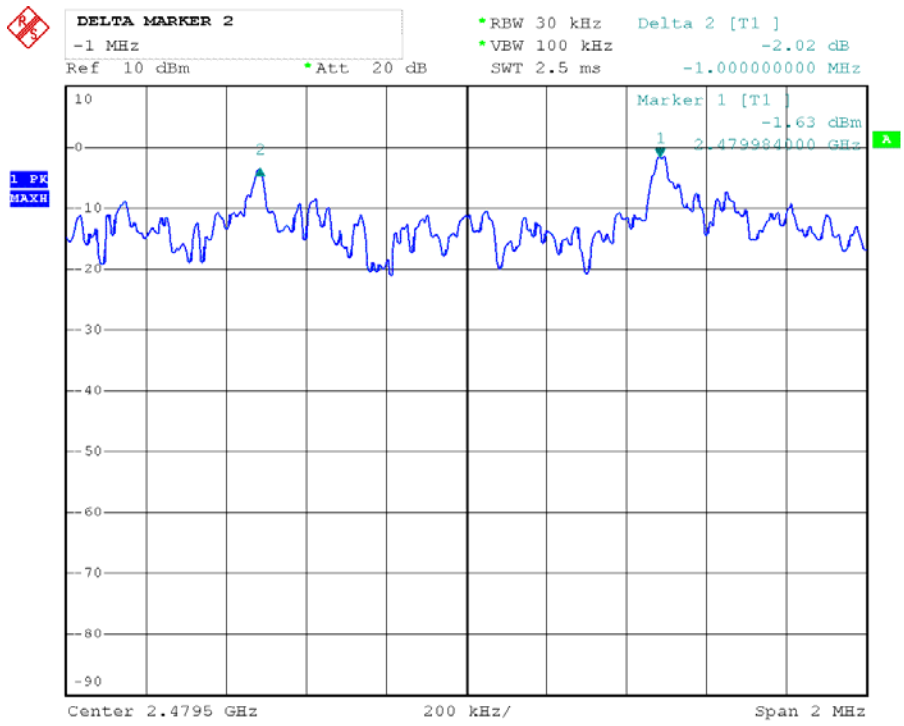
Channel Middle



Channel High



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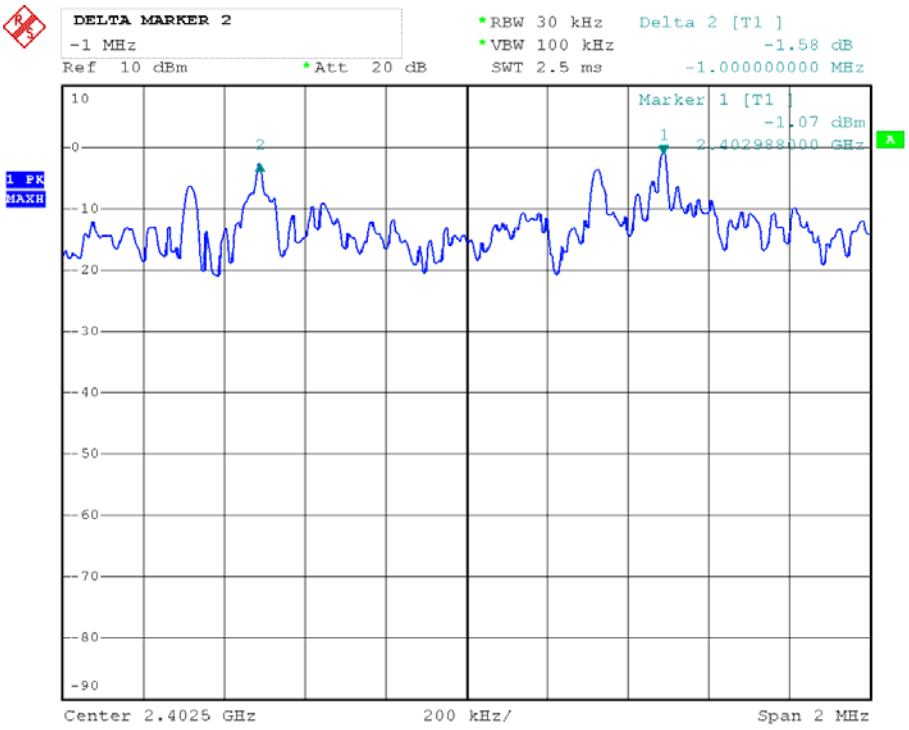
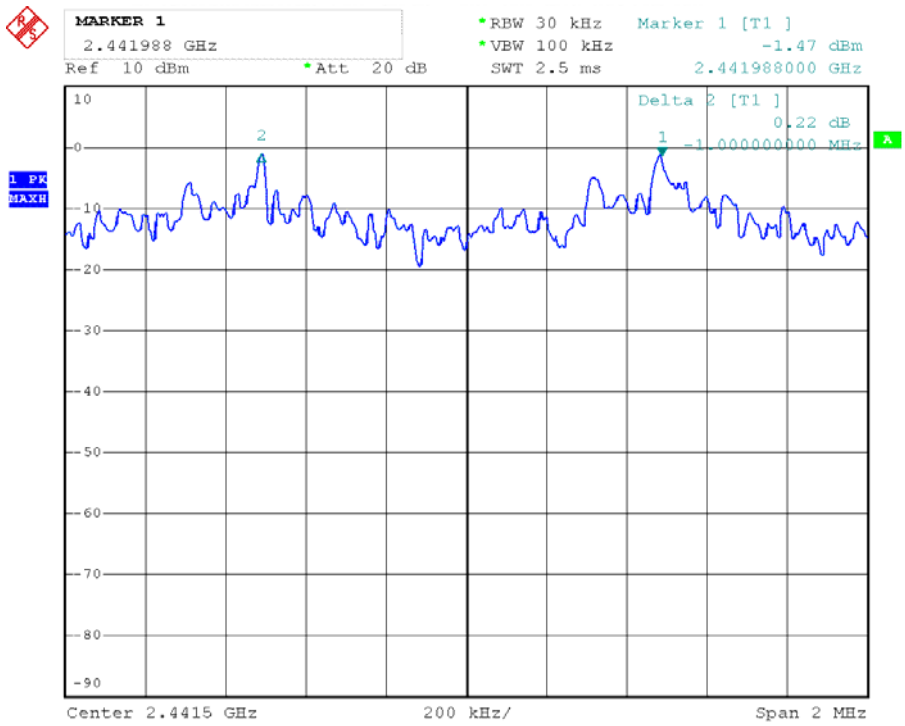
EDR 3M
Channel Low



Channel Middle



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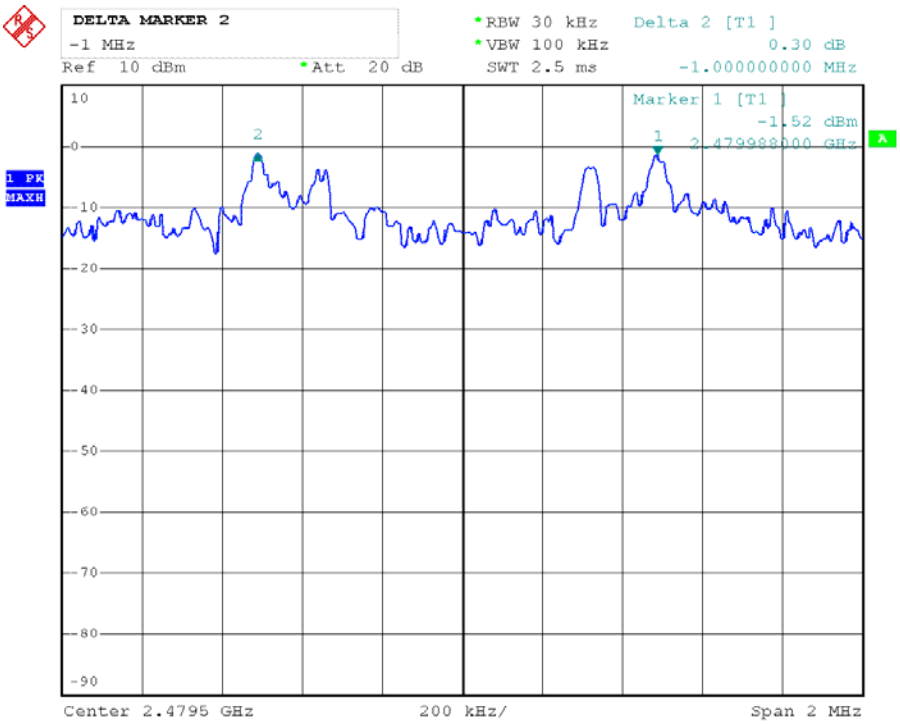
Channel High



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7. Test of Number of Hopping Frequency

7.1 Applicable Standard

Section 15.247(a)(1)(iii): For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 15 non-overlapping hopping channels. Frequency hopping system which use fewer than 75 hopping frequencies may employ intelligent hopping techniques to avoid interference to other transmissions. Frequency hopping system may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 non-overlapping channels are used.

7.2 EUT Setup

Spectrum Analyzer

7.3 Test Equipment List and Details

See section 2.6.

7.4 Test Procedure

1. The transmitter output was connected to the spectrum analyzer through an attenuator.

2. Set RBW of spectrum analyzer to 100KHz and VBW to 100KHz.

3. Set Detector to Peak, Trace to Max Hold and Sweep Time is Auto.

4. Observe frequency hopping in 2400MHz~2483.5MHz, there are at least 32 non-overlapping channels.

5. Repeat above 1~3 points for the middle and highest channel of the EUT.

7.5 Test Result

Temperature (℃) : 22~23	EUT: LOONA
Humidity (%RH): 50~54	M/N: RC133N1
Barometric Pressure (mbar): 950~1000	Operation Condition: Tx Mode

Modulation Type	Frequency (MHz)	Number of Hopping Channels	Min. Limit
GFSK	2402~2480	79	≥15
Pi/4 DQPSK	2402~2480	79	≥15
8-DPSK	2402~2480	79	≥15

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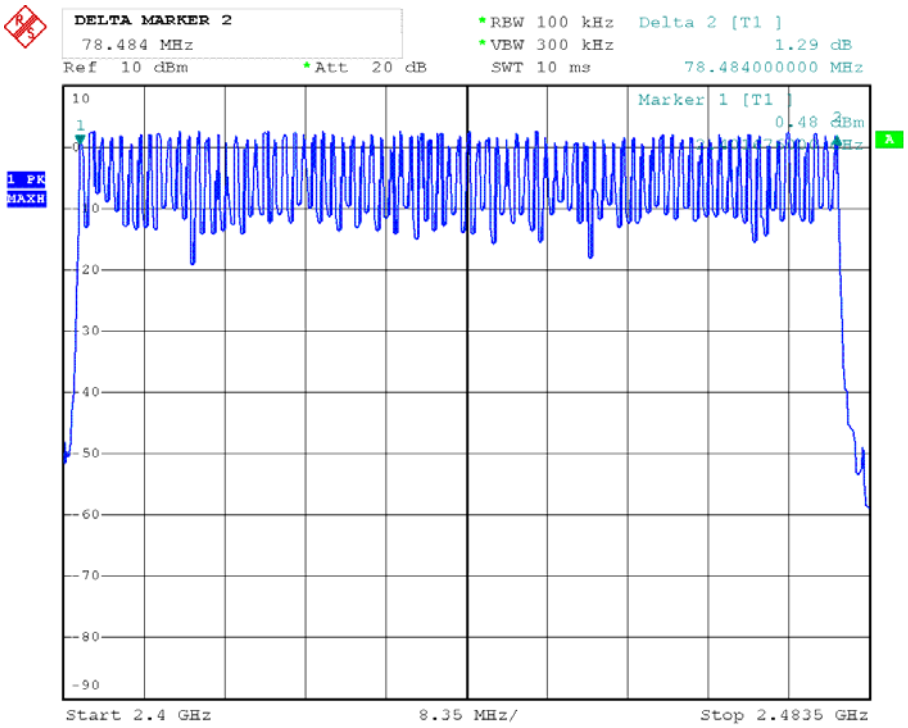
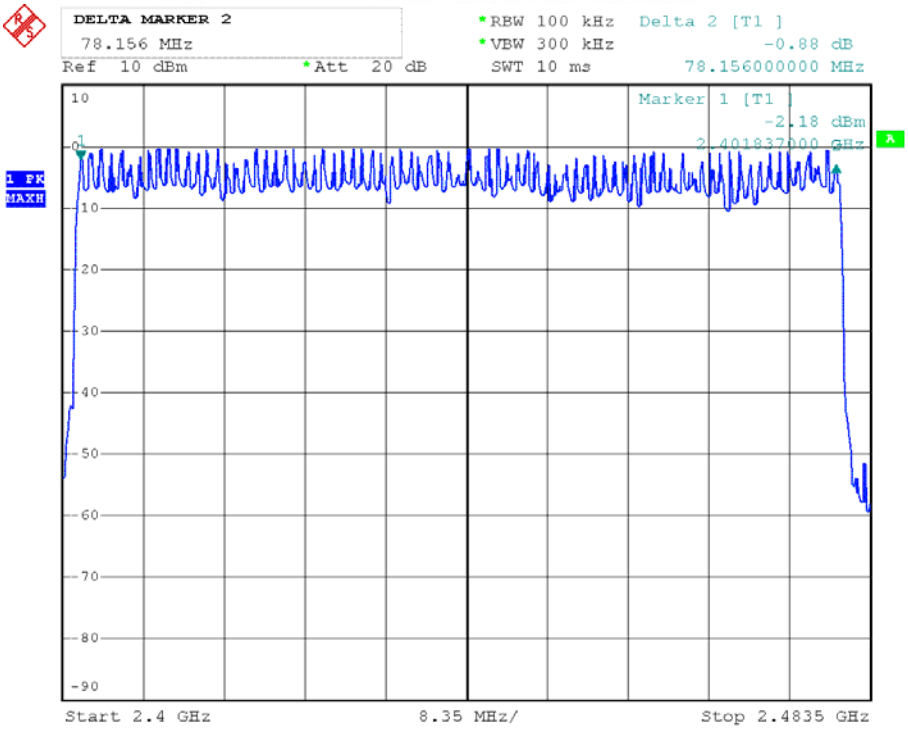
BDR-1M



EDR-2M



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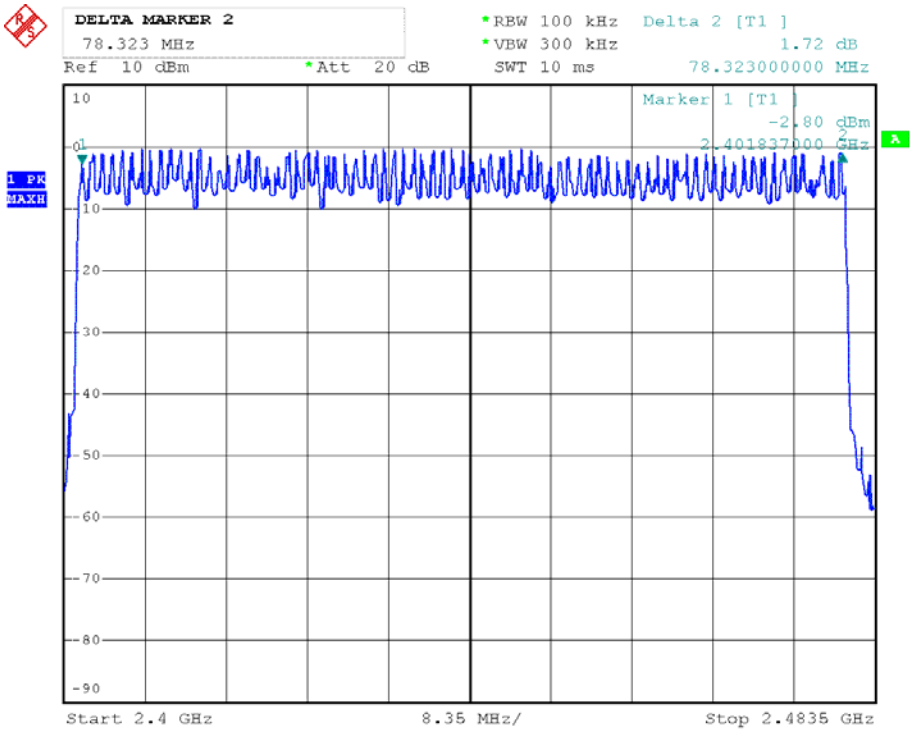
EDR-3M



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8. Test of Dwell Time of Each Frequency

8.1 Applicable Standard

Section 15.247(a)(1)(iii): For frequency hopping systems operating in the 2400-2483.5 MHz band The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4seconds multiplied by the number of hopping channels employed.

8.2 EUT Setup

Spectrum Analyzer

8.3 Test Equipment List and Details

See section 2.6.

8.4 Test Procedure

1. The transmitter output was connected to the spectrum analyzer through an attenuator.

2. Set RBW of spectrum analyzer to 1000kHz and VBW to 1000kHz.

3. Set Detector to Peak, Trace to Max Hold and Sweep Time is more than once pulse time.

4. Set the center frequency on any frequency would be measure and set the frequency span to zero span.

5. Measure the maximum time duration of one single pulse.

8.5 Test Result

Temperature (℃) : 22~23	EUT: LOONA
Humidity (%RH): 50~54	M/N: RC133N1
Barometric Pressure (mbar): 950~1000	Operation Condition: Continuously Tx Mode

DH1

Dwell time= t*(1.6/2/79)*31.6

DH3

Dwell time= t*(1.6/4/79)*31.6

DH5

Dwell time= t*(1.6/6/79)*31.6

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BR 1M
Low Channel

Modulation Type	Channel	Reading (ms)	Dwell Time (ms)	Limit (ms)
GFSK	DH1	0.384	122.88	400
GFSK	DH3	1.640	262.40	400
GFSK	DH5	2.888	309.02	400

Middle Channel

Modulation Type	Channel	Reading (ms)	Dwell Time (ms)	Limit (ms)
GFSK	DH1	0.385	123.20	400
GFSK	DH3	1.620	259.20	400
GFSK	DH5	2.888	309.02	400

High Channel

Modulation Type	Channel	Reading (ms)	Dwell Time (ms)	Limit (ms)
GFSK	DH1	0.385	123.20	400
GFSK	DH3	1.620	259.20	400
GFSK	DH5	2.888	309.02	400

EDR 2M
Low Channel

Modulation Type	Channel	Reading (ms)	Dwell Time (ms)	Limit (ms)
Pi/4 DQPSK	2DH1	0.395	126.40	400
Pi/4 DQPSK	2DH3	1.645	263.20	400
Pi/4 DQPSK	2DH5	2.909	311.26	400

Middle Channel

Modulation Type	Channel	Reading (ms)	Dwell Time (ms)	Limit (ms)
Pi/4 DQPSK	2DH1	0.395	126.40	400
Pi/4 DQPSK	2DH3	1.645	263.20	400
Pi/4 DQPSK	2DH5	2.877	307.84	400

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High Channel

Modulation Type	Channel	Reading (ms)	Dwell Time (ms)	Limit (ms)
Pi/4 DQPSK	2DH1	0.395	126.40	400
Pi/4 DQPSK	2DH3	1.645	263.20	400
Pi/4 DQPSK	2DH5	2.877	307.84	400

EDR 3M

Low Channel

Modulation Type	Channel	Reading (ms)	Dwell Time (ms)	Limit (ms)
8-DPSK	3DH1	0.400	128.00	400
8-DPSK	3DH3	1.640	262.40	400
8-DPSK	3DH5	2.896	308.97	400

Middle Channel

Modulation Type	Channel	Reading (ms)	Dwell Time (ms)	Limit (ms)
8-DPSK	3DH1	0.400	128.00	400
8-DPSK	3DH3	1.640	262.40	400
8-DPSK	3DH5	2.896	308.97	400

High Channel

Modulation Type	Channel	Reading (ms)	Dwell Time (ms)	Limit (ms)
8-DPSK	3DH1	0.405	129.60	400
8-DPSK	3DH3	1.640	262.40	400
8-DPSK	3DH5	2.896	308.97	400

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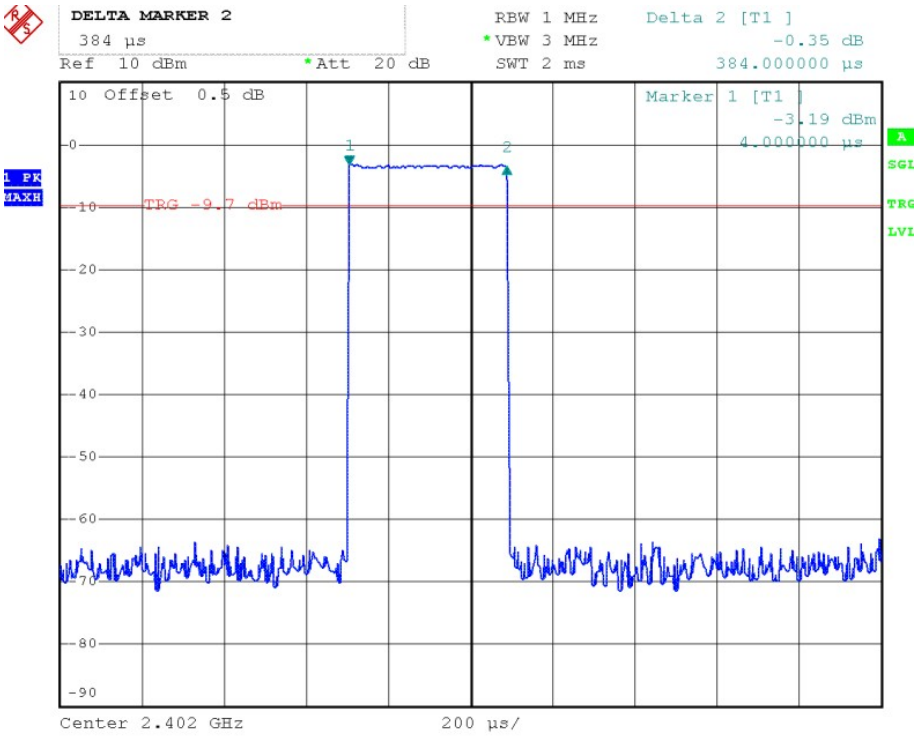
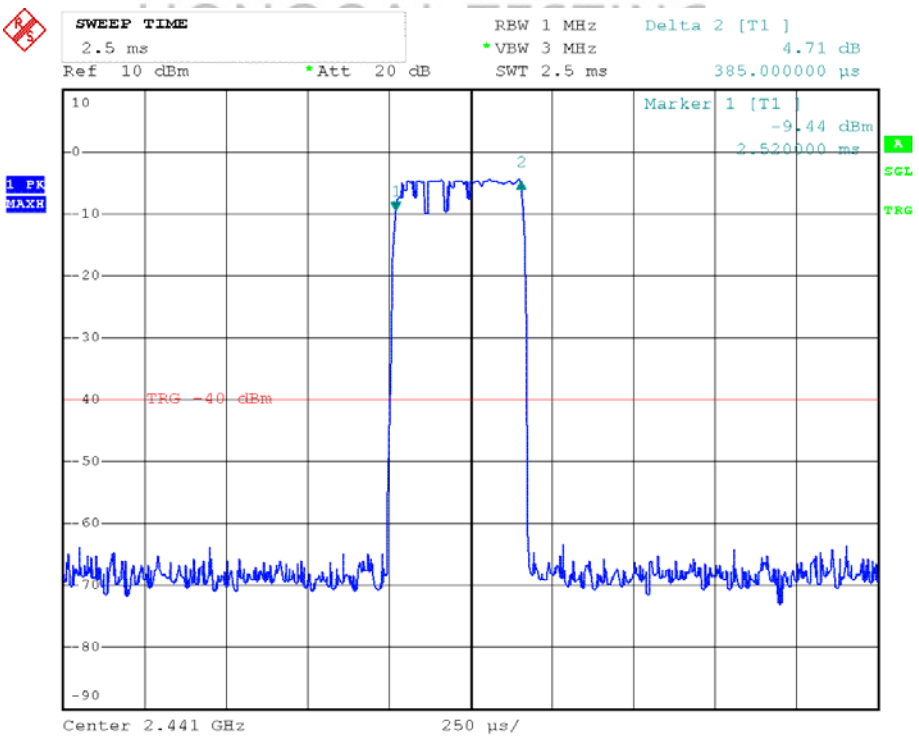
BDR-DH1
Channel Low



Channel Middle



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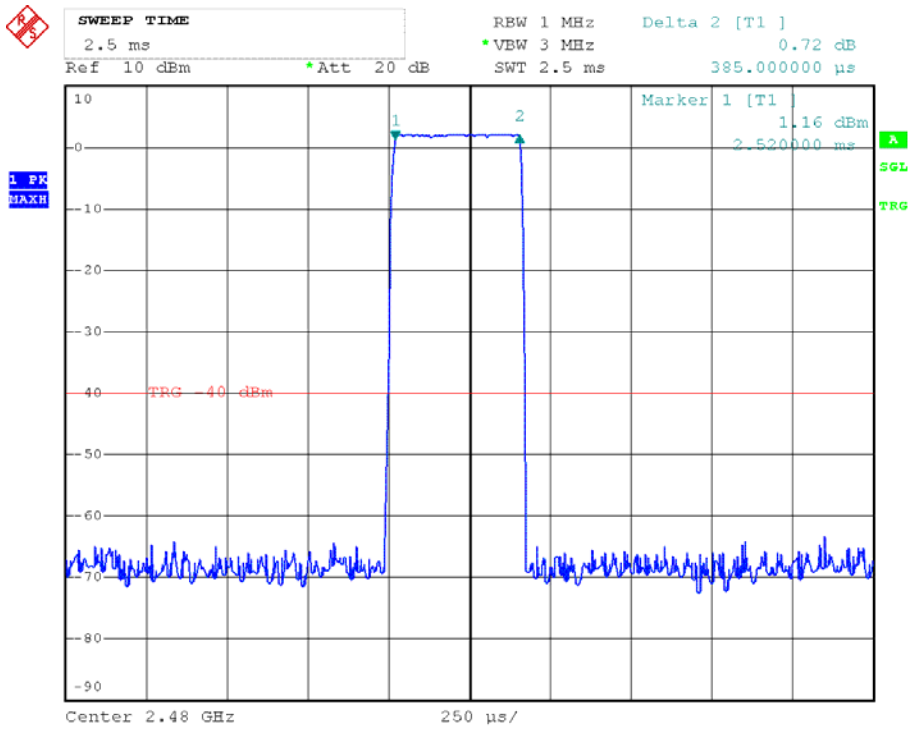
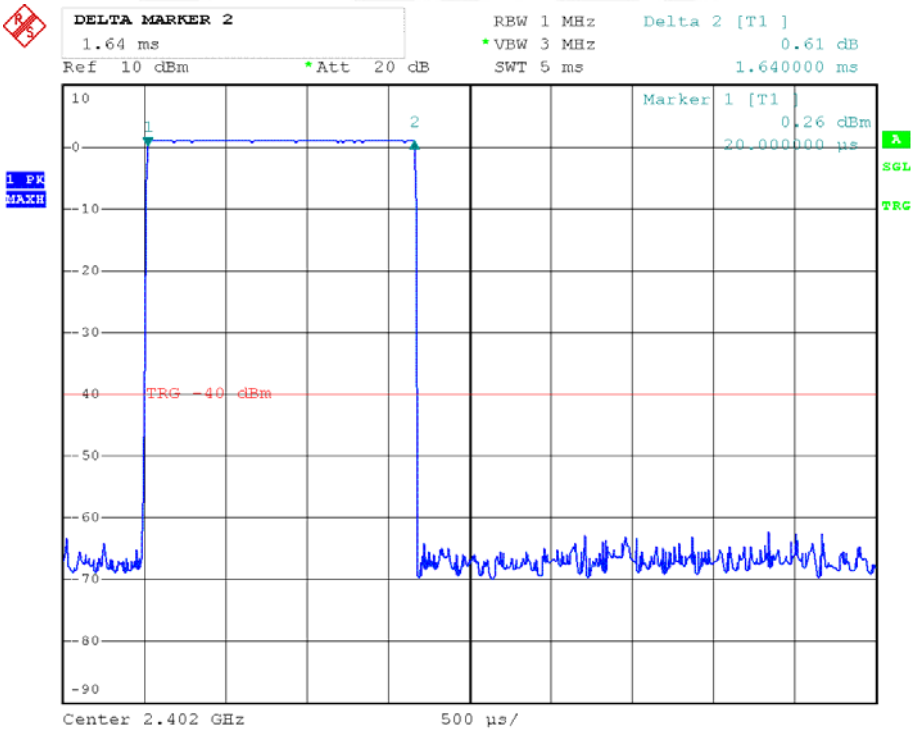
Channel High



DH3
Channel Low



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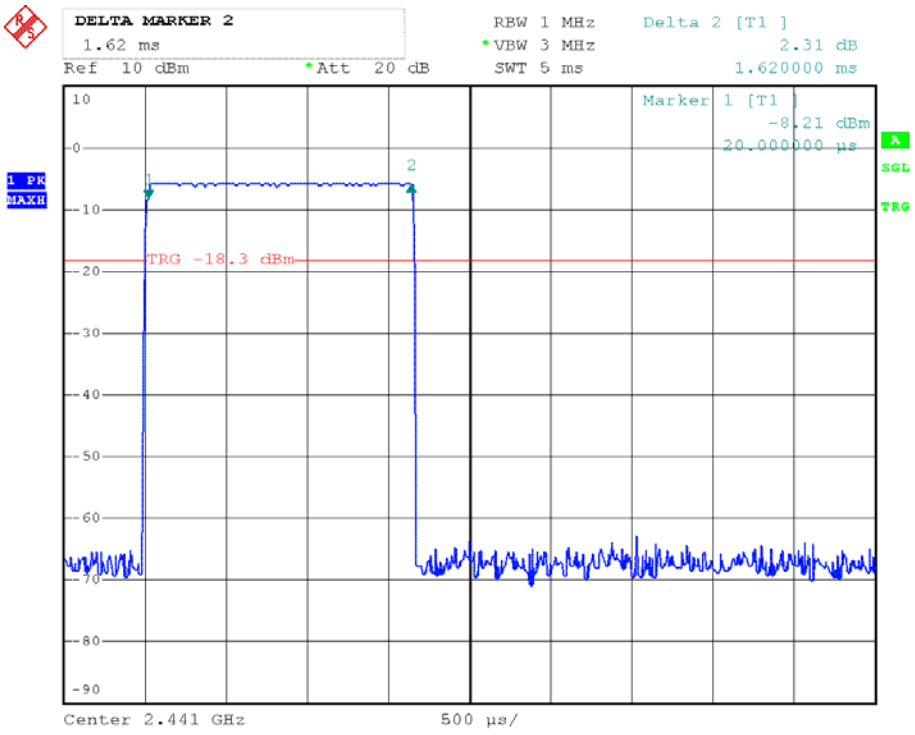
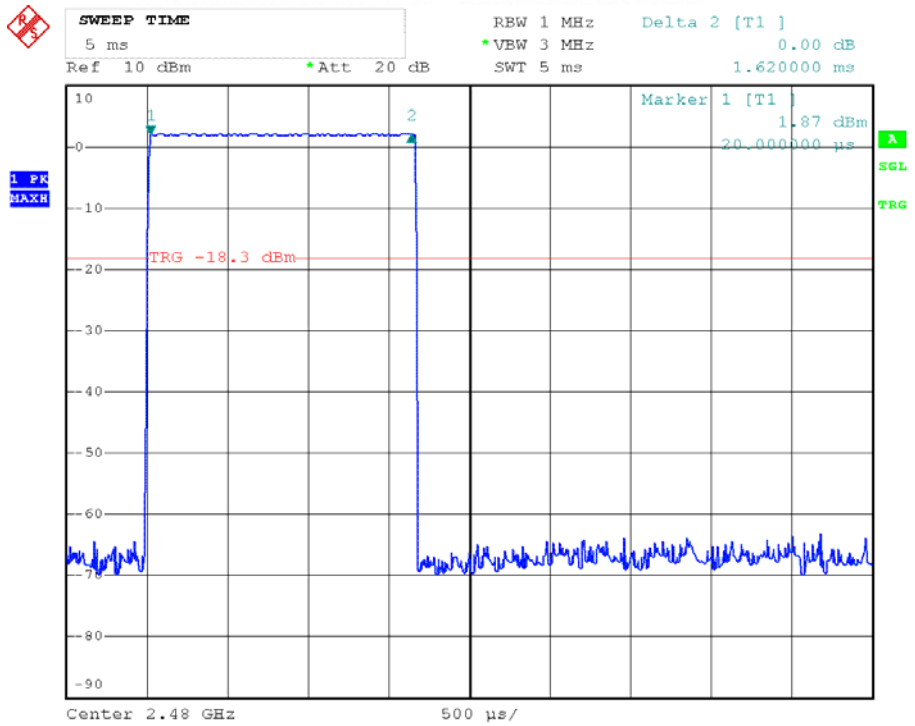
Channel Middle



Channel High



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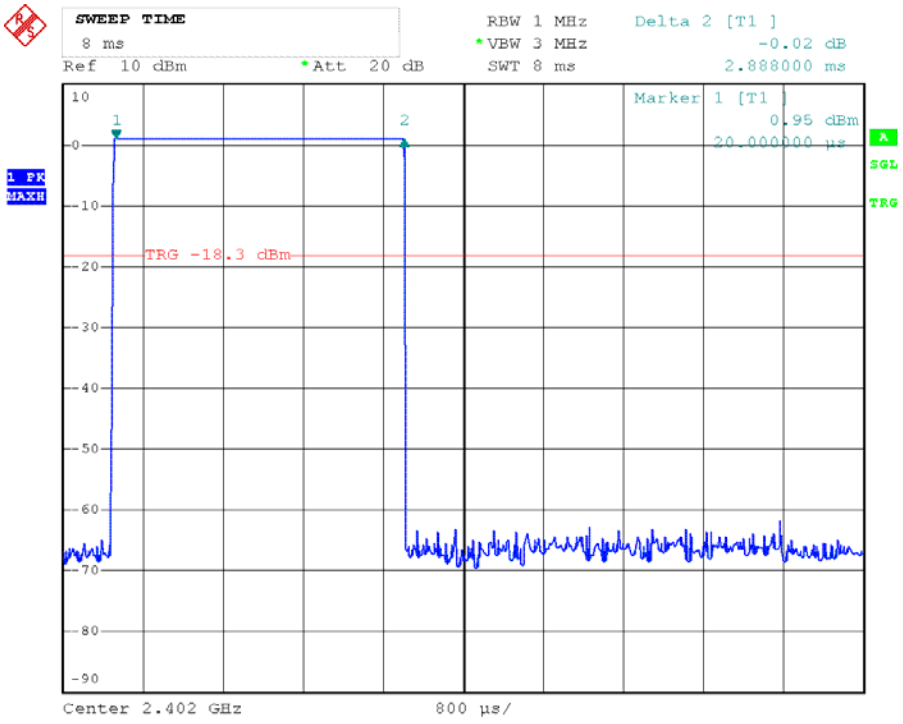
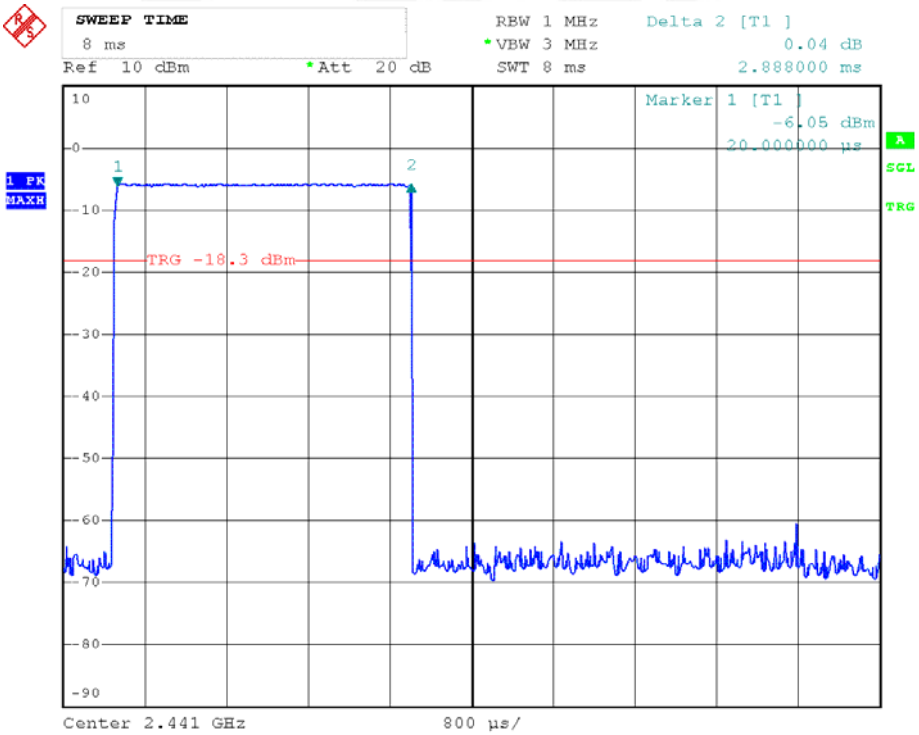
DH5
Channel Low



Channel Middle



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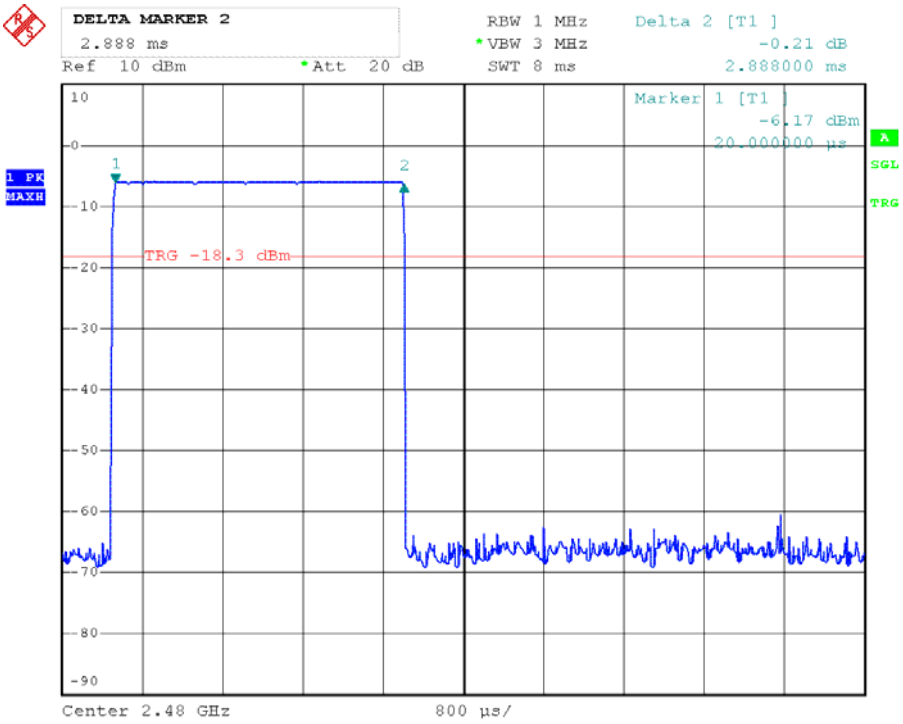
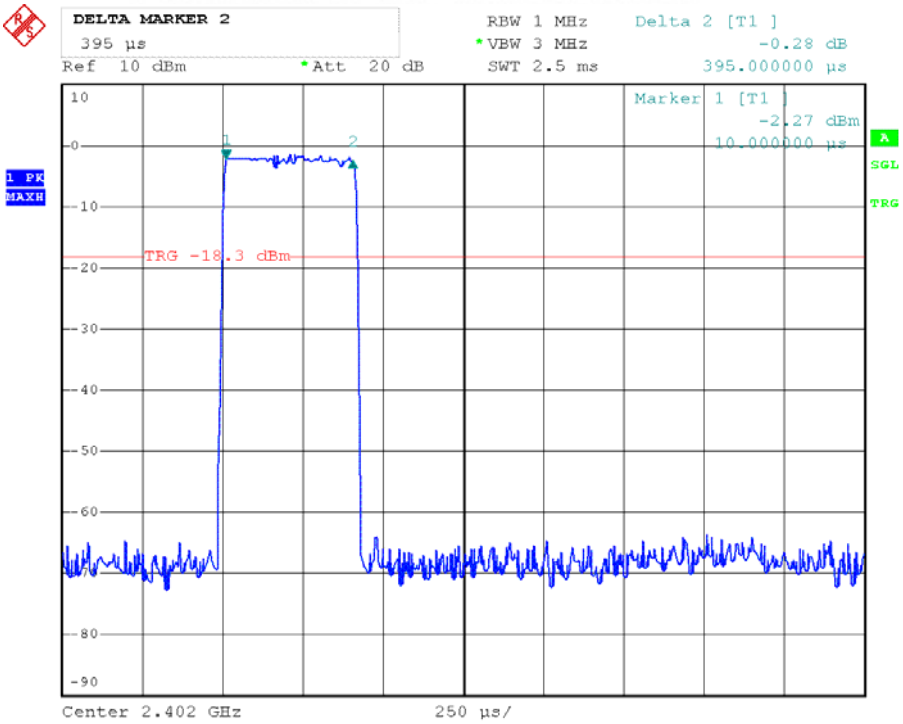
Channel High



EDR 2M 2DH1
Channel Low



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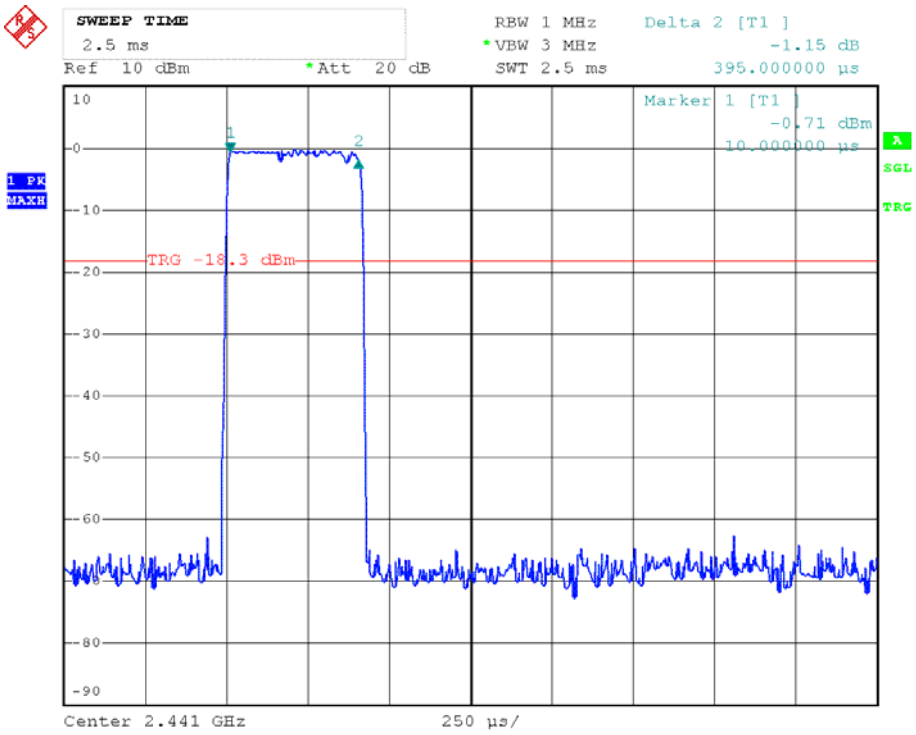
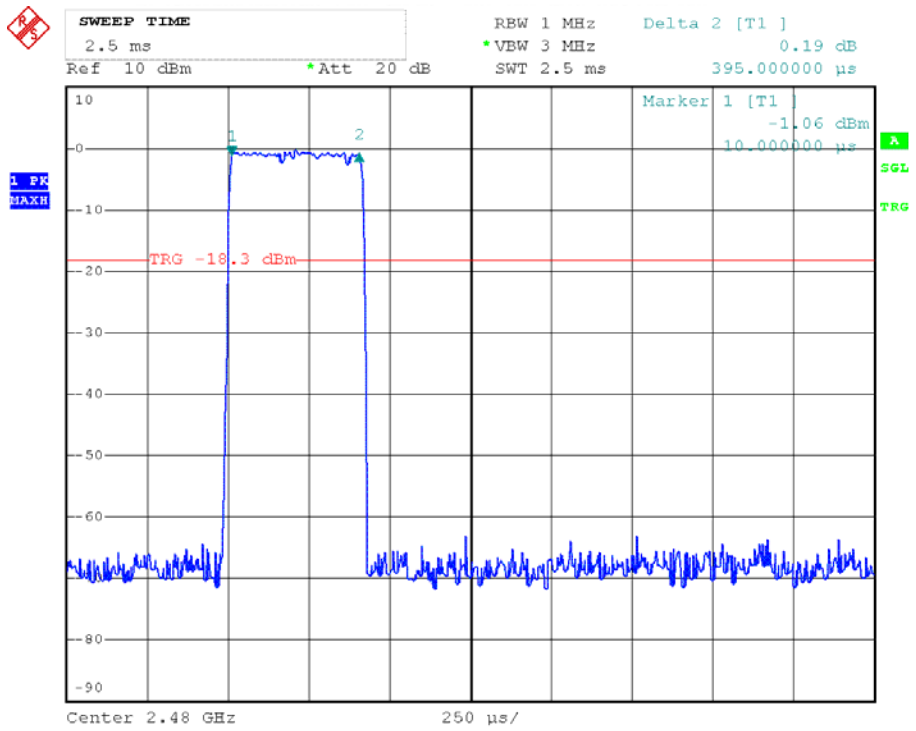
Channel Middle



Channel High



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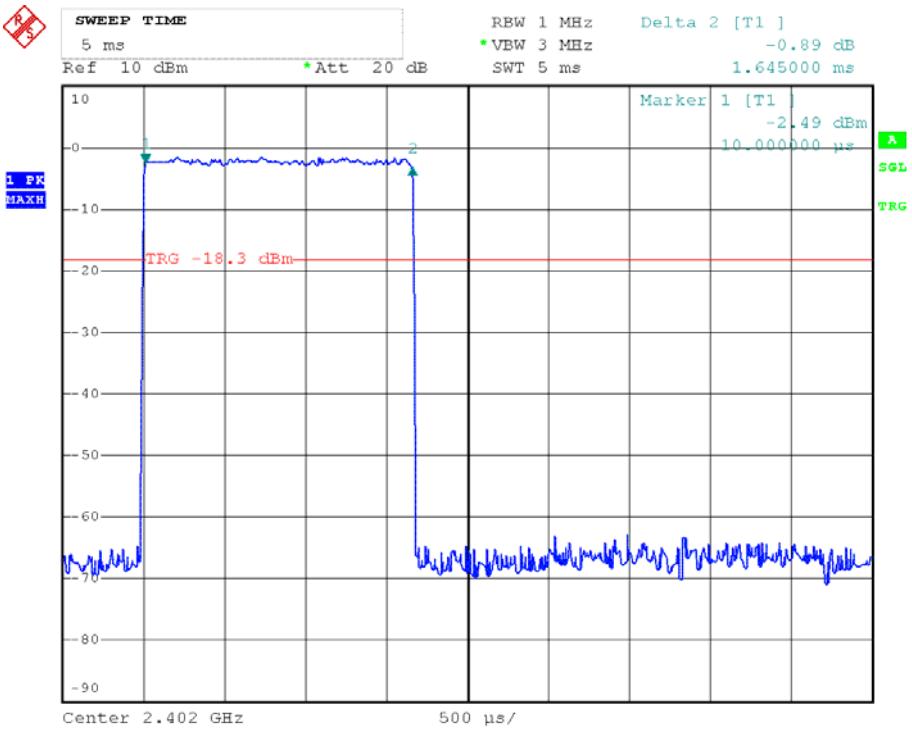
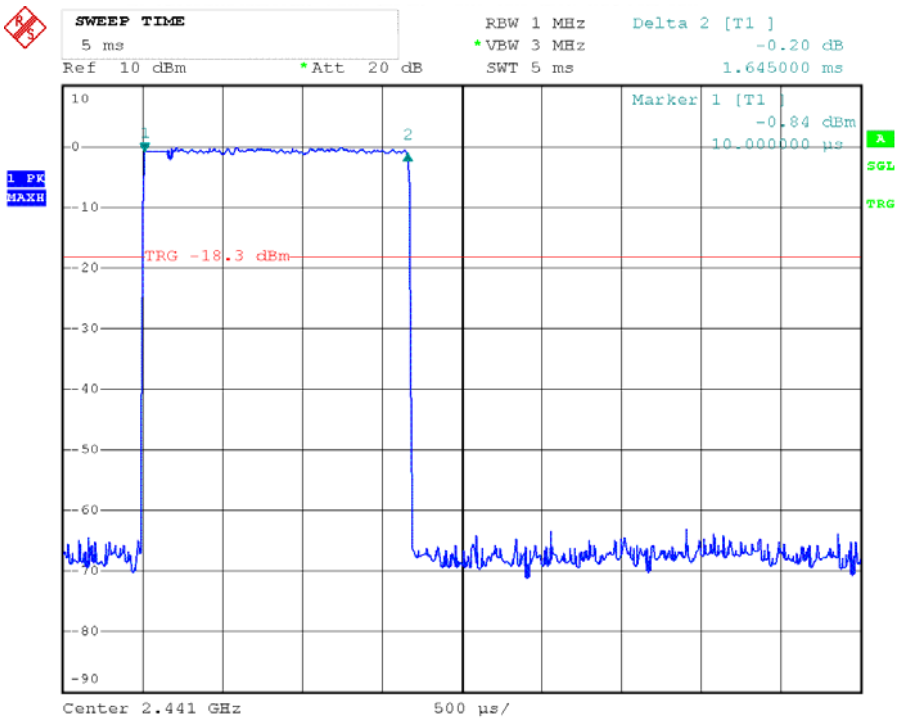
EDR 2M 2DH3
Channel Low



Channel Middle



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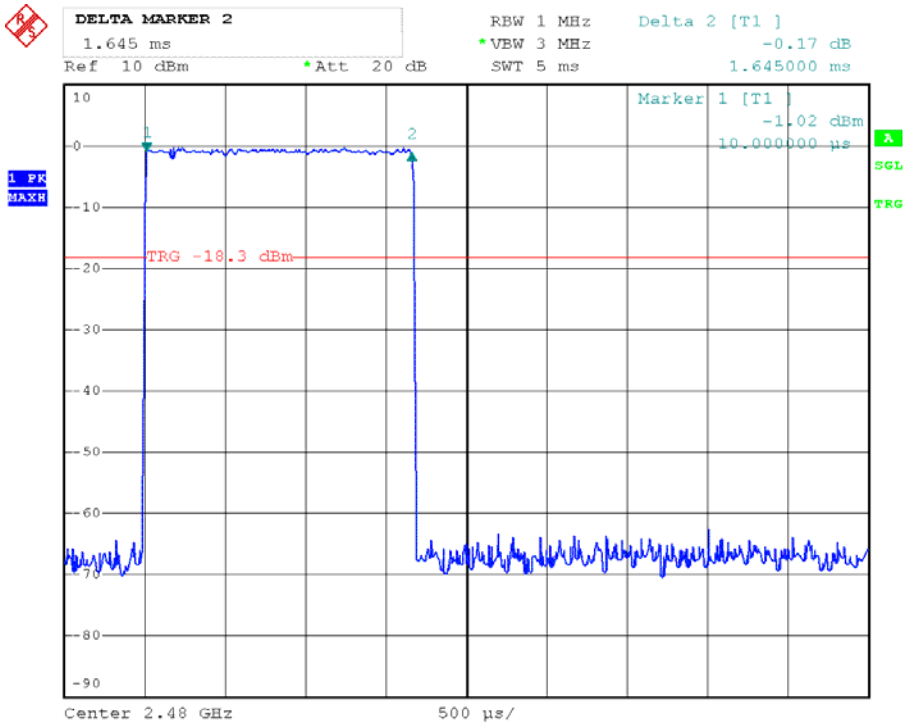
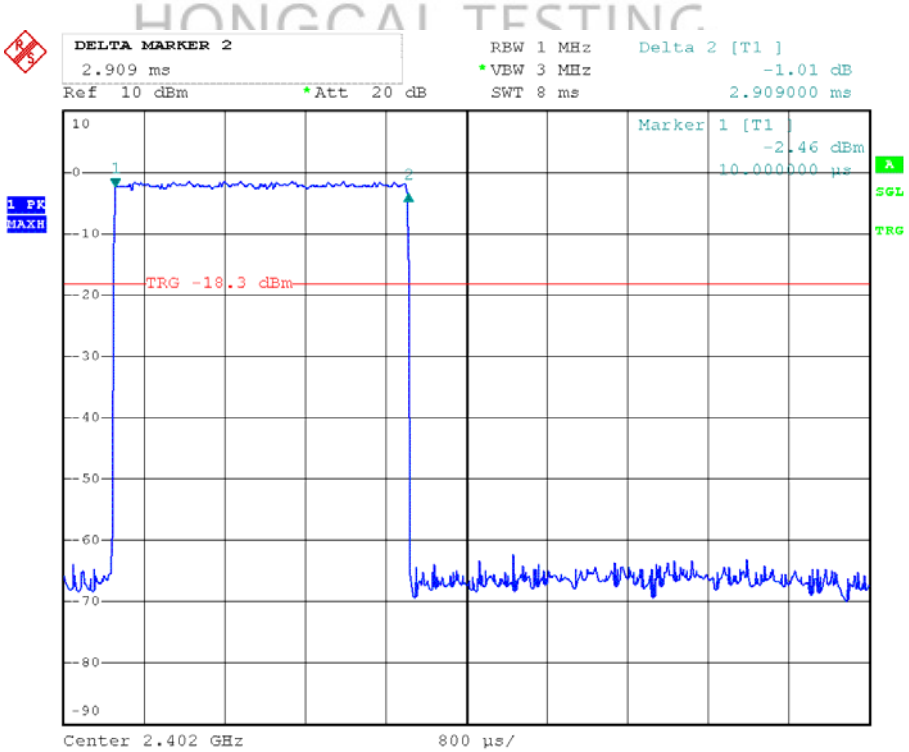
Channel High



EDR 2M 2DH5
Channel Low



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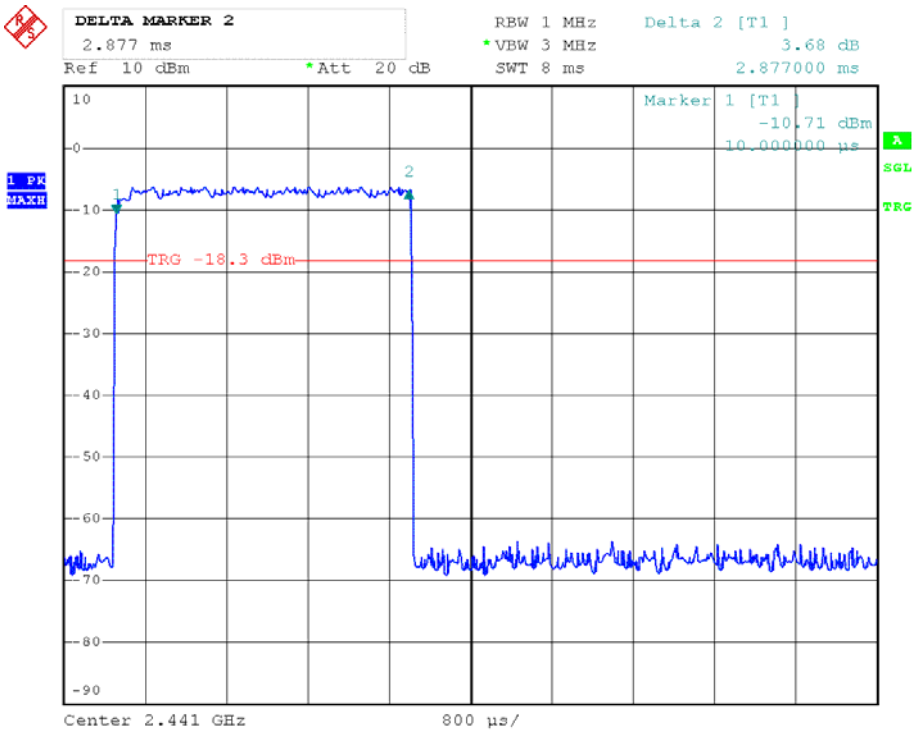
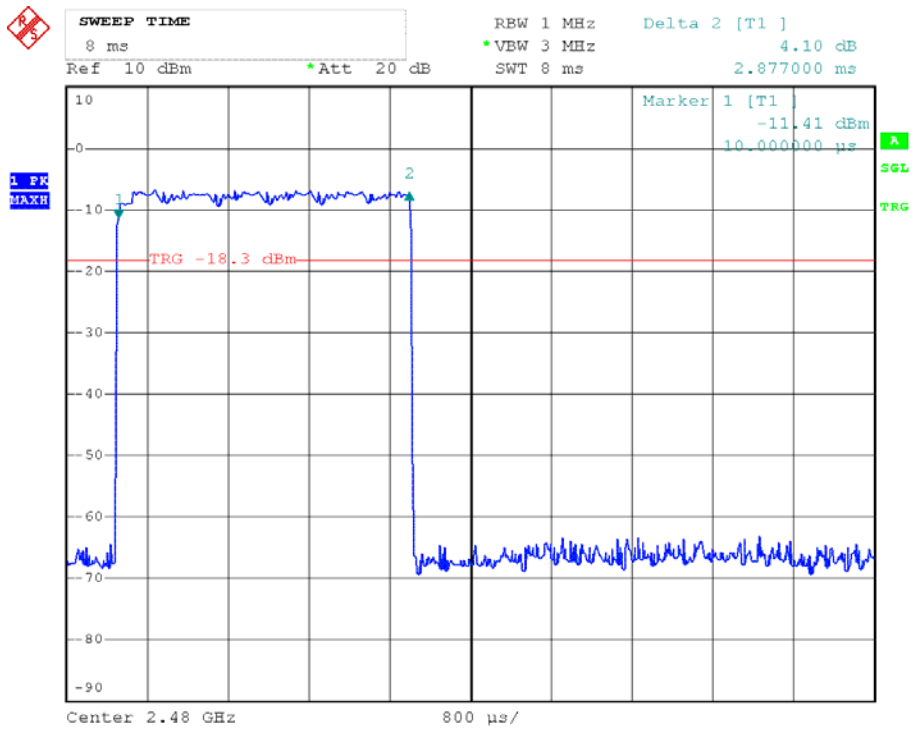
Channel Middle



Channel High



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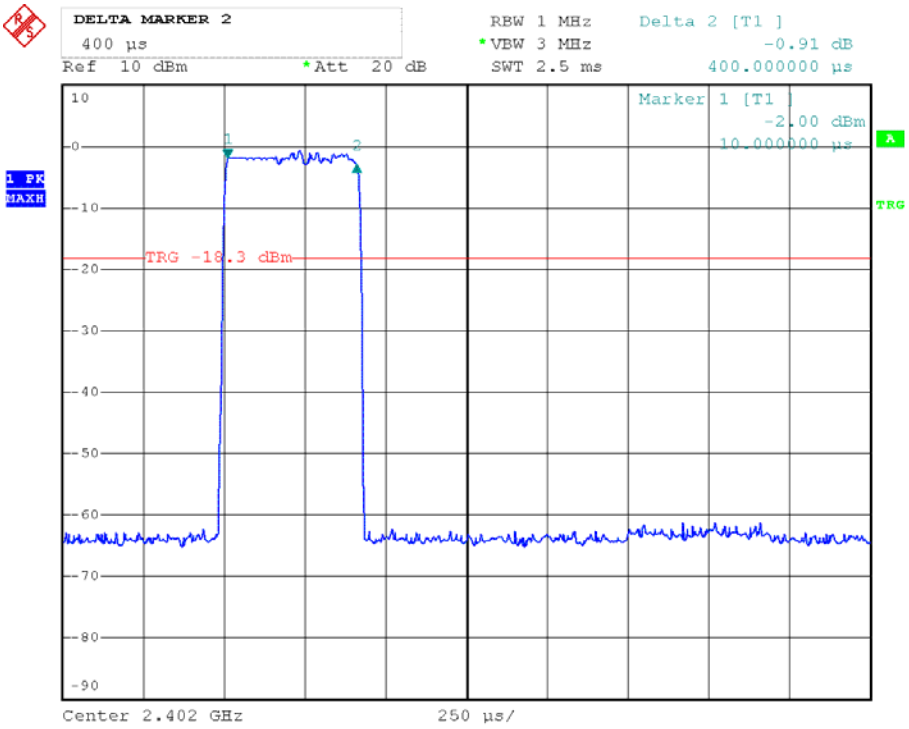
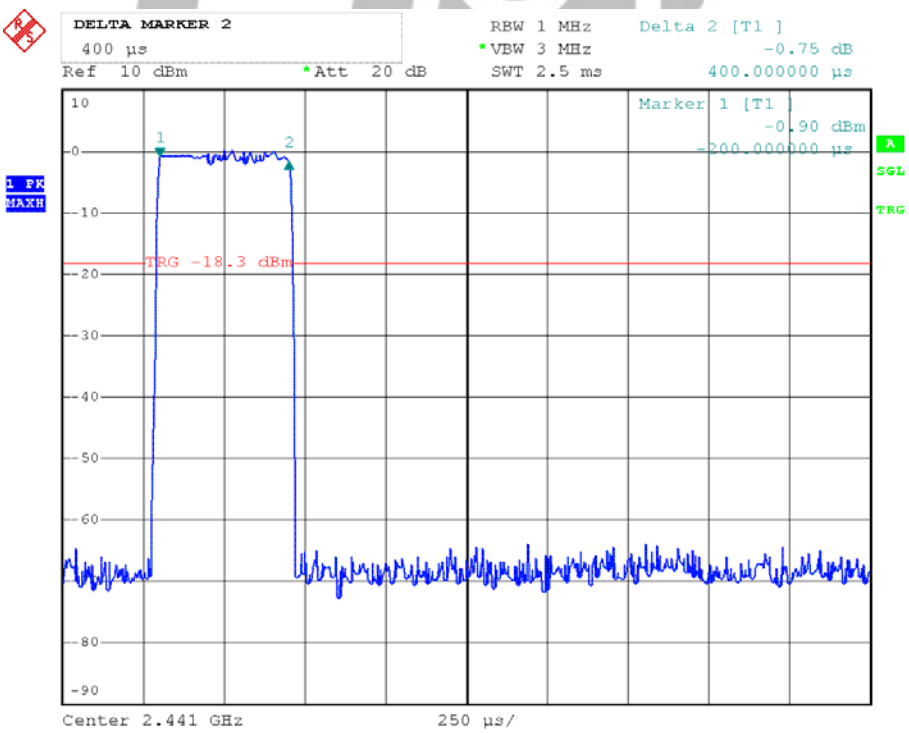
EDR 3M 3DH1
Channel Low



Channel Middle



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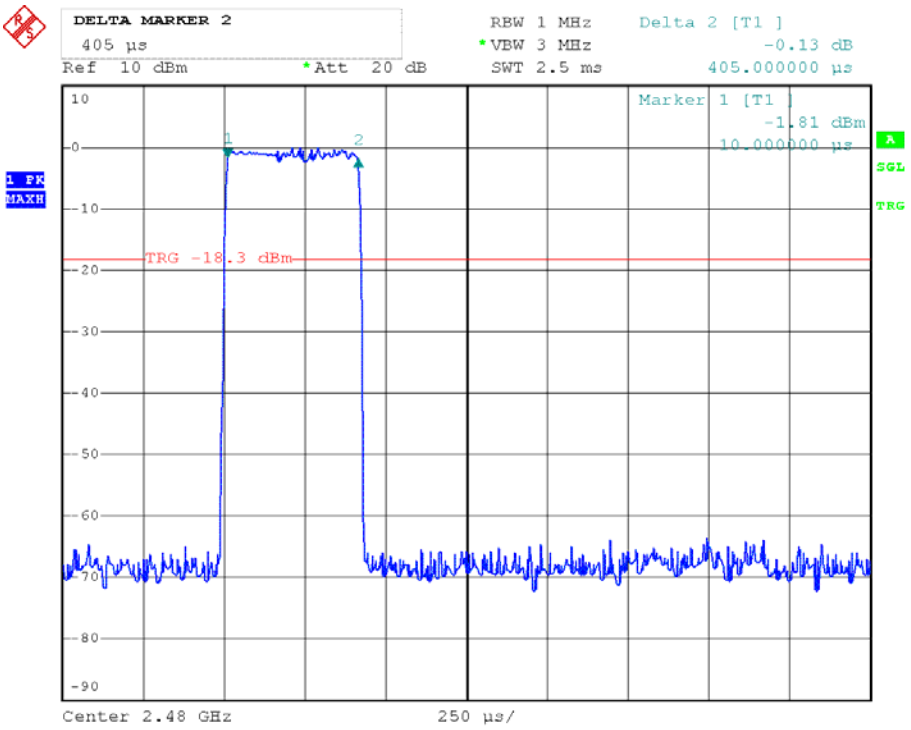
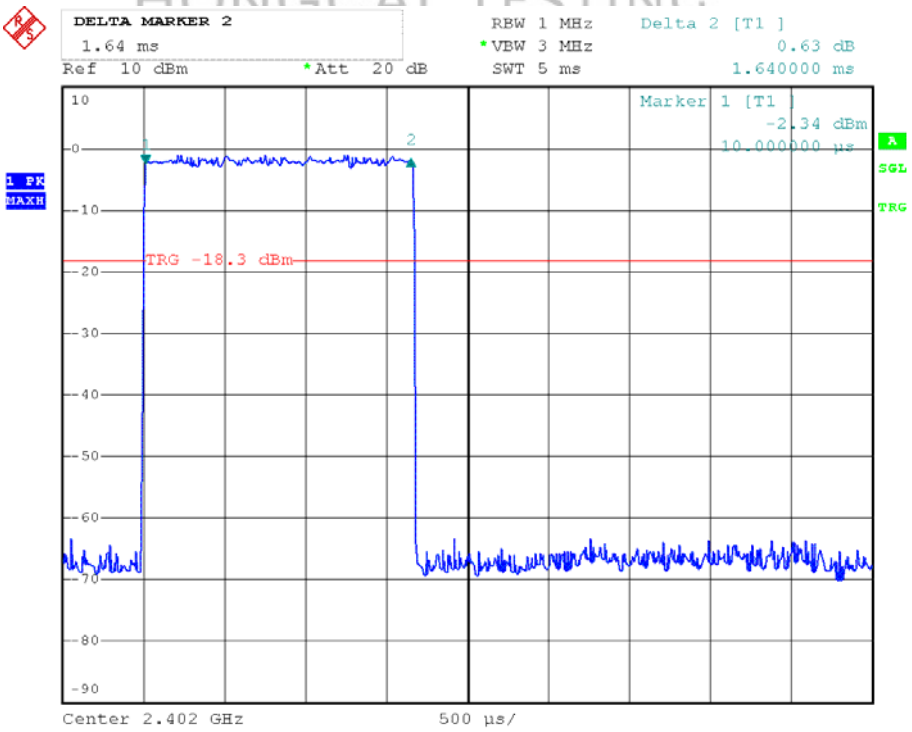
Channel High



EDR 3M 3DH3
Channel Low



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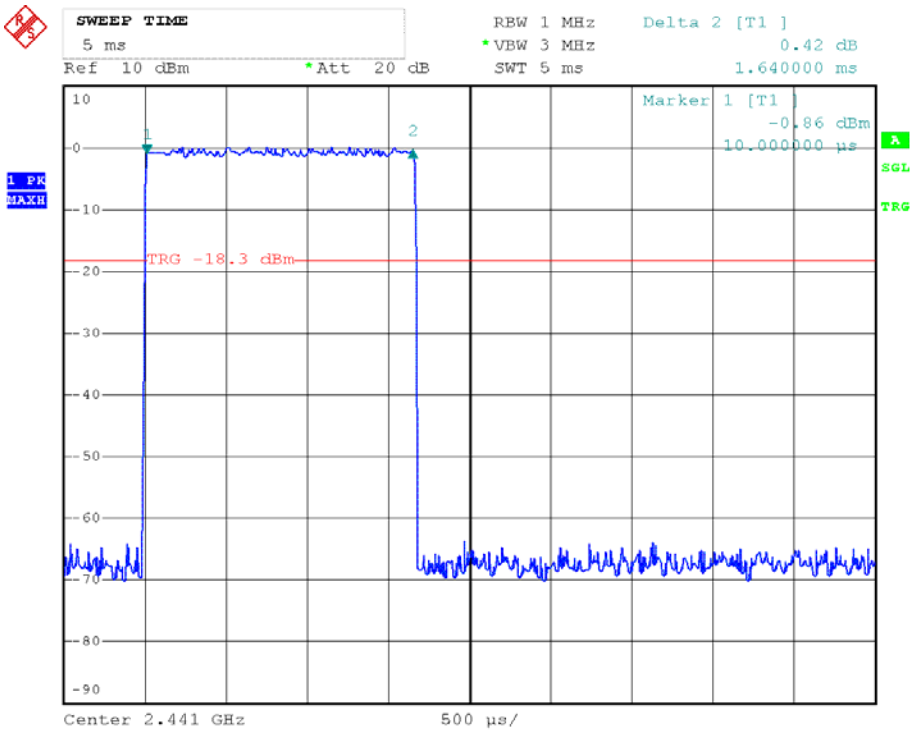
Channel Middle



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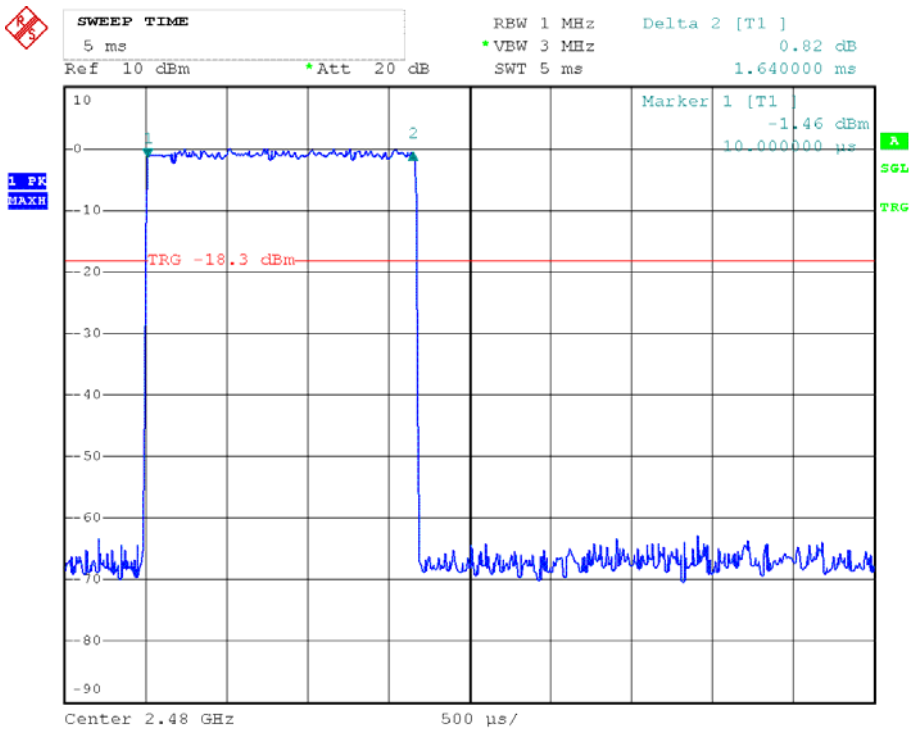

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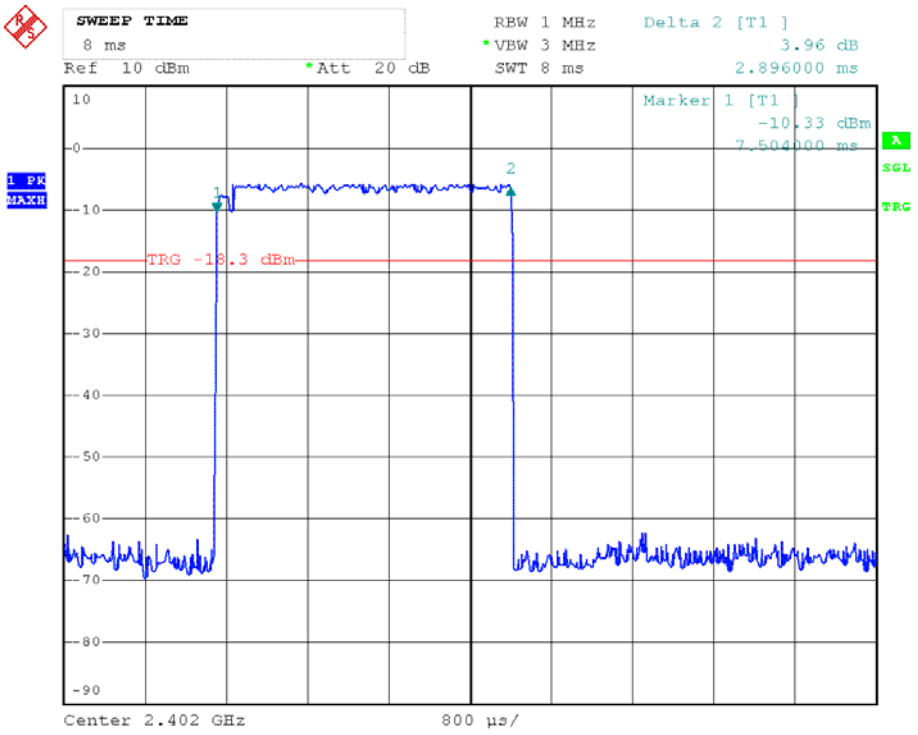
EDR 3M 3DH5
Channel Low



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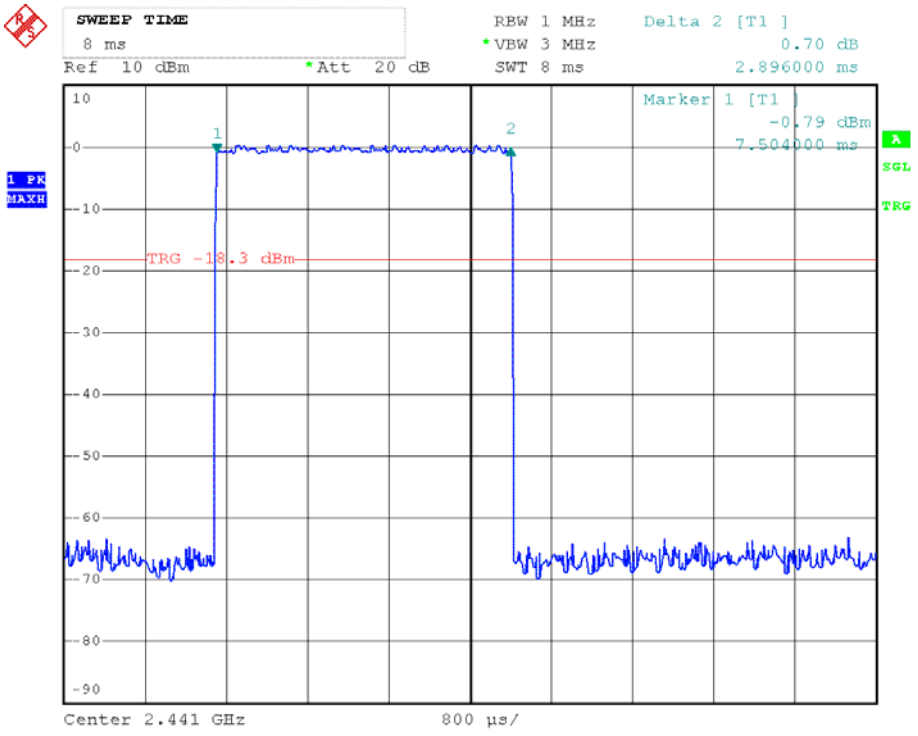

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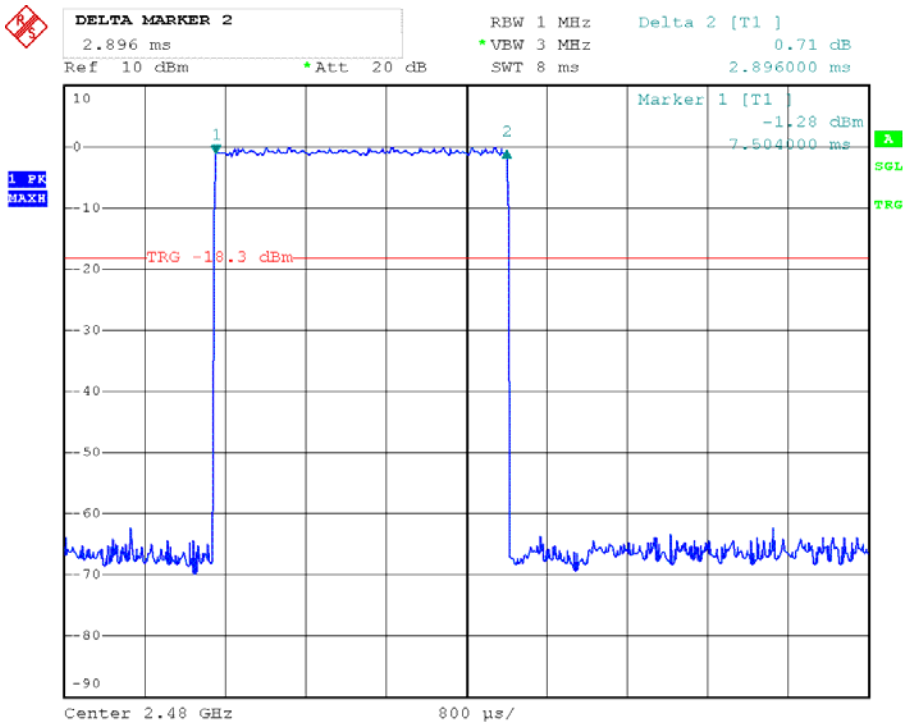
Channel High



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9. Test of Maximum Peak Output Power

9.1 Applicable Standard

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 The maximum peak output power shall not exceed 1 watt. For all other frequency hopping systems in this frequency band, The maximum peak output power shall not exceed 0.125 watt.

9.2 EUT Setup

Spectrum Analyzer

9.3 Test Equipment List and Details

See section 2.6.

9.4 Test Procedure

1. The transmitter output was connected to the peak power meter and recorded the peak value.

2. Peak power meter parameter set to auto attenuator and filter is the same as.

3. Repeated the 1 for the middle and highest channel of the EUT.

9.5 Test Result

Temperature (℃) : 22~23	EUT: LOONA
Humidity (%RH): 50~54	M/N: RC133N1
Barometric Pressure (mbar): 950~1000	Operation Condition: Continuously Tx Mode

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BR 1M

Modulation Type	Channel No.	Frequency (MHz)	Output Power (dBm)	Limits (dBm)	Result
GFSK	Low	2402.00	1.13	30	PASS
GFSK	Middle	2441.00	2.15	30	PASS
GFSK	High	2480.00	2.09	30	PASS

EDR 2M

Modulation Type	Channel No.	Frequency (MHz)	Output Power (dBm)	Limits (dBm)	Margin (dB)
Pi/4 DQPSK	Low	2402.00	-1.25	30	PASS
Pi/4 DQPSK	Middle	2441.00	0.25	30	PASS
Pi/4 DQPSK	High	2480.00	0.04	30	PASS

EDR 3M

Modulation Type	Channel No.	Frequency (MHz)	Output Power (dBm)	Limits (dBm)	Margin (dB)
8-DPSK	Low	2402.00	-0.98	30	PASS
8-DPSK	Middle	2441.00	0.24	30	PASS
8-DPSK	High	2480.00	0.27	30	PASS

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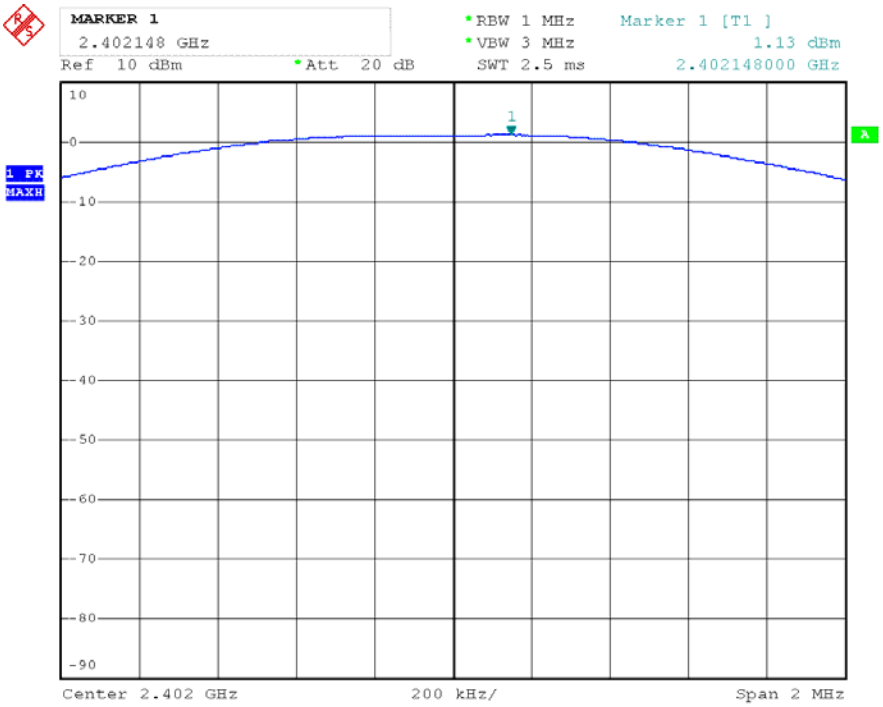
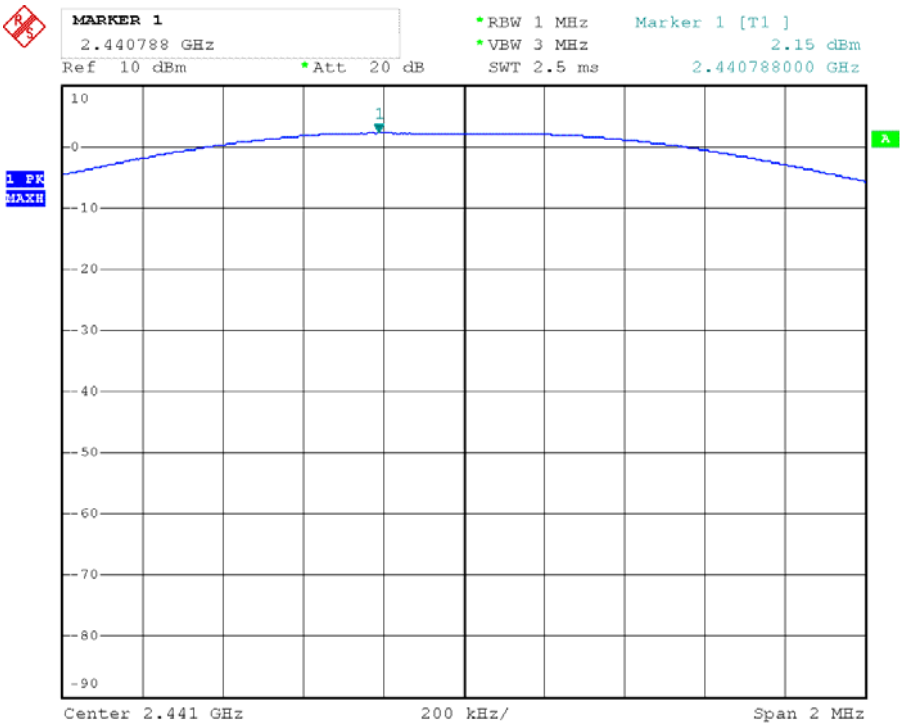
BR 1M
Channel Low



Channel Middle



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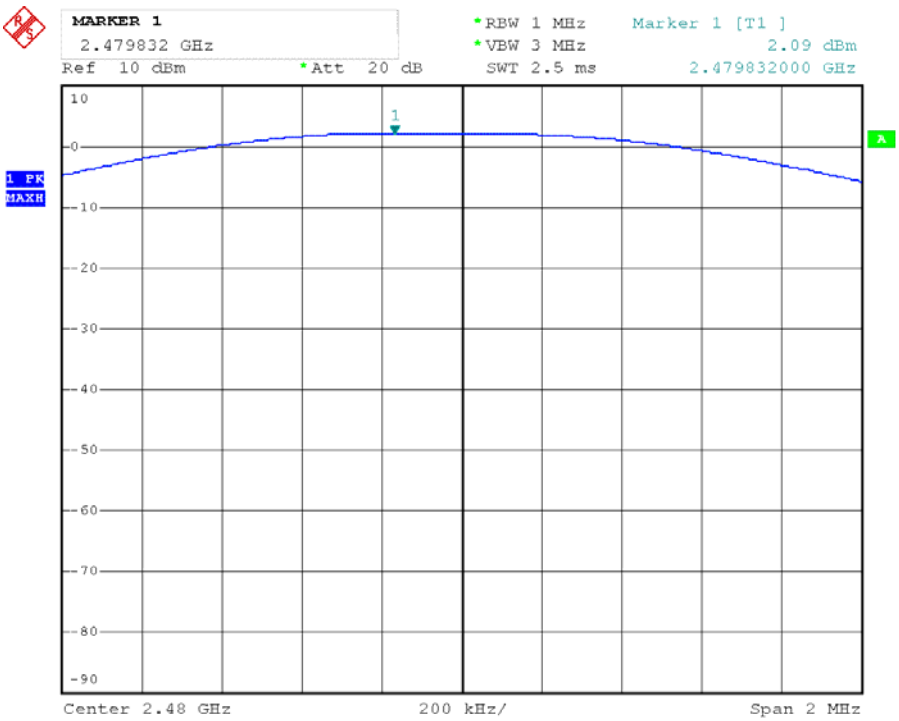
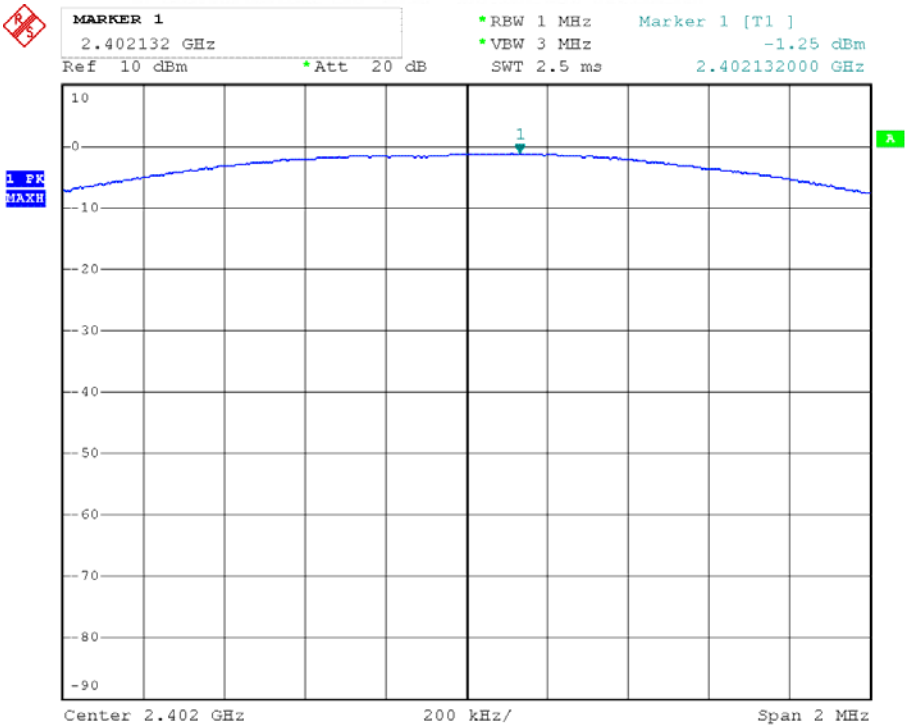
Channel High



EDR 2M
Channel Low



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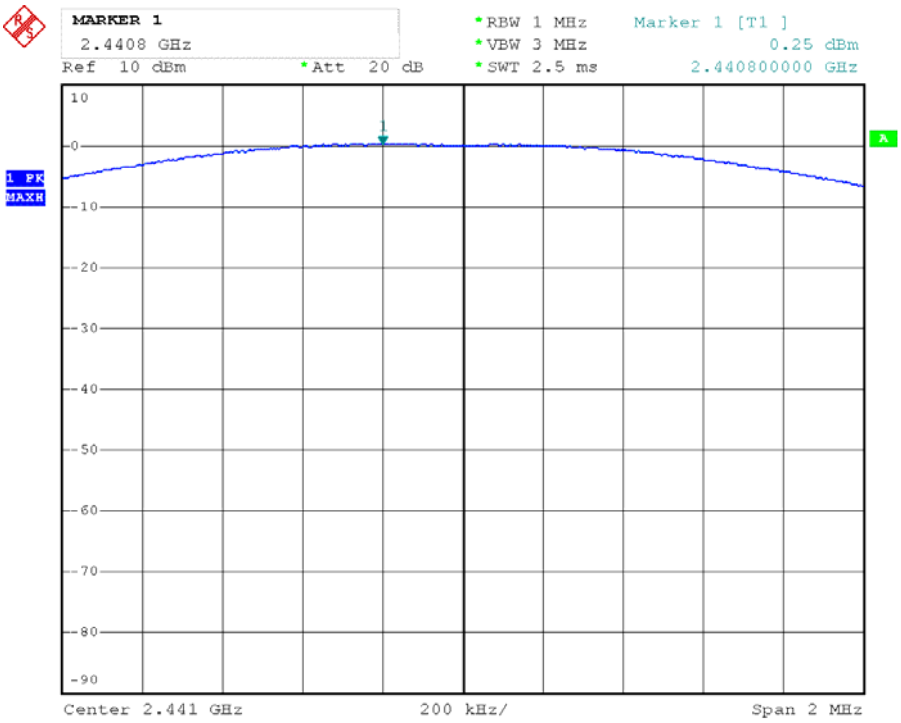
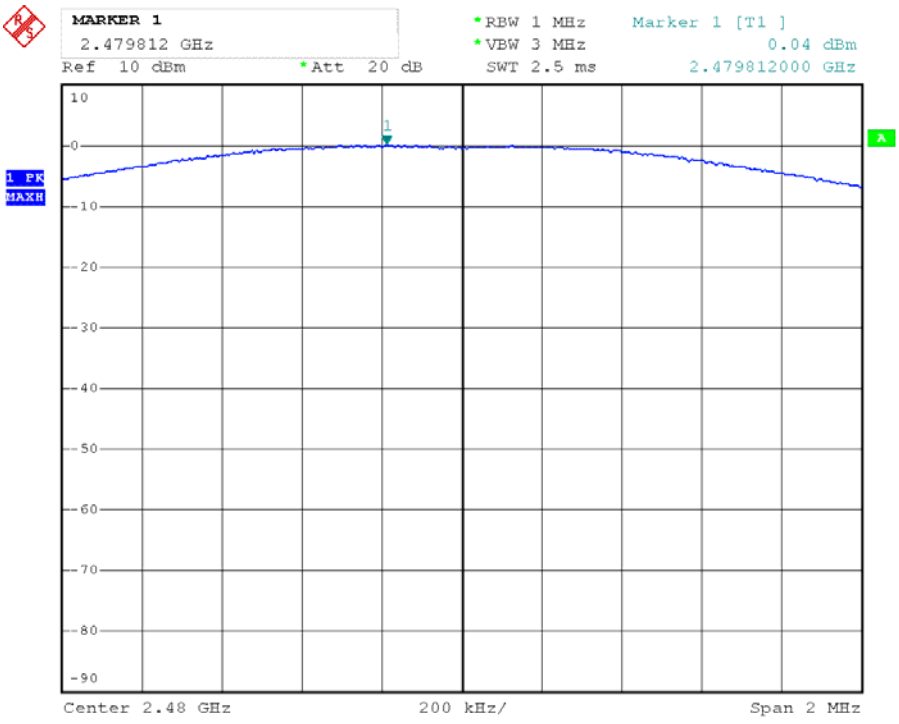
Channel Middle



Channel High



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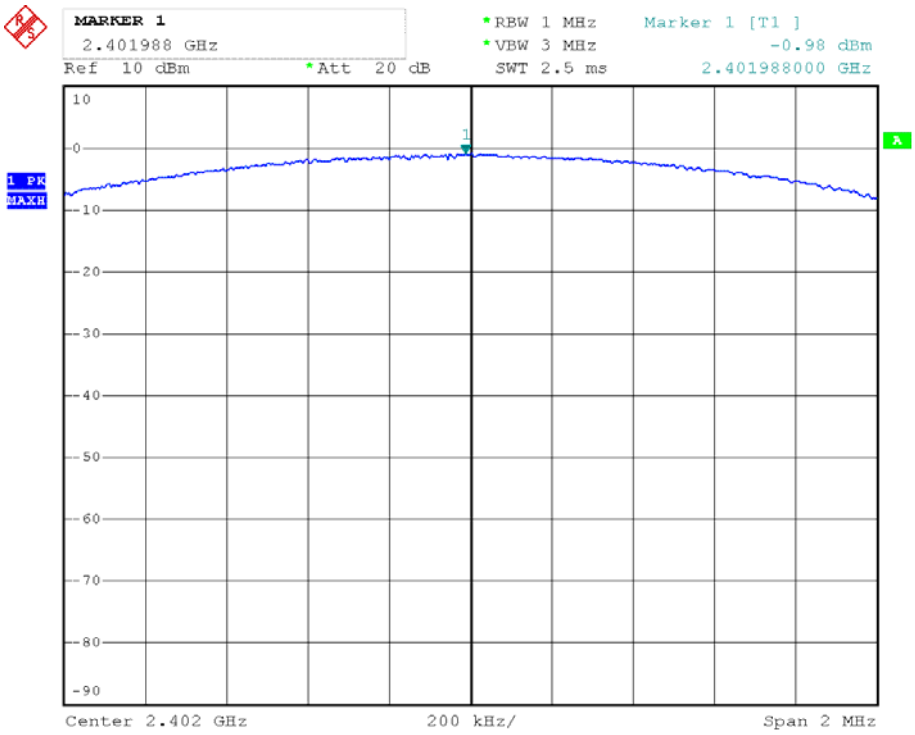
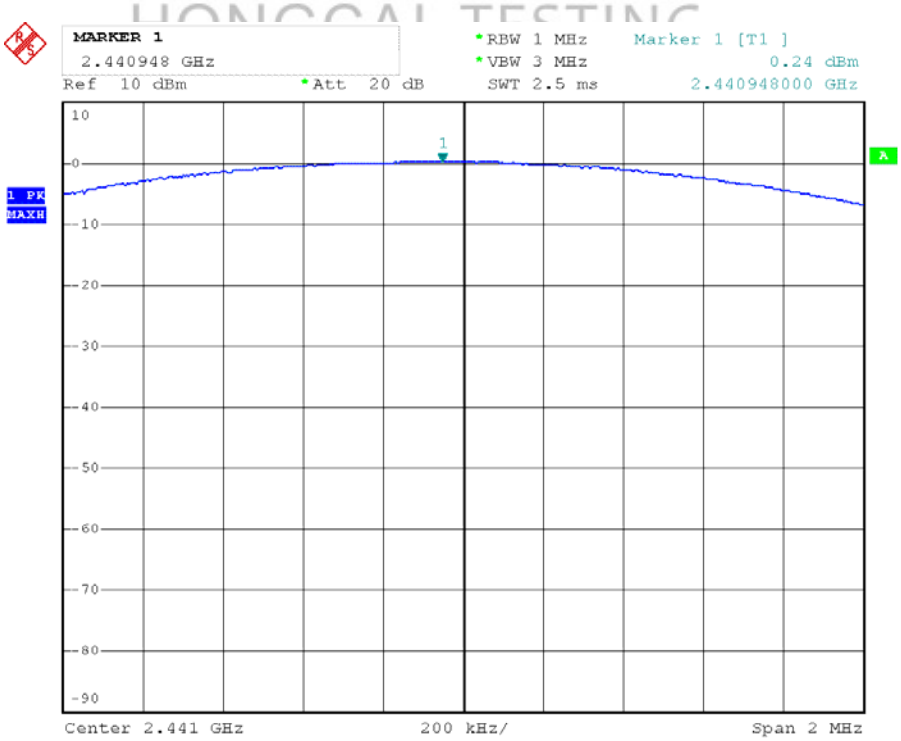
EDR 3M
Channel Low



Channel Middle



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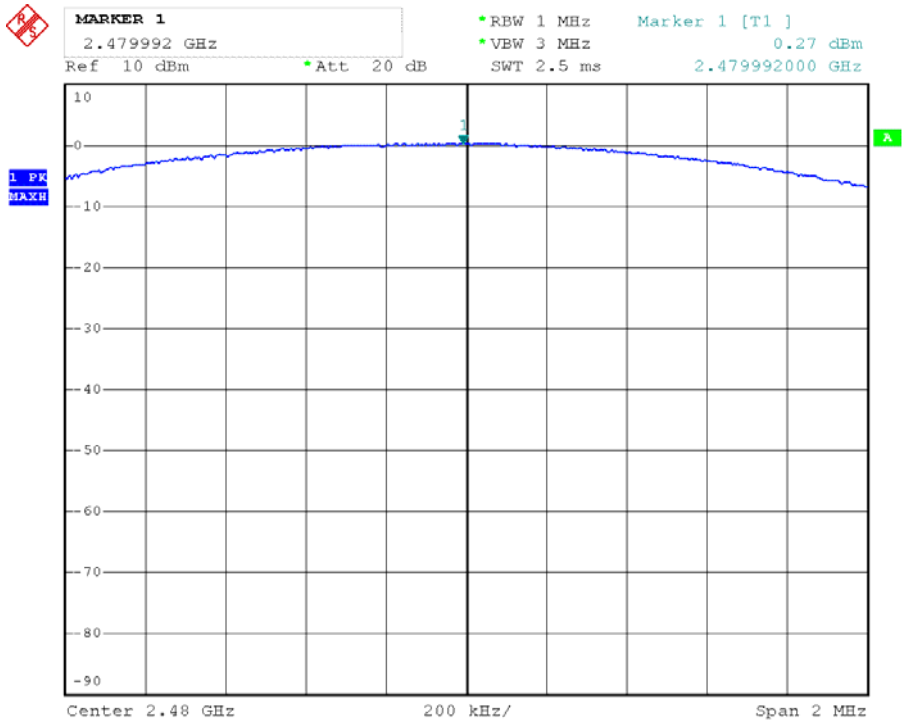
Channel High



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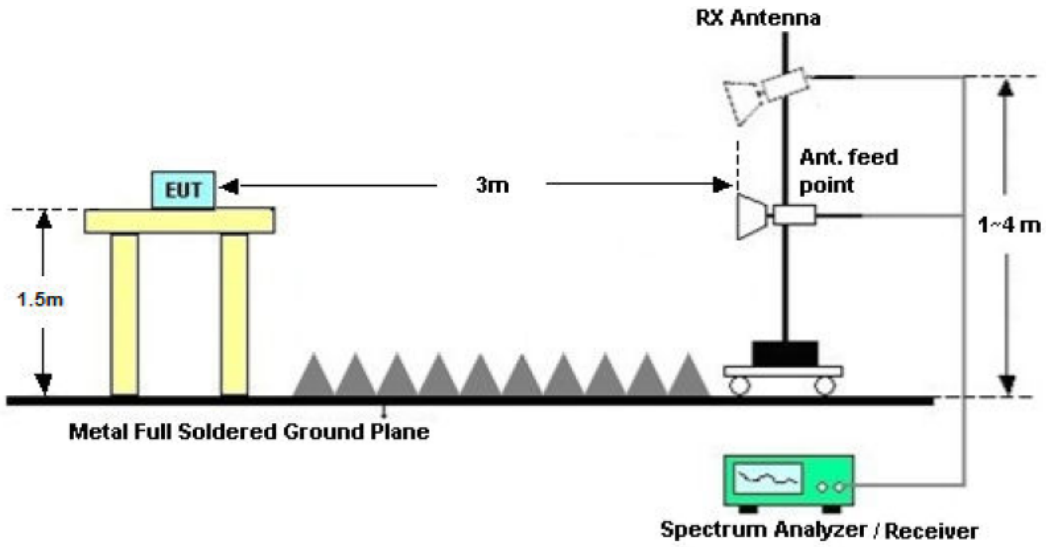
10. Test of Band Edges Emission

10.1 Applicable Standard

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. In addition, radiated emissions that fall in the restricted bands, as defined in Section 15.205, must also comply with the radiated emission limits specified in Section 15.209.

10.2 EUT Setup

Radiated Measurement Setup



Conducted Measurement Setup

Spectrum Analyzer

10.3 Test Equipment List and Details

See section 2.6.

10.4 Test Procedure

Conducted Measurement

1. The transmitter is set to the lowest channel.

2. The transmitter output was connected to the spectrum analyzer via a cable .

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3. Set both RBW and VBW of spectrum analyzer to 100KHz with convenient frequency span including 100MHz bandwidth from lower band edge. Then detector set to peak and max hold this trace.

4. The lowest band edges emission was measured and recorded.

5. The transmitter set to the highest channel and repeated 2~4.

Radiated Measurement

1. Configure the EUT according to ANSI C63.10-2013

2. The turntable was rotated by 360 degrees to determine the position of the highest radiation.

3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emission field strength of both horizontal and vertical polarization.

4. For band edge emission, the antenna tower was scan (from 1 M to 4 M) and then the turn table was rotated (from 0 degree to 360 degrees) to find the maximum reading.

5. For band edge emission, use 1MHz VBW and 1MHz RBW for reading under AV and use 1MHz VBW and 1MHz RBW for reading under PK.

10.5 Test Result

Temperature (℃) : 22~23	EUT: LOONA
Humidity (%RH): 50~54	M/N: RC133N1
Barometric Pressure (mbar): 950~1000	Operation Condition: Tx Mode

Radiated Test Result

Worst Case BR 1M

Frequency (MHz)	Antenna Polarization	Emission Read Value (dBμV/m)	Emission Level (dBμV/m)	Margin (dB)	Limits (dBμV/m)	Det.
2400	H	30.23	60.13	-13.87	74	PK
2400	H	17.21	47.11	-6.89	54	AV
2400	V	32.49	62.29	-11.71	74	PK
2400	V	17.32	47.22	-6.78	54	AV
2483.5	H	31.66	61.54	-12.46	74	PK
2483.5	H	17.90	47.80	-6.20	54	AV
2483.5	V	32.58	62.46	-11.54	74	PK
2483.5	V	18.20	48.10	-5.9	54	AV

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Worst Case EDR 2M

Frequency (MHz)	Antenna Polarization	Emission Read Value (dBμV/m)	Emission Level (dBμV/m)	Margin (dB)	Limits (dBμV/m)	Det.
2400	H	28.61	59.82	-14.43	74	PK
2400	H	13.72	44.61	-4.33	54	AV
2400	V	33.71	59.79	-19.5	74	PK
2400	V	12.72	44.72	-3.44	54	AV
2483.5	H	27.76	59.04	-12.8	74	PK
2483.5	H	13.1	45.3	-4.4	54	AV
2483.5	V	31.19	59.96	-17.15	74	PK
2483.5	V	15.95	45.6	-7.55	54	AV

Worst Case EDR 3M

Frequency (MHz)	Antenna Polarization	Emission Read Value (dBμV/m)	Emission Level (dBμV/m)	Margin (dB)	Limits (dBμV/m)	Det.
2400	H	29.02	59.82	-14.84	74	PK
2400	H	16.71	44.61	-7.32	54	AV
2400	V	31.19	59.79	-16.98	74	PK
2400	V	15.72	44.72	-6.44	54	AV
2483.5	H	29.28	59.04	-14.32	74	PK
2483.5	H	15.73	45.3	-7.03	54	AV
2483.5	V	30.88	59.96	-16.84	74	PK
2483.5	V	16.15	45.6	-7.75	54	AV

Note: 1. Emission Level = Emission Read Value + Correction Factor

2. Correction Factor) = Antenna Factor + Cable Loss- amplifier gain

3. The other emission levels were very low against the limit.

4. Margin value = Emission Level – Limit value

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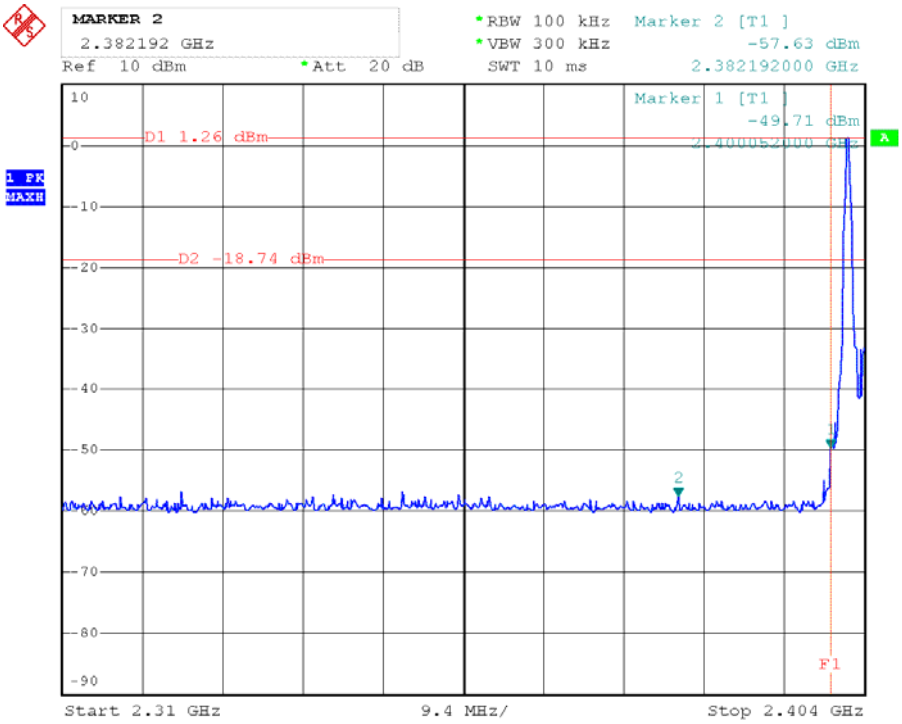
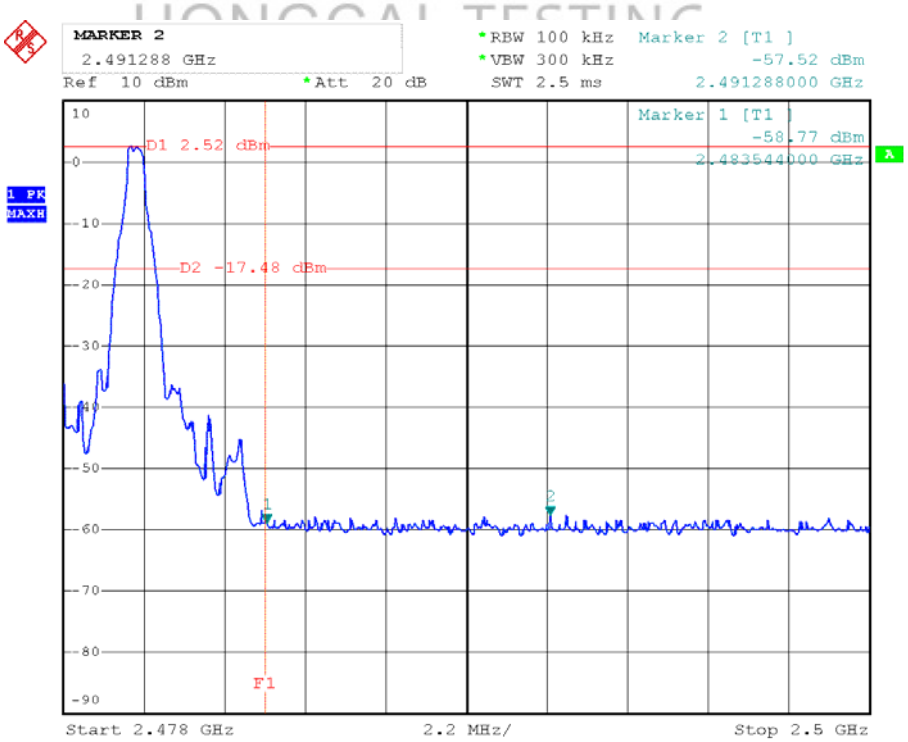
Conducted Test Result
BR 1M
Channel Low



Channel High



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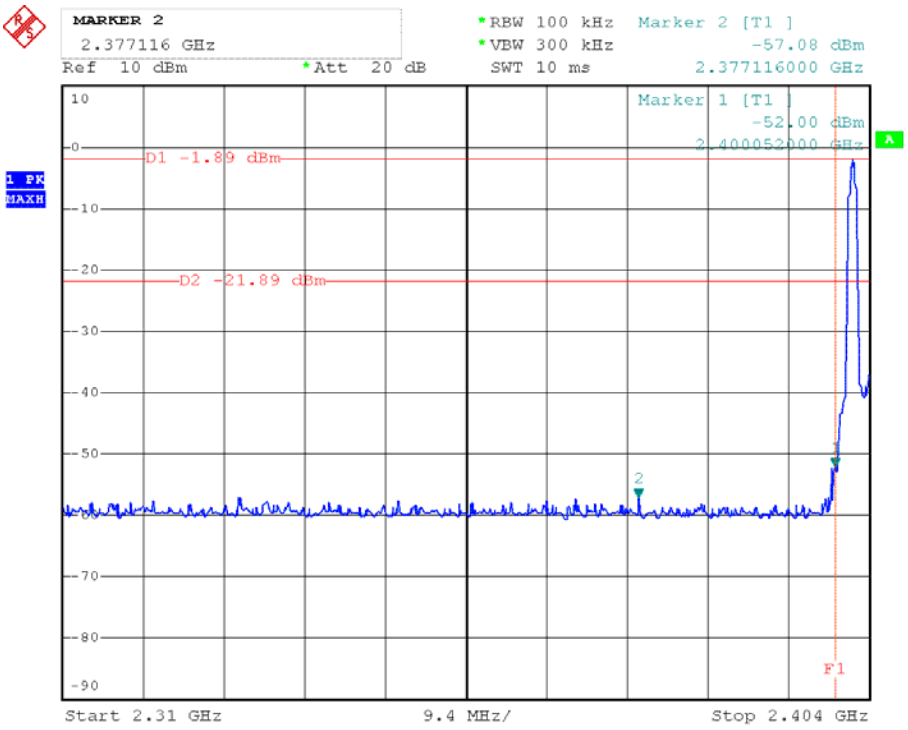
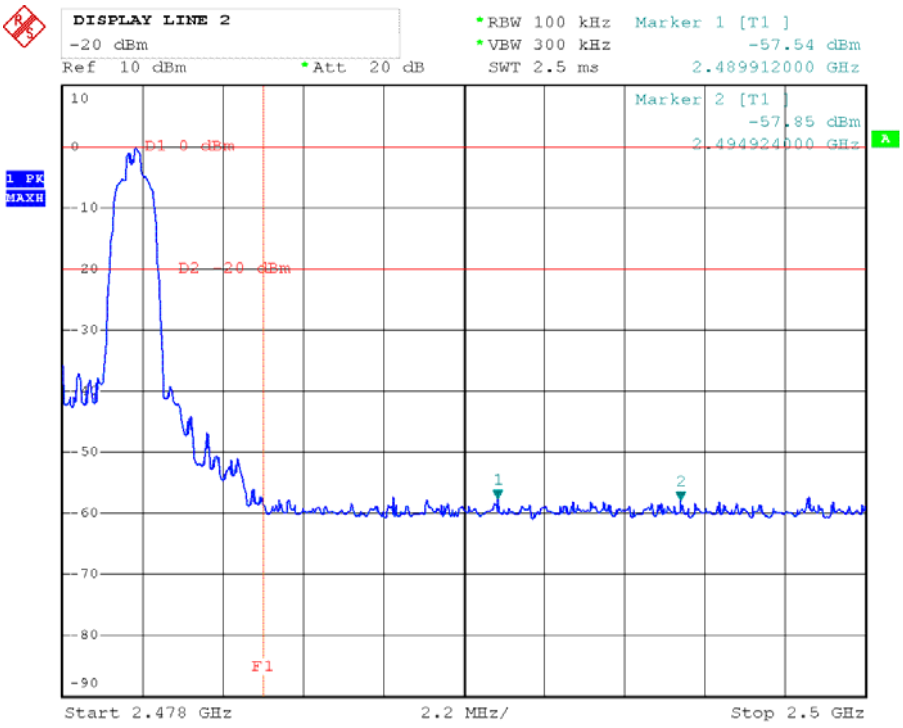
EDR 2M
Channel Low



Channel High



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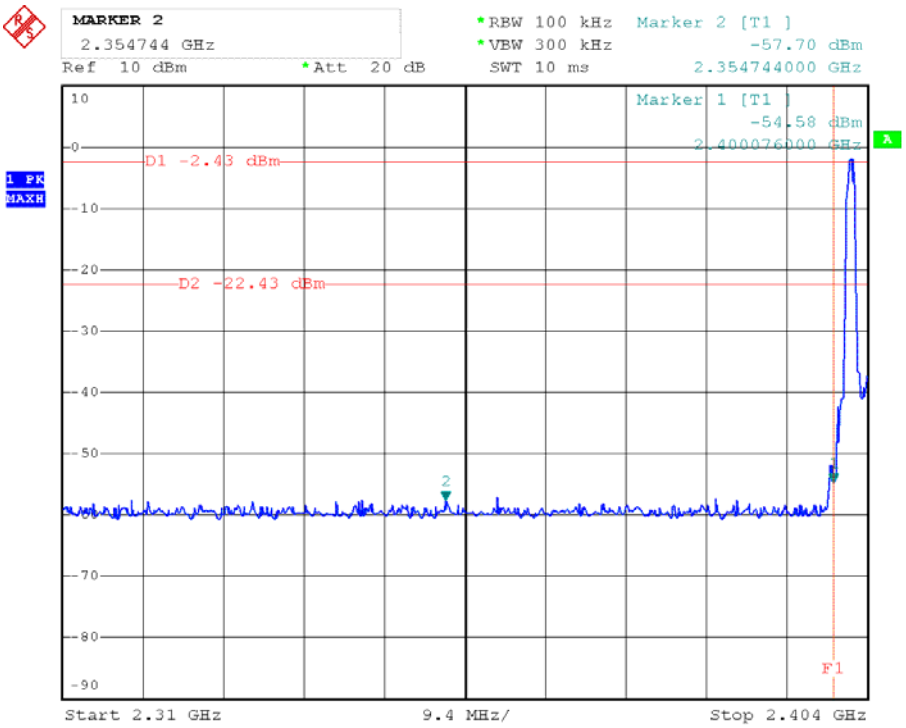
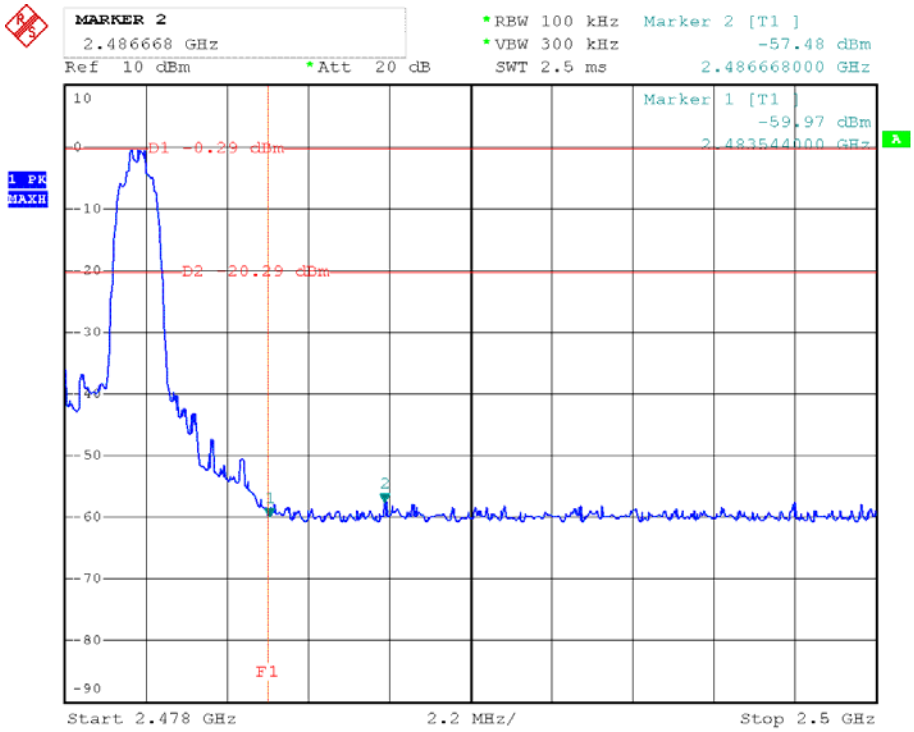
EDR 3M
Channel Low



Channel High



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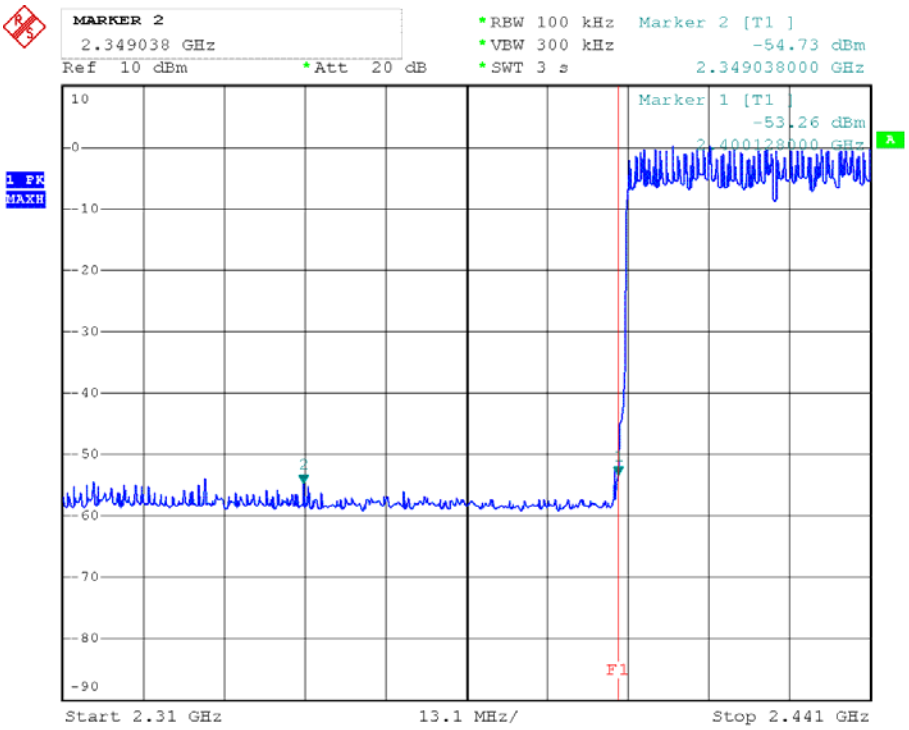
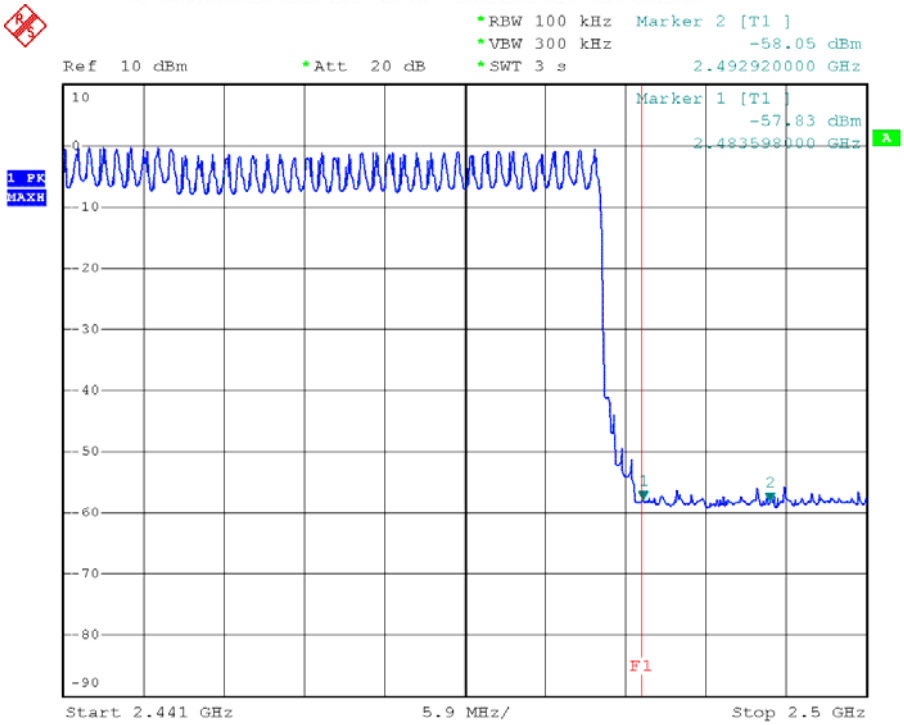
Hopping Mode Worst case EDR 2M
Channel Low



Channel High



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11. Test of Spurious Radiated Emission

11.1 Applicable Standard

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. In addition, radiated emissions that fall in the restricted bands, as defined in Section 15.205, must also comply with the radiated emission limits specified in Section 15.209.

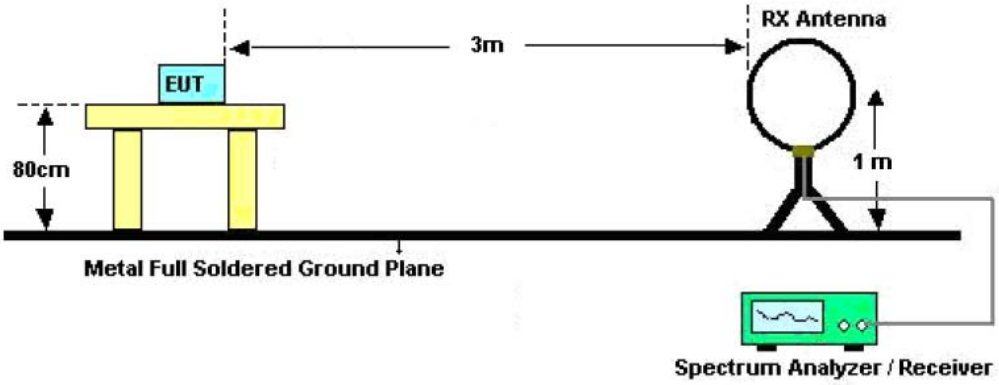
11.2 EUT Setup

Conducted Measurement Setup

Spectrum Analyzer

Radiated Measurement Setup

For radiated emission below 30MHz



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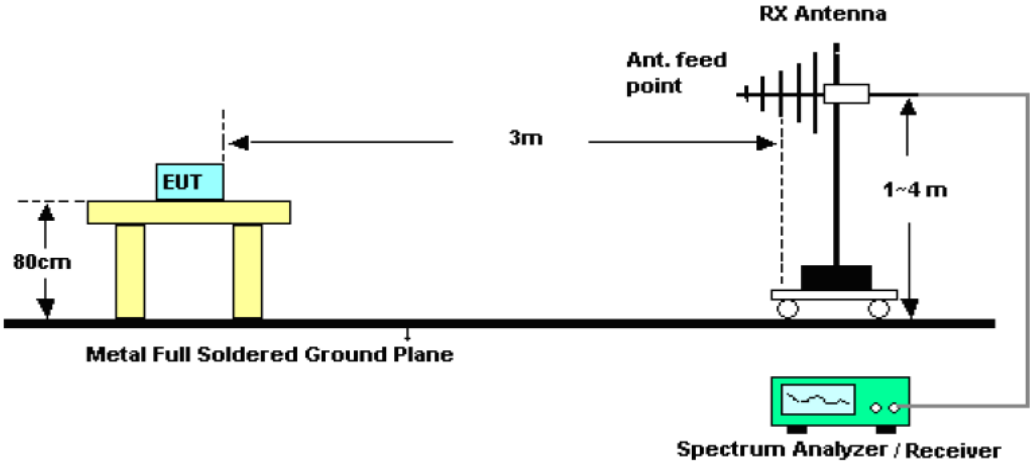
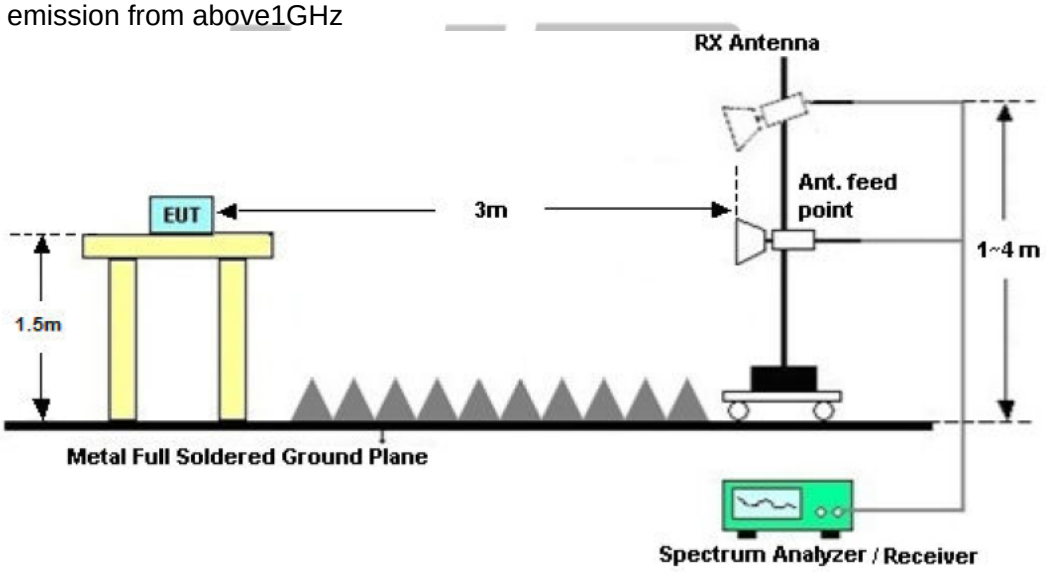
For radiated emission from 30MHz to1GHz



For radiated emission from above1GHz



11.3 Test Equipment List and Details

See section 2.6.

11.4 Test Procedure

Conducted Measurement

1. For emission above 1GHz to 26G,conducted measurement method is used.

2. The transmitter is set to the lowest channel.

3. The transmitter output was connected to the spectrum analyzer via a cable and cable loss is used as the offset of the spectrum analyzer.

4. Set RBW to 1 MHz and VBW to 3 MHz, Then detector set to peak and max hold this trace.

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5. The lowest band edges emission was measured and recorded.

6. The transmitter set to the highest channel and repeated 2~4.

Radiated Measurement

1. Configure the EUT according to ANSI C63.10-2013

2. The EUT was placed on the top of the turntable 0.8 meter above ground.

3. Receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable. When the frequency spectrum measured started from 9 kHz to 30 MHz, a loop antenna is used. When the frequency spectrum measured started from 30 MHz to 1000 MHz and above 1000 MHz, a broadband receiving antenna and the horn antenna are used.

4. Power on the EUT and all the supporting units.

5. The turntable was rotated by 360 degrees to determine the position of the highest radiation.

6. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emission field strength of both horizontal and vertical polarization.

7. For each suspected emission, the antenna tower was scanned (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.

8. According to the characteristic of the EUT crystals, the range of frequencies was investigated from 9KHz to 30MHz, 30MHz to 1GHz and 1GHz to 26GHz.

9. For emission below 1GHz, Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.

10. For emission above 1GHz, Set the RBW=1MHz,VBW=3MHz for Peak Detector while the RBW=1MHz, VBW=10Hz for Average Detector, Readings are both peak and average values.

11. The pre-test have done for the EUT in three axes and found the worst emission at position shown in test setup photos. The worst case data is recorded in the report. All emission not reported are much lower than the prescribed limits.

11.5 Test Result

Temperature (℃) : 22~23	EUT: LOONA
Humidity (%RH): 50~54	M/N: RC133N1
Barometric Pressure (mbar): 950~1000	Operation Condition: TX Mode

Note:
1. Worst-case radiated emission below 30MHz is BR1M mode.
2. Worst-case radiated emission below 1GHz is EDR 2M mode.
3. Worst-case radiated emission above 1GHz is EDR 3M mode.

The worst Spurious Emission Data BR1M Mode Below 30 MHz

Frequency (MHz)	Read Level	Antenna Factor	Cable Loss	Emission Levels	Limit (dBμV/m)	Margin (dB)	Detector Mode

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	(dBuV)	(dB/m)	(dB)	(dBuV/m)			
0.51	21.14	7.69	1.03	33.74	73.5	-39.76	QP
14.24	21	8.53	1.19	43.77	69.5	-25.73	QP
21.77	21.83	8.71	1.08	52.31	69.5	-17.19	QP
22.8	21.69	7.89	1.66	52.38	69.5	-17.12	QP

Note:

1. The pre-test have done for the EUT in three axes and found the worst emission at position shown in test setup photos. The worst case data is recorded in the report.

2. Emission level (dBuV/m) =Raw Value (dBuV) + Correction Factor (dB/m)

3. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)

4. The other emission levels were very low against the limit.

5. Margin value = Emission level.- Limit value

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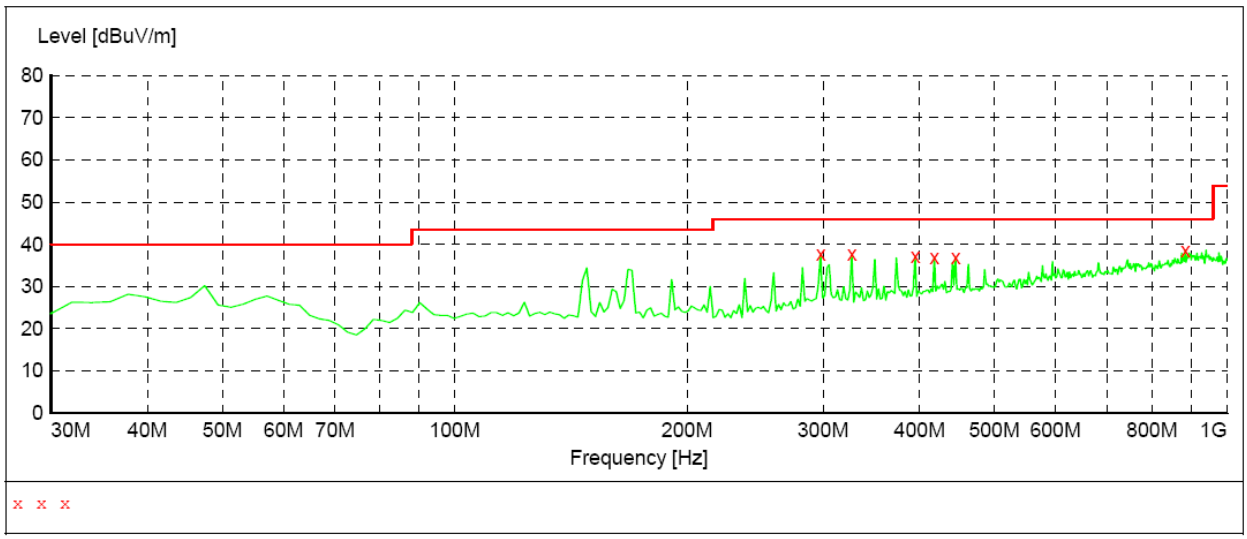
The worst Spurious Emission Data EDR 2M Mode Below 1GHz Channel Low:

EUT:	LOONA
M/N:	RC133N1
Operating Condition:	TX Mode
Test Site:	3m CHAMBER
Operator:	Chen
Test Specification:	AC 120V 60Hz
Comment:	Polarization: Horizontal

SWEEP TABLE: "test (30M-1G)"

Short Description:		Field Strength			
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	9163-2015



MEASUREMENT RESULT:

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
297.720000	37.60	14.8	46.0	8.4	QP	100.0	0.00	HORIZONTAL
326.820000	37.80	16.0	46.0	8.2	QP	300.0	0.00	HORIZONTAL
394.720000	37.10	17.5	46.0	8.9	QP	300.0	0.00	HORIZONTAL
418.000000	37.00	18.2	46.0	9.0	QP	100.0	0.00	HORIZONTAL
445.160000	37.00	18.3	46.0	9.0	QP	300.0	0.00	HORIZONTAL
883.600000	38.60	25.4	46.0	7.4	QP	100.0	0.00	HORIZONTAL

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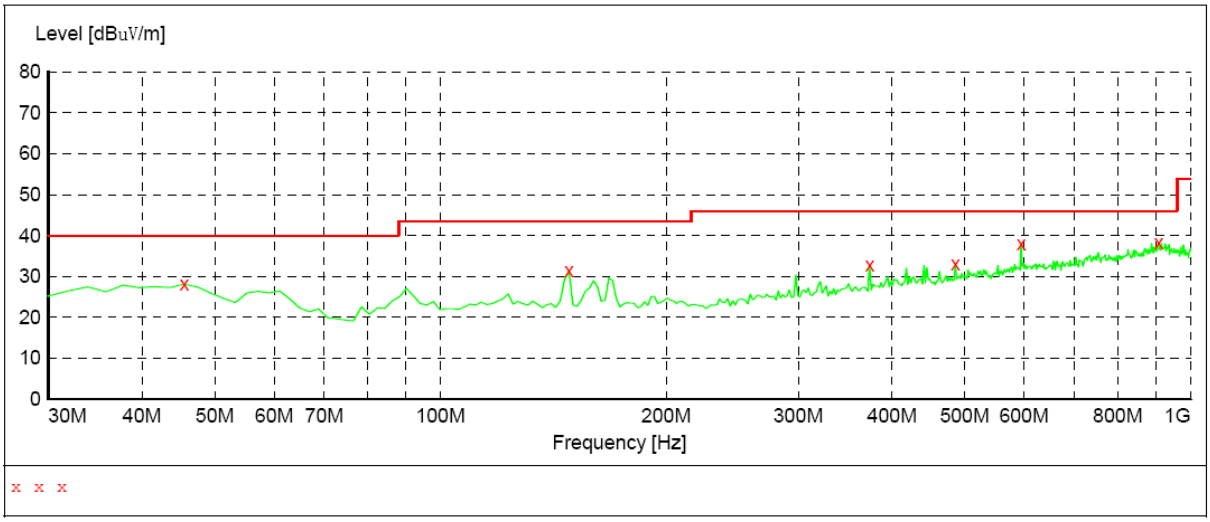
The worst Spurious Emission Data EDR 2M Mode Below 1GHz Channel Low:

EUT:	LOONA
M/N:	RC133N1
Operating Condition:	TX Mode
Test Site:	3m CHAMBER
Operator:	Chen
Test Specification:	AC 120V 60Hz
Comment:	Polarization: Vertical

SWEEP TABLE: "test (30M-1G)"

Short Description:			Field Strength		
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	9163-2015



MEASUREMENT RESULT:

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
45.520000	28.10	16.8	40.0	11.9	QP	100.0	0.00	VERTICAL
148.340000	31.40	11.7	43.5	12.1	QP	100.0	0.00	VERTICAL
373.380000	32.70	17.0	46.0	13.3	QP	100.0	0.00	VERTICAL
485.900000	33.00	19.2	46.0	13.0	QP	100.0	0.00	VERTICAL
594.540000	38.00	21.5	46.0	8.0	QP	100.0	0.00	VERTICAL
906.880000	38.30	25.8	46.0	7.7	QP	100.0	0.00	VERTICAL

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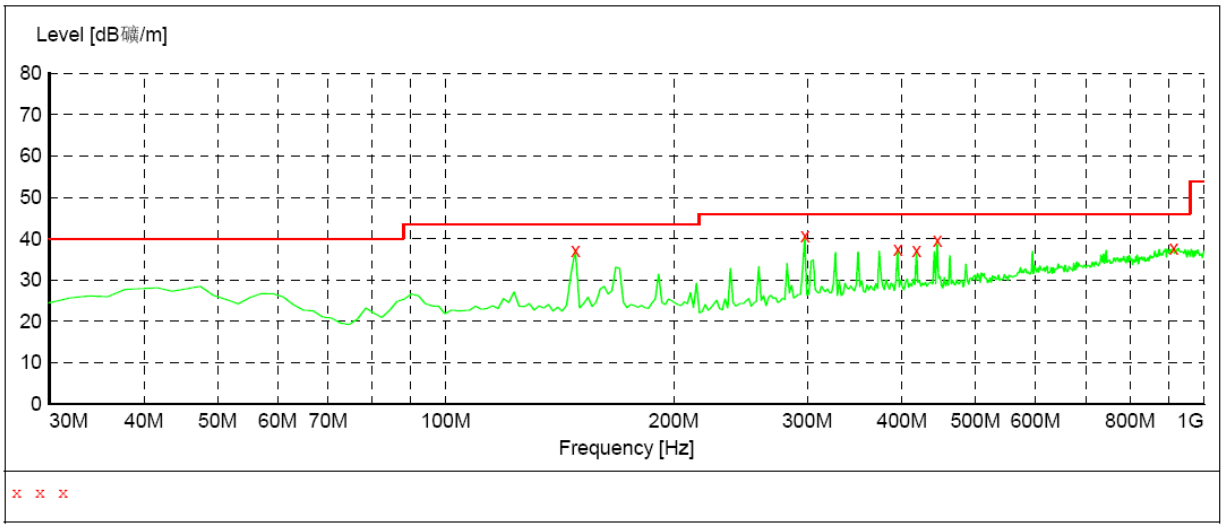
The worst Spurious Emission Data EDR 2M Mode Below 1GHz Channel Middle:

EUT:	LOONA
M/N:	RC133N1
Operating Condition:	TX Mode
Test Site:	3m CHAMBER
Operator:	Chen
Test Specification:	AC 120V 60Hz
Comment:	Polarization: Horizontal

SWEEP TABLE: "test (30M-1G)"

Short Description:			Field Strength		
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	9163-2015



MEASUREMENT RESULT:

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
148.340000	37.20	11.7	43.5	6.3	QP	300.0	0.00	HORIZONTAL
297.720000	40.70	14.8	46.0	5.3	QP	100.0	0.00	HORIZONTAL
394.720000	37.50	17.5	46.0	8.5	QP	300.0	0.00	HORIZONTAL
418.000000	37.20	18.2	46.0	8.8	QP	100.0	0.00	HORIZONTAL
445.160000	39.60	18.3	46.0	6.4	QP	100.0	0.00	HORIZONTAL
912.700000	37.70	25.8	46.0	8.3	QP	100.0	0.00	HORIZONTAL

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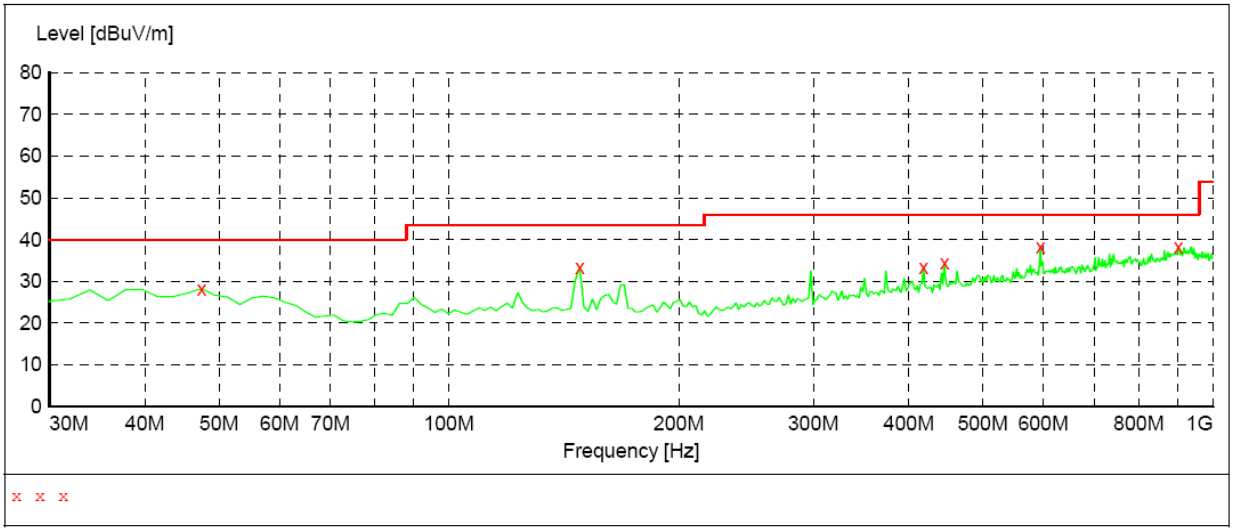
The worst Spurious Emission Data EDR 2M Mode Below 1GHz Channel Middle:

EUT:	LOONA
M/N:	RC133N1
Operating Condition:	TX Mode
Test Site:	3m CHAMBER
Operator:	Chen
Test Specification:	AC 120V 60Hz
Comment:	Polarization: Vertical

SWEEP TABLE: "test (30M-1G)"

Short Description:			Field Strength		
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	9163-2015



MEASUREMENT RESULT:

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
47.460000	28.30	16.7	40.0	11.7	QP	100.0	0.00	VERTICAL
148.340000	33.40	11.7	43.5	10.1	QP	100.0	0.00	VERTICAL
418.000000	33.30	18.2	46.0	12.7	QP	100.0	0.00	VERTICAL
445.160000	34.50	18.3	46.0	11.5	QP	100.0	0.00	VERTICAL
594.540000	38.40	21.5	46.0	7.6	QP	100.0	0.00	VERTICAL
901.060000	38.30	25.8	46.0	7.7	QP	100.0	0.00	VERTICAL

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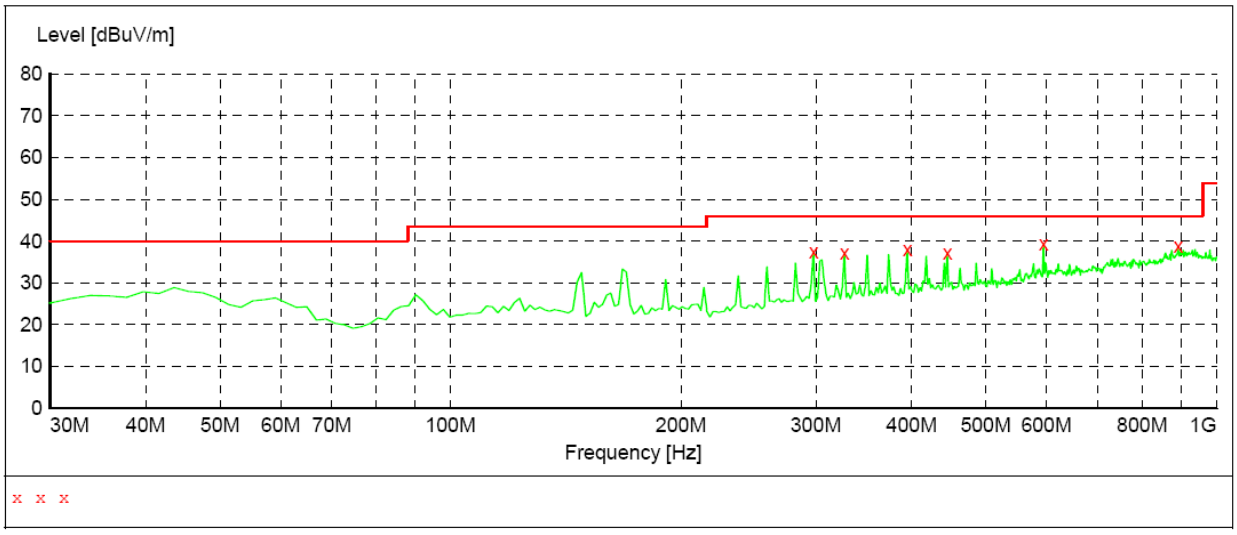
The worst Spurious Emission Data EDR 2M Mode Below 1GHz Channel High:

EUT:	LOONA
M/N:	RC133N1
Operating Condition:	TX Mode
Test Site:	3m CHAMBER
Operator:	Chen
Test Specification:	AC 120V 60Hz
Comment:	Polarization: Horizontal

SWEEP TABLE: "test (30M-1G)"

Short Description:			Field Strength		
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	9163-2015



MEASUREMENT RESULT:

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
297.720000	37.40	14.8	46.0	8.6	QP	300.0	0.00	HORIZONTAL
326.820000	37.30	16.0	46.0	8.7	QP	100.0	0.00	HORIZONTAL
394.720000	37.90	17.5	46.0	8.1	QP	100.0	0.00	HORIZONTAL
445.160000	37.10	18.3	46.0	8.9	QP	300.0	0.00	HORIZONTAL
594.540000	39.30	21.5	46.0	6.7	QP	100.0	0.00	HORIZONTAL
891.360000	38.80	25.5	46.0	7.2	QP	300.0	0.00	HORIZONTAL

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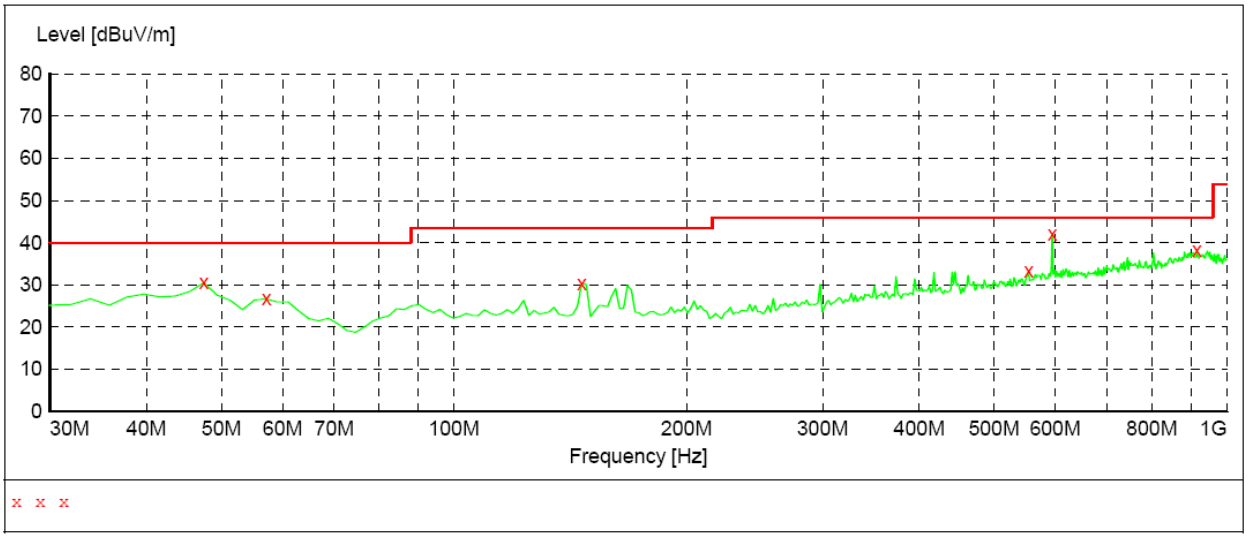
The worst Spurious Emission Data EDR 2M Mode Below 1GHz Channel High:

EUT:	LOONA
M/N:	RC133N1
Operating Condition:	TX Mode
Test Site:	3m CHAMBER
Operator:	Chen
Test Specification:	AC 120V 60Hz
Comment:	Polarization: Vertical

SWEEP TABLE: "test (30M-1G)"

Short Description:			Field Strength		
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	9163-2015



MEASUREMENT RESULT:

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
47.460000	30.50	16.7	40.0	9.5	QP	100.0	0.00	VERTICAL
57.160000	26.70	15.7	40.0	13.3	QP	100.0	0.00	VERTICAL
146.400000	30.30	12.0	43.5	13.2	QP	100.0	0.00	VERTICAL
553.800000	33.40	20.4	46.0	12.6	QP	100.0	0.00	VERTICAL
594.540000	42.20	21.5	46.0	3.8	QP	100.0	0.00	VERTICAL
914.640000	38.20	25.8	46.0	7.8	QP	100.0	0.00	VERTICAL

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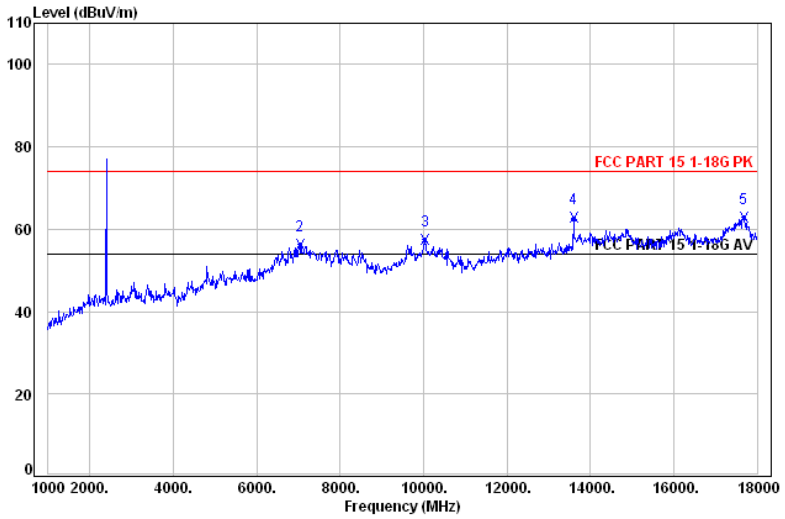
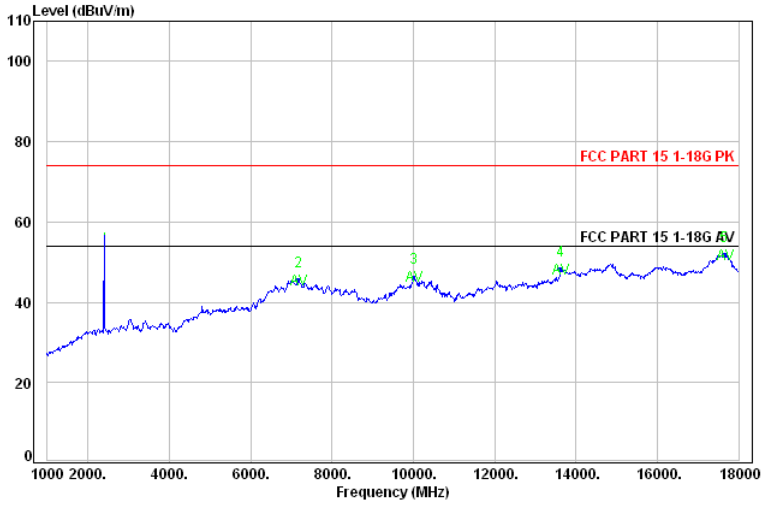
The worst Spurious Emission Data EDR 3M Mode Above 1GHz
Channel Low: Vertical



Freq	Ant Factor	Read Level	Limit Level	Over Line Limit	Remark
MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
2	7171.00	39.47	26.96	45.50	74.00	-28.50	Peak
3	10010.00	39.40	28.85	46.24	74.00	-27.76	Peak
4	13614.00	42.39	33.78	48.13	74.00	-25.87	Peak
5	17660.00	43.46	34.87	51.79	74.00	-22.21	Peak

AV:



Freq	Ant Factor	Read Level	Limit Level	Over Line Limit	Remark
MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
2	7035.00	39.49	37.37	56.30	74.00	-17.70	Average
3	10044.00	39.42	40.22	57.51	74.00	-16.49	Average
4	13597.00	42.38	43.34	62.67	74.00	-11.33	Average
5	17677.00	43.31	46.09	62.92	74.00	-11.08	Average

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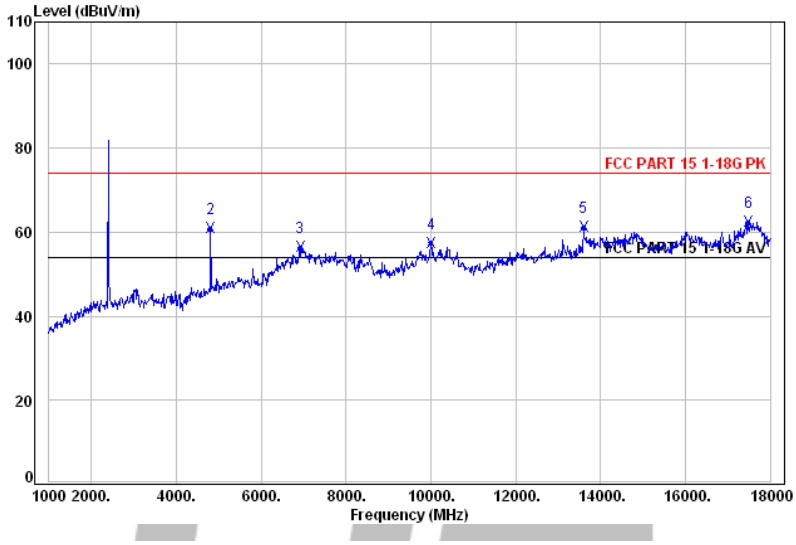
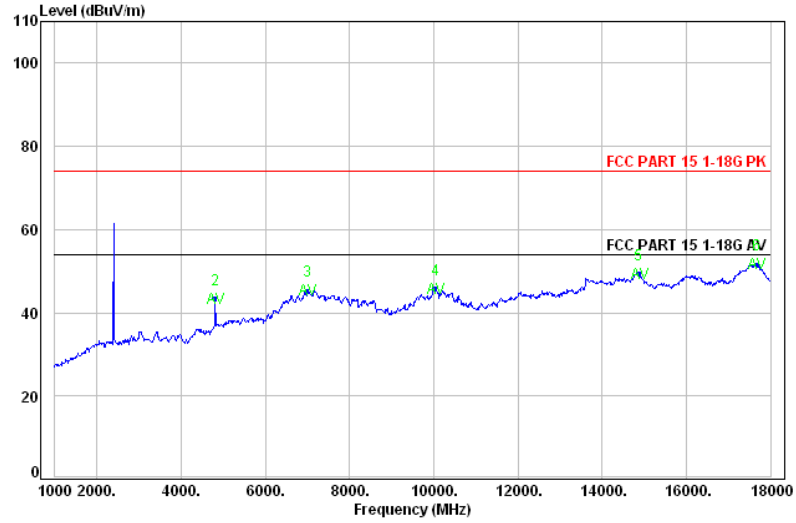
Channel Low: Horizontal



Freq	Ant Factor	Read Level	Limit Level	Over Line	Limit	Remark
MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
2	4808.00	35.16	34.34	43.32	74.00	-30.68 Peak
3	7001.00	39.50	26.26	45.28	74.00	-28.72 Peak
4	10044.00	39.42	28.55	45.84	74.00	-28.16 Peak
5	14872.00	42.30	36.01	49.45	74.00	-24.55 Peak
6	17677.00	43.31	34.82	51.65	74.00	-22.35 Peak

AV:



Freq	Ant Factor	Read Level	Limit Level	Over Line	Limit	Remark
MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
2	4808.00	35.16	51.95	60.93	74.00	-13.07 Average
3	6916.00	39.30	37.91	56.39	74.00	-17.61 Average
4	10010.00	39.40	40.10	57.49	74.00	-16.51 Average
5	13597.00	42.38	41.85	61.18	74.00	-12.82 Average
6	17490.00	44.79	44.73	62.40	74.00	-11.60 Average

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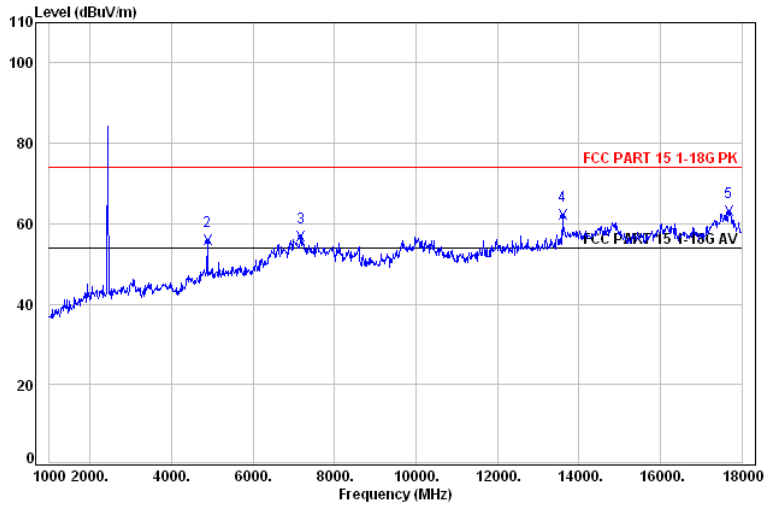
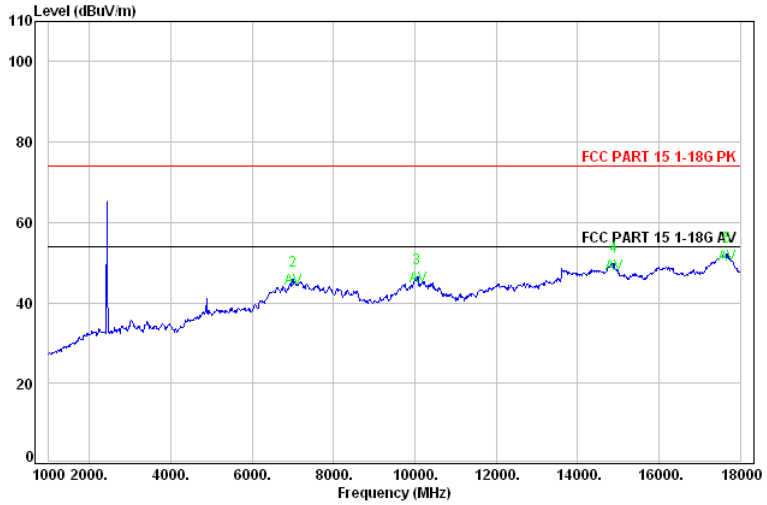
Channel Middle: Vertical



	Freq	Ant Factor	Read Level	Limit Level	Over Line Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
2	7001.00	39.50	26.54	45.56	74.00	-28.44	Peak
3	10061.00	39.42	28.97	46.19	74.00	-27.81	Peak
4	14889.00	42.28	36.00	49.40	74.00	-24.60	Peak
5	17677.00	43.31	34.96	51.79	74.00	-22.21	Peak

AV:



	Freq	Ant Factor	Read Level	Limit Level	Over Line Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
2	4876.00	35.35	46.46	55.75	74.00	-18.25	Average
3	7171.00	39.47	38.32	56.86	74.00	-17.14	Average
4	13597.00	42.38	42.74	62.07	74.00	-11.93	Average
5	17677.00	43.31	46.26	63.09	74.00	-10.91	Average

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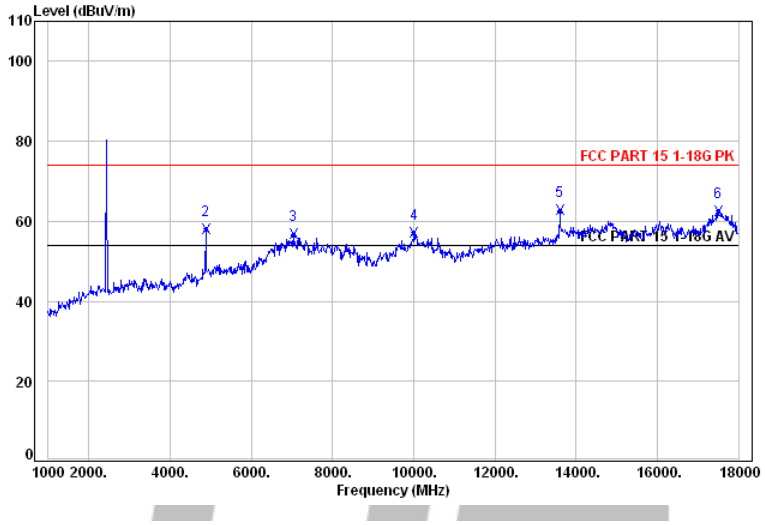
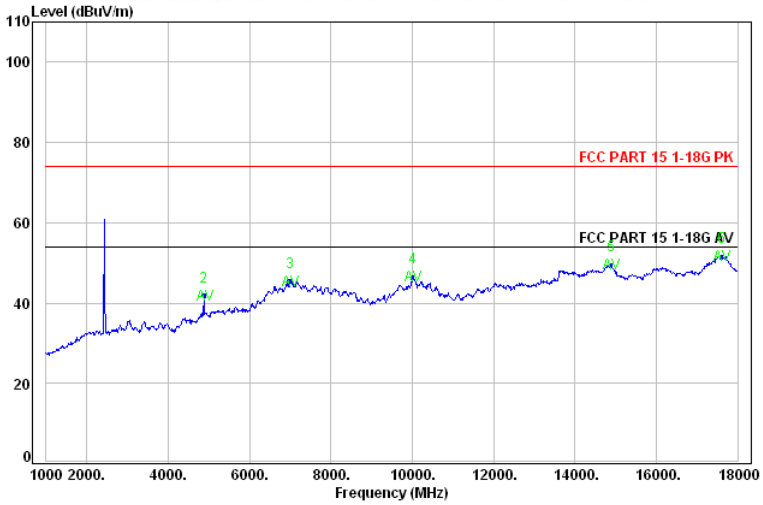
Channel Middle: Horizontal



	Freq	Ant Factor	Read Level	Limit Level	Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
2	4876.00	35.35	32.55	41.84	74.00	-32.16	Peak
3	7001.00	39.50	26.51	45.53	74.00	-28.47	Peak
4	10010.00	39.40	29.09	46.48	74.00	-27.52	Peak
5	14889.00	42.28	36.15	49.55	74.00	-24.45	Peak
6	17609.00	43.88	34.48	51.65	74.00	-22.35	Peak

AV:



	Freq	Ant Factor	Read Level	Limit Level	Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
2	4876.00	35.35	48.73	58.02	74.00	-15.98	Average
3	7035.00	39.49	37.81	56.74	74.00	-17.26	Average
4	10010.00	39.40	39.81	57.20	74.00	-16.80	Average
5	13597.00	42.38	43.34	62.67	74.00	-11.33	Average
6	17507.00	44.74	44.88	62.56	74.00	-11.44	Average

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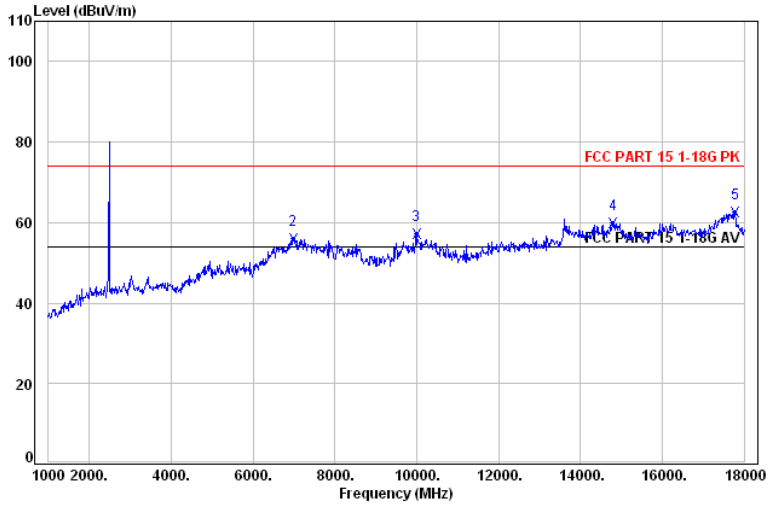
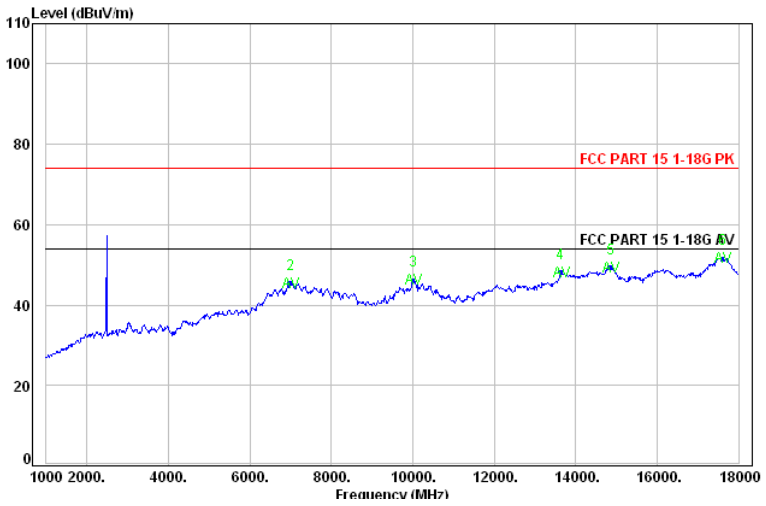
Channel High: Vertical



	Freq	Ant Factor	Read Level	Limit Level	Over Line Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB
2	7001.00	39.50	26.44	45.46	74.00 -28.54	Peak
3	10010.00	39.40	28.78	46.17	74.00 -27.83	Peak
4	13631.00	42.40	33.89	48.26	74.00 -25.74	Peak
5	14855.00	42.33	35.90	49.38	74.00 -24.62	Peak
6	17609.00	43.88	34.53	51.70	74.00 -22.30	Peak

AV:



	Freq	Ant Factor	Read Level	Limit Level	Over Line Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB
2	6984.00	39.46	37.07	55.99	74.00 -18.01	Average
3	9993.00	39.39	39.74	57.13	74.00 -16.87	Average
4	14804.00	42.41	46.27	59.89	74.00 -14.11	Average
5	17779.00	42.46	46.27	62.60	74.00 -11.40	Average

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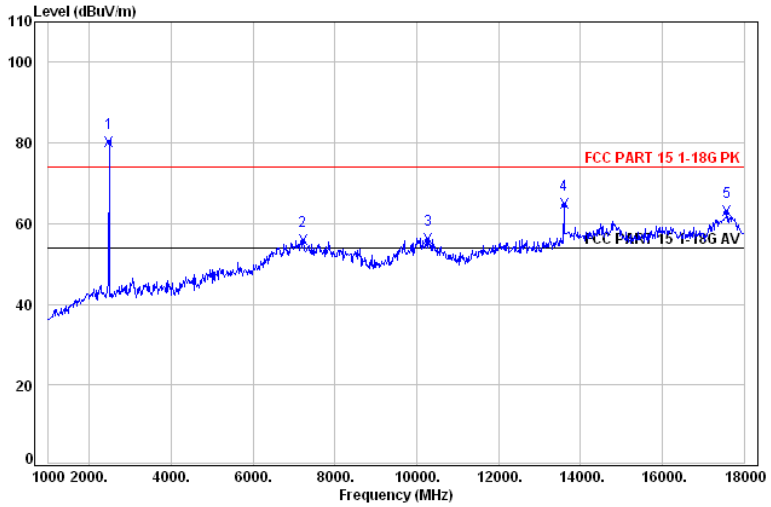
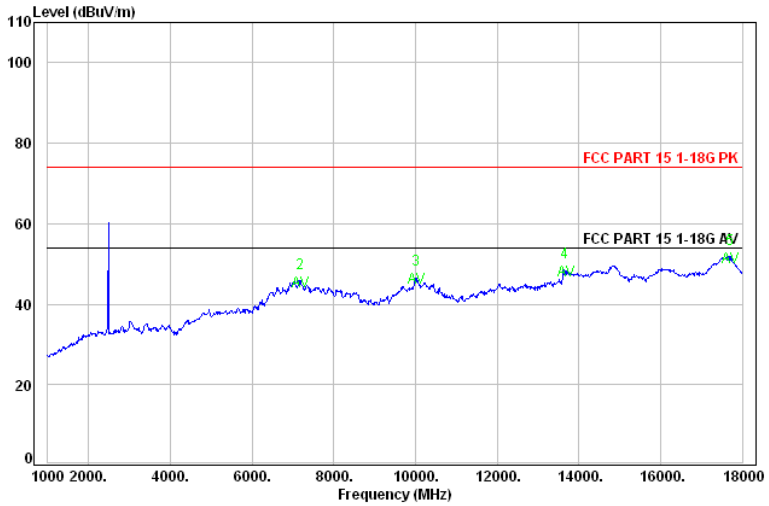
Channel High: Horizontal



Freq	Ant Factor	Read Level	Limit Level	Over Line Limit	Remark
MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
2	7171.00	39.47	27.00	45.54	74.00	-28.46	Peak
3	10010.00	39.40	28.88	46.27	74.00	-27.73	Peak
4	13665.00	42.43	33.66	48.06	74.00	-25.94	Peak
5	17694.00	43.17	34.77	51.52	74.00	-22.48	Peak

AV:



Freq	Ant Factor	Read Level	Limit Level	Over Line Limit	Remark
MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
2	7222.00	39.46	37.44	55.84	74.00	-18.16	Average
3	10282.00	39.51	39.60	56.15	74.00	-17.85	Average
4	13597.00	42.38	45.44	64.77	74.00	-9.23	Average
5	17575.00	44.17	45.71	63.05	74.00	-10.95	Average

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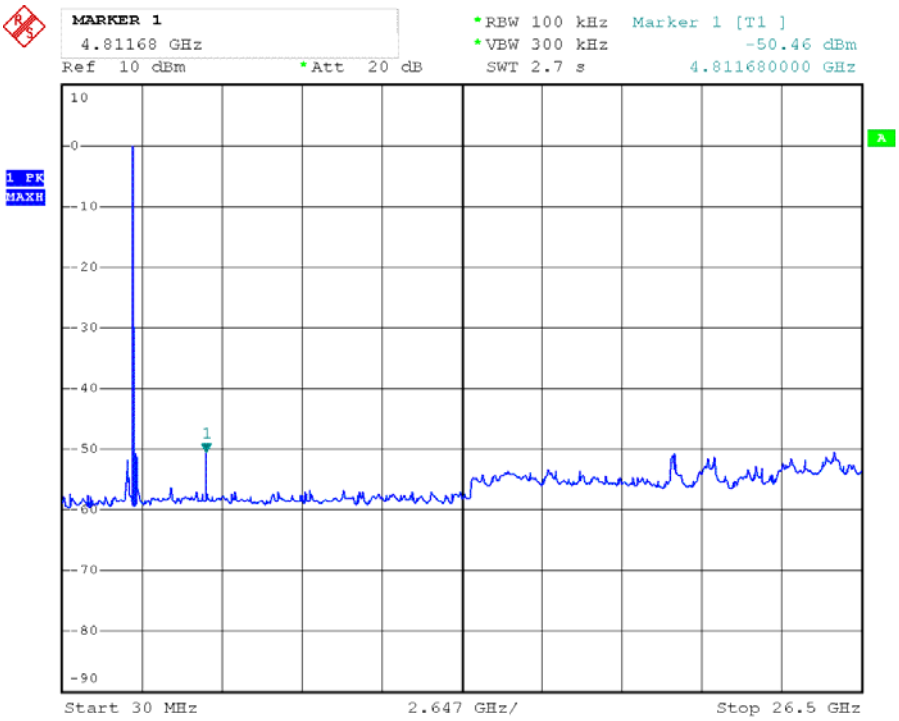
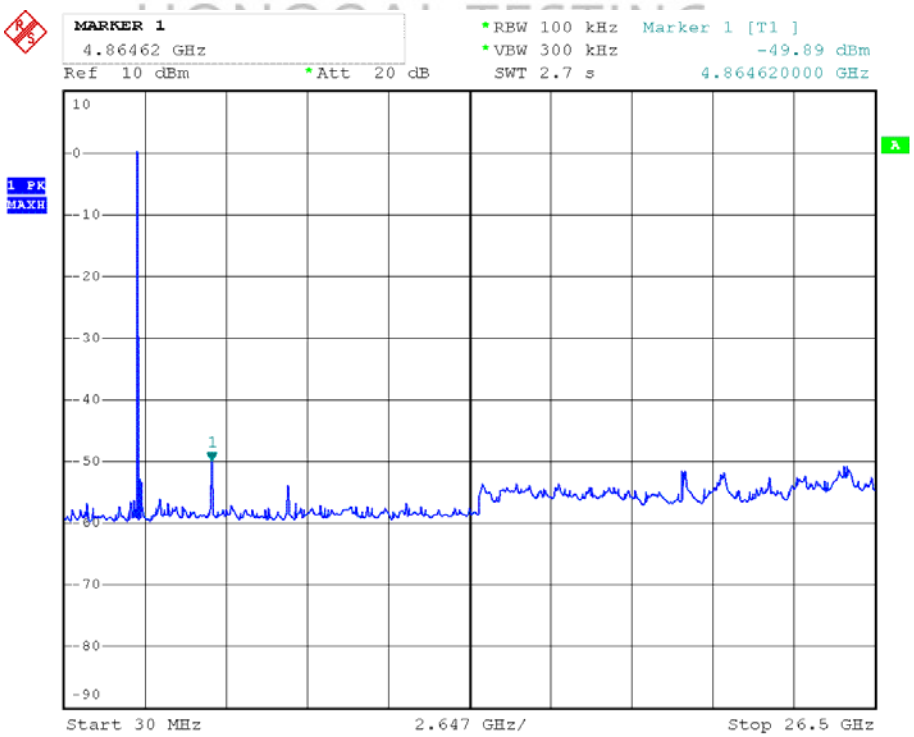
Conducted Spurious Emission
BR 1M
Channel Low



Channel Mid



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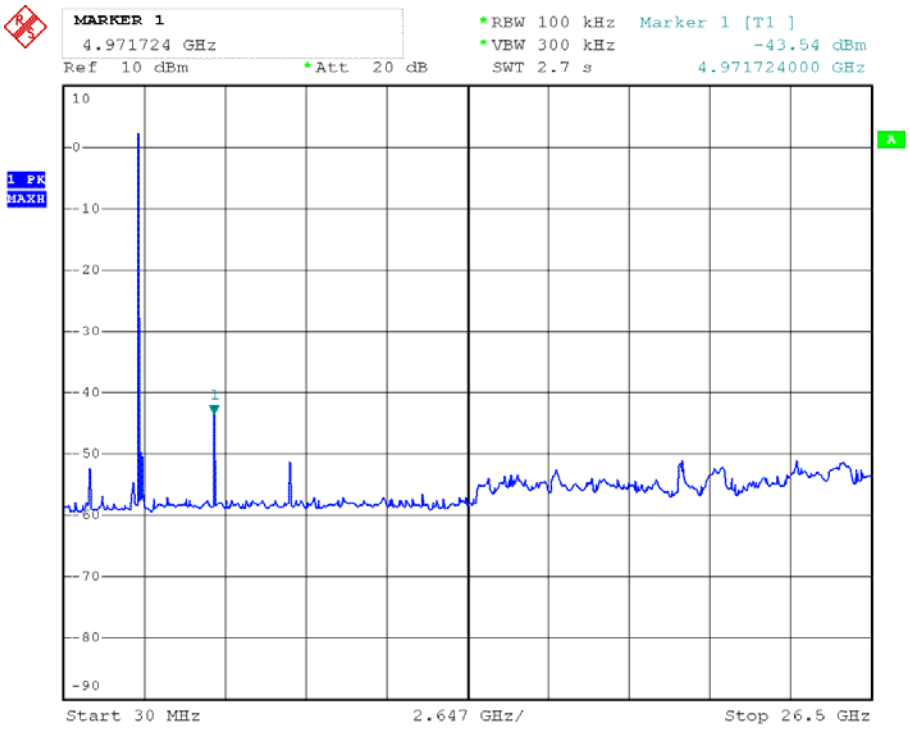
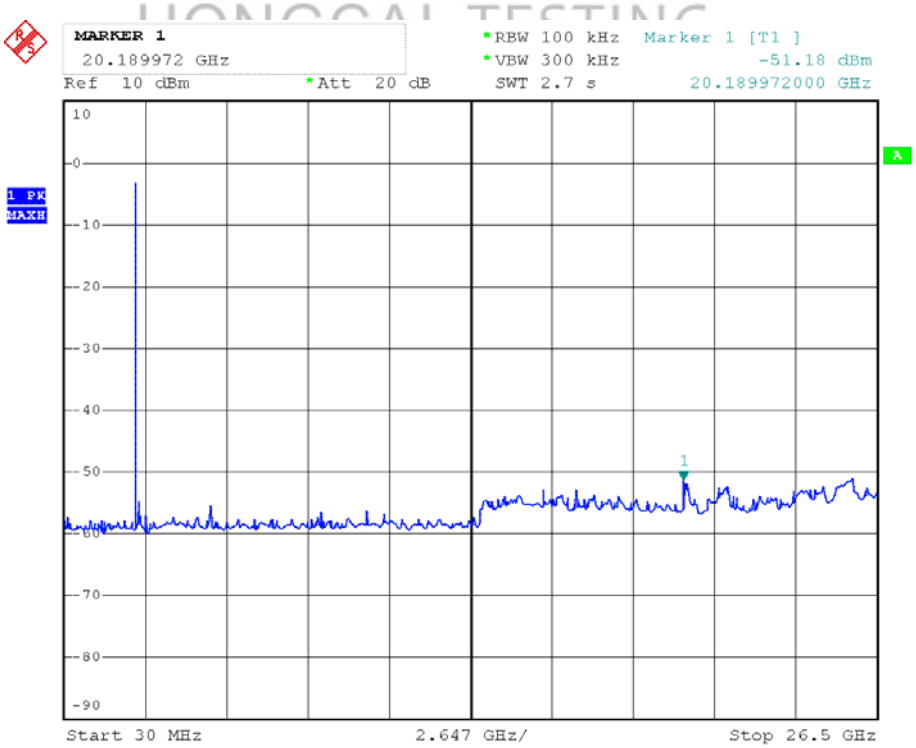
Channel High



BDR 2M
Channel Low



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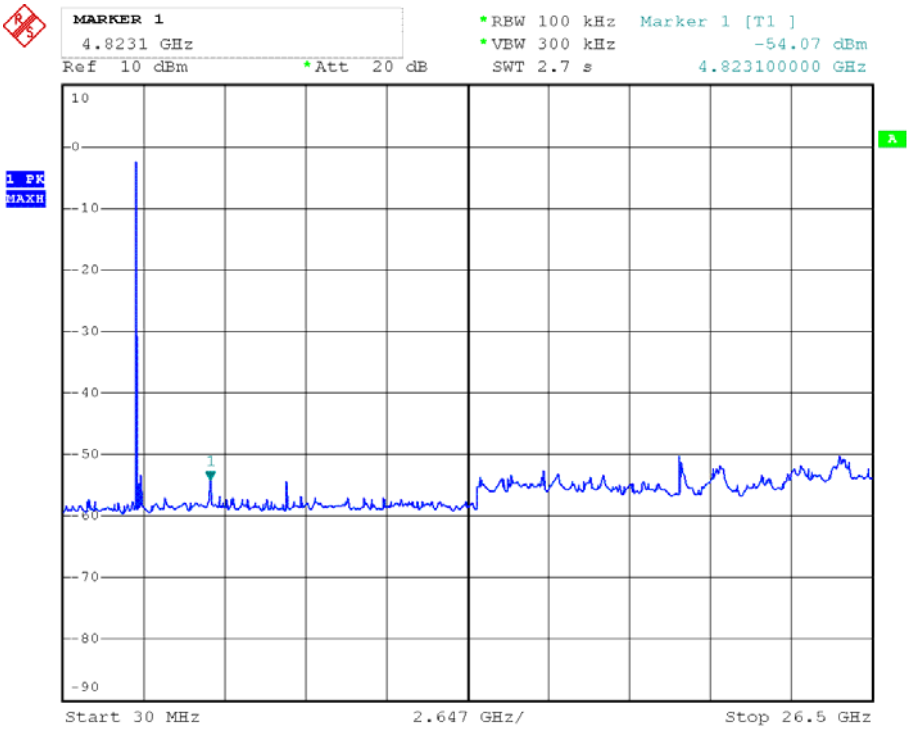
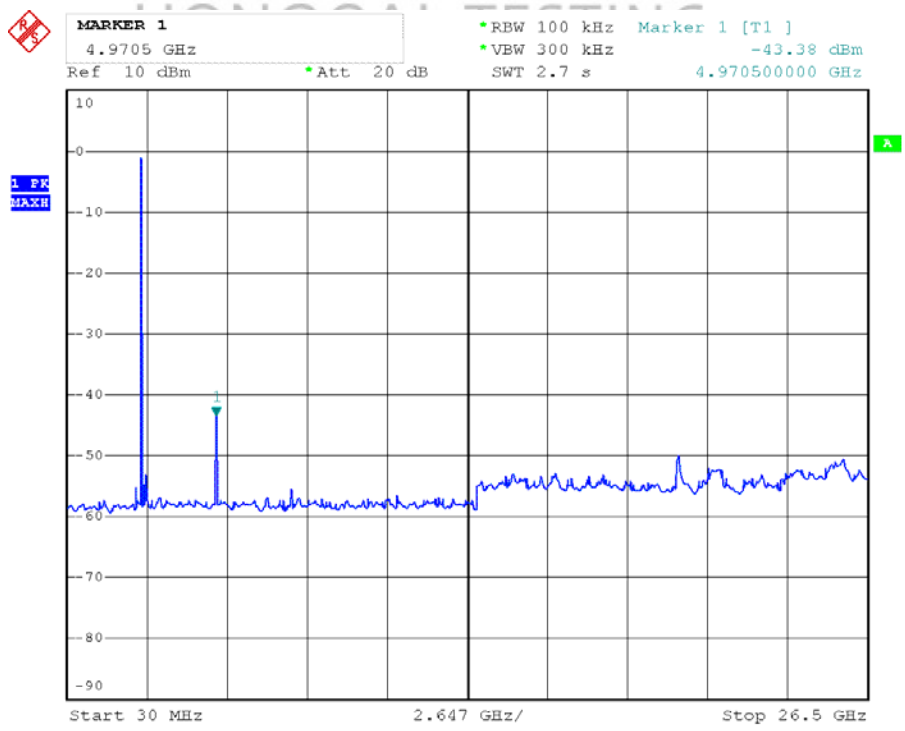
Channel Middle



Channel High



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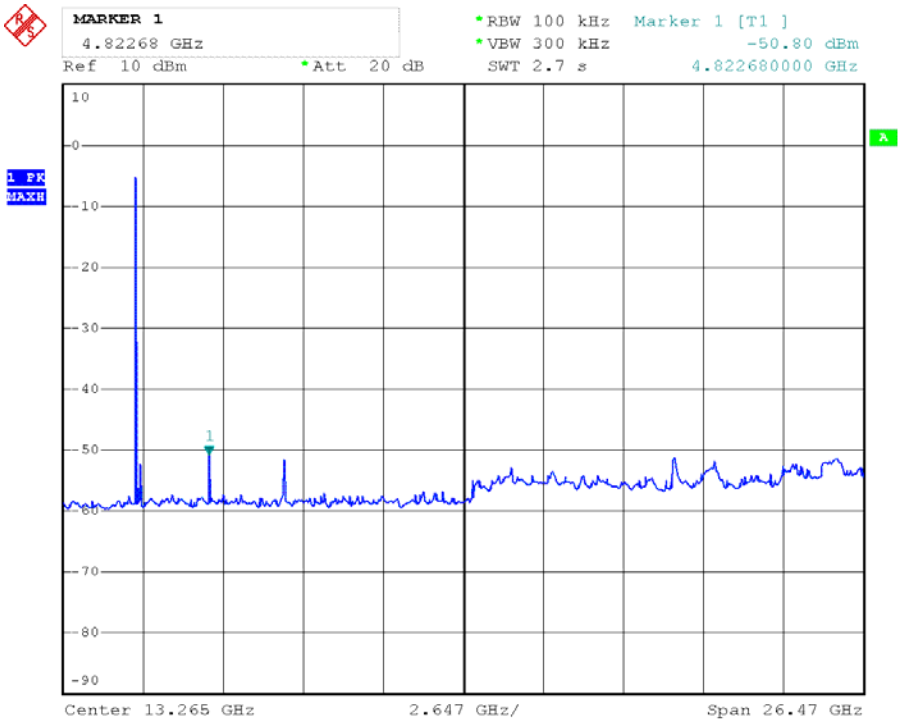
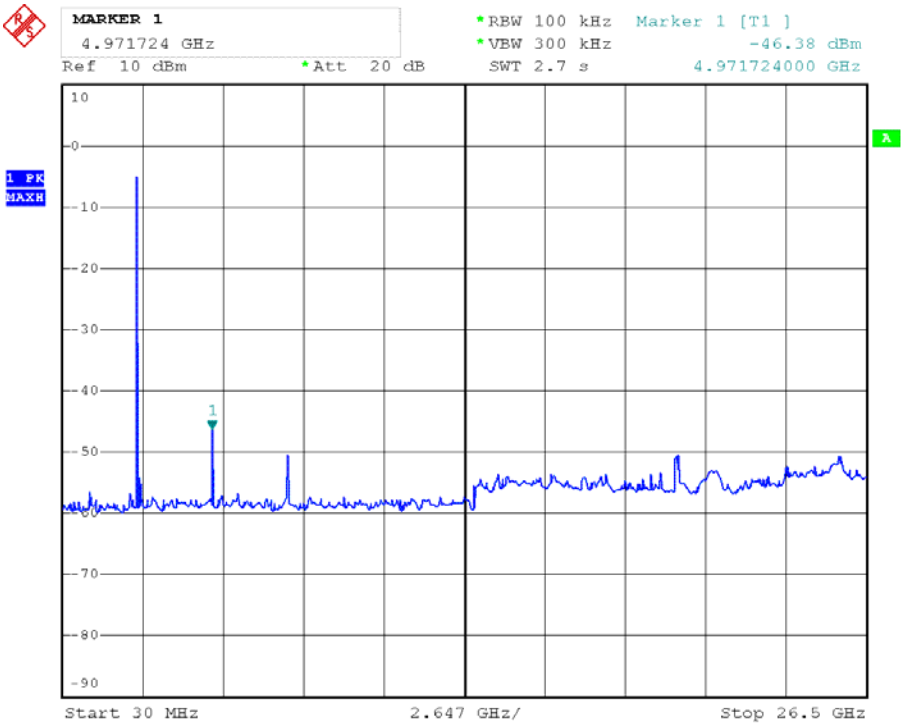
BDR 3M
Channel Low



Channel Middle



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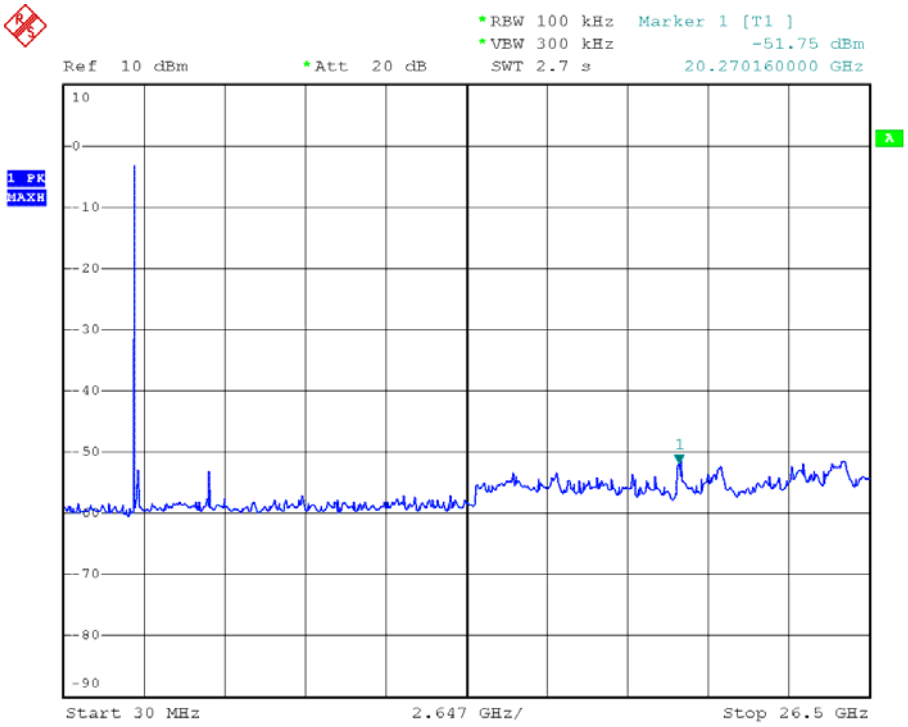
Channel High



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12. ANTENNA REQUIREMENT

12.1 Standard Applicable

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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

Section 15.247(b)/(c):

If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

If the intentional radiator is used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum peak output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

12.2 Antenna Connected Construction

The antenna is designed with permanent attachment and no consideration of replacement. The antenna used in this product is complied with Standard. The maximum Gain of the antenna lower than 6.0dBi and have the definite antenna Specification.

…End of Report…

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