FCC Part 15 Subpart

TEST REPORT

FOR

Product Name: Bluetooth Module

Model : P120
Trade Name: Canmax

Issued to

CANMAX Technology Ltd.
7F., No.183, Sec.1, Datong Rd., Xizhi Dist., New Taipei City

Issued by

Global Certification Corp.
No.146, Sec. 2, Xiangzhang Rd., Xizhi Dist.,New Taipei City 221,
Taiwan (R.O.C.)

Testing Laboratory
1640

Revision History

Revision	No.	Report Number	Issue Date	Description	Author/ Revised by
1.	7O0601	7O0601	Nov. 20, 2017	Original Report	Michelle

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1. GENERAL INFORMATION

Applicant	:	CANMAX Technology Ltd.
Address	:	7F., No.183, Sec.1, Datong Rd., Xizhi Dist., New Taipei City
Manufacturer	:	CANMAX Technology Ltd.
Address	:	7F., No.183, Sec.1, Datong Rd., Xizhi Dist., New Taipei City
EUT	:	Bluetooth Module
Model No.	:	P120

Is here with confirmed to comply with the requirements set out in the FCC Rules and Regulations Part 15 Subpart C and the measurement procedures were according to ANSI 63.10:2013. The said equipment in the configuration described in this report shows the maximum emission levels emanating from equipment are within the compliance requirements.

FCC Part 15 Subpart C 15.247

Tested By:		**Approved by:**	
Nov. 20, 2017	Eason Hsu.	Nov. 20, 2017	Adam Chou
Date	***Eason Hsu, Engineer***	**Date**	***Adam Chou, Manager***
			Designation Number: TW1640

1.1 DESCRIPTION OF THE TESTED SAMPLES

EUT Name	:	Bluetooth Module
Model Number	:	P120
FCC ID	:	
Input Voltage	:	DC5V
Power From		☑Inside ☐Outside
		☐Adaptor ☐BATTERY ☐Power Supply ☐DC Power Source ☑Support Unit PC
Operate Frequency	:	Refer to the channel list as described below
Number of Channels	:	79
Channel spacing	:	☐N/A ☑ 1 MHz
Modulation Type	:	FHSS(GFSK)
Antenna Type	:	☐integral antenna: ☑PCB Printing ☐a dedicated antenna
Antenna gain		-1.35dBi

Channels	Frequencies (MHz)	Channels	Frequencies (MHz)
0	2402	40	2442
1	2403	41	2443
2	2404	42	2444
3	2405	43	2445
4	2406	44	2446
5	2407	45	2447
6	2408	46	2448
7	2409	47	2449
8	2410	48	2450
9	2411	49	2451
10	2412	50	2452
11	2413	51	2453
12	2414	52	2454
13	2415	53	2455
14	2416	54	2456
15	2417	55	2457
16	2418	56	2458
17	2419	57	2459
18	2420	58	2460
19	2421	59	2461
20	2422	60	2462
21	2423	61	2463
22	2424	62	2464
23	2425	63	2465

24	2426	64	2466
25	2427	65	2467
26	2428	66	2468
27	2429	67	2469
28	2430	68	2470
29	2431	69	2471
30	2432	70	2472
31	2433	71	2473
32	2434	72	2474
33	2435	73	2475
34	2436	74	2476
35	2437	75	2477
36	2438	76	2478
37	2439	77	2479
38	2440	78	2480
39	2441		

1.3 LIST OF MEASUREMENTS AND EXAMINATIONS

FCC Rule	Description of Test	Result
15.203	Antenna Requirement	Pass
15.207	Conducted Emission	Pass
15.209 15.247(d)	Radiated Emission	Pass
15.247(d)	Spurious Emmission	Pass
15.247(b)	Band Edges Measurement Data	Pass
15.247(b)(1)	Peak Output Power Measurement Data	Pass
15.247(a)(1)	Channel Separation	Pass
15.247(a)(1)	Dwell Time of Each Channel	Pass
15.247(a)(1)	Number of Channels	Pass
15.247(a)(1)	20dB Bandwidth Measurement	Pass

2. TEST METHODOLOGY

All testing as described bellowed were performed in accordance with ANSI 63.10:2013 and FCC CFR 47 Part 15 Subpart C.

2.1 GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on a wood table, which is at 0.8 m above ground plane acceding to clause 15.207 and requirements of ANSI 63.10:2013. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz are using CISPR Quasi-Peak / Average detectors.

Radiated Emissions

The EUT is a placed on a turn table, which is 0.8 m above ground plane. The turntable was rotated through 360 degrees to determine the position of maximum emission level. The EUT is placed at 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.

2.2 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS

(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
10.495 - 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	2655 - 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 MHz.

2 Above 38.6

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

2.3 DESCRIPTION OF TEST MODES

The EUT was tested under following modes:

Modes:

1. **Continuous transmitting**

Channels:

1. **2.402GHz (**Lowest Channel**)**
2. **2.441GHz (**Middle Channel**)**
3. **2.480GHz (**Highest Channel**)**

2.4 DESCRIPTION OF THE SUPPORT EQUIPMENTS

Setup Diagram

See test photographs attached in appendix 1 for the actual connections between EUT and support equipment.

Support Equipment

Peripherals Devices:

OUTSIDE SUPPORT EQUIPMENT							
No.	Equipment	Model	Serial No.	FCC ID/ BSMI ID	Trade name	Data Cable	Power Cord
1.	PC	AD2	L3H8476	N/A	N/A	N/A	Unshielded 1.8M
2.	Fixture	N/A	N/A	N/A	Canmax	N/A	N/A

Note: All the above equipment /cable were placed in worse case position to maximize emission signals during emission test

Grounding: Grounding was in accordance with the manufacturer's requirement and conditions for the intended use.

3. TEST AND MEASUREMENT EQUIPMENT

3.1 CALIBRATION

The measuring equipment utilized to perform the tests documented in the report has been calibrated once a year or in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

3.2 EQUIPMENT

The following list contains measurement equipment used for testing. The equipment conforms to the requirement of CISPR 16-1, ANSI C63.2 and. Other required standards.

Calibration of all test and measurement, including any accessories that may effect such calibration, is checked frequently to ensure the accuracy. Adjustments are made and correction factors are applied in accordance with the instructions contained in the respective.

TABLE 1 LIST OF TEST AND MEASUREMENT EQUIPMENT

Instrument	Manufacturer	Model No.	Serial No.	Calibration Due Date	Note
EMC Test Receiver	R&S	ESCI	100438	Dec. 16, 2017	
LISN #1	SCHWARZBECK	NNLK8121	550213	Feb. 02, 2018	For EUT
LISN #2	EMCO	3825/2	9001-1400	N/A	For Support Unit
RF Cable	Huber+Suhner	RG223/U	Cable-001	Dec. 17, 2017	
Impedance Stabilization	Teseq GmbH	ISNT800	23334	Mar. 19, 2018	
Absorbing Clamp	COM-POWER	AB-050	421915	Oct. 27,2018	
RF Cable	Huber+Suhner	5D-FB	CABLE-007	Oct. 29,2018	
Test Software	AUDIX	E3	6.2008-10-2C	N/A	
EMC Test Receiver	LIG	ER-265	L0907B006	Jul. 08, 2018	
Bilog Antenna	SUNOL	JB1	A052204	Nov. 26, 2017	
Pre-Amplifier	WIRELESS	FPA-6592G	60028	Sep. 29, 2018	
RF Cable_NSA_Rx	HUBER + UHNER	RG213/U	Cable-004	Jul. 27, 2018	
Double Ridged Guide Horn Antenna	EST.LINDGREN	3117	00119028	Oct.01, 2018	

Microwave Cable	HUBER SUHNER	SUCOFLEX 104	Cable-003-4M	Jan. 26, 2018	
Microwave Preamplifier	EMCINSTRUMENT	EMC051845	980059	Mar. 23, 2018	
Test Software	AUDIX	E3	6.101222	N/A	

※ Calibration interval of instruments listed above is one year

4. ANTENNA REQUIREMENTS

4.1 STANDARD APPLICABLE

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

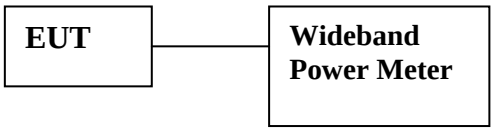
And according to FCC 47 CFR Section 15.247(b), if transmitting antennas of direction gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

4.2 ANTENNA CONSTRUCTION AND DIRECTIONAL GAIN

Antenna type: PCB Antenna
Antenna Gain: -1.35dBi

5. PEAK OUTPUT POWER

5.1 TEST SETUP



5.2 LIMIT

The maximum peak output power of the intentional radiator shall not exceed the following:

1. According to § 15.247(b)(3) , for systems using digital modulation in the bands of 902 – 928 MHz , 2400 – 2483.5 MHz: 1 Watt.
2. According to § 15.247(b)(4) , the conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section , if transmitting antennas of directional gain greater than 6 dBi are used , the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1) , (b)(2) , and (b)(3) of this section , as appropriate , by the amount in dB that directional gain of the antenna exceeds 6 dBi.

5.3 TEST PROCEDURE

1. Peak power is measured using the wideband power meter.
2. Power is integrated over a bandwidth greater than or equal to the 99% bandwidth.

5.4 TEST RESULT: PASS

5.5 TEST DATA:

BDR 1M

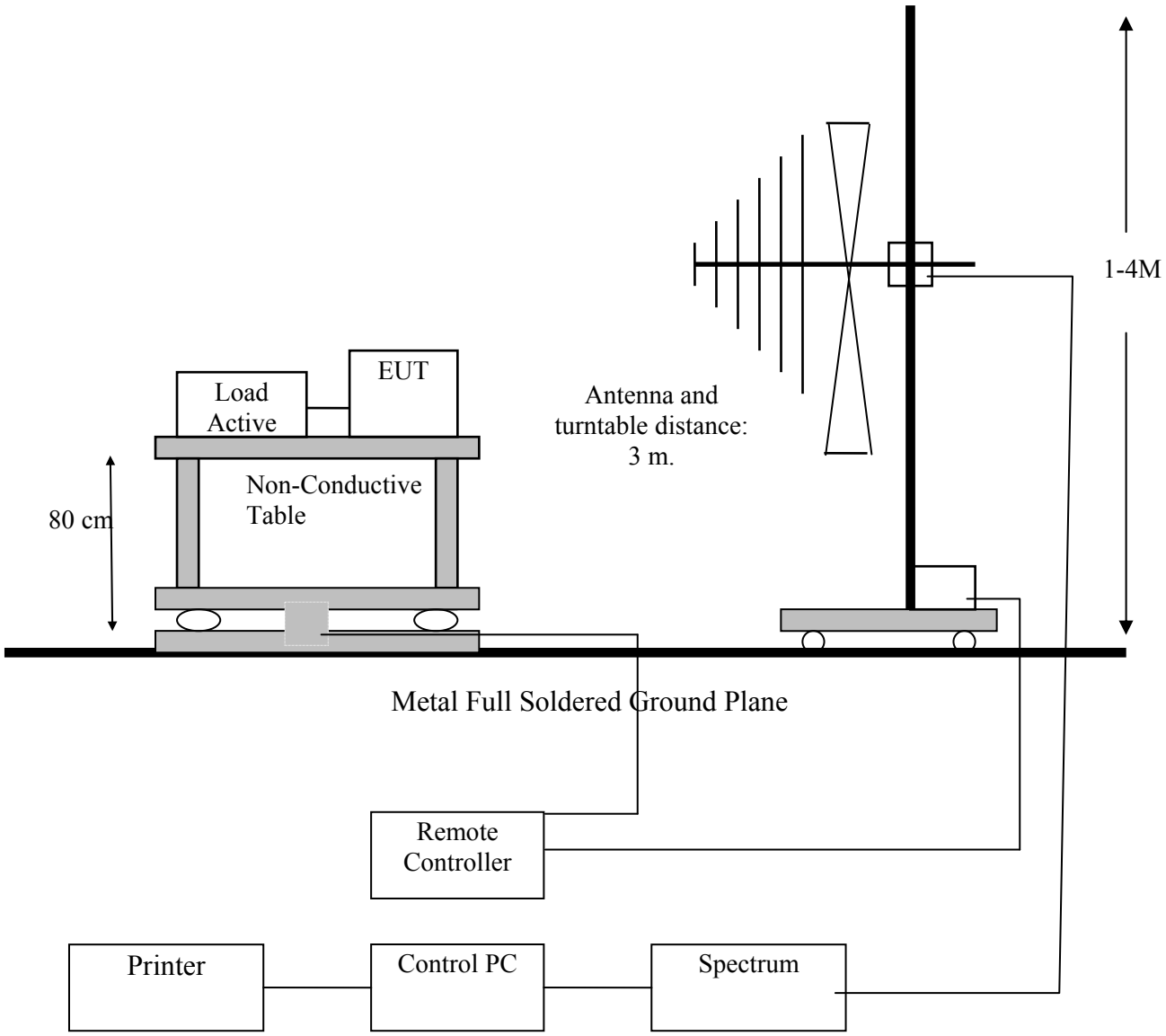
Channel No.	Frequency (MHz)	Measurement Level (dbm)	Required Limit (dbm)	Result
0	2402	0.36	＜30 dbm	PASS
39	2441	0.7	＜30 dbm	PASS
79	2480	-0.08	＜30 dbm	PASS

BDR 3M

Channel No.	Frequency (MHz)	Measurement Level (dbm)	Required Limit (dbm)	Result
0	2402	1.01	＜30 dbm	PASS
39	2441	0.65	＜30 dbm	PASS
79	2480	-0.99	＜30 dbm	PASS

6. BAND EDGE

6.1 TEST SETUP



6.2 LIMIT

Restricted Bands:

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
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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			

Operation within the bands:
902 - 928 MHz, 2400 - 2483.5 MHz, 5725 - 5875 MHz, and 24.0 - 24.25 GHz.

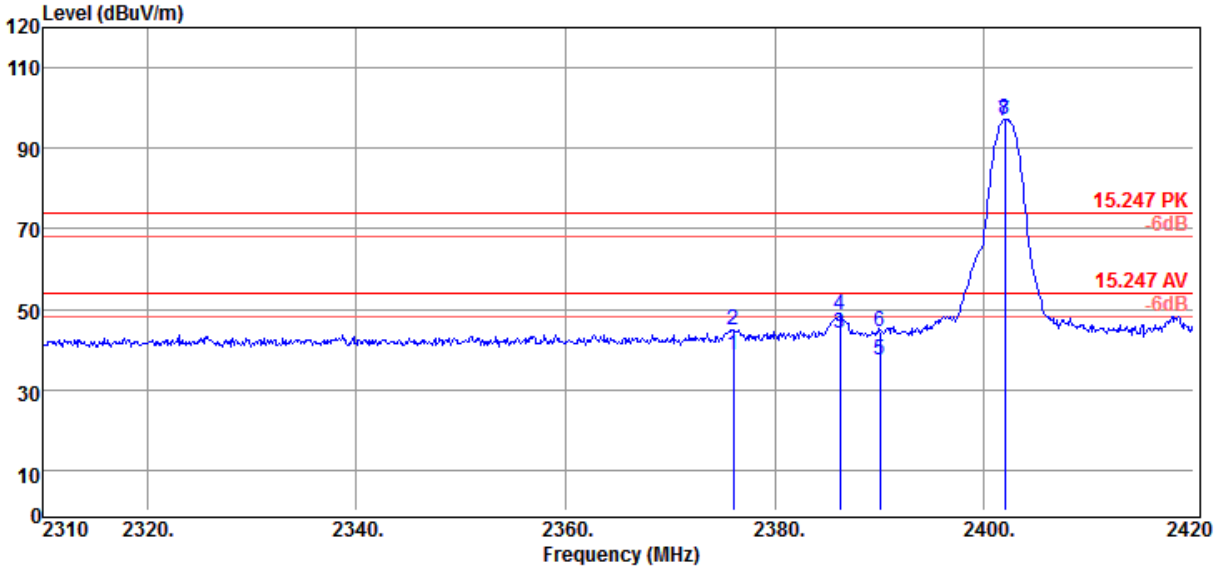
Frequency (Hz)	Field Strength (μV/m at 3-meter)	Field Strength (dBμV/m at 3-meter)
1.705-30	30 (at 30-meter)	69.54
30-88	100	40
88-216	150	43
216-960	200	46
Above 960	500	54

6.3 RESULT: PASS

6.4 TEST DATA:

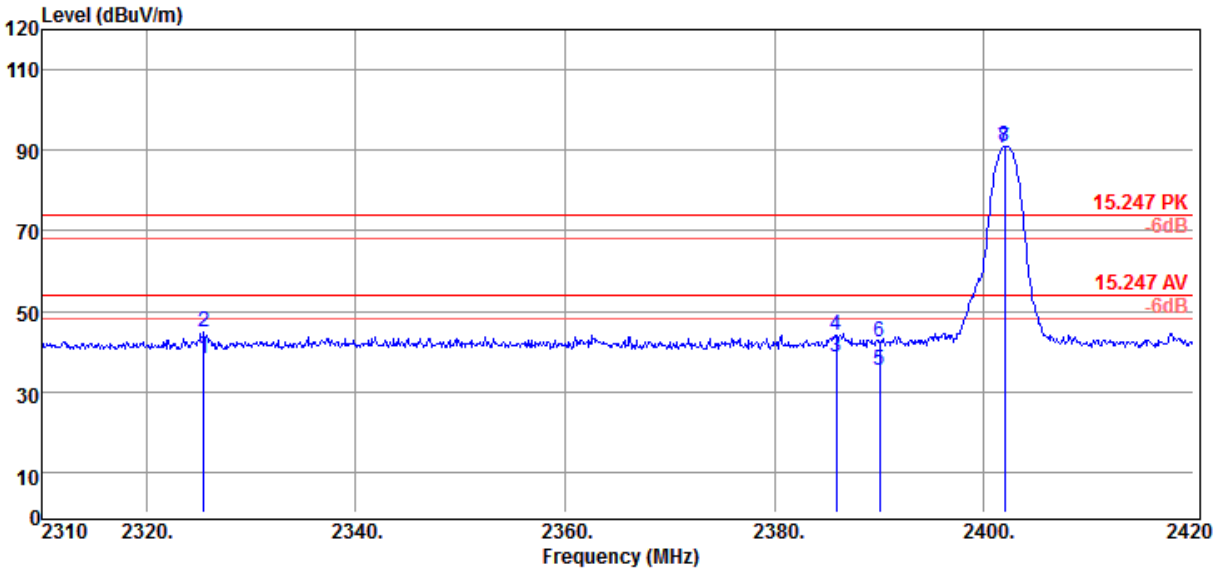
BDR 1M

Lowest Channel- Horizontal



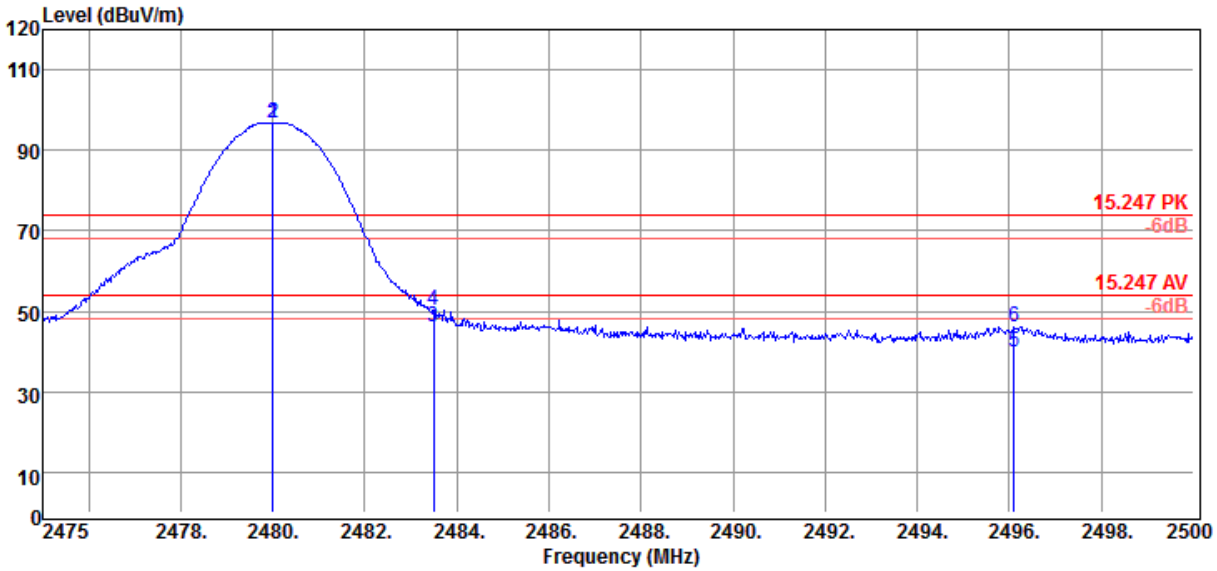
	Freq MHz	Meter Level dBuV	System Factor dB/m	Cable Loss dB	Antenna Factor dB/m	Preamp Gain dB	Real Level dBuV/m	Limit Line dBuV/m	Margin dB	Remark
1	2376.00	48.89	-10.41	3.83	32.48	46.72	38.48	54.00	-15.52	Average
2	2376.00	55.18	-10.41	3.83	32.48	46.72	44.77	74.00	-29.23	Peak
3	2386.23	54.33	-10.39	3.83	32.50	46.72	43.94	54.00	-10.06	Average
4	2386.23	58.77	-10.39	3.83	32.50	46.72	48.38	74.00	-25.62	Peak
5	2390.00	47.57	-10.39	3.83	32.50	46.72	37.18	54.00	-16.82	Average
6	2390.00	54.66	-10.39	3.83	32.50	46.72	44.27	74.00	-29.73	Peak
7	2402.00	107.15	-10.38	3.82	32.52	46.72	96.77	54.00	42.77	Average
8	2402.00	107.53	-10.38	3.82	32.52	46.72	97.15	74.00	23.15	Peak

Lowest Channel-Vertical



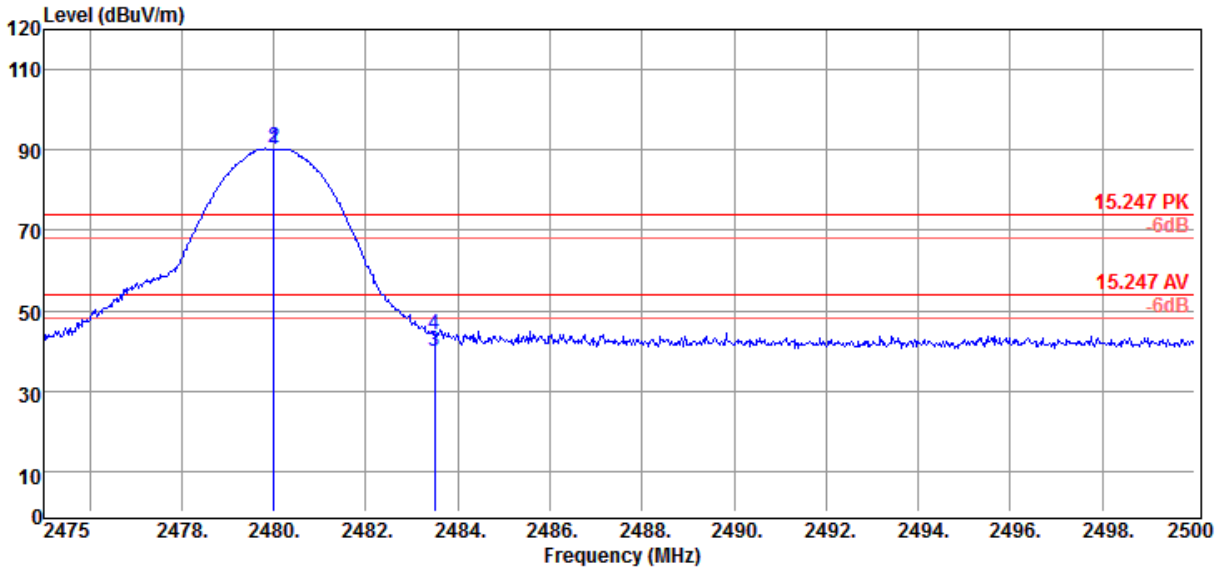
	Freq MHz	Meter Level dBuV	System Factor dB/m	Cable Loss dB	Antenna Factor dB/m	Preamp Gain dB	Real Level dBuV/m	Limit Line dBuV/m	Margin dB	Remark
1	2325.51	48.55	-10.49	3.85	32.39	46.73	38.06	54.00	-15.94	Average
2	2325.51	55.31	-10.49	3.85	32.39	46.73	44.82	74.00	-29.18	Peak
3	2385.90	48.88	-10.40	3.83	32.49	46.72	38.48	74.00	-35.52	Peak
4	2385.90	54.49	-10.40	3.83	32.49	46.72	44.09	74.00	-29.91	Peak
5	2390.00	45.57	-10.39	3.83	32.50	46.72	35.18	54.00	-18.82	Average
6	2390.00	52.77	-10.39	3.83	32.50	46.72	42.38	74.00	-31.62	Peak
7	2402.00	101.05	-10.38	3.82	32.52	46.72	90.67	54.00	36.67	Average
8	2402.00	101.38	-10.38	3.82	32.52	46.72	91.00	74.00	17.00	Peak

Highest Channel- Horizontal



	Freq MHz	Meter Level dBuV	System Factor dB/m	Cable Loss dB	Antenna Factor dB/m	Preamp Gain dB	Real Level dBuV/m	Limit Line dBuV/m	Margin dB	Remark
1	2480.00	106.94	-10.25	3.79	32.66	46.70	96.69	54.00	42.69	Average
2	2480.00	107.19	-10.25	3.79	32.66	46.70	96.94	74.00	22.94	Peak
3	2483.50	56.16	-10.24	3.79	32.67	46.70	45.92	54.00	-8.08	Average
4	2483.50	60.40	-10.24	3.79	32.67	46.70	50.16	74.00	-23.84	Peak
5	2496.10	49.89	-10.23	3.78	32.69	46.70	39.66	54.00	-14.34	Average
6	2496.10	56.39	-10.23	3.78	32.69	46.70	46.16	74.00	-27.84	Peak

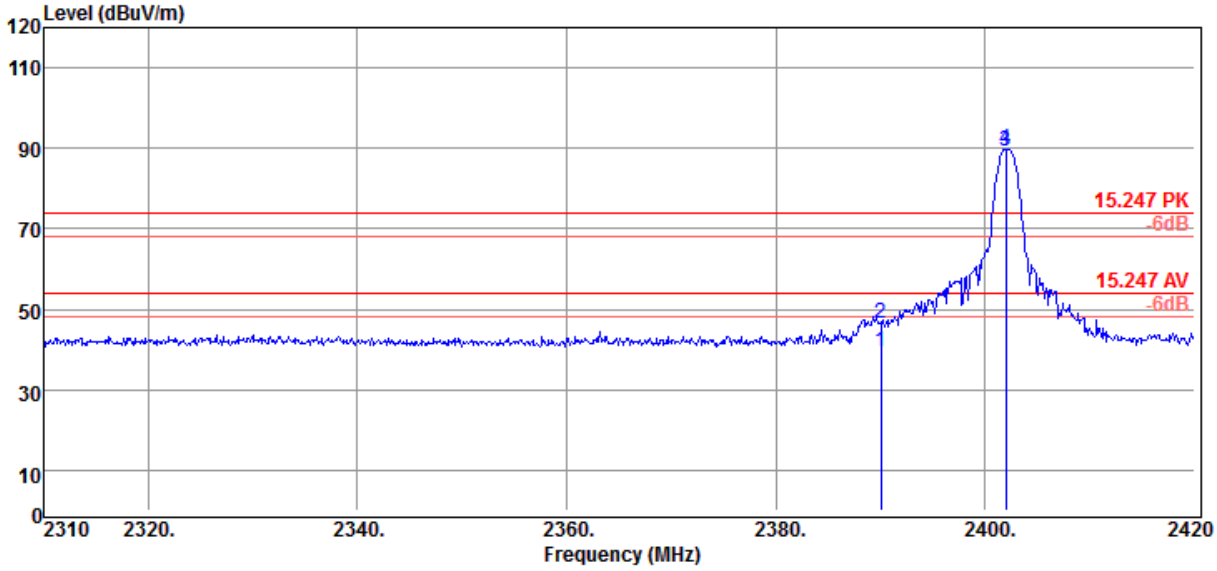
Highest Channel- Vertical



	Freq MHz	Meter Level dBuV	System Factor dB/m	Cable Loss dB	Antenna Factor dB/m	Preamp Gain dB	Real Level dBuV/m	Limit Line dBuV/m	Margin dB	Remark
1	2480.00	100.34	-10.25	3.79	32.66	46.70	90.09	54.00	36.09	Average
2	2480.00	100.57	-10.25	3.79	32.66	46.70	90.32	74.00	16.32	Peak
3	2483.50	49.94	-10.24	3.79	32.67	46.70	39.70	54.00	-14.30	Average
4	2483.50	54.32	-10.24	3.79	32.67	46.70	44.08	74.00	-29.92	Peak

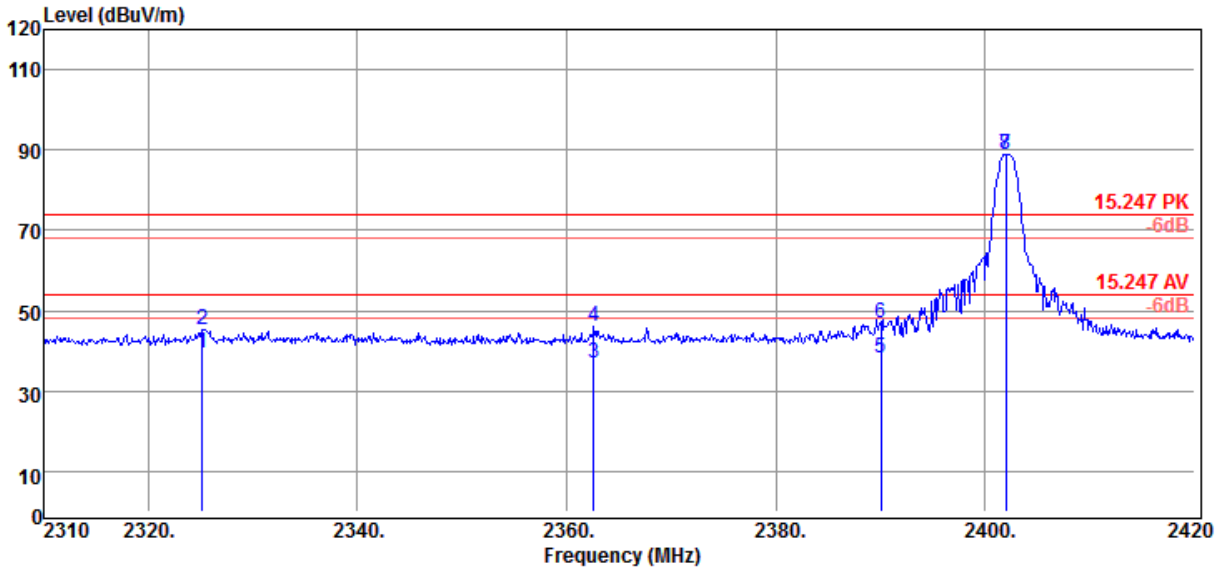
BDR 3M

Lowest Channel- Horizontal



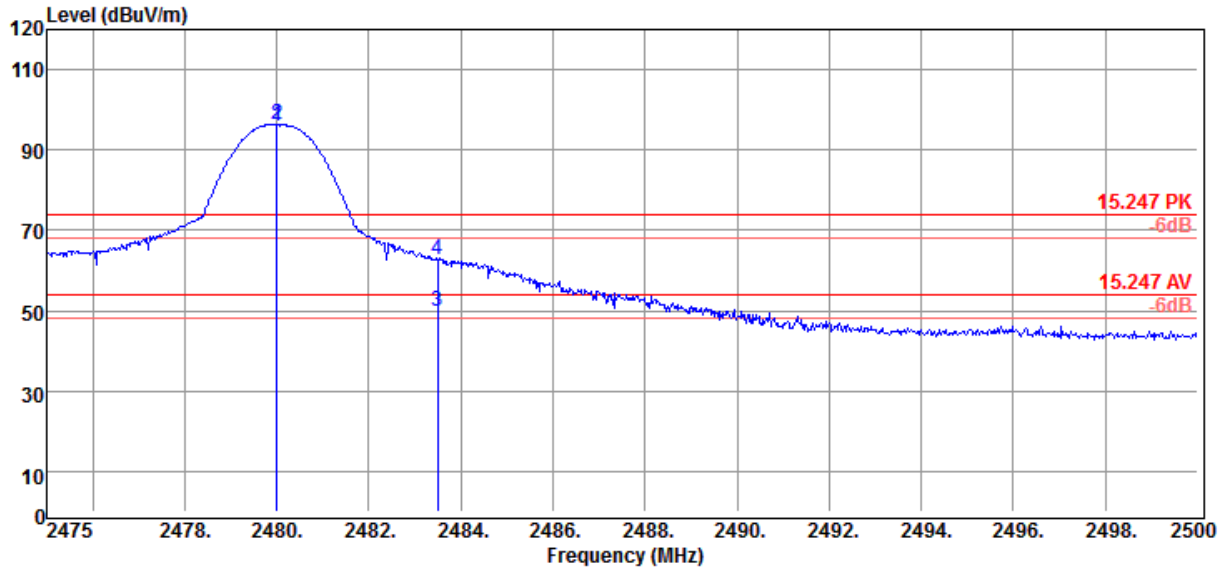
	Freq MHz	Meter Level dBuV	System Factor dB/m	Cable Loss dB	Antenna Factor dB/m	Preamp Gain dB	Real Level dBuV/m	Limit Line dBuV/m	Margin dB	Remark
1	2390.00	49.98	-10.39	3.83	32.50	46.72	39.59	54.00	-14.41	Average
2	2390.00	56.87	-10.39	3.83	32.50	46.72	46.48	74.00	-27.52	Peak
3	2402.00	99.80	-10.38	3.82	32.52	46.72	89.42	54.00	35.42	Average
4	2402.00	100.14	-10.38	3.82	32.52	46.72	89.76	74.00	15.76	Peak

Lowest Channel-Vertical



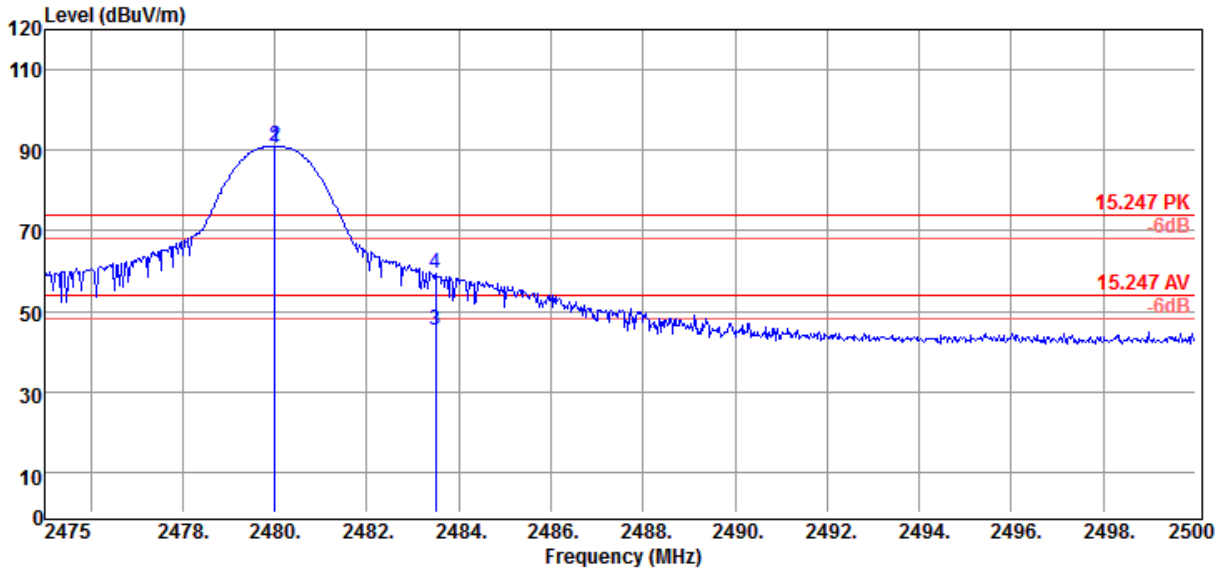
	Freq	Meter Level	System Factor	Cable Loss	Antenna Factor	Preamp Gain	Real Level	Limit Line	Margin	Remark
	MHz	dBuV	dB/m	dB	dB/m	dB	dBuV/m	dBuV/m	dB	
1	2325.18	49.75	-10.49	3.85	32.39	46.73	39.26	54.00	-14.74	Average
2	2325.18	55.93	-10.49	3.85	32.39	46.73	45.44	74.00	-28.56	Peak
3	2362.58	47.54	-10.44	3.84	32.45	46.73	37.10	54.00	-16.90	Average
4	2362.58	56.33	-10.44	3.84	32.45	46.73	45.89	74.00	-28.11	Peak
5	2390.00	48.61	-10.39	3.83	32.50	46.72	38.22	54.00	-15.78	Average
6	2390.00	57.51	-10.39	3.83	32.50	46.72	47.12	74.00	-26.88	Peak
7	2402.00	99.10	-10.38	3.82	32.52	46.72	88.72	54.00	34.72	Average
8	2402.00	99.39	-10.38	3.82	32.52	46.72	89.01	74.00	15.01	Peak

Highest Channel- Horizontal



	Freq MHz	Meter Level dBuV	System Factor dB/m	Cable Loss dB	Antenna Factor dB/m	Preamp Gain dB	Real Level dBuV/m	Limit Line dBuV/m	Margin dB	Remark
1	2480.00	106.02	-10.25	3.79	32.66	46.70	95.77	54.00	41.77	Average
2	2480.00	106.43	-10.25	3.79	32.66	46.70	96.18	74.00	22.18	Peak
3	2483.50	60.21	-10.24	3.79	32.67	46.70	49.97	54.00	-4.03	Average
4	2483.50	73.14	-10.24	3.79	32.67	46.70	62.90	74.00	-11.10	Peak

Highest Channel- Vertical



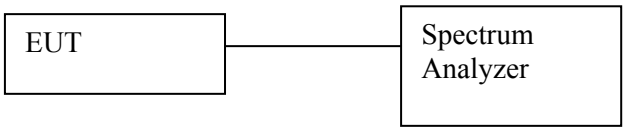
	Freq MHz	Meter Level dBuV	System Factor dB/m	Cable Loss dB	Antenna Factor dB/m	Preamp Gain dB	Real Level dBuV/m	Limit Line dBuV/m	Margin dB	Remark
1	2480.00	100.76	-10.25	3.79	32.66	46.70	90.51	54.00	36.51	Average
2	2480.00	101.07	-10.25	3.79	32.66	46.70	90.82	74.00	16.82	Peak
3	2483.50	55.57	-10.24	3.79	32.67	46.70	45.33	54.00	-8.67	Average
4	2483.50	69.62	-10.24	3.79	32.67	46.70	59.38	74.00	-14.62	Peak

Note:

1. Emission level = Reading level + Correction factor
2. Correction factor : Antenna factor, Cable loss, PreAmp, etc.
3. All emissions as described above were determining by rotating the EUT through three orthogonal axes to maximizing the emissions if the EUT belongs to hand-held or body-worn devices.
4. Measurements above 1000 MHz, Peak detector setting: use a 1 MHz RBW, a 3 MHz VBW.
5. Measurements above 1000 MHz, Average detector setting: 1 MHz RBW with 10 Hz VBW.
6. Peak detector measurement data will represent the worst case results.

7. 20DB BANDWIDTH

7.1 TEST SETUP



7.2 TEST PROCEDURE

a. The transmitter output was connected to the spectrum analyzer.
b. Set RBW of spectrum analyzer to 30 KHz and VBW to 300KHz.
c. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

7.3 LIMIT

N/A

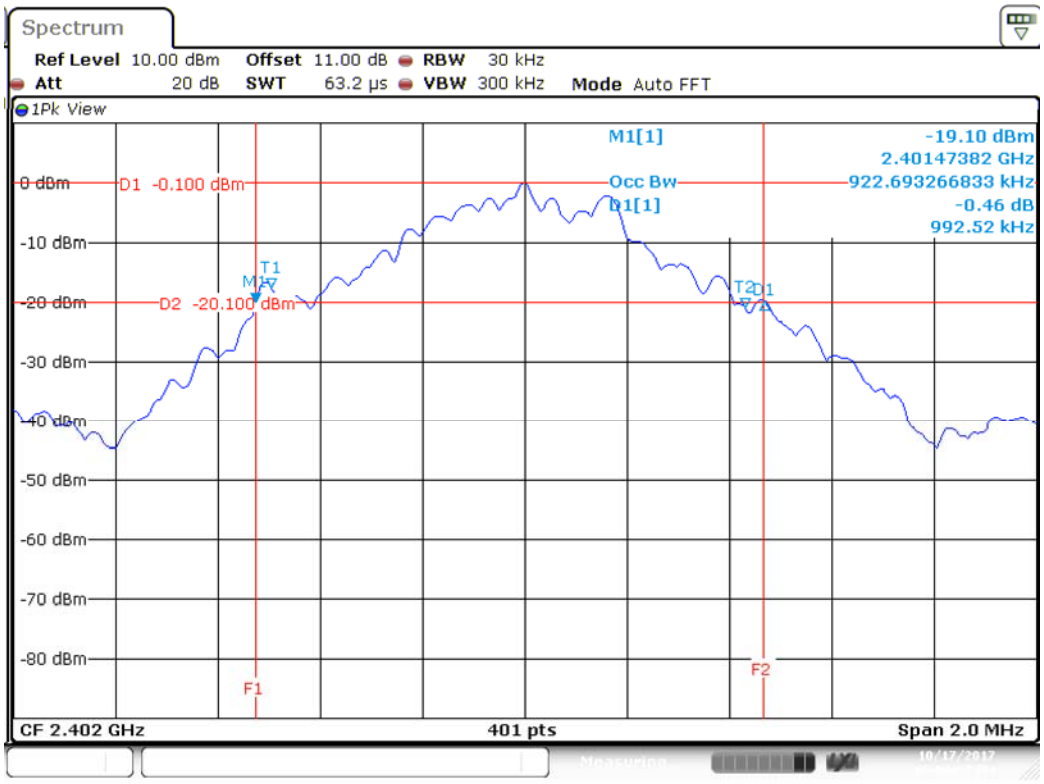
7.4 RESULT: PASS

7.5 TEST DATA:

BDR 1M

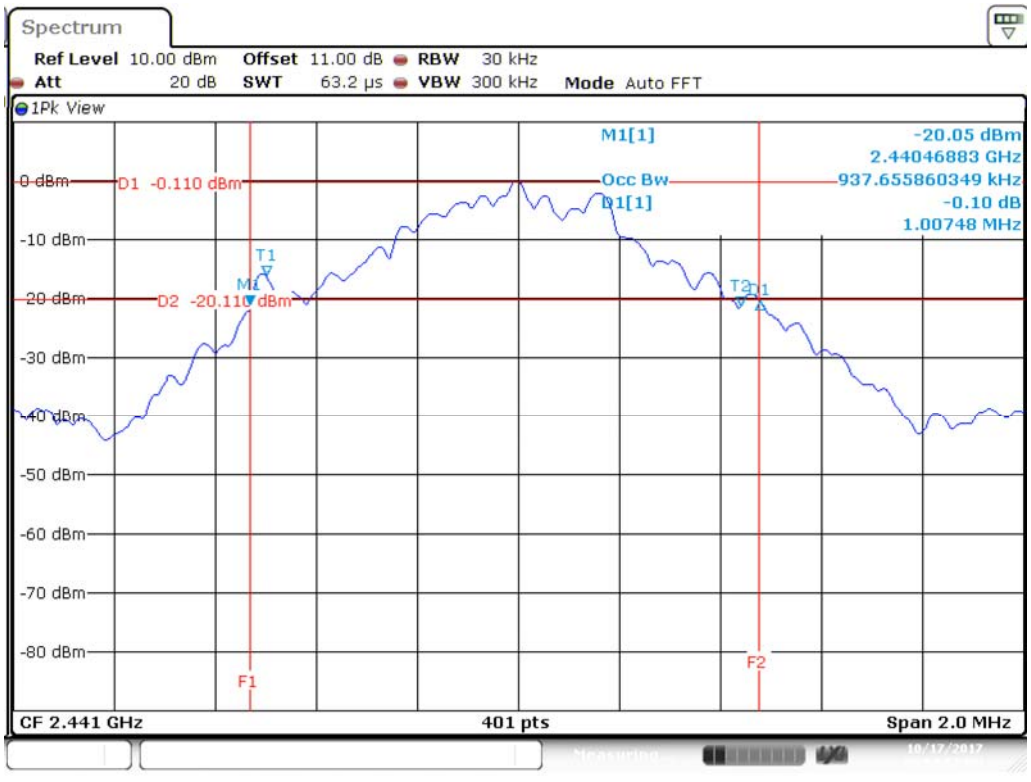
Channel	Frequency (MHz)	20dB Bandwidth (KHz)
00	2402	992.52KHz
39	2441	1,007.48KHz
78	2480	932.67KHz

Lowest Channel



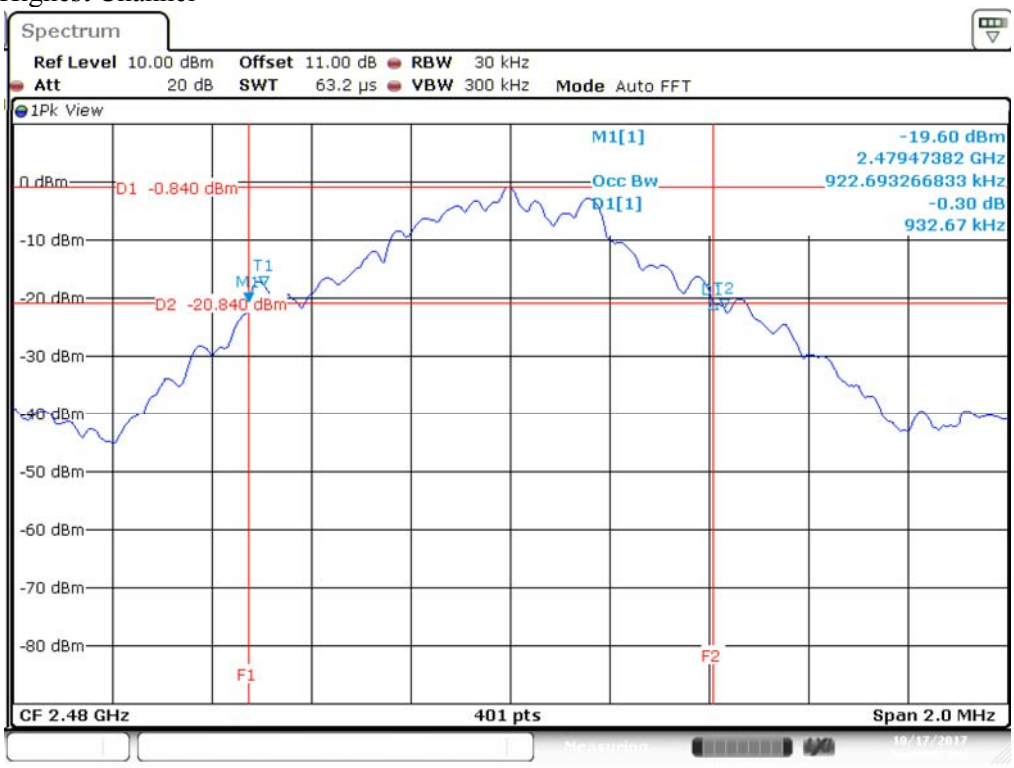
Date: 17.OCT.2017 17:50:58

Middle Channel



Date: 17.OCT.2017 17:54:57

Highest Channel

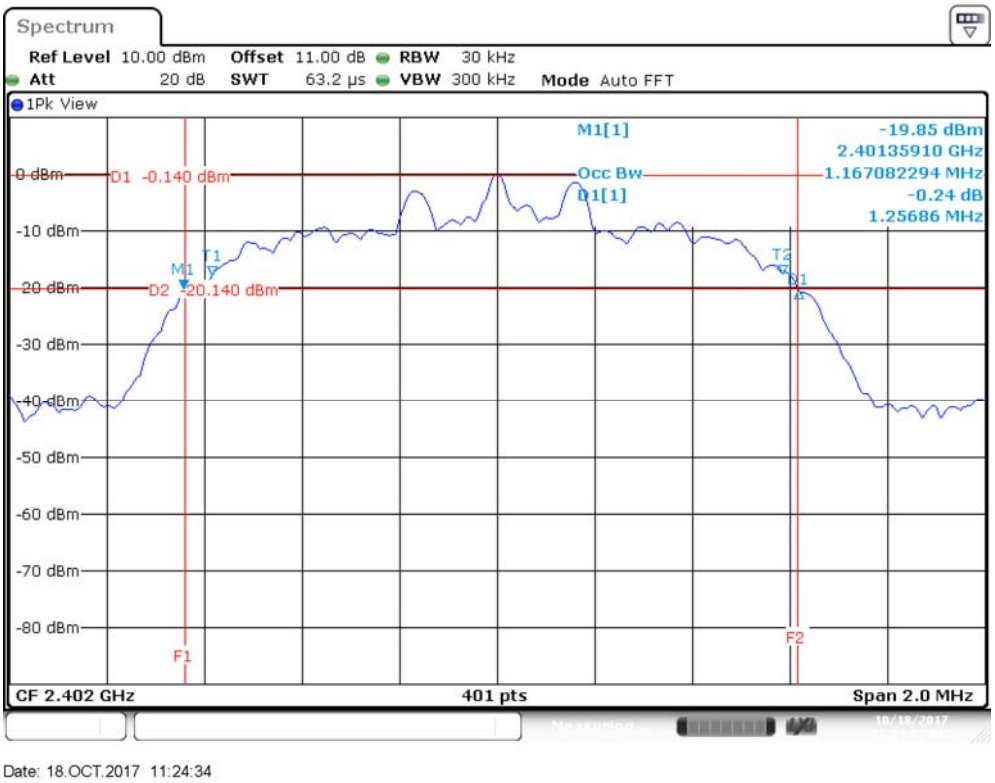


Date: 17.OCT.2017 18:08:47

BDR 3M

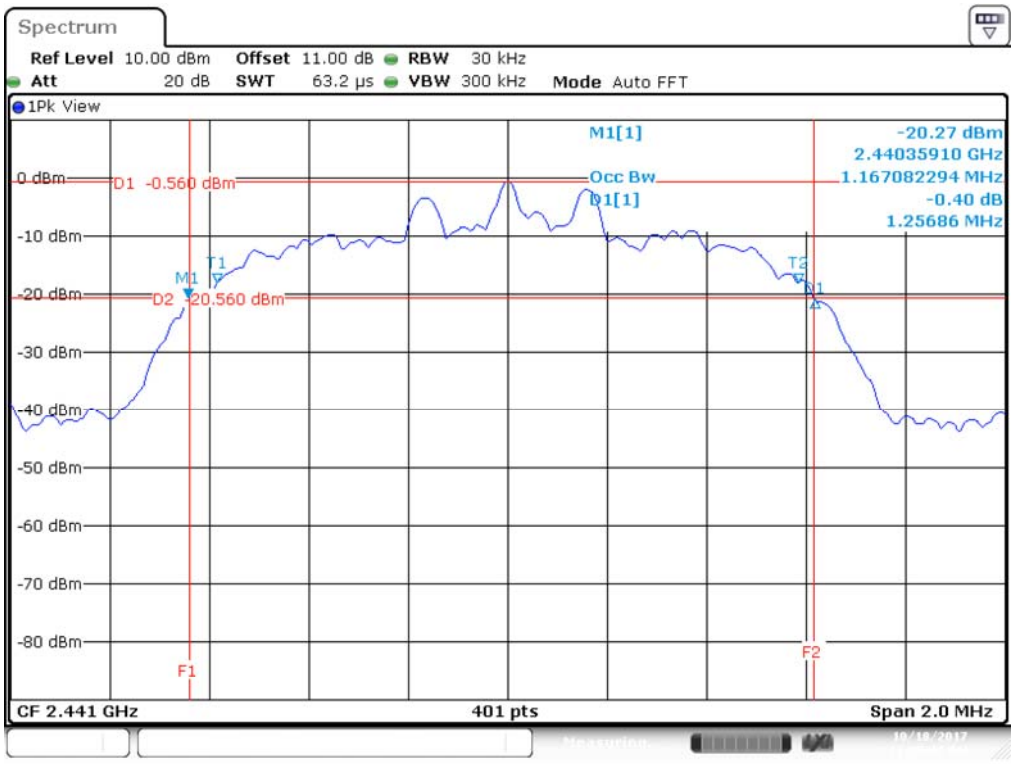
Channel	Frequency (MHz)	20dB Bandwidth (KHz)
00	2402	1,256.86KHz
39	2441	1,256.86 KHz
78	2480	1,266.83KHz

Lowest Channel



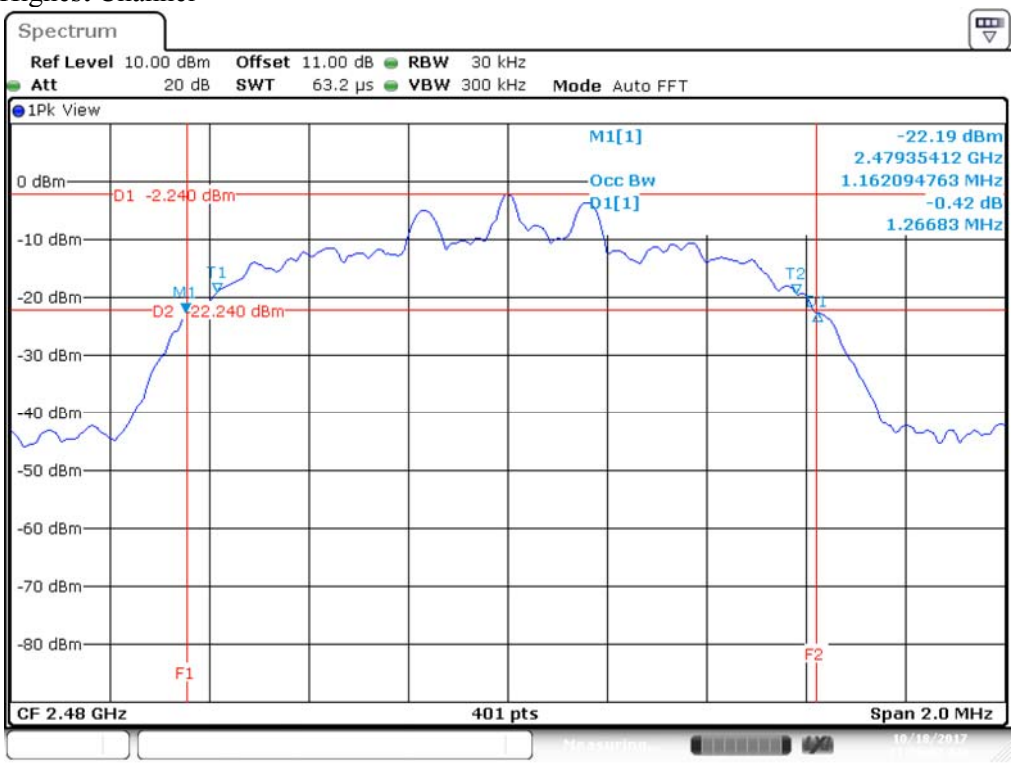
Date: 18.OCT.2017 11:24:34

Middle Channel



Date: 18.OCT.2017 11:25:44

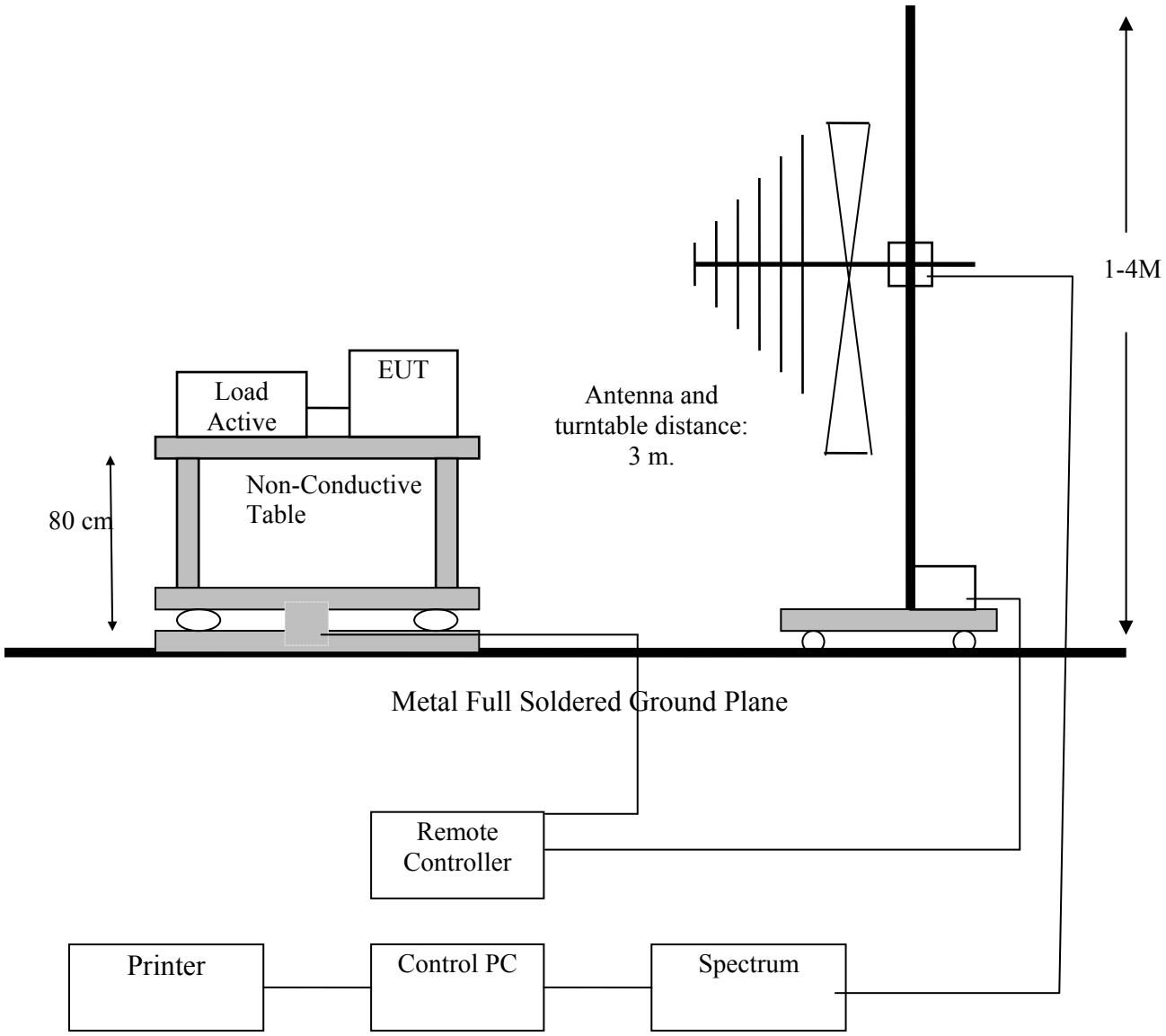
Highest Channel



Date: 18.OCT.2017 11:30:02

8. RADIATED EMISSION

8.1 TEST SETUP



8.2 LIMIT

The field strength of any emissions which appear outside of this band shall not exceed the general radiated emission limits in section 15.209 as below.

Frequency (MHz)	Field Strength (mV/m)	Measurement Distance (m)
1.705-30	30	30
30-88	100*	3
88-216	150*	3
216-960	200*	3
Above 960	500*	3

**Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.*

In the above emission table, the tighter limit applies at the band edges.

Frequency (Hz)	Field Strength (μV/m at 3-meter)	Field Strength (dBμV/m at 3-meter)
1.705-30	30 (at 30-meter)	69.54
30-88	100	40
88-216	150	43
216-960	200	46
Above 960	500	54

8.3 TEST PROCEDURE

1. The EUT was placed on a turntable, which was 0.8m above ground plane.
2. The turntable was rotated for 360 degrees to determine the position of maximum emission level.
3. EUT was set at 3m away from the receiving antenna, which was varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was maximized by changing the polarization of receiving antenna, both horizontal and vertical.
6. Repeated above procedures until the measurements for all frequencies are completed.

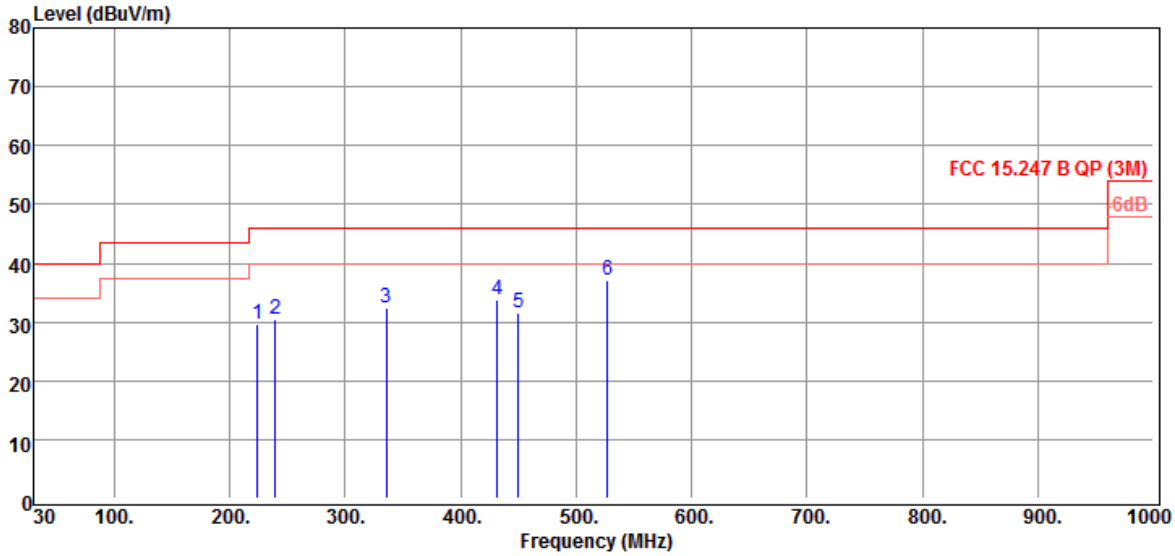
8.4 RESULT: PASS

8.5 TEST DATA:

All frequencies not described in this test report and within the range of the general radiated emission limits are not detectable significantly. The table as below is representing worst emissions found.

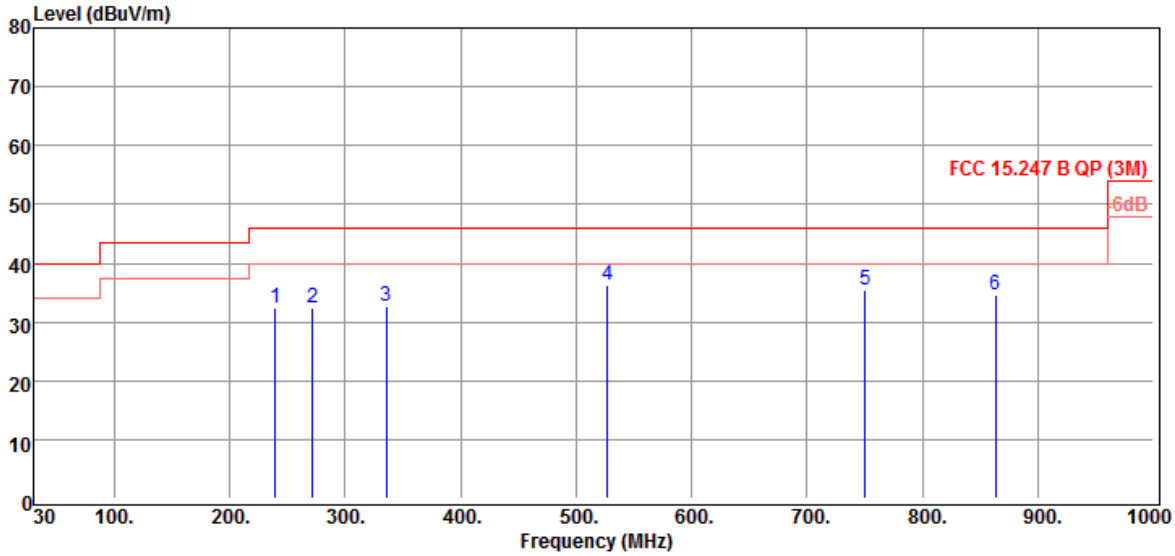
30MHz ~ 1GMz

Horizontal



	Freq MHz	Meter Level dBuV	System Factor dB/m	Cable Loss dB	Antenna Factor dB/m	Preamp Gain dB	Real Level dBuV/m	Limit Line dBuV/m	Margin dB	Remark
1	224.00	39.13	-9.40	1.46	17.78	28.64	29.73	46.00	-16.27	Peak
2	239.52	39.25	-8.80	1.51	18.28	28.59	30.45	46.00	-15.55	Peak
3	335.55	37.99	-5.55	1.98	20.81	28.34	32.44	46.00	-13.56	Peak
4	431.58	36.30	-2.62	2.43	22.93	27.98	33.68	46.00	-12.32	Peak
5	450.01	33.68	-2.13	2.49	23.30	27.92	31.55	46.00	-14.45	Peak
6	527.61	37.47	-0.33	2.64	24.59	27.56	37.14	46.00	-8.86	Peak

Vertical



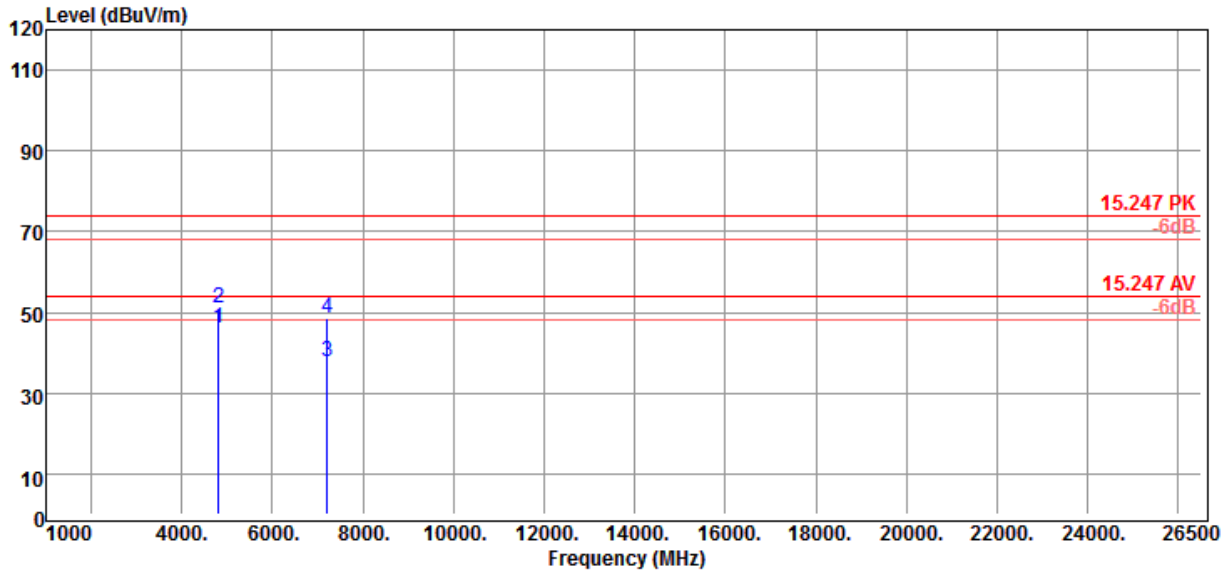
	Freq MHz	Meter Level dBuV	System Factor dB/m	Cable Loss dB	Antenna Factor dB/m	Preamp Gain dB	Real Level dBuV/m	Limit Line dBuV/m	Margin dB	Remark
1	239.52	41.18	-8.80	1.51	18.28	28.59	32.38	46.00	-13.62	Peak
2	271.53	39.60	-7.24	1.64	19.63	28.51	32.36	46.00	-13.64	Peak
3	335.55	38.30	-5.55	1.98	20.81	28.34	32.75	46.00	-13.25	Peak
4	527.61	36.47	-0.33	2.64	24.59	27.56	36.14	46.00	-9.86	Peak
5	750.71	30.93	4.49	3.16	27.41	26.08	35.42	46.00	-10.58	Peak
6	863.23	28.02	6.70	3.46	28.56	25.32	34.72	46.00	-11.28	Peak

1GHz ~26.5GHz

BDR 1M

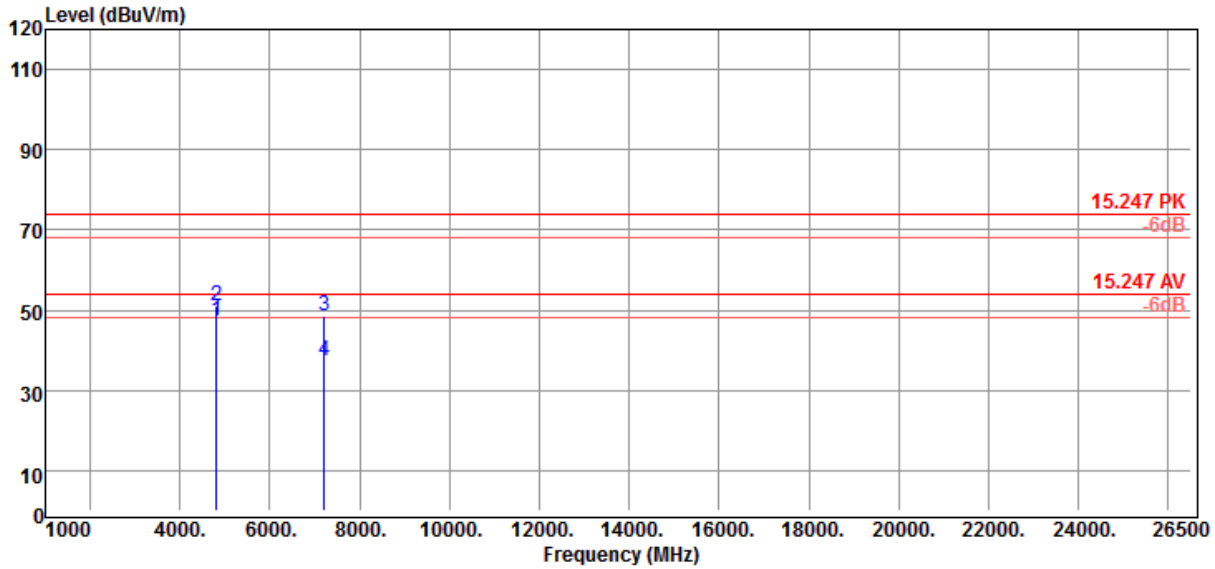
Lowest Channel

Horizontal



	Freq MHz	Meter Level dBuV	System Factor dB/m	Cable Loss dB	Antenna Factor dB/m	Preamp Gain dB	Real Level dBuV/m	Limit Line dBuV/m	Margin dB	Remark
1	4804.00	52.15	-6.00	6.26	34.58	46.84	46.15	54.00	-7.85	Average
2	4804.00	57.07	-6.00	6.26	34.58	46.84	51.07	74.00	-22.93	Peak
3	7206.00	40.13	-2.40	8.09	35.99	46.48	37.73	54.00	-16.27	Average
4	7206.00	51.03	-2.40	8.09	35.99	46.48	48.63	74.00	-25.37	Peak

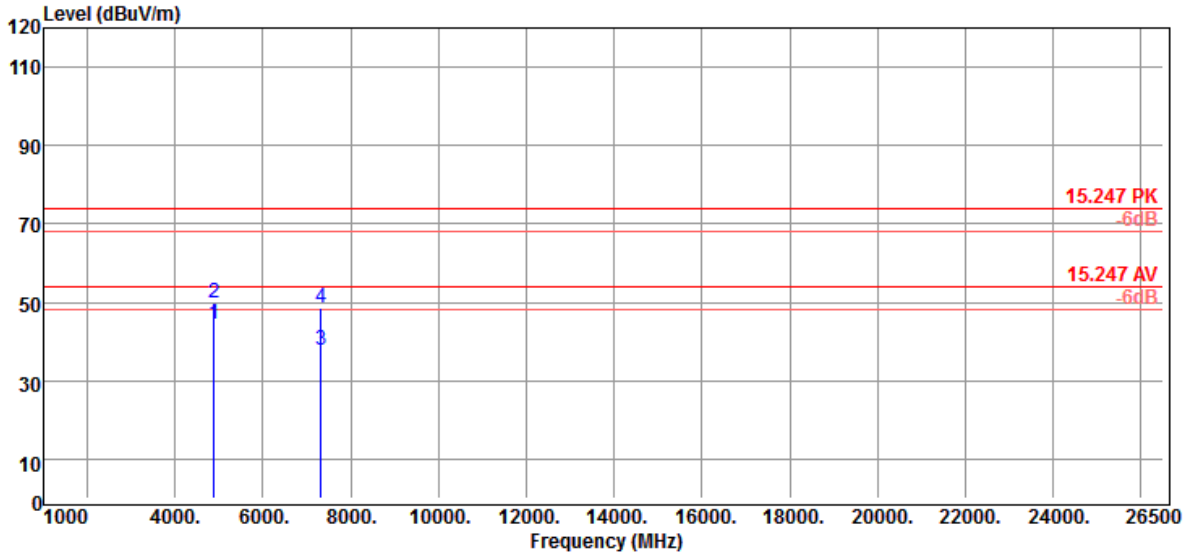
Vertical



	Freq MHz	Meter Level dBuV	System Factor dB/m	Cable Loss dB	Antenna Factor dB/m	Preamp Gain dB	Real Level dBuV/m	Limit Line dBuV/m	Margin dB	Remark
1	4804.00	53.39	-6.00	6.26	34.58	46.84	47.39	54.00	-6.61	Average
2	4804.00	57.28	-6.00	6.26	34.58	46.84	51.28	74.00	-22.72	Peak
3	7206.00	50.79	-2.40	8.09	35.99	46.48	48.39	74.00	-25.61	Peak
4	7206.00	39.93	-2.40	8.09	35.99	46.48	37.53	74.00	-36.47	Peak

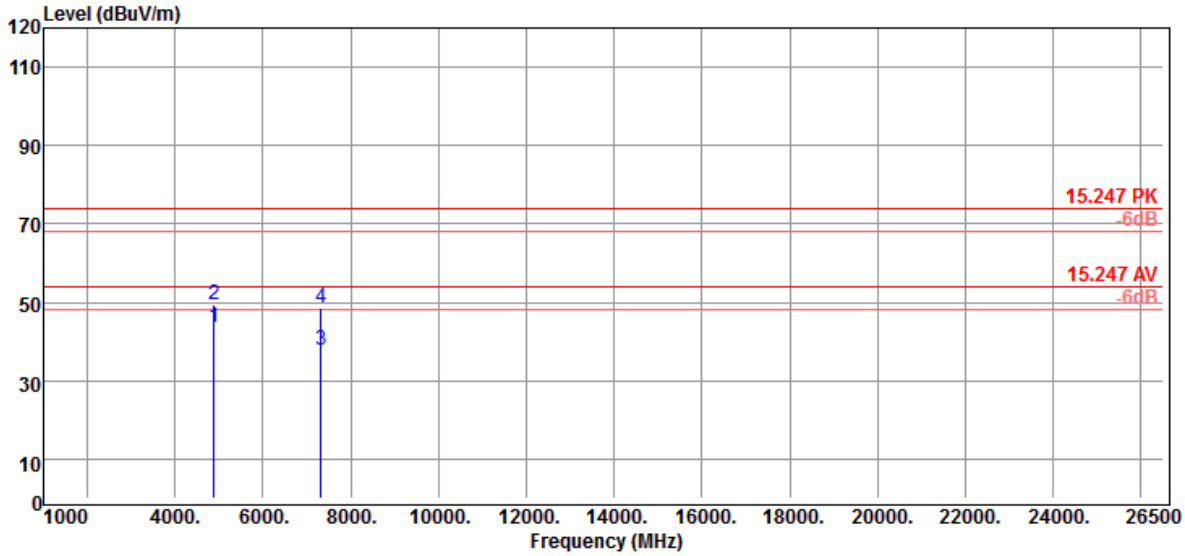
Middle Channel

Horizontal



	Freq MHz	Meter Level dBuV	System Factor dB/m	Cable Loss dB	Antenna Factor dB/m	Preamp Gain dB	Real Level dBuV/m	Limit Line dBuV/m	Margin dB	Remark
1	4882.00	50.15	-5.87	6.32	34.63	46.82	44.28	54.00	-9.72	Average
2	4882.00	55.61	-5.87	6.32	34.63	46.82	49.74	74.00	-24.26	Peak
3	7323.00	39.95	-2.08	8.18	36.15	46.41	37.87	54.00	-16.13	Average
4	7323.00	50.67	-2.08	8.18	36.15	46.41	48.59	74.00	-25.41	Peak

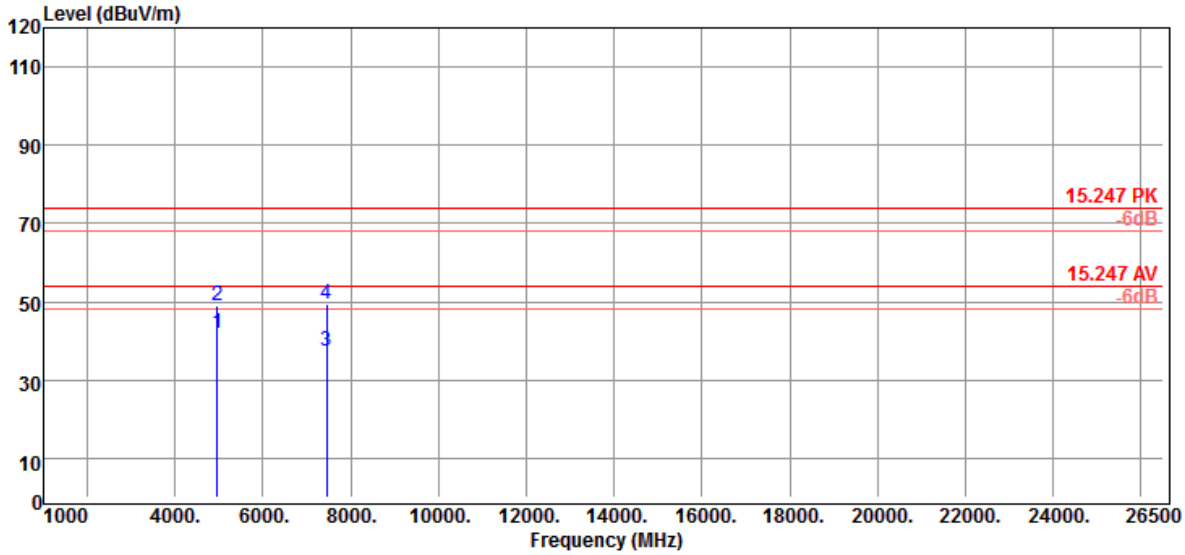
Vertical



	Freq MHz	Meter Level dBuV	System Factor dB/m	Cable Loss dB	Antenna Factor dB/m	Preamp Gain dB	Real Level dBuV/m	Limit Line dBuV/m	Margin dB	Remark
1	4882.00	49.46	-5.87	6.32	34.63	46.82	43.59	54.00	-10.41	Average
2	4882.00	55.13	-5.87	6.32	34.63	46.82	49.26	74.00	-24.74	Peak
3	7323.00	39.93	-2.08	8.18	36.15	46.41	37.85	54.00	-16.15	Average
4	7323.00	50.72	-2.08	8.18	36.15	46.41	48.64	74.00	-25.36	Peak

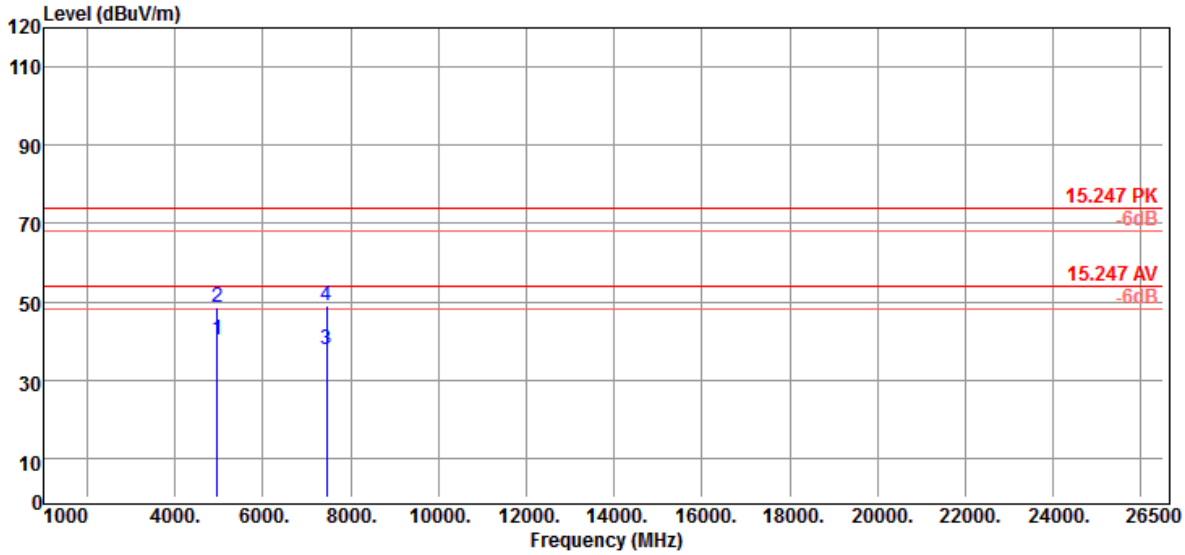
Highest Channel

Horizontal



	Freq MHz	Meter Level dBuV	System Factor dB/m	Cable Loss dB	Antenna Factor dB/m	Preamp Gain dB	Real Level dBuV/m	Limit Line dBuV/m	Margin dB	Remark
1	4960.00	47.52	-5.75	6.38	34.68	46.81	41.77	54.00	-12.23	Average
2	4960.00	54.69	-5.75	6.38	34.68	46.81	48.94	74.00	-25.06	Peak
3	7440.00	39.12	-1.75	8.27	36.32	46.34	37.37	54.00	-16.63	Average
4	7440.00	50.99	-1.75	8.27	36.32	46.34	49.24	74.00	-24.76	Peak

Vertical

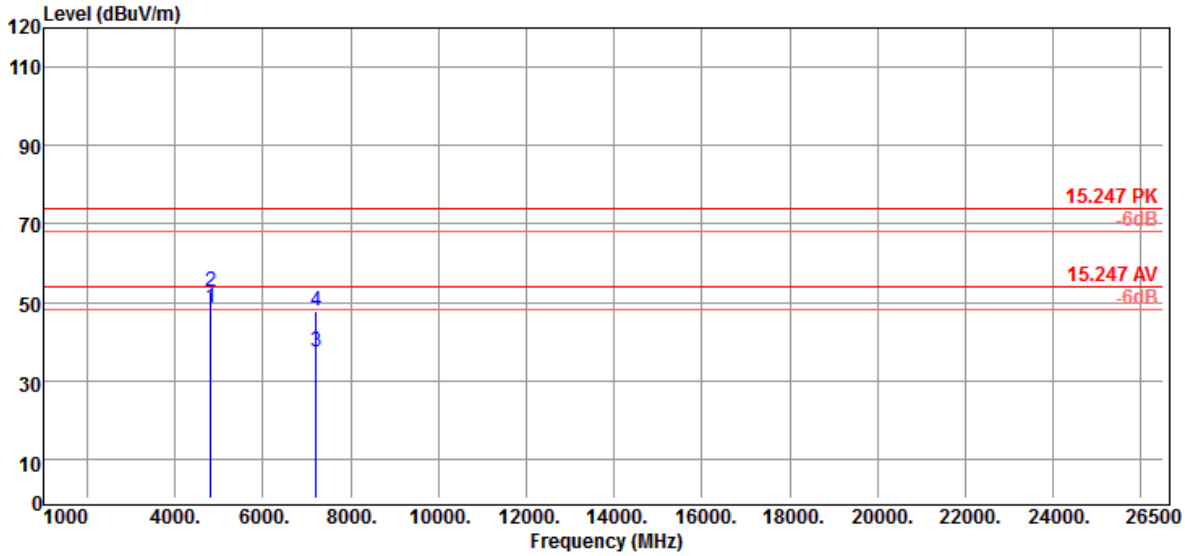


	Freq MHz	Meter Level dBuV	System Factor dB/m	Cable Loss dB	Antenna Factor dB/m	Preamp Gain dB	Real Level dBuV/m	Limit Line dBuV/m	Margin dB	Remark
1	4960.00	45.92	-5.75	6.38	34.68	46.81	40.17	54.00	-13.83	Average
2	4960.00	54.14	-5.75	6.38	34.68	46.81	48.39	74.00	-25.61	Peak
3	7440.00	39.36	-1.75	8.27	36.32	46.34	37.61	54.00	-16.39	Average
4	7440.00	50.73	-1.75	8.27	36.32	46.34	48.98	74.00	-25.02	Peak

BDR 3M

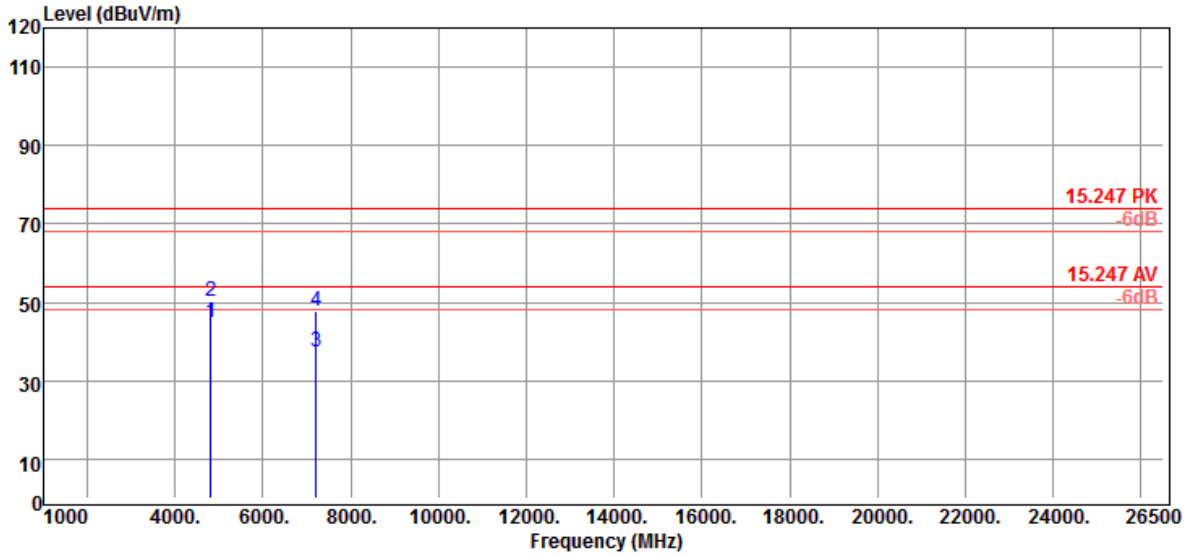
Lowest Channel

Horizontal



	Freq MHz	Meter Level dBuV	System Factor dB/m	Cable Loss dB	Antenna Factor dB/m	Preamp Gain dB	Real Level dBuV/m	Limit Line dBuV/m	Margin dB	Remark
1	4804.00	54.59	-6.00	6.26	34.58	46.84	48.59	54.00	-5.41	Average
2	4804.00	58.75	-6.00	6.26	34.58	46.84	52.75	74.00	-21.25	Peak
3	7206.00	39.95	-2.40	8.09	35.99	46.48	37.55	54.00	-16.45	Average
4	7206.00	49.97	-2.40	8.09	35.99	46.48	47.57	74.00	-26.43	Peak

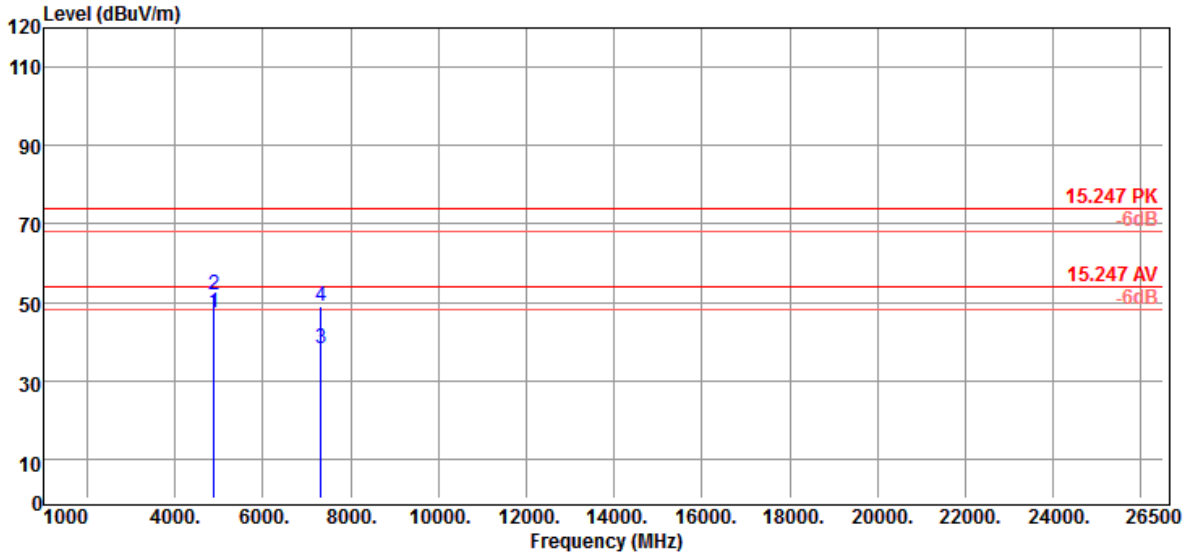
Vertical



	Freq MHz	Meter Level dBuV	System Factor dB/m	Cable Loss dB	Antenna Factor dB/m	Preamp Gain dB	Real Level dBuV/m	Limit Line dBuV/m	Margin dB	Remark
1	4804.00	50.80	-6.00	6.26	34.58	46.84	44.80	54.00	-9.20	Average
2	4804.00	56.27	-6.00	6.26	34.58	46.84	50.27	74.00	-23.73	Peak
3	7206.00	39.88	-2.40	8.09	35.99	46.48	37.48	54.00	-16.52	Average
4	7206.00	50.26	-2.40	8.09	35.99	46.48	47.86	74.00	-26.14	Peak

Middle Channel

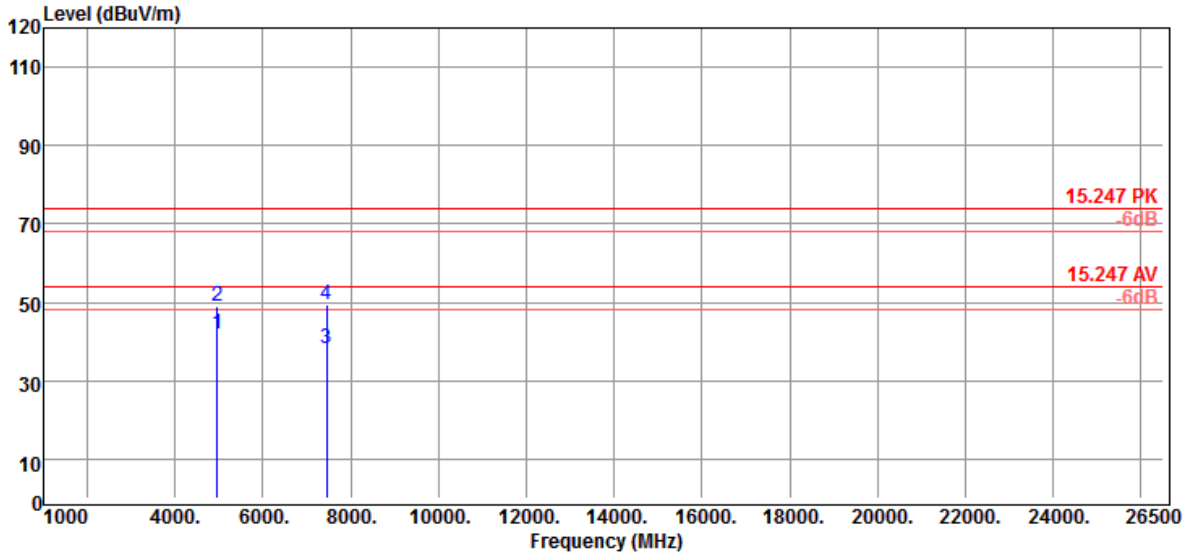
Horizontal



	Freq MHz	Meter Level dBuV	System Factor dB/m	Cable Loss dB	Antenna Factor dB/m	Preamp Gain dB	Real Level dBuV/m	Limit Line dBuV/m	Margin dB	Remark
1	4882.00	53.22	-5.87	6.32	34.63	46.82	47.35	54.00	-6.65	Average
2	4882.00	57.77	-5.87	6.32	34.63	46.82	51.90	74.00	-22.10	Peak
3	7323.00	40.09	-2.08	8.18	36.15	46.41	38.01	54.00	-15.99	Average
4	7323.00	51.11	-2.08	8.18	36.15	46.41	49.03	74.00	-24.97	Peak

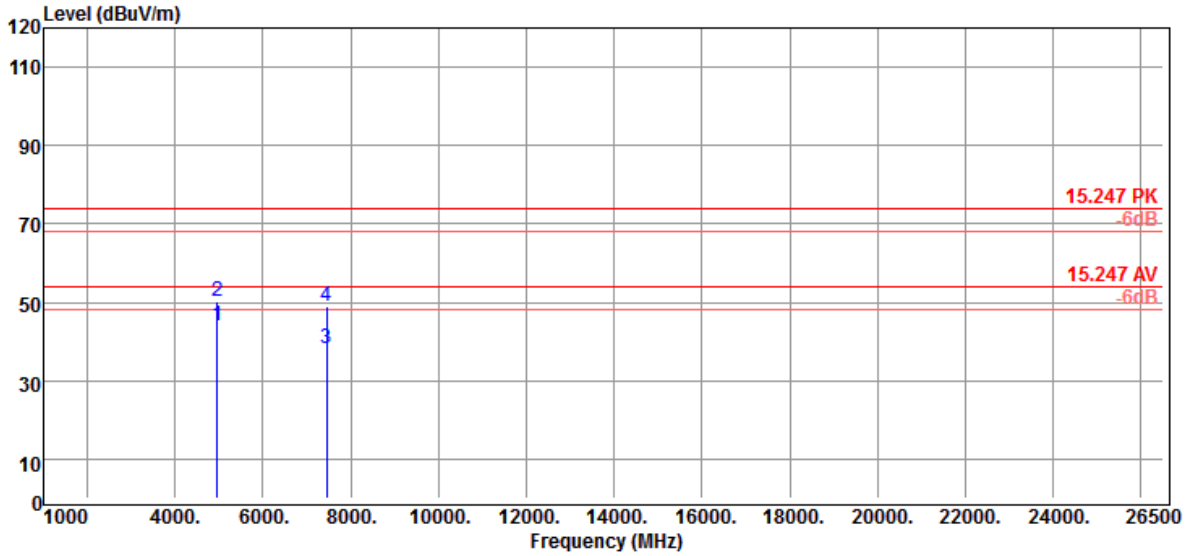
Highest Channel

Horizontal



	Freq MHz	Meter Level dBuV	System Factor dB/m	Cable Loss dB	Antenna Factor dB/m	Preamp Gain dB	Real Level dBuV/m	Limit Line dBuV/m	Margin dB	Remark
1	4960.00	47.59	-5.75	6.38	34.68	46.81	41.84	54.00	-12.16	Average
2	4960.00	54.92	-5.75	6.38	34.68	46.81	49.17	74.00	-24.83	Peak
3	7440.00	40.06	-1.75	8.27	36.32	46.34	38.31	54.00	-15.69	Average
4	7440.00	51.07	-1.75	8.27	36.32	46.34	49.32	74.00	-24.68	Peak

Vertical



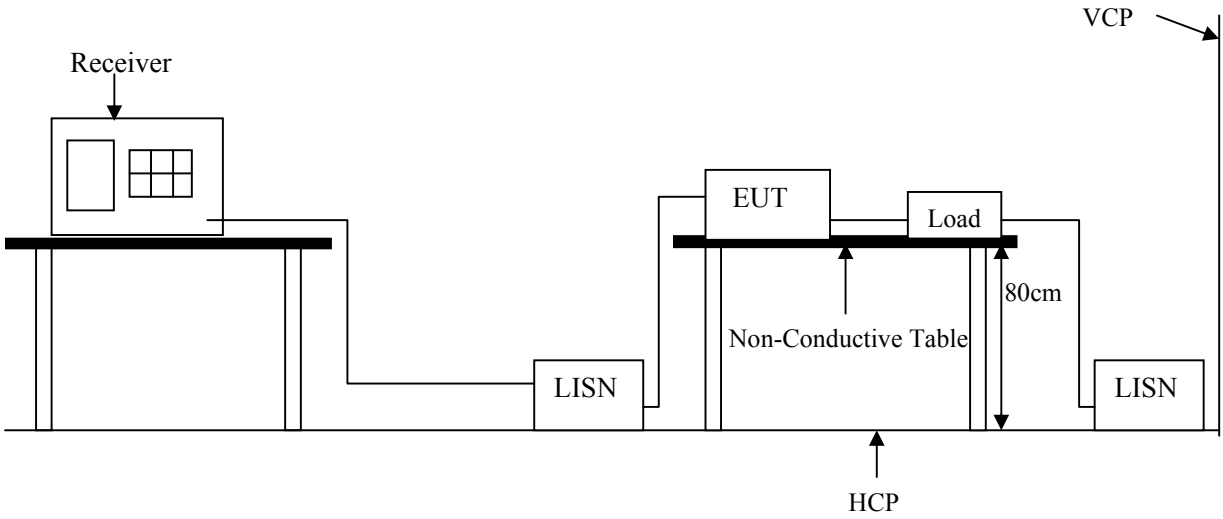
	Freq MHz	Meter Level dBuV	System Factor dB/m	Cable Loss dB	Antenna Factor dB/m	Preamp Gain dB	Real Level dBuV/m	Limit Line dBuV/m	Margin dB	Remark
1	4960.00	49.76	-5.75	6.38	34.68	46.81	44.01	54.00	-9.99	Average
2	4960.00	56.11	-5.75	6.38	34.68	46.81	50.36	74.00	-23.64	Peak
3	7440.00	39.88	-1.75	8.27	36.32	46.34	38.13	54.00	-15.87	Average
4	7440.00	50.69	-1.75	8.27	36.32	46.34	48.94	74.00	-25.06	Peak

Note:

1. Emission level = Reading level + Correction factor
2. Correction factor : Antenna factor, Cable loss, PreAmp, etc.
3. All emissions as described above were determining by rotating the EUT through three orthogonal axes to maximizing the emissions if the EUT belongs to hand-held or body-worn devices.
4. Measurements from 9 kHz to 150 kHz, Peak detector setting: 100 Hz RBW
5. Measurements from 150 kHz to 30MHz, Peak detector setting: 10 kHz RBW
6. Measurements from 30 MHz to 1000 MHz, Peak detector setting: 100 kHz RBW
7. Measurements from 9 kHz to 150 kHz, CISPR Quasi-Peak detector: 200 Hz RBW
8. Measurements from 150 kHz to 30MHz, CISPR Quasi-Peak detector: 9 kHz RBW
9. Measurements from 30 MHz to 1000 MHz, CISPR Quasi-Peak detector: 120 kHz RBW
10. Peak detector measurement data will represent the worst case results.

9. CONDUCTED EMISSIONS

9.1 TEST SETUP



9.2 LIMIT

Frequency range (MHz)	CLASS A		CLASS B	
	QP dB(uV)	Average dB(uV)	QP dB(uV)	Average dB(uV)
0.15-0.5	79 dBuV	66 dBuV	66 - 56 dBuV	56 - 46 dBuV
0.5-5.0	73 dBuV	60 dBuV	56 dBuV	46 dBuV
5.0-30.0	73 dBuV	60 dBuV	60 dBuV	50 dBuV

Remark: In the above table, the tighter limit applies at the band edges.

9.3 TEST PROCEDURE

The EUT and simulators are connected to the main power through a line impedance stabilization network (LISN). It provides a 50 ohm / 50 μH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50 ohm / 50 μH coupling impedance with 50 ohm termination. (Please refer to the block diagram of the test setup and photograph.)

Both sides of AC line are checked for the maximum conducted emission interference. In order to find the maximum emissions, the relating positions of equipment and all of the interference cables must be changed according to EN 55022 regulations: The measurement procedure on conducted emission interference.

The resolution bandwidth of the field strength meter is set at 9 KHz.

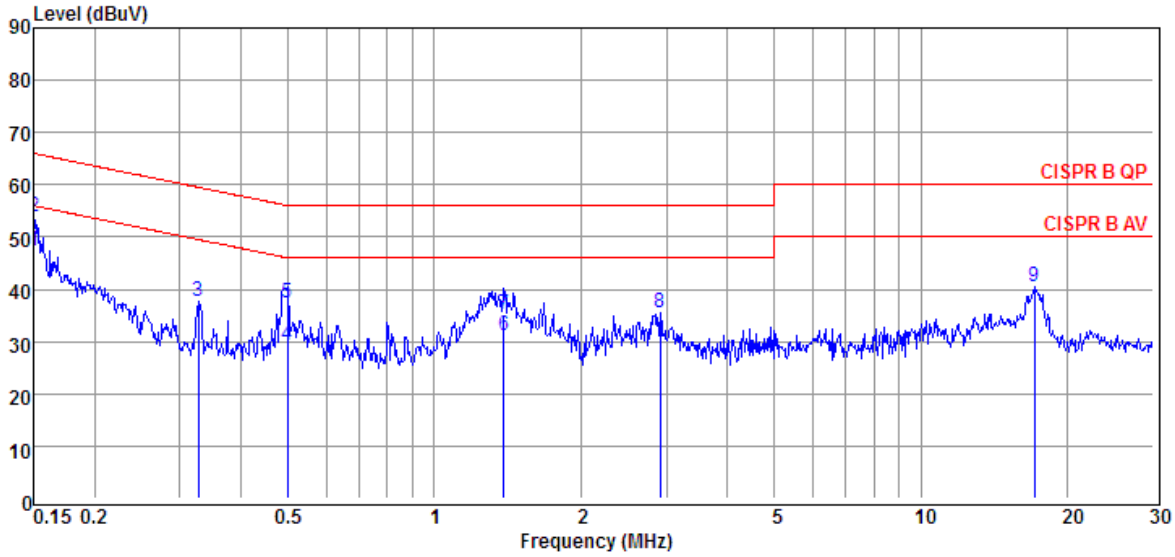
9.4 TEST SPECIFICATION

According to PART15.207

9.5 RESULT: PASS

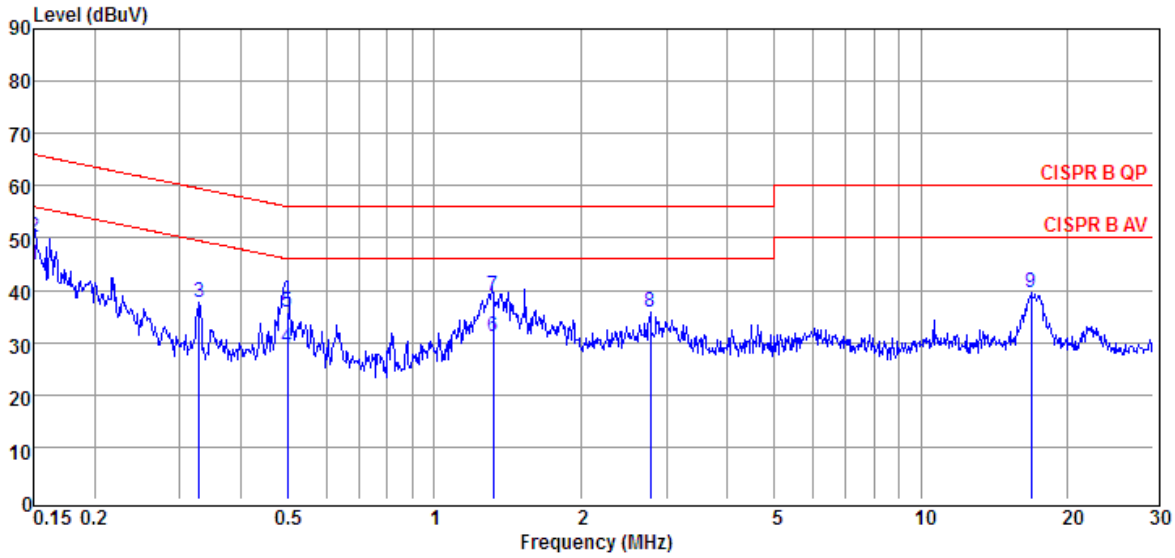
9.6 TEST DATA:

LINE



	Freq	Meter Level	System Factor	Cable Loss	LISN Factor	Real Level	Limit Line	Margin	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dB	
1	0.15	27.25	20.11	20.10	0.01	47.36	55.99	-8.63	Average
2	0.15	33.62	20.11	20.10	0.01	53.73	65.99	-12.26	QP
3	0.33	17.63	20.15	20.13	0.02	37.78	59.53	-21.75	Peak
4	0.50	9.17	20.17	20.15	0.02	29.34	46.01	-16.67	Average
5	0.50	17.17	20.17	20.15	0.02	37.34	56.01	-18.67	QP
6	1.39	10.84	20.24	20.21	0.03	31.08	46.00	-14.92	Average
7	1.39	14.91	20.24	20.21	0.03	35.15	56.00	-20.85	QP
8	2.92	15.31	20.33	20.27	0.06	35.64	56.00	-20.36	Peak
9	17.11	19.22	21.13	20.88	0.25	40.35	60.00	-19.65	Peak

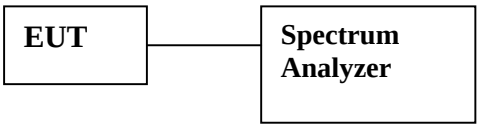
NEUTRAL



	Freq MHz	Meter Level dBuV	System Factor dB	Cable Loss dB	LISN Factor dB	Real Level dBuV	Limit Line dBuV	Margin dB	Remark
1	0.15	24.57	20.13	20.10	0.03	44.70	55.99	-11.29	Average
2	0.15	30.05	20.13	20.10	0.03	50.18	65.99	-15.81	QP
3	0.33	17.38	20.16	20.13	0.03	37.54	59.49	-21.95	Peak
4	0.50	8.70	20.18	20.15	0.03	28.88	46.02	-17.14	Average
5	0.50	15.52	20.18	20.15	0.03	35.70	56.02	-20.32	QP
6	1.32	11.04	20.26	20.21	0.05	31.30	46.00	-14.70	Average
7	1.32	18.52	20.26	20.21	0.05	38.78	56.00	-17.22	QP
8	2.78	15.62	20.33	20.26	0.07	35.95	56.00	-20.05	Peak
9	16.84	18.49	21.15	20.86	0.29	39.64	60.00	-20.36	Peak

10. SPURIOUS EMISSIONS

10.1 TEST SETUP



10.2 LIMIT

According to § 15.247(d) , in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intention radiator in operating , the radio 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. In addition, radiated emissions which fall in the restricted bands , as defined in § 15.205(a) , must also comply with the radiated emission limits specified in 15.209(a) (see Section 15.205(c)).

10.3 TEST PROCEDURE

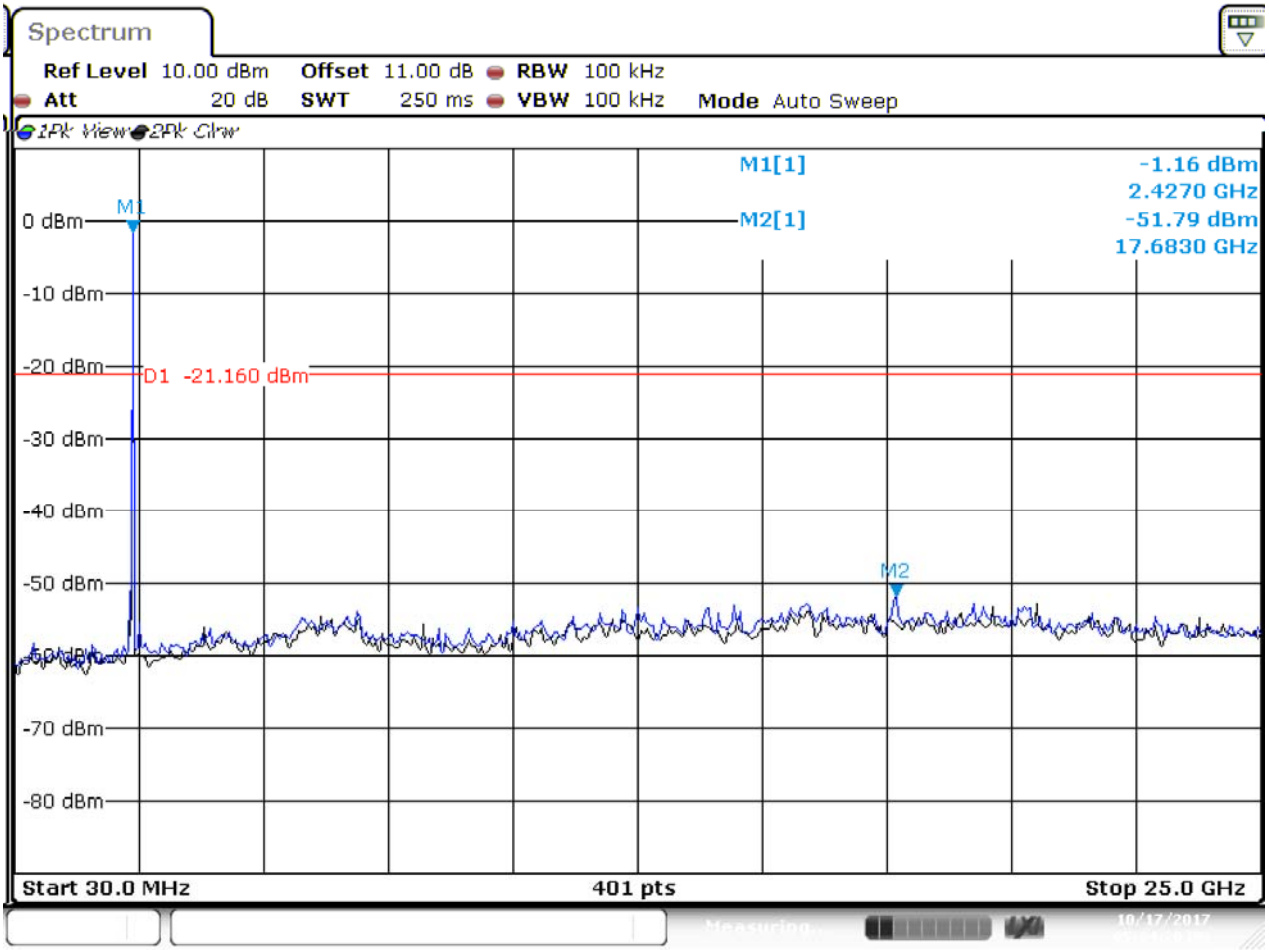
Conducted RF measurements of the transmitter output were made to confirm that the EUT antrnna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 100 kHz.
Measurements are made over the 13 GHz to 26GHz range for IEEE 802.11b/g.

10.4 TEST RESULTS: PASS

10.5 TEST DATA:

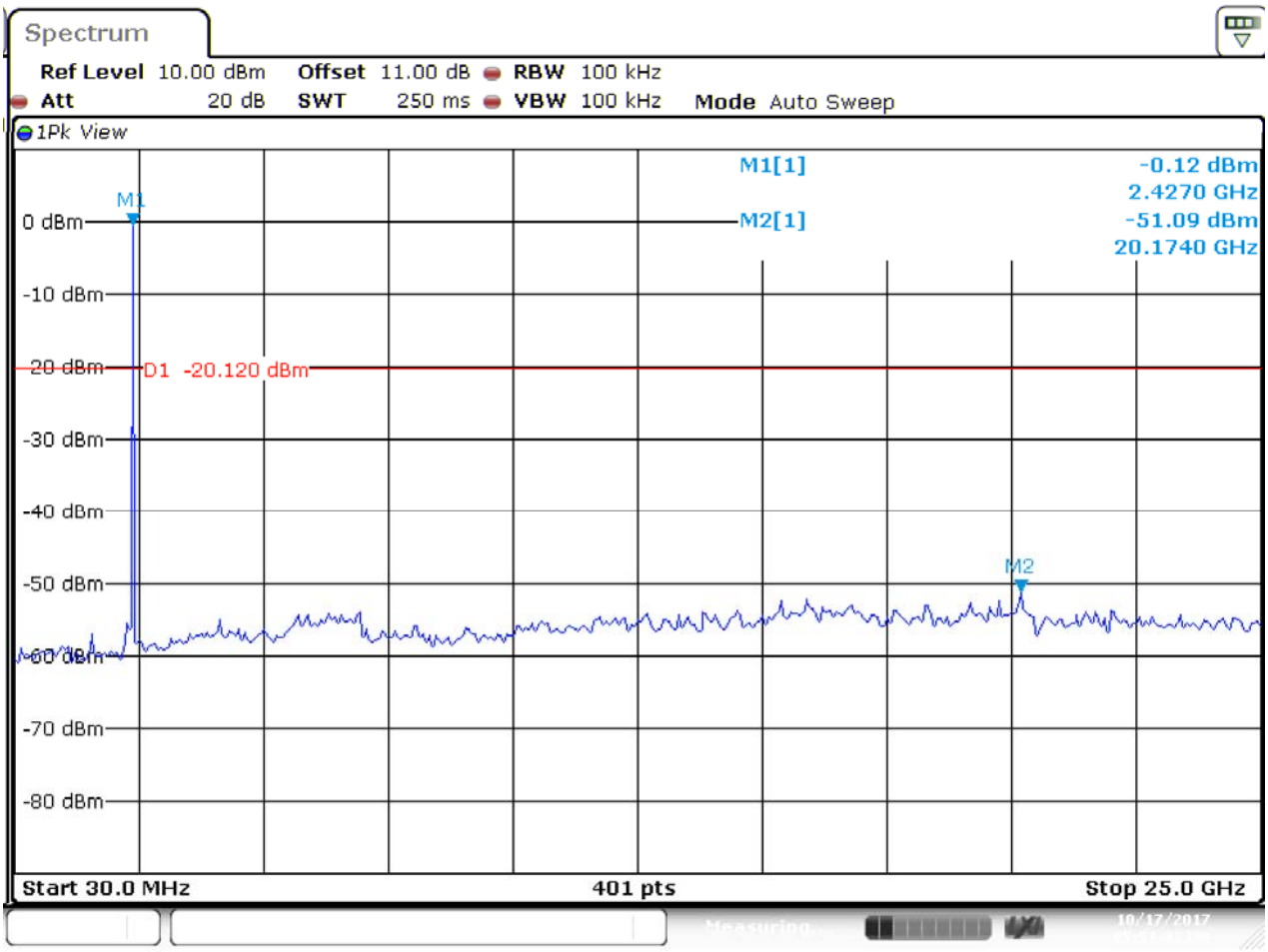
BDR 1M

Lowest Channel



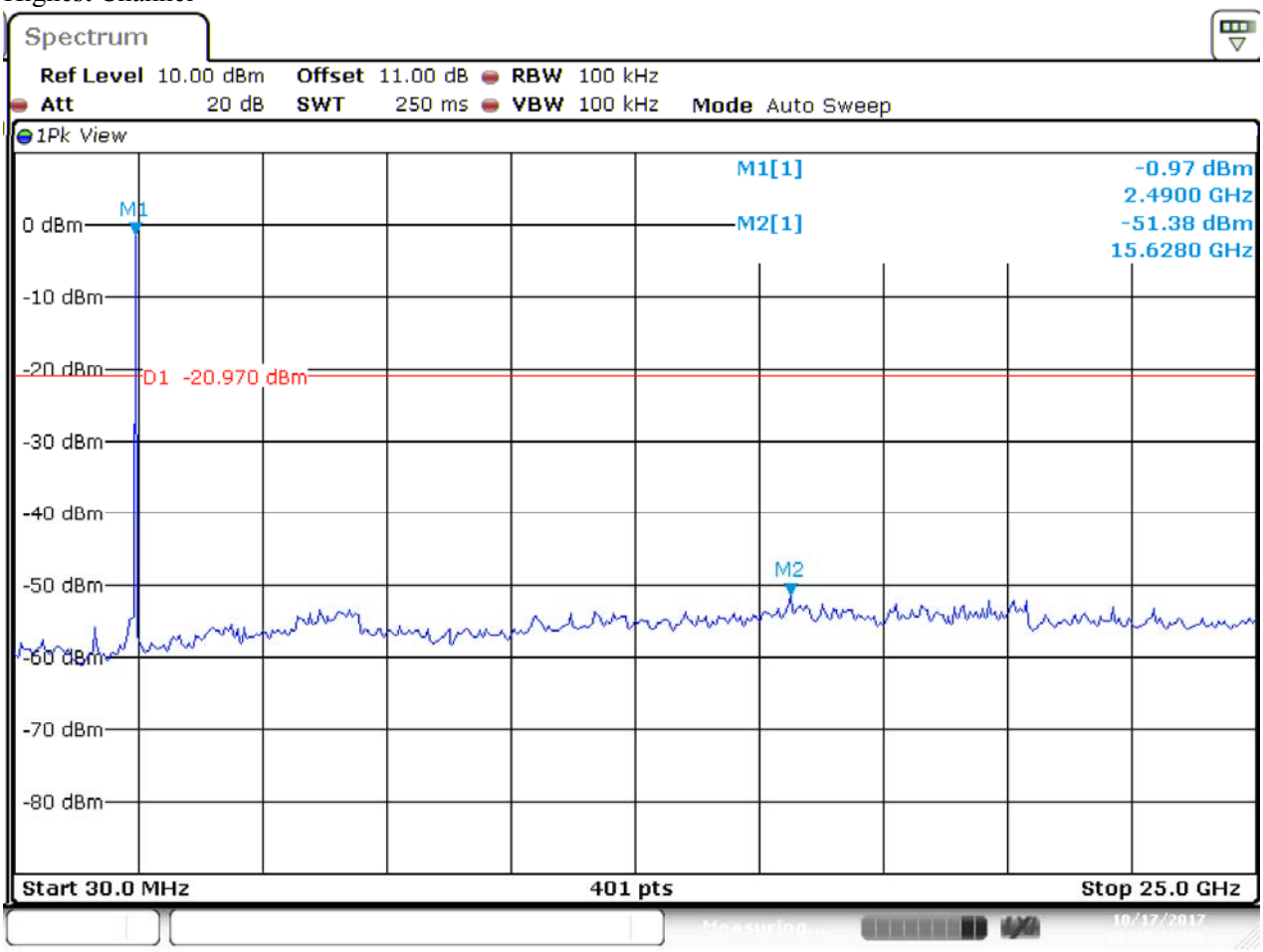
Date: 17.OCT.2017 17:34:19

Middle Channel



Date: 17.OCT.2017 17:51:43

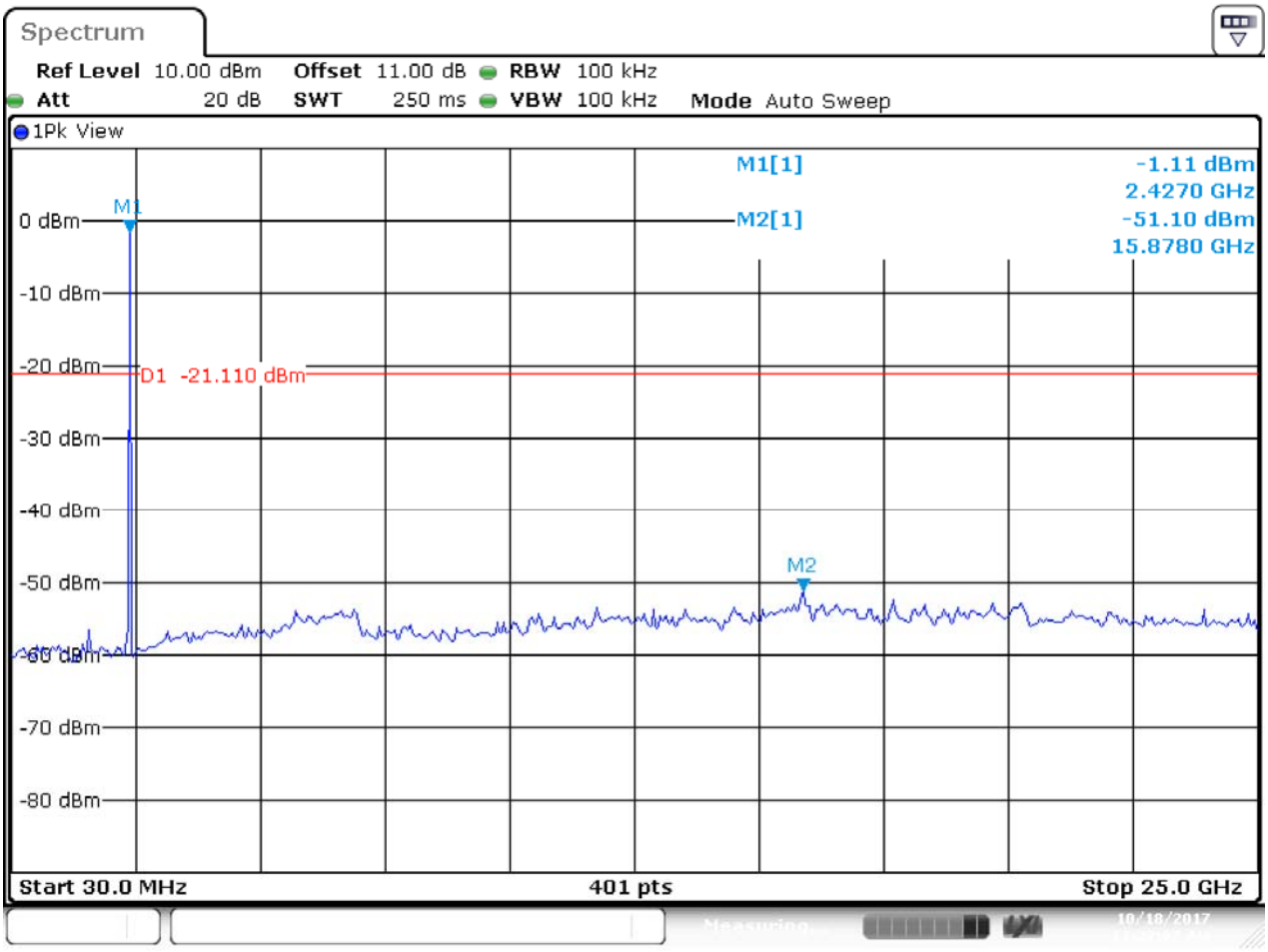
Highest Channel



Date: 17.OCT.2017 18:08:03

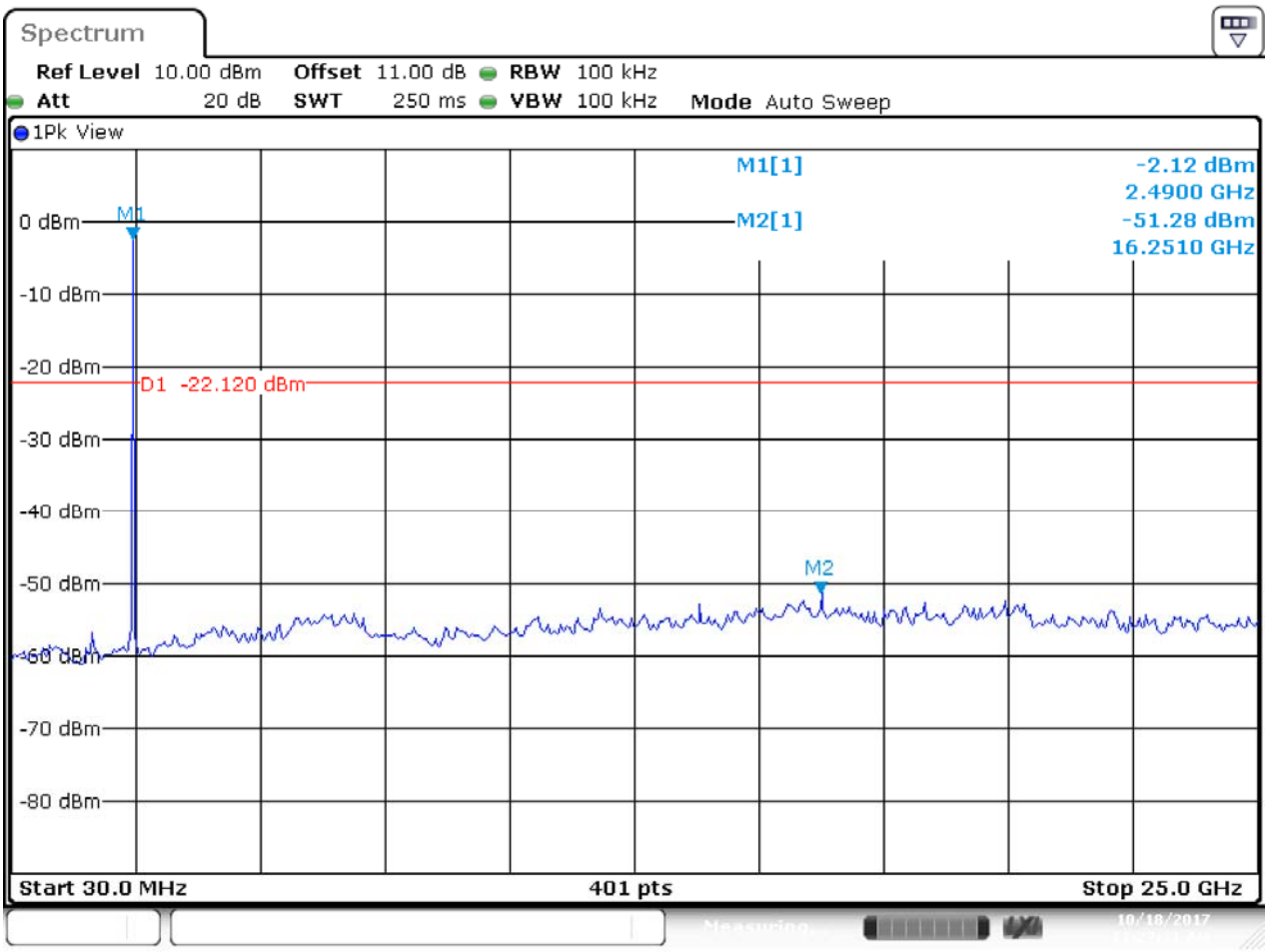
BDR 3M

Lowest Channel



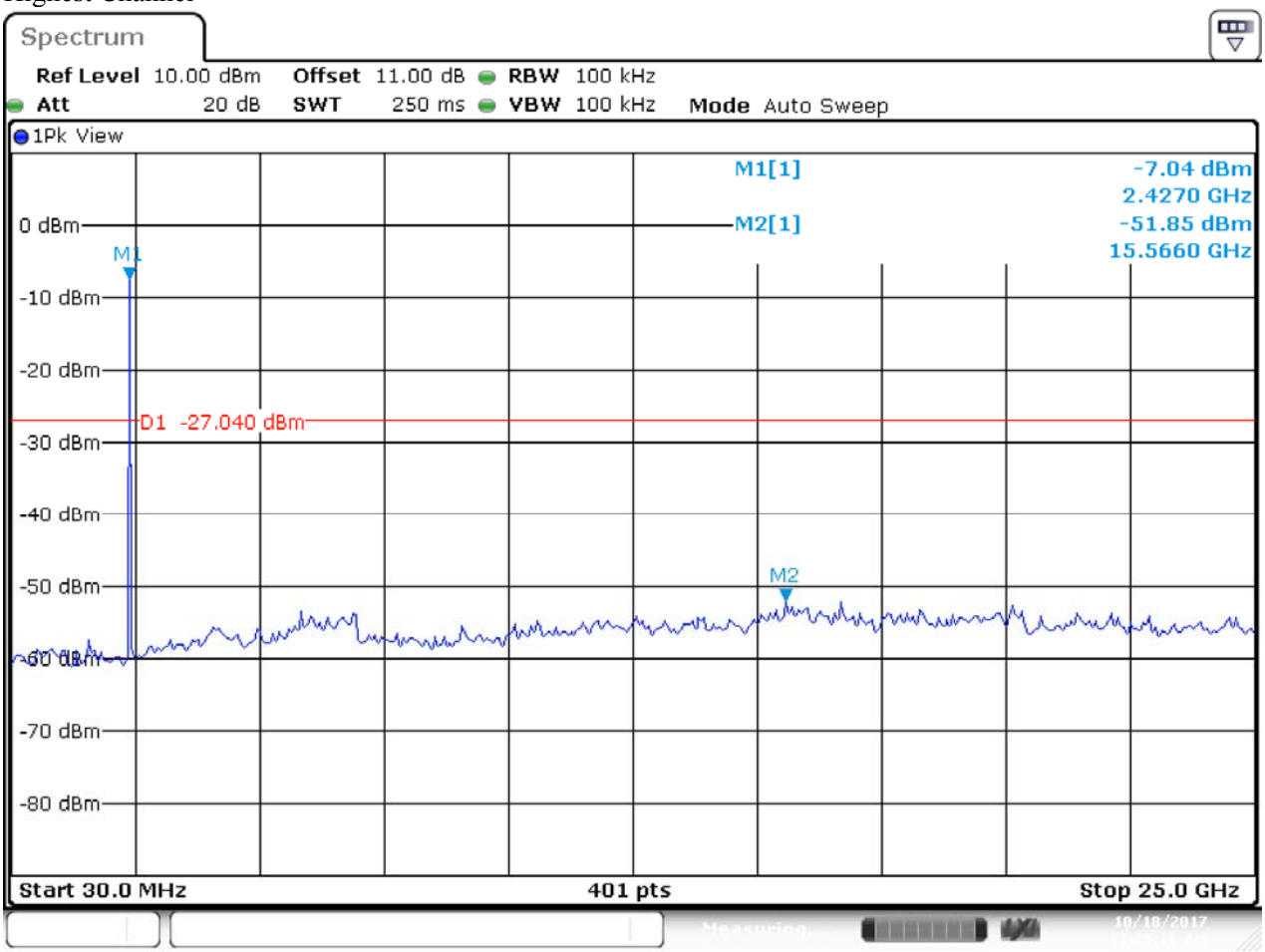
Date: 18.OCT.2017 11:22:07

Middle Channel



Date: 18.OCT.2017 11:27:31

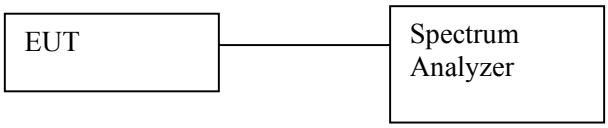
Highest Channel



Date: 18.OCT.2017 11:25:16

11. CHANNEL SEPARATION

11.1 TEST SETUP



11.2 TEST PROCEDURE

1. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
2. The EUT should be transmitting at its maximum data rate as the worst cases.
3. Use the following spectrum analyzer settings:
   Span = wide enough to capture the peaks of two adjacent channels; RBW ≥ 1% of the span;
   VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold.
4. Use the marker-delta function to determine the separation between the peaks of the adjacent channels.

11.3 LIMIT

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.

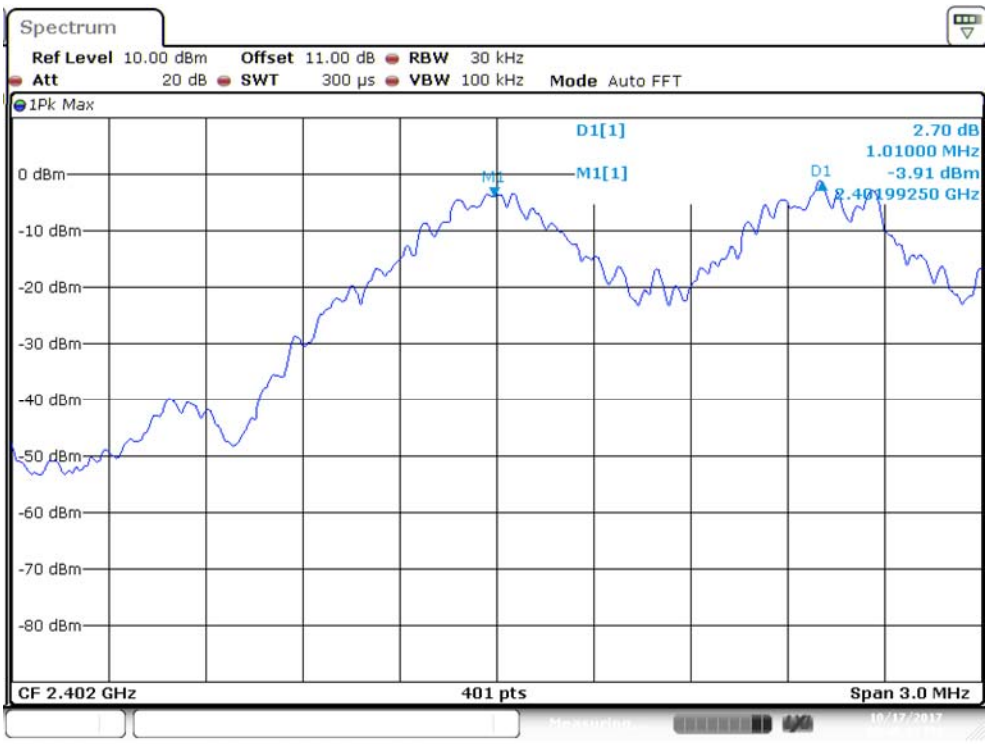
11.4 RESULT: PASS

11.5 TEST DATA:

BDR 1M

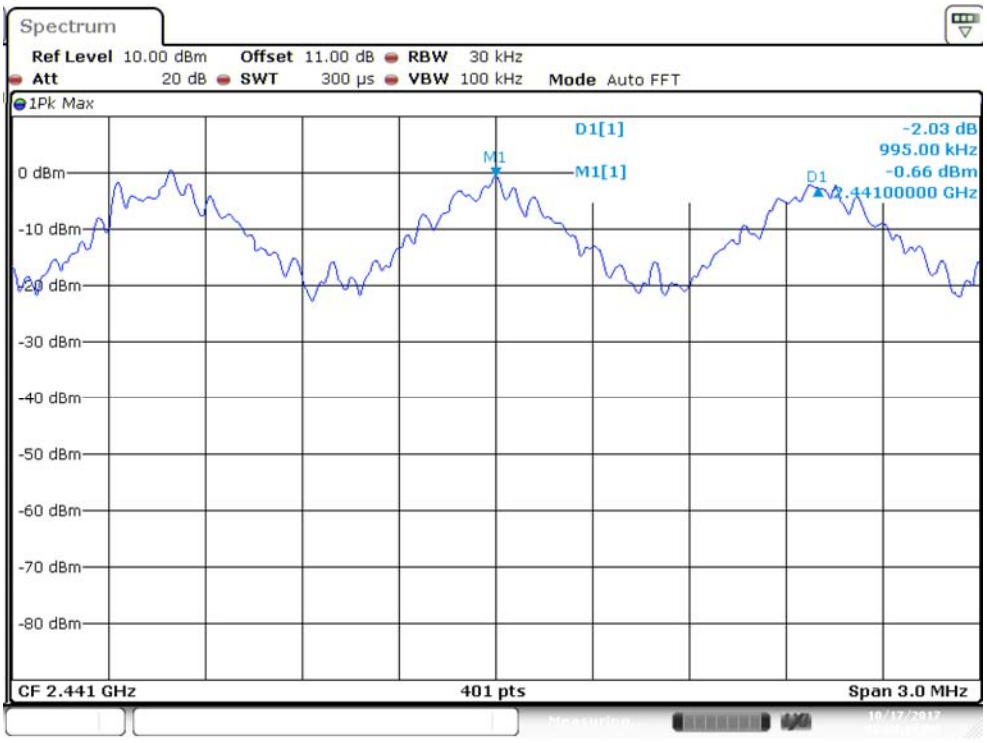
Channel	Frequency (MHz)	Frequency Separation (MHz)	(2/3 of 20dB BW) Limit (MHz)
00	2402	1.010	0.657
39	2441	0.995	0.665
78	2480	1.0025	0.615

Lowest Channel



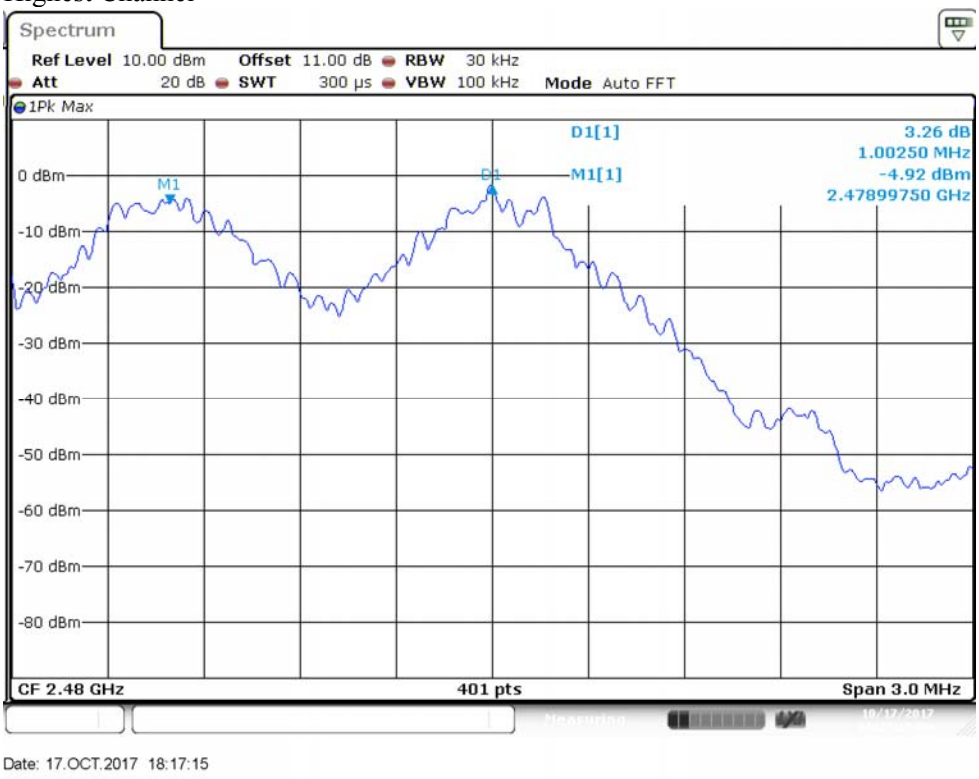
Date: 17.OCT.2017 17:49:32

Middle Channel



Date: 17.OCT.2017 18:04:11

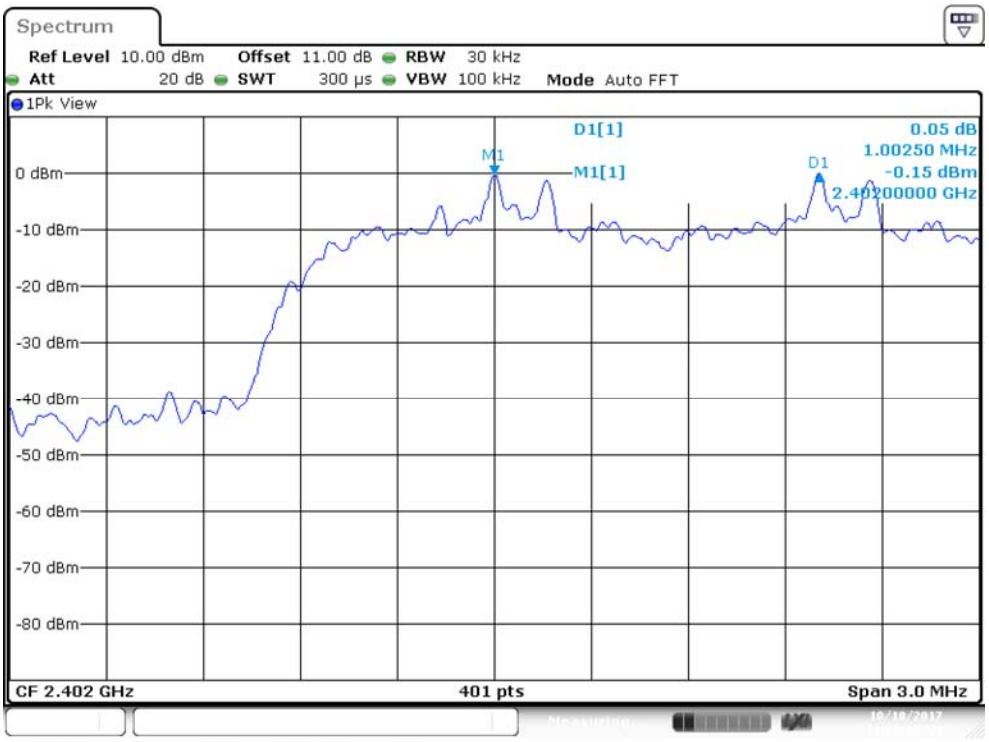
Highest Channel



BDR 3M

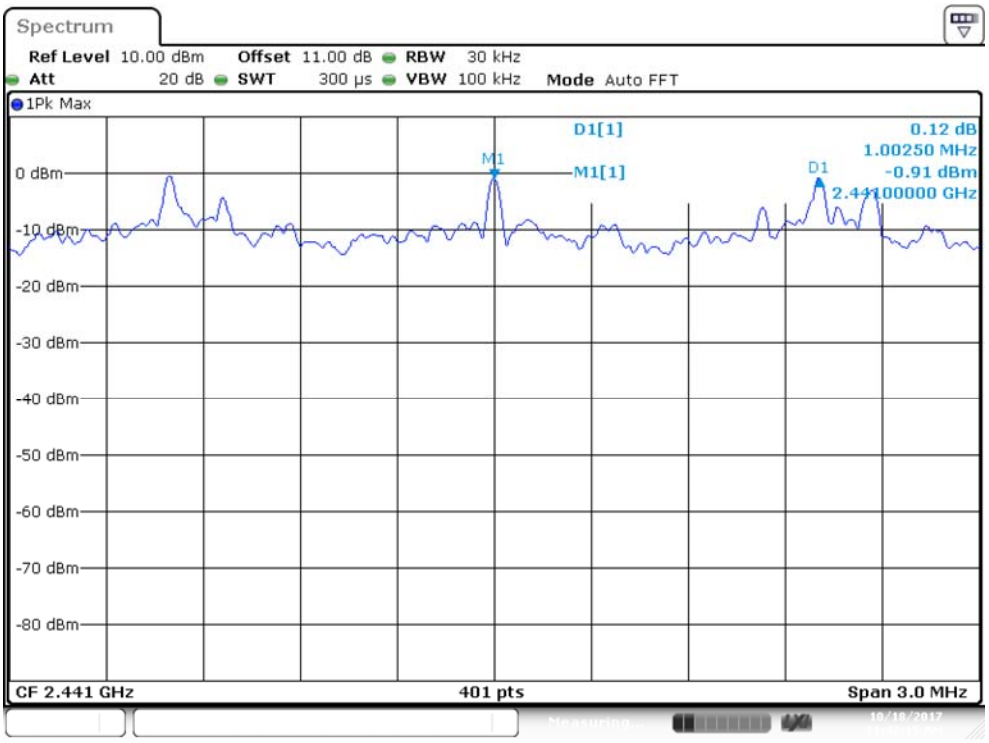
Channel	Frequency (MHz)	Frequency Separation (MHz)	(2/3 of 20dB BW) Limit (MHz)
00	2402	1.0025	0.829
39	2441	1.0025	0.829
78	2480	1.0025	0.836

Lowest Channel



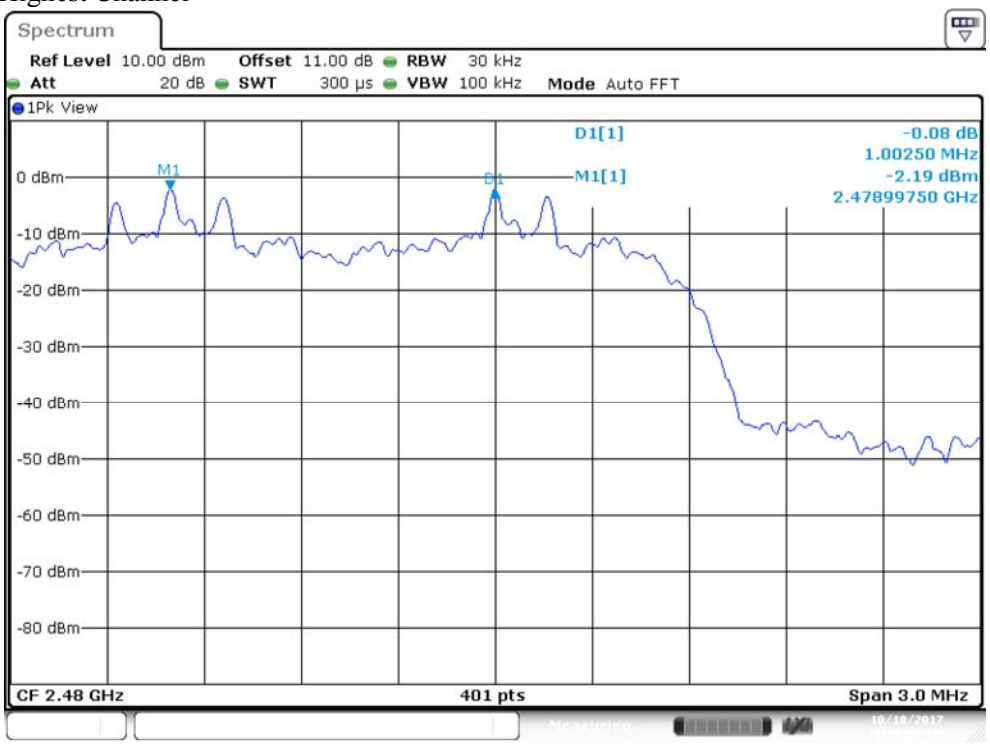
Date: 18.OCT.2017 11:41:04

Middle Channel



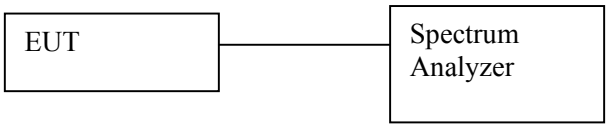
Date: 18.OCT.2017 11:42:16

Highest Channel



12. DWELL TIME OF EACH CHANNEL

12.1 TEST SETUP



12.2 TEST PROCEDURE

1.The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
2. The EUT should be transmitting at its maximum data rate as the worst cases.
3. The EUT must have its hopping function enabled. Use the following spectrum analyzer settings: Span = zero span, centered on a hopping channel; RBW = 1 MHz; VBW ¸ RBW; Sweep = as necessary to capture the entire dwell time per hopping channel; Detector function = peak; Trace = max hold.
4. Use the marker-delta function to calculate the dwell time.

12.3 LIMIT

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.

12.4 RESULT: PASS

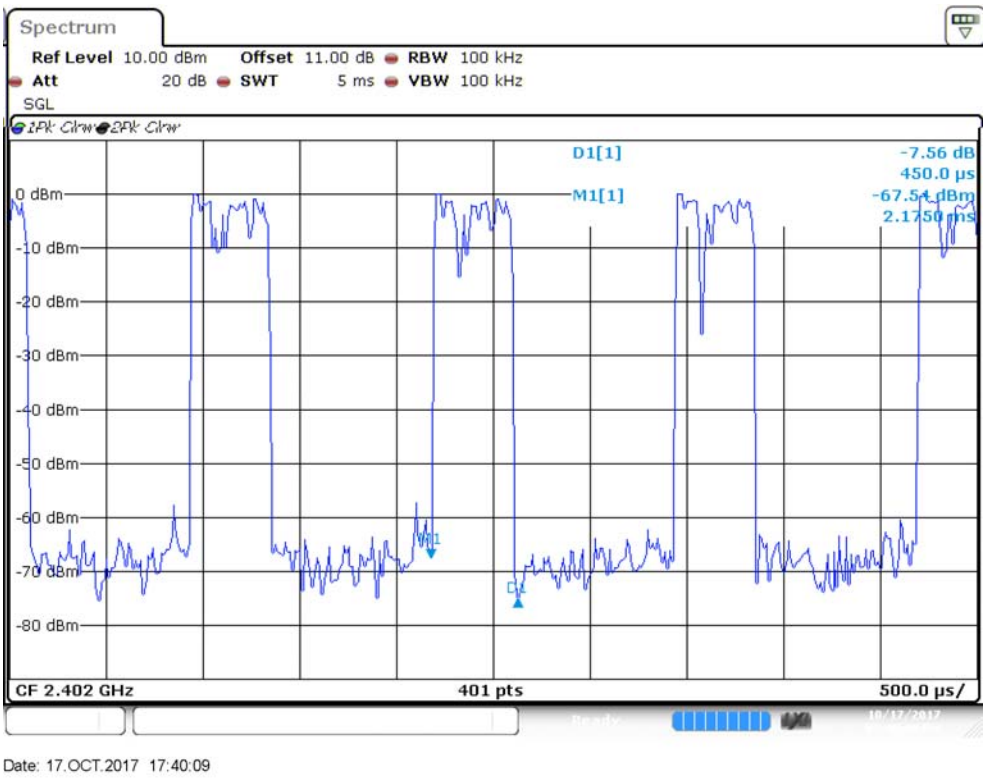
12.5 TEST DATA:

BDR 1M

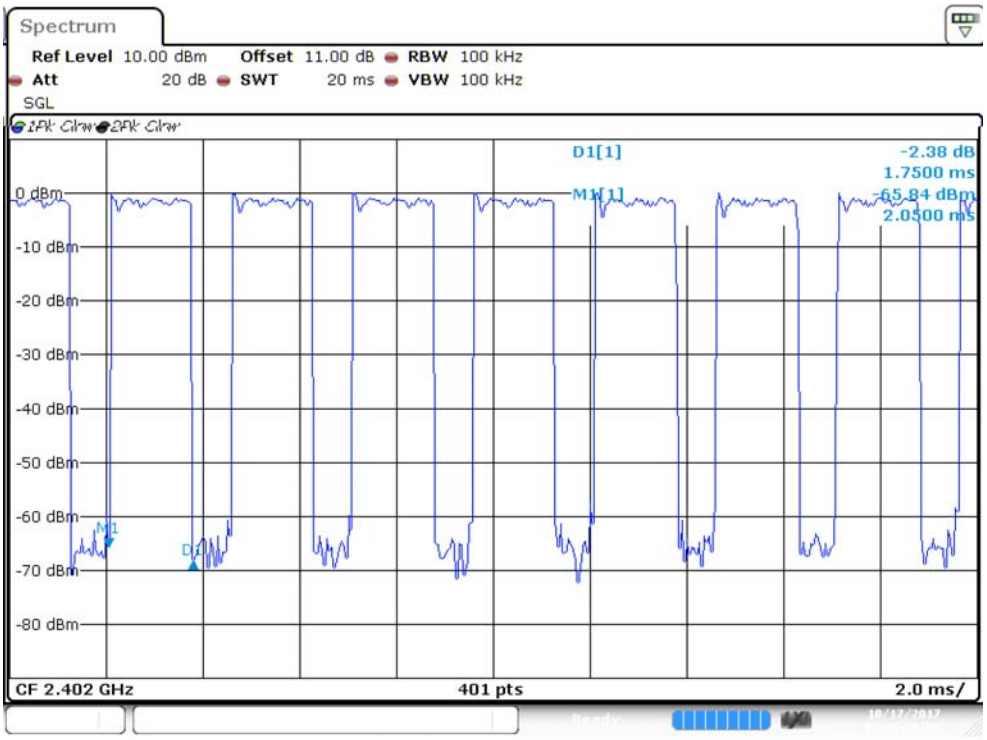
A period time = 0.4 (ms) * 79 = 31.6 (s)

CH Low	DH1 time slot	=	0.450 (ms)	*	(1600/2/79) * 31.6 =	144.00	(ms)
	DH3 time slot	=	1.750 (ms)	*	(1600/4/79) * 31.6 =	280.00	(ms)
	DH5 time slot	=	3.000 (ms)	*	(1600/6/79) * 31.6 =	320.00	(ms)
CH Mid	DH1 time slot	=	0.450 (ms)	*	(1600/2/79) * 31.6 =	144.00	(ms)
	DH3 time slot	=	1.900 (ms)	*	(1600/4/79) * 31.6 =	304.00	(ms)
	DH5 time slot	=	3.050 (ms)	*	(1600/6/79) * 31.6 =	325.33	(ms)
CH High	DH1 time slot	=	0.450 (ms)	*	(1600/2/79) * 31.6 =	144.00	(ms)
	DH3 time slot	=	1.850 (ms)	*	(1600/4/79) * 31.6 =	296.00	(ms)
	DH5 time slot	=	3.050 (ms)	*	(1600/6/79) * 31.6 =	325.33	(ms)

Lowest Channel
DH1

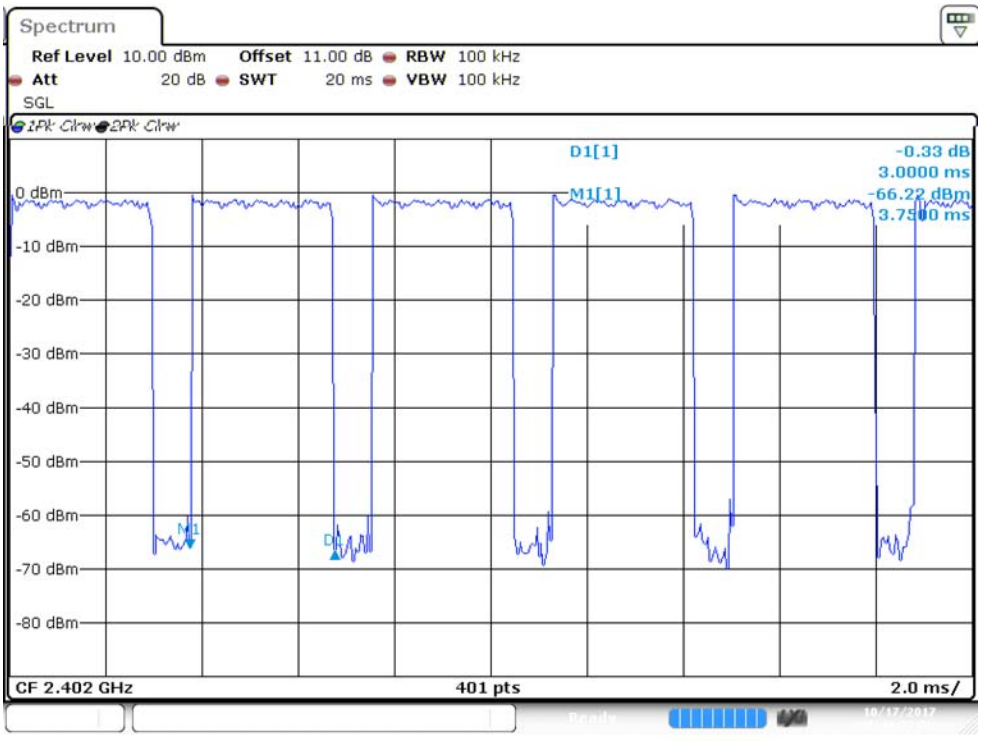


DH3



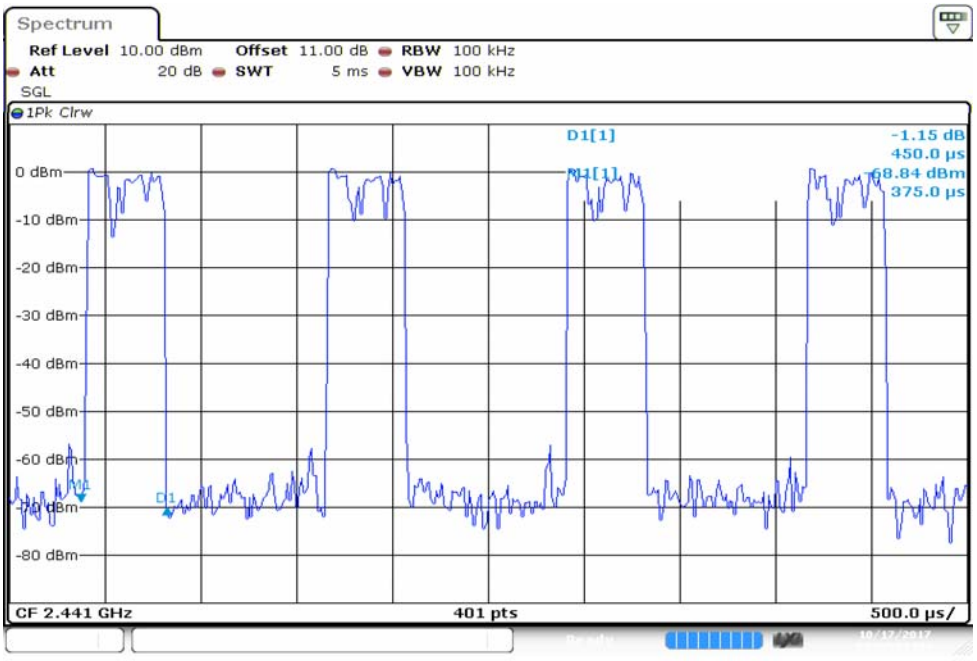
Date: 17.OCT.2017 17:41:31

DH5



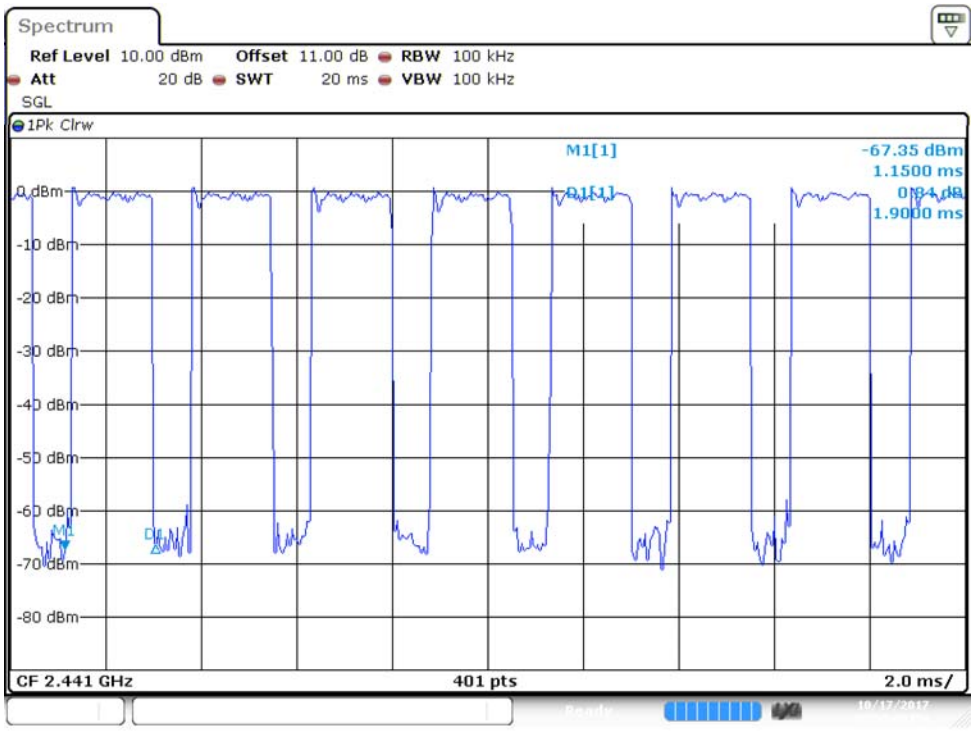
Date: 17.OCT.2017 17:42:38

Middle Channel
DH1



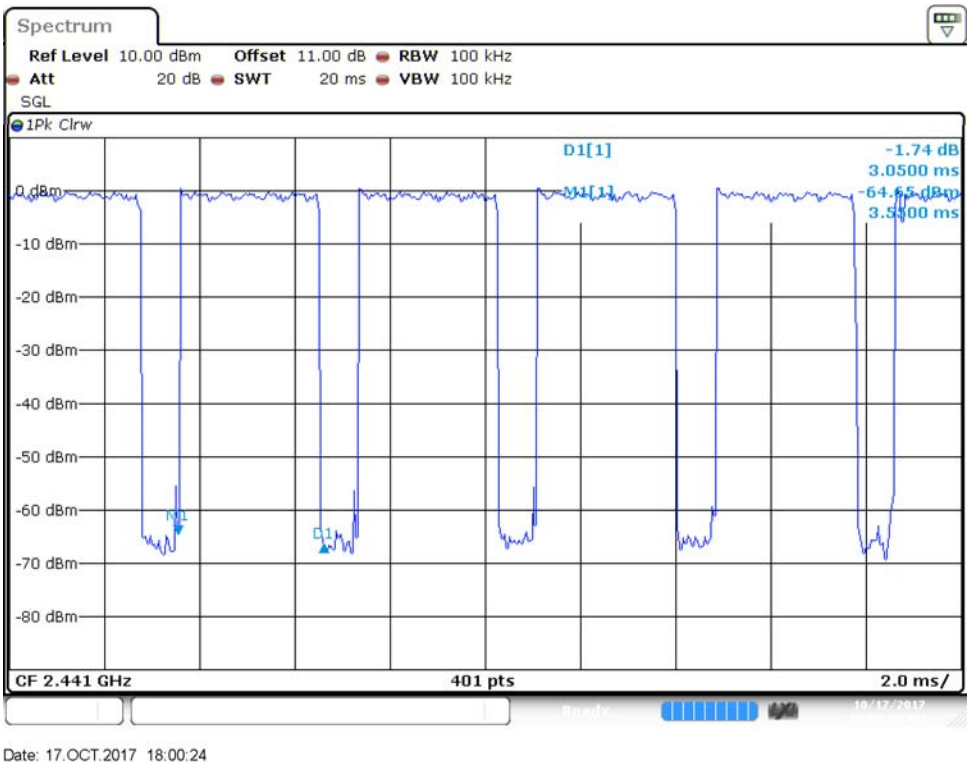
Date: 17.OCT.2017 17:57:33

DH3

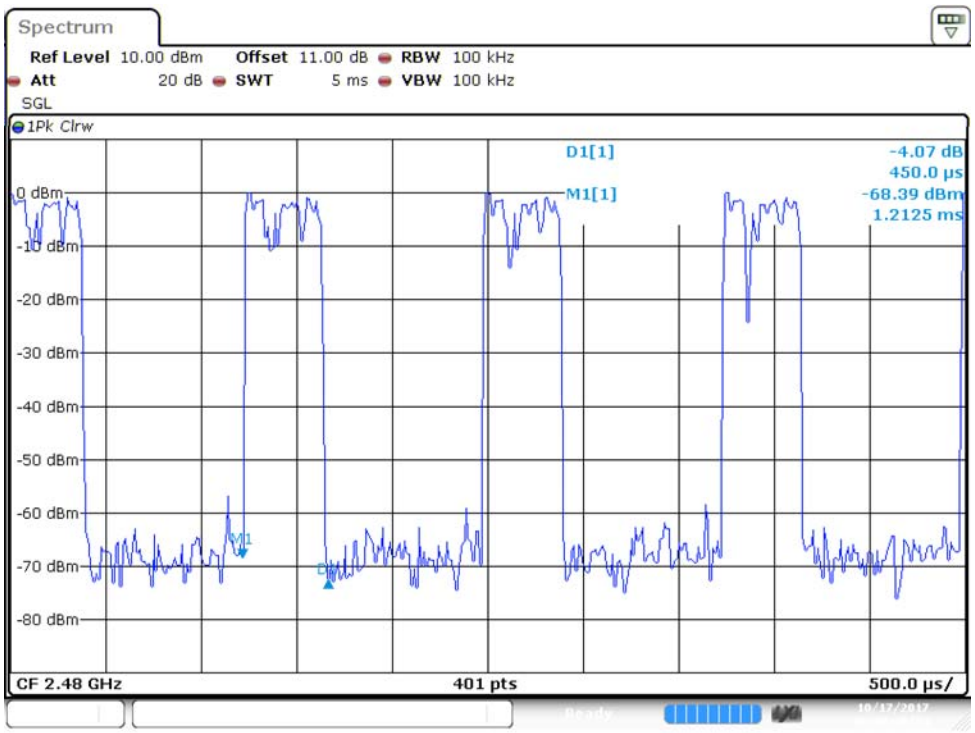


Date: 17.OCT.2017 17:58:46

DH5

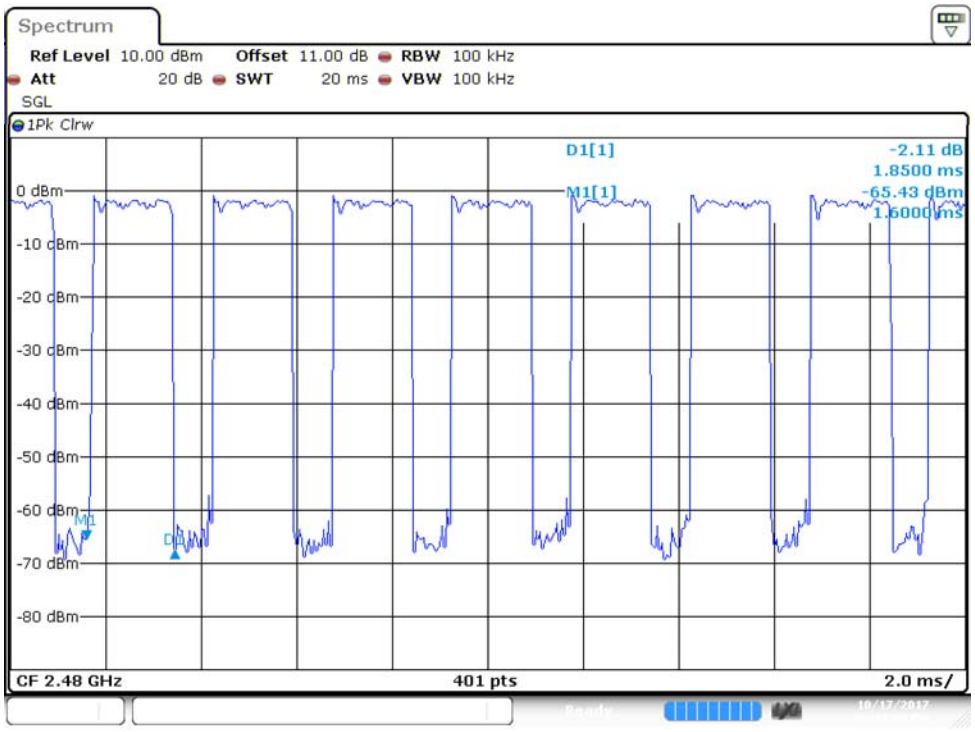


Highest Channel
DH1



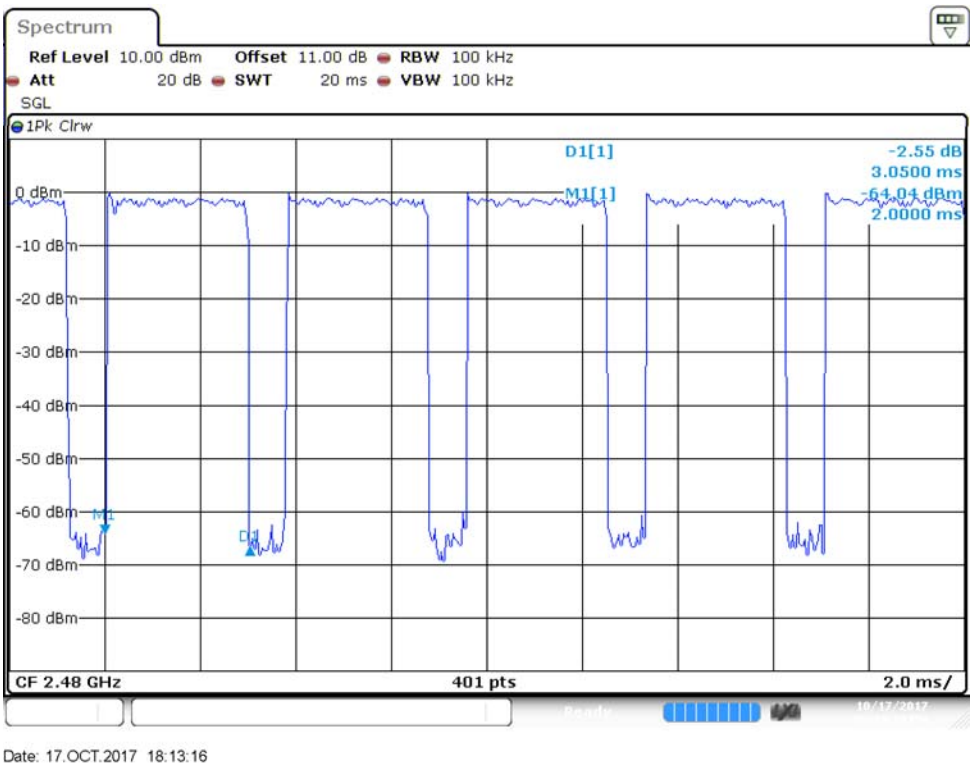
Date: 17.OCT.2017 18:10:40

DH3



Date: 17.OCT.2017 18:12:10

DH5



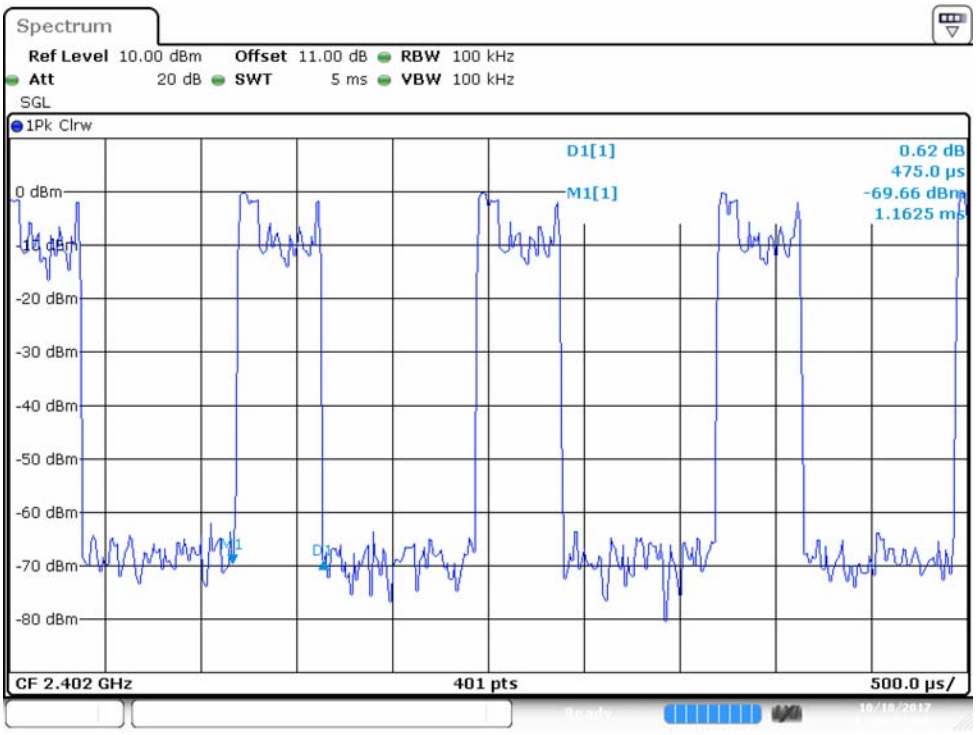
BDR 3M

A period time = 0.4 (ms) * 79 = 31.6 (s)

CH Low	DH1 time slot	=	0.475 (ms)	*	(1600/2/79) * 31.6 =	152.00	(ms)
	DH3 time slot	=	1.800 (ms)	*	(1600/4/79) * 31.6 =	288.00	(ms)
	DH5 time slot	=	3.100 (ms)	*	(1600/6/79) * 31.6 =	330.66	(ms)
CH Mid	DH1 time slot	=	0.487 (ms)	*	(1600/2/79) * 31.6 =	155.84	(ms)
	DH3 time slot	=	1.800 (ms)	*	(1600/4/79) * 31.6 =	288.00	(ms)
	DH5 time slot	=	3.050 (ms)	*	(1600/6/79) * 31.6 =	325.33	(ms)
CH High	DH1 time slot	=	0.475 (ms)	*	(1600/2/79) * 31.6 =	152.00	(ms)
	DH3 time slot	=	1.900 (ms)	*	(1600/4/79) * 31.6 =	304.00	(ms)
	DH5 time slot	=	3.100 (ms)	*	(1600/6/79) * 31.6 =	330.66	(ms)

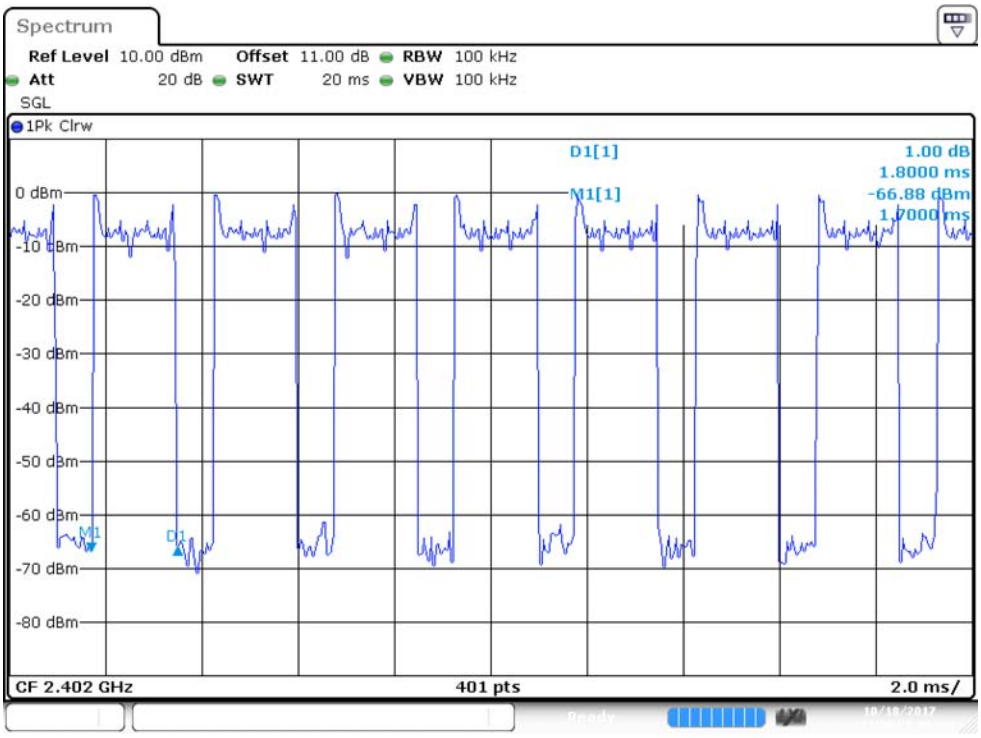
Lowest Channel

DH1



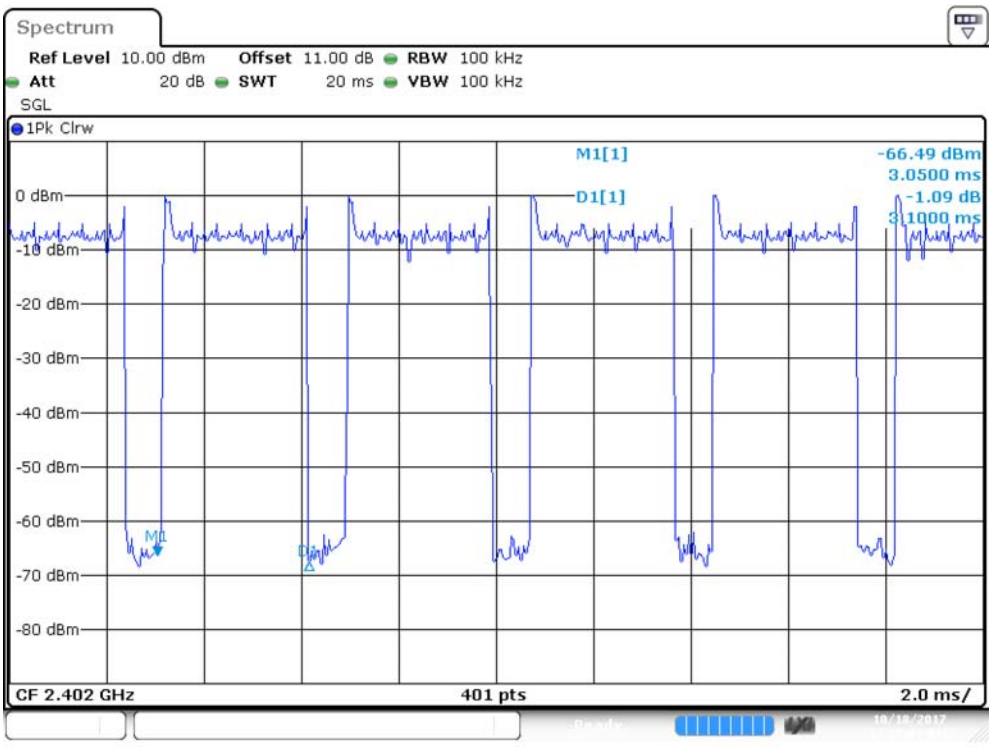
Date: 18.OCT.2017 11:33:53

DH3



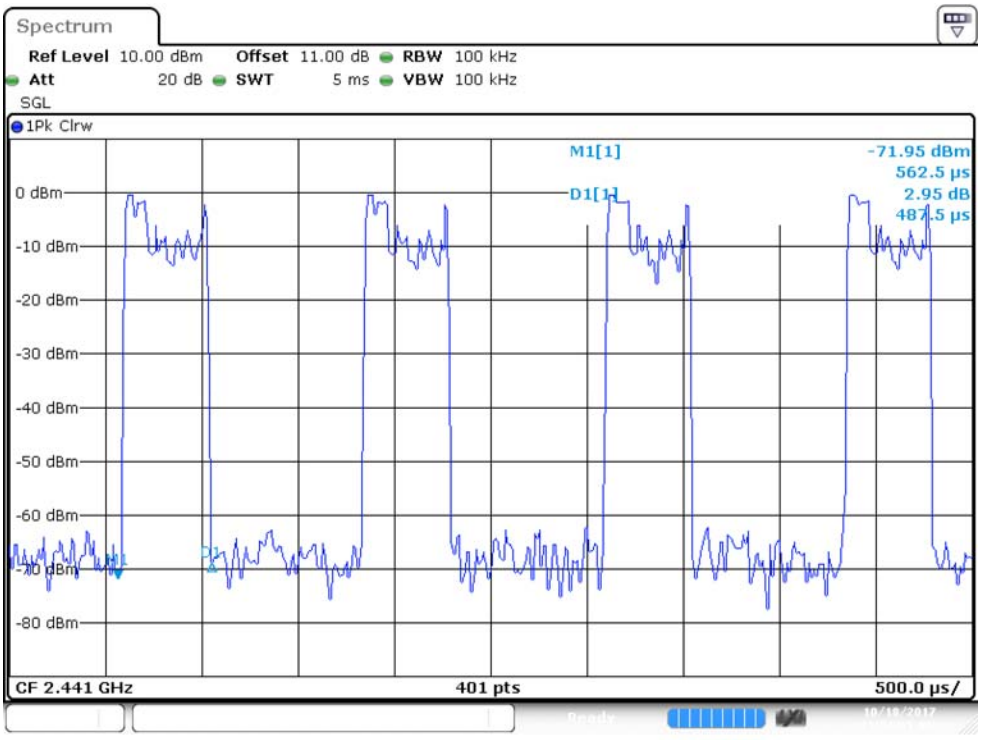
Date: 18.OCT.2017 11:36:29

DH5



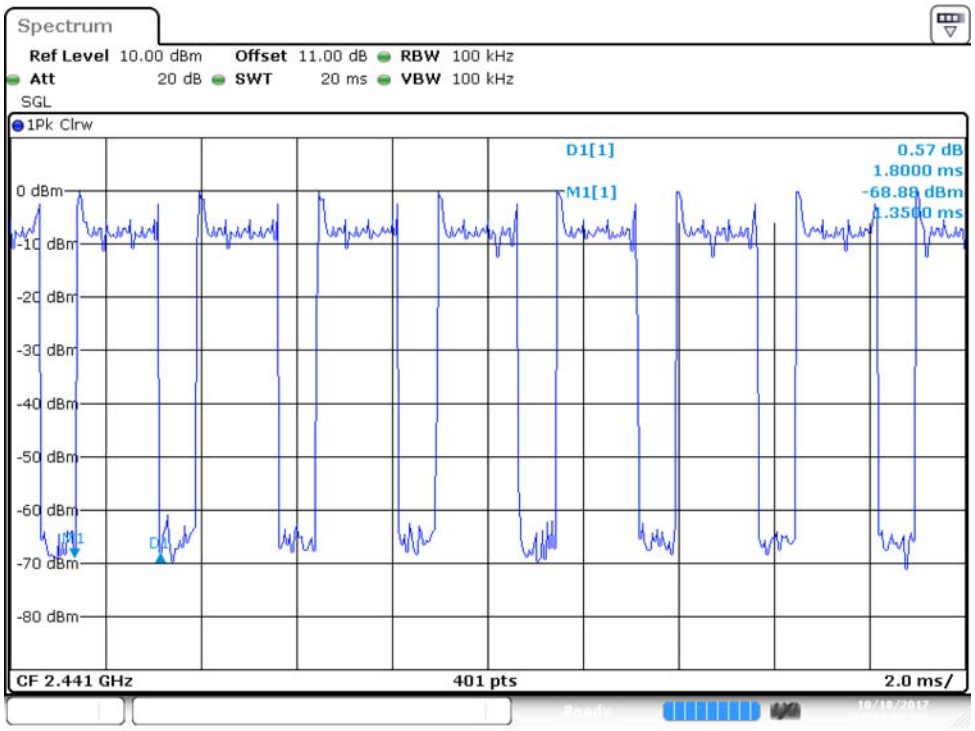
Date: 18.OCT.2017 11:23:25

Middle Channel
DH1



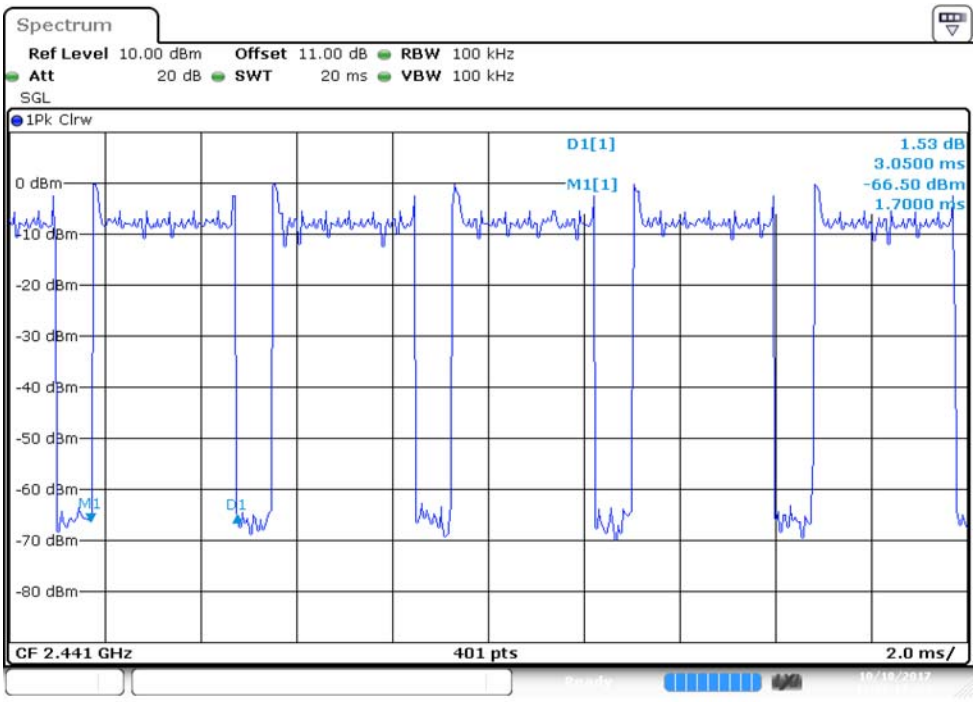
Date: 18.OCT.2017 11:34:42

DH3



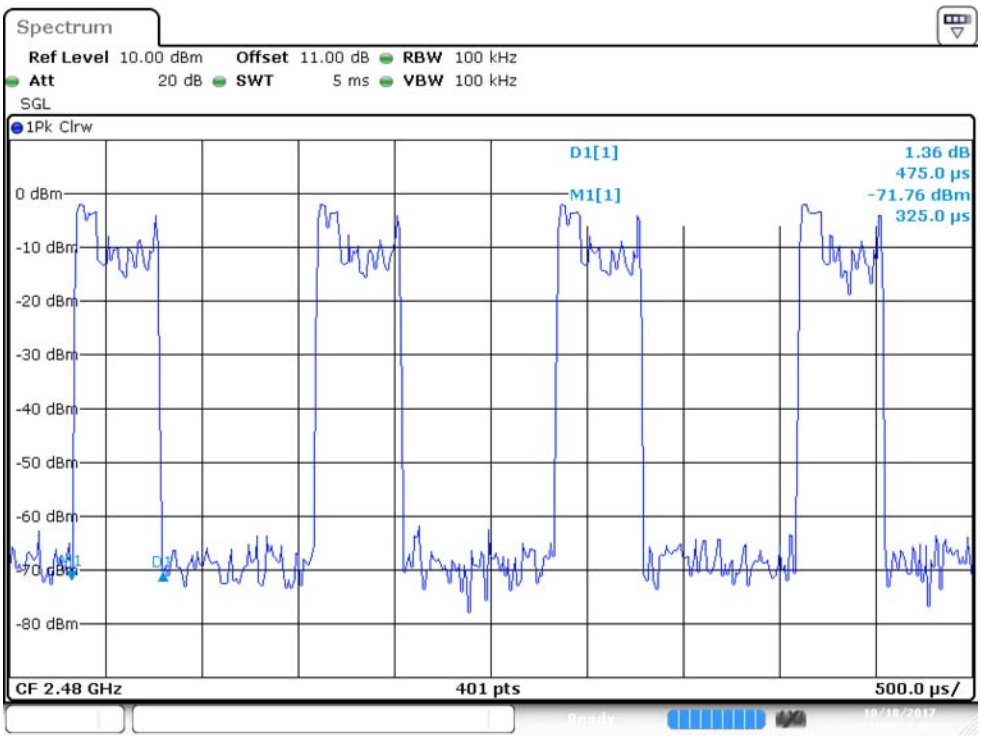
Date: 18.OCT.2017 11:37:08

DH5



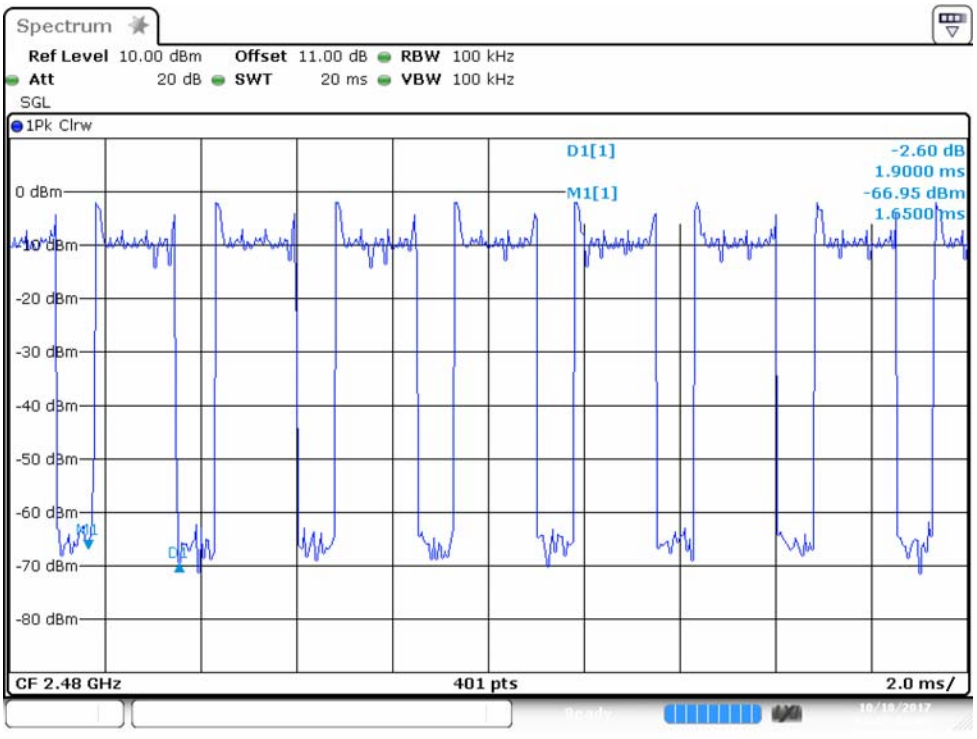
Date: 18.OCT.2017 11:26:17

Highest Channel
DH1



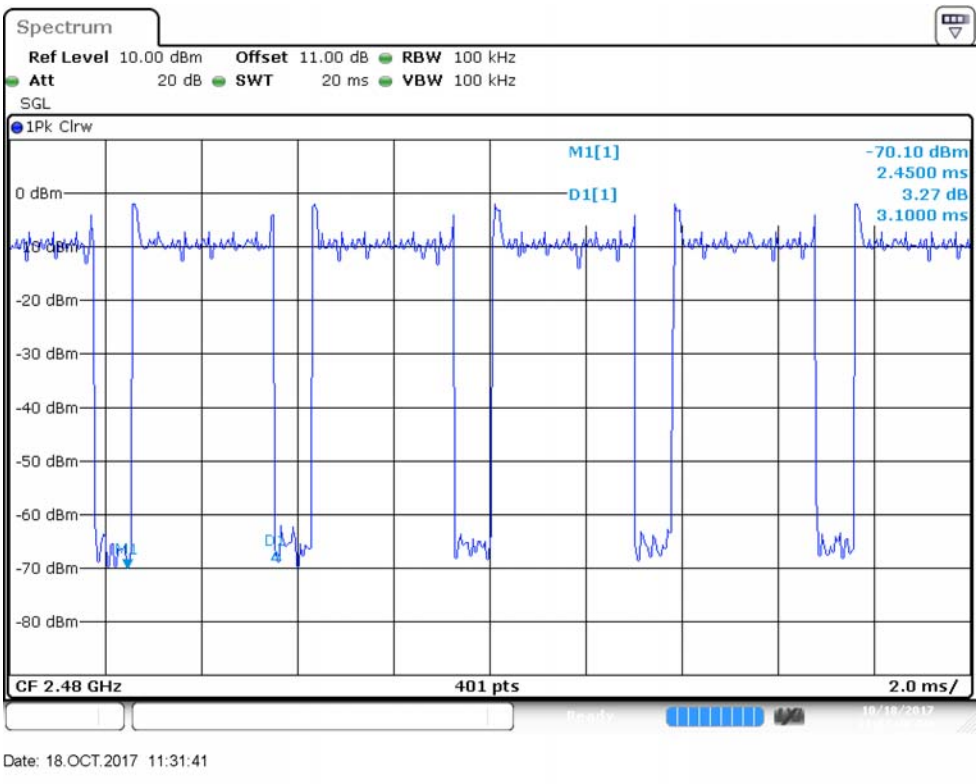
Date: 18.OCT.2017 11:35:21

DH3



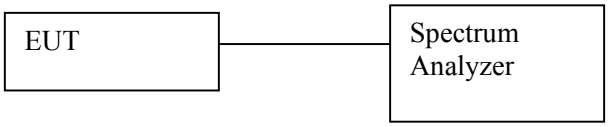
Date: 18.OCT.2017 11:37:44

DH5



13. NUMBER OF CHANNELS

13.1 TEST SETUP



13.2 TEST PROCEDURE

1. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
2. The modulation types of EUT are irrelevant to number of hopping channels deviation.
3. The EUT must have its hopping function enabled. Use the following spectrum analyzer settings: Span = the frequency band of operation; RBW . 1% of the span; VBW . RBW; Sweep = auto; Detector function = peak; Trace = max hold.
4. The number of hopping frequency used is defined as the device has the numbers of total channel.

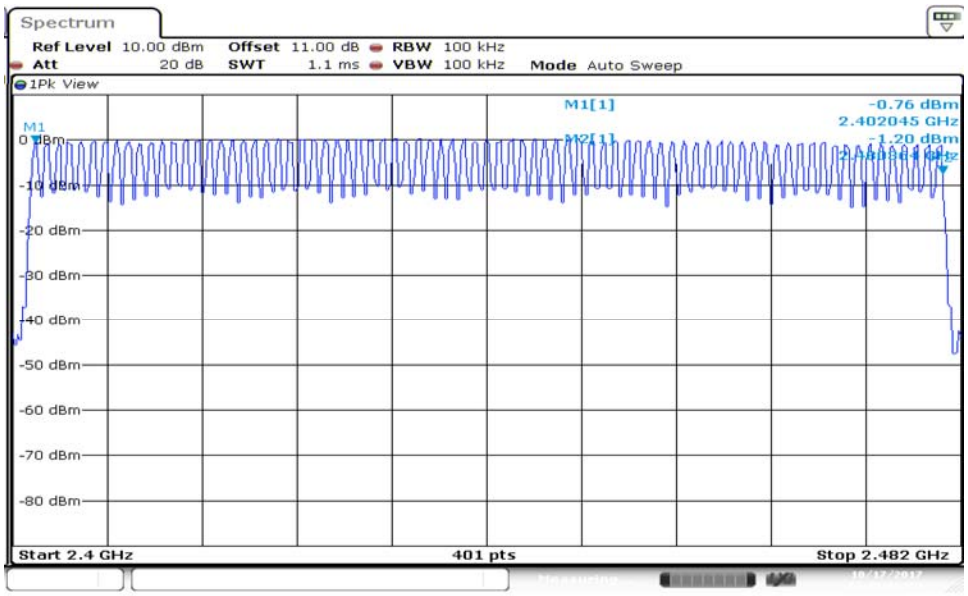
13.3 LIMIT

Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels

13.4 RESULT: PASS

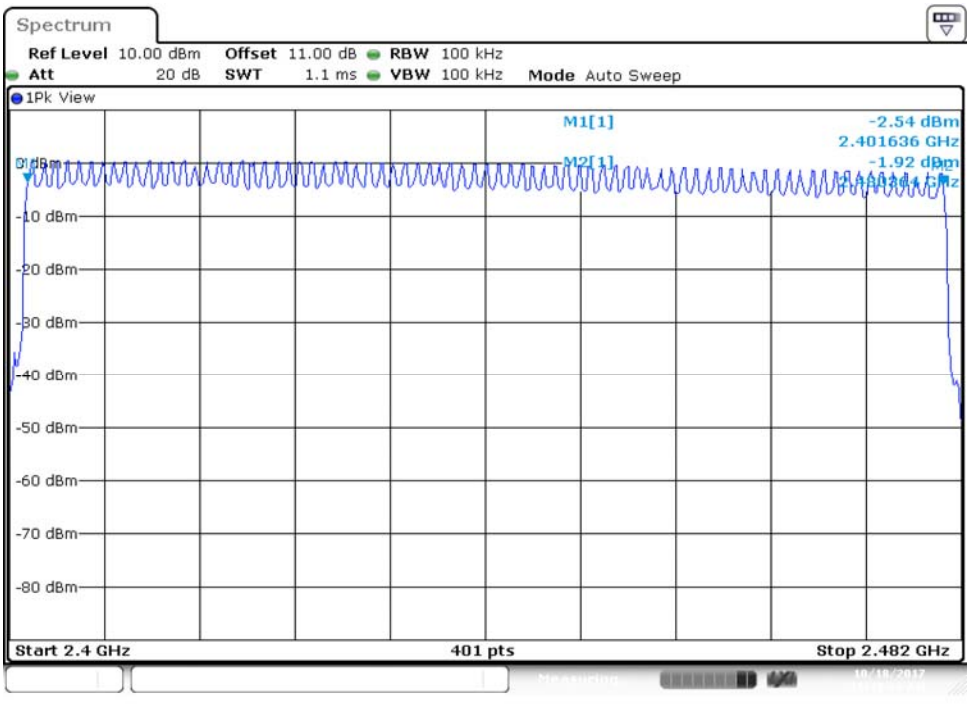
13.5 TEST DATA:

BDR 1M



Date: 17.OCT.2017 18:18:36

BDR 3M



Date: 18.OCT.2017 11:45:36

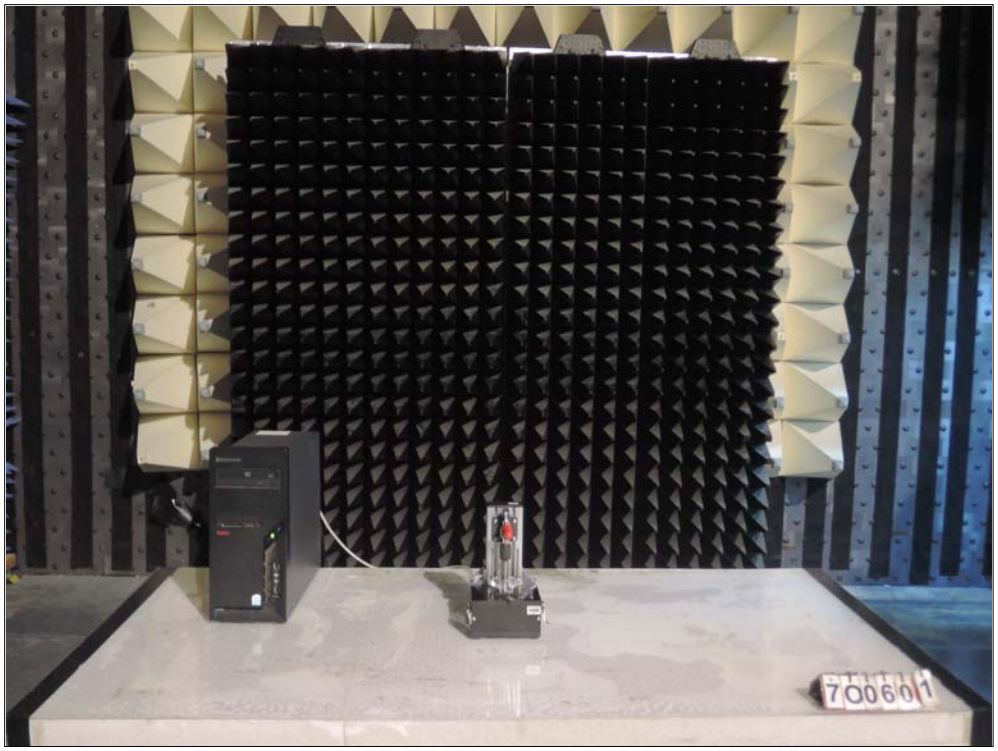
Appendix 1

PHOTOS OF TEST CONFIGURATION

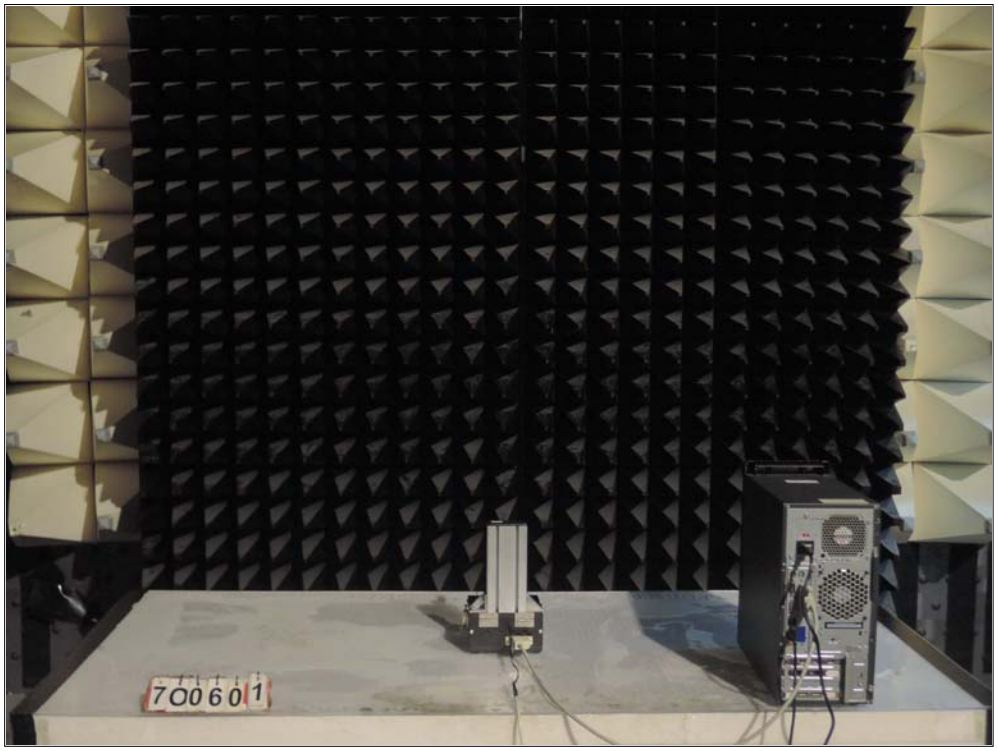
01 CE Front View

02 CE Rear View

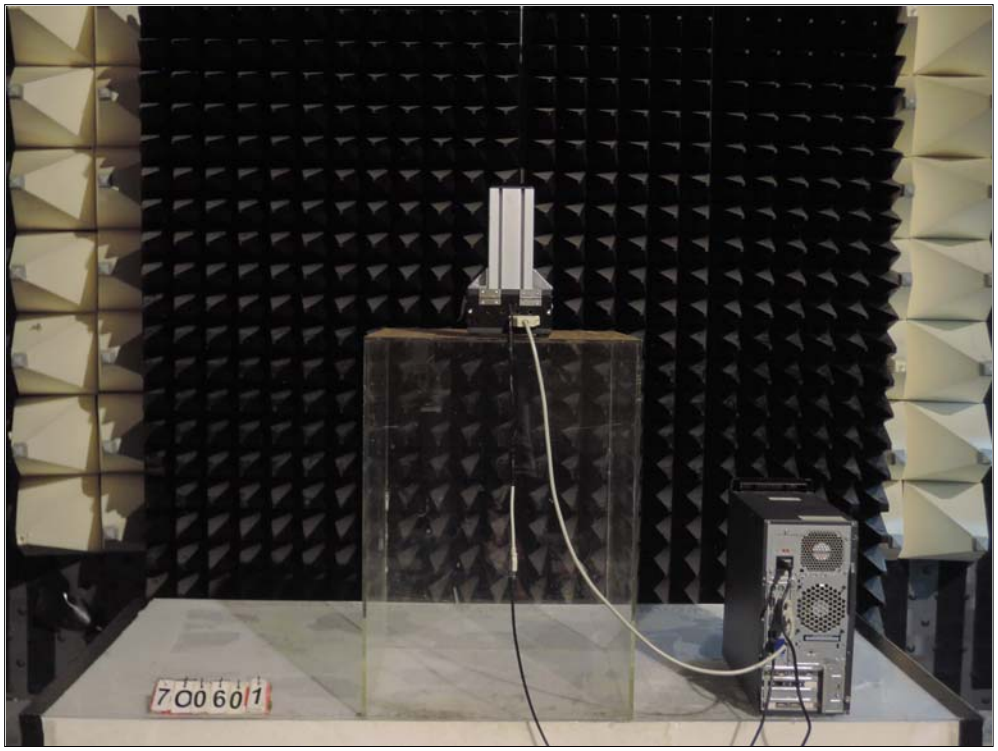
03 RE Front View (below 1GHz)



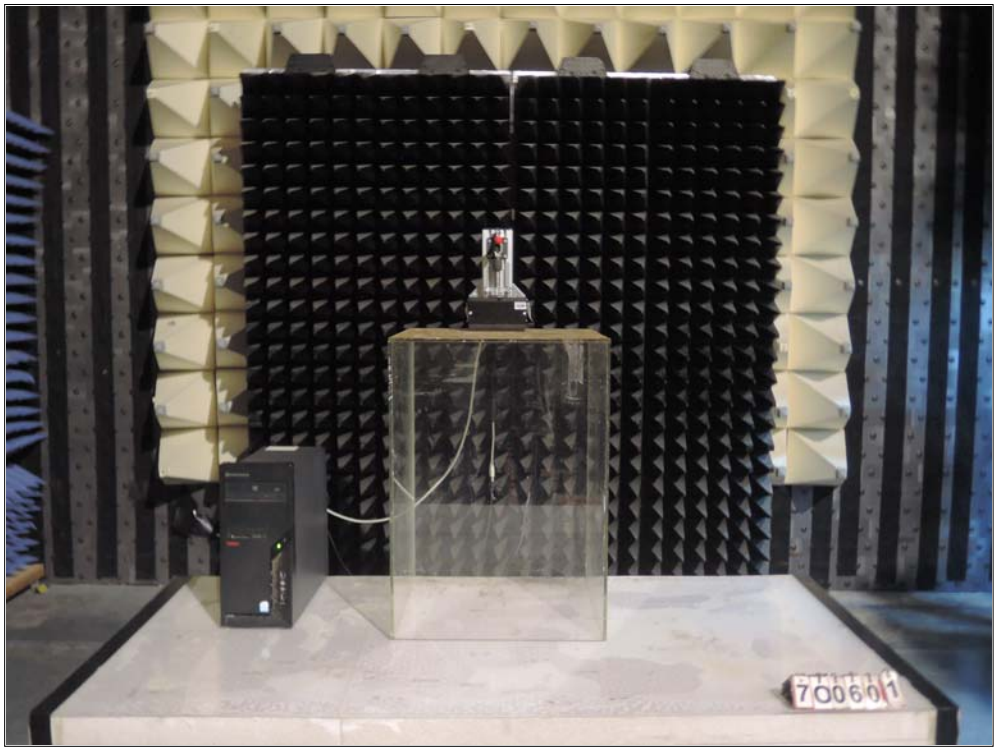
04 RE Rear View(below 1GHz)



05 RE Front View(Above 1Ghz)



06 RE Rear View(Above 1Ghz)



07 Conducted